DEVELOPMENT SERVICES DEPARTMENT
ENVIRONMENTAL COORDINATOR
450 110th Ave NE., P.O. BOX 90012
BELLEVUE, WA 98009-9012

OPTIONAL DETERMINATION OF NON-SIGNIFICANCE (DNS) NOTICE MATERIALS

The attached materials are being sent to you pursuant to the requirements for the Optional DNS Process (WAC 197-11-355). A DNS on the attached proposal is likely. This may be the only opportunity to comment on environmental impacts of the proposal. Mitigation measures from standard codes will apply. Project review may require mitigation regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for this proposal may be obtained upon request.

File No. 17-114331-LO

Project Name/Address: COBU – SE 41st St Storm Drain Culvert Rehabilitation near 17124 SE 41st St.

Planner: Reilly Pittman

Phone Number: 425-452-4350

Minimum Comment Period: August 3, 2017

Materials included in this Notice:

☒ Blue Bulletin
☒ Checklist
☒ Vicinity Map
☒ Plans
☒ Other: Geotech Report, Project Narrative

OTHERS TO RECEIVE THIS DOCUMENT:
☒ State Department of Fish and Wildlife / Sterwart.Reinbold@dfw.gov; Christa.Heller@dfw.wa.gov;
☒ State Department of Ecology, Shoreline Planner N.W. Region / Jobu461@ecy.wa.gov; sepaunit@ecy.wa.gov
☒ Army Corps of Engineers Susan.M.Powell@nws02.usace.army.mil
☒ Attorney General ecyolyef@atg.wa.gov
☒ Muckleshoot Indian Tribe Karen.Walter@muckleshoot.nsn.us; Fisheries.fileroom@muckleshoot.nsn.us

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

***Instructions for applicants*:**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:
Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background

1. Name of proposed project, if applicable:

   SE 41st Street Culvert Repair

2. Name of applicant:

   City of Bellevue Utilities Department

RP

3. Address and phone number of applicant and contact person:

Vanaja Raja, PE
City of Bellevue, Utilities
425 452 4881
450 110th Ave NE
Bellevue, WA 98004
vrajah@bellevue.gov

4. Date checklist prepared:

April 2017

5. Agency requesting checklist:

City of Bellevue (COB) (lead agency)

6. Proposed timing or schedule (including phasing, if applicable):

Construction – Summer 2017

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

To date, the following environmental information has been obtained:

- Research performed by CHS Engineers, LLC (CHS) through King County iMap of critical areas revealed the residential lot to the east of the project (parcel no. 2607800322) has a noted steep slope.
- Coordination with the Washington State Department of Fish and Wildlife on stream classification. See attached Pre-Design Report.

It is not anticipated that the project will require environmental studies in addition to the conditions of the permits noted below.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None known.

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10. List any government approvals or permits that will be needed for your proposal, if known.

- Hydraulic Project Approval (HPA) – Washington State Department of Fish and Wildlife
- Critical Area Land Use Permit (CALUP) – City of Bellevue
- Clearing and Grading Permit – City of Bellevue
- Right of Way Permit – City of Bellevue

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The project will consist of sliplining of the existing 93 LF 48" CMP culvert that crosses beneath SE 41st Street with a 42" HDPE culvert, grouted in place with outlet (and possibly inlet) protection structures as well as downstream energy dissipation.

Portions of the existing culvert's invert are corroded through allowing conveyed stormwater to erode the supporting earth beneath. The unsatisfactory conditions were brought to the attention of the COB by adjacent property owners concerned over the amount of visible erosion.

See attached Predesign Report and 65% Plans.

SEPA review is triggered by the energy dissipation structure and disturbance in the stream buffer. Slip-lining of the culvert was separately permitted.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project will be located directly westerly adjacent to 17124 SE 41st Street, Bellevue, WA.

See Predesign Report or Plans (attached) for site map.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

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Steeper than 100% - nearly vertical eroded soil bank to the east of the existing outlet.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

As a requirement of the COB CALUP, a visual geotechnical evaluation of the adjacent stream banks will be performed by a registered professional.

A review of the US Department of Agriculture's interactive soil map indicates the area to be composed of gravelly sandy loam, gravelly course sand and silt loam. Visual field observations confirm soils similar to those noted by the USDA.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Yes. Erosion of the streambanks to the east of the outlet is clearly evident.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Three man and four man rock will be placed for protection against adjacent streambank erosion at the culver outlet. Approx. 40 CY

Crushed rock will be placed as backfill for the outlet protection structure. This same crushed rock will be used to level the void between 6" below the top of the outlet protection rock and the existing upslope (remaining 6" to top of outlet protection rock will be filled with topsoil to facilitate natural vegetation growth). The backfill and leveling will replace much of the previously eroded soil. Approx. 40 CY

An apron of Class 6 rounded rip rap will be installed at the culvert outlet. The apron will act as an energy dissipater which will help prevent erosion further downstream. Appox. 40 CY

Excavation for rip rap apron installation will be required.

Total installation will cover approximately 600 sq ft.

Material will come from local suppliers

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

As with most construction projects, it is possible minor erosion due to construction activities could occur. This erosion, however, will be minimal as construction operations will adhere to the conditions set by the applicable permits obtained and the Construction Storm Water Pollution Prevention Plan and erosion control best management practices as described in the Storm Water Management Manual for Western Washington.

The completed project intends to mitigate existing on-site eroded stream banks and protect against future erosion of these streambanks within the project extents via outfall armoring. Downstream erosion will also be reduced as a result of the stream's energy dissipation from the installed outfall apron.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

No additional impervious surface as a result of this project is expected – sliplined culvert

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

All measures required by the applicable permits obtained for the project, the Construction Storm Water Pollution Prevention Plan and erosion control best management practices as described in the Storm Water Management Manual for Western Washington. The Contractor will be required to schedule operations such that the work is performed in dry conditions.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

As with most construction projects, emissions to the air from equipment exhaust will occur during construction. No emissions will be a result of the operation and maintenance of the proposed 42" HDPE culvert. The Contractor will be required to limit emissions as required by the appropriate regulatory agencies and to control dust emission so as not to damage property or vegetation or create a nuisance for the public.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

None that we are aware of.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

The Contractor will be required to control dust during construction as required by the appropriate regulatory agencies.

3. **Water**

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes. The culvert to be repaired acts as a conveyance system for a Type F unnamed drainage course tributary to Lake Sammamish. The existing 48" CMP culvert is WDFW reference #996964. The draingage course will be treated as non-fish bearing under WAC 22-16-031 as slopes downstream of the culvert range up to 30%. See attached Predesign Report.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Yes. The project will require work within the previously mentioned unnamed drainage course. If required by governing agencies or deemed necessary during design or construction, a temporary stream bypass system will be installed. Work on the project is planned during the dry season of 2017 and a bypass system may not be necessary.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

See B.1.e.

Fill described above will replace the material that has been washed downstream due to erosion of the adjacent streambanks as well as provide protection against future streambank and downstream erosion.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The drainage course may need to be diverted through a temporary covered piping bypass system during construction. Work on the project is planned during the dry season of 2017 and a bypass system may not be necessary. No withdrawls are expected.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Location was not displayed in a 100-year floodplain as reported by FEMA and King County iMap.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The runoff produced during the work will flow into the drainage course for the culvert to be repaired. The source of this runoff is a combination of uphill runoff and on-site runoff.

Construction operations will adhere to the conditions set by the applicable permits obtained for the project, the Construction Storm Water Pollution Prevention Plan and storm water quality best management practices as described in the Storm Water Management Manual for Western Washington.

The finished project will not result in an appreciable increased amount of impervious surface area and current drainage patterns will not be altered.

