

Swan Creek Stream Restoration

Project Concept Plan

March 1997



*Appendix B to the City of Tacoma
Natural Resource Damages Consent Decree*



City of Tacoma

This document is a reprint of the October 1996 document of the same title. This document and the October 1996 document differ in the following manner:

- 1. The date on the initial title pages has been corrected (updated);***
- 2. Selected graphics have been reproduced (but not changed) to enhance readability;***
- 3. The project schedule has been modified to reflect the passage of time.***

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SWAN CREEK STREAM RESTORATION
PROJECT CONCEPT PLAN

CITY OF TACOMA
MARCH 1997

CITY OF TACOMA
 SWAN CREEK STREAM RESTORATION
 PROJECT CONCEPT PLAN

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Acknowledgment

A number of individuals and groups have worked in recent years on efforts to secure or improve Swan Creek properties for public access and habitat restoration. In particular, we would like to acknowledge the members of the Swan Creek AmeriCorps crew, who have begun the initial and at times difficult work of property cleanup, stream habitat restoration, and trail construction for public access along Swan Creek.

**CITY OF TACOMA
SWAN CREEK STREAM RESTORATION
PROJECT CONCEPT PLAN**

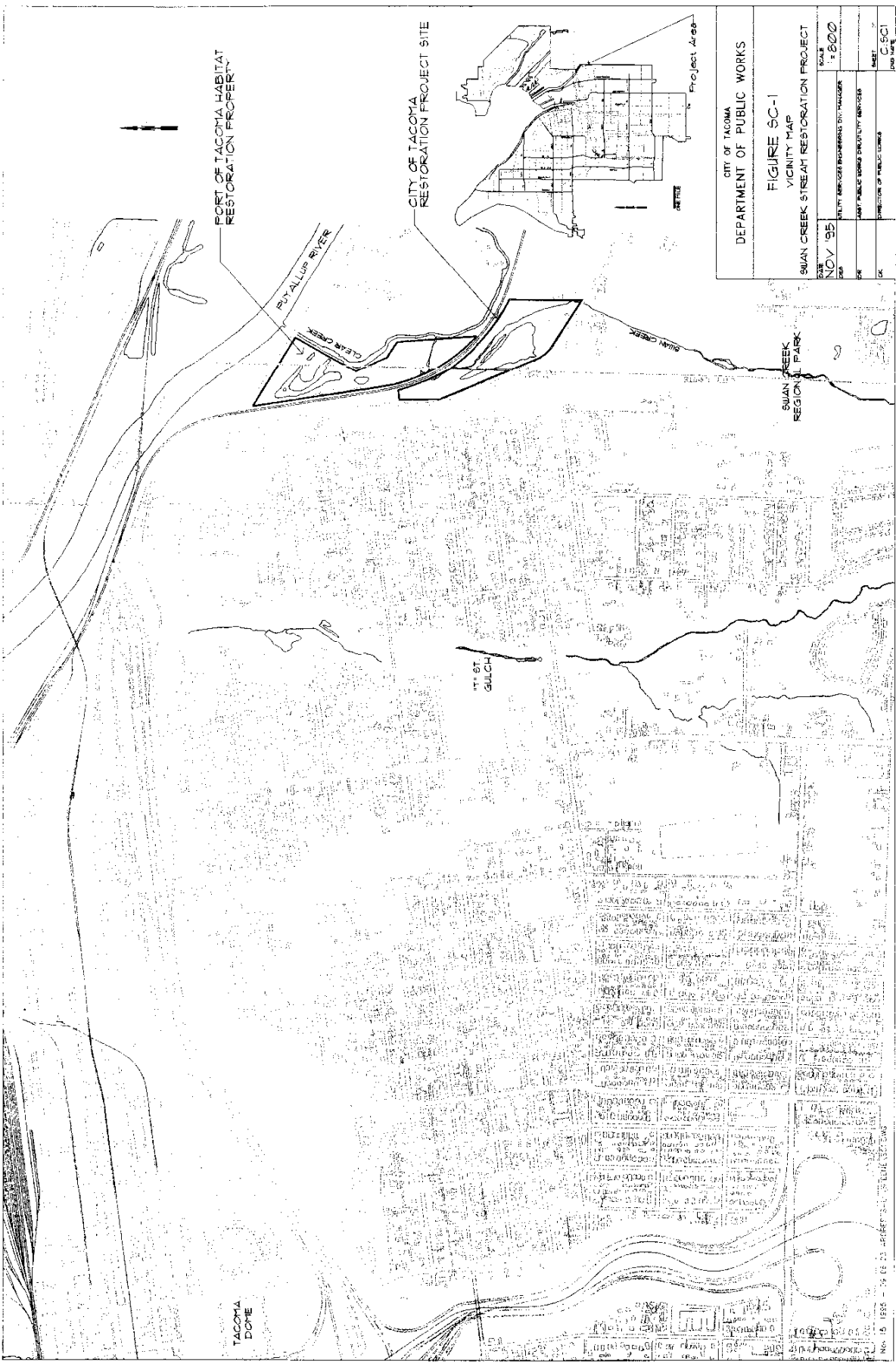
I INTRODUCTION

The City of Tacoma is proposing to initiate a stream restoration project on 12 acres of property bordering Swan Creek near the City of Tacoma corporate boundary and the Puyallup River (Figure SC-1). The project would be developed on property that is presently owned by the City of Tacoma or which is in the process of being acquired by the City.

Activities associated with site habitat restoration include excavation of approximately two acres of filled wetland property to create off-channel wetland and open water habitat for juvenile anadromous salmonids and other wildlife species; evaluation and implementation of habitat improvements, including possible channel relocation, in an area of the stream adjacent to the Burlington-Northern railroad tracks; evaluation of existing fish passage and implementation of recommended passage improvements in the stream channel upstream of the railroad tracks; and the planting of native vegetation within and adjacent to newly created wetlands and on nearby hillslopes. Restoration activities are designed to complement the wetland complex which presently dominates the Haire parcel in the center of the restoration site. Public access improvements would be designed and constructed consistent with habitat restoration objectives. The location of this project adjacent to both Swan Creek Regional Park and Port of Tacoma restoration properties presents opportunities for both habitat restoration and public outreach.

The City's goals for the restoration project are based upon the habitat needs of the Puyallup River Estuary and Commencement Bay. Project goals include:

1. Restoring and enhancing refuge habitat for juvenile salmonids originating in the Puyallup River System;
2. Providing increased and enhanced wetland habitat for wetland dependent species in the lower Puyallup River system and estuary;
3. Eliminating fish passage impediments in the lower reaches of Swan Creek to support migration of anadromous salmon to Swan Creek
4. Providing a habitat linkage between the downstream Port mitigation area and the upstream watershed; and



PORT OF TACOMA HABITAT RESTORATION PROPERTY

PUYALLUP RIVER
SWAN CREEK

CITY OF TACOMA RESTORATION PROJECT SITE

1ST ST GULCH

SWAN CREEK REGIONAL PARK

TACOMA DOME

CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS	
FIGURE SC-1 VICINITY MAP	
SWAN CREEK STREATH RESTORATION PROJECT	
DATE	NOV '95
SCALE	1" = 500'
DESIGNED BY	DEPT. OF PUBLIC WORKS
CHECKED BY	DEPT. OF PUBLIC WORKS
APPROVED BY	DEPT. OF PUBLIC WORKS
DRAWN BY	DEPT. OF PUBLIC WORKS
SHEET	SC1
OF	100

5. Providing stewardship and educational opportunities for city and county residents to increase public awareness of the importance of this type of habitat in the ecosystem.

The importance of restoring off-channel refuge habitat for aquatic species, in particular coho salmon (*Oncorhynchus kisutch*), deserves some comment.

Pacific Salmon, which historically and presently occupy the Puyallup River watershed and all other watersheds of the Pacific Northwest, rely upon habitats common to all and particular habitats that are of specific importance to each. Flood plain off-channel habitat is a type of habitat that is particularly important to coho salmon due to that species over-wintering requirements (Peterson and Reid, 1983). Similar to steelhead (*Oncorhynchus mykiss*) and sea-run cutthroat (*Oncorhynchus clarki*), coho salmon do not migrate to the ocean or an adjacent lake shortly after emergence from gravel but instead over-winter in the riverine system where they are subject to predator and flow-related hazards. Off-channel habitats provide coho salmon refuge from predators and winter flow conditions, and areas for rearing during summer months. Such habitats may originate as springs flowing from valley walls which are subsequently dammed by beaver operating on the valley floor (Peterson and Reid, 1983).

Stream habitat environments historically utilized by Pacific Salmon are described by Murphy and Meehan (1994), quoted below.

“Historically, wild fish stocks evolved with streams that were obstructed by fallen trees, beaver dams, and vegetation growing in and alongside the channels. Rivers as large as seventh order had numerous fallen trees in their channels and frequently were obstructed by drift jams. Main river channels contained abundant gravels and fine sediments, and habitat complexity was enhanced by multiple channels and sloughs and scour and boulders and snags.”

Restoration efforts designed to restore such habitats in the Pacific Northwest have achieved notable success. Reeves and others (1991) report that restored off-channel habitat along an Oregon stream accounts for 50% of that systems coho salmon over-winter survival while accounting for only 1% of the habitat in the basin. Similarly, on the Olympic Peninsula, Cederholm and others (1988) report that a one-acre off-channel habitat restoration project increased annual coho smolt production by approximately 3% in the 92,000 acre Clearwater River basin. Off-channel wetland restoration results reported by these researchers suggest that the restoration of such habitats is an important factor in assuring coho salmon survival prior to out-migration from the river system.

