

SOIL MANAGEMENT PLAN

Engineered & Institutional Site Controls

Former Sooper Dry Cleaners Site
Normandy Park Shopping Center
Normandy Park, Washington

Prepared for:

Griffin & Jensen DBA
Normandy Park, Washington

Prepared by:

SCS ENGINEERS

Bellevue, Washington

May 2003

04202037.00

SCS ENGINEERS

May 23, 2003
File No. 04202037.00

Mr. Frank Jensen
Griffin & Jensen DBA- Normandy Park Shopping Center
22608 Marine View Drive South
Des Moines, Washington 98198

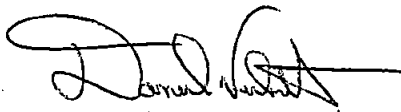
Subject: Soil Management Plan, Sooper Dry Cleaners, Normandy Park Shopping Center

Dear Mr. Jensen:

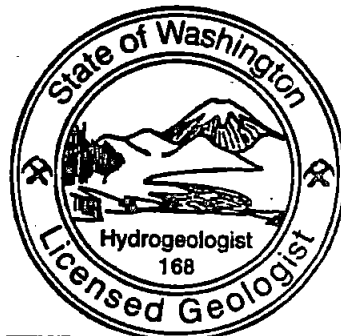
Attached please find two copies of the Soil Management Plan to document the in-place management of residual subsurface soil contamination at the former Sooper Dry Cleaners site located at the Normandy Park Shopping Center, Normandy Park, Washington. This document supports the Remedial Action Report issued for the recently completed soil cleanup at the site. These cleanup actions included limited soil excavation to remove suspected sources of tetrachloroethene (PCE) soil and groundwater contamination followed by the implementation of engineered and institutional controls to further isolate any remaining residual soil contamination.

Thank you for the opportunity to provide our services. If you have any questions, please do not hesitate to call.

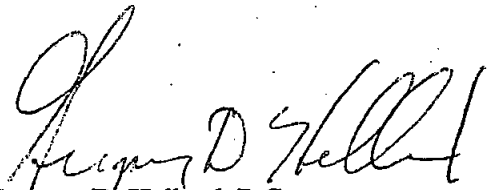
Sincerely,



Daniel A. Venchiarutti, P.G.
Project Manager
SCS ENGINEERS



Daniel A. Venchiarutti



Gregory D. Helland, P.G.
Project Director
SCS ENGINEERS

cc: Agnes Griffin, Griffin & Jensen DBA
Ken Bloch, Wolfstone Panchot and Bloch
Brad Helland, Washington Department of Ecology



SOIL MANAGEMENT PLAN

Engineered & Institutional Site Controls

Sooper Dry Cleaners
Normandy Park Shopping Center
17835 First Avenue South
Normandy Park, Washington 98148

Prepared for:

Griffin & Jensen DBA
22608 Marine View Drive South
Des Moines, Washington
(206) 824 - 9100

Prepared by:

SCS ENGINEERS

2405 140th Avenue NE
Suite 107
Bellevue, Washington
(425) 746-4600

May 2003

04202037.00

TABLE OF CONTENTS

TABLE OF CONTENTS	i
LIST OF FIGURES	ii
SECTION 1 INTRODUCTION	1
SECTION 2 BACKGROUND INFORMATION	2
2.1 SITE INFORMATION	2
2.2 SUMMARY OF SITE CONDITIONS	2
2.2.1 Subsurface Conditions and Hydrogeology	2
2.2.2 Soil Contamination Issues	5
2.2.3 Groundwater Contamination Issues	5
2.3 SUMMARY OF REMEDIAL ACTIONS	6
2.3.1 Dry Well Decommissioning.....	7
2.3.2 Sanitary Sewer Improvements	7
2.3.3 Stormwater System Improvements	7
2.3.4 Septic Tank Decommissioning.....	8
2.3.5 Site Repaving	8
SECTION 3 IN-PLACE SOIL MANAGEMENT	9
3.1.1 Extent of Residual PCE Soils.....	9
3.1.2 PCE Soil Exposure Issues	12
SECTION 4 SITE CONTROL MAINTANANCE AND BMPS	14
4.1 SANITARY SEWER AND STORMWATER UTILITIES	14
4.2 BUILDING FOUNDATIONS AND SURFACE PAVEMENT	16
4.3 GROUNDWATER MONITORING WELLS.....	17
4.4 INSTITUTIONAL/ADMINISTRATIVE MEASURES	17
SECTION 5 REFERENCES	18



LIST OF FIGURES

FIGURE 1	SITE LOCATION MAP.....	3
FIGURE 2	GENERALIZED SITE PLAN.....	4
FIGURE 3	ESTIMATED EXTENT OF RESIDUAL PCE SOIL CONTAMINATION.....	10
FIGURE 4	OVERVIEW OF ENGINEERED SITE CONTROLS.....	15



SECTION 1 INTRODUCTION

This Soil Management Plan was prepared by SCS Engineers for Griffin and Jensen DBA to document the in-place management of residual subsurface soil contamination at the Normandy Park Shopping Center. Historical operations at several dry cleaner businesses formerly located in the shopping center appear to have released dry cleaning chemicals into the subsurface soils and groundwater. The primary chemicals of concern at the property are tetrachloroethene (PCE) and trichloroethene (TCE).

During March and April 2003, SCS Engineers completed a remedial program at the shopping center to address these residual soil contamination issues. The remedial actions included limited soil excavation to remove suspected sources of soil and groundwater contamination followed by the implementation of engineered and institutional controls to further isolate the remaining areas of residual soil contamination.

The soil cleanup activities were completed under the Washington Department of Ecology's Voluntary Cleanup Program (VCP). The site was entered into the VCP in February 2001, and has been assigned TCP #NW0614 by Ecology.

The main components of the remedial action completed at the site included:

- Limited source removal through soil excavation of the most highly contaminated zones previously observed in the shallow subsurface. The removal action focused on approximately 50 cubic yards of contaminated soil associated with a suspected former dry well and the soils/fill materials surrounding nearby sanitary sewer utilities.
- Decommissioning the suspected former dry well and an out-of-service septic tank present on the property.
- Removal and replacement of the sanitary sewer and stormwater utilities that service the former dry cleaner tenant space to eliminate further infiltration of surface water into areas of residual soil contamination.
- Installation of a french drain along the western property border to route runoff into the improved stormwater system and further isolate any residual soil contamination.
- Sealing and repaving the entire area behind the main building and the disturbed portion of the parking area where the septic tank were removed.

The following sections of this soil management plan summarize the nature and extent of the remaining areas of the residual PCE soil contamination present on the property. The plan also describes the engineered controls that have been installed at the site to isolate the residual contamination from human and environmental receptors. This is followed by a brief discussion on the care and maintenance of the physical site controls, including Best Management Practices (BMPs) to ensure that the remedial infrastructure remains effective. The plan concludes with a discussion of soil management issues related to future site construction and/or redevelopment, including mitigating worker exposure in areas of residual contamination, and ensuring proper handling and disposal of any PCE soils removed from the site.