Stormwater runoff impacting the construction zone will be intercepted for sedimentation control prior to release to the stormwater system.

The project is proposed to take place during the dry season of 2017.

2) Could waste materials enter ground or surface waters? If so, generally describe.

As with most construction projects, it is possible small amounts of fuel and oil from equipment and miscellaneous construction fluid could spill during construction operations. However, the occurrence of these spills will be minimized as construction operations will adhere to all spill prevention requirements set by the applicable permits obtained for the project and typically observed spill prevention best management practices.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The drainage course may need to be diverted through a temporary bypass system during construction. Work on the project is planned during the dry season of 2017 and a bypass system may not be necessary. The finished project will not alter current drainage patterns.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Construction operations, including the possible bypass system, will adhere to the conditions set by the applicable permits obtained for the project, the Construction Storm Water Pollution Prevention Plan and storm water quality best management practices as described in the Storm Water Management Manual for Western Washington.

The construction documents will require the Contractor to ensure that sediment laden water does not enter the natural drainage system.

4. **Plants**

a. Check the types of vegetation found on the site:

__X__deciduous tree: alder, maple, aspen, other
__X__evergreen tree: fir, cedar, pine, other
__X__shrubs
__X__grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
__X__other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

All vegetation disturbed as a result of the project will be restored as close as possible to its current condition - or the conditions required by the applicable government permits.

Ground cover vegetation disturbance as a result of equipment operation is expected but will be minimized as much as possible. The expected total area of these low-growing vegetation is approximately 400 square feet.

Vegetation clearing is not expected but may be required on either side of the culvert to facilitate installation operations of the proposed slipline. Tree cutting is not expected to be required.

Vegetation disturbance will adhere to the conditions set by the applicable permits obtained for the project.

c. List threatened and endangered species known to be on or near the site.

Due to a high level of prior disturbances in the area to be impacted as a result of road and residential construction, habitation by threatened or endangered plant species is unlikely to occur on the construction site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Avoidance: The following measures will be incorporated into the construction plans to avoid impacts to the existing plant communities and other wildlife habitat features.

- The project will be planned to limit construction impact to within existing ROW, public access easements and on land owned by the City of Bellevue Parks Department.
- Large trees and native plants of significance will be protected during construction.

Reduction of Unavoidable Impacts: The following measures will be incorporated into the construction plans to reduce unavoidable impacts to existing plant communities and other wildlife habitat features.

- Any topsoil removed as necessary or incidental to installation will be stockpiled separately for short periods of time and replaced above the subsoil fill. This approach will allow for the survival of plant regenerative parts (roots, stems, rhizomes and seeds) present in the existing topsoil.
- Silt fences and straw wattles will be placed to avoid erosion and sedimentation of plant communities.

Compensatory Mitigation Measures: The following measures will be incorporated into the construction plans to compensate for unavoidable impacts to existing plant communities and other wildlife habitat features.

- Disturbed areas will be hydroseeded with a seed mixture containing native grasses and forbs.

All above described measures are contingent upon their conformance to the required conditions set by the applicable permits obtained for the project.

e. List all noxious weeds and invasive species known to be on or near the site.

No noxious weeds have been surveyed on site but a 2014 survery indicated the existence of Tansy Ragwort in the Interstate 90 WSDOT ROW approximately 0.25 miles east of the site.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

The existing natural stream gradient at location is 21 to 26 percent. Cutthroat have been documented in lower reaches of the stream, near Lake Sammamish but the presence of fish is unlikely given the grades ~~at the~~ project location.

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other

Animal presence has not been studied by any party involved with the project; however, the project's construction will take place within a private drive with public access easement and on land owned by the COB Parks Department. Although it is possible for any animal that has been previously observed within the COB limits to be observed on site during construction, it is not anticipated that the project will either temporarily nor permanently disturb nor displace any animal species.

b. List any threatened and endangered species known to be on or near the site.

Review of the Washington Department of Fish and Wildlife Conservation website - none known.

c. Is the site part of a migration route? If so, explain.

The site is within the Pacific Flyway, the north-south migration route of birds along the Pacific coastline.

d. Proposed measures to preserve or enhance wildlife, if any:

Erosion control, vegetation conservation and spill control measures.

e. List any invasive animal species known to be on or near the site.

None known.

6. **Energy and Natural Resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

None – stormwater conveyance culvert.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

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No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None.

7. **Environmental Health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

The main risk would occur during construction from machinery and construction practices. This could include spills of small amounts of oil and gas because of improper filling and/or other machinery failures. Construction operations for the project will adhere to all spill prevention requirements set by the applicable permits and typically observed spill prevention best management practices.

1) Describe any known or possible contamination at the site from present or past uses.

None known.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None known.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

No hazardous material will be produced as a result of the finished project. During construction, as with most construction projects, small amounts of fuel and oil for equipment and miscellaneous construction fluid will be stored on site. Construction operations for the project will adhere to all spill prevention requirements set by the applicable permits and typically observed spill prevention best management practices.

4) Describe special emergency services that might be required.

All public emergency services: Ambulance, Fire, Police
Gas and Power: Emergency shut-off
Spill clean-up services during construction

5) Proposed measures to reduce or control environmental health hazards, if any:

Construction will adhere to all requirements set by the applicable permits obtained for the project and typically observed spill prevention best management practices.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Traffic noise from Instertate 90 WSDOT ROW

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

No long term noise will be created as a result of the project. Noise from truck traffic, equipment operation and other miscellaneous construction noises will be produced during construction and will be in compliance with the COB noise ordinance. The hours of work will be set by the COB permit(s).

3) Proposed measures to reduce or control noise impacts, if any:

Construction will be limited to daylight hours set by the COB and equipment shall be properly maintained.

Noise regulated by BCC 9.18.

8. **Land and Shoreline Use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Transportation and access – private drive with public access easement
Stormwater conveyance – COB Parks Department owned land

The project will not affect current land use.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

No.

c. Describe any structures on the site.

RP

None.

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

Private drive with public access easement and COB Parks Department (R-3.5) **R-5**

f. What is the current comprehensive plan designation of the site?

Private drive with public access easement and COB Parks Department (R-3.5)
SF-H, Single-Family High Density

g. If applicable, what is the current shoreline master program designation of the site?

N/A

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Location was not displayed as a steep slope as reported by King County iMap. The property to the east of the project's site was identified to have a steep slope present. In addition, COB GIS data includes only the upstream and immediately downstream portions of the stream in relation to the project site as having steep slopes present.

i. Approximately how many people would reside or work in the completed project?

None.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

None.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The project's intent is to repair to existing on-site facilities to maintain it's current land use.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

N/A

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

None.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

N/A – Below grade culvert

b. What views in the immediate vicinity would be altered or obstructed?

None.

b. Proposed measures to reduce or control aesthetic impacts, if any:

None.

11. **Light and Glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Some additional light may occur temporarily due to construction equipment and operations. No permanent increase to light or glare will occur.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

N/A

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

N/A

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?

None.

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

N/A

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe.

No.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

There are no known landmarks or evidence of historic, archaeological, scientific or cultural importance known to be on the site. Work will occur within previously disturbed areas.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

The project will occur in the area of previously disturbed earth and minimal excavation is planned. Minimal excavations to facilitate sliplining operations may occur and will be incidental.

Construction operations will adhere to the conditions set by the applicable permits obtained for the project and any applicable cultural resource preservation plans required by the governing agencies.

Coordination w/ Washington State Department of Fish and Wildlife determined the stream to be nonfish-bearing.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Construction operations will adhere to the conditions set by the applicable permits obtained for the project and any applicable cultural resource preservation plans required by the governing agencies. Construction will result in stabilization of streambank erosion.

