ENVIRONMENTAL ASSESSMENT
FOR THE SALE, DEVELOPMENT, AND EXCHANGE OF ARMY-OWNED LAND, FORT BLISS, TEXAS

Prepared for:

The Office of the Deputy Assistant Secretary of the Army for Installations, Housing, and Partnerships

and

U.S. Army Directorate of Public Works
Environmental Division
Fort Bliss, Texas

Prepared by:

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October 2012

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PREPARED FOR:

The Office of the Deputy Assistant Secretary of the Army
for Installations, Housing, and Partnerships

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Date

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Brant V. Dayley
Colonel, US Army
Commanding

21 SEPTEMBER 2012
Date

FINAL FINDING OF NO SIGNIFICANT IMPACT

1.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action

The Army plans to optimize the land use of certain areas on the margins of the Fort Bliss Cantonment to meet crucial Army needs in terms of additional military housing, buffer areas, and other uses. Fort Bliss proposes to sell two parcels on the periphery of the Fort Bliss Cantonment to provide land for private housing and light commercial development suited, but not exclusive, to Fort Bliss military personnel. The buildup of military personnel under Base Realignment and Closure (BRAC) mandates and Army Transformation initiatives has resulted in a projected deficit of on-post housing for the Soldiers and their families being stationed at Fort Bliss. There is also a shortage of suitable private housing near Fort Bliss in the City of El Paso. Proceeds of the sale would in turn be used to fund construction of additional military housing inside the Fort Bliss Cantonment.

The Army would also execute a value-for-value exchange with the Texas General Land Office (TxGLO) for parcels along Fort Bliss's southern boundary. Additional land is needed in the South Training Area (TA) of Fort Bliss that would protect the long-term viability of this region from development encroachment immediately outside the installation boundary. In the exchange, the Army would convey a parcel in the extreme southern part of the Fort Bliss Cantonment that has limited mission utility for a parcel of state land located along Fort Bliss's southeast boundary. Five alternatives were considered for analysis within this Environmental Assessment (EA).

Alternative 1 – No Action Alternative

Under the No Action Alternative, parcels A, B, and C would not be sold or exchanged. Selection of this alternative would eliminate any potential impacts associated with the sale or exchange of Fort Bliss land; however, it would not satisfy the purpose and need of the Proposed Action.

Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Under Alternative 2, approximately 1,635 acres of Fort Bliss land (Parcel A) located on undeveloped former training lands in the southeastern part of the Fort Bliss Cantonment, north of Montana Avenue, and east of the El Paso International Airport, would be sold. The property would be annexed by the City of El Paso concurrently with the land sale closing, and developed as a combination of residential, retail, community facilities, and mixed-use buildings based on the City of El Paso's SmartCode Growth Plan. The parcel would be developed in phases tied to the improvements of the area roadways planned by the City of El Paso and Texas Department of Transportation (TxDOT). Proceeds from the land sale would pay for the construction of additional military housing within the Fort Bliss Cantonment.

Alternative 3 – Land Exchange and Development of Parcel B (Fort Bliss and TxGLO)

Under Alternative 3, approximately 694 acres of land currently owned by Fort Bliss (Parcel B) would be exchanged for approximately 2,880 acres of land currently owned by TxGLO that is located adjacent to TA 1B and 2E. Fort Bliss has determined that Parcel B is not suited for training of heavy maneuver brigades due to its close proximity to city developments. Currently, there are no long-term foreseeable uses for the land TxGLO would receive from Fort Bliss. If and when the land is ever developed, TxGLO would be responsible for assuring that it be conducted in accord with all permitting and development requirements.

Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)
Under Alternative 4, approximately 91 acres of Fort Bliss land (Parcel C) located in the William Beaumont General Hospital Historic District south of Fred Wilson Road, and east of the present hospital, would be sold to a private developer. This parcel would also be annexed by the City of El Paso concurrently with the closing of the land sale. It is anticipated that Parcel C would be developed as a combination of residential, retail, and community facilities and mixed-use buildings. Proceeds from the land sale would pay for the construction of additional military housing within the Fort Bliss Cantonment.

Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Alternative 5 includes the implementation of alternatives 2, 3, and 4, or any combination thereof. Any of alternatives 2-5 would be contingent upon a viable memorandum of agreement (MOA) and/or project-specific programmatic agreement (PA) between Fort Bliss, Texas State Historic Preservation Office, and the land purchaser regarding the protection and management of cultural resources.

2.0 SUMMARY OF ENVIRONMENTAL RESOURCES AND IMPACTS

Implementation of the Proposed Action and any Action Alternatives with the incorporated design, construction, operation, and safety measures would have negligible or no impacts on airspace operations. There would be minor direct, indirect, and cumulative impacts on surface water, groundwater, biological resources, cultural resources, air quality, noise, hazardous materials and waste, health and safety, socioeconomics, and environmental justice. There would be moderate impacts on land use, soils, and utilities infrastructure; and on traffic and transportation once proposed mitigation strategies are implemented. Proposed mitigation measures and best management practices would reduce or eliminate the potential short- and long-term effects on the environment caused by the development of the proposed parcels.

3.0 CONCLUSION

Based on the analysis of the Proposed Action and the design, construction, operation, safety, and mitigation measures presented in the EA, the impacts of the Proposed Action and any Alternative will not significantly affect the human or natural environment of Fort Bliss or the surrounding area. I further conclude that the Proposed Action will impose no direct or indirect effects that cannot be mitigated or that could contribute to cumulative effects requiring preparation of an Environmental Impact Statement, pursuant to the National Environmental Policy Act of 1969 (Public Law 91-190). Therefore a Finding of No Significant Impact (FNSI) is warranted.

17 December 2012

Brant V. Dayley
Colonel, US Army
Commanding

Date

EXECUTIVE SUMMARY

Proposed Action
The Army proposes to sell two parcels on the periphery of the Fort Bliss Cantonment to provide land for private housing and light commercial development suited, but not exclusive, to Fort Bliss military personnel. Proceeds of the sale would in turn be used to fund construction of additional military housing inside the Fort Bliss Cantonment.

The Army would also execute a value-for-value exchange with the Texas General Land Office (TxGLO) for parcels along Fort Bliss's southern boundary. In the exchange, the Army would convey a parcel in the extreme southern part of the Fort Bliss Cantonment that has limited mission utility for a parcel of state land located along Fort Bliss's southeast boundary.

The purpose of the Proposed Action is to optimize the land use of certain areas on the margins of the Fort Bliss Cantonment to meet crucial Army needs in terms of additional military housing, buffer areas, and other uses. The buildup of military personnel under Base Realignment and Closure (BRAC) mandates and Army Transformation initiatives has resulted in a projected deficit of on-post housing for Soldiers and their families stationed at Fort Bliss. There is also a shortage of suitable private housing near Fort Bliss in the City of El Paso. A need exists to have land developed adjacent to Fort Bliss to be used for residential/light commercial construction for Soldiers and their families, and to help generate funding for additional on-post housing.

Additionally, the Army has a need for additional land area in the South Training Area of Fort Bliss to protect the long-term viability of this region from development encroachment immediately outside the installation boundary. The present TxGLO parcel proposed for exchange intrudes into the southern portions of Training Areas (TA) 1B and 2E. This hinders military training use in the region. Further, the parcel has the potential for future development that would be detrimental to the Fort Bliss mission. Military vehicles sometimes cross through the TxGLO land, as it contains a tank trail that is the shortest route between TA 1B and 2E. This is allowed under a "Visible and Apparent Easement Clause" in the conveyance document of the land to the State of Texas, but not in a separate formal easement of record. If the TxGLO parcel were to be sold for development, Fort Bliss would almost certainly be required to establish a 1-mile noise and dust buffer around the parcel, further reducing useable training land in this region. Five alternatives were considered for analysis within this Environmental Assessment (EA).

Alternative 1 – No Action Alternative
Under the No Action Alternative, parcels A, B, and C would not be sold or exchanged. Selection of this alternative would eliminate any potential impacts associated with the sale or exchange of Fort Bliss land. However, this alternative would not satisfy the purpose and need of the Proposed Action.

Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)
Under Alternative 2, approximately 1,635 acres of Fort Bliss land (Parcel A) located on undeveloped former training lands in the southeastern part of the Fort Bliss Cantonment, north of Montana Avenue, and east of the El Paso International Airport, would be sold to a private developer. Since the sale would change the status of the property from Federal to private

ownership, the property would be annexed by the City of El Paso concurrently with the land sale closing. A 200 foot right-of-way along Montana Avenue would be dedicated to the City of El Paso prior to the closing. To assess the greatest potential impacts of this alternative, it is assumed that the property would be developed as a combination of residential, retail, and community facilities and mixed-use buildings based on the City of El Paso's SmartCode Growth Plan, which is the densest development allowed. Additionally, as part of mitigation requirements, the development would be conducted in phases tied to the City of El Paso and Texas Department of Transportation (TxDOT) planned improvements of area roadways. The City of El Paso permitting process would be the enforcing mechanism to ensure that the development would not create a substantial impact on area traffic or water and wastewater service. Parcel A contains a historic feature in the form of a segment of the Butterfield Overland Mail Route. This historic feature would require protection under a Memorandum of Agreement (MOA) between Fort Bliss, Texas State Historic Preservation Office (SHPO), and the purchasing entity.

Proceeds from the land sale would be retained locally at Fort Bliss and would help pay for the construction of additional military housing within the Fort Bliss Cantonment. Land use changes from training to facilities (housing/light industrial) inside the Texas Loop 375 (Loop 375) area of Fort Bliss were assessed in the *Fort Bliss Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Statement* (SEIS) for which a Record of Decision was signed on 30 April 2007. Additional housing construction on Fort Bliss was also previously analyzed in the *Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement* (GFS EIS).

Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Under Alternative 3, approximately 683 acres of land currently owned by Fort Bliss (Parcel B) would be exchanged for approximately 2,880 acres of land currently owned by TxGLO that is located adjacent to TA 1B and 2E. Fort Bliss has determined that Parcel B is not suited for training of heavy maneuver brigades due to its close proximity to city developments. Parcel B is located east of Parcel A and consists of 683 acres, including 14.5 acres located on the northern side of Loop 375. There are 44.5 acres within a 500-foot buffer adjacent to Loop 375 that would not be included with the exchange of Parcel B. In addition, there is a Federal Aviation Administration (FAA) easement around a VHF Omnidirectional Range/Tactical Aircraft Control (VORTAC) antenna located near the property subject to height restrictions. Although currently there are no future development uses planned by TxGLO for the land, for valuation purposes and cumulative impact analyses, it is assumed that mixed residential, light commercial development would eventually occur. This type of future development is forecasted based on the surrounding land use and census data, with approximately one-third of the site being developed for commercial use and two-thirds for residential use.

Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Under Alternative 4, approximately 91 acres of Fort Bliss land (Parcel C) located in the William Beaumont General Hospital Historic District, south of Fred Wilson Road, and east of the present hospital would be sold to a private developer. This parcel would also be annexed by the City of El Paso concurrently with the closing of the land sale. It is anticipated that Parcel C would be developed as a combination of residential, retail, and community facilities and mixed-use buildings as described in Alternative 2. Proceeds from the land sale would pay for the construction of additional military housing within the Fort Bliss Cantonment, which was previously analyzed in the SEIS and GFS EIS.

The property is the site of the old William Beaumont General Hospital and contains two buildings and a feature that are eligible for listing on the National Register of Historic Places (NRHP). A large building (7115) that is currently used for Army nurse training, a smaller building (T-7167) that is used as a blood donor facility near the northern access control point (Fred Wilson Gate) and contains a mural that needs to be protected, and a landscape feature (arroyo garden) are individually eligible for listing on the NRHP. These buildings and feature would be included in the sale; however, the Army would retain use of these buildings, along with building T-7166, through approximately 2016, at which time the replacement hospital would be completed. This would be accomplished through a leaseback or similar arrangement. Reuse of existing older buildings on the property may be feasible or they can be demolished after undergoing Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey (HABS/HAER/HALS) documentation. The treatment of the historic properties would be addressed in a Programmatic Agreement (PA) developed between Fort Bliss and Texas SHPO.

Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Alternative 5 includes the implementation of alternatives 2, 3, and 4, or any combination thereof.

Environmental Consequences

Implementation of the Proposed Action and any alternatives with the incorporated design, construction, operation, and safety measures would have negligible or no impacts on airspace operations. There would be minor direct and indirect impacts on surface water, groundwater, cultural resources, biological resources, air quality, noise, hazardous materials and waste, health and safety, socioeconomics, and environmental justice. There would be moderate impacts on land use, soils, and utilities infrastructure; and on traffic and transportation once proposed mitigation strategies are implemented. Proposed mitigation measures and best management practices would reduce or eliminate the potential short- and long-term effects on the environment caused by the construction and development of the proposed land sale and/or exchange parcels. In Table ES-1, the potential effects of the Proposed Action and action alternatives are summarized. Minor, cumulative long-term impacts on the region would occur on land use, soils, biological resources, air quality, and noise. Moderate, cumulative long-term impacts on transportation in the region would occur from the additional traffic expected as a result of the proposed developments near the Montana Avenue corridor once the proposed mitigation strategies are implemented. For a detailed discussion of the potential impacts of the proposed alternatives in table format, please refer to Table 3-1 on Page 15 of the EA.

Table ES-1. Potential Effects of the Alternatives to the Proposed Action*

Resource	Alternative 1 – No Action Alternative	Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)	Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)	Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)	Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Land Use and Aesthetics	None	Moderate	Negligible	Minor	Moderate
Soils	None	Moderate	None	Minor	Moderate
Surface Water	None	None	None	Minor	Minor
Groundwater	None	Minor	None	Minor	Minor
Biological Resources	None	Minor	Minor	Minor	Minor
Cultural Resources	None	Minor	Minor	Minor	Minor
Air Quality	None	Minor	None	Negligible	Minor
Noise	None	Minor	None	Minor	Minor
Traffic and Transportation	None	Moderate	Moderate	Minor	Moderate
Health and Safety	None	Minor	Minor	Minor	Minor
Hazardous Materials and Waste	None	Minor	Minor	Minor	Minor
Airspace Operations	None	Negligible	None	Negligible	Negligible
Utilities Infrastructure	None	Moderate	Minor	Minor	Moderate
Socioeconomics	Minor	Minor	Minor	Minor	Minor
Environmental Justice and Protection of Children	Minor	Minor	Minor	Minor	Minor

*For a detailed discussion see Table 3-1 on Page 15 of the EA.
None: Resource would not be affected.
Negligible: Resource would not be affected or the effects would be at or below the level of detection.
Minor: Effects on a resource would be detectable, but would be localized, minimal, and of little consequence to the resource. Mitigation measures would be simple and achievable.
Moderate: Effects on a resource would be readily detectable, long-term, localized, and measurable. Mitigation measures would be extensive and likely achievable.
Major: Effects on a resource would be obvious, long-term, and would have substantial consequences on a regional scale. Extensive mitigation measures would be required.

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PURPOSE AND NEED FOR THE PROPOSED ACTION

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

Fort Bliss Army Reservation is an active training facility located near El Paso, Texas, and covers areas in the extreme western part of Texas and south-central New Mexico. It consists of the Fort Bliss Cantonment, Biggs Army Airfield (BAAF), and the Fort Bliss Training Complex (FBTC), which contains approximately 1.1 million acres and is used for training and maneuvers by the United States (U.S.) Army and other military units. The FBTC is generally separated into three operational regions: the South Training Area in El Paso County, Texas; the Doña Ana Range-North Training Area, in Doña Ana and Otero counties, New Mexico; and the McGregor Range, in Otero County, New Mexico. The FBTC is further subdivided into numbered training areas to manage and schedule the different training missions (Figure 1-1).

Fort Bliss has recently been expanding its mission due to Base Realignment and Closure (BRAC) mandates and Army Transformation initiatives under the Army Campaign Plan. Since 2004, the Army Campaign Plan has guided and synchronized efforts to use Army resources more effectively and efficiently and to measure the progress and success of Army priorities. The Fort Bliss mission is transitioning from supporting the Army's Air Defense Artillery training to a major mounted training facility that supports Brigade Combat Teams (BCTs) under Forces Command (FORSCOM). Fort Bliss is now the home of the U.S. Army 1st Armored Division and has become a training platform for multiple units deploying to Afghanistan. It is also a focal point for the U.S. Army as a major installation for training Soldiers for combat readiness.

The potential and cumulative impacts of the mission expansion have been discussed in the *Fort Bliss, Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement* (SEIS), for which a Record of Decision (ROD) was signed 30 April 2007, and the *Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement* (GFS EIS), for which a ROD was signed 8 June 2010.

Background

The decisions made under BRAC and other Army initiatives to station additional Soldiers at Fort Bliss have resulted in a projected shortage of military housing. By the end of Fiscal Year (FY) 2012, approximately 36,000 Soldiers will be housed at Fort Bliss due to recent and upcoming stationing of several BCTs, a Combat Aviation Brigade, and other units. While approximately 972 homes are proposed for construction on-post by the Residential Communities Initiative, there is a projected deficit of approximately 1,800 homes necessary to house the anticipated number of Soldiers. The wait for on-post housing is currently over 1 year which will continue to be exacerbated by the increased housing shortage. There is also a shortage of off-post housing. Currently, approximately 70 percent of the Soldiers reside off-post, and a deficit exists in the amount of adequate housing adjacent to the base.

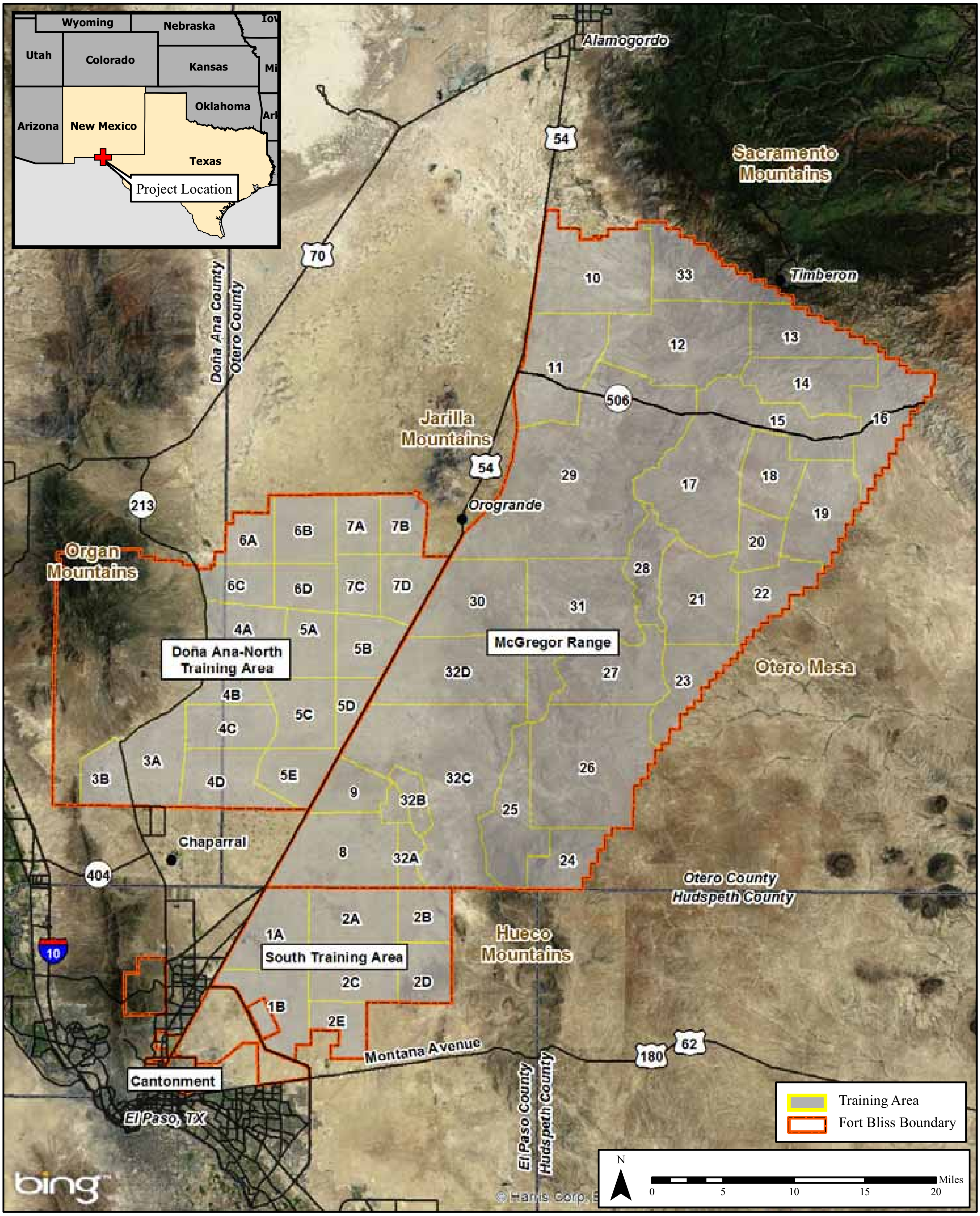

Figure 1-1: Fort Bliss Vicinity Map

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1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to optimize the land use of certain areas on the margins of the Fort Bliss Cantonment to meet crucial Army needs in terms of additional military housing, buffer areas, or other uses. The Army has a need for additional housing and a way to fund that additional housing. The Army proposes to do this by selling land adjacent to Fort Bliss that could be developed for residential and/or light commercial purposes, which would enhance the availability of off-post housing for Soldiers and their families and generate funding for additional on-post housing. These lands are at the margins of the installation, isolated by major highways (Texas Spur 601 [Spur 601] and Texas Loop 375 [Loop 375]), and no longer useable for training which was their historic use. Normally, marginal use lands no longer useable by the Army are declared surplus and turned over to the General Services Administration for disposal. Funds generated by the sale would then be deposited in the U.S. Treasury General Fund. However, under a Public Private Capital Venture (PPCV) program authorized under Title 10, Public Law (PL) 110-190, surplus Army land may be sold to a private party and the funds used locally for Soldier housing. Funds generated would be used by Fort Bliss' Residential Construction Initiative's (RCI) partner to add additional on-post housing inventory.

Additionally, the Army has a need for additional land area in the South Training Area of Fort Bliss to protect the long-term viability of this region from development encroachment immediately outside the installation boundary. The present TxGLO parcel proposed for exchange forms a deep embayment into the southern portions of Training Areas (TA) 1B and 2E that hinders military training use in the region. Further, the parcel has the potential for future development that would be detrimental to the Fort Bliss mission. If the TxGLO parcel were sold for development, Fort Bliss would be required to establish a noise and dust buffer around the parcel, further reducing useable training land in this region.

1.3 Scope and Content of the Analysis

This Environmental Assessment (EA) identifies, documents, and evaluates the potential environmental effects of the sale and/or exchange of Fort Bliss land. It has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969 (PL 91-190) and the President's Council on Environmental Quality (CEQ) Regulations outlined in 40 Code of Federal Regulations (CFR) parts 1500 – 1508, and 32 CFR Part 651 – Environmental Analysis of Army Actions. NEPA is a Federal environmental law establishing procedural requirements for all Federal agency actions. It directs the U.S. Army to disclose the environmental effects of its proposed activities at Fort Bliss to the public and officials who must make decisions regarding the proposal.

The proposed land conveyances and the direct consequences of development are the focus of this EA. This EA provides a discussion of the affected environment and the potential impacts on physical, natural, and socioeconomic resources. A Valued Environmental Components (VEC) analysis was used to determine the resources that could be affected by the alternatives, which will be the focus of this EA. VECs are those components that are considered to be important by society and potentially at risk from human activity or natural hazards.

1.4 Decision(s) To Be Made

The Proponent for the action is the Office of the Deputy Assistant Secretary of the Army for Installations, Housing, and Partnerships. The U.S. Army, Fort Bliss, and U.S. Army Corps of Engineers, Tulsa District, are the lead agencies responsible for the completion of the EA. The decision to be made is whether or not to sell the various described parcels to a private entity. A direct result of the decision would be that these parcels would then have the potential to be developed for use as housing, commercial, and community facilities. One or more of the alternatives analyzed in the EA will be selected. If no significant environmental impacts are determined based on the evaluation of impacts in the EA, a Finding of No Significant Impact (FNSI) will be signed by the Garrison Commander. If it is determined that any of the action alternatives will have significant environmental impacts, the action will either not be undertaken, be mitigated to the point of insignificance, or a Notice of Intent to prepare an Environmental Impact Statement (EIS) will be published in the *Federal Register*.

1.5 Public Participation

The U.S. Army invites public participation in the NEPA process to promote open communication and enable better decision making. The EA and draft FNSI were made available to the public for a 30-day comment period, in accordance with NEPA. The Notice of Availability for public review of the EA and draft FNSI was published in the *El Paso Times* and in Spanish in the *El Diario* newspaper on September 30, 2012 (Appendix A). The distribution of the EA and draft FNSI included local libraries and any agencies, organizations, and individuals who expressed interest in the project. Comments on the EA and draft FNSI were received from the Texas Parks and Wildlife Department and the Texas Historical Commission (THC). Their comments and the Army's responses are included in Appendix A.

SECTION 2.0
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Army proposes to sell two parcels on the periphery of the Fort Bliss Cantonment to provide land under Title 10 of the United States Code (USC) for private housing and light commercial development suited, but not exclusive, to Fort Bliss military personnel. Proceeds of the sale would in turn be used to fund construction of additional military housing inside the Fort Bliss Cantonment.

The Army would also execute a value-for-value exchange with TxGLO for parcels along Fort Bliss's southern boundary. The Army would convey a parcel in the extreme southern part of the Fort Bliss Cantonment that has limited mission utility in exchange for a parcel of State land located along Fort Bliss's southeast boundary that would protect Fort Bliss's training capabilities.

Per CEQ regulations (40 CFR 1502.14) and 32 CFR Part 651, the EA must identify and describe all reasonable alternatives to the Proposed Action, including the No Action Alternative. One or a combination of the alternatives listed below will be selected to meet the Proposed Action.

2.2 Alternative 1 – No Action Alternative

Under the No Action Alternative, parcels A, B, and C would not be sold or exchanged. Selection of this alternative would necessarily eliminate any potential impacts associated with the sale or exchange of Fort Bliss land. However, this alternative would not satisfy the need for adequate, affordable, quality housing for Soldiers and their families near the Fort Bliss Cantonment or the need to protect TA 1B and 2E from encroachment and future development.

2.3 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Under Alternative 2, approximately 1,635 acres of Fort Bliss land (Parcel A) would be sold to a private developer and annexed by the City of El Paso concurrently with the closing of the land sale. A 200 foot right-of-way along Montana Avenue would be dedicated to the City of El Paso prior to the closing. Parcel A is located on undeveloped land formerly used for military training in the southeastern part of the Fort Bliss Cantonment, north of Montana Avenue and east of the El Paso International Airport (Figure 2-1). A small, fence-enclosed cinderblock building that was formerly leased to the Federal Aviation Administration (FAA) is located on the property and will be conveyed to the buyer. It is anticipated that the parcel would be developed as a combination of residential, retail, community facilities, and mixed-use buildings based on the City of El Paso's SmartCode Growth Plan. SmartCode allows for the densest development possible. Population and traffic numbers based on this type of development were used to assess direct and indirect impacts that may result from the Proposed Action. The Army plans to use proceeds from the land sale to pay for construction of additional military housing within the Fort Bliss Cantonment. Construction of these additional housing units has already been analyzed in the GFS EIS.

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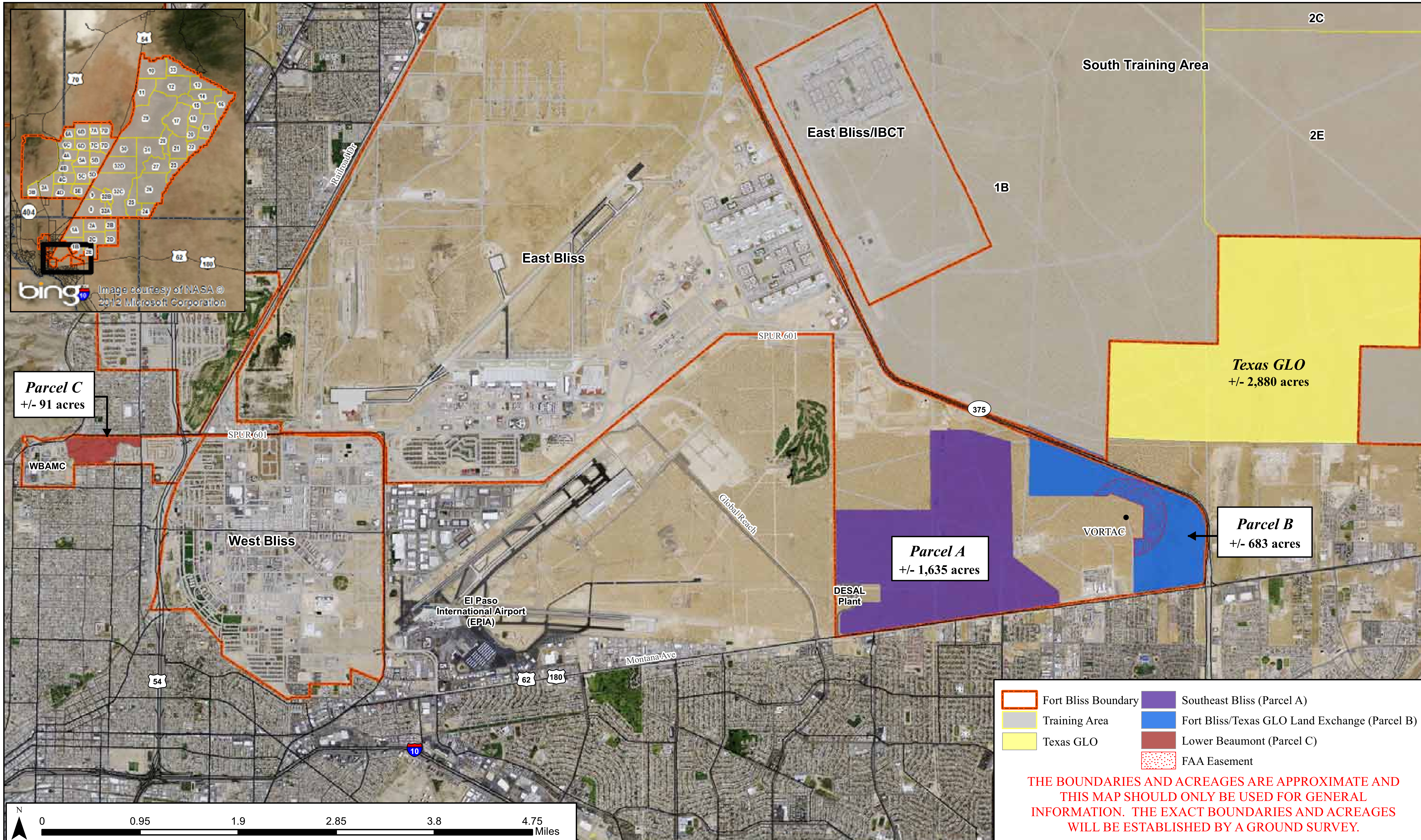

Figure 2-1: Proposed Sites for Fort Bliss Land Sale and/or Exchange

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As part of the proposed land sale agreement, the acquiring developer would be required to phase the development so that the traffic level(s) of service (LOS) at the various intersections near the parcel would not deteriorate from pre-development conditions. As such, phasing would be required to proceed in tandem with the City of El Paso and Texas Department of Transportation (TxDOT) improvement projects along Montana Avenue, Spur 601, and Loop 375. The City of El Paso permitting process would be the enforcing mechanism to ensure that the development would not create substantial impacts on area traffic or water and wastewater service. The acquiring entity would be required to complete a project-specific traffic impact analysis that would be submitted to the city for review.

Parcel A contains a historic feature in the form of a segment of the Butterfield Overland Mail Route. This historic feature would require protection under a Memorandum of Agreement (MOA) between Fort Bliss, the Texas State Historic Preservation Office (SHPO), and the purchasing entity. Stipulations reached under a typical agreement to protect this type of historic feature usually include interpretive trails and creation of buffer zones from development. A requirement of the city codes for developments of this size mandates the setting aside of a 30-acre natural area and 5 acres of open space, which would be designed to include the site. This natural area set-aside could be used to help protect the trail from encroachment.

Other requirements for developers that will be enforced under the city permitting process include providing onsite ponding for stormwater. Onsite ponding should accommodate a typical 100-year storm event. A 1.5-acre tract would be made available for a firefighting station, and the private entity would need to enter negotiations with the proper school districts for sale(s) of tract(s) to construct the required schools.

2.4 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Under Alternative 3, approximately 683 acres of land currently owned by Fort Bliss (Parcel B) would be exchanged for approximately 2,880 acres of land currently owned by TxGLO that is located adjacent to TA 1B and 2E (see Figure 2-1). Fort Bliss has determined that Parcel B is not suited for training of heavy maneuver brigades due to its close proximity to city developments. Parcel B is located east of Parcel A and consists of 683 acres, including 14.5 acres located on the northern side of Loop 375. There are 44.5 acres within a 500-foot buffer adjacent to Loop 375 that would not be included with the exchange of Parcel B. In addition, there is an FAA easement around a VHF Omnidirectional Range/Tactical Aircraft Control (VORTAC) antenna located near the property that includes height restrictions on land use within 1,500 feet of the VORTAC antenna and additional height restrictions up to 2,000 feet away from the antenna (see Figure 2-1). The FAA easement would remain with the property. Currently, TxGLO has not developed a land use plan for the portion of Parcel B that they would be acquiring from Fort Bliss, and no plans are expected in the foreseeable future. However, for the purpose of real property appraisal and to assess potential cumulative impacts in this document, it is assumed that a mixed development would occur on the property, with approximately one-third of the site being developed for commercial use and two-thirds of the site being developed for residential use.

As part of Alternative 3, the Army has also decided to pursue the acquisition of the 2,880 acres of TxGLO land located adjacent to TA 1B and 2E to permanently protect it from encroachment. Military vehicles sometimes cross through the TxGLO land, as it contains a tank trail that is the shortest route between TA 1B and 2E. This is allowed under a "Visible and Apparent Easement Clause" in the conveyance document of the land to the State of Texas, but not in a separate formal easement of record. However, if TxGLO were to sell or develop the land, the easement would not be transferable and military training activities in the training areas would become impossible or severely restricted. Fort Bliss would also be required to install a noise and dust generation buffer zone of 1 mile to the west, north, and east, thereby rendering that portion of the existing training areas unusable for tactical vehicle maneuvers. For these reasons, Fort Bliss would acquire the 2,880 acres of TxGLO land, which would serve as buffer for encroachment and allow continued use of the tank trail for the foreseeable future once it is transferred to Fort Bliss. The 2,880 acres of land would be included as part of the existing training areas and no long- or short-range construction is planned or programmed for the property.

2.5 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Parcel C includes approximately 91 acres and is located in the former William Beaumont General Hospital Historic District south of Fred Wilson Road and east of the present hospital (see Figure 2-1). It would be developed as a combination of residential, retail, community facilities, and mixed-use buildings based on the City of El Paso's SmartCode Growth Plan. As in the previous alternatives, proceeds from the land sale would pay for the construction of additional military housing within the Fort Bliss Cantonment, which has been previously analyzed in the SEIS and GFS EIS.

The property is the site of the old William Beaumont General Hospital and contains two buildings and a feature that are eligible for listing on the National Register of Historic Places (NRHP). A large building (7115) that is currently used for Army nurse training, a smaller building (T-7167) near the northern access control point (Fred Wilson Gate) that contains a mural that needs to be protected, and a landscape feature (arroyo garden) are individually eligible for listing on the NRHP. These structures and feature would be included in the sale; however, the Army would retain use of these buildings, along with building T-7166, through approximately 2016, at which time a replacement hospital would be completed. This would be accomplished through a leaseback or similar arrangement. Reuse of existing older buildings on the property may be feasible, or they can be demolished after undergoing Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey (HABS/HAER/HALS) documentation. The treatment of the historic properties would be addressed in a Programmatic Agreement (PA) developed between Fort Bliss and Texas SHPO. The developer would be required to provide a demolition plan for dilapidated buildings located on the property.

2.6 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Alternative 5 includes the implementation of alternatives 2, 3, and 4. Under Alternative 5, parcels A and C would be sold to provide land and funding for additional housing as described in alternatives 2 and 4, respectively, and Parcel B would be exchanged with TxGLO for land adjacent to the South Training Area as described in Alternative 3. Approximately 2,409 acres of land would be developed as a combination of residential, retail, community facilities, and mixed-use buildings. Also, approximately 2,880 acres of TxGLO land would be transferred to Fort Bliss. This land would be included as part of the existing training areas and used as training land. All requirements as outlined in the specific alternative descriptions would be imposed as part of Alternative 5.

2.7 Alternatives Considered and Eliminated from Detailed Study

There were no other sites that were considered for the land sale or land exchange. The sites that will be analyzed in the EA were specifically chosen because they were lands on the margins of the Fort Bliss Cantonment that have been isolated by the growth of El Paso and are, therefore, not now feasible for the military mission.

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SECTION 3.0
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section of the EA describes the natural and human environment that exists within the project area and the potential impacts of the Proposed Action and alternatives as outlined in Section 2.0 of this document. The effects from the Proposed Action include impacts from the sale and/or exchange of Army-owned land, including the potential development of that land. In accordance with NEPA and the CEQ regulations (40 CFR 1501.7[3]) implementing NEPA, the analysis of environmental conditions only addresses those areas and environmental resources with the potential to be affected by any of the alternatives considered, including Alternative 1 (No Action), Alternative 2 (Sale of Parcel A), Alternative 3 (Land Exchange of Parcel B), Alternative 4 (Sale of Parcel C), and Alternative 5 (Sale and/or Exchange of Parcels A, B, and C – Preferred Alternative). More specifically, the EA will examine the potential for direct, indirect, adverse, or beneficial impacts. The EA will also assess whether such impacts are likely to be long-term, short-term, permanent, or cumulative. Locations and resources with no potential to be affected need not be analyzed.

Impacts on each resource can vary in degree or magnitude from a slightly noticeable change to a total change in the environment. For the purpose of this analysis, the intensity of impacts will be classified as negligible, minor (minimal), moderate, or major. The intensity thresholds are defined as follows:

- Negligible: A resource would not be affected or the effects would be at or below the level of detection, and changes would not result in any measurable or perceptible consequences.
- Minor (Minimal): Effects on a resource would be detectable, although the effects would be localized, small, and of little consequence to the sustainability of the resource. Mitigation measures, if needed to offset adverse effects, would be simple and achievable.
- Moderate: Effects on a resource would be readily detectable, long-term, localized, and measurable. Mitigation measures, if needed to offset adverse effects, would be extensive and likely achievable.
- Major: Effects on a resource would be obvious, long-term, and would have substantial consequences on a regional scale. Extensive mitigation measures to offset the adverse effects would be required and success of the mitigation measures would not be guaranteed.

A VEC analysis was used to determine which resources would potentially be affected by the Proposed Action (Table 3-1). These include land use and aesthetics, soils and geologic resources, water resources, biological resources, cultural resources, air quality, noise, traffic and transportation, health and safety, hazardous materials and waste, airspace, utilities infrastructure, socioeconomics, and environmental justice.

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Table 3-1. Summary of Valued Environmental Components Analysis

Resource	Alternative 1 – No Action Alternative	Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)	Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)	Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)	Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Land Use and Aesthetics	No impacts on land use or aesthetics would occur.	Parcel A is located within the Fort Bliss Cantonment and is currently undeveloped and relatively undisturbed. Land use was changed from training to light industrial in the SEIS. The proposed development as part of the land sale would be similar to the surrounding developments near the parcel and would be compatible with the surrounding land use. The additional residential areas within the parcel would be beneficial since there is a shortage of housing in the area. Alternative 2 would have moderate impacts on land use and aesthetics.	Parcel B is located within the Fort Bliss Cantonment and is currently undeveloped and relatively undisturbed. Military land use changed from training to light industrial in the SEIS. However, TxGLO has no plans for development of the parcel in the foreseeable future. The approximately 2,880 acres of land currently owned by TxGLO that is located adjacent to TA 1B and 2E is undeveloped and relatively undisturbed. It is currently used as a tank trail by the Army under an apparent easement. This use would continue under this alternative. Alternative 3 would have no impacts on land use and aesthetics.	Parcel C is located within the Fort Bliss Cantonment and portions of the parcel are already developed. Land development would be compatible with the surrounding land use. Alternative 4 would have minor impacts on land use and aesthetics.	Impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered moderate.
Soils	No impacts on soils would occur.	Moderate impacts on soils due to the direct loss of local soils through development and construction. No prime or unique farmlands occur within Parcel A.	No prime or unique farmlands occur within Parcel B. The land near TA 1B and 2E to be exchanged with TxGLO would likely continue to be used as a tank trail and an encroachment buffer once acquired by Fort Bliss, and thus, no changes to soils would occur with its use.	Impacts similar to, but less than those under Alternative 2 since the total amount of acreage impacted is much less than the other parcels. Minor impacts on soils due to the direct loss of soils. No prime or unique farmlands occur within Parcel C.	Impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered moderate.
Surface Water	No impacts on surface water would occur.	None present, no impacts.	None present, no impacts.	There would be minor impacts on approximately 5,574 feet of arroyo within Parcel C. The arroyo is a historic landscape and best management practices (BMP) implemented by the developer such as silt fencing and avoidance of the arroyo would be used to minimize impacts.	There would be no surface water impacts within parcels A and B and minor impacts on the arroyo within Parcel C.
Groundwater	No impacts on groundwater would occur.	Minor impacts during construction activities and once Parcel A is fully developed due to the increased demand in groundwater.	Groundwater resources would not be affected by Alternative 3 for the foreseeable future.	Impacts similar to those under Alternative 2 and considered minor.	Impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor.
Biological Resources	No impacts on vegetation or wildlife would occur.	Minimal impacts on approximately 1,635 acres of regionally common vegetation. Two Federal species of concern, the western burrowing owl and the Texas horned lizard, have the potential to be minimally impacted by Alternative 2. Migratory bird species protected under the Migratory Bird Treaty Act (MBTA) may be minimally impacted by Alternative 2. However, these bird species would be protected in accordance with the MBTA to include phasing construction around the nesting season, and implementing BMPs to avoid harassing or harming these species.	No impacts on biological resources would occur in the foreseeable future. Impacts similar to those under Alternative 2 if the property is developed sometime in the future. At that time, minimal impacts on approximately 683 acres of regionally common vegetation could occur. The two Species of Concern and bird species protected by the MBTA may be minimally affected. The TxGLO-owned land near TA 1B and 2E would be used as a tank trail and encroachment buffer once Fort Bliss acquires it, which is its current use, and there would be no impacts on biological resources within the proposed training land.	Impacts similar to those under Alternative 2. Since most of Parcel C has been previously developed, only a minimal amount of regionally common vegetation would be cleared as a result of the development of Parcel C. The two species of concern and bird species protected by the MBTA may be minimally impacted.	Impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Minimal impacts on approximately 2,330 acres of regionally common vegetation as a result of the development of parcels A, B, and C. The two species of concern and bird species protected by the MBTA may be minimally impacted.

Table 3-1, continued

Resource	Alternative 1 – No Action Alternative	Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)	Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)	Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)	Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Cultural Resources	No impacts on cultural resources would occur.	The Butterfield Overland Mail Route is the only site eligible for the National Register of Historic Places (NRHP) located within Parcel A. An MOA regarding the treatment, protection, and management of the Butterfield Overland Mail Route would be developed between the purchasing entity, the Texas SHPO, and Fort Bliss. The MOA would set stipulations and time frames for resolution of any adverse effects on historic properties.	Within Parcel B, there is one site that is eligible for inclusion on the NRHP and has the potential to be impacted by any future development within the parcel. An MOA agreement between Fort Bliss, Texas SHPO, and TxGLO provides for TxGLO to be responsible for the management of the eligible site within the parcel and the mitigation of adverse effects on the site. In the land exchange tract near TA 1B and 2E, Fort Bliss would acquire a 2,880-acre parcel from TxGLO. Fort Bliss will accept responsibility for all cultural resources located within the TxGLO-owned parcel to be acquired and will apply all management policies, guidelines and agreements. As there are no foreseeable plans for development in this parcel, there would be no effects on cultural resources from implementation of Alternative 3 regarding the 2,880-acre parcel.	The William Beaumont General Hospital Historic District (WBGHHD) within Parcel C has been re-evaluated and determined not to be eligible as a historic district. Two structures (Buildings 7115 and T-7167) and one landscape feature within Parcel C are individually eligible for listing on the NRHP. A Programmatic Agreement (PA) regarding the treatment of these historic properties would be developed between the Texas SHPO and Fort Bliss. Reuse of existing older buildings on the property may be feasible or they can be demolished after undergoing HABS/HAER/HALS documentation. Thus, adverse effects on cultural resources in Parcel C related to the sale would be mitigated through the PA.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Adverse effects on cultural resources as a result of Alternative 5 would be mitigated through the stipulations contained within agreement documents between Fort Bliss, Texas SHPO, and the purchasing entity for the respective parcels.
Air Quality	No air quality impacts would occur.	Air emissions from the proposed construction activities during development of Parcel A would not exceed Federal *de minimis* thresholds; however, the operational air emissions would exceed thresholds for volatile organic compounds (VOC), carbon monoxide (CO), and nitrous oxides (NO_x). Texas Commission on Environmental Quality (TCEQ) has implemented a state implementation plan (SIP) for CO and ozone that accounts for the increase in residential traffic. The mitigation programs incorporated in the El Paso CO and ozone SIPs ensure that the new operational air emissions associated with Alternative 2 are in compliance with regulations. As there are no violations of air quality standards and no conflicts with the Texas SIPs, impacts on air quality in El Paso County due to Alternative 2 would be minor.	No foreseeable future use of Parcel B was identified. Therefore, no impacts on air quality would occur under this alternative.	Air emissions from the proposed construction activities or operational air emissions would not exceed Federal *de minimis* thresholds. Therefore, the impacts on air quality in El Paso County from the implementation of Alternative 4 would be negligible.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor.
Noise	No noise impacts would occur.	Long-term noise impacts would result from the increase of vehicle traffic due to the additional residents and businesses in the region. The increase in the number of vehicle trips in the adjacent neighborhoods associated with Alternative 2 would be less than a 100 percent increase; therefore, the increase in noise generation would be barely perceptible above current levels, and the impacts on the noise environment would be minor. Construction noise impacts would be intermittent, temporary, and minor after which noise levels would return to relative ambient levels.	No foreseeable future use of Parcel B was identified. Therefore, no noise impacts would occur under this alternative.	Impacts similar to those under Alternative 2 and considered minor.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor.

Table 3-1, continued

Resource	Alternative 1 – No Action Alternative	Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)	Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)	Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)	Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Traffic and Transportation	No impacts on traffic and transportation would occur.	The development of Parcel A, once sold to a private developer, would greatly increase traffic on Montana Avenue, Loop 375, and nearby intersections, some of which currently have low levels of service (LOS). As a result, there would be long-term, moderate adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways around Parcel A. A pre-development traffic impact analysis (TIA) indicates that future traffic impacts can be mitigated, for the most part, by implementing at-grade solutions not involving major infrastructure investments. A development-specific TIA would be required of the private developer when actual designs are completed. The current TIA indicates that applying mitigation strategies would bring the LOS scores at most of the affected intersections into the “good” or “below average” operating conditions. This, in most cases, is better than the existing LOS. At-grade mitigation solutions including additional street connectivity, traffic control improvements, and modified street geometry and intersection design allow for acceptable LOS on the area roadways after the development of the parcel. One intersection, the Montana-Yarborough intersection, may require above- grade improvements. Therefore, the developer would be required to either construct these improvements or key the development to TxDOT plans on improving the traffic flow through this intersection. Additionally, the City of El Paso and TxDOT are planning a series of above-grade improvements on Montana Avenue and other area streets that would further mitigate traffic impacts in this area.	Although there are no plans for post land-exchange use of Parcel B, for the purposes of cumulative impact analysis under NEPA, it was assumed that Parcel B would be developed based on surrounding land use and census data. Notional development of Parcel B was incorporated into the TIA performed for this EA as a stand-alone option. The pre-development TIA indicates that any future development of Parcel B would increase traffic on Montana Avenue, Loop 375, and nearby intersections, some of which already have poor LOS, and affect traffic similar to Alternative 2. As in Alternative 2, mitigation strategies would bring the LOS scores at the impacted intersections into the “good” or “below average” operating conditions, which, in most cases, is better than the existing LOS. As opposed to Alternative A, development of Parcel B could be completed entirely with at-grade solutions for traffic impacts. Mitigation measures would be similar to Parcel A, but to a lesser extent, since not as much traffic would be generated by the development of Parcel B. Additionally, the City of El Paso and TxDOT are planning a series of improvements on Spur 601 and Loop 375 that would further mitigate area traffic impacts from this alternative.	The proposed sale of Parcel C would directly result in development that would increase traffic on Fred Wilson, Dyer, and nearby intersections. Most intersections near Parcel C operate at acceptable LOS and have low traffic volumes, but some do have poor LOS. As a result, there would be long-term, minor adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways around the proposed developed Parcel C. The pre-development TIA indicates that future traffic impacts could be mitigated by implementing at-grade solutions that would not involve major infrastructure investments. A development-specific TIA submittal to the city would be required of the acquiring entity when project designs are completed.	The development of parcels A, B, and C would increase traffic on Montana Avenue, Loop 375, Fred Wilson, Dyer, and nearby intersections, some of which already have poor LOS. As a result, there would be long-term, moderate adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways around the proposed developed parcels A, B, and C when the future traffic impacts are mitigated, for the most part, by implementing at-grade solutions that would not involve major infrastructure investments, with the exception of the Montana-Yarborough intersection. This intersection would require above-grade improvements to handle the additional traffic. Applying mitigation strategies would bring the 2015 LOS scores for parcels A and B (if developed) together at the other impacted intersections into the “good” or “below average” operating conditions, which in most cases is better than the existing LOS and for Parcel C at the impacted intersections into the “good” operating conditions. Additionally, the City of El Paso and TxDOT are planning a series of above-grade improvements on Montana Avenue and other area streets that would further mitigate traffic impacts in the area.
Health and Safety	No impacts on health and safety would occur.	The sale of Parcel A would not affect the health and safety of the local populace. There is a possibility for traffic accidents due to the increased traffic from the development of the parcel. Minimal health and safety impacts as a result of the implementation of Alternative 2.	No foreseeable future use of Parcel B was identified; therefore, no impacts on health and safety would occur with the exchange of Parcel B. The TxGLO-owned land to be acquired by Fort Bliss is located adjacent to military training areas and minimal impacts on health and safety would be expected as a result of the implementation of Alternative 3.	Impacts similar to those under Alternative 2 and considered minimal.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minimal.

Table 3-1, continued

Resource	Alternative 1 – No Action Alternative	Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)	Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)	Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)	Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Hazardous Materials and Waste	No hazardous materials and waste impacts would occur.	The proposed sale of Parcel A would not use or generate hazardous materials. Subsequent to the sale, the parcel developer would work under current Federal, State, and local laws and regulations regarding hazardous material use, generation, and disposal. Prior to the sale of Parcel A, the FAA will remove the building and concrete slab. If any asbestos-containing material (ACM) is found, abatement would be performed per all applicable regulations. Hazardous material and wastes impacts would be minor as a result of the implementation of Alternative 2.	Impacts under Alternative 3 would be considered minor. The TxGLO-owned land contains illegal refuse piles. If any piles containing ACM or lead-based paint (LBP) are encountered during cleanup, removal should be conducted per all regulatory requirements. No changes in land use would occur in the land to be acquired by the Army since an implied easement has allowed training there for at least the past 50 years. Handling of waste petroleum products during training would continue per the Fort Bliss Hazardous Waste Management Plan.	A closed landfill, FTBL-010 (SWMU-014), is located within the property and has been closed per Texas regulatory requirements with a stipulation that the landfill contents be left in-place. The UST site, FTBL-082 (LPST ID No. 115412), was closed with a restriction from TCEQ that prior to soil excavation or construction activities the site must undergo evaluation of any remaining contaminant levels and potential exposure pathways. These stipulations and restrictions should be adhered to and deed restrictions or land use controls, if not currently in place, would be documented and conveyed with the sale or exchange of the property. There are several older structures located throughout Parcel C and, due to the age of the buildings, it is likely that ACM and LBP are present. Steam pipes and water and sewer lines that could contain ACM may still remain within the parcel, even in areas where the buildings have been torn down. It is expected that the developer would perform all ACM and LBP management per regulatory requirements. All other impacts under Alternative 4 would otherwise be similar to those under Alternative 2.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor.
Airspace Operations	No impacts on airspace operations would occur.	The implementation of Alternative 2 would not require any change in designated airspace. Due to the proximity to the El Paso International Airport, height restrictions on the building structures within the development may be necessary. Negligible impacts on airspace operations would be expected as a result of the implementation of Alternative 2.	No impacts on airspace operations would occur as a result of Alternative 3.	Impacts similar to those under Alternative 2 and considered negligible.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered negligible.
Utilities Infrastructure	No impacts on utilities infrastructure would occur.	The development of Parcel A as a combination of residential, retail, and commercial buildings would greatly increase overall utilities usage and require increases in utilities infrastructures. The implementation of Alternative 2 would have moderate impacts on energy, communications, potable water, wastewater, stormwater, and solid waste; however, development utilizing "green" and sustainable building techniques would help to minimize these impacts on utilities.	If and when Parcel B is developed, impacts would be similar to those under Alternative 2. However, the overall magnitude of these impacts would be less than that of Alternative 2, as Parcel B is smaller than Parcel A, and would be considered to have minor impacts on energy, communications, potable water, wastewater, stormwater, and solid waste. Alternative 3 also includes the exchange of the TxGLO land (2,880 acres) into military jurisdiction and use. This portion of Alternative 3 is not anticipated to cause any utilities or utilities infrastructure impacts, as the land for the foreseeable future is to remain undeveloped and used for training maneuvers.	Impacts similar to those under Alternative 2. However, the Lower Beaumont Parcel was previously developed and used by the Army. Although upgrades on much of the utilities infrastructure would be required, these utilities already exist over much of the property. Additionally, although similar impacts would occur as discussed in Alternative 2, these impacts would be much smaller in magnitude since Parcel C is less than 100 acres in size. Therefore, the implementation of Alternative 4 would have minor impacts on utilities.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. However, the development of parcels A, B (if conducted), and C would inevitably cause greater increases in demand for overall utilities usage and would require additional utilities infrastructure. Although there is a greater increase for the demand for utilities, the implementation of Alternative 5 would have moderate impacts on energy, communications, potable water, wastewater, stormwater, and solid waste. However, it is imperative that SmartCode Growth principles for Parcel A, "green" and sustainable building plans, and energy efficient techniques are utilized for impacts to remain moderate.

Table 3-1, continued

Resource	Alternative 1 – No Action Alternative	Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)	Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)	Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)	Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Socioeconomics	Under the No Action Alternative, there would be minor impacts. There would be no additional funds for construction of on-base housing, and additional off-base housing would be at the discretion of developers to find locations and construct the housing further away from Fort Bliss since available land is on the outskirts of the city. The No Action Alternative will leave Fort Bliss and the region to identify additional options for housing the projected influx of people.	There would be minor impacts with the implementation of Alternative 2. The sale of Parcel A would make 1,635 acres available for residential and light commercial development adjacent to Fort Bliss. This new development in Parcel A is expected to result in a number of benefits for the region including better housing options, more affordable housing, temporary construction-related jobs, revenues for local businesses as companies purchase materials and supplies locally, additional income for construction workers, and any increased property taxes paid by new residents. A potential negative impact may result from the increase in the number of school-age children in the El Paso school system. It is expected that the system would need to build additional schools to accommodate the increase in students and that the developer would need to negotiate with the proper school districts for sale(s) of tract(s) to construct the required schools.	For the foreseeable future, no impacts on socioeconomics would occur from the implementation of Alternative 3. If Parcel B is ever developed, impacts would be similar to those under Alternative 2 and considered minor and beneficial.	Impacts similar to those under Alternative 2 and considered minor. However, since Parcel C has a much smaller land area impact, any negative impacts associated with construction, traffic, and additional children in schools would be relatively small. The smaller increase in students would not be expected to create a need for additional school construction.	Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor. This new development in the three areas near Fort Bliss is expected to result in a number of benefits for the region.
Environmental Justice and Protection of Children	Under the No Action Alternative, there would minor impacts. The No Action Alternative has the potential to negatively impact minority and low-income populations. Homeowner and rental vacancy rates in El Paso County are very low compared to Texas and the Nation. Additional military and civilian personnel projected for Fort Bliss have the potential to put additional pressure on the existing housing markets (both rental and homeowner), likely driving up rental rates and home prices. The Proposed Action would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.	Under Alternative 2, there would be minor impacts on minority and low-income populations, since most of the County is minority and low-income, but most of the impacts would be expected to be positive. The implementation of Alternative 2 would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.	For the foreseeable future, no impacts on minority and low-income populations and children would occur from the land exchange of Parcel B. If Parcel B is ever developed, impacts would be similar to those under Alternative 2 and considered minor; however, most of the permanent impacts would be positive.	Impacts similar to those under Alternative 2 and considered minor.	Under Alternative 5, impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor.

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3.1 Land Use and Aesthetics

3.1.1 Affected Environment

The Fort Bliss land area consists primarily of undeveloped desert training ground, associated training ranges and support facilities, and a fully developed Fort Bliss Cantonment adjacent to El Paso, Texas. This section of the EA addresses the existing pattern of land use for the proposed project sites and adjacent areas. The Region of Influence (ROI) consist of the southern portion of Fort Bliss within Texas, including the Fort Bliss Cantonment, and also the portion of El Paso County south of TA 1B and 2E, north of Montana Avenue. The Fort Bliss Cantonment consists of West Bliss (which includes a residential area, Logan Heights); East Bliss (which includes BAAF); and William Beaumont Army Medical Center (see Figure 2-1). The developed Fort Bliss Cantonment is located next to the largely urban/suburban areas of the City and County of El Paso, Texas, having a mixture of residential, commercial, and industrial uses. These existing developments detract somewhat from the aesthetic and visual qualities of the natural landscape. The undeveloped training areas are visible when traveling along roadways within Fort Bliss and surrounding areas and from overlooks at higher elevations (U.S. Army 2007a). Overall land use within the Fort Bliss Cantonment has focused on accommodating a major build-up of Army units for training over the last decade, especially for military family housing (U.S. Army 2007a).

Parcel A (Southeast Bliss)

Parcel A includes approximately 1,635 acres of undeveloped land located in the southern part of East Bliss, designated as Cantonment/mixed land use (Figure 3-1). Land use changes from training to facilities (light industrial) were assessed in the SEIS for which a Record of Decision was signed on 30 April 2007 (U.S. Army 2007a). This change was made to expand the Fort Bliss Cantonment to accommodate the stationing of additional BCTs and allow development of land for housing, commercial, and community support purposes.

Parcel A is located along US 62/180 (Montana Avenue) between Global Reach Drive and Loop 375. The western boundary of the parcel adjoins the El Paso International Airport. Immediately north of Parcel A, new facilities, including an Army hospital complex and El Paso Community College campus, are planned. The eastern portion of the parcel is within sight of Loop 375 and adjacent to the Armed Forces Reserve Center and the proposed Immigration and Customs Enforcement administrative facility. Urban development in El Paso has occurred to the south of US 62/180 and includes residential, multi-family, retail, and commercial properties (U.S. Army 2007a).

Parcel B (Fort Bliss-owned Land)

Parcel B includes approximately 683 acres of undeveloped land in the southern part of East Bliss approximately one mile east of Parcel A. Parcel B is designated as Cantonment/mixed land use with a small portion of Parcel B, north of Loop 375, designated as Land Use A with mission facilities (see Figure 3-1). Parcel B is located near the intersection of Montana Avenue and Loop 375, and a portion of the southern boundary line of the parcel abuts Montana Avenue. The western boundary of the parcel is adjacent to the Armed Forces Reserve Center. To the north are Loop 375 and the South Training Area. The eastern portion of the parcel abuts Loop 375. There is an FAA easement around the VORTAC antenna located near the parcel that would remain in place and includes height restrictions on land use within 1,500 feet of the antenna and additional

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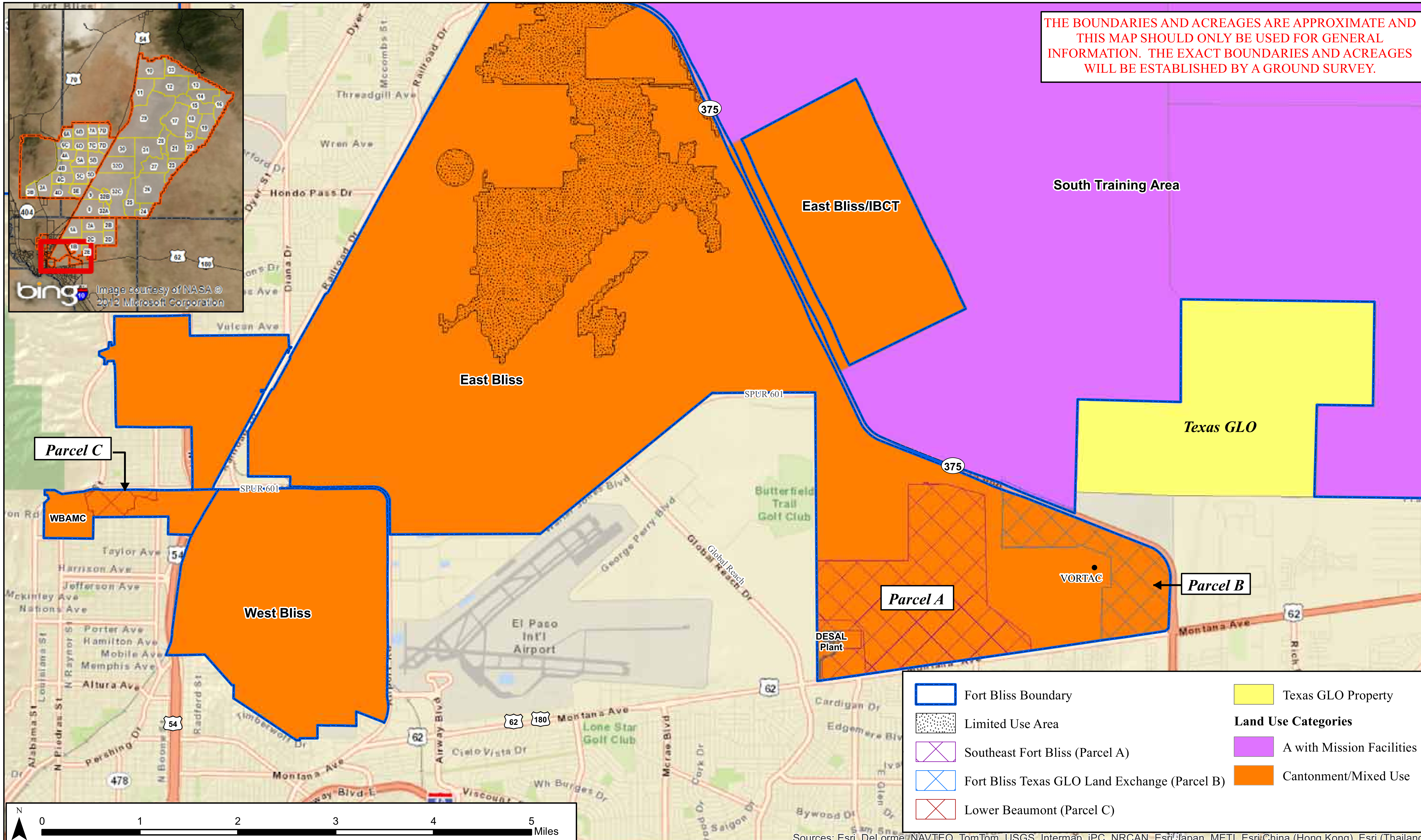

Figure 3-1: Land Use for the Proposed Land Sale and/or Exchange

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height restrictions up to 2,000 feet away from the antenna (see Figure 2-1). Within the 1,500-foot distance from the antenna, no structural development is allowed and no vehicles or other mobile objects can be left in the clear zone. Additionally, tree height, fences, and power and control lines have height restrictions.

Parcel B (TxGLO-owned Land)

The proposed land that will be exchanged to Fort Bliss is currently owned by TxGLO. It includes approximately 2,880 acres of undeveloped land located on the east side of El Paso, Texas (see Figure 3-1). The TxGLO-owned land is located north of Montana Avenue, east of Loop 375, and approximately 0.5 mile northeast of Parcel B. The TxGLO-owned land is surrounded on the north, east, and west by the South Training Area.

Parcel C (Lower Beaumont)

Parcel C includes approximately 91 acres of previously developed land, including various buildings for military use, and is located in the westernmost part of West Bliss. The City of El Paso bounds the parcel to the north and south. The land use within Parcel C is designated as Cantonment/mixed land use (see Figure 3-1). The William Beaumont Army Medical Center abuts the parcel on the western boundary, but it is to be relocated to East Bliss by 2016. A portion of the eastern parcel boundary is adjacent to Dyer Street, the northern parcel boundary is adjacent to Fred Wilson Avenue, and the southern parcel boundary is adjacent to Hayes Avenue. Both Fred Wilson and Dyer are arterial roadways and Hayes is a residential street. The neighborhood is a mixture of residential and commercially zoned properties. Parcel C is within 1 mile of two major transportation arteries, US Highway 54 and Spur 601.

3.1.2 Environmental Consequences

3.1.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on land use or aesthetics would occur because no land sale or exchange of parcels would take place.

3.1.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Under Alternative 2, approximately 1,635 acres of Fort Bliss land would be sold and annexed by the City of El Paso and would likely be developed as a combination of retail, residential, community facilities, and mixed-use buildings based on the City of El Paso's SmartCode Growth Plan. The buyer of the property would be required to comply and conform to the SmartCode requirements. SmartCode requires streets that are safe and comfortable for pedestrians, ample public spaces, walkable block sizes, urban format buildings, and a mix of housing types and uses. Applying the SmartCode Growth Plan within Parcel A would allow for a very high density of households, compared to the existing land use within the project area. Approximately 19,000 households and 200 businesses have the potential to be located within Parcel A with SmartCode principles applied (ICRC 2012). Open space and recreational areas such as parks, civic spaces, and trails would also be required with the development of the parcel. A requirement of the city codes for developments of this size mandates the setting aside of a 30-acre natural area and 5 acres of open space. The proposed development would be consistent with developments that are already in place near the parcel and would be compatible with the surrounding land use. The additional residential areas and high density of households within the parcel would be beneficial since there is a shortage of housing in the area. Alternative 2 would have moderate impacts on land use and aesthetics.

3.1.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Parcel B is located within the Fort Bliss Cantonment and is currently undeveloped and relatively undisturbed. TxGLO has no plans for development of Parcel B in the foreseeable future; however, if Parcel B would ever be developed, then approximately 683 acres of former Fort Bliss land could be turned into a combination of retail, residential, community facilities, and mixed-use buildings based on the surrounding development and urban pattern. Approximately 6,500 households and 100 businesses have the potential to be located within Parcel B (ICRC 2012). The proposed development would be consistent with adjacent developments and compatible with the surrounding land use.

The approximately 2,880 acres of land currently owned by TxGLO that is located adjacent to TA 1B and 2E is undeveloped and relatively undisturbed. This land is currently used as a tank trail by the Army under an apparent easement. This use would continue under this alternative. Alternative 3 would have negligible impacts on land use and aesthetics.

3.1.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Approximately 91 acres of Fort Bliss land would be sold and annexed into the City of El Paso and developed as a combination of residential and light retail/commercial mixed-use buildings based on the surrounding development and urban pattern. Parcel C is located within the Fort Bliss Cantonment and portions of Parcel C are already developed. Approximately 300 households and 10 businesses have the potential to be located within Parcel C (ICRC 2012). In addition, the nursing school (Building 7115) and Blood Donor Facilities (Buildings T-7166 and T-7167) will be retained by the U.S. Army through approximately 2016. Those buildings, along with an access control point, will be reserved. Also, ingress and egress would need to be made available to the adjacent housing area. Land development would be compatible with the surrounding land use. Alternative 4 would have minor impacts on land use and aesthetics.

3.1.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Approximately 2,409 total acres of land currently owned by Fort Bliss would be sold and/or exchanged. Since the development of the parcels would be similar to and compatible with the surrounding land use, Alternative 5 would have moderate impacts on land use and aesthetics.

3.2 Soils

3.2.1 Affected Environment

Soils on or near the surface in parcels A and B are predominantly sands and loamy sands that form expanses of coppice dunes, with each dune typically anchored by a mesquite shrub (*Prosopis glandulosa*). Dunes in these two areas range from approximately 4 to 6 feet in height, often with a mantle of wind-deposited sand sheets between dunes. The dune and sand sheet landforms are young, formed in the latest Holocene (approximately 100-200 years before present). Older soils (mid-Holocene to Pleistocene and earlier) underlie the coppice dunes, often containing white, calcium carbonate-bearing soil horizons (calcic or petrocalcic horizons).

Parcel C soils have been extensively disturbed due to previous construction and activities from the former hospital facilities. The soils formed on the piedmont slope of the Franklin Mountains and are relatively coarse, containing large amounts of gravels, pebbles, and boulders. These soils are typically heavily cemented with soil carbonate and are difficult to excavate. The sections below provide summary information for each parcel, obtained from the *Soil Survey of Fort Bliss Military Reservation, New Mexico and Texas* (U.S. Department of Agriculture [USDA] 2003).

The wind erosion hazard on Fort Bliss is high due to the dominance of highly erodible soils and low soil moisture content. The soil surface is dry, sandy, and sparsely vegetated, especially in areas that have already been impacted by military vehicle traffic. The soils are susceptible to dust generation and dune formation. The Fort Bliss Soil Survey (USDA 2003) provides details on the potential uses and traffic tolerance ratings of each soil based on the physical characteristics.

Soil management at Fort Bliss is coordinated through the Fort Bliss Directorate of Public Works-Environmental Division (DPW-E) and Integrated Training Area Management - Directorate of Plans, Training, Mobilization, and Security (ITAM-DPTMS). Soil management is used to control or mitigate for water or wind erosion, and includes cost-effective soil stabilization techniques such as revegetation, erosion control structures, site hardening, blockades, and dust palliatives to prevent soil degradation, soil erosion, and excessive road damage. Fort Bliss resource management objectives include preventing the deterioration of highly erodible soil resources (U.S. Army 2008b).

Parcel A (Southeast Bliss)

The soils within Parcel A are mapped as Copia-Nations Complex, 1 to 3 percent slopes; Elizario-Copia complex, 2 to 5 percent slopes; Hueco loamy fine sand, 1 to 3 percent slopes; Mcnew-Copia-Foxtrot complex, 1 to 5 percent slopes; Pendero-Copia-Nations complex, 2 to 5 percent slopes; and Wessly-Copia complex, 1 to 3 percent slopes (Figure 3-2). The dominant soil types are Elizario-Copia complex, 2 to 5 percent slopes (39 percent), Copia-Nations complex, 1 to 3 percent slopes (26 percent), and Mcnew-Copia-Foxtrot complex, 1 to 5 percent slopes (29 percent) (USDA 2003).

Elizario-Copia complex, 2 to 5 percent slopes soils are loamy fine sands and occur at elevations 3,900 to 4,200 feet. They are well to excessively drained, with moderately slow to moderately rapid permeability (USDA 2003). Copia-Nations complex soils, 1 to 3 percent slopes, occur at elevations of 3,900 to 4,200 feet mean sea level (MSL), and are fine loamy sands. They are well to excessively drained, with low available water capacity (USDA 2003). Mcnew-Copia-Foxtrot complex, 1 to 5 percent slopes are loamy fine sand or sandy clay loam soils that occur at 3,900 to 4,200 feet MSL, are well to excessively drained, and have very slow to moderately rapid permeability (USDA 2003).

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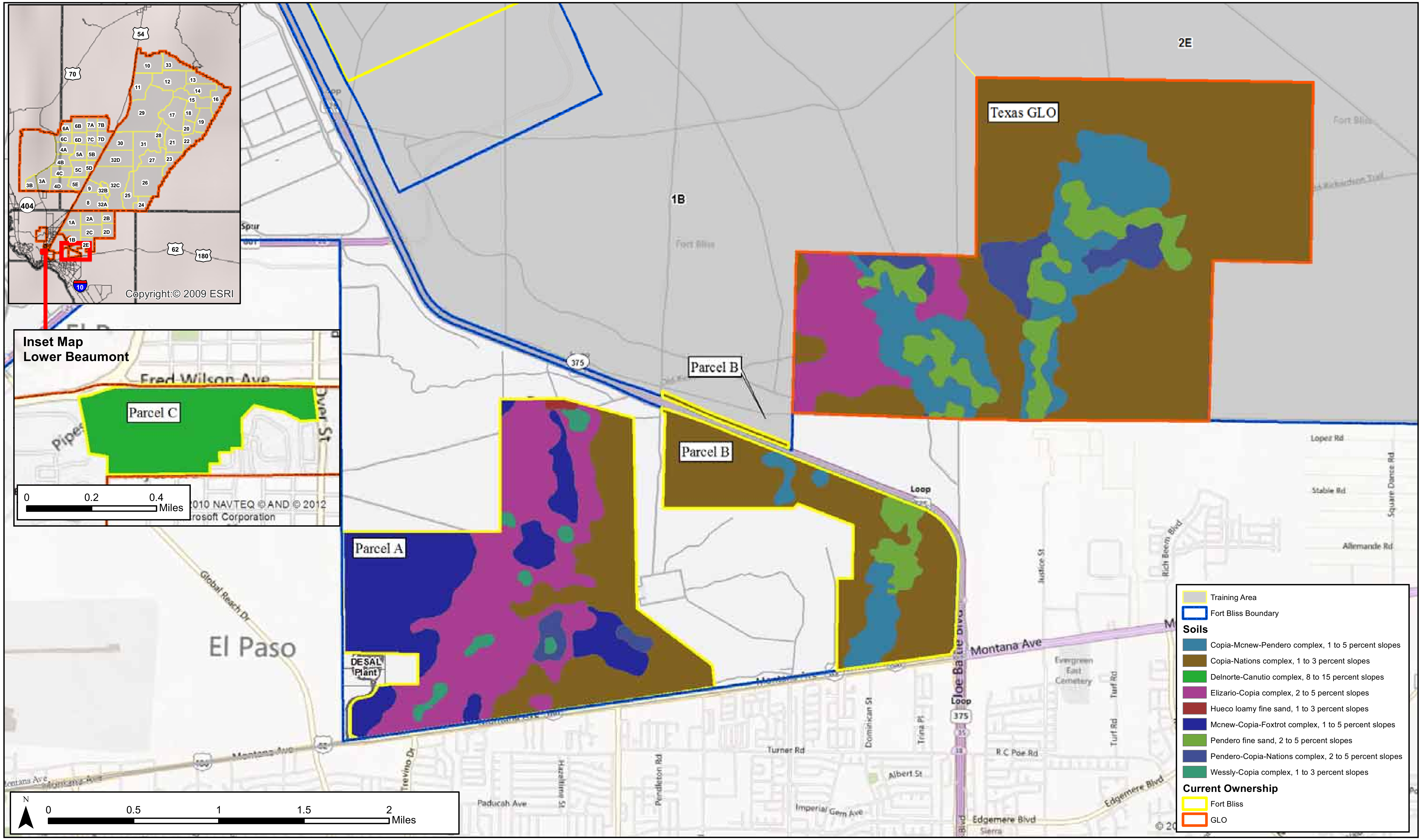

Figure 3-2: Soils Located Within the Proposed Land Sale and/or Exchange

October 2012

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Parcel B (Fort Bliss-owned Land)
The soils found within Parcel B include Copia-Mcnew-Pendero complex, 1 to 5 percent slopes; Copia-Nations complex, 1 to 3 percent slopes; Hueco loamy fine sand, 1 to 3 percent slopes; and Pendero fine sand, 2 to 5 percent slopes, with the dominant soil type, Copia-Nations complex, 1 to 3 percent slopes, comprising 79 percent of the total parcel (USDA 2003).

Parcel B (TxGLO-owned Land)
The dominant soil located in the land currently owned by TxGLO is Copia-Nations complex, 1 to 3 percent slopes (60 percent); other soils are mapped as Copia-Mcnew-Pendero complex, 1 to 5 percent slopes; Elizario-Copia complex, 2 to 5 percent slopes; Pendero fine sand, 2 to 5 percent slopes; and Pendero-Copia-Nations complex, 2 to 5 percent slopes (USDA 2003).

Parcel C (Lower Beaumont)
The entirety of Parcel C is mapped as Delnorte-Canutio complex, 8 to 15 percent slopes soils that occur at elevations of 3,900 to 4,200 feet MSL and are well-drained, gravelly alluvium, loamy-skeletal mixed soils that are about 50 percent gravel and have moderately rapid permeability (USDA 2003). The soils also frequently contain a hard petrocalcic horizon (caliche) at depths of approximately 6 to 20 inches (USDA 2003).

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1 – No Action Alternative
Under the No Action Alternative, no impacts on soils would occur because no land sale or exchange of parcels would take place.

3.2.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)
Under Alternative 2, approximately 1,635 acres of local soils would be permanently disturbed and developed. No prime or unique farmland soils would be impacted because none occur within the parcel. The potential for fugitive dust impacts would occur during construction. Direct post-construction impacts on soils include the physical disturbance of upper soil layers, including biological crusts, and the disruption of soil processes caused by activities that alter the natural soil layers or result in accelerated erosion, increased soil compaction, loss of protective vegetation, and loss of soil productivity. Impacts would depend on the frequency, intensity, total area of disturbance, and amount of exposed bare ground. Development may increase the potential for soil erosion (water and wind). Indirect effects (e.g., soil compaction) include reduced surface water infiltration, increased surface water runoff, increased wind erosion due to loss of vegetation, and poor plant growth and seed germination. A stormwater pollution prevention plan (SWPPP) would be required and best management practices (BMP) per the SWPPP would be followed to minimize temporary fugitive dust and erosion during construction. Applicable BMPs include silt fencing, structural wind breaks, erosion control mats, and application of water during construction. Alternative 2 would have moderate impacts on soils with the implementation of the SWPPP and BMPs.

3.2.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Under Alternative 3, there would be no foreseeable impacts on soils. No prime or unique farmland soils would be impacted because none occur within the parcel. The land to be exchanged by TxGLO would continue to be used as a tank trail and encroachment buffer once acquired by Fort Bliss, and thus no changes to soils would occur with its use.

3.2.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Under Alternative 4, impacts on soils would be similar to, but less than, those listed under Alternative 2. There would be minor impacts on soils with the implementation of the SWPPP and BMPs. Approximately 91 acres of soils would be permanently disturbed and developed. No prime or unique farmland soils would be impacted, as none occur within Parcel C.

3.2.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts on soils under Alternative 5 would be considered moderate since approximately 2,409 acres would be permanently disturbed with the development of parcels A, B, and C. No prime or unique farmland soils would be impacted, as none occur within any of the parcels.

3.3 Surface Water

3.3.1 Affected Environment

No Federally regulated wetlands, as defined by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act of 1972 (CWA), are located within any of the parcels. The vast majority of arroyo-riparian drainages on Fort Bliss do not qualify as jurisdictional wetlands as defined by USACE (U.S. Army 2009). However, a large arroyo landscaped with rock structures and a cactus garden bisects the northern part of the property in Parcel C. Although the arroyo is normally dry except during major rain events, it is considered potential waters of the U.S. because there is evidence of a hydrologic connection to the Rio Grande (Figure 3-3) (U.S. Army 2009). No other surface water is located within the project area, except during large rainstorms when ephemeral streams and ponds may form.

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on surface water would occur because no land sale or exchange of parcels would take place.

3.3.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Under Alternative 2, there would be no impacts on surface water because none is present within Parcel A.

3.3.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Under Alternative 3, there would be no impacts on surface water because none is present within Parcel B or the TxGLO land to be acquired by Fort Bliss.

