

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

June 2005

Project Sponsors

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City of Austin
City of Buda
City of Kyle
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City of Sunset Valley
Village of Bee Cave
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Springs/Edwards
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Hays Trinity
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Conservation District
Blanco-Pedernales
Groundwater
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Final Report
Volume 1 of 2

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VOLUME I

**Regional Water Quality Protection Plan for the
Barton Springs Segment of the Edwards
Aquifer and Its Contributing Zone**

Project Sponsors

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Barton

***Springs/Edwards
Aquifer Conservation
District***

***Hays Trinity
Groundwater***

Conservation District

***Blanco-Pedernales
Groundwater***

Conservation District

Prepared by

NAISMITH ENGINEERING, INC.

In Association With

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Eco-Southwest Services

Good Company Associates

Hicks & Company

Kelly, Hart & Hallman, P.C.

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In addition to these grants, the following entities assisted by providing local support through either monetary contributions, in-kind services or both:

Public Entities

The City of Austin
Austin Community College
The Barton Springs/Edwards Aquifer Conservation District
The Village of Bee Cave
The Blanco-Pedernales Groundwater Conservation District
The City of Dripping Springs
Hays County
The Hays Trinity Groundwater Conservation District
The City of Kyle
The Lower Colorado River Authority
The City of Sunset Valley

Private Entities and Individuals

The Austin Waldorf School
Carpenter and Langford, P.C.
George Cofer
The Oak Hill United Methodist Church
John Orr
The Save Barton Creek Association
TechPeople, Inc.
Terri Buchanan, M.P.H.
The Urban Design Group
The Salt Lick Bar B-Q

Engineering Oversight of the Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

On March 28, 2005, the Texas Board of Professional Engineers (TBPE) issued for public comment a "Draft Policy Advisory Opinion" on the aspects of water quality planning that are subject to the Texas Engineering Practice Act (TEPA). Under Texas State Law, the TBPE is authorized to issue advisory opinions and interpretations of the TEPA. The "Draft Policy Advisory Opinion" was developed by the TBPE staff and, as of the date of this document, has not yet been ratified by the TBPE Board.

Based on this Draft Opinion, "Water Quality Planning Activities" that require professional engineers include the following:

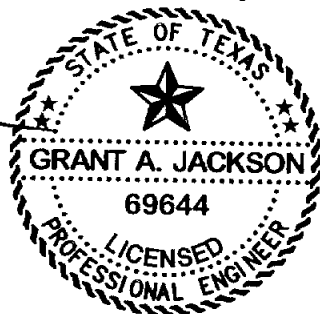
- Feasibility studies regarding engineered water quality control measures, treatment technologies and treatment plants.
- Siting of engineered water quality management measures.
- Monitoring and evaluation of engineered water quality measures for assessment or adjustment of functional processes.
- Specification of engineered water treatment technologies.

In addition to these specific tasks, Texas licensed engineers are required to prepare the specifications, designs and perform construction monitoring of public works projects not exempted by the Act. Licensed professional engineers are required to perform the design of the listed activities for private works not exempted by the Act.

Based on this draft advisory opinion, certain elements of this Plan involve the "monitoring and evaluation of engineered water quality measures for assessment or adjustment of functional processes" and may also include the "specification of engineered water treatment technologies", to the degree that certain minimum design requirements for water quality best management practices have been included in the Plan. This Plan does not involve feasibility studies for specific measures or the siting of specific measures. I certify that the elements of this Plan determined by the TBPE under this draft advisory opinion to constitute the practice of engineering have been performed under my direct supervision.



Grant A. Jackson, P.E.
Texas License No. 69644
June 20, 2005



"Good water quality is one of the things that contributes most to the health of the citizens of a city. There is nothing of more interest to magistrates than maintaining the healthfulness of the water that serves both men and animals and preventing accidents that can cause the water to become polluted, whether in springs, rivers, and streams where it flows or in places where diverted water is stored, or in the wells used as sources."

(De Jussieu, Histoire de l'Academie royale des sciences [History of the Royal Academy of Science], 1733, p.331. From The Public Fountains of the City of Dijon by Henry Darcy, translated by Patricia Bobeck, Kendall/Hunt Publishing Co., 2004.)

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PREFACE BY THE STAKEHOLDER COMMITTEE

The Stakeholders urge you to adopt the protections outlined in the plan. Failure to act is the greatest threat to both water quality and the economic viability of the region.

The Stakeholder Committee gratefully acknowledges the leadership of the Executive and Core Committees in initiating this pioneering regional water quality planning process. The long-standing public interest in preserving water quality in this area of Texas, coupled with unprecedented population growth, will require continued leadership as we move toward meaningful regional water quality protections.

The Executive and Core Committees challenged those most interested in the process and outcome of any such plan--ordinary citizens with a broad spectrum of interests and backgrounds--to form a stakeholder committee and take a leadership role in the plan's development. By guiding a professional consulting firm and acting on advice from nationally recognized experts, the stakeholders negotiated the key provisions of the plan. The Stakeholder Committee submits this Final Report in fulfillment of its charge.

The stated goal of the plan is to maintain or enhance the existing water quality of the groundwater and surface water within the study area. This goal is premised on the belief that water quality is vital to every person, and that protection of water quality is an individual as well as governmental responsibility. The Stakeholder Committee sought to balance responsible water quality regulation with economic interests.

Based on the best available science and engineering data specific to this area, this report is the culmination of months of education, analysis, collaboration, compromise and ultimately consensus on fundamental issues. Perhaps most fundamental is the decision to allow no increase in pollution under the plan. We believe that the protections offered by the plan will withstand exhaustive scrutiny. Indeed, we encourage all interested persons and organizations to review the entire report.

We believe that this Final Report, when implemented on a regional basis, will achieve the critical goal of preserving the most valuable assets of this region--the pristine waters and the natural physical features from which they flow. Preservation of these unique resources will enhance the future economic interests of the region. We believe that implementation of this plan will be met with broad public support.

The Stakeholders urge you to adopt the protections outlined in the plan. Failure to act is the greatest threat to both water quality and the economic viability of the region.

EXECUTIVE SUMMARY

BACKGROUND

Rapid growth and development in northern Hays County and southwest Travis County have created community concerns with the increasing potential for pollution of groundwater and surface waters. A regional summit was convened to begin discussions on the impacts that development was having on the region and particularly to water quality in the Barton Springs Zone of the Edwards Aquifer. As a result of these discussions, a Regional Group was established, made up of representatives from the Cities of Dripping Springs, Austin, Buda, Kyle, Rollingwood, Sunset Valley, the Village of Bee Cave, Blanco, Hays and Travis Counties, the Barton Springs/Edwards Aquifer Conservation District, the Hays Trinity Groundwater Conservation District, and the Blanco-Pedernales Groundwater Conservation District. This Regional Group set out to develop a regional water quality protection plan to implement local water quality protection measures. This “Regional Water Quality Protection Plan”, or simply the “Plan” is the result of that effort.

From the outset of the Project, the development of the Plan was guided by the participation of various stakeholders. A Stakeholder Committee (SHC) was established to coordinate this input. The input obtained at the meetings as well as written comments submitted by members of the Stakeholder Committee and the Technical Review Group (TRG) were evaluated by the consulting team with many of the comments serving as the basis for subsequent revisions of the various project documents.

The “Planning Region” is defined as the recharge zone for the Barton Springs segment of the Edwards Aquifer and its contributing zone. Located in the Texas Hill Country, one of the states’ most unique natural areas, the Planning Region covers portions of northern Hays County, southwest Travis County and a small section of eastern Blanco County. It includes all or a portion of the Cities of Austin, Buda, Dripping Springs, Hays City, Kyle, Mountain City, Rollingwood, Sunset Valley, West Lake Hills and the Villages of Bee Cave, Bear Creek, Lakeway and portions of the Barton Springs/Edwards Aquifer, the Hays Trinity and the Blanco-Pedernales Groundwater Conservation Districts.

Estimates of historical population growth trends for the Planning Region were developed based on U.S. census data. The Planning Region experienced a combined annual growth rate of 3.6% between 1990 and 2000, while the Hays County portion experienced a higher growth rate (5.2%) than tracts within the Travis County portion (3.3%). Future projections indicate that the Planning Region could experience a combined annual growth rate of 1.9% between 2000 and 2060, with the total population within the Planning Region growing from an estimated 122,954 in 2000 to an estimated 385,594 in 2060. This corresponds to an increase of approximately 101,000 households by 2060, or approximately 1,680 households per year.

GUIDING PRINCIPLES

The Stakeholder Committee developed a set of guiding principles to provide direction and a steady reference point as the plan progressed. These guiding principles are presented below.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

1. *The economy and environment of this unique part of Texas depend upon the preservation, conservation and management of dependable supplies of clean water. We all recognize the unacceptable consequences that would result if we take no action to protect our water.*
2. *Both private individuals and the Public have a responsibility to respect the legitimate interests of others and to do no harm in their activities.*
3. *Those who benefit from an activity must bear the responsibility for the costs and impacts of that activity.*
4. *We will favor measures which, all else being equal, minimize the risk of failure or of damage to the watershed.*
5. *The water quality protection measures we recommend will strive to balance Government regulations with appropriate economic incentives.*
6. *The regulatory measures we recommend shall be accompanied by strategies for administration and enforcement that provide as much certainty as possible while discouraging exemptions and exceptions.*
7. *We will make all our decisions being mindful of the economic impact of the measures recommended and strive to achieve a fair and reasonable balance among the various interests.*
8. *We will not permit any party or group in this process to have undue or unfair control over the outcome.*

GOALS AND OBJECTIVES

The Stakeholder Committee goals statement.

“Develop an implement-able Regional Water Quality Management Plan that preserves and protects resources and manages activities within the planning region so that existing and future land use, land management, and development activities maintain or enhance the existing water quality of the groundwater and surface water within both the Barton Springs segment of the Edwards Aquifer and the contributing portion of the watersheds within the Planning Region, for the benefit of people and the environment.”

To achieve this goal, the following objectives were identified:

- Objective 1 – Define “Water Quality”
- Objective 2 – Identify Causes of Water Quality Problems
- Objective 3 – Identify Standards to Protect Water Quality
- Objective 4 – Identify Who Can Act to Protect Water Quality
- Objective 5 – Identify Protection Measures that are Already in Place
- Objective 6 – Identify New Measures Needed
- Objective 7 – Develop a Strategy for Action

WHAT DOES THE REGIONAL PLAN PROTECT?

The Regional Plan is intended to protect “Water Quality”, including both surface water and groundwater. “Surface water” includes all forms of water on the surfaces of the earth, including that flowing or stored in above or below ground watercourses or storage features. “Groundwater” is water flowing or stored in the voids of natural earthen material below ground level. Groundwater is found in the voids of many natural earthen materials, often called media. While groundwater is found in all types of earthen media, it is most frequently encountered in useable quantities in sand, gravel and porous rock. Surface water becomes groundwater when it infiltrates into the earthen media through a process called “recharge”. The location where this recharge occurs is referred to as the “recharge zone”. The earthen media containing groundwater is often referred to as an “aquifer”. When groundwater discharges to the land surface, for example at a “spring”, the groundwater once again becomes surface water.

There are several defined streams and watersheds within the planning region, generally proceeding from north to south:

- Little Barton Creek
- Barton Creek
- Bee Creek
- Little Bee Creek
- Eanes Creek
- Williamson Creek
- Slaughter Creek
- Bear Creek
- Little Bear Creek
- Onion Creek

Six (6) of these streams (Barton, Williamson, Slaughter, Bear, Little Bear, and Onion) cross the Recharge Zone on their lower reaches and are responsible for a approximately eighty five percent (85%) of the surface recharge to the Barton Springs Zone.

There are numerous springs in and around the Planning Region. The most famous of these springs are the Barton Springs. A few hundred feet upstream of its confluence with the Colorado River, Barton Creek is dammed to capture spring flows at the Edwards Aquifer primary discharge point; the Barton Springs. The captured spring flows create a popular swimming facility known as the Barton Springs Pool.

The Edwards Aquifer Recharge Zone is the outcrop of the geologic unit known as the Edwards Group. The Edwards Group consists of complex carbonate formations with characteristic karst features, formed by solution of limestone by water. The Edwards Aquifer is an important sole source aquifer relied on extensively in Central Texas as a water supply source. The Contributing Zone for the Edwards Aquifer in Hays and Travis Counties is the outcrop of the Glen Rose Formation, which also serves as the recharge zone for the Trinity aquifer group. The Trinity Aquifer group is an important groundwater supply, which extends from Uvalde County in South Texas to Montague County along the Red River in North Texas.

Another aspect of the Planning Region is the existence of Critical Environmental Features (CEFs), which are geological, topographical, physiographical, or hydrological components of the landscape that serve to remediate the quality of water for human use as well as use by terrestrial and aquatic biological resources including endangered species. CEFs consist of four general categories:

- Category 1: Limestone recharge features

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

- Category 2: Streams and associated streambeds
- Category 3: Floodplains and Wetlands
- Category 4: Edwards Aquifer discharge areas

Categories 1-3 are geographically located within generally finite boundaries, and can function to substantially affect water quality. Therefore, protection of these features is the first line of defense in protecting Category 4 features. The Plan recommends protecting Category 1, 2 and 4 features with dedicated offsets. Category 3 features have been incorporated into the protections for streams.

While there are several threatened and/or endangered species that inhabit the Planning Region, the most prominent is the Barton Springs salamander. The Barton Springs salamander (*Eurycea sosorum*) has been listed as endangered by the U.S. Fish and Wildlife Service (USFWS) and the State of Texas. In response to the federal listing and the recognized threats to the Barton Springs salamander, the USFWS has taken several measures to protect the species. Individuals and entities that comply with these measures will be in compliance with the requirements of the Endangered Species Act.

EXISTING WATER QUALITY REGULATORY PROGRAMS

There are many existing water quality regulatory programs. Although there are numerous specific water quality regulatory programs at both the federal and state level, the major programs pertaining to the Planning Region include:

- TCEQ Edwards Aquifer Protection Program
- TCEQ Texas Pollutant Discharge Elimination System (TPDES) regulations, including point source wastewater discharges, and storm water discharges from industrial sites, construction sites, and certain municipal systems.
- The TCEQ On-Site Sewage Facility (OSSF) Program.
- The Federal Endangered Species Program
- The Railroad Commission of Texas' Oil and Gas Environmental Program.
- The TCEQ's Municipal Solid Waste Program.
- The TCEQ's Petroleum Storage Tank Program
- The TCEQ's Industrial and Hazardous Waste Program
- The Texas State Soil and Water Conservation Board (TSSWCB) Agricultural and Silvicultural Water Quality Management Program
- The Federal Spill Prevention, Control and Countermeasure (SPCC) Program
- The Federal Superfund Program
- The Federal Toxic Substances Control Program
- The National Wetlands Program
- The National Floodplain Program

There are also a number of existing regulatory programs at the local level specifically intended to protect water quality, both inside and outside the Planning Region. The Cities of Austin, Buda and Dripping Springs and the Village of Bee Caves have water quality protection ordinances. The LCRA also has existing water quality protection ordinances applicable to portions of Travis County. A summary presentation of these programs is included in Appendix I. There are several local jurisdictions in the general area, but outside the Planning Region that have existing water quality

regulatory programs and similar hydrogeology. Water quality ordinances from the Cities of New Braunfels, San Antonio and San Marcos have also been included in Appendix I for comparison purposes.

WATER QUALITY PARAMETERS AND MONITORING

In general, “water quality parameters” are defined as physical, chemical or biological constituents in water or other indicators used to assess, monitor and control water quality. While the scope of this Plan prevents a complete listing of all the parameters utilized by all the current water quality regulatory programs, several general categories of water quality parameters have been identified for use in the plan. These include:

- Solids
- Dissolved Oxygen/Oxygen-demanding Substances
- Nutrients (primarily nitrogen and phosphorus)
- Pathogens
- Petroleum Hydrocarbons
- Metals
- Synthetic Organic Compounds
- Major Ions
- Physical Parameters, including temperature and pH

In addition, a significant amount of historical monitoring has been conducted in the Planning Region by a variety of entities. A coordinated data collection, monitoring and evaluation system is recommended as a part of this Plan.

Water quality data used for planning and design should be evaluated and treated differently than data used for monitoring and evaluation. Water quality parameters used for planning and design have been selected to be representative of the major broad issues, while an expanded list of parameters is recommended for monitoring and evaluation purposes. The following water quality parameters have been identified for use in planning and design:

- Suspended Solids/Sediment
- Total Dissolved Solids
- Suspended biological constituents/oxygen depleting constituents

An on-going water quality monitoring and evaluation process will be an integral part of implementing the water quality protection measures from this Plan. This monitoring program should encompass a variety of water quality parameters and should include all surface watersheds, and representative groundwater wells within the Planning Region.

WATER QUALITY THREATS

Based on the goals and objectives established for the Plan, there are many potential water quality threats and many different types of pollutants that may affect water quality. Many of these threats or pollutants result in some way from human activity. The major threats identified by the consultant team and Stakeholder Committee are presented below.

- **Urbanization** can threaten water quality by removing natural vegetation, increasing erosion and sedimentation, and by increasing impervious cover, resulting in increased storm water runoff rates and volumes, decreased recharge, and decreased base flow in streams. Urbanization also increases human activity, resulting in additional pollutant loadings, the generation of more wastes, and an increased use of potentially harmful materials.
- **Long-Term Groundwater Withdrawal Exceeding Recharge** results in “outflows” exceeding “inflows” within an aquifer. Over time, this net decrease could deplete the aquifer. Modeling conducted by the Barton Springs Edwards Aquifer Conservation District concluded that with current pumping rates and a recurrence of the drought of record, water levels in the aquifer could decrease to the point where the Barton Springs would go dry, saline water could intrude into the fresh water zone, and some existing domestic supply wells could go dry.
- **Point source discharges** result from a limited number of activities, but account for a majority of the non-storm water flows. Almost all point source discharges result from the treatment of either domestic wastewater or from industrial/commercial process wastewater, with major threat being the excessive discharge of biological constituents and nutrients.
- **Storm Water/Non-Point Source Pollution** - NPS pollution occurs as a result of rainfall events. When human activities or natural processes result in pollutants being present at or near the land surface, these pollutants can be taken up by storm water runoff and can result in NPS pollution. Several specific threats from storm water NPS pollution include: construction site storm water discharges, discharges from industrial activities and from urbanized areas.
- **Domestic Wastewater Collection, Treatment and Discharge** - the major threats arise from biological constituents and nutrients through unintended discharges, inadequate treatment, or the improper design and application of treated wastewater effluent.
- **Lack of Water Quality Protection Measures on Existing Development** poses a threat to water quality in the Planning Region, in much the same way that Urbanization does.
- **Failure to Implement/Enforce Existing Regulations** presents a significant threat to water quality from construction site storm water controls, sanitary sewer overflows, on-site, decentralized sewage facilities, and structural best management practices (BMPs) and storm water control systems.
- **Use, Storage and Disposal of Harmful Materials** can threaten water quality through the improper management of hazardous materials, wastes, pesticides and nutrients.
- **Improper Vegetative Management** threatens water quality through excessive erosion/sedimentation and through excessive nutrients and biological constituent loadings.
- **Improper Agricultural Practices** also adversely impact water quality through excessive erosion/sedimentation and excessive nutrients.

STRATEGY FOR SELECTION OF WATERSHED MANAGEMENT AND WATER QUALITY PROTECTION MEASURES

As outlined in the Goals Statement developed by the Stakeholder Committee, the ultimate goal of the water quality protection measures presented in this Plan is to maintain or enhance the existing water quality, including both surface water and groundwater. To accomplish this objective, the strategy has been to select measures that facilitate no net increase in anticipated pollutant loadings

for individual sites or developments. This strategy will require site specific calculation of pre- and post-development conditions, along with a technical demonstration that the objective can be met.

While the Planning Region has been designated based on the Edwards Aquifer recharge zone and contributing zone, the water quality protection measures presented in this Plan will also protect other water resources. These measures will protect surface water and groundwater in the Planning Region, including groundwater in the Trinity aquifer group. These measures will maintain and enhance water quality wherever they are applied.

The measures presented and discussed included both “structural” and “non-structural” measures, or “Best Management Practices” (BMPs). Structural BMPs are generally engineered and constructed systems, while non-structural BMPs are generally institutional and pollution prevention practices. The approach outlined in this Plan is a combination of structural and non-structural BMPs, with a preference for non-structural. However, non-structural BMPs alone will not always be sufficient. If development activities are to meet the Plan Objectives, they will typically require both structural and non-structural controls.

There are several aspects unique to the Planning Region that require any water quality protection measures considered to be tailored to address these unique aspects. This is particularly true of structural BMPs and their tendency to concentrate water quality pollutants in the vicinity of the structural control. For example, to prevent localized excessive pollutant loadings to groundwater recharge, it may be necessary to place a recharge barrier underneath some BMPs. Where these unique aspects are important to the description of a measure, they have been explicitly addressed.

As outlined above, only a portion of the previously monitored water quality parameters have been selected for use in planning and design of new development. The parameters selected for use during planning and design were based on the availability of a relatively extensive database of monitoring data for these parameters and their relationship to a variety of activities. Certain selected parameters (e.g. total dissolved solids) are intended to be representative of other parameters (e.g. dissolved inorganic toxic compounds) that are transmitted in essentially the same way. Their use in planning and design is not intended to replace water quality monitoring.

There are other water quality threats posed by parameters which have not been selected for use in planning and design of new development. The general approach used to address these other parameters is through the use of non-structural measures, including use restrictions and public education. These non-structural measures allow a wider range of parameters to be addressed than those traditionally addressed in current water quality protection programs.

DESCRIPTION OF WATERSHED MANAGEMENT AND WATER QUALITY PROTECTION MEASURES

A wide variety of different water quality protection measures were considered and evaluated during this process, and are presented in the general order of the level of water quality protection provided.

Natural Area and Open Space Conservation

During the initial identification of issues by the stakeholders early in the process, the concept of natural area/open space conservation consistently ranked among the most important objectives for the Plan. The purpose of this measure is to restrict the land in that space from further development. This can be accomplished through conservation easements of land acquired for habitat protection.

Transferable Development Rights

This concept would allow development rights to be transferred from one property to another, while ensuring that the net effect complied with the water quality protection measures presented in the Plan. The intended outcome of this concept is to direct higher intensity development either outside the Planning Region or into preferred growth areas

Comprehensive Site Planning and Pre-Development Review

To ensure that the water quality protection measures are incorporated into the site design, a comprehensive site plan should be prepared, including:

- A thorough site characterization
- A presentation of design details for the technical elements of the site plan
- A technical demonstration that the site design meets the water quality protection objectives of this Plan
- An operations, maintenance, monitoring and funding plan to ensure the long term function of the water quality protection measures for the site.

Location of Development

It was determined that the location of development activities can have significant impacts on water quality, and the concept of streams offsets/buffer zones, and offsets from CEFs were incorporated to address these impacts. The following stream buffer zones would be required:

Table ES-1 - Required Buffer Zone Widths (from Stream Centerline)

Stream Contributing Area (Acres)	Width/Offset (feet, each side of centerline)	Total width (feet)
32 to 120	100	200
120 to 300	150	300
300 to 640	200	400
Greater than 640	300	600

Some localized modification of these buffer zones would be allowed to address site specific conditions. The following offsets from CEFs would be required:

Table ES-2 - Required Offset Distances for Critical Environmental Features

Type of Feature	Upstream Offset (feet)	Downstream Offset (feet)
Point recharge feature (direct communication with aquifer)	Upper catchment divide or 300, not less than 150	150
Indirect feature (no direct communication with aquifer)	150	150

Intensity of Development

Several scientific studies have identified a direct relationship between the intensity of development (impervious cover) and water quality. In general terms, as development intensity increases, water quality impacts also increase. A number of relevant water quality studies have been conducted in and around the Planning Region. In general, these studies indicate that significant water quality impacts begin to occur at between five and eighteen percent (5-18%) impervious cover. These impacts occur in storm runoff, stream characteristics, recharge and replenishment of base flow in streams. Based on the evaluations of the scientific studies presented, the consulting team determined that the approximate quantity of impervious cover which can occur while remaining protective of water quality in the Planning Region is in the range of ten to fifteen percent (10% to 15%), on a gross site area basis.

Due to the established correlation between increasing impervious cover and decreases in water quality, the concept of limiting impervious cover would be one measure to help achieve the goals and objectives of the Plan. The following tables summarize the recommended impervious cover limitations recommended by the consulting team and the stakeholders. Detailed explanatory notes for each table are included in the Plan.

Table ES-3 - Required Impervious Cover Limits, in Percent (%) – Consulting Team Recommendation

Location	Simplified Methods	Standard Methods	Standard Methods + TDRs
Recharge Zone	5	10	15
Contributing Zone, outside “preferred growth areas” (PGAs)	7.5	15	25
Contributing Zone, Single Family Residential inside PGAs	7.5	15	30
Contributing Zone, Commercial and Multi-family Residential inside PGAs	7.5	25	45 or No Limit ¹

¹ The “No Limit” option requires that building roof runoff be captured through rainwater harvesting with fourteen (14) days storage capacity, used for landscape irrigation.

Table ES-4 - Required Impervious Cover Limits, in Percent (%) – Range of Stakeholder Recommendations

Location	Simplified	Standard Methods	Standard Methods + TDRs
Recharge Zone	3 to 5	5 to 15	10 to 25
Contributing Zone, outside “preferred growth areas” (PGAs)	5 to 10	10 to 25 + TDRs	15 to 30
Contributing Zone, Single Family Residential inside PGAs	5 to 20	10 to 30 + TDRs	20 to 30
Contributing Zone, Commercial and Multi-family Residential inside PGAs	5 to 20	20 to 40 + TDRs	30 to No Limit

Control of Hydrologic Regime

Scientific studies have established that increases in the rate and volume of storm water runoff generally have an adverse impact on water quality in natural streams. To address adverse impacts, measures are recommended to control the rate and volume of storm water runoff. For site designs that provide for discharge of surface water, adequate retention/detention should be incorporated into the site design to limit flows into the receiving stream consistent with the volume from the two (2) year, three (3) hour duration rainfall, evenly distributed over a twenty four (24) hour period. In addition to limiting the rate of discharge, prior to discharge into the buffer zone, all concentrated flows should be properly distributed to provide for sheet flow through the buffer zone into the stream channel. Drainage structures providing discharge routes for flood flows should be sized to maintain flood flow velocities below erosive levels, up to the twenty five (25) year, three (3) hour duration. All discharge points from ponds or other accumulation areas must provide for energy dissipation prior to exiting the site, in order to minimize erosion.

Structural BMPs for Discharges from Developed Land

As indicated previously, structural BMP’s should be utilized in conjunction with the other water quality protection measures presented in this Plan, to minimize the localized impacts of development. However, the removal effectiveness of most structural BMPs varies significantly, and in some instances, BMPs operating in sequence together, or “treatment trains,” are required to achieve specific performance goals. Structural BMPs are also less effective at removing dissolved constituents than at removing suspended constituents. Due to the uncertainty and variability, certain design considerations and safety factors have been incorporated. The BMPs recommended for use in the Planning Region are broken down into two (2) categories: primary and secondary. The primary BMPs, working alone within their documented operating range, should meet the objective of “no net increase” of pollutants, and include retention/irrigation, bio-retention, and created wetlands. The secondary BMPs presented may not meet the objectives working alone, but may be useful working in conjunction with other measures. Secondary BMPs include:

- Infiltration Systems

- Detention/Sedimentation Systems
- Sand Filtration Systems
- Vegetative Filter Strips
- Vegetated Swales

Specific requirements for operations and maintenance of BMPs are also included.

Local Enforcement of Construction Site Controls

Because the failure to use the appropriate controls for storm water discharges from construction sites poses a significant threat to water quality, local jurisdictions should request delegation of the TCEQ's Edwards Aquifer Protection Program and the TPDES Storm Water Construction Site program, or take other steps to enforce these requirements locally. Another mechanism for ensuring local enforcement of construction site storm water controls is by requiring that they be submitted and reviewed by the local jurisdiction in conjunction with the development review process. The local jurisdiction should require the following items in conjunction with a construction site storm water control plan:

- A demonstration that the estimated sediment capturing capacity of each type of control measures is capable of handling the expected sediment loading rate
- A demonstration that control measures for concentrated flow are suitable for the quantity and rate of flow expected

The review of these items should be incorporated into the development review and construction plan approval process, and will require appropriate technical expertise on behalf of the reviewing entity. The inspection of storm water controls should also be incorporated into other inspection activities.

Wastewater Management

While the improper management of wastewater can pose a significant threat to water quality, the proper management of wastewater can be of great benefit in maintaining and enhancing water quality. The following specific measures are recommended:

- Increased inspection frequency for centralized wastewater collection systems
- Providing secondary treatment of wastewater
- Limitations on the characteristics of the receiving site for wastewater effluent land application
- Controlling the hydraulic loading rate of wastewater effluent land application
- Additional design and inspection requirements for OSSFs
- Requiring an operations, maintenance and funding plan

Alternative Water Sources/Uses and Conservation

Rainwater harvesting and water conservation are included as recommended strategies for improving water quality. Rainwater harvesting has also been incorporated into the strategy to allow increased development density in certain situations.

Characteristics of Development and Land Use

There are varying potential threats to water quality that depend on the specific characteristics of the development. These threats need to be addressed through a number of water quality protection measures unique to the type of development occurring, and through various land use restrictions, related to existing state law.

Restrictions on Use, Storage and Disposal of Potentially Harmful Materials

Restrictions on the use, storage and disposal of potentially harmful materials help address the threats posed by these substances to water quality. These restrictions include:

- Limitations on the concentrated storage of hazardous materials
- Response requirements to transportation incidents
- The use of certain petroleum products (e.g. "Coal tar" sealants)
- Proper Management of wastes
- Proper use and application of pesticides and nutrients

Proper Vegetative Management

Good vegetative ground cover slows and filters surface sediment from storm runoff, prevents erosion, and improves infiltration of water into the soil. Requirements have been included for the restoration of natural vegetation following land disturbance, and recommendations have been included for restoring/improving existing vegetation to improve water quality.

Proper Agricultural Practices

Proper livestock/range and cropland practices have been included to to minimize adverse water quality impacts from improper agricultural practices.

Protection of Endangered and Threatened Species

Scientific evidence supports the conclusion that water quality impacts can adversely affect the Barton Springs Salamander and other endangered species. The types of endangered species protective measures outlined under existing federal programs have been incorporated into the Plan.

Public Education/Outreach

Public education and outreach is a major factor in the success of many water quality protection measures. Through public education, people gain an understanding of how their actions can affect water quality and become more informed about water quality issues in their community. Public education, awareness and acceptance are crucial for the political and financial sustainability of water quality protection measures implemented by local governments. Public Education is also the primary driver for the voluntary implementation of water quality protection measures. Specific public education recommendations include:

- Developing awareness and support for the Regional Plan,
- Public Education/Outreach for Homeowners
- Education/Outreach for Commercial Activities
- Outreach Programs to Minority and Disadvantaged Communities and Children
- Public Outreach Programs for New Development
- Public Assistance with Problem Identification and Enforcement
- Public Education Outreach Avenues

IMPLEMENTATION, ENFORCEMENT AND ACCOUNTABILITY

Existing Entities

There are a number of different types of governmental and quasi-governmental entities that have existing legal authority for implementing certain parts of the Plan. The following types of existing entities are described in the Plan, along with an explanation of their powers and limitations.

- Texas Commission on Environmental Quality
- Home Rule Municipalities
- General Law Municipalities
- Counties
- Special Purpose Districts
- Groundwater Conservation Districts
- Public Improvement Districts
- Authorities

There are several areas of overlapping jurisdiction between existing entities within the Planning Region, including between municipalities and counties, and between special districts and other governmental jurisdictions. A detailed explanation of these overlapping jurisdictions are provided in the Plan.

The following table lists the municipalities and counties within the planning area, the estimated area within their municipal boundaries, areas within the Extra Territorial Jurisdiction (ETJ) of municipalities, and unincorporated areas of the counties outside the incorporated boundaries and ETJs.

Table ES-5 – Approximate Areas Under the Jurisdiction of Local Entities Within the Planning Region²

LOCAL ENTITY	Area (Ac.)	% of study area
City of Austin (Incorporated)	22,384	9.26
City of Austin (Limited Purpose ETJ)	5,470	2.26
City of Austin (2 mile ETJ)	23,587	9.76
City of Austin (5 mile ETJ)	17,836	7.38
Village of Bear Creek (Incorporated)	739	0.31
Village of Bee Cave (Incorporated)	1,200	0.50
Village of Bee Cave (1 mile ETJ)	5,582	2.31
City of Buda (Incorporated)	91	0.04
City of Buda (ETJ)	1,338	0.55
City of Dripping Springs (Incorporated)	2,536	1.05
City of Dripping Springs (ETJ)	69,335	28.68
City of Hays (Incorporated)	2,539	1.05
City of Kyle (ETJ) [Estimated]	100	0.04
Village of Lakeway (Incorporated)	140	0.06
Village of Lakeway (ETJ)	3	0.00
Mountain City (Incorporated)	157	0.07
Mountain City (0.5 mile ETJ)	840	0.35
City of Rollingwood (Incorporated)	441	0.18
City of Sunset Valley (Incorporated)	154	0.06
City of Sunset Valley (0.5 mile ETJ)	724	0.30
City of West Lake Hills (Incorporated)	763	0.32
SUB-TOTAL	155,960	64.51
Blanco County (Unincorporated outside ETJs)	3,304	1.37
Hays County (Unincorporated outside ETJs)	73,540	30.42
Travis County (Unincorporated outside ETJs)	8,952	3.70
SUB-TOTAL	85,796	35.49
TOTAL	241,756	100.00

Recommended Implementation Strategy

The successful implementation of this Plan will depend on a number of factors, including: the type of growth and development that local governments want to encourage, the adoption of water quality ordinances and orders that will complement platting and subdivision regulation, effective operations and maintenance of facilities and educating the public on the importance of managing their activities to minimize the potential for adversely impacting water quality. The implementation recommendations presented in the plan are both long term and short term. The

² Base data taken from "Northern Hays and Southwestern Travis Counties, Water Supply System Project Environmental Impact Study", BIO-WEST, Inc. and LCRA, June 2002. Data supplemented with information provided directly by local entities.

short term recommendations have been developed to rely solely on local jurisdictions involved in the planning process, working strictly within their existing legal authority. Due to the time required and the uncertainty in outcome, the establishment of a single implementing entity has been incorporated as an alternative, long term objective.

As shown in the previous section, the Planning Region consists of portions of twelve municipalities and three counties with a combined area of approximately 240,000 acres. The unincorporated area of Hays County accounts for 30.4% of the Planning Region, while the City of Dripping Springs and its ETJ accounts for 29.7%; the City of Austin accounts for 28.7%, the unincorporated area of Travis County accounts for 3.7%, and the Village of Bee Cave and its ETJ accounts for 2.8%. These five entities have over 95% of the Planning Region within their jurisdictional boundaries.

Since a small number of the local governments control the vast majority of the Planning Region, the initial (short-term) implementation strategies have been developed focusing on municipalities and counties. Other types of entities, whose establishment is within the powers of existing local jurisdictions, can be utilized to supplement this implementation. Additional long-term alternatives have been suggested by the Stakeholder Committee and are presented in subsequent sections.

Implementation Mechanisms for All Jurisdictions

The following specific measures are recommended for all public entities:

- Incorporating the recommended water quality protection measures into existing design Criteria
- Establishing or modifying their pre-development review process to incorporate these measures
- Modifying their construction inspections to include water quality protection measures
- Incorporating Water Quality Protection Measures into Public Projects
- Requesting delegation from TCEQ for local enforcement of the Edwards Aquifer Protection Program, TPDES construction site storm water permit program, and the OSSF program, or taking other steps to enforce these requirements locally
- Using development agreements to encourage compliance with and not circumvent the water quality protection measures
- Requiring financial assurance and long-term funding for operations and maintenance of water quality protection measures
- Cooperating with other political subdivisions on water quality protection
- Developing public-private partnerships with conservancy groups

Specific recommendations are included for municipalities, including:

- Enforcing water quality protection measures through zoning
- The use of development agreements to secure financial assurance and long-term funding
- The possible use of special taxing entities/districts, including MUDs, WCIDs and PIDs.
- Mechanisms for operations, maintenance and monitoring

Specific recommendations are included for counties, including:

- Enforcing water quality protection measures through limited land use powers
- The use of development agreements to secure financial assurance and long-term funding
- The possible use of special districts (including MUDs, WCIDs) to address water quality protection measures
- The use of special taxing entities (MUDs, WCIDs & PIDs) as funding mechanisms
- Mechanisms for operations, maintenance and monitoring

Although limited in their ability to directly participate in regulation, recommendations are included for authorities and special districts.

Natural Area Conservation

Natural area/open space conservation can be accomplished through a combination of voluntary conservation and conservation in exchange for flexibility in other areas. However, if these areas are to provide these benefits in perpetuity, their conservation must be ensured by preventing their future development.

Conservation easements can be used to bring the “as-built” impervious cover in the Planning Region closer to the uniform development intensities presented in this Plan. Based on an evaluation of impervious cover within the Planning Region, the Plan recommends that approximately 20,000 acres of natural area conservation be implemented within the Planning Region to address the equity issues with prior development. Conservation easements can also be used to secure transferable development rights, by applying restrictive mechanisms to ensure that future development of the property will not occur. There are several different aspects to the process for ensuring that future development of designated natural area/open space conservation easements is prohibited, including:

- Controlling Ownership
- Zoning Restrictions
- Easements to the Public
- Restrictive Covenants
- Physical Barriers

Other aspects of assuring the long term protection of conservation easements include the appointment of a conservator responsible for long-term custodial management, and securing long-term funding.

Transferable Development Rights Secured by Retrofitting Prior Development

The term Transferable Development Rights, or “TDR” refers to the ability to trade the “right” to develop from one property to another, based on the impervious cover limits presented above. The recommended strategy for securing TDRs through retrofitting was to allow credits only for net reductions in impervious cover, and defer the evaluation of quantifying any future TDR credits that may be obtained through the adaptive management process. In instances where this

is utilized, the party responsible for the site to be developed must perform the retrofit. Local jurisdictions may also establish a retrofit program which allows developers to make a cash payment in lieu of the required retrofit.

Uncertainties and the Fear of Unintended Consequences

As with any new venture, even a thorough evaluation of the concepts and strategies may not always identify and avoid uncertainty and unintended consequences. It is absolutely imperative that the institution of the concept of TDRs be evaluated by each entity and be an evaluation factor during the adaptive management process, discussed later. The outcome intended for TDRs in this Plan is to bring equity to the development process and prevent early projects from exceeding protective intensities at the expense of later development that would have to be further restricted beyond protective levels. Given this understanding of the purpose and intended outcome of the use of TDR's, the following restrictions should be incorporated into the implementation process:

- TDRs are a voluntary component intended to create a market for flexibility in development intensity and can not be secured through the use of eminent domain or the right of condemnation. Entities with the right of eminent domain should be encouraged to use TDRs, where appropriate or desirable, but must secure them through an open market and not through the use of eminent domain.
- TDRs are not intended to have an independent or inherent taxable value. In accordance with established Texas law and tax policy, the tax status, including any exemptions, for all property should be based on the use of that property and not on the status of the TDRs.

On-going Monitoring Program

Most of the water quality protection measures included in the Plan have been based to varying degrees on monitoring data. A cooperative, on-going monitoring program should be implemented to allow better use of this monitoring data through the Planning Region.

Public Education

A comprehensive and coordinated public education program should be included as a part of implementing these measures. This coordinated effort could be accomplished by identifying one coordinating entity that executed the public education efforts through cooperative agreement with the public entities.

Alternative Implementation Mechanisms

During the identification of issues by the stakeholders, the concept of a single regional entity to implement the Plan was consistently popular and considered important by many stakeholders. Such an entity would have several distinct advantages, including consistency of implementation across the entire Planning Region, eliminating replicated administration and overhead, and the economies of scale typically associated with larger entities. Due to the legal authority required for such an entity, it could only be created by the Texas Legislature. There are two alternatives presented to implementation using only local jurisdictions: the creation of a new regulatory

entity or expanding the authority of an existing entity. Under either alternative, it would require an extended time frame and multiple existing jurisdictions would need to agree on its establishment. Issues to be resolved under either alternative would include additional legal authority, addressing the interaction of the new jurisdiction with existing entities, and funding.

Adaptive Management

Adaptive management is a process allowing for periodic evaluation and adjustment of programs. The adaptive management process should include all aspects of the plan in all jurisdictions. A standing committee should oversee this process, and should include representatives of the entities responsible for implementing and enforcing the plan, and representation from members of the public. The committee overseeing the adaptive management process should perform an annual evaluation to assess the effectiveness of the Plan. This evaluation should include:

- Review and Evaluation of Monitoring Data
- Review of the Implementation Process
- Development of Recommendations
- Implementation by Local Jurisdictions

Water Quality Protection Measures as Regulatory “Takings”

In any consideration of water quality protection measures to be adopted by local governmental entities, it is necessary to consider whether or to what extent such measures may be vulnerable to legal challenges on the grounds that they may constitute a prohibited “regulatory taking.” A regulatory taking is a governmental action which regulates a private property interest to such a degree that it violates the Constitutional prohibition on the taking of private property without just compensation. Water quality protection measures such as the impervious cover and setback requirements of this Plan are good examples of potential regulatory takings.

The U.S. Supreme Court and the Texas Supreme Court have struggled to formulate a standard for governmental takings, and have adopted the following basic legal principles:

- Remedies for a taking are to invalidate the regulation or make the governmental entity liable for monetary damages.
- The governmental entity must show that the regulation actually substantially advances a legitimate state interest, including such things as protecting residents from the “ill effects of urbanization” and the preservation of desirable aesthetic features.
- A compensable taking occurs when a land use regulation denies the landowner economically viable uses of the property, or unreasonably interferes with the owner’s right to use and enjoy his property.
- In determining whether a taking has occurred a court must evaluate the economic impact of the regulation and the extent to which the regulation interferes with “distinct investment backed expectations” of the landowner.
- In the case of governmental exactions, the required dedication for public use or for public facilities must be roughly proportional to the actual need for those public facilities, which is generated by the proposed development.

In response to widespread concerns about governmental intrusions on private real property rights, the Legislature enacted the Texas Real Property Rights Preservation Act to ensure that governmental entities in Texas take a “hard look” at the effects on private real property rights of the regulations they adopt. It appears that reasonable water quality protection measures, such as impervious cover limits and setback requirements from critical environmental features, are not of such an extreme character as would constitute a regulatory taking. However, it is the responsibility of each jurisdiction within the planning region to obtain specific legal advice on proposed actions and to conduct a thorough takings impact assessment prior to adopting regulatory measures and/or rules as prescribed by Texas state law.

IMPLICATIONS

There are many implications of the implementation of the water quality protection measures presented in this Plan. These include social, political, economic and environmental impacts. While it is not possible to provide a detailed quantitative evaluation of each potential impact, the following sections attempt to address the major issues from a qualitative perspective, supplemented with quantitative information where available.

Economic Impacts

There are numerous potential economic impacts associated with the water quality protection measures included in the Plan. Some of them will require fundamental changes in the way certain activities are conducted, resulting in additional costs. Others will require new expenditures for which no source currently exists. Still others will impose limits on activities that some perceive to be a restriction of rights. However, the economic impacts of the water quality protection measures must be gauged against the value of the resources they are designed to protect.

The potential adverse economic impacts of the “No Action” alternative are tremendous. As recognized in Stakeholder Guiding Principal No. 1, this “no action” alternative is unacceptable. The threats to water quality and environmental resources in the Planning Region have already been established. In addition, the value of the unique, “one of a kind” resources to both public and private interests is also unquestioned. The groundwater and surface water resources within the Planning Region are irreplaceable. Should these resources be damaged, impaired or destroyed, the economic damages would be incalculable.

The economic impacts of the proposed water quality protection measures will vary significantly depending on their location and the nature of the activities requiring the incorporation of protective measures. Another factor affecting the economic impact is identifying the true basis for assessing the incremental cost of the new proposal. The following elements have been included in the economic impacts evaluation:

- Land Value/Costs
- Costs of Structural BMPs
- Impact of Incremental Costs on Total Costs

The following figure presents the estimated economic impacts in terms of impact on total costs:

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

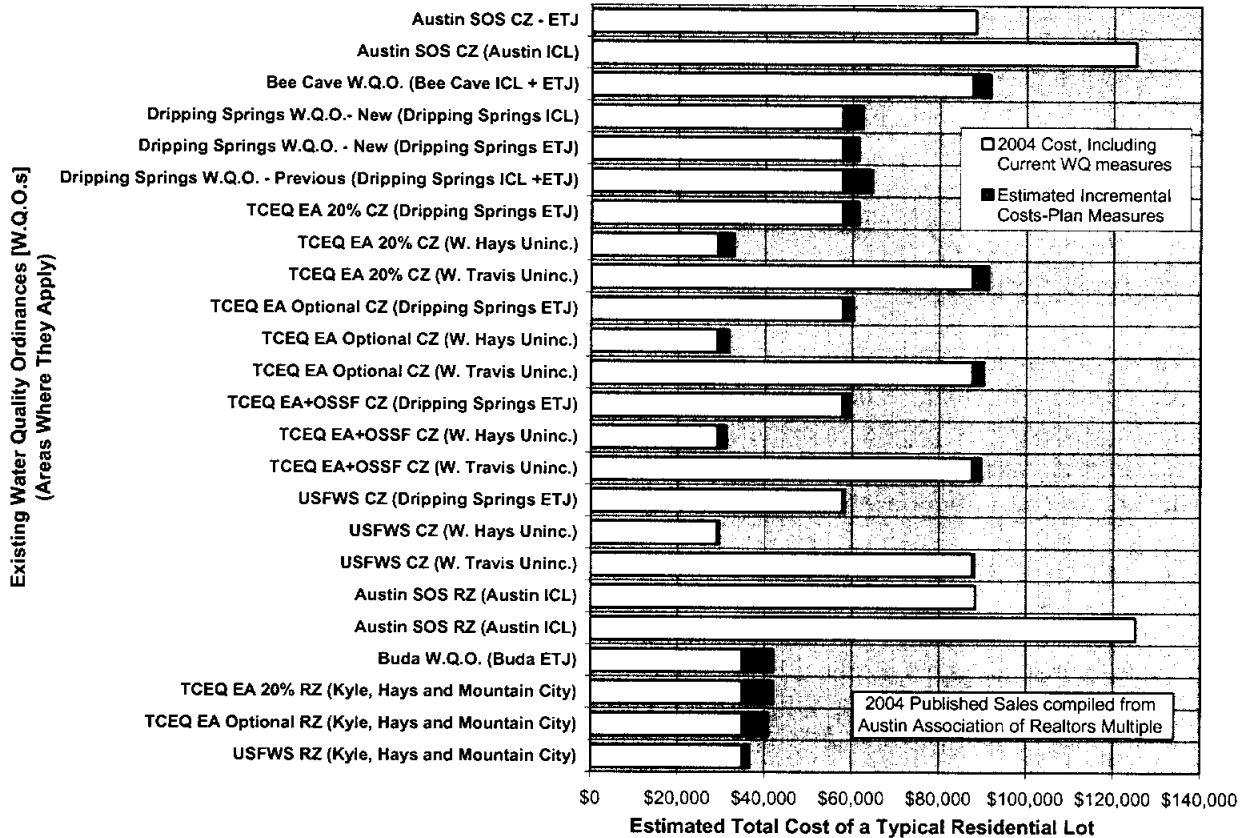


Figure ES-1 –Estimated Impact of Incremental Costs of the Plan Measures on the Total Cost for a Typical Residential Lot for Various Locations in the Planning Region

While “costs” are often straightforward to quantify and assess, “value” is much more difficult to quantify. In the truest sense, the value of instituting water quality protection measures is determined in the court of public opinion. The relationship between water quality protection measures and public policy is discussed in more detail below. However, the value of these measures will be assessed based on whether or not public and private entities are willing to bear the costs required to protect the resources in the Planning Region.

Funding

One of the critical areas identified by the Stakeholder Committee as well as the political subdivisions is identifying sources of revenue to provide for the initial capital improvements as well as ongoing operations and maintenance. In all of these discussions one common factor is to identify an ongoing source of revenue that can be used to finance long term operations and maintenance. Recommendations are included for both initial implementation and on-going operations and maintenance.

Enforcement and Oversight

The strategy presented in this Plan will only achieve true protection of water quality if it is enforced, with proper oversight from the implementing jurisdictions. As discussed in the implementation section, coordinated and comprehensive implementation is essential to providing this water quality protection. If the local jurisdictions are not coordinated in their implementation, future development will likely occur preferentially in areas with less stringent enforcement and oversight. It is important that each and every jurisdiction involved provide consistent levels of enforcement and oversight.

Interaction of Population Growth and Protection Measures

One of the implications of the water quality protection measures is their interaction with projected population growth. A number of these measures (e.g. stream offsets and impervious cover limits) directly impact the quantity of development that can take place on a tract of land. Combined with the transferable development rights concept presented in the Plan, these measures establish a direct relationship between the amount of land remaining to be developed within the Planning Region, and the amount of development that can occur on that land. In practice, the recommended water quality protection measures will impose certain limitations on the ultimate build-out of the land in the Planning Region.

Using current population projections, the projected growth rates would require the construction of approximately 1,386 residential dwelling units per year. At a uniform development intensity of 15% impervious cover, the Planning Region is approximately seventy five percent (75%) built out by 2060. At a uniform development intensity of 10%, the projected growth in the Planning Region through 2060 requires more land area than what is available.

Interrelation with Public Policies

Water quality protection measures are inherently linked to broader public policies. Environmental protection is primarily a public policy issue in that the governmental powers of the public are focused on preventing and correcting those activities which might harm the environment. Public policies that encourage human and economic activities are also inherently linked to water quality. This fundamental understanding of the relationship between human and activity and environmental protection should be recognized in all public policy.

To help the proposed water quality protection measures succeed, the following actions are recommended to ensure that these measures are integrated into larger scale public policy, and should be included into the adoption of the measures:

- Public entities should adopt broad policy statements regarding the need to integrate water quality protection measures into all public actions.
- Public entities should adopt broad policy statements regarding the need to integrate water quality protection measures into all regulated private actions.
- Public entities should also encourage non-regulated private actions to integrate water quality protection measures.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer
and Its Contributing Zone

These recommendations should accomplish one of the expected outcomes of this Plan, which is to have coordinated public policies that encourage the protection of water quality.

1. BACKGROUND

1.1. History

Rapid growth and development in northern Hays County and southwest Travis County have created community concerns with the increasing potential for pollution of groundwater and surface waters. Concerns have been raised with regard to the potential impacts to drinking water supplies and the recreational and aesthetic values of water, and to the threatened or endangered species that live in the area.

In December, 2002, Hays County Judge Jim Powers and City of Austin Council Member Daryl Slusher convened a Regional Summit to begin discussions on the impacts that development was having on the region and particularly to water quality in the Barton Springs Zone of the Edwards Aquifer. These discussions continued and from this initial effort a Regional Group was established to address the water quality issues facing the Barton Springs segment of the Edwards Aquifer and its contributing zone. The Regional Group was comprised of an Executive Committee and Core Committee whose members were initially made up of representatives from the Cities of Dripping Springs, Austin, Buda, Kyle, Rollingwood, Sunset Valley, the Village of Bee Cave, Hays and Travis Counties, the Barton Springs/Edwards Aquifer Conservation District and the Hays Trinity Groundwater Conservation District. During the process, the Core Committee was expanded to include representation from Blanco County and the Blanco-Pedernales Groundwater Conservation District. It was determined by this Regional Group that there was a need to develop a regional approach to water quality protection within the Barton Springs Zone in order to protect both the quality of drinking and recreational water and the endangered species in the area, particularly the Barton Springs salamander. It was the intent of the Regional Group that a regional water quality protection plan be developed to provide the basis for political subdivisions, to the extent allowed by law, to implement local water quality protection measures and ordinances and provide best management practices that could be adopted by local entities to protect water quality in the area. This effort has been termed the "Regional Water Quality Planning Project", or simply the "Project". This "Regional Water Quality Protection Plan", or simply the "Plan" is the result of that effort.

1.2. Governmental Entities Involved

There are a number of governmental entities that initiated and have been involved in the planning process. Several of these governmental entities serve on the two (2) steering committees for the Project.

1.2.1. Executive Committee

The Executive Committee provides administrative and policy oversight to the Project. The following entities are represented on the Executive Committee:

- The City of Austin
- The Barton Springs/Edwards Aquifer Conservation District
- The City of Dripping Springs
- Hays County
- The Hays Trinity Groundwater Conservation District
- Travis County

1.2.2. Core Committee

The Core Committee provides technical direction to the Project. The following entities are represented on the Core Committee:

- The City of Austin
- The Barton Springs/Edwards Aquifer Conservation District
- The Village of Bee Cave
- Blanco County
- The Blanco-Pedernales Groundwater Conservation District
- The City of Buda
- The City of Dripping Springs
- The Hays Trinity Groundwater Conservation District
- Hays County
- The City of Kyle
- The City of Rollingwood
- The City of Sunset Valley
- Travis County

1.2.3. Other Entities

A number of other entities have been involved in the Project. These include:

- The Texas Commission on Environmental Quality (TCEQ)
- The Texas Water Development Board (TWDB)
- The Lower Colorado River Authority (LCRA)
- The Guadalupe Blanco River Authority (GBRA)
- The U.S. Fish and Wildlife Service (USFWS)

1.3. Project Team

The Project team consisted of the Executive Director and the consulting team. Mr. Terry Tull was appointed by the Executive Committee to serve as the project's Executive Director. His role was to serve as the primary liaison to the public and as the coordinator for the efforts of the consulting team.

Naismith Engineering, Inc., (NEI) was the lead firm for the consulting team. NEI was assisted by a number of sub-consultants:

- CAS Consulting and Services
- Eco-Southwest Services
- Good Company Associates
- Hicks & Company
- Kelly, Hart & Hallman, P.C.

1.4. Description of the Stakeholder and Public Involvement Process

From the outset of the Project, the Executive Committee determined that the development of the Plan should be guided by the participation of various stakeholders. The following sections describe the involvement of the stakeholders in the various phases of the planning process. Attachment 3 contains a general timeline of the stakeholder and public involvement process. Appendix A includes the documents developed to guide the stakeholder process.

1.4.1. Past Stakeholder Involvement

While many previous efforts had attempted to identify issues and obtain input from various stakeholders, few gained much traction until the current effort began in late 2003. There was an initial stakeholder meeting held in September 2003, but it was not until May, 2004 that the Executive Committee was able to retain an Executive Director and a consulting team for the Project. On June 8, 2004, the Executive Director and consultant team conducted a meeting with the Stakeholders to identify issues and discuss their role in the process. This meeting included joint sessions with all stakeholders as well as break-out sessions by areas of interest.

1.4.2. Establishment of Stakeholder Committee

The consulting team, working with the Executive Director, reviewed information on the affiliations and interests of past stakeholders involved in the process. At the initial meeting in early June, 2004, the consulting team presented to the stakeholders a list of eight (8) categories of interest proposed for inclusion in a Stakeholder Committee (SHC). These categories were:

- Concerned Citizens
- Governmental Entities
- Neighborhood Interests
- Local Environmental Preservation/Good Governance Organizations
- Development Interests
- Economic Interests
- Property Owners/Agricultural Interests
- Public Interest Organizations

After significant discussion to determine whether or not this was a proper division of interests for inclusion in the SHC, the stakeholders affirmed the categories initially identified by the consulting team. Following the initial selection of the SHC members, a public “validation” process was used to determine if the members of the wider public agreed that their interests were represented on the SHC. Based on the feedback received, several adjustments were made to the SHC to broaden the representation of landowner and local government categories, and to limit the representation of certain interest groups in more than one category. In August 2004, after organizing itself and establishing its Bylaws, the Stakeholder Committee began to work in earnest with the Executive Director and the consulting team to provide input on the Plan development. Information on the final make-up of the SHC has been included in Attachment 1.

1.4.3. Public Availability and Notice

The Executive and Core Committees charged the consulting team and the project Executive Director with making the development of the Plan an open public process. Several steps were taken to ensure that the public had opportunity to follow and offer input to the process. A project website was established on the internet that served as the primary repository for the project documentation. This provided a low-cost means to distribute information to the stakeholders and members of the SHC, but also made this information available to the general public. In addition to having the project documentation available on the website, hard copies of the project documents were maintained at the Executive Director’s office in the City of Dripping Springs municipal offices and in the offices of the consulting team. Each meeting of the

Executive and Core Committees, as well as the SHC, were preceded with posted public notices as well as e-mails to anyone subscribing to the project notification list. Each public meeting included the opportunity for public comment. At each of the meetings and in each of the notices, stakeholders and members of the public were also invited to submit written comments to the consulting team. Through these steps, numerous opportunities were provided for public input to the process.

1.4.4. Stakeholder Committee Meetings

A series of Stakeholder Committee meetings were held to educate the stakeholder committee members, identify and rank relevant issues, and obtain stakeholder input on draft work products. At the request of the stakeholders, a Technical Review Group (TRG) of outside experts nominated by members of the SHC was set up to provide an independent review of the project work products. Various subcommittees and working groups were formed to address specific issues. All project documentation was furnished to the stakeholders and the public through the website prior to each meeting and throughout the process. While not all of the initial SHC members were able to serve for the entire term of the project, the vast majority attended every meeting and provided valuable participation. Attachment 1 contains the final listing of the representatives and alternates to the Stakeholder Committee. Attachment 4 contains information on the TRG.

1.4.5. Interface with the Consulting Team

While the consulting team was responsible for preparing the Plan, the input from the stakeholders was critical in its development. Working drafts of the Plan were presented at monthly stakeholder meetings between October 2004 and March 2005. The input obtained at the meetings as well as written comments submitted by members of the SHC and the TRG were evaluated by the consulting team with many of the comments serving as the basis for subsequent revisions of the various project documents. This written Plan is the result of that effort.

1.4.6. Communication Efforts

A critical part of the development and implementation of the Plan is communication with the stakeholders and general public. To accomplish this, a Communication Plan was developed. A copy of this plan has been included in Append F.

1.5. Definition of the Planning Region

1.5.1. Geography

For the purposes of the Plan, the "Planning Region" is defined as the recharge zone for the Barton Springs segment of the Edwards Aquifer and its contributing zone. Located in the Texas Hill Country, one of the states' most unique natural areas, the Planning Region covers portions of northern Hays County, southwest Travis County and a small section of eastern Blanco County. It includes all or a portion of the Cities of Austin, Buda, Dripping Springs, Hays City, Kyle, Mountain City, Rollingwood, Sunset Valley, West Lake Hills and the Villages of Bee

Cave, Bear Creek, Lakeway and portions of the Barton Springs/Edwards Aquifer, the Hays Trinity and the Blanco-Pedernales Groundwater Conservation Districts. The Planning Region encompasses approximately 240,000 acres. Figure 1, on the following page, indicates the general location of the Planning Region, and shows the delineation between the recharge and contributing zones.

In common usage, the recharge and contributing zones are defined by geologic and hydrologic characteristics. However, it is important to note that these terms are routinely used as “terms of art” in several existing federal and state regulatory programs. In most instances, these regulatory programs allow the extent of the contributing zone to be modified by factors other than the geologic and hydrologic characteristics of the land, such as political, jurisdictional or administrative boundaries. For the purposes of The Plan, the extent of the contributing zone has been defined using the geologic and hydrologic characteristics. The consequence of this choice is that the Planning Region includes the portion of the hydrologic contributing zone within Blanco County, which is excluded from most regulatory programs.

The Plan also includes the description of the recharge zone as modified by changes recommended to the TCEQ by the Barton Springs/Edwards Aquifer Conservation District.³ The petition for these changes involves changes to the current recharge, contributing and transition zone boundaries in southern Travis and northern Hays Counties. These changes involve a total of approximately 2,750 acres, with a net addition of approximately 490 acres to the recharge zone. For consistency, the boundaries of the recharge zone for the purposes of this Plan should conform to those ultimately adopted by the TCEQ.

1.5.2. Demographics

1.5.2.1. Historical Population Growth 1990-2000

Estimates of historical population growth trends for the Planning Region were developed based on 1990 and 2000 U.S. census data for tracts within the Planning Region using data obtained from the Texas Water Development Board (TWDB).⁴ While the Planning Region does not correspond exactly to the census tracts or “designated places” and includes several cities as well as unincorporated areas of Travis, Hays, and Blanco Counties, this methodology is useful for analyzing general growth trends. Table 1 and Table 2, on the pages following Figure 1, present information taken from the 1990 and 2000 U.S. census data, and includes information on populations and household make-up for each census tract within the Planning Region.

³ The map showing the proposed changes is available from the BSEACD internet website. (http://www.bseacd.org/graphics/Map_Rech_Zone_Chg.pdf)

⁴ Detailed data was provided by staff from the TWDB. The underlying census data was obtained by the State of Texas directly from the U.S. Census Bureau for the years 1990 and 2000.

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Table 1 – Information for Census Tracts within the Planning Region – 1990 Census

Census Tract Total	Population	Total Households	Family Households	Avg. HH Size
Travis County				
17.12	3,934	1,696	1,032	2.25
17.13	4,069	1,549	1,119	2.43
17.29	3,670	1,367	941	2.68
17.32	5,629	1,742	1,563	3.09
17.33	2,344	800	684	2.91
17.34	6,252	2,234	1,754	2.8
17.27	7,602	2,856	2,161	2.66
17.3	5,300	1,883	1,396	2.76
17.31	10,880	3,598	3,021	3.02
17.35	6,613	2,724	2,128	2.41
17.36	6,185	2,391	1,680	2.59
19.01	5,405	2,788	1,251	1.93
19.02	3,463	1,216	966	2.76
19.04	5,428	1,979	1,581	2.74
19.05	5,183	2,448	1,230	2.12
19.06	5,126	1,629	1,463	3.15
Sub-Total	87,083	32,900	23,970	2.64
Hays County				
108.01	7,031	2,461	1,967	2.82
109.01	4,749	1,485	1,348	3.2
109.02	3,341	1,094	922	3.03
Sub-Total	15,121	5,040	4,237	3.02
Total	102,204	37,940	28,207	2.69

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Table 2 – Information for Census Tracts in the Planning Region– 2000 Census

Census Tract Total	Population	Total Households	Family Households	Avg. HH Size	Avg. Family Size
Travis County					
13.03	3,022	1,555	580	1.91	2.7
17.12	4,195	1,892	997	2.19	2.9
17.13	4,075	1,619	1,031	2.51	3.06
17.29	4,266	1,670	1,069	2.55	3.09
17.32	13,267	4,196	3,675	3.11	3.29
17.33	2,883	1,016	853	2.84	3.07
17.37	5,135	1,897	1,522	2.7	3
17.38	7,212	2,578	1,996	2.78	3.17
17.39	8,105	2,830	2,125	2.86	3.28
17.4	2,424	799	694	3.03	3.25
17.43	5,958	2,051	1,620	2.9	3.25
17.46	3,979	1,521	1,031	2.62	3.19
17.47	4,510	1,689	1,205	2.66	3.15
17.48	2,327	879	697	2.61	2.89
17.49	4,786	2,058	1,154	2.27	2.98
17.5	4,739	2,241	1,015	2.11	2.91
17.68	3,584	1,292	1,037	2.69	3
17.69	4,715	1,803	1,312	2.61	3.03
19.04	6,079	2,215	1,767	2.74	3.07
19.06	8,061	2,468	2,215	3.27	3.44
19.08	2,408	1,008	715	2.3	2.83
19.09	6,913	3,099	1,791	2.2	2.81
19.1	4,340	1,712	1,160	2.48	3.06
19.11	3,211	1,865	578	1.72	2.75
Sub-Total	120,194	45,953	31,839	2.57	3.05
Hays County					
108.01	12,908	4,455	3,709	2.86	3.01
109.01	6,609	2,173	1,933	3.04	3.22
109.02	5,512	1,871	1,558	2.95	3.26
Sub-Total	25,029	8,499	7,200	2.95	3.16
Total	145,223	54,452	39,039	2.63	3.07

Table 3, below, provides an analysis of the data in Table 1 and Table 2, and reveals that the census tracts within the Planning Region experienced a combined annual growth rate of 3.6% between 1990 and 2000. Census tracts within the Hays County portion of the Planning Region experienced a higher growth rate (5.2%) than tracts within the Travis County portion (3.3%). The census tracts located in the Hays County portion of the Planning Region also grew faster than Hays County as a whole, which experienced an annual growth rate of 4.1%. The census tracts within the Travis County portion of the Planning Region grew slightly slower than Travis County as a whole, which grew annually at a rate of 3.5%.

Table 3 – Historical Growth Trends in the Planning Region 1990 - 2000

	Total Population	Total Households	Family Households	Avg. HH Size
Travis County				
1990 Census	87,083	32,900	23,970	2.64
2000 Census	120,194	45,953	31,839	2.57
Amount of Change	33,111	13,053	7,869	(0.07)
Percent Change 1990-2000	38.0%	39.7%	32.8%	-2.8%
Annual Growth Rate	3.3%	3.4%	2.9%	
Hays County				
1990 Census	15,121	5,040	4,237	3.02
2000 Census	25,029	8,499	7,200	2.95
Amount of Change	9,908	3,459	2,963	(0.07)
Percent Change 1990-2000	65.5%	68.6%	69.9%	-2.2%
Annual Growth Rate	5.2%	5.4%	5.4%	
Travis and Hays Counties				
1990 Census	102,204	37,940	28,207	2.69
2000 Census	145,223	54,452	39,039	2.63
Amount of Change	43,019	16,512	10,832	(0.06)
Percent Change 1990-2000	42.1%	43.5%	38.4%	-2.4%
Combined Growth Rate	3.6%	3.7%	3.3%	

1.5.2.2. Population Projections

Population estimates and projections for the Planning Region were based on population projections developed as part of the Regional Water Plan for the TWDB and population projections from the City of Austin.⁵ As mentioned above, one of the difficulties in developing projections for the Planning Region is that the boundaries do not coincide with those of the census tracts used by the U.S. Census Bureau, the Water User Groups (WUGs) used in the TWDB projections or the Zip Code Zones used by the City of Austin. However, the portion of the Planning Region which lies in Hays County is nearly identical to the portion of Hays County located in TWDB's Region K Planning Group. Thus, the TWDB

⁵ Detailed population projections were provided by staff from the TWDB. The underlying projections were based on several sources of data, but constitute the officially adopted projections from the TWDB.

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population projections were used for the portion of the Planning Region within Hays County. In developing the population projections for the portion of the Planning Region within Travis County, the short term growth rates developed by the City of Austin's Planning Department were applied to 2000 Census tract data to project population in the year 2010. The 2010 total population projection for the Travis County portion was then projected through the year 2060 using the average short term annual growth rate of 1.47% for all applicable zip codes. Populations for the portion of the Planning Region within Blanco County and Census tracts within Travis County, but outside the City of Austin's ETJ were excluded from projections. Table 4 shows the projected populations and annual growth rates for the Planning Region.

Table 4 – Population Projections for the Planning Region 2010 - 2060

County	2000 (Estimated)	2010	2020	2030	2040	2050	2060
Hays	25,090	46,143	69,377	88,887	108,495	132,051	150,574
Annual Rate		6.28%	4.16%	2.51%	2.01%	1.98%	1.32%
Travis	97,864	113,250	131,054	151,658	175,500	203,091	235,020
Annual Rate		1.47%	1.47%	1.47%	1.47%	1.47%	1.47%
Total	122,954	159,393	200,431	240,545	283,995	335,142	385,594
Annual Rate (Combined)		2.63%	2.32%	1.84%	1.67%	1.67%	1.41%

These projections indicate that the Planning Region could experience a combined annual growth rate of 1.9% between 2000 and 2060, with the total population within the Planning Region growing from an estimated 122,954 in 2000 to an estimated 385,594 in 2060. Utilizing an average household population of 2.6 (based on the historical trend), this corresponds to an increase of approximately 101,000 households by 2060, or approximately 1,680 households per year. The portion of the Planning Region located in Hays County is projected to experience a higher annual growth rate (3.03%) compared to the Travis County portion (1.47%). In addition, the portion of the Planning Region in Hays County is projected to grow faster than Hays County as a whole, according to TWDB projections. The portion of the Regional Planning Area located in Travis County is projected to experience a higher annual growth rate than Travis County as a whole, which TWDB projects to grow at an annual rate of 1.12% between 2000 and 2060.

It is important to note that these projections are based on historical growth trends. While these types of projections are typically utilized for infrastructure planning, the matters addressed through this planning process may influence ultimate population growth within the Planning Region. This is discussed in more detail in Section 11.

1.5.3. Climate

The climate in the Planning Region is characterized as humid subtropical with hot summers and relatively mild winters. Daytime temperatures in summer are hot, with highs over 90 degrees Fahrenheit (°F) approximately eighty percent (80%) of the time. Overnight lows are generally in the 70s. On some occasions, lows can be in the 50s, while at other times highs for many days approach the 100s. During the summers, winds are generally from the south or southeast, with occasional periods experiencing hot west and southwest winds. Most of the time, the moderating effects of the Gulf of Mexico limit daytime highs; however, they also add to the discomfort with higher humidity. In summer, the average temperature is in the mid 80s, and the average daily maximum temperature is approximately 96°F. The highest temperature on record for Austin was 112°F on September 5, 2000.

During winter, the area is alternately influenced by cold air masses from the north and west, and by warm, humid air masses from the Gulf of Mexico. Mild weather prevails during most of the winter, but strong cold fronts occasionally usher in frigid conditions. Sub-freezing temperatures occur on average about 25 days each year. Alternatively, very warm days can occur during winter when dry west winds allow temperatures to climb into the 90s. In winter the average temperature is in the lower 50s, with the average daily minimum temperature approximately 40°F degrees. The lowest temperature on record for Austin was -2°F on January 31, 1949.

Average sunshine varies from about 50 percent in the winter to near 75 percent in the summer. Average yearly rainfall ranges from approximately 33 inches in southern Hays County, to approximately 31 inches in western Travis County. Precipitation is fairly evenly distributed throughout the year with heaviest amounts occurring in May and September, primarily because of tropical cyclones that migrate out of the Gulf of Mexico, or stalled out cool fronts. A majority of the precipitation (approximately 57%) occurs from April through September and usually results from thunderstorms, with large amounts of rain falling within short periods of time. Rainfall amounts have exceeded 5 inches in several hours, causing flash floods. While thunderstorms and heavy rains may occur in all months of the year, most of the winter precipitation consists of light rain. While the total annual precipitation usually is adequate for range vegetation, due to the high rate of evapotranspiration, it often is not adequate for optimum growth of most commodity crops. Although snow is not a significant source of moisture, it does visit the area during some winters. Total annual precipitation extremes measured in Austin vary from 11.52 inches in 1954 to 64.68 inches in 1919.⁶⁻⁷⁻⁸

⁶ "Climatological Narrative for Austin, Texas", National Weather Service Forecast Office Austin/San Antonio, Texas, National Oceanographic and Atmospheric Administration, <http://www.srh.noaa.gov/ewx/html/cli/auscli.htm>, December, 2004.

⁷ "Soil Survey of Comal and Hays Counties Texas", Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C.

⁸ "Soil Survey of Travis County Texas", Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C., June 1974.

2. GUIDING PRINCIPLES

The Stakeholder Committee developed a set of guiding principles to provide direction and a steady reference point as the plan progressed. These guiding principles are presented below.

1. *The economy and environment of this unique part of Texas depend upon the preservation, conservation and management of dependable supplies of clean water. We all recognize the unacceptable consequences that would result if we take no action to protect our water.*
2. *Both private individuals and the Public have a responsibility to respect the legitimate interests of others and to do no harm in their activities.*
3. *Those who benefit from an activity must bear the responsibility for the costs and impacts of that activity.*
4. *We will favor measures which, all else being equal, minimize the risk of failure or of damage to the watershed.*
5. *The water quality protection measures we recommend will strive to balance Government regulations with appropriate economic incentives.*
6. *The regulatory measures we recommend shall be accompanied by strategies for administration and enforcement that provide as much certainty as possible while discouraging exemptions and exceptions.*
7. *We will make all our decisions being mindful of the economic impact of the measures recommended and strive to achieve a fair and reasonable balance among the various interests.*
8. *We will not permit any party or group in this process to have undue or unfair control over the outcome.*

3. GOALS AND OBJECTIVES

Working within the guiding principles presented above, the Stakeholder Committee developed its goals and objectives for the Plan. These goals and objectives are presented below.

3.1. Stakeholder Committee Goals Statement

“Develop an implement-able Regional Water Quality Management Plan that preserves and protects resources and manages activities within the planning region so that existing and future land use, land management, and development activities maintain or enhance the existing water quality of the groundwater and surface water within both the Barton Springs segment of the Edwards Aquifer and the contributing portion of the watersheds within the Planning Region, for the benefit of people and the environment.”

3.2. Objective 1 – Define “Water Quality”

How do we define “Water Quality” for this project?

Develop a working definition of water quality for the planning region which can be utilized during the development of the regional plan.

Water quality being defined for this project as: “The condition of water, as affected by chemical, physical, biological and habitat factors, and its hydrological regime, for use as public and private drinking water supplies, for protection and propagation of the Barton Springs Salamander, and for aesthetic and recreational use within the contributing area and aquifer boundary for the Barton Springs segment of the Edwards Aquifer”. – Executive Committee

Based on stakeholder input the following items have been incorporated:

- The common definition of “environment” includes the earthen media, water, air, flora and fauna in the Planning Region.
- The definition of “hydrologic regime” includes flow rates, flow volumes, base flow and additional storm water flows.
- The Executive Committee’s definition of “Water Quality” is expanded to include not only the protection and propagation of the Barton Springs Salamander, but also other beneficial plant and animal communities.

3.3. Objective 2 – Identify Causes of Water Quality Problems

What Causes Water Quality Problems?

Identify activities within the planning region that have had or could have a short term or long term adverse impact on water quality in the Barton Springs Segment of the Edwards Aquifer or in the contributing watersheds within the Planning Region.

3.4. Objective 3 – Identify Standards to Protect Water Quality

What Standards do we Apply?

Identify standards that can be used to establish goals and maintain or enhance baseline water quality, including: (1) existing regulatory standards for drinking water; (2) current analysis of groundwater quality in the Barton Springs Segment of the Edwards Aquifer; (3) current surface water quality in the contributing watersheds within the planning region; (4) scientifically-based thresholds for adverse impacts to human health and the environment; and, (5) existing hydrologic flow regimes.

3.5. Objective 4 – Identify Who Can Act to Protect Water Quality

Who Can Act?

Identify entities capable of implementing, monitoring, and enforcing water quality protection measures within the planning area, as well as any existing legal and institutional constraints on these entities, and develop procedures to educate and inform the public of voluntary measures they can implement.

3.6. Objective 5 – Identify Protection Measures that are Already in Place

What Measures are Already in Place?

Identify existing water quality plans and regulations currently in effect in the planning region including any parameters used to measure the success of those plans and regulations, identify any significant deficiencies in these plans and regulations, and identify proposed solutions for these deficiencies.

3.7. Objective 6 – Identify New Measures Needed

What New Measures are Needed?

Identify new structural and non-structural water quality protection measures to maintain or enhance the existing groundwater or surface water quality, as defined above, including any parameters used to measure the success of those protection measures.

3.8. Objective 7 – Develop a Strategy for Action

What is our Strategy for Action?

Identify a strategy to: (1) enforce existing water quality protection measures; (2) implement the identified solutions for existing deficient water quality protection measures; (3) implement the identified new water quality protection measures; (4) monitor and assess the effectiveness of the water quality protection measures; and, (5) revise current and future water quality protection measures determined to be ineffective.

4. WHAT DOES THE REGIONAL PLAN PROTECT?

During the planning process, many asked: “What should the plan protect?” Responses vary significantly. Initially, many stakeholders answered “the Aquifer”, while others answered “the Barton Springs Salamander”. However, the real answer is much more complex. As charged by the Executive Committee, the Regional Plan was to protect “Water Quality”. The definition of “Water Quality” for the Plan is presented above as a part of the Stakeholder Committees Goals and Objectives. Based on the Stakeholder Committee’s definition of water quality, expanded definitions of certain physical elements were included in Plan development. These definitions are presented below.

4.1. General Hydrology

Most people learn about the hydrologic cycle in elementary school. This same model is relevant in understanding water quality issues in the Planning Region. This Plan addresses three types of water resources: surface water, groundwater, and groundwater under the influence of surface water. Each is described in more detail in the following sections. Figure 2, on the following page, presents a simplified general model of the hydrologic cycle in the Edwards Aquifer region to illustrate the relationship between the different types of water discussed in the plan.

Based on this generalized hydrologic model, more detailed definitions have been incorporated for surface water, groundwater, and groundwater under the influence of surface water.

4.1.1. Surface water

“Surface water” includes all forms of water on the surfaces of the earth, including that flowing or stored in above or below ground watercourses or storage features.⁹

Watercourses can be natural, man-made or somewhere in between. Gullies, creeks, streams and rivers are examples of natural watercourses. Culverts, storm sewers, and gutters are examples of man-made watercourses. There are also many types of natural watercourses that have been modified by man, and are neither entirely natural nor entirely man-made. Storage features for surface water can also take many forms. These storage features can include lakes, depressions, ponds, impoundments and tanks. Water in these types of watercourses or storage features would be considered surface water.

⁹ This definition was derived from the definition of “surface water” cited in “Handbook of Applied Hydrology”, V.T. Chow, et al, McGraw-Hill Publishing, and modified to include water in watercourses or storage features. [Pg. 27-27]

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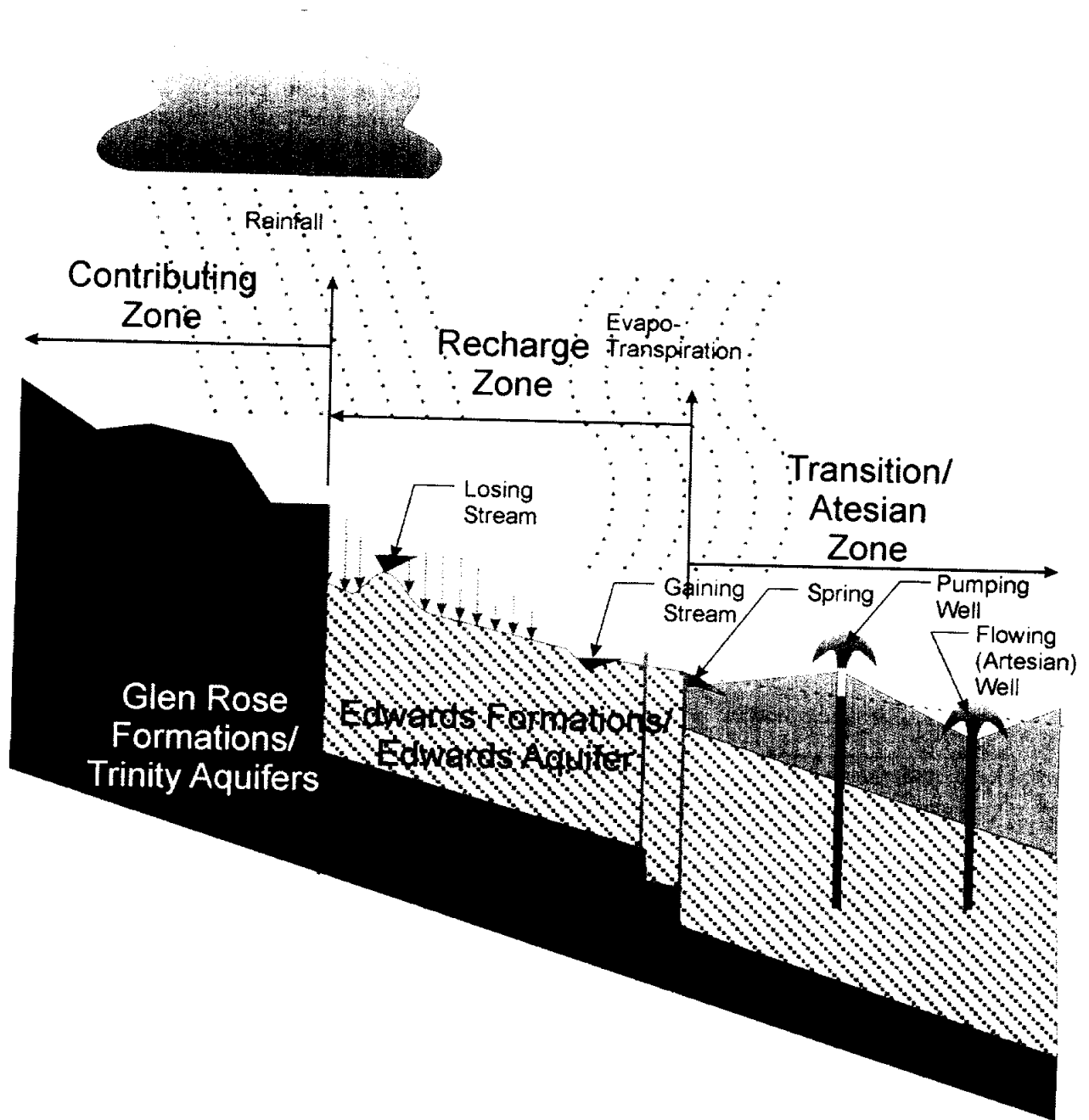


Figure 2 – Simplified General Hydrologic Model in the Edwards Aquifer Region

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

Donna Tiemann announced that the Greater Edwards Aquifer Alliance was hosting a regional summit in San Antonio this weekend, March 4-6, 2005 (“A Regional Summit on The Edwards Aquifer and the Hill Country”). She had sent e-mails to the SHC suggesting that the group put together an informational handout on this current planning effort.

Robbie Botto stated that he thought this was a good idea.

It was suggested that the Executive Director prepare a summary about the Regional Planning process for distribution at the Summit. The Regional Director agreed to review the materials regarding the Summit and to let the SHC know of his decision in this regard.

2. Discussion and Approval of Meeting Minutes from the February 16 & 23, 2005 Stakeholder Committee Meetings (Meeting Attachments Nos. 1a and 1b).

Coordinator Tull stated that the minutes from the February 16 & 23, 2005 SHC meetings had been posted on the web site and that he had received no comments from the SHC members. Coordinator Tull asked if anyone had any comments on the minutes, and hearing none, the minutes were approved by consensus.

3. Review, Discuss and Approve Updated Project Schedule and Milestones (Meeting Attachment No. 2).

Coordinator Tull presented the latest Project Schedule that showed the tentative dates of the remaining meetings. The current schedule has the next SHC meeting scheduled for next Wednesday night, March 9th. It is currently the last scheduled SHC meeting. Additional meetings, if necessary, would have to be scheduled as necessary.

Coordinator Tull stated that the Executive and Core Committee meeting to present the plan had been set for Monday, March 21, 2005.

4. Review and Discussion of Illustrative Case s #1 and #2. (Meeting Attachment No. 3).

Grant Jackson/NEI began a discussion of Illustrative Cases #1 and #2.

Grant Jackson presented the Illustrative Case #1. This imaginary case involves the development of approximately 218 acres of Hill Country property. Mr. Jackson showed the layout of the illustrative case in both the existing and proposed conditions. He stated that the intent of the illustrative case was to show people what can be designed under the requirements of the proposed plan. The proposed conditions result in an impervious cover of approximately 13.24%.

4.2. Surface Water (Hydrologic) Description of the Planning Region

Although the hydrologic cycle deals with both surface and groundwater, the term hydrology classically refers to surface water. There are several surface water features that influence the hydrology of the Planning Region.

4.2.1. Streams

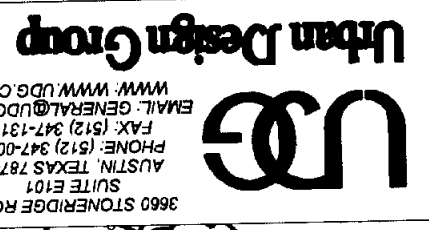
There are several defined streams and watersheds within the planning region. Table 5, below identifies the streams/watersheds within the planning region¹² (generally proceeding from north to south) and presents their approximate relative size, in acres. The location of these streams and watersheds is portrayed in Figure 3, below.

Table 5 – Streams/Watersheds Intersecting the Planning Region and Their Relative Size

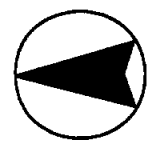
Stream/Watershed	Total Watershed Size ¹³ (Acres)	Portion Within the Planning Region (Acres)	Portion Outside the Planning Region (Acres)
Little Barton Creek	7,300	7,300	-
Barton Creek	69,477	69,477	-
Bee Creek	1,920	1,920	-
Little Bee Creek	640	640	-
Eanes Creek	2,560	2,560	0
Williamson Creek	19,200	11,016	8,184
Slaughter Creek	19,840	14,000	5,840
Bear Creek	17,280	15,600	1,680
Little Bear Creek	14,720	13,020	1,700
Onion Creek	135,040	106,700	28,340
Total, All Watersheds	287,977	242,233	45,744

¹² Stream/Watershed designations and watershed size was taken from individual fact sheets developed by the City of Austin Watershed Protection and Development Review Department. Portion Within/Outside the Planning Region was determined from GIS mapping data results supplied in 2005 by the City of Austin Watershed Protection and Development Review Department.

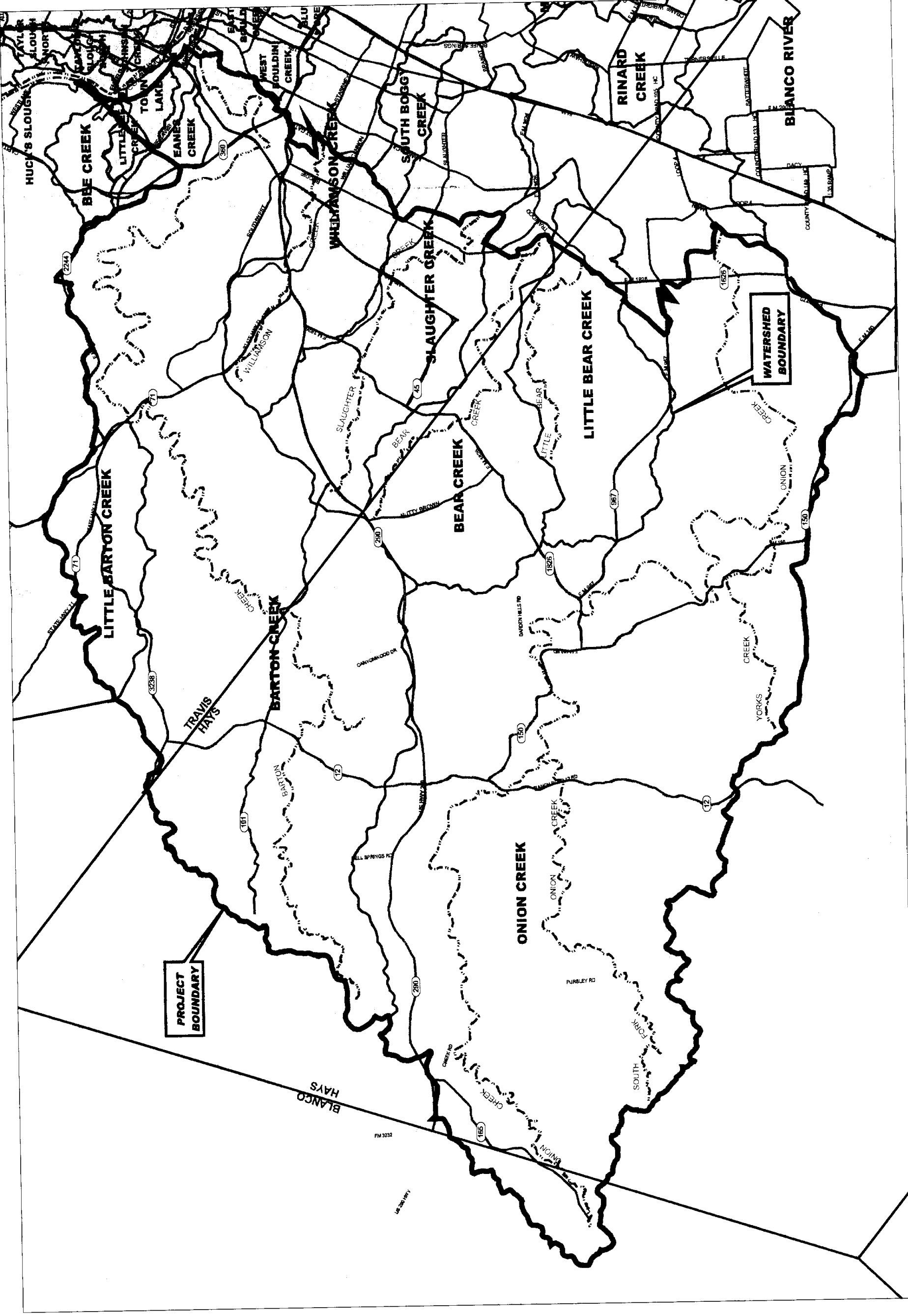
¹³ Portions of the Williamson Creek, Slaughter Creek, Bear Creek, Little Bear Creek, and Onion Creek watersheds extend south and east of the Recharge Zone boundary, which places these portions outside the Planning Region. The total watershed area reflected in Table 5 is approximately 45,000 acres larger than the area in the Planning Region as indicated in Table 13.



1" = 12,000'



**REGIONAL WATER QUALITY PROTECTION PLAN FOR THE
 BARTON SPRINGS SEGMENT OF THE EDWARDS AQUIFER
 AND ITS CONTRIBUTING ZONE**
Figure 3. Streams & Watersheds Within the Planning Region



River, Barton Creek is dammed to capture spring flows from the Barton Springs. The captured spring flows create a popular swimming facility known as the Barton Springs Pool.

4.3. Geologic Description of the Planning Region

4.3.1. Edwards Aquifer Recharge Zone

The Edwards Aquifer Recharge Zone is the outcrop of the geologic unit known as the Edwards Group. The Lower Cretaceous age Edwards Group unconformably overlies the Lower Cretaceous Age Glen Rose Formation. The Edwards Group is characterized by light to dark beds of highly fractured limestone layers, and includes the Edwards and Georgetown limestones. The Edwards Group consists of complex carbonate formations with characteristic karst features.¹⁵ A significant number of faults are generally found in these formations in the Planning Region.

The Edwards Aquifer is comprised of groundwater bearing geologic formations within the Edwards Group. This aquifer extends generally southwest to northeast, from Kinney County southwest of San Antonio, to Bell County. There are three (3) recognized zones within the Edwards Aquifer: 1) the Southern (or San Antonio) Zone, the 2) Barton Springs Zone, and 3) the Northern Zone. The definition of the Planning Region coincides with the Barton Springs Zone, which is separated from the Southern Zone by a groundwater divide, occurring in the vicinity of the City of Kyle. The Barton Springs Zone is separated from the Northern Zone by the Colorado River in Austin. The flow of groundwater in the Barton Springs Zone is discussed in more detail below.

4.3.2. Edwards Aquifer Contributing Zone/Trinity Aquifer Recharge Zone

The Trinity aquifer is actually a series of three (3) differentiated aquifers: the Upper Trinity, the Middle Trinity, and the Lower Trinity. The Upper Glen Rose Formation comprises the Upper Trinity aquifer. The Lower Glen Rose formation and the upper Travis Peak formations (the Hensell Sand and the Cow Creek Limestone) comprise the Middle Trinity aquifer. The Hammett Shale serves a confining layer between the Middle Trinity aquifer and the Lower Trinity aquifer. The lower Travis Peak formations (the Sligo limestone and the Hosston Sand), comprise the lower Trinity Aquifer. Various studies have established some hydrologic communication between the Upper Trinity and the Middle Trinity, and between the Middle Trinity and the Lower Trinity. The Trinity Aquifer group is an important groundwater supply, which extends from Uvalde County in South Texas to Montague County along the Red River in North Texas.

The Contributing Zone for the Edwards Aquifer in Hays and Travis Counties lies on the outcrop of the Lower Cretaceous Age Glen Rose Formation. These formations also serve as the recharge zone for the Trinity aquifer group. Within the Planning Region, the Glen Rose Formation is subdivided into the upper member and the lower member. The surface of the Contributing Zone

¹⁵ Geomorphic, topographic, and hydrologic features formed by solution of limestone by water. From Glossary, "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones", Application Form 0585, Texas Commission on Environmental Quality, October, 2004.

is the exposed expression of the upper member of the Glen Rose Formation. As a result of the Balcones Fault System, rocks of the younger Edwards Group are in lateral contact with the Glen Rose Formation along this fault system in Hays and Travis Counties.

The upper member of the Glen Rose (upper Glen Rose) is characterized by light to dark gray, resistant beds of limestone and dolomite alternating with softer clayey or marl layers. The alternating soft and hard layers create the stair-step topography common in the Central Texas region. The lower member of the Glen Rose Formation (lower Glen Rose) is generally more massive and fossiliferous than the upper Glen Rose. It is composed of pale brown to buff, massive, fossiliferous limestone with some interbedded marl layers. The lower Glen Rose tends to be more fractured and has dissolution features containing secondary calcite along fracture or dissolution planes. The lower Glen Rose unconformably overlies the Lower Cretaceous age Hensel Sand and Cow Creek Limestone members of the Travis Peak Formation in the subsurface. At some locations, the base of the Cow Creek grades into the Hammett Shale member of the Travis Peak Formation. The Hammett Shale overlies the Sligo Limestone of the Travis Peak Formation (Sligo). The Sligo is usually light gray in color and is composed of argillaceous limestone interbedded with shale. The Sligo overlies the Hosston Sand member of the Travis Peak Formation (Hosston).^{16, 17, 18, 19}

4.3.3. Recharge in the Planning Region

There are a number of common elements for the recharge occurring to all of the aquifers in the Planning Region. In the recharge zones for these aquifers, direct recharge occurs from infiltration through the soil column. However, for both the Trinity and the Edwards, significant portions of the recharge also occur along streams that cross the recharge zone. This recharge from streams includes both percolation/infiltration of surface water through the stream beds, and entry through “point” recharge features, including caves, sinkholes, solution cavities, fractures, and other similar features. A more detailed discussion of the particular recharge processes for each aquifer is provided below.

4.3.3.1. Recharge to the Barton Springs Zone of the Edwards Aquifer

As indicated in the preceding section, approximately eighty five percent (85%) of the recharge to the Barton Springs Zone of the Edwards Aquifer occurs in the channels of the six major creeks identified previously. Average recharge contribution calculations from the USGS gages in the Planning Region indicated that Onion and Barton creeks are the two largest contributors of recharge. Their peak recharge rate also is larger compared to the smaller creeks. Data from these gages indicates that approximately 75% of the stream volume is generated from baseflow and 25% results from runoff. Runoff recharged into the

¹⁶ “Groundwater Availability of the Lower Cretaceous Formations in the Hill Country of South-Central Texas”, J.B. Ashworth, Texas Department of Water Resources, Report 273, 1983.

¹⁷ “Geologic Atlas Map of Texas, Austin Sheet”, Bureau of Economic Geology, University of Texas, 1974.

¹⁸ “Geologic Atlas Map of Texas, Llano Sheet”, Bureau of Economic Geology, University of Texas, 1981.

¹⁹ “Evaluation of Groundwater Resources of the Paleozoic and Cretaceous Aquifers in the Hill country of Central Texas”, R.L. Bluntzer, Texas Water Development Board, Report 339, 1992.

Edwards Aquifer from Barton Creek in this area comprises less than 13% of the total recharge volume. Once this water enters the aquifer, its movement is generally in an eastern direction until the edge of the confined portion is reached. At this point, flow moves generally northeast to discharge at the Barton Springs.²⁰

4.3.3.2. Recharge to the Trinity Aquifer

The primary sources of direct recharge to the Trinity Aquifer in the Planning Region are from rainfall on the outcrop, and seepage losses through headwater creeks into the Upper Member of the Glen Rose Limestone.²¹ The Cow Creek Limestone and Lower Trinity Aquifer sediments are recharged by vertical leakage from overlying strata.²² Inter-bedded layers of relatively low permeability marl sediments within the Upper Member of the Glen Rose Limestone impede downward percolation of stream recharge and provide for baseflow and springflow to the mostly gaining perennial streams in the Planning Region, and other parts of the Hill Country.²³

The range of average precipitation recharge rates to the Trinity Aquifer for the study area lie between 31,000 and 33,000 acre-feet per year (Ac-ft/yr).²⁴ These values are based on results of calibrated groundwater-flow models that indicate recharge of approximately 4.7 percent of average annual rainfall. These results do not differ much from previous work by the Texas Water Development Board that reported recharge rates of 4 to 5 percent of average annual rainfall.²⁵

One study reports that in some areas “caverns formed by the solution of limestone and evaporites by ground water are common in the Trinity formations, particularly in the Glen Rose Limestone. These caverns are characteristically influenced by the jointing structure of the limestone and may extend both vertically and laterally for great distances and provide major conduits for the flow of ground water. When caverns grow to such a size as to no longer support their overburden, they collapse thus forming sinkholes that are visible from the surface as circular depressions that may transmit large quantities of surface water to a passage below ground. Sinkholes are a common occurrence in streambeds flowing over the Glen Rose Limestone and provide a passageway for a substantial amount of recharge to the aquifer”.²⁶ However another study contends that “because much of this recharge is quickly transmitted to the Edwards aquifer, it has minimal effects on the Trinity aquifer”.²⁷

²⁰ "Barton Springs Management Plans for Groundwater Protection", C. Soeur, et al, presentation to the National Symposium on: Assessing the Cumulative Impacts of Watershed Development on Aquatic Ecosystems and Water Quality, Chicago, Illinois, March, 1996.

²¹ Mace, R. E., et al, "Groundwater Availability of the Trinity Aquifer, Hill Country Area, Texas", numerical simulations through 2050, Texas Water Development Board Report 353, 2000, 117 pp.

²² See Note 16.

²³ See Notes 21 and 22, and Barker and Ardis, 1996.

²⁴ Jones, I. C., "What is the Recharge Rate for the Trinity Aquifer within the Hays Trinity Groundwater Conservation District?", Texas Water Development Board, Groundwater Availability Model (GAM) Run 04-18, 2004, 4 pp.

²⁵ See Notes 19 and 22.

²⁶ See Note 16.

²⁷ See Notes 21 and 22, and Barker and Ardis, 1996.

4.3.3.3. Communication Between the Trinity and Edwards Aquifers

It is certain that the Upper and Middle Trinity aquifers contribute groundwater to the Edwards aquifer but the specific amount is not well understood.²⁸ Some studies suggest that up to 50% of the Edwards Aquifer recharge is contributed from the Upper and Middle Trinity aquifers along the Balcones Fault Zone, but most experts believe this estimate is too high.²⁹ A number of studies have shown, through hydraulic and chemical analyses, that groundwater likely flows from the Trinity Aquifer into the Edwards Aquifer across the Balcones Fault Zone. Most of the studies have focused on the movement of groundwater from the Glen Rose Limestone into the Edwards Aquifer. Water level studies suggest that groundwater from the Trinity Aquifer discharges to the east in the direction of the Edwards Aquifer within the Planning Region. The Hill Country Trinity Groundwater Availability Model is calibrated so that 12% and 14% of the precipitation recharge to the Upper and Middle Trinity Aquifers, respectively, is discharged to the Edwards Aquifer. This model suggests that part of this groundwater moves into the Edwards through faults, part continues to flow in the Trinity Aquifer beneath the Edwards, and that the groundwater that continues to flow in the Trinity Aquifer eastward, eventually discharges upward to the Edwards Aquifer in the planning region.³⁰

4.3.4. Groundwater Flow in the Barton Springs Zone

Abundant caves, sinkholes, and enlarged fractures provide further evidence of the karst nature of the aquifer and dictate the transport patterns of water (and pollutants) entering the aquifer.

Groundwater flow in the Barton Springs Zone of the Edwards Aquifer is dependent on a number of factors. These factors include recharge, groundwater withdrawal, NE-SW trending faulting and jointing associated with the Balcones Fault Zone, and karst solution features. The karst features such as caves, sink holes and enlarged fractures of the Edwards Aquifer are the result of dissolution of the limestone aquifer along groundwater flow paths. In contrast to more homogeneous aquifers, these secondary solution features serve as preferred pathways for groundwater flow. Darcy's Law,³¹ which normally is used to describe flow in porous media, typically does not properly represent flow in highly karstic formations such as the Edwards. Groundwater flow in the aquifer occurs primarily in these solution features with secondary transport through porous limestone. Unfortunately, these preferred pathways for water also serve as preferred pathways for pollutants. This feature makes the Edwards Aquifer in general and the Barton Springs Segment in particular extremely susceptible to contamination from pollutants.

²⁸ Mace, R. E., 2003, "What is the County-by-County Water Budget in the Hill County Trinity model (GAM)?", Texas Water Development Board, GAM Run 02-01,-02, 4 pp.

²⁹ See Note 21.

³⁰ See Notes 21 and 22.

³¹ "Handbook of Applied Hydrology", V.T. Chow, et al, McGraw-Hill Publishing

4.4. Description of Critical Environmental Features in the Planning Region

Critical Environmental Features (CEFs) are defined as geological, topographical, physiographical, or hydrological components of the landscape within the Barton Springs Segment of the Edwards Aquifer that, if protected, would serve to remediate the quality of surface and ground water for consumptive and non-consumptive human use as well as protect biological components of the human environment such as terrestrial and aquatic biological resources including endangered species. Other entities and agencies have developed definitions and descriptions for some of these types of features as a part of various regulatory and natural resource protection programs.³² For the purpose of this Plan, many of these definitions have been incorporated due to their current use in actual practice. Critical Environmental Features, as used in this Plan, are described as follows:

4.4.1. Category 1: Limestone recharge features

- Caves – natural underground open space formed by dissolution of limestone that are large enough for an average-sized person to enter.
- Solution Cavities – a natural cavity or depression formed as a result of dissolution of limestone.
- Solution-enlarged Fractures – fractures that show evidence of being locally enlarged by dissolution of limestone, may be part of interconnected voids connecting surface with subsurface strata.
- Faults- a fracture along which there has been displacement of one side of the fracture relative to the other.
- Manmade features affecting bedrock - unplugged abandoned water wells, quarries, or cultural features that would permit infiltration of surface water to subsurface strata.
- Swallet or swallow holes – a recharge feature in a streambed or drainage where surface flow is diverted to subsurface strata.
- Sinkholes – a broad topographic depression greater than 6 feet in diameter with more than 6 inches of topographic relief that provides a pathway to subsurface strata.

4.4.2. Category 2: Streams and associated streambeds

Streams and associated streambeds that transport water to recharge features or contain aquatic communities that would be adversely affected by degraded water quality. This category includes all creeks and associated tributaries lying over the recharge and artesian zones of the Barton Springs Segment of the Edwards Aquifer.

4.4.3. Category 3: Floodplains and Wetlands

Floodplains, wetlands, associated soils, and vegetation that would attenuate rainfall runoff, decrease the volume and velocity of flood flows, filter suspended solids and contaminants, and contribute to groundwater recharge. Construction and development activities in the vicinity of

³² Section III.A.2A, "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones", Application Form 0585, Texas Commission on Environmental Quality, October, 2004.

floodplains and wetlands are governed by several existing federal regulatory programs, as outlined below.

4.4.4. Category 4: Edwards Aquifer discharge areas

Involving seeps and springs including: Power House Spring near Tom Miller Dam, Seiders Springs on Shoal Creek, Cold Springs near Town Lake, Manchaca Springs on a tributary of Onion Creek, Barton Springs, and Barton Creek. These areas support biological communities including rare or endangered species that depend on spring discharge entirely or partially for survival. Because these features function as a result of the combined effects of pumping and recharge, they are directly affected by effects to the previous Categories 1-3.

As discussed in more detail below, all projects under the jurisdiction of the TCEQ's Edwards Aquifer Protection Program require a geologic assessment. These features should be identified and categorized as a part of this assessment. Categories 1-3 are geographically located with generally finite boundaries, and can function to substantially affect water quality. Therefore, protection of these features is the first line of defense in protecting Category 4 features. A number of structural and non-structural measures are identified in this Plan to protect Critical Environmental Features. Category 1, 2 and 4 features should be protected using dedicated offsets, as described below. Procedures for protecting Category 3 features (floodplains wetlands) have been incorporated into the protections for streams. Any development occurring in the vicinity of these features should incorporate the water quality protection measures prescribed in this Plan.

4.5. Description of Threatened/Endangered Species in the Planning Region

While there are several threatened and/or endangered species that inhabit the Planning Region, the most prominent is the Barton Springs salamander. The Barton Springs salamander (*Eurycea sosorum*) was listed as endangered by the U.S. Fish and Wildlife Service (USFWS) in 1997.³³ As a part of its Draft Recovery Plan,³⁴ the USFWS indicates that it has listed the Barton Springs salamander as a Federally endangered species based on the following threats:

- Degradation of the quality and quantity of water that feeds Barton Springs resulting from urban expansion
- Modification of the salamander's surface habitat
- Lack of a comprehensive plan to protect Barton Springs watershed from increasing threats to water quality and water quantity, and
- The salamander's extreme vulnerability to environmental degradation because of its restricted range in an entirely aquatic environment.

The Barton Springs salamander is also listed as endangered by the State of Texas. The Barton Springs salamander has only been documented at four spring outlets (collectively known as Barton

³³ Federal Register, Volume 62, Number 39, Thursday, February 27, 2003, Pages 9094-9095. (62 FR 23377-23392, Service 1997). May 30, 1997.

³⁴ "Draft Recovery Plan for the Barton Springs Salamander (*Eurycea sosorum*)". U.S. Fish and Wildlife Service, Albuquerque, NM., 2004.

Springs) within the City of Austin's Zilker Park. Barton Springs salamanders live in flowing water within a narrow temperature range. Their habitat includes clean gravel aquatic plants and leaf litter. They are dependent on spring flow and the abundance of aquatic plants for survival. Sedimentation, poor water quality, and flooding can affect their habitat.

In response to the federal listing and the recognized threats to the Barton Springs Salamander, the USFWS has taken several measures to protect the species. In addition to the Draft Recovery Plan, the USFWS has also engaged in several cooperative efforts. Most recently, the USFWS has entered into a cooperative agreement with the TCEQ to allow for the implementation of optional water quality protection measures. The USFWS has determined that these optional measures will not result in a "take" of the Barton Springs Salamander. Individuals and entities that follow these optional measures will be in compliance with the requirements of the Endangered Species Act, as described below.

During the public and agency comment process, the USFWS conducted a review of the water quality protection measures presented in this Plan. Based on that review, the USFWS has determined that the measures recommended in the Plan, if implemented, will protect the Salamander and contribute to the recovery of its habitat.³⁵

³⁵ Letter from Mr. Robert T. Pine, Supervisor, Austin Office of the USFWS, to Mr. Terry Tull, Executive Director of the Regional Water Quality Planning Project, received May 2, 2005.

5. EXISTING WATER QUALITY REGULATORY PROGRAMS

There are many existing water quality regulatory programs. Although there are numerous specific water quality regulatory programs at both the federal and state level, the major programs pertaining to the Planning Region are summarized below. More information on the specific requirements of each program can be obtained from the implementing agency. A detailed presentation of existing federal and state water quality regulatory programs is included in Appendix H.

5.1. TCEQ Edwards Aquifer Protection Program

The Edwards Aquifer Protection Program³⁶ (EAPP) is a state instituted program intended to provide additional protection to the Edwards Aquifer, administered by the TCEQ. The EAPP regulations govern soil disturbance activities over the recharge zone, contributing zone and the transition zone of the Edwards Aquifer, through the approval of site specific Water Pollution Abatement Plans (WPAPs) and Contributing Zone Plans (CZPs). Approved plans utilize a combination of “structural” and “non-structural” controls, and in addition to addressing construction and post-construction erosion and sedimentation control for any new development project, must also include special provisions for the following types of projects:

- Organized Sewage Collection Systems
- Underground Storage Tank (UST) facilities for hydrocarbons and hazardous substances
- Aboveground Storage Tank (AST) facilities for hydrocarbons and hazardous substances

5.2. TCEQ TPDES Regulations

The Texas Pollutant Discharge Elimination System (TPDES) regulations³⁷ are state requirements instituted based on the federal Clean Water Act (CWA) and the Texas Water Code (TWC). The TCEQ has been officially delegated federal permitting authority for the TPDES program under the National Pollutant Discharge Elimination System (NPDES). This means that the TCEQ administers the permitting and enforcement program for all NPDES discharges (all point source wastewater discharges and certain storm non-point source discharges) in the state.

The regulations require that a combination of “structural” and “non-structural” controls be utilized under the terms of an individual permit or other regulatory approvals, including permits by rule and general permits. These regulations include requirements for public notice and public involvement in the regulatory approval process. These regulations govern numerous types of discharges, including point source wastewater discharges and storm water non-point source discharges.

³⁶ The Edwards Aquifer regulations are codified in Title 30, Texas Administrative Code (TAC), Chapter 213, “Edwards Aquifer”. [30 TAC §213.1-§213.28]

³⁷ The TPDES regulations are codified in 30 TAC §307, “Texas Surface Water Quality Standards”, 30 TAC §308, “Criteria and Standards for the National Pollutant Discharge Elimination System”, 30 TAC §309, “Domestic Wastewater Effluent Limitation and Plant Siting”, 30 TAC §311, “Watershed Protection”, 30 TAC §312, “Sludge Use, Disposal, and Transportation”, 30 TAC §314, “Toxic Pollutant Effluent Standards”, 30 TAC §315, “Pretreatment Regulations for Existing and New Sources of Pollution”, and 30 TAC §317, “Design Criteria for Sewerage Systems”

5.2.1. Point Source Wastewater Discharges

TCEQ TPDES regulations govern all point source wastewater discharges in the state, including domestic and industrial wastewater. These discharges are required to meet the treatment standards and effluent quality identified in the regulations. In the Planning Region, the Edwards Aquifer rules restrict certain wastewater discharges.

The TCEQ has established Critical Water Quality Parameters listed in Chapter 7: Texas Surface Water Quality Standards, Chapter 307, §§307.1-307.10, required to allow human use and maintain aquatic life. These standards also include maximum threshold criteria for specific toxic materials for aquatic life protection. Parameters included in the TCEQ Water Quality Standards for specific stream segments in each river basin include: 1) chlorides; 2) sulfates; 3) total dissolved solids; 4) dissolved oxygen; 5) pH; 6) indicator bacteria; 7) temperature; and 8) flow criteria below which some of these previous standards (1-7) will not apply;. The standards also list acute and chronic criteria for 39 different toxic materials.

5.2.2. Municipal Storm Water Discharges

In the early 1990's, EPA adopted the Phase I Storm Water Regulations. Among other things, these regulations governed storm water non-point source (NPS) pollution from large (greater than 100,000 population) municipal separate storm sewer systems (MS4s). Under Phase I, MS4s were defined as publicly owned separate storm sewers that are located in an incorporated municipality or county with a population of 100,000 or more.³⁸ The owners and/or operators of these MS4s were required to obtain individual permits, characterize their storm water, institute certain monitoring and control measures, and conduct public education. The only permitted Phase I MS4 in the Planning Region is the City of Austin.

In 1999, the EPA adopted the Phase II Storm Water Regulations, which extended storm water NPS regulation to smaller MS4s in defined urbanized areas. Under Phase II, the definition of an MS4 was expanded to include any storm water conveyance or system of conveyances that is operated by a public entity within these defined areas.³⁹ While the Phase II storm water regulations do not require cities to obtain individual permits, they must characterize their storm water and develop, implement, and enforce a Storm Water Management Plan (SWMP), designed to reduce the discharge of pollutants from their MS4 to the "maximum extent practicable." The Phase II rules use narrative, rather than numeric, criteria for controlling water quality.⁴⁰ To comply with these regulations, SWMPs must include the following six (6) minimum control measures:

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination

³⁸ See 40 CFR §122.26(b)(4) and §122.26(b)(7)

³⁹ See 40 CFR §122.26(b)(8)

⁴⁰ "Storm Water Phase II Final Rule, An Overview", Fact Sheet 1.0, Publication No. EPA883-F-00-001, U.S. EPA, January 2000.

- Construction Site Storm Water Runoff Controls
- Post Construction Storm Water Management in Areas of New and Redevelopment
- Pollution Prevention and Good Housekeeping Measures for Municipal Operations.

The Phase II regulations also allow SWMPs to be expanded to include a seventh minimum control measure, addressing construction activities conducted by the operator of the regulated MS4. This measure could be incorporated in lieu of obtaining coverage for individual construction projects under a general permit. The TCEQ has currently issued a draft general permit to be used by all small MS4s wishing to obtain coverage through a general permit.⁴¹ However, this permit has not been issued in final form.

Based on information developed by the TCEQ and the EPA,⁴² the following local government entities in the Planning Region are subject to these regulations:

• Village of Bee Cave	• City of Rollingwood
• City of Buda	• City of Sunset Valley
• City of Hays	• Travis County
• Hays County	• City of West Lake Hills

5.2.3. Industrial Site Storm Water Discharges

In addition to regulating municipal NPS storm water discharges, Phase I of the EPA’s storm water regulations also governed a wide range of industrial site discharges. The list of regulated industrial activities was expanded in the Phase II storm water regulations. These industrial discharges are subject to numerous technical standards. The TCEQ has currently issued a general permit that can be used to cover discharges from industrial facilities meeting certain conditions. Industrial storm water dischargers can also obtain an individual TPDES permit, in lieu of utilizing a general permit. Both the individual and general permits require permittees to characterize their storm water and institute certain control measures. Industrial discharges obtaining coverage through a general permit are required to notify any applicable MS4s that may receive their storm water discharges.

5.2.4. Construction Site Storm Water Discharges

The EPA’s Phase I storm water regulations also governed storm water non-point source (NPS) pollution from construction sites greater than five (5) acres in size. With the implementation of the Phase II storm water regulations, this threshold has been reduced to one (1) acre in size. This threshold applies to all parts of sites with a “common plan of development”, even if they are not constructed at the same time. The requirements of this provision apply regardless of the type or sequencing of construction. The application of this provision to commercial and multi-family residential construction is straightforward. However, this provision also governs all construction (including individual residences) within a typical residential subdivision, even if the residences

⁴¹ The notice of Proposed General Permit No. TXR040000 was published in the Texas Register on September 27, 2002.

⁴² Information on the requirements for these permits and a description of the areas covered is available on the TCEQ internet website (<http://www.tnrcc.state.tx.us/permitting/waterperm/wwperm/ms4.html>).

are constructed well after the construction of the common development components (e.g. streets, drainage facilities, etc) is completed.

Current federal and state regulations require controls to be implemented to prevent storm water discharges from construction sites from adversely impacting water quality. TCEQ rules and regulations prohibit discharges from construction sites that “would cause or contribute to a violation of water quality standards or that would fail to protect and maintain existing designated uses.”⁴³ These regulations also require all control measures to be “adequately maintained to effectively reduce or prohibit erosion”.⁴⁴ Owners and operators are required to “describe and ensure the implementation of practices that will be used to reduce the pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions” of the regulations.⁴⁵ Erosion and sediment controls must be designed to retain sediment on-site to the extent practicable with consideration for local topography, soil type and rainfall.⁴⁶

5.3. TCEQ OSSF Program

The Texas On-Site Sewage Facility (OSSF) Program⁴⁷ is based on the Texas Health and Safety Code⁴⁸ and is administered by the TCEQ. These regulations govern the installation, operation and maintenance of OSSF’s including septic tanks, irrigation systems, proprietary treatment systems and others. The program utilizes primarily “structural” controls, is implemented through a permit program, and can be delegated to qualified local governments. In the Planning Region, the following local governments implement the TCEQ OSSF program:

- City of Austin
- Village of Bee Cave
- Blanco County
- Hays County
- LCRA
- City of Rollingwood
- Travis County

5.4. Federal Endangered Species Program

The federal endangered species programs are administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and are based primarily on the federal Endangered Species Act (ESA). The programs have several different elements. The first element is a “Listing Program” which includes procedures to evaluate and list “threatened” and “endangered” species, as mandated by the ESA. In instances where the implementing agency identifies a species as endangered, a Species

⁴³ Article II.B.3., TCEQ General Permit No. TXR150000, issued March 5, 2003, under the authority of the Federal Clean Water Act, Section 402 and the Texas Water Code, Section 26.040

⁴⁴ Article II.D.1.(c), TCEQ General Permit No. TXR150000

⁴⁵ Article III, TCEQ General Permit No. TXR150000

⁴⁶ Article III.F.2(a)(i), TCEQ General Permit No. TXR150000

⁴⁷ The OSSF regulations are codified in 30 TAC §285, “On-Site Sewage Facilities”

⁴⁸ Texas “Health and Safety Code”, Title 5, “Sanitation and Environmental Quality”, Chapter 366, “On-Site Sewage Disposal Systems”, §366.001-§366.0923.

Recovery Plan (SRP) is to be developed. Another element of the programs is a review of “Federal Actions” to avert or minimize their impact on endangered species. This requires all federal agencies to aid conservation efforts for endangered species and to consult with USFWS on direct federal actions, actions using federal funds, and the issuance of permits under federal programs, including delegated states. A third element of the programs is to prohibit the taking of endangered species. The implementing agency is allowed to adopt provisions to prohibit the taking, possession, sale, or transfer of certain endangered species, to allow the issuance of incidental take permits, and to coordinate Habitat Conservation Plans (HCPs).

5.5. Other State Water Quality Programs

In addition to the programs presented above, there are several other state programs with a partial focus on water quality. These are listed below with a basic description of the regulated activities:

- Texas Oil and Gas Environmental Program⁴⁹ – administered by the Railroad Commission of Texas (RRC), regulates the exploration and production of oil, gas and geothermal resources and the disposal and clean-up of associated wastes.
- Texas Municipal Solid Waste Program⁵⁰ – administered by the TCEQ, regulates the transportation, storage, processing and disposal of municipal solid waste (garbage)
- Texas Petroleum Storage Tank Program⁵¹ - administered by the TCEQ, regulates the installation, operation and pollution from petroleum storage tanks
- Texas Industrial and Hazardous Waste Program⁵² – administered by the TCEQ, regulates the handling, transportation, storage, processing and disposal of hazardous and non-hazardous industrial solid waste
- Texas Agricultural and Silvicultural Water Quality Management Program⁵³ – administered by the Texas State Soil and Water Conservation Board (TSSWCB), is a voluntary program to control pollution from certain agricultural operations.

5.6. Other Federal Water Quality or Related Programs

In addition to the programs presented above, there are several other federal programs with a partial focus on water quality, that have not already been covered under another federal or state program. These include:

- Federal Spill Prevention, Control and Countermeasure (SPCC) Program - administered by the U.S. EPA, regulates the storage and handling of petroleum products and hazardous materials.⁵⁴

⁴⁹ The Texas Oil and Gas Environmental program regulations are codified in 16 TAC §3, “Oil and Gas Division” and 16 TAC §4, “Environmental Protection”.

⁵⁰ The Texas Municipal Solid Waste regulations are codified in 30 TAC §330, “Municipal Solid Waste”.

⁵¹ The Texas Petroleum Storage Tank regulations are codified in 30 TAC §334, “Underground and Aboveground Storage Tanks”.

⁵² The Texas Industrial and Hazardous Waste regulations are codified in 30 TAC §335, “Industrial Solid Waste and Municipal Hazardous Waste”.

⁵³ The Texas Agricultural and Silvicultural Water Quality Management Program regulations are codified in 31 TAC §523, “Agricultural and Silvicultural Water Quality Management”.

⁵⁴ The Federal SPCC program regulations are codified in 40 CFR §112.

- Federal Superfund Program – administered by the EPA, requires the compilation and management of the National Priorities List (NPL) for contaminated sites, governs the clean-up of those sites and outlines the Emergency Planning and Community Right-to-Know program.
- Federal Toxic Substances Control Program – administered by the EPA, regulates the creation, use, transportation, storage, processing and disposal of toxic substances.
- National Wetlands Program – administered by the U.S. Army Corps of Engineers, regulates construction activities, dredging and placement of fill in jurisdictional wetlands and navigable waterways.⁵⁵
- National Floodplain Program – administered by the Federal Emergency Management Agency (FEMA), regulates construction activities and development in floodplains.⁵⁶

5.7. Local Water Quality Programs

There are a number of existing regulatory programs at the local level specifically intended to protect water quality, both inside and outside the Planning Region. The following sections describe in general the central elements of these local programs both inside and outside the Planning Region. A summary presentation of these programs is included in Appendix I.

5.7.1. Local Programs Within the Planning Region

Several local jurisdictions within the Planning Region currently have local water quality protection programs. The City of Austin has a number of land development controls intended to protect water quality, including the Save Our Springs Initiative, adopted in 1992.⁵⁷ The resulting development ordinances require certain water quality protection measures within the Barton Creek watershed. In addition, the City of Buda and the Village of Bee Caves have water quality protection ordinances. The LCRA also has existing water quality protection ordinances applicable to portions of Travis County.

5.7.2. Local Programs In the General Area but Outside the Planning Region

There are several local jurisdictions in the general area, but outside the Planning Region that have existing water quality regulatory programs. However, due to the unique characteristics within the Planning Region, only areas with similar hydrogeology could be considered applicable for comparison purposes. The water quality ordinances from the Cities of New Braunfels, San Antonio and San Marcos⁵⁸ were selected for comparison due to their proximity to the Edwards Aquifer and similar hydrogeology.

⁵⁵ The National Wetlands Program is administered under the authority of Section 404 of the Federal Clean Water Act.

⁵⁶ The National Floodplain Program regulations are codified in 40 CFR §9, "Floodplain Management and Protection of Wetlands"

⁵⁷ Land development restrictions instituted by the City of Austin are codified in the Austin City Code, Title 25, "Land Development".

⁵⁸ Land development restrictions instituted by the City of San Marcos are codified in the San Marcos City Code, Chapter 94, "Development Standards".

6. WATER QUALITY PARAMETERS AND MONITORING

There were numerous water quality parameters evaluated as a part of the planning process. While many of these parameters were applicable to both surface water and groundwater, some were only applicable to one medium.

6.1. Definition of Water Quality Parameter

In general, “water quality parameters” are defined as physical, chemical or biological constituents in water or other indicators used to assess, monitor and control water quality. However, one of the objectives of the Plan is to institute water quality protection measures designed to minimize the introduction of pollutants into water. With this understanding, the working definition of a water quality parameter adopted for this Plan is:

Water Quality Parameter: A physical property or a chemical or biological constituent in water which is used to assess, monitor and control water quality

Water quality parameters address specific chemical, physical, or biological aspects of surface or ground water that affect the ability of the water to support human uses or maintain aquatic life. The level of suitability for human use or maintenance of aquatic life would be determined by the quantity of water available, the type of water quality constituents present, and whether the minimum or maximum acceptable threshold concentration levels of the constituents have been exceeded. Many different public and private scientific studies of water quality have identified numerous water quality parameters used for different purposes. The further discussion of water quality parameters in this Plan will be subdivided by the water medium (surface water, groundwater or both) to which these parameters apply. In addition to their subdivision by medium, the Plan discusses the use of water quality parameters in four (4) general contexts:

- General Categories of Water Quality Parameters
- Historical monitoring
- Planning and design
- Monitoring and evaluation

6.2. General Categories of Water Quality Parameters

There are numerous ways to assign water quality parameters to general categories. Since regulatory programs are a significant factor in determining which water quality parameters are widely used, the general categories used by these regulatory programs serve as a good starting point for distinguishing between various parameters. Although numerous water quality parameters have been identified, a smaller (although still extensive) set of water quality parameters is used in these regulatory programs for the purposes of assessing water quality and evaluating compliance with regulatory standards. Also, since most regulatory programs require some type of monitoring, there is generally a much larger universe of available data for the monitored parameters through these regulatory programs. This is certainly true for the Planning Region. While the scope of this Plan prevents a complete listing of all the parameters utilized by all the current water quality regulatory programs, several general categories of water quality parameters have been identified that span most

water quality regulatory programs.⁵⁹ These general categories will provide some background information on water quality parameters.

6.2.1. Solids

Solids in water originate from many sources and can vary widely in size and physical form. They are introduced into the water column in a variety of ways, including human activity and natural process. Solids can float on the surface, be suspended, or settle out of the water column. Floating solids are an anecdotal water quality parameter, since they are generally observed visually and do not require a specific measurement method. Suspended solids are most frequently measured in water as Total Suspended Solids (TSS). A secondary parameter for solids in water is turbidity. However, turbidity can also at times be affected by dissolved constituents.

Floating or suspended solids increase turbidity, reduce light penetration, and limit the growth of desirable aquatic plants. Solids that settle out as bottom deposits contribute to sedimentation and can alter and eventually destroy habitat for fish and bottom-dwelling organisms. Solids can also facilitate the transport, storage and accumulation of other pollutants. Pollutants bound up in settled solids remain in contact with the water column and are subject to re-suspension, and redeposition.

In most locations, solids are primarily a surface water issue, since they are often filtered out of groundwater by the earthen media. However, aquifers in karst environments, such as the Edwards Aquifer, can experience very pronounced solids impacts to groundwater due to the short-circuiting of groundwater flow through faults, fractures and secondary features. This short-circuiting prevents the natural filtering process which normally removes these solids. For this reason, TSS is a water quality parameter that applies to both surface water and groundwater in the Planning Region.

6.2.2. Dissolved Oxygen/Oxygen-demanding Substances

Adequate levels of dissolved oxygen in water are necessary for the survival of aquatic plants and animals. However, many pollutants sequester or extract oxygen when introduced into the water column. These pollutants are generally described as oxygen-demanding substances. While these substances vary in origin and composition, they all can adversely impact water quality by removing sufficient oxygen from the water column to reduce dissolved oxygen levels below those necessary to sustain aquatic life.

Several different water quality parameters are used to quantify this condition. The first is the direct measurement of dissolved oxygen (DO) in the water column, most frequently using a hand-held probe. Oxygen demand potential for substance in the water is typically measured by Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Organic Carbon (TOC), utilizing laboratory tests.

⁵⁹ "Preliminary Data Summary of Urban Storm Water Best Management Practices", Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

Although oxygen demanding substances are most frequently encountered in surface water, insufficient DO levels can also occur in groundwater. If DO levels are reduced prior to surface water being recharged to groundwater, there is typically no mechanism available in the earthen media to reintroduce oxygen to the water. For this reason, DO, BOD, COD and TOC are parameters that apply to both surface water and groundwater in the Planning Region.

6.2.3. Nutrients (primarily nitrogen and phosphorus)

Nutrients are necessary to support aquatic life. The principal nutrients impacting water quality are nitrogen and phosphorus. Major sources of these nutrients include urban landscape runoff (fertilizers, detergents, plant debris), atmospheric deposition, improperly functioning domestic waste management systems, animal wastes, and in some instances treated domestic wastewater.

A number of water quality parameters are used to measure the various forms of nitrogen and phosphorus in water. Ammonia (NH_3) nitrogen is the nitrogen form that is usually the most readily toxic to aquatic life. Nitrate (NO_3) and nitrite (NO_2) are the inorganic fractions of nitrogen. Total Kjeldahl nitrogen (TKN) measures the organic and ammonia nitrogen forms. By subtraction, the organic fraction can be determined. Total phosphorus measures the total amount of phosphorus in both the organic and inorganic forms. Orthophosphate measures phosphorus that is most immediately biologically available.

Excessive quantities of nutrients in the water column can result in significant increases in primary biological productivity, with the major impact being excessive algal growth. In surface waters, this can lead to nuisance algal blooms and eutrophication. A secondary impact is increased oxygen demand resulting from the decomposition of dead algae.

As discussed above in the section on solids, the karst characteristics of the Edwards Aquifer often circumvent the natural filtering process which might normally remove these nutrients from groundwater. For this reason, the nutrient parameters identified above apply to both surface water and groundwater in the Planning Region.

6.2.4. Pathogens

Pathogens are disease-producing organisms that present a potential health threat when present in water. The principle pathogens from a water quality standpoint are bacteria, viruses, protozoans and toxigenic fungi. These pathogens are typically introduced to water through contact with human or animal waste products, or decomposing organic matter. Some types of pathogenic bacteria are also naturally present in soil and can be introduced where surface water or groundwater come in contact with that soil. Since they are living organisms, pathogens require favorable environmental conditions (e.g. suitable temperatures, etc.) for their continued existence. Pathogens pose potential health threats to humans, animals and aquatic life.

Due to the large number of species and significant variations within each species, the monitoring and identification of pathogens is difficult. However, a number of indicator organisms have been used historically to assess the presence of harmful pathogens in water. While not necessarily pathogenic themselves, these indicator organisms can provide a useful marker when

attempting to assess and quantify the presence of pathogenic organisms. Fecal coliform has been widely used as a parameter indicating the presence of harmful pathogens in wastewaters and storm water runoff. Other bacterial indicator parameters that have been used to evaluate the presence of harmful pathogens in water include escherichia coli, streptococci and enterococci. In more specialized situations, the presence of enteric viruses and/or protozoans such as Giardia lamblia and cryptosporidium are also monitored. Specific laboratory testing and evaluation is typically required to measure the presence of these pathogens and surrogate indicator parameters.

As discussed above in the section on solids, the karst characteristics of the Edwards Aquifer often circumvent the natural filtering process which might normally remove most pathogenic organisms from groundwater. For this reason, pathogens are water quality parameters that apply to both surface water and groundwater in the Planning Region.

6.2.5. Petroleum Hydrocarbons

Petroleum hydrocarbons include oil and grease; volatile and semi-volatile organic compounds (VOCs and SVOCs), and a variety of polynuclear aromatic hydrocarbons (PAHs). Sources of petroleum hydrocarbons include parking lots and roadways, leaking storage tanks, auto emissions, and improper disposal of waste oils and other petroleum products. Higher concentrations are typically found in soils and sediments along transportation corridors.

Numerous scientific studies have evaluated and identified various toxic effects of petroleum hydrocarbons, sometimes at very low concentrations. These toxic effects pose potential health threats to humans, animals and aquatic life. Numerous regulatory agencies have established water quality criteria for petroleum hydrocarbons, principally VOCs, SVOCs, and PAH compounds. Most petroleum hydrocarbons have low solubility in water and will generally remain phase-separated when in contact with water. In a phase separated state, petroleum hydrocarbons are still mobile in both surface water and groundwater. However, a few petroleum hydrocarbons have higher solubility and will partition readily into water when they are in contact. Once dissolved in water, petroleum hydrocarbons are very mobile in both surface water and groundwater. Specific laboratory testing and evaluation is typically required to measure the presence of petroleum hydrocarbon parameters.

Due to their mobility in both surface water and groundwater, petroleum hydrocarbon parameters apply to both surface water and groundwater in the Planning Region.

6.2.6. Metals

Metals are naturally occurring compounds that are frequently encountered in water. The principal sources of metals in water are industrial activity and mechanized equipment, including automobiles. Metals are introduced to water through a variety of processes, including storm water runoff, atmospheric deposition, leaching of earthen materials.

Various regulatory programs categorize “heavy metals” as priority pollutants. While the definition of this term varies some across regulatory programs, heavy metals generally include

arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver and zinc⁶⁰. In water, metals are most frequently encountered in dissolved form. Metals may also be adhered to suspended solids. In dissolved form, metals are very mobile in both surface water and groundwater. Metals in water have the potential to impact human uses and cause acute or chronic toxic impacts to aquatic life. Specific laboratory testing and evaluation is typically required to measure the presence of metals parameters.

Due to their mobility in both surface water and groundwater, metals parameters apply to both surface water and groundwater in the Planning Region.

6.2.7. Synthetic Organic Compounds

The term synthetic organic compounds (SOCs) is used to describe a variety of manufactured or refined organic compounds, including pesticides, solvents and household and industrial chemicals. The principle sources of SOC are the residuals of these chemicals. SOC are introduced to water through a variety of processes, including storm water runoff, discharge through point sources and atmospheric deposition.

Various regulatory programs categorize SOC as priority pollutants. Most SOC are soluble in water and are therefore very mobile in both surface water and groundwater. Numerous scientific studies have identified SOC as posing serious health risks to humans and aquatic life, often at very low concentrations. One aspect generally unique to SOC is their tendency for bioaccumulation in the food chain. Specific laboratory testing and evaluation is typically required to measure the presence of SOC.

Due to their mobility in both surface water and groundwater, SOC parameters apply to both surface water and groundwater in the Planning Region.

6.2.8. Physical Parameters

Several physical parameters of water also play a key role in evaluating and assessing water quality.

6.2.8.1. Temperature

Water temperature is an important measure of water quality, since the temperature affects other physical properties of water, including conductance and the solubility of both chemical compounds and gases.⁶¹ Other previously identified parameters, such as DO, are directly linked to temperature. The principal determinants of water temperature are natural. However, increased temperature can be imparted to water through the discharge or runoff of

⁶⁰ Sources: Title 40, Code of Federal Regulations (CFR), Chapter 261, [40 CFR §261] "Identification and Listing of Hazardous Wastes", 40 CFR §403, "General Pretreatment Regulations for Existing and New Sources of Pollution", Appendix G, and 40 CFR §503, "Standards for the Use or Disposal of Sewage Sludge"

⁶¹ Malina, J. F. 1996. "Chapter 8: Water Quality.", Water Resources Handbook. L. W. Mays, ed. McGraw-Hill. New York, NY.

water whose temperature has artificially been raised due to human activity. Temperature is measured directly using a variety of different instruments.

Elevated temperatures are typically a water quality issue for surface water since the significant geothermal capacity of earthen media tends to moderate groundwater temperatures rapidly. In surface water, elevated temperatures can significantly increase the metabolism, respiration, and oxygen demand of fish and other aquatic life. This poses a potential threat to aquatic life. While excessive temperature can sometimes cause direct mortality, it is more often the secondary conditions associated with elevated temperature (e.g. low DO) which result in mortality. Even if significant aquatic life mortality does not result from elevated temperatures, it can result in a change of character in the aquatic life in surface water bodies⁶². Sudden changes in temperature can also directly stress aquatic ecosystems. Due to its unique impacts to surface water, temperature is a water quality parameter which generally only applies to surface water in the Planning Region.

6.2.8.2.pH

pH is a measure of the effective concentration of hydrogen ions in water. While pH levels fluctuate naturally based on changes in temperature, circulation, and DO content, significant changes in pH can result from the introduction of additional water with differing pH levels, or through the introduction of other compounds in the water. Most aquatic ecosystems experience natural fluctuations of pH, but can be significantly harmed if human activity or natural events cause significant changes in pH levels. Rainwater typically has much lower pH levels than surface waters (e.g. acid precipitation), while storm runoff from alkaline environments can have much higher pH levels. Groundwater flowing through earthen media can also experience significant changes in pH based on the characteristics of the media. pH is measured directly using a variety of different instruments. pH is a water quality parameter that applies equally to surface water and groundwater.

6.3. Historical Monitoring in the Planning Region

A significant amount of historical monitoring has been conducted in the Planning Region by a variety of entities.

6.3.1. City of Austin

For many years, the City of Austin has conducted extensive monitoring for a wide variety of water quality parameters on both surface water and groundwater. Large volumes of data are available from this source for parameters such as total suspended solids, bacteria, oxygen consuming constituents, nutrients, petroleum hydrocarbons and metals. A lesser volume of data is available for infrequent constituents and priority pollutants.⁶³

⁶² "Water Quality Criteria, Second Edition", Publication No. 3-A, California State Water Resources Control Board, 1963.

⁶³ Various data compilations, publications and other documentation, obtained from the City of Austin Watershed Protection and Development Review Department, obtained October, 2004.

6.3.2. U.S. Geologic Survey

The U.S. Geologic Survey (USGS) has also conducted extensive monitoring for a wide variety of water quality parameters on both surface water and groundwater within the Planning Region. This data was compiled from a combination of fixed, continuous monitoring stations and one-time events. A large portion of this data is available to the public on the internet⁶⁴ in raw format. Additional data and data compilations are available in a wide range of reports, many of which are also available on the internet.⁶⁵

6.3.3. Lower Colorado River Authority

The LCRA has also conducted monitoring in the Planning Region for a number of years. This monitoring includes chemical and biological monitoring on the Colorado River and its major tributaries on a periodic basis. The LCRA also has its own internal laboratory. A large portion of this data is available to the public on the internet.⁶⁶

6.3.4. Texas Commission on Environmental Quality

The TCEQ has also conducted monitoring in the Planning Region for a number of years. This monitoring includes chemical and biological monitoring on numerous streams on a periodic basis as a part of its Water Quality Inventory and its assessment of impaired waters under Section 303(d) of the federal CWA. The TCEQ also supervises a significant coordinated monitoring program. A large portion of the TCEQ's data is available to the public on the internet.⁶⁷

6.3.5. Other Public and Private Entities

Several other public and private entities have collected historical monitoring data in the Planning Region. This data is available in a variety of formats. Please refer to the Technical Reference List in Appendix J for other data sources used in conjunction with this planning effort.

6.4. Planning and Design

Water quality data used for planning and design should be evaluated and treated differently than data used for monitoring and evaluation. One primary difference is the number of parameters to be used. While in monitoring and evaluation, all parameters of concern should be addressed. However, for planning and design, a more limited approach can be taken. This limited approach typically focuses on using representative parameters. In this situation, one or two representative parameters are used to represent several monitoring parameters.

Water quality parameters used for planning and design have been selected to be representative of the major broad issues, while an expanded list of parameters is recommended for monitoring and

⁶⁴ <http://tx.usgs.gov/aquifer/edwards.html> and <http://nwis.waterdata.usgs.gov/tx/nwis/qwdata>

⁶⁵ http://tx.usgs.gov/aquifer/biblio_aquifer.html

⁶⁶ <http://waterquality.lcra.org/sitelist.asp>

⁶⁷ http://www.tnrcc.state.tx.us/water/quality/data/wqm/swqm_data.html

evaluation purposes. In general the selected parameters represent the movement and transport of other similar parameters and can serve as surrogates for them during the design process. These other parameters will, however, be independently monitored as part of the comprehensive management process. The following water quality parameters have been identified for use in planning and design in conjunction with this Plan. In addition, these parameters have been further subdivided by the water medium which may be affected (surface water, groundwater or both).

6.4.1. Design Parameters Applicable to Both Surface water and Groundwater:

- Suspended Solids/Sediment
- Total Dissolved Solids
- Suspended biological constituents/oxygen depleting constituents

6.4.2. Design Parameters Applicable Only to Surface Water

- Floating constituents

6.5. Monitoring and Evaluation

An on-going water quality monitoring and evaluation process will be an integral part of implementing the water quality protection measures from this Plan. This monitoring program should encompass a variety of water quality parameters and should include all surface watersheds, and representative groundwater wells within the Planning Region. The recommended monitoring program is presented below. On-going evaluation of the monitoring data will take place as a part of implementing the Plan. Elements of the evaluation program have been described in the Implementation section.

6.5.1. Benefits of Coordinated Monitoring

A coordinated monitoring program will provide many benefits to the Planning Region. As indicated previously, there are a number of different entities currently engaged in varying degrees of water quality monitoring and evaluation. Coordinating these efforts can result in more cost efficient monitoring which should result in corresponding savings in expenditures for the various public entities. The coordinated monitoring program can ensure that adequate data is collected in representative locations, and that the selected monitored parameters are adequately sensitive and predictive of changes in water quality. Specific recommendations for coordinating the monitoring program are outlined in the Implementation section.

In addition to coordinating the collection of the data, the reporting and public availability of the data should also be coordinated. There will be a number of entities, public and private, involved in the implementation of the Plan. The results of the monitoring data should be publicly available, ensuring that all of the entities involved have this data at their disposal during the decision-making processes required by this Plan. The data should be maintained in a central repository, with access to the raw data available over the internet or another suitable means.

6.5.2. Strategy for Defining the Monitoring Program

There was considerable discussion during the planning process over that strategy to be used to define the monitoring program. Some stakeholders suggested that a monitoring program be defined to include monitoring all outfalls for all new development, as well as representative monitoring points for both surface water and groundwater. The primary concerns expressed from this viewpoint involved the need to accurately assess the capabilities of the recommended water quality protection measures and to respond quickly to potential water quality problems. Other stakeholders as well as members of the TRG indicated that a regional monitoring network was sufficient. The primary concerns expressed from this viewpoint were the potential cost and the resources required to institute an intensive project-specific monitoring program. The approach selected for defining the monitoring programs was to establish representative regional sites for periodic monitoring, combined with an evaluation and response procedure, and public education.

6.5.3. Recommended Monitoring Parameters and Frequency

6.5.3.1. Surface Water Monitoring Parameters and Frequency

Many different existing water quality regulatory programs require monitoring for a variety of surface water parameters. The consulting team prepared a comparison of these parameters across the various regulatory programs to identify representative parameters. This comparison also looked at the parameters included in the on-going monitoring in the Planning Region, as well as the studies conducted in the Planning Region. Based on this comparison, water quality parameters occurring at least twice were considered for inclusion in the recommended monitoring program. Table 6, on the following page, presents the results of that comparison.

These parameters are recommended for inclusion in a coordinated, monthly surface water monitoring program to be implemented throughout the Planning Region. In addition to the monthly monitoring, annual monitoring for an expanded list of parameters should occur at selected sites within the Planning Region. This expanded list of parameters should consist of those specified in the TCEQ's Surface Water Quality Standards (SWQS).⁶⁸

⁶⁸ Appendix D, "Monitoring Variables and Analytical Methods", "Surface Water Quality Monitoring Procedures, Volume 1", RG-415, TCEQ, December 2003

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Table 6 – Recommended Surface Water Quality Indicator Parameters for Use in Planning Region

Water Quality Parameter	USGS 1990 ⁶⁹	COA 70	LCRA 71	TCEQ SWQS ⁷²	EPA NURP ⁷³	EPA Ph. I ⁷⁴
Field Parameters						
Conductivity		X	X			
Discharge	X	X				X
pH			X	X		X
Temperature			X	X		
Turbidity				X		X
Laboratory Parameters						
Copper (Cu)				X	X	X
E. Coli.			X	X		
Fecal Coliform				X		
Lead (Pb)				X	X	
Nitrogen, as Ammonia		X		X		
Nitrogen, as Nitrate		X	X	X		
Nitrogen, as Nitrate + Nitrite		X		X	X	X
Nitrogen, Total Kjeldahl		X		X	X	X
Oil and Grease				X		X
Organic Carbon, Total (TOC)	X			X		
Ortho-phosphorous as P		X		X		
Oxygen, Dissolved (DO)		X	X	X		
Oxygen Demand, Biochemical (BOD)	X			X	X	X
Oxygen Demand, Chemical (COD)				X	X	X
Phosphorous, Total		X		X	X	X
Solids, Total Dissolved (TDS)	X			X		
Solids, Total Suspended (TSS)	X	X		X	X	X
Sulfate		X		X		
Zinc (Zn)				X	X	

⁶⁹ Table 3, "Relation Between Urbanization and Water Quality of Streams in the Austin Area, Texas", Report 90-4107, J.E. Veenhuis, et al., U.S. Geologic Survey, 1990.

⁷⁰ See Note 63.

⁷¹ "Water quality indicators" used as a part of the LCRA's "Colorado River Watch Network" (<http://www.lcra.org/water/indicators.html>)

⁷² Selected parameters from the TCEQ's Surface Water Quality Standards. See Note 68.

⁷³ "Standard Pollutants Characterizing Urban Runoff", "Results of the Nationwide Urban Runoff Program, Volume I -- Final Report", USEPA, 1983.

⁷⁴ From the EPA's Phase I Storm Water Regulations, 40 CFR §122.26(d)(1)(iii)(D)

6.5.3.2. Groundwater Monitoring Parameters and Frequency

Existing water quality regulatory and monitoring programs include a variety of groundwater parameters. The Texas Water Development Board (TWDB) has an extensive set of historic water quality monitoring data for groundwater wells throughout the state, including the Planning Region. The TWDB standard parameter list⁷⁵ has been adopted as the recommended indicator parameter list for general water quality monitoring in the Planning Region. Table 7, below, presents the list of recommended parameters for monitoring groundwater.

Table 7 – Recommended Groundwater Quality Indicator Parameters for Use in Planning Region

Field Parameters	
Conductivity	pH
Temperature	
Laboratory Parameters	
Bicarbonate (HCO ₃)	Nitrogen, as Nitrate
Calcium (Ca)	Potassium
Carbonate (CO ₃)	Silica
Chlorides	Sodium
Fluoride	Solids, Dissolved (TDS)
Hardness (CaCO ₃)	Sulfate
Magnesium	

These parameters are recommended for inclusion in a coordinated, quarterly groundwater monitoring program to be implemented throughout the Planning Region. In addition to the quarterly monitoring, annual monitoring for an expanded list of parameters should occur at selected wells within the Planning Region. This expanded list of parameters should consist of those specified in the TCEQ’s Drinking Water Regulations⁷⁶ and should include all constituents with either a primary or secondary Maximum Contaminant Level, as defined under those regulations.

6.5.4. Recommended Monitoring Locations

If the recommended monitoring parameters are to be used to characterize water quality in the Planning Region, the resulting data must be collected from enough different locations to ensure that it represents the true diversity of the range of conditions present. While past monitoring data has been concentrated in the more developed portions of the Planning Region, the monitoring data from this point forward should be spatially diverse.

While monitoring locations should be selected based on their ability to provide representative data, they must also take into account practical considerations such as:

⁷⁵ Appendix G, “Database Field Descriptions”, “Ground-water Data System Dictionary”, Publication UM-50, Texas Water Development Board, May, 1999.

⁷⁶ 30 TAC §290

- Physical Accessibility (especially during sampling conditions)
- Legal Right of Access
- Accommodating (adequate to perform necessary sampling/measurement at the location)
- Continuity (sampling in the same location despite changes in conditions)
- Reliability (not unduly influenced by factors which might interfere with results)

These factors must all be evaluated on a site specific basis. Due to the need to do a site specific evaluation, specific locations have not been identified. Instead, general guidance has been provided to be used by the implementing entities in determining the exact location of the monitoring locations.

6.5.4.1. Surface Water Monitoring Locations

In general, at least one (1) surface water quality monitoring location should be identified in each of the previously designated watersheds⁷⁷ within the Planning Region. For larger watersheds, monitoring points should be located to be representative of each third of the watershed, based on reach length. Publicly available access points to surface water monitoring locations can typically be established in conjunction with public roadway crossings. However, additional locations may be required in some areas to accomplish the objectives of the monitoring plan.

6.5.4.2. Groundwater Monitoring Locations

Public water supply wells are obvious choices for groundwater monitoring locations. In fact, all such public water supply wells are required under current regulations to do extensive monitoring. While there are a few public water supply wells in the Planning Region, they are generally concentrated in the south and east portions. In addition to these public water supply wells, an additional set of between twenty (20) and twenty five (25) wells should be identified for incorporation into an on-going monitoring program. This number of wells should provide an approximate spacing of fifteen square miles.⁷⁸

6.5.5. Monitoring for the Protection of Endangered Species

USFWS measures recommended to ensure the recovery of the various endangered species in the Planning Region rely heavily on water quality monitoring data. The Barton Springs Salamander Recovery Plan,⁷⁹ prepared by the USFWS, specifies a number of water quality parameters to be measured to ensure the protection of the salamander. This monitoring should be coordinated with the surface water and groundwater monitoring recommended as a part of this Plan.

⁷⁷ Refer to Figure 3 and Table 5.

⁷⁸ Refer to Table 13, indicating that the Planning Region includes approximately 240,000 acres, or approximately 375 square miles.

⁷⁹ See Note 34.

7. WATER QUALITY THREATS

Based on the goals and objectives established for the Plan, there are many potential water quality threats and many different types of pollutants that may affect water quality. Many of these threats or pollutants result in some way from human activity. The major threats identified by the consultant team and Stakeholder Committee are presented below.

7.1. Urbanization

Urbanization can threaten water quality in several ways. Construction activities remove natural vegetation and can potentially increase erosion and sedimentation. Urbanization often results in more impervious cover, which increases storm water runoff rates and volumes, decreases recharge, and decreases base flow in streams. Urbanization also increases the resident population, introducing more human activity into an area. This increase in human activity often results in additional pollutant loadings from storm water runoff, the generation of more wastes (solid and liquid), and an increased use of potentially harmful materials in the newly urbanized area.

As areas change from undeveloped to developed, increases in pollutant loadings to surface water and groundwater and reductions in recharge and infiltration correspond directly to increases in development intensity. In general terms, as development intensity increases, water quality impacts also increase. In the current practice of water quality planning, the intensity of development is most often described by using the percentage of impervious cover resulting from the development. Impervious cover consists of buildings, streets, driveways, parking lots, and other types of impervious surfaces that generally increase the amount of rainfall which turns to runoff and correspondingly decreases the amount of infiltration (recharge). For the purposes of the Plan, the percentage of impervious cover has been adopted as the primary indicator of development intensity.

There is some disagreement among the scientific community on whether the impervious cover is actually the source of additional pollutant loading or whether it is an indicator parameter tied to additional human activity, which is the actual source of pollutants. In general, though, the scientific literature indicates that reductions in recharge and corresponding changes in groundwater quality, as well as increases in the volume and rate of surface water runoff and additional pollutant loading are directly correlated to increases in intensity of development. This would include additional sediment loading from erosion. However, the scientific literature also indicates that, for other types of pollutants and impacts, impervious cover is simply a correlation to increased human activity.

The threat to water quality posed by urbanization has consensus agreement among the scientific community. This threat in general is acknowledged by the existence of a number of federal and state regulatory programs intended to control the effects of urbanization on water quality through restrictions on land development. On the local level, several scientific studies have established a direct relationship between increased urbanization and adverse impacts to water quality. A cooperative study prepared by the USGS and the City of Austin established this relationship for both

storm flows and base flow in streams throughout the Austin area.⁸⁰ The results of this report demonstrated statistically significant increases in suspended solids, biochemical oxygen demand, total organic carbon, total nitrogen, total phosphorous, fecal group bacteria, inorganic trace elements, and synthetic organic compounds related to urbanization. At the Barton Springs, the City of Austin has also documented statistically significant reductions in water quality over time that have been attributed to urbanization⁸¹. An expanded discussion of the water quality threats posed by impervious cover is presented below.

7.1.1. Impacts of Impervious Cover

Many of the scientific documents reviewed during the development of the Plan attempted to assess impact to water quality correlated to impervious cover. These publications provide varying degrees of underlying scientific justification for the correlation between impervious cover and adverse water quality impacts. In addition, many of these studies were performed in other areas of the country and the world where the hydrogeology is vastly different. While there is no single authoritative reference that precisely establishes all the impacts of impervious cover upon water quality, a growing body of research clearly points to the conclusion that these measurable adverse impacts fall within a certain range.

7.1.1.1. Impacts of Impervious Cover on Surface Water

While scientific studies performed in other areas of the country may not be directly applicable to the Planning Region, they can shed some light on the general relationship between urbanization and water quality. A study performed in Washington State indicated that impervious cover above approximately ten percent (10%) indicated irreversible loss of aquatic system function in surface streams.⁸² Another study performed in the Chesapeake Bay area of Maryland, based on the Impervious Cover Model, indicated that impervious cover above ten percent (10%) reduced overall surface stream quality to “fair”.⁸³ However, this study also indicated that in watersheds where a high percentage (greater than 66%) of the impervious cover areas were subjected to storm water management, that the overall surface stream water quality could be maintained as “good” to just above twenty percent (20%) impervious cover. This study also cautioned about the applicability of the results to areas with differing climates and hydrogeologic characteristics. While the hydrogeologic characteristics of these two areas are significantly different than the Planning Region, they do support the general correlations between urbanization and impervious cover, and between the implementation of protection measures and protected water quality.

⁸⁰ “Relation Between Urbanization and Water Quality of Streams in the Austin Area, Texas”, Report 90-4107, J.E. Veenhuis, et al., U.S. Geologic Survey, 1990.

⁸¹ “Update of Barton Springs Water Quality Data Analysis - Austin, Texas” Martha Turner, P.E., Environmental Resources Management Division, City of Austin, May, 2000.

⁸² “Urbanization of Aquatic Systems: Degradation Thresholds, Stormwater Detection, and the Limits of Mitigation”, D.B. Booth, et al, Journal of the American Water Resources Association, October, 1997.

⁸³ “Impervious Cover in the Chesapeake Bay Watershed”, K. Cappiella, et al, Center for Watershed Protection and U.S. EPA Chesapeake Bay Program, August, 2001.

The U.S. Fish and Wildlife Service (USFWS) has conducted numerous water quality evaluations in the Planning Region as they related to the protection of endangered species. As a part of their Section 7 ESA consultation on the construction of a water pipeline into northern Hays and western Travis counties by the LCRA, the USFWS required a number of water quality protection measures for areas to be served by the water pipeline. Among these measures were impervious cover restrictions for new development served by the water pipeline. These measures are presented in a Memorandum of Understanding (MOU) between the LCRA and the USFWS.⁸⁴ The technical requirements of the MOU include impervious cover limits (on a net site areas basis) of fifteen percent (15%) for the recharge zone and twenty percent (20%) for the contributing zone. Although the correlation between net site area and gross site is site specific, industry practices generally recognize that impervious cover estimates using a gross site area basis is generally about five percent (5%) lower than impervious cover estimates using a net site area basis, for the same land areas. The USFWS measures required in the MOU also allow an increase of impervious cover (30% in the RZ and 35% in the CZ) if offsite mitigation (establishing conservation easements sufficient to achieve a net impervious cover equal to the established limits) were incorporated. Although they were intended for the limited purpose of protecting endangered species, these guidelines suggest that the USFWS acknowledged the correlation between increased urbanization and adverse water quality impacts.

A number of relevant surface water quality studies have been conducted in and around the Planning Region. One peer-reviewed study addressing surface water quality impacts to Lake Austin suggested that very little impact on surface water quality was observed below about 20% impervious cover.⁸⁵ However, it also acknowledged that a major component of the inflow to Lake Austin was from Lake Travis, with long residence times and generally good water quality. This study likely does not adequately represent streams in the Planning Region where substantially all of the surface water flow (including storm flow and base flow) results from localized rainfall. This study did, however, provide specific correlations between some suspended and dissolved parameters with increasing development intensity. In general, each ten percent (10%) increase in impervious cover resulted in a corresponding increase of approximately 510% for suspended solids parameters and approximately 260% for certain dissolved parameters.