II RESTORATION STUDY AREA: HISTORY AND SITE CONDITIONS

The Swan Creek restoration project site is located on property bordering one or both sides of Swan Creek on Pioneer Way near the Puyallup River and the City of Tacoma jurisdictional limits (Figure SC-2). The property is approximately 12 acres in size and is composed of four separate parcels owned or in the process of being acquired by the City of Tacoma. The four parcels are referred to at times in this report as:

1. The Walter parcel, acquired by the City of Tacoma in 1995. This parcel is 2.7 acres in size.
2. The Haire parcel, to be acquired by the City of Tacoma. The Haire parcel is 6.0 acres in size.
3. The City parcels. These two parcels have been in City ownership for a number of years and were acquired as part of the initial effort to create a block of public lands along the Swan Creek corridor. The parcels total 3.1 acres and are the two most northern parcels at the site.

The two primary physiographic features of the site are Swan Creek and the wetland complex which dominates the Haire family parcel. The wetland has apparently formed in part as the result of beaver activity along Swan Creek. Numerous beaver dams are evident on the creek where it traverses the Haire property.

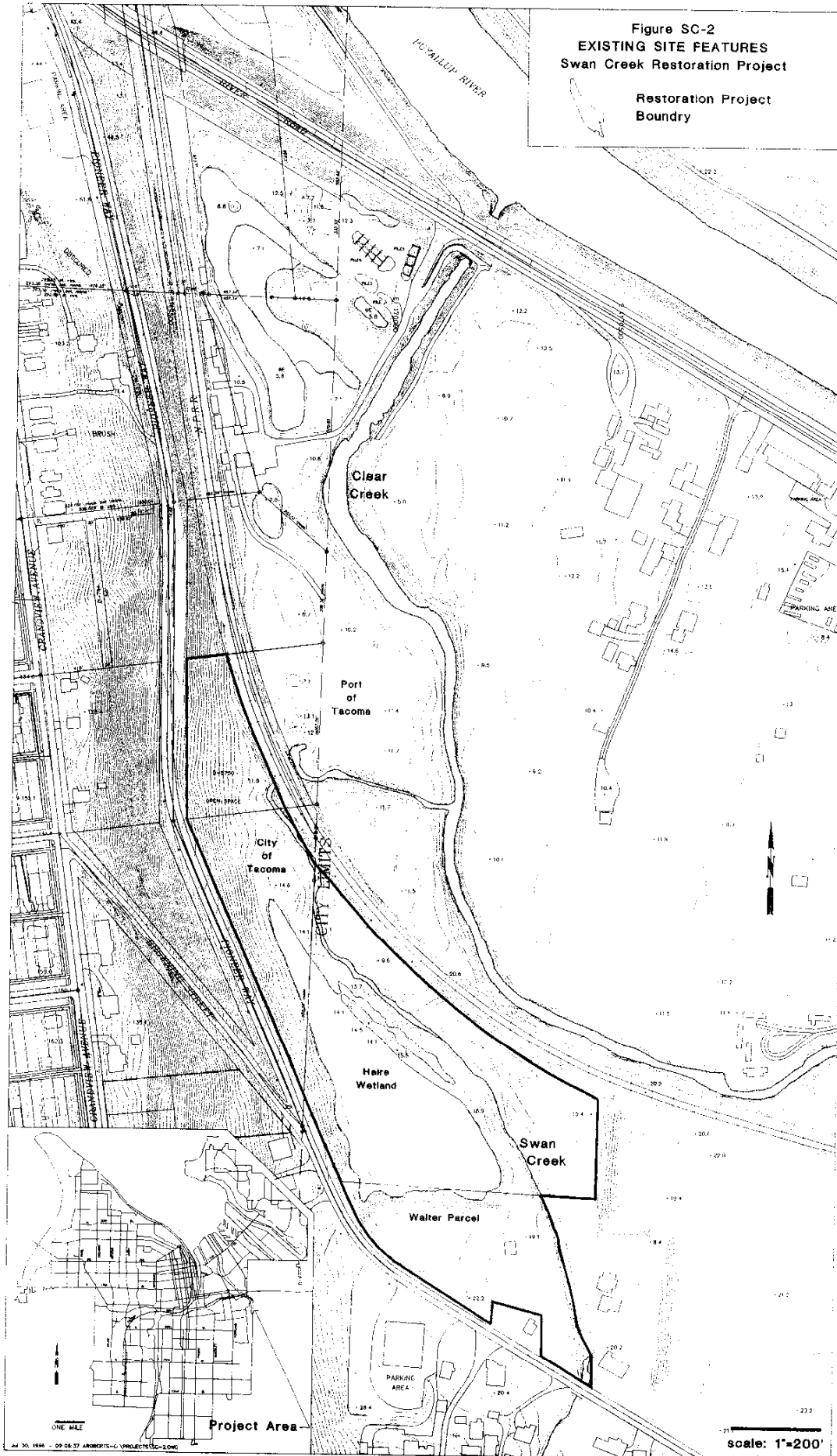
The properties are located near the historic mouth of Swan Creek. Swan Creek today ends at its confluence with Clear Creek but, at the time of European settlement, Swan Creek discharged directly into the Puyallup River. The river at that time flowed in a meandering channel immediately north of the present-day Burlington-Northern railroad, approximately 1600 feet south of its present day location. The mouth of Swan Creek was located north of the now existing railroad tracks on the west side of a meander bend and the mouth of Clear Creek was located on the east side of the same bend. This bend in the former river channel has been partially filled and a constricted remnant river channel, now occupied by Clear Creek, is visible at the southern end of the property now owned by Entertainment Communications (Figure SC-2).

The restoration properties were subject to overbank flooding from Swan Creek, Clear Creek and the Puyallup River until the Inter-County River Improvement District undertook a program of flood control improvements along the Puyallup, White, and Green Rivers in the period 1914-1919. During that time period, River Improvement constructed the Auburn Wall to make permanent the flow of the White into the Puyallup,¹ channelized the Puyallup between its confluence with the White and the City of Tacoma, and channelized both the White and the

¹ Until 1906, the White River distributed its water to both the Green and the Puyallup Rivers, with approximately 2/3 of the water flowing north to the Green River and Elliott Bay. During a high flow in 1906, a log jam in the White resulted in the diversion of all or a substantial portion of that river's flow south to the Puyallup.

Figure SC-2
EXISTING SITE FEATURES
Swan Creek Restoration Project

Restoration Project
Boundry



Puyallup rivers for a number of miles above their confluence. After the Puyallup River was steered into its new channel, Clear Creek was diverted into the old river bed and Swan Creek was in turn diverted into Clear Creek. The outline of the former river channel is still visible on both sides of Clear Creek on Port of Tacoma property in Figure SC-2; the former channel is defined approximately by the 10 foot contour lines on the Port property.

The restoration site properties have exchanged hands a number of times since being reclaimed from the area of the river bottom but have been apparently little used. Site features which possibly limited site development include slopes and soils on two properties (the City parcels) and the wetland nature of all or parts of the valley properties (Haire and Walter). Despite the program of river improvement, the Haire and Walter property had until the 1970's remained largely wetland.² The primary development activity undertaken on the properties occurred in the early 1970's when the Walter family filled that part of the wetland that occupied their property and built a very small single family home, garage, and storage sheds. The site was visited by Ecology staff when the fill was largely complete; fill material apparently consisted of wood and soil although other inert solid waste was noted by the inspector. The property owner was instructed by Ecology staff to complete the fill with an impermeable soil layer to control off-site runoff and leaching, an instruction the owner apparently followed.

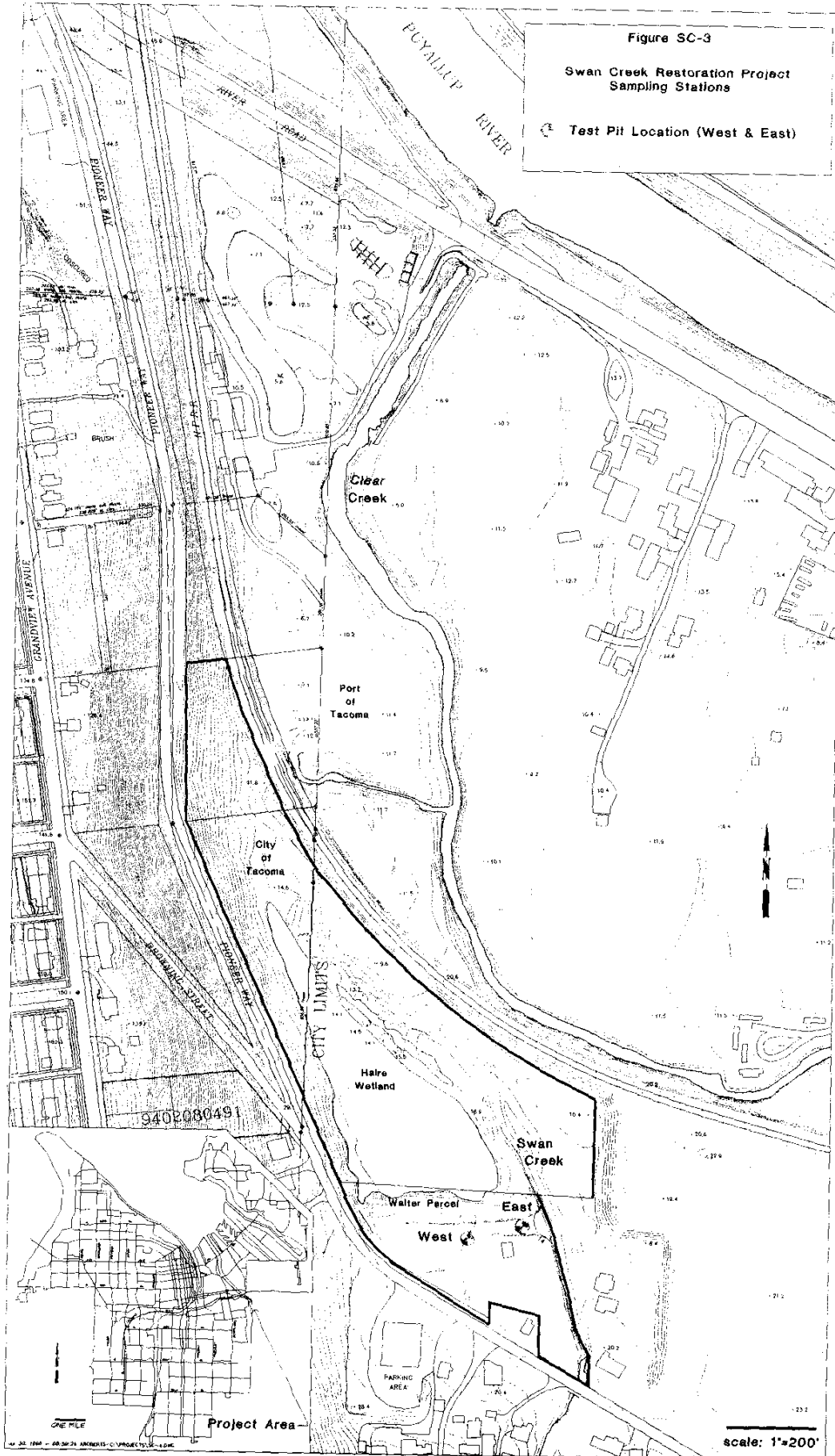
In 1994, the City sampled subsurface soils (Figure SC-3) in two locations on the Walter property prior to property purchase. Samples were obtained from test pits excavated by backhoe from the vicinity of the proposed wetland area. One test pit was located in the fill area and the sample from the pit was obtained from the approximate mean depth of fill. The second test pit was excavated in assumed non-fill area between the fill test pit and Swan Creek. The samples were submitted to the City laboratory for priority pollutant analysis. Trace amounts of some metals and organic compounds were noted in the fill sample, but all concentrations were below levels of concern. Sample results and site investigation memorandum are contained in Appendix B.