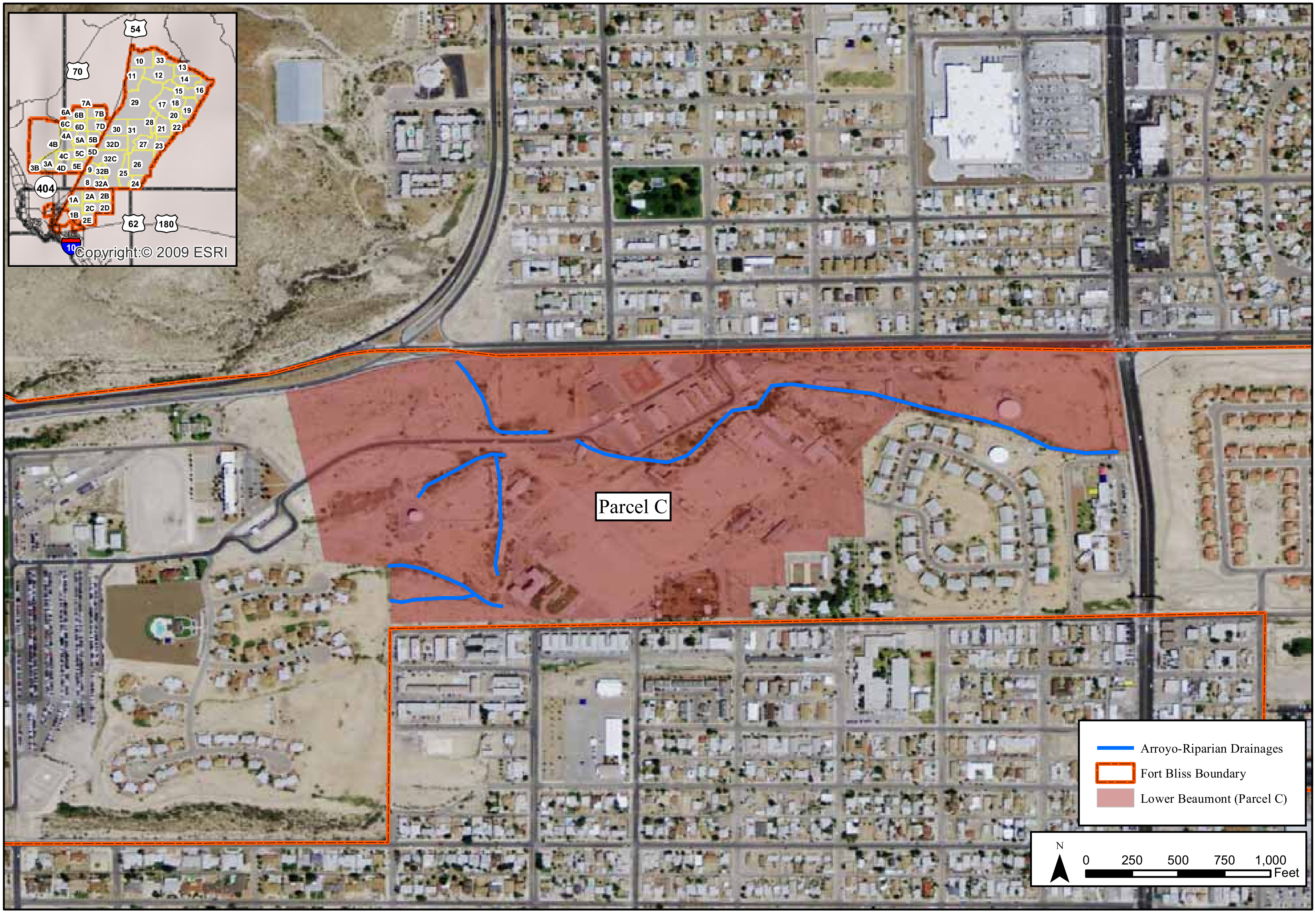

Figure 3-3: Surface Water Drainages (Arroyos) Located within Lower Beaumont (Parcel C)

December 2012

3.3.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Under Alternative 4, there would be minor impacts on approximately 5,574 feet of arroyo within Parcel C. The land would be sold and developed, and construction-related impacts on the arroyo due to the development of the parcel would occur. Impacts on surface water under Alternative 4 may include the following: increased sedimentation within the arroyo; temporary erosion during construction; and decreased surface water quality from nonpoint source sediment loading, increased runoff, and accidental spills and contamination. In addition, an increase in the amount of bare ground may reduce the quantity of water held within the upland areas and increase overland flow, thus increasing discharge from peak flows and decreasing the duration of flood flows. However, the arroyo is a historic landscape and BMPs implemented by the developer such as silt fencing and avoidance of the arroyo would be used to minimize impacts.

3.3.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. There would be no surface water impacts within parcels A and B and minor impacts on the arroyo within Parcel C.

3.4 Groundwater

3.4.1 Affected Environment

Fort Bliss is located primarily in the Tularosa-Hueco Basin of the Basin and Range Physiographic Province. The Hueco Bolson (the basin underlying the Fort Bliss Cantonment) provides groundwater to the City of El Paso, the Fort Bliss Cantonment (including the project area), and Cuidad Juarez. The Hueco Bolson is an intermontane basin incised by the Rio Grande Valley and is replenished by mountain front recharge, seepage from the Rio Grande, canals and agricultural drains, and deep well injection (U.S. Army 2010a). The primary area of recharge occurs along the eastern edge of the Franklin and Organ Mountains, where runoff infiltrates the alluvial fans. The total annual recharge of the upper Hueco Bolson is approximately 8,560 acre-feet per year, of which 5,600 acre-feet per year occurs via natural recharge from infiltration (U.S. Army 2010a).

Estimates of groundwater availability representing the amount of usable water in the Hueco Bolson aquifer in Texas varies and range from 3 million to 10.6 million acre-feet. El Paso Water Utilities (EPWU) estimates that fresh water in the Hueco Bolson is approximately 9.4 million acre-feet. The depth to groundwater near El Paso ranges from 259 to 400 feet below the surface. Potable water to support Fort Bliss operations comes from three sources: on-post wells operated by Fort Bliss, water purchased from the EPWU, and the Kay Bailey Hutchison Desalination Plant. The Kay Bailey Hutchison Desalination Plant was constructed in 2007 as a joint effort between the EPWU and Fort Bliss to treat brackish water from the Hueco Bolson aquifer (EPWU 2012b). It is projected that due to expansions of Fort Bliss, EPWU would increase as a water supplier to Fort Bliss populations, and much of this increased need will also be met by the new El Paso-Fort Bliss Kay Bailey Hutchison Desalination Facility (TWDB 2011).

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on groundwater would occur because no land sale or exchange of parcels would take place.

3.4.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Under Alternative 2, Parcel A would be sold for development, which would result in further groundwater resource depletion due to increased pumping required to meet water demand from the new development. However, it is anticipated that a portion of the water made available to the developed Parcel A would come from the Kay Bailey Hutchison Desalination Plant. Under Alternative 2, impacts on groundwater resources would be minor during construction activities and once Parcel A is fully developed due to the increased demand for groundwater.

3.4.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

No foreseeable impacts on groundwater would occur as a result of Alternative 3.

3.4.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Under Alternative 4, impacts on groundwater would be similar to those listed under Alternative 2. The impacts on groundwater resources would be minor during construction activities and once Parcel B is fully developed.

3.4.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. The impacts on groundwater resources would be minor during construction activities and with the development of all three parcels.

3.5 Biological Resources

3.5.1 Affected Environment

The U.S. Fish and Wildlife Service, under the Endangered Species Act (ESA) of 1973, and the State of Texas list various species of flora and fauna that are known to occur, or that have the potential to occur, on Fort Bliss as threatened, endangered, or species of concern. Additionally, Locally Important Natural Resources (LINRs) have been identified for protection by Fort Bliss. A listing of these resources and information on habitat and occurrences can be found in the SEIS, the GFS EIS, and the *Fort Bliss Integrated Natural Resources Management Plan, November 2009* (INRMP) (U.S. Army 2009).

<u>Threatened and Endangered Species, Species of Concern, and LINRs</u>

On Fort Bliss, 61 sensitive species of flora and fauna are known to occur or have the potential to occur, of which 31 have Federal special status. Seven are listed as threatened or endangered under the ESA, and one is a candidate for listing. The remaining 23 are listed as species of concern. In addition to those Federally listed and special status species, seven are listed as Texas threatened animals, and five are listed as endangered animals in the state. While most of these species are known to occur on Fort Bliss land, the probability of these species occurring within the Fort Bliss Cantonment and/or within parcels A, B, C or the proposed training land is low due to the lack of suitable habitat. However, the following Federal species of concern have the potential to occur within the project area: Texas horned lizard (*Phrynosoma hernandezii*) and western burrowing owl (*Athene cunicularia*). The western burrowing owl occurs in all desert shrubland communities and grassland vegetative communities on Fort Bliss, and the Texas horned lizard (also a Texas threatened species) is widespread throughout Fort Bliss in grassland and shrubland communities (U.S. Army 2010a). Currently, species of concern do not receive legal protection under the ESA, but Fort Bliss treats them as LINRs. The project area also has habitat that could be utilized by bird species protected under the Migratory Bird Treaty Act (MBTA) of 1918.

Parcel A (Southeast Bliss)
Parcel A is undeveloped land situated on the sparsely vegetated basin floor of the Hueco Bolson in the Chihuahuan Desert. Elevations range from approximately 3,970 feet to 4,005 feet MSL, and mean annual precipitation is approximately 8 to 10 inches. The parcel consists of large expanses of coppice sand dunes anchored by honey mesquite shrubs (*Prosopis glandulosa*). Other common plants include broom snakeweed (*Gutierrezia sarothrae*) and dropseed grasses (*Sporobolus flexuosus*). Approximately 31 percent of Fort Bliss land (348,847 acres) is characterized as coppice dunes (U.S. Army 2009). Common wildlife species in the area include the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Silvilagus audubonii*), coyote (*Canis latrans*), and red-tailed hawk (*Buteo jamaicensis*).

Parcel B (Fort Bliss and TxGLO-owned Land)
Parcel B is undeveloped land located east of Parcel A. The land currently owned by TxGLO is also undeveloped and located just northeast of Parcel B. Parcel B and the land currently owned by TxGLO consist of large expanses of coppice sand dunes anchored by honey mesquite shrubs. Other common plants include broom snakeweed and dropseed grasses. The black-tailed jackrabbit, desert cottontail, coyote, and red-tailed hawk inhabit the area.

Parcel C (Lower Beaumont)
Parcel C is previously developed land situated on a piedmont alluvial fan on the eastern flanks of the Franklin Mountains. Elevations range from approximately 3,950 feet to 4,125 feet MSL, sloping toward the east at more than eight percent. The area near Parcel C contains native desert plant species typical of northern Chihuahuan Desert mountain piedmont areas such as creosotebush (*Larrea tridentata*), ocotillo (*Fouquieria splendens*), and lechuguilla (*Agave lechuguilla*). Desert grasses include bush muhly (*Muhlenbergia porteri*) and tridens (*Tridens flavus*). Tree-of-heaven (*Ailanthus altissima)*, giant reed (*Arundo donax*), and saltcedar (*Tamarix* spp.) are a few exotic species found within Parcel C. Wildlife found in the area includes the black-tailed jackrabbit, desert cottontail, and numerous birds and reptiles.

3.5.2 Environmental Consequences

3.5.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on biological resources would occur because no land sale or exchange of parcels would take place.

3.5.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Parcel A encompasses approximately 0.5 percent of coppice dune vegetation found throughout Fort Bliss. Approximately 1,635 acres of this vegetation type would be cleared and lost but there would be minimal impacts since it is regionally common and abundant. Two Federal species of concern, the western burrowing owl and the Texas horned lizard, may be minimally impacted by Alternative 2. Preconstruction biological surveys for the Texas horned lizard and burrowing owl are recommended to detect their presence and provide for reducing impacts to these species. Migratory bird species protected under the MBTA may be minimally impacted by Alternative 2. However, these bird species would be protected in accordance with the MBTA to include phasing construction around the nesting season, and implementing BMPs to avoid harassing or harming these species. No other LINRs described in the SEIS, the GFS EIS, or the INRMP would be affected.

3.5.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Since the current TxGLO plans are to leave Parcel B as open land, no impacts on biological resources would occur in the foreseeable future. However, if Parcel B were to be developed at some time in the future, impacts would need to be reassessed given the changes occurring within the area and the region as a whole. It is anticipated that any development impacts of Parcel B would be similar to those under Alternative 2. Parcel B encompasses approximately 0.2 percent of coppice dune vegetation found throughout Fort Bliss. Approximately 683 acres of this regionally common vegetation would be cleared and lost but impacts would be minimal. The two Species of Concern and bird species protected by the MBTA may be minimally impacted.

The currently owned TxGLO land would serve as a buffer from encroachment once Fort Bliss acquires it, and there would be no impacts on biological resources. To prevent the spread of noxious weeds from activities in the proposed training land parcel, a noxious weed monitoring and treatment program would be established by Fort Bliss with guidance from DPW-E biologists. Additionally, equipment would be cleaned of all dirt, mud, and plant debris prior to moving onto or off of the area.

3.5.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Impacts under Alternative 4 would be similar to those under Alternative 2. Since most of Parcel C has been previously developed, only a minimal amount of regionally common vegetation would be cleared as a result of the development of Parcel C. The two species of concern and bird species protected by the MBTA may be minimally impacted.

3.5.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Approximately 2,330 acres of vegetation would be cleared as a result of the development of parcels A, B, and C; however, the vegetation that would be removed is common throughout the region and can be found in abundance. Therefore, the impacts on vegetation would be minimal. The two species of concern and bird species protected by the MBTA may be minimally impacted.

3.6 Cultural Resources

3.6.1 Affected Environment

Cultural resources are regulated at Fort Bliss per the National Historic Preservation Act of 1966, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, the Archaeological Resources Protection Act of 1979, and other statutes. Cultural resources are important because of their association or linkage to past events, historically important persons, design and construction values, and their ability to yield important information about history. Fort Bliss manages cultural resources associated with all prehistoric and historic periods recognized in southwest Texas. The SEIS (U.S. Army 2000) describes in detail the cultural history of Native Americans and post-contact inhabitants in the region. The *Integrated Cultural Resources Management Plan* (ICRMP) for Fort Bliss (U.S. Army 2008a) also contains detailed information about the history of Fort Bliss. Both documents are incorporated herein by reference. Pursuant to Army Regulation (AR) 200-1, the Fort Bliss Garrison Command is responsible for managing the cultural resources on the installation in compliance with all Federal laws, regulations, and standards. Additionally, a Programmatic Agreement (PA) between the Fort Bliss Garrison Command, the Texas SHPO, the New Mexico SHPO, and the Advisory Council on Historic Preservation (ACHP) for the Management of Historic Properties on Fort Bliss was signed into effect on September 19, 2006 and serves to guide cultural resources related compliance on Fort Bliss managed lands. This PA was recently amended in August 2011 to be effective for an additional six years.

Parcel A (Southeast Bliss)

Parcel A has been the subject of numerous cultural resources surveys, the most recent and comprehensive of which was conducted by Geo-Marine in 2006 (Stowe et al. 2007) and 2008 (Russell and Arford 2008). The Stowe et al. (2007) survey covered 920 acres that included a small portion of the upper western arm of Parcel A and the area adjacent to the northwest of Parcel A. Fourteen archaeological sites were documented, including a segment of the Butterfield Overland Mail Route, which runs through Parcel A. Four prehistoric sites were recommended as eligible for the National Register of Historic Places (NRHP), as was the Butterfield Overland Mail Route. The Butterfield Overland Mail Route is the only eligible site within Parcel A documented in the Stowe et al. (2007) study. The Russell and Arford (2008) investigation consisted of an intensive archaeological pedestrian survey that covered 3,087 acres within the Inner Loop 375 area, including the remainder and majority of the Parcel A area not surveyed by Stowe et al. 2007 and beyond. Five of the sites recommended eligible by Russell and Arford (2008) are located within Parcel A.

A follow-up investigation by Fort Bliss (Burt 2011) re-evaluated seven archaeological sites previously recommended eligible for the NRHP and located between Inner Loop 375 and Montana Avenue. The sites were tested and evaluated against standards developed in *Significance and Research Standards for Prehistoric Archaeological Sites at Fort Bliss: A Design for the Evaluation, Management and Treatment of Cultural Resources (*Miller 2009). The investigation resulted in the previous eligibility recommendations for the seven sites being re-evaluated as not eligible for the NRHP (Burt 2011). Included among the re-evaluated sites are all five of the previously recommended eligible sites by Russell and Arford (2008) located within Parcel A.

Parcel B (Fort Bliss and TxGLO-owned Land)

In the course of four archaeological investigations, four prehistoric sites within Parcel B were deemed potentially eligible for listing on the NRHP. These sites were formally evaluated in 2010 (U.S. Army 2010b). Only one site, FB 6971/41EP1473, was determined to meet the necessary requirements to qualify for listing under Criterion D, as it is likely to yield information important in the understanding of prehistory.

A total of 226 archaeological sites, including the Butterfield Overland Trail, have been noted within the parcel north of Loop 376 which is presently owned by TxGLO (Sitton 2012).

Parcel C (Lower Beaumont)

Parcel C is located within the William Beaumont General Hospital Historic District (WBGHHD) and is east of the current hospital. The WBGHHD was developed in the 1920s as the William Beaumont General Hospital. Originally consisting of 48 buildings with connecting corridors that were constructed of hollow tile and stucco, many buildings have been added through the years, and several of the buildings at the site have been demolished. An EA for the WBGHHD was conducted in 1999 to analyze the demolition, rehabilitation, and re-use of the buildings in order to improve safety and decrease the operating costs. Also in 1999, an archaeological survey was conducted at the WBGHHD and determined that there were no archaeological features or sites at this location. One landscape feature is considered worthy of preservation: a drainage channel (arroyo) that includes rock bridges, culverts, and landscaping elements.

A recent investigation into the integrity of the historic district has determined that it is no longer eligible as a district for NRHP listing. This determination has received concurrence from Texas SHPO as of May 2012 (THC 2012).

Two structures (Buildings T-7115 and T-7167) and one landscape area within Parcel C are considered eligible for inclusion on the NRHP. The current nursing school (Building 7115) was initially the Neuropsychiatry Building at the William Beaumont General Hospital and was constructed during World War II in an Italian Renaissance style. It is potentially eligible under Criterion A, as it is associated with events that have made a significant contribution to the broad patterns of our history, and under Criterion C for architecture.

The Blood Donor Facilities (Building T-7167), originally the Medical Detachment Kitchen and Main Library for William Beaumont General Hospital, contains a wall mural painted by Captain Rudolph Von Ripper, a prominent artist and well-decorated World War II hero. This structure is considered eligible for the NRHP under Criterion B, as it is associated with a famous individual, and under Criterion C as art produced by a master.

The portion of the parcel that features a rock-lined arroyo with associated footpaths, bridges, and garden areas is the only surviving component of what had been the carefully tended grounds of the William Beaumont General Hospital. The landscaping was considered remarkable by the community from 1925 to 1952, when it was under the care of the gardener W.H. Reeves. This area is considered eligible under Criterion C for landscape architecture with historic significance.

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on cultural resources would occur because no land sale or exchange would take place.

3.6.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

The Butterfield Overland Mail Route is the only eligible site located within Parcel A. The Texas SHPO has indicated that the trail should be made accessible to the public, but also appropriately protected and managed. A requirement of the city for development of an area as large as Parcel A mandates the setting aside of a 30-acre natural area, which, in this case, would be designed to include the site. The most viable solution would be a Memorandum of Agreement (MOA) developed between Fort Bliss, Texas SHPO, and the purchasing entity. The MOA would provide details on conveyance of the property upon sale, and any encumbrances to the purchasing entity, to ensure continued preservation of the site. Stipulations reached under a typical agreement to protect this type of historic feature usually include use of interpretive signs and creation of buffer zones from development. The MOA would set stipulations and timeframes for resolution of any adverse effects on historic properties.

3.6.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Within Parcel B, there is one site that is eligible for inclusion on the NRHP and has the potential to be impacted by development within the parcel. An MOA agreement between Fort Bliss, Texas SHPO, and TxGLO provides for TxGLO to be responsible for the management of this site within the parcel and the mitigation of adverse effects on the site (Appendix A).

In the land exchange, Fort Bliss would acquire a 2,880-acre parcel from TxGLO. This parcel would serve as a tank trail and buffer from encroachment, and no development is planned. Fort Bliss would accept responsibility for all cultural resources located within the parcel and apply all management policies, guidelines, and agreements detailed in its Mission and Master Plan SEIS, ICRMP, and PA (U.S. Army 2000; U.S. Army 2008a). As there are no foreseeable plans for development in this parcel to be acquired by the Army, there would be no effects on cultural resources from implementation of Alternative 3 regarding the 2,880-acre parcel.

3.6.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

The WBGHHD within Parcel C has been re-evaluated and determined to not be eligible as a historic district. Two structures (Buildings 7115 and T-7167) and one landscape feature within Parcel C are considered individually eligible for inclusion on the NRHP. Like Alternative 2, a PA regarding the treatment of these historic properties would be developed between Fort Bliss and Texas SHPO. Reuse of existing older buildings on the property, though desirable, may not be financially feasible, and these structures may be demolished after undergoing Historic American Buildings Survey/Historic American Engineering Record/Historic American Landscapes Survey (HABS/HAER/HALS) documentation. Thus, adverse effects on cultural resources in Parcel C related to the sale would be mitigated through the PA.

3.6.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under Alternatives 2, 3, and 4. Adverse effects on cultural resources as a result of Alternative 5 would be mitigated through the stipulations contained within agreement documents between Fort Bliss, Texas SHPO, and the purchasing entity developed for the respective parcels.

3.7 Air Quality

3.7.1 Affected Environment

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Ambient air quality standards are classified as either "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns (PM-10), particulate matter less than 2.5 microns (PM-2.5), and lead (Pb). NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare (USEPA 2010a). Areas that do not meet these NAAQS standards are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas (USEPA 2010b). The USEPA and Texas Commission on Environmental Quality (TCEQ) have designated the City of El Paso as a non-attainment area for all PM-10, a portion of the city as a maintenance area for CO, and El Paso County as a maintenance area for the 8-hour ozone standard (TCEQ 2012a and USEPA 2010b).

Greenhouse gases (GHG) have properties that promote the trapping of heat in the atmosphere and are a concern as a major factor in global warming. These gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases, including chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HFC), and halons, as well as ground-level O_3 (California Energy Commission 2007). Some gases have a greater global warming potential than others. Nitrogen oxides (NO_x), for instance, have a global warming potential that is 310 times greater than an equivalent amount of CO_2, and CH_4 is 21 times greater than an equivalent amount of CO_2.

3.7.2 Environmental Consequences

3.7.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on air quality would occur because no land sale or exchange of parcels would take place.

3.7.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Temporary and minor increases in air pollution would occur from the use of construction equipment (combustion and GHG emissions) and the disturbance of soils (fugitive dust) during development of Parcel A. Construction workers would temporarily increase the combustion emissions in the airshed during their commute to and from the project area. Emissions from delivery trucks would also contribute to the overall air emission budget.

Operational air emissions refer to air emissions that may occur after the parcel is developed and would include emissions from residential auto trips and delivery vehicles servicing the commercial tenants. The calculations for air emissions from construction and operational sources are presented in Appendix B.

Based upon the calculations, air emissions from the proposed construction activities would not exceed Federal *de minimis* thresholds; however, the operational air emissions would exceed thresholds for volatile organic compounds (VOC), CO, and NO_x. TCEQ has implemented a state implementation plan (SIP) for CO and ozone that accounts for the increase in residential traffic (TCEQ 2012b). The maintenance plan includes the use of oxygenated fuels in El Paso County during the winter months, new-source-review provisions for major CO stationary sources, and corrections to the existing vehicle inspection and maintenance program (TCEQ 2008). Similarly, the ozone SIP requires modified fuels in El Paso County during the summer months. The fuel is modified to lower its evaporation rate (TCEQ 2012c). The mitigation programs incorporated in the El Paso CO and ozone SIPs ensure that the new operational air emissions associated with Alternative 2 are in compliance with regulations.

As there are no violations of air quality standards and no conflicts with the Texas SIPs, the impacts on air quality in El Paso County from the implementation of the Alternative 2 would be minor. Dust suppression BMPs should be implemented to minimize fugitive dust, including wetting solutions applied to construction areas.

3.7.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

For the foreseeable future, no impacts on air quality from the exchange of Parcel B would occur. If development of Parcel B were to occur sometime in the future, then impacts on air quality would be similar to those under Alternative 2. Based upon the calculations, air emissions from the proposed construction activities would not exceed Federal *de minimis* thresholds; however, the operational air emissions would exceed thresholds for volatile organic compounds (VOC), CO, and NO_x. As there are no violations of air quality standards and no conflicts with the Texas SIPs, the impacts on air quality in El Paso County from the implementation of Alternative 3 would be minor.

3.7.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Based upon the calculations, neither air emissions from the proposed construction activities nor operational air emissions would exceed Federal *de minimis* thresholds. Therefore, the impacts on air quality in El Paso County from the implementation of Alternative 4 would be negligible.

3.7.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. The impacts on air quality in El Paso County from the implementation of Alternative 5 would be minor.

3.8 Noise

3.8.1 Affected Environment

Noise is generally described as unwanted sound, which can be based either on objective effects (i.e., hearing loss, damage to structures, etc.) or on subjective judgments (e.g., community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 3 dB, and the threshold of discomfort or pain is around 130 dB. The A-weighted decibel (dBA) is a measure of sound pressure adjusted (weighted) to conform to the frequency response of the human ear. The dBA metric is most commonly used for the measurement of environmental and industrial noise.

Noise levels occurring at night generally produce a greater annoyance than the same noise levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of intrusive noise during the day, at least in terms of its potential for causing community annoyance. This perception is largely because background environmental sound levels at night in most areas are also about 10 dBA lower than those during the day.

Long-term noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by the USEPA and has been adopted by most Federal agencies (USEPA 1974). A DNL of 65 dBA is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction.

U.S. Army noise abatement policy is implemented through AR 200-1, *Environmental Protection and Enhancement* (U.S. Army 2007b), which defines land use recommendations based on noise exposure levels resulting from Army activities. Three noise zones are presented in Table 3-2.

Table 3-2. Noise Limits and Zones for Land Use Planning

Noise Zone	DNL	Land Use Recommendations
I	< 65 dBA	Recommended: Housing, schools, medical facilities, and other noise-sensitive land uses are recommended as compatible with noise levels in the zone.
II	65–75 dBA	Normally not recommended: Noise-sensitive land uses (e.g., housing, schools, and medical facilities) are normally not recommended in this zone.
III	> 75 dBA	Not recommended: Noise-sensitive land uses (e.g., housing, schools, and medical facilities) are not recommended in this zone.

Source: U.S. Army 2007b

Noise Attenuation

As a general rule of thumb, noise generated by a stationary noise source, or "point source," will decrease by approximately 6 dBA over hard surfaces and 9 dBA over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of 85 dBA at a reference distance of 50 feet over a hard surface, then the noise level would be 79 dBA at a distance of 100 feet from the noise source, 73 dBA at a distance of 200 feet, and so on. To estimate the attenuation of the noise over a given distance the following relationship is utilized:

Equation 1: $dBA_2 = dBA_1 - 20 \log^{(d2/d1)}$

Where:

dBA_2 = dBA at distance 2 from source (predicted)
dBA_1 = dBA at distance 1 from source (measured)
d_2 = Distance to location 2 from the source
d_1 = Distance to location 1 from the source
Source: California Department of Transportation (Caltrans) 1998.

Parcels A and B are located on the north side of Montana Avenue, which is a four-lane highway. The south side of Montana Avenue is occupied by commercial, industrial, and residential land uses. The distance between parcels A and B and the civilian businesses and residences across the street is approximately 260 feet. Parcel C is located in a residential neighborhood between Fred Wilson Avenue and Hayes Avenue, and there are a number of single- and multi-family homes nearby. The Travis Elementary School is located approximately 370 feet from the southeast corner of Parcel C.

3.8.2 Environmental Consequences

3.8.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, sensitive noise receptors would not experience construction noise emissions or additional traffic noise because no land sale or exchange of parcels would take place.

3.8.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

The development of Parcel A would require the use of common construction equipment. Table 3-3 presents noise emission levels for construction equipment expected to be used during the proposed construction activities during the development of the parcel. Anticipated sound levels at 50 feet from various types of construction equipment range from 76 dBA to 84 dBA, based on data from the Federal Highway Administration ([FHWA] 2007).

Construction would involve the use of a bulldozer, which has a noise emission level of 84 dBA at 50 feet from the source. Assuming the worst case scenario, the noise model (Caltrans 1998) estimates that noise emissions of 84 dBA would have to travel 450 feet before they would attenuate to an acceptable level of 65 dBA. To achieve an attenuation of 84 dBA to a normally unacceptable level of 75 dBA, the distance from the noise source to the receptor would need to be 140 feet.

Table 3-3. A-Weighted (dBA) Sound Levels of Construction Equipment and Modeled Attenuation at Various Distances[1]

Noise Source	50 feet	100 feet	200 feet	500 feet	1,000 feet
Backhoe	78	72	66	58	51
Crane	81	75	69	61	54
Dump Truck	76	70	64	56	49
Excavator	81	75	69	61	54
Concrete mixer truck	79	73	67	59	52
Bulldozer	84	78	72	64	57
Front-end loader	82	76	70	62	55

Source: FHWA 2007

1. The dBA at 50 feet is a measured noise emission. The 100- to 1,000-foot results are GSRC modeled estimates.

Depending upon the number of construction hours, as well as the number, type, and distribution of construction equipment being used, the noise levels near the project area could temporarily exceed 65 dBA up to 450 feet from the project area. A Geographic Information Systems (GIS) database was used to determine the number of sensitive noise receptors within 450 feet of the edge of the project corridor. Approximately 89 residential receptors and one church may experience temporary noise intrusions equal to or greater than 65 dBA from construction equipment. Noise generated by the construction activities would be intermittent and last for several years, after which noise levels would return to relative ambient levels. To minimize the impact potential, the developer may be required to limit construction activities to daylight hours during the workweek. Construction noise impacts would be minor if work hour restrictions are implemented during construction.

Long-term noise impacts would result from the increase of vehicle traffic due to the additional residents and businesses in the region. Generally, a project may have a significant effect on the environment if it would substantially increase the ambient noise levels or would conflict with local planning criteria or ordinances. For the proposed project, the significance of anticipated noise effects is based on a comparison between existing and predicted noise levels. It is known that doubling the traffic volume, or increasing it by 100 percent, could increase the "Equivalent Continuous Noise Level," or Leq, by about 3 dBA, which is the smallest change in noise level a person can detect. A 3 dBA change in Leq noise levels is not typically perceived by persons with average hearing. Some people can detect a change in noise levels between 3 dBA and 5 dBA Leq, and changes greater than 5 dBA Leq are readily perceived by people with average hearing (FHWA 1996). The increase in the number of vehicle trips in the adjacent neighborhoods associated with the Proposed Action would be less than 100 percent; therefore, the increase in noise generation would be barely perceptible above current levels, and the impacts on the noise environment would be minor.

3.8.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

For the foreseeable future, no noise impacts from the exchange of Parcel B would occur. If development of Parcel B were to occur sometime in the future, approximately 104 single-family homes, 106 multi-family homes, one church, and two schools may experience temporary noise intrusions equal to or greater than 65 dBA from construction equipment. Long-term noise impacts would be similar to those described in Alternative 2 and would be considered minor.

3.8.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Approximately 41 single-family homes and 9 multi-family homes may experience temporary noise intrusions equal to or greater than 65 dBA from construction equipment. Noise generated by the construction activities would be intermittent and last for several years, after which noise levels would return to relative ambient levels. To minimize the impact potential, the developer may be required to limit construction activities to daylight hours during the workweek. Construction noise impacts would be minor if these timing restrictions are implemented during construction. Long-term noise impacts would be similar to those described in Alternative 2 and would be considered minor.

3.8.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Construction noise impacts would be considered temporary and minor, and long-term noise impacts would be considered minor.

3.9 Traffic and Transportation

3.9.1 Affected Environment

Several highways provide regional access in the El Paso area (Figure 3-4). The major east-west access is provided by Interstate 10 (I-10), which runs through downtown El Paso and passes just south of the Fort Bliss Cantonment. I-10 is the most heavily traveled roadway in El Paso and connects the region to western and central Texas to the east and southern New Mexico and Arizona to the west. US 54 (Patriot Freeway) is the major north-south divided highway in the area. Another key regional roadway is Montana Avenue (US 62/180), which is located immediately south of Fort Bliss and provides access to locations east of El Paso.

Loop 375, also an important regional traffic corridor, connects the northeast and eastern portions of the city and helps reduce traffic congestion along US 54. Loop 375 crosses the Fort Bliss installation between Montana Avenue and US 54. Spur 601 provides a 7.4-mile connection between US 54 on the west and Loop 375 on the east.

The El Paso International Airport located west of parcels A and B, provides airline passenger services, air cargo, and general aviation services to West Texas and New Mexico. The airport is located 6 miles east of downtown El Paso and 1.7 miles north of I-10.

Public transportation is available along the project corridors by the Sun Metro Public Transportation System. There are several bus routes and stops located near all of the parcels. Rapid transit systems, light rail systems, and bicycle routes are also planned in the vicinity of the parcels.

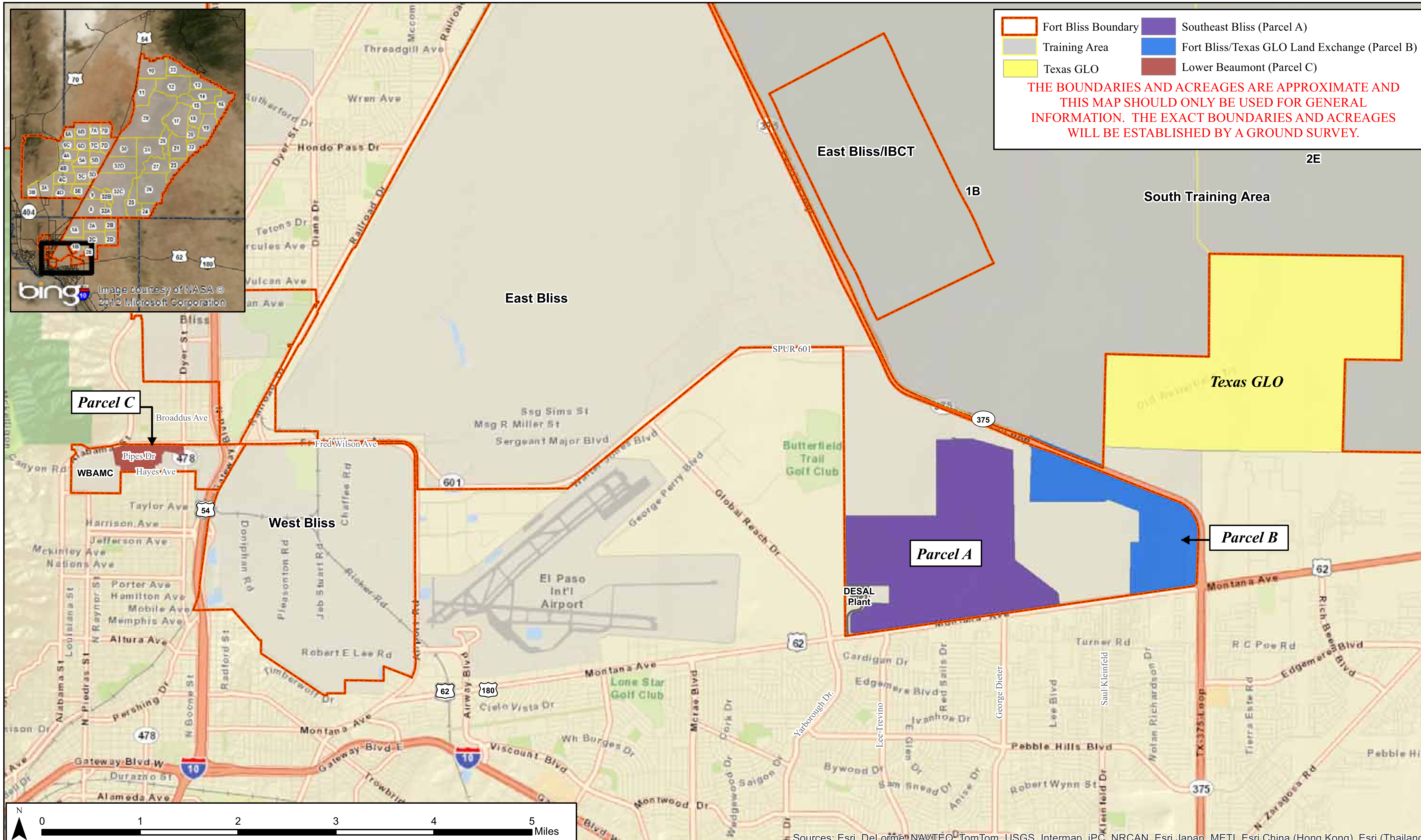

Figure 3-4: Transportation Corridors Near the Proposed Land Sale and/or Exchange Parcels

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Several projects are in the queue by the El Paso Metropolitan Planning Organization (MPO) and TxDOT to increase the traffic movement and the level(s) of service (LOS) in the area of parcels A and B. These area projects include constructing an interchange at Loop 375 and Sergeant Major Boulevard and widening Montana Avenue to six lanes, both scheduled for year 2015. In 2021, plans are to widen Loop 375 to six lanes (El Paso MPO 2010). Additionally, TxDOT is beginning preliminary plans to construct above-grade improvements at all intersections along Montana Boulevard (Leos 2012).

Parcels A and B are located on the north side of Montana Avenue, between Global Reach (Yarbrough) Drive and Loop 375. At this location, Montana Avenue is a divided highway. The proposed training land parcel currently owned by TxGLO is located just north of Montana Avenue and east of Loop 375. Parcel C is located along Fred Wilson Avenue near Spur 601 (see Figure 3-4).

Existing traffic volumes were obtained for AM and PM peak periods (0700 – 0900 and 1600 – 1800 hours) during the weekday for 23 critical intersections in the project area around the parcels proposed for development (ICRC 2012). From the traffic volumes, the existing LOS for AM and PM peak hours were obtained. LOS (on a scale from A to F) provides a qualitative rating of the traffic operational conditions experienced by the users of a transportation facility and is a measure of the capacity of a roadway to handle the volume of traffic anticipated. Table 3-4 defines the six LOS ratings used for capacity analysis.

Table 3-4. Level of Service Description

LOS	Description
A (Best)	Free-flow conditions. Drivers maintain their speed. Minimum or no delay.
B (Very Good)	Reasonable free-flow conditions. Driver has some flexibility to select his speed. Minimum delay.
C (Good)	At or near free-flow conditions. Driver experiences some movement restrictions.
D (Below Average)	Decreasing free-flow conditions. Driver has little freedom of movement. Recommended design LOS in urban areas.
E (Unacceptable)	Operating conditions at or near capacity. Substantial movement restriction and delay.
F (Worst)	Stop and go conditions. Breakdown in vehicular flow. Long delays. Drivers will seek alternative routes.

The existing LOS (peak hour) for intersections near the proposed parcels are shown in Table 3-5. The table shows that for parcels A and B the existing LOS for AM peak hour traffic is “unacceptable” at four nearby intersections (Loop 375 southbound [SB] and Spur 601, Loop 375 northbound [NB] and Spur 601, Global Reach (Yarbrough) Drive and Montana Avenue, Pebble Hills Boulevard and Yarbrough Drive). The LOS scores for the PM peak hour are better, with two intersections (Global Reach (Yarbrough) Drive and Montana Avenue, Pebble Hills Boulevard and Yarborough Drive) having “unacceptable” operating conditions. For Parcel C none of the intersections have a LOS rating of “unacceptable” in the AM peak hour, while two intersections (Fred Wilson Avenue and Gateway Boulevard SB, Dyer Street and Broaddus Avenue) have a LOS rating of “unacceptable” in the PM peak hour.

Table 3-5. Existing Levels of Service (Peak Hour) for Intersections near the Parcels

Intersection	Parcels A and B Existing LOS		Parcel C Existing LOS	
	AM	PM	AM	PM
Loop 375 (SB) and Liberty Expressway (Spur 601)	E	D		
Loop 375 (NB) and Liberty Expressway (Spur 601)	F	B		
Loop 375 (SB) and Montana Avenue	B	C		
Loop 375 (NB) and Montana Avenue	B	B		
Saul Kleinfeld Drive and Montana Avenue	C	B		
George Dieter Drive and Montana Avenue	D	B		
Lee Trevino Drive and Montana Avenue	D	D		
Global Reach (Yarbrough) Drive and Montana Avenue	F	F		
Lee Boulevard and Montana Avenue	C	B		
Edgemere Boulevard and Yarbrough Drive	B	C		
Edgemere Boulevard and Lee Trevino Drive	B	C		
Edgemere Boulevard and George Dieter Drive	C	C		
Pebble Hills Boulevard and Yarbrough Drive	F	F		
Pebble Hills Boulevard and Lee Trevino Drive	C	D		
Pebble Hills Boulevard and George Dieter Drive	C	C		
Turner Road and Lee Boulevard	B	A		
Fred Wilson Avenue and Gateway Boulevard (NB)			C	C
Fred Wilson Avenue and Gateway Boulevard (SB)			D	F
Dyer Street and Hayes Avenue			B	A
Dyer Street and Broaddus Avenue			A	E
Fred Wilson Avenue and Pipes (Russell) Drive			D	B
Fred Wilson Avenue and Dyer Street			D	C
Fred Wilson Avenue and Alabama Street			B	B

Source: ICRC 2012
Green – LOS A or B; Yellow – LOS C or D; Red – LOS E or F

3.9.2 Environmental Consequences

A pre-development traffic impact analysis (TIA) was prepared to determine the traffic impacts as a result of the sale and/or exchange of the parcels and the anticipated development of those parcels (ICRC 2012, Appendix C). In order to assess impacts, the TIA analyzed a development scenario based on a combination of retail, residential, community facilities, and mixed-use buildings and assumed that the parcels would be fully developed by 2015. Future infrastructure proposed by the City of El Paso and the Texas Department of Transportation includes the widening of Montana Avenue by adding one lane in each direction and the construction of an overpass at Sergeant Major Boulevard and Loop 375. This infrastructure was included in the analysis of the 2015 full build-out scenario. Projected city growth in 2015 was also considered in the analysis.

As part of the TIA, trips generated to and from the proposed developed parcels were forecast to determine traffic flow. In order to obtain trip generation from the developed parcels, the following assumptions were used:

- Parcel A residential development was based on the City of El Paso's SmartCode Growth and a Smart Growth Density Table, which was provided by the City of El Paso; commercial and industrial development was based on the surrounding urban land use patterns and U.S. Census data.
- Development in parcels B and C was based on the surrounding land use urban patterns and U.S. Census data.
- Future population and jobs scenarios for the city were verified by the El Paso Metropolitan Planning organization and Texas State Data Center.
- 65 percent of trips would exit the parcels and 35 percent would enter the parcels during the AM peak hour. The directionality proportion would reverse for the PM peak hour.
- Access to Parcel A would be available at two points: 1) from the north via a connecting road near the El Paso Community College (EPCC) campus and the William Beaumont hospital to a new interchange on Loop 375; and 2) from the south along a road connecting to Montana Avenue opposite George Dieter Drive.
- Access to Parcel C would be available at several points: from the north via Fred Wilson Avenue, from the west through the William Beaumont Army Medical Center, and from the south along Hayes Avenue.

The traffic analysis determined the existing traffic volumes and estimated future traffic volumes once the parcels were developed for various intersections within the project area. From these volumes, the LOS could be evaluated. Table 3-6 shows the existing AM and PM peak hour LOS scores and the full build-out 2015 LOS scores for intersections in the area around the parcels proposed for development. Also shown in Table 3-6 are the LOS scores for the nearby intersections after mitigation strategies were applied to improve the LOS to acceptable levels.

Proposed mitigation measures include:

- redesigning traffic light phasing and timing for optimization
- improving street geometry and signalization
- lengthening of left lane capacity in order to absorb demand
- adding a new left turn lane in median
- adding a left turn sign in existing lane
- adding a right turn lane in existing shoulder
- opening new thoroughfares and turns in order to redistribute traffic access to parcels A, B, and C
- adding new connections to the city grid using existing streets that are currently interrupted
- substituting left turns by indirect trajectories at Montana Avenue and Yarbrough Drive, Montana Avenue and Lee Trevino Drive, and partially at Montana Avenue and George Dieter Drive
- adding new traffic lights

Appendix C details the mitigation measures needed at each specific intersection to reduce traffic impacts and achieve acceptable LOS.

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Table 3-6. Levels of Service for Nearby Intersections within the Project Area

Intersection	Parcel A alone						Parcel B alone						Parcels A and B together						Parcel C alone					
	Existing LOS		2015 LOS		Future Mitigation (2015) LOS		Existing LOS		2015 LOS		Future Mitigation (2015) LOS		Existing LOS		2015 LOS		Future Mitigation (2015) LOS		Existing LOS		2015 LOS		Future Mitigation (2015) LOS	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Loop 375 (SB) and Liberty Expressway (Spur 601)	E	D	E	F	D	A	E	D	E	F	B	A	E	D	E	F	E	A						
Loop 375 (NB) and Liberty Expressway (Spur 601)	F	B	F	B	F	B	F	B	F	B	C	B	F	B	F	B	F	B						
Loop 375 (SB) and Montana Avenue	B	C	C	D	B	C	B	C	C	D	B	C	B	C	C	D	C	C						
Loop 375 (NB) and Montana Avenue	B	B	C	B	B	B	B	B	C	B	B	C	B	B	C	B	B	B						
Saul Kleinfeld Drive and Montana Avenue	C	B	C	B	C	C	C	B	C	C	C	B	C	B	C	B	C	C						
George Dieter Drive and Montana Avenue	D	B	F	F	C	D	D	B	E	B	D	B	D	B	F	F	D	D						
Lee Trevino Drive and Montana Avenue	D	D	F	F	D	B	D	D	D	D	D	B	D	D	F	F	D	B						
Global Reach (Yarbrough) Drive and Montana Avenue	F	F	F	F	B	F	F	F	F	F	D	E	F	F	F	F	C	F						
Lee Boulevard and Montana Avenue	C	B	D	C	B	B	C	B	C	B	B	B	C	B	D	C	C	B						
Edgemere Boulevard and Yarbrough Drive	B	C	C	C	C	B	B	C	B	C	B	B	B	C	C	C	C	B						
Edgemere Boulevard and Lee Trevino Drive	B	C	B	C	B	C	B	C	B	C	B	B	B	C	B	C	B	C						
Edgemere Boulevard and George Dieter Drive	C	C	D	D	D	C	C	C	C	C	C	C	C	C	D	D	C	C						
Pebble Hills Boulevard and Yarbrough Drive	F	F	F	F	C	C	F	F	F	F	D	D	F	F	F	F	C	C						
Pebble Hills Boulevard and Lee Trevino Drive	C	D	C	D	C	D	C	D	C	D	C	C	C	D	C	D	C	C						
Pebble Hills Boulevard and George Dieter Drive	C	C	D	F	C	C	C	C	C	C	C	C	C	C	D	F	C	C						
Turner Road and Lee Boulevard	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A						
New Avenue (A) @ Oasis Drive and Montana Avenue					C	B											C	B						
New Avenue (B) @ Smoke Signal Drive and Montana Avenue					C	C											D	C						
Loop 375 (EB) and George Dieter Drive (new)			A	A	A	A			B	A	A	A			A	A	A	A						
Loop 375 (WB) and George Dieter Drive (new)			A	A	A	A			B	A	A	A			A	A	A	A						
Fred Wilson Avenue and Gateway Boulevard (NB)																			C	C	C	C	B	C
Fred Wilson Avenue and Gateway Boulevard (SB)																			D	F	E	F	B	C
Dyer Street and Hayes Avenue																			B	A	B	A	A	A
Dyer Street and Broaddus Avenue																			A	E	A	F	A	B
Fred Wilson Avenue and Pipes (Russell) Drive																			D	B	D	C	B	B
Fred Wilson Avenue and Dyer Street																			D	C	C	C	C	C
Fred Wilson Avenue and Alabama Street																			B	B	C	B	B	B
Fred Wilson Avenue and Lackland Street (new)																							A	A
Hayes Avenue and Eastman Street (new)																							A	A

Source: ICRC 2012 Green – LOS A or B; Yellow – LOS C or D; Red – LOS E or F

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3.9.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on transportation and supporting infrastructure would occur because no land sale or exchange of the parcels would take place.

3.9.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

The proposed sale of Parcel A would directly result in development that would increase traffic on Montana Avenue, Loop 375, and nearby intersections, some of which currently have a poor LOS. With the development of Parcel A, approximately 102,000 vehicle trips per day to and from Parcel A would occur. Overall, 33 percent (six intersections) of the analyzed intersections would have an AM and PM LOS of E or F. As a result, there would be long-term adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways around the proposed developed Parcel A.

The pre-development TIA indicates that future traffic impacts could be mitigated to moderate impacts for the most part by implementing at-grade solutions that would not involve major infrastructure investments. A development-specific TIA would be required of the private developer when actual project designs are completed and submitted to the city for review. As shown in Table 3-6, applying mitigation strategies would bring the 2015 LOS scores at the impacted intersections into the “good” or “below average” operating conditions, which in most cases is better than the existing LOS. After the proposed mitigation is implemented, 8 percent (one intersection) of the analyzed intersections would have an AM LOS of E or F and 4 percent would have a PM LOS of E or F. At-grade mitigation solutions including additional street connectivity, traffic control improvements, and modified street geometry and intersection design provide acceptable LOS on the area roadways after the development of the parcel.

Congestion would be mostly concentrated along Montana Avenue, particularly at Yarbrough Drive, Lee Trevino Drive, and George Dieter Drive. Timing and phasing optimization and additional left and right turn lanes were not sufficient enough to achieve acceptable LOS. Additional connections would be essential to distribute traffic to Parcel A. New connections to Parcel A would be proposed at Lee Boulevard, and at existing turns near Oasis Drive and Montana Avenue (new Avenue A) and Smoke Signal Street and Montana Avenue (new Avenue B). The existing traffic signal at Lee Boulevard would be optimized, and new traffic signals would be required at the two other connections.

Extra lanes would be necessary at the northern George Dieter Drive planned extension, as well as in segments of Montana Avenue between Yarbrough Drive and Lee Trevino Drive, and their respective U-turns. Left turn management using indirect trajectories and reducing the number of phases at the intersections would provide a complementary at-grade solution to Lee Trevino Drive and George Dieter Drive. Signalized, two-way U-turns would allow for indirect left turn movements, managing accumulation and delays, and giving more capacity to the traffic control system. The signalized intersections would also be beneficial to pedestrians by allowing protected pedestrian crossings at appropriate distances. Mitigation for the intersection at Montana Avenue and Yarborough (Global Reach) Drive can only be accomplished by constructing above-grade infrastructure (overpass) for through traffic, which is planned for the near future.

Additionally, the City of El Paso and TxDOT are planning a series of at-grade and above-grade improvements on Montana Avenue and other area streets that would further mitigate traffic impacts in this area (Leos 2012). The developer would either phase the development of Parcel A to coincide with the above-grade improvements being planned by TxDOT, or pay to construct the infrastructure as part of the development. The pre-development TIA analyzed other mitigation alternatives for Parcels A and B including the overpasses on Montana Avenue, overpasses on Montana Avenue with additional connectivity, and the option of a viaduct extending the Montana Avenue/Loop 375 underpass. While these other mitigation alternatives would successfully improve the LOS at the analyzed intersections, they would be considered as more long-term and expensive mitigation solutions that the developer could use. Detailed mitigation measures for each of the intersections can be found in Appendix C.

Although not analyzed as part of the traffic study, additional thoroughfares, including the planned extension of Lee Trevino Drive and an east-west thoroughfare between Global Reach and Loop 375, would likely be necessary in the future beyond 2020. In addition, the planned overpass improvement at Loop 375 and Spur 601 and the planned underpass at Loop 375 and Montana Avenue are likely to improve the LOS at these intersections. Alternative transportation modes, such as public transportation and non-motorized alternatives, are being planned by the city and would be necessary for any future SmartCode Growth applications. The implementation of these public transportation projects would need to be coordinated with the developer to ensure that proper right-of-way designs are incorporated.

3.9.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

The proposed exchange of Parcel B would not result in development for the foreseeable future since the TxGLO has no plans for the property other than to manage it as is. However, for the purposes of cumulative impact analysis, it was assumed that the parcel could be developed as mixed residential, light commercial based on surrounding land use and census data. Using this data, the TIA modeling showed an increase in traffic on Montana Avenue, Loop 375, and nearby intersections, some of which currently have a poor LOS. Approximately 21,000 vehicle trips per day to and from Parcel B could presumably occur. Overall, 28 percent (five intersections) of the analyzed intersections would have an AM LOS of E or F and 17 percent (three intersections) would have a PM LOS of E or F. As a result, there could be long-term adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways if Parcel B were to be developed.

The TIA analysis for Parcel B indicates that future traffic impacts could be mitigated to moderate impacts by implementing at-grade solutions that would not involve major infrastructure investments. A project-specific TIA would be required of the private developer when actual project designs are completed and the City of El Paso permits acquired prior to any development. As shown in Table 3-6, applying mitigation strategies if development occurred, would bring the 2015 LOS scores at the impacted intersections into the "good" or "below average" operating conditions, which in most cases is better than the existing LOS. After the proposed mitigation is implemented, none of the analyzed intersections would have an AM LOS of E or F and 6 percent (one intersection) would have a PM LOS of E or F. Mitigation measures would be similar to Parcel A, but not as many measures would be needed, since less traffic would be generated by the development of Parcel B. The impacts on Parcel B could be mitigated by adding right and left turn lanes, extending the accumulation space for left and right turns, and optimizing traffic light timing and phasing. One extra lane would be necessary in a segment of Yarborough Drive between Montana Avenue and Edgemere Boulevard. Detailed mitigation measures can be found in Appendix C. Additionally, the City of El Paso and TxDOT are planning a series of at-grade and above-grade improvements on Montana Avenue, Loop 375, Spur 601, and other area streets that would further mitigate traffic impacts in this area.

3.9.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

The proposed sale of Parcel C would directly result in development that would increase traffic on Fred Wilson Avenue, Dyer Street, and nearby intersections. Most intersections near Parcel C operate at acceptable LOS and have low traffic volumes, but some do have poor LOS. Approximately 1,700 vehicle trips per day to and from Parcel C would occur. Overall, 14 percent (one intersection) of the analyzed intersections would have an AM LOS of E or F and 28 percent (two intersections) would have a PM LOS of E or F. As a result, there would be long-term adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways around the proposed developed Parcel C.

The pre-development TIA indicates that future traffic impacts could be mitigated to minor impacts by implementing at-grade solutions that would not involve major infrastructure investments. A development-specific TIA would be required of the private developer when actual project designs are completed and submitted to the city for review. As shown in Table 3-6, applying mitigation strategies would bring the 2015 LOS scores at the impacted intersections into the "good" operating conditions, which in most cases is better than the existing LOS. After the proposed mitigation is implemented, none of the analyzed intersections would have an AM or PM LOS of E or F. Mitigation actions would eliminate E and F LOS levels and would increase the A and B LOS levels at the intersections. Traffic light timing and phasing optimization would be able to improve traffic light operation and LOS. To reduce the traffic volume at the Fred Wilson Avenue and Pipes Drive access, new entrances to Parcel C are proposed at the Fred Wilson Avenue and Lackland Street intersection and at the Hayes Avenue and Eastman Street intersection. A new traffic signal would be necessary at the intersection of Fred Wilson Avenue and Lackland Street, along with left turn lanes for vehicles traveling eastbound and westbound. A non-signalized intersection would be sufficient for the intersection of Hayes Avenue and Eastman Street. Detailed mitigation measures can be found in Appendix C.

3.9.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

The proposed sale and/or exchange of parcels A, B, and C would directly result in development that would increase traffic on Montana Avenue, Loop 375, Fred Wilson Avenue, Dyer Street, and nearby intersections, some of which currently have a poor LOS. However, it is important to note that no development is anticipated within Parcel B for the foreseeable future. All discussions on traffic impacts from the three parcels are based on development scenarios to generate potential impacts to transportation resources. If developments of parcels A, B, and C were to occur, approximately 125,000 vehicle trips per day to and from the parcels could be generated. Overall, 33 percent (six intersections) of the analyzed intersections for parcels A and

B would have an AM or PM LOS of E or F. Also, 14 percent (one intersection) of the analyzed intersections for Parcel C would have an AM LOS of E or F and 28 percent (two intersections) would have a PM LOS of E or F. As a result, there would be long-term adverse impacts on traffic and roadway wear and tear as a result of additional vehicle traffic on the local roadways around the proposed developed parcels A, B, and C.

The pre-development TIA indicates that future traffic impacts could be mitigated to minor or moderate impacts by implementing, for the most part, at-grade solutions that would not involve major infrastructure investments, with the exception of the Montana-Yarborough intersection. A development-specific TIA would be required of the private developer when actual project designs are completed for each parcel. As shown in Table 3-6, applying mitigation strategies would bring the 2015 LOS scores for parcels A and B at the impacted intersections into the "good" or "below average" operating conditions, which in most cases is better than the existing LOS, and for Parcel C at the impacted intersections, LOS would improve into the "good" operating conditions. After the proposed mitigation is implemented, 8 percent (one intersection) of the analyzed intersections at parcels A and B would have an AM LOS of E or F, and 4 percent (one intersection) would have a PM LOS of E or F; none of the intersections at Parcel C would have an AM or PM LOS of E or F. Mitigation measures would be equivalent to those for alternatives 2, 3, and 4, and detailed mitigation measures can be found in Appendix C. Additionally, the City of El Paso and TxDOT are planning a series of above-grade improvements on Montana Avenue and other area streets that would further mitigate traffic impacts in this area.

3.10 Health and Safety

3.10.1 Affected Environment

Federal, state, and Fort Bliss guidelines, rules, and regulations are in place to protect personnel throughout the installation. Safety information and analysis is found in the SEIS (U.S. Army 2000) and Fort Bliss Regulation 385-63. Health programs are promoted through U.S. Army Public Health Command and Medical Command. Various Fort Bliss procedures have also been established to meet health and safety requirements.

Health and safety hazards in the project areas would likely occur during construction and could include exposure to unexploded ordnance (UXO), dehydration and heat illness, contact with venomous animals and spiny vegetation, and vehicle accidents.

3.10.2 Environmental Consequences

3.10.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on health and safety would occur because no land sale or exchange of the parcels would occur.

3.10.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

The sale and development of Parcel A would not affect the health and safety of the local populace. During development construction, all applicable Occupational Safety and Health Administration (OSHA) rules and regulations would be followed by project contractors. Heavy equipment operation areas and trenching locations would be secured to prevent inadvertent public access. There is a possibility for traffic accidents due to the increased traffic from the development of the parcel. The accidents would be minimized by the implementation of the mitigation measures developed to ease traffic conditions. Minimal health and safety impacts with OSHA rules and regulations and BMPs in place would be expected as result of the implementation of Alternative 2.

3.10.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Impacts under Alternative 3 would be similar to those under Alternative 2. The TxGLO-owned land is located adjacent to military training areas; as such, there is a potential for encountering UXO during any use of this land after acquisition. Safety briefings on the recognition and avoidance of UXO would be conducted prior to land clearing. Any detected UXO would be handled by explosive ordnance disposal (EOD) personnel, as per approved procedures at Fort Bliss. Minimal impacts on health and safety would be expected as a result of the implementation of Alternative 3.

3.10.2.4 Alternative 4 – Sale of Parcel C or Development (Lower Beaumont)

Impacts under Alternative 4 would be similar to those under Alternative 2 and considered minimal.

3.10.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Minimal impacts on health and safety would be expected as a result of the implementation of Alternative 5.

3.11 Hazardous Materials and Waste

3.11.1 Affected Environment

Hazardous materials are substances that cause human physical or health hazards (29 CFR 1910.1200). Materials that are physically hazardous include combustible and flammable substances, compressed gases, and oxidizers. Health hazards are associated with materials that cause acute or chronic reactions, including toxic agents, carcinogens, and irritants.

Hazardous waste is produced from various equipment maintenance processes and is composed of any material listed in 40 CFR 261 Subpart D, or those that exhibit characteristics of toxicity, corrosivity, ignitability, and reactivity. Hazardous materials are regulated in Texas by a combination of mandated laws promulgated by the USEPA and TCEQ. In addition, hazardous wastes are managed under the Installation Hazardous Waste Management Plan, which provides detailed information on training; hazardous waste management roles and responsibilities; and hazardous waste identification, storage, transportation, and spill control, consistent with Federal and state regulations (U.S. Army 2011).

Department of Defense (DoD) guidance defines seven categories for describing the Environmental Condition of Property (ECP), based on the extent of environmental contamination on the property and on the status of any associated restoration activities. These categories are defined with respect to Comprehensive, Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances and are found in AR 200-1 (U.S. Army 2007b):

- Category 1: Areas where no release or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas).
- Category 2: Areas where only release or disposal of petroleum products has occurred.
- Category 3: Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response.
- Category 4: Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken.
- Category 5: Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are under way, but all required remedial actions have not yet been taken.
- Category 6: Areas where release, disposal, and/or migration of hazardous substances has occurred, but where required actions have not yet been implemented.
- Category 7: Areas that are not evaluated or that require additional evaluation.

The following describes the environmental conditions found at the properties discussed in this EA:

Parcel A (Southeast Bliss)
An ECP report was done for Parcel A in October 2011 to document the environmental conditions on the subject property (U.S. Army 2011). The property has been under military jurisdiction since 1939. Most of the property has been used for military training maneuvers, with a small portion of it (approximately 8.5 acres) leased and used as an FAA facility. The ECP concluded that there were two noteworthy sites on the parcel described as follows (Figure 3-5):

- A 138-acre Defense Environment Restoration Program (DERP or DERA) site located along the power line right-of-way, known as the Rubble Dump Spill Site near Site Monitor SWMU-16 FTBL-028. The site was discovered in 1983 and had been used repeatedly for illegal dumping activities. Subsequent sampling revealed the presence of semi-volatile organic compounds, volatile organic compounds, total petroleum hydrocarbons, and asbestos-containing material (ACM). Remediation actions were taken in 2001. All hazardous materials were removed, and the site met Texas Risk Reduction Program Remedy Standard A for Residential Protective Concentration levels. Based on AR 200-1, the site is considered a Category 4 site, which characterizes it as a site where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken. The parcel was fenced to prevent further illegal dumping activities.

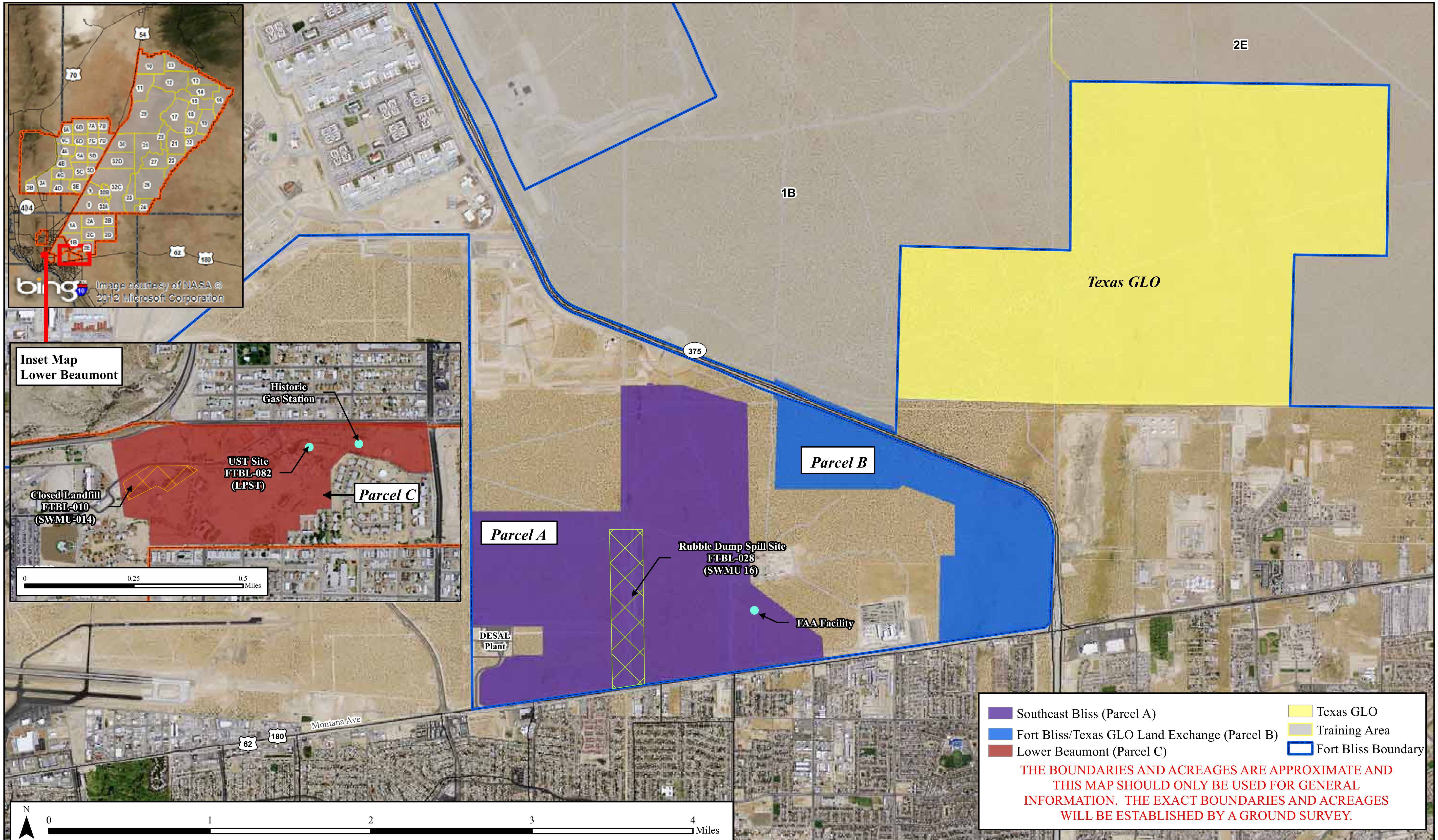

Figure 3-5: Hazardous Waste Areas of Concern within the Proposed Land Sale and /or Exchange Parcels

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- An inspection of the old FAA facility indicated that ACM may be present in the flooring, interior and exterior walls, and the roof. Per AR 200-1, the site is considered a Category 7 site, which is a site that either has not been evaluated or requires additional evaluation (actual sampling for ACM and lead). The FAA will remove the building and concrete slab in 2012 and will follow all surveys and testing required per 40 CFR 61 Subpart M. No presence of lead-based paint (LBP) was indicated in the FAA facility.

Although some household refuse has been illegally dumped along some of the two-track roads in the western portion of the property, the remainder of the Southeast Bliss Parcel does not have a history of contamination by hazardous chemicals or from other sources and, as such, is considered to be a Category 1 area, in which the area has had no release of hazardous substances or petroleum products, and no migration of these substances from adjacent properties has occurred (U.S. Army 2007b).

Parcel B (Fort Bliss-owned Land)

An ECP report was done for Parcel B in July 2012 to document the environmental conditions on the subject property (U.S. Army 2012a). The property has been under military jurisdiction since 1939 and is undeveloped land primarily used for military training maneuvers. Near the property, but not within the parcel, is the FAA VORTAC antenna. The ECP concluded that there are no recognized environmental concerns located on the property. Some household refuse has been illegally dumped within or directly adjacent to the property; however, the parcel does not have a history of contamination by hazardous chemicals or from other sources. As such, the majority of the parcel is considered to be a Category 1 area (U.S. Army 2007b).

Parcel B (TxGLO-owned Land)

The TxGLO-owned property was formerly part of Fort Bliss and is relatively lightly developed. Petroleum pipelines and power lines traverse the property within utility right-of-ways. Military vehicles sometimes cross through the TxGLO land, as it has a tank trail and is the shortest route between TA 1B and 2E in the South Training Area. A bulk gasoline terminal storage site called the El Paso Refined Products Terminal is located approximately 350 feet from the TxGLO parcel's southern boundary. There are no records of any DERA sites in the area, and the parcel does not have a history of contamination by hazardous chemicals or from other sources. Some refuse has been illegally dumped within the property, and there is a possibility that the refuse could contain ACM or LBP.

Parcel C (Lower Beaumont)

An ECP report was done for Parcel C in July 2012 to document the environmental conditions on the subject property (U.S. Army 2012b). The property has been under military jurisdiction since 1919 and was the site of William Beaumont General Hospital. The structures, which became the core of the hospital complex, were built in the 1920s, and the facility was expanded and improved in the 1930s and 1940s. Most of the buildings within the parcel were abandoned and demolished upon the completion of the William Beaumont Army Medical Center, which was opened in 1972 and is located west of the old hospital complex. Some of the buildings that still remain on the Lower Beaumont site include a chapel, theatre, gymnasium, barracks, and a number of small residential structures. The ECP concluded there were three primary areas of concern on the parcel, including two of three DERA sites on the Lower Beaumont Parcel (see Figure 3-5):

- A closed landfill, designated as DERA Site FTBL-010 (SWMU-014), contains the ash and other hospital waste residuals burned in an incinerator, as well as material from the old hospital complex demolished buildings. The landfill was operated primarily from 1946 to 1950, but the building materials were probably added in the 1970s and may contain ACM and LBP. In January 1990, the site was closed by agreement with the Texas Natural Resource Conservation Commission (TNRCC), now known as the TCEQ, with the stipulation that the landfill contents be left in place. The landfill site is characterized as a Category 7 area per AR 200-1, which is an area that either has not been evaluated or requires additional evaluation.

- Two underground storage tanks (UST) (Tanks 6 and 7), which were installed in 1921 and stored Number 2 heating oil for use in the neighboring steam plant for the William Beaumont Army Hospital, leaked. Soil samples collected from around the tanks in 1999 revealed polynuclear aromatic hydrocarbons (PAH) at concentrations above TNRCC action levels and Total Recoverable Petroleum Hydrocarbons (TRPH) above TNRCC screening levels. A Release Determination Report was submitted to the TNRCC on November 22, 1999, and the site was listed as a Leaking Petroleum Storage Tank (LPST) facility (LPST Identification Number 115412), DERA Site FTBL-082. The tanks were removed in 2002, and the site was capped with an 8-foot layer of concrete screening material to reduce the risk of accidental exposure. In the site closure request form, it was stated that Fort Bliss had planned to build "a green belt area covering the former Building No. 7146 and surrounding areas" in order to further limit long-term exposure. The site was closed by the TCEQ in March 2003 with the restriction that "...any remaining contaminant levels and potential exposure pathways should be evaluated when conducting any future soil excavation or construction activities at site." The UST site is considered to be a Category 2 site (AR 200-1), which is an area where only the release or disposal of petroleum products has occurred.

- The potential site of what may be a petroleum UST is located where there once a gas station. This was indicated in a December 1952 document, which stated that the vessel was of steel construction and was built in 1946, and the vessel was also identified in a Fort Bliss map dated October 1961. In February 2012, an inspection of the site using a metal detector resulted in the identification of an anomaly that may be a petroleum UST. Another inspection of the site using a metal detector was performed in July 2012, and the UST was not found. There have been no recorded spills of petroleum products in the area. This area is classified within AR 200-1 as a Category 7 site.

Other sites of concern that were mentioned in the ECP include other aboveground storage tanks (AST), USTs, a Pathology Incinerator, and the remaining buildings within the subject property described as follows.

ASTs and USTs

Two ASTs for emergency generators are located near the large water tank (Building 7090) on the subject property easement; however, no reports of inadvertent release from these tanks were found. One 300-gallon, steel UST was located on the southeast side of the nursing school and held Number 2 heating oil. The tank and the associated fuel lines were removed in November 1998. Since the UST appeared to be in good shape with no sign of leaking, no soil samples were collected, and the site was backfilled with clean fill material.

Seven petroleum storage tanks were associated with the steam boiler plant that provided steam to the William Beaumont General Hospital complex through an underground distribution system for heating, sterilizing, and cooking. Tanks 1, 2, 3, 6, and 7 were USTs that contained gasoline, diesel, or fuel oil, while Tanks 4 and 5 were ASTs that contained fuel oil and diesel. Tanks 6 and 7 were discussed above and are known as FTBL-082 (LPST ID NO. 115412). Tanks 1 through 5, which were steel tanks, were removed in August 1995. A total of 18 soil samples were collected and analyzed from around Tanks 1 through 4 for benzene, toluene, ethylbenzene, and total xylene (BTEX) concentrations. Results indicated that the BTEX concentrations were below State Plan A Groundwater Protective Soil Concentrations. A soil sample collected from the north wall of the area excavated for the removal of Tank 2 contained TRPH at a maximum concentration of 460 milligrams per kilogram (mg/kg), while the remaining soil samples had concentrations of TRPH ranging from 10 mg/kg to 240 mg/kg. The holes in the ground that remained after the USTs were removed were backfilled with stockpiled material from the initial excavation and backfill that was imported. Soil samples analyzed from the stockpile yielded low-level concentrations of toluene, ethylbenzene, total xylenes, and TRPH. Prior to site closure for Tanks 1 through 4, soil samples were collected for analysis from soil borings that extended 14 feet below the ground surface. Concentrations for BTEX, metyl-tert-butyl-ether (MTBE), TRPH, and PAH were below State Plan A Category III Target Concentrations. In April 2003, the TCEQ concurred with the site closure recommendations, which stated that no further action was required.

Pathology Incinerator (FTBL-020)

A small natural gas incinerator designated as DERA Site FTBL-020 (SWMU-040) was built in 1943 and torn down in 1990. The materials burned in the incinerator originated from the pathology department and reportedly consisted of animal carcasses and human body parts, plus solid waste that included glass items. Approximately 20 pounds of residual refuse, mostly ash and bone fragments, were produced daily and presumably disposed of in a landfill. The site was closed by the TNRCC in January 1991, and it was determined that there was little potential that any hazardous materials were released at the site due to the nature of the materials incinerated.

Remaining Hospital Complex Buildings and Utility Lines

Although limited ACM surveys and inspections were performed in 1990 and 2009, the remaining buildings from the old hospital complex within the Lower Beaumont Parcel have not been fully evaluated for the presence of ACM or LBP and, as such, are considered to be within Category 7 (per AR 200-1). Steam pipes and water and sewer lines, which could contain asbestos, may still remain within the parcel, even in areas where the buildings have been torn down. Surveys and testing for the presence of ACM and LBP, per 40 CFR 61 Subpart M, is required prior to the renovation or demolition. The remainder of the Lower Beaumont Parcel does not have a history of contamination by hazardous chemicals or from other sources and is considered a Category 1 area per AR 200-1.

3.11.2 Environmental Consequences

3.11.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on hazardous materials and waste would occur because no land sale or exchange of the parcels would take place.

3.11.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Prior to the sale of Parcel A, the FAA will remove the building and concrete slab and conduct all surveys and testing required per 40 CFR 61 Subpart M. If any materials contain ACM, abatement will be performed by a licensed asbestos contractor and per all applicable regulations. Additionally, an Environmental Due Diligence Audit of the facility will be performed by the FAA prior to the sale of the land.

Under Alternative 2, the potential development of Parcel A would require heavy machinery and the use of petroleum, oil, and lubricants (POL). A limited amount of hazardous materials and waste, including POL, would be used or generated during routine maintenance and operation of any facilities constructed on the site. All hazardous and regulated wastes and substances generated during implementation of Alternative 2 would be collected, characterized, labeled, stored, transported, and disposed of in accordance with all Federal, state, and local regulations, including proper waste manifesting procedures. All other hazardous and regulated materials or substances would be handled according to materials safety data sheet instructions. Several debris piles from illegal dumping can be found throughout the parcel, and the buyer of the property would remove all household refuse and have the material placed in an approved landfill. This material is comprised mostly of construction and demolition materials and does not pose a long-term environmental risk.

The potential impacts of the handling and disposal of hazardous and regulated materials and substances during project implementation would be minor when BMPs are implemented, and would not impact the public, groundwater, or general environment. BMPs would be implemented as standard operating procedures during all construction activities, including proper handling, storage, and/or disposal of hazardous and/or regulated materials. To minimize potential impacts from hazardous and regulated materials, all fuels, waste oils, and solvents would be collected and stored in tanks or drums within a secondary containment system that consists of an impervious floor and bermed sidewalls capable of containing the volume of the largest container stored therein. The refueling of machinery would be completed following accepted guidelines, and all vehicles would have drip pans during storage to contain minor spills and drips. Although it would be unlikely for a major spill to occur, any spill of a reportable quantity would be contained immediately within an earthen dike, and an absorbent (e.g., granular, pillow, sock) would be used to absorb and contain the spill. Any major reportable spill of a hazardous or regulated substance would be reported immediately to on-site environmental personnel, who would notify appropriate Federal and state agencies.

3.11.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

Impacts under Alternative 3 would be considered minor. Although Parcel B has never been developed as a firing range and no military ranges are located adjacent to it, it has been under military jurisdiction for the last 73 years. Safety briefings on the recognition and avoidance of UXO would be recommended prior to any land clearing.

The TxGLO-owned land to be acquired by Fort Bliss contains illegal refuse piles, and if any materials containing ACM or LBP are encountered during cleanup of the piles, removal would be conducted per all regulatory requirements. No changes in land use would occur in the Army acquired land since an implied easement has allowed training there for at least the past 50 years. Handling of waste petroleum products during training would continue per the Fort Bliss Hazardous Waste Management Plan. With the use of BMPs, hazardous materials and waste impacts would be minor as a result of the implementation of Alternative 3.

3.11.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

There are several older structures located throughout Parcel C, and due to the age of the buildings, it is likely that ACM and LBP are present. The buyer would be required to perform ACM and LBP surveys and testing as required per 40 CFR 61 Subpart M prior to any building renovation or demolition. Underground steam pipes and water and sewer lines that could contain ACM may still be present within the parcel property, even in areas where the buildings have been torn down. It is expected that the developer would perform all ACM and LBP management per regulatory requirements.

The closed landfill, FTBL-010 (SWMU-014), is located within the property that has been closed per Texas regulatory requirements with a stipulation that the landfill contents be left in place. The USTs site, FTBL-082 (LPST ID No. 115412), was closed with a restriction from TCEQ that prior to soil excavation or construction activities the site would undergo evaluation of any remaining contaminant levels and potential exposure pathways. These stipulations and restrictions should be adhered to, and deed restrictions or land use controls, if not currently in place, would be documented and conveyed with the sale of the property.

With these land use controls in place, the adherence to 40 CFR 61 Subpart M, and the use of construction BMPs, the impacts under Alternative 4 would be similar to those under Alternative 2. Hazardous materials and waste impacts would be minor as a result of the implementation of Alternative 4.

3.11.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Hazardous materials and waste impacts would be minor as a result of the implementation of Alternative 5.

3.12 Airspace Operations

3.12.1 Affected Environment

The U.S. Army manages airspace on Fort Bliss designated by the FAA in accordance with DoD Directive 5030.19, *Responsibilities on Federal Aviation and National Airspace System Matters*. The Army implements these requirements through AR 95-2, *Air Traffic Control, Airspace, Airfields, Flight Activities, and Navigational Aids*. Airspace has defined designations assigned by the FAA and adopted from international norms to control flights of all aircraft, especially around airports. The controlled airspace is designed to provide aircraft separation for approach, landing, takeoff, and transit from the airports in the El Paso area. Airspace in the vicinity of Fort Bliss consists of a combination of Class C and Class E airspace around the El Paso International Airport and Class D airspace around BAAF (Figure 3-6).

3.12.2 Environmental Consequences

3.12.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on airspace operations would occur because no land sale or exchange would take place.