A previously cited cooperative study prepared by the USGS and the City of Austin⁸⁶ confirmed this general correlation for both storm flows and base flow. This study indicated that as drainage basins changed from rural (less than 10% impervious cover) to urban (greater than 40% impervious cover, there were marked increases in both suspended and dissolved parameters in surface water. For storm flows, suspended constituents generally

⁸⁴ "Memorandum of Understanding between U.S. Department of the Interior, U.S. Fish and Wildlife Service, and the Lower Colorado River Authority for the Purpose of Providing Surface Water for Residents in Western Travis and Northern Hays Counties", dated May 24, 2000.

⁸⁵ "Impact of Land Use and NPS Loads on Lake Quality", David A. Todd, et. al., Journal of Environmental Engineering, Volume 115, Number 3, American Society of Civil Engineers, June 1989.

⁸⁶ "Relation Between Urbanization and Water Quality of Streams in the Austin Area, Texas", Report 90-4107, J.E. Veenhuis, et al., U.S. Geologic Survey, 1990.

7.1.1.2. Impacts of Impervious Cover on Groundwater and Base Flow

In addition to the adverse impacts of impervious cover on surface water quality, impervious cover also impacts both groundwater and base flow. Since impervious cover essentially precludes surface recharge, the quantity of reduction in surface recharge directly corresponds to the quantity of impervious cover installed. These reductions in surface recharge correspondingly reduce the amount of water in the shallow soil column that is available for aquifer or stream base flow replenishment. The Natural Resource Conservation Service (NRCS), and its predecessor agencies, have conducted extensive research into the relationships between rainfall, runoff and infiltration. As a result of this research, the NRCS has published technical guidance documents on this subject for use by engineers and hydrologists. Figure 6, on the following page, illustrates this relationship based on varying percentages of impervious cover for the two (2) year return frequency, three (3) hour duration storm event for the Planning Region.⁸⁸ Based on the conditions used to prepare this figure, the surface infiltration potential would be reduced from approximately 1.8 inches with no impervious cover, to approximately 0.3 inches as a site approaches one hundred percent (100%) impervious cover. This is a reduction of over eighty percent (80%) of surface infiltration potential. At fifty percent (50%) impervious cover, the surface infiltration is still reduced by almost thirty percent (30%).

Reductions in surface infiltration of this magnitude are likely to have minimal impact on direct recharge to the Edwards Aquifer. Based on the previously established condition that eighty five percent (85%) of the total recharge to the Edwards Aquifer originates from stream flow, this indicates that only about fifteen percent (15%) of total recharge originates from direct surface recharge. If reductions in surface infiltration potential from increased impervious cover resulted in an actual decrease in direct recharge of thirty percent (30%) of the potential, this would result in a corresponding reduction in total recharge to the Edwards Aquifer of less than five percent (5%). However, reductions in surface infiltration potential likely have a significantly greater impact on maintaining baseflow.

⁸⁸ A value of 2.5 inches for this storm event was taken from "Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years: Technical Paper No. 40", Weather Bureau, U.S. Department of Commerce, 1961.

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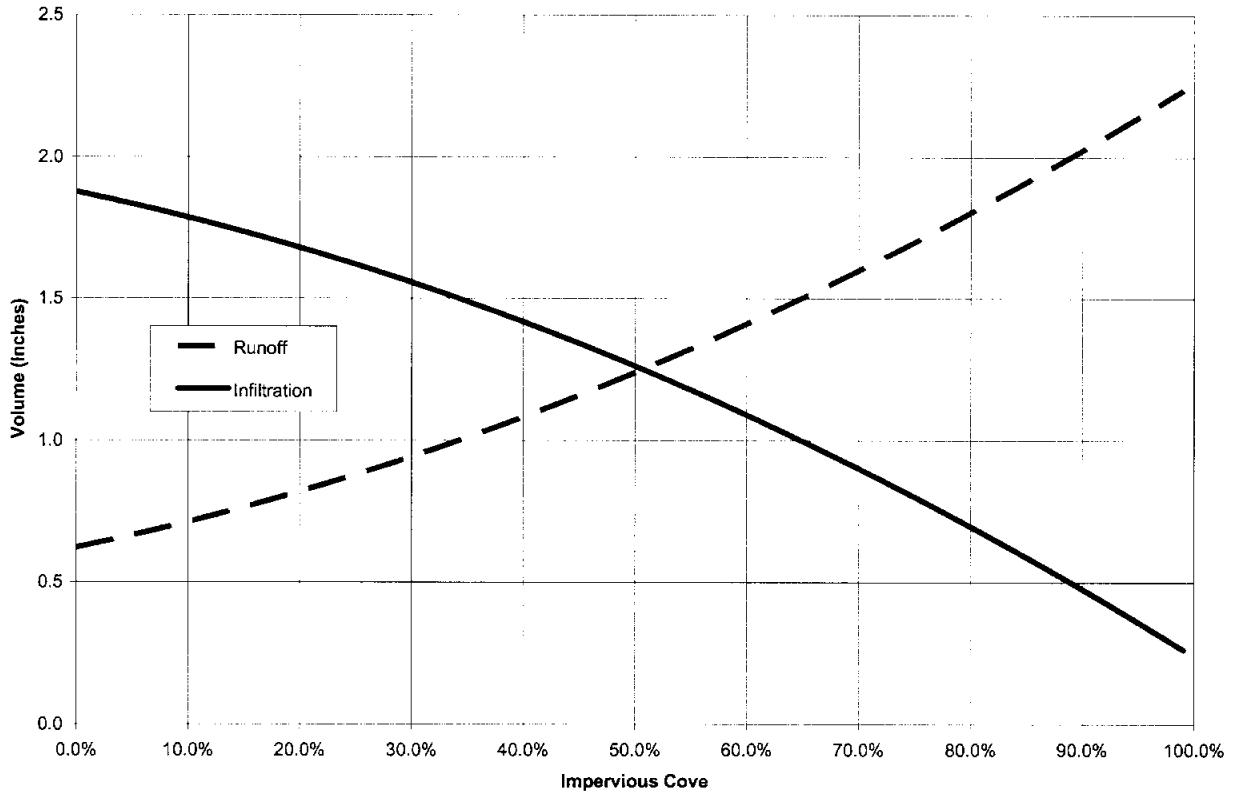


Figure 6 – Runoff/Infiltration for Various Levels of Impervious Cover for the 2 Year, 3 Hour Rainfall⁸⁹

7.1.2. Existing Development Intensity in the Planning Region

“As-built” development intensity is often difficult to assess. In most instances, development intensity is either estimated from land use or assessed from some type of physical observation, such as the evaluation of aerial photography. The City of Austin has performed several land use assessments within each of the watersheds within the Planning Region using a Geographic Information System (GIS). Data from the year 2000 is available through the City of Austin’s internet website.⁹⁰ Additional data from the year 2003 was supplied by the City to the planning effort. Table 8, on the following page, drawn from the City’s year 2003 land use data, shows the estimated as-built development intensity by location, and the resulting overall as-built development intensity for each watershed.

⁸⁹ Data taken from “Urban Hydrology for Small Watersheds: Technical Release No. 55”, Soil Conservation Service, U.S. Department of Agriculture, 1975, using Antecedent Moisture Condition II, and Hydrologic Soil Group C.

⁹⁰ This information was furnished by the City of Austin and is also available on the internet (http://www.ci.austin.tx.us/watershed/learn_ws.htm).

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Table 8 – Estimated Year 2003 Development Intensity by Watershed and Location

Watershed	Area in RZ (Ac)	Area in CZ (Ac)	Area in PR (Ac)	RZ IC (Ac)	RZ IC (%)	CZ IC (Ac)	CZ IC (%)	Total
Little Barton Creek	0	7,300	7,300	0	-	459	6.29%	6.29%
Barton Creek	4,956	64,521	69,477	1,096	22.11%	2,975	4.61%	5.86%
Bee Creek	96	1,824	1,920	15	15.37%	280	15.37%	15.38%
Little Bee Creek	397	243.2	640	80	20.04%	49	20.05%	20.08%
Eanes Creek	1,587	973	2,560	433	27.25%	265	27.25%	27.26%
Williamson Creek	5,205	5,811	11,016	1,361	26.14%	925	15.91%	20.75%
Slaughter Creek	6,743	7,256	13,999	775	11.50%	538	7.41%	9.38%
Bear Creek	4,126	11,477	15,603	179	4.33%	568	4.95%	4.78%
Little Bear Creek	11,412	1,608	13,020	337	2.95%	35	2.16%	2.86%
Onion Creek	15,739	90,986	106,725	324	2.06%	2,890	3.18%	3.01%
Total	50,262	191,999	242,260	4,598		8,982		

This information is presented graphically in Figure 7, on the following page.

Barton Springs segment⁹² in pursuit of determining the sustainable yield.⁹³ Based on this modeling, the BSEACD concluded that with current pumping rates and a recurrence of the drought of record (1950-1956) the water levels in the Barton Springs segment could decrease up to one hundred (100) feet in certain areas. The model predicted that under these conditions, mean monthly flow from the Barton Springs would be approximately one (1) cubic foot per second (cfs). For comparison purposes, the historic low instantaneous flow from the Barton Springs is reported as 9.6 cfs. The BSEACD further concluded that this low flow would practically result in the Barton Springs going dry for short periods of time. While this condition might not change the quality of the water contained within the aquifer, it would severely impact plant and animal species, possibly resulting in the elimination of habitat for such endangered species as the Barton Springs Salamander. It would also adversely affect the aesthetic and recreational value of the Barton Springs and the Barton Springs Pool. Based on the Stakeholder Guiding Principles and Goals and Objectives, this would definitely be considered an adverse water quality impact.

Based on their groundwater availability modeling, the BSEACD also identified several other threats from over-pumping. One identified threat involves the intrusion of saline water into the fresh water zone of the aquifer due to the decrease in water levels. Were this to occur, several existing groundwater extraction wells, including some domestic supply wells on the east side of the Planning Region, could be rendered unusable due to excessive salinity. In addition, some of the existing domestic supply wells on the west side of the Planning Region would be dry because the water level in the aquifer dropped below the bottom of their intake screen.

The withdrawal of groundwater in Texas has historically been unregulated. Recent sessions of the Texas legislature passed legislation authorizing the formation of Groundwater Conservation Districts. The BSEACD was established “for the purpose of providing for the conservation, preservation, protection, recharging and prevention of waste of groundwater and of groundwater reservoirs in the Barton Springs segment of the Edwards Aquifer”.

7.3. Point Source Discharges

Point source discharges result from a limited number of activities, but in most areas account for a majority of the non-storm water flows into hydrologic systems. Almost all point source discharges result from the treatment of either domestic wastewater or from industrial/commercial process wastewater. While many different types of pollutants exist in domestic wastewater, the major threat to water quality stems from the excessive discharge of biological constituents (e.g. bacteria, viruses, etc.) and nutrients (e.g. phosphorous, nitrates, etc.) The make-up and character of industrial/commercial process wastewater varies greatly and can include a wide range of chemical, biological, and nutrient constituents.

⁹² "Evaluation of Sustainable Yield of the Barton Springs Segment of the Edwards Aquifer, Hays and Travis Counties, Central Texas", Brian A. Smith, et al, Barton Springs Edwards Aquifer Conservation District, October, 2004.

⁹³ The BSEACD defined “sustainable yield” to mean “the amount of water that can be pumped for beneficial use from the aquifer under drought-of-record conditions after considering adequate water levels in water-supply wells and degradation of water quality that could result from low water levels and low spring discharge”.

Point source discharges of wastewater were among the first environmental concerns to be regulated on a national level. Beginning in the early 1970's, the United State Congress established the Environmental Protection Agency (EPA) and initially charged the agency with evaluating and regulating point source discharges. In the intervening time, the EPA and various state-level agencies have identified and regulated most point source discharges. Due to the historic regulation at the federal and state levels, very little local-level regulation of point source discharges has occurred in the Planning Region. In addition, there is currently little or no legal authority for local entities to regulate point source discharges.

7.4. Storm Water/Non-Point Source Pollution

In contrast to point source discharges, storm water non-point source (NPS) pollution occurs as a result of rainfall events. When human activities or natural processes result in pollutants being present at or near the land surface, these pollutants can be taken up by storm water runoff and can result in NPS pollution. The impacts of NPS pollutants vary widely and depend on the following general factors:

- Topography
- Land surface characteristics
- Human activities or natural processes taking place
- Types of pollutants present

In the United States, NPS pollution has been documented to occur from urbanized areas, industrial/commercial areas, developing areas, agricultural areas, and areas affected by natural disasters (e.g. forest fires, volcanic eruptions, etc.)

Until relatively recently, storm water NPS discharges in the U.S. have been largely unregulated. In the early 1990's, EPA adopted the Phase I Storm Water Regulations, which attempted to address NPS pollution from industrial activity, construction sites greater than five (5) acres in size and from large (greater than 100,000 population) cities. In 1999, the EPA adopted the Phase II Storm Water Regulations, which extended storm water NPS regulation to additional industrial/commercial activities, smaller construction sites (greater than one [1] acre in size) and smaller cities in defined urbanized areas. Many states, including Texas, have been delegated the authority to implement these federal regulatory programs. Certain aspects of the TCEQ's Edwards Aquifer Protection Program also govern storm water NPS pollution. As discussed in the section on Urbanization, above, there are also a number of existing regulatory programs at the local level with water quality protection aspects. Further discussion of storm water NPS pollution is subdivided by the general types of activities that contribute to storm water NPS pollution.

7.4.1. Construction Storm Water Discharges

As discussed previously, existing regulations govern storm water discharges from construction sites as small as one (1) acre. These regulations require that operators control the discharge of pollutants from the site using a variety of measures. In actual practice, many of the control measures specified in the current regulations are improperly used or improperly operated. In many instances, even when otherwise properly used, certain technologies are inappropriate in

certain circumstances. Numerous examples of failed construction site controls were provided by several different stakeholders. The Stakeholder Committee and the consulting team have determined that the failure to use the appropriate measures and the failure to properly install, inspect, maintain, and repair the measures used to control storm water discharges from construction sites poses a significant threat to water quality in the Planning Region. In addition, the current regulatory process contributes to this threat. Under the current regulatory program, significant failures can meet with regulatory enforcement, but only after they have adversely impacted water quality. Other than the existing design review under the TCEQ Edward's Aquifer rules, there are no other regulatory mechanisms for addressing potential problems before they occur. In addition, after problems occur, past enforcement actions have not been publicized sufficiently to serve as a deterrent for future violations.

While many different types of pollutants may be discharged from construction sites, the primary pollutant discharged is sediment in the form of suspended solids. The Natural Resource Conservation Service (NRCS) has identified sediment from eroded soil as having the ability to adversely impact water quality.⁹⁴ Sediment with the potential to adversely affect water quality can be transported from construction sites in several different ways. The most prominent transport mechanism is direct discharge of sediment in storm water. Sediment can also be transported from construction sites on vehicle tires, through spillage onto roadways and areas outside of control measures, and through accumulated dust which blows off the site. Sediment which leaves the site through one of these mechanisms is then exposed to the elements and can be transported in storm water runoff during the next rain event. Sediment leaving construction sites can obstruct storm water and drainage facilities, can adversely impact the habitat of various plant and animal communities, and can result in significant changes in the appearance (aesthetics) and chemical characteristics of rainfall runoff.

7.4.2. Other Storm Water NPS Discharges

Other types of storm water NPS discharges can also pose a threat to water quality in the Planning Region. Discharges from industrial activities and from urbanized areas are currently governed by TCEQ's storm water programs. The potential pollutants typically found in NPS discharges from industrial activities are similar to those described above for point source discharges. Potential NPS pollutants resulting from urban areas have also been described previously under the discussion on Urbanization. In addition to these two regulated areas, other types of storm water NPS discharges can pose water quality threats. Discharges from agricultural activities can also generate significant amounts of pollutants. Failing to utilize proper tilling and erosion control practices can result in significant sediment generation from areas under cultivation. The sale of agricultural chemicals (primarily pesticides and nutrients) is stringently regulated and their use is controlled through educational processes (e.g. labeling, training, advertising, etc.) However, in areas where these controls are not diligently enforced, significant pollutants can be generated from the improper use of these chemicals. These other storm water NPS discharges also pose a threat to water quality in the Planning Region.

⁹⁴ "Water Quality and Agriculture: Status, Conditions, and Trends", Working Paper #16, Natural Resource Conservation Service, U.S. Department of Agriculture, July, 1997.

7.5. Domestic Wastewater Collection, Treatment and Discharge

As discussed in the section above on Point Source Discharges, many different types of pollutants exist in domestic wastewater, with the major threats arising from biological constituents and nutrients. In the case of untreated domestic wastewater, the principal threats are the biological constituents. There are two basic types of domestic wastewater systems, with a multitude of variations: centralized and on-site. While both types of systems are designed to treat pollutants in domestic wastewater prior to release into the environment, the primary threat results from unintended discharges (e.g. exfiltration, overflow, line breaks, etc.) or inadequate treatment (e.g., from improper operation and maintenance) or improper design and application of treated wastewater effluent. Unlike storm water related discharges, significant threats to water quality can result from wastewater systems during periods of no or very little rainfall.

Domestic wastewater collection, treatment and discharge have been regulated for some time at both the federal and state levels. The TCEQ's Wastewater regulations as well as certain aspects of the TCEQ's Edwards Aquifer Protection Program govern the design, construction and operation of domestic wastewater systems in the Planning Region. As outlined in subsequent sections of the Plan, several local jurisdictions have been delegated the regulatory authority for on-site domestic wastewater systems. However, due to this historic regulation at the federal and state levels, very little local-level regulation of centralized domestic wastewater systems has occurred in the Planning Region. In addition, there is currently little or no authority for local entities to regulate centralized domestic wastewater collection, treatment and disposal.

7.6. Lack of Water Quality Protection Measures on Existing Development

While current science indicates to us the threat posed by urbanization, this threat has not always been identified and understood. Based on this lack of understanding, development has been allowed to occur in many areas of the Planning Region without the benefit of water quality protection measures. As presented in the discussion on Urbanization, this development has resulted in additional impervious cover which increases storm water runoff rates and volumes, and has introduced more human activity, resulting in additional pollutant loadings. While more recent developments may incorporate some limited water quality protection measures, the vast majority of the existing development in the Planning Region incorporates little or no water quality protection measures. The existence of this previous development, with no water quality protection measures, poses a threat to water quality in the Planning Region. The same potential pollutants and general types of threats identified in the section on Urbanization, including reduction of recharge and base flow replenishment, apply to existing development with no water quality protection measures.

7.7. Failure to Implement/Enforce Existing Regulations

The failure to fully implement and enforce existing water quality regulations presents a significant threat to water quality in the Planning Region. With few exceptions, the water quality protection regulations currently in existence were implemented to address recognized threats. Failing to enforce existing regulations in effect neutralizes safeguards established to prevent adverse impacts

from these recognized threats. Based on reviews of available scientific literature and observations and concerns offered by the Stakeholder Committee and individual stakeholders, the following specific areas of concern have been identified:

- Inadequate implementation/enforcement of construction site storm water controls
- Inadequate design, inspection, maintenance, and enforcement for sanitary sewer overflows
- Improper installation/permitting and lack of competent inspection of on-site, decentralized sewage facilities
- Improper operating/inspection of on-site, decentralized sewage facilities
- Inadequate maintenance, inspection and operation of structural best management practices (BMPs) and storm water control systems

These areas of existing regulation are currently authorized and delegated to a variety of state and local entities.

7.8. Use, Storage and Disposal of Harmful Materials

There are a number of harmful materials in use in our society that have the ability to impact water quality. Some of those identified by the consultant team and the Stakeholder Committee as being potential threats in the Planning Region are identified below.

7.8.1. Hazardous materials

In common usage, the term “hazardous material” is most often a substance, product or waste that poses some threat to the environment. There are numerous existing regulatory programs that have specific definitions for terms including “hazardous substances”, “hazardous materials”, “toxic substances” and “hazardous wastes”. For the purposes of this Plan, the term “hazardous material” will be applied based on its more common usage.

There are literally thousands of substances, with many thousands of different pollutants that would be considered hazardous materials. The most dramatic water quality threats from hazardous materials result from their accidental discharge or improper disposal. However, the unintended release of residuals from hazardous materials (e.g. the leaching of hazardous materials from building materials, etc.) can also pose water quality threats.

Many types of hazardous materials are regulated at both the federal and state levels. Due to this historic regulation, there is little or no authority for local entities to regulate hazardous materials directly.

7.8.2. Wastes

As with the term “hazardous material”, there are a number of different definitions of the term “waste”. Similarly, there are numerous existing regulatory programs that regulate all types of wastes (e.g., industrial solid waste; municipal solid waste; medical waste). For the purposes of this Plan, the term “waste” will be applied based on its more common usage of any material which can no longer serve its original intended purpose and therefore must be discarded or disposed of.

Many different types of waste materials containing various types of pollutants can pose water quality threats if not properly handled and disposed. The principal threats from waste materials stem from the release of pollutants into groundwater (e.g. leaching from a waste disposal unit) or into storm water (e.g. used motor oil dumped into a storm drain).

The management and disposal of most types of waste are regulated at both the federal and state levels. Due to this historic regulation, there is little or no authority for local entities to regulate wastes directly.

7.8.3. Pesticides

There are number of different chemicals used to control plants and animals perceived to be a nuisance by humans. Typically referred to as “pesticides”, these chemicals also include herbicides (plants), insecticides (insects) and rodenticides (rodents). For the purposes of this Plan, the term “pesticides” will be used as the generic term covering all these chemicals. The principal threat is the unintended release of residuals from excessive or improper application, but water quality threats from pesticides can also result from their accidental discharge or improper disposal.

The use and disposal of most pesticides is regulated at both the federal and state levels. Due to this historic regulation, very few local entities currently regulate pesticides.

7.8.4. Nutrients

Many people do not consider nutrients to pose water quality threats. However, in excess quantities, nutrients (such as nitrogen and phosphorous) can lead to many water quality problems, including excessive algae build-up, oxygen depletion, aesthetic impacts (taste and odor), and eutrophication of water bodies.⁹⁵ Eutrophication is a process by which a body of water becomes enriched in dissolved nutrients (e.g. phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen. Major sources of excessive nutrients include residential lawns, golf courses, athletic fields, livestock pastures, commercial landscaped areas and some park lands. The principal threat from nutrients is the unintended release of residuals from excessive application of fertilizers.

7.9. Improper Vegetative Management

While undeveloped land left in its natural state can be an effective measure for maintaining water quality, other activities occurring on undeveloped land can have adverse impacts on water quality. The majority of undeveloped land that is subjected to human activity is utilized for either agriculture or recreation. The primary threats from undeveloped land subjected to human activity are excessive erosion/sedimentation from disruption of natural vegetation and excessive nutrients and biological constituents.

⁹⁵ "Water Quality and Agriculture: Status, Conditions, and Trends", Working Paper #16, Natural Resource Conservation Service, U.S. Department of Agriculture, July, 1997.

Other water quality threats from undeveloped land may result without human activity. The U.S. Department of Agriculture, in cooperation with the Texas State Soil and Water Conservation Board, reports that the invasion of noxious brush and weeds is a high priority in approximately thirty percent (30%) of the counties in Texas, including Hays and Travis.⁹⁶ In many areas of the Texas Hill Country, juniper (cedar) has propagated extensively. A series of studies conducted by the Texas Agricultural Experiment Station have indicated that juniper intercepts approximately forty percent (40%) of the total rainfall, and up to seventy five percent (75%) of light intensity rainfall.⁹⁷ The study authors concluded that with significant juniper propagation, areas which received thirty inches of rainfall would only have eighteen inches available for plant growth, recharge or runoff.⁹⁸

7.10. Improper Management of Agricultural Operations

Improper agricultural practices also have the ability to adversely impact water quality. The primary threats from agricultural operations include excessive erosion/sedimentation from over-grazing and improper tillage, excessive nutrients from improper fertilizer application and excess nutrients and biological constituents from improper animal waste management.

⁹⁶ "Grazing Lands" A Valuable Resource for All Texans", U.S. Department of Agriculture, Natural Resource Conservation Service.

⁹⁷ "Evaporation and Interception Water Loss from Juniper Communities on the Edwards Aquifer Recharge Area - Final Report", M.K. Owens, et al, Texas Agricultural Experiment Station and Texas Agricultural Extension Service, Uvalde, Texas, June 25, 2001.

⁹⁸ "Uvalde Scientists Prove Cedar A Water Thief", S. Byrns, Ranch and Rural Living, November 2004.

8. STRATEGY FOR SELECTION OF WATERSHED MANAGEMENT AND WATER QUALITY PROTECTION MEASURES

8.1. Maintain or Enhance Existing Water Quality

As outlined in the Goals Statement developed by the Stakeholder Committee, the ultimate goal of the water quality protection measures presented in this Plan is to maintain or enhance the existing water quality. This objective includes the protection of the quality of both surface water and groundwater. To accomplish this objective, the strategy has been to select measures that facilitate no net increase in anticipated pollutant loadings in discharges (including pollutant loadings in recharge) for individual sites or developments. For areas to be developed, this strategy will require a thorough site specific evaluation of pre- and post-development conditions, along with a technical demonstration that the objective can be met. This Plan does not require site specific pre and post-development water quality monitoring for this evaluation, but anticipates that this evaluation can be performed by calculation, utilizing existing, publicly available data from a number of the sources identified in this document.

8.2. Applicability Within the Planning Region

While the Planning Region has been designated based on the Edwards Aquifer recharge zone and contributing zone, the water quality protection measures presented in this Plan will also protect other water resources. These measures will protect surface water and groundwater in the Planning Region, including groundwater in the Trinity aquifer group. These measures will maintain and enhance water quality wherever they are applied.

8.3. Rationale for Selection of Measures

8.3.1. Structural and Non-Structural Measures

Numerous watershed management and water quality protection measures were presented and discussed during the stakeholder process. The measures presented and discussed included both "structural" and "non-structural" measures. In current water quality planning practice, these measures are typically referred to as "Best Management Practices" (BMPs). The EPA has adopted the following definitions for structural and non-structural BMPs:⁹⁹

Structural BMPs include engineered and constructed systems that are designed to provide for water quantity and/or water quality control of storm water runoff.

Non-structural BMPs include institutional and pollution-prevention type practices designed to prevent pollutants from entering storm water runoff or reduce the volume of storm water requiring management.

⁹⁹ "Preliminary Data Summary of Urban Storm Water Best Management Practices", Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

These general distinctions between structural and non-structural measures have been adopted for the purposes of the Plan. In addition, the term “BMP” has also been incorporated for use in the Plan. While this term sometimes has a poor connotation based on past failings, its use in the area of water quality planning and practice is too widespread to ignore. The approach outlined in this Plan is a combination of structural and non-structural BMPs. Although most people’s perception of water quality protection measures is limited to classic structural BMPs, the EPA has acknowledged the effectiveness of non-structural BMPs. In the previously cited publication, EPA advocates their use in preference to structural BMPs:

Non-structural BMPs can be very effective in controlling pollution generation at the source, which in turn can reduce or eliminate the need for costly end-of-pipe treatment by structural BMPs.

Based on this approach, the measures recommended for inclusion in the Plan have been based on this same preference, as presented in Stakeholder Guiding Principal No. 4. While this preference is explicit in the plan, it is also acknowledged that non-structural BMPs alone will not always be satisfactory. If development activities are to occur and meet the Plan Objectives, they will typically require a combination of structural and non-structural controls working together.

8.3.2. Aspects Unique to the Planning Region

While there is extensive scientific literature available nationally on many different types of water quality protection measures, it is recognized that there are several aspects unique to the Planning Region that require any measures considered for implementation to be consistent with these unique aspects. This is particularly true of structural BMPs and their tendency to concentrate water quality pollutants in the vicinity of the structural control. Given the unique vulnerability of rapid recharge and movement through the Edwards Aquifer, structural BMPs which may be adequate in other settings may require augmentation for use in the Planning Region. For example, to prevent localized excessive pollutant loadings to groundwater recharge, it may be necessary to place a recharge barrier underneath some BMPs. Where these unique aspects are important to the description of a measure, they have been explicitly addressed.

8.3.3. Applicability of Water Quality Parameters

As outlined above, only a portion of the previously monitored water quality parameters have been selected for use in planning and design of new development. The parameters selected for use during planning and design were based on the availability of a relatively extensive database of monitoring data for these parameters and their relationship to a variety of activities. Certain selected parameters (e.g. total dissolved solids) are intended to be representative of other parameters (e.g. dissolved toxic compounds) that are transmitted in essentially the same way. Their use in planning and design is not intended to replace water quality monitoring.

There are other water quality threats posed by parameters which have not been selected for use in planning and design of new development. The general approach used to address these other parameters is through the use of non-structural measures, including use restrictions and public

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education. These non-structural measures allow a wider range of parameters to be addressed than those traditionally addressed in current water quality protection programs.

9. DESCRIPTION OF WATERSHED MANAGEMENT AND WATER QUALITY PROTECTION MEASURES

A wide variety of different water quality protection measures were considered and evaluated during this process. Each of the measures considered was evaluated by the consulting team, the stakeholders, and the Technical Review Group. Based on the input received from the Stakeholder Committee and the technical evaluation performed by the consulting team and outside experts, a list of recommended watershed management and water quality protection measures (including BMPs) was developed. A general description of these measures is presented in this section. Implementation procedures for these measures are described in subsequent sections. The measures presented are in the general order of the level of water quality protection provided.

9.1. Natural Area and Open Space Conservation

Land that is allowed to stay in its natural state will not typically contribute significant pollutants that adversely impact water quality. Known as “natural area” or “open space conservation”, the purpose of this measure is to restrict the land in that space from further development. During the initial identification of issues by the stakeholders early in the process, the concept of natural area/open space conservation consistently ranked among the most important objectives for the Plan. All entities and individuals inside and outside the Planning Region should be encouraged to voluntarily conserve natural areas/open space. In addition to voluntary conservation, several elements of the Plan require the conservation of natural areas in exchange for certain flexibility in implementation. While it often involves either the purchase of the land or purchase of development rights for the land, natural area/open space preservation is considered a non-structural protection measure. Natural area conservation accomplishes the objective of no net increase in pollutant loadings by restricting development activities that would generate these additional pollutant loadings.

There are a number of mechanisms that can accomplish natural area conservation. Each of these mechanisms involves establishing or identifying a Conservator, implementing restrictions to prevent the future development of the land, and providing long-term funding for its conservation. Specific procedures for securing the conservation area are provided in the section on Implementation. While each mechanism has one specific purpose for natural area conservation, it may also accomplish other purposes. Mixed use natural area conservation may be beneficial, but for the purposes of this plan, separate descriptions are provided for each mechanism, based on its intended purpose. The following natural area conservation mechanisms are identified for use within the Planning Region.

9.1.1. Conservation Easements

Conservation easements are tracts of land that are permanently set aside to remain in a natural state with minimal improvement. While some improvement may be made to facilitate access for maintenance or public recreation, other uses of the land (other than conservation) should be restricted. To qualify as a conservation easement for the purposes of the Plan, the land should remain in a reasonably undeveloped state in perpetuity, and comply with the restrictions outlined in the Implementation section. In instances where the ownership remains privately held, the maximum amount of build-out of the property should be established at the time the conservation

easement is set aside. These areas should be subjected to proper vegetative management as described below. Public and private entities should be encouraged to voluntarily secure conservation easements as a means of natural area conservation. As discussed below, mandatory conservation easements may also be established under this Plan as a component of the Transferable Development Rights program, described below.

9.1.2. Land Acquisition for Habitat Protection

Natural areas/open space set aside for habitat protection has different objectives than natural areas set aside for other reasons. In most instances, areas of critical habitat for the species to be protected will be identified. Typically, no development is allowed on areas set aside for habitat protection except for that necessary for access. Land acquired for habitat protection may be on a voluntary basis or it may be required under some regulatory programs. Because the development rights must also be secured for habitat protection, land set aside for habitat protection may be considered a conservation easement under the Plan, if it complies with the requirements for conservation easements established under the Implementation section.

9.2. Transferable Development Rights

The concept of transferable development rights (TDR) was discussed extensively during the stakeholder process. This concept was considered important by the stakeholders in addressing the issue of providing economic incentive for controlling development (Guiding Principal No. 5) and the issue of equity (based on Guiding Principle No. 7). As a water quality protection measure, the concept of transferable development rights allows the flexibility to consider site specific constraints while ensuring that urbanization intensity is controlled at uniform levels protective of water quality.

To accomplish these objectives, the concept of transferable development rights has been coupled with development intensity. As discussed below, uniform levels of development intensity considered to be protective of water quality have been established for the Planning Region. By incorporating the concept of transferable development rights, development intensity could be exchanged between various tracts of land, allowing greater flexibility in development plans and creating a link between the economic incentives for development and the value of natural area conservation. This concept would allow development rights to be secured for land which is otherwise not suitable for development because it is largely taken up with water quality protection features such as stream buffers, critical environmental feature setbacks, or other water quality protection features.

As implemented under the Plan, the concept of transferable development rights would apply to all future proposed new development. This measure would allow a property owner or development planner to incorporate development exceeding the recommended uniform intensity levels on one tract, if additional development rights from other tracts were secured corresponding to the amount of development intensity on the first tract which exceeded the uniform levels. These additional development rights would be obtained either by setting aside a conservation easement or by obtaining intensity credit from a prior development. Conservation easements used to secure transferable development rights under this Plan must comply with the restrictions outlined in the

Implementation section. Intensity credits may be obtained from prior development through physical impervious cover reductions (e.g. removing structures). When viewed together, this process would result in all the tracts conforming to the recommended uniform intensity levels. As outlined below, additional measures may be required to ensure that the higher intensity levels on the developed tract do not adversely impact water quality.

There was extensive discussion among the stakeholders as to how the concept of TDRs could be utilized to allow flexibility, while minimizing the risk to the environment posed by the recognized threats from human activities. In accordance with Stakeholder Guiding Principle No. 4, the stakeholders recommended incorporating qualitative concepts of risk into the process. In general, the stakeholders felt that the most sensitive areas, expressed as the recharge zone and rural waterways in the contributing zone, should be subjected to lower risk than other areas. The application of lower risk strategies would involve greater reliance on non-structural controls of development location and intensity, with less reliance on structural control measures (e.g. structural BMPs). The intended outcome of this concept is to direct higher intensity development, which has a greater reliance on structural BMPs, either outside the Planning Region or into preferred growth areas within the contributing zone portion of the Planning Regions, as defined in more detail below. To accomplish this objective, several restrictions on the exchange of TDRs have been incorporated into the program:

- TDRs used to increase intensity for sites in the contributing zone (whether inside or outside preferred growth areas) should be obtained from land outside of preferred growth areas in the contributing zone or from the recharge zone.
- TDRs obtained from the recharge zone and used in the contributing zone allow the development to use the higher intensity levels from the contributing zone in determining the quantity of TDRs required.

9.3. Comprehensive Site Planning and Pre-Development Review

As outlined above, land development can often result in significant threats to water quality. There are many site specific issues associated with any proposed development that can impact water quality as well as future land management decisions. Once the decision is made to develop, these threats can be minimized by incorporating appropriate water quality protection measures. To ensure that these measures are incorporated into the site design, a comprehensive site plan should be prepared and a pre-development review should be performed. Given the diverse geological, topographical, and environmental factors, and the costs to the developer and the public, this planning and review should take place early in the process. They should address both the short term and long term consequences of the development on water quality.

The developer of the site should prepare a comprehensive site plan to demonstrate that the development complies with the water quality protection measures presented in this plan and those adopted by local jurisdictions. Currently, most development activities in the Planning Region are regulated by the TCEQ's Edwards Aquifer Protection Program. A regulatory guidance document

developed by the TCEQ for use in the EAPP¹⁰⁰ has a section which describes a comprehensive site planning process. In addition, the municipalities within the Planning Region that currently have water quality protection ordinances also require a comprehensive site plan. By utilizing this planning process, the developer will ensure adequate planning and provide local jurisdictions with sufficient information to determine compliance with the applicable water quality protection measures. This comprehensive site plan may be done in phases to coincide with the review process of the applicable local jurisdiction.

This comprehensive site plan must include several different elements, including:

- A thorough site characterization
- A presentation of design details for the technical elements of the site plan
- A technical demonstration that the site design meets the water quality protection objectives of this Plan
- An operations, maintenance, monitoring and funding plan to ensure the long term function of the water quality protection measures for the site.

A more detailed discussion of these elements and how they should be integrated into the development review process is presented in the Implementation section.

While it is the developer's responsibility to prepare a comprehensive site plan and demonstrate compliance with applicable water quality protection measures, local jurisdictions also have a responsibility to review these plans. Entities or individuals who commit to develop property are responsible for ensuring that personnel with adequate qualifications are involved in the planning and design of the development. To meet the requirements of this plan, special expertise in engineering and geology will be required. Where necessary, these individuals must also possess the appropriate professional license to practice in their area of expertise. To ensure that the water quality protection measures contained in this Plan are incorporated into the comprehensive site design, the local jurisdiction should conduct a thorough pre-development review. In general, the personnel performing this review should possess qualifications equivalent to those required for those preparing the demonstration that development complies with the requirements of the Plan. Specific recommendations for conducting this review are contained in the Implementation section. Comprehensive site planning and pre-development review are non-structural measures that will ensure compliance with the goals and objectives of this Plan.

9.4. Location of Development

There is general consensus in the scientific community that the location of development activities can have significant impacts on water quality. To address adverse impacts due to the location of development, the following water quality protection measures are prescribed.

¹⁰⁰ Section 2.2, "Comprehensive Site Planning", "Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices", Regulatory Guidance Document No. 348, Texas Natural Resource Conservation Commission, June, 1999.

9.4.1. Stream Offsets/Buffer zones

A number of scientific studies have documented the water quality benefits of maintaining naturally vegetated riparian¹⁰¹ corridors along streams and watercourses. These riparian corridors serve a number of functions including filtering/sequestering pollutants, providing localized recharge to contribute to sustained base flow, providing flood flow attenuation, and providing habitat for various plant and animal communities. They also provide a pervious strip along the bank to accept sheet flow from developed areas and help minimize the adverse impacts of runoff.¹⁰²

When development occurs adjacent to a stream or watercourse, the development should be offset from the streams to maintain these riparian corridors and minimize the impact of the development on the stream. The offset between the development and the stream is typically called a “buffer zone” and that term will be used in this Plan. These buffer zone areas are intended to protect the stream or watercourse and should not be utilized for other purposes. Activities or development taking place within the buffer zone (e.g. roadway crossings, utilities, etc.) can compromise the ability of this buffer zone area to perform its intended function. For this reason development within the buffer zone should be avoided when possible. The only development activities allowed in stream buffer zones are critical utility and transportation crossings, with the number and locations of these crossings minimized. Other than critical crossings, utilities and transportation infrastructure should not be located within stream buffers, and kept to a minimum (e.g. minimum number and surface area) when development is unavoidable. Where crossings are located, their design should incorporate protections from future damage to the stream from these crossings. Structural BMPs are specifically prohibited from buffer zones.

Stream buffer zones should be designated using the centerline of the active channel. Based on the review of available literature, a number of sources recommend that the minimum width of buffer for a defined stream or watercourse¹⁰³ should be at least 100 feet on either side of the centerline. The available scientific literature does not provide definitive recommendations for any “practical minimum” contributing drainage area for streams requiring buffer protection. However, the Stakeholder committee determined that some practical minimum contributing drainage area was needed to minimize uncertainty in implementing these requirements. A review of the “practical minimum” contributing drainage areas for streams afforded buffer zone protection in existing local regulations¹⁰⁴ and environmental resource protection programs indicated ranges from twenty (20) to sixty four (64) acres.

¹⁰¹ "relating to or living or located on the bank of a natural watercourse", Merriam-Webster Online Dictionary, 2004.

¹⁰² Section 1.4.11 “Vegetative Buffers”, “Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices”, Regulatory Guidance Document No. 348, Texas Natural Resource Conservation Commission, June, 1999.

¹⁰³ “A definite channel of a stream in which water flows within a defined bed and banks, originating from a definite source or sources. The water may flow continuously or intermittently, and if the latter with some degree of regularity, depending on the characteristics of the sources.”, 30 TAC §297.1, “Water Rights, Substantive – Definitions”

¹⁰⁴ Austin City Code, Title 25, “Land Development”, Section 25-8-92, “Critical Water Quality Zones Established”

Based on this range, a minimum value of thirty two (32) acres has been established for use in the Plan. Table 9, below, provides the minimum required buffer zone widths (or offset distances) from the stream centerline:

Table 9 - Required Buffer Zone Widths (from Stream Centerline)

Stream Contributing Area (Acres)	Width/Offset (feet, each side of centerline)	Total width (feet)
32 to 120	100	200
120 to 300	150	300
300 to 640	200	400
Greater than 640	300	600

In circumstances where some natural stream features extend outside the minimum recommended buffer areas, the buffer width should be expanded based on the following conditions. These conditions should be evaluated on both sides of the stream independently, and adjustments applied to the affected areas only.

- Where a FEMA recognized 100-year floodplain has been established, or a 100-year floodplain has been calculated and the governmental authority has approved the calculations, the buffer zone shall be expanded to encompass the 100-year floodplain plus 25 feet beyond the edge of the floodplain.
- When federal jurisdictional wetlands extend beyond the edge of the required buffer, the buffer zone shall be adjusted to be the extent of the wetland plus a 25-foot zone extending beyond the wetland edge.

In some limited instances, it may be appropriate to reduce the width of the buffer zone to accommodate certain site specific conditions. Many of the streams in the Planning Region have a “high bank” on one side of the stream, consisting of a cliff, bluff or other similar feature. In these instances, the top of the cliff or bluff is often significantly above the 100 year floodplain. Where this occurs, the area on top of the cliff or bluff is not in the floodplain, and typically provides minimal protection to the riparian zone. For these locations, it appears appropriate to remove the portion of the property above the cliff or bluff from the buffer zone.

In their regulations, FEMA requires that levees used to contain the 100 year floodplain be at least three (3) feet higher than the 100 year flood elevation. This standard has been adopted for use in addressing the situations outlined above. Where the elevation of the top of a “high bank” extends more than three (3) feet above the elevation of the 100 year floodplain, the buffer zone offset on that side may be adjusted downward, but must extend at least 25 feet horizontally beyond the edge of the “high bank”.

Stream buffer zones are considered non-structural BMPs for the purposes of the Plan, and are intended to be requirements independent of other protection measures. Based on the City of Austin’s Geographic Information System (GIS) analysis utilizing topographic and photogrammetric mapping of the Planning Region, it is estimated that out of the approximately 240,000 acres in the planning region, approximately 44,000 acres (or approximately 18.5%) would be occupied by stream buffers, as defined under the Plan.

9.4.2. Offsets from Critical Environmental Features/Sensitive Areas

A “Critical Environmental Feature” (CEF) is a geologic or topographic feature of critical importance to the protection of the environmental resources in the planning region. CEF’s include caves, sinkholes, springs, faults and fractures with solution enlarged openings, and other related features, as discussed previously. These micro-geologic features are important because they can become direct entry points where pollutants are introduced into the aquifer. When development occurs adjacent to a CEF, that development should be offset from the CEF to minimize the impact of the development. The TCEQ has determined that preservation of CEFs is an important nonstructural BMP and an important consideration for long term viability of the Edwards Aquifer.¹⁰⁵

Offsets from CEFs should begin at the edge of the feature with a minimum width of 150 feet. For the Planning Region, Table 10, below, provides required offset distances (or buffer zone widths) from CEF’s.

Table 10 - Required Offset Distances for Critical Environmental Features

Type of Feature	Upstream Offset (feet)	Downstream Offset (feet)
Point recharge feature (direct communication with aquifer)	Upper catchment divide or 300, not less than 150	150
Indirect feature (no direct communication with aquifer)	150	150

Setbacks from CEFs are considered non-structural BMPs for the purposes of the Plan, and are intended to be requirements independent of other protection measures.

9.5. Intensity of Development

As outlined in Section 7.1, several scientific studies have identified a direct relationship between the intensity of development and water quality. While many scientific studies recommend controlling impervious cover or development intensity as a primary water quality protection measure, they differ on how to quantify impervious cover and how to control it. The strategies presented below provide a means of quantifying impervious cover and implementing measures to control it.

9.5.1. Strategy for Limiting Impervious Cover

Due to the established correlation between increasing impervious cover and decreases in water quality, the concept of limiting impervious cover would be one measure to help achieve the goals and objectives of the Plan. Many of the studies reviewed as a part of the development of the Plan attempted to assess the impact of impervious cover and then recommended impervious cover limits. For evaluation purposes, almost all of these studies estimated the impervious cover

¹⁰⁵ “Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices”, Regulatory Guidance Document No. 348, Texas Natural Resource Conservation Commission, June, 1999.

as a percentage of the entire watershed or study area, more commonly referred to as “gross site area”. However, some of the studies included impervious cover limit recommendations based on gross site area while others based their recommendations on a concept called “effective impervious cover” or “net site area”. Net site area is a concept of calculating impervious cover percentages based on excluding certain land areas from the total area based on the rationale that these excluded areas do not function as impervious. In addition, there are a number of existing municipalities and other governmental agencies that currently limit impervious cover for new development using the concept of net site area. It is impossible to develop a universal correlation between gross site area and net site area due to the site specific variations introduced by the net site area calculations. Correspondingly, it is difficult to precisely correlate impervious cover recommendations based on gross site area to development regulations using net site area, and vice versa. Since the majority of the studies evaluated as a part of the Plan are based on gross site area, the gross site area calculation method has been adopted as the standard of evaluation, as outlined below. The use of gross site area for evaluating impervious cover provides a more equitable tie to development rights, as presented in the section on Transferable Development Rights.

However, one issue that was discussed extensively with the stakeholders and the TRG was how irrigation areas (wastewater and stormwater) would be treated. Many existing jurisdictions make some adjustments to the impervious cover calculations either through excluding these areas (removing them from net site area) or considering them as some fraction of impervious cover. Based on the technical discussions, the consensus approach of the consulting team and the TRG was to incorporate sufficient design standards and safety factors into the design of the irrigation application to allow them to be considered pervious rather than impervious. Specific design standards and safety factors have been incorporated to allow irrigation application areas to be considered pervious areas, and these standards and factors are described in detail in the detailed design sections below.

Based on the evaluations of the scientific studies presented, the consulting team determined that the approximate quantity of impervious cover which can occur while remaining protective of water quality in the Planning Region is in the range of ten to fifteen percent (10% to 15%), on a gross site area basis. In the application of this range, the lower end of the range will be applied to more sensitive areas, while the upper end of the range can be applied to less sensitive areas. However, as described below, adverse impacts can also occur from localized areas within a site whose total impervious cover falls within these ranges when viewed as an entire site.

Impervious cover limits are a non-structural water quality protection measure. However, due to the sensitivity of the elements in the Planning Region, localized impacts may occur from localized areas of higher intensity development within a site meeting the established impervious cover limits for the entire site. For this reason, the impervious cover limits should be used in conjunction with other BMPs to control the effects from the developed areas, and are not intended to be utilized as the sole water quality protection measure for site development.

During the technical evaluation of the scientific studies addressing the impacts of impervious cover, the consulting team reviewed available information regarding the impact of structural

BMPs working in conjunction with impervious cover limits. While a large database exists on the performance of specific structural BMPs, very little data is available assessing the ability of structural BMPs to control pollutant loading when viewed on a watershed basis. In a recent update of the Impervious Cover Model, it has been suggested that incorporating appropriate storm water BMPs might mitigate the impacts of impervious cover up to approximately five percent (5%).¹⁰⁶ Specific evaluation and design issues for structural BMPs are discussed elsewhere in this Plan. However, for the purposes of assessing how structural BMPs relate to the strategy of limiting impervious cover, this approach of allowing five percent of additional impervious cover where the structural BMPs are utilized to control surface water will be incorporated into the recommendations.

9.5.2. Approach for Limiting Impervious Cover

As presented above, most of the studies evaluated indicated that measurable water quality impacts began to occur in the range of ten to fifteen percent (10% to 15%) gross impervious cover. In the contributing zone, the identified threat from urbanization results from surface water. Surface water from the contributing zone with elevated levels of pollutants can have localized water quality impacts in the Contributing Zone, can pose a threat to groundwater in the Barton Springs Zone due to surface water recharge once the water reaches the Recharge Zone, and can also pose a continuing threat to surface water in the Recharge Zone. On the other hand, the water quality threat from urbanization in the Recharge Zone can come from either surface water or from localized recharge to groundwater. For this reason, the lower end of the range of impervious cover limits will be applied to the Recharge Zone, while the upper end of the range will be applied to the Contributing Zone.

In the Recharge Zone, impervious cover on future new development shall be limited to ten percent (10%). In the Contributing Zone, impervious cover on future new development shall be limited to fifteen percent (15%). These limits shall be evaluated on a gross site area basis. These limits shall apply to all development types, including public and private development, roads and infrastructure. There shall be no variances from these limitations, except in conjunction with the implementation of Transferable Development Rights, as outlined below. During the site evaluation process, the total planned percentage of impervious cover shall be determined by dividing the total impervious cover of the project by the gross area of the site. By applying these impervious cover limitations to all future projects individually, the uniform average impervious cover for all future development will be maintained within the limits presented above. These limitations shall apply irrespective of the requirements for other structural or non-structural BMPs, setbacks, buffers or other water quality protection measures set out elsewhere in the Plan.

9.5.2.1. Design Considerations Related to Impervious Cover

Should a development planner desire to institute a project that would result in a localized tract with a development intensity exceeding the impervious cover limits presented above,

¹⁰⁶ "Is Impervious cover Still Important? A Review of Recent Urban Stream Research", T. Schueller, Impacts of Impervious Cover on the Quality of Aquatic Systems, Center for Watershed Protection, March, 2003.

the concept of transferable development rights can be utilized. This concept allows development exceeding the recommended uniform intensity levels, if additional development rights are secured from other tracts or through reducing impervious cover in a prior development within the same aquifer zone (recharge or contributing). The amount of additional development rights shall be that necessary to achieve the recommended intensity levels (impervious cover) when evaluating both tracts together.

While it is the responsibility of the party wishing to develop the land to design a site-specific water quality protection strategy, improperly controlled increases in development intensity have the potential to cause significant localized impacts, even if the uniform intensity levels are met. For this reason, safeguards are needed to ensure that the designs allowing the increased development intensity are protective of these localized effects.

9.5.2.2. Low Vulnerability Growth Areas

Some jurisdictions within the Planning Region may have designated preferred growth areas where it is their intent to encourage higher intensity development. The establishment of these preferred growth areas normally occurs through a comprehensive planning process carried out by the local jurisdiction, after considering a multitude of factors, including environmental considerations. Because these preferred growth areas are generally in less environmentally sensitive areas, where tighter controls can more easily be exercised, their objectives are in general agreement with those of this Plan. However, due to the potential threat of urbanization to groundwater through direct recharge, areas in the Recharge Zone should be considered environmentally sensitive. To provide incentive to steer higher intensity development into these less vulnerable and more controlled areas in the Contributing Zone, it is recommended that no upper intensity limit be imposed for preferred growth areas established through local comprehensive planning processes. These sites would still be required to include appropriately designed structural controls and offset this additional localized intensity by obtaining additional transferable development rights.

9.5.3. Summary of Recommended Impervious Cover Limitations

After considerable discussion by the Stakeholder Committee, consensus could not be reached on the content of a table to summarize recommended impervious cover limits. There was however, consensus reached on the general format of the table, including the distinctive areas to be considered (the rows in the table) and the approach to limiting impervious cover in each area (the columns in the table). The consensus direction of the Stakeholder Committee was that the consulting team should incorporate into the Plan its recommendations for impervious cover limits, and should also incorporate a representation of the range of stakeholder input received on the consulting teams proposals through the process. The following tables summarize the recommended impervious cover limitations presented above, based on location. All of the recommended impervious cover limits are given on the basis of gross site area. The concept of transferable development rights (TDRs) has also been incorporated into the recommended impervious cover limitations, as presented below.

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Table 11 - Required Impervious Cover Limits, in Percent (%) – Consulting Team Recommendation

Location	Simplified ¹⁰⁷ , 108	Standard Methods ¹⁰⁹	Standard Methods + TDRs ¹¹⁰
Recharge Zone	5	10	15
Contributing Zone, outside “preferred growth areas” (PGAs) ¹¹¹	7.5	15	25
Contributing Zone, Single Family Residential inside PGAs	7.5	15	30
Contributing Zone, Commercial and Multi-family Residential inside PGAs	7.5	25	45 or No Limit ¹¹²

As presented below, Table 12 identifies the range of comments received on the version of Table 11 included with the last draft of the plan submitted to the Stakeholder Committee. Please note that the footnotes from Table 11 would also apply to Table 12.

¹⁰⁷ Only applicable to tracts with scattered and disconnected impervious cover (IC), also respecting stream buffers and CEF setbacks. No connected blocks of IC (buildings and parking lots) greater than 20,000 sf. All off-site discharges must be distributed to sheet flow. No hard-lined drainage conveyance structures. (e.g. no curb & gutters, storm sewers or hard lined drainage ditches/swales).

¹⁰⁸ Simplified review will constitute an on-site survey for CEFs and streams, a geometric review of the site plan layout demonstrating that the proposed activities (impervious cover) respects applicable stream buffers and CEF setbacks, but no technical demonstration of performance is required.

¹⁰⁹ Standard Methods include the use of primary and or secondary BMPs; a technical demonstration of “no net increase” and of “lowest risk” choice of BMPs; and comprehensive site design as defined in the Plan. Further, for categories where on-site IC is allowed to exceed the established CZ impervious cover limit of 15%, the following additional provisions apply: a) the implementation of an operations and maintenance program that includes site specific performance monitoring for water quality protection measures, b) the monitoring program must be administered by a public entity, and c) establishment of a secured funding source for the operations, maintenance and monitoring programs.

¹¹⁰ TDRs used in the RZ must be obtained from the RZ and the combined IC of all tracts considered together must be 10% or lower. TDRs used in the CZ may be obtained from either the RZ or the CZ and should come from properties outside of PGAs. The combined IC of all tracts considered together must be 15% or lower.

¹¹¹ Preferred Growth Areas are areas defined by local governmental jurisdiction(s) through the comprehensive planning process (in accordance with the Texas Local Government Code, Chapter 213) as areas where future zoning is proposed to be industrial, commercial or high-density residential, provided these area are located within incorporated municipal boundaries.

¹¹² The “No Limit” option requires that building roof runoff be captured through rainwater harvesting with fourteen (14) days storage capacity, used for landscape irrigation.

Table 12 - Required Impervious Cover Limits, in Percent (%) – Range of Stakeholder Recommendations

Location	Simplified ¹¹³ , 114	Standard Methods ¹¹⁵	Standard Methods + TDRs ¹¹⁶
Recharge Zone	3 to 5	5 to 15	10 to 25
Contributing Zone, outside “preferred growth areas” (PGAs) ¹¹⁷	5 to 10	10 to 25 + TDRs	15 to 30
Contributing Zone, Single Family Residential inside PGAs	5 to 20	10 to 30 + TDRs	20 to 30
Contributing Zone, Commercial and Multi-family Residential inside PGAs	5 to 20	20 to 40 + TDRs	30 to No Limit

The impervious cover limit approach presented above is intended to create a link between the economic incentives for development and the value of open space/natural area preservation. Specific discussion on the implementation of impervious cover limits is presented in subsequent sections.

9.5.4. Clustering/Low Impact Development

Clustering is the concept of concentrating the impervious cover within a tract of land to maximize separation from the impervious areas to potentially sensitive receptors, such as streams and critical environmental features. For the purposes of the Plan, the concept of clustering is recognized and recommended for incorporation into the impervious cover implementation strategy. However, as outlined above, the use of clustered development should take into consideration the potential localized effects of more intense impervious cover.

¹¹³ Only applicable to tracts with scattered and disconnected impervious cover (IC), also respecting stream buffers and CEF setbacks. No connected blocks of IC (buildings and parking lots) greater than 20,000 sf. All off-site discharges must be distributed to sheet flow. No hard-lined drainage conveyance structures. (e.g. no curb & gutters, storm sewers or hard lined drainage ditches/swales).

¹¹⁴ Simplified review will constitute an on-site survey for CEFs and streams, a geometric review of the site plan layout demonstrating that the proposed activities (impervious cover) respects applicable stream buffers and CEF setbacks, but no technical demonstration of performance is required.

¹¹⁵ Standard Methods include the use of primary and or secondary BMPs; a technical demonstration of “no net increase” and of “lowest risk” choice of BMPs; and comprehensive site design as defined in the Plan. Further, for categories where on-site IC is allowed to exceed the established CZ impervious cover limit of 15%, the following additional provisions apply: a) the implementation of an operations and maintenance program that includes site specific performance monitoring for water quality protection measures, b) the monitoring program must be administered by a public entity, and c) establishment of a secured funding source for the operations, maintenance and monitoring programs.

¹¹⁶ TDRs used in the RZ must be obtained from the RZ and the combined IC of all tracts considered together must be 10% or lower. TDRs used in the CZ may be obtained from either the RZ or the CZ and should come from properties outside of PGAs. The combined IC of all tracts considered together must be 15% or lower.

¹¹⁷ Preferred Growth Areas are areas defined by local governmental jurisdiction(s) through the comprehensive planning process (in accordance with the Texas Local Government Code, Chapter 213) as areas where future zoning is proposed to be industrial, commercial or high-density residential, provided these area are located within incorporated municipal boundaries.

While the concept of Low Impact Development (LID) has many elements common to clustering, the underlying premise is to take a holistic approach to design that minimizes the overall impact of development on the site. Instead of removing pollutants, LID concepts reduce runoff volumes, thereby reducing the impacts from the associated runoff, and further reducing the need for conventional structural BMPs.¹¹⁸ LID includes the following essential elements:¹¹⁹

- Minimizing Impervious Areas
- Directed Growth (through land use ordinances and zoning)
- Sensitive Area Protection
- Open Space Preservation

While these concepts can certainly be applied on a broad scale, the general concepts can also be applied to design on an individual site. For instance, minimizing contiguous impervious areas allows the surrounding pervious areas to more effectively offset the effects of increased runoff from the pervious areas. This process, in turn reduces the need for structural BMPs. Since they rely less on structural BMPs and more on the interaction of several different water quality protection measures working together, the use of LID procedures reduces the water quality risk from the catastrophic failure of a single BMP. For this reason, LIDs should be encouraged in preference to high impact designs which rely heavily on structural BMPs.

9.5.5. Use of Semi-pervious Cover

In many areas, semi-pervious cover is recommended as a means to reduce overall impervious cover. While this practice may reduce impervious cover, and corresponding storm water runoff rates and volumes, the potential for increased recharge warrants careful consideration. For the purposes of the Plan, the use of semi-pervious cover should be encouraged in conjunction with other measures to control recharge and runoff. However, additional study is necessary to assess the actual reduction in impervious cover realized by utilizing semi-pervious cover. Until such time as those relationships can be established, no such preferential consideration for semi-pervious cover can be incorporated into the Plan.

9.6. Control of Hydrologic Regime

Scientific studies have established that increases in the rate and volume of storm water runoff generally have an adverse impact on water quality in natural streams. In past practice, most discussions regarding hydrologic regime have addressed large, infrequent storm water runoff flows. While these flows can do significant damage to natural streams, smaller and more frequent storm flows can result in significant erosion and sedimentation. For the purposes of the Plan, the control of the hydrologic regime for flows from developed areas is recommended. The hydrologic regime represents the total volume and the rate/timing/duration of storm water runoff flows. To address adverse impacts, the following measures are recommended to control the rate and volume of all storm water discharges from developed areas within the Planning Region.

¹¹⁸ Section 5.2.3, "Preliminary Data Summary of Urban Storm Water Best Management Practices", Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

¹¹⁹ Ibid

9.6.1. Erosive Flows Control

A number of scientific evaluations in central Texas have indicated that a significant portion of the total estimated long-term erosion occurs during runoff events with a one (1) to two (2) year return frequency and durations of one (1) to six (6) hours.^{120, 121} The control of erosive flows is an essential element in the overall engineering design of a developed site. For site designs that provide for discharge of surface water, adequate retention/detention should be incorporated into the site design to limit flows into the receiving stream consistent with the volume from the two (2) year, three (3) hour duration rainfall, evenly distributed over a twenty four (24) hour period. This will provide the added benefit of reducing siltation in drainage ditches, culverts and other public storm water systems. In addition to limiting the rate of discharge, prior to discharge into the buffer zone, all concentrated flows should be properly distributed to provide for sheet flow through the buffer zone into the stream channel.

9.6.2. Flood Flows Control

Although infrequent, flood flows can also result in significant erosion to natural streams. Drainage structures providing discharge routes for flood flows should be sized to maintain flood flow velocities below erosive levels, up to the twenty five (25) year, three (3) hour duration. All discharge points from ponds or other accumulation areas must provide for energy dissipation prior to exiting the site, in order to minimize erosion.

9.7. Structural BMPs for Discharges from Developed Land

As indicated previously, structural BMP's should be utilized in conjunction with the other water quality protection measures presented in this Plan, to minimize the localized impacts of development. The design standards included in the Plan should apply to all surface water discharges from a site. The procedures for incorporating their use into an overall water quality protection strategy are presented below.

9.7.1. BMP Performance

There are numerous structural BMPs for which a significant amount of actual performance data exists. However, this data is not always in a readily useable form. In many existing regulatory programs, the concept of "removal effectiveness" is most often quantified using a "percentage removal efficiency". The U.S. EPA has commissioned several studies to determine how the performance of structural BMPs should be assessed so that realistic capabilities can be incorporated into the design process. The conclusions from several of these studies reveal that the removal effectiveness of most structural BMPs varies significantly (e.g. are not "linear") based on a number of site specific factors, including:¹²²

¹²⁰ "Water Quality and Quantity Inputs for the Urban Creeks Future Needs Assessment", M.E. Barrett, et al, The University of Texas at Austin, Austin, Texas, 1998.

¹²¹ "Barton Creek Watershed Study", C. Soeur, City of Austin, Texas, 1995.

¹²² "Preliminary Data Summary of Urban Storm Water Best Management Practices", Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

- the size, type and design of the BMP
- the soil types and characteristics
- the geology and topography of the site
- the intensity and duration of the rainfall
- the length of antecedent dry periods;
- climatological factors such as temperature, solar radiation, and wind
- the size and characteristics of the contributing watershed; and
- the properties and characteristics of the various pollutants.

Due to these significant variations, these studies generally recommend that performance requirements should not be specified in terms of percent removal.¹²³ These studies also generally indicate that several BMPs operating in sequence together, or “treatment trains,” are required to achieve specific performance goals.¹²⁴

In addition to the uncertainty of actual performance for constituents for which data exists, another practical obstacle to assessing BMP performance is the small amount, or complete lack, of data for certain constituents. This is particularly true for dissolved constituents. Only limited data is available for assessing the performance of BMPs in reducing dissolved constituents. The assessment of removal effectiveness for dissolved constituents differs significantly from suspended constituents due to the different mechanisms used to accomplish the removal (e.g. settling for suspended solids, versus uptake or sequestering for dissolved solids).¹²⁵ In general, most studies have concluded that BMPs are less effective at removing dissolved constituents than at removing suspended constituents.

9.7.2. BMP Design Considerations

The uncertainty and variability in the performance of structural BMPs suggests that several considerations be incorporated into the design process.

9.7.2.1. General Design Considerations

Regardless of the specific BMPs utilized, they should all be incorporated into a site specific design to meet the objectives of the Plan. It is imperative that the performance data used for the design of BMPs be reliable and realistic. The U.S. EPA’s BMP database¹²⁶ contains a large database of performance data on various BMPs, but the data is technical in nature and not always readily adaptable for use in design. While there is a substantial amount of data, the specific correlation of influent (water received by the BMP) quality to effluent (water discharged from the BMP) quality for particular types of BMPs is not always adequately consistent to allow reliable predictions of effluent to influent quality. Unfortunately, this

¹²³ “Determining Urban Stormwater Best Management Practice Removal Efficiencies, Task 3.4 – Final Data Exploration and Evaluation”, Geosyntec Consultants, et al and U.S. EPA, June 2000.

¹²⁴ “Urban Stormwater BMP Performance Monitoring - A Guidance Manual for Meeting the National Stormwater BMP Database Requirements”, Geosyntec Consultants, et al and U.S. EPA, April 2002.

¹²⁵ “Preliminary Data Summary of Urban Storm Water Best Management Practices”, Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

¹²⁶ “International Stormwater Best Management Practices (BMP) Database”, U.S. EPA, (<http://www.bmpdatabase.org/>)

type of comparison is necessary to demonstrate that a particular design meets the objectives of this Plan. In addition, the EPA's BMP database contains very little performance data on capture-based (e.g. retention/irrigation or rainwater harvesting) BMPs that are currently prevalent in the Planning Region and that have been considered for use in this Plan. Given the known limitations of the data, it is imperative that technical demonstrations made to document compliance with the design standards in this Plan properly account for the uncertainties in this data. Site specific evaluations used to demonstrate the capabilities of BMPs should utilize the following factors of safety:¹²⁷

- 1.25 for BMPs without a significant operational component (e.g. vegetative filter strips, grassy swales, etc.)
- 1.50 for BMPs with significant operational components (e.g. retention/irrigation, sand filters, etc.)

Previously cited EPA publications and regulatory guidance documents¹²⁸ address the processes used to evaluate the performance of BMPs and design recommendations for these BMPs. Proper design of BMPs and utilizing realistic performance data as the basis for that design was determined by the Stakeholder Committee to be very important to the overall process, since unrealistic designs will not provide the desired level of water quality protection intended as an outcome of the Plan. To accomplish this proper design, the procedures presented in these studies should be utilized to assess the capabilities and apply them in actual design situations.

In addition to the need to utilize realistic design parameters for the pollutant removal effectiveness of the BMPs, the hydraulic characteristics of the BMP must also be considered. BMP components must have adequate capacity to convey the range of hydraulic loadings they will likely experience. The hydraulic design of the BMPs must also consider discharges from the BMP. For BMPs designed to have routine discharges, the outlet should be designed to provide erosive flows control, as outlined above, and must provide for distribution of the discharge to allow sheet flow through the buffer zone to the receiving stream. Bypass and overflow structures must be included to accommodate extreme flood flows. However, these structures should provide energy dissipation, as outlined above.

The design processes addressed in the technical publications on BMP performance are technical in nature and require significant technical expertise to ensure that these considerations are incorporated into actual design and construction. For this reason, designs should be performed by qualified engineers, who are licensed to practice in the State of Texas and are experienced in the design of structural BMPs for controlling storm water. In addition to the need to have qualified personnel design these systems, it is also important that the personnel reviewing these designs on behalf of the public have similar qualifications and experience. This review will provide an additional level of protection.

¹²⁷ For example, a BMP with no significant operational component having a published removal effectiveness of 125 milligrams per liter (mg/L) at the Event Mean Concentration (EMC) should be considered to have a removal effectiveness of 100 mg/L (125/1.25). A BMP with a significant operational component having a published removal effectiveness of 75% should be considered to have a removal effectiveness of 50% (75/1.50).

¹²⁸ Reference Note 122.

9.7.2.2. Design Considerations Unique to the Planning Region

The unique aspects of the Barton Springs Zone make many of the standard structural BMPs unsuitable for use in the Planning Region without modification. In most instances, these BMPs serve to concentrate pollutants in the vicinity of the device, and then either control or remove the pollutants, and retain the water prior to release. The characteristics of the Barton Springs Zone of the Edwards Aquifer make it undesirable for this pollutant laden water to be allowed to recharge. It is important that any BMP utilized in the Recharge Zone be modified or augmented to prevent direct infiltration/recharge from the BMP.

9.7.2.3. Construction Quality Assurance Consideration

Proper function of structural BMPs not only requires proper design, but also requires construction in compliance with that design. As a part of the construction quality assurance program for the work incorporating structural BMPs, procedures should be established for inspection and testing of those BMPs. Local jurisdictions should also incorporate these considerations into their development review and construction inspection processes.

9.7.3. Strategy for Identifying BMPs for Use in the Planning Region

For the purposes of the Plan, several different types of structural BMPs have been recommended for implementation in the Planning Region. Extensive background information on the design, construction and operation of these BMPs exists in readily available literature. The descriptions of the recommended BMPs are not intended to be exhaustive, but to describe their general nature and function. They are presented in order of preference. Additional information can be obtained on these BMPs from the literature citations provided in the Technical Reference List in Appendix J. Where modifications to the standard application of a BMP due to the unique nature of the Edwards Aquifer are appropriate, these have been noted. The purpose of the structural BMPs presented is to control the effects of storm water discharges from the developed portions of tracts complying with the non-structural measures (e.g. location restrictions, buffer zones, impervious cover limits, etc.) for the tract as a whole.

The structural BMPs recommended for use in the Planning Region are broken down into two (2) categories: primary and secondary. Technical background data on all the listed BMPs has been evaluated by the consulting team. Based on that evaluation, the consulting team has determined that the primary BMPs presented, working alone within their documented operating range, should meet the objective of “no net increase” of pollutants, as presented in the section “Strategy for Selection of Watershed Management and Water Quality Protection Measures”. The specific primary BMPs selected have also been identified as appropriate for use in complying with the TCEQ’s Edwards Aquifer Protection Program, under both existing¹²⁹ and proposed¹³⁰ guidelines. The secondary BMPs presented may not meet the objectives working alone, but may be useful working in conjunction with other measures. Regardless of the type, number and sequencing of

¹²⁹ “Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices”, Regulatory Guidance Document No. 348, Texas Natural Resource Conservation Commission, June, 1999.

¹³⁰ PROPOSED - “Edwards Aquifer Technical Guidance Manual”, TCEQ, December, 2004.

structural BMPs selected for use, they should all be addressed and evaluated through the comprehensive site planning and design process, presented previously.

9.7.4. Primary Structural BMPs

9.7.4.1. Retention/Irrigation Systems

Retention/Irrigation systems provide storm water capture for subsequent irrigation. This capture is accomplished using structures such as wet ponds or basins with adequate capacity to prevent discharge and retain captured storm water until it can be land applied for irrigation. The goal of these systems is to model natural normal infiltration/evapo-transpiration processes. These systems are very effective at controlling a wide variety of pollutants, including both suspended and dissolved constituents, and can approach one hundred percent (100%) pollutant removal efficiency. However, these systems also require routine maintenance to ensure that the irrigation system is performing properly. If the irrigation system is not operational, the performance of the system is significantly diminished. By minimizing the total pollutant loadings from developed portions of the site, these systems should achieve the objective of no increase in pollutant loadings from the entire site.

There are special considerations necessary for use of this BMP in any location where direct recharge to useable groundwater may occur, including the Recharge Zone. To prevent recharge from the retention pond, an appropriate barrier should exist. This could include an artificial lining or an evapo-transpiration bed of sufficient depth to prevent recharge even during extended wet periods. The same requirement applies to the area where the collected storm water is irrigated. A sufficient depth of soil profile (for evapo-transpiration) is necessary to prevent unintended recharge of pollutants. Application rates should also be controlled to prevent runoff, and irrigation should take place only on upland areas and not areas that may be subjected to concentrated flow. The design strategy presented below in the section on Wastewater Management, should be followed for areas receiving irrigation of retained storm water. For the application areas to be considered as pervious cover, the establishment of the hydraulic loading rate and the corresponding safety factors in the Wastewater Management section must be respected.

9.7.4.2. Bio-retention/Bio-filtration Systems

Bio-retention systems are similar to retention/irrigation systems in that they capture storm water for subsequent reuse. However, this reuse takes place inside the retention system through the support of vegetation and benthic and aquatic organisms. Capture is accomplished using structures such as wet ponds or basins with adequate capacity to prevent discharge. These systems are also very effective at controlling a wide variety of pollutants, including both suspended and dissolved constituents. By minimizing the total pollutant loadings from developed portions of the site, these systems should achieve the objective of no increase in pollutant loadings from the entire site.

There are special considerations necessary for use of this BMP in any location where direct recharge to useable groundwater may occur, including the Recharge Zone. To prevent recharge, an appropriate barrier or evapo-transpiration bed should exist beneath the retention structure.

9.7.4.3. Constructed Wetland System

Similar in design and concept to bio-retention systems, Constructed wetland systems capture storm water to support wetland vegetation and aquatic organisms. These systems incorporate the natural functions of wetlands to aid in pollutant removal from storm water.

Constructed wetlands can also provide for quantity control of storm water by providing a significant volume of ponded water above the permanent pool elevation. A water balance must be performed to determine the availability of water to sustain the aquatic vegetation between runoff events and during dry periods. In addition sediment fore bay or some other pretreatment provision should be incorporated into the wetland system design to allow for the removal of coarse sediments that can degrade the performance of the system. Also, construction sediment should be prevented from entering constructed wetlands, as the resulting sediment loading can severely degrade the performance of the system. Constructed wetlands are particularly appropriate where ground water levels are close to the surface because ground water can supply the water necessary to sustain the wetland system.

9.7.5. Secondary Structural BMPs

9.7.5.1. Infiltration System

An infiltration system can be designed to capture a volume of storm water and infiltrate this water into the ground over a period of several hours or even days, thereby maximizing the infiltrative capacity of the BMP. Infiltration systems include an infiltration basin, porous pavement and infiltration trenches or wells. Infiltration increases the recharge capacity of underlying aquifers thereby increasing the base flow level of nearby streams. Infiltration removes pollutants as water percolates through the soil and dissolved constituent particles can be filtered out. Infiltration may not be appropriate in areas where ground water is a primary source of drinking water due to potential for contaminant migration. This is especially true if the runoff is from commercial or industrial areas where the potential for contamination by organics or metals is present.

9.7.5.2. Detention/Sedimentation Systems

Detention/Sedimentation systems also capture storm water, but subsequently release it following a certain residence time. The residence time varies but is usually only for relatively short durations, typically measured in some multiple of the duration of the storm runoff event. During extended dry periods, these systems do not retain water. While these systems have lower recharge potential, they are also less effective at removing or sequestering pollutants. They are most effective at removing suspended constituents such as sediment. Depending on the design and operational parameters, detention sedimentation

systems can remove up to approximately eighty percent (80%) of suspended solids. However, these systems are much less effective at removing dissolved constituents, in some instances accomplishing almost no removal. Since these systems discharge, their design and operation should also control the rate, volume and characteristics of discharge to avoid altering the hydrologic regime of the receiving stream. Even though the recharge potential is lower, when constructed in the recharge zone, these systems should also include an appropriate barrier beneath the structure. Given the removal efficiency of these systems, they should be sized to accomplish adequate removal from the portion under their control to meet the objective of no net increase in pollutant loadings from the entire site. Detention/Sedimentation Systems may also be used in conjunction with existing systems to control hydrologic regime.

9.7.5.3. Sand Filtration Systems

Sand filtration systems are designed to remove suspended particles from storm water runoff and provide very little, if any detention. As with sedimentation ponds, these systems have lower recharge potential, and are much less effective at removing or sequestering pollutants than wet ponds. As with sedimentation ponds, they can remove up to approximately eighty percent (80%) of suspended solids. Sand filtration systems provide almost no removal of dissolved constituents. As with sedimentation ponds, the design and operation of sand filtration systems should also control the rate, volume and characteristics of discharge to avoid altering the hydrologic regime of the receiving stream. Even though the recharge potential is lower, when constructed in the recharge zone, these systems should also include an appropriate barrier beneath the structure. Given the removal efficiency of these systems, they should be sized to accomplish adequate removal from the portion under their control to meet the objective of no net increase in pollutant loadings from the entire site.

9.7.5.4. Vegetative Filter Strips

As their name implies, vegetative filter strips are areas of land where storm water is discharged for the purpose of utilizing the vegetation to trap sediment and other pollutants. As stand alone BMPs, vegetative filter strips are limited in that they can only accommodate sheet flow and not concentrated flow. If concentrated flow is discharged to a vegetated filter strip, adequate provisions should be incorporated to dissipate the energy and properly distribute the flow. The removal efficiency of these strips varies depending on the pollutant loading and the size of the strip, but they generally provide partial removal of suspended constituents and limited removal of dissolved constituents. Even though the recharge potential is lower with vegetative filter strips, when constructed in the recharge zone, their design should include recharge limitation features. In most instances, vegetative filter strips are intended to work in series with other structural BMPs.

9.7.5.5. Vegetated Swales

Vegetated swales are broad, shallow channels with a dense stand of vegetation covering the side slopes and channel bottom. Vegetated swales are designed to slowly convey storm water

runoff, and in the process trap pollutants, promote infiltration and reduce flow velocities. Swales are very effective in removing Total Suspended Solids (TSS) and adsorbed metals. Wet swales can be used where standing water does not create a nuisance problem and where the ground water level is close enough to the surface to maintain the permanent pool in inter-event periods.

9.7.5.6. Rainwater Harvesting

Rainwater harvesting consists of a series of components designed to capture, store and reuse rainwater. More information on rainwater harvesting systems is provided in Section 9.10. When used as a water quality component in a comprehensive site design, rainwater harvesting should allow for a storage volume sufficient to contain the runoff from the largest fourteen (14) day period on record.

9.7.6. Operations, Maintenance and Funding of Structural BMPs

Another important consideration for structural BMPs is their on-going operation and maintenance. Numerous studies by the EPA, the TCEQ and other organizations acknowledge the necessity of proper operation and maintenance for the proper long-term function of structural BMPs. In accordance with Stakeholder Guiding Principal No. 6, the use of any structural BMP as a water quality measure within the Planning Region will require a long-term operations, maintenance and funding plan. This plan should identify the requirements and responsibilities for operations and maintenance of the BMP and for funding of these tasks.

9.8. Local Enforcement of Construction Site Controls

As outlined in the discussion on Water Quality Threats, the Stakeholder Committee and consulting team have determined that the failure to use the appropriate measures and controls for storm water discharges from construction sites poses a significant threat to water quality. For this reason it is recommended that local jurisdictions either request delegation of the review, inspection and enforcement of construction site storm water controls under the TCEQ's Edwards Aquifer Protection Program and the TPDES Storm Water Construction Site program, or take other steps to enforce these requirements locally. The procedures for establishing local control of these programs are described in more detail in the Implementation Section.

Another mechanism for ensuring local enforcement of construction site storm water controls is by requiring that they be submitted and reviewed by the local jurisdiction in conjunction with the development review process. While local requirements may not be less stringent than the TCEQ's rules cited above, local controls may certainly be more restrictive, if warranted. In addition to ensuring that the construction site storm water controls have been reviewed and approved by the TCEQ, the local jurisdiction should require the following items in conjunction with a construction site storm water control plan:

- A demonstration that the estimated sediment capturing capacity of each type of control measures is capable of handling the expected sediment loading rate (using the NRCS Universal Soil Loss Equation¹³¹, or similar evaluation).
- A demonstration that control measures for concentrated flow are suitable for the quantity and rate of flow expected at their respective location.

The review of these items should be incorporated into the development review and construction plan approval process, as identified in the Implementation section. Instituting these requirements will also require appropriate technical expertise on behalf of the reviewing entity during the review process.

In addition to incorporating storm water controls into the site design review, the inspection of storm water controls should also be incorporated into other inspection activities conducted by the local jurisdictions. This will require incorporating the requirements into existing inspection guidance documents or forms and providing appropriate training to inspectors.

9.9. Wastewater Management

While the improper management of wastewater can pose a significant threat to water quality, the proper management of wastewater can be of great benefit in maintaining and enhancing water quality. When properly treated and reused with appropriate precautions, wastewater can become a valuable resource for the Planning Region. The primary threats result from unintended discharges or inadequate treatment. Depending on the management scheme selected, different water quality protection measures will be required to address these various threats. Water quality protection measures are outlined below for the prevailing existing management strategies as well as alternative management strategies.

9.9.1. Centralized Collection and Treatment Systems

A widely used strategy for the management of domestic wastewater is centralized collection and treatment. Due to the limitations on the surface discharge of treated wastewater imposed by the TCEQ's Edwards Aquifer Protection Program¹³², the primary means of discharge of treated wastewater from centralized collection and treatment systems in the Planning Region is through land application, utilizing either irrigation or evapo-transpiration. The following water quality protection measures are recommended for centralized collection and treatment systems.

9.9.1.1. Centralized Collection Systems

Due to the significant water quality threats posed by unintended discharges from centralized wastewater collection systems, these systems should be designed, installed, inspected and operated to prevent the discharge of untreated wastewater. The TCEQ's Edwards Aquifer Protection Program rules currently require the systems to be designed and installed under the

¹³¹

¹³² New wastewater discharges and increases in the capacity of existing discharges are prohibited in the Recharge Zone [30 TAC§213.6(a), "Wastewater Treatment and Disposal Systems, General"]. New wastewater discharges and increases in the capacity of existing discharges in the Contributing Zone must meet certain quality standards [[30 TAC§213.6(c), "Wastewater Treatment and Disposal Systems, Discharge Upstream from the Recharge Zone"]]

supervision of a professional engineer licensed to practice in the state of Texas, and that the systems be inspected regularly.¹³³ Systems constructed after 1990 in the Recharge Zone are required to be inspected every five years.

As noted previously, approximately 85% of the recharge to the Barton Springs Segment of the Edwards Aquifer comes from streams which originate in the Contributing Zone and cross the Recharge Zone. Given the sensitivity of the Recharge zone and potential impact on Barton Springs, the consulting team has concluded that an increased inspection frequency will be more protective of water quality. Local jurisdictions should consider a plan to conduct full television monitoring of all centralized wastewater collection systems on a more frequent basis or to otherwise increase inspection during construction and operation of systems for both the Recharge and Contributing zones. In addition to adopting this water quality protection measure, local jurisdictions should also incorporate into their ordinances the other requirements of the TCEQ's Edwards Aquifer Protection Program for collection systems. These measures will help address the water quality threat from unintended discharges of untreated wastewater.

9.9.1.2. Adequate Treatment

Another previously identified water quality threat is the inadequate treatment of domestic wastewater. Inadequate treatment fails to adequately reduce pathogens and remove oxygen demanding constituents and nutrients from the wastewater. If discharged without adequate treatment, wastewater with excessive pathogens, oxygen demanding constituents or nutrients can adversely impact surface water or groundwater. Treatment requirements for domestic wastewater are specified in the TCEQ's Edwards Aquifer Protection Program and Texas Pollutant Discharge Elimination System (TPDES) rules.¹³⁴ These rules specify that treated domestic wastewater that is to be land applied, must meet secondary treatment standards.¹³⁵ The requirement for treatment facilities to be designed and operated in accordance with these regulations should be incorporated into local ordinances. These measures will help address the water quality threat from improperly treated domestic wastewater.

9.9.1.3. Treated Wastewater Discharge Through Land Application

Wastewater that is treated to meet the land application requirements specified in the TCEQ rules is not necessarily suitable for direct surface discharge. Any discharge of treated wastewater effluent from an irrigation site to either surface water or groundwater is prohibited by TCEQ rules.¹³⁶ For this reason, it is imperative that the land application be designed and operated so that the applied wastewater is incorporated into the soil profile and

¹³³ 30 TAC§213.5(c), "Required Edwards Aquifer Protection Plans, Notification, and Exemptions, Organized Sewage Collection Systems"

¹³⁴ The TCEQ Edwards Aquifer rules are codified in 30 TAC§213, and the TPDES regulations are codified in 30 TAC §307-309, §311, §312, §314, §315, and §317.

¹³⁵ 30 TAC §213.6, "Wastewater Treatment and Disposal Systems" and 30 TAC §309.20, "Land Disposal of Sewage Effluent"

¹³⁶ 30 TAC §309.20(b)(2)(A)

allowed to either assimilate or be consumed through evapo-transpiration. There are a number of different techniques use to accomplish this land application, with the most common being surface spray irrigation or subsurface drip irrigation. The design considerations presented below apply to either practice.

There are several factors that must be addressed to ensure that the irrigation practices are consistent with the limitations of the receiving site. These factors include the surface characteristics of the receiving site, the characteristics of the vegetation, the depth of the soil profile, the infiltration characteristics of the soil present, the application rate for the treated wastewater, and the mechanics of the irrigation system.

The surface characteristics of the receiving site should be evaluated to determine how they will respond to the irrigation practices. Irrigation on slopes steeper than ten percent (10%) should be avoided. Given the same soil characteristics, the effective infiltration capacity of sloped areas is inherently lower than flat areas since the rainfall to runoff fractions increase proportionately to increasing slope. In addition to avoiding slopes areas, the receiving site should not be intersected by concentrated stormwater flow channels. While irrigation is not intended to occur during rainfall events, any erosion or scour occurring from stormwater flow could disturb or disrupt the vegetation and/or soil profile. This would result in localized areas with significantly different infiltration characteristics than the rest of the site. These surface characteristics need to be addressed in the evaluation of the irrigation receiving site.

The vegetation is a major factor in determining the effectiveness of the irrigation site to assimilate the irrigation. Vegetation utilizes both water and nutrients. As the assimilative hydraulic capacity of the vegetation increases, this reduces the amount of infiltration that must occur through the soil profile. The vegetation also assimilates nutrients, which are not normally assimilated well into the soil profile. Soil profile depth is also an important factor in the design of an irrigation area. A soil profile with inadequate depth will not allow adequate sequestering/filtering of remaining pollutants through the soil matrix. This is particularly important to address metals and organic constituents that are not well assimilated through vegetation. Soil profiles with effective infiltration rates that are lower than the actual application rate will limit the amount of infiltration occurring and cause the excess wastewater applied to run off. If the application rate is set to the saturated infiltration rate of the soil profile, this allows no margin of error for changes in antecedent moisture content that may drastically affect effective infiltration. This could result in a direct surface discharge of treated wastewater in violation of existing rules. It is important that all of these factors be adequately evaluated in the design of a land application site for treated wastewater.

There are a number of current technical procedure manuals and regulatory guidance documents addressing the mechanics of the irrigation process.¹³⁷ It is important that these components be properly designed to ensure that they function properly, and are adequately designed. By following existing design standards for the irrigation mechanics and

¹³⁷ "Nonpoint Source Pollution Control Technical Manual", LCRA, July 1998, and TCEQ regulations at 30 TAC §213.

performing a thorough evaluation of the receiving site, the land application of treated wastewater through irrigation can be protective of water quality.

There are a number of existing evaluation and design procedures in use within the Planning Region. Current TCEQ rules require a site specific evaluation of the soil's infiltration characteristics, as well as an assessment of the evapo-transpiration capacity of the receiving site. Due to the necessity to prevent runoff from land application areas, realistic estimates for these parameters are required. For land application sites within the Planning Region, a wastewater irrigation plan shall be included with the comprehensive site design. This plan shall be developed by a licensed professional engineer, licensed geoscientist, or licensed sanitarian with knowledge of the soils in the Planning Region. Due to the uncertainty of effective infiltration rates and antecedent moisture conditions, a safety factor of 1.50 shall be applied to the measured hydraulic infiltration rate to determine the design application rate. This provision has been included to ensure that the irrigation application area is considered pervious cover, as discussed previously. The TCEQ design standards and these additional measures should be incorporated by the local jurisdictions into their ordinances.

9.9.2. On-site Sewer Facilities

Another widely used strategy for the management of domestic wastewater is on-site sewer facilities (OSSFs). OSSFs are currently regulated by the TCEQ's OSSF rules.¹³⁸ These systems are typically used for individual tracts of land with a single residence or for residences in larger lot subdivisions. OSSFs rely on infiltration and evapo-transpiration for discharge of the treated wastewater. The following water quality protection measures are recommended for OSSFs.

9.9.2.1. Proper Design and Installation

The presence of a suitable soil profile, with known infiltration characteristics is critical to the proper design and installation of an OSSF. As with surface irrigation, a soil profile with inadequate depth will not allow adequate sequestering/filtering of remaining pollutants through the soil matrix and could result in the introduction of these pollutants into the groundwater. Soils with infiltration rates that are lower than the design rate of the system could result in surface accumulations of untreated wastewater, with the excess being discharged as runoff. This could result in a direct surface discharge of untreated or partially treated wastewater in violation of existing rules. It is important that all of these factors be adequately evaluated in the design of an OSSF.

As with the other water quality protection measures recommended, utilizing realistic design constraints is necessary to achieve the intended outcome of protecting water quality. Soil profile depths and types and infiltration rates should be addressed as part of the geologic assessment of the site. The use of "default" infiltration rates can lead to inadequate designs, which can correspond to inadequate function. The design procedures utilized should comply with established technical guidance documents, such as the LCRA's On-Site Sewage

¹³⁸ The TCEQ OSSF rules are codified in 30 TAC §285, "On-Site Sewage Facilities"

Facilities Program.¹³⁹ These designs should also respect existing regulatory requirements regarding lot size, including a minimum one (1) acre lot size in the recharge zone under the TCEQ's OSSF rules¹⁴⁰, and other existing local regulations.

In addition to proper design, proper installation is also necessary. Local public entities should inspect each OSSF system located within the recharge and contributing zone to assure that they have adequate soil depth, soil type, and that they are being installed in accordance with their design.

9.9.3. Alternative Systems

A wide variety of wastewater management systems are available as alternatives to centralized collection systems or on-site systems. These alternatives can include hybrid systems with centralized collection, but on-site reuse. Alternative systems can also include centralized collection, but wastewater discharge through various means, including evapo-transpiration through the soil matrix instead of surface irrigation. Due to the number and potential variety of these systems, specific designs are not included in this Plan. However, the other water quality protection measures presented in this Plan are intended and should be construed to encourage the beneficial reuse of treated wastewater in preference to use in a manner constituting disposal.

The beneficial reuse of treated wastewater is currently subject to significant regulation at the state level. While local regulations can not relax these requirements, they can treat preferentially beneficial use over uses which constitute disposal. An example of this difference is using wastewater for irrigation of landscaped areas inherently tied to the development in place of other sources of water, as opposed to irrigating wastewater effluent on a dedicated disposal tract that would not inherently be part of the development. Preferences to encourage beneficial use, in compliance with existing regulations, should be incorporated into each jurisdiction's local implementing ordinances.

9.9.4. Operations, Maintenance and Funding of Wastewater Management Systems

As discussed above with structural BMPs, the proper operation and maintenance of wastewater management systems is necessary to ensure that they are protective of water quality. In accordance with Stakeholder Guiding Principal No. 6, wastewater management systems within the Planning Region will require a long-term operations, maintenance and funding plan. This plan should identify the requirements and responsibilities for operations and maintenance of the wastewater management system and for funding of these tasks.

¹³⁹ "Construction Standards for On-Site Sewage Facilities", LCRA, September, 1997

¹⁴⁰ 30 TAC 285, Subchapter E, "Special Requirements for OSSFs Located in the Edwards Aquifer Recharge Zone"

9.10. Alternative Water Sources/Uses and Conservation

9.10.1. Rainwater harvesting

Rainwater harvesting holds the potential to provide both an alternative water supply as well as being used as a BMP for water quality protection. The Texas Guide to Rainwater Harvesting notes that “Rainwater harvesting also lessens local erosion and flooding caused by runoff from impervious cover ... Thus, stormwater run-off, the normal consequence of rainfall which picks up contaminants and degrades our waterways, becomes captured rainfall which can then fulfill a number of productive uses.”¹⁴¹ Rainwater tends to be very soft and contain almost no dissolved minerals and salts. Total dissolved minerals and salt levels average about 10 mg/l and total dissolved solids can range as high as 50 mg/l and as low as 2 mg/l. This compares to city tap water in Texas which is typically 200 to 600 mg/l.¹⁴² A rainwater harvesting system consists of six basic components including:

- Catchment Area/Roof which is the surface on which the rain falls;
- Gutters and Downspouts which transport the water from the catchment area to storage;
- Leaf screens and Roof washers which are used to filter out debris;
- Cisterns or Storage Tanks where collected rainfall is stored;
- Conveyance, which is the method of delivering the water either by gravity or pump; and
- Water Treatment which include filters and equipment that are used to settle, filter, and disinfect the water if it is to be used for drinking water.

Catchment areas are usually roofs of buildings. However, they can also be channeled gullies along driveways. Swales in yards can also serve as catchment areas. If these areas are used as a catchment area the water is diverted to a French drain or bermed detention area. Rainwater yield varies with the size and texture of the catchment area. Smoother, cleaner and more impervious roofing material will increase the yield. Losses tend to be negligible with a pitched metal roof but concrete and/or asphalt roofs average just less than 10% loss and tar and gravel roofs average a maximum of 15% loss. Regardless of roofing materials used, designers assume up to a 25% loss on annual rainfall due to the roofing material texture, evaporation, and inefficiencies in the collection process.¹⁴³

Gutters and downspouts are typically made of seamless aluminum and are sized to match the size of the catchment area. Typically, downspouts are designed to handle 1.25 inches of rainfall during a 10 minute period. Roof washing is the collection and disposal of the initial flush coming off the catchment area. These systems are typically a standpipe made from PVC pipe which extends from the gutter to the ground with the top of the pipe sealed so water will not flow out of the top. Once the pipe has filled the rest of the water will not flow out the top. These systems should be designed so that at least 10 gallons of water are diverted for every 1,000 square feet of collection area. The first flush can be used for irrigation or other non-potable uses. Many of the

¹⁴¹ “Texas Guide to Rainwater Harvesting”, Second Edition, Texas Water Development Board, Center for Maximum Potential Building Systems, 1997, pg. 2

¹⁴² Ibid. p.4

¹⁴³ “Texas Guide to Rainwater Harvesting”, Second Edition, Texas Water Development Board, Center for Maximum Potential Building Systems, 1997, pg. 7

commercial roof washers which also contain filter or strainer boxes are available. Storage tanks may be made of several different materials including concrete or masonry, ferrocement, stone, fiberglass, metal or wood. The conveyance system is typically PVC pipe and pumps that assist in pressure maintenance. Water treatment includes the use of filters as well as disinfection if the water is to be used for potable uses.

Design criteria are based on precipitation in the area. Approximately 620 gallons of rainwater runoff is generated per inch of rainfall for every 1,000 square feet of roof area routed to collection facilities. Collection efficiencies will vary based on the storage availability and anticipated usage. Collection efficiencies of 75%-90% are often used by installers depending on the specific design if the system is to be used for in home use or for large scale irrigation. For small systems designed for supplemental irrigation collection factors of below 50% are common because it is not economic to install the large storage required to gain a higher percentage.¹⁴⁴

A rainwater harvesting system is generally more cost effective if it is designed and integrated as part of new construction. Retrofitting existing buildings can often be significantly more expensive. If there is a potable supply of water available, using rainwater harvesting as a supplemental supply is usually the most cost effective method of implementing a rainwater harvesting project. In general the cost to install a rainwater harvesting system in new construction is approximately \$1/gallon of collection capacity.¹⁴⁵ The City of Austin currently offers financial incentives for both residential and commercial water customers to use rainwater harvesting as a water conservation measure. These incentives can be up to \$500 per system and a short application form is required to be submitted to the Water Conservation Division at the City of Austin.¹⁴⁶ The City has identified the following sites as demonstration sites:

- Lady Bird Johnson Wildflower Center
- American Botanical Council
- Summit Elementary School
- Pickle Elementary School
- Feather and Fur Animal Hospital
- Parque Zaragoza Recreation Center
- The Natural Gardener
- Westwood High School
- Robert E. Lee Elementary School
- HEB Grocery at William Canon and Brodie Lane

The Texas Water Development Board also identified rainwater harvesting systems around the state, the vast majority of which were in Travis and Hays Counties serving households with both potable water and water for irrigation and other non-potable uses.

Additionally, the State of Texas created a sales tax exemption for equipment used in water conservation including rainwater harvesting, water recycling and reuse, reduction or elimination

¹⁴⁴ Ibid, pg. 22

¹⁴⁵ Ibid, pg. 33

¹⁴⁶ Rainwater Harvesting Incentive Program, City of Austin, October, 2004.

of water use, desalination, brush control, precipitation enhancement, and water and wastewater system improvements.

While rainwater harvesting has traditionally been considered a water conservation tool, it can also serve as a water quality BMP, for both residential and commercial development within the Planning Region. Additional information on the use of rainwater harvesting as a structural BMP has been included in Section 9.7.

9.10.2. Water Conservation

While some may argue that water conservation is not directly linked to water quality, this is not the case in areas where there is significant reliance on the use of groundwater, such as in the Planning Region. Particularly given the water quality threats posed by excessive groundwater pumping as established by the BSEAC Study, water conservation that reduces groundwater usage is directly linked to water quality.

Water conservation practices have long been advocated in Texas, and in recent years, the Texas legislature has passed a number of mandatory water conservation measures. These measures include the requirement that all new fixtures (especially toilets and shower heads) sold in the state must include water conserving features. The Legislature has also mandated that all regional water plans include water conservation practices and drought management measures that are at least as stringent as those required under water rights permitting statutes.

There is a wealth of information available on proven water conservation measures. Among other sources, the Texas Water Development Board has numerous publications on water conservation techniques, many of which are available over the internet.¹⁴⁷ The following water conservation measures are recommended for implementation in the Planning Region. These measures should be implemented as mandatory, through water suppliers, and voluntarily, in conjunction with the recommended public education measures.

9.10.2.1. Water Conservation Rate Structures

The concept of conservation water rates is based on the idea that the quantity of water demand clearly decreases with increasing water prices. There are four generally accepted conservation rate structures:

- Uniform Rates - the same rate applies to all water users.
- Inverted Block Rates - a schedule of rates applicable to blocks of increasing usage in which the usage in each succeeding block is charged at a higher unit rate than in the previous blocks.
- Seasonal Rates - based on the cost of service variations with respect to system season requirements. For example, a higher unit rate for water may be charged in the summer than for the rest of the year.

¹⁴⁷ <http://www.twdb.state.tx.us/assistance/conservation/pubs.asp>

- Marginal Cost Rates - the cost of water is based on the cost of providing the next unit of production such as an increment of plant capacity and supply. Example: If a water utility needed to develop a new source of supply at considerable expense, the charge for all water sold should reflect that cost even though the average could be less.

9.10.2.2.Drought Management

Drought management includes short-term measures enacted during times of water shortage. Drought management allows for essential water needs to be met during water-short periods while other potential uses of water, that are not as high a priority, are curtailed. Those measures provide the ability to stretch water supplies to avoid running out of water during drought conditions. It is important to have drought contingency measures in place in case they are needed, and they are a required component of good water resource management.

9.10.2.3.Water Conservation Regulations

The following are examples of regulations that could establish water conservation requirements or encourage the more efficient use of water:

- Retrofit of Plumbing fixtures on Resale - When buildings or houses are sold, all plumbing fixtures would be retrofitted in order to meet current plumbing standards.
- Irrigation Permitting - Require all new underground irrigation systems to obtain a permit, ensuring that the system is constructed in the most water efficient manner including the installation of a rain shut off switch, wind sensor, check valves, or other water saving equipment.
- Separate Irrigation Meter Requirements - Require all commercial properties including duplexes, triplexes, and four-plexes to install separate irrigation meters so that the property owner could effectively monitor outdoor water use.
- Waste of Water Regulations - Regulation or ordinances could be passed prohibiting the waste of water such as running an irrigation system with broken heads, heads directed over paved areas, allowing water to run down the street or pond in a parking lot, or other similar events.
- Landscape Ordinance - A landscape ordinance could be adopted requiring the use of water efficient plants, irrigation systems that have rain shut-off switches, etc. Additionally, the ordinance could require that parking lot medians and buffer areas be at least 8 feet wide to prevent water waste.

9.10.2.4.Xeriscape

Xeriscape is a method of landscaping which includes the use of native and/or naturally drought resistant plants, landscape renovation to reduce water use, and more efficient irrigation. Xeriscape practices used in public parks and landscape areas represent an opportunity for local governments to reduce water demand.

9.10.2.5. Irrigation Techniques

The use of low-pressure drip irrigation instead of high-pressure spray irrigation offers a more efficient means of irrigating crops. This concept can also be applied in conjunction with the irrigation of wastewater effluent or retained storm water, as discussed in other sections.

9.11. Characteristics of Development

There are varying potential threats to water quality that depend on the specific characteristics of the development. These threats need to be addressed through a number of water quality protection measures unique to the type of development occurring.

9.11.1. Commercial/Institutional

Commercial developments are generally accompanied by large parking areas. The typical construction materials used for parking lots generally result in higher unit runoff rates than those generated from other types of impervious cover. This characteristic tends to concentrate both storm runoff and pollutants. To address this characteristic, parking lots should be designed to avoid large contiguous areas of impervious cover. By concentrating large numbers of parked vehicles, parking lots can accumulate residuals from automobiles, including leaked fluids, organic rubber constituents and metals. These residuals contain a variety of parameters which can adversely impact water quality. In addition to automobile residuals, commercial parking lots serve as accumulation points for litter. In terms of water quality parameters, these pollutants are best represented by oil and grease, dissolved metals, and floatables. The design of parking lots for commercial areas, and their associated BMPs, should address these parameters. These structural measures are necessary to protect water quality. Other design features for commercial development should incorporate the other water quality protection measures included in this Plan.

9.11.2. Golf Courses and Other Concentrated Recreational Facilities

While the construction of golf courses and other concentrated recreational facilities may not result in the construction of significant amounts of impervious cover, they can still pose significant water quality threats in other ways. Although not completely impervious, the construction of these facilities can increase storm water runoff rates and volumes. The application of pesticides and nutrients at these facilities can also result in significant increases in the discharge of these pollutants in storm water if no controls are present. These types of facilities should be required to go through the comprehensive site design and development review process, and be required to incorporate sufficient water quality protection measures to demonstrate that they achieve no net increase in pollutant discharges and properly control storm water runoff rates and volumes.

9.12. Land-use restrictions

Land-use restrictions involve developing laws and ordinances restricting certain activities with the ability to adversely impact water quality.

9.12.1. Land-use restrictions

As outlined in the current Edwards Aquifer Protection Program rules, there are a number of land-uses that are currently prohibited in the Recharge Zone.¹⁴⁸

- Waste disposal wells (disposal of liquid wastes by underground injection)
- New feedlot/concentrated animal feeding operations
- Land disposal of Class I industrial wastes (landfills or land application sites)
- Sewage holding tanks as part of an organized sewage collection system
- Municipal solid waste landfill facilities
- New municipal and industrial wastewater discharges.

Local jurisdictions should develop land-use restrictions to prohibit these activities.

In addition to these prohibitions, local jurisdictions should also develop restrictions on industrial facilities. Industrial facilities concentrate operations and chemicals which pose a serious threat to water quality given the unique conditions of the Recharge Zone. New industrial facilities would typically be restricted through their need to obtain a wastewater discharge permit, which is prohibited under the Edwards Aquifer Protection Program rules. However, local jurisdictions should be explicit in prohibiting industrial land-uses in the Recharge Zone. These land-use restrictions will serve as non-structural measures to protect water quality.

9.12.2. Zoning/Use limitations

In addition to certain land-use prohibitions, local jurisdictions should also restrict the location of certain activities through zoning and/or use-limitations. These zoning/use limitations should address the activities prohibited in the Recharge Zone, as outlined above. Due to their characteristics, these facilities also pose a water quality risk when located in the Contributing Zone. For proper protection of water quality in both the Recharge Zone and the Contributing Zone, the land uses listed above should also be restricted in all areas of the Planning Region through the use of zoning and use limitations.

As outlined above, commercial activities can also pose water quality threats. Due to their tendency to require large, contiguous areas of impervious cover, commercial activities should be located where they pose a lower risk to the environment. Since the EPA NPDES storm water regulations adopted a threshold of five (5) acres for differences in requirements for construction site runoff, this same threshold has been adopted in this Plan for restricting commercial development. Commercial developments exceeding five (5) acres in size should be restricted to preferred growth areas, as defined above. This threshold is intended to provide flexibility for implementation by local jurisdictions.

¹⁴⁸ 30 TAC §213.8, "Prohibited Activities"

9.13. Restrictions on Use, Storage and Disposal of Potentially Harmful Materials

Restrictions on the use, storage and disposal of potentially harmful materials help address the threats posed by these substances to water quality. These types of restrictions are non-structural water quality protection measures. Restrictions are most effective when coordinated with the Public Education measures outlined later in the Plan.

9.13.1. Hazardous Materials

The improper handling, use and disposal of hazardous materials can have an adverse impact on water quality. Water quality protection measures addressing the disposal of wastes resulting from hazardous materials are included elsewhere in the Plan. Restrictions on the use of pesticides and nutrients are also incorporated elsewhere in the plan. The following additional restrictions on other types of hazardous materials should be implemented:

9.13.1.1. Concentrated Storage

The concentrated storage of hazardous materials poses a significant threat to water quality. Current programs in the state dealing with the concentrated storage of hazardous materials require most facilities to register and file public reports. The TCEQ currently requires all facilities that handle industrial waste to file certain notifications.¹⁴⁹ A program under the Department of State Health Services (DSHS) also requires facilities that store more than certain threshold quantities of specified hazardous materials to register and file public reports.¹⁵⁰ While neither of these programs prohibits these facilities, they do record their location and the type and quantity of materials stored. Local jurisdictions with zoning authority should restrict the concentrated storage of hazardous materials to those areas determined to pose a lower threat to water quality and the environment.

9.13.1.2. Transportation Incidents

One significant identified threat is the release of hazardous materials during transportation incidents. Current programs in the state dealing with the release of hazardous materials during transportation focus primarily on risks to public safety. Incidents involving the release of hazardous materials can also pose threats to water quality and the environment. Due to the amount of public infrastructure already in place, local jurisdictions should coordinate with existing hazardous materials (HAZMAT) response programs to ensure that water quality protection measures are incorporated into those programs. This measure can be accomplished through providing water quality training to HAZMAT responders, including the importance of initial response actions to contain and recover the released materials. Ordinances addressing the clean-up of released hazardous materials should also be reinforced

¹⁴⁹ 30 TAC §335.6, "Notification Requirements".

¹⁵⁰ The notification requirements are established under legal authority of the Texas Health and Safety Code, are administered by the Department of State Health Services, are codified in 25 TAC §295, "Occupational Health", Subchapter H, "Hazardous Chemical Right-to-know" (25TAC §295.181-§295.183).

to include requirements to perform proper assessment, and to use proper waste characterization and disposal methods.

9.13.1.3. Use of Certain Petroleum Products

Certain hazardous materials used in specific applications pose significant threats to water quality in the Planning Region. As identified previously, the use of paving materials containing “coal tar” have been linked to the occurrence of PAH compounds in storm water runoff. Materials containing these “coal tars” are used as overlays on previously paved areas, such as parking lots, roadways and driveways. PAH compounds are a serious threat to certain aquatic species and specifically to the Barton Springs Salamander. Due to these threats, the use of “coal tar” sealants containing leachable PAH compounds should be prohibited in the Planning Region. Local jurisdictions should incorporate this use restriction into laws and ordinances governing development, public projects, and to the extent allowed by law the sale and use of these items by the public.

9.13.2. Wastes

Numerous waste management measures are included in existing state and federal regulations. Most of these regulations are intended specifically to protect water quality from the improper management of disposal of wastes. Local jurisdictions should incorporate into their laws and ordinances restrictions on waste management activities consistent with these state and federal regulations. Jurisdictions with zoning authority should restrict waste management activities to those areas determined to pose a lower threat to water quality and the environment. These activities have previously been described in the section on Existing Water Quality Regulatory Programs.

9.13.3. Pesticides and Nutrients

To avoid the adverse impacts associated with pesticides and excessive nutrients, integrated management programs should be implemented by all entities that utilize pesticides and/or nutrient supplements. This includes both public and private entities and individuals in the Planning Region. A number of sources describe integrated management programs. The U.S. Department of Agriculture, (USDA) Natural Resource Conservation Service (NRCS) has developed an integrated nutrient management program for agricultural activities.¹⁵¹ Both the existing¹⁵² and proposed¹⁵³ guidelines for use in complying with the TCEQ’s Edwards Aquifer Protection Program include an integrated pesticide and nutrient management strategy. Integrated management strategies serve as non-structural measures to protect water quality.

¹⁵¹ "Nutrient Management", Conservation Practice Standard Code 590, U.S. Department of Agriculture, Natural Resource Conservation Service, October, 2003.

¹⁵² Section 2.3, "Pesticide and Fertilizer Management", "Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices", Regulatory Guidance Document No. 348, Texas Natural Resource Conservation Commission, June, 1999.

¹⁵³ PROPOSED - Section 2.3, "Pesticide and Fertilizer Management", "Edwards Aquifer Technical Guidance Manual", TCEQ, December, 2004.

9.14. Proper Vegetative Management

While undeveloped land left in a natural state can be an effective measure for maintaining water quality, other activities occurring on undeveloped land can have adverse impacts on water quality. As previously identified, the majority of these potential impacts are associated with improper management of vegetation. Good vegetative ground cover slows and filters surface sediment from storm runoff, prevents erosion, and improves infiltration of water into the soil. More sediment is deposited on the land rather than carried into streams or water impoundments, and more water is retained in the riparian zone for slow release to the streams as base flow. Various scientific studies have confirmed the relationship between proper vegetative cover, decreased sediment yield and increased infiltration.¹⁵⁴

The following measures are recommended to minimize adverse water quality impacts from improper vegetation management. Additional information is available from the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS).

9.14.1. Vegetative/forestation practices

Proper vegetative practices will help ensure good water quality on undeveloped land. Practices such as removing invasive/noxious brush and weeds and propagating/re-establishing native plant communities will provide storm water runoff quality similar to undeveloped land in its natural state. As indicated in the section on Water Quality Threats, the excessive propagation of juniper can abstract a significant amount of water that would otherwise contribute to plant growth, runoff or recharge. Those who own and/or manage undeveloped land should institute programs to control the propagation of juniper and replace this growth with other native trees and/or grasses. Information from the USDA NRCS indicates that brush and noxious weed removal may make additional water available to sustain healthy streamflow and aquifer recharge, ranging from approximately 30,000 to 100,000 gallons per acre per year.¹⁵⁵ Other studies have indicated that a woody plant canopy coverage of approximately fifteen percent (15%) is optimal.¹⁵⁶

However, the management of juniper should be approached with caution and consideration of endangered species (particularly the Golden Cheek Warbler) and the overall diversity of habitat composition. This kind of consideration has been given to vegetative management in other preserves and conservation easements in the study area, including endangered species preserves and the City of Austin Water Quality Management Properties Protection Lands (Prop 2 Lands).

Proper vegetative practices should also be integrated into other areas of the plan. Stream buffers or adjacent uplands taken out of agricultural use and preserved as stream buffers or open space conservation easements should be subjected to proper vegetative management practices. This

¹⁵⁴ Reference Figure 2, "Rangeland Hydrology and Water Quality in the Texas Coastal Bend", D. Lynn Drawe, Coastal Coordination Council, National Oceanic and Atmospheric Administration, August 2002.

¹⁵⁵ "Grazing Lands" A Valuable Resource for All Texans", U.S. Department of Agriculture, Natural Resource Conservation Service.

¹⁵⁶ "Improved Rangeland Management: Prospects for Improved Water Quantity and Quality from the Proposition 2 Lands in Austin, Texas", M. Hollon, Glenrose Engineering, Inc., et al, Austin, Texas

will maximize water quality/quantity functions and values. Management may be needed to restore the land to a more ideal composition of woody plant and native grass cover, or to restore areas disturbed during the development process.

9.14.2. Restoration Following Construction/Development

There are a number of practices that should be utilized to re-establish proper vegetation and minimize erosion and sedimentation following disturbance by construction and/or development. A series of proposed practices for proper restoration has been developed by the City of Austin to maximize the establishment of appropriate native vegetation following land disturbance.¹⁵⁷ These practices address:

- Identification of species, sources, mixtures, and rate of application of seeding, specifically the relationship of cool season vegetation to warm season vegetation.
- Type of mulch and compost.
- Watering requirements
- Management practices for establishment of vegetation.

These practices should be followed in all areas of the Planning Region for the re-establishment of vegetation following land disturbance.

9.15. Proper Agricultural Practices

The following measures are recommended to minimize adverse water quality impacts from improper agricultural practices. Additional information is available from the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS).

9.15.1. Livestock/Range Practices

There are a number of practices that can be utilized to minimize the impact from livestock grazing and range practices. Some of these practices have been summarized below.

- **Controlled Grazing** – utilizing structural fencing and administrative rotation practices to evenly distribute grazing activity across the property, to avoid concentrating animal byproducts and vegetative disruption in the same areas over the long-term. This practice is also intended to balance forage consumption by grazing animals with plant biomass production in a manner that provides a portion of the plant resources for conservation purposes and maintenance of a healthy plant community.
- **Distributed Watering** – similar to controlled grazing, the objective is to distribute watering activities around the property to avoid concentrating animal activity and byproducts in the same areas over the long-term.
- **Topsoil/Nutrient Maintenance and Enrichment** – ensuring that the topsoil and grasses have adequate nutrients to support grazing and prevent the adverse impacts of over-grazing.
- **Weed/Invasive Plant Control** – managing and controlling the propagation of weeds/invasive plants to ensure that soil nutrients are available for grasses and minimizing the need for supplemental nutrient application.

¹⁵⁷ “Native Grassland Seeding and Planting for Erosion Control”, City of Austin Standard Specification Manual 609S.

9.15.2. Cropland Practices

There are a number of practices that can be utilized to minimize adverse water quality impacts from cropland:

- Select crops which can be sustained from natural precipitation, and avoid the need for irrigation or additional water application.
- Minimize the use of pesticides and nutrients, and use proper application procedures when they are used.
- Use conservation practices (e.g. contour farming,¹⁵⁸ hedgerow planting,¹⁵⁹ crop rotation,¹⁶⁰ etc.) to minimize erosion/sedimentation.

9.16. Protection of Endangered and Threatened Species

Scientific evidence obtained from the City of Austin supports the conclusion that the combined effects of changes in springflow, sedimentation, turbidity, and pollutant loading adversely affect the Barton Springs Salamander. Minimum target spring flows will be identified with associated aquifer management strategies as part of the development of the Barton Springs Habitat Conservation Plan (HCP) currently being developed by the Barton Springs Edwards Aquifer Groundwater Conservation District. Dissolved oxygen concentrations are also being investigated to determine overall habitat requirements and suitability. Effects of non-point source pollution including nutrient loading (chemical compounds comprised of phosphates and nitrates that cause excessive growth of vegetation that degrades habitat for aquatic animals), and contamination from pesticides and polycyclic aromatic hydrocarbons (PAHs) are of concern.

Species protection imposed by federal law and/or water quality threshold criteria determined by additional scientific studies that are on-going or identified by future studies in the Barton Springs HCP may supplant current TCEQ standards. The sensitivity of the Barton Springs ecosystem to changes in both water quantity and quality suggests establishment of critical water quality parameters that may include other components not listed in or having different thresholds than the current TCEQ Water Quality Standards.

9.17. Public Education/Outreach

Public education and outreach is a major factor in the success of many water quality protection measures. Through public education, people gain an understanding of how their actions can affect water quality and become more informed about water quality issues in their community. When the public is aware of the impacts that they have on their surroundings, they develop a greater sense of responsibility for those actions. Public education, awareness and acceptance are crucial for the political and financial sustainability of water quality protection measures implemented by local

¹⁵⁸ "Contour Farming", Conservation Practice Standard Code 330, U.S. Department of Agriculture, Natural Resource Conservation Service, February, 2000.

¹⁵⁹ "Hedgerow Planting ", Conservation Practice Standard Code 422, U.S. Department of Agriculture, Natural Resource Conservation Service, October, 2003.

¹⁶⁰ "Conservation Crop Rotation ", Conservation Practice Standard Code 328, U.S. Department of Agriculture, Natural Resource Conservation Service, February, 2000.

governments. Public Education is also the primary driver for the voluntary implementation of water quality protection measures.

As a part of its Phase II Storm Water program, the U.S. EPA has adopted Public Education as one of the minimum control measures to be implemented to control storm water pollution. The public education component of this Plan is based on the EPA's minimum control measure strategy. To the extent possible, this effort should be coordinated with other public education activities.

9.17.1. Awareness/Support of the Regional Plan

Ensuring that the public is aware that the Plan exists is a major step in facilitating its implementation. This should be accomplished through public notices made by the implementing entities, and should include an outline of the water quality threats and the protection measures included in the Plan to address those threats. While other parts of this Plan incorporate elements to inform the individuals and entities requesting permission for certain regulated activities, the measures recommended for voluntary implementation have few inherent notification mechanisms. Specific emphasis should be placed on voluntary measures and those measures directed toward individual citizens.

9.17.2. Public Education/Outreach for Homeowners

Public education/outreach directed to Homeowners should include the following topics:

- Lawn and Garden Activities - Programs that encourage composting, decreased fertilizer and pesticide use, water use efficiency, practical turf areas, appropriate plant selection, and soil analysis/improvement.
- Water Conservation Practices for Homeowners - Programs that encourage water conservation in the home including reduced consumption, looking for leaks, and efficient lawn watering.
- Proper Disposal of Household Hazardous Wastes - Programs that educate citizens on impacts of hazardous household materials and alternatives to toxic chemicals. Also initiatives to provide disposal opportunities for paints, paint thinners, solvents, motor oil, and other chemicals.
- Pet Waste Management - Education and possibly ordinances to encourage pet owners who live in concentrated residential areas or areas where the waste could not be properly assimilated to collect and properly dispose of their pet's waste.
- Trash Management – Programs that educate citizens on impacts of garbage and control measures, including source reduction (alternative packaging, waste reduction, alternative chemicals, recycling etc,) and community clean-up programs

9.17.3. Education/Outreach for Commercial Activities

Public education/outreach directed to Commercial Activities should include the following topics: pollution prevention activities at businesses, education for employees, and recognition programs for businesses that participate.

9.17.4. Outreach Programs to Minority and Disadvantaged Communities and Children

Programs that are bilingual, community organization based; and/or directed at children through school, scouts, and other groups.

- K-12 programs in the classroom, lab, or "hands-on" in the field. Storm Water Educational Materials
- Mail, door-to-door, businesses, organizations, public places, presentation, conferences, and media distribution of materials and information.

9.17.5. Public Outreach Programs for New Development

Public education/outreach directed to new development should be addressed to those who are involved in planning and constructing, and those who will occupy the new development. This should include the following topics:

- The importance of a comprehensive site design
- Low Impact Development
- Outreach encouraging pollution prevention with residential and commercial developers and owners.

9.17.6. Public Assistance with Problem Identification and Enforcement

An informed public can help identify potential water quality problems and assist the agencies charged with enforcing the water quality protection measures. This can be accomplished by informing the public about the processes for reporting and providing information on water quality problems. As a part of its own outreach program, the TCEQ has developed procedures for citizens wishing to report environmental problems¹⁶¹, and has provided technical guidance for citizens who wish to collect evidence of environmental violations.¹⁶² This information is available on the agency's website. In addition, publicizing the consequences of enforcement actions can also serve as a deterrent for future water quality violations.

9.17.7. Public Education Outreach Avenues

Public education/outreach should utilize a combination of avenues to ensure that all segments of the population are reached. These avenues can include:

- Educational displays and informational material (e.g. pamphlets, booklets, brochures, etc.) on water quality that are made available at public locations and events including conferences, seminars, libraries, schools, and community events.
- Special events (e.g. festivals, proclamations, tours, seminars, etc.) designed to raise awareness of water quality issues.
- Notification through regulatory approval processes (e.g. development approvals, building permits, etc.)

¹⁶¹ http://www.tceq.state.tx.us/nav/reports/report_prob.html

¹⁶² <http://www.tceq.state.tx.us/compliance/complaints/index.html>.

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- Coordinated distribution of informational material on water quality issues (e.g. coordinated with utility or service billings, real estate/property transactions, construction materials suppliers, etc.)
- Public service announcements through various media outlets (e.g., newspapers, magazines, radio, internet, and television)

10. IMPLEMENTATION, ENFORCEMENT AND ACCOUNTABILITY

In any endeavor, planning only gets you part of the way to the solution. A well planned strategy requires execution to be successful. This Regional Plan is no different. The best of all possible plans will provide no real water quality protection if it is not implemented. During the Stakeholder meetings and discussions, much emphasis was placed on the importance of implementation, specifically including enforcement and accountability. The following sections outline the general implementation strategy and address specific implementation mechanisms.

10.1. Implementation Principles: Voluntary, Mandatory or Both?

For the types of measures identified in this Plan, there are two possible implementation strategies: 1) mandatory, and 2) voluntary. Obviously, all of the measures outlined can and should be implemented on a voluntary basis. However, a completely voluntary implementation strategy would provide uncertain and disparate implementation. For this reason, a number of the water quality protection measures are identified as recommended for mandatory implementation. Among the measures recommended for mandatory implementation, there are several for which more than one agency has existing regulatory authority. In a few cases, there are measures for which no existing entities have the legal authority to implement. These potential impediments to implementation are addressed in a separate section below.

10.2. Legal Authority of Existing Entities

There are a number of different types of governmental and quasi-governmental entities that have existing legal authority for implementing certain parts of the Plan. The benefits of utilizing existing authority in existing entities include shorter implementation time and the ability to amend existing ordinances instead of adopting new ones. The disadvantages of using existing entities include potential funding limitations and institutionalized cultures that are not sensitive to water quality concerns. Strategies to take advantage of the benefits and compensate for the disadvantages are outlined in later sections. The various types of entities and their general powers to implement water quality protection measures are outlined below. For a more detailed presentation of the existing legal authorities of these entities, please refer to Appendix K, "Existing Authorities Matrix for Governmental Entities in the Planning Region".

10.2.1. Texas Commission on Environmental Quality

Under the Texas Water Code, the TCEQ was designated by the Texas Legislature as the agency with "primary responsibility for implementation of water quality management functions, including enforcement actions, within the state."¹⁶³ Under this broad authority, the TCEQ can implement any water quality regulations that it can demonstrate are necessary and do not conflict with other state legislation. The TCEQ may also delegate these responsibilities to local governments through cooperative agreement.¹⁶⁴

¹⁶³ Texas "Water Code", Title 2, Chapter 26, "Water Quality Control", §26.0136(a).

¹⁶⁴ Texas "Water Code", Title 2, Chapter 26, "Water Quality Control", §26.175.

10.2.2. Home Rule Municipality

In Texas, Home Rule (or Chartered) municipalities are subdivisions of the state vested with the full power of local self government through the adoption of a charter conforming to the requirements of the Texas Constitution.¹⁶⁵ Home Rule municipalities have relatively broad powers to enact rules and ordinances to protect public health and water quality within their Municipal Boundaries (i.e. City Limits) and their Extra-Territorial Jurisdiction (ETJ). Zoning restrictions can also be adopted and enforced by Home Rule municipalities within their municipal boundaries, but not within their ETJ. The Home Rule municipalities in the Planning Region are the City of Austin and the City of Kyle.

Home rule municipalities have generally attempted to incorporate water quality protection measures as part of their plat and subdivision approval process as authorized under Chapter 212 of the Texas Local Government Code¹⁶⁶. Home rule municipalities also have legal authority to regulate water quality through the Texas Water Code¹⁶⁷. Under this section, a municipality may establish a water pollution control and abatement program for areas within the municipal limits and it's ETJ. Although such a program generally entails water quality monitoring, sampling and inspection requirements for waste dischargers, the program may also include "reasonable and realistic plans for controlling and abating pollution or potential pollution" from non-point sources such as storm sewer discharges and urban rainfall runoff. Once the plan is developed it must be submitted to the TCEQ for its review and approval and any requirement under the program may be appealed to TCEQ or the district court. Under the Texas Water Code, home rule municipalities may also request delegation of water quality functions from the TCEQ.

A home rule municipality is also given the authority to "prohibit the pollution or degradation of, and may police, a stream, drain, recharge feature, recharge area, or tributary that may constitute or recharge the source of water supply of any municipality." A home rule municipality may also provide for the protection of and may police any watersheds. This authority may be exercised in the municipality's ETJ, except that the authority to protect recharge features and groundwater aquifers in the ETJ may only be exercised by a municipality with a population of over 750,000 and only if that groundwater constitutes more than 75% of the municipality's source of water.¹⁶⁸

10.2.3. General Law Municipality

In Texas, General Law municipalities are also subdivisions of the state incorporated in accordance with the Texas Local Government Code.¹⁶⁹ General Law municipalities are vested with less local self government power than Home Rule municipalities, but can still enact certain rules and ordinances to protect public health and water quality within their municipal limits and

¹⁶⁵ Texas "Local Government Code", Title 2, "Organization of Municipal Governments", §5.004, §51.072-§51.079.

¹⁶⁶ Texas "Local Government Code", Title 7, "Regulation of Land Use, Structures, Businesses and Related Activities", Chapter 212, "Municipal Regulation of Subdivisions and Property Development", §212.004-§212.903.

¹⁶⁷ Texas "Water Code", Title 2, Chapter 26, "Water Quality Control", §26.175 and §26.177.

¹⁶⁸ Texas "Local Government Code", Title 13, "Water and Utilities", Chapter 401, "Water Control by Municipalities", §401.003, "Protection of Streams and Watersheds by Home-Rule Municipality".

¹⁶⁹ Texas Local Government Code, Title 2, "Organization of Municipal Governments", §5.001-§5.003.

their ETJ. Like Home Rule municipalities, General Law municipalities can adopt and enforce zoning restrictions within their municipal boundaries, but not within their ETJ. The General Law municipalities in the Planning Region are:

- Village of Bear Creek
- Village of Bee Cave
- City of Buda
- City of Dripping Springs
- City of Hays
- Village of Lakeway
- City of Mountain City
- City of Rollingwood
- City of Sunset Valley
- City of West Lake Hills

As with home rule municipalities, general law municipalities are also authorized to incorporate water quality protection measures as part of their plat and subdivision approval process under the Texas Local Government Code¹⁷⁰, and to regulate water quality under the Texas Water Code¹⁷¹. General law municipalities may establish a water pollution control and abatement program for areas within the municipal limits and the ETJ and may also request delegation of water quality functions from the TCEQ.

10.2.4. Counties

Counties are subdivisions of the state created under the Texas Constitution or by act of the Texas Legislature,¹⁷² but have no specific authority granted by virtue of their existence. The Planning Region includes portions of the Counties of Blanco, Hays and Travis. Through various acts of the Texas Legislature, counties have been given some powers to regulate the subdivision of land through the platting process. They also have been given some authority to own and operate some public infrastructure, including water, wastewater, drainage and waste disposal facilities. Counties may also institute civil actions and prosecute criminal actions under the Texas Water Code and the Texas Health and Safety Code.

Under Senate Bill (SB) 873¹⁷³ the Texas Legislature gave Travis and Hays Counties¹⁷⁴ the authority to adopt regulations governing plats and subdivisions of land in unincorporated areas of the county if the regulations promote the “health, safety, morals, or general welfare of the county and the safe, orderly, and healthful development of the unincorporated area of the

¹⁷⁰ Texas “Local Government Code”, Title 7, “Regulation of Land Use, Structures, Businesses and Related Activities”, Chapter 212, “Municipal Regulation of Subdivisions and Property Development”, §212.004-§212.903.

¹⁷¹ Texas “Water Code”, Title 2, Chapter 26, “Water Quality Control”, §26.175 and §26.177.

¹⁷² Texas Constitution, Article IX, Section 1, “Creation of Counties”.

¹⁷³ Senate Bill 873, An Act of the Legislature of the State of Texas, Amending Title 7, Chapter 232 and a portion of Title 7, Chapter 242, of the Texas “Local Government Code”, 77th Regular Legislative Session, May, 2001.

¹⁷⁴ Texas Local Government Code, Title 7, Chapter 232, “Infrastructure Planning in Certain Urban Counties”, §232.100, applicable to counties with a population greater than 700,000 or counties adjacent to a county with a population of 700,000 and within the same metropolitan statistical area, or if not within the same MSA, has a population that has increased at least 40% from one decennial census to the next.

county.”¹⁷⁵ However, SB 873 specifically prohibits the county from regulating certain elements, usually regulated by municipalities through zoning. These elements include:¹⁷⁶

- The use of any building for a particular purpose (e.g. residential, business, or industrial).
- The bulk, height, or number of buildings constructed on a particular tract of land.
- The size of a building including the ratio of the square footage of the building’s floor space to square footage of the land.
- The number of residential units per acre of land.

Given the broad charge to promote health, general welfare, or safe and orderly and healthful development it would appear that Counties affected by SB 873 may enact water quality regulations as part of the platting process as long as they do not restrict these specific items. While this interpretation, like any other, would be subject to legal review if challenged, the current construction would prohibit the outright regulation of impervious cover limits and dwelling unit densities, except to the extent density may be regulated under a county’s existing authority to establish lot size restrictions.

10.2.5. Special Purpose Districts

The Texas Constitution allows for the creation of special purpose districts¹⁷⁷ as subdivisions of the state. There are several different types of districts authorized under current legislative authority. The types of districts identified as potentially relevant to the implementation of the Plan, and examples of these types of districts within the Planning Region, are presented below.

10.2.5.1. Municipal Utility Districts

Municipal utility districts (MUDs) can be created by the TCEQ at the request of fifty percent (50%) of the landowners located within the proposed MUD, and the Commissioners Court of the county may make recommendations to TCEQ on the creation of the MUD. The Texas Legislature may also create a MUD during the legislative session. MUDs are authorized to own and operate facilities inside and outside their district boundaries to facilitate service within their boundaries. They have the ability to levy taxes for payment of debt service as well as operations and maintenance and to enter into contracts and interlocal agreements with other political subdivisions. There are no active MUDs in the Blanco portion of the Planning Region, but there are several active MUDs in the Hays and Travis County portions.¹⁷⁸ Current MUD boundaries are shown on Figure 8, on the following page. Active MUDs in the Planning Region include:

¹⁷⁵ Texas Local Government Code, Title 7, Chapter 232, “Infrastructure Planning in Certain Urban Counties”, §232.101(b)(1)-(4).

¹⁷⁶ Texas Local Government Code, Title 7, Chapter 232, “Infrastructure Planning in Certain Urban Counties”, §232.101(a).

¹⁷⁷ Texas Constitution, Article III, Section 52, “Counties, Cities or Other Political Corporations or Subdivisions” and Article XVI, Section 59, “Conservation and Development of Natural Resources and Parks and Recreational Facilities; Conservation and Reclamation Districts”.

¹⁷⁸ “2004 Appraisal District Directory”, No. 016 Blanco County, No. 105 Hays County and No. 227 Travis County, Texas Comptroller of Public Accounts, 2004.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

- Hays County MUD No. 4
- Hays County MUD No. 5
- Lost Creek (Travis Co.)
- Northwest Travis County MUD No. 3
- Northwest Travis County MUD No. 4
- Northwest Travis County MUD No. 5
- Northwest Travis County MUD No. 6
- Northwest Travis County MUD No. 7
- Northwest Travis County MUD No. 8
- Northwest Travis County MUD No. 9
- Shady Hollow (Travis Co.)
- Sienna Hills (Travis Co.)

If a MUD is to be formed within the ETJ of a city, the city must grant permission allowing the formation of the district.¹⁷⁹ If a MUD is formed outside the ETJ of a city the TCEQ is required to notify the County Commissioners Court of any proposed bond issue and projects that are to be funded by those bond issues. The County has thirty (30) days after notification to examine all information on file and submit a written opinion from the Commissioners Court stating any findings, conclusions, or other information that the Commissioners Court considers important to the TCEQ making a final determination. If a written opinion is submitted the TCEQ is obliged to consider the written opinion before taking final action.¹⁸⁰

MUDs have traditionally been used to facilitate development in the area under their jurisdiction and are regulated under Chapter 54 of the Texas Water Code. A MUD is given specific authority to act for “the protection, preservation, and restoration of the purity and sanitary condition of water within the state; and the preservation of all natural resources of the state.”¹⁸¹ Based on this authority the MUD may adopt and enforce water quality regulations within their jurisdiction.

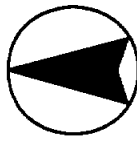
¹⁷⁹ Texas “Water Code”, Title 4, Chapter 54, “Municipal Utility Districts”, §54.016.

¹⁸⁰ Texas “Water Code”, Title 4, Chapter 54, “Municipal Utility Districts”, §54.0161(a)-(b).

¹⁸¹ Texas “Water Code”, Title 4, Chapter 54, “Municipal Utility Districts”, §54.012(7)-(8).

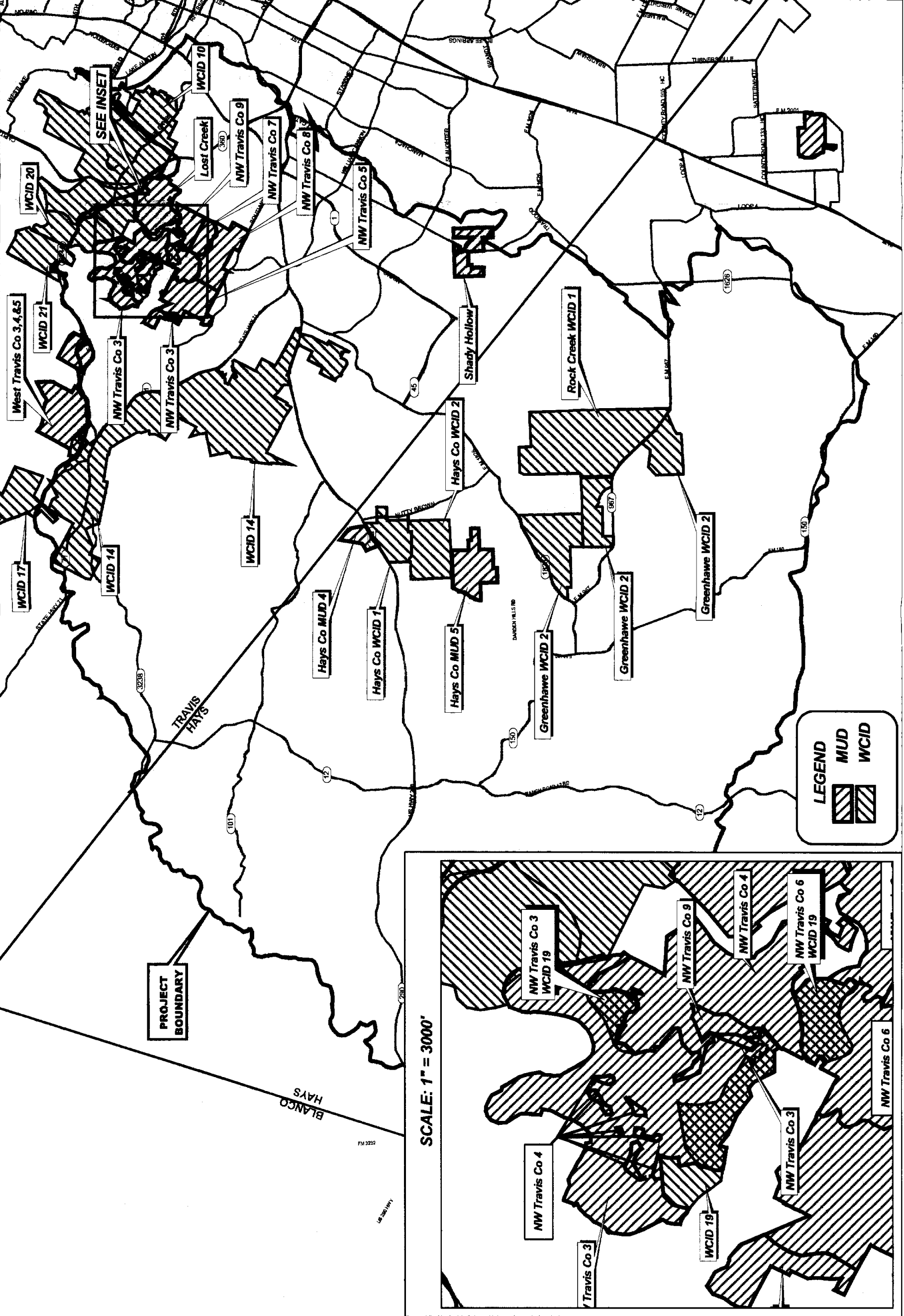


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1" = 12,000'

**REGIONAL WATER QUALITY PROTECTION PLAN FOR THE
BARTON SPRINGS SEGMENT OF THE EDWARDS AQUIFER
AND ITS CONTRIBUTING ZONE**
Figure 5. Existing MUDs & WCIDs in the Planning Region



10.2.5.2. Water Control and Improvement Districts

Water Control and Improvement Districts (WCIDs) can be created by either a County Commissioners Court or the TCEQ at the request of fifty percent (50%) of the landowners located within the proposed WCID, or by the Texas Legislature. While formed in the same manner, WCIDs do not possess all of the powers of MUDs. WCIDs are authorized to use any practical means to protect, preserve and restore the purity and sanitary condition of water.¹⁸² They can adopt rules to preserve the sanitary condition of water controlled by the district and to prevent waste or unauthorized use of water.¹⁸³ Like MUDs, WCIDs are authorized to own and operate facilities inside and outside their district boundaries to facilitate service within their boundaries. They can levy taxes for payment of debt service as well as operations and maintenance and can enter into contracts and interlocal agreements with other political subdivisions. If a WCID is formed in a city's ETJ, there are notification and consent procedures very similar to those for MUDs.¹⁸⁴

There are no active WCIDs in the Blanco County portion of the Planning Region, but there are several active WCIDs in the Hays and Travis County portions.¹⁸⁵ Current WCID boundaries are shown on Figure 8. Active WCIDs in the Planning Region include:

- Greenhawe WCID No. 2 (Hays Co.)
- Hays County WCID No. 1
- Hays County WCID No. 2
- Rock Creek WCID No. 1 (Hays Co.)
- Travis County WCID No. 10
- Travis County WCID No. 14
- Travis County WCID No. 19
- Travis County WCID No. 20

10.2.5.3. Groundwater Conservation Districts

Groundwater Conservation Districts (GCDs) are subdivisions of the state created by the Texas Legislature or under the authority of the Texas Water Code.¹⁸⁶ GCDs are authorized to "provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence."¹⁸⁷ Under the Texas Water Code, GCDs are authorized to "make and enforce rules, including rules limiting groundwater production based on tract size or the spacing of wells, to provide for conserving, preserving, protecting, and recharging of the groundwater or of a groundwater reservoir or its subdivisions in order to control subsidence, prevent degradation of water quality, or prevent waste of groundwater."¹⁸⁸ The GCDs with jurisdiction in the Planning Region are the Barton Springs/Edwards Aquifer Conservation District, the Blanco-Pedernales Groundwater Conservation District, and the Hays Trinity Groundwater Conservation District.

¹⁸² Texas "Water Code", Title 4, Chapter 54, "Water Control and Improvement Districts", §51.121.

¹⁸³ Texas "Water Code", Title 4, Chapter 54, "Water Control and Improvement Districts", §51.127.

¹⁸⁴ Texas "Local Government Code", Title 2, Chapter 42, "Extraterritorial Jurisdictions of Municipalities", §42.042.

¹⁸⁵ "2004 Appraisal District Directory", No. 016 Blanco County, No. 105 Hays County and No. 227 Travis County, Texas Comptroller of Public Accounts, 2004.

¹⁸⁶ Texas "Water Code", Title 2, Chapter 36, "Groundwater Conservation Districts", §36.011.

¹⁸⁷ Texas "Water Code", Title 2, Chapter 36, "Groundwater Conservation Districts", §36.0015.

¹⁸⁸ Texas "Water Code", Title 2, Chapter 36, "Groundwater Conservation Districts", §36.101.

10.2.5.4. Public Improvement Districts

Under the Texas Local Government Code, a municipality or county may form a Public Improvement District (PID) upon the submission of a petition filed by the landowners of 50% in value of the land to be included in the PID.¹⁸⁹ A PID is intended as an alternative financing mechanism to pay for improvement projects that confer special benefits on a definable part of a municipality or a county. Examples of improvements that may be financed through a PID include water, wastewater, drainage facilities, parks, landscaping, lighting, sidewalks, pedestrian malls, artwork, libraries, parking facilities, mass transportation facilities, and projects similar to these listed projects. A PID has the power to levy a tax, called an assessment, on the property in the district to pay for the improvements which benefit the land subjected to the assessment. While water quality protection is not specifically included as a similar project, if structural and non-structural BMP's are part of the design criteria for drainage or flood control, streets and roadways, and parks and open space there is a potential that a PID could be used to finance construction and operations and maintenance. The PID is not intended to be a property-owning entity in its own right so the title to the improvements and responsibility for the operations and maintenance of the improvements is vested in the entity within whose jurisdiction the improvements are located.

10.2.6. Authorities

Authorities are subdivisions of the state created by act of the Texas Legislature with the specific powers granted to them through their enabling legislation. Since each Authority in the State of Texas is individually created, their powers and duties vary widely. Authorities with water quality powers and/or duties in the Planning Region include the Edwards Aquifer Authority, the Lower Colorado River Authority, and the Guadalupe Blanco River Authority.

10.2.6.1. The Lower Colorado River Authority

The Lower Colorado River Authority (LCRA) was formed by the Texas legislature under Article XVI, Section 59 of the Texas Constitution as a conservation and reclamation district. The boundaries of the LCRA include Blanco, Burnet, Llano, Travis, Bastrop, Fayette, Colorado, Wharton, San Saba and Matagorda counties. Under its enabling legislation the LCRA has broad powers including storage of water, generation of water power and electric energy, own and operate water and wastewater facilities, operate parks, conserve and protect the waters of the basin and enter into contracts. The authority was also expressly authorized to adopt water quality regulations and penalties as found in Section 222.004(q) of the water code. This section allows the LCRA to adopt rules that provide for the control of both artificial and natural pollution, including organic and thermal, of all groundwater or surface water of the Colorado River and its tributaries within the boundaries of the LCRA. The LCRA has adopted water quality rules and regulations for those areas that drain directly into Lake Travis.

¹⁸⁹ Texas "Local Government Code", Title 12, Chapter 372, "Improvement Districts in Municipalities and Counties", §372.002.

10.2.6.2. The Edwards Aquifer Authority

The Edwards Aquifer Authority (EAA) was formed by the Texas Legislature under Article XVI, Section 59 of the Texas Constitution as a conservation and reclamation district.¹⁹⁰ The boundaries of the EAA include all or part of Atascosa, Bexar, Caldwell, Comal, Guadalupe, Hays, Medina, and Uvalde counties. The EAA's jurisdiction in Hays County encompasses a small portion of the Planning Region.

10.2.6.3. The Guadalupe Blanco River Authority

The Guadalupe Blanco River Authority (GBRA) was formed by the Texas Legislature under Article XVI, Section 59 of the Texas Constitution as a conservation and reclamation district.¹⁹¹ The boundaries of the GBRA include all or part of Caldwell, Calhoun, Comal, Dewitt, Guadalupe, Gonzales, Hays, Kendall, Refugio and Victoria counties. The GBRA's jurisdiction in Hays County encompasses a small portion of the Planning Region.

10.2.7. Overlapping Jurisdictions

There are several areas of overlapping jurisdiction between existing entities within the Planning Region.

10.2.7.1. Municipalities and Counties

Under the local government structure in Texas, municipalities may be located within one or more counties and therefore both the municipality and the county have potentially overlapping jurisdiction over development issues. The entity that actually exercises jurisdiction over a tract of land may differ depending on the boundaries of the municipality's corporate limits and its ETJ, and whether the city and county have entered into an agreement allocating their jurisdiction, and whether there are any development agreements affecting the property. Within the incorporated boundaries of a municipality, the municipality has sole jurisdiction to regulate development and to own and operate public infrastructure. However, within its ETJ, the law has recently been amended to clarify the potentially overlapping jurisdiction between a municipality and a county regarding subdivision plat approvals. For projects not governed by a development agreement, the law now requires a municipality and a county to mutually decide on which entity shall regulate new plat approvals for tracts of land within a city's ETJ. The municipality and county may agree that either entity, but not both, shall have sole plat approval authority; or they may apportion jurisdiction over designated geographic ETJ between themselves; or finally, they may by interlocal agreement establish an independent plat approval office administering a single set of regulations concerning plats, subdivisions, and subdivision construction plans.¹⁹² Within unincorporated areas outside of a city's ETJ, the county retains platting approval authority. Within

¹⁹⁰ Senate Bill 1477, An Act of the Legislature of the State of Texas, 73rd Regular Legislative Session, 1993.

¹⁹¹ An Act of the Legislature of the State of Texas, 44th Regular Legislative Session, 1935.

¹⁹² Texas Local Government Code, Title 7, Chapter 242, "Authority of Municipality and County to Regulate Subdivisions in and Outside Municipality's Extraterritorial Jurisdiction", §242.001(c).

unincorporated areas and municipality ETJ areas, a county also retains authority to own and operate public infrastructure.

10.2.7.2. Special Districts and Other Governmental Entities

As presented above, governmental entities in whose jurisdiction a special district is to be located have the opportunity to comment on the creation of that district. Once the district is approved, the specific powers which it is given determine whether or not it has primacy over the other governmental entities. In most instances, special districts within the ETJs of municipalities and within the unincorporated areas of counties will have primacy over both the municipality and the county.

10.3. Existing Entities within the Planning Region

As presented above, Texas law gives varying degrees of authority to each of these political subdivisions to regulate water quality within their jurisdictions. Additionally, in Travis County the LCRA has been granted authority to regulate water quality and the LCRA currently has water quality regulations for areas around their reservoirs. Other special purpose units of government such as MUDs and WCIDs have limited authority to regulate water quality within their jurisdictions. However, state law does impose certain limits on general law cities and counties as to how they can enforce their water quality regulations. Home Rule cities, such as Austin, have the greatest flexibility in enforcing water quality ordinances. Table 13, on the following page, lists the municipalities and counties within the planning area, the estimated area within their municipal boundaries, areas within the Extra Territorial Jurisdiction (ETJ) of municipalities, and unincorporated areas of the counties outside the incorporated boundaries and ETJs. Figure 9, on page 116, shows the location of these areas municipalities and their ETJ within the Planning Region.

In addition to these entities, portions of the following groundwater conservation districts are located within the Planning Region:

- Barton Springs/Edwards Aquifer Groundwater Conservation District
- Hays Trinity Groundwater Conservation District
- Blanco-Pedernales Groundwater Conservation Districts

Figure 10, on page 117, shows the location of these areas municipalities and their ETJ within the Planning Region.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

Table 13 – Approximate Areas Under the Jurisdiction of Local Entities Within the Planning Region¹⁹³

LOCAL ENTITY	Area (Ac.)	% of study area
City of Austin (Incorporated)	22,384	9.26
City of Austin (Limited Purpose ETJ)	5,470	2.26
City of Austin (2 mile ETJ)	23,587	9.76
City of Austin (5 mile ETJ)	17,836	7.38
Village of Bear Creek (Incorporated)	739	0.31
Village of Bee Cave (Incorporated)	1,200	0.50
Village of Bee Cave (1 mile ETJ)	5,582	2.31
City of Buda (Incorporated)	91	0.04
City of Buda (ETJ)	1,338	0.55
City of Dripping Springs (Incorporated)	2,536	1.05
City of Dripping Springs (ETJ)	69,335	28.68
City of Hays (Incorporated)	2,539	1.05
City of Kyle (ETJ) [Estimated]	100	0.04
Village of Lakeway (Incorporated)	140	0.06
Village of Lakeway (ETJ)	3	0.00
Mountain City (Incorporated)	157	0.07
Mountain City (0.5 mile ETJ)	840	0.35
City of Rollingwood (Incorporated)	441	0.18
City of Sunset Valley (Incorporated)	154	0.06
City of Sunset Valley (0.5 mile ETJ)	724	0.30
City of West Lake Hills (Incorporated)	763	0.32
SUB-TOTAL	155,960	64.51
Blanco County (Unincorporated outside ETJs)	3,304	1.37
Hays County (Unincorporated outside ETJs)	73,540	30.42
Travis County (Unincorporated outside ETJs)	8,952	3.70
SUB-TOTAL	85,796	35.49
TOTAL	241,756	100.00

¹⁹³ Base data taken from "Northern Hays and Southwestern Travis Counties, Water Supply System Project Environmental Impact Study", BIO-WEST, Inc. and LCRA, June 2002. Data supplemented with information provided directly by local entities.

10.4. Recommended Implementation Strategy

The successful implementation of this Plan will depend on a number of factors, including: the type of growth and development that local governments want to encourage, the adoption of water quality ordinances and orders that will complement platting and subdivision regulation, effective operations and maintenance of facilities and educating the public on the importance of managing their activities to minimize the potential for adversely impacting water quality.

The implementation recommendations presented in the plan are both long term and short term. The short term recommendations have been developed to rely solely on local jurisdictions involved in the planning process, working strictly within their existing legal authority. There are several reasons for taking this approach. The first is that these entities have demonstrated initiative in instituting this planning process and have expressed a desire to commit to implementation of the resulting plan. Secondly, these entities can act within their own existing authority, without relying on an outside entity over which they have no control. Thirdly, by working within these constraints, the timing for implementation can be substantially reduced over that required for actions by outside entities, such as the TCEQ or the Texas Legislature. Fourthly, the implementation approach presented here incorporates local mechanisms for funding the implementation. Using this approach, the local jurisdictions have the means to successfully implement the Plan.

During the planning process, there has been much stakeholder input stressing the need for consistent implementation of the recommended measures to provide effective water quality protection. The objective of consistent implementation could certainly be achieved more effectively with one entity than with multiple entities. However, this one entity would need both the legal authority to implement the measures as well as a funding mechanism to support implementation. No local governmental entity has legal authority in all areas of the Planning Region. A number of existing regional entities (e.g. the EAA, the LCRA, the GBRA, the BSEACD, etc.) have jurisdiction over larger portions of the Planning Region, but they do not currently have the legal authority to implement all of the recommended protection measures. While the TCEQ currently has the legal authority to regulate all aspects of water quality anywhere in the State, (including the Planning Region) they do not have a long-term, reliable funding mechanism to implement the water quality protection measures. The Texas Legislature could certainly remedy these impediments through the establishment of a new entity or through the expansion of powers or funding base for an existing entity. However, due to the time required and the uncertainty in outcome for these types of actions, the establishment of a single implementing entity has been incorporated as an alternative, long term objective.

As shown in the previous section, the Planning Region consists of portions of twelve municipalities and three counties with a combined area of approximately 240,000 acres. The unincorporated area of Hays County accounts for 30.4% of the Planning Region, while the City of Dripping Springs and its ETJ accounts for 29.7%; the City of Austin accounts for 28.7%, the unincorporated area of Travis County accounts for 3.7%, and the Village of Bee Cave and its ETJ accounts for 2.8%. These five entities have over 95% of the Planning Region within their jurisdictional boundaries.

As noted earlier in this Plan, water quality management is multi-faceted. The recommendations developed in the Plan include design criteria to ensure the incorporation of appropriate water quality protection measures, as well as regulatory and contractual arrangements to ensure the implementation, maintenance and enforcement of the water quality protection measures. Depending on the approach taken to accomplish water quality objectives using structural BMP's, non-structural BMP's or a combination of the two there are many questions and policy decisions that have to be made as to who pays for capital improvements, land acquisition, and ongoing operations and maintenance as well as land management techniques. This is also complicated by the varying degrees of development regulation authority between local jurisdictions and the role of the TCEQ.

The water quality protection measures identified in this Plan are intended for implementation through all local jurisdictions within the Planning Region. It is recommended that, at a minimum, the local jurisdictions adopt the water quality protection measures outlined in this Plan. However, it is the local jurisdiction that will ultimately be responsible for the long term implementation of these measures, even if they are funded through another source. As noted in previous sections, the geologic, topographic and environmental features of the planning area do not necessarily facilitate a "one-size" fits all approach to water quality assessment. Each of the local jurisdictions involved must make a fundamental decision as to whether they intend to adopt the measures recommended in this Plan, or adopt measures that the local jurisdictions believe are more protective of water quality than those presented here. However, for this Plan to function as a true regional plan, it is imperative that there be consistent implementation to ensure a consistent level of water quality protection throughout the Planning Region.

Since a small number of the local governments control the vast majority of the Planning Region, the initial (short-term) implementation strategies have been developed focusing on municipalities and counties. Other types of entities, whose establishment is within the powers of existing local jurisdictions, can be utilized to supplement this implementation. Table 14, on the following page, presents a summary implementation matrix for the existing entities within the Planning Region. This implementation matrix characterizes their implementation as either:

- Full – currently authorized for full implementation of this measure.
- Partial – currently authorized for partial implementation of this measure.
- Limited – currently authorized for limited implementation of this measure, generally in support of another entity with full or partial implementation authority.
- No – currently not authorized to implement this measure.

The specific implementation steps for each type of entity are presented below.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

Table 14 – Summary Implementation Matrix for the Existing Entities in the Planning Region

Water Quality Protection Measure	Home Rule Municipalities: Austin Kyle	General Law Municipalities: Bear Creek, Bee Cave, Buda, Dripping Springs, Hay, Mountain City, Lakeway	Counties: Hays, Travis & Blanco	Groundwater Conservation Districts: Barton Springs/Edwards Aquifer, Hays Trinity & Blanco- Pedernales	Other Governmental Entities	The General Public
Natural Area/Open Space Conservation	Full	Full	Full	Partial	Partial	Partial
Transferrable Development Rights	Full	Full	Partial	No	No	No
Comprehensive Site Planning and Pre-Development Review	Full	Full	Full	Limited	Limited	No
Location of Development	Full	Full	Full	Limited	Limited	No
Intensity of Development	Full	Full	Limited	Limited	Limited	No
Control of Hydrologic Regime	Full	Full	Full	Limited	Limited	No
Structural BMPs for Discharges from Developed Land	Full	Full	Full	Limited	Limited	No
Local Enforcement of Construction Site Controls	Full - If Delegated	Full - If Delegated	Full - If Delegated	Limited	Limited	No
Wastewater Management	Full - If Delegated	Full - If Delegated	Full - If Delegated	Limited	Limited	No
Alternative Water Sources/Uses and Conservation	Full	Full	Full	Limited	Limited	Limited
Characteristics of Development	Full	Full	Full	Limited	Limited	No
Land Use Restrictions	Full ICL, Partial ETJ	Full ICL, Partial ETJ	Partial	No	No	No
Restrictions on Use, Storage and Disposal of Potentially Harmful Materials	Full	Full	Full	Limited	Limited	Limited
Proper Vegetative Management	Full - Own Projects, Partial - Others	Full - Own Projects, Partial - Others	Full - Own Projects, Partial - Others	Partial	Partial	Full
Proper Agricultural Practices	Limited	Limited	Limited	Limited	Limited	Full
Protection of Endangered Species	Partial	Partial	Partial	Limited	Limited	Limited
Public Education/Outreach	Full	Full	Full	Full	Full	Full

Additional long-term alternatives have been suggested by the Stakeholder Committee and are presented in subsequent sections.