SECTION 2 BACKGROUND INFORMATION

2.1 SITE INFORMATION

The Sooper Dry Cleaners business was formerly situated in a multi-tenant commercial building on the western end of the Normandy Park Shopping Center at 19935 First Avenue South in Normandy Park, Washington (Figure 1). Various dry cleaning businesses have historically operated within this tenant space since approximately the early 1970's. A generalized site plan illustrating the layout of the Normandy Park, shopping center and the location of the former Sooper Dry Cleaners is provided in Figure 2.

2.2 SUMMARY OF SITE CONDITIONS

A series of environmental investigations completed at the former Sooper Dry Cleaners confirmed that chlorinated solvents, primarily PCE, had contaminated the subsurface soils and groundwater beneath the shopping center. The field and chemical data obtained during these site investigations was presented in an Environmental Site Assessment Report (SCS Engineers, October 2001).

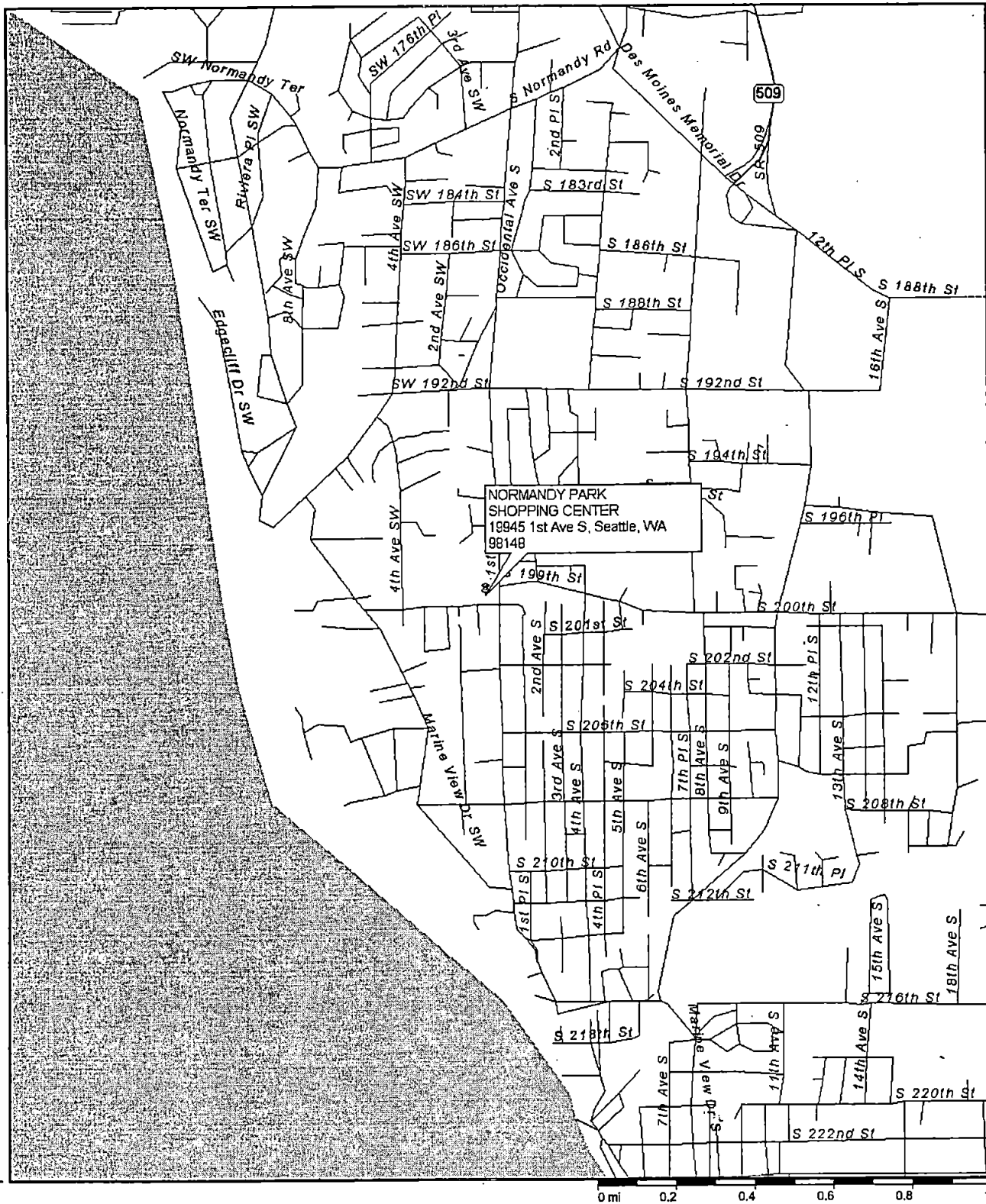
The PCE contaminated soils observed at the site were generally associated with an old dry well and the sanitary sewer utilities immediately behind the dry cleaner tenant space. These areas in turn appear to be the focus for a plume of PCE contaminated groundwater observed beneath the western end of the shopping center. In addition, lower-level PCE soil and groundwater contamination was also observed to be associated with an old septic tank system located near the center of the parking area.

2.2.1 Subsurface Conditions and Hydrogeology

The subsurface soils beneath the property generally consist of compact silts that grade into silty fine sands in the vicinity of the water table. Groundwater occurs approximately 40 feet beneath ground surface (bgs) in fine to medium sand with silty zones. Groundwater flow is predominantly to the west-southwest with a hydraulic gradient that ranges from approximately 0.004 to 0.02 ft/ft. Aquifer testing data collected at the site derived hydraulic conductivity values ranging between 5.5×10^{-5} to 2.9×10^{-4} ft/sec.

The ground surface hydrologically downgradient (towards the west) of the shopping center forms a broad plateau that abruptly rises over 50 feet above the subject property. As a result, the subject aquifer is situated approximately 115 feet bgs on the properties downgradient of the site. In addition, a distinct, shallow water bearing zone was observed to be perched on a till confining layer at 60 feet bgs in an offsite investigative area (groundwater well MW-13) situated approximately 1,000 feet southwest of the shopping center. Regional groundwater information suggests that the subject aquifer discharges along the Puget Sound shoreline approximately one-half mile further towards the west.





SCS ENGINEERS

STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.

2405 140TH AVE NE, SUITE 107, BELLEVUE, WA 98005 (425) 746-4500

PROJECT NO. 04202037.00 DES BY D.V.

SCALE - CHK BY D.V.

