Engineering Design Report
North Lot Development
Seattle, Washington

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Prepared for

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1.0 INTRODUCTION

This Engineering Design Report was prepared for the cleanup action at the North Lot Property (Property) located in the south end Central Business District, southeast of the intersection of South King Street and Occidental Avenue South in Seattle, Washington (Figure 1). Cleanup will be conducted as part of development of the Property for commercial and residential uses. North Lot Development (NLD), as prospective purchaser of the Property, has conducted several investigations to characterize soil and groundwater conditions at the Property, as documented in the Remedial Investigation (RI) report (Landau Associates 2011a) and the Feasibility Study (FS) report (Landau Associates 2011b). The cleanup action for the Property is presented in the FS and the Cleanup Action Plan (CAP; Landau Associates 2011c) and will be conducted in accordance with the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Cleanup Regulation (Chapter 173-340 WAC) and the Prospective Purchaser Consent Decree (PPCD) between NLD and Ecology (Ecology 2009). The cleanup action includes hotspot excavation of contaminated soil from the northwestern portion of the Property (former gasoline station area) to the elevation of the groundwater table, enhanced bioremediation for soil and groundwater impacted by residual gasoline and benzene near the elevation of the water table in the area of the hotspot excavation, a surface cap over the entire Property, added measures to prevent contact with shallow contaminated soil outside the footprints of the building foundations, institutional controls, groundwater monitoring, and contingent groundwater treatment.

As noted above, cleanup will be conducted as part of construction for development of the Property. The purposes of this Engineering Design Report are to document additional details of the cleanup action outlined in the CAP, and ensure that the cleanup action is performed in a manner that is consistent with accepted engineering practices. This document assumes the reader is generally familiar with the history, background of previous site investigations and remedial actions, and current conditions at the Property, which are documented in the Ecology-approved RI, FS, and CAP. This Engineering Design Report includes the following elements:

- Hotspot excavation soil sampling and analysis (Section 2.0)
- Environmental engineering plans (Section 3.0)
- Conceptual groundwater treatment contingency plan (Section 4.0)
- Environmental worker health and safety plan (Section 5.0).

1.1 SUMMARY OF DEVELOPMENT PROJECT

The Property will be developed by NLD as part of Transit-Oriented Development and will encompass two full city blocks, with approximately 1.5 million gross square feet (ft^2) of buildable area. The planned development will include two podiums (east and west blocks) that will contain first- and

second-floor parking and retail space; third- and fourth-floor parking and residential space; and parking/office/residential space above the fourth floor. The east block will be a single office tower and the west block will include three high-rise structures with more than 400 units of new housing (including 100 affordable units directly related to the development, at least 30 of which will be constructed at the Property).

The planned development project, as outlined in the approved Seattle Master Use Permit (MUP) and related State Environmental Policy Act documentation, does not include below-grade construction or features such as a basement or an underground garage. Construction for Property development will include removal of the existing surface material to a depth of approximately 1.5 feet (ft) below ground surface (BGS) across the entire Property, including the existing asphalt surface, associated subgrade, and shallow soil/fill, to prepare the Property for construction of the impervious surfaces and high-rise buildings associated with Property development. Below-grade excavation will be strategic and limited to utilities, piles, grade beams, and elevator pits, and will be primarily within the footprints of the two proposed podium buildings. A foundation plan for the buildings including the locations of the pile caps, elevator pits, and grade beams is shown on Figure 2. Based on current construction estimates, about 16,500 cubic yards (yd^3) (measured in place) of existing surface material will be excavated as part of the proposed construction. Excavated material, including shallow contaminated soil, removed during construction will be disposed of off-Property consistent with MTCA and other applicable regulations.

As discussed above, the cleanup will be conducted as part of the planned development that will be constructed consistent with the MUP in accordance with market conditions. The west block will be constructed first. The four-story podium structure on the west block will support three high-rise buildings. The three high-rises will sit on top of the podium approximately 40 ft above the existing ground elevation and extend to a maximum of 25 stories. The podium will be designed and constructed in anticipation of the future high-rise buildings; therefore, all physical underground requirements for the high-rise buildings will be built during the initial construction to avoid future disturbance of the podium foundation. The construction elements for the podium include underground and ground-level items such as piles, pile caps, elevator pits, grade beams, slab-on-grade foundations, and underground utilities. Once the podium is constructed, there will be no further need to penetrate below the ground level.

The east block will be developed as market conditions allow and in accordance with the requirements of the MUP. The construction plan will account for all elements of the preferred alternative discussed in the CAP, and will ensure protection of human health and the environment in accordance with MTCA requirements. During construction on the west block, the asphalt on the east block will be cleaned, replaced (if necessary), and repaired. The asphalt will be maintained as a protective cap over the underlying soil until development of the east block occurs. The groundwater compliance monitoring plan

(Appendix A of the CAP) will be implemented Property-wide following cleanup and development of the west block.

The Property development team is aware of the soil contamination at the Property and the associated constraints on construction. Therefore, as discussed above, the development approach is to eliminate underground uses such as parking garages and basements to minimize grading and excavation.

1.2 PROPERTY DESCRIPTION AND HISTORY

The Property is known as the "North Lot Development" (King County parcel numbers 7666204878, 7666206780, and 7666206790) and is located in Seattle, Washington's south end Central Business District adjacent to Qwest Field, as shown on Figure 1. The Property consists of 3.85 acres currently owned by King County, and is located southeast of the intersection of South King Street and Occidental Avenue South in Seattle, Washington (Figure 4 of the CAP). The Property consists of a paved parking lot, which is used for commuter parking and parking for events at Qwest Field.

Based on a Phase I Environmental Site Assessment (ESA) completed by Landau Associates (2007), the Property was originally undeveloped tideflats of Elliott Bay. The Property was filled in the late 1890s and early 1900s and was operated as a rail yard from the late 1800s until the late 1960s. The fill material underlying the Property is composed of remnants of the former rail yard operations and construction debris (i.e., brick, metal, and concrete). Prior to filling, the area that includes the Property was initially developed with streets, buildings, and railroad tracks elevated on and supported by pilings. Several sets of railroad tracks were formerly present on the Property. Structures associated with the rail yard included engine maintenance buildings, paint shops, track switching areas, and materials storage areas. In addition, two gasoline stations were formerly located in the northwestern portion of the Property at different times between the late 1930s and approximately 1966. King County purchased the Property in the 1970s to facilitate construction of the Kingdome stadium to the south of the Property, which was later demolished and replaced with the current Qwest Field development.

The Property has been used as a parking lot since the 1970s (Landau Associates 2007). The Property is served by various utilities including a stormwater drainage system that consists of a series of four storm drain pipelines running north to south across the Property. A fifth storm drain pipeline runs approximately northwest to southeast in the eastern half of the Property. The King County main storm drain runs along King Street to the north of the Property, and the King County combined sewer main runs along Occidental Avenue to the west of the Property. Relevant historical Property features are shown on Figure 5 of the CAP. Existing Property features include asphalt paving, a stormwater drainage system, site lighting, and below-grade utilities on and adjacent to the Property (Figure 6 of the CAP).

1.3 PROPERTY CHARACTERIZATION

The environmental investigations conducted at the Property from 2008 through 2010 are summarized in the RI and FS reports. The investigations conducted to date to characterize soil and groundwater conditions at the Property include the Phase II investigation, the RI field investigation, the supplemental investigation, and the data gaps investigation. Sampling locations are presented on Figure 7 of the CAP. An investigation of soil vapor in the northwestern portion of the Property was also conducted as part of the FS (Landau Associates 2011b). The investigations of the Property have included a review of the Property's industrial history to confirm that the investigations included all areas likely to have contamination; an evaluation of soil and groundwater conditions; and laboratory analysis of soil, groundwater, and soil vapor samples to document the nature and extent of contamination.

The investigations included the sampling of soil, soil vapor, and/or groundwater from more than 70 borings and the installation and sampling of 20 groundwater monitoring wells. The soil, groundwater, and soil vapor samples collected during the various investigations were submitted for selected laboratory analysis for a comprehensive list of analytical parameters including:

- Total petroleum hydrocarbons (TPH)
- Gasoline-range total petroleum hydrocarbons (TPH-G)
- Diesel-range total petroleum hydrocarbons (TPH-D)
- Motor oil-range total petroleum hydrocarbons (TPH-O)
- Metals (including arsenic, cadmium, chromium, copper, lead, mercury, and zinc)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Polycyclic aromatic hydrocarbons (PAHs)
- Semivolatile organic compounds (SVOCs)
- Volatile organic compounds (VOCs)
- Polychlorinated biphenyls (PCBs)
- Dioxins/Furans.

Soil quality was evaluated in the RI based on three general Property areas: the northwestern portion of the Property, the northeastern portion of the Property, and Property-wide based on the operational history and the findings of the various investigations. Constituents of concern identified in the RI include TPH, BTEX, PAHs, dioxins/furans, and metals. A summary of the detections of these constituents in soil at the three identified areas of the Property is provided below:

- Northwestern Portion of the Property: The laboratory analytical and field-screening data indicate that shallow soil (less than 15 ft BGS) has been impacted by releases resulting from the former gasoline station operations. The soil contamination appears to be primarily near the top of the groundwater table, but extends to a depth of at least 17 ft BGS locally. Due to

the presence of benzene in shallow soil in the northwestern portion of the Property, the potential for vapor intrusion was evaluated during the soil vapor investigation.

- Northeastern Portion of the Property: Deeper soil (greater than 15 ft BGS) has been impacted by petroleum hydrocarbons and PAHs. Based on field screening, observations during drilling, and analytical data, the soil contamination appears to be primarily associated with creosote-like material observed at the base of the fill. Based on the occurrence of the creosote-like material at the base of the fill material, and the lack of evidence of contamination within the fill at shallower depths, the creosote-like material appears to be from a distinct source and likely predates placement of the overlying fill.
- Property-wide: PAHs, primarily carcinogenic PAHs, were detected at concentrations greater than the cleanup levels in most of the soil samples collected across the southern portion of the Property. Arsenic and TPH-O were also detected at concentrations greater than the cleanup levels in soil samples collected in the west-central portion of the Property. Dioxins/furans were detected at concentrations greater than the laboratory reporting limit in both of the samples analyzed and one of the detected concentrations was greater than the cleanup level. The occurrence of these analytes in shallow surface soil suggests a source within the fill material placed over the native marine sediment layer. Off-Property borings to the northwest of the Property were clean and bounded the extent of the constituents of concern in soil.

Groundwater quality was evaluated in the RI based on the three general Property areas described above, the northwestern portion of the Property, the northeastern portion of the Property, and Property-wide. The evaluation of impacts to groundwater at the Property is based on a comparison of analytical results for groundwater samples collected from the 17 monitoring wells located on the Property and the 3 wells installed off-Property (MW-16D, MW-17D, and MW-18D) to the cleanup levels.

Overall, only arsenic was detected in groundwater at concentrations greater than the cleanup level(s), and these are in the eastern portion of the Property, are upgradient of much of the Property, and are the result of migration from off-Property sources. Arsenic concentrations in the samples from wells in the eastern portion of the Property have been greater than the cleanup levels [i.e., 5 micrograms per liter (μg/L) established for the western portion of the Property and 21.3 μg/L established for the eastern portion of the Property due to the effect of off-Property sources]. In addition, there have been localized detections of analytes at concentrations greater than the cleanup levels (i.e., TPH-G, TPH-D, TPH-O, BTEX, and PAHs) in the former gasoline station and creosote areas of the Property. However, there is no evidence of migration of any analytes at concentrations greater than the cleanup levels across, or off, the Property.

In summary, the nature and extent of contamination at the Property are discussed in the RI and FS reports by area, based on the operational history of the Property and the analytical results for the soil, groundwater, and soil vapor samples collected, as follows:

- Northwestern Portion of the Property, which is the former location of the historical gasoline stations and where gasoline-related constituents have been detected

- Northeastern Portion of the Property, which is where the creosote-like material was encountered at the base of the fill material, and where creosote-related constituents have been detected
- Property-Wide, where various constituents have been detected that are interpreted to be related to the presence of the fill placed over the native tideflat surface during the development of the area or that may be related to activities that occurred Property-wide, such as the rail yard operations.

Groundwater elevations have been measured Property-wide six times (November 24, 2008; January 16, 2009; June 3, 2009; August 25, 2009; February 24, 2010; and April 22, 2010). Groundwater elevations at wells located at the Union Station site, which is located to the east and hydraulically upgradient of the Property, were also collected during the June 3, 2009; February 24, 2010; and April 22, 2010 monitoring events. In February 2010, information from the King Street Center building located at 201 South Jackson Street (immediately to the north of the Property) verified the presence of a foundation drain system at the building. The drain system passively collects groundwater along the building foundation. The water that collects in the drain system is pumped to the sanitary sewer system for disposal. Based on the information confirming the presence of the foundation drain system that is collecting groundwater, the groundwater elevation contours for all six monitoring events were redrawn. The revised groundwater contours, which account for the withdrawal of groundwater at King Street Center, are presented on Figures 8 through 13 of the CAP.

The goals of the cleanup action are to adhere to the cleanup standards developed in the RI and FS, and implement the preferred cleanup action alternative selected in the FS, which is protective of human health and the environment, per MTCA requirements. The cleanup action goals are described in detail in the CAP.

2.0 HOTSPOT EXCAVATION SOIL SAMPLING AND ANALYSIS PLAN

Based on the results of the evaluation of the potential for vapor intrusion discussed in Sections 3.0 and 4.2.1 of the FS report, soil with benzene concentrations greater than the remediation level of 780 micrograms per kilogram (µg/kg) will be removed as part of the cleanup action to mitigate the potential for vapor intrusion. The hotspot soil excavation will be conducted in the northwestern portion of the Property within the area of the former gasoline stations. Soil in this area with benzene concentrations greater than the remediation level will be excavated to the elevation of the groundwater table (a depth of approximately 8 ft BGS) and disposed of off-Property at a permitted solid waste Subtitle D landfill. The hotspot excavation will also include soil removal at the location where the highest concentrations of carcinogenic PAHs were detected in the shallow soil (the sample from 4.6 ft BGS at boring B-23). The approximate limits of the hotspot excavation are presented on Figures 2 and 3. The amount of soil excavated for off-Property disposal will be approximately 720 yd^3 after the Property-wide excavation to approximately 1.5 ft BGS and excavation for the pile caps, elevator pits, utilities, and grade beams that are planned as part of Property development. The final lateral limits of the hotspot excavation area will be determined in the field based on the results of field screening and the laboratory analysis of confirmation samples collected at the limits of the excavation. Confirmation samples will be collected to document soil conditions once the field screening indicates that the soil with the highest benzene and gasoline concentrations has been removed. Collection procedures for the confirmation samples and field-screening methodologies are described in the following sections.

2.1 SAMPLING METHODOLOGY

This section describes procedures to be used for the collection of soil confirmation samples. Samples will be collected from the excavation bottom and sidewalls. Confirmation soil samples will be collected about every 20 linear feet along the excavation side walls (about 11 total sidewall samples) and across the base of the excavation (about 6 total bottom samples) to provide sufficient samples to document the gasoline and benzene concentrations remaining in soil at the limits of the excavation. The exact locations and number of confirmation samples to be collected along the base and sidewalls of the excavation area will be determined in the field, but it is anticipated that between 15 and 20 soil samples will be collected and submitted for laboratory analysis, as appropriate based on the conditions encountered. The planned laboratory analyses and anticipated reporting limits are discussed below and summarized in Table 1.

An environmental professional from Landau Associates will supervise all excavation and sampling activities, prepare a descriptive log of excavation and sampling activities, and field-screen

samples for possible contamination. Field-screening results [i.e., obvious signs of contamination, photoionization detector (PID) headspace analysis] will be recorded on the excavation and sampling log. Headspace analysis will be conducted by placing a representative portion of the soil in a sealable plastic bag, allowing the soil to vaporize inside the sealed container for 5 minutes, then inserting the PID tip into the bag to measure total VOCs. All samples collected will be visually described in the field in general accordance with American Society for Testing and Materials (ASTM) D 2455, *Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)*.

The soil confirmation samples will be placed in laboratory-supplied containers and submitted for laboratory analysis under appropriate chain-of-custody procedures. The soil samples will be analyzed for TPH-G by Method NWTPH-G and benzene by U.S. Environmental Protection Agency (EPA) Method 8021b. The target reporting limit for each method is listed in Table 1. Sample collection methods are discussed below.