10.5. Implementation Mechanisms for All Jurisdictions

Many of the water quality protection measures can be implemented directly by all existing jurisdictions. The following specific measures are common to all the previously listed types of public entities.

10.5.1. Incorporate Water Quality Protection Measures into Existing Design Criteria

The water quality protection measures presented in the Plan should be incorporated into existing design criteria for roads, streets, utilities, drainage structures and site design. Many of the water quality management strategies and BMPs that are identified in this Plan can be effectively integrated into drainage and flood control design while also meeting the water quality management objectives. As outlined above, local jurisdictions may adopt measures that they deem to be more protective of water quality than those provided here. For example, if lower density development is desired (less impervious cover) and more stringent non-structural BMPs are utilized, there is the potential that long term operations, maintenance and monitoring costs will be lower than if higher density and structural BMPs are utilized. In addition, the capabilities of the entity performing the long term operations, maintenance and monitoring should be considered as part of the design criteria.

10.5.2. Pre-Development Review Process

Pre-development reviews, of varying level of detail, are conducted by almost all local governments. Traditionally, the first step in approving a development project begins with the submission and approval of a preliminary plat. This preliminary plat identifies generally how the property is to be divided between different land uses, such as residential lots, roadways, utilities, easements, parks, floodplains, etc. While local jurisdictions issue an approval on preliminary plats, they are not the final authorization. Following the approval of the preliminary plat, most jurisdictions require the preparation and approval of a final plat. This final plat provides detailed dimensions and locations for how the property is to be divided between different land uses, as outlined above. However, final plats must be completed with sufficient detail to serve as the basis for the sale of individual lots and for the dedication of road rights-of-way, easements, parks, etc. Once a final plat is approved and recorded, detailed construction plans are typically required before construction authorization (typically a building permit) is issued. The water quality protection measures included in this Plan are intended to fit within this typical pre-development review process.

10.5.2.1. Preliminary Plat

In conjunction with the general layout of the proposed development typically shown on the preliminary plat, the local jurisdiction should require that the developer submit a preliminary site characterization and development plan. The site characterization should include

identification of streams, critical environmental features, areas with steep slopes, and a preliminary soils assessment, identifying the approximate soil types and depths across the site. The preliminary development plan should identify the areas of the site to be developed, the areas to be used for buffer zones, proposed storm water and wastewater management strategies, the approximate development density that will result from the development, and the proposed transportation and utility plan for the development. This information should be reviewed by the local jurisdiction during the preliminary platting process and any corresponding deficiencies noted. As with other aspects of the preliminary platting process, if these deficiencies were not satisfactorily corrected, the preliminary plat would be rejected.

10.5.2.2.Final Plat

In conjunction with the detailed layout of the proposed development typically shown on the final plat, the local jurisdiction should require that the developer submit a detailed site development plan. The site development plan should include water quality protection measures for all aspects of the site development, including:

- A detailed characterization of streams and drainage ways (physical and hydrologic) and identification of associated buffer zones.
- A detailed characterization of critical environmental features and identification of associated buffer zones.
- A detailed soils assessment, identifying the soil types and depths in all areas of steep slopes and areas proposed for storm water and/or wastewater irrigation, or below grade discharge of wastewater.
- A detailed intensity evaluation based on the gross site area method, demonstrating compliance with the applicable impervious cover limits.
- A detailed evaluation of proposed storm water and wastewater management strategies, including estimated quantities, runoff rates, storage volumes, application rates, infiltration rates, discharge rates, etc. This evaluation should also identify all structural water quality protection measures and include pollutant loading calculations to demonstrate compliance with the goals and objectives.
- A proposed transportation and utility plan for the development, including any water quality protection measures associated with this infrastructure (e.g. procedures for protection of stream crossings, etc.)
- An operations, maintenance, monitoring and funding plan identifying responsibilities for on-going operations, monitoring, maintenance and inspection.
- Evidence of suitable potable water supply.
- A listing of other water quality related permits and/or regulatory approvals required for the development.
- Evidence of coordination with the TCEQ and other applicable jurisdictions (e.g. groundwater conservation districts).

This information should be reviewed by the local jurisdiction during the final platting process and any corresponding deficiencies noted. As with other aspects of the platting

process, if these deficiencies were not satisfactorily corrected, the final plat would be rejected.

10.5.2.3. Construction Plan Approval

In conjunction with the review of the final construction plans, the local jurisdiction should require that the developer submit a final site development plan. This final site development plan should address all of the items required in the development plan submitted with the final plat, along with any updates or modifications required. In addition to the final development plan, the developer should submit the following documentation:

- Evidence of construction site storm water permit coverage, including a copy of the Storm Water Pollution Prevention Plan (SW3P), copies of all Notices of Intent (NOIs) submitted for the site, and copies of any regulatory responses to the SW3P or NOI.
- Evidence of regulatory approval for the wastewater management strategy.
- Evidence of obtaining all water quality related permits and/or regulatory approvals required for the development.
- A final operations, maintenance, monitoring and funding plan for all water quality protection measures.
- Evidence of financial assurance for the operations and maintenance period identified in the funding plan.

During the development of this Plan, standardized checklists have been developed to assist in the coordination and implementation of the pre-development review throughout the Planning Region. Copies of these checklists have been included in Appendix M.

10.5.3. Construction Inspection

An important element of successful water quality protection is inspections during construction. These inspections can ensure that the water quality protection measures are being implemented in accordance with their approved design. Each implementing jurisdiction should incorporate inspections into their development review process. This will provide an additional level of water quality protection.

10.5.4. Incorporating Water Quality Protection Measures into Public Projects

All jurisdictions should adopt the water quality protection measures outlined in the Plan for their own public projects. This should include new and expanded facilities as well as significant retrofit projects, and should encompass all types of public improvements, including utilities and transportation facilities. Utilities and transportation facilities can be addressed through the incorporation of structural BMPs and through acquisition of sufficient property to achieve the protection standards addressed in the Plan. By incorporating additional open space into utility and transportation projects, local jurisdictions demonstrate a commitment to protecting water quality, and also provide a valuable public amenity. In acquiring park land or open space/natural areas, water quality protection measures should be incorporated into the design of amenities and

the acquisition of properties. Jurisdictions should consider the potential for leveraging public funds by partnering with conservation organizations, private landowners, developers, and other political subdivisions for land acquisition for park and open space/natural area properties as well as providing for public recreational opportunities. There are many instances where cooperative agreements have been reached not only for the acquisition and development of parks and open space/natural areas, but also agreements for management and operations and maintenance of the properties. This approach offers several advantages to all parties by broadening the pool of funds available, and can provide water quality protection and environmental preservation through the acquisition of additional open space/natural areas.

10.5.5. Local Enforcement of TCEQ Water Quality Regulations

Throughout this planning process, concern has been expressed by the stakeholders that the TCEQ does not have the resources necessary and does not adequately enforce many of its rules. Public entities within the Planning Region have a vested interest in assuring that the TCEQ rules are followed since the water quality protection measures required under these rules (both construction and post-construction) will directly impact the public entity when it is given title to the infrastructure. Local jurisdictions in the Planning Region should consider one of two options for local enforcement of TCEQ water quality regulations: 1) incorporating TCEQ regulations into local ordinances, or 2) requesting delegation from TCEQ for local enforcement of several water quality related programs.

Local jurisdictions have the option of incorporating the TCEQ regulations into local ordinances, thereby having the authority to enforce these requirements on a local level. Through this process, a set of parallel regulations would be established, in essence, allowing the TCEQ, the local jurisdiction, or both the ability to enforce the regulations. In this instance, the TCEQ would not be restricted from independently enforcing their regulations.

Local jurisdictions may also request delegation of TCEQ water quality regulations. Delegation of these authorities to local jurisdictions is already authorized under the Texas Water Code.¹⁹⁵ The following programs should be considered for delegation:

- Edwards Aquifer Protection Program
- TPDES construction site storm water permit program
- OSSF program, if not already delegated

To receive delegation for each of these programs, local jurisdictions must obtain certification from the Executive Director of the TCEQ. Upon certification, the local jurisdiction may assume the rights, duties, and responsibilities to review and either approve or deny applications within its boundaries and monitor and enforce compliance with the approved plans. The local jurisdiction must demonstrate that it has a water quality protection program equal to or more stringent than the TCEQ rules and has performance standards equal to or more protective of water quality. The local jurisdiction must have adopted ordinances or have other enforceable

¹⁹⁵ Texas "Water Code", Title 2, Chapter 26, "Water Quality Control", §26.175, "Cooperative Agreements".

means sufficient to enforce the program throughout the local jurisdiction's boundaries; and have adequate resources to implement and enforce the program.

As a result of delegation, the public entity will have its own inspectors and engineers keeping track of construction progress and conformance with the design criteria that the public entity enforces. Local public entities delegated the authority from TCEQ for enforcement could provide much closer inspection and could respond more quickly if violations were noted and reduce the risk of potential water quality impacts. If this delegation is requested and approved it will significantly streamline the regulatory process and allow local control of decisions and implementation. Conversely, if the local governments do not perform, they are much more readily accountable to the local public than is a larger, state-wide agency. If the local government was not performing satisfactorily, the delegation could be revoked.

An important element in delegation is how the implementation of the delegated TCEQ rules would be financed. Public entities would need to ensure that development permit and/or review fees would cover the cost of inspections and enforcement in new development during construction and use other sources of funds as noted earlier for ongoing inspection and enforcement. Additionally, these fees could be used for on-going monitoring of the site to determine compliance. The cost of this delegation would be incremental and could be recovered by assessing a fee when a development plan is submitted for review.

10.5.6. Development Agreements

Where necessary to ensure compliance with certain measures, local jurisdictions may enter into development agreements to clearly define the responsibilities of the developer and the local jurisdiction for the installation, operation, maintenance, monitoring and funding of the water quality protection measures. While these types of agreement are not necessarily self-enforcing, they do establish specific responsibilities that can serve as the basis of enforcement using other means. Due to the differences between the types of items that can be covered in development agreements between municipalities, counties and other special purpose districts, the recommended details for these development agreements are discussed in more detail in the individual sections below.

During the discussions on developer agreements within the stakeholder process, there was considerable concern that development agreements might be utilized by local jurisdictions to supersede or circumvent the water quality protection measures outlined in the Plan. As indicated previously, the success of the Plan is dependent upon the uniform implementation of the Plan. The use of development agreements to circumvent the intent of the Plan would be inconsistent with the intent to implement the Plan consistently throughout the Planning Region. For this reason, development agreements should be utilized as an optional means for certain local jurisdictions (e.g. counties) to encourage compliance with and not circumvent the water quality protection measures presented in the Plan.

10.5.7. Financial Assurance/Long-Term Funding

Local jurisdictions should adopt ordinances outlining the specific requirements for providing financial assurance in instances where the jurisdiction determines that it is necessary to satisfy operations, maintenance, and monitoring of water quality protection measures. This financial assurance should be sufficient to cover all anticipated future costs associated with the condition assured. The TCEQ has specific regulations regarding financial assurance¹⁹⁶ for many types of environmental controls, including water quality protection measures. The financial assurance mechanisms allowed under TCEQ regulations should provide equivalent financial assurance to local jurisdictions. In addition to these available financial assurance mechanisms, long-term funding for operations, maintenance and monitoring may be secured through the levying of taxes or through user fees. Specific long-term funding mechanisms for the differing types of local jurisdictions are presented below.

10.5.8. Cooperative Agreements with Other Political Subdivisions

Local jurisdictions that determine they are not in a position to perform a specific function for which they are currently authorized may enter into cooperative agreements with other political subdivisions. Cooperative agreements with other political subdivisions would provide a method of coordination in plat and construction plan review, subdivision regulations, drainage, flood control, water quality protection measures, monitoring, park and open space acquisition and development, and other related development issues. Given the diverse number and types of political subdivisions and utility providers that are involved in the Planning Region there is the potential for certain overlaps and gaps when water quality measures are involved. Complicating this situation is turnover at all levels in terms of elected officials and city/county/district professional staff that means loss of institutional knowledge as well as technical support. A coordinated effort between political subdivisions regarding development issues and how they affect water quality will help ensure a consistent approach to protecting water quality throughout the Planning Region.

Cooperative agreements provide the framework and process to address these issues and provide a forum so that the decisions of one unit of government do not adversely affect another political subdivision. This is an important step in facilitating continuity and consistency in planning, review of measures, and responsibility for implementation and operations and maintenance. This coordination should allow each participant to evaluate the impact of a particular land use issue on water quality within their jurisdictions. Additionally, the cost of monitoring, operations and maintenance and other water quality issues could potentially place a significant financial burden on smaller entities. As part of this strategy local political subdivisions should evaluate the potential of joining together to take advantage of economies of scale to reduce costs. One measure that could be considered is identifying one group or contracting out with a private vender to provide periodic inspections to facilities to assure that they are functioning properly for all or part of the group. Additionally, this type of arrangement could be used for coordination of mitigation banking in conjunction with the transferable development rights.

¹⁹⁶ Title 30, Texas Administrative Code (TAC), Chapter 37, "Financial Assurance". [30 TAC §37.1-§37.9085]

10.5.9. Public-Private Partnerships with Conservancy Groups

All jurisdictions should consider entering into public-private partnerships with conservancy groups to identify potential opportunities to acquire property by purchase or negotiated conservation easements for water quality protection and enhancement. Public entities are in a unique position to partner with conservation groups to leverage funding from multiple sources to acquire land and/or conservation easements. As an example, a public entity could apply for state and federal funds for this purpose and combine those resources with those from a non-profit conservancy group.

10.6. Implementation Mechanisms for Municipalities

10.6.1. Adoption of Water Quality Protection Measures

The water quality protection measures and land use restrictions (e.g. location restrictions, density restrictions, and other zoning related items) recommended in this plan should be incorporated into each municipality's local development ordinances. Municipalities can incorporate these measures under existing legal authority. This will implement these water quality protection measures for all new development. Other new improvements within existing developments (e.g. streets, drainage, flood control, parks or open space acquisition) performed by the municipality should incorporate the same water quality measures in the design and operations and maintenance water quality protection measures outlined in the development ordinances.

10.6.2. Development Agreements

Municipalities may enter into development agreements based on their adopted water quality protection ordinances which also identify specific financial assurance and funding mechanisms. The broad authority of municipalities often facilitates reaching development agreements between the municipality and the developer or special district. As part of this agreement it must be decided who will be responsible for the initial cost of implementing the water quality protection measures.

10.6.3. Financial Assurance/Long-Term Funding

There are several possible mechanisms for municipalities to secure financial assurance and/or long-term funding for on-going operations, maintenance and monitoring for new development. The simplest mechanisms are paid-in trusts or cash accounts, fully funded by the developer or property owner, under the fiscal control of the local jurisdiction. These mechanisms are not in wide-spread current use and will likely not be preferred by developers and/or property owners due to the up-front cash requirements. Another mechanism is to establish a taxing entity to provide the long-term funding.

As noted earlier, municipalities generally have authority to regulate water quality protection measures within their municipal boundaries and ETJ. Municipalities also have significant authority in the formation of taxing entities (special districts) including MUDs, WCIDs and PIDs. Of the available mechanisms, the most advantageous to municipalities is the PID. The

formation of a PID creates a taxing authority associated with definable infrastructure, but does not physically create a separate regulatory entity, with the ability to own infrastructure. Conversely, MUDs and WCIDs are separate regulatory entities, with the ability to own and operate infrastructure. For municipalities, the use of PIDs for water quality protection measures provides a funding mechanism specific to the property benefited by the measures, but allows the municipality to collect the revenue to own, operate, maintain and monitor the improvements, without the creation of a new regulatory entity.

10.6.4. Operations, Maintenance and Monitoring

Another important issue for municipalities is performing the long-term operations, maintenance and monitoring of the water quality protection measures. In order to avert a potential conflict of interest, the entity responsible for inspection and monitoring should not be the same entity that is responsible for operations and maintenance. If a PID is utilized for long-term funding, the municipality should normally assume the responsibility for all aspects. However, the inspection and monitoring should be performed by another entity through a cooperative agreement. Municipalities could enter cooperative agreements with a special district (e.g. the LCRA), a county or another municipality to conduct the inspection and monitoring. If desired, the municipality could also enter a cooperative agreement for operations and maintenance, as long as it was not the same entity performing the monitoring.

If a MUD or WCID is utilized to provide long-term funding for the water quality protection measures, the municipality should normally assume the responsibility for inspection and monitoring. The MUD or WCID would then be responsible for operations and maintenance. Since the MUD or WCID would be collecting the tax revenue, a cooperative agreement would be necessary to fund the municipalities inspection and monitoring functions from the tax revenue generated by the improvements.

In general, it is not appropriate for the landowner or a Home Owners Association to be responsible for the long-term operation, maintenance or monitoring of water quality protection measures. While this approach may seem initially cost effective, it can quickly become a financial burden on the land owner or association, with judicial action as the only way to enforce performance. While third-party financial assurance mechanisms may help bridge this gap, the preferred method of funding these activities is through a taxing entity.

10.7. Implementation Mechanisms for Counties

Due to their differences in authority, the implementation mechanisms for counties are different from those of municipalities. The following strategies are not intended to be stand alone but as part of larger policy decisions made by the Commissioners Court in addressing development issues.

10.7.1. Adoption of Water Quality Protection Measures

The water quality protection measures and land use restrictions (e.g. location restrictions, intensity restrictions, and other zoning related items) recommended in this plan should be incorporated into each county's local development ordinances to the extent allowed under

current law. Counties may currently regulate the design and construction of roadways and drainage improvements in unincorporated areas of the county. This allows the county to enact a variety of regulations to reduce and control stormwater runoff which is generally recognized as a major source of non-point pollution. Within the context of regulating these activities the county can require water quality measures to be incorporated in the plans and specifications for the improvements and can require that they be included as part of the overall operations and maintenance of the roads and stormwater management system. This approach should be taken by counties in incorporating the water quality protection measures outlined into their existing storm water (drainage) and roadway management ordinances and rules. Additionally, a county may require that a developer provide a bond in order to ensure compliance with road and drainage regulations. A county also has authority to regulate on-site wastewater facilities as well as regulate minimum lot frontages on county roads and buildings and set back lines on public roads in unincorporated areas outside of a municipal boundary or ETJ. Counties also have the authority to own and operate parks and recreational facilities as well as public open space and nature areas. Using an integrated management approach as part of the regulatory requirements, it is possible to include water quality management parameters as part of the roadway and drainage improvements and to use park and open space areas as part of a water quality management strategy.

If counties desire a fuller implementation of the water quality protection measures recommended in the Plan, the option is available to work with landowners to establish another regulatory authority (e.g. a MUD or WCID) to implement more of these measures than allowed under the county's own jurisdictional authority. On petition of a majority in value of landowners in an area located entirely within one county, the County Commissioners Court may approve the creation of a WCID in the unincorporated areas of the county outside the ETJ of any municipality if the Commissioners Court determines that the WCID is necessary, feasible, practicable and of benefit to the land within the district. In addition a MUD may be created by TCEQ if TCEQ makes those same findings following petition by a majority in value of the landowners within the proposed MUD boundaries. Establishing a MUD or WCID which covered any part of a municipality or its ETJ would generally require a cooperative agreement with that municipality. The MUD or WCID could then adopt many of the water quality protection measures outlined in this Plan.

During the stakeholder and public comment processes, significant concern has been expressed regarding the use of special districts (e.g. MUDs and WCIDs) to implement water quality protection measures. The principal issue of concern was the traditional use of these districts by developers as a mechanism to finance and install infrastructure to further their development objectives. Following the completion of the development activities, the infrastructure would be turned over to the district to assume maintenance and operational responsibilities. In many instances, the developer is involved in selecting the initial directors for the district, who are in turn responsible for reviewing the infrastructure improvements to ensure that the public interest is protected. This situation has many potential conflicts of interest, especially where there is no independent review by the newly created entity. Several examples were cited during the stakeholder process where these districts were used by unscrupulous developers to allow artificially low initial installation cost for the improvements at the expense of significant

operations and maintenance costs that became the responsibility of the district. In instances of misuse such as this, costs which would normally be included with the initial development were deferred to the maintenance and operational phase, resulting in higher than expected taxes and fees being charged by the district to accommodate these costs. While only few special district may be used unscrupulously, enough have been misused in this manner to leave an unfavorable impression of special districts with many people.

These special districts need not be tools which only further the aims of unscrupulous developers. The legislature initially authorized these types of districts to protect the public interests and to provide certain regulatory powers to existing entities (namely counties) who lacked broad regulatory powers. WCIDs were initially envisioned to afford public protections to water resources. MUDs were envisioned to vest public utility infrastructure in a public entity, under public oversight, with a tax-secured long term funding source. While in some instances these special districts have been used by private interests to externalize development costs, the Plan envisions the use of these districts in a manner more consistent with their original intended purpose.

The Plan proposes that special districts be established at the initiation of the local public jurisdiction for public purposes, rather than for private economic interest. In this context, the special purpose district will be structured to satisfy a local jurisdiction's desire to protect water quality. By taking the initiative in establishing these districts for public purposes, local jurisdictions can much better assure a satisfactory outcome.

Without the use of special purpose districts, some local jurisdictions (especially counties) would find it difficult to implement all the recommended water quality protection measures in the Planning Region, which in some instances only constitutes a part of the entity's jurisdiction. Further, the creation of a special purpose district creates an entity which would have certain land use control authorities that counties do not possess, but which are needed to effectively implement the recommended measures. These districts can also provide a funding source for the long-term maintenance and operation of water quality protection measures within a defined geographic area, which counties would not otherwise have the ability to do. Without the use of these special districts, counties would be faced with either implementing less than all of the measures or responding to legal challenges to the County's authority to enforce the recommended measures.

10.7.2. Development Agreements

Counties may enter into development agreements based on their adopted water quality protection ordinances, with the purpose of identifying specific financial assurance and funding mechanisms. A contractual agreement would provide several benefits for each party including clearly defining the roles and responsibilities for: initial construction costs, operations and maintenance, compliance with rules and regulations, financial assurances that facilities will function as they were intended, and budgeting of long term operations and maintenance. A development agreement could also facilitate cooperation in identifying land and easements for parks, open

space and conservation easement acquisition that could aid and/or enhance drainage, flood control and water quality protection measures.

Under current authority, the county could not incorporate into development agreements any restriction on the elements they are prohibited from regulating under SB 873,¹⁹⁷ including

- The use of any building for a particular purpose (e.g. residential, business, or industrial).
- The bulk, height, or number of buildings constructed on a particular tract of land.
- The size of a building including the ratio of the square footage of the building's floor space to square footage of the land.
- The number of residential units per acre of land.

While these agreements do define responsibility for some aspects, they can not be used to directly regulate these items.

10.7.3. Financial Assurance/Long-Term Funding

There are several possible mechanisms for counties to secure financial assurance and/or long-term funding for on-going operations, maintenance and monitoring for new development. County tax revenues should not be used to accomplish these objectives because the costs are not county wide and affect only the Planning Region. As with municipalities, the simplest mechanisms are paid-in trusts or cash accounts, fully funded by the developer or property owner, under the fiscal control of the county. While a PID addresses the financial assurance and funding issues, it does not broaden the regulatory powers of the county. As outlined above, these mechanisms still do not give the county the ability to regulate certain prohibited items. However, counties can help form MUDs or WCIDs which may then regulate many aspects of development and water quality as identified in this Plan.

MUDs and WCIDs are separate regulatory and taxing entities, with the ability to own and operate infrastructure. For counties, the use of MUDs or WCIDs for water quality protection measures provides a funding mechanism specific to the property benefited by the measures, but vests the responsibility for operations, maintenance and monitoring with a separate entity.

10.7.4. Operations, Maintenance and Monitoring

Another important issue for counties is performing the long-term operations, maintenance and monitoring of the water quality protection measures. In order to avert a potential conflict of interest, the entity responsible for inspection and monitoring should not be the same entity that is responsible for operations and maintenance. If a MUD or WCID is utilized for long-term funding, that entity should normally assume the responsibility for all aspects. However, the inspection and monitoring should be performed by another entity through a cooperative agreement. Counties could enter cooperative agreements with the MUD or WCID to conduct the inspection and monitoring, with appropriate funding provided by the MUD or WCID. As with municipalities, it is not appropriate for the landowner or a Home Owners Association to be

¹⁹⁷ Texas Local Government Code, Title 7, Chapter 232, "Infrastructure Planning in Certain Urban Counties", §232.101(a).

responsible for the long-term operation, maintenance or monitoring of water quality protection measures.

10.8. Implementation Mechanisms for Special Purpose Districts/Authorities

As previously noted, special purpose districts will play an important role in implementing a regional water quality plan because of the authority they have been given by the Texas Legislature as well as their role as water and wastewater provider in the area.

10.8.1. Lower Colorado River Authority

The LCRA should consider and adopt water quality regulations within unincorporated areas of Travis County that are outside of a city ETJ.

- The LCRA has been granted the authority to develop water quality regulations within its original jurisdiction, which includes Travis County. In fact, the LCRA has had an ongoing water quality regulatory program for those areas generally surrounding Lake Travis. This program was developed and adopted by the LCRA Board of Directors in 1990 and updated in 2004. The ordinance requires a water quality permit and establishes performance standards. Additionally, a Non-Point Source Pollution Control Technical Manual has been developed which includes design standards as well as Best Management Practices that should be considered.
- Given the limited authority that counties have in water quality regulations, the LCRA is in a position to enforce water quality regulations in unincorporated areas of Travis County outside of a city's ETJ. For this authority to be extended to the portion of Hays County in the Colorado River basin, legislative action would be required.
- As a regional water supplier, the LCRA is in the unique position to be able to include water quality parameters as part of long term water supply contracts as well as where they provide retail water supplies. The LCRA has regulatory authority in unincorporated areas of Travis County outside of a city ETJ and should consider adopting and enforcing water quality regulations consistent with the regional plan in these areas.
- In Hays County, consider including provisions within wholesale and retail water service agreements that require compliance with water quality ordinances of the cities and counties and that there be a plan in place and a development agreement between the purchaser and appropriate city or county jurisdiction for the development and implementation of water quality measures.

10.8.2. Groundwater Conservation Districts

Most groundwater conservation districts (GCDs) are limited in their powers to directly enforce water quality regulations. Within the limitations of their founding legislation, these entities can directly regulate:

- Groundwater production rates, within certain limits.
- Well spacing.

GCDs can also play a supporting role in the implementation of the Plan. Their role in implementation should be coordinated with the primary implementation entities, (municipalities and counties) but can include:

- Incorporating cross references to other adopted governmental regulations (specifically water quality protection measures) to verify compliance prior to issuing any approvals under the GCD's authority.
- Engaging in public education activities, including the proper management of groundwater (e.g. withdrawal rates, proper well construction, etc.), the effects of surface activities on groundwater quality, and general public awareness of water quality issues.

In cooperation with other entities, GCDs may take a leading role in the coordinated public education program recommended as part of implementing the Plan.

10.8.3. Other Special Districts

Other types of special districts may assist with implementation of the following tasks.

- Work with local governments and other interests to determine opportunities where water quality protection can be enhanced and cost effective measures of monitoring and operations can provide water quality protection for the planning region.
- Work with wholesale customers such as MUD's and WCID's to reach development agreements with cities and to comply with and enforce water quality measures in a cost effective and efficient manner.
- Another alternative for the implementation of a regional water quality plan would be the establishment of a regional entity that would have the authority to implement a regional plan. While County Commissioners Courts and the TCEQ may, in cooperation with affected landowners, establish a special purpose district for providing public services such as water, sewer and drainage, a special purpose district focused on water quality protection would probably need to be established by the Texas Legislature since existing Texas law does not clearly authorize creation of special districts solely for protection of water quality. Several issues would have to be addressed including jurisdictional boundaries, authority to regulate within a city's ETJ, and how the regulations would be incorporated into the platting process by cities and counties. Administrative issues include how the district would be governed through an appointed board or an elected board, how the district would be funded either through taxes, fees or a combination, and if a confirmation election by the voters in the proposed district would be required.

10.9. Natural Area Conservation and Transferable Development Rights

Natural area/open space conservation was previously identified as an important water quality protection measure. While the voluntary conservation of natural areas was recommended, several elements of the Plan provide for natural area conservation in exchange for flexibility in other areas. To implement this exchange, the implementation of transferable development rights (as presented previously) is essential.

There was extensive discussion with the Stakeholder Committee regarding the implementation of TDRs. While the concept of TDRs received consensus acceptance, there were also significant concerns expressed. Instituting TDR's in the Planning Region was often characterized as "coining a new currency". Because the use of TDRs is a relatively new and untested concept in Texas and in the Planning Region, there are many uncertainties about how they would be accepted, traded and enforced. These uncertainties and the potential for unintended consequences is discussed in more detail below. The process to implement both voluntary and mandatory natural area conservation, including the TDR concept, is presented below.

10.9.1. Voluntary Conservation

All entities and individuals inside and outside the Planning Region should be encouraged to voluntarily conserve natural areas/open space. As discussed previously, this water quality protection measure was consistently considered among the most important objectives of the Plan. There are many benefits to the public and the environment from the voluntary conservation of natural areas. However, if these areas are to provide these benefits in perpetuity, their conservation must be ensured by preventing their future development. It is strongly recommended that any individual or entity committed to the voluntary conservation of natural areas under this measure secure the future development rights for the property using the procedures outlined below.

10.9.2. Natural Area Conservation and the Effects of Prior Development

As presented in Stakeholder Guiding Principal No. 7, the issue of equity in the implementation of water quality protection measures was considered an important issue for the stakeholders. One recurring issue during stakeholder deliberations was the "fairness" of requiring significant water quality protection measures for new development while ignoring the adverse water quality impact of prior development with few or no water quality protection measures. In most instances, this existing development has occurred at intensities which significantly exceed the uniform intensities recommended in this Plan. The stakeholders determined that one way to address the equity issue was to recommend that local public jurisdictions secure conservation easements in an attempt to bring the "as-built" impervious cover in the Planning Region closer to the uniform development intensities presented in this Plan.

As indicated in the discussion on the impacts of impervious cover (see Table 8), there are several watersheds within the Planning Region, where the estimated "as-built" development intensities exceed the uniform development intensities specified for future development. In being consistent with the equity principle, the stakeholders have recommended that natural area conservation be implemented in an amount sufficient to offset these excess intensities. While this will not necessarily address any current water quality impact issues within these watersheds, it will achieve a distribution of development intensity across the Planning Region that is closer to the intensities presented in this Plan as protective of water quality. Table 15, below, provides a quantification of the amount of natural area conservation necessary to achieve a net of ten percent (10%) impervious cover for these watersheds.

Table 15 – Amount of Natural Area Conservation Necessary to Achieve a Net 10% IC for Watersheds with an Estimated As-built IC exceeding 10%

Watershed	Area in PR (Ac)	Est. As-Built IC	Est. IC (Ac.)	Addn. Ac. for 10%
Bee Creek	1,920	15.37%	295	1,031
Little Bee Creek	640	20.05%	128	643
Eanes Creek	2,560	27.25%	698	4,416
Williamson Creek	11,016	20.75%	2,286	11,842
Total	16,136		3,407	17,932

Based on this evaluation, the Plan recommends that approximately 20,000 acres of natural area conservation be implemented within the Planning Region to address the equity issues with prior development. To accomplish this objective, each of the local jurisdictions in the Planning Region would be responsible for assessing the intensity of existing development within its boundaries and determining the quantity of conservation easement required to reach this recommended quantity. Once this quantity is allocated among the jurisdictions, a process for identifying target tracts should be developed. This process should focus on maximizing the benefits obtained. One way to maximize the water quality benefit of these acquisitions is to secure tracts for which prior development approvals have been issued which allow construction to occur with fewer water quality protections than those specified in this Plan. Utilizing this strategy in effect purchases more water quality benefit than simply securing the development rights from undeveloped land which would otherwise be required to comply with this Plan. Once target tracts have been identified, a funding plan and acquisition schedule should be developed.

Funding for the acquisition and long-term care of these conservation easements could be provided by several different mechanisms. The specifics of the funding mechanisms would vary based on the type of entity, and have been previously presented. To qualify as conservation easement under the Plan, the local jurisdiction must secure the future development rights for the property using the procedures outlined below.

10.9.3. Conservation Easements Used to Secure Transferable Development Rights

The concept of using conservation easements to secure transferable development rights was previously discussed as a means to allow significant flexibility in the application of water quality protection measures in the Planning Region. Individuals or entities wishing to utilize this flexibility bear the responsibility for satisfying the requirements of the local public entity having jurisdiction over the tract to be developed and for securing sufficient transferable development rights to comply with the other sections of this Plan. In general, the amount of additional transferable development rights will be determined and verified by the local public entity during the development review process. If these rights are to be secured through conservation easements, the party responsible for the site to be developed must secure the identified quantity of conservation easement in compliance with the terms of this Plan and the requirements of the applicable local jurisdiction. Documentation that the restrictive mechanisms outlined below have been applied to the property from which the transferable development rights were obtained,

must be provided before that property can be accepted by any of the local public jurisdictions implementing this Plan. The local public jurisdictions should ensure that this documentation is provided and that the other requirements of this program have been met before issuing the final development approval.

Since the use of transferable development rights to allow additional development intensity will generally be directed by private for-profit interests, sufficient safeguards must be incorporated into the process to protect the public interest. These safeguards must include transfer of undivided ownership interest and control, free of liens and encumbrances, to a governmental or non-profit entity acceptable to the local public jurisdiction accepting the conservation easement as part of the transfer. These conservation easements must also comply with the procedures for assuring conservation, as outlined below.

10.9.4. Procedures for Assuring Conservation

There are several different aspects to the process for ensuring that future development of designated natural area/open space conservation easements is prohibited. While the specific aspects may vary from property to property, each aspect should be investigated and appropriate restrictive mechanisms put in place before establishing an area as a conservation easement. Specific restrictions or requirements for these mechanisms have been presented in the preceding sections.

10.9.4.1. Ownership

The most important aspect of long-term conservation is controlling ownership interests. In Texas, current law allows surface ownership interests to be separated from sub-surface mineral ownership interests. In some instances, property whose ownership has been tightly controlled (e.g. generally family transfers only) may have common ownership of surface and sub-surface interests. However, in many instances, the surface interests and sub-surface interests have previously been severed and are under separate ownership. To ensure long-term preservation of property, control of both surface and sub-surface ownership interests is imperative.

The most straightforward mechanism for securing ownership interests of conservation easements is through direct purchase or donation, with title transfer to a conservator using appropriate legal instruments (e.g. warranty deeds, quit-claim deeds, etc). Sole ownership is the preferred mechanism for conservation easements used to secure transferable development rights under the Plan. An alternative mechanism of securing a controlling ownership interest is by purchase or donation of a majority undivided interest. However, this encumbers the majority ownership with the interests of the minority ownership. Regardless of the mechanism used, the control of ownership interests is critical to long term conservation.

In instances where a conservation easement is being secured by a governmental entity, the property will benefit from the public interest protection inherent in the operation of the governmental entity. The property secured as a conservation easement will also receive all the protections of public property. Cooperative ventures to secure conservation easements

often have significant merit. Ventures between multiple governmental entities should be pursued where possible to maximize public benefit and minimize costs. Non-profit organizations can also provide good partnering opportunities to governmental entities for conservation purposes, if appropriate safeguards are incorporated. An appropriate safeguard from the aspect of ownership is to ensure that the ownership interest and control of the conservation easement reverts to a public entity if the non-profit entity becomes insolvent or incapacitated. Cooperative ventures with for-profit entities are often problematic due to competing interests, and should generally be avoided. If utilized, cooperative ventures with for-profit entities must incorporate strict safeguards to protect public interests.

10.9.4.2. Legal Mechanisms to Prohibit Future Development

Instituting legal mechanisms to prohibit future development is another important aspect of assuring the protection of conservation easements. There are several different mechanisms available to prohibit future development. For conservation easements located within the jurisdiction of public entities having zoning authority, zoning restrictions are an effective legal mechanism for prohibiting future development. A zoning designation should be selected which allows little to no development of the property. Any future attempts to develop the property would encounter administrative safeguards through the zoning process. Another legal mechanism to control future development is through the granting and filing of a dedicated easement to the public. While this mechanism does not directly prohibit future development, it would serve as a recurring reminder of the public easement during any future title research on the property. Another available legal mechanism is the incorporation of restrictive covenants into the deed records. Since these covenants are contained within the text of the deeds, they are sometimes not as readily visible in the public record as are zoning restrictions and easements to the public. Legal mechanisms to restrict future development should generally be utilized to supplement and not substitute for the control of ownership.

10.9.4.3. Physical Barriers

Another aspect of assuring preservation of property is incorporating physical barriers to future development. Physical barriers include fencing, signage and other types of physical notification that the property is protected and restricted. These mechanisms are limited in their ability to prevent future development and they require long-term maintenance and upkeep. Physical barriers can only supplement and can not substitute for either the control of ownership or the use of legal mechanisms.

10.9.4.4. Long-term Custodial Management

Another aspect of assuring the long term protection of conservation easements is by the appointment of a conservator responsible for long-term custodial management of the property. Since little or no development will be allowed in preserves, the maintenance of physical systems will be minimal. However, to ensure their proper function, conservation easements should be subjected to active management in accordance with the water quality protection measures presented in the Plan for undeveloped land. This active management

will include controlling human activity on the property, vegetative management, protection of the property from exterior physical threats (e.g. vandalism, fire, impacts from adjacent development, etc.), and on-going evaluation to ensure that the preserve is meeting its objectives. To accomplish this on-going active management, a conservator will be required. This conservator must be under the direct control of the entity with controlling ownership interests in the conservation easement, and should possess the necessary resources to effectively perform the on-going active management. If the entity with controlling ownership interests delegates the role of conservator to another party, sufficient safeguards (e.g. minimum qualifications, financial assurance, insurance, etc.) should be required to ensure that the conservator performs the management properly.

10.9.4.5. Long-term Funding

Long-term funding is another key aspect to assuring conservation. An assured source of long-term funding will allow the conservation easement to be properly managed and protected. The entity establishing or owning the controlling interest in the preserve is responsible for establishing this long-term funding source and ensuring that it is sufficient for reasonably anticipated future expenditures. If the establishing entity arranges with another entity to provide long-term funding, the establishing entity is required to demonstrate the long-term financial stability to ensure the long-term custodial care of the property.

10.9.5. Transferable Development Rights Secured by Retrofitting Prior Development

The concept of securing transferable development rights by retrofitting prior development was discussed during the stakeholder process as a means to allow significant flexibility in the application of water quality protection measures in the Planning Region. However, as discussed previously, there was some concern about how to quantify the capabilities of various structural water quality protection measures. Some quantification of these capabilities would be necessary to determine the corresponding amount of TDRs that could be obtained by retrofitting prior development with these measures. In instances where there is a net reduction in impervious cover obtained through the retrofitting process, this can provide some tangible quantification of water quality benefit. As a result of the stakeholder discussions, the recommended strategy for securing TDRs through retrofitting was to allow credits only for net reductions in impervious cover. In practice, the net quantity of impervious cover removed could be transferred to a new development utilizing TDRs. The adaptive management process recommended for implementation of the Plan, should evaluate case studies of retrofit projects to quantify any future TDR credits that may be obtained, if it is deemed appropriate.

Individuals or entities wishing to utilize this flexibility bear the responsibility for satisfying the requirements of the local public entity having jurisdiction over the developed tract and for securing sufficient transferable development rights to comply with the other sections of this Plan. The party responsible for the site to be developed must perform the retrofit in compliance with the terms of this Plan and the requirements of all applicable local jurisdictions. The retrofit must

comply with the same design standards used in conjunction with the water quality protection measures presented in this Plan.

If the retrofit is to be performed by the party performing the development, it must be completed prior to the local jurisdiction issuing the final development approval. If the local jurisdiction has a program in place to evaluate the adequacy of financial assurance, a local jurisdiction may accept an appropriate, irrevocable financial assurance mechanism¹⁹⁸ posted by the responsible party in lieu of the retrofit being performed prior to final development authorization. Local jurisdictions may also establish a retrofit program which allows developers to make a cash payment in lieu of the required retrofit.

10.9.6. Legal Bases and Precedent for TDRs

As outlined previously, this Plan looks at legal issues in general and is not intended to provide specific legal advice to any specific individual or situation, and the information provided is for general information only. There is no current specific provision enabling TDR transactions under Texas law, but neither is there a prohibition on such transactions. As envisioned in the RWQP Plan, the purchase or sale of TDRs would be considered a private transfer of private property, subject to existing Texas law governing such transactions. In some respects, the sale and transfer of TDRs could be compared to the current practice of trading mineral leases for a property, where the mineral lease is severed from the actual ownership of the property. While completely different in purpose, the legal and procedural methods used for TDR transactions would likely be similar to mineral lease transactions.

There are a number of TDR and closely related conservancy programs that have met with varying degrees of success. Locally, the City of Austin's mitigation program has been used in some instances to allow additional development intensity through the purchase of conservation easements. A program with many common elements (and also some significant differences) to the program envisioned under the RWQP Plan is the New Jersey Pinelands Development Credit Bank.¹⁹⁹ Other programs, with varying degrees of similarity, are successfully operating in New York, Pennsylvania, North Carolina, Oregon and Washington State. With implementation of a TDR program within the Planning Region, local jurisdictions and entities have a variety of examples on which to base their specific programs. The intended outcome of using these models is to utilize relevant aspects of existing programs supplemented as necessary to facilitate a local market in the Planning Region and to comply with existing state and local laws.

10.9.7. Mechanisms for Implementation

The TDR program envisioned for the Planning Region is voluntary and would be implemented by each jurisdiction independently. While there are certainly disadvantages to this approach, it is simple to initiate and leaves the decision about whether to allow TDRs and if so, where they would be acquired and applied, to the local jurisdictions. In situations where both the originating

¹⁹⁸ See the discussion on financial assurance mechanisms in the Implementation Section for local jurisdictions.

¹⁹⁹ "Transfer of Development Rights: A Flexible Option for Redirecting Growth in Pennsylvania", Brandywine Conservancy Environmental Management Center, 2003.

tract (tract from which TDRs are acquired) and the destination tract (tract to which TDRs are applied) are within the same local jurisdiction, that jurisdiction will have ultimate control over the TDR transaction. However, in instances where more than one local jurisdiction would be involved, a written approval and acceptance of the transfer would be required by all of the jurisdictions, both originating and destination. This process would in essence allow any of the local jurisdictions to “veto” the transfer. If approved, this process would also allow each jurisdiction to track and administer the TDR transactions.

Working within this process, each entity implementing TDRs would need to incorporate into their development review process:

- Policies on TDR transactions and objectives for the TDR program
- Administrative procedures to be followed to request a TDR transaction
- Personnel assignments for individuals to process TDR transaction requests
- A record-keeping tracking method to identify which properties were the subject of a TDR transaction
- A review process to determine if the transactions are meeting the entity’s objectives.

10.9.8. Uncertainties and the Fear of Unintended Consequences

As with any new venture, even a thorough evaluation of the concepts and strategies may not always identify and avoid uncertainty and unintended consequences. It is absolutely imperative that the institution of the concept of TDRs be evaluated by each entity and be an evaluation factor during the adaptive management process. The outcome intended for TDRs in this Plan is to bring equity to the development process and prevent early projects from exceeding protective intensities at the expense of later development that would have to be further restricted beyond protective levels. Given this understanding of the purpose and intended outcome of the use of TDR’s, the following restrictions should be incorporated into the implementation process:

- TDRs are a voluntary component intended to create a market for flexibility in development intensity and can not be secured through the use of eminent domain or the right of condemnation. Entities with the right of eminent domain should be encouraged to use TDRs, where appropriate or desirable, but must secure them through an open market and not through the use of eminent domain.
- TDRs are not intended to have an independent or inherent taxable value. In accordance with established Texas law and tax policy, the tax status, including any exemptions, for all property should be based on the use of that property and not on the status of the TDRs.

10.10. Compliance with the EPA’s Phase II Municipal Storm Water Regulations

The EPA’s Phase II Municipal Storm Water Regulations are part of the EPA’s NPDES program, as presented in the section on existing regulatory programs. In Texas, this program is being implemented by the TCEQ. As discussed previously, these regulations apply to all municipal separate storm sewer systems (MS4s) owned or operated by governmental entities within designated urbanized areas. The water quality protection measures addressed in the Plan have been developed to be consistent with the EPA’s Phase II Municipal Storm Water Regulations for urbanized areas.

While there are additional requirements of this program that are not incorporated into this Plan, the adoption of the water quality protection measures included in the Plan will satisfy a good portion of the Minimum Control Measures required under that program. These measures can result in significant reductions in non-point source pollution, as required under that program.

10.11. On-going Monitoring Program

Most of the water quality protection measures included in the Plan have been based to varying degrees on monitoring data. As outlined in the strategies for achieving Objectives No. 7, the ability to monitor and assess performance of these measures is essential to the success of the Plan. The primary mechanism for assessing the effectiveness of the plan will be an on-going monitoring program. This monitoring program should correspond to the historical monitoring database so that it can be compared to the historical data. This comparison will serve as the basis for assessing the effectiveness of the water quality protection measures implemented.

This on-going monitoring program should be a cooperative venture between the local jurisdictions involved. Cooperative efforts with entities that are currently performing monitoring should be pursued.

10.12. Public Education

A comprehensive and coordinated public education program should be included as a part of implementing these measures. While each entity involved has the responsibility to conduct public education as a part of its implementation activities, significant opportunities for cooperation with other entities exist. Cooperative ventures can be more effective through combined effort and can reduce overall costs. Due to the nature of the public education efforts outlined in the proposed measures, a coordinated regional public education program should be adopted by all jurisdictions in the Planning Region. This coordinated effort could be accomplished by identifying one coordinating entity that executed the public education efforts through cooperative agreement with the public entities. Entities with a larger geographic focus (e.g. authorities, groundwater conservation districts, etc.) would be the logical choices for fulfilling this responsibility of the plan.

As outlined in Section 9.17, one of the primary elements of the public education program should include awareness of the Plan and communication of the merits of the Plan to the local jurisdictions and public at large. To aid in this effort a standardized presentation on the Plan has been developed and included in Appendix Q.

10.13. Alternative Implementation Mechanisms

There are several alternatives to the implementation mechanisms presented above. In some instances, these alternative mechanisms can supplement the current recommendations, while in other instances they would replace them entirely. Three alternatives are presented and discussed.

10.13.1. Creation of a New Regulatory Entity to Implement the Plan

This alternative would involve the creation of one legal entity to be responsible for the implementation of the Plan. During the identification of issues by the stakeholders, the concept of a single regional entity to implement the Plan was consistently popular and considered important by many stakeholders. Such an entity would have several distinct advantages, including consistency of implementation across the entire Planning Region, eliminating replicated administration and overhead, and the economies of scale typically associated with larger entities. However, this type of new entity would also have several disadvantages. The principal disadvantages would be the extended time frame required to start up this type of entity, the requirement for multiple political jurisdictions to agree on its establishment and how to integrate the water quality criteria into the platting and subdivision regulations of local political subdivisions as well as design criteria for drainage and flood control. Other issues that would need to be addressed include identifying who would be responsible for enforcement, ongoing operations and maintenance of the water quality measures that are implemented, and for future capital improvements associated with the improvements. Due to the legal authority required for such an entity, it could only be created by the Texas Legislature. This requirement places the establishment of a new entity beyond the direct control of the existing local jurisdictions within the Planning Region.

As a part of its establishment, this entity would require the legal authority to regulate all aspects of water quality protection within the Planning Region. The Legislature has at its disposal multiple legal mechanisms to establish an entity with the necessary powers, including a conservation and reclamation district or a water control and improvement district. There are also several important inter-jurisdictional issues that would have to be resolved. The first of these issues would be how the powers of the new entity relate to the TCEQ; specifically how the TCEQ's existing powers would impact the new entity, and how the new entity's powers would impact the TCEQ. A second issue would be how the powers of this new entity interacted with the existing powers of other governmental entities, including municipalities and counties. A third issue would be how the powers of this new entity interacted with other special purpose districts that have already been established in the Planning Region.

In most cases when the legislature establishes a special purpose district a confirmation election is held to validate the establishment of the district. If the confirmation election were to fail, there is a potential that the legislature would have to take up the enabling legislation again during the next legislative session. A related issue is how the governing body of the new entity would be selected. Options include having a general election of governing members from within the boundaries of the entity at large or forming single member districts. Another option is to have the governing board for the new entity selected by the governing bodies of political subdivisions that have platting and subdivision control within the boundaries of the new entity.

In addition to the inter-jurisdictional issues, the issue of funding would need to be addressed. Since the implementation of water quality protection does not typically result in the transfer of a commodity, (e.g. the sale of water or electricity) funding this type of entity through service fees is more difficult to implement. For this new entity to be funding using service fees, a utility

system would have to be established. While this is one funding possibility, the lack of the ability to couple this service to another essential commodity (e.g. water or electricity) leaves significant doubts about the financial feasibility of the service fee approach. Given the role and function of a new entity to implement this plan, the preferred funding mechanism is through ad valorem taxes. However, a significant impediment to the collection of ad valorem tax revenue is the necessity for voter approval prior to instituting the tax. Even if an entity is established and empowered, it cannot begin implementation until it has secured a long term funding source. The establishment and funding of a new regional taxing authority can be expected to take several years.

The issues outlined above could be significant impediments to the establishment and operation of a single new regional entity to implement the plan. There are many complex issues that must be resolved, requiring political consensus and initiative. It is anticipated that several years will be required to establish a new entity. Additional time (likely several additional years) will be required for the entity to have secured funding, obtain resources, and set up infrastructure to implement the Plan. Due to the complexity of the issues involved and the extended time required for actual implementation, this alternative should be considered a possible long-term goal.

10.13.2. Expanding the Authority of An Existing Entity to Implement the Plan

This alternative would involve expanding the authority of an existing entity and assigning that entity the responsibility for implementation of the Plan. As identified in the previous alternative, the concept of a single regional entity to implement the Plan was consistently popular and considered important by many stakeholders. There are several existing entities whose current boundaries, powers and authority could be expanded to allow implementation of the Plan, including the EAA, the LCRA, the GBRA, the BSEACD and the HTGCD. This expanded, single entity would have most of the same advantages and disadvantages of a new entity. Due to the nature of the changes required to expand the authority of any of these entities, the change would have to be instituted by the Texas Legislature, again removing the process from the direct control of the existing local jurisdictions within the Planning Region. This expanded entity would also require the legal authority to regulate all aspects of water quality protection within the Planning Region.

The funding mechanisms available to these potential entities are currently limited to the assessment of fees. None of the entities has taxing authority. The EAA, BSEACD, or HTGCD do not own or operate a utility system and are limited to raising funds through permit and operation fees. Neither the GBRA nor LCRA has taxing authority and must rely on revenues generated through the sale of electricity, water and wastewater service. The LCRA currently is providing surface water to areas outside the city limits of Austin. Given the limited availability of groundwater in the planning area it is anticipated that surface water will be used instead of groundwater for new development and growth within existing developments. The LCRA has also been actively involved in regulating water quality in the Lake Travis watershed since 1990 and has developed the Lake Travis Nonpoint-Source Pollution Control Ordinance and a

Nonpoint-Source Pollution Control Technical Manual. As part of this ordinance the LCRA has established a permit procedure, fees for inspection during construction, enforcement actions, and financial security for implementing water quality measures in the event that a developer would not be able to perform in accordance with the permit. As a policy measure, the LCRA Board of Directors has determined that the Highland Lakes are the first priority in establishing programs for the control and prevention of nonpoint-source water pollution. As part of their ordinance the LCRA encourages municipalities within the Planning Region that do not have a water quality ordinance at least as strict as the LCRA ordinance, to enter into an interlocal agreement or MOU with the LCRA stating that they will adopt and administer the LCRA ordinance within their jurisdiction for new development. Currently the LCRA has the authority to implement water quality measures in Travis County but not in Hays County. If the LCRA were to become the regional water quality entity the legislature would have to expand its authority into the Hays County portion of the planning area. Since the LCRA is providing water service to much of the undeveloped portion of the planning region a potential source of revenue would be to add a water quality component to the wholesale water rate to cover these costs.

The process for accomplishing this expansion would require resolving the same inter-jurisdictional and funding issues as establishing a new entity. However, it would also involve the selection of one existing entity over the other potential agencies. This process would require significant political consensus and would correspondingly have several potential political pitfalls. While the expansion of an existing entity could likely be completed more quickly than creation of a new entity, it is likely that several years would still be needed for full implementation. Due to the complexity of the issues involved and the extended time required, this alternative should also be considered a possible long-term goal.

10.14. Adaptive Management

Adaptive management is a process allowing for periodic evaluation and adjustment of programs. The concept of adaptive management will be applied to assessing the effectiveness of the water quality protection measures implemented, evaluating new technologies and new scientific data, and recommending and implementing solutions for measures determined to be ineffective. The adaptive management process should include all aspects of the plan in all jurisdictions. To do this, a standing committee should be maintained to oversee the adaptive management process. This committee should be a public process and should include representatives of the entities responsible for implementing the plan, the entities responsible for enforcing the plan, and representation from members of the public. A process similar to the current stakeholder involvement process, and possibly continuing the existing Stakeholder Committee, would fulfill these conditions.

The committee overseeing the adaptive management process should perform an annual evaluation to assess the effectiveness of the Plan, utilizing several different elements, as outlined below.

10.14.1. Review and Evaluation of Monitoring Data

As outlined in the Goals and Objectives, the purpose of this plan is to provide water quality protection. The effectiveness of these measures will be reflected in the data collected as a part of

the on-going monitoring. The committee reviewing this monitoring data should be assisted by technically competent individuals. This review and evaluation of the monitoring data should be summarized in a written report.

10.14.2. Review of the Implementation Process

In addition to the technical review of the monitoring data, the committee should also review the performance and function of the implementation system. This review should include all elements of the implementation process including the legal status of water quality protection measures, the development review process, actual case studies of selected development projects, implementation funding, and enforcement activities. The results of this review should be presented in a written report.

10.14.3. Evaluation of New Science and Technology

In addition to the technical review of the monitoring data and the review of the implementation process, the committee should also review any new science and technology that is relevant to the goals and objectives of the Plan. As presented previously, a number of areas of significant scientific uncertainty were identified during the planning process, including:

- Specific pollutant loadings resulting from various activities
- Actual performance (removal effectiveness) of structural BMPs (particularly retention/irrigation)
- The vulnerability of failure of structural BMPs due to inadequate maintenance and catastrophic events (e.g. floods, power outages, etc.)
- The assimilative capacity of open space and expanded buffer zones

During its reviews, the adaptive management oversight committee should evaluate any relevant data that becomes available and determine if this data warrants changes in the water quality protection measures presented in the Plan.

10.14.4. Development of Recommendations

Based on the technical evaluation of the monitoring data and the performance review of the implementation measures, the committee should develop recommendations for any necessary response actions and modifications needed to the implementation system. These recommendations should include an implementation strategy, identification of funding sources for implementation, and an economic evaluation of the recommendations. These recommendations should be summarized and presented in a written report.

10.14.5. Implementation by Local Jurisdictions

At the conclusion of the evaluation process, the committee should deliver the written report containing the evaluation and recommendations, to the local jurisdictions. The jurisdictions implementing the Plan will be responsible for implementing the recommendations developed by the committee.

10.15. Implementation Obstacles

10.15.1. Incorporating Water Quality Controls in Existing Development

One of the issues raised during the stakeholder process has been the need to incorporate water quality controls in existing development. However, there are many complicating factors which make identifying workable solutions for this issue difficult. The EPA has evaluated this issue and acknowledged the difficulty of retrofitting existing development with water quality protection measures:²⁰⁰

In highly urbanized and densely populated cities, little opportunity exists for retrofitting storm drainage systems with BMPs to provide water quantity control due to flooding considerations. The large area of impervious surfaces in heavily urbanized areas produce large quantities of runoff. Rapid conveyance by the storm drain system is frequently the only option that exists in order to prevent flooding of yards, streets and basements. In these areas, the most appropriate BMPs are those that limit the generation of pollutants or remove pollutants from the urban landscape.

In contrast to the recognized authority of a municipality to regulate water quality through its land development authority in its ETJ for proposed new development, it would be problematic for a municipality to attempt to impose water quality controls on existing development. For example, any attempt by a city to require existing ETJ development to comply with a new setback requirement would undoubtedly be challenged as an unconstitutional taking of property, especially if complying with the ordinance meant having to tear down or re-construct existing development. Supreme Court Justice Craig Enoch alluded to this legal issue of a city's regulation of ETJ development in his concurring opinion in the *Quick* case. Justice Enoch expressed concern that a city exercising land use control authority in its ETJ disenfranchises a class of citizens because the residents of the ETJ are subjected to regulations yet have no right to vote in city council elections or otherwise participate in the city's electoral process. An attempt to impose new water quality controls on existing development would probably implicate the sort of constitutional concerns described by Justice Enoch in the *Quick* case. A detailed discussion on the takings issues is provided in a subsequent section.

10.15.2. Enforcing Impervious Cover Limits in Unincorporated Areas of a County

Another obstacle to implementation is the enforcement of impervious cover limits in unincorporated areas of a county. As discussed in the Implementation Mechanisms outlined above, there are several alternatives for implementing these measures. The recommended procedure is for the county to help in establishing a MUD or WCID to enforce these provisions to the extent possible.

²⁰⁰ "Preliminary Data Summary of Urban Storm Water Best Management Practices", Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

10.16. Water Quality Protection Measures as Regulatory “Takings”

In any consideration of water quality protection measures to be adopted by local governmental entities, it is necessary to consider whether or to what extent such measures may be vulnerable to legal challenges by any particular landowner on the grounds that they may constitute a prohibited “regulatory taking.” A regulatory taking is a governmental action which regulates a private property interest to such a degree that it violates the Constitutional prohibition on the taking of private property without just compensation.²⁰¹ One form of a taking is a physical taking where a governmental entity physically takes or occupies private property (e.g., a city condemning an easement to expand a roadway across private property).

A more difficult-to-define form of taking is a regulatory taking which is a governmental regulatory requirement which has the effect of reducing the economic usefulness and value of private property to such an extent that it constitutes a taking of private property. Water quality protection measures such as the impervious cover and setback requirements of this Plan are good examples of potential regulatory takings. Another example of a potential regulatory taking is where a governmental entity imposes a dedication requirement or “exaction” on a landowner as a condition for granting a governmental approval (e.g., a county conditioning its approval of a subdivision plat on the dedication by the developer of right-of-way for road expansion or lands for public parks).

10.16.1. General Principles in the Law of Regulatory Takings

The U.S. Supreme Court and the Texas Supreme Court have struggled to formulate a standard for determining when a governmental regulation of private property goes so far as to become a taking. At present the U.S. Supreme Court and Texas Supreme Court have adopted the following basic legal principles concerning the law of regulatory takings:

- Possible remedies for a regulatory taking are to invalidate the offending regulation or to make the governmental entity liable for monetary damages.²⁰²
- In defending a challenge to a regulation, the governmental entity must show that the regulation actually substantially advances a legitimate state interest.²⁰³ A legitimate state interest has been liberally interpreted to include even such things as protecting residents from the “ill effects of urbanization” and the preservation of desirable aesthetic features.²⁰⁴
- A compensable regulatory taking occurs when a land use regulation either (1) denies the landowner all economically viable uses of the property, or (2) unreasonably interferes with the owner’s right to use and enjoy his property.²⁰⁵ The Texas Supreme Court has held that a

²⁰¹ The 5th Amendment of the U.S. Constitution states that “private property [shall not] be taken for public use without just compensation.” Similarly, Article I, Section 17 of the Texas Constitution provides that no “person’s property shall be taken, damaged, or destroyed for or applied to public use without adequate compensation being made....”

²⁰² *First English Evangelical Lutheran Church v. County of Los Angeles*, 482 U.S. 304 (1987).

²⁰³ *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987).

²⁰⁴ *Agins v. City of Tuburon*, 447 U.S. 255 (1980); *Penn Central Trans. Co. v. City of New York*, 438 U.S. 104 (1978).

²⁰⁵ *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992). In this case, the landowner was prohibited from using any part of his beachfront property for the construction of any structure and this was held to constitute a regulatory taking because of the extreme deprivation of the uses to which the property could be put.

land use regulation denies a landowner all economically viable uses of the property if the regulation renders the property valueless.²⁰⁶

- In determining whether a governmental regulation unreasonably interferes with an owner's right to use and enjoy his property, a court must evaluate two factors: (1) the economic impact of the regulation (i.e., comparing the value that has been taken from the property with the value that remains), and (2) the extent to which the regulation interferes with "distinct investment backed expectations" of the landowner.²⁰⁷ A regulation that interferes with existing or already-permitted land uses is more likely to be considered a regulatory taking than a regulation which interferes with speculative uses or the landowner's asserted entitlement to the highest and most valuable use of every piece of his property.
- In the case of governmental exactions, the required dedication for public use or of public facilities must be roughly proportional to the actual need for those public facilities which is generated by the proposed development.²⁰⁸ For example, the amount of roadway required to be dedicated by the developer must be reasonably commensurate to the amount of traffic generated by the new development.

10.16.2. The Texas Real Property Rights Preservation Act

In response to widespread concerns about governmental intrusions on private real property rights in the mid-1990's (sometimes referred to as the "Take Back Texas" movement), the Legislature enacted the Texas Real Property Rights Preservation Act which is codified in Chapter 2007 of the Texas Government Code. The overriding purpose of the Act was to ensure that governmental entities in Texas take a "hard look" at the effects on private real property rights of the regulations they adopt.

10.16.2.1. Lawsuit to Invalidate a Governmental Taking.

The Act allows landowners whose property is significantly impaired by governmental regulations to sue the governmental entity to invalidate the regulation.²⁰⁹ As an alternative to invalidation of the governmental action, the governmental entity may elect to pay the landowner compensation for the loss in value of the property interest.²¹⁰ The Act is generally applicable to any governmental action (e.g., adoption of an ordinance, regulatory requirement or policy, or a governmental exaction) that restricts or limits the landowner's rights in the real property and that causes a reduction of 25% or more in the market value of the property. Any lawsuit by an affected real property owner against the governmental entity must be filed within 180 days after the owner knew or should have known of the governmental action.²¹¹ The prevailing party in the lawsuit against the governmental entity

²⁰⁶ *Mayhew v. Town of Sunnyvale*, 964 S.W.2d 922, 935 (Tex. 1998).

²⁰⁷ *Mayhew v. Town of Sunnyvale*, 964 S.W.2d 922, 936 (Tex. 1998).

²⁰⁸ *Dolan v. City of Tigard*, 512 U.S. 374 (1994).

²⁰⁹ §§ 2007.021 - 2007.023 Tx. Gov't Code.

²¹⁰ § 2007.024 Tx. Gov't Code.

²¹¹ § 2007.021(b) Tx. Gov't Code.

is entitled to recover reasonable and necessary attorneys fees and court costs from the losing party.²¹²

10.16.2.2. Governmental Actions Exempted From the Act.

The Act does not apply to an annexation of land by a city nor to a city's regulation of its ETJ if the same regulation applies to all other areas within the city. Other governmental actions exempted from coverage under the Act include (1) actions reasonably taken to fulfill an obligation mandated by federal or state law; (2) regulation of public or private nuisances; (3) governmental actions necessary to prevent a grave and immediate threat to life or property; (4) exercise of the power of eminent domain; (5) regulation of construction in a floodplain; (6) regulation of onsite sewage facilities; (7) regulations to prevent waste of groundwater or to protect groundwater rights holders; (8) actions taken in response to a real and substantial threat to public health and safety; and (9) actions designed to significantly advance public health and safety.

10.16.2.3. Requirement to Prepare Takings Impact Assessment

In addition to the risk of a lawsuit to invalidate a taking by a governmental entity, all governmental entities in Texas are required to prepare an evaluation (called a "takings impact assessment") of any proposed regulation that may impair private real property interests and to provide public notice of the takings impact assessment.²¹³ If a governmental entity fails to prepare a required takings impact assessment, an affected real property owner may bring suit to invalidate the governmental action and recover attorneys fees and court costs.²¹⁴

10.16.3. Conclusion: Reasonable Water Quality Protection Measures Do Not Constitute a Regulatory Taking

It appears that reasonable water quality protection measures, such as impervious cover limits and setback requirements from critical environmental features, are not of such an extreme character as would constitute a regulatory taking so long as they do not deprive a landowner of all economically viable uses of his/her property nor impair his/her distinct investment-backed expectations. First, the goal of protecting water quality would clearly appear to qualify as a legitimate state interest since prior U.S. Supreme Court rulings have held that governmental regulations addressing the "ill effects of urbanization" and the preservation of desirable aesthetic features are legitimate state interests.²¹⁵ It has also been expressly held by the Supreme Court that governmental restrictions on the use of only limited portions of a parcel of land such as setback ordinances are not considered regulatory takings.²¹⁶

²¹² § 2007.026 Tx. Gov't Code.

²¹³ §§ 2007.041 - 2007.045 Tx. Gov't Code.

²¹⁴ § 2007.044 Tx. Gov't Code.

²¹⁵ See Footnote 4.

²¹⁶ *Gorieb v. Fox*, 274 U.S. 603 (1927).

Moreover, in the latest U.S. Supreme Court case on regulatory takings, the Court was faced with the question of whether a temporary moratorium on all development around Lake Tahoe constituted a regulatory taking *per se*. The Supreme Court held that such a moratorium did not constitute a *per se* taking and that various factors must be analyzed to determine whether a moratorium constitutes a taking. In so ruling, the Court referred to a set of Lake Tahoe water quality protection ordinances enacted in 1972 which restricted impervious cover and established setback limits. These measures preceded the establishment of the development moratorium at issue in the case. Since the moratorium was held not to be a *per se* regulatory taking, **it is very doubtful that traditional water quality protection measures such as impervious cover limits and set back requirements would be considered a regulatory taking if crafted to accomplish the purpose of water quality protection while still allowing the landowner to reasonably use and enjoy his property.**

This conclusion is consistent with the guidelines adopted by the Texas Attorney General's Office. The Attorney General publishes these guidelines to help local governmental entities meet their responsibilities under the Texas Private Real Property Rights Preservation Act. The Attorney General's guidelines provide as follows:

“Accordingly, government may abate public nuisances, terminate illegal activity, and establish building codes, safety standards, or sanitary requirements generally without creating a compensatory ‘taking.’ Government may also limit the use of real property through land use planning, zoning ordinances, setback requirements, and environmental regulations.”²¹⁷

These guidelines further indicate that traditional water quality protection measures may qualify for the exemption from the Texas Private Real Property Rights Preservation Act as regulatory actions which protect public health and safety.²¹⁸ Based on the concepts outlined above, the imposition of reasonable water quality protection measures is consistent with Stakeholder Guiding Principals Nos. 2 and 3.

10.16.4. Limitations

While this analysis does represent a general presentation of the status of current law, it is not intended to provide specific legal advice for any particular jurisdiction or entity. In particular, it is important to recognize that whether a water quality protection measure is a regulatory taking depends on how the measure is applied to and impacts a particular tract of land. For example, a landowner who is essentially prevented from developing his/her land would more likely have a valid regulatory takings claim than a landowner who could still make some substantial use of his/her property. In those cases where it is necessary to avoid a regulatory taking, the local governmental entity should consider the approval of a transferable development right or other form of variance. It is the responsibility of each jurisdiction within the planning region to obtain

²¹⁷ See § 1.32 of the Attorney General's Private Real Property Rights Preservation Act Guidelines.

²¹⁸ See § 1.33 of the Attorney General's Private Real Property Rights Preservation Act Guidelines.

specific legal advice on proposed actions and to conduct a thorough takings impact assessment prior to adopting regulatory measures and/or rules as prescribed by Texas state law.

10.17. Obligation of Development to Avoid Offsite Impacts

While the imposition of reasonable water quality protection measures does not generally constitute a public regulatory taking of private property, it is also the obligation of development to prevent or mitigate offsite impacts resulting from that development, to prevent a private taking of public or other private property. This concept is also consistent with Stakeholder Guiding Principals Nos. 2 and 3.

10.18. Model Ordinances

As outlined in the preceding sections, the implementation of the Plan will require that each jurisdiction adopt new or amend existing ordinances and rules. To aid in implementation, model ordinances have been developed. One set of model ordinances has been developed for a municipality, with another set developed for counties. Copies of these model ordinances have been included in Appendix N.

11. IMPLICATIONS

There are many implications of the implementation of the water quality protection measures presented in this Plan. These include social, political, economic and environmental impacts. While it is not possible to provide a detailed quantitative evaluation of each potential impact, the following sections attempt to address the major issues from a qualitative perspective, supplemented with quantitative information where available.

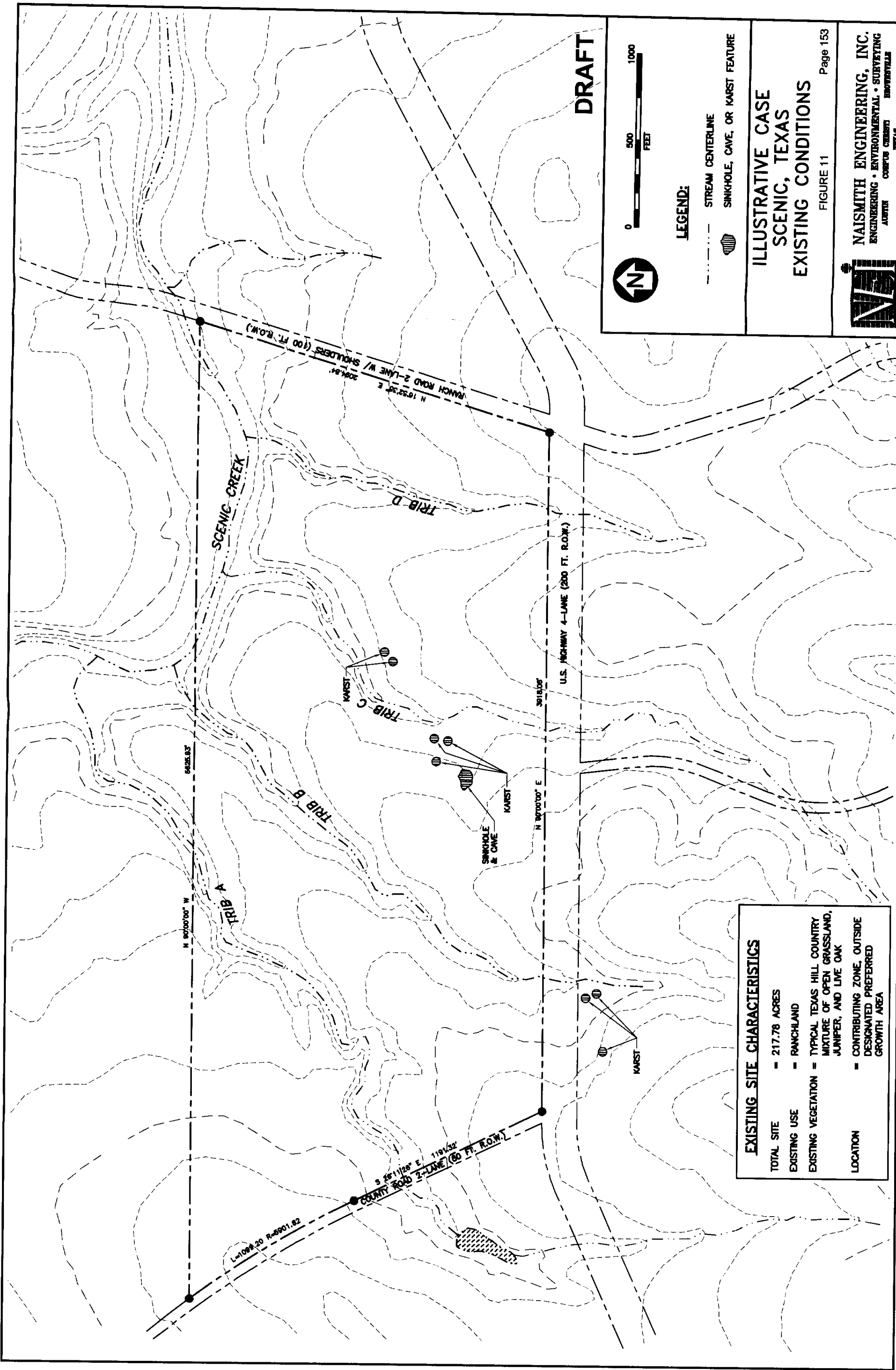
11.1. Illustrative Cases

To help better understand how the measures recommended in the plan would be applied to realistic development scenarios, some illustrative cases have been developed. The Project Executive Director selected these cases, without input from the consulting team, to represent some hypothetical tracts located within the Planning Region. The consulting team then developed a possible development scenario for each case, applying the measures recommended in the Plan to the case. While only hypothetical, these cases are intended to illustrate how the Plan measures would be applied to realistic pieces of property. A discussion of each case is provided below. Detailed information for this case is included in Appendix O.

11.1.1. Illustrative Case No. 1 – “Scenic, Texas”

Illustrative Case No. 1, entitled Scenic Texas, is intended to represent a typical rural tract in the contributing zone. The tract encompasses approximately 218 acres, is traversed by several streams, bounded by several roadways, and hosts several karst features. The primary development objectives for the site were mixed commercial residential, to comply with the Plan measures. Potable water would be furnished from surface water supplies, and the domestic wastewater would be managed in a centralized collection and treatment system with surface irrigation of the treated effluent. Figure 11, on the following page, presents the pre-development site plan for this case. Figure 12 presents the post-development site plan for this case.

As observed from Figure 12, this development plan results in approximately 82 residential lots, with approximately nineteen (19) acres of area set aside for multi-family residential and approximately eleven (11) acres of commercial development. Using the development intensities for each land use (reported in Appendix O), and allowing for roadways and other infrastructure, the overall impervious cover for this proposed development plan is just over thirteen percent (13%), comfortably below the fifteen percent (15%) required by the Plan for the contributing zone. An evaluation comparing the economics of developing this tract versus various existing water quality protection measures is presented in Section 11.2.2.4, below.



DRAFT



LEGEND:

- STREAM CENTERLINE
- ☐ SINKHOLE, CAVE, OR KARST FEATURE

**ILLUSTRATIVE CASE
SCENIC, TEXAS
EXISTING CONDITIONS**

FIGURE 11 Page 153



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AUSTIN CORPUS CHRISTI DALLAS HOUSTON

EXISTING SITE CHARACTERISTICS	
TOTAL SITE	= 217.78 ACRES
EXISTING USE	= RANCHLAND
EXISTING VEGETATION	= TYPICAL TEXAS HILL COUNTRY MIXTURE OF OPEN GRASSLAND, JUNIFER, AND LIVE OAK
LOCATION	= CONTRIBUTING ZONE, OUTSIDE DESIGNATED PREFERRED GROWTH AREA

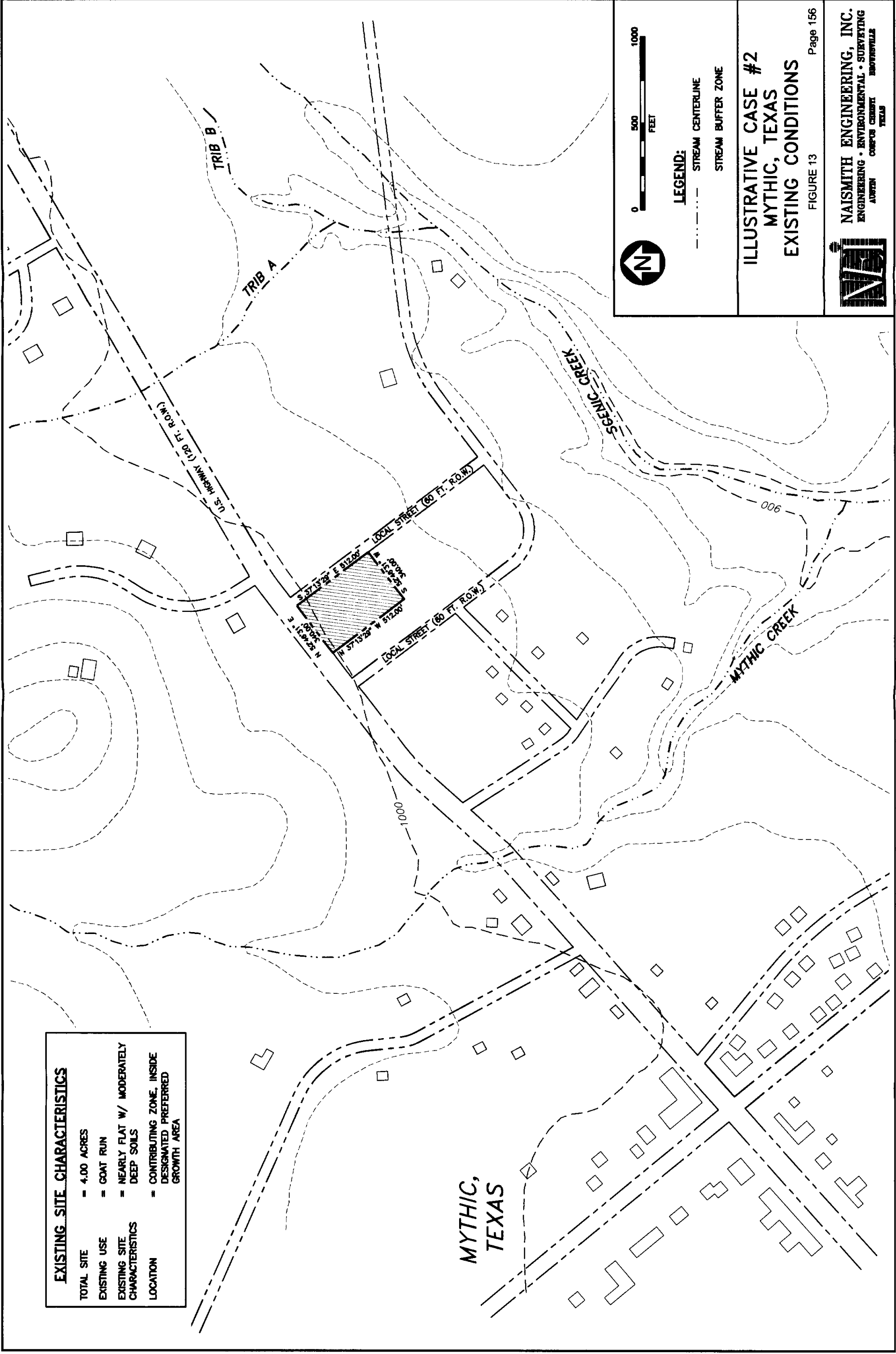
11.1.2. Illustrative Case No. 2 – “Mythic, Texas”

Illustrative Case No. 2, entitled Mythic, Texas, is intended to represent a suburban tract in the contributing zone. The tract encompasses approximately four (4) acres and is bordered on two (2) sides by typical municipal streets, with no streams or karst features on or near the site. The development objective for this site is commercial, with maximized building and service areas. Potable water would be furnished from surface water supplies, and the domestic wastewater would be managed through either a publicly owned treatment works (centralized collection and treatment system) or through an On-Site Sewage Facility (OSSF). Figure 13, on the following page, presents the pre-development site plan for this case. Figure 14 presents the post-development site plan for this case.

As observed from Figure 14, this development plan results in approximately three (3) acres of useable impervious cover, after allowing one (1) acre for irrigation of storm water. With the entire three (3) acres covered with impervious surfaces, the impervious cover would be approximately seventy five percent (75%). Based on the measures required by the Plan, this would require the use of rainwater harvesting as an on-site structural BMP, with the impervious cover exceeding the plan limits to be offset through the acquisition of TDRs. The water from the rainwater harvesting would be utilized for non-potable uses such as landscape irrigation, equipment wash water and flushing toilets and sanitary facilities, requiring a separate delivery system from the potable water used for drinking and hand washing. An evaluation comparing the economics of developing this tract versus various existing water quality protection measures is presented in Section 11.2.2.4, below.

EXISTING SITE CHARACTERISTICS

- TOTAL SITE = 4.00 ACRES
- EXISTING USE = COAT RUN
- EXISTING SITE CHARACTERISTICS = NEARLY FLAT W/ MODERATELY DEEP SOILS
- LOCATION = CONTRIBUTING ZONE, INSIDE DESIGNATED PREFERRED GROWTH AREA

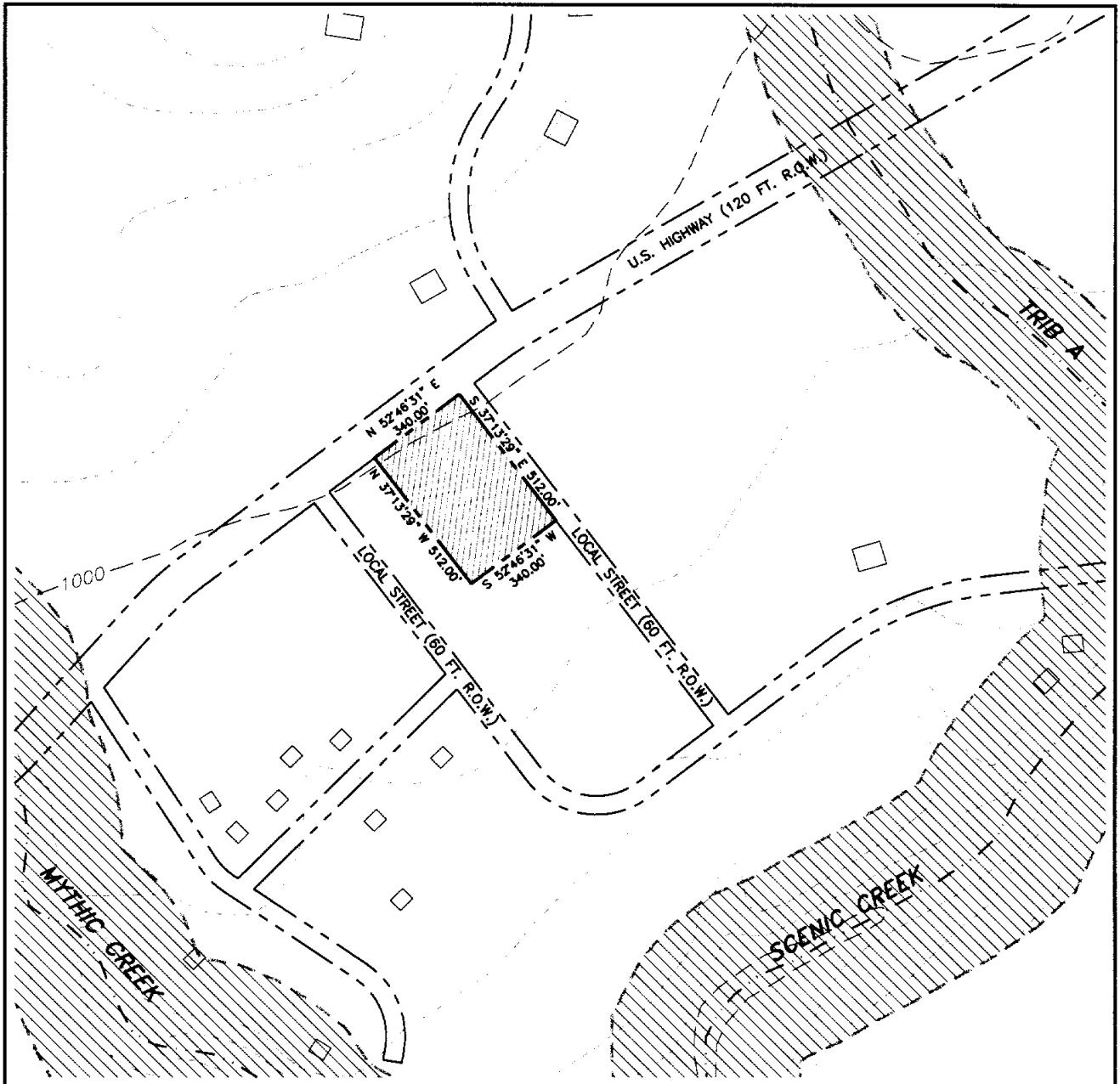


**ILLUSTRATIVE CASE #2
MYTHIC, TEXAS
EXISTING CONDITIONS**

FIGURE 13



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AUSTIN CORPUS CHRISTI HOUSTONVILLE TEXAS



LAND USE - PROPOSED

Designated Use	Area (ac.)	Comments
Commercial	3.0	1 lot
Roadways	-	
Stream Buffers	-	
CEF Set Backs	-	
Steep Slopes	-	
BMP Area/Greenspace	1.00	
TOTAL	4.00	

IMPERVIOUS COVER CALCULATIONS

LAND USE		
Commercial*	1.80	
Roadways	0.00	
Total Impervious Cover	1.80	
% IMPERVIOUS COVER	60.00	Gross Site Area

* - Assume rainwater harvesting for a 1.0 acre roof area.



LEGEND:

- STREAM CENTERLINE
- STREAM BUFFER ZONE

**ILLUSTRATIVE CASE #2
MYTHIC, TEXAS
PROPOSED CONDITIONS**

FIGURE 14

Page 157



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AUSTIN CORPUS CHRISTI BROWNSVILLE
TEXAS

11.2. Economic Impacts

There are numerous potential economic impacts associated with the water quality protection measures included in the Plan. Some of them will require fundamental changes in the way certain activities are conducted, resulting in additional costs. Others will require new expenditures for which no source currently exists. Still others will impose limits on activities that some perceive to be a restriction of rights. However, the economic impacts of the water quality protection measures must be gauged against the value of the resources they are designed to protect.

11.2.1. The “No Action” Alternative

The potential adverse economic impacts of the “No Action” alternative are tremendous. As recognized in Stakeholder Guiding Principal No. 1, this “no action” alternative is unacceptable. The threats to water quality and environmental resources in the Planning Region have already been established. In addition, the value of the unique, “one of a kind” resources to both public and private interests is also unquestioned. The groundwater and surface water resources within the Planning Region are irreplaceable. Should these resources be damaged, impaired or destroyed, the economic damages would be incalculable.

In reviewing the scientific literature, there is only a small amount of information available on the costs of natural resource restoration once damage has occurred. The U.S. Department of Interior has established procedures for calculating the cost of restoring damage to natural resources.²¹⁹ While the specific costs are based on the details of the situation, the old adage, “An ounce of prevention is worth a pound of cure” is certainly applicable. In almost every case, the least costly damage restoration is many times more expensive than the most costly protection measures to prevent the water quality damage in the first place. In addition to the fiduciary responsibility of government to protect public assets such as water quality, the economic principles involved should provide incentive for private interests to participate in water quality protection measures.

11.2.2. Economic Impacts of the Proposed Water Quality Protection Measures

The economic impacts of the proposed water quality protection measures will vary significantly depending on their location and the nature of the activities requiring the incorporation of protective measures. Another factor affecting the economic impact is identifying the true basis for assessing the incremental cost of the new proposal, and particularly comparing them to current water quality protection measures, if any, that may already be in effect.

No specific studies assessing the impacts of the proposed measures, beyond the evaluation presented here, have been performed. In addition, there is very little scientific data available assessing the economic impact on land values of the types of water quality protection measures proposed. However, some basic correlations between the comparative costs of the proposed

²¹⁹ These regulations are codified in 43 CFR §11, “Natural Resource Damage Assessments”

water quality protection measures versus existing water quality protection measures can be assessed. The following discussion focuses on several key areas of potential economic impact.

11.2.2.1.Land Value/Costs

It is difficult to assess the direct impact of the proposed water quality protection measures on land values and/or costs in the Planning Region. This is particularly true of the concept of value. Land in the Planning Region not only derives its value from development potential, but also for recreational potential and its inherent aesthetic attributes. In accordance with the Stakeholder Guiding Principles, it is important to protect these recreational and aesthetic values from losses resulting from the degradation of water quality.

Based on information obtained from the stakeholders in the process, land values/costs in the Planning Region run from approximately \$5,000 to \$20,000 per acre. Given an idealized “typical residential lot”, before and after the implementation of the proposed measures, a basic correlation between the cost of undeveloped land and the final cost of the typical residential lots developed from that land can be established. For illustration purposes, it will be assumed that current residential development is represented by approximately twenty percent (20%) impervious cover. This corresponds to 8,712 square feet of impervious cover per acre.²²⁰ Using an approximation of 4,350 square feet (one-tenth of one acre) of impervious cover per homesite, this corresponds to 2 homesites (or lots) per acre. Correspondingly, at fifteen percent (15%) and ten percent (10%) impervious cover, this corresponds to 1.5 and 1 unit (or lot) per acre, respectively. By dividing the land cost by the number of units (lots), the land cost component of the typical residential lot can be determined. Table 16, below illustrates the correlation for the noted impervious cover percentages to varying land costs.

Table 16 – Correlation Between Percentage of Impervious Cover and Land Cost Component of A Typical Residential Lot

Land (\$/Ac)	30% IC		20% IC		15% IC		10% IC	
	Units (Lots/Ac)	Land Cost Component (\$/Unit)	Units (Lots/Ac)	Land Cost Component (\$/Unit)	Units (Lots/Ac)	Land Cost Component (\$/Unit)	Units (Lots/Ac)	Land Cost Component (\$/Unit)
\$5,000	3	\$1,667	2	\$2,500	1.5	\$3,333	1	\$5,000
\$10,000	3	\$3,333	2	\$5,000	1.5	\$6,667	1	\$10,000
\$15,000	3	\$5,000	2	\$7,500	1.5	\$10,000	1	\$15,000
\$20,000	3	\$6,667	2	\$10,000	1.5	\$13,333	1	\$20,000

While the land cost component of the salable tracts varies significantly based on the land value, this analysis indicates a clear correlation between the land cost component associated with the magnitude of impervious cover allowed under varying water quality protection measures.

²²⁰ One acre is equivalent to 43,560 square feet. Reference: Table Ia, “Engineering Surveys: Elementary and Applied”, H. Rubey, et al, MacMillen Company, New York, New York, 1950.

11.2.2.2. Costs of Structural BMPs

The EPA has conducted a number of studies attempting to assess the costs of structural BMPs. However, due to the number of different types and the variability of BMPs from region to region, and from site to site, their studies concluded that there was insufficient data to develop estimates of costs in sufficient detail to compare to corresponding benefits.²²¹ However, these studies do provide some examples of the costs for specific BMPs. As presented below, there are two elements to the cost of structural BMPs: 1) initial construction, and 2) long-term operations and maintenance.

Initial capital costs for BMPs vary significantly depending on the type and the value of the underlying land. The specific costs can depend on the nature of the incoming surface water, the specific BMP technology selected, and design/performance requirements. Unit costs quoted in one EPA study ranged from \$0.50 to \$5.00 per cubic foot of capacity, or from \$10,000 to \$125,000 per installation, standardized to five (5) acres of development, for many types of BMPs.²²² This translates to an approximate installation cost of between \$2,000 and \$25,000 per acre. While this nationwide study provided some regional adjustments, there was only a small amount of data from the local area for the types of structural BMPs considered in the Plan.

Structural BMP cost installation data for approximately forty (40) actual installations in the local area was obtained from the City of Austin. The information supplied with the cost data also included the actual amount of impervious cover served by the structural BMPs. Using the impervious cover data, the costs for these installations were standardized using the unit area (acres) of impervious cover served by the structural BMP. For comparison purposes, the Plan was considered to require retention irrigation. Since the TCEQ Edwards Aquifer Program guidance provides a design standard of seventy percent (70%) reduction of TSS loadings, sand filtration BMPs are frequently used. These two types of BMPs (sand filtration and retention/irrigation) were used to perform the evaluation. The installation costs for these BMPs were \$9,100 per acre of impervious cover (\$/Ac-IC) and \$19,500/Ac-IC, respectively. Using the typical residential lot from the land cost component analysis presented above, this would correspond to capital cost allocations of \$910 per lot for sand filtration and \$1,950 per lot for retention irrigation.

Operations and maintenance (O&M) costs for structural BMPs can be a significant burden to the entity or organization charged with carrying out these tasks. Regular maintenance of the structural BMPs is critical to ensuring that water quality within the planning region is being maintained or enhanced. Most structural BMPs will require routine maintenance to keep them functional and to maintain the pollutant removal level capabilities of the BMP. Structural BMPs that will require routine maintenance include retention/irrigation systems, sedimentation/filtration ponds, bio-retention/bio-filtration systems, detention/sedimentation systems, and vegetative filter strips.

²²¹ "Preliminary Data Summary of Urban Storm Water Best Management Practices", Publication No. 821-R-99-012, U.S. Environmental Protection Agency, August, 1999.

²²² Ibid. Table 6.1 and 6.2.

O&M costs for structural BMPs can be found for communities throughout the country. Due to the variable nature of personnel costs, local cost information is most useful in determining the actual O&M costs that will be incurred by the communities. Recent City of Austin data indicates that the average, annual maintenance cost for their water quality ponds was approximately \$3,500 per pond, not including the initial acquisition of maintenance equipment (backhoes, trucks, etc...). Local information for on-going maintenance of bio-retention/bio-filtration systems and vegetative filter strips has not been obtained. On-going operational costs for BMPs such as a retention/irrigation system, where power costs for pumps and more-intensive maintenance of the pumps and sprinkler system may be required, will tend to increase the annual per pond cost for such systems.

Based on the City of Austin data discussed above, the annual costs for O&M on sand filtration and retention/irrigation systems was \$11,000/Ac-IC and \$22,000/Ac-IC, respectively. Using the typical residential lot from the land cost component analysis presented above, this would correspond to O&M cost allocations of \$1,100 per lot and \$2,200 per lot, respectively.

11.2.2.3. Costs of Non-Structural BMPs

As stated previously non-structural BMPs encompass a variety of different institutional and pollution-prevention type practices designed to prevent pollution from entering storm water runoff or reduce the volume of storm water requiring management. Non-structural BMPs include, but are not limited to the following: natural area and open space conservation; conservation easements; stream buffer zones; CEF offsets; land-use restrictions; low-impact development (LID); public education and outreach; restrictions on use, storage, and disposal of potentially harmful materials.

Due to the varied nature of non-structural BMPs, the determination of on-going O&M costs is difficult. However, annual costs will be incurred for on-going program management for personnel costs, material costs, and possibly equipment costs for maintenance of natural areas and conservations easements. The costs associated with these on-going activities can fluctuate dramatically from community to community due to the variable level of implementation between communities.

11.2.2.4. Summary of Estimated Incremental Initial Costs

Any illustration of the potential cost impacts of the proposed water quality protection measures must be based on some scenario. The outcome of the illustration will depend significantly on the starting point. For example, a comparison of the Plan's measures to a proposed development with no limit on intensity and no water quality protection measures would of course show a very significant corresponding increase in costs. However, in most locations in the Planning Region, this is not a relevant comparison. In many locations, the terrain and physical features of the property will dictate maximum development intensities. As presented previously, analysis of developments occurring prior to the requirement for significant water quality protection measures generally ranges from twenty to twenty five

percent (20-25%) impervious cover. In addition, significant areas of the Planning Region are subject to existing water quality protection measures. For example, areas in the Planning Region under the jurisdiction of the City of Austin are subjected to the SOS ordinance or other similar land development codes that incorporate significant water quality protection measures. In addition, from a practical standpoint, most substantial developments occurring in Hays County and in western Travis County outside of the City of Austin's jurisdiction, will likely require the use of surface water to be furnished by the LCRA. Under this scenario, the developments requiring surface water would be subjected to the water quality protection measures incorporated into the MOU between the LCRA and the USFWS. Even developments within the Planning Region which did not require surface water would still be required to comply with the TCEQ's Edwards Aquifer Protection Program. Beyond these scenarios, developments which relied solely on groundwater and OSSFs would be subjected to minimum lot sizes under existing rules for most local jurisdictions in the Planning Region. For illustration purposes, the incremental initial costs (land cost, structural BMP installation, and TDRs) for the Plan measures for the Recharge Zone (10% impervious cover) and the Contributing Zone (15% impervious cover) have been compared to the following existing water quality ordinances:

- The current City of Austin SOS WQO for the Barton Springs Zone
- The current Village of Bee Cave WQQ
- The current City of Buda WQO
- The current (April 2005) City of Drippings Springs WQO for inside city limits (ICL) and outside city limits (ETJ)
- The previous City of Dripping Springs WQO
- The cooperative optional measures included in the TCEQ's Edwards Aquifer Protection Program for avoiding take of the Barton Springs salamander, as approved by the USFWS, based on twenty percent (20%) impervious cover
- The TCEQ's Edwards Aquifer Protection Program, with base development intensity at twenty percent (20%)
- The TCEQ's Edwards Aquifer Protection Program, with lot size restricted by current county (Hays and Travis) OSSF ordinances.
- The USFWS measures in the MOU with the LCRA

For generalized comparison purposes, an idealized tract of three hundred (300) acres, with approximate proportions of three to five (3:5) was used. On this tract were super-imposed the stream buffers represented by the various water quality scenarios. Based on the City of Austin's Geographic Information System (GIS) evaluation, the approximately eighteen to nineteen percent (18%-19%) of the Planning Region is occupied by stream buffers, as defined in the Plan and in the TCEQ Optional Measures and the USFWS measures. Correspondingly, for the areas within the jurisdiction of the City of Austin SOS WQO, approximately thirty two percent (32%) of the total area is occupied by stream buffers, as defined under the SOS WQO. Utilizing these standard ratios of buffer zone areas, along with a reduction for wastewater irrigation areas as required by the City of Austin SOS areas, a comparative cost evaluation was performed. The results of the comparative incremental costs for these scenarios are presented in Figure 15, on the following page. As can be

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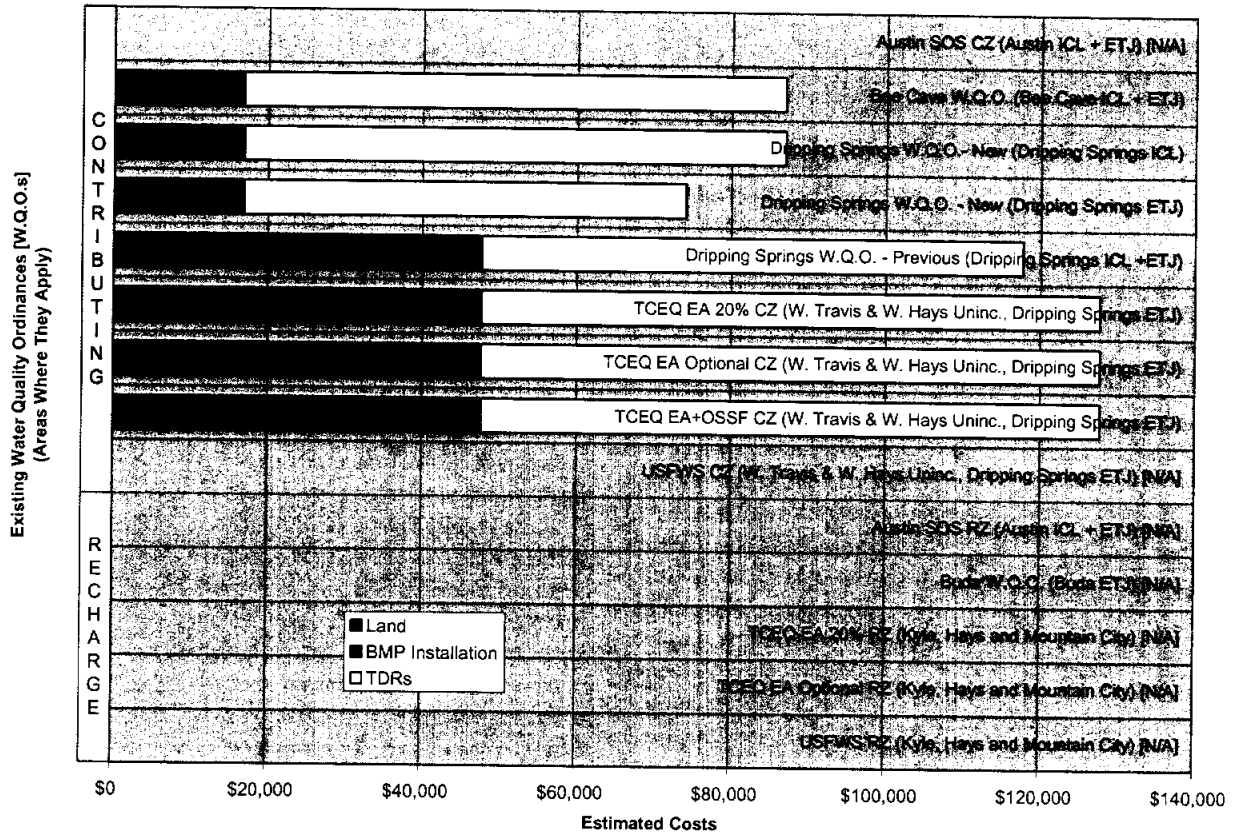


Figure 17 –Estimated Incremental Costs of the Plan Measures Compared to Existing Water Quality Protection Measures for the Total Project for Illustrative Case No. 2

11.2.2.5. Impact of Incremental Costs on Total Costs – Typical Case

As with the illustration of the potential incremental costs, the illustration of the impact of these incremental costs on the total cost must also be based on some scenarios. In general, the higher the existing cost of a typical residential lot, the lower the impact of the incremental cost on the total cost. Conversely, the lower the existing cost of a typical residential lot, the more pronounced the impact of the incremental costs on the total cost. Data from 2004 un-built residential lot sales figures were obtained from the Austin Association of Realtors²²³ for various areas across the Planning Region. The incremental costs developed for the various scenarios above, were combined with the published sales data. The results of the evaluation of these scenarios are presented in Figure 18, on the following page. For this evaluation only positive (and no negative) results were utilized,

²²³ Information compiled from a printout of the Austin Association of Realtors Multiple Listing Service (MLS) for completed sales of lots with no habitable structures, for the period ended December, 2004. Median costs were used.

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based on the rationale that the adoption of the Plan would not likely lead to a reduction in development costs in most instances.

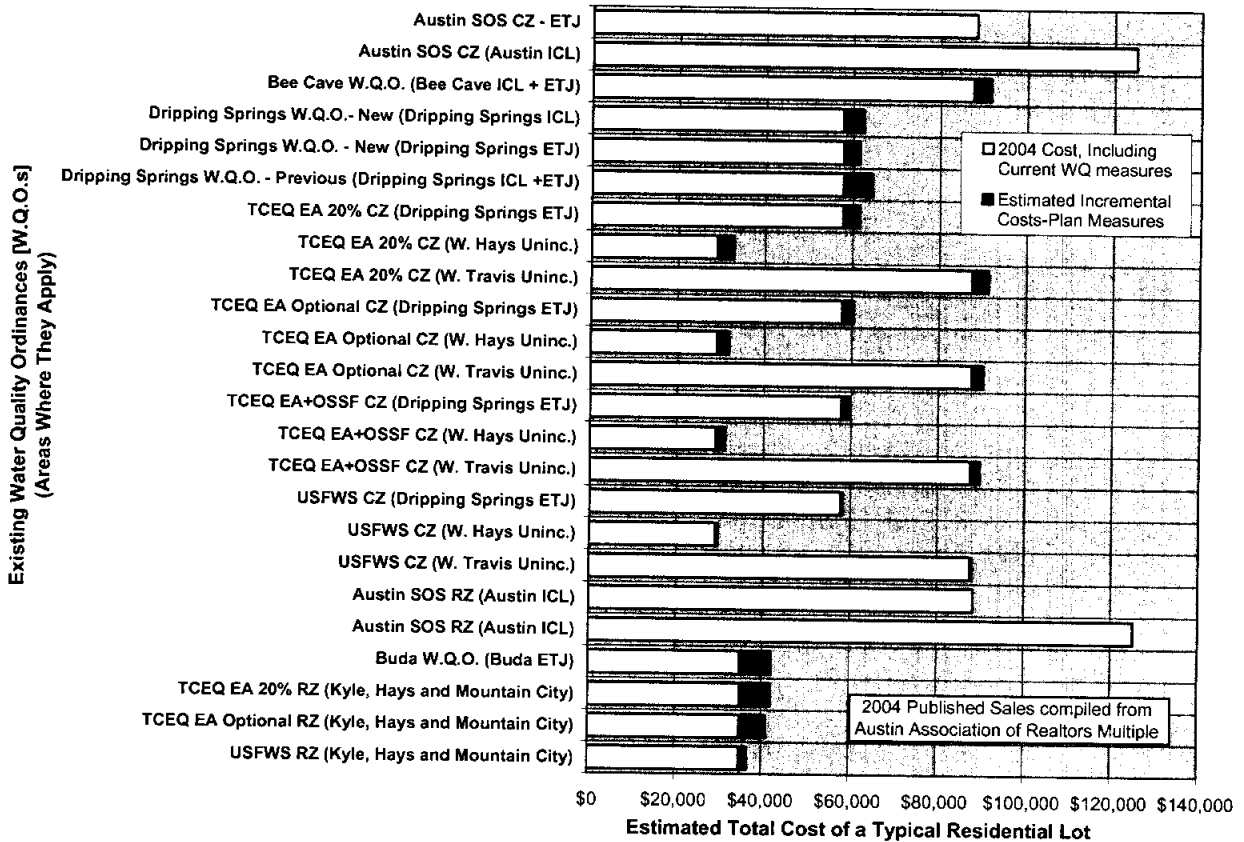


Figure 18 –Estimated Impact of Incremental Costs of the Plan Measures on the Total Cost for a Typical Residential Lot for Various Locations in the Planning Region

As can be observed in Figure 18, the impact of the incremental costs on the total cost for a typical residential lot varies based on location and the current sales price, which takes into consideration the impacts of current water quality protection measures. The incremental costs range from nothing to approximately \$7,200 per lot, with the impacts on the total cost ranging from nothing to approximately twenty percent (20%).

As noted above, these comparisons are for illustrative purposes only, and are based on the scenarios outlined along with implementing the proposed water quality protection measures. While the analysis presented focused on residential development, the general influences on the costs of commercial tracts should follow the same general trends. In addition, this analysis addresses only “cost” and does not address “value”. The analysis also does not address the “costs” of water quality impacts associated with unregulated development

activities or attempt to relate these costs to the benefits of preserving water quality. As previously stated, the value of the resources at stake is incalculable.

11.2.3. Relationships Between Water Quality Protection Measures and Land Values

A significant economic issue raised by the SHC was the relationships between water quality protection measures and land values. While little hard data was available for land “values”, there was limited data available on land “costs”. Anecdotally, many stakeholders suggested that there was significant value attached to land that was located adjacent to natural areas and preserves. Conversely, many stakeholders suggested that there was a significantly decreased value for land located adjacent to areas where the water quality had been adversely impacted (e.g. a polluted creek). While “costs” are often straightforward to quantify and assess, “value” is much more difficult to quantify. In the truest sense, the value of instituting water quality protection measures is determined in the court of public opinion. The relationship between water quality protection measures and public policy is discussed in more detail below. However, the value of these measures will be assessed based on whether or not public and private entities are willing to bear the costs required to protect the resources in the Planning Region.

11.3. Funding

One of the critical areas identified by the Stakeholder Committee as well as the political subdivisions is identifying sources of revenue to provide for the initial capital improvements as well as ongoing operations and maintenance. There have been diverse viewpoints expressed in terms of both policy and implementation with some favoring that new development should bear the burden of both capital improvements and ongoing operations costs for the development while others feel that once capital improvements or buffer zones are dedicated to the local political subdivision, ongoing operational costs should be borne by local government. A related issue is how to incorporate water quality protection measures in existing developments that were not required to meet current standards. In all of these discussions one common factor is to identify an ongoing source of revenue that can be used to finance long term operations and maintenance.

11.3.1. Initial Construction and Start-up

Determining who is responsible for initial construction and the operations and maintenance of water quality protection measures is a critical issue. There has been little disagreement that the developer is responsible for installing the water quality protection measures for both commercial and residential development. In general, most of the water quality ordinances that are currently in effect require that commercial development be responsible for O&M of BMPs on their property as well as additional capital improvements if they are necessary. In some cases the property owner is required to obtain an annual certification from a professional engineer that the water quality measures meet specifications and are functioning properly. Residential development is usually treated differently with either a homeowners association or political subdivision responsible for the O&M. It has been suggested by some members of the stakeholder committee that the developer should bear the responsibility for O&M for the development.

However, this approach has some very practical limitations. With commercial development there is a property owner that is subject to financial liability for non-compliance and the political subdivision has recourse to put a lien on the property if there is a bankruptcy or a refusal to make necessary repairs. A residential subdivision is very different in that once the development is sold out the developer would only own the water quality BMPs and if the developer were to go bankrupt the political subdivision would not be able to collect if an enforcement action were to take place. Another consideration is that many of the BMPs that are being recommended are non-structural in nature and would represent green space which could be used for public purposes. If the property were still in private hands the public could be excluded from access and use of the property. If O&M were to be handled by a homeowners association the only method of collecting revenue is to assess fees through the homeowners association. Previous experience has shown that collecting these fees can sometimes be problematic and there is still limited recourse if there is an enforcement issue.

Local political subdivisions have two methods of raising funds for capital improvements. The first is to issue bonds, which are supported from taxes, utility revenues, or a combination pledge of taxes and revenues. The second is to develop a capital improvement reserve fund, which is capitalized over time using O&M taxes, utility revenues, or a combination pledge. If a bond issue is supported by a tax pledge the issue must be approved by the voters. If certificates of obligation are used a vote is not necessary, but the tax measures can be subject to a public referendum if certain requirements are met. Taxes must be levied on all property in the jurisdiction. There are two exceptions to this rule. The first is if a public improvement district is formed then taxes can be levied within the district to support certain improvements that benefit that district. The second is for Municipal Utility Districts that are larger than 2,000 acres. In those districts a "defined area" can be identified and a separate bond issue can be voted to construct improvements that benefit the defined area. The taxes that are levied to support the bond issue are then levied within the defined area along with any other taxes levied by the MUD. The following is a brief discussion on financing options available for water quality capital improvements as well as O&M.

11.3.1.1. Municipalities

Municipalities can issue bonds for capital improvements which can include structural and non-structural BMPs and land acquisition. The pledge for these bonds can be either a tax pledge or a revenue pledge of surplus revenues of the utility system. If taxes are pledged the municipality would levy a debt service tax sufficient to cover annual debt service on all properties within the boundaries of the municipality. If revenues are used to cover the debt service the rates that are charged must be sufficient to make debt service payments along with a reserve fund capitalized over the first five years of the bond issue to protect bondholders. Using a revenue pledge has been used by municipalities over 100,000 to implement the federal stormwater permit requirements since voters have turned down the establishment of a separate stormwater utility where it was proposed. If a city were to make water quality capital improvements in their ETJ those improvements would have to be supported by taxes only from residents within the boundary of a municipality unless a Public Improvement District were formed and then they could be supported by debt service taxes

from the PID. If surplus utility revenues were used for debt repayment it would have to be from all revenues paid into the system. However, if the municipality did not provide utility service to the area in the ETJ the revenues would still have to be generated from their municipal utility service area.

11.3.1.2.Counties

Counties can issue bonds for capital improvements which can include water quality improvements if the BMPs are identified as part of a flood control/drainage program or for land acquisition if it is part of an open space or park plan. The county would either have to receive voter approval for the issuance of the bonds on a county wide basis or issue certificates of obligation. In all cases the bonds would be supported by a county wide tax for debt service. Since most counties do not have utility revenues to fall back on the cost of debt service would strictly be taxes, unless a PID or other special taxing entity were formed by the county to levy a specific tax on an area for specific improvements.

11.3.1.3.Municipal Utility Districts/Water Control and Improvement Districts

A MUD or WCID may include water quality capital improvements as part of their overall bond package when being started as well as subsequent bond issues if the issuance is approved by TCEQ. If it were a new district the pledge for repayment would be secured by ad valorem taxes. Future improvements once the district was established could be secured by either taxes, utility revenues or a combination pledge. If a district were to be formed in a city's ETJ the district would need to receive an approval of the city. One of the requirements of that approval from the city could be that the district must adopt the city water quality standards and require that the district operate and maintain those improvements. If the district were to be established in an unincorporated area outside of a city ETJ, the developer would have to obtain approval of the plat as well as drainage plans and streets and roads from the county. While the county could not block the establishment of a district by the TCEQ or legislature, if water quality controls were incorporated into design criteria or a contractual agreement were entered into by the county, then the district water quality capital improvements could be addressed as part of that agreement. If the district were to be a wholesale customer for water and/or wastewater service from a regional entity, such as LCRA, the water and/or wastewater supply agreement could incorporate the regional water quality plan as part of the contractual obligation.

11.3.1.4.Regional Authorities

If a regional water quality authority were formed by the legislature several issues would have to be negotiated between the authority and existing cities, counties and special districts over jurisdictional and financing issues for water quality capital improvements that would be required for new and future capital improvements required by the authority. Since a new authority would not have any utility sales or other revenues available it would have to depend on assessments from other entities within its jurisdiction or ad valorem taxes, if approved by the voters, to pay for capital improvements. As noted earlier, the LCRA has

been granted authority to regulate water quality within Travis County and has had an active water quality ordinance for the watershed draining into Lake Travis. As part of this ordinance the LCRA requires that developers obtain a water quality permit and include appropriate water quality BMPs into their developments as a permit requirement. Currently, the LCRA has not expanded its water quality regulations to include any other parts of Travis County. While the LCRA currently does not have water quality management authority in Hays County, it is supplying the surface water to the area and has the ability to require that water quality measures be implemented by its wholesale customers as part of the wholesale water contract. A second option would be to request that the legislature expand the LCRA water quality authority to the planning region in Hays County and allow the LCRA to implement water quality measures and require development to install appropriate water quality capital improvements. While the LCRA does not have taxing authority, it could require initial capital improvements be developed by developers and build into its wholesale water rate a capital component that could be made available for future capital improvements that were not covered by other political subdivisions.

11.3.2. On-going Operations and Maintenance

11.3.2.1. Municipalities

Municipalities typically have three methods of financing ongoing water quality O&M costs within their jurisdiction. The first is to levy an O&M tax, dedicate revenue from its general fund and the third is to use revenues from its utility system. While municipalities do have the ability to establish a stormwater utility that could include O&M costs for water quality O&M, these proposed utilities have proven very unpopular and the charges associated with them are sometimes referred to as a “rain tax” by opponents. If O&M taxes are used for ongoing operations and maintenance of the water quality protection measures a policy decision has to be made by the municipality if they are to provide O&M for just the municipal boundaries or include the ETJ. If the ETJ is included, only taxpayers within the municipal boundaries would have the tax levied against their property and could be subject to a roll back tax election. However, if a PID were formed O&M taxes could be assessed for the water quality protection only for the PID area to pay for ongoing O&M of those improvements within the PID. In the case of a MUD/WCID being established within the ETJ, they could levy a tax within the district or use revenues from their utility system to pay for ongoing O&M. If revenues from the utility system were to be used all users of the utility system would be contributing to the revenue stream.

11.3.2.2. Counties

Counties can only finance ongoing O&M for water quality improvements as well as road and bridge funds through the levy of an O&M tax. This tax is levied county wide and is subject to the O&M rollback provisions under the tax code. If a MUD/WCID has been established and an agreement is in place for the district to provide O&M for water quality measures the district would be have to generate funds through their O&M tax or utility revenues.

11.3.2.3. Municipal Utility Districts/Water Control and Improvement Districts

A district may provide funding for O&M through either an O&M tax or through revenues of its utility system. As previously mentioned the O&M tax is subject to rollback restrictions and in many cases the district is also restricted to a cap on an O&M tax rate. These restrictions typically can be included as part of the enabling legislation for the district or through voter approval of the creation of the district. The only way to raise this tax is to ask for voter approval. Utility revenues can also be used and in many cases are used for providing O&M for water quality protection measures.

11.3.2.4. Regional Authority

If a new regional authority were to be established and would be responsible for O&M of water quality protection measures it would need to acquire taxing authority to accomplish this objective and be subject to the rollback requirements established in the tax code. Since the authority would not have utility revenues to draw upon the only other source of funding would be from voluntary assessments from other entities. If the LCRA were to assume the role of a regional authority for water quality purposes its only source of funding for ongoing O&M would be from its water sales within the planning area as well as potential assessments to other local governments.

11.3.3. Implementation Funding for Local Jurisdictions

Another significant issue is funding for local jurisdictions to implement the water quality protection measures presented in the Plan. While there are outside sources of funding available for some aspects of implementation, other aspects will require local jurisdictions to procure funding from the local sources available to them.

There are several sources of outside funding that can be used for implementing water quality protection measures. These sources include other local, state and federal governmental resources. State and federal agencies assistance to local entities typically will fund planning, capital improvements, and land acquisition. However, the agencies will not provide funding for operations and maintenance of the projects. This assistance can be in the form of grants, loans or a combination of assistance. In most cases the applicant for the assistance must provide a matching share through either a cash contribution or in-kind contributions. The application process for assistance is based on rules and regulations developed by the agencies and generally will require a project description, estimated budget, assurances by the applicant, and before final funding is approved an environmental information document and cultural resources study must be developed. Because of the limited resources available for assistance there is usually competition for funding among eligible applicants and specific timetables for submitting applications and awarding assistance. The amount of funding available varies from year to year based on appropriations by the Congress and the Texas Legislature. An implementation funding plan has been developed, focusing on state and federal programs and includes a brief discussion on eligible applicants, description of the program, the administering agency, matching

requirements, and application procedures. A copy of this funding plan has been included in Appendix R.

Local governments can also finance water quality improvements through the issuance of bonds, budget appropriations, or through contractual agreements with public and private entities. This type of financing was previously discussed in Section 11.3.

11.4. Enforcement and Oversight

The strategy presented in this Plan will only achieve true protection of water quality if it is enforced, with proper oversight from the implementing jurisdictions. As discussed in the implementation section, coordinated and comprehensive implementation is essential to providing this water quality protection. If the local jurisdictions are not coordinated in their implementation, future development will likely occur preferentially in areas with less stringent enforcement and oversight. It is important that each and every jurisdiction involved provide consistent levels of enforcement and oversight.

11.5. Interaction of Population Growth and Protection Measures

One of the implications of the water quality protection measures is their interaction with projected population growth. A number of these measures (e.g. stream offsets and impervious cover limits) directly impact the quantity of development that can take place on a tract of land. Combined with the transferable development rights concept presented in the Plan, these measures establish a direct relationship between the amount of land remaining to be developed within the Planning Region, and the amount of development that can occur on that land. If population growth continues at or above the projected rates, the amount of land available for development will be consumed more quickly. Conversely, if the rate of development is controlled, this will in turn limit available population growth. In practice, the recommended water quality protection measures will impose certain limitations on the ultimate build-out the land in the Planning Region.

In order to assess the interaction of population growth with the implementation of the recommended water quality protection measures, the consulting team prepared an analysis of the build-out rates based on a set of established scenarios. The population projections presented in the section on Demographics, were used to estimate the number of single family residential structures, and the corresponding land area required, to accommodate these projects. This analysis has been simplified for illustration purposes and does not address relevant issues such as:

- the current real property vacancies that could be used to accommodate population growth with no additional construction
- the construction of multi-story, high occupancy residential structures that can accommodate a higher population density than low-rise single story construction with the same footprint

Given a current estimated population of approximately 122,954, the projected population for 2010 is approximately 159,393, resulting in an increase of approximately 36,439 people. Using the estimated average 2.63 persons per household, this would require the construction of approximately 13,855 single family residential dwelling units during that 10 year time frame, or 1,386 residential dwelling units per year. If each of these residential dwelling units occupies approximately 5,000

square feet of impervious cover, this represents an increase of approximately 6,930,000 square feet (or 159 acres) of impervious cover per year. Using a basin wide average impervious cover of approximately fifteen percent (15%), this represents approximately 1,060 acres of total development per year. This corresponds to an overall development density of approximately one dwelling unit for every 0.75 acres. If a basin wide average impervious cover of approximately ten percent (10%) is used, this represents approximately 1,590 acres of total development per year.

An analysis of several urbanized watersheds within the City of Austin (Waller, Shoal and East Bouldin) indicates that the approximate relationship between commercial, industrial and infrastructure land uses and residential land uses is approximately 1.4 to 1. Given this ratio, and that the other development will comply with the water quality protection measures, an approximate total land area required to support development can be correlated to the projected population growth. Table 17, below presents the anticipated number of dwelling units and corresponding acres of development necessary to support the population projections, given the conditions established for the evaluation scenario.

Table 17 – Land Area Estimates Required to Sustain Population Growth with the Recommended Measures

Year	Population	Growth	Dwelling Units	Residential Area Required at 15% (Acres)	Total Area Required	Residential Area Required at 10% (Acres)	Total Addn. Area Required (Acres)
2000	122,954	2.63 P		0.75 Ac	2.4 Ac	1.15 Ac	2.4
2010	159,393	36,439	13,855	10,391	24,938	15,933	38,239
2020	200,431	41,038	15,604	11,703	28,087	17,945	43,068
2030	240,545	40,114	15,252	11,439	27,454	17,540	42,096
2040	283,995	43,450	16,521	12,391	29,738	18,999	45,598
2050	335,142	51,147	19,448	14,586	35,006	22,365	53,676
2060	385,594	50,452	19,183	14,387	34,529	22,060	52,944
Total		262,640	99,863	74,897	179,752	114,842	275,621

At a uniform limit of 15% impervious cover, and the corresponding relationship between residential land use and commercial land use, the Planning Region is approximately seventy five percent (75%) built out by 2060. At a uniform limit of 10% impervious cover and the corresponding relationship between residential land use and commercial land use, the projected growth in the Planning Region requires more land area than what is available.

11.6. Partial Implementation

To achieve its objectives, it is important that the Plan presented be implemented by all of the local jurisdictions. With this in perspective, one disadvantage of having each local government responsible for adopting and enforcing the Plan within its jurisdiction, is that there may be inconsistent implementation. It is also possible that some jurisdictions may choose to implement only a part of the Plan or choose not to implement the Plan at all. The implications of a decision for no or only partial implementation of the Plan will vary, based on the existing water quality measures

in effect within that jurisdiction. There are two primary aspects to these implications: 1) equity, and 2) economics.

As identified early on in the planning process, equity was an issue important to many stakeholders across the spectrum of interests. The importance of this issue resulted in the adoption of equity as one of the guiding principles for the process. In addition to the sentiment of the stakeholders, the concept of equity is important in the application of governmental regulations, including water quality protection measures. The concept of “equity at law” requires that all persons be held to the same standards, with any differences based on objective technical or legal considerations that do not show partiality to specific individuals or interests. Unless partial application of the measures was based on such objective technical reasons, it would likely be subject to review as arbitrary. This would certainly not meet the objective of equity at law.

Another aspect of concern is providing an economic incentive for development to avoid more stringent water quality protection measures. In jurisdictions with comparatively more protective water quality ordinances, there will be little economic incentive to preferentially locate development within that jurisdiction merely to avoid the costs of the water quality protection measures required by the Plan. However, in cases where jurisdictions with no or minimal water quality protection measures in place decide not to implement the Plan, or to only implement part of the Plan, there would be some fairly substantial costs avoiding by not having to implement the water quality protection measures in the Plan. While the cost of water quality protection measures is only one of the many financial considerations used in determining the location for development projects, a significant difference in costs would provide an economic incentive for preferentially locating a project in one jurisdiction versus another.

11.7. Interrelation with Public Policies

Water quality protection measures are inherently linked to broader public policies. Environmental protection is primarily a public policy issue in that the governmental powers of the public are focused on preventing and correcting those activities which might harm the environment. Specifically, the imposition of water quality protection measures in the Planning Region is a public policy decision that must be made to protect water quality. Most of the water quality protection measures presented in this plan must be adopted by local government jurisdictions, making them inherent public policy. If their implementation is to be successful, these measures must be adopted, accepted and enforced as public policy. But beyond their inclusion as public policy, the effectiveness of water quality measures can also be affected by other public policies.

Public policies that encourage human and economic activities are also inherently linked to water quality. These activities provide many benefits to society as a whole through gainful employment and economic empowerment of the population, which generally results in a higher quality of life. However, if not properly controlled, these activities may also have adverse water quality and other environmental impacts. While the importance of these economic activities is not the same across all elements of society, most agree that these activities can not go unchecked or they will result in harm to a valued public asset: the environment. This fundamental understanding of the relationship between human and activity and environmental protection should be recognized in all public policy.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

To help the proposed water quality protection measures succeed, the following actions are recommended to ensure that these measures are integrated into larger scale public policy, and should be included into the adoption of the measures:

- Public entities should adopt broad policy statements regarding the need to integrate water quality protection measures into all public actions.
- Public entities should adopt broad policy statements regarding the need to integrate water quality protection measures into all regulated private actions.
- Public entities should also encourage non-regulated private actions to integrate water quality protection measures.

These recommendations should accomplish one of the expected outcomes of this Plan, which is to have coordinated public policies that encourage the protection of water quality.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer
and Its Contributing Zone

ATTACHMENT 1
Stakeholder Committee Information

June 20, 2005

STAKEHOLDER COMMITTEE REPRESENTATIVES -E-MAIL LIST

Final March 9, 2005

Stakeholder Category	Representatives	E-mail Address	Affiliation
Neighborhood Interests	Robbie Botto Karen Ford Hugh Winkler Randall Thomas (Alt.)	robbie.botto@ci.austin.tx.us klford@austin.rr.com hughw@hughw.net rthomas@varco.com	Barton Hills Neighborhood Assn. NBRNA & FA HPRSCC La Tierra de los Pedernales
Concerned Citizens	Jim Phillips J.T. Stewart David Venhuizen Bret Raymis (Alt.)	jimphillips@imagicmail.com stewbagel@hotmail.com waterguy@ix.netcom.com braymis@yahoo.com	Self Self Self Self
Property Owners / Agricultural Interest	Henry Brooks S. Tim Casey Gene Lowenthal Ira Yates Carlotta McLean (Alt.)	hbrooks10@aol.com timcasey@texas.net gene@lowenthal.net Yatespct3@aol.com carlotta@texas.net	Self Self Self/HPRSCC Self Self & others
Economic Interests	Joe C. Day Michael Waite S.H. Snyder -- vacant -- (Alt.)	JoeCDay@msn.com michael@drippingspringsrealty.com tsnyder@snyderhomes.com	Wimberley Economic Development Self & Real Estate Realtor
Development Interests	Rebecca Hudson Bryan Jordan Hank Smith Chris Risher (Alt.)	rebhudson@aol.com bjordan@jonescarter.com hsmith@cfaulknerengineering.com chris@headwatersdevelopment.com	Self RECA/Jones & Carter HBA Headwaters Dev. Co./Hays Co. Developer
Public Interest Organizations	Colin Clark Karen Hadden Donna Tiemann -- vacant -- (Alt.)	colin@sosalliance.org karen@seedcoalition.org donna@austinaction.org	SOS Alliance & GEAA Self/SEED Coalition Sierra Club
Local Environmental Preservation/ Good Governance Organizations	Jon Beall Mark Gentle Charles O'Dell Dana Blanton (Alt.)	jbeall@tdiaustin.com jmgentle@aol.com codell@austin.rr.com alumc@texas.net	Save Barton Creek Association Barton Springs Swimmers Hays Community Action Network Self
Government Entities	Andrew Backus Nancy McClintock Alan Bojorquez Charlie Johnson Dave Fowler Jack Goodman (Alt.)	aback@austin.rr.com nancy.mcclintock@ci.austin.tx.us alan@texasmunicipallawyers.com johnson@ci.cedar-park.tx.us dave.fowler@co.travis.tx.us JackGoodman2@aol.com	HTGCD City of Austin City of Dripping Springs Hays County Travis County BSEACD

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer
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ATTACHMENT 2

Summary of Stakeholder Committee Ballot Results

June 20, 2005

Summary of Stakeholder Committee Member Ballots and Comments
Regarding Draft Water Quality Plan

The Stakeholder Committee (SHC) was comprised of 27 voting Members representing 8 Interest Groups. For each Interest Group, an Alternate member also was named. By the end of the planning process, two of the regular Members dropped out and were replaced by their Alternates, keeping the total number of voting Members at 27.

Upon the conclusion of the work of the SHC, each Member was asked to complete and sign a Ballot regarding the Water Quality Plan. The Ballot included a certification that each Member had worked to the best of his/her ability within the process and that each Member understood that the Plan reflected a compromise among the competing interests of the Stakeholders. Each Member also was asked to indicate on the Ballot his/her position on the Plan, as it stood at that time, by choosing one of the following statements. The purpose of this part of the ballot was to determine the extent of support that existed within the SHC for the Plan, and to give each Member the opportunity to state specifically what objections they had and how these could be remedied:

CHOICE # 1. I support the Plan in its current form and recommend its full adoption.

CHOICE # 2. I do not support the Plan in its current form but would give it my support if the specific changes enumerated on the attached document were incorporated.

CHOICE # 3. I do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.

The results of the balloting were as follows:

- Of the 27 voting Members of the Stakeholder Committee, 26 submitted Ballots.
- Of the 26 Members who submitted Ballots, 23 marked one of the three choices, while 3 chose not to mark any of the three choices. However, these 3 Members DID SUBMIT comments about the parts of the Plan to which they objected and, in some cases, how their objections could be cured.
- Of the 26 Members who submitted a Ballot, the results were:

<u>Choice Number</u>	<u>Number of Members Selecting this Choice</u>
Choice No. 1	17
Choice No. 2	6
Choice No. 3	0
<u>No Choice Selected</u>	<u>3</u>
Total	26

Each of the six SHC Members who selected Choice # 2, and each of the three SHC Members who did not select a choice, provided comments indicating the reasons why they could not support the Plan as it was. In some cases, they also stated how these problems could be remedied. We called these objections "show stoppers." Additionally, three of the SHC Members who selected Choice #1 also submitted comments about ways in which the Plan could be improved.

Copies of the Stakeholder Committee Member ballots and the full text of their comments may be found in Appendix C.

Summary of Stakeholder Committee Member Ballots and Comments (Continued)

Prior to and after the final stakeholder committee meeting, the consulting team worked with the stakeholder representatives to try to resolve their “show stopper issues” and cure any objections they might have to the Plan. The following is a summary of the “show stopper” issues that were identified, and whether or not the Final Plan has been revised to resolve them:

Synopsis of Comment	Number who Commented	Interest Groups Represented	Actions Taken to Resolve Comment
1. Recommend LESS STRINGENT IMPERVIOUS COVER LIMITS than those proposed in the Plan.	3	Development Interests	None. Had been examined thoroughly during planning process.
2. Recommend MORE STRINGENT IMPERVIOUS COVER LIMITS than those proposed in the Plan.	4	Economic Interests, Public Interest Orgs., Concerned Citizens	None. Had been examined thoroughly during planning process.
3. Recommend LESS STRINGENT STREAM AND CEF SETBACKS than those proposed in the Plan.	3	Development Interests	None. Had been examined thoroughly during planning process.
4. Recommend MORE STRINGENT STREAM AND CEF SETBACKS than those proposed in the Plan.	1	Public Interest Orgs.	None. Had been examined thoroughly during planning process.
5. Recommend MORE STRINGENT EROSION FLOWS CONTROLS than those proposed in the Plan.	1	Public Interest Orgs.	None. Had been examined thoroughly during planning process.
6. Developers should get credit for the water quality benefits of stream and CEF setbacks.	3	Development Interests	None. Had been examined thoroughly during planning process.
7. Clarify that BMP designs are based on engineering calculations and not on-site demonstrations.	3	Development Interests	Changes were made to Sections 9.3 and 9.7 to clarify that the basis for the comprehensive site design and the design of BMPs was to be based on engineering design calculations and not on-site pre- and post-development monitoring.

Summary of Stakeholder Committee Member Ballots and Comments (Continued)

Synopsis of Comment	Number who Commented	Interest Groups Represented	Actions Taken to Resolve Comment
8. All references to wetlands should be removed from the Plan.	3	Development Interests	None. Had been examined thoroughly during planning process.
9. All wastewater system design criteria should be left to TCEQ and not addressed in the Plan.	3	Development Interests	None. Had been examined thoroughly during planning process.
10. Preferred Growth Areas should include Transit Corridors.	3	Development Interests	None. Had been examined thoroughly during planning process.
11. No safety factors should be used in design of water quality controls.	3	Development Interests	None. Had been examined thoroughly during planning process.
12. Recommends provisions for greater testing and evaluation of existing and new BMP technologies.	1	Economic Interests	Changes were made to Section 10.14 to elements to the Adaptive Management Process addressing this issue.
13. Requested better delineation of overlaps between County and local municipal jurisdictions.	1	Local Govt.	Changes were made to Sections 10.2 and 10.5 to better delineate responsibilities where jurisdictions overlap.
14. Vulnerability must be explicitly addressed during planning, design, construction and use phases of the project.	1	Concerned Citizens	Minor changes regarding the design of structural BMPs were made in Section 9.7. Otherwise, this issue had been examined thoroughly during planning process.
15. Economic Impact discussion should give more attention to the "benefit" side of the Cost vs. Benefit equation of water quality protection measures.	1	Concerned Citizens	Changes were made to Sections 11 to better define some benefits of water quality protection.

Summary of Stakeholder Committee Member Ballots and Comments (Continued)

Synopsis of Comment	Number who Commented	Interest Groups Represented	Actions Taken to Resolve Comment
16. Give greater emphasis on reuse of wastewater effluent.	1	Concerned Citizens	Changes were made to Sections 9.9 and 9.10 to expand the reuse of wastewater effluent.
17. The Plan does not have adequate analysis of the differences between the Trinity and Edwards aquifers to justify greater Impervious Cover in the Edwards Contributing Zone as compared to the Recharge Zone.	1	Governments	Changes were made to Section 4.3 to address the differences between the Edwards and Trinity Aquifers and identify the specific vulnerabilities that indicate additional protection for the Edwards.
18. Provisions regarding “TDRs” should be strengthened to ensure they are properly implemented.	1	Public Interest Orgs.	Changes were made to Sections 9.2 and 10.9 to better define the intent, present precautions and identify potential uncertainties in the use of TDRs.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer
and Its Contributing Zone

ATTACHMENT 3

Timeline of Stakeholder Involvement

June 20, 2005

EXAMPLE

Stakeholder Committee Member Ballot Regarding Amended 6th Draft of the Water Quality Protection Plan

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

I recognize that the Plan being submitted by the Consultant reflects a compromise among the various interests of the Stakeholders, and that it is not possible to satisfy all of the needs of every stakeholder interest group.

Accordingly, in connection with the 6th Draft of the Plan, which was posted to the Project web site on March 4th, and which was amended during the Stakeholder Committee meeting of March 9th, I (mark one option):

___ support the Plan in its current form and recommend its full adoption.

___ do not support the Plan in its current form but would give it my support if the specific changes enumerated on the attached document were incorporated.

___ do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.

(signature)

(date)

(printed name)

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer
and Its Contributing Zone

Attachment 4
Technical Review Group Information

June 20, 2005

TECHNICAL REVIEW GROUP APPOINTMENT STATUS as of December 20, 2004

NOMINEE & EXPERTISE	AFFILIATIONS	NOMINATED BY	INVITATION	ACCEPTANCE	SHC DECISION
Mike Kelly, PE Engineer, specializing in Soil and Water Resources Management	Currently employed as a Water Resource Engineer for Austin's Watershed Protection and Development Review Department. Owns property in Barton Springs contributing zone in Drippings Springs ETJ as well as City of Austin. Is former member of Dripping Springs Planning and Zoning Commission.	Property Owners	Nov 4	Nov 16	Confirmed Nov 17
Raymond Slade Hydrologist, USGS (retired)	No personal, financial, or organizational affiliations within the defined planning region.	Property Owners	Nov 4	Nov 8	Confirmed Nov 17
Mike Lyday Wetland Biologist	Resident of Hays County for over twenty years - owns ten acres along Sycamore Creek - worked for the City of Austin's Watershed Protection and Development Review Department for over 15 years - member of the Texas Riparian Society & the Austin-Bastrop Colorado River Corridor Partnership.	Local Environmental / Good Government	Nov 4	Nov 10	Confirmed Nov 17
John Noell, PE Civil Engineer with extensive Design Expertise in the BSZ	Consulting engineer with clients who have projects in the defined planning region. Member of the Water Environment Federation, the American Society of Civil Engineers and the American Waterworks Association.	Developers	Nov 4	Nov 10	Confirmed Nov 17
Charles Heimsath Real Estate Economist	I currently have no personal, financial or organizational interests in the defined planning region. I have, however, completed market studies in the area over the last 15 years, although I am not currently under contract.	Developers	Nov 4	Nov 16	Confirmed Nov 17

NOMINEE & EXPERTISE	AFFILIATIONS	NOMINATED BY	INVITATION	ACCEPTANCE	SHC DECISION
<p>Dr. Lauren Ross, PE Water Quality Engineer</p>	<p>Engineering consultant to several organizations and individuals participating in the Regional Water Quality Planning process, including: City of Sunset Valley, City of Austin, BSEACD, Save Our Springs Alliance, and the Hamilton Pool Road Scenic Corridor Coalition.</p>	<p>Public Interest Orgs.</p>	<p>Nov 4</p>	<p>Nov 12</p>	<p>Confirmed Nov 17</p>
<p>Dr. Kent Butler Dr. Butler is a professor of planning, specializing in land use, environmental management and policy, and water resources.</p>	<p>Currently, within the state of Texas, he has contractual relationships with the Texas General Land Office, Texas Commission on Environmental Quality, Barton Springs-Edwards Aquifer Conservation District (BSEACD), Lower Colorado River Authority (LCRA), and City of Sunset Valley, all providing technical planning services in the areas of environmental planning, land use and development, and endangered species protection.</p> <p>The two closest affiliations pertaining to the work of the Regional Water Quality Planning program are as follows:</p> <ol style="list-style-type: none"> 1. He is coordinating the Habitat Conservation Plan for the Barton Springs salamander and the Austin blind salamander, under contract with the BSEACD. This project will involve groundwater hydrology and water quality and biological considerations. 2. He is completing a technical planning and feasibility study for the LCRA, involving innovative water management and low-impact development strategies, applicable to the Central Texas Hill Country and Hamilton Pool Road in particular. 	<p>Concerned Citizens</p>	<p>Nov 4</p>	<p>Nov 16</p>	<p>Confirmed Nov 17</p>

NOMINEE & EXPERTISE	AFFILIATIONS	NOMINATED BY	INVITATION	ACCEPTANCE	SHC DECISION
Ed Peacock, PE Water Quality Engineer specializing in Water Resource Management	Current financial and organizational affiliations are exclusively as an employee of the City of Austin Watershed and Development Review Department. Not a member of any citizen's organizations, administrative boards or commissions for any political entity or other organization within the defined planning region. Worked in consulting over 9 years ago and had several projects with NEI staff, but none that would have any influence on the current project. Through previous business of the City, personally knows several of the stakeholder and consulting team.	Government	Nov 9	Nov 9	Confirmed Nov 17
Roger Glick, PE Water Quality Engineer specializing in Water Quality Modeling and BMP Effectiveness	I do not believe I have any affiliations in the planning area, other than living in the Austin area and Working for the City of Austin (Watershed Protection and Development Review Department).	Government	Nov 9	16 Nov	Confirmed Nov 17
Lisa O'Donnell Biologist specializing in Water Quality and Salamander Biology	Environmental Scientist with City of Austin - oversees management and monitoring for Barton Springs, Austin blind, and Jollyville Plateau salamanders. Member of Barton Springs Salamander Recovery Team. Worked for City of Austin for 3.5 years. Prior to that, worked for U.S. Fish and Wildlife Service for 10 years.	Government	Nov 9	17 Nov	Confirmed Nov 17
Beyrl Armstrong Land and Wildlife Management Specialist	Business Affiliations: Plateau Land & Wildlife Management, Inc., Dripping Springs, TX. (Cofounder and Board Member and Stockholder); Plateau Ecological Management Services, LLC, Dripping Springs, TX (Principal); Drippings Springs Realty, LLC, Dripping Springs, TX (Contract Real Estate Salesperson).	Government	Nov 9	Nov 17	Confirmed Nov 17

NOMINEE & EXPERTISE	AFFILIATIONS	NOMINATED BY	INVITATION	ACCEPTANCE	SHC DECISION
Beyrl Armstrong (cont'd)	On-going Contractual Consulting Relationships: Environmental Defense, Audubon Texas. Past Affiliations: The Nature Conservancy of Texas (employee from 1993-1996)				
Michael Morrow Landscape Architect and Land Planner specializing in ecology, Instructor on Sustainable Design, Writer of Research Text on "Ecological Design Criteria for Developments"	Owns local landscape architecture/planning company, serves on faculty at Texas State University	Economic Interests	Nov 28	Dec 10	Confirmed Dec 15

Attachment 5
Glossary

GLOSSARY OF ABBREVIATIONS

AST	-	Above Ground Storage Tank
BMP	-	Best Management Practices
BOD	-	Biochemical Oxygen Demand
BSEACD	-	Barton Springs Edwards Aquifer Conservation District
CEF's	-	Critical Environmental Features
CFR	-	Code of Federal Regulations
COD	-	Chemical Oxygen Demand
CWA	-	Clean Water Act
CZ	-	Contributing Zone
DO	-	Dissolved Oxygen
DSHS	-	Department of State Health Services
EAA	-	Edwards Aquifer Authority
EPA	-	Environmental Protection Agency
ESA	-	Endangered Species Act
ETJ	-	Extra Territorial Jurisdiction
GBRA	-	The Guadalupe Blanco River Authority
GCDs	-	Groundwater Conservation Districts
HAZMAT	-	Hazardous Materials
HCPs	-	Habitat Conservation Plans
HTGCD	-	Hays Trinity Groundwater Conservation District
LCRA	-	The Lower Colorado River Authority
MOU	-	Memorandum of Understanding
MUDs	-	Municipal Utility Districts
NMFS	-	National Marine Fisheries Service
NOAA	-	National Oceanic and Atmospheric Administration
NOI	-	Notices of Intent
NPDES	-	National Pollutant Discharge Elimination System
NPL	-	National Priorities List
NPS	-	Non-Point Source

NRCS	-	National Resource Conservation Service
O&M	-	Operations and Maintenance
OSSF	-	On Site Sanitary Sewage Facility
PAHs	-	Polynuclear Aromatic Hydrocarbons
PID	-	Public Improvement District
RRC	-	Railroad Commission
RZ	-	Recharge Zone
SHC	-	Stakeholder Committee
SPCC	-	Spill Prevention Control and Countermeasure
SRP	-	Species Recovery Plan
SW3P	-	Storm Water Pollution Prevention Plan
TAC	-	Texas Administrative Code
TCEQ	-	Texas Commission on Environmental Quality
TDR	-	Transferable Development Rights
TKN	-	Total Kjeldahl Nitrogen
TOC	-	Total Organic Carbon
TPDES	-	Texas Pollutant Discharge Elimination System
TSS	-	Total Suspended Solids
TSSWCB	-	Texas State Soil and Water Conservation Board
TWC	-	Texas Water Code
TWDB	-	Texas Water Development Board
USDA	-	U.S. Department of Agriculture
USFWS	-	The U.S. Fish and Wildlife Service
USGS	-	U. S. Geologic Survey
UST	-	Underground Storage Tank
WCID	-	Water Control and Improvement District
WPAP	-	Water Pollution Abatement Plans
WUGs	-	Water User Groups

VOLUME II

**Regional Water Quality Protection Plan for the
Barton Springs Segment of the Edwards
Aquifer and Its Contributing Zone**

Project Sponsors

***City of Dripping
Springs***

City of Austin

City of Buda

City of Kyle

City of Rollingwood

City of Sunset Valley

Village of Bee Cave

Blanco County

Hays County

Travis County

Barton

***Springs/Edwards
Aquifer Conservation
District***

***Hays Trinity
Groundwater***

Conservation District

***Blanco-Pedernales
Groundwater***

Conservation District

Prepared by

NAISMITH ENGINEERING, INC.

In Association With

CAS Consulting and Services

Eco-Southwest Services

Good Company Associates

Hicks & Company

Kelly, Hart & Hallman, P.C.

Appendix A
Stakeholder Process Guidance Documents

Overview of Stakeholder Process

DEVELOPMENT OF A REGIONAL WATER QUALITY PROTECTION PLAN FOR THE
BARTON SPRINGS SEGMENT OF THE EDWARDS AQUIFER AND ITS CONTRIBUTING
ZONE

Initial Meeting

Administrative Items (introductions, announcements, restroom locations, etc.)

First Combined Session

Orientation

Basic

Process and Objectives

Information Exchange

Project Area

Hydrology/Geology

Current Regulatory/Policy Issues

Future Regulatory/Policy Issues (e.g. TPDES Storm Water)

Available Technical Information/Existing Studies

Organization

Committee Make-up (Even number between 28 & 32)

Participation

Public Comment/Input Opportunities

Roles and Responsibilities of Stakeholder Representatives

Meeting Attendance

Representation of Identified Groups

Possible Outcomes/Expectations

Categories of Stakeholders

Environmental Organizations

Governmental Entities (Federal, State & Local)

Homeowners/Landowners (Associations, Individuals, Agriculture)

Development Interests

Others by Consensus of Participants

Overview of Stakeholder Process (Continued)

Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

Breakout Sessions (Split out by Category)

Consulting Team Member Serves as Facilitator for each Session

Nominate and Elect Representatives to Stakeholders Committee

Equal number from each group (between 5 and 8) representatives and alternates

From representatives, select 1 spokesperson and 1 alternate

Review examples of Goals for Process/Plan

Develop/Prioritize Category Goals for Process/Plan

Itemization of goals from floor – all participate

Prioritize – each participant 5 votes (dots)

Consensus goals selected for Category's Goals, to be presented in Second Combined Session

Second Combined Session

Presentations by each Break-out Session outlining Category's prioritized Goals for Process and Plan and relevant view-points/comments

All Participants (everyone participating in a Break-out session) votes on prioritizing Goals for Process/Plan

Participants vote to rank (prioritize) Goals of other three break-out sessions

Each participant gets nine total votes (three per stakeholder category)

Identify Date/Time and General format for Second Meeting

Second Meeting

Administrative Items

Review/Adopt Bylaws (Governing Operation of Stakeholders)

Progress Report/Review of Milestones

Canvas/Prioritize Goals from First Meeting

Confirmation of Body of Information to be used as Basis for Plan

Presentation of Comparison Matrix for previously submitted plans

Discuss Consensus Items from Comparison Matrix

Appendix B
Stakeholder Issues Summary

Overview of Stakeholder Process (Continued)

Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

Additional Meetings

Administrative Items

Progress Report/Review of Milestones

Discuss Consensus Items from Comparison Matrix

Identify Implementation Elements

Align Implementation Elements with Goals

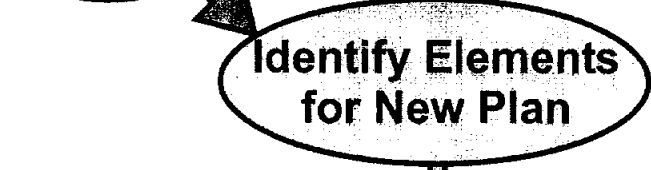
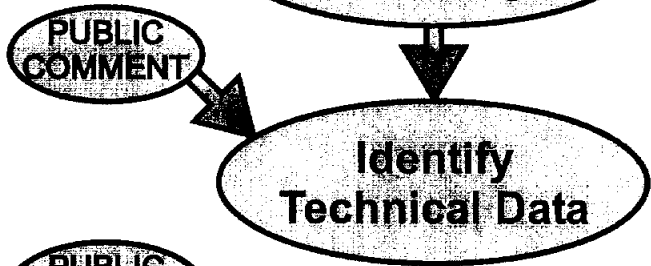
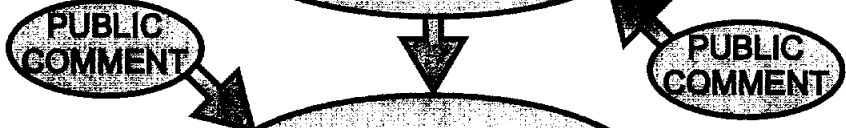
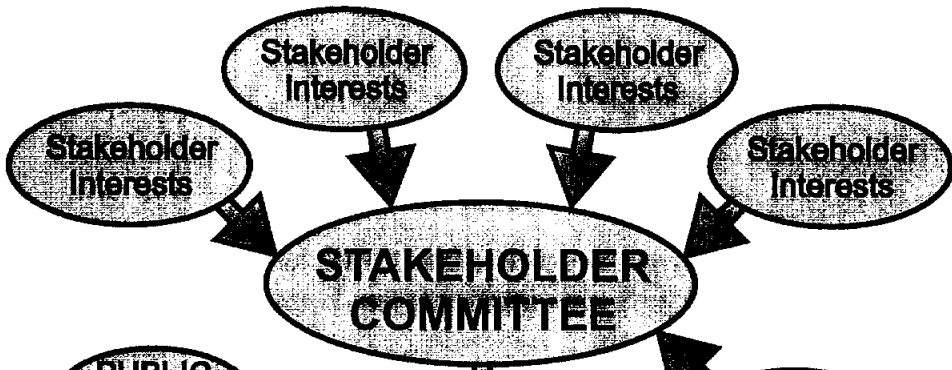
Prioritize Implementation Elements

Develop Draft Plan based on Implementation Elements

Stakeholder Process

DEVELOPMENT OF A REGIONAL WATER QUALITY PROTECTION PLAN
FOR THE BARTON SPRINGS SEGMENT
OF THE EDWARDS AQUIFER AND ITS CONTRIBUTING ZONE

Orientation & Information Exchange



Consensus Plan & Implementation Elements

Involvement of All Participants

Stakeholders Select 32 Committee Representatives (8 from each Group)

Representation of Public by Stakeholder Group

Develop Bylaws and Administrative Procedures for Stakeholder Committee

Stakeholder Group with Public Input

ADDN MEETINGS

Outline for Future Activities of the Stakeholder Committee

(Items in brackets [*] are reflected on the “Project Tasks and Overview of Planning Process” Chart)

1. Organization Meeting – June 30, 2004

2. Second Meeting – July 21, 2004

- a. Confirm Stakeholder Representatives
- b. Review and Approve Minutes
- c. Review and Approve Bylaws
- d. Review and Discuss Issues Summary/Voting Tabulation [“Summarize Issues and Challenges”]
- e. Governmental Entity Authority Briefing [“Identify Implementing Entities”]
- f. Review and approval of technical information bibliography [“Compile Existing Scientific Studies”]
- g. Review of comparison matrix of existing plans [“Identification of Water Quality Protection Strategies”]
- h. Schedule discussion

3. Third Meeting - TBA

- a. Discussion of overlaps/gaps of governmental entity authority and identification of possible solutions [“Identify Implementing Entities”]
- b. Regulatory briefing to identify universe of existing federal and state regulations governing water quality in the planning region [“Identify Implementing Entities” and “Identification of Water Quality Protection Strategies”]
- c. Presentation and discussion of proposed water quality protection measures identified in the draft plans [“Identification of Water Quality Protection Strategies”]
- d. Presentation and discussion on additional water quality protection measures not previously identified [“Identification of Water Quality Protection Strategies”]
- e. Develop Prioritized List of Issues/Goals for Plan, based on Issues/Voting Summary from Second Meeting [“Summarize Issues and Challenges”]

4. Fourth Meeting – TBA

- a. Review and discuss draft water quality protection measures compiled by consulting team [“Identification of Water Quality Protection Strategies” and “Develop Water Quality Protection Plan”]
- b. Review and discussion on draft implementation measures compiled by consulting team [“Identify Implementing Entities” and “Develop Implementation Plan”]

5. Fifth Meeting – TBA

- a. Review and discuss draft water quality protection plan document compiled by consulting team ["Identification of Water Quality Protection Strategies" and "Develop Water Quality Protection Plan"]
- b. Review and discussion on draft implementation plan document compiled by consulting team ["Identify Implementing Entities" and "Develop Implementation Plan"]

Planned Topics - Remaining Meetings to Complete Water Quality Protection Plan

Tues Jan 11 at OH UMC

Full SHC

Philosophical Issues:

1. What is Standard for Selecting Water Quality Protection Measures?
 - Basis for Recommendation?
 - Enhance & Maintain?
 - No net increase?
 - Non-degradation?
 - Other?

2. Where are the Measures to be applied?
 - Basis for Recommendation?
 - New development only?
 - New development and Retrofit?
 - Recharge vs. Contributing Zones?
 - Basin specific?
 - Other?

Wed Jan 19 at ACC

Full SHC divided into 3 Sub-groups

Technical Issues:

1. Sub-Group 1. Impervious Cover Limits
 - Basis for Recommendation?
 - Net vs. Gross Site Area?
 - Too high, too low, or just right?

2. Sub-Group 2. Buffer Zones
 - Basis for Recommendation?
 - Too high, too low, or just right?

3. Sub-Group 3. Mitigation and Conservation Easements
 - Basis for Recommendation?
 - Voluntary or mandatory?
 - TDRs?
 - Correlative Rights?

Wed Jan 26 at OH UMC
Full SHC

More Philosophical Issues:

1. Adoption of Decisions from previous meeting regarding Technical Issues
2. USFWS and TCEQ agreement on optional Edwards Aquifer rules to protect Endangered Species
3. Rights and Responsibilities in connection with New and Existing Development and Water Quality Protection Measures?
 - As Citizens
 - As Land Owners and Developers
 - As Governments
4. Who receives the Benefits and should pay the Costs of:
 - New Development?
 - Water Quality Protection Measures?