3.12.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

The implementation of Alternative 2 would not require any change in designated airspace. Because of the proximity to the El Paso International Airport, coordination with the FAA would be necessary regarding building height maximums. Since the development of Parcel A would be based on the City of El Paso's SmartCode, a higher density of households would be located within the parcel. This could create the potential for some high-rise residential buildings, and some height restrictions on the building structures within the development may be necessary. Negligible impacts on airspace operations would be expected as a result of the implementation of Alternative 2.

3.12.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

No impacts on airspace operations would be expected as a result of the implementation of Alternative 3.

3.12.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Impacts under Alternative 4 would be similar to those under Alternative 2. Negligible impacts on airspace operations would be expected as a result of the implementation of Alternative 4.

3.12.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. Negligible impacts on airspace operations would be expected as a result of the implementation of Alternative 5.

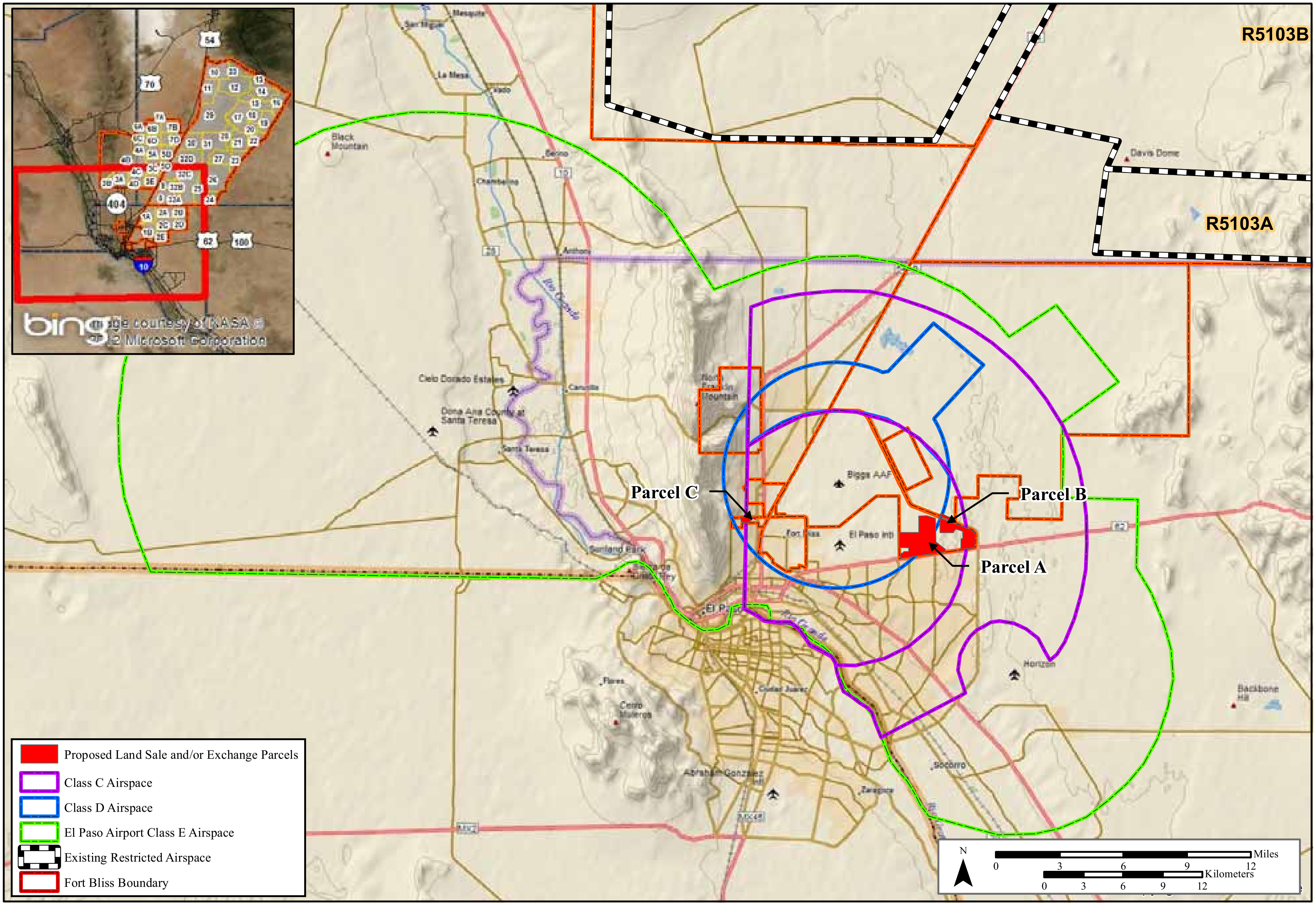

Figure 3-6: Airspace around the Proposed Land Sale and/or Exchange Parcels

GSRC

December 2012

3.13 Utilities Infrastructure

The City of El Paso is committed to sustainable growth and has defined an integrated, strategic framework for sustainability that is documented in their Livable City Sustainability Plan (City of El Paso na). Through the wise use of energy and other renewable and non-renewable resources, energy conservation and sustainability can be achieved. The City of El Paso's mission statement for achieving sustainability, as listed by the Office of Sustainability, is that …"by 2014, El Paso will be a model of sustainability and smart growth by building on its roots as an international hub, promoting sustainable enterprises and wisely using natural resources" (City of El Paso 2012a). Fort Bliss is also committed to sustainable practices, as outlined in the Energy Independence and Security Act Section 438, and the use of Low Impact Development/Green Infrastructure design options (such as Leadership in Energy and Environmental Design [LEED]).

3.13.1 Affected Environment

Energy

<u>Electricity</u>

Electrical power is supplied to Fort Bliss by El Paso Electric Company (EPE) through a 115-kilovolt (kV) high voltage transmission line and distributed to Fort Bliss by Rio Grande Electric Cooperative. This line has a loading capacity of 150 megavolt amperes, serves Fort Bliss, the City of El Paso, and military reservations to the north, and is part of a loop that can supply Fort Bliss from two directions. EPE has a net dependable generating capacity of 1,795 megawatts (MW) (EPE 2012). As of 2010, the peak electricity usage within the EPE service area is estimated to be approximately 75 percent of available power (EPCC 2010). Utilizing the standard rates detailed in Army Technical Manual TM-5-811, the average power consumption is approximately 0.3 kilowatt per person, or 10 MW (U.S. Army 2007a). As of 2010, the Fort Bliss Cantonment consumes approximately 1 percent of power available from EPE (1.4 percent of peak electricity use) (EPCC 2010). Off-site military dependents consume considerably less than this amount (U.S. Army 2007a).

In the next 10 years, in order to accommodate future load increases from growth of the El Paso area, EPE has proposed the placement of additional and/or larger transformers at new and existing substations throughout the system and upgrades to transmission lines for these transformers. EPE is anticipating a 38 MW average growth in demand in its service area. The 10-year proposed system expansion by EPE includes a projected load growth increase at Fort Bliss (EPE 2010).

<u>Natural Gas</u>

Natural gas is supplied to Fort Bliss by the El Paso Natural Gas Company and is delivered through a looped gas distribution network owned and maintained by Texas Gas Services. Natural gas is the primary heating fuel in the Fort Bliss Cantonment, and the average annual gas consumption of the post is estimated to be approximately 0.88 million cubic feet per hour (cfh). There are a number of distribution points, with an estimated total capacity of 2.5 million cfh (EPCC 2010). The Texas Gas Service provides 25.9 billion cubic feet of natural gas per year to 28 cities in Texas, including El Paso, with an annual average consumption of 47,000 cubic feet per customer (U.S. Army 2007a).

Parcel A (Southeast Bliss)

Electric power enters the property from the northeast near Loop 375 along an east-west traversing, high-tension transmission line. Towards the center of the property, the transmission line turns south and continues beyond the center of the property in a north-south direction over US 62/180. A 6-inch natural gas main runs along the south side of Montana Avenue. Easements for energy systems will be reserved in the conveyance document for Parcel A.

Parcel B (Fort Bliss-owned Land)

Electrical transmission lines lie within the parcel, and the nearest natural gas line to the parcel is located within the proposed Parcel A.

Parcel B (TxGLO-owned Land)

Main trunk electrical power transmission and natural gas lines currently traverse north and south through the TxGLO-owned Parcel.

Parcel C

Electrical transmission lines are primarily located aboveground along the surrounding streets. In addition, natural gas lines currently exist along the main access roads within the parcel. Easements for energy transmission systems will be reserved in future parcel conveyance documents.

Communications

Fort Bliss communication systems include telephone, optical cable, automated digital network (AUTODIN), microwave, and television systems. Telephones on Fort Bliss are linked to a commercial telephone network, the Integrated Switch Digital Network (ISDN), and the Defense Switched Network (DSN). In addition, Fort Bliss has 12 secure phone systems (U.S. Army 2007a). Cell phone coverage exists through a tower in the Franklin Mountains. The AUTODIN is supported by a Worldwide Area Network, and diskettes containing organizational messages are hand-carried to the network center for transmittal to virtually any place on earth (U.S. Army 2007a). The microwave system allows communication within the entire installation, and radio systems include amplitude modulation (AM), very high frequency (VHF), and trunking radios. The microwave system is used for communications among military units, between aircraft and controllers, and with the Military Police and fire department using the radio frequencies managed by two frequency managers assigned to Fort Bliss (U.S. Army 2007a). The use of radio frequencies has the potential to interfere with the many radio astronomy telescopes that operate in Socorro, New Mexico. Four television networks operate on-post and include two closed-circuit systems used for training, one cable network provided to the military housing units, and the William Beaumont Army Medical Center which has its own television network (U.S. Army 2007a). A number of large and small communications companies providing telephone, cable, television, and fiber-optic Internet service serve clients in and around El Paso.

Parcel A (Southeast Bliss)

Currently, on Parcel A there are existing fiber-optic lines. Easements for these communication systems will be reserved in the conveyance document.

Parcel B (Fort Bliss-owned Land)
Currently, on Parcel B there are no known communication system networks in place.

Parcel B (TxGLO-owned Land)
Currently, on the TxGLO-owned parcel there are no known communication system networks in place.

Parcel C (Lower Beaumont)
Currently, on Parcel C there are existing fiber-optic lines. Easements for this communication system network will be reserved in future conveyance documents.

Potable Water
Potable water is provided to Fort Bliss from three sources: on-post wells, interconnection with the existing EPWU system, and the Kay Bailey Hutchison Desalination Plant. The water is distributed to Fort Bliss by Fort Bliss Water Service, which is privatized. Water sources include groundwater and surface water from the Rio Grande. During the winter, groundwater is used to meet the city's water needs. The Fort Bliss water wells and the EPWU system primarily obtain freshwater from the Hueco Bolson and Mesilla Bolson aquifers. Capacity from the wells is approximately 193 million gallons per day (MGD). Surface water from the Rio Grande is the primary water source in the spring, summer, and early fall, although groundwater is used to meet water needs for some areas that are further from the Rio Grande and to augment summer needs, particularly in drought years. Surface water capacity is approximately 100 MGD, with 60 MGD treated at the Jonathon Rogers Plant and 40 MGD treated at the Canal Street Water Treatment Plant (EPWU 2012a). The Kay Bailey Hutchison Desalination Plant was constructed in 2007 as a joint effort between the EPWU and Fort Bliss to treat brackish water from the Hueco Bolson aquifer. This facility produces 27.5 MGD of potable water and minimizes freshwater use in order to address water demand in the area (EPWU 2012b).

Together the surface and groundwater sources bring summer capacity to approximately 300 MGD. Daily average water demand in 2011 was 106 MGD, with maximum daily demand of 163.5 MGD (EPWU 2012a). In spite of a steadily increasing population, water use in the El Paso area has remained relatively constant or has declined since 1994 through water conservation programs. In Texas Water Development Board's (TWDB) 2011 Far West Texas Regional Water Plan, it is projected that, due to expansions of Fort Bliss, EPWU would increase as a water supplier to Fort Bliss populations, with an increase in service from 10 percent to 60 percent of old Fort Bliss in 2020 to 2060, with water supplies for new Fort Bliss populations at 100 percent from 2010 on into the future (EPWU 2012b, TWDB 2011). The plan further states that approximately 4,000 acre-feet of water will be used by Fort Bliss in the year 2020. The TWDB anticipates that much of this increased need will be met by the new El Paso-Fort Bliss Kay Bailey Hutchison Desalination Facility (TWDB 2011).

Parcel A (Southeast Bliss)
The EPWU operates and maintains a 30-inch diameter water main that extends along the south side of Montana Avenue. Although some EPWU waterlines exist near the southeastern boundary of Parcel A, large scale waterline connections for all proposed development would be required.

Parcel B (Fort Bliss-owned Land)

Currently, there are no known water wells located on the property, and no water distribution lines are known to exist on the parcel.

Parcel B (TxGLO-owned Land)

Buildings in the South Training Area near the TxGLO land parcel currently obtain water from an on-site well. The water is chlorinated and stored in a 30,000-gallon tank (U.S. Army 2010a).

Parcel C (Lower Beaumont)

Currently, connections to EPWU water main systems do not exist within the parcel; however, water distribution lines exist along the main access roads. There are several water tanks that appear to be located within Parcel C.

Wastewater

Wastewater generated at Fort Bliss flows through five connections to the EPWU's sanitary sewer system for treatment at the Haskell Street Wastewater Treatment Plant approximately 3 miles from Fort Bliss. The treatment capacity at the EPWU plant is 27.7 MGD (EPWU 2012c). In 2004, Fort Bliss used approximately 10.5 percent of the wastewater treatment plant's treatment capacity with an average wastewater generation rate of 2.9 MGD (U.S. Army 2007a). EPWU has a total of four wastewater treatment facilities, and as of 2011, had a total treatment capacity of 93.5 MGD. The average use in 2011 was 61.5 MGD, with maximum daily use of 68.1 MGD (EPWU 2012a).

Parcel A (Southeast Bliss)

Currently there are plans for a wastewater sewer line to be installed near the central portion of Parcel A.

Parcel B (Fort Bliss-owned Land)

Connections to EPWU wastewater system mains currently do not exist within the parcel; however, sewer lines are located near U.S. 62/180 and Loop 375.

Parcel B (TxGLO-owned Land)

Wastewater is currently generated at buildings in the South Training Area near the TxGLO land parcel and is collected in septic tanks that flow to drain fields (U.S. Army 2007a).

Parcel C (Lower Beaumont)

Currently, connections to EPWU wastewater system mains do not exist within Parcel C; however, wastewater distribution lines exist along the main access roads.

Stormwater

At Fort Bliss, due to low precipitation, undulating topography, and low vegetated state, most of the precipitation becomes stormwater runoff. Much of the stormwater runoff within the Fort Bliss Cantonment flows through a series of storm drainage channels, pipes, and stormwater pump stations into stormwater retention ponds (U.S. Army 2007a). Stormwater collected in the retention ponds is lost through evaporation and infiltration. Several connections with the City of El Paso's stormwater collection system occur near the Fort Bliss boundary, primarily along the

Fort Bliss Cantonment access roads. A large portion of the collected stormwater flows into the 2.23-acre-foot main stormwater retention pond located north of Fred Wilson Road and east of the Union Pacific/Southern Pacific rail lines. This retention pond is a CWA Section 404 jurisdictional wetland with the capacity to store runoff generated by a 100-year storm (U.S. Army 2007a). A smaller retention basin located northwest of the Pershing Street Gate collects stormwater runoff from Landfill Road, housing on Sheridan Road, and off-post areas. If this retention basin is overtopped, stormwater would typically flow into a drainage way southward to the Rio Grande. All stormwater discharges at Fort Bliss are permitted through a National Pollutant Discharge Elimination System (NPDES) General Stormwater Permit.

Solid Waste Management

Domestic solid waste is collected and disposed of by a private contractor at a government-owned, 102-acre landfill (MSW ID No. 1422). The landfill is located 3 miles north of the intersection of Fred Wilson Avenue and Chaffee Road, and handles Type I waste (refuse) and Type IV waste (construction and demolition wastes) (U.S. Army 2010a). Fort Bliss has a waste recycling program that has reduced the post's reliance on the on-site landfill. In 2005, as on-post landfill capacities decreased, Fort Bliss began to dispose of residential waste (approximately 8.8 tons per day) in the City of El Paso's Clint Landfill (a Type I Landfill). The Clint Landfill receives waste from residents and businesses in the city, as well as residential waste from Fort Bliss. It is located in southeast El Paso County and permitted new cells which began operating in 2005, and intends to utilize new cells in the future. Approximately 1,500 tons of municipal solid waste is disposed annually at the Clint Landfill by the City of El Paso's residential garbage collection operations, private haulers, surrounding communities, and the general public. Current projections estimate that permitted cells will be filled by the year 2030 (City of El Paso 2012b).

3.13.2 Environmental Consequences

3.13.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, no impacts on utilities or utilities infrastructure would occur because no land sale or exchange of parcels would take place.

3.13.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

Under the implementation of Alternative 2, the sale of Parcel A and the subsequent development of the land for residential, retail, and commercial uses would greatly increase overall utilities usage and require increases and upgrades in utilities infrastructure. The overall development plans would be developed in concert with current City of El Paso sustainability and expansion plans. At this time, it is expected that the development of the Southeast Parcel would follow SmartCode Growth principles and be "green" and sustainable, and energy efficient, and most retail and commercial buildings would be LEED certified. The mixed-use development would increase the electrical and natural gas consumption levels, and power and natural gas lines would be routed to areas of new construction. Electricity would be supplied and distributed to the proposed development by EPE. Depending upon the density of the new development, the addition of one or more new substations would be required. However, the EPE's 10-year expansion plan has considered further expansions, and developments in the El Paso area and the subsequent development of the property should not exceed the planned load capacities in the area. Communications and fiber-optic lines would be obtained from a private contractor provider. Water would be supplied and distributed to the proposed development by EPWU.

Some EPWU waterlines exist near the southeastern boundary of Parcel A near Montana Avenue, but large-scale waterline connections for the proposed development would be required.

The existing wastewater system would require upgrades to handle the increase in capacity required for a high-density mixed-use development, and may also require the City of El Paso to upgrade the Haskell Street Wastewater Treatment Plant in the future. A new 33 inch wastewater line would need to be installed for Parcel A. Once detailed development plans are available, water and sanitary sewer analyses would be required by EPWU to determine the exact infrastructure improvements/upgrades required to provide service to the property based on the large amount of acreage and proposed density. Sanitary sewer and water impact fees will likely be assessed. A private sanitary sewer lift station and force main for the future EPCC site and William Beaumont Hospital has been proposed to be located through Parcel A to connect to a public sewer main on Montana Avenue. The annexation of Parcel A to the City of El Paso may alter the plans for the private sewer main to be located within city right-of-way, and coordination would be necessary between the developers of the parcels.

The high-density, mixed-use development of the parcel would cause an increase in impervious surfaces in the area, and stormwater conveyances would need to be constructed within the parcel. Under the city permitting process, the developer would be required to provide onsite ponding for stormwater, which should accommodate a typical 100-year storm event. The use of drainage swales and other low-impact building techniques throughout the property (i.e., recessed landscaping, rainwater harvesting, and porous pavements) would minimize the impacts on stormwater capacity.

As the area of disturbance would exceed 1 acre, construction stormwater permitting through the TCEQ NPDES would be obtained as required under the CWA. A SWPPP would be developed outlining the BMPs and other measures to be implemented to prevent excess stormwater runoff during and following construction. The construction of the proposed mixed-use development would temporarily result in increased sedimentation within surrounding ephemeral drainage areas during construction activities.

The implementation of Alternative 2 would have moderate impacts on energy, communications, potable water, wastewater, stormwater, and solid waste; however, development utilizing SmartCode Growth principles, "green" and sustainable building, low-impact development, and energy-efficient techniques would minimize the impacts on utilities.

3.13.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

No development of Parcel B is anticipated for the foreseeable future. However, if and when Parcel B is developed, it would result in construction and permanent impacts on utilities and utility infrastructure similar to those discussed for Alternative 2. However, the overall magnitude of these impacts would be less than that of Alternative 2, as Parcel B is smaller than Parcel A, and would be considered to have minor impacts on energy, potable water, wastewater, stormwater, and solid waste. The development of this parcel utilizing "green" and sustainable building techniques would minimize impacts on utilities.

The implementation of Alternative 3 also includes the exchange of the TxGLO land (2,880 acres) into military jurisdiction and use. This portion of Alternative 3 is not anticipated to cause any utilities or utility infrastructure impacts, as the land for the foreseeable future would remain undeveloped and continue to be used as a tank trail. Therefore, no impacts on utilities and utility infrastructures would occur. In the future, should construction of any facilities with a footprint exceeding 5,000 square feet occur, Fort Bliss would require the design of the operational stormwater drainage aspects of these facilities to comply with the Energy Independence and Security Act Section 438, and Low Impact Development/Green Infrastructure design options (such as LEED) would be utilized.

3.13.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Under the implementation of Alternative 4, the development of Parcel C by non-military developers would result in similar construction and permanent impacts on utilities and utilities infrastructure as discussed for Alternative 2. However, the Lower Beaumont Parcel was previously developed and used by the military, so although upgrades on much of the utilities infrastructure would be required, these utilities already exist over much of the property. Additionally, although impacts would occur similar to those discussed for Alternative 2, these impacts would be much smaller in magnitude, as Parcel C is less than 100 acres in size (as compared to Parcel A ~1,600 acres). Therefore, the implementation of Alternative 4 would have minor impacts on energy, potable water, wastewater, stormwater, and solid waste. The development of this parcel utilizing "green," low-impact development, and sustainable building techniques would minimize impacts on utilities.

3.13.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Impacts under Alternative 5 would be equivalent to the impacts discussed under alternatives 2, 3, and 4. However, the development of parcels A, B (if conducted), and C would inevitably cause greater increases in demand for overall utilities usage and would require additional utilities infrastructure. Although there is a greater increase for the demand for utilities, the implementation of Alternative 5 would have moderate impacts on energy, communications, potable water, wastewater, stormwater, and solid waste. However, it is imperative that SmartCode Growth principles, "green" and sustainable building plans, and energy-efficient techniques are utilized for impacts to remain moderate.

3.14 Socioeconomics

3.14.1 Affected Environment

This section outlines the basic attributes of population and economic activity within the Fort Bliss region in El Paso County, Texas.

Population

Population data for the Fort Bliss region are shown in Table 3-7. El Paso County is the only county in the El Paso Metropolitan Statistical Area (MSA). El Paso County, like the state of Texas, grew rapidly (almost 18 percent) over the last decade. The U.S. as a whole experienced a much lower growth rate of 9.7 percent from 2000-2010.

Table 3-7. Population for El Paso, Texas

	El Paso County	Texas
2010 Population	800,647	25,145,561
2000 Population	679,622	20,851,820
Percent Change	17.8%	20.6%

Source: U.S. Census Bureau 2000 and 2010a.

According to the 2010 U.S. Census, more than 82 percent of El Paso County's population reports being of Hispanic or Latino origin, with 13 percent reporting "white, not Hispanic," and 3 percent black. More than 26 percent of the population of El Paso County is foreign born, and almost 75 percent of persons age 5 and above report speaking a language other than English at home. As shown in Table 3-8, the U.S. Census Bureau American Community Survey estimates show that El Paso County also has a lower percentage of high school and college graduates than the State of Texas and the Nation.

Table 3-8. Educational Attainment

Percent of Persons Age 25+	El Paso County	Texas	U.S.
High school graduates	71.0%	80.0%	85.0%
Bachelor's degree or higher	19.3%	25.8%	27.9%

Source: U.S. Census Bureau 2010b

According to the Fort Bliss GFS EIS, the 2005 population directly associated with Fort Bliss was approximately 140,100. The expected increase in population as a result of Army growth initiatives is about 41,700 over the next several years.

Income and Poverty

Income and poverty data are shown in Table 3-9. Per capita income for El Paso County is well below the U.S. average per capita income. Median household incomes are also below the U.S. average (U.S. Bureau of Economic Analysis [BEA] 2009). The poverty rate for El Paso County is estimated to be 25.6 percent, almost double the National poverty rate of 13.8 percent (U.S. Census Bureau 2010b).

Table 3-9. Income and Poverty

	El Paso County	City of El Paso	Texas	U.S.
Per capita personal income (dollars), 2009	$29,381	NA	$38,601	$39,635
Per capita income as a percent of U.S., 2009	74.1%		97.4%	
Median Household Income (2006-2010)	$36,333	$37,428	$49,646	$51,914
Persons of all ages below poverty level, percent, 2006-2010	25.6%	24.1%	16.8%	13.8%

Sources: U.S. Census Bureau 2010b and U.S. BEA 2009.

Housing

Data on housing units in El Paso County, the State of Texas, and the Nation are presented in Table 3-10. El Paso has a higher rate of renter-occupied housing (37 percent) than Texas (36.3

percent) and noticeably higher than the National rate of 34.9 percent. The homeowner and rental vacancy rates for El Paso County are well below the rates for Texas and the Nation, with the rental vacancy rate of 4.4 percent being less than half of those rates for Texas (10.8 percent) and the Nation (9.2 percent).

Table 3-10. Housing Units

Geographic Area	Total Housing Units	Occupied			Homeowner Vacancy Rate*	Rental Vacancy Rate**	Vacant Units for Rent
		Units	Percent Owner Occupied	Percent Renter Occupied			
El Paso County	270,307	256,557	63.0%	37.0%	1.6%	4.4%	4,361
State of Texas	9,977,436	8,922,933	63.7%	36.3%	2.1%	10.8%	394,310
U.S.	131,704,730	116,716,292	65.1%	34.9%	2.4%	9.2%	4,137,567

Source: U.S. Census Bureau 2010a
*Homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale."
** Rental vacancy rate is the proportion of the rental inventory that is vacant "for rent."

Labor Force and Employment

The estimated civilian labor force in El Paso County in October 2011 was 326,400. The unemployment rate was 10.2 percent, which is well above the 8.4 percent unemployment rate for the state of Texas but a decrease from the 10.9 percent in El Paso County for June and July (U.S. Bureau of Labor Statistics 2011). County Business Patterns data show that employment in El Paso County is concentrated in the “retail,” “healthcare and social assistance,” and “accommodation and food services” categories, as shown in Table 3-11. Together, they account for approximately 45 percent of employment in El Paso County, compared to 37 percent for Texas and 38 percent for the U.S.

Table 3-11. Employment by Industry Sector (Percent of Total)

	El Paso County	Texas	U.S.
Forestry, fishing, hunting, and agricultural support	<1%	<1%	<1%
Mining, quarrying, and oil and gas extraction	<1%	2%	1%
Utilities	NA	1%	1%
Construction	5%	7%	5%
Manufacturing	7%	9%	10%
Wholesale trade	5%	5%	5%
Retail trade	16%	13%	13%
Transportation and warehousing	6%	4%	4%
Information	4%	3%	3%
Finance and insurance	3%	5%	5%
Real estate, rental, and leasing	2%	2%	2%
Professional, scientific, and technical services	5%	6%	7%
Management of companies and enterprises	1%	3%	2%
Admin & support; Waste management & remediation services	10%	9%	8%
Educational services	1%	2%	3%
Health care and social assistance	17%	14%	15%

Table 3-11, continued

	El Paso County	Texas	U.S.
Arts, entertainment, and recreation	1%	1%	2%
Accommodation and food services	12%	10%	10%
Other services (except public administration)	4%	5%	5%
Industries not classified	NA	<1%	NA

Source: U.S. Census Bureau 2009

Schools

Nine school districts surround Fort Bliss, with four independent school districts (ISD) in the area around the Proposed Action: El Paso, Socorro, Ysleta, and Clint ISDs. Fort Bliss reports that 70 percent of students from Fort Bliss attend El Paso ISD schools, with 15 percent attending Socorro ISD schools and 12 percent attending schools in the Ysleta ISD (Fort Bliss 2012). School districts in the region report that planning for future school needs is a challenge given the uncertainty of troop movements into and out of Fort Bliss. The school districts work closely with Fort Bliss, but report that it is sometimes difficult to get mutual agreement on the number of students expected in the future, making planning a challenge.

Table 3-12 shows enrollment by school district for those immediately around Fort Bliss. Overall enrollment in the four districts increased almost 5 percent from the 2006-07 academic year through 2011-12. The Clint ISD, which has relatively few Fort Bliss students, grew the fastest at over 18 percent, while the El Paso ISD, which is the region's largest ISD and educates a majority of Fort Bliss students, grew by only 2 percent. The Socorro ISD has also grown substantially.

Table 3-12. Enrollment by ISD

Academic Year	Clint ISD	Growth Rate	El Paso ISD	Growth Rate	Socorro ISD	Growt h Rate	Ysleta ISD	Growth Rate	Total	Total Growth Rate
2006-07	10,061		62,857		38,357		45,242		156,517	
2007-08	10,522	4.6%	62,123	-1.2%	38,878	1.4%	45,049	-0.4%	156,572	0.0%
2008-09	10,899	3.6%	62,244	0.2%	39,775	2.3%	44,556	-1.1%	157,474	0.6%
2009-10	11,295	3.6%	63,378	1.8%	41,363	4.0%	44,620	0.1%	160,656	2.0%
2010-11	11,675	3.4%	64,330	1.5%	42,569	2.9%	44,746	0.3%	163,320	1.7%
2011-12	11,889	1.8%	64,227	-0.2%	43,669	2.6%	44,373	-0.8%	164,158	0.5%
2006-12		18.2%		2.2%		13.8%		-1.9%		4.9%

Source: Education Service Center 2012

3.14.2 Environmental Consequences

Projected increases in military and civilian personnel associated with Fort Bliss would result in additional demand for housing and schools. This demand would be expected to put pressure on the already tight housing market. Increased demand for the limited supply would be expected to lead to higher rents and increased prices for homes. The lack of affordable housing in close proximity to Fort Bliss can also lead to longer drive times for on-base personnel. The alternatives being considered are designed to address a projected shortage of military housing.

3.14.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be minor socioeconomics impacts. Under the No Action Alternative, where parcels A, B, and C would not be sold or exchanged, there would be no additional funds for construction of on-base housing, and additional off-base housing would be at the discretion of developers to find locations and construct the housing, further away from Fort Bliss. With the projected additional military personnel, civilian employees, and dependents, the demand for housing will increase. Military and civilian employees would have to find housing, much of which might be farther away from the base and/or more expensive as added demand pushes prices higher.

Data provided in Table 3-10 indicate that even before the projected population increases, there is relatively little housing available in the area. Homeowner and rental vacancy rates of 1.6 and 4.4 percent, respectively, for El Paso County are well below rates for the State of Texas (2.1 and 10.8 percent) and the Nation (2.4 and 9.2 percent). Anecdotal information confirms the housing issues in the area. The No Action Alternative will leave Fort Bliss and the region to identify additional options for housing the projected influx of people.

3.14.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)

There would be minor impacts on socioeconomics with the implementation of Alternative 2. The sale of Parcel A would make 1,635 acres available for residential and mixed commercial development adjacent to Fort Bliss. This new development in Parcel A would be expected to result in a number of benefits for the region. Benefits would include better housing options, more affordable housing, temporary construction-related jobs, revenues for local businesses as companies purchase materials and supplies locally, additional income for construction workers, new jobs created by commercial development, and any increased property taxes paid by new residents.

A potential negative impact could be caused by the increase in the number of school-aged children. The El Paso ISD covers the Fort Bliss area and provides schools to the installation. However, parcels A and B fall within the boundaries of three school systems: the El Paso ISD, the Ysleta ISD, and the Socorro ISD. All three districts could provide schools for the anticipated developments. Estimates project that approximately 19,000 residential units (single- and multi-family) could be built within Parcel A. Approximately 6,300 school-aged children would be expected to live in those units, adding approximately 6,300 students to El Paso schools. Given the current (2011-12 school year) enrollment of 64,227 students, the projected increase would lead to a 10 percent increase over current enrollment. The impact on the El Paso school districts would occur over several years. However, if spread over eight years, there would be almost 800 additional children added in the school system each year. It is expected that the school system would need to build additional schools to accommodate these students and that the developer would need to negotiate with the proper school districts for sale(s) of tract(s) to construct the required schools. A school study would be incorporated into the master planning effort by the developer. The ISD affected would receive additional revenues from residents paying property taxes, but the planning, construction, and overall stress on the system could be a challenge.

3.14.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)

For the foreseeable future, no impacts on socioeconomics would occur from the land exchange of Parcel B. If Parcel B is ever developed, impacts would be similar to those under Alternative 2 and considered minor and beneficial.

3.14.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)

Under Alternative 4, impacts would be similar to those under Alternative 2 and considered minor; however, since Parcel C has a much smaller land area impacted, any negative impacts associated with construction and additional children in schools would be relatively small. Only about 300 residences would be expected to be constructed in this area, and an estimated 370 students would be added to the rolls in El Paso ISD schools. Over an 8-year period, about 50 students per year would be added to El Paso ISD schools. This smaller number would not be expected to create a need for additional school construction.

3.14.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)

Under Alternative 5, impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor. The sale and/or exchange of parcels A, B, and C would provide approximately 2,409 acres of land that could be used for private housing and light commercial development suited to Fort Bliss military personnel. This new development in the three areas near Fort Bliss would be expected to result in a number of benefits for the region. Benefits would include better housing options, more affordable housing, temporary construction-related jobs, revenues for local businesses as companies purchase materials and supplies locally, additional income for construction workers, and any increased property taxes paid by new residents of the three parcels.

A potential negative impact could be caused by the increase in the number of school-aged children in the El Paso school systems. All three of the parcels are traditionally within the El Paso ISD; however, the Ysleta ISD is directly south and across Montana Avenue, and the Socorro ISD covers the area directly east of the Monitor area of Fort Bliss. When fully built out, there could be an estimated 19,000 additional housing units (single- and multi-family) adding an estimated 9,700 school children to El Paso district schools over the next six to eight years. Given the current (2011-12 school year) enrollment of 64,227 students, the projected increase would lead to a 15 percent increase over current enrollment. Although that growth would occur over several years, new schools would be needed to support the increased student population. The ISDs would receive additional revenues from residents paying property taxes, but the planning, construction, and overall stress on the system could be a challenge.

3.15 Environmental Justice and Protection of Children

3.15.1 Affected Environment

Environmental Justice

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President Clinton on February 11, 1994. It was intended to ensure that proposed Federal actions do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations and to ensure greater public participation by minority and low-income populations. It required each agency to develop an agency-wide environmental justice strategy. A Presidential Transmittal Memorandum issued with the EO states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 USC section 4321, et. seq." The DoD has directed that NEPA will be used to implement the provisions of the EO.

EO 12898 does not provide guidelines as to how to determine concentrations of minority or low-income populations. However, analysis of demographic data on race and ethnicity and poverty provides information on minority and low-income populations that could be affected by the proposed actions. The 2010 Census reports numbers of minority individuals and the American Community Survey provides the most recent poverty estimates available. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. Poverty status is used to define low-income. Poverty is defined as the number of people with income below poverty level, which was $22,314 for a family of four in 2010, according to the U.S. Census Bureau. A potential disproportionate impact may occur when the minority in the study area exceeds 50 percent and/or the percent low-income exceeds 20 percent of the population. Additionally, a disproportionate impact may occur when the percent minority and/or low-income in the study area are meaningfully greater than those in the region. El Paso County's population is largely minority (primarily Hispanic) and low-income. According to the 2010 Census, El Paso County is approximately 86.9 percent minority, and 25.6 percent of the population have incomes below the poverty level.

Protection of Children

EO 13045 requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas.

3.15.2 Environmental Consequences

The Proposed Action and alternatives would be located in El Paso County, which has a population that is more than 86 percent minority and more than 25 percent low-income.

3.15.2.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be minor impacts. The No Action Alternative has the potential to negatively impact minority and low-income populations. Homeowner and rental vacancy rates in El Paso County are very low compared to Texas and the Nation. Additional military and civilian personnel projected for Fort Bliss will have the potential to put additional pressure on the existing housing markets (both rental and homeowner), likely driving up rental rates and home prices. The No Action Alternative would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.

3.15.2.2 Alternative 2 – Sale of Parcel A for Development (Southeast Bliss)
Under Alternative 2, there would be minor impacts on minority and low-income populations, since most of the County is minority and low-income, but most of the impacts would be expected to be positive. The implementation of Alternative 2 would allow the development of affordable housing that could meet the needs of the existing minority and low-income populations, as well as expected military personnel and dependents. There could also be negative impacts from additional traffic. Some of these impacts would be temporary, during construction, but some could be more long-term. However, long-term traffic impacts would be mitigated as described in Section 3.9. The positive financial benefits and available affordable housing would be expected to outweigh the traffic impacts, some of which would be temporary and most of which would be mitigated over time. The implementation of Alternative 2 would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.

3.15.2.3 Alternative 3 – Land Exchange and Development of Parcel B (Between Fort Bliss and TxGLO)
For the foreseeable future, no impacts on minority and low-income populations would occur from the land exchange of Parcel B. If Parcel B is ever developed, impacts would be similar to those under Alternative 2 and considered minor; however, most of the permanent impacts would be positive. The implementation of Alternative 3 would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.

3.15.2.4 Alternative 4 – Sale of Parcel C for Development (Lower Beaumont)
Under Alternative 4, impacts would be similar to those under Alternative 2 and considered minor; however, most of the permanent impacts would be positive. Alternative 4 would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.

3.15.2.5 Alternative 5 – Sale and/or Exchange of Parcels A, B, and C for Development (Preferred Alternative)
Under Alternative 5, impacts would be equivalent to the impacts discussed under alternatives 2, 3, and 4 and considered minor; however, most of the impacts would be expected to be positive. Alternative 5 would not be expected to cause environmental health risks or safety risks that would disproportionately affect children.

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SECTION 4.0
CUMULATIVE IMPACTS

4.0 CUMULATIVE IMPACTS

Cumulative impacts are defined as the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts of recent U.S. Army initiatives for mandated expansion and construction activities at Fort Bliss are discussed in the *Fort Bliss, Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement,* for which a Record of Decision (ROD) was signed 30 April 2007, and the *Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement,* for which a ROD was signed 8 June 2010.

The development of the proposed land sale and/or exchange parcels has the potential for cumulative impacts on land use, soils, biological resources, air quality, noise, and transportation. Several areas in the region around the proposed land sale and/or exchange parcels are proposed for development. These areas include parcels to the west, north, and east of parcels A and B currently being considered for or in the process of being developed. These include the proposed ICE facility that would be located between parcels A and B, the EPCC campus and William Beaumont Army Hospital just to the north of Parcel A, an area being considered for a gun range by Fort Bliss along Loop 375 northwest of the parcels, as well as several expansion and development plans on the El Paso International Airport property. Other development is also expected to occur along the US 62/180, Loop 375, and US 54 corridors.

There would be long-term, minor cumulative impacts on land use and aesthetics as undeveloped and undisturbed lands north of Montana Avenue would be developed. However, the proposed land uses are consistent with land use zoning in the area, and the loss or degradation of this land is minimal in comparison to the amount of similar lands available in the region and within Fort Bliss. The planned developments would also detract from the aesthetic and visual qualities of the landscape. As a result, minor cumulative impacts would occur on land use and aesthetics. BMPs, as described in a SWPPP that would be developed for all of the proposed projects in the area, would minimize soil loss during and after construction. Therefore, minor cumulative impacts on soils would occur.

Potential cumulative impacts on biological resources as a result of the loss of vegetation and wildlife habitat would be considered permanent but minor because of the low quality of the habitat for wildlife and similar vegetation communities at and near the proposed parcels. Some sensitive species may be minimally impacted. Private development on adjacent, undeveloped parcels could impact the Texas horned lizard, western burrowing owl, and nesting migratory birds, which could lead to a minor cumulative impact on sensitive species.

A cumulative long-term adverse impact in the region would occur from the additional traffic expected to result from the development of areas along Montana Avenue near parcels A and B. In addition to the proposed parcels, facilities such as the EPCC campus and William Beaumont Hospital are expected to bring in a large amount of additional traffic to the area. The additional vehicles from these developments would further reduce the LOS on Montana Avenue and surrounding corridors, and cause additional traffic delays during commute hours. However, mitigation strategies are proposed to mitigate the impacts, including but not limited to, redesigning traffic light phasing and timing for optimization, adding new traffic signals, adding turn lanes, and opening new thoroughfares to redistribute traffic. Once mitigation strategies are implemented, the cumulative impacts would be considered minor to moderate.

The development of the other projects being considered in the area could also cause minor, cumulative adverse impacts on air quality and noise. The ongoing construction and additional traffic in the area could impact overall air quality. However, the TCEQ has implemented a SIP for CO and ozone that accounts for the future increase in population and traffic. The maintenance plan includes the use of oxygenated fuels in El Paso County during the winter months, new-source-review provisions for major CO stationary sources, and corrections to the existing vehicle inspection and maintenance program. Similarly, the ozone SIP requires modified fuels in El Paso County during the summer months. These mitigation programs incorporated in the El Paso CO and ozone SIPs ensure that the new operational air emissions would be in compliance with regulations. The construction-related air quality and noise impacts would be temporary until construction is complete. The additional traffic associated with the operation of the new developments would increase the noise in the area. However, most of the traffic would be expected to remain on the major highways and thoroughfares which already have a large amount of traffic-related noise. Therefore, the additional traffic would only cause minor, cumulative noise impacts in the region.

SECTION 5.0
SUMMARY OF MITIGATION MEASURES

5.0 SUMMARY OF MITIGATION MEASURES

The following is a summary of the mitigation measures identified under the Proposed Action:

- Per State of Texas mandated construction requirements, a SWPPP would be generated by the developer, and BMPs per the SWPPP would be followed to control temporary fugitive dust and erosion during construction. These BMPs include silt fencing, structural windbreaks, erosion control mats, and application of water during construction.

- Avoidance of the arroyo located within Parcel C and BMPs such as silt fencing would be used to minimize impacts on surface water and protect this small amount of riparian habitat.

- Native vegetation would be preserved to the greatest extent possible when planning and implementing the Proposed Action.

- Preconstruction biological surveys for the Texas horned lizard and burrowing owl are recommended to detect their presence and provide for reducing impacts to these species.

- Migratory bird species would be protected in accordance with the MBTA to include phasing construction around the nesting season, and implementing BMPs to avoid harassing or harming these species.

- Required setting aside of at least a 30-acre natural area that is distinct and apart from required community parks and 5 acres of open space. This 30-acre set-aside would be designed to include the Butterfield Overland Mail Route within Parcel A to help protect and preserve the site.

- An MOA/PA regarding the treatment of the historic properties would be developed between the purchasing entity, Texas SHPO, and Fort Bliss for protection and management of the properties. Existing historic buildings within Parcel C may be demolished after undergoing HABS/HAER/HALS documentation and mitigation. The landscape feature would be left intact and preserved and this requirement would be included as a term of the sale in the PA.

- TCEQ mitigation programs incorporated in the El Paso CO and ozone SIPs would be followed as standard practice to ensure that the operational air quality emissions are in compliance. These include the use of oxygenated fuels in El Paso County during the winter months, new-source-review provisions for major CO stationary sources, and corrections to the existing vehicle inspection and maintenance program. The ozone SIP requires modified fuels in El Paso County during the summer months.

- The area of disturbance would exceed 1 acre, and construction stormwater permitting through the TCEQ NPDES would be obtained as required under the CWA. A SWPPP would be developed outlining the BMPs and other measures to be implemented to prevent excess stormwater runoff during and following construction.

- As part of the proposed land sale agreement, the acquiring developer would be required to phase the development so that the traffic LOS at the various intersections near the parcel would not deteriorate from pre-development conditions. As such, phasing would be required to proceed in tandem with the City of El Paso and TxDOT improvement projects along Montana Avenue, Spur 601, and Loop 375. The City of El Paso permitting process would be the enforcing mechanism to ensure that the development would not create substantial impacts on area traffic or water and wastewater service. The acquiring entity would be required to complete a project-specific traffic impact analysis that would be submitted to the city for review.

- According to a pre-development, non-project-specific TIA, future traffic impacts could be mitigated, for the most part, by implementing at-grade solutions that would not involve major infrastructure investments. Detailed mitigation measures for each of the intersections can be found in Appendix C. Listed below are some of the proposed mitigation measures that would be necessary at various intersections near the parcels:

    - redesigning traffic light phasing and timing for optimization
    - improving street geometry and signalization
    - lengthening of left lane capacity in order to absorb demand
    - adding a new left turn lane in median
    - adding a left turn sign in existing lane
    - adding a right turn lane in existing shoulder
    - opening new thoroughfares and turns in order to redistribute traffic access to parcels A, B, and C
    - adding new connections to the city grid by using mainly existing streets that are currently interrupted
    - substituting left turns by indirect trajectories at Montana Avenue and Lee Trevino Drive, and partially at Montana Avenue and George Dieter Drive
    - adding new traffic lights
    - constructing above-grade thoroughfares on Montana Avenue at the Yarborough (Global Reach) Drive intersection.

    Implementation of these proposed traffic mitigation measures would reduce traffic impacts and achieve acceptable LOS for a development scenario based on a combination of residential, retail, and community facilities and mixed-use buildings. A project-specific TIA for a less dense development could potentially result in even better LOS scores for the intersections.

SECTION 6.0
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6.0 REFERENCES

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SECTION 7.0
LIST OF PREPARERS

7.0 LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Assessment.

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SECTION 8.0
ACRONYMS AND ABBREVIATIONS

8.0 ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-Containing Material
AM	Amplitude Modulation
AR	Army Regulation
AST	Aboveground Storage Tank
AUTODIN	Automated Digital Network
BAAF	Biggs Army Airfield
BCT	Brigade Combat Team
BMP	Best Management Practice
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethlybenzene, Xylene
Caltrans	California Department of Transportation
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFC	Chlorofluorocarbons
CFH	Cubic Feet per Hour
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted Decibel
DERP/DERA	Defense Environment Restoration Program
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DPTMS	Directorate of Plans, Training, Mobilization and Security
DPW-E	Directorate of Public Works-Environmental Division
DSN	Defense Switched Network
EA	Environmental Assessment
ECP	Environmental Condition of Property
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPCC	El Paso Community College
EPE	El Paso Electric Company
EPWU	El Paso Water Utilities
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FBTC	Fort Bliss Training Complex
FHWA	Federal Highway Administration
FNSI	Finding of No Significant Impact
FORSCOM	Forces Command

FY	Fiscal Year
GFS EIS	Army Growth and Force Structure Realignment FEIS
GHG	Greenhouse Gases
GIS	Geographic Information Systems
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscapes Survey
HFC	Hydrochlorofluorocarbons
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
I-10	Interstate 10
ISD	Independent School District
ISDN	Integrated Switch Digital Network
ITAM	Integrated Training Area Management
kV	Kilovolt
LBP	Lead-Based Paint
LEED	Leadership in Energy and Environmental Design
Leq	Equivalent Continuous Noise Level
LINRs	Locally Important Natural Resources
LOS	Level(s) of Service
LPST	Leaking Petroleum Storage Tank
MBTA	Migratory Bird Treaty Act
Mg/m^3	Milligrams per Cubic Meter
Mg/kg	Milligrams per Kilogram
MGD	Million Gallons Per Day
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
MTBE	Metyl-Tert-Butyl-Ether
MW	Megawatts
N_2O	Nitrous Oxide
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NB	Northbound
NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PL	Public Law

PM-2.5	Particulate Matter less than 2.5 microns
PM-10	Particulate Matter less than 10 microns
POL	Petroleum, Oil, and Lubricants
ppb	Parts per Billion
ppm	Parts per Million
PPCV	Public Private Capital Venture
RCI	Residential Construction Initiative
ROD	Record of Decision
ROI	Region of Influence
SB	Southbound
SEIS	Mission and Master Plan Supplemental Programmatic EIS
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
T	Threatened
TA	Training Area
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TIA	Traffic Impact Analysis
TNRCC	Texas Natural Resource Conservation Commission
TRPH	Total Recoverable Petroleum Hydrocarbons
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TxGLO	Texas General Land Office
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VEC	Valued Environmental Component
VHF	Very High Frequency
VOC	Volatile Organic Compounds
VORTAC	VHF Omnidirectional Range/Tactical Aircraft Control
WBGHHD	William Beaumont General Hospital Historic District
$\mu g/m^3$	Micrograms per Cubic Meter

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APPENDIX A
INTERAGENCY AND PUBLIC CORRESPONDENCE

ALTERNATIVE LANGUAGE AFFIDAVIT OF PUBLICATION

STATE OF TEXAS §

COUNTY OF El Paso §

Before me, the undersigned authority, on this day personally appeared

Minerva Macias, who being by me duly sworn, deposes
(name of newspaper or publication representative)

and says that (s)he is the Account Executive
(title of newspaper representative)

of the El Diario; that said newspaper or publication is
(name of newspaper or publication)

generally circulated in El Paso, Texas;
(municipality in which the site or proposed site is located)

that the attached notice was published in said newspaper or publication on the following date(s):

September 30th, 2012

(newspaper or publication representative's signature)

Subscribed and sworn to before me this the 1 day of Oct, 2012.

to certify which witness my hand and seal of office.

Notary Public in and for the State of Texas

(Seal)

Silvia Diaz
Print or Type Name of Notary Public

12/13/2014
My Commission Expires

NOTARY PUBLIC STATE OF TEXAS
Silvia Diaz
My Commission Expires
12/13/2014

NOTIFICACION DE DISPONIBILIDAD
Borrador de la Declaratoria de Impacto No Significativo del Estudio Ambiental para la Venta, Desarrollo e Intercambio de Terrenos Propiedad de Fort Bliss, Texas

El Ejército está anunciando la disponibilidad de un Estudio Ambiental que analiza una acción para optimizar el uso del suelo de ciertas aéreas abiertas localizadas en los márgenes de las instalaciones de la Guarnición de Fort Bliss. El propósito de la acción es cumplir con ciertas necesidades del Ejército en cuanto a complejos habitacionales adicionales y a la protección de las aéreas de entrenamiento. Para esto, el Ejército propone la venta de dos parcelas localizadas en aéreas periféricas de las instalaciones de la Guarnición para permitir el establecimiento de complejos habitacionales privados y desarrollo comercial ligero dirigido, pero no en forma exclusiva, a personal militar. Los fondos de la venta de estas parcelas serían entonces usados para financiar la construcción de unidades habitacionales militares dentro de la Guarnición. El Ejército también propone la ejecución de un intercambio valor por valor con la Texas General Land Office de parcelas localizadas a lo largo de los límites sur de Fort Bliss. El intercambio proveería una zona continua e ininterrumpida en el Área de Entrenamiento Sur de Fort Bliss y protegería la viabilidad a largo plazo de esta área protegiéndola del desarrollo aledaño. El análisis del Estudio Ambiental ha resultado en la preparación de un borrador de declaratoria de Impacto no Significativo (FNSI, por sus siglas en inglés). Ambos documentos, el Estudio Ambiental y el borrador del FNSI están disponibles para su revisión y comentarios del público en El Paso Main Public Library, Irving Schwartz Branch Library y UTEP Library. También se pueden consultar en el sitio: www.bliss.army.mil; seleccione y presione "Environmental Public Documents".

Se invita al público a que revise los documentos y proporcione comentarios. La Recepción de comentarios tiene que ser antes de 30 días a partir de esta fecha y pueden enviarse por correo electrónico a: john.f.barrera.civ@mail.mil o por correo normal a: John J. Barrera, NEPA Program Manager, IMBL-PWE, B624 Pleasonton Avenue, Fort Bliss, Texas 79916-6812.

GULF SOUTH RESEARCH CORPORATION

8081 GSRI AVE
BATON ROUGE, LA 70820

AD # 0000731300

LINES 45
COST: $668.15

PUBLISHERS AFFIDAVIT

STATE OF TEXAS
COUNTY OF EL PASO

Before me, a Notary in and for El Paso County, State of Texas, on this day personally, appeared JOE WOODS who states upon oath that he is the ASSISTANT CLASSIFIED MANAGER of the EL PASO TIMES, a daily newspaper published in the City and County El Paso, State of Texas, which is a newspaper of general circulation and which has been continuously and regularly published for the period of not less than one year in the said County of El Paso, and that she was upon the dates herein mentioned in the EL PASO TIMES.

That the PUBLIC NOTICE copy was published in the EL PASO TIMES for the date(s) of such follows 1 DAY(s) to wit SEPTEMBER 30, 2012.

Signed ____________

BELIA DUENES
MY COMMISSION EXPIRES
March 19, 2016

Subscribed and sworn to before me,
This 16th day of October 16, 2012.

Belia Duenes

DOÑA ANA COUNTY JOB VACANCIES

SHERIFF'S DEPUTY CERTIFIED

HUMAN RESOURCES ADMINISTRATOR

LIEUTENANT EMT BASIC / INTERMEDIATE

HEAVY EQUIPMENT MECHANIC – BARGAINING UNIT

DASO COURT SECURITY AND TRANSPORT OFFICER

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www.donaanacounty.org

We are no longer accepting paper applications. It is necessary to apply on-line. Computer Kiosks are also available in the Human Resources Department.

Price's

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EEOE M/F/D/V

Southern NM Human Dev, Inc.

Behavioral Health Agency

JOB VACANCIES

Therapist: MA/MSW

Community Support Specialist, BA

Behavioral Management Specialist, BA

Secretary II: 4 yrs work experience

FOR ALL POSITIONS: Bilingual (English/Spanish) preferred. Appropriate NM License. E-Mail resume to hr@snmhd.org or mail to HR Dept., P.O. Box 4430, Anthony, NM 88021 or call HR (575) 882-5101. www.snmhd.org EOE

Prayers 133

Devotion to Saint Jude

May the Sacred Heart of Jesus be praised, adored loved, preserved & glorified throughout the world now & forever. Sacred Heart of Jesus pray for us. St. Jude worker of miracles pray for us. St. Jude Helper of the Hopeless pray for us. Praise to you Lord, Jesus Christ for the help of your servant St. Jude in listening to my prayers. Pray this prayer 9 days. By the end of the 8th day your prayers will be answered. It has never been known to fail. Publication must be promised. Thank you for hearing my prayer.
D.R.

School Instructions 142

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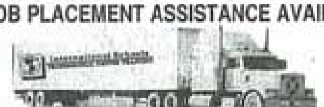


3950 DONIPHAN SUITE C — 845-1414

1155 ZARAGOZA #C-102 — 858-1515

WWW.INTERNATIONALSCHOOLS.COM

NOTICE OF AVAILABILITY
Draft Finding Of No Significant Impact Environmental Assessment for the Sale, Development, and Exchange of Army-Owned Land, Fort Bliss, Texas

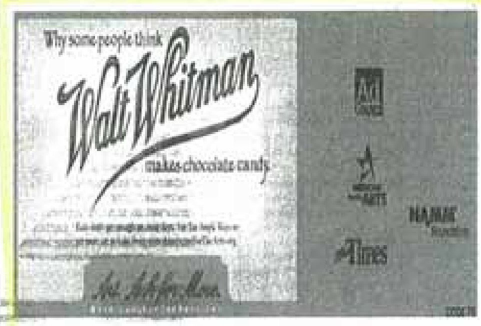
The Armyannounces the availability of an Environmental Assessment to optimize the land use of certain areas on the margins of the Fort Bliss Cantonment to meet crucial Army needs in terms of additional military housing, training areas, and other uses. Fort Bliss proposes to sell two parcels on the periphery of the Fort Bliss Cantonment to provide land for private housing and light commercial development suited, but not exclusive to, military personnel. Proceeds of the sale would in turn be used to fund construction of additional military housing inside the Cantonment. The Army would also execute a value-for-value exchange with the Texas General Land Office for parcels along Fort Bliss's southern boundary to protect the South Training Area by providing a buffer from encroachment. Both the EA and Draft FNSI are available for public review and comment at the El Paso Main Public Library, the Irving Schwartz Branch Library, and the UTEP Library. They can also be viewed on the following website: www.bliss.army.mil; click on "Environmental Public Documents."

The public is encouraged to review, and comment on, these documents. Submittal of public comments must be received no later than 30 days from today and can be submitted by e-mailat john.f.barrera.civ@mail.mil, or mailed to:Mr. John F. Barrera, NEPA Program Manager, IMBL-PWE, 8624 Pleasonton Avenue, Fort Bliss, Texas 79916-6812.

Immigration and Customs Enforcement
El Paso City Administrative Facility
Fort Bliss, Texas

The Army and the Department of Homeland Security (DHS) - Immigration and Customs Enforcement (ICE) announce the availability of an Environmental Assessment (EA) that analyzes the construction and operation of an administrative facility on 19-acres fronting Montana Avenue, west of the existing Armed Forces Reserve Center within Fort Bliss, Texas. The Army intends to issue a long term lease to the DHS for the facility. The EA has resulted in a Draft Finding of No Significant Impact (FNSI), as ICE will consult with the City of El Paso and the Texas Department of Transportation during the design phase to address potential traffic impacts in the area. The proposed facility would house approximately 500 employees currently working at seven different facilities located throughout El Paso, Texas. The leases on the seven facilities currently used by ICE would be terminated and those functions consolidated at the new facility. No high risk activities would occur at the new facility. Both the EA and Draft FNSI are available for public review and comment at theEl Paso Main Public Library, the Irving Schwartz Branch Library, and theUTEP Library. They can also be viewed on the following websites:www.bliss.army.mil; click on "Environmental" and http://ecso.swf.usace.army.mil/Pages/Publicreview.cfm.

The public is encouraged to review and comment on these documents. Submittal of public comments must be received no later than 30 days from today and can be submitted by e-mail at john.f.barrera.civ@mail.mil, or mailed to: Mr. John F. Barrera, NEPA Program Manager, IMBL-PWE, 8624 Pleasonton Avenue, Fort Bliss, Texas 79916-6812.



DISTRIBUTION LIST

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UTEP Library
500 West University
El Paso, Texas 79968

Irving Schwartz Branch Library
1865 Dean Martin Dr.
El Paso Texas 79936

Federal Agencies

Adam Zerrenner
Field Supervisor
Austin Ecological Services Field Office
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, Texas 78758

Tribes

Ysleta del Sur Pueblo
Javier Loera, War Captain
P.O. Box 17579
El Paso, Texas 79917-7579

State Agencies –Texas

Mark Wolfe, Executive Director
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711-2276

Stan Graves, Architect
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711-2276

Jerry Patterson, Commissioner
Texas General Land Office
1700 N. Congress Ave, Suite 840
Austin, Texas 78701-1495

Eddie Arellano
TxDOT-APD Section
13301 Gateway Boulevard W.
El Paso, Texas 79928

Lorinda Gardner, Regional Director
Texas Commission on Environmental Quality
401 E. Franklin Ave, Suite 560
El Paso, Texas 79901-1206

Carter Smith, Executive Director
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

City of El Paso

The Hon. John Cook, Mayor
City of El Paso
2 Civic Center Plaza
El Paso, Texas 79901-1196

Joyce A. Wilson, City Manager
City of El Paso
2 Civic Center Plaza
El Paso, Texas 79901-1196

Ann Morgan Lilly
El Paso City Representative, District #1
2 Civic Center Plaza
El Paso, Texas 79901-1196

Susie Byrd
El Paso City Representative, District #2
2 Civic Center Plaza
El Paso, Texas 79901-1196

Emma Acosta
El Paso City Representative, District #3
2 Civic Center Plaza
El Paso, Texas 79901-1196

Carl. L. Robinson
El Paso City Representative, District #4
2 Civic Center Plaza
El Paso, Texas 79901-1196

Dr. Michael Noe
El Paso City Representative, District #5
2 Civic Center Plaza
El Paso, Texas 79901-1196

Eddie Holguin Jr.
El Paso City Representative, District #6
2 Civic Center Plaza
El Paso, Texas 79901-1196

Steve Ortega
El Paso City Representative, District #7
2 Civic Center Plaza
El Paso, Texas 79901-1196

Cortney Niland
El Paso City Representative, District #8
2 Civic Center Plaza
El Paso, Texas 79901-1196

Anthony T. Do
Traffic Engineer
City of El Paso
7968 San Paulo Dr.
El Paso, Texas 79907

El Paso County

The Hon. Veronica Escobar
County Judge
500 E. San Antonio, Suite 301
El Paso, Texas 79901

Anna Perez
Commissioner, Precinct #1
500 E. San Antonio, Suite 301
El Paso, Texas 79901

Sergio Lewis
Commissioner, Precinct #2
500 E. San Antonio, Suite 301
El Paso, Texas 79901

Tania M. Chozet
Commissioner, Precinct #3
500 E. San Antonio, Suite 301
El Paso, Texas 79901

Daniel Haggerty
Commissioner, Precinct #4
500 E. San Antonio, Suite 301
El Paso, Texas 79901

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT BLISS
1 PERSHING ROAD
FORT BLISS, TX 79916-3803

REPLY TO
ATTENTION OF:

May 17, 2012

Garrison Command
IMBL-PWE
Conservation Branch

Mr. Bill Martin
Archaeology Division
Texas Historical Commission
108 West 16th Street
El Rose Building, 1st Floor
Austin, TX 78701

Dear Mr. Martin,

For your records, please find enclosed a Memorandum of Agreement signed by all parties--Fort Bliss, the Texas General Land Office, and the Texas Historical Commission. The Agreement provides for the future management of a historic property in a proposed land exchange between Fort Bliss and the GLO. That site is FB6971/41EP1473 and I have attached the signed MOA and corresponding maps.

If you have any questions, concerns etc. please do not hesitate to contact Brian Knight at (915) 568-6746 or email at brian.d.knight.civ@mail.mil.

Sincerely,

Brian Knight, RPA
Conservation Branch Chief
DPW-Environmental

Enclosure

MEMORANDUM

Texas General Land Office • Jerry Patterson • Commissioner

DATE: May 14, 2012

TIME SENSITIVE MATERIAL
Requires action by 3:00 5/15/2012

TO: **Commissioner Patterson**

Thru: Larry Laine ____
General Counsel WFW ____
Hal Croft ____

FROM: BURTON MINTON

SUBJECT: Memorandum of Agreement between Fort Bliss, GLO and THC Property in El Paso County, Texas

---

SUMMARY and DETAILS: The MOA is for the further management of a historic property in a proposed land exchange between Fort Bliss and the GLO.

RECOMMENDATIONS: Staff recommends the execution of one (1) original of the MOA.

ATTACHMENT 1

MEMORANDUM OF AGREEMENT FOR FUTURE MANAGEMENT OF ONE HISTORIC PROPERTY WITHIN A PROPOSED LAND EXCHANGE BETWEEN FORT BLISS GARRISON COMMAND (GC) AND THE TEXAS GENERAL LAND OFFICE (GLO) IN EL PASO COUNTY, TEXAS

UNDERTAKING: Management of Historic Property in Proposed Land Exchange
STATE: Texas (El Paso County)
AGENCY: Headquarters, Fort Bliss Garrison Command, Fort Bliss, Texas

WHEREAS, Fort Bliss GC and the Texas General Land Office (GLO) propose to exchange land in El Paso County, Texas; and

WHEREAS, the Fort Bliss GC, in consultation with the Texas State Historic Preservation Officer (SHPO), has determined that FB6971/41EP1473, located within the footprint of the land which the GLO will accept, is a prehistoric archeological site eligible for inclusion in the National Register of Historic Places by virtue of the significant information the site may yield about prehistoric occupations (per 36 CFR part 800.4 and the *Significance and Research Standards for Prehistoric Archaeological Sites at Fort Bliss (2009)*; and

WHEREAS, the parties agree that Fort Bliss will have a Metes and Bounds Survey, with 20-meter buffer, conducted of the site, and will apply for designation of FB6971/41EP1473 as a State Archeological Landmark (SAL) prior to transfer of the property from Fort Bliss to the GLO; and

WHEREAS, the parties agree that GLO will ensure that so long as the land is administered by GLO, site FB6971/41EP1473 will be preserved and protected from physical destruction or damage; and

WHEREAS, the parties agree that if the property containing FB6971/41EP1473, or any part of it, shall be transferred or sold out of State ownership or control, GLO will ensure that the proposed new owner of the land shall be required to execute an antiquities conservation easement on the entire site (see attached) in favor of THC, as holder (pursuant to the terms of the currently effective interagency MOU between GLO and THC relating to management of antiquities properties), that ensures the ongoing protection and preservation of the site (or mitigation in the event of any future unavoidable harmful effects proposed by the new landowner).

OTHER TERMS AND CONDITIONS:

Modification, amendment and termination of this agreement, as necessary, shall be accomplished by the signatories by mutual agreement.

Disputes regarding the completion of the terms of this agreement shall be resolved by the signatories. If the signatories cannot agree regarding a dispute, any one of the signatories may request the participation of the Advisory Council on Historic Preservation (ACHP) to assist in resolving the dispute.

Federal Agency Official:

23 July 2010

VICKI G. HAMILTON, Historic Preservation Officer Date

State Agency Official:

5/15/12

JERRY PATTERSON, Commissioner Date

APPROVED:
Contents
Legal
Deputy Comm.
General Counsel
Chief Clerk

State Agency Official:

7/26/10

MARK WOLFE, Executive Director, THC Date

Responses to letter received from Texas Parks and Wildlife Department dated 23 October 2012:

Fort Bliss appreciates the comments received from TPWD regarding the Environmental Assessment for the Sale, Development, and Exchange of Army-owned Land, Fort Bliss, Texas. These comments have been conscientiously examined and evaluated by Fort Bliss DPW-E personnel and changes made to the document as indicated:

Fort Bliss concurs with the recommendation to avoid impacts to native vegetation to the greatest extent possible, and wording that effect will be added to the mitigations listed in Chapter 5.0. Likewise, mitigation to minimize impacts to the Texas horned lizard and burrowing owl would include the recommendation for pre-construction surveys to confirm their presence or absence. Migratory birds would be protected in accordance with the Migratory Bird Treaty Act to include phasing construction around nesting season, and implementing best management practices to avoid harassing or harming these species.

With the exception of potential habitat for burrowing owls and Texas horned lizards, none of the parcels contain habitat for the listed or sensitive species included in the TPWD letter. Sneeds' pincushion cactus is found only on specific limestone substrates, which do not exist on any of the parcels. A population of this cactus is known to exist on state-owned land close to, but not part of, Parcel C. Despite numerous surveys, this cactus species is not known to exist on the Texas portions of Fort Bliss.

Like the Sneed's pincushion cactus, no habitat exists in any of the three parcels for the four species listed on page six of the TPWD letter. None of these species are known from the Texas portion of Fort Bliss despite many surveys. Surveys in deep sand substrates have not found Wheeler's spurge or sand prickly-pear on Fort Bliss. However, not all of this specific type of substrate has been surveyed to date. Nevertheless, none of the three parcels contain this particular substrate.

Neither the black-tailed prairie dog nor the New Mexico garter snake are known in the areas being evaluated. There is no habitat for black-tailed prairie dogs in the Texas portion of Fort Bliss. The only known population of prairie dogs exists on the Otero Mesa portion of Fort Bliss in New Mexico. Likewise, there are no sufficiently moist habitats associated with the landscaped arroyo in Parcel C that could be expected to maintain a population of New Mexico garter snakes. This arroyo will continue to exist as a historic feature per agreement with Texas SHPO, and will not be negatively impacted by the proposed action.

October 31, 2012

John Barrera
NEPA Program Manager
Bldg. 624S Taylor Rd.
Fort Bliss, TX 79916

Re: *Project review under Section 106 of the National Historic Preservation Act of 1966, Draft Finding of No Significant Impact and Environmental Assessment for the Sale, Development, and Exchange of Army-Owned Land, Fort Bliss, El Paso County, Texas (DOD/106, THC track 201301017)*

Dear Mr. Barrera,

Thank you for your correspondence regarding the above-referenced project. This letter serves as comment from the State Historic Preservation Officer (SHPO), the Executive Director of the Texas Historical Commission.

The review staff, led by archeologist Tiffany Osburn and architectural reviewer Elizabeth Brummett, has completed its review of the project documentation received on October 1, 2012. Based on the draft Finding of No Significant Impact (FONSI) and Environmental Assessment (EA), the proposed undertaking entails the sale, development, and/or exchange of army-owned land at Fort Bliss. Five alternatives under consideration include the sale or exchange of up to three tracts, Parcels A, B, and C. We have the following comments regarding this undertaking.

Parcels A, B, and C include cultural resources eligible for listing in the National Register of Historic Places. These include one eligible site, the Butterfield Overland Mail Route, in Parcel A; three eligible archeological sites in Parcel B; and two eligible buildings and a landscape feature associated with the former William Beaumont General Hospital in Parcel C. We appreciate your intent to enter into Memorandums of Agreement (MOAs) between Fort Bliss, the SHPO, and the purchasing entities for these projects; however, the phrasing used in the EA does not accurately reflect the Section 106 consultation process.

Under the Section 106 regulations at 36 CFR 800.5, disposition of federal property can cause an adverse effect to historic properties if the transfer occurs without adequate and legally enforceable restrictions to ensure long-term preservation. The EA also references potential development of two sites in Parcel B, as well as the possible demolition of historic buildings in Parcel C should reuse of the buildings prove infeasible, which would also constitute adverse effects. Under Section 800.6, to resolve adverse effects the federal agency must consult with the SHPO, other consulting parties, and the public; notify the Advisory Council on Historic Preservation and inquire whether they will participate in consultation; and seek ways to avoid, minimize, or mitigate the adverse effects. Mitigation cannot be prescribed in advance of this consultation. Once the parties have reached consensus on how adverse effects will be resolved, this is formalized through an MOA; while this step concludes the Section 106 process, signing an MOA does not signify that the project has no adverse effect on cultural resources, as stated in the EA. Resolution of any adverse effects should occur prior to finalization of the FONSI, per Section 800.8.

The former William Beaumont General Hospital site is covered by a 2005 Programmatic Agreement (PA) between Fort Bliss, our office, and a developer for the enhanced use lease

(EUL) of the site. At the time of the agreement, the William Beaumont General Hospital was considered eligible for listing in the National Register of Historic Places as a historic district. In May of 2012, our office concurred that the district does not retain integrity and is no longer eligible for National Register listing, but two buildings and a landscape feature (Building 7115, Building 7167, and the Arroyo Garden) are individually eligible for listing. In light of the revised eligibility determination, as well as the change in the nature of the undertaking from an EUL to sale of the property, the existing agreement should be amended or terminated and a new agreement reached for the current undertaking. Under the 2005 agreement, Buildings 7115 and 7167 and the Arroyo Garden were identified for retention and reuse. Ideally, we look forward to working with your office to negotiate the terms of a preservation covenant or easement to be included in the deed of sale to ensure the long-term preservation of these historic properties.

Thank you for your cooperation with this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. **If you have any questions concerning our review or if we can be of further assistance, please contact Tiffany Osburn at 512/463-8883 or Elizabeth Brummett at 512/463-6167.**

Sincerely,

A. Elizabeth Brummett

A. Elizabeth Brummett, State Coordinator for Project Review
For: Mark Wolfe, State Historic Preservation Officer

Cc: Michael Johnson, Historical Architect, Fort Bliss, *via email*

MW/aeb

October 23, 2012

Mr. John F. Barrera
NEPA Program Manager
Department of the Army
Bldg. 624S Taylor Rd.
Fort Bliss, TX 79916

RE: Draft Finding of No Significant Impact Environmental Assessment for the Sale, Development, and Exchange of Army-Owned Land, Fort Bliss, Texas

Dear Mr. Barrera:

Texas Parks and Wildlife Department (TPWD) reviewed the Draft Finding of No Significant Impact Environmental Assessment (EA) for the Sale, Development, and Exchange of Army-Owned Land in Fort Bliss, Texas.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number ERCS-3046 in any return correspondence regarding this project.

Project Description

The Army plans to optimize the land use of certain areas on the margins of the Fort Bliss Cantonment to meet crucial Army needs in terms of additional military housing, training areas, and other uses. Fort Bliss proposes to sell two parcels on the periphery of the Fort Bliss Cantonment to provide land for private housing and light commercial development suited, but not exclusive, to Fort Bliss military personnel.

The Army would also execute a value-for-value exchange with the Texas General Land Office (TxGLO) for parcels along Fort Bliss's southern boundary. A need exists to create a continuous, uninterrupted training area in the South Training Area of Fort Bliss. In the exchange, the Army would convey a parcel in the extreme southern part of the Fort Bliss Cantonment that has limited mission utility for a parcel of state land located along Fort Bliss's southeast boundary that would add to Fort Bliss's training capabilities. Five alternatives were considered for analysis within this EA.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

For purposes of this letter, impacts associated with the Preferred Alternative will be assessed. The Preferred Alternative (Alternative 5) encompasses Alternatives two through four, with Alternative 1 being the No-Build Alternative. Alternative 5 includes the sale of Parcel A for development (Southeast Bliss), land exchange and development of Parcel B (between Fort Bliss and TxGLO), and the sale of Parcel C for development (Lower Beaumont).

Impacts to Vegetation/Wildlife Habitat

Section 3.5.2 of the EA states approximately 1,636 acres of vegetation would be cleared as a result of the sale of Parcel A for development. Since the current TxGLO plans are to leave Parcel B as open land, no impacts to vegetation would occur in the foreseeable future. However, if Parcel B were to be developed at some time in the future, impacts would need to be reassessed given the changes occurring within the area and the region as a whole. It is anticipated that approximately 694 acres of vegetation would be cleared as a result of the development of Parcel B. The currently owned TxGLO land is proposed to be used as training land once Fort Bliss acquires it, and there would be no vegetation clearing within the proposed training land. To prevent the spread of noxious weeds from activities in the proposed training land parcel, a noxious weed monitoring and treatment program would be established by Fort Bliss with guidance from Directorate of Public Works-Environmental Division biologists. Since most of Parcel C has been previously developed, only a minimal amount of regionally common vegetation would be cleared as a result of the development of Parcel C.

Alternative 5 would result in the clearing of approximately 2,330 acres of vegetation due to the development of parcels A, B, and C.

Chapter 5 of the EA states mitigation will take place through a required setting aside of at least a 30-acre natural area that is distinct and apart from required community parks and 5 acres of open space.

> **Recommendation**: TPWD recommends avoiding impacts to native vegetation to the greatest extent possible. Conserving native vegetation would provide the greatest benefit overall to the existing wildlife.
>
> Invasive species pose a significant threat to the existence of native plant communities in disturbed areas. In accordance with the ***Executive Order on Invasive Species (EO 13112)*** and the ***Executive Memorandum on Beneficial Landscaping***, TPWD recommends that practices be implemented to prevent the establishment of invasive species and sustain existing native species, particularly during the early stages of revegetation. Lists of invasive species

to avoid planting can be accessed online at http://texasinvasives.org/invasives_database/. The Lady Bird Johnson Wildflower Center's ***Native Plant Alternatives to Invasives*** database can be accessed at http://www.wildflower.org/ alternatives/index.php.

For projects that incorporate revegetation or landscape planning, the ***TPWD Texas Wildscapes*** website has information about selecting native plants that would be best suited for the particular area. Information on ***Texas Wildscapes*** (including how to obtain a free copy of an interactive Texas Wildscapes DVD) is available at http://www.tpwd.state.tx.us/huntwild/wild/wildscapes/. Additional sources include the TPWD ***Texas Plant Information Database*** at http://tpid.tpwd.state.tx.us/ and the Lady Bird Johnson Wildflower Center's ***Recommended Native Plants*** database at http://www.wildflower.org/collections/.

Federal Laws

Endangered Species Act

Federally-listed animal species and their habitats are protected from "take" on any property by the Endangered Species Act (ESA). Take of a federally-listed species can be allowed if it is "incidental" to an otherwise lawful activity and must be permitted in accordance with Section 7 or 10 of the ESA. Federally-listed plants are not protected from take except on lands under federal/state jurisdiction or for which a federal/state nexus (i.e., permits or funding) exists. Any take of a federally-listed species or its habitat without the required take permit (or allowance) from the U.S. Fish and Wildlife Service (USFWS) is a violation of the ESA.

The Texas Natural Diversity Database (TXNDD) is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously based on new, updated and undigitized records; for questions regarding a record, please contact txndd@tpwd.state.tx.us.

Sneed's pincushion cactus (*Escobaria sneedii var. sneedii*)

According to the TXNDD the nearest occurrence of the federal- and state-listed endangered Sneed's pincushion cactus is approximately 1.5 miles northwest of the project area, particularly Parcel C. There is another occurrence of the Sneed's pincushion cactus approximately 2 miles northwest of the project area (Parcel C). A printout of the occurrence records is attached for your reference.

> **Recommendation:** TPWD strongly recommends that Parcel C be surveyed for the Sneed's pincushion cactus. On-the-ground surveys should be performed by a qualified biologist familiar with the identification of this species prior to construction. Surveys should be conducted when this species is most detectable and identifiable (usually during the flowering season), and disturbance of this species should be avoided during construction to the extent feasible. If plants are found in the path of construction, this office (512-389-4571) and the USFWS should be contacted. Plants not in the direct path of construction should be protected by markers or fencing and by instructing construction crews to avoid any harm.

Migratory Bird Treaty Act

Section 3.5.2 of the EA states that bird species protected by the Migratory Bird Treaty Act (MBTA) may be minimally impacted under Alternative 5 (Preferred Alternative).

The MBTA prohibits taking, attempting to take, capturing, killing, selling/purchasing, possessing, transporting, and importing of migratory birds, their eggs, parts and nests, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. El Paso County is located within the Central Flyway for migratory birds. Many bird species nest in the general area during the spring and summer. Fall and spring migrants use the region for temporary stops during travel between the northern and southern hemispheres.

> **Recommendation:** TPWD recommends that best management practices for avoiding harassment and harm to migratory birds be implemented. In accordance with the MBTA, TPWD recommends that vegetation removal and ground disturbing activities be phased to occur outside of the nesting season (March 15 to September 15) and impacts to spring and fall migrants be avoided. Construction noise that could harass nesting birds should be phased to occur outside of the nesting season as well. Additional information regarding the MBTA may be obtained through the USFWS Region 2 Migratory Bird Permit Office at (505) 248-7882 or online at http://www.fws.gov/birds/Permits-Fact-Sheet.pdf.

State Laws

State-listed Species

Section 68.015 of the Parks and Wildlife Code regulates state-listed species. Please note that there is no provision for take (incidental or otherwise) of state-listed species. A copy of *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, is attached for your reference. State-listed species may only be handled by persons with a scientific collection permit obtained through TPWD. For more information on this permit, please contact the Wildlife Permits Office at (512) 389-4647.

Section 3.5.1 of the EA states the Texas horned lizard (*Phrynosoma cornutum*), a state-listed threatened species, has the potential to occur within the project area. TPWD would also like to point out that suitable habitat for the Mountain short-horned lizard (*Phrynosoma hernandesi*), a state-listed threatened species, may also be present within the project area.

If present on site, both the Mountain short-horned lizard and the Texas horned lizard could be impacted by ground disturbing activities from construction and training activities. Horned lizards may hibernate on site in the loose soils few inches below ground during the cool months from September/October to March/April. Construction in these areas could harm hibernating lizards. Horned lizards are active above ground when temperatures exceed 75 degrees Fahrenheit. If horned lizards (nesting, gravid females, newborn young, lethargic from cool temperatures or hibernation) cannot move away from noise and approaching construction equipment in time, they could be affected by construction activities.

> **Recommendation:** TPWD recommends that a pre-construction survey be conducted to determine if horned lizards are present on site. A useful indication that Texas horned lizard may occupy the site is the presence of Harvester Ant (*Pogonomyrmex barbatus*) nests since Harvester Ants are the primary food source of horned lizards. The survey should be performed during the warm months of the year when the horned lizards are active. Fact sheets, including survey protocols and photos of Texas horned lizard may be found online at http://www.tpwd.state.tx.us/learning/texas_nature_trackers/horned_lizard/ and at http://www.tpwd.state.tx.us/huntwild/wild/species/thlizard/.
>
> If horned lizards are found on site, TPWD recommends contacting this office to develop plans to relocate them, particularly if there is likelihood that they would be harmed by project activities.