² Soils have been mapped as "Shalcar Muck" as recently as 1979. These soils are defined as "poorly drained, level, formed in decaying sedges, cattails and reeds and in alluvium in long backwater depressions of the major river valleys". See USDA, 1979.

Figure SC-3

Swan Creek Restoration Project
Sampling Stations

⊗ Test Pit Location (West & East)



III PROJECT CONCEPT PLAN

The City is proposing a number of project elements to restore stream, riparian, and off-channel wetland habitat at the project site in order to further the project goals outlined in Section I. Project elements are depicted in Figure SC-4 and include:

- i. Restoration of freshwater wetland and open water habitat (2.0 acres) on the former Walter parcel.
- ii. Planting newly re-established riparian areas (0.7 acres) with native vegetation.
- iii. Planting hillslopes (3.1 acres) with native coniferous species such as western red cedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*).
- iv. Evaluation of methodologies to improve 1100 feet of stream habitat through the project site, and implementation of recommended stream habitat improvement projects.
- v. Construction of public access improvements at the project site.
- vi. Provisions for monitoring and maintenance of the restoration project site.

These project elements are discussed in more detail below.

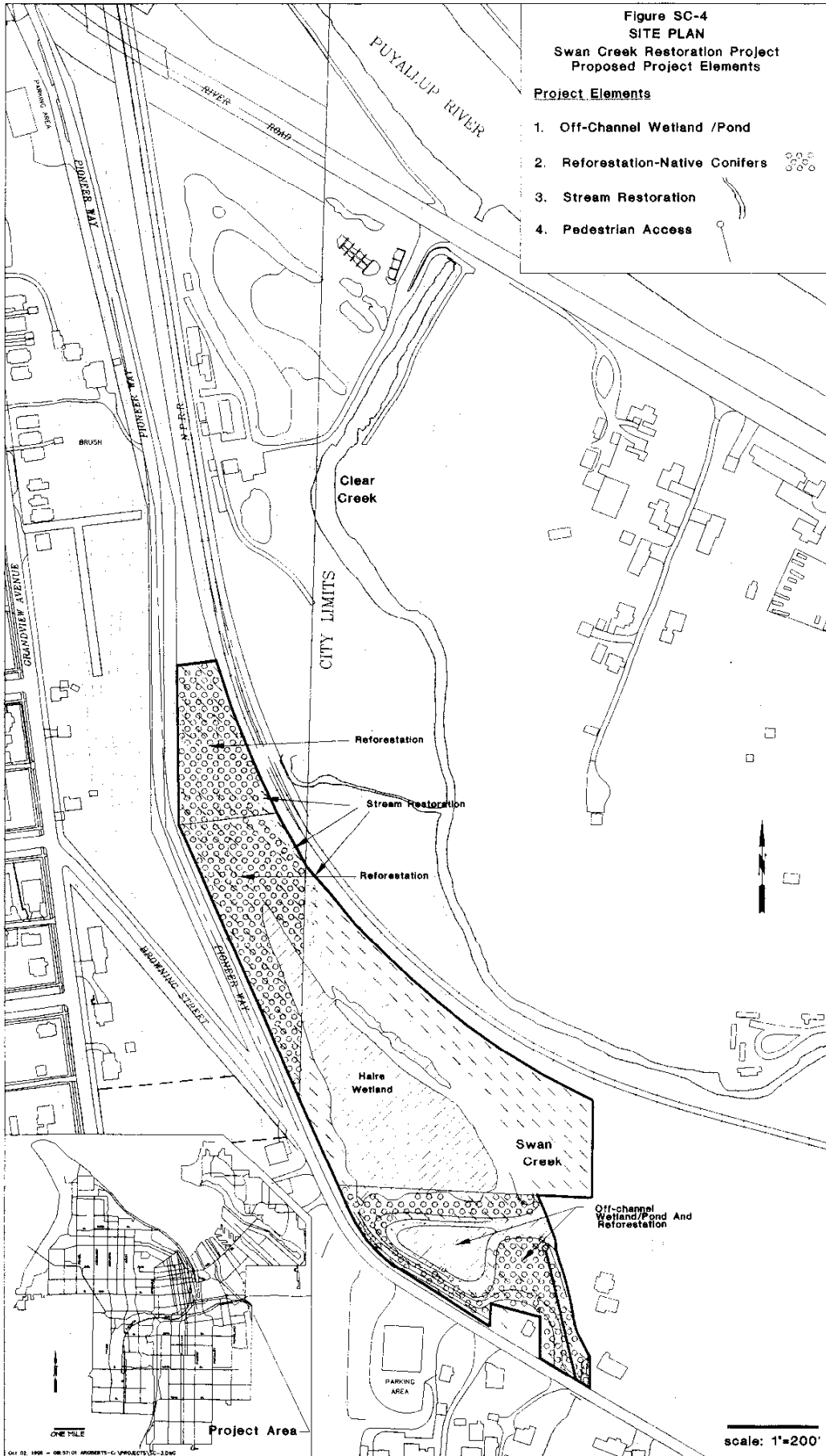
Restoration of freshwater habitat

Freshwater marsh and open water habitat would be created by excavating approximately eight feet of fill material from the interior of the Walter property. Post construction elevations would range from 13-14 feet NGVD29 in the re-established wetland area to existing elevations - approximately 22 ft NGVD29 - around the marsh perimeter. The marsh would be connected via an open water channel to Swan Creek to allow access into the re-established open water/wetland habitat for juvenile salmonids and other aquatic species using Swan Creek. Large trees presently on site would be retained and island habitat would be designed into the wetland area if biologically desirable. A second channel may also be established connecting the restored wetland area to the Haire wetland during average or above average water conditions, if recommended by project biological consultants and if state and federal agency staff concur with such a recommendation. Such a connection would establish permanent or periodic island habitat on what is now the east-west upland property boundary between the Haire and Walter parcels.

Figure SC-4
 SITE PLAN
 Swan Creek Restoration Project
 Proposed Project Elements

Project Elements

1. Off-Channel Wetland /Pond
2. Reforestation-Native Conifers
3. Stream Restoration
4. Pedestrian Access



ONE INCH = 200 FEET
 Project Area
 OCT 02 1998 - 08:57:01 ABBOTT-C:\PROJECTS\SC-3.DWG

scale: 1"=200'

The material excavated from the property - approximately eight feet of fill - would be removed to the appropriate disposal facility. If suitable, some excavated material may be utilized on site to create topographic features, such as a small berm between Pioneer Way and the restored wetland area. Material might also be used to create a similar berm in places between the pedestrian walkway and project habitat areas as a method of encouraging people to utilize only developed pedestrian access facilities.

Material on the restored wetland bed and immediately below will be demonstrably suitable for use in such environments. Where subsurface exploration or project excavation reveals fill at the proposed wetland bed, such fill will be excavated to a depth of 3 feet or to a depth where fill material is not evident, whichever is less, and replaced by suitable material. The excavated area will then be brought to the correct elevation by the incorporation of clean substrate suitable for the growth and development of wetland vegetation. Where subsurface exploration reveals native material at the proposed wetland bed and to a depth of two feet below that surface, the proposed surface would be considered suitable.

A planting plan will be developed for the restoration site during project permitting and would be subject to the review, comment and approval of resource and permitting agencies prior to the issuance of project permits. Planting will be designed for 50% of the emergent area of the freshwater habitat area and shall be based upon a review of similar projects in the Commencement Bay Area. The city may propose during project permitting, if federal, state and tribal resource staff agree, that an additional area or areas of emergent vegetation be re-established through natural re-colonization to investigate the efficacy of natural re-colonization in this wetland environment or if a higher value of habitat can be achieved through an alternative expenditure.