Wed, Feb 2 at OH UMC (TBC)

Full SHC Divided into 3 Sub-Groups

More Technical Issues:

1. Subgroup 1 - Performance Measures
2. Subgroup 2 - Implementation Details
3. Subgroup 3 - Economic Implications

Wed, Feb 9 at OH UMC (TBC)

1. Adoption of Decisions from Previous Meeting regarding Technical Issues
2. Full SHC Review of Plan

Wed, Feb 16 – additional SHC meeting if needed

Wed, Feb 23 – SHC Presentation of Final Plan to Executive and Core Committees (rescheduled monthly meeting of EC/CC)

**Planned Topics - Remaining Meetings to Complete the Regional Water Quality Protection Plan
Revised Feb 15, 2005**

Wed, Feb 16 – SHC Meeting

1. Review of 5th Draft of the Regional Water Quality Protection Plan (RWQPP)
2. Discussion of the following topics:
 - Economic Implications
 - Transferable Development Rights (TDRs)
 - Implementation Details
 - Economic Implications
3. Identification of Remaining “Showstopper” Issues
4. Identification of Remaining “Important” Issues

Wed, Feb 23 – SHC Meeting [tentative date]

1. Identification/Resolution of Remaining “Showstopper” Issues
2. Identification/Resolution of Remaining “Important” Issues
3. Discuss/Finalize the Stakeholder Committee Preface to the RWQPP

Wed, Mar 2 – SHC Meeting [tentative date]

1. Presentation of Final RWQPP to the Stakeholder Committee
2. Stakeholder Committee Approval of the Final RWQPP
3. Stakeholder Committee Approval of the Preface to the RWQPP
4. Identification of any typos, or minor changes needed to the RWQPP
5. Discussion and organization of SHC/Consulting Team Presentation to the EC/CC

Wed, Mar 9 – SHC Presentation of Final Plan to Executive and Core Committees (rescheduled Feb meeting of EC/CC) [tentative date]

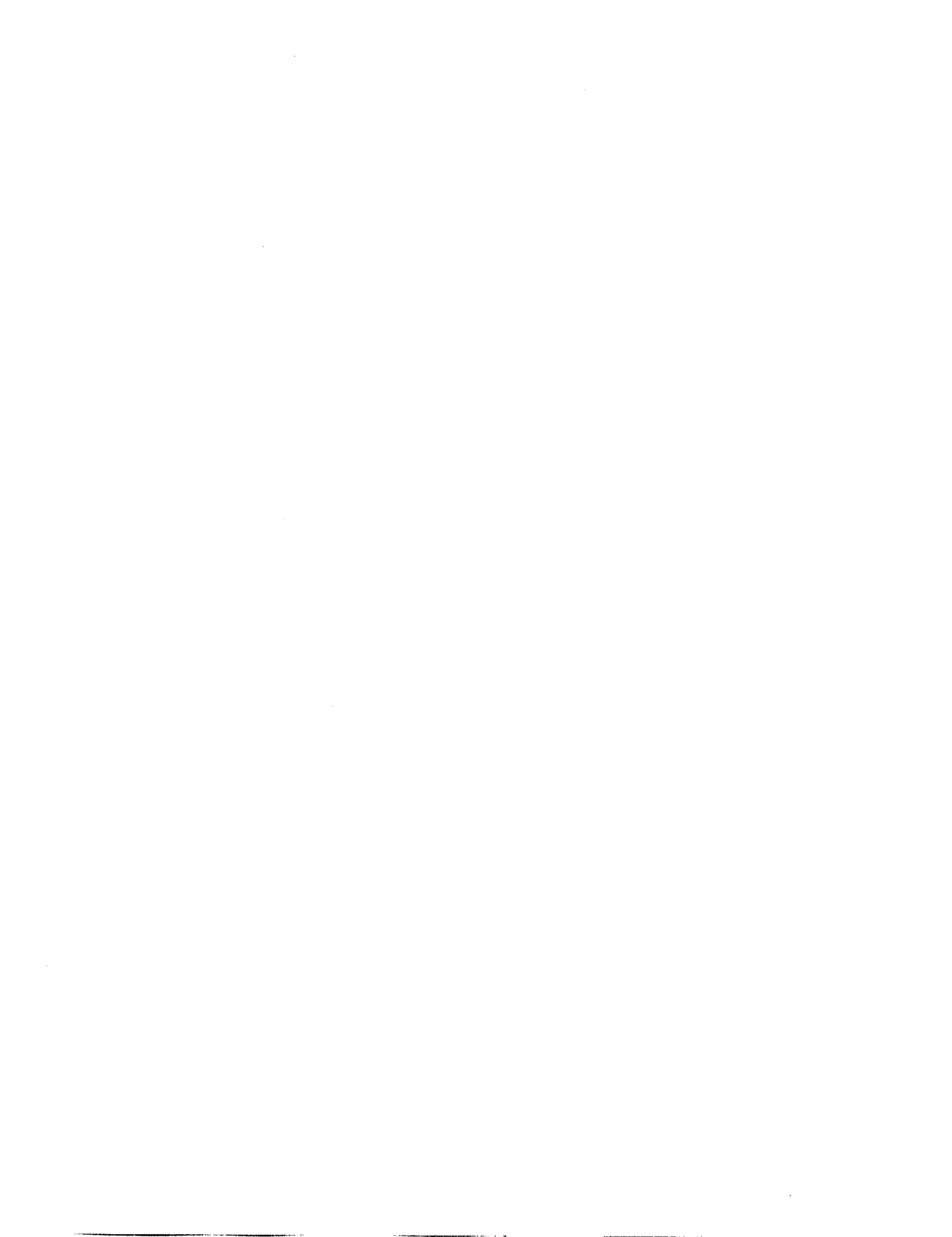
1. Presentation of Final Regional Water Quality Protection Plan to the Executive and Core Committees

Wed, Feb 16 to Wed, Mar 2 – Various Meetings (subcommittees?) of SHC Members (as needed)

1. SHC Members will work with the Consulting Team and the Executive Director to resolve any remaining contentious issues in an effort to finalize a consensus-based plan by March 2, 2005 (for adoption by the entire Stakeholder Committee).
2. SHC Members will work with the Executive Director to develop a preface to the RWQPP.

Appendix B
Stakeholder Issues Summary

Appendix B
Stakeholder Issues Summary



STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: NEIGHBORHOOD INTERESTS

Neighborhood Interests		ISSUE		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
	Votes								
1	24 24%	Long - Term preservation management of watershed and aquifer for future generations.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 11 15 2 2 4 10 10			54 26%	
2	11 11%	Fiscal surety—Assuring the cost are fairly distributed including monies from developers (sick creek syndrome); ensuring that W.Q. projects are adequately funded, constructed, <u>maintained</u> , monitored and <u>enforced</u> . Who pays fiscal surety?		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 1 2 1 0 0 3 2			9 4%	
3	0 0%	Reporting mechanism for enforcement.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 0 0 0 0 0			0 0%	
4	10 10%	Clustering is not the only solution. Determine appropriate density.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 4 1 0 0 0 1			6 3%	

Note: Item numbers are for identification purposes only, they do not indicate ranking of individual issues.

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: NEIGHBORHOOD INTERESTS

Neighborhood Interests Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
8 8%	Neighborhood education on water quality, low water use xeriscape, water collection, conservation; pesticide, fertilizer, chemical use.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 5 3 1 3 1 4 5	22 11%
0 0%	Property valuation.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 2 0 0 0 0	2 1%
4 4%	Tax assessment forcing sale of properties on large acreages.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 1 0 0 0 0	1 0%
0 0%	Well water quality and quantity.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 4 2 0 1 0 2	9 4%

Note: Item numbers are for identification purposes only, they do not indicate ranking of individual issues.

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: NEIGHBORHOOD INTERESTS

	Neighborhood Interests Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
9	3	Wildlife water sources.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 0 0 0 0 0	0 0%
10	4 4%	Protection of critical water quality features.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 1 2 1 1 2 2 2	11 5%
11	6 6%	Impervious coverage percentage.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 2 2 0 0 5 2 2	13 6%
12	0 0%	Roadway runoff - low water crossings.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 1 0 0 0 0 0	1 0%

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: NEIGHBORHOOD INTERESTS

Neighborhood Interests		ISSUE		Breakout Groups		Votes by Other Groups	Total Votes by Other Groups				
Item	Votes	Item	Issue	Neighborhood Interests	Concerned Citizens	Property Owners	Economic Interests	Development Interests	Public Interest Organizations	Local Environmental Preserv./Good Governance Orgs.	Government Entities
13	0 0%	13	Septic tanks number.	0 0%	0	0	0	0	0	0	0
14	0 0%	14	Protect recreational water use.	0 0%	0	0	0	0	0	0	0
15	0 0%	15	Require retrofitting (reclamation).	0 0%	0	0	0	0	0	0	1
16	0 0%	16	Water collection.	0 0%	0	0	1	0	0	0	2

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: NEIGHBORHOOD INTERESTS

Neighborhood Interests		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
Item	Issue	Neighborhood Votes	Breakout Groups	Other Groups	Total Votes	Percentage	Percentage
17	Agriculture waste.	0 0%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 0 0 0 0 0	0 0%		
18	Wastewater effluent runoff.	0 0%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 0 0 0 0 0	0 0%		
19	Identify responsible agency with authority for enforcement.	9 9%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 2 5 0 15 1 3 7	33 16%		
20	Interim regulations eliminate grandfathering.	8 8%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 4 3 0 0 1 5 2	15 7%		

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: NEIGHBORHOOD INTERESTS

Neighborhood Interests		ISSUE		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
Item	Votes	Item	ISSUE	Breakout Groups	Other Groups	Other Groups	Total Votes	Other Groups	by Other Groups
21	6 6%		Broad participation and representation of individuals outside of HOAs.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 2 0 0 1 0	0 0 0 0 0 0 0	3 1%		
22	0 0%		Financing options (PUD, MUDs).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 0 0 0 3 0 0 0	0 0 0 0 3 0 0 0	3 1%		
23	14 14%		Preservation of open space. Encourage conservation easements.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	- 5 11 2 4 3 6 11	5 11 2 4 3 6 11	42 20%		
									99
									205

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: CONCERNED CITIZENS

Concerned Citizens		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
Item	Issue	Concerned Citizens Votes	Breakout Groups	Other Groups	Total Votes	Other Groups	by Other Groups
1	Waste water management.	1 4%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 - 2 4 0 0 1 3	10 4%	0	10
2	Enforcement of regulation of water quality.	1 4%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 - 0 0 0 0 3 0	3 1%	0	3
3	Non-degradation of existing water quality.	4 16%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	14 - 11 5 3 3 12 11	59 22%	0	59
4	Non-point source (runoff from various places- golf course, autos, home fertilizers).	1 4%	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	2 - 1 1 0 0 0 0	4 1%	0	4

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: CONCERNED CITIZENS

Concerned Citizens		ISSUE	Breakout Groups	Votes by	
Votes	Other Groups			Other Groups	Total Votes by Other Groups
2 8%		Education of pollution prevention.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 - 3 1 2 0 1 0	8 3%
1 4%		Stressing alternatives (rainwater collection and septic).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 - 2 3 0 1 0 0	9 3%
2 8%		Low impact development.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 - 4 0 1 1 1 1	11 4%
4 16%		Review and enforcement must be uniform and competent.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	11 - 8 4 10 0 8 12	53 19%

Note: Item numbers are for identification purposes only, they do not indicate ranking of individual issues.

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: CONCERNED CITIZENS

Item	Concerned Citizens		ISSUE	Breakout Groups	Votes by Other Groups		Total Votes by Other Groups
	Votes	Percentage			Groups	Groups	
9	3	12%	All sources of pollution must be addressed.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 - 2 0 0 2 3 0	10 4%	
10	1	4%	How water quality affects quality of life.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 - 0 1 0 1 0 0	3 1%	
11	1	4%	There should be environmental impact study for subdivision and commercial development.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	7 - 5 1 1 0 1 0 0	21 8%	
12	1	4%	Any economic analysis must be holistic and include all cost (i.e. endangered species, habitat).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	8 - 6 2 1 3 1 3	24 9%	

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: CONCERNED CITIZENS

Concerned Citizens Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
3 12%	Incentive program for native plants and rainwater harvesting; remove disincentives.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	14 - 11 3 8 1 7 14	58 21%
25				273

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: PROPERTY OWNERS

Property Owners		ISSUE	Breakout Groups	Votes by Other Groups		Total Votes by Other Groups
Property Owners	Votes			Groups	Groups	
1	1 1%	Too many wells - impact on aquifer.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 1 0 0 0 6	8 3%	
2	0 0%	Property owners uninformed, left out of the process. Better communication, outreach.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	2 1 - 0 0 1 2 0	6 3%	
3	1 1%	Extraction of parkland during subdivision process.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 0 0 0 0 0	1 0%	
4	2 3%	Incompetent regulation based on politics/ anecdotal stuff.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 - 0 2 0 0 0 1	3 1%	

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: PROPERTY OWNERS

Item	Property Owners		ISSUE	Breakout Groups		Votes by Other Groups		Total Votes by Other Groups
	Votes					Groups	Groups	
5	5 7%		Property values – short term and long term - affected negatively by punitive regulations.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 1 0 0 1 1	1	4 2%	
6	3 4%		Water quality - all aspects - not just stormwater (USFWS) - e.g. wastewater.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 4 - 0 1 4 5 5	1	20 8%	
7	15 22%		Over-development - overly intensive/dense.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	14 5 - 1 1 3 5 5	14	34 14%	
8	4 6%		Equality and fairness of allocation of resources (resources=impervious cover and water).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 2 - 0 0 0 0 0	0	2 1%	

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: PROPERTY OWNERS

Item	Property Owners		ISSUE	Breakout Groups	Votes by Other Groups		Total Votes by Other Groups
	Votes	Percentage			Groups	Percentage	
9	6	9%	Promotion of vegetative cover that will promote water infiltration (including juniper control, other invasive, destructive plants).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	6	22	9%
10	4	6%	Shifting burden of mitigation of water quality to undeveloped land.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	0%
11	3	4%	Share the economic pain.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	2	1%
12	0	0%	Different water quality guidelines for rural and urban areas within the region.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	0%

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: PROPERTY OWNERS

Property Owners Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
0 0%	Conservation easements.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	11 3 - 2 2 3 8 6	35 15%
1 1%	Expansion of water lines, roads and other infrastructure - impact on water quality.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 1 - 1 0 2 3 1	11 5%
4 6%	Publicly owned and financed open space vs. forced dedication.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 0 1 0 2 0	4 2%
2 3%	Grandfathering of existing platted subdivisions.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	5 1 - 2 1 0 0 2	11 5%

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: PROPERTY OWNERS

	Property Owners Votes	ISSUE	Breakout Groups	Votes by		Total Votes by Other Groups
				Other Groups	Groups	
17	4 6%	Rules should be site-specific.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 - 0 0 0 0 0	0 0 0 0 0 0 0	0 0%
18	1 1%	Rural neighborhood associations look out for the (rural) neighborhood.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 0 0 0 0 0	1 0 0 0 0 0 0	1 0%
19	0 0%	Restoration of land and vegetation following pipeline construction.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	4 0 - 1 0 0 0 0	0 0 0 0 0 0 0	8 3%
20	6 9%	Upstream development consequences on downstream property owners (value and water quality).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	4 1 - 4 1 1 1 1	4 1 0 4 1 1 3 6	20 8%

Note: Item numbers are for identification purposes only, they do not indicate ranking of individual issues.

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: PROPERTY OWNERS

Property Owners		ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
21	7 10%	Incentives for high quality development (to include high water quality measures) - flexibility to innovate.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	5 5 - 4 5 0 4 7	30 13%
22	4 6%	Market & science should dictate density limitations, not emotions.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 0 6 0 0 2	9 4%
23	1 1%	Regional planning project needs to stay on schedule.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 - 0 6 0 0 2	9 4%
				69	236

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: ECONOMIC INTERESTS

Item	Economic Interests Votes	ISSUE	Breakout Groups	Votes by	
				Other Groups	Total Votes by Other Groups
1	5 20%	Water value vs. land value (eminent domain). Balance between sustainable economics & ecosystems based on good science.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	4 2 7 - 9 1 1 7	31 17%
2	2 8%	Education.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	12 9 7 - 2 5 14 11	60 32%
3	3 12%	Commercial tax base stewardship.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 - 5 0 0 1	6 3%
4	5 20%	Regional Infrastructure (Transportation, utilities, water (ground & surface), sewage.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 8 - 0 0 0 2	10 5%

Note: Item numbers are for identification purposes only, they do not indicate ranking of individual issues.

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: ECONOMIC INTERESTS

Economic Interests Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
5 20%	Master planned development. Reasonable balance/promotion of renewable resources/stewardship of resources.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	13 3 12 - 1 1 3 8	41 22%
5 20%	Regional - consistent and steady course regulation. (illegible) regs. impervious cover requirement/water buffer.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	5 0 6 - 7 8 6 7	39 21%
0 0%	Restoration - riparian/ historic (downtown).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 - 0 0 0 0	0 0%
25				187

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: DEVELOPMENT INTERESTS

Development Interests		ISSUE	Breakout Groups		Total Votes by Other Groups
Development Interests	Votes		Other Groups	Groups	
1	0 0%	Science-based water quality protection.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	2 1 3 0 - 6 1 3	16 6%
2	3 8%	Balance environment, affordable housing, economic & development issues. Keep central Texas open to all.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 1 0 2 - 0 0 1	4 2%
3	1 3%	Liability concerns. Who is responsible for regulations that are adopted? Can we depend on legally defensible regulations?	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 0 0 - 0 0 1	1 0%
4	0 0%	What are the development needs of central Texas? Economic diversity and population.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 - 0 0 0	0 0%

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: DEVELOPMENT INTERESTS

Development Interests		ISSUE	Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
Item	Votes		Item	Votes	Item	Votes	Item	Votes
5	6 15%	Water quality regulations based on science, not emotions.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	7 2 8 4 - 2 5 6	34 14%			
6	0 0%	Educating the public (landowners and concerned groups) on avenues for public/private conservation (i.e., Hill Country Conservancy, Nature Conservancy, etc...).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	15 11 12 3 - 2 6 7	56 22%			
7	2 5%	Focus our energies on enabling good development vs. regulating "bad" development.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 1 5 1 - 2 1 3	16 6%			
8	1 3%	Encourage collaborative planning to better coordinate effective water quality features.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	6 3 2 3 - 1 5 5	25 10%			

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: DEVELOPMENT INTERESTS

Development Interests Votes	ISSUE	Breakout Groups	Votes by	
			Other Groups	Total Votes by Other Groups
9	4 10%	Acknowledge and respect property rights.	0	18 7%
10	7 18%	Provide a legal safe harbor for the development process - dependable and predictable.	0	12 5%
11	3 8%	Provide a set of rules that allow the flexibility to plan for all types of development. Not impervious cover, but establish a water quality goal and allow engineering measures to accomplish.	0	1 0%
12	0 0%	Achieve consensus among <u>all</u> parties.	0	0 0%

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: DEVELOPMENT INTERESTS

Development Interests Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
1 3%	Timelines for process.	<ul style="list-style-type: none"> Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities 	0 0 0 0 - 0 0 0	0 0%
2 5%	Determine maintenance responsibility (property owner, HOA, municipality, etc.).	<ul style="list-style-type: none"> Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities 	8 2 3 0 - 0 1 3	17 7%
0 0%	Determine maintenance criteria – clear maintenance program.	<ul style="list-style-type: none"> Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities 	6 1 0 0 - 0 1 3	11 4%
3 8%	Create or use (an existing) single (taxing) authority to administrate and maintain the plan and resulting BMPs.	<ul style="list-style-type: none"> Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities 	6 0 1 3 - 2 11 6	29 12%

Note: Item numbers are for identification purposes only, they do not indicate ranking of individual issues.

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: DEVELOPMENT INTERESTS

Development Interests		ISSUE		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
Item	Votes	Issue	Breakout Groups	Other Groups	Other Groups	Other Groups	Other Groups	Other Groups	Other Groups
17	7 18%	Use existing TCEQ regulations as "plan". Implement program for government maintenance responsibility.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 1 3 1 - 0 0 4	10 4%				
	40								250

STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: PUBLIC INTEREST ORGANIZATIONS

Public Interest Orgs.		ISSUE		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
	Votes								
1	5 20%	WQ impacts: includes E&T species, non-degradation of water quality, evaluating appropriateness of water supply sources, and wastewater treatment. Also includes, quantity and quality.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	11 5 6 3 0 - 10 8			43 18%	
2	0 0%	Legal analysis/evaluation of efficacy of various regulations.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 1 1 - 0 0			2 1%	
3	0 0%	Filling scientific research gaps.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 2 0 - 0 0			3 1%	
4	4 16%	Enforcement jurisdiction/mechanisms for Aquifer water quality and management. Single aquifer-wide entity.		Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	9 3 6 4 8 - 12 11			53 22%	

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: PUBLIC INTEREST ORGANIZATIONS

Public Interest Orgs.		ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
5	2 8%	Retrofitting of old infrastructure/developments with outdated management practices.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	4 2 3 1 5 - 2 4	21 9%
6	3 12%	Water conservation (rainwater collection) Provide incentives. Eliminate restrictions (financing). Xeriscape/ native plants.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	8 7 6 4 4 - 4 12	45 18%
7	0 0%	Education/outreach.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 1 2 - 0 0	3 1%
8	1 4%	Research needs: BSS levels of WQ constituents which may affect species (dissolved oxygen, pH, contaminants); Types of BMPs/effectiveness; Designing effective cumulative impacts analysis; Funding Sources.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 1 0 2 0 - 2 2	7 3%

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: PUBLIC INTEREST ORGANIZATIONS

Public Interest Orgs. Votes		ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
4 16%		Land acquisition/easements. How much/where? Configuration (landscape level). Funding sources - Revenue streams. Recharge. Critical environmental features.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	5 1 7 2 6 - 2 10	33 14%
3 12%		Impervious cover limits.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	7 5 7 1 0 - 3 5	28 11%
3 12%		Appropriateness of new roads and utilities.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 1 1 4 0 - 0 0	6 2%
25				244	

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: LOCAL ENVIRONMENTAL PRESERVATION / GOOD GOVERNANCE ORGANIZATIONS

Local Env.Pres./
Good Govern. Org.

Votes by
Other
Groups

Total Votes
by Other
Groups

	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
1	Open space - land acquisition & conservation easements as part of the Plan.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	8 2 5 2 2 3 - 10	32 14%
2	Open public decision-making in the government process by getting more citizens involved.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 2 0 0 - 0	2 1%
3	Conservation of Barton Springs salamander and other rare and endangered species.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 1 0 0 1 - 1	4 2%
4	Land stewardship for water quality and water quality effect on wildlife.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 1 2 0 1 - 0	5 2%

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: LOCAL ENVIRONMENTAL PRESERVATION / GOOD GOVERNANCE ORGANIZATIONS

Local Env.Pres./
Good Govern. Org.

Item	Local Env.Pres./ Good Govern. Org.		ISSUE	Breakout Groups	Other Groups		Total Votes by Other Groups	
	Votes	Percentage			Votes	Percentage		
5	0	0%	New paradigm to replaced bulldozing the environment.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	0	0%
6	0	0%	Developers required to do rigorous environmental impact studies before getting approvals to build.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	0	0%
7	8	24%	Create an authority/ perhaps combine the Trinity Aquifer District and BSEACD and give them authority to <u>review</u> and <u>approve</u> development applications for compliance with water quality provisions, and enforce WQ protection measures, and maintain WQ structures.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	13	31	13	14%
8	0	0%	Water lines, wastewater directed off the Barton Springs zone.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	0	0%

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: LOCAL ENVIRONMENTAL PRESERVATION / GOOD GOVERNANCE ORGANIZATIONS

Local Env.Pres./
Good Govern. Org.

Votes by
Other
Groups

Total Votes
by Other
Groups

ISSUE	Breakout Groups	Other Groups	Total Votes by Other Groups
9 Limit density & impervious cover of development to assure nondegradation, sustainability and sufficient water supply.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	10 2 19 1 2 4 - 11	49 22%
10 Wastewater management/reuse must be considered and its impact on the environment, conservation and supply.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 1 1 0 0 - 0	2 1%
11 Advocate rainwater harvesting as the first source of supply.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 0 1 - 0	1 0%
12 Prevent additional traffic in the Barton Springs Zone and reduce vehicle miles traveled with a transportation plan that limits access to the Barton Springs Zone.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 3 0 0 0 1 - 0	4 2%

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: LOCAL ENVIRONMENTAL PRESERVATION / GOOD GOVERNANCE ORGANIZATIONS

Local Env.Pres./
Good Govern. Org.

Votes	ISSUE	Breakout Groups	Votes by Other Groups	Total Votes by Other Groups
0 0%	Research to fill gaps in technical knowledge about the effect of water quality.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 1 0 - 1	2 1%
3 9%	What effect will centralized sewer have vs. septic systems.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 2 0 4 1 0 - 2	12 5%
0 0%	Prohibit industries that would pollute the aquifer from locating in the Barton Springs Zone.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 0 0 0 0 - 0	1 0%
5 15%	Control the bad effects of increased volumes of runoff from development. Post development hydrology should equal pre-development hydrology: both peak flows and volume.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	10 4 2 1 1 1 - 5	24 11%

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: LOCAL ENVIRONMENTAL PRESERVATION / GOOD GOVERNANCE ORGANIZATIONS

Local Env.Pres./
Good Govern. Org.

Item	ISSUE		Breakout Groups	Votes by Other Groups		Total Votes by Other Groups
	Votes			Groups	Groups	
17	0 0%	Captured volumes that are re-irrigated and percolate into the Aquifer should not pollute the Aquifer.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 0 0 -	0 0 0 0 0 0 0	0 0%
18	0 0%	Some pre-developed flows may exceed good levels due to poor land management.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 1 0 0 0 -	1 0 0 0 0 0 0	1 0%
19	0 0%	Require xeriscaping and IPM (integrated pest management) to eliminate the use of herbicides and pesticides.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	4 2 3 0 2 1 -	13 6%	
20	0 0%	Developer and neighborhoods conduct joint predevelopment planning sessions.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	3 0 0 1 3 0 -	7 3%	

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: LOCAL ENVIRONMENTAL PRESERVATION / GOOD GOVERNANCE ORGANIZATIONS

Local Env.Pres./
Good Govern. Org.

21	ISSUE	Breakout Groups	Votes by	
			Other Groups	Total Votes by Other Groups
3 9%	Moratorium on Development within watershed until Regional Plan Adoption.	Neighborhood Interests	14	36 16%
		Concerned Citizens	7	
		Property Owners	11	
		Economic Interests	0	
		Development Interests	0	
		Public Interest Organizations	1	
		Local Environmental Preserv./Good Governance Orgs.	-	
		Government Entities	3	
34				222

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: GOVERNMENT ENTITIES

Item	Government Entities		ISSUE	Breakout Groups		Total Votes	
	Votes	Percentage		Other Groups	Government Groups	Other Groups	Percentage
1	10	20%	Water quality too narrow, include other water impact related issues (stream erosion, head water protection, water use).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	24 11 15 2 2 4 10	68 28%	
2	0	0%	Recharge water quality.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 0 0 0	0 0%	
3	1	2%	Legally defensible measures.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 0 0 0	0 0%	
4	7	14%	BMP Issues: BMPs that require minimal maintenance; Institutional framework for BMP maintenance; Funding for monitoring BMPs; Preference for non-structural BMPs.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	11 2 2 1 3 2 10	31 13%	

STAKEHOLDER ISSUE VOTING

JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: GOVERNMENT ENTITIES

Government Entities		ISSUE	Breakout Groups		Votes by Other Groups		Total Votes by Other Groups			
Government Entities	Votes		Neighborhood Interests	Concerned Citizens	Property Owners	Economic Interests	Development Interests	Public Interest Organizations	Local Environmental Preserv./Good Governance Orgs.	Government Entities
5	10 20%	Define local governmental roles and responsibilities. Is a regional entity needed and appropriate (centralized vs. decentralized)?	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	8	1	4	4	1	1	22 9%
6	0 0%	Resolution of mandated missions with respect to goals of this process (unfunded mandates).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	0	0	0	0	0 0%
7	0 0%	Confidence that plan will provide adequate protection (HCP).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	0	1	0	0	0	1 0%
8	0 0%	How do we define success?	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0	2	0	0	0	0	2 1%

**STAKEHOLDER ISSUE VOTING
JUNE 30, 2004 STAKEHOLDER MEETING**

GROUP: GOVERNMENT ENTITIES

Government Entities		Breakout Groups		Total Votes by Other Groups	
Government Entities Votes	ISSUE	Breakout Groups	Other Groups	Other Groups	by Other Groups
9	Balance science against best professional judgments.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 1 0 0 0 -	1 0%	
10	Goal definition: Define non-degradation. Is non-degradation achievable? What level of degradation of aquifer is acceptable, if any? How can non-degradation be achieved?	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	5 5 4 2 3 2 2 -	23 10%	
11	How does sustainable yield of the aquifer factor in this discussion (water quality)?	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 0 0 0 1 -	1 0%	
12	Cost/benefit analysis (regulatory).	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	0 0 0 2 0 0 0 -	2 1%	

Appendix L
Implementation Matrix

STAKEHOLDER ISSUE VOTING JUNE 30, 2004 STAKEHOLDER MEETING

GROUP: GOVERNMENT ENTITIES

Government Entities		ISSUE		Breakout Groups		Votes by Other Groups		Total Votes by Other Groups	
	Votes					Groups	Groups	Groups	Groups
17	1 2%	Funding mechanisms for implementation, maintenance and enforcement.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	13 2 9 1 10 4 6 -	45 19%				
18	4 8%	Work within the existing systems.	Neighborhood Interests Concerned Citizens Property Owners Economic Interests Development Interests Public Interest Organizations Local Environmental Preserv./Good Governance Orgs. Government Entities	1 0 1 0 4 0 0 -	6 2%				
									241

50



Appendix C

Stakeholder Committee Meeting Information



Presentation Outline for Stakeholder Committee Organizational Meeting

- 1. Greeting (Terry Tull – 5 minutes)**
 - a. Thanks for coming to the meeting*
 - b. Reminder to sign in, pick up agenda and information packet*
 - c. Layout of facilities, restroom locations, and thanks to Waldorf School for hosting this meeting*
 - d. Introductions (Executive/Core Committee members, local public officials, members of consulting team)*
- 2. Background (Terry Tull – 15 minutes)**
 - a. How the process started.*
 - b. Where we have been including initial efforts by the Core Committee and Executive Committee, Settlement Agreement between LCRA and USFW, hiring of the consultant team.*
 - c. Source of the funding for the study including LCRA funds, TWDB grant and in-kind contributions. Reminder that registration helps the Project meet its in-kind match requirement for the TWDB grant.*
 - d. Work orders and timeline for completion of the plan.*
- 3. Communication (Terry Tull – 15 minutes)**
 - a. There has been a web-site established for this planning process and is located at www.waterqualityplan.org*
 - b. A Stakeholder list is being developed with e-mail addresses and mailing addresses for notices of meetings and other information dealing with the planning process.*
 - c. This web site will contain information on meetings, documents, minutes from the Core Committee and Executive Committee, Stakeholder Committee, lists of reports being used by the Consultant Team for this plan, as well as the milestone reports filed by the Consultant Team.*
 - d. Persons that do not have access to the internet may review documents and information through designated locations including:*
 - i) the Executive Directors office*
 - ii) Travis County Precinct 3 office*
 - iii) The Sunset Valley City Hall*

iv) The Rollingwood City Hall

v) Buda City Hall

vi) The Austin Central Library

vii) Naismith Engineering, Inc.

4. Review of Participant Information Handout (Grant Jackson – 10 minutes)

- a. Summary of Goals/Objectives for this meeting.*
- b. Guidelines for conducting the meeting.*
- c. Expectations for Participants in the Initial Meeting.*
- d. Expectations for Stakeholder Committee Members.*
- e. Expectations for Stakeholder Committee Members.*
- f. Other Opportunities for Involvement.*
- g. Evaluation Forms.*

5. Outline of the Planning Process (Tom Brown – 20 minutes)

- a. Graphic showing the planning process.*
- b. Purpose of developing the plan is to provide a guide for the development of water quality standards that can be implemented by the local governments and be voluntarily adopted by private interests to assist in water quality protection.*
- c. The development of the plan is to actively involve stakeholders that are interested in water quality and the impacts associated with development within the project area.*
- d. The Stakeholder Committee will identify the key issues to be addressed and will oversee, review and comment on the work products produced by the Consulting Team*
- e. Given the large number of interested persons in this planning process we feel that it will be necessary to develop a Stakeholder Committee to work with the Executive Director, as the representative of the Core Committee, and the Consultant Team. In order to have a manageable size the Committee will be limited to 24-32 representatives and represent between 6-12 communities of interest identified by the Stakeholders at this meeting.*
- f. Based on previous Stakeholder meetings and those attending the Executive Committee and Core Committee meetings the following community of interests were identified:*

- i) **Property Owners which include large and medium size landowners and agricultural interests.**
 - ii) **Development Interests which include persons or groups interested in platting and subdividing property for the developmental purposes.**
 - iii) **Neighborhood Interests which include Home Owner Associations, Property Owner Associations, Neighborhood Associations.**
 - iv) **Public Interest Organizations which include organized groups that advocate positions on growth and development, environmental issues or other resource conservation issues.**
 - v) **Environmental Interest/Preservation groups which include local groups primarily interested in the protection of local resources as well as conservancy of land for open space and habitat protection.**
 - vi) **Governmental Entities which include affected cities, counties, special purpose districts, as well as other utility providers.**
 - vii) **Economic Development interests including local business owners, business or economic development associations including chambers of commerce, real estate interests, and home builders associations.**
 - viii) **Concerned Citizens include those individuals that are interested in water quality protection but do not feel that their interests do not coincide with other identified interest groups.**
 - ix) **Additionally, there are agency and institutional resources available to the stakeholders that have a direct impact on water quality issues including the Texas Commission on Environmental Quality (TCEQ), U.S. Fish and Wildlife Service (USFW), Texas Department of Transportation (TXDOT), Texas Parks and Wildlife (TPW), Lower Colorado River Authority (LCRA), Guadalupe Blanco River Authority (GBRA), and state and local elected officials.**
- 6. Identification of Stakeholder Categories (Leonard Olson – 20 minutes)**
- a. Listing of Categories developed from previous involvement*
 - b. Nominations from the floor for adding additional categories or deleting previously identified categories, with justification.*
 - c. Voting instructions*
- 7. Break-Out Group Instructions (Grant Jackson – 5 minutes)**
- a. Listing of Final Stakeholder Categories, including changes from voting*
 - b. Identification of Floating Moderators for each Break-out Session*
 - i) **Property Owners - Leonard**

- ii) **Development Interests – Grant**
- iii) **Neighborhood Interests – Terry**
- iv) **Public Interest Organizations – Tom**
- v) **Environmental Interest/Preservation – Grant**
- vi) **Governmental Entities – Tom**
- vii) **Economic Development – Leonard**
- viii) **Concerned Citizens - Terry**
- c. ***Objectives for Break-out Sessions***
 - i) **Discuss stakeholder process and how your category fits**
 - ii) **Identify your category's Top 10 (or fewer) key issues**
 - iii) **Get to know the other participants in your category**
- d. ***Deliverables for Break-out Sessions***
 - i) **List of participants in the session**
 - ii) **List of key issues**
 - iii) **Collected Evaluation Forms**
- e. ***Thanks again for participation. The meeting is concluded after the break-out sessions and the building closes at 9:30 pm.***

8. Props

- a. ***Powerpoint Projector (backup?)***
- b. ***Screen***
- c. ***Nametags and Holders (Suggest recyclable materials)***
- d. ***Markers & Pens***
- e. ***Rip Charts with easels (8?)***
- f. ***Stakeholder Handouts (300?)***
- g. ***Stakeholder Category Voting Dots (300?)***
- h. ***Notepads for Moderators***
- i. ***Refreshments***

MEETING INFORMATION

Meeting Date and Time: June 8, 2004, at 6:00 pm

Meeting Location: The Waldorf School, off U.S. Highway 290, between Austin and Dripping Springs, in Travis County, Texas

Contact Information: Terry Tull, Executive Director
Regional Water Quality Planning Project
P.O. Box 384
Dripping Springs, Texas 78620
Telephone: (512) 858-2148 Fax: (512) 858-5646
E-mail: regionalplan@zeecon.com

Tom Brown
Naismith Engineering, Inc.
600 West Eighth Street, Suite 300
Austin, Texas 78701
Telephone: (512) 708-9322 Fax: (512) 708-9014
E-mail: tbrown@naismith-engineering.com

Website: www.waterqualityplan.org

AGENDA

Time	Activity
6:00 pm	Welcome/Opening Remarks – Terry Tull, Executive Director, Regional Water Quality Planning Project
6:35 pm	Review of Participant Information Handout – Grant Jackson, Naismith Engineering
6:45 pm	Overview of the Planning Process – Tom Brown, Naismith Engineering
7:05 pm	Question/Answer Session on the Planning Process
7:15 pm	Identification of Stakeholder Categories – Leonard Olson, Good Company Associates
7:35 pm	Break
7:45 pm	Break-out Group Instructions – Grant Jackson, Naismith Engineering
7:55 pm	Begin Break-out Sessions
8:45 pm	End of Break-out Sessions
9:00 pm	Building Closed

WELCOME

Welcome to the Stakeholder Committee Organizational Meeting for the Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone (the "Project"). On behalf of the Executive and Core Committees, "Thank You" for your attendance and participation. **The purpose of this initial meeting is to identify categories of stakeholders for participation in a stakeholders committee.** The following objectives will help achieve that purpose:

- Provide some general background information on the Project, including the goals established for the Project.
- Identify some initial categories of stakeholders based on previous involvement in the Project.
- Identify additional categories of stakeholders based on input from participants.
- Break-out into the identified categories of stakeholders to discuss issues and goals for the process.
- Outline the process and agenda for the next stakeholder meeting.

In consideration of your valuable time, we will follow the scheduled beginning and ending times shown on the meeting agenda. Please be sure to sign the registration sheet, since your participation counts towards an in-kind match for some of the grant funds secured for the Project. Your attendance, participation and enthusiasm are appreciated.

GUIDELINES

To help maintain an effective and productive meeting, please observe a few simple guidelines:

- Focus on the purpose and objectives of the meeting.
- Be courteous and considerate of others.
- Please turn off all cell phones, pagers, etc. to avoid disrupting the meeting.
- Provide honest, straightforward input.
- Be willing to rationally discuss all points of view, even those with which you personally disagree.
- Be positive.
- Resist the urge to monopolize the discussion. Express your ideas, then allow others to do the same.
- Listen to the other participants and digest their input.
- Remember that this is an initial "set-up" session. Give the process an opportunity to work. Some of the concepts presented and discussed will be good, while others may be inappropriate for various reasons. You may even personally disagree with some concepts. However, this is not the appropriate forum for a critical evaluation of these concepts. The critical evaluation of ideas and concepts will occur later in the process.

By following these simple guidelines, we can all be assured a successful meeting.

EXPECTATIONS FOR PARTICIPANTS IN THE STAKEHOLDER COMMITTEE ORGANIZATIONAL MEETING

During this initial meeting you will be requested to:

- Register and wear a name tag. By registering, you will have your time credited as an in-kind match that helps the Project fulfill its requirements under a grant obtained from the Texas Water Development Board. You will also have the option of being placed on the electronic notification list for the Project.
- Attend the entire meeting, including the initial presentations and the break-out sessions.
- Select the stakeholder category that you feel most closely represents your role and concerns, and participate in the break-out session for that category.
- Be willing to assist the break-out session moderator. Each session will be moderated by a member of the consulting team. However, volunteers will be needed to assist the moderator.
- Follow the Guidelines for conducting the meeting (presented on the previous page).

EXPECTATIONS FOR STAKEHOLDER COMMITTEE MEMBERS

The selection of representatives to the Stakeholder Committee will be made at the next Stakeholder Meeting. If you are selected as a representative to the Stakeholder Committee by your category, you will be expected to do the following:

- Carefully consider the requirements (in time and effort) before agreeing to serve as a representative on the Stakeholder Committee.
- Attend the remainder of the stakeholder meetings. Current plans are to conduct four (4) additional stakeholder meetings over the next eight (8) months. Each meeting will be approximately four (4) hours in length and will take place at a location within the region, on a date and time established at the previous meeting.
- Review and evaluate materials submitted to you prior to the meetings, to facilitate informed discussion.
- Communicate and meet with members of your stakeholder category to develop input for the Stakeholder Committee meetings.
- Represent the views and interests of your stakeholder category on the Stakeholder Committee.
- Participate in Technical Working Groups outside of the regular Stakeholder Committee meetings.
- Work with the Project Executive Director and Consulting Team to provide input and feedback on issues and resolutions presented.
- Follow the Guidelines for participating in the meetings.

INVOLVMENT FOR STAKEHOLDERS OUTSIDE THE COMMITTEE

- Offering public comment at future Stakeholder Committee meetings.
- Participation in Technical Working Groups reporting to the Stakeholder Committee.
- Regular communication with a Stakeholder Committee Representative.

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The stakeholder involvement opportunities were clearly outlined	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The stakeholder process outlined will allow adequate input	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The stakeholder process outlined will address your individual concerns/goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please place this form in the designated box as you leave the meeting. Thanks again for your participation!

Stakeholder Committee Organizational Meeting

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Or the

“Regional Water Quality Planning Project”

Waldorf School
June 8, 2004

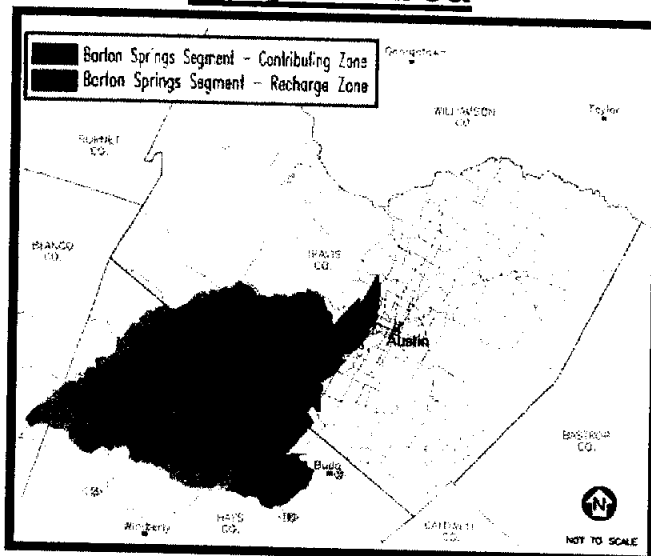
Welcome

- Register
 - Sign-in Sheet
 - Agenda
 - Information Packet
 - Sign-up for Notification List
 - Privacy Policy
- Waldorf School Facilities
- Please turn off all cell phones, pagers, etc.
- Introductions
- Our Topic: WATER QUALITY PROTECTION
PLANNING

Regional Water Quality Planning Project

June 8, 2004

Project Area



Regional Water Quality Planning Project

June 8, 2004

Regional Water Quality Planning Project

- Why are we here?
- How did we get here?
- Where are we going?
- How do we get there?
- When do we get there?

Regional Water Quality Planning Project

June 8, 2004

Why are we here?

- Start creating a WATER QUALITY PROTECTION PLAN
- Create a common understanding of PURPOSE
- Create a common baseline of KNOWLEDGE
- Begin MEANINGFUL STAKEHOLDER PARTICIPATION
- Establish PROCESS and PROCEDURES

Regional Water Quality Planning Project

June 8, 2004

How did we get here?

- Need for water quality protection plan highlighted by US 290 Pipeline project, other events
- Local governments want resolution
- Inter-local agreement to create plan
- Stakeholders demanded involvement in the process
- September 2003 Stakeholder Meeting
- Naismith Engineering hired to produce plan
- Executive Director hired to manage process

Regional Water Quality Planning Project

June 8, 2004

Where are we going?

- Effective water quality protection plan
 - Will ensure aquifer protection
 - “Implementable” by jurisdictions
 - Voluntary measures included
- Stakeholder acceptance and support
 - Recognizes diverse stakeholder interests
 - Real stakeholder role in creating the plan
- Provide local governments with basis for decisions

Regional Water Quality Planning Project

June 8, 2004

How do we get there?

- Executive Committee: **funding and oversight**
- Core Committee: **process guidance**
- Stakeholder Committee: **consensus agreement: issues, process & outcome**
- Executive Director: **process management**
- Naismith Engineering, Inc.: **plan development**
- Local governments: **plan implementation**
- Individual stakeholders: **voluntary implementation**

Regional Water Quality Planning Project

June 8, 2004

Resources

- LCRA grant: \$100,000
- TWDB grant: \$128,000 matching funds
 - Matched against:
 - LCRA funding
 - Other in-kind support provided
 - Volunteer effort
 - Public participation
- Opportunities for Support & Recognition
 - Public
 - Private

Regional Water Quality Planning Project

June 8, 2004

Communications

- Website: www.waterqualityplan.org
- Email: regionalplan@zeecon.com
- Phone: (512) 858-2148
- Mail: Regional Water Quality Planning Project
c/o City of Dripping Springs
P.O. Box 384
Dripping Springs, Texas 78620
- Public repository locations
- SIGN UP FOR NOTIFICATION LIST!

Regional Water Quality Planning Project

June 8, 2004

Participant Information Handout – Page 1

Regional Water Quality Planning Project
 Meeting Information

MEETING INFORMATION

Meeting Location: Regional Water Quality Planning Project
 Meeting Date: June 8, 2004
 Meeting Time: 9:00 AM - 12:00 PM
 Meeting Contact: [Name], [Phone], [Email]

AGENDA

- 9:00 am - Welcome
- 9:30 am - Regional Water Quality Planning Project
- 10:00 am - Regional Water Quality Planning Project
- 10:30 am - Regional Water Quality Planning Project
- 11:00 am - Regional Water Quality Planning Project
- 11:30 am - Regional Water Quality Planning Project
- 12:00 pm - Regional Water Quality Planning Project

- Meeting Information
 - Project Executive Director
 - Consultant Team – Naismith Engineering
 - Website: waterqualityplan.org
- Agenda

Participant Information Handout – Page 2

Regional Water Quality Planning Project
 Meeting Information

WELCOME

The purpose of this meeting is to provide an overview of the project and to identify stakeholders. The meeting will be held on June 8, 2004, from 9:00 AM to 12:00 PM. The meeting will be held at the Regional Water Quality Planning Project. The meeting will be held at the Regional Water Quality Planning Project. The meeting will be held at the Regional Water Quality Planning Project.

GUIDELINES

- Please arrive on time.
- Please turn off your cell phone.
- Please do not drink alcohol.
- Please do not use profanity.
- Please do not use foul language.
- Please do not use profanity.
- Please do not use foul language.
- Please do not use profanity.
- Please do not use foul language.

- Welcome
 - Purpose: Identify Categories of Stakeholders
 - Break-out Groups
- Guidelines

Participant Information Handout – Page 3

EXPECTATIONS FOR PARTICIPANTS IN THE STAKEHOLDER COMMITTEE ORGANIZATIONAL MEETING

- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.

EXPECTATIONS FOR STAKEHOLDER COMMITTEE MEMBERS

- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.

INVOLVEMENT FOR STAKEHOLDERS OUTSIDE THE COMMITTEE

- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.
- Expect to meet at least one other stakeholder representative from your organization and to discuss the meeting agenda and the meeting objectives.

- Expectations for Participants in the Stakeholder Committee Organizational Meeting
- Expectations for Stakeholder Committee Members
- Involvement for Stakeholders Outside the Committee

Participant Information Handout – Page 4

EVALUATION FORM

1. How useful was the information presented?

2. How clear was the information presented?

3. How well did the meeting address your concerns?

4. How well did the meeting address the concerns of other stakeholders?

5. How well did the meeting address the concerns of the community?

6. How well did the meeting address the concerns of the regulatory agencies?

7. How well did the meeting address the concerns of the media?

8. How well did the meeting address the concerns of the public?

9. How well did the meeting address the concerns of the business community?

10. How well did the meeting address the concerns of the academic community?

11. How well did the meeting address the concerns of the environmental community?

12. How well did the meeting address the concerns of the political community?

13. How well did the meeting address the concerns of the religious community?

14. How well did the meeting address the concerns of the cultural community?

15. How well did the meeting address the concerns of the ethnic community?

16. How well did the meeting address the concerns of the disabled community?

17. How well did the meeting address the concerns of the low-income community?

18. How well did the meeting address the concerns of the elderly community?

19. How well did the meeting address the concerns of the young community?

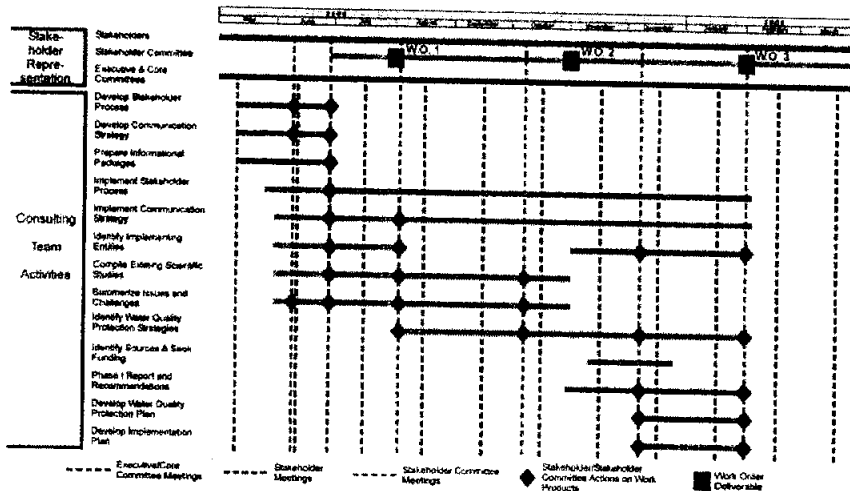
20. How well did the meeting address the concerns of the overall community?

- Evaluation Form
 - Complete
 - Turn in at conclusion of break-out session

Overview of the Planning Process

PROJECT TASKS AND OVERVIEW OF PLANNING PROCESS

Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone



Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process (Continued)

- Purpose: to provide a guide for developing water quality protection standards that can be implemented by local governments and be voluntarily adopted by private interests
- Will reflect consensus agreement among stakeholders

Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process **(Continued)**

- Large Number of Stakeholders
- Stakeholder Committee
 - Work with the Executive Director, as the representative of the Core Committee, and the Consultant Team
 - Manageable Size: 24-32 Representatives
 - Representing approximately 6-12 communities of interest, identified by the Stakeholders

Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process **(Continued)**

- Based on previous Stakeholder meetings and those attending the Executive Committee and Core Committee meetings the following communities of interests have been identified:
 - Property Owners - large and medium size landowners and agricultural interests
 - Development Interests – persons/groups interested in platting, subdividing and constructing new residential and commercial developments
 - Neighborhood Interests - existing home owners associations, property owner associations, and neighborhood associations
 - Public Interest Organizations - organized groups that advocate regional and/or national policies on environmental protection and resource conservation.

Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process **(Continued)**

- **Communities of Interest (Continued) :**
 - Environmental Preservation/Local Interest groups - local groups primarily interested in the protection of local resources as well as conservancy of land for open space and habitat protection, and groups advocating effective local governance.
 - Governmental Entities - affected cities, counties, special purpose districts, and other utility providers.
 - Economic interests - existing local business owners, business or economic development associations, chambers of commerce, and real estate interests.
 - Concerned Citizens - those individuals that are interested in water quality protection but do not feel that their interests coincide with other identified groups.

Regional Water Quality Planning Project

June 8, 2004

Other Entities With An Interest in the **Final Plan**

- **Agency and Institutional Resources with:**
 - An interest in the planning process
 - A direct impact on water quality issues
- **Examples:**
 - US Fish and Wildlife Service (USFW)
 - Texas Commission on Environmental Quality (TCEQ)
 - Texas Department of Transportation (TXDOT)
 - Texas Parks and Wildlife Department (TPWD)
 - Lower Colorado River Authority (LCRA)
 - Guadalupe Blanco River Authority (GBRA)
 - State and local elected officials

Regional Water Quality Planning Project

June 8, 2004

Questions on the Planning Process



- Terry Tull, Executive Director, Regional Water Quality Planning Project
- Grant Jackson, Naismith Engineering
- Tom Brown, Naismith Engineering
- Leonard Olson, Good Company Associates (NEI Team Member)

Regional Water Quality Planning Project

June 8, 2004

Identification of Stakeholder Categories

- Property Owners - large and medium size landowners and agricultural interests
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- Concerned Citizens - those individuals that are interested in water quality protection but do not feel that their interests coincide with other identified groups.

Regional Water Quality Planning Project

June 8, 2004

Review of Stakeholder Categories

- Nominations for adding categories, with justification offered.
- Voting instructions:
 - Each participant allowed up to three votes.
 - Each vote must be used on only one category.
 - May be either “add” or “don’t add”.

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Identification

- Final listing of Stakeholder Categories
- Moderators
 - Property Owners – Leonard Olson
 - Concerned Citizens – Leonard Olson
 - Development Interests – Grant Jackson
 - Environmental Preservation/Local Interest groups – Grant Jackson
 - Neighborhood Interests – Tom Brown
 - Public Interest Organizations – Tom Brown
 - Governmental Entities – David Fusilier
 - Economic interests – David Fusilier

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Instructions

➤ Objectives:

- Get to know the other participants in your category.
- Identify your category's key issues.
- Participate in the discussion to determine if this category represents a forum for issues important to you.
- Offer input on the stakeholder process.

➤ Deliverables:

- List of participants.
- List of key issues.
- Evaluation Forms.

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Instructions (Continued)

➤ Procedures:

- Moderator will appoint a volunteer stenographer.
- Stenographer will direct discussion around the room, providing each participant the opportunity to identify one key issue.
- Proceed around the room, allowing each participant to bring up additional issues (one per round), as time permits.
- Stenographer records issues on rip-chart

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Instructions (Continued)

- Things to Avoid:
 - Critical commentary on issues raised by other participants.
 - Breaking the Guidelines.
- Future Break-out Sessions:
 - Sessions at the next Stakeholder Meeting will distill and prioritize the issues.
 - Stakeholder Committee representatives will be selected at the next Stakeholder Meeting
 - Stakeholder Committee may also conduct additional break-out and/or technical working group sessions .

Regional Water Quality Planning Project

June 8, 2004

Closing Remarks

- Thanks again for participation.
- This meeting is concluded after the break-out sessions.
- Building closes at 9:00 p.m.
- Please turn in Evaluation Forms
- Tentative Date for next Stakeholder Meeting: Saturday, June 26, 2004

Regional Water Quality Planning Project

June 8, 2004

MEETING SUMMARY

MEETING INFORMATION

The meeting was held at the Waldorf School, off U.S. Highway 290, between Austin and Dripping Springs, on June 8, 2004, from 6:00 to 9:00 pm

PARTICIPANT INFORMATION

- 61 people registered participate. Approximately 10 additional people attended but didn't register (e.g. reporters, etc.)
- 4 members of the consulting team and Executive Director Terry Tull conducted the meeting.

ACCOMPLISHMENTS

- Presentations on the history of the process, the purpose for the meeting, and outlines of what to expect at future meetings.
- Question and answer session.
- 8 tentative Stakeholders categories were presented by the consulting team and confirmed by the participants:
 - Property Owners
 - Environmental Preservation/Local Interest Groups
 - Public Interest Organizations
 - Economic Interests
 - Concerned Citizens
 - Development Interests
 - Neighborhood Interests
 - Governmental Entities
- Break-out groups identified and discussed key issues for each Stakeholder category.
- Participants evaluated all elements of the meeting.

FEEDBACK

- Received 36 Evaluation forms following the meeting.
- Greater than 90% of participants rated meeting date, time, location and format as good ("Agree" or "Strongly Agree" on form)
- Greater than 88% of participants rated presentations and materials as good ("Agree" or "Strongly Agree")
- Greater than 85% of participants indicated the proposed Stakeholder process would allow adequate input and address their concerns.
- Some helpful critique was received about the readability of the presentation slides, directions to the facility, and administrative items for the meeting.
- Participants generally indicated that their favorite part of the meeting was the "break-out" sessions and the discussion of issues.

UPCOMING ITEMS

- Next Stakeholder meeting tentatively: Saturday, June 26, 2004 at the Waldorf School
- Prioritizing issues by each Stakeholder category and selection of Stakeholder Committee representatives.

draft – draft - draft - draft – draft - draft

Presentation Outline for the
Stakeholder Committee Selection Meeting
Wednesday, June 30, 2004

- 1. Greeting (Terry Tull – [6:00] 5 minutes)**
 - a. Thanks for coming to the meeting**
 - b. Reminder to sign in, pick up agenda and information packet**
 - c. Layout of facilities, restroom locations, and thanks to Waldorf School for hosting this meeting**
 - d. Introductions (Executive/Core Committee members, local public officials, members of consulting team)**
 - e. Turn off cell phones, pagers, etc.**
 - f. Our Topic: WATER QUALITY PLANNING**

- 2. Communication (Terry Tull – [6:05] 5 minutes)**
 - a. A Stakeholder notification list is being developed.**
 - b. There has been a web-site established for this planning process and is located at www.waterqualityplan.org**
 - c. This web site will contain information on meetings, documents, minutes from the Core Committee and Executive Committee, Stakeholder Committee, lists of reports being used by the Consultant Team for this plan, as well as the milestone reports filed by the Consultant Team.**
 - d. Persons that do not have access to the internet may review documents and information through designated locations including:**
 - 1) The Executive Directors office**
 - 2) Naismith Engineering, Inc.**
 - 3) Other public locations in the future as appropriate**
 - e. Tentative date for the next Stakeholder Meeting: Wednesday, July 21, 2004**

- 3. Background (Terry Tull – [6:10] 5 minutes)**

(This will contain a quick review of the information Terry presented at the previous meeting for those who were not able to attend)

- a. Why are we here?
- b. How did we get here?
- c. Where are we going?
- d. How do we get there?
- e. When do we get there?

4. Meeting Overview (Tom Brown – [6:15] 5 minutes)

- a. Review of Guidelines & expectations for Stakeholders
- b. Review of Agenda
 - 1) Informational presentations.
 - 2) Break-out groups.
 - 3) Break-out group wrap-up/presentations.
 - 4) Initial Meeting of the Stakeholder Committee.
 - 5) Evaluation Forms.
- c. Format and content preview of subsequent meetings
 - 1) Meetings of Stakeholder Committee, with opportunities for input by individual stakeholders.
 - 2) Discussion and/or action on specific agenda items.
 - 3) Opportunity to discuss non-agenda items.

5. Informational Presentations (1 hour)

- a. Legal Issues (Susan Zachos - [6:20] 15 minutes)
 - 1) Impact of CWA & ESA on this process.
 - 2) Who has what authority.
 - 3) Local Authority.
 - 4) ESA: Who are permittees? Who are enforcement authorities?
 - 5) Water/sewer platting requirements.
 - 6) Map of governmental jurisdictions within planning region.
 - 7) Summary of litigation and relevance to the process.
 - 8) Involvement of regulatory agencies—TCEQ, USFWS, TPWD, TSSWCB.
 - 9) Important to highlight that MOU is not an Incidental Take Permit.

- b. **U.S. Fish and Wildlife Service presentation on guidance document for the protection of the Barton Springs Salamander. [6:35] (15 minutes)**
 - c. **Texas Commission on Environmental Quality presentation on the Edwards Aquifer Protection Rules [6:50] (15 minutes)**
 - d. **City of Austin presentation on watershed protection program [7:05] (15 minutes)**
- 6. Break [7:20] (10 minutes)**
- 7. Break-out Group Instructions (Grant Jackson – [7:30] 15 minutes)**
- a. **Graphic showing the planning process.**
 - b. **Objectives for Break-out Sessions**
 - 1) **Select stakeholder representatives**
 - 2) **Identify/prioritize issues to be addressed and goals for plan**
 - 3) **Get to know the other participants in your category**
 - c. **Each category to select three (3) representatives to the Stakeholder Committee:**
 - 1) **Nominations from the floor**
 - 2) **Popular vote: three (3) nominated candidates getting the most votes**
 - 3) **Alternates?**
 - 4) **Spokesperson for the Break-out Wrap-up?**
 - d. **Stakeholder Committee representatives will take turns moderating discussion on:**
 - 1) **Review of issues identified during previous stakeholder meeting.**
 - 2) **Prioritize the Top Ten issues/areas to be addressed by the plan, then a cumulative list of any others.**
 - 3) **Prioritize the Top Ten implementation goals for the plan, then a cumulative list of any others.**
 - 4) **Concerns, issues and goals to be presented in break-out wrap-up (5 min. max. for presentation).**
 - e. **Each stakeholder category will vote on each of the other categories priorities during break between wrap-up presentations and the Stakeholder Committee meeting.**
 - f. **Deliverables for Break-out Sessions**

- 1) **List of participants in the session**
 - 2) **List of prioritized issues/implementation goals that were identified at the first meeting**
 - 3) **Selection of three representatives and one alternate for the Stakeholder Committee.**
 - 4) **Written outline of presentation for wrap-up**
 - 5) **Collected Evaluation Forms**
- g. Stakeholder categories affirmed at the previous meeting:**
- 1) **Property Owners - large and medium size landowners and agricultural interests.**
 - 2) **Development Interests – persons/groups interested in platting, subdividing and constructing new residential and commercial developments.**
 - 3) **Neighborhood Interests – existing home owners associations, property owner associations, and neighborhood associations.**
 - 4) **Public Interest Organizations - organized groups that advocate regional and/or national policies on environmental protection and resource conservation.**
 - 5) **Environmental Preservation/Local Interest groups - local groups primarily interested in the protection of local resources as well as conservancy of land for open space and habitat protection, and groups advocating effective local governance.**
 - 6) **Governmental Entities - affected cities, counties, special purpose districts, and other utility providers.**
 - 7) **Economic Development Interests - existing local business owners, business or economic development associations, chambers of commerce, and real estate interests.**
 - 8) **Concerned Citizens - those individuals that are interested in water quality protection but do not feel that their interests coincide with other identified groups.**
- ** - Additionally, there are agency and institutional resources available to the stakeholders that have a direct impact on water quality issues including the Texas Commission on Environmental Quality (TCEQ), U.S. Fish and Wildlife Service (USFW), Texas Department of Transportation (TXDOT), Texas Parks and Wildlife (TPW), Lower Colorado River Authority (LCRA), Guadalupe Blanco River Authority (GBRA), and state and local elected officials.**

h. Identification of Moderators for each Break-out Session

- **Property Owners -** Leonard Olson
- **Development Interests -** David Fusilier
- **Neighborhood Interests -** KH&H
- **Public Interest Organizations -** Hicks & Co.
- **Environmental/Preservation/Local Int. -** Grant Jackson
- **Economic Development -** Eco-SW
- **Concerned Citizens -** CAS

8. Break-out Sessions [7:45] (60 minutes)

- a. **Introductions (5 minutes)**
- b. **Review of issues identified at the first stakeholder meeting. (10 minutes)**
- c. **Identification of additional issues (10 minutes)**
- d. **Dot vote to prioritize the issues with each stakeholder getting five dots (5 minutes)**
- e. **Review voting and rank the priorities (5 minutes)**
- f. **Nominations for stakeholder committee members and alternate. The three nominees with the most votes will be selected as committee members and the nominee with the fourth highest vote total will be the alternate. In case of a tie vote for a position a second vote will be taken. If there still is a tie there will be a coin toss to determine the winner. (10 minutes)**
- g. **Do the vote tally and announce the winners. (5 minutes)**
- h. **Select spokesperson for presentation. (5 minutes)**
- i. **Wrap-up (5 minutes)**

9. Break [8:45] (15 minutes)

10. Reconvene the General Session (Terry Tull - [9:00] 90 minutes)

- a. **Announce committee selections from the breakout groups (5 minutes)**
- b. **Ask spokesperson to review priorities established by the stakeholder groups. (15 minutes)**
- c. **Review dot voting by each group on the priorities. Each person will get three dots for each group, twenty-four in total, that will be used to indicate the individuals ranking of the other groups priorities. (15 minutes)**
- d. **Tally and announce the results (15 minutes)**

- e. Convene the Stakeholder Committee with Terry Tull being the Committee Coordinator. (10 minutes)**
- f. Distribute draft bylaws and give a general overview of the bylaws. (10 minutes)**
- g. Review project development schedule. (5 minutes)**
- h. Questions from the Committee. (10 minutes)**
- i. Set next meeting date (5 minutes)**
- j. Adjourn [10:30]**

Stakeholder Committee Organizational Meeting

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Or the

“Regional Water Quality Planning Project”

Waldorf School
June 8, 2004

Welcome

- Register
 - Sign-in Sheet
 - Agenda
 - Information Packet
 - Sign-up for Notification List
 - Privacy Policy
- Waldorf School Facilities
- Please turn off all cell phones, pagers, etc.
- Introductions
- Our Topic: WATER QUALITY PROTECTION
PLANNING

Regional Water Quality Planning Project

June 8, 2004

Regional Water Quality Planning Project

- Why are we here?
- How did we get here?
- Where are we going?
- How do we get there?
- When do we get there?

Regional Water Quality Planning Project

June 8, 2004

Why are we here?

- Start creating a WATER QUALITY PROTECTION PLAN
- Create a common understanding of PURPOSE
- Create a common baseline of KNOWLEDGE
- Begin MEANINGFUL STAKEHOLDER PARTICIPATION
- Establish PROCESS and PROCEDURES

Regional Water Quality Planning Project

June 8, 2004

How did we get here?

- Need for water quality protection plan highlighted by US 290 Pipeline project, other events
- Local governments want resolution
- Inter-local agreement to create plan
- Stakeholders demanded involvement in the process
- September 2003 Stakeholder Meeting
- Naismith Engineering hired to produce plan
- Executive Director hired to manage process

Regional Water Quality Planning Project

June 8, 2004

Where are we going?

- Effective water quality protection plan
 - Will ensure aquifer protection
 - “Implementable” by jurisdictions
 - Voluntary measures included
- Stakeholder acceptance and support
 - Recognizes diverse stakeholder interests
 - Real stakeholder role in creating the plan
- Provide local governments with basis for decisions

Regional Water Quality Planning Project

June 8, 2004

How do we get there?

- Executive Committee: **funding and oversight**
- Core Committee: **process guidance**
- Stakeholder Committee: **consensus agreement: issues, process & outcome**
- Executive Director: **process management**
- Naismith Engineering, Inc.: **plan development**
- Local governments: **plan implementation**
- Individual stakeholders: **voluntary implementation**

Regional Water Quality Planning Project

June 8, 2004

Resources

- LCRA grant: \$100,000
- TWDB grant: \$128,000 matching funds
 - Matched against:
 - LCRA funding
 - Other in-kind support provided
 - Volunteer effort
 - Public participation
- Opportunities for Support & Recognition
 - Public
 - Private

Regional Water Quality Planning Project

June 8, 2004

Communications

- Website: www.waterqualityplan.org
- Email: regionalplan@zeecon.com
- Phone: (512) 858-2148
- Mail: Regional Water Quality Planning Project
c/o City of Dripping Springs
P.O. Box 384
Dripping Springs, Texas 78620
- Public repository locations
- SIGN UP FOR NOTIFICATION LIST!

Regional Water Quality Planning Project

June 8, 2004

Participant Information Handout – Page 1

For more information, contact the Regional Water Quality Planning Project Executive Director at (512) 858-2148 or regionalplan@zeecon.com.

MEETING INFORMATION

Meeting Location: The Robert Stanley, 4000 Highway 101, Dripping Springs, Texas 78620

Meeting Date: June 10, 2004

Meeting Time: 10:00 AM to 12:00 PM

Meeting Contact: (512) 858-2148

Meeting Agenda: www.waterqualityplan.org

Meeting Registration: www.waterqualityplan.org

Meeting Materials: www.waterqualityplan.org

Meeting Sign-in: www.waterqualityplan.org

Meeting Parking: www.waterqualityplan.org

Meeting Refreshments: www.waterqualityplan.org

Meeting Security: www.waterqualityplan.org

Meeting Signage: www.waterqualityplan.org

Meeting Transportation: www.waterqualityplan.org

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Meeting Signage: www.waterqualityplan.org

Meeting Transportation: www.waterqualityplan.org

Meeting Accommodations: www.waterqualityplan.org

- Meeting Information
 - Project Executive Director
 - Consultant Team – Naismith Engineering
 - Website: waterqualityplan.org
- Agenda

Regional Water Quality Planning Project

June 8, 2004

Participant Information Handout – Page 2

WATER QUALITY PLANNING PROJECT
REGIONAL WATER QUALITY PLANNING PROJECT
WATER QUALITY PLANNING PROJECT

WELCOME

The purpose of this handout is to provide information to participants in the Regional Water Quality Planning Project. The purpose of this handout is to provide information to participants in the Regional Water Quality Planning Project. The purpose of this handout is to provide information to participants in the Regional Water Quality Planning Project.

- Provide your personal information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.

Participants are encouraged to provide information to the Project and help us get to know you better. Participants are encouraged to provide information to the Project and help us get to know you better. Participants are encouraged to provide information to the Project and help us get to know you better.

GUIDELINES

- 1. Participants are encouraged to provide information to the Project and help us get to know you better.
- 2. Participants are encouraged to provide information to the Project and help us get to know you better.
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- 9. Participants are encouraged to provide information to the Project and help us get to know you better.
- 10. Participants are encouraged to provide information to the Project and help us get to know you better.

- Welcome
 - Purpose: Identify Categories of Stakeholders
 - Break-out Groups
- Guidelines

Participant Information Handout – Page 3

WATER QUALITY PLANNING PROJECT
REGIONAL WATER QUALITY PLANNING PROJECT
WATER QUALITY PLANNING PROJECT

EXPECTATIONS FOR PARTICIPANTS IN THE STAKEHOLDER COMMITTEE ORGANIZATIONAL MEETING

- Provide your personal information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.

EXPECTATIONS FOR STAKEHOLDER COMMITTEE MEMBERS

- Provide your personal information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.
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INVOLVEMENT FOR STAKEHOLDERS OUTSIDE THE COMMITTEE

- Provide your personal information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.
- Provide your contact information to the Project and help us get to know you better.

- Expectations for Participants in the Stakeholder Committee Organizational Meeting
- Expectations for Stakeholder Committee Members
- Involvement for Stakeholders Outside the Committee

Participant Information Handout – Page 4

EVALUATION FORM

The following questions are designed to help you evaluate the meeting. Please check the appropriate box for each question. The scale is as follows: 1 = Strongly Dislike, 2 = Dislike, 3 = Neutral, 4 = Like, 5 = Strongly Like.

	Strongly Dislike	Dislike	Neutral	Like	Strongly Like
The meeting was well organized.					
The meeting was well planned.					
The meeting was well presented.					
The meeting was well conducted.					
The meeting was well attended.					
The meeting was well facilitated.					
The meeting was well moderated.					
The meeting was well supported.					
The meeting was well documented.					
The meeting was well summarized.					
The meeting was well concluded.					
The meeting was well evaluated.					

What was the best part of the meeting? What made it good for you?

What was the worst part of the meeting? What made it poor for you?

What suggestions do you have?

Please place this form in the designated box on the floor of the meeting. Thank you for your participation!

➤ Evaluation Form

- Complete
- Turn in at conclusion of break-out session

Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process (Continued)

- **Purpose: to provide a guide for developing water quality protection standards that can be implemented by local governments and be voluntarily adopted by private interests**
- **Will reflect consensus agreement among stakeholders**

Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process **(Continued)**

- Large Number of Stakeholders
- Stakeholder Committee
 - Work with the Executive Director, as the representative of the Core Committee, and the Consultant Team
 - Manageable Size: 24-32 Representatives
 - Representing approximately 6-12 communities of interest, identified by the Stakeholders

Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process **(Continued)**

- Based on previous Stakeholder meetings and those attending the Executive Committee and Core Committee meetings the following communities of interests have been identified:
 - Property Owners - large and medium size landowners and agricultural interests
 - Development Interests – persons/groups interested in platting, subdividing and constructing new residential and commercial developments
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Regional Water Quality Planning Project

June 8, 2004

Overview of the Planning Process **(Continued)**

- **Communities of Interest (Continued) :**
 - Environmental Preservation/Local Interest groups - local groups primarily interested in the protection of local resources as well as conservancy of land for open space and habitat protection, and groups advocating effective local governance.
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 - Concerned Citizens - those individuals that are interested in water quality protection but do not feel that their interests coincide with other identified groups.

Regional Water Quality Planning Project

June 8, 2004

Other Entities With An Interest in the **Final Plan**

- **Agency and Institutional Resources with:**
 - An interest in the planning process
 - A direct impact on water quality issues
- **Examples:**
 - US Fish and Wildlife Service (USFW)
 - Texas Commission on Environmental Quality (TCEQ)
 - Texas Department of Transportation (TXDOT)
 - Texas Parks and Wildlife Department (TPWD)
 - Lower Colorado River Authority (LCRA)
 - Guadalupe Blanco River Authority (GBRA)
 - State and local elected officials

Regional Water Quality Planning Project

June 8, 2004

Questions on the Planning Process



- Terry Tull, Executive Director, Regional Water Quality Planning Project
- Grant Jackson, Naismith Engineering
- Tom Brown, Naismith Engineering
- Leonard Olson, Good Company Associates (NEI Team Member)

Regional Water Quality Planning Project

June 8, 2004

Identification of Stakeholder Categories

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- Neighborhood Interests - existing home owners associations, property owner associations, and neighborhood associations
- Public Interest Organizations - organized groups that advocate regional and/or national policies on environmental protection and resource conservation.
- Environmental Preservation/Local Interest groups - local groups primarily interested in the protection of local resources as well as conservancy of land for open space and habitat protection, and groups advocating effective local governance.
- Governmental Entities - affected cities, counties, special purpose districts, and other utility providers.
- Economic interests - existing local business owners, business or economic development associations chambers of commerce, and real estate interests.
- Concerned Citizens - those individuals that are interested in water quality protection but do not feel that their interests coincide with other identified groups.

Regional Water Quality Planning Project

June 8, 2004

Review of Stakeholder Categories

- Nominations for adding categories, with justification offered.
- Voting instructions:
 - Each participant allowed up to three votes.
 - Each vote must be used on only one category.
 - May be either “add” or “don’t add”.

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Identification

- Final listing of Stakeholder Categories
- Moderators
 - Property Owners – Leonard Olson
 - Concerned Citizens – Leonard Olson
 - Development Interests – Grant Jackson
 - Environmental Preservation/Local Interest groups – Grant Jackson
 - Neighborhood Interests – Tom Brown
 - Public Interest Organizations – Tom Brown
 - Governmental Entities – David Fusilier
 - Economic interests – David Fusilier

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Instructions

➤ Objectives:

- Get to know the other participants in your category.
- Identify your category's key issues.
- Participate in the discussion to determine if this category represents a forum for issues important to you.
- Offer input on the stakeholder process.

➤ Deliverables:

- List of participants.
- List of key issues.
- Evaluation Forms.

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Instructions (Continued)

➤ Procedures:

- Moderator will appoint a volunteer stenographer.
- Stenographer will direct discussion around the room, providing each participant the opportunity to identify one key issue.
- Proceed around the room, allowing each participant to bring up additional issues (one per round), as time permits.
- Stenographer records issues on rip-chart

Regional Water Quality Planning Project

June 8, 2004

Break-out Group Instructions (Continued)

- Things to Avoid:
 - Critical commentary on issues raised by other participants.
 - Breaking the Guidelines.
- Future Break-out Sessions:
 - Sessions at the next Stakeholder Meeting will distill and prioritize the issues.
 - Stakeholder Committee representatives will be selected at the next Stakeholder Meeting
 - Stakeholder Committee may also conduct additional break-out and/or technical working group sessions .

Regional Water Quality Planning Project

June 8, 2004

Closing Remarks

- Thanks again for participation.
- This meeting is concluded after the break-out sessions.
- Building closes at 9:00 p.m.
- Please turn in Evaluation Forms
- Tentative Date for next Stakeholder Meeting: Saturday, June 26, 2004

Regional Water Quality Planning Project

June 8, 2004

STAKEHOLDER COMMITTEE MEETING MINUTES

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: June 30, 2004, at 10:30 pm

Meeting Location: The Waldorf School, off U.S. Highway 290, between Austin and Dripping Springs, in Travis County, Texas

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Charles O' Dell
X	Jon Beall		Jim Phillips
X	Robbie Botto	X	Randy Robinson
X	Henry Brooks	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Harold Daniel	X	J. T. Stewart
X	Joe C. Day	X	Randall Thomas
X	Karen Hadden	X	David Venhuizen
X	Rebecca Hudson	X	Joe Volpe
X	Bryan Jordan	X	Michael Waite
X	Gene Lowenthal	X	Hugh Winkler
X	Nancy McClintock	X	Ira Yates
Present	Alternate	Present	Alternate
X	Dana Blanton	X	Bret Raymis
	Dominic Chavez	X	S.H. Snyder
X	Jack Goodman	X	Donna Tiemann
X	Terry Henry	X	Alex (Sandy) Wood
X	John Mikels		
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Leonard Olson - GCA
X	Tom Brown – NEI		
X	Grant Jackson – NEI		

CALL TO ORDER/DETERMINATION OF QUORUM

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the consulting team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at 10:40 pm. A head count by Coordinator Tull verified that a quorum was present.

NEW BUSINESS

1. Welcome

Coordinator Terry Tull thanked all of the Stakeholder Committee representatives and alternates for their time and participation. He also indicated that the current selections were provisional, that he and the consulting team would be reviewing the Committee representative selections to ensure that they represented all the diverse views needed to reach consensus, and that it may be necessary to make some changes to ensure representation of all views.

2. Bylaws

Copies of draft bylaws developed by the consulting team were distributed and reviewed by Coordinator Terry Tull. Action on approving the bylaws was tabled until the next meeting.

3. Privacy Policy for Stakeholder Information

Coordinator Terry Tull initiated a discussion regarding the privacy of stakeholder contact information. The consensus of the group was that limited contact information (names, telephone numbers and e-mail addresses) of the Stakeholder Committee representatives and alternates could be distributed to: 1) the people participating in the Stakeholder category break-out sessions, and 2) to the Stakeholder Committee representatives and alternates. Additional discussion on this issue was tabled until the next meeting.

4. Schedule

Coordinator Terry Tull initiated a discussion on accelerating the proposed schedule for completion of the regional water quality plan in light of the Lower Colorado River Authority's (LCRA) proposed action on the Hamilton Pool Road waterline. The current schedule for completion of the plan is February 2005, but the LCRA has delayed action on the Hamilton Pool Road waterline until December, 2004. Consulting team representative Grant Jackson provided an overview of the requirements to expedite the schedule. Further action on modifying the schedule was tabled until the next meeting.

5. Expectations at Future Meetings

Consulting team representative Grant Jackson presented an overview of items to be covered at the next Stakeholder Committee meeting:

- Review of the Stakeholder Issue voting from the break-out groups and the general session
- A presentation by members of the consulting team on the existing regulatory authorities of various governmental entities within the planning region
- A presentation by members of the consulting team on the bibliography of technical information to be utilized in developing the regional water quality plan

- A presentation by members of the consulting team on a comparison matrix of four unsolicited plans submitted to the Regional Planning Core Committee, along with water quality protection measures previously published by the U.S. Fish and Wildlife Service (USFWS).

6. Meeting Locations/Dates/Times

Coordinator Terry Tull initiated a discussion on the meeting locations, dates and times. Numerous representatives expressed their displeasure with the length of the current meeting and requested that the timing and length of future meetings be better controlled. Several representatives expressed the need to allow people time to eat or have refreshments if future meetings were to extend this long. The consensus of the group was that weekday evening meetings were the best and that the time should be limited to about three (3) hours. Additional discussion on this issue will be conducted at the next meeting.

7. Next Meeting Location/Date/Time

Coordinator Terry Tull proposed that the next meeting be held on Wednesday evening, July 21, 2004 at the Austin Community College (ACC) Pinnacle campus. With no strenuous objections being expressed, this proposal was confirmed.

ADJOURNMENT

The meeting was adjourned at 11:20 pm.

APPROVAL

These minutes were approved, with changes, at the Stakeholder Committee meeting on July 21, 2004.

MEETING INFORMATION

Meeting Date and Time: Wednesday, July 21, 2004, at 6:00 pm

All interested Stakeholders for the following breakout groups should plan to be at the meeting starting at **6:00 pm**: Property Owners, Development Interests, Neighborhood Interests, Governmental Entities, and Local Environmental Preservation/Good Governance Organizations. These breakout groups will meet separately to consider and elect replacement representatives for the Stakeholder Committee.

All Stakeholder Committee Representatives should plan to attend the general Stakeholder Committee Meeting beginning at **7:00 pm**. All meetings of the Regional Water Quality Planning Project's Stakeholder Committee are open to the public. The public and all interested stakeholders are invited to attend.

Meeting Location: Austin Community College, Pinnacle Campus, Student Commons Area on the Ground Floor. The campus is located off U.S. Highway 290, between Austin and Dripping Springs, in Travis County, Texas [7748 W. Hwy 290, Austin, Texas 78737].

Please note that the **Pinnacle Campus has a snack bar** located on the 9th floor. The snack bar will be open prior to the meeting. It is permissible for Stakeholders to bring food to the meeting room(s).

ATTACHMENTS for Stakeholder Committee Meeting:

- Provisional list – Stakeholder Committee Representatives
- Minutes from the June 30, 2004 Stakeholder Committee Meeting
- Draft Bylaws
- Governmental Entity Authority Matrix – spreadsheet
- Technical information bibliography
- Stakeholder Issue Summary Table
- Draft Plan Comparison Matrix
- Detailed Process Outline

AGENDA - CONSIDERATION AND ELECTION OF REPLACEMENT STAKEHOLDER REPRESENTATIVES BY AFFECTED BREAKOUT GROUPS (applies to the following Breakout Groups: Property Owners, Development Interests, Neighborhood Interests, Governmental Entities, and Local Environmental Preservation/Good Governance Organizations):

Time	Activity
6:00 pm	Welcome/Opening Remarks – Terry Tull, Executive Director, Regional Water Quality Planning Project
6:10 pm	Stakeholder Breakout Groups – Canvass Stakeholder Committee Representative Selections for Affected Breakout Groups (applies only to the following Breakout Groups: <u>Property Owners, Development Interests, Neighborhood Interests, Governmental Entities, Local Environmental Preservation/Good Governance Organizations</u>)
6:45 pm	Break

Participant Information

Stakeholder Committee Meeting – Wednesday, July 21, 2004

Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

AGENDA - for the Stakeholder Committee Meeting:

Time	Activity
7:00 pm	Convene Stakeholder Committee Meeting (entire committee), Opening Remarks, Roll Call – Terry Tull
7:10 pm	Confirm Stakeholder Committee Representatives – Terry Tull
7:20 pm	Review and Approval of Minutes – Terry Tull
7:25 pm	Discussion and Approval of Bylaws – Terry Tull
7:50 pm	Discuss Stakeholder Issues Summaries (Review Summary Table) – Tom Brown, Naismith Engineering
8:05 pm	Break
8:15 pm	Governmental Entity Authority Briefing – Susan Zachos, Kelly, Hart & Hallman
8:25 pm	Review of technical information bibliography – Roy Frye, Hicks & Company; and, Grant Jackson, Naismith Engineering
8:40 pm	New Business Items (Submitted by Representatives prior to meeting) – Terry Tull
8:50 pm	Discuss Project Schedule /set next meeting date – Terry Tull, and Tom Brown, Naismith Engineering
9:10 pm	Open Public Comment
9:20 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please place this form in the designated box as you leave the meeting. Thanks again for your participation!

Appendix U

Supporting Information for Economic Evaluation

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at 7:05 p.m. Secretary Jackson performed a roll call of members present, as outlined in the table above.

SPECIAL ITEM

Prior to convening the Stakeholder Committee meeting, individual meetings of the following stakeholder categories were convened at 6:00 p.m. to revise the representation to the Stakeholder Committee: Neighborhood Interests, Property Owners/Agricultural Interests, Development Interests, Local Environmental Preservation/Good Governance Organizations, and Government Entities. The revisions are reflected on the Stakeholder Committee List, a copy of which is attached.

AGENDA ITEMS

1. Opening Remarks

Coordinator Terry Tull welcomed and thanked all of the Stakeholder Committee representatives and alternates for their time and participation, and addressed several administrative items.

2. Stakeholder Committee Representation

As notified prior to the meeting, and as identified during the individual meetings of several of the Stakeholder categories, Coordinator Terry Tull reviewed the revised list of representatives and alternates. There were several questions regarding the make-up of the committee:

- a. **County Representation:** A suggestion was offered by two (2) representatives that an additional seat be added on the Committee, representing Government Entities, for Travis County, since Hays County had a new representative on the Committee and since Travis County's involvement would be integral to implementation. After discussion of this issue, the consensus of the committee was to have Terry Tull coordinate this issue with Hays and Travis Counties, and to make no formal action at this time to add a seat to the Committee.
- b. **Scientific/Technical Representation:** Coordinator Tull brought up an unresolved issue having to do with whether and how to involve scientific/technical expertise in the Stakeholder Committee process. During the ensuing discussions, several views were expressed: some members favored creating a new Stakeholder Committee category group for Technical experts; some favored establishing a process for external technical reviews of the Consultant's work; some favored treating any Technical experts as a "resource" rather than as "stakeholders." To close the discussion of the issue, Coordinator Tull acknowledged that this remained an open item and committed to bring it back to the Committee to resolve at a future meeting.

3. Approval of the Minutes from the June 30, 2004 Meeting

Coordinator Terry Tull reviewed previously posted copies of the minutes from the June 30, 2004 meeting. The minutes were approved by consensus of the group after several suggested changes to the names, affiliations and attendance of the committee members, and the deletion of a duplicate paragraph.

4. Bylaws

Coordinator Terry Tull reviewed copies of the bylaws that had previously been presented and posted for the Committee. Coordinator Tull also presented some requested changes to Article II, Section 1 of the Bylaws dealing with the number and role of the Committee representatives and alternates. A clarification question arose over Article IV, Section 1, regarding whether meetings of the stakeholder categories or subgroups were required to be open to the public. Secretary Jackson and Coordinator Tull indicated that meetings of the Stakeholder Committee and any formal sub-committees of the Stakeholder Committee would need to be handled as open public meetings. However, while informal stakeholder interest groups were encouraged to make their meetings open to the public, this would not be required by the Bylaws. An extensive discussion took place regarding Article VI, Section 2, regarding whether or not a "three-fourths" majority was appropriate for situations where the Committee could not achieve consensus. A few of the representatives requested that this be changed to a simple majority. However, other representatives indicated that the "three-fourths" majority would be appropriate, and that votes should seldom, if ever be required. At the conclusion of the discussion, the consensus of the Committee was to leave the "three-fourths" majority rule in place, while recognizing that the Committee could return to this issue again later, if it wished to do so. Although Committee Member Karen Hadden voiced her dissent to the three-fourths majority rule, she acceded to the group decision so that the bylaws could be adopted. The Bylaws were approved by the consensus of the Committee, incorporating the proposed changes suggested by Coordinator Tull. The amended Bylaws will be posted on the project website.

5. Stakeholder Issues Summary

Tom Brown, of the consulting team, made a presentation and reviewed a previously posted handout on the results of the "dot voting" on issues and challenges from the June 30, 2004 stakeholder meeting. Mr. Brown responded to several questions from the Committee. Mr. Brown's presentation will be posted to the project website.

6. Governmental Entity Authority Briefing

Steve Dickman, of the consulting team, made a presentation and reviewed a previously posted handout on the existing legal authorities of major governmental entities in the planning region. Mr. Dickman responded to several questions from the Committee. Mr. Dickman's presentation will be posted to the project website.

7. Technical Bibliography Briefing

Roy Frye and Grant Jackson, of the consulting team, made a presentation and reviewed a previously posted handout on the technical information bibliography being prepared for the development of the water quality protection plan. Mr. Frye and Mr. Jackson responded to several questions from the Committee. One representative indicated a series of technical

references that he felt should be added to the bibliography, and indicated that he would forward this information to the consulting team via e-mail. Another representative distributed copies of two documents that he indicated he would like to have considered for inclusion in the bibliography. Mr. Jackson requested the Committee review the bibliography, distribute it to any technical resources they deemed appropriate, and either bring any suggested revisions for discussion at the next meeting or forward those suggestions to the consulting team via e-mail.

8. Draft Plan Comparison Matrix

Grant Jackson of the consulting team presented and discussed a previously posted comparison of the four proposed water quality protection plans that had been submitted to the Core Committee by various stakeholders.

NEW BUSINESS ITEMS

1. Distribution of Contact Information

Coordinator Terry Tull reminded the Committee about previous discussions regarding the distribution of their contact information as follows: 1) the contact information for the representatives and alternates for each stakeholder category would be distributed to individuals who have signed-in or indicated their desire to participate in that stakeholder category, and 2) the contact information for each representative and alternates would be distributed to the Committee. No objections were expressed to this policy.

2. Project Schedule

Coordinator Terry Tull initiated a discussion on accelerating the proposed schedule for completion of the regional water quality plan. Several comments were offered indicating that it was important to complete the process prior to the Lower Colorado River Authority's (LCRA) proposed action on the Hamilton Pool Road waterline in December, 2004. Other comments were offered indicating that the process should not be artificially rushed to meet a specific deadline. Consulting team member Grant Jackson reviewed a previously posted outline of the anticipated future steps in the process and how each of the agenda items in the current meeting related to proposed actions at future meetings. In response to a question about expediting the process, Mr. Jackson indicated that the consultant's work could be expedited, but the critical path items on the schedule were the frequency of the stakeholder meetings, and the progress made at those meetings. Coordinator Tull requested volunteers from each stakeholder category to form a Schedule Review Subcommittee to review the Stakeholder participation process and establish a more firm schedule. The Schedule Review Subcommittee will meet in the offices of Naismith Engineering on Monday, July 26th at 1:00 pm. The following Stakeholder Committee volunteers were named to serve on the Schedule Review Subcommittee:

Robbie Botto (Neighborhood Interests)
Jim Phillips (Concerned Citizens)
Gene Lowenthal (Landowners)
Joe C. Day (Economic Interests)
Hank Smith (Development Interests) (name provided following the meeting)
Tom Smith (Public Interest Organizations)
Jon Beall (Local Environmental/Good Governance)
Jack Goodman (Local Government)

Further action on modifying the schedule was tabled until the next meeting.

Coordinator Terry Tull also initiated a discussion on the location, date and time for the next meeting, and suggested August 18, 2004. A few representatives indicated that this date would not be convenient and offered an alternative date. However, a larger number of representatives indicated that the alternative date would not be convenient and the consensus of the group was to have the meeting on August 18th and to begin at 6:00 pm. Several representatives expressed concerns about the size of the meeting room and the need to provide additional space for the alternates and observers. Coordinator Tull indicated that the ACC Pinnacle campus seemed to be convenient, but that he would investigate other venues.

OPEN PUBLIC COMMENT

Not having received any public comment request forms, Coordinator Tull skipped over this part of the agenda without asking if anyone wished to speak. However, after the meeting was adjourned, a public comment form was handed to the Coordinator by Mr. Ron Fieseler, the General Manager of the Blanco-Pedernales Groundwater Conservation District. Mr. Fieseler's public comment form contained the following remarks:

“Portion of Blanco County included in Planning Area. Therefore, I suggest that Blanco County and the Blanco Pedernales G.C.D. be included in the Matrix of Legal Authorities and in the Governmental Entities Stakeholder Category.”

Coordinator Tull apologized to Mr. Fieseler for failing to give him the opportunity to speak.

ADJOURNMENT

The meeting was adjourned at 10:02 pm.

APPROVAL

These minutes were approved, with changes, at the Stakeholder Committee meeting on August 18, 2004.

MEETING INFORMATION

Meeting Date and Time: Wednesday, August 18, 2004, at 6:00 pm

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

- 1. Minutes from the July 21, 2004 Stakeholder Committee Meeting.**
[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
- 2. Proposal to Add a Travis County Representative to the Stakeholder Committee.**
[GOAL: Consensus approval of proposal. HOMEWORK: Read proposal to add a Travis County Representative to the Stakeholder Committee posted on the web site. Any significant issues should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
- 3. Minutes from July 26, 2004 Schedule Review Subcommittee Meeting.**
[GOAL: Consensus approval of recommendations. HOMEWORK: Read Minutes from July 26 Schedule Review Subcommittee posted on the web site. Any significant comments should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
- 4. Updated - Proposed Detailed Project Schedule (w/ Stakeholder Committee Meeting dates).**
[GOAL: Consensus approval of updated project schedule and meeting dates. HOMEWORK: Read Updated-Proposed Detailed Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
- 5. Proposal to Establish a Standing Process Subcommittee.**
[GOAL: Consensus agreement to establish Standing Process Subcommittee, appoint members, and assign initial tasks. HOMEWORK: Read Proposal to Establish a Standing Process Subcommittee posted on the web site. Any significant comments should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting, so that issues may be resolved ahead of time.]
- 6. Updated - Technical information bibliography.**
[GOAL: Identify needed additions to the Bibliography. HOMEWORK: Review the Updated Technical Information Bibliographies posted on the web site. Be prepared to comment on and recommend changes to the bibliographies.]
- 7. Ranking of Stakeholder Identified Issues and Goals.**
[GOAL: Achieve consensus agreement on ranking of issues and goals. HOMEWORK: Read, review, and rank the Stakeholder Issues and Goals List posted on the web site. Provide your rankings, via e-mail or fax, to David Fusilier at Naismith Engineering, Inc. by the end of the day on Monday, August 16, 2004. David's e-mail address is dfusilier@naismith-engineering.com and his fax number is (512) 708-9014. Results of the rankings received will be presented at the August 18th meeting for discussion and approval.]
- 8. Federal & State Regulatory Briefing Presentation.**
[GOAL: Understand the role of Federal & State governments in water quality regulation. HOMEWORK: Review the Federal & State Regulatory Briefing Presentation posted on the web site. Be prepared to comment on, ask questions on, and discuss the presentation and to achieve a high level of understanding.]
- 9. Approved Version – Stakeholder Committee Bylaws.**
[FYI.]
- 10. Current list – Stakeholder Committee Representatives.**
[FYI.]

AGENDA - for the August 18, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:10 pm	Open Public Comment
6:20 pm	Discussion and Action to approve Minutes of July 21, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:30 pm	Discussion and Action on Proposal to Add a Travis County Representative on Stakeholder Committee – Terry Tull (See attachment 2)
6:50 pm	Discussion and Action to approve Recommendations of Schedule Review Subcommittee. – Terry Tull (See attachment 3)
7:20 pm	Discussion and Action on Updated-Proposed Detailed Project Schedule (w/ Stakeholder Committee Meeting Dates). (See attachment 4)
7:50 pm	Break
8:00 pm	Discussion and Action on Proposal to Establish a Process Review Subcommittee – including selection of Subcommittee Members and approving issues to be considered by the Subcommittee – Terry Tull (See attachment 5)
8:30 pm	Update of Comprehensive and Barton Springs Zone Specific Bibliographies (Review Summary Table) – David Fusilier/NEI (See attachment 6)
8:35 pm	Presentation on Ranking of Stakeholder Issues and Goals, followed by Stakeholder Committee Discussion and Approval. – David Fusilier (See attachment 7)
8:55 pm	Federal and State Regulatory Review – Discussion of Meeting Handout (from web site) – Grant Jackson (See attachment 8)
9:10 pm	Other Business
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please place this form in the designated box as you leave the meeting. Thanks again for your participation!

STAKEHOLDER COMMITTEE MEETING MINUTES

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **August 18, 2004, at 6:00 pm**

Meeting Location: Oak Hill United Methodist Church, 7815 U.S. Highway 290 West, Austin, Travis County, Texas 78736.

ATTENDEES

Present	Member	Present	Member
	Andrew Backus	X	Gene Lowenthal
X	Jon Beall	X	Nancy McClintock
X	Alan Bojorquez	X	Charles O' Dell
X	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks	X	Randy Robinson
X	S. Tim Casey	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Joe C. Day	X	Dede Stevenson
X	Karen Ford		J. T. Stewart
X	Mark Gentle	X	David Venhuizen
	Karen Hadden	X	Michael Waite
X	Rebecca Hudson	X	Hugh Winkler
X	Bryan Jordan	X	Ira Yates
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
X	Mike Lyday		S.H. (Tary) Snyder
	Carlotta McLean	X	Randall Thomas
X	Bret Raymis	X	Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Leonard Olson - GCA
X	Grant Jackson – NEI	X	Steve Dickman - KHH
X	David Fusilier – NEI	X	Joe Vickers - ESW

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to

order at approximately 6:00 p.m. Secretary Jackson performed a roll call of members present, as outlined in the table above.

AGENDA ITEMS

1. Minutes from the July 21, 2004 Stakeholder Committee Meeting.

Coordinator Tull reviewed the previously posted copies of the minutes from the July 21, 2004 Stakeholder Committee (SHC) Meeting. The minutes were approved by consensus with minor changes.

2. Proposal to Add a Travis County Representative to the Stakeholder Committee.

Coordinator Tull reviewed the previously posted "Proposal to Add a Travis County Representative to the Stakeholder Committee". A few SHC members expressed their objections to the proposal. One SHC member commented that the Committee's representation needs to reflect, in part, Travis County's wishes, and felt that the proposal should be approved. Coordinator Tull then went around the table and asked each SHC member to express their opinion on the matter. One SHC member commented that if a Travis County representative is added, the person added should be a staff person involved in water quality issues. Mr. David Fowler from Travis County Transportation & Natural Resources, who was attending the meeting, said that he would be the person representing Travis County, if such a position was added to the SHC. After the discussion, it was requested by a SHC member that the issue be voted on by the SHC. A vote was taken and the proposal, to add David Fowler as Travis County's representative to the SHC was adopted (with two no votes). Mr. Fowler then took a seat at the SHC table.

3. Minutes from July 26, 2004 Schedule Review Subcommittee Meeting.

Coordinator Tull reviewed the previously posted copies of the minutes from the July 26, 2004 Schedule Review Subcommittee Meeting. The minutes were approved by consensus.

4. Updated - Proposed Detailed Project Schedule (w/ Stakeholder Committee Meeting dates).

Grant Jackson presented a handout of the current project schedule. Mr. Jackson indicated that this schedule would be adjusted/revised based on the SHC suggestions, comments, and decisions made at this meeting. Mr. Jackson stated that review time for the SHC had been included in the schedule. Several SHC members suggested that the schedule be posted on the web site in a more readable size/format. It was requested that the SHC members review the proposed schedule and offer their comments or suggestions.

5. Proposal to Establish a Standing Process Subcommittee.

Coordinator Tull reviewed the previously posted "Proposal to Establish a Standing Process Subcommittee". Mr. Tull stated that establishing a Process Subcommittee would allow the SHC members another avenue to deal with process related issues, thereby freeing up more time at the SHC meetings to discuss issues/concerns related to water quality planning. The first issues to be addressed by the Process Subcommittee would be: (1) Provide detailed recommendations on how independent technical input should be used by the Stakeholder Committee and/or the Consultant; (2) How will Stakeholder Committee know that it has reached consensus on an issue?; (3) How should the Stakeholder Committee report on its work to the Core and Executive Committee? After a brief discussion by SHC members the proposal was approved by consensus. Members of the Process Subcommittee were named, or would be named, by their fellow SHC members (one from each Stakeholder Committee Category). Mr. Tull stated that he would coordinate the meeting time for the Process Subcommittee.

6. Updated - Technical information bibliography.

Grant Jackson informed the SHC that the latest, updated bibliography had been posted on the web site. Mr. Jackson indicated that the intent was to have a list of references that could be used during the development of the plan. Mr. Jackson stated that the Consulting Team was in the process of obtaining electronic or hard copies of the references to be used during the development of the plan. Mr. Jackson stated that it is the intent of the Consulting Team to have either a hard copy, electronic copy, or a web site link to the documents to be used during the development of the plan.

7. Ranking of Stakeholder Identified Issues and Goals.

Grant Jackson presented a list of stakeholder identified issues and goals. The list presented showed the results of rankings by the SHC members. Mr. Jackson acknowledged that the rankings may not be useful to the SHC members in the present format. Mr. Jackson requested that the SHC members disregard this handout and allow the Consulting Team to reformulate the stakeholder identified goals and issues into a more user friendly and useful format. Several SHC members requested that the Consulting Team present the rankings of the stakeholder identified issues and goals based on the dot voting results at the June 30, 2004 Stakeholder Committee Organizational Meeting.

8. Federal & State Regulatory Briefing Presentation.

Grant Jackson stated that a Federal & State Regulatory Briefing Presentation had been posted on the web site. The presentation was intended to educate the SHC on existing state and federal rules, regulations, and laws that may have an influence on the proposed plan. A few SHC members commented that they would rather discuss issues than sit through another presentation. In an effort to keep the meeting on schedule, it was suggested that the SHC review the presentation, and ask questions or comment on the presentation at the next SHC meeting.

NEW BUSINESS ITEMS

1. Proposed September 15, 2004 SHC Meeting Agenda

Coordinator Tull circulated a draft of proposed agenda items for the next SHC meeting to be held on Wednesday, September 15, 2004. Mr. Tull requested that the SHC members review this proposed agenda and provide their comments to him as soon as possible.

ADJOURNMENT

The meeting was adjourned at approximately 9:40 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on September 15, 2004. **[Please note that subsequent to the Stakeholder Committee (SHC) meeting on September 15, 2004, errors were discovered in the attendance record for the August 18, 2004 SHC meeting shown on the first page of this document. In order to correct the errors, the attendance record was corrected based on a review of the SHC Sign-In Sheets for the August 18, 2004 meeting – Executive Director and NEI.]**

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STAKEHOLDER COMMITTEE MEETING – SEPTEMBER 15, 2004

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

INFORMAL ROUNDTABLE DISCUSSION ON WATER QUALITY GOALS [OPTIONAL]:

Meeting Time: Wednesday, September 15, 2004, at 5:00 pm

Meeting Information: The roundtable discussion will give Stakeholder Committee Members an opportunity to participate in an informal discussion on water quality goals within the planning region. Guest speakers will be invited to present their views on issues surrounding the establishment of water quality goals and objectives within the planning region. **NOTE TO STAKEHOLDER COMMITTEE MEMBERS – THIS ROUNDTABLE DISCUSSION IS OPTIONAL. THE FORMAL DISCUSSION OF GOALS AND OBJECTIVES FOR THE REGIONAL PLAN WILL BE CONDUCTED DURING THE STAKEHOLDER COMMITTEE MEETING THAT BEGINS AT 6:00 PM.**

Guest Speakers: TBA

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, September 15, 2004, at 6:00 pm

Meeting Information: Regularly scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the August 18, 2004 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Minutes from the August 26, 2004 Process Subcommittee Meeting.

[GOAL: Consensus approval of minutes, including Subcommittee's recommendations included in the minutes. HOMEWORK: Read & review the draft minutes posted on the web site which include ten (10) specific recommendations by the Process Subcommittee. Any significant issues should be brought to the attention of the entire Stakeholder Committee, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

3. Review and Discuss Draft Presentation of the Goals and Objectives for the Regional Water Quality Protection Plan.

[GOAL: Presentation and Discussion on the Consulting Team's draft of the Goals and Objectives. HOMEWORK: Read & review the draft posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that initial comments to the draft may be summarized for expedited presentation at the meeting.]

4. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation and discussion on the updated project schedule. HOMEWORK: Review the Updated-Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

5. Review and Discuss Draft “Areas of Focus” for the Regional Water Quality Protection Plan.

[GOAL: Presentation and Discussion on the draft plan outline presented by the Consulting Team, with revisions to the plan outline if necessary. HOMEWORK: Read and review the Draft “Areas of Focus” for the Regional Water Quality Protection Plan Statement posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

6. Updated –Governmental Authority Matrix.

[GOAL: Understanding of final government authority matrix (updated to address Blanco County entities, and other entities requested by the Stakeholders), including existing gaps and overlaps in authority. HOMEWORK: Read & review Final Government Authority Matrix posted on the web site. Be prepared to comment on, ask questions on, and discuss the presentation and to achieve a high level of understanding]

7. Updated - Technical information bibliography.

[GOAL: Consensus approval of Technical Information Bibliography. HOMEWORK: Review the Updated Technical Information Bibliographies posted on the web site. Be prepared to comment on, ask questions on, and discuss the presentation and to achieve a high level of understanding.]

8. Federal & State Regulatory Briefing Presentation. (from the last agenda)

[GOAL: Understand the role of Federal & State governments in water quality regulation. HOMEWORK: Review the Federal & State Regulatory Briefing Presentation posted on the web site. Be prepared to comment on, ask questions on, and discuss the presentation and to achieve a high level of understanding.]

AGENDA - for the OPTIONAL Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Time	Activity
5:00 pm	Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region (Guest Speakers, TBA)
5:50 pm	Break

AGENDA - for the September 15, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of August 18, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:20 pm	Discussion and Action to approve Minutes of August 26, 2004 Process Subcommittee, including Subcommittee’s recommendations - Terry Tull (See attachment 2)
6:30 pm	Review and Discuss Draft Presentation of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
7:30 pm	Break
7:40 pm	Review and Discuss Draft Presentation of the Goals and Objectives for the Regional Water Quality Protection Plan (Continued)
8:00 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 4)
8:20 pm	Review and Discuss Draft “Areas of Focus” for the Regional Water Quality Protection Plan – NEI (See attachment 5)
8:45 pm	Other Business (next meeting agenda, etc...)
8:55 pm	Break
9:05 pm	Presentation on Governmental Authority Matrix with Discussion of gaps and overlaps – NEI (See attachment 6)
9:20 pm	Presentation on Technical Bibliography – discussion of proposed bibliography (See attachment 7)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please place this form in the designated box as you leave the meeting. Thanks again for your participation!

STAKEHOLDER COMMITTEE MEETING MINUTES - Final

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **September 15, 2004, at 6:00 pm**

Meeting Location: Oak Hill United Methodist Church, 7815 U.S. Highway 290 West, Austin, Travis County, Texas 78736.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
X	Jon Beall	X	Nancy McClintock
X	Allen Bojorquez	X	Charles O' Dell
X	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks	X	Randy Robinson
	S. Tim Casey	X	Hank Smith
X	Colin Clark	X	Tom (Smitty) Smith
X	Joe C. Day		Dede Stevenson
X	Karen Ford	X	J. T. Stewart
	David Fowler	X	David Venhuizen
X	Mark Gentle	X	Michael Waite
X	Karen Hadden	X	Hugh Winkler
	Rebecca Hudson	X	Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
	Mike Lyday	X	S.H. (Tary) Snyder
	Carlotta McLean	X	Randall Thomas
X	Bret Raymis	X	Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Steve Dickman - KHH
X	Grant Jackson – NEI	X	Joe Vickers - ESW
X	David Fusilier – NEI		

OPTIONAL - Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Prior to the official Stakeholder Committee Meeting an optional, informal Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region was convened at approximately 5:15 pm. This roundtable discussion was open to all interested stakeholders. The guest speaker was Dr. Michael Barrett from The University of Texas at Austin Center for Research in Water Resources. Dr. Barrett's research interests are focused on the quality, impacts, and mitigation of urban, agricultural, and construction site stormwater runoff and he has conducted numerous studies nationwide on this subject. The informal roundtable discussion was ended at approximately 5:55 pm.

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at approximately 6:05 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

AGENDA ITEMS

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of August 18, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:20 pm	Discussion and Action to approve Minutes of August 26, 2004 Process Subcommittee, including Subcommittee's recommendations - Terry Tull (See attachment 2)
6:30 pm	Review and Discuss Draft Presentation of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
7:30 pm	Break
7:40 pm	Review and Discuss Draft Presentation of the Goals and Objectives for the Regional Water Quality Protection Plan (Continued)
8:00 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 4)
8:20 pm	Review and Discuss Draft “Areas of Focus” for the Regional Water Quality Protection Plan – NEI (See attachment 5)
8:45 pm	Other Business (next meeting agenda, etc...)
8:55 pm	Break
9:05 pm	Presentation on Governmental Authority Matrix with Discussion of gaps and overlaps – NEI (See attachment 6)
9:20 pm	Presentation on Technical Bibliography – discussion of proposed bibliography (See attachment 7)
9:30 pm	Adjourn

1. Open Public Comment Period.

Mr. Ron Fieseler of the Blanco-Pedernales Groundwater Conservation District was introduced by Coordinator Tull. Mr. Fieseler stated that a small portion of the planning area extends into the District's boundary. As a result, he would continue to attend meetings and participate as a stakeholder.

2. Discussion and Action to Approve Minutes from the August 18, 2004 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull reviewed the previously posted copies of the minutes from the August 18, 2004 Stakeholder Committee (SHC) Meeting. The minutes were approved by consensus with no changes.

3. Discussion and Action to Approve Minutes from the August 26, 2004 Process Review Subcommittee Meeting (Meeting Attachment No. 2).

Coordinator Tull reviewed the previously posted copies of the minutes from the August 26, 2004 Process Review Subcommittee Meeting. The minutes were approved by consensus, with the addition of the "Standard Operating Procedure for Achieving Consensus" document.

4. Review and Discussion of Draft "Goals and Objectives for the Regional Water Quality Protection Plan" document presented by the NEI Consulting Team (Meeting Attachment No. 3).

Prior to the discussion of the Draft "Goals and Objective for the Regional Water Quality Plan" Coordinator Tull distributed two handouts: (1) excerpts from selected documents relating to the Regional Water Quality Plan; and, (2) "Section 4.0 – Work Statement and Technical Specifications" from the project's RFP. Mr. Tull summarized the handouts and let the SHC members know they were provided by the Executive Director as an FYI.

Tom Brown with NEI introduced the Draft "Goals and Objectives for the Regional Water Quality Plan" document. Mr. Brown emphasized that the goal of this planning process is to produce an "implementable plan". Mr. Brown then read the goal statement from the draft document.

Grant Jackson with NEI completed the initial review of the document by reading the six objective statements included in the document, and providing brief explanations on the rationale behind each objective.

Each member of the SHC was then asked to provide their comments on the document. The comments were requested by the eight SHC groups. The comments are summarized as follows:

Development Interests

- How do you determine what is legitimate research and data, and what is not?
- Objective #2 (*What standards do we apply?*) – The range of data will lead to it being difficult to say exactly what the baseline water quality is.
- Objective #2 (*What standards do we apply?*) - How define the standards without spending lots of money?
- Objective #5 (*What new measures are needed?*) – The phrasing appears to assume that new measures are needed, but that has not yet been determined.

Public Interest Organizations

- Goal Statement - had problems with the use of the word “impair” in the goal statement.
- Goal Statement - Water quality definition should include stormwater runoff rate and volume.
- Objective #2 (*What standards do we apply?*) – in Bullet #4 include aquatic species. Also, how about damage due to increased runoff (volume and rate). How about the dissolved substances? Should we add a reference to the salamander?
- Objective #5 (*What new measures are needed?*) – Bullet #2 should include opportunities to protect vacant land (finance open space).
- Objective #5 (*What new measures are needed?*) – the thrust appears to be BMPs. The best way to protect water quality is to leave land undeveloped.
- Objective #5 (*What new measures are needed?*) – revise wording to state “...additional structural and non-structural BMPs, including land preservation, for the...”.
- For establishing existing water quality, USGS Barton Springs/Barton Creek data should be reviewed.
- Objective #6 (*What is our strategy for action?*) – Bullet #5 – recommend looking at CAMPO monitoring results.
- Clarify what is meant by “resources” (water quality, wildlife & environment).

Local Environmental Preservation/Good Governance Groups

- What type of safety factor is going to be used in developing the plan?
- Goal Statement - Cite sources for using the word “impair”, or provide a definition.
- Objective #1 (*What Causes Water Quality Problems?*) – Assume that threats to water quality will be ranked [Grant Jackson – they will more than likely be ranked in terms of low, medium, and high].
- Objective #2 (*What standards do we apply?*) – modify to include impact due to increased runoff volume and rate.
- Objective #3 (*Who can act?*) – revise to state “...capable of implementing, monitoring, and enforcing...”.
- Objective #5 (*What new measures are needed?*) – why use the word “substantially”? If it is used, recommend defining this word and where it came from.
- Objective #6 (*What is our strategy for action?*) – in the objective statement, why should we state “...(1) enforce existing water quality protection measures...”? Shouldn’t this already be happening?

Government Entities

- Goal Statement – revise to say “...physical and chemical properties...”.
- Goal Statement – have a problem with the use of the word “impair” – suggested using “preserve and protect” instead. Recommend we add the Executive Committee’s definition of water quality.
- Goal Statement – substitute the words “water quality” for “the physical properties”.
- Objective #2 (*What standards do we apply?*) – Does the use of the word “environment” in Bullet #4 include wildlife? [Grant Jackson – Yes. The term “environment” includes wildlife, aquatic species, etc...] Shouldn’t we be more specific?
- Objective #3 (*Who can act?*) – Bullet #3 – revise to state “...currently authorized, including possibly establishing...”.
- Can we address runoff rates and volumes? [Grant Jackson – Yes.] We should incorporate some wording to address this issue.

OPTIONAL - Informal Roundtable Discussion on Water Quality Planning

Goals and Objectives:

Prior to the official Stakeholder Committee Meeting an optional, informal Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region was convened at approximately 5:00 pm. This roundtable discussion was open to all interested stakeholders. The guest speaker was Raymond Slade, a hydrologist formerly with the USGS (retired). Mr. Slade spoke about issues relating to the development of the Regional Water Quality Protection Plan including: existing water quality within the planning region; degradation vs. non-degradation issue; BMP removal efficiencies; pollutant loads vs. concentrations; location of impervious cover within the watershed, including the concept of “effective impervious cover”. The informal roundtable discussion was ended at approximately 6:00 pm.

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at approximately 6:15 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

PLANNED AGENDA - for the October 20, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of September 15, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review and Discuss the Draft Version of a Standard Operating Procedure for the Outside Technical Review Group - NEI (See attachment 2)
6:35 pm	Review and Discuss the Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
7:00 pm	Review and Discuss Updated Draft Version of the “Areas of Focus” for the Regional Water Quality Protection Plan – NEI (See attachment 4)
7:30 pm	Break
7:45 pm	Review and Discuss the Draft Version of the Water Quality Protection Measures for the Regional Water Quality Protection Plan - NEI (See attachment 5)
8:45 pm	Break
8:55 pm	Review and discussion on the Edwards Aquifer Water Quality Advisory Task Force’s Recommendations – overview and discussion of recommendations – NEI (See attachment 6)
9:05 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 7)
9:15 pm	Discussion on Possible Formats, Methods, and Subject Matters for Technical/ Informational Presentations to the Stakeholder Committee – Terry Tull/NEI
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

- Objective #5 – Need to identify public rules/policies that are counter to our aims (for example: lower bond rates for MUDs which encourage development that fails to adequately protect groundwater)

Economic Interests

- Water quality is directly related to water quantity.
- Look at establishing a “banking” system (talk with Carolyn Vogel).
- Water quantity is a big issue. Particularly groundwater.
- Government tax dollars are supplemented by commercial land property taxes. Concerned that homeowners will be burdened by increased taxes. Need to encourage commercial growth to help carry the tax burden.
- Provide incentives.
- Trinity Aquifer cannot recharge fast enough to supply present demands. We should be concerned about cross-contamination of the aquifers and include the Trinity Aquifer in our planning

Miscellaneous comments not attributed to any particular group

- Goal Statement – revise to state “...that protects resources and manages...”.
- Goal Statement – revise to state “...that preserves, protects, and enhances resources, and manages...”.

5. Review and Discussion of Updated - Proposed Project Schedule and Milestones (Meeting Attachment No. 4).

Grant Jackson referred to the schedule posted as meeting attachment no. 4 on the planning project’s web site. Mr. Jackson stated that review time for the SHC had been included in the schedule and that the schedule would be updated on an as-needed basis.

6. Review and Discussion of Draft “Areas of Focus” for the Regional Water Quality Protection Plan (Meeting Attachment No. 5).

Grant Jackson reviewed this draft document. Mr. Jackson indicated that this was a first cut at a table of contents for the regional water quality plan. Mr. Jackson solicited comments from the SHC members. Comments received from the SHC members are summarized as follows:

Watershed Management/Water Quality Protection Measures

- Add “land acquisition for water quality protection”.
- Bullet #8 – some water quality protection measures may be mandatory, not voluntary.

Economic Implications

- Add bullet - “Value of preserved land & land adjacent to preserved land”.
- Add bullet – “Value of land next to impaired creek”.
- Add bullet – “Cost to government to add 10,000 homes”.

7. Review and Discussion of Updated – Governmental Authority Matrix (Meeting Attachment No. 6).

Grant Jackson informed the SHC that the latest, updated Governmental Authority Matrix had been posted on the web site.

8. Review and Discussion of Updated - Technical information bibliography (Meeting Attachment No. 7).

Grant Jackson informed the SHC that the latest, updated bibliography had been posted on the web site.

9. Federal & State Regulatory Briefing Presentation (Meeting Attachment No. 8).

Grant Jackson stated that the Federal & State Regulatory Briefing Presentation has been posted on the web site and that the presentation may be of benefit to SHC members that are not intimately familiar with Federal & State regulations. In order to shorten the meeting time, Mr. Jackson recommended that SHC members review the presentation on their own time. Mr. Jackson stated that SHC members could contact him or Tom Brown if they had any questions or comments regarding the presentation.

NEW BUSINESS ITEMS

1. Proposed October 20, 2004 SHC Meeting

In accordance with the SHC approved schedule, Coordinator Tull proposed the next SHC meeting to be held on Wednesday, October 20, 2004. Mr. Tull stated that a draft agenda would be circulated to SHC members and that the SHC members should review the proposed agenda and provide their comments to him as soon as possible.

2. SHC Report to the Executive/Core Committee

In accordance with the policy developed by the Process Subcommittee and adopted by consensus by the SHC, Coordinator Tull stated that the Development Interest stakeholder group would be responsible for representing the SHC and reporting on the SHC's activities at the next Executive/Core Committee Meeting, currently scheduled for Wednesday, October 13, 2004.

ADJOURNMENT

The meeting was adjourned at approximately 9:30 pm.

APPROVAL

These minutes were approved, with minor changes, at the Stakeholder Committee meeting on October 20, 2004.

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STAKEHOLDER COMMITTEE MEETING – OCTOBER 20, 2004

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

INFORMAL ROUNDTABLE DISCUSSION ON WATER QUALITY GOALS [OPTIONAL]:

Meeting Time: Wednesday, October 20, 2004, at 5:00 pm

Meeting Information: The roundtable discussion will give Stakeholder Committee Members an opportunity to participate in an informal discussion on water quality goals and issues within the planning region. Guest speakers will be invited to present their views on issues surrounding the establishment of water quality goals and objectives within the planning region. **NOTE TO STAKEHOLDER COMMITTEE MEMBERS – THIS ROUNDTABLE DISCUSSION IS OPTIONAL. FORMAL DISCUSSIONS RELATING TO THE REGIONAL PLAN WILL BE CONDUCTED DURING THE STAKEHOLDER COMMITTEE MEETING THAT BEGINS AT 6:00 PM.**

Guest Speakers: Raymond Slade, hydrogeologist, USGS (retired)

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, October 20, 2004, at 6:00 pm

Meeting Information: Regularly scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the September 15, 2004 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review and discuss Draft Version of a Standard Operating Procedure for the Outside Technical Review Group.

[GOAL: Presentation and discussion on the Consulting Team's draft version of a Standard Operating Procedure for the Outside Technical Review Group; recommendations from the SHC to the Consulting Team on revisions. HOMEWORK: Read & review the draft version posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that initial comments to the draft may be summarized for expedited presentation at the meeting.]

3. Review and Discuss Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan.

[GOAL: Presentation and Discussion on the Consulting Team's Updated Draft Version of the Goals and Objectives; recommendations from the SHC to the Consulting Team on revisions, in an effort to present a finalized version of the "Goals and Objectives" document at the November 17, 2004 Stakeholder Committee Meeting.

HOMEWORK: Read & review the updated draft posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that these comments may be summarized for expedited presentation at the meeting.]

4. Review and Discuss Updated Draft Version of the "Areas of Focus" for the Regional Water Quality Protection Plan.

[GOAL: Presentation and Discussion on the updated draft version of the plan's "Areas of Focus" presented by the Consulting Team; recommendations from the SHC to the Consulting Team on revisions, in an effort to present a finalized version of the "Goals and Objectives" document at the November 17, 2004 Stakeholder Committee Meeting. HOMEWORK: Read and review the Updated Version of the Draft "Areas of Focus" for the Regional Water Quality Protection Plan Statement posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

5. Review and Discuss 1st Draft of the Water Quality Protection Measures for the Regional Water Quality Protection Plan.

[GOAL: Presentation and Discussion on the 1st draft of the Water Quality Protection Measures for the Regional Water Quality Plan; recommendations from the SHC to the Consulting Team on revisions. HOMEWORK: Read and review the 1st draft of the Water Quality Protection Measures posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

6. Review and discuss Edwards Aquifer Authority Water Quality Advisory Task Force's Recommendations.

[GOAL: Presentation and discussion of the Edwards Aquifer Authority Water Quality Advisory Task Force's "Summary of Recommendations from the Water Quality Advisory Task Force" and the "Final Report of Recommendations" documents. HOMEWORK: These documents will be presented to the SHC for informational purposes. Reviewing the documents prior to the meeting may give SHC members additional insight into the planning effort.]

7. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation and discussion on the updated project schedule. HOMEWORK: Review the Updated-Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

8. Discussion on Possible Formats, Methods, and Subject Matters for Technical/Informational Presentations to the Stakeholder Committee.

[GOAL: Discussion on the types of technical/informational presentations the Stakeholder Committee would like to arrange. Discussion will include subject matter, formats, schedule, etc...with the goal of establishing a schedule of technical/informational presentations. HOMEWORK: SHC members should prepare a list of topics they would like to see addressed in technical presentations. SHC members should also consider what format would be most appropriate for these presentations.]

AGENDA - for the OPTIONAL Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Time	Activity
5:00 pm	Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region. Guest Speaker – Raymond Slade, Hydrogeologist, USGS (retired)
5:50 pm	Break

AGENDA - for the October 20, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of September 15, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review and Discuss the Draft Version of a Standard Operating Procedure for the Outside Technical Review Group - NEI (See attachment 2)
6:35 pm	Review and Discuss the Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
7:00 pm	Review and Discuss Updated Draft Version of the “Areas of Focus” for the Regional Water Quality Protection Plan – NEI (See attachment 4)
7:30 pm	Break
7:45 pm	Review and Discuss the Draft Version of the Water Quality Protection Measures for the Regional Water Quality Protection Plan - NEI (See attachment 5)
8:45 pm	Break
8:55 pm	Review and discussion on the Edwards Aquifer Water Quality Advisory Task Force’s Recommendations – overview and discussion of recommendations – NEI (See attachment 6)
9:05 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 7)
9:15 pm	Discussion on Possible Formats, Methods, and Subject Matters for Technical/ Informational Presentations to the Stakeholder Committee – Terry Tull/NEI
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please place this form in the designated box as you leave the meeting. Thanks again for your participation!

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **October 20, 2004, at 6:00 pm**

Meeting Location: Oak Hill United Methodist Church, 7815 U.S. Highway 290 West, Austin, Travis County, Texas 78736.

ATTENDEES

Present	Member	Present	Member
	Andrew Backus	X	Gene Lowenthal
X	Jon Beall	X	Nancy McClintock
X	Alan Bojorquez	X	Charles O' Dell
X	Robert (Robbie) Botto		Jim Phillips
X	Henry Brooks		Randy Robinson
X	S. Tim Casey	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Joe C. Day		Dede Stevenson
X	Karen Ford	X	J. T. Stewart
X	David Fowler	X	David Venhuizen
X	Mark Gentle	X	Michael Waite
X	Karen Hadden	X	Hugh Winkler
	Rebecca Hudson	X	Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman		Chris Risher
X	Mike Lyday		S.H. (Tary) Snyder
X	Carlotta McLean	X	Randall Thomas
X	Bret Raymis		Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

OPTIONAL - Informal Roundtable Discussion on Water Quality Planning

Goals and Objectives:

Prior to the official Stakeholder Committee Meeting an optional, informal Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region was convened at approximately 5:00 pm. This roundtable discussion was open to all interested stakeholders. The guest speaker was Raymond Slade, a hydrologist formerly with the USGS (retired). Mr. Slade spoke about issues relating to the development of the Regional Water Quality Protection Plan including: existing water quality within the planning region; degradation vs. non-degradation issue; BMP removal efficiencies; pollutant loads vs. concentrations; location of impervious cover within the watershed, including the concept of “effective impervious cover”. The informal roundtable discussion was ended at approximately 6:00 pm.

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at approximately 6:15 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

PLANNED AGENDA - for the October 20, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of September 15, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review and Discuss the Draft Version of a Standard Operating Procedure for the Outside Technical Review Group - NEI (See attachment 2)
6:35 pm	Review and Discuss the Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
7:00 pm	Review and Discuss Updated Draft Version of the “Areas of Focus” for the Regional Water Quality Protection Plan – NEI (See attachment 4)
7:30 pm	Break
7:45 pm	Review and Discuss the Draft Version of the Water Quality Protection Measures for the Regional Water Quality Protection Plan - NEI (See attachment 5)
8:45 pm	Break
8:55 pm	Review and discussion on the Edwards Aquifer Water Quality Advisory Task Force’s Recommendations – overview and discussion of recommendations – NEI (See attachment 6)
9:05 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 7)
9:15 pm	Discussion on Possible Formats, Methods, and Subject Matters for Technical/ Informational Presentations to the Stakeholder Committee – Terry Tull/NEI
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

1. Open Public Comment Period.

Mr. Ken Manning from the LCRA announced that the LCRA Board of Directors have planned a separate meeting to discuss issues relating to water service in the areas of western Travis County and northern Hays County, including the Hamilton Pool Road water line and the LCRA's current CCN application. Mr. Manning stated that the Board should finalize plans for this meeting in the next few days and that he would notify the SHC members via e-mail.

2. Discussion and Action to Approve Minutes from the September 15, 2004 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull reviewed the previously posted copies of the minutes from the August 18, 2004 Stakeholder Committee (SHC) Meeting. The minutes were approved by consensus with minor changes.

3. Review and Discussion of the draft Standard Operating Procedures for the outside Technical Review Group (TRG) (Meeting Attachment No. 2).

Coordinator Tull reviewed the previously posted copy of the Standard Operating Procedure for the outside Technical Review Group. Comments on the document from the SHC included the following:

- the current SOP does not include a presentation(s) by the NEI Consultant Team to the TRG. Something is lost by not having this exchange;
- not allowing graphics in the responses from the TRG is a problem [Tom Brown/NEI stated that the graphics exclusion was included in order to keep the document file sizes down to make the posting to, and retrieving from, the project web site easier. Tom stated that the inclusion of graphics in the TRG responses would be acceptable for now, and that if it became an issue in the future we would address it at that time;
- the categories of technical expertise for the TRG group did not include anything about economic analysis (including sustainable economics and cost/benefit analysis);
- the concept of removing someone from the TRG, as outlined in Item #4 of "Appointment of TRG Members" is not necessary.

Coordinator Tull stated that, based on the input received at this meeting, the NEI Consultant Team would revise the SOP document and present the revised version at the next SHC meeting (November 17, 2004). Coordinator Tull also suggested that, in the interest of saving time, invitations would be sent to those persons nominated to the TRG prior to the next SHC meeting. Those prospective TRG members that accepted the invitation would be considered for approval by the SHC at the November 17, 2004 meeting.

4. Review and Discussion of the Updated Draft Version of the "Goals and Objectives for the Regional Water Quality Protection Plan" document presented by the NEI Consulting Team (Meeting Attachment No. 3).

Prior to the discussion of the Updated Draft Version of the "Goals and Objective for the Regional Water Quality Plan" Coordinator Tull stated that it was his opinion that the NEI Consulting Team had done a good job of incorporating the comments and suggestions received from the SHC.

Grant Jackson with NEI introduced this Updated Draft Version of the “Goals and Objectives for the Regional Water Quality Plan” document. Mr. Jackson stated that the most apparent change to the document was the addition of an objective to define water quality (listed as Objective #1), and that the other objectives included in the document had been renumbered, and revised as appropriate.

The SHC discussed the document and the comments are summarized as follows:

Goal Statement:

- the use of the term “beneficial use” allows degradation and precludes the establishment of a goal of “non-degradation”;
- the use of the term beneficial use does not preclude the establishment of a goal of “non-degradation”;
- the term “beneficial use” is a regulatory term that has a “regulatory” meaning;
- Get rid of everything after the comma following “...watersheds within the planning region,...”;
- we need clearer goals;
- What about establishing a “Guiding Principle” or “Principle Statement” to protect the environment and preserve land value?;

[At the suggestion of Coordinator Tull, the SHC agreed to meet to discuss the possibility of establishing a set of guiding principles for the planning process. Coordinator Tull requested that one person from each SHC subgroup be nominated for this meeting. Coordinator Tull stated that he would contact the SHC members about this meeting via e-mail.]

Objective 1:

- the definition of the term “water quality” should be revised to include stormwater flow
- define “hydrologic regime” as stating that includes water flow
- revise to include the protection of other flora and fauna, not just the Barton Springs Salamander

Objective 2:

- no substantial comments received

Objective 3:

- revise the objective statement to say that standards should be identified to establish goals & protect existing water quality
- how does this objective fit in with the concept of “non-degradation”?

Objective 4:

- no substantial comments received

Objective 5:

- revise the third bullet to state “... within the Barton Springs Segment of the Edwards Aquifer and the Barton Creek Watershed, or in the contributing portion of the watersheds within the planning region”;

Objective 6:

- allow innovative approaches including compensation of land owners, density trading, etc...
- include as a strategy the “minimization of new sources of pollution” [other SHC members objected to the inclusion of this strategy]

- include a strategy to “minimize negative economic impacts to land owners” [another SHC members suggested adding “and the general public”]

Objective 7:

- no substantial comments received

One general comment received was that all edits should be shown on the updated/revised documents to make it easier to see what has been changed.

Grant Jackson stated that the “Goals & Objectives” document would be updated per the comments received and the revised, and hopefully final, version of the document would be presented at the next SHC meeting (November 17, 2004).

5. Review and Discussion of the Updated Draft Version of the “Areas of Focus” for the Regional Water Quality Protection Plan (Meeting Attachment No. 4).

Grant Jackson reviewed this updated draft version of the “Areas of Focus” document.

The following comments were received from the SHC at the meeting:

Water Quality Threats

- Land Development includes construction and post-construction activities, and also includes infrastructure improvements;
- instead of just stating “on-site wastewater treatment” it should include the term “Improper Wastewater Management”;
- Include threats to the hydrologic regime, including water quality;
- include quarrying and mining operations, maybe include under an “Industrial Activities” category;
- the category of “improper land management” should be included under the heading “Watershed Management/Water Quality Protection Measures”.

Watershed Management/Water Quality Protection Measures

- include the trading of development rights under “Mitigation for excess impervious cover”;
- include xeriscaping;
- does not address the issue of over-pumping of the aquifer;
- “Alternative water uses/source” should include the concept of wastewater management.

Economic Implications

- include “incentives to preserve land”.

Grant Jackson stated that this document would not be presented again, but that the document and the comments would be used to craft the table of contents for the Regional Water Quality Protection Plan (a draft of which will be presented to the SHC members for discussion/comment at the next SHC Meeting on November 17, 2004).

6. Review and Discussion of the Draft Water Quality Protection Measures for the Regional Water Quality Protection Plan (Meeting Attachment No. 5).

Grant Jackson referred to the draft Water Quality Protection Measures document that was posted as meeting attachment no. 4 on the planning project's web site. Mr. Jackson stated that the intent of this document was to give the SHC list of the protection measures the Consulting Team is considering for inclusion in the Regional Water Quality Protection Plan. Due to time lack of time this document was not reviewed in detail at the meeting.

NEW BUSINESS ITEMS

1. Proposed November 17, 2004 SHC Meeting.

In accordance with the SHC approved schedule, Coordinator Tull proposed the next SHC meeting to be held on Wednesday, November 17, 2004. Mr. Tull stated that a draft agenda would be circulated to SHC members and that the SHC members should review the proposed agenda and provide their comments to him as soon as possible.

2. SHC Report to the Executive/Core Committee.

In accordance with the policy developed by the Process Subcommittee and adopted by consensus by the SHC, Coordinator Tull stated that the Development Interest stakeholder group would be responsible for representing the SHC and reporting on the SHC's activities at the next Executive/Core Committee Meeting, currently scheduled for Wednesday, October 27, 2004 (rescheduled from the originally scheduled October 13, 2004 meeting).

3. Meeting of the "Guiding Principles Subcommittee".

As stated previously in the meeting, Coordinator Tull stated that he would be in touch with all SHC members via e-mail about the scheduling of the time and date for holding the initial meeting of the "Guiding Principles Subcommittee".

ADJOURNMENT

The meeting was adjourned at approximately 9:35 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

~~DRAFT -- DRAFT -- DRAFT -- DRAFT -- DRAFT -- DRAFT~~

STAKEHOLDER COMMITTEE MEETING – NOVEMBER 17, 2004

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

INFORMAL ROUNDTABLE DISCUSSION ON WATER QUALITY GOALS [OPTIONAL]:

Meeting Time: Wednesday, November 17, 2004, at 5:00 pm

Meeting Information: The roundtable discussion will give Stakeholder Committee Members an opportunity to participate in an informal discussion on water quality issues within the planning region. Guest speakers will be invited to present their views on issues surrounding the preparation of a regional water quality protection plan within the planning region. **NOTE TO STAKEHOLDER COMMITTEE MEMBERS – THIS ROUNDTABLE DISCUSSION IS OPTIONAL. FORMAL DISCUSSIONS RELATING TO THE REGIONAL PLAN WILL BE CONDUCTED DURING THE STAKEHOLDER COMMITTEE MEETING THAT BEGINS AT 6:00 PM.**

Guest Speaker: Mr. Brian Smith, Senior Hydrogeologist. A representative from the Barton Springs Edwards Aquifer Conservation District will provide an update concerning the District's groundwater modeling efforts ~~tentative~~.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, November 17, 2004, at 6:00 pm

Meeting Information: Regularly scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the October 20, 2004 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2a. Review, discuss, and approve Standard Operating Procedures (SOP) document and nominees for the outside Technical Review Group (TRG).

[GOAL: Consensus approval of an updated version of the Standard Operating Procedures document originally presented at the October 20, 2004 SHC Meeting, along with a list of nominees for the outside Technical Review Group (TRG). HOMEWORK: Read & review the updated SOP document and the list of nominees posted on the web site. Any comments, or additional names of potential nominees, should be forwarded to the Executive Director and the Consulting Team, preferably via e-mail, prior to the meeting so that they may be distributed to all SHC members prior to the meeting.]

2b. Review and discuss the 1st Draft of the Guiding Principles for the Regional Water Quality Protection Plan.

[GOAL: Review and brief discussion of the 1st Draft of the Guiding Principles for the Regional Water Quality Protection Plan as developed by the Guiding Principles Subcommittee. The SHC will decide at the meeting the next steps to be taken with regard to this document. At present, our ultimate goal for this document is consensus approval of an updated version of the Guiding Principles at the next SHC Meeting (tentatively scheduled for Wednesday, December 15, 2004). HOMEWORK: Read & review the 1st Draft of the Guiding Principles document.]

3. Review, discuss, and approve Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan.

[GOAL: Consensus approval of the Consulting Team's Final Version of the Goals and Objectives document. HOMEWORK: Read & review the updated draft posted on the web site. Any comments should be forwarded to the Executive Director, the Consulting Team, preferably via e-mail, prior to the meeting so that these comments may be summarized for expedited presentation at the meeting.]

4. Review and Discuss 1st Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation and Discussion on the 1st draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on revisions. HOMEWORK: Read and review the 1st draft of the Regional Water Quality Protection Plan. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

5. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation and discussion on the Updated Project Schedule. HOMEWORK: Review the Updated-Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

AGENDA - for the **OPTIONAL Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:**

Time	Activity
5:00 pm	Roundtable Discussion on Water Quality Planning Issues Within the Planning Region. Guest Speaker – A representative from the Barton Springs Edwards Aquifer Conservation District will provide an update concerning the District's groundwater modeling efforts [<u>tentative</u>].
5:50 pm	Break

AGENDA - for the November 17, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of October 20, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review, Discuss, and Approve an updated version of the Standard Operating Procedures and a list of nominees for the outside Technical Review Group (TRG) - NEI (See attachment 2a)
<u>6:25</u>	<u>Review and Discuss the 1st Draft of the Guiding Principles for the Regional Water Quality Protection Plan developed by the Guiding Principles Subcommittee – Terry Tull/NEI (See attachment 2b)</u>
6:35 pm	Review, Discuss, and Approve the Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
6:50 pm	Break
7:00 pm	Review and Discuss the 1 st Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 4)
8:00 pm	Break
8:10 pm	Review and Discuss the 1 st Draft Version of the Water Quality Protection Plan for the Regional Water Quality Protection Plan - NEI (continued)
9:00 pm	Discuss the preparation and submittal of a Stakeholder Committee report to the LCRA prior to the LCRA Board Meeting on December 7, 2004 (tentative date)
9:10 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 5)
9:15 pm	Discussion on Possible Formats, Methods, and Subject Matters for Technical/ Informational Presentations to the Stakeholder Committee – Terry Tull/NEI
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

Presentation to the Stakeholder Committee on Draft #1 of the Regional Water Quality Protection Plan

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Oak Hill United Methodist Church
November 17, 2004

Background/Goals Objectives

➤ Background

- No comments received
- Minor Expansion anticipated
- History
- Definition of the Planning Region
 - Add Blanco County Entities
- Entities Involved
- Description of the Stakeholder Process

➤ Goals and Objectives for the Plan

- Revisions based on Adopted Goals and Objectives
- Add Guiding Principals

Regional Water Quality Planning Project

November 17, 2004

What does the Regional Plan Protect?

- Hydrology
 - Minor Expansion anticipated
- Definition of Critical Parameters (CPs)
 - Anticipated suspended solids, nutrients, biological constituents & toxic constituents
- Scientific Basis for CPs
 - Narrative with listing in Attachment 5
- Definition-Monitoring & Assessment CPs
 - Narrative of how CPs used in Implementation

Regional Water Quality Planning Project

November 17, 2004

Water Quality Threats

- General Comments
 - Vulnerability Analysis for different types of development
 - Minor Expansion anticipated
- Land Development
- Point Source Discharges
 - Minor Expansion anticipated
- Storm Water/Non-Point Source Pollution
 - Minor Expansion anticipated

Regional Water Quality Planning Project

November 17, 2004

Water Quality Threats (Continued)

- Wastewater Collection, Treatment and Disposal
 - Avoid bias toward centralized systems
 - Consider as a resource, avoid “disposal”
 - Consider “community” on-site concepts
 - Significant expansion anticipated
- Use, Storage and Disposal of Harmful Materials
- Improper Management of Undeveloped Land

Regional Water Quality Planning Project

November 17, 2004

Existing Regulatory Programs

- Discuss construction phase requirements
- Consider additional requirements for construction similar to City of Austin
 - Address deficiencies in existing programs

Regional Water Quality Planning Project

November 17, 2004

Open Space Preservation (OSP)

- Funding strategies and financial aspects – avoid funding with development fees
- Opposed to mitigation
 - More detail on protection of critical environmental features (e.g. activities)

Regional Water Quality Planning Project

November 17, 2004

Location of Development

- No development/BMPs in Buffer Zones (BZs)
- Increased offsets for Critical Environmental Features (CEFs) & BZs
- No filling/plugging CEFs
- No construction on slopes > 15%
- Clustering emphasized—separate IC from BZ/CEFs

Regional Water Quality Planning Project

November 17, 2004

Density of Development

- Steep slopes/BMPs considered impervious cover (IC) for net site area (NSA) calcs.
- Reductions in proposed IC Limits
 - No Mitigation
 - No differences for jurisdiction
 - RZ to 10%
 - CZ to 10-15%
- Add restrictions for # dwelling units/acre
 - Anticipate significant expansion

Regional Water Quality Planning Project

November 17, 2004

Control of Hydrologic Regime

- 1 yr, 3 hr retained for 24 hrs instead of 2 yr, 3 hr
- Limit post-development flow to pre-development
 - Address comments on flow control/erosive discharges

Regional Water Quality Planning Project

November 17, 2004

Structural BMPs

- Recommend specific BMPs for use in the Planning Region
- List of “Worst Management Practices” to be avoided
 - Address rationale for selection of BMPs (no net increase in pollutants), recommended BMPs, and criteria for alternatives

Regional Water Quality Planning Project

November 17, 2004

Nature of Development

- Residential
 - Realistic estimates of IC for residential
 - Address lot size, units/acre
- Commercial
 - Allowable activities
 - support features
- Industrial
 - Restricted zones
 - Protective measures

Regional Water Quality Planning Project

November 17, 2004

Use Restrictions/Public Education

- **Use Restrictions**
 - Address specific land uses, restriction by zoning
 - Restrictions on Use, Storage and Disposal of Potentially Harmful Materials
 - Address wastes, hazardous materials, pesticides, and nutrients, with emphasis on integrated mgmt.
- **Public Education**
 - Expand using EPA Phase II Storm water Minimum Control Measure

Regional Water Quality Planning Project

November 17, 2004

Alternative Water Sources/Uses & Management of Undeveloped Land

- **Alternative Water Sources & Uses**
 - Replacement of consumptive uses
 - rainwater harvesting-potable & irrigation
 - water conservation
 - wastewater reuse
- **Management of Undeveloped Land**
 - Address other agricultural practices

Regional Water Quality Planning Project

November 17, 2004

Parameters to be Used to Measure and Monitor Water Quality within the Planning Region

- Goal – No net increase in pollutant loadings
- Tied to CPs previously identified
 - Anticipated significant expansion

Regional Water Quality Planning Project

November 17, 2004

Implementation

- Entities Responsible for Implementation
 - Measures (previously described) recommended for adoption by local governments
 - Measures (previously described) which require new/expanded authority
 - Measures (previously described) recommended for voluntary implementation
- Mechanisms
- Schedule

Regional Water Quality Planning Project

November 17, 2004

Economic Implications

- Initial Implementation
- On-going Operations and Maintenance
- Enforcement and Oversight
- Impacts of failure and/or inadequacy
- Land value
- Cost of public facilities to serve development

Regional Water Quality Planning Project

November 17, 2004

Comments by Stakeholder Category

- | | |
|--------------------------|---|
| ➤ Neighborhood Interests | ➤ Concerned Citizens |
| ➤ Economic interests | ➤ Public Interest Organizations |
| ➤ Governmental Entities | ➤ Environmental Preservation/ Local Interest groups |
| ➤ Development Interests | ➤ Property Owners |

Order selected by lottery

Regional Water Quality Planning Project

November 17, 2004

Questions/Comments on the Draft Plan



- Naismith Engineering (NEI)
- Grant A. Jackson, P.E.
gjackson@
- Tom Brown
tbrown@
- David Fusilier, P.E.
dfusilier@

All NEI e-mails:

@naismith-engineering.com

Regional Water Quality Planning Project

November 17, 2004

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **November 17, 2004, at 6:00 pm**

Meeting Location: Oak Hill United Methodist Church, 7815 U.S. Highway 290 West, Austin, Travis County, Texas 78736.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
X	Jon Beall	X	Nancy McClintock
X	Alan Bojorquez		Charles O' Dell
X	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks	X	Randy Robinson
	S. Tim Casey	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Joe C. Day	X	J. T. Stewart
X	Karen Ford		Jon Thompson
X	David Fowler	X	David Venhuizen
X	Mark Gentle	X	Michael Waite
X	Karen Hadden	X	Hugh Winkler
X	Rebecca Hudson	X	Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
	Mike Lyday	X	S.H. (Tary) Snyder
	Carlotta McLean	X	Randall Thomas
	Bret Raymis	X	Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

OPTIONAL - Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Prior to the official Stakeholder Committee Meeting an optional, informal Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region was convened at approximately 5:00 pm. This roundtable discussion was open to all interested stakeholders. The guest speaker was Brian Smith, Senior Hydrogeologist with the Barton Springs Edwards Aquifer Conservation District. Mr. Smith spoke about the District's groundwater modeling efforts and the development of the Sustainable Yield Report. The Sustainable Yield Report may be accessed from the home page of the District's web site at www.bseacd.org. The informal roundtable discussion was ended at approximately 6:00 pm.

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at approximately 6:15 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

[TABLE BELOW IS FROM 11/17 MEETING AGENDA DOCUMENT]

AGENDA - for the November 17, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of October 20, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review, Discuss, and Approve an updated version of the Standard Operating Procedures and a list of nominees for the outside Technical Review Group (TRG) - NEI (See attachment 2a)
6:25	Review and Discuss the 1 st Draft of the Guiding Principles for the Regional Water Quality Protection Plan developed by the Guiding Principles Subcommittee – Terry Tull/NEI (See attachment 2b)
6:35 pm	Review, Discuss, and Approve the Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – NEI (See attachment 3)
6:50 pm	Break
7:00 pm	Review and Discuss the 1 st Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 4)
8:00 pm	Break
8:10 pm	Review and Discuss the 1 st Draft Version of the Regional Water Quality Protection Plan - NEI (continued)
9:00 pm	Discuss the preparation and submittal of a Stakeholder Committee report to the LCRA prior to the LCRA Board Meeting on December 7, 2004 (tentative date)
9:10 pm	Review and Discuss Updated Project Schedule and Milestones – presentation and discussion of current project schedule - NEI (See attachment 5)
9:15 pm	Discussion on Possible Formats, Methods, and Subject Matters for Technical/ Informational Presentations to the Stakeholder Committee – Terry Tull/NEI
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

1. Open Public Comment Period.

Mr. Ken Manning from the LCRA announced that the LCRA Board of Directors have planned a Special Board meeting on December 7, to discuss issues relating to water service contracts serving the Hamilton Pool Road area. The regular LCRA Board meeting later in December will address other issues relating to water services in the areas of western Travis County and northern Hays County, including the LCRA's current CCN application. Mr. Manning stated that the Board should finalize plans for the December 7th meeting in the next few days and that he would notify the SHC members via e-mail.

2. Discussion and Action to Approve Minutes from the October 20, 2004 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull reviewed the previously posted copies of the minutes from the October 20, 2004 Stakeholder Committee (SHC) Meeting. The minutes were approved by consensus with minor changes.

3. Review, Discuss, and Approve the Updated Draft Standard Operating Procedures for the outside Technical Review Group (TRG), as well as the draft list of nominees (Meeting Attachment No. 2a).

Coordinator Tull reviewed the previously posted copy of the Updated Draft Version of the Standard Operating Procedure for the outside Technical Review Group. One comment received from the SHC was that members of the TRG should be informed as to the degree of completion (or version) of the documents they are being asked to review (i.e., 1st draft, 2nd draft, final). After receiving no other comments, the SOP document was approved by consensus.

Coordinator Tull then reviewed the current list of nominees for the TRG that was transmitted to the SHC via e-mail on November 16, 2004. There being no objections, the nominees were confirmed as members of the TRG. Following some additional discussion, the SHC decided that other candidates could be nominated for the TRG and presented at the next SHC meeting for confirmation.

4. Review and Discussion of the 1st Draft of the Guiding Principles Document for the Regional Water Quality Protection Plan developed by the Guiding Principles Subcommittee (Meeting Attachment No. 2b).

Coordinator Tull presented the 1st Draft of the Guiding Principles document as developed by the Guiding Principles Subcommittee (draft dated November 15, 2004). After discussion by the SHC, a wording change was made to the draft document (Item No. 6), and the revised document was approved by consensus later in the meeting.

5. Review, Discuss, and Approve the Updated Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan (Meeting Attachment No. 3).

Coordinator Tull introduced the latest Updated Draft Version of the Goals and Objectives document. He explained that it was intended that the SHC would adopt the Goals and Objectives document at this meeting.

Grant Jackson then conducted the review of the Updated Draft Version of the Goals and Objectives, with the results:

- A suggested wording change to the Goal Statement by Henry Brooks (Property Owners) conveyed prior to the meeting via e-mail from Coordinator Tull on November 16, 2004 was discussed and agreed upon.
- There were _____#_____ sections of the document about which there were comments but not sufficient time to reach agreement on any changes. The SHC agreed that the remainder of the Goals and Objectives were accepted, but that these _____#_____ provisions would be the subject of further discussion at the next meeting. NAISMITH will post the revised Goals and Objectives document with these _____#_____ provisions highlighted, along with accompanying comments, on the website for discussion at the next meeting.

6. Review and Discussion of the 1st Draft Version of the Regional Water Quality Protection Plan (Meeting Attachment No. 4).

Grant Jackson reviewed the 1st Draft Version of the Regional Water Quality Protection Plan with a PowerPoint presentation.

After Mr. Jackson's presentation the SHC members were given an opportunity to comment on this draft version. The comments were solicited by the individual SHC interest groups (the order of the groups had been selected at random by the NEI Team). The comments from the SHC are summarized as follows:

Neighborhood Interests

- Density. How do you address this issue outside of city limits? Counties may not have the authority to control density.
- Don't confuse the issues of density vs. impervious cover. They are not the same.
- BMPs: need to identify constituents; removal levels; and, be mindful of groundwater effects from the BMPs.
- Recommend the detention of the 2-yr, 3-hour storm event, and releasing this volume over a 24-hour period.
- Amend the net site area calculations.
- The more environmentally sensitive areas within the planning region should be identified. In some way, these more sensitive areas should receive more attention.
- The plan doesn't "hang together" well.
- The plan is "inside out"/"backwards" – should have parameters/goals first.

Economic Interests

- Irrigation/Retention BMPs: the pollutants are discharged onto the land and wait for a big flood event to be washed downstream. Need to look at what happens to pollutants.
- A big threat to the aquifer is that current pumping rates exceed recharge rates, creating a deficit.
- Current OSSF rules are inadequate (e.g., spray irrigation systems don't use chlorine when they should and are required to.)
- Preferred growth corridors should be identified within the planning region.
- Education is a key to public acceptance/actions.
- Need to recognize the "public good" of water in aquifer/streams/natural lands, and the resulting economic and social benefits to the region.

Government Entities

- Scientific justification needs to be provided with the plan. None shown with this version.

- The plan, in its current state, is hard to review – hard to know if it works when we don't have a target or goal.
- Net Site Area – net site area calculations should exclude golf courses and wastewater reuse areas.
- Public Education should be emphasized (e.g., public schools, “Green Builder” Program, etc...).
- For construction plans: need specifics on temporary BMP requirements; reviewer qualifications should be standardized; the TCEQ's Stormwater Pollution Prevention Plan format should serve as a guide.
- For Permanent BMPs: an inspection/maintenance program should be established.
- Add scientific justification for buffer zone and critical environmental feature set backs, impervious cover limitations, etc...
- Where does it say in the document that the BMPs will be required to function properly? Need guarantee of performance.
- Emphasize erosion control – provide help to builders
- Address landscape maintenance after construction – “grow green”

Development Interests

- Stream offsets seem arbitrary. Where is the science behind these requirements? Needs better definition – recommend use TCEQ definitions.
- Defining the drainage areas (that establish stream offset requirements) is sometimes difficult.
- Utility lines and roads should be allowed to cross streams.
- Impervious cover limits seem arbitrary. The science behind these limits should be provided.
- Why are impervious cover limits different inside vs. outside city limits? What's the difference?
- The TCEQ would be a good start for protecting water quality within the planning region. We should work with them to identify and eliminate deficiencies in their Edwards Aquifer program.
- Not sure about the density and impervious cover limits. Need to have experts look at the “takings” issue this may create.
- Pollutants are assimilated in the environment. This fact needs to be considered with respect to the “no net increase” goal.
- Question the relevance of impervious cover limits for “inside/outside” of city limits. Are we pushing development elsewhere? We need to considerate of others and be sure we are not creating problems in other areas. We should not shut the door to development in this area.
- Impervious cover limits – need to look at the “Take Back Texas” issues on “takings”.
- Where is the science behind the limits established in the plan?
- When did we set a goal of no net increase in pollutants?
- We should start with the TCEQ rules, and build on them.
- The use of the “Net Site Area” concept should be dropped in favor of “Gross Site Area”.
- Pg. 21, Table 3 – Add column to table to include impervious cover limits if you use structural BMPs.
- Purpose of “semi-pervious” cover is not clear – what is the goal? What is achieved?
- Pg. 22, “Erosive Flow Control” – do need to control 2 year/3 hour event, but requirement for detention may be unnecessary if it converts back to storm flow.

Concerned Citizens

- TCEQ is not a useful organization.
- Just because TCEQ regulates wastewater doesn't mean we can't address it in the plan.
- Standards need to be set. We don't have that with this current draft plan. What are we trying to achieve?
- “Maintain and Enhance” – doesn't that limit what we can add?
- There are good reasons to ban surface dispersal of effluent.

- Need for vulnerability assessment and micro-sensitivity analysis of sites.

Public Interest Organizations

- Can you really measure the cumulative effects? Cumulative effects need to be an issue.
- CEF setbacks need to be looked at and justified.
- Regarding the issue of creating more density/impervious cover within City Limits – you are still over a sensitive area. This issue needs to be looked at.
- “Open Space Preservation” section. Change title to “Natural Area Preservation”.
- On Page 9, under “Water Quality Threat” section: add threats from infrastructure construction and threats from post-construction.
- Look at the transfer of development rights (from on the watershed to off the watershed).
- Look at discouraging major employers from locating within the planning region.
- Would like to incorporate what could be done to protect water quality (not just what can be done today) – want to see policy and process to protect aquifer long term.
- Land use – controlling this needs to be looked at.
- Land clearing – limit what and how much can be done.
- Discourage the use of St. Augustine grass.
- Control use of pesticides.
- The use of native vegetation should be encouraged.
- Emphasize open space preservation now. This preservation may be able to be developed for transportation purposes (hike & bike trails, etc...).
- Pg. 19 – expand on the first paragraph (is impervious cover the source of increased pollutant loads or is it an indicator parameter tied to additional human activity, which is the actual source of pollutants).