Species of Concern

The EA does not address rare species on the ***TPWD Annotated List of Rare Species for El Paso County*** (attached). In addition to state- and federally-protected species, TPWD tracks special features, natural communities, and rare resources that are not listed as threatened or endangered. These species and communities are tracked in the TXNDD, and TPWD actively promotes their conservation. TPWD considers it important to evaluate and, if necessary, minimize impacts to rare species and their habitat to reduce the likelihood of endangerment.

Based on the project description, site location, a review of the TXNDD, and publicly-available aerial photographs, the following species of concern could be impacted as a result of the proposed project:

Desert night-blooming cereus (*Peniocereus greggii* var. *greggii*)
Resin-leaf brickellbush (*Brickellia baccharidea*)
Sand prickly-pear (*Opuntia arenaria*)
Wheeler's spurge (*Chamaesyce geyeri var. wheeleriana*)

One TXNDD record for the Desert night-blooming cereus is located approximately 3.8 miles north of Parcel C and approximately 8 miles from the rest of the project area. One record for the Resin-leaf brickellbush is located approximately 1.3 miles southwest of Parcel C and approximately 8.5 miles from the rest of the project area. One record for the Sand prickly-pear is located approximately 1.7 miles west of Parcel C and approximately 9.5 miles from the rest of the project area. Two records for the Wheeler's spurge are located within Parcels A, B, and the TxGLO land. One record for the Wheeler's spurge is located approximately 4.5 miles east of Parcels A, B, and the TxGLO land. A printout of these occurrence records is attached for your reference.

Recommendation: TPWD strongly recommends that the 2,330 acres of vegetation slated for clearing be surveyed for the Desert night-blooming cereus, Resin-leaf brickellbush, Sand prickly-pear, and Wheeler's spurge where suitable habitat is present. On-the-ground surveys should be performed by a qualified biologist familiar with the identification of this species. Surveys should be conducted when each species is most detectable and identifiable (usually during their respective flowering seasons), and disturbance of these species should be avoided during construction to the extent feasible. If plants are found in the path of construction, this office (512-389-4571) should be contacted for further coordination and possible salvage of plants and/or seeds for seed banking. Plants not in the direct path of construction should be protected by markers or fencing and by instructing construction crews to avoid any harm.

Although there are no TXNDD records for the following rare species in the project area, suitable habitat may still be present.

New Mexico garter snake (*Thamnophis sirtalis dorsalis*)
Black-tailed prairie dog (*Cynomys ludovicianus*)

The wet or moist microhabitats associated with the arroyo in Parcel C may contain suitable habitat for the New Mexico garter snake. The shrubs and grasslands associated with Parcel A, B, and the TxGLO land may provide suitable habitat for the black-tailed prairie dog.

> **Recommendation:** TPWD recommends that, if not done to date, the project area be surveyed for the rare species and other species on the county list that have potential to occur in the action area. The survey should be performed at the time of year when the species is most likely to be found. If these species are present, plans should be made to avoid adverse impacts to the greatest extent possible. In addition, this TPWD office should be contacted for further guidance.

> **Recommendation:** Snakes are generally perceived as a threat and killed when encountered during clearing or construction. Therefore, TPWD recommends that personnel involved in clearing and construction be informed of the potential for the rare New Mexico garter snake to occur on the project site. Personnel should be advised to avoid impacts to this snake as it is non-venomous and poses no threat to humans. Contractors should avoid contact with this species if encountered and allow the snake to safely leave the premises.

Western Burrowing Owl (*Athene cunicularia hypugaea*)

Section 3.5.1 of the EA states the Western Burrowing Owl, a species of concern, has the potential to occur within the project area. TPWD notes that the MBTA protects not only migratory birds but also their eggs and nests and requires that eggs be hatched and young birds be fledged before nests can be removed.

> **Recommendation:** If mammal burrows or other suitable habitat would be disturbed as a result of the proposed project, TPWD recommends they be surveyed for burrowing owls. If nesting owls are found, disturbance should be avoided until the eggs have hatched and the young have fledged.

> **Recommendation:** TPWD requests that Department of the Army address potential impacts to rare species that are included on the Annotated County List of Rare Species for the project county. If potential impacts are identified,

TPWD requests that Department of the Army incorporate actions into the project to minimize impacts to these species.

Section 3.5.1 of the EA states "On Fort Bliss, 61 sensitive species of flora and fauna are known to occur or have the potential to occur, of which 31 have Federal special status. Seven are listed as threatened or endangered under the ESA, and one is a candidate for listing. The remaining 23 are listed as species of concern. In addition to those Federally listed species and special status species, seven are listed as Texas threatened animals, and five are listed as endangered animals in the state. While most of these species are known to occur on Fort Bliss land, the probability of these species occurring within the Fort Bliss Cantonment and/or within parcels A, B, C or the proposed training land is low due to lack of suitable habitat."

The EA does not address when or if an on-the-ground biological survey was performed by a qualified biologist to determine the presence, absence, or probability of suitable habitat for any of the above mentioned species that are known to occur or have the potential to occur on Fort Bliss.

Recommendation: TPWD would like to point out that before a determination can be made as to whether the project would affect species or resources, the evaluation would have to be carried further with on-the-ground surveys for potential habitat and species. TPWD recommends that an on-the-ground survey be performed by a qualified biologist if one has not been performed to date.

I appreciate the opportunity to review and comment on this project. Please contact me at (512) 389-8054 or by email at jessica.schmerler@tpwd.state.tx.us if you have any questions.

Sincerely,

Jessica Schmerler

Jessica Schmerler
Wildlife Habitat Assessment Program
Wildlife Division

JES:gg.ERCS-3046

Attachments (3)

Protection of State-Listed Species
Texas Parks and Wildlife Department Guidelines

Protection of State-Listed Species

State law prohibits any take (incidental or otherwise) of state-listed species. State-listed species may only be handled by persons possessing a **Scientific Collecting Permit** or a **Letter of Authorization** issued to relocate a species.

- **Section 68.002 of the Texas Parks and Wildlife (TPW) Code** states that species of fish or wildlife indigenous to Texas are endangered if listed on the United States List of Endangered Native Fish and Wildlife or the list of fish or wildlife threatened with statewide extinction as filed by the director of Texas Park and Wildlife Department. Species listed as Endangered or Threatened by the Endangered Species Act are protected by both Federal and State Law. The State of Texas also lists and protects additional species considered to be threatened with extinction within Texas.

- **Animals** - Laws and regulations pertaining to state-listed endangered or threatened animal species are contained in **Chapters 67 and 68 of the Texas Parks and Wildlife (TPW) Code** and **Sections 65.171 - 65.176 of Title 31 of the Texas Administrative Code (TAC).** State-listed animals may be found at **31 TAC §65.175 & 176.**

- **Plants** - Laws and regulations pertaining to endangered or threatened plant species are contained in **Chapter 88 of the TPW Code and Sections 69.01 - 69.9 of the TAC.** State-listed plants may be found at **31 TAC §69.8(a) & (b).**

Prohibitions on Take of State Listed Species

Section 68.015 of the TPW Code states that no person may capture, trap, take, or kill, or attempt to capture, trap, take, or kill, endangered fish or wildlife.

Section 65.171 of the Texas Administrative Code states that except as otherwise provided in this subchapter or **Parks and Wildlife Code, Chapters 67 or 68**, no person may take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the department as endangered or threatened.

"Take" is defined in **Section 1.101(5) of the Texas Parks and Wildlife Code** as:

> *"Take," except as otherwise provided by this code, means collect, hook, hunt, net, shoot, or snare, by any means or device, and includes an attempt to take or to pursue in order to take.*

Penalties

The penalties for take of state-listed species (**TPW Code, Chapter 67 or 68**) are:

- 1ST Offense = Class C Misdemeanor:
  $25-$500 fine

- One or more prior convictions = Class B Misdemeanor
  $200-$2,000 fine and/or up to 180 days in jail.

- Two or more prior convictions = Class A Misdemeanor
  $500-$4,000 fine and/or up to 1 year in jail.

Restitution values apply and vary by species. Specific values and a list of species may be obtained from the TPWD Wildlife Habitat Assessment Program.

Element Occurrence Record

Scientific Name: *Chamaesyce geyeri var. wheeleriana* **Occurrence #:** 3 **Eo Id:** 8587

Common Name: Wheeler's spurge **TX Protection Status:** **ID Confirmed:** Y

Global Rank: G5T2 **State Rank:** S1 **Federal Status:**

Location Information:

Latitude: 314846N **Longitude:** 1061316W

Watershed Code:	Watershed Description:
13040100	Rio Grande-Fort Quitman

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-G2	Nations South Well	TX
		31106-G3	Fort Bliss SE	TX
		31106-H2	Nations East Well	TX
		31106-H3	Fort Bliss NE	TX
		31106-F2	Clint NW	TX
		31106-F3	Ysleta	TX
		31106-G1	Helms West Well	TX

Directions:

ALONG US ROUTE 62/180, 15-17 MILES EAST OF EL PASO NEAR FOOTHILLS OF HUECO MOUNTAINS

Survey Information:

First Observation: 1942-08-16 **Survey Date:** **Last Observation:** 1952-07-28

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description: AMONG SHIFTING SAND DUNES AND IN OTHER SANDY SITUATIONS OF WHAT WARNOCK AND JOHNSTON (1969) CALLED THE JORNADA DEL MUERTO

Comments: COMPLETE SPECIMEN CITATIONS: AMONG SHIFTING SAND DUNES NEAR FOOTHILLS OF HUECO MOUNTAINS, 17 MILES EAST OF EL PASO, 16 AUGUST 1942, U.T. WATERFALL 3900 (GH); AND, IN DEEP SAND ALONG CARLSBAD HIGHWAY CA. 15 MILES EAST OF EL PASO, ALTITUDE 4000 FEET, 28 JULY 1952, B.H. WARNOCK 10900 (SMU, SRSC, TEX); BOTH SPECIMENS CITED IN THE ARTICLE CONTAINING THE TYPE DESCRIPTION (SEE BEST SOURCE)

Protection Comments:

Management Comments:

Data:

EO Data:

Element Occurrence Record

Managed Area:

Managed Area Name: **Managed Area Type:**

Reference:

Full Citation:

WARNOCK, B.H. AND M.C. JOHNSTON. 1969. EUPHORBIA EXSTIPULATA VAR. LATA AND EUPHORBIA GEYERI VAR. WHEELERIANA WARNOCK & JOHNSTON, NEW TAXA FROM WESTERN TEXAS. SOUTHWESTERN NATURALIST 14(1): 127-128.

Specimen:

GRAY HERBARIUM. 1942. U.T. WATERFALL #3900, SPECIMEN # NONE GH.

SOUTHERN METHODIST UNIVERSITY HERBARIUM. 1952. B.H. WARNOCK #10900, SPECIMEN # NONE SMU.

SUL ROSS STATE UNIVERSITY HERBARIUM. 1952. B.H. WARNOCK #10900, SPECIMEN # NONE SRSC.

UNIVERSITY OF TEXAS HERBARIUM. 1952. B.H. WARNOCK #10900, SPECIMEN # NONE TEX.

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Chamaesyce geyeri var. wheeleriana* **Occurrence #:** 1 **Eo Id:** 7801

Common Name: Wheeler's spurge **TX Protection Status:** **ID Confirmed:** Y

Global Rank: G5T2 **State Rank:** S1 **Federal Status:**

Location Information:

Latitude: 314807N **Longitude:** 1061850W

Watershed Code:	Watershed Description:
13040100	Rio Grande-Fort Quitman

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-G3	Fort Bliss SE	TX
		31106-F3	Ysleta	TX
		31106-G2	Nations South Well	TX
		31106-G4	El Paso	TX

Directions:

69 MILES WEST OF JUNCTION OF HIGHWAY 180 AND 1437, ON 180

Survey Information:

First Observation: 1972 **Survey Date:** **Last Observation:** 1972-08-14

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description: RED SAND HILLS ALONG ROADSIDE

Comments: VERY NEAR EL PASO ON HIGHWAY 180; ORIGINAL SOURCE STATES THAT SPECIES WAS OBSERVED IN HUDSPETH COUNTY

Protection Comments:

Management Comments:

Data:

EO Data: IN FRUIT

Managed Area:

Managed Area Name:	Managed Area Type:
FORT BLISS MILITARY RESERVATION	FDADD

Element Occurrence Record

Reference:

Full Citation:

Specimen:

University of Texas at Austin, Lundell Herbarium. 1972. J.D. Bacon #1408 and R.L. Hartman, Specimen # none TEX-LL. 14 August 1972.

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Peniocereus greggii var. greggii* **Occurrence #:** 12 **Eo Id:** 6446

Common Name: desert night-blooming cereus **TX Protection Status:** **ID Confirmed:** Y

Global Rank: G3G4T2 **State Rank:** S2 **Federal Status:**

Location Information:

Latitude: 315702N **Longitude:** 1062631W

Watershed Code:	Watershed Description:
13030102	El Paso-Las Cruces
13050003	Tularosa Valley
13040100	Rio Grande-Fort Quitman

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-H4	North Franklin Mountain	TX
		31106-H5	Canutillo	TX
		31106-G4	El Paso	TX
		31106-G5	Smeltertown	TX

Directions:

DESERT SURROUNDING FRANKLIN MOUNTAINS

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 19??

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description:

Comments: SEE ALSO CHAMPIE, C. 1973. STRANGERS IN THE FRANKLINS, P.40.

Protection Comments:

Management Comments:

Data:

EO Data: RARE; FLOWERS IN APRIL

Managed Area:

Element Occurrence Record

Managed Area Name: **Managed Area Type:**

Reference:

Full Citation:

CHAMPIE, C. 19??. CACTI AND SUCCULENTS OF EL PASO. ABBEY GARDEN PRESS, SANTA BARBARA, CA. 100 PP.

CHAMPIE, C. 1973. STRANGERS IN THE FRANKLINS.

Specimen:

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Escobaria sneedii var. sneedii* **Occurrence #:** 6 **Eo Id:** 6736

Common Name: Sneed's pincushion cactus **TX Protection Status:** E **ID Confirmed:** Y

Global Rank: G2T2 **State Rank:** S2 **Federal Status:** LE

Location Information:

Latitude: 315107N **Longitude:** 1062935W

Watershed Code:	Watershed Description:
13030102	El Paso-Las Cruces

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-G4	El Paso	TX

Directions:

LOW POINT OF THE CREST OF THE FRANKLIN MOUNTAINS JUST SOUTH OF SOUTH FRANKLIN MOUNTAIN

Survey Information:

First Observation: ? **Survey Date:** **Last Observation:**

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description:

Comments:

Protection Comments: LISTED ENDANGERED BY THE USF& WS

Management Comments:

Data:

EO Data:

Managed Area:

Managed Area Name:	Managed Area Type:
FRANKLIN MOUNTAINS STATE PARK	SPWPK

Reference:

Full Citation:

WORTHINGTON, R. D. 1980. REPORT ON A SURVEY FOR SNEED PINCUSHION CACTUS, CORYPHANTHA SNEEDII VAR SNEEDII ON THE DONA ANA RANGE, DONA ANA COUNTY, NEW MEXICO.

Element Occurrence Record

Specimen:

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Chamaesyce geyeri var. wheeleriana* **Occurrence #:** 2 **Eo Id:** 5919

Common Name: Wheeler's spurge **TX Protection Status:** **ID Confirmed:** Y

Global Rank: G5T2 **State Rank:** S1 **Federal Status:**

Location Information:

Latitude: 314930N **Longitude:** 1060759W

Watershed Code:	Watershed Description:
13040100	Rio Grande-Fort Quitman
13050003	Tularosa Valley

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-G2	Nations South Well	TX
		31106-H2	Nations East Well	TX
		31106-H1	Hueco Tanks	TX
		31106-G1	Helms West Well	TX

Directions:

ABOUT 20 MILES EAST OF EL PASO [ON CARLSBAD HIGHWAY, PER WARNOCK]

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1961-09-08

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description: REDDISH SAND COPPICE MOUNDS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: ABUNDANT ANNUALS IN LOOSE SAND NOT YET IN FRUIT (8 SEPT. 1961)

Managed Area:

Managed Area Name: **Managed Area Type:**

Element Occurrence Record

Reference:

Full Citation:

Warnock, Barton H. 1974. Wildflowers of the Guadalupe Mountains and the sand dune country, Texas. Sul Ross State University, Alpine, TX. 176 pp.

Specimen:

University of Texas at Austin Herbarium. 1961. D.S. Correll #24330 and M.C. Johnston, Specimen # 256097 TEX. 8 September 1961. (Holotype)

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Brickellia baccharidea* **Occurrence #:** 7 **Eo Id:** 1474

Common Name: resin-leaf brickellbush **TX Protection Status:** **ID Confirmed:** Y

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Latitude: 314811N **Longitude:** 1062837W

Watershed Code:	Watershed Description:
13040100	Rio Grande-Fort Quitman

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-G4	El Paso	TX

Directions:

EAST SIDE OF FRANKLIN MOUNTAINS NEAR RANGER PEAK

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 198?

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description:

Comments: VISIT UTEP AND GET LABEL INFORMATION; LOCATION FROM DOT MAP SUPPLIED BY WORTHINGTON

Protection Comments:

Management Comments:

Data:

EO Data:

Managed Area:

Managed Area Name:	Managed Area Type:
FRANKLIN MOUNTAINS STATE PARK	SPWPK

Reference:

Full Citation:

WORTHINGTON, R.D. 198?. PERSONAL COMMUNICATION TO JACKIE POOLE RE: SPECIMENS OF SPECIAL PLANTS IN UTEP HERBARIUM.

Element Occurrence Record

Specimen:

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Opuntia arenaria* **Occurrence #:** 6 **Eo Id:** 1300

Common Name: sand prickly-pear **TX Protection Status:** **ID Confirmed:** Y

Global Rank: G2 **State Rank:** S2 **Federal Status:**

Location Information:

Latitude: 314850N **Longitude:** 1063408W

Watershed Code:	Watershed Description:
13030102	El Paso-Las Cruces

County Code:	County Name:	Mapsheet Code:	Mapsheet Name:	State:
TXELPA	El Paso	31106-G5	Smeltertown	TX

Directions:

FRONTERA (IN 1852-ON THE RIO GRANDE IN NEW MEXICO, NOW- IN NORTHWEST EL PASO)

Survey Information:

First Observation: 1852 **Survey Date:** **Last Observation:** 1852-05-15

Eo Type: **EO Rank:** **EO Rank Date:**

Observed Area (acres): **Estimated Representation Accuracy:**

Comments:

General Description: SANDY RIDGES

Comments: FRONTERA USED BY U.S. BOUNDARY COMMISSION AS AN ASTRONOMICAL OBSERVATORY FROM 1851-1853; DESTROYED IN 1854.

Protection Comments:

Management Comments:

Data:

EO Data:

Managed Area:

Managed Area Name: **Managed Area Type:**

Reference:

Element Occurrence Record

Full Citation:

Benson, Lyman. 1982. The cacti of the United States and Canada. Stanford University Press, Stanford, CA. 1,044 pp.

Webb, Walter P. 1952. The handbook of Texas, volume 1. The Texas State Historical Association, Austin. 977 pp.

Specimen:

Associated Species:

Species Name	Type	Comments

Element Occurrence Record

Scientific Name: *Escobaria sneedii var. sneedii* **Occurrence #:** 7 **Eo Id:** 302

Common Name: Sneed's pincushion cactus **TX Protection Status:** E **ID Confirmed:** Y

Global Rank: G2T2 **State Rank:** S2 **Federal Status:** LE

Location Information:

Latitude: 315047N **Longitude:** 1063018W

Watershed Code:	Watershed Description:
13030102	El Paso-Las Cruces
13040100	Rio Grande-Fort Quitman

County Code:	County Name:
TXELPA	El Paso

Mapsheet Code:	Mapsheet Name:	State:
31106-G5	Smeltertown	TX
31106-G4	El Paso	TX

Directions:

FRANKLIN MOUNTAINS, 0.3 MAP MILE SOUTHEAST OF THE CITY [SMELTERTOWN] WATERTANK AT EAST END OF CORONADO COUNTRY CLUB GOLF COURSE; MESA TO SUNLAND PARK TO SHADOW MOUNTAIN TO THUNDERBIRD TO TANK

Survey Information:

First Observation: 1978-05-22 **Survey Date:** 1986-06-14 **Last Observation:** 1986-06-14

Eo Type: **EO Rank:** AB - Excellent or good estimated viability **EO Rank Date:** 1986-06-14

Observed Area (acres): 5 **Estimated Representation Accuracy:**

Comments:

General Description: DRY, WEST-FACING, STEEP, ROCKY, LIMESTONE, DESERT SLOPE; NEAR POWERLINE; IN FULL SUN OR SHADE OF ROCKS; WITH AGAVE LECHEGUILLA, DASYLIRION LEIOPHYLLUM, PARTHENIUM INCANUM

Comments: RESEMBLES DIMINUTIVE C. STROBILIFORMIS

Protection Comments: LISTED ENDANGERED BY THE USF& WS

Management Comments:

Data:

EO Data: DORMANT; 7 CLUMPS; OCCURS WITH C. STROBILIFORMIS, NO HYBRIDS OBSERVED, BUT RELATIONSHIP UNCLEAR

Managed Area:

Managed Area Name:	Managed Area Type:
FRANKLIN MOUNTAINS STATE PARK	SPWPK

Element Occurrence Record

Reference:

Full Citation:

POOLE, J. M. 1986. FIELD SURVEY TO FRANKLIN MOUNTAINS OF JUNE 14, 1986.

Specimen:

University of Texas Herbarium, El Paso. 1982. R.D. Worthington #8164, Specimen #18676 EP. 25 April 1982.

University of Texas Herbarium, El Paso. 1978. R.D. Worthington #2852, Specimen #3252 EP. 22 May 1978.

Associated Species:

Species Name	Type	Comments

Code Key for Printouts from
Texas Parks and Wildlife Department
Texas Natural Diversity Database (TXNDD)

This information is for your assistance only; due to continuing data updates, vulnerability of private land to trespass and of species to disturbance or collection, **please refer all requesters to our office to obtain the most current information available.** Also, please note, identification of a species in a given area does not necessarily mean the species currently exists at the point or area indicated.

LEGAL STATUS AND CONSERVATION RANKS

FEDERAL STATUS (as determined by the US Fish and Wildlife Service)

LE	Listed Endangered
LT	Listed Threatened
PE	Proposed to be listed Endangered
PT	Proposed to be listed Threatened
PDL	Proposed to be Delisted (Note: Listing status retained while proposed)
SAE, SAT	Listed Endangered on basis of Similarity of Appearance, Listed Threatened on basis of Similarity of Appearance
DL	Delisted Endangered/Threatened
C	Candidate. USFWS has substantial information on biological vulnerability and threats to support proposing to list as threatened or endangered. Data are being gathered on habitat needs and/or critical habitat designations.
C*	C, but lacking known occurrences
C**	C, but lacking known occurrences, except in captivity/cultivation
XE	Essential Experimental Population
XN	Non-essential Experimental Population
Blank	Species is not federally listed

TX PROTECTION (as determined by the Texas Parks and Wildlife Department)

E	Listed Endangered
T	Listed Threatened
Blank	Species not state-listed

GLOBAL RANK (as determined by NatureServe)

G1	Critically imperiled globally, extremely rare, typically 5 or fewer viable occurrences
G2	Imperiled globally, very rare, typically 6 to 20 viable occurrences
G3	Very rare and local throughout range or found locally in restricted range, typically 21 to 100 viable occurrences
G4	Apparently secure globally
G5	Demonstrably secure globally
GH	Of historical occurrence through its range
GU	Possibly in peril range-wide, but status uncertain
G#G#	Ranked within a range as status uncertain
GX	Apparently extinct throughout range
Q	Rank qualifier denoting taxonomic assignment is questionable
#?	Rank qualifier denoting uncertain rank
C	In captivity or cultivation only
G#T#	"G" refers to species rank; "T" refers to variety or subspecies rank

STATE (SUBNATIONAL) RANK (as determined by the Texas Parks and Wildlife Department)

S1	Critically imperiled in state, extremely rare, vulnerable to extirpation, typically 5 or fewer viable occurrences
S2	Imperiled in state, very rare, vulnerable to extirpation, typically 6 to 20 viable occurrences
S3	Rare or uncommon in state, typically 21 to 100 viable occurrences
S4	Apparently secure in State
S5	Demonstrably secure in State
S#S#	Ranked within a range as status uncertain
SH	Of historical occurrence in state and may be rediscovered
SU	Unrankable – due to lack of information or substantially conflicting information
SX	Apparently extirpated from State
SNR	Unranked – State status not yet assessed
SNA	Not applicable – species id not a suitable target for conservation activities
?	Rank qualifier denoting uncertain rank in State

ELEMENT OCCURRENCE RECORD

Element Occurrence Record (EOR) Spatial and tabular record of an area of land and/or water in which a species, natural community, or other significant feature of natural diversity is, or was, present and associated information; may be a single contiguous area or may be comprised of discrete patches or subpopulations

Occurrence # Unique number assigned to each occurrence of each element when added to the NDD

LOCATION INFORMATION

Watershed Code Eight digit numerical code determined by US Geological Survey (USGS)

Watershed Name of watershed as determined by USGS

Quadrangle Name of USGS topographical map

Directions Directions to geographic location where occurrence was observed, as described by observer or in source

SURVEY INFORMATION

First/Last Observation Date a particular occurrence was first/last observed; refers only to species occurrence as noted in source and does not imply the first/last date the species was present

Survey Date If conducted, date of survey

EO Type State rank qualifiers:

- **M** Migrant – species occurring regularly on migration at staging areas, or concentration along particular corridors; status refers to the transient population in the State
- **B** Qualifier indicating basic rank refers to the breeding population in State
- **N** Qualifier indicating basic rank refers to the non-breeding population in State

EO Rank

A	Excellent	**AI**	Excellent, Introduced
B	Good	**BI**	Good, Introduced
C	Marginal	**CI**	Marginal, Introduced
D	Poor	**DI**	Poor, Introduced
E	Extant/Present	**EI**	Extant, Introduced
H	Historical/No Field Information	**HI**	Historical, Introduced
X	Destroyed/Extirpated	**XI**	Destroyed, Introduced
O	Obscure	**OI**	Obscure, Introduced

EO Rank Date Latest date EO rank was determined or revised

Observed Area Acres, unless indicated otherwise

COMMENTS

Description General physical description of area and habitat where occurrence is located, including associated species, soils, geology, and surrounding land use

Comments Comments concerning the quality or condition of the element occurrence at time of survey

Protection Comments Observer comments concerning legal protection of the occurrence

Management Comments Observer comments concerning management recommendations appropriate for occurrence conservation

DATA

EO Data Biological data; may include number of individuals, vigor, flowering/fruiting data, nest success, behaviors observed, or unusual characteristic, etc.

SITE

Site Name Title given to site by surveyor

MANAGED AREA INFORMATION

Managed Area Name Place name or (on EOR printout) name of area when the EO is located within or partially within an area identified for conservation, such as State or Federal lands, nature preserves, parks, etc.

Alias Additional names the property is known by

Acres Total acreage of property, including non-contiguous tracts

Manager Contact name, address, and telephone number for area or nearest area land steward

Please use one of the following citations to credit the source for the printout information:

Texas Natural Diversity Database. [year of printouts]. Wildlife Diversity Program of Texas Parks & Wildlife Department. [day month year of printouts].

Texas Natural Diversity Database. [year of printouts]. Element occurrence printouts for [scientific name] *records # [occurrence number(s)]. Wildlife Diversity Program of Texas Parks & Wildlife Department. [day month year of printouts]. *Use of record #'s is optional.

Revised 1 Apr 2008

EL PASO COUNTY

AMPHIBIANS

		Federal Status	State Status
Northern leopard frog	*Rana pipiens*		

streams, ponds, lakes, wet prairies, and other bodies of water; will range into grassy, herbaceous areas some distance from water; eggs laid March-May and tadpoles transform late June-August; may have disappeared from El Paso County due to habitat alteration

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon *Falco peregrinus tundrius* DL

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Baird's Sparrow *Ammodramus bairdii*

shortgrass prairie with scattered low bushes and matted vegetation; mostly migratory in western half of State, though winters in Mexico and just across Rio Grande into Texas from Brewster through Hudspeth counties

Ferruginous Hawk *Buteo regalis*

open country, primarily prairies, plains, and badlands; nests in tall trees along streams or on steep slopes, cliff ledges, river-cut banks, hillsides, power line towers; year-round resident in northwestern high plains, wintering elsewhere throughout western 2/3 of Texas

Interior Least Tern *Sterna antillarum athalassos* LE E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Mexican Spotted Owl *Strix occidentalis lucida* LT T

remote, shaded canyons of coniferous mountain woodlands (pine and fir); nocturnal predator of mostly small rodents and insects; day roosts in densely vegetated trees, rocky areas, or caves

Montezuma Quail *Cyrtonyx montezumae*

open pine-oak or juniper-oak with ground cover of bunch grass on flats and slopes of semi-desert mountains and hills; travels in pairs or small groups; eats succulents, acorns, nuts, and weed seeds, as well as various invertebrates

EL PASO COUNTY

BIRDS		Federal Status	State Status
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	LE	E

open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus; nests in old stick nests of other bird species

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Prairie Falcon	*Falco mexicanus*		

open, mountainous areas, plains and prairie; nests on cliffs

Snowy Plover	*Charadrius alexandrinus*		

formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast

Southwestern Willow Flycatcher	*Empidonax traillii extimus*	LE	E

thickets of willow, cottonwood, mesquite, and other species along desert streams

Sprague's Pipit	*Anthus spragueii*	C	

only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.

Western Burrowing Owl	*Athene cunicularia hypugaea*		

open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Western Snowy Plover	*Charadrius alexandrinus nivosus*		

uncommon breeder in the Panhandle; potential migrant; winter along coast

Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	C;NL	

status applies only to western population beyond the Pecos River Drainage; breeds in riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; deciduous woodlands with cottonwoods and willows; dense understory foliage is important for nest site selection; nests in willow, mesquite, cottonwood, and hackberry; forages in similar riparian woodlands; breeding season mid-May-late Sept

FISHES		Federal Status	State Status
Bluntnose shiner	*Notropis simus simus*		T

extinct; Rio Grande; main river channel, often below obstructions over substrate of sand, gravel, and silt; damming and irrigation practices presumed major factors contributing to decline

EL PASO COUNTY

FISHES		Federal Status	State Status
Rio Grande silvery minnow	*Hybognathus amarus*	LE	E

extirpated; historically Rio Grande and Pecos River systems and canals; reintroduced in Big Bend area; pools and backwaters of medium to large streams with low or moderate gradient in mud, sand, or gravel bottom; ingests mud and bottom ooze for algae and other organic matter; probably spawns on silt substrates of quiet coves

INSECTS		Federal Status	State Status
A Royal moth	*Sphingicampa raspa*		

woodland - hardwood; with oaks, junipers, legumes and other woody trees and shrubs; good density of legume caterpillar foodplants must be present; Prairie acacia (Acacia augustissima) is the documented caterpillar foodplant, but there could be a few other woody legumes used

A tiger beetle *Cicindela hornii*

grassland/herbaceous; burrowing in or using soil; dry areas on hillside or mesas where soil is rocky or loamy and covered with grasses, invertivore; diurnal, hibernates/aestivates, active mostly for several days after heavy rains. the life cycle probably takes two years so larvae would always be present in burrows in the soil

Barbara Ann's tiger beetle *Cicindela politula barbarannae*

limestone outcrops in arid treeless environments or in openings within less arid pine-juniper-oak communities; open limestone substrate itself is almost certainly an essential feature; roads and trails

Poling's hairstreak *Fixsenia polingi*

oak woodland with Quercus grisea as substantial component, probably also uses Q. emoryi; larvae feed on new growth of Q. grisea, adults utilize nectar from a variety of flowers including milkweed and catslaw acacia; adults fly mid May - Jun, again mid Aug - early Sept

MAMMALS		Federal Status	State Status
Big free-tailed bat	*Nyctinomops macrotis*		

habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore

Black bear	*Ursus americanus*	T/SA;NL	T

bottomland hardwoods and large tracts of inaccessible forested areas; due to field characteristics similar to Louisiana Black Bear (LT, T), treat all east Texas black bears as federal and state listed Threatened

Black-footed ferret	*Mustela nigripes*	LE	

extirpated; inhabited prairie dog towns in the general area

Black-tailed prairie dog *Cynomys ludovicianus*

dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups

EL PASO COUNTY

MAMMALS

		Federal Status	State Status
Cave myotis bat	*Myotis velifer*		

colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore

Desert pocket gopher *Geomys arenarius*

cottonwood-willow association along the Rio Grande in El Paso and Hudspeth counties; live underground, but build large and conspicuous mounds; life history not well documented, but presumed to eat mostly vegetation, be active year round, and bear more than one litter per year

Fringed bat *Myotis thysanodes*

habitat variable, ranging from mountainous pine, oak, and pinyon-juniper to desert-scrub, but prefers grasslands at intermediate elevations; highly migratory species that arrives in Trans-Pecos by May to form nursery colonies; single offspring born June-July; roosts colonially in caves, mine tunnels, rock crevices, and old buildings

		Federal Status	State Status
Gray wolf	*Canis lupus*	LE	E

extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands

Long-legged bat *Myotis volans*

in Texas, Trans-Pecos region; high, open woods and mountainous terrain; nursery colonies (which may contain several hundred individuals) form in summer in buildings, crevices, and hollow trees; apparently do not use caves as day roosts, but may use such sites at night; single offspring born June-July

Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*

roosts in caves, abandoned mine tunnels, and occasionally old buildings; hibernates in groups during winter; in summer months, males and females separate into solitary roosts and maternity colonies, respectively; single offspring born May-June; opportunistic insectivore

Pecos River muskrat *Ondatra zibethicus ripensis*

creeks, rivers, lakes, drainage ditches, and canals; prefer shallow, fresh water with clumps of marshy vegetation, such as cattails, bulrushes, and sedges; live in dome-shaped lodges constructed of vegetation; diet is mainly vegetation; breed year round

Western red bat *Lasiurus blossevillii*

roosts in tree foliage in riparian areas, also inhabits xeric thorn scrub and pine-oak forests; likely winter migrant to Mexico; multiple pups born mid-May - late Jun

Western small-footed bat *Myotis ciliolabrum*

mountainous regions of the Trans-Pecos, usually in wooded areas, also found in grassland and desert scrub habitats; roosts beneath slabs of rock, behind loose tree bark, and in buildings; maternity colonies often small and located in abandoned houses, barns, and other similar structures; apparently occurs in Texas only during spring and summer months; insectivorous

EL PASO COUNTY

MAMMALS — Federal Status — State Status

Yuma myotis bat *Myotis yumanensis*

desert regions; most commonly found in lowland habitats near open water, where forages; roosts in caves, abandoned mine tunnels, and buildings; season of partus is May to early July; usually only one young born to each female

MOLLUSKS — Federal Status — State Status

Franklin Mountain talus snail *Sonorella metcalfi*

terrestrial; bare rock, talus, scree; inhabits igneous talus most commonly of rhyolitic origin

Franklin Mountain wood snail *Ashmunella pasonis*

terrestrial; bare rock, talus, scree; talus slopes, usually of limestone, but also of rhyolite, sandstone, and siltstone, in arid mountain ranges

REPTILES — Federal Status — State Status

Big Bend slider *Trachemys gaigeae*

almost exclusively aquatic, sliders (Trachemys spp.) prefer quiet bodies of fresh water with muddy bottoms and abundant aquatic vegetation, which is their main food source; will bask on logs, rocks or banks of water bodies; breeding March-July

Chihuahuan Desert lyre snake *Trimorphodon vilkinsonii* — State Status: T

mostly crevice-dwelling in predominantly limestone-surfaced desert northwest of the Rio Grande from Big Bend to the Franklin Mountains, especially in areas with jumbled boulders and rock faults/fissures; secretive; egg-bearing; eats mostly lizards

Mountain short-horned lizard *Phrynosoma hernandesi* — State Status: T

diurnal, usually in open, shrubby, or openly wooded areas with sparse vegetation at ground level; soil may vary from rocky to sandy; burrows into soil or occupies rodent burrow when inactive; eats ants, spiders, snails, sowbugs, and other invertebrates; inactive during cold weather; breeds March-September

New Mexico garter snake *Thamnophis sirtalis dorsalis*

nearly any type of wet or moist habitat; irrigation ditches, and riparian-corridor farmlands, less often in running water; home range about 2 acres; active year round in warm weather, both diurnal and nocturnal, more nocturnal during hot weather; bears litter July-August

Texas horned lizard *Phrynosoma cornutum* — State Status: T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

EL PASO COUNTY

PLANTS

		Federal Status	State Status

Comal snakewood *Colubrina stricta*

in El Paso County, found in a patch of thorny shrubs in colluvial deposits and sandy soils at the base of an igneous rock outcrop; the historic Comal County record does not describe the habitat; in Mexico ,found in shrublands on calcareous, gravelly, clay soils with woody associates; flowering late spring or early summer

Desert night-blooming cereus *Peniocereus greggii var greggii*

Chihuahuan Desert shrublands or shrub invaded grasslands in alluvial or gravelly soils at lower elevations, 1200-1500 m (3900-4900 ft), on slopes, benches, arroyos, flats, and washes; flowering synchronized over a few nights in early May to late June when almost all mature plants bloom, flowers last only one day and open just after dark, may flower as early as April

Hueco rock-daisy *Perityle huecoensis*

north-facing or otherwise mostly shaded limestone cliff faces within relatively mesic canyon system; flowering spring-fall

Sand prickly-pear *Opuntia arenaria*

deep, loose or semi-stabilized sands in sparsely vegetated dune or sandhill areas, or sandy floodplains in arroyos; flowering May-June

Sand sacahuista *Nolina arenicola*

Texas endemic; mesquite-sand sage shrublands on windblown Quarternary reddish sand in dune areas; flowering time uncertain May-June, June-September

Sneed's pincushion cactus *Escobaria sneedii var sneedii* LE E

xeric limestone outcrops on rocky, usually steep slopes in desert mountains, in the Chihuahuan Desert succulent shrublands or grasslands; flowering April-September (peak usually in April, sometimes opportunistically after summer rains; fruiting August - November

Texas false saltgrass *Allolepis texana*

sandy to silty soils of valley bottoms and river floodplains, not generally on alkaline or saline sites; flowering (May-) July-October depending on rainfall

Vasey's bitterweed *Hymenoxys vaseyi*

Occurs on xeric limestone cliffs and slopes at mid- to high elevations in desert shrublands.

Wheeler's spurge *Chamaesyce geyeri var wheeleriana*

sparingly vegetated, loose eolian quartz sand on reddish sand dunes or coppice mounds; flowering and fruiting at least August-September, probably earlier and later, as well

APPENDIX B
AIR EMISSIONS CALCULATIONS

Appendix B

Air Quality

El Paso County is a non-attainment area for PM-10 and designated maintenance area for CO and ozone. GSRC performed a conformity analysis of emissions associated with constructing and operating Parcel A, Parcel B, Parcel C, Parcel A and B, and Parcel A, B, and C. Table 1 presents a summary of the analysis.

Table 1. Conformity Analysis of Proposed Action and Alternatives

	Emission Results (tons/year)								
Emission Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO2**	**CO2**	**CO2 Equivalents**	**Total CO2**
Parcel A - Construction	8.22	16.75	27.97	25.63	4.89	3.24	2,344.80	8,430.75	10,775.55
Parcel A - Operation and Commuting	890.23	631.56	414.30	16.41	18.37	1.14	NA	93,479.68	93,479.68
Parcel B - Construction	6.36	15.24	25.99	25.54	4.78	3.18	2,302.25	8,023.41	10,325.66
Parcel B - Operation and Commuting	182.66	131.00	105.23	4.29	4.84	0.25	NA	21,848.75	21,848.75
Parcel C - Construction	4.54	10.38	16.77	24.69	3.96	1.98	1,435.09	5,140.30	6,575.39
Parcel C - Operation and Commuting	14.73	10.40	6.18	0.24	0.27	0.02	NA	1,457.27	1,457.27
Parcel A & B - Construction	14.66	31.82	53.55	50.93	9.61	6.24	4,519.43	16,185.74	20,705.17
Parcel A & B - Operation and Commuting	890.23	631.56	414.30	16.41	18.37	1.14	NA	93,479.68	93,479.68
Parcel A, B, & C - Construction	17.92	39.53	67.13	75.02	13.15	7.83	5,673.55	20,307.54	25,981.09
Parcel A, B, & C - Operation and Commuting	1,087.63	772.97	525.71	20.94	23.48	1.41	NA	116,786.79	116,786.79
***De minimis* Thresholds**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**NA**	**27,557**

The vehicle air emissions from new residents and commercial enterprises associated with the land development in Parcel A, B, and C and the combination of Parcel A and B and A, B, and C, would exceed the *de minimis* thresholds for ozone and CO; however, the mitigation actions are already in place with the implementation of the TCEQ ozone and CO state implementation plans (SIPs). Therefore the project exceedance of *de minimis* thresholds as described in the following conformity analysis does not require a conformity determination.

The following pages present the modeling and calculations to estimate the air emissions associated with the development in Parcel A, B, and C and the combination of Parcel A and B and A, B, and C.

	Vehicle Trips Per Day						
Development Plan	NHB	HBW	HBNW	TRT	NHEX	EXT	Total
Parcel A	4,807	22,930	50,161	13,327	4,015	6,667	101,907
Parcel B	1,652	3,702	9,103	3,674	1,380	1,366	20,877
Parcel C	267	296	602	190	223	110	1,688
A&B	6,459	26,632	59,264	17,001	5,395	8,033	122,784
A,B,C	6,726	26,928	59,866	17,191	5,618	8,143	124,472

A			%of total	
Light commercial truck			0.33	4,442
Short-haul truck			0.33	4,442
Long-haul truck			0.33	4,442
Total			1.00	

B			%of total	
Light commercial truck			0.33	1,225
Short-haul truck			0.33	1,225
Long-haul truck			0.33	1,225
Total			1.00	

C			%of total	
Light commercial truck			0.33	63
Short-haul truck			0.33	63
Long-haul truck			0.33	63
Total			1.00	

A & B			%of total	
Light commercial truck			0.33	5,667
Short-haul truck			0.33	5,667
Long-haul truck			0.33	5,667
Total			1.00	

A, B, & C			%of total	
Light commercial truck			0.33	5,730
Short-haul truck			0.33	5,730
Long-haul truck			0.33	5,730
Total			1.00	

NHB=Non-home base trips
HBW=Home base work trips
HBNW=Home base non-work trips
TRT=Commercial trucks, i.e. light delivery truck, short-haul truck, long-haul truck (18 wheeler).
NHEX=Non-home external trips
EXT=External trips

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION-PARCEL A

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	1	100	8	30	24000
Diesel Dump Truck (see MOVES calc.)	0	300	8	45	0
Diesel Excavator	2	300	8	30	144000
Diesel Hole Trenchers	2	175	8	60	168000
Diesel Bore/Drill Rigs	1	300	8	60	144000
Cement Trucks (see MOVES calc.)	0	300	8	60	0
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	30	72000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bulldozers	1	300	8	30	72000
Diesel Front-end Loaders	2	300	8	60	288000
Diesel Forklifts	2	100	8	240	384000
Diesel Generator Set	3	40	8	240	230400

Emission Factors[1]							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bulldozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front-end Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Forklifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION-PARCEL A

1. Emission factors (EF) were generated using USEPA's preferred model for nonroad sources, the NONROAD2008 model. Emmisions were modeled for the 2007 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2008 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2008 model is based on the population in U.S. for the 2007 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Paver	0.010	0.039	0.130	0.009	0.009	0.020	14.181
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.054	0.206	0.730	0.051	0.049	0.117	85.104
Diesel Hole Cleaners\Trenchers	0.094	0.452	1.076	0.085	0.081	0.137	99.196
Diesel Bore/Drill Rigs	0.095	0.363	1.135	0.079	0.078	0.116	84.057
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.028	0.108	0.375	0.026	0.025	0.059	42.552
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bulldozers	0.029	0.109	0.378	0.026	0.025	0.059	42.552
Diesel Front-end Loaders	0.121	0.492	1.587	0.111	0.108	0.235	170.177
Diesel Aerial Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.307	0.955	1.516	0.185	0.180	0.206	149.116
Total Emissions	**3.243**	**13.073**	**24.809**	**2.513**	**2.442**	**3.232**	**2344.802**

Conversion factors	
Grams to tons	1.102E-06

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS-
DELIVERY MATERIALS AND COMMUTING DURING CONSTRUCTION ACTIVITIES-PARCEL A

MOVES 2010a					
Source	**Fuel type**	**Number of vehicles**	**Miles traveled per day**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	60	20	260	312,000
Passenger truck	Gasoline	60	20	260	312,000
Light commercial truck	Diesel	5	20	260	26,000
Short-haul truck	Diesel	16	40	260	166,400
Long-haul truck	Diesel	4	80	260	83,200

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Construction Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	2.921	0.994	0.198	0.007	0.006	0.002	110
Passenger truck	1.253	1.873	0.402	0.009	0.009	0.002	151
Light commercial truck	0.128	0.062	0.086	0.005	0.005	0.000	17
Short-haul truck	0.447	0.417	1.118	0.049	0.057	0.001	170
Long-haul truck	0.231	0.331	1.355	0.057	0.067	0.001	185
Total	**4.980**	**3.677**	**3.158**	**0.127**	**0.144**	**0.007**	**634**

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.
Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS- ONGOING OPERATIONS-PARCEL A

MOVES 2010a					
Source	**Fuel type**	**Number of trips per day**	**Miles traveled per trip**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	44,290	5	260	57,577,000
Passenger truck	Gasoline	44,290	5	260	57,577,000
Light commercial truck	Diesel	4,442	10	260	11,549,200
Short-haul truck	Diesel	4,442	10	260	11,549,200
Long-haul truck	Diesel	4,442	10	260	11,549,200

Assumptions: Number of trips for commuter and commercial trucks were based on the Transportation Impact Analysis (2012). Total trips per day = 101,907. This includes 88,580 commuter trips where it was assumed that half of the commuter vehicles were passenger cars and other half were passenger trucks and 13,327 commercial transport trips. The commercial transport trips were distributed evenly to light commercial trucks, short-haul trucks, and long-haul trucks.

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Residental Commuter and Commercial Truck Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	539.11	183.49	36.52	1.23	1.14	0.33	20,313
Passenger truck	231.27	345.73	74.14	1.70	1.58	0.46	27,870
Light commercial truck	56.76	27.46	38.01	2.09	2.42	0.06	7,753
Short-haul truck	31.03	28.93	77.58	3.43	3.98	0.09	11,829
Long-haul truck	32.05	45.95	188.06	7.96	9.24	0.20	25,715
Total	890.23	631.56	414.30	16.41	18.37	1.14	93,480

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.

Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION-PARCEL A

Assumptions for Combustion Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Proje	12	months
Length	0	miles
Length (converted)	0	feet
Width	0	feet
Area	20.00	acres

Conversion Factors

0.000022957	acres per feet
5280	feet per mile

*Assume that 20 acres of the project area is being disturbed during the work day.

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	45.60	22.80	4.56	2.28
Staging Areas	0.38	0.19	0.04	0.02
Total	**45.98**	**22.99**	**4.60**	**2.30**

References:

USEPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-PARCEL A

Emission Results									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	3.24	13.07	24.81	2.51	2.44	3.23	2344.80	7,797	10,141
Construction Site-Fugitive PM-10	NA	NA	NA	22.99	2.30	NA	NA	NA	NA
Construction Workers Commuter & Trucking	4.98	3.68	3.16	0.13	0.14	0.01	NA	634	634
Total Emissions-CONSTRUCTION	**8.22**	**16.75**	**27.97**	**25.63**	**4.89**	**3.24**	**2,345**	**8,431**	**10,776**
Commuting and Delivery Trucks	890.23	631.56	414.30	16.41	18.37	1.14	NA	93,480	93,480
Total Operational Emissions	**890.23**	**631.56**	**414.30**	**16.41**	**18.37**	**1.14**	**0.00**	**93,480**	**93,480**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	27,557

1. Note that El Paso County is a moderate non-attainment area for PM-10 and a maintenance area for CO (USEPA 2010b).

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION--PARCEL B

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	1	100	8	30	24000
Diesel Dump Truck (see MOVES calc.)	0	300	8	45	0
Diesel Excavator	1	300	8	30	72000
Diesel Hole Trenchers	2	175	8	60	168000
Diesel Bore/Drill Rigs	1	300	8	60	144000
Cement Trucks (see MOVES calc.)	0	300	8	60	0
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	30	72000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bulldozers	1	300	8	30	72000
Diesel Front-end Loaders	2	300	8	60	288000
Diesel Forklifts	2	100	8	240	384000
Diesel Generator Set	3	40	8	240	230400

Emission Factors[1]							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bulldozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front-end Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Forklifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION--PARCEL B

1. Emission factors (EF) were generated using USEPA's preferred model for nonroad sources, the NONROAD2008 model. Emmisions were modeled for the 2007 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2008 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2008 model is based on the population in U.S. for the 2007 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Paver	0.010	0.039	0.130	0.009	0.009	0.020	14.181
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.027	0.103	0.365	0.025	0.025	0.059	42.552
Diesel Hole Cleaners\Trenchers	0.094	0.452	1.076	0.085	0.081	0.137	99.196
Diesel Bore/Drill Rigs	0.095	0.363	1.135	0.079	0.078	0.116	84.057
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.028	0.108	0.375	0.026	0.025	0.059	42.552
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bulldozers	0.029	0.109	0.378	0.026	0.025	0.059	42.552
Diesel Front-end Loaders	0.121	0.492	1.587	0.111	0.108	0.235	170.177
Diesel Aerial Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.307	0.955	1.516	0.185	0.180	0.206	149.116
Total Emissions	**3.216**	**12.970**	**24.444**	**2.488**	**2.418**	**3.173**	**2302.250**

Conversion factors	
Grams to tons	1.102E-06

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS-
DELIVERY MATERIALS AND COMMUTING DURING CONSTRUCTION ACTIVITIES--PARCEL B

MOVES 2010a					
Source	**Fuel type**	**Number of vehicles**	**Miles traveled per day**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	40	20	260	208,000
Passenger truck	Gasoline	40	20	260	208,000
Light commercial truck	Diesel	3	20	260	15,600
Short-haul truck	Diesel	6	40	260	62,400
Long-haul truck	Diesel	2	80	260	41,600

Emission Factors (MOVES 2010a Emission Rates) [1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Construction Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	1.948	0.663	0.132	0.004	0.004	0.001	73
Passenger truck	0.835	1.249	0.268	0.006	0.006	0.002	101
Light commercial truck	0.077	0.037	0.051	0.003	0.003	0.000	10
Short-haul truck	0.168	0.156	0.419	0.019	0.022	0.000	64
Long-haul truck	0.115	0.166	0.677	0.029	0.033	0.001	93
Total	**3.143**	**2.271**	**1.548**	**0.061**	**0.068**	**0.004**	**341**

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.
Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS- ONGOING OPERATIONS--PARCEL B

MOVES 2010a					
Source	**Fuel type**	**Number of trips per day**	**Miles traveled per trip**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	8,601	5	260	11,181,300
Passenger truck	Gasoline	8,601	5	260	11,181,300
Light commercial truck	Diesel	1,225	10	260	3,185,000
Short-haul truck	Diesel	1,225	10	260	3,185,000
Long-haul truck	Diesel	1,225	10	260	3,185,000

Assumptions: Number of trips for commuter and commercial trucks were based on the Transportation Impact Analysis (2012). Total trips per day = 101,907. This includes 88,580 commuter trips where it was assumed that half of the commuter vehicles were passenger cars and other half were passenger trucks and 13,327 commercial transport trips. The commercial transport trips were distributed evenly to light commercial trucks, short-haul trucks, and long-haul trucks.

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Residental Commuter and Commercial Truck Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	104.69	35.63	7.09	0.24	0.22	0.06	3,945
Passenger truck	44.91	67.14	14.40	0.33	0.31	0.09	5,412
Light commercial truck	15.65	7.57	10.48	0.58	0.67	0.02	2,138
Short-haul truck	8.56	7.98	21.39	0.95	1.10	0.03	3,262
Long-haul truck	8.84	12.67	51.86	2.19	2.55	0.05	7,092
Total	182.66	131.00	105.23	4.29	4.84	0.25	21,849

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.

Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION--PARCEL B

Assumptions for Combustion Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Proje	12	months
Length	0	miles
Length (converted)	0	feet
Width	0	feet
Area	20.00	acres

Conversion Factors

0.000022957	acres per feet
5280	feet per mile

*Assume that 20 acres of the project area is being disturbed during the work day.

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	45.60	22.80	4.56	2.28
Staging Areas	0.38	0.19	0.04	0.02
Total	**45.98**	**22.99**	**4.60**	**2.30**

References:

USEPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Assumptions for Fugitive Emissions

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS--PARCEL B

Assumptions for Combustion Emissions									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	3.22	12.97	24.44	2.49	2.42	3.17	2302.25	7,682	9,985
Construction Site-Fugitive PM-10	NA	NA	NA	22.99	2.30	NA	NA	NA	NA
Construction Workers Commuter & Trucking	3.14	2.27	1.55	0.06	0.07	0.00	NA	341	341
Total Emissions-CONSTRUCTION	**6.36**	**15.24**	**25.99**	**25.54**	**4.78**	**3.18**	**2,302**	**8,023**	**10,326**
Commuting and Delivery Trucks	182.66	131.00	105.23	4.29	4.84	0.25	NA	21,849	21,849
Total Operational Emissions	**182.66**	**131.00**	**105.23**	**4.29**	**4.84**	**0.25**	**0.00**	**21,849**	**21,849**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	27,557

1. Note that El Paso County is a moderate non-attainment area for PM-10 and a maintenance area for CO (USEPA 2010b).

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION-PARCEL C

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	1	100	8	30	24000
Diesel Dump Truck (see MOVES calc.)	0	300	8	45	0
Diesel Excavator	1	300	8	30	72000
Diesel Hole Trenchers	1	175	8	60	84000
Diesel Bore/Drill Rigs	1	300	8	60	144000
Cement Trucks (see MOVES calc.)	0	300	8	60	0
Diesel Cranes	1	175	8	240	336000
Diesel Graders	1	300	8	30	72000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bulldozers	1	300	8	30	72000
Diesel Front-end Loaders	1	300	8	60	144000
Diesel Forklifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors[1]							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bulldozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front-end Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Forklifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION-PARCEL C

1. Emission factors (EF) were generated using USEPA's preferred model for nonroad sources, the NONROAD2008 model. Emmisions were modeled for the 2007 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2008 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2008 model is based on the population in U.S. for the 2007 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.010	0.039	0.130	0.009	0.009	0.020	14.181
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.027	0.103	0.365	0.025	0.025	0.059	42.552
Diesel Hole Cleaners\Trenchers	0.047	0.226	0.538	0.043	0.041	0.069	49.598
Diesel Bore/Drill Rigs	0.095	0.363	1.135	0.079	0.078	0.116	84.057
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
Diesel Graders	0.028	0.108	0.375	0.026	0.025	0.059	42.552
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bulldozers	0.029	0.109	0.378	0.026	0.025	0.059	42.552
Diesel Front-end Loaders	0.060	0.246	0.793	0.056	0.054	0.117	85.089
Diesel Aerial Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**2.172**	**8.648**	**15.477**	**1.652**	**1.605**	**1.978**	**1435.088**

Conversion factors	
Grams to tons	1.102E-06

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS-
DELIVERY MATERIALS AND COMMUTING DURING CONSTRUCTION ACTIVITIES-PARCEL C

MOVES 2010a					
Source	**Fuel type**	**Number of vehicles**	**Miles traveled per day**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	30	20	260	156,000
Passenger truck	Gasoline	30	20	260	156,000
Light commercial truck	Diesel	2	20	260	10,400
Short-haul truck	Diesel	4	40	260	41,600
Long-haul truck	Diesel	2	80	260	41,600

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Construction Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	1.461	0.497	0.099	0.003	0.003	0.001	55
Passenger truck	0.627	0.937	0.201	0.005	0.004	0.001	76
Light commercial truck	0.051	0.025	0.034	0.002	0.002	0.000	7
Short-haul truck	0.112	0.104	0.279	0.012	0.014	0.000	43
Long-haul truck	0.115	0.166	0.677	0.029	0.033	0.001	93
Total	**2.366**	**1.728**	**1.291**	**0.051**	**0.057**	**0.003**	**273**

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.
Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS- ONGOING OPERATIONS-PARCEL C

MOVES 2010a					
Source	**Fuel type**	**Number of trips per day**	**Miles traveled per trip**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	749	5	260	973,700
Passenger truck	Gasoline	749	5	260	973,700
Light commercial truck	Diesel	63	10	260	163,800
Short-haul truck	Diesel	63	10	260	163,800
Long-haul truck	Diesel	63	10	260	163,800

Assumptions: Number of trips for commuter and commercial trucks were based on the Transportation Impact Analysis (2012). Total trips per day = 101,907. This includes 88,580 commuter trips where it was assumed that half of the commuter vehicles were passenger cars and other half were passenger trucks and 13,327 commercial transport trips. The commercial transport trips were distributed evenly to light commercial trucks, short-haul trucks, and long-haul trucks.

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Residental Commuter and Commercial Truck Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	9.12	3.10	0.62	0.02	0.02	0.01	344
Passenger truck	3.91	5.85	1.25	0.03	0.03	0.01	471
Light commercial truck	0.81	0.39	0.54	0.03	0.03	0.00	110
Short-haul truck	0.44	0.41	1.10	0.05	0.06	0.00	168
Long-haul truck	0.45	0.65	2.67	0.11	0.13	0.00	365
Total	14.73	10.40	6.18	0.24	0.27	0.02	1,457

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.

Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION-PACEL C

Assumptions for Combustion Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Proje	12	months
Length	0	miles
Length (converted)	0	feet
Width	0	feet
Area	20.00	acres

Conversion Factors

0.000022957	acres per feet
5280	feet per mile

*Assume that 20 acres of the project area is being disturbed during the work day.

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	45.60	22.80	4.56	2.28
Staging Areas	0.38	0.19	0.04	0.02
Total	**45.98**	**22.99**	**4.60**	**2.30**

References:

USEPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Assumptions for Fugitive Emissions

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-PARCEL C

Assumptions for Combustion Emissions									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	2.17	8.65	15.48	1.65	1.61	1.98	1435.09	4,868	6,303
Construction Site-Fugitive PM-10	NA	NA	NA	22.99	2.30	NA	NA	NA	NA
Construction Workers Commuter & Trucking	2.37	1.73	1.29	0.05	0.06	0.00	NA	273	273
Total Emissions-CONSTRUCTION	**4.54**	**10.38**	**16.77**	**24.69**	**3.96**	**1.98**	**1,435**	**5,140**	**6,575**
Commuting and Delivery Trucks	14.73	10.40	6.18	0.24	0.27	0.02	NA	1,457	1,457
Total Operational Emissions	**14.73**	**10.40**	**6.18**	**0.24**	**0.27**	**0.02**	**0.00**	**1,457**	**1,457**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	27,557

1. Note that El Paso County is a moderate non-attainment area for PM-10 and a maintenance area for CO (USEPA 2010b).

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION--PARCEL A **B**

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	4	300	8	240	2304000
Diesel Road Compactors	2	100	8	30	48000
Diesel Dump Truck (see MOVES calc.)	0	300	8	45	0
Diesel Excavator	4	300	8	30	288000
Diesel Hole Trenchers	4	175	8	60	336000
Diesel Bore/Drill Rigs	2	300	8	60	288000
Cement Trucks (see MOVES calc.)	0	300	8	60	0
Diesel Cranes	4	175	8	240	1344000
Diesel Graders	2	300	8	30	144000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bulldozers	2	300	8	30	144000
Diesel Front-end Loaders	4	300	8	30	288000
Diesel Forklifts	4	100	8	240	768000
Diesel Generator Set	6	40	8	240	460800

Emission Factors[1]							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bulldozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front-end Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Forklifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION--PARCEL A **B**

1. Emission factors (EF) were generated using USEPA's preferred model for nonroad sources, the NONROAD2008 model. Emmisions were modeled for the 2007 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2008 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2008 model is based on the population in U.S. for the 2007 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	1.117	5.256	13.939	1.041	1.016	1.879	1360.908
Diesel Road Paver	0.020	0.078	0.259	0.018	0.017	0.039	28.363
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.108	0.413	1.460	0.102	0.098	0.235	170.209
Diesel Hole Cleaners\Trenchers	0.189	0.903	2.151	0.170	0.163	0.274	198.392
Diesel Bore/Drill Rigs	0.190	0.727	2.269	0.159	0.156	0.232	168.114
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.652	1.925	8.472	0.504	0.489	1.081	785.273
Diesel Graders	0.056	0.216	0.751	0.052	0.051	0.117	85.104
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bulldozers	0.057	0.219	0.755	0.052	0.051	0.117	85.104
Diesel Front-end Loaders	0.121	0.492	1.587	0.111	0.108	0.235	170.177
Diesel Forklifts	1.676	6.568	7.245	1.176	1.143	0.804	584.649
Diesel Generator Set	0.614	1.909	3.032	0.371	0.361	0.411	298.232
Total Emissions	**6.365**	**25.654**	**48.030**	**4.916**	**4.777**	**6.229**	**4519.428**

Conversion factors	
Grams to tons	1.102E-06

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS-
DELIVERY MATERIALS AND COMMUTING DURING CONSTRUCTION ACTIVITIES--PARCEL A B

MOVES 2010a					
Source	**Fuel type**	**Number of vehicles**	**Miles traveled per day**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	100	20	260	520,000
Passenger truck	Gasoline	100	20	260	520,000
Light commercial truck	Diesel	8	20	260	41,600
Short-haul truck	Diesel	24	40	260	249,600
Long-haul truck	Diesel	8	80	260	166,400

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Construction Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	4.869	1.657	0.330	0.011	0.010	0.003	183
Passenger truck	2.089	3.122	0.670	0.015	0.014	0.004	252
Light commercial truck	0.204	0.099	0.137	0.008	0.009	0.000	28
Short-haul truck	0.671	0.625	1.677	0.074	0.086	0.002	256
Long-haul truck	0.462	0.662	2.710	0.115	0.133	0.003	371
Total	**8.295**	**6.166**	**5.522**	**0.223**	**0.253**	**0.012**	**1,089**

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.
Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS- ONGOING OPERATIONS--PARCEL A B

MOVES 2010a					
Source	Fuel type	Number of trips per day	Miles traveled per trip	Days of travel per year	Miles traveled per year
Passenger cars	Gasoline	44,290	5	260	57,577,000
Passenger truck	Gasoline	44,290	5	260	57,577,000
Light commercial truck	Diesel	4,442	10	260	11,549,200
Short-haul truck	Diesel	4,442	10	260	11,549,200
Long-haul truck	Diesel	4,442	10	260	11,549,200

Assumptions: Number of trips for commuter and commercial trucks were based on the Transportation Impact Analysis (2012). Total trips per day = 101,907. This includes 88,580 commuter trips where it was assumed that half of the commuter vehicles were passenger cars and other half were passenger trucks and 13,327 commercial transport trips. The commercial transport trips were distributed evenly to light commercial trucks, short-haul trucks, and long-haul trucks.

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	VOC (g/mile)	CO (g/mile)	NOx (g/mile)	PM-10 (g/mile)	PM-2.5 (g/mile)	SO_2 (g/mile)	CO2 and CO2 Equivalents (g/mile)
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Residental Commuter and Commercial Truck Activities (tons/year)							
Source	VOC	CO	NOx	PM-10	PM-2.5	SO_2	CO2 and CO2 Equivalents
Passenger cars	539.11	183.49	36.52	1.23	1.14	0.33	20,313
Passenger truck	231.27	345.73	74.14	1.70	1.58	0.46	27,870
Light commercial truck	56.76	27.46	38.01	2.09	2.42	0.06	7,753
Short-haul truck	31.03	28.93	77.58	3.43	3.98	0.09	11,829
Long-haul truck	32.05	45.95	188.06	7.96	9.24	0.20	25,715
Total	890.23	631.56	414.30	16.41	18.37	1.14	93,480

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.

Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION--PARCEL A B

Assumptions for Combustion Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Proje	12	months
Length	0	miles
Length (converted)	0	feet
Width	0	feet
Area	40.00	acres

Conversion Factors

0.000022957	acres per feet
5280	feet per mile

Assume that the 40 acres of the toal area are being disturbed at any time.

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	91.20	45.60	9.12	4.56
Staging Areas	0.38	0.19	0.04	0.02
Total	**91.58**	**45.79**	**9.16**	**4.58**

References:

USEPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS--PARCEL A B

Assumptions for Combustion Emissions									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	6.36	25.65	48.03	4.92	4.78	6.23	4519.43	15,097	19,616
Construction Site-Fugitive PM-10	NA	NA	NA	45.79	4.58	NA	NA	NA	NA
Construction Workers Commuter & Trucking	8.29	6.17	5.52	0.22	0.25	0.01	NA	1,089	1,089
Total Emissions-CONSTRUCTION	**14.66**	**31.82**	**53.55**	**50.93**	**9.61**	**6.24**	**4,519**	**16,186**	**20,705**
Commuting and Delivery Trucks	890.23	631.56	414.30	16.41	18.37	1.14	NA	93,480	93,480
Total Operational Emissions	**890.23**	**631.56**	**414.30**	**16.41**	**18.37**	**1.14**	**0.00**	**93,480**	**93,480**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	27,557

1. Note that El Paso County is a moderate non-attainment area for PM-10 and a maintenance area for CO (USEPA 2010b).

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION-PARCEL A, B, C

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	5	300	8	240	2880000
Diesel Road Compactors	3	100	8	30	72000
Diesel Dump Truck (see MOVES calc.)	0	300	8	45	0
Diesel Excavator	5	300	8	30	360000
Diesel Hole Trenchers	5	175	8	60	420000
Diesel Bore/Drill Rigs	3	300	8	60	432000
Cement Trucks (see MOVES calc.)	0	300	8	60	0
Diesel Cranes	5	175	8	240	1680000
Diesel Graders	2	300	8	30	144000
Diesel Tractors/Loaders/Backhoes	5	100	8	240	960000
Diesel Bulldozers	3	300	8	30	216000
Diesel Front-end Loaders	5	300	8	30	360000
Diesel Forklifts	5	100	8	240	960000
Diesel Generator Set	7	40	8	240	537600

Emission Factors[1]							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bulldozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front-end Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Forklifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION-PARCEL A, B, C

1. Emission factors (EF) were generated using USEPA's preferred model for nonroad sources, the NONROAD2008 model. Emmisions were modeled for the 2007 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2008 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2008 model is based on the population in U.S. for the 2007 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	1.396	6.570	17.424	1.301	1.270	2.349	1701.135
Diesel Road Paver	0.029	0.117	0.389	0.027	0.026	0.059	42.544
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.135	0.516	1.825	0.127	0.123	0.294	212.761
Diesel Hole Cleaners\Trenchers	0.236	1.129	2.689	0.213	0.204	0.343	247.990
Diesel Bore/Drill Rigs	0.286	1.090	3.404	0.238	0.233	0.348	252.171
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.815	2.407	10.590	0.629	0.611	1.351	981.591
Diesel Graders	0.056	0.216	0.751	0.052	0.051	0.117	85.104
Diesel Tractors/Loaders/Backhoes	1.957	8.686	7.638	1.449	1.407	1.005	731.129
Diesel Bulldozers	0.086	0.328	1.133	0.079	0.076	0.176	127.657
Diesel Front-end Loaders	0.151	0.615	1.984	0.139	0.135	0.294	212.721
Diesel Aerial Lifts	2.095	8.209	9.056	1.471	1.428	1.005	730.811
Diesel Generator Set	0.717	2.228	3.537	0.432	0.421	0.480	347.937
Total Emissions	**7.958**	**32.111**	**60.418**	**6.158**	**5.984**	**7.819**	**5673.551**

Conversion factors	
Grams to tons	1.102E-06

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS-
DELIVERY MATERIALS AND COMMUTING DURING CONSTRUCTION ACTIVITIES-PARCEL A, B, C

MOVES 2010a					
Source	**Fuel type**	**Number of vehicles**	**Miles traveled per day**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	120	20	260	624,000
Passenger truck	Gasoline	120	20	260	624,000
Light commercial truck	Diesel	10	20	260	52,000
Short-haul truck	Diesel	28	40	260	291,200
Long-haul truck	Diesel	10	80	260	208,000

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Construction Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	5.843	1.989	0.396	0.013	0.012	0.004	220
Passenger truck	2.506	3.747	0.803	0.018	0.017	0.005	302
Light commercial truck	0.256	0.124	0.171	0.009	0.011	0.000	35
Short-haul truck	0.782	0.729	1.956	0.086	0.100	0.002	298
Long-haul truck	0.577	0.828	3.387	0.143	0.166	0.004	463
Total	**9.964**	**7.416**	**6.713**	**0.271**	**0.307**	**0.015**	**1,318**

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.
Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

MOVES2010a MODEL ON-ROAD TRANSPORTATION AIR EMISSIONS- ONGOING OPERATIONS-PARCEL A, B, C

MOVES 2010a					
Source	**Fuel type**	**Number of trips per day**	**Miles traveled per trip**	**Days of travel per year**	**Miles traveled per year**
Passenger cars	Gasoline	53,641	5	260	69,733,300
Passenger truck	Gasoline	53,641	5	260	69,733,300
Light commercial truck	Diesel	5,730	10	260	14,898,000
Short-haul truck	Diesel	5,730	10	260	14,898,000
Long-haul truck	Diesel	5,730	10	260	14,898,000

Assumptions: Number of trips for commuter and commercial trucks were based on the Transportation Impact Analysis (2012). Total trips per day = 101,907. This includes 88,580 commuter trips where it was assumed that half of the commuter vehicles were passenger cars and other half were passenger trucks and 13,327 commercial transport trips. The commercial transport trips were distributed evenly to light commercial trucks, short-haul trucks, and long-haul trucks.

Emission Factors (MOVES 2010a Emission Rates)[1]							
Source	**VOC (g/mile)**	**CO (g/mile)**	**NOx (g/mile)**	**PM-10 (g/mile)**	**PM-2.5 (g/mile)**	**SO_2 (g/mile)**	**CO2 and CO2 Equivalents (g/mile)**
Passenger cars	8.497	2.892	0.576	0.019	0.018	0.005	320
Passenger truck	3.645	5.449	1.168	0.027	0.025	0.007	439
Light commercial truck	4.460	2.158	2.986	0.164	0.190	0.005	609
Short-haul truck	2.438	2.273	6.095	0.270	0.313	0.007	929
Long-haul truck	2.519	3.610	14.776	0.625	0.726	0.016	2,020

Total Emission for On-Road Residental Commuter and Commercial Truck Activities (tons/year)							
Source	**VOC**	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO_2**	**CO2 and CO2 Equivalents**
Passenger cars	652.93	222.23	44.24	1.49	1.39	0.40	24,602
Passenger truck	280.10	418.72	89.79	2.06	1.92	0.55	33,755
Light commercial truck	73.22	35.43	49.03	2.69	3.13	0.08	10,001
Short-haul truck	40.03	37.31	100.07	4.42	5.14	0.12	15,258
Long-haul truck	41.35	59.27	242.59	10.26	11.92	0.26	33,171
Total	1087.63	772.97	525.71	20.94	23.48	1.41	116,787

Key:

Short-haul trucks category includes trucks such as dump trucks and cement trucks.
Long-haul trucks category includes trucks such as semi-trailer (18 wheeler).

1. Emission factors were generated by USEPA preferred model MOVES2010a. MOVES simulates daily motor vehicle operations and produces emission rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emission rates are daily averages for each of the criteria pollutants. The averages are from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc.

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION -PARCEL A, B, C

Assumptions for Combustion Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Proje	12	months
Length	0	miles
Length (converted)	0	feet
Width	0	feet
Area	60.00	acres

Assume that the 60 acres of the toal area are being disturbed at any time.

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

Conversion Factors

0.000022957	acres per feet
5280	feet per mile

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	136.80	68.40	13.68	6.84
Staging Areas	0.38	0.19	0.04	0.02
Total	**137.18**	**68.59**	**13.72**	**6.86**

References:

USEPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Assumptions for Fugitive Emissions

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-PARCEL A, B, C

Assumptions for Combustion Emissions									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.96	32.11	60.42	6.16	5.98	7.82	5673.55	18,989	24,663
Construction Site-Fugitive PM-10	NA	NA	NA	68.59	6.86	NA	NA	NA	NA
Construction Workers Commuter & Trucking	9.96	7.42	6.71	0.27	0.31	0.01	NA	1,318	1,318
Total emissions-CONSTRUCTION	**17.92**	**39.53**	**67.13**	**75.02**	**13.15**	**7.83**	**5,674**	**20,308**	**25,981**
Commuting and Delivery Trucks	1087.63	772.97	525.71	20.94	23.48	1.41	NA	116,787	116,787
Total Operational Emissions	**1087.63**	**772.97**	**525.71**	**20.94**	**23.48**	**1.41**	**0.00**	**116,787**	**116,787**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	27,557

1. Note that El Paso County is a moderate non-attainment area for PM-10 and a maintenance area for CO (USEPA 2010b).

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

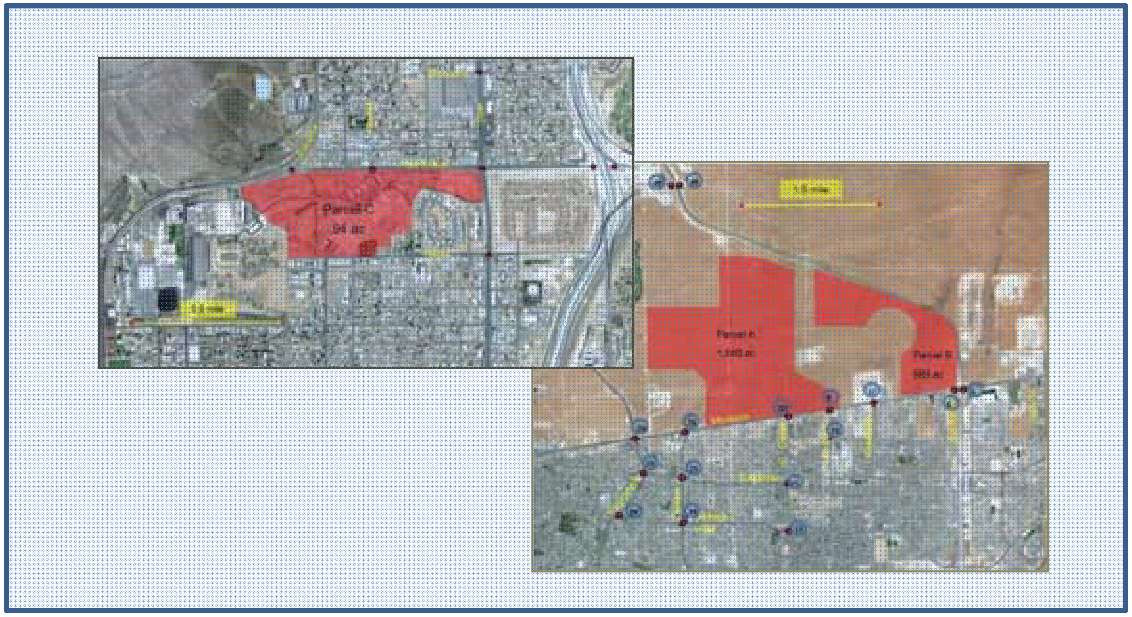
Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

APPENDIX C
TRANSPORTATION IMPACT ANALYSIS

Transportation Impact Analysis

Potential Development Sites at El Paso,Texas:

Southeast Bliss (Parcel A)
Texas General Land Office (Parcel B)
Lower Beaumont (Parcel C)



September 2012

Contents

I. STUDY OBJECTIVES AND EXECUTIVE SUMMARY

I.1. Study objectives

The purpose of this Study is to determine existing and future transportation conditions, in view of the potential sale and/or exchange of land in order to facilitate military needs in two different parts of Fort Bliss:

1. Parcels A and B
2. Parcel C

Analysis have included current and forecasted post-development traffic volumes in 2015.

Parcel development was evaluated under two future conditions:

1) A Full build development do-nothing scenario, which adds development impacts, projected city growth in 2015 and planned infrastructure, keeping the present network and intersections configuration,
2) A mitigation scenario, which should allow acceptable levels of service. In this case, we added traffic control improvements that match traffic demand, and new infrastructure, in order to mitigate the transportation impacts generated by the proposed development project.

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I.2. Studies Undertaken

Gathering of field information

• Analysis of existing information

• Traffic counts on 23 critical intersections in the study area. Selection reviewed by The Department of Transportation of the City of El Paso.

•Traffic volumes obtained for AM and PM peak periods (0700-0900 and 1600-1800 hours) during weekdays.

Coding of base network and micro-simulation of current traffic conditions

•Computer micro-simulations for current situation

Determining Future Land Occupation parameters

•Based on 1) Smart growth density table provided by El Paso Planning Dept.), 2) Existing surrounding land use (with US Census Info) and 3) Future population and jobs scenarios for the city by MPO and the City of El Paso.

Trip generation and distribution estimation

Relied on "The Mission“ parameters for travel demand modeling (TDM) in a Transcad platform, calculated 2015 demographics, person-trips, vehicle-trips and person daily trips; Used a gravity model calibration process to obtain Trip Distribution. Resulting daily trips were converted into 2015 peak hour trips.

Future traffic evaluation.

Traffic results from the travel demand modeling (TDM) were used to simulate future conditions, under a do-nothing alternative that keeps the current network operation.

Mitigation and improvement scenario

Mitigation proposals were evaluated with Synchro software in order to obtain acceptable LOS according to ITE Standards and City of El Paso Code of Ordinances, Title 19, Article 2, Chapter 19.18 .

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II. SITES DEVELOPMENT DESCRIPTION

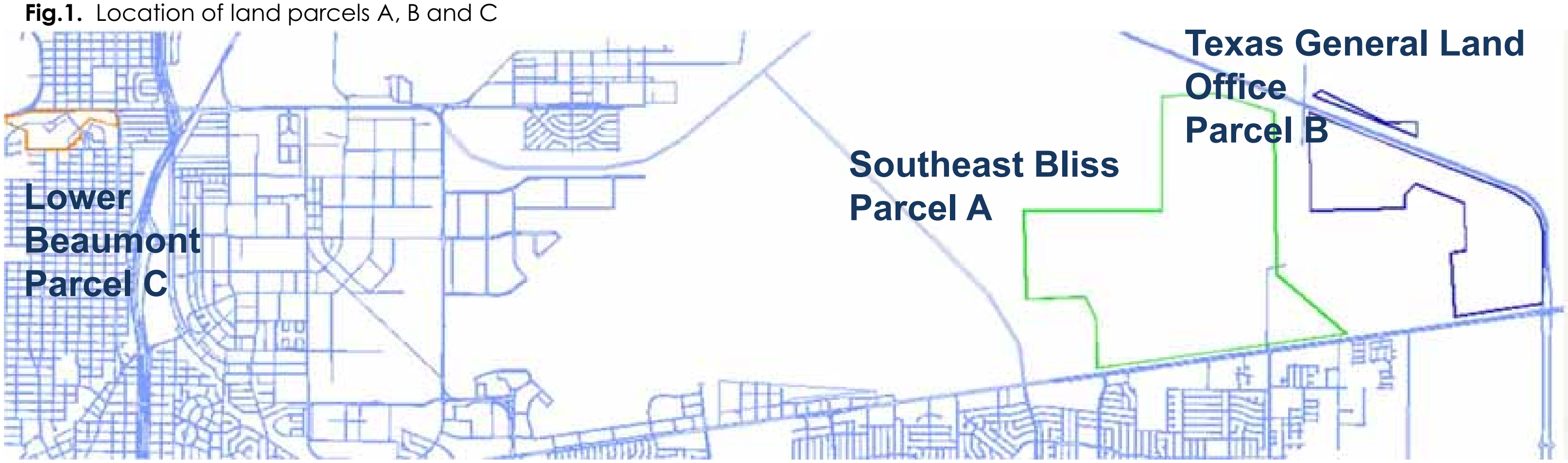
II.1. Development description

The Army proposes to sell the Southeast Bliss property, located in the southeastern part of the Fort Bliss Cantonment, north of Montana Avenue and east of the El Paso International Airport to a private developer, and will participate in land exchange with the Texas General Land Office (TxGLO), involving a parcel located in the southern portion of the installation, abutting Texas State Highway Loop 375 and Montana Avenue to the south. In addition, Fort Bliss will sell and annex into the City the Lower Beaumont parcel, located in the William Beaumont General Hospital Historic District.

