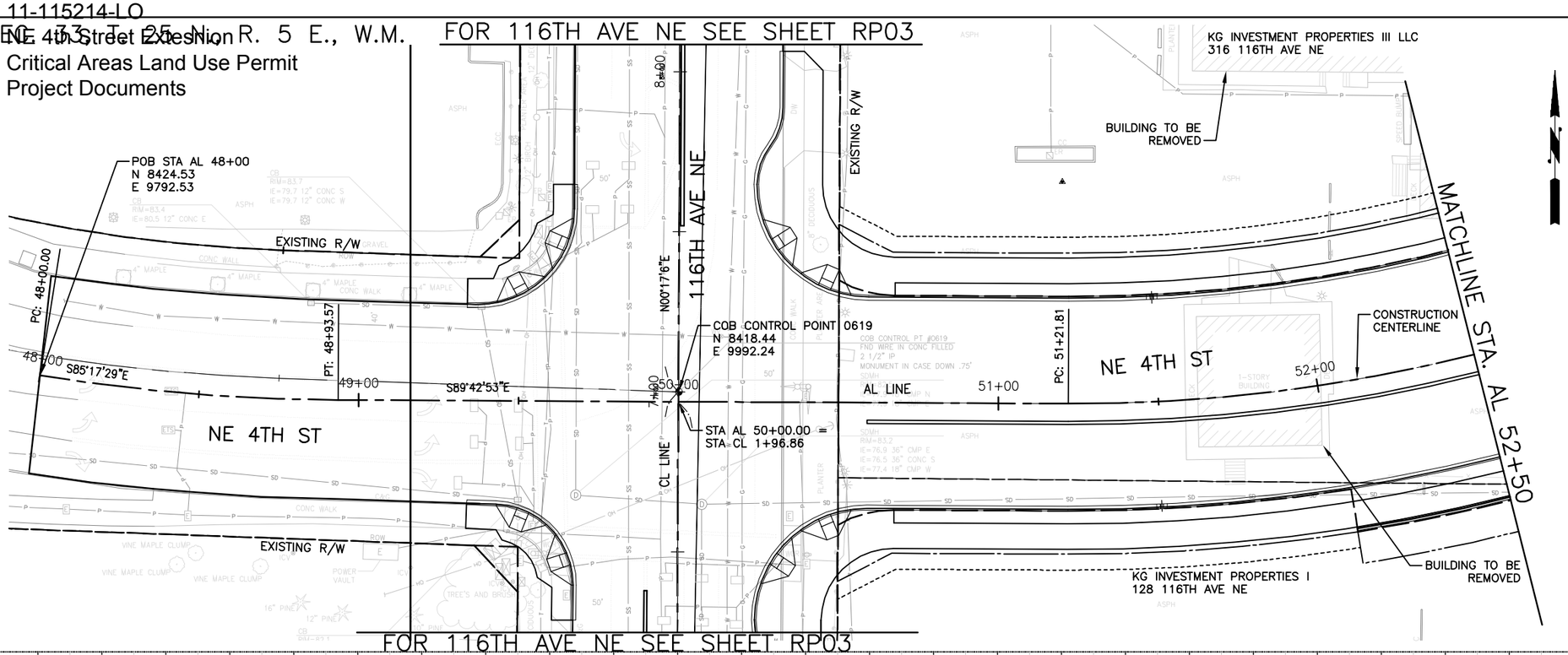
11-115214-LO

NE 4th Street Extension
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.



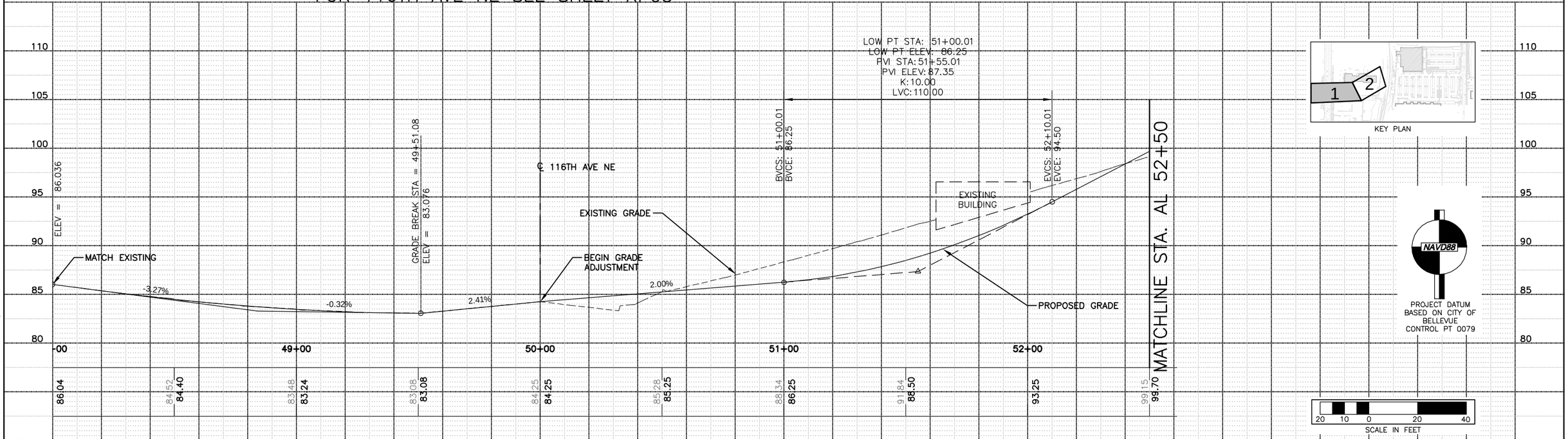
GENERAL NOTES:

1. FOR TYPICAL SECTIONS SEE SHEET RS01 AND RS02.
2. FOR CHANNELIZATION PLANS SEE SHEET CH01.

NOTES:

1. SEE SHEET RP03 FOR CL LINE ALIGNMENT AND PROFILE.

PI STATION	DELTA	RADIUS	TANGENT	LENGTH
48+46.88	8°50'48"	606.00'	46.88'	93.57'
52+35.90	25°13'10"	510.00'	114.09'	224.48'



NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

R.SHELTON	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
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NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

ROADWAY PLAN AND PROFILE
SHEET 1 OF 3
AL LINE STA. 48+00 TO 52+50

RP01 — SHT ____ OF ____

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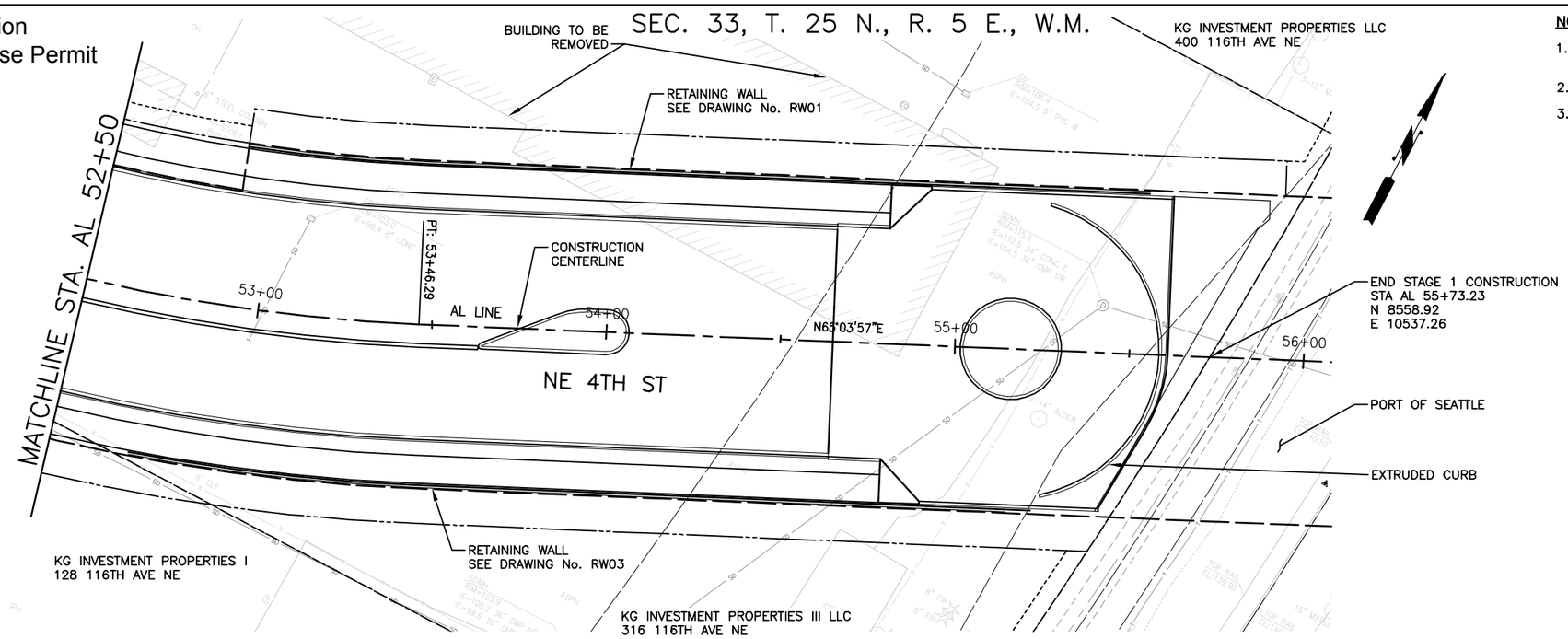
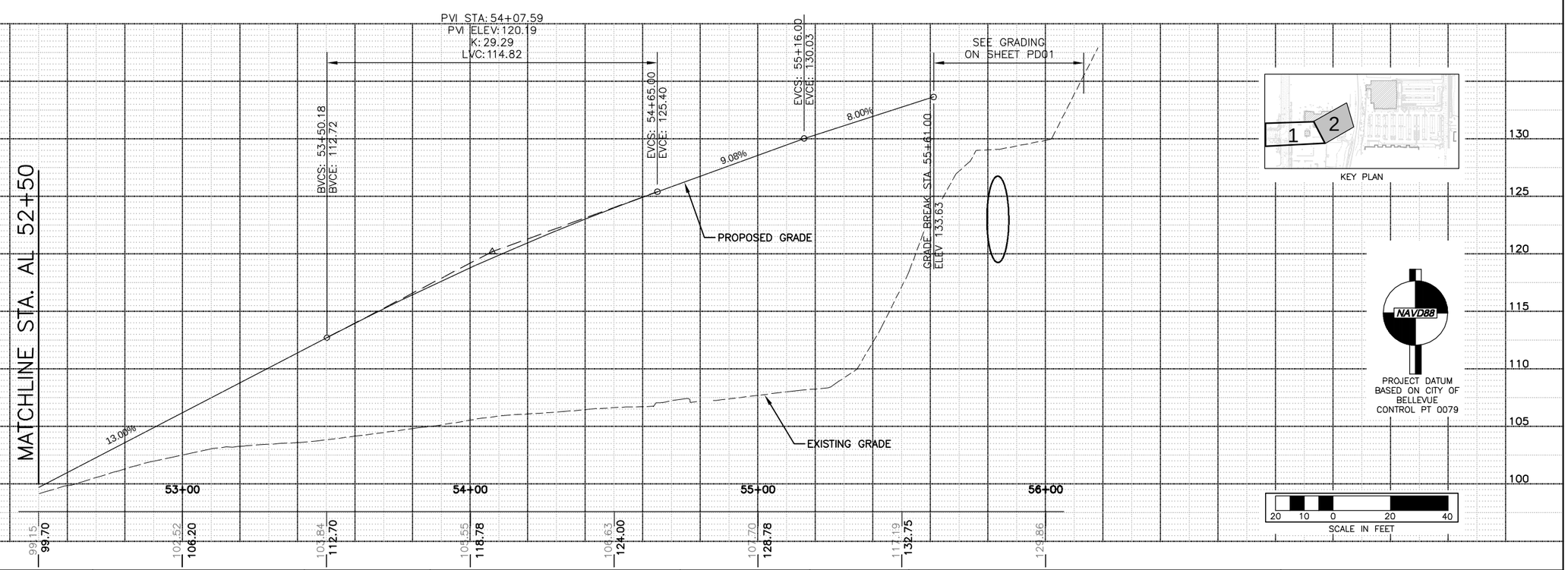
11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents



NOTES:

1. CONSTRUCTION ACTIVITY NOT PERMITTED ON BNSF RR RIGHT-OF-WAY.
2. FOR CHANNELIZATION PLANS SEE SHEET CH02.
3. FOR TYPICAL SECTION SEE SHEETS RS01 AND RS02.



NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
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				NOT FOR CONSTRUCTION

Approved By

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PROJECT MANAGER — DATE

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NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF-WAY

ROADWAY PLAN AND PROFILE
SHEET 2 OF 2
AL LINE STA. 52+50 TO 56+00

RP02 — SHT ____ OF ____

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Memorandum

Date: February 12, 2013

To: Marina Arakelyan
City of Bellevue Department of Transportation

From: Ken Oswell
Parsons Brinckerhoff

Subject: Critical Areas Technically Feasible Alternatives Analysis Letter Report for the NE 4th Street Extension Project – Stage 1: 116th Avenue NE to Burlington Northern Santa Fe (BNSF) railroad (RR) corridor

Enclosures: Figure 1. NE 4th Street/120th Avenue NE Corridor Project Critical Areas Map

Geotechnical Report, NE 4th Street Extension, 116th Avenue NE to 120th Avenue NE, Bellevue, Washington (Shannon & Wilson; October 31, 2012)

Addendum Number 1, Assessment of Steep Slope Critical Area, Geotechnical Report, NE 4th Street Extension, 116th Avenue NE to 120th Avenue NE, Bellevue, Washington, October 31,2012 (Shannon & Wilson; February 6, 2013)

Copies of proposed critical areas (steep slopes) mitigation plans (2 sheets)

CRITICAL AREA IMPACTS – TECHNICAL FEASIBILITY ANALYSIS

Previous Documentation

Information in this letter report was taken from the *Critical Areas Technically Feasible Alternatives Analysis Letter Report for the NE 4th Street / 120th Avenue NE Corridor Project (Parsons Brinckerhoff, October 19, 2011).* This prior report covered the entire NE 4th Street / 120th Avenue NE Corridor Project shown in the attached copy of Figure 1 from that document.

This letter report summarizes and updates the information from the October 19, 2011 report for the NE 4th Street portion of the overall corridor. The NE 4th Street project extends from 116th Avenue NE to 120th Avenue NE, and will be constructed in two stages. Stage 1 is from 116th Avenue NE to the BNSF RR corridor, and Stage 2 is from the BNSF RR corridor to 120th Avenue NE.

Applicable Land Use Codes

Pursuant to the *Bellevue City Code (BCC)*, as codified by *Land Use Code (LUC) 20.25H Critical Areas Overlay District,* the project is required to meet certain performance criteria as a result of impacts to identified critical areas.

Critical Area Types

LUC 20.25H identifies requirements related to impacts to the following Critical Areas (bold indicates Critical Areas addressed by this report):

1. Streams
2. Wetlands
3. Shorelines
4. **Geologic hazard areas (Stage 1 only)**
5. Habitat associated with species of local importance
6. Areas of special flood hazard

For reasons described below, this report addresses only Geological Hazard Areas (specifically, Steep Slopes in Stage 1) which is the only critical area impact identified for the NE 4th Street project area.

Allowable Uses

Allowable uses for all critical areas *except habitat areas* are outlined by LUC 20.25H.055. The NE 4th Street Extension Project falls within the allowable use identified as "New or expanded public rights-of-way, private roads, access easements and driveways." The LUC defines sets of performance standards that must be met, which vary for streams, wetlands, shorelines, geologic hazard areas, and areas of special flood hazard.

Allowable uses for habitat critical areas are defined by LUC 20.25H.050.B.1, which states that all uses allowable by zoning may be undertaken in habitat critical areas, so long as the performance standards of LUC 20.25H.160 are met. Those standards do not reference a requirement for a technically feasible alternatives analysis, so habitat associated with species of local importance will not be addressed by this report.

Performance Standard Requiring Technically Feasible Alternatives Analysis

Subsection LUC 20.25H.055.C.2.a requires that a determination of technically feasible alternatives be prepared in order to demonstrate that no technically feasible alternative with less impact exists for streams, wetlands, shorelines, geologic hazard areas, and areas of special flood hazard. However, the NE 4th Street Extension Project has no impacts to streams, wetlands, shorelines or areas of special flood hazard, so these types of critical areas are not addressed by this report. Furthermore, the project impacts only the sub-category of "steep slopes" in the geologic hazard areas category, so all further references to geologic hazard areas in this memo will refer specifically to steep slope areas which occur only in Stage 1.

The purpose of this report, therefore, is to meet the requirement of LUC 20.25H.055.C.2.a to provide a technically feasibility alternatives analysis with respect to Stage 1 project impacts

on steep slope areas. These critical areas along the NE 4th Street Extension Project are described below and shown on the attached Figure 1 referenced above.

STEEP SLOPE AREAS

Definition:

City of Bellevue Ordinance 5680 Section 20.25H.120 defines a steep slope as a slope meeting the following criteria:

- A slope that is greater or equal to 40 percent;
- that rises at least ten feet; and,
- has an area of at least 1,000 square feet.

Steep Slope Location: Proposed NE 4th Street Extension Crossing the Western Embankment of the ex-BNSF Railroad Corridor.

Analysis per LUC 20.25H.055.C.2.a and b:

2.a.i. There is no existing roadway infrastructure at this location. The steep slope on the western embankment of the ex-BNSF railroad corridor extends north-south across the proposed east-west alignment for the NE 4th Street Extension Project between 116th Avenue NE and 120th Avenue NE, as shown near the bottom of Figure 1.

2.a.ii. The purpose of the extension is to provide access between 116th and 120th Avenues NE to complete the road grid identified in the Wilburton Sub-Area Plan as necessary to accommodate the City's future growth plans. The project proposes to construct a five lane roadway with two travel lanes in each direction and a two-way left-turn lane (or median) in the center, and with a 5-foot bike lane, 4-foot planter and 8-foot sidewalk on each side.

2.a.iii. A total of ten alignment and configuration alternatives were considered during the preliminary design stage. These included alternatives that would shift the alignment north or south of the proposed alignment and change the roadway vertical profile. However, the steep slope areas extend well to the north and south of the proposed alignment and none of the alternative alignments that satisfied the purpose of the project were able to avoid similar impacts to the steep slopes.

Moving the alignment south results in slightly smaller steep slope impacts but results in steeper roadway grades and impacts to more properties. Moving the alignment north adversely impacts the desired grid function of the extension and moderately increases the amount of steep slope area impacted.

2.a.iv. No technically feasible alternative was found for constructing the proposed NE 4th Street extension that would have less impact on steep slopes, regardless of cost.

2.a.v. All temporary and permanent disturbance of the steep slope can be mitigated as described below.

2.b.i. The proposed alignment is considered to be the most feasible alignment and is designed to minimize steep slope impacts by crossing the slope as close to perpendicular as is feasibly possible.

2.b.ii. As shown in Figure 1 of the project *Geotechnical Report, NE 4th Street Extension, 116th Avenue NE to 120th Avenue NE, Bellevue, Washington (Shannon & Wilson; October 31, 2012),* the overall NE 4th Street Extension project site consists of a lower plain and an upland terrace that are connected by a north-south-trending, approximately 30-foot-high steep slope. The proposed roadway rises in elevation from west to east to meet the existing grade near the railroad tracks. The roadway embankment will be supported by mechanically stabilized earth walls until it meets the existing grade.

The new roadway construction will require clearing, grubbing, and benching of the steep slope within the project limits so that the embankment and walls can be constructed. The construction means, methods, and sequence and equipment type will be determined by the Contractor. Excavation to prepare the existing slope for fill placement should be terraced in accordance with Washington State Department of Transportation Standard Specification 2-03.3 (14). Temporary shoring may be required for the excavation. The need for shoring will be determined by the Contractor. The Contractor will be responsible for stability of temporary excavations.

In its final configuration, the new roadway embankment and retaining walls will create a buttress that will improve the stability of the existing steep slope within the project limits. In effect, the existing critical slope will be removed and replaced by a very shallow slope held in place by retaining walls and a roadway surface. The project would also include walls at the top of the slope for the sole purpose of preventing additional fill material from spilling back on the steep slope, thus further minimizing the steep slope impacts. A summary of the slope stability analyses and results for the proposed retaining walls at Stations 55+55 and 55+72 are included in the October 31, 2012 geotechnical report. The stability analyses assume that the groundwater level in the hillside does not rise as a result of the proposed construction so it is important that the surface and subsurface drainage measures recommended in the geotechnical report be implemented.

All steep slope and buffer impacts would be limited to the construction of NE 4th Street Extension Stage 1 - 116th Avenue NE to Burlington Northern Santa Fe (BNSF) railroad (RR) right-of-way (ROW). The total impacted area is about 9,600 square feet which includes about 3,700 square feet of critical slope areas to be mitigated and 5,900 square feet of buffer areas. The impact areas are detailed on the figure enclosed with *Addendum Number 1, Assessment of Steep Slope Critical Area, Geotechnical Report, NE 4th Street Extension, 116th Avenue NE to 120th Avenue NE, Bellevue, Washington, October 31,2012 (Shannon & Wilson; February 6, 2013)*, a copy of which is enclosed with this memo. If the engineering recommendations provided in the October 31, 2012 geotechnical report are followed, the proposed NE 4th Street Extension Stage 1 should not increase the potential for instability of the steep slope identified. The steep slopes outside of the Stage 1 limits will not be modified, nor should the proposed construction adversely impact those slopes.

2.b.iii. NA

2.b.iv. NA

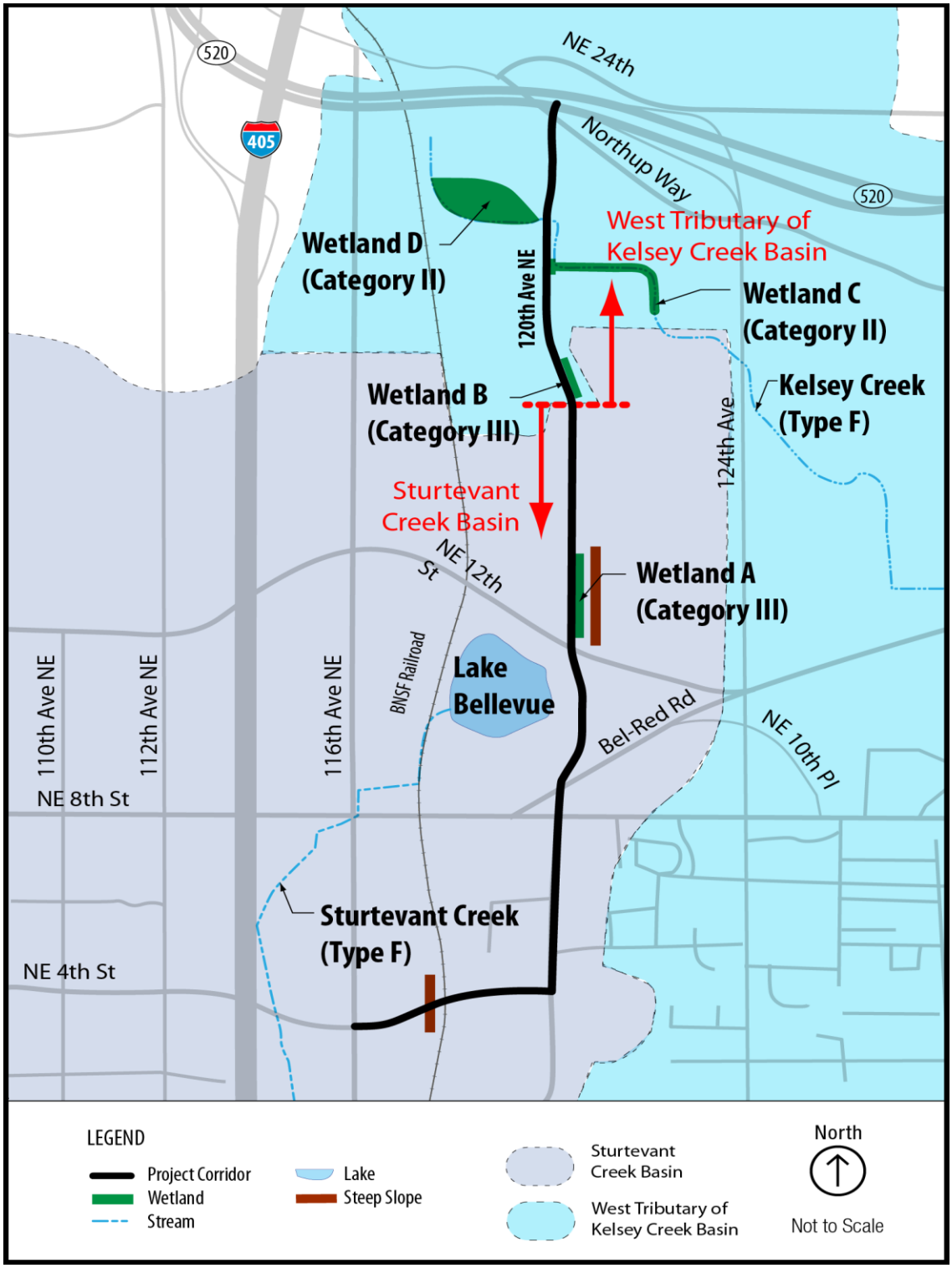
2.b.v. Permanent steep slope impacts will be mitigated by the creation of a landscape enhancement area of at least 3,700 square feet, constructed consistent with applicable City of Bellevue codes and standards.

2.b.vi. NA

2.b.vii. NA

2.b.viii. The proposed mitigation site is a City-owned property at the intersection of 116th Avenue SE and SE 5th Street. Copies of proposed mitigation plans for this site meeting requirements of LUC 20.25H.210 are attached.

Figure 1. NE 4th Street/120th Avenue NE Corridor Project Critical Areas Map



Source: *Critical Areas Technically Feasible Alternatives Analysis Letter Report for the NE 4th Street /120th Avenue NE Corridor Project (Parsons Brinckerhoff, October 19, 2011)*

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

Geotechnical Report
NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

October 31, 2012

Submitted To:
Mr. Kenneth Oswell, P.E.
PB Americas, Inc.
999 Third Avenue, Suite 3200
Seattle, Washington 98104-4020

By:
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, Washington 98103

21-1-21232-002

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GEOTECHNICAL REPORT
NE 4TH STREET EXTENSION
116TH AVENUE NE TO 120TH AVENUE NE
BELLEVUE, WASHINGTON

1.0 INTRODUCTION

This report presents the results of Shannon & Wilson's field explorations, field and laboratory testing, and geotechnical engineering studies for the NE 4th Street Extension Project in Bellevue, Washington. This report presents seismic design considerations and geotechnical design recommendations for proposed embankments, retaining walls, luminaires and signal poles, stormwater management system, and pavement. We understand that the project will be designed in accordance with American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) standards (AASHTO, 2012).

Our scope of services included evaluating the subsurface conditions at the site and providing geotechnical engineering recommendations for the design and construction of the proposed elevated roadway embankment and roadway improvements. Our services included collecting and reviewing existing subsurface information, observing drilling and sampling of soil borings at the site, developing observation wells and measuring groundwater levels, performing field and laboratory testing, performing engineering analyses, evaluating infiltration and drainage options for proposed bioretention swales, and preparing this report.

Our services were performed in accordance with our subconsultant agreement with PB Americas (PB) dated October 15, 2009.

This geotechnical report provides recommendations for the 90% Submittal project drawings (PB, 2012a). Selected sheets from the 60% Submittal and the 90% Submittal project drawings have been included in this report as Appendix D.

2.0 SITE AND PROJECT DESCRIPTION

NE 4th Street is a major arterial that connects the southeast Clyde Hill neighborhood and downtown Bellevue with Interstate 405 and 116th Avenue NE. The NE 4th Street Extension Project, in conjunction with the proposed 120th Avenue NE Widening and NE 6th Street Extension Projects, is an effort by the City of Bellevue to boost mobility between downtown Bellevue, the Bellevue-Redmond Road corridor, and the Overlake area. The location of the

proposed NE 4th Street Extension project is shown in Figure 1. The proposed roadway would be about 91 feet wide and include two lanes in each direction, a center turning lane, bicycle lanes, planter strips, and 8-foot-wide sidewalks. We understand that the proposed roadway would be constructed in two phases. Phase 1 would extend from 116th Avenue NE (Station 50+00) to the former BNSF Railway Company (BNSF) railroad tracks (about Station 56+50). Phase 2 would extend from BNSF ROW to 120th Avenue NE.

As shown in Figures 2 and 3, the project site generally slopes downward to the west. A north-south-trending, approximately 30-foot-high hill slope divides the site into a lower plain and an upland terrace. The hill slope consists of, from west to east, an approximately 1.5 horizontal to 1 vertical (1.5H:1V), 20-foot-tall slope, an approximately 30-foot-wide horizontal bench, and a 10-foot-tall railroad embankment with about 2H:1V side slopes. The railroad line is a former BNSF line that is currently owned by the Port of Seattle. The portion of the site west of the hill slope currently consists of paved, sloping lots with an existing single-story building (previously a car dealership). The building is planned to be demolished as part of proposed future development. The future development plans have not been completed. We understand that the future development may include excavation to about 20 feet or deeper below the existing ground surface (bgs). This future excavation could impact the NE 4th Street embankment, walls, pavement, utilities, and associated structures and improvements. The upper terrace in the east half of the site is generally level and is comprised of Best Buy and Home Depot parking lots and buildings. We understand that a portion of the Best Buy building may be demolished to make room for the proposed NE 4th Street extension alignment.

The proposed extension consists of an approximately 1,300-foot-long curved roadway to connect 116th Avenue NE to 120th Avenue NE. The proposed alignment and retaining wall locations are indicated in Figures 2 and 3. The Phase 1 alignment from about Station 50+00 to about Station 56+50 gains about 50 feet in elevation (about 85 feet to 135 feet). From the start of the alignment at 116th Avenue NE (Station 50+00) to about Station 52+40, the roadway would be at or below existing grade and would climb in elevation from about 85 feet to about 98 feet. The cut on the north side of the below grade roadway would be supported by an ecology block-type wall (Wall W3), up to about 5.5 feet in height. From about Station 52+40 to about Station 56+20, the roadway would consist of an elevated roadway embankment with vertical mechanically stabilized earth (MSE) retaining walls up to about 25 feet in height (including wall embedment) on the north and south sides of the embankment, Walls W1 and W2, respectively. The roadway crosses the existing Metro sewer between Stations 55+55 and 56+05.

The Phase 2 alignment from about Station 56+50 to 120th Avenue NE (Station 63+56), the Phase 2 alignment passes through the current Best Buy and Home Depot parking lots, which are at about elevation 136 feet.

3.0 SUBSURFACE EXPLORATIONS AND LABORATORY TESTING

3.1 Current Explorations

Five soil borings were performed for the project. Borings SW-B2-10 and SW-B3-10 were drilled to explore subsurface conditions below the roadway alignment near the Metro sewer and railroad. These borings were completed on October 20 and 22, 2010, respectively. Borings SW-B1-11, SW-B4-11, and SW-B5-11 were drilled in the Home Depot parking lot to explore subsurface conditions near proposed infiltration facilities. These explorations were completed on January 17, 2011. Exploration locations are indicated in Figure 2.

Appendix A presents a description of the methods and procedures used for drilling and sampling the borings and boring logs. A Shannon & Wilson representative was on site to log each boring during drilling.

Groundwater observation wells were installed in borings SW-B1-11, SW-B3-10, SW-B4-11, and SW-B5-11. Well construction methods are presented in Appendix A.

3.2 Geotechnical Laboratory Testing

Samples collected during the explorations we performed for this project were sealed in jars and returned to our Seattle, Washington, laboratory for testing. Shannon & Wilson, Inc. performed geotechnical laboratory tests on selected samples to evaluate the index properties and the engineering characteristics of the subsurface soil encountered at the site. Laboratory tests included visual classification, water content, Atterberg limits, grain size distributions, and percent of particles passing the No. 200 sieve. Laboratory tests were performed in general accordance with applicable ASTM International (ASTM) standards (2011).

Laboratory test procedure descriptions and results are presented in Appendix B. Water content, Atterberg limits, and fines content test results are presented on the boring logs in Appendix A.

3.3 Explorations by Others

We collected and reviewed subsurface explorations completed previously for the following properties:

- K.G. Investors property for a proposed a mixed-use development (Earth Solutions NW, LLC, 2009);
- Best Buy (Hart Crowser, 2001); and
- Home Depot (GeoEngineers, 1994).

Figure 2 presents the approximate locations of the previous explorations that we used to interpret subsurface conditions. Figure 3 presents Standard Penetration Test (SPT) N-values and groundwater observations from selected existing boring logs.

We developed the groundwater observation wells in explorations ES-B2-06, ES-B6-06, and ES-B11-06 (Earth Solutions NW, LLC, 2009) on February 9 and 10, 2011. We measured groundwater levels in these observation wells on February 17, 2011. These groundwater levels are indicated in Figures 2 and 3.

Boring logs and laboratory tests associated with these explorations by others are presented in Appendix C.

4.0 GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Geologic Setting

The project is located in the central portion of the Puget Lowland, which is an elongated, north-south depression between the Olympic Mountains and the Cascade Range. Geologists generally agree that the Puget Lowland was subjected to six or more major glacial events. Each glaciation deposited new sediment and partially eroded existing deposits. During the most recent glaciation (termed Vashon), glacial ice is estimated to have been about 3,000 feet thick in the project area (Thorson, 1989). The weight of the glacial ice resulted in compaction of the underlying soils. The glacially overridden deposits are overlain by recessional glacial deposits that accumulated during retreat of the Vashon ice sheet. The glacial deposits are in turn overlain by younger (Holocene Epoch) soils deposited principally by streams, lakes, and mass wasting processes.

Topography at the project site is characterized by a gradually sloping surface west of the Metro sewer (Phase 1), that steps upwards in elevation by about 15 to 20 feet to a relatively flat surface east of the railroad track (Phase 2). The slope that comprises the step is at least partially obscured by artificial fill placed during construction of the existing railroad embankment and Metro sewer. Based on our interpretation of the topography and of existing and new borings, the slope likely represents the boundary between a broad Vashon recessional outwash channel to the west and a till upland to the east.

4.2 Subsurface Conditions

Subsurface conditions in the project area consist of a sequence of Vashon and pre-Vashon glacial deposits overlain by Holocene fill, as shown in Figure 3. We divide our discussion of subsurface conditions into three areas: (a) western portion of site from 116th Avenue NE to about Station 54+00, (b) central portion of site from about Station 54+00 to the western edge of the Home Depot and Best Buy parking lots (about Station 57+00), and (c) eastern portion of site from about Station 57+00 to 120th Avenue NE. Our interpretations of geologic units for existing explorations are based on limited information and should be considered approximate.

4.2.1 Western Portion of Site

The western portion of the site includes the relatively gradually sloping ground west of the railroad and Metro sewer embankment, on the broad floor of the recessional outwash channel. The uppermost layer in this area typically consists of 5 to 10 feet of loose to medium dense, silty sand with gravel. The layer probably represents Vashon recessional outwash deposits (Qvro) locally overlain by Holocene fill (Hf). We use a dual classification (Hf/Qvro) for this soil layer. The fill/recessional outwash layer is underlain by at least 15 feet of Vashon till (Qvt). The till layer is not observed in borings east of Station 53+40 in the central portion of the site, which indicates that the till layer is thinning. The till consists of very dense, silty sand with gravel. At the site of boring ES-B10-06, the till is underlain by very dense silt that probably represents pre-Vashon glaciolacustrine deposits (Qpgl).

4.2.2 Central Portion of Site

The central portion of the site includes the transition from the lower elevation recessional outwash plain to the higher elevation till upland. Recent borings SW-B3-10 and SW-B2-10, drilled near the Metro sewer and railroad embankment, encountered about 18 to 20 feet of fill. The fill consisted largely of medium dense, silty sand and sandy gravel with scattered to numerous cobbles. The fill is underlain by a 3- to 12-foot-thick layer of recessional outwash.

The recessional outwash deposit in the central portion of the site is underlain by a sequence of intact and disturbed glaciolacustrine deposits. The uppermost surface of the glaciolacustrine deposits appears to slope downward to the west, as the unit is not observed in borings in the western portion of the site. The glaciolacustrine deposits consist of layers of hard, silty clay and clayey silt, and very dense silt. Disturbed glaciolacustrine deposits represent glaciolacustrine deposits that have been disturbed by some process following deposition. The disturbed deposits are typically blocky, sheared, and slickensided.

4.2.3 Eastern Portion of Site

The eastern portion of the site lies within the till upland. The uppermost layer in this area consists of about 5 to 12 feet of medium dense to dense, silty sand with organics that probably represents fill (Hf). The fill is underlain by an approximately 8- to 12-foot-thick layer of ablation till (Qvat), which is comprised of medium dense to very dense, gravelly, silty sand. Glacial till (Qvt), comprised of very dense, silty sand, is present below the ablation till.

4.3 Groundwater

Groundwater elevation varies with season and exploration location along the alignment. Groundwater elevation was difficult to interpret at this site due to the lack of data. Gravel and cobbles caused poor sample recovery in the upper 20 feet of borings SW-B2-10 and SW-B3-10 where groundwater was expected and previous borings in the site vicinity had limited and inconsistent groundwater information.

Groundwater levels measured in observation wells (February 2011) are indicated in Figures 2 and 3. For borings in which wells were not installed, groundwater levels encountered during drilling are indicated in Figure 3.

Groundwater measurements in the western, lower elevation part of the site indicate groundwater to be near elevation 100 feet at boring ES-B6-06 and to increase to near elevation 115 feet at boring SW-B3-10. Artesian groundwater conditions with static water head elevation about 2 feet above the ground surface was measured in the well in boring ES-B11-06. This well is isolated at depth in clay about 200 feet south and downgrade of the alignment. Groundwater measurements in this well are not representative of general groundwater at shallow depth along the alignment, in our opinion. Elevated groundwater pressures in clay and soil layers in and below the clay may be present along the alignment. We anticipate groundwater to be perched above the clay layer in the western portion of the site.

For our analyses, we assume the long-term groundwater elevation for the western, lower elevation part of the site will be at the base of the embankment and walls. This assumption is based on our interpretation of existing groundwater conditions and our recommendations, presented later in this report, that sub-embankment drainage systems be installed. Measurements in the well in boring SW-B3-10 indicated groundwater will likely be below the depth of excavation where the existing ground rises eastward as covering for the Metro sewer and as railroad embankment.

The groundwater level observed in the till upland (Home Depot parking lot) ranged from about elevation 130 feet at boring SW-B5-11 (about 5 feet bgs), to about elevation 123 at boring SW-B4-11 (about 7 feet bgs), to about elevation 121 feet at boring SW-B1-11.

The well in boring SW-B1-11 is isolated below the upper surface of the glacial till layer. Therefore, groundwater elevation measurements made in the well installed in boring SW-B1-11 are not indicative of groundwater in soil above the till. Soil moisture observations made in the underlying very dense glacial till layer indicated dry to moist conditions. Based on these observations, we expect groundwater is perched above the glacial till.

Based on groundwater elevation measurements made in the wells installed in borings SW-B4-11 and SW-B5-11 and the top of glacial till surface interpreted from the borings, groundwater perched above the till likely flows westward. Measurements in the wells installed in borings SW-B4-11 and SW-B5-11 indicate the groundwater was about 7 and 5 feet bgs, respectively, at the time the measurements were taken in February 2011. The groundwater elevation is, therefore, relatively close to the ground surface. The site is currently paved with limited opportunity for direct infiltration of water falling on the site. The groundwater elevation would be expected higher if water is allowed to infiltrate.

4.4 Contaminated Soil and Groundwater

The presence of contaminated soil and groundwater within and near the project area has been documented. This geotechnical report does not address the type and extent of contamination that could be encountered. The Hazardous Materials Technical Report (Shannon & Wilson, Inc., 2011) provides information regarding potential contamination that could be encountered during construction.

5.0 SEISMIC DESIGN CONSIDERATIONS

5.1 Design Ground Motion Parameters

We understand that the project will be designed for an earthquake with a 7 percent probability of occurrence in 75 years, also termed as an earthquake with a 1,000-year return period (RE_{1000}).

The AASHTO site class is determined using the SPT N-values and/or shear wave velocities measured in the upper 100 feet of the soil profile. The SPTs and soil classifications derived from current and existing explorations completed in the project area indicate that the soils in the upper 100 feet generally consist of dense to very dense and very stiff to hard glacially consolidated

soil. In accordance with the criteria in the AASHTO 2009 Guide Specifications for LRFD Seismic Bridge Design (AASHTO, 2009), conditions at this site should be considered Site Class C. AASHTO does not require a site-specific ground motion evaluation for Site Class C sites.

Table 1 presents our recommended seismic design ground motion parameters. These design parameters were developed using the AASHTO Earthquake Ground Motion Parameter Application Version 2.10 (U.S. Geological Survey, 2008) and procedures recommended by AASHTO (2009).

5.2 Earthquake-induced Geologic Hazards

Earthquake-induced geologic hazards that may affect a given site include landsliding, fault-related ground rupture, and liquefaction and associated effects (loss of shear strength, bearing capacity failure, loss of lateral support, ground oscillation, lateral spreading, etc.).

5.2.1 Landsliding

Based on existing as-built plans, we consider the majority of the surficial soil that comprises the hillside in the center of the site to consist of fill associated with the railroad embankment and Metro sewer construction. Several notable earthquakes have occurred in the region since the initial placement of the railroad fill and early 1960s addition of the Metro sewer fill. We did not observe evidence of historic landsliding at the site or find reports of landslides at the site in existing information or literature we reviewed. However, the site has not experienced the design seismic ground motions since the embankment was constructed. Based on our observations and the lack of evidence of existing slide scarps at the site, we consider the risk of earthquake-induced landsliding at the site to be low to moderate.

5.2.2 Fault-related Ground Rupture

The project site is about 2 miles north of the Seattle Fault Zone. The Seattle Fault Zone runs approximately east-west adjacent to Interstate 90 and has been estimated to range from about 1 to 2 miles wide (Johnson and others, 2004). The Seattle Fault is a shallow crustal type fault with a recurrence period that has ranged from about 200 years or less to 12,000 years (Goldfinger and others, 2003). Radiocarbon dating evidence suggests that the last ground-rupturing earthquake associated with the Seattle Fault Zone occurred about 1,100 years ago and caused nearly 22 feet of permanent vertical displacement across the fault on Bainbridge Island. The rupture history of the fault zone is the subject of current and ongoing research in the

scientific community. Preliminary geologic evidence developed to date suggests that the current recurrence rate of large ground-surface-deforming earthquakes on the Seattle Fault may be on the order of thousands of years.

Because of the relatively large recurrence interval of ground-rupturing earthquakes associated with the Seattle Fault Zone and because the site is not within the mapped deformation zone, in our opinion, the potential for ground surface fault rupture at the site is low.

5.2.3 Liquefaction

Soil liquefaction is a phenomenon which occurs in loose, saturated, granular soil when the water pressure in the pore spaces increases to a level that is sufficient to separate the soil grains from each other. When a saturated soil experiences partial or full liquefaction, porewater pressure between the soil grains increases, which causes a reduction in soil strength and stiffness. As a result, ground settlement, lateral spreading, and landslides may occur. The existing and current subsurface explorations indicate the granular soils underlying the proposed NE 4th Street alignment are generally medium dense to very dense or above the groundwater elevation. Therefore, we consider the potential for liquefaction to occur on the project site to be low.

6.0 ROADWAY EMBANKMENT

6.1 General

The proposed NE 4th Street extension will consist of an elevated roadway embankment between about Stations 53+00 and 56+00. Plans and profiles provided to us indicate that the maximum retained height (including wall embedment) will be about 25 feet. As shown in Figure 2, the easternmost segment of the proposed roadway embankment intersects an existing slope at an angle of about 30 degrees from perpendicular.

6.2 Fill Slopes

We recommend embankments have permanent fill slopes of 2H:1V or flatter. Fill slopes steeper than 2H:1V should be individually evaluated to assess stability. Fill slopes steeper than 2H:1V may require reinforcement.

6.3 Mechanically Stabilized Earth (MSE) Wall Global Stability Analyses

We performed global stability analyses using the wall geometry included in the 60% Submittal project drawings which is the same as the 90% Submittal.

We evaluated global stability for the proposed embankment and MSE walls along cross sections perpendicular to the roadway alignment at Stations 54+50, 55+55, and 55+72 and assuming both Phase 1 and Phase 2 embankments are complete. These locations were selected as representative based on the proposed embankment geometry, wall height, and subsurface conditions. Station 55+55 represents the maximum wall height. Station 55+72 was selected to model the condition where a retaining wall is constructed on an existing slope. As shown in Figure 3, the subsurface explorations indicate the upper contact of the glaciolacustrine clay decreases in elevation from east to west and is replaced by a layer of very dense till somewhere west of about Station 54+20. The analysis at Station 54+50 was selected to model an intermediate condition between the highest clay elevation and highest wall height at Station 55+55 and the minimum wall height and maximum glacial till layer thickness at the west end of the elevated roadway embankment.

We used the criteria recommended by AASHTO (2012) and the Washington State Department of Transportation (WSDOT) Geotechnical Design Manual (GDM) to evaluate the global stability of the proposed retaining walls (WSDOT, 2010a). AASHTO and the WSDOT GDM recommend that non-critical retaining walls be designed to meet a minimum static resistance factor of 0.75 (factor of safety [FS] of 1.3). AASHTO and the WSDOT GDM recommend that retaining walls be designed to meet a resistance factor of 0.9 (FS of 1.1) for seismic loading conditions.

6.3.1 Analysis Method

We used the computer program SLOPE/W Version 7.16 (Geo-Slope, 2007) to perform the global stability analyses. SLOPE/W uses several methods to estimate the FS of the stability of a slope by analyzing the shear and normal forces acting on a series of vertical “slices” that comprise a failure surface. Each vertical slice is treated as a rigid body; therefore, the forces and/or moments acting on each slice are assumed to satisfy static equilibrium (i.e., a limit equilibrium analysis). We used the Morgenstern-Price method of analysis, which satisfies both moment and force equilibrium, to calculate the FS (Morgenstern and Price, 1965).

In accordance with AASHTO guidelines for global stability analyses, we assumed that failure would not occur through the reinforced soil zone of the MSE walls (i.e., we did not consider compound stability of the MSE wall). Target global static FSs of 1.3 were achieved by varying the width of the reinforced soil zones. We assumed the base of the reinforced soil zone was embedded a minimum of 2 feet bgs.

We evaluated seismic global stability by applying a pseudo-static horizontal acceleration equal to half of the peak design spectral acceleration (A_S) (1/2 of 0.43g = 0.215g) to the failure mass of the most critical static slip surface for each cross section (WSDOT, 2010a). For cross sections with seismic FSs less than 1.1, we estimated the seismically induced displacements using a procedure developed by Bray and Travasarou (2007).

6.3.2 Soil Parameters

Figure 4 presents the engineering parameters used in our global stability analyses. These parameters, except for disturbed glaciolacustrine deposits, are based on published correlations with SPT N-values and our experience with the geologic units present at the site.

As described in Section 4.2.2, several layers of blocky, slickensided, and/or diced silty clay (Qpgl disturbed) deposits were encountered in borings SW-B2-10 and SW-B3-10. Based on our experience, disturbed glaciolacustrine deposits are commonly discontinuous in both the vertical and horizontal directions and are typically encountered adjacent to and between large blocks of intact glaciolacustrine deposits. Based on our experience with similar disturbed Qpgl clays from nearby projects, we anticipate that the Qpgl has undergone strain softening. In our global stability analyses, we assumed that this deformation caused the clay to be in a residual strength state. We estimated the residual strength of the disturbed glaciolacustrine deposits using correlations developed by Stark and others (2005). These correlations relate the residual internal friction resistance to the clay fraction (CF – percentage of clay per unit mass), Liquid Limit (LL), and mean effective stress on the failure surface. Based on the results of our grain size distribution and Atterberg Limits tests (see Appendix B), we estimated representative CF and LL values of 35 and 55, respectively. Using these parameters, we developed a shear strength versus normal stress function and applied this to the Qpgl deposit in our Slope/W analyses. Because of uncertainty in defining the spatial distribution of the disturbed and intact glaciolacustrine clay deposits, we assumed that the entire Qpgl deposit was at a residual strength state in our global stability analyses models (see Figure 4).

6.3.3 Analysis Results

Our global stability analyses results are summarized in Table 2. The Station 55+55 analyses results are presented graphically in Figure 4. Our analyses at Stations 54+50 and 55+55 indicate that wall configurations with typical reinforcement length (L) to wall height (H) ratios (L/H) of 0.7 do not meet the required FSs for static conditions. Our analyses indicate that wall

global static stability criteria could be met at these sections by increasing the L/H ratio at the base of the retaining wall to the values indicated in Table 2.

At Stations 54+50, 55+55 and 55+72, our seismic global stability analyses resulted in seismic FSs below 1.1, which indicates that the proposed roadway embankment may displace laterally during the design seismic event. We estimated the seismically-induced lateral displacements using the Bray and Travasarou (2007) procedure as recommended in Chapter 6 of the WSDOT GDM (WSDOT, 2010a). Our estimated displacements are summarized in Table 2. Our analyses results indicate that the lateral displacement would range from about 1 to 3 inches. Lateral displacements of this magnitude may cause cracking in the roadway and wall facing panels and outward wall rotation, but are unlikely to lead to structural failure of a properly designed and constructed MSE wall system.

6.4 Settlement

We performed settlement analyses primarily to estimate the settlement at the Metro sewer invert (see Figures 2 and 3 for location) resulting from the embankment load. We used the computer program Settle3D Version 2.0 (Rocscience, Inc., 2008) to perform these analyses. Based on 90% Submittal drawings and our discussions with PB, we understand that the fill will be installed in a single stage and the existing Metro sewer will be protected by constructing a relieving slab that will span over the sewer line. Our settlement analysis does not include the presence of the protection slab. Settle3D discretizes the soil strata into a grid of one-dimensional soil columns and performs a settlement analysis for each grid point. The increases in stresses due to a three-dimensional load distribution such as a curved embankment are calculated for each vertical segment of the soil columns using a linear-elastic-type stress distribution. The settlement at a given depth and grid point location is calculated by summing the strains of the underlying soil segments in the column. Settlement due to the compression of the new embankment fill is not considered in the analysis. This approach assumes that the subsurface soil behaves as an elastic material in response to the applied loads. An assumption of elastic foundation soil behavior is consistent with standard practice for granular soil and glacially overridden soil.

6.4.1 Subsurface Profiles

Subsurface conditions and ground surface topography vary throughout the roadway embankment alignment, as shown in the generalized subsurface profile A-A' (Figure 3). Settle3D assumes a flat ground surface and horizontal soil layers. In an effort to capture the

uncertainty of the subsurface conditions and to mitigate program limitations, we performed settlement analyses using two subsurface soil profiles:

Type 1 Using the generalized subsurface conditions at the Metro sewer (using borings SW-B2-10 and SW-B3-10), and

Type 2 Using the generalized subsurface conditions at the base of the slope and maximum embankment height (using boring ES-B5-06).

The subsurface soil profiles at both locations are shown in Figure 3.

6.4.2 Soil Parameters

The soil parameters used for our settlement analyses included unit weight, elastic modulus, and Poisson's ratio. The unit weights are the same as those used in the global stability analyses (see Figure 4). The elastic modulus and Poisson's ratio were estimated using published correlations to N-values, AASHTO (2012) recommendations, soil grain size distributions, and our experience with similar soils. Soil parameters used in settlement analyses are shown in Figure 5.

6.4.3 Analysis Results

Our analyses results indicated maximum settlement beneath the embankment of about 5 inches. The maximum settlement is located beneath the center of the embankment between about Stations 55+00 and 55+50. Our settlement analysis results for settlement along the faces of Walls W1 and W2 indicate maximum total settlement of about 3 inches, which occurs near where the walls are highest, and maximum differential settlement less than 200H:1V. The estimated differential settlement is less than the maximum differential settlement of 100H:1V recommended by AASHTO for MSE walls with 5-foot by 5-foot precast concrete face panels.

The estimated settlement profile along the Metro sewer at the pipe invert resulting from embankment placement is presented in Figure 5. The estimated total settlement at the pipe invert elevation is less than 1 inch. The difference in settlement at the Metro sewer pipe invert elevation using the two subsurface profile types was negligible. The subsurface conditions and soil parameters summarized in Figure 5 represent profile Type 1. The estimated angular distortion along the Metro sewer associated with pipe settlement is also presented in Figure 5. Estimates of angular distortion may be used to aid in evaluating pipe bending and pipe joint deflection.

Our analyses results indicate that the majority of the estimated settlement will occur in existing fill soil immediately beneath the new embankment. This existing fill is predominantly granular and will likely compress as the load is applied. The underlying glaciolacustrine deposit is predominantly cohesive (i.e., not granular). This unit is heavily overconsolidated (hard), resulting in a low compressibility. Our settlement analyses results indicate that the settlement in the glaciolacustrine deposit will account for about 25 percent of the total settlement. We anticipate that about 75 percent (associated with the upper granular soil) of the total estimated settlement would occur as the load is applied, with the remaining settlement occurring within the first year following construction.

In addition to the static settlement of the subgrade soils, we estimate that the embankment and retaining wall fill material will compress during or shortly after construction. For properly placed and compacted granular embankment fill, surface settlement associated with fill compression would be expected to be on the order of 0.3 to 0.5 percent of the total embankment height. Internal compression-related settlement would be essentially complete within a month after fill placement.

7.0 RETAINING WALL RECOMMENDATIONS

7.1 General

We understand that two vertical-face MSE walls, Walls W1 and W2, and one stacked concrete block wall, Wall W3, are proposed along the NE 4th Street extension. The locations of these walls are indicated in Figure 2. Walls W1 and W2 will have maximum heights of about 25 feet, and 21 feet (including embedment), respectively. The 90% Submittal project plans indicate that Walls W1 and W2 will each be comprised of two wall segments of different MSE wall types. From the western end of the walls to about 10 to 15 feet west of the existing Metro sewer line, Walls W1 and W2 will be structural earth walls (SEW) which are constructed using discrete steel strip reinforcements that are embedded into the backfill. East of this point, W1 and W2 will be constructed using continuous, wrapped geosynthetic fabric reinforcements consistent with WSDOT Standard Plan D-3 (WSDOT, 2010a).

7.2 Geosynthetic Walls

We understand that Wall W1 between Stations 12+93 and 13+47, and Wall W2 between Stations 23+49 and 24+01 will be constructed as geosynthetic retaining walls. Based on the characteristics of the subsurface soils at these locations, these wall segments may be designed and constructed as WSDOT Standard Plan D-3 (WSDOT, 2012a) walls. We recommend that a

minimum of 3 inches of WSDOT Standard Specifications (WSDOT, 2010b) 9-03.14(4) Gravel Borrow for Geosynthetic Retaining Walls be placed and compacted beneath the lowest reinforcement layer.

7.3 Structural Earth Walls

We understand that Wall W1 between Stations 10+00 and 12+93, and Wall W2 between Stations 20+00 and 23+49 will be constructed as SEWs. The following discussion presents our geotechnical recommendations for the proposed SEW segments for Walls W1 and W2. The MSE wall designer should design walls in accordance with AASHTO (2012) requirements.

7.3.1 Reinforcement Length

Our recommended minimum base reinforcement lengths for the walls are provided in Table 2. To meet global stability requirements and reduce potential for compound stability to control the design, we recommend a minimum of six layers of wall reinforcement at the base of the wall be extended to the minimum L/H ratios presented in Table 2, or 8 feet, whichever is greater. We recommend reinforcement layers higher in the wall have a minimum length equal to an L/H ratio of 0.7, or 8 feet, whichever is greater.

The reinforcement lengths may need to be increased to meet internal, external (sliding and overturning), or compound stability requirements. We did not evaluate internal, external (sliding and overturning), and compound failure modes. These failure modes should be evaluated by the wall designer because these failure modes depend on the particular reinforcement and soil properties and reinforcement vertical spacing selected by the wall designer.

90% Submittal drawing RW03 shows a buried detention vault within the embankment between about Stations 55+20 and 53+70 (see Appendix D). The south face of the vault is indicated on the drawing as being about 15 feet behind the south wall (Wall W2) face. Based on the reinforcement length recommendations presented in Table 2, the detention vault would not interfere with the wall reinforcement.

A continuous planter strip is proposed between the sidewalk and roadway. The bottom of planter strip will be less than 2 feet below the top of sidewalk elevation. Where wall reinforcement would extend into or through the planter strip, we recommend the reinforcement be deflected downward below the bottom of the planter strip soil such that a minimum of 3 inches of MSE wall reinforced zone backfill separates the reinforcement from planter strip soil.

Catch basins; signal, light, or sign foundation; and tree pits (tree wells) are proposed to be installed within the wall reinforced zone. Catch basins will extend from a few feet to more than 8 feet below roadway elevation. Signal, light, and sign foundations, to about 3 feet diameter, may extend a few feet to about 11 feet below roadway elevation. Tree pits (wells) are proposed to be spaced at approximately 25-foot centers along the north and south sides of the roadway. The tree pits are proposed to be within the planter strip between the curb and sidewalk. Each tree pit will be a concrete walled structure about 6 feet long by 5 feet wide by 5 feet deep. The sidewalk-side face of tree pit structures will be less than 8 feet behind the wall face. Where these and similar obstructions are to be installed in the wall reinforced zone, the wall and reinforcement design should be modified using one of the following alternatives (in accordance with AASHTO [2012] Section 11.10.10.4):

- Where reinforcement would need to be truncated to avoid an obstruction, design the reinforcement adjacent (horizontally or vertically) to the obstruction to carry the additional load which would have been carried by the truncated reinforcement.
- When soil reinforcement consists of discrete strips (i.e., the western segments of Walls W1 and W2), or can be cut into discrete strips, and depending on the size and location of the obstruction, splay the reinforcements around the obstruction. Reinforcement should not be splayed more than 15 degrees from perpendicular to the wall face.
- Where obstructions are of limited depth and extend no more than 12 inches below the design reinforcement elevation, bend reinforcement such that it extends below the obstruction.
- Place a structural frame around the obstruction that is capable of carrying the load from the reinforcements in front of the obstruction to reinforcements connected to the structural frame behind the obstruction.

Where tree pits are proposed to be installed, they will likely interfere with the uppermost one or two reinforcement layers. A combination of deflecting reinforcement below the tree pits and splaying reinforcement around tree pits may be required. Where reinforcement would need to be splayed greater than 15 degrees, we recommend truncating the reinforcement elements at the face of the tree pit. Reinforcement sheets or bar mats, if used, should be cut perpendicular to the wall face such that discrete elements that may be splayed are created and the minimum width of reinforcement possible truncated.

A water pipe is proposed to be installed south of the Wall W1. We understand the water pipe would be buried a few feet below the pavement. Based on the reinforcement length

recommendations presented above, this water pipe would be outside the reinforced zone and not require modification of reinforcement lengths or installation.

7.3.2 Embedment Depth

Where the ground surface in front of the wall face is near horizontal, the base of the reinforced zone should be a minimum of 24 inches, or 10 percent of the wall height, whichever is greater, below the ground surface. If the ground surface in front of the wall is sloped, the bottom of the reinforced zone should be located a minimum of 24 inches below the elevation at which there is a 4-foot horizontal distance from the wall face to the slope face in front of the wall. In addition to the above requirements, the base of the reinforced zone for Walls W1 and W2 should be a minimum of 24 inches below the existing grade elevation at the wall face.

7.3.3 Lateral Earth Pressures

Lateral earth pressures were estimated using methods specified in the AASHTO LRFD Bridge Design Specifications (2012). To evaluate the static active lateral earth pressures acting on MSE walls and structural elements adjacent to soil, we recommend using an equivalent fluid weight of 35 pounds per cubic foot (pcf). The active lateral earth pressures should be applied to the back of the reinforced zone of SEWs and structures free to displace a minimum of 1/1000th the structure height (0.001H). This static earth pressure recommendation assumes a vertical wall face with a horizontal backslope and a wall backfill that is a free-draining material which does not allow hydrostatic pressure buildup.

Surcharge loads such as traffic and construction equipment will induce lateral loads on retaining walls and buried structures. Traffic surcharge loads may be estimated using a uniform pressure of 250 pounds per square foot (psf). Construction equipment surcharge loads should also be considered. We recommend applying a minimum construction equipment surcharge load of 600 psf. Because construction equipment loads are unknown, we recommend stating in the contract documents (plans or specifications) the maximum lateral loads that the structures can accommodate. Surcharge-induced lateral pressures acting on retaining structures and buried structures retaining soil should be computed using an earth pressure coefficient, K, equal to 0.28 for active conditions and 0.44 for at-rest conditions.

Seismic earth pressures should be added to the static earth pressures acting on walls and structures retaining soil that are free to displace a minimum of 0.001H. Seismic earth pressures should be calculated in accordance with AASHTO 2012, Section 11.10.7. The soil parameters for calculation of external and internal seismic stability are provided in Tables 3 and 4.

7.3.4 Sliding Resistance

We expect silty sand with a trace of gravel will be exposed at MSE wall foundation levels. Where silty sand is not encountered at wall foundation elevation, we recommend that a minimum of 3 inches of reinforced zone backfill be placed over the foundation soils below the lowest reinforcement layer. To evaluate sliding resistance, we recommend assuming an internal friction angle equal to 36 degrees. For the SEW segments of W1 and W2, discontinuous ribbed steel reinforcement (e.g., strips or bar mats) will be used. We recommend using a coefficient of sliding equal to 0.73 for these reinforcements. In accordance with AASHTO (2012), we recommend applying a resistance factor of 1.0 for Strength Limit and Extreme Limit State design.

7.3.5 Bearing Resistance

Wall height, recommended base reinforcement lengths, and subsurface conditions influence bearing resistance. The base of SEW reinforcement lengths and wall heights used for developing our bearing resistance recommendations are based on our wall global stability analyses (see Section 6.0). Generalized subsurface conditions beneath the walls are based on the subsurface profile presented in Figure 3. For our bearing resistance analyses, we assumed a minimum embedment depth of 2 feet.

Our bearing resistance recommendations are presented in Tables 3 and 4. Because of the discontinuous nature of the disturbed glaciolacustrine zones (see discussion in Section 4.2.2), our bearing resistance recommendations are based on foundation soil friction angles that vary along each wall, in accordance with that interpreted from the boring logs.

AASHTO 2012 recommends that, for MSE walls, a resistance factor of 0.65 be applied to the nominal resistance for the Strength Limit State and a resistance factor of 1.0 be applied for the Extreme Event Limit State.

7.3.6 Wall Drainage

7.3.6.1 Surface Drainage

A surface seal such as pavement or an 8-inch-thick layer of impervious soil should be provided on the top of the embankment fill to reduce infiltration and groundwater buildup in and behind the MSE walls. Surface water should be captured in a drainage swale or catch basins and drain pipes. We recommend that drain pipes be behind the reinforcement zone to reduce interference with the reinforcement. The ground surface in front of walls should be

sloped such that water is diverted away from the wall toe. The ground surface above walls should be shaped to divert water away from the wall.

7.3.6.2 Subsurface Drainage

Based on field observations and measurements, groundwater may be encountered in the hillside running north-south through the site. Our analyses assume that groundwater would be below the base of the MSE walls. To achieve and maintain this drainage condition, drainage measures presented in Figure 6 should be implemented. These recommendations include placement of a drainage blanket below the reinforced zone, construction of a chimney drain (inclined or vertical) behind the reinforced zone, and installation of underdrain pipe to remove collected water. The drainage blanket and chimney can be eliminated if reinforced zone backfill has less than 3 percent fines (percent of particles by weight passing the US Standard No. 200 sieve) and consists of soil meeting WSDOT Standard Specification Section 9-03.13(1) requirements for Gravel Borrow. Underdrain pipes should discharge water to a storm drain or other appropriate discharge location away from the embankment.

If seeps are encountered during terracing of slopes for fill placement, supplemental drainage measures should be implemented in accordance with WSDOT Standard Specification Section 2-03.3(14). These drainage measures may include installing a minimum 8-inch layer of Sand Drainage Blanket material meeting WSDOT Standard Specification Section 9-03.13(1).

The proposed tree pits and planter strip will allow direct infiltration of precipitation and irrigation water. Excessive infiltration could adversely impact wall performance. We recommend that one or more of the following measures be implemented to protect the MSE walls and embankment from potential impacts of excess infiltration:

- Construct the entire MSE reinforced zone using soil with less than 3 percent fines (percent of particles by weight passing the U.S. Standard No. 200 sieve) and meeting WSDOT Standard Specification Section 9-03.13(1) requirements for Gravel Borrow.
- Place an impermeable or low-permeability infiltration barrier below the tree pits and planter strips and collect and remove infiltrated water.
  - This barrier could consist of a geomembrane or a minimum 12-inch-thick layer of compacted low-permeability clay or glacial till soil.
  - The top surface of the infiltration barrier should be shaped such that it flows toward a drainage pipe trench or swale at the center of the planter strip.

- A drainage pipe should be installed in the trench or at the low point of the swale on top of the infiltration barrier to collect and drain excess water. Perforations in the drain pipe should be a minimum of 4 inches below the elevation of adjacent infiltration barrier.
- Permeable backfill placed around the pipe should be protected from contamination or plugging by adjacent soil by wrapping the drain gravel that surrounds the pipe with a non-woven geotextile filter fabric that completely surrounds the drain gravel. The geotextile filter fabric should meet WSDOT Standard Specification Section 9-33.2(1) requirements for moderate survivability, Class B geotextile.
- We recommend that trench dams be installed around the drainage pipe at 25-foot intervals along the steeply graded roadway to force water that might otherwise flow within the pipe backfill into the drain pipe. The trench dams should consist of compacted low-permeability soil or concrete that is in direct contact with the top of the infiltration barrier and adjacent soil and extend to a minimum of 6 inches above the drain pipe crown.
- The drainage pipe should discharge water to a storm drain or other appropriate discharge location away from the embankment.
- The MSE wall reinforcement layer immediately below the planter strip elevation should extend below the planter strip for its full width. This recommendation may require longer reinforcement at this elevation than is required for MSE wall internal or external stability. This reinforcement layer would reduce the potential for open cracks to develop in compacted soil or for damage to the geomembrane placed below the planter strip.

7.4 Stacked Concrete Block Wall

The 90% Submittal project plans show a modular concrete block wall (Wall W3) on the north side of the roadway way between about Stations 50+49 and 52+83. The plans indicate that the wall will have a maximum height of about 7 feet, including embedment. These blocks typically have nominal dimensions of 2.5 by 2.5 by 5 feet, although blocks with other dimensions are available. Recommended soil parameters for bearing capacity, sliding, and overturning for use in wall design are:

- Unit weight of retained soil: 120 pcf
- Friction angle of retained soil: 30 degrees
- Cohesion of retained soil: 0 psf
- Active earth pressure coefficient (Ka): 0.33
- Equivalent fluid weight: 40 pcf
- Coefficient of sliding fiction: 0.46

- Allowable bearing resistance: 2,000 psf
- Construction surcharge: 100 psf

These parameters were developed assuming that the walls will be designed to allow enough lateral movement for active earth pressures to develop.

Our recommendations assume that groundwater would be below the base of the wall. To achieve and maintain this drainage condition, drainage measures presented in Figure 7 should be implemented. These recommendations include construction of a chimney drain (inclined or vertical) behind the blocks and installation of underdrain pipe to remove collected water.

8.0 72-INCH-DIAMETER METRO SEWER

8.1 General

The location of the existing 72-inch-diameter Metro sewer line is shown in Figures 2 and 3. We understand that this pipeline was constructed in the early 1960s in a fill embankment that extended westward from the existing BNSF railroad embankment. Borings SW-B2-10 and SW-B3-10 indicate that the fill associated with the Metro sewer construction is generally medium dense, slightly silty to silty, gravelly sand to sandy gravel. We understand that the project team has decided to protect the existing Metro sewer by constructing a relieving slab that will span over the pipe.

8.2 Pipe Relieving Slab

We understand that a 1-foot-thick reinforced concrete relieving slab will be constructed over the pipe to transfer vehicle loads to adjacent soil and reduce the stress increase on the pipe. We understand that one alternative being considered to reduce traffic loads on the pipe is the installation of a 3-inch-thick layer of expanded polystyrene (EPS) geofoam fill below the slab, as presented in Phase 2 Drawing SL01 of the 90% Submittal of the project drawings. For the EPS alternative, we recommend the following:

- EPS fill should extend beyond the pipe centerline such that the ends of the concrete slab bear on compacted embankment soil that is, in cross section, outside a zone defined by lines that are tangent to the pipe and extend upward and away from the pipe at 1H:1V. The slab should be designed to fully support roadway loads over the EPS.
- The EPS will act as an insulating material. As such, ice may form on the concrete slab over the EPS during freezing weather sooner than ice may form on adjacent pavement sections. To reduce the potential for this differential icing, we recommend

that consideration be given to thickening the concrete slab or lowering it below the pavement section such that the EPS is 24 inches or greater below the roadway surface.

- Low-compressive-strength EPS material should be used; such as EPS Geofoam meeting ASTM D 6817 requirements for EPS 12, which has 2.2 pounds per square inch compressive resistance at 1 percent strain.

An alternative to installing the EPS may be to construct a 6-inch-thick zone of undercompacted soil directly below the proposed reinforced relieving concrete slab. This soil could be compacted to about 80 percent of modified Proctor dry density, instead of the 95 percent modified Proctor dry density typically specified for embankments below pavement. The limits of this undercompacted soil zone should extend beyond the pipe centerline such that the ends of the concrete slab bear on compacted embankment soil that is, in cross section, outside a zone defined by lines that are tangent to the pipe and extend upward and away from the pipe at 1H:1V. The slab should be designed to fully support roadway loads over the undercompacted soil zone.

8.3 Pipe Settlement

Our settlement analyses results (see Section 6.3.3 and Figure 5) indicate that constructing the roadway embankment as proposed in the 90% Submittal project drawings will cause pipeline settlement. Our settlement estimates are approximate; actual settlement may be greater or less. The potential for total settlement to be up to 25 percent greater than we have estimated should be considered when evaluating potential risk to the pipeline associated with the work.

9.0 LUMINAIRE STRUCTURES AND SIGNAL POLES

9.1 General

Luminaire structures and signal poles will be constructed as part of this project. We understand these structures will be designed in general accordance with the City of Bellevue Transportation Design Manual (TDM) (City of Bellevue, 2009). The standard plans included in the City of Bellevue TDM are similar to WSDOT Standard plans for luminaires and signal poles. We performed our analyses in accordance with the recommendations in the WSDOT GDM.

Based on WSDOT Standard Plan J-28.30-1 for Type A and B steel lights and City of Bellevue's TDM standard drawings, we anticipate that standard plan luminaire foundations will be about 3 to 8 feet deep.

9.2 Subsurface Conditions

Soil and groundwater conditions vary over the proposed NE 4th Street Extension alignment. Section 4.2 and Figure 3 present our interpretation of the subsurface conditions along the centerline of the new roadway. In general, the proposed luminaires and signal pole foundations will bear against new compacted fill, loose to dense existing fill, and medium dense to dense recessional outwash soil.

9.2.1 Luminaire Foundations

For luminaires between about Stations 50+00 and 52+00, we anticipate foundations will likely bear against loose, existing fill up to about 7 feet thick. Based on SPT blow counts, this soil does not meet the lateral bearing design assumptions for standard foundations.

Between about Station 52+00 and the existing railroad tracks (about Station 56+00), we anticipate that luminaire foundations will bear against newly placed compacted backfill. For luminaires east of the existing railroad tracks (about Station 56+00), we anticipate foundations will bear against existing medium dense to dense fill or dense recessional outwash soils.

9.2.2 Signal Pole Foundations

We anticipate that new signal pole foundations at the proposed 116th Avenue NE and NE 4th Street intersection will likely bear against loose, existing fill up to about 7 feet deep. Based on SPT blow counts, this soil does not meet the lateral bearing design assumptions for standard plan foundations.

New signal pole foundations at the proposed 120th Avenue NE and NE 4th Street intersection will likely bear against medium dense to dense recessional outwash soils.

9.3 Analysis Criteria and Methods

We developed lateral bearing recommendations for proposed luminaire structures and signal poles for this project based on the design criteria presented in Chapter 17 of the 2010 WSDOT GDM (WSDOT, 2010a), WSDOT Standard Plans (WSDOT, 2010b), and City of Bellevue TDM Standard Plans (City of Bellevue, 2009). P-y analysis (LPile) parameters have been selected based on recommendations in the Technical Manual for LPile, Version 6 (Ensoft, Inc., 2008) and published correlations with SPT blow counts (N-values), and our experience with similar soils.

9.3.1 Standard Foundations

The City of Bellevue and WSDOT standard plan foundations for luminaire structures and signal poles are designed based on allowable lateral bearing pressures developed from a correlation with SPT values. The standard foundation for steel luminaires and signal poles is a drilled shaft foundation. The City of Bellevue Standard Plans do not specify a minimum allowable lateral bearing pressure (ALBP) for luminaires, but WSDOT standard plans assume a minimum ALBP of 1,500 psf and require special designs (P-y analysis) for foundations in soil with an ALBP less than 1,500 psf. City of Bellevue standard signal pole foundation plans assume a minimum ALBP of 1,500 psf. WSDOT Standard Plans contain standard signal pole foundation designs for ALBPs as low as 1,000 psf.

Based on our interpretation of subsurface conditions, the ALPB of the soils within the anticipated foundation depths east of Station 52+00 meet or exceed the WSDOT and City of Bellevue standard plan foundation design requirements for the luminaires and signal poles. We recommend designing luminaires and signal pole foundations east of Station 52+00 using an ALPB of 1,500 psf.

In our opinion, new signal pole foundations west of Station 52+00 and at the intersection of 116th Avenue NE and NE 4th Street can be designed using WSDOT standard plans using an ALBP of 1,000 psf.

The preceding ALBP recommendations assume that the foundations are built on slopes flatter than 4H:1V and are at least 4 feet from any slope greater than 4H:1V. We assume that luminaire or signal pole height will not exceed 50 feet. In situations where these assumptions are not valid, our recommendations should be reconsidered and a special design may be needed.

9.3.2 Non-Standard (Special Design) Foundations

Standard luminaire structure foundations are not applicable west of about Station 52+00 for the existing soil conditions. Standard foundations could be used if the existing soil at each luminaire foundation location is excavated and replaced with compacted Gravel Borrow meeting the requirements of WSDOT Standard Specification Section 9-03.14(1). The limits of excavation and replacement should extend from the center of the foundation to 4 times the foundation radius at the ground surface and 2 times the foundation radius at the bottom of the foundation.

Non-standard luminaire structure foundations can be designed by performing a P-y method analysis of drilled shaft foundations using the program LPile (Ensoft, Inc., 2008). Our recommended parameters to be used for design using LPile are presented in Table 5.

10.0 STORMWATER SYSTEM

10.1 Stormwater Pipes and Detention

Stormwater collection systems and a detention vault will be installed to manage surface water runoff. Stormwater pipes and pipe connections to structures west of about Station 56+50 should have watertight joints.

10.2 Lateral Earth Pressures on Buried Structures

Catch basins, manholes, access vaults, the detention vault, and other buried project elements having stiff walls should be designed for at-rest earth pressures. To evaluate static at-rest earth pressures acting on buried stormwater manholes, detention vaults, tree pit structure walls, and other walls not free to displace at least $1/1000^{th}$ of the structure height, we recommend designing the structures to retain an equivalent fluid weight of 55 pcf. Our lateral pressure recommendations assume that these structures will be buried completely in common borrow fill. Surcharge loads should be estimated in accordance with the recommendations provided in Section 7.4, except that an at-rest earth pressure coefficient K equal to 0.44 should be used for design. Seismic earth pressures do not need to be added to buried rigid wall structures designed for at-rest earth pressures.

10.3 Infiltration Potential

We evaluated infiltration potential in accordance with the City of Bellevue's Surface Water Engineering Standards, which refer to the Washington State Department of Ecology's (Ecology's) Stormwater Management Manual for Western Washington (SMMWW). Ecology's SMMWW provides correlations to long-term design infiltration rates using grain size distribution. The SMMWW recommended analyses methods include the U.S. Department of Agriculture (USDA) textural triangle and the d_{10} value (sieve size where 10 percent of particles pass through the sieve) obtained from the grain size distribution. These methods do not account for soil density. Based on our experience, we consider the infiltration rates determined using SMMWW and USDA methods unconservative for ablation till deposits.

For infiltration facilities which have bottom elevations within the existing fill and more than 5 feet above the top of ablation till, we recommend assuming a long-term design infiltration rate

of 0.1 inch per hour (iph) for design. For infiltration facilities which have bottom elevations less than 5 feet above the ablation till, we recommend assuming a long-term design infiltration rate of 0.05 iph. Table 6 summarizes our recommended infiltration rates by station.

We recommend maintaining a minimum distance of 5 feet between the bottom elevation of infiltration facilities and the groundwater elevation. Groundwater below infiltration points will mound in response to infiltration, i.e., the groundwater surface elevation will rise. Meeting these criteria may preclude infiltration using bioretention swales or porous pavement in the easternmost part of the alignment.

Our scope of services did not include groundwater modeling to assess the potential height of groundwater mounding that may result from the proposed infiltration. We expect the increase in infiltration, relative to the current paved-site condition, will increase groundwater flow to the west, toward the railroad embankment and slope.

11.0 PAVEMENT DESIGN

11.1 General

We followed the AASHTO Guide for Design of Pavement Structures (AASHTO, 1993) and the WSDOT Pavement Guide in accordance with City of Bellevue requirements. The AASHTO and WSDOT Pavement Guides use an empirical equation developed from actual road test data and is widely used in pavement design. The equation considers serviceability, traffic, and pavement thickness.

11.2 Subgrade Conditions

We anticipate that the pavement subgrade will consist of compacted structural fill, and we assume that the subgrade conditions will be “Average to Good,” according to the WSDOT Pavement Guide. We recommend using a subgrade resilient modulus (M_R) of 15 kips per square inch for the pavement design.

We recommend that pavement subgrade soils be systematically compacted and proof rolled after excavation to subgrade elevation to identify areas of soft, wet, organic, or unstable soils. Proof rolling should be accomplished with a heavy vibratory roller, front-end loader, or loaded dump truck (or equivalent) making systematic passes over the site while being observed by a representative of the geotechnical engineer.

11.3 Groundwater

Groundwater may exist near the ground surface on the western portion of the site due to runoff from the large hillslope to the east. We recommend constructing a low-permeability berm to collect and drain runoff and prevent infiltration into the base course material west of the retaining walls.

11.4 Traffic Load

PB provided us with anticipated daily traffic volumes for NE 4th Street projected over the next 20 years. Based on those volumes, we estimated the traffic volume for pavement design would be about 6.8 million equivalent single axle loads. This estimate assumes 3 percent trucks and 1 percent buses.

11.5 Pavement Recommendation

The City of Bellevue's standard pavement design specifies that a pavement section contain 10 inches of hot-mix asphalt (HMA) and 4 inches of crushed surfacing base course. Based on the expected subgrade soils and projected traffic volumes, it is our opinion that the City of Bellevue's standard pavement design is sufficient to handle the estimated projected traffic volumes. If such a heavy-duty pavement section is not preferred, it is our opinion that a 7-inch surface HMA layer with a 6½-inch crushed surfacing base course layer would also be acceptable.

Pavements subjected to vehicular traffic should generally be protected from potential damage due to frost action. Frost-susceptible soils are generally regarded as those that have more than 3 percent of its particles finer than 0.02 millimeter. According to the WSDOT Pavement Guide (WSDOT, 2003), the calculated maximum frost depth near the City of Bellevue for coarse-grained soil is about 15 to 20 inches. However, the maximum measured frost depth during cold winters of 1949 and 1950 was about 10 to 15 inches near the City of Bellevue. Based on these data, the City of Bellevue could consider pavements designed for an assumed frost depth of 15 inches, in our opinion.

One way to reduce pavement damage due to frost action is to provide a pavement structure thickness consisting of pavement and clean, granular, non-frost-susceptible base materials. WSDOT recommends a minimum pavement structure thickness equal to 50 percent of the total freeze depth.

11.6 Edge of Pavement and Sidewalk Support

Planter strips and tree pits are proposed between the roadway and sidewalk. We recommend that these features be constructed such that they do not compromise roadway and sidewalk pavement support. In general, compacted soil supporting soil below the roadway or sidewalk would have sufficient lateral support if it extends to the bottom of pavement asphalt or sidewalk concrete and slopes down no steeper than 1.5H:1V. This recommendation should be applied along the roadway and sidewalk where planter strips and tree pits are proposed.

12.0 CONSTRUCTION CONSIDERATIONS

12.1 Fill Placement, Compaction, and Use of On-site Soils

Fill within the reinforced zone of MSE walls should meet the requirements of WSDOT Standard Specifications (WSDOT, 2010b) Section 9-03.12(2) Gravel Backfill for Walls and 9-03.14(4) Gravel Borrow for Geosynthetic Retaining Walls for SEW and geosynthetic segments, respectively. Maximum particle size should be limited to 1¼ inch in the reinforced soil zone if geosynthetic reinforcement is used. Common Borrow (WSDOT Standard Specification Section 9-03.14(3)) can be used for permanent slopes. We understand that the unreinforced embankment backfill within the roadway prism will consist of Section 9-03.14(1) Gravel Borrow.

Fill soil should be free of organics, debris, and rubbish. Fines, if present, should be nonplastic. Fill should be placed at a moisture content near optimum to allow proper compaction.