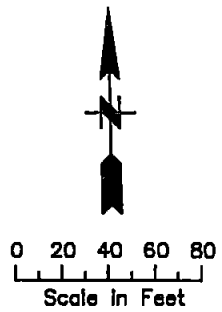
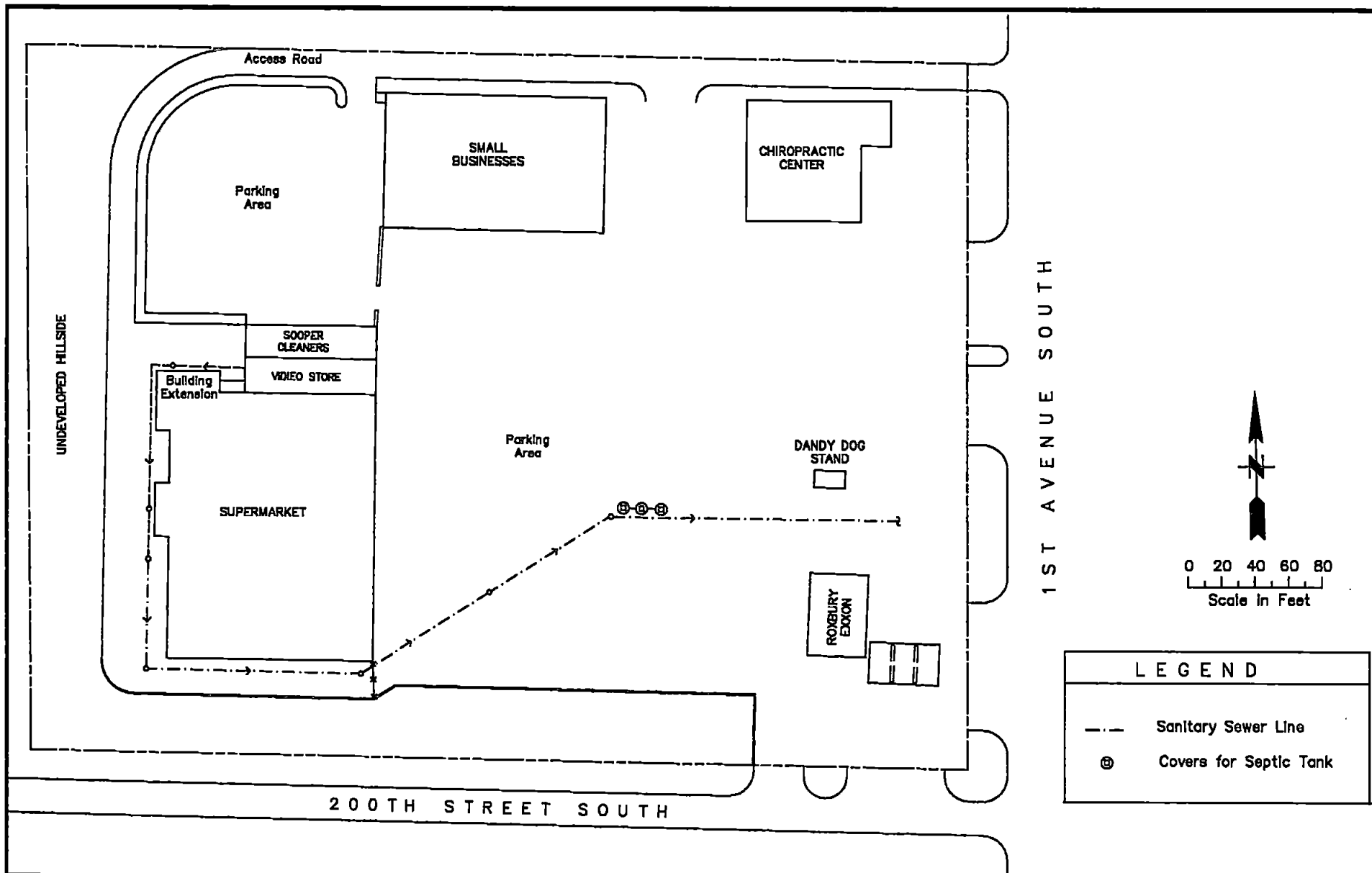
CAD FILE Figure 1 APP BY G.H.

SITE LOCATION MAP
NORMANDY PARK SHOPPING CENTER
SITE REMEDIATION REPORT

DATE
MAY 2003

FIGURE

1



LEGEND	
---	Sanitary Sewer Line
⊗	Covers for Septic Tank

SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS 2405 140TH AVE NE, SUITE 107, BELLEVUE, WA 98005 (425) 748-4600	PROJECT NO. 04202037.00	DCS BY D.V.	GENERALIZED SITE PLAN SOOPER DRY CLEANERS NORMANDY PARK SHOPPING CENTER	DATE MAY 2003
	SCALE AS SHOWN	CHK BY D.V.		FIGURE 2
	CAD FILE Figure 2	APP BY G.H.		

2.2.2 Soil Contamination Issues

PCE concentrations exceeding the 0.05 mg/kg Model Toxic Control Act (MTCA) Method A soil standard have been previously detected in the subsurface soils immediately behind the former dry cleaner tenant space and along sections of the sanitary sewer system.

Previous subsurface soil investigations at the shopping center identified the following:

- PCE soil concentrations ranging to 5.1 mg/kg were observed in the gravelly fill comprising the upper 13 feet of the former dry well. The next highest soil concentrations (ranging between 0.82 and 0.85 mg/kg) occurred at a depth of approximately 50 feet bgs the upper saturated zone directly beneath and immediately downgradient of the dry well. The remaining PCE soil detections at the site ranged from 0.057 to 0.34 mg/kg. With few exceptions, all the detectable contaminant levels were present in samples collected from depths of 10 feet or greater.
- Low, but detectable levels of PCE and several related compounds (TCE and PCA) were also observed in the subsurface soils immediately to the west of the dry cleaner tenant space and the former septic tank. These low level detections were sporadically present throughout the vadose and saturated zones. No evidence of any non-aqueous phase liquids (NAPL) was noted in either the vadose or saturated zones during the site investigation.

Neither PCE, nor any related compounds, were detected in any of the soil samples collected from four shallow hand auger borings installed inside the dry cleaner tenant space. With the exception of one soil boring located immediately beside the former septic tank, PCE was not detected in any of the soil borings drilled along the sanitary sewer line. In addition, PCE was not detected in any of the borings installed on the far north and southern ends of the shopping center, or in the offsite monitoring well boring situated approximately 1,000 feet west-southwest of the subject property.

2.2.3 Groundwater Contamination Issues

Groundwater PCE concentrations exceeding the 5 µg/L MTCA Method A standard have been detected beneath the western end of the shopping center and immediately downgradient of the old septic tank. However, neither PCE nor any related contaminants were detected in any of the groundwater samples collected downgradient of the shopping center at the offsite well.

The groundwater investigations at the site indicated the following:

- The highest PCE concentrations (ranging between 2,300 to 8,300 µg/L) at the site were observed in the groundwater wells directly within and immediately downgradient of the former dry well. In addition, TCE was also detected immediately downgradient of the dry well above its 5 µg/L Method A groundwater standard.