The inclusion of the freshwater emergent/open water marsh at this restoration site has three purposes. First, the wetland area as a whole is conceived as winter storm refuge habitat for species utilizing Swan Creek. Second, the wetland will provide year-round and seasonal habitat for wildlife species dependent upon such habitats. Third, the restored wetland and its riparian zone provide a mechanism by which nutrients originating in terrestrial riparian habitats can be efficiently transferred to the aquatic environment. The wetland area will trap nutrients and detrital matter dropped directly into the wetland (leaf drop and emergent plant senescence) or washed into the wetland from Swan Creek. The trapping of nutrients in the wetland provides for additional use of carbon and other energy sources by aquatic species before the ultimate export of organic and inorganic detrital matter to the Puyallup River and Commencement Bay.

Table SC-1
Proposed Plantings - Wetland and Riparian Areas
Swan Creek Stream Restoration Project

Trees

Western Red Cedar
(Thuja plicata)
 Western Hemlock
(Tsuga heterophylla)
 Douglas Fir
(Pseudotsuga menziesii)
 Red Alder
(Alnus rubra)
 Black Cottonwood
(Populus trichocarpa)
 Big Leaf Maple
(Acer macrophyllum)

Shrubs

Vine Maple
(Acer circinatum)
 Red Osier Dogwood
(Cornus stolonifera)
 Salmonberry
(Rubus spectabilis)
 Serviceberry
(Amelanchier alnifolia)
 Nootka rose
(Rosa nutkana)
 Red Elderberry
(Sambucus racemosa)

Ninebark
(Physocarpus capitatus)
 Ocean Spray
(Holodiscus discolor)
 Willow (*Salix sp.*)

Emergent Vegetation

Rushes
(Juncus sp.)
 Sedges
(Carex sp.)
 Small-fruited and Hard Stem Bulrush
(Scirpus microcarpus & S. acutus)

Bur-reed
(Sparganium emersum)
 Wapato (i.e. Arrowhead)
(Sagittaria latifolia)
 Skunk cabbage
(Lysichitum americanum)

Planting newly re-established riparian areas with native vegetation.

City plans for restoration include the planting of riparian flora around the perimeter of the newly created wetland. Riparian plantings will be comprised of a mixture of native vegetation suitable for this area considering site soil, shade and proximity to seasonal water. Tree and shrub species will likely include a mixture of the species listed in Table SC-1 and other species as appropriate.

A planting plan will be developed for the restoration site during project permitting and would be subject to the review, comment and approval of resource and permitting agencies prior to the issuance of project permits. Planting will be designed for 100% of the riparian area less land utilized for public access and shall be based upon a review of similar projects in the Commencement Bay Area. Drip irrigation will be established to provide water to plantings and soil amendments will be applied in a manner consistent with requirements for fertilizer use in shoreline areas.

Replanting slope property with native coniferous species.

City plans for restoration of upland slopes are based upon establishing successional and shade-tolerant species that will in time grow and replace the deciduous species which now populate this area. Plantings will be comprised of a mixture of native vegetation suitable for this area considering site soil, shade, slope orientation and proximity to water. Tree, shrub and herbaceous species will include a mixture drawn from the species listed in Table SC-2 and other plants as appropriate. The planting plan shall consider the entire hillslope area and shall seek to establish or promote appropriate successional species or species which provide high quality habitat over 100% of the hillslope area; and shall be based upon an assessment of species already evident on the hillslope area and a review of similar projects in the Commencement Bay Area. Drip irrigation will be established to provide water to plantings and soil amendments will be applied in a manner consistent with requirements for fertilizer use in shoreline areas.

Evaluation of methodologies to improve stream habitat

The City will evaluate and has budgeted funds to restore in-channel stream habitat as part of the Swan Creek restoration effort. Two areas in particular are of interest. The first area is that part of the creek on City property, adjacent to the railroad right-of-way, downstream of the Haire parcel. In this reach, the creek flows directly against the railroad embankment and the City would evaluate the feasibility of re-locating the creek away from the tracks. The second area of interest is the stream channel along the length of the Haire wetland. In this area, numerous beaver dams suggest that an evaluation of the ability of juvenile and adult salmonids to access upstream and downstream resource areas would be prudent.

Table SC-2
Proposed Plantings - Slope Areas
Swan Creek Stream Restoration Project

Trees	Shrubs	Herbaceous Plants
Western Red Cedar <i>(Thuja plicata)</i>	Snowberry <i>(Symphoricarpos albus)</i>	Trillium <i>(Trillium ovatum)</i>
Western Hemlock <i>(Tsuga heterophylla)</i>	Hazelnut <i>(Corylus cornuta)</i>	Fairy lantern <i>(Disporum smithii)</i>
Douglas Fir <i>(Pseudotsuga menziesii)</i>	Salmonberry <i>(Rubus spectabilis)</i>	Wild-lily-of-the-Valley <i>(Maianthemum dilatatum)</i>
Grand Fir <i>(Abies grandis)</i>	Thimbleberry <i>(Rubus parviflorus)</i>	Miner's Lettuce <i>(Montia perfoliata)</i>
Pacific Yew <i>(Taxus brevifolia)</i>	Red Huckleberry <i>(Vaccinium parvifolium)</i>	Vanilla Leaf <i>(Achlys triphylla)</i>
	Dewberry <i>(Rubus ursinus)</i>	Sandwort <i>(Arenaria macrophylla)</i>
	Red currant <i>(Ribes sanguineum)</i>	Bunchberry <i>(Cornus canadensis)</i>
	Long Leaf Oregon grape <i>(Berberis nervosa)</i>	Sweet-cicely <i>(Osmorhiza chilensis)</i>
	Salal <i>(Gaultheria shallon)</i>	

The downstream reach (i.e., the railroad reach) is approximately 250 feet in length from the point the creek leaves the area of the Haire wetland complex - at approximately the parcel boundary - to the point the creek crosses under the railroad track through a culvert. Flow velocity in this reach is often slack but varies with creek discharge and river stage; backwater effects from the tidally influenced river are evident. Fish passage does not appear to be limited by flow depth or velocity during these alternating creek conditions. Creek habitat in this reach is however compromised by its proximity to the railroad bank. The bank is a steep slope backfilled with angular rock-riprap. Vegetation that colonizes the bank is regularly removed by the railroad. Specific vegetation practices have not been documented; however, mechanical and chemical brush control are common road and railroad vegetation management practices.

Field surveys in this area of the project site have noted the presence of two abandoned creek channels to the west of the present channel, between the creek and Pioneer Way. The northern extension of the Haire wetland occupies one of these (Figure SC-2). A second channel is evident between this extension of the Haire wetland and the creek. State and federal resource agency staff have suggested evaluating the feasibility of relocating the creek into one of these alternative channels away from the influence of railroad or, alternatively, leaving the channel in-place and implementing recommended improvements. The City has recently completed a topographical survey of the property and this information, along with discharge and water surface elevation data, will be used to evaluate alternatives for improving stream habitat in this reach. Selection of a restoration methodology, including relocation of the channel, will be subject to a technical feasibility evaluation, public comment and permitting requirements.

Areas upstream of the railroad reach may be at times inaccessible to juvenile salmonids due to the location and configuration of a beaver dam spanning the creek at the upstream end of this reach. Surveys on the Haire property upstream of the railroad reach have also noted numerous beaver dams which are likely responsible for much of the existing wetland quality and flooded nature of the properties. The city will evaluate fish passage in this reach to determine if passage improvements are desirable and implement recommendations for passage improvements if resource and permitting agencies and tribal staff concur. The City will not remove or otherwise compromise beaver placed structures or attempt to limit the activity of beavers within the restoration site. As the Port of Tacoma is also interested in enhancing passage for salmonids using Swan and Clear Creeks, the City will coordinate the evaluation of passage with Port staff.

Provisions for public access at the project site.

The City plans to develop public access improvements at the project site in order to provide stewardship and educational opportunities for the citizens of Tacoma and Pierce County. However, recent site visits conducted by City, Park District, and federal, tribal, and state resource agency staff suggest that avian wildlife utilizing the interior of the project site may be sensitive to the presence of humans. Avian species noted during a recent survey include great blue heron, red-tailed hawk and harlequin duck, a state listed species.

City plans for public access are depicted in Figure SC-4. This public access concept would entail the construction of a small trail extending from Pioneer Way to a turn-around point over-looking the re-established wetland on the Walter parcel. A kiosk outlining the ecological significance of the area and the relationship of the properties to the surrounding watershed would be located along this pathway. The public would access this trail from Swan Creek park facilities south of Pioneer Way. If the small parcel on the north side of Pioneer Way and bordered on three sides by the Walter parcel is acquired in the future by the City or Park District, this property (0.16 acres or 7000 square feet) could also be used for limited parking and an additional kiosk.

Provisions for monitoring and maintenance

The City has included in the project budget funds sufficient for monitoring and maintenance of the project over a five year period. Funds have been budgeted for maintenance and the implementation of recommendations developed through project monitoring at an amount equal to 25% of the expected construction cost, or 5% per annum for five years. Additional funds are available for the monitoring of site conditions.

The City expects that some parts of the monitoring program can be conducted in close cooperation with other government efforts. The Port of Tacoma may be sponsoring juvenile salmon habitat utilization studies in the downstream area; if so, the City will coordinate with the Port to extend the studies into the City restoration project area. Additionally, the Puyallup Tribal Government Offices including fisheries and other natural and cultural resources staff are located within the immediate area; the Tribe may be interested in participating in the monitoring program and incorporating monitoring into tribal school curriculum; the City will solicit the involvement of the Tribe. The City also provides funding to the Pierce County Stream Team and will seek its involvement in ongoing monitoring efforts.