All samples will be collected using a laboratory-supplied coring device for collection of soil for VOC analysis (TPH-G and benzene) per EPA Method 5035A. Each VOC sampling device will be preset by the sampler to collect approximately 5 grams of soil. The sample will be collected directly from the soil of interest (i.e., an undisturbed portion of the soil sample volume) using the coring device. The soil will be transferred from the coring device to pre-weighed, laboratory-supplied vials. After the sample has been collected, it will be placed in a cooler on ice, cooled to 4°C, and recorded on the chain-of-custody form. Sample details will be recorded on a sample collection form. Samples will be submitted to Analytical Resources in Tukwila, Washington (or other Ecology-accredited laboratory). Samples will be requested to be analyzed on an expedited 48-hour turnaround time.

2.2 SAMPLE IDENTIFICATION

Soil samples will be labeled using the following format:

LAI-CON – Sample Matrix and Sample Number (Sample Depth or Date)

Each of these entries is discussed below:

- The **sample matrix** code will be S (soil sample).
- The samples from each matrix type will be numbered, starting with 01 (**sample boring number**).
- The **sample depth code** is the depth interval below ground surface from which the sample was collected. Samples collected from the bottom of the excavation will be identified with "BOT" in place of a depth interval. Sidewall confirmation samples will contain the approximate depth below ground surface from which the sample was collected.

For example, sample LAI-CON-S01(BOT) will represent the first soil confirmation sample collected from the bottom of the excavation. Sample LAI-CON-S02(7-8) will represent a soil confirmation sample collected from 7 to 8 ft BGS at a sidewall sample location.

2.3 QUALITY ASSURANCE/QUALITY CONTROL

Accuracy of the data will be determined through laboratory recovery of method blanks and laboratory control samples within the laboratory internal standard ranges. Copies of the chromatograms from the analysis may also be requested to allow further evaluation of the concentrations detected and reported by the laboratory.

2.4 SAMPLING EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated before collecting each sample to avoid cross-contamination between samples. Decontaminated sampling equipment will be handled in a manner that minimizes contact with potentially contaminated surfaces. Between sampling events, all non-dedicated equipment will be stored in a manner (e.g., in a plastic bag) that protects them from inadvertent contamination.

Decontamination of sampling equipment will consist of the following steps:

- Spray or scrub soiled equipment
- Wash with an Alconox soap-water solution
- Rinse with tap water
- Rinse with de-ionized or distilled water.

2.5 REPORTING

The details of the hotspot excavation will be included in the Cleanup Action Report that will be prepared to document the cleanup action. The report will include the final soil quantity removed and disposed of off site, the final dimensions of the excavation, and the analytical results for the confirmation samples. The laboratory report and documentation of the disposal of the excavated soil will be included in appendices to the report.

3.0 ENVIRONMENTAL REMEDIATION ENGINEERING PLANS

3.1 APPLICATION OF THE BIOREMEDIATION AMENDMENT

As part of the cleanup action for the Property, a bioremediation material will be applied to the area of the hotspot excavation near the depth of the water table. The selected bioremediation material is Oxygen Release Compound (ORC®), manufactured by Regenesis. The ORC will be placed at the bottom of the excavated area, prior to backfilling, to enhance bioremediation of residual gasoline and benzene contamination at the elevation of the groundwater table. Following placement of the ORC, the hotspot excavation will be backfilled with clean imported fill.

ORC is a proprietary formulation of phosphate-intercalated magnesium peroxide that, when hydrated, produces a controlled release of oxygen for periods of up to 12 months on a single application. ORC will accelerate the rate of naturally occurring aerobic contaminant biodegradation in groundwater and saturated soils. Approximately 7,000 pounds of ORC will be placed at the bottom of the excavation. Technical specifications for ORC are provided in Appendix A, including the material safety data sheet. Instructions for placement/application of the ORC provided by the vendor are also described in detail in Appendix A.

3.2 PROTECTIVE SURFACE CAP

The cleanup action includes the placement of a protective cap to prevent contact with soil remaining in place at the Property following the cleanup and construction activities associated with property development. The cap will consist primarily of the building foundations that will be constructed as part of Property development. In areas outside of the footprint of the building foundations, but within the Property boundary that will not be landscaped, an impervious concrete cap will be installed. In the planned landscaped areas (where exposure to soil will not be prevented by a concrete cap or building foundation), soil will be excavated to 5 ft BGS, a geotextile fabric barrier will be placed at the bottom of the excavation, and the excavated area will be backfilled with clean soil. The landscaped areas where soil will be excavated to 5 ft BGS and the areas where protective pavement will be placed are shown on Figure 3.

Building foundation, concrete paving/cap, and landscaping plans are being prepared by the North Lot Development project team. Selected construction design plans, including the demolition plan, pile and pile cap plans, and typical concrete section plans are provided in Appendix B.

3.2.1 OPERATION AND MAINTENANCE PROCEDURES

Scheduled operation and maintenance of the protective surface cap will ensure the ongoing performance of the cap and maintain its intended function. The general approach to long-term maintenance of the protective cap will include:

- Conducting routine, periodic inspection and monitoring to identify any problems or areas of concern in a timely manner
- Evaluating each identified problem, and, if required, identifying appropriate, cost-effective mitigation measures
- Implementing repairs or corrective actions.

Cap inspections will be conducted at least annually, and after significant earthquakes, to identify the need for any maintenance or repair activities. The cap surface and adjacent areas will be inspected to identify conditions that may indicate potential or actual damage to the cap. Items and conditions that will be noted during the cap inspections will include:

- Integrity of the concrete pavement (including the presence of visible cracking and significant erosion or settlement)
- Presence of differential settlement and ponding of stormwater on top of or directly adjacent to the cap
- Condition of Property roadways
- Condition of stormwater collection, conveyance, and discharge structures.

If a significant problem with the cap, roadway, or associated drainage structures (or other pertinent Property features) is identified, North Lot Development will make arrangements to evaluate and correct the problem(s). Substantial cracks or any conditions observed that adversely affect the performance of the cap will be evaluated and repaired as necessary.

4.0 CONCEPTUAL GROUNDWATER TREATMENT CONTINGENCY PLAN

A contingency for groundwater treatment is included in the cleanup action. Under current Property conditions, contamination in groundwater does not pose a threat to human health or the environment; therefore, groundwater treatment options were not evaluated in the cleanup alternatives. In the event that compliance groundwater monitoring shows a significant increase in contaminant concentrations in groundwater and evidence of off-Property migration of groundwater with contaminant concentrations greater than the cleanup levels or a significant change in Property conditions, groundwater treatment options such as a groundwater extraction system will be evaluated to prevent contaminated groundwater from migrating beyond the conditional point of compliance.

Since the contaminants that could require treatment have not been detected in groundwater above cleanup levels at the downgradient boundaries of the Property, a detailed design of extraction system components is not possible (or appropriate) at this time. If a groundwater extraction system becomes necessary in the future based on the results of compliance monitoring, it would likely be constructed in the northeastern corner of the Property on the east block, either outside, adjacent to the northeastern corner of the building, or in the northeastern corner of the first floor parking garage. Areas for placement of the groundwater treatment system and access for construction/installation will be considered during development of the east block building foundation construction plans to allow for the system components to be installed if groundwater remediation becomes necessary. A future extraction system could include extraction of groundwater from wells, treatment of the collected water using a granular-activated carbon treatment system, and discharge of the water to the sanitary sewer system for further treatment and disposal. The possible locations for the extraction wells and placement of the treatment system are shown on Figure 4. The actual number of wells, their locations, and the size, type, and location of the treatment system, along with the needed piping would be designed once the need for and type of remedial action system has been identified and approved by Ecology.

The list of possible contaminants that could require remediation are listed in the Groundwater Compliance Monitoring Plan, Appendix A of the CAP, and include: TPH, metals, BTEX, and PAHs. The degree to which the groundwater will have to be treated to address these contaminants will depend on the intended point of discharge (sanitary sewer, storm sewer, or reinjection well), and the discharge criteria enforced by the regulating agency at the time the treatment is required. As described above, it is anticipated that any required groundwater treatment could be accomplished using a granular-activated carbon treatment system and that the treated water would be discharged to the sanitary sewer for further treatment and disposal. A skid-mounted system would likely occupy the space of a typical parking stall.

5.0 ENVIRONMENTAL WORKER HEALTH AND SAFETY PLAN

A project health and safety plan (HASP) for implementation of typical environmental field activities conducted at the North Lot Development Property is provided in Appendix A. Landau Associates employees will follow the procedures described in this HASP. Landau Associates' subcontractors will prepare their own health and safety plan, which is at least as protective as the HASP in Appendix A, or choose to adopt the HASP prepared by Landau Associates.

6.0 REPORTING AND DATA SUBMISSION

As noted above, a Cleanup Action Report will be prepared to document the cleanup action. The report will include appropriate information to document the cleanup action. The cleanup action will be implemented according to the schedule included in the CAP. A schedule for completion of the Cleanup Action Report will be developed following initiation of the cleanup action. The Cleanup Action Report will be submitted to Ecology following review by NLD.

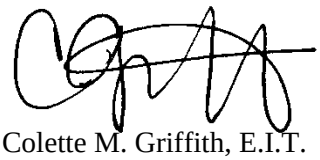
As outlined in the CAP, the planned cleanup action will be implemented following the effective date of the PPCD and will be conducted as part of construction for Property development. The cleanup activities will begin with the removal and off-Property disposal of the approximately 1.5 ft of surface material that will be excavated as part of site preparation. The hotspot excavation will be conducted following removal of the surface material. The remaining cleanup action elements will be implemented as appropriate, as development construction progresses. A detailed schedule is provided in Appendix B of the CAP.

Groundwater compliance monitoring as mentioned above and described in Appendix A of the CAP will begin following completion of construction in the western portion of the Property, which includes the installation of the additional compliance groundwater monitoring wells. Any wells that are damaged or destroyed as part of construction in the eastern portion of the Property will be replaced. Capping (via installation of building foundations and added concrete in areas outside of the building foundation footprints), will be accomplished in conjunction with the construction for Property development. The contingency for groundwater treatment will remain in effect for the duration of the groundwater compliance monitoring.

7.0 USE OF THIS DOCUMENT

This report was prepared for the exclusive use of North Lot Development, and applicable regulatory agencies, for specific application to the North Lot Development Property, including review by the public. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied. This document was prepared under the supervision and direction of the undersigned.

LANDAU ASSOCIATES, INC.



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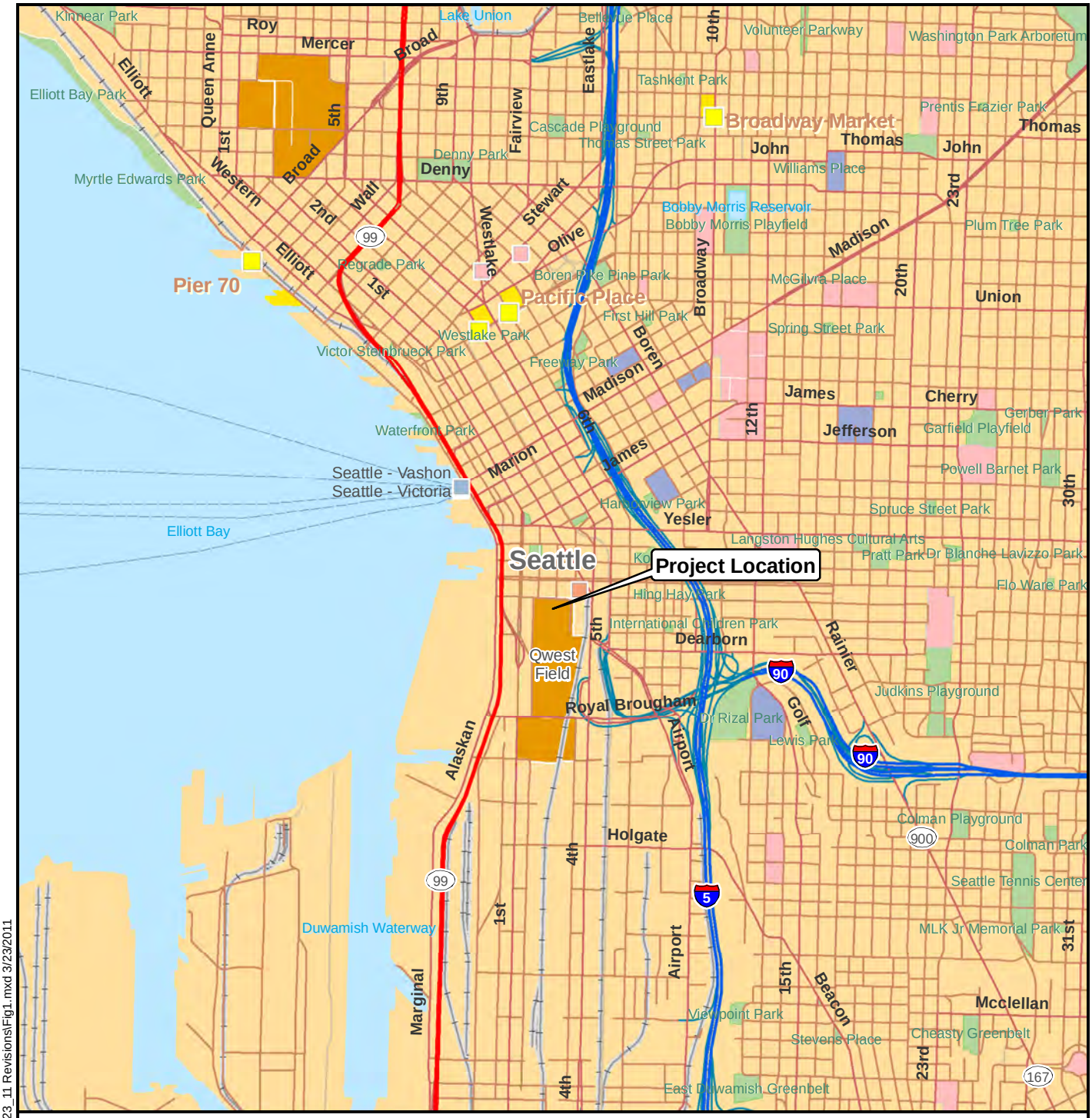

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LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Vicinity Map**	Figure 1

N

SECOND AVENUE SOUTH

SOUTH KING STREET

WEST BLOCK

EAST BLOCK

SEE NOTE 3 FOR LANDSCAPED AREAS OUTSIDE THE BUILDING FOOTPRINTS WITHIN THE PROPERTY.

A

B

C

SCOPE OF WORK IS WITHIN PROPERTY LINE, TYP.

OCCIDENTAL AVENUE SOUTH

EXTENT OF BUILDING FOOTPRINT - BUILDING FOUNDATION WITH CONCRETE SLAB

SEE NOTE 2 FOR NON-LANDSCAPED AREAS OUTSIDE BUILDING FOOTPRINT

A'

B'

C'

WEST BLOCK

EAST BLOCK

NOTES

1. APPROXIMATELY 18" OF MATERIAL TO BE REMOVED ACROSS ENTIRE SITE, PER PHASE, WITHIN PROPERTY BOUNDARIES.
2. CAP NON-LANDSCAPED AREAS OUTSIDE OF BUILDING FOOTPRINT WITH CONCRETE.
3. LANDSCAPED AREAS - EXCAVATE 5'-0" BGS AND PROVIDE MEMBRANE, FILL WITH CLEAN SOIL.
4. UNTIL COMPLETION OF EAST BLOCK EXISTING ASPHALT PAVING WILL BE MAINTAINED.
5. SCOPE OF WORK IS WITHIN PROPERTY LINE.

LEGEND

ASSUMED AREA OF EXCAVATION TO APPROXIMATELY 8 FT BGS (OR GROUNDWATER ELEVATION)- THE LATERAL EXTENT OF THE EXCAVATION WILL BE DETERMINED IN THE FIELD BASED ON FIELD SCREENING AND THE LABORATORY RESULTS FOR CONFIRMATION SAMPLES COLLECTED AT THE LIMITS OF THE EXCAVATION.

A A'

CROSS-SECTION LOCATION AND DESIGNATION, SEE FIGURES 3A, 3B, AND 3C.