Prior to fill placement, any ponding water should be drained from the area. Fill should be placed and compacted in accordance with WSDOT Standard Specifications. In general, the thickness of loose lifts should not exceed 12 inches for heavy equipment compactors or 6 inches for hand-operated mechanical compactors. Backfill compaction adjacent to walls should be performed using hand-operated compactors. Fill operations should be observed and evaluated by an experienced geotechnical engineer or technician.

While preparing the MSE wall lifts, the Contractor should be sure that the machine direction of the reinforcement runs perpendicular to the roadway alignment and that heavy equipment not be allowed to run directly over the reinforcement.

Non-cohesive silt, sand, and gravel suitable for re-use as fill may be encountered in excavations performed for the project. Soil derived from excavations should meet applicable City of Bellevue or WSDOT standards where they are to be re-used for the proposed construction.

12.2 Groundwater Control

Except as otherwise designed and/or specifically covered in the contract, the Contractor should be made responsible for control of all surface water and groundwater encountered during construction. In this regard, sloping, slope protection, ditching, sumps, trench drains, dewatering, and other measures should be employed as necessary to permit proper completion of work.

We anticipate that groundwater may be encountered in excavations. The Contractor should anticipate the need to provide measures to control and remove groundwater during excavations. If groundwater is encountered during excavations for the MSE walls, additional permanent subsurface drainage measures in addition to those recommended in Section 7.7.2 may be required.

12.3 Temporary Excavations

For safe working conditions, prevention of ground loss, and protection of existing work, temporary shoring and excavation slopes should be the responsibility of the Contractor, who will be at the job site to observe and control the work. All current and applicable safety regulations regarding shoring and excavation slopes should be followed.

We understand that the Metro sewer will remain in operation during construction. We understand the roadway and wall design have been performed to limit excavation near the pipe, as discussed in Section 8.0. Temporary shoring may be required if temporary excavations for wall and embankment construction come too close to the existing sewer or require excavation that could loosen soil around the pipe below the pipe springline.

Temporary shoring walls are typically flexible systems. Flexible shoring systems should be designed for active earth pressures. Cantilever-type, flexible shoring walls can be designed using an active equivalent fluid weight of 35 pcf. Where ground movement must be limited, tiebacks may be installed. Earth pressures for tied-back retaining structures should be designed in accordance with AASTHO standards. Lateral pressures due to construction traffic and soil stockpile surcharge loads should be added where appropriate.

Where temporary open-cut, sloped excavations are used, the stability and safety of these slopes will depend on careful evaluation of the following factors: (a) amount of groundwater seepage, (b) soils exposed in the excavation slope, (c) depth of the excavation, (d) surcharge loads at the top of the excavation, (e) geometry of the excavation, and (f) time of construction.

Temporary excavation slopes should be terraced in accordance with WSDOT Standard Specifications Section 2-03.3(14). For planning purposes, we recommend that temporary, unsupported, open-cut slopes be no steeper than 1.5H:1V, unless the slope surface is stabilized. Flatter cut slopes may be required where loose soils or seepage zones are encountered during excavation. Exposed cut slopes may need to be protected with a waterproof covering during periods of wet weather to reduce sloughing and erosion.

Traffic and/or construction equipment loads should be set back from the edge of the temporary cut slopes a minimum of 5 feet. Excavated material, stockpiles of construction materials, and equipment should not be placed closer to the edge of any excavation than the depth of the excavation, unless the excavation is shored and such materials are accounted for as a surcharge load.

12.4 Wet Weather and Wet Conditions Considerations

In the Puget Sound region, wet weather generally begins about mid-October and continues through about May, although rainy periods could occur at any time of year. It would be advisable to schedule earthwork during the dry weather months such as June through September. During wet weather months, the groundwater levels could increase, resulting in seepage into site excavations. Performing earthwork during dry weather would reduce these problems and the costs associated with rainwater, trafficability, and handling of wet soil. Should wet weather/wet condition earthwork be unavoidable, the following recommendations should be followed:

- The ground surface in and surrounding the construction area should be sloped as much as possible to promote runoff of precipitation away from work areas and to prevent ponding of water. The runoff should be directed away from steep slopes.
- Work areas or slopes should be covered with plastic. The use of sloping, ditching, sumps, dewatering, and other measures should be employed as necessary to permit proper completion of the work. Appropriate temporary erosion and sediment control measures should be applied.
- Earthwork should be accomplished in small sections to minimize exposure to wet conditions. That is, each section should be small enough so that the removal of unsuitable soils and placement and compaction of clean structural fill could be

accomplished on the same day. The size of construction equipment may have to be limited to prevent soil disturbance and to minimize the subgrade disturbance caused by equipment traffic.

- Fill material should consist of clean, well-graded, pit-run sand and gravel soils, of which no more than 5 percent fines by dry weight pass the No. 200 sieve, based on the fraction passing the ¾-inch sieve. The fines should be nonplastic.
- No soil should be left uncompacted and exposed to moisture. A smooth-drum vibratory roller, or equivalent, should roll the surface to seal out as much water as possible.
- In-place soil or fill soil that becomes wet and unstable and/or too wet to suitably compact should be removed and replaced with clean, granular soil.
- Excavation and placement of structural fill material should be observed on a full-time basis by a geotechnical engineer (or representative) experienced in wet weather/wet conditions earthwork to determine that all work is being accomplished in accordance with the project specifications and our recommendations.
- Grading and earthwork should not be accomplished during periods of heavy, continuous rainfall.

We recommend that the above requirements for wet weather/wet condition earthwork be incorporated into the contract specifications.

12.5 Drilled Shaft Foundation Installation

Where luminaire or signal pole drilled shaft foundations will extend below and into soft and loose soils, we recommend that drilled shafts be cased during construction. We recommend that casing extend to the bottom of the excavation. Where drilling extends below the groundwater table, the casing should not lag the excavation by more than 2 feet. To help maintain hole bottom and sidewall stability, water or degradable synthetic slurry should be maintained in the casing at an elevation that is a minimum of 10 feet above the groundwater elevation or at the ground surface. Casing installation and extraction methods and slurry requirements should be in accordance with WSDOT standards.

Backfill placed around drilled shaft foundations should be compacted in accordance with WSDOT Standard Specifications (WSDOT, 2010c) requirements. Fill material should meet WSDOT backfill criteria for its intended use. Backfill placement and compaction should be verified in the field.

13.0 FUTURE DEVELOPMENT IN ADJACENT PROPERTIES

We understand that one or both of the properties adjacent to Walls W1 and W2 may be re-developed and that the developments may include buildings with basements. The excavations for these basements, whether completed using cut slopes or temporary shoring, may impact the global stability of Walls W1 and W2. The excavations would require cutting into the Qpgl deposit below the NE 4th Street walls. Due to the glacial stress history of the Qpgl, this geologic unit commonly contains high locked-in lateral stresses. These high lateral stresses can cause global instability problems if they are not sufficiently restrained. Deformed zones in the Qpgl, described in Section 4.2.2 of this report, present additional risks to excavation stability because they have lower shear strength due to pre-defined failure surfaces. The wall designer for the future developments should take these issues into careful consideration when designing excavation shoring systems that support Walls W1 and W2.

14.0 ADDITIONAL SERVICES

Geotechnical recommendations that are used as a basis for design are developed from a limited number of explorations and tests. Consequently, there may be a need for adjustment in the field during construction. We recommend that Shannon & Wilson, Inc. be retained to observe the geotechnical aspects of construction including site excavations, fill placement and compaction, embankment and MSE wall subgrade, erosion control, and other geotechnically related activities. Observing the work would allow us to evaluate the subsurface conditions as they are exposed during construction, to make recommendations as needed, and to determine that the work is accomplished in general accordance with our recommendations. We maintain a staff of experienced and qualified geotechnical engineers and field technicians who are familiar with the subsurface conditions and construction methods to be used at the project site.

15.0 LIMITATIONS

This report was prepared for the exclusive use of the City of Bellevue, PB, and their design team for specific application to the design of the NE 4th Street Extension project. The data and report should be provided to prospective contractors and/or the Contractor for factual information only. Our judgments, conclusions, and interpretations presented in the report should not be construed as a warranty of subsurface conditions and should not be relied upon by prospective contractors. Construction-period observation by our firm is necessary to confirm the recommendations and interpretations made in this report.

The analyses, conclusions, and recommendations presented in this report were prepared in accordance with generally accepted professional geotechnical engineering principles and practice in this area at this time. No other warranty, either express or implied, is made.

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed during our site visits and explorations, and further assume that the explorations are representative of the subsurface conditions throughout the site; i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations. If subsurface conditions different from those described in this report are observed or appear to be present during construction, we should be advised at once so that we can review these conditions and reconsider our recommendations, where necessary.

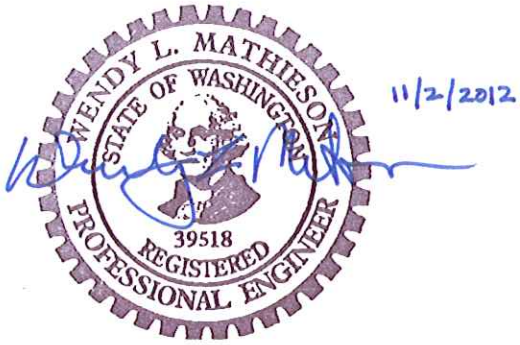
If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at or adjacent to the site, we recommend that this report be reviewed to determine the applicability of the conclusions and recommendations, considering the changed conditions and time lapse.

Unanticipated soil conditions are commonly encountered and cannot be fully determined by merely taking soil samples or completing test borings. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

The scope of our present work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, groundwater, or air on or below or around this site, or evaluations regarding the disposal of contaminated soils or groundwater, should any be encountered.

Shannon & Wilson, Inc. has prepared the enclosed Appendix E, "Important Information About Your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of our reports.

SHANNON & WILSON, INC.



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THL:CWY:OTH:WLM:SRB/oth

16.0 REFERENCES

ASTM International (ASTM), 2011, Annual book of standards, construction, v. 4.08, soil and rock (I): D 420 – D 5611: West Conshohocken, Pa., ASTM International.

American Association of State Highway and Transportation Officials (AASHTO), 1993, AASHTO guide for design of pavement structures: Washington, D.C., AASHTO, 1993.

American Association of State Highway and Transportation Officials, 2009, AASHTO guide specifications for LRFD seismic bridge design (1st ed.): Washington, D.C., AASHTO, 1 v.

American Association of State Highway and Transportation Officials (AASHTO), 2012, AASHTO LRFD bridge design specifications: Customary U.S. Units (6th ed.): Washington, D.C., AASHTO, 1 v.

Bray and Travasarou, 2007, Simplified procedure for estimating earthquake-induced deviatoric slope displacements: ASCE Journal of Geotechnical and Geoenvironmental Engineering, v. 133, no. 4, April.

City of Bellevue, 2009, Transportation design manual: Bellevue, Wash., City of Bellevue, February, available: http://www.ci.bellevue.wa.us/transportation_design_manual.htm.

Earth Solutions NW, LLC, 2009, Updated geotechnical engineering study, proposed mixed-use development, Bellevue, Washington: Report prepared by Earth Solutions NW, LLC, Redmond Wash., for KG Investment Management, job no. ES-0415.02, September.

Ensoft, Inc., 2008, LPile Plus v. 5.0: Austin, Tex., Ensoft, Inc.

GeoEngineers, 1994, Boring nos. B-1 to B-8, for the 300 120th Avenue (Home Depot) project: Boring collected from GeoMapNW at the University of Washington, available: http://geomapnw.ess.washington.edu/index.php.

Geo-Slope, 2007, Documentation for the SLOPE\W Version 7.13 Software, Geo-Slope International Ltd., Calgary, Alberta.

Goldfinger, Chris, Nelson, C.H., and Johnson, J.E., 2003, Holocene earthquake records from the Cascadia subduction zone and northern San Andreas Fault based on precise dating of offshore turbidities: Annual Review of Earth and Planetary Sciences, v. 31, p. 555-577.

Harbaugh, A.W., 2005, MODFLOW-2005, the U.S. Geological Survey modular ground-water model – the Ground-Water Flow Process: U.S. Geological Survey Techniques and Methods 6-A16, variously p.

Hart Crowser, 2001, Geotechnical engineering design study, Best Buy retail development, Bellevue, Washington: Report prepared by Hart Crowser, Seattle, Wash., for Mulvanny Architects, job no. 7498, June.

Johnson, S.Y., Blakely, R.J., Brocher, T.M., Bucknam, R.C., and others, compilers, 2004, Fault number 570, Seattle fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/regional/qfaults.

Morgenstern, N.R., and Price, V.E., 1965, The analysis of the stability of general slip surfaces: Geotechnique, v. 15, p. 79-93.

PB Americas, 2011a, NE 4th St / 120th Ave NE Corridor Project: BNSF RR Right-of-Way to 120th Ave NE, 60% Submittal, July 28.

PB Americas, 2011b, NE 4th St / 120th Ave NE Corridor Project: 116th Ave NE to BNSF RR Right-of-Way, 60% Submittal, July 28.

PB Americas, 2012, NE 4th St / 120th Ave NE Corridor Project: BNSF RR Right-of-Way to 120th Ave NE, 90% Submittal, September 13.

Rocscience, Inc., 2008, Settle3D Version 2.0, settlement and consolidation analysis: Toronto, Ontario, Rocscience, Inc.

Shannon & Wilson, Inc., 2011, NE 4th Street / 120th Avenue NE Corridor Project, Draft Hazardous Materials Technical Report, Bellevue, Washington: Report prepared by Shannon & Wilson, Inc. for the City of Bellevue, April 8.

Stark, T.D.; Choi, H.; and McCone, S., 2005, Drained shear strength parameters for analysis of landslides: Journal of Geotechnical and Geoenvironmental Engineering, v. 131, no. 5, p. 575-588.

Thorson, R.M., 1989, Glacio-isostatic response of the Puget Sound area, Washington: Geological Society of America Bulletin, v. 101, p. 1163-1174.

U.S. Geological Survey (USGS), 2008, AASHTO seismic design parameters CD: available: http://earthquake.usgs.gov/hazards/designmaps/aashtocd.php.

Washington State Department of Transportation (WSDOT), 2003, WSDOT Pavement Guide Interactive (cd rom): Olympia, Wash.

Washington State Department of Transportation (WSDOT), 2010a, Geotechnical Design Manual (GDM): Olympia, Wash., WSDOT, publication no. M 46-03, November, available: http://www.wsdot.wa.gov/Publications/Manuals/M46-03.htm.

Washington State Department of Transportation (WSDOT), 2010b, Standard Plans: Olympia, Wash., Washington State Department of Transportation, publication no. M 21-01, available: http://www.wsdot.wa.gov/Publications/Manuals/M21-01.htm.

Washington State Department of Transportation (WSDOT), 2010c, Standard specifications for road, bridge, and municipal construction, M 41-10: Olympia, Wash.

TABLE 1
EISMIC DESIGN GROUND MOTION PARAMETERS
NE 4TH STREET EXTENSION

Ground Motion Parameters	Value
Peak Ground Acceleration[1] (PGA_B)	0.43 g
Site Class	C
Short-period Spectral Acceleration, S_s	0.95 g
Long-period Spectral Acceleration, S_1	0.32 g
Site Factor, F_{pga}	1.00
Site Factor, F_a	1.02
Site Factor, F_v	1.48
Peak Design Spectral Acceleration, A_S	0.43 g
Short-period Design Spectral Acceleration, S_{DS}	0.97 g
Long-period Design Spectral Acceleration, S_{D1}	0.47 g
T_0	0.10 g
T_S	0.48 g

Note:

PGAB = peak ground acceleration for a site underlain by Site Class B soil (soft rock).

TABLE 2
WALL GLOBAL STABILITY AND RECOMMENDED BASE REINFORCEMENT LENGTHS SUMMARY

	Stability Evaluation								Recommendation
						Global Factor of Safety (FS)			
Wall Name	**NE 4th Street Representative Cross Section Evaluated**	**Slip Direction**	**Maximum Wall Height, H‡ (ft)**	**Minimum Embedment Depth (ft)**	**Required Base Reinforcement Width for Section Evaluated, L (ft)**	**Static FS**	**Seismic FS**	**Estimated Seismic-Induced Displacement (inches)**	**Minimum Bottom Reinforcement L/H Ratio for Station Interval** (1)
North (W1)	---	North	11	2	8	---	---	---	0.7
	54+50	North	21	2	23	1.41	1.09	1 to 2	1.1
	55+55	North	25	2	32	1.39	0.97	1 to 3	1.3
	55+72	North	18	2	13	1.44	0.99	1 to 3	0.7
	---	North	8	2	8	---	---	---	---
South (W2)	---	South	11	2	8	---	---	---	0.7
	54+50	South	21	2	21	1.43	1.08	1 to 2	1.0
	---	South	21	2	14	---	---	---	0.7
	---	South	8	2	8	---	---	---	---

Notes:

1. A minimum of six of the lowermost layers of mechanically stabilized earth wall reinforcement should have lengths equal to or greater than the length indicated. Reinforcement above these layers should have a minimum length to height ratio of 0.7, or 8 feet, whichever is greater.

"--- " = case not run

‡ Wall Height, H includes embedment.

ft = foot

GSW = Geosynthetic Wall

SEW = Structural Earth Wall

TABLE 3
RECOMMENDED SOIL PARAMETERS FOR WALL W1 STRUCTURAL EARTH WALL DESIGN

Parameter	Reinforced Fill	Retained Fill	Foundation Soil			
	Gravel Backfill for Walls	Gravel Borrow	Wall Stations 10+00 to 11+55	Wall Stations 11+55 to 12+10	Wall Stations 12+10 to 12+55	Wall Stations 12+55 to 12+93
Unit Weight, γ (pcf)	135	135	130	130	130	130
Effective Friction Angle, ϕ' (degrees)	38	38	25	25	25	25
Cohesion (psf)	0	0	0	0	0	0
Nominal Bearing Resistance (ksf):[1]	-	-	3.7	6.5	7.5	5.5
Coefficient of Sliding Friction:[2]						
Discontinuous Reinforcement / SEW [3,4]	-	0.73	0.73	0.73	0.73	0.73
Static Lateral Earth Pressure Parameters:						
Static Active Earth Pressure Coefficient, Ka:[5]	-	0.24	-	-	-	-
Static Active Equivalent Fluid Weight (psf)	-	33H	-	-	-	-
Seismic Lateral Wall Acceleration Coefficient for External Stability Analyis, $k_h = 0.5A_s$ (see Note 6 and Table 1)	0.5·0.43 = 0.215		-	-	-	-
Seismic Lateral Wall Acceleration Coefficient for Internal Stability Analyis, $k_h = A_s$ (see Table 1)	0.43		-	-	-	-

Notes:

[1] American Association of State Highway and Transportation Officials (AASHTO) 2012 recommends that resistance factors of 0.65 for the Strength Limit State and 1.0 for the Extreme Event Limit State be applied to nominal strength.

[2] AASHTO 2012 recommends that a resistance factors of 1.0 be used when evaluating sliding for MSE walls.

[3] Discontinuous reinforcement examples include metal strips.

[4] Coefficient of sliding friction assumes that a minimum of 3 inches of reinforced zone backfill is placed below the lowest reinforcement layer.

[5] Active lateral earth pressures are dependent on the inclination of the mechanically stabilized earth (MSE) reinforced zone (wall back-batter). Values shown assume vertical wall back-batter. The coefficients should be reevaluated using the applicable friction angles shown above for non-vertical walls.

[6] In accordance with AASHTO 2012 Section 11.6.5.2.2, the seismic lateral wall acceleration coefficient, k_h, for MSE walls are capable of tolerating lateral displacements of 1 to 2 inches or more may be calculated as 50 percent of A_s.

[7] See AASHTO 2012 Section 11.10.7.1 and 11.6.5 for various load combinations of P_{AE}, P_{IR}, and static forces to be evaluated.

[8] W = weight of the effective MSE wall system mass (per unit width of wall). AASHTO 2012 Section 11.10.7.1 dictates that, for walls with horizontal backfill, W shall be calculated by assuming an effective mass width (perpendicular to the wall face) equal to the width of the structural facing plus 50 percent of the wall height, H.

H = wall height including embedment (ft)

ksf = kips per square foot

lb = pound (force)

MSE = mechanically stabilized earth

pcf = pounds per cubic foot

psf = pounds per square foot

TABLE 4
RECOMMENDED SOIL PARAMETERS FOR WALL W2 STRUCTURAL EARTH WALL DESIGN

Parameter	Reinforced Fill	Retained Fill	Foundation Soil	
	Gravel Backfill for Walls	Gravel Borrow	Wall Stations 20+00 to 21+35	Wall Stations 21+35 to 23+49
Unit Weight, γ (pcf)	135	135	130	130
Effective Friction Angle, ϕ' (degrees)	38	38	25	25
Cohesion (psf)	0	0	0	0
Nominal Bearing Resistance (ksf):[1]	-	-	3.7	6.5
Coefficient of Sliding Friction:[2]				
Discontinuous Reinforcement / SEW [3,4]	-	0.73	0.73	0.73
Static Lateral Earth Pressure Parameters:				
Static Active Earth Pressure Coefficient, Ka:[5]	-	0.24	-	-
Static Active Equivalent Fluid Weight (psf)	-	33H	-	-
Seismic Lateral Wall Acceleration Coefficient for External Stability Analyis, $k_h = 0.5A_s$ (see Note 6 and Table 1)	0.5·0.43 = 0.215		-	-
Seismic Lateral Wall Acceleration Coefficient for Internal Stability Analyis, $k_h = A_s$ (see Table 1)	0.43			

Notes:

[1] American Association of State Highway and Transportation Officials (AASHTO) 2012 recommends that resistance factors of 0.65 for the Strength Limit State and 1.0 for the Extreme Event Limit State be applied to nominal strength.

[2] AASHTO 2012 recommends that a resistance factor of 1.0 be used when evaluating sliding for MSE walls.

[3] Discontinuous reinforcement examples include metal strips.

[4] Coefficient of sliding friction assumes that a minimum of 3 inches of reinforced zone backfill is placed below the lowest reinforcement layer.

[5] Active lateral earth pressures are dependent on the inclination of the MSE reinforced zone (wall back-batter). Values shown assume vertical wall back-batter. The coefficients should be reevaluated using the applicable friction angles shown above for non-vertical walls.

[6] In accordance with AASHTO 2012 Section 11.6.5.2.2, the seismic lateral wall acceleration coefficient, k_h, for MSE walls are capable of tolerating lateral displacements of 1 to 2 inches or more may be calculated as 50 percent of A_s.

[7] See AASHTO 2012 Section 11.10.7.1 and 11.6.5 for various load combinations of P_{AE}, P_{IR}, and static forces to be evaluated.

[8] W = weight of the effective MSE wall system mass (per unit width of wall). AASHTO 2012 Section 11.10.7.1 dictates that, for walls with horizontal backfill, W shall be calculated by assuming an effective mass width (perpendicular to the wall face) equal to the width of the structural facing plus 50 percent of the wall height, H.

H = wall height including embedment (ft)
ksf = kips per square foot
lb = pound (force)
pcf = pounds per cubic foot
psf = pounds per square foot

TABLE 5
LPILE PARAMETER FOR NON-STANDARD FOUNDATION DESIGN

Location	Boring Considered	Geological Unit	USCS Symbol	Soil Type	Top Depth of Layer (feet)	Total Unit Weight[1,2] g (pcf)	Total Unit Weight[2,3] g (pci)	Effective Unit Weight[1,2] g' (pcf)	Effective Unit Weight[1,2] g' (pci)	L-Pile Soil Type	Friction Angle, f (deg)	Initial Modulus Parameter, k (pci)
NE 4th Street Stations 52+00 to 50+00	ES-B2-06	HF/Qvrl	SM	Loose, silty SAND and SILT	0	110	0.064	110	0.064	Sand (API)	26	15
		Qvro to weathered Qvt	SP/SM	Dense, silty SAND	7	130	0.075	67.6	0.039	Sand (API)	38	125

Notes:

[1] Depth to groundwater is assumed to be at about 7 feet below the ground surface.

[2] Effective unit weight = total unit weight – unit weight of water. $\gamma' = \gamma_t - \gamma_w$, where, $\gamma_w = 62.4$ pcf

API = American Petroleum Institute

deg = degree

pcf = pounds per cubic foot

pci = pounds per cubic inch

USCS = Unified Soil Classification System

TABLE 6
RECOMMENDED INFILTRATION RATES BY STATION

Stations	57+00 to 58+40	58+40 to 59+00	59+00 to 61+00	61+00 to 63+00
Approximate Depth to Qvat (feet)	8 to 12	5 to 8	< 5	<5
Approximate Depth to Groundwater (feet)	unknown	unknown	< 10	< 5
Recommended infiltration rate (inch per hour)	0.1	0.05	0.05	0.05

0 500 1000

Approximate Scale in Feet

NOTE

Map adapted from aerial imagery provided by Google Earth Pro and Image © 2009 City of Bellevue, reproduced by permission granted by Google Earth ™ Mapping Service.

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

VICINITY MAP

October 2012 21-1-21232-002

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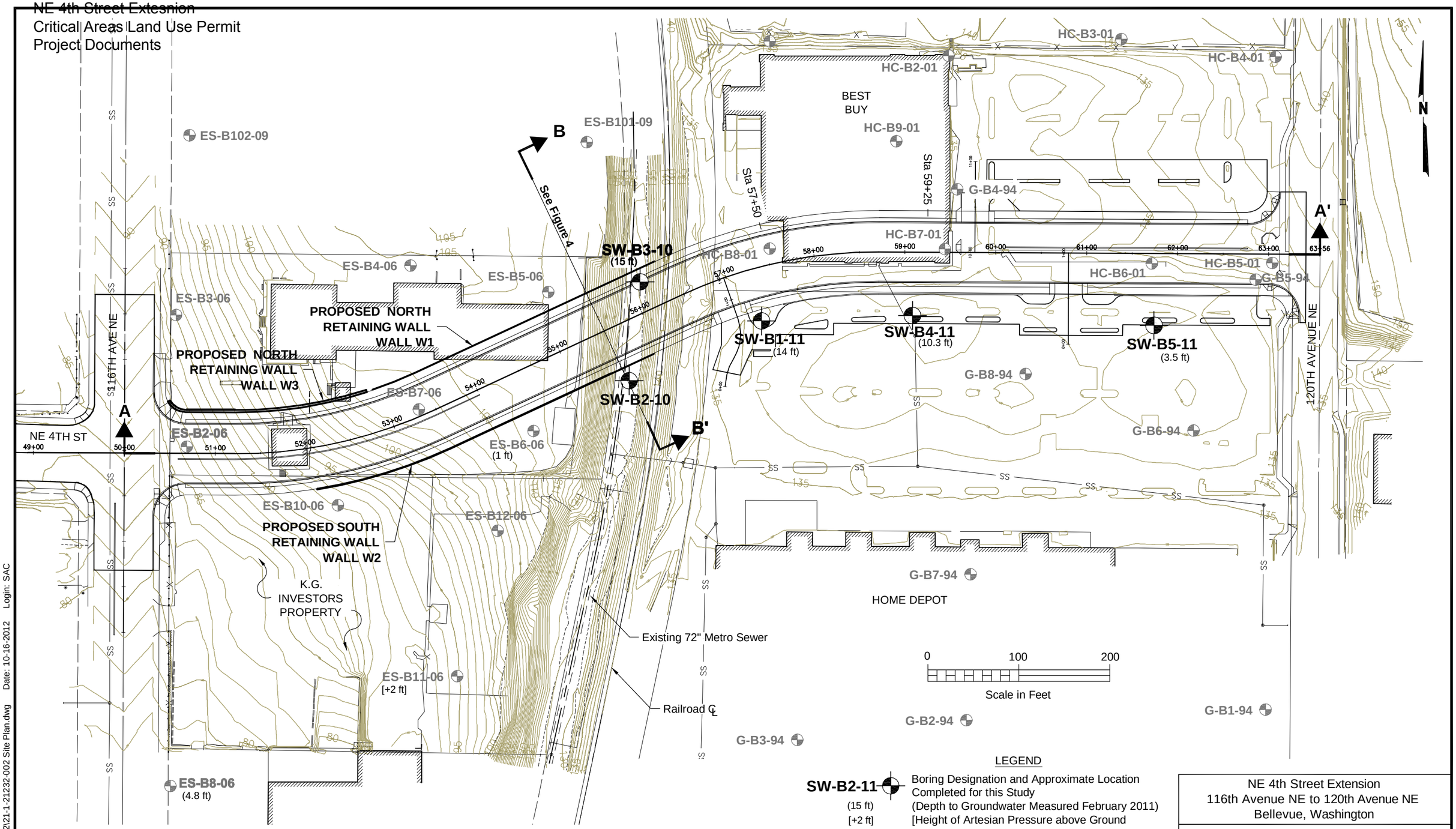
FIG. 1



NOTES

1. Explorations were not surveyed. Locations of current explorations were measured from existing site features using a cloth tape. Locations of previous explorations were taken from their respective project exploration plans.
2. Figure adapted from file *SVTPXPBQX0000- 0247_2.dwg* received 04-19-2010 and files *NE4-PALGN.dwg* and *NE4-PPLAN.dwg* received 10-26-2010 and *NE4-PWALL.dwg* received 7-3-2012. Wall extent revisions based on *NE4PH1-RW01* through *-RW05.pdf,* received 10-10-2012.

LEGEND

SW-B2-11 (15 ft) [+2 ft] — Boring Designation and Approximate Location Completed for this Study (Depth to Groundwater Measured February 2011) [Height of Artesian Pressure above Ground Surface, Measured February 2011]

G-B1-94 — Boring Designation and Approximate Location Previously Competed by Others

A — Generalized Subsurface Profile (See Figure 3)

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

SITE AND EXPLORATION PLAN

October 2012 | 21-1-21232-002

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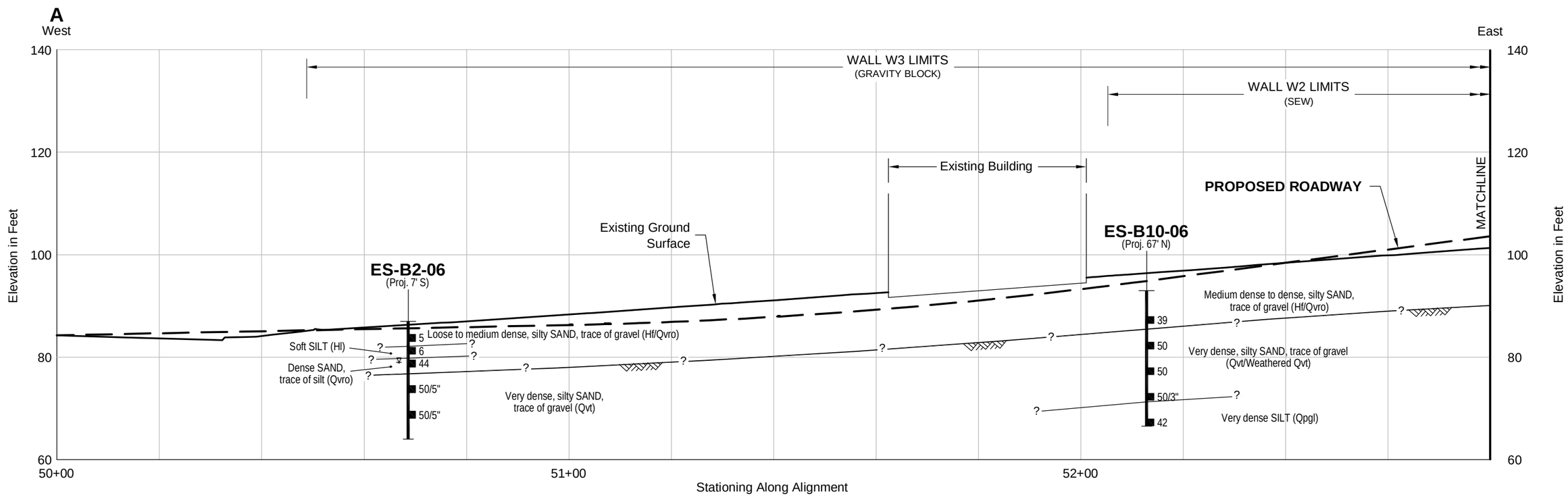
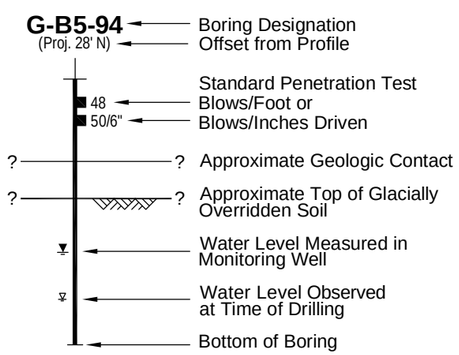
FIG. 2

Filename: J:\211\21232-002\21-1-21232-002 Site Plan.dwg Date: 10-16-2012 Login: SAC

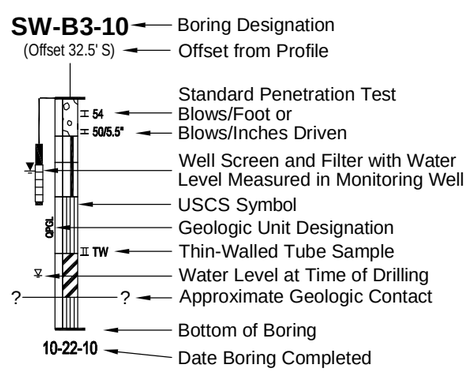


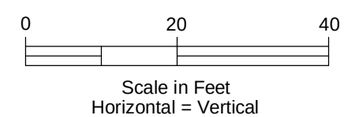
LEGEND

EXISTING EXPLORATIONS



RECENT EXPLORATIONS





NOTE

Figure adapted from client file *NE4-PPROF.dwg* received 10-26-2010.

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

GENERALIZED SUBSURFACE PROFILE A-A'

October 2012 | 21-1-21232-002

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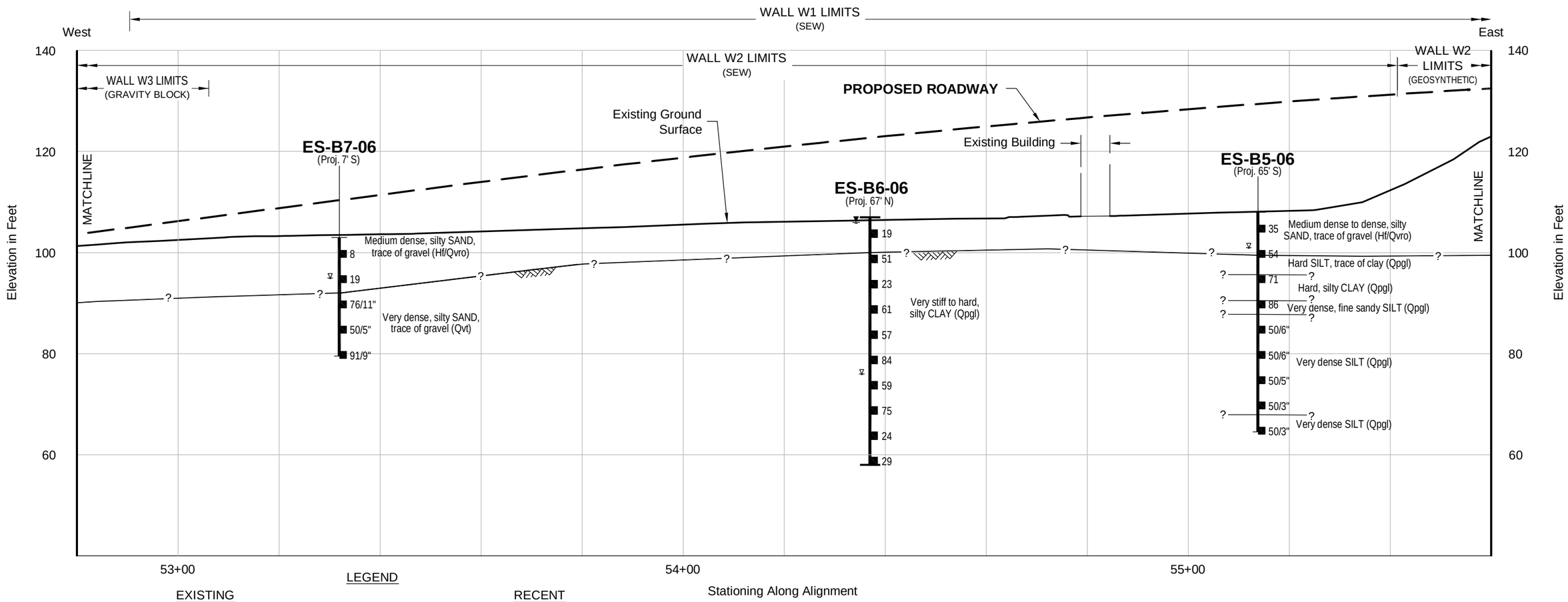
FIG. 3
Sheet 1 of 5

Filename: J:\211\21232-002\21-1-21232-002 Fig 3.dwg Date: 10-16-2012 Login: SAC



LEGEND

EXISTING EXPLORATIONS

G-B5-94 — Boring Designation
(Proj. 28' N) — Offset from Profile

48 — Standard Penetration Test Blows/Foot or
50/6" — Blows/Inches Driven

? — ? Approximate Geologic Contact

? — ? Approximate Top of Glacially Overridden Soil

Water Level Measured in Monitoring Well

Water Level Observed at Time of Drilling

Bottom of Boring

RECENT EXPLORATIONS

SW-B3-10 — Boring Designation
(Offset 32.5' S) — Offset from Profile

54 — Standard Penetration Test Blows/Foot or
50/5.5" — Blows/Inches Driven

Well Screen and Filter with Water Level Measured in Monitoring Well

USCS Symbol

Qpgl — Geologic Unit Designation

TW — Thin-Walled Tube Sample

Water Level at Time of Drilling

? — ? Approximate Geologic Contact

Bottom of Boring

10-22-10 — Date Boring Completed

0 20 40
Scale in Feet
Horizontal = Vertical

NOTE

Figure adapted from client file *NE4-PPROF.dwg* received 10-26-2010.

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

GENERALIZED SUBSURFACE PROFILE A-A'

October 2012 | 21-1-21232-002

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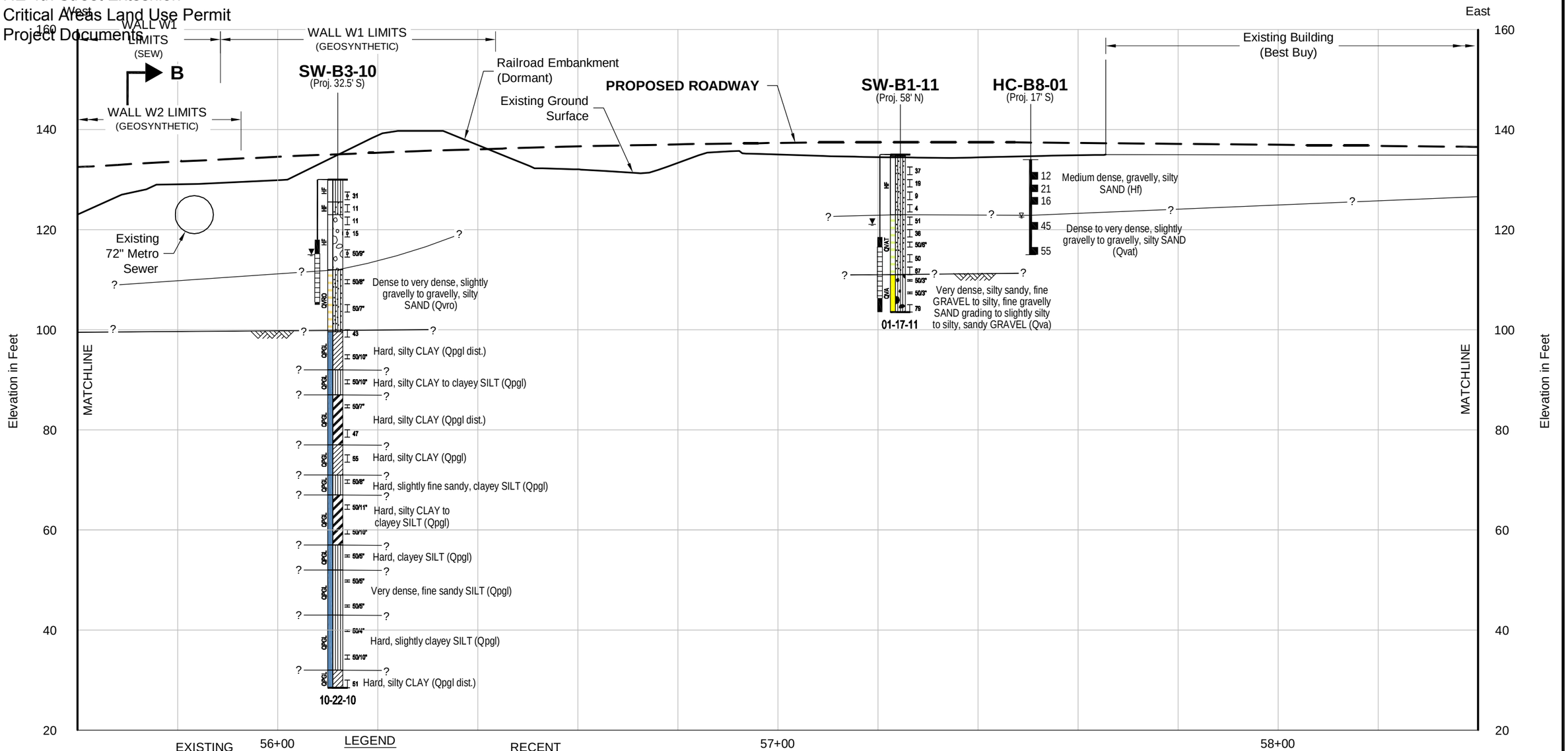
FIG. 3
Sheet 2 of 5

Filename: J:\211\21232-002\21-1-21232-002 Fig 3.dwg Date: 10-16-2012 Login: SAC



LEGEND

EXISTING EXPLORATIONS

G-B5-94 — Boring Designation
(Proj. 28' N) — Offset from Profile
48 — Standard Penetration Test Blows/Foot or
50/6" — Blows/Inches Driven
? — ? Approximate Geologic Contact
? — ? Approximate Top of Glacially Overridden Soil
Water Level Measured in Monitoring Well
Water Level Observed at Time of Drilling
Bottom of Boring

RECENT EXPLORATIONS

SW-B3-10 — Boring Designation
(Offset 32.5' S) — Offset from Profile
54 — Standard Penetration Test Blows/Foot or
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Well Screen and Filter with Water Level Measured in Monitoring Well
USCS Symbol
Geologic Unit Designation
TW — Thin-Walled Tube Sample
Water Level at Time of Drilling
? — ? Approximate Geologic Contact
Bottom of Boring
10-22-10 — Date Boring Completed

0 20 40
Scale in Feet
Horizontal = Vertical

NOTE

Figure adapted from client file *NE4-PPROF.dwg* received 10-26-2010.

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

GENERALIZED SUBSURFACE PROFILE A-A'

October 2012 — 21-1-21232-002

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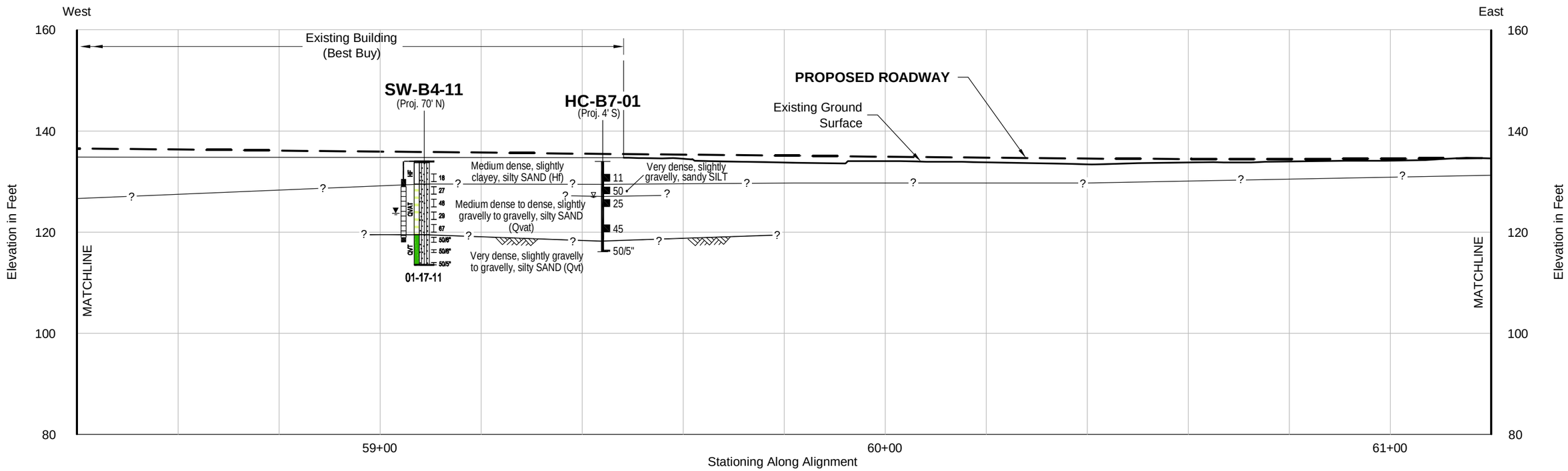
FIG. 3
Sheet 3 of 5

Filename: J:\211\21232-002\21-1-21232-002 Fig 3.dwg Date: 10-16-2012 Login: SAC



LEGEND

EXISTING EXPLORATIONS

G-B5-94 — Boring Designation
(Proj. 28' N) — Offset from Profile
48 — Standard Penetration Test Blows/Foot or
50/6" — Blows/Inches Driven
? — ? Approximate Geologic Contact
? — ? Approximate Top of Glacially Overridden Soil
Water Level Measured in Monitoring Well
Water Level Observed at Time of Drilling
Bottom of Boring

RECENT EXPLORATIONS

SW-B3-10 — Boring Designation
(Offset 32.5' S) — Offset from Profile
54 — Standard Penetration Test Blows/Foot or
50/5.5" — Blows/Inches Driven
Well Screen and Filter with Water Level Measured in Monitoring Well
USCS Symbol
QPGL — Geologic Unit Designation
TW — Thin-Walled Tube Sample
Water Level at Time of Drilling
? — ? Approximate Geologic Contact
Bottom of Boring
10-22-10 — Date Boring Completed

0 20 40
Scale in Feet
Horizontal = Vertical

NOTE

Figure adapted from client file *NE4-PPROF.dwg* received 10-26-2010.

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

GENERALIZED SUBSURFACE PROFILE A-A'

October 2012 | 21-1-21232-002

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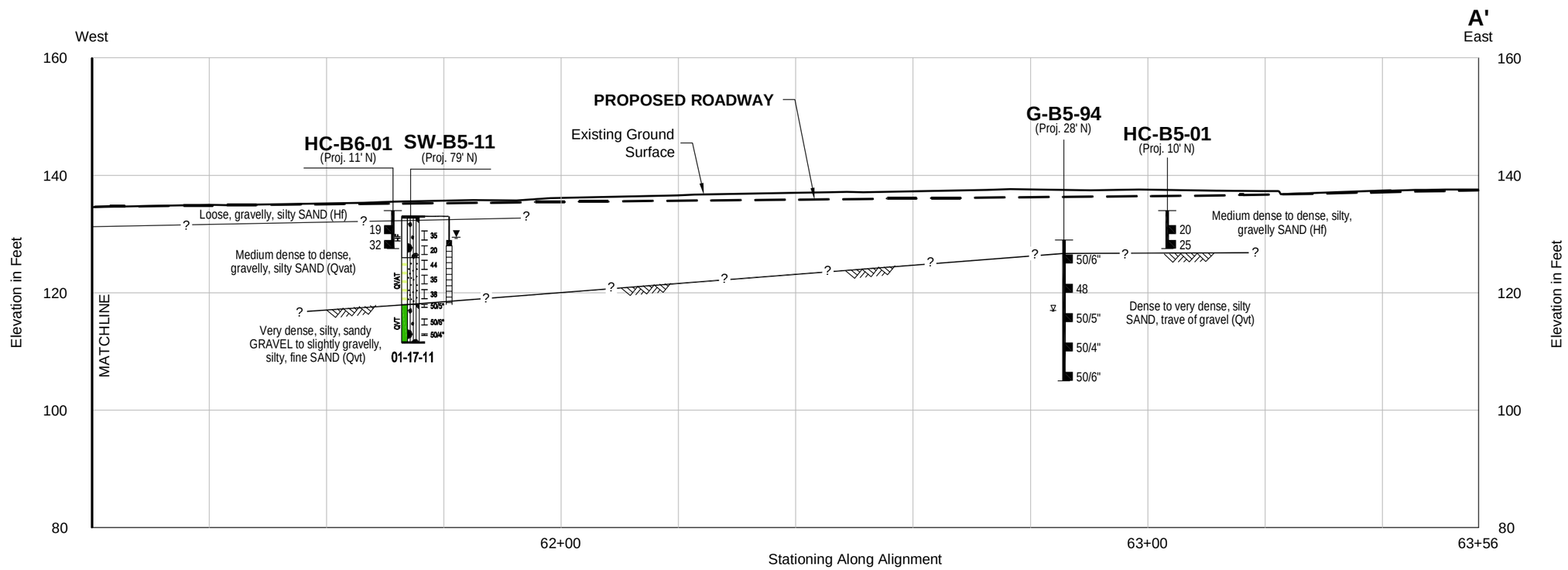
FIG. 3
Sheet 4 of 5

Filename: J:\211\21232-002\21-1-21232-002 Fig 3.dwg Date: 10-16-2012 Login: SAC



LEGEND

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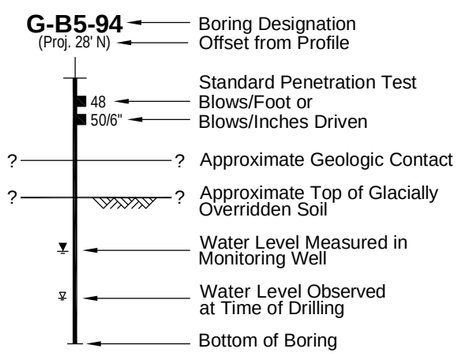
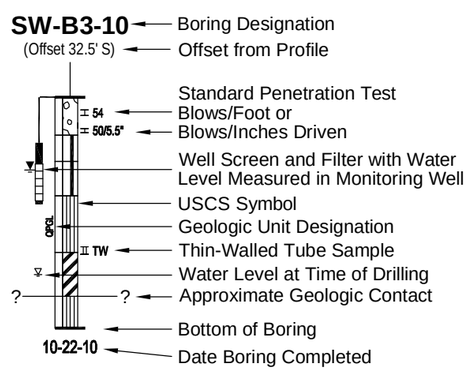


RECENT EXPLORATIONS



NOTE

Figure adapted from client file *NE4-PPROF.dwg* received 10-26-2010.

0 20 40

Scale in Feet
Horizontal = Vertical

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

GENERALIZED SUBSURFACE PROFILE A-A'

October 2012 | 21-1-21232-002

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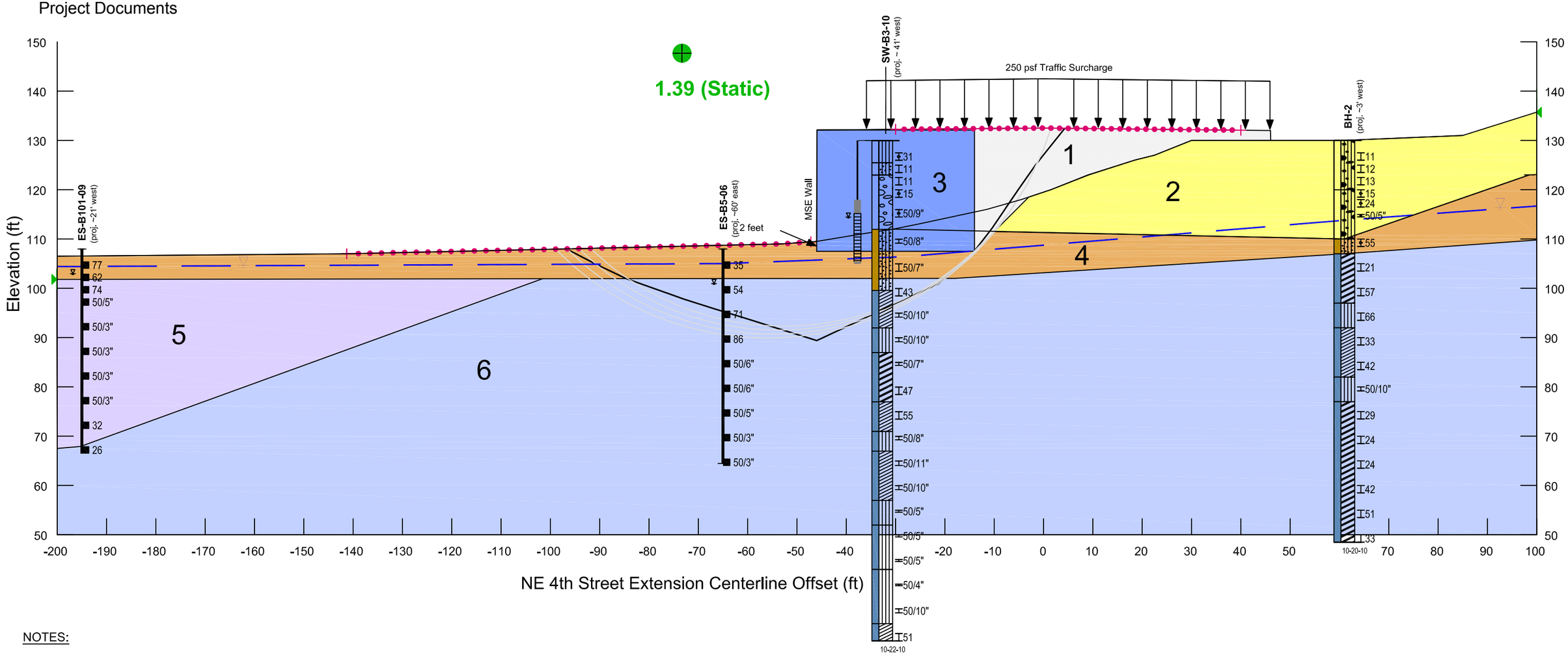
FIG. 3
Sheet 5 of 5

Filename: J:\211\21232-002\21-1-21232-002 Fig 3.dwg Date: 10-16-2012 Login: SAC

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SLOPE/W ANALYSIS LOCATION: I:\WIP\21-1\21232 NE 4th Street\Geotechnical\-002 Geotechnical Analyses and Report\Global Stability GC-002\2012-OCT\STA 55+55 - OCT 2012.gsz, 12/16/2010, 9:13:45 AM, Last Edited By: OTH



NOTES:

1. Global stability analyses were performed using SLOPE/W V7.16 (GeoStudio, 2007).
2. Our analyses assume the reinforcement is sufficient to preclude stability failure through the reinforced zone. Reinforcement lengths less than the L/H ratio presented here may be acceptable for reinforcement above the MSE bottom.
3. The soil parameters and recommendations assume that the soil behind the wall is fully drained. Improper wall drainage will result in a buildup of porewater pressures behind the wall which could contribute to wall instability.
4. Subsurface soil layering shown in this Figure were generalized for the purposes of global stability analysis. Layer thicknesses and contact elevations were conservatively selected to capture the uncertainty involved in boring log projections and geologic interpretation of existing logs.

SOIL PARAMETERS

Material Number	Description	Unit Weight, γ (pcf)	Friction Angle, ϕ (deg)	Cohesion, c (psf)
1	New compacted commom borrow FILL	130	34	0
2	Loose to medium dense existing FILL	125	34	0
3	MSE wall reinforced FILL	130	34	5,000
4	Medium dense to dense silty fine SAND	130	34	0
5	Very dense silty SAND	135	38	200
6	Very stiff to hard silty CLAY (disturbed)	130	Shear/Normal Stress Function from Stark, Choi & McCone (2005) using Liquid Limit = 55 and Clay Fraction = 35	

0 20 40
Scale in Feet

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

GLOBAL STABILITY ALONG SECTION B-B'

October 2011 21-1-21232-002

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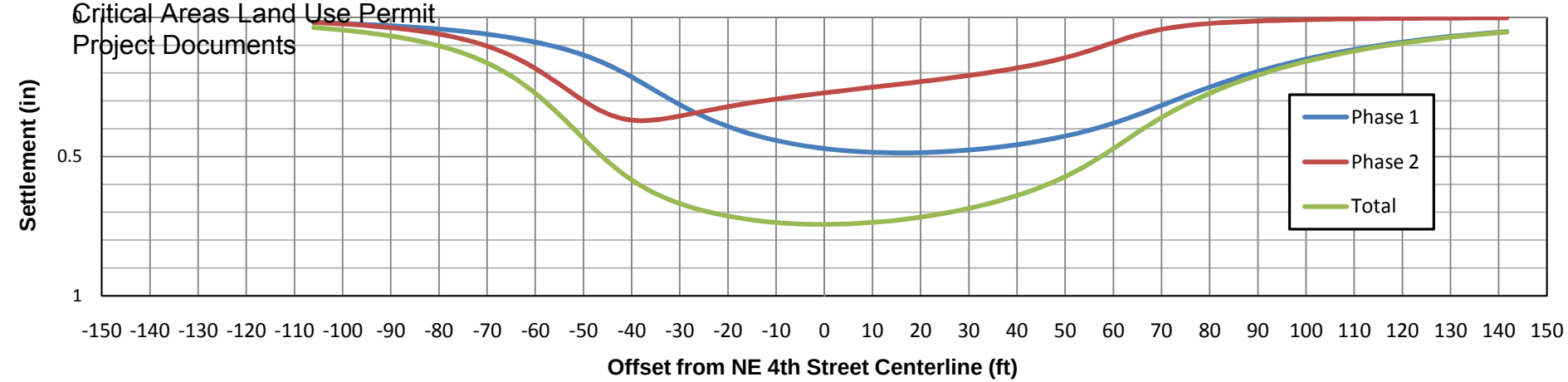
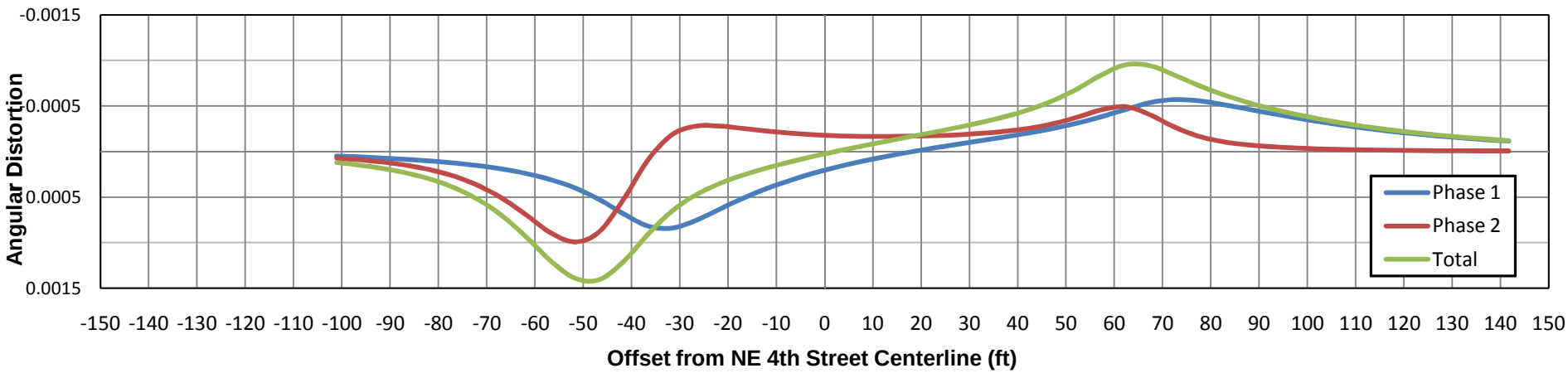
FIG. 4

Filename: I:\WIP\21-1\21232 NE 4th Street\Geotechnical\-002 Geotechnical Analyses and Report\Global Stability GC-002\FIG 4_STA 55+55 Global Stability.dwg Date: 10-30-2012 Login: oth





ASSUMED SUBSURFACE SOIL CONDITIONS AND PARAMETERS

Soil	Depth[2] (feet)	Unit Weight (pcf)	Elastic Modulus (psi)	Poisson's Ratio
Fill	0 to 19	125	1,500	0.30
Qvro	19 to 26	130	6,800	0.25
Qpgl	Below 26	130	6,900	0.45

NOTES:

1. Settlement calculations were performed using the computer program Settle3D. Settle3D computes settlements using a grid of 1-D soil columns under 3-D loading distributions.
2. The ground surface elevation above the Metro Sewer aligmnent is approximately 130 feet. The sewer invert depth is approximatly 12 feet below the ground surface (about elevation 118 feet).
3. Angular Distortion defined as the difference in calculated settlement over an interval, divided by the length of the interval. 5-foot intervals were used for this plot

NE 4th Street Extension
116th Avenue NE to 120th Avenue NE
Bellevue, Washington

METRO SEWER INVERT SETTLEMENT

October 2012 21-1-21232-002

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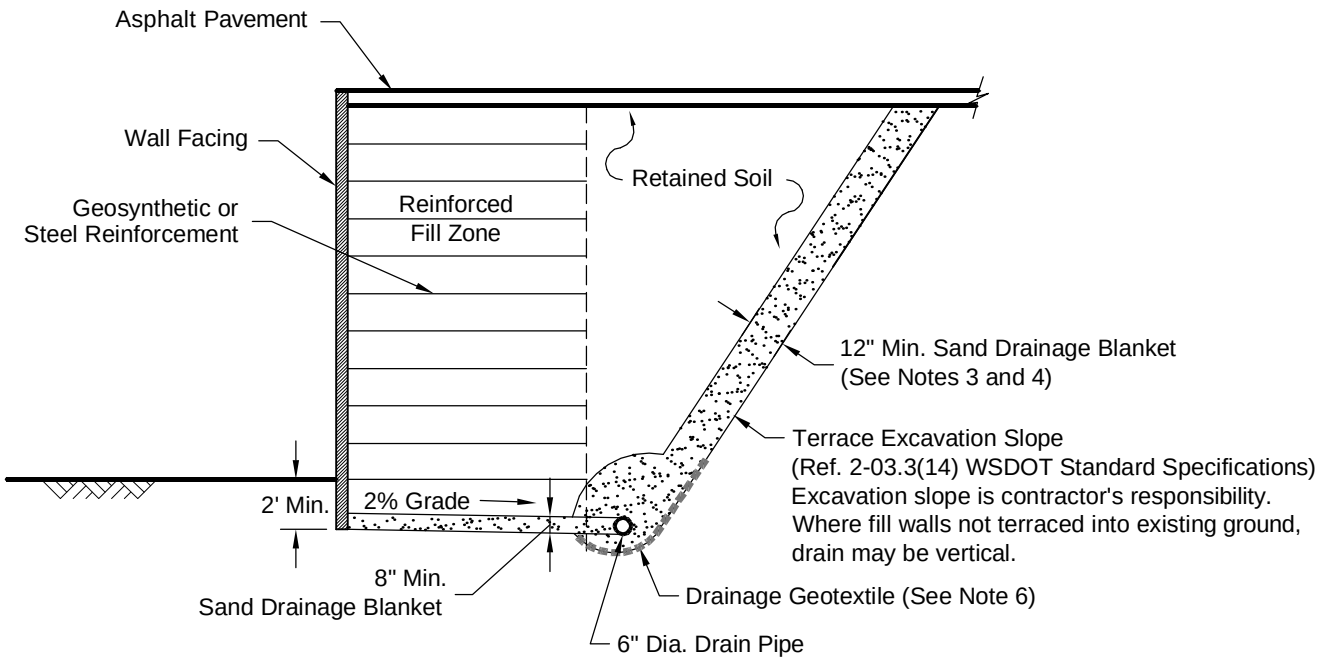
FIG. 5

FIG. 5



Not to Scale

NOTES

1. Fill placed in the reinforced zone should meet the requirements for Gravel Borrow, Gravel Backfill for Walls, or Gravel Borrow for Geosynthetic Retaining Walls as specified in Sections 9-03.12(2), 9-03.14(1), or 9-03.14(4), respectively, of the WSDOT Standard Specifications. Maximum particle size of 1 $\frac{1}{4}$-inch should be used where geosynthetic reinforcement is used.

2. Retained soil should meet the requirements for Gravel or Select Borrow as specified in Section 9-03.14(1) or 9-03.14(2) of the WSDOT Standard Specifications.

3. Sand Drainage Blanket should meet the requirements of WSDOT Standard Specification 9-03.13(1).

4. Sand Drainage Blanket, reinforced backfill, and retained soil should be placed and compacted in accordance with WSDOT Standard Specification Sections 2-03.3(14)C and 6-13-3(4).

5. Wall system to be designed by a professional engineer.

6. Drainage geotextile to be placed below drain pipe drainage backfill only. Geotextile should **not** be placed below retaining wall, between drainage sand and gravel and retained soil, or wrapped over the top of the drainpipe. Drainage geotextile shall meet the requirements of WSDOT Standard Specification 9-33.2, for a non-woven, moderate survivability Class B geosynthetic.

NE 4th Street Extension
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Bellevue, Washington

TYPICAL MSE WALL SUBDRAINAGE AND BACKFILL DETAIL

October 2012 | 21-1-21232-002

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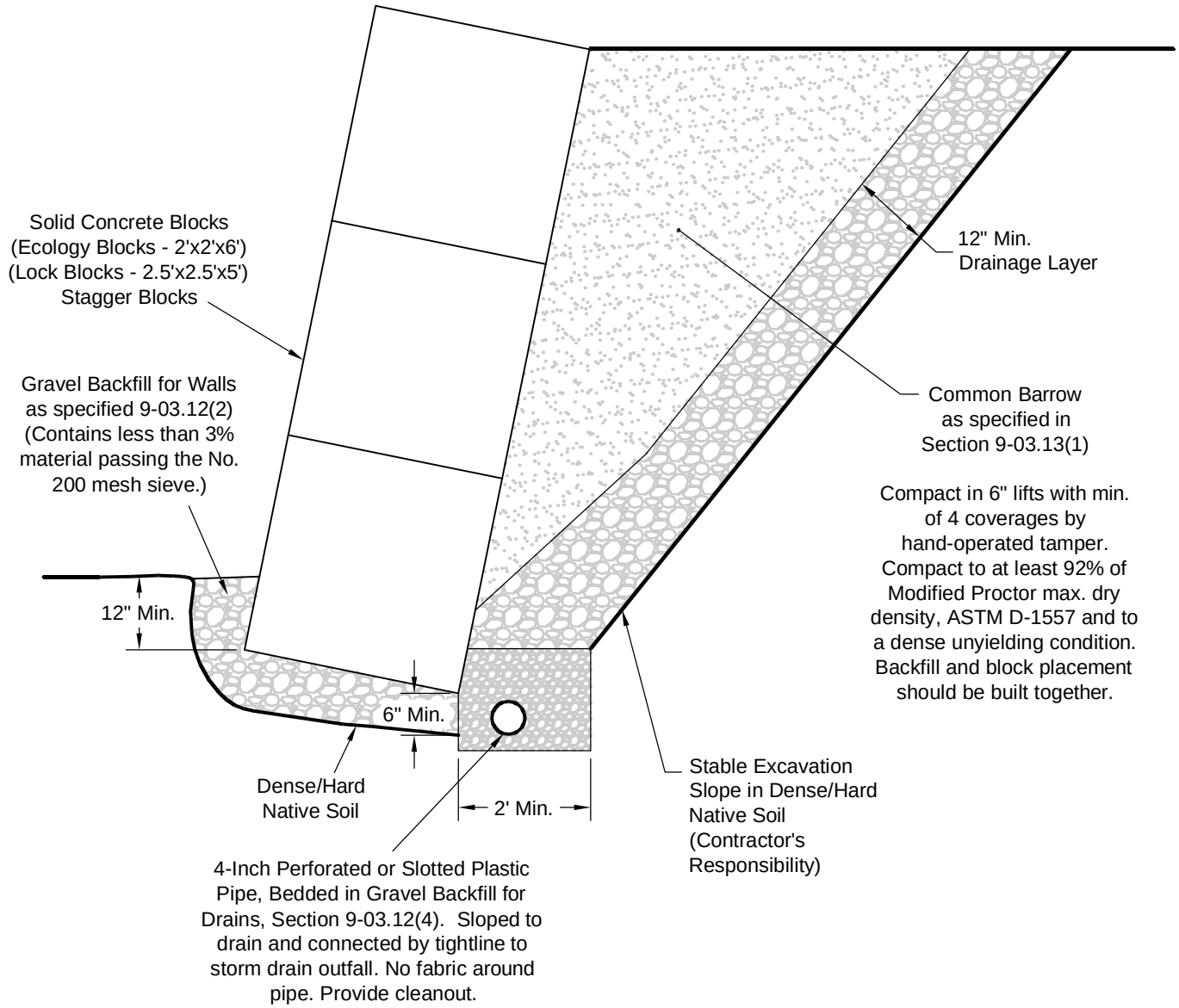
FIG. 6



Not to Scale

NOTES

1. All loose to medium dense soil at block foundation should be overexcavated down to dense/hard soil and replaced with compacted backfill as described above. The excavation shall be kept free of water. The prepared block foundation shall be evaluated by a geotechnical engineer prior to placement of blocks.

2. Remove vegetation organics, disturbed soil and debris from wall area. Expose hard/dense native soil.

3. Wall to be designed by others.

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116th Avenue NE to 120th Avenue NE
Bellevue, Washington

WALL W3
TYPICAL BLOCK WALL SECTION
SUBDRAINAGE AND BACKFILL
DETAIL

October 2012 21-1-21232-002

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FIG. 7

File: J:\211\21232-002\21-1-21232-002 Fig 7.dwg Date: 10-16-2012 Author: SAC

APPENDIX A

SUBSURFACE EXPLORATIONS

APPENDIX A

SUBSURFACE EXPLORATIONS

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APPENDIX A

SUBSURFACE EXPLORATIONS

A.1 GENERAL

The subsurface exploration program for the project was conducted by Shannon & Wilson, Inc. The exploration program consisted of five soil borings. The approximate locations of the explorations are shown in Figure 2. The locations should be considered approximate.

The logs of the soil borings completed for this project are presented as Figures A-2 through A-6. Figure A-1 presents a key to our classification of the soils encountered in the explorations.

A.2 SOIL BORINGS

Borings SW-B2-10 and SW-B3-10 were drilled by Boart Longyear Drilling Services to 81.5 and 101.5 feet below existing grade (bgs). These borings were completed on October 20 and 22, 2010, respectively. Boart Longyear Drilling Services completed these soil borings using a CME 850 limited-access, tracked rig using mud-rotary drilling techniques. Mud-rotary drilling borings are advanced by circulating drilling mud from the drill rig down through hollow rods to a tri-cone bit at the bottom of the borehole. The drilling mud was a mixture of bentonite powder and water. Cuttings were transported from the bottom of the borehole to the surface by drilling mud flowing between the drilling rods and the sides of the borehole. The cuttings were deposited in a settling tank at the ground surface and the mud re-circulated. After completion, the boreholes were backfilled with bentonite chips. Drill cuttings and spoils were considered clean, and cuttings were disposed of by Boart Longyear Drilling Services.

Borings SW-B1-11, SW-B4-11, and SW-B5-11 were drilled by Holocene Drilling to 31.5, 20.5, and 21.5 feet bgs using hollow-stem auger methods. These explorations were completed on January 17, 2011. Drill cuttings and spoils were considered clean, and cuttings were disposed of by Holocene Drilling.

Disturbed samples were obtained in conjunction with the Standard Penetration Test (SPT). The SPT is an in situ soil test which can be used to interpret several engineering properties of soils. The Unified Soil Classification System (USCS), as described in Figure A-1, was used to classify the soils.

A.3 OBSERVATION WELL INSTALLATION

Groundwater observation wells were installed in borings SW-B1-11, SW-B3-10, SW-B4-11, and SW-B5-11. The observation wells were constructed of new, commercially fabricated, threaded, flush-jointed, 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC). The well screens consisted of new, commercially fabricated, threaded, 10-foot-long, flush-jointed, 2-inch-diameter, 0.01-inch-wide, machine-slotted PVC. The well screen placements are indicated in the boring logs. A silica sand filter pack was poured in the annular space between the boring wall and the well screen to approximately 1½ feet above the screen. The remaining portions of the boreholes were filled with a bentonite/cement grout, bentonite grout, or bentonite chips.

Well SW-B-3-10 was completed such that it extends above the surrounding grade by placing a 4-foot-high, 6-inch-square, steel monument over the top of the borehole. The monument was then protected using three, 3-foot-high steel bollards. Both the steel monument and steel bollards were set in place with quick-set concrete. Wells SW-B1-11, SW-B4-11, and SW-B5-11 were completed flush with the surrounding grade by placing 8-inch-diameter, flush-mounted steel monuments over the top of the boreholes. The steel monuments were set in place with quick-set concrete.

We developed the observation wells on February 8 and 9, 2011.

A.4 GROUNDWATER OBSERVATIONS

Where observed, groundwater was noted during drilling. The groundwater level during drilling was difficult to determine for borings SW-B2-10 and SW-B3-10 due to poor sample recovery. Interpreted groundwater levels in borings advanced using mud-rotary drilling and where high fines content soil is encountered are not considered reliable, but can have value in interpreting subsurface conditions when other factors are considered and direct measurement of groundwater levels in wells or piezometers is not performed.

We measured groundwater levels in the observation wells installed in borings completed for this project on February 16, 2011. Groundwater levels are indicated in Figures 2 and 3 and are shown in the boring logs.

Both the groundwater level during drilling and the most recent groundwater level measurements in borings are noted on the logs. These measurements may not be representative of the highest potential groundwater levels.

A.5 SOIL SAMPLING AND CLASSIFICATION

The borings were logged in the field by a Shannon & Wilson, Inc. representative. Representative soil samples collected were transferred to our laboratory in Seattle, Washington, for analysis. The field logs and soil samples were reviewed by Shannon and Wilson, Inc. personnel in the Seattle laboratory using the USCS field classification method. The boring logs in this report represent our interpretation of the field logs.

Disturbed soil samples were obtained in conjunction with the SPT. SPTs were performed in general accordance with the ASTM International (ASTM) Designation: D 1586, Test Method for Penetration Test and Split-Barrel Sampling of Soils (ASTM, 2011). SPTs were collected in the borings generally at 2.5-foot intervals in the upper 20 feet and at 5-foot intervals thereafter. The SPT consists of driving a 2-inch-outside diameter split-spoon sampler a total distance of 18 inches below the bottom of the drill hole with a 140-pound hammer falling 30 inches. The number of blows required to advance the split spoon from 6 to 18 inches of penetration is termed the Standard Penetration Resistance (N-value). The N-values are plotted on the boring logs presented in this appendix. These values provide a means for evaluating the relative density of granular soils and the relative consistency (stiffness) of cohesive soils.

Due to poor sample recovery during drilling in the upper, more gravelly layers, a 3½-inch-outside diameter Dames and Moore sampler was used to attempt better sample recovery. These blow counts were also obtained using a 140-pound hammer falling 30-inches.

Select retrieved samples were screened in the field for the potential presence of contamination based on visual and olfactory observations. Potentially contaminated soils were not observed in the field explorations.

A.6 REFERENCE

ASTM International, 2011, 2011 Annual book of standards, Construction, v. 04.08, Soil and rock (I): D 420 - D 5876: West Conshohocken, Pa.

Shannon & Wilson, Inc. (S&W), uses a soil classification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following page. Soil descriptions are based on visual-manual procedures (ASTM D 2488-93) unless otherwise noted.

S&W CLASSIFICATION OF SOIL CONSTITUENTS

- MAJOR constituents compose more than 50 percent, by weight, of the soil. Major consituents are capitalized (i.e., SAND).
- Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (i.e., silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (i.e., slightly silty SAND).
- Trace constituents compose 0 to 5 percent of the soil (i.e., slightly silty SAND, trace of gravel).

MOISTURE CONTENT DEFINITIONS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

ABBREVIATIONS

ATD	At Time of Drilling
Elev.	Elevation
ft	feet
FeO	Iron Oxide
MgO	Magnesium Oxide
HSA	Hollow Stem Auger
ID	Inside Diameter
in	inches
lbs	pounds
Mon.	Monument cover
N	Blows for last two 6-inch increments
NA	Not applicable or not available
NP	Non plastic
OD	Outside diameter
OVA	Organic vapor analyzer
PID	Photo-ionization detector
ppm	parts per million
PVC	Polyvinyl Chloride
SS	Split spoon sampler
SPT	Standard penetration test
USC	Unified soil classification
WOH	Weight of hammer
WOR	Weight of drill rods
WLI	Water level indicator

GRAIN SIZE DEFINITION

DESCRIPTION	SIEVE NUMBER AND/OR SIZE
FINES	< #200 (0.08 mm)
SAND*	
- Fine	#200 to #40 (0.08 to 0.4 mm)
- Medium	#40 to #10 (0.4 to 2 mm)
- Coarse	#10 to #4 (2 to 5 mm)
GRAVEL*	
- Fine	#4 to 3/4 inch (5 to 19 mm)
- Coarse	3/4 to 3 inches (19 to 76 mm)
COBBLES	3 to 12 inches (76 to 305 mm)
BOULDERS	> 12 inches (305 mm)

* Unless otherwise noted, sand and gravel, when present, range from fine to coarse in grain size.

RELATIVE DENSITY / CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
0 - 4	Very loose	Under 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
Over 50	Very dense	15 - 30	Very stiff
		Over 30	Hard

WELL AND OTHER SYMBOLS

Bent. Cement Grout	Surface Cement Seal
Bentonite Grout	Asphalt or Cap
Bentonite Chips	Slough
Silica Sand	Bedrock
PVC Screen	
Vibrating Wire	

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SOIL CLASSIFICATION AND LOG KEY

October 2012 21-1-21232-002

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FIG. A-1
Sheet 1 of 2

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
(From USACE Tech Memo 3-357)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL		TYPICAL DESCRIPTION
COARSE-GRAINED SOILS *(more than 50% retained on No. 200 sieve)*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Clean Gravels *(less than 5% fines)*	GW		Well-graded gravels, gravels, gravel/sand mixtures, little or no fines.
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with Fines *(more than 12% fines)*	GM		Silty gravels, gravel-sand-silt mixtures
			GC		Clayey gravels, gravel-sand-clay mixtures
	Sands *(50% or more of coarse fraction passes the No. 4 sieve)*	Clean Sands *(less than 5% fines)*	SW		Well-graded sands, gravelly sands, little or no fines
			SP		Poorly graded sand, gravelly sands, little or no fines
		Sands with Fines *(more than 12% fines)*	SM		Silty sands, sand-silt mixtures
			SC		Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS *(50% or more passes the No. 200 sieve)*	Silts and Clays *(liquid limit less than 50)*	Inorganic	ML		Inorganic silts of low to medium plasticity, rock flour, sandy silts, gravelly silts, or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		Organic	OL		Organic silts and organic silty clays of low plasticity
	Silts and Clays *(liquid limit 50 or more)*	Inorganic	MH		Inorganic silts, micaceous or diatomaceous fine sands or silty soils, elastic silt
			CH		Inorganic clays of medium to high plasticity, sandy fat clay, or gravelly fat clay
		Organic	OH		Organic clays of medium to high plasticity, organic silts
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat, humus, swamp soils with high organic content (see ASTM D 4427)

NOTE: No. 4 size = 5 mm; No. 200 size = 0.075 mm

NOTES

1. Dual symbols *(symbols separated by a hyphen, i.e., SP-SM, slightly silty fine SAND)* are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.

2. Borderline symbols *(symbols separated by a slash, i.e., CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND)* indicate that the soil may fall into one of two possible basic groups.

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SOIL CLASSIFICATION AND LOG KEY

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FIG. A-1
Sheet 2 of 2

BORING_CLASS2 21-21232.GPJ SWNEW.GDT 10/26/12

Shannon & Wilson, Inc. (S&W), uses a soil classification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following page. Soil descriptions are based on visual-manual procedures (ASTM D 2488-93) unless otherwise noted.

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ABBREVIATIONS

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ID	Inside Diameter
in	inches
lbs	pounds
Mon.	Monument cover
N	Blows for last two 6-inch increments
NA	Not applicable or not available
NP	Non plastic
OD	Outside diameter
OVA	Organic vapor analyzer
PID	Photo-ionization detector
ppm	parts per million
PVC	Polyvinyl Chloride
SS	Split spoon sampler
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SOIL CLASSIFICATION AND LOG KEY

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FIG. A-1
Sheet 1 of 2

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(From USACE Tech Memo 3-357)

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SOIL CLASSIFICATION AND LOG KEY

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FIG. A-1
Sheet 2 of 2

BORING_CLASS2 21-21232.GPJ SWNEW.GDT 10/26/12

Total Depth:	31.5 ft	Northing:		Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*5 in.*
Top Elevation:	*~135 ft*	Easting:		Drilling Company:	*Holocene Drilling*	Rod Diam.:	*2-3/4-inch Steel*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*BK-81 Truck Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

Pavement. (0.3)

Very loose to medium dense, gray-brown, slightly gravelly to gravelly, silty SAND, trace of clay; moist; wet below 7 feet; locally trace of organics; (Hf) SM.