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

SE 41st Street – See attached Predesign Report and 65% Plans.

Public access of above noted street will be maintained in accordance with the conditions set by the applicable COB permits obtained for the project.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

No.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

None.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

None more than current practice.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

No.

h. Proposed measures to reduce or control transportation impacts, if any:

Construction operations will adhere to the conditions set by the applicable permits obtained from the COB. Residential access will be maintained.

15. **Public Services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Construction operations will adhere to the conditions set by the applicable permits obtained from the COB. Residential access shall be maintained.

16. **Utilities**

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The project will consist of sliplining of the existing storm water culvert that crosses beneath SE 41st Street. Outlet protection and downstream energy dissipation will be provided. Construction will include installing a 42" pipe inside an exsiting CMP culvert, temporary erosion and sedimentation control, temporary stream flow bypassing and surface restoration.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee Tucker Collins

Position and Agency/Organization Design Engineer CHS Engineers, LLC
City Consultant

Date Submitted: 05/31/17

CHS ENGINEERS

MEMORANDUM

To: Reilly Pittman, Senior Planner, City of Bellevue
c: Vanaja Rajah, PE, Senior Utilities Engineer, City of Bellevue

From: Scott Christensen, PE, Principal
CHS Engineers, LLC

Date: May 31, 2017

Subject: Critical Area Land Use Permit Narrative
SE 41st Street Culvert Repair

At your direction to include in the City of Bellevue's Critical Area Land Use Permit submittal, CHS has prepared the following narrative for the subject project. The intent of this narrative is to demonstrate that the proposed outfall protection and stabilization is the best alternative with the least amount of impact based on the criteria in LUC 20.25H.055.C.2.a and LUC 20.25H.055.M and to demonstrate the projects conformance with LUC 20.25H.055.C.2.b, LUC 20.25H.080 and LUC 20.25H.125.

The proposal for work in the critical area includes the installation of a rock wall for outfall protection and a rip rap apron for energy dissipation. These improvements are intended to replace the previously-eroded soils from the existing culvert outfall and adjacent stream banks and provide protection from further outfall and downstream erosion. The completed project will enhance the function of the facility and the on-site and downstream critical areas.

The existing culvert and outfall convey stormwater beneath the existing residential access street (SE 41st Street). Relocation of the existing infrastructure to outside of the critical area is not feasible.

The proposed rock wall bordering the rip rap apron serves two primary functions:

1. Replace the previously-eroded stream bank and headwall at the outfall
2. Provide protection against future stream bank and headwall erosion

Alternatives and corresponding disadvantages to replacing the eroded material and providing stream bank armoring with large rocks (3 to 4 man) are as follows:

1. Replace with smaller import fill aggregates
   a. Small-sized import fill aggregates (including rip rap) would likely be washed downstream as is happening with the existing on-site soil. Small-sized fill would not fulfill the necessary erosion protection functions.
2. Replace with gabion baskets

   a. Coordination with Washington Department of Fish and Wildlife determined that gabion baskets are no longer a WDFW approved stream bank or outfall protection method.
3. Replace with fill and a manufactured retaining system
   a. Manufactured face-plated MSE walls, spray-on coatings, soil nails/tie-backs and associated slope plating, railroad ties, etc. would not provide as much of a 'natural look' as locally-mined import boulders.
   b. Additionally, the manufactured systems described would have approximately the same amount of impact to the critical area (if not more) and may not provide the same amount of erosion protection.

Temporary disturbance due to installation of each alternative would be approximately equal as the same area of work will be utilized; however, the proposed rock wall provides a better opportunity for permanent disturbance mitigation. The rock wall is proposed to be backfilled with permeable drainage aggregates, leveled, topped with 6" of topsoil and hydroseeded with native vegetation. The quantity of native vegetation installed with the rock wall could not be achieved with any of the other alternatives (apart from the MSE wall). This native vegetation, once mature, will provide a 'natural look' as well as increase backfill soil stability; furthering the function of the facility.

An additional benefit to the proposed rock wall is slope stability. Avoidance measures for slope stabilization such as vegetation enhancement, upland drainage control and protective wall installation outside of the critical area are not technically feasible. The stream bank slopes are too steep (>100% in some locations) for vegetation to thrive and provide slope stability. Upland drainage control is not feasible as the inlet to the culvert to be repaired is in WSDOT ROW. And protective walls installed outside the critical area would not effectively protect the slope from erosion. The rock wall proposal is considered a 'soft stabilization' measure by the City of Bellevue LUC.

The proposed rip rap apron serves three primary functions:
1. Replace the previously-eroded stream bed at the outfall
2. Provide protection against future stream bed erosion
3. Provide energy dissipation for protection against downstream erosion

Alternatives and corresponding disadvantages to replacing the eroded material and providing stream bed protection and energy dissipation with a rip rap apron are as follows:
1. Replace with grout splash pad and embedded or extruded energy dissipaters
   a. Although nearly equal in effectively serving the three functions and having similar impacts to the critical area, grout with embedded or extruded material would not provide as much of a 'natural look' as a locally-mined import rip rap apron.
2. Replace with manufactured energy dissipaters

a. Again, manufactured energy dissipaters, such as precast concrete jacks, would be nearly equal in effectiveness and impact but would not provide for a 'natural look'.

Temporary and permanent disturbance due to installation of the rip rap apron compared to its alternatives would be approximately equal as the same area of work will be utilized.

The area of impact and disturbance to the critical area has been minimized while still allowing for the facility to function optimally. The rock wall borders the rip rap apron to provide stream bank protection, thus, the area of impact is ultimately determined by the footprint of the apron. The apron's design is based on the standards of the Federal Highway Administration's Hydraulic Engineering Circular, No. 14, Third Edition – Hydraulic Design of Energy Dissipaters for Culverts and Channels.

The rock wall will minimize topographic modification as it will maintain the nearly-vertical slope of the existing stream banks. It will also provide erosion protection to preserve the higher elevations of the stream bank from slides.

Failing to provide outfall protection would put the City at risk for costs associated with the eroding stream banks and the adjacent and downstream residences.

Please contact us if you require additional information.

CITY OF BELLEVUE
UTILITIES DEPARTMENT

VASA SE 41ST ST 48"
CULVERT REPAIR
BU NUMBER: 281690102

MAYOR
JOHN STOKES

DEPUTY MAYOR
JOHN CHELMINIAK

CITY MANAGER
BRAD MIYAKE

UTILITIES DIRECTOR
NAV OTAL

CITY COUNCIL
CONRAD LEE
JENNIFER ROBERTSON
LYNNE ROBINSON
ERNIE SIMAS
KEVIN WALLACE

SHEET INDEX

COVER
2. NOTES LEGEND
3. PLAN AND PROFILE
4. OUTLET PROTECTION PLAN AND SECTIONS
5. CSWPP, TREE PROTECTION & TEMPORARY BYPASS