0 50 100

Scale in Feet

Base map source: North Lot Development Team (March 15, 2011)

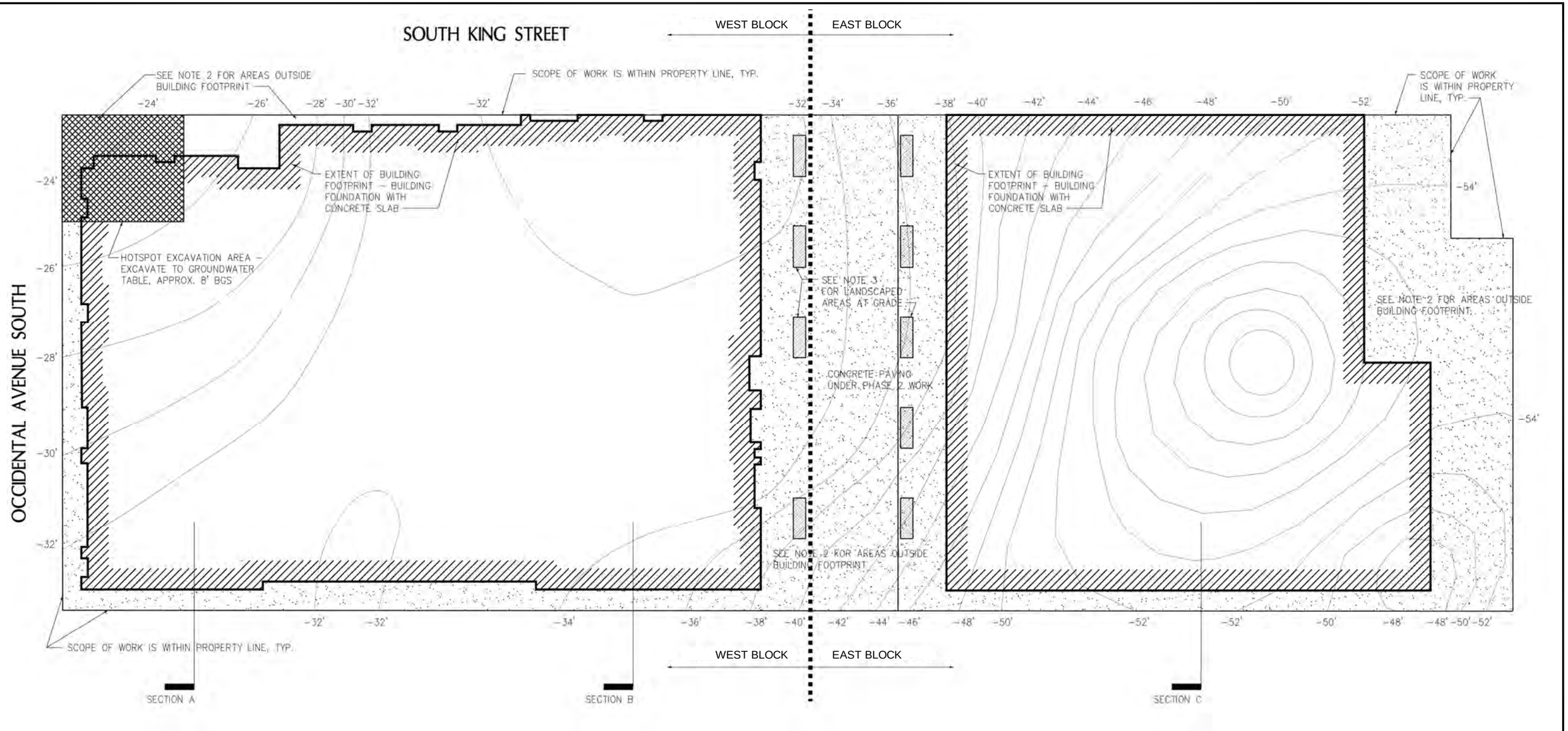
LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Conceptual Property Development Plan

Figure 2

North Lot | V:\1014\001\050.053\2011-3-15\Figure 2_3ABC.dwg (A) "Figure 2" 5/19/2011



NOTES

1. APPROXIMATELY 18" OF MATERIAL TO BE REMOVED ACROSS ENTIRE SITE, PER PHASE, WITHIN PROPERTY BOUNDARIES.
2. CAP NON-LANDSCAPED AREAS OUTSIDE OF BUILDING FOOTPRINT WITH CONCRETE.
3. LANDSCAPED AREAS - EXCAVATE 5'-0" BGS AND PROVIDE MEMBRANE, FILL WITH CLEAN SOIL.
4. UNTIL COMPLETION OF EAST BLOCK EXISTING ASPHALT PAVING WILL BE MAINTAINED.
5. SCOPE OF WORK IS WITHIN PROPERTY LINE.

0 50 100
Scale in Feet

Source: North Lot Development Team (May 2011)

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Planned Cleanup Action: Areas of Soil Overexcavation and Protective Pavement**	Figure 3

N

Second Avenue South

MW-18D

MW-16D

South King Street

West Block

East Block

Scope Of Work Is Within Property Line, Typ.

Extent of Creosote

OCCIDENTAL AVENUE SOUTH

Extent Of Building Footprint - Building Foundation With Concrete Slab

West Block

East Block

Legend

- Poss ble Extraction Well Location (Actual location dependent on final design and presence of utilities)
- MW-16D — Monitoring Well Location and Designation
- Treatment Unit Location (Actual location dependent on final building design. Location would be in northeast corner of first parking level.)

Base map source: North Lot Development Team (March 15, 2011)

0 50 100

Scale in Feet

LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Conceptual Groundwater Extraction and Treatment Layout

Figure 4

EDR | V:\1014001\050.053\EDR\Figure 4.dwg (A) "Figure 4" 6/2/2011

TABLE 1
ANALYTICAL METHODS
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

Analysis	Medium	Analytical Method	Reporting Limits (a)
TPH-G	Soil	NWTPH-G	5 mg/kg
Benzene	Soil	EPA Method 8021b (low level)	12.5 µg/kg

Notes:
(a) Target reporting limits
TPH-G = Gasoline-range Petroleum Hydrocarbons
mg/kg = Milligrams per Kilogram
µg/kg = Micrograms per Kilogram

APPENDIX A

Oxygen Release Compound® Technical Specifications

REGENESIS

Oxygen Release Compound (ORC®) Installation Instructions

(Excavation Applications)

SAFETY:

Pure ORC is shipped to you as a fine powder, which is rated at -325 mesh (passes through a 44 micron screen). It is considered to be a mild oxidizer and as such should be handled with care while in the field. Field personnel should take precautions while applying the pure ORC. Typically, the operator should work up wind of the product as well as use appropriate safety equipment. These would include eye, respiratory protection and gloves as deemed appropriate by exposure duration and field conditions.

Although two options are discussed, application of ORC should never be applied by personnel within the tank excavation, unless proper shoring or sidewall cutback is in place.

GENERAL GUIDELINES:

ORC can be applied in a dry powder form or as a slurry. Field conditions dictate which form of ORC can be used most effectively.

Installation of ORC should be within the tank excavation floor and/or in an adequate backfill section thickness to account for the anticipated groundwater "smear zone".

Maximum treatment effect is obtained when ORC is mixed as thoroughly as possible within the backfill material. The more dispersed the ORC slurry/powder within the excavation backfill, the more effective the treatment.

The quantity of ORC to be used is generally calculated prior to moving into the field for installation. Generally it is applied at a rate of between 0.1% and 1.0% by weight of the soil matrix. The following illustrates a dilute application rate calculation:

> Use a weight/weight percent of ORC/backfill material to ensure distribution of the ORC into the desired aquifer section. For example: a 0.15% weight of ORC to weight of backfill for the standard ORC weight (30 pounds) per container calculates as follows: 30 lb. ORC/0.15% = 20,000 lbs. of soil matrix. Thus, to achieve a 0.15% mixture of ORC in the backfill material, 30 lb. of pure ORC should be mixed into 10 tons (20,000 lbs. ÷2,000 lbs./ton) of backfill, or approximately 7 - 10 cubic yards of soil depending on field conditions. Professional judgment should be used to select the appropriate soil mass per cubic yard for designing each site treatment.

CHOOSING THE FORM OF INSTALLATION:

Pure ORC is shipped to you in a powder form. Weather conditions (especially wind) may have a direct effect on the application of ORC as a tank backfill amendment.

Application of the dry powder may be difficult in windy conditions. To counter the effects of wind (and the subsequent potential loss of ORC), Regenesis recommends that a water source or a spray tank be on-site to wet down the ORC and the backfill material as ORC is applied.

Application of ORC in a slurry format is a very effective method and eliminates the wind issue.

Four somewhat different installation conditions can be encountered in the field:

- ORC in a pea gravel back-fill. ("Type 1")
- ORC in a soil back-fill. ("Type 2")
- ORC mixed in native soil in the bottom of a tank pit. ("Type 3")
- ORC installed in soil under standing water in the bottom of a tank pit. ("Type 4")

A single tank pit excavation can include more than one of these conditions, depending on the site and extent of treatment. Instructions for each condition are discussed separately in the following sections. After the installation instructions are detailed instructions for mixing the slurry, if that is the option chosen.

INSTALLATION INSTRUCTIONS:

"Type 1," ORC in a Pea Gravel Back-fill

The easiest method for installing ORC in pea gravel back-fill is to mix the ORC in the material in a backhoe or skiploader bucket before placing it in the excavation.

- **Dry Powder method**

Into each scoop of back-fill material add the appropriate portion of ORC being installed. Generally, it is advisable to moisten the material in the bucket to reduce wind blown ORC loss. Excessive winds make this method not feasible.

After mixing the dry powder in the bucket, it is dumped into the bottom of the excavation. The backhoe bucket can be used for further mixing in the excavation.

- **Slurry method**

Mix a 63% solids slurry of ORC and water (see "Steps to make ORC slurry). This relatively thick slurry is used to help keep the ORC dispersed through the pea gravel, even when it contacts water in the bottom of the excavation during installation. It is generally desirable to avoid having the ORC run down through the pea gravel and collect in the bottom of the excavation. The thick slurry addresses this issue.

In each scoop of back-fill material, add the appropriate amount of ORC slurry. Pre-mix the materials in the backhoe bucket After mixing, dump the slurry and back-fill into the bottom of the excavation. The backhoe bucket can be used for further mixing in the

excavation.

If the slurry method is being used, observe the physical behavior of the ORC in the fill material. If the ORC collects at the bottom of the back-fill material, increase the percent solids content by reducing the amount of water being used to make the slurry.

"Type 2," ORC in a Soil Back-fill

Follow the instructions for the pea gravel back-fill method, except:

If the slurry method is being used, the solids content should be reduced. Typically a 50% solids is appropriate, although soil conditions sometimes dictate lower solids contents (see "Steps to make ORC slurry").

" Type 3," ORC Mixed in Native Soil in the Bottom of the Tank Pit

When ORC is added to the bottom of a tank pit it may be done by backhoe or injection. CAUTION: Personnel should never work within the tank excavation, unless proper shoring or sidewall cutback is in place.

- **Backhoe method**

A skilled backhoe operator can distribute the ORC around the bottom of the tank excavation and, using the bucket, mix it thoroughly. If there are no winds, it may be possible to:

1. Put the dry ORC powder in the backhoe bucket,
2. Lower it to the bottom of the pit,
3. Gently deposit the ORC evenly on the remaining soil,
4. Use the bucket to mix the powder into the soil,
5. To mitigate dusting, if necessary, spray water into the excavation during the process.

An alternative backhoe method is to use a 50% (or less) solids ORC slurry (see "Steps to make ORC slurry) in place of the dry powder. This eliminates the dusting problem, and in some cases enhances the even distribution of ORC into the soil. Observe the slurry mixing behavior in the bottom of the excavation, and adjust the water content of the slurry to optimize mixing, if necessary.

- **Injection method**

If available, a pump and root feeder may be used to inject an ORC slurry into the excavation floor. This may require a more dilute slurry mix, and care should be taken to assure that the solids do not settle out of the slurry prior to injection.

" Type 4." ORC installed in standing water in the bottom of a tank pit

Application of ORC into tank excavations with standing water requires the operator apply ORC in a slurry form. ORC powder application in this scenario is not advised because a portion of the ORC particle fraction is not likely to pass through the surface tension of the standing water. Caution: Personnel should never work within the tank excavation, unless proper shoring or sidewall cutback is in place.

- **Backhoe method**

A skilled backhoe operator can distribute the ORC slurry within the excavation, and mix it into the soil underlying the standing water with the bucket. Steps for installation:

1. Mix a high solids content ORC slurry (63% solids). See ("Steps to make ORC slurry").
2. Pour slurry into the backhoe bucket.
3. Lower the bucket to the standing water level in the excavation, and deposit the slurry as evenly as possible across the excavation floor. The dense slurry (63%solids is 1.6 grams per ml) will tend to make the majority of the slurry sink quickly to the bottom of the water layer.
4. Use the bucket to mix the slurry into the soil.
5. Water in the vicinity of the ORC slurry will often turn white and milky, since some of the ORC is dispersed within the standing water. This provides additional dispersion within the standing water and back-fill material as it is added to the excavation.

- **Injection method**

If available, a pump and root feeder may be used to inject an ORC slurry into the soil in an excavation. This may require a more dilute slurry mix, and care should be taken to assure that the solids do not settle out of the slurry prior to injection.

MIXING ORC SLURRY:

ORC powder is shipped to you in pre-measured batches. Each batch is contained in a plastic bag which is shipped in a 5-gallon bucket.

Remove the pre-measured ORC bag from the 5-gallon bucket and open
Measure and pour the appropriate amount of water from the following table into the 5 gallon bucket

Slurry Solids Content (%)	Pounds of ORC	Gallons of Water
63%	30 lbs.	2.1 gal. (2 gal. + 2 cups)
50%	30 lbs.	3.6 gal. (3 gal + 2 1/2 qts.)

Add the entire ORC pre-measured bag to the water (30 pounds). If the slurry solids contents of less than 50% are desired, the quantity of ORC per batch mixed in the bucket must be reduced. For example, a bucket containing four gallons of water would require 22.4 pounds of ORC to make a 40% solids slurry, and 16.6 pounds of ORC to make a 33% slurry.

Use an appropriate mixing device to thoroughly mix ORC and water. Regenesis

recommends use of a 0.5 Horsepower (minimum) hand held drill with a “jiffy mixer” or stucco mixer. A common paint paddle can be used to scrape the bottom and sides of the container to ensure thorough mixing. Standard environmental slurry mixers may also be used.

After mixing, small amounts of water can be added to adjust the consistency of the slurry.

When slurries are used, the early batches should be observed in the process of mixing with the soil. Each site can vary, due to soil type and moisture content. Based on professional judgment, additional water can be added to subsequent slurry batches.

ORC slurry should be used ASAP; if the ORC slurry has been standing more than 15 minutes, it should be remixed immediately before using. Do not let stand more than 30 minutes without stirring. Otherwise, the slurry will begin to harden into a weak cement.

For direct assistance or answers to any questions you may have regarding these instructions, contact Regenesis Technical Services at 949-366-8000.