Monitoring will include the collection of baseline data on site use by avian and mammalian species. The presence of bird nesting areas will be noted and a baseline data report will be prepared which shall include recommendations for the development of nesting improvements (e.g. islands; nest boxes) into the project design. The baseline report will be provided to the design team and public and tribal agencies for review and comment.

If funds are not utilized as part of the monitoring and maintenance program, they will be available for the implementation of project elements arising outside of the formal monitoring program or for restoration actions elsewhere in Commencement Bay at the discretion of the trustee agencies.

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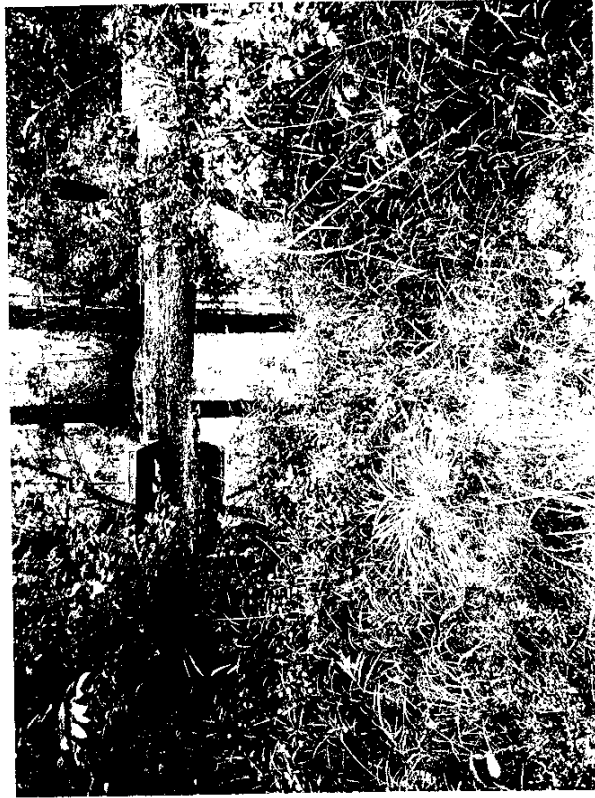
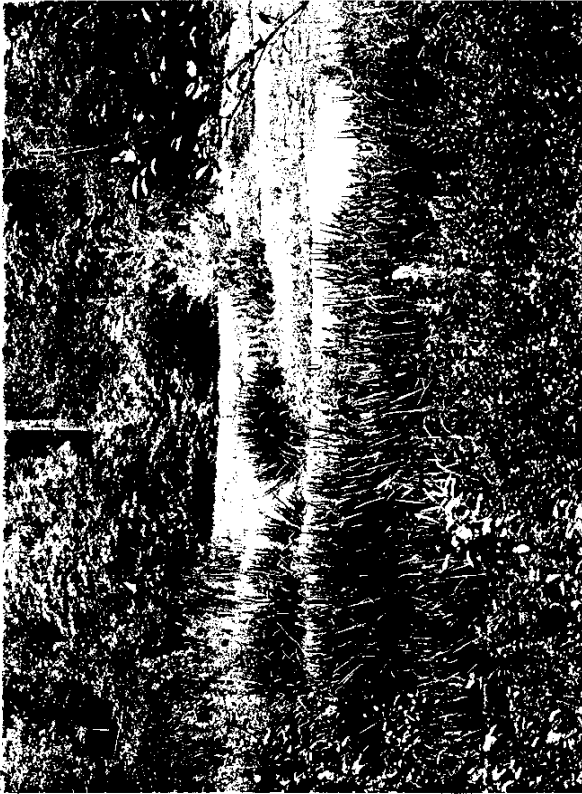
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³ American Fisheries Society Special Publication 19 is titled, "Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. (W.R. Meehan, ed.). The reference given above is the one suggested by the editor of the publication.

Appendix A

Photo Log

*Overleaf: Swan Creek Stream Restoration Site
View is to the south
Photograph: Aequalis Photography, Tacoma, WA.*



Swan Creek Restoration Properties

Photo 1 (Above) View east across the Haire wetland.

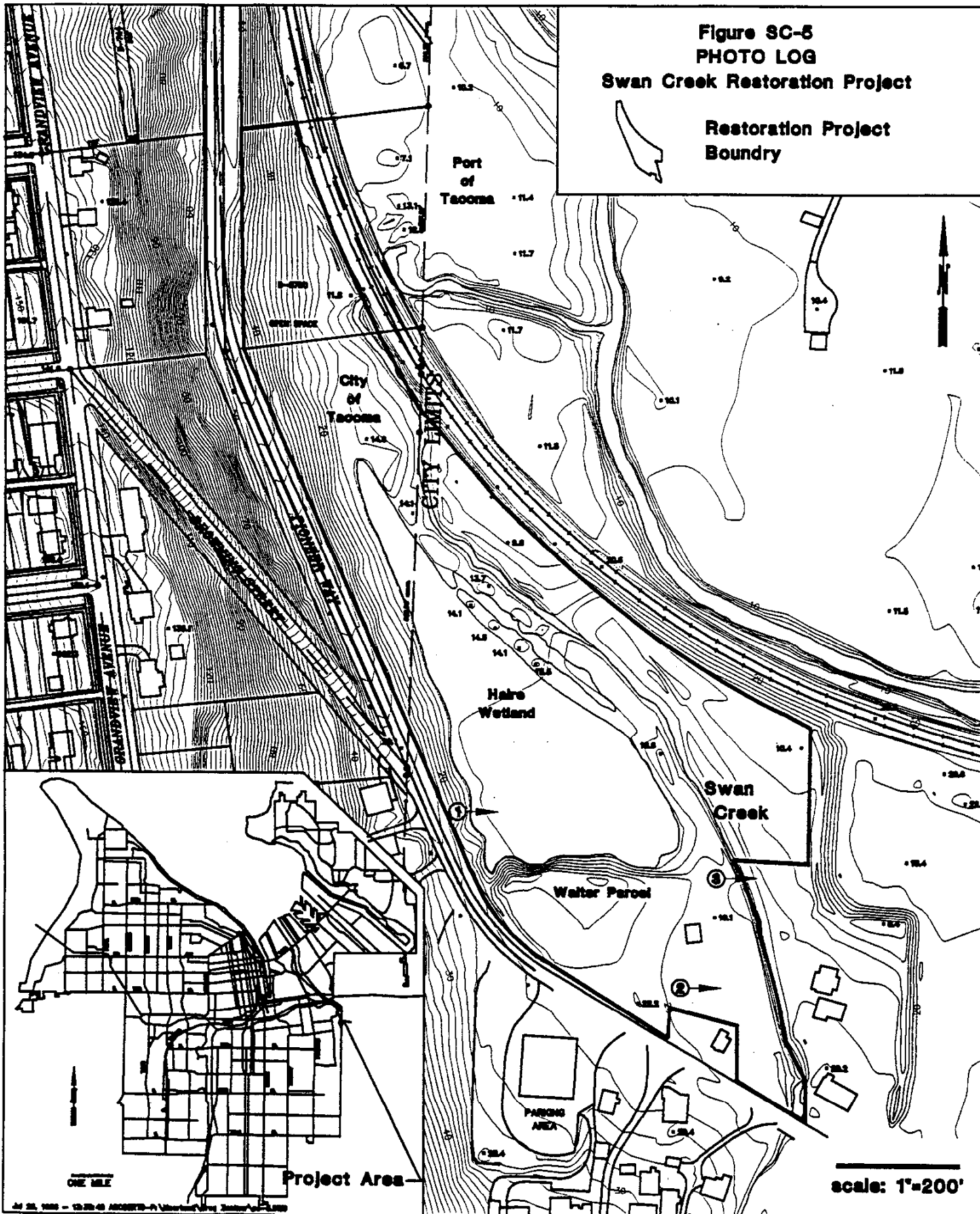
Photo 2 (Above, Right) View east across the Walter Parcel.

Photo 3 (Right) View east, Swan Creek and creek riparian zone from the Walter parcel boundary.