Local Environmental Preservation/Good Governance Groups

- Pg. 19 - Net Site Area should not include steep slopes (> 18%).
- Pg. 21 – Runoff is a geometric increase, therefore, mitigation cannot be linear. Look at City of Austin requirements.
- Pg. 23 – Evapotranspiration has problems (retention/irrigation systems).
- Need to address the issue of dissolved pollutants in stormwater.
- Need to be able to measure and control new pesticides, not just existing.
- Link the need for certainty to scientific defensibility.
- Emphasize “non-degradation” – recognize that there are “property rights” and “takings” issues that flow both ways.
- Address economic benefits derived from preserving water quality.
- Address the concept of establishing a regional authority to regulate water quality.
- Need to discuss impervious cover limits. Why put this in now? What is the standard being achieved?
- Need a global target – then define strategies.
- Must recognize that we can regulate property rights without having a taking.

Property Owners/Agricultural Interests

- We should avoid using the term “undeveloped” land. Other terms to use are: “natural land”, “rangeland”, “cropland”, “right-of-way”, “parks”, “public land”, etc..
- Need to address whether the right to develop should be on a first-come first-serve basis.
- “Voluntary” compliance is a viable technique for water quality protection and should be used when possible – can be effective without regulation.
- Pg. 22 – erosive flow – needs to get into retrofit.

- Nothing about retrofitting existing development. Should be addressed as a fairness issue.
- Concerning higher impervious cover limits in urban areas (vs. rural areas): developments in urban areas can put more money into the BMPs, thus protecting water quality even with higher i.c. levels.
- Need to address the “what” and “when” of using TDRs.
- The current draft is pretty boilerplate.
- TCEQ is an ineffective organization – doubts this plan can get them to do more, or get them more resources.
- Pg. 17 – instead of “Open Space Preservation” use “Natural Areas Preservation”.
- Not very receptive to a first-come first-serve development policy.
- Who will bear the operation and maintenance costs on structural BMPs?
- Urbanization is the main threat to the aquifer.
- Advocates “correlative rights” – helps to create a market.
- Need to address/change public policies that often are counterproductive to public good
- Need to address public responsibility to consider impact of decisions to promote utilities

Miscellaneous comments not attributed to any particular group

- The “Guiding Principles” that were developed should be added to the plan.
- Pg. 4 – add Blanco County to “Other Entities”.
- Pg. 4 - Add a section on demographics.
- Pg. 9 – instead of using the term “Land Development”, use “Urbanization”.
- Pg. 10 – Wastewater Collection, Treatment, and Disposal Section should address land application, OSSFs, and utility lines crossing streams.
- Pg. 22 – Structural BMPs section – this section should include something about “wet” ponds.

After the discussion/comments by the SHC, Mr. Jackson stated that the NEI Team would attempt to incorporate the comments received at this meeting into the 2nd draft version of the Regional Water Quality Protection Plan that would be presented at the next SHC Meeting (tentatively scheduled for December 15, 2004).

7. Discuss the preparation and submittal of a SHC report to the LCRA prior to the LCRA Board Meeting on December 7, 2004 (tentative date).

Coordinator Tull discussed the idea of the SHC formally submitting a report to the LCRA prior to the LCRA Board Meeting that would discuss the Hamilton Pool Road water line issue. After a brief discussion it was agreed that the SHC as a body would not give any presentation or report to the LCRA. Coordinator Tull stated that he would prepare a report to LCRA and would coordinate its content with the SHC.

NEW BUSINESS ITEMS

1. Proposed December 15, 2004 SHC Meeting.

In accordance with the SHC approved schedule, Coordinator Tull proposed the next SHC meeting to be held on Wednesday, November 17, 2004. Mr. Tull stated that a draft agenda would be circulated to SHC members and that the SHC members should review the proposed agenda and provide their comments to him as soon as possible.

2. SHC Report to the Executive/Core Committee.

In accordance with the policy developed by the Process Subcommittee and adopted by the SHC, Coordinator Tull stated that the Economic Interest stakeholder group would be responsible for representing the SHC and reporting on the SHC's activities at the next Executive/Core Committee Meeting, currently scheduled for Wednesday, December 1, 2004 (rescheduled from the originally scheduled November 10, 2004 meeting).

ADJOURNMENT

The meeting was adjourned at approximately 9:35 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

STAKEHOLDER COMMITTEE MEETING – DECEMBER 15, 2004

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

INFORMAL ROUNDTABLE DISCUSSION ON WATER QUALITY GOALS [OPTIONAL]:

Meeting Time: Wednesday, December 15, 2004, at 5:00 pm

Meeting Information: The roundtable discussion will give Stakeholder Committee Members an opportunity to participate in an informal discussion on water quality issues within the planning region. Guest speakers will be invited to present their views on issues surrounding the preparation of a regional water quality protection plan within the planning region. **NOTE TO STAKEHOLDER COMMITTEE MEMBERS – THIS ROUNDTABLE DISCUSSION IS OPTIONAL. FORMAL DISCUSSIONS RELATING TO THE REGIONAL PLAN WILL BE CONDUCTED DURING THE STAKEHOLDER COMMITTEE MEETING THAT BEGINS AT 6:00 PM.**

Guest Speaker: TBA.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, December 15, 2004, at 6:00 pm

Meeting Information: Regularly scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the November 17, 2004 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review, discuss, and confirm additional nominees for the Technical Review Group (TRG).

[GOAL: Decide on the confirmation of additional nominees for the Technical Review Group (TRG). HOMEWORK: Review the list of additional nominees which will be distributed by the Executive Director.. Any comments should be forwarded to the Executive Director and the Consulting Team, preferably via e-mail, prior to the meeting so that they may be distributed to all SHC members prior to the meeting.]

3. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. HOMEWORK: Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

4. Review, discuss, and approve Final Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan.

*[GOAL: Consensus approval of the Consulting Team's Final Version of the Goals and Objectives document. HOMEWORK: Read & review the updated draft posted on the web site. Remember that the Goals and Objectives were accepted except for those sections that are highlighted in the attachment. **Each and every SHC member is requested to forward either your concurrence with the draft language, or your comments, along with any recommended revisions, to the Executive Director and the Consulting Team via e-mail prior to the meeting so that these comments may be summarized for expedited presentation at the meeting.**]*

5. Review and Discussion of 2nd Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation by NEI Consulting Team and Discussion on the 2nd draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on revisions. HOMEWORK: Read and review the 2nd draft of the Regional Water Quality Protection Plan. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

AGENDA - for the OPTIONAL Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Time	Activity
5:00 pm	Roundtable Discussion on Water Quality Planning Issues Within the Planning Region. Guest Speaker – TBA.
5:50 pm	Break

AGENDA - for the December 15, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of November 17, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review, Discuss and Confirm additional nominees for the Technical Review Group (TRG) – Terry Tull (See attachment 2)
6:25 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 3)
6:35 pm	Review, Discuss and Approve the Final Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – Terry Tull/NEI (See attachment 4)
7:05 pm	Break
7:15 pm	Review and Discuss the 2 nd Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 5)
8:15 pm	Break
8:25 pm	Review and Discuss the 2 nd Draft Version of the Regional Water Quality Protection Plan - NEI (continued)
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

Presentation to the Stakeholder Committee on Draft #2 of the Regional Water Quality Protection Plan

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Oak Hill United Methodist Church
December 15, 2004

Comments Received on Draft #2 Prior to the Meeting

- Stakeholder Committee
 - Concerned Citizens
 - Property Owners
 - Development Interests
- Technical Review Group
 - Mike Lyday (Local Environmental, et al)

On-going Work - General

- **Attachments**
 - Not included in draft, but existing documents available on project website
- **Footnotes**
 - Added to identify specific studies/references tied to applicable section
- **Graphics**
 - Many in draft are placeholders
 - Most graphics being done through in-kind contributions – incorporated as available

Regional Water Quality Planning Project

December 15, 2004

On-going Work - Background/Goals Objectives

- **Background**
 - Add discussions on Climate and Demographics [SHC]
 - Expand description of Stakeholder Process
- **Goals and Objectives**
 - Revise to match final adoption by SHC
- **Guiding Principals**
 - Conform to final adoption by SHC

Regional Water Quality Planning Project

December 15, 2004

On-Going Work - What does the Regional Plan Protect?

- Surface Water
 - Address Lakes/Reservoirs/Surface Water Bodies
- Geologic Description
 - Expanded discussion of RZ geology
 - Groundwater withdrawal - other aquifers & implications in Planning Region [SHC]
- Critical Environmental Features
- Threatened/Endangered Species

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Existing Regulatory Programs

- State Federal Programs
 - Clarify/Expand - TCEQ Programs [SHC]
- Local Programs
 - Summary of existing local government WQ regulations within the Planning Region
 - Examples of existing local government WQ regulations, outside the Planning Region, but within the local area.

Regional Water Quality Planning Project

December 15, 2004

On-Going Work - Water Quality Threats

- Threats Listed in Draft
 - Expansion of Domestic Wastewater [SHC]
 - Expansion of Improper Management of Undeveloped Land [SHC]
 - Expansion of Groundwater Withdrawal Exceeding Recharge to address additional water supply sources [SHC]
- Addition of “Lack of WQ Controls on Existing Development” [SHC]

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Critical Water Quality Parameters

- Definition
 - Revisions to “indicative of a pollutant”
- Addition of Preferred Measurement methods for each Critical Parameter
 - Tie to existing test methods used under existing programs and ordinances

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Strategy for Selection

- Provide Scientific Basis for “No Net Increase in CP Discharges” Approach [SHC]
- Non-structural measures generally cost less than structural measures [SHC]
- Justify Need for Site Specific Evaluation [SHC]

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Description of Measures

- Natural Area/Open Space Conservation
 - Conservation Easements as mitigation for existing development [SHC]
 - Why net 10% IC when base IC is 15% [SHC]
- Stream Offsets/Buffer Zones
 - Centerline vs. Stream Bank [SHC]
 - Practical minimums for BZs [SHC]
 - Justify rationale for BZs where there are existing BMPs/Measures [SHC]
 - Construction (utilities, etc.) in BZ [SHC]

Regional Water Quality Planning Project

December 15, 2004

**On-Going Work – Description of
Measures (Continuation 1)**

- Density of Development
 - Net Site Area vs. Gross Site Area [SHC]
 - Elaborate on “Cited Studies” consideration of BMPs [SHC]
 - Focus on CP loadings rather than IC limits [SHC]
 - Applicable to Local Govt. projects [SHC]
- Nature of Development
 - Characteristics of each type of development
 - Corresponding infrastructure [SHC]

Regional Water Quality Planning Project

December 15, 2004

**On-Going Work – Description of
Measures (Continuation 2)**

- Restrictions on Harmful Materials
 - Sales/availability controls
 - Use/disposal restrictions
 - Integrated pest/nutrient management
- Public Education
 - Specific local recommendations
- Alternate Water Sources/Uses
 - Replacement of consumptive uses

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Description of Measures (Continuation 3)

- Management of Undeveloped Land
 - Applicable to changes in use [SHC]
 - Address Invasive Plants (e.g. cedar) [SHC]

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Implementation

- Legal Authority of Existing
 - Expand for “Authorities”
- Implementation Strategy
 - Tie strategies to Objectives
 - Define procedures for “overlaps”
 - Develop procedures for “gaps”
- Regulatory Takings/Property Rights
 - Address obligations of development
 - Expand to cover impact of “pollution” [SHC]

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Implementation
(Continuation 1)

- Available Implementation Mechanisms
 - Outline of ordinances for municipal entities and special districts with pattern ordinances as attachments
 - Outline of ordinances and procedures for County governments with pattern ordinances and agreements
 - Mechanisms for local enforcement of state/federal requirements

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Implementation
(Continuation 2)

- Proposed Implementation Mechanisms
 - Recommended changes to existing programs under existing authority
 - Recommendations for new programs, expanded authority
 - Bridging mechanisms – until new, expanded authority in-place
- Implementation Schedule
 - Short term – changes under existing authority
 - Long term – new authority required

Regional Water Quality Planning Project

December 15, 2004

On-Going Work – Economic Implications

- Funding/Financial Assurance for initial implementation
- Funding/Financial Assurance for O&M
- Enforcement/Oversight
- Impacts of Failure to Protect
- Impacts on private property
- Impacts on public property

Regional Water Quality Planning Project

December 15, 2004

Contentious Issues – General/Philosophical

- Standard for Selection of Measures
 - No Net Increase v. % Reduction
 - Mandatory Measures – maintain
 - Voluntary Measures - enhance
- Level of Detail for Implementation Plan

Regional Water Quality Planning Project

December 15, 2004

Contentious Issues – Water Quality Protection Measures

- Conservation Easements/Mitigation
 - Voluntary or Mandatory
 - Transfer of development rights
- Buffer Zones/Offsets
 - Too high, too low or just right
- Impervious Cover Limits
 - Net site area vs. gross site area
 - Too high, too low or just right

Regional Water Quality Planning Project

December 15, 2004

Contentious Issues – Implementation

- Role of the TCEQ
 - Primary vs. Secondary
 - Relation of TCEQ rules to local ordinances
- Entities - Existing or new
- Financial/Funding Issues
 - Sustainable funding for O&M & enforcement (split between private/public & which “public”)
 - Cost burdens for developers vs. public
 - Long term financial assurance mechanisms

Regional Water Quality Planning Project

December 15, 2004

- (f) All water quality control discharges and stormwater discharges onto a WQBZ shall only be in the form of diffused, overland sheet flow and shall have peak velocities of less than five (5) feet per second at the 2-year design rainfall event.

Sec. 3.107 Setback Areas for Critical Environmental Features (CEFs).

- (a) A minimum setback area of one hundred fifty (150) feet is established around the outside periphery of all CEFs.
- (b) For a CEF which is in direct communication with the Edwards Aquifer, the upstream setback area shall extend out to the upper catchment divide of the CEF or three hundred (300) feet, whichever is less, but in no circumstances less than 150 feet.

Sec. 3.108. Control of Erosive Flows From Developed Areas.

- (a) No untreated stormwater runoff from developed land shall be allowed to flow over critical environmental features.
- (b) To the maximum extent practical, all roof runoff from non-residential buildings shall have down spouts disconnected from the site stormwater drainage system.
- (c) To the maximum extent practical, all stormwater drainage shall be treated using overland flow methods to a grass-lined swale or other vegetated buffer. The vegetated buffer shall be designed in accordance with the TCSS Manual.
- (d) Drainage patterns shall be designed to the maximum extent practical to prevent erosion, maintain the recharge of local seeps and springs, and attenuate the harm of contaminants collected and transported by stormwater. All discharge points from stormwater retention and detention ponds or other accumulation areas shall provide for energy dissipation prior to exiting the site. Overland sheet flow and natural drainage features and patterns shall be maintained to the maximum extent practical, rather than concentrating flows in storm sewers and drainage ditches. Stormwater drainage structures shall be sized to maintain flood flow velocities below the velocity associated with the 25-year, 3-hour rainfall event.
- (e) For site designs that provide for discharge of stormwater into a waterway, adequate retention and detention shall be incorporated into the site design to limit flows into the receiving waterway to the level consistent with the volume of the two-year, three-hour rainfall event evenly distributed over a 24-hour period.
- (f) Construction of enclosed storm sewers and impervious channel linings are permitted only when the City determines that such storm sewers or impervious linings are protective of water quality.
- (g) Overland flow facilities for a stormwater drainage system shall be designed in accordance with criteria set forth in the TCSS Manual.

Sec. 3.109. Infiltration.

Questions/Comments on the Draft

Plan



- Naismith Engineering (NEI)
- Grant A. Jackson, P.E.
gjackson@
- Tom Brown
tbrown@
- David Fusilier, P.E.
dfusilier@

All NEI e-mails:

@naismith-engineering.com

Regional Water Quality Planning Project

December 15, 2004

STAKEHOLDER COMMITTEE MEETING MINUTES - Final

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **December 15, 2004, at 6:00 pm**

Meeting Location: Oak Hill United Methodist Church, 7815 U.S. Highway 290 West, Austin, Travis County, Texas 78736.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
X	Jon Beall		Nancy McClintock
X	Alan Bojorquez	X	Charles O' Dell
	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks		Randy Robinson
	S. Tim Casey	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Joe C. Day	X	J. T. Stewart
X	Karen Ford		Jon Thompson
	David Fowler	X	David Venhuizen
	Mark Gentle		Michael Waite
	Karen Hadden	X	Hugh Winkler
X	Rebecca Hudson	X	Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
	Carlotta McLean	X	Randall Thomas
X	Bret Raymis		Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI
X	Stephen Dickman - KHH		

OPTIONAL - Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Prior to the official Stakeholder Committee Meeting an optional, informal Roundtable Discussion on Water Quality Planning Goals and Objectives Within the Planning Region was convened at approximately 5:00 pm. This roundtable discussion was open to all interested stakeholders. The guest speaker was David Meesey, Project Manager, with the Texas Water Development Board (TWDB). Mr. Meesey gave a presentation on State-wide and regional water planning efforts, and TWDB's role in these efforts. The informal roundtable discussion was ended at approximately 5:50 pm.

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at approximately 6:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

[TABLE BELOW IS FROM 12/15 MEETING AGENDA DOCUMENT]

AGENDA - for the December 15, 2004 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of November 17, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review, Discuss and Confirm additional nominees for the Technical Review Group (TRG) – Terry Tull (See attachment 2)
6:25 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 3)
6:35 pm	Review, Discuss and Approve the Final Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan – Terry Tull/NEI (See attachment 4)
7:05 pm	Break
7:15 pm	Review and Discuss the 2 nd Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 5)
8:15 pm	Break
8:25 pm	Review and Discuss the 2 nd Draft Version of the Regional Water Quality Protection Plan - NEI (continued)
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

1. Open Public Comment Period.

Mr. Colin Clark (SHC Member – Public Interest Groups) addressed the SHC and presented handouts on “Percent of Precipitation Converted to Stormflow and Baseflow versus Impervious Cover..” He also presented photo maps showing planned new development and existing and potential open space areas in the Planning Region.

2. Discussion and Action to Approve Minutes from the November 17, 2004 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull reviewed the previously posted copies of the minutes from the November 17, 2004 Stakeholder Committee (SHC) Meeting. The minutes were approved by consensus with minor changes.

3. Review, Discuss, and Confirm Additional Nominees for the Technical Review Group (TRG) (Meeting Attachment No. 2).

Coordinator Tull then reviewed the nomination of Mr. Michael Morrow as an additional member of the TRG. There being no objections, Mr. Morrow was confirmed by consensus.

4. Review and Discussion of the Updated Project Schedule and Milestones (Meeting Attachment No. 3).

Coordinator Tull and Grant Jackson/NEI Consulting Team presented the latest updated Project Schedule. Coordinator Tull indicated that much work has already been done on The Plan, but there is a lot to be accomplished in a relatively short amount of time. He stated that to get The Plan completed by the February deadline, it will likely take multiple SHC meetings, and possibly necessitate the formation of subcommittees to resolve certain issues. The schedule for the next SHC Meeting would be set at the end of this meeting after review and discussion of the 2nd draft of The Plan.

5. Review, Discuss, and Approve the Final Draft Version of the Goals and Objectives for the Regional Water Quality Protection Plan (Meeting Attachment No. 4).

Coordinator Tull introduced the Final Draft Version of the Goals and Objectives document. He explained that it was intended that the SHC would adopt the Goals and Objectives document at this meeting. Coordinator Tull stated that if the SHC could not reach consensus on the entire document at this meeting, the sections that could, and have previously been, agreed on, would be approved by consensus and the contentious sections would be identified, and a subcommittee would be formed in an attempt to resolve the contentious issues.

Based on the November 17, 2004 SHC Meeting, there were six (6) sections of the document about which there were comments but not sufficient time to reach agreement on any changes. The SHC agreed at the November 17, 2004 SHC Meeting that the remainder of the Goals and Objectives were accepted.

A particular issue that received much discussion at tonight’s meeting was the use of the terms “...maintain and enhance existing water quality...” in the Goal Statement of the document. After much discussion, it was resolved that NAISMITH would attempt to revise the Goals and Objectives and would include the new version in Draft #3 of The Plan. The SHC would then provide comments on

these updated Goals and Objectives prior to the next meeting, and unresolved issues would be sent to a subcommittee for resolution.

6. Review and Discussion of the 2nd Draft Version of the Regional Water Quality Protection Plan (Meeting Attachment No. 5).

Grant Jackson reviewed the 2nd Draft Version of the Regional Water Quality Protection Plan with a PowerPoint presentation.

After Mr. Jackson's presentation, the SHC members were given an opportunity to comment on the Consultant's summary of Contentious Issues that remained to be resolved. The comments were solicited from the individual SHC members in attendance at the meeting. These comments have been summarized in two separate documents that have been posted on the Project's web site on the Stakeholder page under Meeting Summary Documents for the December 15, 2004 Stakeholder Committee Meeting (the link to the Stakeholder page is <http://www.waterqualityplan.org/index.php?BODY=stakeholders>). The documents are titled "Contentious Issues Not Commented on by SHC Members" and "Contentious Issues Commented on by SHC Members".

NEW BUSINESS ITEMS

1. Proposed January 11, 2005 SHC Meeting.

After a discussion on the future schedule and tasks to be completed, Coordinator Tull proposed the next SHC meeting to be held on Wednesday, January 12, 2005. Mr. Tull stated that an e-mail would be circulated to SHC members confirming this date [Note: subsequent to the meeting it was determined that the next Executive Committee/Core Committee Meeting was to be held on January 12, 2005. To avoid a conflict, Coordinator Tull circulated an e-mail to the SHC presenting options for meeting dates. After receiving feedback from SHC members, the SHC Meeting date was changed to Tuesday, January 11, 2005 at 6:00 p.m.].

2. SHC Report to the Executive/Core Committee.

In accordance with the policy developed by the Process Subcommittee and adopted by the SHC, Coordinator Tull stated that the Government Interest stakeholder group would be responsible for representing the SHC and reporting on the SHC's activities at the next Executive/Core Committee Meeting, currently scheduled for Wednesday, January 12, 2005.

ADJOURNMENT

The meeting was adjourned at approximately 10:00 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on January 11, 2005.

STAKEHOLDER COMMITTEE MEETING -- JANUARY 11, 2005

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Tuesday, January 11, 2005, at 6:00 pm

Meeting Information: A scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS/ASSIGNMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the December 15, 2004 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. The identification and scheduling of all remaining SHC meetings, including any subcommittee meetings necessary to resolve the contentious issues identified in Item #3 (see above Item #3). The goal for this revised schedule is to set in motion a plan of action that will allow us to meet our previously established target date for adoption of The Plan of Monday, February 7, 2005. HOMEWORK: Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Also, be prepared to provide input on a plan of action to resolve the remaining contentious issues that are identified at this meeting (FYI – the contentious issues identified at the December 15, 2004 SHC Meeting are posted on the web site under the December 15, 2004 SHC Meeting Summary Documents.) Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

3. Review and Discussion of 3rd Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation by NEI Consulting Team and Discussion on the 3rd draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on revisions. Also, the identification of remaining contentious issues among SHC members. HOMEWORK: Read and review the 3rd draft of the Regional Water Quality Protection Plan. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

4. Review, Discus and Answer Basic Philosophical Questions regarding the Purpose of Regional Water Quality Protection Plan, including:

- a. What is the Standard for Selecting Water Quality Protection Measures? and
- b. Where are the Measures to be Applied?.

[GOAL: Resolve these fundamental questions that are critical to determining the scope and content of the Plan. HOMEWORK: Read and review the background documents posted on the web site and be prepared to discuss and answer this question as a group.]

AGENDA - for the January 11, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of December 15, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones, and Schedule of Remaining Stakeholder Committee Meetings (including any necessary subcommittee meetings) – Terry Tull/NEI (See attachment 2)
7:00 pm	Present the 3 rd Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 3)
7:30 pm	Break
7:40 pm	(Break into Sub-Groups?) Discuss and answer the following questions to guide the Consultant's work to complete the Water Quality Protection Plan: <ol style="list-style-type: none"> 1. What is the Standard for Selecting Water Quality Protection Measures? 2. Where are the Measures to be Applied?
9:20 pm	Other Business (set next meeting dates, next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

Presentation to the Stakeholder Committee on Draft #3 of the Regional Water Quality Protection Plan

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Oak Hill United Methodist Church
January 11, 2005

On-Going Work – Existing Regulatory Programs

- State Federal Programs
 - Clarify/Expand - TCEQ Programs [SHC]
- Local Programs
 - Summary of existing local government WQ regulations within the Planning Region
 - Examples of existing local government WQ regulations, outside the Planning Region, but within the local area.

On-Going Work - Water Quality Threats

- Threats Listed in Draft
 - Expansion of Domestic Wastewater [SHC]
 - Expansion of Groundwater Withdrawal Exceeding Recharge to address additional water supply sources [SHC]
- Addition of “Lack of WQ Controls on Existing Development” [SHC]

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Critical Water Quality Parameters

- Identification of Design Parameters and Monitoring Parameters
 - City of Austin monitoring data
 - USGS monitoring data
- Addition of Preferred Measurement methods for each Critical Parameter
 - Tie to existing test methods used under existing programs and ordinances

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Strategy for Selection

- Provide Scientific Basis for “No Net Increase in CP Discharges” Approach [SHC]
- Justify Need for Site Specific Evaluation [SHC]

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Description of Measures

- Natural Area/Open Space Conservation
 - NA/OSC as mitigation for existing development [SHC]
- Stream Offsets/Buffer Zones
 - Construction (utilities, etc.) in BZ [SHC]
- Nature of Development
 - Characteristics of each type of development
 - Corresponding infrastructure [SHC]
- Site Specific Construction Phase Controls

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Description of Measures (Continuation)

- Restrictions on Harmful Materials
 - Sales/availability controls
 - Use/disposal restrictions
 - Integrated pest/nutrient management
- Public Education
 - Specific local recommendations
- Alternate Water Sources/Uses
 - Replacement of consumptive uses

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Implementation

- Implementation Strategy
 - Elaborate on need for comprehensive, regional strategy; will not work if some don't implement
 - Define procedures for "overlaps"
 - Develop procedures for "gaps"
 - Incorporate concept of purchase of NA/OSC as mitigation for existing development

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Implementation
(Continuation 2)

- Proposed Implementation Mechanisms
 - Recommended changes to existing programs under existing authority
 - Recommendations for new programs, expanded legal authority to implement and enforce
 - Bridging mechanisms – until new, expanded legal authority in-place to implement and enforce

Regional Water Quality Planning Project

January 11, 2005

On-Going Work – Implementation
(Continuation 3)

- Regulatory Takings/Property Rights
 - Address obligations of development
 - Expand to cover impact of “pollution” [SHC]
- Implementation Schedule
 - Short term – changes under existing authority
 - Long term – new authority required

Regional Water Quality Planning Project

January 11, 2005

On-Going Work –Implications

- Funding/Financial Assurance for initial implementation
- Funding/Financial Assurance for O&M
- Enforcement/Oversight
- Impacts of Failure to Protect
- Impacts on private property
- Impacts on public property
- Impacts on future growth/demographics

Regional Water Quality Planning Project

January 11, 2005

Responses to Comments

- Do comments go into a “Black Hole”? NO!
- Response Strategy
 - Incorporate
 - Reject
 - Modify/elaborate and incorporate
- Some require significant background to address (e.g. correlative rights, risk analysis)
- Prepare responses to those not incorporated

Regional Water Quality Planning Project

January 11, 2005

DESCRIPTION

Illustrative Case #1

BY
D. FUSILIER

TRIAL

Hydrology Summary (From HEC-HMS) ← EXIST CU = 84
 Prop CU = 80 ← Improvement in soil & vegetation for lot area

	2-yr	
	Flow, cfs	Vol., cu. ft.
Lot 39 - Front - Existing	0.72	0.0255
Lot 39 - Front - Proposed	0.73	0.0298
Lot 39 - Rear - Existing	0.99	0.0366
Lot 39 - Rear - Proposed	0.87	0.0359

Δ = -0.0007 cu. ft. ← No storage required.

Distilled Contentious Issue – Where are the Measures to be Applied?

- Retrofitting of Existing vs. Mitigation
 - Basis for Recommendation
 - New development only?
 - New development and retrofit?
 - Recharge v. Contributing Zones?
 - Basin Specific
- Difficulties of Retrofitting Existing
 - Physical limitations and cost
 - Legal Issues

Regional Water Quality Planning Project

January 11, 2005

Distilled Contentious Issue – Where are the Measures to be Applied? (Cont.)

- Mitigation
 - Proximity: region-wide vs. watershed specific
 - Integration with transfer of development rights
 - Agreements between various legal entities
 - Mechanisms for preventing future development

Regional Water Quality Planning Project

January 11, 2005

Issues for January 19th Meeting

- Impervious Cover Limits
 - Basis for Recommendation
 - Net vs. Gross Site Area
 - What to include in Net Site Area
 - Too high, too low or just right?
- Buffer Zones
 - Basis for Recommendation
 - Too high, too low or just right?

Regional Water Quality Planning Project

January 11, 2005

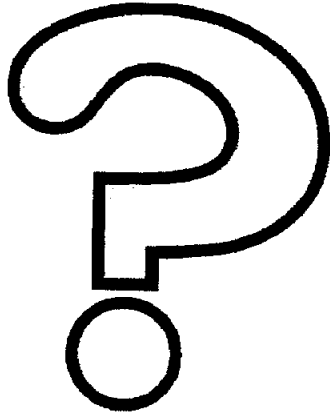
Issues for January 19th Meeting (Cont.)

- Mitigation/Conservation Easements
 - Basis for Recommendation
 - Voluntary or Mandatory

Regional Water Quality Planning Project

January 11, 2005

Questions/Comments on the Draft Plan



- Naismith Engineering
(NEI)
- Grant A. Jackson, P.E.
gjackson@
- Tom Brown
tbrown@
- David Fusilier, P.E.
dfusilier@

All NEI e-mails:

@naismith-engineering.com

Regional Water Quality Planning Project

January 11, 2005

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **January 11, 2005, at 6:00 pm**

Meeting Location: Oak Hill United Methodist Church, 7815 U.S. Highway 290 West, Austin, Travis County, Texas 78736.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
X	Jon Beall		Nancy McClintock
	Alan Bojorquez		Charles O' Dell
X	Robert (Robbie) Botto		Jim Phillips
X	Henry Brooks		Randy Robinson
	S. Tim Casey	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Joe C. Day	X	J. T. Stewart
	Karen Ford		Jon Thompson
X	David Fowler	X	David Venhuizen
	Mark Gentle		Michael Waite
	Karen Hadden	X	Hugh Winkler
	Rebecca Hudson		Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman		Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
	Carlotta McLean		Randall Thomas
X	Bret Raymis	X	Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

CALL TO ORDER

Executive Director Terry Tull served as Coordinator for the meeting, and Grant Jackson of the NEI Consulting Team served as the Secretary for the meeting. Coordinator Tull called the meeting to order at approximately 6:05 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

[TABLE BELOW IS FROM 1/11/05 MEETING AGENDA DOCUMENT]

AGENDA - for the January 11, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of December 15, 2004 Stakeholder Committee Meeting – Terry Tull (See attachment 1)
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones, and Schedule of Remaining Stakeholder Committee Meetings (including any necessary subcommittee meetings) – Terry Tull/NEI (See attachment 2)
7:00 pm	Present the 3 rd Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 3)
7:30 pm	Break
7:40 pm	(Break into Sub-Groups?) Discuss and answer the following questions to guide the Consultant’s work to complete the Water Quality Protection Plan: <ol style="list-style-type: none"> 1. What is the Standard for Selecting Water Quality Protection Measures? 2. Where are the Measures to be Applied?
9:20 pm	Other Business (set next meeting dates, next meeting agenda, etc...)
9:30 pm	Adjourn

1. Open Public Comment Period.

Mr. Henry Brooks (SHC Member – Property Owners) addressed the SHC and handed out a USDA publication titled “Grazing Lands – A Valuable Resource For All Texans”.

2. Discussion and Action to Approve Minutes from the December 15, 2004 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull reviewed the previously posted copies of the minutes from the December 15, 2004 Stakeholder Committee (SHC) Meeting. The minutes were approved by consensus without changes.

3. Review and Discussion of the Proposed Meeting Schedule for the Remainder of the Project (Meeting Attachment No. 2a and 2b).

Coordinator Tull presented the latest updated Project Schedule. Coordinator Tull indicated that much work has already been done on The Plan, but there is a lot to be accomplished in a relatively short amount of time. He stated that to get The Plan completed by the February deadline, it will likely take multiple SHC meetings, and possibly necessitate the formation of subcommittees to resolve certain issues. The schedule for the next SHC Meeting was discussed and it was agreed to that the SHC would meet next Wednesday, January 19, 2005. A schedule was outlined that would have the SHC meeting weekly (at least according to the tentative schedule) in an attempt to address the outstanding issues and have a consensus based plan that could be presented to the Executive and Core Committees at their Wednesday, February 23, 2005 meeting.

4. Review and Discussion of the 3rd Draft Version of the Regional Water Quality Protection Plan (Meeting Attachment No. 3).

Grant Jackson/NEI reviewed the 3rd Draft Version of the Regional Water Quality Protection Plan with a PowerPoint presentation.

During and after Mr. Jackson’s presentation, the SHC members were given an opportunity to comment on the 3rd Draft of The Plan. The comments received from the individual SHC members in attendance at the meeting are summarized below:

Implementation

- The plan needs to describe how things will work with regard to implementation (first – locally?; second – regionally?).
- Just because a regional entity would take legislative action doesn’t mean we shouldn’t try to do it.
- TCEQ has the authority – we should start with their rules and change them as we see fit.
- It is not a bad idea for all the entities to approach their elected officials and ask for legislative action.

General

- Eutrophication is important. BMPs cannot address this issue.
- We haven’t set a standard. How do you set background levels on existing streams?
- How do we address “enhancing”?

- Small increases result in a cumulative problem.
- We need to outline what a “non-degradation” policy really is.
- Monitoring needs to be part of the plan (monitor constructed BMPs?).
- Stream background quality needs to be specified.
- “Adaptive management model” – one should be created.
- Developer and engineer need to know if there is a problem, that they may need to fix it.
- We need to see where water quality data has been taken and what that data says.
- Test the stream first, then test after development.
- We may need to make specific recommendations for additional monitoring for certain constituents that we don’t have.
- Mixing “performance-based” standards with “design-based” standards – this is not good.
- Do not understand the mix between design and performance based standards (you can monitor for a site, but do not see how you do it for a watershed).
- If we aim for 100% removal of the increased pollutant load, we may get 90 % (real world).
- The plan needs to be specific how to calculate pre- and post-development conditions.
- The plan needs to accommodate the evaluation of BMPs (like looking at BMPs and adjusting the removal efficiencies if necessary).
- If the data shows a problem, then the plan should specify a mechanism to correct the problem.
- Performance-based standards are the way we should go.
- Engineers can design to meet performance-based standards.
- We should consider building into the plan a procedure to review quality control data; a “team” or “group” could look at this subject.

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

NEW BUSINESS ITEMS

1. Proposed January 19, 2005 SHC Meeting.

After the discussion on the future schedule and tasks to be completed, Coordinator Tull proposed the next SHC meeting to be held on Wednesday, January 19, 2005.

2. SHC Report to the Executive/Core Committee.

In accordance with the policy developed by the Process Subcommittee and adopted by the SHC, Coordinator Tull reminded the SHC that the Government Interest stakeholder group would be responsible for representing the SHC and reporting on the SHC's activities at the next Executive/Core Committee Meeting, currently scheduled for Wednesday, January 12, 2005.

ADJOURNMENT

The meeting was adjourned at approximately 9:50 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

STAKEHOLDER COMMITTEE MEETING – JANUARY 19, 2005

MEETING INFORMATION

Meeting Location: ACC Pinnacle Campus, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, January 19, 2005, at 6:00 pm

Meeting Information: A scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

AGENDA - for the January 19, 2005 Stakeholder Committee Meeting:

1. 6:00 PM - Assemble in the Student Common, Room 108 on the ground floor, for roll call and task and room assignments.
2. 6:15 PM - The SHC will divide into two groups and then proceed to the assigned rooms and work on the assigned tasks. The aim is to reach agreement within each group about the Plan's recommendations regarding the specific topic assigned. Success will require that you stay focused on your topic and work productively. If a group fails to reach a conclusion in the available time, it will be asked to set a time for a follow-on meeting to finish the task BEFORE the SHC meeting on Jan 26.

The tasks assigned to the two groups are:

- a. **GROUP 1: Where are the measures to be applied?** (This is the part of the agenda that we did not cover in our meeting on Jan 11th) Consider:
 - Basis for recommendation in Plan?
 - New Development only or include Retrofit?
 - Mitigation as a form of Retrofit?
 - Recharge vs. Contributing Zones?
 - Basin Specific?
- b. **GROUP 2: Do we accept the standards in the Plan regarding IMPERVIOUS COVER LIMITS, BUFFERS and MITIGATION OFFSETS FOR HIGHER DENSITY?** Consider:
 - Basis for recommendation in the Plan
 - Specific recommendations for changes, with justification
 - Scientific, legal, cost and fairness considerations

After a period of time, if we are making satisfactory progress, individuals MAY be given the opportunity to change groups and to participate in the activities of the other group.

When each group has finished its task, it may depart.

The results will be reported to the full SHC the following day (or as soon as possible) for consideration and discussion at the next SHC meeting on Jan 26.

3. 9:50 PM – all must depart the ACC building.

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, January 19, 2005, at 6:00 pm**

Meeting Location: **ACC Pinnacle Campus**, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
X	Jon Beall	X	Nancy McClintock
	Alan Bojorquez	X	Charles O' Dell
X	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks		Randy Robinson
X	S. Tim Casey	X	Hank Smith
X	Colin Clark		Tom (Smitty) Smith
X	Joe C. Day		J. T. Stewart
X	Karen Ford		Jon Thompson
X	David Fowler	X	David Venhuizen
X	Mark Gentle	X	Michael Waite
X	Karen Hadden	X	Hugh Winkler
X	Rebecca Hudson	X	Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
X	Carlotta McLean	X	Randall Thomas
X	Bret Raymis	X	Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	David Fusilier – NEI
X	Grant Jackson – NEI	X	Steve Dickman – KHH

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:05 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

AGENDA - for the January 19, 2005 Stakeholder Committee Meeting:

1. 6:00 PM - Assemble in the Student Common, Room 108 on the ground floor, for roll call and task and room assignments.
2. 6:15 PM - The SHC will divide into two groups and then proceed to the assigned rooms and work on the assigned tasks. The aim is to reach agreement within each group about the Plan's recommendations regarding the specific topic assigned. Success will require that you stay focused on your topic and work productively. If a group fails to reach a conclusion in the available time, it will be asked to set a time for a follow-on meeting to finish the task BEFORE the SHC meeting on Jan 26.

The tasks assigned to the two groups are:

- a. **GROUP 1: Where are the measures to be applied?** (This is the part of the agenda that we did not cover in our meeting on Jan 11th) Consider:
 - Basis for recommendation in Plan?
 - New Development only or include Retrofit?
 - Mitigation as a form of Retrofit?
 - Recharge vs. Contributing Zones?
 - Basin Specific?
- b. **GROUP 2: Do we accept the standards in the Plan regarding IMPERVIOUS COVER LIMITS, BUFFERS and MITIGATION OFFSETS FOR HIGHER DENSITY?**
Consider:
 - Basis for recommendation in the Plan
 - Specific recommendations for changes, with justification
 - Scientific, legal, cost and fairness considerations

After a period of time, if we are making satisfactory progress, individuals MAY be given the opportunity to change groups and to participate in the activities of the other group.

When each group has finished its task, it may depart.

The results will be reported to the full SHC the following day (or as soon as possible) for consideration and discussion at the next SHC meeting on Jan 26.

3. 9:50 PM – all must depart the ACC building.

Meeting Summary:

1. Group 1 Discussion Summary.

GROUP 1: Where are the measures to be applied? (This is the part of the agenda that we did not cover in our meeting on Jan 11th) Consider:

- Basis for recommendation in Plan?
- New Development only or include Retrofit?
- Mitigation as a form of Retrofit?
- Recharge vs. Contributing Zones?
- Basin Specific?

Group 1 Discussion Results:

The following is a summary of the Group 1 discussion:

New Development Only or Include Retrofit?

- By consensus, the Group agreed that the water quality control measures should be applied not only to new development but also to existing development so that, in the interest of fairness to all, everyone who enjoys the benefits of living in the planning area should also share the burden of protecting the planning area.
- The Group recognized the legal, financial and practical problems with imposing new requirements on existing development; therefore the Group believed that the goal should be to develop a broad-based source of funding for mitigation land and for retrofits in appropriate cases, rather than imposing the full cost of retrofits or mitigation on existing development.

Mitigation as a Form of Retrofit?

- In many cases, retrofits will be wholly impracticable and so acquisition of mitigation land (either in fee simple or as conservation easements) should also be pursued.
- The Group discussed several different forms of funding such as: (1) a large scale Public Improvement District (PID) that could impose financial assessments on everyone within the PID to finance the cost of creating greenbelts and parklands that could serve as water quality control measures; (2) a coordinated, multi-jurisdictional bond issuance. For example, all political subdivisions with bonding authority would issue "water quality control improvement" bonds to finance the creation and funding of a Mitigation Bank.

Recharge vs. Contributing Zone? Basin Specific?

- The Mitigation bank would be responsible for deciding whether to spend its funds on retrofits in those cases where retrofits are necessary and appropriate, or on mitigation tracts.
- Where retrofits are constructed, a certain amount of Mitigation Bank funding should be set aside for O&M of the retrofit.
- Where mitigation tracts are acquired, the Mitigation Bank should attempt first to acquire like-kind mitigation tracts (e.g., impairments of critical WQ protection zones or in one stream basin should be offset by mitigation acreage in the same critical area or same stream basin).
- However, the Mitigation Bank should have the flexibility to "trade-off" by securing larger mitigation tracts in less critical areas for water quality impairments in more critical areas. The Mitigation Bank should determine these ratios in advance through sound scientific analysis of all lands within the planning area. If the setting of such ratios cannot be done in advance, then the Mitigation Bank should have authority to set the ratios on an ad hoc basis.

Group 1 Discussion Summary:

The following is a summary of the ideas and issues that Group 1 developed and discussed at the January 19, 2005 SHC Meeting (this is a summation of the flip-chart bullet points):

1 – Retrofitting Existing Development

- Rate existing developments based on the existing or potential water quality impact and determine which developments need to provide treatment.
- Retrofits are expensive.
- For existing developments – public education and awareness on ways to protect water quality (less expensive than structural BMPs or mitigation through land acquisition).
- If existing development comes to a local authority for revision/addition/modification to any existing permits for that development, make them upgrade their facilities to comply with the existing water quality rules.
- Require retrofits of existing development when they make a request for new or additional surface water.
- Installation of structural BMP retrofits, due to expense/difficulty, may/should be delayed (40-50 yrs?). They can be installed when it is determined that they are needed to protect water quality.
- Retrofit costs should be shared by everyone that lives in the area.
- “Existing” needs to be defined.
- Employ a “grace” period to provide “assistance” to help existing development come into compliance with the new requirements.
- Define “retrofit”.
- Topography within the planning region can make retrofitting expensive.
- Apply The Plan to existing developments [consensus was reached on this item, although the specifics of “how” and “what” to apply to the existing developments was not developed, and would affect the way people feel about this issue]
- “Mitigation Bank” could also include retrofits.

2 – Mitigation

- Prioritize land acquisitions.
- “Mitigation Bank” would determine where and how much land would need to be acquired for mitigation.
- Look at what “activities” can be allowed on land acquired for mitigation (bike trails, parks, etc...).
- Mitigation land should be based on site specific conditions/evaluations.
- Base mitigation land requirements on proximity to land to be “mitigated”.
- “Advisory Board” would determine how much mitigation is required.
- Mitigation should be in the same basin if it is “reasonable”.

3 – Funding

- If you do retrofit – funding source? [other than the private landowners].
- Funding source of retrofits – charge a fee for new development that can be “pooled”.
- Are federal funds available for funding retrofits (due to the Endangered Species affected)? [it was stated that we were not aware of any]
- Public Improvement District (create this across the planning region).
- Create a “Multi-jurisdictional coordinated board”.
- Real estate transfer tax (buyer pays). [Negatives: (1) requires State law; (2) not everybody “shares” the cost, or “pays”.]
- Create a “Mitigation Bank”.
- Pay a fee or acquire land (at option of landowner/developer).

2. Group 2 Discussion Summary.

GROUP 2: Do we accept the standards in the Plan regarding IMPERVIOUS COVER LIMITS, BUFFERS and MITIGATION OFFSETS FOR HIGHER DENSITY? Consider:

- Basis for recommendation in the Plan
- Specific recommendations for changes, with justification
- Scientific, legal, cost and fairness considerations

Group 2 Discussion Results:

The following is a summary of the topics/issues on which Group 2 was able to reach consensus:

- Stream buffer zone set backs should be determined from the stream centerline (instead of the bank as the Draft 3 of The Plan currently states).

The following is a summary of the topics/issues on which Group 2 was not able to reach consensus:

- The use of Net Site Area vs. Gross Site Area for impervious cover calculations;
- Whether to require all development to meet a “10% net”, or allow the recommended 20% RZ, 25% CZ Inside City Limits (ICL), 15% RZ/20% CZ Outside City Limits (OCL), with no mitigation;
- Defining stream buffer zones as the 100-year floodplain or as prescribed, and the Net Site Area (NSA) vs. Gross Site Area (GSA) issues as it applies to buffer zones.

Group 2 Discussion Summary:

The following is a summary of the ideas and issues that Group 2 developed and discussed at the January 19, 2005 SHC Meeting (this is a summation of the flip-chart bullet points):

- Provide a greater buffer zone at steep slopes.
- Have a problem with deducting slopes in Net Site Area calculations.
- Minimum drainage area for establishing a stream centerline should be 64 acres.
- Allow buffer zones for water quality credit.
- BMPs alone won't get us to “no net increase” – buffer zones are a safety factor.
- Not all buffer zones are equal – depends on the characterization of the vegetation in the buffer zone.
- When establishing stream buffer zones, the measurement of the set back should be from the centerline of the creek or the 100-yr floodplain (these are not arbitrary).
- Some activities should be allowed in the buffer zones.
- Net site area calculations should include subtracting the stream buffer zone areas.

Meeting Summary – Wednesday, January 19 2005 Stakeholder Committee Meeting
Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

- Differentiation between slopes and vegetation.
- Can channelized flow be discharged in buffer zone?
- Center for Watershed Protection – buffer zones add value to property and provide safety factor.
- Risk and compensation for shifting risk.
- Impacts on small properties.
- Performance vs. prescriptive design standards.
- Classification of buffer zone soils & slopes.
- Type of pollutants mitigated by BMPs – density bonuses.
- Floodplains as buffer zones – areas outside of riparian.
- Support 10% impervious cover limit for all mitigation.
- Bigger buffer zones, net site for whole.
- There is an exponential impact for mitigation.
- Risk model – allows trades. Definition of preferred growth areas. Needs to address economics.
- Can't believe we set the 10% impervious cover limit based on studies conducted outside our project area.
- The net site area issue, impervious cover limits, and the concept of “no net increase” proposed in the plan continue an erosion of property rights.
- Using Net Site Area double-dips the impervious cover.
- Have an issue with baseflow and impervious cover limits for the recharge zone.
- Support performance-based standards.
- Economic impact – look at cost of implementation.
- Preferred development areas vs. non-preferred development areas – start same place.

NEW BUSINESS ITEMS

1. Proposed January 24, 2005 “Group 2” Meeting.

After their discussion on impervious cover limitations, buffer zones, and mitigation, the Group 2 was unable to reach a consensus on the issues. Coordinator Tull asked the SHC to vote on when they would like to meet again (prior to the next scheduled SHC meeting on Wednesday, January 26, 2005) in an attempt to reach consensus on the outstanding issues. After a vote, a meeting date of Monday, January 24, 2005 was set.

ADJOURNMENT

The meeting was adjourned at approximately 9:55 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

DETAIL DISCUSSION FOR RESOLUTION OF ISSUES FOR: BUFFER ZONES, IMPERVIOUS COVER LIMITS AND MITIGATION

BUFFER ZONES

Consensus Agreement

- Riparian Zones Need Protection
- Centerline is the best measure for determining buffer zones
- Some enhancement can be achieved through the buffer zone

Areas of Disagreement

- Specific width recommendations
- Practical minimum drainage area and corresponding width

Stakeholder Concerns for Resolution by Consultant

- Clarify activities allowed and disallowed in the buffer zone
- Respect the floodplain
- Establish criteria for minimum drainage areas
- Address the water quality impacts of adjacent development
- The buffer zone provides an additional safety factor beyond site controls
- “Quality” of buffer zones are important (slopes, vegetation and soils)
- Based on specific risk levels
- Existing regulatory definitions of streams are not sufficient, especially in the Recharge Zone (RZ).
- Consider some removal credit for buffer zones with appropriate vegetation, if improved by non-invasive means
- Credit for achieving some minimum criteria
- Potentially identify sub-zones within the buffer zones

Approach for Resolution by Consultant

- Establish minimum widths for single zone buffers for first order (no tributaries) streams/headwaters
- Establish dual zone buffers for second and higher order streams
- Activities allowed in single zone buffers: authorized utility/roadway crossings only; limited in frequency, with controls
- Activities allowed dual zones: low impact activities (e.g. parks, “greenspace”, hike/bike trails), utilities with proper restoration, and vegetative supplementation for extra credit

IMPERVIOUS COVER

Consensus Agreement

- Some overall impervious cover (IC) limit is appropriate

Majority Agreement, without Consensus

- Some additional IC may be allowed, if appropriate buffer zones, setbacks and limiting site features are respected, and structural controls are properly installed and operated, respecting their inherent limitations
- There are differences between the RZ and the contributing zone (CZ).
- Gross site area is acceptable for determining IC limits, if it properly respects site features, such as steep slopes, irrigation areas, critical environmental features, etc.

Areas of Disagreement

- The magnitude of the IC limit(s)
- Whether to use Net Site Area vs. Gross Site Area to determine IC
- The specific capabilities of structural controls/BMPs

Stakeholder Concerns for Resolution by Consultant

- Consider allowing greater density in “growth areas” (without consensus on how to define growth areas: e.g. city limits, preferred areas, etc.)
- Equity is important: trading development rights and retrofitting should be tied to utility requests and rehabilitation
- Address localized impacts
- A combination of measures may be needed to achieve the water quality goals
- De-facto IC limits will be determined by the practical limitations of the documented effectiveness of the BMPs that are utilized.
- Need to address the realistic capabilities of BMPs
- Risk basis: designated zones based on risk (high, medium and low, to be defined by jurisdictions) with “tradable” credits for IC

Approach for Resolution by Consultant

- Establish overall IC limits to be applied to all future development
- Revise the IC recommendations in the plan to allow use of higher IC limits in localized areas, with the requirement to mitigate to the established overall IC limits, and to apply appropriate structural controls designed respecting their realistic capabilities, with reasonable safety factors applied.
- Outline a strategy for local jurisdictions to identify high, medium and low risk areas, and allow the use of differing safety factors, commensurate with the established risk level.
- Recommend procedures for determining appropriate safety factors
- Incorporate requirements to use reliable data in design for structural BMPs
- Address the level of technical expertise required on behalf of local jurisdictions to be able to properly implement the identified strategy

MITIGATION

Consensus Agreement

- The concept is appropriate for incorporation into the Plan.
- Mitigation needs to include mechanisms to lock-up development rights.

Majority Agreement, without Consensus

- There should be differences in value (undefined) assigned to the RZ and the CZ.

Stakeholder Concerns for Resolution by Consultant

- Mitigation can't just be a "math problem"
- The IC "allocations" need to be truly "tradable"
- All areas, including those which may not be "developable", should be eligible for mitigation/IC credit trading.
- Legal mechanisms for locking up development rights in the future
- Long-term caretaking

Approach for Resolution by Consultant

- Tie the overall IC limit to the ability/requirement to perform mitigation for sites where the localized IC exceeds the overall limit
- Establish criteria for ownership/operation of mitigation areas
- Establish criteria for "locking up" development rights for mitigation areas.

STAKEHOLDER COMMITTEE MEETING – JANUARY 26, 2004

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

INFORMAL ROUNDTABLE DISCUSSION ON WATER QUALITY GOALS [OPTIONAL]:

Meeting Time: Wednesday, January 26, 2005, at 5:30 pm

Meeting Information: The roundtable discussion will give Stakeholder Committee Members an opportunity to participate in an informal discussion on water quality issues within the planning region. Guest speakers will be invited to present their views on issues surrounding the preparation of a regional water quality protection plan within the planning region. **NOTE TO STAKEHOLDER COMMITTEE MEMBERS – THIS ROUNDTABLE DISCUSSION IS OPTIONAL. FORMAL DISCUSSIONS RELATING TO THE REGIONAL PLAN WILL BE CONDUCTED DURING THE STAKEHOLDER COMMITTEE MEETING THAT BEGINS AT 6:00 PM.**

Guest Speaker: Robert Pine, Director, Austin office of the USFWS

Mary Ambrose, TCEQ.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, January 26, 2005, at 6:00 pm

Meeting Information: Regularly scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the January 11, 2005 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. **HOMEWORK:** Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Minutes from the January 19, 2005 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. **HOMEWORK:** Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

3. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. **HOMEWORK:** Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

4. Review, discuss, and approve decisions and recommendations reached at the January 19 and January 24, 2005 SHC Meetings.

[GOAL: Discussion and consensus approval of the decisions and recommendations of the Group 1 and Group 2 decisions previously discussed. [Group 1 – Where are the Standards to be applied?; Group 2 – What are the accepted standards for IMPERVIOUS COVER, BUFFER ZONES, AND MITIGATION.] **HOMEWORK:** Read & review the minutes from the January 19, 2005 SHC Meeting (Attachment 2) and the summary of the discussion from the January 24, 2005 SHC Meeting (Group 2).]

5. Review and Discussion of Water Quality Protection Measures Proposed for the Regional Water Quality Protection Plan.

[GOAL: Review, discuss, and answer the following two questions: (1) What are the RIGHTS and RESPONSIBILITIES of the following participants in connection with New and Existing Development, and Water Quality Protection Measures?; and, (2) Who receives the BENEFITS and should pay the COSTS of: New Development and the Water Quality Protection Measures? **HOMEWORK:** Read and review the 3rd draft of the Regional Water Quality Protection Plan. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

AGENDA - for the OPTIONAL Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Time	Activity
5:00 pm	Roundtable Discussion on Water Quality Planning Issues Within the Planning Region. Guest Speaker – Robert Pine, Austin Office of the USFWS.
5:55 pm	Break

AGENDA - for the January 26, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of the January 11, 2005 and January 19, 2005 Stakeholder Committee Meetings – Terry Tull (See attachments 1 and 2)
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 3)
6:20 pm	Review, Discuss and Approve the Decisions and Recommendations Reached at the SHC Meetings of January 19 and January 24, 2005 (Group 1 and Group 2 Discussions) – Terry Tull/NEI (See attachment 2 and 4)
7:20 pm	Break
7:30 pm	What are the RIGHTS and RESPONSIBILITIES of the following participants in connection with New and Existing Development, and Water Quality Protection Measures: <ul style="list-style-type: none"> ▪ Citizens? ▪ Land Owners and Developers? ▪ Governments?
8:30 pm	Who receives the BENEFITS and should pay the COSTS of: <ul style="list-style-type: none"> ▪ New Development? ▪ Water Quality Protection Measures?
9:20 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

Endangered Species Program/ Edwards Aquifer Initiative

U.S. Fish and Wildlife Service
&
Texas Commission on Environmental
Quality



USFWS/TCEQ Coordination

- USFWS and TCEQ have recognized the overlap in their natural resources responsibilities and have determined that taking a coordinated approach to water quality protection will have mutual benefits.



How is USFWS involved?



USFWS has been coordinating with TCEQ's development of optional water quality measures for the technical guidance document of the Edwards Aquifer Rules. These Rules protect groundwater from degradation.

How is USFWS involved? (con't)

The USFWS anticipates that if project planners follow the current technical guidance document for the Edwards Aquifer Rules and the new, optional water quality measures, water quality impacts would not result in "take" of some of the listed and candidate species found in the Edwards Aquifer region.

Take avoidance through Edwards Aquifer Rules and optional water quality measures

The optional water quality measures are an appendix to TCEQ's technical guidance document for the Edwards Aquifer Rules.

Take avoidance through Edwards Aquifer Rules and optional water quality measures (con't)

These measures will include:

- 1) Stronger BMP performance requirements
- 2) Measures to address stream channel erosion
- 3) Sensitive feature protection practices
- 4) Natural buffers adjacent to streams
- 5) Guidelines for sealing sensitive features
- 6) Methods to improve BMP maintenance documentation

What is "take"?

"Take" as defined by the Endangered Species Act of 1973, as amended means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct".

What is "take"? (con't)

"Take" also includes habitat modification or degradation that results in death or injury to Federally-listed species.

Take is prohibited under the ESA, unless a permit has been issued for a project by the USFWS.

How does "take" relate to the measures?

Implementation of the current technical guidance document for the Edwards Aquifer Rules and the new optional water quality measures will allow project planners to determine that their project will not result in take of one or more listed species due to water quality impacts.

Project Planning

- To determine if take of listed species is possible and use of the optional water quality measures should be considered, a project planner first needs to determine if listed species are present in the segment of the Edwards Aquifer of their planning area. A species list may be requested from the USFWS.

Project Planning (con't)

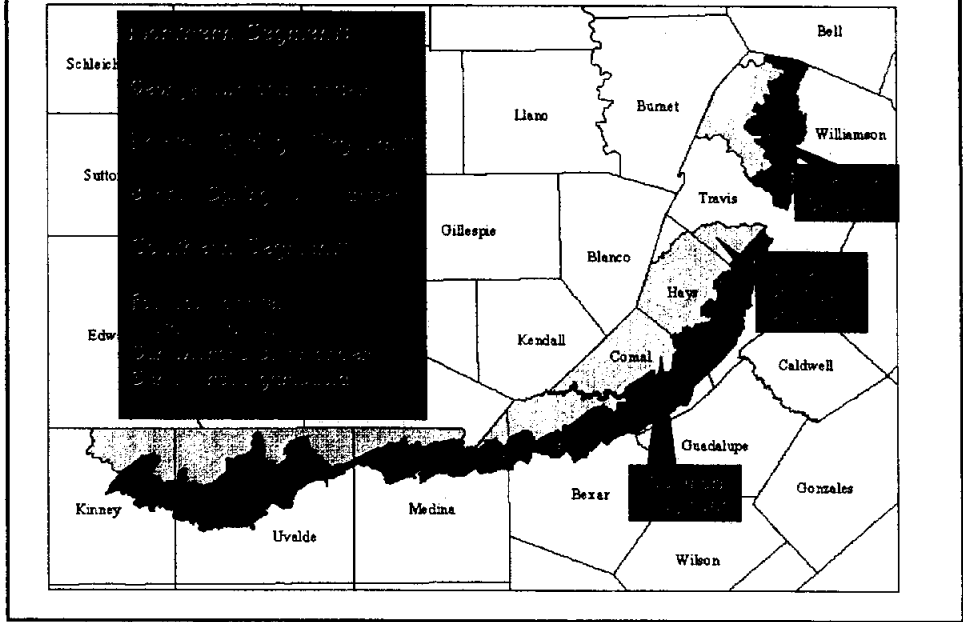
- If no listed species are present, then no further action is necessary for ESA compliance. If a listed species is present and it is one of the included species, then the technical guidance document with optional water quality measures may be followed for ESA compliance.

Which species will be included?

- Barton Springs salamander
- San Marcos salamander
- San Marcos gambusia
- fountain darter
- Texas wild-rice*
- Georgetown salamander

*Plants are not covered by the take provisions of section 9 of the ESA so wild-rice would not be affected by water quality impacts through implementing the Rules and optional water quality measures

In what segment of the Edwards Aquifer are the included species found?



What situations will still warrant direct consultation with USFWS?

Examples:

- 1) Projects outside the Edwards Aquifer rules jurisdiction
- 2) Projects resulting in impacts to listed species that are not water quality related
- 3) Projects in close proximity to springs
- 4) Projects that may impact subterranean, listed species

Monitoring information sharing

- Recently, USFWS and TCEQ met with many of the groups that are currently monitoring Edwards Aquifer water quality, and in some cases, biological resources.

Monitoring information sharing (con't)

- All of these groups have committed to sharing the results of their monitoring.
- Information will be routed to a clearinghouse where trend analysis will be done. This information will be used for adaptive management.

Adaptive management

If analysis of Edwards Aquifer monitoring information indicates water quality degradation that might impact an included listed species, then a technical team would meet to plan appropriate actions.

Revisions to the optional water quality measures will be made, if necessary.

USFWS/TCEQ information coordination

USFWS will receive information from TCEQ such as the number and location of projects it authorizes within the Edwards Aquifer region.



How is TCEQ involved?



TCEQ implements the Edwards Aquifer Rules:

(Title 30 TAC, Chapter 213)

- were designed to ensure "the existing quality of groundwater not be degraded, consistent with the protection of the environment, the operation of existing industries, and the maintenance and enhancement of the long term economic health of the state"

How is TCEQ involved? (con't)

- The Edwards Aquifer Rules:
 - do not restrict the powers of any other governmental entity to protect water quality

Edwards Aquifer Rules

To comply with the Edwards Aquifer Rules:

- project planners must implement measures known as best management practices (BMPs) to reduce impacts to water quality
- TCEQ has provided "*Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices*"

Optional water quality measures approval process

- Developer chooses to use the optional measures in their plan design.
- Developer indicates on their application to TCEQ that they want their plan reviewed under the optional measures document.

Optional water quality measures approval process (con't)

- TCEQ reviews the application under the optional measures document, using the same processes currently in place for the program.

Optional water quality measures approval process (con't)

- Upon approval of the plan, developers that opt to comply with the new measures will receive an authorization letter from the TCEQ that indicates that the plan is approved under the optional measures.

Optional Water Quality Measures:

(1) Stronger BMP performance requirements

- **Justification** - Current rules allow substantial increases in pollutant loads, exempt certain developments, do not take advantage of retrofit opportunities

(1) Stronger BMP performance requirements (con't)

- **Action** - Require 80% removal of solids in runoff (rather than 80% of the increase), eliminate exemptions (i.e., there will no longer be an exemption from other permanent BMPs if the site uses 20% or less impervious cover), and provide buffers between development and waterways.

(2) Measures to address stream channel erosion

- Justification - As much as 90% of the sediment carried in urban streams are derived from channel erosion caused by the increase in impervious cover.
- Action - Restrict post development runoff rates to maintain stream morphology.

(3) Sensitive feature management

- Justification - Substantial recharge occurs in upland sensitive features.
- Action - Require buffer areas around sensitive features. Gate larger openings to prevent disposal of trash, protecting water quality with benefits to endangered species.

(4) Stream buffers

- **Justification** - Development adjacent to streams promotes erosion and allows pollutants to enter waterways.
- **Action** - Require buffer areas adjacent to streams with size dependent on drainage area.

(5) Sealing sensitive features

- **Justification** - Sealing of sensitive features reduces the quantity of clean runoff entering the aquifer.
- **Action** - Require that all sensitive features identified in geologic assessment remain open except in extenuating circumstances.

(6) BMP maintenance documentation

- **Justification** - One of the principal concerns regarding BMPs is impact of maintenance on long term performance.
- **Action** - Require facility owners to retain records of maintenance activities for at least 3 years to document that activities were performed in accordance with WPAP and add signs to BMPs.

Future USFWS/TCEQ coordination



- Additional species may be considered for inclusion in the "no take" concurrence at a later date. This will occur either:

Future USFWS/TCEQ coordination (con't)

- as further analysis of biological information indicates that the Edwards Aquifer Rules and optional water quality measures are protective of other listed species, or

- as new changes are made to the optional water quality measures that are protective of additional species.

Local water quality control

- This effort is not meant to replace local water quality control that is more stringent and provides protection for listed species.
- Municipalities and local authorities are encouraged to continue ongoing efforts that seek to improve water quality.

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, January 26, 2005, at 6:00 pm**

Meeting Location: **Oak Hill United Methodist Church**, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
X	Jon Beall	X	Nancy McClintock
	Alan Bojorquez	X	Charles O' Dell
X	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks		Randy Robinson
X	S. Tim Casey		Hank Smith
X	Colin Clark	X	Tom (Smitty) Smith
X	Joe C. Day	X	J. T. Stewart
X	Karen Ford		Jon Thompson
X	David Fowler	X	David Venhuizen
X	Mark Gentle	X	Michael Waite
X	Karen Hadden	X	Hugh Winkler
	Rebecca Hudson	X	Ira Yates
X	Bryan Jordan		
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
X	Dana Blanton		S.H. (Tary) Snyder
	Carlotta McLean	X	Randall Thomas
X	Bret Raymis	X	Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

[TABLE BELOW IS FROM 1/26/05 MEETING AGENDA DOCUMENT]

AGENDA - for the OPTIONAL Informal Roundtable Discussion on Water Quality Planning Goals and Objectives:

Time	Activity
5:30 pm	Roundtable Discussion on Water Quality Planning Issues Within the Planning Region. Guest Speaker – Robert Pine, Austin Office of the USFWS; Mary Ambrose, TCEQ.
5:55 pm	Break

AGENDA - for the January 26, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull
6:05 pm	Open Public Comment
6:10 pm	Discussion and Action to approve Minutes of the January 11, 2005 and January 19, 2005 Stakeholder Committee Meetings – Terry Tull (See attachments 1 and 2)
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 3)
6:20 pm	Review, Discuss and Approve the Decisions and Recommendations Reached at the SHC Meetings of January 19 and January 24, 2005 (Group 1 and Group 2 Discussions) – Terry Tull/NEI (See attachment 2 and 4)
7:20 pm	Break
7:30 pm	What are the RIGHTS and RESPONSIBILITIES of the following participants in connection with New and Existing Development, and Water Quality Protection Measures: Citizens? Land Owners and Developers? Governments?
8:30 pm	Who receives the BENEFITS and should pay the COSTS of: <ul style="list-style-type: none"> • New Development? • Water Quality Protection Measures?
9:20 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

INFORMAL ROUNDTABLE DISCUSSION ON WATER QUALITY GOALS [OPTIONAL]:

Meeting Time: Wednesday, January 26, 2005, at 5:30 pm

**Guest Speakers: Robert Pine, Director, Austin office of the USFWS
Mary Ambrose, TCEQ.**

Meeting Information: The roundtable discussion included a presentation by Robert Pine (US Fish & Wildlife Service – Austin Office) and Mary Ambrose (TCEQ – Austin Headquarters) on their agencies “Endangered Species Program/Edwards Aquifer Initiative”. The speakers outlined the reasons behind the initiative and what their agencies hope to accomplish. Topics discussed during the presentation included the current listed species involved in this effort, the area where this program will be in effect, their “Adaptive Management” program, and the “optional” water quality measures. According to the speakers, their agencies intend to release the “Optional Water Quality Measures” by the end of February 2005. A copy of the presentation may be found on the project website at URL: http://www.waterqualityplan.org/stakeholders/1.26/13_USFWS%2BTCEQ%20Ed%20Aq%20Presentation_color.pdf

Also, the speakers announced that the following documents were available for review and comments:

- (1) USFWS’s [Draft Barton Springs Salamander Recovery Plan](#) is now available for public review. The Austin Office of the U.S. Fish and Wildlife Service will be accepting comments on the draft recovery plan through COB Monday, March 28th, 2005.

Go to the URL:

http://ifw2es.fws.gov/Documents/R2ES/Barton_Springs_Salamander_DRAFT_Recovery_Plan_Jan-2005.pdf

Go to the Electronic Library @:

<http://ifw2es.fws.gov/Library/>

Scroll down the page and select the link for the [Barton Springs Salamander DRAFT Recovery Plan January-2005](#).

- (2) TCEQ’s Draft Edwards Aquifer Technical Guidance Document is now available for public review and comment.

Go to the URL:

<http://www.tnrcc.state.tx.us/EAPP/index.html#manual>

And select the link to the Draft Technical Guidance Manual.

The TCEQ plans to hold two meetings to receive comments on the draft plan. The date and location for the meeting in the Austin area is as follows:

February 3, 2005 at 9:00 am (Thursday)

[TCEQ Headquarters](#)

Building E, Room 201S

12100 Park 35 Circle

Austin, Texas 78753

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 7:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

Several individuals spoke during the Open Public Comment Period. The significant comments offered during this period were as follows:

Mr. Robert Botto (SHC Member – Neighborhood Interests) – (1) expressed concern with the absence of some SHC members and reminded everyone that the adopted by-laws stated that SHC members that miss two consecutive meetings could be removed as a member of the SHC and replaced with an alternate; also concerned as to whether the members' absences will result in possible disruption to the process later on when the absent member(s) may express an idea or opinion counter to the groups' consensus, or introduce a new idea into the process [Coordinator Tull stated that he had been in contact with some (unnamed) SHC members concerning their attendance, and if this issue became a problem to the process later on it would be addressed at that time. The SHC was in general agreement with this approach.]; (2) concerned that participation in the SHC meetings by non-SHC members may reduce the ability of the SHC members to discuss the issues [Coordinator Tull said that he understood the concern and that generally, non-SHC members that were allow to participate and provide input during the meetings were members of the Technical Review Group (TRG) whose expertise had been sought by the SHC. Other interested public who wished to have matters raised during the deliberations of the SHC should pass their requests to their representatives on the SHC.]

Mr. Bret Raymis (SHC Member – Concerned Citizens) – Reminded everyone that the USFWS's Draft Barton Springs Recovery Plan has been issued for review and comments and recommended that all SHC members review this document.

Mr. Colin Clark (SHC Member – Public Interest Organizations) – Informed the group that it appeared that the LCRA was in the process of approving the extension of a wholesale water line along Hwy 71 (west from Bee Cave).

Mr. Tim Casey (SHC Member – Property Owners/Agricultural Interests) – Stated that he hoped this plan would give consideration to the value of the land and how that value was being impacted. He stated that it was time to get specific on this subject.

Ms. Margot Clark (Member of the General Public in attendance) – Ms. Clark informed the group that she was a candidate for the City of Austin City Council and expressed her support for the planning effort and the group's hard work.

2. Discussion and consensus Approval of Meeting Minutes from the January 11, 2005 and January 19, 2005 Stakeholder Committee Meeting (Meeting Attachments No. 1 and 2).

Coordinator Tull stated that the minutes from these two meetings had been posted on the web site. Due to the fact that the SHC members had not had adequate time to review these minutes Coordinator Tull suggested that action on these two items be postponed until the next meeting. The SHC agreed to this action.

3. Review and Discussion of the Proposed Meeting Schedule for the Remainder of the Project (Meeting Attachments No. 3a and 3b).

Coordinator Tull stated that the schedule the group was working was basically the same as had been provided at the previous SHC meetings. Coordinator Tull then handed out the SHC members present an updated meeting schedule that he had updated based on the previous SHC meetings. There were no comments from the SHC regarding the current schedule.

4. Review, Discuss and Approve the Decisions and Recommendations Reached at the SHC Meetings of January 19 and January 24, 2005 (the Group 1 and Group 2 Discussions)(included in Meeting Attachments Nos. 2 and 4).

Grant Jackson/NEI summarized the subject of the discussions that took place at the January 19, 2005 and January 24, 2005 SHC Meetings.

The SHC members were given an opportunity to comment on the discussion summaries that were included in Meetings Attachments Nos. 2 and 4. The comments received from the individual SHC members in attendance at the meeting are summarized below:

Group 1 - Where are the measures to be applied?

- How does acquisition of mitigation land for an already polluting subdivision reduce the pollution caused by that subdivision?
- Existing developments causing problems need to be retrofitted.
- Retrofits should not be reserved solely for existing developments causing problems.
- Some existing developments, that aren't egregious polluters, should still be required to retrofit before it becomes a major problem.
- Plan could recommend that highway construction/expansion projects be required to conform to the plan.
- Mitigation is a practical solution, although it does not reduce the pollution coming off an existing development, it helps to reduce the overall impervious cover, and is a simpler solution than retrofitting with structural BMPs.
- The Group 1's discussion of retrofitting acknowledged the high cost of retrofitting existing subdivisions with structural BMPs.
- What if we allowed the developer of a new project, using his own resources, to retrofit an existing development in exchange for allowing increased impervious cover limits on the new development (vs. purchasing mitigation land)?

Group 2 – Do we accept the standards in The Plan regarding Impervious Cover Limits, Buffer Zones, and Mitigation Offsets for Higher Density?

Buffer Zones

- Buffer zones on streams with drainage areas less than 5 acres?
- By protecting low order streams, you really do protect water quality.
- Recommend using a minimum of 5 acres for the drainage area.
- When establishing a minimum drainage area we should err on the side of caution.
- We should protect first order streams, what ever the correct number.
- Minimum buffer zone off-set of 25 feet off the centerline.
- Delineation of the stream is important: (1) bed and banks?; (2) min. 5 acre drainage area?
- Center for Watershed Protection document states that a minimum buffer zone should be 100 feet off the centerline of the stream.
- The 5 acre minimum drainage area may be acceptable, if we can determine that it is necessary, and what the economic impact is to the landowner
- Have we lost the proposed concept of grading the buffer zone (based on buffer zone soil quality, slope, vegetation, etc...)?
- Polluting utilities should not be allowed to run the length of the buffer zone, they should only be allowed to cross the buffer zone.

Impervious Cover

- Concept for mitigation is basin wide?
- Impervious cover limit is 10% across the planning region? Is that 10% overall including existing and new development, or just new development? [Grant Jackson/NEI – the 10% basin wide impervious cover limit would apply to new development]
- If we do not have a current mechanism to cap the planning region area at 10% impervious cover (because of multiple jurisdictions), can we place this limit in the plan as a recommendation, but put into the plan site specific impervious cover limits?
- What about selling development rights in cases where you don't use up your impervious cover "allotment"?
- Instead of setting site specific impervious cover limits, let the buffer zones, setbacks, and BMP removal calculations determine the impervious cover limit for a site.
- We need to specify an upper impervious cover limit for sites so that someone doesn't come in with a ridiculous impervious cover number (like 100%).
- The Plan should be based on a risk-based concept – high risk vs. low risk areas. Low risk areas could purchase mitigation land in high risk areas, but high risk could not purchase mitigation land in low risk areas (high risk area being defined as more environmentally sensitive than low risk areas).
- The concept of "trading" development rights sounds risky, and this plan should attempt to minimize risk.
- Why do we have to set an upper impervious cover limit for a specific site?
- The 3rd Draft of The Plan sets a limit of 10% impervious cover over the entire planning region, and caps the impervious cover on a specific site at 35%. [Grant Jackson/NEI]
- Will there be a process put in place to tell the developer that their proposed development is too dense and that they have to reduce the impervious cover? If not, let's be conservative.
- Why can't we specify an overall, planning region-wide, impervious cover limit, but recommend a site specific upper limit for impervious cover?
- Vulnerability and risk have not been addressed adequately in the draft plan.
- We should consider two approaches for crafting the plan: (1) "Passive" approach – low risk, conservative limits; (2) "Expert" approach – higher risk, higher cost, and requires much more expertise on both sides of the issue (Developer's side and the Regulating Entity's side).
- Why don't we define a preferred growth corridor. Higher impervious cover limits could be allowed in this corridor.
- The Plan should distinguish between residential and commercial development.

Meeting Summary – Wednesday, January 26 2005 Stakeholder Committee Meeting
Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

- Allow Cities to designate a preferred growth area with the idea of mitigating to an overall impervious cover percentage.
- “Mitigation fund” – for smaller commercial developments (for example), you could offer a fee-in-lieu-of. The money collected in this fund would be used to purchase mitigation land.
- The plan should acknowledge the work of Envision Central Texas.
- The plan should specify the level of expertise of City reviewers (we should also require them to conduct on-site inspections of projects).
- We should scrap the table in the plan that allows increased impervious cover limits within City limits.
- The plan should differentiate between the recharge and the contributing zones.
- There should be a cap placed on the maximum amount of mitigation allowed for an individual project.

NEW BUSINESS ITEMS

1. Proposed February 2, 2005 Stakeholder Committee Meeting.

Coordinator Tull asked the SHC to vote on whether they would like to meet to discuss the items and issues that were not discussed in tonight's meeting. After a show of hands, it was decided that the next meeting would be the Stakeholder Committee Meeting already scheduled for Wednesday, February 2, 2005.

2. New Draft of Regional Water Quality Protection Plan

Grant Jackson of NEI stated that they would attempt to post the 4th draft of The Plan on the project web site by the end of the day, Monday, January 31, 2005.

ADJOURNMENT

The meeting was adjourned at approximately 10:00 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

STAKEHOLDER COMMITTEE MEETING – FEBRUARY 2, 2005

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, February 2, 2005, at 6:00 pm

Meeting Information: A scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. **Minutes from the January 11, 2005 Stakeholder Committee Meeting.**
[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
2. **Minutes from the January 19, 2005 Stakeholder Committee Meeting.**
[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
3. **Minutes from the January 26, 2005 Stakeholder Committee Meeting.**
[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]
4. **Review and Discuss Draft Stakeholder Committee Preface to the Regional Water Quality Protection Plan.**
[GOAL: Presentation, discussion and agreement on future actions to draft the Stakeholder Committee Preface.. HOMEWORK: Review the first draft Stakeholder Committee Preface to be posted on the web site. Be prepared to comment and discuss. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]
5. **Review and Discuss Updated Project Schedule and Milestones.**
[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. HOMEWORK: Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]
6. **Review and Discussion of 4th Draft of the Regional Water Quality Protection Plan.**
[GOAL: Presentation by NEI Consulting Team and Discussion on the 4th Draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on revisions. Also, the identification and discussion of remaining contentious issues among SHC members. HOMEWORK: Read and review the 4th draft of the Regional Water Quality Protection Plan. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

AGENDA - for the February 2, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
6:05 pm	Open Public Comment.
6:10 pm	Discussion and Action to approve Minutes of the January 11, 2005, January 19, 2005, and January 26, 2005 Stakeholder Committee Meetings – Terry Tull (See attachments 1, 2 and 3).
6:15 pm	Review and Discuss Draft Stakeholder Committee Preface to the Regional Water Quality Protection Plan – Terry Tull (See attachment 4).
6:45 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 5)
6:55 pm	Present the 4 th Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 6)
7:40 pm	Break
7:50 pm	Discuss the following issues as they relate the 4 th Draft of the Regional Water Quality Protection Plan and provide input to the Consulting Team: <ul style="list-style-type: none"> ▪ Performance Measures ▪ Implementation Details ▪ Economic Implications
9:20 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

STAKEHOLDER COMMITTEE MEETING MINUTES - final

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, February 2, 2005, at 6:00 pm**

Meeting Location: **Oak Hill United Methodist Church**, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Gene Lowenthal
	Jon Beall	X	Nancy McClintock
	Alan Bojorquez	X	Charles O' Dell
X	Robert (Robbie) Botto	X	Jim Phillips
X	Henry Brooks		Randy Robinson
X	S. Tim Casey	X	Hank Smith
X	Colin Clark		J. T. Stewart
X	Joe C. Day		Jon Thompson
X	Karen Ford	X	David Venhuizen
	David Fowler		Michael Waite
X	Mark Gentle	X	Hugh Winkler
	Karen Hadden	X	Ira Yates
X	Rebecca Hudson		
	Bryan Jordan		
Present	Alternate	Present	Alternate
	Jack Goodman		Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
X	Carlotta McLean	X	Randall Thomas
X	Bret Raymis		Donna Tiemann
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

[TABLE BELOW IS FROM 2/2/05 MEETING AGENDA DOCUMENT]

AGENDA - for the February 2, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
6:05 pm	Open Public Comment.
6:10 pm	Discussion and Action to approve Minutes of the January 11, 2005, January 19, 2005, and January 26, 2005 Stakeholder Committee Meetings – Terry Tull (See attachments 1, 2 and 3).
6:15 pm	Review and Discuss Draft Stakeholder Committee Preface to the Regional Water Quality Protection Plan – Terry Tull (See attachment 4).
6:45 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 5)
6:55 pm	Present the 4 th Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 6)
7:40 pm	Break
7:50 pm	Discuss the following issues as they relate the 4 th Draft of the Regional Water Quality Protection Plan and provide input to the Consulting Team: <ul style="list-style-type: none"> ▪ Performance Measures ▪ Implementation Details ▪ Economic Implications
9:20 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

No comments were made during the Open Public Comment Period.

2. Discussion and consensus Approval of Meeting Minutes from the January 11, 2005, January 19, 2005, and January 26, 2005 Stakeholder Committee Meeting (Meeting Attachments No. 1, 2, and 3).

Coordinator Tull stated that the minutes from these three meetings had been posted on the web site, and asked if anyone had any suggested changes for the meeting minutes. No changes were suggested. The minutes were approved by consensus.

3. Review and Discussion of the Draft Stakeholder Committee Preface to the Regional Water Quality Protection Plan (Meeting Attachments No. 4).

Coordinator Tull presented a three page handout of a draft of the preface for The Plan. Coordinator Tull stated that the intent of the preface was to summarize the message that the SHC believes will be important for the EC/CC to consider. Coordinator Tull requested that the SHC members review this preface and be ready to discuss and offer suggestion at the meeting on Wednesday, February 9 2005. It was requested that the SHC members e-mail suggestions if they were going to be unable to attend the meeting.

4. Review, Discuss and Approve Updated Project Schedule and Milestones (Meeting Attachment No. 5).

Coordinator Tull stated that Grant Jackson/NEI had requested that the next SHC Meeting scheduled for Wednesday, February 9, 2005 be postponed until Wednesday, February 16, 2005 in order to give the Consulting Team additional time to incorporate changes necessitated by SHC and TRG comments, and to complete, as much as possible, the entire plan. Mr. Jackson stated that the Consulting Team proposed that the next draft of The Plan would be posted to the web site by the end of the day, Friday, February 11, 2005.

Coordinator Tull suggested that the full SHC meet on Wednesday, February 9, 2005 to work on the SHC Preface for The Plan.

Coordinator Tull also stated that it was his intent to request of the Executive and Core Committees that the EC/CC Meeting currently scheduled for February 23, 2005 (presentation of The Plan to the EC/CC) be postponed until Wednesday, March 9, 2005. Coordinator Tull said that this request had not yet been made to the EC/CC, because he wanted to be sure that the SHC was in general agreement with this schedule prior to making the request.

After a brief discussion, the SHC agreed to the schedule outlined above.

5. Presentation of the 4th Draft of the Regional Water Quality Protection Plan (Meeting Attachments No. 6).

Grant Jackson/NEI stated that the 4th Draft of the Regional Water Quality Protection Plan had been posted to the web site. Mr. Jackson distributed a six page handout that provided additional details on buffer zones, impervious cover limits, and mitigation with respect to the current draft of the plan

6. Discussion of Issues Relating to the 4th Draft of the Regional Water Quality Protection Plan.

Grant Jackson/NEI led the discussion of the 4th Draft of The Plan. The discussion focused on buffer zones, impervious cover, and mitigation.

The SHC members were given an opportunity to comment on the issues. The comments received from the individual SHC members in attendance at the meeting are summarized below:

Buffer Zones [Stream Offsets/Buffer Zones section, including Table 1]

- Consensus at the last meeting was to offset the buffer zone from the stream centerline. Need to clarify in the Stream Offsets/Buffer Zones section in The Plan that this is the basis for the stream offsets.
- Why is the minimum contributing drainage area for establishing buffer zones based on 5 acres? Why does off-site contributing drainage areas of less than 5 acres matter, but not on-site contributing areas of less than 5 acres?
- It was unclear to several of the SHC members that the buffer zone widths specified in Table 1 were total width of the buffer zone centered on the stream, and not an offset from the centerline [e.g., for a contributing drainage area of 120-300 acres, the 150 feet width specified in Table 1, means an offset of 75 feet from the centerline of the stream]. It was requested that this fact be clarified.
- SHC consensus was to approve eliminating the first line of Table 1 (for contributing areas “Up to 5 acres from off-site”. The SHC deemed it impractical to establish contributing drainage areas of less than 5 acres.
- What is the science behind these numbers?
- [Grant Jackson/NEI stated that the Consulting Team would review the basis for the current stream buffer zone requirements and report back to the SHC at the next meeting. Draft #5 would also be updated to include the latest recommendation from the Consulting Team. The Consulting Team may also consult with members of the TRG on this issue.]

Impervious Cover Limits [Table 2 from handout (updated for inclusion in The Plan)]

- Where did we get the idea of no professional review? There should always be a professional review. [After a discussion by the SHC, the consensus of the group was to eliminate the second column of Table 2 (Max. Impervious Cover (%) – with TDR & No. Prof. Review)].
- BMP Removal Efficiencies. Does the current plan set the numbers for BMP removal efficiencies? [Grant Jackson/NEI – no]. Experts say not to use set removal efficiencies. How will the engineer design his system? How does The Plan provide guidance on this issue? What will keep one local entity in the planning region from doing something different than everyone else? How are we going to resolve this?
- We should embrace the “smart growth” concept, some of which is already in the plan (like TDRs, the notion of preferred growth areas, etc...). Clustering development on a regional level is a good idea that should be encouraged. TDRs should be a “one-way” street – landowners outside the preferred growth areas sell TDRs to developers inside preferred growth areas.
- The Plan should limit (some said prohibit) the ability to trade up if you are outside the preferred growth areas.
- Table 2 – for the first two rows, the impervious cover limits should be the same across the row (i.e., for the Recharge Zone – the impervious cover limit should be the same in each column [No TDRs & TDRs w/ Prof. Review]).
- For column 3, recommend the following limits (1st row – 15%, 2nd row – 20%, 3rd row – 25%).
- For column 3, recommend the following limits (1st row – 15%, 2nd row – 30%, 3rd row – 45%). We want very little risk in the recharge zone
- For column 1, use 10% in all the rows. Why should the impervious cover limits be any different for the recharge zone vs. contributing zone? What is the justification for this?
- For the TDR example given (at the bottom of page 4 of the handout), it should be clarified whether this is for the recharge zone or contributing zone. [Grant Jackson – the example is for the Contributing Zone].
- Would like to see direction from the SHC as to why they think that preferred growth areas are a good idea. What are the criteria of the preferred growth areas? Also, would like to see something on public policy guidance on this subject
- How are we going to define preferred growth areas? [Grant Jackson/NEI – someone, or some entity outside the current planning process would do that.]. The Plan should at least define the concept and give some guidance for establishing preferred growth areas.
- We should encourage entities (like the City of Austin) to “sell” preferred growth land (outside the current planning region) in exchange for not developing land on the recharge zone.
- [Grant Jackson – TDRs are in the plan to address the equity issue.]

- Let Cities be flexible in establishing maximum impervious cover limits within the preferred growth areas.
- Current plan will encourage “big box” developments, since small developers (“Mom & Pop” stores) will be unable to afford to develop with the impervious cover limits set by the current plan.
- Why is irrigation area considered impervious cover? What is the science behind this issue? This requirement forces you to keep the irrigation area as small as possible, and also discourages the use of irrigation altogether.

Mitigation

- The concept of mitigation was discussed by the SHC in terms Transferable Development Rights (TDRs). This discussion was included in the discussion on impervious cover limits. Please see above summary on impervious cover limits.

NEW BUSINESS ITEMS

1. Proposed February 9, 2005 Stakeholder Committee Meeting.

Coordinator Tull, at the suggestion of Grant Jackson/NEI, proposed that the SHC meet on Wednesday, February 16, 2005 to discuss the 5th Draft of The Plan. To allow the Consulting Team more time to work on The Plan, Grant Jackson suggested that the NEI Team skip any meeting scheduled for Wednesday, February 9, 2005. Coordinator Tull suggested that the SHC meet on February 9, 2005 to work on the SHC Preface to The Plan. After a show of hands, it was decided that the next SHC Meeting would be a Workshop held on Wednesday, February 9, 2005 to discuss the Preface to The Plan (w/o the NEI Team present), and that the SHC would then meet again on Wednesday, February 16, 2005.

2. New Draft of Regional Water Quality Protection Plan

Grant Jackson of NEI stated that the 5th Draft of the Regional Water Quality Protection Plan would be posted by the end of the day, Friday, February 11, 2005.

ADJOURNMENT

The meeting was adjourned at approximately 10:00 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on February 23, 2005.

Summary of discussions during SHC Workshop Meeting on Feb 9, 2005, regarding SHC Preface to the Water Quality Protection Plan

1. The attendees were:

- Neighborhood Interests: Karen Ford
- Concerned Citizens: none
- Property Owners: Henry Brooks
Ira Yates
- Economic Interests: Joe Day
- Development Interests: none
- Public Interests Orgs.: none
- Local Env./Good Gov.: Mark Gentle
Charles O'Dell
Dana Blanton
- Government Entities: Andrew Backus
Charlie Johnson

2. The discussions are summarized in the following table:

Item #	Who Commented	Comment	Votes to Incl. in Pref.(of 10)
1.	Karen	Set specific goal for land conservation - 20K acres – perhaps more?	0
2.	Joe	Identify & target sensitive land for conserving. - means to do difficult to specify	0
3.	Henry	Steer away from specifics.	Na
4.	Henry	Amend 3 rd paragraph to read: "... flow past us. The waters in our streams "owned" by anyone. Rather, We must collectively..."	Na
5.	Joe	Need to target the audience that we need to sell to (local govt. & citizens). What does local govt. need to know? - budget impact - legal risk & assoc. costs - citizen views	Na
6.	Charles	Lots of media attention will surround delivery of plan.	Na
7.	Charles	Need show parameters (e.g., same details listed as what local govt. wants to know)	Na
8.	Charles	Austin Mayor's proposal for bond election to buy conservation land - we can project conservation land needs based on projected build out under plan	Na

9.	Charles	Recognize ECT results supportive of Plan - "Protect open space in hill country/aquifer" - "not business as usual"	Na
10.	Charles	Need for companion document with summary of impacts and results	Na
11.	Charles	Mention that Plan is "community based"	9
12.	Mark	Our charge was to have "implementable" plan - implementable-must be defensible based on: -- science -- legal -- consensus -- community based -- fair (sharing of burdens and benefits)	Na
13.	Mark	This is a unique area requiring unique actions. What is unique?: - eco-region based - not political boundaries - community based - consensus based - drainage basin/watershed - No Net Increase goal adopted - Replicable model for employment elsewhere as a process - most studied aquifer = best data - aquifer most threatened by growth Karen: "In the PR Business, this is called a "Unique selling proposition." " Mark: "A vulnerability will be drawing conclusions based on data from other regions." Mark: "Pioneering", "Call to action", "Obligation to act"	10
14.	Charles	Put positive face on difficult issues	Na
15.	Dana	Importance of coherent/regional action – emphasize the Big Picture and stress overall action (see unique features above)	Na
16.	Karen	Mention region	Na
17.	Charles	This is a model for others to apply	Na
18.	Mark	Say that the goal is No Net Increase	Na
19.	Joe	Set in historical perspective: "Longstanding Public Concerns..."	Na
		AGREED REVISED STRUCTURE FOR SHC PREFACE: 1. You charged us to do this 2. We've done it 3. You take it and act on it 4. Here are the benefits if you implement it	
		OTHER ITEMS TO DISCUSS WITH NAISMITH 1. Need for a separate legal statement regarding legal basis and	

Sec. 1.103. Findings of Fact.

1. The creeks, streams, drainage ways and other watershed areas within the jurisdiction of the County, as well as those portions of those groundwater aquifers which underlie areas within the jurisdiction of the County, are subject to actual and potential threats of pollution as a result of poor or inadequate planning for development and flood control. These threats may result in public health and safety hazards, disruption of commerce and governmental services, impairment of recreational and aesthetic values, and extraordinary public expenditures for pollution reduction and environmental protection, all of which adversely affect the public health, safety and general welfare.
2. All watersheds within the County's jurisdiction are undergoing development or are facing development pressure, which if not adequately and properly regulated can result in increased flooding hazards and pollution of waterways and groundwater aquifers from many sources. Sources of pollution include, but are not limited to, contaminated stormwater runoff; mismanagement of wastewater; discharges of pollutants from roadways, construction sites, and waste management areas; runoff of pesticides, fertilizers, and other nutrients from residential and agricultural land uses; and infiltration of such surface water contaminants to underground water-bearing formations.
3. The continued economic growth of the County is dependent on adequate quality and quantity of water, a pleasing natural environment, and recreational opportunities for residents of the County.
4. If watersheds within the County's jurisdiction are not developed in an environmentally responsible manner, the water resources, natural environment, and recreational opportunities within the County could be irreparably damaged.
5. The adoption of this Article is a vital step necessary to ensure the environmentally responsible development of watersheds, minimization of flood hazards, and the protection of surface and subsurface water quality within the County's jurisdiction.

Sec. 1.104. Lands to which this Article Applies.

This Article shall apply to all areas of land within the unincorporated areas of the County except to the extent stricter regulatory requirements may apply in the ETJ of a city. This Article applies to any person proposing to develop or improve real property within the jurisdiction of the County.

Division 2. Definitions.

Sec. 2.101. General Definitions for Purposes of This Article.

Unless otherwise explicitly stated in another section of this Article, the following terms and phrases shall have the following meanings:

STAKEHOLDER COMMITTEE MEETING – FEBRUARY 16, 2005

MEETING INFORMATION

Meeting Location: Oak Hill United Methodist Church, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, February 16, 2005, at 6:00 pm

Meeting Information: A scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the February 2, 2005 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. HOMEWORK: Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

3. Review and Discuss 2nd Draft of the Stakeholder Committee Preface to the Regional Water Quality Protection Plan.

[GOAL: Presentation, discussion and agreement on future actions to draft the Stakeholder Committee Preface.. HOMEWORK: Review the 2nd draft Stakeholder Committee Preface to be posted on the web site. Be prepared to comment and discuss. Any significant comments should be forwarded to the Consulting Team and the Executive Director, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

4. Review and Discussion of 5th Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation by NEI Consulting Team and Discussion on the 5th Draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on revisions. Also, the identification and discussion of remaining contentious issues among SHC members. HOMEWORK: Read and review the 5th draft of the Regional Water Quality Protection Plan. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

AGENDA - for the February 16, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
6:05 pm	Open Public Comment.
6:10 pm	Discussion and Action to approve Minutes of the February 2, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1) .
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2)
6:30 pm	Review and Discuss 2 nd Draft of Stakeholder Committee Preface to the Regional Water Quality Protection Plan – Terry Tull (See attachment 3) .
7:00 pm	Break
7:10 pm	Present the 5 th Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 4)
8:00 pm	Break
8:10 pm	Discuss the following issues as they relate to the 5 th Draft of the Regional Water Quality Protection Plan and provide input to the Consulting Team: <ul style="list-style-type: none"> ▪ Stream Buffer Zones ▪ Transferable Development Rights (TDR) ▪ Implementation Details ▪ Economic Implications
9:20 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

STAKEHOLDER COMMITTEE MEETING MINUTES - Final

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, February 16, 2005, at 6:00 pm**

Meeting Location: **Oak Hill United Methodist Church**, located at 7815 Hwy 290 West, Austin, Texas 78736, on the south side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the ACC Pinnacle Campus, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus		Bryan Jordan
X	Jon Beall	X	Gene Lowenthal
	Alan Bojorquez	X	Nancy McClintock
X	Robert (Robbie) Botto	X	Charles O' Dell
X	Henry Brooks	X	Jim Phillips
	S. Tim Casey		Randy Robinson
X	Colin Clark	X	Hank Smith
X	Joe C. Day	X	J. T. Stewart
X	Karen Ford	X	Donna Tiemann
	David Fowler		David Venhuizen
X	Mark Gentle		Michael Waite
X	Karen Hadden	X	Hugh Winkler
X	Rebecca Hudson	X	Ira Yates
X	Charles Johnson		
Present	Alternate	Present	Alternate
X	Jack Goodman		Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
X	Carlotta McLean	X	Randall Thomas
X	Bret Raymis		
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

[TABLE BELOW IS FROM 2/16/05 MEETING AGENDA DOCUMENT]

AGENDA - for the February 16, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
6:05 pm	Open Public Comment.
6:10 pm	Discussion and Action to approve Minutes of the February 2, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1) .
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2)
6:30 pm	Review and Discuss 2 nd Draft of Stakeholder Committee Preface to the Regional Water Quality Protection Plan – Terry Tull (See attachment 3) .
7:00 pm	Break
7:10 pm	Present the 5 th Draft Version of the Regional Water Quality Protection Plan - NEI (See attachment 4)
8:00 pm	Break
8:10 pm	Discuss the following issues as they relate to the 5 th Draft of the Regional Water Quality Protection Plan and provide input to the Consulting Team: <ul style="list-style-type: none"> ▪ Stream Buffer Zones ▪ Transferable Development Rights (TDR) ▪ Implementation Details ▪ Economic Implications
9:20 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

Suzanne Pierce, a doctoral graduate student in Geological Sciences at The University of Texas at Austin Jackson School of Geosciences spoke to the SHC. Her announcement is summarized as follows:

A team of researchers at the University of Texas at Austin are looking at ways of creating tools that can enhance a stakeholder decision making process. Ms. Pierce presented information related to a request for stakeholder participation in the design and development of an interactive decision support tool that could possibly aid groundwater management practices. The tool is an integrated, systems model that is based on Texas Water Development Board Groundwater Availability Model (GAM) for hydrologic performance, linking GIS, and stakeholder preferences with a relational database. Her announcement ended with a request for any stakeholders interested in the simulation process to contact Terry Tull to confirm an interest in possible participation. As plans progress updates will be communicated to the stakeholder group.

It was requested by a SHC member that Ms. Pierce summarize what would be expected of potential participant (number of meetings, time involved, etc...) and forward this summary to Executive Director Tull so he could in turn distribute the information to the SHC members for their consideration.

2. Discussion and Approval of Meeting Minutes from the February 2, 2005 Stakeholder Committee Meeting (Meeting Attachments No. 1).

Coordinator Tull stated that the minutes from the February 2, 2005 SHC meeting had been posted on the web site yesterday, 2/15/05. The SHC requested that this item be continued to the next SHC meeting in order to give the members adequate time to review the draft minutes.

3. Review, Discuss and Approve Updated Project Schedule and Milestones (Meeting Attachments Nos. 2a and 2b).

Coordinator Tull and Grant Jackson/NEI presented the latest Project Schedule that showed the tentative dates of the remaining meetings.

Coordinator Tull stated that a meeting location for the SHC meeting tentatively scheduled for next week (Wednesday, February 23, 2005) had not been finalized, but that the Oak Hill UMC was not available. Coordinator Tull stated that he would let the SHC members know of the proposed meeting location as soon as possible.

Coordinator Tull also stated that due to schedule conflicts of some of the Executive and Core Committee members, he was attempting to reschedule the next EC/CC Meeting tentatively from Wednesday, March 9, 2005 to a date the following week. Coordinator Tull said that he had requested that the EC/CC members advise him on which dates were preferred from March 15, 16, and 17. SHC members pointed out that this was Spring Break week for most school children and some requested that the meeting be scheduled for another week.

4. Review and Discussion of the Draft Stakeholder Committee Preface to the Regional Water Quality Protection Plan (Meeting Attachments No. 3).

Coordinator Tull presented the 2nd draft of the SHC Preface to The Plan. Coordinator Tull again stated that the intent of the preface was to summarize the message that the SHC believes will be important for the EC/CC to consider.

SHC members had the following comments on the current draft Preface:

- If we recommend set asides (natural areas, conservation areas, etc...) we should put that recommendation in the Preface (other SHC members recommended putting this into the Executive Summary);
- We should detail in the Preface, by the use of bullets, what the benefits are to adopting The Plan.
- We should not clutter up the Preface with a lot of details, let the details be outlined in the Executive Summary and The Plan itself.

Grant Jackson/NEI, asked if it would be acceptable for this draft Preface to be put into any subsequent draft of The Plan. The SHC members did not object to the inclusion of the latest draft Preface in the latest draft version of The Plan.

5. Presentation of the 5th Draft of the Regional Water Quality Protection Plan (Meeting Attachments No. 6).

Grant Jackson/NEI stated that the 5th Draft of the Regional Water Quality Protection Plan had been posted to the web site.

6. Discussion of Issues Relating to the 5th Draft of the Regional Water Quality Protection Plan.

Grant Jackson/NEI led the discussion of the 5th Draft of The Plan. The discussion focused on economic implications, transferable development rights (TDRs), implementation details, and stream buffer zones.

The SHC members were given an opportunity to comment on the issues. The comments received from the individual SHC members in attendance at the meeting are summarized below:

General Comments

- It may be a good idea to invite the Technical Review Committee (TRG) to the next SHC meeting, so they can help provide input on some portions of the plan.
- The unintended consequences of The Plan are a concern.
- The Plan does not include enough details on commercial development, including “Big Box” developments.

Economic Implications

- Economic analysis needs to consider that there are current rules in place within the planning region (Cities of Austin, Dripping Springs, etc...; TCEQ; USFWS; LCRA; etc...).
- What are our current criteria to determine whether to incur a cost for implementation of The Plan. Who bears this cost? Need to address cost of infrastructure to serve new development.
- Would like the economic analysis to consider the loss of the use of Barton Springs.
- The Plan should state why we have not considered the infrastructure cost into the economic analysis, if we are not going to do so.
- The Plan should show the economic “savings” that result from limiting impervious cover and promoting more dense (clustered) developments (i.e., more density results in less infrastructure, therefore less infrastructure cost, etc...).
- We need to find a way to encourage commercial development, since commercial development helps the tax base.
- The City of Austin’s SOS ordinance has not negatively impacted property values. We should present a better picture of the value of the land. BMP costs are minor compared to other costs associated with the land.
- Local developers should be consulting to find out realistic numbers for the economic impacts.
- The costs for projected toll roads to be constructed in the Barton Creek watershed should be considered. Under their current planned, CAMPO (Capitol Metropolitan Planning Organization) will construct approximately \$1.5 billion worth of toll roads in the Barton Creek watershed.
- If money was used to purchase land currently earmarked for development, the costs for future infrastructure would be reduced.
- Buying up land currently set aside for future develops would push developments further out and increase the needs for roads and other infrastructure.
- Need to add information that quantifies the damages caused by the degradation of water quality (similar to how studies have quantified the damages caused by the degradation of air quality in the Big Bend area).

Economic Implications (cont.)

- Need to quantify and summarize the cost of the various BMP approaches (e.g., structural vs. non-structural).
- How can we judge the cost of this Plan and its effect on affordable housing?

Implementation Details

- The cost of implementation could be simulated by estimating the cost to a local government entity to implement the plan (e.g., Travis or Hays County). You could use current labor costs and estimate the number of staff members necessary to implement a program under The Plan. [one SHC member commented that this would be a very difficult undertaking; another commented that this would at least be an attempt to quantify the expected cost and could be used for comparison purposes].
- Local entities within the planning region will implement this plan differently. Until we get a unified approach in place, implementation will be fragmented.
- TDRs – Is there a problem with someone acquiring TDRs outside of another local governments jurisdiction (e.g., developing a project in City of Austin, and acquiring TDRs in Hays County)? How will The Plan control this?
- Has The Plan been written so that local entities can implement The Plan under current laws? [Grant Jackson/NEI – yes.]
- Cost of implementation would be more valuable if we had a variety of different scenarios.

Transferable Development Rights (TDRs)/ Impervious Cover

- Table 10 (Recommended Impervious Cover Limits) – Add rows to Table 10 – inside “preferred conservation areas”.
- Recommend defining “preferred conservation areas” as being inside the recharge zone. “Preferred development areas” should be defined as inside City Limits.
- Leave TDR methodology open-ended – The Plan should just define the basics (i.e., TDRs should follow the guiding principles, etc...).
- Have we, or are we going to, define “preferred conservation areas”?
- As Table 10 is currently drafted, Cities over the recharge zone will be severely limited on commercial development. We should increase the allowable impervious cover limits shown in the table (based on the 5th Draft version of the table). [another SHC member commented that higher impervious cover numbers will create densities that are too high and destroy the character of the Hill Country and degrade water quality.]

Transferable Development Rights (TDRs)/ Impervious Cover (cont.)

- The ability of public officials to administer a “preferred conservation area” system is a “showstopper” issue.
- Plan does not adequately address construction on steep slopes.
- The risk of failure is from BMPs. The impervious cover table (Table 10 of 5th Draft) is the heart of The Plan.
- How about breaking out commercial developments in the table and give them their own impervious cover limits?
- The impervious cover table as drafted is pretty good, and already accommodates commercial development
- Maybe we could increase impervious cover numbers for commercial development inside “preferred growth areas”.
- The Plan should put in place recommendations to encourage environmentally sensitive developments (for parking lots, etc...).
- BMPs could be used to increase the allowable impervious cover limits allowed by The Plan.

Irrigation Areas as Impervious Cover

- Grant Jackson/NEI – current input from SHC and TRG members has indicated that if a site specific analysis was conducted to determine proper irrigation rates and locations on a site, then it would be permissible to not count the irrigation area as impervious cover.
- Nothing is more labor intensive than the proper operation and maintenance of an irrigation system. Against not counting this area as impervious cover.
- The irrigation area should be deducted from the gross site area, prior to determining the impervious cover percentage.
- The 5th Draft includes the BMP areas as impervious cover. This area should not be considered impervious cover.
- Current TCEQ wastewater drip irrigation rules are inadequate.

NEW BUSINESS ITEMS

1. Proposed February 23, 2005 Stakeholder Committee Meeting.

Coordinator Tull stated that the meeting location for February 23, 2005 has not been finalized and that he would notify the SHC when the location had been determined.

ADJOURNMENT

The meeting was adjourned at approximately 10:00 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on March 2, 2005.

STAKEHOLDER COMMITTEE MEETING – FEBRUARY 23, 2005

MEETING INFORMATION

Meeting Location: ACC Pinnacle Campus, 6th Floor, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

STAKEHOLDER COMMITTEE MEETING:

Meeting Time: Wednesday, February 23, 2005, at 6:00 pm

Meeting Information: A scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. All attachments will be available on the projects web site prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the February 2, 2005 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. HOMEWORK: Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

3. Review and Discuss Draft Illustrative Case.

[GOAL: Presentation by NEI, and discussion on, the draft illustrative case prepared by NEI. HOMEWORK: Review the draft Illustrative Case to be posted on the web site. Be prepared to comment and discuss at the meeting.]

4. Review and Discussion of Revised Draft of Table 10 – Recommended Maximum Impervious Cover Limits from the 5th Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation by NEI Consulting Team and Discussion on a revised, draft version of Table 10 from the 5th Draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on further revisions to the table. HOMEWORK: Read and review the revised Table 10 that has been e-mailed to SHC members and posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

AGENDA - for the February 23, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
6:05 pm	Open Public Comment.
6:10 pm	Discussion and Action to approve Minutes of the February 2, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1).
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2)
6:20 pm	Review and Discuss Illustrative Case – NEI (See attachment 3).
7:15 pm	Break
7:25 pm	Discuss the revised Table 10 - Recommended Maximum Impervious Cover Limits Table and provide input to the Consulting Team (See attachment 4)
8:25 pm	Break
8:35 pm	Identify remaining SHC “Showstopper” issues and “Important” issues as they relate to the 5 th Draft of the Regional Water Quality Protection Plan, and provide input to the Consulting Team.
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

EVALUATION FORM

The Executive and Core Committees, the Executive Director and the Consulting Team appreciate your participation in this meeting. We would like to have your evaluation of this meeting, with a focus on how we might improve future meetings. Please rate the following elements of the meeting:

Category	Strongly Agree	Agree	Disagree	Strongly Disagree
The method and timeliness of notification about this meeting was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting date and time were good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting location was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting environment (facility) was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting format was good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The handout materials were clear and helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The length of the presentations was just right	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The content of the presentations was helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the agenda	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meeting followed the time schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There was adequate opportunity for each representative to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Describe your favorite part of the meeting. What made it your favorite?

Describe your least favorite part of the meeting. What made it your least favorite?

Other Suggestions/Comments:

Please hand this form to the Executive Director or an NEI Consulting Team member as you leave the meeting. Thanks again for your participation!

Resolution of Outstanding Issues

Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

Austin Community College - Pinnacle Campus
February 23, 2005

“Show Stopper” Issues Submitted by SHC Members

- Transferable Development Rights
 - Need preferred conservation areas where low IC cannot be increased through TDRs
 - No Eminent Domain/Condemnation allowed
- Impervious Cover
 - Limits are “required”, not “recommended”
 - Actual Constructed IC < or = Estimated IC
 - Steep slopes must be considered
 - Include % of irrigation areas and BMPs/Ponds

“Show Stopper” Issues Submitted by SHC Members (Continued)

- Impervious Cover (Continued)
 - RZ be limited to 10%
- Buffer Zones
 - No BMPs in BZ
- Implications
 - Economic impact evaluation either more thorough or eliminated

Regional Water Quality Planning Project

February 23, 2005

On-Going Work – Critical Water Quality Parameters

- Preferred measurement methods
 - Existing test methods under existing programs/ordinances
 - Coordinated with regional clearinghouse
- Procedures for response to “failing” data, as part of Adaptive Management

Regional Water Quality Planning Project

February 23, 2005

On-Going Work – Description of Measures

- Stream Offsets/Buffer Zones
 - Construction (utilities, etc.) in BZ [SHC]
 - Requirements for discharges into BZ
 - No BMPs in BZ
 - No concentrated flow (sheet flow required)
- Site Specific Construction Phase Controls
- Site/BMP Design
 - Expanded definition of Low Impact Dev. (LID)
 - Site characteristics - irrigation areas not IC

Regional Water Quality Planning Project

February 23, 2005

On-Going Work – Implementation

- TDRs
 - Differences across jurisdictions
 - Concept of acquiring TDRs from regional “Mitigation Bank” vs. individual tracts
 - Detail requirements for obtaining TDRs by retrofitting prior development
 - Specific recommendations for purchase of NA/OS Conservation Easements
- Economic implications of measures
- Relationship with growth/demographics

Regional Water Quality Planning Project

February 23, 2005

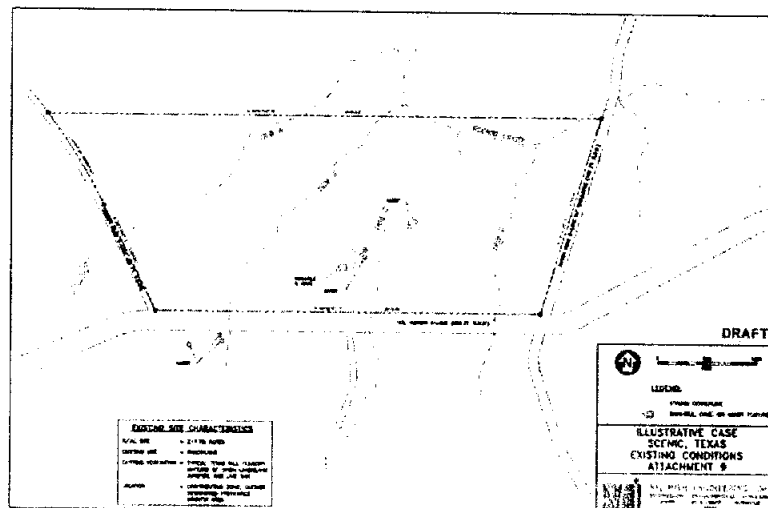
Illustrative Case #1 – Scenic, Texas

- Location
 - Contributing Zone
 - Rural – Outside Preferred Growth Areas
- Site Characteristics
 - 218 Acres, undeveloped ranch land
 - Boundaries: S – 4 lane US Highway, E – TX RR w/ paved shoulders, W – 2 lane CR, N – ranch land & Scenic Creek (>2,000 Ac drain.)
 - Several on-site streams/karst features

Regional Water Quality Planning Project

February 23, 2005

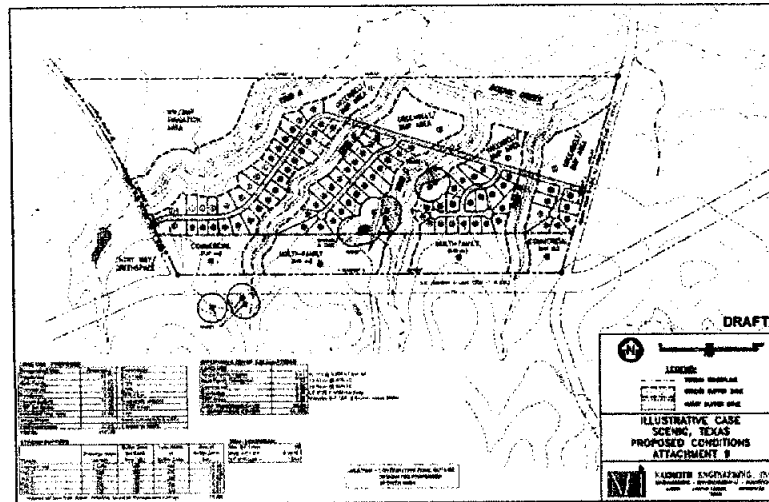
Pre-Development - Illustrative Case #1



Regional Water Quality Planning Project

February 23, 2005

Post-Development - Illustrative Case #1



Regional Water Quality Planning Project

February 23, 2005

IC Calculations – Illustrative Case #1

Land Use	Impervious Cover (Acres)	Basis
Single Family Residential	9.41	82 lots @ 5,000 sf IC per lot
Multi-Family Residential	7.53	18.83 Ac. @ 40% IC
Commercial	6.5	10.83 Ac. @ 60% IC
Roadways	5.40	None
BMPs	3.50	-
Totals	32.34	32.34 / 218 = 14.83%

Regional Water Quality Planning Project

February 23, 2005

Illustrative Case #2 – Mythic, Texas

➤ Location

- Contributing Zone
- Urban – Inside Preferred Growth Areas

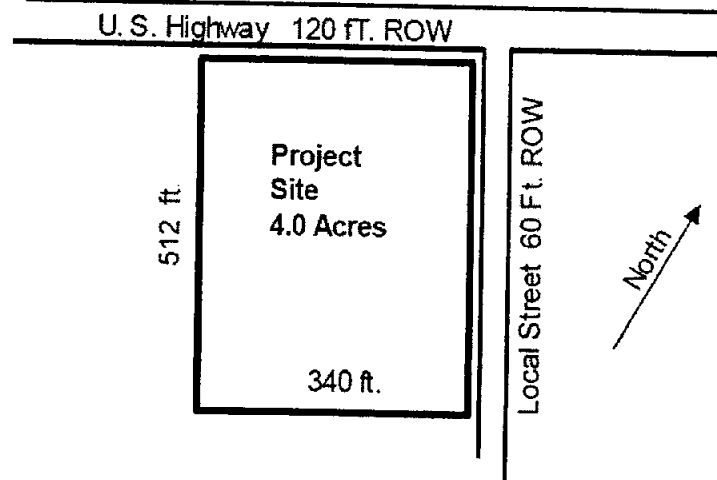
➤ Site Characteristics

- 4.0 Acres, undeveloped agricultural land
- Boundaries: S & W – Open field, NW - 4 lane US Highway, SE – paved city street
- Nearly flat, moderately deep soils

Regional Water Quality Planning Project

February 23, 2005

Pre-Development - Illustrative Case #2



Regional Water Quality Planning Project

February 23, 2005

Illustrative Case #2 – Mythic, Texas

➤ Development Objectives

- Retail Commercial
- Max. building, material laydown and parking

➤ Design Restrictions

- Ret./Irr. requires 1.0 Ac. of irrigation area
- Resulting: 3.0 Ac. Or 75% IC

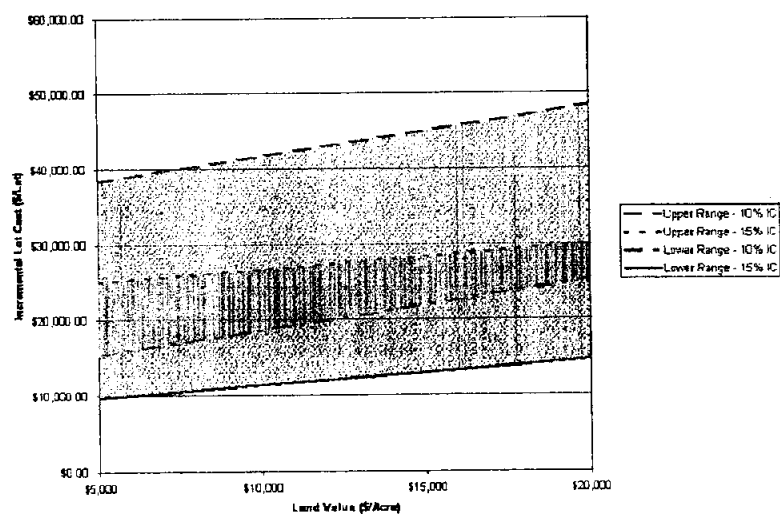
➤ TDRs

- On – site allows: 0.6 Ac. IC (4 x 15% = 0.6)
- Off-site req'd: 2.4 Ac. IC or 26.67 Ac. @ 1%
(26.67 x [.10 - .01] = 2.4)

Regional Water Quality Planning Project

February 23, 2005

Est. Addn. Cost – Typ. Residential Lot



Regional Water Quality Planning Project

February 23, 2005

Proposed Impervious Cover Table

Location	No BMPs No Incoming TDRs	Sec. (LID) BMPS, no TDRs	Prim. BMPs & no TDRs	Sec. (LID) BMPs & TDRs	Prim. BMPs & TDRs
Recharge Zone	7.5	10	15	15	15
Contributing Zone, outside PGAs	10	15	20	25	25
Contributing Zone, residential, inside PGAs	10	15	20	25	30
Contributing Zone, commercial, inside PGAs	10	20	25	30	None

Regional Water Quality Planning Project

February 23, 2005

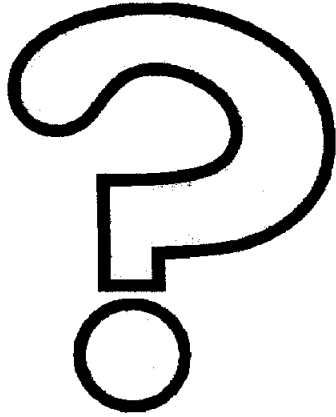
Recommendations – Compilation of Various Development Interests

Location	No BMPs No TDRs	Sec. (LID) BMPS only	Prim. BMPs & no TDRs	Sec. (LID) BMPs & TDRs	Prim. BMPs & TDRs
Recharge Zone	7.5	10-15 (10)	15-25 (15)	20-25 (15)	25-30 (15)
Contributing Zone, outside PGAs	10	20 (15)	20-25 (20)	25-30 (25)	25-30 (25)
Contributing Zone, residential, inside PGAs	20 (10)	20 (15)	20-25 (20)	25-30 (25)	30-35 (30)
Contributing Zone, commercial, inside PGAs	20 (10)	20-25 (20)	35-40 (25)	50-60 (30)	No Limit

Regional Water Quality Planning Project

February 23, 2005

Questions/Comments on the Draft Plan



- Naismith Engineering
(NEI)
 - Grant A. Jackson, P.E.
gjackson@
 - Tom Brown
tbrown@
 - David Fusilier, P.E.
dfusilier@
- All NEI e-mails:
@naismith-engineering.com

STAKEHOLDER COMMITTEE MEETING MINUTES - Final

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, February 23, 2005, at 6:00 pm**

Meeting Location: **ACC Pinnacle Campus**, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus		Bryan Jordan
X	Jon Beall	X	Gene Lowenthal
X	Alan Bojorquez	X	Nancy McClintock
X	Robert (Robbie) Botto		Charles O' Dell
X	Henry Brooks	X	Jim Phillips
	S. Tim Casey		Randy Robinson
X	Colin Clark	X	Hank Smith
X	Joe C. Day	X	J. T. Stewart
X	Karen Ford	X	Donna Tiemann
X	David Fowler		David Venhuizen
X	Mark Gentle		Michael Waite
X	Karen Hadden	X	Hugh Winkler
	Rebecca Hudson	X	Ira Yates
X	Charles Johnson		
Present	Alternate	Present	Alternate
	Jack Goodman		Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
X	Carlotta McLean	X	Randall Thomas
X	Bret Raymis		
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

[TABLE BELOW IS FROM 2/23/05 MEETING AGENDA DOCUMENT]

AGENDA - for the February 23, 2005 Stakeholder Committee Meeting:

Time	Activity
6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
6:05 pm	Open Public Comment.
6:10 pm	Discussion and Action to approve Minutes of the February 2, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1).
6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2)
6:20 pm	Review and Discuss Illustrative Case – NEI (See attachment 3).
7:15 pm	Break
7:25 pm	Discuss the <u>revised</u> Table 10 - Recommended Maximum Impervious Cover Limits Table and provide input to the Consulting Team (See attachment 4)
8:25 pm	Break
8:35 pm	Identify remaining SHC “Showstopper” issues and “Important” issues as they relate to the 5 th Draft of the Regional Water Quality Protection Plan, and provide input to the Consulting Team.
9:25 pm	Other Business (next meeting agenda, etc...)
9:30 pm	Adjourn

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

No public comments.

2. Discussion and Approval of Meeting Minutes from the February 2, 2005 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull stated that the minutes from the February 2, 2005 SHC meeting had been posted on the web site and that he had received no comments from the SHC members. Coordinator Tull asked if anyone had any comments on the minutes, and hearing none, the minutes were approved by consensus.

3. Review, Discuss and Approve Updated Project Schedule and Milestones (Meeting Attachment No. 2).

Coordinator Tull and Grant Jackson/NEI presented the latest Project Schedule that showed the tentative dates of the remaining meetings. Coordinator Tull also passed out a document showing completion milestones left for the planning process (titled "Outline of Milestones to Finish Water Quality Protection Plan – 2nd Draft February 23, 2005). The current schedule has the SHC meeting on the next two Wednesday nights, March 2 and 9. Additional meetings, if necessary, would have to be scheduled as necessary.

Coordinator Tull stated that the Executive and Core Committee meeting to present the plan had been set for Monday, March 21, 2005.

Coordinator Tull also stated that in accordance with the contract between the City of Dripping Springs and the Texas Water Development Board (TWDB), a draft version of the plan must be submitted to the TWDB by March 31, 2005. The current schedule presented is based on this deadline.

Coordinator Tull also mentioned that the TWDB had a 30-day comment period and based on their comments, the plan may need to be revised, with a submittal deadline for the final report of May 31, 2005.

Some SHC members expressed concern with the process of finalizing The Plan, and the possibility of a lack of SHC input into changes proposed to The Plan during the revision process.

4. Review and Discussion of Illustrative Case #1. (Meeting Attachment No. 3).

Grant Jackson/NEI began the discussion with a presentation titled "Resolution of Outstanding Issues" (presentation is included on the project's web site as a meeting summary document). The presentation included the following topics:

- "Showstopper" issues from SHC members;
- On-going Work by the NEI Team;

- Illustrative Case #1;
- Illustrative Case #2;
- Graph showing “Estimated Additional Cost to Typical Residential Lot” as the result of The Plan;
- Updated, revised Table 10 from the 5th Draft of The Plan (Recommended Impervious Cover Limits).

Grant Jackson presented the Illustrative Case #1. This imaginary case involves the development of approximately 218 acres of Hill Country property. Mr. Jackson showed the layout of the illustrative case in both the existing and proposed conditions. He stated that the intent of the illustrative case was to show people what can be designed under the requirements of the proposed plan. The proposed conditions result in an impervious cover of approximately 14.85%.

Mr. Jackson also presented an outline of Illustrative Case #2. This imaginary case involves the development of approximately 4.0 acres in a “preferred development area”.

The discussion of the illustrative cases generated the following comments:

- The net site area should be shown for comparison purposes.
- Grant Jackson/NEI: The two most common methods for setting aside property used for TDRs would be:
 - (1) Fee simple transfer of property used for TDRs to an entity that will manage this property, or ensure its management (preferred method);
 - (2) easement dedication of the property.
- Taxing Implications:
 - Assume you had 100 acres of “raw”, undeveloped property:
 - You “sold” 20 ac of the 100 acres for TDRs (but still retained ownership);
 - The 100 acres now consists of the following:
 - “Development Interest” Property = 80 acres (100 ac – 20 ac sold for TDRs)
 - “Surface-Interest” Property = 20 acres (the 20 ac TDRs that can no longer be developed.
 - How is the entire 100 acres taxed?
 - 80 acres at one rate + 20 acres at a different rate (reduced)?
 - 100 acres at the same rate?
 - Will the difference in land value, between the 80 acres and the 20 acres, be recognized by the taxing authority?

Meeting Summary – Wednesday, February 23, 2005 Stakeholder Committee Meeting
Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

- The TDR transfer example needs to be simplified, or explained in more detail.
- It is very difficult to give an accurate opinion of the affect The Plan may have on property values at this time (The Plan may actually increase the value of undeveloped land due to the TDR implications).
- As an example of real-life tax implications – one recent case resulted in a landowner donating an endowment to maintain a conservation easement, resulting in an approx. \$1 million dollar annual tax savings.
- We do not need to re-invent the wheel with respect to TDRs. Let's look at existing model programs and get input from existing experts.
- Small businesses couldn't afford to acquire enough TDRs to develop the 4 acre site shown in Illustrative Case #2.
- TDRs allow someone to buy a small piece of property and acquire TDRs on cheaper property, instead of having to buy a larger, contiguous piece of property to begin with.

5. Presentation and discussion of Revised Table 10 (Recommended Maximum Impervious Cover Limits) of the 5th Draft of the Regional Water Quality Protection Plan (Meeting Attachments No. 6).

Grant Jackson/NEI presented the following revised Table 10 from the 5th Draft of The Plan:

Table 10 - Recommended Maximum Impervious Cover Limits

Location	(1) No BMPs ¹ No TDRs	(2) Sec. (LID) BMPS ² only	(3) Prim. BMPs & no TDRs ³	(4) Sec. (LID) BMPs & TDRs ⁴	(5) Prim. BMPs & TDRs ⁵
Recharge Zone	7.5	10	15	15	15
Contributing Zone, outside “preferred growth areas” (PGAs) ⁶	10	15	20	25	25
Contributing Zone, Residential inside PGAs	10	15	20	25	30
Contributing Zone, Commercial inside PGAs	10	20	25	30	None ⁷

- ¹ Includes a restriction to limit contiguous impervious cover to blocks less than 50,000 sf, with non-concentrated discharge flow.
- ² Includes demonstration of “no net increase” and comprehensive site design using Low Impact Design (LID) measures, including non-contiguous impervious cover, and the use of secondary BMPs (as described in the Plan) which do not require an operation component (vegetated buffer strips, grassy swales, etc)
- ³ Includes demonstration of “no net increase” and comprehensive site design relying mostly on primary BMPs, as defined in the Plan).
- ⁴ TDRs assume the maximum impervious cover, including the additional development rights is 15%.
- ⁵ Includes demonstration of “no net increase” and comprehensive site design using a combination of primary and secondary BMPs, in conjunction with TDRs.
- ⁶ Preferred Growth Areas as used in this Plan are areas defined by local governmental jurisdiction(s) through the comprehensive planning process (in accordance with the Texas Local Government Code, Chapter 213) as areas where higher concentrations of development should be directed, provided they are located within municipal boundaries.
- ⁷ Building roof runoff requires rainwater harvesting with fourteen (14) days storage capacity.

The discussion of the revised, updated Table 10 generated the following comments:

- The table is too complicated. Why do we need column 1, why not just use column 2?
- Column 1 (No BMPs + No TDRs) would allow too much development. At 10% impervious cover you could make a significant impact on water quality.
- We need to allow an option to not have to provide calculations to prove the “no net increase” requirement. Column 1 gives us this option. Supports the inclusion of Column 1 in the table.

- Column 1 is a loophole. Violates the intent of what we want to accomplish.
- What if we simplify the table? We could define what the removal efficiencies are for a variety of BMPs.
- What exactly is meant by an LID BMPs? [Grant Jackson/NEI – a BMP WITHOUT an “operating” element (e.g., a re-irrigation pump, a sand filter, etc...)].
- Arrange the table, by columns, from low to high impervious cover, and explain what the requirements are to reach each level of impervious cover.
- Could we set a minimum lot size requirement.
- Column 1 should still have the “no net increase” requirement.
- Set some design standards for Column 1.
- The following table was drawn on the board and represented the input from some of the SHC members present (table was a working draft and was generated to promote discussion):

Table 10 - Recommended Maximum Impervious Cover Limits

Location	(1) Review Streamlined + Low Imp. Cov.?	(2) No TDRs	(3) w/ TDRs
Recharge Zone	?	10	15
Contributing Zone	?	15	25
Contributing Zone - inside PGA	?	15 (20?)	30
Contributing Zone - Commercial inside PGAs “designated urban core”	?	35	45

Other general comments received during the discussion on impervious cover limits included:

- Designated transportation corridors should be considered to be inside the designated “Preferred Growth Area”.
- We should encourage clustering of developments. PGAs should not be extended to the transportation corridors.
- We should include in The Plan the emphasis that the impervious cover table was the negotiated upper limit and the impervious cover numbers should not be increased beyond what is shown in the table.
- We should encourage development of a comprehensive plan for each project.
- Recommend limiting the designated PGAs to no more than 10% of the entire planning region.

6. Discussion of Remaining Issues Relating to the 5th Draft of the Regional Water Quality Protection Plan.

Grant Jackson/NEI led the discussion of remaining issues relating to the 5th Draft of The Plan. The following are general comments received from the individual SHC members in attendance at the meeting:

General Comments

- The current cost impact analysis included in the plan is not very good, or at least, is incomplete. This cost impact analysis does not currently account for the benefits of The Plan.
- The impact of The Plan on some properties could be next to zero. Please show the illustrative cases before The Plan (w/ TCEQ, USFWS requirements) and after The Plan.

Comments from members of the Technical Review Group

[The following comments are a summary of comments received from various TRG members that were in attendance at the meeting.]

- Recommend using prescriptive criteria for BMP treatment capabilities (i.e., % removal).
- Some design standards need to be set even for low density, low impervious cover developments.
- Against performance-based standards (monitoring of each BMP). The Table 10 – Recommended Impervious Cover Limits introduced by Grant Jackson tonight include good numbers. Numbers significantly higher than what have been proposed will result in degradation.
- With respect to erosive flow control – volume control has not been addressed by the current plan.
- No net increase is a good idea.
- Yes to use of gross site area.
- Recommend looking at the “what ifs” with respect to build-out of the watershed (using a variety of scenarios).
- Wastewater issues have not been adequately addressed by the current version of The Plan.

NEW BUSINESS ITEMS

1. Proposed March 2, 2005 Stakeholder Committee Meeting.

Coordinator Tull stated that based on the current schedule and SHC input, the next SHC meeting would be held on Wednesday, March 2, 2005. Based on a show of hands, the SHC preferred holding the meeting at the ACC Pinnacle Campus.

ADJOURNMENT

The meeting was adjourned at approximately 10:00 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on March 2, 2005.

STAKEHOLDER COMMITTEE MEETING – MARCH 2, 2005

MEETING INFORMATION

Meeting Location: ACC Pinnacle Campus, 6th Floor, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

Meeting Time: Wednesday, March 2, 2005, at 6:00 pm

Meeting Information: This is a scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. Attachments will be available on the project web site (www.waterqualityplan.org) prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the February 16, 2005 and February 23, 2005 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. HOMEWORK: Review the Updated- Project Schedule posted on the web site. Be prepared to comment and discuss this revised schedule. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting so that comments may be summarized for expedited presentation at the meeting.]

3. Review and Discuss Draft Illustrative Case.

[GOAL: Presentation by NEI, and discussion on, a draft illustrative case prepared by NEI. HOMEWORK: Review the draft Illustrative Case to be posted on the web site. Be prepared to comment and discuss at the meeting.]

4. Review and Discussion of an Updated Version of the Revised Draft of Table 10 – Recommended Maximum Impervious Cover Limits from the 5th Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation by NEI Consulting Team and Discussion on an updated, revised, draft version of Table 10 from the 5th Draft of the Regional Water Quality Protection Plan, based on SHC input at the February 23, 2005 SHC Meeting; recommendations from the SHC to the Consulting Team on further revisions to the table. HOMEWORK: Read and review the updated, revised draft of Table 10 that has been posted on the web site. Any significant comments should be forwarded to the Consulting Team, preferably via e-mail, prior to the meeting, so that these comments may be summarized for expedited review at the meeting.]

5. Review and Discussion of Remaining “Showstopper” and “Important” Remaining Regional Water Quality Protection Plan.

[GOAL: Identification of the remaining “Showstopper” and “Important” issues identified by the SHC members with respect to the 5th Draft of the Regional Water Quality Protection Plan; recommendations from the SHC to the Consulting Team on possible revisions to The Plan to resolve these issues. HOMEWORK: Review the current draft (5th Draft) of the Regional Water Quality Protection Plan. It would be helpful if all SHC members would e-mail a list of their issues to the Consulting Team prior to the meeting. These issues will be summarized for review at the meeting.]

AGENDA - for the March 2, 2005 Stakeholder Committee Meeting:

	Time	Activity
	6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
1.	6:05 pm	Open Public Comment.
2.	6:10 pm	Discussion and Action to approve Minutes of the February 16 and 23, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1a and 1b).
3.	6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2).
4.	6:20 pm	Review and Discuss Illustrative Case – NEI. (See attachment 3).
5.	6:50 pm	Discuss the updated, revised Table 10 - Recommended Maximum Impervious Cover Limits Table and provide input to the Consulting Team. (See attachment 4).
	7:20 pm	Break
5.	7:30 pm	Discuss the updated, revised Table 10 - Recommended Maximum Impervious Cover Limits Table and provide input to the Consulting Team. (cont.)
6.	8:00 pm	Identify remaining SHC “Showstopper” issues and “Important” issues as they relate to the 5 th Draft of the Regional Water Quality Protection Plan.
7.	9:00 pm	Discuss process for resolving remaining issues and reaching final SHC decision on the Plan at March 9 th SHC meeting.
8.	9:25 pm	Other Business (next meeting agenda, etc...)
9.	9:30 pm	Adjourn

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, March 2, 2005, at 6:00 pm**

Meeting Location: **ACC Pinnacle Campus**, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
	Andrew Backus	X	Bryan Jordan
X	Jon Beall	X	Gene Lowenthal
	Alan Bojorquez	X	Nancy McClintock
X	Robert (Robbie) Botto	X	Charles O' Dell
X	Henry Brooks	X	Jim Phillips
	S. Tim Casey		Randy Robinson
X	Colin Clark		Hank Smith
X	Joe C. Day		J. T. Stewart
X	Karen Ford	X	Donna Tiemann
X	David Fowler	X	David Venhuizen
X	Mark Gentle		Michael Waite
X	Karen Hadden	X	Hugh Winkler
	Rebecca Hudson	X	Ira Yates
X	Charles Johnson		
Present	Alternate	Present	Alternate
X	Jack Goodman		Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
	Carlotta McLean	X	Randall Thomas
	Bret Raymis		
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	Tom Brown – NEI
X	Grant Jackson – NEI	X	David Fusilier – NEI

[TABLE BELOW IS FROM 3/02/05 MEETING AGENDA DOCUMENT]

AGENDA - for the March 2, 2005 Stakeholder Committee Meeting:

	Time	Activity
	6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
1.	6:05 pm	Open Public Comment.
2.	6:10 pm	Discussion and Action to approve Minutes of the February 16 and 23, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1a and 1b).
3.	6:15 pm	Review, Discuss and Approve Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2).
4.	6:20 pm	Review and Discuss Illustrative Case – NEI. (See attachment 3).
5.	6:50 pm	Discuss the updated, revised Table 10 - Recommended Maximum Impervious Cover Limits Table and provide input to the Consulting Team. (See attachment 4).
	7:20 pm	Break
5.	7:30 pm	Discuss the updated, revised Table 10 - Recommended Maximum Impervious Cover Limits Table and provide input to the Consulting Team. (cont.)
6.	8:00 pm	Identify remaining SHC “Showstopper” issues and “Important” issues as they relate to the 5 th Draft of the Regional Water Quality Protection Plan.
7.	9:00 pm	Discuss process for resolving remaining issues and reaching final SHC decision on the Plan at March 9th SHC meeting.
8.	9:25 pm	Other Business (next meeting agenda, etc...)
9.	9:30 pm	Adjourn

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:00 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

Donna Tiemann announced that the Greater Edwards Aquifer Alliance was hosting a regional summit in San Antonio this weekend, March 4-6, 2005 (“A Regional Summit on The Edwards Aquifer and the Hill Country”). She had sent e-mails to the SHC suggesting that the group put together an informational handout on this current planning effort.

Robbie Botto stated that he thought this was a good idea.

It was suggested that the Executive Director prepare a summary about the Regional Planning process for distribution at the Summit. The Regional Director agreed to review the materials regarding the Summit and to let the SHC know of his decision in this regard.

2. Discussion and Approval of Meeting Minutes from the February 16 & 23, 2005 Stakeholder Committee Meetings (Meeting Attachments Nos. 1a and 1b).

Coordinator Tull stated that the minutes from the February 16 & 23, 2005 SHC meetings had been posted on the web site and that he had received no comments from the SHC members. Coordinator Tull asked if anyone had any comments on the minutes, and hearing none, the minutes were approved by consensus.

3. Review, Discuss and Approve Updated Project Schedule and Milestones (Meeting Attachment No. 2).

Coordinator Tull presented the latest Project Schedule that showed the tentative dates of the remaining meetings. The current schedule has the next SHC meeting scheduled for next Wednesday night, March 9th. It is currently the last scheduled SHC meeting. Additional meetings, if necessary, would have to be scheduled as necessary.

Coordinator Tull stated that the Executive and Core Committee meeting to present the plan had been set for Monday, March 21, 2005.

4. Review and Discussion of Illustrative Case s #1 and #2. (Meeting Attachment No. 3).

Grant Jackson/NEI began a discussion of Illustrative Cases #1 and #2.

Grant Jackson presented the Illustrative Case #1. This imaginary case involves the development of approximately 218 acres of Hill Country property. Mr. Jackson showed the layout of the illustrative case in both the existing and proposed conditions. He stated that the intent of the illustrative case was to show people what can be designed under the requirements of the proposed plan. The proposed conditions result in an impervious cover of approximately 13.24%.

Mr. Jackson also presented an outline of Illustrative Case #2. This imaginary case involves the development of approximately 4.0 acres in a “Preferred Growth Area”.

The discussion of the illustrative cases generated the following comments:

- If the irrigation rate is set at the hydraulic conductivity of the soil, this is too high.
- Where in the Hill Country do we have 12” of soil as required by The Plan?
- Cost information would be helpful in evaluating the effects of The Plan.

5. Presentation and discussion of Updated, Revised Recommended Maximum Impervious Cover Limits (Table 10 from the 5th Draft of the Regional Water Quality Protection Plan) (Meeting Attachment No. 4).

Grant Jackson/NEI presented the following updated, revised Table 10:

Table 10 – Required Maximum Impervious Cover Limits

Column #:	(1)	(2)	(3)	(4)
Location	<100 Ac + No Review (1)	Sec. (LID) BMPs only (2)	Prim. BMPs & no TDRs (3,4)	BMPs + TDRs (5)
Recharge Zone	3	10	15	20
Contributing Zone, outside “preferred growth areas” (PGAs) (6)	5	15	20	25
Contributing Zone, Residential inside PGAs	5	15	20	30
Contributing Zone, Commercial inside PGAs	5	20	35	45 or No Limit (7)

- 1) Includes the following restrictions: **Only applicable to tracts less than 100 acres, no contiguous IC blocks greater than 20,000 sf, IC blocks must be separated from each other by at least 25 feet (excluding sidewalks), and no concentrated discharge of runoff (e.g. no curb & gutters, storm sewers or drainage ditches/swales).**
- 2) Site design must include demonstration of “no net increase” and comprehensive site design using Low Impact Design (LID) measures, including non-contiguous impervious cover, and the use of secondary BMPs (as described in the Plan) which do not require an operation component (vegetated buffer strips, grassy swales, etc)
- 3) Includes demonstration of “no net increase” and comprehensive site design relying on primary BMPs, as defined in the Plan).
- 4) **TDRs used in the RZ must be obtained from the RZ and the combined IC of all tracts considered together must be 10% or lower. TDRs used in the CZ may be obtained from either the RZ or the CZ**

and should come from properties outside of PGAs. The combined IC of all tracts considered together must be 15% or lower.

- 5) Includes demonstration of “no net increase” and comprehensive site design using BMPs, in conjunction with TDRs.
 - 6) Preferred Growth Areas as used in this Plan are areas defined by local governmental jurisdiction(s) through the comprehensive planning process (in accordance with the Texas Local Government Code, Chapter 213) as areas where future zoning is proposed to be industrial, commercial or high-density residential, provided these area are located within incorporated municipal boundaries.
 - 7) **The “No Limit” option requires that building roof runoff** be captured through rainwater harvesting with fourteen (14) days storage capacity, used for landscape irrigation.
-

The discussion of the revised, updated Table 10 generated the following comments:

- How will the Preferred Growth Areas (PGAs) be established? Can Mountain City prepare a comprehensive plan?
- The I.C. limits shown in Columns 3 & 4 are too high.
- Construction site run-off is our biggest problem and we have not adequately addressed this issue.
- The underlying numbers are 10% for RZ and 15% for CZ. Higher numbers are site specific. The “no net increase” requirement still applies.
- TCEQ’s current rules for construction BMPs do not address sites under one acre in size. Recommend we require/provide some type of education for these types of projects.
- We started out with a basin wide 10% I.C. limit, because studies showed that I.C. limits greater than 10% cause problems. This table abandons that idea, and puts the plan at risk.
- The lack of maintenance and enforcement for BMPs is a problem. Footnote Column 33 with a requirement for a public entity to operate and maintain the BMPs. The entity could make sure the BMPs are functioning properly, not necessarily own the BMP.
- We wanted a basin wide I.C. limit. We have abandoned that idea. The amount of impervious cover is now dependent on BMPs. TDRs were to be used to increase risk. Now you can increase your I.C. limit (and therefore your risk), without the use of TDRs.
- Let’s produce a plan that is based on science. Let’s not negotiate I.C. limits now. That can be done later. Request that no negotiations be done outside this group on our behalf.
- Why can’t we recommend performance testing for BMPs (quarterly?)? We can set performance limits that the BMPs must meet.
- Column #3 [CZ, Commercial Inside PGA] – now 35%, was 35%. Why would we want to allow this build-out in areas (PGAs) that we don’t know for sure what the boundaries are?

Meeting Summary – Wednesday, March 2, 2005 Stakeholder Committee Meeting
Development of a Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone

- Need to produce a plan that can be implemented, otherwise all this time put in by the SHC members has been wasted.
- Politics are involved. How do we get past Column #3? We need to reach consensus.
- Column #3 is not needed. BMPs are given their due by Column #4.
- Column #1 – disconnect applies to parking lots and buildings (should not apply to roads, etc...). Public entities will own and operate BMPs. Column #3 is good and can be supported by science. Why limit Column #1 to 100 acres?
- Why limit Column #1 to 100 acres? [multiple comments on this subject]
- Why different I.C. limits for residential and commercial properties? [answer from other SHC members was that this was a concession to developers of commercial tracts]
- Column #3 is necessary/essential. [multiple comments on this subject]
- In Footnote #1 – strike the mention of ditches/swales. It would be difficult to development anything without them.
- The thought process for implementation is critical. Maintenance of BMPs needs to be in public hands, just like roads, sewers, water lines, etc...
- Agreed months ago to a basin-wide cap of 10% I.C. Some went along w/ concept of gross-site area basis because of this overall 10% limit. Need to move numbers down, or go to net site area concept.
- TDR concept is currently unclear and potentially problematic. Perhaps using the City of Austin concept (a concept not actually implemented at this time) of limiting TDRs/Mitigation to a two mile radius from the development.
- Why do we need Column #2? [Other SHC members – Column #2 will be a popular option.]
- Grant Jackson – Straw poll on how many agree to the following concept for BMPs, in exchange for increases in I.C.:
 - (1) Monitoring;
 - (2) Quarterly Inspection;
 - (3) O&M by public entity.

Yes – 14; No – 9.

- Supports 10% basin-wide I.C. limits. If there is not a 10% cap, then we will see degradation.
- Why allow greater I.C. for using more vulnerable BMPs (structural)? Vulnerability analysis should be required.
- Why would we want a “no limit” option?
- The proposed table is not as strict as the USFWS 2000 requirements.
- NEI hasn’t done a good job a selling the plan. The plan is more about landowners than developers.
- Footnote #1 is not workable.
- For Column #1 – delete 100 ac limit, instead require a maximum of 10% I.C. on any 10 acre tract of a development.
- We should assign numbers (acreage) to all of the tables cells so we can calculate an overall basin impervious cover percentage.
- Naismith should give the SHC multiple options for the I.C. table (based on SHC input received).

6. Identify remaining SHC “Showstopper” issues and “Important” issues as they relate to the 5th Draft of the Regional Water Quality Protection Plan.

Grant Jackson presented a graph showing economic implications resulting from the proposed plan. The graph generated the following comments from the SHC:

- We’re not seeing the base costs. Platted residential subdivisions are not at 30% I.C. in this area. We need to see this in relation to the overall base cost.
- Why is the current plan more expensive than USFWS 2000 requirements? [Grant Jackson – we judge the current plan to be more restrictive than the USFWS 2000 requirements.] Not giving enough credits to the “strictness” of the USFWS measures.
- Don’t start at 30% I.C. for existing developments, use something more like 20%.
- Concerned about the accuracy of these numbers. These are “guesses” – concerned about the implications of the numbers if we choose to put them in the plan.

NEW BUSINESS ITEMS

1. Proposed March 9, 2005 Stakeholder Committee Meeting.

Coordinator Tull stated that the next SHC meeting would be held on Wednesday, March 9, 2005, at the ACC Pinnacle Campus.

ADJOURNMENT

The meeting was adjourned at approximately 10:00 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

STAKEHOLDER COMMITTEE MEETING – MARCH 9, 2005

MEETING INFORMATION

Meeting Location: ACC Pinnacle Campus, 6th Floor, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

Meeting Time: Wednesday, March 9, 2005, at 6:00 pm

Meeting Information: This is a scheduled Stakeholder Committee Meeting. Items and issues to be discussed can be found on the below list of attachments and the accompanying agenda. Attachments will be available on the project web site (www.waterqualityplan.org) prior to the meeting (attachments will be posted as soon as they are finalized).

ATTACHMENTS for Stakeholder Committee Meeting:

[Please note that below each listed attachment we have outlined our expectations for each Stakeholder Committee Representative with regards to the particular attachment. Where appropriate, we have also included things each representative may want to consider when reviewing the attachments.]

1. Minutes from the March 2, 2005 Stakeholder Committee Meeting.

[GOAL: Consensus approval of minutes. HOMEWORK: Read & review final version posted on the web site. Any significant problems with the minutes should be brought to the attention of the entire Stakeholder Committee and the Executive Director, preferably via e-mail, prior to the meeting so that issues may be resolved ahead of time.]

2. Review and Discuss Updated Project Schedule and Milestones.

[GOAL: Presentation, discussion and agreement on the Updated Project Schedule. HOMEWORK: Review the Updated- Project Schedule posted on the web site.]

3. Review and Discussion of 6th Draft of the Regional Water Quality Protection Plan.

[GOAL: Presentation by NEI Consulting Team and Discussion on the 6th Draft of the Regional Water Quality Protection Plan. HOMEWORK: Read and review the 6th draft of the Regional Water Quality Protection Plan posted on the web site.]

4. Review, Discussion, and Resolution of Remaining “Showstopper” Issues for the Regional Water Quality Protection Plan.

[GOAL: Identification of and resolution of (by consensus, if possible) the remaining “Showstopper” issues identified by the SHC members with respect to the 6th Draft of the Regional Water Quality Protection Plan; hear recommendations from individual SHC members on their proposal(s) to resolve their “Showstopper” issue(s); voting by the SHC to resolve remaining “Showstopper” issues. HOMEWORK: Review the current draft (6th Draft) of the Regional Water Quality Protection Plan posted on the web site. Identify your “Showstopper” issues; develop solutions for these “Showstopper” issues; circulate via e-mail (to all SHC members, the E.D., and NEI) a list of your “Showstopper” issues and your developed solutions for these “Showstopper” issues by the end of the day on Monday, March 7, 2005. These issues will be summarized for review at the meeting.]

AGENDA - for the March 9, 2005 Stakeholder Committee Meeting:

	Time	Activity
	6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
1.	6:05 pm	Open Public Comment.
2.	6:10 pm	Discussion and Action to approve Minutes of the March 2, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1).
3.	6:15 pm	Review and Discuss the Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2).
4.	6:20 pm	Present the 6 th Draft Version of the Regional Water Quality Protection Plan - NEI (posted on the web site).
	6:50 pm	Break
5.	7:00 pm	Identification of, and resolution of, remaining SHC “Showstopper” issues as they relate to the 6th Draft of the Regional Water Quality Protection Plan. SHC members will present their “Showstopper” issues and their developed solution for these issues. If unable to reach consensus on an identified issue in a timely manner, the SHC will vote to resolve the issue (in accordance with the SHC By Laws).
6.	9:00 pm	SHC Vote on the Pre-Final Version of the Regional Water Quality Protection Plan to be presented to the Executive/Core Committee on March 21, 2005.
	9:30 pm	Break
7.	9:45 pm	The Way Ahead. Discussion on the role the SHC will play at the March 21, 2005 EC/CC Meeting; discussion on the future involvement of the SHC with respect to finalizing the Regional Water Quality Protection Plan.
8.	10:00 pm	Adjourn

Resolution of Outstanding Issues and Final Committee Votes

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Austin Community College - Pinnacle Campus
March 9, 2005

“Show Stopper” Issues Submitted by SHC Members

- Comprehensive Site Design
 - “thorough, site specific assessment of pre and post development conditions” [DIG] – **Clarify**
- Transferable Development Rights (TDRs)
 - No IC credits for retrofits [IY]
 - Others associated with IC Table (later)

**“Show Stopper” Issues Submitted by
SHC Members (Cont’d)**

- Buffer Zones-CEF Setbacks
 - 32-120 Ac. & 120-300 Ac. Too large [DIG]
 - “Credit” for BZs [DIG]
 - Wetlands –conflicts between BZ & CEF [DIG]
- Wastewater Management
 - Design criteria left to TCEQ or more discussion by this group [DIG]
- Structural BMPs
 - No safety factor to be added [DIG]
 - Innovation & performance [JD]

Regional Water Quality Planning Project

March 9, 2005

**“Show Stopper” Issues Submitted by
SHC Members (Cont’d #2)**

- Implementation
 - No development agreements [CC, IY]
 - Perpetual funding for O&M of BMPs [IY]
- Implications
 - Economic impact evaluation should include more than development costs [DV]
 - Include ranges of demographic projections in implications [KH]

Regional Water Quality Planning Project

March 9, 2005

“Show Stopper” Issues Submitted by SHC Members (Cont'd #3)

- Impervious Cover (General)
 - Upper Limit on Transitional [GL]
 - No extra IC for BMPs [IY]
 - No region. cap on IC + “no net increase” [DIG]
 - TDRs required for IC > 10%. [HB, KF, BR, JB]
 - PGAs to included “transportation corridors” or take out completely [DIG]
 - Exempt roadways (govt) from IC limits [DIG]
 - Table on next slide

Regional Water Quality Planning Project

March 9, 2005

Proposed Impervious Cover Table

Location	Simplified	Standard [Mon-CC]	Standard + TDRs	Transitional + Std. [Del.- Sev.]
Recharge Zone	3 [7.5 DIG]	10 [15 DIG]	20 <u>(10)</u> [25 DIG] [10 CC]	15 <u>(10)</u>
Contributing Zone, outside PGAs	5 [10 DIG]	15 [20-25 DIG] [+TDR-HB]	25 <u>(20M)</u> [30 DIG] [15 CC]	20 <u>(15)</u>
Contributing Zone, SF Res. in PGA	5 [20 DIG]	15 [25-30 DIG] [+TDR-HB]	30 <u>(30M)</u>	25 <u>(25M)</u>
Contributing Zone, MF Res. & Comm. in PGA	5 [20 DIG]	20/30 <u>(30M)</u> [30-40 DIG] [+TDR-HB]	45 <u>(50M)</u> /NL [60 DIG] [30 CC]	35 <u>(40M)</u>

Regional Water Quality Planning Project

March 9, 2005

Impervious Cover Table (Markup)

Location	Simplified	Standard [Mon-CC]	Standard + TDRs	Transitional + Std. [Del.- Sev.]
Recharge Zone	3 [7.5 DIG]	10 [15 DIG]	20 <u>(10)</u> [25 DIG] [10 CC]	15 <u>(10)</u>
Contributing Zone, outside PGAs	5 [10 DIG]	15 [20-25 DIG] [+TDR-HB]	25 <u>(20M)</u> [30 DIG] [15 CC]	20 <u>(15)</u>
Contributing Zone, SF Res. in PGA	5 [20 DIG]	15 [25-30 DIG] [+TDR-HB]	30 <u>(30M)</u>	25 <u>(25M)</u>
Contributing Zone, MF Res. & Comm. in PGA	5 [20 DIG]	20/30 <u>(30M)</u> [30-40 DIG] [+TDR-HB]	45 <u>(50M)/NL</u> [60 DIG] [30 CC]	35 <u>(40M)</u>

Regional Water Quality Planning Project

March 9, 2005

Questions/Comments on the Draft Plan



- Naismith Engineering (NEI)
- Grant A. Jackson, P.E.
gjackson@
- Tom Brown
tbrown@
- David Fusilier, P.E.
dfusilier@

All NEI e-mails:

@naismith-engineering.com

Regional Water Quality Planning Project

March 9, 2005

STAKEHOLDER COMMITTEE MEETING MINUTES - draft

A meeting of the Stakeholder committee was held as follows:

MEETING INFORMATION

Meeting Date and Time: **Wednesday, March 9, 2005, at 6:00 pm**

Meeting Location: **ACC Pinnacle Campus**, located at 7748 Hwy 290 West, Austin, Texas 78736, on the north side of Hwy 290, west of the Y in Oak Hill, and opposite to the entrance to the Oak Hill United Methodist Church, in Travis County, Texas.