The parcels are on the margins of the Fort Bliss Cantonment, on excess land not required for the military mission. The areas of each parcel are:

1. Southeast Bliss (Parcel A -approximately 1,540 acres),
2. The TxGLO land exchange property (Parcel B - approximately 685 acres)
3. Lower Beaumont (Parcel C - approximately 94 acres)

Fig.1. Location of land parcels A, B and C

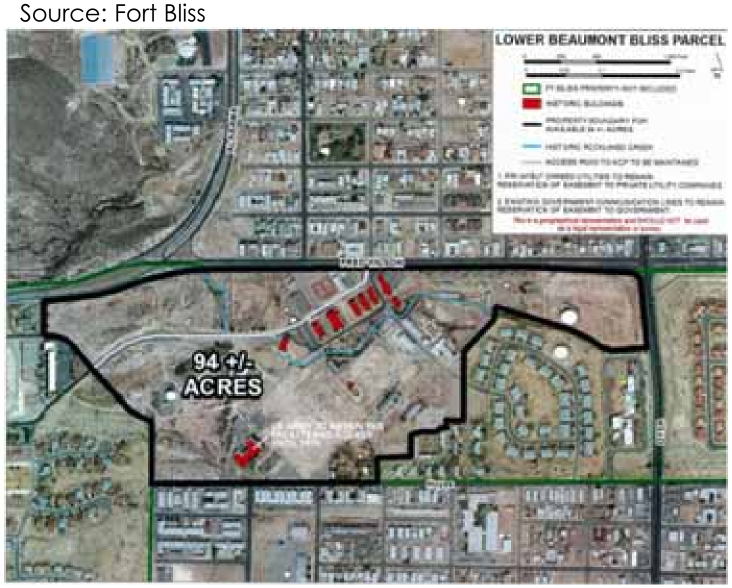


II.1. Development description

Fig.2. Preliminary Draft, Fort Bliss & El Paso, Commercial Real Estate
Development Opportunity.

Source: Forum held at Wyndham El Paso Airport Hotel, March 24, 2011,
Source: National Association of Home Builders (NAHB) Research Center

Fig. 3. Parcel C "Lower Beaumont"
Source: Fort Bliss



Site development includes 3 parcels of land:

Southeast Bliss Parcel A
Located on undeveloped land in the southeastern part of the Fort Bliss Cantonment north of Montana Avenue and east of the El Paso International Airport. The parcel would be offered for sale to a private developer and then annexed into the City of El Paso. It is likely that a combination of residential, retail, light industrial, and mixed use construction would take place. A park and public school would also possibly be included. A potential development and unit mix density based on what is reasonably foreseeable was prepared by the Planning Department of the City of El Paso.

The Texas General Land Office (TxGLO) land exchange property (Parcel B)
Located in the southern portion of the installation, abutting Texas State Highway Loop 375 and US 62/180 to the south. The City of El Paso is expected to annex all of the acreage involved and zone accordingly for residential, commercial and light industrial development.

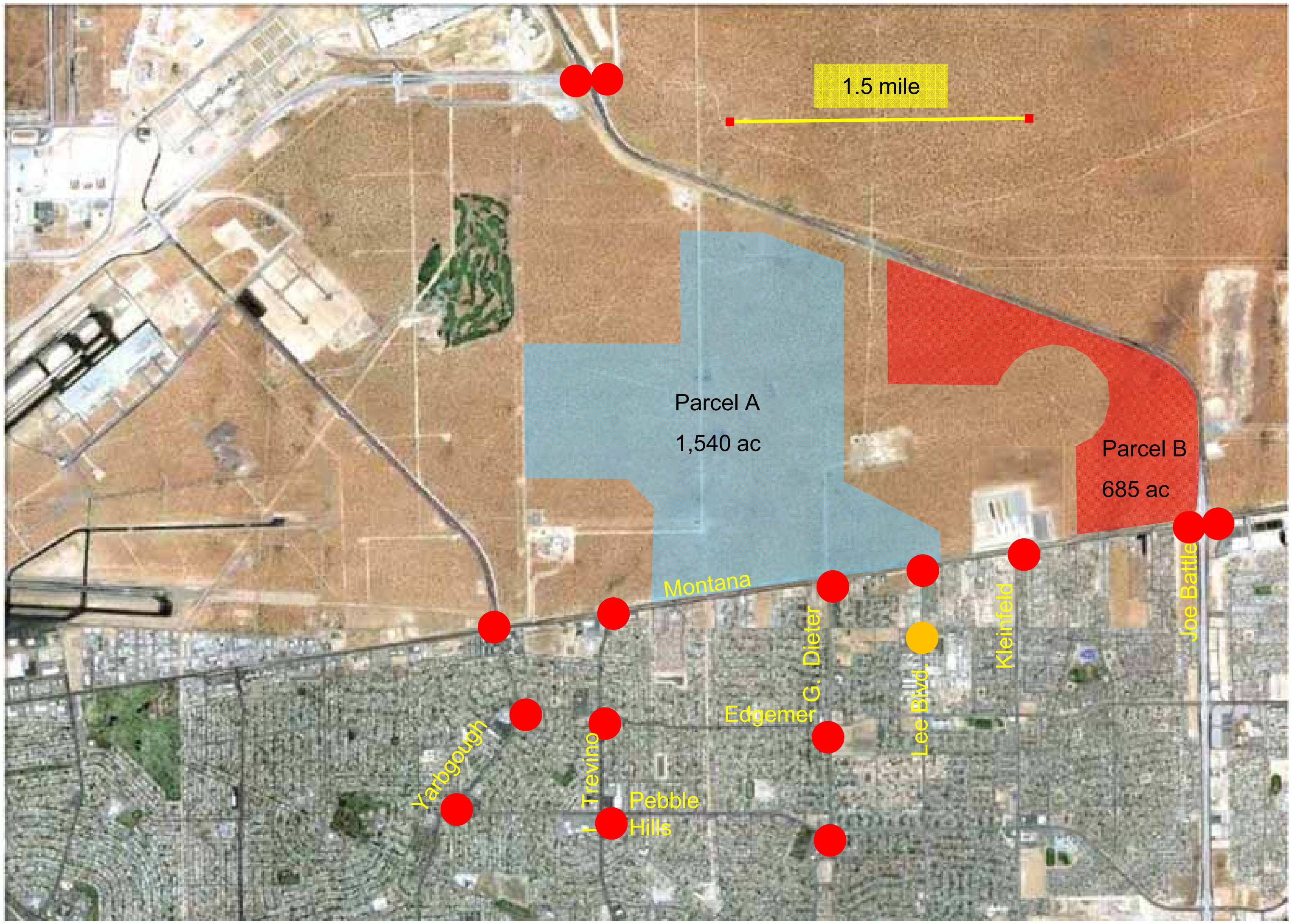
Lower Beaumont Parcel C
Consists of approximately 94 acres and is located in the William Beaumont General Hospital Historic District (WBGHHD). This area, south of Fred Wilson Road and east of the present hospital. It is likely that a combination of residential, retail and mixed use construction would occur. Reuse of existing older buildings on the property will most likely occur.

II.2. Site location and study area

Fig.4. Location of parcels A and B

Southeast Bliss
Parcel A: 1540 acres

Texas General Land Office
Parcel B: 685 acres



Critical signalized intersection

Critical unsignalized intersection

II.2. Site location and study area

Lower Beaumont
Parcel C:94 acres

Fig.5. Location of Parcel C

Critical signalized intersection

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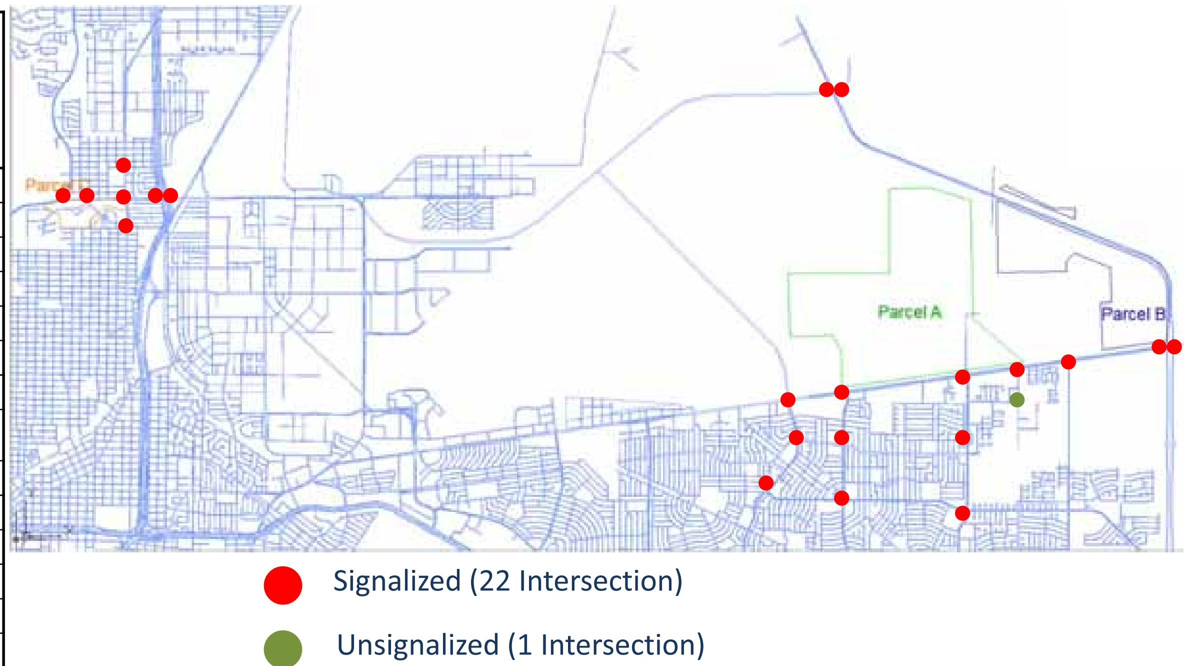
II.2. Site location and study area

Intersections included in traffic study

Table 1. List of intersections for traffic study

Intersection		Signalized	Unsignalized
Loop 375 North	Liberty Expressway (spur 601)	x	
Loop 375 South	Liberty Expressway (spur 601)	x	
Loop 375 North	Montana Ave	x	
Loop 375 South	Montana Ave	x	
Saul Kleinfeld	Montana Ave	x	
George Dieter	Montana Ave	x	
Lee Trevino	Montana Ave	x	
Global Reach (Yarbrough)	Montana Ave	x	
Fred Wilson	Pipes (Russell)	x	
Fred Wilson	Dyer	x	
Fred Wilson	Alabama	x	
Lee Blvd	Montana Ave	x	
Lee Blvd	Turner		x
Edgemere	Yarbrough	x	
Edgemere	Lee Trevino	x	
Edgemere	George Dieter	x	
Pebble Hills	Yarbrough	x	
Pebble Hills	Lee Trevino	x	
Pebble Hills	George Dieter	x	
Fred Wilson	Gateway North	x	
Fred Wilson	Gateway South	x	
Dyer	Hayes	x	
Dyer	Broaddus	x	

Fig.6. Location of intersections included in traffic study



III. AREA OF INFLUENCE. CONDITIONS AND PLANS

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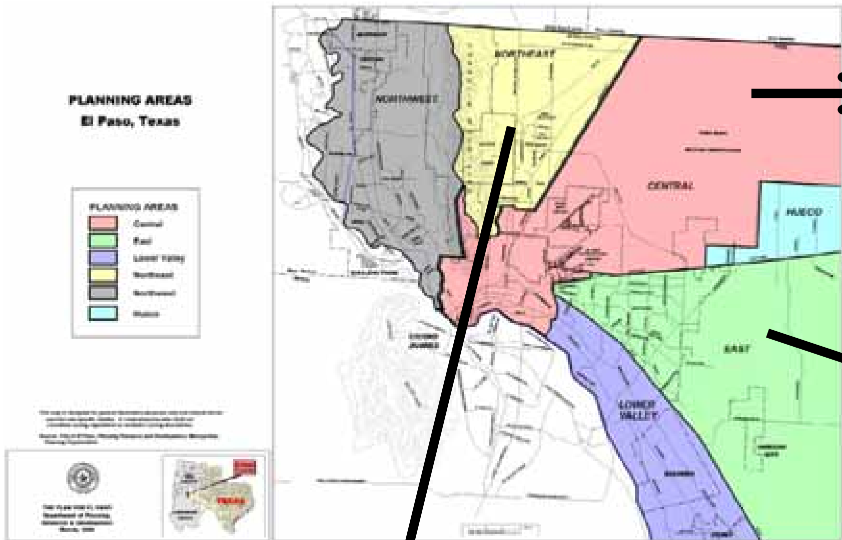
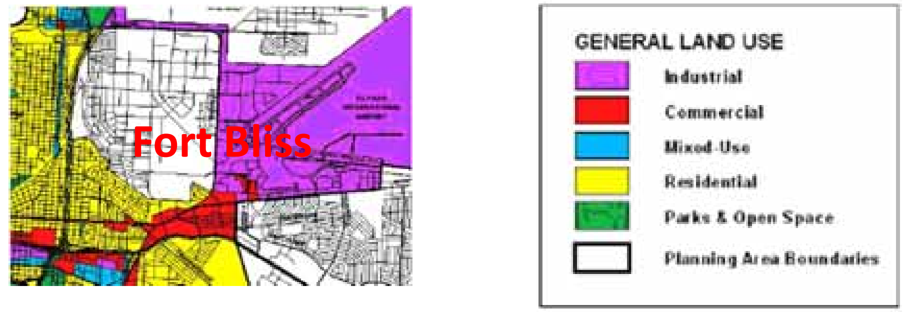
III.1. Area of influence Land use

Fig.7. Existing land use plans for development's area of influence



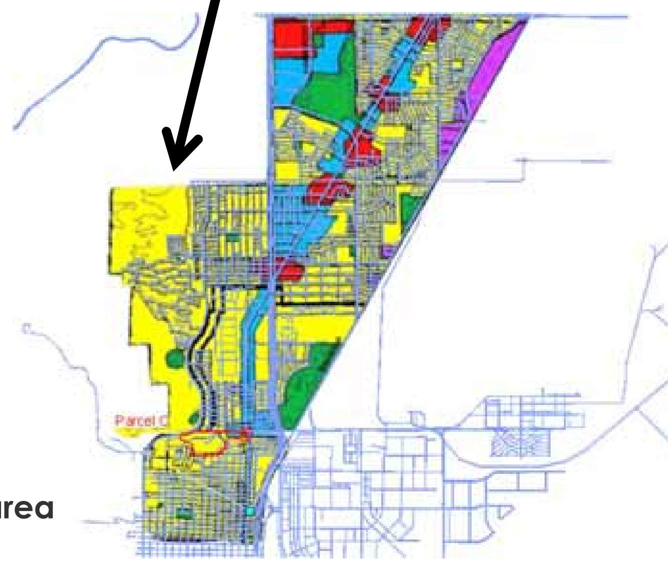
El Paso Planning Areas



Central area

East area

Source: City of El Paso, Planning and Economic Development, Planning Division - Plans, Studies & Maps, at http://www.elpasotexas.gov/econdev/plans_studies_maps.asp



Northeast area

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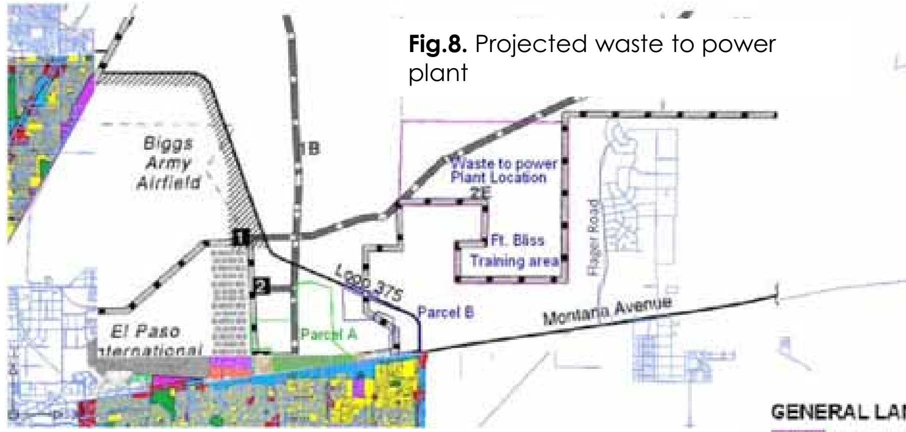
III.2. Offsite projected facilities and land use

Offsite development includes the future operation of a proposed Waste to Energy Plant and Landfill in far east Fort Bliss. These two facilities are proposed for far-east Fort Bliss in Training Area 2E, north of Montana, east of the county prison, with possible access between the Magellan Tank farm property and Flager Road.

Fig.8. Projected waste to power plant



A draft for potential development at El Paso International Airport and Southeast Fort Bliss was presented as part of Plan El Paso, by Dover, Kohl & Partners, Lead Consultant. A SmartCode Rezoning Application was prepared by the City of El Paso Planning and Economic Development Department for El Paso International Airport. Source: http://planelpaso.org/wp-content/uploads/2012/03/DRAFT%202%20ELP%2012%20Fort%20Bliss_web.pdf

Fig. 9 and10. Projected Development near to El paso International Airport

Source: Department of Planning, Research & Development (El Paso)

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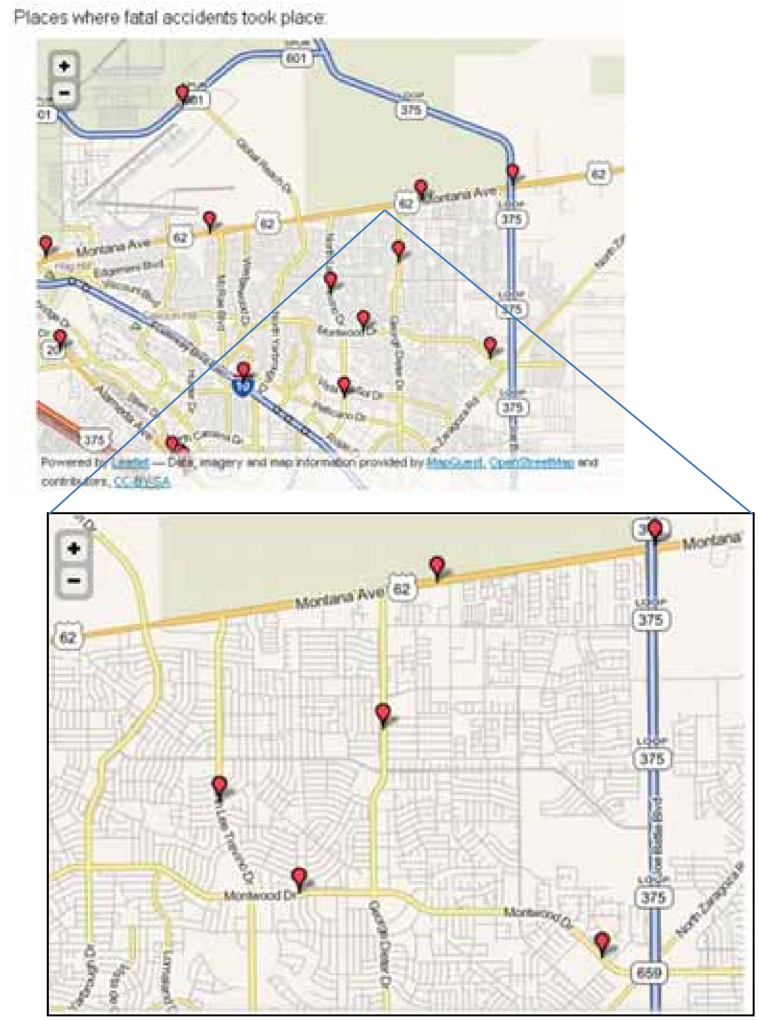
III.3. Transportation safety

Fatal accident location in the area took place along US Highway 54 in the Parcel C area and along Montana, Lee Trevino, G. Dieter and Loop 375. According to the Texas Department of Transportation, most collisions are a result of speeding, failure to yield, driving under the influence of alcohol, following too closely, and running red lights and stop signs. In fatal accident count per 100,000 population, El Paso has since 1994 a lower average rate than the Texas average.

Fig.11. Parcel C area: Accident location in 2009
Source: City-data.com

Fig.12. Parcel A and B area fatal car crashes location in 2009
Source: City-data.com
http://www.city-data.com/accidents/acc-El-Paso-Texas.html



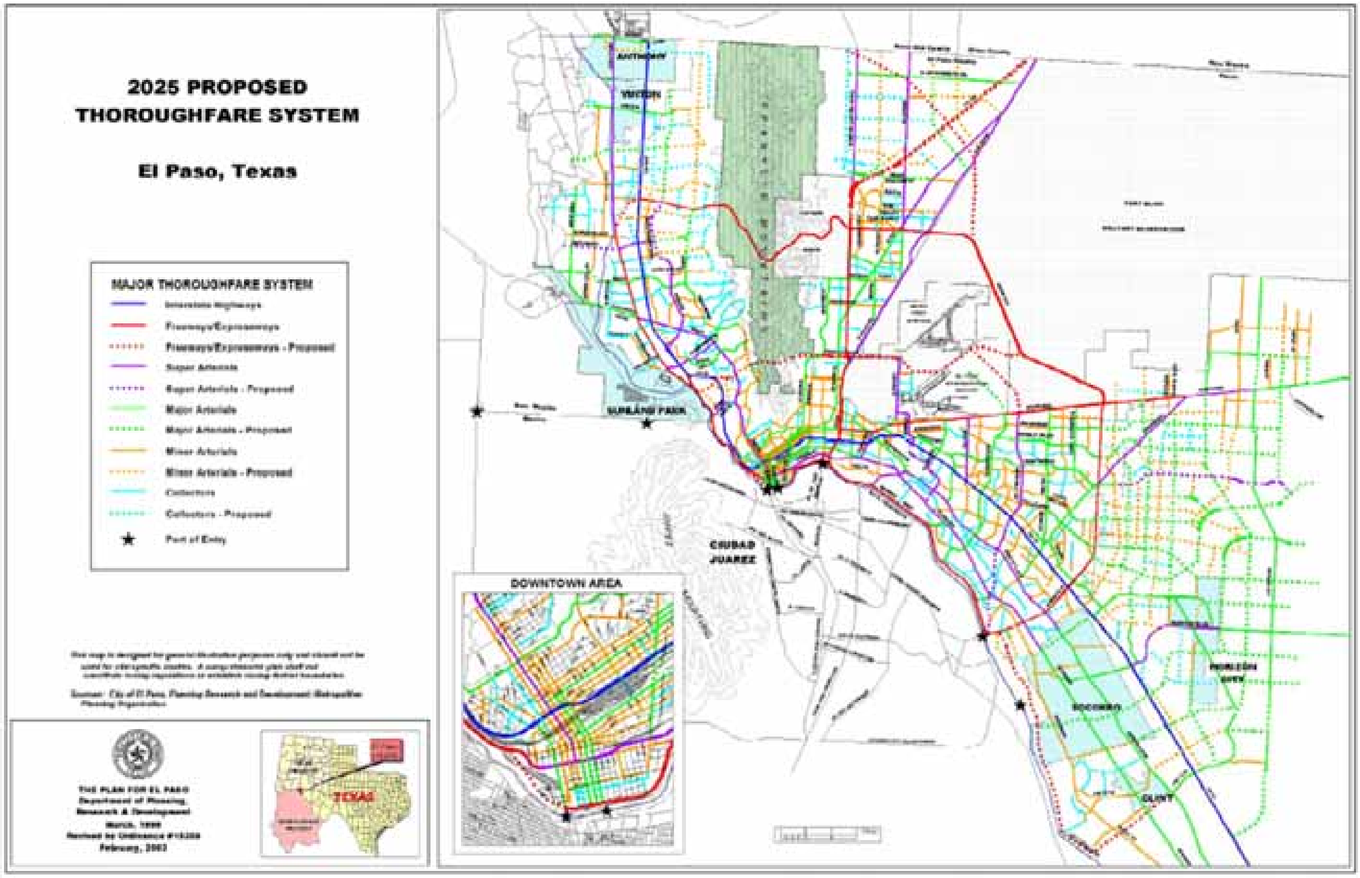
III.4. Existing traffic lanes

Table .2. Number of traffic lanes at each intersection

	Intersection	Orientation/# Lanes							
		Lanes south		Lanes north		Lanes west		Lanes east	
		SB	NB	SB	NB	WB	EB	WB	EB
Parcel AB	MONTANA - LOOP 375 (South)	2	-	4	-	3	4	3	3
	MONTANA - LOOP 375 (North)	-	4	-	2	3	3	4	3
	MONTANA - LEE BLVD	2	3	-	-	2	4	3	3
	MONTANA - S KLEINFELD	2	3	3	2	2	4	4	2
	MONTANA - G. DIETER	2	3	2	1	2	4	4	2
	MONTANA - LEE TREVINO	3	3	-	-	3	4	4	2
	MONTANA - YARBROUGH	2	4	4	3	3	4	5	3
	DIETER - PEBLE HILLS	2	4	5	2	2	4	4	2
	TUERNER - LEE	2	2	2	2	2	2	2	2
	DIETER - EDGEMERE	3	3	3	3	2	3	4	2
	YARBROUGH - EDGEMERE	2	3	3	3	2	3	3	2
	LEE TREVINO - EDGEMERE	3	4	4	3	2	3	3	2
	YABROUGH - PEBBLE HILLS	2	4	3	2	1	1	3	2
	LEE TREVINO - PEBBLE HILLS	3	5	4	3	2	4	3	2
	LOOP 375 - LIBERTY EXPRESSWAY (south)	2	-	4	-	2	4	3	3
	LOOP 375 - LIBERTY EXPRESSWAY (north)	-	4	2	-	3	3	4	2
Parcel C	DYER - BROADDUS	2	2	2	2	1	1	1	1
	DYER - WILSON	2	3	3	2	2	4	4	3
	DYER - HAYES	2	3	3	2	1	1	1	1
	WILSON - RUSSELL	2	2	1	1	2	3	3	2
	WILSON - ALABAMA	1	2	1	1	-	-	2	2
	WILSON - GWY (South)	3	-	5	-	3	3	4	4
	WILSON - GWY (North)	-	5	-	3	4	4	4	3

III.5. 2025 City of El Paso proposed thoroughfare system

Fig.13. Parcel C area: Accident location in 2009
Source: Department of Planning, Research & Development (El Paso)



<u>2025 projects related to Site development</u>:

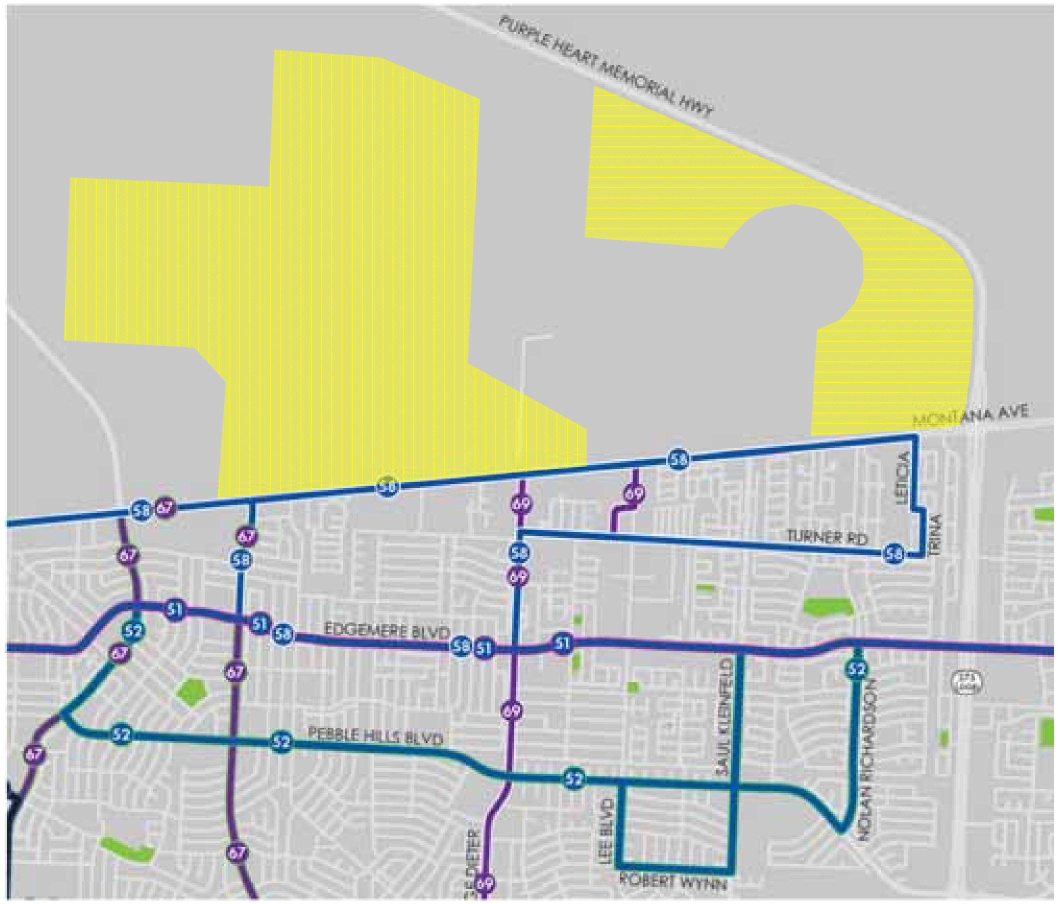
- Extension of Lee Trevino
- Extension of Liberty Expressway (built)

III.6. Public transportation service

Parcels A and B

- ❖Route 51
- ❖Route 52
- ❖Route 58
- ❖Route 67
- ❖Route 69

Fig.14. Public transportation routes adjoining site (Parcels A and B)



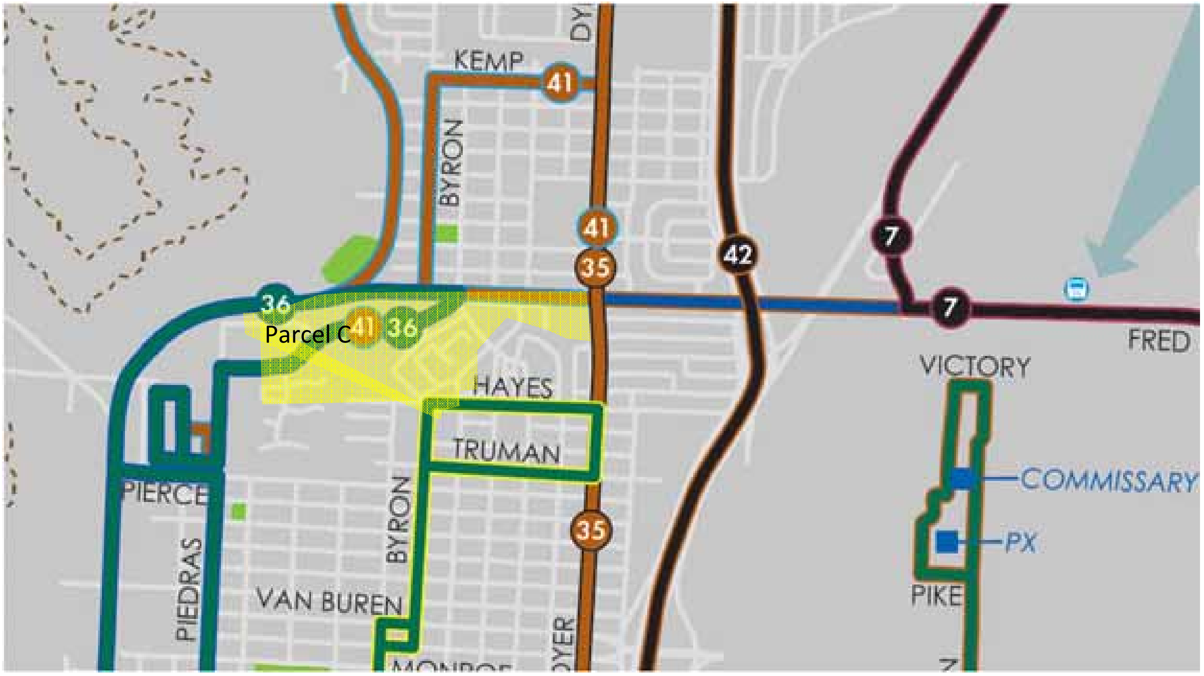
Source: City Of El Paso, Sun Metro Public Transportation System, 2012

III.6. Public transportation service

Fig.15. Public transportation routes adjoining site (Parcel C)

Parcel C

- ❖Route 7
- ❖Route 35
- ❖Route 36
- ❖Route 41



Source: City Of El Paso, Sun Metro Public Transportation System, 2012

III.7. City of El Paso proposed BRT/LRT

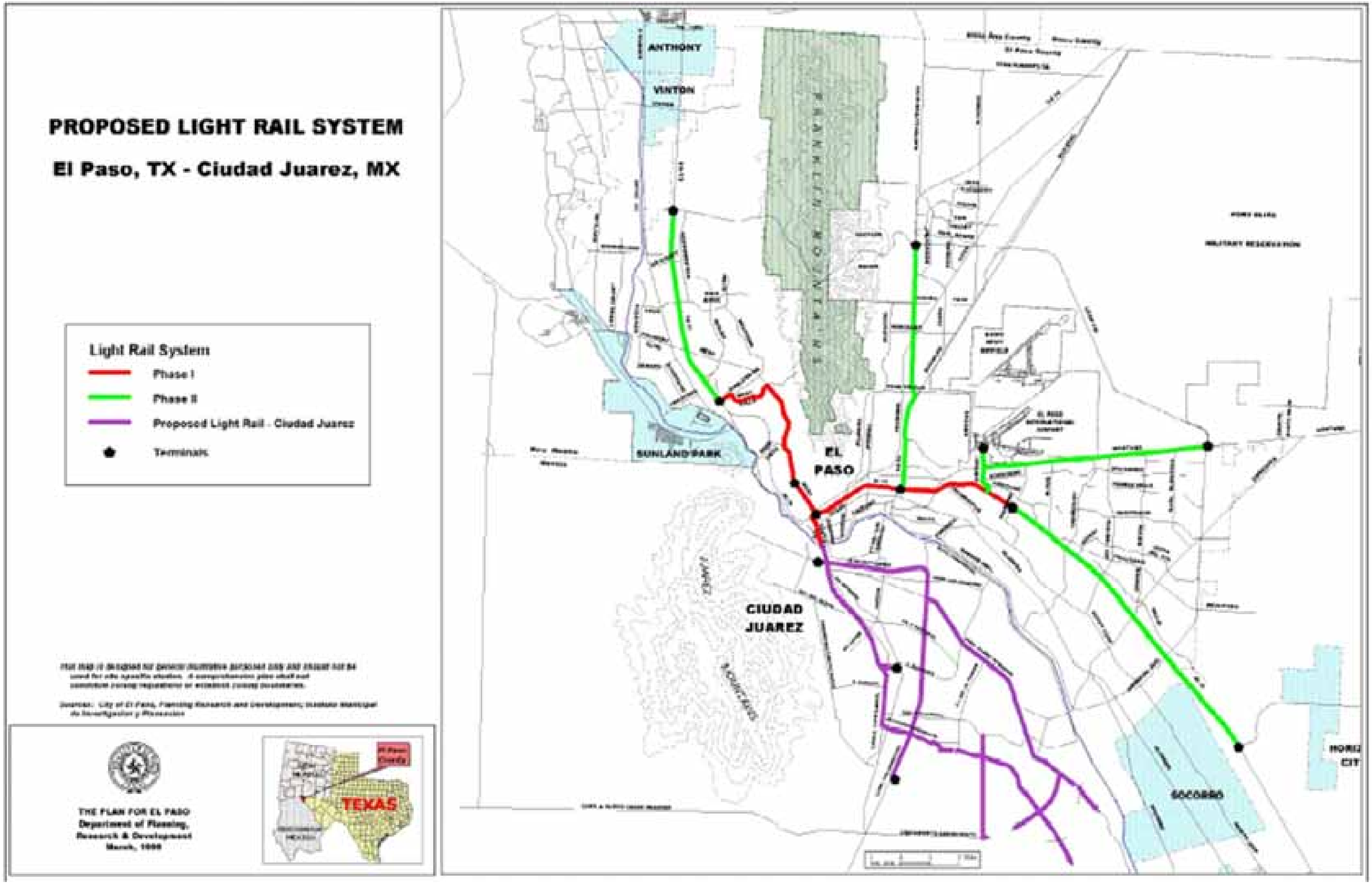


Fig.16. Proposed public transportation system

Source: City of El Paso Planning Division
http://www.elpasotexas.gov/econdev/_documents/CompPlan/map-bikeways.pdf?view=fitH

<u>Future lines projects related to Site development:</u>

PARCELS A AND B:
•Montana Line

Parcel C
•Gateway N/S (Patriot Freeway) Line

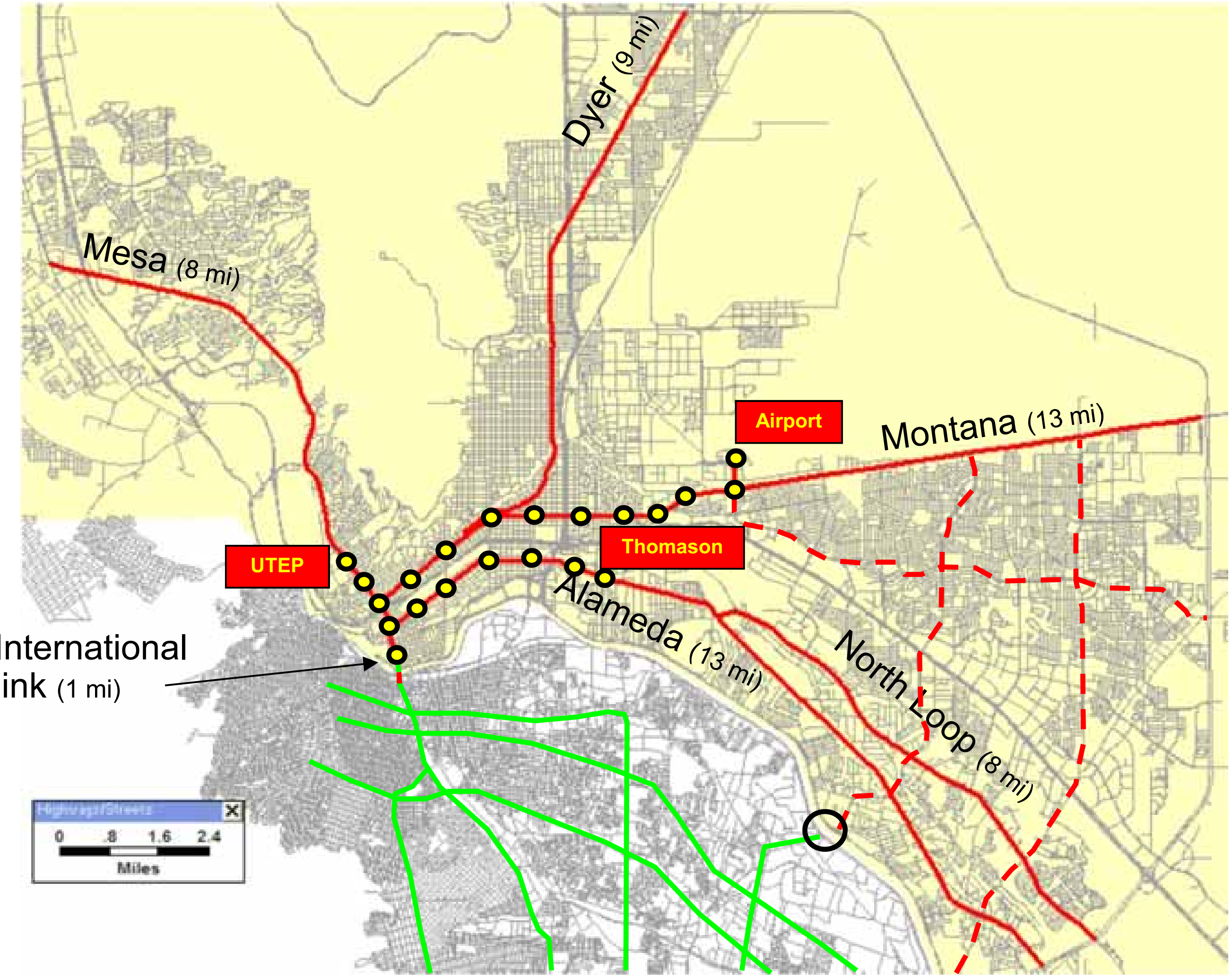
III.7. City of El Paso proposed BRT/LRT

Fig.17. Main BRT alignments by 2025

Main BRT alignments by 2025

- 5 corridors
- 3 under evaluation
- Transborder connectivity
- Phased implementation

-



<u>Future lines projects related to Site development:</u>

PARCELS A AND B:
•Montana Line

Source: City of El Paso Metropolitan Planning Organization

III.8. City of El Paso future bicycle routes

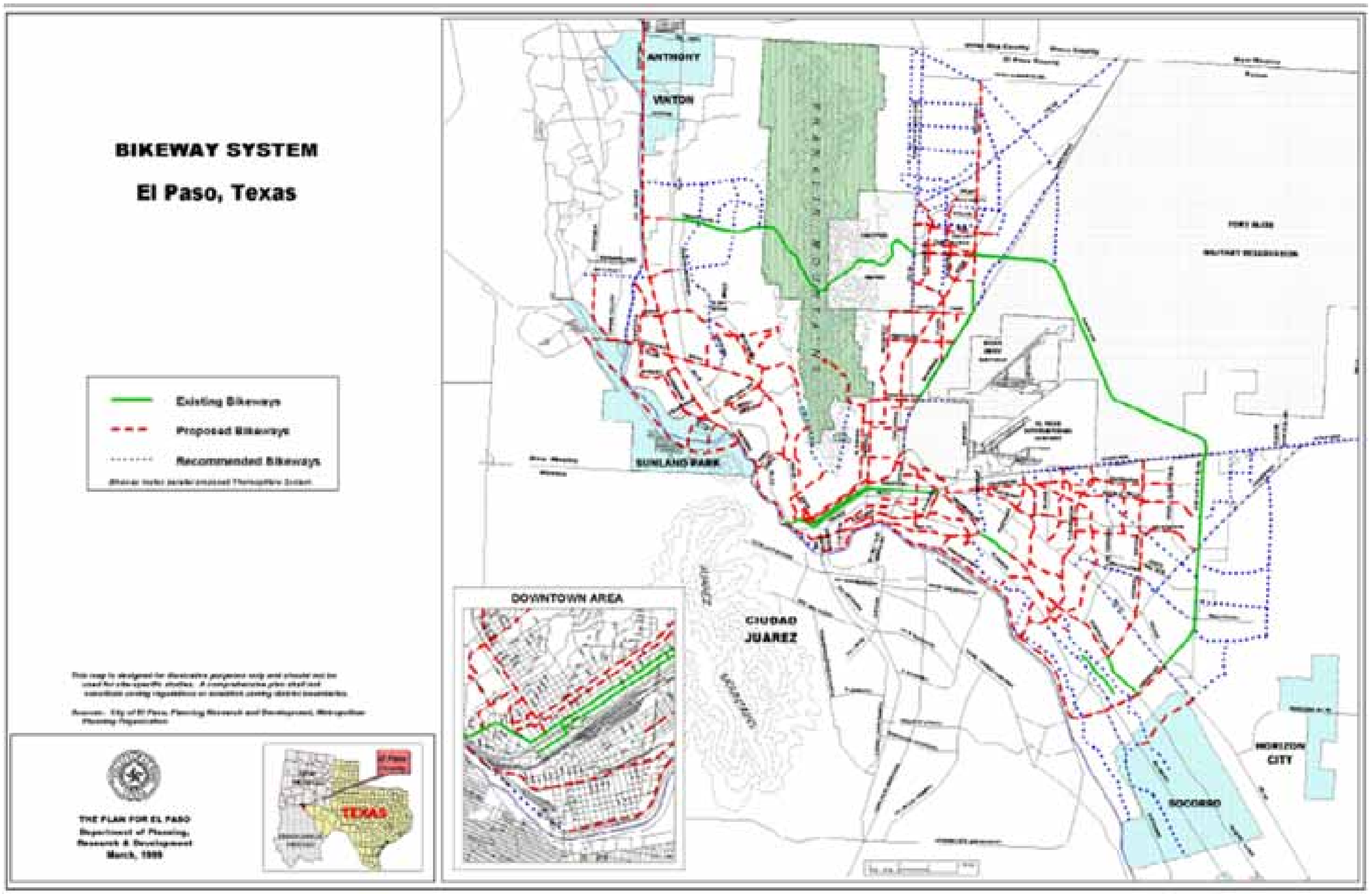


Fig.18. Proposed Bikeways

Source: City of el Paso Planning Division http://www.elpasotexas.gov/econdev/_documents/CompPlan/map-bikeways.pdf?view=fitH

<u>Future bikeway projects related to Site development</u>

PARCELS A AND B AREA:
- Montana
- Pebble Hills
- Edgemere
- Yarbrough
- George Dieter

Parcel C AREA:
- Fred Wilson
- Alabama
- Dyer
- Gateway S/N

IV. CURRENT TRAFFIC CONDITIONS

Coding of base network and micro-simulation of current traffic conditions took place for each intersection and results are shown in the following pages. We are attaching traffic counts for AM and PM peak periods (**Attachment 1**) and Synchro files which show detailed intersections results (**Attachment 2**).

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IV.1. Gathering of field information

•Extent of work was agreed with the City of El Paso Department of Transportation
•Phasing and timing for the current network was provided by the City of El Paso
•Traffic counts took place on 23 critical intersections in the study area.
•Traffic volumes were obtained for AM and PM peak periods (07:00-09:00 and 16:00-18:00 hours) during weekdays (**Attachment 1**).

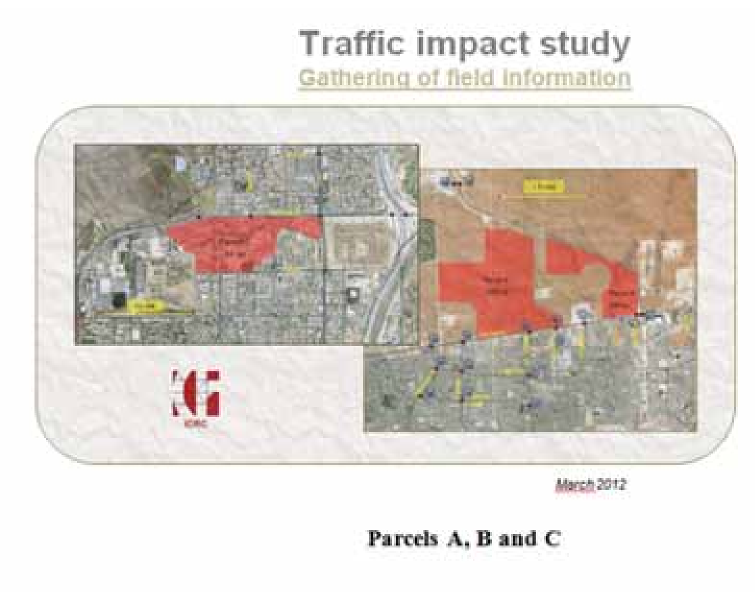


Fig.19. Title page of gathering and field information study, March 2012

Fig.20. Example of data provided by the Transportation Department, City of El Paso, 2012

Table A. Controller Timing Information

	Phase Description							
Interval Name	Phase 1	Phase 2 DYER N/S	Phase 3	Phase 4 BROADDUS E/W	Phase 5	Phase 6	Phase 7	Phase 8
Min Green		15		11				
Passage		4		4				
Maximum I		30		30				
Maximum II		30		30	60			
Veh Clearance		4		4	8			
All Red		1		1	2			
Walk		8		10	70			
Ped Clearance		10		20				
Recall		MAX		OFF				
Memory		ON		ON				
Detector		PULSE		PULSE				
Flash Operation		AMBER		RED				
Prot/P&P Left								

Table B. Coordinator Settings (Sec/FO)

Coordinator	Average	Inbound	Outbound
Timing	Cycle 1	Cycle 2	Cycle 3
Cycle Length			
Offset(and O2)			
Splits			
Cycle Check			

Table C. Schedule

Cycle	Day of Week: Mon-Fri	Sat-Sun
1		
2		
3		
Free	ALL DAY	ALL DAY
Flash	NA	NA

Table d.

Table D. Revisions

Init	WO #	Date	Modification
LC	97-1577	12/17/97	Revised controller settings
LC		5/19/00	170 Installation
LC	NA	9/20/04	Revise phase 4 ped settings

IV.2. Existing peak–hour volumes

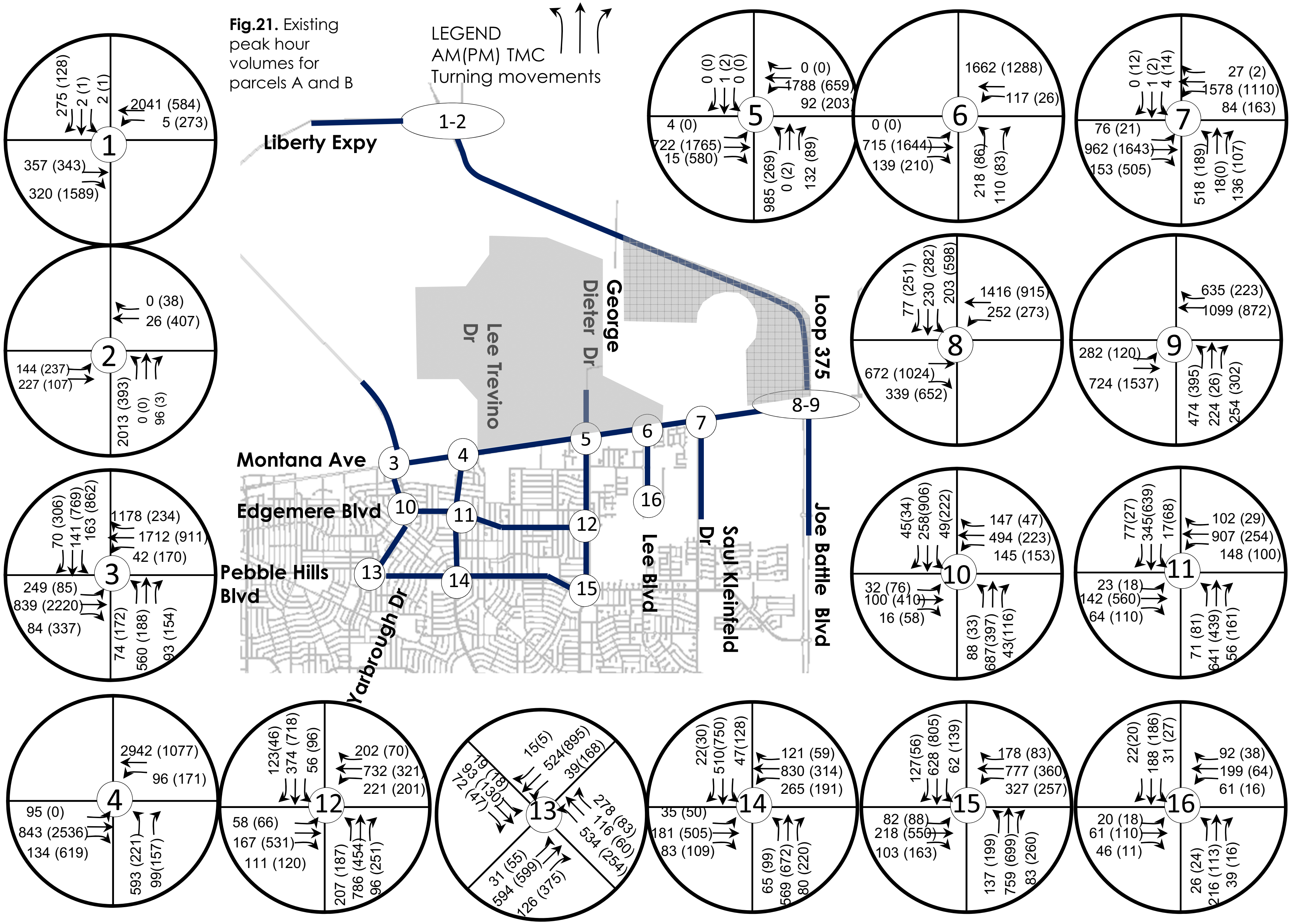
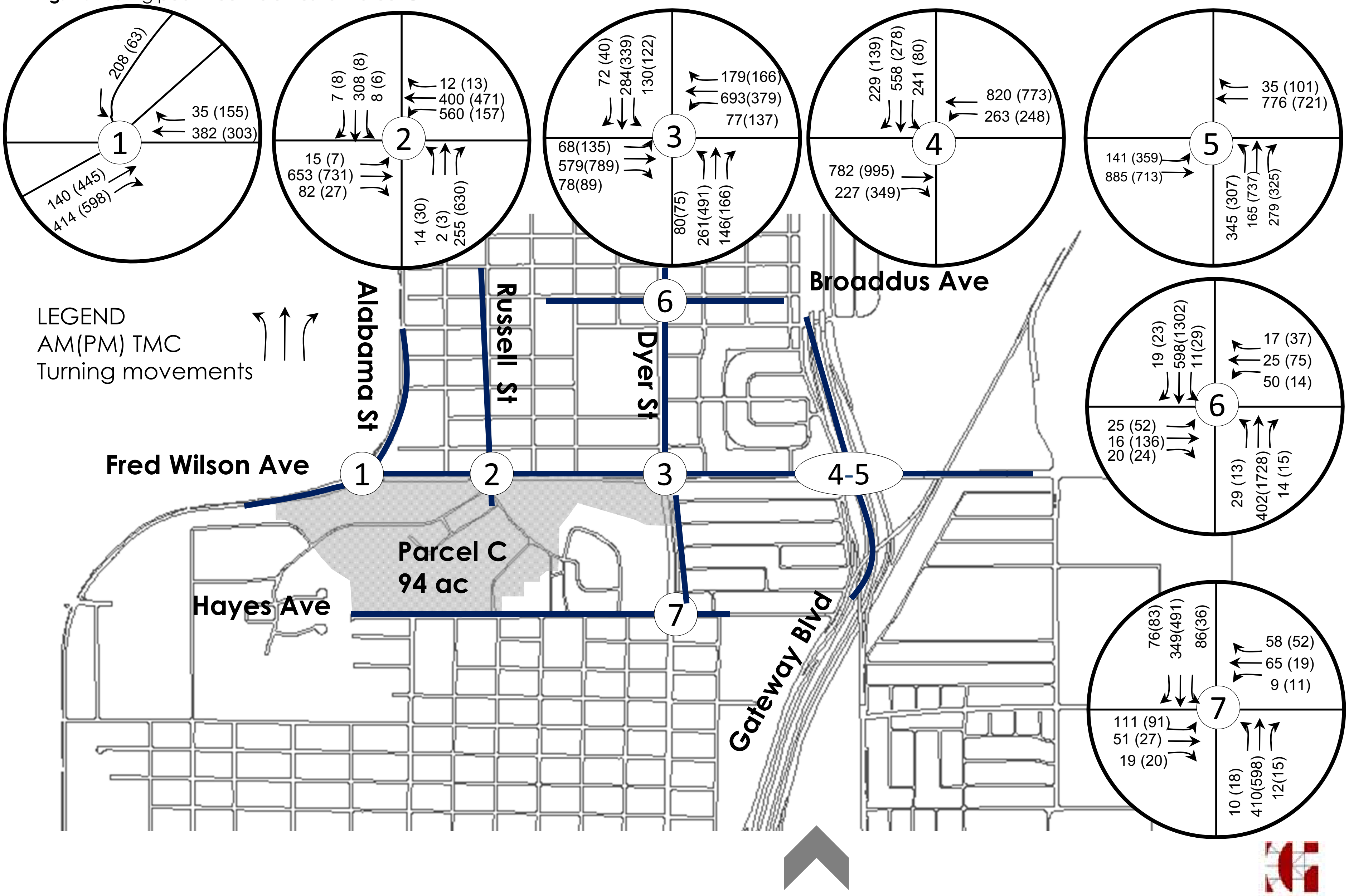


Fig.21. Existing peak hour volumes for parcels A and B

IV.2. Existing Peak–hour volumes

Fig.22. Existing peak hour volumes for Parcel C



IV.3. Current conditions principal observations

In Parcel AB network area, low levels of service are present in the following intersections:

At Loop 375 and Spur 601 (Liberty Expressway)
Queues are observed in NBL, generating conflict with through vehicles (AM).

Montana and Yarbrough
Queues in EBL (AM). Delays in southbound lanes (PM).

Yarbrough and Pebble Hills
Delays in NBL (AM and PM).

Fig.23. Delays in Loop 375 and Spur 601

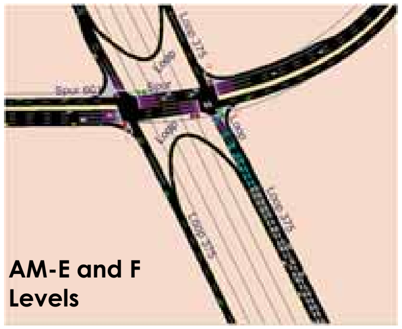


Fig.24. Delays in Yarbrough and Montana

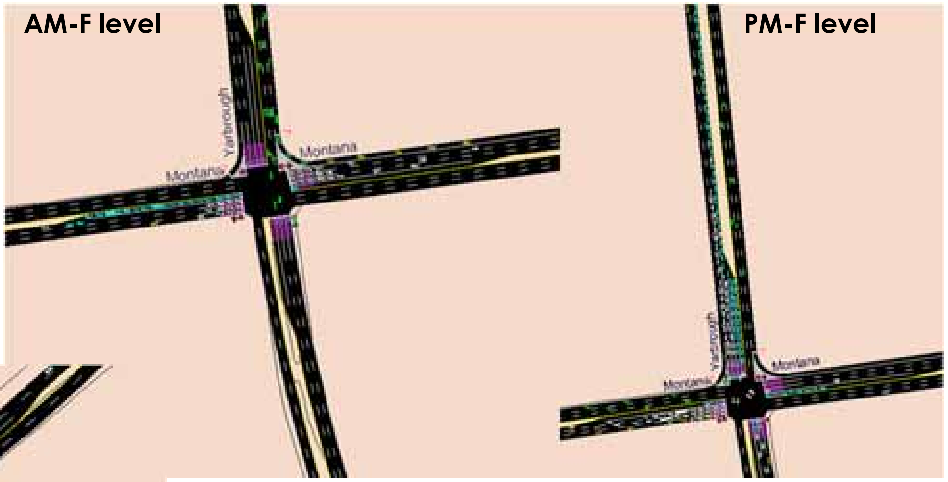


Fig.25. Delays in Yarbrough and Pebble Hills

IV.3. Current conditions principal observations

In Parcel C area, lower levels of service are located on Wilson avenue in AM peak hour and on Dyer in PM.

Wilson and Pipes (D): in AM, queues in vehicles trying to go west when mixing with vehicles trying to turn left.

Wilson and Dyer (D): in AM, delays on Gateway affect Wilson's eastbound trough lanes; westbound vehicles going left, slow down through vehicles.

Wilson and Gateway (D) southbound: in AM, eastbound lanes have similar traffic volumes than westbound, but fewer seconds on green. As a result, queues are formed; right turn queues affect throughout the next intersection (Wilson and Dyer).

Wilson and Gateway (F) southbound: in PM, timing and phasing should better match traffic volumes. Eastbound traffic needs more time on green; extra space for right turn in eastbound lanes could help reduce delays in eastbound lanes.

Dyer and Broaddus (E): in PM, timing doesn't match traffic volume: Broaddus has fewer vehicles than Dyer, but equal time on green.

The remaining intersections operate at acceptable levels of service and have lower traffic volumes, but can also be improved.

Fig.26. Wilson and Pipes- Delay in westbound

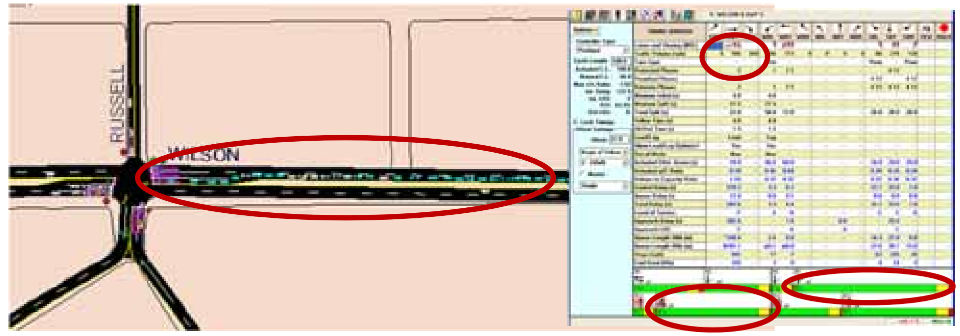
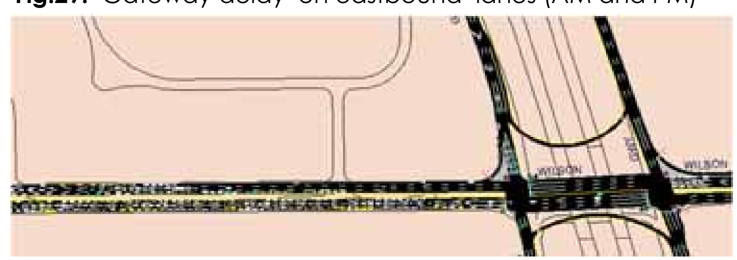


Fig.27. Delays in Dyer and Wilson (AM)

Fig.28. Dyer and Broaddus-timing

Fig.29. Gateway delay on eastbound lanes (AM and PM)



IV.4. Level of service description

Fig.30. Levels of service

	Control delay per vehicle [sec/veh]	Description
A	< 10	Drivers maintain their speed. Minimum or no delay.
B	10 a 20	Driver has some flexibility to select his speed. Minimum delay.
C	20 a 35	Driver experiences some movement restrictions.
D	35 a 55	Driver has little freedom of movement.
E	55 a 80	Substantial movement restriction and delay.
F	> 80	Long delays. Drivers will seek alternative routes.

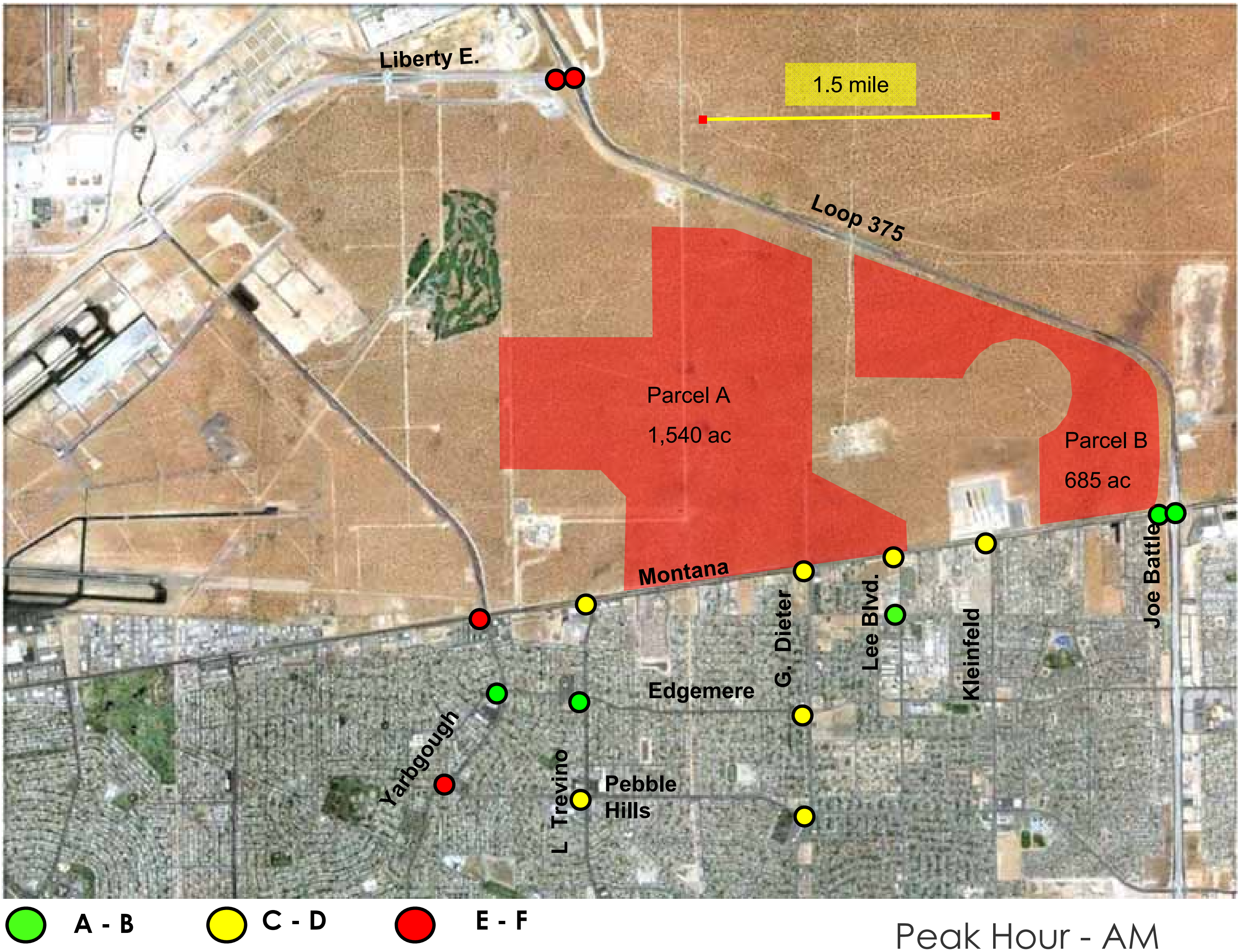
Recommended design LOS in urban areas is D, according to AASHTO specifications.

IV.5. Current conditions summary.

Fig.31. Summary of AM Levels of service

Southeast Bliss
Parcel A

Texas General Land Office
Parcel B



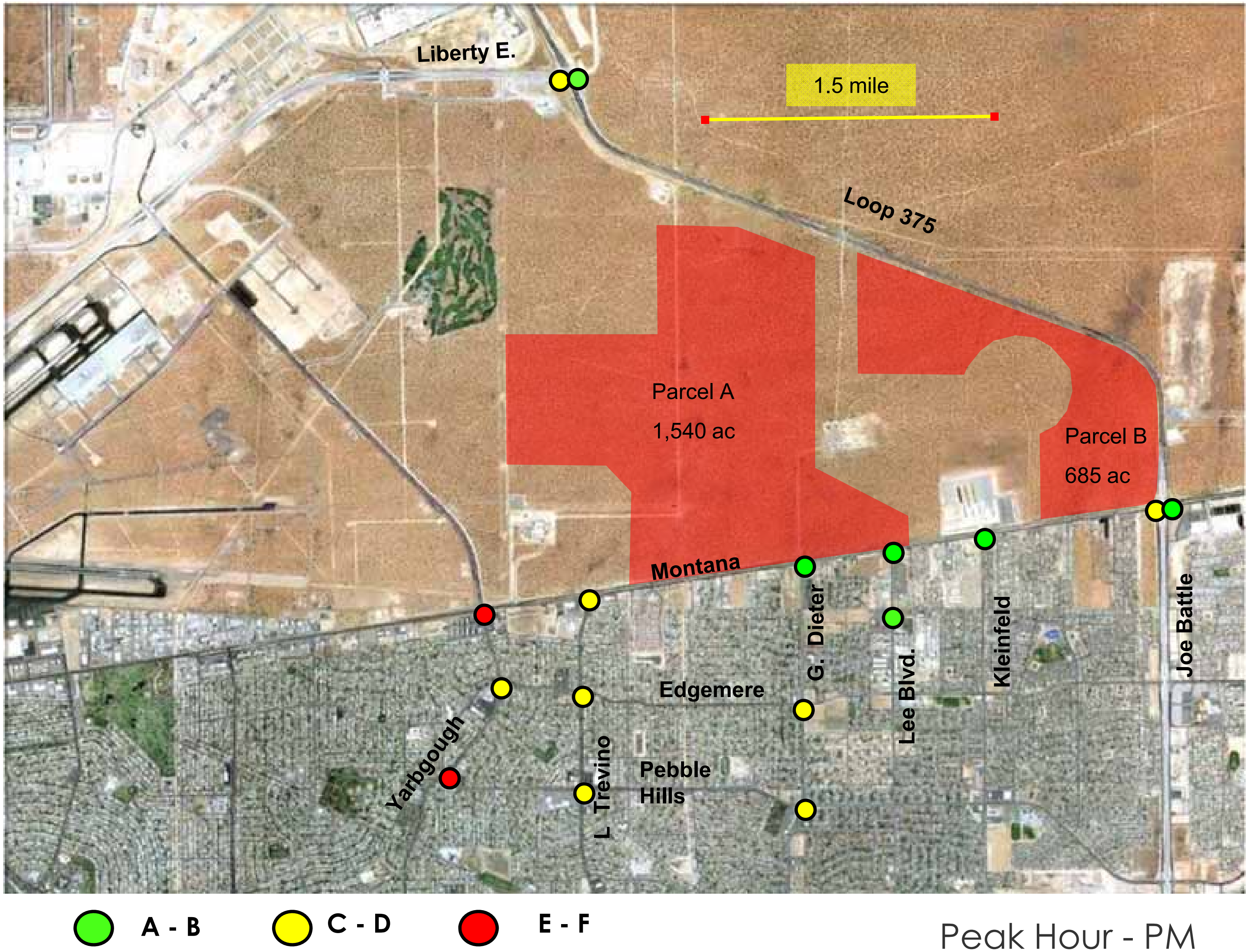
Peak Hour - AM

IV.5. Current conditions summary

Fig.32. Summary of PM Levels of service

Southeast Bliss
Parcel A

Texas General Land Office
Parcel B



Peak Hour - PM

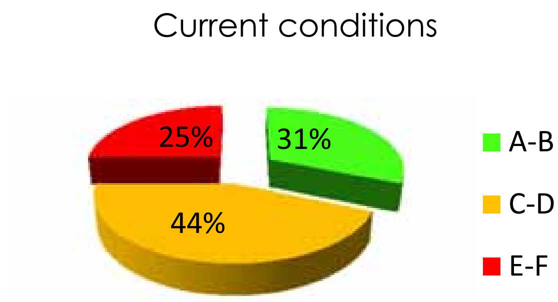
IV.5. Current conditions summary

Fig.33. Summary of AM and PM Levels of service

Summary Current AM

A - B	(5)	31%
C - D	(7)	54%
E - F	(4)	25%
Total	**(16)**	**100%**

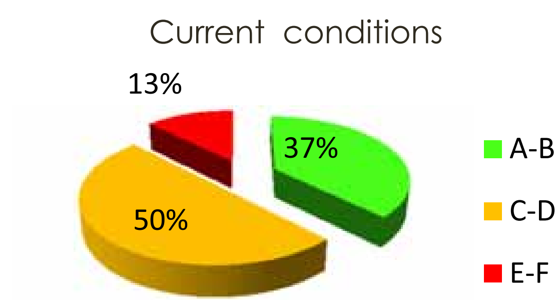
→ → → → →



Summary Current PM

A - B	(6)	37%
C - D	(8)	50%
E - F	(2)	13%
Total	**(16)**	**100%**

→ → → → →



IV.5. Current conditions summary

Fig.34. Summary of AM Levels of service

Lower Beaumont- Parcel C

A - B

C - D

E - F

Peak Hour - AM

ICRC

IV.5. Current conditions summary

Fig.35. Summary of PM Levels of service

Lower Beaumont- Parcel C

A - B   C - D   E - F

Peak Hour - PM

IV.5. Current conditions summary

Lower Beaumont- Parcel C

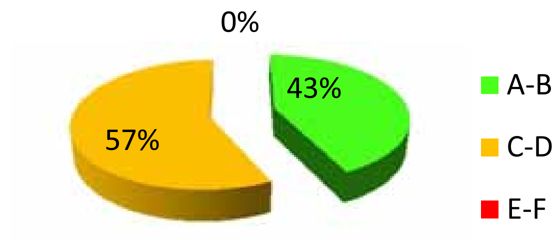
Fig.36. Summary of AM and PM Levels of service

Summary Current AM

A - B	(3)	43%
C - D	(4)	57%
E - F	(0)	0%
Total	**(7)**	**100%**

→ → → → →

Current scenario

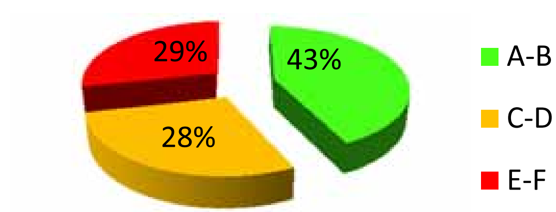


Summary Current PM

A - B	(3)	43%
C - D	(2)	28%
E - F	(2)	29%
Total	**(7)**	**100%**

→ → → → →

Current scenario



IV.5. Current conditions summary

Table.3. Summary of AM levels of service and delays

	CURRENT CONDITION (AM - LOS and Delay)					
	Intersection		Scenario 3 Parcels A and B		Scenario 4 Parcel C	
			LOS	*Delay*	*LOS*	*Delay*
Parcel AB	Loop 375 (Southbound)	Liberty Expressway (spur 601)	E	57.5		
	Loop 375 (Northbound)	Liberty Expressway (spur 601)	F	150.8		
	Loop 375 (Southbound)	Montana Ave	B	16.3		
	Loop 375 (Northbound)	Montana Ave	B	19.7		
	Saul Kleinfeld	Montana Ave	C	28.7		
	George Dieter	Montana Ave	D	44.8		
	Lee Trevino	Montana Ave	D	36.6		
	Global Reach (Yarbrough)	Montana Ave	F	88.4		
	Lee Blvd	Montana Ave	C	28.9		
	Edgemere	Yarbrough	B	18.1		
	Edgemere	Lee Trevino	B	16.4		
	Edgemere	George Dieter	C	23.1		
	Pebble Hills	Yarbrough	F	539.9		
	Pebble Hills	Lee Trevino	C	32.6		
	Pebble Hills	George Dieter	C	30.9		
	Turner	Lee	B	10.5		
	New avenue (A)	Montana Ave	NOT APPLICABLE		NOT APPLICABLE	
	New avenue (B)	Montana Ave				
	Loop 375 (Eastbound)		NOT APPLICABLE		NOT APPLICABLE	
	Loop 375 (Westbound)					
Parcel C	Fred Wilson	Gateway (Northbound)			**C**	**21.2**
	Fred Wilson	Gateway (Southbound)			**D**	**45.4**
	Dyer	Hayes			**B**	**11.3**
	Dyer	Broaddus			**A**	**5.9**
	Fred Wilson	Pipes (Russell)			**D**	**39**
	Fred Wilson	Dyer			**D**	**35.5**
	Fred Wilson	Alabama			**B**	**18.7**
	Fred Wilson	Lackland			NOT APPLICABLE	
	Hayes	Eastman				

IV.5. Current conditions summary

	CURRENT CONDITION (PM - LOS and Delay)					
	Intersection		Scenario 3 Parcels A and B		Scenario 4 Parcel C	
			LOS	Delay	LOS	Delay
Parcel AB	Loop 375 (Southbound)	Liberty Expressway (spur 601)	D	37.7		
	Loop 375 (Northbound)	Liberty Expressway (spur 601)	B	15.1		
	Loop 375 (Southbound)	Montana Ave	C	34.2		
	Loop 375 (Northbound)	Montana Ave	B	17.3		
	Saul Kleinfeld	Montana Ave	B	19.8		
	George Dieter	Montana Ave	B	15.7		
	Lee Trevino	Montana Ave	D	43.7		
	Global Reach (Yarbrough)	Montana Ave	F	101.6		
	Lee Blvd	Montana Ave	B	11.9		
	Edgemere	Yarbrough	C	22.9		
	Edgemere	Lee Trevino	C	28.9		
	Edgemere	George Dieter	C	28.0		
	Pebble Hills	Yarbrough	F	407.7		
	Pebble Hills	Lee Trevino	D	35.8		
	Pebble Hills	George Dieter	C	28.0		
	Turner	Lee	A	8.3		
	New avenue (A)	Montana Ave	NOT APPLICABLE		NOT APPLICABLE	
	New avenue (B)	Montana Ave				
	Loop 375 (Eastbound)		NOT APPLICABLE		NOT APPLICABLE	
	Loop 375 (Westbound)					
Parcel C	Fred Wilson	Gateway (Northbound)			C	24.1.
	Fred Wilson	Gateway (Southbound)			F	101.2
	Dayer	Hayes			A	7.9
	Dayer	Broaddus			E	63.5
	Fred Wilson	Pipes (Russell)			B	19.4
	Fred Wilson	Dyer			C	33.3
	Fred Wilson	Alabama			B	13.3
	Fred Wilson	Lackland			NOT APPLICABLE	
	Hayes	Eastman				

Table.4. Summary of PM levels of service and delays

IV.6. Arterial Capacity Analysis

Table.5. Arterial levels of service for Current Condition. Parcels A and B

Current Condition AM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	I	55	13.0	48.0	61.0	0.13	7.9	F
Lee Trevino	I	55	38.6	13.8	52.4	0.59	40.5	B
G. Dieter	I	55	79.1	29.5	108.6	1.21	40.1	B
Lee Blvd	I	55	36.7	36.4	73.1	0.50	24.8	D
Kleinfeld	I	55	37.6	5.8	43.4	0.52	42.7	A
Joe Battle	I	55	64.5	26.8	91.3	0.99	38.9	B
Joe Battle	I	55	5.6	1.6	7.2	0.06	28.7	C
Total	I		275.1	161.9	437.0	3.99	32.9	C

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle	I	55	19.8	32.9	52.7	0.20	13.9	F
Joe Battle	I	55	5.6	6.2	11.8	0.06	17.5	E
Kleinfeld	I	55	64.5	21.2	85.7	0.99	41.4	B
Lee Blvd	I	55	37.6	24.2	61.8	0.52	30.0	C
G. Dieter	I	55	36.7	41.4	78.1	0.50	23.2	D
Lee Trevino	I	55	79.1	14.2	93.3	1.21	46.6	A
Yarbrough	I	55	38.6	27.6	66.2	0.59	32.0	C
Total	I		281.9	167.7	449.6	4.06	32.5	C

Current Condition PM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	I	55	27.5	46.7	74.2	0.30	14.5	F
Lee Trevino	I	55	38.5	67.7	106.2	0.59	20.0	E
G. Dieter	I	55	79.1	11.7	90.8	1.21	47.9	A
Lee Blvd	I	55	36.7	2.7	39.4	0.50	45.9	A
Kleinfeld	I	55	37.6	10.4	48.0	0.51	38.6	B
Loop 375	I	55	64.5	32.1	96.6	0.99	36.7	B
Loop 375	I	55	5.6	3.8	9.4	0.06	22.0	D
Total	I		289.5	175.1	464.6	4.16	32.2	C

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Loop 375	I	55	19.8	30.2	50.0	0.20	14.7	F
Loop 375	I	55	5.6	1.3	6.9	0.06	29.9	C
Kleinfeld	I	55	64.5	24.9	89.4	0.99	39.7	B
Lee Blvd	I	55	37.6	21.6	59.2	0.51	31.3	C
G. Dieter	I	55	36.7	4.3	41.0	0.50	44.1	A
Lee Trevino	I	55	79.1	1.4	80.5	1.21	54.0	A
Yarbrough	I	55	38.5	13.7	52.2	0.59	40.6	B
Total	I		281.8	97.4	379.2	4.06	38.6	B

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IV.6. Arterial Capacity Analysis

Table 6. Arterial levels of service for Current Condition. Parcel C

Current Condition AM

Arterial Level of Service: NB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
HAYES	III	31	9.0	6.5	15.5	0.06	13.4	E
WILSON	III	31	36.2	22.2	58.4	0.28	17.6	D
BROADDUS	III	31	40.1	4.4	44.5	0.32	25.5	B
Total	III		85.3	33.1	118.4	0.66	20.0	C

Arterial Level of Service: SB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BROADDUS	III	31	14.8	4.8	19.6	0.11	19.3	C
WILSON	III	31	40.1	24.8	64.9	0.32	17.5	D
HAYES	III	31	36.2	5.8	42.0	0.28	24.4	B
Total	III		91.1	35.4	126.5	0.71	20.1	C

Arterial Level of Service: EB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
RUSSELL	II	40	29.6	28.2	57.8	0.27	16.7	E
DYER	II	40	35.5	34.3	69.8	0.36	18.5	D
GWY S	II	40	36.3	111.7	148.0	0.37	8.9	F
GWY N	II	40	8.2	1.5	9.7	0.07	26.4	C
Total	II		109.6	175.7	285.3	1.07	13.4	E

Arterial Level of Service: WB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GWY N	II	40	17.2	41.3	58.5	0.15	9.2	F
GWY S	II	40	8.2	2.9	11.1	0.07	23.1	C
DYER	II	40	36.3	47.7	84.0	0.37	15.7	E
RUSSELL	II	40	35.5	10.3	45.8	0.36	28.2	B
ALABAMA	II	40	29.6	24.7	54.3	0.27	17.8	D
Total	II		126.8	126.9	253.7	1.22	17.2	D

Current Condition PM

Arterial Level of Service: NB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
HAYES	III	31	9.0	5.1	14.1	0.06	14.7	D
WILSON	III	31	36.2	30.3	66.5	0.28	15.4	D
BROADDUS	III	31	40.1	71.9	112.0	0.32	10.1	E
Total	III		85.3	107.3	192.6	0.66	12.3	E

Arterial Level of Service: SB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BROADDUS	III	31	23.9	63.9	87.8	0.19	7.7	F
WILSON	III	31	40.1	23.8	63.9	0.32	17.8	D
HAYES	III	31	36.2	4.7	40.9	0.28	25.1	B
Total	III		100.2	92.4	192.6	0.79	14.7	D

Arterial Level of Service: EB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
RUSSELL	II	40	29.6	21.9	51.5	0.27	18.8	D
DYER	II	40	35.5	42.9	78.4	0.36	16.5	E
GWY S	II	40	36.3	196.1	232.4	0.37	5.7	F
GWY N	II	40	8.2	1.3	9.5	0.07	27.0	C
Total	II		109.6	262.2	371.8	1.07	10.3	F

Arterial Level of Service: WB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GWY N	II	40	17.2	50.1	67.3	0.15	8.0	F
GWY S	II	40	8.2	0.3	8.5	0.07	30.2	B
DYER	II	40	36.3	20.8	57.1	0.37	23.1	C
RUSSELL	II	40	35.5	10.3	45.8	0.36	28.2	B
ALABAMA	II	40	29.6	23.8	53.4	0.27	18.1	D
Total	II		126.8	105.3	232.1	1.22	18.9	D

V. FUTURE SITES DEVELOPMENT PARAMETERS

ICRC

V.1. Scenarios and projection criteria

Full build scenario was prepared for 2015 only, concerning two sites:

1. Parcel A and B
2. Parcel C

Parcels A and B are part of the same network, whereas Parcel C relates to a different one.