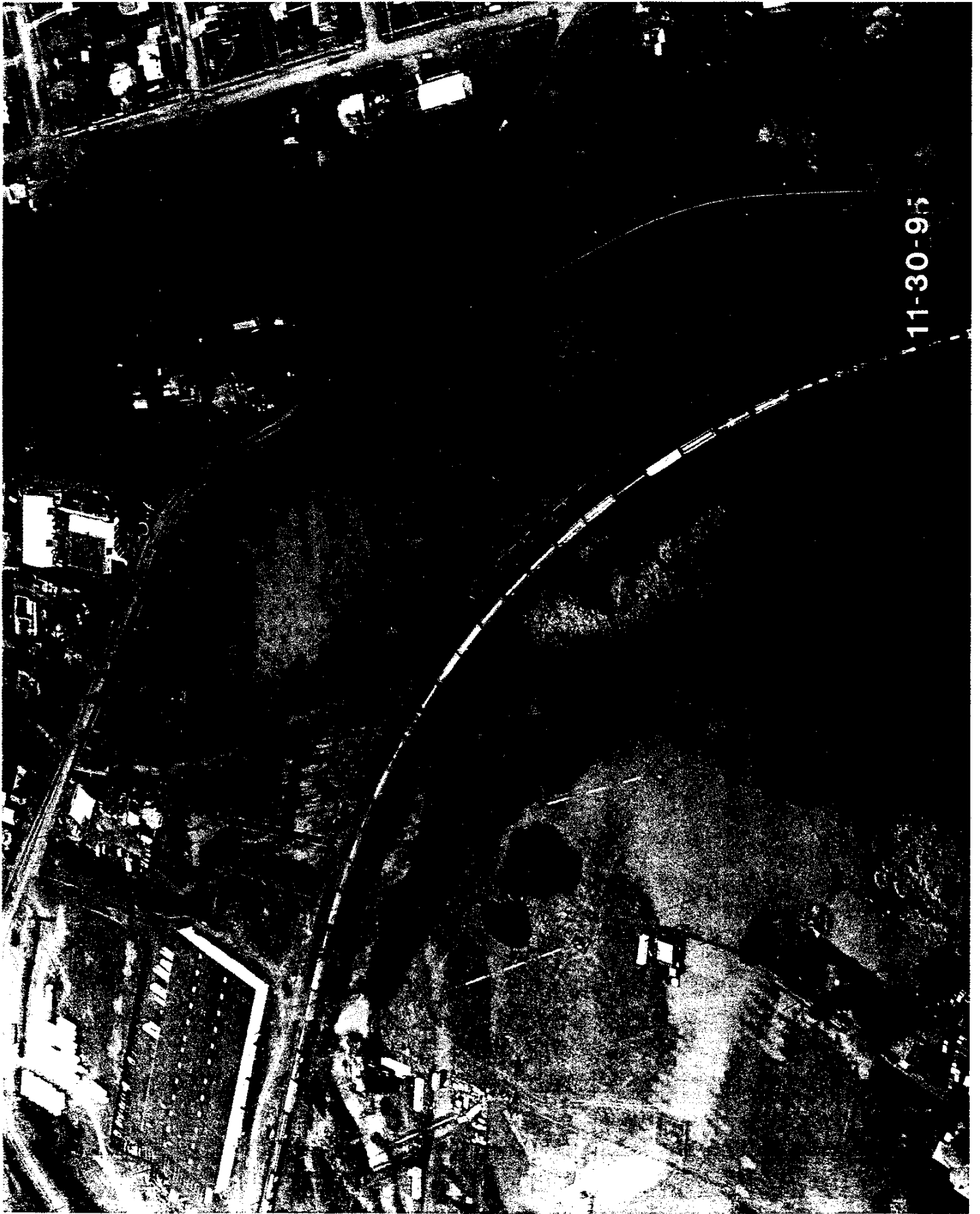
Overlap View south, Swan Creek Restoration Site. Restoration properties are located between the railroad tracks and Pioneer Way, both cross the photograph from the bottom (north), curving to the left (east).

Figure SC-5
PHOTO LOG
Swan Creek Restoration Project

Restoration Project
Boundry



All SD, 1993 - 1998-08 11/15/18-12/11/18
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11-30-95

Appendix B

Site Investigation Memorandums and Environmental Data

DEPARTMENT OF ECOLOGY

May 5, 1972

Mr. Earl Walter
8714 Meadow Road S.W.
Tacoma, Washington 98499

Dear Mr. Walter:

During my May 2, 1972 visit to your landfill operation on Pioneer Way, you stated the method you had chosen to prevent further degradation of water in the adjacent swamp was to cover the wood debris in the fill with a layer of soil. We are agreeable to this; however, care must be taken to insure the soil used as a seal is impermeable and properly compacted both on top and on the face of the fill. Soil types suitable for cover material would include silt, clay or a mixture of these two types. Ideally, the soil used should minimize moisture entering the fill and be capable of growing vegetation. A compacted thickness of at least two feet is recommended.

If you will remember, during my most recent visit we agreed that this covering operation should be completed by July 1, 1972. To determine the effectiveness of this seal, we will subsequently inspect and sample the area adjacent to the fill. If we find that this method is not adequate to prevent pollution of state waters, it will be necessary for you to remove all wood waste from this landfill.

If you have any questions on this matter, please call me at 753-6285.

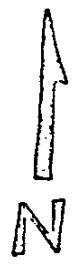
Sincerely,

Robert F. Bottman
Regional Sanitarian

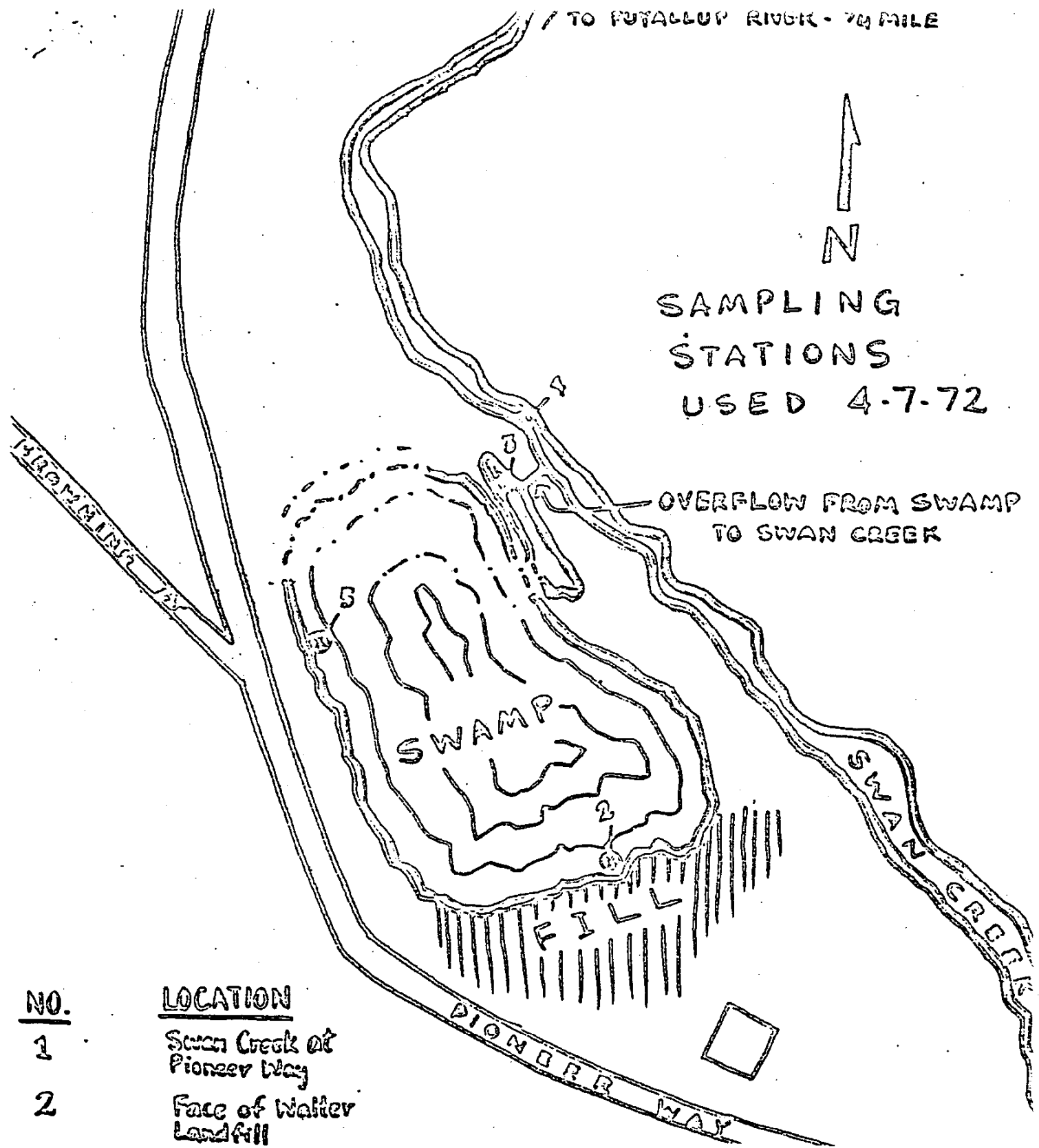
RFB:rc
20/2

cc: Mr. William Haire
Mr. Marvin Durning

TO FUYALLUP RIVER - 7/8 MILE



SAMPLING STATIONS USED 4-7-72



OVERFLOW FROM SWAMP TO SWAN CREEK

NO.

LOCATION

- 1 Swan Creek at Pioneer Way
- 2 Face of Water Landfill
- 3 Branch of swamp adjacent to Swan Creek
- 4 Swan Creek below swamp
- 5 Swamp adjacent to intersection of

Figure 2 1972 Department of Ecology Inspection Site Map

1. =

TO: File
FROM: Greg Zentner
DATE: July 1, 1994
RE: Sampling On Del Walter's Property (2717 Pioneer Way, Tacoma)
June 28, 1994

Present:

Del Walters Dayne Hauge (City of Tacoma Utility Services/Lab).
Dean Carmichael Hebert Ward (City of Tacoma Utility Services/Lab)
Dean Carmichael Jr. John Schwer (City of Tacoma Utility Services)
Greg Zentner (City of Tacoma Planning & Development Services)

Soil samples were obtained from the Walter's property early in the afternoon (1:00-2:30 PM) of June 28, 1994. A map of the property and sample locations is attached.

Samples were obtained from a depth of 3-4 feet in two test pits. A backhoe was used to excavate the pits and samples were obtained from the backhoe shovel for priority pollutant analysis and comparison to Washington State Model Toxic Control Act Standards.

Pit 1 was excavated approximately 50 feet northeast of the garage/utility building near the rear of the property. The test pit was excavated to a depth of approximately 4 feet. The excavated material consisted of mixed sand and gravel with a marked increase in moisture content at approximately 3 feet. The material at that depth was not saturated. No wood products were noted in the material excavated. No odor was noted. Samples were obtained from the last shovel of material brought to the surface by laboratory personnel (Mr. Hauge and Mr. Ward) using appropriate sampling methodology. Mr. Schwer was the backhoe operator.

Pit 2 was excavated approximately 50 feet northwest of the garage/utility building (approximately 100 feet west of Pit 1). The test pit was excavated to a depth of approximately 3 1/2 feet. The excavated material varied in content with depth. Material in the pit to about one foot consisted of a silt and gravel mix. Material in the pit from one foot to three feet depth was a mixture of wood (raw and finished product) debris, sawdust, and silt. The material was not saturated. A septic odor was noted. Samples were obtained as previously by Mr. Hauge and Mr. Ward.