Oxygen Release Compound (ORC®)
MATERIAL SAFETY DATA SHEET (MSDS)

Last Revised: **September 14, 2009**

Section 1 - Material Identification

Supplier:

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Phone: **949.366.8000**
Fax: **949.366.8090**
E-mail: **info@regenesis.com**

Chemical Description:	**A mixture of Magnesium Peroxide (MgO_2), Magnesium Oxide (MgO), and Magnesium Hydroxide [$Mg(OH)_2$]**
Chemical Family:	**Inorganic Chemical**
Trade Name:	**Oxygen Release Compound (ORC®)**
Product Use:	**Used to remediate contaminated soil and groundwater (environmental applications)**

Section 2 – Chemical Identification

CAS#	Chemical
14452-57-4	**Magnesium Peroxide (MgO_2)**
1309-48-4	**Magnesium Oxide (MgO)**
1309-42-8	**Magnesium Hydroxide [$Mg(OH)_2$]**
7758-11-4	**Dipotassium Phosphate (HK_2O_4P)**
7778-77-0	**Monopotassium Phosphate (H_2KO_4P)**
Assay:	**25-35% Magnesium Peroxide (MgO_2)**

Section 3 - Physical Data	
Melting Point:	**Not Determined (ND)**
Boiling Point:	**ND**
Flash Point:	**Not Applicable (NA)**
Self-Ignition Temperature:	**NA**
Thermal Decomposition:	**Spontaneous Combustion possible at ≈ 150°C**
Density:	**0.6 – 0.8 g/cc**
Solubility:	**Reacts with Water**
pH:	**Approximately 10 in saturated solution**
Appearance:	**White Powder**
Odor:	**None**
Vapor Pressure:	**None**
Hazardous Decomposition Products:	**Not Known**
Hazardous Reactions:	**Hazardous Polymerization will not occur**
Further Information:	**Non-combustible, but will support combustion**

Section 4 – Reactivity Data	
Stability:	**Product is stable unless heated above 150 °C. Magnesium Peroxide reacts with water to slowly release oxygen. Reaction by product is Magnesium Hydroxide**
Conditions to Avoid:	**Heat above 150 °C. Open Flames.**
Incompatibility:	**Strong Acids. Strong Chemical Agents.**
Hazardous Polymerization:	**None known.**

Section 5 - Regulations

Permissible Exposure Limits in Air	**Not Established. Should be treated as a nuisance dust.**

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:	**Keep in tightly closed container. Keep away from combustible material.**
Handling:	**Use only in well ventilated areas.**

Personal Protective Equipment (PPE)

Respiratory Protection:	**Recommended (HEPA Filters)**
Hand Protection:	**Wear suitable gloves.**
Eye Protection:	**Use chemical safety goggles.**
Other:	**NA**
Industrial Hygiene:	**Avoid contact with skin and eyes**
Protection Against Fire & Explosion:	**NA**
Disposal:	**Dispose via sanitary landfill per state/local authority**
Further Information:	**Not flammable, but may intensify a fire**
After Spillage/Leakage/Gas Leakage:	**Collect in suitable containers. Wash remainder with copious quantities of water.**
Extinguishing Media:	**NA**
Suitable:	**Carbon Dioxide, dry chemicals, foam**
Further Information:	**Self contained breathing apparatus or approved gas mask should be worn due to small particle size. Use extinguishing media appropriate for surrounding fire.**
First Aid:	**After contact with skin, wash immediately with plenty of water and soap. In case of contact with eyes, rinse immediately with plenty of water and seek medical attention.**

Section 7 – Information on Toxicology

Toxicity Data:	**Not Available**

Section 8 – Information on Ecology

Water Pollution Hazard Raging (WGK):	**0**

Section 9 – Further Information

After the reaction of magnesium peroxide with water to form oxygen, the resulting material, magnesium hydroxide, is mildly basic. The amounts of magnesium oxide (magnesia) and magnesium hydroxide in the initial product have an effect similar to lime, but with lower alkalinity.

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available.

APPENDIX B

Construction Specification Drawings

Call before you Dig. 8-1-1 or 1-800-424-5555 UNDERGROUND SERVICE (USA)

0 10 20 40

SCALE 1"=20'

PROTECT EX UTILITY POLE

PROTECT EX STREET TREE

REMOVE EX CURBING AND DRIVEWAY (UNDER SEPARATE SIP PERMIT)

REMOVE EX GUARD SHACK CUT AND CAP ALL ASSOCIATED UTILITIES

REMOVED EX TREE AND ROUND CONCRETE PLANTER (TYP AS SHOWN)

REMOVE EX DRAINAGE STRUCTURES

GRIND EXISTING ASPHALT

EX TREES TO BE REMOVED

ABANDON EX 8" SD PIPE

REMOVAL OF EX ASPHALT PARKING LOT LIMITS

CUT, CAP AND PLUG EX 8" SD MARK FOR FUTURE CONNECTION

ZGF

ZIMMER GUNSUL FRASCA ARCHITECTS LLP

PORTLAND
SEATTLE
LOS ANGELES
WASHINGTON DC
NEW YORK

DANIELS REAL ESTATE

Residential Consultant

Ankrom Moisan Architects
117 Main St, Suite 400
Seattle, WA 98104
206 576 1600

Structural & Civil

Coughlin Porter Lundeen
413 Pine St, Suite 300
Seattle, WA 98101
206 343 0460

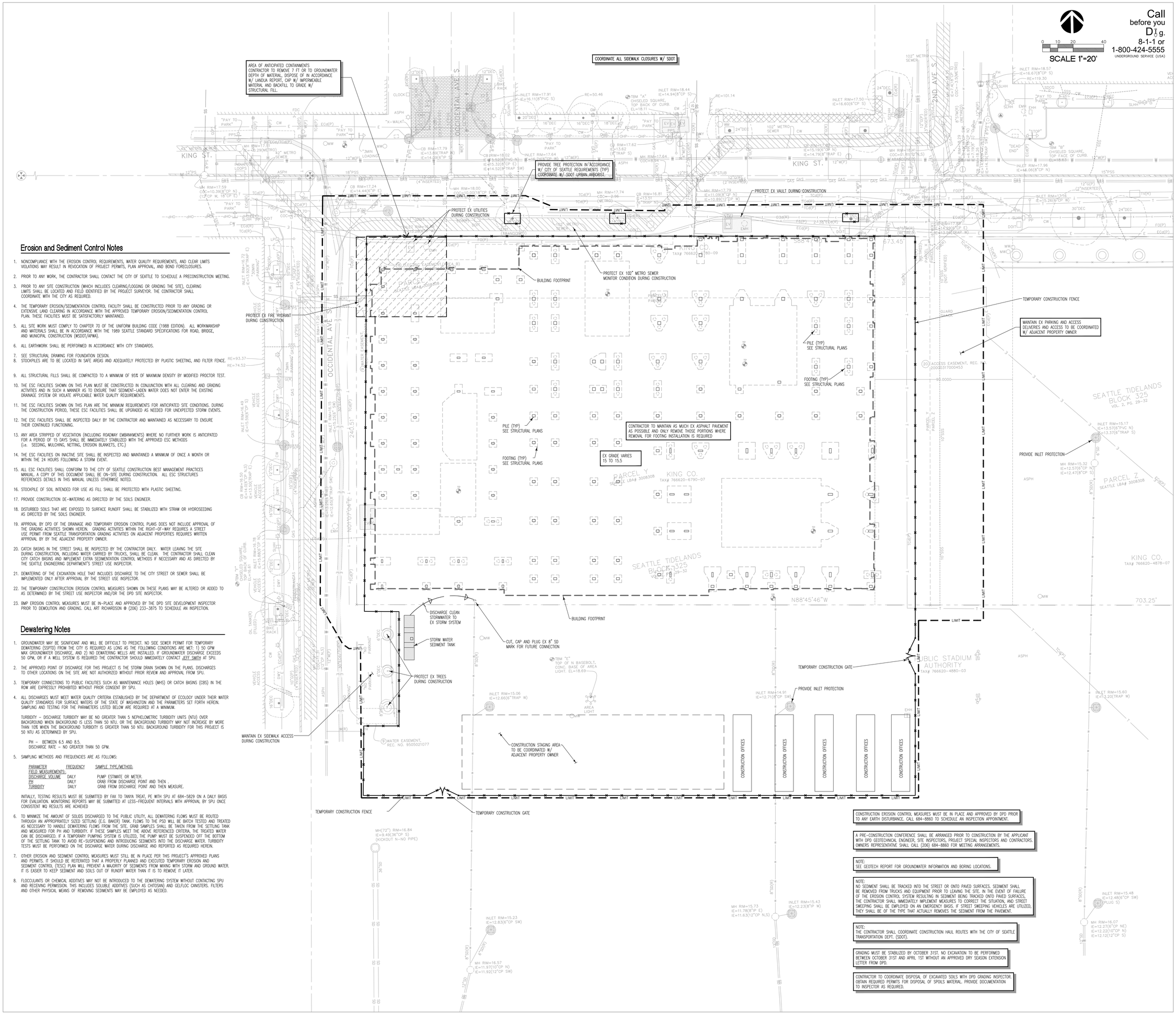
General Contractor

JTM Construction
1730 Minor Ave, Suite 1120
Seattle, WA 98101
206 587 4000

COUGHLINPORTERLUNDEEN
A CONSULTING STRUCTURAL AND CIVIL ENGINEERING CORPORATION
413 PINE STREET - SUITE 300 P: 206/343-0460
SEATTLE, WA 98101 F: 206/343-5491

Demolition Plan

C 1.0



Erosion and Sediment Control Notes

1. NONCOMPLIANCE WITH THE EROSION CONTROL REQUIREMENTS, WATER QUALITY REQUIREMENTS, AND CLEAR LIMITS VIOLATIONS MAY RESULT IN REVOCATION OF PROJECT PERMITS, PLAN APPROVAL, AND BOND FORECLOSURES.
2. PRIOR TO ANY WORK, THE CONTRACTOR SHALL CONTACT THE CITY OF SEATTLE TO SCHEDULE A PRECONSTRUCTION MEETING.
3. PRIOR TO ANY SITE CONSTRUCTION (WHICH INCLUDES CLEARING/LOGGING OR GRADING THE SITE), CLEARING LIMITS SHALL BE LOCATED AND FIELD IDENTIFIED BY THE PROJECT SURVEYOR. THE CONTRACTOR SHALL COORDINATE WITH THE CITY AS REQUIRED.
4. THE TEMPORARY EROSION/SEDIMENTATION CONTROL FACILITY SHALL BE CONSTRUCTED PRIOR TO ANY GRADING OR EXTENSIVE LAND CLEARING IN ACCORDANCE WITH THE APPROVED TEMPORARY EROSION/SEDIMENTATION CONTROL PLAN. THESE FACILITIES MUST BE SATISFACTORILY MAINTAINED.
5. ALL SITE WORK MUST COMPLY TO CHAPTER 70 OF THE UNIFORM BUILDING CODE (1988 EDITION). ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 1989 SEATTLE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (WSDOT/APWA).
6. ALL EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH CITY STANDARDS.
7. SEE STRUCTURAL DRAWING FOR FOUNDATION DESIGN.
8. STOCKPILES ARE TO BE LOCATED IN SAFE AREAS AND ADEQUATELY PROTECTED BY PLASTIC SHEETING, AND FILTER FENCE.
9. ALL STRUCTURAL FILLS SHALL BE COMPACTED TO A MINIMUM OF 95% OF MAXIMUM DENSITY BY MODIFIED PROCTOR TEST.
10. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT-LADEN WATER DOES NOT ENTER THE EXISTING DRAINAGE SYSTEM OR VIOLATE APPLICABLE WATER QUALITY REQUIREMENTS.
11. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS.
12. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
13. ANY AREA STRIPPED OF VEGETATION (INCLUDING ROADWAY EMBANKMENTS) WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 15 DAYS SHALL BE IMMEDIATELY STABILIZED WITH THE APPROVED ESC METHODS (i.e. SEEDING, MULCHING, NETTING, EROSION BLANKETS, ETC.)
14. THE ESC FACILITIES ON INACTIVE SITE SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 24 HOURS FOLLOWING A STORM EVENT.
15. ALL ESC FACILITIES SHALL CONFORM TO THE CITY OF SEATTLE CONSTRUCTION BEST MANAGEMENT PRACTICES MANUAL. A COPY OF THIS DOCUMENT SHALL BE ON-SITE DURING CONSTRUCTION. ALL ESC STRUCTURES REFERENCES DETAILS IN THIS MANUAL UNLESS OTHERWISE NOTED.
16. STOCKPILE OF SOIL INTENDED FOR USE AS FILL SHALL BE PROTECTED WITH PLASTIC SHEETING.
17. PROVIDE CONSTRUCTION DE-WATERING AS DIRECTED BY THE SOILS ENGINEER.
18. DISTURBED SOILS THAT ARE EXPOSED TO SURFACE RUNOFF SHALL BE STABILIZED WITH STRAW OR HYDROSEEDING AS DIRECTED BY THE SOILS ENGINEER.
19. APPROVAL BY DPD OF THE DRAINAGE AND TEMPORARY EROSION CONTROL PLANS DOES NOT INCLUDE APPROVAL OF THE GRADING ACTIVITIES SHOWN HEREIN. GRADING ACTIVITIES WITHIN THE RIGHT-OF-WAY REQUIRES A STREET USE PERMIT FROM SEATTLE TRANSPORTATION GRADING ACTIVITIES ON ADJACENT PROPERTIES REQUIRES WRITTEN APPROVAL BY BY THE ADJACENT PROPERTY OWNER.
20. CATCH BASINS IN THE STREET SHALL BE INSPECTED BY THE CONTRACTOR DAILY. WATER LEAVING THE SITE DURING CONSTRUCTION, INCLUDING WATER CARRIED BY TRUCKS, SHALL BE CLEAN. THE CONTRACTOR SHALL CLEAN CITY CATCH BASINS AND IMPLEMENT EXTRA SEDIMENTATION CONTROL METHODS IF NECESSARY AND AS DIRECTED BY THE SEATTLE ENGINEERING DEPARTMENT'S STREET USE INSPECTOR.
21. DEWATERING OF THE EXCAVATION HOLE THAT INCLUDES DISCHARGE TO THE CITY STREET OR SEWER SHALL BE IMPLEMENTED ONLY AFTER APPROVAL BY THE STREET USE INSPECTOR.
22. THE TEMPORARY CONSTRUCTION EROSION CONTROL MEASURES SHOWN ON THESE PLANS MAY BE ALTERED OR ADDED TO AS DETERMINED BY THE STREET USE INSPECTOR AND/OR THE DPD SITE INSPECTOR.
23. BMP EROSION CONTROL MEASURES MUST BE IN-PLACE AND APPROVED BY THE DPD SITE DEVELOPMENT INSPECTOR PRIOR TO DEMOLITION AND GRADING. CALL ART RICHARDSON @ (206) 233-3875 TO SCHEDULE AN INSPECTION.

Dewatering Notes

1. GROUNDWATER MAY BE SIGNIFICANT AND WILL BE DIFFICULT TO PREDICT. NO SIDE SEWER PERMIT FOR TEMPORARY DEWATERING (SSPTD) FROM THE CITY IS REQUIRED AS LONG AS THE FOLLOWING CONDITIONS ARE MET: 1) 50 GPM MAX GROUNDWATER DISCHARGE, AND 2) NO DEWATERING WELLS ARE INSTALLED. IF GROUNDWATER DISCHARGE EXCEEDS 50 GPM, OR IF A WELL SYSTEM IS REQUIRED THE CONTRACTOR SHOULD IMMEDIATELY CONTACT JEFF SMITH AT SPU.
2. THE APPROVED POINT OF DISCHARGE FOR THIS PROJECT IS THE STORM DRAIN SHOWN ON THE PLANS. DISCHARGES TO OTHER LOCATIONS ON THE SITE ARE NOT AUTHORIZED WITHOUT PRIOR REVIEW AND APPROVAL FROM SPU.
3. TEMPORARY CONNECTIONS TO PUBLIC FACILITIES SUCH AS MAINTENANCE HOLES (MHS) OR CATCH BASINS (CBS) IN THE ROW ARE EXPRESSLY PROHIBITED WITHOUT PRIOR CONSENT BY SPU.
4. ALL DISCHARGES MUST MEET WATER QUALITY CRITERIA ESTABLISHED BY THE DEPARTMENT OF ECOLOGY UNDER THEIR WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF WASHINGTON AND THE PARAMETERS SET FORTH HEREIN. SAMPLING AND TESTING FOR THE PARAMETERS LISTED BELOW ARE REQUIRED AT A MINIMUM.

   TURBIDITY – DISCHARGE TURBIDITY MAY BE NO GREATER THAN 5 NEPHELOMETRIC TURBIDITY UNITS (NTU) OVER BACKGROUND WHEN BACKGROUND IS LESS THAN 50 NTU, OR THE BACKGROUND TURBIDITY MAY NOT INCREASE BY MORE THAN 10% WHEN THE BACKGROUND TURBIDITY IS GREATER THAN 50 NTU. BACKGROUND TURBIDITY FOR THIS PROJECT IS 50 NTU AS DETERMINED BY SPU.

   PH – BETWEEN 6.5 AND 8.5.
   DISCHARGE RATE – NO GREATER THAN 50 GPM.

5. SAMPLING METHODS AND FREQUENCIES ARE AS FOLLOWS:

PARAMETER	FREQUENCY	SAMPLE TYPE/METHOD
FIELD MEASUREMENTS:		
DISCHARGE VOLUME	DAILY	PUMP ESTIMATE OR METER.
PH	DAILY	GRAB FROM DISCHARGE POINT AND THEN .
TURBIDITY	DAILY	GRAB FROM DISCHARGE POINT AND THEN MEASURE.