Future land use was estimated from different sources. For Parcel A, we applied a Smart Growth Table, elaborated by The El Paso Planning & Economic Development Department to calculate residential use; to estimate commercial and industrial jobs, the surrounding pattern was used, particularly Zip Code 79936. For parcels B and C we used the surrounding urban pattern (codes 79936 and 79930 respectively), to estimate future population and jobs. We verified the results with population and job projections from Texas State Data Center (2010 SED update, 2011 MTP update) and the El Paso Metropolitan Planning Organization (2011 Demographic Update Technical Memorandum).

The source of information came from the US Census Bureau for population (2010 Demographic Profile Data) and activities (2009 Business Patterns), which use the American Industry Classification System (NAICS) Codes 11 through 813990. The potential development was calculated considering only the urbanized land. Existing households, businesses and jobs were considered to be distributed only in the developed land, in order to obtain densities for each element .

Parcel A accounts for 23% of total County population growth in 2040, given the use of the Smart Code Table. Jobs, based in the surrounding pattern, represent approximately 10% of total additional city jobs in the same year. Parcel B represents 2% of future added population and 4% of new jobs in 2040.

Future scenarios needed to address city's own growth and the increase in transportation needs, as a result of the proposed developments. Infrastructure projected by The City was included in the 2015 scenario:

1) Street widening of Montana avenue by adding one lane by direction and
2) George Dieter and Loop 375 overpass

ICRC

V.1. Scenarios and projection criteria

Table.7. Employment and population forecast 2010-2040

EL PASO COUNTY						
	2010 SED UPDATE		2011 MTP UPDATE			
Year	Employment Forecast	Compounded Annual Growth Rate	Employment Forecast	Compounded Annual Growth Rate	Forecast employment change	Base 2012 employment change (2011 update)
2007	N/A	N/A	288,118.00	__	N/A	0
2010	299,795.00	__	301,429.00	1.52%	6,232.00	0.00
2012	306,934.00	1.18%	308,282.00	1.13%	-3,254.00	0.00
2014	314,243.00	1.18%	315,361.00	1.14%	-5,939.00	-2,685.00
2017	325,534.00	1.18%	322,520.00	0.75%	-10,656.00	-7,402.00
2020	337,231.00	1.18%	333,352.00	1.11%	-16,026.00	-12,772.00
2030	350,927.00	0.40%	371,725.00	1.10%	15,086.00	18,340.00
2040	363,923.00	0.36%	415,581.00	1.12%	40,990.00	44,244.00

EL PASO COUNTY						
	2010 SED UPDATE		2011 MTP UPDATE			
Year	Population Forecast	Compounded Annual Growth Rate	Population Forecast	Compounded Annual Growth Rate	Forecast population change	Base 2012 population change (2011 update)
2007	N/A	N/A	747,478.00	__	N/A	0
2010	781,913.00	__	788,145.00	1.78%	6,232.00	0.00
2012	804,929.00	1.46%	801,675.00	0.85%	-3,254.00	0.00
2014	828,622.00	1.46%	822,683.00	1.30%	-5,939.00	21,008.00
2017	865,476.00	1.46%	854,820.00	1.29%	-10,656.00	53,145.00
2020	903,969.00	1.46%	887,943.00	1.28%	-16,026.00	86,268.00
2030	971,845.00	0.73%	986,931.00	1.06%	15,086.00	185,256.00
2040	1,031,572.00	0.60%	1,072,562.00	0.84%	40,990.00	270,887.00

Source: Texas State Data Center, 2007

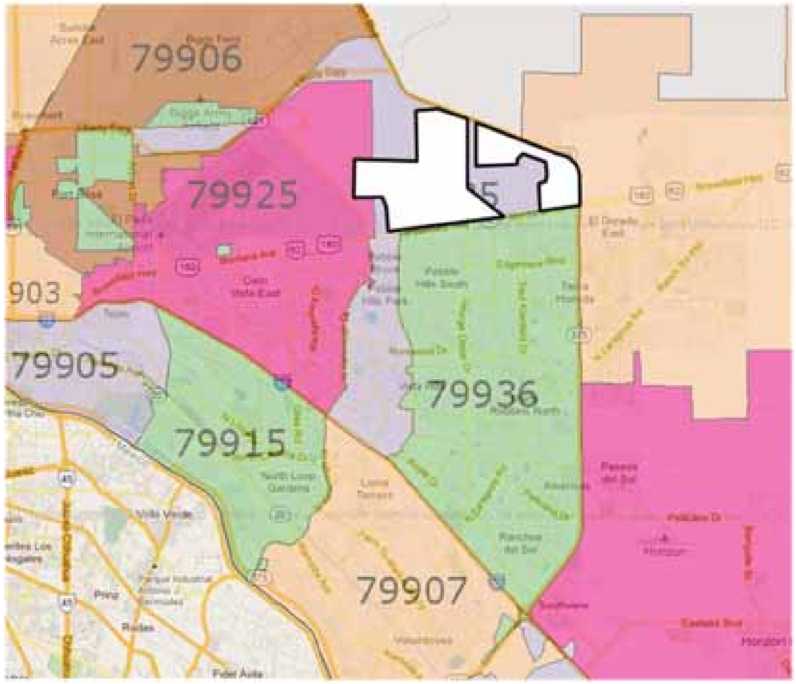
V.1. Scenarios and projection criteria

Table.8. Existing land use surrounding parcels A and B

US CENSUS DATA			
EXISTING LAND USE SURROUNDING PARCELS A AND B			
ZIP CODE REFERENCE	**79936**	79925	79935
Observations	Similar commercial/res distribution. More commercial share expected.	Stronger relationship to DW, + comm share	More residential share
2010 Pop	111,086	40,975	18,262
% Tot Pop change 2000-2010	20.63%	-0.89%	-7.25%
Households	34,452	15,583	6,663
% Tot Households change 2000-2010	28.07%	2.10%	0.24%
Persons per Household	3.22	2.54	2.67
Number of Businesses (2009)	1669	1595	488
# of Employees	32,990	26,923	9,199
Tot Land Area	26.739 sq mi	16.919 sq mi	3.494 sq mi
Tot Land Area (Acres)	17,112.96	10,828.16	2,236.16
Urbanized land (acres).	11,618.00	5,690.26	2,236.16
Households per acre Tot	2.01	1.44	2.98
Households per acre in occupied land	2.97	2.74	2.98
Business per acre Tot	0.10	0.15	0.22
Business per acre in occupied land	0.14	0.28	0.22
# of Employees per acre in occ land	2.84	4.73	4.11
*Only terminal and hangars of EPIA included in developped area			

Sources: US Census Bureau, Texas State Data Center

Fig.37. El Paso City map by zip code areas for parcels A and B



V.1. Scenarios and projection criteria

Alternatives analysis

Table.9. Total potential development for parcels A and B

TOTAL POTENTIAL DEVELOPMENT PARCELS A AND B							
FUTURE DEVELOPED LAND	PARCEL A Potential Development acc to	Share of total growth (2040) with existing land use	PARCEL A (Smart Code Density Table)	**PARCEL A** Smart Code (households)+Surrounding pattern (commercial)	PARCEL A Share of total growth (2040)	**PARCEL B** Surrounding pattern (housing + commercial)	Share of total growth (2040)
Observations			Very high density, compared to existing land use				
Future Population	14,685.72	0.05	62,326.94	62,326.94	0.23	6,540.78	0.02
Households	4,561		19,356	19,356		2,031	
Median household income (est. 2010)				$48,491		$48,491	
Persons per Household	3.22			3.22		3.22	
Number of Businesses	220.94		Not established	221		98.40	
Total # of Employees	4,367.24	0.10		4,367.24	0.10	1,945.10	0.04
Employees in BASIC sector				909.55		405.10	
Employees in RETAIL sector				1,441.06		641.82	
Employees in SERVICES sector				2,016.64		898.18	
Tot Land Area (Acres)	1538		1538	1538		685	
Urbanized land (acres).	1538		1538	1538		685	
Households per acre Tot	2.97		12.59	12.59		2.97	
Business per acre Tot	0.14			0.14		0.14	
# of Employees per acre in occ land	2.84			2.84		2.84	

Sources: US Census Bureau, Texas State Data Center and Smart Growth Table (The El Paso Planning & Economic Development Department

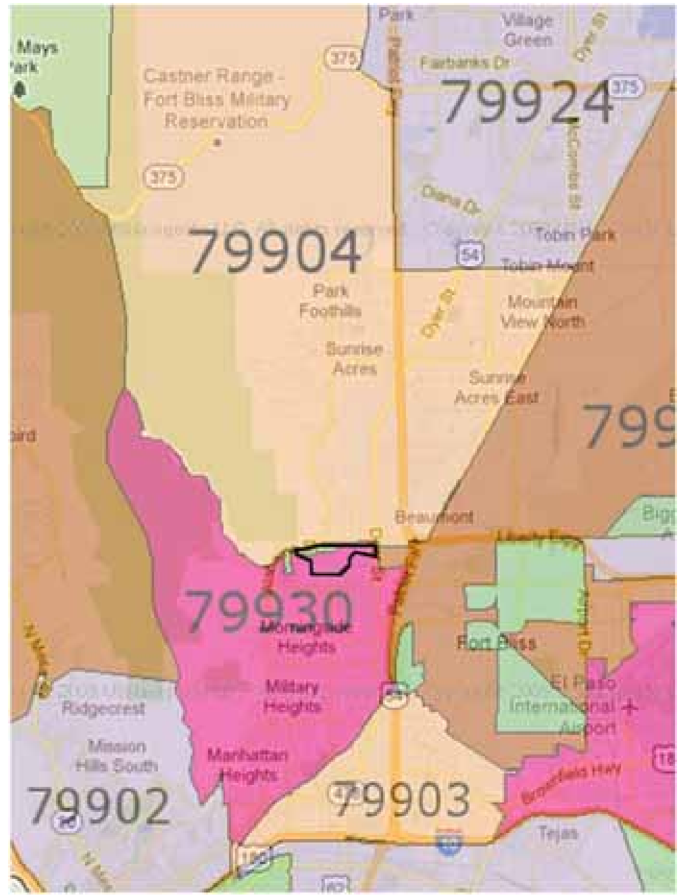
V.1. Scenarios and projection criteria

Table.10. Total potential development for Parcel C

EXISTING LAND USE SURROUNDING PARCEL C			TOTAL POTENTIAL DEVELOPMENT	
ZIP CODE REFERENCE	**79930**	79904	FUTURE DEVELOPED LAND	**PARCEL C** surrounding pattern (housing+commercial)
Observations	Similar commercial/res distribution	Mostly unurbanized	Observations	
2010 Pop	28,129	36,917	Future Population	716.05
Households	10,229	11,574	Households	259
% Tot Households change 2000-2010	9.21%	7.12%	Median household income (est. 2010)	$33,750
Persons per Household	2.76	3.03	Persons per Household	2.76
Number of Businesses (2009)	222	279	Number of Businesses	10.02
# of Employees	2,322	3,091	Total # of Employees	104.84
Tot Land Area	10.969 sq mi	8.804 sq m	Employees in BASIC sector	20.19
Tot Land Area (Acres)	7020.16	5634.56	Employees in RETAIL sector	29.53
Urbanized land (acres)	2082	2289	Employees in SERVICES sector	55.11
Households per acre Tot	1.46	2.05	Tot Land Area (Acres)	94
Households per acre in occupied land	4.91	5.06	Urbanized land (acres).	94
Business per acre Tot	0.11	0.05	Households per acre Tot	2.76
Business per acre in occupied land	0.11	0.12	Business per acre Tot	0.11
# of Employees per acre in occ land	1.12	1.35	Business per acre in occupied land	0.11
			# of Employees per acre in occ land	1.12

Sources: US Census Bureau, Texas State Data Center

Fig.38. El Paso City map by zip code areas for Parcel C



V.1. Scenarios and projection criteria

Table 11. Total potential development for parcels A, B and C

TOTAL POTENTIAL DEVELOPMENT			
FUTURE DEVELOPED LAND	PARCEL A Smart Code (households)+Surrounding pattern (commercial)	PARCEL B Surrounding pattern (housing + commercial)	PARCEL C surrounding pattern (housing+commercial)
Observations			
Future Population	62,326.94	6,540.78	716.05
Households	19,356.19	2,031.30	259.44
Median household income (est. 2010)	$48,491	$48,491	$33,750
Persons per Household	3.22	3.22	2.76
Number of Businesses	220.94	98.40	10.02
Total # of Employees	4,367.24	1,945.10	104.84
Employees in BASIC sector	909.55	405.10	20.19
Employees in RETAIL sector	1,441.06	641.82	29.53
Employees in SERVICES sector	2,016.64	898.18	55.11
Tot Land Area (Acres)	1,538.00	685.00	94.00
Urbanized land (acres).	1,538.00	685.00	94.00
Households per acre Tot	12.59	2.97	2.76
Business per acre Tot	0.14	0.14	0.11
# of Employees per acre in occ land	2.84	2.84	1.12

Sources: US Census Bureau, Texas State Data Center and Smart Growth Table (The El Paso Planning & Economic Development Department

VI. TRIP GENERATION AND DISTRIBUTION

ICRC

VI.1. Trip generation

Summary of Methodology to forecast 2015 peak hour flows at critical intersections

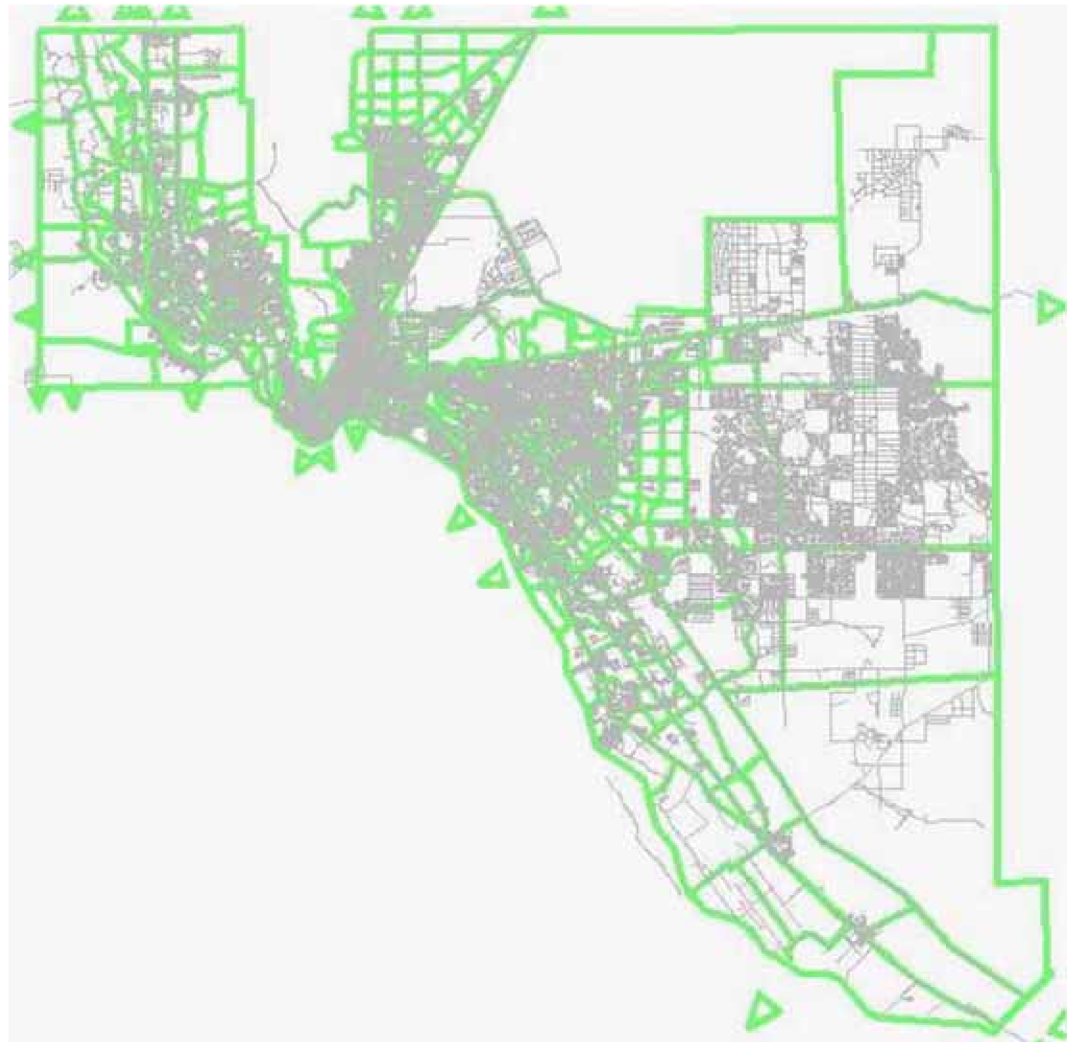
Overview

In order to forecast 2015 traffic flows generated by the potential development of Fort Bliss parcels A, B and C, ICRC relied on "The Mission" MTP parameters for travel demand modeling (TDM), the official tool used by the El Paso MPO. Its calibrated parameters and other TDM algorithms estimated by the MPO are currently available to ICRC for its research on bi-national traffic models.

TDM platform

The official TDM is based on a Geographic Information System (GIS) in TransCAD, with traffic zone and roadway network layers. Figures 39 and 40 show images of each of these layers.

Fig.39. Traffic Analysis Zone GIS layer for El Paso TDM



VI.1. Trip generation

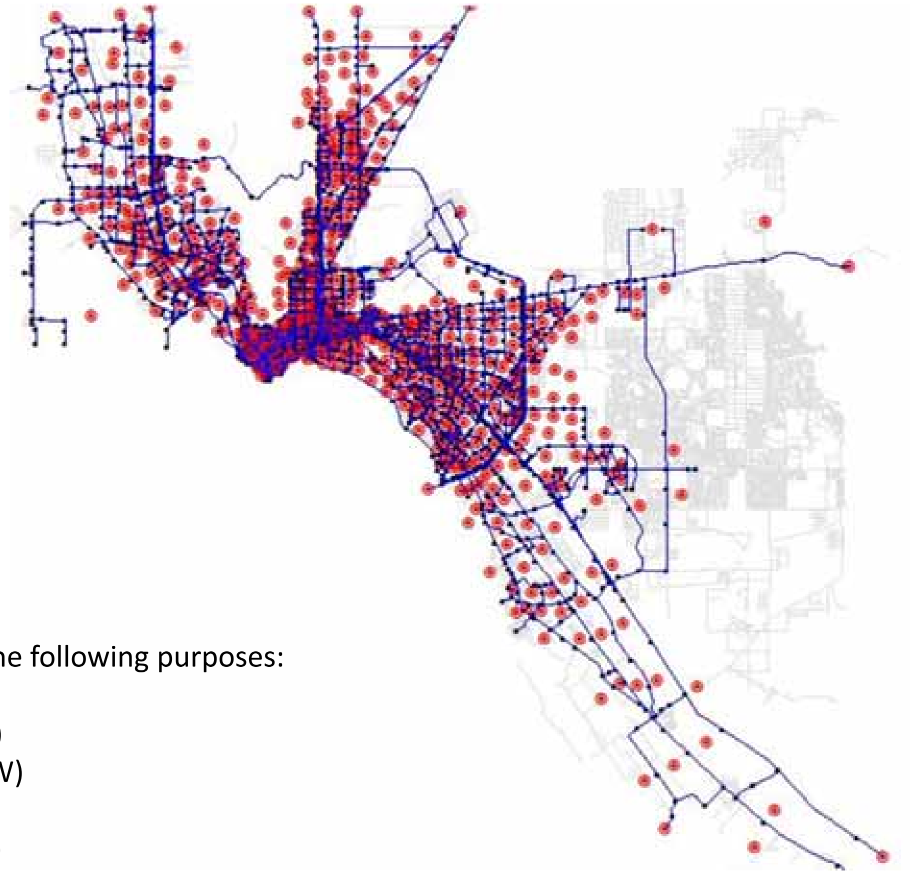


Fig.40. Roadway network GIS layer for El Paso TDM

The official TDM has demographics and network information for years 2002, 2010, 2020, 2025, and 2035. Under the current traffic impact study, intermediate year 2015 demographics were estimated through interpolation from years 2010 and 2020. Furthermore, in order to better capture the impact of the Fort Bliss parcels under study, special TAZs were configured for each of the parcels, as well as their access links to and from the network, as depicted by Figure 40. All the critical intersections identified for evaluation under this study are represented in the network.

Trip Purposes

The official TDM for El Paso has categorized internal trips under the following purposes:

1. Home Based Work trips (HBW)
2. Home Based Non-work trips (HBNW)
3. Non-home Based trips (NHB)
4. Commercial Truck/Taxi trips (TRTX)
5. NHB local trips from external residents (NHB EXLO)
6. External trips (EXT)

Such differentiation of trip purposes allow for a better characterization of travel patterns for the El Paso area. The TDM parameters have been calibrated under these trip purpose categories.

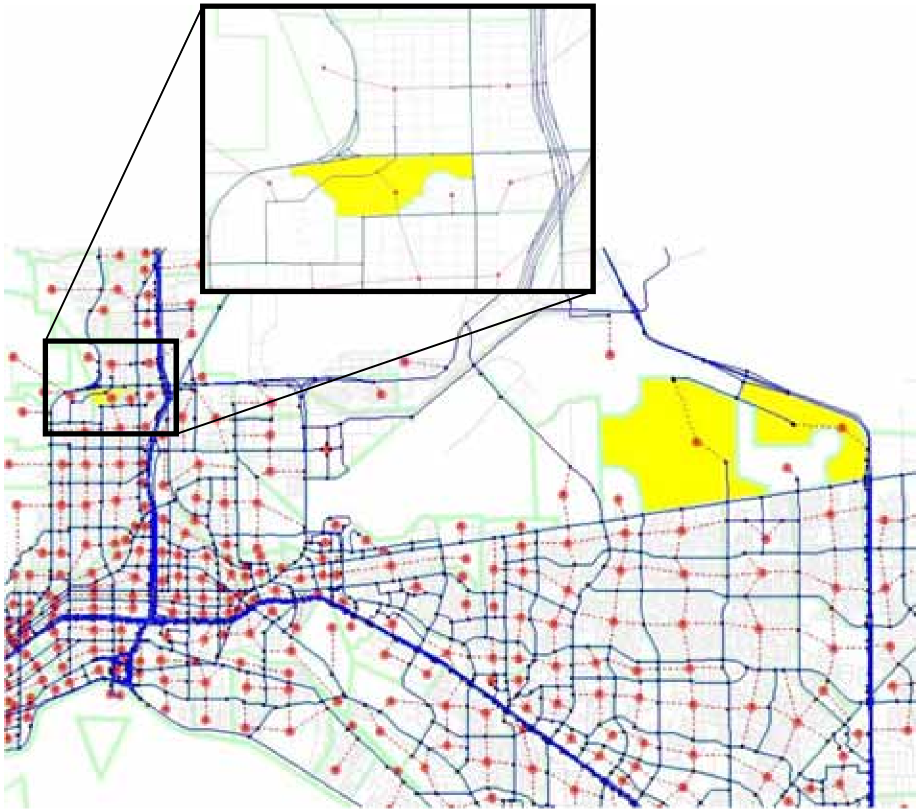
VI.1. Trip generation

Trip Generation TDM component

Trip Generation is the step within the TDM process, which calculates Trip Productions and Trip Attractions for each Traffic Analysis Zone (TAZ). Of the trip purposes used in the El Paso TDM, only HBW, HBNW and NHB trips are generated as person-trips. All other trip purposes are generated as vehicle-trips. Person-trips for HBW, HBNW, and NHB are later converted to vehicle-trips by applying mode shares and vehicle occupancy rates obtained from surveys.

Internal Trip Generation for the El Paso was performed by using Tripcal5. This is a multi-functional, flexible trip generation computer program which estimates trip productions and attractions for multiple trip purposes using various user-specified input data. The Trip Production Model used here is a Two-way Cross-Classification model where TAZ Households are stratified by Median HH Income and HH Size. The Trip Attraction Model is a Cross-Classification Regression Model where TAZ Employment is stratified by Employment Type and Area Type.

Fig.41. TAZ and network access adjusted for parcels A, B, and C.



VI.1. Trip generation

Person Trip Production Rates

NHB, HBW and HBNW person trip production rates were applied on the basis of disaggregated TAZ Households. The calibrated rate table follows:

Table.12. Production rates per household

trip purpose	income level	Household size				
		one	two	three	four	five +
NHB	1	0.91	1.07	1.44	2.05	2.62
	2	1.11	1.31	1.54	2.20	2.66
	3	1.42	1.68	1.89	2.56	3.15
	4	1.95	2.37	2.61	3.39	4.22
	5	2.41	3.07	3.52	4.58	5.81
HBW	1	0.18	0.56	0.78	1.02	1.03
	2	0.38	0.90	1.38	1.67	1.76
	3	0.85	1.28	1.84	2.09	2.02
	4	1.03	1.61	2.39	2.70	2.82
	5	1.31	1.89	2.78	3.09	3.22
HBNW	1	1.46	3.02	4.70	7.60	11.05
	2	2.16	3.34	4.70	7.61	11.09
	3	2.37	3.54	4.71	7.61	11.13
	4	2.81	3.72	4.73	7.62	11.16
	5	3.32	3.86	4.76	7.62	11.18

Income Ranges (in 1994 dollars)

1 = Zero to $5,000
2 = $5,000 to $10,000
3 = $10,000 to $20,000
4 = $20,000 to $35,000
5 = $ 35,000 & over

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VI.1. Trip generation

Person Trip Attraction Rates

NHB, HBW and HBNW person trip attraction rates were applied by trip purpose on the basis of TAZ Employment, which has been stratified by Employment Type and Zonal Area Type. Also included is the person trip attraction rate for Households. The calibrated rate table follows:

Table.13. Attraction Rate per employee

trip purpose	area type	households	employment type		
			basic	retail	service
NHB	CBD	0.35	0.88	4.90	3.80
	CBD Fringe	0.30	0.65	4.00	2.70
	Urban	0.29	0.54	3.80	2.40
	Suburban	0.28	0.48	3.30	1.90
	Rural	0.10	0.20	1.90	0.80
HBW	CBD	0.12	1.55	1.60	1.66
	CBD Fringe	0.12	1.55	1.60	1.66
	Urban	0.12	1.55	1.60	1.66
	Suburban	0.12	1.55	1.60	1.66
	Rural	0.12	1.55	1.60	1.66
HBNW	CBD	0.78	0.33	9.45	3.08
	CBD Fringe	0.80	0.34	9.60	3.10
	Urban	0.84	0.45	12.40	4.50
	Suburban	0.85	0.67	14.60	5.60
	Rural	0.86	0.68	14.70	5.62

ICRC

VI.1. Trip generation

Commercial Truck Model

The El Paso TDM has separate vehicle trips-rates for Truck-Taxi (TRT) purpose; the rates are a function of households and employment type in a TAZ

Table.14. Commercial truck vehicle-trip rates

trip purpose	area type	households	employment type		
			basic	retail	service
TRTX	CBD	0.16	0.34	0.54	0.24
	CBD Fringe	0.17	0.55	1.35	0.49
	Urban	0.18	6.59	1.22	0.24
	Suburban	0.18	1.57	1.37	0.69
	Rural	0.18	1.57	1.37	0.69

External trips

External vehicle trips are those with a trip end outside of the area, or locally made by non-residents visiting the area. These trips are the EXT trips and the NHB EXLO trips. EXT trips are provided by the State Wide models, and the NHB EXLO are estimated as a function of external counts, following the proportion of the NHB trip purpose.

Applying the Trip Generation component

In addition to the interpolation of demographics for year 2015 for all TAZs, the following conditions of full urban development were used for parcels A, B and C (correspondingly TAZs 490, 491, and 161):

Table 15. Demographics estimated for fully developed parcels

FULLY DEVELOPED DEMOGRAPHICS	parcel A (TAZ 490)	parcel B (TAZ 491)	parcel C (TAZ 161)
Population	62,327	6,541	716
Households	19,356	2,031	259
Median household income	$ 30,760	$ 30,760	$ 20,574
Persons per Household	3.22	3.22	2.76
Total # of Employees	4,367	1,945	105
Employees in BASIC sector	910	405	20
Employees in RETAIL sector	1,441	642	30
Employees in SERVICES sector	2,017	898	55

VI.1. Trip generation

Once trip rates were applied and totals balanced by purpose, the final person daily trips from the three parcels resulted as follows:

Table 16. Daily trips generated by parcels A, B, and C

PERSON trips per day

	NHB	HBW	HBNW
parcel A /TAZ 490	7,727	25,478	83,871
parcel B /TAZ 491	2,655	4,114	15,220
parcel C /TAZ 161	429	329	1,007

% auto share	98.29%	97.20%	99.28%
auto occupancy	1.58	1.08	1.66

VEHICLE trips per day

	NHB	HBW	HBNW	TRT	NHEX	EXT	**Total daily**
parcel A /TAZ 490	4,807	22,930	50,161	13,327	4,015	6,667	101,907
parcel B /TAZ 491	1,652	3,702	9,103	3,674	1,380	1,366	20,876
parcel C /TAZ 161	267	296	602	190	223	110	1,688
							124,471

As previously stated, daily person-trips are converted into daily vehicle-trips by applying auto share percentages and vehicle occupancy rates observed and documented for El Paso.

VI.2. Trip distribution

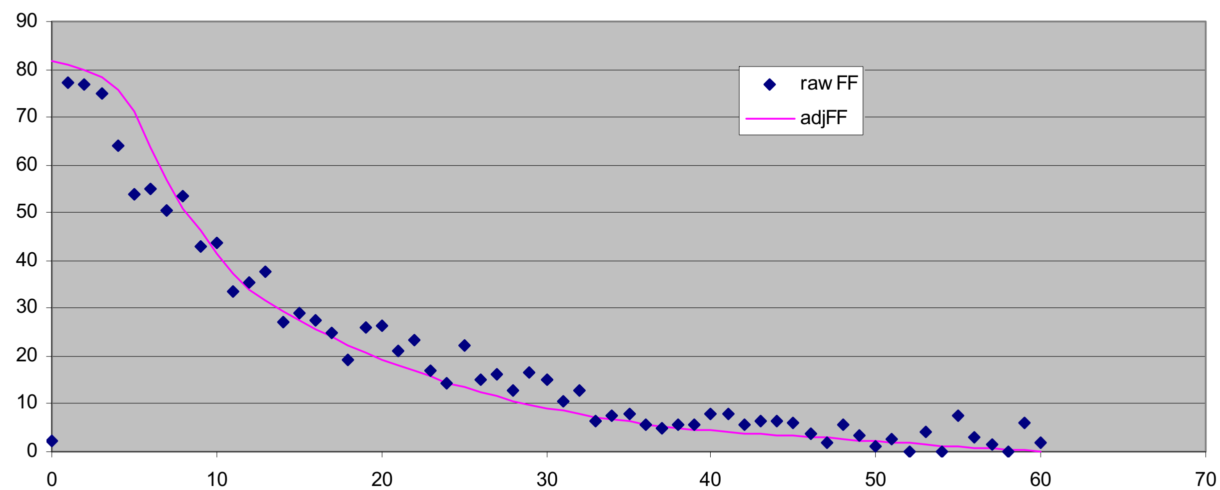
Trip Distribution TDM component

Trip Distribution is the step within the TDM process, which matches trip productions to trip attractions to form trip interchanges among TAZs. The El Paso MPO Trip Distribution process is done using a doubly constrained gravity model, where productions are matched to desired attractions and trip length frequency in an iterative procedure. With the data from the latest travel survey and the TransCAD roadway network, separate gravity models have been calibrated for the HBW, HBNW, NHB, TRTX, and HBN EXLO trip purposes, using the tools available in TransCAD. From the gravity model calibration process, friction factor (FF) functions were obtained for each of the trip purposes.

Friction Factors (FFs)

For the HBW trip purpose the best fit was obtained through hand-smoothing of the FFs. The resulting impedance curve is shown on Figure 42.

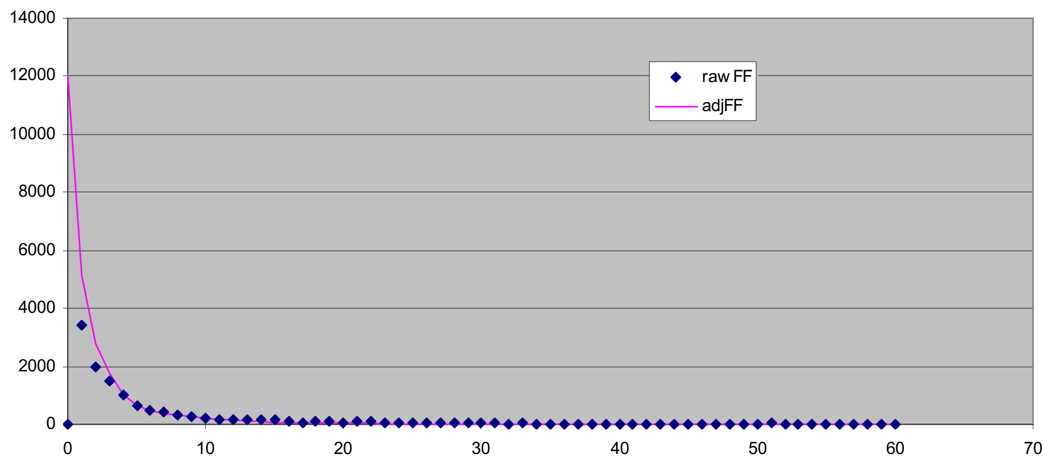
Fig. 42. Daily trips generated by parcels A, B, and C



VI.2. Trip distribution

For the HBNW trip purpose the best fit was also obtained through hand-smoothing of the FFs. The resulting impedance curve is shown on Figure 43.

Fig. 43. Raw FFs and hand-smoothed impedance curve for HBNW trip purpose.



For the NHB trip purpose the best fit was obtained through a negative exponential impedance function. The resulting function is shown as Equation 1.

$$f(t_{ij}) = e^{-0.144485\ t_{ij}} \qquad \text{(eq. 1)}$$

where:

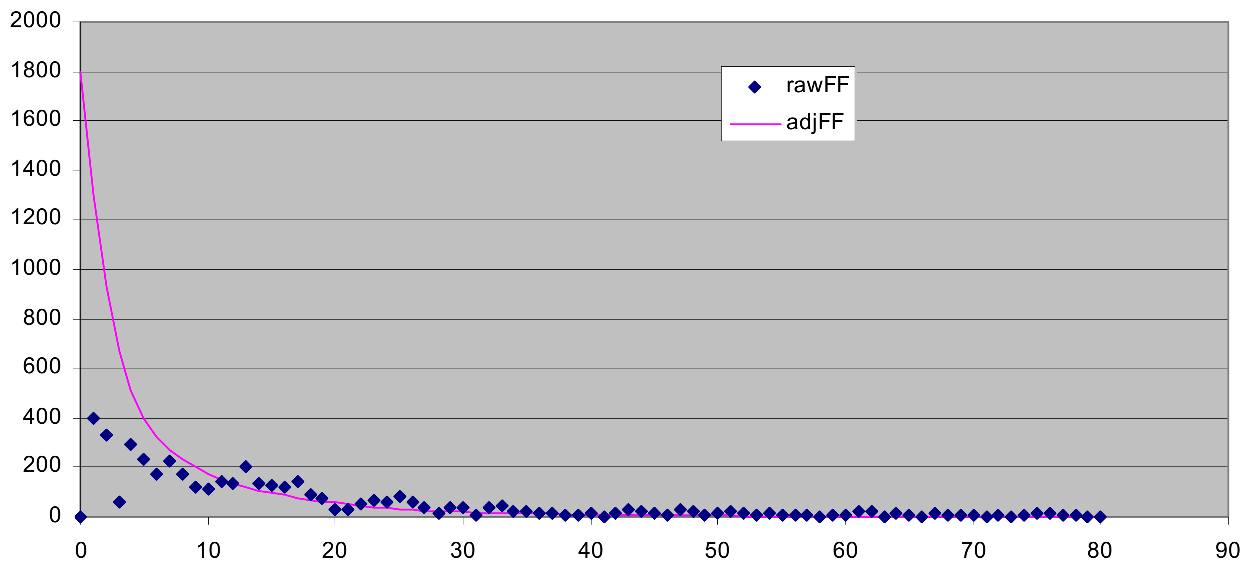
$f(t_{ij})$: friction factor between each i,j pair of zones

t_{ij} : travel time between each i,j pair of zones

VI.2. Trip distribution

For the EXLO trip purpose the best fit was obtained again through hand-smoothing of the FFs. The resulting impedance curve is shown on Figure 44.

Fig. 44. Raw FFs and hand-smoothed impedance curve for EXLO trip purpose.



Based on the commercial vehicle surveys, a gravity model was calibrated as well for the TRT trip purpose. For this trip purpose the best fit was obtained through an inverse power impedance function. The resulting function is shown as equation 2.

$$\mathbf{f}(t_{ij}) = \mathbf{t}_{ij}^{-0.144485} \qquad \textbf{(eq. 2)}$$

where:

$\mathbf{f}(t_{ij})$: friction factor between each i,j pair of zones

$\mathbf{t}_{ij}$: travel time between each i,j pair of zones

VI.2. Trip distribution

The calibrated FFs were used along with the trip generation tables (TAZ productions and attractions) by trip purpose, and roadway network skims (zone-to-zone travel times) to obtain Production-Attraction matrices. By making these matrices symmetric to their diagonal vector, Origin-Destination matrices were obtained.
All the matrices show 24-hour travel between OD pairs. The final step requires converting the 24-hour traffic flows into AM and PAM peak hour traffic.

IV. Network loading for 2015 peak hours

Converting 2015 daily trips into 2015 peak hour trips, required establishing the peak hour proportion of trips (both AM and PM) compared to the entire day traffic, as well as the directionality proportion of trips entering and exiting each of the Fort Bliss parcels.

Based on the latest set of travel surveys in El Paso, the AM and PM peak motor-vehicle traffic, each roughly represents about 9% of the daily traffic. Regarding directionality, based on the proportion of resident and employees estimated at each of the Fort Bliss parcels, it was established that for the AM peak hour traffic, 65% of trips would exit the parcels while 35% will enter the parcels; for the PM peak hour traffic this directionality proportion would reverse.

<u>Scenarios for peak hour traffic assignment to the network</u>
Once established the adjustment factors, the OD matrix trips for parcels A, B, and C (TAZes 490, 491, and 161) where isolated and multiplied by the factors, therefore creating separate AM and PM peak hour matrices for each parcel development:

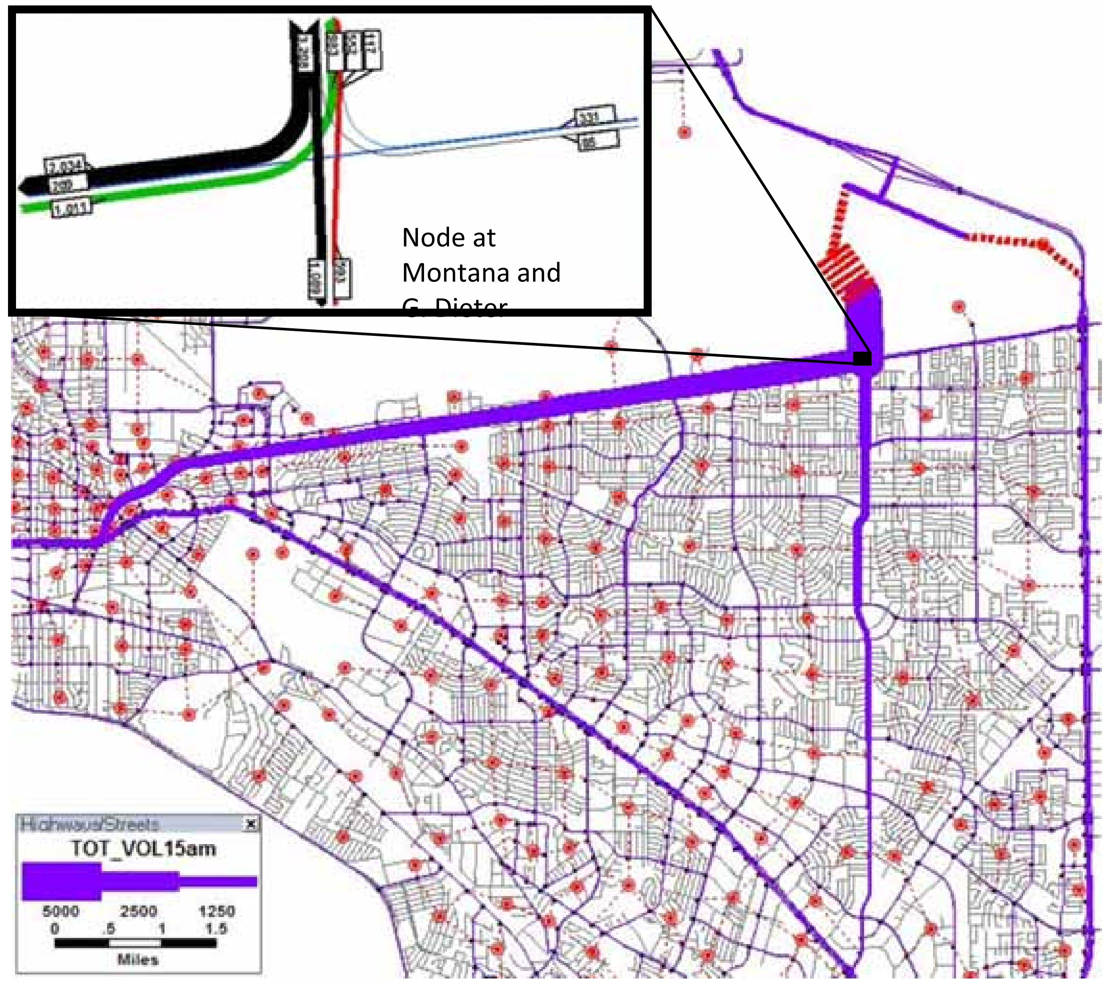
- Development of parcels A and B combined
- Development of parcel C

VI.2. Trip distribution

The peak hour matrices for each of the scenarios were assigned to the 2015 networks, using an All-or-Nothing algorithm. Figure 45 shows an example of the resulting AM assignment for combined A and B parcels.

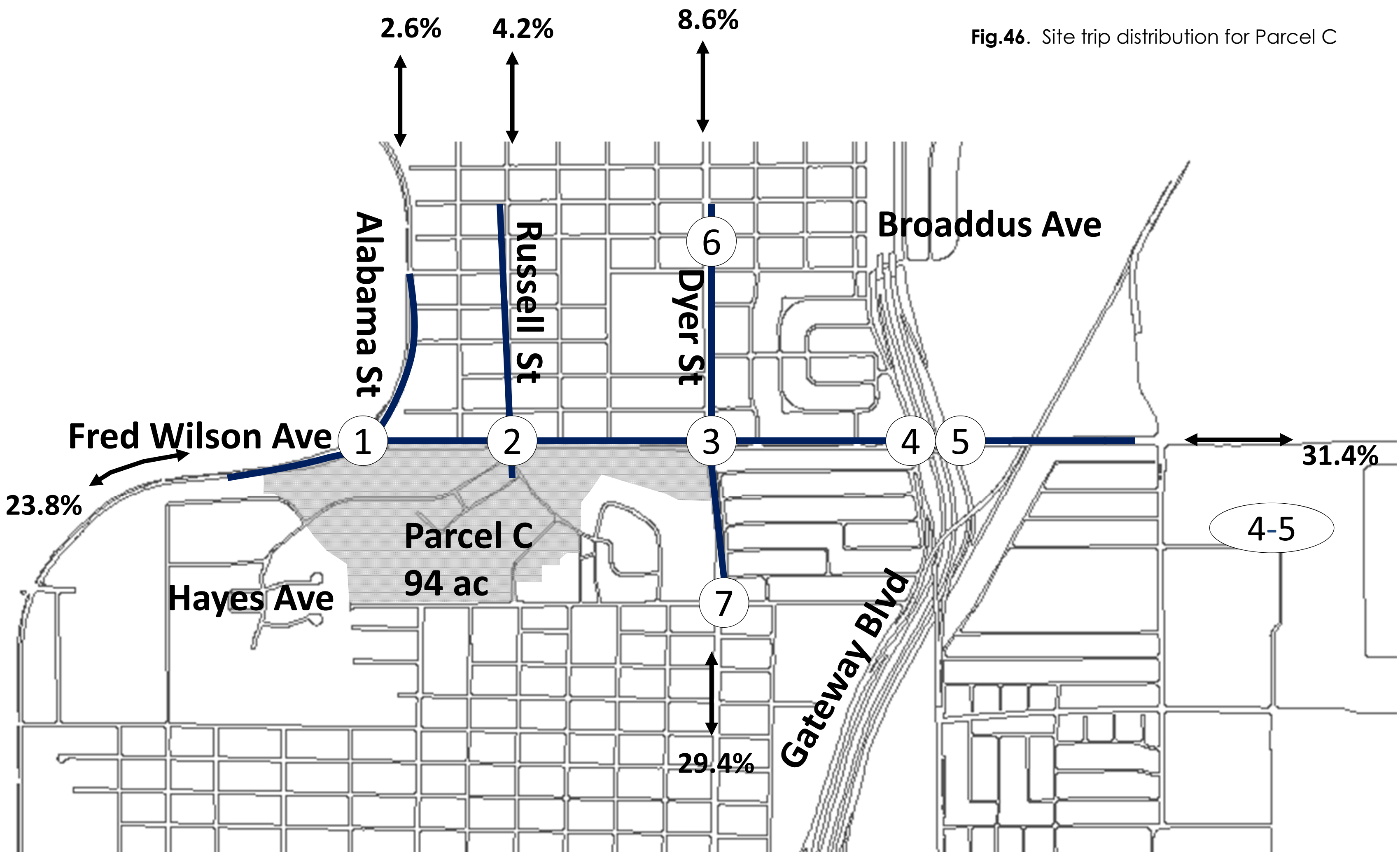
The directional peak flow graphs were obtained for each of the critical intersections; these flows were added to the existing peak hour traffic and growth, for further micro-simulation and level-of-service evaluation for year 2015.

Fig.45. Example of AM traffic assigned, generated by parcels A and B combined



VI.2. Trip distribution

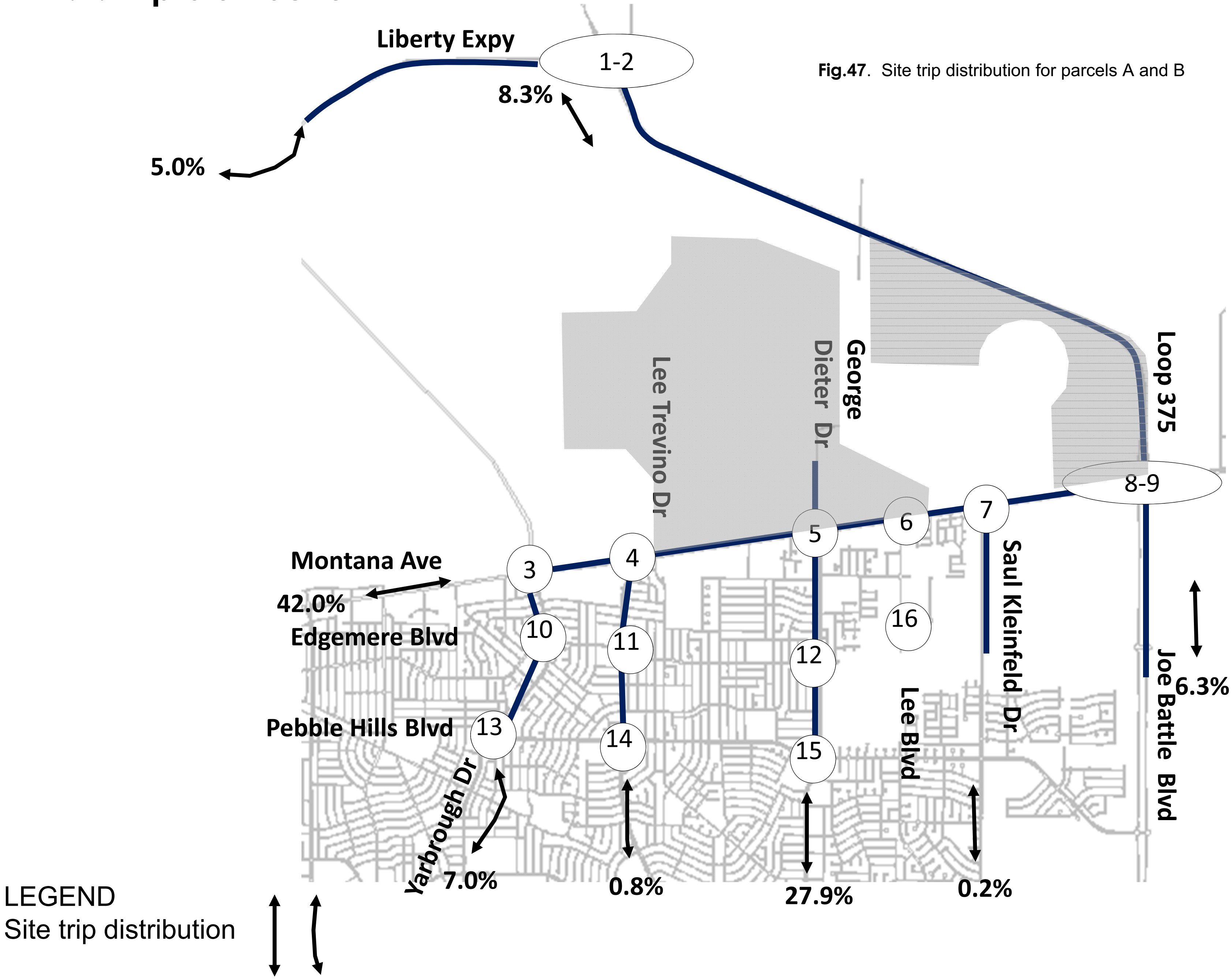
Fig.46. Site trip distribution for Parcel C



LEGEND
Site trip distribution

VI.2. Trip distribution

Fig.47. Site trip distribution for parcels A and B



VI.3. Trip assignment-turning movements for each intersection

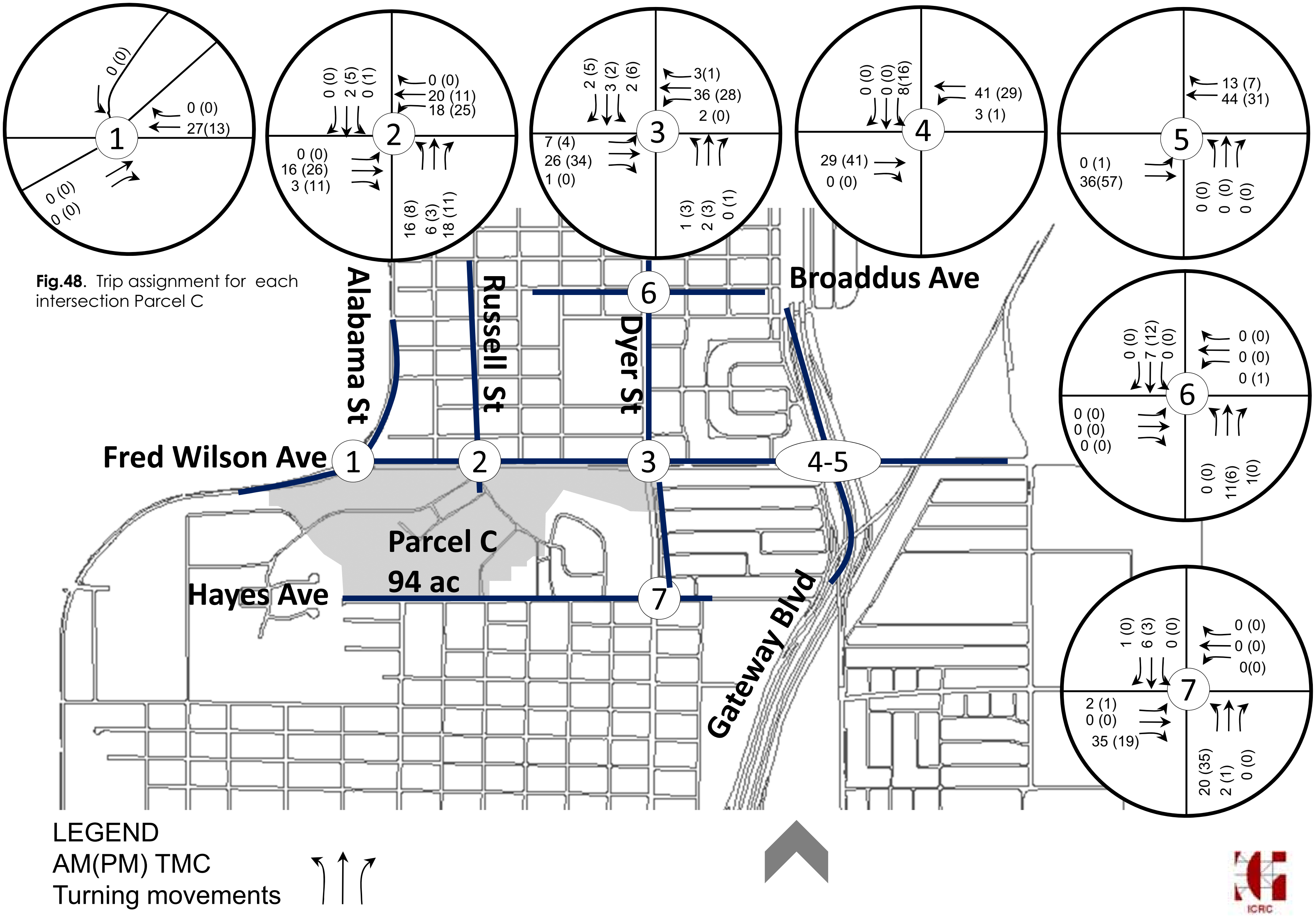


Fig.48. Trip assignment for each intersection Parcel C

VI.3. Trip assignment-turning movements for each intersection

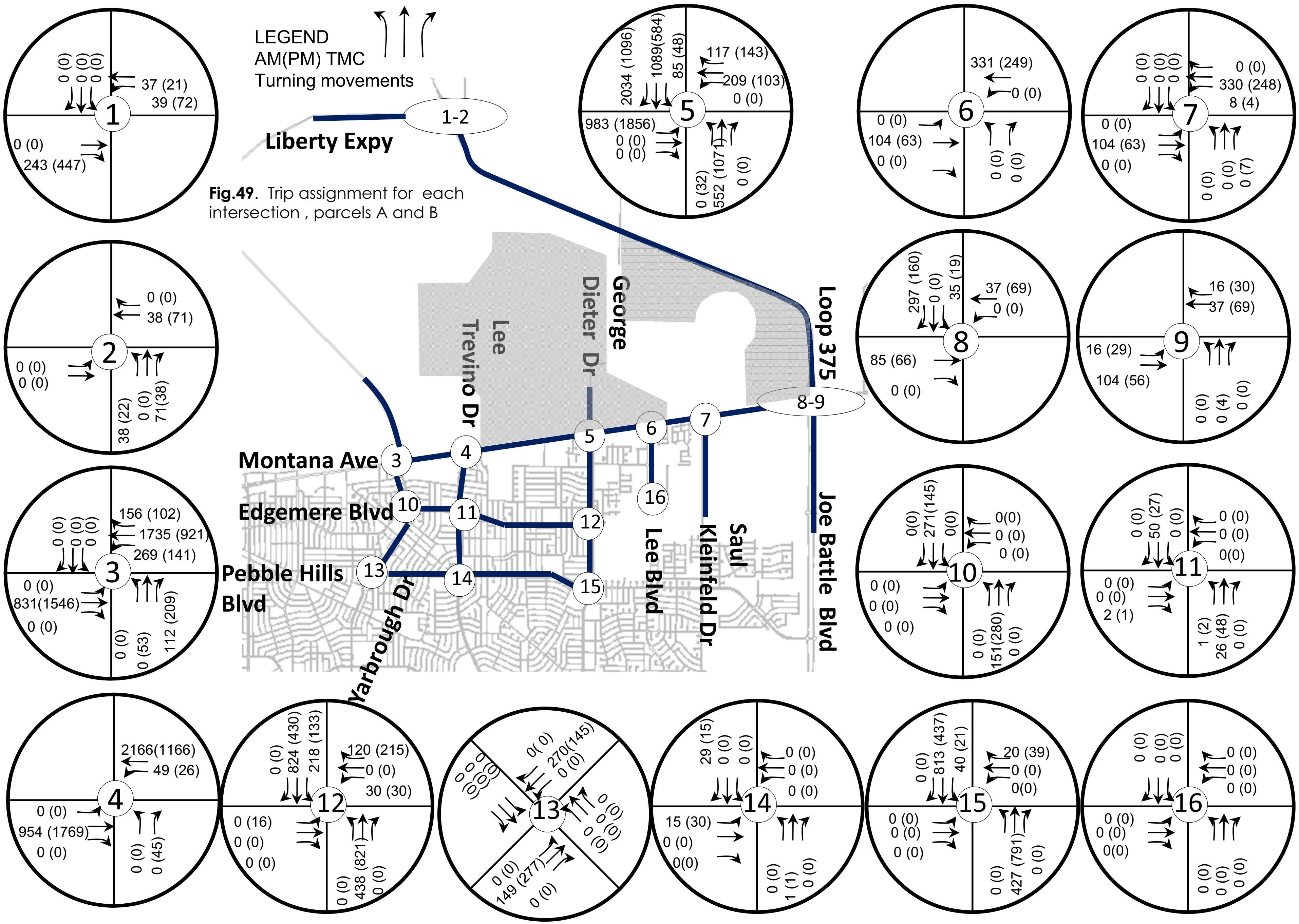
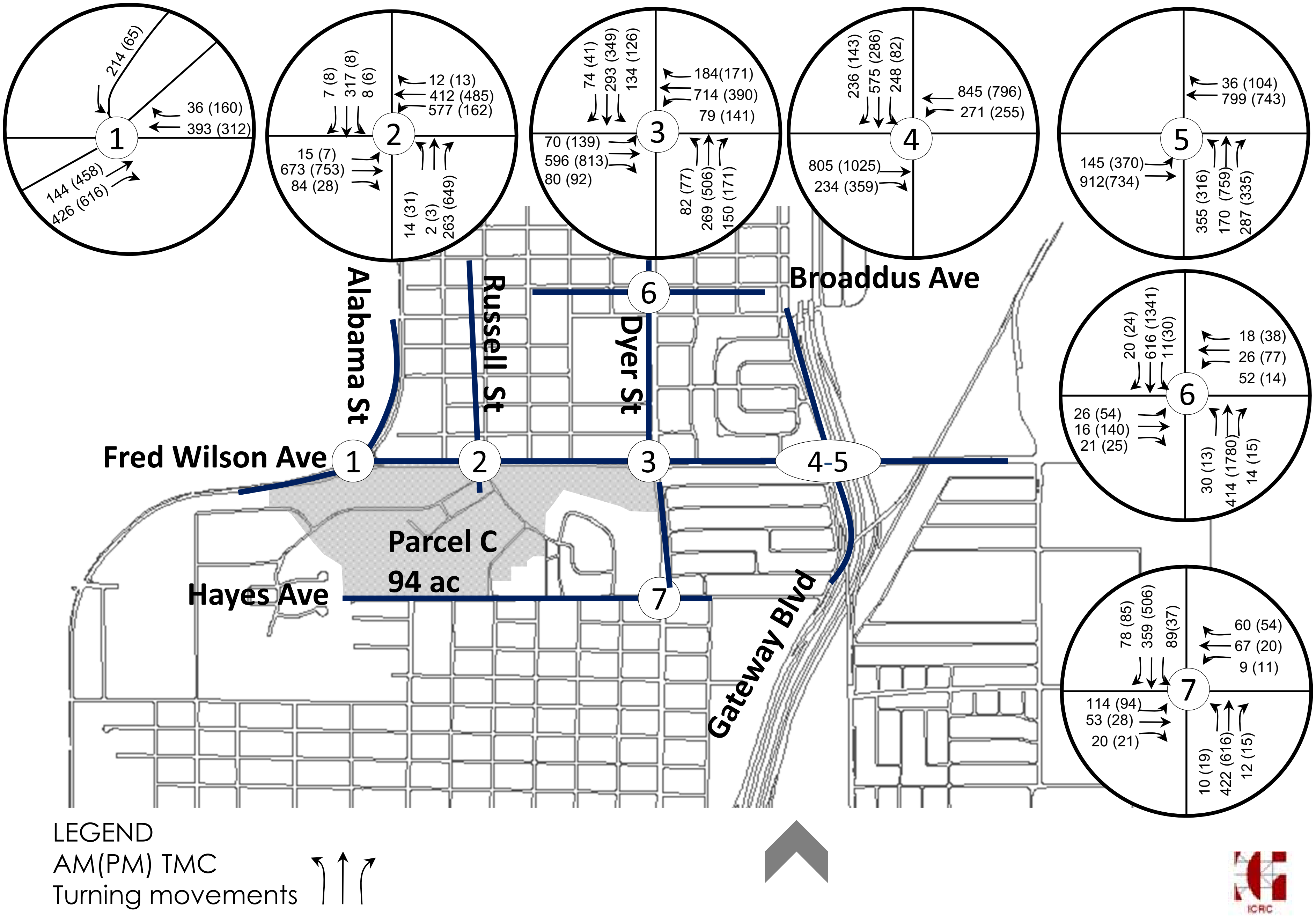


Fig.49. Trip assignment for each intersection , parcels A and B

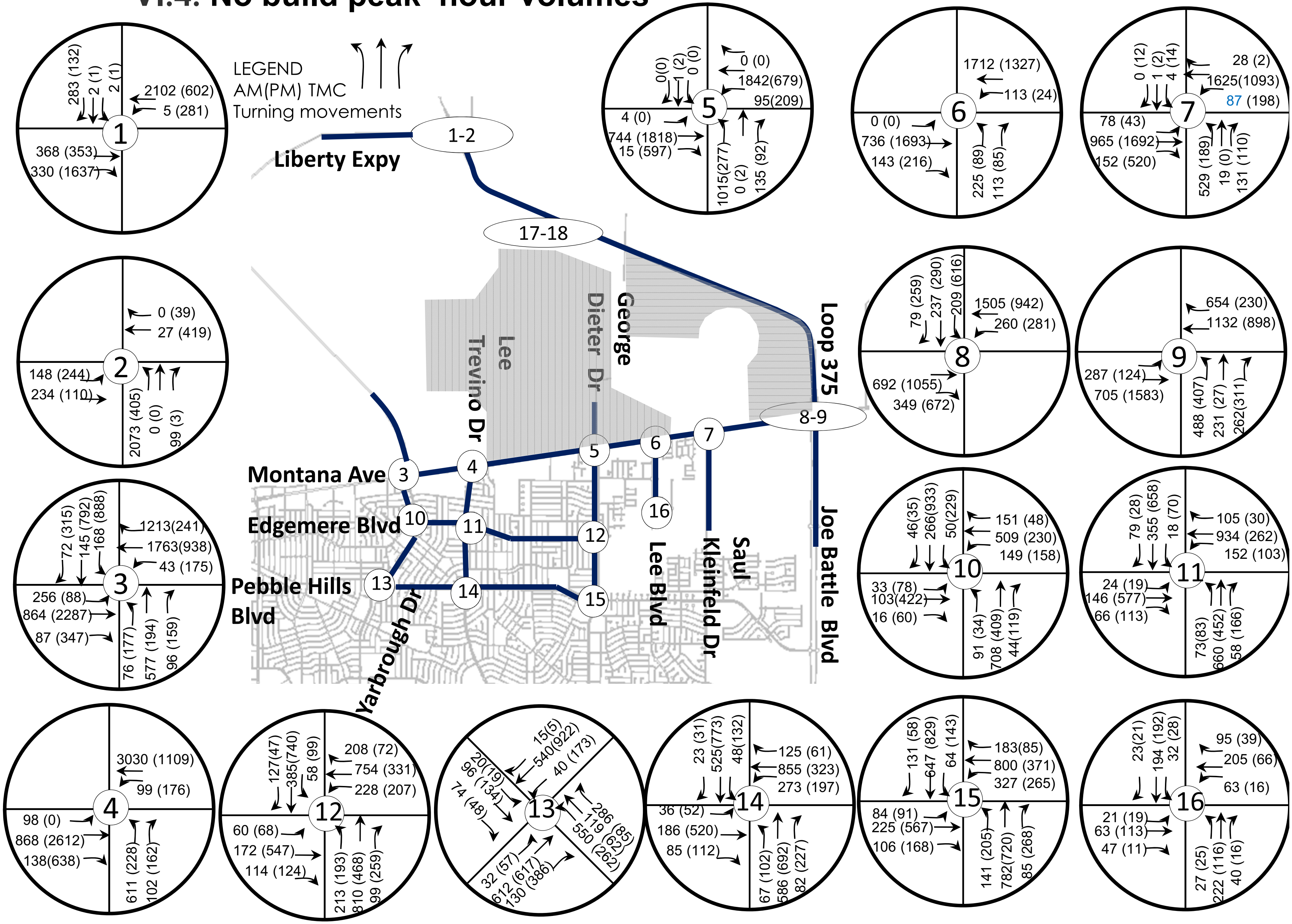
VI.4. No build peak–hour volumes

Fig.50. No build peak-hour volumes Parcel C in 2015



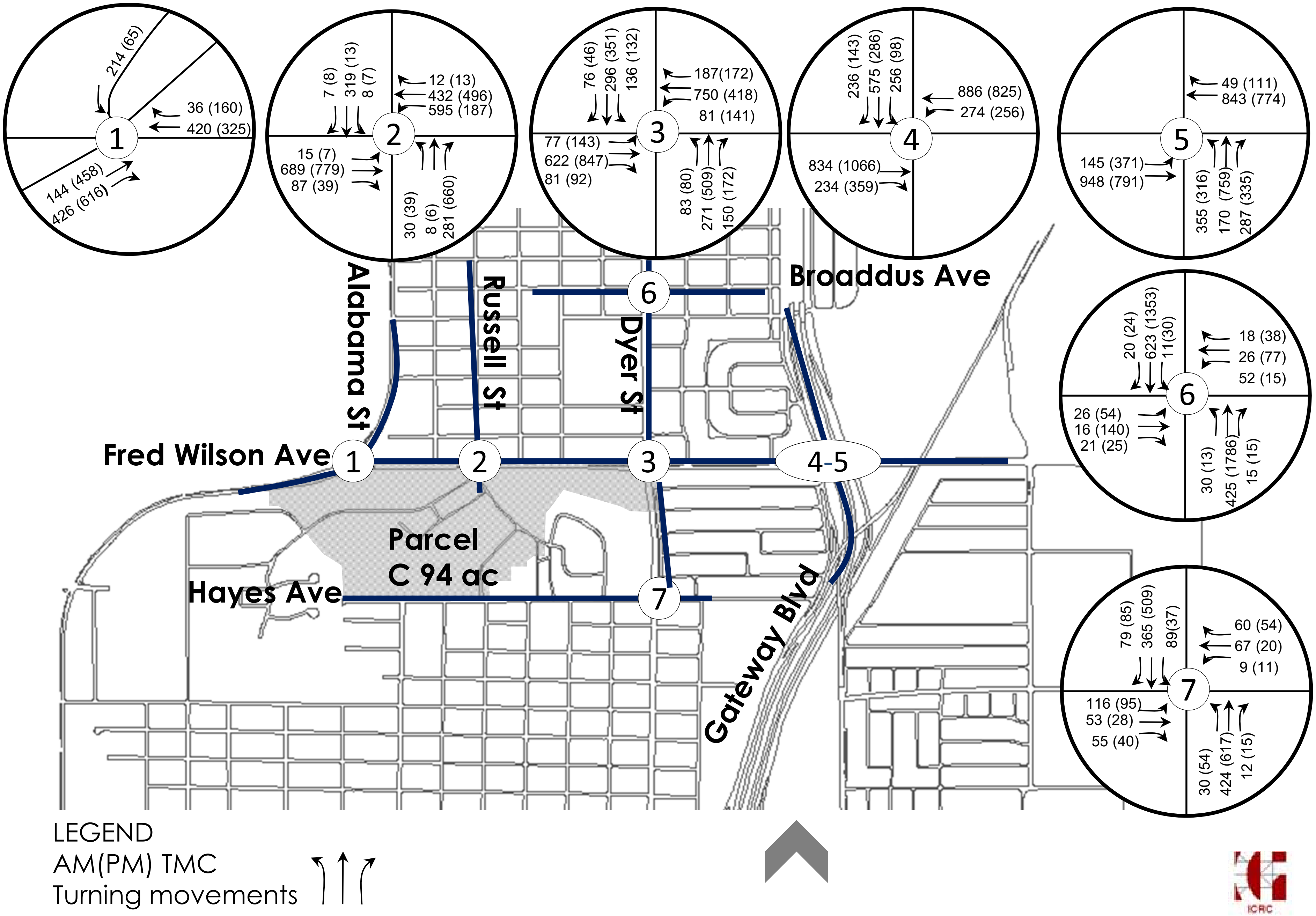
VI.4. No build peak–hour volumes

Fig.51. No build peak-hour volumes parcels A and B in 2015



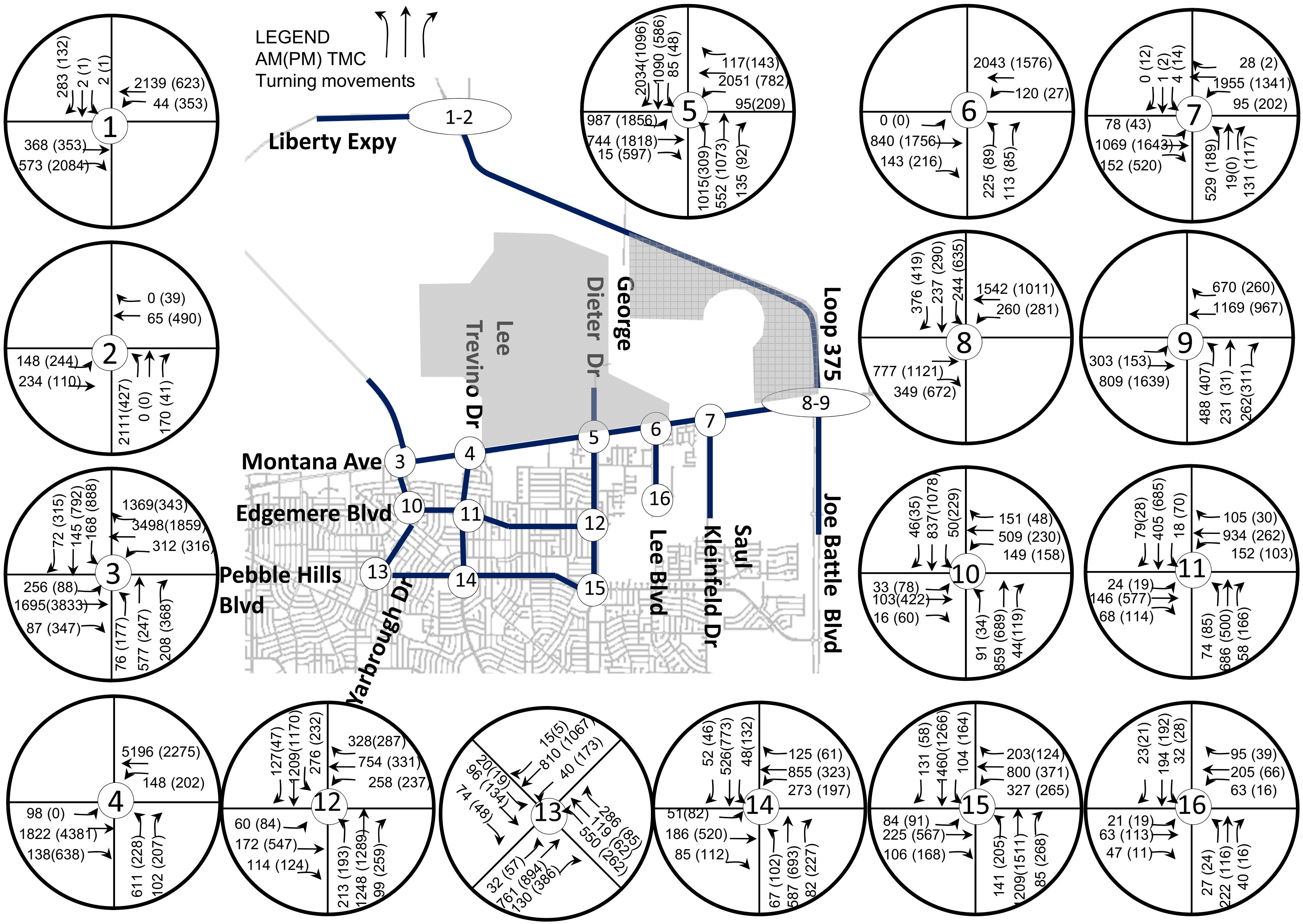
VI.5. Full build peak–hour volumes

Fig.52. Full build peak-hour volumes Parcel C in 2015



VI.5. Full build peak–hour volumes

Fig.53. Full build peak-hour volumes parcels A and B in 2015



VII. FULL BUILD SCENARIO 2015

The do-nothing scenario adds development impacts, projected city growth in 2015 and planned infrastructure, but keeps the present network and intersections configuration. This scenario lowers the levels of service to the following figures (in percentage of total area intersections) :

- A+B= 33% AM and 33.3% PM with LOS E and F
- C only= 14% AM and 28% PM with LOS E and F

Main traffic impacts are generated by the Parcel A development. In this scenario, access and connections to development sites was based on the following considerations:

A) Access to Parcel A at two points: 1) North via a connecting road near the El Paso Community College campus and the replacement hospital to a new interchange on Loop 375 and; 2) South along a road connecting to Montana Avenue opposite George Dieter Drive.

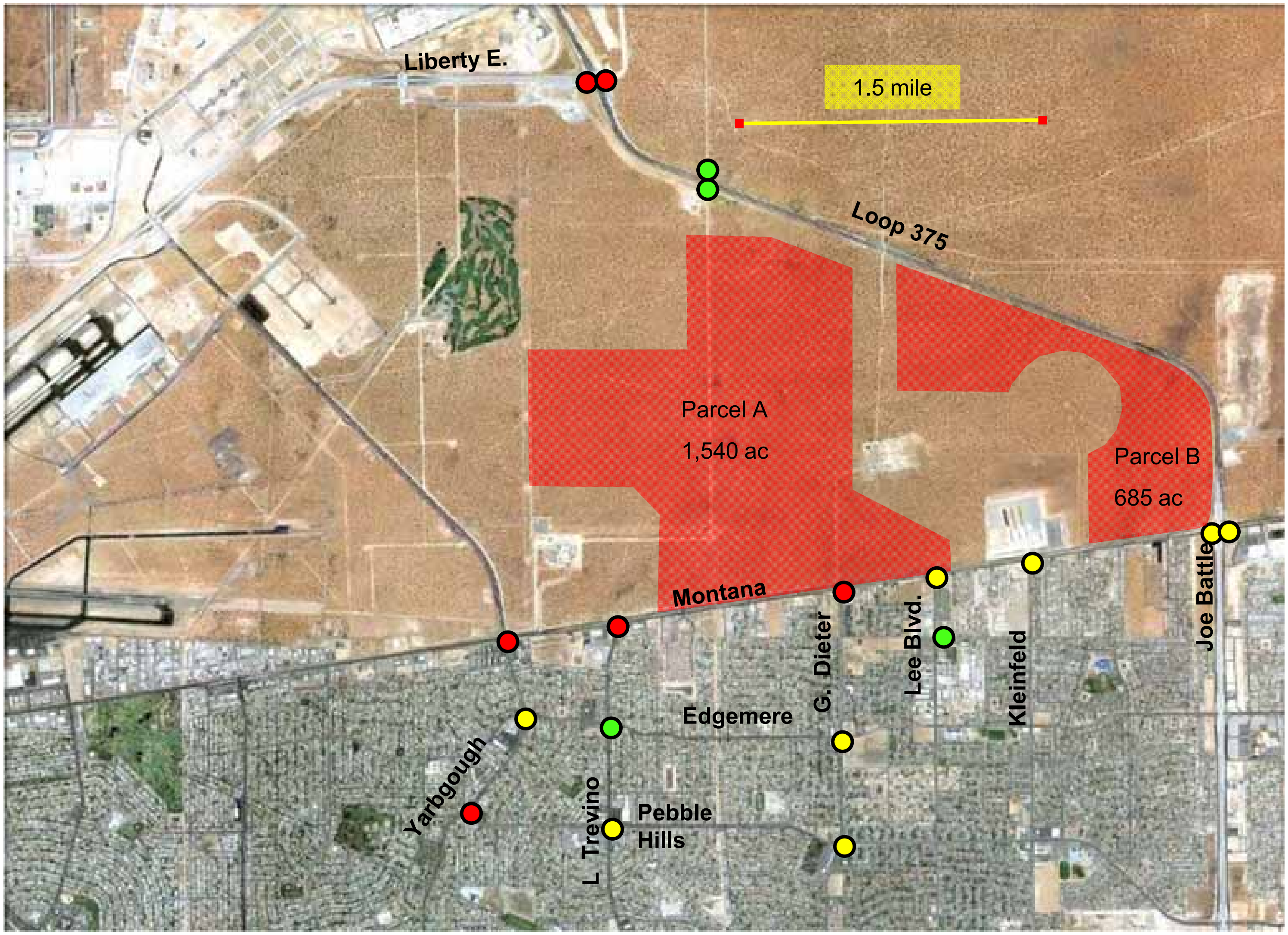
B) Access to The Lower Beaumont parcel from several points: 1) On the north from Fred Wilson Road; 2) On the west through William Beaumont Army Medical Center; and 3) On the south along Hayes Road

Micro-simulation results for each intersection are shown in the attached Synchro files (**attachment 3**).