BID NO. 17062
C.I.P. D-64

CHS ENGINEERS

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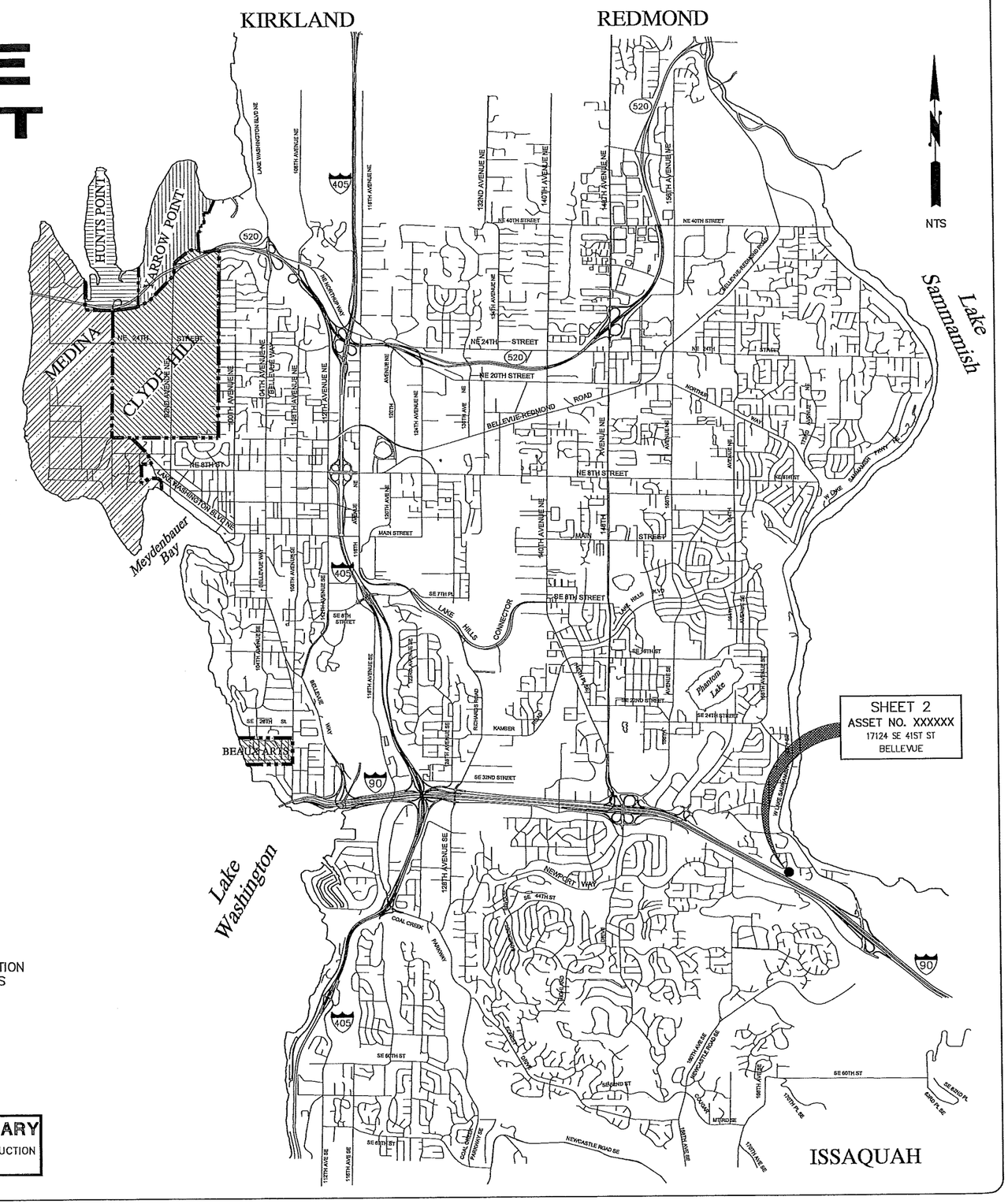
5-23-17



USER: Scott Stcherbinin PLOTTING DATE: 5/23/2017 FILE LOCATION: K:\22-Bellevue\2016\221601-Trenchless On-call Utility Design\Task C - SE 41st Design\CAD\221601 - 2016 CULVERT REPAIR.dwg

CITY OF BELLEVUE UTILITIES DEPARTMENT STORM DRAINAGE GENERAL NOTES

(1) ALL WORK SHALL CONFORM TO THE 2017 EDITION OF THE CITY OF BELLEVUE UTILITIES DEPARTMENT ENGINEERING STANDARDS ~~AND THE DEVELOPER EXTENSION AGREEMENT.~~

~~(2) STORM PIPE SHALL BE PVC CONFORMING TO ASTM D-3034 SDR 35 (4"-15") OR ASTM F-679 (18"-27"). BEDDING AND BACKFILL SHALL BE AS SHOWN IN THE STANDARD DETAILS.~~

(3) THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE EXCAVATOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN, AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN. IMMEDIATELY NOTIFY THE ENGINEER IF A CONFLICT EXISTS.

~~(4) THE FOOTING DRAINAGE SYSTEM AND THE ROOF DOWNSPOUT SYSTEM SHALL NOT BE INTERCONNECTED AND SHALL SEPARATELY CONVEY COLLECTED FLOWS TO THE CONVEYANCE SYSTEM OR TO ON-SITE STORMWATER FACILITIES.~~

(5) PROVIDE AND MAINTAIN TEMPORARY SEDIMENTATION COLLECTION FACILITIES TO ENSURE THAT SEDIMENT OR OTHER HAZARDOUS MATERIALS DO NOT ENTER THE STORM DRAINAGE SYSTEM IN ACCORDANCE WITH THE SITES APPROVED CSWPPP. FOR ALL CONSTRUCTION DURING THE RAINY SEASON, DOWNHILL BASINS AND INLETS MUST BE PROTECTED WITH CATCH BASIN INSERTS. SIMPLY PLACING FILTER FABRIC UNDER THE GRATE IS NOT ACCEPTABLE.

(6) PRIOR TO FINAL INSPECTION AND ACCEPTANCE OF STORM DRAINAGE WORK, PIPES AND STORM DRAIN STRUCTURES SHALL BE CLEANED AND FLUSHED. ANY OBSTRUCTIONS TO FLOW WITHIN THE STORM DRAIN SYSTEM, (SUCH AS RUBBLE, MORTAR AND WEDGED DEBRIS), SHALL BE REMOVED AT THE NEAREST STRUCTURE. WASH WATER OF ANY SORT SHALL NOT BE DISCHARGED TO THE STORM DRAIN SYSTEM OR SURFACE WATERS. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL REMOVE CATCH BASIN INSERTS.

~~(7) ENDS OF EACH STORM DRAIN STUB AT THE PROPERTY LINE SHALL BE CAPPED AND LOCATED WITH AN 8' LONG 2" X 4" BOARD, EMBEDDED TO THE STUB CAP AND EXTENDING AT LEAST 3 FEET ABOVE GRADE, AND MARKED PERMANENTLY "STORM". A COPPER 12 GA. LOCATE WIRE FIRMLY ATTACHED. THE STUB DEPTH SHALL BE INDICATED ON THE MARKER.~~

~~(8) ALL GRATES IN ROADWAYS SHALL BE DUCTILE IRON, BOLT LOCKING, VANED GRATES PER THE STANDARD DETAILS. STRUCTURES IN TRAFFIC LANES OUTSIDE OF THE CURBLINE WHICH DO NOT COLLECT RUNOFF SHALL BE FITTED WITH ROUND, BOLT LOCKING SOLID COVERS. OFF-STREET STRUCTURES WHICH DO NOT COLLECT RUNOFF SHALL BE FITTED WITH BOLT-LOCKING SOLID COVERS.~~

~~(9) VEGETATION/LANDSCAPING IN THE DETENTION POND, BIORETENTION FACILITY, VEGETATED ROOF AND/OR DRAINAGE SWALE(S) ARE AN INTEGRAL PART OF THE RUNOFF TREATMENT SYSTEM FOR THE PROJECT. SUCH DRAINAGE FACILITIES WILL NOT BE ACCEPTED UNTIL PLANTINGS ARE ESTABLISHED.~~

~~(10) ALL NEW MANHOLES SHALL HAVE A MINIMUM INSIDE DIAMETER OF 48" AND SHALL CONFORM TO THE STANDARD DETAILS. ALL NEW CATCH BASINS SHALL CONFORM TO THE STANDARD DETAILS.~~

~~(11) SIDE STORM STATIONS ARE REFERENCED FROM NEAREST DOWNSTREAM MANHOLE/CATCH BASIN.~~

(12) ALL TESTING AND CONNECTIONS TO EXISTING MAINS SHALL BE DONE IN THE PRESENCE OF A REPRESENTATIVE OF THE CITY OF BELLEVUE UTILITIES DEPARTMENT.