   INITIALLY, TESTING RESULTS MUST BE SUBMITTED BY FAX TO TANYA TREAT, PE WITH SPU AT 684-5829 ON A DAILY BASIS FOR EVALUATION. MONITORING REPORTS MAY BE SUBMITTED AT LESS-FREQUENT INTERVALS WITH APPROVAL BY SPU ONCE CONSISTENT WQ RESULTS ARE ACHIEVED

6. TO MINIMIZE THE AMOUNT OF SOLIDS DISCHARGED TO THE PUBLIC UTILITY, ALL DEWATERING FLOWS MUST BE ROUTED THROUGH AN APPROPRIATELY SIZED SETTLING (E.G. BAKER) TANK. FLOWS TO THE PSD WILL BE BATCH TESTED AND TREATED AS NECESSARY TO HANDLE DEWATERING FLOWS FROM THE SITE. GRAB SAMPLES SHALL BE TAKEN FROM THE SETTLING TANK AND MEASURED FOR PH AND TURBIDITY. IF THESE SAMPLES MEET THE ABOVE REFERENCED CRITERIA, THE TREATED WATER CAN BE DISCHARGED. IF A TEMPORARY PUMPING SYSTEM IS UTILIZED, THE PUMP MUST BE SUSPENDED OFF THE BOTTOM OF THE SETTLING TANK TO AVOID RE-SUSPENDING AND INTRODUCING SEDIMENTS INTO THE DISCHARGE WATER. TURBIDITY TESTS MUST BE PERFORMED ON THE DISCHARGE WATER DURING DISCHARGE AND REPORTED AS REQUIRED HEREIN.
7. OTHER EROSION AND SEDIMENT CONTROL MEASURES MUST STILL BE IN PLACE PER THIS PROJECT'S APPROVED PLANS AND PERMITS. IT SHOULD BE REITERATED THAT A PROPERLY PLANNED AND EXECUTED TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) PLAN WILL PREVENT A MAJORITY OF SEDIMENTS FROM MIXING WITH STORM AND GROUND WATER. IT IS EASIER TO KEEP SEDIMENT AND SOILS OUT OF RUNOFF WATER THAN IT IS TO REMOVE IT LATER.
8. FLOCCULANTS OR CHEMICAL ADDITIVES MAY NOT BE INTRODUCED TO THE DEWATERING SYSTEM WITHOUT CONTACTING SPU AND RECEIVING PERMISSION. THIS INCLUDES SOLUBLE ADDITIVES (SUCH AS CHITOSAN) AND GELFLOC CANISTERS. FILTERS AND OTHER PHYSICAL MEANS OF REMOVING SEDIMENTS MAY BE EMPLOYED AS NEEDED.

Call before you Dig. 8-1-1 or 1-800-424-5555 UNDERGROUND SERVICE (USA)

0 10 20 40
SCALE 1"=20'

ZGF
ZIMMER GUNSUL FRASCA ARCHITECTS LLP
PORTLAND
SEATTLE
LOS ANGELES
WASHINGTON DC
NEW YORK
W W m
DANIELS REAL ESTATE
Residential Consultant
Ankrom Moisan Architects
117 Main St, Suite 400
Seattle, WA 98104
206 576 1600
Structural & Civil
Coughlin Porter Lundeen
413 Pine St, Suite 300
Seattle, WA 98101
206 343 0460
General Contractor
JTM Construction
1730 Minor Ave, Suite 1120
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206 587 4000
COUGHLINPORTERLUNDEEN
A CONSULTING STRUCTURAL AND CIVIL ENGINEERING CORPORATION
413 PINE STREET - SUITE 300 P: 206/343-0460
SEATTLE, WA 98101 F: 206/343-5491

N
D m

Demolition and T.E.S.C. Plan

STATE OF WASHINGTON

C 2.0

Call before you Dig. 8-1-1 or 1-800-424-5555 UNDERGROUND SERVICE (USA)

SCALE 1"=20'

Side Sewer Note:
ANY EXISTING SIDE SEWER TO BE RE-USED AND SHALL BE FIELD VERIFIED, VIDEO INSPECTED AND PRESSURE TESTED

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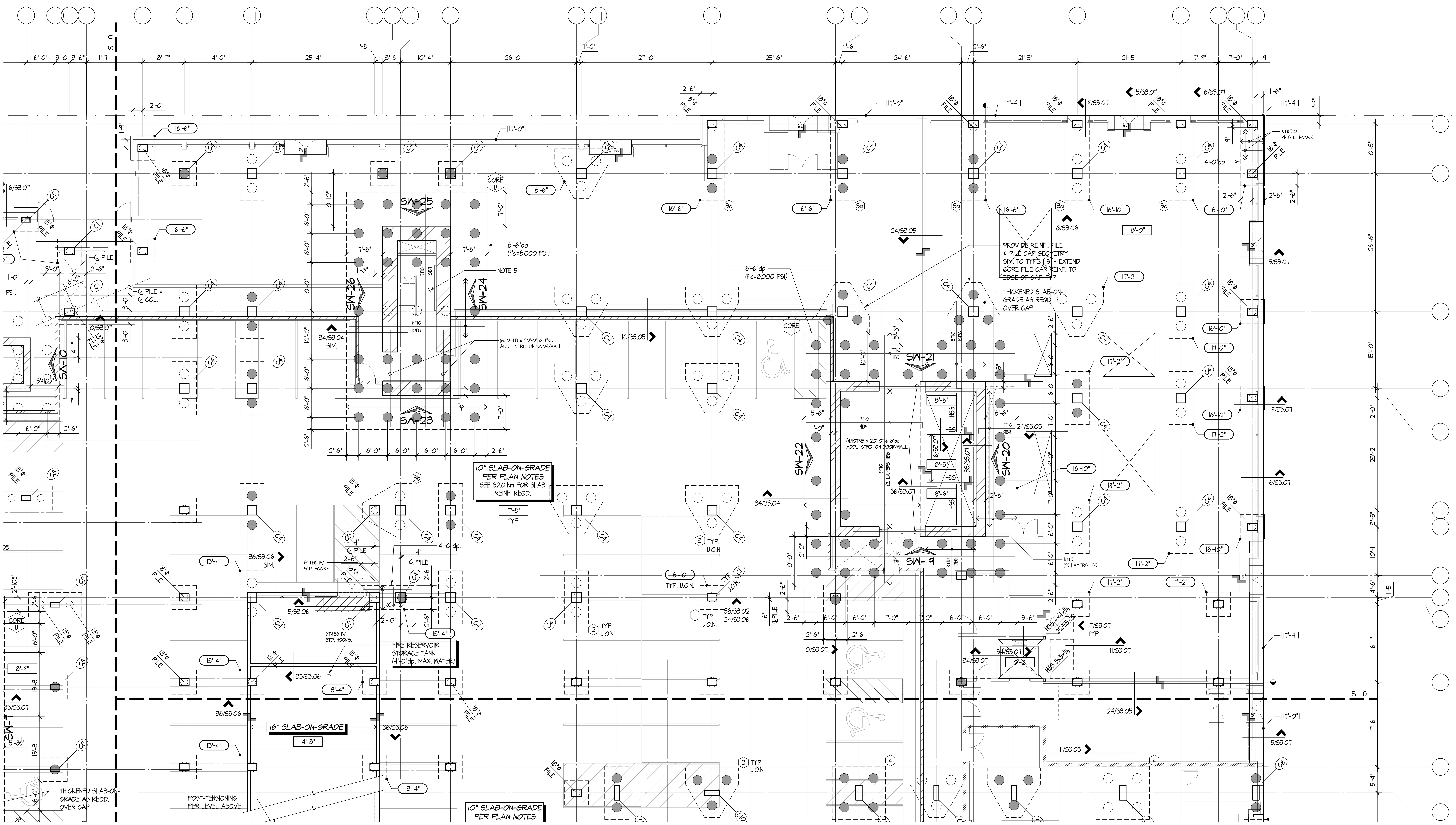
Civil Site Plan

C 3.0



1. SLAB ELEVATION VARIES PER PLAN AND ARCHITECTURAL DRAWINGS.

   SEE ARCHITECTURAL DRAWINGS FOR SLAB DEPRESSION AND SLOPE REQUIREMENTS.

2. SEE ARCHITECTURAL/MECHANICAL/CIVIL/UTILITIES DRAWINGS FOR UNDERSLAB PIPING. COORDINATE PIPE ROUTING WITH PILE CAPS. SEE 24/S3.01 FOR PIPE SUPPORT REQUIREMENTS. SEE 23/S3.01 FOR PIPE LAYOUT WITHIN CAPS, TYP.

3. SEE SHEETS S2.01Wn, S2.01Nn & S2.01Sn FOR SLAB-ON-GRADE INFORMATION & REINF., TYP.

4. ALL PILES SHALL BE 24"Ø PER 24/S3.04, U.O.N. ON PLAN. SEE PLAN FOR LOCATIONS WHERE 18"Ø (OPEN END) PILES REQD. SEE LEGEND FOR SHADED CLOSED END 24"Ø PILE DESIGNATION.

5. ALL STAIRS AND LANDINGS NOT SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS ARE DESIGN BUILD COMPONENTS. ALL DESIGN BUILD STEEL COMPONENTS SHALL BE DESIGNED, DETAILED, AND SUPPLIED BY THE STEEL FABRICATOR - SEE GENERAL STRUCTURAL NOTE 13. SUPPLY AND INSTALL COMPLETE STAIR SYSTEMS INCLUDING TREADS, RISERS, AND INTERMEDIATE LANDINGS. ANY NON-STEEL COMPONENTS INCLUDING FOOTINGS SHALL BE DESIGNED PER GENERAL STRUCTURAL NOTE 13 AND SHALL BE SUPPLIED AND INSTALLED BY SUPPLIERS AND SUBCONTRACTORS AS DIRECTED BY THE GENERAL CONTRACTOR.

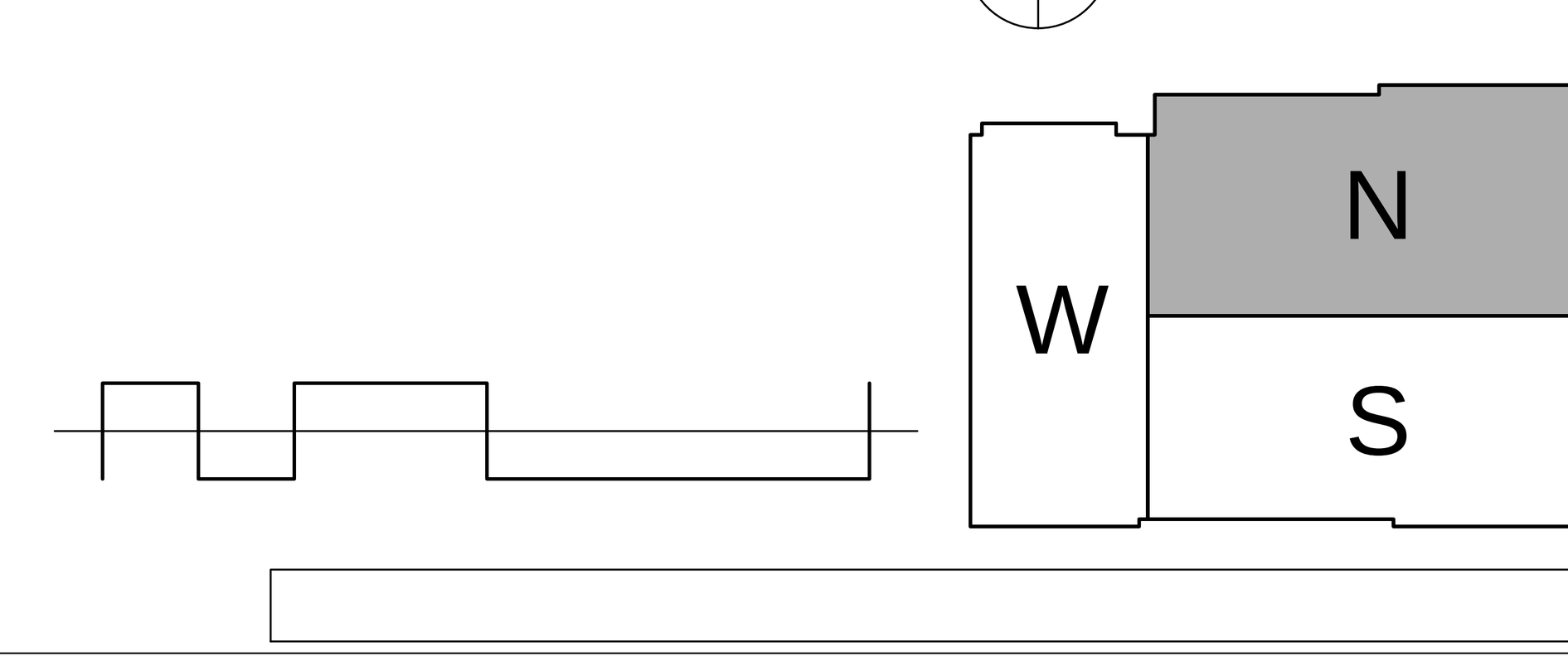
6. SEE 24/S3.19 FOR BOLLARD DESIGN. LOCATE BOLLARDS PER ARCH'L.

X'-X"	T.O. SLAB ELEVATION
X'-X"	TOP OF PILE CAP ELEVATION
X	PILE NUMBER & CAP TYPE PER S3.04
Cx	COLUMN MARK PER SCHEDULE OF S5/S3.02
high / low	STEP IN PILE CAP OR CONCRETE LEDGE PER DETAILS
	STEP IN TOP OF SLAB
	FULL-HT. NON-BEARING MASONRY WALL THIS LEVEL
	PARTIAL HEIGHT MASONRY WALL THIS LEVEL
[XX'-XX"]	TOP OF CONCRETE LEDGE AT SIDEWALK - SEE 6/S3.07
	OPEN END PILE (SEE PLAN NOTE 4 FOR PILE SIZE)
	CLOSED END 24"Ø PILE
HSS	HSS 8x4x¼ - SEE 22/S3.07 FOR ATTACHMENT TO CONCRETE

(8) 5 B 15
- QUANTITY (WHERE SPECIFIED)
- BAR SIZE
- "T" TOP, "M" MIDDLE, or "B" BOTTOM
- @ SPACING oc (EQ. SPACE IF NOT SPECIFIED)

(SEE GENERAL STRUCTURAL NOTE #16)