- PCE concentrations (ranging between 580 to 980 $\mu\text{g/L}$) were detected in several monitoring wells situated slightly west-northwest of the former dry cleaner tenant space. Although these PCE detections are slightly crossgradient of the former dry well, it is believed that these contaminant detections are also associated with this structure.
- Lower-level PCE groundwater contamination (ranging from 18 to 120 $\mu\text{g/L}$) was also observed in the vicinity of the old septic tank and on the southwest corner of the property. The 120 $\mu\text{g/L}$ PCE detection was associated with a smaller plume of PCE contaminated groundwater originating from the former septic tank. The lack of PCE or any related compounds in the southernmost monitoring well suggests that this latter plume remains limited in extent.

Due to the proximity of the property line, PCE contaminated groundwater is suspected of migrating beyond the western border of the shopping center. However, neither PCE nor any related contaminants have been detected in the offsite monitoring well. The lack of groundwater contamination in the offsite well suggests that the plume of PCE contaminated groundwater observed beneath the shopping center does not extend this far west. As noted in the October 2001 ESA report, changes in the lithological condition of the aquifer (i.e. an increasingly reducing environment and higher organic carbon levels) immediately downgradient of the property may potentially be attenuating and/or limiting the migration of the PCE contamination.

2.3 SUMMARY OF REMEDIAL ACTIONS

A feasibility analysis of possible remedial alternatives to address the residual contamination at the Normandy Park Shopping Center was completed and a formal site cleanup/management plan was prepared (SCS Engineers, June 2002). Based on the observed distribution of the PCE contamination at the site, as well as the lack of onsite and/or downgradient exposure to the chemicals of concern, the cleanup strategy selected for the site consisted of limited soil excavation to remove suspected sources of PCE contamination followed by the implementation of engineered and institutional controls to isolate the remaining residual soil contamination from onsite surface receptors and minimize future contaminant leaching into the underlying groundwater.

The remedial plan was submitted to Ecology for review. Following their technical review, Ecology indicated that the proposed cleanup approach (with minor modifications) was consistent with the goal of achieving a no further action (NFA) determination for the residual soil contamination at the site (Ecology correspondence, dated January 6, 2003).

Remedial activities to address the residual soil contamination issues at the site were completed during March and April 2003. Detailed descriptions of the cleanup activities completed as part of the soil remedy, including the results of the confirmation soil sampling, are documented in a Remedial Action Report (SCS Engineers, May 2003). A brief summary of the source removal and engineering/institutional control remedial actions completed at the site is presented below.



2.3.1 Dry Well Decommissioning

The old dry well located behind the dry cleaner tenant space was decommissioned by excavating approximately 20 cubic yards of PCE contaminated fill material and surrounding soil from the upper 13 feet of the structure. Based on the results of confirmational soil sampling, the excavated materials were loaded into 10-ton plastic-lined, steel storage containers and hauled offsite for non-hazardous land disposal at Columbia Ridge Landfill in Arlington, Oregon. After the soil removal activities were completed, the dry well excavation was backfilled with clean material, compacted, and resurfaced with new asphalt pavement.

2.3.2 Sanitary Sewer Improvements

Approximately 320 linear feet of the sanitary sewer piping that formerly serviced the dry cleaner tenant space was replaced with new utility piping. The original butt-jointed concrete piping was removed from the trench excavation and a new, watertight Schedule 80 PVC line was installed in its place. Because a portion of the sanitary line was situated beneath a building extension an estimated 50 feet of the original sanitary piping could not be accessed. This section of concrete piping was decommissioned in-place, and the new line was re-routed around the building extension. Once the new sanitary line was in place, the trench was backfilled, compacted, and resurfaced with a gravel sub-base and new asphalt pavement.

Based on the results of confirmational soil sampling, an estimated 32 cubic yards of PCE contaminated soil was removed from the sanitary sewer trenching. With the exception of approximately 12 cubic yards of soil which were removed from the northern edge of the building extension, all the excavated material was hauled offsite for non-hazardous land disposal. Confirmational sampling of the 12 cubic yard soil stockpile indicated that this material was a hazardous waste since it contained leachable levels of PCE. All 12 cubic yards of this latter material was transported by rail for proper disposal at Waste Management's hazardous waste landfill in Arlington, Oregon.

2.3.3 Stormwater System Improvements

Approximately 300 linear feet of the original underground stormwater piping located immediately behind the main building were removed and replaced with new utility piping. Four roof drain laterals servicing the west side of the building were also replaced. As previously described for the sanitary sewer, the original butt-jointed concrete stormwater piping was replaced with a watertight Schedule 80 PVC line. In addition, one stormwater catch basin was completely replaced, and two other catch basins were refurbished.

The stormwater system was further improved through the installation of a 250 foot long french drain that parallels the western property border. The french drain was installed in two sections, one section connecting to the newly installed center catch basin, the other discharging into the refurbished southern catch basin. The french drain consists of a geomembrane wrapped 4-inch perforated PCV pipe covered by approximately 2.5 feet of ¾" to 2" washed round rock.



The majority of the soils excavated during replacement of the stormwater system were determined to be suitable for reuse as backfill. Once the new stormwater utilities were installed, the trench was backfilled, compacted, and resurfaced with a gravel sub-base and new asphalt pavement.

2.3.4 Septic Tank Decommissioning

The out-of service septic tank which formerly connected to the sanitary sewer system was decommissioned. The three concrete chambers comprising the septic tank were cleaned of accumulated water and sediment, rinsed out, dismantled, and removed from the site. Approximately 6,800 pounds of PCE contaminated bottom sediment was containerized into 55-gallon drums and hauled offsite to a permitted hazardous waste treatment/disposal facility (Pollution Control Industries, Chicago, IL). In addition, an estimated 2,500 gallons of PCE contaminated septic tank water was successfully treated onsite using carbon filtration and hauled off for discharge at a METRO waste water treatment plant.

After the septic tank decommissioning was completed, the excavation was expanded to allow replacement of approximately 20 feet of old sanitary sewer piping upstream (to the west) of the system. Confirmation soil sampling in the excavation did not indicate the presence of any "hotspots" of PCE contamination. The excavation was backfilled with clean material, compacted to grade, and resurfaced with new asphalt pavement.

2.3.5 Site Repaving

Approximately 12,000 square feet of new asphalt pavement was installed along the western third of the property and at the former location of the septic tank. The new pavement effectively isolates all known areas of residual PCE soil contamination from both potential surface receptors and from future stormwater infiltration. The combined effect of the aforementioned engineered controls will be to reduce the potential for future leaching to groundwater of any residual contamination remaining in the unsaturated soil column.