~~(13) ALL TRENCHES SHALL BE COMPACTED, AND HOT MIX ASPHALT IN PLACE IN PAVED AREAS, PRIOR TO TESTING STORM LINES FOR ACCEPTANCE.~~

(14) ALL PUBLIC STORM DRAINS SHALL BE AIR TESTED AND HAVE A VIDEO INSPECTION PERFORMED PRIOR TO ACCEPTANCE (SEE #23 BELOW). ~~STORM MAIN CONSTRUCTED WITH FLEXIBLE PIPE SHALL BE DEFLECTION TESTED WITH A MANDREL PRIOR TO ACCEPTANCE.~~

~~(15) STORM STUBS SHALL BE TESTED FOR ACCEPTANCE AT THE SAME TIME THE MAIN STORM IS TESTED.~~

~~(16) ALL MANHOLES/CATCH BASINS IN UNPAVED AREAS SHALL INCLUDE A CONCRETE SEAL AROUND ADJUSTMENT RINGS PER STANDARD DETAILS.~~

~~(17) ALL STORM MAIN EXTENSIONS WITHIN THE PUBLIC RIGHT-OF-WAY OR IN EASEMENTS MUST BE "STAKED" BY A SURVEYOR LICENSED IN WASHINGTON STATE FOR "LINE AND GRADE" AND CUT SHEETS PROVIDED TO THE ENGINEER, PRIOR TO STARTING CONSTRUCTION.~~

(18) THE CONTRACTOR SHALL USE A VACUUM STREET SWEEPER TO REMOVE DUST AND DEBRIS FROM PAVEMENT AREAS AS DIRECTED BY THE ENGINEER. FLUSHING OF STREETS SHALL NOT BE PERMITTED WITHOUT PRIOR CITY APPROVAL.

~~(19) STORM DRAINAGE MAINLINES, STUBS AND FITTINGS SHALL BE CONSTRUCTED USING THE SAME PIPE MATERIAL AND MANUFACTURER. CONNECTIONS BETWEEN STUBS AND THE MAINLINE WILL BE MADE WITH A TEE FITTING. TEE FITTING SHALL BE FROM SAME MANUFACTURER AS PIPE. CUT-IN CONNECTIONS ARE ONLY ALLOWED WHEN CONNECTING A NEW STUB TO AN EXISTING MAINLINE.~~

~~(20) MANHOLES, CATCH BASINS AND VAULTS ARE CONSIDERED TO BE PERMIT REQUIRED CONFINED SPACES. ENTRY INTO THESE SPACES SHALL BE IN ACCORDANCE WITH CHAPTER 296-809 WAC.~~

(21) PLACEMENT OF SURFACE APPURTENANCES (MH LIDS, VALVE LIDS, ETC) IN TIRE TRACKS OF TRAFFIC LANES SHALL BE AVOIDED WHENEVER POSSIBLE.

(22) CALL 1-800-424-5555, OR 8-1-1, 72 HOURS BEFORE CONSTRUCTION FOR UTILITY LOCATES.

(23) THE CONTRACTOR SHALL PERFORM A VIDEO INSPECTION AND PROVIDE A DVD OF THE STORM PIPE INTERIOR FOR THE CITY'S REVIEW. THE VIDEO SHALL PROVIDE A MINIMUM OF 14 LINES PER MILLIMETER RESOLUTION AND COVER THE ENTIRE LENGTH OF THE APPLICABLE PIPE. THE CAMERA SHALL BE MOVED THROUGH THE PIPE AT A UNIFORM RATE (30 FT/MIN), STOPPING WHEN NECESSARY TO ENSURE PROPER DOCUMENTATION OF THE PIPE CONDITION. THE VIDEO SHALL BE TAKEN AFTER INSTALLATION AND CLEANING TO INSURE THAT NO DEFECTS EXIST. THE PROJECT WILL NOT BE ACCEPTED UNTIL ALL DEFECTS HAVE BEEN REPAIRED.

~~(24) CLEARLY LABEL PUBLIC AND PRIVATE SYSTEMS ON THE PLANS. PRIVATE SYSTEMS SHALL BE MARKED "PRIVATE" AND SHALL BE MAINTAINED BY THE PROPERTY OWNER(S).~~

~~(25) ALL CONCRETE STRUCTURES (VAULTS, CATCH BASINS, MANHOLES, OIL/WATER SEPARATORS, ETC.) SHALL BE VACUUM TESTED.~~

~~(26) MANHOLES, CATCH BASINS AND INLETS IN EASEMENTS SHALL BE CONSTRUCTED TO PROVIDE A STABLE, LEVEL GRADE FOR A MINIMUM RADIUS OF 2.5 FEET AROUND THE CENTER OF THE ACCESS OPENING TO ACCOMMODATE CONFINED SPACE ENTRY EQUIPMENT.~~

~~(27) TOPS OF MANHOLES/ CATCH BASINS WITHIN PUBLIC RIGHT-OF-WAY SHALL NOT BE ADJUSTED TO FINAL GRADE UNTIL AFTER PAVING.~~

~~(28) CONTRACTOR SHALL ADJUST ALL MANHOLE/ CATCH BASIN RIMS TO FLUSH WITH FINAL FINISHED GRADES, UNLESS OTHERWISE SHOWN.~~

(29) CONTRACTOR SHALL INSTALL, AT ALL CONNECTIONS TO EXISTING DOWNSTREAM MANHOLES/CATCH BASINS, SCREENS OR PLUGS TO PREVENT FOREIGN MATERIALS FROM ENTERING EXISTING STORM DRAINAGE SYSTEM. SCREENS OR PLUGS SHALL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE CONSTRUCTION AND SHALL BE REMOVED ALONG WITH COLLECTED DEBRIS AT THE TIME OF FINAL INSPECTION AND IN THE PRESENCE OF A REPRESENTATIVE OF THE CITY OF BELLEVUE UTILITIES DEPARTMENT.

(30) SURFACE RESTORATION OF EXISTING ASPHALT PAVEMENT SHALL BE AS REQUIRED BY THE RIGHT-OF-WAY USE PERMIT.

~~(31) THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF FIVE FEET (5') HORIZONTAL SEPARATION BETWEEN ALL WATER AND STORM DRAINAGE LINES. ANY CONFLICT SHALL BE REPORTED TO THE UTILITY AND THE DEVELOPER'S ENGINEER PRIOR TO CONSTRUCTION.~~

(32) IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT NO CONFLICTS EXIST BETWEEN STORM DRAINAGE LINES AND PROPOSED OR EXISTING UTILITIES PRIOR TO CONSTRUCTION.