(12.0)

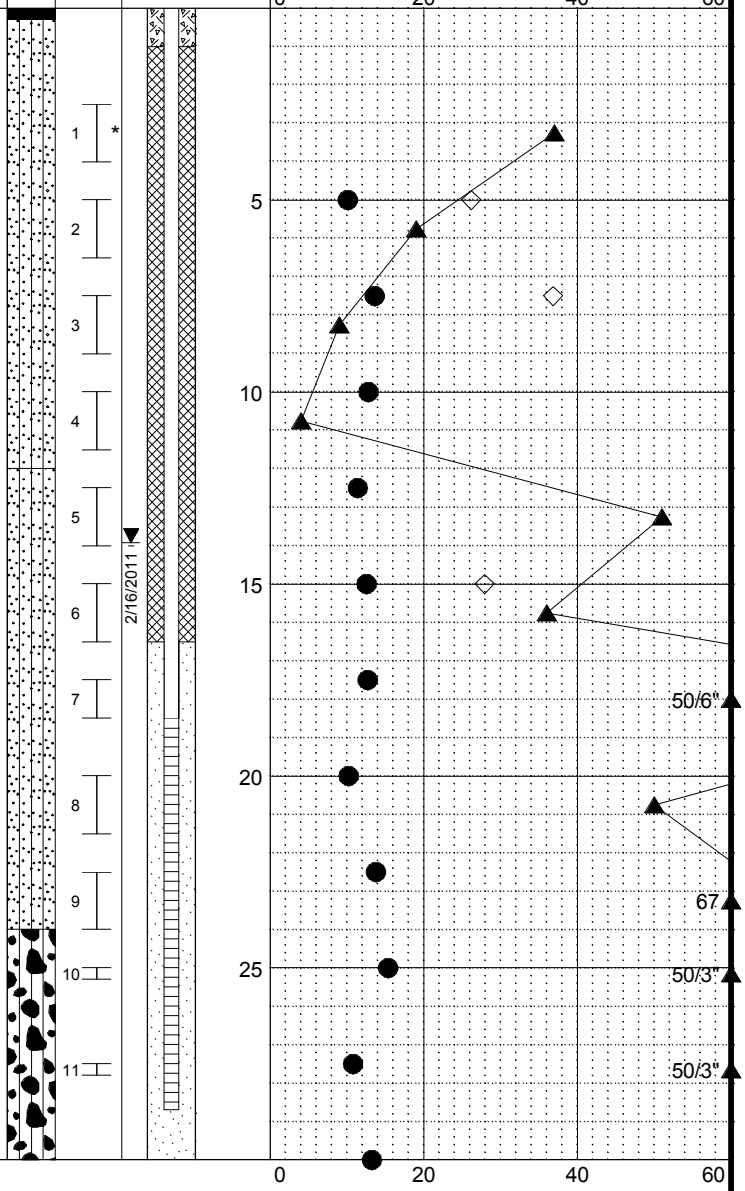
Dense to very dense, gray and brown, slightly gravelly to gravelly, silty SAND; wet; locally trace of clay, trace to scattered organics above 16 feet; (Qvat) SM.

- Slightly silty sand seams at 20 feet.

(24.0)

Very dense, brown and gray-brown, silty, sandy, fine GRAVEL to silty, fine gravelly SAND grading to slightly silty to silty, sandy GRAVEL; wet; (Qva) GM/GP-GM/SM.

CONTINUED NEXT SHEET



LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B1-11

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FIG. A-2
Sheet 1 of 2

Total Depth:	31.5 ft	Northing:	Drilling Method:	*Hollow Stem Auger*	Hole Diam.: *5 in.*
Top Elevation:	*~135 ft*	Easting:	Drilling Company:	*Holocene Drilling*	Rod Diam.: *2-3/4-inch Steel*
Vert. Datum:	*(NAVD88)*	Station:	Drill Rig Equipment:	*BK-81 Truck Rig*	Hammer Type: *Automatic*
Horiz. Datum:		Offset:	Other Comments:		

SOIL DESCRIPTION *Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.*	Depth, ft.	Symbol	Samples	Ground Water	Depth, ft.	PENETRATION RESISTANCE (blows/foot) ▲ Hammer Wt. & Drop: *140 lbs / 30 inches* 0 20 40 60
			12			79 ▲
BOTTOM OF BORING COMPLETED 1/17/2011	31.5					
					35	
					40	
					45	
					50	
					55	
						0 20 40 60

LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B1-11

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FIG. A-2
Sheet 2 of 2

Total Depth:	31.5 ft	Northing:		Drilling Method:	*Mud Rotary*	Hole Diam.:	
Top Elevation:	*~130 ft*	Easting:		Drilling Company:	*Boart Longyear*	Rod Diam.:	*Steel/3.5-inch O.D.*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Medium dense, brown and dark gray, silty, sandy GRAVEL and silty, gravelly SAND; moist to wet; scattered cobbles; (Hf) GM/SM.

Note: Layer description based on poor sample recovery.

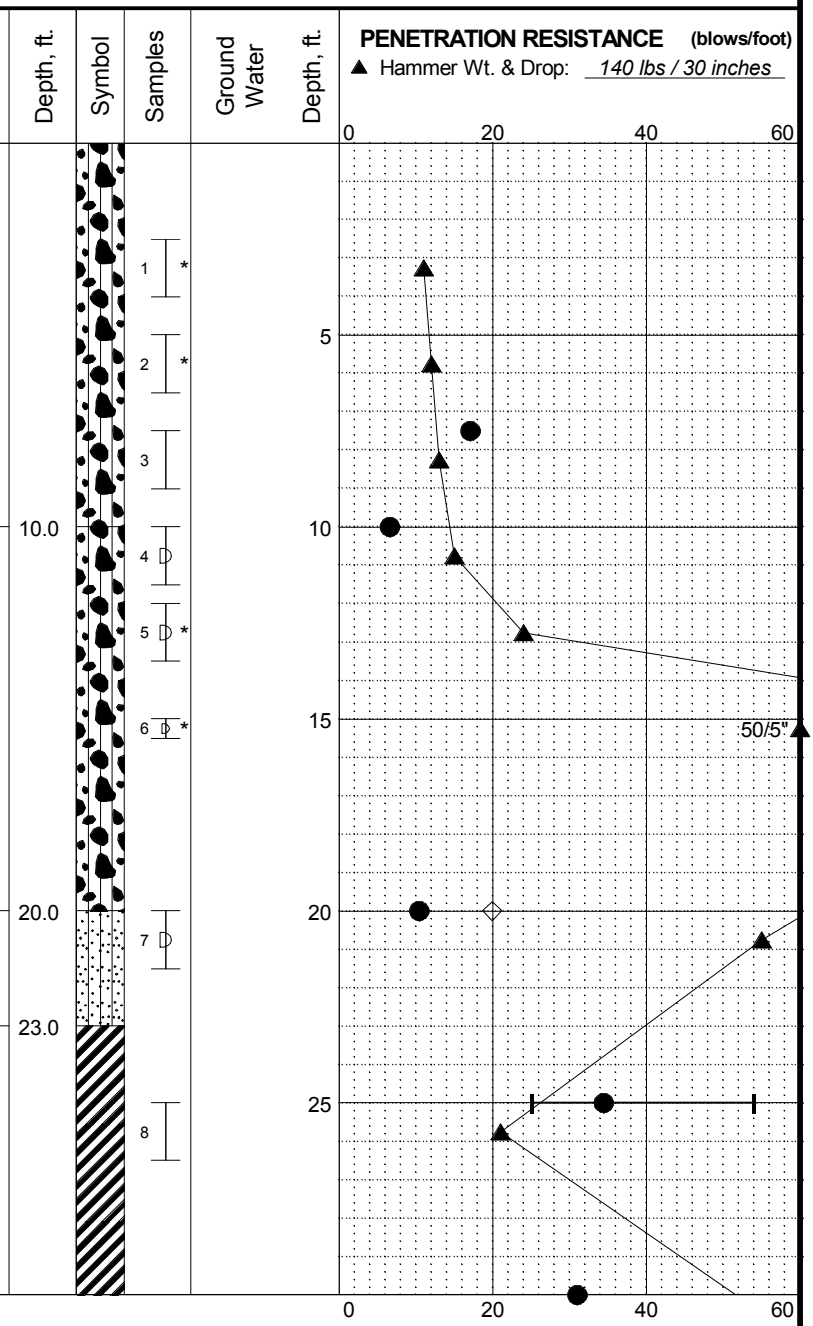
Medium dense, silty, sandy GRAVEL; moist; locally slightly clayey to clayey, scattered to numerous cobbles, scattered organics; (Hf) GM/GC.

Note: Layer description based on poor sample recovery. Blow counts may locally be artificially high due to the presence of gravel and cobbles.

Dense to very dense, gray, slightly gravelly, silty, fine to medium SAND; wet; scattered less than 1-inch-thick layers of fine sandy silt; (Qvro) SM.

Very stiff to hard, gray, silty CLAY; moist; diced, blocky, scattered slickensides, interbedded with slightly clayey silt below 30 feet; (Qpgl disturbed) CH.

CONTINUED NEXT SHEET



LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- 3.25" O.D. Split Spoon Sample

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B2-10

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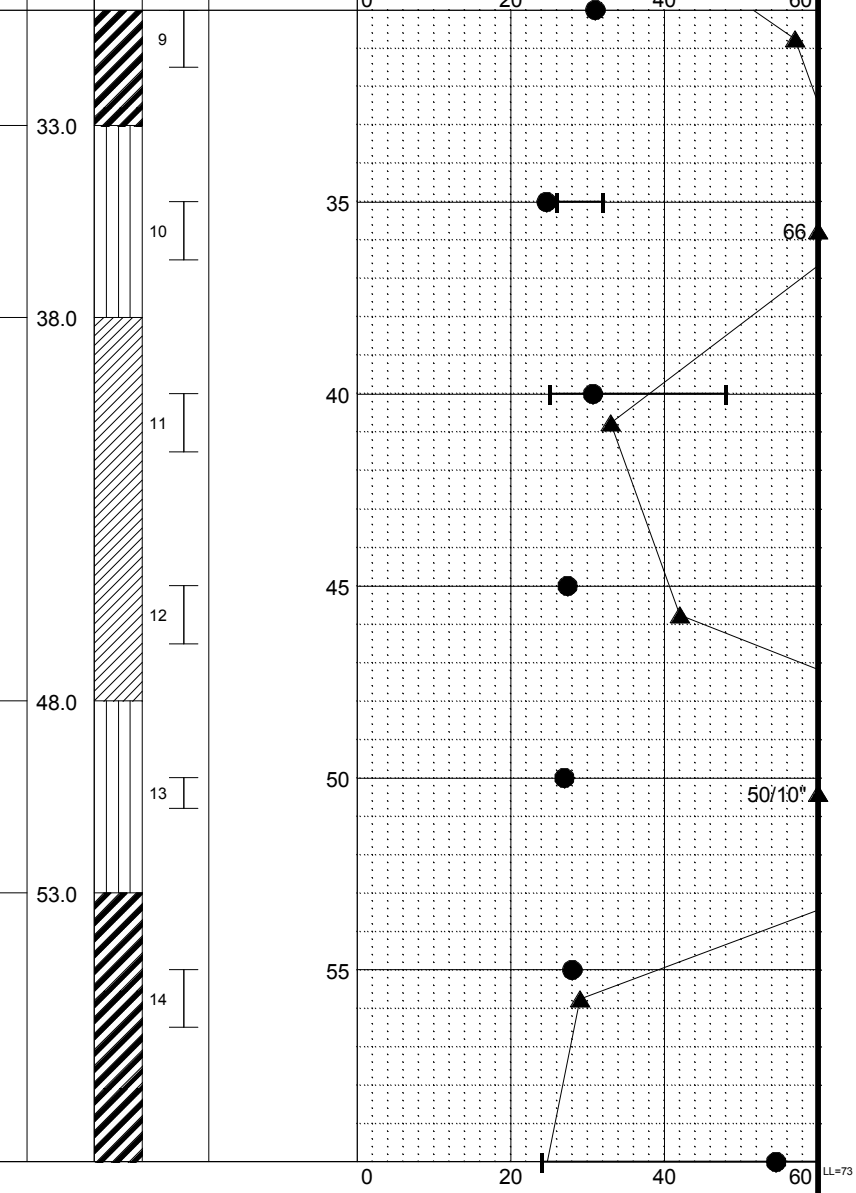
FIG. A-3
Sheet 1 of 3

Total Depth:	81.0 ft	Northing:	Drilling Method:	*Mud Rotary*	Hole Diam.:
Top Elevation:	*~130 ft*	Easting:	Drilling Company:	*Boart Longyear*	Rod Diam.: *Steel/3.5-inch O.D.*
Vert. Datum:	*(NAVD88)*	Station:	Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type: *Automatic*
Horiz. Datum:		Offset:	Other Comments:		

SOIL DESCRIPTION *Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.*	Depth, ft.
Hard, gray, trace of clay to slightly clayey SILT; moist; (Qpgl) ML.	33.0
Hard, gray, silty CLAY; moist; locally blocky and diced, trace slickensides; (Qpgl disturbed) CL.	38.0
Hard, gray, slightly clayey to clayey SILT; moist; (Qpgl) ML.	48.0
Very stiff to hard, silty CLAY; moist to wet; locally trace to scattered slickensides; (Qpgl) CH.	53.0

CONTINUED NEXT SHEET



LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- 3.25" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B2-10

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FIG. A-3
Sheet 2 of 3

Total Depth:	81.5 ft	Northing:	Drilling Method:	*Mud Rotary*	Hole Diam.:
Top Elevation:	*~130 ft*	Easting:	Drilling Company:	*Boart Longyear*	Rod Diam.: *Steel/3.5-inch O.D.*
Vert. Datum:	*(NAVD88)*	Station:	Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type: *Automatic*
Horiz. Datum:		Offset:	Other Comments:		

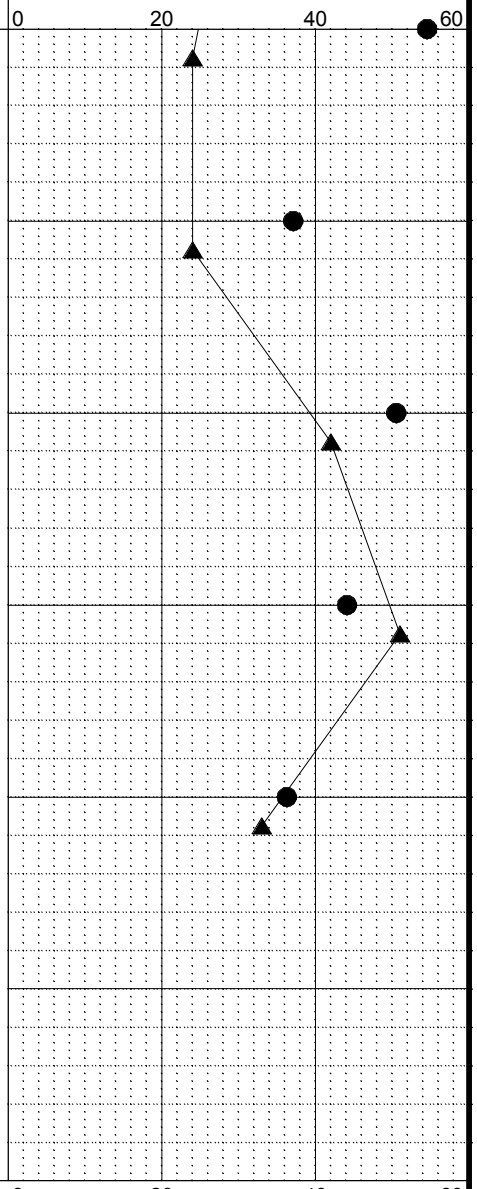
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



BOTTOM OF BORING
COMPLETED 10/20/2010

81.5

Note: Samples S-4, S-5, S-7, and S-7 driven using a 3.5-inch outside diameter split-spoon and a 140-pound hammer.

LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- 3.25" O.D. Split Spoon Sample

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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FIG. A-3
Sheet 3 of 3

Total Depth:	101.5 ft	Northing:	Drilling Method:	*Mud Rotary*	Hole Diam.:
Top Elevation:	*~130 ft*	Easting:	Drilling Company:	*Boart Longyear*	Rod Diam.: *3.5-inch O.D./Steel*
Vert. Datum:	*(NAVD88)*	Station:	Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type: *Automatic*
Horiz. Datum:		Offset:	Other Comments:		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Hard, brown, slightly sandy, slightly gravelly to gravelly, slightly clayey to clayey SILT; moist; (Hf) ML.

4.5

Medium dense, brown, slightly gravelly, silty, fine to medium SAND; moist; (Hf) SM.

7.0

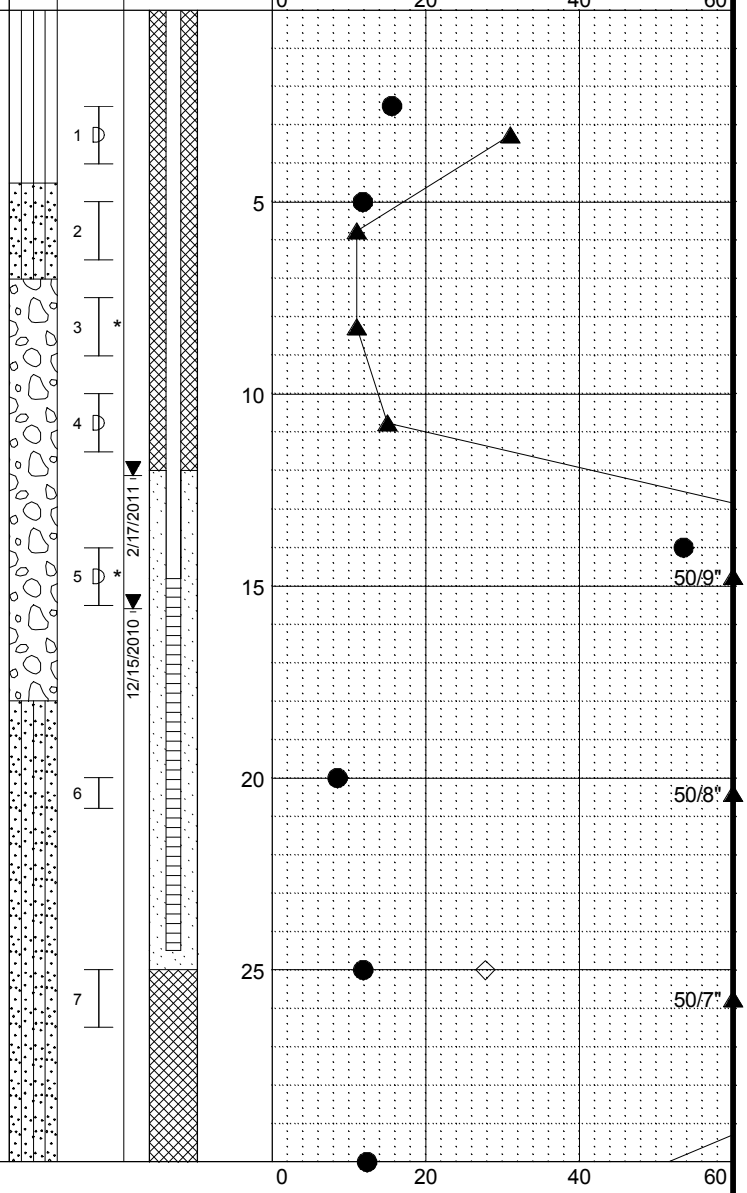
Medium dense, gray-brown, slightly silty to silty, sandy GRAVEL; moist to wet; scattered to numerous cobbles; (Hf) GP/GP-GM.

Note: Layer description based on poor sample recovery. Blow counts may locally be artificially high due to the presence of gravel and cobbles.

18.0

Dense to very dense, tan-gray, slightly gravelly to gravelly, slightly silty to silty, fine SAND; wet; interbedded with layers of fine sandy silt below 25 feet; (Qvro) SM.

CONTINUED NEXT SHEET



LEGEND

- * Sample Not Recovered
- 3.25" O.D. Split Spoon Sample
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ├─●─┤ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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FIG. A-4
Sheet 1 of 4

Total Depth:	101.5 ft	Northing:		Drilling Method:	*Mud Rotary*	Hole Diam.:	
Top Elevation:	*~130 ft*	Easting:		Drilling Company:	*Boart Longyear*	Rod Diam.:	*3.5-inch O.D./Steel*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Description	Depth, ft.
Hard, gray, silty CLAY, trace of gravel; moist; diced, blocky, scattered slickensides, scattered sand partings and silt zones; (Qpgl disturbed) CL.	30.4
Hard, gray, slightly clayey to clayey SILT, trace of fine sand; moist; (Qpgl) ML.	38.0
Hard, gray, slightly silty CLAY, trace of gravel; wet; diced, blocky; (Qpgl disturbed) CH.	43.0
Hard, gray, silty CLAY; moist; possible gravel and/or cobbles based on drill action; (Qpgl) CH/CL.	53.0
	59.0

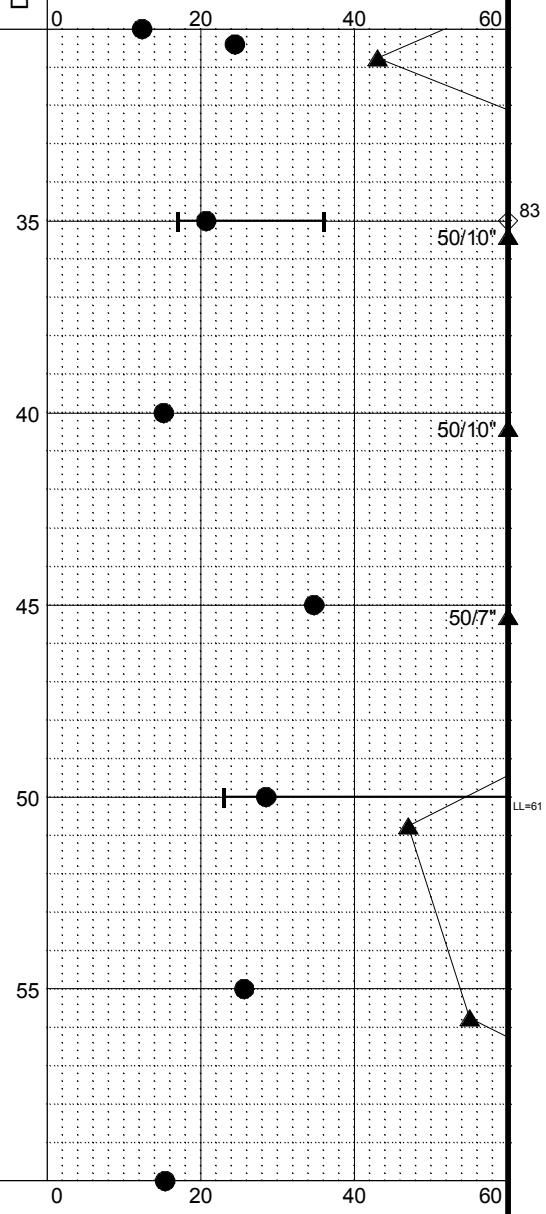
CONTINUED NEXT SHEET

Samples: 8, 9, 10, 11, 12, 13

Ground Water

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

- * Sample Not Recovered
- 3.25" O.D. Split Spoon Sample
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well
- ◇ % Fines (<0.075mm)
- ● % Water Content
- Plastic Limit ├─●─┤ Liquid Limit
- Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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FIG. A-4
Sheet 2 of 4

Total Depth:	101.5 ft	Northing:	Drilling Method:	*Mud Rotary*	Hole Diam.:
Top Elevation:	*~130 ft*	Easting:	Drilling Company:	*Boart Longyear*	Rod Diam.: *3.5-inch O.D./Steel*
Vert. Datum:	*(NAVD88)*	Station:	Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type: *Automatic*
Horiz. Datum:		Offset:	Other Comments:		

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Hard, gray, slightly fine sandy, clayey SILT; moist; (Qpgl) ML.

63.0

Hard, gray, silty CLAY, trace of fine sand; moist; locally slightly sandy; (Qpgl) CH/CL.

73.0

Hard, gray, slightly clayey SILT, trace of fine sand; moist; (Qpgl) ML.

78.0

Very dense, gray, fine sandy SILT, trace of clay; moist; locally slightly clayey; (Qpgl) ML.

87.0

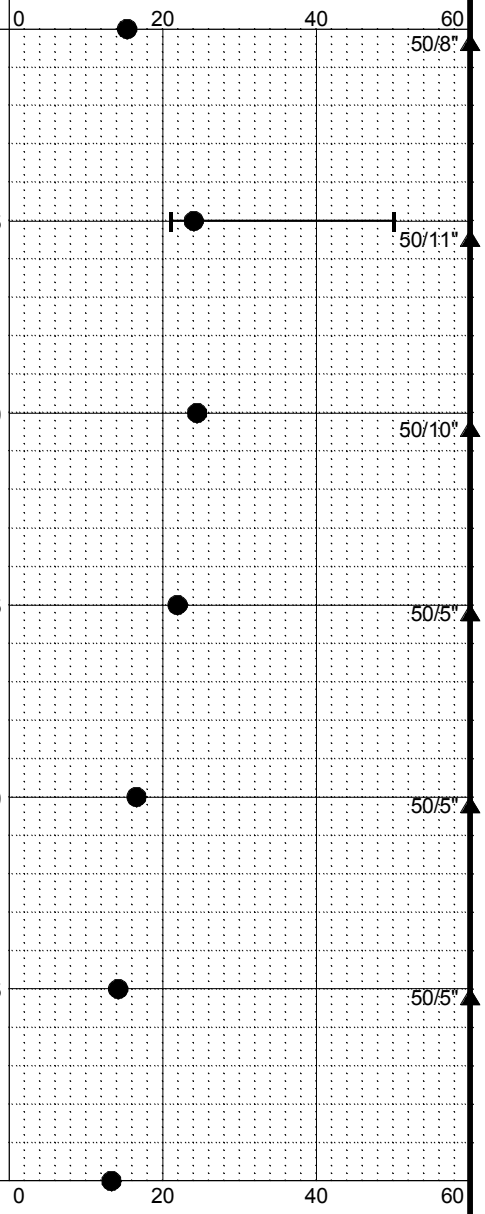
Hard, gray, slightly clayey SILT, trace of fine sand; moist; (Qpgl) ML.

CONTINUED NEXT SHEET

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



LEGEND

- * Sample Not Recovered
- 3.25" O.D. Split Spoon Sample
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B3-10

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FIG. A-4
Sheet 3 of 4

MASTER_LOG_E_21-21232.GPJ SHAN_WIL.GDT 10/26/12 Log: CWY Rev: BZH Typ: LKN

Total Depth:	101.5 ft	Northing:		Drilling Method:	*Mud Rotary*	Hole Diam.:	
Top Elevation:	*~130 ft*	Easting:		Drilling Company:	*Boart Longyear*	Rod Diam.:	*3.5-inch O.D./Steel*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*CME 850 Track Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

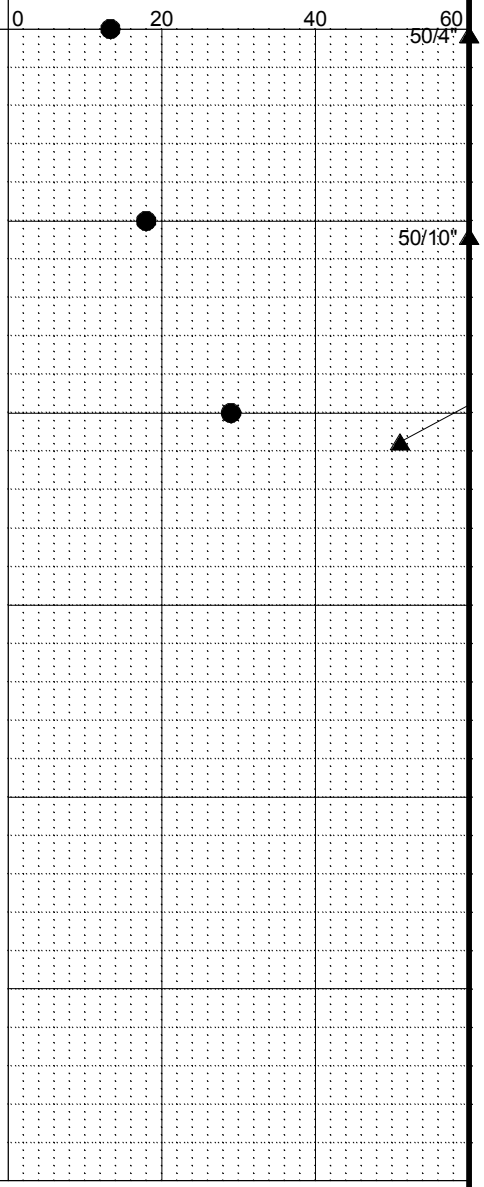
SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



Hard, gray, silty CLAY; moist; sheared, blocky, scattered slickensides; (Qpgl disturbed) CL.

98.0

101.5

BOTTOM OF BORING
COMPLETED 10/22/2010

Note: Samples S-1, S-4, and S-5 driven using a 3.5-inch outside diameter split-spoon and a 140-pound hammer.

LEGEND

- * Sample Not Recovered
- 3.25" O.D. Split Spoon Sample
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well

◇ % Fines (<0.075mm)
● % Water Content
Plastic Limit ├─●─┤ Liquid Limit
Natural Water Content

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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FIG. A-4
Sheet 4 of 4

Total Depth:	20.5 ft	Northing:		Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*5 in.*
Top Elevation:	*~138 ft*	Easting:		Drilling Company:	*Holocene Drilling*	Rod Diam.:	*2-3/4-inch Steel*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*BK-81 Truck Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

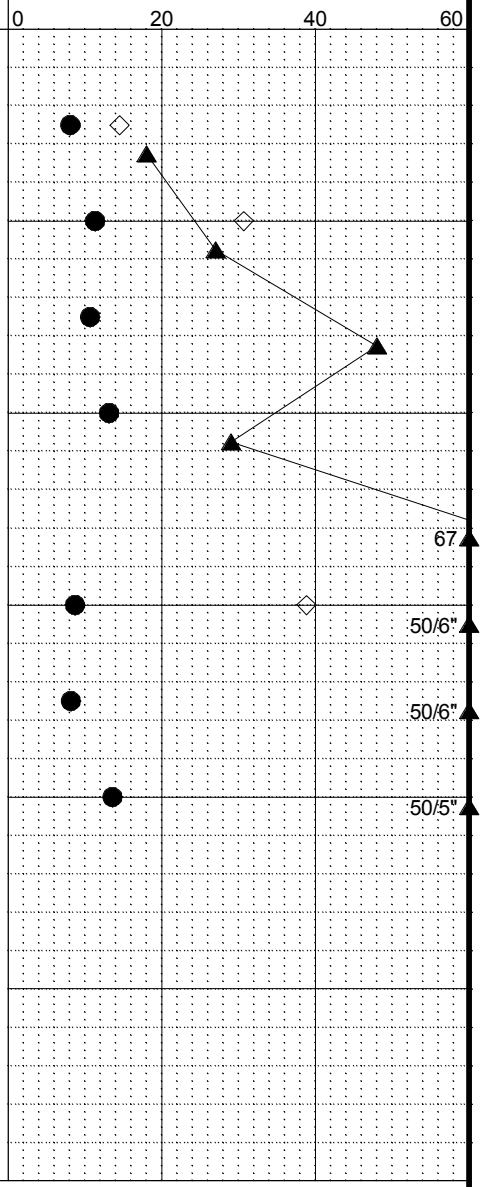
Description	Depth, ft.
Pavement.	0.3
Medium dense, red-brown, silty, fine gravelly SAND; moist; trace of organics; (Hf) SM.	4.5
Medium dense to very dense, brown, slightly gravelly to gravelly, silty SAND; moist; (Qvat) SM.	14.5
Very dense, gray, slightly gravelly to gravelly, silty SAND to sandy SILT; moist; (Qvt) SM/ML.	20.5
BOTTOM OF BORING COMPLETED 1/17/2011	

Samples: 1, 2, 3, 4, 5, 6, 7, 8

Ground Water: 2/16/2011

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*



◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B4-11

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FIG. A-5

MASTER_LOG_E_21-21232.GPJ SHAN_WIL.GDT 10/26/12 Log: CWY Rev: PHZ Typ: LKN

Total Depth:	21.5 ft	Northing:		Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*5 in.*
Top Elevation:	*~137 ft*	Easting:		Drilling Company:	*Holocene Drilling*	Rod Diam.:	*2-3/4-inch Steel*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*BK-81 Truck Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

SOIL DESCRIPTION

Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.

Depth, ft. | Symbol | Samples | Ground Water | Depth, ft.

PENETRATION RESISTANCE (blows/foot)

▲ Hammer Wt. & Drop: *140 lbs / 30 inches*

Pavement. (0.3)

Medium dense to dense, brown-gray, silty, sandy GRAVEL to silty, gravelly SAND; moist; mixed with pockets and clasts of blue-gray, slightly clayey to clayey silt; (Hf) GM/SM.

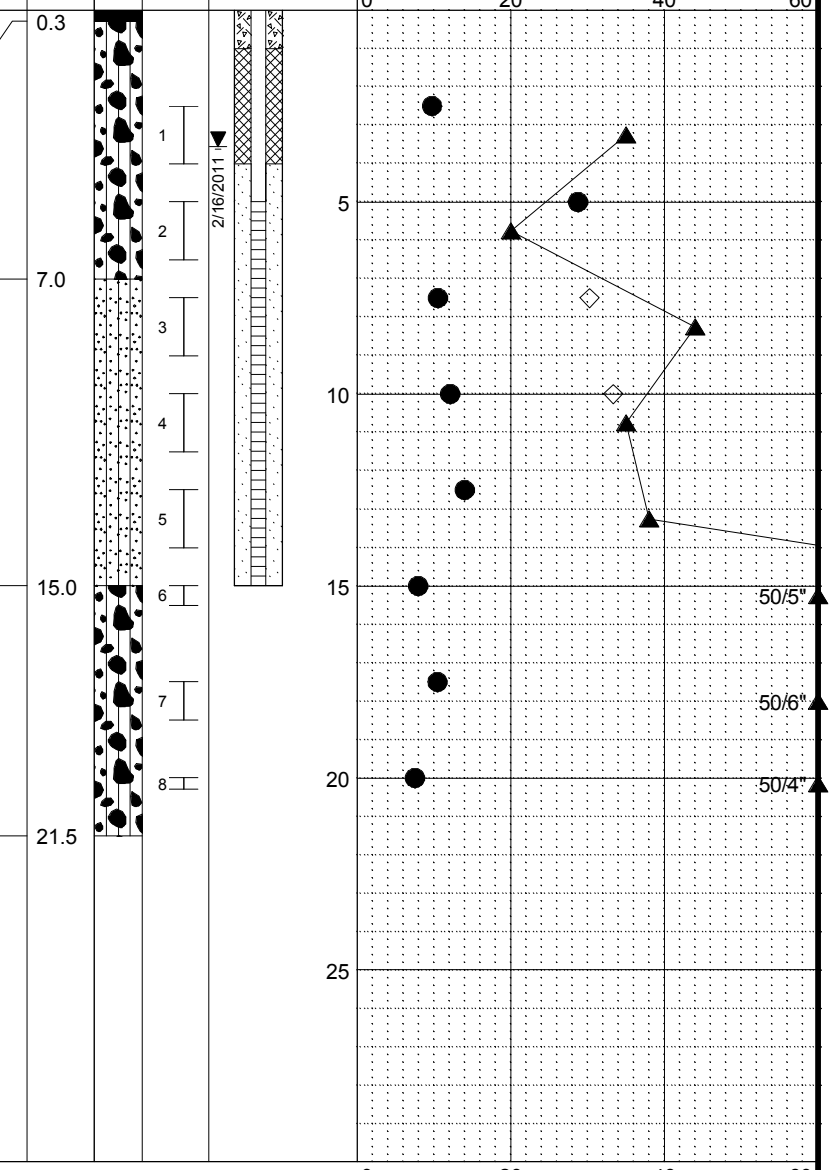
Dense, brown, gravelly, silty SAND; wet; locally trace of clay; (Qvat) SM. (7.0)

Very dense, brown and gray, silty, sandy GRAVEL to slightly gravelly, silty, fine SAND; moist; (Qvt) GM/SM. (15.0)

BOTTOM OF BORING (21.5)
COMPLETED 1/17/2011

Notes:
(1) Sample S-8 had no recovery following the initial drive. Sample was retrieved using a 3-inch outside-diameter (O.D.) split-spoon sampler driven to a depth of 21.5 feet using the 140-pound hammer. Blow counts shown on the

CONTINUED NEXT SHEET



◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B5-11

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FIG. A-6
Sheet 1 of 2

MASTER_LOG_E_21-21232.GPJ SHAN_WIL.GDT 10/26/12 Log: CWY Rev: PHZ Typ: LKN

Total Depth:	21 ft.	Northing:		Drilling Method:	*Hollow Stem Auger*	Hole Diam.:	*5 in.*
Top Elevation:	*~137 ft.*	Easting:		Drilling Company:	*Holocene Drilling*	Rod Diam.:	*2-3/4-inch Steel*
Vert. Datum:	*(NAVD88)*	Station:		Drill Rig Equipment:	*BK-81 Truck Rig*	Hammer Type:	*Automatic*
Horiz. Datum:		Offset:		Other Comments:			

SOIL DESCRIPTION *Refer to the report text for a proper understanding of the subsurface materials and drilling methods. The stratification lines indicated below represent the approximate boundaries between material types, and the transition may be gradual.*	Depth, ft.	Symbol	Samples	Ground Water	Depth, ft.	PENETRATION RESISTANCE (blows/foot) ▲ Hammer Wt. & Drop: *140 lbs / 30 inches* 0 20 40 60
log are from the intial drive performed using the standard sampler. (2) Sampled borehole was inadvertantly overfilled with bentonite chips during well installation. Consequently, the well was installed in a new borehole (15 feet deep) drilled 5 feet away from sampled borehole.					35 40 45 50 55	

0 20 40 60

◇ % Fines (<0.075mm)
● % Water Content

LEGEND

- * Sample Not Recovered
- Standard Penetration Test
- Piezometer Screen and Sand Filter
- Bentonite-Cement Grout
- Bentonite Chips/Pellets
- Bentonite Grout
- Ground Water Level in Well

NOTES

1. Refer to KEY for explanation of symbols, codes, abbreviations and definitions.
2. Groundwater level, if indicated above, is for the date specified and may vary.
3. USCS designation is based on visual-manual classification and selected lab testing.

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LOG OF BORING SW-B5-11

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FIG. A-6
Sheet 2 of 2

APPENDIX B

GEOTECHNICAL LABORATORY TESTING PROCEDURES AND RESULTS

APPENDIX B

GEOTECHNICAL LABORATORY TESTING PROCEDURES AND RESULTS

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B.2 VISUAL CLASSIFICATION B-1

B.3 WATER CONTENT DETERMINATION B-1

B.4 ATTERBERG LIMITS B-1

B.5 GRAIN SIZE DISTRIBUTION B-2

B.6 REFERENCE B-2

FIGURES

B-1 Plasticity Chart
B-2 Grain Size Distribution (2 sheets)

APPENDIX B

GEOTECHNICAL LABORATORY TESTING PROCEDURES AND RESULTS

B.1 INTRODUCTION

During the explorations, samples collected from the borings were sealed in jars and returned to our Seattle, Washington, laboratory for testing. Selected samples were tested to evaluate the basic index properties and the engineering characteristics of the subsurface soils at the site. Geotechnical laboratory testing included visual classification, water content, Atterberg limits, and grain size distribution tests. Tests were conducted in general accordance with applicable ASTM International (ASTM) standards.

B.2 VISUAL CLASSIFICATION

Soil samples recovered from the borings were visually reclassified in our laboratory using a system based on ASTM Designation: D 2487, Standard Practice for Classification of Soil for Engineering Purposes (Unified Soil Classification System), and ASTM Designation: D 2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 2011). This visual classification method allows for convenient and consistent comparison of soils from widespread geographic areas. The individual sample classifications for the soil have been incorporated into the boring logs presented in Appendix A.

B.3 WATER CONTENT DETERMINATION

The natural water content of soil samples recovered from the field explorations was determined in general accordance with ASTM Designation D: 2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass. Comparison of water content of a soil with its index properties can be useful in characterizing soil unit weight, consistency, compressibility, and strength. Water content is plotted on each of the boring logs presented in Appendix A.

B.4 ATTERBERG LIMITS

Seven Atterberg Limits tests were performed on samples of fine-grained soil obtained from borings BH-2 and BH-3 in general accordance with ASTM Designation: D 4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. The Atterberg Limits include Liquid Limit (LL), Plastic Limit (PL), and Plasticity Index (PI=LL-PL). They are

generally used to assist in classification of soil, indicate soil consistency (when compared with natural water content), and provide correlation to soil properties including compressibility and strength.

Results of the Atterberg Limits test are presented in the Plasticity Chart, Figure B-1, and graphically on the BH-2 and BH-3 boring logs (Figures A-2 and A-3, respectively).

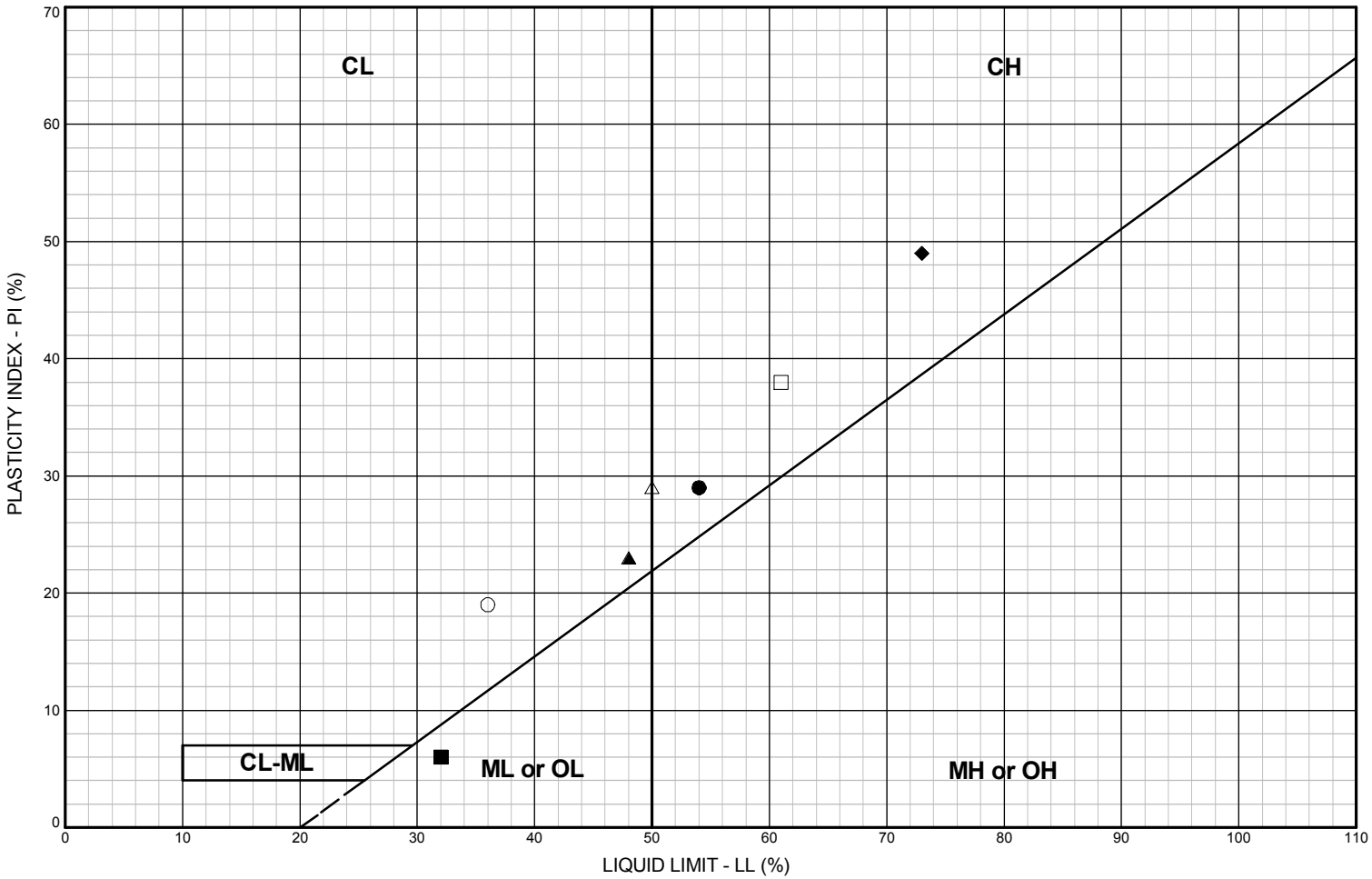
B.5 GRAIN SIZE DISTRIBUTION

Grain size analyses were performed on selected samples of granular soils in general accordance with ASTM Designation: D 422, Standard Test Method for Particle-Size Analysis of Soils, and ASTM Designation: D 1140, Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve (75 micrometers). Grain size distribution is used to assist in classifying soils and to provide correlation with soil properties, including permeability, capillarity, susceptibility to liquefaction, and sensitivity to moisture.

Grain size analysis results are plotted as grain size distribution curves in Figure B-2. The fines contents (percentage of soil grains finer than the No. 200 sieve, ASTM D 1140) of samples tested are presented in the boring logs in Appendix A.

B.6 REFERENCE

ASTM International, 2011, 2011 Annual Book of ASTM Standards, Construction, v. 04.08, Soil and Rock (I): D 420 - D 5876: West Conshohocken, Pa.



LEGEND

CL: Low plasticity inorganic clays; sandy and silty clays

CH: High plasticity inorganic clays

ML: Inorganic silts and clayey silts of low plasticity

MH: Inorganic silts and clayey silts of high plasticity

CL-ML: Silty clays and clayey silts

OL: Organic silts and clays of low plasticity

OH: Organic silts and clays of high plasticity

LL: Liquid limit

PL: Plastic limit

PI: Plasticity index; PI=LL-PL

NP: Nonplastic

BORING AND SAMPLE NO.	DEPTH (feet)	U.S.C.S. SYMBOL	SOIL CLASSIFICATION	LL %	PL %	PI %	NAT. W.C. %	PASS. #200,%	TEST BY	CKD BY	ASTM STD
● SW-B2-10, S-8	25.0	CH	Gray, silty CLAY, trace of sand	54	25	29	34.4		EJK	JFL	
■ SW-B2-10, S-10	35.0	ML	Gray, slightly clayey SILT, trace of sand	32	26	6	24.6		JFL	JFL	
▲ SW-B2-10, S-11	40.0	CL	Gray, silty CLAY, trace of sand	48	25	23	30.7		JFL	JFL	
◆ SW-B2-10, S-15	60.0	CH	Gray, silty CLAY, trace of sand	73	24	49	54.5		JFL	JFL	
○ SW-B3-10, S-9	35.0	CL	Gray, sandy, silty CLAY	36	17	19	20.7	83.0	AKV	JFL	
□ SW-B3-10, S-12	50.0	CH	Gray, silty CLAY, trace of sand	61	23	38	28.5		AKV	JFL	
△ SW-B3-10, S-15	65.0	CH	Light gray, silty CLAY, trace of sand	50	21	29	24.0		AFW	JFL	

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PLASTICITY CHART

October 2012 21-1-21232-002

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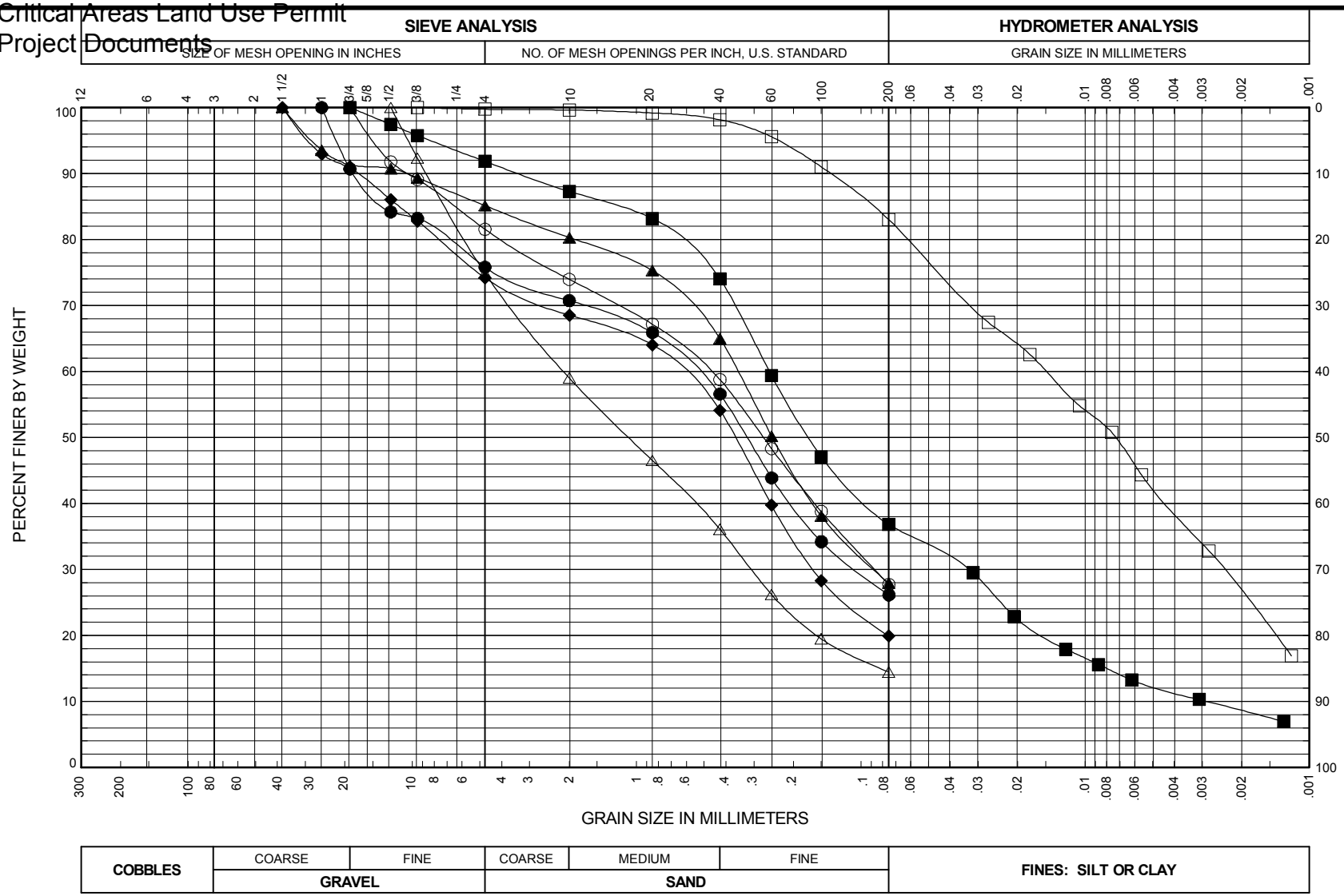
FIG. B-1
Sheet 1 of 1

FIG. B-1

AASHTO_ATT_MAIN 21-21232.GPJ SHAN_WIL.GDT 10/26/12



BORING AND SAMPLE NO.	DEPTH (feet)	U.S.C.S. SYMBOL	SOIL CLASSIFICATION	COBBLE %	GRAVEL %	SAND %	FINES %	NAT. W.C. %	TEST BY	REVIEW BY	ASTM STD
● SW-B1-11, S-2*	5.0	SM	Brown, gravelly, silty SAND; trace of organics		24	50	26.1	10.1	EJK	JFL	D422
■ SW-B1-11, S-3*	7.5	SM	Gray, slightly fine gravelly, silty SAND, trace of clay		8	55	36.8	13.6	EJK	JFL	D422
▲ SW-B1-11, S-6*	15.0	SM	Gray-brown, gravelly, silty SAND; trace of organics		15	57	27.9	12.5	EJK	JFL	D422
◆ SW-B2-10, S-7*	20.0	SM	Gray, silty, gravelly SAND		26	54	19.9	10.4	EJK	JFL	D422
○ SW-B3-10, S-7*	25.0	SM	Gray, gravelly, silty SAND		18	54	27.7	11.8	EJK	JFL	D422
□ SW-B3-10, S-9	35.0	CL	Gray, sandy, silty CLAY		0	17	83.0	20.7	JSL	JFL	D422
△ SW-B4-11, S-1*	2.5	SM	Brown, silty, fine gravelly SAND; trace of organics		25	60	14.5	8.1	EJK	JFL	D422

** Sample specimen weight did not meet required minimum mass for ASTM test method.*

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GRAIN SIZE DISTRIBUTION

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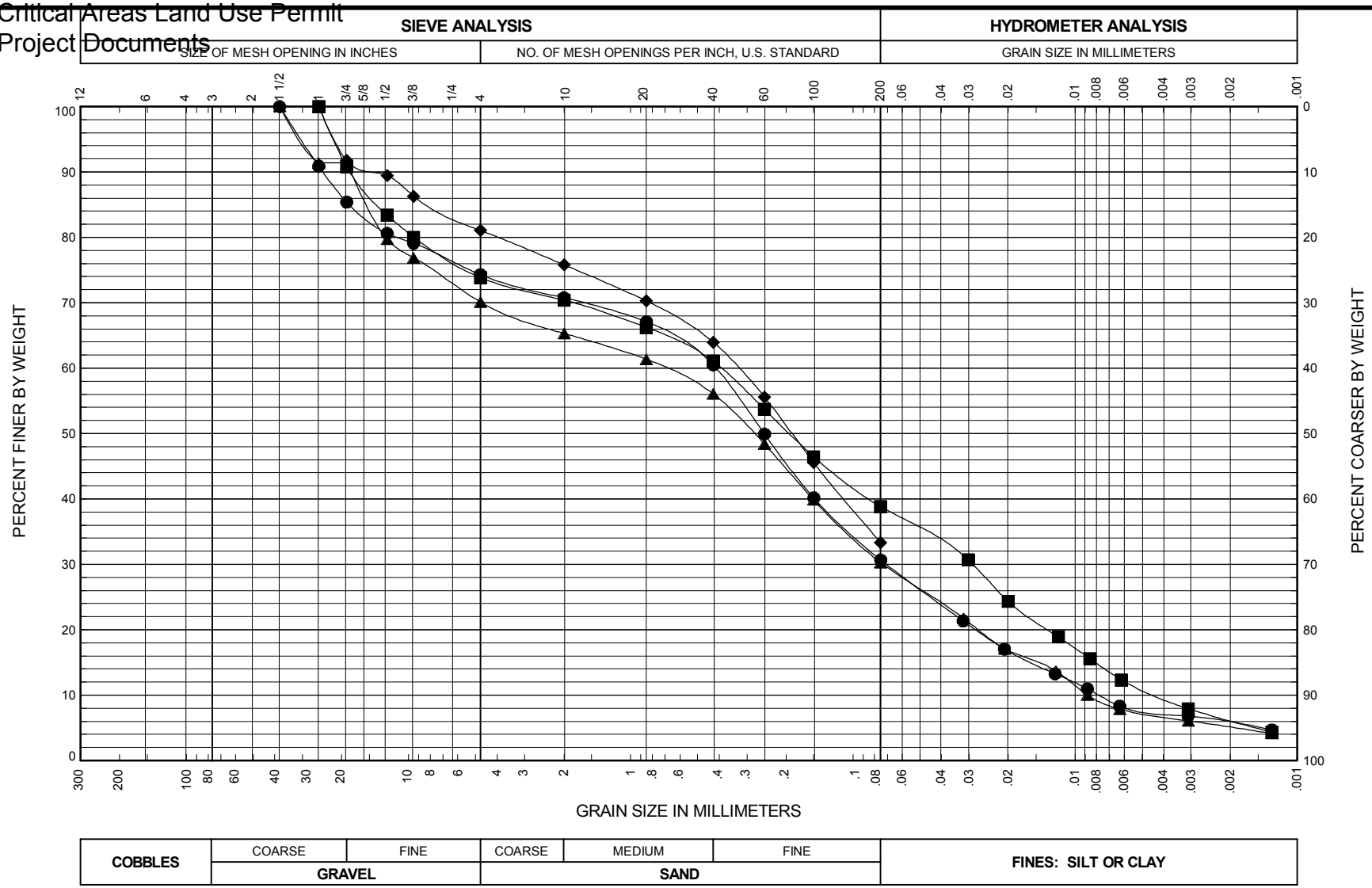
FIG. B-2
Sheet 1 of 2

FIG. B-2

AASHTO GSA MAIN 21-21232.GPJ SHAN WIL.GDT 10/26/12



BORING AND SAMPLE NO.	DEPTH (feet)	U.S.C.S. SYMBOL	SOIL CLASSIFICATION	COBBLE %	GRAVEL %	SAND %	FINES %	NAT. W.C. %	TEST BY	REVIEW BY	ASTM STD
● SW-B4-11, S-2*	5.0	SM	Brown, gravelly, silty SAND		26	44	30.7	11.3	EJK	JFL	D422
■ SW-B4-11, S-6*	15.0	SM	Brown, gravelly, silty SAND		26	35	38.8	8.7	EJK	JFL	D422
▲ SW-B5-11, S-3*	7.5	SM	Brown, gravelly, silty SAND, trace of clay		30	40	30.3	10.5	EJK	JFL	D422
◆ SW-B5-11, S-4*	10.0	SM	Brown, gravelly, silty SAND; trace of organics		19	48	33.3	12.1	EJK	JFL	D422

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GRAIN SIZE DISTRIBUTION

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FIG. B-2
Sheet 2 of 2

** Sample specimen weight did not meet required minimum mass for ASTM test method.*

FIG. B-2

AASHTO GSA MAIN 21-21232.GPJ SHAN WIL.GDT 10/26/12

APPENDIX C

SUBSURFACE EXPLORATIONS BY OTHERS

APPENDIX C

SUBSURFACE EXPLORATIONS BY OTHERS

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C.1 PREVIOUS EXPLORATIONS C-1

C.2 LABORATORY TEST RESULTS C-1

C.3 GROUNDWATER OBSERVATIONS C-1

C.4 BORING DESIGNATIONS C-2

C.5 REFERENCES C-2

BORINGS

Boring Log ES-B2-06 (2 sheets)
Boring Log ES-B3-06 (2 sheets)
Boring Log ES-B4-06 (2 sheets)
Boring Log ES-B5-06 (3 sheets)
Boring Log ES-B6-06 (3 sheets)
Boring Log ES-B7-06 (2 sheets)
Boring Log ES-B8-06 (2 sheets)
Boring Log ES-B10-06 (2 sheets)
Boring Log ES-B11-06 (3 sheets)
Boring Log ES-B12-06 (3 sheets)
Boring Log ES-B101-09 (2 sheets)
Boring Log ES-B102-09 (2 sheets)
Grain Size Distributions (for Earth Solutions NW borings) (4 sheets)
Atterberg Limits Results (for Earth Solutions NW borings)
Boring Log G-B1-94
Boring Log G-B2-94
Boring Log G-B3-94
Boring Log G-B4-94
Boring Log G-B5-94
Boring Log G-B6-94
Boring Log G-B7-94
Boring Log G-B8-94

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BORINGS (cont.)

Boring Log HB-B1-01
Boring Log HB-B2-01
Boring Log HB-B3-01
Boring Log HB-B4-01
Boring Log HB-B5-01
Boring Log HB-B6-01
Boring Log HB-B7-01
Boring Log HB-B8-01
Boring Log HB-B9-01
Particle Size Distribution Test Report (for Hart Crowser, Inc. borings)

APPENDIX C

SUBSURFACE EXPLORATIONS BY OTHERS

C.1 PREVIOUS EXPLORATIONS

We collected and reviewed subsurface explorations previously completed by others for the following properties:

- K.G. Investors property for a proposed mixed-use development (Earth Solutions NW, LLC, 2009);
- Best Buy (Hart Crowser, 2001); and
- Home Depot (GeoEngineers, 1994).

Figure 2 presents the approximate locations of the previous explorations that we used in our interpretation of the subsurface conditions. Figure 3 presents Standard Penetration Test N-values and groundwater observations from selected existing boring logs. Boring logs for the previous explorations that we used in our interpretation of the subsurface conditions are included in this appendix for reference. The original reports should be referred to for discussion of exploration methods and boring log interpretation.

C.2 LABORATORY TEST RESULTS

Selected laboratory test results for samples obtained from the previous explorations that were presented in the referenced geotechnical reports are included in this appendix for reference. The original reports should be referred to for discussion of laboratory test methods and use of the results.

C.3 GROUNDWATER OBSERVATIONS

Groundwater observation wells were installed in borings ES-B6-06, ES-B8-06, and ES-B11-06 at the time they were completed (Earth Solutions NW, 2009). We developed these wells on February 9 and 10, 2011. We measured groundwater levels in these wells on February 17, 2011. These groundwater levels are indicated in Figures 2 and 3.

Where groundwater observations made during drilling are indicated on boring logs of the previously performed explorations, these groundwater levels are indicated on boring logs included in Figure 3.

C.4 BORING DESIGNATIONS

For the purposes of this report and to reduce confusion when referring to borings with similar designations but performed for different projects, we have adopted a naming convention for boring designations and have modified the boring designations for borings performed by others. The boring designation convention we have adopted is as follows:

- The first one or two letters of the boring designation are an abbreviation of the name of the firm that prepared the boring log: ES indicates Earth Solutions, Inc., HC indicates Hart Crowser, Inc., and G indicates GeoEngineers, Inc.
- The next letter, B, indicates "boring." The B is followed by numbers that correspond to the boring number originally assigned to the boring by the firm that prepared the boring log.
- The last number of the boring log indicates the year in which the boring was completed.

On each boring log for borings by others included in this appendix, we have added our modified boring designation next to the original boring designation. Where we have included in this appendix laboratory test results for laboratory tests performed on samples retrieved from the previously performed borings, we did not indicate the modified boring designation.

C.5 REFERENCES

Earth Solutions NW, LLC, 2009, Updated geotechnical engineering study, proposed mixed-use development, Bellevue, Washington: Report prepared by Earth Solutions NW, LLC, Redmond Wash., for KG Investment Management, job no. ES-0415.02, September.

GeoEngineers, 1994, Boring nos. B-1 to B-8, for the 300 120th Avenue (Home Depot) project: Boring collected from GeoMapNW at the University of Washington, available: http://geomapnw.ess.washington.edu/index.php.

Hart Crowser, 2001, Geotechnical engineering design study, Best Buy retail development, Bellevue, Washington: Report prepared by Hart Crowser, Seattle, Wash., for Mulvanny Architects, job no. 7498, June.

11-115214-LO
Street Extension
Areas Land Use Permit
Documents

Earth Solutions NW
2881 152nd Avenue N.E.
Redmond, Washington 98052
Telephone: 425-284-3300
Fax: 425-284-2855

ES-B102-09

BORING NUMBER B-102

CLIENT KG Investment Mangement
PROJECT NAME 116th Avenue N.E. Site
PROJECT NUMBER 0415.02
PROJECT LOCATION Bellevue, Washington
DATE STARTED 7/8/09 **COMPLETED** 7/8/09
GROUND ELEVATION 95 ft **HOLE SIZE**
DRILLING CONTRACTOR Boretec
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** SSR
AT END OF DRILLING —
NOTES 4" Asphalt
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							Brown silty SAND with gravel, medium dense, moist
	SS	100	5-9-17 (26)	MC = 11.70%	SM		-sand layers
5							5.0 — 90.0
	SS	100	9-11-13 (24)	MC = 13.90% Fines = 15.00%	SM		Brown silty SAND, medium dense, wet
	SS	100	50/5"				-no sample recovery - possible obstruction
10							
	SS	100	50/5"				-no sample recovery - trace gravels
15							
	SS	100	50/5"	MC = 11.20%			
20							20.0 — 75.0

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ES-B102-09

BORING NUMBER B-102

CLIENT KG Investment Mangement
PROJECT NAME 116th Avenue N.E. Site
PROJECT NUMBER 0415.02
PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20	SS	100	50		SM		Brown silty SAND with gravel, very dense, wet -no sample recovery - large gravel in sampler tip -seepage
25	SS	100	32-50/5"	MC = 10.60%	SM		Gray silty SAND with gravel, very dense, moist

25.0 — 70.0

26.0 — 69.0

Boring terminated at 26.0 feet below existing grade. Groundwater seepage encountered at 24.5 during drilling. Boring backfilled with bentonite.

Bottom of hole at 26.0 feet.

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ES-B1-06

BORING NUMBER B-1

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/18/06 **COMPLETED** 4/18/06
GROUND ELEVATION 81 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING --
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING --
NOTES 3" Asphalt Pavement
AFTER DRILLING --

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							Brown silty SAND with gravel, loose, wet
	SS	100	2-3-16 (19)	MC = 17.50%	SM		-becomes medium dense
5							5.0 — 76.0 Brown brown silty SAND with gravel, medium dense, wet
	SS	100	21-50/5"	MC = 10.80% Fines = 33.70%			-sand layer -becomes very dense
10							
	SS	100	50	MC = 13.40%	SM		-sand layer
15							
	SS	100	39-50/4"	MC = 11.40%			-sand layer
20							20.0 — 61.0

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ES-B1-06

BORING NUMBER B-1

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							
					SM		Gray silty SAND with gravel, very dense, wet
22.5							58.5
	SS	100	25-50/4"	MC = 11.20%	SP-SM		Gray poorly graded SAND with silt and gravel, very dense, wet
23.5							57.5
							Boring terminated at 23.5 feet below existing grade. Groundwater seepage encountered at 7.0 feet during drilling. Boring backfilled with bentonite and cuttings. Bottom of hole at 23.5 feet.

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ES-B2-06

BORING NUMBER B-2

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/18/06 **COMPLETED** 4/18/06
GROUND ELEVATION 87 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING —
NOTES 2" Asphalt Pavement
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SM		Brown silty SAND with gravel, loose to medium dense, moist (Fill) 2.0 85.0
	SS	100	1-1-4 (5)	MC = 18.90%	SM		Brown silty SAND, loose, wet (Fill) -trace organics 5.0 82.0
5	SS	100	1-3-3 (6)	MC = 36.80%	MH		Gray elastic SILT, soft, moist -trace organics -sand layers 7.0 80.0
	SS	100	6-12-32 (44)		SP-SM		Brown poorly graded SAND with silt, dense, wet 9.5 77.5
10	SS	100	50/5"	MC = 12.30% Fines = 16.00%	SM		Gray silty SAND with gravel, dense, moist -becomes very dense 17.5 69.5
15	SS	100	50/5"		SM		Gray silty SAND, very dense, moist
20							

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ES-B2-06

BORING NUMBER B-2

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							
					SM		Gray silty SAND, very dense, moist *(continued)*
							-trace gravel
	SS	100	50/5"	MC = 9.20%			23.0 64.0
							Boring terminated at 23.0 feet below existing grade. Groundwater seepage encountered at 8.0 feet during drilling. Boring backfilled with bentonite and cuttings.
							Bottom of hole at 23.0 feet.

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ES-B3-06

BORING NUMBER B-3

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/18/06 **COMPLETED** 4/18/06
GROUND ELEVATION 92.5 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING --
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING --
NOTES 2" Asphalt Pavement
AFTER DRILLING --

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SM		Brown silty SAND with gravel, loose to medium dense, moist (Fill)
	SS	100	4-5-5 (10)	MC = 11.90%			
4.0							Gray silty SAND with gravel, medium dense, wet (88.5)
5					SM		
7.0							Gray sandy SILT with gravel, very dense, wet (85.5)
	SS	100	39-50/4"	MC = 4.70%			
10					ML		
	SS	100	41-50	MC = 8.60%			
15							
17.5							Gray silty SAND, very dense, moist (75.0)
	SS	100	41-50/3"	MC = 9.10%	SM		
20							

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ES-B3-06

BORING NUMBER B-3

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20					SM		Gray silty SAND, very dense, moist *(continued)*
	SS	100	50/2"	MC = 8.60%			23.0
							Boring terminated at 23.0 feet below existing grade. No groundwater encountered during drilling. Boring backfilled with bentonite and cuttings.
							Bottom of hole at 23.0 feet.

69.5

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ES-B4-06

BORING NUMBER B-4

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/18/06 **COMPLETED** 4/18/06
GROUND ELEVATION 105 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING —
NOTES 4" Asphalt Pavement
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							Brown silty SAND with gravel, medium dense, moist
							-contains cobbles
	SS	100	13-17-25 (42)	MC = 9.30%	SM		-becomes dense -becomes wet
5							
							7.5 — 97.5
							Brown silty SAND with gravel, very dense, wet
	SS	100	16-22-30 (52)	MC = 11.90%			
10					SM		
							12.5 — 92.5
	SS	100	50/5"	MC = 7.90%			Brown poorly graded coarse SAND with silt and gravel, very dense, wet
					SP-SM		
15							15.0 — 90.0
							Brown silty SAND with gravel, very dense, wet
					SM		
	SS	100	10-13-15 (28)	MC = 10.80%			-becomes gray
20							20.0 — 85.0

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ES-B4-06

BORING NUMBER B-4

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20					SM		Gray silty SAND, very dense, moist -trace gravel
	SS	100	33-50/3"	MC = 8.60%			
23.5							81.5
							Boring terminated at 23.5 feet below existing grade. Groundwater seepage encountered at 1.5 feet during drilling. Boring backfilled with bentonite and cuttings. Bottom of hole at 23.5 feet.

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ES-B5-06

BORING NUMBER B-5

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/18/06 **COMPLETED** 4/18/06
GROUND ELEVATION 108 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING —
NOTES 2" Asphalt Pavement
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SM		Brown silty SAND with gravel, medium dense, wet
	SS	100	9-17-18 (35)	MC = 15.40%			
4.0							Gray silty fine SAND, dense, wet (104.0)
5					SM		
7.5							Gray SILT with clay, hard, wet (100.5)
	SS	100	21-23-31 (54)	MC = 18.20%			
10					ML		
12.5							Gray lean CLAY with silt, hard, wet (95.5)
	SS	100	21-31-40 (71)	MC = 15.60%			
							-becomes moist
15					CL		
17.5							Gray fine sandy SILT, very dense, wet (90.5)
	SS	100	21-36-50 (86)	MC = 20.30%			
20					ML		(88.0)

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Earth Solutions NW, LLC
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ES-B5-06

BORING NUMBER B-5

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							Gray SILT, very dense, wet
	SS	100	31-50	MC = 19.30%			
25							
	SS	100	34-50	MC = 16.70%			-decrease in sand content -becomes moist
30					ML		
	SS	100	28-50/5"	MC = 9.90%			
35							
	SS	100	23-50/3"	MC = 16.20%			
40					ML		40.0 Gray SILT, very dense, moist 68.0

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ES-B5-06

BORING NUMBER B-5

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS	100	31-50/3"	MC = 12.60%	ML		Gray SILT, very dense, moist *(continued)* 64.5
43.5							Boring terminated at 43.5 feet below existing grade. Groundwater seepage encountered at 7.0 feet during drilling. Boring backfilled with bentonite and cuttings. Bottom of hole at 43.5 feet.

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ES-B6-06

BORING NUMBER B-6

CLIENT KG Investment Management
PROJECT NUMBER 0415
DATE STARTED 4/19/06 COMPLETED 4/19/06
DRILLING CONTRACTOR Holocene Drilling
DRILLING METHOD HSA
LOGGED BY SSR CHECKED BY KRC
NOTES Asphalt Pavement

PROJECT NAME Bellevue Development
PROJECT LOCATION Bellevue, Washington
GROUND ELEVATION 107 ft HOLE SIZE
GROUND WATER LEVELS:
AT TIME OF DRILLING —
AT END OF DRILLING —
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SM		Brown silty SAND with gravel, medium dense, moist
							-becomes gray
	SS	100	4-9-10 (19)	MC = 11.20% Fines = 20.90%			3.5 — 103.5
					SP-SM		Brown poorly graded SAND with silt and gravel, medium dense, wet
5							6.5 — 100.5
					CH		Gray fat CLAY, hard, moist
	SS	100	16-23-28 (51)	MC = 21.60%			
							-massive texture
10							
	SS	100	5-8-15 (23)	MC = 25.20%			
15							
	SS	100	12-30-31 (61)	MC = 24.40%			
20							

11-115214-LO
NE 4th Street Extesnion
Areas Land Use Permit
Documents

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ES-B6-06

BORING NUMBER B-6

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20					CH		Gray fat CLAY, hard, moist *(continued)*
						22.5	84.5
	SS	100	7-27-30 (57)	MC = 25.80%			Gray lean CLAY / SILT, hard, moist
25							
	SS	100	17-34-50 (84)	MC = 22.80%			
30					CL-ML		-possible seepage zone
	SS	100	27-28-31 (59)	MC = 25.80%			
35							
	SS	100	14-25-50 (75)	MC = 24.40%			-increase in silt content
40						40.0	67.0
					CL		Gray lean CLAY, very stiff, moist

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ES-B6-06

BORING NUMBER B-6

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS	100	6-10-14 (24)	MC = 29.50%	CL		Gray lean CLAY, very stiff, moist *(continued)*
45							
	SS	100	7-11-18 (29)	MC = 24.30%			49.0
							Boring terminated at 49.0 feet below existing grade. Possible groundwater seepage encountered at 31.0 feet during drilling. 1" PVC standpipe installed to 49.0 feet. Lower 10.0 feet slotted. Boring backfilled with bentonite, sand and well cap. 58.0
							Bottom of hole at 49.0 feet.

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NE 4th Street Extesnion
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ES-B7-06

BORING NUMBER B-7

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/19/06 **COMPLETED** 4/19/06
GROUND ELEVATION 103 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING —
NOTES Asphalt Pavement
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							Brown silty SAND with gravel, medium dense, moist (Fill)
					SM		-becomes loose
	SS	100	2-3-5 (8)	MC = 23.20% Fines = 36.50%			
4.5							98.5
5					SP-SM		Brown poorly graded SAND with silt and gravel, loose, wet
7.5							95.5
	SS	100	7-8-11 (19)	MC = 10.70%			Gray silty SAND with gravel, medium dense, wet
10							
							-increase in gravel content
	SS	100	26-50/5"	MC = 5.90% Fines = 24.60%			-becomes brown
					SM		-becomes very dense
15							-becomes gray
	SS	100	50/5"	MC = 7.50%			
20.0							83.0

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ES-B7-06

BORING NUMBER B-7

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20					SM		Gray silty SAND with gravel, very dense, moist to wet
	SS	100	41-50/3"	MC = 10.30%			-decrease in gravel content
23.5							79.5
							Boring terminated at 23.5 feet below existing grade. Groundwater seepage encountered at 8.0 feet during drilling. Boring backfilled with bentonite and cuttings. Bottom of hole at 23.5 feet.

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NE 4th Street Extesnion
Areas 1 and 2 Land Use Permit
Documents

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ES-B8-06

BORING NUMBER B-8

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/20/06 **COMPLETED** 4/20/06
GROUND ELEVATION 75 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING --
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING --
NOTES Asphalt Pavement
AFTER DRILLING --

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SM		Brown silty SAND with gravel, loose, moist to wet (Fill)
1.0							Gray silty SAND, medium dense, moist
	SS	100	4-4-6 (10)	MC = 13.80%			-trace organics
5							
	SS	100	2-1-12 (13)	MC = 18.20%			
	SS	100	2-7-8 (15)	MC = 14.80%			
10							
	SS	100	9-13-15 (28)	MC = 12.20%	SM		
15							
	SS	100	7-8-9 (17)	MC = 14.60%			
20							

74.0

20.0

55.0

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ES-B8-06

BORING NUMBER B-8

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20	SS	100	50/5"	MC = 9.40%	SM		Gray SAND with silt, very dense, wet
25	SS	100	50/4"	MC = 13.70%			25.5

Boring terminated at 25.5 feet below existing grade. Groundwater seepage encountered at 7.5 feet during drilling. 1" PVC standpipe installed to bottom of boring. Lower 10.0 feet slotted. Boring backfilled with bentonite, sand and well cap.

Bottom of hole at 25.5 feet.

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ES-B10-06

BORING NUMBER B-10

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/20/06 **COMPLETED** 4/20/06
GROUND ELEVATION 93 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING —
NOTES Asphalt Pavement
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					SM		Brown silty SAND, medium dense, moist (Fill)
1.5							91.5
					SP		Brown poorly graded SAND with gravel, very dense, moist
5	SS	100	10-23-16 (39)	MC = 7.80%			
7.5							85.5
					SM		Gray silty SAND with gravel, very dense, moist
10	SS	100	50	MC = 7.40%			
15	SS	100	50	MC = 7.90%			
20							

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ES-B10-06

BORING NUMBER B-10

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20	SS	100	50/3"	MC = 5.50%	SM		Gray silty SAND with gravel, very dense, moist *(continued)*
							21.5 — 71.5
					ML		Gray SILT, very dense, moist
25	SS	100	16-17-25 (42)	MC = 23.10%			
							26.5 — 66.5
							Boring terminated at 26.5 feet below existing grade. No groundwater encountered during drilling. Boring backfilled with bentonite and capped with cement.
							Bottom of hole at 26.5 feet.

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ES-B11-06

BORING NUMBER B-11

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/20/06 **COMPLETED** 4/20/06
GROUND ELEVATION 97 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING ---
NOTES Gravel Parking
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					GP		Brown poorly graded GRAVEL, dense, moist (1.0, 96.0)
					SM		Brown silty SAND with gravel, loose, wet (4.0, 93.0)
	SS	100	2-4-5 (9)	MC = 11.60%			
5							Gray silty SAND, very dense, wet
	SS	100	12-22-36 (58)	MC = 13.90%			
10					SM		
	SS	100	24-31-28 (59)	MC = 20.10%			
15							
	SS	100	23-54-4 (58)	MC = 19.20%			
20							

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ES-B11-06

BORING NUMBER B-11

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20					SM		Gray silty SAND, very dense, wet *(continued)*
						21.0	76.0
							Gray lean CLAY with sand, hard, moist
	SS	100	29-50/4"	MC = 20.10%			
25							
	SS	100	29-39-39 (78)	MC = 14.20%			
30					CL		
	SS	100	12-14-26 (40)	MC = 26.00%			
35							
	SS	100	5-7-14 (21)	MC = 37.30%			
40							

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BORING NUMBER B-11

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS	100	24-33-35 (68)	MC = 25.80%	CL		Gray lean CLAY with sand, hard, moist *(continued)*
45							
	SS	100	12-20-38 (58)	MC = 27.00%			
						49.0	48.0
							Boring terminated at 49.0 feet below existing grade. Groundwater seepage encountered at 2.5 feet during drilling. 1" PVC standpipe installed to 15.0 feet. Lower 10.0 feet slotted. Boring backfilled with bentonite, sand and well cap. Bottom of hole at 49.0 feet.

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NE 4th Street Extesnion
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ES-B12-06

BORING NUMBER B-12

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington
DATE STARTED 4/20/06 **COMPLETED** 4/20/06
GROUND ELEVATION 103 ft **HOLE SIZE**
DRILLING CONTRACTOR Holocene Drilling
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING —
LOGGED BY SSR **CHECKED BY** KRC
AT END OF DRILLING —
NOTES Gravel Surfacing
AFTER DRILLING —

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							Brown silty SAND with gravel, medium dense, moist
							-becomes dense
	SS	100	50/5"	MC = 8.20%			
							-becomes very dense
5							
							-becomes gray
	SS	100	50	MC = 7.10%			
10					SM		
	SS	100	50	MC = 7.70%			
15							
	SS	100	50	MC = 5.80%			
20							

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ES-B12-06

BORING NUMBER B-12

CLIENT KG Investment Management
PROJECT NAME Bellevue Development
PROJECT NUMBER 0415
PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							Brown silty SAND with gravel, medium dense, moist *(continued)*
					SM		22.0 — 81.0
					ML		22.5 — Gray SILT, very dense, moist — 80.5
	SS	100	30-26-24 (50)	MC = 27.10%	CH		Gray fat CLAY, hard, moist -massive texture
25							
	SS	100	9-13-16 (29)	MC = 34.50%			-very stiff
30							
	SS	100	11-17-24 (41)	MC = 26.40%			
35							
	SS	100	11-13-17 (30)				
40							

11-115214-LO
NE 4th Street Extension
Areas 1 and 2 Land Use Permit
Documents

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ES-B12-06

BORING NUMBER B-12

CLIENT KG Investment Management

PROJECT NAME Bellevue Development

PROJECT NUMBER 0415

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS	100	9-10-14 (24)	MC = 32.60%	CH		Gray fat CLAY, hard, moist *(continued)*
45							
	SS	100	9-13-26 (39)	MC = 27.50%			
							49.0 — 54.0
							Boring terminated at 49.0 feet below existing grade. No groundwater encountered during drilling. Boring backfilled with bentonite and cuttings.
							Bottom of hole at 49.0 feet.