ATTENDEES

Present	Member	Present	Member
X	Andrew Backus	X	Bryan Jordan
X	Jon Beall	X	Gene Lowenthal
X	Alan Bojorquez	X	Nancy McClintock
X	Robert (Robbie) Botto	X	Charles O' Dell
X	Henry Brooks	X	Jim Phillips
	S. Tim Casey		Randy Robinson
X	Colin Clark	X	Hank Smith
X	Joe C. Day	X	J. T. Stewart
X	Karen Ford		Donna Tiemann
X	David Fowler	X	David Venhuizen
X	Mark Gentle		Michael Waite
X	Karen Hadden	X	Hugh Winkler
X	Rebecca Hudson	X	Ira Yates
X	Charles Johnson		
Present	Alternate	Present	Alternate
X	Jack Goodman	X	Chris Risher
X	Dana Blanton	X	S.H. (Tary) Snyder
X	Carlotta McLean		Randall Thomas
X	Bret Raymis		
Present	Staff/Consultants	Present	Staff/Consultants
X	Terry Tull – Executive Director	X	David Fusilier – NEI
X	Grant Jackson – NEI		

[TABLE BELOW IS FROM 03.09.05 MEETING AGENDA DOCUMENT]

AGENDA - for the March 9, 2005 Stakeholder Committee Meeting:

	Time	Activity
	6:00 pm	Convene Stakeholder Committee Meeting, Opening Remarks, Roll Call – Terry Tull.
1.	6:05 pm	Open Public Comment.
2.	6:10 pm	Discussion and Action to approve Minutes of the March 2, 2005 Stakeholder Committee Meeting – Terry Tull (See attachment 1).
3.	6:15 pm	Review and Discuss the Updated Project Schedule and Milestones – Terry Tull/NEI (See attachment 2).
4.	6:20 pm	Present the 6 th Draft Version of the Regional Water Quality Protection Plan - NEI (posted on the web site).
	6:50 pm	Break
5.	7:00 pm	Identification of, and resolution of, remaining SHC “Showstopper” issues as they relate to the 6th Draft of the Regional Water Quality Protection Plan. SHC members will present their “Showstopper” issues and their developed solution for these issues. If unable to reach consensus on an identified issue in a timely manner, the SHC will vote to resolve the issue (in accordance with the SHC By Laws).
6.	9:00 pm	SHC Vote on the Pre-Final Version of the Regional Water Quality Protection Plan to be presented to the Executive/Core Committee on March 21, 2005.
	9:30 pm	Break
7.	9:45 pm	The Way Ahead. Discussion on the role the SHC will play at the March 21, 2005 EC/CC Meeting; discussion on the future involvement of the SHC with respect to finalizing the Regional Water Quality Protection Plan.
8.	10:00 pm	Adjourn

CALL TO ORDER

Executive Director Terry Tull served as Coordinator. Coordinator Tull called the meeting to order at approximately 6:15 p.m. Mr. Tull performed a roll call of members present, as outlined in the table above.

1. Open Public Comment Period.

Suzanne Pierce, a doctoral graduate student in Geological Sciences at The University of Texas at Austin Jackson School of Geosciences spoke to the SHC. Ms. Pierce had previously addressed the SHC (the February 16, 2005 SHC Meeting) concerning her participation, as part of a research team, in a process to look at ways of creating tools that can enhance a stakeholder decision making process. The project involves design and development of an interactive decision support tool that could possibly aid groundwater management practices. The tool is an integrated, systems model that is based on Texas Water Development Board Groundwater Availability Model (GAM) for hydrologic performance, linking GIS, and stakeholder preferences with a relational database.

She indicated that she had recently attended a conference where she was able to become familiar with several tools and methods that will aid in making this project a success. She encouraged the group to continue their good work, as they are helping to serve as a guide for the development of the integrated, systems model. Any SHC member that would be interested in participating in this project should contact Ms. Pierce through the Executive Director (Terry Tull) via e-mail.

SHC Member Colin Clark showed an animated presentation CAMPO's current proposed toll roads within the planning region. The projects' estimated costs total approximately \$1.6 billion dollars. Mr. Clark stated that a more complete presentation is available on the Save Our Springs Alliance web site (www.sosalliance.org).

SHC Member Robbie Botto addressed the group and requested that the SHC Members carefully consider their "Showstopper" issues and hoped that all the members would help in getting the group to come to a consensus on what is, as currently drafted, a fairly sound plan.

2. Discussion and Approval of Meeting Minutes from the March 2, 2005 Stakeholder Committee Meeting (Meeting Attachment No. 1).

Coordinator Tull stated that the minutes from the March 2, 2005 SHC meeting had not been finalized and had not been posted to the web site, and therefore consideration by the SHC of these minutes would not take place.

3. Review and Discuss the Updated Project Schedule and Milestones (Meeting Attachment No. 2).

Coordinator Tull presented the latest Project Schedule (meeting handout) that showed the tentative dates of some of the remaining tasks including: delivery of The Plan to the EC/CC members (March 14-16); presentation of The Plan to the EC/CC at their meeting on March 21; a workshop for EC/CC members to help familiarized them with The Plan's features and requirements; deadline for submittal of The Plan to the Texas Water Development Board (March 31).

Coordinator Tull also stated that additional important dates to remember that have not been included on the schedule handout presented at this meeting are as following:

- April 30, 2005** - Comments on The Plan expected back from TWDB;
- May 31, 2005** - Final Plan due to TWDB;
- June 30, 2005** - TWDB deadline to accept or reject The Plan.

Coordinator Tull stated that the Executive and Core Committee meeting to present the plan is still set for Monday, March 21, 2005.

SHC members expressed concern with the process of finalizing The Plan, and the possibility of a lack of SHC input into changes proposed to The Plan during the revision process. Grant Jackson/NEI stated that it was his and the Executive Director's intent that the SHC would be engaged in some manner during the revision process.

4. Presentation of the 6th Draft of the Regional Water Quality Protection Plan.

Grant Jackson stated that the 6th Draft of the Regional Water Quality Protection Plan had been posted on the web site as of end of the day on Friday, March 4, 2005. Subsequent to the posting of the 6th Draft, additional changes/updates have been made to the plan and are included in a 17 page handout (handout only includes those pages that have had changes made since March 4th).

5. Identification of, and resolution of, remaining SHC "Showstopper" issues as they relate to the 6th Draft of the Regional Water Quality Protection Plan.

The Executive Director reviewed the ground rules for identifying and voting on (if necessary) the "Showstopper" issues. Grant Jackson/NEI then began a review of a PowerPoint slide presentation that listed the SHC "Showstopper" issues currently identified by the Consulting Team. Each voting member of the SHC was then asked to identify any other showstopper issues that were not currently listed by the Consulting Team. Once this process was complete, a break was taken and the PowerPoint presentation was updated by the Consulting Team to include these additional issues.

The "Showstopper" issues addressed at the meeting were as follows:

1. Comprehensive Site Design

Issue:

- Page 51 still says "For areas to be developed, this strategy will require a thorough, site specific assessment of pre and post development conditions"... I thought we discussed this a long time ago and agreed to modify - I do see in version 6 that there is some discussion about what a "comprehensive site plan" must include and additional information in the implementation section but no clear relationship back to a "thorough site specific assessment of pre and post development conditions..." [DIG]
- What does the above sentence really mean?

Solution:

- Add a sentence that states there is "...no requirement for pre- and post-development monitoring of the site..."

Vote:

- The SHC approved the above solution by consensus (no SHC member voiced their objection to the proposed solution).

2. TDRs

Issue:

- Do not support impervious cover credit for retrofits of existing developments. [TY]
- What does retrofit mean? If you add a BMP to an existing development, how do you calculate the benefit?

Solution:

- Amend the plan to state the following:
 - (1) Retrofits are to be encouraged;
 - (2) If the retrofit involves reducing (removing) impervious cover from an existing subdivision or development, then the developer can receive credit for this impervious cover removal.
 - (3) Local jurisdictions are encouraged to develop a retrofit program through the adaptive management process. The development of the retrofit program should include the determination of the amount of “credit” to assign to various retrofit options.

Vote:

- The SHC approved the above solution by consensus (no SHC member voiced their objection to the proposed solution).

3. Buffer Zones/CEF Setbacks

Issue:

- Page 57-58 stream and CEF setbacks - in the lower 2 areas 32-120 and 120-320 these setbacks are too large (larger than COA today). Setbacks less than 64 acres would be acceptable if they could be included in the yards or development area but have a building setback on the lot and be tied to a pesticide management education program for homeowners. [DIG]
- [Grant Jackson: FYI – current plan (6th Draft) says buffer zones must be owned by a public entity.]

Solution:

- Change stream buffer zones to the following:

<u>Drainage Area</u>	<u>Buffer Zone from Stream CL</u>
16 – 64 ac.	50 ft.
64 – 120 ac.	75 ft.
16 – 64 ac.	100 ft.
- Buffer zone can be on private property, provided they are included in a dedicated easement and are outside building setbacks, and tied to pesticide management education program for homeowners.

Vote:

- The SHC voted to leave The Plan as is (did not want to consider the alternative).

4. Credit for Pollutant Removal in Buffer Zones

Issue:

- Further we continue to assert that the development should be able to recognize credit for these buffer zones since they do provide a water quality benefit and as I have stated before if credit is given for these structures we are only encouraging them to be properly constructed and maintained and not just an area left undisturbed that may not truly end up being a benefit at all. [DIG]

Solution:

- Credit for pollutant removal by stream buffer zones, as a vegetative filter strip, will be allowed with the following conditions:
 1. Sheet flow must be established into the buffer zone;
 2. A vegetative management plan must be developed (and areas inside the buffer zone improved if necessary);
 3. Areas receiving pollutant removal credit must be outside the 100-yr floodplain, and must not have steep slopes;
 4. Allow Consultant Team to set a standard for buffer zones that will receive pollutant removal credit.

Vote:

- A straw poll of the SHC was taken, and the SHC voted to leave The Plan as is (did not want to consider the alternative).

5. Wetlands in Buffer Zones and CEF Setbacks

Issue:

- Also Stream setbacks get widened when wetlands are encountered but wetlands also are considered CEF and have setbacks - this conflicts! All references to wetlands should be removed from the plan. Wetlands are the jurisdiction of the USACE (federal gov't). [DIG]

Solution:

- The following changes to The Plan were proposed:
 1. remove the mention of wetlands from the CEF setbacks section;
 2. include the term "jurisdictional wetland" in the section on stream buffer zones.

Vote:

- The SHC approved the above solution by consensus (no SHC member voiced their objection to the proposed solution).

6. Wastewater Management

Issue:

- Page 75 - wastewater treatment and irrigation criteria needs to be left to TCEQ or we need to have several major discussions of these issues which we have not even talked about to date. [DIG]
- The section titled "Treated Wastewater Discharge Through Land Application" states in part "...a safety factor of 1.50 shall be applied to the measured infiltration rate to determine the design application rate." What is the justification for this safety factor?
- [Grant Jackson – the safety factor was included as part of a set of requirements that, if met, would exclude wastewater irrigation sites from being included as impervious cover in the impervious cover calculations. This requirement was primarily aimed at spray irrigation systems.]

Solution:

- Eliminate the proposed safety factor.

Vote:

- A straw poll of the SHC was taken, and the SHC voted to leave The Plan as is (did not want to consider the alternative).

7. Structural BMPs

Issue:

- No Safety factor should be added to design of the structural BMP controls. [DIG]
- [Grant Jackson – the safety factor was included to account for the variability in BMP data available in the EPA database for structural BMPs. Formula used would be as follows:
Removal Efficiency from EPA Statistics/Safety Factor = Design Standard]

Solution:

- Eliminate the safety factor proposed for the sizing of structural BMPs.

Vote:

- A straw poll of the SHC was taken, and the SHC voted to leave The Plan as is (did not want to consider the alternative).

8. Structural BMPs

Issue:

- Innovation & Performance of Structural BMPs. The Plan does not encourage innovation of new BMP technologies. Also, The Plan does not adequately ensure that all BMPs are functioning properly, and providing the removal rates necessary to meet their design requirements.[JD]

Solution:

- Revise The Plan to better encourage innovation (such as the EPA stipulations for Innovative and Performance Studies).
- Modify language in The Plan's Adaptive Management section to more clearly indicate that BMP performance is important and should be considered.

Vote:

- The SHC approved the above solution by consensus (no SHC member voiced their objection to the proposed solution).

9. Implementation

Issue:

- No Development Agreements. They are too political in nature and should be discouraged. [CC,IY]

Solution:

- Include the following wording, or something with the same meaning, in the existing Development Agreement section of the plan: "Development Agreements are intended as a tool to enforce the

provisions of The Plan, and are not intended to allow circumvention of any provisions of The Plan.”

Vote:

- A straw poll of the SHC was taken, and the SHC voted to approve the above solution (and modify The Plan accordingly).

10. Implementation

Issue:

- Perpetual funding for O&M of BMPs is necessary and should be required. The Plan does not specifically require the developer to pay for the on-going O&M of BMPs. [DV, IY]

Solution:

- Funding for BMP O&M shall be as follows:
 - Inside City Limits:
 - (a) City should be responsible for on-going O&M for residential developments;
 - (b) City can charge a fee for funding O&M for commercial developments.
 - Outside City Limits:
 - (a) The funding source for the O&M of the BMPs to be installed must be detailed in accordance with The Plan requirements.

Vote:

- A straw poll of the SHC was taken, and the SHC voted to approve the above solution (and modify The Plan accordingly).

11. Impervious Cover Table (Table 11 from 6th Draft)

Issue #1:

- Column #4 (Transitional period I.C. Limits) in the Option #1 – I.C. Table (Table 11 from 6th Draft) is not a good idea.

Solution:

- Eliminate this column from the I.C. Table.

Vote:

- The SHC approved the above solution by consensus (no SHC member voiced their objection to the proposed solution).

Issue #2:

- What impervious cover percentages should be included in the I.C. Table to be included in The Plan (Table 11 from 6th Draft).

Solution:

- The following revisions/modifications were suggested:
 1. Allow the Consulting Team to prepare their own table, using their best professional judgment, to establish what they believe to be the proper impervious cover limit numbers.
 2. The Consulting Team should prepare a second version of the I.C. Table showing the range in values for the impervious cover limits suggested by the SHC.

Vote:

- The SHC approved the above solution by consensus (no SHC member voiced their objection to the proposed solution).

12. Additional “Showstopper” Issues Raised During the Meeting

Issue:

- Economic Analysis – assign value to loss of recreation, tourism, quality of life, etc...due to water quality degradation. [KH]
- Cost of implementation – provide more scenarios. [KH]
- Erosive flows. [DV]
- Economic Impact – relating to I.C. table (depends on what we decide about the table). [TS]

Solution:

- The above issues were raised by individual SHC members during the meeting, however, due to lack of time, no significant SHC member discussion on these issues occurred during the meeting. The Consulting Team will attempt to resolve these issues with the individual SHC members without altering the plan in such a way as to raise additional issues with other SHC members.

NEW BUSINESS ITEMS

1. Proposed March 21, 2005 Executive and Core Committee Meeting.

Coordinator Tull stated that the current schedule calls for The Plan to be presented to the Executive and Core Committees at their next meeting scheduled for Monday, March 21, 2005.

ADJOURNMENT

The meeting was adjourned at approximately 11:30 pm.

APPROVAL

These minutes were approved, with no changes, at the Stakeholder Committee meeting on _____.

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer
and Its Contributing Zone

Appendix D
Stakeholder Committee Bylaws

June 20, 2005

BY-LAWS OF REGIONAL WATER QUALITY PROTECTION PLANNING STAKEHOLDERS COMMITTEE

INTRODUCTION

These By-Laws are intended to be used as ground rules and operating procedures to assist the Stakeholder Committee in the process to develop consensus on issues and implementation goals among the various stakeholder interests participating in the development of a Regional Water Quality Protection Plan for the Barton Spring segment of the Edwards Aquifer and its contributing zone.

Rapid growth and development in northern Hays County and southwest Travis County have created concerns with the increasing potential for pollution of groundwater and surface waters. Concerns raised were not only on the impacts to drinking water supplies but to the threatened or endangered species that reside in the area.

In December, 2002, Hays County Judge Jim Powers and City of Austin Council Member Daryl Slusher convened a Regional Summit to begin discussions on the impacts development was having on the region and particularly on water quality in the Barton Creek Watershed. These discussions continued and from this initial effort the Cities of Dripping Springs and Austin, Hays and Travis Counties and the Barton Springs Edwards Aquifer Conservation District and the Hays Trinity Groundwater Conservation District entered into an Interlocal Agreement to address the water quality issues facing the area of the Barton Springs segment of the Edwards Aquifer and its contributing zone and the desire to preserve water quality in this area. It was determined there is a need to develop a regional approach to water quality protection within the Barton Creek watershed in order to protect the quality of drinking water and the endangered species in the area, particularly the Barton Springs salamander. The completion of a regional water quality protection plan would provide the basis for political subdivisions, to the extent allowed by law, to implement local water quality protection plans and ordinances and provide best management practices that could be adopted by local stakeholders for water quality protection.

The planning area is the Barton Springs segment of the Edwards Aquifer and its contributing zone. The area covers northern Hays County, southwest Travis County and a small section of Blanco County. The area includes the cities of Austin, West Lake Hills, Buda, Hays City, Kyle, Mountain City, Rollingwood, Sunset Valley, the Villages of Bee Cave and Bear Creek and the areas within the jurisdiction of the Barton Springs/Edwards Aquifer and Hays Trinity Conservation Districts.

Article I. Organization

Section 1: Name

The official name of this group shall be the Regional Water Quality Planning Project Stakeholder Committee, (hereafter "Stakeholder Committee").

Section 2: Purpose

The purpose of the Stakeholder Committee will be to represent the interests of various stakeholder groups by identifying issues and implementation goals, reaching consensus on best management practices and providing input in the development of a regional water quality protection plan that can be implemented by local governments and be voluntarily adopted by private interests.

Section 3: Principal Administrative Office

The principal administrative office of the Stakeholder Committee will be the office of the Executive Director, Regional Water Quality Planning Project, P.O. Box 384, Dripping Springs, Texas 78620. The office is located at 550 Hwy 290 W. in Dripping Springs.

Article II. Stakeholder Committee

Section 1: Stakeholder Group Membership

Membership within the various stakeholder groups is open to all interested persons willing to make the commitment in time and resources to the process. Stakeholder groups, with the assistance from the Executive Director and the Naismith Engineering Project Team, will facilitate initial stakeholder membership and assist in the selection process for membership on the Stakeholder Committee. The identified stakeholder groups are as follows:

- a. **Property Owners** which represent large and medium size landowners and agricultural interests. These stakeholders own tracts of land large enough to subdivide and develop and have the potential for impacting water quality in the project area. (4 primary members plus 1 alternate)
- b. **Development Interests** which represent persons or groups interested in platting, subdividing and constructing new residential and commercial developments. (3 primary members plus 1 alternate)
- c. **Environmental/Preservation/Good Governance Groups** which represent local groups primarily interested in effective local governance that plans for growth, and in the protection of local resources and conservancy of land for open space and habit protection. (3 primary members plus 1 alternate)
- d. **Neighborhood Interests** which represent existing home owners' associations, property owners' associations and neighborhood associations. (3 primary members plus 1 alternate)

- e. **Public Interest Organizations** which represent organized groups that advocate regional and/or national policies on environmental protection and resource conservation. (3 primary members plus 1 alternate)
- f. **Governmental Entities** which represent affected cities, counties, special purpose districts and other utility providers. (4 primary members plus 1 alternate)
- g. **Economic Interests** which represent existing local business owners, business or economic development associations, chambers of commerce and real estate interests. (3 primary members plus 1 alternate)
- h. **Concerned Citizens** which represent individuals that are interested in water quality protection but do not feel that their interests coincide with other identified groups. (3 primary members plus 1 alternate)

Section 2: Selection of Stakeholder Committee

The Stakeholder Committee shall consist of members selected from each of the stakeholder groups listed in Section 1. Voting members from each stakeholder group will select 4 or 5 members from their group to represent them on the Stakeholder Committee, as indicated above. All but one of these members will be the primary representatives on the Stakeholder Committee and the remaining member will be an alternate. The alternate representative will serve on the Stakeholder Committee in the absence of one of the primary representatives from the Stakeholder Group. In the selection of stakeholder committee members, the voting members of each stakeholder group shall strive to achieve interest and geographic diversity. Stakeholder Committee members must acknowledge that they have been selected to the committee as the representative of all others in their stakeholder group, and not just themselves. To this end, the committee members pledge to communicate with other members of their stakeholder group to ensure that the issues they represent reflect the viewpoints of their stakeholder group or interests as a whole.

Section 3: Executive Director and Consultant Responsibilities

The Executive Director will provide facilitative leadership at the group meetings and work with committee members to ensure that the process runs smoothly. Working with and assisted by the Consultants, the Executive Director's duties include posting agendas, focusing meeting discussions, working to resolve any impasses that may arise among the various groups and committees working within this process, posting meeting summaries, working with committee members to support between-meeting activities, working with the Consulting Team in locating and posting background materials and documents the members need or develop on the project web site.

Section 4: Responsibilities of Stakeholder Committee Members

Representatives to the Stakeholder Committee will be responsible for the following:

- Carefully consider the requirements (in time and effort) before agreeing to serve as a representative on the Stakeholder Committee.
- Review and evaluate materials submitted to you prior to the meetings, to facilitate informed discussion.
- Communicate and meet with members of your stakeholder category to develop input for the Stakeholder Committee meetings.
- Represent the views and interests of your stakeholder category on the Stakeholder Committee.
- Participate in Working Groups outside of the regular Stakeholder Committee meetings.
- Work with the Project Executive Director and the Consultant’s Team to provide input and feedback on issues and work toward consensus among the Stakeholder Committee and working groups.
- Follow the Guidelines for participating in the meetings as set forth in Sections 1 and 2 of Article VII.

Section 5: Participation

Stakeholder Committee members will be expected to participate in all Stakeholder Committee meetings. Records of attendance will be kept by the Project Executive Director and presented as part of the minutes. Only the committee member or the designated alternate may participate in any decision making that occurs during meetings of the Stakeholder Committee. Members that have recorded absences from two consecutive meetings shall be considered to have engaged in excessive absenteeism and may at the will of the other members of their Stakeholder Group be removed as a member of the Stakeholder Committee and replaced with the Alternate Member from the Stakeholder Group.

Section 6: Alternate Member to the Stakeholder Committee

The selected alternate must be a member of the stakeholder group and must have similar expertise and perspective and/or the ability to fully represent the members. A committee member that anticipates being absent will take responsibility for briefing the alternate on the issues under discussion in advance of any meeting to ensure the substitution of an alternate does not slow down the group discussions. The designated alternate shall enjoy the same privileges and shall be bound by the same duties, terms, and conditions as other committee members.

Section 7: Right to Resign

Any committee member may resign from the committee at any time.

Section 8: Successors

Members of the stakeholder group shall select a replacement to the Stakeholder Committee by a means of their choosing. Resigning stakeholder committee members shall be given the opportunity to fully participate in the selection process for their successors and shall serve until their successors are selected.

Section 9: Replacing a Member of the Stakeholder Committee

The following shall constitute grounds for replacing of a member:

- a. engaging in excessive absenteeism as defined under Section 5 of this Article
- b. death
- c. resignation
- d. change in status, as determined by the committee, so that the member no longer represents the interest they were selected to represent
- e. any other serious violation of these bylaws as may be determined by the committee members

Article III. Subcommittees

Section 1: Project Executive Director

The Project Executive Director may establish subcommittees or technical work groups to assist the Stakeholder Committee. A subcommittee may be formed to address specific issues assigned by the Project Executive Director and may have a specified term of membership. Subcommittees may consist both of individuals who are members of the stakeholder groups and individuals who are not.

Section 2: Stakeholder Groups

Each stakeholder group may establish subgroups to assist the associated stakeholder group. Subgroups may consist both of individuals who are members of the stakeholder group and individuals who are not. However, only those subgroup members who are also members of the stakeholder group will participate in decision-making for recommendations to the full committee. The subgroup(s) shall strive to operate by consensus in generating recommendations or advice to the full group. Should consensus not be forthcoming, the subgroup may produce majority and minority reports; outside interests, at the request of the subgroup, may submit or contribute to such reports.

Article IV. Meetings

Section 1: Meetings and Notice

(a) All meetings of the Stakeholder Committee and its subcommittees will be posted and open to the public. Stakeholder Groups and/or sub-groups are encouraged to notify the

Executive Director of their meetings and open those meetings to the public. The time and place of meetings shall be set to facilitate, to the greatest extent possible, the participation of all members.

(b) All interested parties and the general public are allowed to attend scheduled meetings of the stakeholder committee, subcommittees, Stakeholder Groups, and/or sub-groups. The members of the general public will be allowed to address the Stakeholder Committee during the public comment period identified in the Meeting Agenda. Every effort will be made to provide copies of all materials presented or discussed and made available for public inspection on the project web site following any meeting of the Stakeholder Committee, subcommittee, Stakeholder Groups, and subgroups meetings.

Section 2: Agendas

(a) Stakeholder Committee. The Project Executive Director will be responsible for preparing the agenda for each Stakeholder Committee meeting and will post the agenda on the project website. The draft agenda shall be sent to all eight stakeholder groups (e.g., distributed by email and/or posted on the project website) approximately 10 days in advance of the meeting, with an invitation to provide review and comment. If feedback on the agenda is received from Stakeholder Committee members, the Executive Director shall confer with the Naismith Engineering Project Team on how best to incorporate this feedback.

(b) All stakeholder groups or their subcommittee's should prepare an agenda for their meetings and supply it to the Executive Director.

Article V. Meeting Summaries

Section 1: Meeting Minutes for the Stakeholder Committee and Stakeholder Groups

(a) Stakeholder Committee Meeting Minutes shall be kept by the Executive Director, assisted by the Consultant Team, and posted on the web site for the project. The Stakeholder Committee will review the minutes at its next meeting and will approve the minutes as presented or amended.

(b) Each Stakeholder Group shall determine the method of keeping minutes of their meetings and provide those minutes to the Executive Director so that they can be posted on the web site.

Section 2: Electronic Communication

Electronic communication mechanisms will be utilized to the greatest extent possible for the sharing of information outside of committee and sub-committee meetings, including distribution of meeting agendas and summaries. For any committee member who is unable to participate in electronic communication, others means of communication will be utilized

(fax and hard copy mail). The purpose of electronic communications is to reduce paperwork, delay and expense of mailing or faxing.

Article VI. Decision Making

Section 1: Proxies

Written proxies shall not be allowed in any decision-making by the Stakeholder Committee, its subcommittees, Stakeholder Groups or its subgroups. However, the designated alternate shall be allowed to participate in decision making as set forth in these bylaws in the absence of the Stakeholder Committee member. Because it is important in achieving consensus for all members to participate actively, keep up-to-date on the progress of the group, and develop a common base of information, members shall in good faith attempt to minimize the number of times they are absent from meetings or are represented by the designated alternates.

Section 2: Decision-Making Process

(a) Use of Consensus Based Decision Making. The Stakeholder Committee shall attempt to make decisions using a consensus decision-making process. Consensus is an agreement built by identifying and exploring all members' interests and by assembling a package agreement which satisfies these interests to the greatest extent possible. A consensus is reached when all members agree that their major interests have been taken into consideration and addressed in a satisfactory manner so that they can support the decision of the group. The process of building consensus involves the development of alternatives and the assessment of the impacts of those alternatives.

Consensus does not necessarily mean unanimity. Some members may strongly endorse a particular solution while others may accept it as a workable agreement. A member can participate in the consensus without embracing each element of the agreement with the same fervor as other members, or necessarily having each of his or her interests satisfied to the fullest extent. In a consensus agreement, the members recognize that, given the combination of gains and trade-offs in the decision package and given the current circumstances and alternative options, the resulting agreement is the best one the voting members can make at this time.

(b) Failure to Reach Consensus. If, after good faith negotiations, it appears likely to the Project Executive Director that the voting members will be unable to reach consensus, the Project Executive Director shall entertain a motion to put the issue to a vote to be conclusively decided by agreement of not less than three-fourths of the voting members present.

Article VII. Meetings

Section 1: Guidelines

To the greatest extent possible, committees shall take ownership over decisions about the mechanics of their committee operations. The committee shall work out such details in a way that meets the needs of its members and reflects timing considerations associated with the issues they want to work on. To help maintain an effective and productive meeting, committee members agree to comply with the following:

- Focus on the purpose and objectives of the meeting.
- Be courteous and considerate of others.
- Provide honest, straightforward input.
- Be willing to rationally discuss all points of view, even those with which you personally disagree.
- Be positive.
- Resist the urge to monopolize the discussion. Express your ideas, then allow others to do the same.
- Listen to the other participants and digest their input.
- Give the process an opportunity to work.
- Personal attacks and prejudiced statements will not be tolerated

Section 2: Meeting Procedure

Meeting procedures should be adopted by stakeholder groups and committee members to help maintain an effective and productive meeting. Members agree to comply with the following:

- The agenda for each meeting will be coordinated with committee members in advance.
- Follow the agenda and stay on topic.
- Participants shall speak one at a time and not interrupt others who are speaking.
- Participants agree to show respect for all other participants, their positions, and concerns.
- Participants agree to ask questions for clarification or for more information, not to challenge or intimidate the other participants.
- All pagers or phones with audible beeps or rings should be turned off during meetings.
- In order to maximize the productive time available, participants should avoid repeating points that have been adequately made by others, except to briefly indicate concurrence.

Article VIII. ADOPTING AND AMENDING THE BYLAWS

These bylaws shall have full force and effect upon approval and adoption by the voting members of the Stakeholder Committee, acting on behalf of the interests they represent. The voting members shall adopt these bylaws and any amendments thereto by consensus, but not less than agreement of three-fourths of the voting membership present.

Appendix E

Stakeholder Committee Ballots and Statements, Annotated

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

I recognize that the Plan being submitted by the Consultant reflects a compromise among the various interests of the Stakeholders, and that it is not possible to satisfy all of the needs of every stakeholder interest group.

Accordingly, in connection with the 6th Draft of the Plan, which was posted to the Project web site on March 4th, and which was amended during the Stakeholder Committee meeting of March 9th, I (mark one option):

support the Plan in its current form and recommend its full adoption.

do not support the Plan in its current form but would give it my support if the specific changes enumerated on the attached document were incorporated.

do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.

Robert B Botto
(signature)

3/9/05
(date)

Robert B Botto
(printed name)

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Karen Ford
(signature)

3-21-05
(date)

KAREN FORD
(printed name)

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(signature)

3/21/2005
(date)

HUGH V WINKLER
(printed name)

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James L Phillips
(signature)

4/7/05
(date)

JAMES L PHILLIPS
(printed name)

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(signature)

3/9/05
(date)

JT STEWART
(printed name)

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David Venhuizen
(signature)

3/10/05
(date)

DAVID VENHUIZEN
(printed name)

CHANGES TO REGIONAL PLAN NEEDED TO OBTAIN MY SUPPORT

1. The table of impervious cover limits must be modified as set forth below:

Location of Project	Limited Review ¹	Standard Review ²	Std. Review + TDR ^{2,3,4}
Recharge Zone	3	10% ⁴	15%
Contributing Zone— outside PGA	5	Up to 15% allowed TDR to net at 10% ⁴	20%
Contributing Zone—inside PGA, s.f. res. ⁵	5 ⁶	Up to 15% allowed TDR to net at 10% ⁴	25%
Contributing Zone—inside PGA, m.f. & comm. ⁵	N/A	Up to 25%	50% TDR to net at 25%

RATIONALE: The development “right” running with ALL land is 10% impervious cover. This derives from an evaluation of the science on water quality providing a “consensus” conclusion that irreversible damage begins to accrue at an overall watershed-wide impervious cover of about 10%. Therefore, it should be a primary goal of this Plan to take measures that would cap watershed-wide impervious cover at about 10%. To do so would require that most development “net out” at 10% impervious cover. As a matter of EQUITY among all landowners, this would require that a Transfer of Development Rights (TDR) from other properties be acquired so that each project “nets out” at 10% or below. Therefore, most development proposing impervious cover of greater than 10% must acquire TDR’s to bring the overall impervious cover to 10% or less. Any development executed at less than 10% impervious cover may transfer the unused development right as a TDR to mitigate development with more than 10% impervious cover, so that “full value” may be obtained on that land as well. These arrangements provide the additional advantage of sending a “fiscal signal” that lower intensity development is to be preferred, and since minimizing the intensity of development is THE most effective water quality protection measure, this should be an inherent aspect of the Plan.

EXCEPTION: To accommodate commercial and higher density residential development within incorporated areas, where zoning authority to “direct” (and limit?) such development exists, a higher impervious cover without requiring TDR’s is allowed so that such development can be accommodated by consent of the governing municipality without incurring the fiscal penalty of mitigating to the watershed-wide average impervious cover. It is to be expected that the overall impact of this on watershed-wide impervious cover level would not be “severe” and could be offset by acquisitions of protected open space.

NOTE ON TDR’S: A TDR used to increase the impervious cover of a project within the Recharge Zone must be derived from properties within the Recharge Zone. A TDR used to increase the impervious cover of a project within the Contributing Zone outside of a PGA must be derived from properties outside of a PGA.

Footnotes:

(1) Development in this category requires that impervious cover be scattered and disconnected. In essence, this IS the “BMP” that assures compliance with water quality protection goals. Specifically it is stipulated that, other than roadways and driveways (which may be of any length required to provide access, thus not limited in total contiguous area), there be no contiguous blocks of impervious cover over 20,000 sq. ft., that any flows channelized by the development plan be sheeted out through created or natural vegetative buffer strips prior to flowing off the project site,

that roadways not have curbs and gutters, that there be no hard-lined drainage conveyance structures (other than culverts under roads required to accommodate drainage patterns), and that within a circle with a radius of 500 feet placed anywhere on the site the impervious cover created by the project must be <10%. Review of such a development would be limited to ensuring that these provisions are met; there would be no requirement for explicitly showing that the “no net increase” standard has been met. Note that buffer zones along waterways and around CEF’s specified in this Plan must be provided as relevant on all projects in this category.

(2) Development in this category requires that explicit demonstration of “no net increase” be provided, using whatever development strategies and array of approved BMP’s the developer chooses, with the additional provision that all flows channelized by the development plan be sheeted out through created or natural vegetative buffer strips (which may be streamside buffers) prior to flowing off the project site. This provision is an intentional “redundancy” in recognition of the uncertainties in calculating pre- and post-development pollutant loads and the uncertainties in removal capabilities of BMP’s. It is a necessary component of controlling vulnerability of the overall water quality management process.

(3) These limits establish the maximum impervious cover allowed to be obtained by a transfer of development rights to bring the overall average impervious cover on all land addressed by the project (active project property plus mitigation property) to 10% or less (25% or less on properties inside a PGA zoned to accept multi-family and/or commercial development). Note that these intensities are not “automatically” granted by acquiring TDR’s. The developer must still demonstrate “no net increase” using appropriate strategies.

(4) The difference between impervious cover limits in the Recharge Zone and the Contributing Zone is a recognition of greater vulnerability in the Recharge Zone, urging lower levels of vulnerability there. The allowance for increased intensity within the Recharge Zone with TDR’s provides for flexibility while still retaining an overall impervious cover of 10% or less in the Recharge Zone—understanding that projects with impervious cover up to 15% must still meet the “no net increase” standard and provide the vulnerability controls built into the general standards. A larger increase is allowed inside a PGA on the basis of explicit municipal zoning and control of the area in question. Note that the “limits” for “Standard Review” in the Contributing Zone outside a PGA and for single-family residential development inside a PGA are meaningless if the equity standard suggested here is adopted, since they can be increased to the levels in the last column by acquiring additional TDR’s. They are listed as the maximum that would be acceptable without TDR if the equity standard suggested here is rejected and alternatively the “buy down” point for Contributing Zone is set at 15% as in the Consultant’s impervious cover table.

(5) Placement in these categories is dependent upon the local municipality applying the appropriate zoning to the project land. Note that it requires that a PGA be entirely within municipal limits, as that is the area where zoning may be applied.

(6) This is an unlikely development scenario, as development within a PGA would generally be more intense, but it is offered as an option, since there is no reason to deny this category to development within a PGA.

2. Vulnerability MUST be explicitly addressed in planning and design of projects.

The Consultant is to be commended for recognizing this issue to some extent, but this is an issue that is **ABSOLUTELY** critical to actually maintaining water quality on the ground over the long term. It must be made clear that, in the comprehensive site plan review process, the developer must demonstrate that the project is being addressed with the lowest vulnerability water quality management strategy practically implementable, given the allowable intensity of development. The developer must not be allowed to “knee-jerk” to “cookie-cutter” designs when less vulnerable strategies are readily implementable on the project.

Another aspect of vulnerability is the evaluation of certain BMP's. The consultant has proposed a method of assigning BMP “capability” which has not been made clear and which it appears none of us understands. This needs to be made transparent so that those who implement this plan “properly”—and uniformly—represent the ability of any given BMP to improve water quality.

Of particular concern is the retention/irrigation BMP. There seems to be a “rush” to adopt and approve this BMP despite there apparently having been no actual evaluation of its actual effectiveness under any given set of design standards. I have reviewed the problems I see with this method in detail in other communications, so will not repeat all that here. Suffice it to say that, as with the general evaluation of BMP's, the standards for the retention/irrigation BMP must be made transparent.

Also, the expectation that projects must be managed during the construction phase to minimize vulnerability during that process must also be made absolutely clear. Perhaps this is made explicit in the processes referred to in the Plan document in regard to this aspect and I am simply not aware of their scope. If so, I apologize for that ignorance. However, it would still be beneficial to explicitly state this as a primary factor in planning and execution of the construction phase controls. In particular, it should be made clear that there is to be **NO** disturbance on the building lots—except as required to stub utilities into them, or to execute aspects of the overall water quality management plan—until construction on that lot is imminent.

Vulnerability control needs to be extended past the overall site development process to the “secondary” construction of buildings on the lots created by the “primary” development process. There needs to be explicit control of the actual intensity of development. Currently, common practice is to presume a given amount of impervious cover would be installed based upon lot size, but there is no follow-up to assure that these limits are adhered to. This must be an explicit duty of the developer, or other appropriate party. Further, whatever presumptions about activities on the lots are made to justify that water quality would be protected must be verifiable and enforceable. For example, the LCRA contract with the Rocky Creek Ranch project contained a whole appendix of actions that were expected to occur on the lots, but **NO** provision for actually checking to see if these stipulations were being followed, or for enforcing them. This renders such actions essentially meaningless as an “agent” of public policy. While they **MAY** deliver water quality benefits if adhered to, without a process to **ASSURE** this, no such expectations should be allowed as any part of the process of showing compliance with the water quality goals of this Plan. Alternatively, if these actions are considered to be integral and necessary for actual protection of water quality long-term, then there should be compulsory language about their use and for actual verification and enforcement in the Plan.

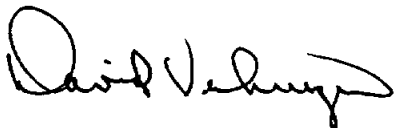
I understand that to some extent all of this gets into "micromanaging" details of the development process, which some may see as beyond the reach of this overall Plan, but in reality the devil will always be in these sorts of details. At the very least, the Plan should address the issues in a manner that makes it clear that, if you expect to actually maintain water quality on the ground over the long term, you **MUST** properly address these matters.

3. The discussion of economic impacts must either be eliminated or expanded.

This is a very one-sided discussion of FISCAL impacts incurred by developers, with the unstated antecedent that protecting water quality is an entirely "new" cost that has been generated by the proposed rules. This ignores the obvious fact that water quality degradation imposes costs, which would be avoided by application of the proposed rules; that is, these are costs which would be externalized—not eliminated—absent the proposed rules. Further, this analysis focuses exclusively on the supposed increases in costs of development products that would be imposed by the reductions in intensity that would be imposed by the proposed rules, and it ignores the avoided costs provided by a lower intensity of development. These costs potentially include school building and school transportation costs, road building and road maintenance, police and fire protection, and solid waste services. Typically ALL these costs which development incurs are externalized to the community at large, in essence being a "grant" to the actuators of development, in theory given in exchange for the increase in tax base provided by the products of development. There is considerable evidence that these costs typically exceed the tax revenues by a considerable amount, at least for some classes of development. Therefore, focusing on one side of the "equation" while totally ignoring the other provides a very one-sided view of the actual economic impact. What is presented only provides "fuel" for those who would attack this Plan as fiscally "damaging" to the community, when the facts may indicate quite the opposite. Thus, if the full analysis is not included, then this one-sided picture of the impacts of the proposed rules must be eliminated from the Plan document. Leave it to those who would use that information to attack the Plan to generate this information on their own, so that it is clear that it comes from people with an ax to grind, rather than giving it the imprimatur of "officialdom" by including it in the Plan document.

Finally, I am disappointed that the Plan document does not set forth the principle that "waste" water is not a problem to gotten rid of, rather a resource to be husbanded and utilized to most beneficial effect. This is a water quality issue in a direct sense, as beneficially reused water would be more carefully managed, minimizing water quality vulnerability, and in an indirect sense, since it would "extend" water supplies in this region—and there is no more critical water quality problem than not having a supply of it. I realize, however, that this is rather peripheral to the major intent of this Plan document, so I simply note its absence.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "David Venhuizen". The signature is fluid and cursive, with a large initial "D" and "V".

David Venhuizen, P.E.

**Stakeholder Committee Member Statement Regarding
6th Draft of the Water Quality Protection Plan
Posted to the Website on March 4, 2005**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

I recognize that the Plan being submitted by the Consultant reflects a compromise among the various interests of the Stakeholders, and that it is not possible to satisfy all of the needs of every stakeholder interest group.

Accordingly, in connection with the 6th Draft of the Plan, which was posted to the Project web site on March 4th, I (mark one option):

support the Plan as a whole and recommend its full adoption.

support the Plan as presented but believe it would be improved if the specific changes enumerated on the attached document were incorporated.

do not support the Plan as presented but would give it my support if the specific changes enumerated on the attached document were incorporated.

do not support the Plan as presented and believe that it cannot be made satisfactory in its present form.

Henry H. Brooks, Jr.
(signature)

3/21/05
(date)

(printed name)

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(signature)

3/9/05
(date)

Gene Lowenthal
(printed name)

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(signature)

4/7/05
(date)

IRA JON YATES
(printed name)

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(signature)

4-7-05

(date)

JOE C. DAY

(printed name)

STAKEHOLDER BALLOT STATEMENT
FROM
JOE C. DAY

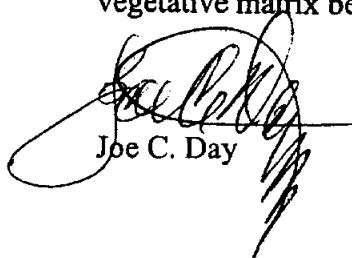
The Regional Water Quality Plan as presented in final draft form is a leading edge plan to protect water quality, quality of life, and economic prosperity. I agree with almost all the composition of the plan except:

- The impervious cover table in regards to having limits above 8% for the simplified column.
- In the standard review column, the maximum impervious cover limits should be 10% in the Recharge Zone, 15% in the contributing zone outside preferred growth area, 20% for single family in Contributing zone, and 25% commercial/multi family inside preferred growth area.
- In the Standard review and Transfer of Development column, I/C limits should not exceed 15% in the Recharge Zone, 20% CZ outside preferred growth area, 25% CZ single family, and 30% CZ commercial and multifamily inside preferred growth areas.

The rationale for these numbers is based on available science and the extremely low confidence for BMPs and their inherent lack of performance. This performance deficiency is exacerbated particularly when asked to perform at a level of no net increase in erosive flows and pollution, especially dissolved constituents. These systems are still designed with hypothetical pollutant loads for influent and estimated pollutant treatment effectiveness and when actually performance tested, do not come close to design tolerance significance.

Until BMP's can be put on a quality assurance/quality control plan that shows that their performance is actually working as designed, they will always be highly suspect. This plan should contain provisions for innovative and existing BMPs to meet performance testing standards.

Until we can prove BMP effectiveness, the ecosystem will have to remediate anthropogenic effects. So it is of paramount importance that soil structure and vegetative matrix be configured on a site specific basis to remediate these effects.


Joe C. Day

Federal Toxic Substance Control Program

- ▶ Administered by the U.S. EPA [40 CFR §700-766]
- ▶ Regulates the creation, use, transportation, storage, processing and disposal of toxic substances
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through combination of permit program and "self implementation"
- ▶ Includes requirements for public notice & public involvement

Regional Water Quality Planning Project

September 2, 2004

FEDERAL ENDANGERED SPECIES PROGRAMS – Part 1

- ▶ Administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) [50 CFR §1-697]
- ▶ Listing Program (ESA §4)
 - Includes procedures to evaluate and list "threatened" and "endangered" species
 - Species Recovery Plans

Regional Water Quality Planning Project

September 2, 2004

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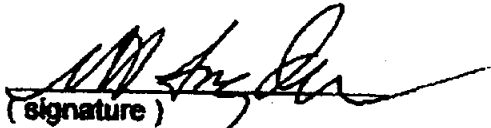
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(signature)


(date)

S. H. Snyder
(printed name)

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see
attached

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Rebecca M. Hudson

(signature)

Rebecca Hudson

(printed name)

4/1/05

(date)

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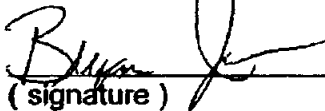
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do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.

See Attached

(signature)

4/1/05
(date)

BRYAN JORDAN
(printed name)

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

I recognize that the Plan being submitted by the Consultant reflects a compromise among the various interests of the Stakeholders, and that it is not possible to satisfy all of the needs of every stakeholder interest group.

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(signature)

4/1/05
(date)

Hank B. Smith
(printed name)

* SEE ATTACHED

Here is a summary of the Development Interest Groups concerns based on a review of Draft #5 and a quick look at Draft #6 as it relates

Show Stoppers

Page 51 it still says "For areas to be developed, this strategy will require a thorough, site specific assessment of pre and post development conditions"... I thought we discussed this a long time ago and agreed to modify - I do see in version 6 that there is some discussion about what a "comprehensive site plan" must include and additional information in the implementation section but no clear relationship back to a "thorough site specific assessment of pre and post development conditions..."

Page 57-58 stream and CEF setbacks - in the lower 2 areas 32-120 and 120-320 these setbacks are too large (larger than COA today) I have suggested and we need to continue to restate that setbacks less than 64 acres would be acceptable to us if they could be included in the yards or development area but have a building setback on the lot and be tied to a pesticide management education program for homeowners. Management of these areas particularly on smaller basin will be difficult and I believe we can solve that problem and maintain the setback by putting it in backyards for smaller basins.

Further we continue to assert that the development should recognize credit for these buffer zones since they do provide a water quality benefit and as I have stated before if credit is given for these structures we are only encouraging them to be properly constructed and maintained and not just an area left undisturbed that may not truly end up being a benefit at all.

Also Stream setbacks get widened when wetlands are encountered but wetlands also are considered CEF and have setbacks - this conflicts! All references to wetlands should be removed from the plan. Wetlands are the jurisdiction of the USACE (federal gov't). This item was partially addressed in the final version of the plan

We do not agree with a basin-wide IC cap of 10% (or 15% for that matter) in ADDITION to a no net increase standard. But if IC is chosen to be included in the plan we offer the following:

Impervious Cover - See Below - TDR are acquired to get back to the BMPs & no TDRs Column

Location	No BMP's No TDR's	BMP's & no TDR's	BMP's & TDR's
Recharge Zone	7.5	15	25
Contributing Zone, outside "preferred growth areas" (PGA's)6	10	20 - 25	30
Contributing Zone, Residential inside PGA's	20	25 - 30	30
Contributing Zone, Commercial inside PGA's	20	30 - 40	60

Page 75 - wastewater treatment and irrigation criteria needs to be left to TCEQ or we need to have several major discussions of these issues which we have not even talked about to date

PGA's should include transit corridors or all reference to PGA land use and locations should be removed from the Plan

No Safety factor added to design of controls

Other Issues that need to be clarified or discussed

Page 3 it says we all "affirmed the categories initially identified by the consulting teams" in reference to the groups we now have . I remember discussion but do not remember affirming

Page 6 - when did we talk about adding Blanco County!!! and it seems we are "recognizing the description of the recharge zone as modified by changes **recommended** to the TCEQ - we need to stick with actual changes not what some group recommends.

Page 22 Contributing zone references only Hays and Travis County several times is Blanco in or out?

Page 56 "In general, the personnel performing the review should possess qualifications equivalent to those required for those preparing the demonstration that development complies" This needs further discussion as to possible implication

Page 69 - "In addition to the need to have qualified personnel design these systems, it is also important that the personnel reviewing these designs on behalf of the public have similar qualifications" These last 2 points need to be clearly made to any entity assuming this responsibility

Page 74 - Local jurisdiction should implement a plan to conduct full television monitoring of all centralized wastewater collection systems on a three - currently restriction is 5 years and seems to be working - there is not a problem with new systems leaking - besides when a wastewater system leaks it infiltrates not exfiltrates i.e. groundwater enters the wastewater system and wastewater does not leak out into the groundwater based on fundamental pressures unless someone has invented a way to make water flow uphill? Further there are better and more cost effective ways to monitor

[Page 79 - we cannot mandate water rates or rate structures or Xeriscaping or irrigation techniques in this plan - it has nothing to do with water quality!

Page 81 - We should not even have a section marked land use restrictions or zoning use limitations

Page 103 - Requesting Delegation from TCEQ for local enforcement - I do not know if this can even be delegated only TCEQ has enforcement authority and it cannot be delegated

General Issues

Construction Controls have not even been discussed in any reasonable fashion but have potential for far worse problems than permanent controls

Roadways should be exempt and condemnation should not be a problem for TDR's (condemnation should be allowed for TDR's)

Fiscal impact analysis should be done for whatever legal jurisdiction assumes this program

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.


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Accordingly, in connection with the 6th Draft of the Plan, which was posted to the Project web site on March 4th, and which was amended during the Stakeholder Committee meeting of March 9th, I (mark one option):

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do not support the Plan in its current form but would give it my support if the specific changes enumerated on the attached document were incorporated.

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(signature)

3-21-05
(date)

Colin Clark
(printed name)

Regional Water Quality Planning Office

From: colin clark [colin@sosalliance.org]
Sent: Tuesday, April 12, 2005 7:19 PM
To: regionalplan@zeecon.com
Subject: comments



Discrepancies
between the Edwa...

Terry,

Please find attached a document outlining differences between the Edwards Aquifer Protection Plan and the Regional Water Quality Plan.

It's not looking like I will make it to the meeting, and I don't know if anyone else from SOS will be able to attend as we're pretty swamped with the Legislature, fundraising, etc.

Thanks,
Colin

Discrepancies between the Edwards Aquifer Protection Plan and the Regional Water Quality Plan

Impervious Cover:

EAPP - 10% **net site area** in recharge zone and 15% **net site area** in contributing zone
Net site area should be defined as as land with slopes less than 15% outside or stream of CEF setbacks, golf courses, managed turf, and effluent-irrigated land.

RWQP - 10% **gross site area** in recharge zone and 15% **gross site area** in contributing zone, plus increases up to 25, 30, 45 or NO LIMIT with Transfer of Development Rights.

Buffer Zones:

EAPP - 5-100 acre drainage area - 100 foot setback (each side of centerline)
100-500 acre drainage area - 200 foot setback
<500 acre drainage area - 400 foot setback
setback shall never be less than the 100-year flood plain

RWQP - 32-120 acre drainage area - 100 foot setback (each side of centerline)
120 -300 acre drainage area - 150 foot setback
300 -640 acre drainage area - 200 foot setback
<640 acre drainage area - 300 foot setback
buffer zone shall be expanded to 100-year flood plain plus 25 feet beyond edge of floodplain

Critical Environmental Feature Protections

EAPP - Direct transmission to aquifer - 300 foot upstream and downstream offset
Indirect transmission to aquifer - 150 feet upstream side and 50 feet downstream

RWQP - Direct transmission to aquifer - Upper catchment divide or 300 feet, not less than 150 feet on upstream side and 150 feet on downstream side
Indirect transmission to aquifer - 150 feet on upstream side and 150 feet on downstream side

Erosive Flows Control

EAPP - Detain one-year, three-hour rain event for at least 24 hours

RWQP - Detain and evenly distribute a two-year, three-hour rain event over 24 hours

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do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.

Karen Hadden

(signature)

5/11/04
(date)

____Karen Hadden_____

(printed name)

A huge amount of work went into this plan, and a lot of ground has been gained. Properly implemented, TDRs should have the effect of motivating growth towards preferred growth areas and away from the most sensitive areas, which actually is a big plus for water quality.

I have concerns that the TDR's might not be "properly implemented" and that the impervious cover limits are not adequate to protect water quality in the region. It would be a loss beyond comprehension to destroy the Texas Hill Country. The work in this plan is a good start, but should be strengthened to be more protective. The comments and plan submitted by Save Our Springs Alliance would go further towards protecting our aquifer, watershed and precious land.

**Stakeholder Committee Member Ballot Regarding
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Donna Tiemann
(signature)

March 27, 2005
(date)

Donna Tiemann
(printed name)

As per my emailed response: I am supportive of this plan & effort to protect one of our regions resources, our underground water supply. I do have concerns that relate to some of the higher impervious cover settings and would encourage extreme care in implementing or reduction of some of these. But feel that overall the plan is sound in it's intent to protect one of our water supplies.

Regional Water Quality Planning Office

From: Donna Tiemann [donna@austinaction.org]
Sent: Sunday, March 27, 2005 2:57 PM
To: Regional Water Quality Planning Office
Subject: Re: Stakeholder Committee Ballots

Hi all,

Sorry it has taken me so long to respond. Wanted to get back with you on this....

I will register my support for the Plan in its current form and recommend its full adoption. I continue to have some concerns about some of the higher impervious cover levels but feel if the Plan can be implemented in its entirety we have a better chance at minimizing the degradation to the aquifer than with no Plan at all.

I also want to share my respect and admiration for all my fellow stakeholders in giving their time, energy, and expertise toward this effort. This also factors into my decision to support the work. However, the unsung heroes are you all with Naismith and Terry for keeping this all together and on track and producing a document that most of us feel represents our group's consensus on a way to protect the Barton Springs segment of the Edwards Aquifer.

Many thanks and blessings to us all for this effort.

Donna Tiemann
Austin Regional Sierra Club

3/29/2005

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(signature)

3/9/05
(date)

Jon Beall
(printed name)

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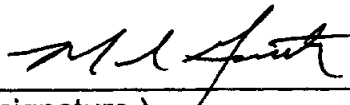
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(signature)

3-9-05
(date)

Mark Gentle
(printed name)

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Charles O'Dell
(signature)

3/21/05
(date)

Charles O'Dell
(printed name)

Regional Water Quality Planning Office

From: rodney [rodney@wheatassoc.demon.co.uk]
Sent: Friday, April 29, 2005 12:04 PM
To: regionalplan@zeecon.com; albro33@aol.com; aback@austin.rr.com; arkose83@yahoo.com
Subject: Stakeholder position of A. Backus

Terry,

If you need my vote prior to May 4, 2005 I would like to provide in this e-mail.

As a representative of the governmental stakeholders' committee representing the Hays Trinity Groundwater Conservation District I vote for the middle box. I do not feel I can fully support the version of the plan we were to vote on. I totally support the stakeholder process, concept and topics of consideration of the plan but do not feel I have seen adequate analysis of the difference in the recharge characteristics of the Trinity and Edwards to justify the greater density proposed for the contributing zone versus the recharge zone. I feel this detail of the plan did not receive adequate analysis due to time and money constraints. As a member of the Hays Trinity Groundwater Conservation District, with a duty to protect and preserve the resource, I do not feel I can support greater density over our recharge area without further peer reviewed analysis. As your work documented, residential development as it is currently carried out, does cause non-point source pollution which eventually recharges the aquifer. There was not any analysis to actually arrive at how much greater density may be justified over the Trinity Recharge (Edwards Contributing Zone) versus the Edwards Recharge, a greater density was proposed based on assumed general differences in the recharge characteristics. All karst aquifers need to be carefully assessed as to where and how much density is appropriate. The Trinity is less karstified than the Edwards but it is still a fractured rock aquifer with some karst that can be rapidly contaminated from the surface.

I appreciate all your work on this plan and look forward to working with you in the future to sustain the evolution of this plan going forward. This is simply an aspect of the plan that needs more work in my opinion.

Sincerely,

Andrew Backus
Board Vice President
Hays Trinity Groundwater Conservation District

Send any response to:
aback@austin.rr.com

I will be back in Austin at my desk on May 4, 2004.

5/2/2005

Cel 512-663-2093
512-858-2148
Regionalplan@zeecon.com
Fax 512-858-5646

Tom Brown & Grant Jackson
tbrown@naismith-engineering.com
fax 512-708-9014

4.3.2. Edwards Aquifer Contributing Zone/Trinity Aquifer Recharge Zone

The Contributing Zone for the Edwards Aquifer in Hays and Travis Counties lies on the outcrop of the Lower Cretaceous Age Glen Rose Formation. These formations also serve as the recharge zone for the Trinity-Glen Rose aquifer. Within the Planning Region, the Glen Rose Formation is subdivided into the upper member and the lower member. The surface of the Contributing Zone is the exposed expression of the upper member of the Glen Rose Formation. As a result of the Balcones Fault System, rocks of the younger Edwards Group are in lateral contact with the Glen Rose Formation in southern Hays and Travis Counties.

The upper member of the Glen Rose (upper Glen Rose) is characterized by light to dark gray, resistant beds of limestone and dolomite alternating with softer clayey or marl layers. The alternating soft and hard layers create the stair-step topography common in the Central Texas region. The lower member of the Glen Rose Formation (lower Glen Rose) is generally more massive and fossiliferous than the upper Glen Rose. It is composed of pale brown to buff, massive, fossiliferous limestone with some interbedded marl layers. The lower Glen Rose tends to be more fractured and has dissolution features containing secondary calcite along fracture or dissolution planes. The lower Glen Rose unconformably overlies the Lower Cretaceous age Hensel Sand and Cow Creek Limestone members of the Travis Peak Formation in the subsurface. At some locations, the base of the Cow Creek grades into the Hammett Shale member of the Travis Peak Formation. The Hammett Shale overlies the Sligo Limestone of the Travis Peak Formation (Sligo). The Sligo is usually light gray in color and is composed of argillaceous limestone interbedded with shale. The Sligo overlies the Hosston Sand member of the Travis Peak Formation (Hosston).

The Trinity aquifer is actually a series of three (3) differentiated aquifers: the Upper Trinity, the Middle Trinity, and the Lower Trinity. The Upper Glen Rose Formation comprises the Upper Trinity aquifer. The Lower Glen Rose formation and the upper Travis Peak formations (the Hensell Sand and the Cow Creek Limestone) comprise the Middle Trinity aquifer. The Hammett Shale serves a confining layer between the Middle Trinity aquifer and the Lower Trinity aquifer. The lower Travis Peak formations (the Sligo limestone and the Hosston Sand), comprise the lower Trinity Aquifer. Various studies have established some hydrologic communication between the Upper Trinity and the Middle Trinity, and between the Middle Trinity and the Lower Trinity. The Trinity Aquifer group is an important groundwater supply, which extends from Uvalde County in South Texas to Montague County along the Red River in North Texas.^{16, 17, 18, 19}

Page 22 Footnotes

¹⁶ "Groundwater Availability of the Lower Cretaceous Formations in the Hill Country of South-Central Texas", J.B.

Ashworth, Texas Department of Water Resources, Report 273, 1983. ¹⁷ "Geologic Atlas Map of Texas, Austin Sheet", Bureau of Economic Geology, University of Texas, 1974.

18 "Geologic Atlas Map of Texas, Llano Sheet", Bureau of Economic Geology, University of Texas, 1981.

19 "Evaluation of Groundwater Resources of the Paleozoic and Cretaceous Aquifers in the Hill country of Central Texas", R.L. Bluntzer, Texas Water Development Board, Report 339, 1992.

end page 22

The primary sources of direct recharge to the Trinity aquifer in the study area are from rainfall on the outcrop, and seepage losses through headwater creeks into the Upper Member of the Glen Rose Limestone (Mace et al, 2000, page 33). The Cow Creek Limestone and Lower Trinity aquifer sediments are recharged by vertical leakage from overlying strata (Ashworth, 1983). Interbeds of relatively low permeability marl sediments within the Upper Member of the Glen Rose Limestone impede downward percolation of stream recharge and provide for baseflow and springflow to the mostly gaining perennial streams that drain the Hill Country (Barker and Ardis, 1996; Ashworth, 1983)" (Mace et al, 2000, Page 33).

The range of average precipitation recharge rates to the Trinity Aquifer for the study area lie between 31,000 and 33,000 ac-ft/yr (Jones, 2004, page 4). These values are based on results of calibrated groundwater-flow models that indicate recharge of 4.7 percent of average annual rainfall. These results do not differ much from previous work by the Texas Water Development Board that reported recharge rates of 4 to 5 percent of average annual rainfall (Ashworth, 1983; Bluntzer, 1992).

Ashworth (1983, page 10) reports that in some areas "caverns formed by the solution of limestone and evaporites by ground water are common in the Trinity formations, particularly in the Glen Rose Limestone. These caverns are characteristically influenced by the jointing structure of the limestone and may extend both vertically and laterally for great distances and provide major conduits for the flow of ground water. When caverns grow to such a size as to no longer support their overburden, they collapse thus forming sinkholes that are visible from the surface as circular depressions that may transmit large quantities of surface water to a passage below ground. Sinkholes are a common occurrence in streambeds flowing over the Glen Rose Limestone and provide a passageway for a substantial amount of recharge to the aquifer".

However Mace et al (2000, page 33) contends that "because much of this recharge is quickly transmitted to the Edwards (BFZ) aquifer (Barker and Ardis, 1996; Veni, 1994), it has minimal effects on the Trinity aquifer".

4.3.3. Groundwater Flow in the Barton Springs Zone

Abundant caves, sinkholes, and enlarged fractures provide further evidence of the karst nature of the aquifer and dictate the transport patterns of water (and pollutants) entering the aquifer. Groundwater flow in the Barton Springs Zone of the Edwards Aquifer is dependent on a number of factors. These factors include recharge, groundwater withdrawal, and ~~micro-geology~~ **NE-SW trending faulting and jointing associated with the Balcones Fault Zone, and karst solution features.** As indicated previously, ~~the Edwards Aquifer is unusual in its karst geology manifested in faults, fractures, caves, sinkholes, and other micro-geologic features.~~ **The karst features such as caves, sink holes and enlarged fractures of the Edwards Aquifer are the result of dissolution of the limestone aquifer along groundwater flow paths.** In contrast to more homogeneous aquifers, these ~~micro-~~

geologic secondary solution features serve as preferred pathways for groundwater flow. Darcy's Law (20) which normally is used to describe flow in porous media, typically does not properly represent flow in highly karstic formations such as the Edwards. Groundwater flow in the aquifer occurs primarily in these ~~micro-~~**geologic solution** features with secondary transport through porous limestone. Unfortunately, these preferred pathways for water also serve as preferred pathways for pollutants. This feature makes the Edwards Aquifer in general and the Barton Springs Segment in particular extremely susceptible to contamination from pollutants.

It is certain that the Upper and Middle Trinity aquifers contribute groundwater to the Edwards aquifer but the specific amount it is not well understood, Mace et al (2003) note that some studies suggest that up to 50% of the Edwards BFZ Aquifer recharge is contributed from the Upper and Middle Trinity aquifers but most experts believe this estimate is too high (Mace et al 2000). A number of studies have shown, either through hydraulic or chemical analyses, that groundwater likely flows from the Trinity aquifer into the Edwards (Balcones Fault Zone) aquifer (Mace et al, 2000, page 57). Most of the studies have focused on the movement of groundwater from the Glen Rose Limestone into the Edwards aquifer. Water level studies suggest that groundwater from the Trinity aquifer discharges to the east in the direction of the Edwards (BFZ) aquifer in the Water Quality Plan study area (Mace et al, 2000, page 57). The Hill Country Trinity Groundwater Availability Model (Mace et al, 2000) is calibrated so that 12% and 14% of the precipitation recharge to the Upper and Middle Trinity Aquifers', respectively, is discharged to the Edwards BFZ Aquifer (Mace, 2003). Mace et al (2000) believe that 'part of this groundwater moves into the Edwards through faults, and part continues to flow in the Trinity aquifer beneath the Edwards (BFZ). It is likely that the groundwater that continues to flow in the Trinity aquifer eventually discharges upward to the Edwards (BFZ) aquifer (Mace et al, 2000).

Recharge to the Barton Springs Zone occurs mostly in the channels of the six major creeks identified previously. Average recharge contribution calculations from the USGS gages in the watershed indicated that Onion and Barton creeks are the two largest contributors of recharge. Their peak recharge rate also is larger compared to the smaller creeks. Data from these gages indicates that approximately 75% of the stream volume is generated from baseflow and 25% results from runoff. Runoff recharged into the Edwards Aquifer in this area comprises less than 13% of the total recharge volume. Once this water enters the aquifer, its movement is generally in an eastern direction until the edge of the confined portion is reached. At this point, flow moves generally northeast to discharge at the Barton Springs. (21)

Surface and groundwater pollution of the Upper and Lower Trinity Aquifer will ultimately recharge the Edwards Aquifer. Moving greater development density, that is known to be produced as non-point source pollution from residential development, to the contributing zone of the Edwards will only delay the inevitable degradation of the Edwards Aquifer and increase the speed that the Trinity Aquifer is degraded. The most certain way to avoid degradation of the Edwards and Trinity aquifer is to have greater density east of the Edwards contributing zone.

4.4. Description of Critical Environmental Features in the Planning Region

Critical Environmental Features (CEFs) are defined as geological, topographical, physiographical, or hydrological components of the landscape within the Barton Springs Segment of the Edwards Aquifer that, if protected,

would serve to remediate the quality of surface and ground water for consumptive and non-consumptive human use as well as protect biological components of the human environment such as terrestrial and aquatic biological resources including endangered species. Other entities and agencies have developed definitions and descriptions for some of these types of features as a part of various regulatory and natural resource protection programs.²² For the purpose of this Plan, many of these definitions have been incorporated due to their current use in actual practice. Critical Environmental Features, as used in this Plan, are described as follows:

page 23

Page 23 footnotes:

²⁰ "Handbook of Applied Hydrology", V.T. Chow, et al, McGraw-Hill Publishing

²¹ "Barton Springs Management Plans for Groundwater Protection", C. Soeur, et al, presentation to the National Symposium on: Assessing the Cumulative Impacts of Watershed Development on Aquatic Ecosystems and Water Quality, Chicago, Illinois, March, 1996.

²² Section III.A.2A, "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones", Application Form 0585, Texas Commission on Environmental Quality, October, 2004.

4.4.1. Category 1: Limestone recharge features

- Caves - natural underground open space formed by dissolution of limestone that are large enough for an average-sized person to enter.
- Solution Cavities - a natural cavity or depression formed as a result of dissolution of limestone.
- Solution-enlarged Fractures - fractures that show evidence of being locally enlarged by dissolution of limestone, may be part of interconnected voids connecting surface with subsurface strata.
- Faults- a fracture along which there has been displacement of one side of the fracture relative to the other.
- Manmade features affecting bedrock - unplugged abandoned water wells, quarries, or cultural features that would permit infiltration of surface water to subsurface strata.
- Swallet or swallow holes - a recharge feature in a streambed or drainage where surface flow is diverted to subsurface strata.
- Sinkholes - a broad topographic depression greater than 6 feet in diameter with more than 6 inches of topographic relief that provides a pathway to subsurface strata.

4.4.2. Category 2: Streams and associated streambeds

Streams and associated streambeds that transport water to recharge features or contain aquatic communities that would be adversely affected by degraded water quality. This category includes all creeks and associated tributaries lying over the recharge and artesian zones of the Barton Springs Segment of the Edwards Aquifer.

4.4.3. Category 3: Floodplains and Wetlands

Floodplains, wetlands, associated soils, and vegetation that would attenuate rainfall runoff, decrease the volume and velocity of flood flows, filter suspended solids and contaminants, and contribute to groundwater recharge. Construction and development activities in the vicinity of floodplains and

wetlands are governed by several existing federal regulatory programs, as outlined below.

4.4.4. Category 4: Edwards Aquifer discharge areas

Involving seeps and springs including: Power House Spring near Tom Miller Dam, Seiders Springs on Shoal Creek, Cold Springs near Town Lake, Manchaca Springs on a tributary of Onion Creek, Barton Springs, and Barton Creek. These areas support biological communities including rare or endangered species that depend on spring discharge entirely or partially for survival. Because these features function as a result of the combined effects of pumping and recharge, they are directly affected by effects to the previous Categories 1-3.

As discussed in more detail below, all projects under the jurisdiction of the TCEQ's Edwards Aquifer rules requires a geologic assessment. These features should be identified and categorized as a part of this assessment. Categories 1-3 are geographically located with generally finite boundaries, and can function to substantially affect water quality. Therefore, protection of these features is the first line of defense in protecting Category 4 features. A number of structural and non-structural measures are identified in this Plan to protect Critical Environmental Features. Category 1, 2 and 4 features should be protected using dedicated offsets, as described below. Procedures for protecting Category 3 features (floodplains wetlands) have been incorporated into the protections for streams. Any development occurring in the vicinity of these features should incorporate the water quality protection measures prescribed in this Plan.

Anaya, R. and Jones, I. C., 2004, Groundwater Availability Model for the Edwards- Trinity (Plateau) and Cenozoic Pecos Alluvium Aquifer Systems, Texas: Texas Water Development Board GAM report, <http://www.twdb.state.tx.us/gam/eddt p/eddt p.htm>, 208 pp

Ashworth, J. B., 1983, Ground-water availability of the lower Cretaceous formations in the Hill Country of south-central Texas. Texas Department of Water Resources Report 273, 65 pp.

Barker and Ardis, 1996

Bluntzer, R. L., 1992, Evaluation of the ground-water resources of the Paleozoic and Cretaceous aquifers in the Hill Country of central Texas. Texas Water Development Board Report 339, 130 pp.

Jones, I. C., 2004, What is the recharge rate for the Trinity aquifer within the Hays Trinity Groundwater Conservation District?, Texas Water Development Board, GAM Run 04-18, 4 pp.

Mace, R. E., Chowdhury, A. H., Anaya, R., and Way, S.-C., 2000, Groundwater availability of the Trinity aquifer, Hill Country area, Texas: numerical simulations through 2050. Texas Water Development Board Report 353, 117 pp.

Mace, R. E., 2003, What is the county-by-county water budget in the Hill Country Trinity model (GAM)?, Texas Water Development Board, GAM Run 03-01, -03, J. B.

April, 1994

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

I recognize that the Plan being submitted by the Consultant reflects a compromise among the various interests of the Stakeholders, and that it is not possible to satisfy all of the needs of every stakeholder interest group.

Accordingly, in connection with the 6th Draft of the Plan, which was posted to the Project web site on March 4th, and which was amended during the Stakeholder Committee meeting of March 9th, I (mark one option):

support the Plan in its current form and recommend its full adoption.

do not support the Plan in its current form but would give it my support if the specific changes enumerated on the attached document were incorporated.

do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.

Nancy L. McClintock
(signature)

4/12/05
(date)

Nancy L. McClintock
(printed name)

*I support this plan but believe it needs
to a companion plan for open space
acquisition with a proposed revenue generating
strategy. I do not believe that potential
degradation from golf courses and wastewater
disposal are fully addressed in the plan
as well. Lastly, I am still looking at the
incremental cost part of the plan + think it may
be flawed.*

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

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(signature)

3/9/05
(date)

Alan J. Bojorquez
(printed name)

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

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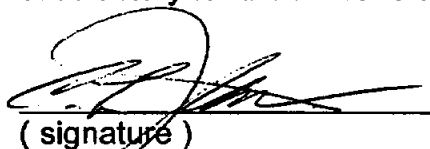
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(signature)

03-09-05
(date)

Charles L. Johnson
(printed name)

**Stakeholder Committee Member Ballot Regarding
Amended 6th Draft of the Water Quality Protection Plan**

As a member of the Stakeholder Committee, I have worked in good faith and to the best of my ability with the others on the Committee and with the consultant to create a proposed set of water quality protection measures that, if implemented, will achieve the stated objectives and be fair to all the parties who will be affected.

I recognize that the Plan being submitted by the Consultant reflects a compromise among the various interests of the Stakeholders, and that it is not possible to satisfy all of the needs of every stakeholder interest group.

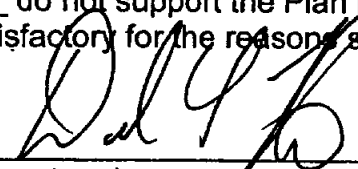
Accordingly, in connection with the 6th Draft of the Plan, which was posted to the Project web site on March 4th, and which was amended during the Stakeholder Committee meeting of March 9th, I (mark one option):

support the Plan in its current form and recommend its full adoption.

do not support the Plan in its current form but would give it my support if the specific changes enumerated on the attached document were incorporated.

(SEE NOTE BELOW)

do not support the Plan in its current form and believe that it cannot be made satisfactory for the reasons stated in the attached document.



(signature)

3-21-05

(date)

DAVID L FOWLER

(printed name)

PLEASE OUTLINE THE BASIC OVERLAPPING JURISDICTIONAL RESPONSIBILITIES OF TRAVIS COUNTY AND THE CITIES OF AUSTIN, BEE CAVE, AND SUNBEL VALLEY WITHIN THE ETJS OF THESE CITIES AS IDENTIFIED ON TABLE 12. THIS CAN BE OUTLINED IN TEXT FORM IN THE "EXISTING ENTITIES WITHIN THE ^{Planning} REGION!"

Regional Water Quality Planning Office

From: Dave Fowler [Dave.Fowler@co.travis.tx.us]
Sent: Monday, May 02, 2005 9:12 AM
To: gjackson@naismith-engineering.com; regionalplan@zeecon.com
Cc: Totalitull@aol.com; dfusilier@naismith-engineering.com; tbrown@naismith-engineering.com
Subject: RE: Revisions to Address Overlapping Jurisdictions

Terry,

The answer to that is "yes", please put me down for a final first box vote. I will trust you to articulate the intent and specifics of my comments in your final Report.

My final comments are an attempt to describe the overlapping public works/services programs in an ETJ as specifically as I can, versus leaving it more general. This stems out of my experience with HB1445 several years ago where the legislature put "subdivisions" in this overlapping category that needed to be adressed, but didn't adequately describe other overlapping areas. It may be the desire of cities and counties to not address these areas because of the extra coordination work involved, but the comfort and convenience of the jurisdictions should be secondary to trying to better achieve water quality efforts in my opinion. Just because this is not an easy coordination process is just too bad if we are really serious about water quality issues. If the jurisdictions have a problem with this, they should complain to the Legislature for creating ETJs without articulating more specifically how ALL of the public services and authorities need to be coordinated instead of some of them. If we do nothing more than just bring this issue to light in the Report, hopefully it could result in these issues being addressed better.

thanks,
Dave

>>> "Regional Water Quality Planning Office" <regionalplan@zeecon.com>
>>> 04/29/05 5:10 PM >>>
Dave,

Thanks very much for this and all the other efforts you contributed. I think it is very helpful that you took the time to put your thoughts into specific recommendations that we could consider. (By the way, if this paragraph is added to the Plan, does that mean that your ballot becomes a "first box" vote? in other words, that you support implementation of the Plan?)

Grant, I'll let you and your team consider the merits of what Dave has provided and whether or not it can be inserted. For my part, it looks good.

Thanks.

Terry Tull
Executive Director
Office: 512.858.2148
Mobile: 512.663.2093
FAX: 512.858.5646
US Mail: Regional Water Quality Planning Project
c/o City of Dripping Springs
PO Box 384
Dripping Springs, TX 78620
Website: www.waterqualityplan.org

-----Original Message-----

From: Dave Fowler [mailto:Dave.Fowler@co.travis.tx.us]
Sent: Friday, April 29, 2005 4:55 PM
To: gjackson@naismith-engineering.com
Cc: Totalitull@aol.com; dfusilier@naismith-engineering.com;
tbrown@naismith-engineering.com; regionalplan@zeecon.com

Grant,

Here are my comments on the final issue I had brought up for the RWQPP. I meant get this to you sooner, but I believe Terry said we had until the end of this month. I have not been able to get this to the other county staff to review yet, so I have copied them on this email and I invite them to please make any comments on this directly to you if they have any.

I propose adding a short second paragraph underneath the existing paragraph in Section 10.2.7.1 on Overlapping Jurisdictions to identify the primary overlapping program areas between counties and municipalities that affect water quality in an ETJ more specifically, and the importance of developing a coordinated effort in these areas in order to achieve the most effective water quality protection, as follows:

Within a municipal ETJ with storm water ordinance authority, the municipality and the county should develop a coordinated or delegated effort in all overlapping program areas in order to achieve the most effective water quality protection. Development permits of all types (subdivision, site development, utilities, single family residential, etc.) should have clearly designated responsibility for plan review for agreed-upon storm water technical standards and field inspection for compliance with such standards, which include both construction storm water pollution prevention plans and post-construction storm water controls. Post-construction storm water standards include floodplain development and drainage conveyance requirements as well as water quality. Clearly designated responsibility for maintenance of post-construction storm water controls is essential, whether it is the property owner, municipality, or county. The county has primary responsibility for maintenance of the public roadway infrastructure in the ETJ, as the Small Municipal Separate Storm Sewer (MS4) Operator. As such, mechanisms must be in place for the county to adequately review, permit, inspect, or enforce as necessary, any activities with overlapping jurisdictions that can directly affect the county right-of-way and easements, including permitted construction discharges or un-permitted storm water and non-storm water discharges. Capital improvements to county roadways should have mutually agreed-upon construction and post-construction storm water standards, in particular where they discharge adjacent to a municipal MS4 or within a near-term municipal annexation area.

thanks very much,

Dave Fowler
Environmental Project Manager
TPDES Storm Water Management Program (SWMP)
Phone: (512) 854-7590
Fax: (512) 854-4626
Pager: (512) 935-0692

>>> "Grant A. Jackson, P.E." <gjackson@naismith-engineering.com>
03/29/05 12:31 AM >>>
Dave,

Attached please find an excerpt from some revisions that we made to the Regional Water Quality Protection Plan. We have made changes both to the text and to the table of areas. Please look this over and see if it will cure your objection to the Plan. Please let me know if you have any additional questions or suggestions. Thanks.

Grant A. Jackson, P.E.
Naismith Engineering, Inc.
(800) 677-2831
(361) 814-9900

Appendix F
Communication Plan

Communication Plan

Development of A Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

Element	Target Audience	Purpose of Communication	Timing/Frequency	Methods
Draft Stakeholder Process and Communication Plan	Executive and Core Committees (EC+CC) and tentative stakeholder groups	Distribute stakeholder process and communication plan to receive feedback. Incorporate comments into final document.	Before initial stakeholder meeting.	Document provided to members and available electronically. Set up project website for posting of future meeting notices and meeting notes with attachments to receive public feedback. Prepare news release to local news media of grant award and of project objectives and initiation.
Stakeholder Roles and Expectations	All stakeholders	Define roles and responsibilities of stakeholders, selection process for stakeholder representatives, identify issues and challenges and develop and prioritize goals for the plan. Seek feedback from stakeholders and receive public input.	Prior to and during initial stakeholder meeting	Public Notice (Notice sent to local papers, posted on project website, and e-mailed to current identified stakeholder members and others on distribution list). Make Documents Available Prior to Meeting (hard copies available at Dripping Springs City Hall and NEI Office, post on project website, distribute by e-mail to interested individuals). Dialogue During Meeting. Distribution List Sign-up Opportunity. Distribute Meeting Records (post meeting notes and other deliverables on the website for public comment, and e-mail to interested individuals).

COMMUNICATION PLAN (Continued)

Element	Target Audience	Purpose of Communication	Timing/Frequency	Methods
Stakeholder Committee (SHC) Roles, Responsibilities and Process	SHC Representatives	Verify stakeholder representation, review and adopt By-laws, review timelines and stakeholder process, discuss project schedule and set subsequent meeting dates.	Prior to and during series of regularly scheduled SHC meetings.	Public Notice. Make Documents Available Prior to Meeting (post on project website, distribute by e-mail to SHC members). Dialogue During Meeting. Distribute Meeting Records (post meeting notes and other deliverables on the website for public comment, and e-mail selected documents to SHC Representatives and others on the distribution list).
Stakeholder Education	SHC Representatives	Provide background technical information from the Consulting Team to the SHC.	Prior to and during series of regularly scheduled SHC meetings.	Same as above.
Feedback on Consultant Work Products	SHC Representatives and the Public	Obtain feedback on technical work products prepared by the Consulting Team.	Prior to and during series of regularly scheduled SHC meetings.	Same as above.
Project Status Updates	EC+CC members, SHC Representatives and the Public	Provide updates on the technical and financial status of the project status and milestone reports. Seek feedback from committees and receive public input.	Prior to and during series of regularly scheduled EC+CC and SHC meetings.	Public Notice of Meeting. Make Documents Available Prior to Meeting. Dialogue During Meeting. Distribute Meeting Records.
Project Team Meetings	Naismith Engineering and Subcontractors (Consulting Team)	Internal coordination meetings to receive progress reports from subcontractors and coordinate development of deliverables.	Beginning of project, prior to each stakeholder meetings, prior to milestone and prior to finalizing each deliverable, and as determined by project manager.	Dialogue During Meeting. Follow-up assignments.

COMMUNICATION PLAN (Continued)

Element	Target Audience	Purpose of Communication	Timing/Frequency	Methods
Milestone Reports	EC+CC	Report on key project milestones and deliverables. Receive and discuss comments with Stakeholder Committee. Review report and comments received from Stakeholder committee with Core committee. Seek feedback from committee and receive public input.	As determined by Project Timeline.	Public Notice of Meeting. Make Documents Available Prior to Meeting. Presentations. Dialogue During Meeting. Distribute Meeting Records.
Presentations	Project Participants, EC+CC, SHC, Special Interest Groups and Civic Groups	To inform groups of project objectives and project status and to seek buy-in to the process.	As requested by groups or if it is determined by project team that a particular group needs to be informed of project activities.	Talks and Presentations.
Draft Plan	EC+CC, SHC Representatives, Stakeholders, Project Participants, Funding Agencies, Resource Agencies and the Public.	Presentation of draft plan. Seek feedback from parties and receive public input.	Upon Completion of Draft Plan (March 31, 2005).	Public Notice of Availability. Make Documents Available (hard copies available at Dripping Springs City Hall and NEI Office, post on project website, distribute Executive Summary by e-mail to EC+CC, SHC Representatives, Project Participants, Funding Agencies, Resource Agencies, and individuals on distribution list). Submission to Funding Agencies. Presentation to EC+CC Meeting. Public Hearing. Receive submitted Public Comments.

COMMUNICATION PLAN (Continued)

Element	Target Audience	Purpose of Communication	Timing/Frequency	Methods
Response to Comments on Draft Plan	EC+CC, SHC Representatives, stakeholders, Project Participants, Funding Agencies, Resource Agencies and the Public.	Provide summary of issues raised during public comment and responses to those issues.	Meeting of EC+CC following close of public comment period (May 11, 2005).	Presentation at Meeting. Responses included in Final Plan.
Final Plan	EC+CC, SHC Representatives, stakeholders, Project Participants, Funding Agencies, Resource Agencies and the Public.	Presentation of final plan and response to comments.	Meeting of EC+CC following completion of Final Plan (Scheduled June 13, 2005).	Public Notice of Availability. Make Documents Available (hard copies available at Dripping Springs City Hall and NEI Office, post on project website, distribute Executive Summary by e-mail to EC+CC, SHC Representatives, Project Participants, Funding Agencies, Resource Agencies, and individuals on distribution list). Submission to Funding Agencies.

Appendix G

Summary of Technical Review Group Comments and Responses

Responses to Technical Review Group Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
T-01	Water Quality Parameters/ Monitoring	Need to address water quality constituents beyond the TSS addressed in the TCEQ Edwards Aquifer regulations. Plan should address PAH compounds Expand the list of monitoring constituents.	Raymond Slade Lisa O'Donnell	Hydrologist Hydrologist Biologist	Incorporated into plan. Incorporated into plan. Several of the monitoring parameters recommended were included in the comprehensive program. However, several of the recommendations specific to the Barton Springs Salamander were not included due to their specialized nature.
T-02			Raymond Slade	Hydrologist	Incorporated into plan.
T-03			Lisa O'Donnell	Biologist	While not addressed separately, this comment is addressed in the implementation section.
T-04		Incorporate minimum design standards for structural BMPs	Raymond Slade	Hydrologist	The Plan recommendation includes coordinated monitoring, but does not specify GIS, but leaves implementation details to the discretion of those implementing the Plan.
T-05		Identify potential sources of funding for monitoring.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-06		Recommend GIS based coordinated monitoring program.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-07	Water Quality Threats	Provide additional detail on water quality threats.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-08		Identify inadequacies of existing regulations.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-09	Geology/ Hydrology	Use correct split of stream flow between storm flow and base flow, and for sources of recharge. Include the segment of the Barton Springs Zone of the Edwards Aquifer east of the recharge zone.	Raymond Slade	Hydrologist	Incorporated into plan.
T-10			Raymond Slade	Hydrologist	Not incorporated into plan, since the planning region was defined by the Executive Committee prior to the project.
T-11		Clarify the discharge points for the various springs mentioned in the Plan.	Raymond Slade	Hydrologist	Incorporated into plan.
T-12		Identify special sensitivity of Barton Creek on the Barton Springs flow.	Raymond Slade	Hydrologist	Included several statements in the hydrogeologic description to identify relationship to Barton Springs, but did not other wise distinguish this stream from others.
T-13	Natural Area/Open Space Conservation	Need to include a plan to specify quantity and develop funding strategy for open space conservation.	Mike Kelly	Engineer	Incorporated into plan.
T-14	Stream Buffers	Stream buffers are reasonable and defensible.	Mike Kelly	Engineer	No response required.
T-15	Impervious Cover (IC) Limitations	Need to better explain details for impervious cover and how it relates to wastewater irrigation and roadways.	Charles Heimsath	Economist	Incorporated into plan.
T-16		Considers the impervious cover limitations recommended in the Plan to be a taking.	Charles Heimsath	Economist	Disagree, but expanded the section on regulatory takings in response to this comment.
T-17		Regulation of impervious cover is complex and does not need to be overly simplified.	Raymond Slade	Hydrologist	No response required.

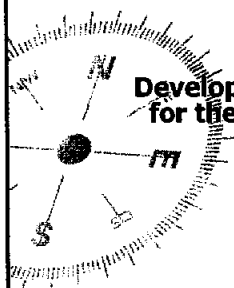
Responses to Technical Review Group Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
T-18		Supports the science-based limits in the plan, but dislikes some of the accommodations in the final table.	Mike Kelly	Engineer	Did not address because this dealt with issues addressed by the Stakeholder Committee, who have been given this input prior to their deliberations.
T-19		Concerned that irrigation areas were treated as pervious area instead of impervious.	Mike Kelly	Engineer	Incorporated safety factors into the design of the irrigation systems to prevent them from responding as pervious cover.
T-20	Structural BMPs	Require some types of BMPs for all development.	Mike Kelly	Engineer	The Plan recommendation allow a simplified option with very low impervious cover limits, with no technical demonstrations required. All projects exceeding these lower threshold are required to make a technical demonstration documenting compliance with the Plan.
T-21		Require that BMPs be designed for the 2-year, 3-hr storm, released over 24 hours.	Mike Kelly	Engineer	Incorporated into plan.
T-22		Incorporate minimum design standards for wastewater/stormwater irrigation areas	Raymond Slade	Hydrologist	Incorporated into plan.
T-23	Restrictions on Harmful Materials	Incorporate requirements on the storage of harmful materials.	Raymond Slade	Hydrologist	Incorporated into plan.
T-24		Need to address catastrophic hazardous materials spills.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-25	Vegetative Management	Need to provide more detail on vegetative management., particularly juniper.	Charles Heimsath Lisa O'Donnell	Economist Biologist	Incorporated into plan.
T-26	Construction Site Storm Water Controls	Need to include specific recommendations for construction sedimentation/erosion control	Raymond Slade	Hydrologist	Incorporated into plan.
T-27	Characteristics of Development	Need to address golf courses.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-28	Various	Need to provide more details on implementation procedures.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-29		Provide clarifying details on endangered species.	Lisa O'Donnell	Biologist	Incorporated into plan.
T-30		The economic evaluation needs to include an appropriate level of detail.	Charles Heimsath	Economist	Expanded the economic evaluation to provide more detail and address a broader range of alternatives.
T-31		Need to ensure that population projects address all possible potentials.	Charles Heimsath	Economist	Original population projections were expanded to make use of additional data.
T-32		Recommended changes to Stakeholder Guiding principles.	Charles Heimsath	Economist	Disagree. No changes were made because the substance of this comment was non-technical and addressed issues vested in the Stakeholder Committee.

Appendix H

Summary of Existing Federal and State Water Quality Regulatory Programs

Regulatory Briefing



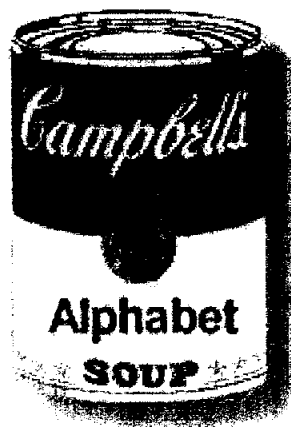
Presented to the Stakeholder Committee

Development of a Regional Water Quality Protection Plan
for the Barton Springs Segment of the Edwards Aquifer
and its Contributing Zone

"Regional Water Quality Planning Project"

September 2, 2004

THE KEY TO UNDERSTANDING ENVIRONMENTAL REGULATIONS:



Making Sense of the Alphabet Soup!

- ▶ "Insiders" use acronyms for everything!
- ▶ These acronyms are confusing to even the average college graduate
- ▶ We're here to help make sense out of all this!
- ▶ If we forget to spell out an acronym, please ask!

© Campbell Soup Company

Regional Water Quality Planning Project

September 2, 2004

RELATIONSHIP TO THE REGIONAL WATER QUALITY PLANNING PROCESS

- ▶ Some areas and activities impacting water quality are regulated under existing programs
- ▶ An understanding of current regulations will bring into focus activities to be addressed in the water quality protection plan
- ▶ Identification of areas where **implementation** can be shared, coordinated or augmented
- ▶ Identification of areas where **enforcement** can be shared, coordinated or augmented

Regional Water Quality Planning Project

September 2, 2004

DISCLAIMERS

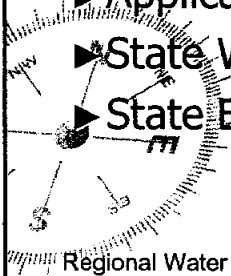
- ▶ While certainly not brief, neither is this presentation exhaustive or unabridged. It is intended to provide general background information only.
- ▶ It is not intended to provide specific direction or advice to any person or entity, or to offer legal opinions or advice.
- ▶ The regulatory framework presented is focused on the project area. Other water quality regulations exist that apply to other geographic areas and those were omitted from this presentation.

Regional Water Quality Planning Project

September 2, 2004

OVERVIEW

- ▶ Applicable Federal Legislation
- ▶ Federal Water Quality Regulatory Programs
- ▶ Federal Endangered Species Programs
- ▶ Applicable State Legislation
- ▶ State Water Quality Regulatory Programs
- ▶ State Endangered Species Programs

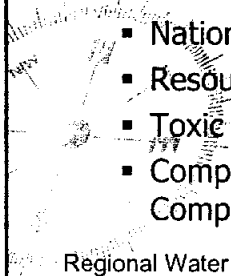


Regional Water Quality Planning Project

September 2, 2004

APPLICABLE FEDERAL LEGISLATION

- ▶ Federal Clean Water Act (CWA)
- ▶ Federal Endangered Species Act (ESA)
- ▶ Additional Federal Legislation
 - Rivers and Harbors Act
 - Fish and Wildlife Coordination Act
 - National Environmental Policy Act (NEPA)
 - Resource Conservation and Recovery Act (RCRA)
 - Toxic Substances Control Act (TSCA)
 - Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)



Regional Water Quality Planning Project

September 2, 2004

APPLICABLE FEDERAL LEGISLATION (Continued)

▶ Additional Federal Legislation (Continued)

- Hazardous and Solid Waste Amendments (HSWA) to RCRA
- Superfund Amendments and Reauthorization Act (SARA) / Emergency Planning and Community Right-to-Know Act (EPCRA)
- Oil Pollution Act (OPA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
- Numerous provisions attached to other pieces of legislation (e.g. riders to appropriations bills, etc.)

Regional Water Quality Planning Project

September 2, 2004

Federal Clean Water Act

▶ Legislative History:

- Congress in 1948 – “Water Pollution Control Act”
- Major amendments 1961, 1966, 1970, and 1972
- Amended/renamed 1977 - “Clean Water Act” (CWA)
- Several subsequent amendments

- ▶ Governs discharges to water, activities that can impact water quality, and the disposal of sludge from water treatment processes

Regional Water Quality Planning Project

September 2, 2004

Federal Clean Water Act (Continued)

- ▶ Implemented by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE)
- ▶ Allows delegation of activities to approved states
- ▶ Provides civil and criminal penalties for violations and citizen suits for enforcement

Regional Water Quality Planning Project

September 2, 2004

Federal Endangered Species Act

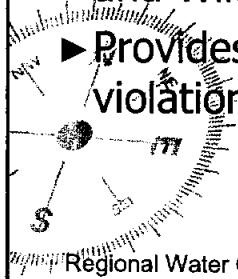
- ▶ Legislative History:
 - Congress in 1966 - "Endangered Species Protection Act"
 - Amended/Renamed 1969 – "Endangered Species Conservation Act"
 - Amended/Renamed 1973 – "Endangered Species Act" (ESA)
- ▶ Several subsequent amendments
- ▶ Identifies procedures for listing species as "threatened" and "endangered"

Regional Water Quality Planning Project

September 2, 2004

Federal Endangered Species Act (Continued)

- ▶ Governs activities that could impact listed species
- ▶ Implemented and enforced by the U.S. Fish and Wildlife Service (USFWS)
- ▶ Provides civil and criminal penalties for violations and citizen suits for enforcement

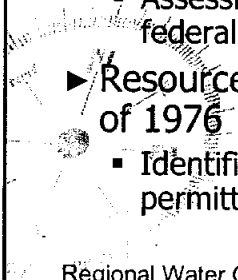


Regional Water Quality Planning Project

September 2, 2004

Additional Federal Legislation—Part 1

- ▶ Rivers and Harbors Act of 1899
 - Dredging/filling & ensuing ecological damage
- ▶ Fish and Wildlife Coordination Act of 1934
 - Consultation with USFWS for impounding, controlling or diverting water
- ▶ National Environmental Policy Act (NEPA) of 1969
 - Assessment/control of environmental impacts from federal actions
- ▶ Resource Conservation and Recovery Act (RCRA) of 1976
 - Identification/control of hazardous wastes and permitting of management facilities



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Additional Federal Legislation—Part 2

- ▶ Toxic Substances Control Act (TSCA) of 1976
 - Identification/control of toxic substances and permitting of management facilities
- ▶ Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980
 - Defined/regulated hazardous substances, municipal and hazardous wastes, and petroleum storage tanks
- ▶ Hazardous and Solid Waste Amendments (HSWA) to RCRA of 1984
 - Restrictions and minimum technology requirements for disposal of hazardous and industrial wastes

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Additional Federal Legislation—Part 3

- ▶ Superfund Amendments and Reauthorization (SARA) / Emergency Planning and Community Right-to-know Act (EPCRA) of 1986
 - Petroleum storage tanks design and operation
 - Local planning to prevent health/safety threat & environmental pollution from hazardous materials
- ▶ Oil Pollution Act (OPA) of 1990
 - Planning, response and clean-up for oil spills
- ▶ Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
 - Pesticide approval, use and management

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FEDERAL WATER QUALITY REGULATORY PROGRAMS

- ▶ National Pollutant Discharge Elimination System (NPDES)
- ▶ Federal Spill Prevention, Control and Countermeasure (SPCC) Program
- ▶ Federal Municipal Solid Waste Management Program
- ▶ Federal Hazardous Waste Program
- ▶ Federal Sludge Management Program
- ▶ Federal Superfund Program
- ▶ Federal Toxic Substances Control Program

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National Pollutant Discharge Elimination System (NPDES)

- ▶ Administered by the U.S. EPA [Title 40, Code of Federal Regulations (CFR), Chapter 122 or 40 CFR §122]
- ▶ Regulates:
 - Municipal Wastewater (Sewer) Discharges
 - Industrial Wastewater (Process) Discharges
 - Municipal Storm Water Discharges
 - Industrial Storm Water Discharges
 - Construction Site Storm Water Discharges

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National Pollutant Discharge Elimination System (NPDES)– Continued

- ▶ Utilizes “structural” and “non-structural” controls
- ▶ Administered through a permit system
- ▶ Includes requirements for public notice & public involvement
- ▶ Provides for delegation to approved states

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Federal Spill Prevention, Control and Countermeasure (SPCC) Program

- ▶ Administered by the U.S. EPA [40 CFR §112]
- ▶ Regulates the storage and handling of petroleum products and hazardous materials
- ▶ Utilizes “structural” and “non-structural” controls
- ▶ “Self Implementing” system – submittals only when requested

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Federal Municipal Solid Waste Program

- ▶ Administered by the U.S. EPA [40 CFR §256-259]
- ▶ Regulates the transportation, storage, processing and disposal of municipal solid waste (garbage)
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through combination of permit program and "self implementation"
- ▶ Includes requirements for public notice & public involvement
- ▶ Provides for delegation to approved states

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Federal Hazardous Waste Program

- ▶ Administered by the U.S. EPA [40 CFR §260-273]
- ▶ Regulates the generation, transportation, storage, processing and disposal of hazardous wastes
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through combination of permit program and "self implementation"
- ▶ Includes requirements for public notice & public involvement
- ▶ Provides for delegation to approved states

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Federal Superfund Program

- ▶ Administered by the U.S. EPA [40 CFR §300-399]
- ▶ Requires the compilation and management of the National Priorities List (NPL) for contaminated sites, governs the clean-up of those sites, and outlines the Emergency Planning and Community Right-to-Know program
- ▶ Implementation through direct federal actions and required reporting
- ▶ Includes requirements for public notice & public involvement

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Federal Sludge Management Program

- ▶ Administered by the U.S. EPA [40 CFR §500-503]
- ▶ Regulates the transportation, storage, processing and disposal of sludge from water and wastewater treatment
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through combination of permit program and "self implementation"
- ▶ Includes requirements for public notice & public involvement
- ▶ Provides for delegation to approved states

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Federal Toxic Substance Control Program

- ▶ Administered by the U.S. EPA [40 CFR §700-766]
- ▶ Regulates the creation, use, transportation, storage, processing and disposal of toxic substances
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through combination of permit program and "self implementation"
- ▶ Includes requirements for public notice & public involvement

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FEDERAL ENDANGERED SPECIES PROGRAMS – Part 1

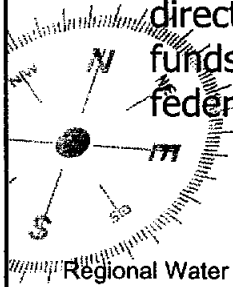
- ▶ Administered by the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) [50 CFR §1-697]
- ▶ Listing Program (ESA §4)
 - Includes procedures to evaluate and list "threatened" and "endangered" species
 - Species Recovery Plans

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FEDERAL ENDANGERED SPECIES PROGRAMS – Part 2

- ▶ “Federal Actions” (ESA §7)
 - §7(a)(1) requires all federal agencies to aid conservation efforts for endangered species
 - §7(a)(2) requires consultation with USFWS on direct federal actions, actions using federal funds, and the issuance of permits under federal programs, including delegated states

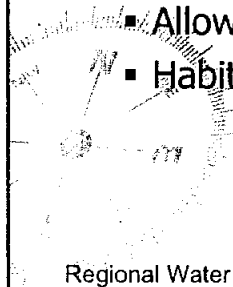


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FEDERAL ENDANGERED SPECIES PROGRAMS – Part 3

- ▶ Prohibition of “Taking” endangered species (ESA §9 & §10)
 - Prohibits taking, possession, sale, or transfer of certain endangered species
 - Allows the issuance of incidental take permits
 - Habitat Conservation Plans



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APPLICABLE STATE LEGISLATION

▶ Texas Water Code

- Governs the protection, procurement, use, storage, and return of water in the state

▶ Health and Safety Code

- Governs the treatment & disposal of municipal & industrial wastes, sewage sludge, & pollution clean-up

▶ Natural Resources Code

- Governs oil & gas exploration/production, mining, natural resource protection, & conservation easements

Regional Water Quality Planning Project

September 2, 2004

STATE WATER QUALITY REGULATORY PROGRAMS – Part 1

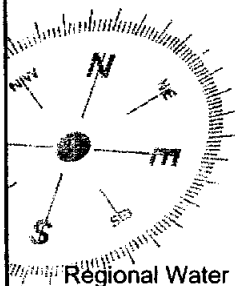
- ▶ Texas Oil and Gas Environmental Program
- ▶ Texas Edwards Aquifer Protection Program
- ▶ Texas On-Site Sanitary Facility (OSSF) Program
- ▶ Texas Pollutant Discharge Elimination System (TPDES)
- ▶ Texas Sludge Disposal Program
- ▶ Texas Municipal Solid Waste Program

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STATE WATER QUALITY REGULATORY PROGRAMS – Part 2

- ▶ Texas Petroleum Storage Tank Program
- ▶ Texas Industrial and Hazardous Waste Program
- ▶ Texas Agricultural and Silvicultural Water Quality Management Program



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Texas Oil and Gas Environmental Program

- ▶ Administered by the Railroad Commission of Texas (RRC) [Title 16, Texas Administrative (TAC), Chapters 1-7 or 16 TAC §1-§7]
- ▶ Regulates the exploration and production of oil, gas & geothermal resources and the disposal and clean-up of wastes
- ▶ Implementation through various regulatory approvals, including registrations and major and minor permits
- ▶ Enforcement by RRC Division offices

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Texas Edwards Aquifer Protection Program – Part 1

- ▶ Administered by Texas Commission on Environmental Quality (TCEQ) [Title 30, Texas Administrative (TAC), Chapter 213 or 30 TAC §213]
- ▶ Regulates soil disturbance activities over the recharge zone, contributing zone and the transition zone of the Edwards Aquifer
- ▶ Utilizes “structural” and “non-structural” controls
- ▶ Implementation through the approval of Water Pollution Abatement Plans (WPAP)

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Texas Edwards Aquifer Protection Program – Part 2

- ▶ Special Requirements for:
 - Organized Sewage Collection Systems
 - Underground Storage Tank (UST) facilities for hydrocarbons and hazardous substances
 - Aboveground Storage Tank (AST) facilities for hydrocarbons and hazardous substances
 - On-site Sanitary Sewage Facilities (OSSF)
- ▶ Enforcement by TCEQ central and region offices

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Texas On-Site Sanitary Sewage Facility (OSSF) Program

- ▶ Administered by TCEQ and delegated local governments [30 TAC §285]
- ▶ Regulates the installation, operation and maintenance of OSSF's including septic tanks, irrigation systems, proprietary treatment systems and others
- ▶ Utilizes primarily "structural" controls
- ▶ Implementation through a permit program
- ▶ Enforcement by TCEQ region offices and delegated local governments

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Texas Pollutant Discharge Elimination System (TPDES) – Part 1

- ▶ Administered by TCEQ [30 TAC §307-317]
- ▶ Regulates:
 - Municipal Wastewater (Sewer) Discharges
 - Industrial Wastewater (Process) Discharges
 - Municipal Storm Water Discharges
 - Industrial Storm Water Discharges
 - Construction Site Storm Water Discharges
 - Certain point and non-point source discharges
- ▶ Approved delegation under the U.S. EPA's NPDES program

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Texas Pollutant Discharge Elimination System (TPDES) – Part 2

- ▶ Utilizes “structural” and “non-structural” controls
- ▶ Implementation through various regulatory approvals, including permits by rule, general permits, and individual permits
- ▶ Includes requirements for public notice & public involvement
- ▶ Enforcement by TCEQ central and region offices
- ▶ Examples of regulated facilities/entities:
 - Municipal sewer plants of any size
 - Industrial process wastewater plants of any size

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Texas Pollutant Discharge Elimination System (TPDES) – Part 3

- ▶ Examples of regulated facilities/entities:
(Continued)
 - Large and medium municipalities (Phase I) and small municipalities in urbanized areas (Phase II) that own/operate/manage municipal separate storm sewer systems (MS4s)
 - Construction sites larger than 1 acre
 - Certain industrial facilities with storm water discharges
 - Pollution clean-up sites with treated water discharges
 - Certain agricultural facilities (Concentrated Animal Feeding Operations – CAFOs) with point source and non-point source discharges

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Texas Sludge Program

- ▶ Administered by TCEQ [30 TAC §312]
- ▶ Regulates the transportation, storage, processing and disposal of sludge from water and wastewater treatment plants
- ▶ Approved delegation under the U.S. EPA's NPDES program
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through various regulatory approvals, including notifications, registrations and permits
- ▶ Enforcement by TCEQ central and region offices

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Texas Municipal Solid Waste Program

- ▶ Administered by TCEQ [30 TAC §330]
- ▶ Regulates the transportation, storage, processing and disposal of municipal solid waste (garbage)
- ▶ Approved delegation from U.S. EPA
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through various regulatory approvals, including notifications, registrations and permits
- ▶ Enforcement by TCEQ central and region offices

Regional Water Quality Planning Project

September 2, 2004

Texas Petroleum Storage Tank Program

- ▶ Administered by TCEQ [30 TAC §334]
- ▶ Regulates the installation, operation and pollution from underground and aboveground petroleum storage tanks (USTs and ASTs)
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through registrations
- ▶ Enforcement by TCEQ central and region offices

Regional Water Quality Planning Project

September 2, 2004

Texas Industrial and Hazardous Waste Program

- ▶ Administered by TCEQ [30 TAC §335]
- ▶ Regulates the transportation, storage, processing and disposal of hazardous and non-hazardous industrial solid waste
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through various regulatory approvals, including notifications, registrations and permits
- ▶ Enforcement by TCEQ central and region offices

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Texas Agricultural and Silvicultural Water Quality Management Program

- ▶ Administered by Texas State Soil and Water Conservation Board (TSSWCB) [31 TAC §523]
- ▶ Voluntary program to control pollution from certain agricultural operations
- ▶ Utilizes "structural" and "non-structural" controls
- ▶ Implementation through water quality management plans
- ▶ Enforcement by TSSWCB and district offices

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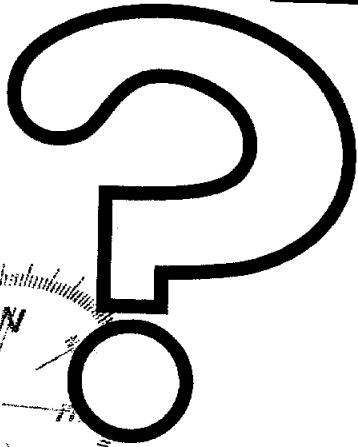
STATE ENDANGERED SPECIES PROGRAMS

- ▶ Administered by the Texas Parks and Wildlife Department (TPWD) [31 TAC §65-69]
- ▶ Listing Program similar to Federal ES programs
 - Includes procedures to evaluate and list "threatened" and "endangered" species
 - Natural Resource Protection/Restoration

Regional Water Quality Planning Project

September 2, 2004

Questions



► Grant A. Jackson, P.E.
Naismith Engineering

Regional Water Quality Planning Project

September 2, 2004

Appendix I

Summary of Existing Local Water Quality Regulatory Programs

COMPARISON OF WATER QUALITY REGULATIONS

Issue No.	TCO Description	LCRA Description	USF	USF	USF	USF	USF	USF	USF	USF
	Sec. 213.8(a) identifies activities prohibited on the recharge and protection zone including prohibition of waste disposal wells, new feedlot/concentrated animal feeding operations, land disposal of Class 1 wastes, the use of sewage holding tanks, new municipal solid waste landfill facilities must meet Type 1 standards, new wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.	Sec. 4 of the Lake Travis NPS Pollution Ordinance identifies authorized activities where no permit is required including the construction of SF homes, any existing development or redevelopment, a development project of a County or other political subdivision, certain mining operations provided that erosion controls are in place along with notifying the LCRA 48 hours in advance of construction. Authorized activities where a permit is required include any development activity not otherwise required to obtain a Type II, III, or IV permit shall require a Type I permit; any construction of a public utility; any subdivision of land which creates access by new roadways; certain dredging activities; certain mining operations.	X	X	X	X	X	X	X	X
Identification of Regulated/Prohibited Activities		Section 5 of the ordinance establishes performance standards for the removal of TSS, total phosphorus, and oil and grease based on the slope of the property and its location with respect to the 691 msi contour. Additionally, there are requirements identified in the LCRA NonPoint Source Pollution Control Technical Manual requiring the identification of slopes on maps submitted as part of the permit application.	X	X	X	X	X	X	X	X
Slopes		Sec. 5 of the ordinance establishes management performance standards for Total Suspended Solids (TSS), Total Phosphorus (TP), and Oil and Grease (OG) based on the slope and type of development. The predevelopment loadings for these constituents are also recognized in the ordinance. The ordinance requires that the level of removal of these constituents is based on proximity to Lake Travis in Travis County. For inland areas a slope of >10% requires the removal rate is 70% for TSS; a slope of >10% but <20% is 80% for TSS; and a slope of greater than 20% requires 90% removal for TSS. For near shore the removal rates for TSS are 75% for slopes <10% and 90% for slopes >10%. TP removal rates for inland areas are 70% for slopes less than 10%, 75% for slopes >10% <20%, and 85% for slopes greater than 20%. Near shore removal rates are required to be 75% for slopes <10% and 90% for slopes >10%. O&G removal for inland areas is 70% for slopes <10%, 75% for slopes >10% <20%, and 85% for slopes >20%. Areas near the lake are required to remove O&G to a level of 75% for slopes <10% and 85% for slopes >10%.	X	X	X	X	X	X	X	X
Management Standards	Sec 213.3(5) Management Performance Standards are to be determined based on existing and proposed monitoring studies by EPA, ASCE, WEFB or other water quality studies. No specific constituents are specified other than TSS. All BMPs and measures are required to remove 80% of the incremental increase in the annual mass loading of TSS caused by the regulated activity.	Chapter 5, Sec. 5-4 of Land Development Code (LDC) sets maximum impervious cover as a function of slope and by excluding 50% of land with slope between 15% and 25%, and excluding all land with slope greater than 25% from impervious cover calculations.	X	X	X	X	X	X	X	X
		Sec. 13.108 of Village Code prohibits the discharge of various pollutants into a stormwater drainage system.	X	X	X	X	X	X	X	X
		Sec. 13.114 restricts non-residential development to areas with pre-development slopes <25%. Finished grades in excess of 33% must be stabilized with a permanent structure.	X	X	X	X	X	X	X	X
		Sec. 13.109 sets performance standards for 95% removal of TSS, Phosphorus, Oil & Grease, Nitrogen, COD, BOD, Fecal Coliform and TDC.	X	X	X	X	X	X	X	X
		City of Burda adopted the City of Austin's Environmental Criteria Manual (except as noted) regarding standards and specifications in the design, development, and construction of all storm water quality related improvements. See this section for City of Austin.	X	X	X	X	X	X	X	X
		Sec. 25-6-514 requires no net increase of annual load of various pollutants for development in the Barton Springs Zone. Sec. 1.6.9.3 Manual provides guidelines for BMP design to achieve ordinance compliance, including calculation of background load, load for developed conditions, and water quality capture volume.	X	X	X	X	X	X	X	X
		Requires no net increase of annual average loads of stormwater pollutants, and to preserve the current form and function of the drainage system. Also includes guidelines for BMP design to achieve ordinance compliance, including calculation of pre-development and post-development loads and water quality capture volume.	X	X	X	X	X	X	X	X

COMPARISON OF WATER QUALITY REGULATIONS

TCGD	LCRA	USFWS
<p>Sec. 213.5(D)(ii) states that if residential impervious cover is 20% or less other permanent BMPs are not required. If the impervious cover goes above 20% the exemption does not apply.</p>	<p>Sets maximum impervious cover at 15% in recharge zone, 20% in contributing zone, increases to 30% in recharge zone and 35% in the contributing zone are allowed with the provision of additional land, conservation easements, or development rights, with the resulting net impervious cover of 10% for the recharge zone and 15% for the contributing zone.</p>	<p>Sec. 13.109(c) sets impervious cover limits to 20% for residential sites, 40% for multi-family residential and non-residential sites. Sec. 13.110 defines impervious cover, excludes water quality buffer zones (WQBZs) from calculations and prohibits impervious cover in WQBZ.</p>
<p>Impervious Cover</p>	X	X
<p>Water Quality Buffer Zones</p>	X	X
<p>Sec. 213.5(l)(v) requires that buffer strips, or equivalent controls are required for all down slope boundaries. The executive director encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.</p>	<p>Establishes Water Quality Buffer zones for areas down to 5 acres, with widths ranging from 25 feet to 300 feet.</p>	<p>Sec. 13.109(d)(1) establishes locations and widths of WQBZs. Sec. 13.111(a) restricts uses and activities in WQBZ. Sec. 13.111(b) prohibits utilities in WQBZ, except at crossings.</p>
<p>Water Quality Buffer Zones</p>	X	X
<p>Sec. 215.5(B)(v) and Sec. 215.5(C)(v) requires that the technical report identify temporary and permanent measures must, to the maximum extent possible maintain flow to naturally occurring sensitive features.</p>	<p>Sec. 25-8-165 requires drainage patterns to be designed to prevent erosion, maintain flow to recharge features, and maintain overland flow, where possible.</p>	<p>Sec. 13.112 prohibits overland flow of untreated stormwater from developed land to recharge features.</p>
<p>Overland Flow</p>	X	X
<p>Sec. 213.5(E) requires that the technical report must describe measures that will be used to avoid or minimize surface stream contamination and changes in a way in which water enters a stream. The measures must address increased stream flashing, the creation of stronger flows and in-stream velocities, or other in-stream effects cause by the requested activity which increase erosion that results in water quality degradation.</p>	<p>Sec. 25-8-213 (E) establishes required capture volume as the first 1/2-inch of runoff plus an additional 1/10-inch of runoff per 10% increase in impervious cover above 20% of gross site area. Sec. 25-7-61 requires on-site control of 2-year storm (i.e. no increase in peak discharge).</p>	<p>Sec. 13.109(b) sets minimum volume for water quality controls to first 1/2-inch of runoff plus 1/10-inch for each 10% increase of impervious cover over 20% of contributing area to a control device. Sec. 13.117(f) requires that post development peak discharge not exceed pre-development peak discharge for 2-yr storm.</p>
<p>Flow Volume Limits</p>	X	X
<p>Sec. 213.4(i)(v) requires that BMPs and must maintain flow to naturally occurring sensitive features identified in the geologic assessment, executive director review, or during excavation, blasting, or construction.</p>	<p>Requires capturing the runoff from the 1-year, 3-hour storm event and releasing over a 24 hour period.</p>	<p>Sec. 13.113 requires water quality controls to be sized to restore pre-development infiltration capacity.</p>
<p>Infiltration</p>	X	X

COMPARISON OF WATER QUALITY REGULATIONS

	ICRQ	LCRA	Austin				
Vegetation X	Sec. 213	Appendix B and C of the Technical Manual identify the use of vegetation for buffer areas as well as performance standards for removal of pollutants. These appendices also identify specific design criteria. Additionally, there is a requirement on the plan notes requiring that a conservation easement be noted. The protection of water quality and nothing can be placed in the easement without the specific approval of LCRA. There is also a requirement that the easement must be maintained by each lot owner by preserving and restoring with native grass vegetation only.	City of Buda adopted the City of Austin's Environmental Criteria Manual (except as noted) regarding standards and specifications in the design, development, and construction of all storm water quality related improvements. See this section for City of Austin.	X	X	X	Sec. 13.115 promotes preservation of natural landscape, requires maintenance vegetation for all non-residential sites.
Water Quality Controls X	Sec. 213.5(4)(I) involves identifying, as part of the technical report, requires that water quality controls be used to divert flows from exposed soils, store runoff and the discharge of pollutants from exposed areas. Structural practices are identified as well as requiring a sediment basin for common drainage areas that serve an area of 10 or more acres. The sediment basin is required to provide storage for the calculated volume of runoff from a 2-year, 24 hour storm from each disturbed acre drained.	Sec. 5 of the ordinance identifies water quality controls that must be used for both temporary and permanent water quality controls. Appendix B(7) of the Technical Manual identifies water quality requirements that post-development runoff shall be detained long enough so that the pre-development bankfull flooding condition is approximately maintained for all storm events. This approach requires reducing both the peak and the frequency of bankfull conditions. Appendix C provides details and design criteria for BMPs and water quality controls including both non-structural and structural controls.	Sec. 25-8-121 requires Environmental Assessment to include Vegetation Report. Sec. 25-8-123 requires Vegetation Report to demonstrate that the proposed development preserves existing significant trees and vegetation, provides maximum erosion control and overland flow benefits from vegetation, and includes a survey of trees over 8" in diameter measured 4' above ground. Sec. 1.6.7(f) of Environmental Criteria Manual establishes design guidelines for vegetative filter strips.	X	X	X	Sec. 13.108(b) sets water quality control volume to be treated. Sec. 13.116(f) requires water quality controls for all developments designed in accordance with the Village's Technical Construction Standards & Specifications which adopts the City of Austin Environmental Criteria Manual.
Best Management Practices X	Sec. 213.3(5) defines BMPs as measures designed to protect groundwater and surface water quality. BMPs must be supported by existing or proposed monitoring studies from groups such as EPA, ASCE, WERC. Sec. 213.5(B) requires that a technical report be prepared which identifies both temporary and permanent BMPs	Sec. 5 of the ordinance requires that BMPs are required for both temporary and permanent water quality and stormwater controls. Appendix C of the Technical Manual provides a detailed description and design criteria for each BMP that is reviewed. The design criteria are based on specific criteria being met and removal efficiencies are also established.	Sec. 1.6.9.2(D) of Environmental Criteria Manual requires integrated Post Management Plan.	X	X	X	Sec. 13.115 requires minimization of herbicide, pesticide and fertilizer use, preparation of pesticide and fertilizer management plan, and an integrator post management plan.

COMPARISON OF WATER QUALITY REGULATIONS

	TCEQ	LRRA	USPWS	Austin	Other Cities
Construction Management Water Reuse	<p>Sec. 213.5(A) requires that a technical report be filed detailing how temporary BMPs will be used as well as a plan for inspection and for maintenance and repair. The plan must also include calculations used to determine the sizing of a temporary sediment pond. Erosion and sediment controls should be designed to retain sediment on site to the extent practicable. Requires that drainage areas with 10 acres or more are disturbed a sediment basin, or equivalent BMP, that provides storage for a calculated volume of runoff from a two-year, 24-hour storm must be provided.</p>	<p>Construction management is required under Sec. 7 of the ordinance. Permit provisions require that LCRA be notified within 48 hours before commencing construction, all BMPs identified in the permit must be put in place, LCRA has the right to enter the site for the purpose of inspecting compliance with the permit, or for performing any work necessary to bring the site into compliance with the permit. Appendices B, C, and D identify and provide design criteria for BMPs and other recommended construction methods that should be used.</p>	X	X	
Erosion Control	X	<p>Sec. 5 requires that erosion controls be implemented during and after construction. Appendix B(7)(1)(18) and Appendix D includes design criteria for erosion and sedimentation controls for the site as well as addressing streambank erosion. For streambank erosion control development runoff must be detained long enough so that the pre-development bankfull flooding condition is approximately maintained for all storm events. Preservation of natural corridors is identified as a priority for protection.</p>	<p>Sec. 25-9-184 requires additional erosion and sediment controls in the Barton Springs Zone, an approved temporary erosion and sediment control plan, and that temporary BMPs be effective during all stages of construction. Sec. 12.3.1(D) of Environmental Criteria Manual requires construction sequence to begin with installation of E&S controls.</p>	<p>City of Buda adopted the City of Austin's Environmental Criteria Manual (except as noted) regarding standards and specifications in the design, development, and construction of all storm water quality related improvements. See this section for City of Austin.</p>	<p>Sec. 13.121 & Sec. 13.131 require submittal of an erosion control plan prior to building permit approval and implementation prior to construction. Sec. 13.117 requires temporary and permanent BMPs to comply with City of Austin ECM</p>
Operations and Maintenance	<p>Sec. 213.5(A) makes the responsibility for O&M on the applicant but it can be transferred to another entity with the approval of TCEQ. Annual inspections are required to assure that the BMPs are still functioning properly.</p>	<p>Requires development of a maintenance/operation plan and funding for the maintenance/operation of BMPs.</p>	X	X	<p>Section 5.2.2(g)(4) requires Village to inspect Water Quality Controls. Section 13.129 requires an annual operating permit for all water quality controls. Sec. 13.122 requires Village to make landowner responsible for water quality control maintenance. Sec. 6.2(n) requires approved maintenance plan for all water quality controls.</p>
Construction Standards for Wastewater Lines	<p>Sec. 213.5(4) and Sec. 317 rules specify the types of materials that can be used as well as approved construction techniques. Additionally, standards are set for any permitted discharges. Wastewater lines may not be located within the 5-year floodplain.</p>	<p>Applicants are required to submit a Master Plan detailing the development of the site, any phasing that is anticipated, location of utilities and BMPs. This plan must be approved prior to the issuance of a Type 1 permit. A separate permit must be issued for different phases of the development. Appendix D(k) provides guidelines for utility line stream crossings as part of the erosion and sedimentation control for projects.</p>	X	X	

COMPARISON OF WATER QUALITY REGULATIONS

	TCEQ	LRA	August					
<p>Wastewater Treatment/Water Reuse</p>	<p>Sec. 213.6(e) addresses wastewater treatment and disposal systems. New discharges into or adjacent to water in the state that would create additional pollutant loading are prohibited in the recharge zone. Increases in existing discharges are prohibited. Sec. 213.6(c)(1) requires that all new or increased discharges 0-5 miles upstream from the recharge zone, at a minimum, shall achieve the following level of treatment: a) 5mg/l of carbonaceous BOD, b) 5mg/l of TSS, c) 2mg/l of ammonia nitrogen, d) 1mg/l of phosphorus. All these parameters are based on 30 day average. More stringent treatment or more frequent monitoring may be required on a case by case basis.</p>	<p>X</p>	<p>X</p>					
<p>Identification of Critical/Sensitive Areas</p>	<p>Sec. 213.5(3) identifies critical features as part of Geologic Assessment report.</p>	<p>X</p>	<p>X</p>	<p>Requires buffer zones for streams and offsets for sensitive environmental features.</p>	<p>X</p>	<p>X</p>	<p>X</p>	
	<p>The Technical Manual identifies critical areas in Appendix B(9)(b) including floodplains, riparian corridors, shorelines, steep slopes, groundwater recharge and discharge structures (springs), and other significant features such as wetlands, caves, etc. Critical areas must be identified in the Master Plan as well as in the site analysis and be designated for protection.</p>			<p>Sec. 25-8, Article 2 establishes waterway classifications and Water Quality Zones (WQZs). Sec. 25-8-121 requires an environmental assessment for development located on or near sensitive areas. Sec. 1-10.2 of Environmental Criteria Manual identifies various sensitive features.</p>				
	<p>Sec. 13.109(d)(2) establishes Water Quality Buffer Zones (WQBEZ) along each waterway and around all critical environmental features, including natural springs, recharge features, and wetlands.</p>			<p>Sec. 13.110(e) prohibits impervious cover in WQBEZs. Sec. 13.111(e) restricts uses in WQBEZ to roadway crossings, trails, maintenance of vegetation, trash removal and non-obstructing fences, paths, and private drives. Sec. 13.111 (b) prohibits wastewater lift stations, utilities, except for crossings and wastewater lines, in WQBEZ.</p>				

COMPARISON OF WATER QUALITY REGULATIONS

	TCEQ	LCRA	USFWS							
Enforcement	Sec. 213.10 states that violations are subject to civil penalties and injunction.	Section 9 of the ordinance deals with enforcement with penalties including stop-work order, permit revocation, enforcement of BMPs, Maintenance Permits, and any person violating provisions of the ordinance shall be subject to a penalty of not more than \$10,000 for each violation. Each calendar day a violation exists shall constitute a separate offense.	Enforcement through water supply contract through the LCRA	X						Sec. 13.121(4) authorizes village inspector to stop work if violations are not corrected in a timely fashion. Sec. 13.123(f) establishes non-compliance with Annual WQCC as violation of village code. Sec. 13.131(c) makes violation of article an offense. Sec. 13.144 authorizes fines and criminal prosecution for code violators. Sec. 13.140 authorizes village to require performance bonds for Water Quality Controls
Fees	TCEQ assesses fees based on the size and type of development.	Sec. 6(d) establishes application fees as approved by the Board of Directors.		X						
Expiration Date of Approval	Sec. 213.4(n) sets a 2 year term which can be renewed every 6 months if the scope of the project has not changed. No further extensions will be approved if 50% of construction is not completed within 10 years of the approved plan.	Sec. 6(i)(5) establishes a one year deadline for the submission of permit applications once the Master Plan is approved. Subsequent deadlines are also established for phased developments. Sec. 6(g) provides for automatic termination if the permittee has not commenced development within 3 years from the date of the permit. Sec. 6(c) also provides for revocation of a permit upon violation of the permit conditions. Upon termination of the permit LCRA reserves the right to call on the permittee's letter of credit or other financial security in order to provide permanent stabilization of the site.	Sec. 25-9-617 establishes expiration period for site plans and preliminary subdivision plans approved prior to the effective date of said article. However, it does not establish expiration period for subsequently approved plans.	X						Sec. 13.122(6) sets non-point source (NPS) permit term to life of site or development permit or building permit. If site or building permit is terminated for non-use, NPS permit is terminated and security used for permanent stabilization of site.
Notice/Coordination with Other Political Subdivisions	Sec. 213.42(g) requires that the applicant record in the deed records of this county that the property is subject to an approved protection plan within 30 days of approval of WPAP and other related plans. Section 213.11 requires coordination with Groundwater Conservation Districts	Sec. 6(h) requires public notification by the applicant of the permit application and LCRA contacts notice of the application to property owners within 500 feet of the site. Sec. 6(i) provides for a two week public comment period. Sec. 6(j) provides that after the comment period LCRA shall issue a draft permit or deny the permit. Upon the request of the applicant or any other affected person, LCRA may hold a formal public meeting to consider the draft permit. If a public meeting is held, the final permit or the application denied within ten days after the conclusion of the public meeting. Sec. 11 requires coordination with other governments and encourages municipalities in the Lake Travis area to enter into an interlocal agreement with LCRA if they do not have a NPS Pollution Ordinance that obligates the city to adopt and administer an NPS Pollution Ordinance for new development within their jurisdiction. LCRA shall also pursue MOU or Interlocal Agreements with political subdivisions to develop and implement NPS controls for activities within their jurisdiction that might cause po	Sec. 25-9-969 requires Director to give notice to various political and regulatory entities.	X						

COMPARISON OF WATER QUALITY REGULATIONS

Issue	Regional Plan (RP)	City Manual (CM)	City Ordinance (CO)	City Code (CC)	City Ordinance (CO)	City Code (CC)
Identification of Regulated/Prohibited Activities	The Regional Plan (RP) includes draft sections regarding land use, zoning, use limitations, and the use, storage, and disposal of potentially harmful materials, including hazardous materials, pesticides, herbicides, insecticides, and nutrients. To be detailed in subsequent drafts.	X			X	
Slopes	The RP recommends requiring information regarding areas with steep slopes in site development plans during the preliminary and final platting process.	X			X	
Performance Standards Attachment #4	Presumably, the performance standards should be referenced to the Technical Reference List in Attachment #4.	X			X	
				Sec. 94.504(a) applies article to any development on land in the recharge zone or transition zone within city limits or E.I.J.		
				Sec. 94.523(d) prohibits impervious cover in Water Quality Buffer Zones with slopes of 20% or greater, unless applicant obtains approval of a mitigation plan, in which case impervious cover is limited to 10%.		
				Sec. 94.525(b) requires all BMPs to meet requirements of TCEQ Chapter 213 rules and RG-348 (Edwards Aquifer Technical Guidance Manual).		
				Sec. 94.504(a) applies article to any development on land in the recharge zone or transition zone within city limits or E.I.J.		
				Sec. 94.523(d) prohibits impervious cover in Water Quality Buffer Zones with slopes of 20% or greater, unless applicant obtains approval of a mitigation plan, in which case impervious cover is limited to 10%.		
				Sec. 94.525(b) requires all BMPs to meet requirements of TCEQ Chapter 213 rules and RG-348 (Edwards Aquifer Technical Guidance Manual).		
				Sec. 34-702 of City Code prohibits discharges of a variety of substances into storm sewers or water courses. Sec. 34-804 prohibits discharge of construction pollution into MS4. Sec. 34-901 requires all development located over the Edwards Aquifer within the city or E.I.J. to comply with provisions of Aquifer Recharge Zone and Watershed Protection Ordinance.		
				Sec. 34-913 establishes floodplain buffer zones based on slope. Sec. 37.1 of City's Technical Guidance Manual (TGM) uses erosion factors based on slope to calculate the rate of soil loss. Table 5-5 of TGM presents feasibility of BMP's regarding slope.		
				Sec. 34-806 recommends BMP applications in TCEQ RG-348. Sec. 37.2 of TGM establishes method of determining BMP efficiency using published data for each type of BMP.		

COMPARISON OF WATER QUALITY REGULATIONS

Regulatory Program	Regulation	Regulation	Regulation	Regulation	Regulation	Regulation	Regulation	Regulation	Regulation
Impervious Cover	The RP adopts the "Net Site Area" concept which excludes certain land uses from impervious cover calculations. The RP sets impervious cover (IC) limits of 15% and 20% for development without mitigation in the recharge zone and contributing zone, respectively. The RP also recommends the detailed site plan include a detailed density evaluation during final platting process.	X							
	The RP creates buffer zones along streams & watercourses with a minimum width of 100'. The RP recommends that entities require applicants to identify and provide detailed information regarding streams, critical features, and any associated buffer zones in the detailed site development plan. The RP requires applicants to submit as part of the final platting process.	X							
Water Quality Buffer Zones									
Overland Flow									
	The RP adopts the strategy of controlling hydrologic regime and recommends that site design incorporate retention/detention adequate to limit flows under developed conditions to be consistent with the 2-yr, 3-hr duration storm flows under undeveloped conditions. The RP also recommends that drainage structures providing discharge routes for flood flows be sized to maintain velocities below erosive levels for the 25-yr, 3-hr storm event.								
Flow Volume Limits									
Infiltration									

COMPARISON OF WATER QUALITY REGULATIONS

Regional Plan	San Marcos	San Marcos	San Marcos	San Marcos	San Marcos
<p>The RP recognizes the benefits of natural area preservation and creates conservation easements with deed restrictions, mitigation and habitat preservation. The RP also recognizes the benefits of preserving riparian vegetation and creates buffer zones along waterways to preserve "water quality benefits of vegetated riparian corridors along streams." The RP further addresses proper management of undeveloped land and encourages the use of livestock, cropland, and vegetative practices favorable to enhancing water quality.</p>					<p>Sec. 34-925 requires erosion control plan to include methods of slope stabilization and vegetative restoration. Sec. 34-305(g) requires final inspection to verify that final stabilization criteria have been achieved.</p>
<p>The RP describes, in order of preference, the recommended permanent structural BMPs for discharges from developed land. They are: retention/ingestion, bio-retention/bio-filtration, detention/sedimentation, sand filtration, and vegetative filter strips.</p>					
<p>The RP recommends the use of non-structural BMPs, such as impervious cover limits, conservation easements, land acquisition for habitat protection, mitigation, comprehensive site planning and review, and buffer zones for streams and critical environmental features.</p>					
<p>Vegetation</p>			X		
<p>Water Quality Controls</p>				X	
<p>Best Management Practices</p>					X
					<p>Sec. 34-511(f) requires technical report that meets all requirements for TCEQ Chapter 213 rules.</p>
					<p>Sec. 94-525(b) requires all temporary and permanent BMPs to comply with TCEQ Chapter 213 rules and RG-34b.</p>
					<p>Sec. 34-970 requires all development plans to include sufficient BMPs to remove pollutants in a manner & degree acceptable to the Watershed Protection Department, use of vegetative filter strips and an integrated post-management program.</p>

COMPARISON OF WATER QUALITY REGULATIONS

Regulation Title	San Antonio	San Antonio	San Antonio	San Antonio	San Antonio	San Antonio	San Antonio	San Antonio	San Antonio
Construction Management Water Reuse		X	X						
Erosion Control	The RP recommends that local jurisdictions require a detailed evaluation of storm water management strategies during final plat review, and evidence of SWPPP and NOI submittal prior to construction plan approval. The RP also recommends local jurisdictions seek delegation by TCEQ for TPDES permit monitoring, inspection, and enforcement.			Sec. 94.526(c) requires all temporary erosion controls to meet TCEQ Chapter 213 rules and RC-348 standards, to be installed prior to construction, and maintained during construction until permanent vegetation is established and area is stabilized.			X		Sec. 34-975 requires a comprehensive Erosion & Sedimentation Control Plan to be submitted with an application that includes sequencing, methods, and maintenance provisions.
Operations and Maintenance task	The RP recommends that the detailed site development plan include an operation, maintenance monitoring, and funding plan which identifies responsibilities for each			Sec. 94.516 and Sec. 94.517 place responsibility of BMP operation & maintenance on holder of approved plan until the obligation is assumed in writing by another entity having ownership or control of the property. Sec. 94.515(c) stipulates that the requirements and terms of an approved aquifer protection plan is transferred with ownership of the property.			X		Sec. 34-805(h) requires maintenance of BMPs until the site has reached final stabilization.
Construction Standards for Wastewater Lines							X		

COMPARISON OF WATER QUALITY REGULATIONS

Regional Plan						
<p>Wastewater Treatment/Reuse</p> <p>The RP addresses collection of wastewater and recommends implementation of full televisual monitoring of all centralized collection systems on a 3-yr basis. Regarding On Site Sewer Facilities (OSSFs) the RP recommends that public entities seek OSSF delegation for inspection and oversight. The RP also recommends requiring a detailed evaluation of wastewater management strategies as part of the detailed site development plan.</p>					X	
<p>Identification of Critical/Sensitive Areas</p> <p>The RP identifies critical environmental features (CEFs) in the planning region and places them in 4 categories: Limestone Recharge, Streams/Streambeds, Floodplain/Wetlands, and Edwards Aquifer Discharge areas. The RP recommends that both the preliminary and detailed site development plans include a detailed characterization of CEFs and associated buffer zones.</p>					X	
<p>Identification/ Protection of Critical/Sensitive and associated buffer Areas</p> <p>The RP identifies critical environmental features (CEFs) in the planning region and creates buffer zones around them which vary in size based on whether or not the feature is in direct hydrologic communication with the Edwards, and the location up or downstream of the feature. The RP recommends that both the preliminary and detailed site development plans include a detailed characterization of CEFs and associated buffer zones.</p>					X	

COMPARISON OF WATER QUALITY REGULATIONS

Regional Plan	San Marcos	San Marcos	San Marcos	San Marcos
<p>The RP recommends that local jurisdictions seek delegation from TCEQ for local review and enforcement for EAPPs, TPDES Permits, and OSSF programs, to be funded through permit and/or review fees. The RP also includes a draft section for local enforcement of construction site controls to be detailed in subsequent enforcement drafts.</p>	<p>Sec. 94.518 authorizes inspections and technicians of City departments to issue municipal court citations for violations, with subsequent court action, billings, and collection of fines. The city attorney is authorized to prosecute violations and file injunctions to enforce the ordinance.</p>	<p>Sec. 34-808 authorizes city attorney to pursue all legal, equitable, and criminal remedies to enforce ordinances, and establishes violations of ordinance as a misdemeanor. Sec. 34-809 authorizes SAWS to enforce the ordinance.</p>	<p>X</p>	<p>X</p>
<p>Enforcement</p>	<p>X</p>	<p>X</p>	<p>X</p>	<p>X</p>
<p>Fees</p>				
<p>Expiration Date of Approval</p>				
<p>Required Notice/Coordination with Other Political Subdivisional</p>				<p>Sec. 34-805 requires SWPPP, NOI and NOT sent simultaneously to SAWS, EPA, and TCEQ.</p>

Appendix J
Technical Reference List

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Appendix K

Existing Authorities Matrix for Governmental Entities in the Planning Region

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
<p>General Ordinance or Rule-making Authority</p>	<p>Full power of local self-government. § 51.072 - .079. Any ordinance necessary to protect health, life and property. § 54.004. May promote and protect general health, safety and welfare of persons in ETJ. § 42.001.</p>	<p>Type A (Dripping Springs; Bee Caves; Rollingwood; Sunset Valley; Buda): Any ordinance necessary for the government, interest, welfare or good order of the city. § 51.001; .011 - .016 Type B: Any ordinance for proper governance. Generally same powers as Type A. § 51.031 - .035. Type C: Generally same powers as Type A. § 51.051 - .052. May promote and protect general health, safety and welfare of persons in ETJ. § 42.001.</p>	<p>No general grant of authority; all powers must be specifically granted by law.</p>	<p>Hays-Trinity GWCD: To conserve, preserve recharge and prevent waste of GW in western Hays County. All Chapter 36 TWC powers. BS-EA GWCD: To conserve, protect and enhance GW resources of BS segment of Edwards Aquifer. All Chapter 36 TWC powers. Blanco-Pedernales GWCD: To conserve, preserve, protect, recharge and prevent waste of Edwards-Trinity Plateau Aquifer (and 4 other aquifers) in Blanco County.</p>

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
<p>Regulatory Power to Protect Streams and Watersheds</p>	<p>May police and prohibit pollution and degradation of watershed, stream, drain, or tributary that recharges a city water supply, both in city and ETJ. § 401.002.</p> <p>May regulate nonpoint pollution sources thru pollution control & abatement plans, both in city and ETJ. § 26.177 TWC.</p> <p>May enact Austin SOS Ordinance-type protections (impervious cover limits and non-degradation effluent limits). <i>Austin v. Quick case.</i></p>	<p>May regulate nonpoint pollution sources thru pollution control & abatement plans, both in city and ETJ. § 26.177 TWC.</p> <p>May regulate public water supplies inside or outside city for convenience of residents and to prevent waste of water. § 402.015 - .016.</p>	<p>Under SB 873, may regulate plats and subdivisions of land to promote health, safety, morals, & general welfare and safe, orderly, healthful development of unincorporated areas. § 232.101.</p>	<p>Make and enforce rules for conserving and protecting groundwater to control waste of groundwater. § 36.101</p> <p>No other specific statutory authority to enact ordinances to protect streams and watersheds.</p>
<p>Regulation of Subdivision Plats.</p>	<p>May regulate plats and subdivisions within city or ETJ to promote health, safety or general welfare of city and safe, orderly and healthful development of city. § 212.002 - .003.</p> <p>Must allocate jurisdiction with county over ETJ plats. § 242.001.</p> <p>Utility service prohibited in city or ETJ unless developer has certificate of compliance with plat requirements. § 212.0115 - .012.</p>	<p>May regulate plats and subdivisions within city or ETJ to promote health, safety or general welfare of city and safe, orderly and healthful development of city. § 212.002 - .003.</p> <p>Must allocate jurisdiction with county over ETJ plats. § 242.001.</p> <p>Utility service prohibited in city or ETJ unless developer has certificate of compliance with plat requirements. § 212.0115 - .012.</p>	<p>May regulate plats and subdivision of land in unincorporated areas including city ETJ areas. § 232.001 - .002.</p> <p>Under SB 873, may regulate lot frontages on county roads; building and setback line limits; and major roadway widths. § 232.100 - .107; § 233.032 (re: building and setbacks).</p> <p>Must allocate jurisdiction with city over ETJ plats. § 242.001.</p>	<p>No specific statutory authority to regulate subdivision plats.</p>

All references are to Texas Local Government Code unless otherwise indicated.

THSC = Texas Health & Safety Code; TWC = Texas Water Code; TPWC = Texas Parks & Wildlife Code

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Zoning	May enact zoning regs within city limits (height, size, occupancy, density, location and use of buildings). § 211.003.	May enact zoning regs within city limits (height, size, occupancy, density, location and use of buildings). § 211.003.	May not enact zoning ordinances, even in unincorporated areas of county. § 232.101(b).	May not enact zoning ordinances.
Drainage Requirements	May regulate drainage as part of subdivision plat approval authority in unincorporated areas. § 212.002 - .003. May adopt Subchap. C of Chap. 402 and establish Municipal Drainage Utility to charge uniform rates and provide drainage services to all property in service area (up to ETJ for cities with land in Edwards recharge/transition zone. § 402.041 - .054.	May regulate drainage as part of subdivision plat approval authority in unincorporated areas. § 212.002 - .003. May adopt Subchap. C of Chap. 402 and establish Municipal Drainage Utility to charge uniform rates and provide drainage services to all property in service area (up to ETJ for cities with land in Edwards recharge/transition zone. § 402.041 - .054. May place a drain in street, change grade of land, and regulate culverts. Tx. Trans. Code § 311.002 - .003.	May regulate drainage as part of subdivision plat approval authority in unincorporated areas including city ETJ areas. § 232.001 - .003.	May drain lakes, depressions, draws and creeks. § 36.103 TWC.
Regulation of Hazardous Substances	May establish program for collection & disposal of household consumer and agricultural products containing hazardous constituents or hazardous substances, incl. waste collection sites and events. § 26.0135(g) TWC. May regulate hazardous substances in ETJ to protect water supply. AG Op. JM-226(1984)	May establish program for collection & disposal of household consumer and agricultural products containing hazardous constituents or hazardous substances, incl. waste collection sites and events. § 26.0135(g) TWC.	May establish program for collection & disposal of household consumer and agricultural products containing hazardous constituents or hazardous substances, incl. waste collection sites and events. § 26.0135(g) TWC.	May establish program for collection & disposal of household consumer and agricultural products containing hazardous constituents or hazardous substances, incl. waste collection sites and events. § 26.0135(g) TWC.

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GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Enter Into Developer Agreements	May agree with landowner to extend city's planning authority to ETJ land under max. 45-year development plan authorizing land uses and development different from in-city rules. § 212.171 - .174 (HB 1197).	May agree with landowner to extend city's planning authority to ETJ land under max. 45-year development plan authorizing land uses and development different from in-city rules. § 212.171 - .174 (HB 1197).	Under SB 873, may enter into developer participation contracts to construct public improvements related to development, but not buildings (30% limit on county participation). § 232.105.	No specific statutory authority to waive otherwise applicable requirements in developer agreements.
Require Certification of Adequacy of Groundwater Sources	May require that a subdivision plat for land supplied by GW be certified as having adequate supply of GW. § 212.0101.	May require that a subdivision plat for land supplied by GW be certified as having adequate supply of GW. § 212.0101.	May require subdivision plat applicant to provide engineer's certification of adequacy of GW supplies. § 232.0032.	Has authority to require permits for new GW wells, and set spacing and production requirements. § 36.113 - .117 TWC.
Utility Design Requirements	May require plat to conform to general plan of city and its current and future public utility facilities. § 212.010. May extend development ordinances incl. utility design and construction standards to city's ETJ. <i>City of Lucas v. N. Tx. Mun. Water Dist. case.</i> May enact more stringent public water supply standards than TCEQ. § 341.081 THSC.	May require plat to conform to general plan of city and its current and future public utility facilities. § 212.010. May extend development ordinances incl. utility design and construction standards to city's ETJ. <i>City of Lucas v. N. Tx. Mun. Water Dist. case.</i>	No specific statutory authority to regulate utility design and construction.	No specific statutory authority to regulate utility design and construction.
Ownership and Operation of Proprietary Water/Sewer Utility	May acquire, own, operate and regulate connections to municipal water or sewer utility inside or outside city. § 402.001.	May acquire, own, operate and regulate connections to municipal water or sewer utility inside or outside city. § 402.001.	County may acquire, own and operate water or sewer utility system to serve unincorporated areas. § 412.016. (e.g., Hays County creation of Hays County Water & Sewer Authority on 05/09/2000.)	No specific statutory authority to own or regulate utility service.

All references are to Texas Local Government Code unless otherwise indicated.
THSC = Texas Health & Safety Code; TWC = Texas Water Code; TPWC = Texas Parks & Wildlife Code

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Regulation of On-Site Sewerage Facilities (septic tanks)	May implement and enforce TCEQ OSSF permitting rules if designated as TCEQ agent . § 366.001 - .071 THSC.	May implement and enforce TCEQ OSSF permitting rules if designated as TCEQ agent . § 366.001 - .071 THSC.	May implement and enforce TCEQ OSSF permitting rules if designated as TCEQ agent . § 366.001 - .071 THSC.	May implement and enforce TCEQ OSSF permitting rules if designated as TCEQ agent . § 366.001 - .071 THSC.
Solid Waste Management	May regulate solid waste collection, handling, transportation, storage, processing and disposal consistent with TCEQ regs. § 363.111 - 112 THSC. May not abolish or restrict use or operation of existing solid waste facility in city or ETJ. § 361.166 THSC.	May regulate solid waste collection, handling, transportation, storage, processing and disposal consistent with TCEQ regs. § 363.111 - 112 THSC. May not abolish or restrict use or operation of existing solid waste facility in city or ETJ. § 361.166 THSC.	May regulate solid waste collection, handling, transportation, storage, processing and disposal consistent with TCEQ regs. in unincorporated areas § 363.111 - 112 THSC; § 364.001 - .016 THSC. May license and regulate solid waste facilities in unincorporated areas under rules approved by TCEQ. § 361.154 - .162 THSC.	No specific statutory authority to regulate solid waste.
Litter, Nuisances and Unsanitary Conditions	May require the filling, draining of any area and regulate any place that is unwholesome or in any unsanitary condition that could produce disease. § 342.001 - .022 THSC.	May require the filling, draining of any area and regulate any place that is unwholesome or in any unsanitary condition that could produce disease. § 342.001 - .022 THSC.	May abate public nuisance and regulate storage of refuse and unsanitary conditions in unincorporated areas. § 343.011 - .025 THSC. May regulate and remove improperly disposed litter in unincorporated areas. §§ 365.017, 365.034 THSC.	No specific statutory authority to abate litter or other unsanitary conditions.
Capping of Uncovered Water Wells	No specific statutory authority to require capping of wells.	No specific statutory authority to require capping of wells.	No specific statutory authority to require capping of wells.	May require landowner to cap any open or uncovered well. § 36.118 TWC.

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GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Habitat Conservation Plan	<p>May develop and implement habitat conservation plan. § 83.011 - .020 TPWC.</p> <p>May agree with landowner in city or ETJ to establish alternative land development standards to facilitate creation of habitat preserve. § 83.013 TPWC.</p> <p>May not impose an ordinance or regulation related to endangered species unless such ordinance or regulation is necessary to implement a habitat conservation plan. § 83.014 TPWC.</p>	<p>May develop and implement habitat conservation plan. § 83.011 - .020 TPWC.</p> <p>May not impose an ordinance or regulation related to endangered species unless such ordinance or regulation is necessary to implement a habitat conservation plan. § 83.014 TPWC.</p>	<p>May develop and implement habitat conservation plan. § 83.011 - .020 TPWC.</p> <p>May not impose an ordinance or regulation related to endangered species unless such ordinance or regulation is necessary to implement a habitat conservation plan. § 83.014 TPWC.</p>	<p>May participate in study and creation of habitat conservation plan. § 83.013 TPWC.</p>
Regulation of Land Use for Flood Control Purposes	<p>May take reasonable and necessary actions to comply with Nat. Flood Ins. program, incl. regulation of land development to minimize flood damage. § 16.311 - .324 TWC.</p>	<p>May take reasonable and necessary actions to comply with Nat. Flood Ins. program, incl. regulation of land development to minimize flood damage. § 16.311 - .324 TWC.</p>	<p>May take reasonable and necessary actions to comply with Nat. Flood Ins. program, incl. regulation of land development to minimize flood damage. § 16.311 - .324 TWC.</p>	<p>May take reasonable and necessary actions to comply with Nat. Flood Ins. program, incl. regulation of land development to minimize flood damage. § 16.311 - .324 TWC.</p>
Eminent Domain and Condemnation	<p>May acquire property by condemnation inside or outside of city for water and sewer facilities, parklands, and roadways and may regulate use of such acquired property. § 273.001 - .009.</p>	<p>May acquire property by condemnation inside or outside of city for water and sewer facilities, parklands, and roadways and may regulate use of such acquired property. § 273.001 - .009.</p>	<p>May acquire property by condemnation inside or outside of city for water and sewer facilities, parklands, and roadways and may regulate use of such acquired property. § 273.001 - .009.</p>	<p>May acquire property within boundaries of district by condemnation if necessary to purposes of district. § 36.015 TWC.</p>

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GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Require Financial Assurance of Developers	May require as condition of plat approval that developer provide sufficient surety to guarantee that claims against the development will be satisfied if default occurs. § 212.901.	May require as condition of plat approval that developer provide sufficient surety to guarantee that claims against the development will be satisfied if default occurs. § 212.901.	May require as condition of subdivision plat approval that landowner post financial assurance adequate to ensure proper and timely construction of drainage and roadways. §§ 232.004 - .0045; 232.105.	No specific statutory authority to require financial assurance.
Power to Enter and Inspect Private Property	May enter and inspect public or private property within its jurisdiction to investigate conditions relating to water quality. § 26.171 TWC; § 26.173 TWC.	May enter and inspect public or private property within its jurisdiction to investigate conditions relating to water quality. § 26.171 TWC; § 26.173 TWC.	May enter and inspect public or private property within its jurisdiction to investigate conditions relating to water quality. § 26.171 TWC; § 26.173 TWC.	May enter and inspect public or private property within its jurisdiction to investigate conditions relating to water quality. § 26.171 TWC; § 26.173 TWC. § 36.123 TWC
Enforcement Authority	May impose fine up to \$2000 for violations of ordinances re: public health or safety. § 54.001. May bring civil action to enjoin and obtain civil penalties up to \$1000 (or \$5000 for point source pollution) to enforce land development ordinances. § 54.012-.016. May enforce requirements under Chaps. 26 TWC and 361 THSC thru civil penalties up to \$25,000/day and recover costs and atty fees. § 7.351 TWC.	May impose fine up to \$2000 for violations of ordinances re: public health or safety. § 54.001. May bring civil action to enjoin and obtain civil penalties up to \$1000 (or \$5000 for point source pollution) to enforce land development ordinances. § 54.012-.016. May enforce requirements under Chaps. 26 TWC and 361 THSC thru civil penalties up to \$25,000/day and recover costs and atty fees. § 7.351 TWC.	May bring civil action to enjoin and recover damages for violations of county platting requirements. Criminal Class B misdemeanor for knowing or intentional violations of platting requirements. § 232.005. May enforce requirements under Chaps. 26 TWC and 361 THSC thru civil penalties up to \$25,000/day and recover costs and atty fees. § 7.351 TWC.	May enforce district rules thru injunction and civil penalties up to \$10,000/day, plus court costs and attys fees. § 36.102 TWC.

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Moratoriums on Development	May impose up to 120-day moratorium on property development if needed to prevent shortage of essential public facilities (water, sewer, storm drainage). § 212.131 - .138.	May impose up to 120-day moratorium on property development if needed to prevent shortage of essential public facilities (water, sewer, storm drainage). § 212.131 - .138.	No specific statutory authority to impose moratoriums.	No specific statutory authority to impose moratoriums.
Creation and Operation of Public Facility Corporation (PFC)	May sponsor creation of PFC with "broadest possible powers" to finance, acquire, operate public facilities (any real or personal property devoted to public use).	May sponsor creation of PFC with "broadest possible powers" to finance, acquire, operate public facilities (any real or personal property devoted to public use).	May sponsor creation of PFC with "broadest possible powers" to finance, acquire, operate public facilities (any real or personal property devoted to public use).	May sponsor creation of PFC with "broadest possible powers" to finance, acquire, operate public facilities (any real or personal property devoted to public use).
Creation of Public Improvement District (PID)	May create PID upon petition of affected landowners to acquire water, wastewater, drainage, parks, roadways financed thru AV taxes on property within district. § 372.001 - .030.	May create PID upon petition of affected landowners to acquire water, wastewater, drainage, parks, roadways financed thru AV taxes on property within district. § 372.001 - .030.	May create PID upon petition of affected landowners to acquire water, wastewater, drainage, parks, roadways financed thru AV taxes on property within district. § 372.001 - .030.	No specific statutory authority to create PID.
Establishment of Regional Planning Commission (RPC)	May join with any governmental unit(s) to establish RPC as separate political subdivision for regional area to plan for public utilities, land uses, water supply, sanitation facilities, drainage, open spaces, and population densities. § 391.001 - .015.	May join with any governmental unit(s) to establish RPC as separate political subdivision for regional area to plan for public utilities, land uses, water supply, sanitation facilities, drainage, open spaces, and population densities. § 391.001 - .015.	May join with any governmental unit(s) to establish RPC as separate political subdivision for regional area to plan for public utilities, land uses, water supply, sanitation facilities, drainage, open spaces, and population densities. § 391.001 - .015.	May participate in RPC. § 391.003.

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GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	HOME RULE CITY (Austin; Kyle)	GENERAL LAW CITY	COUNTY (Travis, Hays and Blanco Counties)	GROUNDWATER CONS. DISTRICTS
Cooperative Agreements	May enter into cooperative agreements with TCEQ and any local government to perform water quality management, inspection, enforcement, technical aid and education functions. § 26.175 TWC.	May enter into cooperative agreements with TCEQ and any local government to perform water quality management, inspection, enforcement, technical aid and education functions. § 26.175 TWC.	May enter into cooperative agreements with TCEQ and any local government to perform water quality management, inspection, enforcement, technical aid and education functions. § 26.175 TWC.	May enter into cooperative agreements with TCEQ and any local government to perform water quality management, inspection, enforcement, technical aid and education functions. § 26.175 TWC.
Creation of Economic Development Corp.	May create economic development corp. (funded by sales and use taxes) for economic development projects, including water pollution control, water supply, water conservation and waste disposal facilities. V.T.C.S. Art. 5190.6.	May create economic development corp. (funded by sales and use taxes) for economic development projects, including water pollution control, water supply, water conservation and waste disposal facilities. V.T.C.S. Art. 5190.6.	May create economic development corp. (funded by sales and use taxes) for economic development projects, including water pollution control, water supply, water conservation and waste disposal facilities. V.T.C.S. Art. 5190.6.	May create economic development corp. (funded by sales and use taxes) for economic development projects, including water pollution control, water supply, water conservation and waste disposal facilities. V.T.C.S. Art. 5190.6.