~~(33) BEFORE COMMENCEMENT OF TRENCHING, THE CONTRACTOR SHALL PROVIDE FILTER FABRIC FOR ALL DOWNHILL STORM DRAIN INLETS AND CATCH BASINS, WHICH WILL RECEIVE RUNOFF FROM THE PROJECT SITE. THE CONTRACTOR SHALL PERIODICALLY INSPECT THE CONDITION OF ALL FILTER FABRIC AND REPLACE AS NECESSARY.~~

~~(34) MINIMUM COVER OVER STORM DRAINAGE PIPE SHALL BE 2 FEET, UNLESS OTHERWISE SHOWN.~~

~~(35) AVOID CROSSING WATER OR SEWER MAINS AT HIGHLY ACUTE ANGLES. THE SMALLEST ANGLE MEASURE BETWEEN UTILITIES SHOULD BE 45 DEGREES.~~

~~(36) AT POINTS WHERE EXISTING THRUST BLOCKING IS FOUND, MINIMUM CLEARANCE BETWEEN CONCRETE BLOCKING AND OTHER BURIED UTILITIES OR STRUCTURES SHALL BE 5 FEET.~~

(37) WHEN WORK IS TO OCCUR IN EASEMENTS, THE CONTRACTOR SHALL NOTIFY THE EASEMENT GRANTOR AND BELLEVUE UTILITIES IN WRITING A MINIMUM OF 48 HOURS IN ADVANCE OF BEGINNING WORK (NOT INCLUDING WEEKENDS OR HOLIDAYS). FAILURE TO NOTIFY GRANTOR AND BELLEVUE UTILITIES WILL RESULT IN A STOP WORK ORDER BEING POSTED UNTIL THE MATTER IS RESOLVED TO THE SATISFACTION OF BELLEVUE UTILITIES. A WRITTEN RELEASE FROM THE EASEMENT GRANTOR SHALL BE FURNISHED TO THE UTILITIES INSPECTOR PRIOR TO PERMIT SIGNOFF.

(38) THE CONTRACTOR SHALL RESTORE THE RIGHT-OF-WAY AND EXISTING PUBLIC STORM DRAINAGE EASEMENT(S) AFTER CONSTRUCTION TO A CONDITION EQUAL OR BETTER THAN CONDITION PRIOR TO ENTRY. THE CONTRACTOR SHALL FURNISH A SIGNED RELEASE FROM ALL AFFECTED PROPERTY OWNERS AFTER RESTORATION HAS BEEN COMPLETED.

~~(39) WHERE A NEW UTILITY LINE CROSSES BELOW AN EXISTING AC MAIN, THE AC PIPE SHALL BE REPLACED WITH DI PIPE TO 3 FEET PAST EACH SIDE OF THE TRENCH AS SHOWN ON STANDARD DETAIL W-8. ALTERNATIVELY, WHERE DIRECTED BY THE UTILITY, THE TRENCH SHALL BE BACKFILLED WITH CONTROLLED DENSITY FILL (CDF, AKA FLOWABLE FILL) FROM BOTTOM OF TRENCH TO BOTTOM OF AC MAIN.~~

DATUM NAVD 88

Know what's below. Call before you dig.

PRELIMINARY
NOT FOR CONSTRUCTION
5-23-17

THIS DRAWING HAS BEEN REDUCED TO 1/2 SCALE

TESC NOTES

ANY EXCAVATED MATERIAL REMOVED FROM THE CONSTRUCTION SITE AND DEPOSITED ON PROPERTY WITHIN THE CITY LIMITS MUST BE DONE IN COMPLIANCE WITH A VALID FILL PERMIT. LOCATIONS FOR STOCKPILED MATERIAL MUST BE APPROVED BY THE PLANNING AND COMMUNITY DEVELOPMENT INSPECTOR AT LEAST 24 HOURS IN ADVANCE OF ANY DUMPING.

* THOSE BOXES CHECKED INDICATE THE MINIMUM REQUIREMENTS. AN EROSION CONTROL SYSTEM USING THE FOLLOWING BMP'S IS TO BE INSTALLED PRIOR TO ANY CLEARING OR GRADING. ADDITIONAL EROSION CONTROLS MAY BE REQUIRED BY THE ENGINEER AS WEATHER AND FIELD CONDITIONS DICTATE. THESE BMP'S ARE BASED ON THE CITY OF BELLEVUE CLEARING AND GRADING CODE, CHAPTER 23.76; COB DEVELOPMENT STANDARDS; COB STANDARD DETAILS CG-1 THROUGH 20 (UPDATED 03/15); AND THE WASHINGTON STATE STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN.

* TEMPORARY EROSION CONTROL

CLEARING SHALL BE LIMITED TO THE AREA OF CONSTRUCTION ACTIVITY. DURING WET WEATHER SEASON (OCTOBER 1 THROUGH APRIL 30), THE TIME OF DISTURBED SOIL EXPOSURE SHALL NOT EXCEED 24 HOURS. FROM MAY 1 TO SEPTEMBER 30, THE TIME OF EXPOSURE SHALL NOT BE MORE THAN 5 DAYS. EXPOSED SOIL MUST BE COVERED AT THE END OF THE CONSTRUCTION WEEK AND ALSO THE THREAT OF RAIN. THE CONTRACTOR SHALL HAVE A SUFFICIENT AMOUNT OF MATERIALS FOR THE FOLLOWING BMPS TO PROVIDE EROSION CONTROL FOR THE SITE AND EMERGENCY PURPOSES.

- PLASTIC COVERING
- TEMPORARY CONSTRUCTION EXIT
- SILT FENCE

* SEDIMENT TRAPPING

DEWATERING DEVICE SHALL BE DISCHARGED WHERE SEDIMENT, AND/OR OTHER POLLUTANTS, WILL NOT ENTER THE DRAINAGE SYSTEM. PER DEPARTMENT OF ECOLOGY GUIDELINES, WASTEWATER FROM PORTLAND CEMENT CONCRETE, MASONRY, AND ASPHALT CONCRETE CUTTING OPERATIONS SHALL NOT BE DISCHARGED TO STORM DRAINAGE SYSTEMS OR SURFACE WATERS. A HOLDING AREA AWAY FROM THE SEDIMENT POND MUST BE PROVIDED FOR CONCRETE EFFLUENT. SEDIMENT AND GRIT CONTAMINATION FROM CUTTING OPERATIONS SHALL BE PREVENTED FROM ENTERING THE STORM DRAINAGE SYSTEM OR SURFACE WATERS.

- CATCH BASIN INSERT
- STRAW BALE CHECK DAM

* TESC PLAN AND WRITTEN CONSTRUCTION SEQUENCE

A TEMPORARY EROSION AND CONTROL PLAN AND WRITTEN CONSTRUCTION SEQUENCE DESCRIBING HOW CONSTRUCTION AND EROSION CONTROL WILL PROGRESS, RESTORATION BY SECTION, AND PROTECTION OF STOCKPILE AREAS IS REQUIRED. THE CONSTRUCTION SEQUENCE WILL BE REVIEWED WITH THE ENGINEER AT THE PRECONSTRUCTION MEETING.

* BMP MAINTENANCE

REGULARLY INSPECT, INCLUDING ON WEEKENDS, ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENTATION BMP'S AND MAINTAIN THEM PER THE WASHINGTON STATE STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN AND THE DEVELOPMENT STANDARDS SO THAT THEY FUNCTION AS INTENDED UNTIL THE SITE HAS BEEN PERMANENTLY STABILIZED, AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED.

* PERMANENT EROSION CONTROL

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED USING THE FOLLOWING METHODS:

- HYDROSEEDING
- HAND SEEDING (RESTORATION WORK ONLY)
- LANDSCAPING/REVEGETATION (RESTORATION WORK ONLY)

MULCHING TYPE_____

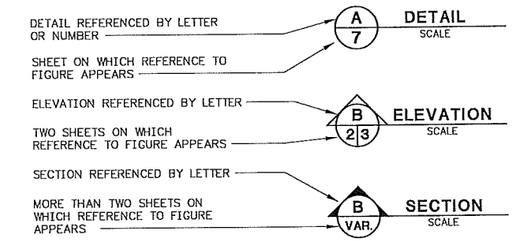
* EASEMENTS

ALL PUBLIC AND PRIVATE EASEMENTS SHALL BE PROTECTED, AND ALL EASEMENT RIGHTS MAINTAINED.