SECTION 3 IN-PLACE SOIL MANAGEMENT

The targeted source removal activities completed as part of the soil remedy resulted in the excavation and offsite disposal of approximately 50 cubic yards of PCE contaminated soil. Approximately 12 cubic yards of contaminated soil containing leachable levels of PCE was also removed from the property for offsite land disposal as a hazardous waste. These removals focused on “hot spots” of residual soil contamination that were associated with the former dry well and the old sanitary sewer piping situated immediately behind the dry cleaner tenant space.

As part of the septic tank decommissioning, approximately 6,800 pounds of PCE contaminated bottom sediment was containerized into 55-gallon drums and hauled offsite to a permitted hazardous waste treatment/disposal facility. In addition, an estimated 2,500 gallons of PCE contaminated septic tank water was successfully treated onsite by carbon filtration and hauled off for discharge at a METRO water treatment plant.

These removal actions have resulted in the elimination of the shallowest, most PCE-impacted media observed at the site. However, several areas containing residual concentrations of PCE soil contamination continue to be present on the property. In accordance with the site remedial plan, the remaining PCE soils will be managed in-place using the engineered controls (i.e. new sanitary and stormwater utilities, french drain system, new asphalt pavement) installed at the site to isolate these areas from surface receptors and stormwater infiltration. In turn, these measures are anticipated to minimize future leaching of site contaminants into the groundwater beneath the site.

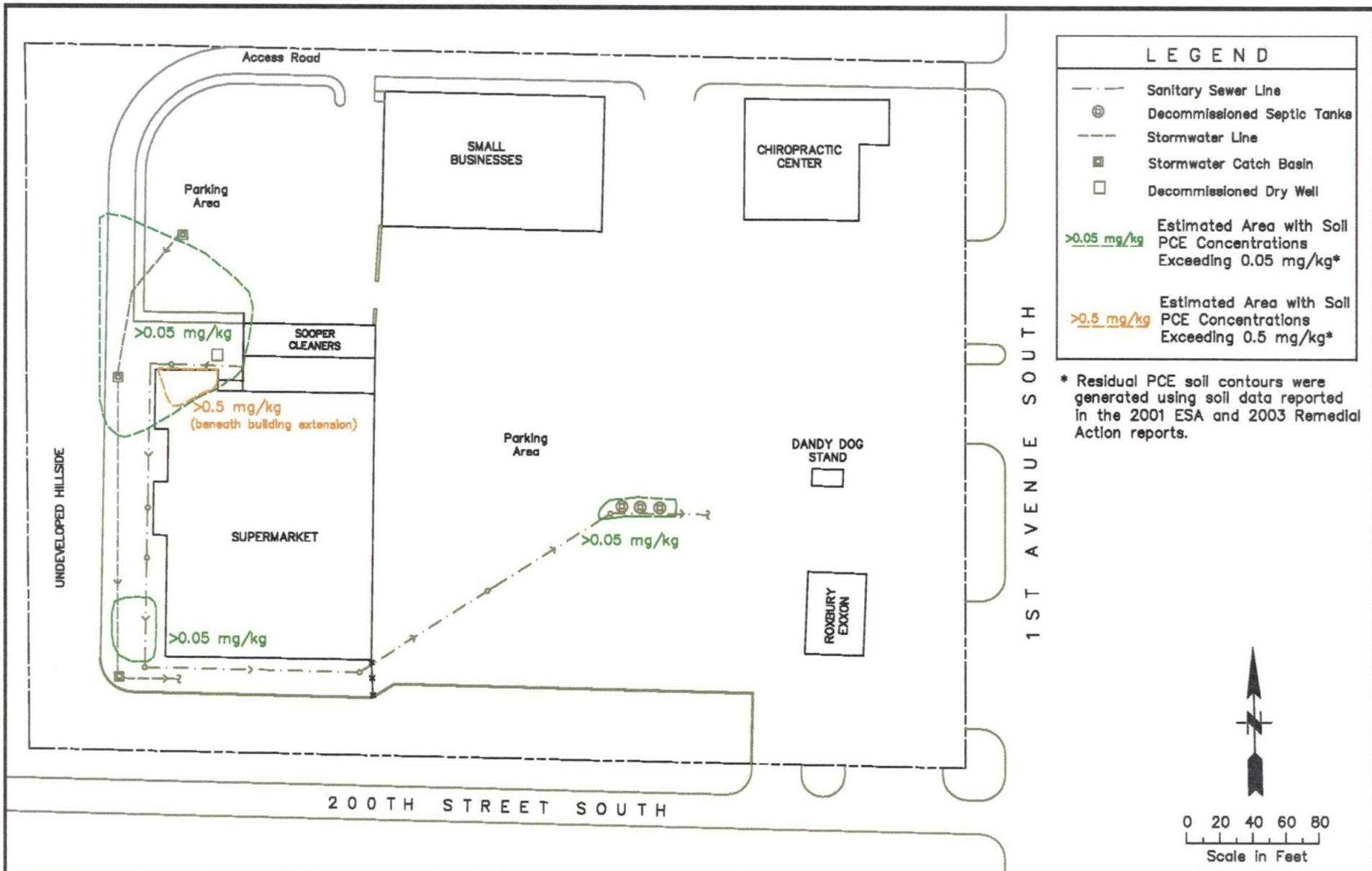
The following sections of the soil management plan identify the areas of residual PCE soil contamination to be managed in-place using the engineered and institutional controls implemented at the property. In addition, measures to mitigate current and future exposure to the residual soil contamination by potential onsite receptors (i.e. business tenants, maintenance staff, construction workers) are discussed.

3.1.1 Extent of Residual PCE Soils

Field and chemical data obtained during the site investigations and through confirmation soil testing completed during the remedial action indicate that three general areas of residual PCE soil contamination remain present on the property. Each of these zones of residual contamination contains PCE concentrations in excess of the calculated, site-specific soil cleanup standard (the 0.053 mg/kg MTCA Method B standard for protection of groundwater) set by Ecology for unrestricted land use. This conservative Method B standard is virtually identical to the published MTCA Method A value for this compound (0.050 mg/kg for PCE).

The three zones of residual PCE contamination include the subsurface soils immediately behind the former dry cleaner tenant space, the soils surrounding the stormwater and sanitary sewer corridors near the southwest end of the main building, and the soils immediately beneath the decommissioned septic tank. The estimated areal extent of each of these zones of residual PCE soil contamination are illustrated on Figure 3.





SCS ENGINEERS
 STEARNS, CONRAD AND SCHMIDT
 CONSULTING ENGINEERS
 2405 140TH AVE NE, SUITE 107, BELLEVUE, WA 98005 (425) 748-4800

PROJECT NO.	04202037.00	DES BY	D.V.
SCALE	AS SHOWN	CHK BY	D.V.
CAD FILE	Figure 3	APP BY	G.H.