11-115214-LO
NE 4th Street Extesnion
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Documents

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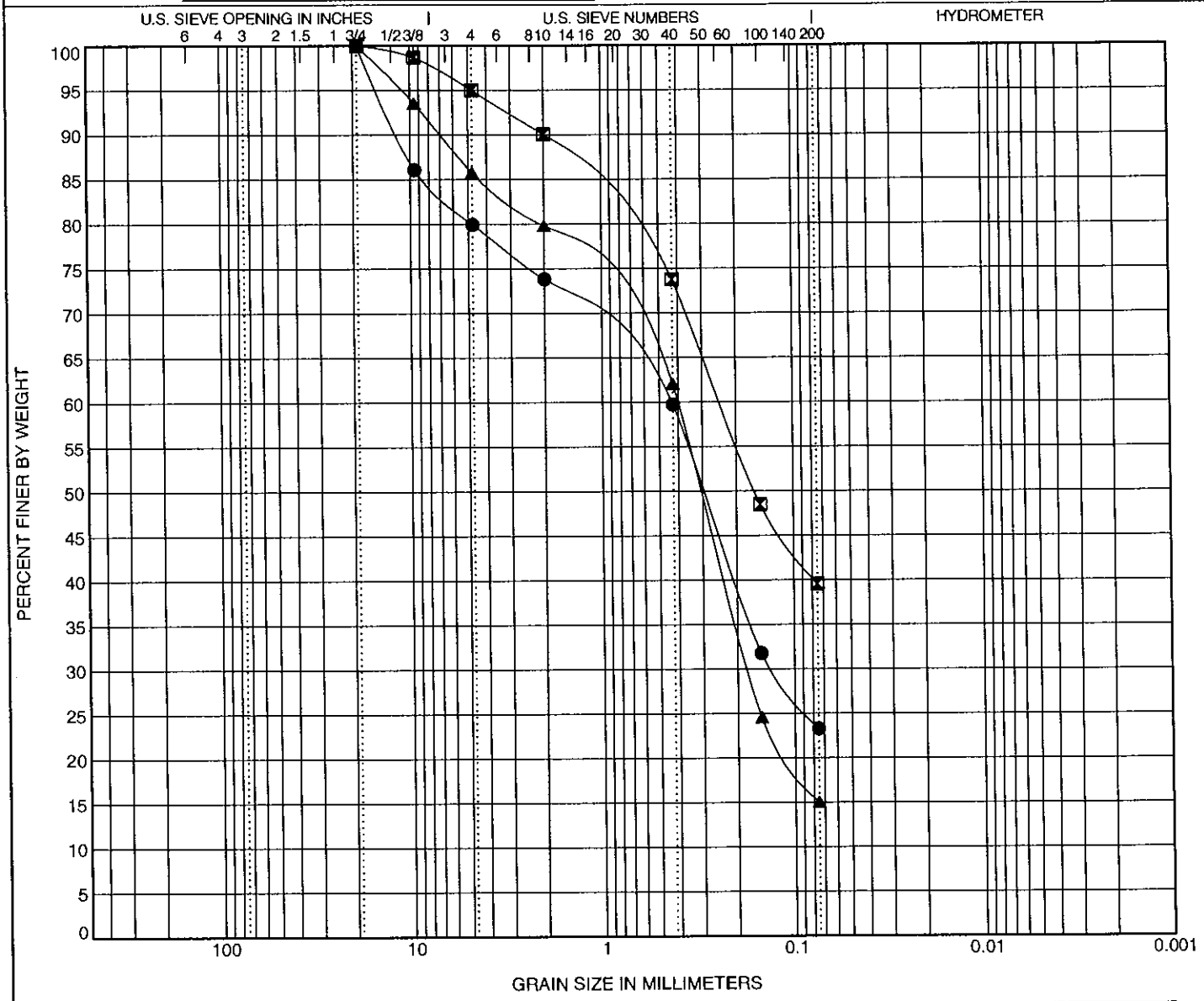
GRAIN SIZE DISTRIBUTION

CLIENT KG Investment **PROJECT NAME** Bellevue Development

PROJECT NUMBER ES-415.02 **PROJECT LOCATION** Bellevue



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-101	5.0ft.	**Gray silty SAND with gravel, SM**					
⊠	B-101	20.0ft.	**Gray silty SAND, SM**					
▲	B-102	5.0ft.	**Brown silty SAND, SM**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-101	5.0ft.	19	0.437	0.129		20.0	56.7	23.3	
⊠	B-101	20.0ft.	19	0.241			5.0	55.5	39.5	
▲	B-102	5.0ft.	19	0.401	0.174		14.2	70.7	15.0	

GRAIN SIZE ES-415.2.GPJ GINT US LAB.GDT 7/10/09

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NE 4th Street Extesnion
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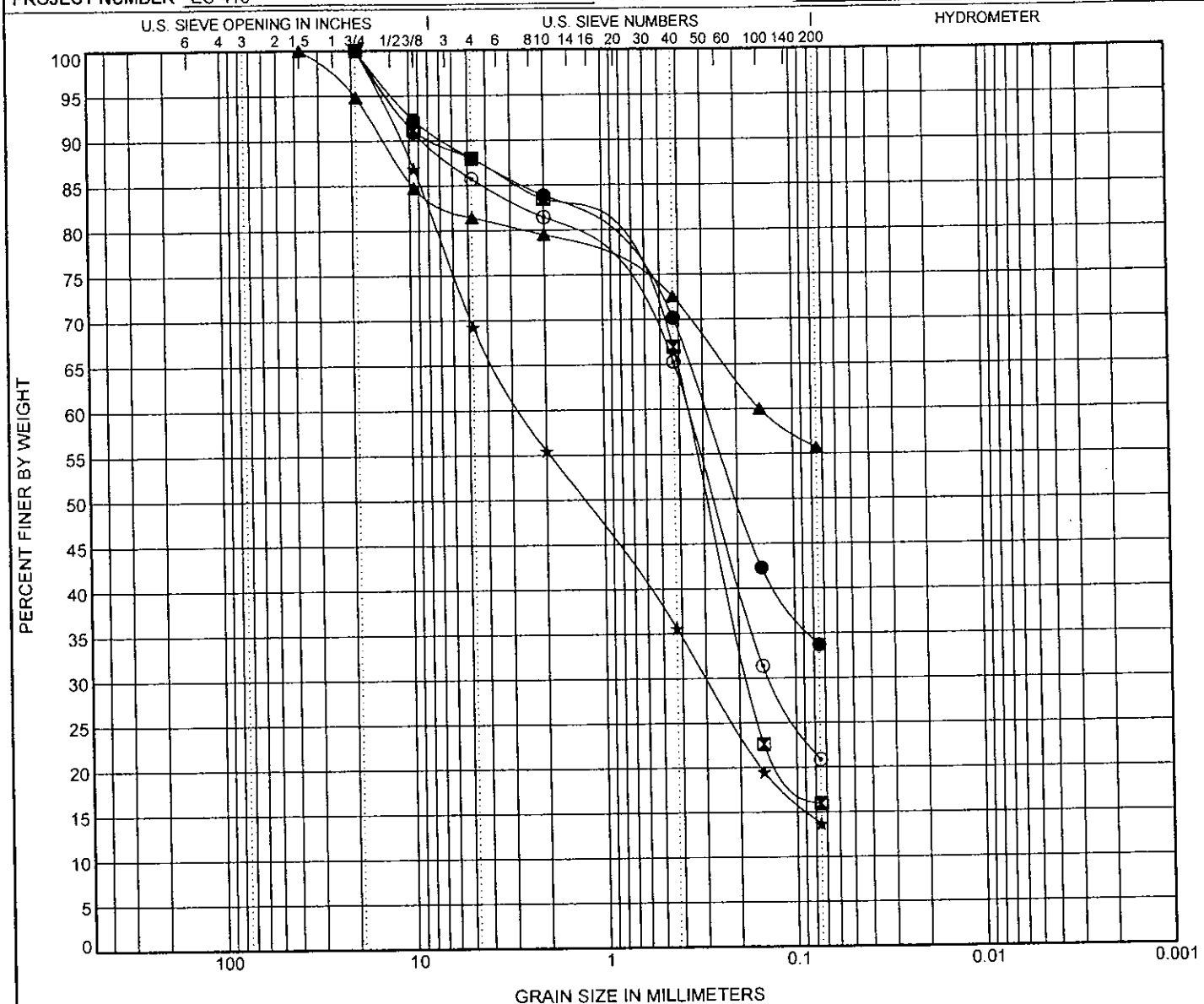
GRAIN SIZE DISTRIBUTION

CLIENT K. G. Investments
PROJECT NAME 16th Mixed-use
PROJECT NUMBER ES-415
PROJECT LOCATION Bellevue



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-01	7.5ft.	Gray silty SAND, SM					
⊠	B-02.	12.5ft.	Gray silty SAND, SM					
▲	B-03	7.5ft.	Light brown sandy SILT with gravel, SM					
★	B-04	2.5ft.	Brown silty SAND with gravel, SM					
⊙	B-06	2.5ft.	Light brown silty SAND, SM					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	7.5ft.	19	0.291			12.0	54.3	33.7	
⊠	B-02.	12.5ft.	19	0.361	0.178		12.0	72.0	16.0	
▲	B-03	7.5ft.	37.5	0.15			18.6	25.8	55.6	
★	B-04	2.5ft.	19	2.657	0.296		30.7	55.6	13.7	
⊙	B-06	2.5ft.	19	0.362	0.137		14.3	64.9	20.9	

GRAIN SIZE ES-415.GPJ GINT US LAB.GDT 4/24/06

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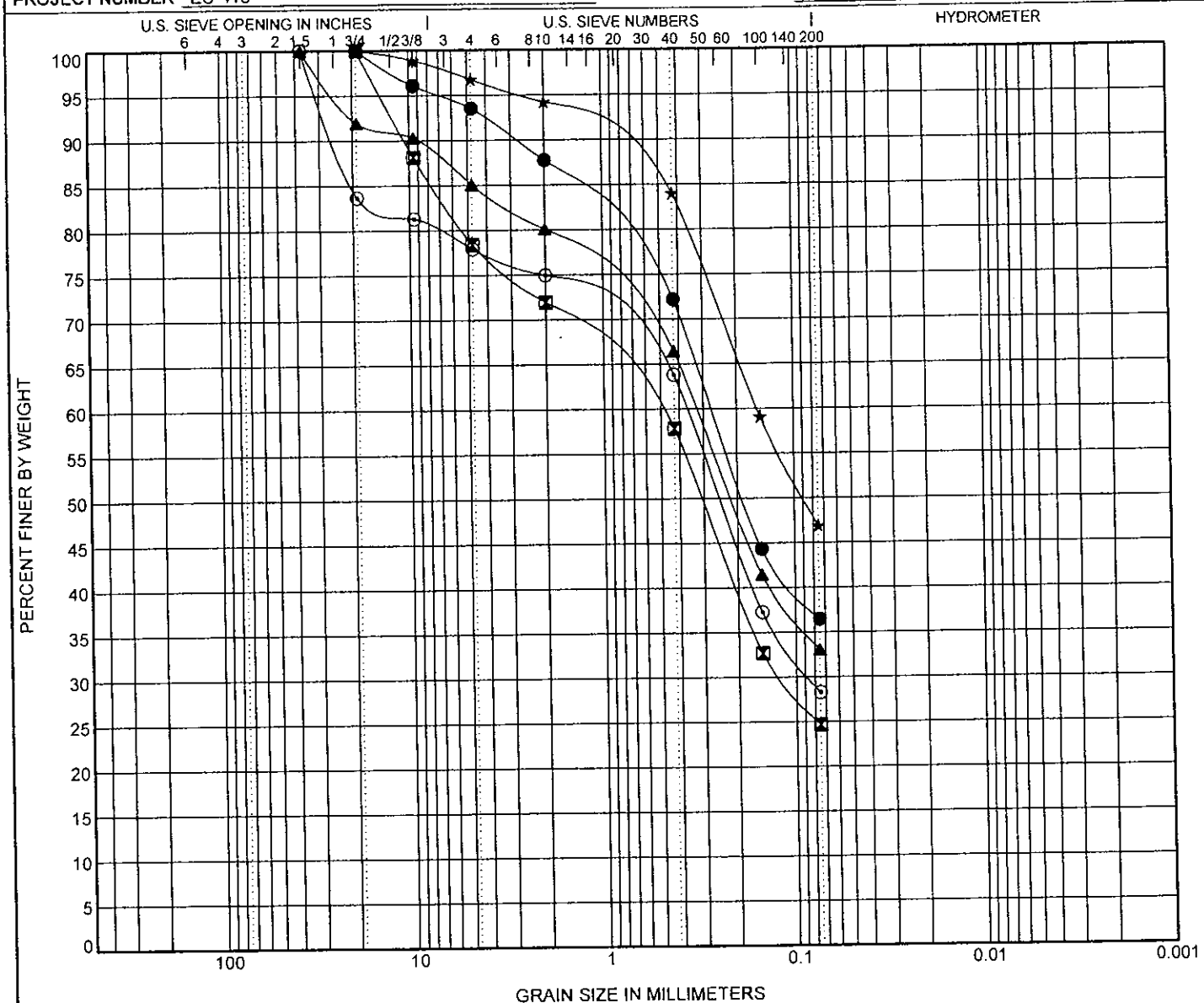
GRAIN SIZE DISTRIBUTION

CLIENT K. G. Investments

PROJECT NAME 16th Mixed-use

PROJECT NUMBER ES-415

PROJECT LOCATION Bellevue



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-07	2.5ft.	Brown silty SAND, SM					
⊠	B-07.	12.5ft.	Light brown silty SAND with gravel, SM					
▲	B-08	5.0ft.	Gray silty SAND, SM					
★	B-08.	15.0ft.	Gray silty SAND, SM					
⊙	B-10	10.0ft.	Gray silty SAND with gravel, SM					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-07	2.5ft.	19	0.269			6.5	57.1	36.5	
⊠	B-07.	12.5ft.	19	0.54	0.119		21.6	53.8	24.6	
▲	B-08	5.0ft.	37.5	0.325			14.9	52.0	33.1	
★	B-08.	15.0ft.	19	0.156			3.3	49.9	46.9	
⊙	B-10	10.0ft.	37.5	0.366	0.086		22.1	49.6	28.3	

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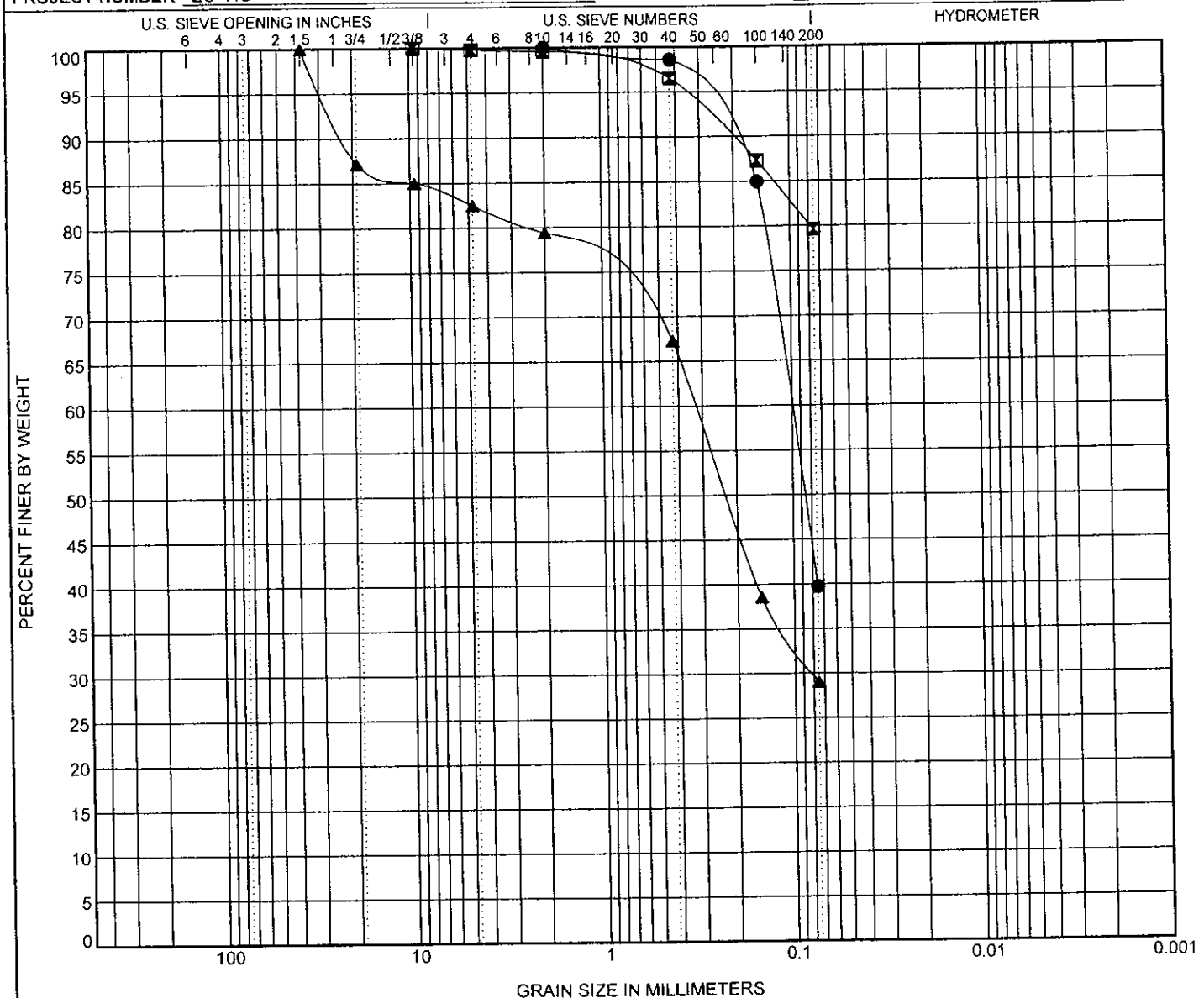
Areas Land Use Permit Documents

GRAIN SIZE DISTRIBUTION

CLIENT K. G. Investments
PROJECT NAME 16th Mixed-use
PROJECT NUMBER ES-415
PROJECT LOCATION Bellevue



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-11	12.5ft.	Gray silty SAND, SM					
⊠	B-11.	22.5ft.	Gray lean CLAY with sand, CL	24	16	8		
▲	B-12	12.5ft.	Gray silty SAND with gravel, SM					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-11	12.5ft.	2	0.102			0.0	60.3	39.7	
⊠	B-11.	22.5ft.	9.5				0.2	20.3	79.6	
▲	B-12	12.5ft.	37.5	0.327	0.081		17.5	53.5	29.0	

GRAIN SIZE ES-415.GPJ GINT US LAB.GDT 4/24/06

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Earth Solutions NW, LLC
2884 152nd Avenue N.E.
Redmond, WA 98052
Telephone: (425) 284-3300
Fax: (425) 284-2855

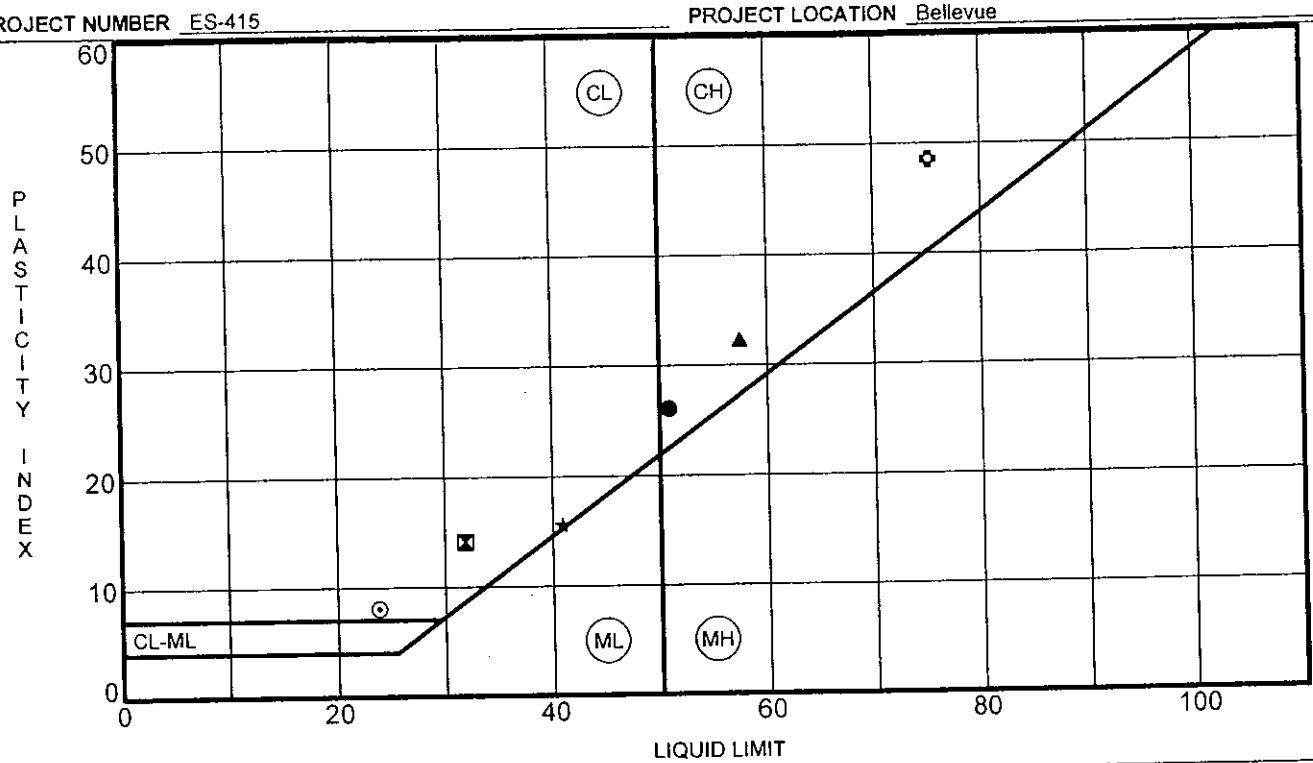
ATTERBERG LIMITS' RESULTS

CLIENT K. G. Investments

PROJECT NAME 16th Mixed-use

PROJECT NUMBER ES-415

PROJECT LOCATION Bellevue



	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-02	5.0	51	25	26		Gray fat CLAY, CH
⊠	B-05	12.5	32	18	14		Gray lean CLAY, CL
▲	B-06.	12.5	57	25	32		Gray fat CLAY, CH
★	B-06..	22.5	41	25	16		Gray lean CLAY/SILT, CL/ML
⊙	B-11.	22.5	24	16	8	80	Gray lean CLAY with sand, CL
✿	B-12.	27.5	75	27	48		Gray fat CLAY, CH

BORING B-1 G-B1-94 Spt

DESCRIPTION

Surface Elevation (ft.): 129.0

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	Description
					ASPHALT	2 inches asphalt concrete
					SM	Brown-gray silty fine to medium sand with occasional gravel (loose, moist) (fill)
MD	12	123	6			
MD	19	109	7			
					SM	Gray silty fine to medium sand with gravel (medium dense, moist)
			29			

Boring completed at 14.0 feet on 03/07/94
No ground water seepage encountered

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30

Note: See Figure A-2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE A-3

SMA:VC: 3/17/94
401-046-T03
NB40

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

BORING B-2 (434) G-B2-94

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION Surface Elevation (ft.): 129.0
					ASPHALT	2 inches asphalt concrete
					SM	Gray silty fine to medium sand with gravel (very dense, moist) (till)
						Sm-25 QUT
			59			
			72			
					SP-SM	Brown fine to medium sand with silt (very dense, moist)
						SP-Sm 12
			78			
						Boring completed at 14.0 feet on 03/07/94 No ground water seepage encountered

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30

Note: See Figure A-2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE A-4

SMA:VC: 3/17/94
401-046-T03
NB40

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

BORING B-3 (435) G-B3-94

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION Surface Elevation (ft.): 129.0
					ASPHALT	2 inches asphalt concrete
					SM	Gray silty fine to medium sand with gravel (very dense, moist) (till)
						Sm-25
			78			
			50/6"			
					GP	Brown fine to coarse gravel with silty sand (very dense, moist)
			50/3"			GP-GM 12
						Boring completed at 14.0 feet on 03/07/94 No ground water seepage encountered

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30

Note: See Figure A-2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE A-5

SMA:VC: 3/17/94
401-046-T03
NB40

BORING B-4 (436) G-B4-94

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
						Surface Elevation (ft.): 129.0
					ASPHALT	2 inches asphalt concrete
					SM	Gray silty fine to medium sand with gravel (dense, moist) (till)
						SM-25 QVT
			43			
			30			Grades to medium dense to dense, damp to moist
			50/6"			Grades to very dense, wet
			50/6"			
			50/6"			
						Boring completed at 24.0 feet on 03/07/94 Ground water seepage observed at about 12.0 feet

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30

Note: See Figure A-2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE A-6

SMA:VC: 3/17/94
401-048-T03
NB40

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

BORING B-5 (437) 1G-B5-94

DESCRIPTION

Surface Elevation (ft.): 129.0

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	Description
					ASPHALT	2 inches asphalt concrete
					SM	Gray silty fine to medium sand with gravel (very dense, moist) (till)
						Sm-25
						QVT
			50/6"			
			48			Grades to dense, moist
			50/5"			Grades to very dense, wet
			50/4"			
			50/6"			

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30

Boring completed at 24.0 feet on 03/07/94
Ground water seepage encountered at about 12.0 feet

Note: See Figure A-2 for explanation of symbols

SMA:VC: 3/17/94

401-046-T03

NB40

Geo Engineers

LOG OF BORING

FIGURE A-7

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

BORING B-6 (438) G-B6-94

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
					ASPHALT	2 inches asphalt concrete
					SM	Gray silty fine to medium sand with gravel (very dense, moist) (till)
						Sm-25 QVT
			50/3"			No recovery, rock in shoe
			50/4"			
			42			Grades to dense, wet
			50/6"			Grades to very dense, wet
			50/6"			

Surface Elevation (ft.): 129.0

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30

Boring completed at 24.0 feet on 03/07/94
Ground water seepage encountered at about 12.0 feet

Note: See Figure A-2 for explanation of symbols

SMA:VC: 3/17/94
401-048-T03
NB40

Geo Engineers

LOG OF BORING

FIGURE A-8

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

BORING B-7

G-B7-94

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
					ASPHALT	2 inches asphalt concrete
					SM	Gray silty fine to medium sand with occasional gravel (dense, moist) (till)
			45			
			63			Grades to very dense, moist
			56			Grades to very dense, wet

Surface Elevation (ft.): 129.0

Sm -30

QVT

Boring completed at 14.0 feet on 03/07/94
Ground water seepage encountered at about 12.0 feet

DEPTH IN FEET

0, 5, 10, 15, 20, 25, 30

Note: See Figure A-2 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE A-9

SMA:VC: 3/17/94

401-046-T03

NB40

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

BORING B-8

440

G-B8-94

TEST DATA

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
					ASPHALT	2 inches asphalt concrete
					SM	Dark brown silty fine sand with organic matter (medium dense, moist) (fill)
			12			
					SM	Gray silty fine to medium sand with gravel (very dense, moist) (till)
			71			
			50/6"			Grades to very dense, wet
			50/3"			
			50/3"			

Surface Elevation (ft.): 129.0

QUT

Sm-40

Sm-25

DEPTH IN FEET

0, 5, 10, 15, 20, 25, 30

Boring completed at 24.0 feet on 03/07/94
Ground water seepage encountered at about 12.0 feet

Note: See Figure A-2 for explanation of symbols

SMA:VC: 3/17/94

401-048-T03

NB40

Geo Engineers

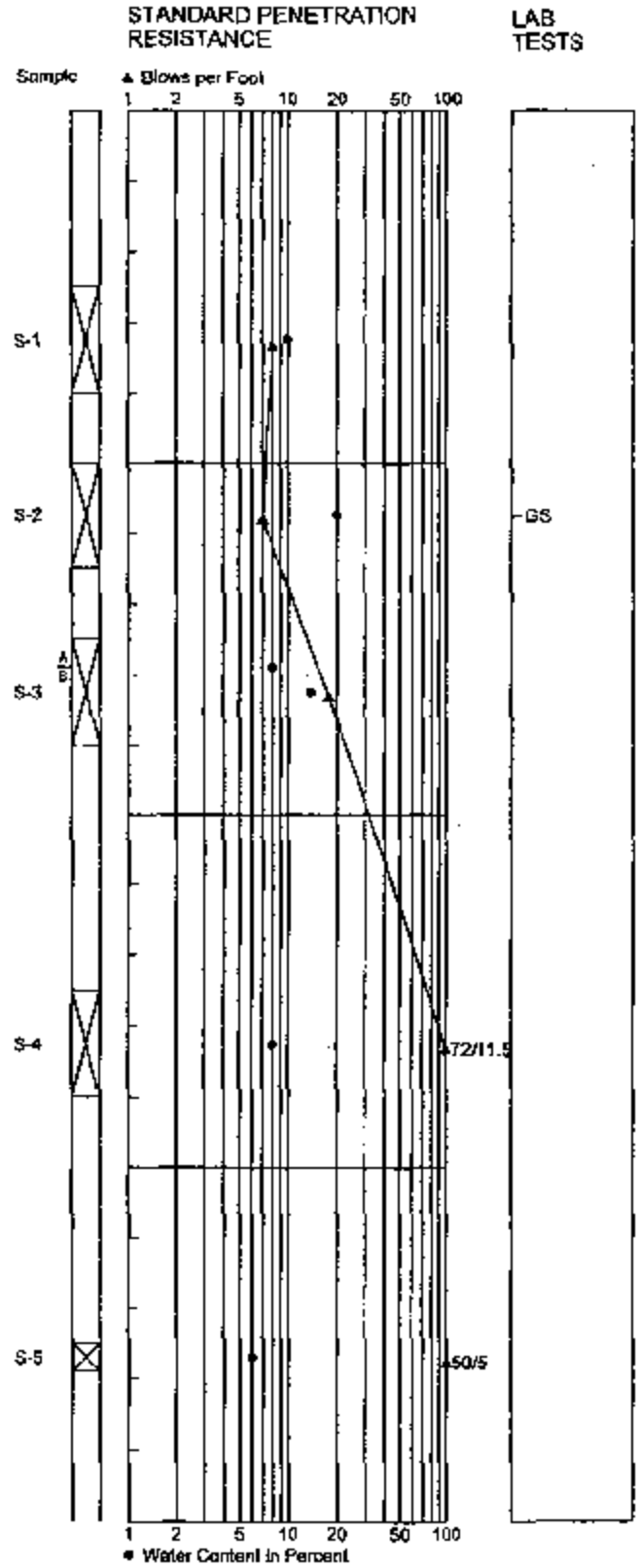
LOG OF BORING

FIGURE A-10

Boring Log B-1

HC-B1-01

Soil Descriptions	Depth in Feet
5 Inches of Asphalt.	0
Loose, damp to moist, light to dark brown, slightly gravelly, very silty SAND with organics. (POTENTIAL FILL)	5
Medium dense, wet, gray, silty, gravelly, fine SAND.	ATD, 10
Hard, damp to wet, blue-gray, slightly gravelly, sandy SILT.	15
Bottom of Boring at 17.9 Feet. Completed 06/07/01.	20



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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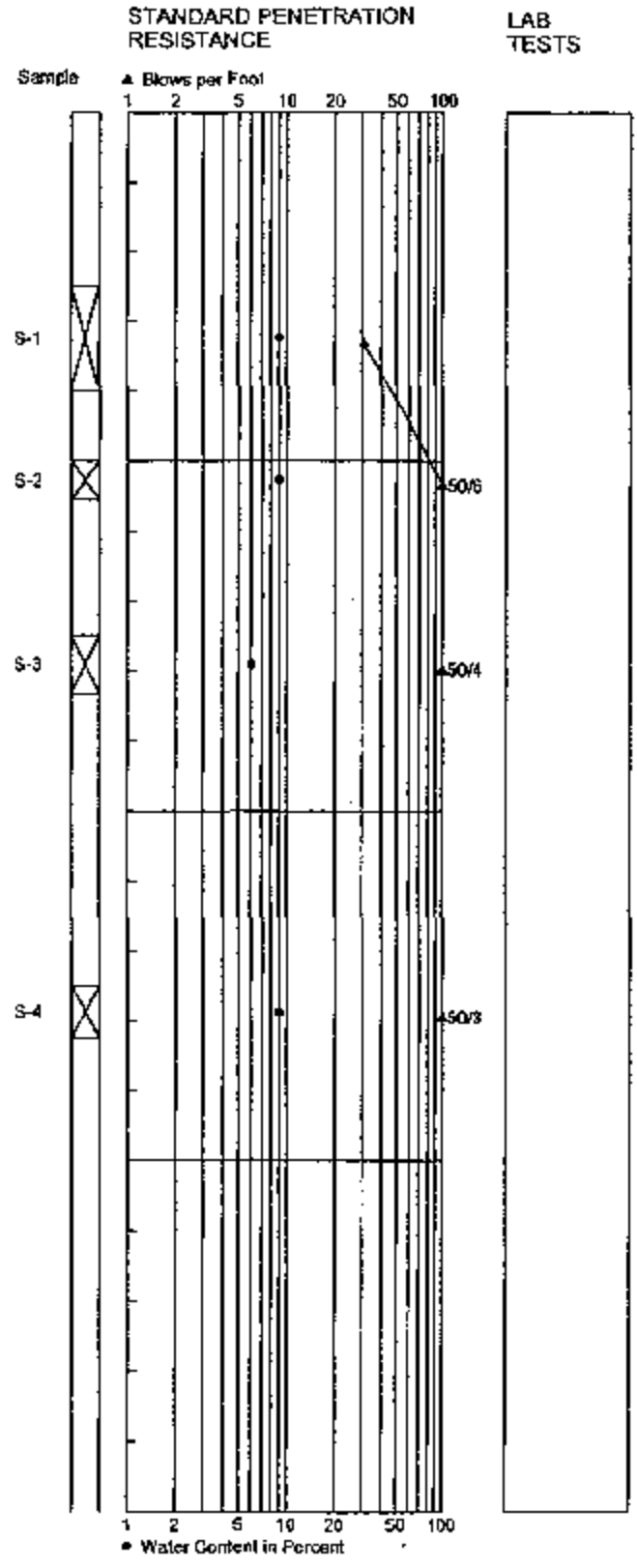
7498 06/01

Figure A-2

Boring Log B-2

HC-B2-01

Soil Descriptions	Depth in Feet
5 inches of ASPHALT.	0
Gravelly crushed rock.	
Dense, wet, gray-brown, silty, gravelly, fine SAND.	ATD
Hard, damp to moist, gray-blue, slightly sandy, slightly gravelly to gravelly SILT.	5
	10
Bottom of Boring at 13.3 Feet. Completed 06/07/01.	15
	20



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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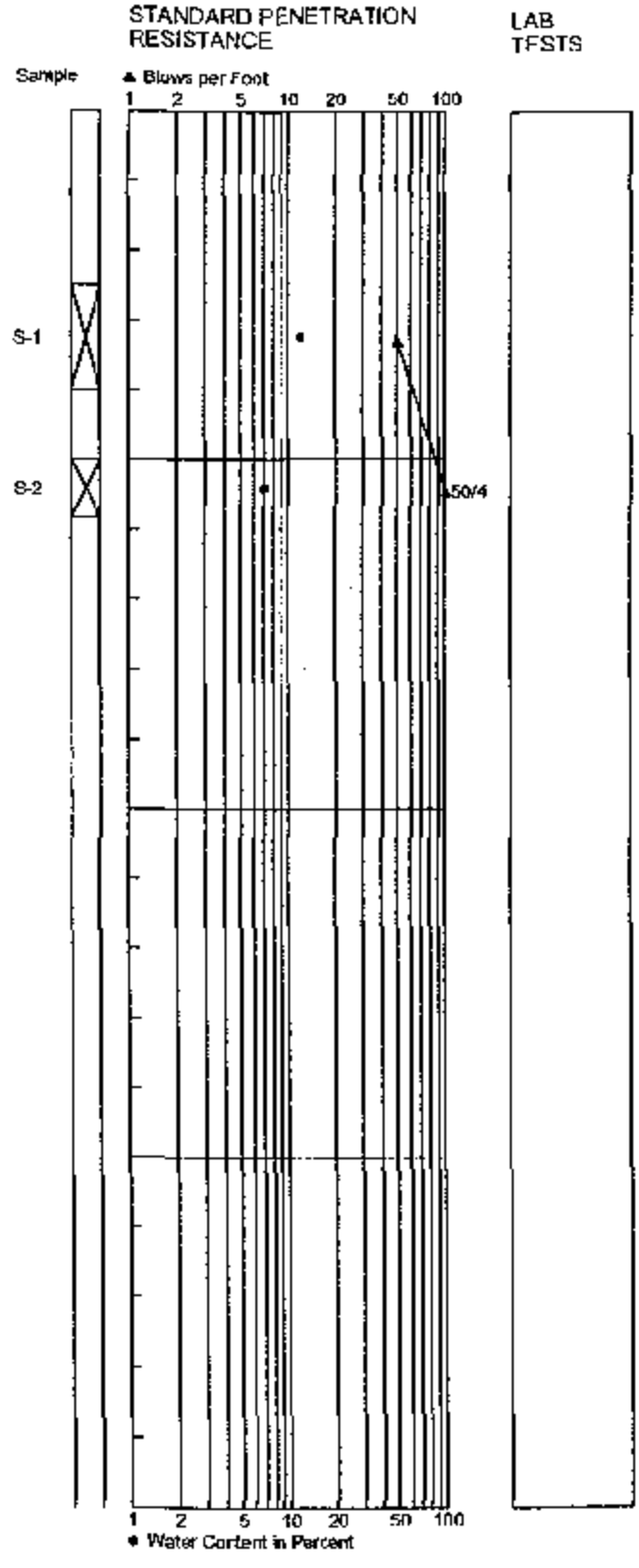
7498 06/01

Figure A-3

BORING LOG 74900.GPJ HC_CORP.GDT 6/25/01

Boring Log B-3 HC-B3-01

Soil Descriptions	Depth in Feet
8 Inches of ASPHALT.	0
Hard, damp to moist, light gray, gravelly, sandy SILT.	
Bottom of Boring at 5.8 Feet. Completed 06/07/01.	5
	10
	15
	20



BORING LOG 749800.GPJ HC_CCRP.GDT 6/22/01

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

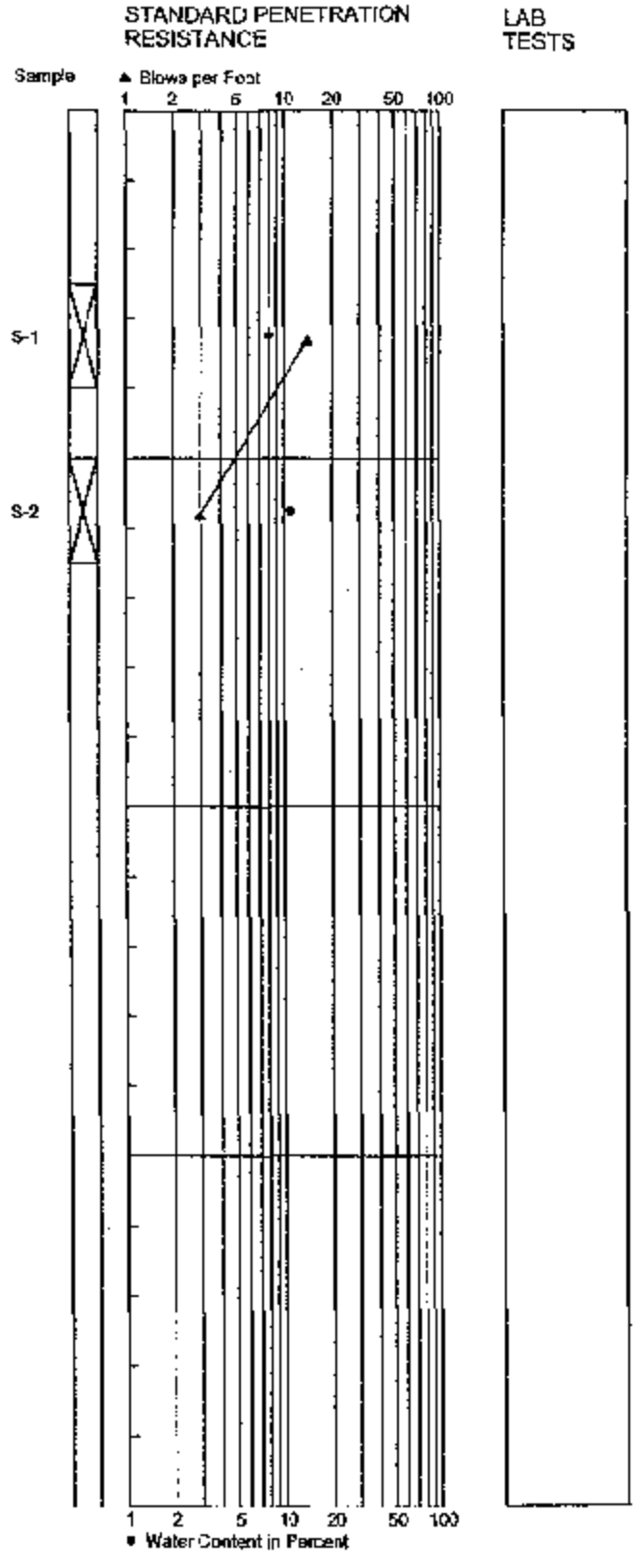
HARTCROWSER

7498 06/01

Figure A-4

Boring Log B-4

Soil Descriptions	Depth in Feet
12" of ASPHALT.	0
Medium dense, damp, dark brown, gravelly, silty SAND with organics. (FILL?)	
Soft, moist, brown-gray, sandy, gravelly, SILT with organics.	5
Bottom of Boring at 6.5 Feet. Completed 06/07/01.	10
	15
	20



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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7498 06/01

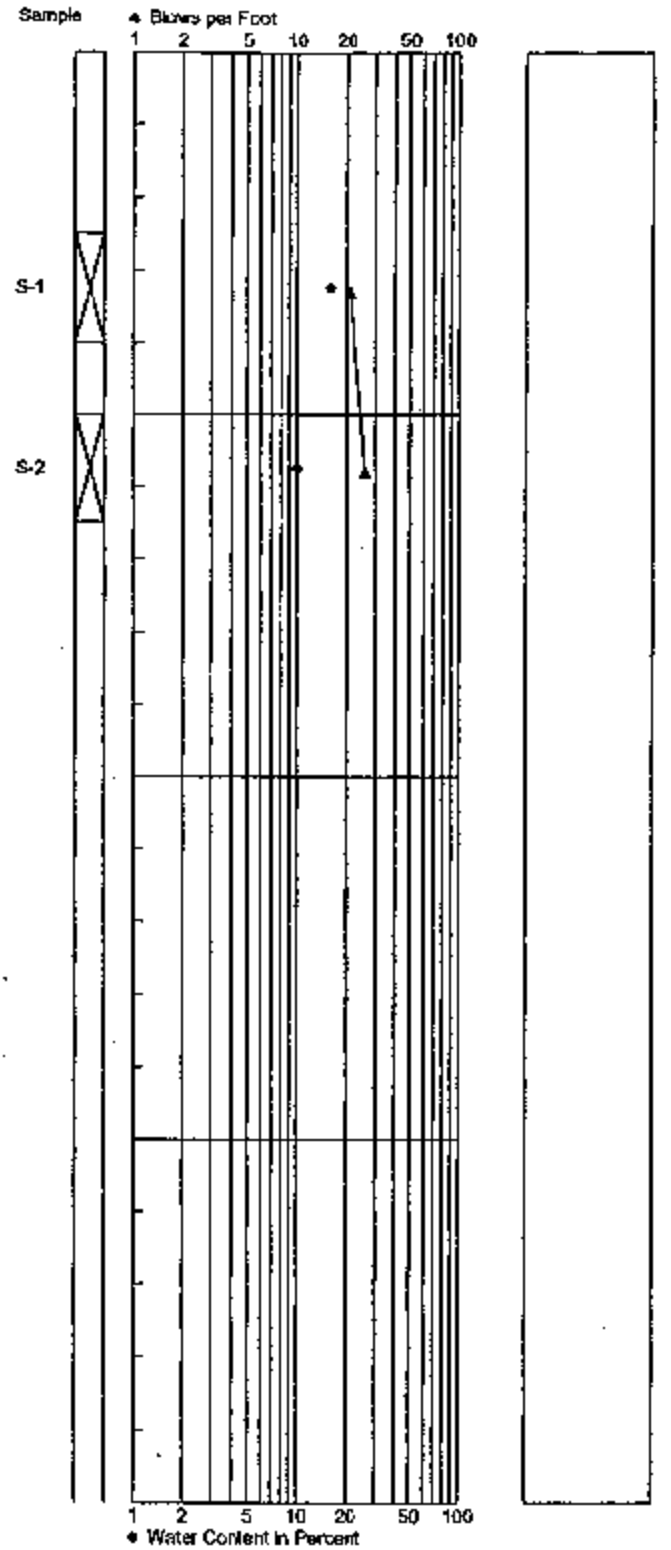
Figure A-5

BORING LOG 7498GPJ HC_CORP.GDT 6/25/01

Boring Log B-5

HC-B5-01

Soil Descriptions	Depth in Feet	Sample	STANDARD PENETRATION RESISTANCE (● Blows per Foot)	LAB TESTS
4 inches of ASPHALT.	0			
Medium dense to dense, moist, gray-brown, silty, gravelly SAND.		S-1		
	5	S-2		
Bottom of Boring at 6.5 Feet. Completed 06/07/01.				
	10			
	15			
	20			



BORING LOG 7498GP.J HC_CORP.GDT 6/22/01

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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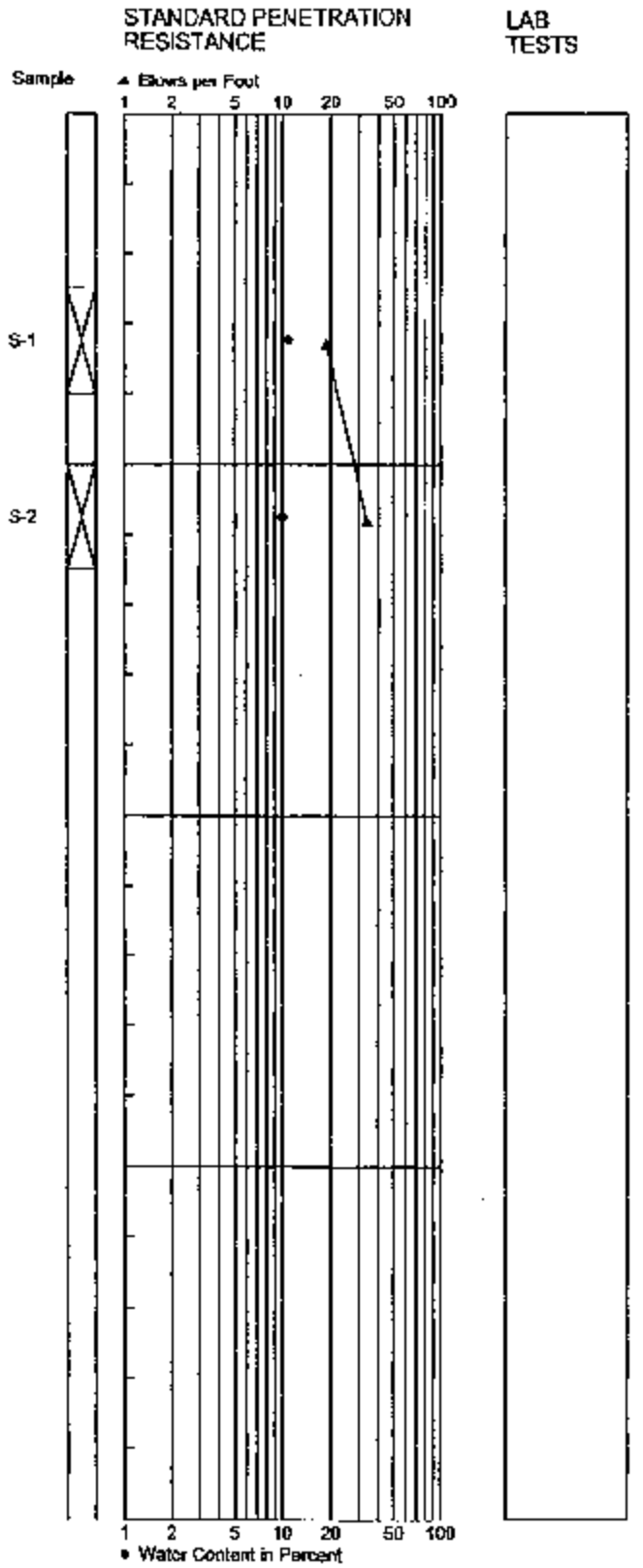
7498 06/01

Figure A-6

Boring Log B-6 HC-B6-01

Soil Descriptions	Depth in Feet
5 inches of ASPHALT.	0
Loose, damp, brown, gravelly, silty SAND. (POTENTIAL FILL)	
Medium dense to dense, damp to moist, blue-gray, gravelly, very silty SAND.	5
Bottom of Boring at 6.5 Feet. Completed 06/07/01.	10
	15
	20



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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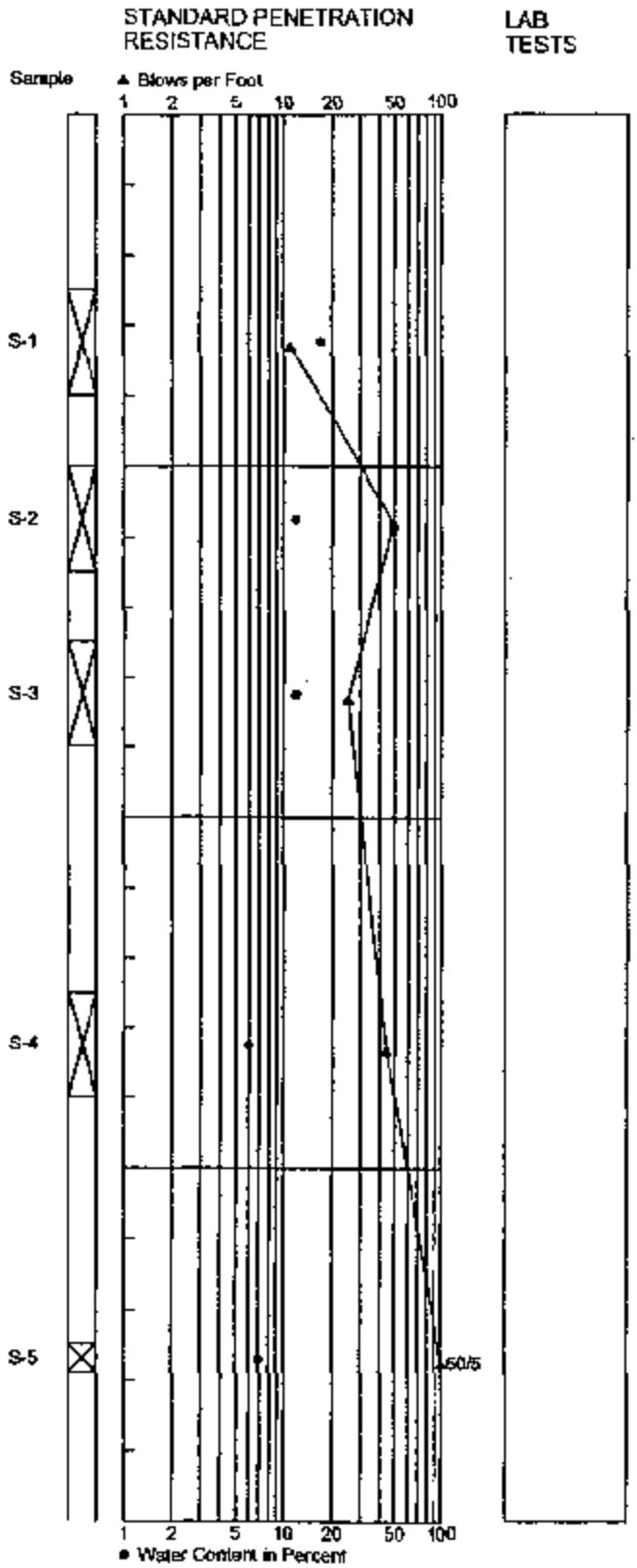
7498 06/01

Figure A-7

BORING LOG 7498GE.GPJ HC_CORP.GDT 6/25/01

Boring Log B-7 HC-B7-01

Soil Descriptions	Depth in Feet
5 inches of ASPHALT.	0
Medium dense, moist, gray-brown, slightly clayey, silty SAND with organics. (POTENTIAL FILL)	
Hard, moist, brown, slightly gravelly, sandy SILT.	5
Medium dense to very dense, wet, gray-brown, slightly gravelly to gravelly, silty, fine SAND.	▽ ATD, 10, 15
Bottom of Boring at 17.9 Feet. Completed 06/07/01.	20



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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7498 06/01

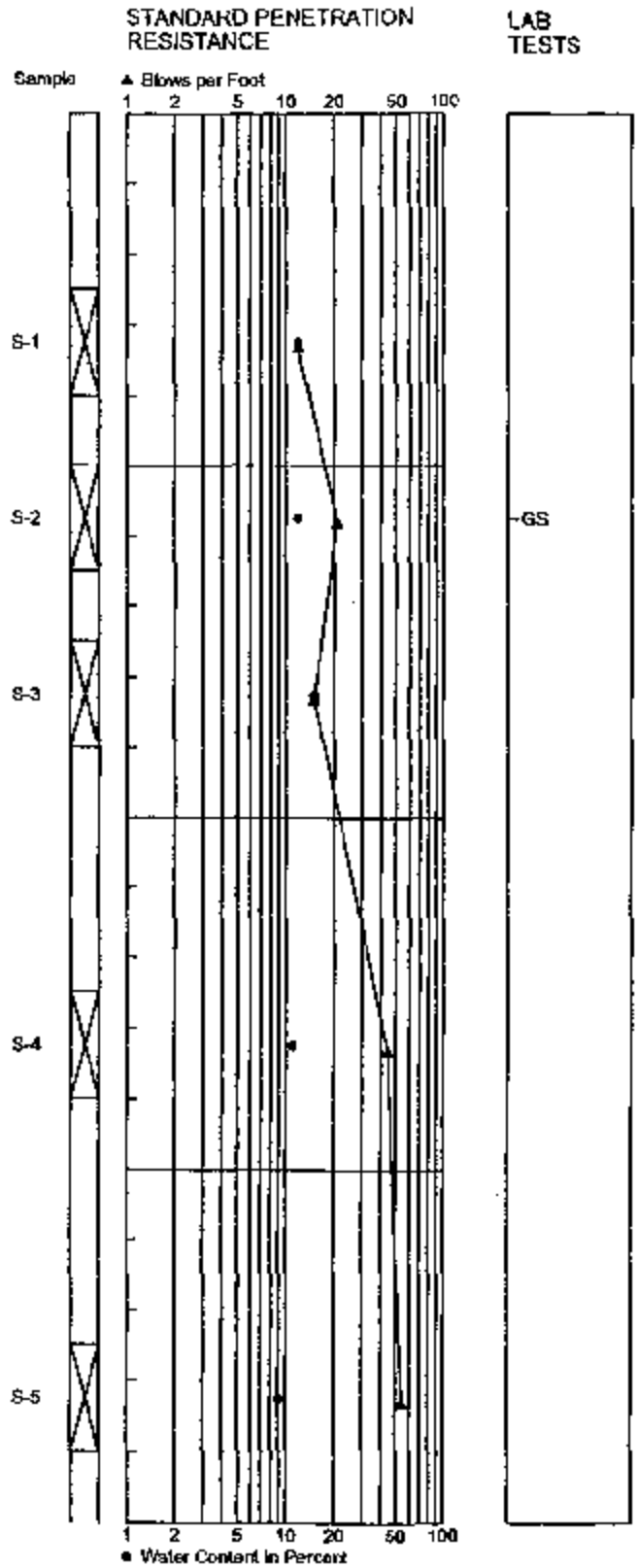
Figure A-8

BORING LOG 749800.GPJ HC_CORP.GDT 6/22/01

Boring Log B-8

HC-B8-01

Soil Descriptions	Depth in Feet
5 inches of ASPHALT.	0
Medium dense, damp, moist, gray-brown, gravelly, silty SAND with trace organics. (POTENTIAL FILL)	5, 10
Dense to very dense, wet, light gray-brown, slightly gravelly to gravelly, silty to very silty SAND.	15
Bottom of Boring at 19.0 Feet. Completed 06/07/01	20



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

7498 06/01

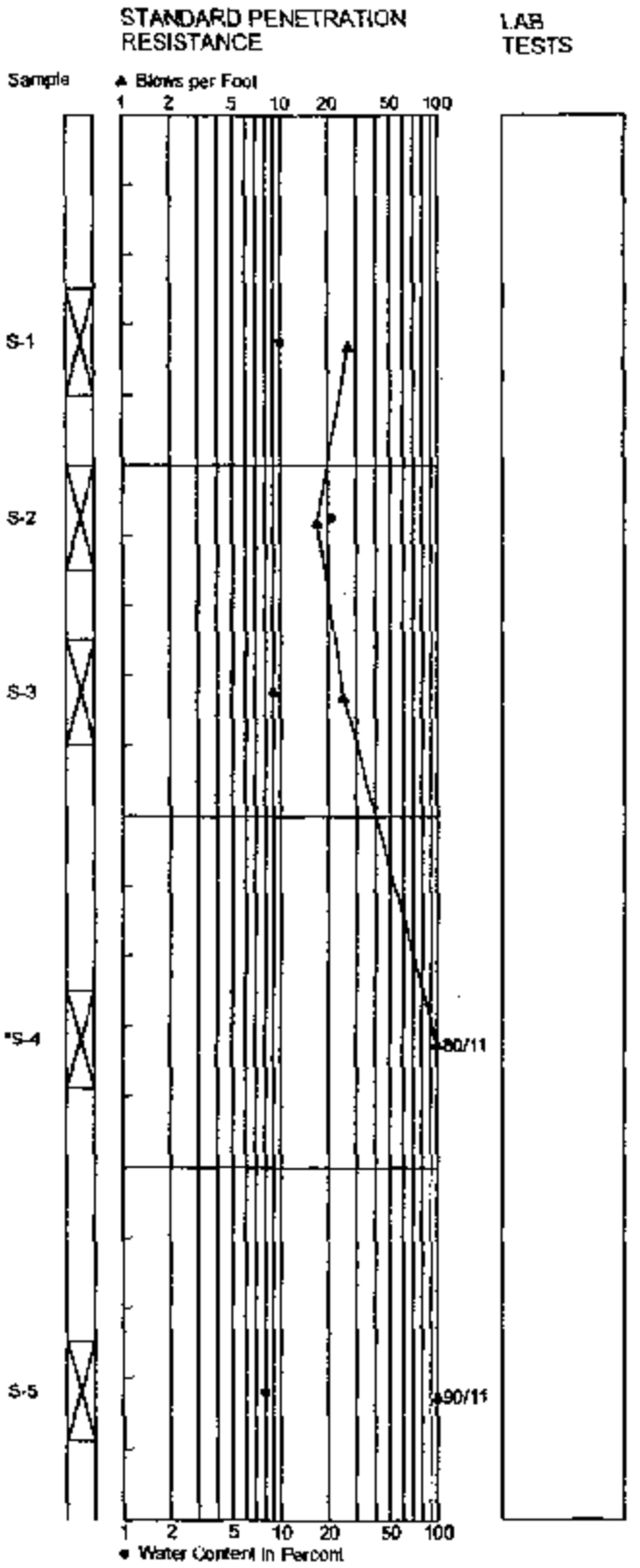
Figure A-9

BORING LOG 7498GPJ HC_CORP.GDT 6/22/01

Boring Log B-9

HC-B9-01

Soil Descriptions	Depth in Feet	Sample	Blows per Foot (1 2 5 10 20 50 100)	Lab Tests
5 inches of ASPHALT.	0			
Medium dense, damp, gray-brown, gravelly, silty SAND with trace organics. (POTENTIAL FILL)	5	S-1, S-2		
Medium dense, moist to wet, gray-brown, slightly gravelly to gravelly, silty to very silty SAND.	10 (▽ ATD)	S-3		
Very dense, moist, gray, slightly gravelly, silty to very silty SAND.	15	*S-4	80/11	
		S-5	90/11	
Bottom of Boring at 18.9 Feet. Completed 06/07/01.	20			



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

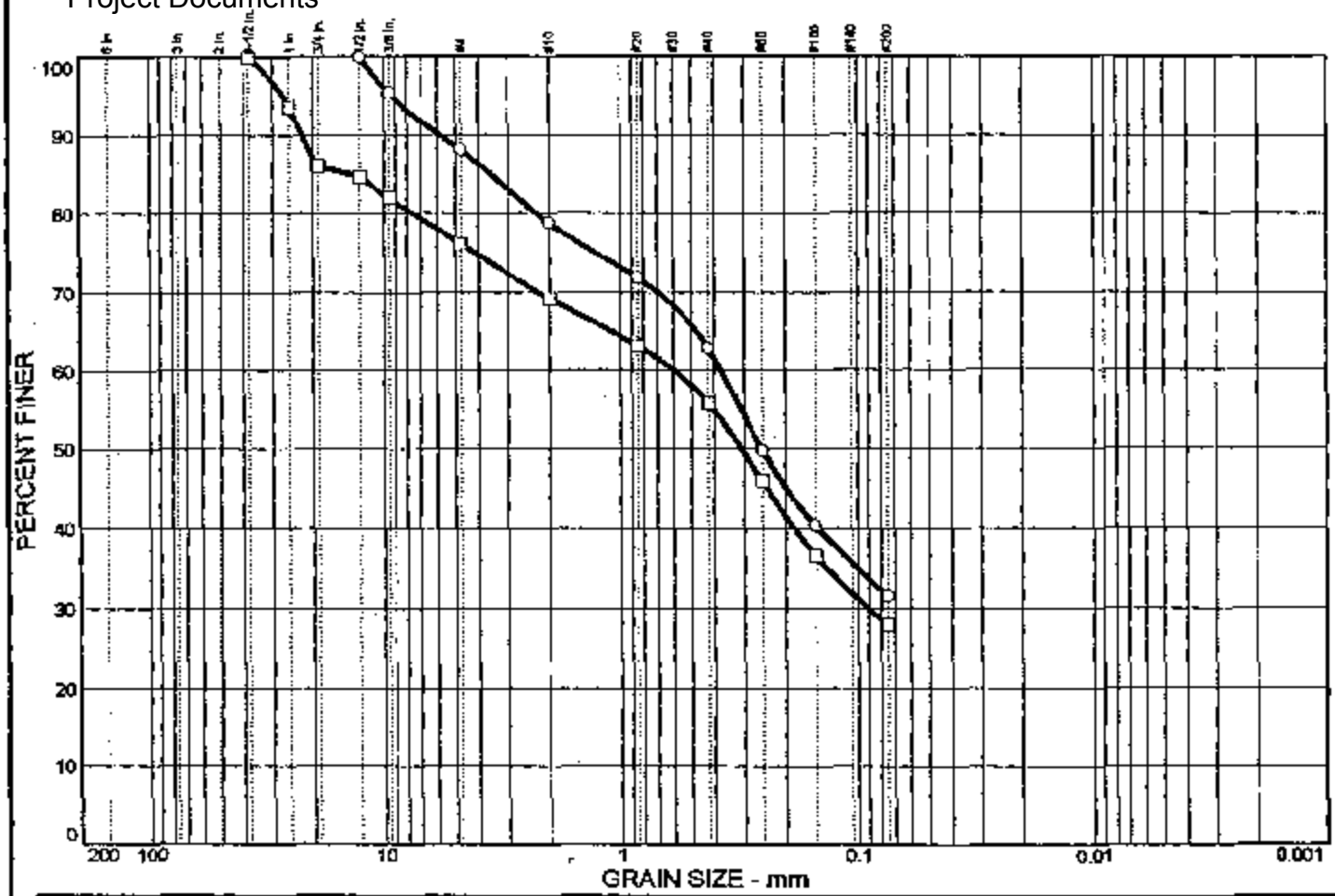
HARTCROWSER

7498 06/01

Figure A-10

BORING LOG 749800.GPJ HC CORP.GDT 8/22/01

PARTICLE SIZE DISTRIBUTION TEST REPORT



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	11.9	9.3	16.0	31.3	31.5	
□	0.0	13.9	9.9	7.0	13.4	27.9	27.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			3.55	0.376	0.252					
□			13.9	0.590	0.307	0.0906				

MATERIAL DESCRIPTION	USCS	NAT. MOIST.
○ Slightly gravelly, very silty SAND	SM	20%
□ Gravelly, silty SAND	SM	12%

Remarks:

○

□

Project: Best Buy Bellevue

Client: Best Buy

○ **Source:** B-1 **Sample No.:** S-2

□ **Source:** B-8 **Sample No.:** S-2

HARTCROWSER

7498 6/19/2001

Figure No. B-2

APPENDIX D

PROJECT DRAWINGS

APPENDIX D

PROJECT DRAWINGS

TABLE OF CONTENTS

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D.2 REFERENCES D-2

APPENDIX D

PROJECT DRAWINGS

D.1 INTRODUCTION

Recommendations presented in this report are based on the project design as presented in the 60% and 90% Submittal drawings. Selected sheets from the project drawing sets for Phase 1 (PB Americas, 2011a and 2012) and Phase 2 (PB Americas, 2011b) are included in this appendix for reference and to illustrate the design concept where it is referred to in the report. The complete 90% Submittal drawings were not available during the preparation of this report. However, we understand that the design details that may impact the geotechnical aspects of the project in the remaining 90% submittal drawings not included in this Appendix are not substantially different and therefore will not affect our recommendations. Not all aspects of the project are included on the sheets included herein. The complete drawing sets should be referred to as necessary to understand the project.

The 60% and 90% Submittal drawing sheets included in this appendix are as follows:

Phase 1:

- Cover Page (60% Submittal)
- RP01 to RP03 (60% Submittal)
- PV01, PV02 (60% Submittal)
- DR01 to DR05 (60% Submittal)
- DRP01, DRP02 (60% Submittal)
- WP01 (60% Submittal)
- RW01 to RW11, RW16 (90% Submittal)
- SL01, SL02 (90% Submittal)

Phase 2:

- Cover Page (60% Submittal)
- RP01 to RP03 (60% Submittal)
- PV01, PV02 (60% Submittal)
- PD01, PD02 (60% Submittal)
- DW01, DW02 (60% Submittal)
- DR01 to DR03 (60% Submittal)
- WP01 (60% Submittal)
- IL01, IL02 (60% Submittal)
- SG01 (60% Submittal)

D.2 REFERENCES

PB Americas, 2011a, NE 4th St / 120th Ave NE Corridor Project: BNSF RR Right-of-Way to 120th Ave NE, 60% Submittal, July 28.

PB Americas, 2011b, NE 4th St / 120th Ave NE Corridor Project: 116th Ave NE to BNSF RR Right-of-Way, 60% Submittal, July 28.

PB Americas, 2012, NE 4th St / 120th Ave NE Corridor Project: BNSF RR Right-of-Way to 120th Ave NE, 90% Submittal, September 13.

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

CITY OF BELLEVUE
TRANSPORTATION DEPARTMENT

NE 4TH ST / 120TH AVE NE CORRIDOR PROJECT
116TH AVE NE TO BNSF RR RIGHT-OF-WAY

CITY MANAGER
STEVEN R. SARKOZY

MAYOR
DON DAVIDSON

DEPUTY MAYOR
CONRAD LEE

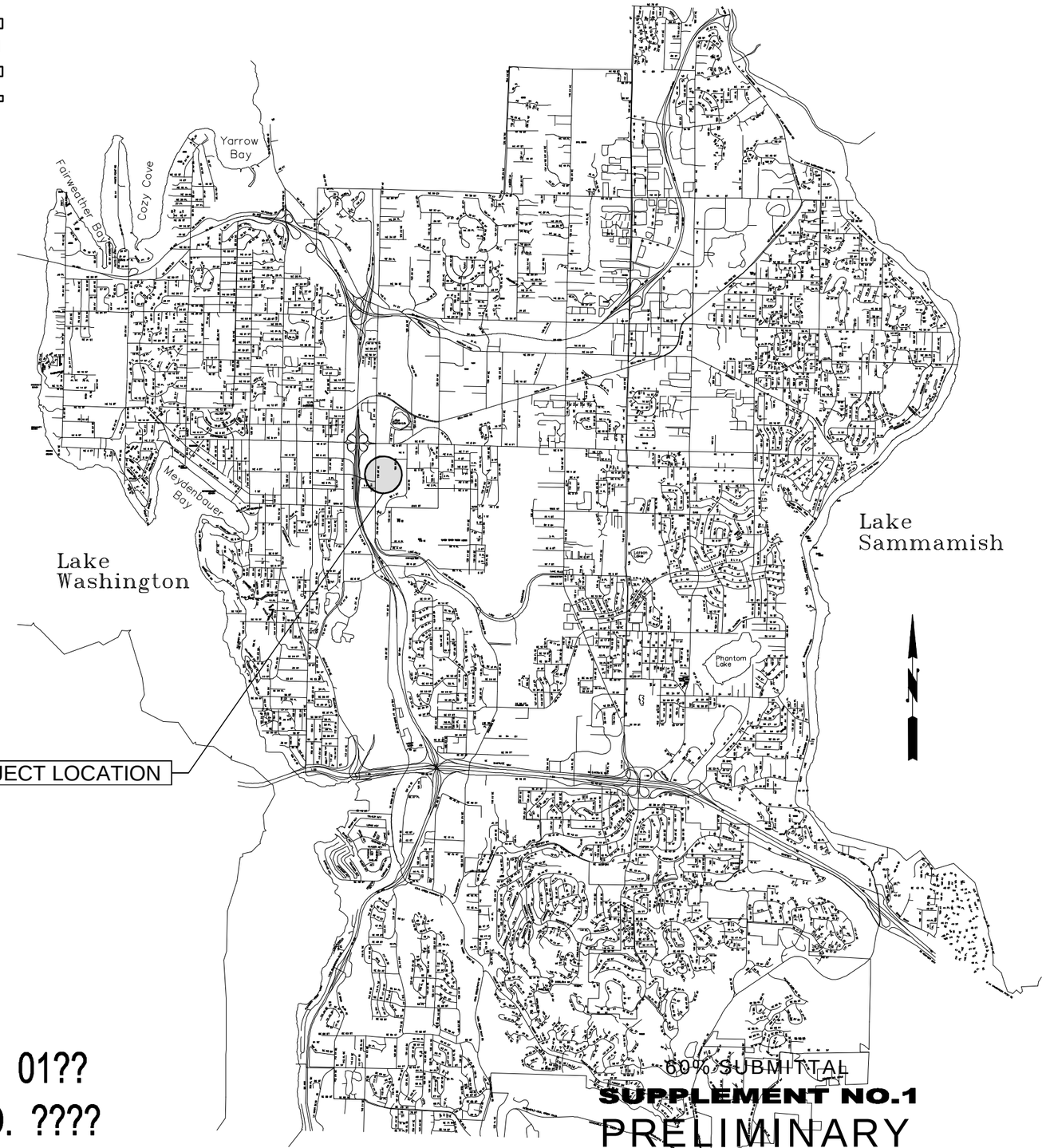
DIRECTOR OF TRANSPORTATION
GORAN SPARRMAN

CITY COUNCIL
CLAUDIA BALDUCCI
JOHN CHELMINIAK
GRANT DEGGINGER
JENNIFER ROBERTSON
KEVIN WALLACE

SCHEDULE OF DRAWINGS

NO.	SHEET ID	TITLE
1	**GN01**	**COVER SHEET**
2–3	GN02–GN03	GENERAL NOTES, ABBREVIATIONS & LEGEND
4–5	SP01–SP02	SITE PREPARATION PLANS
6–7	EP01–EP02	EROSION CONTROL PLANS
8–9	RS01–RS02	ROADWAY SECTIONS
10–12	RP01–RP03	ROADWAY PLAN AND PROFILE SHEETS
13–15	PV01–PV03	PAVING PLANS
16–20	DR01–DR05	DRAINAGE AND UTILITY PLANS & DETAILS
21–22	DPR01–DPR02	DRAINAGE PROFILES
23	WP01	WATER PROFILE
24–27	RW01–RW04	RETAINING WALL PLAN & ELEVATION SHEETS
28	RW05	WALL EXCAVATION AND BACKFILL
29–34	RW06–RW11	RETAINING WALL DETAILS
35–38	CH01–CH04	SIGNING AND STRIPING PLANS
39–40	**IL01–IL02**	**STREET LIGHTING PLANS**
41–44	**SG01–SG04**	**SIGNAL PLAN AND DETAILS**
45	**L1.00**	**LANDSCAPE SHEET LAYOUT**
46–48	L1.01–L1.03	LANDSCAPE PLANTING PLAN
49–51	**L2.01–L2.03**	**LANDSCAPE IRRIGATION PLAN**
52–53	L4.01–L4.02	LANDSCAPE DETAILS
54	**L4.03**	**LANDSCAPE DETAILS**

NOTE: SHEETS INCLUDED IN THIS SUPPLEMENT ARE SHOWN IN **BOLD**



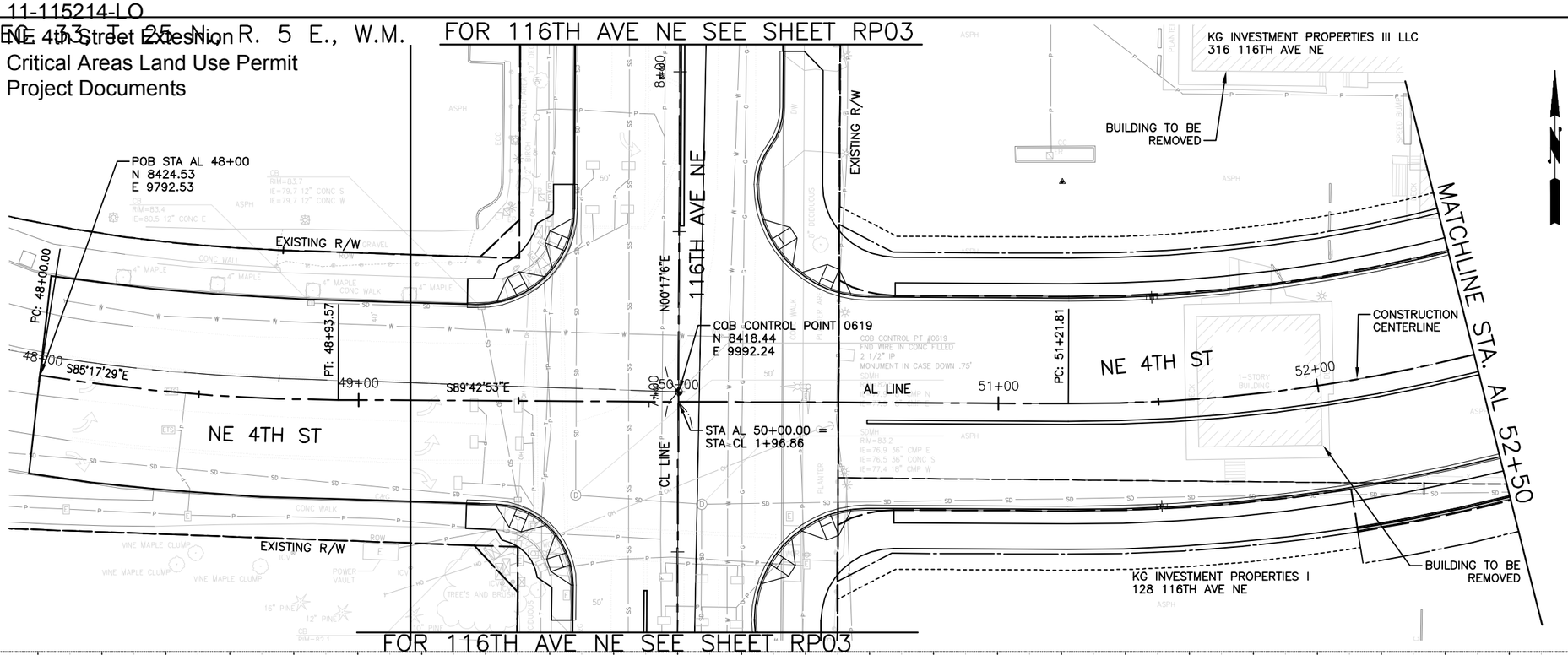
BID NO. 01??
C.I.P. NO. ????
FEDERAL AID NO. ????

60% SUBMITTAL
SUPPLEMENT NO.1
PRELIMINARY
NOT FOR CONSTRUCTION

11-115214-LO

NE 4th Street Extension
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.



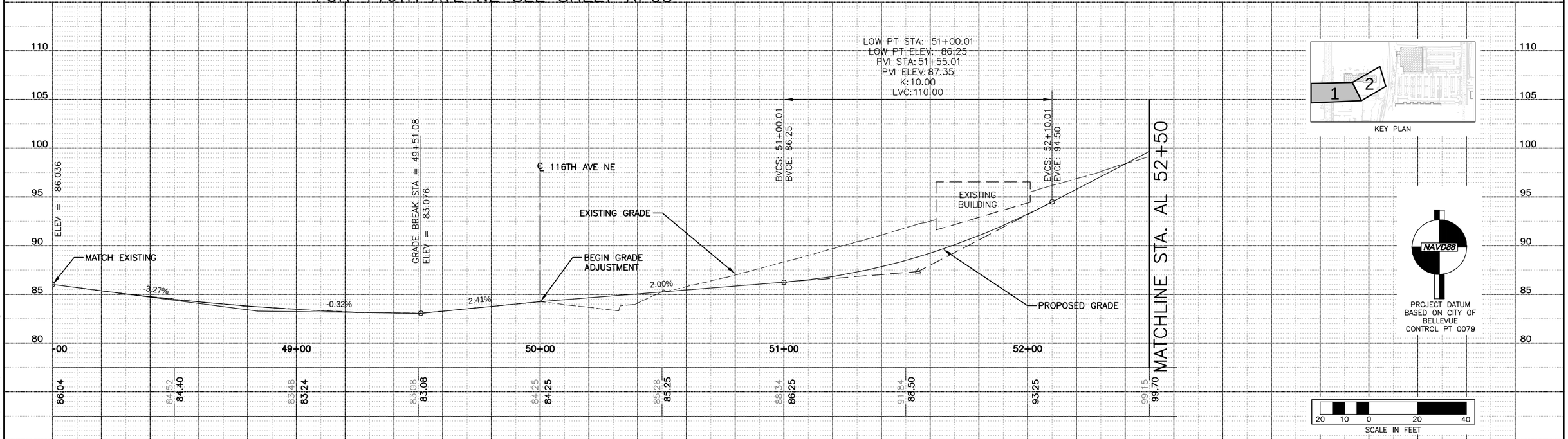
GENERAL NOTES:

1. FOR TYPICAL SECTIONS SEE SHEET RS01 AND RS02.
2. FOR CHANNELIZATION PLANS SEE SHEET CH01.

NOTES:

1. SEE SHEET RP03 FOR CL LINE ALIGNMENT AND PROFILE.

PI STATION	DELTA	RADIUS	TANGENT	LENGTH
48+46.88	8°50'48"	606.00'	46.88'	93.57'
52+35.90	25°13'10"	510.00'	114.09'	224.48'



NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

R.SHELTON	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH N. LOEN — STATE OF WASHINGTON — 38507 — REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 3000
SEATTLE, WASHINGTON 98104-4029
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

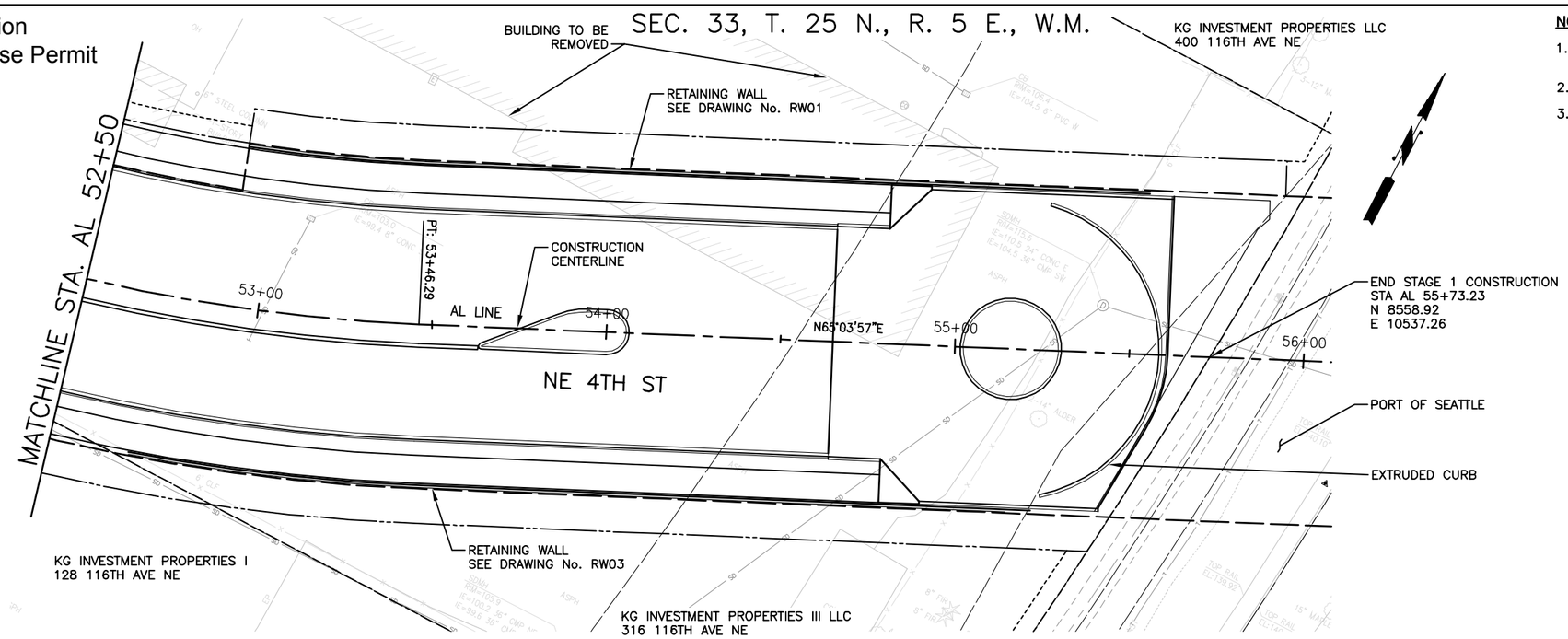
ROADWAY PLAN AND PROFILE
SHEET 1 OF 3
AL LINE STA. 48+00 TO 52+50

RP01 — SHT ____ OF ____

J:\160162C_ NE4thSExt\CADD\CIVIL\PH1\SHT\NE4PH1-RP01.dwg Jun 02, 2011 - 2:13pm

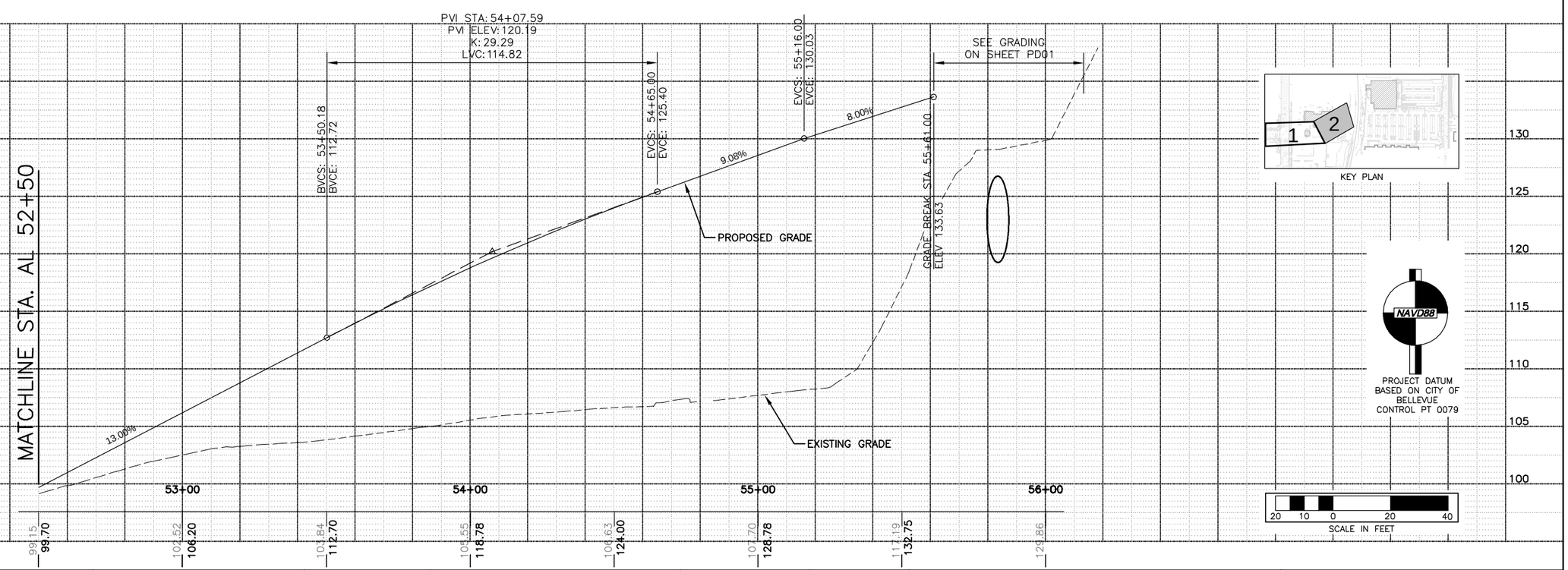
11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents



NOTES:

1. CONSTRUCTION ACTIVITY NOT PERMITTED ON BNSF RR RIGHT-OF-WAY.
2. FOR CHANNELIZATION PLANS SEE SHEET CH02.
3. FOR TYPICAL SECTION SEE SHEETS RS01 AND RS02.



NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH L. LOEN — STATE OF WASHINGTON — 38507 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 1000
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF-WAY

ROADWAY PLAN AND PROFILE
SHEET 2 OF 2
AL LINE STA. 52+50 TO 56+00

RP02 — SHT ____ OF ____

J:\160162C_ NE4thSExt\CADD\CIV\PH1\SHT\NE4PH1-RP02.dwg Jun 02, 2011 - 2:20pm

11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

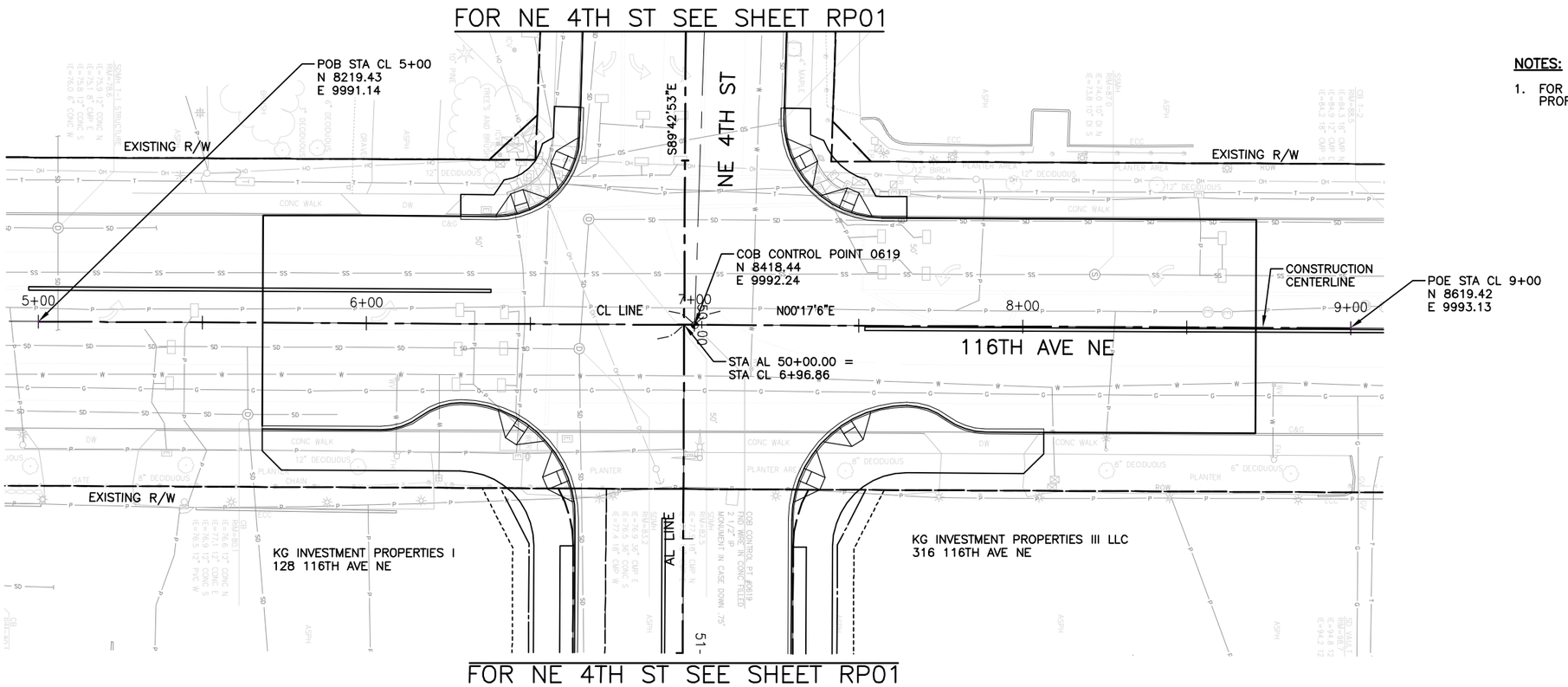
SEC. 33, T. 25 N., R. 5 E., W.M.

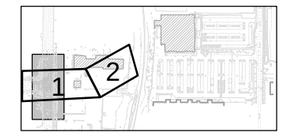
GENERAL NOTES:

1. FOR TYPICAL SECTIONS SEE SHEET RS02.
2. FOR CHANNELIZATION PLANS SEE SHEET CH01.

NOTES:

1. FOR AL LINE ALIGNMENT (NE 4TH STREET) AND PROFILE DATA SHEETS RP01 AND RP02.





KEY PLAN

NAVD88

PROJECT DATUM
BASED ON CITY OF
BELLEVUE
CONTROL PT 0079

20 10 0 20 40
SCALE IN FEET

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

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M.SOPER	5/20/11
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K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOEN
STATE OF WASHINGTON
38507
REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 300
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

ROADWAY PLAN
SHEET 3 OF 3
CL LINE STA. 0+00 TO 4+00

RP03

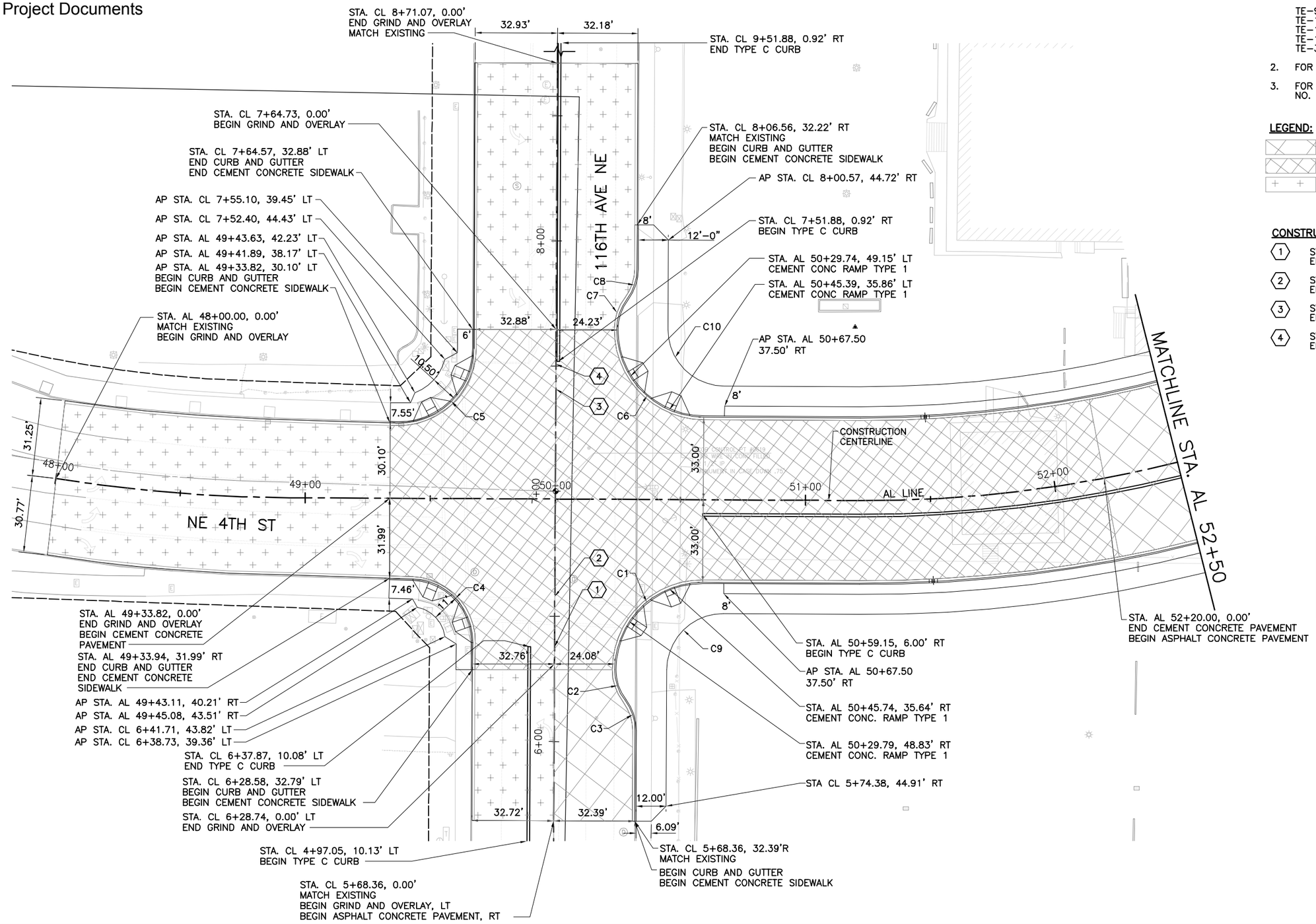
SHT _____ OF _____

J:\160162C_ NE4thSExt\CADD\CIVI\PH1\SHT\NE4PH1-RP03.dwg Jun 02, 2011 - 2:23pm

11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.



GENERAL NOTES:

1. SEE CITY OF BELLEVUE STANDARD PLANS:

   TE-9A/B TYPE A CURB, TYPE C CURB
   TE-10 CURB AND GUTTER, EXTRUDED CURB
   TE-11 CEMENT CONCRETE SIDEWALK
   TE-12 CURB RAMP TYPE 1
   TE-34 METAL SAFETY RAILING

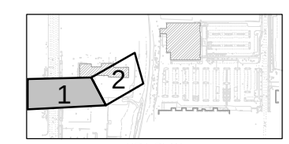
2. FOR CURVE TABLES SEE DRAWING NO. PV03.
3. FOR TYPICAL ROADWAY SECTIONS SEE DRAWING NO. RS01 AND RS02.

LEGEND:

- ASPHALT CONCRETE PAVEMENT
- CEMENT CONCRETE PAVEMENT
- GRIND AND OVERLAY

CONSTRUCTION NOTES:

1. STA CL 6+37.92, 0.00' RT. EL. 82.66
2. STA CL 6+57.92, 0.00' RT. EL. 83.06
3. STA CL 7+35.88, 0.00' RT. EL. 85.34
4. STA CL 7+55.88, 0.00' RT. EL 85.74



KEY PLAN

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

J:\160162C_ NE4thSExt\CADD\CW\PH1\SHT\NE4PH1-PV01.dwg Jun 02, 2011 - 2:31pm

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON 5/13/11 — DESIGNED BY DATE
M.SOPER 5/20/11 — DRAWN BY DATE
K.LOEN 5/23/11 — CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

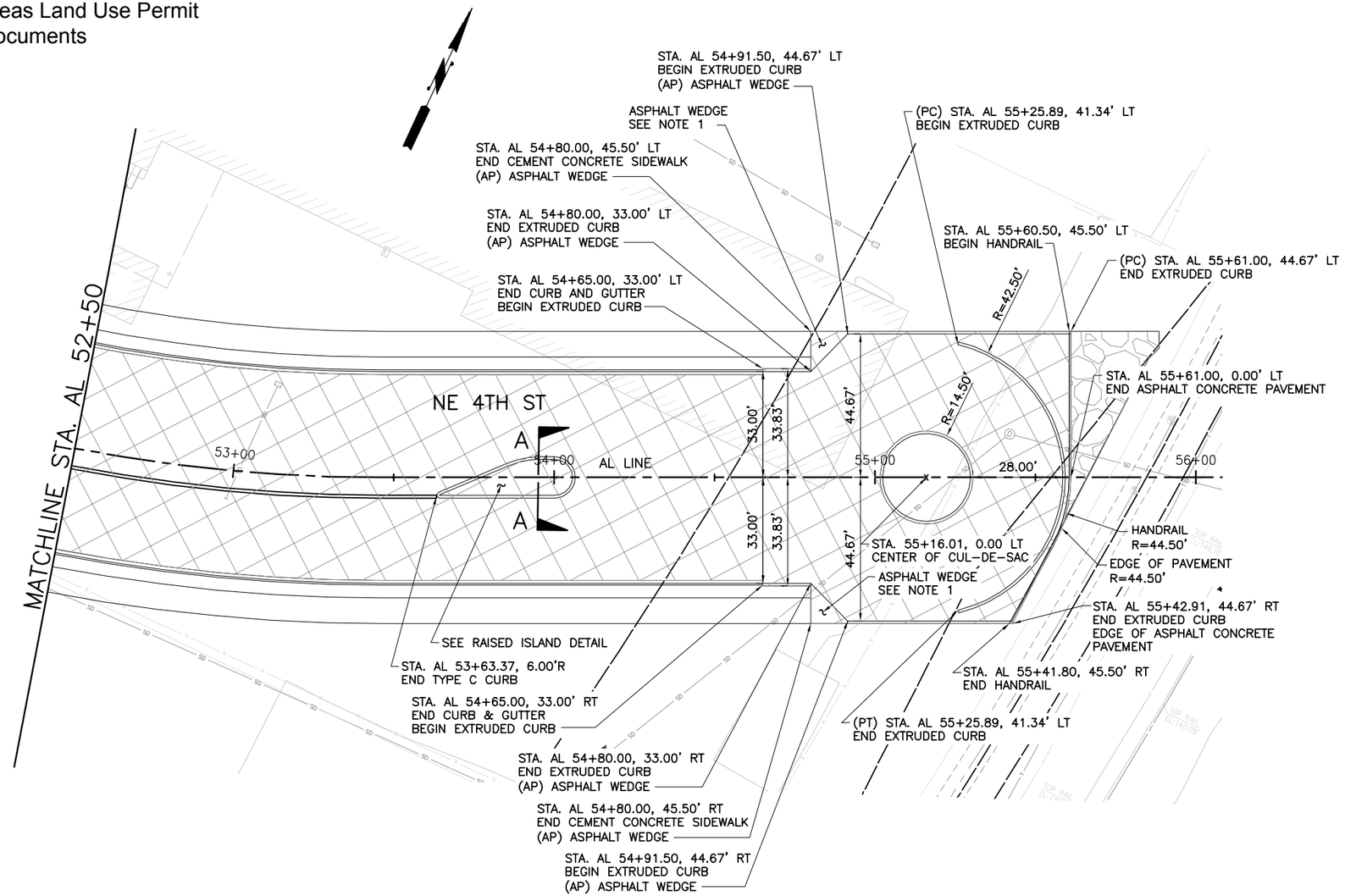
NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

PAVING PLAN
SHEET 1 OF 2
AL LINE STA. 48+00 TO 52+50

PV01

SHT ____ OF ____

SEC. 33, T. 25 N., R. 5 E., W.M.



NOTES:

1. THE ASPHALT WEDGE SHALL PROVIDE A SMOOTH TRANSITION FROM THE END OF THE SIDEWALK TO THE ASPHALT CONCRETE PAVEMENT.
2. FOR TYPICAL ROADWAY SECTIONS SEE DRAWING NO. RS01 AND RS02.

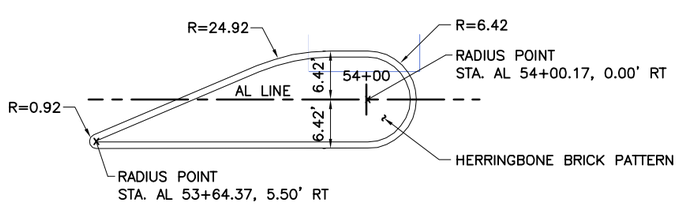
CONSTRUCTION NOTES:

(1) TBD

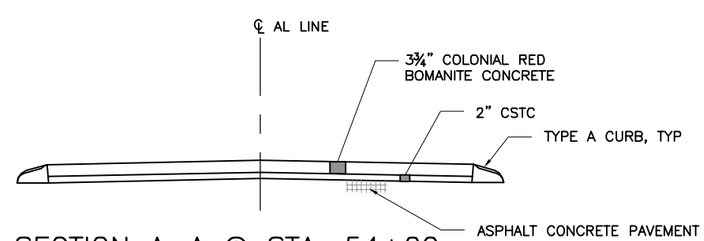
LEGEND:

- ASPHALT CONCRETE PAVEMENT
- CEMENT CONCRETE PAVEMENT
- GRIND AND OVERLAY
- GRAVEL BORROW

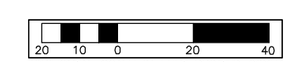
KEY PLAN



RAISED ISLAND
SCALE: NTS



SECTION A–A @ STA. 54+00
SCALE: NTS



HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
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Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2300
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

PAVING PLAN
SHEET 2 OF 2
AL LINE STA. 52+50 TO 56+00

PV02

SHT ____ OF ____

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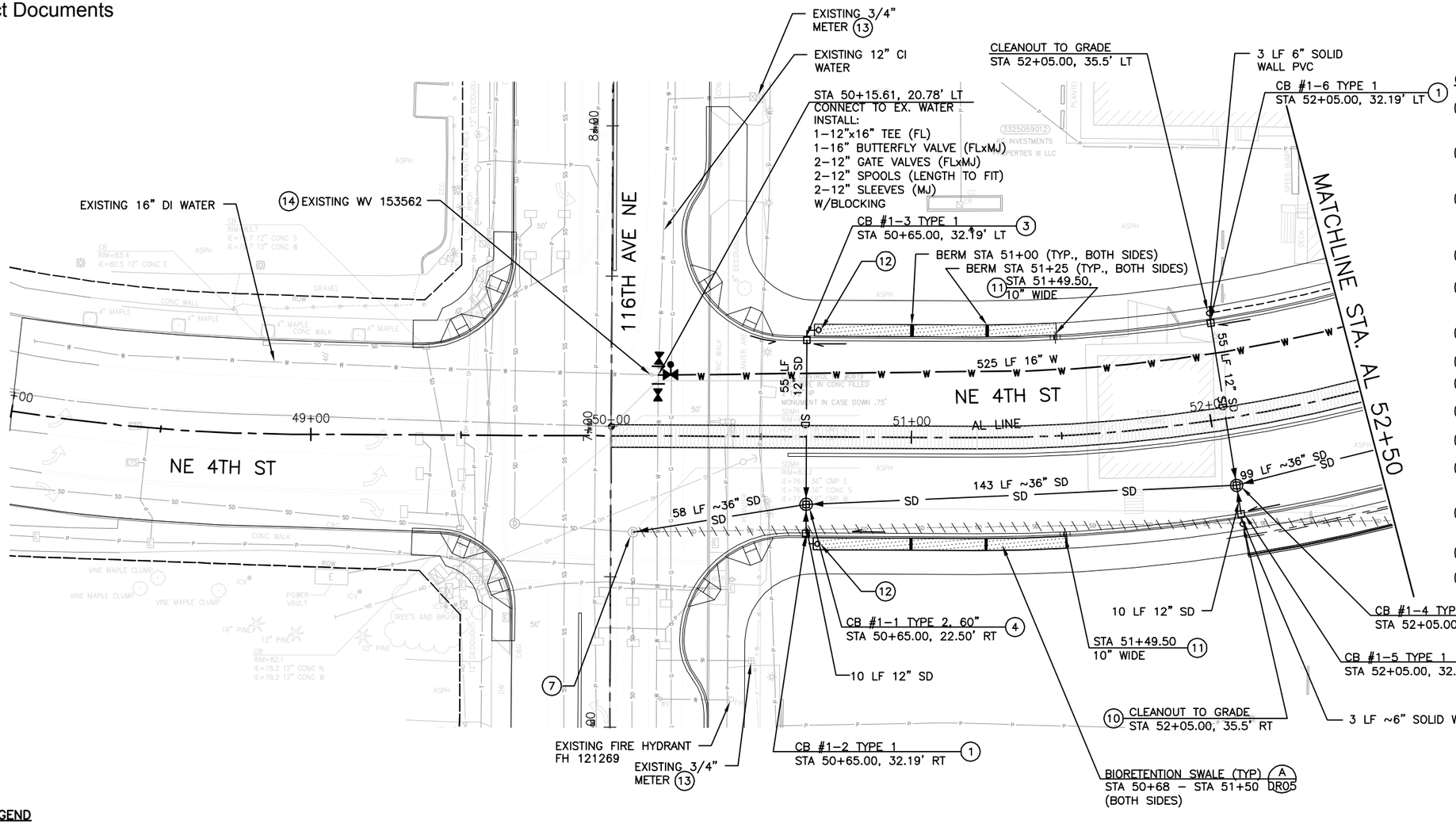
11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.

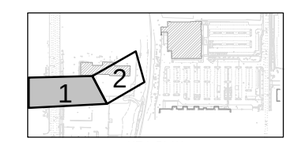


GENERAL NOTES:

1. ALL OFFSETS PROVIDED ARE TO CENTER OF GRATE UNLESS OTHERWISE NOTED.
2. ALL STORM LABELED SD SHALL BE CORRUGATED POLYETHYLENE STORM SEWER PIPE UNLESS OTHERWISE NOTED.

CONSTRUCTION NOTES:

1. INSTALL BOLT-LOCKING VANED DUCTILE IRON GRATE WITH CAST IRON FRAME PER CITY OF BELLEVUE STANDARD DETAIL No. D-6 AND No. D-9.
2. INSTALL SOLID BOLT-LOCKING MANHOLE RING AND COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-22.
3. INSTALL THRU-CURB INLET FRAME AND BI-DIRECTIONAL VANED GRATE PER CITY OF BELLEVUE STANDARD DETAIL No. D-10 AND No. D-11, AND WSDOT STANDARD PLAN B-30.40-00.
4. INSTALL BOLT-LOCKING SOLID COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-8.
5. INSTALL SPILL CONTROL (SC) SEPARATOR TYPE 2 PER CITY OF BELLEVUE STANDARD DETAIL No. D-43.
6. REMOVE EXISTING CB TYPE 2 AND REPLACE WITH NEW MANHOLE 60 INCH DIAMETER TYPE 1.
7. CONNECT NEW SD PIPE TO EXISTING CB.
8. CONNECT TO EXISTING SD PIPE.
9. INSTALL DEBRIS CAGE PER CITY OF BELLEVUE STANDARD DETAIL No. D-39.
10. CONNECT TO WALL DRAIN.
11. INSTALL DRAIN CURB CUT OPENING FOR BIORETENTION PER CITY OF BELLEVUE STD. DETAIL NO. NDP-10.
12. INSTALL OVERFLOW PER CITY OF BELLEVUE STD. DETAIL NO. NDP-8. CONNECT TO TYPE 1 CB AS SHOWN.
13. ABANDON EXISTING WATER SERVICE.
14. ADJUST EXISTING WATER VALVE BOX TO GRADE.



KEY PLAN

LEGEND

— SS —	SANITARY SEWER
— SD —	STORM DRAIN
— W —	WATER LINE
□	CATCH BASIN TYPE 1 OR CATCH BASIN TYPE 1L PER CITY OF BELLEVUE STANDARD DETAIL No. D-2 OR No. D-3
	CATCH BASIN TYPE 2 PER CITY OF BELLEVUE STANDARD DETAIL No. D-4
SD	EXISTING STORM DRAIN TO BE REMOVED
	BUTTERFLY VALVE
	GATE VALVE
•	SANITARY SEWER CLEANOUT TO GRADE PER CITY OF BELLEVUE STANDARD DETAIL No. S-16
	JOINT UTILITY TRENCH
	MANHOLE TYPE 1 PER CITY OF BELLEVUE STANDARD DETAIL No. D-17
○	STORM CLEANOUT TO GRADE PER CITY OF BELLEVUE STANDARD DETAIL No. D-52
	MANHOLE TYPE 1 W/DEBRIS CAGE PER CITY OF BELLEVUE STANDARD DETAIL No. D-39
	GRT = GRATE
	STR = STRUCTURE
	1" AIR AND VACUUM RELEASE VALVE ASSEMBLY PER CITY OF BELLEVUE STANDARD DETAIL NO. W-16
	2" BLOW-OFF ASSEMBLY PER CITY OF BELLEVUE STANDARD DETAIL NO. W-15

N

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

C.VANIER	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

DRAINAGE PLAN
SHEET 1 OF 2
AL LINE STA. 48+00 TO 52+50

DR01 — SHT ____ OF ____

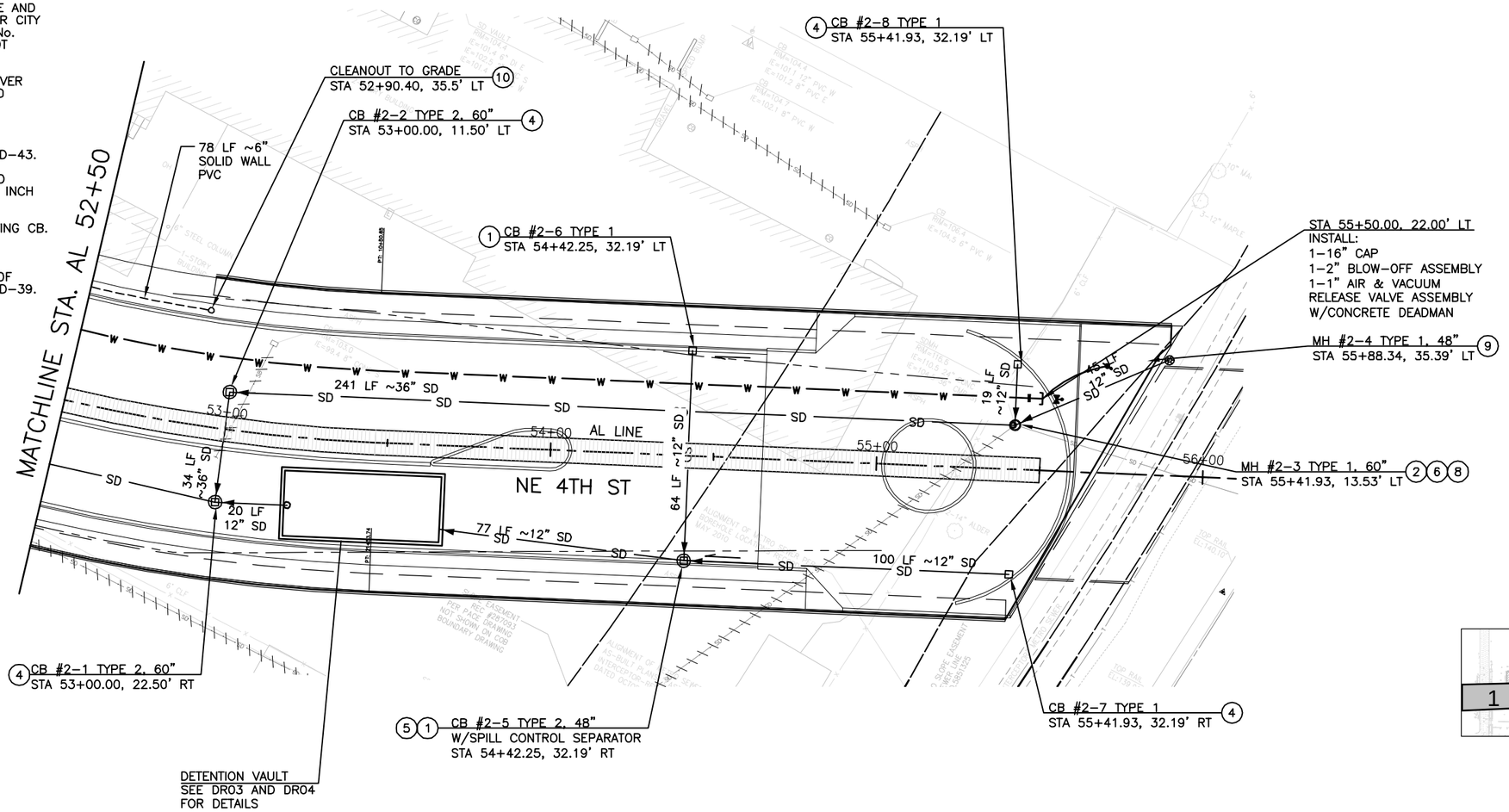
J:\160162C_ NE4thSExt\CADD\CIV\PH1\SHT\NE4PH1-DR01.dwg May 26, 2011 - 8:59am

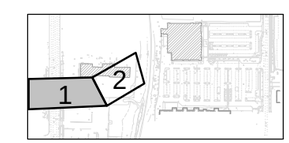
11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Number

SEC. 33, T. 25 N., R. 5 E., W.M.

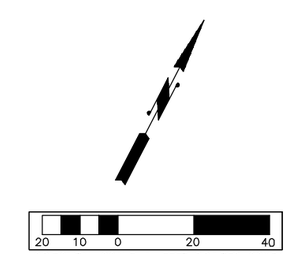
CONSTRUCTION NOTES:

1. INSTALL BOLT-LOCKING VANED DUCTILE IRON GRATE WITH CAST IRON FRAME PER CITY OF BELLEVUE STANDARD DETAIL No. D-6 AND No. D-9.
2. INSTALL SOLID BOLT-LOCKING MANHOLE RING AND COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-22.
3. INSTALL THRU-CURB INLET FRAME AND BI-DIRECTIONAL VANED GRATE PER CITY OF BELLEVUE STANDARD DETAIL No. D-10 AND No. D-11, AND WSDOT STANDARD PLAN B-30.40-00.
4. INSTALL BOLT-LOCKING SOLID COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-8.
5. INSTALL SPILL CONTROL (SC) SEPARATOR TYPE 2 PER CITY OF BELLEVUE STANDARD DETAIL No. D-43.
6. REMOVE EXISTING CB TYPE 2 AND REPLACE WITH NEW MANHOLE 60 INCH DIAMETER TYPE 1.
7. CONNECT NEW SD PIPE TO EXISTING CB.
8. CONNECT TO EXISTING SD PIPE.
9. INSTALL DEBRIS CAGE PER CITY OF BELLEVUE STANDARD DETAIL No. D-39.
10. CONNECT TO WALL DRAIN.





KEY PLAN



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TRAFFIC ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

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CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

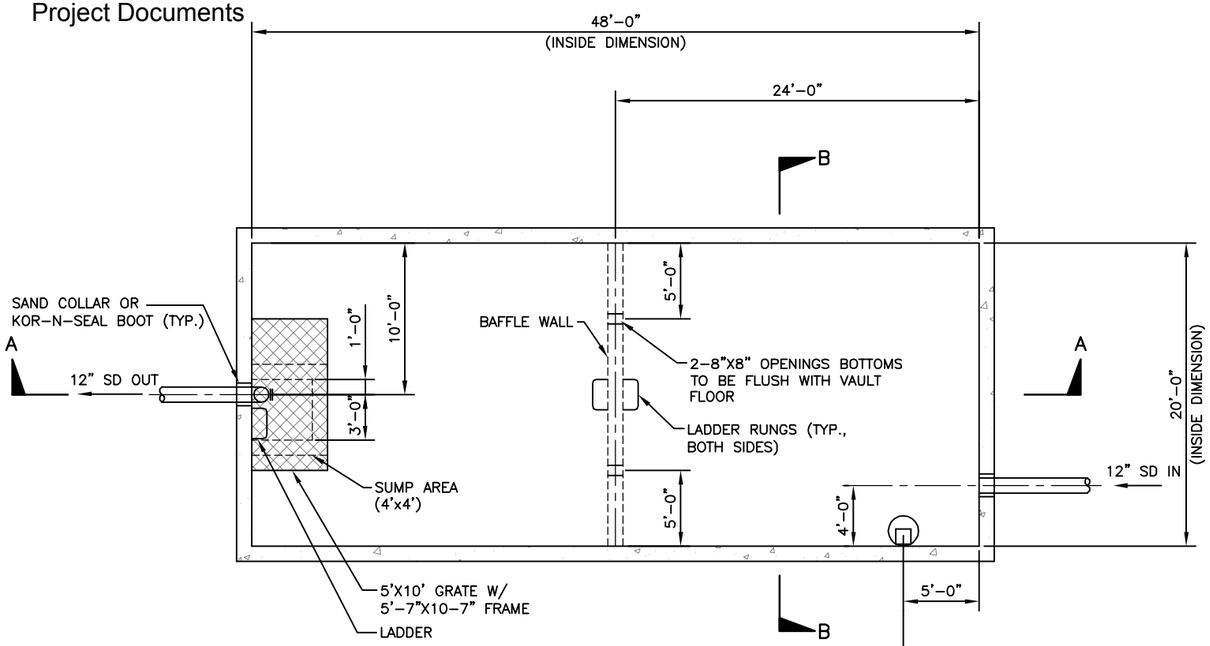
NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

DRAINAGE PLAN
SHEET 2 OF 2
AL LINE STA. 52+50 TO 56+00

DR02

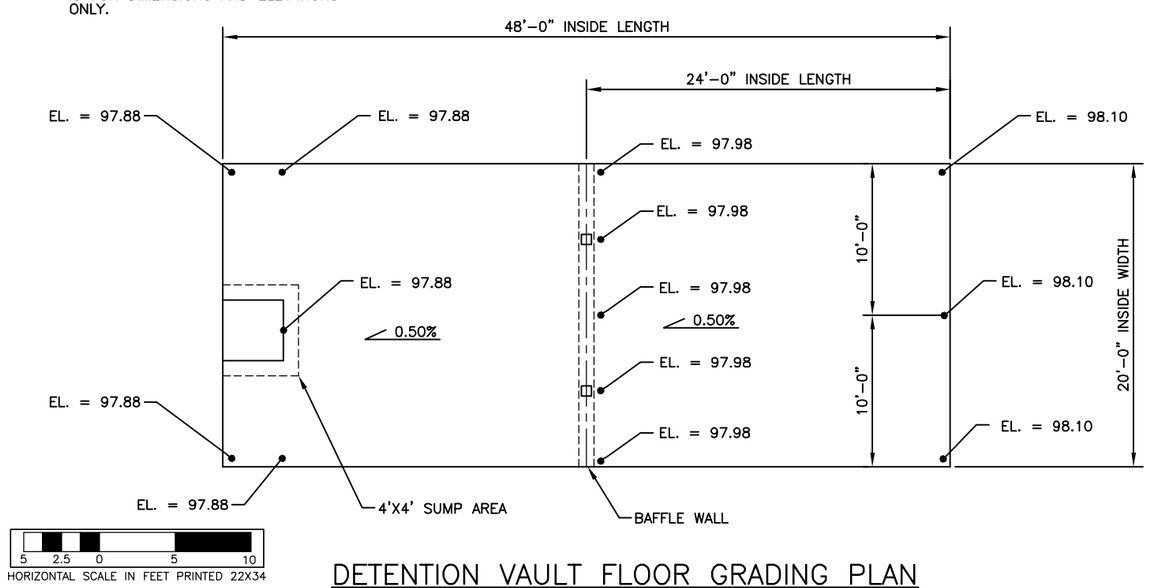
SHT ____ OF ____

J:\160162C_ NE4thStExt\CADD\CIV\PH1\SHT\NE4PH1-DR02.dwg May 26, 2011 - 9:07am

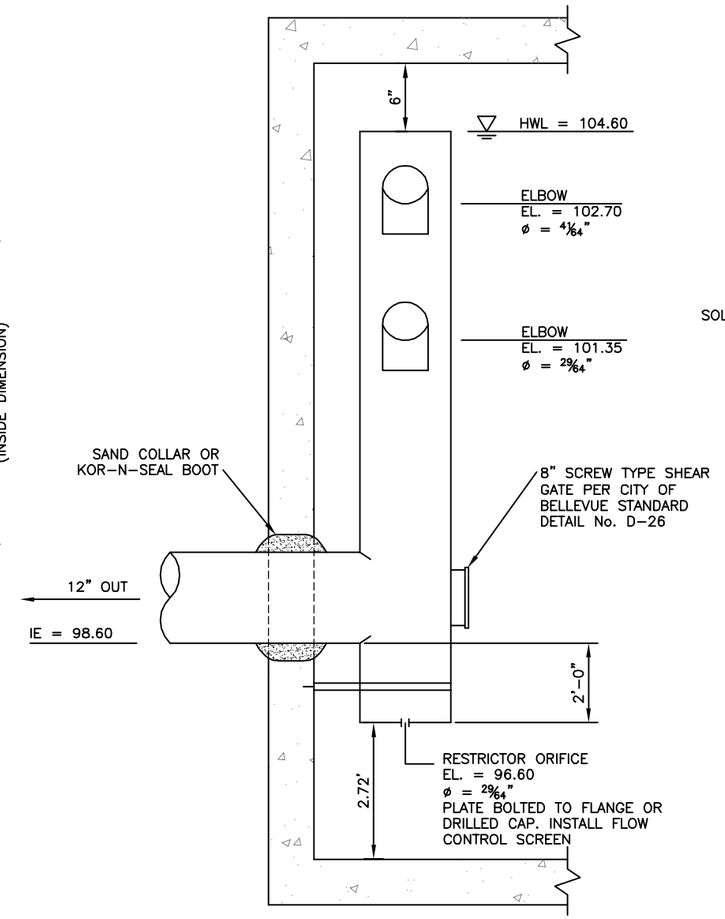


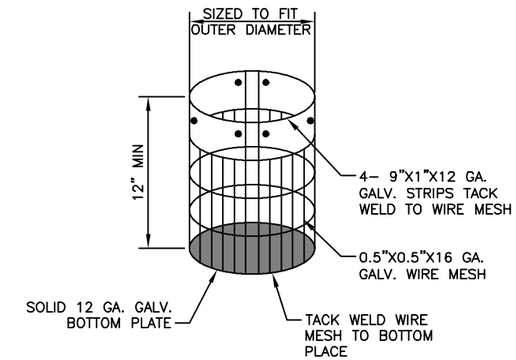
NOTES: DETENTION VAULT SHALL CONFORM TO ALL REQUIREMENTS OF CITY STANDARD DETAIL No. D-32. DETENTION VAULT STRUCTURAL DESIGN FOR CAST-IN-PLACE VAULTS SHALL BE STAMPED BY A LICENSED STRUCTURAL ENGINEER. THIS PLAN IS FOR DIMENSIONS AND ELEVATIONS ONLY.

DETENTION VAULT PLAN VIEW



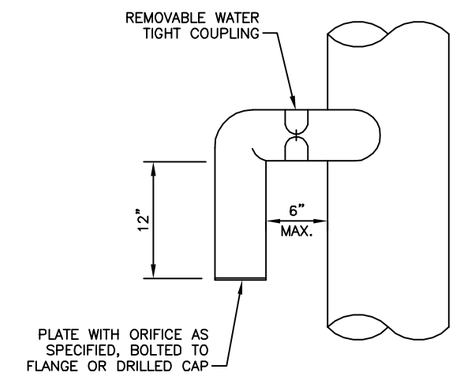
DETENTION VAULT FLOOR GRADING PLAN





NOTES: ATTACH SCREEN TO CMP CROSS W/ 6 1" METAL SCREWS-2 PER STRAP, OR USE STAINLESS STEEL PIPE CLAMP

FLOW CONTROL SCREEN



ELBOW DETAIL

NOTES:

1. PIPE SUPPORTS AND RESTRICTOR SHALL BE OF SAME MATERIAL AND BE ANCHORED AT 3' MAX. SPACING BY ⅝" DIAMETER STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED 2" IN WALL.
2. THE RESTRICTOR SHALL BE FABRICATED FROM 0.060" ALUMINUM, PVC, CPE, OR HDPE PIPE.
3. OUTLET SHALL BE CONNECTED TO STORM DRAINAGE PIPE WITH SUITABLE COUPLER OR GROUTED INTO THE BELL OF CONCRETE PIPE.
4. THE VERTICAL RISER STEM OF THE RESTRICTOR SHALL BE THE SAME DIAMETER AS THE HORIZONTAL OUTLET PIPE, WITH AN 8" MINIMUM DIAMETER. VERTICAL RISER SECTION SHALL BE ALIGNED PLUMB VERTICALLY. HORIZONTAL SECTION SHALL MATCH OUTLET PIPE SLOPE.

1 DR04 FLOW RESTRICTOR DETAIL

SCALE: NTS

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

C.VANIER	5/13/11
DESIGNED BY	DATE
C.COOK	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS — 999 3RD AVENUE, SUITE 2200, SEATTLE, WASHINGTON 98104-4020, PH: 206-382-5200

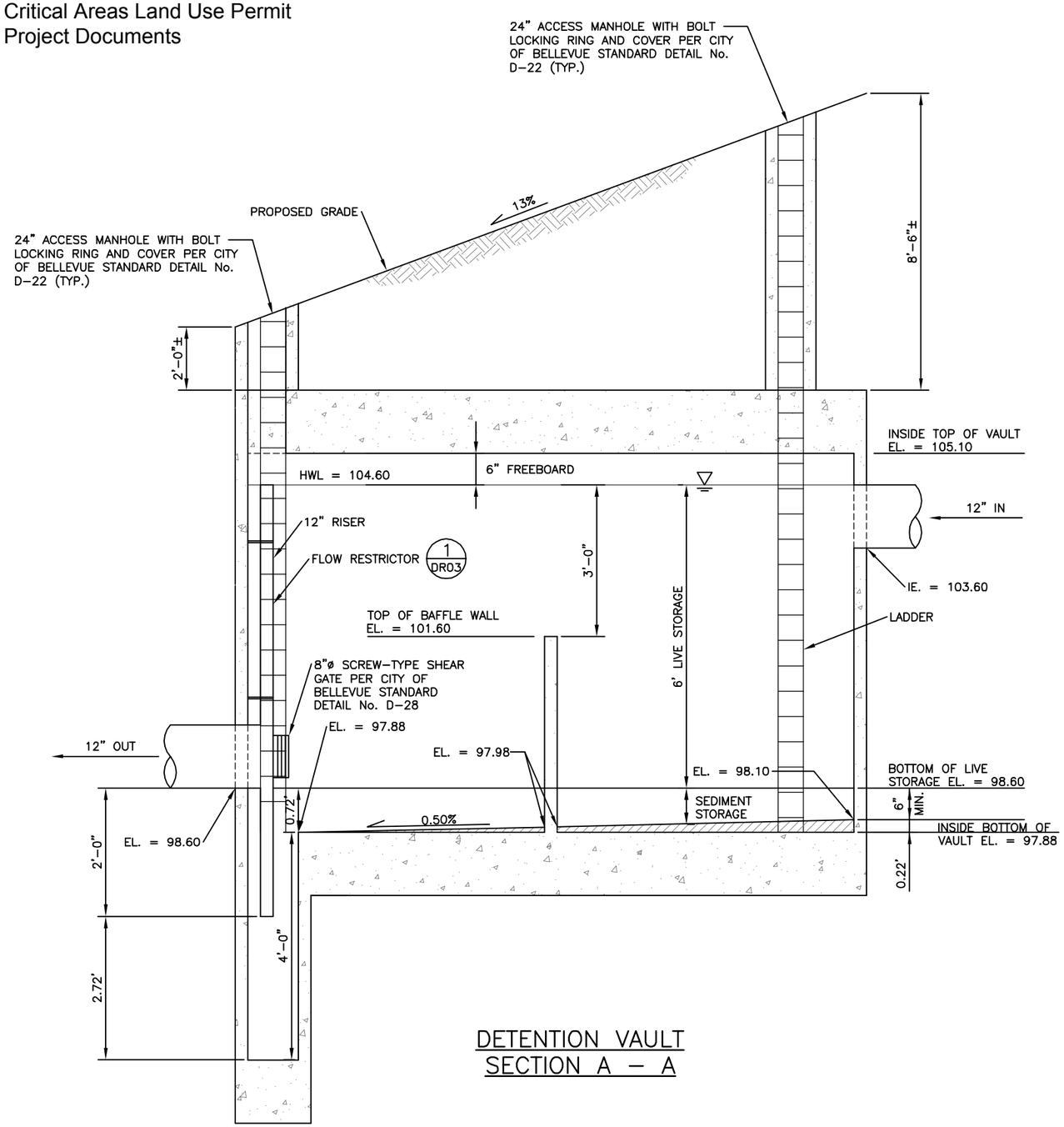
NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

DRAINAGE DETAILS

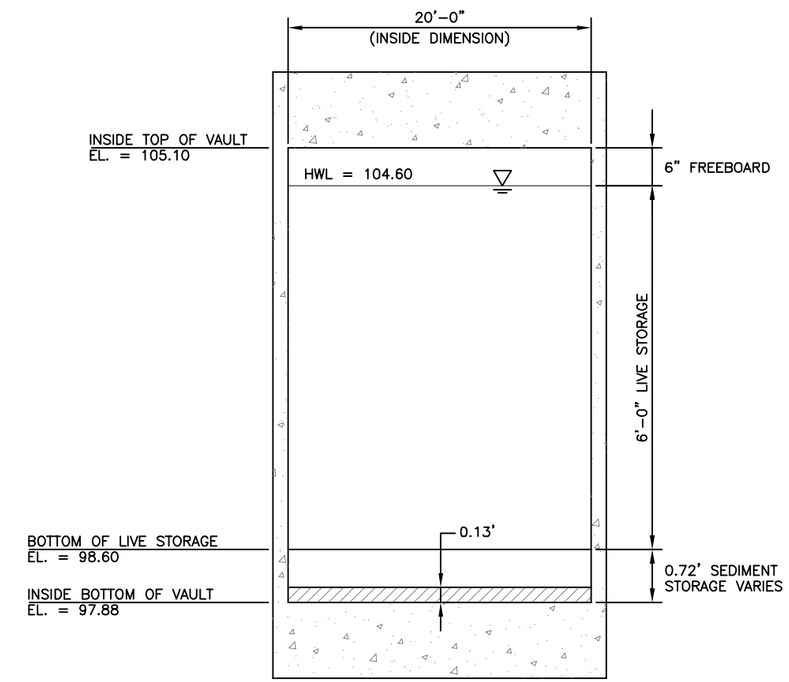
DR03

SHT ____ OF ____

J:\160162C_ NE4thStExt\CADD\CIVI\PH1\SHT\NE4PH1-DR03.dwg May 26, 2011 - 9:21am



DETENTION VAULT
SECTION A – A



DETENTION VAULT
SECTION B – B

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NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

C.VANIER	5/13/11
DESIGNED BY	DATE
C.COOK	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

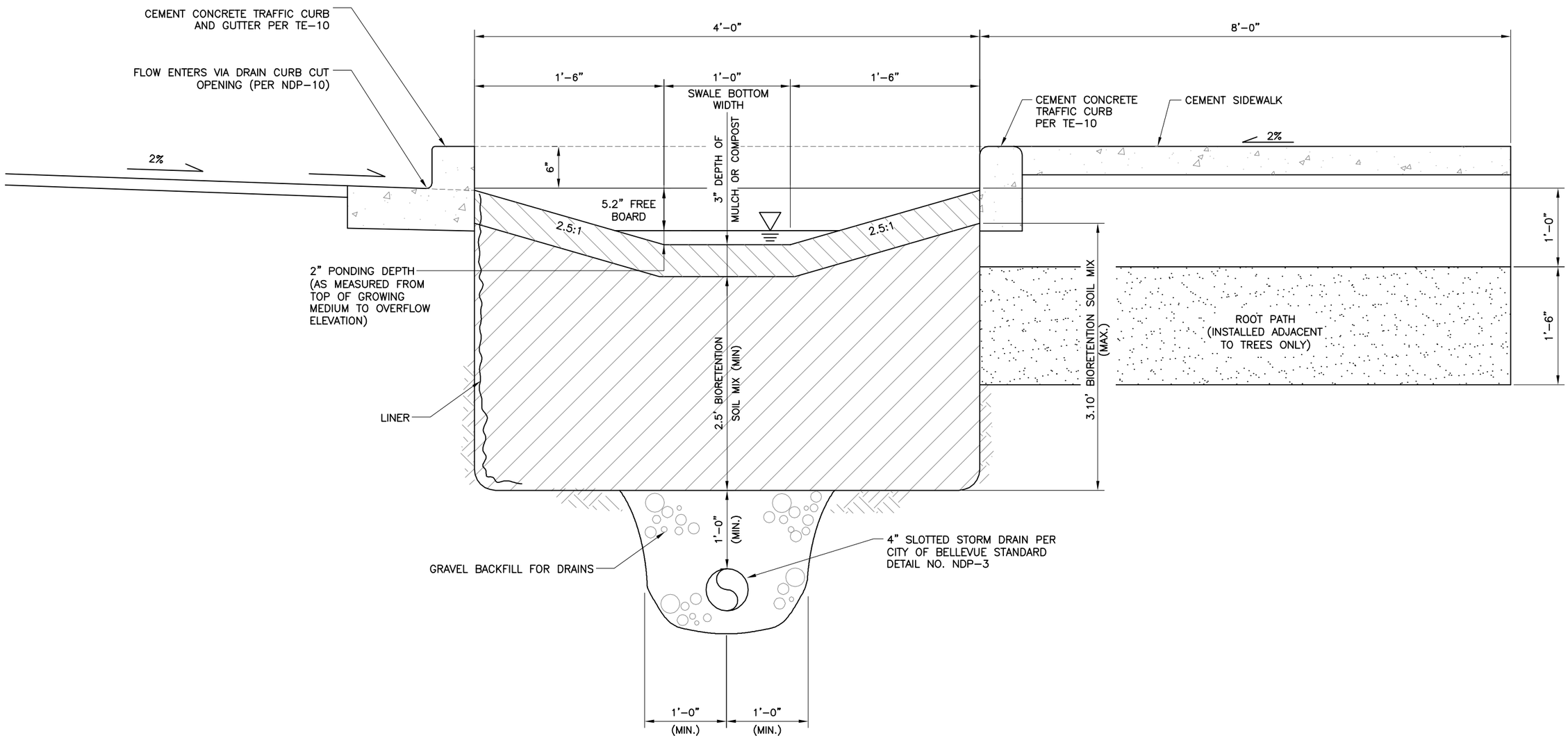
PB — 125 YEARS
999 3RD AVENUE, SUITE 2000
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

DRAINAGE DETAILS

DR04

SHT ____ OF ____



A BIORETENTION SWALE DETAIL
NOT TO SCALE

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

C.VANIER	5/13/11
DESIGNED BY	DATE
C.COOK	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER, STATE OF WASHINGTON, 31784, REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

BIORETENTION SWALE DETAILS

DR05 SHT ____ OF ____

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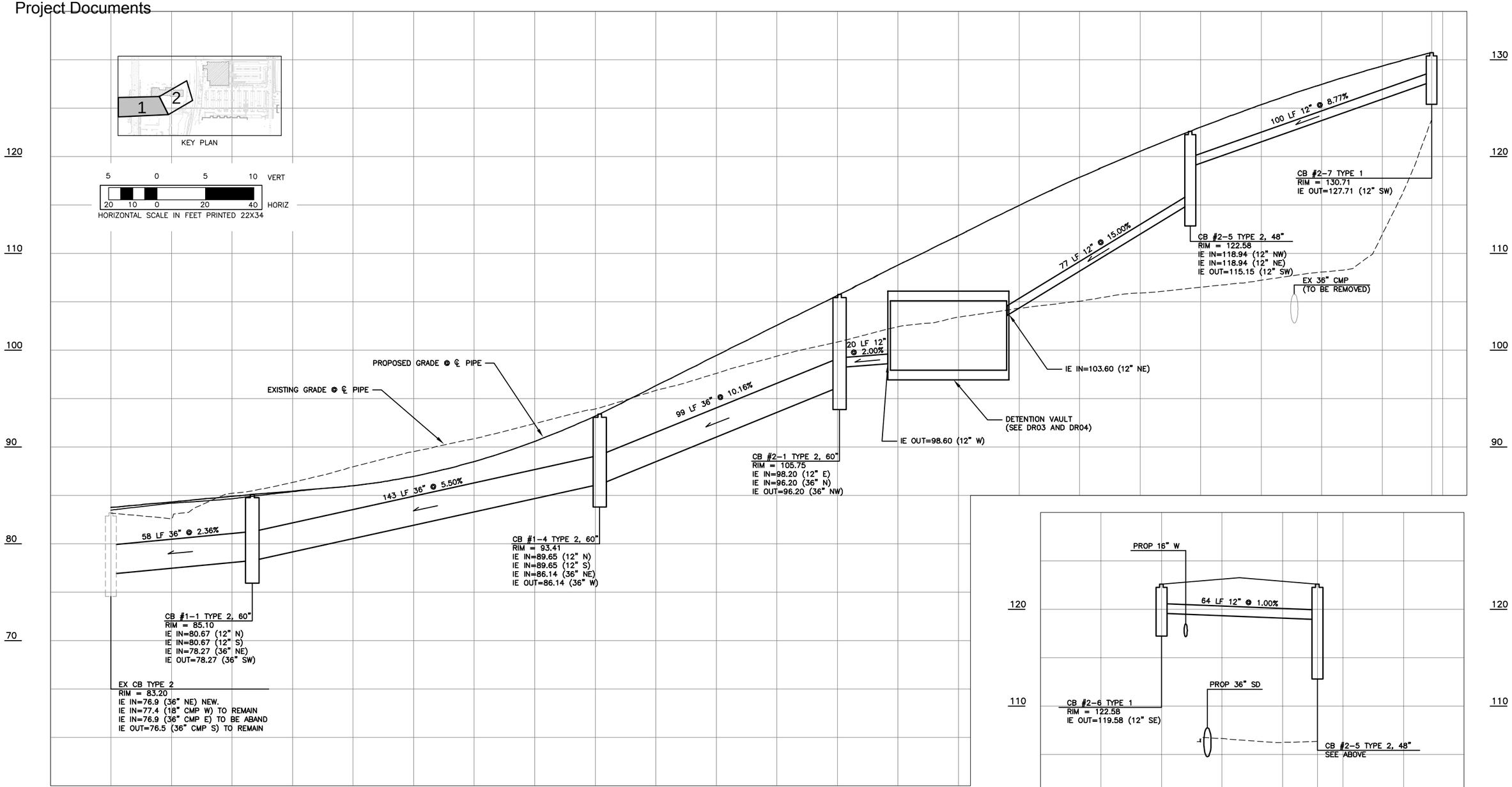


DRAINAGE NOTES:

1. TBD.

STA. 50+07 TO STA. 55+41.93

STA. 54+42.25

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

C.VANIER	5/13/11
DESIGNED BY	DATE
C.COOK	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2300
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

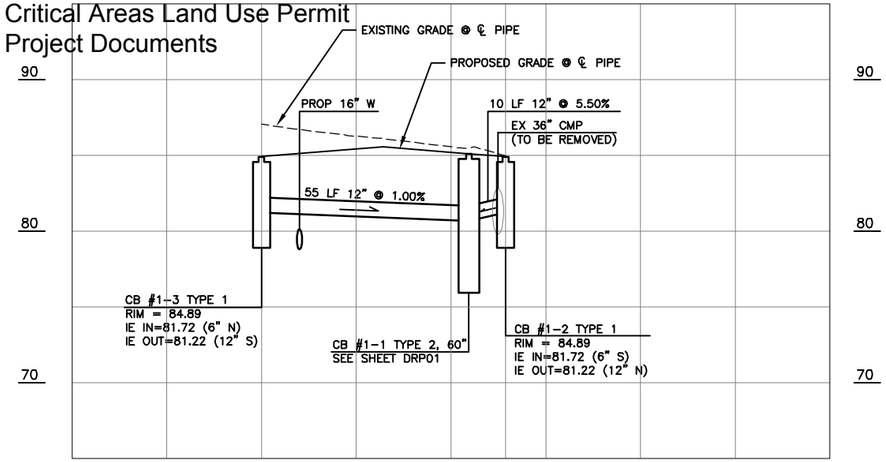
DRAINAGE PROFILE
SHEET 1 OF 2

DRP01

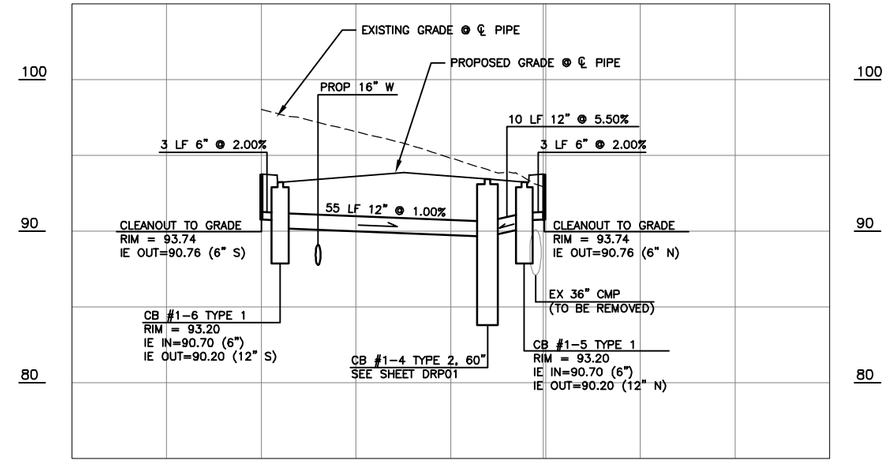
SHT _____ OF _____

J:\160162C_ NE4thSExt\CADD\CIV\PH1\SHT\NE4PH1-DPR01.dwg May 24, 2011 - 1:38pm

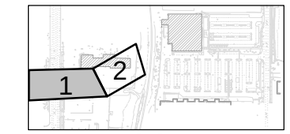
11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents



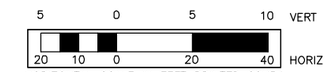
STA. 50+65



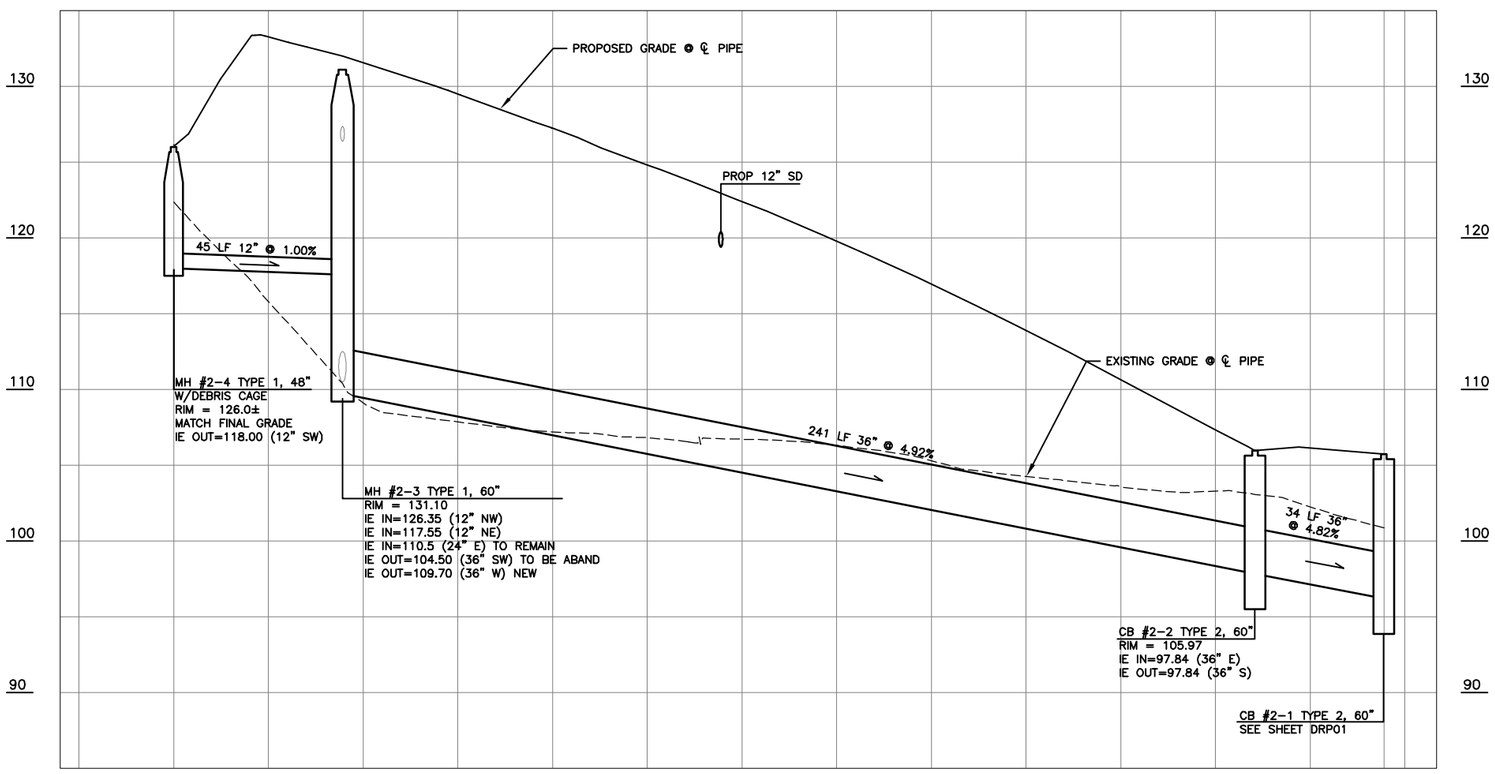
STA. 52+05



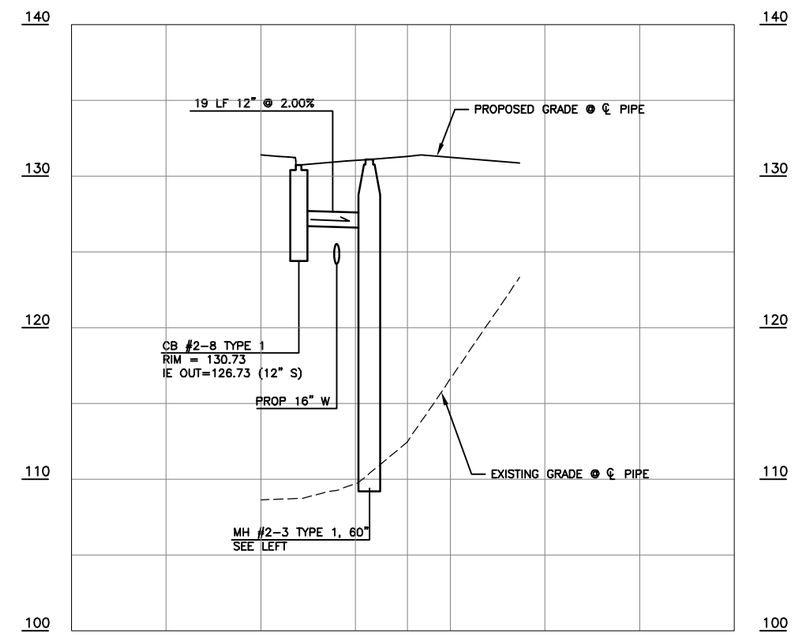
KEY PLAN



HORIZONTAL SCALE IN FEET PRINTED 22X34



STA. 53+00 STA. 55+81



STA. 55+42

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

C.VANIER 5/13/11 DESIGNED BY DATE
C.COOK 5/20/11 DRAWN BY DATE
K.LOEN 5/23/11 CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2500
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

DRAINAGE PROFILE
SHEET 2 OF 2

DRP02 SHT ____ OF ____

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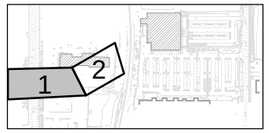
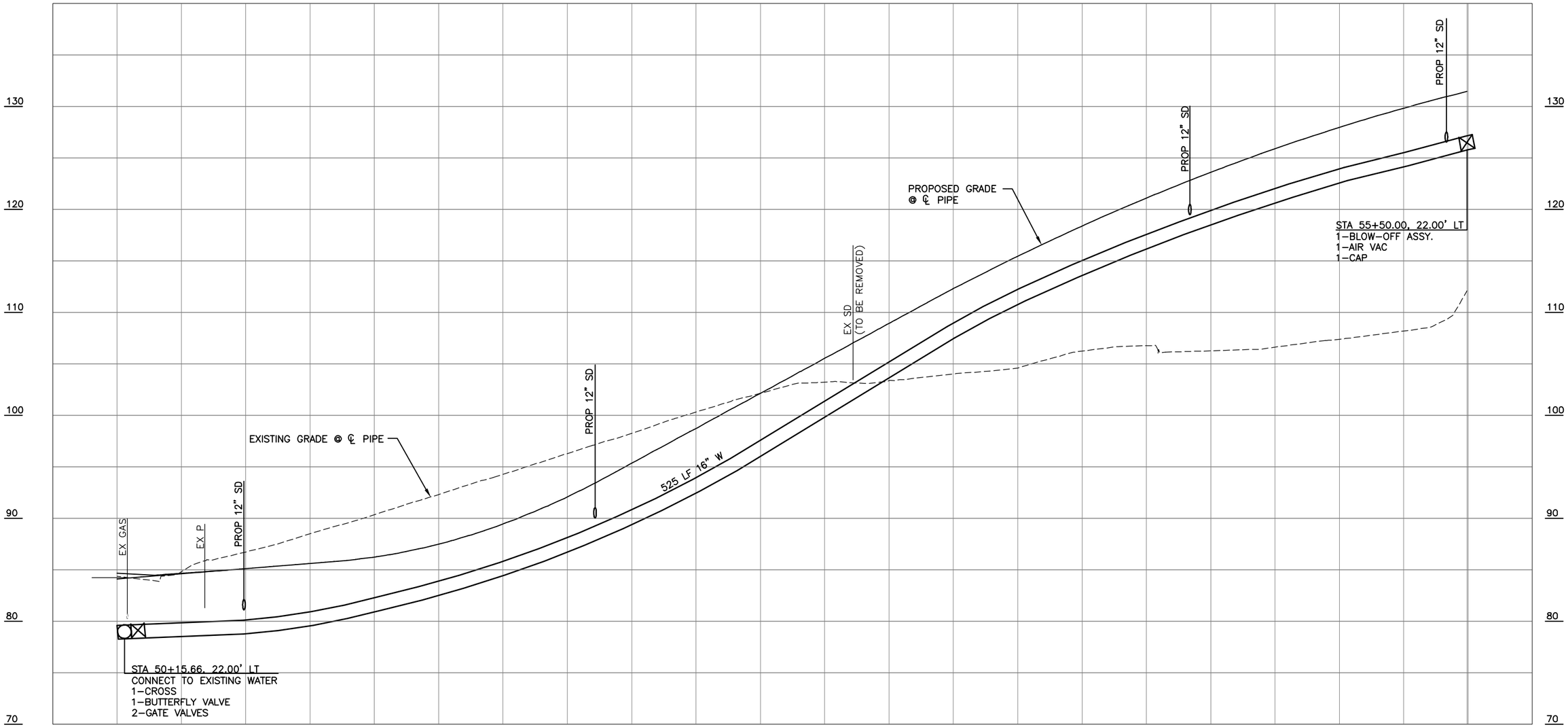


KEY PLAN



5 0 5 10 VERT
20 10 0 20 40 HORIZ
HORIZONTAL SCALE IN FEET PRINTED 22X34

STA. 50+15 STA. 55+50

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

C.VANIER 5/13/11 — DESIGNED BY — DATE
C.COOK 5/20/11 — DRAWN BY — DATE
K.LOEN 5/23/11 — CHECKED BY — DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

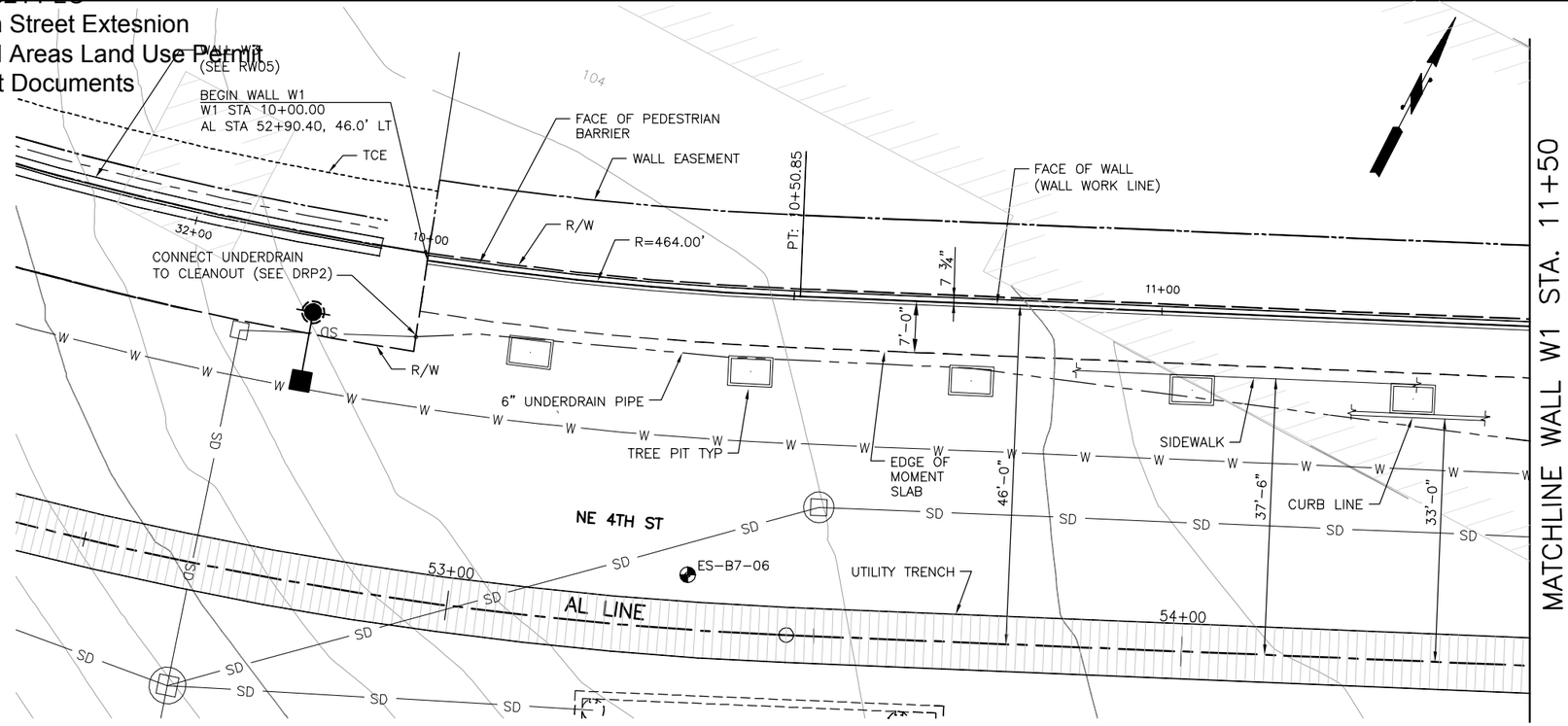
NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WATER PROFILE

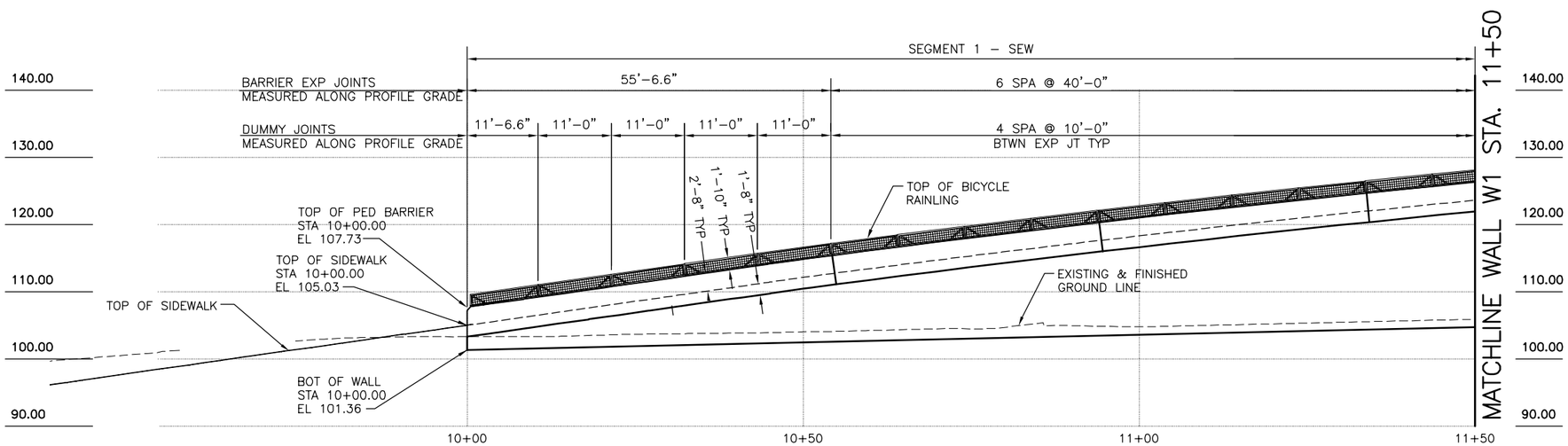
WP01 — SHT ____ OF ____

J:\1601620_ NE4thSExt\CADD\CIV\PH1\SHT\NE4PH1-WP01.dwg May 23, 2011 - 1:06pm

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents



PLAN – WALL W1



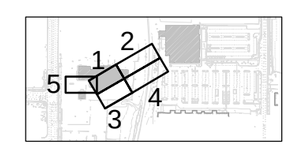
REFLECTED ELEVATION – WALL W1
VIEW LOOKING NORTH

GENERAL WALL NOTES:

1. STRUCTURAL EARTH WALLS (SEW) SHALL BE PROVIDED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION (STD. SPEC.) DATED 2012 AND THESE PLANS.
2. TOP OF SIDEWALK, TOP OF PEDESTRIAN BARRIER AND BOTTOM OF WALL ELEVATIONS GIVEN ARE SPOT ELEVATIONS AND NOT MEANT TO BE STRAIGHT LINED. CONTRACTOR SHALL DETERMINE TOP OF WALL PROFILE AND WALL GEOMETRY FROM ROADWAY PROFILE AND CROSS-SECTION, TOPOGRAPHIC DATA AND THE DETAILS IN THESE PLANS. SEE RS01 FOR ROADWAY CROSS-SECTION. SEE RP01 AND RP02 FOR ROADWAY ALIGNMENT AND PROFILE. WALL STATIONING HAS BEEN PROVIDED TO ASSIST THE CONTRACTOR IN ESTABLISHING QUANTITIES AND TO BE USED AS A BASELINE FOR SUBMITTALS.
3. BOTTOM OF WALL ELEVATIONS SHOWN FOR SEW WALL ARE THE MAXIMUM ALLOWED. ACTUAL BOTTOM OF WALL ELEVATIONS MAY BE LOWER TO ACCOMMODATE LEVELLING PAD, BASE SOIL REINFORCING, AND HILLSIDE TERRACE REQUIREMENTS.
4. SEE FINAL GEOTECHNICAL REPORT NE 4TH STREET EXTENSION, 116TH AVENUE NE TO 120TH AVENUE NE, BELLEVUE, WASHINGTON, SHANNON & WILSON, 2012 FOR PROJECT WALL DESIGN PARAMETERS AND RECOMMENDATIONS.
5. SOIL REINFORCEMENT SHALL BE DESIGNED TO ACCOMMODATE EMBEDDED ITEMS, INCLUDING BUT NOT NECESSARILY LIMITED TO: PRECAST CONCRETE TREE PITS, LIGHT POLE FOUNDATIONS, FILTERRA UNITS, AND CATCH BASINS. SEE RW09 FOR LOCATIONS AND DETAILS OF TREE PITS. SEE LIGHTING PLANS FOR LOCATIONS AND DETAILS OF LIGHT POLES. SEE DRAINAGE PLANS FOR LOCATIONS AND DETAILS OF FILTERRA UNITS, CATCH BASINS, MANHOLES, STORM DRAINS AND OTHER UTILITY TYPES AND LOCATIONS.
6. SEE LANSCAPING PLANS FOR DETAILS OF CONTINUOUS PLANTING STRIP.
7. PLANS DO NOT PRESCRIBE SEQUENCE OF WORK OR DETAIL HOW WORK IS TO BE PERFORMED. CONTRACTOR SHALL SUBMIT PROPOSED WALL DETAILS, INCLUDING CONSTRUCTION SEQUENCE, EQUIPMENT AND STAGING TO THE ENGINEER FOR REVIEW. WALL DETAILS SHALL BE SUBMITTED ALONG WITH SUPPORTING CALCULATIONS. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED PRIOR TO ORDERING MATERIALS AND/OR START OF WORK. SEE SPECIAL PROVISIONS.