* UNDERGROUND UTILITY LINES

WHEN CONSTRUCTING UNDERGROUND UTILITY LINES, NO MORE TRENCH SHALL BE OPENED THAN CAN BE CLOSED IN A SINGLE DAY, OR MORE THAN 500 FEET, WHICHEVER IS LESS. EXCAVATED MATERIAL SHALL BE PLACED ON THE DOWNHILL SIDE OF THE TRENCH WHERE CONSISTENT WITH THE SAFETY AND SPACE CONSIDERATIONS. TEMPORARY TRENCH DEWATERING DEVICES SHALL BE DISCHARGED INTO A SEDIMENT TRAP OR POND. TRENCHES SHALL BE CLOSED AT THE END OF EACH DAY UNLESS OTHERWISE ALLOWED BY THE ENGINEER. FOR UTILITY TRENCHING AND OTHER CLEARING AND GRADING WORK IN STREET RIGHTS-OF-WAY. EROSION AND SEDIMENTATION CONTROL BMPS PER THE STORMWATER MANAGEMENT MANUAL FOR THE PUGET SOUND BASIN. THE COB DEVELOPMENT STANDARDS AND STANDARD DETAILS SHALL BE USED. THE BMPS SHALL BE MAINTAINED DAILY.

REFERENCE SYMBOLS



ROCK WALL NOTES

1. CONSTRUCT ROCKERY TO PRESERVE EX. GRADE AND NATURAL SLOPE FROM EROSION.
2. BACKFILL IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

RESTORATION AND MITIGATION

THIS PLAN HAS BEEN PREPARED AS MITIGATION FOR THE TEMPORARY AND PERMANENT DISTURBANCE OF A CRITICAL AREA IN CITY OF BELLEVUE PARKS PROPERTY IN BELLEVUE (PARCEL #2607801160). THE CRITICAL AREA DISTURBANCE IS NECESSARY TO REPLACE ERODED MATERIAL, PROVIDE STREAM BANK PROTECTION AND ENERGY DISSIPATION FOR A CULVERT OUTLET THAT CONVEYS STORMWATER BENEATH SE 41ST STREET. THE STREAM BANKS, STREAM BED AND OUTFALL HEADWALL ARE NOT PRESENTLY ARMORED AND ARE ERODING. PROPOSED INSTALLATIONS WILL OCCUR WITHIN THE STREAM BED AND ADJACENT STREAM BANK STEEP SLOPES.

ENHANCEMENT OF THE CRITICAL AREA WILL INCLUDE INSTALLATION OF A RIP RAP APRON AND SURROUNDING ROCK WALL.

WORK SEQUENCE

CITY STAFF WILL MAKE SITE VISITS TO VERIFY THE FOLLOWING PROJECT MILESTONES:

1. INSTALL EROSION CONTROL AND TREE PROTECTION MEASURES ACCORDING TO CONSTRUCTION PLANS.
2. REPAIR PIPE CROWN OVALITY AND EXTERIOR VOID SPACES ACCORDING TO CONSTRUCTION PLANS.
3. INSTALL 42" HDPE SLIPLINED CULVERT ACCORDING TO CONSTRUCTION PLANS.
4. INSTALL OUTFALL RIP RAP APRON AND BORDERING ROCK WALL ACCORDING TO CONSTRUCTION PLANS.
5. HYDROSEED DISTURBED AREAS AND INSTALLED TOPSOIL ACCORDING TO CONSTRUCTION PLANS.
6. REMOVE EROSION CONTROL AND TREE PROTECTION MEASURES.

MAINTENANCE

THE SITE SHALL BE MAINTAINED FOR FIVE YEARS FOLLOWING SUCCESSFUL INSTALLATION. REAPPLY NATIVE HYDROSEED MIX AS NEEDED.

GOAL

RESTORE EXISTING GROUND COVER WITH NATIVE PLANT SPECIES.

MONITORING

CITY STAFF WILL MONITOR THE SITE TWICE ANNUALLY FOR FIVE YEARS BEGINNING WITH APPROVAL OF THE AS-BUILT REPORT. CITY STAFF WILL REPORT ON THE CONDITIONS OF THE SITE AND SHALL PROVIDE MAINTENANCE RECOMMENDATIONS THAT MAY BE NECESSARY TO HELP THE SITE ACHIEVE THE STATED GOALS.

LEGEND

EXISTING

- W — WATER MAIN
- PROPERTY LINE
- RIGHT OF WAY LINE
- EDGE OF PAVEMENT
- DITCH
- UG TEL — UNDERGROUND TELEPHONE
- EASEMENT
- NATIVE SOIL

PROPOSED

- CULVERT
- TOPSOIL
- STRUCTURE BACKFILL
- OUTLET PROTECTION ROCK
- QUARRY SPALLS
- RIP RAP APRON
- ERODED VOID GROUT
- CULVERT VOID GROUT

No.	Date	By	Ckd	Revision

City of Bellevue UTILITIES

SCOTT CHRISTENSEN, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER, 16877

Drawn: SS
Designed: TC
Checked: SC
Approved: SC

CHS ENGINEERS
12507 Bel-Red RD., Suite 101, Bellevue, WA 98005
www.chsengineers.com Ph: 425-637-3693

CITY OF BELLEVUE

SE 41ST ST CULVERT REPAIR
NOTES AND LEGEND

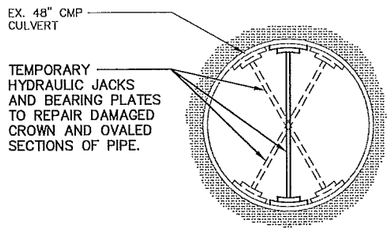
Sheet 2 Of 5

Job No. 221601

X-XX

USER: Scott.Stcherbinine PLOTTING DATE: 5/30/2017 FILE LOCATION: K:\22-Bellevue\2016\221601-Trenchless On-call Utility Design\Task C - SE 41st Design\CAD\221601 - 2016 CULVERT REPAIR.dwg

A PORTION OF NW 1/4 SECTION 13, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., KING COUNTY, WASHINGTON



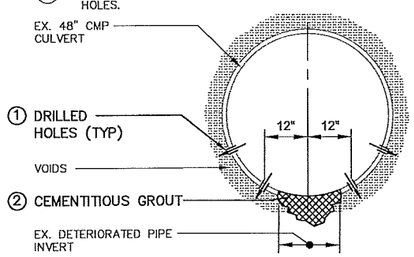
DETAIL - CROWN AND OVALITY REPAIRS

1 / -

NTS

DETAIL 2 KEY NOTES

1. FOLLOWING OVALITY REPAIR, DRILL HOLES INTO CMP IN POSITIONS NOTED ON DETAIL EVERY 5 FEET ON CENTER TO LOCATE THE EXTENTS OF THE VOID CHANNELS BEHIND PIPE. ADJUST HOLE SPACING AND LOCATION BASED ON ACTUAL LOCATIONS OF VOID CHANNELS.
2. INJECT CEMENTITIOUS GROUT INTO VOIDS, AND DRILLED HOLES.