ESTIMATED EXTENT OF
 RESIDUAL PCE SOIL CONTAMINATION
 NORMANDY PARK SHOPPING CENTER

DATE	MAY 2003
FIGURE	3

The largest area of residual soil contamination is situated immediately behind the former dry cleaner tenant space. This contamination appears to have originated from the former dry well and from sanitary sewer leakage along the northwest corner of the building. As previously discussed, the majority of the PCE soils removed during the remedial action were excavated from this portion of the site. The area of residual contamination exceeding 0.05 mg/kg is estimated to cover approximately 9,000 square feet. Given that PCE has been detected to the depth of the water table (~40 feet bgs), it is estimated that the volume of residual soil contamination remaining in this area could reach 14,000 cubic yards. However, based on the subsurface data collected during the 2001 ESA, most of the PCE contamination in this area (especially along the north and west perimeter of this zone) appears to occur at depths greater than 10 feet bgs.

During the site cleanup, a notable shallow subsurface soil zone was encountered in the new utility trench excavated along the northwest building extension. This zone contained apparently stained, rusty-brown silt lenses at depths ranging between 2 and 5 feet bgs. Twelve cubic yards of hazardous waste soil containing up to 23 mg/kg PCE was removed from this area up to the base of the building extension. This represented the most highly contaminated soils encountered at the site. Although additional soil removal could not be conducted due to the proximity of the adjacent structure, this shallow zone of PCE contamination is suspected to extend beneath a portion of the building extension (Figure 3). This is the same area where sections of the original sanitary sewer and the original roof drain/stormwater piping that ran beneath the building extension were decommissioned in place.

Confirmational soil samples collected inside the over-excavated trench detected residual PCE levels ranging from 0.66 to 1.5 mg/kg. A sample obtained from a small test pit immediately beneath the location of the highest in-place PCE soil concentrations (1.3 to 1.5 mg/kg) contained lower PCE levels (0.74 mg/kg). As shown on Figure 3, the area of PCE residual contamination exceeding 0.5 mg/kg is estimated to cover approximately 600 square feet. Assuming the impacted soils extend to a depth of 10 feet bgs, the estimated volume of this zone of residual PCE contamination would be approximately 220 cubic yards. If exposed during future site development, it is possible that some of the residual soil contamination beneath this structure may contain sufficient leachable PCE to require handling/disposal as a hazardous waste.

The second general area of residual soil contamination is located in the subsurface soils immediately surrounding the sanitary sewer and stormwater utilities near the southwest corner of the main building. PCE soil concentrations detected during the pipe replacement in this area ranged between 0.06 and 0.09 mg/kg. These detections occurred at a depth of approximately 5 feet bgs. This area extends over approximately 900 square feet, and is estimated to contain less than 100 cubic yards of residual soil contamination exceeding 0.05 mg/kg PCE (Figure 3).

The final area containing residual PCE levels exceeding 0.05 mg/kg occurs in the subsurface soils in the vicinity of the decommissioned septic tank. These soils occur at depths ranging between 5 and 18 feet bgs, with PCE concentrations ranging from 0.06 to 0.24 mg/kg. Confirmation sampling conducted immediately after the removal of the old septic tank reported PCE soil concentrations ranging between "not detected" and 0.09 mg/kg. As illustrated on Figure 3, this area covers approximately 500 square feet, and is estimated to contain on the order of 200 cubic yards of residual soil contamination exceeding 0.05 mg/kg PCE.



3.1.2 PCE Soil Exposure Issues

The Normandy Park shopping center is a commercially-zoned property that is surrounded by residential developments. During the remedial evaluation, all the potential human and environment receptors at the site were identified and their exposure risk to the residual PCE soil contamination was evaluated. The principal activities expected to occur at the subject property during current and future site use include: retail businesses, food court services, fuel/service station businesses, and customer vehicle parking. Given this site use, potential onsite receptors can be expected to include store workers, shoppers, and facility maintenances personnel. In addition, construction workers will likely be present on the property during any future utility repairs, building demolition or site redevelopment.

The contaminated soils identified at the subject site range in depth from 2 to 45 feet bgs, with most of the observed PCE detections occurring at depths greater than 10 feet below ground surface. Baring some minor areas of perimeter landscaping, the entire site is covered with buildings and asphalt pavement. As a result of the soil removal action and newly installed engineered controls, the residual PCE soils remaining on the property have been further reduced and isolated. Therefore, direct contact with contaminated soil by the general public is not considered to be a viable exposure pathway. For similar reasons, volatile emissions from the PCE contaminated soils are not considered to present a significant exposure potential to either on-site workers or visitors.

The most significant potential for future exposure to PCE, TCE, and related site contaminants is anticipated to be associated with future construction activities that involve earthwork or soil excavation, especially in those portions of the property with in-place management of residual soil contamination. Construction workers could encounter shallow PCE contaminated soils during excavation work behind the former dry cleaner tenant space or along portions of the existing storm and sanitary sewer utility lines. In the event that the existing engineered controls (primarily the asphalt pavement and any clean covering soils) are removed from these areas, dermal, and possibility ingestion and/or inhalation exposure routes to onsite workers could be established. Personnel working in these areas may need to take protective measures, such as wearing chemically resistant gloves and other appropriate personal protective equipment (PPE).

It should be noted that the 0.053 mg/kg Method B soil cleanup being applied by Ecology for the overall soil remedy for the site reflects concerns for residual PCE leaching to groundwater. In situations where the potential for PCE exposure is through direct contact pathways (i.e. dermal, ingestion, inhalation) with contaminated soils, MTCA allows for a ~~10.6~~ ^{18 mg/kg} mg/kg risk-based Method B soil cleanup standard for unrestricted land use. This standard can be used to set a risk-based criteria for protecting construction workers from unacceptable levels of exposure to the residual soil contamination that may be encountered at the site. *4/15/04*

With the exception of the residual contamination observed immediately next to and possibly beneath the building extension (from where soils containing up to 21 mg/kg PCE were excavated), the PCE concentrations observed at the site remain well below the direct contact Method B soil criteria. As a result, it is not anticipated that the residual PCE soil contamination beyond the immediate area of the building extension will present a health risk to site workers. In addition, construction activities that will not disturb subsurface materials (such as above-surface building work and maintenance) is not expected to present any worker health and safety issues related to PCE soils exposure. However, if



subsurface work is planned where residual contamination exceeding 0.05 mg/kg PCE are present, it is recommended that soil sampling be conducted to confirm the PCE levels and ensure proper handling/disposal of the disturbed materials. Ecology rules currently require that all excavated/removed soils containing PCE concentrations in excess of the 0.05 mg/kg MTCA Method A cleanup standard be segregated for disposal at an appropriate offsite facility.