Based upon site and nearby topography, it is reasonable to assume that much of the mound located on the western half of the property (Figure 3) is composed of fill material similar in nature to the material found in Pit 2. See also Map 2 and the accompanying letter, both prepared in 1972 by Mr. Robert Boatman of the Washington State Department of Ecology, who inspected the site at that time. It is also reasonable to assume that, as the

original site soils are mapped as Shalcar Muck, as are the soils in the wetland to the north (Haire property), that original site elevations are similar to those on the Haire property, about 13-14 feet NGVD29. As the average elevation on Walter's site in the fill area is roughly 22 feet, an estimate of 8 feet of fill, on average, is reasonable. Total area filled is about 35-40,000 sq. ft or about 0.8 acres. Total volume of fill is approximately 11,000 cubic yards.

I also today spoke with Mr. Bottman, formerly with Ecology and now with the Washington State Conservation Commission, about his inspection. He did not have the impression that hazardous materials had been placed on-site but he remembered a partially buried car body and some metal debris on the property. The majority of the debris he remembered was wood related, but he did not witness the fill of the property, he said.

Based upon Mr. Bottman' original investigation and our examination of Pit 2, I do not expect that contamination exists on this property to a degree that would impact City planned uses. Any material excavated as part of city development plans can likely be removed to a solid waste disposal or transfer facility. The original Ecology report by Mr. Bottman notes that the property was impacting the Haire wetland at the time it was filled. Such impacts are probably related to runoff associated with the exposure of sawdust and other raw fill material to rain fall. The removal of the material should remove any problem that may exist. This conclusions are tentative pending laboratory confirmation, expected in mid-July.



Figure 1 Walter's Property and Soil Samples Location



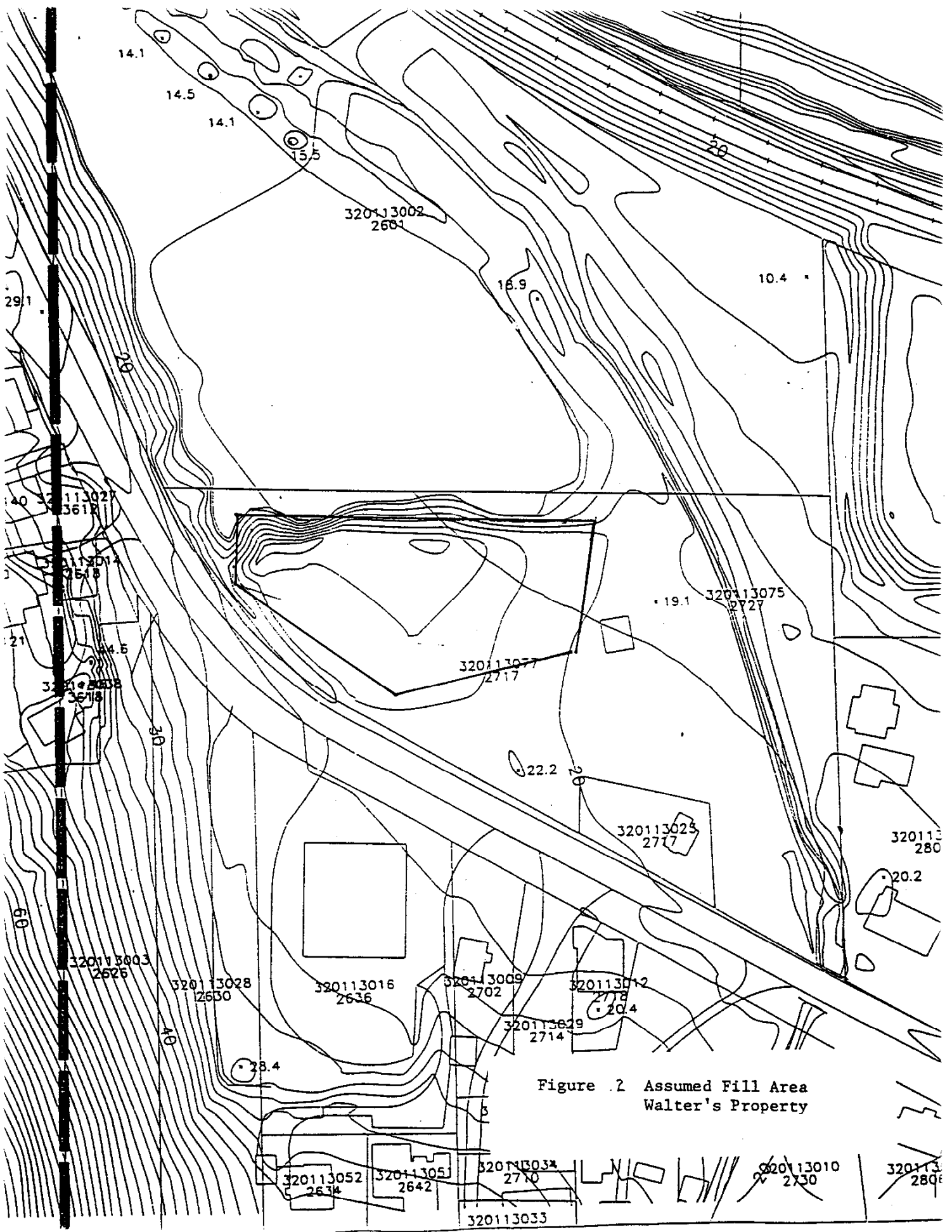


Figure 2 Assumed Fill Area
Walter's Property

Zentner, Greg

From: Getchell, Chris
To: Larkin, Karen
Cc: Zentner, Greg; Hawker, Tom; Stetson, John
Subject: Swan Creek/Walters sample results
Date: Tuesday, July 12, 1994 2:58PM

Karen,

Tom Hawker asked me to call you and also E-mail you with the results of the Swan Creek samples taken on 6/30/94.

We performed a standard laboratory analysis for volatiles, semi-volatiles, pesticides/PCB's and metals.

For the organics(volatiles, semi-volatile, pesticides/PCB's) there was only one low level hit in the West Walters sample of 4-Methlyphenol at 180 ppb(100ppb is the detection limit). This is a very common compound and could be a component of decomposition(such as peat moss) or it could be a low level contaminant not normally associated with the area. There is really no way to know at this point in time.

For the metals analysis there was a low level hit of cyanide, .60 ppm(.54 ppm is our detection limit) also in the West Walters sample, in addition, Total chromium, copper, nickel, selenium and zinc were detected in both samples at comparable levels in both samples. The levels of these compounds appear to be at levels that are comparable or lower to other soil samples that we have taken through out Pierce County for our Tegro program.

It is my opinion, based on the results that we do not have a serious contamination problem at this site, if any contamination at all, based on the samples taken.

chris getchell
5588 ext. 4204

CITY OF TACOMA
Public Works Utility Services Laboratory

To: Christopher L. Getchell, Source Control Supervisor
 From: Karen Crockett, Senior Laboratory Analyst
 Date: July 7, 1994
 Subject: Semivolatile Organics Analyses - Swan Creek WO# AK80C3
 Units: ug/Kg dry weight

Lab ID:	9406280903	9406280904
Location:	Walters East	Walters West
Date sampled:	06/28/94	06/28/94

Analyte

Acenaphthene	100 U	100 U
Acenaphthylene	100 U	100 U
Aniline	100 U	100 U
Anthracene	100 U	100 U
Benzidine	500 U	500 U
Benzo(a)anthracene	100 U	100 U
Benzo fluoranthenes	100 U	100 U
Benzoic acid	500 U	500 U
Benzo(g,h,i)perylene	100 U	100 U
Benzo(a)pyrene	100 U	100 U
Benzyl alcohol	100 U	100 U
Biphenyl	100 U	100 U
bis(2-Chloroethoxy)methane	100 U	100 U
bis(2-Chloroethyl)ether	100 U	100 U
bis(2-Ethylhexyl)phthalate	100 U	100 U
4-Bromophenyl phenyl ether	100 U	100 U
Butyl benzyl phthalate	100 U	100 U
Carbazole	100 U	100 U
4-Chloroaniline	100 U	100 U
4-Chloro-3-methylphenol	100 U	100 U

U indicates not detected at the associated level.

Subject: Semivolatile Organics Analyses - Swan Creek WO# AK80C3

Units: ug/Kg dry weight

Lab ID:	9406280903	9406280904
Location:	Walters East	Walters West
Date sampled:	06/28/94	06/28/94

Analyte		
2-Chloronaphthalene	100 U	100 U
2-Chlorophenol	100 U	100 U
4-Chlorophenyl phenyl ether	100 U	100 U
Chrysene	100 U	100 U
Dibenz(a,h)anthracene	100 U	100 U
Dibenzofuran	100 U	100 U
Dibenzothiophene	100 U	100 U
Di-n-butyl phthalate	100 U	100 U
1,2-Dichlorobenzene	100 U	100 U
1,3-Dichlorobenzene	100 U	100 U
1,4-Dichlorobenzene	100 U	100 U
3,3'-Dichlorobenzidine	500 U	500 U
2,4-Dichlorophenol	100 U	100 U
Diethyl phthalate	100 U	100 U
2,4-Dimethylphenol	100 U	100 U
Dimethyl phthalate	100 U	100 U
2,4-Dinitrophenol	500 U	500 U
2,4-Dinitrotoluene	100 U	100 U
2,6-Dinitrotoluene	100 U	100 U
Di-n-octyl phthalate	100 U	100 U
1,2-Diphenylhydrazine	100 U	100 U
Fluoranthene	100 U	100 U
Fluorene	100 U	100 U
Hexachlorobenzene	100 U	100 U
Hexachlorobutadiene	100 U	100 U
Hexachlorocyclopentadiene	100 U	100 U
Hexachloroethane	100 U	100 U
Indeno(1,2,3-c,d)pyrene	100 U	100 U
Isophorone	100 U	100 U
2-Methyl-4,6-dinitrophenol	500 U	500 U
2-Methylnaphthalene	100 U	100 U

U indicates not detected at the associated level.