SW-x — SHEAR WALL PER ELEVATIONS OF SHEETS S3.08 TO S3.12



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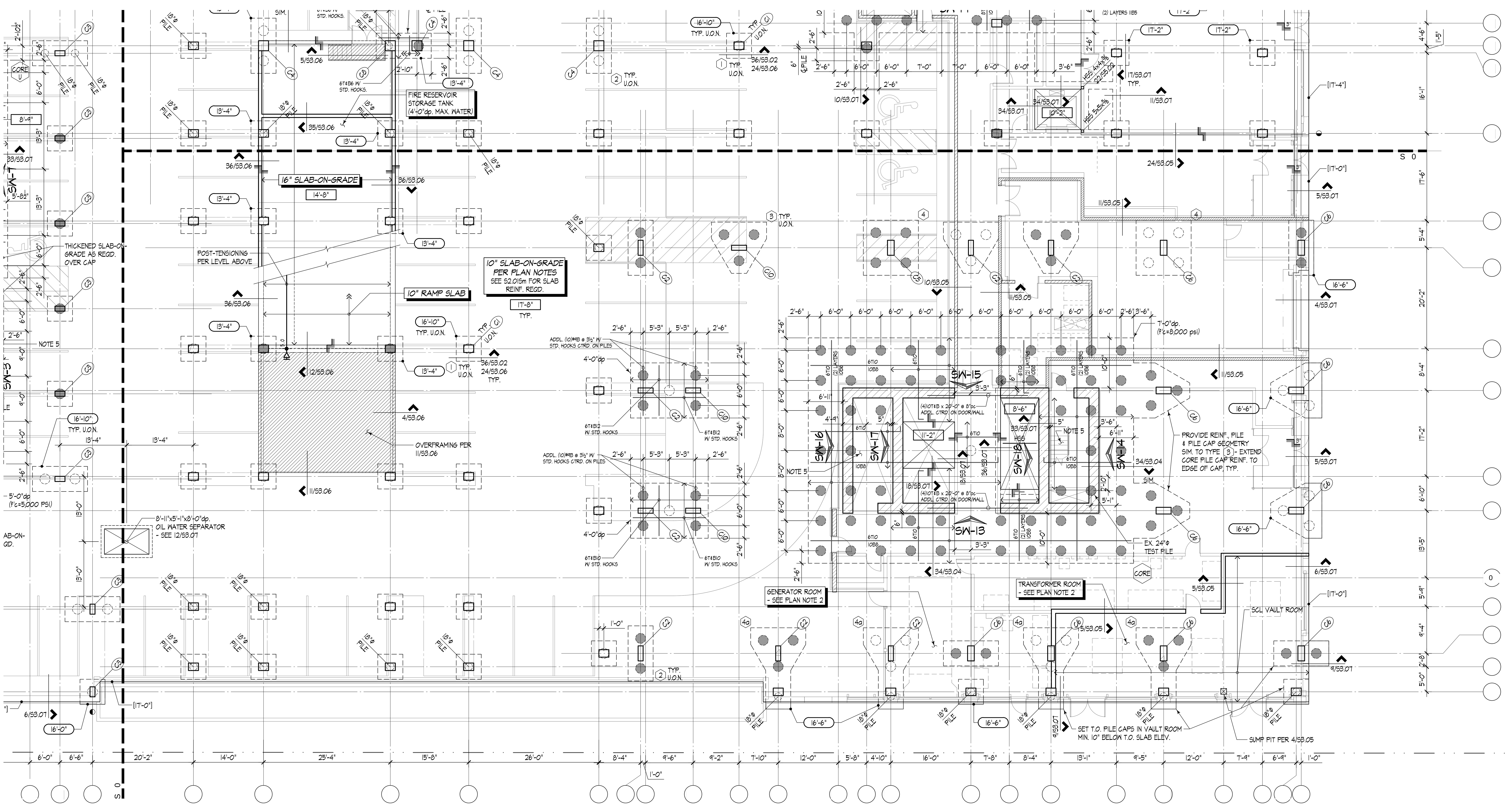
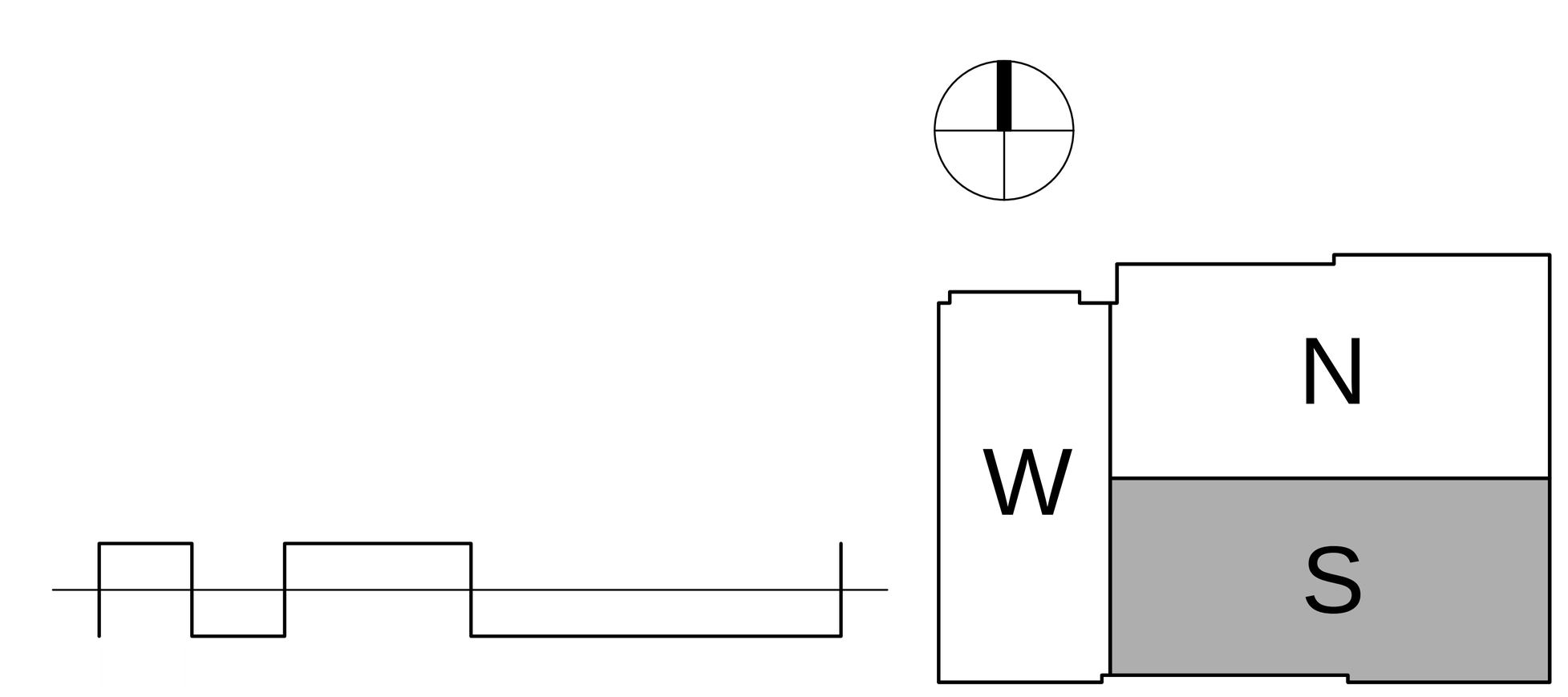
North Lot Development

Level 01 Floor Plan - Sector N
Pile & Pile Cap Plan

S2.01N



1. SEE S2.01N FOR PLAN NOTES AND LEGEND ITEMS.
2. GENERATOR + TANK MAX. WT. = 36,000 LBS. TRANSFORMER MAX. WT. = 22,000 LBS. EACH. + (3) IN ROOM



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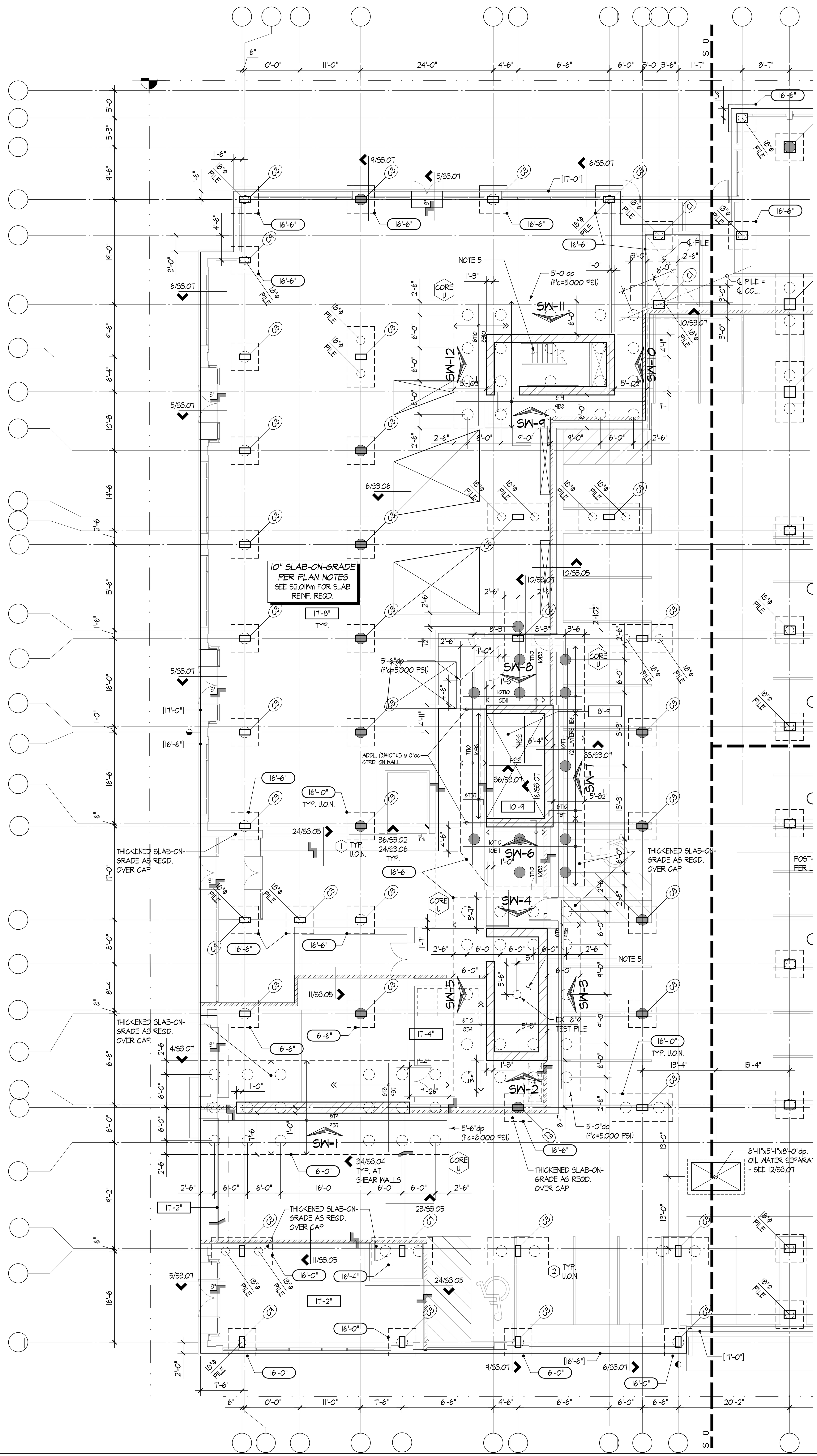
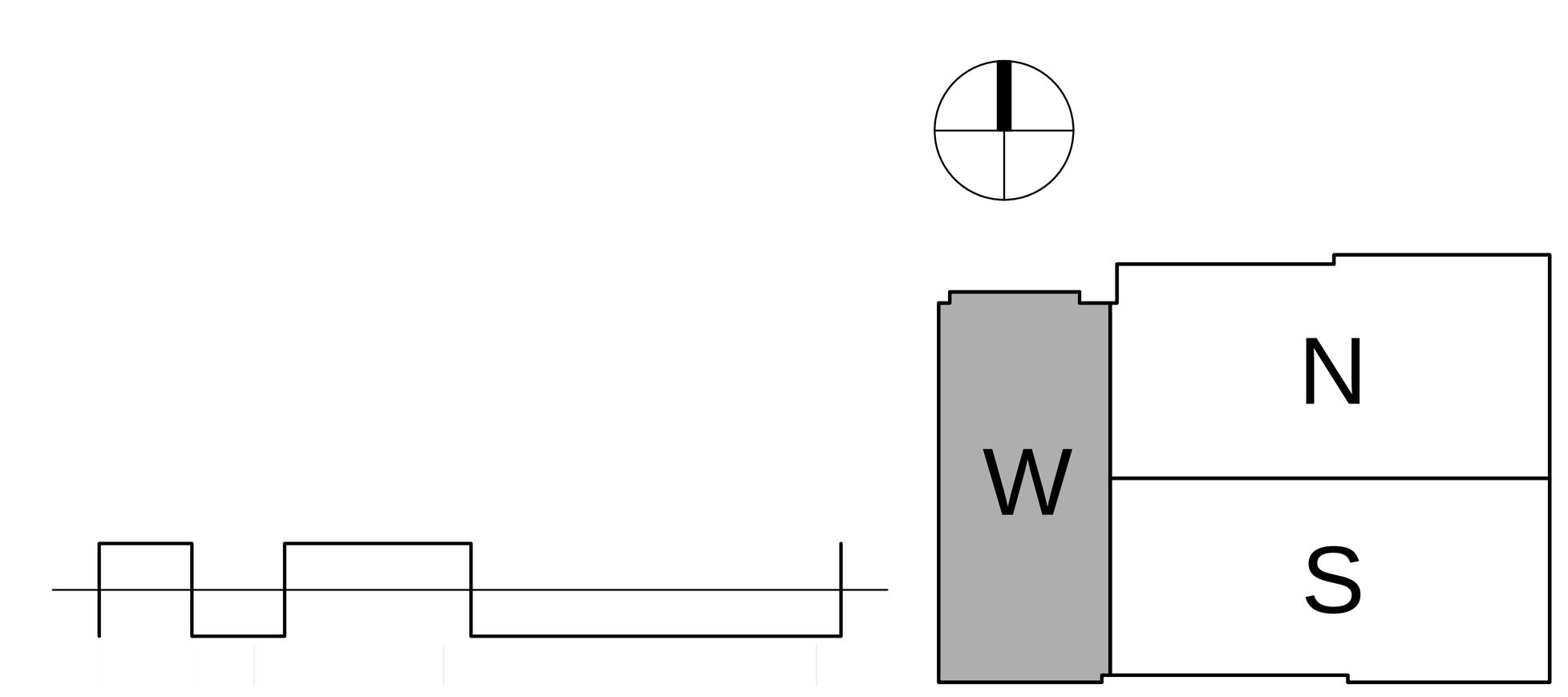
North Lot Development

Level 01 Floor Plan - Sector S
Pile & Pile Cap Plan

S2.01S



1. SEE S2.01N FOR PLAN NOTES AND LEGEND ITEMS.



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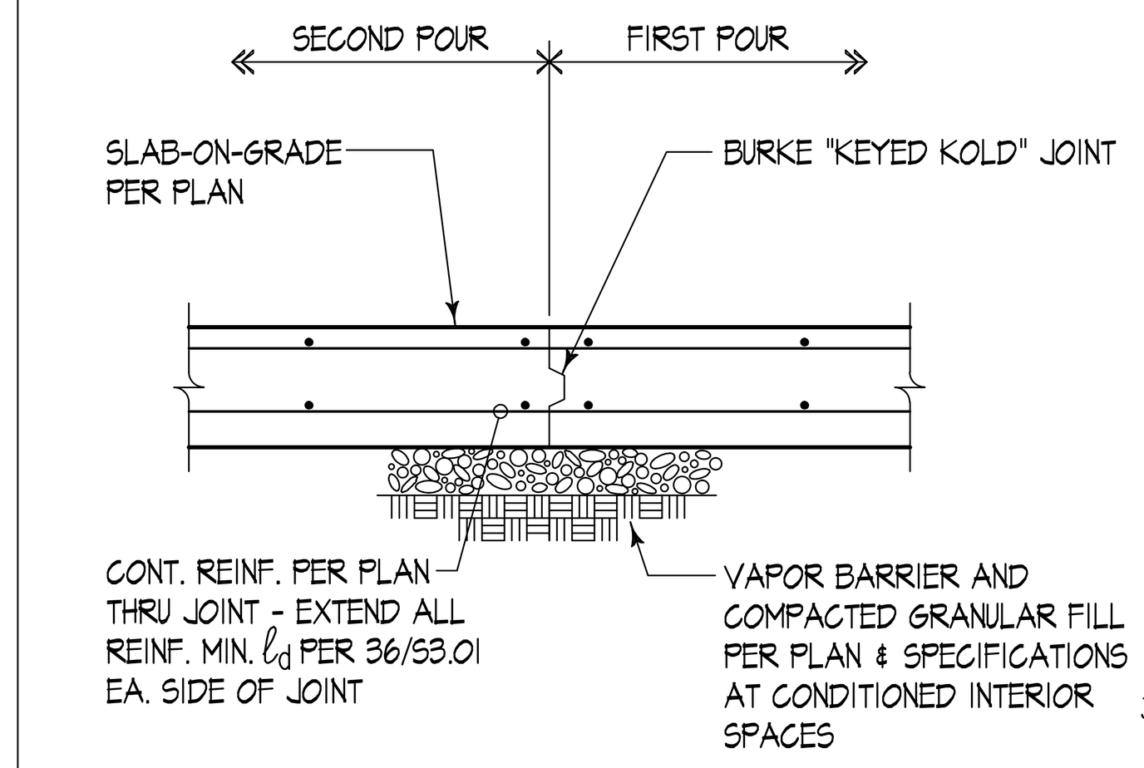
North Lot Development