LEGEND

- ## — BOREHOLE ID AND LOCATION
- LIGHTPOLE AND SHAFT FOUNDATION
- PRECAST CONCRETE TREE PIT, SEE RW09 FOR LOCATIONS & DETAILS
- FILTERRA UNIT SEE DRAINAGE PLANS
- SD — STORM DRAIN
- W — WATER LINE



KEY PLAN

NAVD88

10 5 0 10 20
HORIZ & VERT SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By
TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON 9/13/12 DESIGNED BY DATE
M.SOPER 9/13/12 DRAWN BY DATE
E.KELLEY 9/13/12 CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TIMSON — STATE OF WASHINGTON — 36842 — REGISTERED PROFESSIONAL ENGINEER

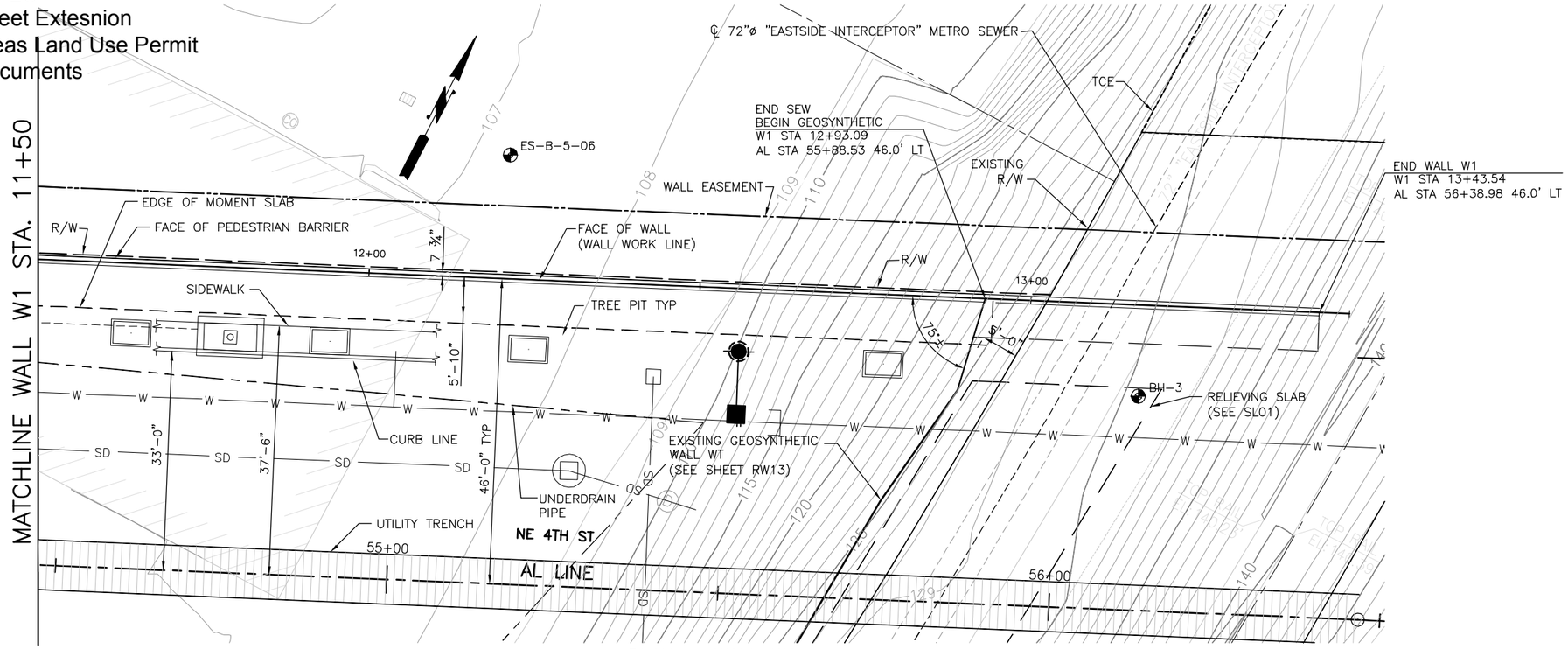
PB — 125 YEARS — 999 3RD AVENUE, SUITE 2200 SEATTLE, WASHINGTON 98104-4020 PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

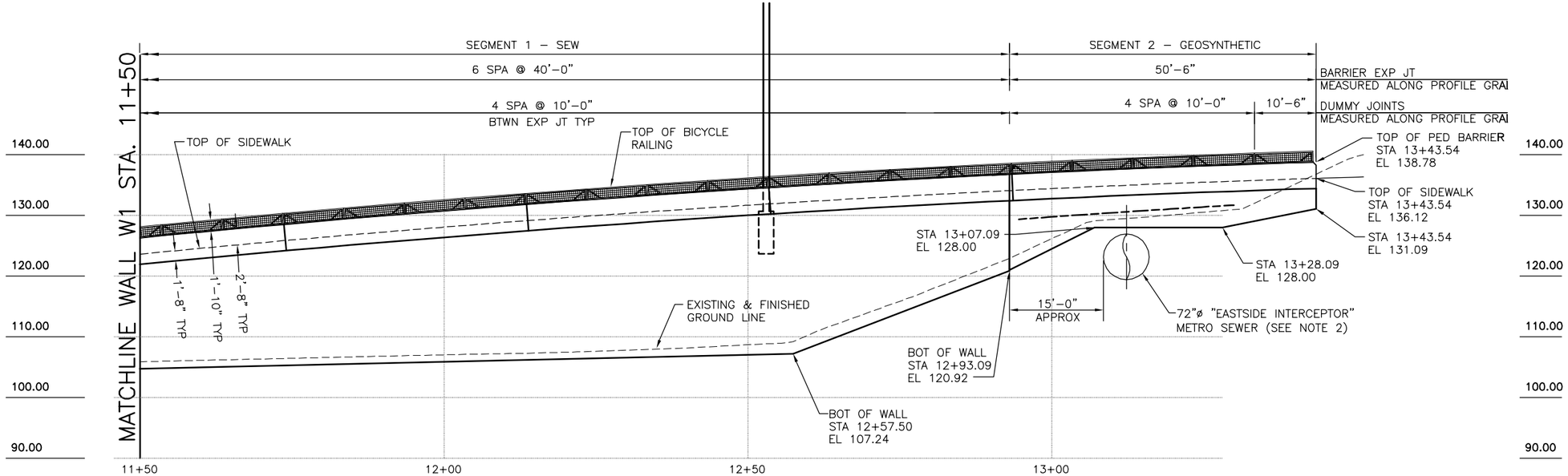
RETAINING WALL W1
PLAN & ELEVATION SHEET 1 OF 2
AL LINE STA. 52+90 TO 54+40

RW01 SHT ____ OF ____

J:\160162C_ NE4thSExt\CADD\STRC\PH1\SHT\NE4PH1-RW01.dwg Oct 23, 2012 - 1:33pm



PLAN – WALL W1

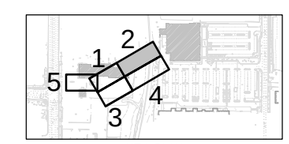


REFLECTED ELEVATION – WALL W1

VIEW LOOKING NORTH

NOTES:

1. SEE GENERAL WALL NOTES AND LEGEND ON RW01.
2. PROTECT-IN-PLACE EXISTING BURIED 72" CONCRETE SEWER PIPE (KING COUNTY EASTSIDE INTERCEPTOR). SEE AS-BUILT PLANS FOR DETAILS CONCERNING THE PIPE. CONTRACTOR SHALL SUBMIT DETAILS ON PROPOSED METHOD(S) TO PROTECT PIPE, INCLUDING CONSTRUCTION SEQUENCE AND EQUIPMENT TO THE ENGINEER FOR REVIEW. APPROVAL FROM THE ENGINEER, CITY OF BELLEVUE, AND KING COUNTY METRO, SHALL BE OBTAINED PRIOR TO START OF WORK. SEE SPECIAL PROVISIONS.
3. AVOID OVER EXCAVATION ADJACENT EXISTING SEWER. SEW SOIL REINFORCEMENT MAY BE SPLAYED A MAXIMUM 15 DEGREES FROM A LINE NORMAL TO THE FACE OF THE WALL.
4. GEOSYNTHETIC RETAINING WALLS SHALL BE PROVIDED IN ACCORDANCE WITH WSDOT STD. SPEC. AND THESE PLANS. SEE RW10 FOR TRANSITION DETAIL FROM SEW WALL TO GEOSYNTHETIC WALL.
5. BOTTOM OF WALL ELEVATIONS SHOWN FOR GEOSYNTHETIC WALL ARE BOTTOM OF FREE STANDING FASCIA PANELS AND ARE APPROXIMATE. ACTUAL BOTTOM OF WALL ELEVATIONS MAY BE LOWER OR HIGHER. BOTTOM OF WALL SHALL MAINTAIN A MINIMUM 1'-0" CLEAR OVER EXISTING SEWER PIPE. BOTTOM OF FOOTING SHALL MAINTAIN A MINIMUM 2-FEET BELOW GRADE.



KEY PLAN

NAVD88

10 5 0 10 20

HORIZ & VERT SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY WINSON
STATE OF WASHINGTON
38843
REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

RETAINING WALL W1
PLAN & ELEVATION SHEET 2 OF 2
AL LINE STA. 54+40 TO 56+00

RW02

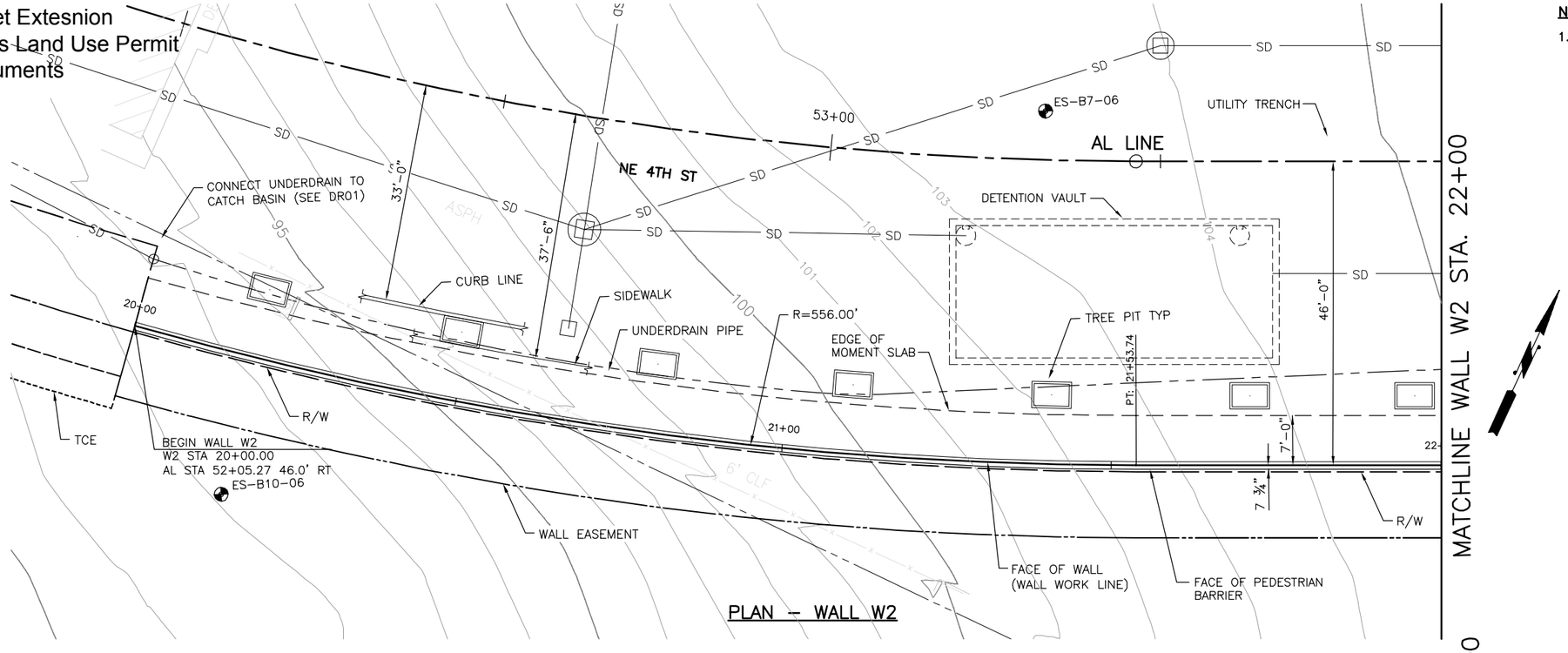
SHT ____ OF ____

J:\160162C_ NE4thSExt\CADD\STRC\PH1\SHT\NE4PH1-RW02.dwg Oct 23, 2012 – 2:54pm

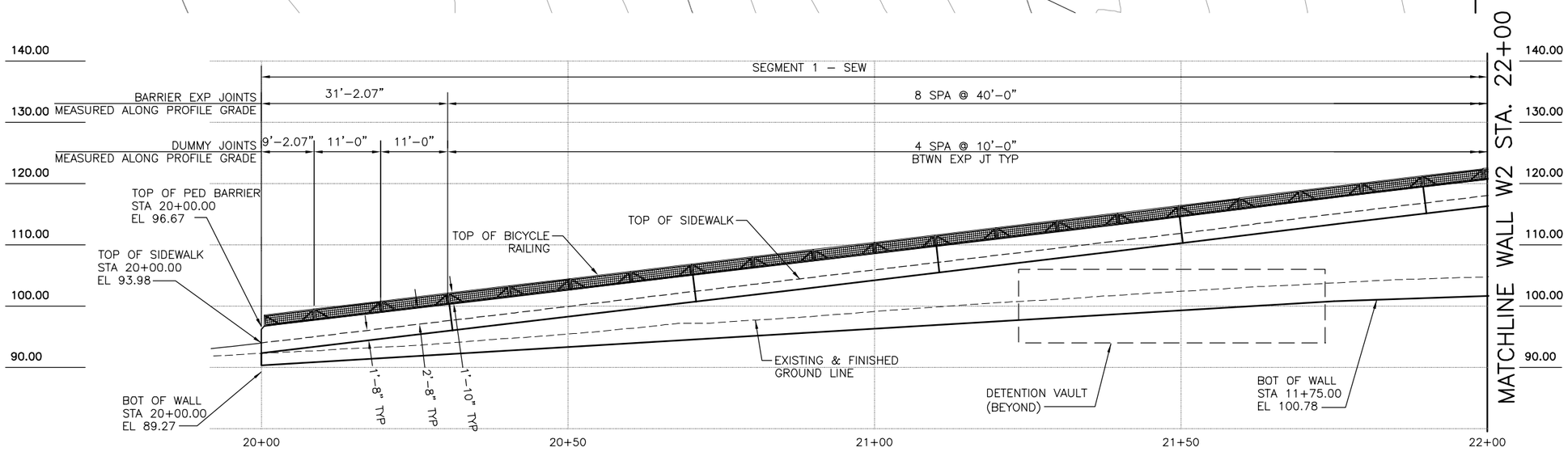
11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

NOTES:

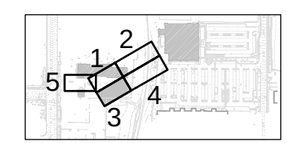
1. SEE GENERAL WALL NOTES AND LEGEND ON RW01.



PLAN – WALL W2



DEVELOPED ELEVATION – WALL W2
VIEW LOOKING NORTH



KEY PLAN

NAVD88

10 5 0 10 20
HORIZ & VERT SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TINSON — STATE OF WASHINGTON — 36842 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH. 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

RETAINING WALL W2
PLAN & ELEVATION SHEET 1 OF 2
AL LINE STA. 52+05 TO 53+93

RW03

SHT _____ OF _____

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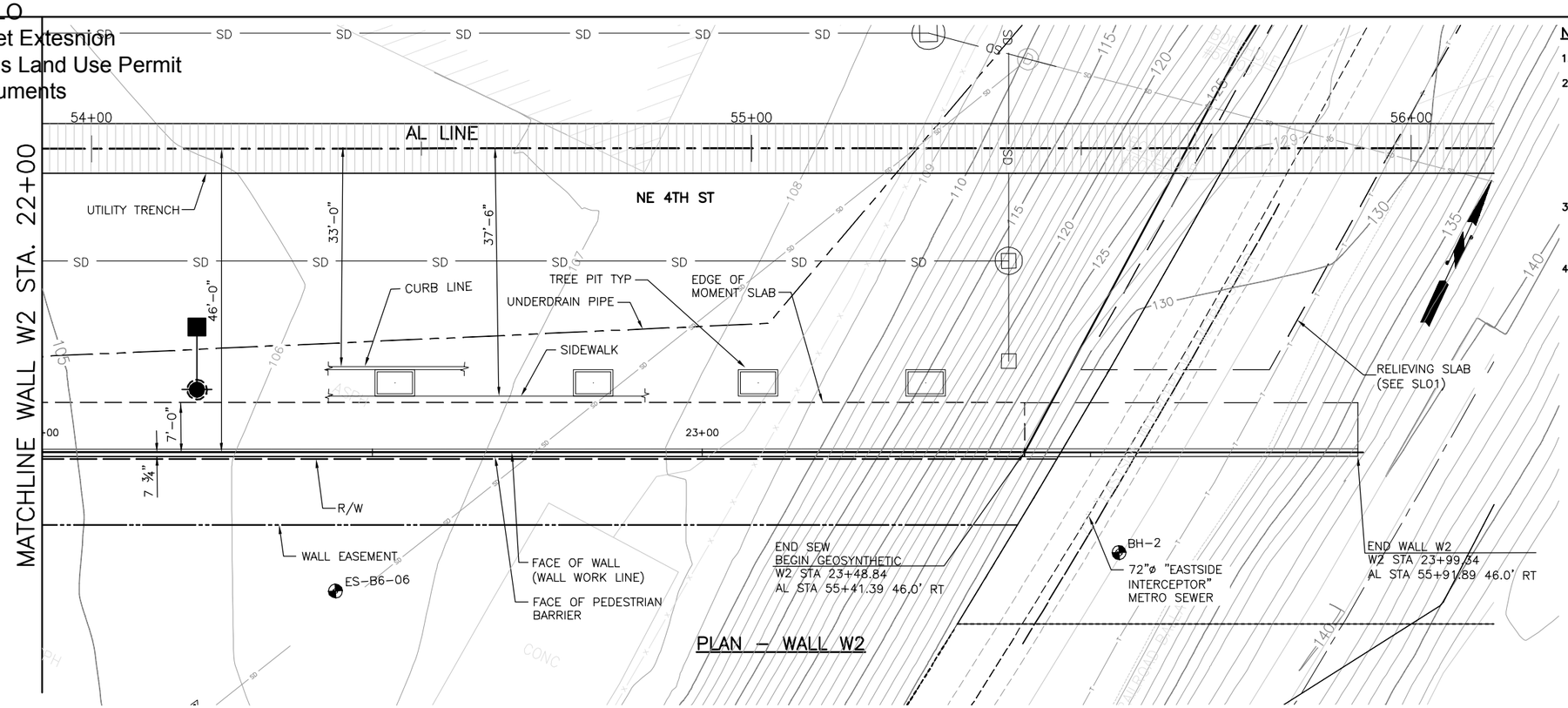
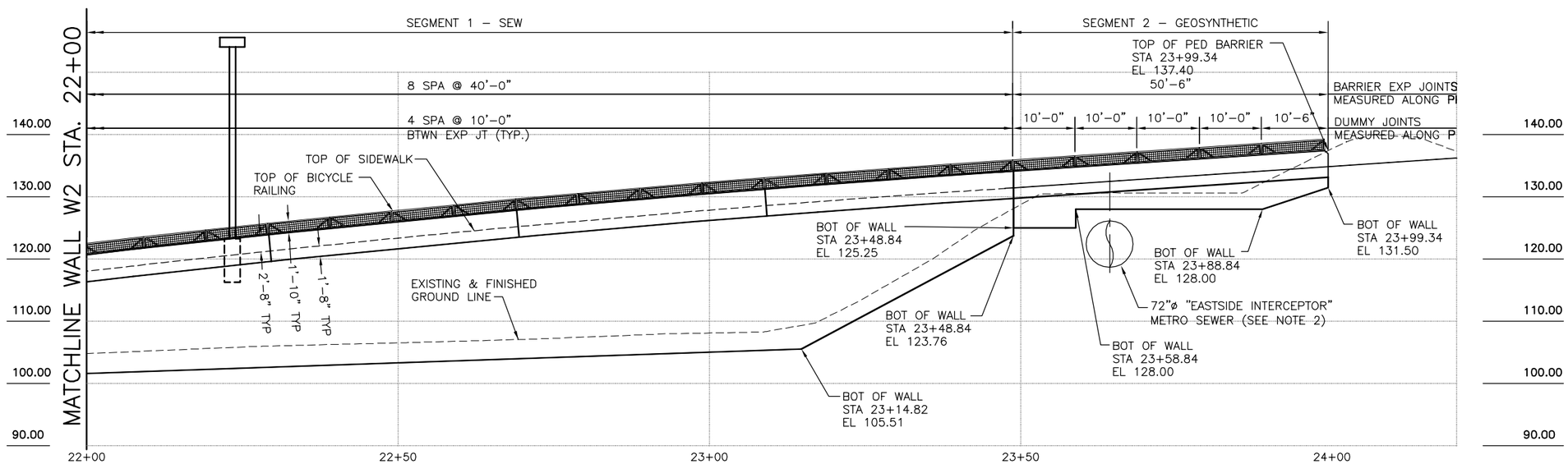


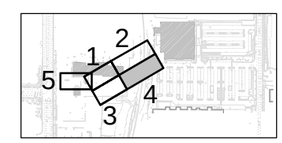
PLAN – WALL W2

NOTES:

1. SEE GENERAL WALL NOTES AND LEGEND ON RW01.
2. PROTECT–IN–PLACE EXISTING BURIED 72" CONCRETE SEWER PIPE (KING COUNTY EASTSIDE INTERCEPTOR). SEE AS–BUILT PLANS FOR DETAILS CONCERNING THE PIPE. CONTRACTOR SHALL SUBMIT DETAILS ON PROPOSED METHOD(S) TO PROTECT PIPE, INCLUDING CONSTRUCTION SEQUENCE AND EQUIPMENT TO THE ENGINEER FOR REVIEW. APPROVAL FROM THE ENGINEER, CITY OF BELLEVUE, AND KING COUNTY METRO, SHALL BE OBTAINED PRIOR TO START OF WORK. SEE SPECIAL PROVISIONS.
3. GEOSYNTHETIC RETAINING WALLS SHALL BE PROVIDED IN ACCORDANCE WITH WSDOT STD. SPEC. AND THESE PLANS. SEE RW10 FOR TRANSITION DETAIL FROM SEW WALL TO GEOSYNTHETIC WALL.
4. BOTTOM OF WALL ELEVATIONS SHOWN FOR GEOSYNTHETIC WALL ARE BOTTOM OF FREE STANDING FASCIA PANELS AND ARE APPROXIMATE. ACTUAL BOTTOM OF WALL ELEVATIONS MAY BE LOWER OR HIGHER. BOTTOM OF WALL SHALL MAINTAIN A MINIMUM 1'–0" CLEAR OVER EXISTING SEWER PIPE. BOTTOM OF FOOTING SHALL MAINTAIN A MINIMUM 2–FEET BELOW GRADE.



DEVELOPED ELEVATION – WALL W2
VIEW LOOKING NORTH



KEY PLAN

NAVD88

10 5 0 10 20
HORIZ & VERT SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY VINSON
STATE OF WASHINGTON
38843
REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

RETAINING WALL W2
PLAN & ELEVATION SHEET 2 OF 2
AL LINE STA. 53+93 TO 55+92

RW04 SHT ____ OF ____

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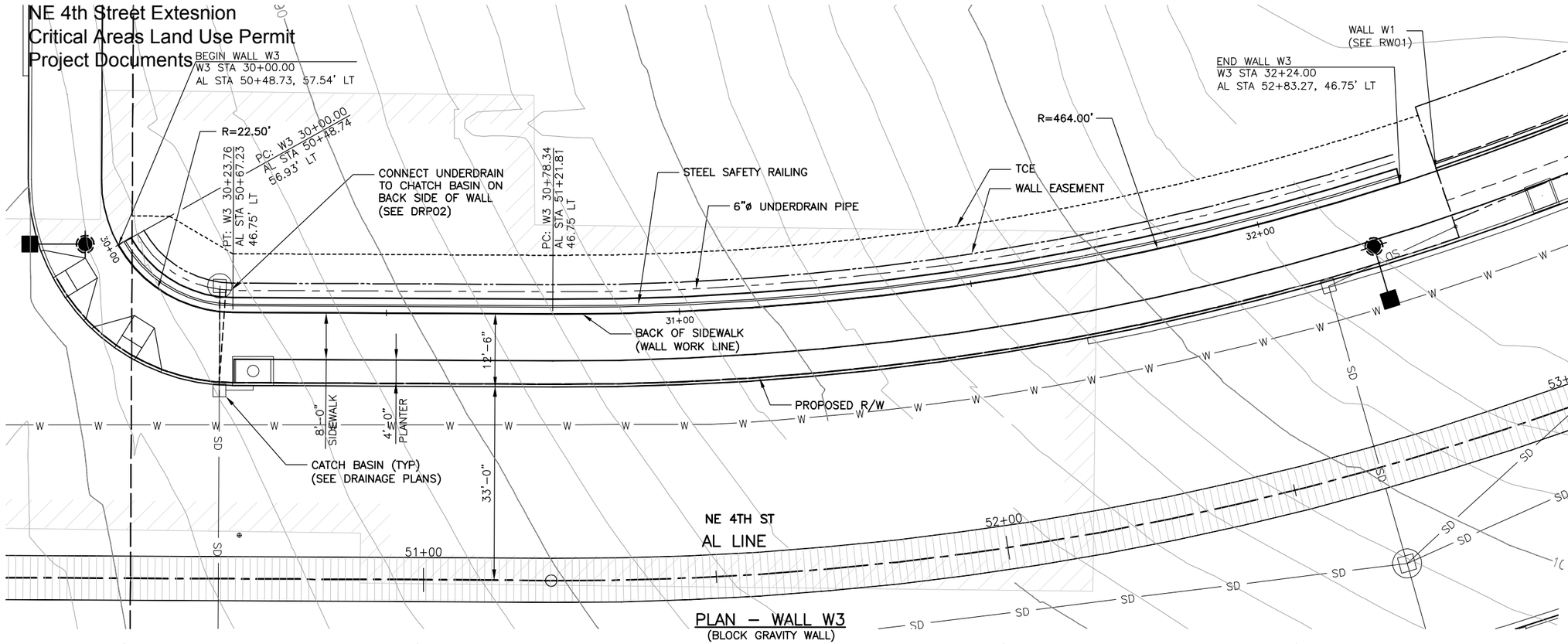
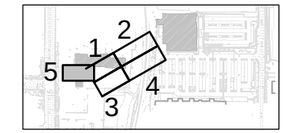
11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents



PLAN – WALL W3
(BLOCK GRAVITY WALL)



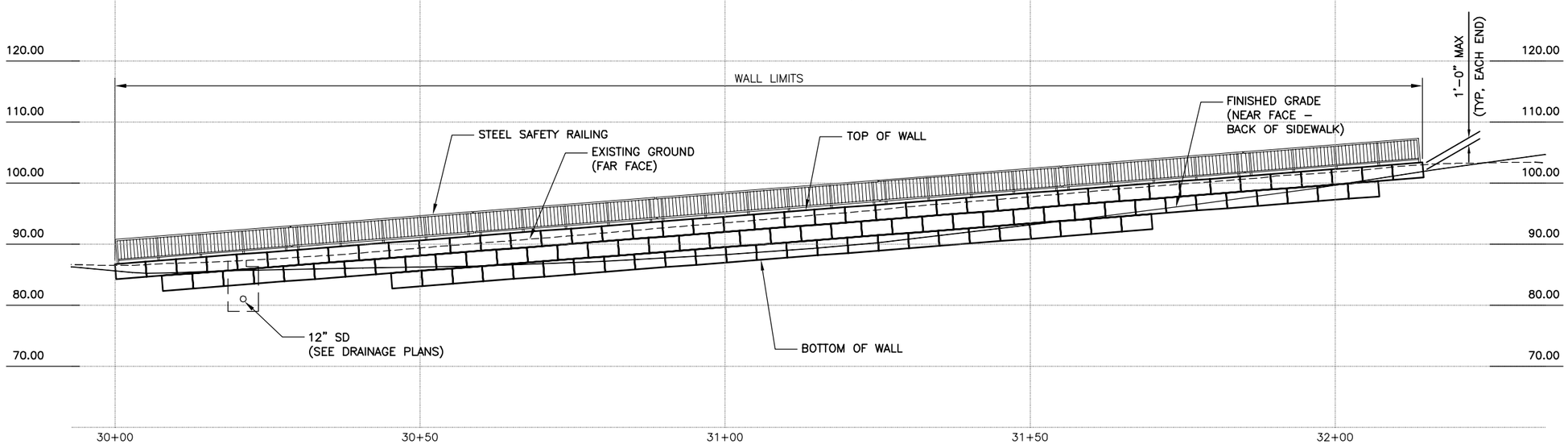
KEY PLAN

LEGEND

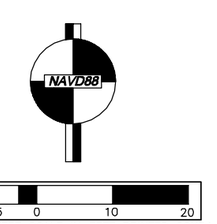
- ## BOREHOLE ID AND LOCATION
- LIGHTPOLE AND SHAFT FOUNDATION
- PRECAST CONCRETE TREE PIT
- FILTERRA UNIT SEE DRAINAGE PLANS
- SD — STORM DRAIN
- W — WATER LINE

GENERAL WALL NOTES:

1. GRAVITY BLOCK WALL SHALL BE PROVIDED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION DATED 2012 AND THESE PLANS.
2. CONTRACTOR SHALL DETERMINE WALL GEOMETRY BASED ON ROADWAY AND TOPOGRAPHIC DATA. SEE RS01 FOR ROADWAY CROSS-SECTION. SEE RP01 FOR ROADWAY PROFILE. WALL STATIONING AND DEVELOPED ELEVATION HAVE BEEN PROVIDED TO ASSIST THE CONTRACTOR IN ESTABLISHING QUANTITIES AND TO BE USED AS A BASELINE FOR SUBMITTALS.
3. THE CONTRACTOR SHALL BE REQUIRED TO DESIGN AND PROPOSE A MODULAR BLOCK RETAINING WALL SYSTEM IN REASONABLY CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN, AND DIMENSIONS SHOWN IN THESE PLANS. THIS DESIGN MAY REQUIRE GEOGRID OR OTHER DESIGN FEATURES TO ADEQUATELY RETAIN THE EMBANKMENT DEPENDING ON THE MODULAR BLOCK SYSTEM PROPOSED BY THE CONTRACTOR.
4. PLANS DO NOT PRESCRIBE SEQUENCE OF WORK OR DETAIL HOW WORK IS TO BE PERFORMED. CONTRACTOR SHALL SUBMIT PROPOSED WALL DETAILS, INCLUDING CONSTRUCTION SEQUENCE, EQUIPMENT AND STAGING TO THE ENGINEER FOR REVIEW. WALL DETAILS SHALL BE SUBMITTED ALONG WITH SUPPORTING CALCULATIONS. WALL DETAILS SHALL ALSO BE SUBMITTED CONCURRENT WITH RAILING DETAILS FOR COMPATIBILITY. APPROVAL FROM THE ENGINEER SHALL BE OBTAINED PRIOR TO ORDERING MATERIALS AND/OR START OF WORK. SEE SPECIAL PROVISIONS.
5. SEE RW16 FOR DETAILS AND ADDITIONAL REQUIREMENTS.



DEVELOPED ELEVATION – WALL W3
VIEW LOOKING NORTH



HORIZ & VERT SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

E.KELLEY	9/13/12
DESIGNED BY	DATE
C.COOK	9/13/12
DRAWN BY	DATE
M.VINSON	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TYSON — STATE OF WASHINGTON — 38094 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 3000
SEATTLE, WASHINGTON 98104-4020
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NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

RETAINING WALL W3
PLAN & ELEVATION
AL LINE STA. 50+48 TO 52+83

RW05

SHT ____ OF ____

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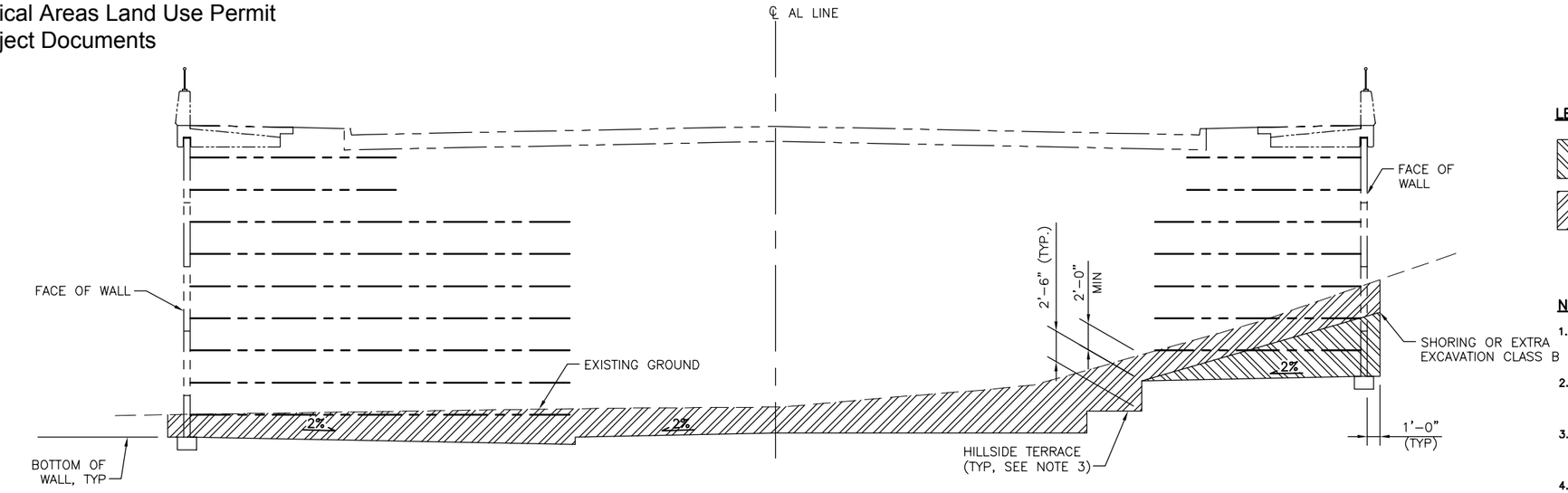


TYPICAL SECTION 1 WALL EXCAVATION LIMITS

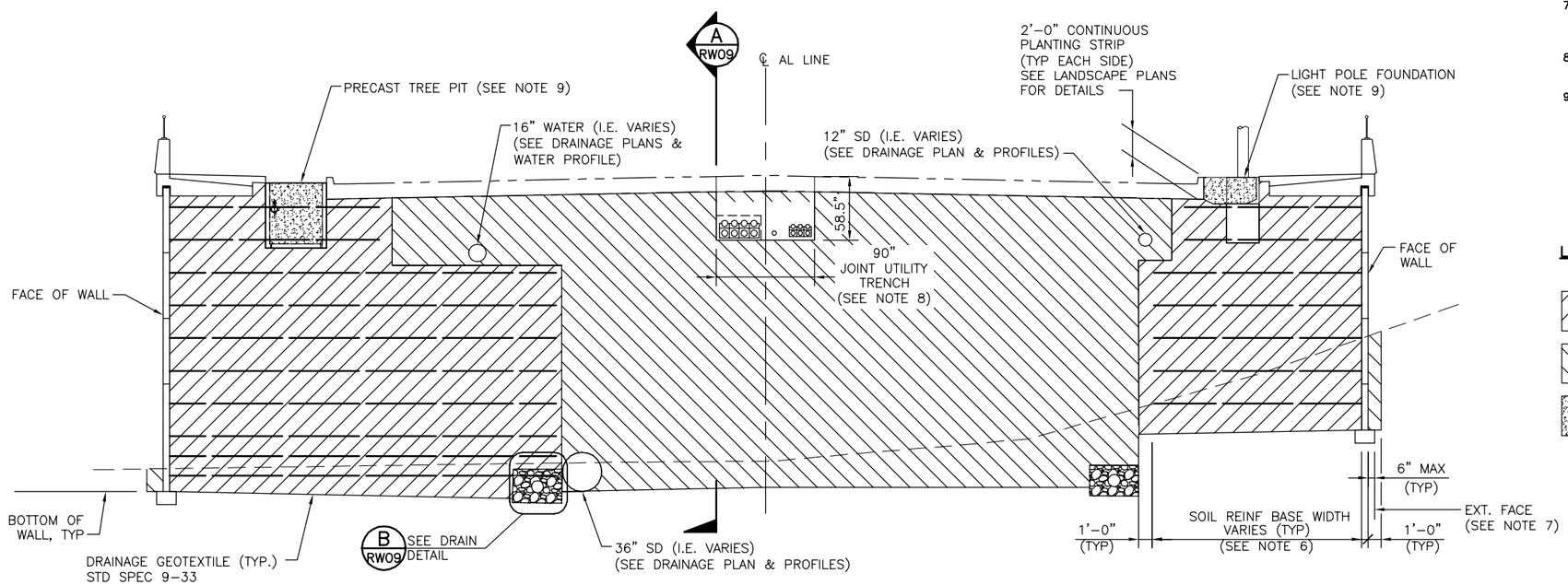
N.T.S.

LEGEND:

- STRUCTURAL EXCAVATION CLASS B
- ROADWAY EXCAVATION (SEE NOTE 2)

NOTES:

1. SHEETS RW01 THROUGH RW04 AND RW06 THROUGH RW11 SHALL BE USED IN CONJUNCTION TO DEFINE LIMITS AND REQUIREMENTS FOR EXCAVATION AND BACKFILL OF EARTH EMBANKMENT BOUND BY WALLS W1 AND W2.
2. SEE RP01 THROUGH RP02 AND RS01 THROUGH RS02 FOR ROADWAY PLANS AND CROSS SECTIONS, RESPECTIVELY. SEE SP01 AND SP02 FOR SITE PREPARATION PLANS, INCLUDING PAVEMENT AND OTHER REMOVALS.
3. ORIGINAL GROUND ON HILLSIDE SHALL BE TERRACED PER WSDOT STD. SPEC 2-03.3(14) AND THESE PLANS. TERRACES SHALL EXTEND FULL WIDTH OF NEW ROADWAY SECTION WITH SKEW AND SHALL BE COORDINATED WITH EACH WALL.
4. BACKFILL MATERIAL GRADATIONS SHALL BE PER WSDOT STD. SPEC., 2012 WITH AMENDMENTS PER THESE PLANS. BACKFILL MATERIAL FOR GEOSYNTHETIC SOIL REINFORCEMENT SHALL ALSO MEET THE MATERIAL REQUIREMENTS OF SECTION 9-03.14(4).
5. GRAVEL BORROW BACKFILL EMBANKMENT SHALL BE COMPACTED TO 95% MAXIMUM DENSITY IN LIFTS COMPATIBLE WITH THE REINFORCED STRUCTURAL SOILS ASSOCIATED WITH EACH WALL.
6. SEE RW01 THROUGH RW04 FOR GENERAL NOTES AND REQUIREMENTS. SEE RW08 FOR STRUCTURAL EARTH WALL (SEW) SOIL REINFORCING REQUIREMENTS. SEE RW10 FOR GEOSYNTHETIC WALL SOIL REINFORCING REQUIREMENTS. SEE RW09 FOR TYPICAL LONGITUDINAL SECTION OF ROADWAY EMBANKMENT ON HILLSIDE.
7. EXTERIOR FACE OF LEVELING PAD FOR SEW WALL SHALL BE OFFSET OUTWARD A MAXIMUM 6-INCHES FROM FACE OF WALLS. CONTRACTOR SHALL INCLUDE DESIGN OF LEVELING PAD WITH DESIGN SUBMITTALS FOR WALLS.
8. SEE CITY FOR JOINT UTILITY TRENCH DETAILS. CONTACT MARINA ARAKELYAN, PROJECT MANAGER AT 425-452-4632.
9. SOIL REINFORCEMENT SHALL BE DESIGNED TO ACCOMMODATE EMBEDDED ITEMS, INCLUDING BUT NOT NECESSARILY LIMITED TO: PRECAST CONCRETE TREE PITS, LIGHT POLE FOUNDATIONS, FILTERRA UNITS, AND CATCH BASINS. SEE RW09 FOR LOCATIONS AND DETAILS OF TREE PITS. SEE LIGHTING PLANS FOR LOCATIONS AND DETAILS OF LIGHT POLES. SEE DRAINAGE PLANS FOR LOCATIONS AND DETAILS OF FILTERRA UNITS, CATCH BASINS AND OTHER DRAINAGE STRUCTURES.



TYPICAL SECTION 1 WALL BACKFILL LIMITS

N.T.S.

LEGEND:

- GRAVEL BACKFILL FOR WALLS 9-03.12(2) (MAX 3% PASSING NO. 200)
- GRAVEL BORROW 9-03.14(1)
- PLANTING SOIL (SEE LANDSCAPE PLANS)

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TINSON — STATE OF WASHINGTON — 38842 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4023
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W1 AND W2
EXCAVATION AND BACKFILL
SHEET 1 OF 2

RW06 SHT ____ OF ____

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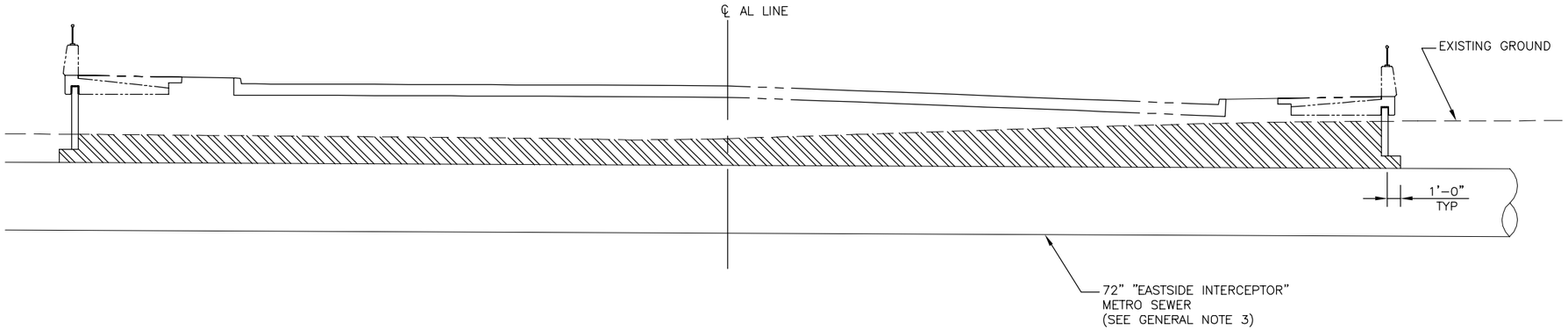
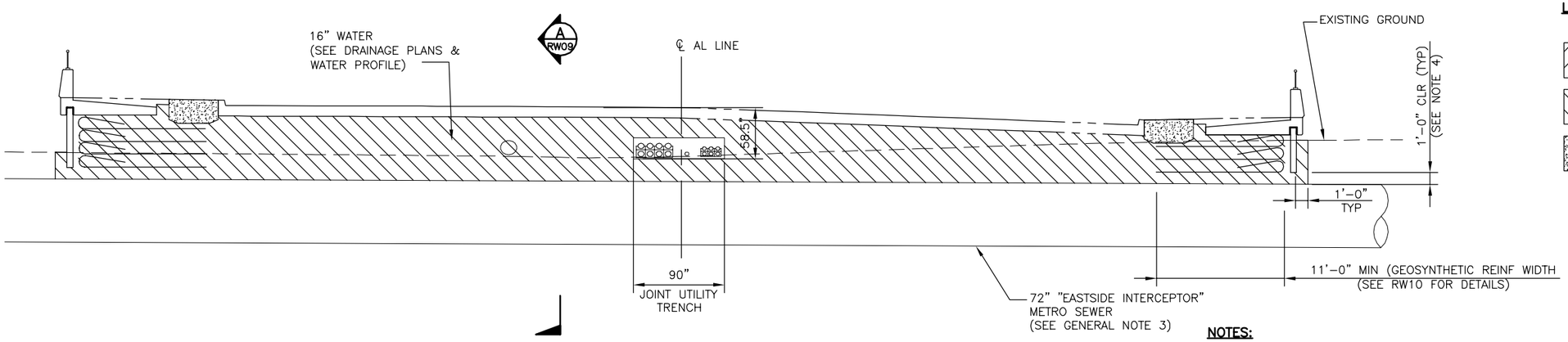


LEGEND:

STRUCTURAL EXCAVATION CLASS B

ROADWAY EXCAVATION (SEE NOTE 2)

SECTION 2 WALL EXCAVATION LIMITS OVER SEWER
N.T.S.



LEGEND:

GRAVEL BACKFILL FOR WALLS 9-03.12(2)
(MAX 3% PASSING NO. 200)

GRAVEL BORROW 9-03.14(1)

PLANTING SOIL
(SEE LANDSCAPE PLANS)

SECTION 2 WALL BACKFILL LIMITS OVER SEWER
N.T.S.

NOTES:

1. SEE RW06 FOR ADDITIONAL DETAILS, NOTES AND REQUIREMENTS.
2. PROTECT-IN-PLACE EXISTING BURIED 72" CONCRETE SEWER PIPE (KING COUNTY EASTSIDE INTERCEPTOR). SEE AS-BUILT PLANS FOR DETAILS CONCERNING THE PIPE. CONTRACTOR SHALL SUBMIT DETAILS ON PROPOSED METHOD(S) TO PROTECT PIPE, INCLUDING CONSTRUCTION SEQUENCE AND EQUIPMENT TO THE ENGINEER FOR REVIEW. APPROVAL FROM THE ENGINEER, CITY OF BELLEVUE, AND KING COUNTY METRO, SHALL BE OBTAINED PRIOR TO START OF WORK. SEE SPECIAL PROVISIONS.
3. EXCAVATION AND COMPACTION OF BACKFILL OVER AND ADJACENT SEWER SHALL BE PERFORMED WITH HAND METHODS.
4. MAINTAIN A MINIMUM CLEARANCE OF 12-INCHES OVER EXISTING SEWER PIPE. 12-INCHES OF BACKFILL MATERIAL SHALL BE PLACED OVER AND ADJACENT EXISTING SEWER PIPE BEFORE FIRST LAYER OF GEOSYNTHETIC REINFORCEMENT.
5. SEE RW10 AND RW11 FOR DETAILS ASSOCIATED WITH GEOSYTHETIC WALL, FREE-STANDING FASCIA PANELS AND FOOTINGS. EXTERIOR FACE OF FOOTINGS SHALL BE OFFSET OUTWARD A MAXIMUM 9-INCHES FROM FACE OF FREE-STANDING CONCRETE PANELS. CONTRACTOR SHALL INCLUDE DESIGN OF LEVELING PAD WITH DESIGN SUBMITTALS FOR WALLS.
6. SEE SL01 AND SL02 FOR DETAILS AND REQUIREMENTS ASSOCIATED WITH THE RELIEVING SLAB.

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
C.COOK	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

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SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W1 AND W2
EXCAVATION AND BACKFILL
SHEET 2 OF 2

RW07

SHT ____ OF ____

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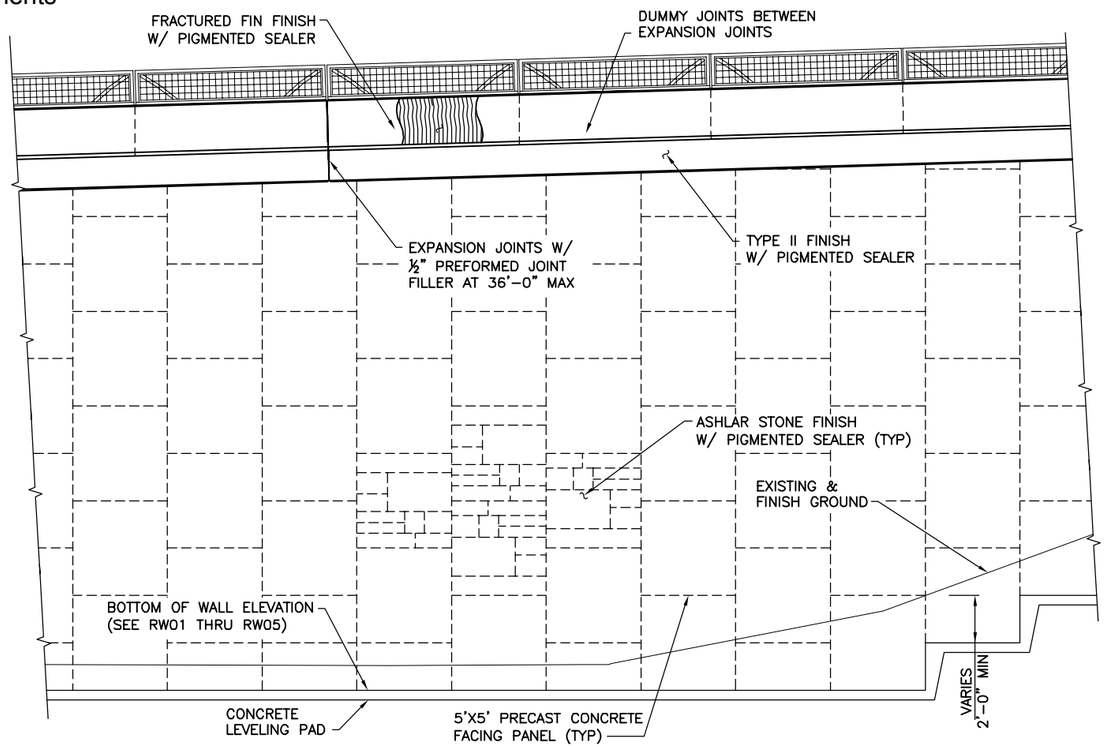
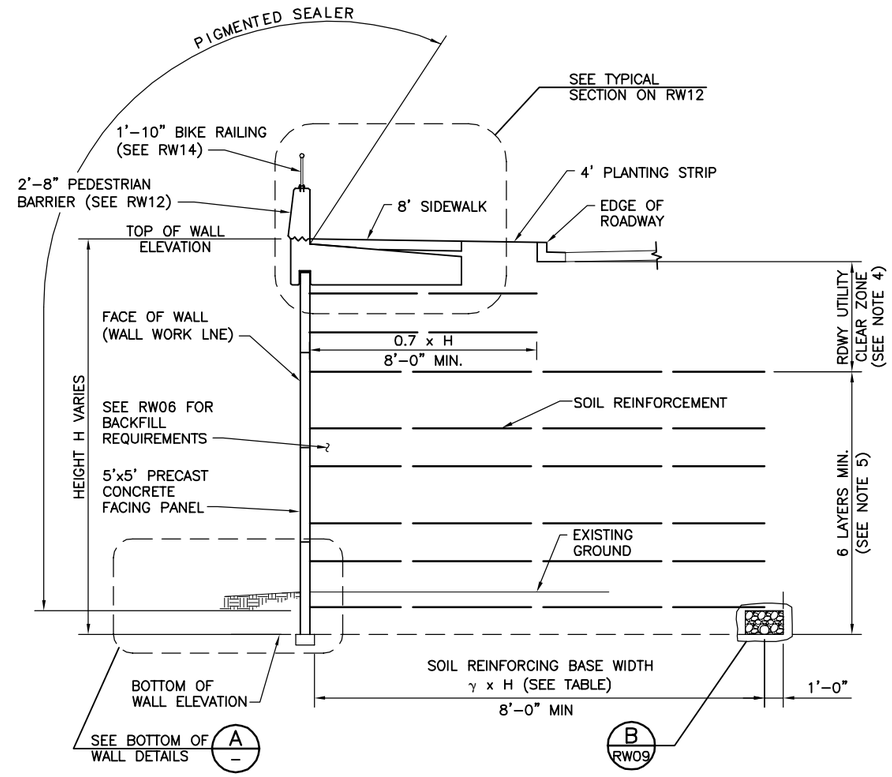


TYPICAL SEW WALL ELEVATION

NTS



TYPICAL SEW WALL SECTION

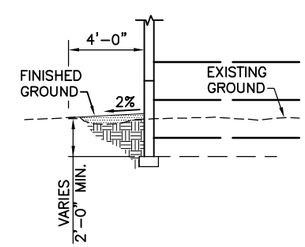
SEE SHEET RW06 FOR EXCAVATION AND BACKFILL REQUIREMENTS AND LIMITS
NTS

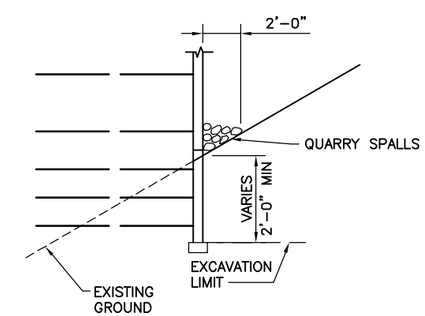
NOTES:

1. STRUCTURAL EARTH WALL (SEW) SHALL BE FACED WITH PRECAST CONCRETE PANELS PER WSDOT STD SPEC 6-13. PANELS SHALL HAVE 5-FOOT BY 5-FOOT NOMINAL DIMENSIONS AND ORIENTED VERTICALLY.
2. SOIL REINFORCING BASE REQUIREMENTS ARE BASED ON WALL GLOBAL STABILITY, FINAL GEOTECHNICAL REPORT NE 4TH STREET EXTENSION, 116TH AVENUE NE TO 120TH AVENUE NE, BELLEVUE, WASHINGTON, SHANNON & WILSON, 2012.
3. SOIL REINFORCING BASE WIDTHS SHALL BE INCREASED INCREMENTALLY IN BLOCKS, MEETING ALL MINIMUM LENGTH REQUIREMENTS WITHIN EACH GIVEN RANGE. SOIL REINFORCING BASE INCREASES SHALL BE COORDINATED AROUND DETENTION VAULT AND OTHER BURIED ELEMENTS.
4. SOIL REINFORCING ABOVE BASE LAYERS SHALL HAVE A MINIMUM EMBEDMENT LENGTH OF 0.7 TIMES HEIGHT OF WALL. ALL SOIL REINFORCING LAYERS SHALL HAVE A MINIMUM EMBEDMENT LAYER 8'-0".
5. DEPTH OF BASE SOIL REINFORCEMENT SHALL BE A MINIMUM OF 6 LAYERS, PER FINAL GEOTECHNICAL REPORT.
6. BASE SOIL REINFORCEMENT WITH EMBEDMENT LENGTHS GREATER THAN 12-FEET SHALL BE MAINTAINED AT A MINIMUM DEPTH OF 6'-0" BELOW THE ROADWAY SURFACE TO FACILITATE INSTALLATION, SERVICE AND MAINTENANCE OF UTILITIES WITHIN THE ROADWAY.
7. ALL APPURTENANCES BEHIND, IN FRONT OF, UNDER, MOUNTED UPON OR PASSING THROUGH THE WALL SUCH AS TRAFFIC BARRIER, LIGHT FOUNDATIONS, TREE PITS, DRAINAGE STRUCTURES OR OTHER UTILITIES SHOWN ON THE PLANS SHALL BE ACCOUNTED FOR IN THE STABILITY DESIGN OF THE WALL.
8. SEE RW01 THROUGH RW04 FOR GENERAL NOTES AND REQUIREMENTS. SEE RW06 AND RW09 FOR EXCAVATION AND BACKFILL REQUIREMENTS.
9. GEOTEXTILE FILTER FABRIC (STD SPEC 9-33) SHALL BE PLACED ON BACK FACE OF PANELS OVER PANEL JOINTS. FILTER FABRIC SHALL BE ADHERED TO BACK FACE OF PANELS USING MANUFACTURER RECOMMENDED ADHESIVE COMPOUND. FILTER FABRIC SHALL OVERLAP EACH PANEL A MINIMUM OF 5 INCHES.
10. COLOR OF ALL PIGMENTED SEALER SHALL BE WASHINGTON GRAY.
11. SEE RW10 AND RW11 FOR GEOSYNTHETIC WALL REQUIREMENTS.

SOIL REINFORCING BASE WIDTH REQUIREMENTS FOR EXTERNAL STABILITY (SEE NOTE 2)

WALL	RANGE			γ (L/H RATIO)
WALL W1	10+00	TO	10+55	0.7
	10+55	TO	12+00	1.1
	12+00	TO	12+75	1.3
	12+75	TO	12+93	0.7
WALL W2	20+00	TO	21+40	0.7
	21+40	TO	23+15	1.0
	23+15	TO	23+49	0.7





A/RW10 A/– BOTTOM OF WALL DETAILS

NTS

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

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SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W1 AND W2
DETAILS 1 OF 4

RW08 — SHT ____ OF ____

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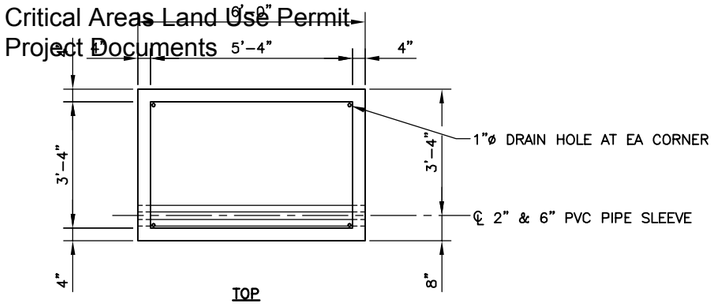
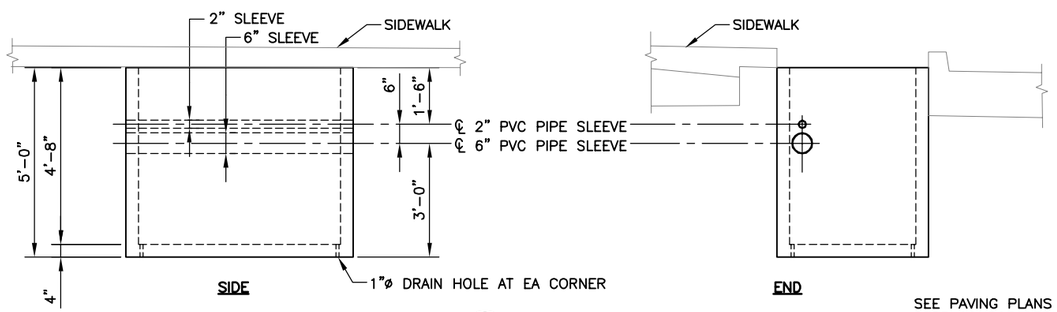


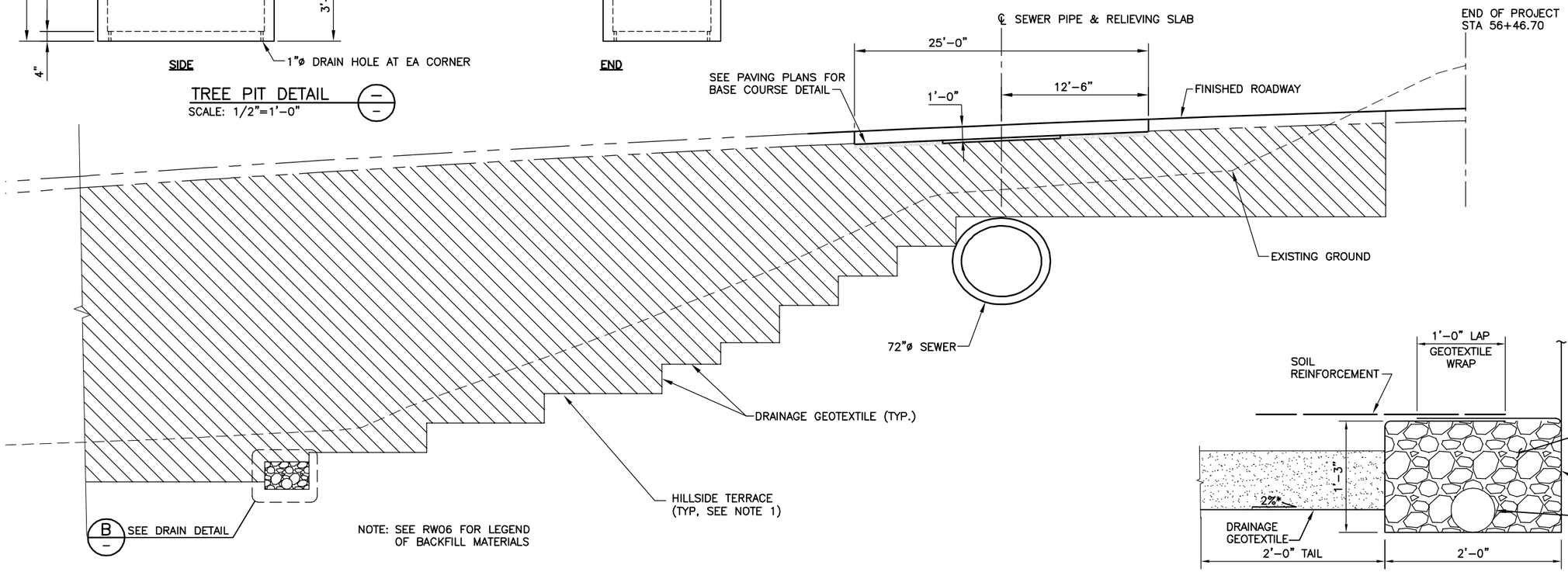


TREE PIT DETAIL (–)
SCALE: 1/2"=1'-0"

NOTES:

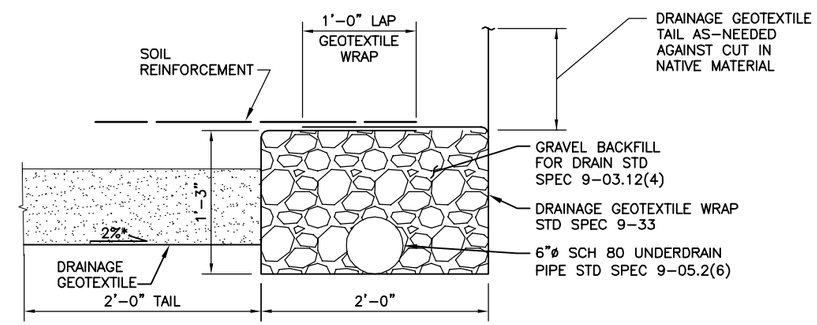
1. ORIGINAL GROUND ON HILLSIDE SHALL BE TERRACED PER WSDOT STD. SPEC 2-03.3(14) AND THESE PLANS. TERRACES SHALL EXTEND FULL WIDTH OF NEW ROADWAY SECTION WITH SKEW AND SHALL BE COORDINATED WITH EACH WALL.
2. TERRACES SHALL BE COORDINATED WITH SOIL REINFORCING BASE REQUIREMENTS AND UNDERDRAINS. UNDERDRAINS SHALL REACH ACROSS FULL WIDTH OF ROADWAY SECTION ALONG TOE OF TERRACED HILLSIDE. SEE RW08 FOR SOIL REINFORCING BASE REQUIREMENTS. SEE RW02 AND RW04 FOR GENERALIZED UNDERDRAIN ARRANGEMENT.
3.
4. EXCAVATION OF TERRACES SHALL BE COORDINATED WITH CONSTRUCTION OF RETAINED EMBANKMENT. TERRACE EXCAVATIONS SHALL MAINTAIN A 1'-0" MINIMUM CLEAR OVER A LINE PROJECTED FROM THE SPRING LINE OF THE 72-INCH SEWER PIPE. THE PROJECTED LINE SHALL HAVE A 2H;1V SLOPE DOWN AND TO THE WEST.
5. DRAINAGE GEOTEXTILE SHALL BE CONTINUOUS UP THE TERRACED HILLSIDE ACROSS THE FULL WIDTH OF THE RETAINED EMBANKMENT. GEOTEXTILE SHALL BE LAPPED PER MANUFACTURER'S RECOMMENDATION.
6. SEE RW01 THROUGH RW04 FOR GENERAL NOTES AND REQUIREMENTS. SEE RW06 AND RW07 FOR EXCAVATION AND BACKFILL REQUIREMENTS.

TREE PIT LOCATIONS		
NO.	STATION	OFFSET
1	AL 52+22.0	35.5' RT
2	AL 52+50.0	35.5' RT
3	AL 52+78.0	35.5' RT
4	AL 53+06.0	35.5' RT
5	AL 53+07.0	35.5' LT
6	AL 53+34.0	35.5' RT
7	AL 53+39.5	35.5' LT
8	AL 53+63.5	35.5' RT
9	AL 53+70.0	35.5' LT
10	AL 53+88.5	35.5' RT
11	AL 54+00.0	35.5' LT
12	AL 54+30.0	35.5' LT
13	AL 54+46.0	35.5' RT
14	AL 54+60.0	35.5' LT
15	AL 54+90.0	35.5' LT
16	AL 54+75.0	35.5' LT
17	AL 55+01.0	35.5' RT
18	AL 55+19.0	35.5' LT
19	AL 55+26.0	35.5' RT
20	AL 55+73.5	35.5' LT



NOTE: SEE RW06 FOR LEGEND OF BACKFILL MATERIALS

PALTIAL LONGITUDINAL SECTION (A RW06 / A RW07)
SCALE: N.T.S.



*NOTE: CROSS SLOPE FOR DRAINAGE TRANSVERSE TO AL LINE.

DRAIN DETAIL (B RW06 / B RW07 / B RW08 / B RW10 / B –)
SCALE: 1 1/2"=1'-0"

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
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				NOT FOR CONSTRUCTION

Approved By
TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TINSON — STATE OF WASHINGTON — 36842 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS — 999 3RD AVENUE, SUITE 2200, SEATTLE, WASHINGTON 98104-4020, PH. 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W1 AND W2
DETAILS 2 OF 4

RW09

SHT ____ OF ____

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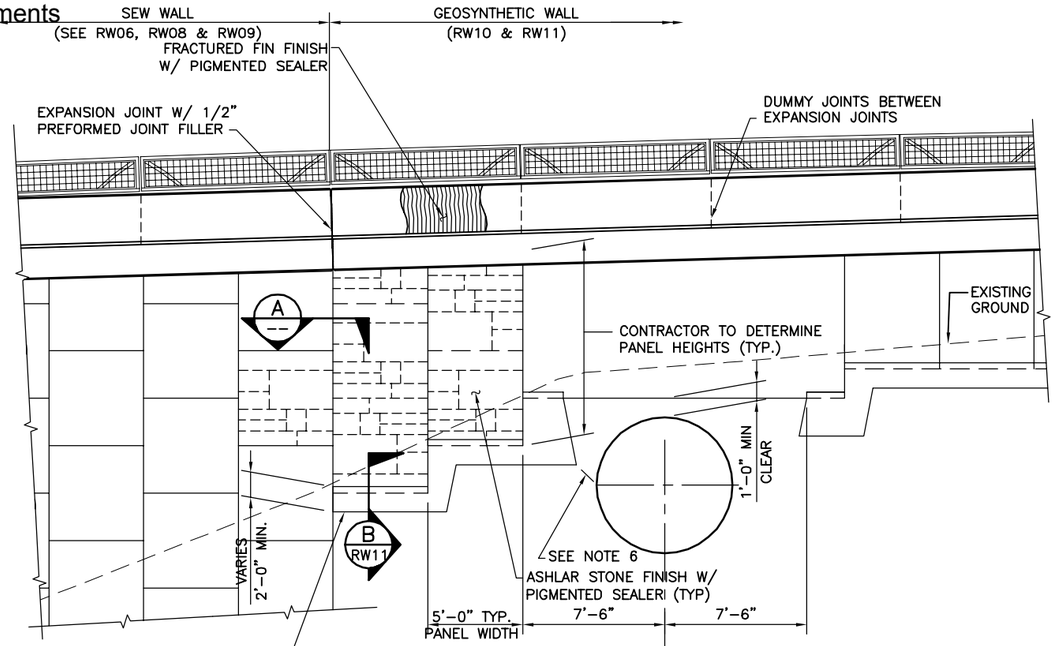
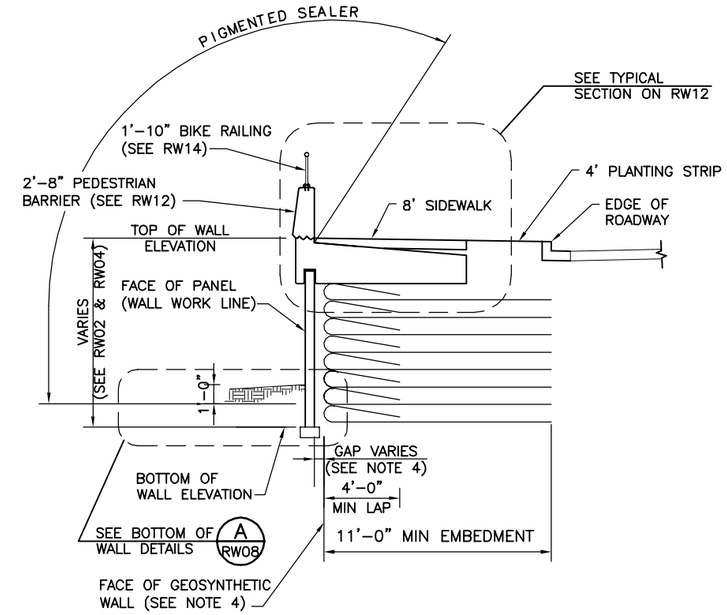
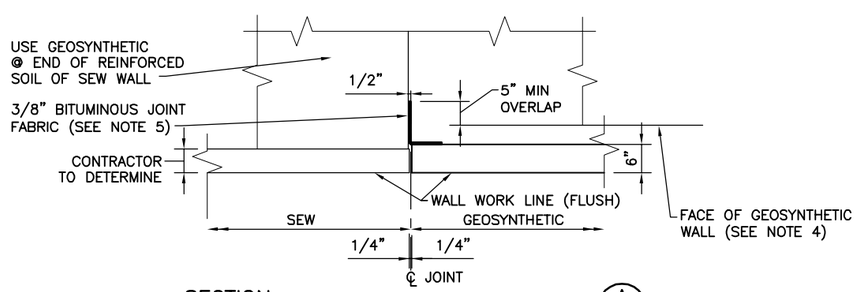


TYPICAL GEOSYNTHETIC WALL ELEVATION
NTS



TYPICAL GEOSYNTHETIC WALL SECTION
NTS



SECTION A
NTS

NOTES:

1. GEOSYNTHETIC RETAINING WALLS SHALL BE CONSTRUCTED PER WSDOT STANDARD PLAN D-3, TYPE 1 AND THESE PLANS. WHERE DETAILS ARE IN CONFLICT, THE DETAILS IN THESE PLANS SHALL GOVERN.

2. SEE RW01 THROUGH RW04 FOR GENERAL NOTES, LIMITS AND REQUIREMENTS. SEE RW06 AND RW07 FOR EXCAVATION AND BACKFILL REQUIREMENTS.

3. GEOSYNTHETIC RETAINING WALLS SHALL BE FACED WITH FREE-STANDING PRECAST CONCRETE PANELS PER PLANS. PANELS SHALL BEAR IN KEYWAY OF REINFORCED CONCRETE LEVELING PADS. PANELS SPANNING OVER SEWER SHALL ONLY BEAR ON PADS EITHER SIDE OF PIPE PER PLANS. PEDESTRIAN BARRIER SHALL NOT BEAR ON TOP OF PANELS. SEE RW11 FOR PANEL AND FOOTING DETAILS.

4. FACE OF GEOSYNTHETIC SHALL HAVE A SLIGHT BATTER SUCH THAT A MINIMUM GAP OF ¾-INCH AND MAXIMUM GAP OF 4-INCHES BETWEEN GEOSYNTHETIC AND FASCIA PANELS WILL BE MAINTAINED FROM LOWEST TO HIGHEST ELEVATION, RESPECTIVELY. FACE OF GEOSYNTHETIC OFFSET FROM FACE OF PANEL SHALL BE DETERMINED BY THE CONTRACTOR.

5. STRIPS OF 3/8-INCH THICH BITUMINOUS CLOTH SHALL BE PLACED ON BACK FACE OF PANELS OVER PANEL JOINTS. BITUMINOUS CLOTH SHALL BE SECURED TO BACK FACE OF PANELS WITH ADHESIVE PER MANUFACTURERS RECOMMENDATION. BITUMINOUS CLOTH SHALL OVERLAP EACH PANEL A MINIMUM OF 5 INCHES.

6. BOTTOM OF FOOTINGS SHALL BE LEVEL. FOOTINGS SHALL TERRACE INCREMENTALLY WITH PRECAST FASCIA PANELS, MAINTAINING A MINIMUM 24-INCH DEPTH OF COVER BELOW EXISTING AND ADJACENT FINISHED GROUND, WHICHEVER IS DEEPER. BOTTOM OF FOOTING SHALL TERMINATE SUCH THAT A LINE PROJECTED FROM THE END OF THE FOOTING TO THE SPRINGLINE OF THE 72-INCH SEWER PIPE SHALL HAVE A 1H:1V SLOPE.

7. COLOR OF ALL PIGMENTED SEALER SHALL BE WASHINGTON GREY.

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

M.VINSON	9/13/12
DESIGNED BY	DATE
M.SOPER	9/13/12
DRAWN BY	DATE
E.KELLEY	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY WINSON
STATE OF WASHINGTON
38843
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SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W1 AND W2
DETAILS 3 OF 4

RW10

SHT ____ OF ____

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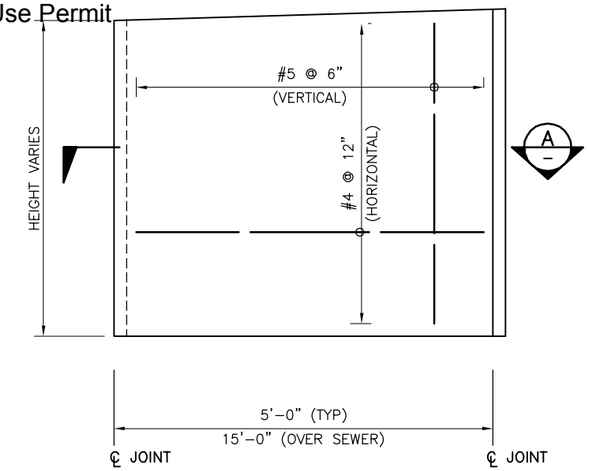
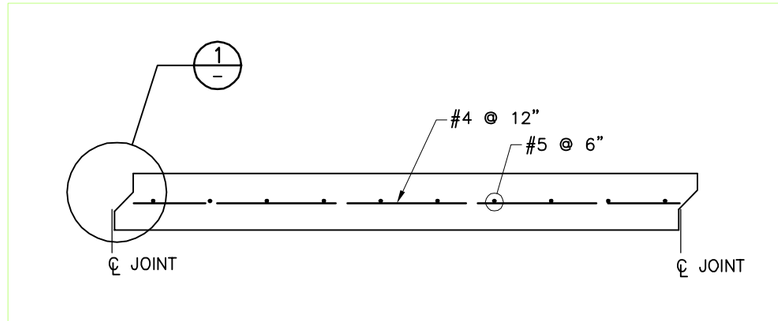
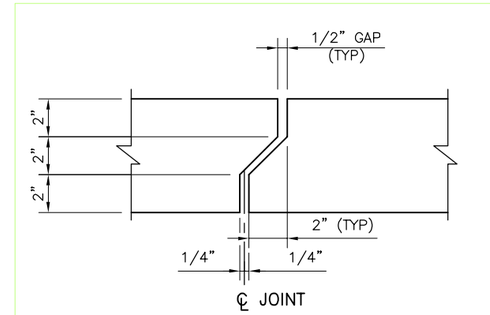


TYPICAL CONCRETE FASCIA PANEL FOR GEOSYNTHETIC WALLS
SCALE: 1"=1'–0"



FASCIA PANEL SECTION A –
SCALE: 1 1/2" = 1'–0"



WALL JOINT DETAIL 1 –
SCALE: 3"=1'–0"

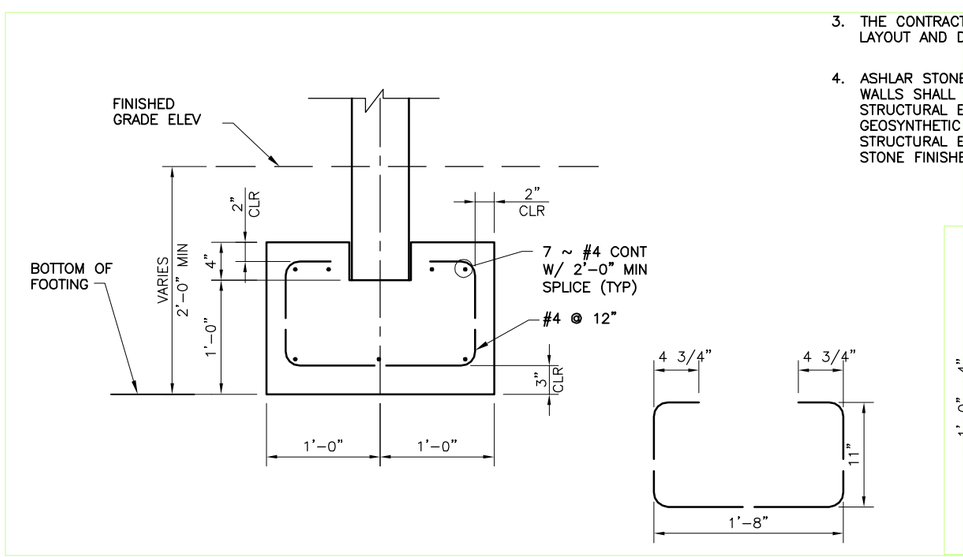
NOTES:

1. RESTEEL SHOWN IN WALL PANELS ARE DESIGNED FOR SELF WEIGHT AND WIND PRESSURE OF 40 PSF. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY ADDITIONAL REINFORCEMENT REQUIRED FOR HANDLING, TRANSPORTATION AND ERECTION.

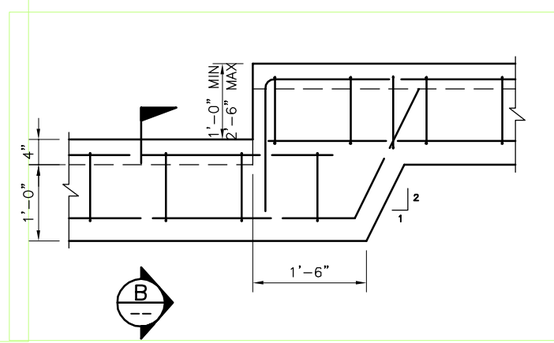
2. BOTTOM OF FOOTINGS ADJACENT SEWER PIPE SHALL TERMINATE SUCH THAT A LINE PROJECTED FROM THE END OF THE FOOTING TO THE SPRINGLINE OF THE 72–INCH SEWER PIPE SHALL HAVE A 1H:1V SLOPE.

3. THE CONTRACTOR SHALL SUBMIT THE PRECAST PANEL AND FOOTING LAYOUT AND DETAILS CONCURRENTLY FOR REVIEW OF COMPATIBILITY.

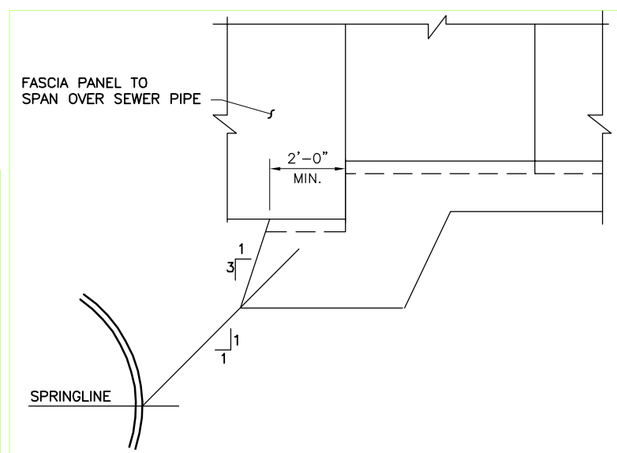
4. ASHLAR STONE FINISH FOR PRECAST PANELS OF GEOSYNTHETIC WALLS SHALL MATCH THE FINISH FOR THE PRECAST PANELS OF THE STRUCTURAL EARTH WALLS. THE CONTRACTOR SHALL SUBMIT THE GEOSYNTHETIC WALL PANEL DETAILS CONCURRENT WITH THE STRUCTURAL EARTH WALL DETAILS FOR COMPATIBILITY OF ASHLAR STONE FINISHES.



TYPICAL FOOTING SECTION B RW10 B –
SCALE: 1 1/2" = 1'–0"



TYPICAL DETAIL OF FOOTING STEP
SCALE: 1" = 1'–0"



FOOTING DETAIL ADJACENT SEWER
SCALE: 1" = 1'–0"

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Approved By
TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON 9/13/12 DESIGNED BY DATE
M.SOPER 9/13/12 DRAWN BY DATE
E.KELLEY 9/13/12 CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY VINSON — STATE OF WASHINGTON — 38842 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS — 999 3RD AVENUE, SUITE 2200 SEATTLE, WASHINGTON 98104-4020 PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W1 AND W2 DETAILS
SHEET 4 OF 4

RW11

SHT ____ OF ____

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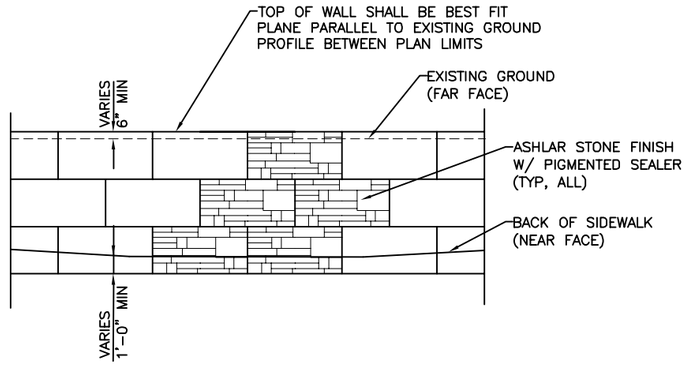
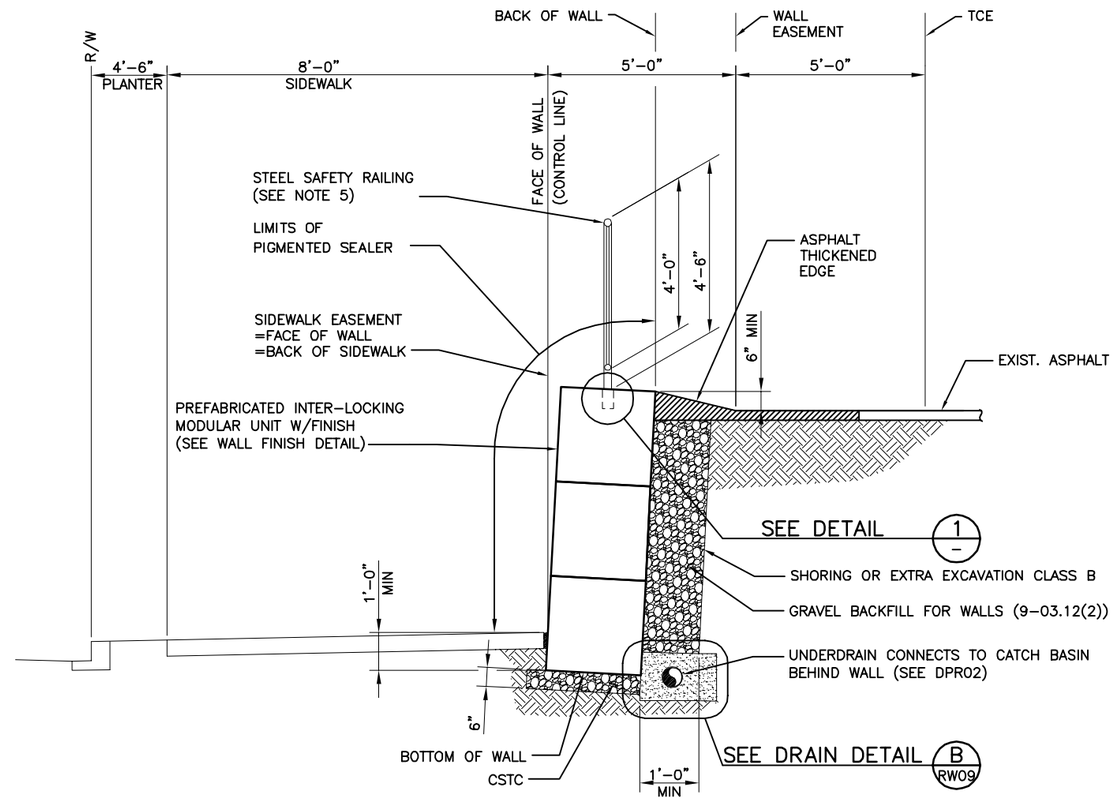


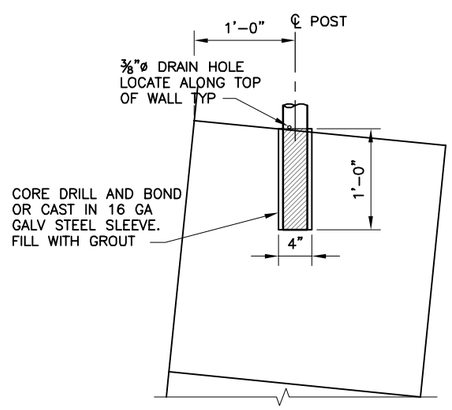
WALL FINISH DETAIL
N.T.S.