VII.1. Summary of 2015 Full build scenario. Parcels A and B

Fig.54. Parcels A and B in 2015 do nothing scenario. AM levels of service

Southeast Bliss (Parcel A) and Texas General Land Office (Parcel B)



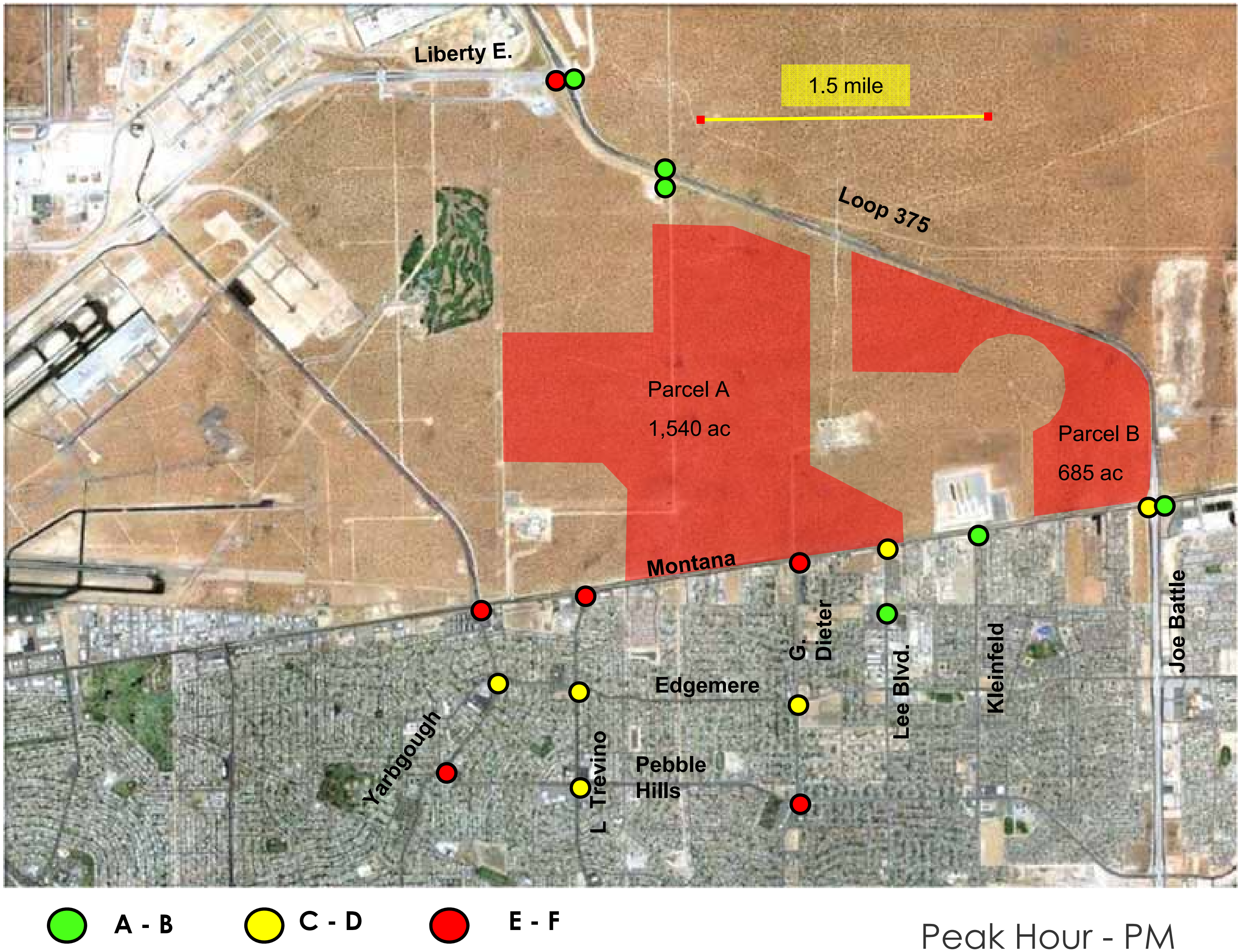
A - B
C - D
E - F

Peak Hour - AM

VII.1. Summary of 2015 Full build scenario. Parcels A and B

Fig.55. Parcels A and B in 2015 do nothing scenario. PM levels of service

Southeast Bliss (Parcel A) and Texas General Land Office (Parcel B)



Peak Hour - PM

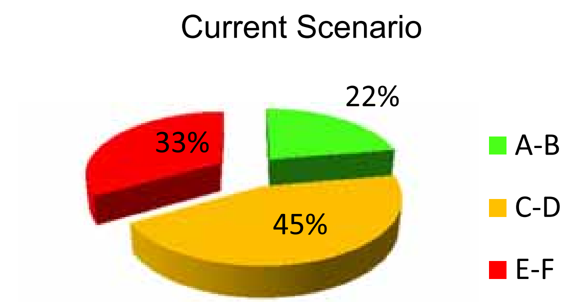
VII.1. Summary of 2015 Full build scenario. Parcels A and B

Fig.56. Parcels A and B in 2015 do nothing scenario. AM and PM levels of service

Summary AM

A - B	(4)	22%
C - D	(8)	45%
E - F	(6)	33%
Total	**(18)**	**100%**

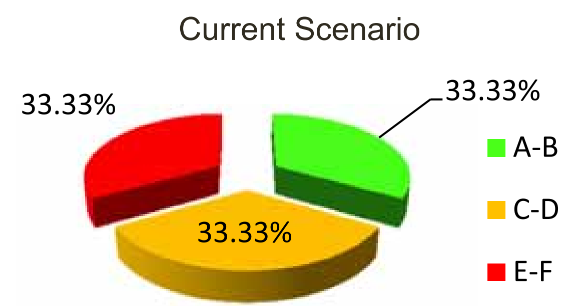
→ → → → →



Summary PM

A - B	(6)	33.33%
C - D	(6)	33.33%
E - F	(6)	33.33%
Total	**(18)**	**100%**

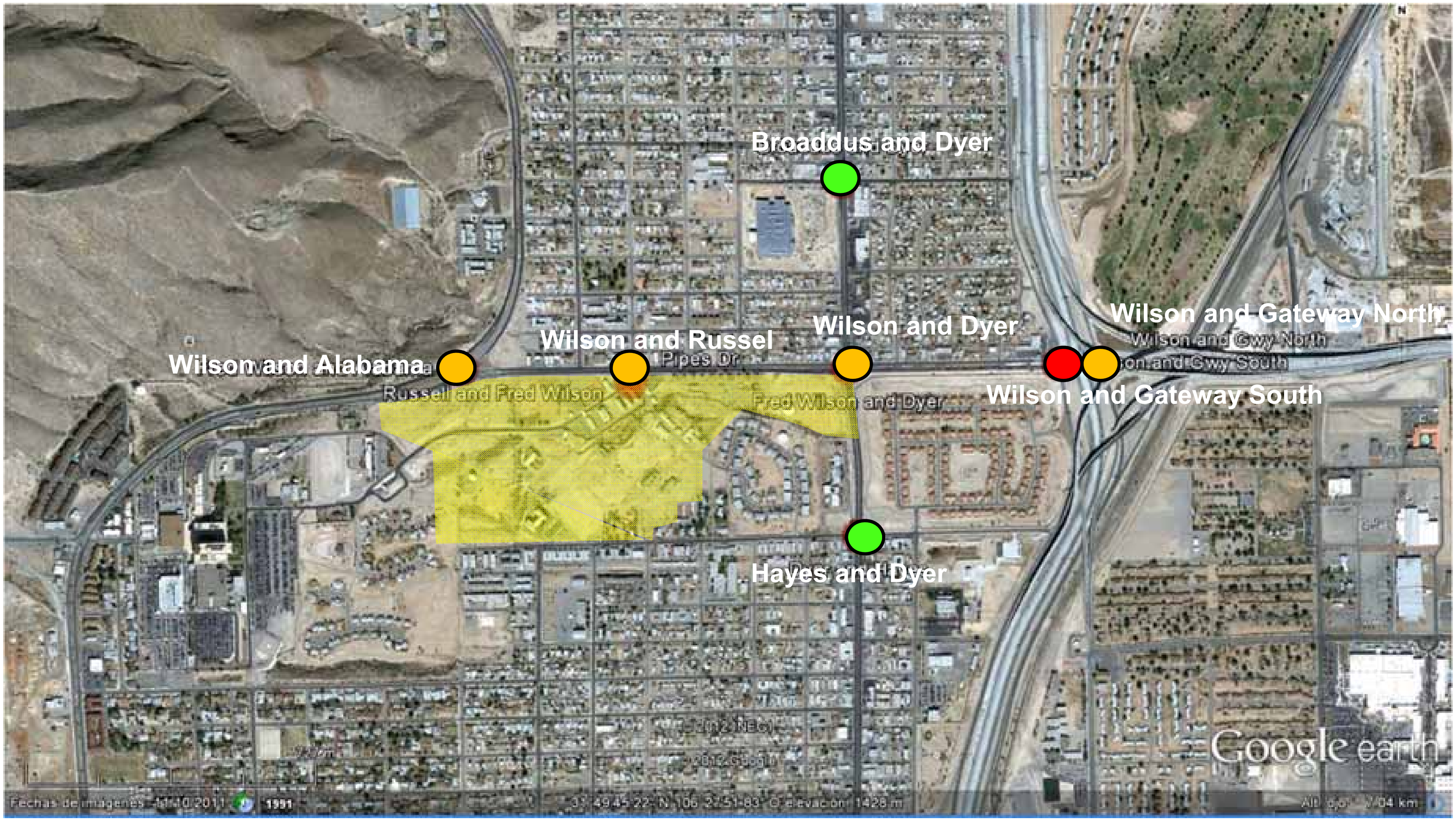
→ → → → →



VII.2. Summary of 2015 Full build scenario. Parcel C

Fig.57. Parcel C in 2015 do nothing scenario. AM levels of service

Lower Beaumont- Parcel C



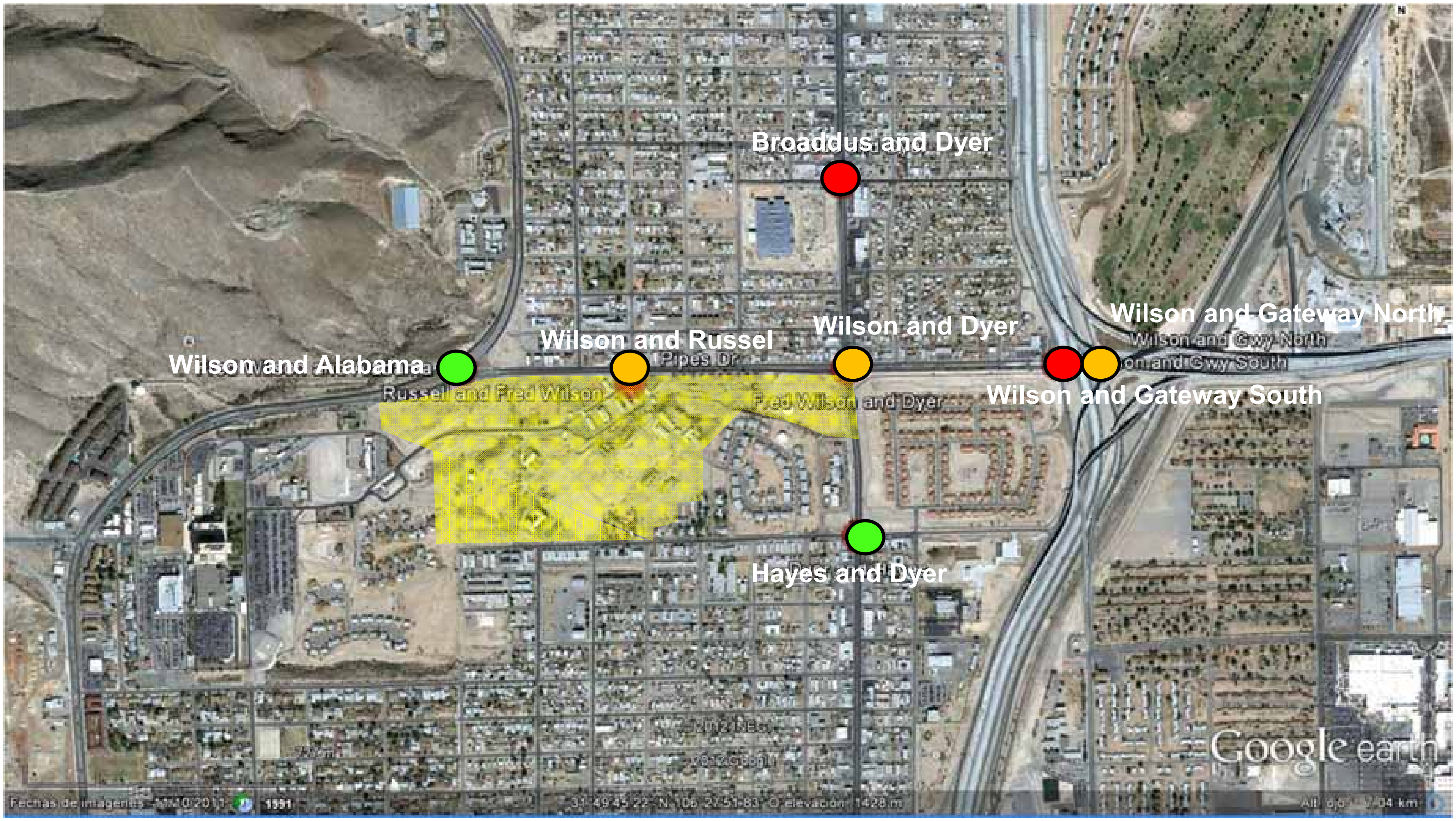
A - B C - D E - F

Peak Hour - AM

VII.2. Summary of 2015 Full build scenario. Parcel C

Fig.58. Parcel C in 2015 do nothing scenario. PM levels of service

Lower Beaumont- Parcel C



A - B
C - D
E - F

Peak Hour - PM

ICRC

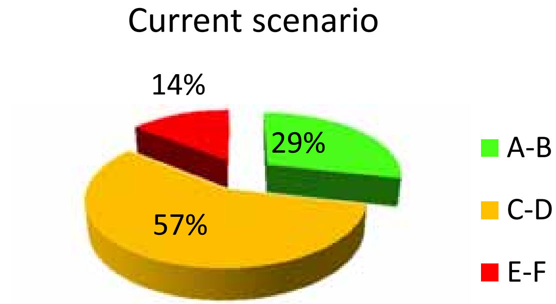
VII.2. Summary of 2015 Full build scenario. Parcel C

Fig.59. Parcel C in 2015 do nothing scenario. AM and PM levels of service

Summary Current AM

A - B	(2)	29%
C - D	(4)	57%
E - F	(1)	14%
Total	**(7)**	**100%**

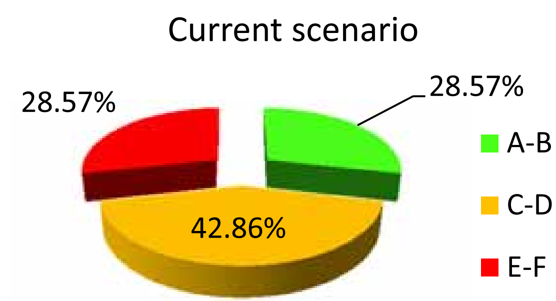
→ → → → →



Summary Current PM

A - B	(2)	42.46%
C - D	(3)	28.57%
E - F	(2)	28.57%
Total	**(7)**	**100%**

→ → → → →



VII.3. Levels of Service Summary. Full build scenario

Table 17. Levels of service and delays for do-nothing scenario- AM Peak hour.

	Intersection		(2015) DO NOTHING (AM - LOS and Delay)			
			Parcels A and B		Parcel C	
			LOS	*Delay*	*LOS*	*Delay*
Parcel AB	Loop 375 (Southbound)	Liberty Expressway (spur 601)	E	79.5		
	Loop 375 (Northbound)	Liberty Expressway (spur 601)	F	179.1		
	Loop 375 (Southbound)	Montana Ave	C	26.3		
	Loop 375 (Northbound)	Montana Ave	C	21.5		
	Saul Kleinfeld	Montana Ave	C	32.4		
	George Dieter	Montana Ave	F	2360.1		
	Lee Trevino	Montana Ave	F	189.7		
	Global Reach (Yarbrough)	Montana Ave	F	170.8		
	Lee Blvd	Montana Ave	D	44.9		
	Edgemere	Yarbrough	C	23.2		
	Edgemere	Lee Trevino	B	15.1		
	Edgemere	George Dieter	D	51.4		
	Pebble Hills	Yarbrough	F	524.2		
	Pebble Hills	Lee Trevino	C	32.7		
	Pebble Hills	George Dieter	D	52.7		
	Turner	Lee	B	10.7		
	New avenue (A)	Montana Ave	NOT APPLICABLE			
	New avenue (B)	Montana Ave				
	Loop 375 (Eastbound)		A	2.4		
	Loop 375 (Westbound)		A	5.9		
Parcel C	Fred Wilson	Gateway (Northbound)			C	23.1
	Fred Wilson	Gateway (Southbound)			E	62.2
	Dyer	Hayes			B	12.3
	Dyer	Broaddus			A	6
	Fred Wilson	Pipes (Russell)			D	49.9
	Fred Wilson	Dyer			C	33.6
	Fred Wilson	Alabama			C	20.5
	Fred Wilson	**Lackland**			NOT APPLICABLE	
	Hayes	**Eastman**				

VII.3. Levels of Service Summary. Full build scenario

Table 18. Levels of service and delays for do-nothing scenario- PM Peak hour.

	Intersection		(2015) DO NOTHING (PM - LOS and Delay)			
			Parcels A and B		Parcel C	
			LOS	*Delay*	*LOS*	*Delay*
Parcel AB	Loop 375 (Southbound)	Liberty Expressway (Spur 601)	F	130.5		
Parcel AB	Loop 375 (Northbound)	Liberty Expressway (Spur 601)	B	16.1		
Parcel AB	Loop 375 (Southbound)	Montana Ave	D	43.3		
Parcel AB	Loop 375 (Northbound)	Montana Ave	B	19.4		
Parcel AB	Saul Kleinfeld	Montana Ave	B	19.7		
Parcel AB	George Dieter	Montana Ave	F	889.9		
Parcel AB	Lee Trevino	Montana Ave	F	254.7		
Parcel AB	Global Reach (Yarbrough)	Montana Ave	F	244.3		
Parcel AB	Lee Blvd	Montana Ave	C	28.9		
Parcel AB	Edgemere	Yarbrough	C	25.2		
Parcel AB	Edgemere	Lee Trevino	C	29.7		
Parcel AB	Edgemere	George Dieter	D	49.2		
Parcel AB	Pebble Hills	Yarbrough	F	493.8		
Parcel AB	Pebble Hills	Lee Trevino	D	36.7		
Parcel AB	Pebble Hills	George Dieter	F	91.3		
Parcel AB	Turner	Lee	A	8.4		
	New avenue (A)	Montana Ave	NOT APPLICABLE			
	New avenue (B)	Montana Ave				
	Loop 375 (Eastbound)		A	4.6		
	Loop 375 (Westbound)		A	8.6		
Parcel C	Fred Wilson	Gateway (Northbound)			C	26.2
Parcel C	Fred Wilson	Gateway (Southbound)			F	127.7
Parcel C	Dayer	Hayes			A	8.5
Parcel C	Dayer	Broaddus			F	93
Parcel C	Fred Wilson	Pipes (Russell)			C	23.1
Parcel C	Fred Wilson	Dyer			C	34.6
Parcel C	Fred Wilson	Alabama			B	13.8
Parcel C	Fred Wilson	Lackland			NOT APPLICABLE	
Parcel C	Hayes	Eastman				

VII.4. Arterial Levels of Service. Full build scenario

Table 19. Arterial levels of service for full build do-nothing scenario Parcels A and B

Do Nothing AM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	I	55	13.0	40.0	53.0	0.13	9.1	F
Lee Trevino	I	55	38.6	25.9	64.5	0.59	32.9	C
G. Dieter	I	55	79.1	9.9	89.0	1.21	48.9	A
Lee Blvd	I	55	36.7	38.2	74.9	0.50	24.2	D
Kleinfeld	I	55	37.6	5.7	43.3	0.52	42.8	A
Joe Battle	I	55	64.5	29.6	94.1	0.99	37.7	B
Joe Battle	I	55	5.6	1.5	7.1	0.06	29.1	C
Total	I		275.1	150.8	425.9	3.99	33.7	C

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle	I	55	19.8	39.0	58.8	0.20	12.5	F
Joe Battle	I	55	5.6	7.8	13.4	0.06	15.4	F
Kleinfeld	I	55	64.5	29.2	93.7	0.99	37.9	B
Lee Blvd	I	55	37.6	51.0	88.6	0.52	20.9	E
G. Dieter	I	55	36.7	87.4	124.1	0.50	14.6	F
Lee Trevino	I	55	79.1	261.4	340.5	1.21	12.8	F
Yarbrough	I	55	38.6	227.4	266.0	0.59	8.0	F
Total	I		281.9	703.2	985.1	4.06	14.8	F

Do Nothing PM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	I	55	27.5	311.3	338.8	0.30	3.2	F
Lee Trevino	I	55	38.5	455.7	494.2	0.59	4.3	F
G. Dieter	I	55	79.1	17.4	96.5	1.21	45.1	A
Lee Blvd	I	55	36.7	1.6	38.3	0.50	47.2	A
Kleinfeld	I	55	37.6	13.3	50.9	0.51	36.4	B
Loop 375	I	55	64.5	34.7	99.2	0.99	35.8	B
Loop 375	I	55	5.6	4.8	10.4	0.06	19.9	E
Total	I		289.5	838.8	1128.3	4.16	13.3	F

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Loop 375	I	55	19.8	32.0	51.8	0.20	14.2	F
Loop 375	I	55	5.6	1.7	7.3	0.06	28.3	C
Kleinfeld	I	55	64.5	19.8	84.3	0.99	42.1	A
Lee Blvd	I	55	37.6	62.0	99.6	0.51	18.6	E
G. Dieter	I	55	36.7	23.8	60.5	0.50	29.9	C
Lee Trevino	I	55	79.1	0.9	80.0	1.21	54.4	A
Yarbrough	I	55	38.5	21.2	59.7	0.59	35.5	B
Total	I		281.8	161.4	443.2	4.06	33.0	C

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VII.4. Arterial Levels of Service. Full build scenario

Table 20. Arterial levels of service for full build do-nothing scenario Parcel C

Do Nothing AM

Arterial Level of Service: NB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
HAYES	III	31	9.0	8.0	17.0	0.06	12.2	E
WILSON	III	31	36.2	23.2	59.4	0.28	17.3	D
BROADDUS	III	31	40.1	4.6	44.7	0.32	25.4	B
Total	III		85.3	35.8	121.1	0.66	19.6	C

Arterial Level of Service: SB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BROADDUS	III	31	14.8	4.9	19.7	0.11	19.2	C
WILSON	III	31	40.1	25.2	65.3	0.32	17.4	D
HAYES	III	31	36.2	7.2	43.4	0.28	23.6	C
Total	III		91.1	37.3	128.4	0.71	19.8	C

Arterial Level of Service: EB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
RUSSELL	II	40	29.6	29.2	58.8	0.27	16.5	E
DYER	II	40	35.5	33.9	69.4	0.36	18.6	D
GWY S	II	40	36.3	163.3	199.6	0.37	6.6	F
GWY N	II	40	8.2	4.9	13.1	0.07	19.6	D
Total	II		109.6	231.3	340.9	1.07	11.3	F

Arterial Level of Service: WB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GWY N	II	40	17.2	44.6	61.8	0.15	8.7	F
GWY S	II	40	8.2	2.9	11.1	0.07	23.1	C
DYER	II	40	36.3	48.2	84.5	0.37	15.6	E
RUSSELL	II	40	35.5	10.5	46.0	0.36	28.1	B
ALABAMA	II	40	29.6	27.9	57.5	0.27	16.8	E
Total	II		126.8	134.1	260.9	1.22	16.8	E

Do Nothing PM

Arterial Level of Service: NB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
HAYES	III	31	9.0	5.6	14.6	0.06	14.2	D
WILSON	III	31	36.2	31.4	67.6	0.28	15.2	D
BROADDUS	III	31	40.1	111.4	151.5	0.32	7.5	F
Total	III		85.3	148.4	233.7	0.66	10.1	E

Arterial Level of Service: SB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BROADDUS	III	31	23.9	87.7	111.6	0.19	6.1	F
WILSON	III	31	40.1	24.1	64.2	0.32	17.7	D
HAYES	III	31	36.2	5.2	41.4	0.28	24.8	B
Total	III		100.2	117.0	217.2	0.79	13.1	E

Arterial Level of Service: EB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
RUSSELL	II	40	29.6	26.0	55.6	0.27	17.4	D
DYER	II	40	35.5	45.7	81.2	0.36	15.9	E
GWY S	II	40	36.3	249.6	285.9	0.37	4.6	F
GWY N	II	40	8.2	1.4	9.6	0.07	26.7	C
Total	II		109.6	322.7	432.3	1.07	8.9	F

Arterial Level of Service: WB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GWY N	II	40	17.2	56.0	73.2	0.15	7.4	F
GWY S	II	40	8.2	0.3	8.5	0.07	30.2	B
DYER	II	40	36.3	20.7	57.0	0.37	23.2	C
RUSSELL	II	40	35.5	10.4	45.9	0.36	28.1	B
ALABAMA	II	40	29.6	24.5	54.1	0.27	17.9	D
Total	II		126.8	111.9	238.7	1.22	18.3	D

VIII. MITIGATION AND IMPROVEMENTS

Optimizing traffic control systems was not enough to address future flows.

In parcel A alone and parcels A and B full development, four mitigation alternatives were evaluated:

I. Low cost, at grade solutions plus connectivity
II. Overpasses on Montana Avenue
III. Overpasses on Montana Avenue plus more connectivity
IV. A viaduct extending the Montana/Loop 375 under pass

In development of parcel B only and parcel C only, new infrastructure, intersections design (geometry) and traffic control improvements achieved acceptable levels of service in all of the studied intersections. In these cases, mitigation strategies involve basically:

- Phasing and timing redesign
- Street geometry and signalization
- Lengthening of left lane capacity, in order to absorb demand
- Adding a new left turn lane (in median)
- Adding a left turn sign in existing lane
- Adding a right turn lane (in existing shoulder)
- Open a new thoroughfare, in order to redistribute access traffic to parcel C

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VIII.1. 2015 Mitigation scenario. Parcels A and B

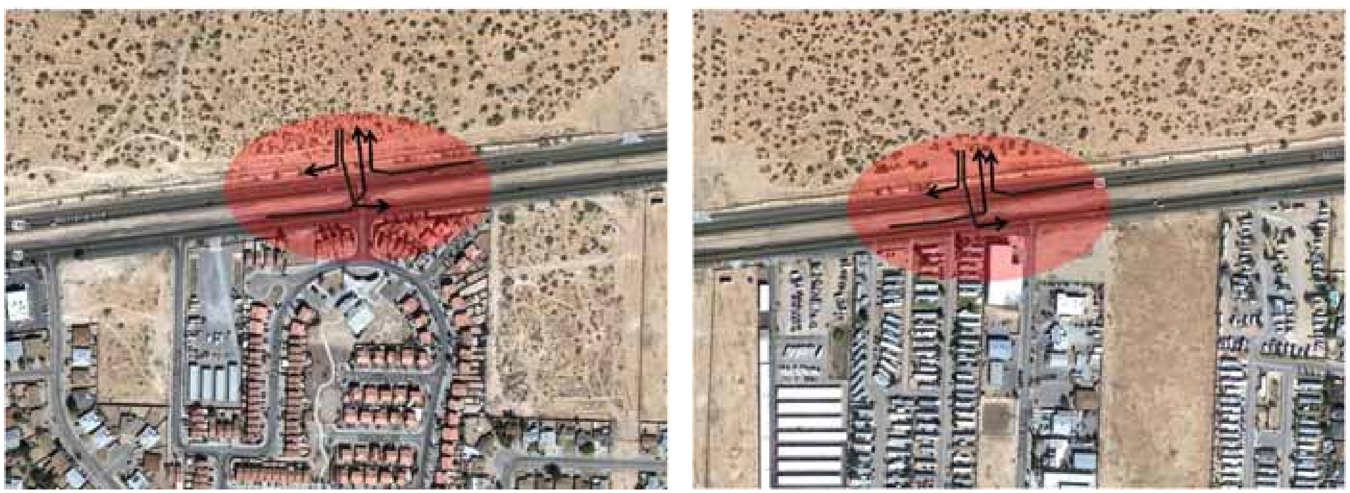
VIII.1.1. Alternative I. At grade solution

Parcel A represents the most important impact to transportation. Most mitigation strategies concentrated in Montana avenue, particularly at Yarbrough, Lee Trevino and George Dieter.

Timing and phases optimization was tried without getting acceptable levels of service. Additional left and right turn lanes and signs were not sufficient either.

Additional connections were essential to distribute access traffic to Parcel A, instead of having a single access point at George Dieter. One supplementary connection was established at Lee Boulevard and two others were proposed as T-intersections at existing turns: one in front of Oasis Dr., and one located between Smoke Signal St., and Wooster Ln. Tributary areas of new connections were calculated in order to establish flows at each intersection.

Fig. 60. Proposed new intersections for Montana Avenue



→ Proposed signalized intersection movements

VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

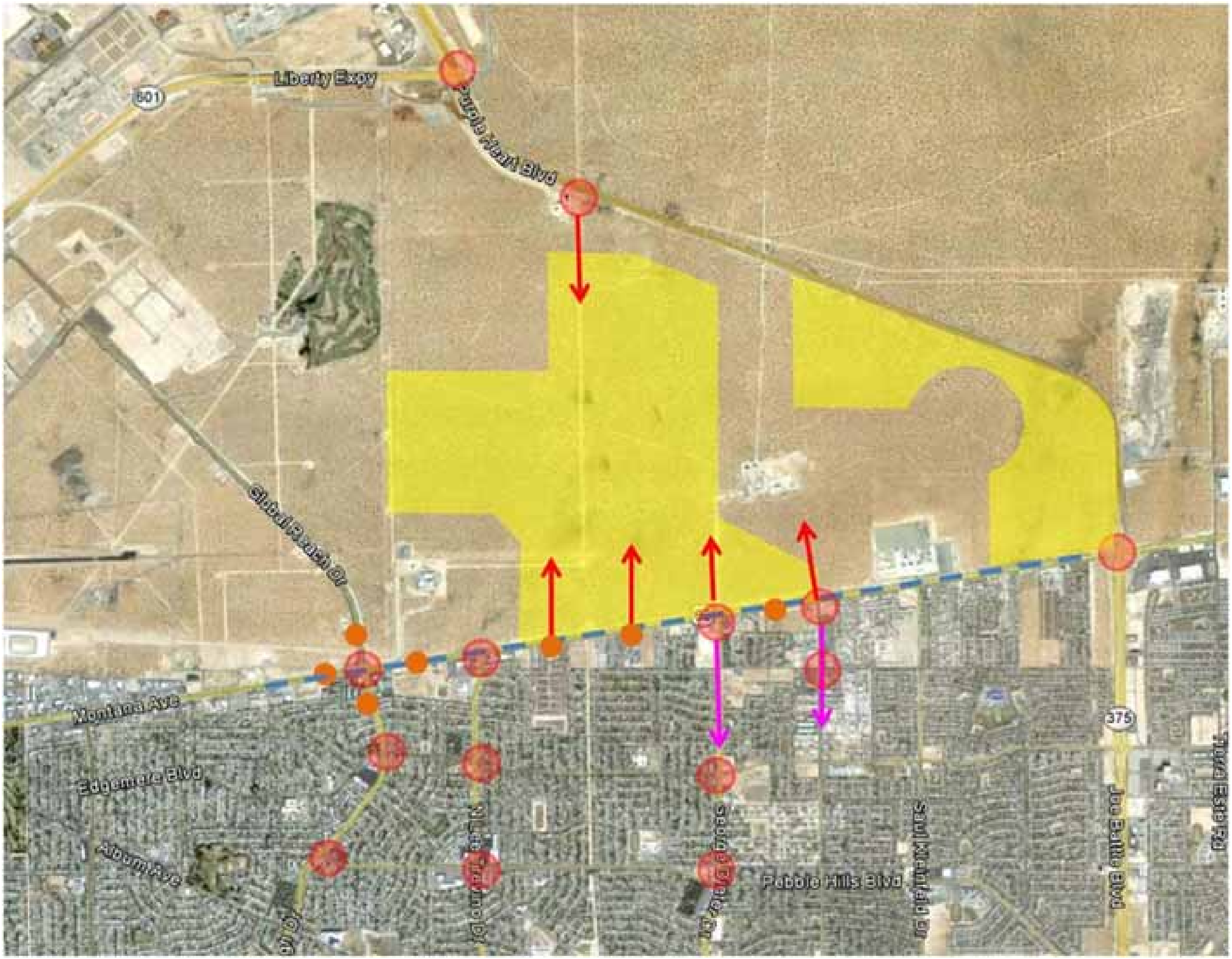


Fig. 61. Alternative 1. Summary of mitigation actions for Parcels A and B

New signalized median turn

Optimized signalized intersection

New thoroughfare connection

Existing connection

2 lanes added

VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

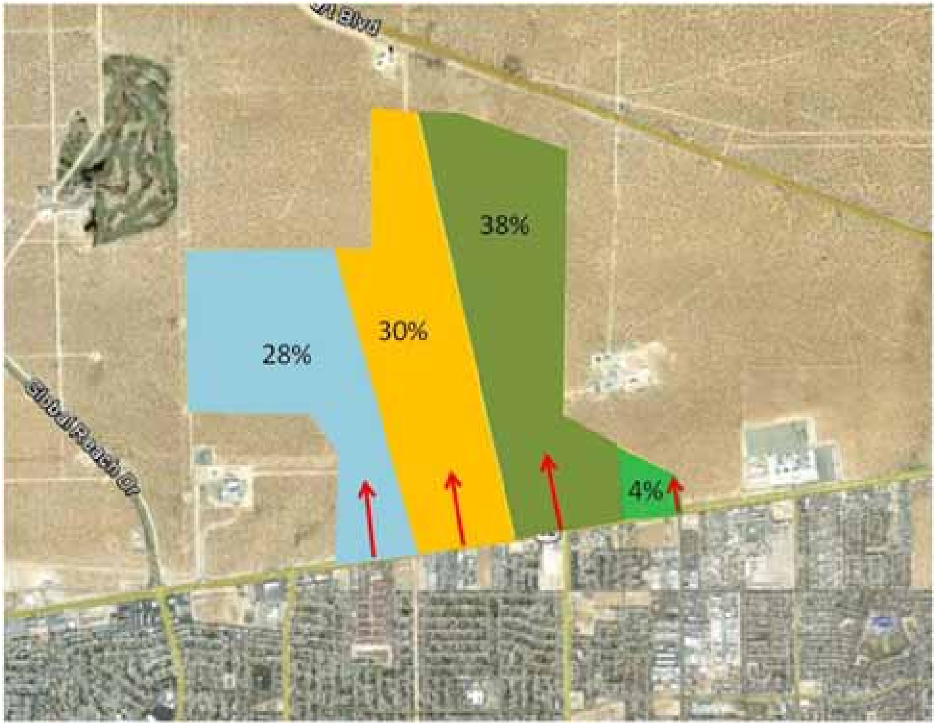
New thoroughfares redistribute access traffic to parcel A. Connections to City Grid use mainly existing streets that are currently interrupted.

Extra lanes were also necessary at the northern George Dieter extension, as well as in segments of Montana Avenue, between Yarbrough and Lee Trevino and their respective u-turns.

Left turn management provided a complementary at grade solution to Yarbrough, Lee Trevino and partially G. Dieter by using median left turns and reducing the number of phases at intersections to: two in Montana and Yarbrough, two in Montana and Lee Trevino, four at Montana and George Dieter. Signalized two-way u-turns allow for indirect left turn movements, managing accumulation and delays and giving more capacity to the traffic control system. Five signalized turns were added, in some cases using existing median turns: three on Montana Avenue and two on Yarbrough.

Median left turns, which use indirect trajectories for left turns are also known as "Michigan turns", since they are widely used in that State since the 1960s, having more than 700 intersections improved traffic flow and reduced travel time and accidents by adopting this system.

Fig. 62. George Dieter access traffic to parcel A is distributed by tributary areas



There is one Median left turn operating in Plano, Tx since 2010 and more in the planning stages. It was confusing to drivers when first installed and involved a learning curve, but at this point, The Texas Department of Transportation has the following opinion on the experience: "The Michigan Left concept has already been successfully implemented in Plano at the busy intersection of Preston Road and Legacy Drive" (http://www.txdot.gov/project_information/projects/austin/loop360/michigan_left.htm). TxDOT indicates the following benefits of this type of innovative solution (http://www.txdot.gov/project_information/projects/austin/loop360/innovative.htm):

- Reduce congestion by allowing extra "green" signal time
- Improve progression and reduce travel times when used at sequential intersections on a corridor
- Improve safety by reducing the number of conflict points
- Offer relatively low construction costs, low environmental impacts, short project development time lines and quick and non-invasive construction methods

VIII.1.1. Alternative I. At grade solution

Added signalized intersections and turns do not affect the general network . All intersection movements are addressed and evaluated in the traffic model. While it is an uncommon turn system, it does not penalize (as in the present situation or in an overpass solution) the public and non-motorized transportation modes, since the effort and longer path is made by the private car. In Yarbrough and Montana, simulation was run under two alternatives:

1) With no right-turn in red allowed, in order to allow the lanes cut

2) Left turn being sent with the through traffic and making a U-turn, which allows cutting lanes protected by signal.

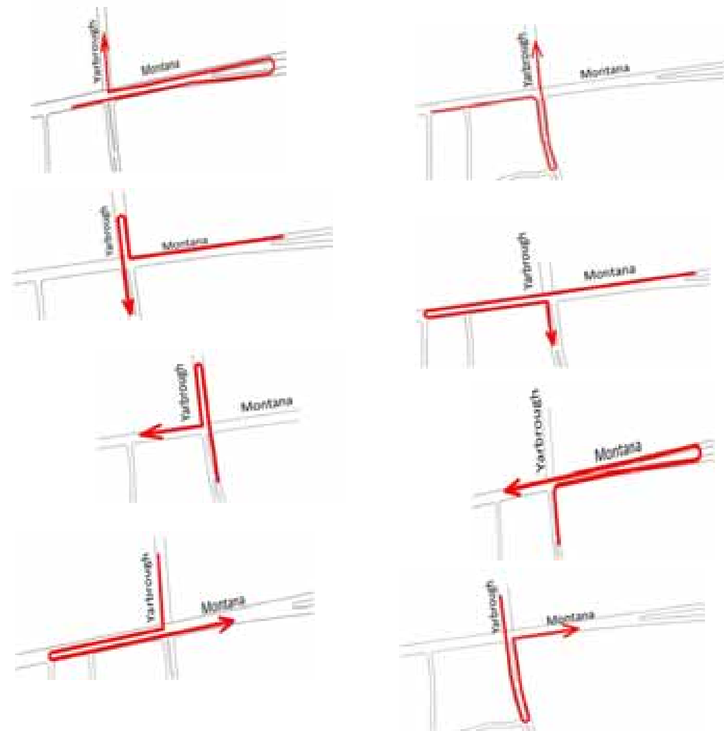
Traffic distributed equally to the two left turn options (right and through) gives a better LOS. If left turn traffic is added only to the through traffic and to the U-turn in the next intersection, the solution still manages volumes with acceptable LOS (worst case scenario, used in Synchro attachment).

The increased connectivity is also beneficial to pedestrians, since the signalized intersections allow protected pedestrian crossings, which otherwise would be situated at excessive distances (Yarbrough-Lee Trevino distance=3,086 ft., Lee Trevino-George Dieter distance= 6,318 ft.). The proposed grid would offer average crossings distances of 1,900 ft.

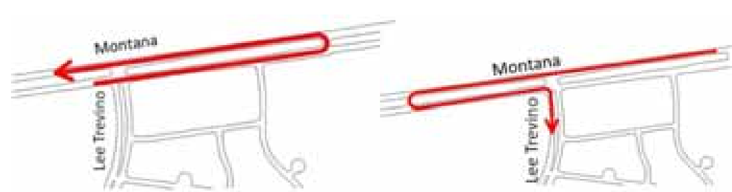
The table 17 details the mitigation procedure followed for each movement at each one of the intersections

Fig. 63. Parcel A alone. Alternative turns

Intersection left turns alternatives . Yarbrough and Montana



Intersection left and u-turn alternatives. Lee Trevino and Montana



VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

Mitigation proposals indicated for parcel A and B development. More Specific strategies at each intersection are indicated in table 21

Table 21. Parcels A and B. Mitigation actions

Alternative I
Parcels A and B together

Intersection		Course	Mitigation actions
Loop 375 (Southbound)	Liberty Expressway (spur 601)	NB	optimize
		SB	optimize
		WB	optimize, Mixed arrow (front and left)
		EB	optimize, Added 1 lanes EBR
Loop 375 (Northbound)	Liberty Expressway (spur 601)	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Loop 375 (Southbound)	Montana Ave	NB	optimize
		SB	optimize
		WB	optimize, Added 1 lane WBT
		EB	optimize, Added 1 lane EBT
Loop 375 (Northbound)	Montana Ave	NB	optimize
		SB	optimize
		WB	optimize, Added 1 lane WBT
		EB	Mixed arrow (front and left)
Saul Kleinfeld	Montana Ave	NB	optimize
		SB	--
		WB	optimize, Added 1 lane WBT
		EB	optimize, Added 1 lane EBT
George Dieter	Montana Ave	NB	optimize, Added 1 lane NBL Storage length 492ft, right turn channelized (curb radius 114ft)
		SB	optimize, Added 5lanes, SBL Storage length 328ft, SBR Storage length 279ft
		WB	optimize, Removed left turns(may make U-turn at 2362ft in traffic light), Added 1 lane WBT, right turn channelized (curb radius 114ft)
		EB	optimize, Removed left turn (may make U-turn at 984ft in traffic light), Added 1 lane EBT, right turn channelized (curb radius 82ft)
Lee Trevino	Montana Ave	NB	optimize, Added 1 lane NBR, Storage length 279ft NBL
		SB	--
		WB	optimize, Removed left turn
		EB	optimize, Removed Uturn, Added 1 lane EBT, EBR Storage length 279ft
Global Reach (Yarbrough)	Montana Ave	NB	optimize, Removed left turns (may make U-turn at 524ft in traffic light)
		SB	optimize, Removed left turns (may make U-turn at 656ft in traffic light),
		WB	optimize, Removed left turns (may make U-turn at 820ft in traffic light), Added 1 lane WBR Storage length 180m
		EB	optimize, Removed left turns (may make U-turn at 1476ft in traffic light), Added 1 lane EBR Storage length 130m
Lee Blvd	Montana Ave	NB	optimize, Added 1 lane SBT, Mixed arrow (front and right)
		SB	optimize, created new avenue
		WB	optimize, Added 1 lane WBR, Added 1 lane WBL, Added 1 lane WBT
		EB	optimize, Added 1 lane EBL, Added 1 lane EBL
Edgemere	Yarbrough	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Edgemere	Lee Trevino	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Edgemere	George Dieter	NB	optimize, Added 1 lanes NBT, NBL Storage length 279ft
		SB	optimize, Added 1 lanes SBL/SBT
		WB	optimize
		EB	optimize
Pebble Hills	Yarbrough	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Pebble Hills	Lee Trevino	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Pebble Hills	George Dieter	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Turner	Lee	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
George Dieter	Loop 375 (Eastbound)	NB	
		SB	
		WB	
		EB	
George Dieter	Loop 376 (Westbound)	NB	
		SB	
		WB	
		EB	
Montana	new avenue (A)	NB	optimize
		SB	optimize, new avenue, 2 lanes SBR and 2 lanes SBL
		WB	optimize, Added 1 lane WBR, Added 1 lane Uturn
		EB	optimize, Added 1 lane EBL, Added 1 lane Uturn
Montana	new avenue (B)	NB	optimize
		SB	optimize, new avenue, 2 lanes SBR and 2 lanes SBL
		WB	optimize, Added 1 lane WBR, Added 1 lane Uturn
		EB	optimize, Added 1 lane EBL

VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

A path is calculated in order to allow trucks to turn securely and protected by signal at the turning points. This may require additional road space and curb realignment at the indicated areas.

Truck turning paths were examined at intersections for types WB-67, WB-62 and WB-50. Only at the turning point located south of the Montana and Yarbrough intersection where we found limitations for added right of way, no additional easement was proposed.

In Montana and George Dieter, no additional road space is required. Montana's right of way allows for heavy trucks U turns at all of the new crossings, as shown in figure

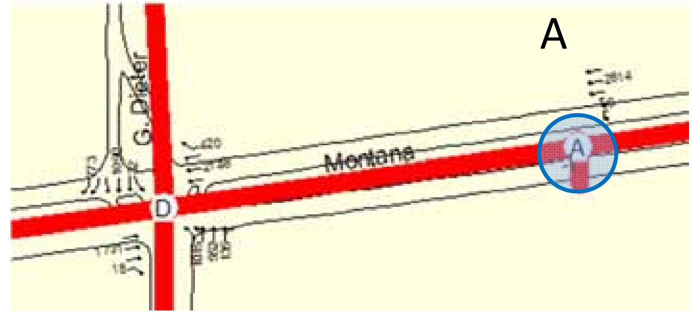
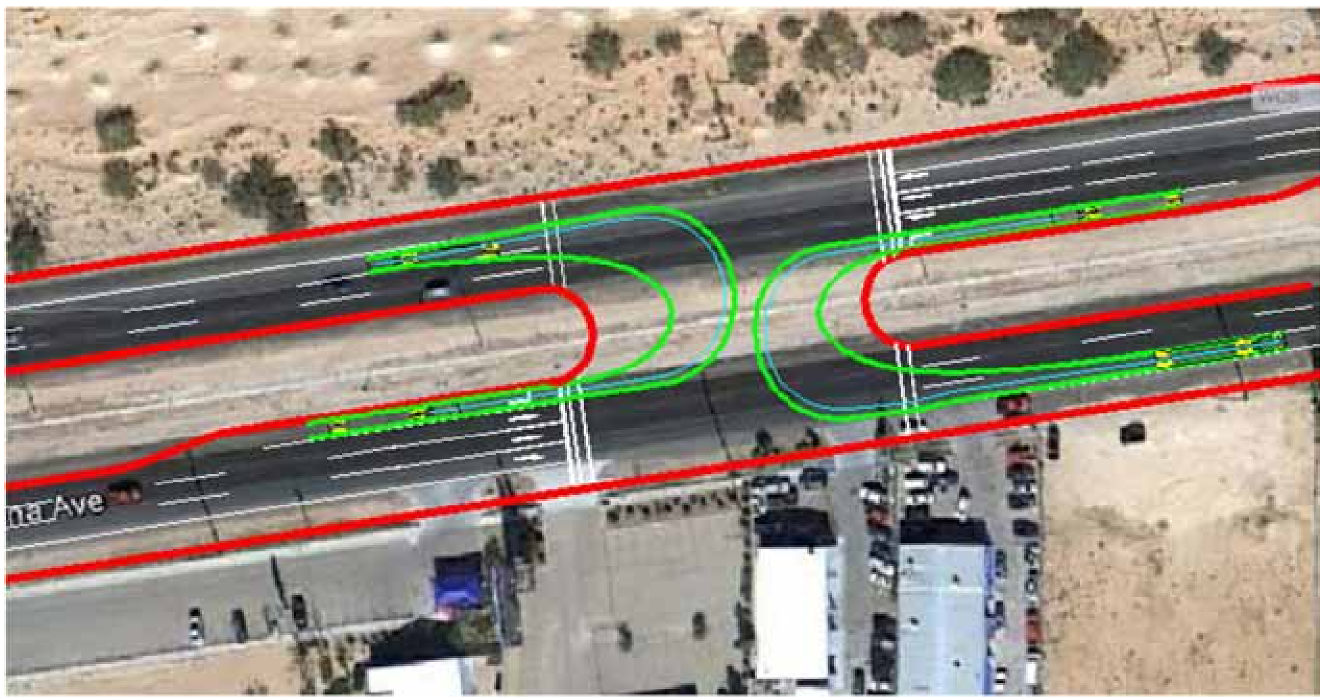


Fig. 64. Montana and George Dieter. No extra area is needed for heavy trucks U turns.

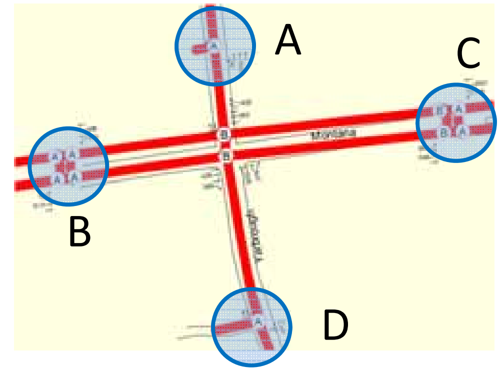


Curb

U-turn radio for heavy trucks

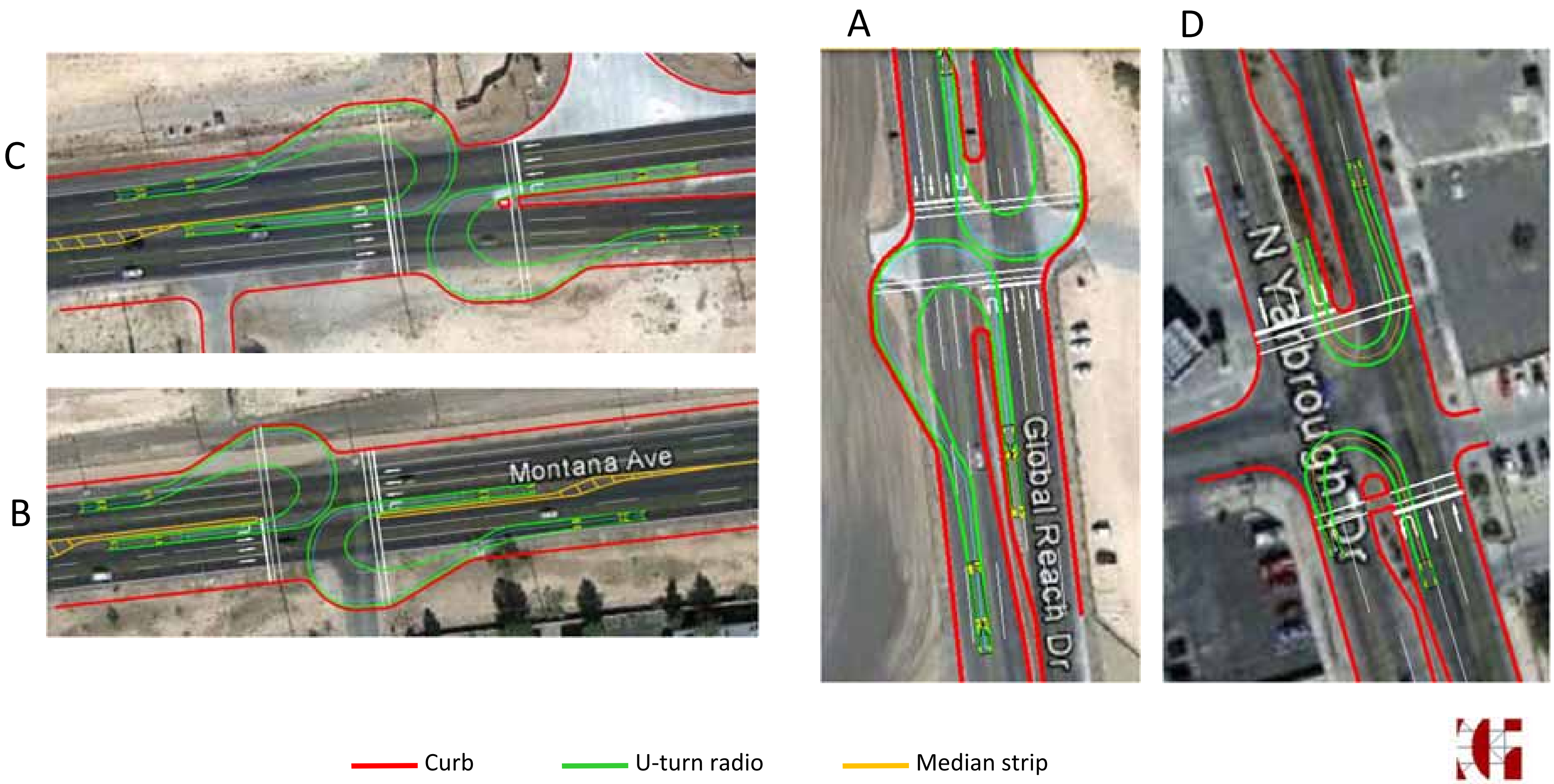
VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution



In Montana and Yarbrough intersection, drawings show widest turning path made by truck type WB-67 for A, B and C turning points. Since D point (south of Montana) does not allow for additional road space due to existing land uses and road limitations, no trucks would be allowed at the U turn and a B-Bus path is indicated in the figure.

Fig. 65. Montana and Yarbrough intersection turning points



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VIII.1.1. Alternative I. At grade solution

Southeast Bliss (Parcel A) and Texas General Land Office (Parcel B)

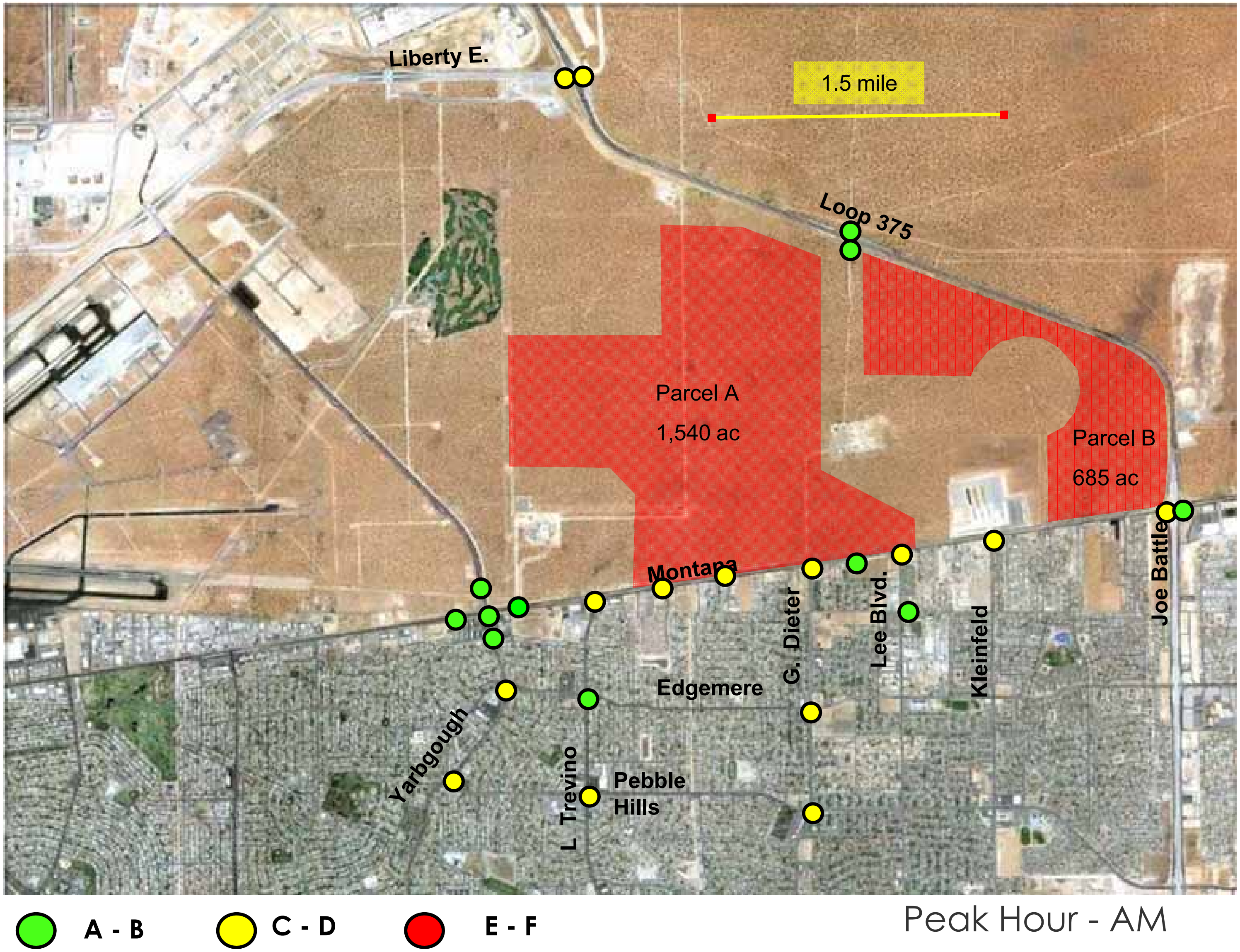


Fig. 66. Parcel A and B in 2015 Mitigation scenario. AM levels of service

VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

Southeast Bliss (Parcel A) and Texas General Land Office (Parcel B)

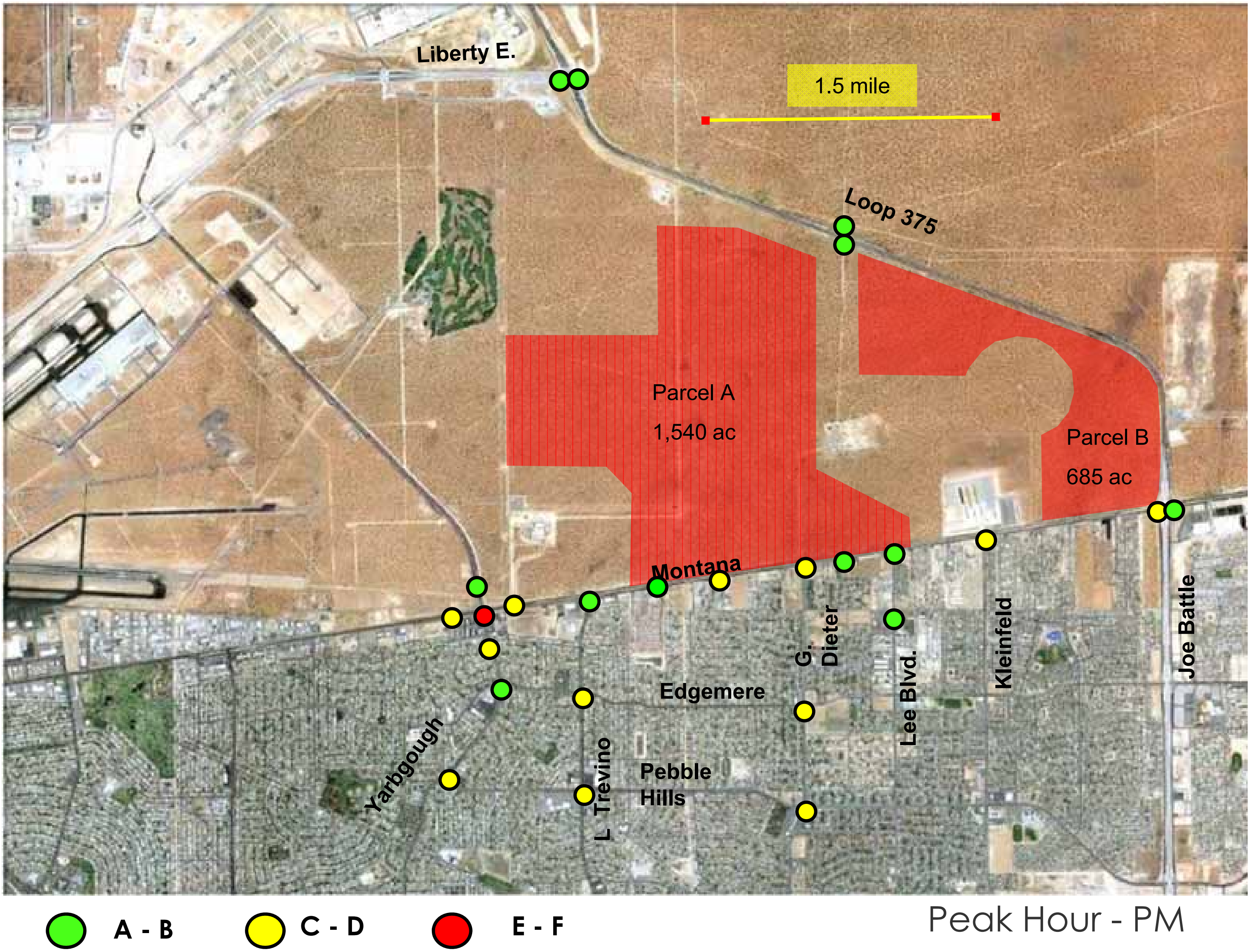


Fig. 67. Parcel A and B in 2015 Mitigation scenario. PM levels of service

VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

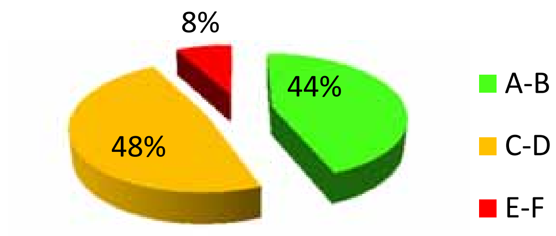
Fig.68. Parcels A and B in 2015 Mitigation scenario. AM and PM levels of service

.

Summary AM

A - B	(11)	44%
C - D	(12)	48%
E - F	(2)	8%
Total	**(25)**	**100%**

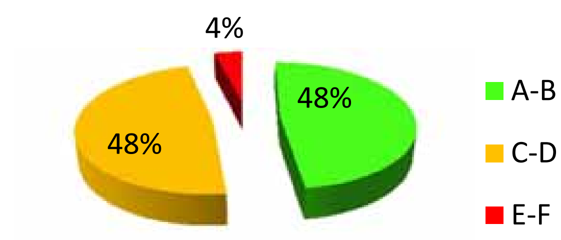
→ → → → →



Summary PM

A - B	(12)	48%
C - D	(12)	48%
E - F	(1)	4%
Total	**(25)**	**100%**

→ → → → →



VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.1. Alternative I. At grade solution

ARTERIAL LEVEL OF SERVICE

Table 22. Parcels A and B in 2015 Mitigation scenario. AM and PM Arterial levels of service**.**
Alternative I

Alternative I - AM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough (U-Turn W)	I	55	9.2	4.7	13.9	0.10	24.6	D
Yarbrough	I	55	11.0	4.9	15.9	0.11	25.7	D
Yarbrough (U-Turn E)	I	55	12.8	3.8	16.6	0.13	28.7	C
Lee Trevino	I	55	35.6	5.2	40.8	0.46	40.3	B
A	I	55	27.7	3.5	31.2	0.30	34.7	B
B	I	55	29.6	9.5	39.1	0.34	31.3	C
G. Dieter	I	55	37.1	27.7	64.8	0.57	31.5	C
G. Dieter (U-Turn E)	I	55	15.9	0.2	16.1	0.16	36.7	B
Lee Blvd	I	55	29.4	43.6	73.0	0.34	16.7	E
Kleinfeld	I	55	37.6	13.1	50.7	0.52	36.6	B
Joe Battle SB	I	55	64.5	28.2	92.7	0.99	38.3	B
Joe Battle NB	I	55	5.6	4.4	10.0	0.06	20.7	E
Total	I		316.0	148.8	464.8	4.07	31.5	C

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	I	55	19.8	32.1	51.9	0.20	14.1	F
Joe Battle SB	I	55	5.6	10.1	15.7	0.06	13.2	F
Kleinfeld	I	55	64.5	17.8	82.3	0.99	43.1	A
Lee Blvd	I	55	37.6	8.0	45.6	0.52	40.7	B
G. Dieter (U-Turn E)	I	55	29.4	7.4	36.8	0.34	33.1	C
G. Dieter	I	55	15.9	62.5	78.4	0.16	7.5	F
B	I	55	37.1	41.7	78.8	0.57	25.9	D
A	I	55	29.6	14.9	44.5	0.34	27.5	C
Lee Trevino	I	55	27.7	58.0	85.7	0.30	12.6	F
Yarbrough (U-Turn E)	I	55	35.6	5.6	41.2	0.46	39.9	B
Yarbrough	I	55	12.8	16.0	28.8	0.13	16.5	E
Yarbrough (U-Turn W)	I	55	11.0	2.5	13.5	0.11	30.3	C
Total	I		326.6	276.6	603.2	4.17	24.9	D

Alternative I - PM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough (U-Turn W)	I	55	12.9	79.2	92.1	0.13	5.2	F
Yarbrough	I	55	16.1	93.8	109.9	0.17	5.4	F
Yarbrough (U-Turn E)	I	55	17.3	45.3	62.6	0.18	10.3	F
Lee Trevino	I	55	33.6	12.8	46.4	0.41	31.8	C
A	I	55	29.5	3.1	32.6	0.32	35.4	B
B	I	55	33.0	15.8	48.8	0.40	29.6	C
G. Dieter	I	55	35.4	29.1	64.5	0.49	27.1	C
G. Dieter (U-Turn E)	I	55	21.7	4.5	26.2	0.22	30.7	C
Lee Blvd	I	55	25.7	8.7	34.4	0.28	29.2	C
Kleinfeld	I	55	37.6	15.2	52.8	0.51	35.1	B
Joe Battle SB	I	55	64.5	31.8	96.3	0.99	36.8	B
Joe Battle NB	I	55	5.6	10.4	16.0	0.06	12.9	F
Total	I		332.9	349.7	682.6	4.16	21.9	D

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	I	55	19.8	18.6	38.4	0.20	19.1	E
Joe Battle SB	I	55	5.6	3.4	9.0	0.06	23.0	D
Kleinfeld	I	55	64.5	14.1	78.6	0.99	45.1	A
Lee Blvd	I	55	37.6	8.1	45.7	0.51	40.6	B
G. Dieter (U-Turn E)	I	55	25.7	6.5	32.2	0.28	31.2	C
G. Dieter	I	55	21.7	17.8	39.5	0.22	20.4	E
B	I	55	35.4	10.9	46.3	0.49	37.8	B
A	I	55	33.0	12.8	45.8	0.40	31.6	C
Lee Trevino	I	55	29.5	7.7	37.2	0.32	31.0	C
Yarbrough (U-Turn E)	I	55	33.6	2.7	36.3	0.41	40.7	B
Yarbrough	I	55	17.3	11.9	29.2	0.18	22.0	D
Yarbrough (U-Turn W)	I	55	16.1	0.4	16.5	0.17	36.2	B
Total	I		339.8	114.9	454.7	4.23	33.5	C

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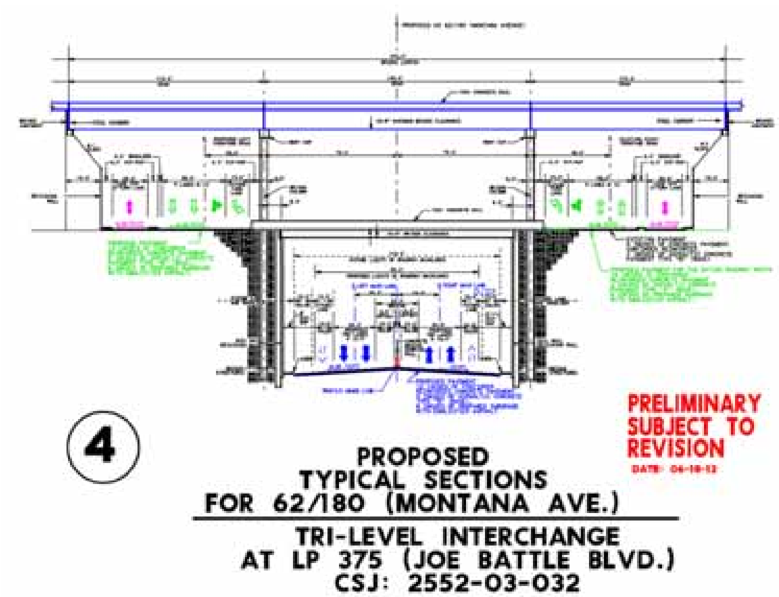
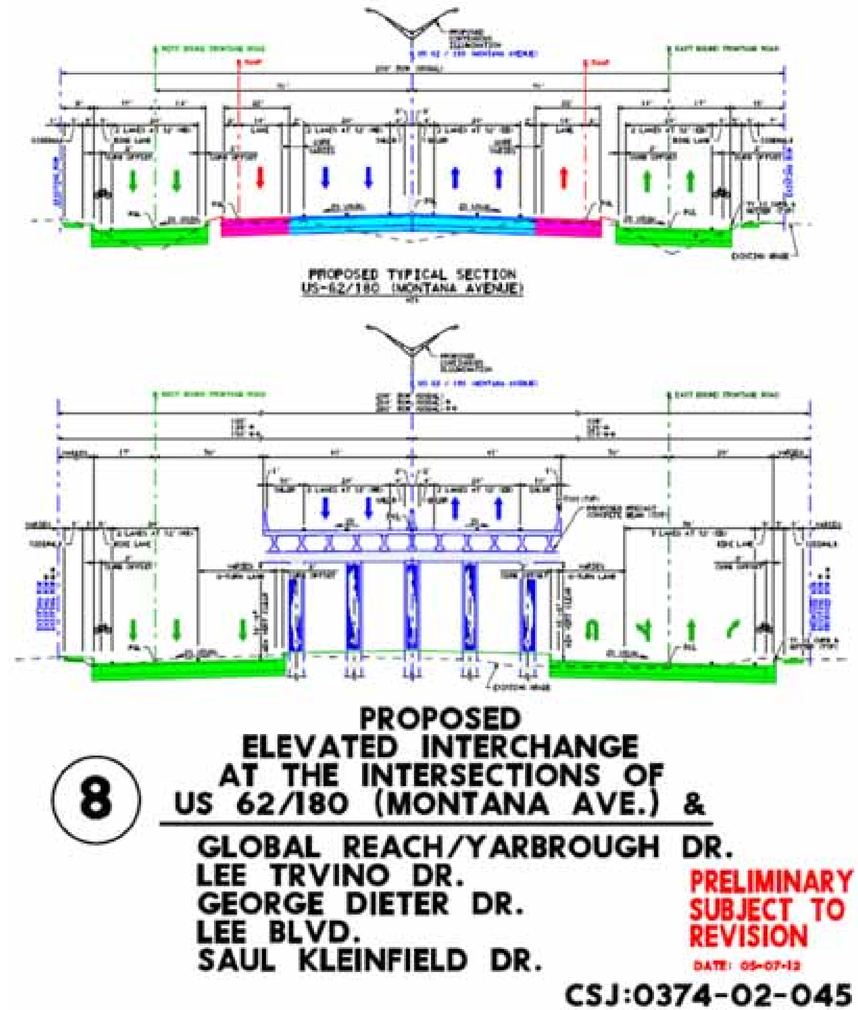
VIII.1.2. Alternative II. Overpasses on Montana

Alternative 2 is based on a preliminary proposal elaborated by the Texas Department of Transportation (TxDOT). Montana Avenue's central lanes are elevated at Global Reach/Yarbrough, Lee Trevino, George Dieter and Saul Kleinfield crossings, and are underground at Montana/LP 375 (Joe Battle Bd) intersection. Frontage roads are generated north and south of Center Lanes

Fig.69. Cross sections for elevated interchanges and tri-level interchange on Montana. TxDOT preliminary proposal, 2012.





Sources: Texas Department of Transportation, June 2012

VIII.1.2. Alternative II. Overpasses on Montana

Summary of PM Levels of service

Southeast Bliss (Parcel A) and Texas General Land Office (Parcel B)

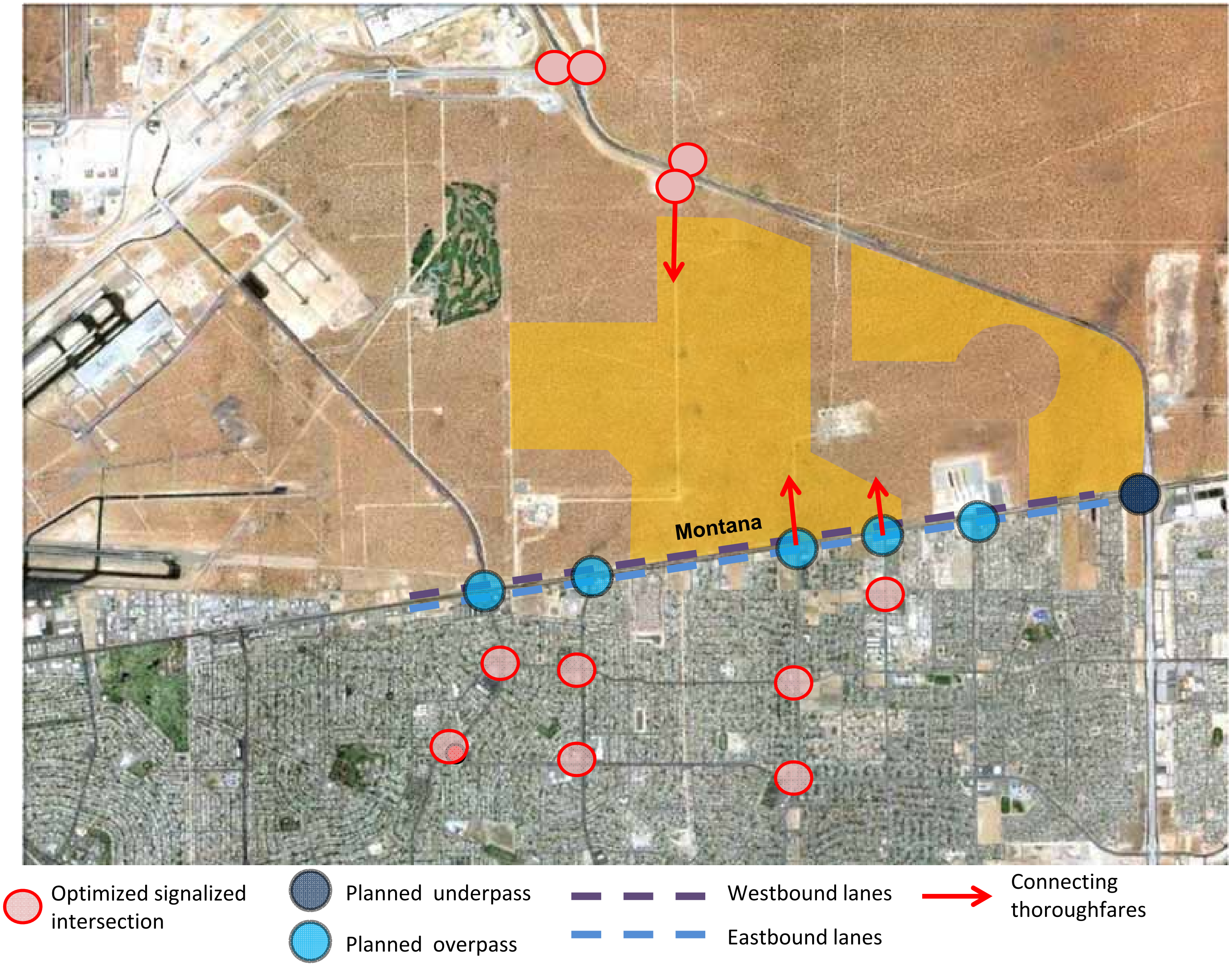


Fig.70. Actions proposed in alternative II

VIII.1.2. Alternative II. Overpasses on Montana

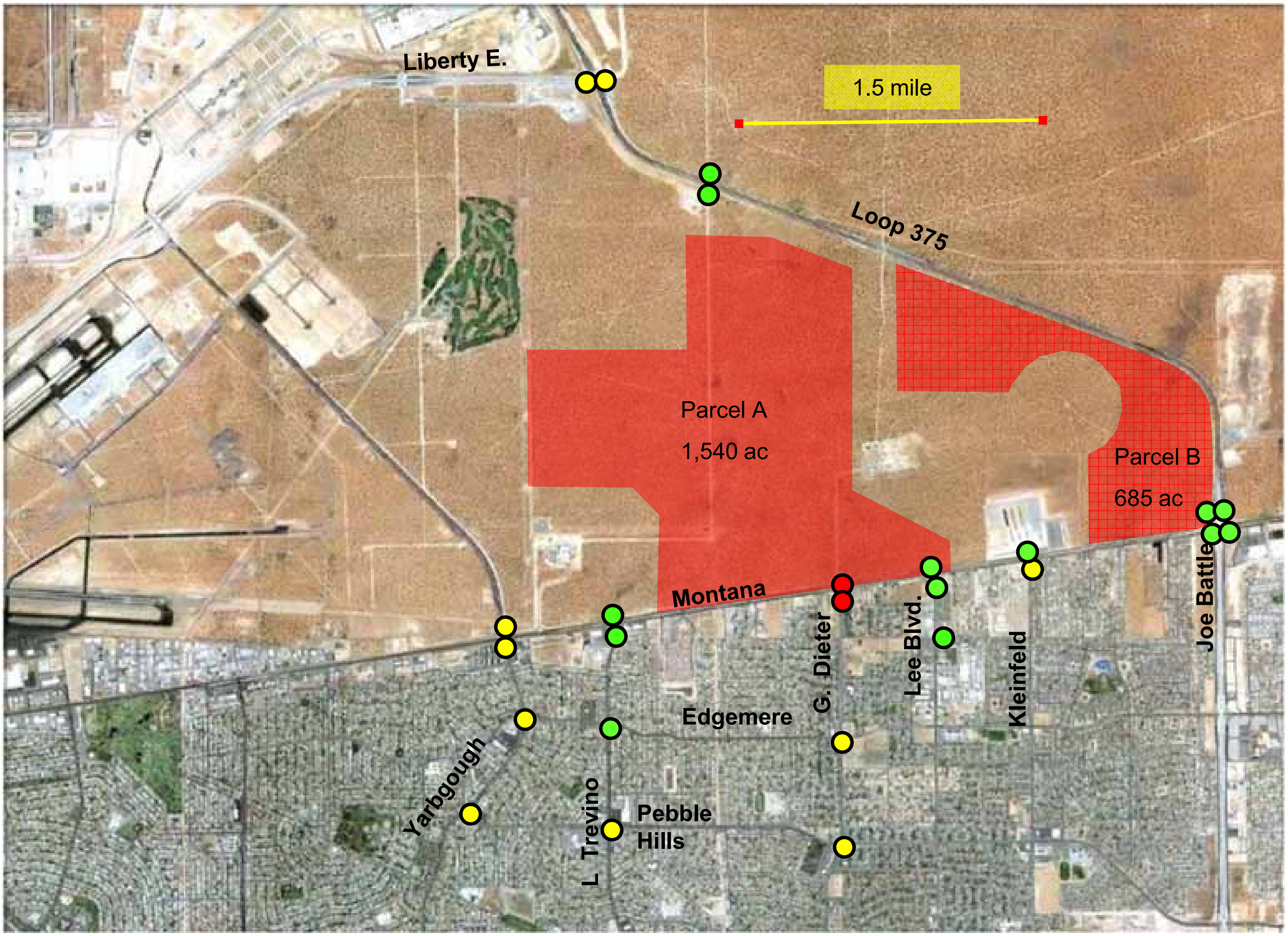
In alternative 2, no new thoroughfares are proposed on the right (northern) frontage road, bordering Parcel A. Only George Dieter and Lee Bd. continue to the north and connect to Parcel A. George Dieter's tributary area would absorb 96% of traffic.