Level 01 Floor Plan - Sector W
Pile & Pile Cap Plan

S2.01W

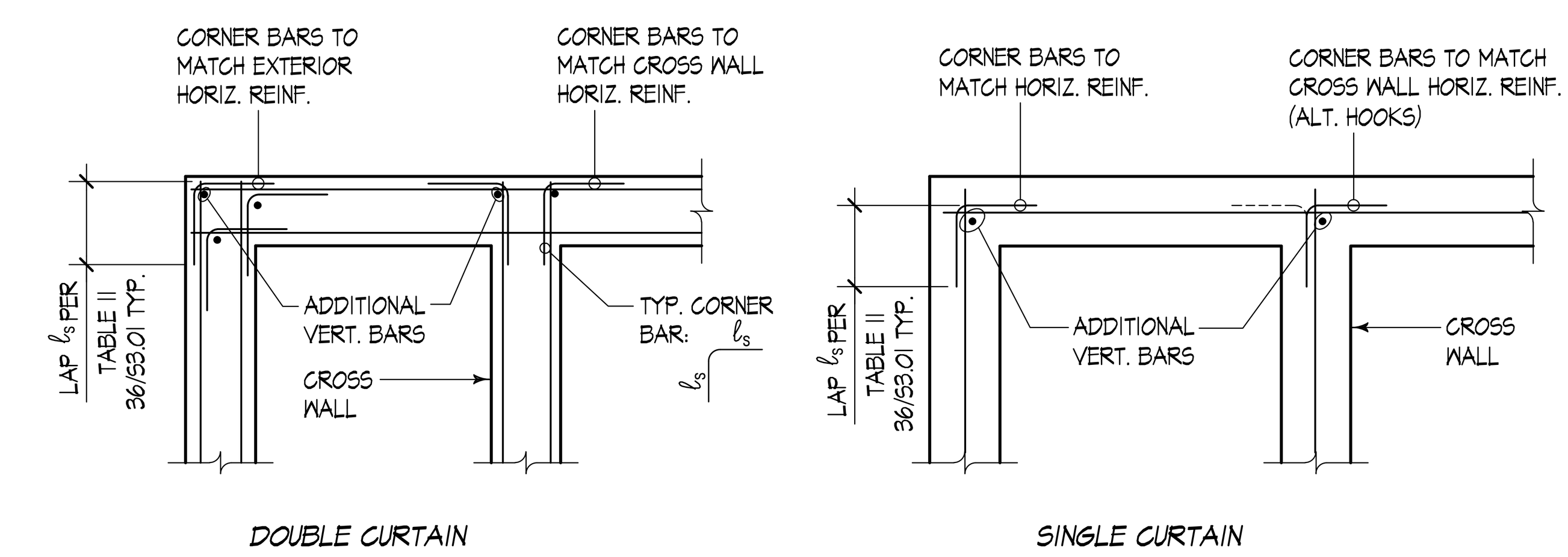
1 2 3 4 5

NOTE:
PROVIDE CONSTRUCTION JOINTS IN SLABS ON GRADE TO BREAK SLAB INTO RECTANGULAR AREAS. JOINT LOCATIONS TO BE APPROVED BY THE ARCHITECT.



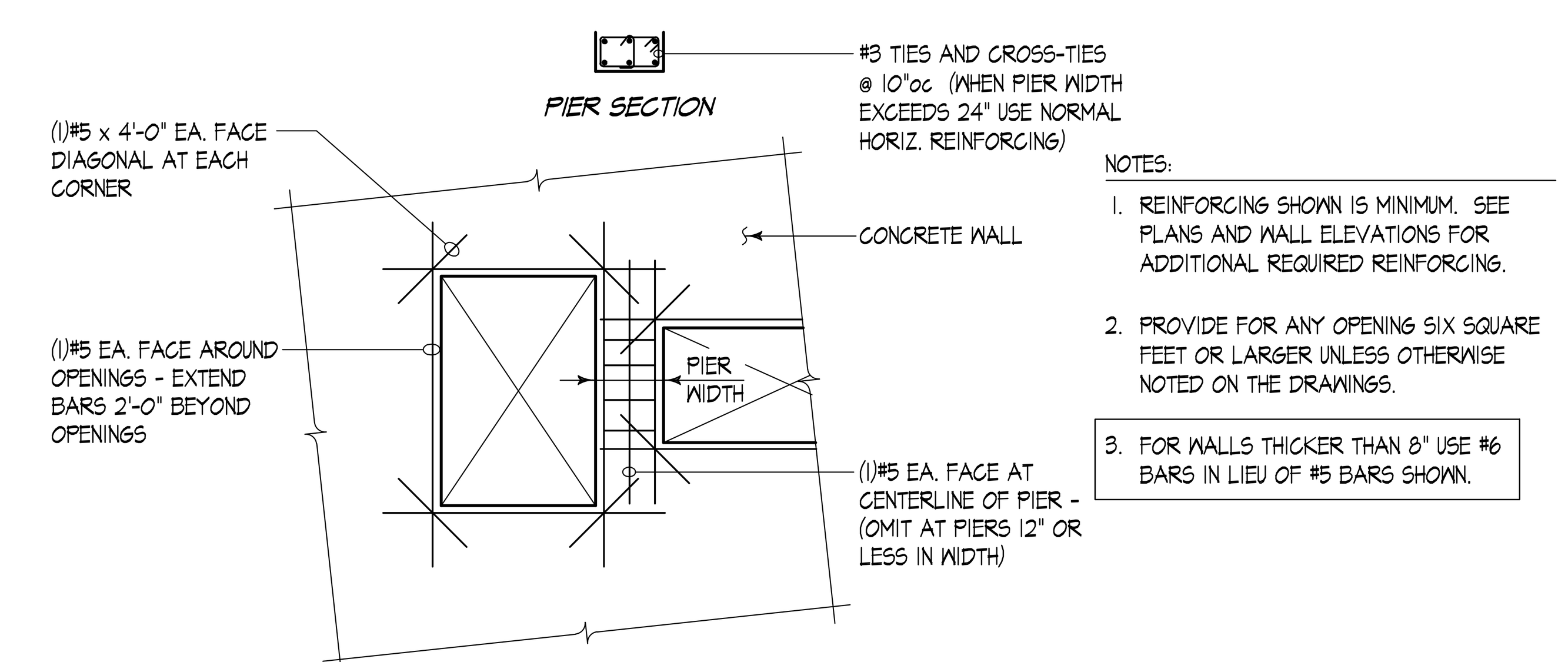
3001
Slab-on-Grade Construction Joints 6

7 8 9 10



3006
12

13 14 15 16

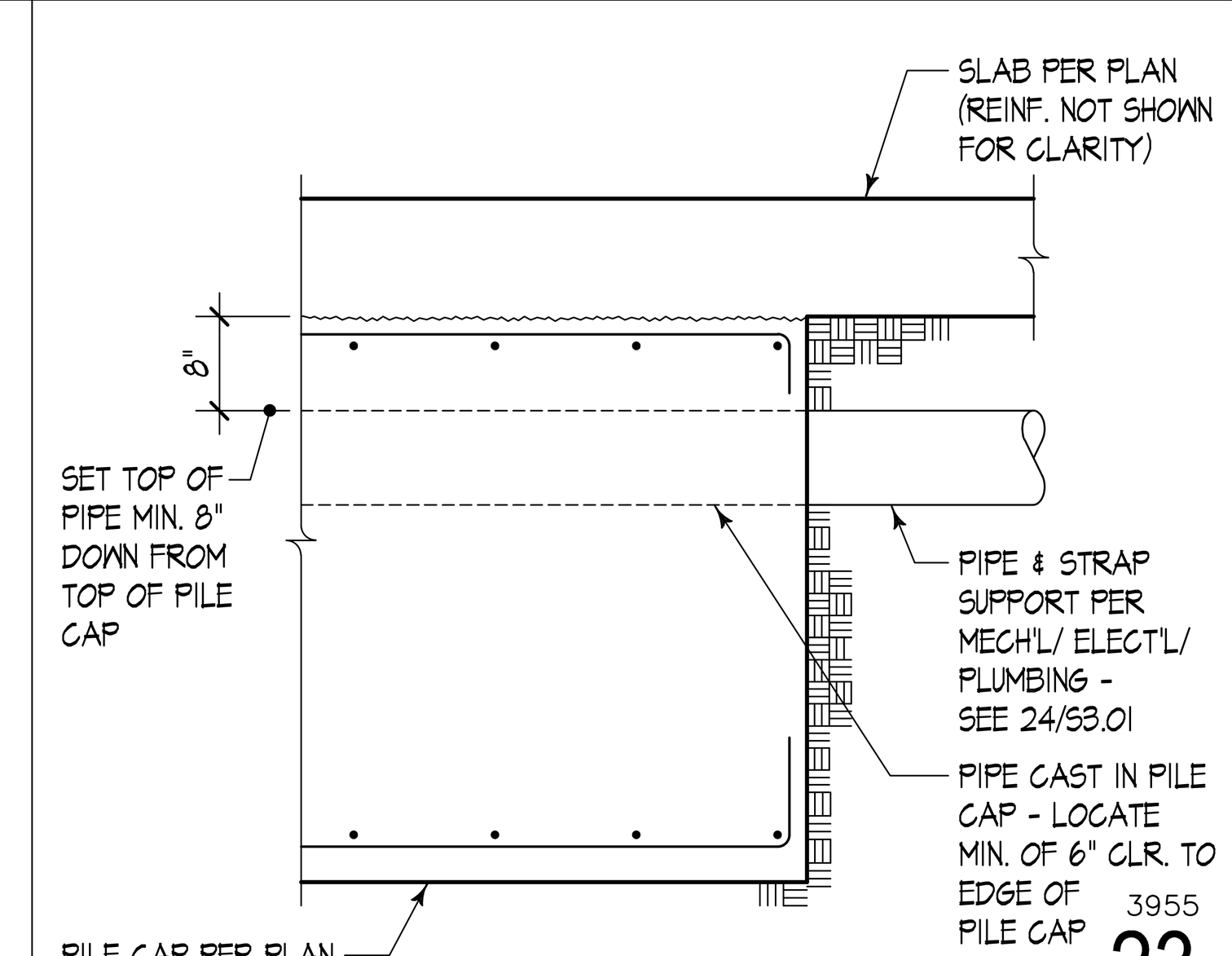


NOTES:

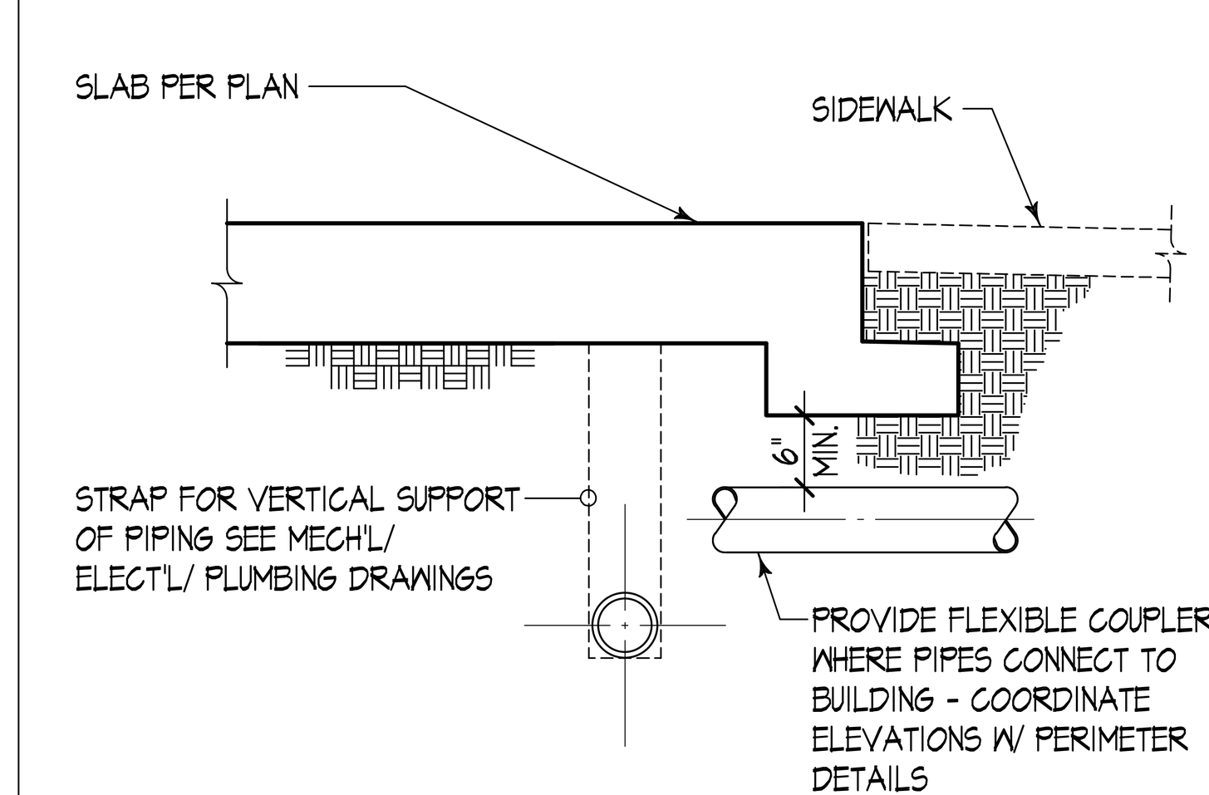
1. REINFORCING SHOWN IS MINIMUM. SEE PLANS AND WALL ELEVATIONS FOR ADDITIONAL REQUIRED REINFORCING.
2. PROVIDE FOR ANY OPENING SIX SQUARE FEET OR LARGER UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. FOR WALLS THICKER THAN 8" USE #6 BARS IN LIEU OF #5 BARS SHOWN.

3007
Wall Opening Trim 18

19 20 21 22



3955
23



3010
Pipe Sleeve 24

25 26 27

31 32 33

I — MINIMUM STRAIGHT DEVELOPMENT LENGTH (ℓ_d) ✦

BAR SIZE	f'c = 3000 PSI		f'c = 4000 to 6000 PSI		f'c = 7000 to 10000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
# 3	22"	17"	19"	15"	-	-
# 4	29"	22"	25"	19"	-	-
# 5	36"	28"	31"	24"	-	-
# 6	43"	33"	37"	29"	28"	22"
# 7	63"	48"	54"	42"	41"	32"
# 8	72"	55"	62"	48"	47"	36"
# 9	81"	62"	70"	54"	53"	41"
# 10	91"	70"	79"	61"	60"	46"
# 11	-	-	87"	67"	66"	51"

✦ "TOP BARS" ARE HORIZONTAL BARS WITH MORE THAN 12" DEPTH OF CONCRETE CAST BELOW THEM.

IF CLEAR CONCRETE COVER IS LESS THAN 1x THE DIAMETER OF THE BAR OR THE CENTER-TO-CENTER SPACING IS LESS THAN (3) BAR DIAMETERS, THEN VALUES SHALL BE INCREASED BY 50%.

II — MINIMUM LAP SPLICE LENGTHS (ℓ_s) ✦ (CLASS B)

BAR SIZE	f'c = 3000 PSI		f'c = 4000 to 6000 PSI		f'c = 7000 to 10000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
# 3	28"	22"	24"	19"	-	-
# 4	37"	29"	33"	25"	-	-
# 5	47"	36"	41"	31"	-	-
# 6	56"	43"	49"	37"	37"	29"
# 7	81"	63"	71"	54"	54"	42"
# 8	93"	72"	81"	62"	62"	47"
# 9	105"	81"	91"	70"	69"	54"
# 10	118"	91"	102"	79"	78"	60"
# 11	-	-	114"	88"	86"	67"

✦ "TOP BARS" ARE HORIZONTAL BARS WITH MORE THAN 12" DEPTH OF CONCRETE CAST BELOW THEM.

IF CLEAR CONCRETE COVER IS LESS THAN 1x THE DIAMETER OF THE BAR OR THE CENTER-TO-CENTER SPACING IS LESS THAN (3) BAR DIAMETERS, THEN VALUES SHALL BE INCREASED BY 50%.

III — MINIMUM EMBEDMENT LENGTHS (ℓ_{dh}) FOR STANDARD END HOOKS

A. for general uses:

BAR SIZE	f'c = 3000 PSI	f'c = 4000 to 6000 PSI	f'c = 7000 to 10000 PSI
# 3	6"	6"	-
# 4	8"	7"	-
# 5	10"	9"	-
# 6	12"	10"	8"
# 7	14"	12"	9"
# 8	16"	14"	11"
# 9	18"	15"	12"
# 10	20"	17"	13"
# 11	-	19"	15"

1. SIDE COVER MUST BE EQUAL TO OR GREATER THAN 2½".
2. END COVER FOR 90° HOOKS MUST BE EQUAL TO OR GREATER THAN 2".

NOTE: USE TABLES IV & V BELOW ONLY WHERE SPECIFICALLY INDICATED ON DRAWINGS.