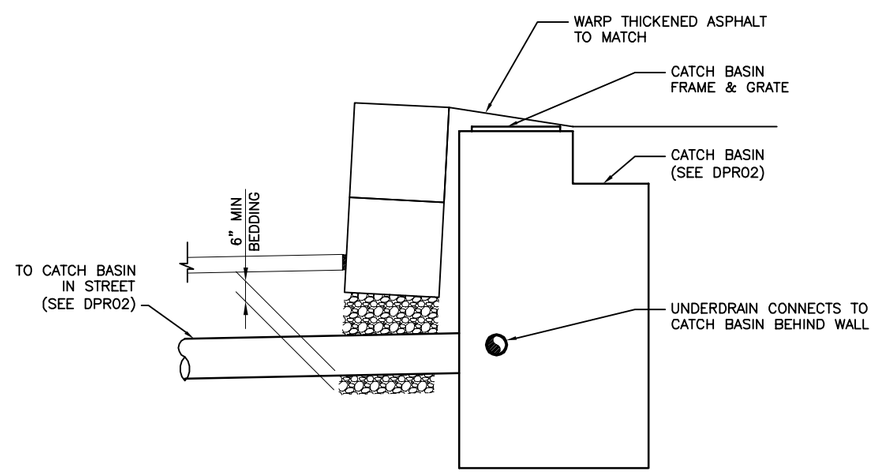
TYPICAL SECTION – WALL W3
N.T.S.

NOTES:

1. SEE GENRAL WALL NOTES ON RW05.
2. THE CONTRACTOR SHALL SUBMIT THE GRAVITY BLOCK WALL LAYOUT AND DETAILS CONCURRENT WITH THE SUBMITTAL FOR STEEL SAFETY RAILING FOR REVIEW OF COMPATIBILITY.
3. ASHLAR STONE FINISH FOR GRAVITY BLOCK WALL (W3) SHALL MATCH THE FINISH FOR STRUCTURAL EARTH WALLS (W1 AND W2). THE CONTRACTOR SHALL SUBMIT THE GRAVITY BLOCK WALL DETAILS CONCURRENT WITH THE STRUCTURAL EARTH WALL DETAILS FOR COMPATIBILITY OF ASHLAR STONE FINISHES.
4. STEEL SAFETY RAILING SHALL BE PROVIDED PER CITY OF BELLEVUE STANDARD DRAWING NO. TE-34 AND THESE PLANS. POST SPACING SHALL BE DETERMINED BY CONTRACTOR WITH GRAVITY BLOCK WALL LAYOUT AND JOINTS. POSTS SHALL BE LOCATED A MINIMUM 10-INCHES FROM JOINT OR ANY END OF BLOCK. TOP AND BOTTOM RAILS SHALL BE PARALLEL TO TOP OF GRAVITY BLOCK WALL. FOR RADIUS' LESS THAN 400', THE RAILINGS SHALL BE ROLLED TO MATCH REQUIRED CURVATURE. FOR RADIUS' GREATER THAN 400', THE RAILINGS MAY BE POSITIONED ON A SERIES OF SHORT CHORDS. THE LENGTH OF THE CHORDS SHALL BE THE CENTER TO CENTER DISTANCE OF RAIL POSTS. BALLISTERS SHALL BE AT MAXIMUM 4-INCH SPACING.
5. SEE "GEOTECHNICAL REPORT, NE 4TH STREET EXTENSION, 116TH AVENUE NE TO 120TH AVENUE NE, BELLEVUE, WASHINGTON" FOR RECOMMENDED SOIL PARAMETERS FOR BEARING CAPACITY, SLIDING AND OVERTURNING FOR USE IN WALL DESIGN.



RAILING POST MOUNT DETAIL 1



UNDERDRAIN CONNECTION

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

E.KELLEY	9/13/12
DESIGNED BY	DATE
C.COOK	9/13/12
DRAWN BY	DATE
M.VINSON	9/13/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TISSON
STATE OF WASHINGTON
36842
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PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH. 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

WALL W3
DETAILS 1 OF 1

RW16

SHT ____ OF ____

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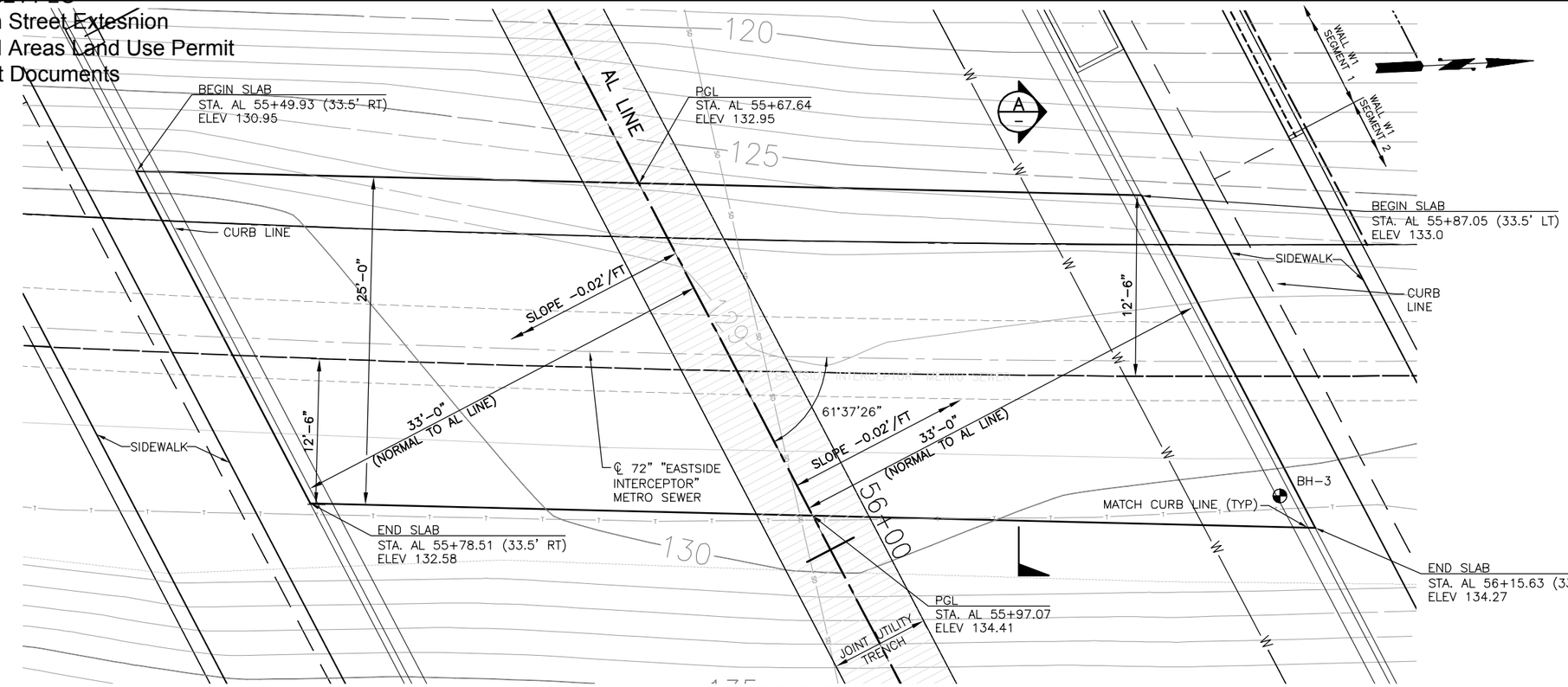
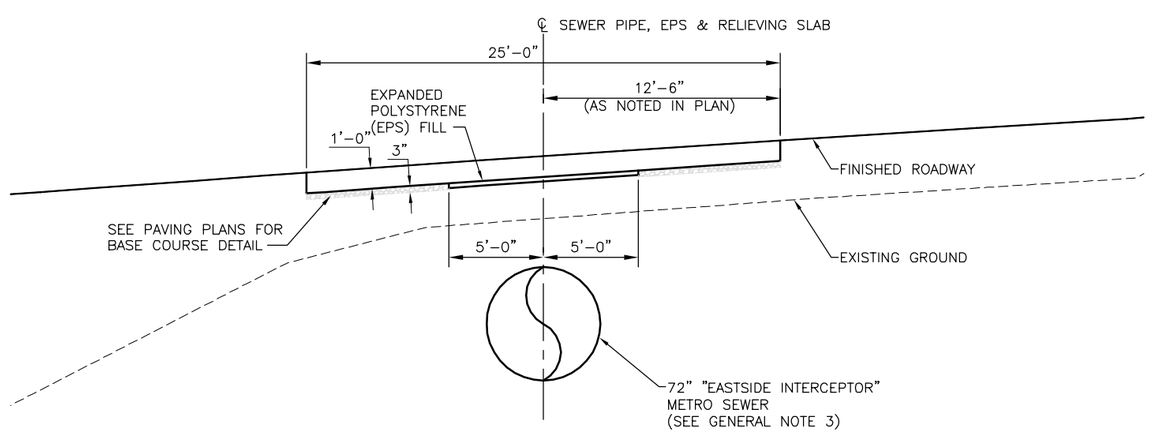


RELIEVING SLAB PLAN

HORIZ & VERT SCALE IN FEET PRINTED 22X34



A – TYPICAL SECTION
SCALE: 1/4" =1'-0"

GENERAL NOTES:

1. ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION DATED 2010.
2. CONTRACTOR SHALL SUBMIT DETAILS AND MATERIAL DATA, CONSTRUCTION SEQUENCE, AND BRACING AND SHORING PLANS TO THE ENGINEER FOR REVIEW. CONTRACTOR SHALL GAIN APPROVALS FROM THE ENGINEER PRIOR TO FABRICATION AND/OR CONSTRUCTION.
3. PROTECT–IN–PLACE EXISTING BURIED 72" CONCRETE SEWER PIPE (KING COUNTY EASTSIDE INTERCEPTOR). SEE AS–BUILT PLANS FOR DETAILS CONCERNING THE PIPE. CONTRACTOR SHALL SUBMIT DETAILS ON PROPOSED METHOD(S) TO PROTECT PIPE, INCLUDING CONSTRUCTION SEQUENCE AND EQUIPMENT TO THE ENGINEER FOR REVIEW. APPROVAL FROM CITY OF BELLEVUE, AND KING COUNTY METRO, SHALL BE OBTAINED PRIOR TO START OF WORK. SEE SPECIAL PROVISIONS.

CONCRETE NOTES:

1. CONCRETE FOR RELIEVING SLAB SHALL CONFORM TO THE THE REQUIREMENTS OF CLASS 4000A. OTHER CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF CLASS 3000.
2. UNLESS NOTED OTHERWISE, MINIMUM CONCRETE COVER SHALL BE:
   - CAST AGAINST EARTH – 3"
   - PERMANENTLY EXPOSED TO EARTH – 2"
   - WEARING SURFACE – 2½"
3. ALL EXPOSED CORNERS SHALL HAVE ¾" CHAMFERS OR FILLETS, UNLESS NOTED OTHERWISE.
4. CONSTRUCTION JOINT SURFACES SHALL BE ROUGHENED WITH ¼" AMPLITUDE UNLESS NOTED OTHERWISE.

REINFORCING STEEL NOTES:

1. ALL REINFORCING STEEL BARS SHALL BE AASHTO M31 (ASTM A615) GR 60, UNLESS NOTED OTHERWISE.
2. ALL BENDS AND HOOKS SHALL MEET THE REQUIREMENTS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION BRIDGE DESIGN MANUAL. ALL BEND DIMENSIONS SHALL BE OUT–TO–OUT OF BARS. ALL PLACEMENT DIMENSIONS SHALL BE TO CENTER OF BARS UNLESS NOTED OTHERWISE.
3. TRANSVERSE REINFORCING BARS SHALL HAVE MINIMUM 2'–0" LAP SPLICES. THERE SHALL BE A MINIMUM LONGITUDINAL STAGGER 4'–0" BETWEEN ADJACENT TRANSVERSE BAR SPLICES.
4. (E) DENOTES BARS THAT ARE TO BE EPOXY COATED.

LEGEND

BOREHOLE ID AND LOCATION

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON 9/13/12 DESIGNED BY DATE
M.SOPER 9/13/12 DRAWN BY DATE
E.KELLEY 9/13/12 CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY VINSON STATE OF WASHINGTON 38842 REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
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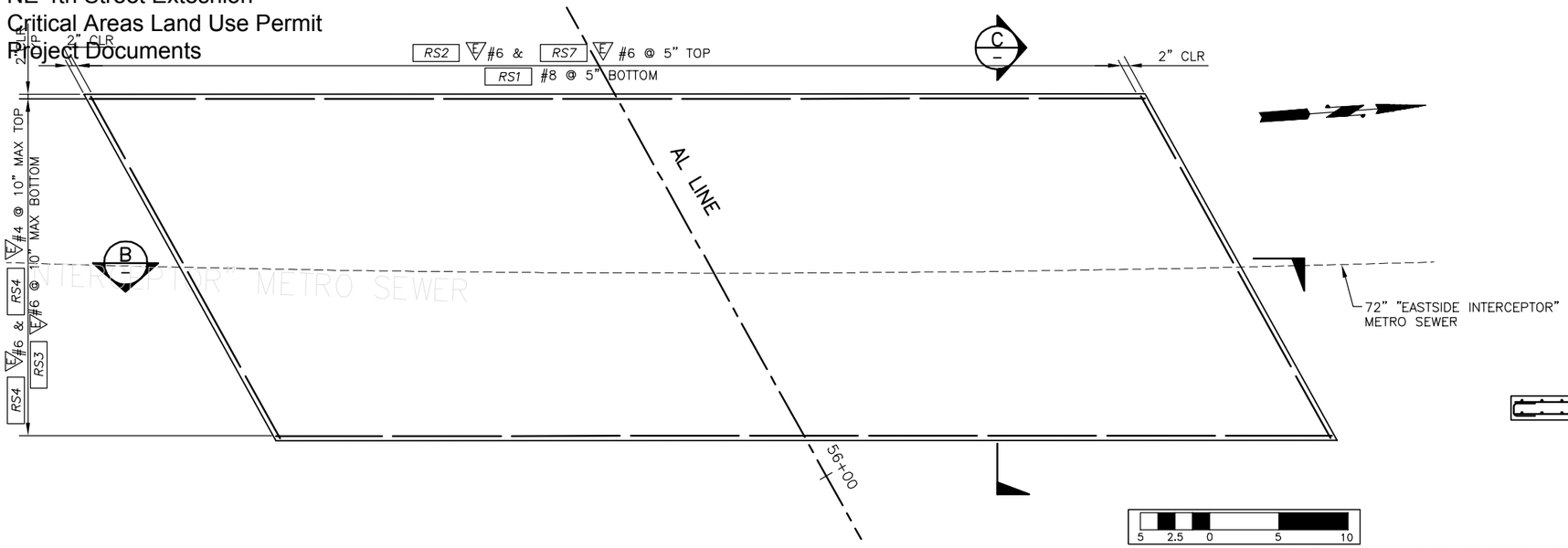
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

RELIEVING SLAB LAYOUT

SL01 SHT ____ OF ____

J:\160162C_ NE4thStExt\CADD\STRC\PH1\SHT\NE4PH1-SL01.dwg Oct 29, 2012 - 9:05am

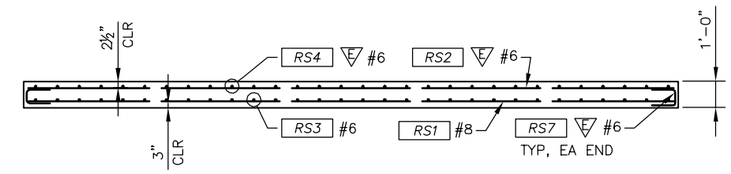


RELIEVING SLAB REINFORCING PLAN

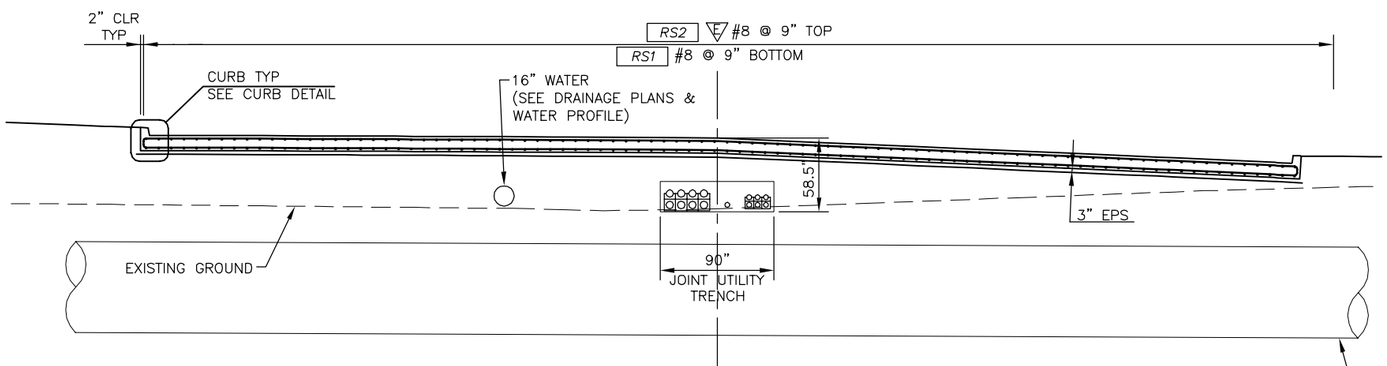
HORIZ & VERT SCALE IN FEET PRINTED 22X34

NOTES:

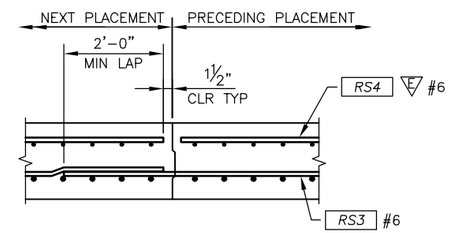
1. ALL EDGES OF RELIEVING SLAB SHALL HAVE ½" RADIUS.
2. LONGITUDINAL JOINTS SHALL BE PLACED ON LANE LINES AND SHALL BE CONSTRUCTED AND SEALED IN ACCORDANCE WITH STD. SPEC. SECTION 5-05.3(8). JOINTS MAY BE EITHER A SAWCUT CRACK CONTROL JOINT OR A CONSTRUCTION JOINT. SAWCUT JOINTS SHALL TERMINATE 1'-0" BEFORE REACHING EDGE OF SLAB AND MUST BE SAWCUT AS SOON AS POSSIBLE AFTER PLACEMENT OF CONCRETE.
3. THE MINIMUM LAP SPLICE OF #6 IS 3'-0". ALL LAP SPLICES SHALL BE STAGGERED SO THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.
4. SEE SL01 FOR ADDITIONAL NOTES.



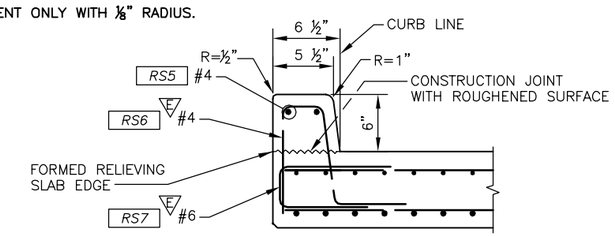
C TYPICAL SECTION
NTS



B SECTION ALONG SEWER LINE
NTS



LONGITUDINAL JOINT DETAIL
NTS
EDGE PRECEDING PLACEMENT ONLY WITH ⅛" RADIUS.

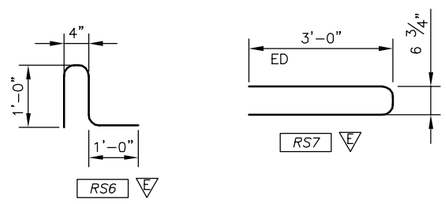


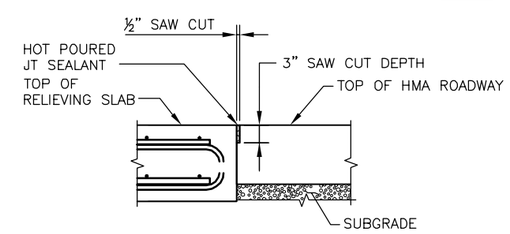
CURB DETAIL
NTS

REINFORCING STEEL BENDING DIAGRAM

MARK	SIZE	NO. REQ'D.	LENGTH	
RS1	8	A	A	STR
RS2	6 E	A	A	STR
RS3	6	A	A	STR
RS4	6 E	A	A	STR
RS5	4	4	A	STR
RS6	4 E	A	3'-4"	
RS7	6 E	A	6'-6¾"	

"A" = DETERMINE FROM PLANS
"STR" = STRAIGHT





HMA ROADWAY JOINT DETAIL
NTS
SAWCUT SHALL BE FILLED WITH HOT-POURED COMPONENT IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 9-04.2(1) AND SEALED IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 5-05.3(8)B.

NO.	DATE	BY	APPR.	REVISIONS
				90% SUBMITTAL
				PRELIMINARY
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Approved By
TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

M.VINSON 9/13/12 DESIGNED BY DATE
M.SOPER 9/13/12 DRAWN BY DATE
E.KELLEY 9/13/12 CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

MARK WESLEY TYSON — STATE OF WASHINGTON — 38842 — REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
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PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
116TH AVE NE TO
BNSF RR RIGHT-OF WAY

RELIEVING SLAB DETAILS

SL02 SHT ____ OF ____

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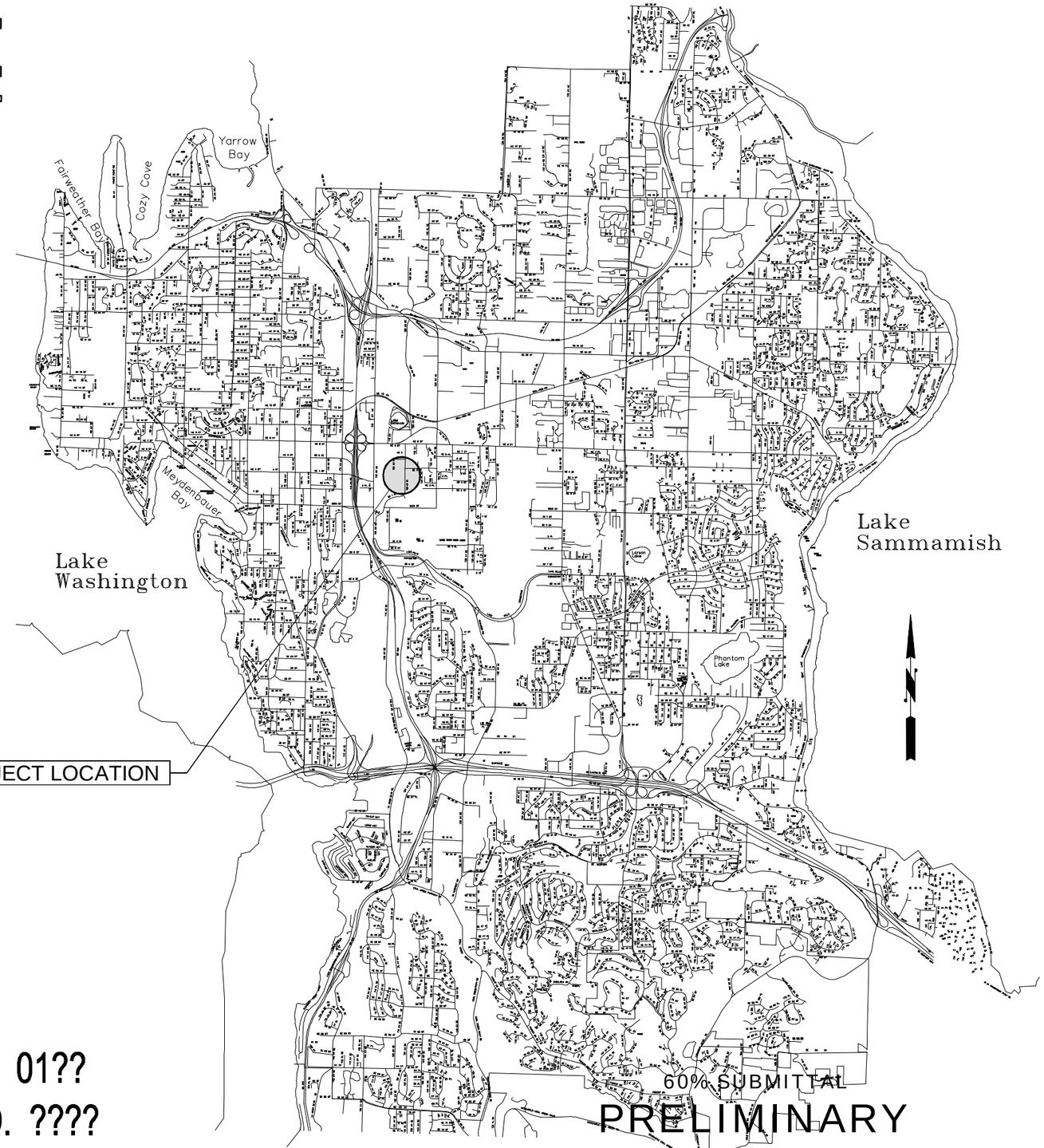
11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

CITY OF BELLEVUE
TRANSPORTATION DEPARTMENT

NE 4TH ST / 120TH AVE NE CORRIDOR PROJECT
BNSF RR RIGHT-OF-WAY TO 120TH AVE NE



CITY MANAGER
STEVEN R. SARKOZY

MAYOR
DON DAVIDSON

DEPUTY MAYOR
CONRAD LEE

DIRECTOR OF TRANSPORTATION
GORAN SPARRMAN

CITY COUNCIL
CLAUDIA BALDUCCI
JOHN CHELMINIAK
GRANT DEGGINGER
JENNIFER ROBERTSON
KEVIN WALLACE

SCHEDULE OF DRAWINGS

NO.	SHEET ID	TITLE
1	GN01	COVER SHEET
2–3	GN02–GN03	GENERAL NOTES, ABBREVIATIONS & LEGEND
4–5	SP01–SP02	SITE PREPARATION PLANS
6–7	GP01–GP02	GRADING PLANS
8	RS01	ROADWAY SECTIONS
9–11	RP01–RP03	ROADWAY PLANS AND PROFILES
12–13	PV01–PV02	PAVING PLANS
14–15	PD01–PD02	PAVING DETAILS
16–17	DW01–DW02	DRIVEWAY PLANS AND PROFILES
18–20	DR01–DR03	DRAINAGE AND UTILITY PLANS & DETAILS
21–23	DPR01–DPR03	DRAINAGE PROFILES
24	WP01	WATER PROFILE
25–26	SL01–SL02	RELIEVING SLAB LAYOUT AND DETAILS
27–28	RW01–RW02	CURB / WALL DETAILS
29–31	CH01–CH03	SIGNING AND STRIPING PLANS
32–33	IL01–IL02	STREET LIGHTING PLANS
34–37	SG01–SG04	SIGNAL PLAN AND DETAILS
38–47	L1.00–L4.03	LANDSCAPE PLANS AND DETAILS

BID NO. 01??
C.I.P. NO. ????
FEDERAL AID NO. ????

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PRELIMINARY
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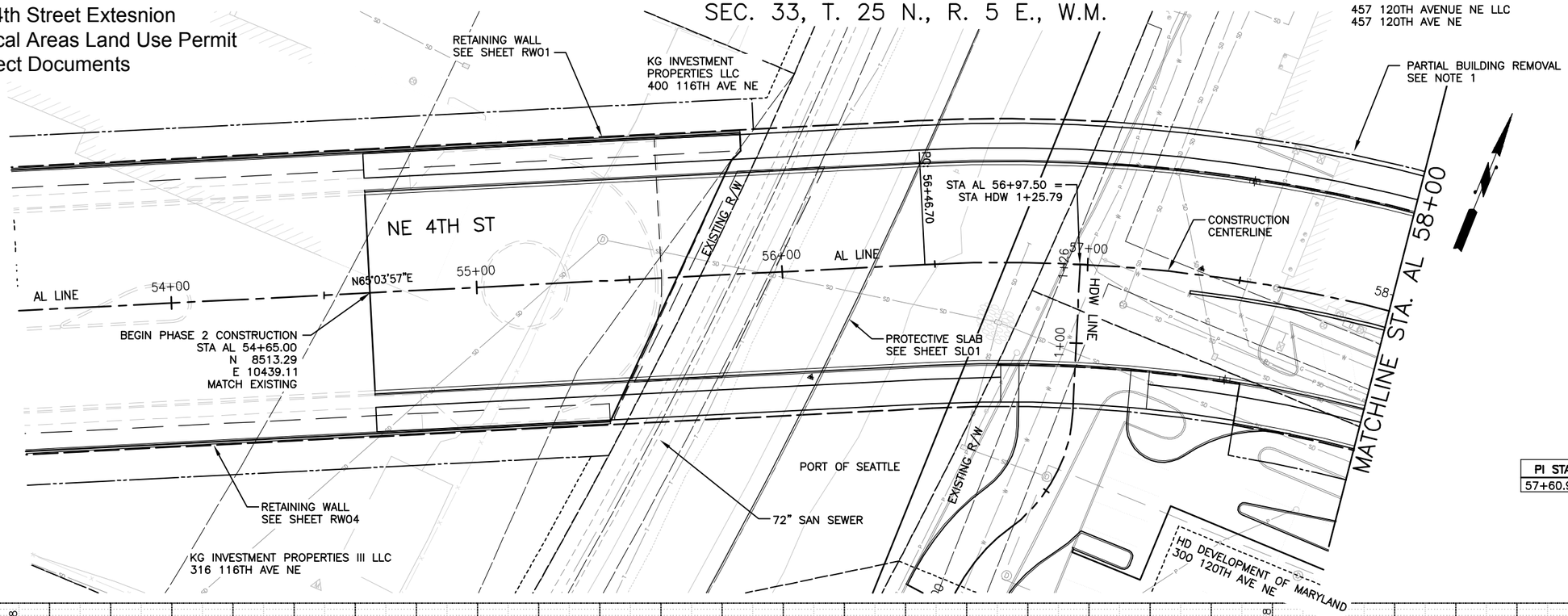
11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents



GENERAL NOTES:

1. FOR TYPICAL SECTIONS SEE SHEET RS01.
2. FOR CHANNELIZATION PLANS SEE SHEET CH01.

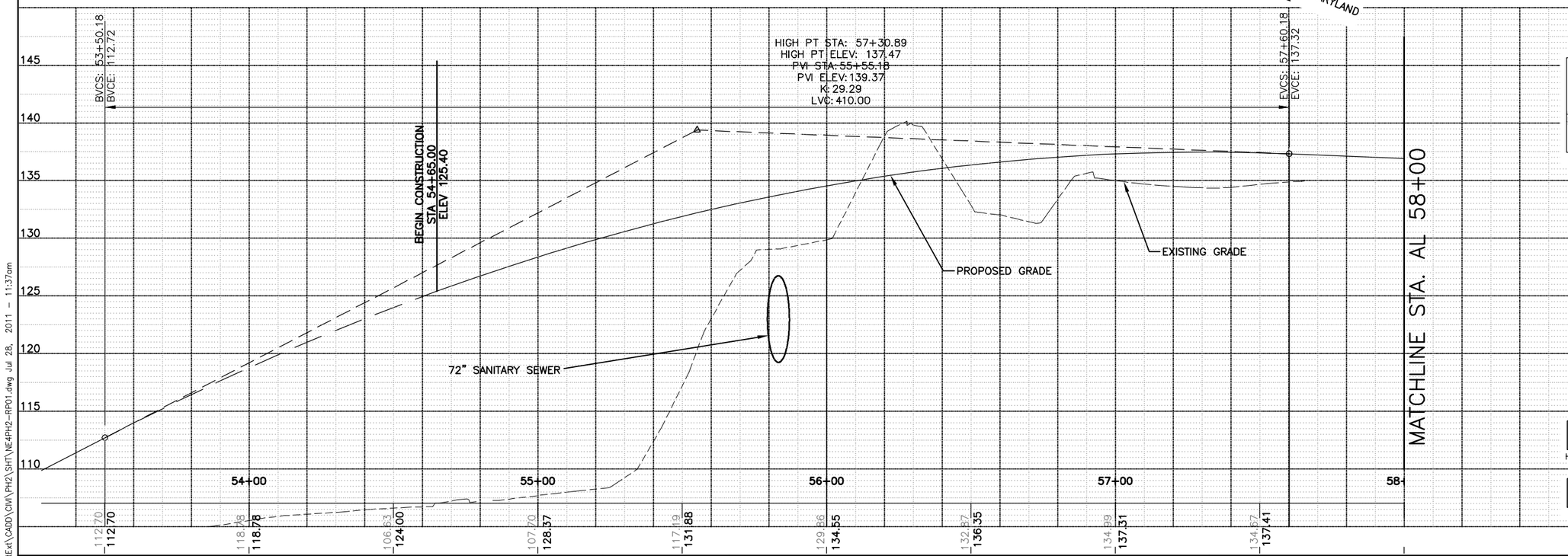
NOTES:

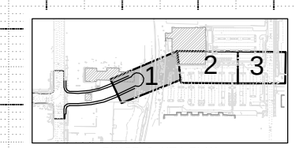
1. BEST BUY BUILDING REMODEL PLANS TO BE DETERMINED.
2. FOR DRIVEWAY PLAN AND PROFILES SEE SHEET DW01 – HDW LINE.
3. FOR COB CONTROL POINT LOCATIONS SEE "116TH AVE NE TO BNSF RR RIGHT OF WAY" SHEET RP01 – PT 06193 OR SHEET RP03 – PT 2720.
4. FOR HOME DEPOT PARKING LOT ADJUSTMENTS, SEE SHEET PD02.

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SIDEWALK EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT

PI STATION	DELTA	RADIUS	TANGENT	LENGTH
57+60.91	25°15'45"	510.00'	114.21'	224.72'





PHASE 2 KEY PLAN

NAVD88

PROJECT DATUM
BASED ON CITY OF
BELLEVUE
CONTROL PT 0079

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

5 2.5 0 5 10
VERTICAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS

60% SUBMITTAL
PRELIMINARY
NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

DESIGNED BY R.SHELTON	DATE 5/13/11
DRAWN BY M.SOPER	DATE 5/20/11
CHECKED BY K.LOEN	DATE 5/23/11

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. OLSEN
STATE OF WASHINGTON
28507
REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2500
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF-WAY
TO 120TH AVE NE

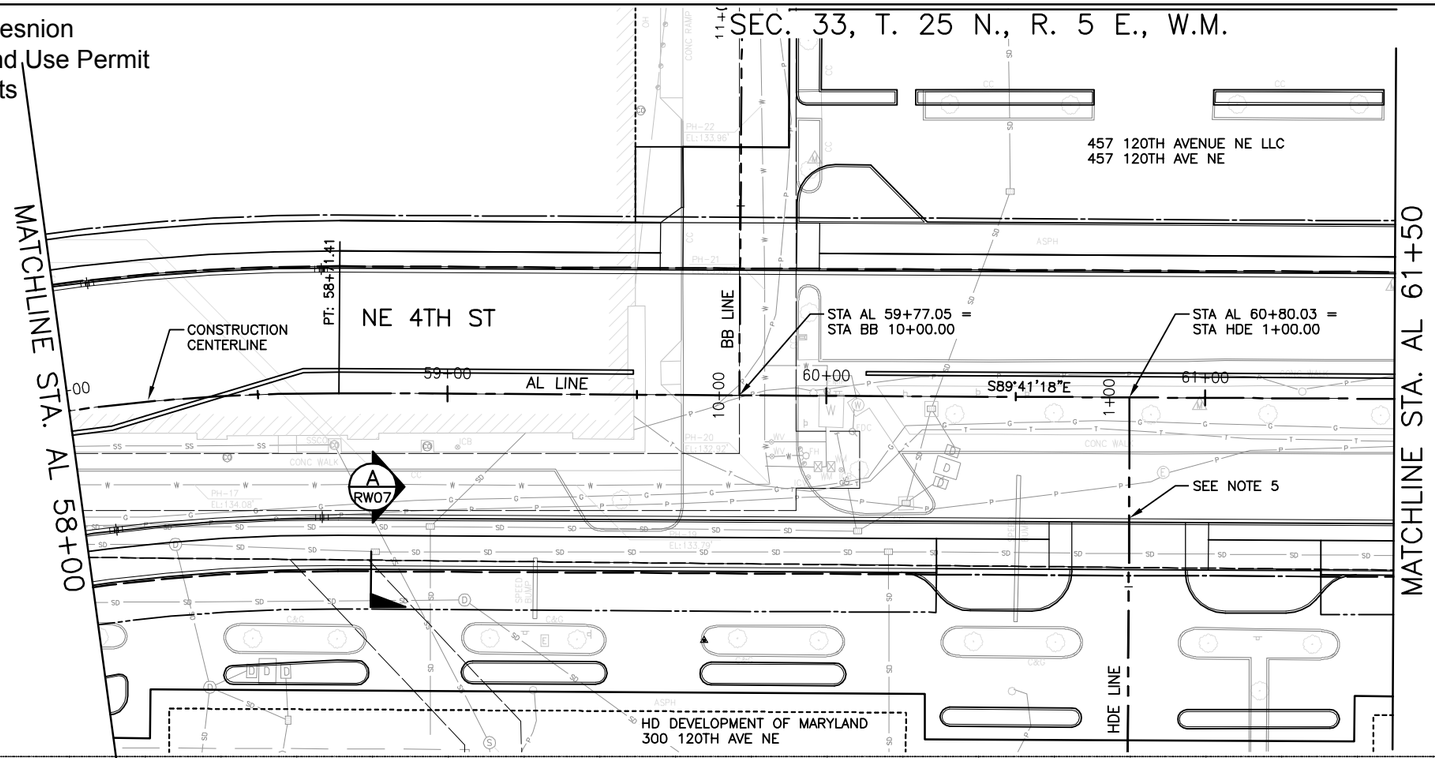
ROADWAY PLAN AND PROFILE
SHEET 1 OF 3
AL LINE STA. 53+50 TO 58+00

RP01

SHT ____ OF ____

J:\1601620_ NE4thSExt\CADD\CIVIL\PH2\SHT\NE4PH2-RP01.dwg Jul 28, 2011 - 11:37am

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

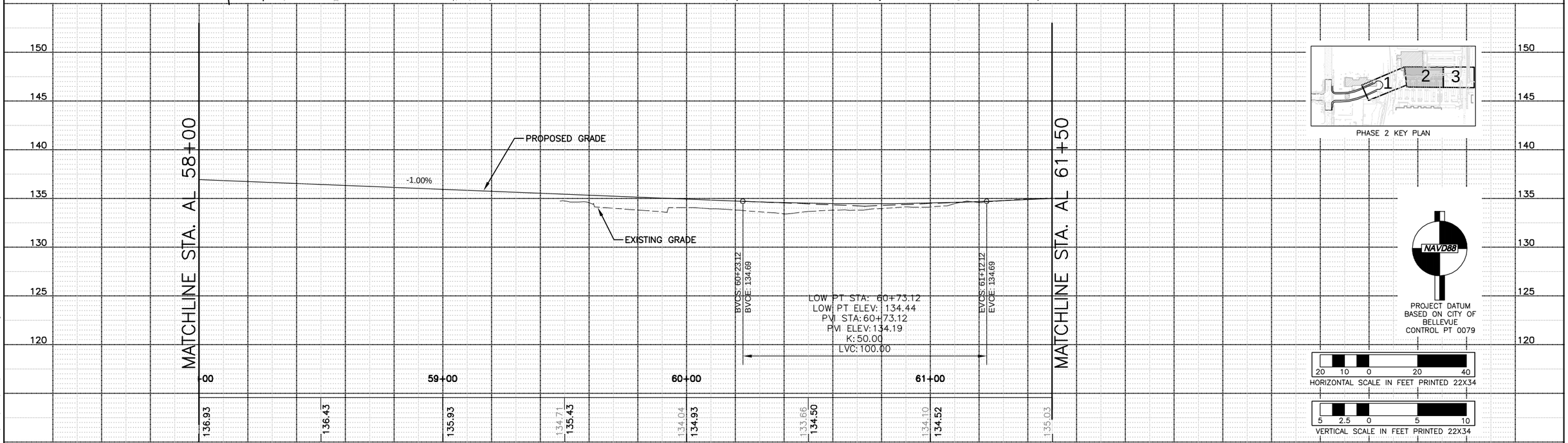


NOTES:

1. 120TH AVE NE WIDENING BY OTHERS, SHOWN EXISTING.
2. FOR TYPICAL SECTIONS SEE SHEET RS01.
3. FOR DRIVEWAY PLAN AND PROFILE SEE SHEET DW01 – BB LINE AND SHEET DW02 – HDE LINE.
4. FOR BEST BUY PARKING LOT ADJUSTMENT SEE SHEET PD01 AND SHEET PD02 FOR HOME DEPOT PARKING LOT ADJUSTMENTS.
5. PLAN REVIEW IDENTIFIED A CONFLICT BETWEEN THE PROPOSED DRIVEWAY AND LOW POINT IN PROFILE REQUIRING A CATCH BASIN. THIS WILL BE ADDRESSED IN THE 90% SUBMITTAL.

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SIDEWALK EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT



PHASE 2 KEY PLAN

NAVD88
PROJECT DATUM BASED ON CITY OF BELLEVUE CONTROL PT 0079

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

5 2.5 0 5 10
VERTICAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL

PRELIMINARY
NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOEN — STATE OF WASHINGTON — 36507 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

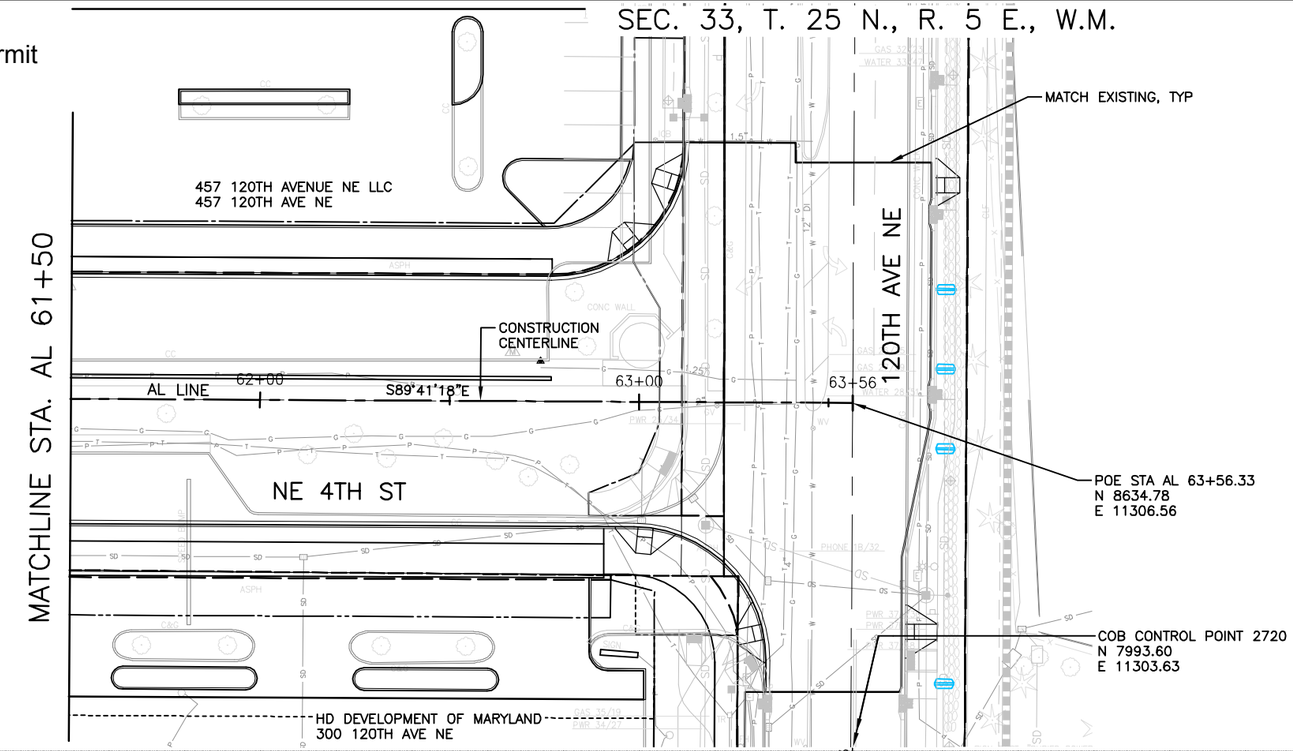
ROADWAY PLAN AND PROFILE
SHEET 2 OF 3
AL LINE STA. 58+00 TO 61+50

RP02

SHT ____ OF ____

J:\160162C_ NE4thSExt\CADD\CIVI\PH2\SHT\NE4PH2-RP02.dwg Jul 28, 2011 - 11:40am

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

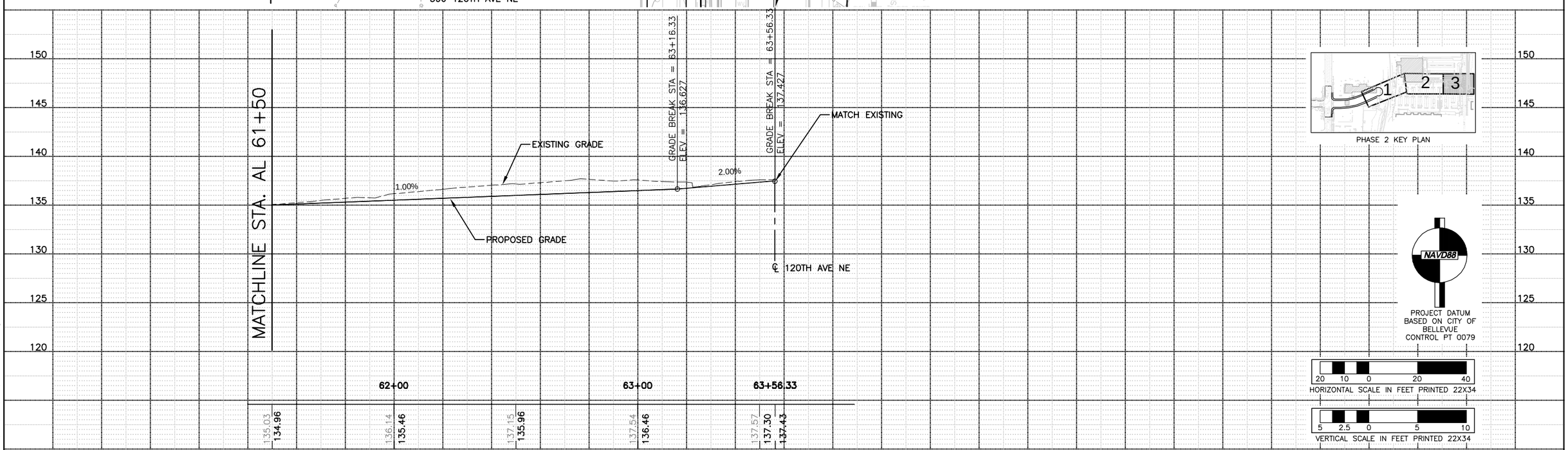


NOTES:

1. 120TH AVE NE WIDENING BY OTHERS, SHOWN EXISTING.
2. FOR TYPICAL SECTIONS SEE SHEET RS01.
3. FOR BEST BUY PARKING LOT ADJUSTMENT SEE SHEET PD01 AND SHEET PD02 FOR HOME DEPOT PARKING LOT ADJUSTMENTS.

LEGEND:

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SIDEWALK EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT



PHASE 2 KEY PLAN

NAVD88

PROJECT DATUM BASED ON CITY OF BELLEVUE CONTROL PT 0079

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

5 2.5 0 5 10
VERTICAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

R.SHELTON	5/13/11
DESIGNED BY	DATE
M.SOPER	5/20/11
DRAWN BY	DATE
K.LOEN	5/23/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOEN — STATE OF WASHINGTON — 38507 — REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

ROADWAY PLAN AND PROFILE
SHEET 3 OF 3
AL LINE STA. 61+50 TO 63+56

RP03

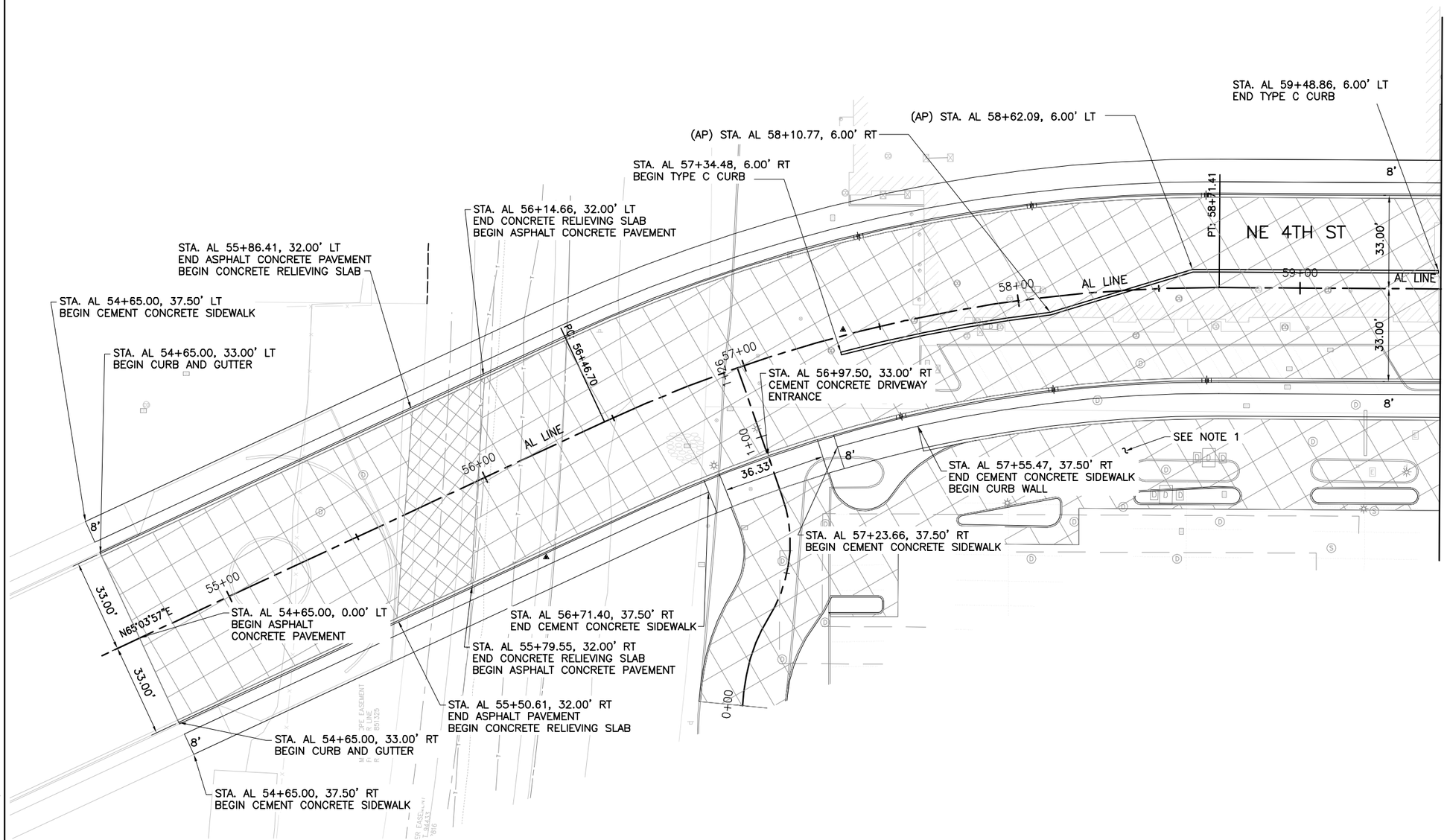
SHT ____ OF ____

J:\160162C_ NE4thStExt\CADD\CIVI\PH2\SHT\NE4PH2-RP03.dwg Jul 28, 2011 - 11:44am

11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.



GENERAL NOTES:

1. SEE CITY OF BELLEVUE STANDARD PLANS:

TE–9A/B	TYPE C CURB
TE–10	CURB AND GUTTER, EXTRUDED CURB
TE–11	CEMENT CONCRETE SIDEWALK
TE–12	CURB RAMP TYPE 1
TE–34	METAL SAFETY RAILING
DEV–6	COMMERCIAL DRIVEWAY APPROACH WITH PLANTER STRIP

CONSTRUCTION NOTES:

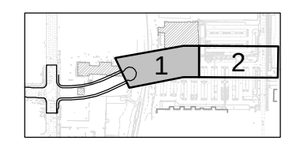
1. TBD

NOTES:

1. FOR TYPICAL ROADWAY SECTIONS, SEE DRAWING NO. RS01.
2. FOR HOME DEPOT PARKING LOT PAVING DETAILS, SEE DRAWING NO. PD02.

LEGEND:

- ASPHALT CONCRETE PAVEMENT
- CEMENT CONCRETE PAVEMENT
- GRIND AND OVERLAY
- GRAVEL BORROW



KEY PLAN

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

R.SHELTON	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2500
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

PAVING PLAN
SHEET 1 OF 2
AL LINE STA. 54+50 TO 59+50

PV01

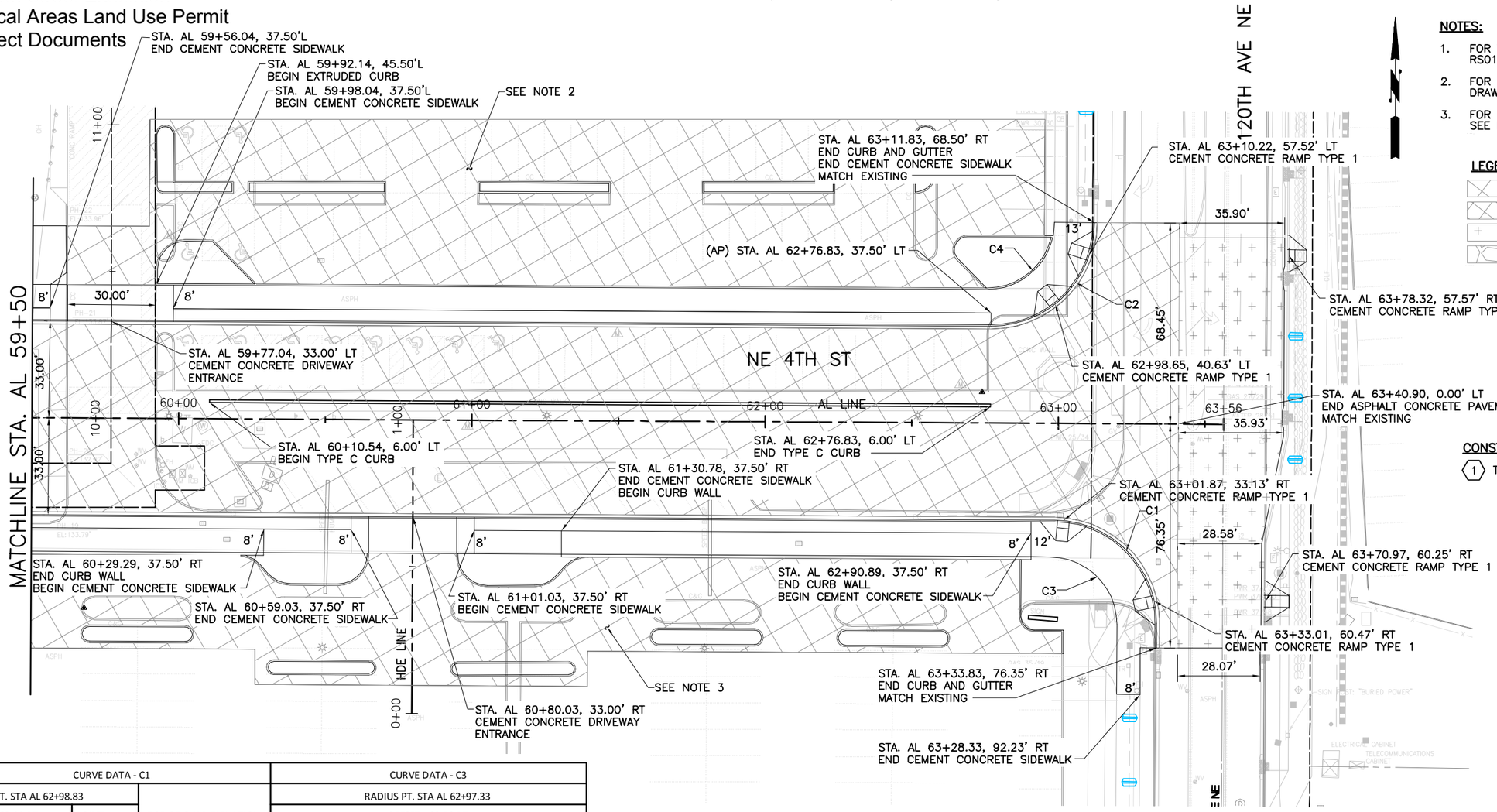
SHT ____ OF ____

J:\160162C_ NE4thStExt\CADD\CIVI\PH2\SHT\NE4PH2-PV01.dwg Jul 28, 2011 – 11:51am

11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.



NOTES:

1. FOR TYPICAL ROADWAY SECTIONS SEE DRAWING NO. RS01.
2. FOR BEST BUY PARKING LOT PAVING DETAILS SEE DRAWING NO. PD01.
3. FOR HOME DEPOT PARKING LOT PAVING DETAILS SEE DRAWING NO. PD02.

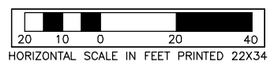
LEGEND:

- ASPHALT CONCRETE PAVEMENT
- CEMENT CONCRETE PAVEMENT
- GRIND AND OVERLAY
- GRAVEL BORROW

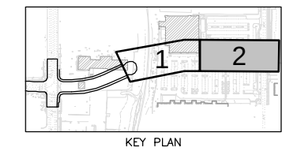
CONSTRUCTION NOTES:

(1) TBD.

CURVE DATA - C1			CURVE DATA - C3
RADIUS PT. STA AL 62+98.83			RADIUS PT. STA AL 62+97.33
OFFSET - 68.00 RT	POINT	TOP OF CURB ELEVATION	OFFSET - 68.50 RT
Δ = 90.00	PC	-	Δ = 90.00
R= 35.00	1/4	-	R= 23.00
L= 54.98	1/2	-	L= 36.13
T= 35.00	3/4	-	T= 23.00
	PT	-	
CURVE DATA - C2			CURVE DATA - C4
RADIUS PT. STA AL 62+76.83			RADIUS PT. STA AL 62.75.33
OFFSET - 68.00 LT	POINT	TOP OF CURB ELEVATION	OFFSET - 68.50 LT
Δ = 90.00	PC	-	Δ = 90.00
R= 35.00	1/4	-	R= 23.00
L= 54.98	1/2	-	L= 36.13
T= 35.00	3/4	-	T= 23.00
	PT	-	



HORIZONTAL SCALE IN FEET PRINTED 22X34



KEY PLAN

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

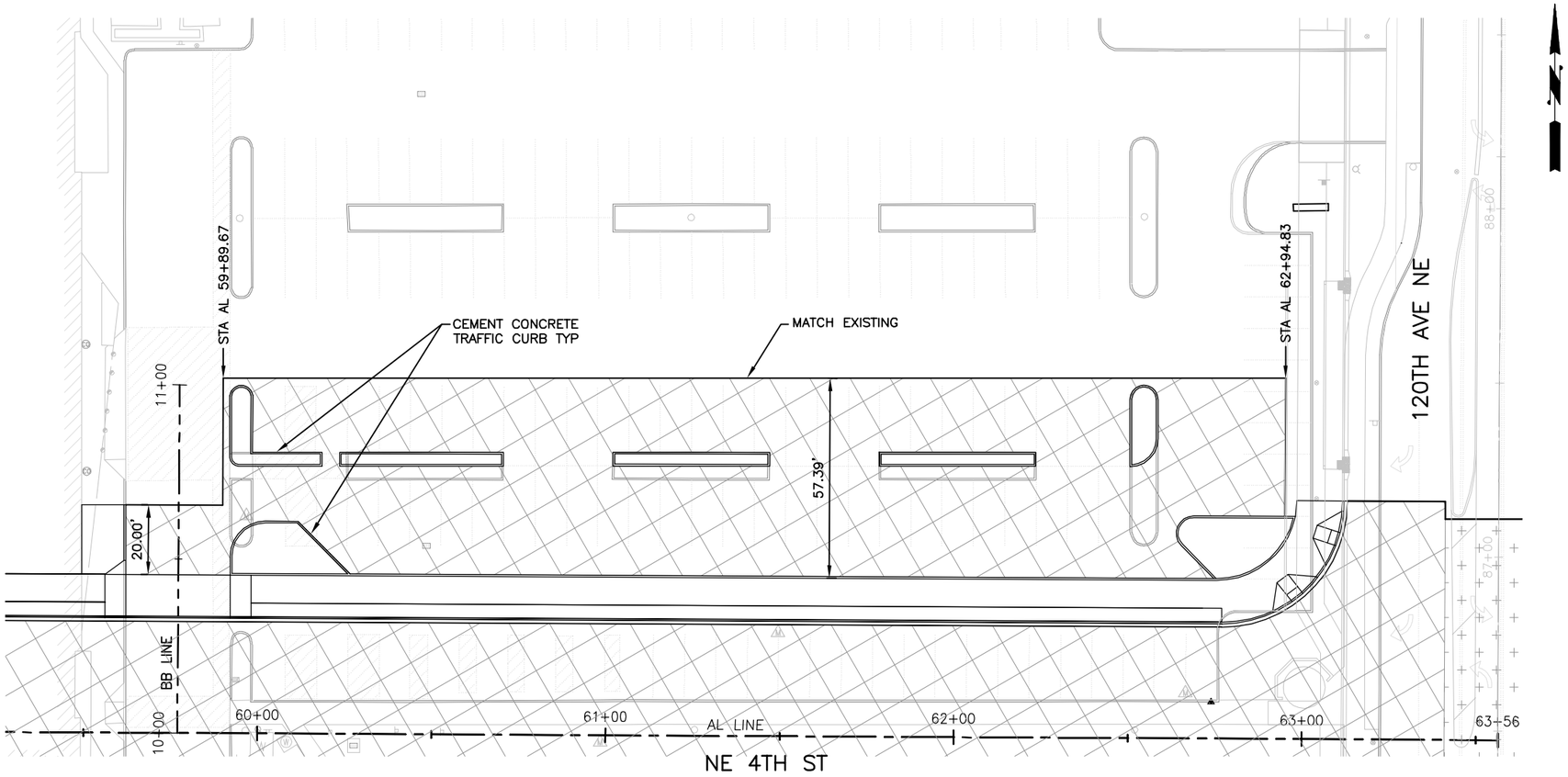
PAVING PLAN
SHEET 2 OF 2
AL LINE STA. 59+50 TO 63+56

PV02

SHT ____ OF ____

J:\160162C_ NE4thSiExt\CADD\CIV\PH2\SHT\NE4PH2-PV02.dwg Jul 27, 2011 - 11:35am

SEC. 33, T. 25 N., R. 5 E., W.M.



GENERAL NOTES:

1. SEE CITY OF BELLEVUE STANDARD PLANS:

   TE–9A/B TYPE C CURB
   TE–10 CURB AND GUTTER EXTRUDED CURB
   TE–11 CEMENT CONCRETE SIDEWALK
   TE–12 CURB RAMP TYPE 1
   TE–13 CURB RAMP TYPE 2
   TE–34 METAL SAFETY RAILING
   DEV–6 COMMERCIAL DRIVEWAY APPROACH WITH PLANTER STRIP

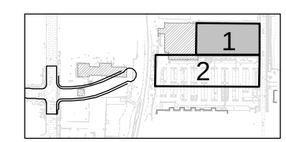
2. SEE SHEET RS01 FOR PARKING LOT PAVEMENT SECTION.
3. SEE SHEET DW01 FOR BB LINE PROFILE.
4. SEE SHEET GP02 FOR FINISHED GRADE CONTOURS.

CONSTRUCTION NOTES:

(1) TBD

LEGEND

ASPHALT CONCRETE PAVEMENT



KEY PLAN

NOTE:

PARKING LOT DESIGN TO BE COORDINATED WITH PROPERTY OWNER.

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2300
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

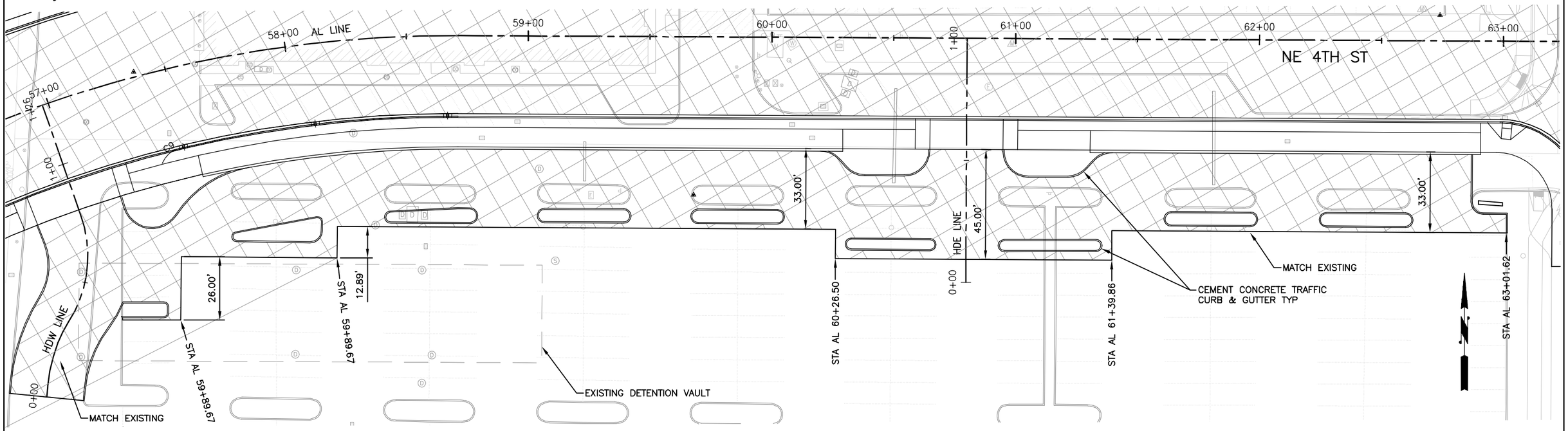
NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

PAVING DETAIL

PD01 SHT ____ OF ____

J:\160162C_ NE4thStExt\CADD\CIVI\PH2\SHT\NE4PH2-PD01.dwg Jul 27, 2011 - 11:36am

SEC. 33, T. 25 N., R. 5 E., W.M.



NOTE:

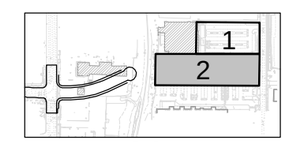
PARKING LOT DESIGN TO BE COORDINATED WITH PROPERTY OWNER.

GENERAL NOTES:

1. SEE CITY OF BELLEVUE STANDARD PLANS:

   TE-9A/B TYPE C CURB
   TE-10 CURB AND GUTTER EXTRUDED CURB
   TE-11 CEMENT CONCRETE SIDEWALK
   TE-12 CURB RAMP TYPE 1
   TE-13 CURB RAMP TYPE 2
   TE-34 METAL SAFETY RAILING
   DEV-6 COMMERCIAL DRIVEWAY APPROACH WITH PLANTER STRIP

2. SEE SHEET RS01 FOR PARKING LOT PAVEMENT SECTION.
3. SEE SHEET DW01 FOR HDW LINE PROFILE AND SHEET DW02 FOR HDE LINE PROFILE.
4. SEE SHEET GP01 AND SHEET GP02 FOR FINISHED GRADE CONTOURS.



KEY PLAN

CONSTRUCTION NOTES:

TBD

LEGEND

ASPHALT CONCRETE PAVEMENT

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

PAVING DETAIL

PD02 SHT ____ OF ____

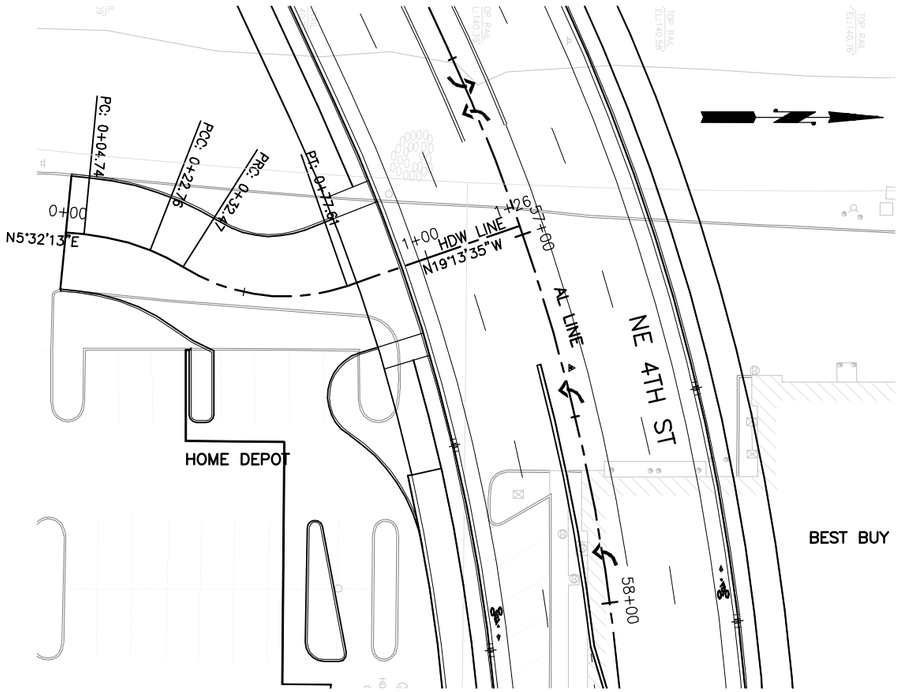
J:\160162C_ NE4thStExt\CADD\CIV\PH2\SHT\NE4PH2-PD02.dwg Jul 28, 2011 - 11:57am

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

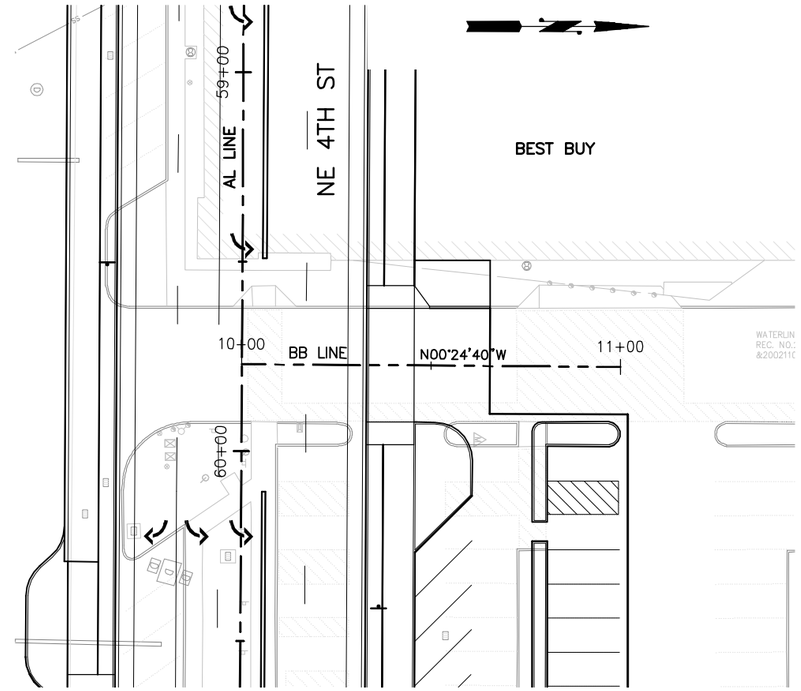
SEC. 33, T. 25 N., R. 5 E., W.M.

NOTES:

1. FOR HOME DEPOT'S EAST DRIVEWAY SEE DRAWING No. DW02.

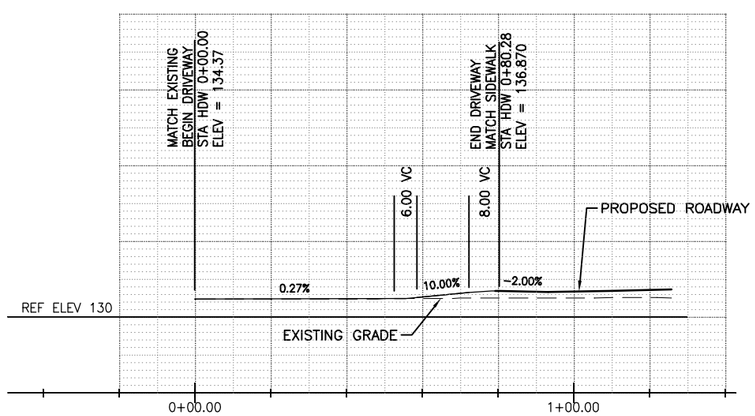


HDW LINE PLAN

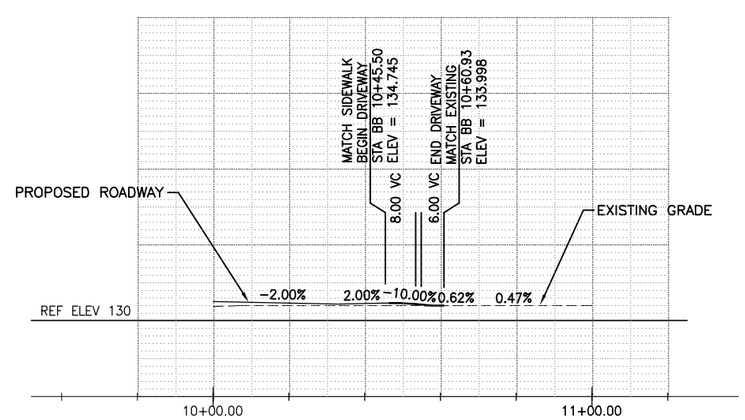


BB LINE PLAN

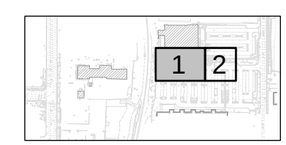
PI STATION	DELTA	RADIUS	TANGENT	LENGTH
0+13.81	15°49'29"	65.25'	9.07'	18.02'
0+27.63	11°07'29"	50.00'	4.87'	9.71'
0+56.71	51°43'42"	50.00'	24.24'	45.14'



HDW LINE PROFILE



BB LINE PROFILE



KEY PLAN

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

R.SHELTON	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOEN — STATE OF WASHINGTON — 36507 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

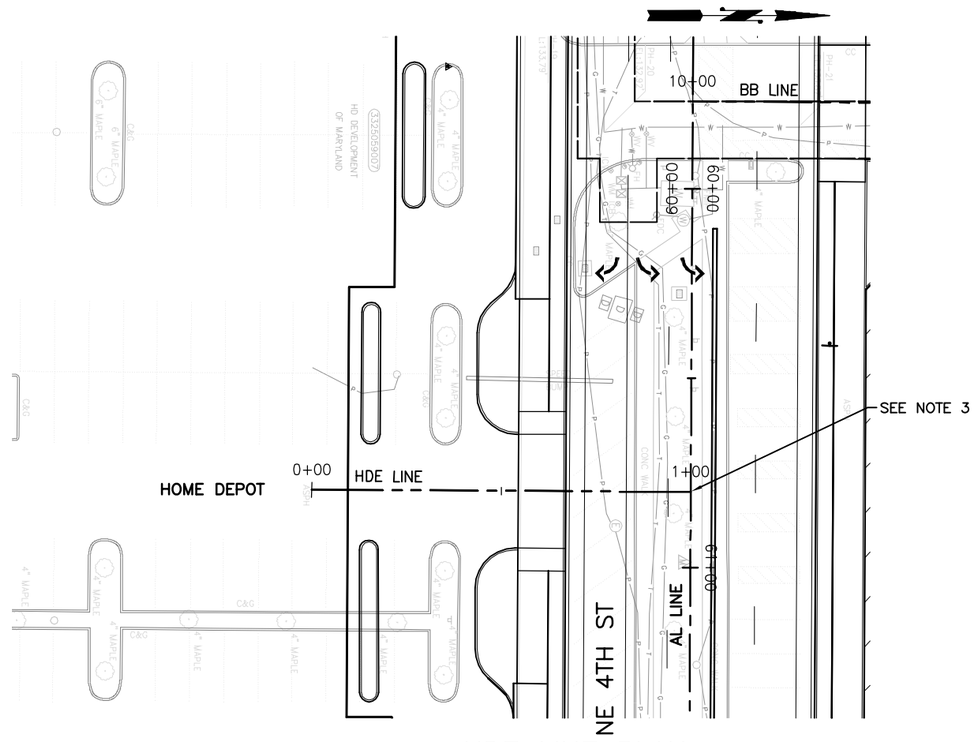
NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

DRIVEWAY PLAN AND PROFILE
HDW LINE STA 0+00 TO 1+00
BB LINE STA. 10+00 TO 11+00

DW01 — SHT ____ OF ____

J:\160162C_ NE4thSExt\CADD\CIV\PH2\SHT\NE4PH2-DW01.dwg Jul 28, 2011 - 12:20pm

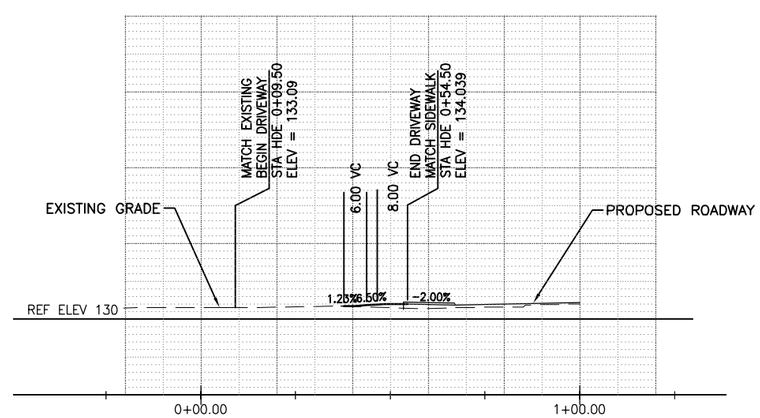
SEC. 33, T. 25 N., R. 5 E., W.M.



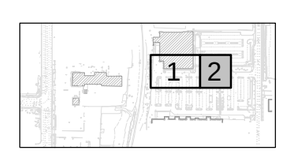
HDE LINE PLAN

NOTES:

1. FOR HOME DEPOT'S WEST DRIVEWAY SEE DRAWING No. DW01.
2. SEE DRAWING No. DW01 FOR BEST BUY DRIVEWAY.
3. PLAN REVIEW IDENTIFIED A CONFLICT BETWEEN THE PROPOSED DRIVEWAY LOCATION AND LOW POINT IN THE NE 4TH PROFILE REQUIRING A CATCH BASIN. THIS WILL BE ADDRESSED IN THE 90% SUBMITTAL.