Alternative 2 also presumes Montana's controlled access lanes (Freeway or Toll way). But right of way restrictions and existing urban conditions (abutting land already consolidated) make very difficult and costly the continuation of such cross section west of Global Reach. Therefore TxDOT is suggesting deviating the facility northward, towards the Patriot Freeway.

Fig.72. Access to parcel A in alternative II

Fig.71. Montana freeway bypass

VIII.1.2. Alternative II. Overpasses on Montana



A - B C - D E - F

Fig.73. Resulting levels of service in alternative II (AM peak hour)

VIII.1.2. Alternative II. Overpasses on Montana

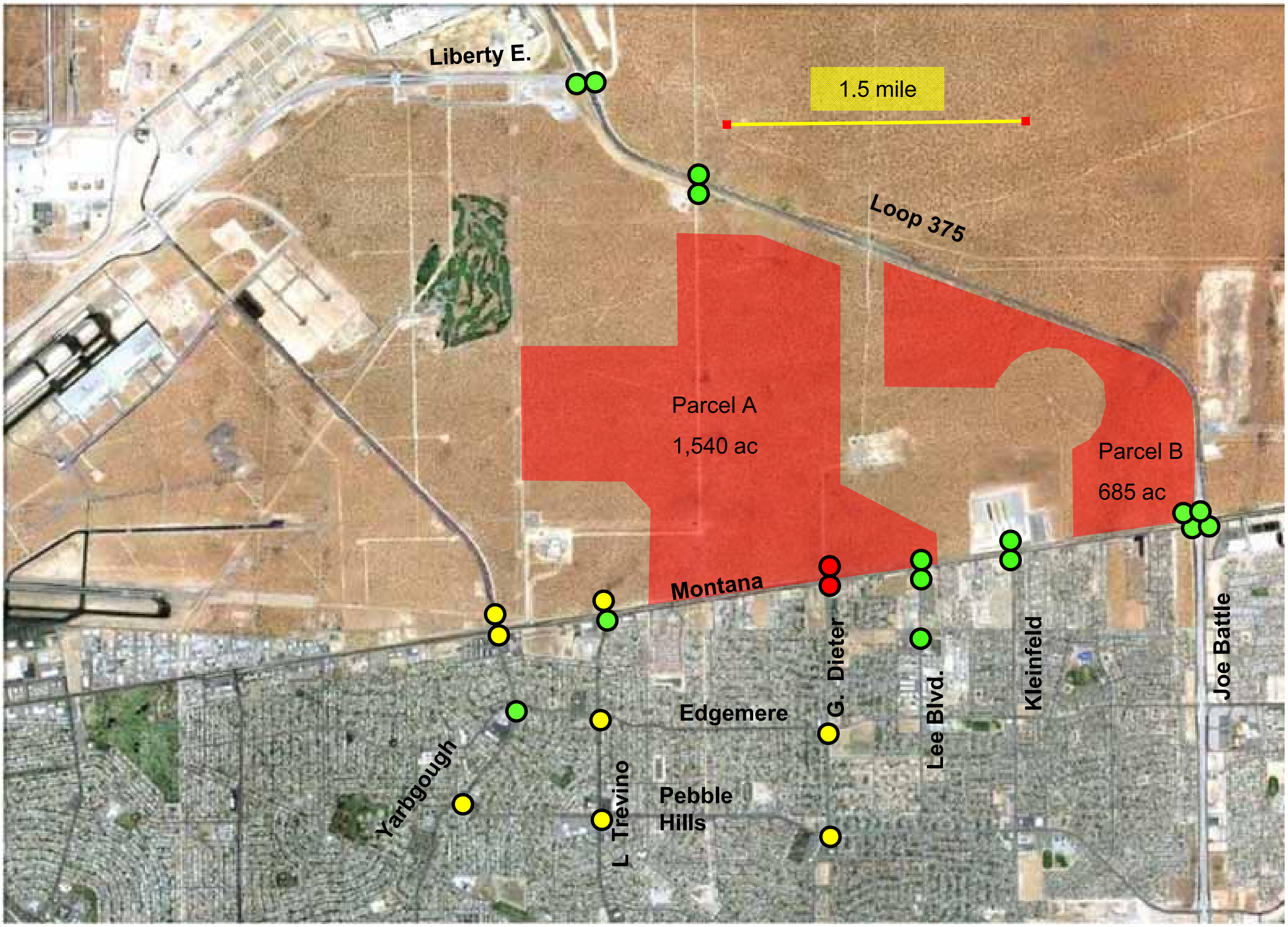


Fig.74. Resulting levels of service in alternative II (PM peak hour)

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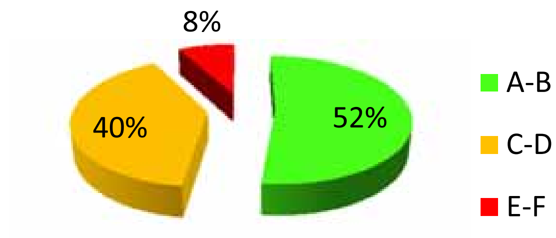
VIII.1.2. Alternative II. Overpasses on Montana

Fig.75. Summary of levels of service in alternative II

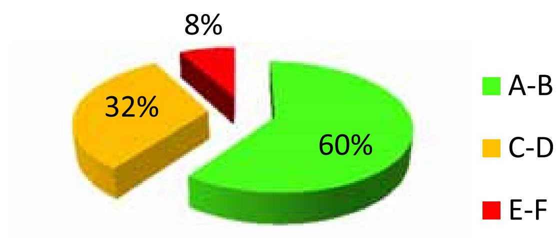
Summary AM

A - B (13)	52%
C - D (10)	40%
E - F (02)	8%
Total (25)	**100%**



Summary PM

A - B (15)	60%
C - D (08)	32%
E - F (02)	8%
Total (25)	**100%**



VIII.1.2. Alternative II. Overpasses on Montana

ARTERIAL LEVEL OF SERVICE

Table 23. Parcels A and B in 2015 Mitigation scenario. AM and PM Arterial levels of service**.**
Alternative II

Alternative II - AM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	III	35	17.1	7.9	25.0	0.13	19.2	C
Lee Trevino	III	35	60.6	12.2	72.8	0.59	29.1	B
G. Dieter	III	35	124.3	37.0	161.3	1.21	27.0	B
Lee Blvd	III	35	60.3	18.4	78.7	0.50	23.0	C
Kleinfeld	III	35	61.8	15.8	77.6	0.52	23.9	C
Joe Battle SB	III	35	101.4	32.0	133.4	0.99	26.6	B
Joe Battle NB	III	35	8.3	0.9	9.2	0.06	22.5	C
Total	III		433.8	124.2	558.0	3.99	25.8	B

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	III	35	24.5	23.8	48.3	0.20	15.2	D
Joe Battle SB	III	35	8.3	4.0	12.3	0.06	16.8	D
Kleinfeld	III	35	101.4	11.7	113.1	0.99	31.4	A
	III	35	61.8	16.0	77.8	0.52	23.8	C
G. Dieter	III	35	60.3	81.9	142.2	0.50	12.7	E
Lee Trevino	III	35	124.3	13.0	137.3	1.21	31.7	A
Yarbrough	III	35	60.6	10.4	71.0	0.59	29.9	B
Total	III		441.2	160.8	602.0	4.06	24.3	B

Alternative II - PM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	III	35	17.1	33.6	50.7	0.13	9.5	F
Lee Trevino	III	35	60.6	13.3	73.9	0.59	28.7	B
G. Dieter	III	35	124.3	31.5	155.8	1.21	27.9	B
Lee Blvd	III	35	60.3	11.1	71.4	0.50	25.3	B
Kleinfeld	III	35	61.8	16.9	78.7	0.52	23.6	C
Joe Battle SB	III	35	101.4	30.4	131.8	0.99	26.9	B
Joe Battle NB	III	35	8.3	0.1	8.4	0.06	24.6	B
Total	III		433.8	136.9	570.7	3.99	25.2	B

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	III	35	24.5	21.8	46.3	0.20	15.8	D
Joe Battle SB	III	35	8.3	4.6	12.9	0.06	16.0	D
Kleinfeld	III	35	101.4	12.3	113.7	0.99	31.2	A
	III	35	61.8	12.8	74.6	0.52	24.9	B
G. Dieter	III	35	60.3	57.9	118.2	0.50	15.3	D
Lee Trevino	III	35	124.3	3.3	127.6	1.21	34.1	A
Yarbrough	III	35	60.6	26.3	86.9	0.59	24.4	B
Total	III		441.2	139.0	580.2	4.06	25.2	B

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VIII.1. 2015 Mitigation scenario. Parcels A and B

VIII.1.3. Alternative III. Overpasses on Montana plus more connectivity

Alternative 3 is exactly the same as alternative 2, but with added thoroughfares on the right (northern) frontage road, bordering Parcel A. These new connections do not cross the street and have only westbound right and southbound right turns, as showed in the figure. The crossing would require a signalized intersection and would have to deal with access and exit ramps to the center lanes and overpasses

Fig.76. New conections for parcel A proposed in alternative III

Proposed connections

Added connectivity redistributes traffic, avoiding concentration and congestion in access points, improving levels of service.

VIII.1.3. Alternative III. Overpasses on Montana plus more connectivity

Summary of PM Levels of service

Southeast Bliss (Parcel A) and Texas General Land Office (Parcel B)

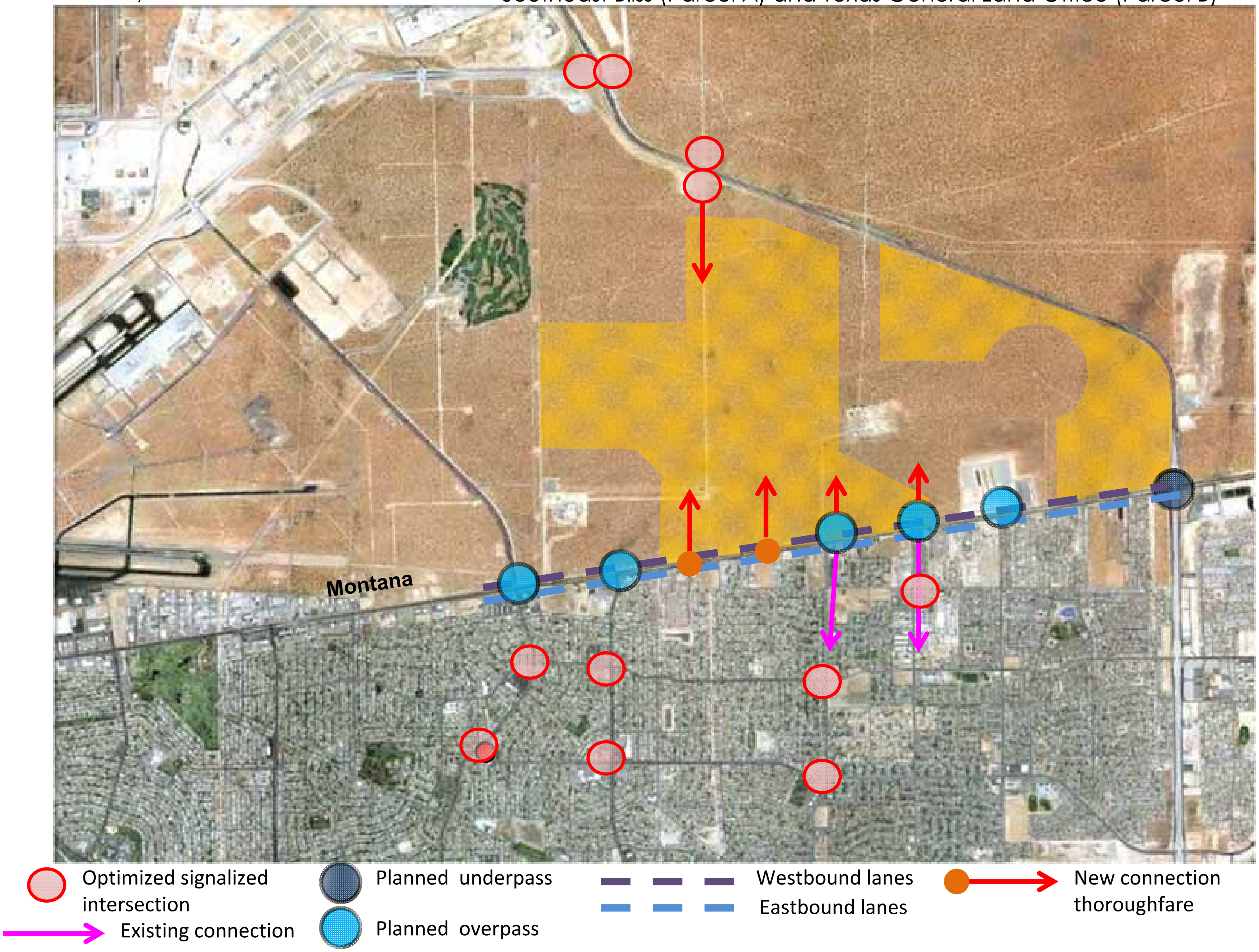
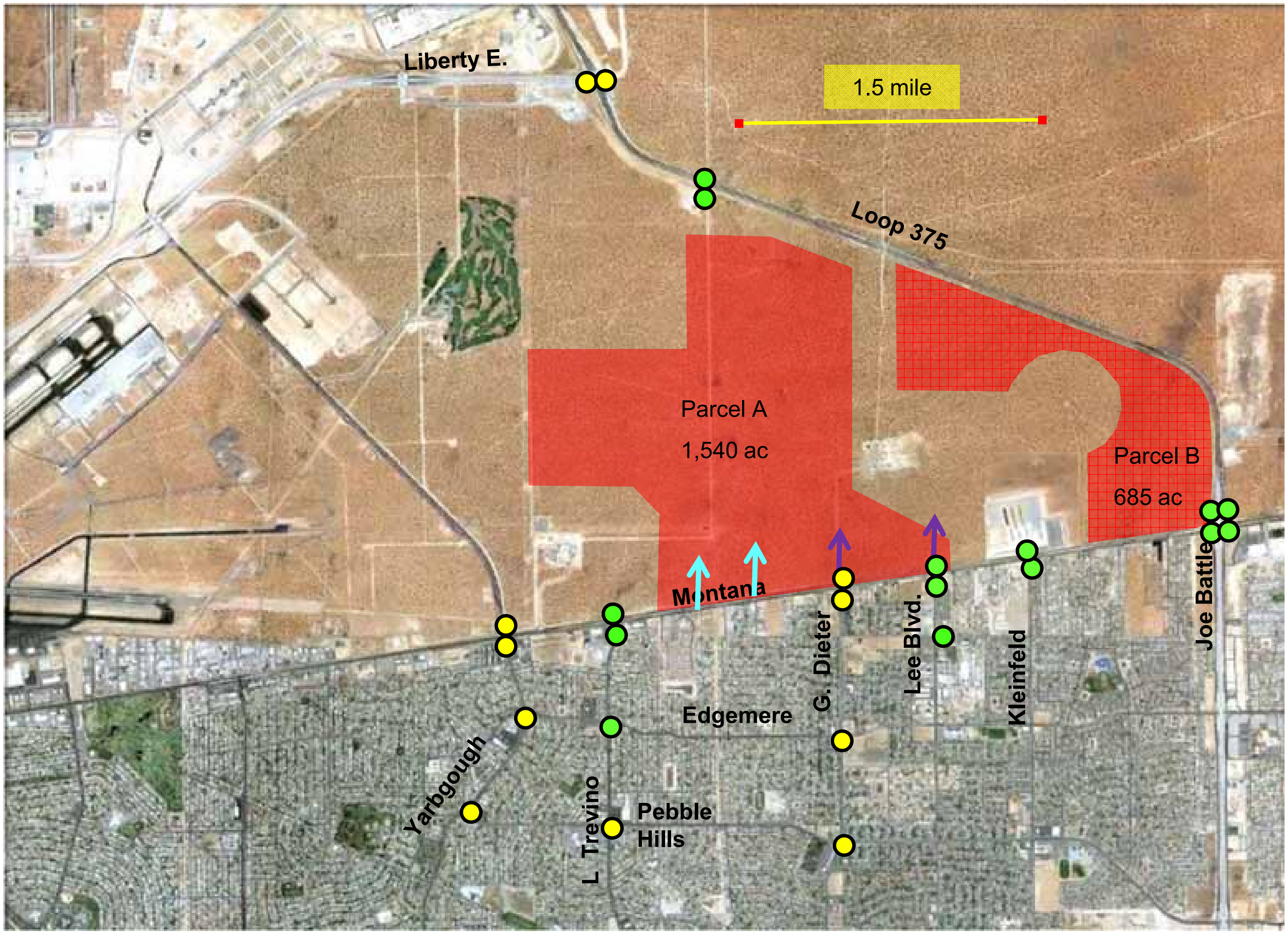


Fig.77. Actions proposed in alternative III

VIII.1.3. Alternative III. Overpasses on Montana plus more connectivity

Peak Hour - AM



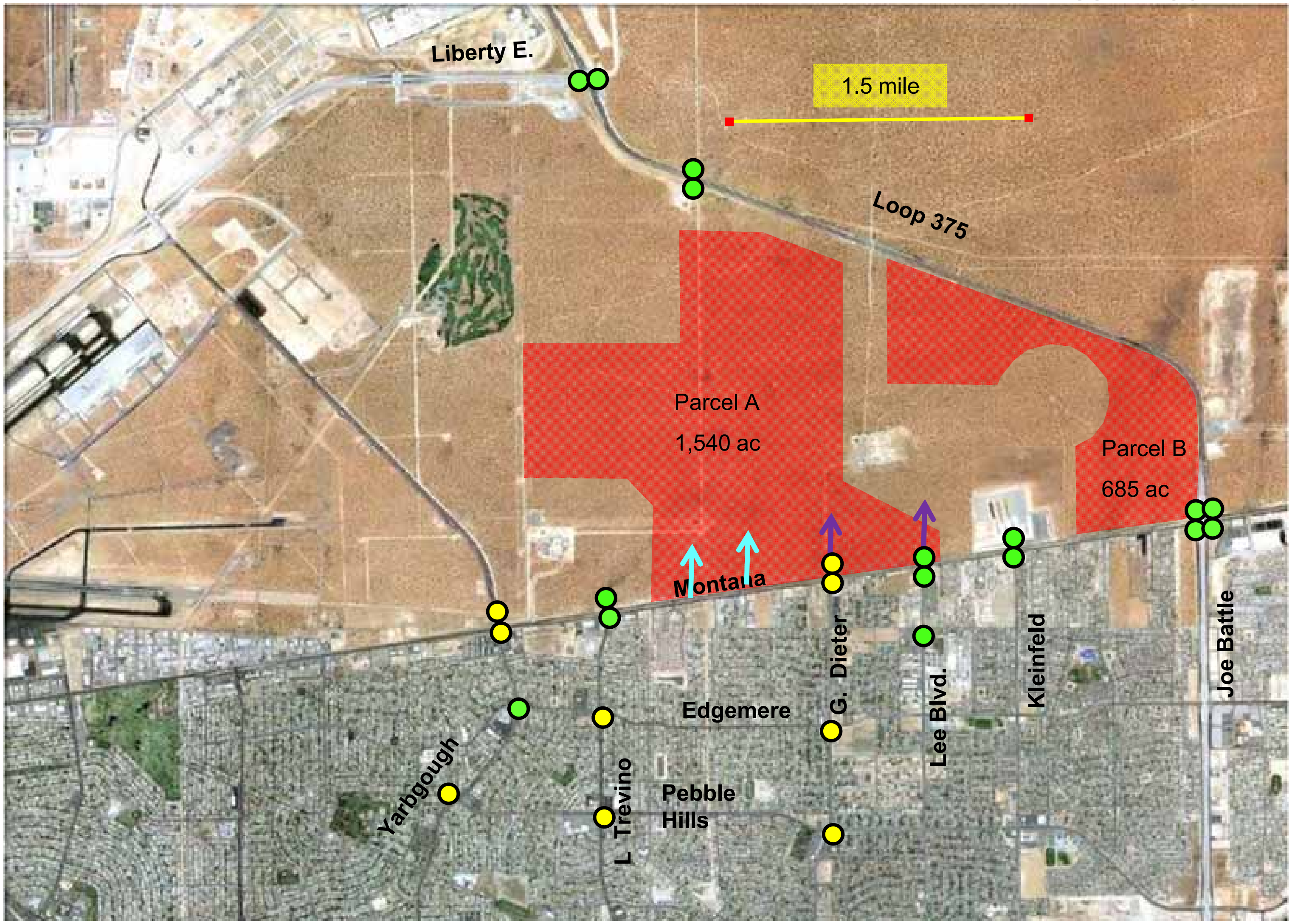
New connection thoroughfare

New connection thoroughfare (unsignalized)

Fig.78. Resulting levels of service in alternative III (AM peak hour)

VIII.1.3. Alternative III. Overpasses on Montana plus more connectivity

Peak Hour - PM



New connection thoroughfare

New connection thoroughfare (unsignalized)

Fig.79. Resulting levels of service in alternative III (AM peak hour)

VIII.1. 2015 Mitigation scenario. Parcels A and B

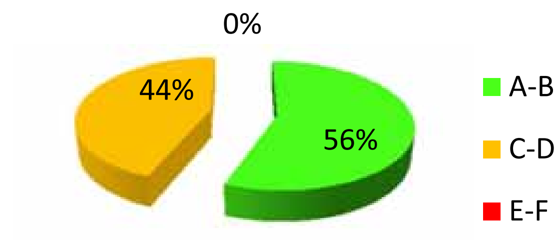
VIII.1.3. Alternative III. Overpasses on Montana plus more connectivity

Fig.80. Summary of levels of service in alternative III

Summary AM

A - B	(14)	56%
C - D	(11)	44%
E - F	(00)	00%
Total	**(25)**	**100%**

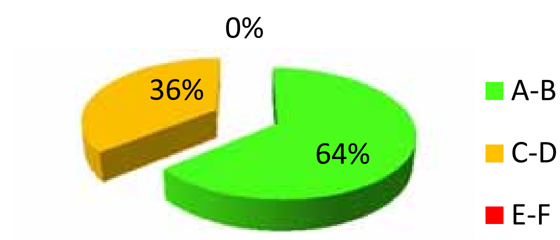
→ → → → →



Summary PM

A - B	(16)	64%
C - D	(09)	36%
E - F	(00)	00%
Total	**(23)**	**100%**

→ → → → →



VIII.1.3. Alternative III. Overpasses on Montana plus more connectivity

ARTERIAL LEVEL OF SERVICE

Table 24. Parcels A and B in 2015 Mitigation scenario. AM and PM Arterial levels of service. Alternative III

Alternative III - AM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	III	35	17.1	4.6	21.7	0.13	22.2	C
Lee Trevino	III	35	60.5	12.2	72.7	0.59	29.2	B
G. Dieter	III	35	124.3	37.2	161.5	1.21	26.9	B
Lee Blvd	III	35	60.3	18.4	78.7	0.50	23.0	C
Kleinfeld	III	35	61.8	15.8	77.6	0.52	23.9	C
Joe Battle SB	III	35	101.4	32.9	134.3	0.99	26.4	B
Joe Battle NB	III	35	8.3	0.9	9.2	0.06	22.5	C
Total	III		433.7	122.0	555.7	3.99	25.9	B

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	III	35	24.5	23.8	48.3	0.20	15.2	D
Joe Battle SB	III	35	8.3	4.0	12.3	0.06	16.8	D
Kleinfeld	III	35	101.4	12.3	113.7	0.99	31.2	A
	III	35	61.8	16.0	77.8	0.52	23.8	C
G. Dieter	III	35	60.3	48.9	109.2	0.50	16.6	D
Lee Trevino	III	35	124.3	13.0	137.3	1.21	31.7	A
Yarbrough	III	35	60.5	6.0	66.5	0.59	31.9	A
Total	III		441.1	124.0	565.1	4.06	25.9	B

Alternative III - PM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough	III	35	17.1	13.5	30.6	0.13	15.7	D
Lee Trevino	III	35	60.6	11.6	72.2	0.59	29.4	B
G. Dieter	III	35	124.2	25.5	149.7	1.21	29.1	B
Lee Blvd	III	35	60.3	11.1	71.4	0.50	25.3	B
Kleinfeld	III	35	61.8	16.9	78.7	0.52	23.6	C
Joe Battle SB	III	35	101.4	30.4	131.8	0.99	26.9	B
Joe Battle NB	III	35	8.3	0.1	8.4	0.06	24.6	B
Total	III		433.7	109.1	542.8	3.99	26.5	B

Arterial Level of Service: WB Montana

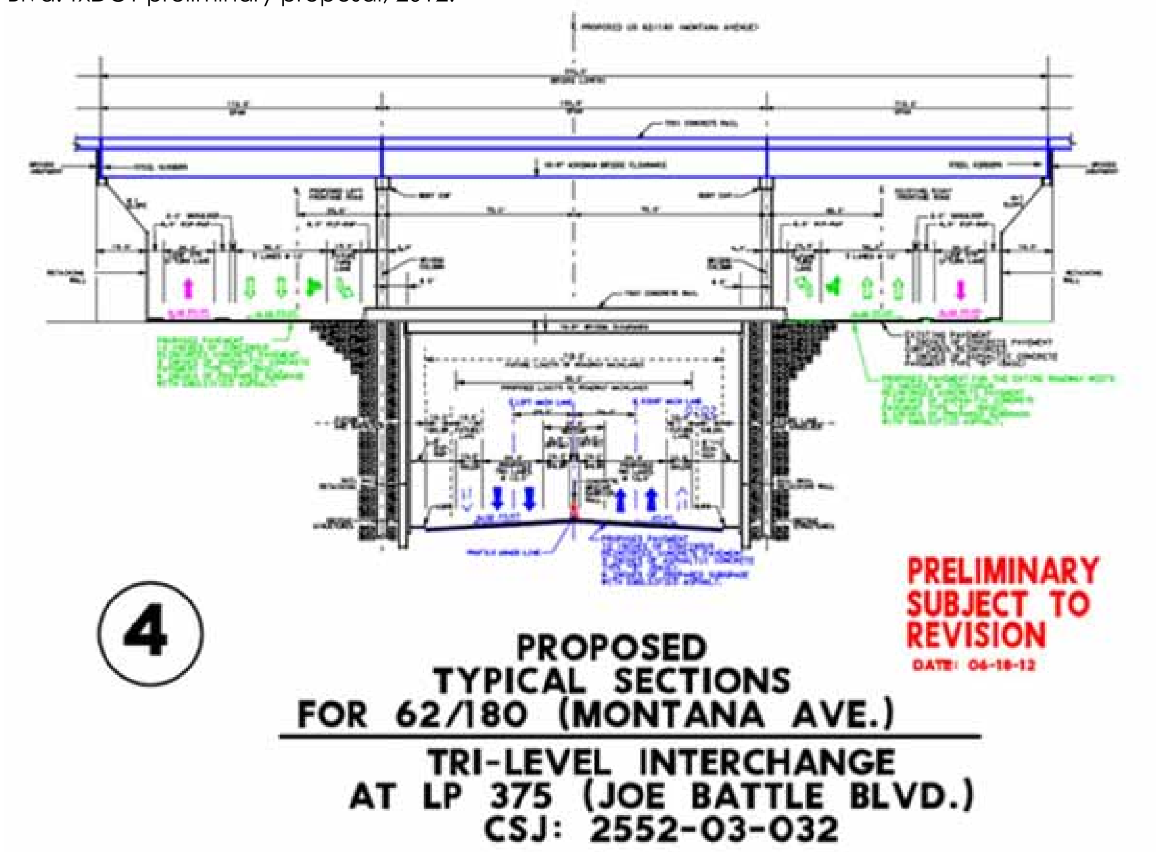
Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	III	35	24.5	21.8	46.3	0.20	15.8	D
Joe Battle SB	III	35	8.3	4.6	12.9	0.06	16.0	D
Kleinfeld	III	35	101.4	12.3	113.7	0.99	31.2	A
	III	35	61.8	12.8	74.6	0.52	24.9	B
G. Dieter	III	35	60.3	80.7	141.0	0.50	12.8	E
Lee Trevino	III	35	124.2	3.5	127.7	1.21	34.1	A
Yarbrough	III	35	60.6	16.8	77.4	0.59	27.4	B
Total	III		441.1	152.5	593.6	4.06	24.6	B

ICRC

VIII.1.4. Alternative IV. Viaduct under Montana Avenue

A viaduct would extend west, from Loop 375 to Global Reach/Yarbrough, the underground characteristics of Montana Avenue's Center lanes proposed by TxDOT at the Montana Ave. and LP 375 (Joe Battle Bd.) interchange. Such a tunnel has the highest construction costs of 4 alternatives but needs less Right of Way when other transportation modes are included, by liberating at grade level space for turning movements and transit use without structural supports and ramps' restrictions.

Fig.81. Cross section of Tri-level interchange in Montana Ave. and Joe Battle Blvd. TxDOT preliminary proposal, 2012.

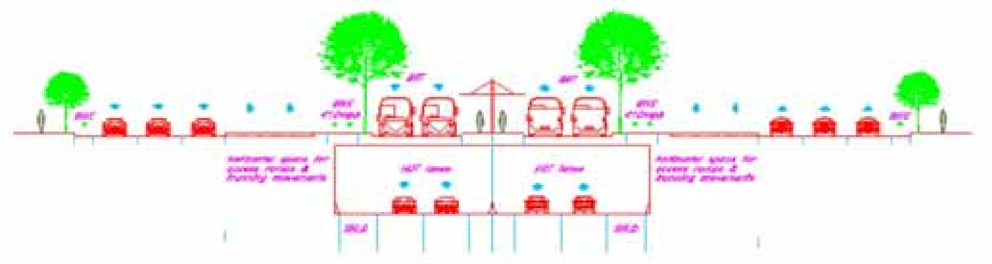


Source: Texas Department of Transportation, June 2012

VIII.1.4. Alternative IV. Viaduct under Montana Avenue

Since a viaduct generates controlled access center lanes and low speed frontage roads, its traffic performance is similar to that of options II and III flyovers. However, by liberating the street level, more connectivity and types of turns become available, thus we added median left turns and new thoroughfares indicated in option I. In the model, 90% of through traffic is removed from the signalized intersection and channeled through the viaduct, as in alternatives II and III. A center located BRT could also be eventually incorporated with additional road space and without conflict with traffic.

Fig.82. Cross section of an underground viaduct proposed for Montana and example of a similar underground solution from a Guadalajara, Mexico project.



VIII.1.4. Alternative IV. Viaduct under Montana Avenue

Peak Hour - AM

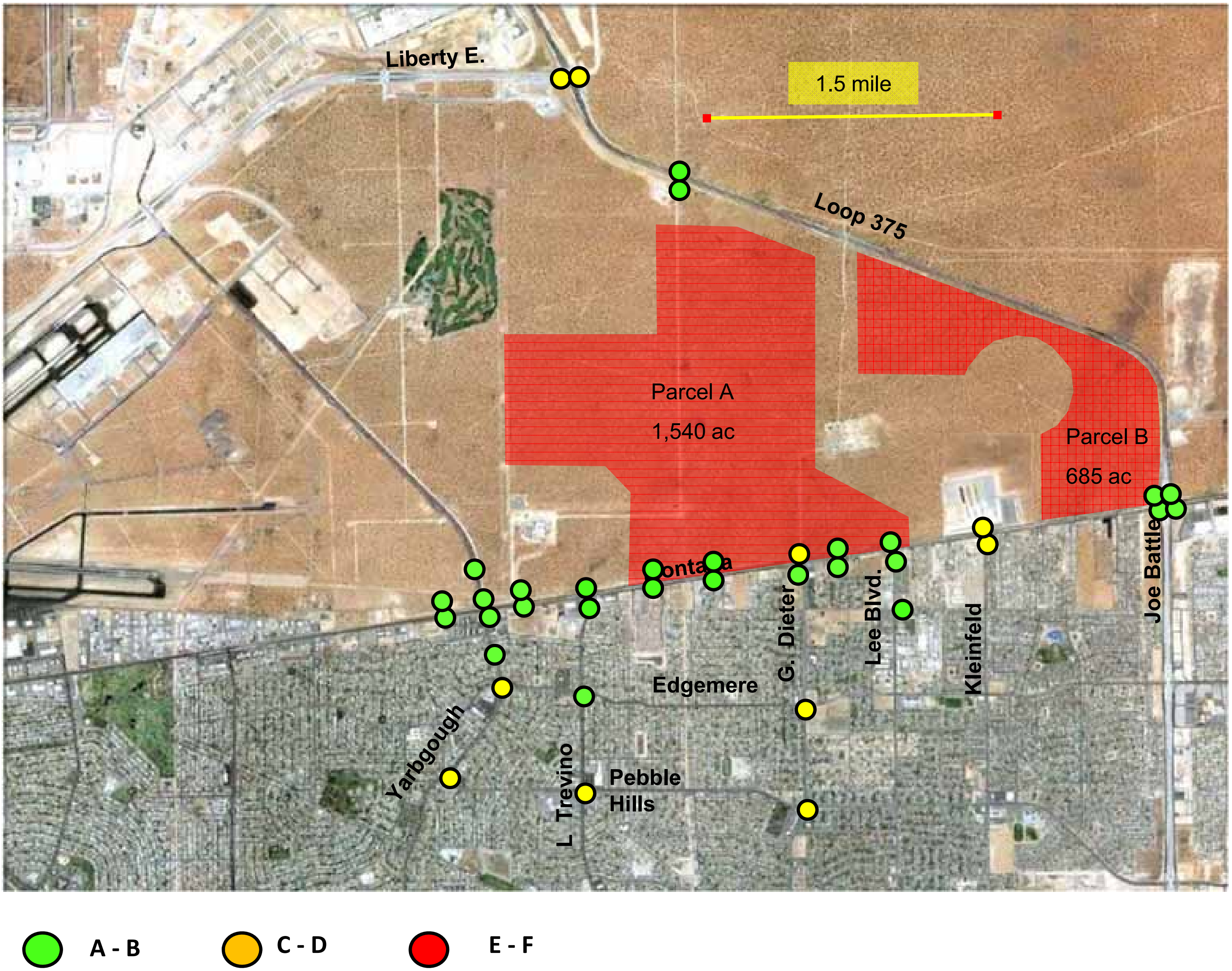


Fig.83. Resulting levels of service in alternative IV(AM peak hour)

VIII.1.4. Alternative IV. Viaduct under Montana Avenue

Peak Hour - PM

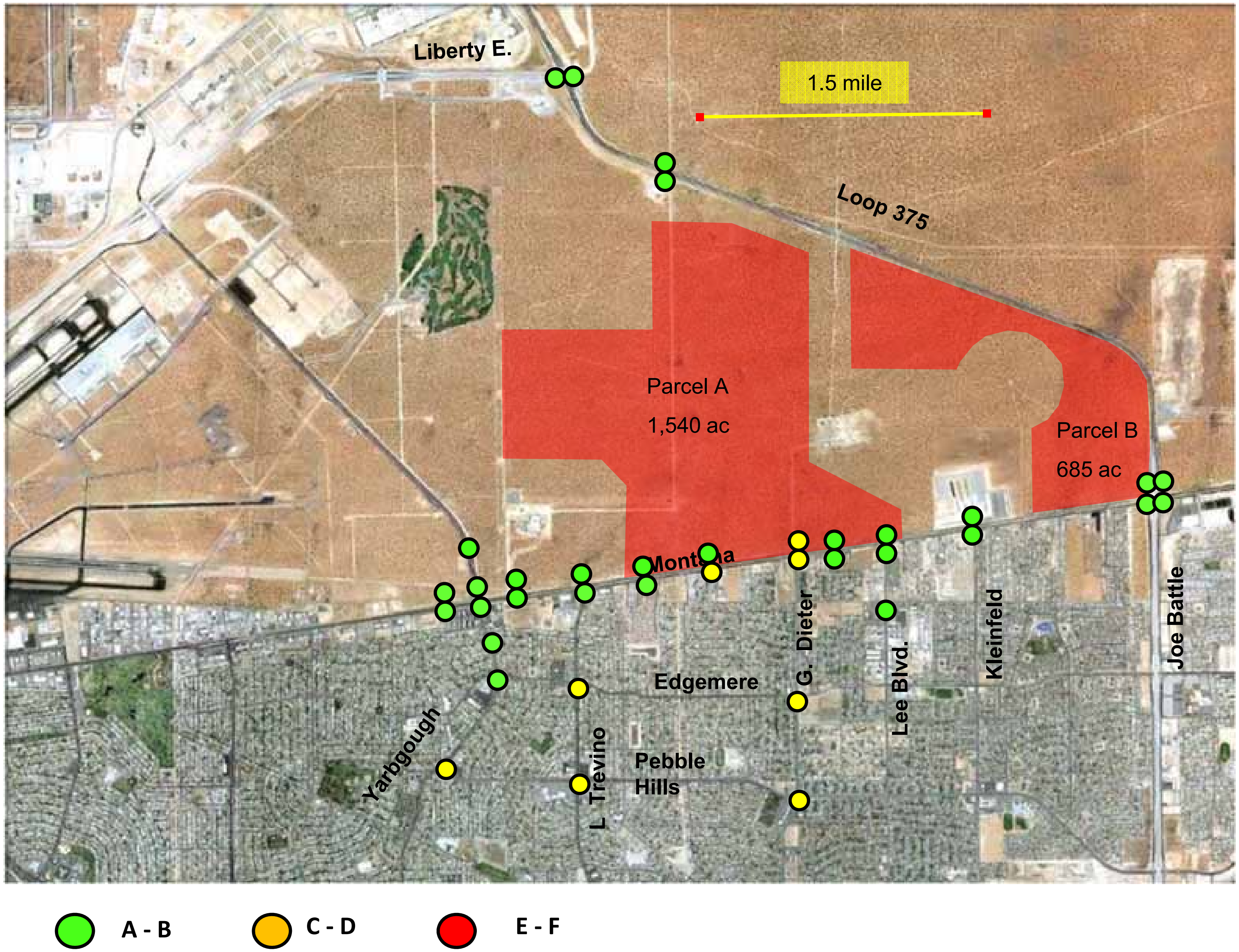


Fig.84. Resulting levels of service in alternative IV(PM peak hour)

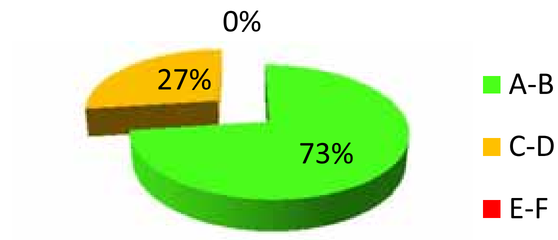
VIII.1.4. Alternative IV. Viaduct under Montana Avenue

Fig.85. Summary of levels of service in alternative IV

Summary AM

A - B	(27)	73%
C - D	(10)	27%
E - F	(00)	00%
Total	**(37)**	**100%**

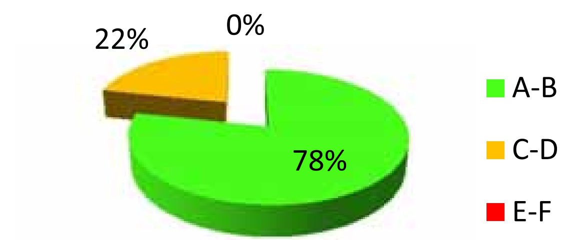
→ → → → →



Summary PM

A - B	(29)	78%
C - D	(08)	22%
E - F	(00)	0%
Total	**(37)**	**100%**

→ → → → →



VIII.1.4. Alternative IV. Viaduct under Montana Avenue

ARTERIAL LEVEL OF SERVICE

Table 25. Parcels A and B in 2015 Mitigation scenario. AM and PM Arterial levels of service**.**
Alternative IV

Alternative IV - AM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough (U-Turn W)	III	35	12.8	4.6	17.4	0.10	19.7	C
Yarbrough	III	35	15.3	3.1	18.4	0.11	22.2	C
Yarbrough (U-Turn E)	III	35	16.9	3.1	20.0	0.13	23.8	C
Lee Trevino	III	35	54.8	4.5	59.3	0.46	27.7	B
A	III	35	36.1	10.8	46.9	0.30	23.1	C
B	III	35	40.8	18.2	59.0	0.34	20.7	C
G. Dieter	III	35	58.4	28.6	87.0	0.57	23.6	C
G. Dieter (U-Turn E)	III	35	21.0	0.1	21.1	0.16	28.0	B
Lee Blvd	III	35	40.6	14.2	54.8	0.34	22.2	C
Kleinfeld	III	35	61.8	14.4	76.2	0.52	24.3	B
Joe Battle SB	III	35	101.4	32.6	134.0	0.99	26.5	B
Joe Battle NB	III	35	8.3	4.7	13.0	0.06	15.9	D
Total	III		468.2	138.9	607.1	4.07	24.1	B

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	III	35	24.5	23.4	47.9	0.20	15.3	D
Joe Battle SB	III	35	8.3	19.0	27.3	0.06	7.6	F
Kleinfeld	III	35	101.4	16.0	117.4	0.99	30.2	A
Lee Blvd	III	35	61.8	19.1	80.9	0.52	22.9	C
G. Dieter (U-Turn E)	III	35	40.6	5.2	45.8	0.34	26.6	B
G. Dieter	III	35	21.0	26.6	47.6	0.16	12.4	E
B	III	35	58.4	20.6	79.0	0.57	25.9	B
A	III	35	40.8	16.4	57.2	0.34	21.4	C
Lee Trevino	III	35	36.1	5.0	41.1	0.30	26.4	B
Yarbrough (U-Turn E)	III	35	54.8	0.3	55.1	0.46	29.8	B
Yarbrough	III	35	16.9	3.4	20.3	0.13	23.4	C
Yarbrough (U-Turn W)	III	35	15.3	0.2	15.5	0.11	26.3	B
Total	III		479.9	155.2	635.1	4.17	23.7	C

Alternative IV - PM

Arterial Level of Service: EB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Yarbrough (U-Turn W)	III	35	12.8	3.2	16.0	0.10	21.4	C
Yarbrough	III	35	15.3	16.6	31.9	0.11	12.8	E
Yarbrough (U-Turn E)	III	35	16.9	4.3	21.2	0.13	22.4	C
Lee Trevino	III	35	54.8	4.5	59.3	0.46	27.7	B
A	III	35	36.1	6.4	42.5	0.30	25.5	B
B	III	35	40.8	7.0	47.8	0.34	25.6	B
G. Dieter	III	35	58.4	17.4	75.8	0.57	26.9	B
G. Dieter (U-Turn E)	III	35	21.0	3.0	24.0	0.16	24.6	B
Lee Blvd	III	35	40.6	9.8	50.4	0.34	24.2	B
Kleinfeld	III	35	61.8	21.4	83.2	0.52	22.3	C
Joe Battle SB	III	35	101.4	37.7	139.1	0.99	25.5	B
Joe Battle NB	III	35	8.3	0.1	8.4	0.06	24.6	B
Total	III		468.2	131.4	599.6	4.07	24.4	B

Arterial Level of Service: WB Montana

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Joe Battle NB	III	35	24.5	38.5	63.0	0.20	11.6	E
Joe Battle SB	III	35	8.3	0.5	8.8	0.06	23.5	C
Kleinfeld	III	35	101.4	16.1	117.5	0.99	30.2	A
Lee Blvd	III	35	61.8	14.4	76.2	0.52	24.3	B
G. Dieter (U-Turn E)	III	35	40.6	5.0	45.6	0.34	26.7	B
G. Dieter	III	35	21.0	16.3	37.3	0.16	15.8	D
B	III	35	58.4	13.7	72.1	0.57	28.3	B
A	III	35	40.8	15.8	56.6	0.34	21.6	C
Lee Trevino	III	35	36.1	4.6	40.7	0.30	26.6	B
Yarbrough (U-Turn E)	III	35	54.8	0.0	54.8	0.46	30.0	B
Yarbrough	III	35	16.9	15.9	32.8	0.13	14.5	D
Yarbrough (U-Turn W)	III	35	15.3	0.1	15.4	0.11	26.5	B
Total	III		479.9	140.9	620.8	4.17	24.2	B

VIII.1.5. Evaluation of alternatives I-IV

Concept Evaluation

Table 26. Concept evaluation of alternatives I-IV

	Support of City's Smart Growth Policies	Signalized intersections levels of service	Pedestrian Oriented Design	Capital savings	Maintains transportation habits unchanged
I	High	Moderate	High	High	Low
II	Low	Moderate	Low	Low	High
III	Low	High	Low	Low	High
IV	High	High	High	Very low	Moderate

High Moderate Low Very low

VIII.1.5. Evaluation of alternatives I-IV

CONCEPT EVALUATION

Concept evaluation is broad and mainly qualitative. It is focused on short term results, but considers smart growth issues adopted by the City of El Paso. In general terms, Alternatives I and IV are more transit and pedestrian oriented, since they provide more connectivity and diffused accessibility. Shorter distance between crossings, absence of access and exit ramps and avoided conflict in intersections between pedestrians and left turns show options I and IV, as safer and friendlier for pedestrians.

Disadvantages of Alternative I are restrictions in left turns and longer driving distance while going left. It may prove confusing or disorienting, and definitely needs the public to adapt to new driving practices. The experience of Plano, TX shows that it takes some time for drivers to get used to this type of indirect left turns.

A doubtful condition for Alternatives II, III and IV has to do with ROW limitations west of Yarbrough/Global Reach. Montana freeway stopping at Yarbrough needs a long detour to connect to I-10. Longer driving distance may reduce demand and impact air quality.

Concerning capital costs Alternative I is the least expensive, and Alternative IV the most costly. The same results can be assumed for implementation time: Alternative I the quicker to build, and Alternative IV the one taking longer.

Landscape and urbanscape are affected the least by Alternatives I and IV and would be most negatively affected by Alternatives II and III, by the series of overpasses. This would be particularly disruptive in smart growth oriented urban settings, where buildings are located close or by the property line.

In the long term, and supposing a BRT or LRT line is implemented, the most conflicting solutions are II and III: 1) access to bus stops or LRT stations normally takes place in major crossings, where traffic left movements take place, 2) Center lanes access and exit ramps would limit pedestrian accessibility, 3) Elevated structure may constrain BRT/LRT's stations and operation, 4) Additional ROW needed.

On the other hand, a BRT or LRT line, would reduce arterial capacity for traffic in Alternative I, since at least two traffic lanes would be transferred from vehicle to transit mobility.

VIII.2. 2015 Mitigation scenario. Parcel C

The do-nothing scenario for Parcel C showed low levels of service on Wilson avenue in AM peak hour and at Dyer and Wilson in PM. E level of service was present in Wilson and Gateway south AM and D level in Wilson and Russell. PM do-nothing scenario showed F levels of service on Wilson and Gateway (southbound lanes) and on Broaddus and Dyer.

Mitigation actions eliminates E and F levels and produces a significant increase in A and B levels (89% for AM peak hour and 67% for PM peak hour)

To reduce the traffic volume at the Wilson and Pipes access, two new entrances to Parcel C are proposed: 1) Fred Wilson and 2) Lackland Hayes and Eastman.

In Parcel C area, optimization improved traffic light operation and levels of service.

Fig.86. Mitigation actions for Parcel C

Access Parcel C	Street
Wilson	Pipes
Wilson	Lackland
Hayes	Eastman/Russell

Table 27. Proposed new entrances for Parcel C

VIII.2. 2015 Mitigation scenario. Parcel C

As a result of the additional connections, access traffic was redistributed according to the following tributary areas criteria:

Fig.87. Tributary areas for Parcel C

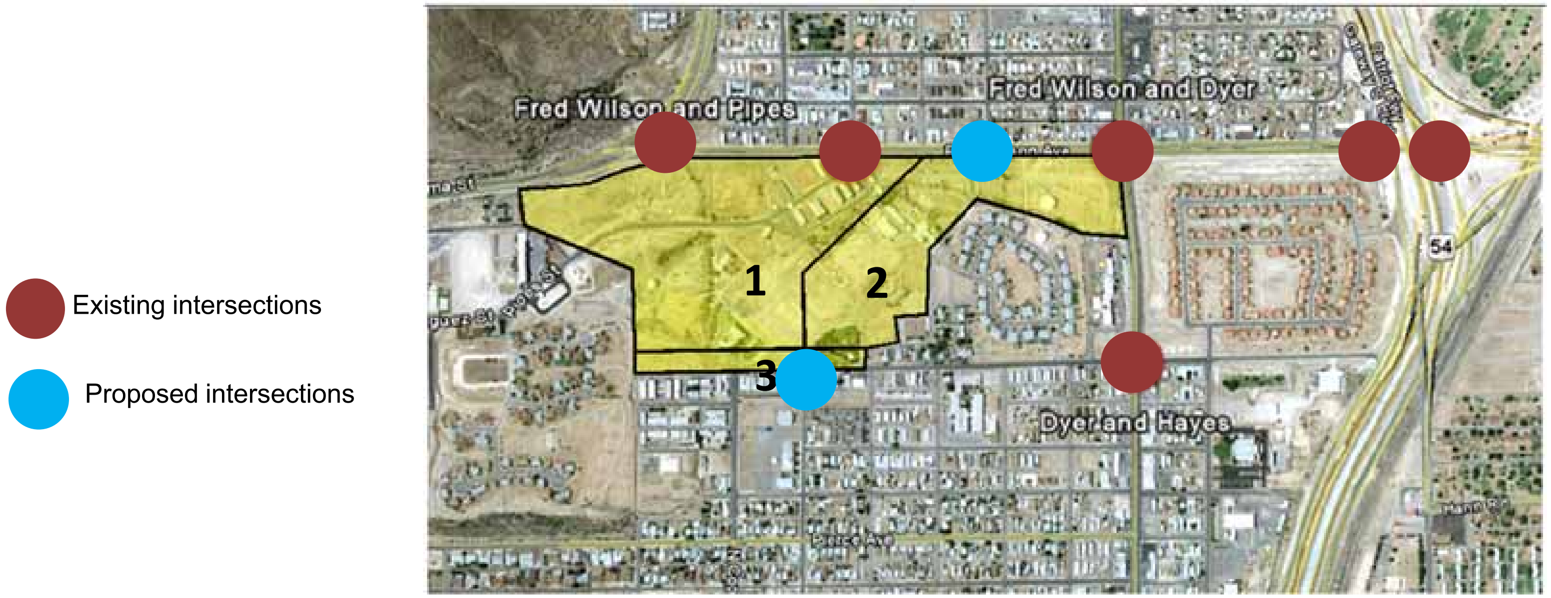


Table 28. Redistribution of traffic volumes for Parcel C

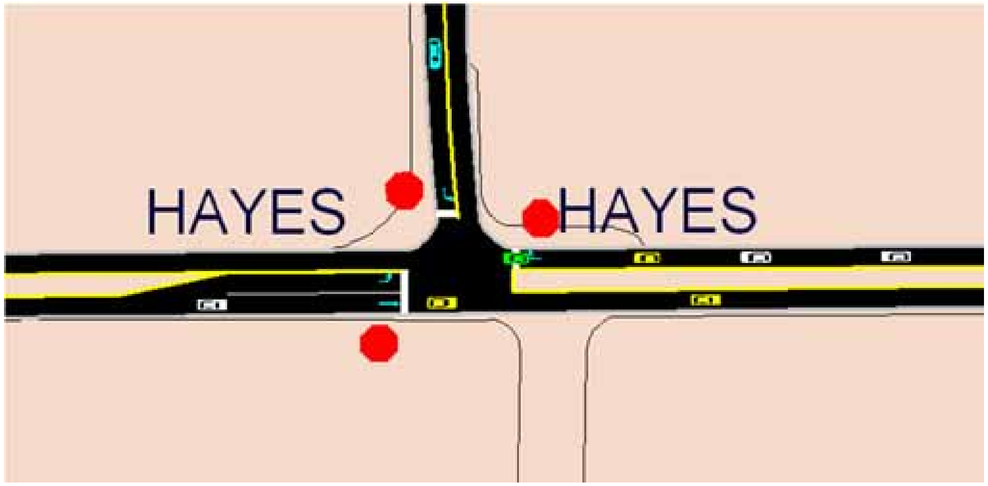
	%	total vehicles in	total Vehicles out	vehicles in (by area)	vehicles OUT (by area)	Total vehicles other left and right turns	Other vehicles (by area)
Area 1	58.32	239	705	139.3842448	411.1543624	28	16.32953
Area 2	35.52			84.90096625	250.4400887		9.946557
Area 4	6.16			14.7147889	43.40554886		1.723908
total area	100.00			239	705		28

VIII.2. 2015 Mitigation scenario. Parcel C

A new traffic light is anticipated at Wilson and Lackland, and left turn lanes are proposed for vehicles going eastbound and westbound. At Hayes, a non signalized intersections is enough.

Fig.88. New intersection at Lackland and Wilson

Fig.89. New intersection at Hayes and Eastman



VIII.2. 2015 Mitigation scenario. Parcel C

Table 29. Mitigation actions for Parcel C

Scenario 4 Parcel C alone			
Intersection		**Direction**	**Mitigation actions**
Fred Wilson	Gateway (Northbound)		
		NB	Northbound right lane distance extended, Extra northbound through lane added, Extension of left turn only lane, U turn lane changed to U turn and left
		WB	optimize
		EB	optimize
		SB	Right turn lane extended, addditional Southbound through lane near the intersection, Extension of left turn only lane, U turn lane changed to U turn and left
		WB	optimize
		EB	Additional Right turn lane using the shoulder of Wilson Ave.
Dyer	Hayes	NB	optimize
		SB	optimize
		WB	optimize
		EB	optimize
Dyer	Broaddus	NB	Additional only left turn lane
		SB	Additional only left turn lane
		WB	optimize

Scenario 4 Parcel C alone			
Intersection		**Direction**	**Mitigation actions**
Fred Wilson	Pipes (Russell)	NB	optimize
		SB	optimize
		WB	Left turn lane extended
		EB	Left turn lane extended
Fred Wilson	Dyer	NB	Longer accumulation distance for left turn provided
		SB	Longer accumulation distance for left turn provided
		WB	Longer accumulation distance for left turn provided
		EB	optimize
		NB	optimize
		SB	optimize
		WB	optimize
Fred Wilson	Lackland	NB	Lackland northbound lanes extended to enter parcel C
		SB	Lackland southbound lanes extended to enter parcel C
		WB	No changes
		EB	Proposed new left turn lane for access to parcel C
Hayes	Eastman	SB	Left turn only to exit parcel C (1 lane)
		WB	no changes
		EB	Left turn extra lane created for access to Parcel C

VIII.2. 2015 Mitigation scenario. Parcel C

Fig. 90. Parcel C in 2015 Mitigation scenario. AM levels of service

Peak Hour - AM

VIII.2. 2015 Mitigation scenario. Parcel C

Fig. 91. Parcel C in 2015 Mitigation scenario. PM levels of service

A - B   C - D   E - F

Peak Hour - PM

ICRC

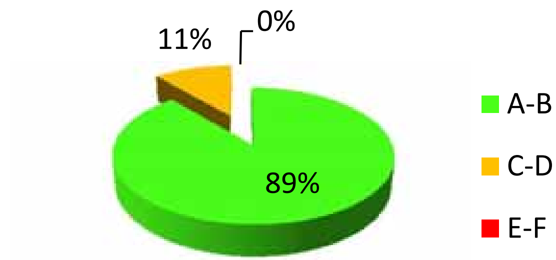
VIII.2. 2015 Mitigation scenario. Parcel C

Fig.92 . Parcel C in 2015 Mitigation scenario. AM and PM levels of service

Summary Future AM

A - B	(8)	88%
C - D	(1)	11%
E - F	(0)	0%
Total	**(9)**	**100%**

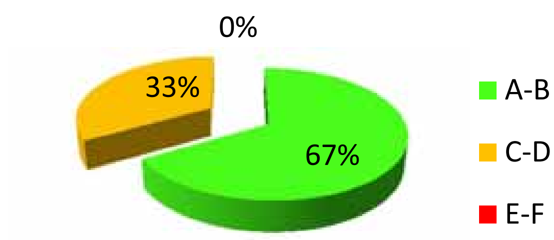
→ → → → →



Summary Future PM

A - B	(6)	67%
C - D	(3)	33%
E - F	(0)	0%
Total	**(9)**	**100%**

→ → → → →



VIII.2. 2015 Mitigation scenario. Parcel C

ARTERIAL LEVEL OF SERVICE

Table 30. Parcel C in 2015 Mitigation scenario. AM and PM Arterial levels of service.

Mitigation AM

Arterial Level of Service: NB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
HAYES	III	31	9.0	6.9	15.9	0.06	13.1	E
WILSON	III	31	36.2	15.7	51.9	0.28	19.8	C
BROADDUS	III	31	40.1	4.2	44.3	0.32	25.7	B
Total	III		85.3	26.8	112.1	0.66	21.1	C

Arterial Level of Service: SB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BROADDUS	III	31	14.8	4.6	19.4	0.11	19.5	C
WILSON	III	31	40.1	19.7	59.8	0.32	19.0	C
HAYES	III	31	36.2	6.3	42.5	0.28	24.1	B
Total	III		91.1	30.6	121.7	0.71	20.9	C

Arterial Level of Service: EB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
RUSSELL	II	40	29.6	18.4	48.0	0.27	20.2	D
LACKLAND	II	40	20.8	5.3	26.1	0.18	24.9	C
DYER	II	40	20.5	21.1	41.6	0.18	15.4	E
GWY S	II	40	36.3	31.4	67.7	0.37	19.5	D
GWY N	II	40	8.2	0.2	8.4	0.07	30.5	B
Total	II		115.4	76.4	191.8	1.07	20.0	D

Arterial Level of Service: WB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GWY N	II	40	17.2	28.7	45.9	0.15	11.7	F
GWY S	II	40	8.2	1.0	9.2	0.07	27.9	C
DYER	II	40	36.3	27.7	64.0	0.37	20.6	D
LACKLAND	II	40	20.5	5.4	25.9	0.18	24.8	C
RUSSELL	II	40	20.8	7.4	28.2	0.18	23.0	C
ALABAMA	II	40	29.6	18.7	48.3	0.27	20.0	D
Total	II		132.6	88.9	221.5	1.22	19.8	D

Mitigation PM

Arterial Level of Service: NB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
HAYES	III	31	9.0	5.5	14.5	0.06	14.3	D
WILSON	III	31	36.2	22.3	58.5	0.28	17.5	D
BROADDUS	III	31	40.1	16.9	57.0	0.32	19.9	C
Total	III		85.3	44.7	130.0	0.66	18.2	C

Arterial Level of Service: SB DYER

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
BROADDUS	III	31	23.9	9.4	33.3	0.19	20.3	C
WILSON	III	31	40.1	17.7	57.8	0.32	19.7	C
HAYES	III	31	36.2	5.2	41.4	0.28	24.8	B
Total	III		100.2	32.3	132.5	0.79	21.4	C

Arterial Level of Service: EB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
RUSSELL	II	40	29.6	15.2	44.8	0.27	21.6	D
LACKLAND	II	40	20.7	9.3	30.0	0.18	21.6	D
DYER	II	40	20.6	25.1	45.7	0.18	14.1	E
GWY S	II	40	36.3	34.5	70.8	0.37	18.7	D
GWY N	II	40	8.2	0.2	8.4	0.07	30.5	B
Total	II		115.4	84.3	199.7	1.07	19.2	D

Arterial Level of Service: WB WILSON

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
GWY N	II	40	17.2	38.7	55.9	0.15	9.6	F
GWY S	II	40	8.2	0.5	8.7	0.07	29.5	B
DYER	II	40	36.3	23.8	60.1	0.37	22.0	D
LACKLAND	II	40	20.6	7.1	27.7	0.18	23.2	C
RUSSELL	II	40	20.7	7.3	28.0	0.18	23.1	C
ALABAMA	II	40	29.6	18.4	48.0	0.27	20.2	D
Total	II		132.6	95.8	228.4	1.22	19.2	D

IX. COMPARED RESULTS AND CONCLUSION

Future traffic in parcel C or B alone may be addressed by a series of measures that do not involve major infrastructure investments by 2015. At grade solutions including additional street connectivity, traffic control improvements and modified street geometry, allow for acceptable levels of service.

Development of parcels A and B together has a high impact on peak hour trips and was evaluated under 4 alternatives:

I. Low cost, at grade solutions plus connectivity
II. Overpasses on Montana Avenue
III. Overpasses on Montana Avenue plus more connectivity
IV. A viaduct extending the Montana/Loop 375 under pass

All of the proposed alternatives for A plus B development achieve acceptable levels of service, even the at grade alternative. Alternative III benefits from added connectivity, as compared to II.

Each option has advantages and disadvantages. A resolution concerning the most useful type of road will have to decide on whether Montana should be car-oriented or transit/pedestrian oriented, since in this case, solutions that are more favorable to one mode of transportation are less favorable to the other. Montana as a freeway could help regional vehicle mobility and attract more traffic, while Montana as a public transportation corridor puts constraints on private transportation modes.

From a sustainable point of view, public transportation and non motorized modes represent a better use of infrastructure, and mobilize more effectively and less expensively, but they represent a series of public challenges: changing driving habits and restrictions in roads shared with public transportation systems and high flow of pedestrians.

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IX.1. Compared results for intersections in Parcels A and B: Current, Full build (do nothing) and Mitigation alternatives I, II, III and IV

Table 31. Compared LOS and delay results in parcels A and B (AM peak-hour)

(AM - LOS and Delay)		Current Condition		Do Nothing		Option I		Node North – South	Option II		Option III		Option IV	
Intersection		LOS	Delay	LOS	Delay	LOS	Delay		LOS	Delay	LOS	Delay	LOS	Delay
Loop 375 (Southbound)	Montana Ave	B	16.3	C	26.3	C	23.9	North	B	16.0	B	15.0	B	12.3
								South	B	12.4	B	10.3	A	9.1
Loop 375 (Northbound)	Montana Ave	B	19.7	C	21.5	B	19.3	North	A	4.7	A	7.3	A	9.5
								South	B	18.5	B	18.0	B	19.8
Saul Kleinfeld	Montana Ave	C	28.7	C	32.4	C	28.3	North	B	16.9	B	19.5	C	22.1
								South	C	22.8	B	12.7	C	25.0
George Dieter	Montana Ave	D	44.8	F	2360.1	C	36.6	North	F	269.4	D	42.7	C	28.1
								South	E	65.7	D	40.5	B	18.7
Lee Trevino	Montana Ave	D	36.6	F	189.7	D	54.6	North	A	6.9	A	6.7	B	12.6
								South	B	17.5	B	17.4	B	19.6
Global Reach (Yarbrough)	Montana Ave	F	88.4	F	207.1	C	45.3	North	D	42.9	D	47.1	B	18.4
								South	D	31.4	D	36.2	B	11.0
Lee Blvd	Montana Ave	C	28.9	D	44.9	C	30.1	North	B	19.3	B	19.9	B	18.8
								South	B	15.7	B	19.4	B	15.8
New avenue (A)	Montana Ave	NOT APPLICABLE		NOT APPLICABLE		C	31.9	North	NOT APPLICABLE		NOT APPLICABLE		B	14.2
								South					B	11.4
New avenue (B)	Montana Ave	NOT APPLICABLE		NOT APPLICABLE		C	33.2	North	NOT APPLICABLE		NOT APPLICABLE		A	9.2
								South					B	15.0

IX.1. Compared results for intersections in Parcels A and B: Current, Full build (do nothing) and Mitigation alternatives I, II, III and IV

Table 32. Compared LOS and delay results in parcels A and B (PM peak-hour)

(PM - LOS and Delay)		Current Condition		Do Nothing		Option I		Node North - Sohuth	Option II		Option III		Option IV	
Intersection		LOS	Delay	LOS	Delay	LOS	Delay		LOS	Delay	LOS	Delay	LOS	Delay
Loop 375 (Southbound)	Montana Ave	C	34.2	D	43.3	C	23.9	North	B	15.7	B	11.3	A	5.5
								South	A	5.0	A	5.5	B	19.2
Loop 375 (Northbound)	Montana Ave	B	17.3	B	19.4	B	19.3	North	A	5.0	B	9.0	B	19.2
								South	B	17.7	B	18.6	A	5.4
Saul Kleinfeld	Montana Ave	B	19.8	C	21.5	C	28.3	North	B	14.9	B	14.5	B	16.1
								South	B	13.7	B	13.7	B	13.1
George Dieter	Montana Ave	B	15.7	F	739.8	C	36.6	North	F	142.6	C	31.7	D	54.8
								South	F	141.2	D	44.3	B	26.6
Lee Trevino	Montana Ave	D	43.7	F	161.4	D	54.6	North	C	21.7	B	11.7	B	14.3
								South	B	11.9	B	13.1	B	12.3
Global Reach (Yarbrough)	Montana Ave	F	101.6	F	224.8	C	45.3	North	D	44.2	C	30.3	B	12.6
								South	D	39.1	D	49.4	B	19.6
Lee Blvd	Montana Ave	B	11.9	B	10.7	C	30.1	North	B	16.9	B	18.8	B	17.5
								South	B	14.9	B	15.0	B	16.0
New avenue (A)	Montana Ave	NOT APPLICABLE		NOT APPLICABLE		C	31.9	North	NOT APPLICABLE		NOT APPLICABLE		A	9.4
								South					B	13.0
New avenue (B)	Montana Ave	NOT APPLICABLE		NOT APPLICABLE		C	33.2	North	NOT APPLICABLE		NOT APPLICABLE		B	10.5
								South					B	17.5

IX.1. Compared results for intersections in Parcel C: Current, Full build (do nothing) and Mitigation

Table 33. Compared LOS and delay results in parcel C (AM peak-hour)

Intersection		CURRENT CONDITION (AM - LOS and Delay) Scenario 4 Parcel C alone		(2015) DO NOTHING (AM - LOS and Delay) Scenario 4 Parcel C alone		(2015) MITIGATION (AM - LOS and Delay) Scenario 4 Parcel C alone	
		LOS	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*
Fred Wilson	Gateway (Northbound)	C	21.2	C	23.1	B	17.3
Fred Wilson	Gateway (Southbound)	D	45.4	E	62.2	B	18.0
Dyer	Hayes	B	11.3	B	12.3	A	9.7
Dyer	Broaddus	A	5.9	A	6	A	5.9
Fred Wilson	Pipes (Russell)	D	39	D	49.9	B	16.5
Fred Wilson	Dyer	D	35.5	C	33.6	C	23.8
Fred Wilson	Alabama	B	18.7	C	20.5	B	15.8
Fred Wilson	Lackland	NOT APPLICABLE		NOT APPLICABLE		A	8.0
Hayes	Eastman					A	8.4

IX.1. Compared results for intersections in Parcel C: Current, Full build (do nothing) and Mitigation

Table 34. Compared LOS and delay results in parcel C (PM peak-hour)

		CURRENT CONDITION		(2015) DO NOTHING		(2015) MITIGATION	
		(PM - LOS and Delay)		(PM - LOS and Delay)		(PM - LOS and Delay)	
Intersection		Parcel C alone		Parcel C alone		Parcel C alone	
		LOS	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*
Fred Wilson	Gateway (Northbound)	C	24.1.	C	26.2	C	23.8
Fred Wilson	Gateway (Southbound)	F	101.2	F	127.7	C	23.4
Dyer	Hayes	A	7.9	A	8.5	A	7.1
Dyer	Broaddus	E	63.5	F	93	B	14.6
Fred Wilson	Pipes (Russell)	B	19.4	C	23.1	B	10.7
Fred Wilson	Dyer	C	33.3	C	34.6	C	25.6
Fred Wilson	Alabama	B	13.3	B	13.8	B	12.3
Fred Wilson	Lackland	NOT APPLICABLE		NOT APPLICABLE		A	8.9
Hayes	Eastman					A	8.0

IX.2. Roadway analysis. Compared results for arterials in Parcels A and B: Current, Full build (do nothing) and Mitigation alternatives I, II, III and IV

Table 35. Compared results for arterials Parcels A and B (AM peak-hour)

Montana level of service (AM)

		Current Condition	Do Nothing	Option I	Option II	Option III	Option IV
EB	Class	1	1	1	3	3	3
	Flow Speed	55	55	55	35	35	35
	Running Time	275.1	275.1	316.0	433.8	433.7	468.2
	Signal Delay	161.9	150.8	148.8	124.2	122.0	138.9
	Travel Time (s)	437.0	425.9	464.8	558.0	555.7	607.1
	Dist (mi)	3.99	3.99	4.07	3.99	3.99	4.07
	Arterial Speed	32.9	33.7	31.5	25.8	25.9	24.1
	LOS	C	C	C	B	B	B
WB	Class	1	1	1	3	3	3
	Flow Speed	55	55	55	35	35	35
	Running Time	281.9	281.9	326.6	441.2	441.7	479.9
	Signal Delay	167.7	703.2	276.6	160.8	124.0	155.2
	Travel Time (s)	449.6	985.1	603.2	602.0	565.1	635.1
	Dist (mi)	4.06	4.06	4.17	4.05	4.06	4.17
	Arterial Speed	32.5	14.8	24.9	24.3	25.9	23.7
	LOS	C	F	D	B	B	C

IX.2. Roadway analysis. Compared results for arterials in Parcels A and B: Current, Full build (do nothing) and Mitigation alternatives I, II, III and IV

Table 36. Compared results for arterials Parcels A and B (PM peak-hour)

Montana level of service (PM)

		Current Condition	Do Nothing	Option I	Option II	Option III	Option IV
EB	Class	1	1	1	3	3	3
	Flow Speed	55	55	55	35	35	35
	Running Time	289.5	289.5	332.9	434.0	433.7	468.2
	Signal Delay	175.1	838.8	349.7	136.9	109.1	131.4
	Travel Time (s)	464.6	1,128.3	682.6	570.7	542.8	599.0
	Dist (mi)	4.16	4.16	4.16	3.99	3.99	4.07
	Arterial Speed	32.2	13.3	21.9	25.2	26.5	24.4
	LOS	C	F	D	B	B	B
WB	Class	1	1	1	3	3	3
	Flow Speed	55	55	55	35	35	35
	Running Time	281.8	281.8	339.8	441.2	441.1	479.9
	Signal Delay	97.4	161.4	114.9	139.0	152.5	140.9
	Travel Time (s)	379.2	443.2	454.7	580.2	593.6	620.8
	Dist (mi)	4.06	4.06	4.23	4.06	4.06	4.17
	Arterial Speed	38.6	33.0	33.5	25.2	24.6	24.2
	LOS	B	C	C	B	B	B

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IX.2. Roadway analysis. Compared results for arterials in Parcel C: Current, Full build (do nothing) and Mitigation

Table 37. Compared results for arterials Parcel C (AM and PM peak-hour)

Dyer level of service (AM)

Direction		Current Condition	Do Nothing	Mitigation
NB	Class	3	3	3
NB	Flow Speed	31	31	31
NB	Running Time	85.3	85.3	85.3
NB	Signal Delay	33.1	35.8	26.8
NB	Travel Time (s)	118.4	121.1	112.1
NB	Dist (mi)	0.66	0.66	0.66
NB	Arterial Speed	20.0	19.6	21.1
NB	LOS	C	C	C
SB	Class	3	3	3
SB	Flow Speed	31	31	31
SB	Running Time	91.1	91.1	91.1
SB	Signal Delay	35.4	37.3	30.6
SB	Travel Time (s)	126.5	128.4	121.7
SB	Dist (mi)	0.71	0.71	0.71
SB	Arterial Speed	20.1	19.8	20.9
SB	LOS	C	C	C

Dyer level of service (PM)

Direction		Current Condition	Do Nothing	Mitigation
NB	Class	3	3	3
NB	Flow Speed	31	31	31
NB	Running Time	85.3	85.3	85.3
NB	Signal Delay	107.3	148.4	44.7
NB	Travel Time (s)	192.6	233.7	130.0
NB	Dist (mi)	0.66	0.66	0.66
NB	Arterial Speed	12.3	10.1	18.2
NB	LOS	E	E	C
SB	Class	3	3	3
SB	Flow Speed	40	40	40
SB	Running Time	100.2	100.2	100.2
SB	Signal Delay	92.4	117.0	32.3
SB	Travel Time (s)	196.6	217.2	132.5
SB	Dist (mi)	0.79	0.79	0.79
SB	Arterial Speed	14.7	13.1	21.4
SB	LOS	D	E	C

Wilson level of service (AM)

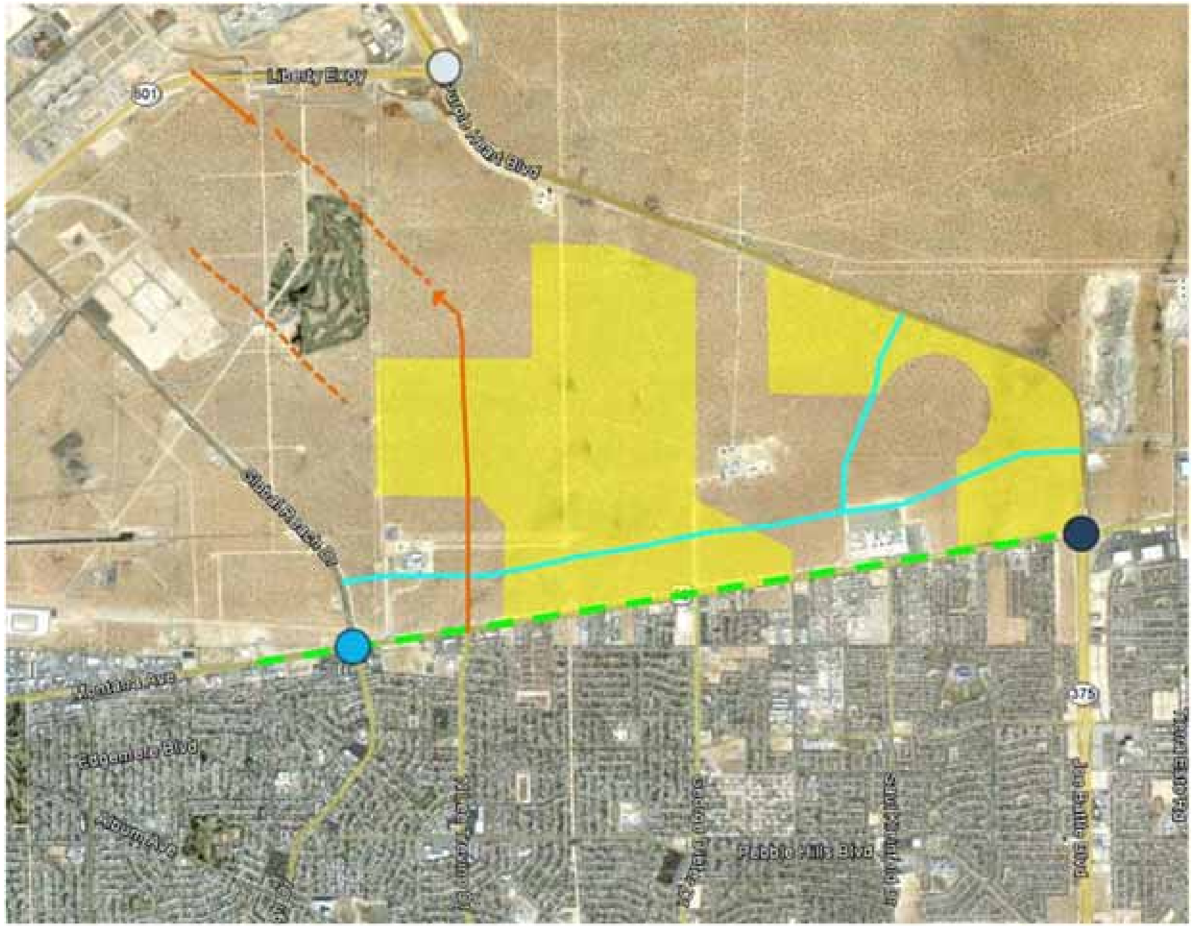
Direction		Current Condition	Do Nothing	Mitigation
EB	Class	2	2	2
EB	Flow Speed	40	40	40
EB	Running Time	149.0	109.6	115.4
EB	Signal Delay	182.8	231.3	76.4
EB	Travel Time (s)	331.8	340.9	191.8
EB	Dist (mi)	1.38	1.07	1.07
EB	Arterial Speed	14.9	11.3	20.0
EB	LOS	E	F	D
WB	Class	2	2	2
WB	Flow Speed	40	40	40
WB	Running Time	126.8	126.8	132.6
WB	Signal Delay	126.9	134.1	88.9
WB	Travel Time (s)	253.7	260.9	221.5
WB	Dist (mi)	1.22	1.22	1.22
WB	Arterial Speed	17.2	16.8	19.8
WB	LOS	D	E	D

Wilson level of service (PM)

Direction		Current Condition	Do Nothing	Mitigation
EB	Class	2	2	2
EB	Flow Speed	40	40	40
EB	Running Time	109.6	109.0	115.4
EB	Signal Delay	262.2	322.7	84.3
EB	Travel Time (s)	371.6	423.3	199.7
EB	Dist (mi)	1.07	1.07	1.07
EB	Arterial Speed	10.3	8.9	19.2
EB	LOS	F	F	D
WB	Class	2	2	2
WB	Flow Speed	40	40	40
WB	Running Time	126.8	126.8	132.6
WB	Signal Delay	105.3	111.9	95.8
WB	Travel Time (s)	232.1	238.7	228.4
WB	Dist (mi)	1.22	1.22	1.22
WB	Arterial Speed	18.9	18.3	19.2
WB	LOS	D	D	D

IX.3. Infrastructure plans for scenarios 2020 - 2030

Fig.93 Probable infrastructure needed for parcels A and B (2020 – 2030)



Planned overpass Improvement

Planned overpass

Planned underpass

Planned thoroughfare 2025

Probable thoroughfare needed 2025

Planned BRT

IX.3. Infrastructure plans for scenarios 2020 - 2030

2020 and 2030 scenarios were not evaluated in this report. Analysis go as far as 2015, when we suppose a full development of parcels A, B and C. Originally, only the following City projects were considered at this 2015 scenario:

a) Montana widening to 6 lanes (2013) and
b) The new overpass at Loop 375/electric towers.

Other approved projects were to be considered in 2020 and 2030 scenarios:

a) Loop 375 and Spur 601 improvement (2015-2020).
b) Montana and Yarbrough overpass (after 2020)
c) Montana and Loop 375 underpass (after 2020)
d) Lee Trevino extension (after 2020)
e) BRT, mixed with traffic or with a dedicated lane (2015-2020)

In a second revision, we added other preliminary projects by TxDOT and an underground suggestion :

h) A series of overpasses along Montana (Yarbrough, Lee Trevino, George Dieter, Lee Boulevard, Saul Kleinfield)
i) A viaduct under Montana

For evaluation purposes only, and lacking the 2020 and 2030 figures, these alternatives were evaluated with the 2015 data. This was made because there are many undefined projects for Montana Avenue, and different visions for its future.