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GOVERNMENTAL AUTHORITY MATRIX
for the
Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

SUPPLEMENTAL MATRIX OF LEGAL AUTHORITIES
For Northern Hays-Western Travis County Regional Water Quality Protection Plan

LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
Purposes For Which District is Created	[Refer to specific statute authorizing particular type of district]	<ul style="list-style-type: none"> • control and distribution of water; • reclamation and irrigation of land; • development of forests, water and hydroelectric power; • navigation of waterways; • control of excesses of water; • preserving and restoring purity and sanitary condition of water; • conservation of natural resources. § 51.121 	<ul style="list-style-type: none"> • control and distribution of water; • reclamation and irrigation of land; • development of forests, water and hydroelectric power; • navigation of waterways; • control of excesses of water; • preserving and restoring purity and sanitary condition of water; • conservation of natural resources. § 54.012 	Control, preservation and distribution of Colorado River watershed waters within LCRA boundaries for: <ul style="list-style-type: none"> • irrigation; • power generation; • land reclamation; • parklands; • conservation and development of water; • conservation and development of forests. § 222.001; 222.004; 222.016

GOVERNMENTAL AUTHORITY MATRIX
for the
Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
General Ordinance or Rule-making Authority	As necessary to implement the purposes for which the district was created. § 49.211.	<p>May adopt rules to:</p> <ul style="list-style-type: none"> • maintain safe and sanitary sewer system; • preserve the sanitary condition of water controlled by the district; • prevent waste or unauthorized use of water; • regulate privileges on district property (i.e., hunting, fishing, boating, camping). • maintain safe and adequate freshwater distribution system. § 51.127 	<p>May adopt rules to:</p> <ul style="list-style-type: none"> • maintain safe and sanitary sewer system; • preserve the sanitary condition of water controlled by the district; • prevent waste or unauthorized use of water; • regulate privileges on district property (i.e., hunting, fishing, boating, camping). • maintain safe and adequate freshwater distribution system. § 54.205 	<p>May adopt rules as necessary to implement the purposes for which the district was created. §§ 222.001; 222.004; 222.016</p> <p>May adopt and enforce pollution control rules through exercise of police powers within LCRA boundaries. § 222.004(q)</p>

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
<p>Power to Acquire, Construct and Operate Facilities</p>	<p>May acquire, construct, operate, improve or extend facilities necessary for accomplishment of district's purposes, both inside and outside district boundaries. § 49.211</p>	<p>May construct works and improvements necessary for:</p> <ul style="list-style-type: none"> • prevention of floods; • irrigation of land within district; • drainage of land within district; • construction of flood control levees; • alteration of land elevations; • supplying of water. § 51.125 	<p>May acquire, construct, operate, improve or extend facilities inside and outside district boundaries for:</p> <ul style="list-style-type: none"> • supply of water; • processing, disposal or control of any wastes; • diverting and controlling local storm water in the district; • irrigating land in the district; • altering land elevations in the district; • navigating waterways; • providing parks and recreational facilities. § 54.201 	<p>May acquire, maintain, use and operate property of any kind within or outside LCRA boundaries. § 222.004(f)</p> <p>May construct, extend, improve, maintain, reconstruct, use and operate any facilities necessary and convenient to the exercise of its powers. § 222.004(j)</p> <p>May construct, own and operate a sewage collection, treatment & disposal system to protect the waters of the Colorado River within LCRA boundaries. § 222.004(r)</p>
<p>Extent of District Boundaries</p>	<p>[Refer to specific statute authorizing particular type of district]</p>	<p>May encompass one or more counties, cities or political subdivisions. Boundaries may encompass separate, non-contiguous tracts of land. § 51.012</p>	<p>May encompass one or more counties, cities or political subdivisions. Boundaries may encompass separate, non-contiguous tracts of land. § 54.103</p>	<p>All land within 10 counties: Blanco, Burnet, Llano, Travis, Bastrop, Fayette, Colorado, Wharton, San Saba, and Matagorda (not Hays County) § 222.003</p>

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GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays–Western Travis–Eastern Blanco County

LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
Regulation and Control of Water Pollution	May investigate conditions relating to water quality and compliance with district's water quality rules. § 49.221	May provide for the protection, preservation and restoration of purity and sanitary condition of any water in the state. § 51.121 May prevent waste of water. § 51.127	May provide for the protection, preservation and restoration of purity and sanitary condition of any water in the state. § 54.012 May prevent waste of water. § 54.205	May provide for the study, correcting and control of artificial and natural pollution of all groundwater and surface water of Colorado River watershed waters within LCRA's boundaries. May adopt and enforce pollution control rules within LCRA boundaries. § 222.004(q)
Regulation and Control of Wastes and Wastewater	May contract for collection, conveyance, treatment and disposal of wastes. § 49.213	May provide for restoration of purity and sanitary condition of any water. § 51.124; § 51.127. May maintain a sanitary sewer system. § 51.127	May take any action to collect, transport, process, dispose and control wastes. § 54.201. May maintain and regulate a sanitary sewer system and preserve the sanitary condition of water. § 54.205	May own and operate a sewage and waste collection, treatment and disposal system and provide such services within LCRA boundaries. § 222.004(r)
Drainage and Flood Control	May adopt a master drainage plan including plan and design criteria for drainage control facilities and flood control improvements. May adopt rules for construction activity concerning drainage and flood control. § 49.211(c) May contract for diverting and control of local storm water. § 49.213	May construct facilities for flood control, drainage of land, and alteration of land elevations. §§ 51.121; 51.125 May control and abate harmful excesses of water. § 54.121	May construct facilities for control and drainage of local storm water. §§ 54.012; 54.201 May control and abate harmful excesses of water. § 54.012	May control Colorado River watershed waters within LCRA boundaries for reclamation of land and conservation and development of water. § 222.001 May prevent soil erosion, floods, and damage to persons or property from Colorado River waters. § 222.004(e).

GOVERNMENTAL AUTHORITY MATRIX

for the

Regional Water Quality Protection Plan for Northern Hays-Western Travis-Eastern Blanco County

LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
Regulation of Soil Erosion and Soil Conservation	No specific statutory authority to regulate soil conservation practices, other than power to regulate drainage and storm water controls.	May take actions necessary for reclamation and irrigation of land and forests; for control of harmful excesses of water; and for conservation of natural resources. § 51.121	May take actions necessary for reclamation and irrigation of land and forests; for control of harmful excesses of water; and for conservation of natural resources. § 54.012	May take action necessary for land reclamation, and conservation of water and forests, § 222.001; 22.004 May prevent soil erosion within Colorado River watershed lands within LCRA boundaries. § 222.004(e); § 222.013(c)
Regulation of Subdivision Plats	No specific statutory authority to regulate subdivision plats.	No specific statutory authority to regulate subdivision plats.	No specific statutory authority to regulate subdivision plats.	No specific statutory authority to regulate subdivision plats.
Zoning	No specific statutory authority to regulate zoning.	No specific statutory authority to regulate zoning.	No specific statutory authority to regulate zoning.	No specific statutory authority to regulate zoning.
Enter Into Developer Agreements	May enter into contracts with any person for: <ul style="list-style-type: none"> • purchase/sale of water; • collection, treatment & disposal of wastes; • control of local storm water; • orderly development of land in the district; • O & M of district facilities. § 49.213 	May enter into any contracts as necessary to accomplish its purposes. § 51.121	May enter into any contracts as necessary to accomplish its purposes. § 54.201	May enter into any contracts as necessary to accomplish its purposes. §§222.001; 222.004

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LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
Ownership and Operation of Proprietary Water/Sewer Utility	May construct all facilities necessary to accomplish its purposes, either inside or outside its boundaries. § 49.211	May construct works and improvements necessary for: <ul style="list-style-type: none"> • prevention of floods; • irrigation of land within district; • drainage of land within district; • construction of flood control levees; • alteration of land elevations; • supplying of water. § 51.125 	May acquire, construct, operate, improve or extend facilities inside and outside district boundaries for: <ul style="list-style-type: none"> • supply of water; • processing, disposal or control of any wastes; • diverting and controlling local storm water in the district; • irrigating land in the district; 	May construct, extend, improve, maintain, reconstruct, use and operate any facilities necessary and convenient to the exercise of its powers. § 222.004(j) May construct, own and operate a sewage collection, treatment & disposal system to protect the waters of the Colorado River within LCRA boundaries. § 222.004(r)
Regulate Utility Design and Operations	No specific statutory authority to regulate design and operations of non-district utility facilities.	No specific statutory authority to regulate design and operations of non-district utility facilities.	No specific statutory authority to regulate design and operations of non-district utility facilities.	No specific statutory authority to regulate design and operations of non-LCRA utility facilities.
Regulation of On-Site Sewerage Facilities (septic tanks)	District that operates a wastewater system may prohibit installation of private on-site wastewater holding or treatment facilities. § 49.234	No specific statutory authority to regulate on-site sewerage facilities.	No specific statutory authority to regulate on-site sewerage facilities.	TCEQ authorized LCRA jurisdiction over 2,200 feet from msl contour of Highland Lakes (includes area within cities of Jonestown, Briarcliff, Lakeway, Lago Vista, and Granite Shoals). §§ 366.001 - .071 THSC

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Solid Waste Management	May enter into contracts for treatment & disposal of municipal solid wastes and other wastes. § 49.213	No specific statutory authority to regulate solid waste management	No specific statutory authority to regulate solid waste management	No specific statutory authority to regulate solid waste management, but may enforce pollution control rules within its boundaries. § 222.004(q)
Litter, Nuisances and Unsanitary Conditions	May investigate conditions relating to water quality and compliance with district's water quality rules. § 49.221	May provide for the protection, preservation and restoration of purity and sanitary condition of any water in the state. § 51.121 May prevent waste of water. § 51.127	May provide for the protection, preservation and restoration of purity and sanitary condition of any water in the state. § 54.012 May prevent waste of water. § 54.205	May provide for the study, correcting and control of artificial and natural pollution of all groundwater and surface water of Colorado River watershed waters within LCRA's boundaries. May adopt and enforce pollution control rules within LCRA boundaries. § 222.004(q)
Parklands and Recreational Facilities	May develop parks and recreational facilities (including landscaping, parkways, greenbelts, sidewalks, trails, public r-o-w beautification projects and associated street lighting). §§ 49.461 - .466	No specific authority to develop parklands and recreational facilities other than as granted to all water districts under §§ 49.461 - .466.	May construct parks and recreational facilities to serve inhabitants of the MUD. § 54.201.	May develop and manage parks, recreational facilities and natural science labs and promote the preservation of fish & wildlife within LCRA boundaries. § 222.004(s)
Eminent Domain and Condemnation	May acquire by eminent domain any interest in property (except groundwater rights) necessary to accomplish its purposes. § 49.222	No specific eminent domain powers other than as granted to all water districts under § 49.222.	No specific eminent domain powers other than as granted to all water districts under § 49.222.	May condemn an interest in property inside or outside its boundaries (except property of a political subdivision) necessary or convenient to the exercise of its powers. § 222.004(g)

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GOVERNMENTAL AUTHORITY MATRIX
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LEGAL AUTHORITY OR POWER	All Art. XVI, Sec. 59 Water Districts - Powers Under Chap. 49 Tx. Water Code (LCRA; WCIDs; MUDs)	Water Control and Improvement Districts (WCIDs)	Municipal Utility Districts (MUDs)	Lower Colorado River Authority (LCRA)
Require Financial Assurance of Developers	No specific statutory authority to require financial assurance of land developers.	No specific statutory authority to require financial assurance of land developers.	No specific statutory authority to require financial assurance of land developers.	No specific statutory authority to require financial assurance of land developers.
Power to Enter and Inspect Private Property	May go onto private or public property to inspect, survey & test property for suitability for placement of district facilities. May inspect and investigate conditions relating to water quality or compliance with district rules, permits or orders. § 49.221	No specific power to enter property other than as granted to all water districts under § 49.221.	No specific power to enter property other than as granted to all water districts under § 49.221.	May adopt and enforce pollution control rules through exercise of police powers within LCRA boundaries. § 222.004(q)
Enforcement Authority	May set civil penalties for breach of any district rule up to jurisdiction of J.P. court (\$5,000) and recover attorney fees and court costs. § 49.004	No specific enforcement powers other than as granted to all water districts under § 49.004.	No specific enforcement powers other than as granted to all water districts under § 49.004.	May adopt and enforce pollution control rules through exercise of police powers within LCRA boundaries. § 222.004(q)
Right to Convert to Another Type of District	Any Art. XVI, Sec. 59 water district may convert to a WCID or a MUD. § 51.040; § 54.030	May convert to a MUD or to a freshwater supply district. § 54.030; § 51.045	May convert to a WCID. § 51.040	No specific power to convert to another type of district.



Appendix L
Implementation Matrix



Implementation Matrix

Water Quality Protection Measure	Home Rule Municipalities: Austin, Kyle	General Law Municipalities: Bear Creek, Bee Cave, Buda, Dripping Springs, Hay, Mountain City, Lakeway	Counties: Hays, Travis & Blanco	Groundwater Conservation Districts: Barton Springs/Edwards Aquifer, Hays Trinity & Blanco-Pedernales	Other Governmental Entities	The General Public
Natural Area/Open Space Conservation	Full - Both Voluntary & With Inc. Intensity	Full - Both Voluntary & With Inc. Intensity	Full	Partial - In support of muni. or county	Partial - In support of muni. or county	Partial - Voluntary
Transferrable Development Rights	Full	Full	Partial - Limited in Ability to regulate intensity	No	No	No
Comprehensive Site Planning and Pre-Development Review	Full	Full	Full	Limited - No site plan review	Limited - No site plan review	No
Location of Development	Full	Full	Full	Limited - No site plan review	Limited - No site plan review	No
Intensity of Development	Full	Full	Limited - limited ability to regulate intensity	Limited - No site plan review	Limited - No site plan review	No
Control of Hydrologic Regime	Full	Full	Full	Limited - No site plan review	Limited - No site plan review	No
Structural BMPs for Discharges from Developed Land	Full	Full	Full	Limited - No site plan review	Limited - No site plan review	No
Local Enforcement of Construction Site Controls	Full - If Delegated	Full - If Delegated	Full - If Delegated	Limited - No site plan review	Limited - No site plan review	No
Wastewater Management	Full - If Delegated	Full - If Delegated	Full - If Delegated	Limited - No site plan review	Limited - No site plan review	No
Alternative Water Sources/Uses and Conservation	Full	Full	Full	Limited - No site plan review	Limited - No site plan review	Limited
Characteristics of Development	Full	Full	Full	Limited - No site plan review	Limited - No site plan review	No
Land Use Restrictions	Full ICL, Partial ETJ	Full ICL, Partial ETJ	Partial - No zoning powers, limited land use controls	No	No	No
Restrictions on Use, Storage and Disposal of Potentially Harmful Materials	Full	Full	Full	Limited - in support of other entities	Limited	Limited
Proper Vegetative Management	Full - Own Projects, Partial - Others	Full - Own Projects, Partial - Others	Full - Own Projects, Partial - Others	Partial	Partial	Full
Proper Agricultural Practices	Limited - Only to ag. Projects under muni. Control	Limited - Only to ag. Projects under muni. Control	Limited - Only to ag. Projects under county control	Limited - Only to ag. Projects under district control	Limited - Only to ag. Projects under district control	Full

Implementation Matrix

Water Quality Protection Measure	Home Rule Municipalities: Austin, Kyle	General Law Municipalities: Bear Creek, Bee Cave, Buda, Dripping Springs, Hay, Mountain City, Lakeway	Counties: Hays, Travis & Blanco	Groundwater Conservation Districts: Barton Springs/Edwards Aquifer, Hays Trinity & Blanco-Pedernales	Other Governmental Entities	The General Public
Protection of Endangered Species	Partial - cooperative agreements with USFWS & other agencies Full	Partial - cooperative agreements with USFWS & other agencies Full	Partial - cooperative agreements with USFWS & other agencies Full	Limited - cooperative agreements with USFWS & other agencies Full	Limited - cooperative agreements with USFWS & other agencies Full	Limited - cooperative agreements with USFWS & other agencies Full
Public Education/Outreach	Full	Full	Full	Full	Full	Full

KEY: BPGCD = Blanco-Pedernales Groundwater Conservation District
 BSEACD = Barton Spring Edwards Aquifer Conservation District
 CC = Core Committee
 CEF = Critical Environmental Features
 CZ = Contributing Zone
 EC = Executive Committee
 GCD = Groundwater Conservation District
 HTGCD = Hays Trinity Groundwater Conservation District
 IC = Impervious Cover
 LCRA = Lower Colorado River Authority

Appendix M
Standardized Pre-Development Review Checklists

**Pre-Development Checklist
for the
Regional Water Quality Protection Plan**

LOCATION OF PROPOSED PROJECT (please check one)

_____ RECHARGE ZONE?
_____ CONTRIBUTING ZONE?
_____ WITHIN THE CITY LIMITS OF THE CITY OF _____
_____ WITHIN THE ETJ OF THE CITY OF _____

NAME AND LOCATION

PROJECT NAME _____
SUBDIVISION NAME _____ LOT _____ BLOCK _____
STREET ADDRESS _____
STREET LOCATION _____ AT _____
OR _____ DISTANCE IN _____ DIRECTION FROM THE INTERSECTION OF _____
_____ AND _____

ATTRIBUTES

JURISDICTION _____ COUNTY _____ TR = Travis HY= Hayes
BL = Blanco
IF WITHIN A MUNICIPAL UTILITY DISTRICT, GIVE NAME _____
WATERSHED(S) _____ IN RECHARGE ZONE? YES NO
IN CONTRIBUTING ZONE? YES NO
SIZE OF PROPERTY _____ ACRES
SIZE OF PROJECT _____ ACRES

RELATED CASES

PRE-DEVELOPMENT ASSESSMENT CASE NO _____ SITE PLAN CASE NO _____
ZONING CASE NO _____ SUBDIVISION CASE NO _____
OTHER
(specify) _____

OWNER INFORMATION:

NAME _____ CONTACT _____
STREET ADDRESS _____
CITY / STATE / ZIP _____ TELEPHONE # _____
E-mail Address _____

Pre-Development Checklist
for the
Regional Water Quality Protection Plan

PRIMARY CONTACT AGENT INFORMATION

FIRM NAME _____ CONTACT _____
STREET ADDRESS _____
CITY / STATE / ZIP _____ TELEPHONE # _____
E-mail Address _____

ENGINEER INFORMATION:

FIRM NAME _____ CONTACT _____
STREET ADDRESS _____
CITY / STATE / ZIP _____ TELEPHONE # _____
STATE OF TEXAS P.E. No. _____ E-mail Address _____

SURVEYOR INFORMATION:

FIRM NAME _____ CONTACT _____
STREET ADDRESS _____
CITY / STATE / ZIP _____ TELEPHONE # _____
STATE OF TEXAS RPLS No. _____ E-mail Address _____

GEOSCIENTIST INFORMATION

FIRM NAME _____ CONTACT _____
STREET ADDRESS _____
CITY / STATE / ZIP _____ TELEPHONE # _____
E-mail Address _____

DESIGNER (OR OTHER) INFORMATION (IF APPLICABLE)

FIRM NAME _____ CONTACT _____
STREET ADDRESS _____
CITY / STATE / ZIP _____ TELEPHONE # _____
E-mail Address _____

LAND USE CATEGORIES

Single Family.....SF
Multi-Family.....MF
Duplex.....DUP
Public/Quasi-Public...PUB

Planned Unit Development.....PUD
Commercial-Office.....OFC
Commercial-Retail.....RET
Commercial-Other.....COMM

Industrial.....IND
Greenbelt.....GRBLT
Right-of-Way.....ROW

**Pre-Development Checklist
for the
Regional Water Quality Protection Plan**

PROPOSED PROJECT DESCRIPTION & LAND USE (by summary) -

Describe the proposed project, as well as the proposed land use in detail, including any unusual features or attributes (e.g., a single-family residential subdivision including a total of X number of single-family lots on approximately X acres; the project includes the use of vegetative filter strips, biofiltration, and multiple retention/irrigation systems for water quality treatment; Transferable Development Rights (TDRs) will/will not be utilized in the development of this project; wastewater collection will be by a pressure sewer system, with wastewater treatment by a centralized treatment system (TCEQ Permit No. 1XXXX-001) with ultimate disposal to a drip-irrigation system; water supply will be from a centralized distribution system through an interconnect with the _____ water system; etc...):

LOT OR BLOCK	LAND USE	EXISTING LAND USE	PROPOSED LAND USE	TOTAL ACREAGE	TOTAL I.C. AREA (AC.)	NUMBER UNITS	DENSITY	OTHER INFORMATION
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

(use additional sheet if necessary)

TOTALS: _____
(Gross Site Area) (I.C. Total) PERCENT I.C. = _____ %
(I.C. TOTAL / GROSS SITE AREA x 100)

PLEASE NOTE: The signature below of an applicant or designated agent authorizes our staff to visit and inspect the property for which this application is being submitted.

Applicant's signature _____

Date _____

Pre-Development Checklist
for the
Regional Water Quality Protection Plan

SUBMITTAL REQUIREMENTS

GENERAL SUBMITTAL REQUIREMENTS	PRE-DEVELOPMENT	
	SUBD	SITE PLAN
Application form signed by record owner or duly authorized agent.	•	•
Filing fee (See Subdivision handout).	•	•
Folded copies of the proposed development layout or plan, existing and proposed land use plan or topographic map.	•	•
Drainage plans.	•	•
Copies of letter or report describing the project, potential waivers, variances etc. or providing necessary statistical data; a description of the intent and purpose of a proposed use of Transferable Development Rights (TDRs) or General Report on a Project Assessment.	•	•
Copies of all covenants and restrictions which address any existing easements or land use restrictions.	•	•
ITEMS RECOMMENDED FOR INCLUSION IN PRE-DEVELOPMENT SUBMITTAL PACKAGE:		
Date	•	•
North point	•	•
Scale: Finals: 1" = 100' Prelims: 1" = 50' less than fifty acres 1 = 100' for 0-100 acres 1 = 200' for 100 + acres	•	•
Accurate adjacent property lines and names of adjacent subdivisions.	•	•
Topography at two-foot vertical contours, maximum 100 feet horizontally apart based on City Standard or USGS date (identify which data used on plan). Extend topography 500 feet beyond the site.	•	•
Slope map for buildable site area determination at: 0-15%, 15-25%, 25-35%, and >35%.	•	•
Boundary lines with bearings and distances.	•	•
Acreage or square footage of subdivision or site.	•	•
City limit line, when located in or near the site.	•	•
Limits of construction, including access drives.	•	•
Location of centerline of existing and proposed water courses, railroads, drainage, and transportation features.	•	•
Approximate limits of 100-year and 25-year flood plains.	•	•
Location, size, and flowline of existing storm sewers/drainage structures in or adjacent to the subdivision.	•	•
Names, locations, and sizes of existing and proposed streets, alleys, and easements, including pavement and right-of-way widths.	•	•
Location of existing and proposed off-street parking, vehicle use areas, median breaks, sidewalks, and driveways.	•	•
Location of existing and proposed parks (public and private), and any other public spaces on or adjoining the site.	•	•
Location of environmentally sensitive areas (e.g. faults, fractures, sinkholes, bluffs, seeps, and springs); environmentally protected areas, as defined in watershed ordinances (e.g. water quality zones); scientific vegetation areas showing major tree and vegetation clusters and types from aerial photos or site checks.	•	•
Location, diameter, type and crown size of existing trees eight inches or larger in diameter located on the site or having critical root zones extending into the site.	•	•
Location of landscape islands, peninsulas, landscaped medians, and buffering of parking and vehicular use areas from the street view or any other landscape improvements.	•	•
Location of any fences, walls or similar land improvements.	•	•
Location of existing and proposed electric utility facilities on site and on adjacent rights-of-way.	•	•
Location of all existing and proposed water distribution systems and wastewater collection systems to be utilized by the proposed development.	•	•
Location and dimensions of existing structures (showing which are to remain and which are to be demolished; for demolitions, show a dashed footprint) and proposed structures. Include areas of structures in sq. ft. or acres.	•	•
Proposed method of providing the following services: <ul style="list-style-type: none"> • Water service including gallons per day requirement • Wastewater disposal including gallons per day generated • Preliminary stormwater management analysis • Location of all required or proposed public facilities 	•	•
Phasing of development and manner in which each phase can exist as a stable independent unit consistent with provision of adequate public facilities and services.	•	•

**Pre-Development Checklist
for the
Regional Water Quality Protection Plan
PROCESS ASSESSMENT QUESTIONNAIRE**

Please provide the following information, where applicable, regarding your proposed development.

1. Total acreage of property to be developed is _____ acres.
Limit of construction for proposed development is _____ acres (limit of construction is an area within which any type of construction will occur, i.e., area for erosion controls, driveway, truck routing, etc.).
2. Total amount of existing impervious cover is _____ acres.
Total amount of new impervious cover is _____ acres.
Total amount of proposed cover is _____ acres. (existing + new)
3. Will the project utilize Transferable Development Rights (TDRs) in development of the project? ____ Yes ____ No.
If yes, please describe how TDRs will be utilized in developing the project.

4. Please describe any unique aspects of the proposed project: _____

In each of the following questions 5-15, please mark either the "yes" or "no" box to indicate whether the statement applies or does not apply to your proposal; and if applicable, mark additional boxes and provide requested information regarding your project.

- | | | | |
|-----|--------------------------|--------------------------|--|
| | Yes | No | |
| 5. | <input type="checkbox"/> | <input type="checkbox"/> | Will a Municipal Utility District (MUD) be created?
Name of MUD _____ |
| 6. | <input type="checkbox"/> | <input type="checkbox"/> | City water/wastewater service will be requested? |
| 7. | <input type="checkbox"/> | <input type="checkbox"/> | Will a TCEQ wastewater discharge permit be necessary? |
| 8. | <input type="checkbox"/> | <input type="checkbox"/> | The site has severe topographical or environmental constraints (steep slopes, faults, large groves of trees, etc.). Describe the situation _____

_____ |
| 9. | <input type="checkbox"/> | <input type="checkbox"/> | Trees are located on site <ul style="list-style-type: none"> <input type="checkbox"/> 8-inch and larger in diameter. <input type="checkbox"/> 19-inch and larger in diameter |
| 10. | <input type="checkbox"/> | <input type="checkbox"/> | Property to be subdivided into _____ lots (indicate the number of lots). |

Pre-Development Checklist
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Regional Water Quality Protection Plan

11. • Yes No
• Will TDRs be utilized in developing the property?
- Yes No
• Have the TDRs already been secured? If yes, please list property owner of the TDR transfer tract: _____
12. • Yes No
• Site will be cleared.
- Yes No
• Fill will placed on site.
13. • Yes No
• Current (Existing) improvements on the site:
- Paved parking = _____ acres.
 - House = _____ acres.
 - Other structure = _____ acres.
 - Driveway = _____ acres.
 - Other = _____ acres.
 - Total: = _____ acres.
14. • Yes No
• Proposed (New) improvements on the site:
- Paved parking = _____ acres.
 - House = _____ acres.
 - Other structure = _____ acres.
 - Driveway = _____ acres.
 - Other = _____ acres.
 - Total: = _____ acres.
15. • Yes No
• Only moving location of wall
- Paved parking = _____ acres.
 - House = _____ acres.
 - Other structure = _____ acres.
 - Driveway = _____ acres.
 - Other = _____ acres.
 - Total: = _____ acres.

NOTE: Provide any additional information you may have, for example, flood plain information, etc. A sketch of the property with pertinent information would be helpful. The more information you provide, the more meaningful the assessment will be. Please use the back of this page or attach additional sheets, as needed.

Appendix N
Model Ordinances



ARTICLE _____

NONPOINT SOURCE POLLUTION CONTROL ORDINANCE

Division 1. General Provisions.

Sec. 1.101. Authority.

This Article is promulgated under the authority of Sections 26.177 and 26.180 of the Texas Water Code and Section 401.002 of the Texas Local Government Code.

Sec. 1.102. Scope of Authority and Jurisdiction.

This Article shall apply to all territory within the incorporated limits and extraterritorial jurisdiction of the City of _____ (the City). Any person proposing to develop or improve real property within the jurisdiction of the City is subject to the provisions of this Article.

Sec. 1.103. Findings of Fact.

1. The creeks, streams, drainage ways and other watershed areas within the jurisdiction of the City as well as those portions of those groundwater aquifers which underlie areas within the jurisdiction of the City are subject to actual and potential threats of pollution. These threats may result in public health and safety hazards, losses of endangered species, damage to the integrity of local ecological systems, disruption of commerce and governmental services, impairment of recreational and aesthetic values, and extraordinary public expenditures for pollution reduction and environmental protection, all of which adversely affect the public health, safety and general welfare.
2. All watersheds within the City's jurisdiction are undergoing development or are facing development pressure, which if not adequately and properly regulated can result in pollution of waterways and groundwater aquifers from many sources. Sources of pollution include, but are not limited to, contaminated stormwater runoff; mismanagement of wastewater; discharges of pollutants from roadways, construction sites, and waste management areas; runoff of pesticides, fertilizers, and other nutrients from residential and agricultural land uses; and infiltration of such surface water contaminants to underground water-bearing formations.
3. All watersheds within the City's jurisdiction, and especially those with abrupt topography, sparse vegetation, and thin and easily disturbed soil, are vulnerable to degradation resulting from development activities.
4. In many cases, land development activities have caused large quantities of soil to be eroded, displaced and transported to downstream locations. This soil displacement and sediment buildup degrades water quality, destroys valuable environmental resources, clogs watercourses and storm drains, and impairs recreational opportunities for residents

of the City. Therefore, soil erosion should be avoided or minimized to the fullest practical extent.

5. The continued economic growth of the City is dependent on adequate quality and quantity of water, a pleasing natural environment, and recreational opportunities for residents of the City.
6. If watersheds within the City's jurisdiction are not developed in an environmentally responsible manner, the water resources, natural environment, and recreational opportunities within the City could be irreparably damaged.
7. The adoption of this Article is a vital step necessary to ensure the environmentally responsible development of watersheds and the protection of surface and subsurface water quality within the City's jurisdiction.

Sec. 1.104. Statement of Purpose.

Non-point source pollution control management policies shall govern the planning, design, construction, operation and maintenance of drainage, erosion, and water quality control facilities within the City's jurisdiction. This Article sets forth the minimum requirements necessary to provide and maintain a safe, efficient and effective non-point source pollution control program and to establish the various public and private responsibilities for the provision thereof. Further, it is the purpose of this Article to:

- (1) protect human life, health and property;
- (2) prevent losses of endangered species and habitat of endangered species;
- (3) protect the integrity of local ecological systems;
- (4) minimize the expenditure of public money for building and maintaining non-point source pollution control projects and cleaning sediments out of storm drains, streets, sidewalks and watercourses;
- (5) help maintain a stable tax base and preserve land values;
- (6) preserve the natural beauty and aesthetics of the community;
- (7) control and manage the quality of stormwater runoff and the sediment load in runoff from new subdivisions and developments;
- (8) establish a reasonable standard of design and performance for development which prevents erosion and sediment damage and which reduces the pollutant loading to streams, ponds and other watercourses.

Sec. 1.105. Lands to which this Article Applies.

This Article shall apply to all areas of land within the incorporated limits and extra-territorial jurisdiction (ETJ) of the City.

Sec. 1.106. Technical Construction Standards and Specifications Manual.

This Article is designed to be implemented and applied in accordance with an accompanying Technical Construction Standards and Specifications (TCSS) Manual, which describes in detail the technical criteria and procedures to be used to comply with the provisions of this Article. The criteria specified in the latest edition of the TCSS Manual are a part of the official non-point

source pollution management plan for the City. Although the purpose of the TCSS Manual is to establish uniform design practices, it neither replaces the need for engineering judgment nor precludes the use of any information relevant to the accomplishment of the purposes of this Article. Other generally accepted, or innovative and effective, engineering designs, practices and procedures may be used in conjunction with, or instead of, those prescribed by the TCSS Manual if approved by the City Engineer. The TCSS Manual is maintained and available for inspection at the central administrative offices of the City.

Division 2. Definitions.

Sec. 2.101. General Definitions for Purposes of This Article.

Unless otherwise explicitly stated in another section of this Article, the following terms and phrases shall have the following meanings:

- 1. Agricultural Activities:** Pasturing of livestock or use of the land for planting, growing, cultivating, and harvesting crops for human or animal consumption.
- 2. Agricultural Stormwater Runoff:** Any stormwater runoff from orchards, cultivated crops, pastures, range land, and other non-point source agricultural activities, but not discharges from concentrated animal feeding operations as defined in 40 CFR Section 122.23 or discharges from concentrated aquatic animal production facilities as defined in 40 CFR Section 122.24.
- 3. Annual Pollutant Load:** The amount of pollution in stormwater runoff that is discharged from a developed site over the course of one (1) year; usually measured in pounds and based on an average year of rainfall. The annual pollutant load is calculated by multiplying the pollutant concentration by the volume of runoff and does not include the background pollutant load.
- 4. Applicant:** A person who submits an application for approval required by this Article. The applicant shall be the owner of the property subject to this Article acting in person or by and through the owner's authorized representative. Documentation evidencing ownership of the property or the authority of the authorized agent may be required to be submitted.
- 5. Application:** A written request for an approval required by this Article.
- 6. Best Management Practices (BMPs):** Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the non-point source pollution of waters in the State. The two basic types of BMPs for purposes of this Article are "structural BMPs" or structural water quality controls (which include engineered and constructed systems that are designed to control water quantity, water quality, and/or erosion and sediment deposits from stormwater runoff) and "non-structural BMPs" (which include institutional and pollution-prevention type practices designed to prevent pollutants from entering storm water runoff or to reduce the volume of stormwater requiring management).

7. **Bluff:** Geologic surface feature with a vertical change in elevation of more than forty feet (40') at an average gradient greater than four hundred percent (400%).
8. **Builder:** A person engaged in clearing, grubbing, filling, excavating, grading, constructing a pad, installing service utility lines and/or constructing or placing a building(s) or other structure(s) on a lot or other type of tract of land that is owned by the person and that will not be further subdivided into other lots.
9. **Commencement of Construction:** The disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.
10. **Commercial Development:** All development other than open space, single-family, or multi-family residential development.
11. **Construction Limit Line:** The line marking the boundary of disturbance from construction.
12. **Contractor:** Any person, other than the owner, engaging in land development activities on land located within City's jurisdiction.
13. **Contributing Zone of the Edwards Aquifer:** The area or watershed where runoff from precipitation flows downgradient to the Recharge Zone of the Edwards Aquifer.
14. **Critical Environmental Features (CEFs):** Features determined to be of critical importance to the maintenance of water quality, including floodplains; wetlands, springs; caves; sinkholes; solution cavities, faults and fractures with solution enlarged openings; and highly erodible natural features.
15. **Developer:** A person who owns a tract of land and who is engaged in clearing, grubbing, filling, mining, excavating, grading, installing streets and utilities or otherwise preparing that tract of land for the eventual division into one or more lots on which building(s) or other structure(s) will be constructed or placed.
16. **Development:** All land modification activity, including the construction of building, roads, paved storage areas, and parking lots. "Development" also includes any land disturbing construction activities or human-made change of the land surface, including clearing of vegetative cover, excavating, filling and grading, mining, and dredging, and the deposit of refuse, waste or fill. The following activities are excluded from the definition: care and maintenance of lawns, gardens, and trees; minimal clearing (maximum ten feet (10') wide) for surveying and testing; and agricultural activities.
17. **Discharge:** Any addition or introduction of any pollutant, stormwater, or any other substance in a harmful quantity into a stormwater drainage system or into waters in the State.
18. **Discharger:** Any person who causes, allows, permits, or is otherwise responsible for, a discharge, including, without limitation, any operator of a construction site or industrial facility.

19. **Domestic Sewage:** Human excrement, gray water from home clothes washing, bathing, showers, dishwashing, and food preparation, other wastewater from household and residential drains, and waterborne waste normally discharged from the sanitary conveniences of apartment houses, hotels, office buildings, factories, institutions and other dwellings, but excluding industrial waste.
20. **Drainage area:** The horizontal projection of the area contributing runoff to a single control or design point.
21. **Erosion:** The detachment and movement of soil, sediment, sand or rock fragments by wind, water, ice or gravity.
22. **Facility:** Any building, structure, installation, process, or activity from which there is or may be discharge of a pollutant.
23. **Fertilizer:** A solid or non-solid substance or compound that contains an essential plant nutrient element in a form available to plants that is used primarily for its essential plant nutrient element content in promoting or stimulating growth of a plant or improving the quality of a crop, or a mixture of one or more fertilizers. The term does not include the excreta of an animal, plant remains, or a mixture of those substances, for which no claim of essential plant nutrients is made.
24. **Fill:** The manmade deposition and compaction of material to effect a rise in elevation.
25. **Final Stabilization:** The status of a site when all soil disturbing activities have been completed and (1) a uniform perennial vegetative cover with a minimum density of seventy percent (70%) of the cover for unpaved areas and areas not covered by permanent structures has been established, or (2) equivalent permanent stabilization measures have been employed, such as the use of riprap, gabions, or geotextiles.
26. **Flood or Flooding:** A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, or (2) the unusual and rapid accumulation or runoff of surface waters from any source.
27. **Grade:** The vertical location or elevation of a surface, or the degree of rise or descent of a slope.
28. **Harmful Quantity:** The amount of any substance that will cause pollution of water in the State.
29. **Hazardous Household Waste (HHW):** Any material generated in a household (including single and multiple residences, hotels, motels, bunk houses, ranger stations, crew quarters, camp grounds, picnic grounds, and day use recreational areas) by a consumer which, except for the exclusion provided in 40 CFR §261.4(b)(1), would be classified as a hazardous waste under 40 CFR Part 261.
30. **Hazardous Substance:** Any substance listed in Table 302.4 of 40 CFR Part 302.

31. **Hazardous Waste:** Any substance identified or listed as a hazardous waste by the EPA pursuant to 40 CFR Part 261.
32. **Herbicide:** A substance or mixture of substances used to destroy a plant or to inhibit plant growth.
33. **Impervious Cover:** Buildings, parking areas, roads, and other impermeable man-made improvements covering the natural land surface that prevents infiltration.
34. **Industrial Waste:** Any waterborne liquid or solid substance that results from any process of industry, manufacturing, mining, production, trade, or business.
35. **Infiltration:** The passage or movement of water into the subsurface of the natural land.
36. **LCRA:** The Lower Colorado River Authority and duly authorized official of the LCRA.
37. **Land User:** Any person operating, leasing, renting, or having made other arrangements with the landowner by which the landowner authorizes use of his or her land.
38. **Licensed Professional Engineer; Professional Engineer:** A person who has been duly licensed and registered by the State Board of Registration for Professional Engineers to engage in the practice of engineering in the State of Texas.
39. **Limited Plan Review:** A level of City review of development site plans that is less detailed than standard review procedures and consisting of a geometric review of proposed impervious cover overlaid on stream buffer zones and CEF setbacks with no requirement in the review process to demonstrate achievement of otherwise applicable performance standards.
40. **Multi-family Dwelling:** Three or more dwelling units on a single lot designed to be occupied by three (3) or more families living independently of one another, exclusive of hotels and motels. Includes three-family units (triplex) and four-family units (quadriplex), as well as traditional apartments.
41. **Natural State:** The condition of the land existing prior to any development activities.
42. **New Construction:** Structures for which the "start of construction" commenced on or after the date of adoption of this Article.
43. **Non-Point Source (NPS) Pollution:** Pollution that is caused by or attributable to diffuse sources. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, or radiological integrity of water. Typically, NPS pollution results from land runoff, precipitation, atmospheric disposition, or percolation.
44. **Non-Point Source Pollution Control Plan:** The drawings and documents submitted by an applicant seeking plan or permit approval under this Article. Such a plan consists of a system of vegetative, structural and other measures to control the increased rate and

volume of surface runoff and reduce pollutants in the runoff caused by human changes to the land.

45. **Oil:** Any kind of petroleum substance including but not limited to petroleum, fuel oil, crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure, sludge, oil refuse, and oil mixed with waste.
46. **Operator:** The person or persons who, either individually or taken together, have day-to-day operational control over a facility and activities at the facility sufficient to attain compliance with the requirements of this Article.
47. **Owner:** The person who owns a facility or part of a facility subject to the requirements of this Article.
48. **Pesticide:** A substance or mixture of substances intended to prevent, destroy, repel, or mitigate any pest, or any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant, as these terms are defined in Section 76.001 of the Texas Agriculture Code.
49. **Petroleum Storage Tank (PST):** Any one or combination of aboveground or underground storage tanks that contain oil, petroleum products or petroleum substances, and any connecting underground pipes.
50. **Point Source:** Any discernable, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.
51. **Pollutant:** Eroded or displaced sediment, soil, silt or sand resulting from development activities; dredged spoil; solid waste; sewage; garbage; chemical waste; biological materials; radioactive materials; abandoned or discarded appliances or equipment; and industrial, municipal, and agricultural waste which is or may be discharged into waters in the State.
52. **Pollution:** The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water in the State that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property, or to the public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.
53. **Preferred Growth Area (PGA):** Land areas within the incorporated municipal boundaries of the City which are defined through the comprehensive planning process described in Chapter 213 of the Texas Local Government Code as areas where future zoning is proposed to be industrial, commercial or high-density residential.
54. **Recharge Zone of the Edwards Aquifer:** That area where the stratigraphic units constituting the Edwards Aquifer crop out, including the outcrops of other geologic

formations in proximity to the Edwards Aquifer where caves, sinkholes, faults, fractures or other permeable features create a potential for recharge of surface waters into the Edwards Aquifer.

- 55. Release:** Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into a stormwater drainage system or into waters in the State.
- 56. Residence:** Any building, or portion thereof, which is designed for or used as living quarters for one or more families.
- 57. Riparian Corridor:** The ecological areas within and adjacent to a floodplain that are or can be comprised of the following plant species: Pecan, American Elm, Arizona Walnut, Bald Cypress, Black Walnut, Bur Oak, Cedar Elm, Little Walnut, Green Ash, Texas Sargaberry, American Sycamore, Eastern Cottonwood, Black Willow, and Live Oak.
- 58. Rubbish:** Nonputrescible solid waste, excluding ashes, that consist of (A) combustible waste materials, including paper, rags, cartons, wood, excelsior, furniture, rubber, plastics, yard trimmings, leaves, and similar materials; and (B) noncombustible waste materials, including glass, crockery, tin cans, aluminum cans, metal furniture, and similar materials that do not burn at ordinary incinerator temperatures (1600 to 1800 degrees Fahrenheit).
- 59. Runoff:** That portion of precipitation or precipitation drainage that flows by force of gravity across ground surface as sheet flow or in a stormwater drainage system towards water in the State.
- 60. Sewer (or Sanitary Sewer):** The system of pipes, conduits, and other conveyances which carry domestic sewage and/or industrial waste from residential dwellings, commercial buildings, industrial and manufacturing facilities, and institutions, whether treated or untreated, to a sewage treatment plant and which are intended to exclude stormwater, surface water, and groundwater.
- 61. Septic Tank Waste:** Any domestic sewage from holding tanks such as vessels, chemical toilets, campers, trailers, and septic tanks.
- 62. Sewage (or Sanitary Sewage):** The domestic sewage and/or industrial waste that is discharged into a sanitary sewer system and passes through the sanitary sewer system to a sewage treatment plant for treatment.
- 63. Single-Family Residence:** A dwelling designed and constructed for occupancy by one single family and which is located on a separate lot delineated by side and rear lot lines, including single-family detached and single-family attached (townhouses) dwellings.
- 64. Solid Waste:** Any garbage, rubbish, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including, solid, liquid, semi-solid, or contained gaseous material resulting from

industrial, municipal, commercial, mining, and agricultural operations, and from community and institutional activities.

- 65. Spring:** A point or zone of natural groundwater discharge having measurable flow, or a pool, and characterized by the presence of a mesic plant community adapted to the moist conditions of the site.
- 66. Start of Construction:** The first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation.
- 67. Stormwater Drainage System:** A conveyance or system of conveyances including roads with drainage systems, catch basins, curbs, gutters, ditches, man-made channels, or storm drains designed or used for collecting or conveying storm water.
- 68. Stormwater Pollution Prevention Plan (SWPPP):** A plan required by either the TPDES Construction Site General Permit or the TPDES Industrial General Permit and which describes and ensures the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction or other industrial activity.
- 69. Subdivision:** A division, or re-division, of any tract of land situated within the City's jurisdiction into two or more parts, lots or sites, for the purpose, whether immediate or in the future, of sale, division of ownership or building development. "Subdivision" includes re-subdivisions of land or lots which are part of previously recorded subdivisions.
- 70. TCEQ:** The Texas Commission on Environmental Quality or its predecessor or successor agencies as defined by law.
- 71. TPDES General Permit for Construction Stormwater Discharges:** The Construction General Permit No. TXR150000 issued by TCEQ on March 5, 2003 and any subsequent modifications or amendments thereto.
- 72. TPDES General Permit for Industrial Stormwater Discharges:** The Industrial General Permit No. TXR050000 issued by TCEQ on August 20, 2001 and any subsequent modifications or amendments thereto.
- 73. TPDES Permit:** A permit issued by TCEQ pursuant to authority granted under 33 USC § 1342(b) that authorizes the discharge of pollutants into waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.
- 74. Transferable Development Right (TDR):** Authorization to exceed the uniform intensity levels otherwise imposed under this Article on a less environmentally-sensitive tract of land resulting from voluntary relinquishment of development rights otherwise allowed under this Article on a more environmentally-sensitive tract of land (e.g.,

through dedicated conservation easement). A TDR can also result from the removal of existing impervious cover within an existing development with water quality protection measures not otherwise required by this Article.

75. Variance: A grant of relief to a person from the requirements of this article when specific enforcement would result in unjustifiable or unnecessary hardship due to out-of-the-ordinary or extenuating circumstances.

76. Water in the State (or Water): Any groundwater, percolating or otherwise, lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, or canals inside the territorial limits of the State, and all other bodies of surface water, natural or artificial, navigable or non-navigable, and including the beds and banks of all water courses and bodies of surface water, that are inside the jurisdiction of the State.

77. Water Quality Control: An engineered and constructed device or system designed to protect water from pollution, control the rate and flows of stormwater runoff, and/or minimize erosion and sediment deposits from stormwater runoff.

78. Watershed: The total area contributing runoff to a stream or drainage system.

79. Wetland: An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions and conforms to the U.S. Army Corps of Engineers' definition. Wetlands generally include swamps, marshes, bogs, and similar areas.

80. Yard Waste: Leaves, grass clippings, yard and garden debris, and brush that results from landscaping maintenance and land-clearing operations.

Division 3. Non-point Source Pollution Control Measures.

Sec. 3.101. General Prohibitions.

- (a) Except as otherwise specifically authorized by this Article or by the City, no person shall discharge, or cause, suffer or allow the discharge, of any wastes, substances or other materials into or adjacent to any water in the State which causes or will cause pollution of any water in the State.
- (b) Except as otherwise specifically authorized by this Article or by the City, no person shall introduce or cause to be introduced into a stormwater drainage system any pollutants or other discharge that is not composed entirely of stormwater.

Sec. 3.102. Specific Prohibitions and Requirements for Protection of Stormwater Drainage.

- (a) No person shall introduce or cause to be introduced into a stormwater drainage system any discharge that causes or contributes to causing a violation of a water quality standard established by law.

- (b) No person shall introduce, discharge, or cause, suffer or allow a release of any of the following substances into a stormwater drainage system:
- (1) any used motor oil, antifreeze, or any other motor vehicle fluid;
 - (2) any industrial waste;
 - (3) any hazardous waste, including hazardous household waste;
 - (4) any domestic sewage or septic tank waste, grease trap waste, or grit trap waste;
 - (5) any garbage, rubbish, or yard waste;
 - (6) any wastewater from a commercial carwash facility; from any vehicle washing, cleaning, or maintenance operation at any new or used automobile or other vehicle dealership, rental agency, body shop, repair shop, or maintenance facility; or from any washing, cleaning, or maintenance of any business or commercial or public service vehicle, including a truck, bus, or heavy equipment, by a business or public entity that operates more than two such vehicles;
 - (7) any wastewater from the washing, cleaning, de-icing, or other maintenance of aircraft;
 - (8) any wastewater from a commercial mobile power washer or from the washing or other cleaning of a building exterior that contains any soap, detergent, degreaser, solvent, or any other harmful cleaning substance;
 - (9) any wastewater from commercial floor, rug, or carpet cleaning;
 - (10) any wastewater from the washdown or other cleaning of pavement that contains any harmful quantity of soap, detergent, solvent, degreaser, emulsifier, dispersant, or any other harmful cleaning substance; or any wastewater from the washdown or other cleaning of any pavement where any spill, leak, or other release of oil, motor fuel, or other petroleum or hazardous substance has occurred, unless all harmful quantities of such released material have been previously removed;
 - (11) any effluent from a cooling tower, condenser, compressor, emissions scrubber, emissions filter, or the blowdown from a boiler;
 - (12) any ready-mixed concrete, mortar, ceramic, or asphalt base material or hydromulch material, or from the cleaning of commercial vehicles or equipment containing, or used in transporting or applying, such material;
 - (13) any runoff or washdown water from any animal pen, kennel, or fowl or livestock containment area;
 - (14) any filter backwash from a swimming pool, or fountain, or spa;
 - (15) any swimming pool water containing any harmful quantity of chlorine, muriatic acid or other chemical used in the treatment or disinfection of the swimming pool water or in pool cleaning;
 - (16) any discharge from water line disinfection by superchlorination or other means if it contains any harmful quantity of chlorine or any other chemical used in line disinfection;
 - (17) any fire protection water containing oil or hazardous substances or materials (except for discharges or flows from fire fighting activities by a locally accredited Fire Department);
 - (18) any water from a water curtain in a spray room used for painting vehicles or equipment;
 - (19) any contaminated runoff from a vehicle wrecking yard;

- (20) any substance or material that will damage, block, or clog the stormwater drainage system;
- (21) any release from a petroleum storage tank (PST), or any leachate or runoff from soil contaminated by a leaking PST, or any discharge of pumped, confined, or treated wastewater from the remediation of any such PST release, unless the discharge satisfies all of the following criteria:
 - (A) the discharge complies with all state and federal standards and requirements;
 - (B) the discharge does not contain a harmful quantity of any pollutant; and
 - (C) the discharge does not contain more than 50 parts per billion of benzene; 500 parts per billion combined total quantities of benzene, toluene, ethylbenzene, and xylene (BTEX); or 15 mg/l of total petroleum hydrocarbons (TPH).
- (c) No person shall introduce or cause to be introduced into a stormwater drainage system any harmful quantity of sediment, silt, dirt, soil, sand or other material associated with clearing, grading, excavation or other construction activities, or associated with landfilling or other placement or disposal of soil, rock, sand or other earth materials, in excess of what could be retained on site or captured by employing sediment and erosion control measures to the minimum extent required by this Article.
- (d) No person shall connect a line conveying sanitary sewage, whether domestic or industrial, to a stormwater drainage system, nor allow such a connection to continue if discovered.
- (e) No person shall cause or allow any pavement washwater from a service station to be discharged into a stormwater drainage system unless such washwater has first passed through a grease, oil, and sand interceptor which is properly functioning and maintained.
- (f) Regulation of Pesticides, Herbicides, and Fertilizers.
 - (1) Any sale, distribution, application, labeling, manufacture, transportation, storage, or disposal of a pesticide, herbicide, or fertilizer must comply fully with all state and federal statutes and regulations including, without limitation, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and all federal regulations promulgated pursuant to FIFRA; Chapters 63, 75, and 76 of the Texas Agriculture Code and all state regulations promulgated pursuant thereto; and any other applicable state or federal requirements.
 - (2) Any license, permit, registration, certification, or evidence of financial responsibility required by state or federal law for sale, distribution, application, manufacture, transportation, storage, or disposal of a pesticide, herbicide or fertilizer must be presented to an authorized City enforcement officer for examination upon request.
 - (3) No person shall use or cause to be used any pesticide or herbicide contrary to any directions for use on any labeling required by state or federal statute or regulation.

- (4) No person shall use or cause to be used any pesticide, herbicide, or fertilizer in any manner that the person knows, or reasonably should know, is likely to cause, or does cause, a harmful quantity of the pesticide, herbicide, or fertilizer to enter a stormwater drainage system or waters in the State.
 - (5) No person shall dispose of, discard, store, or transport a pesticide, herbicide, or fertilizer, or a pesticide, herbicide, or fertilizer container, in a manner that the person knows, or reasonably should know, is likely to cause, or does cause, a harmful quantity of the pesticide, herbicide, or fertilizer to enter a stormwater drainage system or waters in the State.
- (g) **Used Oil Regulation.**
- (1) No person shall:
 - (A) discharge used oil into a stormwater drainage system or a sewer, drainage system, septic tank, surface water, groundwater, or water course;
 - (B) knowingly mix or commingle used oil with solid waste that is to be disposed of in a landfill or knowingly directly dispose of used oil on land or in a landfill;
 - (C) apply used oil to a road or land for dust suppression, weed abatement, or other similar use that introduces used oil into the environment.
 - (2) All businesses engaged in the changing of motor oil for the public, all municipal waste landfills, and all fire stations shall serve as public used oil collection centers as provided by state law.
 - (3) A retail establishment which sells oil in containers directly to the public for use off-premises shall post in a prominent place a sign informing the public that improper disposal of used oil is prohibited by law. The sign shall prominently display the toll-free telephone number of the state used oil information center.

Sec. 3.103. Non-point Source Pollution Control Management Performance Standards.

- (a) Except as otherwise provided in this Article, all development subject to this Article shall achieve the following design standards through the use of structural and nonstructural BMPs and water quality controls. For each of the constituents below, the design shall demonstrate no net increase for the design storm event:
 - (1) Total Suspended Solids
 - (2) Total Phosphorus
 - (3) Total Nitrogen
 - (4) Biochemical Oxygen Demand (BOD)
 - (5) Fecal Coliform
- (b) The design storm event shall be the two (2) year, three (3) hour storm. The pollutant loadings for this storm event shall be calculated in accordance with the TCSS Manual.

Sec. 3.104. Impervious Cover.

- (a) Maximum limitations on impervious cover are established as follows on developments for which a site development plan is first filed after the effective date of this Article:

- (1) For areas within the Edwards Aquifer Recharge Zone:
 - (A) Five percent (5%) - for developments with scattered and disconnected impervious cover (i.e., no connected blocks of impervious cover greater than 20,000 sq. ft.) and which have no hard-lined drainage conveyance structures (i.e., no curbs and gutters; no storm sewers; no ditches or swales). For this classification of developments, no structural BMPs are required and only Limited Plan Review is required.
 - (B) Ten percent (10%) - for developments reviewed under standard plan review procedures and not utilizing a Transferable Development Right.
 - (C) Fifteen percent (15%) - for developments reviewed under standard plan review procedures and utilizing a Transferable Development Right.
- (2) For areas within the Edwards Aquifer Contributing Zone, but outside a Preferred Growth Area (PGA):
 - (A) Seven and on-half percent (7.5%) - for developments with scattered and disconnected impervious cover (i.e., no connected blocks of impervious cover greater than 20,000 sq. ft.) and which have no hard-lined drainage conveyance structures (i.e., no curbs and gutters; no storm sewers; no ditches or swales). For this classification of developments, no structural BMPs are required and only Limited Plan Review is required.
 - (B) Fifteen percent (15%) - for developments reviewed under standard plan review procedures and not utilizing a Transferable Development Right.
 - (C) Twenty-Five percent (25%) - for developments reviewed under standard plan review procedures and utilizing a Transferable Development Right.
- (3) For single-family residential developments within the Edwards Aquifer Contributing Zone and inside a PGA:
 - (A) Seven and one-half percent (7.5%) - for developments with scattered and disconnected impervious cover (i.e., no connected blocks of impervious cover greater than 20,000 sq. ft.) and which have no hard-lined drainage conveyance structures (i.e., no curbs and gutters; no storm sewers; no ditches or swales). For this classification of developments, no structural BMPs are required and only Limited Plan Review is required.
 - (B) Fifteen percent (15%) - for developments reviewed under standard plan review procedures and not utilizing a Transferable Development Right.
 - (C) Thirty percent (30%) - for developments reviewed under standard plan review procedures and utilizing a Transferable Development Right.

- (4) For commercial and multi-family residential developments within the Edwards Aquifer Contributing Zone and inside a PGA:
- (A) Seven and one-half percent (7.5%) - for developments with scattered and disconnected impervious cover (i.e., no connected blocks of impervious cover greater than 20,000 sq. ft.) and which have no hard-lined drainage conveyance structures (i.e., no curbs and gutters; no storm sewers; no ditches or swales). For this classification of developments, no structural BMPs are required and only Limited Plan Review is required.
 - (B) Twenty five percent (25%) - for developments reviewed under standard plan review procedures and not utilizing a Transferable Development Right.
 - (C) Forty-Five percent (45%) - for developments reviewed under standard plan review procedures and utilizing a Transferable Development Right.
 - (D) No Impervious Cover Limit - for developments qualified under subsection (C) above and where all building roof runoff is captured and used for landscape irrigation through rainwater harvesting techniques incorporating a 14-day landscape irrigation storage capacity.

The above impervious cover limits are set forth in the following table for reference purposes:

Location	NO BMPs, Limited Review	Standard Review	Standard Review + TDRs
Recharge Zone	5%	10%	15%
Contributing Zone, Outside PGAs	7.5%	15%	25%
Contributing Zone, Single Family Residential Inside PGAs	7.5%	15%	30%
Contributing Zone, Commercial and Multi- Family Residential Inside PGAs	7.5%	25%	45% (or No Limit w/ rainwater harvesting)

- (b) No variances from the impervious cover limits set forth in this Section shall be granted.
- (c) Impervious cover limits in this Section are expressed as a percentage of the gross site area of the subject tract. For purposes of calculation of impervious cover limits, the gross site area includes Water Quality Buffer Zone areas and Critical Environmental Features setback areas.

- (d) Impervious cover shall include all man-made improvements which prevent the infiltration of water into the natural soil, or prevent the migration of the infiltration as base flow. The following shall be considered as impervious cover:
- (1) roads, pavements, and driveways, except as provided in Subsection (e) of this Section;
 - (2) parking areas;
 - (3) buildings;
 - (4) pedestrian walkways and sidewalks;
 - (5) concrete, asphalt, masonry, surfaces areas, and paving stone surfaced areas;
 - (6) swimming pool water surface area;
 - (7) densely compacted natural soils or fills which result in a coefficient of permeability less than 1×10^{-6} cm/sec;
 - (8) all existing man-made impervious surfaces prior to development;
 - (9) water quality and stormwater detention basins lined with impermeable materials;
 - (10) stormwater drainage conveyance structures lined with impermeable materials;
 - (11) interlocking or "permeable pavers"; and
 - (12) fifty percent (50%) of the horizontal surface area of an uncovered deck that has drainage spaces between the deck boards that is located over a pervious surface.
- (e) The following are not considered to be impervious cover:
- (1) existing roads adjacent to the development and not constructed as part of the development at an earlier phase;
 - (2) naturally occurring impervious features, such as rock out crops;
 - (3) landscaped areas and areas remaining in their natural state;
 - (4) water quality controls and stormwater detention basins; and
 - (5) stormwater drainage conveyance structures not lined with impermeable materials.
- (f) Restrictions on Siting of Impervious Cover:
- (1) Impervious cover shall not be constructed downstream of water quality controls.
 - (2) Impervious cover shall not be constructed within Water Quality Buffer Zones.
 - (3) Impervious cover shall not be constructed within Critical Environmental Feature setback areas.
 - (4) Impervious cover shall not be constructed within the areas designated for on-site irrigation of treated wastewater effluent disposal/captured stormwater.

Sec. 3.105. Transferable Development Rights (TDRs).

- (a) A Transferable Development Right may be obtained by an applicant for a subject tract (receiving tract) of land through any one, or combination, of the following methods:
- (1) The additional impervious cover acreage (up to the impervious cover percentage limits set forth in Section 3.104(a)) requested for the receiving tract must be offset by an equal amount of permanently established pervious cover acreage on a different tract (transferring tract) of land not included in the site development plan (e.g., through dedication to the public of an enforceable, recorded conservation easement).
 - (2) The additional impervious cover acreage (up to the impervious cover percentage limits set forth in Section 3.104(a)) requested for the receiving tract

- must be compensated by retrofitting an equal amount of development acreage with water quality protection measures not otherwise required by this Article.
- (3) The additional impervious cover acreage (up to the impervious cover percentage limits set forth in Section 3.104(a)) requested for the receiving tract must be compensated through any such other voluntary environmental enhancement project which makes an equal contribution to protection of the environment as determined in the sole discretion of the City.
- (b) The granting of a TDR is subject to the following terms and conditions:
- (1) If the receiving tract and the transferring tract are not both located within the jurisdictional limits of the City, a written approval for the transferring tract must be obtained from the local government with jurisdiction over development activities from the transferring tract.
 - (2) A TDR for a receiving tract located in the Contributing Zone of the Edwards Aquifer must be obtained from either (i) a transferring tract located outside of a Preferred Growth Area in the Contributing Zone; or (ii) a transferring tract located in the Recharge Zone.
 - (3) A TDR obtained from a transferring tract located in the Recharge Zone and used for a receiving tract in the Contributing Zone shall authorize the development for the higher impervious cover limit allowed by this Article for the Contributing Zone in determining the amount of required TDR acreage required from the transferring tract.
 - (4) A restrictive covenant that “runs with the land” of the transferring tract and that describes the TDR must be filed in the county deed records.
 - (5) A TDR used for a receiving tract located in the Recharge Zone must be obtained from a transferring tract also located in the Recharge Zone, and both such tracts shall have a combined impervious cover limit of 10%.
 - (6) A TDR used for a receiving tract located in the Contributing Zone may be obtained from a transferring tract located either in the Recharge Zone or the Contributing Zone, but the transferring tract shall not be located in a Preferred Growth Area. In such case, the combined impervious cover limit for the receiving and the transferring tracts shall be 15%.

Sec. 3.106 Water Quality Buffer Zones (WQBZ) for Waterways

- (a) A water quality buffer zone is established along each waterway with the specified contributing (watershed drainage) area as follows:
- (1) Waterways with 32 - 120 acres of contributing area: The WQBZ shall extend a minimum of 100 feet from either side of the centerline of the waterway (total of 200 feet of buffer zone).
 - (2) Waterways with 120 - 300 acres of contributing area: The WQBZ shall extend a minimum of 150 feet from either side of the centerline of the waterway (total of 300 feet of buffer zone).
 - (3) Waterways with 300 - 640 acres of contributing area: The WQBZ shall extend a minimum of 200 feet from either side of the centerline of the waterway (total of 400 feet of buffer zone).

- (4) Waterways with greater than 640 acres of contributing area: The WQBZ shall extend a minimum of 300 feet from either side of the centerline of the waterway (total of 600 feet of buffer zone).
- (b) The minimum buffer zone set forth in Subsection (a) shall be expanded as follows:
 - (1) In those cases where a FEMA 100-year floodplain has been established, or a 100-year floodplain has been calculated and approved by a governmental authority, the buffer zone shall be expanded to encompass such 100-year floodplain plus an additional 25 feet beyond the edge of the floodplain.
 - (2) In those cases where U.S. jurisdictional wetlands exist beyond the edge of the minimum buffer zone set forth in Subsection (a), the buffer zone shall be expanded to encompass the full extent of the wetlands plus an additional 25-feet beyond the edge of the wetland.
 - (3) If two or more WQBZs overlap, the widest of the buffer zones shall be established.
- (c) Except as specifically provided in this Section, all development activities, including temporary construction activities, structural BMPs and landscaping activities, are prohibited in the Water Quality Buffer Zone of a waterway.
- (d) The following development activities within a WQBZ may be allowed in the sole discretion of the City:
 - (1) critical utility crossings if the number of crossings of the WQBZ is limited to the maximum feasible extent;
 - (2) critical roadway crossings if the number of crossings of the WQBZ is limited to the maximum feasible extent;
 - (3) critical transportation crossings if the number of crossings of the WQBZ is limited to the maximum feasible extent;
 - (4) hike and bike trails if provided for in an approved comprehensive development plan;
 - (5) maintenance and restoration of natural vegetation;
 - (6) water quality control monitoring devices;
 - (7) removal of trash, debris, pollutants;
 - (8) fences that do not obstruct flood flows;
 - (9) public and private parks and open space, if human activities are limited to hiking, jogging, or walking trails, and excluding stables, corrals and other forms of animal housing; and
 - (10) private drives to allow access to property not otherwise accessible.
- (e) Any development within a WQBZ allowed under Subsection (d) shall be designed and/or conducted in a manner which limits the alteration and pollution of the natural riparian corridor to the maximum extent feasible. In no case shall any wastewater line be located less than one hundred (100) feet from the center line of a waterway unless the applicant demonstrates that installation of the wastewater line outside of this zone is physically prohibitive or environmentally unsound. Any wastewater lines located in a WQBZ shall meet design standards and construction specifications set forth in the TCSS Manual to ensure zero leakage.

- (f) All water quality control discharges and stormwater discharges onto a WQBZ shall only be in the form of diffused, overland sheet flow and shall have peak velocities of less than five (5) feet per second at the 2-year design rainfall event.

Sec. 3.107 Setback Areas for Critical Environmental Features (CEFs).

- (a) A minimum setback area of one hundred fifty (150) feet is established around the outside periphery of all CEFs.
- (b) For a CEF which is in direct communication with the Edwards Aquifer, the upstream setback area shall extend out to the upper catchment divide of the CEF or three hundred (300) feet, whichever is less, but in no circumstances less than 150 feet.

Sec. 3.108. Control of Erosive Flows From Developed Areas.

- (a) No untreated stormwater runoff from developed land shall be allowed to flow over critical environmental features.
- (b) To the maximum extent practical, all roof runoff from non-residential buildings shall have down spouts disconnected from the site stormwater drainage system.
- (c) To the maximum extent practical, all stormwater drainage shall be treated using overland flow methods to a grass-lined swale or other vegetated buffer. The vegetated buffer shall be designed in accordance with the TCSS Manual.
- (d) Drainage patterns shall be designed to the maximum extent practical to prevent erosion, maintain the recharge of local seeps and springs, and attenuate the harm of contaminants collected and transported by stormwater. All discharge points from stormwater retention and detention ponds or other accumulation areas shall provide for energy dissipation prior to exiting the site. Overland sheet flow and natural drainage features and patterns shall be maintained to the maximum extent practical, rather than concentrating flows in storm sewers and drainage ditches. Stormwater drainage structures shall be sized to maintain flood flow velocities below the velocity associated with the 25-year, 3-hour rainfall event.
- (e) For site designs that provide for discharge of stormwater into a waterway, adequate retention and detention shall be incorporated into the site design to limit flows into the receiving waterway to the level consistent with the volume of the two-year, three-hour rainfall event evenly distributed over a 24-hour period.
- (f) Construction of enclosed storm sewers and impervious channel linings are permitted only when the City determines that such storm sewers or impervious linings are protective of water quality.
- (g) Overland flow facilities for a stormwater drainage system shall be designed in accordance with criteria set forth in the TCSS Manual.

Sec. 3.109. Infiltration.

- (a) To the maximum extent practical, water quality controls shall be designed to restore the infiltration capacity to pre-development conditions. Infiltration BMP's shall be designed in accordance with the TCSS Manual.
- (b) Infiltration systems shall be designed and located to avoid impacts to existing springs and recharge structures.

Sec. 3.110. Steep Slopes.

- (a) To the maximum extent practical, non-residential construction shall be limited to those areas with pre-development natural grades of less than twenty-five percent (25%).
- (b) Erosion control, terracing and water quality control BMP's shall be designed in accordance with the TCSS Manual.
- (c) A cut or fill with a finished gradient steeper than thirty-three percent (33%) shall be stabilized with a permanent structure.

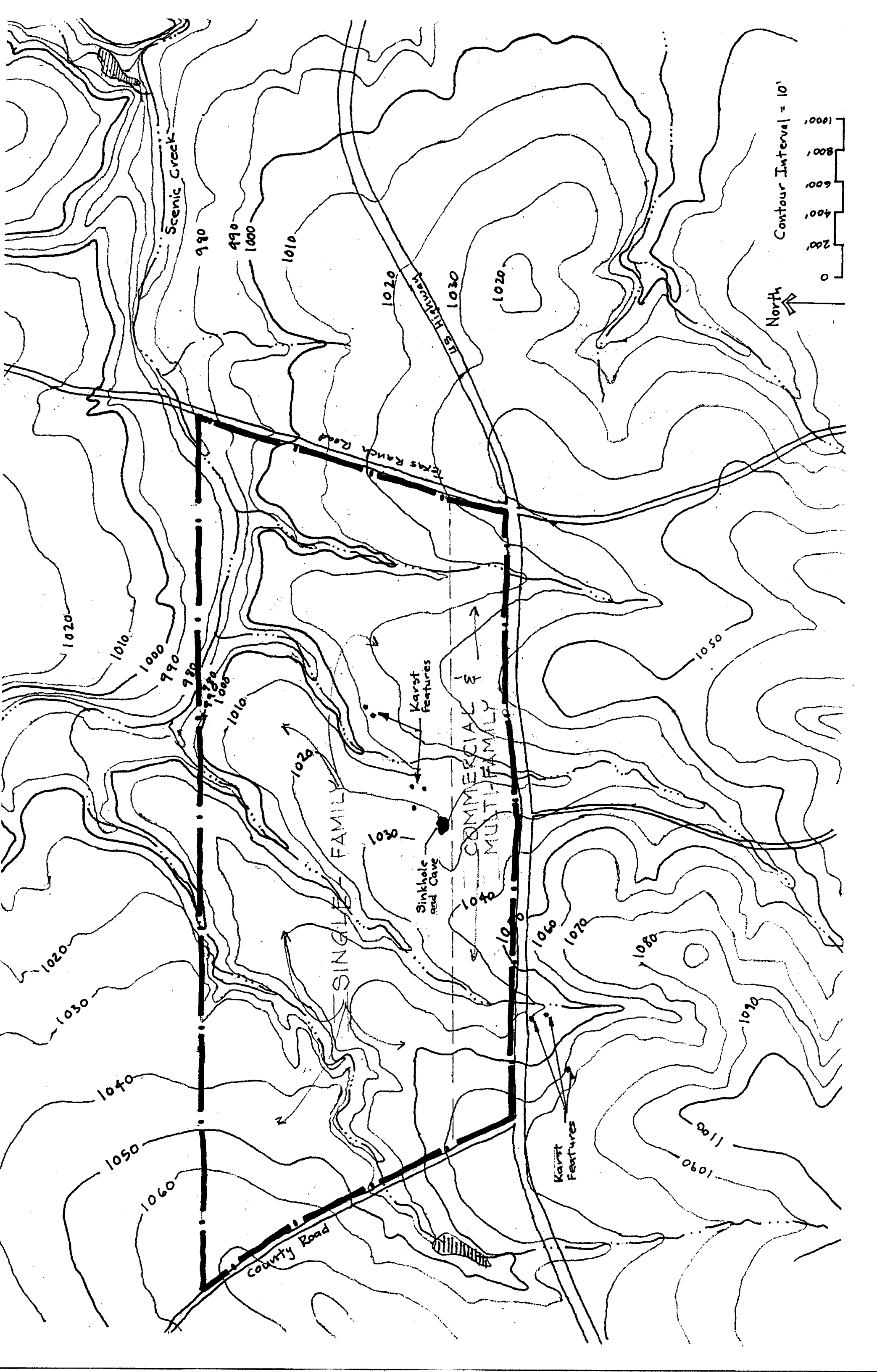
Sec. 3.111. Vegetation.

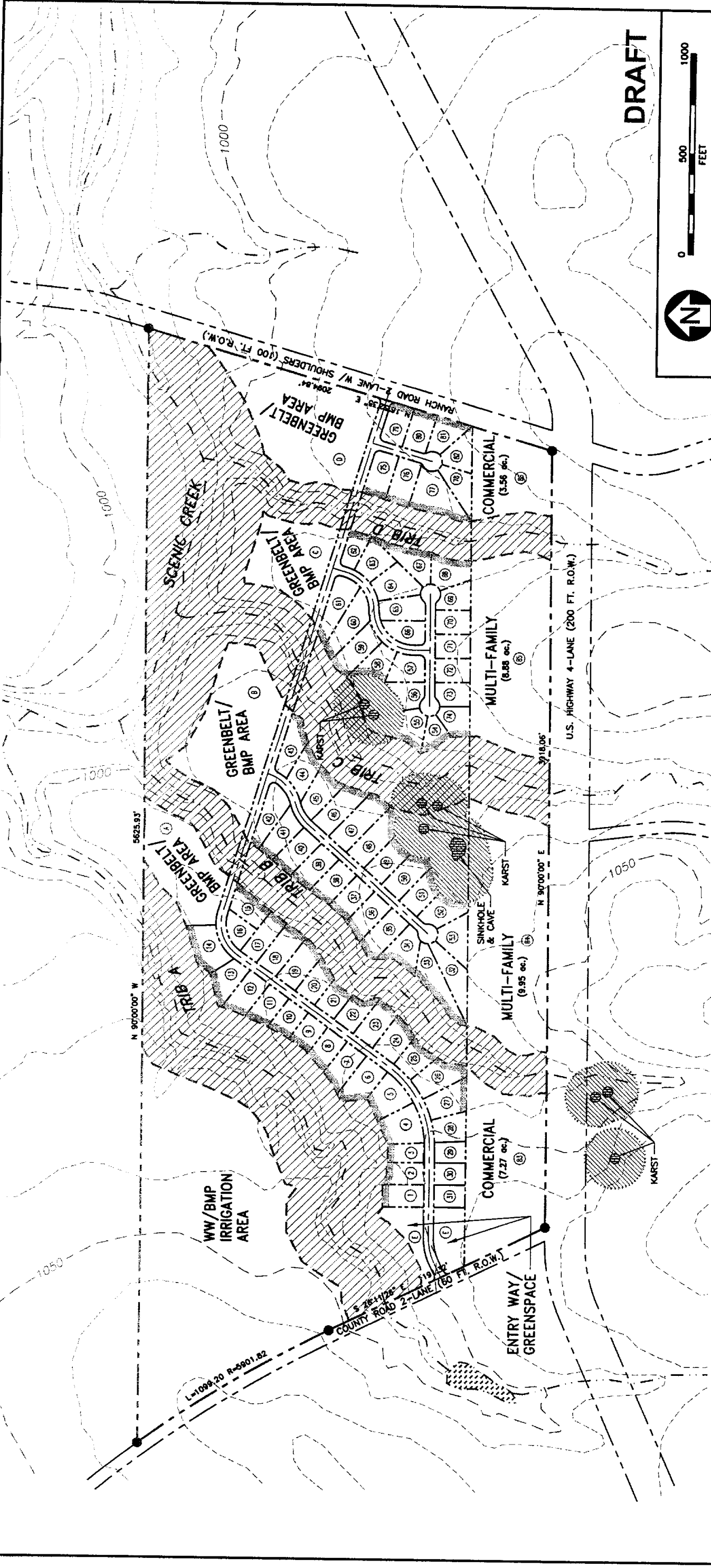
- (a) To the maximum extent practical: (i) landscape shall be preserved in its natural state; (ii) xeriscape and low maintenance vegetation shall be included in all non-residential development in accordance with specifications in the TCSS Manual; (iii) the use of herbicides, pesticides and fertilizers shall be minimized.
- (b) An applicant for a site development permit shall submit a Pesticide and Fertilizer Management Plan providing information regarding proper use, storage, and disposal of pesticides and fertilizers. The plan shall indicate likely pesticides and fertilizers to be used. The plan shall include two lists of pesticides and fertilizers: (1) those which, due to their chemical characteristics, potentially contribute significantly to water quality degradation; (2) those which, due to the chemical characteristics, potentially would result in minimal water quality degradation.
- (c) An applicant for a site development permit shall submit an Integrated Pest Management (IPM) Plan in accordance criteria set forth in the TCSS Manual.
- (d) Vegetative BMP's, such as vegetative filter strips, shall be designed in accordance with the TCSS Manual.

Sec. 3.112. Structural Water Quality Controls.

- (a) Structural water quality controls (WQCs) shall be sized for the entire contributing drainage area for the following types of developments:
 - (1) New multi-family residential development; new non-residential development; and new subdivision development.
 - (2) Redeveloped multi-family residential development, redeveloped non-residential development, and all redeveloped subdivision development that increases total

- impervious cover to a level greater than the impervious cover limits described in Section 3.104.
- (3) New single-family residential development which is not part of a subdivision development if such development has impervious cover greater than the impervious cover limits described in Section 3.104.
- (b) The volume of runoff required to be captured, isolated, and treated by each structural WQC, or series of WQCs operating in sequence as a treatment train, shall be as required in Section 3.103(b) and based on the contributing drainage area for the WQC or series of WQCs.
- (c) Stormwater runoff from the following areas shall not require structural WQCs nor be included in the calculation of the volume of stormwater runoff required to be captured, isolated, and treated by a structural WQC:
- (1) The full area of existing natural areas or restored natural areas from which stormwater runoff is routed around a WQC structure and which is restricted from development and from pesticides, herbicide, or fertilizer application through a plat note or restrictive covenant. The drainage areas from which stormwater is not routed around a WQC structure and which blends with runoff from developed areas shall be included in the water quality volume calculations.
 - (2) Fifty percent (50%) of the area using landscaping that requires no irrigation and no pesticide, herbicide, or fertilizer applications.
 - (3) The area on which a WQC structure is situated.
 - (4) Swimming pools which do not discharge its filter backwash into a stormwater drainage system.
 - (5) Impervious surface areas used for stormwater collection and on-site irrigation.
 - (6) Drainage from off-site areas which is routed around a WQC structure. The drainage areas from which stormwater is not routed around a WQC structure and which blends with runoff from developed areas shall be included in the water quality volume calculations.
- (d) In determining the required level of treatment, the nature and volume of pollutant loads from all developed areas shall be considered including but not limited to the following:
- (1) areas of impervious cover;
 - (2) the potential for pollutant impacts from industrial, commercial and other non-residential types of development;
 - (3) lawns, landscaping, and gardens using pesticides, herbicides or fertilizers;
 - (4) golf courses, play fields and other recreational or greenspace areas using pesticides, herbicides or fertilizers; and
 - (5) areas receiving wastewater effluent spray irrigation.
- (e) All WQCs utilized for any development or redevelopment project shall be designed by a licensed Texas professional engineer in accordance with the removal efficiencies and other technical criteria set forth in the TCSS Manual. Alternative WQC technical criteria may be approved if it is determined in the sole discretion of the City that the alternative technical criteria will result in equal or greater water quality control performance as that required under this Article.





LAND USE - PROPOSED

Designated Use	Area (ac.)	Comments
Residential	47.71	82 s-f lots
Multi-Family	18.83	2 lots
Commercial	10.83	2 lots
Roadways	9.33	50 ft. r.o.w.
Stream Buffers	74.42	5 separate streams
CEF Set Backs	7.23	2 CEF areas
WW+BMP Irrig. Area	27.00	1 lot
Steep Slopes	-	None outside BZs & CEFs
BMP/Greenbelts	22.43	4 areas for BMPs
TOTAL	217.78	

IMPERVIOUS COVER CALCULATIONS

LAND USE	Area (ac.)	Impervious Cover (%)
Single-Family Homes	9.41	82 lots @ 5,000 s.f. per lot
Multi-Family Residential	7.53	18.83 ac @ 40% I.C.
Commercial	6.50	10.83 ac @ 60% I.C.
Roadways	5.40	LF of 30 ft. wide roadway
Total Impervious Cover	28.84	
% IMPERVIOUS COVER	13.24%	Based on "GROSS" Site Area
% IMPERVIOUS COVER	21.19%	Based on "NET" Site Area

(Net = Gross - stream buffers & CEF setbacks)

STREAM BUFFERS

Stream	Drainage Area (acres)	Buffer Zone Set Back Req.* (ft.)	Total Width of Buffer Zone (ft.)	Area of Buffer Zone (ac)
Scenic Creek	2,000+	300	600	29.18
Trib A	328	200	400	23.13
Trib B	86	100	200	8.99
Trib C	228	150	300	8.51
Trib D	102	100	200	4.61
* - required set back from stream centerline, based on drainage area acreage				74.42

Misc. Information:

No. S-F Lots=	82
Avg. AC/Lot=	0.5818
LF of Roads =	7.844

NOTES:
 (1) Where indicated, the Vegetative Filter Strips (VFS) are 30 ft. wide, located at the back of the single-family lots. Total length of VFS is approximately 9,104 LF.

LOCATION = CONTRIBUTING ZONE, OUTSIDE DESIGNATED PREFERRED GROWTH AREA

DRAFT

**ILLUSTRATIVE CASE #1
 SCENIC, TEXAS
 PROPOSED CONDITIONS
 ATTACHMENT 9**

NAISMITH ENGINEERING, INC.
 ENGINEERING • ENVIRONMENTAL • SURVEYING
 AUSTIN CORPUS CHRISTI BROWNSVILLE TEXAS

CASE_MASTER_01.DWG

- (f) All structural WQCs utilized in the Recharge Zone shall be modified or augmented to prevent direct infiltration and recharge from the WQC. To meet this requirement, such WQCs shall utilize artificial linings, evapo-transpiration beds, or other methods designed and operated to prevent infiltration into the Edwards Aquifer even during periods of extended rainfall.
- (g) The erosion control requirements of this Article shall apply to all related land disturbed areas for a development project including off-site borrow areas, off-site spoil areas and off-site construction staging areas.
- (h) The peak runoff rate for developed conditions shall not exceed the peak runoff rate for pre-development conditions for the two-year storm event. Peak runoff rate calculations shall comply with the criteria set forth in the TCSS Manual.
- (i) To provide necessary access for maintenance and monitoring, water quality controls shall be located within an area dedicated to the public by easement, deed restriction, or recorded plat notation. The dedicatory instrument shall note that water quality restrictions exist on the property and that any alternative use or alteration of the property must be approved in writing by the City.

Sec. 3.113. Isolation of Roof Runoff and Irrigation.

- (a) A roof rainfall runoff capture system approved under this Article shall comply with the following minimum requirements:
 - (1) The entire system including rainwater collection, conveyance and storage, shall be isolated from the site stormwater system.
 - (2) The collected rainwater shall be used for on-site irrigation or other purposes as approved by the City.
 - (3) The system shall comply with the pollution control performance standards of Section 3.103.
 - (4) The on-site irrigation system shall be designed in accordance with standard irrigation practices considering such factors as soil type, slope, and vegetative uptake rates.

Sec. 3.114. Natural Waterway Erosion Hazard Setbacks.

- (a) The City may require preservation of an existing channel or waterway for use as a natural floodplain through the establishment of erosion hazard setbacks in accordance with the TCSS Manual. No building, fence, wall, deck, swimming pool or other structure shall be located, constructed or maintained within the area encompassing the setback.
- (b) As an alternative to the establishment of an erosion hazard setback, an existing channel or waterway may be preserved and protected through a bank stabilization and protection plan as approved by the City.

Sec. 3.115. Wastewater Treatment by Land Application.

- (a) Wastewater treatment and disposal by spray surface irrigation, subsurface drip irrigation, evapotranspiration, or other forms of land application of wastewater is prohibited unless approved in advance in writing by the City.
- (b) Land application of treated wastewater is prohibited:
- (1) unless the wastewater is first treated to the levels required by Section 3.101;
 - (2) on a slope with a gradient of more than ten percent (10%);
 - (3) in a Water Quality Buffer Zone;
 - (4) in a CEF setback area;
 - (5) in a 100-year floodplain;
 - (6) in an area intersected by a concentrated stormwater flow channel;
 - (7) during wet weather conditions;
 - (8) if the rate and timing of wastewater application exceeds the agronomic uptake rate of the vegetation being cultivated on the irrigation site; and
 - (9) under any conditions that result in off-site migration of the wastewater or waste constituents.
- (c) Prior to commencement of land application of wastewater, the project applicant shall submit a Wastewater Irrigation Plan including a site specific soil analysis and soil profile. The Wastewater Irrigation Plan shall be prepared and sealed by a Texas licensed professional engineer, licensed geoscientist, or licensed sanitarian with knowledge of the soils in the area of the proposed irrigation site.
- (d) The design wastewater hydraulic application rate as determined under the Wastewater Irrigation Plan shall utilize a safety factor of 1.50 applied to the measured soil infiltration rate. All land application of treated wastewater shall be performed in accordance with applicable TCEQ standards and permit requirements and in accordance with other technical criteria set forth in the TCSS Manual.

Sec. 3.116. Operation and Maintenance of Water Quality Controls.

- (a) An applicant for a site development permit shall submit a WQC Maintenance Plan describing the specific measures proposed for operating, monitoring, and maintaining each water quality control proposed for a development project as required by this Article. The measures described in the WQC Maintenance Plan shall be consistent with the guidelines set forth in the TCSS Manual and shall comply with the financial assurance requirements of Section 4.106 of this Article. City approval of the WQC Maintenance Plan is required prior to issuance of a site development permit.
- (b) Upon City approval of the WQC Maintenance Plan, the project applicant shall record in the county deed records and on any recorded plat(s) for the development a notation stating that the property is subject to a Water Quality Control Maintenance Plan on file at the City's administrative offices. Upon transferring title to the property, or any subdivided portion thereof, the applicant shall establish a deed restriction stating that the property is subject to a Water Quality Control Maintenance Plan on file at the City's administrative offices.

- (c) All applicants shall operate, monitor, and maintain each water quality control required by this Article in accordance with the WQC Maintenance Plan and the requirements of this Article.
- (d) The WQC Maintenance Plan may provide for transfer of responsibility for WQC operation and maintenance activities to: (1) a groundwater district, a municipal utility district, a public utility district, or any other special district created under state law; (2) a homeowners' or property owners' association; (3) a natural resources conservation or other environmental interest group; or (4) any similar third party entity. Transfer of responsibility to any such entity requires the advance written consent of the City. Any entity assuming responsibility for WQC operation and maintenance shall also assume responsibility for the financial assurance required by Section 4.106 of this Article.

Division 4. Administration

Sec. 4.101. Summary of Review and Approval Process.

An applicant for a development project shall comply with all established City pre-development review and approval requirements as otherwise required by City Code. Those Code requirements relating to water quality protection and non-point source pollution control are described in the following subsections:

- (a) Preliminary Plat. The preliminary plat shall generally describe the various land uses and water quality controls proposed for the property. The preliminary plat at a minimum shall identify the following:
 - (1) residential, commercial and industrial lots and land uses;
 - (2) development densities for all land uses;
 - (3) identification of streams, drainage ways and other waterways, plus associated water quality buffer zones;
 - (4) FEMA-designated floodplain areas;
 - (5) Critical Environmental Features and CEF setback areas;
 - (6) areas with slopes greater than five percent (5%);
 - (7) parks, greenbelts and recreational areas;
 - (8) a preliminary soils assessment;
 - (9) proposed stormwater and wastewater management areas and strategies;
 - (10) roadway easements and transportation plans; and
 - (11) utility easements and utility service plans.
- (b) Final Plat. The final plat shall provide specific detailed information on the various land uses and water quality controls proposed for the property as identified in a site development plan submitted with an application for final plat approval. The application for final plat approval and site development plan shall be prepared and sealed by a Texas licensed professional engineer and, at a minimum, shall identify the following:
 - (1) final designation of residential, commercial and industrial lots and land uses, including a detailed evaluation of development densities based on the gross site

- area method demonstrating compliance with all applicable impervious cover requirements;
- (2) streams, drainage ways and other waterways, plus associated water quality buffer zones;
 - (3) FEMA-designated floodplain areas;
 - (4) detailed characterization of Critical Environmental Features and CEF setback areas;
 - (5) identification of the slopes of all different land use areas within the development;
 - (6) final designation of all dedicated parks, greenbelts and recreational areas;
 - (7) a detailed soils assessment identifying the soil types and depths in all areas of the development;
 - (8) temporary erosion and sedimentation controls to be utilized during construction activities;
 - (9) detailed description of stormwater, wastewater and erosion management controls and strategies, including (i) type and location of all structural water quality controls, (ii) pollutant loading calculations for undeveloped and developed conditions, (iii) estimated runoff quantities and runoff rates, (iv) storage volumes, and (v) application, infiltration and discharge rate calculations;
 - (10) the Wastewater Irrigation Plan required by Section 3.115;
 - (11) the WQC Maintenance Plan required by Section 3.116, including evidence of WQC financial assurance as required by Section 4.106;
 - (12) a detailed transportation plan describing measures for protection of roadway stream crossings and identifying final roadway easements;
 - (13) a detailed utility service plan describing measures for protection of utility stream crossings and identifying final utility easements;
 - (14) evidence of an adequate and reliable source of potable water for the development at full build-out;
 - (15) a complete listing of all water quality related permits, registrations and approvals required by any local, state or federal governmental agency or district; and
 - (16) sequencing of construction activities.
- (c) Final Construction Plans. Final plans for the construction of the proposed development as described in the final plat and site development plan shall be submitted to the City when applying for a building permit or the site development permit as required by City Code:
- (1) any modifications(s) or update(s) to the site development plan submitted with the application for final plat approval;
 - (2) final construction drawings and specifications, including a Texas licensed engineer's concurrence letter, for the water quality controls constructed as identified in the site development plan;
 - (3) copies of permits or other evidence of approvals by any local, state or federal agency or district with authority over water quality protection aspects of the development, including but not limited to:
 - (A) any Edwards Aquifer water pollution abatement plan as required by TCEQ rules;

- (B) any federal Clean Water Act Section 404 permit;
 - (C) any TPDES construction stormwater general permit and, if applicable, any required industrial stormwater general permit, including a copy of the Stormwater Pollution Prevention Plan (SWPPP), copies of all Notices of Intent (NOIs) to be covered by the general stormwater permit, and copies of all regulatory agency responses to the SWPPP and NOI;
 - (D) any wastewater discharge permit issued under Chapter 26 of the Texas Water Code;
- (4) copies of all recorded roadway and utility easements and rights-of-way;
 - (5) copies of all instruments dedicating public parklands, greenbelts and recreational areas;
 - (6) copies of all instruments dedicating water quality control public improvements;
 - (7) any modification(s) or update(s) to the Wastewater Irrigation Plan required by Section 3.115;
 - (8) any modification(s) or update(s) to the WQC Maintenance Plan required by Section 3.116;
 - (9) evidence of WQC financial assurance as required by Section 4.106; and
 - (10) the Non-Point Source Pollution Control Permit required by Section 4.103.

Sec. 4.102. Charges and Fees.

- (a) The City may adopt reasonable fees for reimbursement of the City's costs of implementing and administering the requirements of this Article which costs may include, but not be limited to, the following:
 - (1) costs of monitoring and inspecting water quality controls;
 - (2) costs of collecting and analyzing wastewater and stormwater discharges and reviewing discharge monitoring reports;
 - (3) costs of reviewing spill and release reports and costs of responding to spills and releases of oil, hazardous substances and other pollutants;
 - (4) costs of reviewing applications for permits and other approvals required by this Article;
 - (5) costs of reviewing applications for approvals of concept plans, preliminary and final plats, site development plans, and construction plans;
 - (6) costs of conducting field inspections;
 - (7) costs of consulting with the applicant concerning the applicant's development project; and
 - (8) other reasonable and necessary costs of carrying out the requirements of this Article.
- (b) The fees and charges authorized under this Section shall be as shown in the City's Code of Ordinances, and may be amended from time to time. It is the developer's or owner's responsibility to obtain and comply with the City's current fee schedule. The fees authorized by this Section are separate from all other fees, fines, and penalties chargeable by the City under other provisions of the City Code.

Sec. 4.103. Non-Point Source (NPS) Pollution Control Permit.

- (a) Except as provided in subsection (c), a NPS Pollution Control Permit is required for the development of any land within the City and its ETJ to ensure that water quality protection measures are implemented as required by this Article. Prior to issuance of a building permit or a site development permit, a person proposing to develop land shall pay an application fee and submit a complete application for a NPS Pollution Control Permit. By submitting an application, the applicant is authorizing the City to enter applicant's land to obtain information required for the review of the permit application.
- (b) An NPS pollution control permit shall be required for all re-development of existing development and for all utility construction within the City and its ETJ.
- (c) A NPS Pollution Control Permit is not required for the following types of development:
 - (1) Single-Family Residences Not Within a Platted Subdivision. No permit is required for new construction of a single-family residence on a single-family lot which is not part of a platted subdivision. Landowners undertaking such construction shall, however, utilize the measures for controlling erosion and sedimentation and for controlling non-point source pollution as described in the TCSS Manual during the construction process. At the time of application for building permits from the City, such landowners shall submit a description of the erosion and sedimentation control measures and the non-point source pollution control measures that will be used.
 - (2) Existing Development. No permit is required for development in existence or authorized under an approved final plat on the effective date of this Article. However, any re-development or other improvements made after the effective date of this Article which require a new or modified water quality control must be authorized by a permit and meet the performance standards in Section 3.103.
 - (3) Utility Maintenance. No permit is required for routine maintenance and repairs of utility lines if the landowner complies with the guidelines set forth in the TCSS manual for such activity.
- (d) Processing of NPS Pollution Control Permit Applications.
 - (1) Preparation of Permit Applications. Applicants required to obtain a NPS Pollution Control Permit shall prepare the permit application in accordance with the requirements of this Article and the TCSS Manual.
 - (2) Review and Approval of Permit Applications.
 - (A) General. The City shall review an application for a NPS Pollution Control Permit in conjunction with the review of applications for site development permits and subdivision plat approvals.
 - (B) Technical Review. Once the application is accepted by the City as an administratively complete submittal, the City will conduct a technical review of the permit application. The technical review period commences upon acceptance of an administratively complete application and continues for a period of up to fifteen (15) calendar days.

- (C) Requests for Additional Information. The City will notify the applicant in writing of any additional information needed by the City to conduct a complete technical review. An applicant shall have thirty (30) calendar days to submit the requested information or revise the application. If the applicant provides the additional information within the thirty (30) day period, the technical review period shall be extended for no more than fifteen (15) calendar days. If the applicant does not provide the additional information within the thirty (30) day period, the City may withhold approval of any preliminary or final plats or site development plans until such time as the additional information is submitted by the applicant.
- (3) Application Fees. The application and review fee and charges shall be as shown in the City's Code of Ordinances.
- (4) Financial Assurance. A demonstration of financial assurance as required by Section 4.106 shall be provided with the application for NPS Pollution Control Permit.
- (5) Permit Conditions. All permits shall identify the nature and location of each water quality control established for the permitted development and specify whatever special provisions are considered necessary by the City to protect water quality within the City's jurisdiction and to prevent pollution resulting from the permitted development. All permits shall also include the following as standard permit conditions unless modified by the City in its sole discretion:
- (A) The permittee shall notify the City in writing at least forty-eight (48) hours before commencing construction of the permitted development project.
 - (B) The permittee shall obtain a permit amendment from the City prior to modifying or eliminating any structural water quality control, except for minor field adjustments of temporary erosion controls.
 - (C) The permittee shall install all structural water quality controls as identified in the approved permit in accordance with applicable technical criteria in the TCSS Manual.
 - (D) The permittee shall comply with the requirements of this Article regarding proper monitoring, operation and maintenance of water quality controls as set forth in the Maintenance Plan required under Section 3.116.
 - (E) The permittee shall inspect all temporary and permanent water quality controls, including all erosion and sedimentation controls, at least once each week, as well as after each rain of one-half inch (0.5") or more occurring within a 24-hour period.
 - (F) The permittee shall record and document the results of all inspections in an inspection logbook kept on-site at the development and available for review by the City during normal working hours.
 - (G) The permittee shall make all needed repairs to any damaged water quality control structure within 48 hours of discovery of such damage, or such longer time period as authorized in writing by the City.
 - (H) The permittee shall repair any siltation or erosion damage resulting from full or partial failure of a structural water quality control within

- 48 hours of discovery of such damage, or such longer time period as authorized in writing by the City.
- (I) The permittee shall record in the inspection logbook all repairs and maintenance activities conducted on or for the permitted water quality controls, the name and phone number of the contractor performing the repairs and maintenance, and any environmental impacts resulting from the damaged or defective water quality controls.
 - (J) The permittee shall allow the City to enter and inspect the site: (i) for the purpose of annual inspections, (ii) at any other times as deemed necessary by the City to verify compliance with the permit, and (iii) for performing any work necessary to bring the site into compliance with the permit.
 - (K) The permittee shall designate a single, publicly accessible location on the development site for the posting of public notices.
 - (L) The permittee shall designate an individual person (including mailing address, phone number and E-mail address) to act as its representative for purposes of receiving communications by the City and the public regarding compliance with the permit.
 - (M) The permittee shall keep a copy of the permit and the approved site development plan on the development site or with the permittee's designated representative.
 - (N) Upon completion of development, the permittee's Texas licensed professional engineer shall certify in writing to the City that each water quality control was constructed and maintained in accordance with the permit conditions and this Article.
 - (O) The permittee shall not transfer the permit, or any responsibilities of permittee under the permit, to any other person or entity without the advance written consent of the City.
 - (P) The permittee shall pay all permit fees and other fees required by this Article in a timely manner.
 - (Q) The permittee shall perform all activities in accordance with applicable federal, state and local laws or ordinances.
 - (R) The permittee shall indemnify and hold the City and its authorized agents and its authorized consultants harmless from any and all claims, demands, damages, actions, costs and charges to which the City may become subject and which the City may have to pay by reason of injury to any person or property, or loss of life, or loss of property, resulting from, or in any way connected with the permittee's actions under the permit.
 - (S) No land development activities may commence if not fully described in the permit application filed with the City.
 - (T) Nothing in the permit is intended to amend or alter any legal rights or benefits previously granted to or vested in the City, nor the terms and conditions of any private agreement between the City and the permittee.

- (6) Duration. Except as provided in subsection (d)(7), the NPS Pollution Control Permit shall be valid for the life of the site development permit or the building permit for the development.
- (7) Termination for Nonuse. A NPS Pollution Control Permit may be terminated by the City if commencement of development does not occur under the site development permit or building permit within twelve (12) months of the issuance of the NPS Pollution Control Permit. If the City terminates a permit for nonuse and the financial assurance mechanism is still in effect, the City may call on such financial assurance in order to provide permanent stabilization of the site.

Sec. 4.104. Erosion Control Plan.

- (a) As part of an application for a site development permit or a building permit, the applicant shall submit a detailed Erosion Control Plan in accordance with the requirements set forth in the TCSS Manual.
- (b) The purpose of the Erosion Control Plan is to clearly identify all temporary and permanent erosion and sediment control measures which will be installed and maintained throughout the duration of a development project to minimize the erosion and the transport of silt, earth, topsoil, and sand by water runoff or construction activities beyond the boundaries of the development site.
- (c) An Erosion Control Plan shall at a minimum provide for the following:
 - (1) Identification of the type and location of each erosion control structure.
 - (2) A requirement that the developer remove off-site sedimentation that is a direct result of land disturbing activities where such off-site sedimentation results from the failure to implement or maintain erosion control devices as specified in the approved Erosion Control Plan.
 - (3) A prohibition on allowing sediment laden water resulting from below ground installations to flow from a development site without being treated through an erosion control device or a structural water quality control.
 - (4) A requirement that the developer repair damage to a erosion control device, including replacement of existing grass or sod in a vegetative strip, within 48 hours of discovery of the damage.

Sec. 4.105. City Inspections of Development Projects.

- (a) Predevelopment Inspection. Following installation of temporary erosion and sedimentation controls and before development construction commences, the applicant shall provide a written request to the City for an inspection of the temporary erosion controls and water quality controls. Such predevelopment inspection will be attended by the City Engineer who will determine whether the temporary erosion and sedimentation controls and water quality controls are in compliance with the permit. If the City does not conduct the predevelopment inspection within five (5) working days of receipt of the request for inspection, the applicant may proceed with development.

- (b) Inspections During Development. During development, the City may inspect the site to ensure that temporary and permanent erosion and sediment controls are being maintained and that the structural water quality controls described in the NPS Pollution Control Permit are being constructed in accordance with the requirements of this Article.
- (d) Final Inspection. Upon completion of construction, the City will conduct a final inspection of the structural water quality controls. Such final development inspection must be attended by the permittee, the City Engineer, the design engineer, the contractor, and the field engineer. The City Engineer will determine whether the water quality controls are in compliance with the permit.
- (e) The developer shall confirm that the water quality controls are constructed in conformance with the approved design by providing a concurrence letter certified by the permittee's design engineer.

Sec. 4.106. Financial Assurance.

- (a) Financial assurance shall be provided by the landowner or developer to finance the cost of construction, operation and maintenance of all water quality controls, including temporary and permanent erosion and sedimentation controls, for the following types of development:
 - (1) single-family platted subdivisions;
 - (2) multi-family residential developments;
 - (3) non-residential developments;
 - (4) re-development of existing developments.
- (b) Financial assurance shall be provided to the City as part of the application for a NPS Pollution Control Permit or as part of the application for a building permit if a NPS Pollution Control Permit is not required.
- (c) The amount of the financial assurance for each water quality control shall be initially proposed and certified by the developer's engineer and shall be no less than the full cost of the control as constructed.
- (d) Financial assurance for a water quality control shall be in the form of cash escrow or a cashier's check or money order in the required amount. If approved in writing by the City, a performance bond, surety bond, or a letter of credit may also be accepted as an allowable financial assurance mechanism.
 - (1) Performance or Surety Bond. A performance or surety bond shall comply with the following requirements:
 - (A) All bonds must be in a form acceptable to the City Attorney.
 - (B) All bonds must be executed by sureties named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in circular 570 (amended) by Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury.

- (C) All bonds must be signed by an agent accompanied by a certified copy of the agent's authority to act.
 - (D) All bonds shall be obtained from surety or insurance companies that are duly licensed or authorized in the State of Texas to issue performance or surety bonds for the limits and coverage required.
 - (E) If the surety on any bond furnished by the owner is declared to be bankrupt or becomes insolvent, or if its right to do business is terminated in the State of Texas, or if the surety ceases to meet the requirements for listing in Circular 570, the owner shall within twenty (20) calendar days thereafter substitute another performance or surety bond acceptable to the City.
- (2) Letter of Credit. A Letter of credit shall comply with the following requirements:
- (A) It shall be irrevocable.
 - (B) It shall be for a term sufficient to cover the completion, maintenance, and warranty periods of the control, but in no event less than three (3) years.
 - (C) It shall only require the City to present the issuer with a sight draft and a certificate signed by an authorized representative of the City certifying to the City's right to draw funds under the letter of credit.
- (e) The financial assurance must be maintained for the life of the water quality control. To the extent the City draws down the amount of the financial assurance mechanism to finance the cost of construction, operation or maintenance of the control, the developer or other person responsible for the control shall replenish the financial assurance mechanism or provide additional financial assurance so that the full required amount of financial assurance is maintained at all times.
- (f) The developer or other person responsible for the water quality control may request the City to reduce the amount of the required financial assurance by up to 50% if: (i) the control has been properly operated and maintained and has performed in accordance with City standards over a three-year period, and (ii) the City in its sole discretion determines that the developer or other person responsible for the control will continue to properly operate and maintain the control.

Division 5. Compliance and Enforcement.

Sec. 5.101. Release Reporting and Cleanup.

- (a) A developer or other person required to submit a spill or release notification to TCEQ under Chapter 26 of the Texas Water Code, or to the National Response Center under the federal Emergency Planning and Community Right-to-Know Act, shall at the same time submit a copy of such notification to the City. Copies of any follow-up notifications or reports required by such laws shall also be sent to the City at the same time as filed with TCEQ or the National Response Center.

Primary Entities Affected

- Unincorporated Hays County (30.4%)
 - (Including Various ETJs: 60.0%)
- City of Dripping Springs CL + ETJ (29.7%)
- City of Austin CL + ETJ (28.7%)
- Unincorporated Travis County (3.7%)
 - (Including Various ETJs: 23.5%)
- Village of Bee Cave CL + ETJ (2.8%)
- Total for These 5 Entities: > 95%

Regional Water Quality Planning Project

Goals and Objectives of the Plan

- Protect Surface Water and Groundwater
- Address W.Q. in All Areas of the Planning Region (Not just Edwards or Barton Springs)
- Goal: "Maintain"
 - Mandatory applicability
 - No net increase in pollutant loadings
 - Applies to all future development activities
- Goal: "Enhance"
 - Primarily voluntary measures
 - Designed to improve existing water quality

Regional Water Quality Planning Project

- (f) Any temporary or permanent obstruction to safe and easy access to a facility to be inspected or sampled shall be promptly removed by the developer or permittee at the written or verbal request of the City and shall not be replaced. The costs of clearing such access shall be borne by the developer or permittee.
- (g) Unreasonable delays in allowing the City access to the developer's or permittee's facility shall be a violation of this Article.
- (h) The City may seek issuance of a search warrant from any court of competent jurisdiction if prompt and reasonable access is not provided as required by this Article.

Sec. 5.103. Supplemental Financial Assurance.

- (a) The City may, by written notice, order any owner or operator of a source of stormwater or pollution discharge associated with construction or development activity to file a satisfactory bond, payable to the City, in an amount determined by the City to be necessary to ensure consistent compliance with this Article.
- (b) The City may, by written notice, order any owner or operator of a source of stormwater or pollution discharge associated with construction or development activity to submit proof that it has obtained liability insurance in an amount determined by the City to be necessary to ensure proper remediation, restoration, and abatement of any damage to a water quality control or impacts to the environment caused by the discharge.
- (c) The City may deny approval of any building permit, subdivision plat, site development permit, or any other City permit or approval required under the City Code until a performance bond or proof of liability insurance has been provided as required by this Section.

Sec. 5.104. Stop Orders.

Whenever any work is being done in violation of this Article, the City may order the work stopped by written notice (a "Stop Work Order") served on any persons engaged in performing such work. The stop work order shall be posted on the property adjacent to the activity in question, and all work described in the order shall immediately stop until notified in writing by the City that work may proceed.

Sec. 5.105. Permit Revocation.

A violation of this Article shall authorize the City to deny, temporarily suspend, or permanently cancel any permit issued pursuant to this Article. If a permit is denied, suspended or canceled, no further work shall occur on the permitted project until the violation is cured.

Sec. 5.106. Penalties and Injunctive Relief.

Any person convicted of violating any provision of this Article shall be punished by a fine in accordance with the general penalty provisions in the City's Code of Ordinances. Any person violating this Article is also subject to a suit for injunction.

Sec. 5.107. Citizen Complaints.

- (a) Any resident of the City or its ETJ may file a written complaint or report to the City of any spills, releases, illicit connections, or other instances of unauthorized discharge of pollutants into a stormwater drainage system or waters in the State, and any other suspected violation of this Article.
- (b) The written complaint or report should be based on first hand, personal observation or verifiable facts and supported by objective evidence. The City will process citizen complaints and reports of violations in accordance with City Code requirements.

Sec. 5.108. Variances.

- (a) Where the City Council finds that undue hardships will result from strict compliance with one or more provisions of this Article, and where the purposes of this Article will be served to an equivalent extent by an alternative means of compliance, it may approve a variance or a conditional variance. Pecuniary or financial hardship to the property owner or developer, standing alone, does not constitute undue hardship. To grant a variance, the City Council shall make the following findings:
 - (1) Granting the variance will not be detrimental to the public health, safety or welfare.
 - (2) Granting of the variance will not be injurious to, or prevent the orderly development of, property of other persons in the vicinity.
 - (3) The conditions upon which the request for a variance is based are unique to the property for which the variance is sought, and are not applicable generally to other property.
 - (4) Because of the particular physical surroundings, shape or topographical conditions of the specific property which is the subject of the variance request, a particular hardship to the property owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out.
 - (5) An alternate design or means of compliance will generally achieve the same result or intent as the standards and regulations prescribed herein.
- (b) Conditions. In approving a variance, the City Council may require any such conditions as will in its sole discretion serve the purposes of this Article.
- (c) A petition for a variance shall state fully the grounds for the application, and all of the facts relied upon by the petitioner.
- (d) The findings of the City Council together with the specific facts upon which such findings are based, shall be incorporated into the official minutes of the City Council at which a variance is considered.

ARTICLE _____
_____ COUNTY
NONPOINT SOURCE POLLUTION CONTROL
ORDINANCE

Division 1. General Provisions.

Sec. 1.101. Authority.

This Article is promulgated under the authority of the Texas Local Government Code, Chapter 232 (regarding county regulation of subdivisions and development); the Texas Water Code, Chapter 7 (regarding county enforcement authority), Chapter 16 (regarding county regulation and management of floodplains) and Sections 26.171 and 26.173 (regarding county inspections of public and private property to investigate conditions relating to water quality); and the Texas Health and Safety Code, Chapter 343 (regarding county regulation and abatement of public nuisances).

Sec. 1.102. Scope of Jurisdiction and Statement of Purpose.

Non-point source pollution control management policies shall govern the planning, design, construction, operation and maintenance of drainage, erosion, and water quality control facilities within the County's jurisdiction. This Article sets forth the minimum requirements necessary to provide and maintain a safe, efficient and effective non-point source pollution control program and to establish the various public and private responsibilities for the provision thereof. Further, it is the purpose of this Article to:

- (1) promote the public health, safety and general welfare and the safe, orderly, healthful development of unincorporated areas as authorized by Chapter 232 of the Local Government Code;
- (2) control and manage the quality of flood and stormwater runoff and the sediment load in runoff from new subdivisions and developments as authorized by Chapter 16 of the Texas Water Code;
- (3) establish a reasonable standard of design and performance for development which prevents erosion and sediment damage and which reduces the pollutant loading to streams, ponds and other watercourses;
- (4) minimize the expenditure of public money for cleaning sediments out of storm drains, streets, sidewalks and watercourses and building and maintaining non-point source pollution control projects;
- (5) help maintain a stable tax base and preserve land values in the County; and
- (6) preserve the natural beauty and aesthetics of the County.

Sec. 1.103. Findings of Fact.

1. The creeks, streams, drainage ways and other watershed areas within the jurisdiction of the County, as well as those portions of those groundwater aquifers which underlie areas within the jurisdiction of the County, are subject to actual and potential threats of pollution as a result of poor or inadequate planning for development and flood control. These threats may result in public health and safety hazards, disruption of commerce and governmental services, impairment of recreational and aesthetic values, and extraordinary public expenditures for pollution reduction and environmental protection, all of which adversely affect the public health, safety and general welfare.
2. All watersheds within the County's jurisdiction are undergoing development or are facing development pressure, which if not adequately and properly regulated can result in increased flooding hazards and pollution of waterways and groundwater aquifers from many sources. Sources of pollution include, but are not limited to, contaminated stormwater runoff; mismanagement of wastewater; discharges of pollutants from roadways, construction sites, and waste management areas; runoff of pesticides, fertilizers, and other nutrients from residential and agricultural land uses; and infiltration of such surface water contaminants to underground water-bearing formations.
3. The continued economic growth of the County is dependent on adequate quality and quantity of water, a pleasing natural environment, and recreational opportunities for residents of the County.
4. If watersheds within the County's jurisdiction are not developed in an environmentally responsible manner, the water resources, natural environment, and recreational opportunities within the County could be irreparably damaged.
5. The adoption of this Article is a vital step necessary to ensure the environmentally responsible development of watersheds, minimization of flood hazards, and the protection of surface and subsurface water quality within the County's jurisdiction.

Sec. 1.104. Lands to which this Article Applies.

This Article shall apply to all areas of land within the unincorporated areas of the County except to the extent stricter regulatory requirements may apply in the ETJ of a city. This Article applies to any person proposing to develop or improve real property within the jurisdiction of the County.

Division 2. Definitions.

Sec. 2.101. General Definitions for Purposes of This Article.

Unless otherwise explicitly stated in another section of this Article, the following terms and phrases shall have the following meanings:

1. **Annual Pollutant Load:** The amount of pollution in stormwater runoff that is discharged from a developed site over the course of one (1) year; usually measured in pounds and based on an average year of rainfall. The annual pollutant load is calculated by multiplying the pollutant concentration by the volume of runoff and does not include the background pollutant load.
2. **Applicant:** A person who submits an application for approval required by this Article. The applicant shall be the owner of the property subject to this Article acting in person or by and through the owner's authorized representative. Documentation evidencing ownership of the property or the authority of the authorized agent may be required to be submitted.
3. **Application:** A written request for an approval required by this Article.
4. **Best Management Practices (BMPs):** Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the non-point source pollution of waters in the State. The two basic types of BMPs for purposes of this Article are "structural BMPs" or structural water quality controls (which include engineered and constructed systems that are designed to control water quantity, water quality, and/or erosion and sediment deposits from stormwater runoff) and "non-structural BMPs" (which include institutional and pollution-prevention type practices designed to prevent pollutants from entering storm water runoff or to reduce the volume of stormwater requiring management).
5. **Contributing Zone of the Edwards Aquifer:** The area or watershed where runoff from precipitation flows downgradient to the Recharge Zone of the Edwards Aquifer.
6. **Critical Environmental Features (CEFs):** Features determined to be of critical importance to the maintenance of water quality, including floodplains; wetlands; springs; caves; sinkholes; solution cavities; faults and fractures with solution enlarged openings; and highly erodible natural features.
7. **Developer:** A person who owns a tract of land and who is engaged in clearing, grubbing, filling, mining, excavating, grading, installing streets and utilities or otherwise preparing that tract of land for the eventual division into one or more lots on which building(s) or other structure(s) will be constructed or placed.
8. **Development:** All land modification activity, including the construction of building, roads, paved storage areas, and parking lots. "Development" also includes any land disturbing construction activities or human-made change of the land surface, including clearing of vegetative cover, excavating, filling and grading, mining, and dredging, and the deposit of refuse, waste or fill. The following activities are excluded from the definition: care and maintenance of lawns, gardens, and trees; minimal clearing (maximum ten feet (10') wide) for surveying and testing; and agricultural activities.

9. **Discharge:** Any addition or introduction of any pollutant, stormwater, or any other substance in a harmful quantity into a stormwater drainage system or into waters in the State.
10. **Discharger:** Any person who causes, allows, permits, or is otherwise responsible for, a discharge, including, without limitation, any operator of a construction site or industrial facility.
11. **Drainage area:** The horizontal projection of the area contributing runoff to a single control or design point.
12. **Erosion:** The detachment and movement of soil, sediment, sand or rock fragments by wind, water, ice or gravity.
13. **Facility:** Any building, structure, installation, process, or activity from which there is or may be discharge of a pollutant.
14. **Harmful Quantity:** The amount of any substance that will cause pollution of water in the State.
15. **Hazardous Substance:** Any substance listed in Table 302.4 of 40 CFR Part 302.
16. **Hazardous Waste:** Any substance identified or listed as a hazardous waste by the EPA pursuant to 40 CFR Part 261.
17. **Industrial Waste:** Any waterborne liquid or solid substance that results from any process of industry, manufacturing, mining, production, trade, or business.
18. **Non-Point Source (NPS) Pollution:** Pollution that is caused by or attributable to diffuse sources. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, or radiological integrity of water. Typically, NPS pollution results from land runoff, precipitation, atmospheric disposition, or percolation.
19. **Non-Point Source Pollution Control Plan:** The drawings and documents submitted by an applicant seeking plan or permit approval under this Article. Such a plan consists of a system of vegetative, structural and other measures to control the increased rate and volume of surface runoff and reduce pollutants in the runoff caused by human changes to the land.
20. **Point Source:** Any discernable, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.
21. **Pollutant:** Eroded or displaced sediment, soil, silt or sand resulting from development activities; dredged spoil; solid waste; sewage; garbage; chemical waste; biological

materials; radioactive materials; abandoned or discarded appliances or equipment; and industrial, municipal, and agricultural waste which is or may be discharged into waters in the State.

22. **Pollution:** The alteration of the physical, thermal, chemical, or biological quality of, or the contamination of, any water in the State that renders the water harmful, detrimental, or injurious to humans, animal life, vegetation, or property, or to the public health, safety, or welfare, or impairs the usefulness or the public enjoyment of the water for any lawful or reasonable purpose.
23. **Preferred Growth Area (PGA):** Land areas within the incorporated municipal boundaries of a city which are defined through the comprehensive planning process described in Chapter 213 of the Texas Local Government Code as areas where future zoning is proposed to be industrial, commercial or high-density residential.
24. **Recharge Zone of the Edwards Aquifer:** That area where the stratigraphic units constituting the Edwards Aquifer crop out, including the outcrops of other geologic formations in proximity to the Edwards Aquifer where caves, sinkholes, faults, fractures or other permeable features create a potential for recharge of surface waters into the Edwards Aquifer.
25. **Release:** Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into a stormwater drainage system or into waters in the State.
26. **Runoff:** That portion of precipitation or precipitation drainage that flows by force of gravity across ground surface as sheet flow or in a stormwater drainage system towards water in the State.
27. **Solid Waste:** Any garbage, rubbish, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including, solid, liquid, semi-solid, or contained gaseous material resulting from industrial, municipal, commercial, mining, and agricultural operations, and from community and institutional activities.
28. **Stormwater Drainage System:** A conveyance or system of conveyances including roads with drainage systems, catch basins, curbs, gutters, ditches, man-made channels, or storm drains designed or used for collecting or conveying storm water.
29. **Stormwater Pollution Prevention Plan (SWPPP):** A plan required by either the TPDES Construction Site General Permit or the TPDES Industrial General Permit and which describes and ensures the implementation of practices that are to be used to reduce the pollutants in stormwater discharges associated with construction or other industrial activity.
30. **Subdivision:** A division, or re-division, of any tract of land situated within the County's jurisdiction into two or more parts, lots or sites, for the purpose, whether immediate or in

the future, of sale, division of ownership or building development. "Subdivision" includes re-subdivisions of land or lots which are part of previously recorded subdivisions.

31. **TCEQ:** The Texas Commission on Environmental Quality or its predecessor or successor agencies as defined by law.
32. **TPDES General Permit for Construction Stormwater Discharges:** The Construction General Permit No. TXR150000 issued by TCEQ on March 5, 2003 and any subsequent modifications or amendments thereto.
33. **TPDES General Permit for Industrial Stormwater Discharges:** The Industrial General Permit No. TXR050000 issued by TCEQ on August 20, 2001 and any subsequent modifications or amendments thereto.
34. **TPDES Permit:** A permit issued by TCEQ pursuant to authority granted under 33 USC § 1342(b) that authorizes the discharge of pollutants into waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.
35. **Transferable Development Right (TDR):** Authorization to exceed the uniform intensity levels otherwise imposed under this Article on a less environmentally-sensitive tract of land resulting from voluntary relinquishment of development rights otherwise allowed under this Article on a more environmentally-sensitive tract of land (e.g., through dedicated conservation easement). A TDR can also result from the removal of existing impervious cover within an existing development with water quality protection measures not otherwise required by this Article.
36. **Water in the State (or Water):** Any groundwater, percolating or otherwise, lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, or canals inside the territorial limits of the State, and all other bodies of surface water, natural or artificial, navigable or non-navigable, and including the beds and banks of all water courses and bodies of surface water, that are inside the jurisdiction of the State.
37. **Water Quality Control:** An engineered and constructed device or system designed to protect water from pollution, control the rate and flows of stormwater runoff, and/or minimize erosion and sediment deposits from stormwater runoff.
38. **Watershed:** The total area contributing runoff to a stream or drainage system.
39. **Wetland:** An area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions and conforms to the U.S. Army Corps of Engineers' definition. Wetlands generally include swamps, marshes, bogs, and similar areas.

Division 3. Non-point Source Pollution Control Measures.

Sec. 3.101. General Prohibitions.

- (a) Except as otherwise specifically authorized by this Article or by the County, no person shall discharge, or cause, suffer or allow the discharge, of any wastes, substances or other materials into or adjacent to any water in the State which causes or will cause pollution of any water in the State.
- (b) Except as otherwise specifically authorized by this Article or by the County, no person shall introduce or cause to be introduced into a stormwater drainage system any pollutants or other discharge that is not composed entirely of stormwater.

Sec. 3.102. Specific Prohibitions and Requirements for Protection of Stormwater Drainage.

- (a) No person shall introduce or cause to be introduced into a stormwater drainage system any discharge that causes or contributes to causing a violation of a water quality standard established by law.
- (b) No person shall introduce, discharge, or cause, suffer or allow a release of any of the following substances into a stormwater drainage system:
 - (1) any used motor oil, antifreeze, or any other motor vehicle fluid;
 - (2) any industrial waste;
 - (3) any hazardous waste, including hazardous household waste;
 - (4) any domestic sewage or septic tank waste, grease trap waste, or grit trap waste;
 - (5) any garbage, rubbish, or yard waste;
 - (6) any wastewater from a commercial carwash facility; from any vehicle washing, cleaning, or maintenance operation at any new or used automobile or other vehicle dealership, rental agency, body shop, repair shop, or maintenance facility; or from any washing, cleaning, or maintenance of any business or commercial or public service vehicle, including a truck, bus, or heavy equipment, by a business or public entity that operates more than two such vehicles;
 - (7) any wastewater from the washing, cleaning, de-icing, or other maintenance of aircraft;
 - (8) any wastewater from a commercial mobile power washer or from the washing or other cleaning of a building exterior that contains any soap, detergent, degreaser, solvent, or any other harmful cleaning substance;
 - (9) any wastewater from commercial floor, rug, or carpet cleaning;
 - (10) any wastewater from the washdown or other cleaning of pavement that contains any harmful quantity of soap, detergent, solvent, degreaser, emulsifier, dispersant, or any other harmful cleaning substance; or any wastewater from the washdown or other cleaning of any pavement where any spill, leak, or other release of oil, motor fuel, or other petroleum or hazardous substance has occurred, unless all harmful quantities of such released material have been previously removed;

- (11) any effluent from a cooling tower, condenser, compressor, emissions scrubber, emissions filter, or the blowdown from a boiler;
 - (12) any ready-mixed concrete, mortar, ceramic, or asphalt base material or hydromulch material, or from the cleaning of commercial vehicles or equipment containing, or used in transporting or applying, such material;
 - (13) any runoff or washdown water from any animal pen, kennel, or fowl or livestock containment area;
 - (14) any filter backwash from a swimming pool, or fountain, or spa;
 - (15) any swimming pool water containing any harmful quantity of chlorine, muriatic acid or other chemical used in the treatment or disinfection of the swimming pool water or in pool cleaning;
 - (16) any discharge from water line disinfection by superchlorination or other means if it contains any harmful quantity of chlorine or any other chemical used in line disinfection;
 - (17) any fire protection water containing oil or hazardous substances or materials (except for discharges or flows from fire fighting activities by a locally accredited Fire Department);
 - (18) any water from a water curtain in a spray room used for painting vehicles or equipment;
 - (19) any contaminated runoff from a vehicle wrecking yard;
 - (20) any substance or material that will damage, block, or clog the stormwater drainage system;
 - (21) any release from a petroleum storage tank (PST), or any leachate or runoff from soil contaminated by a leaking PST, or any discharge of pumped, confined, or treated wastewater from the remediation of any such PST release, unless the discharge satisfies all of the following criteria:
 - (A) the discharge complies with all state and federal standards and requirements;
 - (B) the discharge does not contain a harmful quantity of any pollutant; and
 - (C) the discharge does not contain more than 50 parts per billion of benzene; 500 parts per billion combined total quantities of benzene, toluene, ethylbenzene, and xylene (BTEX); or 15 mg/l of total petroleum hydrocarbons (TPH).
- (c) No person shall introduce or cause to be introduced into a stormwater drainage system any harmful quantity of sediment, silt, dirt, soil, sand or other material associated with clearing, grading, excavation or other construction activities, or associated with landfilling or other placement or disposal of soil, rock, sand or other earth materials, in excess of what could be retained on site or captured by employing sediment and erosion control measures to the minimum extent required by this Article.
- (d) No person shall connect a line conveying sanitary sewage, whether domestic or industrial, to a stormwater drainage system, nor allow such a connection to continue if discovered.

- (e) No person shall cause or allow any pavement washwater from a service station to be discharged into a stormwater drainage system unless such washwater has first passed through a grease, oil, and sand interceptor which is properly functioning and maintained.

Sec. 3.103. Non-point Source Pollution Control Management Design Standards.

- (a) Except as otherwise provided in this Article, all development subject to this Article shall achieve the following design standards through the use of structural and nonstructural BMPs and water quality controls. For each of the constituents below, the design shall demonstrate no net increase for the design storm event:
 - (1) Total Suspended Solids;
 - (2) Total Phosphorus;
 - (3) Total Nitrogen;
 - (4) Biochemical Oxygen Demand (BOD);
 - (5) Fecal Coliform.
- (b) The design storm event shall be the two (2) year, three (3) hour storm. The pollutant loadings for this storm event shall be calculated in accordance with a methodology prescribed by the County Engineer.

Sec. 3.104 Water Quality Buffer Zones (WQBZ) for Waterways

- (a) A water quality buffer zone is established along each waterway with the specified contributing (watershed drainage) area as follows:
 - (1) Waterways with 32 - 120 acres of contributing area: The WQBZ shall extend a minimum of 100 feet from either side of the centerline of the waterway (total of 200 feet of buffer zone).
 - (2) Waterways with 120 - 300 acres of contributing area: The WQBZ shall extend a minimum of 150 feet from either side of the centerline of the waterway (total of 300 feet of buffer zone).
 - (3) Waterways with 300 - 640 acres of contributing area: The WQBZ shall extend a minimum of 200 feet from either side of the centerline of the waterway (total of 400 feet of buffer zone).
 - (4) Waterways with greater than 640 acres of contributing area: The WQBZ shall extend a minimum of 300 feet from either side of the centerline of the waterway (total of 600 feet of buffer zone).
- (b) The minimum buffer zone set forth in Subsection (a) shall be expanded as follows:
 - (1) In those cases where a FEMA 100-year floodplain has been established, or a 100-year floodplain has been calculated and approved by a governmental authority, the buffer zone shall be expanded to encompass such 100-year floodplain plus an additional 25 feet beyond the edge of the floodplain.
 - (2) In those cases where U.S. jurisdictional wetlands exist beyond the edge of the minimum buffer zone set forth in Subsection (a), the buffer zone shall be expanded

to encompass the full extent of the wetlands plus an additional 25-feet beyond the edge of the wetland.

- (3) If two or more WQBZs overlap, the widest of the buffer zones shall be established.
- (c) Except as specifically provided in this Section, all development activities, including temporary construction activities, structural BMPs and landscaping activities, are prohibited in the Water Quality Buffer Zone of a waterway.
- (d) The following development activities within a WQBZ may be allowed in the sole discretion of the County:
- (1) critical utility crossings if the number of crossings of the WQBZ is limited to the maximum feasible extent;
 - (2) critical roadway crossings if the number of crossings of the WQBZ is limited to the maximum feasible extent;
 - (3) critical transportation crossings if the number of crossings of the WQBZ is limited to the maximum feasible extent;
 - (4) hike and bike trails if provided for in an approved comprehensive development plan;
 - (5) maintenance and restoration of natural vegetation;
 - (6) water quality control monitoring devices;
 - (7) removal of trash, debris, pollutants;
 - (8) fences that do not obstruct flood flows;
 - (9) public and private parks and open space, if human activities are limited to hiking, jogging, or walking trails, and excluding stables, corrals and other forms of animal housing; and
 - (10) private drives to allow access to property not otherwise accessible.
- (e) Any development within a WQBZ allowed under Subsection (d) shall be designed and/or conducted in a manner which limits the alteration and pollution of the natural riparian corridor to the maximum extent feasible. In no case shall any wastewater line be located less than one hundred (100) feet from the center line of a waterway unless the applicant demonstrates that installation of the wastewater line outside of this zone is physically prohibitive or environmentally unsound. Any wastewater lines located in a WQBZ shall meet design standards and construction specifications to ensure zero leakage.
- (f) All water quality control discharges and stormwater discharges onto a WQBZ shall only be in the form of diffused, overland sheet flow and shall have peak velocities of less than five (5) feet per second at the 2-year design rainfall event.

Sec. 3.105. Setback Areas for Critical Environmental Features (CEFs).

- (a) A minimum setback area of one hundred fifty (150) feet is established around the outside periphery of all CEFs.
- (b) All development activities, including temporary construction activities, structural BMPs and landscaping activities, are prohibited in the setback area of a CEF.

- (c) For a CEF which is in direct communication with the Edwards Aquifer, the upstream setback area shall extend out to the upper catchment divide of the CEF or three hundred (300) feet, whichever is less, but in no circumstances less than 150 feet.

Sec. 3.106. Control of Erosive Flows From Developed Areas.

- (a) No untreated stormwater runoff from developed land shall be allowed to flow over critical environmental features.
- (b) To the maximum extent practical, all stormwater drainage shall be treated using overland flow methods to a grass-lined swale or other vegetated buffer.
- (c) Drainage patterns shall be designed to the maximum extent practical to prevent erosion, maintain the recharge of local seeps and springs, and attenuate the harm of contaminants collected and transported by stormwater. All discharge points from stormwater retention and detention ponds or other accumulation areas shall provide for energy dissipation prior to exiting the site.
- (d) Overland sheet flow and natural drainage features and patterns shall be maintained to the maximum extent practical, rather than concentrating flows in storm sewers and drainage ditches. Stormwater drainage structures shall be sized to maintain flood flow velocities below the velocity associated with the 25-year, 3-hour rainfall event.
- (e) For site designs that provide for discharge of stormwater into a waterway, adequate retention and detention shall be incorporated into the site design to limit flows into the receiving waterway to the level consistent with the volume of the two-year, three-hour rainfall event evenly distributed over a 24-hour period.

Sec. 3.107. Natural Waterway Erosion Hazard Setbacks.

- (a) The County may require preservation of an existing channel or waterway for use as a natural floodplain through the establishment of erosion hazard setbacks. No building, fence, wall, deck, swimming pool or other structure shall be located, constructed or maintained within the area encompassing the setback.
- (b) As an alternative to the establishment of an erosion hazard setback, an existing channel or waterway may be preserved and protected through a bank stabilization and protection plan as approved by the County.

Sec. 3.108. Structural Water Quality Controls.

- (a) Structural water quality controls (WQCs) shall be sized for the entire contributing drainage area for the following types of developments:
 - (1) New multi-family residential development; new non-residential development; and new subdivision development.

- (2) Redeveloped multi-family residential development, redeveloped non-residential development, and all redeveloped subdivision development that would result in violation of the requirements of this Article without the use of water quality controls.
- (b) The volume of runoff required to be captured, isolated, and treated by each structural WQC, or series of WQCs operating in sequence as a treatment train, shall be based on the contributing drainage area for the WQC or series of WQCs.
 - (c) Stormwater runoff from the following areas shall not require structural WQCs nor be included in the calculation of the volume of stormwater runoff required to be captured, isolated, and treated by a structural WQC:
 - (1) The full area of existing natural areas or restored natural areas from which stormwater runoff is routed around a WQC structure and which is restricted from development and from pesticides, herbicide, or fertilizer application through a plat note or restrictive covenant. The drainage areas from which stormwater is not routed around a WQC structure and which blends with runoff from developed areas shall be included in the water quality volume calculations.
 - (2) Fifty percent (50%) of the area using landscaping that requires no irrigation and no pesticide, herbicide, or fertilizer applications.
 - (3) The area on which a WQC structure is situated.
 - (4) Swimming pools which do not discharge its filter backwash into a stormwater drainage system.
 - (5) Impervious surface areas used for stormwater collection and on-site irrigation.
 - (6) Drainage from off-site areas which is routed around a WQC structure. The drainage areas from which stormwater is not routed around a WQC structure and which blends with runoff from developed areas shall be included in the water quality volume calculations.
 - (d) In determining the required level of treatment, the nature and volume of pollutant loads from all developed areas shall be considered including but not limited to the following:
 - (1) areas of impervious cover;
 - (2) the potential for pollutant impacts from industrial, commercial and other non-residential types of development;
 - (3) lawns, landscaping, and gardens using pesticides, herbicides or fertilizers;
 - (4) golf courses, play fields and other recreational or greenspace areas using pesticides, herbicides or fertilizers; and
 - (5) areas receiving wastewater effluent spray irrigation.
 - (e) All WQCs utilized for any development or redevelopment project shall be designed by a licensed Texas professional engineer to achieve removal efficiencies required by this Article.
 - (f) All structural WQCs utilized in the Recharge Zone shall be modified or augmented to prevent direct infiltration and recharge from the WQC. To meet this requirement, such WQCs shall utilize artificial linings, evapo-transpiration beds, or other methods designed

and operated to prevent infiltration into the Edwards Aquifer even during periods of extended rainfall.

- (g) The erosion control requirements of this Article shall apply to all related land disturbed areas for a development project including off-site borrow areas, off-site spoil areas and off-site construction staging areas.
- (h) The peak runoff rate for developed conditions shall not exceed the peak runoff rate for pre-development conditions for the two-year, three-hour storm event.
- (i) To provide necessary access for maintenance and monitoring, water quality controls shall be located within an area dedicated to the public by easement, deed restriction, or recorded plat notation. The dedicatory instrument shall note that water quality restrictions exist on the property and that any alternative use or alteration of the property must be approved in writing by the County.

Sec. 3.109. Operation and Maintenance of Water Quality Controls.

- (a) An applicant for a site development permit shall submit a WQC Maintenance Plan describing the specific measures proposed for operating, monitoring, and maintaining each water quality control proposed for a development project as required by this Article. County approval of the WQC Maintenance Plan is required prior to issuance of a site development permit.
- (b) Upon County approval of the WQC Maintenance Plan, the project applicant shall record in the county deed records and on any recorded plat(s) for the development a notation stating that the property is subject to a Water Quality Control Maintenance Plan on file at the County's administrative offices. Upon transferring title to the property, or any subdivided portion thereof, the applicant shall establish a deed restriction stating that the property is subject to a Water Quality Control Maintenance Plan on file at the County's administrative offices.
- (c) All applicants shall operate, monitor, and maintain each water quality control required by this Article in accordance with the WQC Maintenance Plan and the requirements of this Article.
- (d) The WQC Maintenance Plan may provide for transfer of responsibility for WQC operation and maintenance activities to: (1) a groundwater district, a municipal utility district, a public utility district, or any other special district created under state law; (2) a homeowners' or property owners' association; (3) a natural resources conservation or other environmental interest group; or (4) any similar third party entity. Transfer of responsibility to any such entity requires the advance written consent of the County. Any entity assuming responsibility for WQC operation and maintenance shall also assume responsibility for the financial assurance required by Section 4.106 of this Article.

Sec. 3.110. Stormwater Management Plan.

- (a) As part of an application for a site development permit, the applicant shall submit a detailed Stormwater Management Plan for review and approval by the County. The purpose of the Stormwater Management Plan is to clearly identify all water quality and erosion controls and demonstrate that such controls will comply with the requirements of this Article.
- (b) A Stormwater Management Plan shall at a minimum provide for the following:
 - (1) Identification of the type and location of each water quality and erosion control structure.
 - (2) Engineering calculations showing that the design standards for such controls as required by this Article will be achieved.
 - (3) A requirement that the developer remove off-site sedimentation that is a direct result of land disturbing activities where such off-site sedimentation results from the failure to implement or maintain erosion control devices as specified in the approved Stormwater Management Plan.
 - (4) A prohibition on allowing sediment laden water resulting from below ground installations to flow from a development site without being treated through an erosion control device or a structural water quality control.
 - (5) A requirement that the developer repair damage to a water quality or erosion control, including replacement of existing grass or sod in a vegetative strip, within 48 hours of discovery of the damage.

Division 4. Administration and Enforcement.

Sec. 4.101. Comprehensive Site Assessment and Technical Criteria.

- (a) As part of an application for a site development permit, the applicant shall submit a comprehensive site assessment that identifies all critical environmental features, all waterways and their classifications, all associated buffer zones, elevation contours, and any other information deemed necessary by the County Engineer to determine compliance with this Article.
- (b) In reviewing any submissions to the County required under this Article, the County Engineer may rely on any generally accepted set of technical criteria including but not limited to the City of Austin Environmental Criteria Manual, the LCRA Technical Manual, and the TCEQ Technical Criteria for complying with the TCEQ's Edwards Aquifer Rules.

Sec. 4.102. County Inspections of Development Projects.

- (a) Predevelopment Inspection. Following installation of temporary erosion and sedimentation controls and before development construction commences, the applicant shall provide a written request to the County for an inspection of the temporary erosion controls and water quality controls. Such predevelopment inspection will be attended

by the County Engineer who will determine whether the temporary erosion and sedimentation controls and water quality controls are in compliance with the permit. If the County does not conduct the predevelopment inspection within five (5) working days of receipt of the request for inspection, the applicant may proceed with development.

- (b) **Inspections During Development.** During development, the County may inspect the site to ensure that temporary and permanent erosion and sediment controls are being maintained and that the structural water quality controls described in the NPS Pollution Control Permit are being constructed in accordance with the requirements of this Article.
- (c) **Final Inspection.** Upon completion of construction, the County will conduct a final inspection of the structural water quality controls. Such final development inspection must be attended by the permittee, the County Engineer, the design engineer, the contractor, and the field engineer. The County Engineer will determine whether the water quality controls are in compliance with the permit.
- (d) The developer shall confirm that the water quality controls are constructed in conformance with the approved design by providing a concurrence letter certified by the permittee's design engineer.

Sec. 4.103. Financial Assurance.

- (a) As part of the application for a site development permit, financial assurance shall be provided by the landowner or developer to finance the cost of construction, operation and maintenance of all water quality controls required by this Article, including temporary and permanent erosion and sedimentation controls.
- (b) The amount of the financial assurance for each water quality control shall be initially proposed and certified by the developer's engineer and shall be no less than the full cost of the control as constructed.
- (c) Financial assurance for a water quality control shall be in the form of cash escrow or a cashier's check or money order in the required amount. If approved in writing by the County, a performance bond, surety bond, or a letter of credit may also be accepted as an allowable financial assurance mechanism.
- (d) The financial assurance must be maintained for the life of the water quality control. To the extent the County draws down the amount of the financial assurance mechanism to finance the cost of construction, operation or maintenance of the control, the developer or other person responsible for the control shall replenish the financial assurance mechanism or provide additional financial assurance so that the full required amount of financial assurance is maintained at all times.
- (e) The developer or other person responsible for the water quality control may request the County to reduce the amount of the required financial assurance by up to 50% if: (i)

the control has been properly operated and maintained and has performed in accordance with County standards over a three-year period, and (ii) the County in its sole discretion determines that the developer or other person responsible for the control will continue to properly operate and maintain the control.

Sec. 4.104. Stop Orders.

Whenever any work is being done in violation of this Article, the County may order the work stopped by written notice (a "Stop Work Order") served on any persons engaged in performing such work. The stop work order shall be posted on the property adjacent to the activity in question, and all work described in the order shall immediately stop until notified in writing by the County that work may proceed.

Sec. 4.105. Permit Revocation.

A violation of this Article shall authorize the County to deny, temporarily suspend, or permanently cancel any permit issued pursuant to this Article. If a permit is denied, suspended or canceled, no further work shall occur on the permitted project until the violation is cured.

Sec. 4.106. Penalties and Injunctive Relief.

Any person convicted of violating any provision of this Article shall be punished by a fine in accordance with the general penalty provisions in the County's Code of Ordinances. Any person violating this Article is also subject to a suit for injunction.

Sec. 4.107. Citizen Complaints.

- (a) Any resident of the County or its ETJ may file a written complaint or report to the County of any spills, releases, illicit connections, or other instances of unauthorized discharge of pollutants into a stormwater drainage system or waters in the State, and any other suspected violation of this Article.
- (b) The written complaint or report should be based on first hand, personal observation or verifiable facts and supported by objective evidence. The County will process citizen complaints and reports of violations in accordance with County Code requirements.

Sec. 4.108. Variances.

- (a) Where the County Commissioners Court finds that undue hardships will result from strict compliance with one or more provisions of this Article, and where the purposes of this Article will be served to an equivalent extent by an alternative means of compliance, it may approve a variance or a conditional variance. Pecuniary or financial hardship to the property owner or developer, standing alone, does not constitute undue hardship. To grant a variance, the County Commissioners Court shall make the following findings:
 - (1) Granting the variance will not be detrimental to the public health, safety or welfare.

Appendix O
Illustrative Cases

- (2) Granting of the variance will not be injurious to, or prevent the orderly development of, property of other persons in the vicinity.
 - (3) The conditions upon which the request for a variance is based are unique to the property for which the variance is sought, and are not applicable generally to other property.
 - (4) Because of the particular physical surroundings, shape or topographical conditions of the specific property which is the subject of the variance request, a particular hardship to the property owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations is carried out.
 - (5) An alternate design or means of compliance will generally achieve the same result or intent as the standards and regulations prescribed herein.
- (b) Conditions. In approving a variance, the County Commissioners Court may require any such conditions as will in its sole discretion serve the purposes of this Article.
 - (c) A petition for a variance shall state fully the grounds for the application, and all of the facts relied upon by the petitioner.
 - (d) The findings of the County Commissioners Court together with the specific facts upon which such findings are based, shall be incorporated into the official minutes of the Commissioners Court meeting at which a variance is considered.

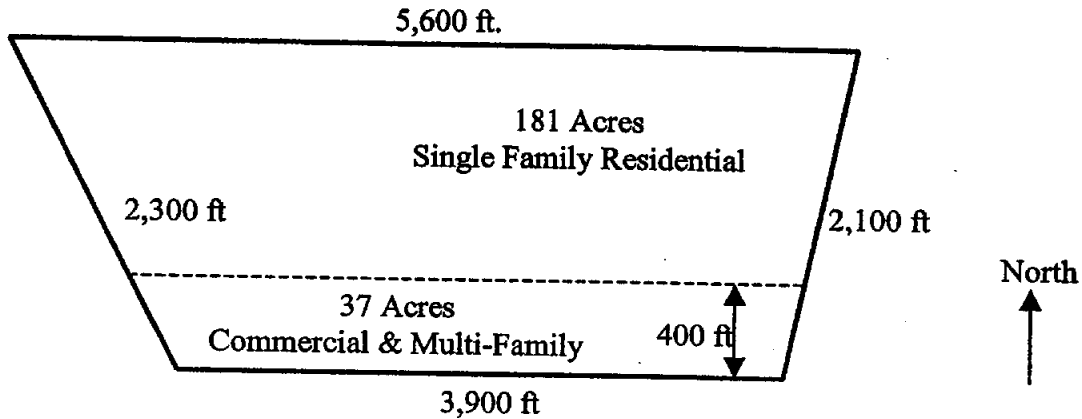
Illustrative Case No. 1

Land Development Example

SCENIC TEXAS, a Hill Country location west of Austin.

SITE DESCRIPTION:

- **SITE AREA:** 218 Acres of prime, undeveloped Texas Hill Country ranch land



- **BOUNDARY DETAILS:**
 - SOUTH: 4-lane US Highway
 - EAST: 2-lane Texas Ranch Road with paved shoulders
 - WEST: 2-lane County Road
 - NORTH: Undeveloped ranch land and 1500' of Scenic Creek
- **SITE FEATURES:**
 - Scenic Creek is a principal recharge stream for the Barton Springs segment of the Edwards Aquifer
 - A sinkhole and minor cave are known to exist on the property
 - Several karst features are known to exist on the property, and on other nearby properties
 - Site vegetation: Typical hill country mixture of open grassland, ashe juniper and live oak

DEVELOPMENT PLANS

- **PROPOSED USES:**
 - Commercial and High-density Residential 37 Acres
 - Single Family Residential 181 Acres
 - Total Site 218 Acres

Job No. 7131	NAISMITH ENGINEERING, INC.	SHEET 1 of 2
Description: Example Calculations for Pollutant Loading Comparison – Illustrative Case #1		Date: 03/07/05
Regional Water Quality Protection Plan – Barton Springs Segment of the Edwards Aquifer		By: dbf

BACKGROUND INFORMATION

Pollutant Loadings

Pollutant Loadings per unit area from undeveloped land are represented by the variable L .

Pollutant Loadings per unit area from developed land are represented by the variable L' and are related to L by the following equation:

$$L' = L \times C$$

Where C is a factor representing the magnitude of increase in that pollutant.

The total unit pollutant loading for a tract of land which is partially developed would be represented by the following equation:

$$L_{total} = A_p \times L + A_i \times L'$$

Where A_p represents the undeveloped (pervious) fraction of the area and A_i represents the developed (impervious) fraction of the area.

BMP Effectiveness

Water quality protection best management practices (BMPs) are to be employed on the developed portion. The pollutant removal reduction rating of a BMP is quantified by the following equation:

$$E_R = 1 - (E_{BMP}/100)$$

Where E_{BMP} is the BMP removal efficiency in percent.

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POLLUTANT LOADING ESTIMATES

Assumptions

A tract of land is to be developed at 13.24% Impervious Cover (IC). Correspondingly, $A_p = 0.8676$ and $A_i = 0.1324$. Studies indicate that for suspended pollutants, $C_s = 5.1$ and for dissolved pollutants, $C_d = 2.6$.

Studies indicate that for **vegetative filter strips (VFS)** the following removal efficiencies can be assumed:

TSS	=	85% [$E_{R85} = 0.15$]
TN	=	30% [$E_{R30} = 0.70$]

Studies indicate that for **retention/irrigation systems** the following removal efficiencies can be assumed:

TSS	=	100% [$E_{R100} = 0.00$]
TN	=	100% [$E_{R100} = 0.00$]

A goal for the developed condition is no net increase in pollutant loadings.

Calculation of BMP Pollutant Removal Reduction Rating (E_R) for TSS and TN removal efficiencies:

For TSS removal (Suspended Pollutant):

Area served by Retention/Irrigation	=	59.08 ac ($A_{R/I}$)	[For Ret./Irrig. TSS Removal Eff. = 100%, therefore $E_{R100} = 0.00$]
Area served by Vegetative Filter Strips	=	26.67 ac (A_{VFS})	[For VFS TSS Removal Eff. = 85%, therefore $E_{R85} = 0.15$]
Area served by BMPs (Total)	=	85.75 ac (A_{TOTAL})	

$$A_{TOTAL} * E_{R-TSS} = (A_{R/I} * E_{R100}) + (A_{VFS} * E_{R85})$$

$$85.75 \text{ ac} * E_{R-TSS} = (59.08 * 0.00) + (26.67 * 0.15)$$

$$E_{R-TSS} = [(0.00) + (4.00)] / 85.75$$

$$E_{R-TSS} = \mathbf{0.05}$$

For TSS Removal – BMP Pollutant Removal Reduction Rating (E_{R-TSS}) = 0.05
(corresponds to a 95% removal efficiency).

Job No. 7131	NAISMITH ENGINEERING, INC.	SHEET 2 of 2
Description: Example Calculations for Pollutant Loading Comparison – Illustrative Case #1		Date: 03/07/05
Regional Water Quality Protection Plan – Barton Springs Segment of the Edwards Aquifer		By: dbf

For TN removal (Dissolved Pollutant):

Area served by Retention/Irrigation = 59.08 ac ($A_{R/I}$) [For Ret./Irrig. TN Removal Eff. = 100%, therefore $E_{R100} = 0.00$]
 Area served by Vegetative Filter Strips = 26.67 ac (A_{VFS}) [For VFS TN Removal Eff. = 30%, therefore $E_{R30} = 0.70$]
 Area served by BMPs (Total) = 85.75 ac (A_{TOTAL})

$$A_{TOTAL} * E_{R-TN} = (A_{R/I} * E_{R100}) + (A_{VFS} * E_{R85})$$

$$85.75 \text{ ac} * E_{R-TN} = (59.08 * 0.00) + (26.67 * 0.70)$$

$$E_{R-TN} = [(0.00) + (18.67)] / 85.75$$

$$E_{R-TN} = \underline{0.22}$$

For TSS Removal – BMP Pollutant Removal Reduction Rating (E_{R-TN}) = 0.22
 (corresponds to a 78% removal efficiency).

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Uncontrolled Condition

Suspended Pollutants (TSS)

For suspended pollutants, the unit pollutant loading for the developed tract would be:

$$L_{total} = A_p \times L + A_I \times L' = A_p \times L + A_I \times L \times C_s$$

$$L_{total} = 0.8676 \times L + 0.1324 \times L \times 5.1 = \underline{1.543 L}$$

This represents an approximately 54% increase in suspended pollutant loadings from the site.

Dissolved Pollutants (TN)

For dissolved pollutants, the unit pollutant loading for the developed tract would be:

$$L_{total} = A_p \times L + A_I \times L' = A_p \times L + A_I \times L \times C_d$$

$$L_{total} = 0.8676 \times L + 0.1324 \times L \times 2.6 = \underline{1.212 L}$$

This represents an approximately 21% increase in dissolved pollutant loadings from the site.

Controlled Condition

Suspended Pollutants (TSS)

For suspended pollutants (TSS), the unit pollutant loading for the developed tract, with an overall BMP removal efficiency of 95% (see above calculations), and therefore $E_{TSS} = E_{R95} = 0.05$ (represents the combined removal efficiency of the vegetative filter strip area and the retention/irrigation area) would be:

$$L_{total} = A_p \times L + A_I \times L' \times E_R = A_p \times L + A_I \times L \times C_s \times E_{R95}$$

$$L_{total} = 0.8676 \times L + 0.1324 \times L \times 5.1 \times 0.05 = \underline{0.9014 L}$$

This represents an approximately **10% decrease** in suspended pollutant loadings from the site, indicating that the combination of vegetative filter strips and retention/irrigation systems with an overall suspended pollutant removal efficiency of 95% **will achieve** the goal of no net increase in loading.

Dissolved Pollutants (TN)

For dissolved pollutants (TN), the unit pollutant loading for the developed tract, with an overall BMP removal efficiency of 78% (see above calculations), and therefore $E_{TN} = E_{R78} = 0.22$ (represents the combined removal efficiency of the vegetative filter strip area and the retention/irrigation area) would be:

$$L_{total} = A_p \times L + A_I \times L' \times E_R = A_p \times L + A_I \times L \times C_d \times E_{R78}$$

$$L_{total} = 0.8676 \times L + 0.1324 \times L \times 2.6 \times 0.22 = \underline{0.9432 L}$$

This represents an approximately **6% decrease** in suspended pollutant loadings from the site, indicating that the combination of vegetative filter strips and retention/irrigation systems with an overall dissolved pollutant removal efficiency of 78% **will achieve** the goal of no net increase in loading.

Excel Spreadsheet from the City of Austin

SIZING VEGETATIVE FILTER STRIPS FOR S.O.S. REQUIREMENTS

PROJECT NAME : All Areas that Drain to VFS Areas.

INPUT PARAMETERS	
Drainage Area in Acres =	26.67
Impervious Cover (%) =	13.8
Recharge Zone ? (Y/N) =	n
Runoff Coeff. For Filter Strip =	0.4
Land Use (SF, MF, or CO) =	sf
Safety Factor =	1.25
Rainfall-Runoff Coefficient, R_v =	0.085

Filter Strip Required : **4.05** acres

Width of Lot, ft: **9,104** (total length of VFS provided)

Min. Length of Veg. Filter Strip Required: **19**

-- Based on slope, veg. Cover, etc.

-- Calculation Based on %IC and Recharge Zone Status

Pollutant	B_p See Pollutant Loading Tables	U_p Total Baseline Pollutant Load	C See Pollutant Loading Tables	T_p Total Developed Pollutant Load	T_{remove} Pollutant Load To Be Removed	Required Removal Efficiency	L Load Removed per Acre of VFS	Required Filter Strip Area Acres
TSS	19.9	530.7	82.5	1382.3	851.5	0.616	291.8	2.92
TP	0.014	0.373	0.10	1.675	1.302	0.777	0.4	3.68
TN	0.20	5.3	1.27	21.279	15.9	0.749	4.5	3.55
COD	7.9	210.7	28.5	477.516	266.8	0.559	100.8	2.65
BOD	2.9	77.3	8	134.039	56.7	0.423	28.3	2.00
Pb	0.0011	0.0293	0.012	0.201	0.1717	0.854	0.042	4.05
FC	6.55E+09	1.75E+11	6200	4.71E+11	2.96E+11	0.629	9.94E+10	2.98
FS	4.91E+09	1.31E+11	7000	5.32E+11	4.01E+11	0.754	1.12E+11	3.57
TOC	2.2	58.7	7.5	125.662	67.0	0.533	26.5	2.53
Zn	0.0029	0.0773	0.024	0.402	0.3248	0.808	0.1	3.83

NOTES

- 1) U_p , T_p , T_{remove} , and L are in units of Lbs/Yr
- 2) B_p is in units of Lbs/Acre/Yr
- 3) Sizing methodology is based on LCRA Nonpoint Source Pollution Control Technical Manual, January 1991.
- 4) Values for R_v are found in the Environmental Criteria Manual, Section 1.6.9.
- 5) Value for B_p and C are found in the ECM, Section 1.6.9

Yellow highlighted cells require data input.
Blue highlighted cells are calculated automatically.

Excel Spreadsheet from the City of Austin

SIZING VEGETATIVE FILTER STRIPS FOR S.O.S. REQUIREMENTS

PROJECT NAME : Lot 39 - Rear [rear lot drainage area is 120 ft. wide x 130 long]

INPUT PARAMETERS	
Drainage Area in Acres =	0.36
Impervious Cover (%) =	13
Recharge Zone ? (Y/N) =	n
Runoff Coeff. For Filter Strip =	0.4
Land Use (SF, MF, or CO) =	sf
Safety Factor =	1.25
Rainfall-Runoff Coefficient, R_v =	0.081

Filter Strip Required : 0.05 acres

Width of Lot, ft. 120 (width of Lot 39 - "typical")

Min. Length of Veg. Filter Strip Required: 19

-- Based on slope, veg. Cover, etc.