Before undertaking any construction activities that will potentially disturb the PCE soils in the immediate vicinity of the building extension, it is recommended that the shallow soils be characterized to establish the levels of residual PCE to which site workers will be exposed. In the event that soil sampling confirms the presence of PCE contamination in excess of the ~~19.6~~ mg/kg criteria, it is recommended that an exclusion zone be established around the effected work area. All workers entering the exclusion zone should be equipped with PPE (i.e., chemically resistant gloves, long-sleeved shirts, steel-toed rubber boots) and have adequate health and safety training. In addition, air monitoring is recommended within the work zone to ensure that workers are not being exposed to volatile organic compounds (VOCs). Respirators equipped with organic vapor cartridges should be worn if VOC levels exceed acceptable levels in the workers breathing zone.

Should confirmational sampling in the vicinity of the building extension confirm the presence of residual PCE above the ~~19.6~~ mg/kg criteria, it is also recommended that the samples be further analyzed for PCE using the Toxicity Characteristics Leaching Procedure (TCLP). Contaminated soils containing leachable concentrations of PCE in excess of the limits set by the Washington Dangerous Waste Rules will need to be managed and disposed of as a hazardous waste.

18 mg/kg
4/15/04

18 mg/kg
4/15/04



SECTION 4 SITE CONTROL MAINTANANCE AND BMPS

The soil remedy implemented at the Normandy Park Shopping Center to mitigate the residual PCE contamination associated with the former operation of the Sooper Dry Cleaners relies heavily on engineered site controls and supporting institutional measures. The newly installed infrastructure will need to be properly maintained and best management practices (BMPs) followed to ensure that these remedial structures continue to effectively isolate the residual contamination from potential surface receptors and the environment. Proper maintenance of the engineered controls will also be essential to minimize any future contaminant leaching to the groundwater beneath the property.

The remedial infrastructure installed at the Normandy Park Shopping Center as part of the engineered site controls include:

- Water-tight sanitary sewer utilities in all areas with in-place management of residual PCE soil contamination;
- Water-tight roof drain conduit, stormwater piping and catch basin structures in the vicinity of the residual PCE soil contamination;
- A new french drain system along the western edge of the site designed to collect surface runoff from the adjacent hillslope and prevent stormwater infiltration through residual PCE soils; and,
- Impermeable surface pavement over all areas with in-place management of residual PCE contaminated soils.

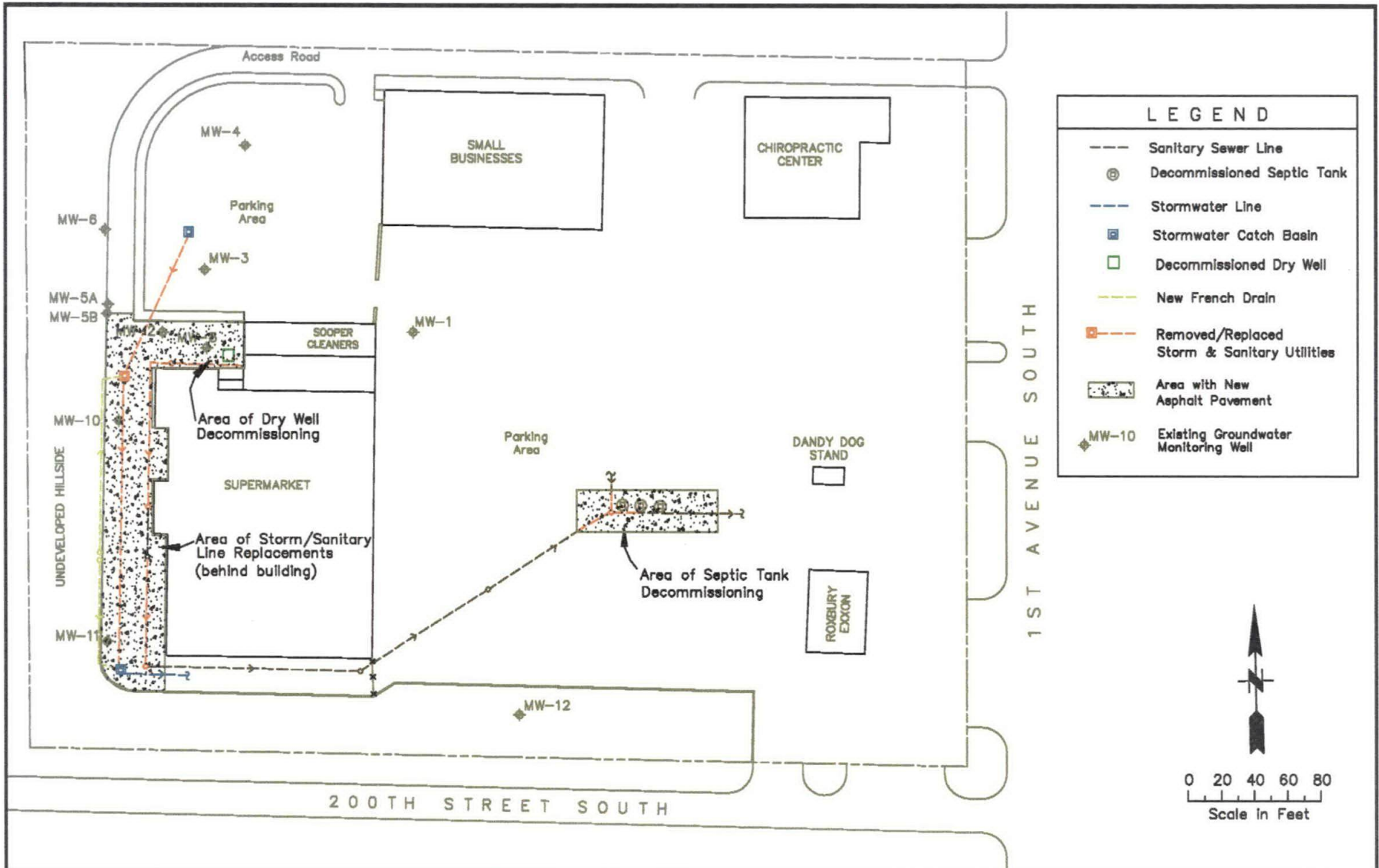
Figure 4 shows the general layout for the engineered site controls installed at the shopping center as part of the soil cleanup activities.

4.1 SANITARY SEWER AND STORMWATER UTILITIES

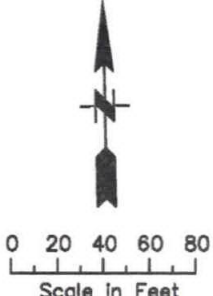
As illustrated on Figure 4, approximately 1,000 liner feet of new watertight sanitary sewer, stormwater, roof drain and french drain utilities have been installed behind the main building and in the main parking area. The new sanitary sewer and stormwater main piping consists of 6-inch diameter, Schedule 80 PVC. The roof drain laterals and the french drain piping are constructed of 4-inch diameter, Schedule 80 PVC. The new central catch basin installed immediately behind the main building consists of a cast-concrete basin. The primary remedial function of these structures is to divert sewage/storm/surface water away from areas designated for the in-place management of residual PCE soil contamination.