IV — MINIMUM STRAIGHT DEVELOPMENT LENGTH (ℓ_d) FOR BARS IN COMPRESSION

BAR SIZE	f'c ≥ 3000 PSI
# 3	9"
# 4	11"
# 5	14"
# 6	17"
# 7	20"
# 8	22"
# 9	25"
#10	28"
#11	31"

V — MINIMUM LAP SPLICE LENGTH (ℓ_s) FOR BARS IN COMPRESSION

BAR SIZE	f'c ≥ 3000 PSI
# 3	12"
# 4	15"
# 5	19"
# 6	23"
# 7	27"
# 8	30"
# 9	34"
# 10	39"
# 11	43"

3011
Reinforcing Splice & Development Length Schedule 36

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North Lot Development

TYPICAL CONCRETE DETAILS

S3.01

APPENDIX C

Health and Safety Plan

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

WORK LOCATION PERSONNEL PROTECTION AND SAFETY EVALUATION FORM

Attach Pertinent Documents/Data
Fill in Blanks As Appropriate

Job No.:	1014001.010		
Prepared by:	Mark Brunner/Colette Griffith	Reviewed by:	Christine Kimmel/Ken Reid/Tim Syverson
Date:	February 21, 2008; updated September 27, 2010 and June 2, 2011	Date:	Feb, 21, 2008/Sept. 27, 2010/June 2, 2011

A. WORK LOCATION DESCRIPTION

1. **Project Name:** North Lot Development

2. **Location:** Parcel #7666204878 and #7666204886 at the southeast corner of South King Street and Occidental Avenue South, Seattle, Washington

3. **Anticipated Activities:** Direct-push drilling, monitoring well installation, and soil, soil vapor, and groundwater sampling to assess potential impacts due to current and historical operations, and soil excavation activities. The subject property (Property) includes about 20 ft of fill over native marine sediments. Groundwater is present at about 5 to 7 ft below grade.

4. **Size:** Approximately 3.85 acres

5. **Surrounding Population:** Municipal, commercial, and residential

6. **Buildings/Homes/Industry:** The Property is currently a parking lot.

7. **Topography:** The average elevation of the Property is approximately 10 to 15 ft above mean sea level. The Property slopes slightly to the west.

8. **Anticipated Weather:** Cool, possibly overcast and/or rainy.

9. **Unusual Features:** The entire Property is a paved parking lot.

10. **Site History:** The Property operated as a rail yard from the late 1800s to the late 1960s. Two gasoline stations built in 1935 and 1941 were formerly located in the northwest corner of the Property. The results of the sampling and analysis conducted for the remedial investigation have identified: 1) soil contamination by gasoline and benzene in the northwest portion; 2) soil contamination by polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons in soil greater than 15 ft below grade in the northeast portion of the Property due to the presence of creosote-like material at the fill-native marine sediments interface; and 3) Property-wide PAHs in soil and areas of arsenic and petroleum hydrocarbon-contaminated soil. Only arsenic has been detected above regulatory levels at multiple locations in groundwater, and these concentrations are due

to upgradient, off-Property sources.

B. HAZARD DESCRIPTION

1. Background Review: ☒ Complete ☐ Partial

If partial, why?

2. Hazardous Level: ☐ B ☐ C ☒ D ☐ Unknown

Justification: Total petroleum hydrocarbons (TPH) including gasoline-range, diesel-range, and oil-range petroleum hydrocarbons, benzene, ethylbenzene, toluene, xylenes, PAHs, polychlorinated biphenyls (PCBs), and lead possible due to current and historical operations.

3. Types of Hazards: (Attach additional sheets as necessary)

A. ☒ Chemical ☒ Inhalation ☒ Explosive
☐ Biological ☒ Ingestion ☐ O2 Def. ☒ Skin Contact

Describe: Exposure to chemical hazards from petroleum products, metals, PAHs, and volatile organic compounds (VOCs). Nitrile gloves will be worn. Incidental inhalation and ingestion possible from sampling process. Respirator will be worn if vapor levels warrant. Potential explosive hazard due to VOCs in subsurface; ambient conditions will be monitored with combustible gas meter.

B. ☒ Physical ☐ Cold Stress ☒ Noise ☐ Heat Stress ☐ Other

Describe: Physical hazards from equipment and overhead obstacles (e.g., overhead power lines) may be encountered during exploration activities. Noise hazards associated with exploration equipment. Ear protection will be used. Steel-toed boots will be worn at all times due to heavy object hazards. Potential trip and fall hazards associated with exploration equipment will be minimized where possible.

C. ☐ Radiation

Describe:

4. Nature of Hazards:

☒ Air	Describe: Potential inhalation exposure to petroleum hydrocarbon and VOC constituents, and contaminated particulates including metals.
☒ Soil	Describe: Potential inhalation, ingestion, or skin exposure to metals, TPH, PAHs, and/or VOCs.
☐ Surface Water	Describe:
☒ Groundwater	Describe: Potential inhalation, ingestion, or skin exposure to metals.
☒ Other	Describe: Creosote-like material is present at greater than 15 ft below grade in a limited area in the northeast portion of the Property.

5. Chemical Contaminants of Concern ☐ N/A

Contaminant	PEL (ppm)	I.D.L.H. (ppm)	Source/Quantity Characteristics	Route of Exposure	Symptoms of Acute Exposure	Instruments Used to Monitor Contaminant
Arsenic	0.5 mg/m^3	5 mg/m^3	Soil and groundwater at concentrations just greater than Project-specific screening levels	Inhalation, ingestion, dermal contact, eye contact	Damage to liver, kidneys, skin, lungs, and lymphatic system (potential occupational carcinogen)	Visual (Dust)
Benzene	1	5	Soil at concentrations greater than Project-specific screening levels	Inhalation, ingestion, dermal contact, eye contact	Irritation of eyes, nose, skin, respiratory system; nausea; dizziness; headache; lassitude	PID meter, detection tubes, combustible gas meter
Ethylbenzene	100	125	Soil at concentrations greater than Project-specific screening levels	Inhalation, ingestion, dermal contact, eye contact	Irritation of eyes, skin, mucous membrane; headache; coma	PID meter
Naphthalene (PAH)	10	15	Soil at concentrations greater than Project-specific screening levels	Inhalation, ingestion, dermal contact, eye contact	Irritation of eyes; headache; confusion; excitement; malaise; nausea; sweating; optical neuritis	PID meter
Toluene	100	150	Soil at concentrations greater than Project-specific screening levels	Inhalation, ingestion, dermal contact, eye contact	Irritation of eyes, nose, skin, throat, respiratory system; nausea; dizziness; convulsions; headache; lassitude; bluish skin; liver injury	PID meter

Contaminant	PEL (ppm)	I.D.L.H. (ppm)	Source/Quantity Characteristics	Route of Exposure	Symptoms of Acute Exposure	Instruments Used to Monitor Contaminant
Total petroleum hydrocarbons	100 (as petroleum distillates)	400 mg/m^3 (as petroleum distillates)	Soil at concentrations greater than Project-specific screening levels	Inhalation, ingestion, dermal contact, eye contact	Irritation of eyes, nose, throat; nausea; dizziness; headache; dry cracked skin	Visual, PID meter
Xylene	100	150	Soil at concentrations greater than Project-specific screening levels	Inhalation, ingestion, percutaneous absorption, and skin and eye contact	Nervous system depression; liver and kidney damage.	PID meter

6. Physical Hazards of Concern ☐ N/A

Hazard	Location	Procedures Used to Monitor Hazard
Moving parts of drill rig, falling and flying objects	Near drill rig	Alert observation of surroundings; minimize time spent near drill rig; no loose clothing; use of safety glasses, hard hat, and steel-toed boots
Vehicles and heavy equipment used at the site	Any area	Alert observation of surroundings, use of brightly colored safety vest
Slips, trips, and falls	Any area	Alert observation of surroundings; chains and other equipment and supplies are covering much of the ground surface
Soil Excavation Machinery	Within swing radius of equipment, proximity to moving parts, and near unsupported excavation	Communicate your actions to the equipment operator. Minimize time spent close to the equipment and the edge of the excavation. Do not enter unsupported excavations more than 4 ft deep.
Forklift Operation	Within swing radius of equipment and proximity to moving parts	Communicate your actions to the equipment operator. Minimize time spent close to the equipment.

7. Work Location Instrument Readings ☐ N/A

Location: _____

Percent O_2: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

Location: _____

Percent O_2: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

Location: _____

Percent O_2: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

Location: _____

Percent O_2: _____ Percent LEL: _____

Radioactivity: _____ PID: _____

FID: _____ Other: _____

Other: _____ Other: _____

Other: _____ Other: _____

8. Hazards Expected In Preparation for Work Assignment ☒ N/A

Describe:

C. PERSONAL PROTECTIVE EQUIPMENT

1. Level of Protection

☐ A ☐ B ☐ C ☒ D

Location/Activity: Drilling of borings. If conditions warrant (based on action levels described in Attachment A), upgrade to Level C PPE.

2. Protective Equipment (specify probable quantity required)

Respirator ☐ N/A

- ☐ SCBA, Airline
- ☐ Full-Face Respirator
- ☒ Half-Face Respirator (Cart. organic vapor) (Only if upgrade to Level C)
- ☐ Escape mask
- ☐ None
- ☒ Other: Hearing protection
- ☐ Other:

Clothing ☐ N/A

- ☐ Fully Encapsulating Suit
- ☐ Chemically Resistant Splash Suit
- ☐ Apron, Specify:
- ☒ Tyvek Coverall (Only if upgrade to Level C)
- ☐ Saranex Coverall
- ☐ Coverall, Specify
- ☐ Other: Work pants/long sleeve shirt or jacket

Head & Eye ☐ N/A

- ☒ Hard Hat
- ☐ Goggles
- ☐ Face Shield
- ☒ Safety Eyeglasses
- ☐ Other:

Hand Protection ☐ N/A

- ☐ Undergloves; Type:
- ☒ Gloves; Type: nitrile
- ☐ Overgloves; Type:
- ☐ None
- ☐ Other:

Foot Protection ☐ N/A

- ☐ Neoprene Safety Boots with Steel Toe/Shank
- ☐ Disposable Overboots
- ☒ Other: Steel-toed boots

3. Monitoring Equipment ☐

☐ CGI	☒ PID
☐ O^2 Meter	☐ FID
☐ Rad Survey	☐ Other
☐ Detector Tubes (optional)	

Type:

D. DECONTAMINATION

PERSONAL DECONTAMINATION

☒ Required ☐ Not Required

If required, describe:
Wash face/hands before breaks and lunch.

EQUIPMENT DECONTAMINATION

☒ Required ☐ Not Required

If required, describe and list equipment:
All non-dedicated equipment needs to be decontaminated between uses and before leaving the project site.

All sampling equipment will be decontaminated using wet decontamination procedures:

- Wash and scrub equipment with Alconox/tap water solution.
- Rinse with tap water.
- Rinse with de-ionized water.
- Repeat entire procedure or any parts of the procedure as necessary.

Down-the-hole equipment will be decontaminated using a hot water, high-pressure steam cleaner.

In addition to the wet decontamination procedures, other measures will be taken to prevent cross-contamination. These measures include: working site from "clean" to "dirty" areas, changing out disposable gloves between each sampling location, using fresh paper towels at each sample location, and maintaining a clean work area.

E. PERSONNEL

	Name	Work Location Title/Task	Medical Current	Fit Test Current
1.	**Paul Raymaker**	**Field Technician, Site Safety Officer**	☒	☒
2.	**Christine Kimmel**	**Health and Safety Officer**	☐	☐
3.	**Tim Syverson**	**Project Manager**	☐	☐
4.	**Kathryn Hartley**	**Task Manager**	☒	☒
5.			☐	☐
6.			☐	☐
7.			☐	☐
8.			☐	☐
9.			☐	☐
10.			☐	☐

Site Safety Coordinator: **Paul Raymaker**

F. ACTIVITIES COVERED UNDER THIS PLAN

Task No.	Description	Preliminary Schedule
011	Drilling/advancement of soil probes, and soil and soil vapor sampling	October 2010

G. SUBCONTRACTOR'S HEALTH AND SAFETY PROGRAM EVALUATION

☐ N/A

Name and Address of Subcontractor: Cascade Drilling
19404 Woodinville Snohomish Rd
Woodinville, WA 98072-8454
(425) 485-8908

EVALUATION CRITERIA

Item	Adequate	Inadequate	Comments
Medical Surveillance Program	☒	☐	
Personal Protective Equipment Availability	☒	☐	
Onsite Monitoring Equipment Availability	☒	☐	
Safe Working Procedures Specification	☒	☐	
Training Protocols	☒	☐	
Ancillary Support Procedures (if any)	☒	☐	
Emergency Procedures	☒	☐	
Evacuation Procedures Contingency Plan	☒	☐	
Decontamination Procedures Equipment	☒	☐	
Decontamination Procedures Personnel	☒	☐	

GENERAL HEALTH AND SAFETY PROGRAM EVALUATION: ☒ Adequate ☐ Inadequate

Additional Comments: Review based on previous experience with contractor and review of contractor health and safety plan

Evaluation Conducted By: Christine Kimmel Date: September 27, 2010

EMERGENCY FACILITIES AND NUMBERS

Hospital: Swedish Medical Center
747 Broadway
Seattle, WA 98122

Telephone: (206) 386-6000

Directions:

Start out heading west on S King St toward Occidental Ave S	< 0.1 miles
Turn RIGHT at 1st Ave S.	0.2 miles
Turn RIGHT at Yesler Way	0.6 miles
Turn LEFT at Broadway	0.5 miles
End at 747 Broadway Seattle, WA 98122-4379, US	
Total Estimated Time:	**6 minutes**
Total Estimated Distance:	**1.4 miles**

Emergency Transportation Systems (Fire, Police, Ambulance) – 911

Emergency Routes – Map (Attachment B)

Emergency Contacts:

Name	Phone Number	Location
Emergency	911	On site
Paul Raymaker	(262) 442-4398 (Cell)	On site
Tim Syverson	(206) 605-9236 (Cell)	Off site
Christine Kimmel	(206) 786-3801 (Cell)	Off site

In the event of an emergency, do the following:

1. Call for help as soon as possible. Call 911. Give the following information:
   - WHERE the emergency is – use cross streets or landmarks
   - PHONE NUMBER you are calling from
   - WHAT HAPPENED – type of injury
   - WHAT is being done for the victim(s)
   - YOU HANG UP LAST – let the person you called hang up first.

2. If the victim can be moved, paramedics will transport to the hospital. If the injury or exposure is not life-threatening, decontaminate the individual first. If decontamination is not feasible, wrap the individual in a blanket or sheet of plastic prior to transport.

HEALTH AND SAFETY PLAN
APPROVAL/SIGN OFF FORMAT

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Paul Raymaker Site Safety Coordinator	Signature	Date
Christine Kimmel Landau Health and Safety Manager	Signature	September 27, 2010 Date
Tim Syverson Project Manager	Signature	Date

Personnel Health and Safety Briefing Conducted By:

Paul Raymaker Name	Signature	Date

ATTACHMENT A

ACTION LEVELS FOR RESPIRATORY PROTECTION

Monitoring Parameter	Reading	Level of Protection
Organic Vapors	PID/detection tube reading >15 ppm in breathing zone for more than 1 minute	Establish 25-ft diameter exclusion zone around work area and evacuate or upgrade to Level C PPE. Establish contamination reduction zone with waste containers and decontamination fluids provided for personal decontamination.
	PID/detection tube reading >75 ppm in breathing zone for more than 1 minute	Evacuate area and move upwind to allow vapors to dissipate; may resume work after vapors dissipate or upgrade to a full-face respirator with organic vapor/HEPA cartridge.
	PID/detection tube reading >150 ppm in breathing zone for more than 1 minute OR >300ppm for momentary peak	Evacuate area and contact H&S Manager
Petroleum-Contaminated Particulates	Visible Dust (with dust suppression utilized)	Evacuate area and upgrade to Level C – half face respirator with organic vapor/HEPA combination cartridges

ATTACHMENT B

EMERGENCY ROUTE TO SWEDISH MEDICAL CENTER
747 BROADWAY, SEATTLE, WASHINGTON
(206) 386-6000