-- Calculation Based on %IC and Recharge Zone Status

Pollutant	B_p See Pollutant Loading Tables	U_p Total Baseline Pollutant Load	C See Pollutant Loading Tables	T_p Total Developed Pollutant Load	T_{remove} Pollutant Load To Be Removed	Required Removal Efficiency	L Load Removed per Acre of VFS	Required Filter Strip Area Acres
TSS	19.9	7.2	82.5	17.8	10.7	0.598	291.8	0.04
TP	0.014	0.005	0.10	0.022	0.017	0.767	0.4	0.05
TN	0.20	0.1	1.27	0.274	0.2	0.738	4.5	0.05
COD	7.9	2.8	28.5	6.159	3.3	0.538	100.8	0.03
BOD	2.9	1.0	8	1.729	0.7	0.396	28.3	0.02
Pb	0.0011	0.0004	0.012	0.003	0.0022	0.847	0.042	0.05
FC	6.55E+09	2.36E+09	6200	6.08E+09	3.72E+09	0.612	9.94E+10	0.04
FS	4.91E+09	1.77E+09	7000	6.86E+09	5.09E+09	0.742	1.12E+11	0.05
TOC	2.2	0.8	7.5	1.621	0.8	0.511	26.5	0.03
Zn	0.0029	0.0010	0.024	0.005	0.0041	0.799	0.1	0.05

NOTES

- 1) U_p , T_p , T_{remove} , and L are in units of Lbs/Yr
- 2) B_p is in units of Lbs/Acre/Yr
- 3) Sizing methodology is based on LCRA Nonpoint Source Pollution Control Technical Manual, January 1991.
- 4) Values for R_v are found in the Environmental Criteria Manual, Section 1.6.9.
- 5) Value for B_p and C are found in the ECM, Section 1.6.9

Yellow highlighted cells require data input.

Blue highlighted cells are calculated automatically.

ILLUSTRATIVE CASE #1
REGIONAL WATER QUALITY PROTECTION PLAN
HYDROLOGY INFO
TR-55 METHOD
TIME OF CONCENTRATION (Tc)

AREA	SHEET FLOW				SHALLOW CONCENTRATED FLOW				CHANNEL FLOW				AREA	
	FLOW DISTANCE (feet)	SLOPE (ft./ft.)	Manning's "n" (Table 3-1 from TR-55)	TIME OF CONC. (Tc) (hours)	FLOW DISTANCE (feet)	SLOPE (ft./ft.)	FLOW PATH (PAVED/UNPAVED?)	AVERAGE VELOCITY (ft/sec) (from Fig. 3-1 of TR-55)	TIME OF CONC. (Tc) (hours)	FLOW DISTANCE (feet)	SLOPE (ft./ft.)	MANNING'S "n" VALUE		AVERAGE VELOCITY (ft/sec)
EXISTING														
A	300	0.0500	0.15	0.2408	600	0.0500	Unpaved	3.6	0.0463	500	0.0220	0.030	2	0.0694
B	300	0.0667	0.15	0.2146	200	0.0750	Unpaved	4.4	0.0126	1,500	0.0287	0.030	5	0.0694
C	300	0.0667	0.15	0.2146	50	0.1000	Unpaved	5.0	0.0028	900	0.0278	0.030	5	0.0833
D	300	0.0667	0.15	0.2146	150	0.0667	Unpaved	4.1	0.0102	800	0.0375	0.030	5	0.0500
A+B+C+D	300	0.0500	0.15	0.2408	600	0.0500	Unpaved	3.6	0.0463	750	0.0293	0.030	5	0.0500
EXISTING - Lot 39 (Typical)														
39 - Front	90	0.0320	0.15	0.1099	0	0.0500	Unpaved	3.6	0.0000	0	0.0220	0.030	2	0.0000
39 - Rear	130	0.0320	0.15	0.1475	0	0.0750	Unpaved	4.4	0.0000	0	0.0287	0.030	5	0.0000
PROPOSED														
A	90	0.0320	0.11	0.0857	0	0.0120	Both	2.0	0.0000	2,600	0.0150	0.013	5	0.1444
B	90	0.0320	0.11	0.0857	0	0.0133	Both	2.1	0.0000	1,160	0.0150	0.013	5	0.0844
C	90	0.0320	0.11	0.0857	0	0.0091	Unpaved	1.5	0.0000	1,000	0.0100	0.013	5	0.0556
D	90	0.0320	0.11	0.0857	0	0.0067	Both	1.5	0.0000	750	0.0100	0.013	5	0.0417
PROPOSED														
39 - Front	90	0.0320	0.11	0.0857	0	0.0120	Both	2.0	0.0000	0	0.0291	0.035	2	0.0000
39 - Rear	130	0.0320	0.20	0.1856	0	0.0133	Both	2.1	0.0000	0	0.0187	0.030	5	0.0000
Lot 39 - Front Composite "n" =	30 ft. at 0.011		0.33		Lot 39 - Rear Composite "n" =									
	50 ft. at 0.24		14.4			25 ft. at 0.011	0.275							
			14.73	0.11		105 ft. at 0.24	252							
						25.475	0.20							

Illustrative Case # 1

DATE
3/2/05BY
D. FUSILIERPROPOSED CONDITIONSBMP A

$$\text{DRAINAGE AREA} = 11.68 \text{ ac} = 0.0183 \text{ sq. mi.}$$

$$\% \text{ I.C.} \Rightarrow \text{ROAD I.C.} = 2,596 \text{ LF} \times 30 \text{ Ft.} = 77,880 \text{ Ft.}^2$$

$$\text{LOT I.C.} = 2,900 \text{ Ft.}^2 / \text{Lot} \times 31 \text{ lots} = 89,900 \text{ Ft.}^2$$

(assume 2,900 Ft.² per front lot)

$$\text{Total I.C.} = 167,780 \text{ Ft.}^2 = 3.85 \text{ ac.}$$

$$\% \text{ I.C.} = 3.85 / 11.68 = \underline{\underline{33\%}}$$

$$T_c = 0.14 \text{ hr.}$$

$$T_{\text{LAG}} = 0.14 \text{ hrs.}$$

BMP B

$$\text{DRAINAGE AREA} = 7.27 \text{ ac} = 0.0114 \text{ sq. mi.}$$

$$\% \text{ I.C.} \Rightarrow \text{ROAD I.C.} = (1,015 + 1,157 \text{ LF}) \times 30 \text{ Ft.} = 65,160 \text{ Ft.}^2$$

$$\text{LOT I.C. (Front)} = 2,900 \text{ Ft.}^2 / \text{Lot} \times 22 \text{ lots} = 63,800 \text{ Ft.}^2$$

$$\text{LOT I.C. (back)} = 2,000 \text{ Ft.}^2 / \text{Lot} \times 2 \text{ lots} = 4,000 \text{ Ft.}^2$$

$$\text{Total I.C.} = 132,960 \text{ Ft.}^2$$

$$\% \text{ I.C.} = 3.05 / 7.27 \text{ ac} \quad \text{Total I.C.} = 3.05 \text{ ac}$$

$$= \underline{\underline{42\%}}$$

$$T_{\text{LAG}} = 0.09 \text{ hrs.}$$

DESCRIPTION

Illustrative Case # 1

DATE

3/2/05

BY

D. FUSILIER

PROPOSED CONDITIONS (cont.)BMP C

$$\text{DRAINAGE AREA} = 8.12 \text{ ac} = 0.0127 \text{ sq. mi.}$$

$$\% \text{ I.C.} \Rightarrow \text{Road I.C.} = (712 \text{ LF} + 560 \text{ LF}) \times 30 \text{ FT} = 38,160 \text{ FT}^2$$

$$\text{Lot I.C.} = 2,900 \text{ FT}^2 / \text{Lot} \times 23 \text{ Lots} = 66,700 \text{ FT}^2$$

$$\text{Lot I.C.} = 2,000 \text{ FT}^2 / \text{Lot} \times 6 \text{ Lots} = 12,000 \text{ FT}^2$$

$$= 116,860 \text{ FT}^2$$

$$\% \text{ I.C.} = 2.68 / 8.12 = \underline{33\%} \quad \text{Total I.C.} = 2.68 \text{ ac}$$

$$T_{\text{Lag}} = 0.08 \text{ hrs}$$

BMP D

$$\text{DRAINAGE AREA} = 2.35 \text{ ac} = 0.0037 \text{ sq. mi.}$$

$$\% \text{ I.C.} \Rightarrow \text{ROAD I.C.} = (582 \text{ LF} + 310 \text{ LF}) \times 30 \text{ FT} = 26,760 \text{ FT}^2$$

$$\text{Lot I.C.} = 2,900 \text{ FT}^2 / \text{LF} \times 8 \text{ Lots} = 23,200 \text{ FT}^2$$

$$= 49,960 \text{ FT}^2$$

$$\% \text{ I.C.} = 1.15 / 2.35 = \underline{49\%} \quad \text{Total I.C.} = 1.15 \text{ ac}$$

$$T_{\text{Lag}} = 0.08 \text{ hrs}$$

$$\text{Total D.A.} =$$

$$(A+B+C+D)$$

DESCRIPTION

Illustrative Case # 1

Proposed Conditions (including Commercial & Multi-Family)

BMP A

DR. Area A = $11.68 \text{ ac} + 7.27 \text{ ac} = 18.95 \text{ ac} = 0.0296 \text{ sq. mi.}$
 $\% \text{ I.C.} = \frac{[(11.68 \times 0.33) + (7.27 \times 0.60)]}{18.95} = 43\% \quad (8.15 \text{ ac} = \text{i.c.})$
 $T_{\text{Lag}} = 0.14 \text{ hrs} + 0.03 = 0.17 \text{ hrs}$

BMP B

DR. Area B = $7.27 \text{ ac} + 9.95 \text{ ac} = 17.22 \text{ ac} = 0.0269 \text{ sq. mi.}$
 $\% \text{ I.C.} = \frac{[(7.27 \text{ ac} \times 0.42) + (9.95 \text{ ac} \times 0.40)]}{17.22} = 41\% \quad (7.06 \text{ ac} = \text{i.c.})$
 $T_{\text{Lag}} = 0.09 \text{ hrs} + 0.03 = 0.12 \text{ hrs}$

BMP C

DR. AREA C = $8.12 \text{ ac} + 8.88 \text{ ac} = 17.00 \text{ ac} = 0.0266 \text{ sq. mi.}$
 $\% \text{ I.C.} = \frac{[(8.12 \text{ ac} \times 0.33) + (8.88 \text{ ac} \times 0.40)]}{17.00} = 37\% \quad (6.29 \text{ ac} = \text{i.c.})$
 $T_{\text{Lag}} = 0.08 \text{ hrs} + 0.03 = 0.11 \text{ hrs}$

BMP D

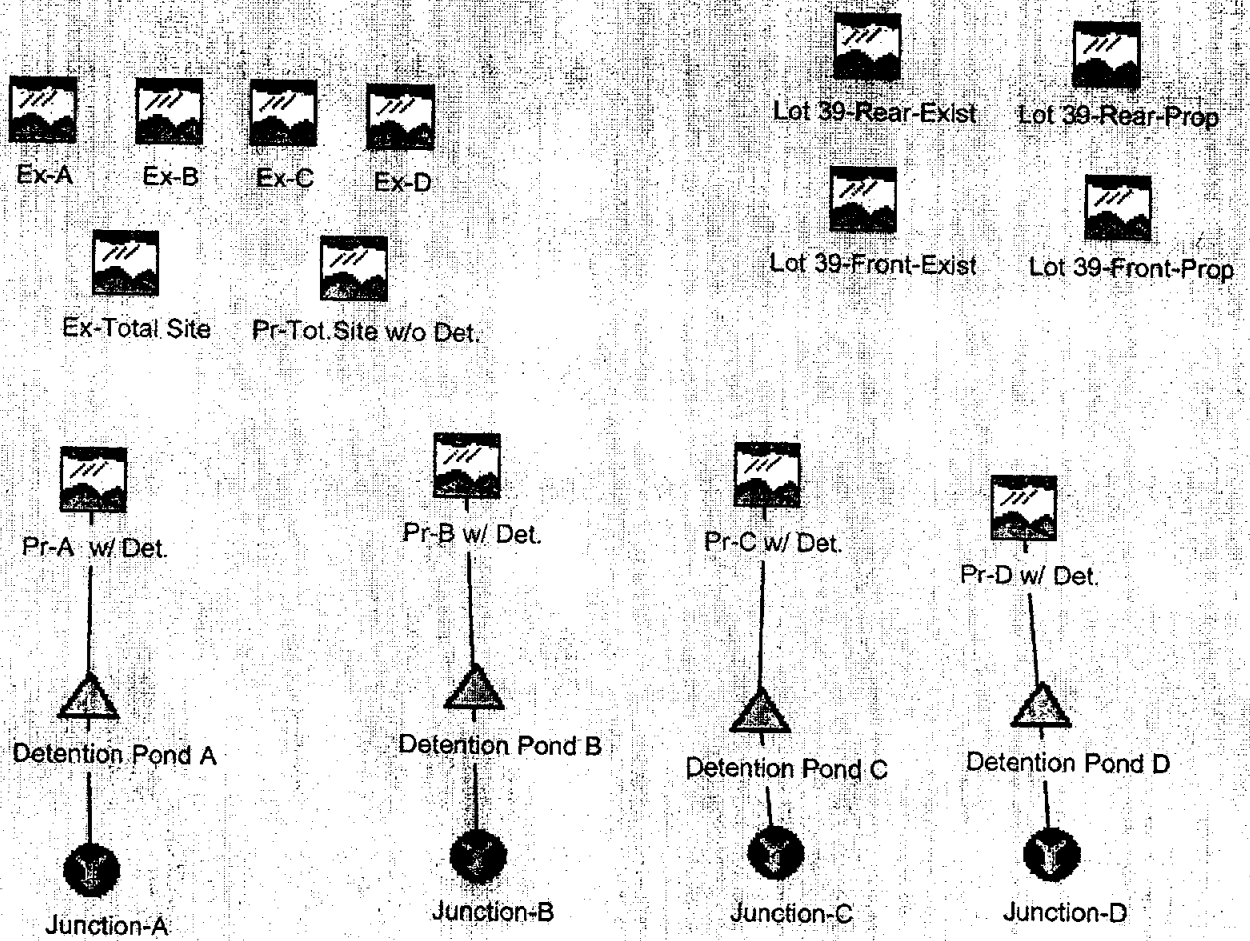
DR. AREA D = $2.35 \text{ ac} + 3.56 \text{ ac} = 5.91 \text{ ac} = 0.0092 \text{ sq. mi.}$
 $\% \text{ I.C.} = \frac{[(2.35 \times 0.49) + (3.56 \times 0.60)]}{5.91} = 56\% \quad (3.31 \text{ ac} = \text{i.c.})$
 $T_{\text{Lag}} = 0.08 \text{ hrs} + 0.02 = 0.10$

Total = 24.81 ac
 Total Volume Req. = 8.96 ac

Volumes (2-yr, 3-hr)

	ac-Ft.	cu.Ft.	Assumed Depth	Req. Area Ft ²	Req. Dimensions
BMP A	2.8950	126,106	6	21,018	200' x 105'
BMP B	2.5903	112,833	6	18,805	190' x 100'
BMP C	2.4812	108,081	6	18,014	180' x 100'
BMP D	0.99001	43,125	6	7,188	120' x 60'

Total Areas = $18.95 + 17.22 + 17.00 + 5.91 = 59.08 \text{ ac}$
 (A+B+C+D)



HMS * Summary of Results

Project : Illustrative Case #1 Run Name : COA 2-yr
w/o Comm. + Multi-Family

Start of Run : 01Dec03 0100 Basin Model : Basin 1
 End of Run : 01Dec03 1900 Met. Model : COA 2-yr 3-hr storm
 Execution Time : 02Mar05 1644 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Pr-Tot.Site w/o Det.	1006.5	01 Dec 03 0232	36.774	0.340
Pr-A w/ Det.	36.376	01 Dec 03 0239	1.6518	0.018
Detention Pond A	0.0	01 Dec 03 0100	0.0	0.018
Junction-A	0.0	01 Dec 03 0100	0.0	0.018
Ex-A	24.001	01 Dec 03 0245	1.1962	0.018
Ex-B	15.651	01 Dec 03 0243	0.74518	0.011
Ex-C	18.772	01 Dec 03 0241	0.83016	0.013
Ex-D	5.4689	01 Dec 03 0241	0.24186	0.004
Ex-Total Site	446.31	01 Dec 03 0245	22.244	0.340
Pr-B w/ Det.	27.209	01 Dec 03 0235	1.1064	0.011
Detention Pond B	0.0	01 Dec 03 0100	0.0	0.011
Junction-B	0.0	01 Dec 03 0100	0.0	0.011
Pr-C w/ Det.	29.294	01 Dec 03 0234	1.1463	0.013
Detention Pond C	0.0	01 Dec 03 0100	0.0	0.013
Junction-C	0.0	01 Dec 03 0100	0.0	0.013
Pr-D w/ Det.	8.8311	01 Dec 03 0235	0.35908	0.004
Detention Pond D	0.0	01 Dec 03 0100	0.0	0.004
Junction-D	0.0	01 Dec 03 0100	0.0	0.004
Lot 39-Rear-Exist	0.73445	01 Dec 03 0245	0.036606	0.001
Lot 39-Rear-Prop	1.0406	01 Dec 03 0237	0.042097	0.001
Lot 39-Front-Exist	0.72165	01 Dec 03 0235	0.025493	0.000
Lot 39-Front-Prop	0.84129	01 Dec 03 0235	0.033436	0.000

HMS * Summary of Results

Project : Illust Case 1_030205 Run Name : COA 2-yr
w/ Comm + Multi-Family

Start of Run : 01Dec03 0100 Basin Model : Basin 1
 End of Run : 01Dec03 1900 Met. Model : COA 2-yr 3-hr storm
 Execution Time : 02Mar05 1714 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Pr-Tot.Site w/o Det.	1006.5	01 Dec 03 0232	36.774	0.340
<u>Pr-A w/ Det.</u>	<u>58.465</u>	<u>01 Dec 03 0241</u>	<u>2.8950</u>	<u>0.030</u>
Detention Pond A	0.0	01 Dec 03 0100	0.0	0.030
Junction-A	0.0	01 Dec 03 0100	0.0	0.030
Ex-A	24.001	01 Dec 03 0245	1.1962	0.018
Ex-B	15.651	01 Dec 03 0243	0.74518	0.011
Ex-C	18.772	01 Dec 03 0241	0.83016	0.013
Ex-D	5.4689	01 Dec 03 0241	0.24186	0.004
Ex-Total Site	446.31	01 Dec 03 0245	22.244	0.340
<u>Pr-B w/ Det.</u>	<u>59.165</u>	<u>01 Dec 03 0237</u>	<u>2.5903</u>	<u>0.027</u>
Detention Pond B	0.0	01 Dec 03 0100	0.0	0.027
Junction-B	0.0	01 Dec 03 0100	0.0	0.027
<u>Pr-C w/ Det.</u>	<u>58.432</u>	<u>01 Dec 03 0237</u>	<u>2.4812</u>	<u>0.027</u>
Detention Pond C	0.0	01 Dec 03 0100	0.0	0.027
Junction-C	0.0	01 Dec 03 0100	0.0	0.027
<u>Pr-D w/ Det.</u>	<u>23.305</u>	<u>01 Dec 03 0236</u>	<u>0.99001</u>	<u>0.009</u>
Detention Pond D	0.0	01 Dec 03 0100	0.0	0.009
Junction-D	0.0	01 Dec 03 0100	0.0	0.009
Lot 39-Rear-Exist	0.73445	01 Dec 03 0245	0.036606	0.001
Lot 39-Rear-Prop	1.0406	01 Dec 03 0237	0.042097	0.001
Lot 39-Front-Exist	0.72165	01 Dec 03 0235	0.025493	0.000
Lot 39-Front-Prop	0.84129	01 Dec 03 0235	0.033436	0.000

Total Volume
8.9566 ac-ft
= 390,149 ft.3

ILLUSTRATIVE CASE #1

D. FUSILIER

Total Site Area = 217.78 ac

Total Area Served by Ret./Irrig. = 59.08 ac

Total Area Served by Veg. Filter Strips = 26.67 ac

Other Areas (Buffers, Setbacks, Greenbelts, Irrig.) = 132.03 ac

FOR TSS:

Ret. Irrig.	= 59.08 ac	[$E_{R100} = 0.00$]	← 100% Removal Eff.
VFS	= 26.67 ac	[$E_{R85} = 0.15$]	← 85% Removal Eff.
	<u>85.75 ac</u>		> Calculate $E_{R-TOTAL}$.

$$A_{TOTAL} \times E_{R-TOTAL} = A_{R/I} \times E_{R100} + A_{VFS} \times E_{R85}$$

$$85.75 \times E_{R-TOTAL} = (59.08)(0.00) + (26.67)(0.15)$$

$$E_{R-TOTAL} = \frac{0.00 + 4.00}{85.75}$$

FOR TSS → $E_{R-TOTAL} = 0.05$ [Corresponds to 95% efficiency]

FOR Dissolved Pollutants [FOR TN]:

Ret. IRRIG.	= 59.08 ac	[$E_{R100} = 0.00$]	← 100% Removal Eff.
VFS	= 26.67 ac	[$E_{R30} = 0.70$]	← 30% Removal Eff.
	<u>85.75 ac</u>		> Calculate Total $E_{R-TOTAL}$

$$A_{TOTAL} \times E_{R-TOTAL} = A_{R/I} \times E_{R100} + A_{VFS} \times E_{R30}$$

$$85.75 \times E_{R-TOTAL} = (59.08)(0.00) + (26.67)(0.70)$$

$$E_{R-TOTAL} = \frac{0.00 + 18.67}{85.75}$$

FOR TN → $E_{R-TOTAL} = 0.22$ [Corresponds to 78% efficiency]

DESCRIPTION

Illustrative Case # 1

DATE

BY

D. Fusilier

BioFiltration/Veg. Filter Strip Design

Criteria

COA - 2-yr, 3hr Storm @ 0.05 cfs/ft width

- Finalize Ponds
- Show Ponds
- Size Ponds for Multi-Family & Commercial

Hydrology Info

	sq. Ft.	Area ac.	sq. mi.	CN	% I.C.	Lag (hrs)
<u>EXISTING</u>						
Lot 39-Front	10,800	0.25	0.00039	84	0	0.07
Lot 39-Rear	15,600	0.36	0.00056	84	0	0.09
		0.61				
<u>Proposed</u>						
Lot 39-Front	10,800	0.25	0.00039	84	27	0.09
Lot 39-Rear	15,600	0.36	0.00056	84	13	0.11
		0.61				

↑
TSS
TN
TP

Hydrology Summary (From HEC-HMS run)

EXIST CN = 84
Prop. CN = 84

	Flow, cfs				Vol., ac-ft.			
	2-yr	10-yr	25-yr	100-yr	2-yr	10-yr	25-yr	100-yr
Lot 39 - Front - Existing	0.72	1.32	1.67	2.17	0.0255	0.0562	0.0757	0.1043
Lot 39 - Front - Proposed	0.84	1.39	1.71	2.17	0.0334	0.0655	0.0856	0.1148
Lot 39 - Rear - Existing	0.99	1.80	2.27	2.97	0.0366	0.0806	0.1087	0.1498
Lot 39 - Rear - Proposed	1.04	1.81	2.24	2.91	0.0421	0.0871	0.1155	0.1570

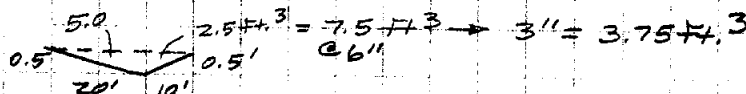
Δ Veg. Filter Strip Loading = $\frac{1.04 \text{ cfs}}{120 \text{ ft}} = 0.009 \text{ cfs/ft}$
 $\Delta = 0.0087 \text{ ac-ft} = 379 \text{ Ft.}^3$
 @ 0.05 cfs/ft need 21 ft. of veg. filter strip.

Storage Volume For 2-yr event:

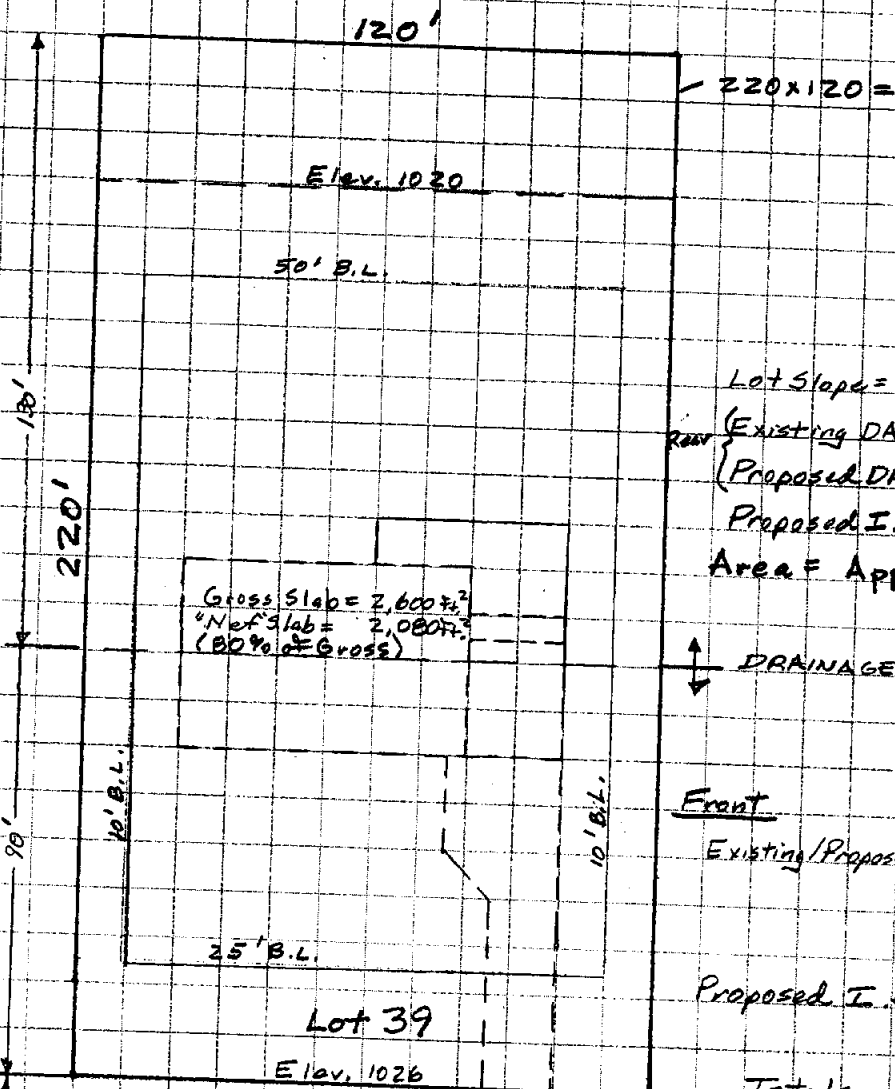
Req. Volume = $0.0087 \text{ ac-ft} = 379 \text{ Ft.}^3$

Assume 120 ft. lot width.

Vol./ft = $379 \text{ Ft.}^3 / 120 \text{ ft} = 3.16 \text{ cu. ft./LF}$



Typical Lot
- Using Lot #39



Existing - Rear
 $T_c = 0.15$
 Lag = 0.09 hrs
 Proposed - Rear
 $T_c = 0.19$
 Lag = 0.11 hrs

Scale, Ft.
 0 20' 40'
 $Lot\ Slope = \frac{(1026 - 1020)}{190'} = 3.2\%$
 Existing DA = $120' \times 130' = 15,600\text{ft}^2 = 0.36\text{ac}$
 Proposed DA = $120' \times 130' = 0.00056\text{sq. mi.}$
 Proposed I.C. = $2,000\text{ft}^2 \left(\frac{2,000}{15,600} = 13\% \right)$
 Area = Approx. 0.61 acres

Gross Slab = $2,600\text{ft}^2$
 Net Slab = $2,080\text{ft}^2$
 (80% of Gross)

EXISTING - Front
 $T_c = 0.11$
 Lag = 0.07 hrs
 Proposed - Front
 $T_c = 0.09$
 Lag = 0.05 hrs

Front
 Existing/Proposed D.A. = $120' \times 90' = 10,800\text{ft}^2 = 0.25\text{ac} = 0.00039\text{sq. mi.}$
 Proposed I.C. = $2,900\text{ft}^2 \left(\frac{2,900}{10,800} = 27\% \right)$

Totals
 $I.C. = 2,000 + 2,900 = 4,900\text{ft}^2$
 $I.C.\% = \frac{4,900}{26,400} = 18.6\%$

LOT 47

DESCRIPTION

Illustrative Case: #1

BY D. FUSILIER

TRIAL

Hydrology Summary (From HEC-HMS) ← EXIST CU=84
 Prop CU=80 ← Improvement in soil & vegetation for lot area

	2-yr	
	Flow, cfs	Vol., cu. ft.
Lot 39 - Front - Existing	0.72	0.0255
Lot 39 - Front - Proposed	0.73	0.0298
Lot 39 - Rear - Existing	0.99	0.0366
Lot 39 - Rear - Proposed	0.87	0.0359

Δ = -0.0007 cu. ft. ← No storage required.

Lot 39 - Rear

6 El. drop
190 Length
3.16% % Slope

120 ft.
130 ft.
15,600 sq.ft.
0.36 ac.
0.00056 sq.mi.

2,000 sq.ft. - I.C.
15,600 sq.ft.
12.82% % I.C.

Lot 39 - Front

6 El. drop
190 Length
3.16% % Slope

120 ft.
90 ft.
10,800 sq.ft.
0.25 ac.
0.00039 sq.mi.

2,900 sq.ft. - I.C.
10,800 sq.ft.
26.85% % I.C.

Lot 39 - Total

120 ft.
220 ft.
26,400 sq.ft.
0.61 ac.

For a "Typical" House:

Gross Slab Area = 2,600 sq.ft.
"Net" Slab Area = 2,080 sq.ft.
"Net" Sq.Ft.-2 story= 4,160 sq.ft.

Note: "Net" is useable floor space at 80% of Gross

Lot 39 - Rear

Vol. Diff = 0.0087 ac-ft
379 cu.ft.

3.16 cu.ft. per ft. of lot width (assume 120')

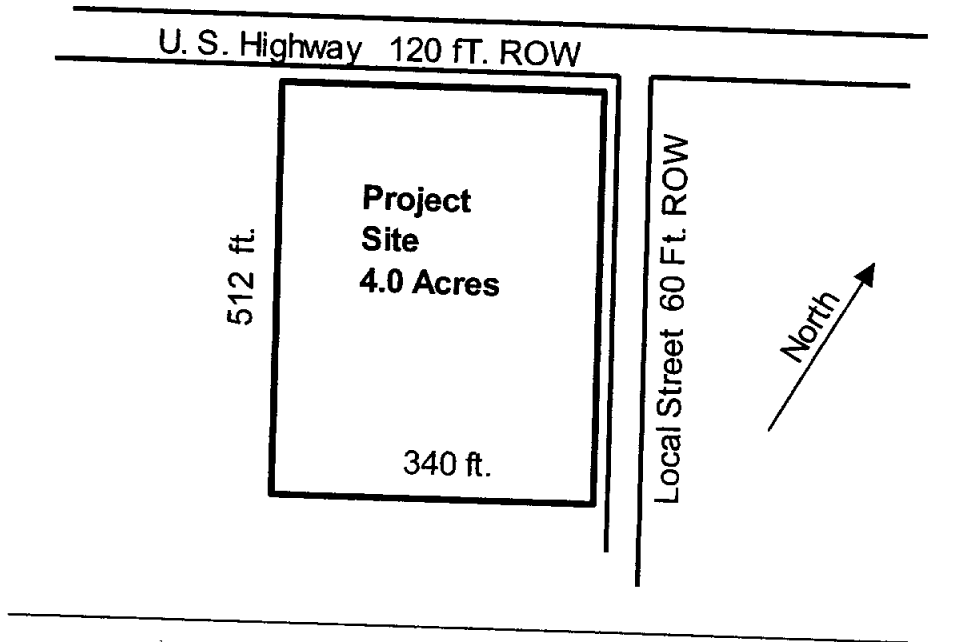
Illustrative Case No. 2

Land Development Example No. 2

MYTHIC, TEXAS - a Hill Country Town southwest of Austin

SITE DESCRIPTION:

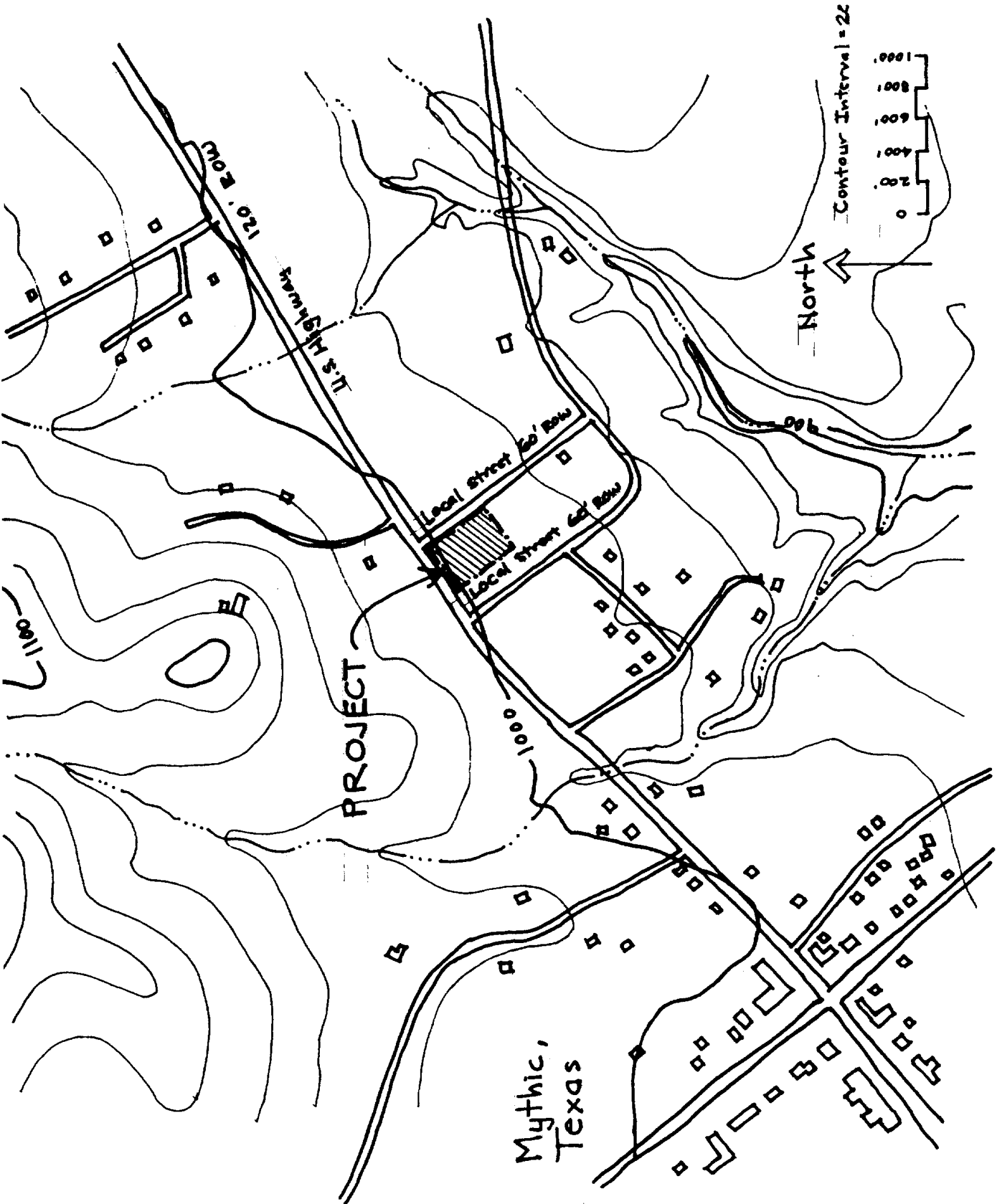
- SITE AREA: 4.0 Acres inside the preferred growth area of the town of Mythic, Texas



- BOUNDARY DETAILS
 - SOUTHEAST: Open field
 - SOUTHWEST: Local street – 60 ft. Right of way
 - NORTHWEST: State Highway – 120 ft. Right of way
 - NORTHEAST: Open field
- SITE FEATURES:
 - Site is currently used to run goats
 - Site is nearly flat, with moderately deep soil
 - Site is in the Contributing Zone of the Barton Springs segment of the Edwards Aquifer. Nearby streams are tributaries of Scenic Creek, a principal recharge stream of the Barton Springs segment.

DEVELOPMENT PLANS

- PROPOSED USE:
 - Retail Commercial – desire is to build maximum allowable facility
 - Includes building, material laydown and parking areas.



Mythic,
Texas

Contour Interval = 20'

North

PROJECT

U.S. Highway
120 E.W.

Local Street 60' Row

Local Street 60' Row

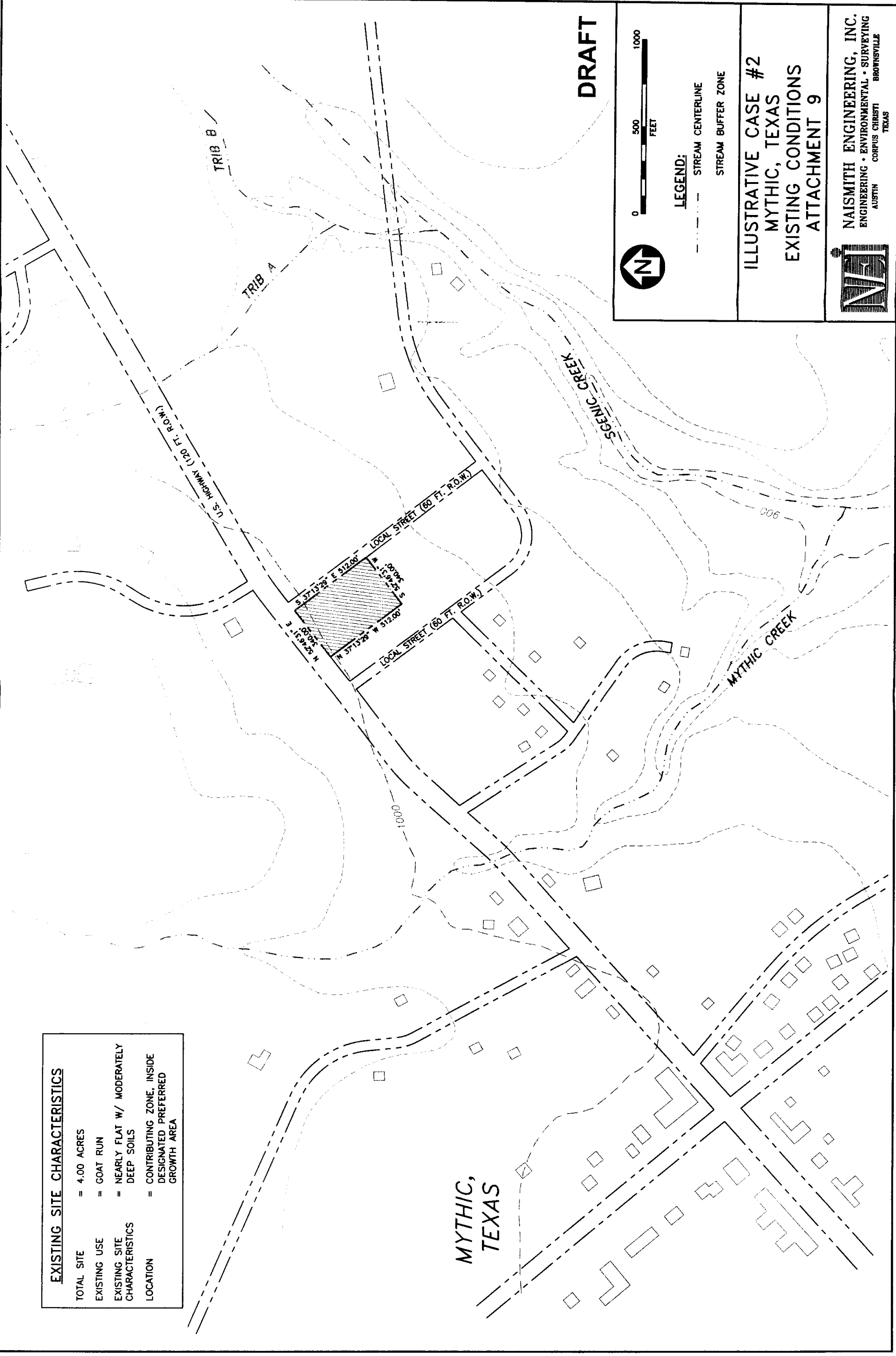
1100

1000



1200
1000
800
600
400
200
0

EXISTING SITE CHARACTERISTICS

- TOTAL SITE = 4.00 ACRES
- EXISTING USE = GOAT RUN
- EXISTING SITE CHARACTERISTICS = NEARLY FLAT W/ MODERATELY DEEP SOILS
- LOCATION = CONTRIBUTING ZONE, INSIDE DESIGNATED PREFERRED GROWTH AREA




DRAFT

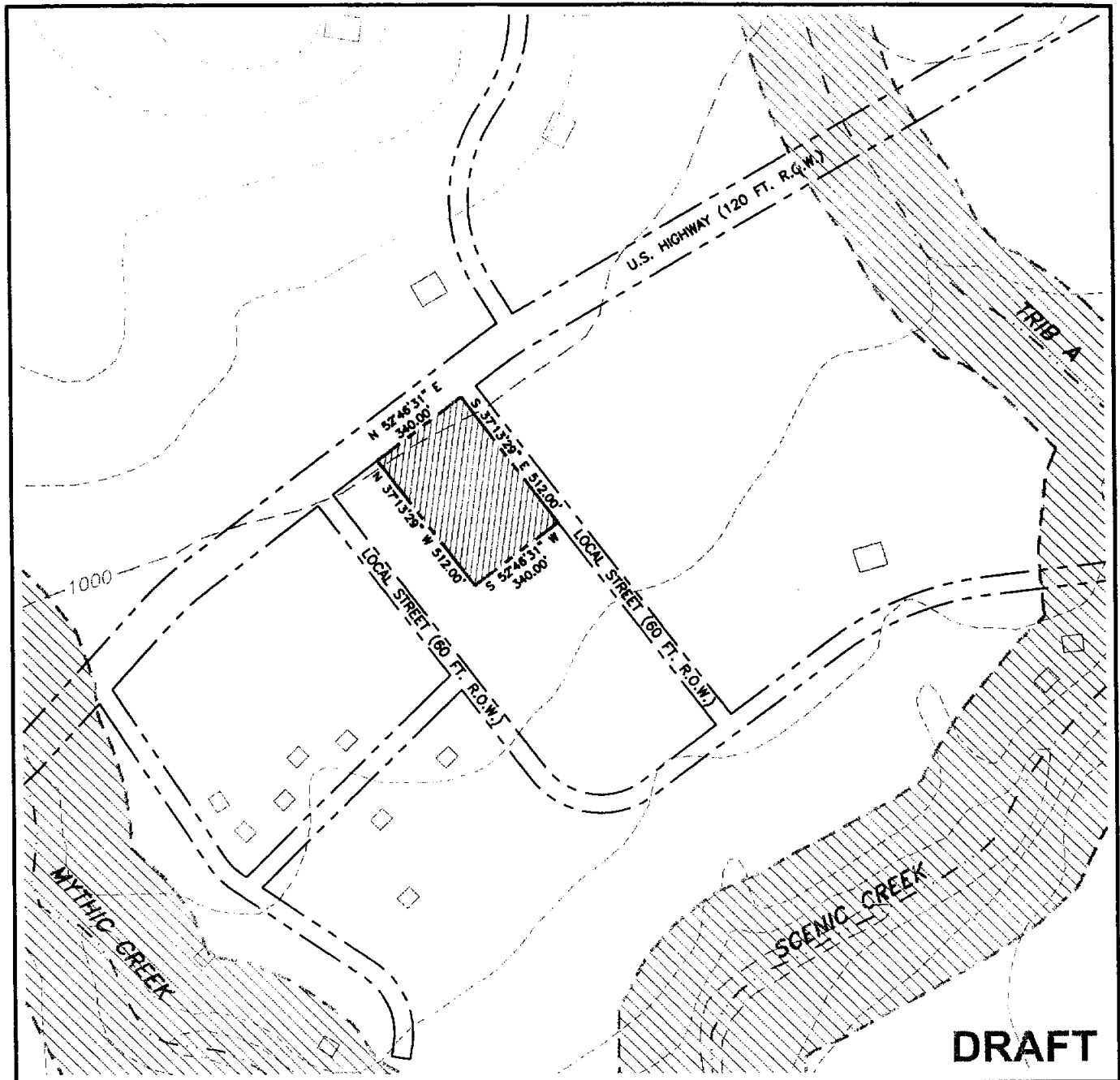
LEGEND:

- - - - - STREAM CENTERLINE
- - - - - STREAM BUFFER ZONE

ILLUSTRATIVE CASE #2
MYTHIC, TEXAS
EXISTING CONDITIONS
ATTACHMENT 9



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 AUSTIN CORPUS CHRISTI BROWNSVILLE
 TEXAS



DRAFT

LAND USE - PROPOSED

Designated Use	Area (ac.)	Comments
Commercial	3.0	1 lot
Roadways	-	
Stream Buffers	-	
CEF Set Backs	-	
Steep Slopes	-	
BMP Area/Greenspace	1.00	
TOTAL	4.00	

IMPERVIOUS COVER CALCULATIONS

LAND USE	
Commercial*	1.80
Roadways	0.00
Total Impervious Cover	1.80
% IMPERVIOUS COVER	60.00

Gross Site Area

* - Assume rainwater harvesting for a 1.0 acre roof area.



LEGEND:

- STREAM CENTERLINE
- STREAM BUFFER ZONE

**ILLUSTRATIVE CASE #2
MYTHIC, TEXAS
PROPOSED CONDITIONS
ATTACHMENT 9**



NAISMITH ENGINEERING, INC.
ENGINEERING • ENVIRONMENTAL • SURVEYING
AUSTIN CORPUS CHRISTI BROWNSVILLE
TEXAS

SITE_PLAN_BX11.DWG

Job No. 7131	NAISMITH ENGINEERING, INC.	SHEET 1 of 2
Description: Example Calculations for Pollutant Loading Comparison – Illustrative Case #2		Date: 03/07/05
Regional Water Quality Protection Plan – Barton Springs Segment of the Edwards Aquifer		By: dbf

BACKGROUND INFORMATION

Pollutant Loadings

Pollutant Loadings per unit area from undeveloped land are represented by the variable L .

Pollutant Loadings per unit area from developed land are represented by the variable L' and are related to L by the following equation:

$$L' = L \times C$$

Where C is a factor representing the magnitude of increase in that pollutant.

The total unit pollutant loading for a tract of land which is partially developed would be represented by the following equation:

$$L_{total} = A_p \times L + A_I \times L'$$

Where A_p represents the undeveloped (pervious) fraction of the area and A_I represents the developed (impervious) fraction of the area.

BMP Effectiveness

Water quality protection best management practices (BMPs) are to be employed on the developed portion.

The pollutant removal reduction rating of a BMP is quantified by the following equation:

$$E_R = 1 - (E_{BMP}/100)$$

Where E_{BMP} is the BMP removal efficiency in percent.

POLLUTANT LOADING ESTIMATES

Assumptions

A 4.0 acre tract of land is to be developed as a commercial site. The tract of land is to be developed at 75% Impervious Cover (IC). Correspondingly, $A_p = 0.25$ ($A_p = 1.0 \text{ ac} / 4.0 \text{ ac} = 0.25$) and $A_I = 0.75$ ($A_I = 3.0 \text{ ac} / 4.0 \text{ ac} = 0.75$).

Studies indicate that for suspended pollutants, $C_s = 5.1$ and for dissolved pollutants, $C_d = 2.6$.

References indicate that for **sedimentation/filtration systems (proprietary systems using cartridge filters)** the following removal efficiencies can be assumed:

TSS	=	95% [$E_{R85} = 0.05$]
TN	=	70% [$E_{R70} = 0.30$]

A goal for the developed condition is no net increase in pollutant loadings.

Uncontrolled Condition

Suspended Pollutants (TSS)

For suspended pollutants, the unit pollutant loading for the developed tract would be:

$$L_{total} = A_p \times L + A_I \times L' = A_p \times L + A_I \times L \times C_s$$

$$L_{total} = 0.25 \times L + 0.75 \times L \times 5.1 = 4.075 L$$

This represents an approximately 400% increase in suspended pollutant loadings from the site.

Dissolved Pollutants (TN)

For dissolved pollutants, the unit pollutant loading for the developed tract would be:

$$L_{total} = A_p \times L + A_I \times L' = A_p \times L + A_I \times L \times C_d$$

$$L_{total} = 0.25 \times L + 0.75 \times L \times 2.6 = 2.200 L$$

This represents an approximately 220% increase in dissolved pollutant loadings from the site.

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Job No. 7131	NAISMITH ENGINEERING, INC.	SHEET 2 of 2
Description: Example Calculations for Pollutant Loading Comparison – Illustrative Case #2		Date: 03/07/05
Regional Water Quality Protection Plan – Barton Springs Segment of the Edwards Aquifer		By: dbf

Controlled Condition

Suspended Pollutants (TSS)

For suspended pollutants (TSS), the unit pollutant loading for the developed tract, with an overall BMP removal efficiency of 95% (see above Assumptions section), and therefore $E_{TSS} = E_{R95} = 0.05$ (represents the BMP Effectiveness (E_R) based on an overall removal efficiency for the sedimentation/cartridge filtration system) would be:

$$L_{total} = A_P \times L + A_I \times L' \times E_R = A_P \times L + A_I \times L \times C_s \times E_{R95}$$

$$L_{total} = 0.25 \times L + 0.75 \times L \times 5.1 \times 0.05 = 0.4413 L$$

This represents an approximately **56% decrease** in suspended pollutant loadings from the site, indicating that the combination of vegetative filter strips and retention/irrigation systems with an overall suspended pollutant removal efficiency of 95% **will achieve** the goal of no net increase in loading.

Dissolved Pollutants (TN)

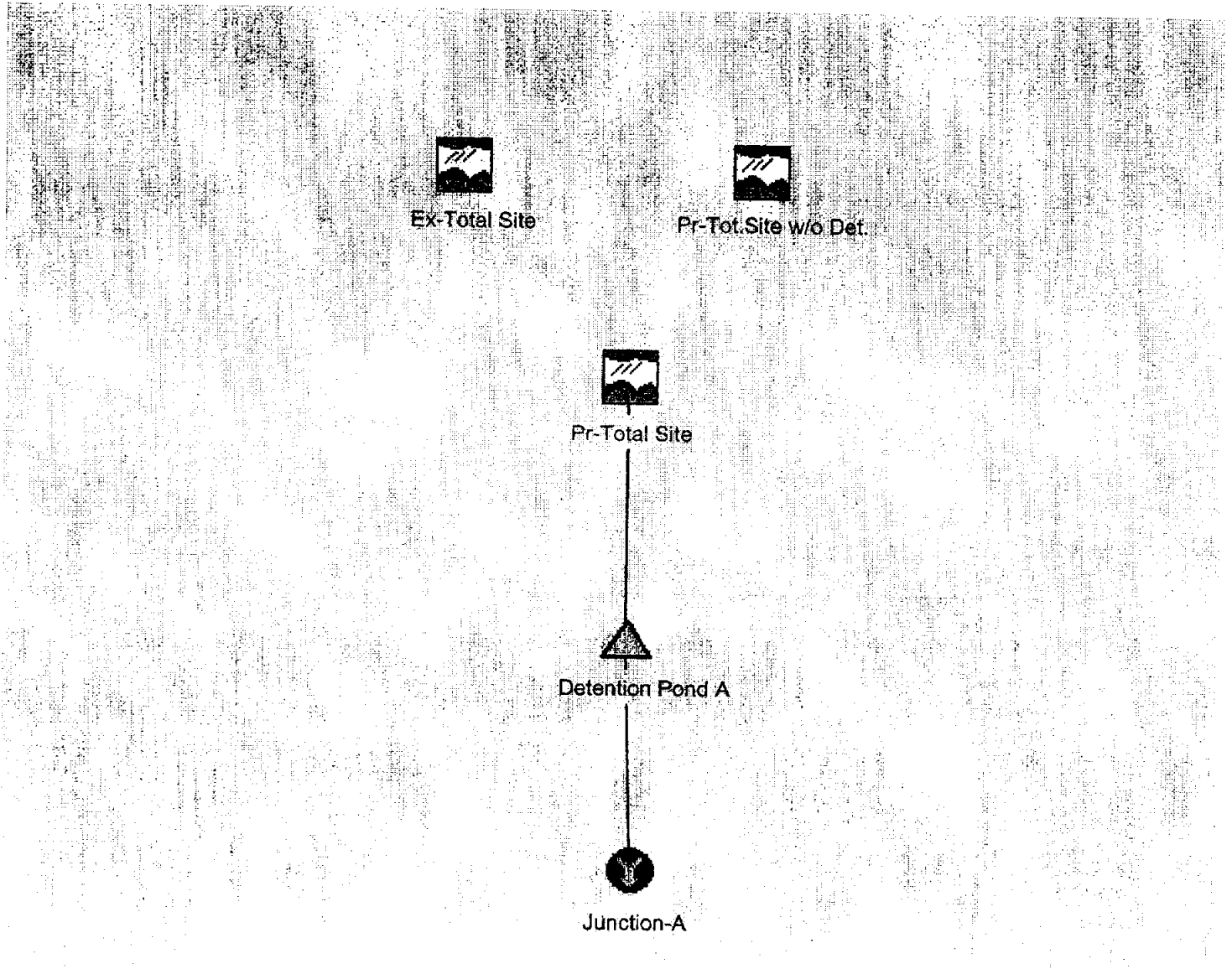
For dissolved pollutants (TN), the unit pollutant loading for the developed tract, with an overall BMP removal efficiency of 70% (see above Assumptions section), and therefore $E_{TN} = E_{R70} = 0.30$ (represents the BMP Effectiveness (E_R) based on an overall removal efficiency for the sedimentation/cartridge filtration system) would be:

$$L_{total} = A_P \times L + A_I \times L' \times E_R = A_P \times L + A_I \times L \times C_d \times E_{R70}$$

$$L_{total} = 0.25 \times L + 0.75 \times L \times 2.6 \times 0.30 = 0.8350 L$$

This represents an approximately **16.5% decrease** in suspended pollutant loadings from the site, indicating that the combination of vegetative filter strips and retention/irrigation systems with an overall dissolved pollutant removal efficiency of 70% **will achieve** the goal of no net increase in loading.

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HMS * Summary of Results

Project : Illust Case 2

Run Name : COA 2-yr

Start of Run : 01Dec03 0100 Basin Model : Basin 1

End of Run : 01Dec03 1900 Met. Model : COA 2-yr 3-hr storm

Execution Time : 08Mar05 1339 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Pr-Tot.Site w/o Det.	20.718	01 Dec 03 0231	0.76823	0.006
Pr-Total Site	20.718	01 Dec 03 0231	0.76823	0.006
Detention Pond A	0.0	01 Dec 03 0100	0.0	0.006
Junction-A	0.0	01 Dec 03 0100	0.0	0.006
Ex-Total Site	12.444	01 Dec 03 0232	0.41181	0.006

FYI -

$$0.76823 \text{ ac} \cdot \text{ft} = 33,464 \text{ cu.ft.}$$

@ 5.0 Ft. depth



$$\begin{aligned} \text{Pond Area (min.)} &= 33,464 \text{ ft}^3 / 5.0 \text{ ft.} \\ &= 6,693 \text{ ft}^2 \end{aligned}$$

@ 20 Ft. wide



$$\begin{aligned} \text{Pond Length} &= 335 \text{ ft} \\ (20' \times 335' &= 6,700 \text{ ft}^2) \end{aligned}$$

HMS * Summary of Results for Detention Pond
A

Project : Illust Case 2 Run Name : COA 2-yr

Start of Run : 01Dec03 0100 Basin Model : Basin 1
End of Run : 01Dec03 1900 Met. Model : COA 2-yr 3-hr storm
Execution Time : 08Mar05 1339 Control Specs : Control 1

Computed Results

Peak Inflow : 20.718 (cfs) Date/Time of Peak Inflow : 01 Dec 03 0231
Peak Outflow : 0.0 (cfs) Date/Time of Peak Outflow : 01 Dec 03 0100
Total Inflow : 2.29 (in) Peak Storage : 0.76823(ac-ft)
Total Outflow : 0.00 (in) Peak Elevation : 1005.0(ft)

HMS * Summary of Results

Project : Illust Case 2

Run Name : COA 10-yr

Start of Run : 01Dec03 0100 Basin Model : Basin 1
 End of Run : 01Dec03 1900 Met. Model : COA 10-yr 3-hr storm
 Execution Time : 08Mar05 1340 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Pr-Tot.Site w/o Det.	29.444	01 Dec 03 0231	1.3280	0.006
Pr-Total Site	29.444	01 Dec 03 0231	1.3280	0.006
Detention Pond A	9.9627	01 Dec 03 0246	0.55893	0.006
Junction-A	9.9627	01 Dec 03 0246	0.55893	0.006
Ex-Total Site	22.756	01 Dec 03 0232	0.90716	0.006

HMS * Summary of Results

Project : Illust Case 2

Run Name : COA 25-year

Start of Run : 01Dec03 0100 Basin Model : Basin 1
 End of Run : 01Dec03 1900 Met. Model : COA 25-yr 3-hr storm
 Execution Time : 08Mar05 1341 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Pr-Tot.Site w/o Det.	35.003	01 Dec 03 0231	1.6664	0.006
Pr-Total Site	35.003	01 Dec 03 0231	1.6664	0.006
Detention Pond A	17.856	01 Dec 03 0241	0.89732	0.006
Junction-A	17.856	01 Dec 03 0241	0.89732	0.006
Ex-Total Site	28.866	01 Dec 03 0231	1.2225	0.006

HMS * Summary of Results

Project : Illust Case 2

Run Name : COA 100-yr

Start of Run : 01Dec03 0100 Basin Model : Basin 1
 End of Run : 01Dec03 1900 Met. Model : COA100-yr 3-hr storm
 Execution Time : 08Mar05 1341 Control Specs : Control 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
Pr-Tot.Site w/o Det.	42.345	01 Dec 03 0231	2.1526	0.006
Pr-Total Site	42.345	01 Dec 03 0231	2.1526	0.006
Detention Pond A	31.338	01 Dec 03 0238	1.3835	0.006
Junction-A	31.338	01 Dec 03 0238	1.3835	0.006
Ex-Total Site	36.975	01 Dec 03 0232	1.6856	0.006

Appendix P

Summary of Public Comments Received and Responses

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
1.1	What is the Need?	There needs to be a clear identification of what is the problem.	Brian Birdwell	Engineer	Portions of Section 7 have been revised to correlate documented problems to the need for protective measures.
1.2		No scientific proof that current regulations are inadequate and that water quality would be improved by the new regulations.	John Moman	Architect / RECA	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
1.3		It has not been shown that LCRA/TCEQ have failed to enforce existing rules, and that actions to improve LCRA/TCEQ enforcement have not been successful.	Bill Locke Brian Birdwell	Attorney / RECA Engineer	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
1.4		Is there evidence of problems from decentralized sewage treatment facilities?	Susie Carter	Jurisdiction-Hays Co.	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
1.5		Provide a side-by-side comparison of the key requirements of the Plan with those issued by TCEQ, USFWS, LCRA, and City of Austin	Lanny Counts	Jurisdiction-Dripping Springs	Appendix I (formerly Attachment 5) in the Plan previously included this comparison, except for USFWS. The USFWS provisions in the LCRA MOU have been added to Appendix I.
2.1	Barton Springs Salamander	If implemented as proposed, the measures set forth in the Draft Water Quality Plan "would also avoid take of the Barton Springs salamander and contribute to its recovery."	Robert Pine	USFWS	Avoid changes to the Plan which will materially affect the protections it now contains.
3.1	Definition of Planning Region	Amend the Plan to encompass protection of all the surface and groundwater of the Planning Region, whether it be in the Edwards or the Trinity Aquifers.	David H. Glenn Al Broun	Geoscientist EC/CC-HTGCD	As discussed at the last EC/CC meeting, the only differences in the measures are based on specific geologic differences between the Edwards and the Hays/Trinity and only reflected in the recommended impervious cover limitations. We do not believe that this difference requires any changes to the Plan.
3.2		Believe the Plan should be implemented throughout the entirety of the participating jurisdictions and not only in the Barton Springs Zone.	Todd Purcell	EC/CC-Dripping Springs	We believe this would be an expansion of the present scope as outlined in the consultant contract and would have to be approved by the EC/CC. This change would also necessitate an evaluation of the hydro-geologic differences for the areas outside the Barton Springs Zone.
3.3		Need to clarify whether or not parts of Blanco County and BPGCD are in the Planning Region	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	Section 1.5.1 already identifies that a portion of Blanco County is included within the Planning Region. Section 10.3 has been revised to identify the groundwater conservation districts within the Planning Region. Figure 10 has been added to illustrate the jurisdictional boundaries of the GCDs within the Planning Region.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
4.1	"No Net Increase" (NNI) Standard	Why does the Plan require the NNI Standard when neither TCEQ nor USFWS find it to be necessary?	Bill Locke Brian Birdwell Mike Murphy	Attorney / RECA Engineer CC-Bee Cave	This standard was identified through consensus of the stakeholder committee and we believe the Plan adequately outlines the scientific processes for this. No changes were made to the Plan in response to this comment.
4.2		Need to clarify that the "thorough site specific assessment of pre and post development conditions" is based on ENGINEERING CALCULATIONS and not on actual field measurements	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	The text of the executive summary and Section 8.3 of the Plan were revised to clarify that this is an engineering calculation and not a field verification.
5.1	Impervious Cover (IC) Limitations	Recommend LESS RESTRICTIVE IC standards	Mike Murphy Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	CC-Bee Cave SHC-Developers	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
5.2		Recommend MORE RESTRICTIVE IC standards	Joe Day Colin Clark David Venhuizen Donna Tiemann Al Broun Doug Wierman	SHC-Economic SHC-PIOs SHC-Con. Citizens SHC-PIOs EC/CC-HTGCD EC/CC-HTGCD	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
5.3		Why are Impervious Cover limits required if the standard is "No Net Increase" in pollutants?	Bill Locke Brian Birdwell Mike Murphy	Attorney / RECA Engineer CC-Bee Cave	While the NNI standard addresses primarily storm runoff, it does not ensure that existing levels of recharge/base flow replenishment continue. Sections 7.1 and 9.5 were revised to better explain the correlation between the impervious cover limits and aquifer recharge/base flow considerations.
5.4		Why are Impervious Cover limits imposed if TCEQ and USFWS does not require them?	Bill Locke	Attorney / RECA	See the response to Item 5.3
5.5		Do not agree with basin-wide IC limits	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
5.6		IC limits are stricter than Austin's SOS rules and will result in only large residential developments without associated commercial.	Hank Smith	SHC-Developers	Appendix I and the economic evaluation in Section 11.2 already address the comparison of the Plan's IC limits to those in Austin's SOS Ordinance. The revisions to the economic evaluation based on other comments should address this issues associated with this comment.
5.7		Impervious Cover limits should be based on NET IC since it provides more protection of sensitive areas than GROSS IC calculations.	Mike Murphy	CC-Bee Cave	The "protection of sensitive areas" as outlined in the Plan is accomplished by several measures other than the method used for IC calculations. We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
5.8		Counties were given authority to regulate density by SB 873, contrary to the statements in the Plan.	Tom Nuckols	Jurisdiction-Travis County	A number of comments address how the plan correlates to SB 873. Section 10.7 has been revised to provide better definition on how the plan can be implemented by counties respecting the allowances and limitations of SB 873.
5.9		The Plan should give more emphasis to the need to regulate IC as a life safety and property damage issue due to the need to prevent flooding	Tom Nuckols	Jurisdiction-Travis County	These areas, while important, are outside the Plan's scope of water quality protection. No changes were made to the Plan in response to this comment.
5.10		Would like to see more analysis of the differences between the Edwards and Trinity Recharge Zones as related to recommended IC limitations.	Andrew Backus	SHC-Governments	We believe this would be an expansion of the present scope and would have to be approved by the EC/CC. No changes were made to the Plan in response to this comment.
6.1	Setbacks for Streams & CEFs	Recommend LESS RESTRICTIVE setbacks	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
6.2		Recommend MORE RESTRICTIVE setbacks	Colin Clark	SHC-PIOs	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
6.3		Measures must provide mechanism for responsible development on cliff top sites.	Eric Swanson	Landowner	Revisions were made to Section 9.4.1. regarding stream setbacks along bluffs and cliffs. In these instances, the stream buffers can be reduced where the top of the bluff/cliff is at least 3 feet above the floodplain elevation and meets certain criteria.
6.4		Method for determining stream buffers needs to be clarified.	Eric Swanson	Landowner	Revisions were made to Section 9.4.1. regarding the definition of stream setbacks.
6.5		Headwaters protection inadequate.	Mary Arnold	Environmentalist	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
6.6		Make provisions for small land owners who have no choice but to build near a stream.	Paul Silver	Landowner	See the responses to Items 6.3. and 6.4.
6.7		Stream setbacks below 64 acres would be acceptable they were allowed to be in yards or development areas	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
6.8		Give developers "credit" for the water quality benefits of stream buffers.	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
6.9		Stream setbacks are virtually a 100% taking of some property along streams.	Jeff Eichelberger	Landowner	See the responses to Items 6.3. and 6.4.
6.10		Why do the setback requirements exceed those of TCEQ and USFWS?	Mike Murphy	CC-Bee Cave	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
6.11		Consider including additional CEFs based on surface geology and infiltration characteristics	Ron Fieseler	CC-BPGCD	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
7.1	Transferable Development Rights (TDRs)	The legal basis for TDRs should be laid out better	Craig Smith Dripping Springs	EC/CC-BSEACD EC/CC-Dripping Springs	A new section (10.9.6) has added to address the legal basis and precedent for TDRs.
7.2		More detail should be provided about how the TDR system will be implemented and how it will work	John Hatchett Dripping Springs	Landowner/ Developer EC/CC-Dripping Springs	A new section (10.9.7) has added to address the mechanics for a TDR program.
7.3		TDRs must be implemented uniformly region-wide.	Hank Smith	SHC-Developers	The plan already states that uniform implementation of the measures, including TDRs throughout the Planning Region is important. No changes were made to the Plan in response to this comment.
7.4		TDRs should be required only when the NNI Standard cannot be met with BMPs	Mike Murphy	CC-Bee Cave	See the response to Item 5.3. While the NNI standard primarily addresses stormwater runoff from individual sites, the TDRs working in concert with the IC limits address the preservation of recharge/baseflow. We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
7.5		Cannot support transfer of development rights between aquifers or watersheds	Al Broun	EC/CC-HTGCD	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
7.6		PGAs should include transit corridors or else be eliminated from the Plan	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
7.7		Condemnation should be allowed for TDRs for jurisdictions with condemnation authority	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
7.8		TDRs used in the RZ should come from the RZ, and those used in the CZ outside a PGA must come from outside a PGA	David Venhuizen	SHC-Citizens	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
8.1	Implementation	Only TCEQ has region-wide authority to enforce water quality protection rules - any new rules should be implemented through TCEQ.	Bill Locke	Attorney / RECA	We believe that the Plan adequately covers this. No changes were made in the Plan in response to this comment.
8.2		Need to get TCEQ on board or all else is in vain	Mary Stone	Homeowner-STOC	Noted. TCEQ review comments indicate they are not opposed to the measures recommended in the Plan. No changes were made to the Plan in response to this comment.
8.3		Trying to implement the full Plan may be too difficult.	Roger Kew	Citizen	Noted. This will be a decision to be made by the participating jurisdictions. No changes were made to the Plan in response to this comment.
8.4		There will be difficulties getting Austin, Hays Co., and Dripping Springs to accept differing restrictions over TDRs, PGAs, and recharge/contributing zones.	David H. Glenn	Geoscientist	Noted. This will be a decision to be made by the participating jurisdictions. No changes were made to the Plan in response to this comment.
8.5		A greater role for groundwater conservation districts should be outlined in the Plan	Craig Smith	EC/CC-BSEACD	Sections 10.4. and 10.8.2. of the Plan were revised to expand the discussion on the roles of GCDs.
8.6		Include an "Implementation Matrix" in the final plan to facilitate understanding the Plan and finding its important parts	Ron Fieseler	CC-BPGCD	Section 10.4 of the Plan was revised to include a Summary Implementation Matrix. A more detailed implementation matrix has been included in Appendix J.
8.7		Need to clarify the qualification requirements for jurisdictional personnel who review development plans to determine that they comply with the NNI Standard	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	These comments were made prior to additions to the Plan regarding qualifications for personnel who prepare development plans on behalf of development interests and who review development plans on behalf of the public jurisdictions. No additional changes were made to the Plan in response to this comment.
8.8		Do not believe TCEQ can delegate enforcement to local entities	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	Section 10.5.5 and other minor areas of the Plan have been revised to address the circumstances under which local jurisdictions can assume delegation of TCEQ regulatory programs.
8.9		Consider clarifying the circumstances under which the Plan recommends delegation of enforcement authority from TCEQ to local entities, including what types of activities this would apply to and the qualifications and availability of personnel to manage the delegated authorities.	Mary Ambrose	TCEQ	See the response to item 8.8.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
8.10		The overlapping jurisdictional responsibilities of Travis County and several municipalities need to be better outlined in the Plan	Dave Fowler	SHC-Governments	Section 10.2.7 was revised to additional detail on the jurisdictional overlaps and clarify how such overlaps might be accommodated when implementing the Plan's measures.
8.11		A forecast is needed for impact on the Plan of failure of some jurisdictions to implement the Plan	Dripping Springs	EC/CC	A new section (11.6) was added to address the impact of the failure of some jurisdictions to implement the Plan.
8.12		Need to address the ability of some jurisdictions to implement aspects of the Plan partially within their jurisdictions (i.e., not county-wide or city-wide)	Dripping Springs	EC/CC	A new section (11.6) was added to address the partial implementation within various jurisdictions.
8.13		For each local government or agency responsible for implementing the Plan, provide a list of the specific steps that it could take, consistent with its own jurisdiction and authority, in order to carry out the Plan	Craig Smith	BSEACD	See the responses to Items 8.5 and 8.6.
9.1	Economic Implications	Need more analysis of the fiscal impact on JURISDICTIONS			
9.1a		-- Fiscal impact on individual jurisdictions should be identified	Bill Locke Brian Birdwell Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	Attorney / RECA Engineer SHC-Developers	This analysis is beyond the scope of a regional plan and requires additional information not collected as a part of this planning effort. This analysis should be done as jurisdictions move into implementation phase and consider alternative implementation scenarios. No changes were made to the Plan in response to this comment.
9.1b		-- Cost analyses shown in Figures 7 and 8 should include every entity that has sponsored the Plan	Todd Purcell	EC/CC-Dripping Springs	Section 11.2 has been revised to show representative costs for each participating entity.
9.1c		-- There should be more of a breakdown on the incremental costs of implementation	Nancy McClintock	SHC-Governments Jurisdiction-Austin	Section 11.2 has been revised to provide a better breakdown of the incremental costs.
9.1d		-- Plan needs to achieve better balance with other values such as: employment; affordable housing; efficient transportation; etc.	Bill Locke	Attorney / RECA	These considerations, while important, are outside the Plan's scope of water quality protection and need to be addressed by local jurisdictions when implementing the Plan. No changes were made to the Plan in response to this comment.
9.1e		-- Need to avoid tax expenditures on legal defense of new rules or costs for taking property rights	Brian Birdwell	Engineer	We agree. The development of the plan has included a general review for legal "defensibility". However, this is a matter for each jurisdiction to evaluate as it considers implementation of the Plan. No changes were made to the Plan in response to this comment.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
9.1f		-- Economic discussion should be expanded to include the cost avoidance or savings for a community that result from imposing water quality protection measures, and not just the additional costs to developers.	David Venhuizen	SHC-Citizens	Section 11 was revised to address the costs to remedy water quality problems based on a failing to accomplish water quality protection.
9.2		Need more analysis of the fiscal impact on LANDOWNERS			See the response to Item 9.1c.
9.2a		-- Plan will drive down cost of raw land while driving up cost of finished lots and commercial development.	Brian Birdwell	Engineer	See the response to Item 9.1c.
9.2b		-- Need to clarify how Plan will affect landowners who do NOT plan to develop.	Jeff Maddox	Rancher/Developer/ Realtor	See the response to Item 9.1c.
9.2c		-- Implications of Plan for small land owners not fully evaluated.	Carlotta McLean	SHC - Landowners	See the response to Item 9.1c.
9.2d		-- I'm against any new taxes.	Jeff Maddox	Rancher/Developer/ Realtor	One of the charges from the EC/CC was to identify ways to pay for water quality protection measures. While there are many funding alternatives, the concept of new taxes is available to individual jurisdictions. No changes were made to the Plan in response to this comment.
9.3		Need more analysis of the fiscal impact on DEVELOPERS			The economic evaluation in Section 11.2 has been expanded to include the Illustrative Cases and provide more focused estimates of the incremental costs and the impact of those incremental costs on total cost.
9.3a		-- Economic impacts are drastic and severely understated, resulting in: discouraging all development, loss of commercial development; no affordable housing.	Mike Murphy	CC-Bee Cave	See the response to Item 9.3.
9.3b		-- Cost is too great to allow affordable housing to be built in the region (example of bio-retention pond (on a 1300 acre residential development at overall IC of 12% costing \$17 million.)	Chris Risher	SHC - Developers	See the response to Item 9.3.
9.3c		-- Illustrative cases not analyzed for financial feasibility	Mike Murphy	CC-Bee Cave	See the response to Item 9.3.
9.3d		-- Taken together, the NNI Standard + the IC limits + the TDR requirements + the safety factors reduce property value by 75% to 95%.	Mike Murphy	CC-Bee Cave	See the response to Item 9.3.
10.1	Takings Assessment	Takings Assessment in the Plan is inadequate because it does not actually assess the impacts of the Plan's measures.	Bill Locke Murphy	Mike Attorney / RECA Bee Cave	Section 10.16 was revised to provide additional discussion on "takings" and clarify how the recommended measures correlate to the regulator definition of a "taking".
10.2		Discussion on takings needs to point out that a determination will entirely depend on the specific site and how the measures affect that site.	Tom Nuckols	Jurisdiction-Travis County	See the response to Item 10.1.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
11.1	Stakeholders' Role	Stakeholder recommendations were ignored.	John Moman	Architect / RECA	While some stakeholder input was not incorporated because it did not meet the thresholds for consensus established by the SHC, no stakeholder recommendations were ignored. We believe this comment is ill-informed. No changes were made to the Plan in response to this comment.
11.2		Stakeholder Committee lacked developer representation	Mike Murphy	CC-Bee Cave	The SHC included representatives from a broad range of interests, including developers. No changes were made to the Plan in response to this comment.
12.1	Special Purpose Districts	Cannot support special purpose districts that serve to help developers.	Mary Arnold Susie Carter	Environmentalist Jurisdiction-Hays Co.	Section 10.7.1 was revised to expand the discussion on special purpose districts to emphasize that they are proposed to be used as originally intended to protect the interest of the public, and not for the benefit of private entities.
12.2		Plan's statement that a County can establish a special purpose district on its own authority is inaccurate.	Tom Nuckols	Jurisdiction-Travis County	Sections 10.2.5 and 10.7 were revised to expand the discussion on the role that counties play in the formation of special districts.
12.3		Plan's statement that the Legislature would need to establish a special purpose district to regulate water quality issues is inaccurate. Need to encourage Sustainable agriculture and wildlife uses.	Tom Nuckols	Jurisdiction-Travis County	See the response to Item 12.2.
13.1	Additional Water Quality Protection Considerations	Need to take account of grandfathered lands	Mary Arnold	Environmentalist	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
13.2		Need to address golf courses.	Mary Arnold	Environmentalist	This issue is partially addressed in the Plan in Section 10.9. We believe this is an issue to be considered further by individual jurisdictions during implementation. No changes were made to the Plan in response to this comment.
13.3		Need to clarify how slopes are treated	Mary Arnold Nancy McClintock	Environmentalist SHC-Governments	A new Section (9.11.2) was added to describe how the water quality protection measures in the Plan apply to golf courses.
13.4		Need to address the disposal of treated sewage effluent more thoroughly, including possible use as a resource rather than as "waste" water.	Mike Murphy	CC-Bee Cave	While several existing local regulations provide for special treatment for previously existing steep sloped areas, we did not find a significant scientific basis for treating these areas differently, especially in light of the use of gross site area as the basis for the Plan. No changes were made to the Plan in response to this comment.
13.5		Need to address the disposal of treated sewage effluent more thoroughly, including possible use as a resource rather than as "waste" water.	David Venhuizen Nancy McClintock	SHC-Citizens SHC-Governments	Section 9.9.3 was revised to include a discussion outlining the Plan's preference for beneficial use of wastewater versus disposal.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
14.1	Safety Factors	The Plan imposes too many safety factors on top of the NNI Standard, resulting in too much cost to develop which adversely impacts both developers and local government.	Mike Murphy Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher,	CC-Bee Cave SHC-Developers	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
15.1	BMPs	More credit should be given to BMP's effectiveness - allow max 10% safety factor	Mike Murphy	CC-Bee Cave	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
15.2		Need to include provisions for evaluating actual performance of both existing and innovative BMPs	Joe Day	SHC-Economic Interests	A new Section 10.14.3 was added to describe how new scientific and technological data, including the effectiveness of existing and future/new BMPs, would be evaluated through the Adaptive Management Program.
15.3		Vulnerability must be addressed when selecting BMPs including: assessing capability; construction phase management; secondary construction stages	David Venhuizen	SHC-Citizens	We believe the Plan is adequate to describe BMP design and evaluation procedures. An additional section (9.7.2.3) was added to highlight the need for construction quality assurance for structural BMPs.
16.1	Scientific Basis	Recommendations based on selective and biased data sources	Mike Murphy	CC-Bee Cave	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
16.2		Reference to rescinded proposed USFWS guidelines undermines credibility of Plan and should be removed.	Mike Murphy	CC-Bee Cave	The reference to the USFWS guidelines was revised to state that these guidelines were incorporated into the LCRA MOU for furnishing surface water to a portion of the Planning Region.
17.1	Water Quality Testing	Testing requirements seem to be excessive and may result in excessive costs	Scott Armstrong	Jurisdiction-Dripping Springs	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
17.2		Need to clarify how testing costs will be funded and minimized	Scott Armstrong	Jurisdiction-Dripping Springs	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
17.3		Doesn't seem feasible to locate source of a problem that shows up in tests of water wells	Scott Armstrong	Jurisdiction-Dripping Springs	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
18.1	Animal Wastes	Restrictions applicable to livestock and pet wastes need to be better justified and better defined	Scott Armstrong	Jurisdiction-Dripping Springs	Section 9.17.2 has been revised to clarify that the possible ordinances are intended to address concentrated residential areas and not agricultural activities.
19.1	Variations	Plan needs to recognize and allow variances for situations where small tracts are highly impacted by setbacks, slopes, and IC limits.	Tom Nuckols	Jurisdiction-Travis County	Revisions were made to Section 9.4.1, regarding the definition of stream setbacks. Revisions were also made to Section 10 to better define the procedures for allowing variances to avoid a regulatory taking.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
20.1	Rainwater Harvesting	Minimum standards should be defined where the use of rainwater harvesting is allowed to result in unlimited IC	Ron Fieseler	CC-BPGCD/Blanco County	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
20.2		Consider specifying the required release rate and maximum drawdown time where rainwater harvesting is used.	Mike Kelly	Jurisdiction-Austin	Sections 9.7.5 and 9.10.1 have been revised to provide additional design details for rainwater harvesting when used to satisfy the requirements of the Plan.
21.1	Wetlands	All references to wetlands should be removed from the Plan because they fall under Federal jurisdiction	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
22.1	Wastewater Systems	Wastewater criteria need to be left to TCEQ and should not be addressed at all in the Plan	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
22.2		Requirement to do TV monitoring of sewers every three years is too frequent, and not the best and most cost effective method	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	Section 9.9 was revised to eliminate a specific frequency of television monitoring and to allow other methods of leak identification.
23.1	Questionable Water Quality Protection Measures	The Plan includes several water quality protection measures that are not appropriate, including: water rates or rate structures; Xeriscaping, irrigation techniques; land use restrictions; zoning	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
24.1	Construction Controls	Construction controls require more extensive treatment in the Plan since they have the potential for far worse problems	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	These comments were made prior to a significant addition to the Plan regarding construction site storm water controls. No additional changes were made to the Plan in response to this comment.
25.1	Roadways	Roadways should be exempt from IC and TDR requirements	Hank Smith, Bryan Jordan, Rebecca Hudson, Chris Risher	SHC-Developers	We believe the Plan adequately covers this. No changes were made to the Plan in response to this comment.
25.2		Need to clarify how roads are treated	Mike Murphy	CC-Bee Cave	Section 10.5.4 was revised to clarify how roadway and other public utility and transportation infrastructure can comply with the Plan measures.
26.1	Control of Hydrologic Regime	Recommend MORE RESTRICTIVE standards for control of erosive flow	Colin Clark	SHC-PIOs	Periodic review and amendment of Plan measures may subsequently take place through the Adaptive Management Program. No changes were made to the Plan in response to this comment.
26.2		Consider expanding the guidance on storm water discharge, including which discharge points require controls.	Mary Ambrose	TCEQ	Sections 9.6 and 9.7 were revised to indicate that the storm water protection measures apply to all discharges from the site.

Responses to Public Comments

Item	Subject Area	Consolidated Summary of Similar Comments	Comment From	Commenter Type	Response to Comment
27.1	Open Space Acquisition	Plan needs a companion plan for open space acquisition including revenue generation strategy	Nancy McClintock	SHC-Governments	We believe this is an issue to be considered by jurisdictions during implementation. No changes were made to the Plan in response to this comment.
PENDING PLAN ITEMS					
C.1	Contract Items	Identify and seek sources of Funding			A new section 11.3.3 has been added to highlight implementation funding for local jurisdictions. A funding plan has also been developed and is included in Appendix R.
C.2		Develop process to facilitate the dissemination and implementation of the Plan			Sections 1.4 and 10.12 have been revised to address the public education, and dissemination and implementation of the Plan.

KEY: BPGCD = Blanco-Pedernales Groundwater Conservation District
 BSEACD = Barton Spring Edwards Aquifer Conservation District
 CC = Core Committee
 CEF = Critical Environmental Features
 CZ = Contributing Zone
 EC = Executive Committee
 GCD = Groundwater Conservation District
 HTGCD = Hays Trinity Groundwater Conservation District
 IC = Impervious Cover
 LCRA = Lower Colorado River Authority

PGA = Preferred Growth Area
 PIO = Public Interest Organizations
 RECA = Real Estate Council of Austin
 RZ = Recharge Zone
 SHC = Stakeholder Committee
 STOC = "Stop The Crusher"
 TCEQ = Texas Commission on Environmental Quality
 TRG = Technical Review Group
 USFWS = US Fish and Wildlife Service



Appendix Q
Informational Presentation on the Plan

An Overview of the Regional Water Quality Protection Plan

**Development of a Regional Water Quality Protection
Plan for the Barton Springs Segment of the Edwards
Aquifer and its Contributing Zone**

Project Sponsors

- City of Dripping Springs
- City of Austin
- City of Buda
- City of Kyle
- City of Rollingwood
- City of Sunset Valley
- Village of Bee Cave
- Blanco County
- Hays County
- Travis County
- Barton Springs/Edwards Aquifer Conservation District
- Hays Trinity Groundwater Conservation District
- Blanco-Pedernales Groundwater Conservation District

Regional Water Quality Planning Project

Funding

➤ Principal Funding – Grants from:

- Texas Water Development Board - \$148,000
- Lower Colorado River Authority - \$100,000

➤ Other Local Public Entities (Cash/In-kind)

- City of Austin
- Austin Community College
- Barton Springs/Edwards Aquifer Conservation District
- Village of Bee Cave
- Blanco-Pedernales Groundwater Conservation District
- City of Dripping Springs
- Hays County
- Hays Trinity Groundwater Conservation District
- City of Kyle
- Lower Colorado River Authority
- City of Sunset Valley

Regional Water Quality Planning Project

Funding (Continued)

➤ Other Entities & Individuals (Cash/In-kind)

- The Austin Waldorf School
- Carpenter and Langford, P.C.
- George Cofer
- The Oak Hill United Methodist Church
- The Salt Lick Bar B-Q
- John Orr
- The Save Barton Creek Association
- TechPeople, Inc.
- Terri Buchanan, M.P.H.
- Urban Design Group

Regional Water Quality Planning Project

The Historic Perspective

“Good water quality is one of the things that contributes most to the health of the citizens of a city. There is nothing of more interest to magistrates than maintaining the healthfulness of the water that serves both men and animals and preventing accidents that can cause the water to become polluted, whether in springs, rivers and streams where it flows or in places where diverted water is stored, or in the wells used as sources.”

(De Jussieu, Histoire de l'Academie royale des sciences [History of the Royal Academy of Science], 1733, p.331. From The Public Fountains of the City of Dijon by Henry Darcy, translated by Patricia Bobeck, Kendall/Hunt Publishing Co., 2004.)

Regional Water Quality Planning Project

Why Do We Need a Plan?

- Water Resources in the Region are Invaluable
- Pressure for Growth & Development is Already Being Felt – The Region Must Be Ready
- Some of What We Have Been Doing is Not Working
 - If we do what we've always done, we'll get what we've always gotten
 - No one wants to destroy the natural resources in the area
- Competing Ideas About How the Resources Should Be Protected

Regional Water Quality Planning Project

Stakeholder Representation

- Stakeholder Categories
 - Property Owners
 - Neighborhood Interests
 - Concerned Citizens
 - Public Interest Organizations
 - Development Interests
 - Governmental Entities
 - Environmental Preservation & Good Governance Interests
 - Economic Interests
- 3 to 5 Representatives from Each Category
- Public validation of representation
- Adjustments to better reflect stakeholder groups:
 - INCREASE landowner representation
 - INCREASE government representation
 - REDUCE duplicate representation

Regional Water Quality Planning Project

Stakeholder Committee Effort

- 27 Members + 8 Alternates
- Meetings from June 2004 thru March 2005:
 - 16 full meetings
 - 6 subcommittee and workshop meetings
 - Over 2000 hours valued at \$51,000
 - PLUS time outside of meetings
- Average attendance for 16 meetings: **93%**
- Identification and Prioritization of Issues
- “Give and Take” Exchanges
- Critical Feedback on Technical Work Products

Regional Water Quality Planning Project

Stakeholder Committee Goal Statement

“Develop an implement-able Regional Water Quality Management Plan that preserves and protects resources and manages activities within the planning region so that existing and future land use, land management, and development activities maintain or enhance the existing water quality of the groundwater and surface water within both the Barton Springs segment of the Edwards Aquifer and the contributing portion of the watersheds within the Planning Region, for the benefit of people and the environment.”

Regional Water Quality Planning Project

Stakeholder Guiding Principles

1. The economy and environment of this unique part of Texas depend upon the preservation, conservation and management of dependable supplies of clean water. We all recognize the unacceptable consequences that would result if we take no action to protect our water.
2. Both private individuals and the Public have a responsibility to respect the legitimate interests of others and to do no harm in their activities.
3. Those who benefit from an activity must bear the responsibility for the costs and impacts of that activity.
4. We will favor measures which, all else being equal, minimize the risk of failure or of damage to the watershed.

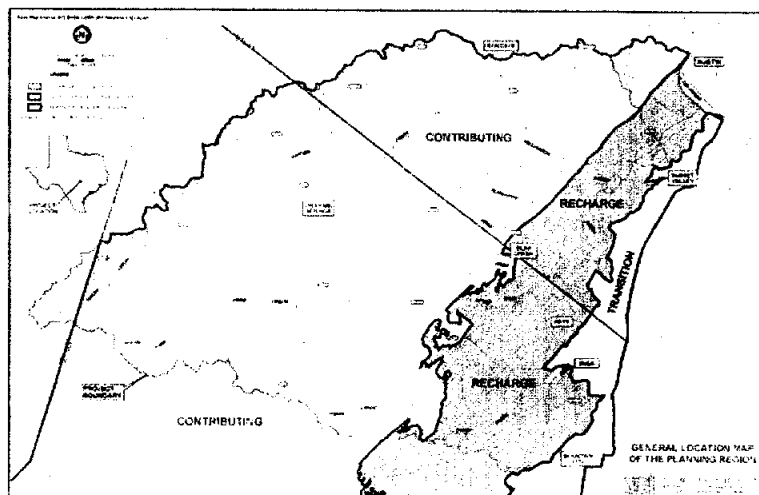
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Stakeholder Guiding Principles (Cont'd)

5. The water quality protection measures we recommend will strive to balance Government regulations with appropriate economic incentives.
6. The regulatory measures we recommend shall be accompanied by strategies for administration and enforcement that provide as much certainty as possible while discouraging exemptions and exceptions.
7. We will make all our decisions being mindful of the economic impact of the measures recommended and strive to achieve a fair and reasonable balance among the various interests.
8. We will not permit any party or group in this process to have undue or unfair control over the outcome.

Regional Water Quality Planning Project

THE PLANNING REGION



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Scientific Basis

- Data Compilation – Large Volume of Data
- Technical Review by Consulting Team Experts
- Coordination of Technical Issues with the Technical Review Group
- Coordination of Technical Issues by the Consulting Team with outside Technical Experts
- Approach for Areas of Uncertainty in the Science
 - Assess Potential Vulnerabilities
 - Tie to the “Best Available” Science
 - Where necessary, incorporate safety factors

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Implementation

- Short Term
 - Relies Only on Local Jurisdictions
 - Existing Entities Under Existing Legal Authority
 - New Entities, Created by Existing Entities Under Existing Legal Authority
 - Built-in Funding Mechanisms
 - Advantages: Doesn't Rely on Others, No Changes to Existing Legal Authority
 - Disadvantages: Possible Non-Uniform Implementation and Political Influences
- Long Term – Possible Single Jurisdiction/
Regional Entity

Regional Water Quality Planning Project

Primary Entities Affected

- Unincorporated Hays County (30.4%)
 - (Including Various ETJs: 60.0%)
- City of Dripping Springs CL + ETJ (29.7%)
- City of Austin CL + ETJ (28.7%)
- Unincorporated Travis County (3.7%)
 - (Including Various ETJs: 23.5%)
- Village of Bee Cave CL + ETJ (2.8%)
- Total for These 5 Entities: > 95%

Regional Water Quality Planning Project

Goals and Objectives of the Plan

- Protect Surface Water and Groundwater
- Address W.Q. in All Areas of the Planning Region (Not just Edwards or Barton Springs)
- Goal: "Maintain"
 - Mandatory applicability
 - No net increase in pollutant loadings
 - Applies to all future development activities
- Goal: "Enhance"
 - Primarily voluntary measures
 - Designed to improve existing water quality

Regional Water Quality Planning Project

A Consensus Based Plan

- General Agreement Among Various Interests
- Stakeholder Committee Bylaws/Procedures
 - Strive for Full Consensus
 - Voting Is A “Last Resort”
 - 75% Agreement Needed to Change Plan
- Results
 - Vast Majority of Issues – Consensus with No Voting
 - Only Handful of Issues Submitted for Vote
 - Of Issues Voted, Most Resolved Through Consensus (>75%)

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Items in the Plan with Less than Consensus Agreement

- Min. Contributing Areas for Stream Buffer Zones
- Specific Widths for Stream BZs
- Recognized Treatment Capacity for Stream BZs/CEF Setbacks
- Wastewater/Stormwater Irrigation Design
- Inclusion of Wetlands in Plan
- Safety Factors/Design for Structural BMPs
- Funding Sources for O&M of BMPs
- Use of Development Agreements
- Details of the Impervious Cover Table and the Thresholds for Requiring TDRs

Regional Water Quality Planning Project

Proposed Water Quality Protection Measures

- Natural Area and Open Space Conservation
- Transferable Development Rights (TDRs)
- Comprehensive Site Planning and Pre-Development Review
- Location of Development
- Intensity of Development
- Control of Hydrologic Regime
- Structural BMPs
- Local Enforcement of Construction Site Controls

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Proposed Water Quality Protection Measures (Cont'd)

- Wastewater Management
- Alternative Water Sources/Uses and Conservation
- Characteristics of Development
- Land Use Restrictions
- Restrictions on Use, Storage and Disposal of Potentially Harmful Materials
- Land Management
- Public Education/Outreach

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Location of Development

➤ Stream Buffers

Contributing Area (Ac.)	Width (ft. from C.L.)	Total
32 to 120	100	200
120 to 300	150	300
300 to 640	200	400
Greater than 640	300	600

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Location of Development (Cont'd)

➤ Critical Environmental Features (CEFs)

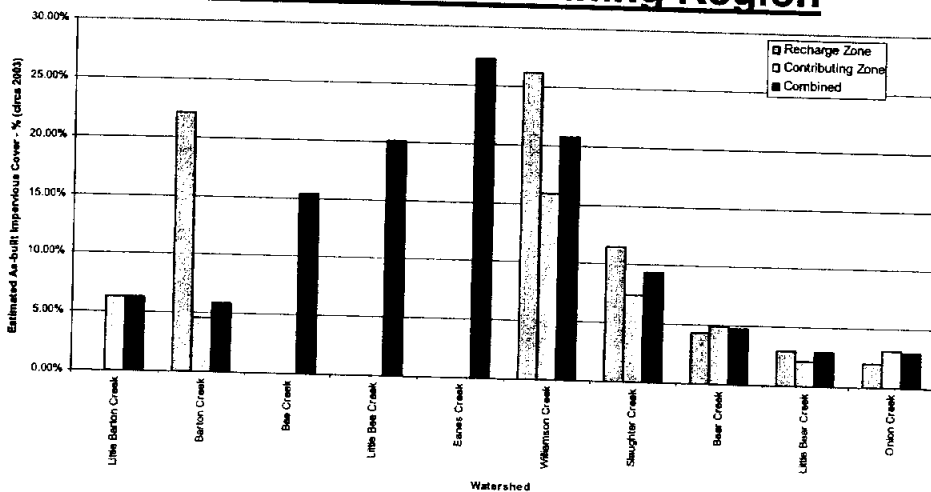
- Point Recharge Features
 - Upstream: Drainage divide up to 300', not less than 150'
 - Downstream: 150'
- Indirect Recharge Features – 150'

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Impacts of Impervious Cover (IC)

- IC – Roofs, Driveways, Streets, Parking Lots, etc. that intercept rainfall and generally do not allow percolation/seepage of rainfall into soil
 - Data Sources
 - U.S. Geological Survey
 - City of Austin
 - LCRA
 - Begin to see statistically significant impacts between 5-18%
 - At 20%, Degradation Using TCEQ Criteria
 - Protective Levels Established
 - 10% for Recharge Zone
 - 15% for Contributing Zone
- Regional Water Quality Planning Project

As-built IC in the Planning Region



Regional Water Quality Planning Project

Recommended IC Limitations

Location	Simplified	Standard Methods	Standard Methods + TDRs
Recharge Zone	5	10	15
Contributing Zone (CZ), outside Preferred Growth Areas (PGAs)	7.5	15	25
CZ, s.f. residential, in PGA	7.5	15	30
CZ, high dens. Res., commercial, in PGA	7.5	25	45 or No Limit*

*Requires rainwater harvesting from building roofs
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Explanatory Notes for IC Table

- Limited Review
 - No connected blocks of IC > 20,000 sf.
 - Off-site discharges to sheet flow
 - No hard-lined drainage conveyance structures
 - On-site survey for CEFs and streams
 - Geometric review of site plan, no technical demonstration of performance required.
- Standard Methods
 - Comp. Site Design + Calc. Demo. "no net increase"
 - Where on-site IC exceed the established IC Limit:
 - O&M program includes site specific performance monitoring
 - Monitoring program by a public entity
 - Secured funding for O&M and monitoring

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Explanatory Notes for I. C. Table (Cont'd)

➤ TDRs

- Recharge Zone
 - TDRs Used in RZ must be obtained from RZ
 - Combined IC of all tracts must be 10% or lower
- Contributing Zone
 - TDRs used in the CZ may be obtained from RZ or CZ
 - TDRs from properties outside of PGAs
 - Combined IC of all tracts must be 15% or lower

➤ Preferred Growth Areas (PGAs)

- Defined by local govts. - Comprehensive Planning
- Within municipal boundaries
- Zoning – industrial/commercial or high-den. Res.

- “No Limit” - roof runoff rainwater harvesting

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Stakeholder Comments on Recommended IC Limits

Location	Simplified	Standard Methods	Standard Methods + TDRs
Recharge Zone	3-7.5	10-15	10-25
Contributing Zone (CZ), outside Preferred Growth Areas (PGAs)	3-10	10-25 +TDRs	15-30
CZ, s.f. residential, in PGA	3-20	15-30 +TDRs	30
CZ, high dens. Res., commercial, in PGA	5-20	20-40 +TDRs	30 to No Limit

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Structural BMPs

- Primary
 - Retention/Irrigation
 - Bioretention
- Secondary – Others recognized by TCEQ
- Limitations
 - Limited Design Data – Base on Good Science
 - Good for TSS, not so good for dissolved
 - Need for redundancy
 - Need for proper Operations & Maintenance

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Transferable Development Rights (TDRs)

- New Concept in Texas (New Currency)
- Based on Uniform Intensity Limits
 - 10% IC for Recharge Zone
 - 15% IC for Contributing Zone
- Voluntary System-Gives Value to All Land
 - Optional for Development – Plan Limits or TDRs
 - Requires Approval of “To” and “From” Jurisdictions
- Address Equity (Principle # 7)
- Restrictions/Limitations
 - Not intended to change tax status
 - No eminent domain/condemnation allowed

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Implementation Challenges

- **Municipalities**
 - All powers in municipal boundaries
 - No zoning and limited ability to regulate IC in ETJ
- **Counties**
 - Prohibited from regulating (density) intensity or IC
 - Can accomplish this through other entities (MUDs, WCIDs)
- **Special Districts**
 - Specific Limitations in enabling legislation
 - Can regulate various aspects depending on location

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Who Pays?

- **Guiding Principle – Those Who Benefit Bear the Cost**
- **Capital Requirements – Included with Development**
- **Operations & Maintenance**
 - Up-front funding
 - Public Entity Assumes Operations
 - Taxing Entity (MUD, WCID or PID) with Water Quality responsibilities

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Economic Implications

- **Incremental Costs of Measures**
 - Depends on starting point – Larger impact on areas with minimal current W.Q. measures
 - Depends on location - Lower impact on total cost for higher \$ areas
- **Other Cost Savings/Benefits?**

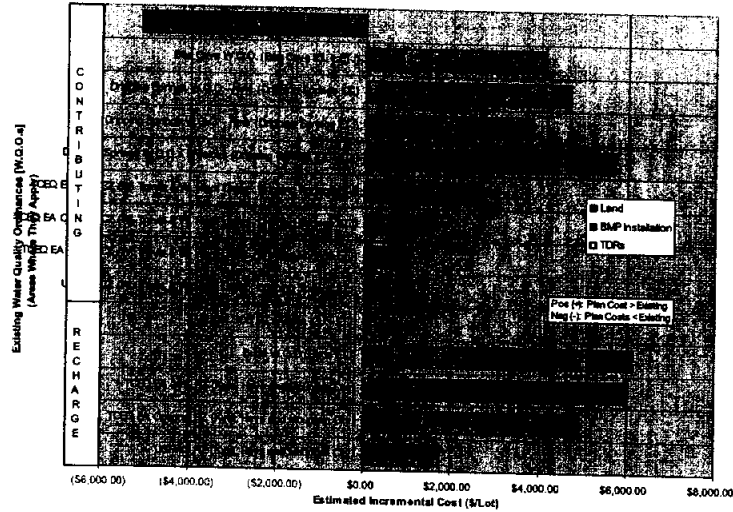
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Incremental Cost Scenarios

- Current City of Austin SOS Water Quality Ordinance (WQO)
- Current Village of Bee Cave WQQ
- Current City of Buda WQO
- Current/previous City of Drippings Springs WQOs
- TCEQ's Edwards Aquifer Protection Program (EAPP) optional measures to avoid take of the Barton Springs salamander, approved by USFWS, with IC at 20%
- TCEQ's EAPP measures, with IC at 20%
- TCEQ's EAPP measures, with lot size restricted by current county (Hays and Travis) OSSF ordinances.
- The USFWS measures from the Memorandum of Understanding with the LCRA for providing surface water

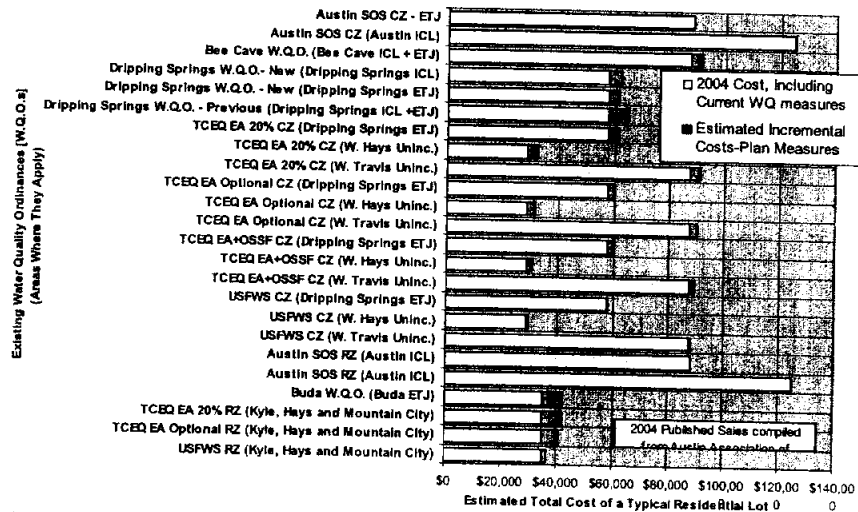
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Incremental Costs – Typical Lot



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Impact of Incremental Cost on Total Cost



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ILLUSTRATIVE CASES

- Intended to Illustrate Effects of Measures on Realistic Properties
 - Rural Tract – mixed development
 - Suburban Tract – commercial development
- Easier to Grasp than 150+ Pages of Text
- Serve as Examples for Implementation

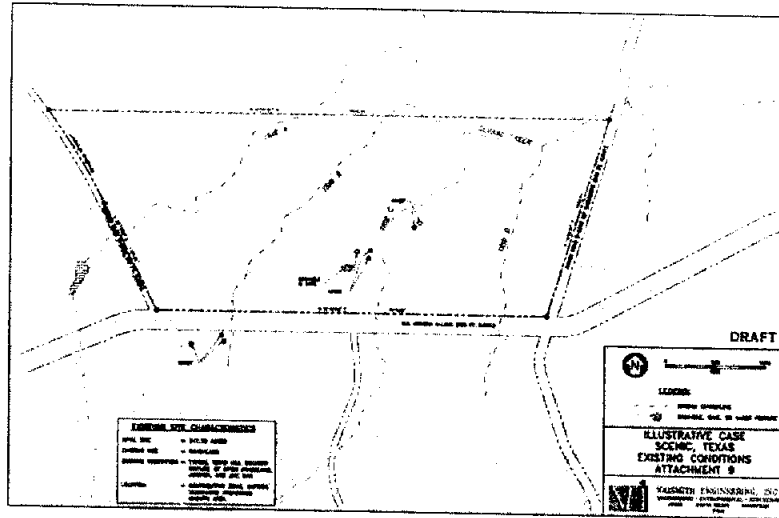
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Illustrative Case #1 – Scenic, Texas

- Location
 - Contributing Zone
 - Rural – Outside Preferred Growth Areas
- Site Characteristics
 - 218 Acres, undeveloped ranch land
 - Boundaries: S – 4 lane US Highway, E – TX RR w/ paved shoulders, W – 2 lane CR, N – ranch land & Scenic Creek (>2,000 Ac drain.)
 - Several on-site streams/karst features

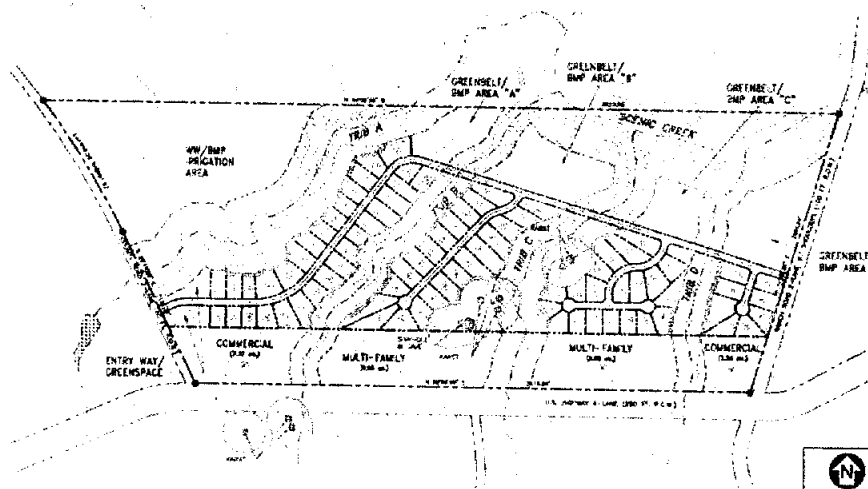
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Pre-Development - Illustrative Case #1



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Post-Development - Illustrative Case #1



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IC Calculations – Illustrative Case #1

Land Use	Impervious Cover (Acres)	Basis
Single Family Residential	9.41	82 lots @ 5,000 sf IC per lot
Multi-Family Residential	7.53	18.83 Ac. @ 40% IC
Commercial	6.5	10.83 Ac. @ 60% IC
Roadways	5.40	Length x Width
Totals	28.84	28.84 / 218 = 13.22%

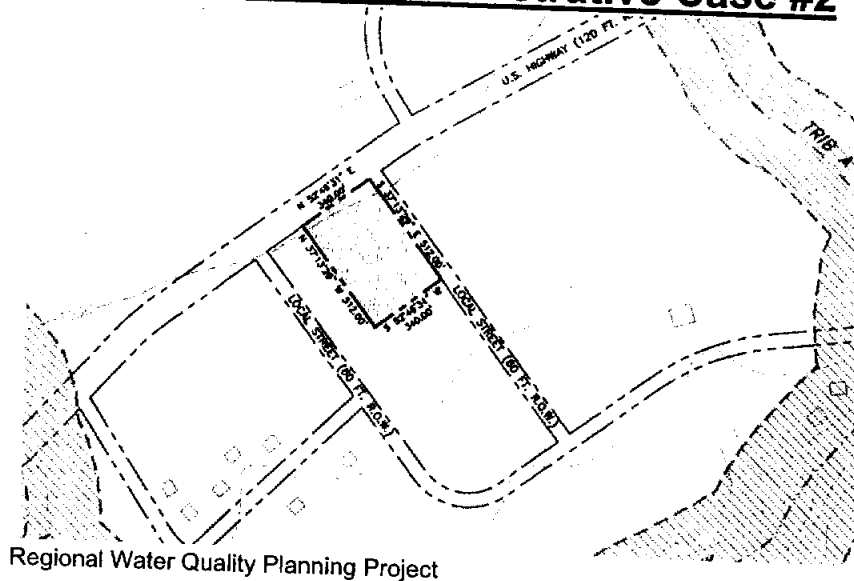
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Illustrative Case #2 – Mythic, Texas

- **Location**
 - Contributing Zone
 - Urban – Inside Preferred Growth Areas
- **Site Characteristics**
 - 4.0 Acres, undeveloped agricultural land
 - Boundaries: S & W – Open field, NW - 4 lane US Highway, SE – paved city street
 - Nearly flat, moderately deep soils

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Pre-Development - Illustrative Case #2

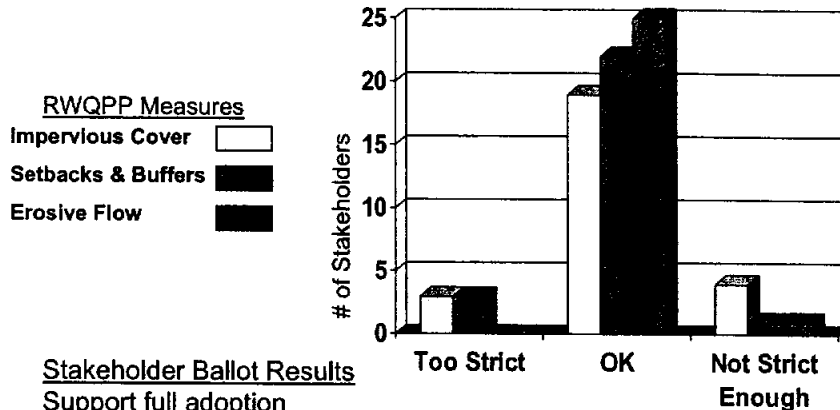


Illustrative Case #2 – Mythic, Texas

- Development Objectives
 - Retail Commercial
 - Max. building, material laydown and parking
- Design Restrictions
 - Ret./Irr. requires 1.0 Ac. of irrigation area
 - Resulting: 3.0 Ac. Or 75% IC (Requires rainwater harvesting)
- TDRs
 - On – site allows: 0.6 Ac. IC ($4 \times 15\% = 0.6$)
 - Off-site req'd: 2.4 Ac. IC or approx. 16 Ac.

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Stakeholder Committee Positions on Key RWQPP Measures



Stakeholder Ballot Results

Support full adoption

17

Want to see changes before adoption

6

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Did not vote (but 3 submitted comments)

4

What About the Future?

- Review, Adoption and Implementation by Local Jurisdictions
 - Integration into existing ordinances/rules
 - New ordinances/rules
 - Specific funding mechanisms
- Inter & Intra-jurisdictional Coordination
- Adaptive Management
 - Important to Identify What's working and Not
 - Accommodate new technologies and science
 - Helps facilitate coordination

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The Current Status of the RWQPP

- March 31st Final Draft Completed
- April 30th End - Public Comment Period
- June 3rd Final Plan to EC+CC
- June 13th EC+CC Meeting Core to consider action, endorsement and implementation
- June 21st Submit Final Plan to TWDB

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Additional Information on the Plan

- Website: www.waterqualityplan.org
- Email: regionalplan@zeecon.com
- Phone: (512) 858-2148
- <http://groups.yahoo.com/group/regionalplan>
- Mail: Regional Water Quality Planning Project
c/o City of Dripping Springs
P.O. Box 384
Dripping Springs, Texas 78620
- Public repository locations – Dripping Springs City Hall and Naismith Engineering

Regional Water Quality Planning Project

Appendix R
Implementation Funding Plan

Implementation Funding Plan

Development of A Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone

Sources of Funding for Water Quality Protection

There are several sources of funding that can be used for water quality protection including local, state and federal governmental resources. These sources are split into two categories: local and non-local.

Local Funding Options

Local governments can also finance water quality improvements through the issuance of bonds, budget appropriations, or through contractual agreements with public and private entities. A detailed discussion of how local governments can finance water quality protection measures is included in the text of the Regional Water Quality Protection Plan, and is not repeated here.

Non-Local Funding Options

State and federal agencies assistance to local entities typically will fund planning, capital improvements, and land acquisition. However, these non-local sources generally will not provide funding for operations and maintenance of the projects. This assistance can be in the form of grants, loans or a combination of assistance. In most cases the applicant for the assistance must provide a matching share through either a cash contribution or in-kind contributions. The application process for assistance is based on rules and regulations developed by the various agencies and generally will require a project description, estimated budget, and certain assurances by the applicant. In many instances, before final funding is approved, an environmental information document and cultural resources study must be completed. The amount of funding available varies from year to year based on appropriations by the U.S. Congress and the Texas Legislature. Most of these programs have limited resources and consequently, there is usually competition for funding among eligible applicants. Each program has its own specific timetables for submitting applications and awarding assistance. The major non-local funding sources are described in the following section.

Program Descriptions for Non-Local Water Quality Protection Funding Sources

The following discussion of funding sources focuses on state and federal programs, identifies the administering agency and includes a brief discussion on eligible applicants, a description of the program, and matching requirements. References for for additional information are also included.

Clean Water Act Section 319 (h) Non-point Source Pollution Prevention Program (Non agricultural program).

Administering Agency:

Texas Commission on Environmental Quality (TCEQ)

Eligible Applicants:

Political subdivisions of the State of Texas including municipalities, counties, special purpose districts, and public universities.

Program Description:

Federal assistance is provided through the TCEQ to eligible applicants to develop local or regional projects that support the state plan for the prevention of non-point source pollution. These projects can be assessment activities or implementation activities. Assessment activities include defining the problems and identifying potential best management practices (BMPs) that would be effective in addressing the problem. Implementation projects include using various BMPs to address non-point source pollution and monitoring their effectiveness. Approximately 80% of the funds must be used for Implementation Projects and 20% of the funds for assessment projects.

Matching Requirements:

60% grant from TCEQ and a 40% local match.

For Additional Information:

http://www.tceq.com/nav/funding/funding_opps.html#nps

Clean Water Act Section 319 (h) Nonpoint Source Pollution Prevention Program (Agricultural and Silviculture program).

Administering Agency:

Texas State Soil and Water Conservation Board (TSSWCB)

Eligible Applicants:

Eligible applicants include both private and public entities including local governments, state agencies, non-profit groups, and universities.

Program Description:

These funds can be used for implementation activities as well as training, demonstrations, technical assistance, public outreach/educational programs aimed to encourage adoption of pollution prevention techniques and practices as well as monitoring activities. Research is not an eligible activity.

Matching Requirements:

60% grant from TSSWCB and a 40% local match.

For Additional Information:

<http://www.tsswcb.state.tx.us/programs/319.html>

Outdoor Recreation Grant Program (ORGP)

Administering Agency:

Texas Parks and Wildlife Department (TPWD)

Eligible Applicants:

Political subdivisions of the State of Texas including municipalities, counties and special purpose districts.

IMPLEMENTATION FUNDING PLAN (Continued)

Program Description:

The ORGP is a state funded grant program that can be used for the acquisition and development of property that will be used for park and recreation purposes. The fund can also be used to purchase sensitive environmental areas, wildlife habitat or open space for the purposes of keeping it from development or for future park sites. This program would be beneficial to local sponsors if the parks and open space were to be used as part of a water quality protection program.

Matching Requirements:

TPWD will provide up to a 50% grant which requires a 50% match from the local sponsor. Grants are limited to \$500,000 and must be completed within 3 years of award.

For Additional Information:

<http://www.tpwd.state.tx.us/grants/outdoor/>

U.S. Fish and Wildlife Service Cooperative Endangered Species Conservation Program

Administering Agency:

U.S. Fish and Wildlife Service (USFWS)

Eligible Applicants:

State Agencies that have a cooperative working agreement with USFWS.

Program Description:

The assistance provided to the State Agency can include animal, plant, and habitat surveys, research, planning, monitoring, habitat protection, restoration, management and acquisition and public education. The TPW has worked with USFWS and local sponsors including cities, counties, special purpose districts, and non-profit groups to apply for assistance under this program.

Matching Requirements:

USFWS will provide up to a 75% grant which needs to be matched by the State Agency.

For Additional Information:

<http://endangered.fws.gov/grants/index.html>

U.S. Fish and Wildlife Service Private Stewardship Program

Administering Agency:

U.S. Fish and Wildlife Service (USFWS)

Eligible Applicants:

Private individuals and groups.

IMPLEMENTATION FUNDING PLAN (Continued)

Program Description:

The Private Stewardship Program provides grants and other assistance on a competitive basis to individuals and groups engaged in local, private, and voluntary conservation efforts that benefit federally listed, proposed, or candidate species, or other at-risk species.

Matching Requirements:

90% grant from USFWS and a 10% local match.

For Additional Information:

<http://endangered.fws.gov/grants/index.html>

Targeted Watershed Grants

Administering Agency:

U.S. Environmental Protection Agency (EPA)

Eligible Applicants:

Political Subdivisions of the State including cities, counties and special purpose districts, public non-profit organizations, colleges and universities, and private individuals.

Program Description:

The Governor must nominate up to two watersheds that would be eligible under this program. Funds may be used toward the prevention, reduction, and elimination of water pollution. Applicants must have a thorough knowledge of their watershed, a specific project to address identified problems or barriers to water quality, broad based support from a number of public and private entities, and a demonstrated record of managing a watershed project. Eligible activities should be able to show tangible environmental improvement within a relatively short time period of 2-3 years. Applicants must also have a specific monitoring and evaluation plan demonstrating measurable results and contain a strong outreach and education component.

Matching Requirements:

EPA will provide up to a 75% grant which requires a 25% match by the applicant.

For Additional Information:

<http://www.epa.gov/owow/watershed/initiative/>

Clean Water State Revolving Loan Fund (CWSRF)

Administering Agency:

Texas Water Development Board (TWDB)

Eligible Applicants:

Political subdivisions of the State of Texas including cities, counties and special purpose districts.

Program Description:

The CWSRF program is a subsidized loan program offering low interest loans for addressing nonpoint source pollution. The loan subsidy is based on the security given for the loan as well as through rules established by the TWDB. The term of the loan is generally 20 years.

IMPLEMENTATION FUNDING PLAN (Continued)

Matching Requirements:

There are no matching requirements since this is a loan program.

For Additional Information:

http://www.twdb.state.tx.us/assistance/financial/fin_infrastructure/cwsrffund.asp

Water Development Fund 2, Flood Protection (D-Fund2)

Administering Agency:

Texas Water Development Board (TWDB)

Eligible Applicants:

Political subdivisions of the State of Texas including cities, counties and special purpose districts.

Program Description:

The D-Fund2 program is a loan program offering loans for addressing drainage and flooding. One of the eligible uses for these funds is the acquisition of property for construction of detention/retention ponds, property that could be used for buffer zones and set backs within the floodplain, and other BMPs that could be used for both water quality protection as well as flood protection. The interest rate is based on the security given for the loan as well as through rules established by the TWDB. The term of the loan is generally 20-30 years.

Matching Requirements:

There are no matching requirements since this is a loan program.

For Additional Information:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

Appendix S

TWDB Contract Comments on Final Draft and Responses

ATTACHMENT I

TEXAS WATER DEVELOPMENT BOARD

Contract No. 2004-483-530

Comments on the Draft Final Report entitled "Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone"

The following review comments are organized into two categories. The first category includes items that must be satisfactorily addressed to comply with the Scope-of-Work (SOW) included in the contract between the Texas Water Development Board and the City of Dripping Springs. The second category is suggested to improve the readability or content of the report. Incorporation of these comments into the final report is at the discretion of the sponsor; however a copy of these report comments must be included with the Final Report.

[NOTE: Responses to comments in Bold type, Arial font]

CATEGORY 1

Please address the following requirements to comply with the Statement-of-Work:

A) *Task 1 – Develop Stakeholder Process.* The following items were not found, please document or provide clarification:

- 1) Information concerning the type of potential stakeholders considered for the Stakeholder Committee (SHC) and the process by which the stakeholders were selected (see Task 1.1 SOW)

Information concerning the type of potential stakeholders considered and the process by which they were selected is presented in Section 1.4 and additional information is provided in Appendices A and C.

- 2) The referenced "Stakeholder Process Guidance Document" was not found in the document. Please include this document with the final plan, or identify where it is in the document. (see Task 1.6 SOW).

The Stakeholder Process Guidance Documents have been included in Appendix A.

B) *Task 2 – Develop Communication Strategy.* Information for this task was not found. Please provide documentation for this task.

The Communication Plan has been included in Appendix F.

C) *Task 3 – Prepare Informational Packets.* Per SOW Task 3.3 the referenced public and stakeholder informational packet was not found in the document.

The referenced information packets have been included in Appendix C.

D) *Task 4 – Identify and Seek Sources of Funding.* This section does not appear to be complete. Information for funding from state and federal sources is not provided, nor are the strategies for obtaining funding.

Information on funding sources has been included in Section 10 and Appendix R.

E) *Task 5- Identify Entities Capable of Implementing....* This section does not appear to be complete. Although a very detailed description of legal authority is provided per Tasks 5.3, 5.4, and 5.5, text describing gaps in legal authority and measures to resolve overlaps and gaps was not found.

Information on gaps and overlaps is presented in Sections 10.5 through 10.9, 10.13 and 10.15. An implementation matrix has been included in Appendix L.

- F) *Task 6 – Compile Existing Water Quality Studies.* This task does not appear to be complete. As required by the SOW, a bibliography for surface and groundwater quality studies was not found (Tasks 6.1 and 6.2). In addition, Tasks 6.3, 6.4, 6.5, 6.6 and 6.7 (review, summarize, and assess existing water quality studies) are also missing.

The Bibliography was previously submitted, but has been relocated to Appendix J. The relevant reports from this list are reviewed summarized and assessed in Sections 7 and 11.

- G) *Task 7 – Summarize Issues and Challenges.* It is not clear if Tasks 7.4, 7.5, and 7.6 are addressed. The titles of these tasks suggest a review of future water issues and challenges. This information was not found.

The issues are summarized in Section 7. Challenges are addressed in Sections 10 and 11. In addition, a summary of stakeholder issues has been included in Appendix B.

- H) *Task 8 - Implement Stakeholder Process.* Task 8.3 refers to a consensus document. From the provided information (mostly in Chapter 1) it is not clear that the Plan is a “consensus document”. Please provide additional information concerning the definition and use of “consensus” in the context of stakeholder and public input and decision making.

This issue is addressed in the Stakeholder Committee Bylaws in Appendix D.

- I) *Task 9 – Implement Communication Strategy.* Please provide a short description for how the Communication Strategy was implemented.

A copy of the communication plan, indicating how it was implemented has been included in Appendix F.

- J) *Task 11 – Identify Water Quality Protection Strategies and Planning Tools.* The SOW organizes this section into three categories – surface water, groundwater and regional planning tools. It is not clear how the provided information fits into these categories.

Section 9 presents water quality protection measures for all categories of water including surface water and groundwater.

- K) *Task 12 – Develop Consensus-Based Water Quality Protection Plan.* The term “consensus” was not included in the report title per Task 12.6. The use of consensus in the plan development process is not clear (see comment for Task 8). In addition, the feedback or input for the draft model ordinance, rules, and BMPs (Task 12.3 SOW) could not be found.

Copies of the responses and corresponding comments from the stakeholders, technical review group and public have been included in Appendices E, G & P. Consensus issues are addressed in Appendix D.

- L) *Task 13- Develop Dissemination and Implementation Process for the Plan.* A description of the process to disseminate the Water Quality Protection Plan was not found.

The Implementation process for the plan is discussed in Section 10, including the public education program highlighting how the plan is to be disseminated. A copy of the Communication Plan has been included in Appendix F.

CATEGORY II - The following comments are discretionary, but are suggested to improve the technical aspects of the report.

- A) It appears that many of the work products were provided in electronic format but are not included in the document. The Plan would be strengthened if these items were included directly within the hard copy of the report or as appendices.

Most project working documents have been included in the various appendices and attachments.

B) Plan development process –

The following items were addressed through additional discussion in Section 1 and in Appendices A through E.

- 1) Section 1.4.2 in the Report refers to a “public validation process” but does not describe what this process entailed, nor the changes that resulted from this input.
- 2) A description of the SHC work process might be included.
- 3) An organizational chart showing the flow of authority and input for the involved groups would be helpful.
- 4) A description of how public input was addressed and incorporated into the report would be helpful. The public comment process is not clear.

C) Page 4 Section – a listing of the members of the SHC-nominated ‘Technical review group’ would be helpful.

Included in Attachment 4.

D) Page xxv, paragraph 4, first sentence (and also on page 138). Suggest replacing word “staggering” with less subjective language such as “large” or “significant.”

Corrected.

E) Add “major ions” to the list of monitoring parameters (page xi executive summary). It is included in the other analysis list found later in the report. This standard analysis parameter is particularly useful when documenting change over time in water quality.

Added.

F) High TDS does not necessarily equate to high concentrations of dissolved toxics (page xiii executive summary and elsewhere). Distinguishing between inorganic and organic toxics would provide a better indication of natural vs man-made contamination.

Clarified.

G) The Trinity-Glen Rose aquifer (Page 22 and elsewhere) is the Glen Rose portion of the Trinity aquifer, which generally is referred to as the Upper Trinity aquifer.

Clarified.

H) The authors might start their discussion on page 22 of 4.3.2 Edwards Aquifer Contributing Zone/Trinity Aquifer Recharge Zone with what is presently the third paragraph, i.e. The Trinity River aquifer is actually a series of three...Placing that paragraph first in the discussion would give the reader a general oversight of aquifer conditions prior to the more detailed discussions in the other two paragraphs.

Moved as noted.

I) The hydrologic equation definition (page 44) is not clear. Suggested phrase is “inflows equal outflows PLUS change in storage.”

Corrected.

- J) Page 140, paragraph 4. The source or justification of the apparently high 10% interest rate is not clear.

Revised to eliminate this reference.

- K) Editing and Formatting Issues –

Corrected and/or clarified each of the following items.

- 1) Page xii – *Improper Vegetative Management* item has a typo (“waster” instead of “water”) and includes an incomplete sentence.
- 2) Page xvi – Table ES-4 - Possible data entry error in TDR for Contributing Area, Outside PGA (3025 appears incorrect).
- 3) Page xiv Table ES-1 and page xv Table ES-4. Tables are split between pages.
- 4) Page xv, Table ES-3, Table ES-4. Table/columns are lacking units.
- 5) Page xxvi, Figure ES-1. Names of columns are abbreviated and unclear sources.
- 6) Page xx – The sentence after Table ES-5 references Figure 6, but the figure is not shown below as stated. The data for Sunset Valley and Sunset Valley ETJ also appear reversed.
- 7) Page 3 Section 1.4.2 – a reference to the SHC list included in Appendix as Attachment 1 would be helpful.
- 8) Typo ("atesian" instead of "artesian") on figure 2, page 17.
- 9) Typo ("requires" instead of "require") on page 24, third line from bottom.
- 10) Page 19, Table 5. The footnote symbol star (“*”) is used in several places but no ‘star’- footnote reference/explanation is provided.
- 11) The document uses three different references to the report, “Working Draft” (page 20/20-b?), “Final Draft” (cover), and “Pre-final draft” footer on each text page.
- 12) Map pages are missing page numbers. To assist the reader, we recommend that all pages (including maps) should be numbered (e.g. maps without numbers on ‘pages’ 20 and 21)
- 13) Page 69, Table 11. Cell numbers have no clear unit values.
- 14) Page 139, Table 15. Title refers to ‘percentage of impervious cover’ whereas the table itself does not include any columns with percentages.
- 15) Page 149 Table 16 - The symbol ‘Ac’ is inconsistently applied within the table cells. In addition, the ‘Growth’ column includes ‘2.63P’ as an entry- the meaning is unclear. Also suggest that the numbers be right-justified.
- 16) The use of percent (%) is not consistent, (e.g. Page 149, paragraph 3. “15%” then “seventy five percent (75%)”)

Appendix T
TDR Primer



A “Transfer of Development Right” Primer

A product of the
Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards
Aquifer and Its Contributing Zone

General Information

The terms “Transferable Development Rights” or “Transfer of Development Rights” (“TDR”) mean different things to different people. They have no meaning at all for many people. In general, both of these terms refer to the ability to trade the “right” to develop from one property to another. In the context of the Regional Water Quality Protection Plan (“RWQP Plan”), the meaning is specific and actually quite simple. Each piece of property is allowed to develop at a certain “intensity”, quantified by the amount of impervious cover (IC.). This approach is relatively simple because the amount of IC for a development plan can easily be determined from a site layout plan.

The RWQP Plan requires developers within the Planning Region to conform to an IC percentage limit, depending on whether the property is located in the recharge zone, the contributing zone, or a preferred growth area. However, the property can be developed at a greater IC percentage if the developer takes steps to insure that another property within the Planning Region is developed at a correspondingly lower IC percentage, so that on average, the overall IC limit is not exceeded. In other words, the developer has the flexibility to develop at a higher intensity (up to a point) through mitigation, or by transferring development rights from one tract to another.

Traditionally, the term “mitigation” has meant that the developer purchased undeveloped land and set it aside in perpetuity so that it would never be developed. So, for example, if a developer wished to develop 60 acres at 25% IC (instead of the 15% IC allowed under the RWQP Plan), he/she could locate and purchase another 40 acres of undeveloped land on the open market, set that aside as mitigation, and thereby achieve a composite 15% IC on the combined 100 acres. This is one type of TDR, because the development rights would convey with the property.

The RWQP Plan differs from this simple model in that it gives the developer the option to purchase the *development rights* for the mitigation land in lieu of an outright purchase of the property, and then permanently retire these development rights. In this scenario the owner of the mitigation property could retain title to the land, but would be prohibited forever from further developing the property from which the *development rights* were sold. Under this situation, the owner could continue to live on the land, use it for agricultural purposes, sell it, pass it on to heirs, etc. Referring back to the example in the previous paragraph, the developer could purchase 40 acres of development rights instead of purchasing 40 acres of land.

The act of one party purchasing the development rights for land from another party is called a transfer of development rights (TDR). This transaction is made on the open market, between a willing buyer and a willing seller at a price negotiated by the two parties. In contrast to some other TDR programs, there is no need to set up a special bureaucracy or infrastructure, such as a development rights “bank”, to implement TDRs under the RWQP Plan. The TDR process is no more or less complex than the process of buying land and then putting it into conservation.

In both cases there are two steps: 1) purchasing land or the development rights for that land, and 2) then retiring the development rights in perpetuity by creating a conservation easement or other equivalent mechanism. The difference of course, is that in the case of TDRs the title to the land

A “Transfer of Development Right” Primer (Continued)

itself could remain in the hands of the original owner or be transferred to a third party. Given these conditions, the purchase price of development rights should be significantly less than the price for outright (fee simple) purchase of the same land. Consequently the cost of mitigation through the use of TDRs is reduced for the developer.

One might object to the idea of TDRs, or any other mitigation feature, on the grounds that it appears to sanction “preserving one part of the watershed as an excuse for trashing another part of the watershed”. It should be emphasized that first, the RWQP Plan encourages (but does not require) the concentration of density within preferred growth areas. The Plan anticipates growth and recognizes the value of concentrating growth (versus uniform “sprawl”) as a means of protecting overall water quality in the Planning Region. Second, whenever a developer uses mitigation to exceed baseline IC limits, the development must still conform to a standard of no net increase in pollutant loads. The high-IC developer will need to rely on highly engineered controls and commit to continuous maintenance of these controls.

Frequently Asked Questions (FAQs)

If I buy the development rights to Fred’s land, can I develop his land?

No. This is a point of confusion. Fred’s land would be put in conservation so that *nobody* could ever develop it, including the person who bought the development rights. Therefore the only value of TDRs to the purchaser (you in this case) is the right it creates to develop the property or properties to which these rights are transferred at a correspondingly higher intensity.

If I buy the development rights to a portion of Fred’s land, can Fred develop the rest of his land?

Yes. While the portion of the property from which the development rights were purchased would be prohibited from future development, the remainder of the property would not otherwise be restricted from future development.

Can someone who purchases TDRs under the RWQP Plan resell them?

Yes. An owner of TDRs could sell them on the open market. A developer who wanted to develop property at a high intensity might be interested in acquiring them. TDRs could be re-sold without restriction until they were applied to a development. At that point, their value would be retired. Note that this resale of TDRs does not change the status of the original land that was put in conservation. This is why TDRs may be thought of as a kind of homogeneous “currency” or “commodity”. They can be detached from the land whose development rights have been retired and traded freely on the market. They could even be accumulated speculatively.

How is the market for TDRs facilitated?

There is no specific market for TDRs established in the RWQP Plan. Intuitively, real estate professionals would advertise and broker TDR transactions the way they broker land transactions.

A “Transfer of Development Right” Primer (Continued)

What will determine the price of TDRs?

The price will generally be determined in the free market by supply and demand. Common sense dictates that TDRs will be less expensive than equivalent fee-simple land on a per-acre basis. Given that there is a limited amount of land in the Planning Region, and given that TDRs will be “consumed” by developers who retire them in exchange for the right to increase development intensity, we can expect that the price of TDRs will increase as the region grows and demand outstrips supply.

Is it necessary that TDRs originate from land that is completely clear of development?

No. There is an important distinction between “TDR” and “conservation agreement”. Conservation agreements typically allow some level of development may account for impervious cover that already exists. From a TDR standpoint, the quantity of development rights conveyed would be net of any existing impervious cover. Moreover, the same undeveloped land can’t be used to satisfy the IC limit requirements for multiple developments. If you have 100 acres with 15 acres of impervious cover clustered on the eastern half of your land, and if you are subject to a 15% IC limit, then you can’t sell the development rights to the undeveloped western half of your property. You need all that land to satisfy the IC percentage limit for your own development. You have no TDRs to sell. It is important that both tracts, when considered together, meet the intensity limits from the RWQP Plan.

What is the legal authority or precedent for a system of TDRs within Texas?

This response is not intended to provide specific legal advice to any specific individual or situation, and is provided for general information only. There is no current specific provision enabling TDR transactions under Texas law, but neither is there a prohibition on such transactions. As envisioned in the RWQP Plan, the purchase or sale of TDRs would be considered a private transfer of private property, subject to existing Texas law governing such transactions. In some respects, the sale and transfer of TDRs could be compared to the current practice of trading mineral leases for a property, where the mineral lease is severed from the actual ownership of the property. While completely different in purpose, the legal and procedural methods used for TDR transactions would likely be similar to mineral lease transactions.

Can you give an example of a region where a TDR system such as the one proposed has been successfully used?

There are a number of TDR and closely related conservancy programs that have met with varying degrees of success. Locally, the City of Austin’s mitigation program has been used in some instances to allow additional development intensity through the purchase of conservation easements. A program with many common elements (and also some significant differences) to the program envisioned under the RWQP Plan is the New Jersey Pinelands Development Credit Bank. Other programs, with varying degrees of similarity, are successfully operating in New York, Pennsylvania, North Carolina, Oregon and Washington State.

A “Transfer of Development Right” Primer (Continued)

What is the estimated value of an acre of “development rights” in today’s market, at the beginning of this system?

An answer to a question such as is speculative at best, and as outlined above, will be principally determined by the law of supply and demand. However, data available from several established TDR and other conservancy programs, indicates that the cost for TDRs typically ranges from approximately one-third to one-half of the purchase price of the property.

If a parcel of land were completely encumbered by stream setbacks or a floodplain, would the owner still be entitled to sell his “development rights” for that land, even though he could not build on it himself?

Yes. All undeveloped land within the jurisdictions that implement the Plan will have the same “development right”, whether or not the land is actually suitable for development. This is actually one of the most important features of the TDR concept: it gives tangible value to land alongside streams and near Critical Environmental Features that is most in need of protection and which is the least likely to be developed. By giving this land value to be used in TDR exchanges, the program ensures that the land most in need of protection will be among the first land to be preserved in TDR exchanges.

For More Information

More information on how TDRs are envisioned in the RWQP Plan can be found on the project website:

<http://waterqualityplan.org>

Appendix U

Supporting Information for Economic Evaluation

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone
 Incremental Cost Comparison Scenario Details - Typical Residential Lot

		300 Ac.			4356 sf										
Total Tract Area		0.1 Ac.													
Average IC/Lot		19350 Per Ac. IC (From City of Austin Data)													
Retention Irrigation Install.		22000 Per Ac. IC-PV-Annualized													
Retention Irrigation O&M		9100 Per Ac. IC (From City of Austin & EPA Data)													
Sand Filter Instal		11000 Per Ac. IC-PV-Annualized													
Sand Filter O&M		0.185 Ac. (From City of Austin Land Development Code Examples)													
WW Irrigation Area/Lot															
Scenario	IC Allowed	Tract (Ac)	BZ Adj.	WW Lots	Irr. Adj.	Area (Ac.)	IC (Ac.)	IC-GSA	Lots	Land Cost (\$/Ac.)	Land Portion	BMP	BMP Cost	BMP Portion	
COA SOS-Recharge	15%	300.0	98.5	0.0	0.0	201.5	30.23	10.1%	302.3	\$15,000	\$14,888.34	R/I	\$584,853.75	\$1,935.00	
COA SOS-Contributing	20%	300.0	96.0	298.0	55.1	148.9	29.77	9.9%	297.7	\$15,000	\$15,113.86	R/I	\$576,126.90	\$1,935.00	
USFWS-Recharge	15%	300.0	57.9	0.0	0.0	242.1	36.32	12.1%	363.2	\$10,000	\$8,261.05	R/I	\$702,695.25	\$1,935.00	
USFWS-Contributing	20%	300.0	54.0	0.0	0.0	246.0	49.20	16.4%	492.0	\$10,000	\$6,097.56	R/I	\$952,020.00	\$1,935.00	
TCEQ Optional	20%	300.0	54.7	0.0	0.0	245.3	49.06	16.4%	490.6	\$10,000	\$6,114.96	SF	\$446,446.00	\$910.00	
TCEQ EA	20%	300.0	0.0	0.0	0.0	300.0	60.00	20.0%	600.0	\$10,000	\$5,000.00	SF	\$546,000.00	\$910.00	
TCEQ EA+OSSF	5%	300.0	0.0	0.0	0.0	300.0	15.00	5.0%	150.0	\$10,000	\$20,000.00	SF	\$136,500.00	\$910.00	
Buda-Recharge	30%	300.0	96.6	0.0	0.0	203.4	61.02	20.3%	610.2	\$10,000	\$4,916.42	SF	\$555,282.00	\$910.00	
DS-Contributing(P)	50%	300.0	0.0	0.0	0.0	300.0	150.00	50.0%	1500.0	\$10,000	\$2,000.00	SF	\$1,365,000.00	\$910.00	
DS-Contributing(N-ICL)	50%	300.0	0.0	0.0	0.0	300.0	150.00	50.0%	1500.0	\$10,000	\$2,000.00	R/I	\$2,902,500.00	\$1,935.00	
DS-Contributing(N-ETJ)	35%	300.0	0.0	0.0	0.0	300.0	105.00	35.0%	1050.0	\$10,000	\$2,857.14	R/I	\$2,031,750.00	\$1,935.00	
BC-Contributing	50%	300.0	66.5	0.0	0.0	233.5	116.75	38.9%	1167.5	\$10,000	\$2,569.59	R/I	\$2,259,112.50	\$1,935.00	
Plan-Recharge	10%	300.0	0.0	0.0	0.0	300.0	30.00	10.0%	300.0	\$15,000	\$15,000.00	R/I	\$580,500.00	\$1,935.00	
Plan-Contributing	15%	300.0	0.0	0.0	0.0	300.0	45.00	15.0%	450.0	\$15,000	\$10,000.00	R/I	\$870,750.00	\$1,935.00	
Plan-Recharge	10%	300.0	0.0	0.0	0.0	300.0	30.00	10.0%	300.0	\$10,000	\$10,000.00	R/I	\$580,500.00	\$1,935.00	
Plan-Contributing	15%	300.0	0.0	0.0	0.0	300.0	45.00	15.0%	450.0	\$10,000	\$6,666.67	R/I	\$870,750.00	\$1,935.00	
Plan-Contributing+OSSF	5%	300.0	0.0	0.0	0.0	300.0	15.00	5.0%	150.0	\$10,000	\$20,000.00	R/I	\$290,250.00	\$1,935.00	

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone
 Incremental Cost Comparison Summary - Typical Residential Lot

Scenario	Land	BMP Installation	BMP O&M	TDRs	Total
USFWS RZ (Kyle, Hays and Mountain City)	\$1,738.95	\$0.00	\$0.00	\$0.00	\$1,738.95
TCEQ EA Optional RZ (Kyle, Hays and Mountain City)	\$3,885.04	\$1,025.00	\$1,100.00	\$0.00	\$6,010.04
TCEQ EA 20% RZ (Kyle, Hays and Mountain City)	\$5,000.00	\$1,025.00	\$1,100.00	\$0.00	\$7,125.00
Buda W.Q.O (Buda ETJ)	\$5,083.58	\$1,025.00	\$1,100.00	\$0.00	\$7,208.58
Austin SOS RZ (Austin ICL + ETJ)	\$111.66	\$0.00	\$0.00	\$0.00	\$111.66
USFWS CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$569.11	\$0.00	\$0.00	\$0.00	\$569.11
TCEQ EA+OSSF CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$0.00	\$1,025.00	\$1,100.00	\$0.00	\$2,125.00
TCEQ EA Optional CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$551.71	\$1,025.00	\$1,100.00	\$0.00	\$2,676.71
TCEQ EA 20% CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$1,666.67	\$1,025.00	\$1,100.00	\$0.00	\$3,791.67
Dripping Springs W.Q.O. - Previous (Dripping Springs ICL +ETJ)	\$4,666.67	\$1,025.00	\$1,100.00	\$0.00	\$6,791.67
Dripping Springs W.Q.O. - New (Dripping Springs ETJ)	\$3,809.52	\$0.00	\$0.00	\$0.00	\$3,809.52
Dripping Springs W.Q.O.- New (Dripping Springs ICL)	\$4,666.67	\$0.00	\$0.00	\$0.00	\$4,666.67
Bee Cave W.Q.O. (Bee Cave ICL + ETJ)	\$4,097.07	\$0.00	\$0.00	\$0.00	\$4,097.07
Austin SOS CZ (Austin ICL + ETJ)	(\$5,113.86)	\$0.00	\$0.00	\$0.00	(\$5,113.86)
					\$3,257.70

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone
 Total Cost Comparison Summary - Typical Residential Lot

Scenario	2004 Cost, Incl Estimated Incremental Costs-Plan Mea % Increase		
USFWS RZ (Kyle, Hays and Mountain City)	\$34,900	\$1,738.95	4.98%
TCEQ EA Optional RZ (Kyle, Hays and Mountain City)	\$34,900	\$6,010.04	17.22%
TCEQ EA 20% RZ (Kyle, Hays and Mountain City)	\$34,900	\$7,125.00	20.42%
Buda W.Q.O. (Buda ETJ)	\$34,900	\$7,208.58	20.65%
Austin SOS RZ (Austin ICL)	\$125,000	\$111.66	0.09%
Austin SOS RZ (Austin ICL)	\$88,250	\$111.66	0.13%
USFWS CZ (W. Travis Uninc.)	\$87,500	\$569.11	0.65%
USFWS CZ (W. Hays Uninc.)	\$29,000	\$569.11	1.96%
USFWS CZ (Dripping Springs ETJ)	\$57,700	\$569.11	0.99%
TCEQ EA+OSSF CZ (W. Travis Uninc.)	\$87,500	\$2,125.00	2.43%
TCEQ EA+OSSF CZ (W. Hays Uninc.)	\$29,000	\$2,125.00	7.33%
TCEQ EA+OSSF CZ (Dripping Springs ETJ)	\$57,700	\$2,125.00	3.68%
TCEQ EA Optional CZ (W. Travis Uninc.)	\$87,500	\$2,676.71	3.06%
TCEQ EA Optional CZ (W. Hays Uninc.)	\$29,000	\$2,676.71	9.23%
TCEQ EA Optional CZ (Dripping Springs ETJ)	\$57,700	\$2,676.71	4.64%
TCEQ EA 20% CZ (W. Travis Uninc.)	\$87,500	\$3,791.67	4.33%
TCEQ EA 20% CZ (W. Hays Uninc.)	\$29,000	\$3,791.67	13.07%
TCEQ EA 20% CZ (Dripping Springs ETJ)	\$57,700	\$3,791.67	6.57%
Dripping Springs W.Q.O. - Previous (Dripping Springs ICL +ETJ)	\$57,700	\$6,791.67	11.77%
Dripping Springs W.Q.O. - New (Dripping Springs ETJ)	\$57,700	\$3,809.52	6.60%
Dripping Springs W.Q.O.- New (Dripping Springs ICL)	\$57,700	\$4,666.67	8.09%
Bee Cave W.Q.O. (Bee Cave ICL + ETJ)	\$87,500	\$4,097.07	4.68%
Austin SOS CZ (Austin ICL)	\$125,000	\$0.00	0.00%
Austin SOS CZ - ETJ	\$88,250	\$0.00	0.00%

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and its Contributing Zone
 Incremental Cost Comparison Scenario Details - Illustrative Case #1

Tract Area	217.8 Ac.	0.1 Ac.	19350 Per Ac. IC	22000 Per Ac. IC-PV-Annualized	9100 Per Ac. IC	11000 Per Ac. IC-PV-Annualized	0.185 Ac.	IC Allowed	Tract (Ac)	BZ Adj.	WW Lots	Irr. Adj.	Area (Ac.)	IC (Ac.)	IC-GSA	Lot Equivalents	Land Cost (\$/Ac.)	Land Portion	BMP	BMP Cost	BMP Portion	
Average IC/Lot									217.8	110.0	157.0	29.0	78.8	15.75	7.2%	157.5	\$15,000	\$20,741.54	R/I	\$304,781.85	\$1,935.00	
Retention Irrigation Install.	20%	217.8	69.4	0.0	0.0	0.0	0.0	148.4	29.68	0.0	0.0	0.0	148.4	29.68	13.6%	296.8	\$10,000	\$7,338.27	R/I	\$574,308.00	\$1,935.00	
Retention Irrigation O&M	20%	217.8	69.4	0.0	0.0	0.0	0.0	148.4	29.68	0.0	0.0	0.0	148.4	29.68	13.6%	296.8	\$10,000	\$7,338.27	SF	\$270,088.00	\$910.00	
Sand Filter Instal	20%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	43.56	0.0	0.0	0.0	217.8	43.56	20.0%	435.6	\$10,000	\$5,000.00	SF	\$396,396.00	\$910.00	
Sand Filter O&M	5%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	10.89	0.0	0.0	0.0	217.8	10.89	5.0%	108.9	\$10,000	\$20,000.00	SF	\$99,099.00	\$910.00	
WW Irrigation Area/Lot	50%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	108.90	0.0	0.0	0.0	217.8	108.90	50.0%	1089.0	\$10,000	\$2,000.00	SF	\$990,990.00	\$910.00	
Scenario	50%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	108.90	0.0	0.0	0.0	217.8	108.90	50.0%	1089.0	\$10,000	\$2,000.00	R/I	\$2,107,215.00	\$1,935.00	
COA SOS-Contributing	35%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	76.23	0.0	0.0	0.0	217.8	76.23	35.0%	762.3	\$10,000	\$2,857.14	R/I	\$1,475,050.50	\$1,935.00	
USFWS-Contributing	50%	217.8	69.4	0.0	0.0	0.0	0.0	148.4	74.20	0.0	0.0	0.0	148.4	74.20	34.1%	742.0	\$10,000	\$2,935.31	R/I	\$1,435,770.00	\$1,935.00	
TCEQ Optional	13%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	28.84	0.0	0.0	0.0	217.8	28.84	13.2%	288.4	\$15,000	\$11,329.31	R/I	\$557,990.53	\$1,935.00	
TCEQ EA	13%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	28.84	0.0	0.0	0.0	217.8	28.84	13.2%	288.4	\$10,000	\$7,552.87	R/I	\$557,990.53	\$1,935.00	
TCEQ EA+OSSF	5%	217.8	0.0	0.0	0.0	0.0	0.0	217.8	10.89	0.0	0.0	0.0	217.8	10.89	5.0%	108.9	\$10,000	\$20,000.00	R/I	\$210,721.50	\$1,935.00	
DS-Contributing(P)																						
DS-Contributing(N-ICL)																						
DS-Contributing(N-ETJ)																						
BC-Contributing																						
Plan-Contributing																						
Plan-Contributing																						
Plan-Contributing																						

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone
 Incremental Cost Comparison Summary - Illustrative Case No. 1

Scenario	Land	BMP Installation	BMP O&M	TDRs	Total
USFWS RZ (Kyle, Hays and Mountain City) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TCEQ EA Optional RZ (Kyle, Hays and Mountain City) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
TCEQ EA 20% RZ (Kyle, Hays and Mountain City) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Buda W.Q.O. (Buda ETJ) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Austin SOS RZ (Austin ICL + ETJ) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
USFWS CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$214.60	\$0.00	\$0.00	\$0.00	\$214.60
TCEQ EA+OSSF CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$0.00	\$1,025.00	\$1,100.00	\$0.00	\$2,125.00
TCEQ EA Optional CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$214.60	\$1,025.00	\$1,100.00	\$0.00	\$2,339.60
TCEQ EA 20% CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$2,552.87	\$1,025.00	\$1,100.00	\$0.00	\$4,677.87
Dripping Springs W.Q.O. - Previous (Dripping Springs ICL +ETJ)	\$5,552.87	\$1,025.00	\$1,100.00	\$0.00	\$7,677.87
Dripping Springs W.Q.O. - New (Dripping Springs ETJ)	\$4,695.73	\$0.00	\$0.00	\$0.00	\$4,695.73
Dripping Springs W.Q.O.- New (Dripping Springs ICL)	\$5,552.87	\$0.00	\$0.00	\$0.00	\$5,552.87
Bee Cave W.Q.O. (Bee Cave ICL + ETJ)	\$4,617.56	\$0.00	\$0.00	\$0.00	\$4,617.56
Austin SOS CZ (Austin ICL + ETJ)	(\$9,412.24)	\$0.00	\$0.00	\$0.00	(\$9,412.24)
					\$2,498.76

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone
 Incremental Cost Comparison Scenario Details - Illustrative Case #2

Tract Area	300 Ac.	IC Required Tract (Ac)	BZ Adj.	Irr. Adj.	Area (Ac.)	IC (Ac.)	IC-GSA	Land Cost (\$/Ac.)	Land Portion	BMP	BMP Cost	IC Allowed	TDR Req.	TDR Cost (\$/Ac.)	TDR Cost
TDR Buydown	15%	50%	4.0	0.0	1.0	3.0	1.50	\$15,000	\$60,000.00	R/I	\$29,025.00	20%	3.5	\$7,500	\$26,250.00
Retention Irrigation Install.		35%	4.0	0.0	0.0	4.0	1.40	\$10,000	\$40,000.00	R/I	\$27,090.00	15%	5.3	\$5,000	\$26,666.67
Retention Irrigation O&M		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	SF	\$27,300.00	75%	0.0	\$5,000	\$0.00
Sand Filter Instal		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	SF	\$27,300.00	75%	0.0	\$5,000	\$0.00
Sand Filter O&M		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	SF	\$27,300.00	75%	0.0	\$5,000	\$0.00
R-I + RWH Install.		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	SF	\$27,300.00	50%	2.0	\$5,000	\$10,000.00
R-I + RWH O&M		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	R/I	\$56,050.00	50%	2.0	\$5,000	\$10,000.00
		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	R/I	\$56,050.00	35%	4.6	\$5,000	\$22,857.14
		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	R/I	\$56,050.00	50%	2.0	\$5,000	\$10,000.00
Plan-Contributing		75%	4.0	0.0	0.0	4.0	3.00	\$15,000	\$60,000.00	R/I+RWH	\$75,000.00	15%	16.0	\$7,500	\$120,000.00
Plan-Contributing		75%	4.0	0.0	0.0	4.0	3.00	\$10,000	\$40,000.00	R/I+RWH	\$75,000.00	15%	16.0	\$5,000	\$80,000.00

Regional Water Quality Protection Plan for the Barton Springs Segment of the Edwards Aquifer and Its Contributing Zone
 Cost Comparison Scenarios - Summary for Illustrative Case #2

Scenario	Land	BMP Installation	TDRs	Total
USFWS RZ (Kyle, Hays and Mountain City) [N/A]	\$0.00	\$0.00	\$0.00	\$67,300.00
TCEQ EA Optional RZ (Kyle, Hays and Mountain City) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00
TCEQ EA 20% RZ (Kyle, Hays and Mountain City) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00
Buda W.Q.O. (Buda ETJ) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00
Austin SOS RZ (Austin ICL + ETJ) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00
USFWS CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ) [N/A]	\$0.00	\$0.00	\$0.00	\$0.00
TCEQ EA+OSSF CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$0.00	\$47,700.00	\$80,000.00	\$127,700.00
TCEQ EA Optional CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$0.00	\$47,700.00	\$80,000.00	\$235,750.00
TCEQ EA 20% CZ (W. Travis & W. Hays Uninc., Dripping Springs ETJ)	\$0.00	\$47,700.00	\$80,000.00	\$195,000.00
Dripping Springs W.Q.O. - Previous (Dripping Springs ICL + ETJ)	\$0.00	\$47,700.00	\$70,000.00	\$195,000.00
Dripping Springs W.Q.O. - New (Dripping Springs ETJ)	\$0.00	\$16,950.00	\$57,142.86	\$195,000.00
Dripping Springs W.Q.O.- New (Dripping Springs ICL)	\$0.00	\$16,950.00	\$70,000.00	\$195,000.00
Bee Cave W.Q.O. (Bee Cave ICL + ETJ)	\$0.00	\$16,950.00	\$70,000.00	\$207,857.14
Austin SOS CZ (Austin ICL + ETJ) [N/A]	\$0.00	\$0.00	\$0.00	\$108,050.00

Scenario	Land	BMP Installation	TDRs	Base Development Cost
TCEQ Optional-CZ	\$40,000.00	\$27,300.00	\$0.00	\$67,300.00
TCEQ EA 20%-CZ	\$40,000.00	\$27,300.00	\$0.00	\$67,300.00
Dripping Springs-CZ (Previous)	\$40,000.00	\$27,300.00	\$10,000.00	\$77,300.00
Dripping Springs-CZ (New-ICL)	\$40,000.00	\$58,050.00	\$10,000.00	\$108,050.00
Dripping Springs-CZ (New-ETJ)	\$40,000.00	\$58,050.00	\$22,857.14	\$120,907.14
Bee Cave-CZ	\$40,000.00	\$58,050.00	\$10,000.00	\$108,050.00