As long as the underground PVC utilities are left in-place and remain undisturbed, it is not anticipated that the piping itself will require any regular maintenance. However, should a blockage or other functionality-related issue occur along the PVC conduit, care must be taken not to unintentionally puncture or crack the plastic piping (for example, thorough careless use of a steel, power snake). These types of repairs should be conducted by knowledgeable utility workers.





LEGEND	
---	Sanitary Sewer Line
⊗	Decommissioned Septic Tank
- - -	Stormwater Line
■	Stormwater Catch Basin
□	Decommissioned Dry Well
- - -	New French Drain
■	Removed/Replaced Storm & Sanitary Utilities
▨	Area with New Asphalt Pavement
◆	Existing Groundwater Monitoring Well



SCS ENGINEERS STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS 2405 140TH AVE NE, SUITE 107, BELLEVUE, WA 98005 (425) 746-4800	PROJECT NO.	04202037.00	DES BY	D.V.	OVERVIEW OF ENGINEERED SITE CONTROLS SOIL MANAGEMENT PLAN NORMANDY PARK SHOPPING CENTER	DATE	MAY 2003
	SCALE	AS SHOWN	CHK BY	D.V.		FIGURE	4
	CAD FILE	Figure 4	APP BY	G.H.			

To keep the sewer and stormwater site controls functioning properly and in good repair, the following routine maintenance and BMPs are recommended:

- Periodic inspection (minimum of once per year) of the three stormwater catch basins situated along the western border of the property. The inspections should be completed during a storm event so that each structure can be examined for blockage or other flow related issues.
- All the stormwater catch basins located on the shopping center should be cleaned of any accumulated sediment at least annually.
- The french drain system should be periodical inspected (minimum of once per year) during a storm event to ensure it continues to collect and divert surface runoff. The drain rock surface that parallels the western edge of the alley behind the main building must be kept clear of vegetation and/or debris that could block infiltration into the system.
- The two clean-out ports located near the center of the french drain line should be periodically inspected for signs of sediment accumulations that could block stormwater drainage.
- The aboveground sections of the roof drains that service the western side of the main building should be inspected annually and kept in good repair to ensure roof runoff is effectively conveyed to the underground laterals and the stormwater main.

4.2 BUILDING FOUNDATIONS AND SURFACE PAVEMENT

All areas on the subject property with in-place management of residual PCE soil contamination are covered by building foundations or asphalt pavement. These covering structures are key site controls for isolating the PCE soils from surface receptors and stormwater infiltration. In the event that future site redevelopment disturbs any of these surface controls (i.e. the removal of the building foundation or stripping asphalt pavement) in areas covering PCE soils, some form of cover system (most likely replacement foundation and pavement) will need to be provided once the work is completed. In addition, any PCE soils exposed during future site work will need to be managed appropriately to ensure worker safety and proper material handling/disposal.

Should the foundation material that underlies the northwest building extension be removed as part of a future site redevelopment, residual soil contamination exceeding 0.5 mg/kg PCE will likely be encountered. If these "higher level" PCE soils are ever exposed, and it is determined that they can be safely excavated, their removal would be recommended. These soils would need to be properly characterized and managed for offsite disposal. In addition, any exposed sections of the original sanitary sewer and roof drain piping which was decommissioned in-place beneath the building foundation should be removed and properly disposed.

The following routine maintenance and BMPs are recommended to keep the surface controls functioning properly and in good repair:

- The exterior pavement covering all areas with in-place management of residual PCE soils should be inspected annually.



- Any cracks or ruptures observed in the asphalt pavement which could provide a conduit for surface runoff to infiltrate into the subsurface soils should be immediately sealed and/or repaired.

4.3 GROUNDWATER MONITORING WELLS

Due to the presence of PCE contaminated groundwater beneath the western portions of the shopping center, Ecology has mandated that the soil remedy include one year of quarterly groundwater monitoring at the site. As illustrated in Figure 4, a total of 11 groundwater monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5A, MW-5B, MW-6, MW-8, MW-10, MW-11 and MW-12) remain present on the property. Two of the groundwater wells (MW-7 and MW-9) installed during the environmental assessment were decommissioned during the closure of the dry well and the sanitary sewer replacements.

Depending on the results of the initial year of quarterly groundwater sampling, Ecology may require further groundwater monitoring that could potentially extend over a period of several additional years. The wells participating in the post-remedial monitoring will need to remain accessible and kept in good repair.

If site construction activities damage any of the monitoring wells, the extent of the damage must be assessed by a competent person (i.e. licensed well driller), and the necessary repairs completed as soon as possible. Extensive damage may require well abandonment consistent with the state well regulations, and replacement of the well. Should future site redevelopments require the removal of one or more of the existing groundwater wells, Ecology may require replacement wells to be installed in the vicinity of the decommissioned wells.

4.4 INSTITUTIONAL/ADMINISTRATIVE MEASURES

A copy of this soil management plan should be attached to the Normandy Park Shopping Center deed/title records to ensure that current and future property owners continue to maintain the engineered and institutional controls implemented at the site. It is also recommended that copies of all the site investigation reports and key correspondence with Ecology (see the list of reference documents in Section 5) accompany the ownership documentation.

Additional institutional and administrative controls have been identified by Ecology to support the soil remedy. These include:

- Deed restrictions on the Normandy Park Shopping Center property to prevent the future use of contaminated groundwater.
- Formal notification of all downgradient municipalities and/or property owners located within the projected area of the groundwater contamination originating from the shopping center property.



SECTION 5 REFERENCES

- 1) SCS Engineers. Phase I/II Environmental Site Assessment, Normandy Park Shopping Center, Normandy Park, Washington. April 2000.
- 2) SCS Engineers. Voluntary Cleanup Program Application for the Sooper Dry Cleaners Site, Normandy Park shopping Center, Normandy Park, Washington. February 2000.
- 3) SCS Engineers. Environmental Site Assessment Report, Sooper Dry Cleaners, Normandy Park Shopping Center, Normandy Park, Washington. October 2001.
- 4) SCS Engineers. Focused Alternative Analysis and Remedial Plan, Sooper Dry Cleaners, Normandy Park Shopping Center, Normandy Park, Washington. June 2002.
- 5) SCS Engineers. Remedial Action Report, Limited Soil Removal and Engineered/Institutional Controls, Sooper Dry Cleaners, Normandy Park Shopping Center, Normandy Park, Washington. May 2003.
- 6) Washington State Department of Ecology. VCP Correspondence Letter: Groundwater and Soil Remediation at Normandy Park Shopping Center, January 6, 2003.
- 7) Washington State Department of Ecology - Toxics Cleanup Program. The Model Toxics Control Act Cleanup Regulation; Chapter 173-340 WAC. Publication 94-06. Amended February 12, 2001.