Subject: Semivolatile Organics Analyses - Swan Creek WO# AK80C3

Units: ug/Kg dry weight

Lab ID: 9406280903 9406280904

Location: Walters Walters
East West

Analyte

2-Methylphenol	100 U	100 U
4-Methylphenol	100 U	180
Naphthalene	100 U	100 U
2-Nitroaniline	100 U	100 U
3-Nitroaniline	100 U	100 U
4-Nitroaniline	100 U	100 U
Nitrobenzene	100 U	100 U
2-Nitrophenol	100 U	100 U
4-Nitrophenol	500 U	500 U
N-Nitrosodimethylamine	100 U	100 U
N-Nitrosodiphenylamine	100 U	100 U
N-Nitroso-di-n-propylamine	100 U	100 U
2,2'-oxybis(1-Chloropropane)	100 U	100 U
Pentachlorophenol	500 U	500 U
Phenanthrene	100 U	100 U
Phenol	100 U	100 U
Pyrene	100 U	100 U
1,2,4-Trichlorobenzene	100 U	100 U
2,4,5-Trichlorophenol	100 U	100 U
2,4,6-Trichlorophenol	100 U	100 U

U indicates not detected at the associated level.



Karen Crockett
Senior Laboratory Analyst

CS 

Reviewed by:

dm 07/11/94
CS 07/12/94

CITY OF TACOMA
Public Works Utility Services Laboratory

To: Christopher L. Getchell, Source Control Supervisor
From: Karen Crockett, Senior Laboratory Analyst
Date: July 8, 1994
Subject: Pesticides/PCB Analyses - Swan Creek WO# AK80C3

Units: ug/Kg
Lab ID: 9406280903 9406280904
Location: Walters East Walters West
Date Sampled: 06/28/94 06/28/94

<u>Analyte</u>		
Aldrin	8.0 U	8.0 U
Alpha-BHC	8.0 U	8.0 U
Alpha-Chlordane	8.0 U	8.0 U
Beta-BHC	8.0 U	8.0 U
4,4'-DDD	8.0 U	8.0 U
4,4'-DDE	8.0 U	8.0 U
4,4'-DDT	8.0 U	8.0 U
Delta-BHC	8.0 U	8.0 U
Dieldrin	8.0 U	8.0 U
Endosulfan I	8.0 U	8.0 U
Endosulfan II	8.0 U	8.0 U
Endosulfan Sulfate	8.0 U	8.0 U
Endrin	8.0 U	8.0 U
Endrin Aldehyde	8.0 U	8.0 U
Endrin Ketone	8.0 U	8.0 U
Gamma-Chlordane	8.0 U	8.0 U
Heptachlor	8.0 U	8.0 U
Heptachlor Epoxide	8.0 U	8.0 U
Lindane	8.0 U	8.0 U
Methoxychlor	40 U	40 U
Toxaphene	200 U	200 U

U indicates not detected at the associated level.

Subject: Pesticides/PCB Analyses - Swan Creek WO# AK80C3-

Units: ug/Kg

Lab ID: 9406280903 9406280904


Location: Walters East Walters West

Date Sampled: 06/28/94 06/28/94

Analyte

PCB 1016	80 U	80 U
PCB 1221	80 U	80 U
PCB 1232	80 U	80 U
PCB 1242	80 U	80 U
PCB 1248	80 U	80 U
PCB 1254	80 U	80 U
PCB 1260	80 U	80 U

U indicates not detected at the associated level.


Karen Crockett
Senior Laboratory Analyst

csct

Reviewed by:

dm 07/11/94
CS 07/12/94

Watters East

VOLATILE ORG/ NICS ANALYSIS DATA SHEET
METHOD 8240

Lab Name: Weyerhaeuser Lab Sample ID: 30755
 Client Sample ID: 9405280903 Request Number ID: 15296
 Sample Description: SOIL Matrix: SOIL
 Sample wt/vol: 5 g Lab File ID: A7403
 Level: LOW Date Received: 7/1/94
 % Moisture: NA Date Analyzed: 7/6/94
 GC Column: Capillary Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)	
		ug/Kg	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
73-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethene	10	U
75-09-2	Methylene Chloride	10	U
67-54-1	Acetone	10	U
75-15-0	Carbon Disulfide	71	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene-total	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10051-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	3	J
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene-total	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-1	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

FORM 1 VOA

7/94 Rev.

020/025

S I T S

07/12/94 11:53 FAX 208 924 6654

Walters West

VOLATILE ORGANICS ANALYSIS DATA SHEET
METHOD 8240

Lab Name:	Weyerhaeuser	Lab Sample ID:	30756
Client Sample ID:	<u>9406260904</u>	Request Number ID:	15296
Sample Description:	SOIL	Matrix:	SOIL
Sample wt/vol:	5 g	Lab File ID:	A7404
Level:	LOW	Date Received:	7/1/94
% Moisture	NA	Date Analyzed:	7/6/94
GC Column:	Capillary	Dilution Factor:	1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg)	
		ug/Kg	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	36	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene-total	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
55-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10081-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylene-total	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-1	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U

FORM 1 VOA

7/94 Rev.

CITY OF TACOMA
Public Works Utility Services Laboratory

To: Christopher L. Getchell, Source Control Supervisor

From: Lori A. Zboralski, Senior Laboratory Analyst

Date: July 12, 1994

Subject: Metals Analyses - Swan Creek WO# AK80C3

Units: mg/Kg

Lab ID:	9406280903	9406280904
Location:	Walters East	Walters West
Date Sampled:	06/28/94	06/28/94

Analyte-Total

Arsenic	0.50 U	0.50 U
Beryllium	0.10 U	0.10 U
Cadmium	0.50 U	0.50 U
Chromium	16.9	19.4
Copper	7.53	10.8
Lead	10.0 U	10.0 U
Mercury	0.020 U	0.020 U
Nickel	16.6	12.1
Selenium	23.6	19.7
Silver	5.0 U	5.0 U
Thallium	1.0 U	1.0 U
Zinc	25.3	22.6

U indicates not detected at the associated value.

Lori A. Zboralski
Lori A. Zboralski
Senior Laboratory Analyst

AA ~~AA~~ BE ~~BE~~ RF ~~RF~~ ^{on for}

Reviewed by:

dm 07/12/94
ls 07/12/94

CITY OF TACOMA
Public Works Utility Services Laboratory

To: Christopher L. Getchell, Source Control Supervisor
From: Lori A. Zboralski, Senior Laboratory Analyst
Date: July 8, 1994
Subject: Conventional Analyses - Swan Creek WO# AK80C3

Units: mg/Kg dry weight unless otherwise noted

Lab ID:	9406280903	9406280904
Location:	Walters East	Walters West
Date Sampled:	06/28/94	06/28/94
Sample Type:	PART	PART

<u>Analyte:</u>		
Cyanide, Total	0.54 U	0.60
Solids, Total		
Percent	83.5	82.3

U indicates not detected at the associated level.

Lori A. Zboralski
Lori A. Zboralski
Senior Laboratory Analyst

YB *[Signature]*

Reviewed by:
hmo 7/08/94
LS 07/14/94

PROPOSED FINAL DRAFT

Appendix C
Project Schedule

**Confidential Draft Consent Decree
Attorney Client Work Product
For Settlement Purposes Only - Provided Under FRE 408**



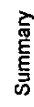
Scconcept.doc
Tuesday, June 18, 1996

**CITY OF TACOMA
SWAN CREEK STREAM RESTORATION
PROJECT SCHEDULE**

ID	Task Name	Start Day	Finish Day	Year 2				Year 3				Year 4			
				Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2		
1	Swan Creek	1	0												
2	Baseline Habitat Data Collection	0	365												
3	Preliminary Design	0	120												
4	Shoreline/Wetland Permit Applications	150	150												
5	Deed Restrictions Filed (1)	180	180												
6	Shoreline/Wetland Permit Review	150	240												
7	City Shoreline/Wetland Permit Approval	240	240												
8	Corps Of Engineers Permit Application (2)	255	255												
9	State Shoreline Permit Approval	270	270												
10	Corps Of Engineers Permit Review (3)	255	435												
11	Final Design	330	420												
12	CMMP Submittal (4)	340	340												
13	Corps Of Engineers Permit Approval	435	435												
14	CMMP Approval	435	435												
15	Bid and Contract	465	525												
16	Construction (5)	525	705												
17	Notice of Completion (6)	735	735												

Notes:

1. Start Date: Consent Decree entry date plus 1 year, except that deed restrictions will be filed within 180 days of the entry of the Consent Decree or acquisition. The date shown is a surrogate date.
2. Anticipated Date. The US Army Corps of Engineers permit application is to be filed within 30 days of the City of Tacoma notice of exemption or approval of the shoreline/wetland permits.
3. Application for State Water Quality Certification and Hydraulic Permit application will be filed during the Corps permit review.
4. Anticipated Date. CMMP (Construction, Maintenance, Monitoring/Adaptive Management Plans) will be filed with the Natural Resource Trustee Agencies within 90 days of the Corps permit application.
5. Anticipated Date. Notice of completion will be filed with the Natural Resource Trustee Agencies within 300 days of the Corps permit and Trustee CMMP approvals.

Project: Swan Creek
 Date: Mar 6 '97
 Task: 
 Milestone Date: 
 Summary: 
 Multiple Dates: 