HDE LINE PROFILE



KEY PLAN

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

R.SHELTON	7/22/11
DESIGNED BY	DATE
E.NELSON	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOEN — STATE OF WASHINGTON — 36507 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS — 999 3RD AVENUE, SUITE 2500, SEATTLE, WASHINGTON 98104-4020, PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

DRIVEWAY PLAN AND PROFILE
HDE LINE STA 0+00 TO 1+00

DW02

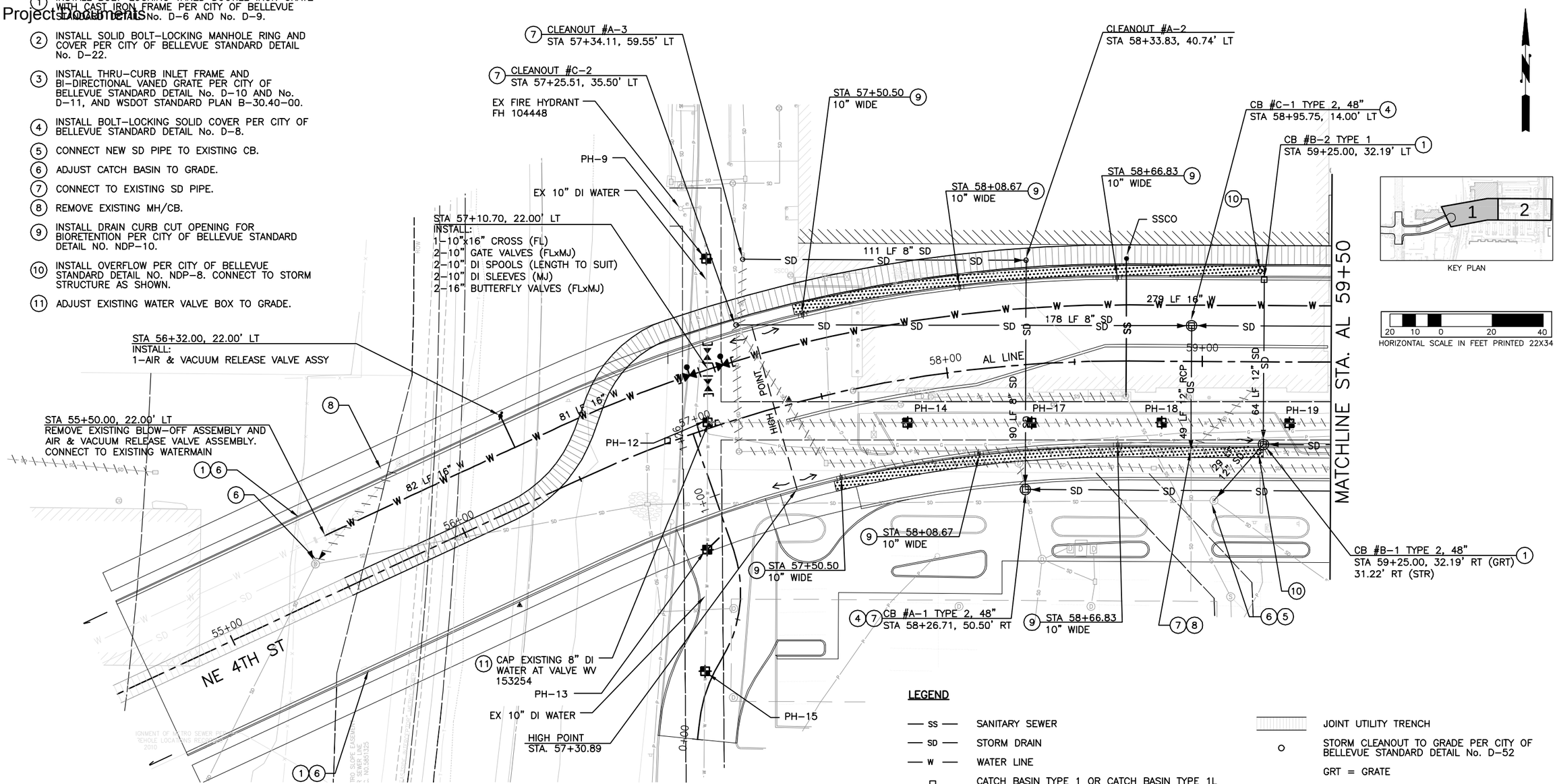
SHT _____ OF _____

J:\160162C_ NE4thSExt\CADD\CIV\PH2\SHT\NE4PH2-DW02.dwg Jul 28, 2011 - 12:30pm

SEC. 33, T. 25 N., R. 5 E., W.M.

CONSTRUCTION NOTES:

1. INSTALL BOLT-LOCKING VANED DUCTILE IRON GRATE WITH CAST IRON FRAME PER CITY OF BELLEVUE STANDARD DETAIL No. D-6 AND No. D-9.
2. INSTALL SOLID BOLT-LOCKING MANHOLE RING AND COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-22.
3. INSTALL THRU-CURB INLET FRAME AND BI-DIRECTIONAL VANED GRATE PER CITY OF BELLEVUE STANDARD DETAIL No. D-10 AND No. D-11, AND WSDOT STANDARD PLAN B-30.40-00.
4. INSTALL BOLT-LOCKING SOLID COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-8.
5. CONNECT NEW SD PIPE TO EXISTING CB.
6. ADJUST CATCH BASIN TO GRADE.
7. CONNECT TO EXISTING SD PIPE.
8. REMOVE EXISTING MH/CB.
9. INSTALL DRAIN CURB CUT OPENING FOR BIORETENTION PER CITY OF BELLEVUE STANDARD DETAIL NO. NDP-10.
10. INSTALL OVERFLOW PER CITY OF BELLEVUE STANDARD DETAIL NO. NDP-8. CONNECT TO STORM STRUCTURE AS SHOWN.
11. ADJUST EXISTING WATER VALVE BOX TO GRADE.



GENERAL NOTES:

1. ALL OFFSETS PROVIDED ARE TO CENTER OF GRATE UNLESS OTHERWISE NOTED.
2. ALL STORM LABELED SD SHALL BE CORRUGATED POLYETHYLENE STORM SEWER PIPE UNLESS OTHERWISE NOTED.
3. THE EXITING GAS, POWER AND TELEPHONE SERVICE LINES TO THE BEST BUY BUILDING WILL BE RELOCATED BY OTHERS IN ADVANCE OF PROJECT.
4. THE EXISTING BEST BUY FDC AND HYDRANT WILL BE RELOCATED AS PART OF THE BEST BUY REMODEL IN ADVANCE OF PROJECT.

LEGEND

- SS — SANITARY SEWER
- SD — STORM DRAIN
- W — WATER LINE
- CATCH BASIN TYPE 1 OR CATCH BASIN TYPE 1L PER CITY OF BELLEVUE STANDARD DETAIL No. D-2 OR No. D-3
- CATCH BASIN TYPE 2 PER CITY OF BELLEVUE STANDARD DETAIL No. D-4
- SD — EXISTING STORM DRAIN TO BE REMOVED
- BUTTERFLY VALVE
- GATE VALVE
- SANITARY SEWER CLEANOUT TO GRADE PER CITY OF BELLEVUE STANDARD DETAIL No. S-16
- JOINT UTILITY TRENCH
- STORM CLEANOUT TO GRADE PER CITY OF BELLEVUE STANDARD DETAIL No. D-52
- GRT = GRATE
- STR = STRUCTURE
- 1" AIR AND VACUUM RELEASE VALVE ASSEMBLY PER CITY OF BELLEVUE STANDARD DETAIL NO. W-16
- 2" BLOW-OFF ASSEMBLY PER CITY OF BELLEVUE STANDARD DETAIL NO. W-15
- BIORETENTION SWALE
- POTHOLE (SEE TABLE ON DR03)

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

C.VANIER	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS — 999 3RD AVENUE, SUITE 2200 SEATTLE, WASHINGTON 98104-4020 PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

DRAINAGE PLAN
SHEET 1 OF 2
AL LINE STA. 54+50 TO 59+50

DR01 — SHT ____ OF ____

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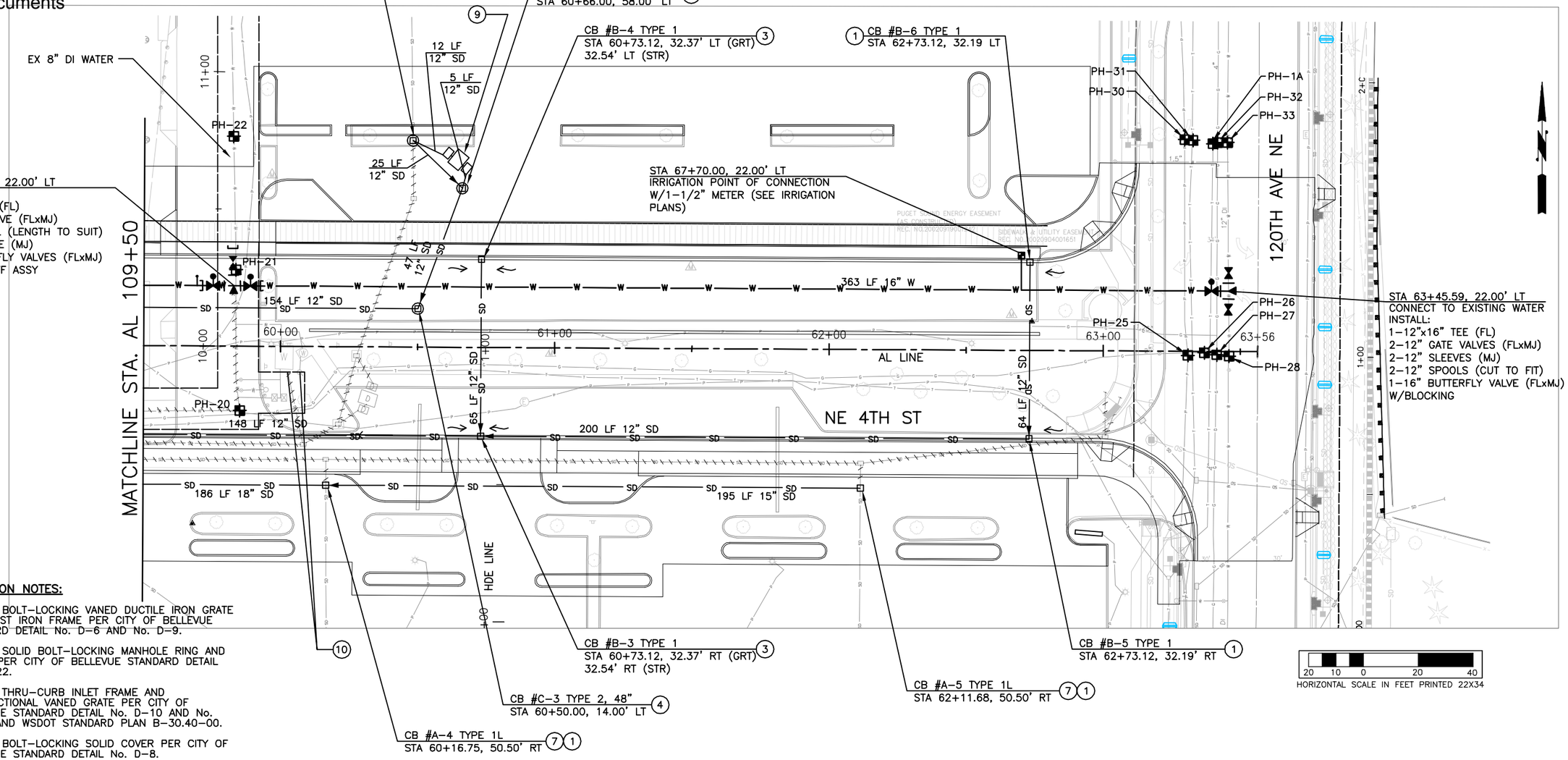
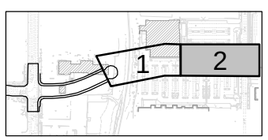
11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.



CONSTRUCTION NOTES:

1. INSTALL BOLT-LOCKING VANED DUCTILE IRON GRATE WITH CAST IRON FRAME PER CITY OF BELLEVUE STANDARD DETAIL No. D-6 AND No. D-9.
2. INSTALL SOLID BOLT-LOCKING MANHOLE RING AND COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-22.
3. INSTALL THRU-CURB INLET FRAME AND BI-DIRECTIONAL VANED GRATE PER CITY OF BELLEVUE STANDARD DETAIL No. D-10 AND No. D-11, AND WSDOT STANDARD PLAN B-30.40-00.
4. INSTALL BOLT-LOCKING SOLID COVER PER CITY OF BELLEVUE STANDARD DETAIL No. D-8.
5. CONNECT NEW SD PIPE TO EXISTING CB.
6. ADJUST CATCH BASIN TO GRADE.
7. CONNECT TO EXISTING SD PIPE.
8. REMOVE EXISTING MH TYPE 1.
9. REPLACE BEST BUY WATER QUALITY SYSTEM IN KIND.
10. BEST BUY FIRE PROTECTION SYSTEMS TO BE RELOCATED AS PART OF BEST BUY REMODEL.



KEY PLAN

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

C.VANIER	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31784 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH. 206-382-5265

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

DRAINAGE PLAN
SHEET 2 OF 2
AL LINE STA. 59+50 TO 63+56

DR02

SHT ____ OF ____

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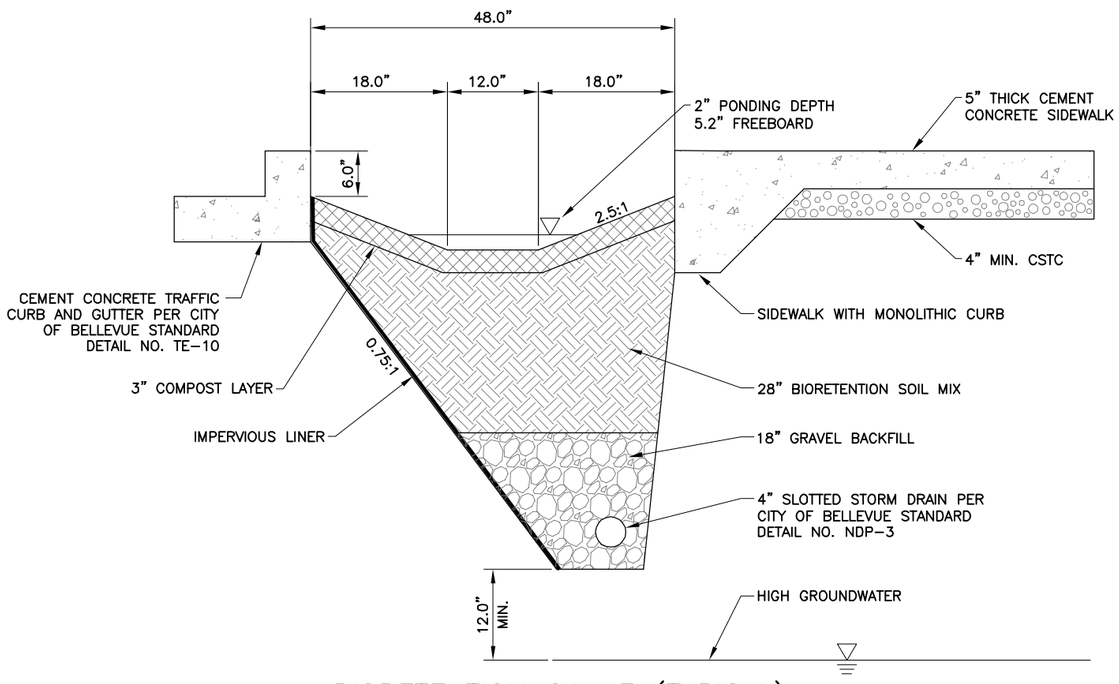
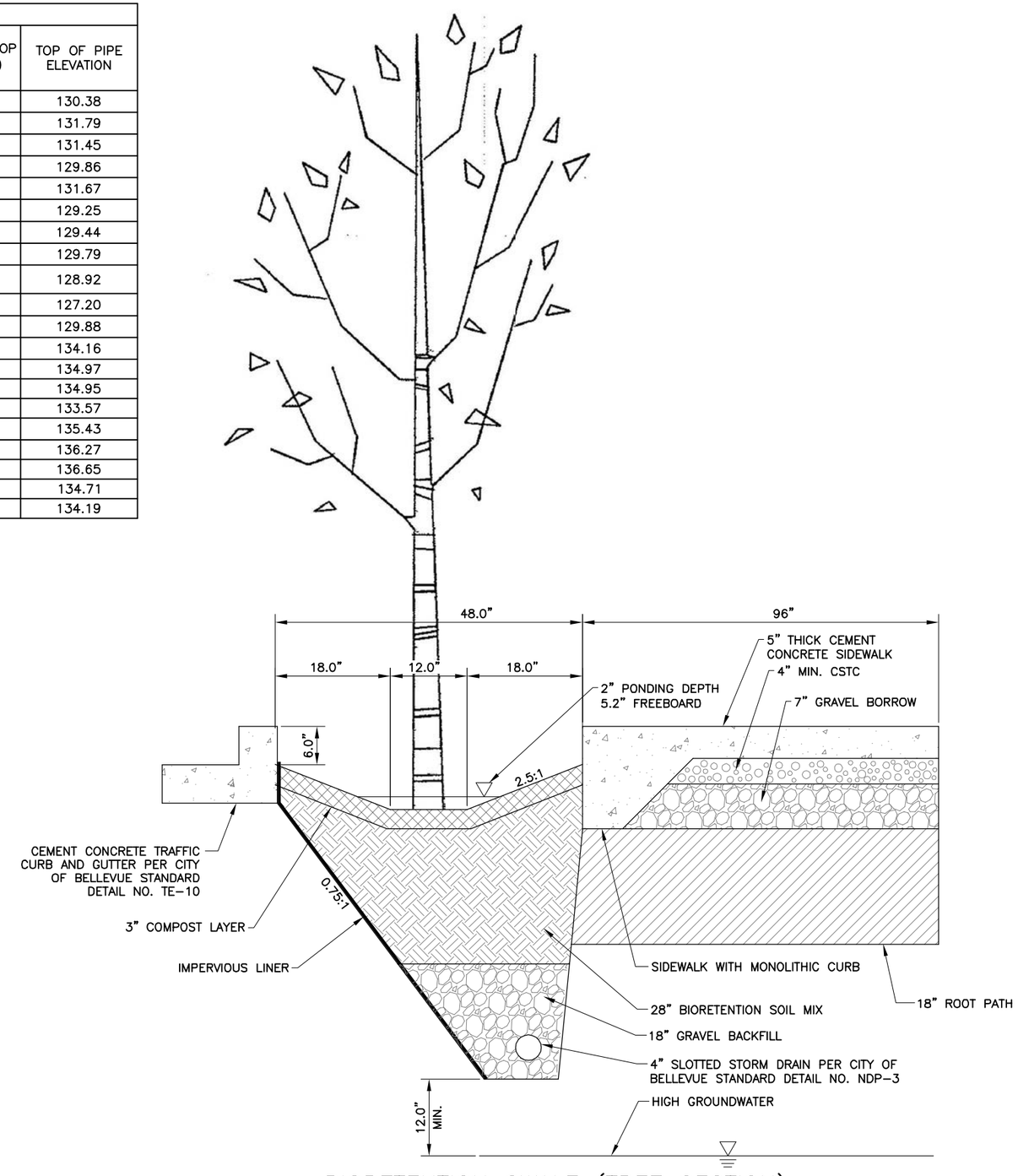
PHASE 2 POTHOLE TABLE

POTHOLE #	TYPE OF UTILITY	MATERIAL	SIZE OF UTILITY	GROUND SURFACE ELEVATION ELEVATION (TAKEN FROM TIN)	GROUND SURFACE ELEVATION (SURVEYED)	MEASUREMENT TO TOP OF PIPE (INCHES)	TOP OF PIPE ELEVATION
9	WATER	STEEL	10"		134.46	49	130.38
12	WATER	STEEL	10"		134.79	36	131.79
13	WATER	STEEL	10"		135.20	45	131.45
14	WATER	STEEL	8"		134.19	52	129.86
15	WATER	STEEL	10"		134.92	39	131.67
17	WATER	STEEL	8"		134.08	58	129.25
18	WATER	STEEL	8"		133.86	53	129.44
19	WATER	STEEL	8"		133.79	48	129.79
20	THRUST BLOCK	CONCRETE	N/A		132.92	48	128.92
21	WATER	STEEL	8"		133.87	80	127.20
22	WATER	STEEL	8"		133.96	49	129.88
25	POWER	CONDUIT	2", 3", 4"	137.08		35	134.16
26	BT/BFO	BLACK PVC	1"–4"	137.30		28	134.97
27	GAS	STEEL	4"	137.37		29	134.95
28	WATER	CIP	12"	137.49		47	133.57
30	POWER	CONDUIT	2", 3", 4"	138.26		34	135.43
31	BT/BFO	IN CONCRETE	21"	138.35		25	136.27
32	GAS	STEEL	4"	138.57		23	136.65
33	WATER	CIP	12"	138.63		47	134.71
1A	SMFO	PVC	4"	138.52		52	134.19



BIORETENTION SWALE (TYPICAL)

NOT TO SCALE



BIORETENTION SWALE (TREE SECTION)

NOT TO SCALE

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE

PROJECT MANAGER — DATE

C.VANIER	7/22/11
DESIGNED BY	DATE
C.COOK	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

CARMEN O. VANIER — STATE OF WASHINGTON — 31764 — REGISTERED PROFESSIONAL ENGINEER

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

DRAINAGE DETAILS

DR03

SHT ____ OF ____

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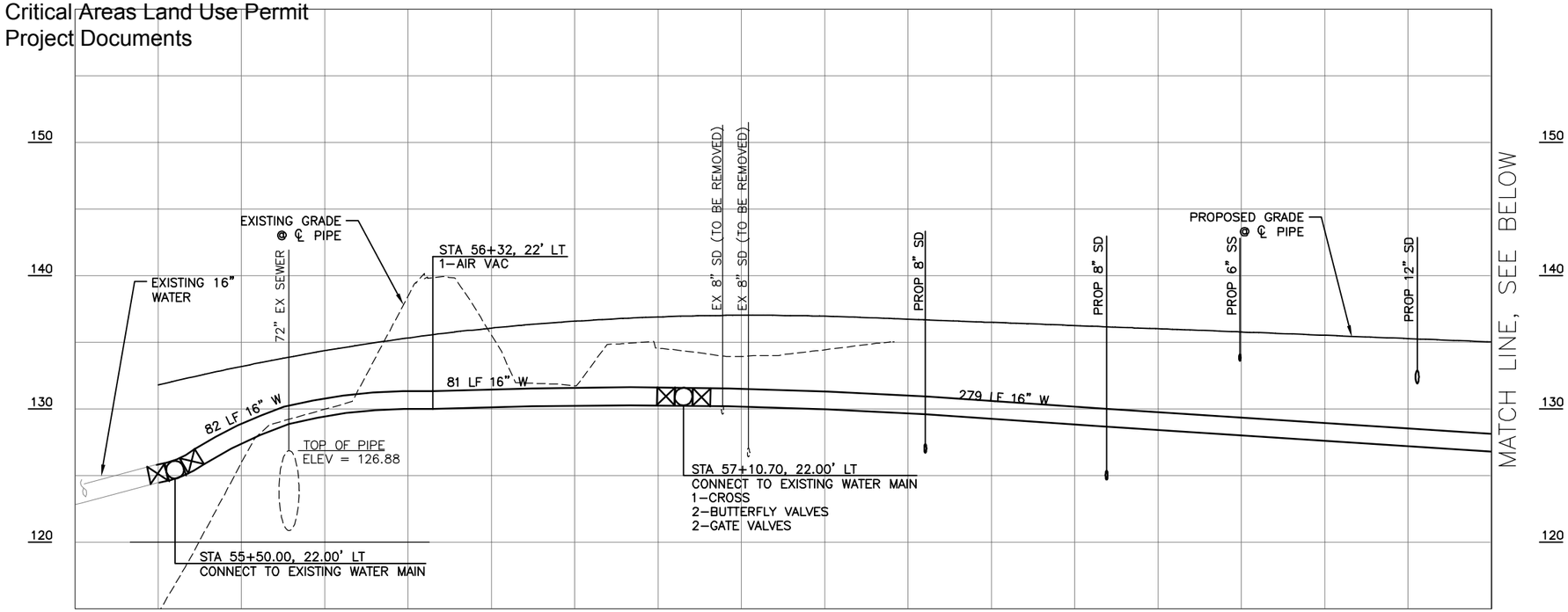
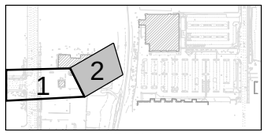


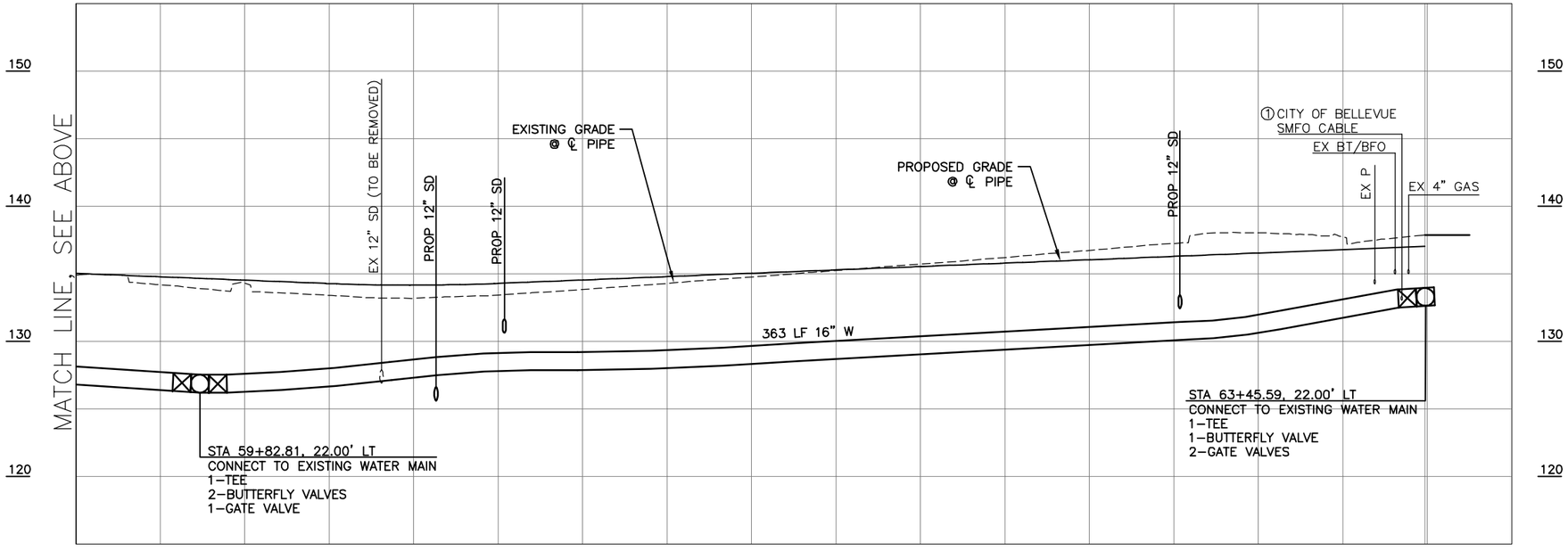
STA. 55+50 TO STA. 59+46



KEY PLAN

NOTES:

1. CONTRACTOR TO VERIFY LOCATION OF CITY SMFO CABLE AT CROSSING LOCATION AND COORDINATE W/CITY TO RELOCATE AS REQUIRED TO AVOID CONFLICT.
2. EXISTING GAS, POWER AND TELEPHONE SERVICE LINES TO BE BEST BUY BUILDING WILL BE RELOCATED BY OTHERS IN ADVANCE OF THE PROJECT, AND ARE NOT SHOWN IN THE DRAINAGE PROFILES.



STA. 59+46 TO STA. 63+46

5 0 5 10 VERT
20 10 0 20 40 HORIZ
HORIZONTAL SCALE IN FEET PRINTED 22X34

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

C.VANIER	7/22/11
DESIGNED BY	DATE
C.COOK	7/26/11
DRAWN BY	DATE
K.LOEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

999 3RD AVENUE, SUITE 2300
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

WATER PROFILE

WP01

SHT ____ OF ____

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11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.

LUMINAIRE SCHEDULE

COB POLE NO.	POLE NO.	STATION (OFFSET)	POLE HEIGHT	POLE TYPE	LUMINAIRE TYPE	ARM LENGTH	CIRCUIT NO.	COMMENTS
	1	56+33, 36.5' RT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	B	
	2	57+22, 36.5' LT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	A	
	3	58+04, 36.5' RT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	B	
	4	58+86, 36.5' LT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	A	

WIRING SCHEDULE

RUN NO.	CONDUIT SIZE	CONDUCTORS	COMMENTS
*1	2" 2"	4 - #8 (ILLUM) 1 - #8 (GND) SPARE	ROADWAY LIGHTING ONLY SEE SIGNAL PLANS FOR INTERSECTION LIGHTING
2	2"	2 - #8 (ILLUM) 1 - #8 (GND)	
*3	2"	3 - #8 (ILLUM) 1 - #8 (GND)	ROADWAY LIGHTING ONLY SEE SIGNAL PLANS FOR INTERSECTION LIGHTING
4	2"	SPARE	

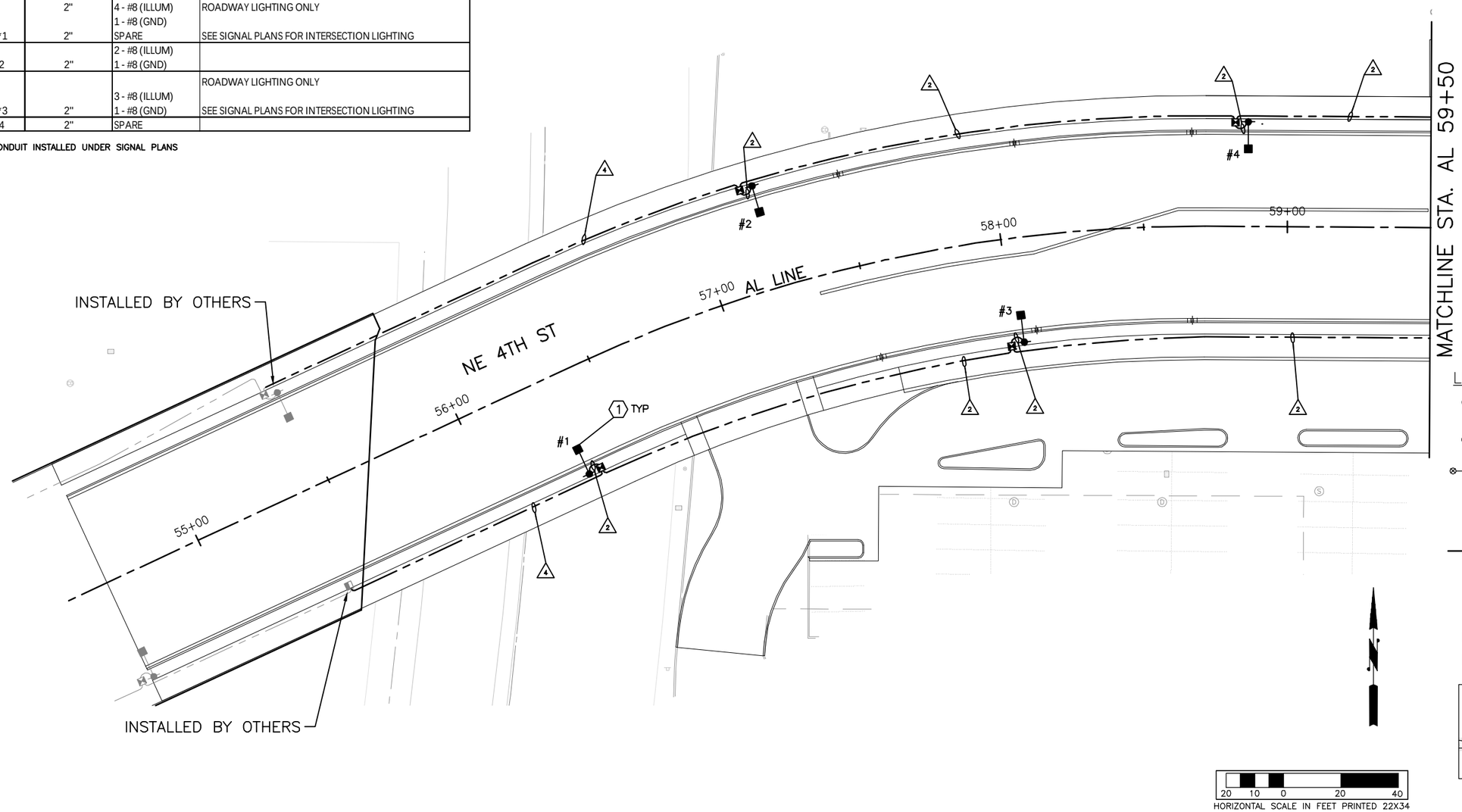
* CONDUIT INSTALLED UNDER SIGNAL PLANS

GENERAL NOTES:

1. CONTRACTOR SHALL MAINTAIN THE OPERATION OF THE EXISTING ILLUMINATION SYSTEMS UNTIL NO LONGER REQUIRED.
2. JUNCTION BOXES SHALL BE INSTALLED IN PLANTER STRIP PER C.O.B. STD DWG TSSL–3.

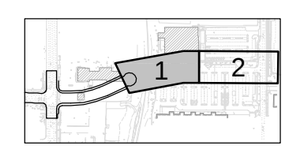
CONSTRUCTION NOTES:

(1) CONSTRUCT FOUNDATION AND INSTALL LUMINAIRE POLE AND LUMINAIRE PER C.O.B. STD DWG TSSL–1.



LEGEND

- SQUARE CONCRETE POLE WITH SHOE BOX LUMINAIRE
- DAVIT POLE WITH COBRAHEAD LUMINAIRE
- SIGNAL POLE WITH LUMINAIRE
- TYPE 1 JUNCTION BOX
- TYPE 2 JUNCTION BOX
- TYPE 8 JUNCTION BOX
- CONDUIT
- SIGNAL CONTROLLER CABINET
- ELECTRICAL SERVICE CABINET
- CONSTRUCTION NOTE
- PULL BOX
- FIBER VAULT



KEY PLAN

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

A.MIZUTA	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.GRACE	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOON — STATE OF WASHINGTON — 18507 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS — 999 3RD AVENUE, SUITE 3500, SEATTLE, WASHINGTON 98104-4020, PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

STREET LIGHTING PLAN
SHEET 1 OF 2
AL LINE STA. 54+50 TO 59+50

IL01

SHT ____ OF ____

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SEC. 33, T. 25 N., R. 5 E., W.M.

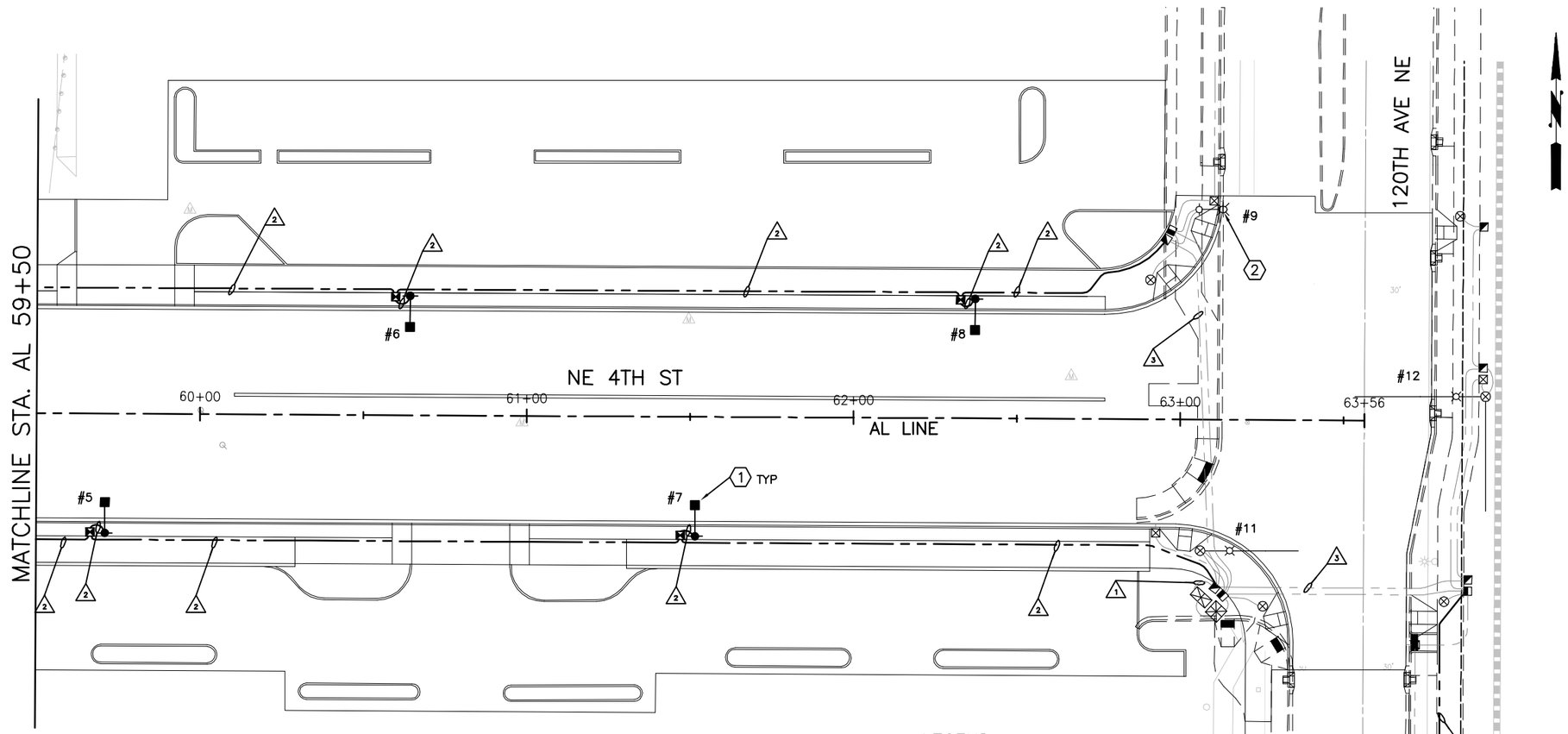
GENERAL NOTES:

1. FOR WIRE SCHEDULE SEE DWG IL01.

CONSTRUCTION NOTES:

(1) CONSTRUCT FOUNDATION AND INSTALL LUMINAIRE POLE AND LUMINAIRE PER C.O.B. STD DWG TSSL-1.

(2) CONSTRUCT FOUNDATION AND INSTALL LUMINAIRE POLE PER C.O.B. STD DWG TSSL-2.



LEGEND

- SQUARE CONCRETE POLE WITH SHOE BOX LUMINAIRE
- DAVIT POLE WITH COBRAHEAD LUMINAIRE
- SIGNAL POLE WITH LUMINAIRE
- TYPE 1 JUNCTION BOX
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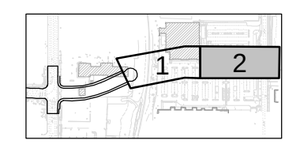

KEY PLAN

20 10 0 20 40
HORIZONTAL SCALE IN FEET PRINTED 22X34

LUMINAIRE SCHEDULE

COB POLE NO.	POLE NO.	STATION (OFFSET)	POLE HEIGHT	POLE TYPE	LUMINAIRE TYPE	ARM LENGTH	CIRCUIT NO.	COMMENTS
	5	59+71, 36.5' RT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	B	
	6	60+64, 36.5' LT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	A	
	7	61+52, 36.5' RT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	B	
	8	62+37, 36.5' LT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	A	
	9		35 FT	DAVIT	250W HPS - MC3 -240V COBRAHEAD	16 FT	C	SEE SIGNAL PLANS
	10	63+75, 109.5' RT	12.2 M	EXPOSED AGGREGATE	250W HPS - MC3 -240V SHOEBOX	.33 FT	B	
	11		35 FT	DAVIT	250W HPS - MC3 -240V COBRAHEAD	16 FT	C	SEE SIGNAL PLANS
	12		35 FT	DAVIT	250W HPS - MC3 -240V COBRAHEAD	16 FT	C	SEE SIGNAL PLANS

NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

A.MIZUTA	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
K.GRACE	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

KENNETH M. LOEN — STATE OF WASHINGTON — 36507 — REGISTERED PROFESSIONAL ENGINEER

PB — 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
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NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

STREET LIGHTING PLAN
SHEET 2 OF 2
AL LINE STA. 59+50 TO 63+56

IL02

SHT ____ OF ____

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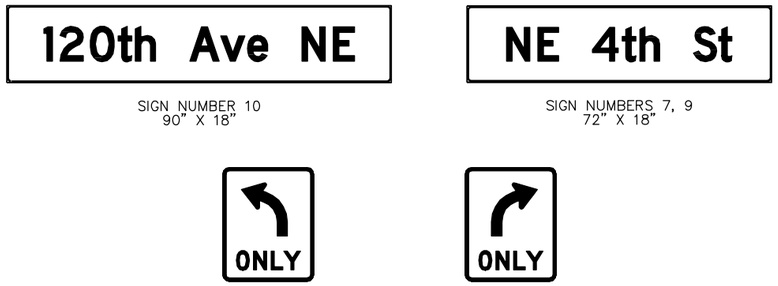
11-115214-LO

NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

SEC. 33, T. 25 N., R. 5 E., W.M.

SIGN DISPLAY

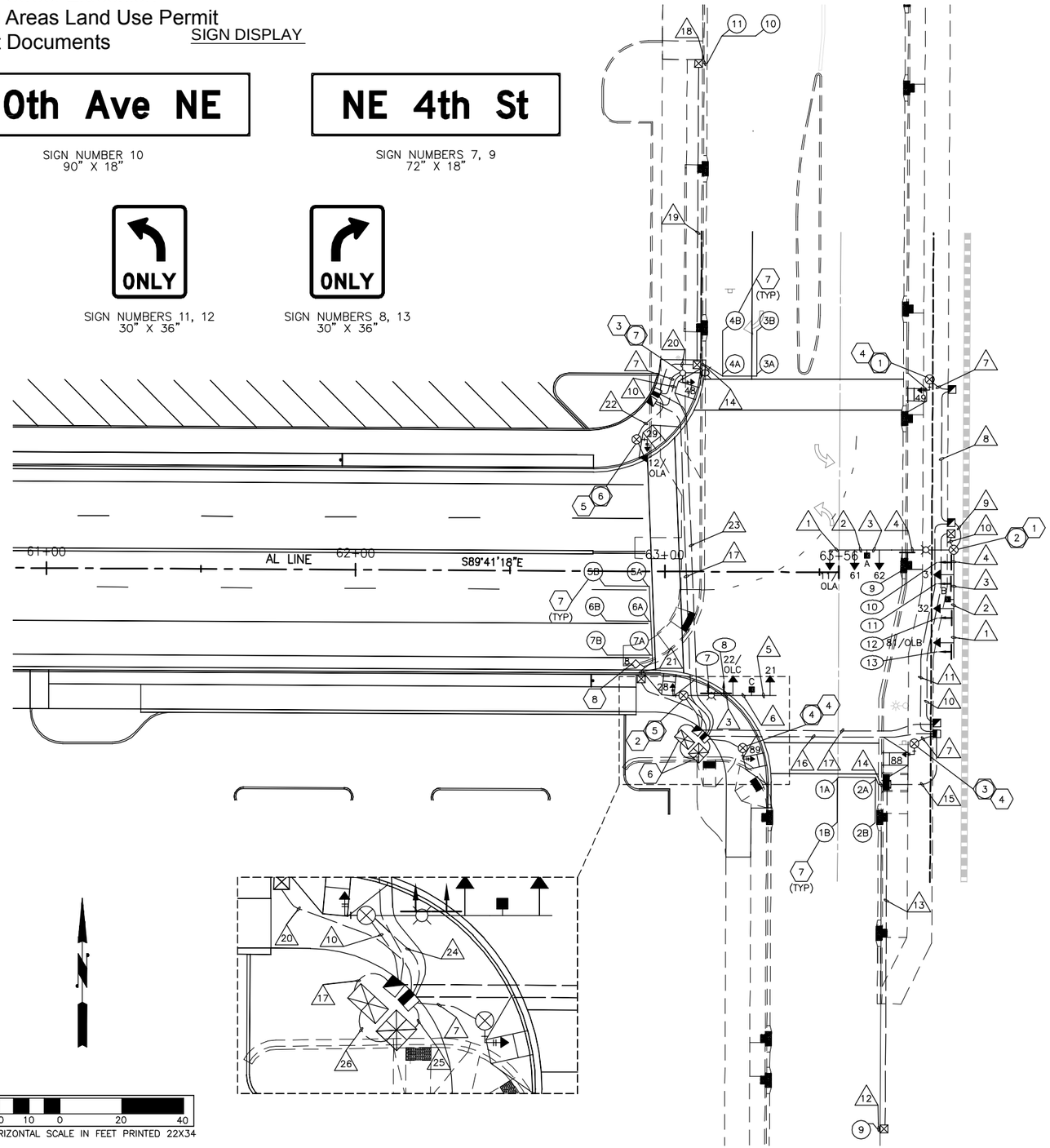


SIGN NUMBER 10
90" X 18"

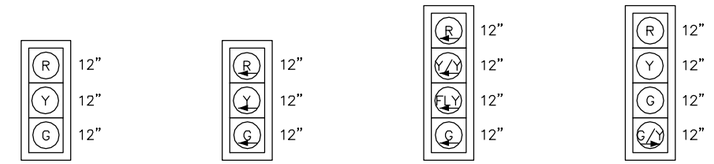
SIGN NUMBERS 7, 9
72" X 18"

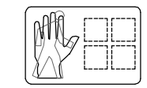
SIGN NUMBERS 11, 12
30" X 36"

SIGN NUMBERS 8, 13
30" X 36"



SIGNAL HEAD DISPLAY



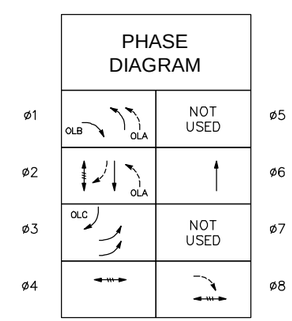


PEDESTRIAN SIGNAL HEADS
NO. 28, 29, 48, 49,
88, 89

NOTES

1. SEE SG2 FOR TRAFFIC SIGNAL GENERAL NOTES, CONSTRUCTION NOTES AND WIRING SCHEDULE.
2. SEE SIGNING PLANS FOR SIGN DETAILS AND SPECIFICATIONS

PHASE DIAGRAM



PROTECTED VEHICLE MOVEMENT
PERMISSIVE VEHICLE MOVEMENT
PEDESTRIAN MOVEMENT

OMIT OLA GREEN AND YELLOW IN ø1

PRE-EMPTION SCHEDULE

EVP	PHASES
A	1 + 6
B	3 + 8
C	2

LEGEND

- SIGNAL CONTROLLER CABINET
- SERVICE CABINET
- CONDUIT
- TYPE III SIGNAL POLE
- DAVIT LUMINAIRE POLE
- TYPE PS/I POLE
- VEHICLE SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSHBUTTON ASSEMBLY
- EMERGENCY PRE-EMPTION DETECTOR
- MAST ARM MOUNTED SIGN
- TYPE 1 JUNCTION BOX
- TYPE 2 JUNCTION BOX
- TYPE 8 JUNCTION BOX
- VEHICLE LOOP DETECTOR
- BICYCLE LOOP DETECTOR
- SIGNAL POLE NUMBER
- CONSTRUCTION NOTE
- WIRE NOTE
- SIGN NUMBER

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NO.	DATE	BY	APPR.	REVISIONS
				60% SUBMITTAL
				PRELIMINARY
				NOT FOR CONSTRUCTION

Approved By

TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

J.NAKAMOTO	7/22/11
DESIGNED BY	DATE
M.SOPER	7/26/11
DRAWN BY	DATE
T.OLSEN	7/28/11
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

PB 125 YEARS
999 3RD AVENUE, SUITE 2200
SEATTLE, WASHINGTON 98104-4020
PH: 206-382-5200

NE 4TH ST / 120TH AVE NE
CORRIDOR PROJECT
BNSF RR RIGHT-OF WAY
TO 120TH AVE NE

SIGNAL PLAN

SG01

SHT ____ OF ____

APPENDIX E

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-21232-002

Date: October 31, 2012
To: Mr. Kenneth Oswell, P.E.
PB Americas, Inc.

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MINNESOTA
MISSOURI
OREGON
WASHINGTON

February 6, 2013

Mr. Kenneth Oswell, P.E.
Parsons Brinckerhoff
999 Third Avenue, Suite 3200
Seattle, WA 98104-4020

RE: ADDENDUM NUMBER 1, ASSESSMENT OF STEEP SLOPE CRITICAL AREA, GEOTECHNICAL REPORT, NE 4TH STREET EXTENSION, 116TH AVENUE NE TO 120TH AVENUE NE, BELLEVUE, WASHINGTON, OCTOBER 31, 2012

Dear Mr. Oswell:

This addendum to our above-referenced geotechnical report addresses the steep slope critical area within the project limits. Refer to our report for a detailed description of the site, the proposed construction, and our geotechnical engineering recommendations.

City of Bellevue Ordinance 5680 Section 20.25H.120 defines a steep slope as a slope that meets the following criteria:

- A slope greater than or equal to 40 percent;
- A rise of at least 10 feet; and
- Exceeds 1,000 square feet in area.

The proposed NE 4th Street alignment crosses over a slope that meets these criteria and is classified as a steep slope. The location of the steep slope critical area and the proposed roadway alignment is shown in the enclosed figure. As shown in Figure 1 of our geotechnical report, the project site consists of a lower plain and an upland terrace that are connected by a north-south-trending, approximately 30-foot-high steep slope. The proposed roadway rises in elevation from west to east to meet the existing grade near the railroad tracks. The roadway embankment will be supported by mechanically stabilized earth walls until it meets the existing grade.

The new roadway construction will require clearing, grubbing, and benching of the steep slope within the project limits so that the embankment and walls can be constructed. The construction means, methods, and sequence and equipment type will be determined by the Contractor. Excavation to prepare the existing slope for fill placement should be terraced in accordance with Washington State Department of Transportation Standard Specification 2-03.3(14). Temporary

400 NORTH 34TH STREET · SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103
206·632·8020 FAX 206·695·6777
TDD: 1·800·833·6388
www.shannonwilson.com

shoring may be required for the excavation. The need for shoring will be determined by the Contractor. The Contractor will be responsible for stability of temporary excavations.

In its final configuration, the new roadway embankment and retaining walls will create a buttress that will improve the stability of the existing steep slope within the project limits. We performed slope stability analyses for the proposed retaining walls at Stations 55+55 and 55+72. Our October 31, 2012, geotechnical report provides a summary of our stability analyses and results. Our stability analyses assume that the groundwater level in the hillside does not rise as a result of the proposed construction. It is important that the surface and subsurface drainage measures recommended in our geotechnical report are implemented.

The slopes outside of the project limits will not be modified, nor will the proposed construction adversely impact those slopes.

Provided the engineering recommendations provided in our October 31, 2012, geotechnical report are followed, it is our opinion that, once constructed, the proposed NE 4th Street Extension will not increase the potential for instability of the steep slope identified in the enclosed figure. All the limitations provided in our October 31, 2012, report apply to this addendum.

If you have any questions regarding the content of this letter, please contact me at (206) 695-6719.

Sincerely,

SHANNON & WILSON, INC.

2/6/13

WENDY L. MATHIESON
STATE OF WASHINGTON
39518
REGISTERED
PROFESSIONAL ENGINEER

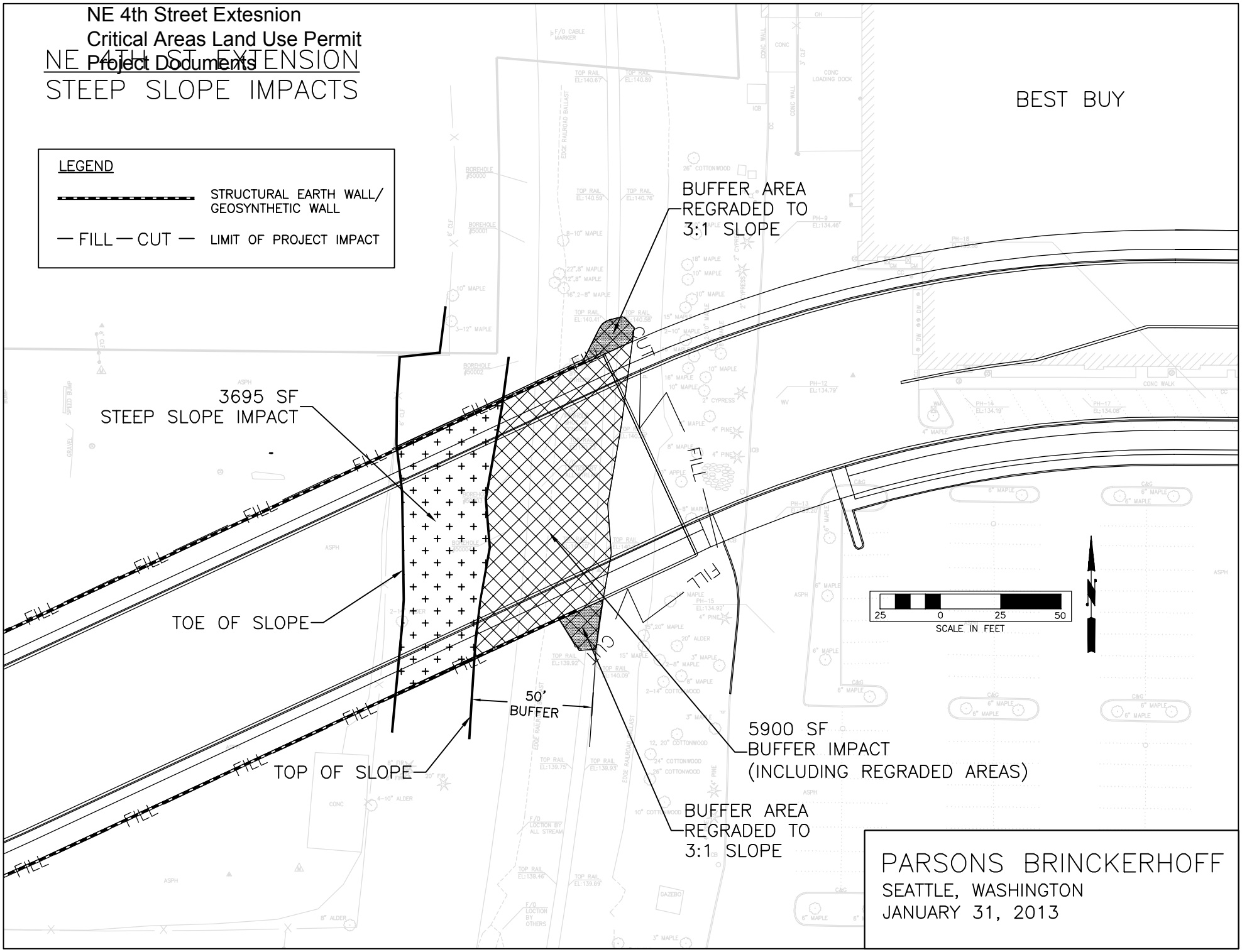
Wendy L. Mathieson, P.E.
Senior Principal Engineer

WLM:SRB/wlm

Enc: Figure – NE 4th Street Extension, Steep Slope Impacts, prepared by Parsons Brinckerhoff, dated January 31, 2013

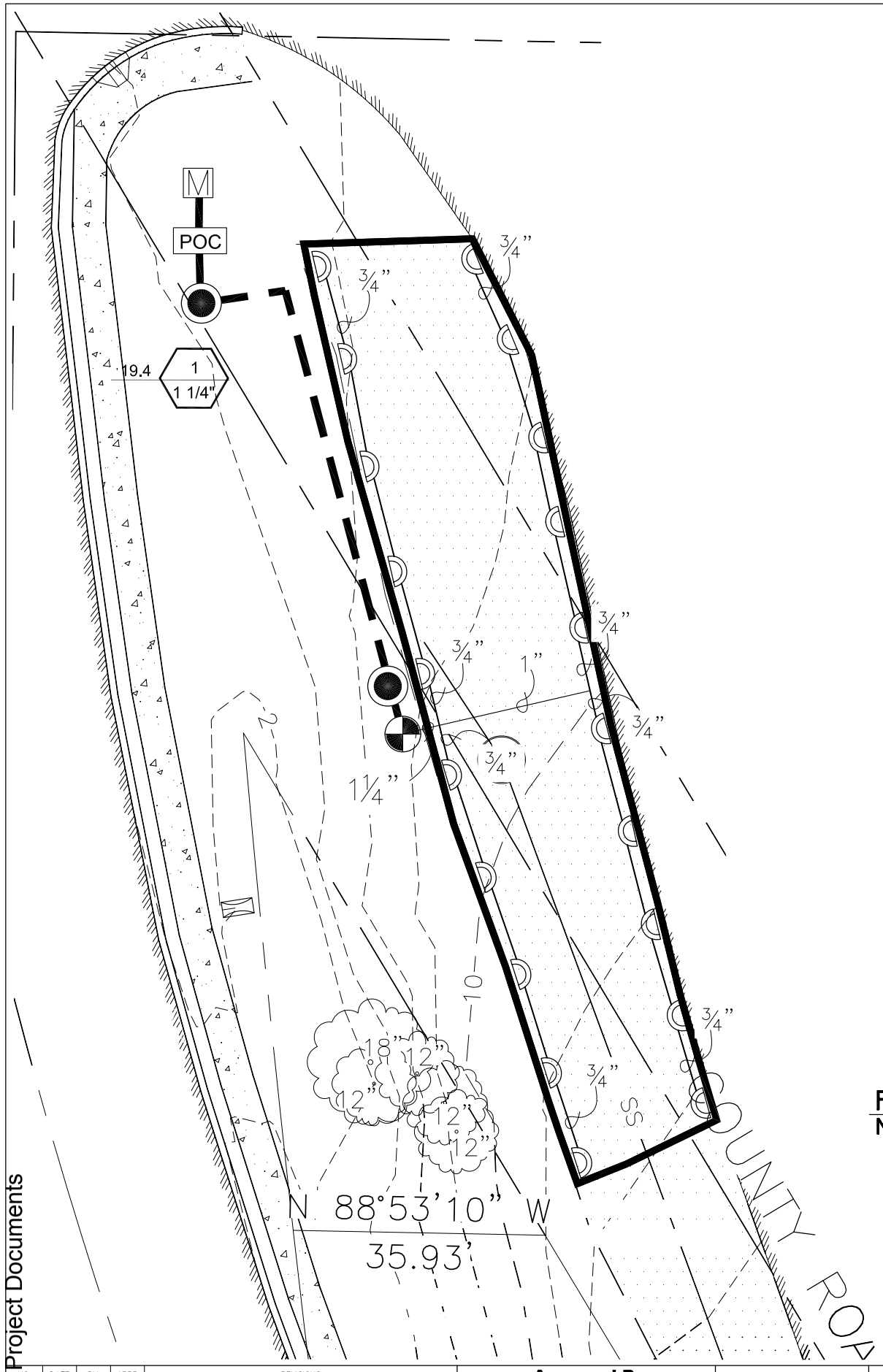
11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

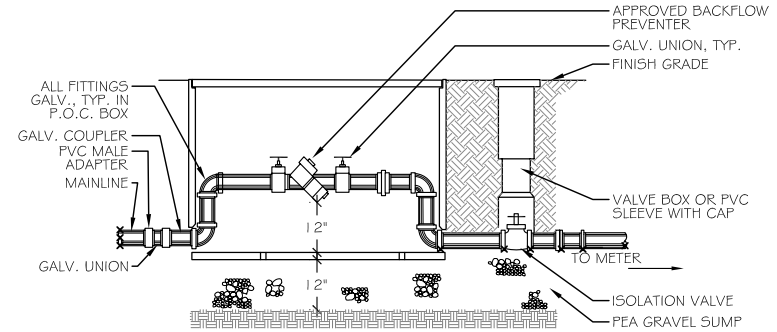
NE 4TH ST EXTENSION
STEEP SLOPE IMPACTS



PARSONS BRINCKERHOFF
SEATTLE, WASHINGTON
JANUARY 31, 2013

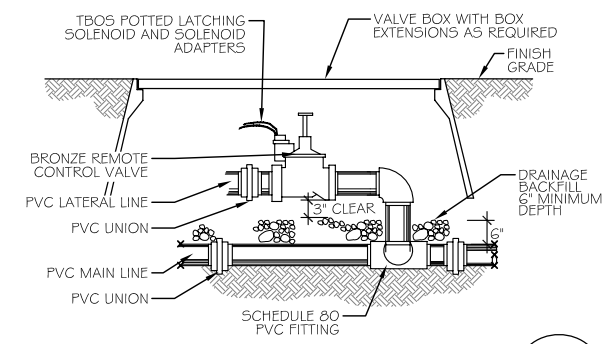
J:\160162C_ NE4thStExt\CADD\CIVIL\DES\YR\Steep Slopes 2013-01-30.dwg, 1/31/2013 4:56:28 PM, PDF-XChange Printer 2012



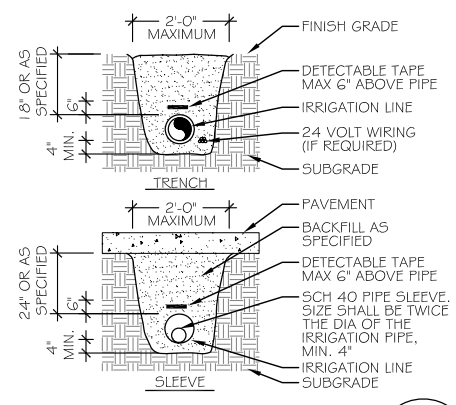


NOTES:
1. SIZE ALL PIPE AND FITTINGS TO DESIGN SPECS.
2. ALL FITTINGS FROM RESILIENT WEDGE TO PVC MALE ADAPT. TO BE GALV. PIPE
3. SEAL INLET AND OUTLET OF VAULT WITH CONCRETE
4. ALL GALV. FITTINGS AND PIPE SHALL BE SCHEDULE 40, DOMESTIC MANUFACTURE

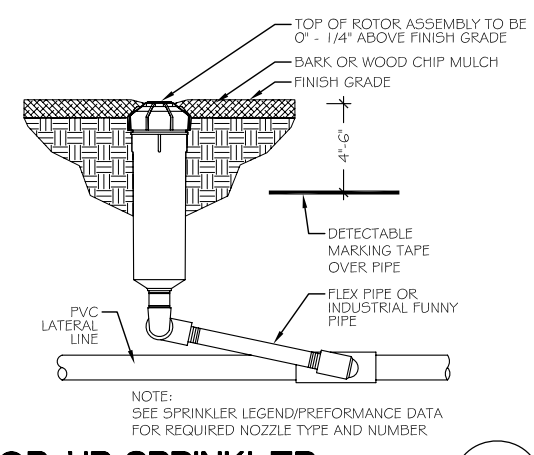
POINT OF CONNECTION (A)
NOT TO SCALE



REMOTE CONTROL VALVE (B)
NOT TO SCALE



PIPE TRENCH & SLEEVE (C)
NOT TO SCALE



NOTE:
SEE SPRINKLER LEGEND/PREFORMANCE DATA FOR REQUIRED NOZZLE TYPE AND NUMBER

POP-UP SPRINKLER (D)
NOT TO SCALE

IRRIGATION SCHEDULE

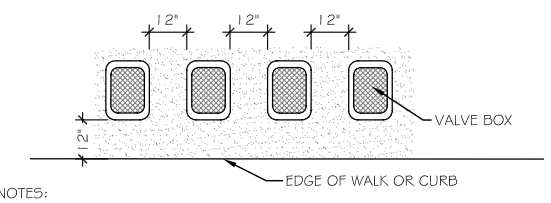
SYMBOL	PRODUCT	FLOW/GPM
	ADJUSTABLE ARC NOZZLE	
	INST-12-CV-7A	.97

SYMBOL	DESCRIPTION
POC	POINT OF CONNECTION (DIRECTLY ADJACENT TO EXISTING METER) • BACKFLOW PREVENTER, DOUBLE CHECK VALVE, WASHINGTON STATE APPROVED • QUICK COUPLING VALVE FOR WINTERIZATION • ISOLATION VALVE
	QUICK COUPLING VALVE FOR WINTERIZATION & ISOLATION VALVE
	ISOLATION VALVES (BALL VALVE) •BALL VALVE-PROVIDE WHERE SHOWN ALONG •MAINLINE BETWEEN METER AND POC
	BATTERY OPERATED REMOTE CONTROL VALVE WITH PRESSURE REDUCING ABILITY
M	EXISTING WATER METER (VERIFY LOCATION, SIZE, AND STATIC WATER PRESSURE IN THE FIELD PRIOR TO STARTING WORK. PROVIDE CURB STOP VALVE.)
	NEW SCHEDULE 40 PVC IRRIGATION MAINLINE, TYPICAL 3"
	CLASS 200 PVC LATERAL LINE (SIZE NOTED ON PLAN)
	SCH 40 PVC PIPE SLEEVE (SIZE NOTED ON PLAN, MINIMUM 4")
	VALVE SEQUENCE; MAX. G.P.M. DEMAND; VALVE SIZE

NOTES
1. ALL POP-UP TO BE HUNTER INSTITUTIONAL SPRAYS WITH FACTORY INSTALLED DRAIN CHECK VALVE.
2. RISERS SHALL BE 12" POP-UP, ON ZONES WITH ADJUSTABLE ARC NOZZLES

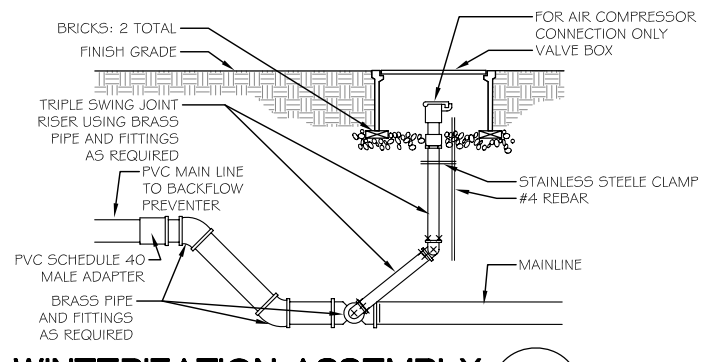
IRRIGATION NOTES:

1. PROVIDE A BATTERY OPERATED RAINBIRD TBOS OR APPROVED EQUAL AUTOMATIC IRRIGATION SYSTEM FOR EACH SITE.
2. PRODUCT SPECIFICATIONS SHOULD BE CONSIDERED NON-PROPRIETORY AND ASSUMED TO BE AS SPECIFIED "OR APPROVED EQUAL." PRODUCT SUBSTITUTIONS WILL BE CONSIDERED AFTER AWARD OF BID.
3. PIPE LAYOUT IS SCHEMATIC AND SHALL NOT BE CONSTRUED AS ACTUAL ALIGNMENTS. MAINLINES AND LATERAL LINES SHALL BE LOCATED IN PLANTING BEDS WHERE POSSIBLE. AVOID TREES AND MAJOR SHRUBS, EXISTING AND NEW UTILITIES, PAVING, AND OTHER SITE FURNISHINGS.
4. PARALLEL LINES SHALL SHARE A COMMON TRENCH, WHERE POSSIBLE. MAINLINE AND LATERAL LINES TO HAVE 6" VERTICAL SEPARATION. LATERAL LINES TO HAVE 2" HORIZONTAL SEPARATION.
5. ALL IRRIGATION PIPES, SPRINKLER HEADS, VALVES, VALVE BOXES, WIRING, AND OTHER INSTALLED IRRIGATION EQUIPMENT SHALL BE PLACED IN THE LANDSCAPED BED AREAS. STAKE VALVE BOX LOCATIONS FOR APPROVAL BY PROJECT REPRESENTATIVE PRIOR TO INSTALLATION.
6. AFTER INSTALLATION, BRING ALL SPRAY HEADS AND VALVE BOXES TO FINISH GRADE. ADJUST HEADS TO PROVIDE UNIFORM COVERAGE. SUPPLY CHECK-O-MATIC (COM), SEAL-A-MATIC (SAM), AND/OR PRESSURE REGULATING STEM (PRS) AS NEEDED TO PROVIDE FULL COVERAGE AND PREVENT LOW HEAD DRAINAGE.
7. PIPES AND VALVE WIRES SHALL BE SLEEVED UNDER ALL PATHS AND PAVING.
8. ADJUST AND/OR CHANGE SPRINKLER HEAD NOZZLE TYPE TO ENSURE COMPLETE BED COVERAGE WITHOUT EXCESS OVERSPRAY ONTO PATH. USE ADJUSTABLE VARIABLE-ARC NOZZLES WHEN NEEDED.
9. THE IRRIGATION SYSTEM IS DESIGNED TO BE WINTERIZED WITH COMPRESSED AIR THROUGH THE QUICK COUPLING VALVES.
10. ALL CONTROL VALUES TO BE DIAL PRESSURE REGULATING, RAINBIRD EFB-CP-R-PRS-D SERIES BRASS VALVES OR APPROVED EQUAL.



NOTES:
1. CENTER VALVE BOX OVER REMOTE CONTROL VALVE TO FACILITATE SERVICING VALVE.
2. SET BOXES AT FINISH GRADE OR MULCH LAYER IN GROUND COVER/SHRUB AREAS.
3. SET BOXES PARALLEL TO EACH OTHER AND PERPENDICULAR TO EDGE OF WALK, CURB OR ROAD.
4. AVOID HEAVILY COMPACTING SOIL AROUND VALVE BOXES TO PREVENT COLLAPSE AND DEFORMATION OF VALVE BOX SIDES.

VALVE BOX LAYOUT (E)
NOT TO SCALE



WINTERIZATION ASSEMBLY (F)
NOT TO SCALE

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

N:\Active Projects\2009\115214 NE 4th Street Extension\Documents\CAO Mitigation Site\L2.01.dwg Nov 20, 2012 - 4:30pm

NO.	DATE	BY	APPR.	REVISIONS

90% SUBMITTAL
PRELIMINARY
NOT FOR CONSTRUCTION

Approved By

—	—
TRAFFIC ENGINEERING MANAGER	DATE
—	—
PROJECT MANAGER	DATE

K.HACKLER	11/26/12
DESIGNED BY	DATE
B. STARK	11/26/12
DRAWN BY	DATE
K.HACKLER	11/26/12
CHECKED BY	DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
KIRK H. HACKLER
CERTIFICATE NO. 631

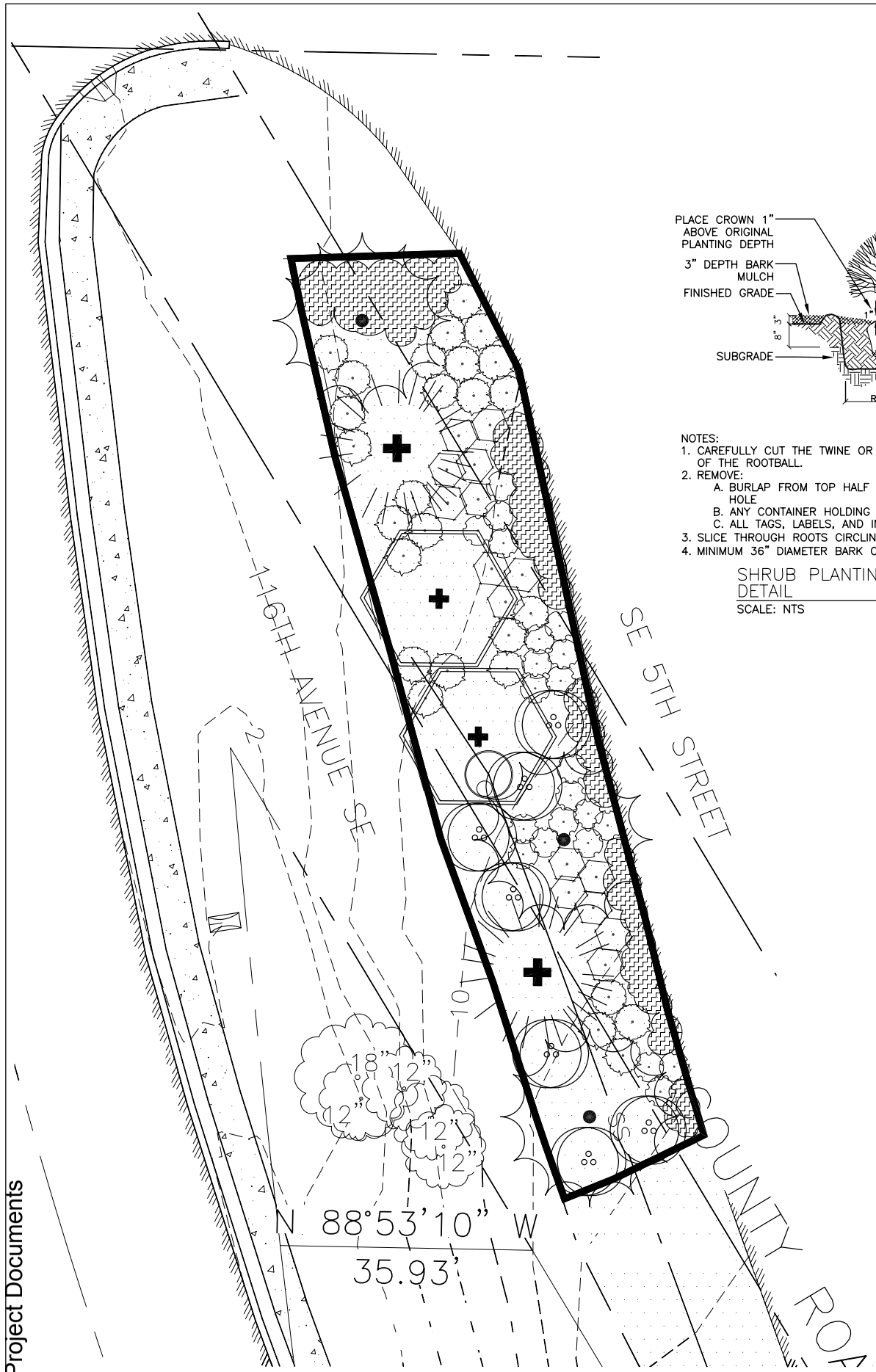
OSBORN PACIFIC GROUP INC.
Landscape Architecture
Recreation Planning
Environmental Compliance
2125 Western Avenue, Suite 502
Seattle, Washington 98121
206-284-5865
opg@osbornpacific.com

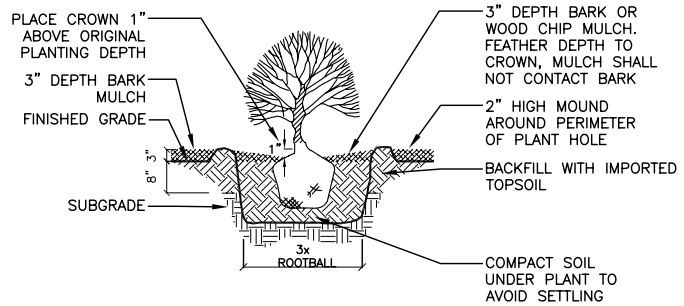
NE 4TH ST / 120TH AVE NE CORRIDOR PROJECT
116TH AVE NE TO BNSF RR RIGHT-OF WAY

STEEP SLOPE MITIGATION AREA
IRRIGATION PLAN

L1.05

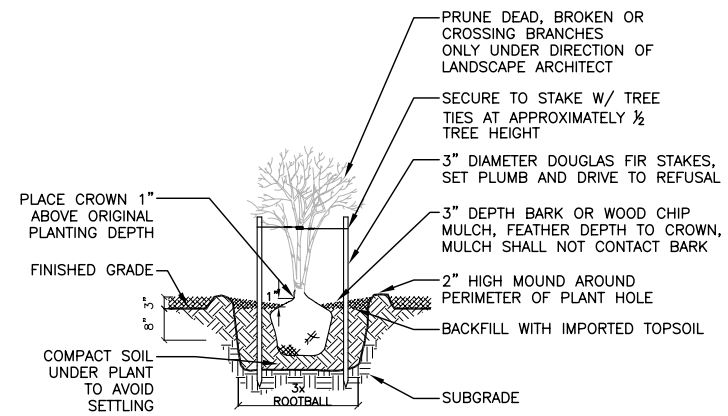
SHT _____ OF _____





NOTES:
1. CAREFULLY CUT THE TWINE OR WIRE WRAPPED AROUND THE STEM AT THE TOP OF THE ROOTBALL.
2. REMOVE:
   A. BURLAP FROM TOP HALF OF THE ROOTBALL AFTER SHRUB IS PLACED IN HOLE
   B. ANY CONTAINER HOLDING THE ROOT SYSTEM
   C. ALL TAGS, LABELS, AND INORGANIC TIES AND WRAPS
3. SLICE THROUGH ROOTS CIRCLING THE BALL. SPREAD ("BUTTER-FLY") ROOTS
4. MINIMUM 36" DIAMETER BARK CIRCLE

SHRUB PLANTING DETAIL (E / L102)
SCALE: NTS



NOTES:
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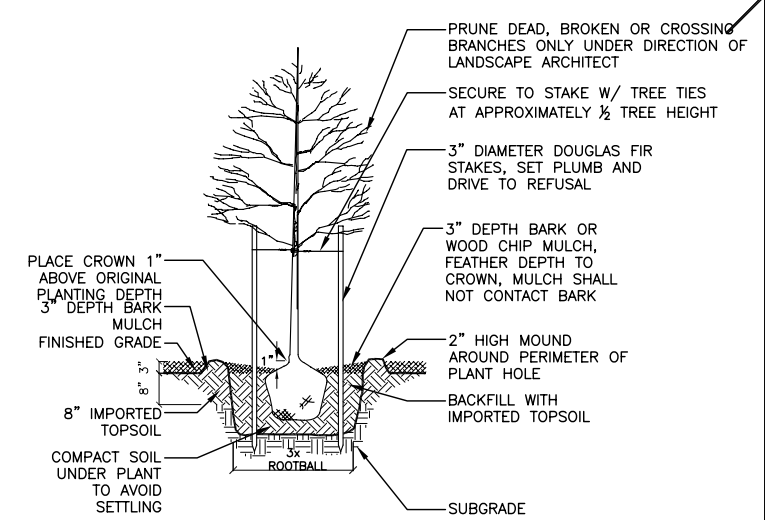
2. REMOVE:
   A. BURLAP FROM TOP HALF OF THE ROOTBALL AFTER SHRUB IS PLACED IN HOLE
   B. ANY CONTAINER HOLDING THE ROOT SYSTEM
   C. ALL TAGS, LABELS, AND INORGANIC TIES AND WRAPS
3. PRUNE DEAD OR BROKEN ROOTS
4. SLICE THROUGH ROOTS CIRCLING THE BALL. SPREAD ("BUTTERFLY") ROOTS
4. MINIMUM 36" DIAMETER BARK CIRCLE

MULTI-STEM TREE PLANTING & STAKING DETAIL (D / L102)
SCALE: NTS



NOTES:
1. CAREFULLY CUT THE TWINE OR WIRE WRAPPED AROUND THE STEM AT THE TOP OF THE ROOTBALL.
2. REMOVE:
   A. BURLAP FROM TOP HALF OF THE ROOTBALL AFTER TREE IS PLACED IN HOLE
   B. ANY CONTAINER HOLDING THE ROOT SYSTEM
   C. ALL TAGS, LABELS, AND INORGANIC TIES AND WRAPS
3. PRUNE DEAD OR BROKEN ROOTS
4. SLICE THROUGH ROOTS CIRCLING THE BALL. SPREAD ("BUTTERFLY") ROOTS
4. MINIMUM 36" DIAMETER BARK CIRCLE

TREE PLANTING AND STAKING, STANDARD DETAIL (A / L102)
SCALE: NTS

PLANTING SCHEDULE AND LEGEND

SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION	SPACING	COMMENTS
CONIFERS							
	2	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	MIN 4' HT	B&B OR CONTAINER	AS SHOWN	MULTI-STEM, 3 STEMS, STAKED
	3	ABIES GRANDIS	GRAND FIR	MIN 4' HT	B&B OR CONTAINER	AS SHOWN	MULTI-STEM, 3 STEMS, STAKED
DECIDIOUS AND SHADE TREES							
	7	ACER CIRCINATUM	VINE MAPLE	MIN 4' HT	B&B OR CONTAINER	8' O.C.	MULTI-STEM, 3 STEMS, STAKED
	2	ACER TRUNCATUM	PACIFIC SUNSET MAPLE	36"-42"	B&B OR CONTAINER	AS SHOWN	MULTI-STEM, 3 STEMS, STAKED
SHRUBS							
	27	ARBUTOS UNEDO	STAWBERRY TREE	1 GAL	CONTAINER	6'	FULL AND BUSHY
	15	ESCALLONIA RUBRA	ESCALLONIA	1 GAL	CONTAINER	6'	FULL AND BUSHY
	22	RIBES SANGUINEUM	RED FLOWERING CURRANT	1 GAL	CONTAINER	4' O.C.	FULL AND BUSHY. BIORETENTION FACILITY AREA SPACING AT 24"
GROUNDCOVER							
	52	GAULTHERIA SHALLON	SALAL	1 GAL	CONTAINER	4' OC	FULL AND BUSHY.

11-115214-LO
NE 4th Street Extesnion
Critical Areas Land Use Permit
Project Documents

N:\Active Projects\2008\08-0343 NE 4th Street Extension\Design\Southern Section\Mitigation Site\L1.01.dwg Nov 20, 2012 - 4:27pm

NO.	DATE	BY	APPR.	REVISIONS

90% SUBMITTAL
PRELIMINARY
NOT FOR CONSTRUCTION

Approved By
TRAFFIC ENGINEERING MANAGER — DATE
PROJECT MANAGER — DATE

K.HACKLER 11/26/12 DESIGNED BY DATE
B. STARK 11/26/12 DRAWN BY DATE
K.HACKLER 11/26/12 CHECKED BY DATE

City of Bellevue
TRANSPORTATION DEPARTMENT

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
KIRK H. HACKLER CERTIFICATE NO. 631

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NE 4TH ST / 120TH AVE NE CORRIDOR PROJECT
116TH AVE NE TO BNSF RR RIGHT-OF WAY

STEEP SLOPE MITIGATION AREA LANDSCAPE PLAN

L2.06

SHT _____ OF _____