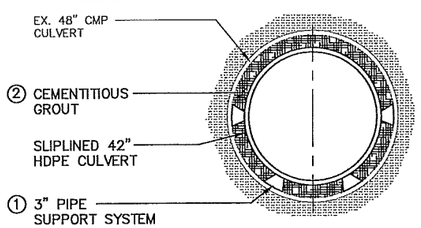
DETAIL - PIPE INVERT GROUT REPAIRS

2 / -

NTS

DETAIL 3 KEY NOTES

1. PRIOR TO GROUTING IN PLACE, INSTALL PIPE SUPPORT TO PROVIDE A UNIFORM GROUT THICKNESS AROUND SLIPLINED 42" CULVERT.
2. INJECT CEMENTITIOUS GROUT INTO VOID SPACE BETWEEN EX. 48" CMP CULVERT AND SLIPLINED 42" HDPE CULVERT.



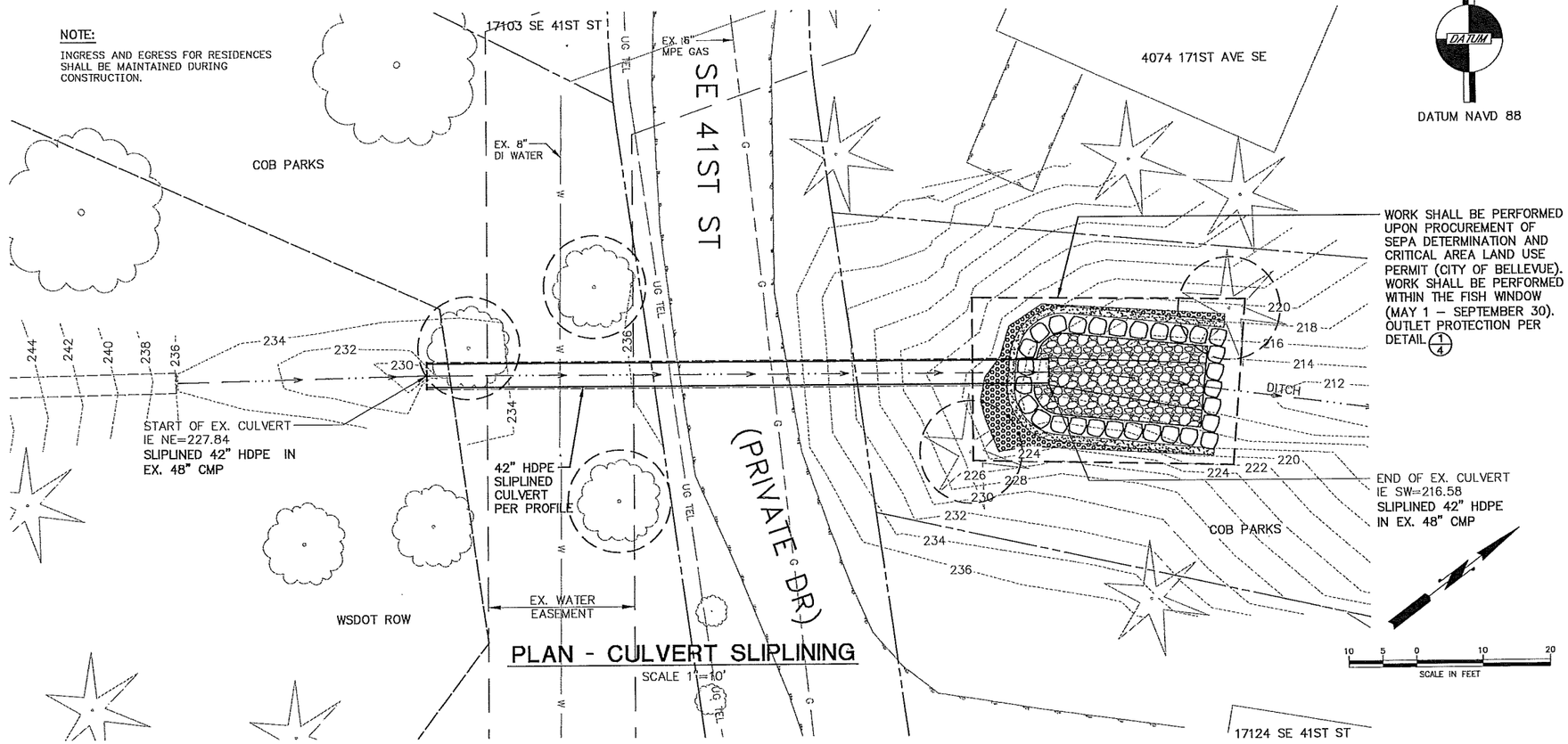
DETAIL - SLIPLINED 42" HDPE CULVERT

3 / -

NTS

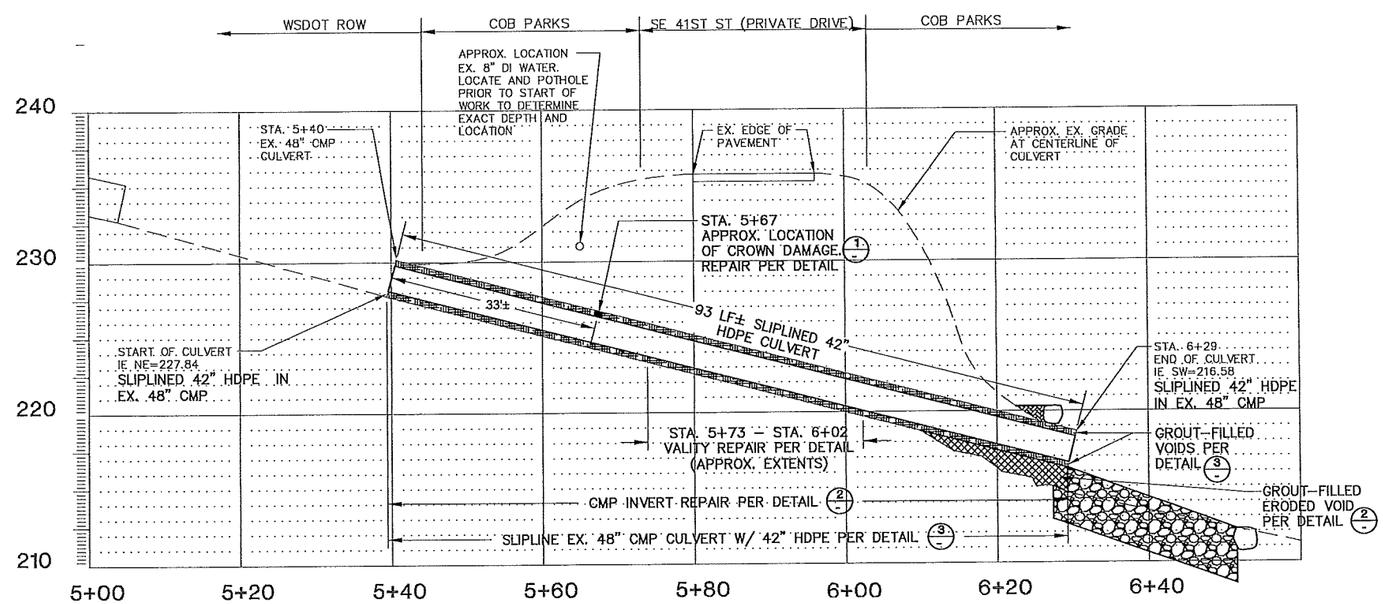
NOTE:

INGRESS AND EGRESS FOR RESIDENCES SHALL BE MAINTAINED DURING CONSTRUCTION.



PLAN - CULVERT SLIPLINING

SCALE 1"=10'



PROFILE - CULVERT LINING

SCALE HORIZ. 1"=10'
VERT. 1"=5'

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5-23-17

No.	Date	By	Ckd	Revision

City of Bellevue UTILITIES

SCOTT CHRISTENSEN STATE OF WASHINGTON 16677 REGISTERED PROFESSIONAL ENGINEER

Drawn: SS
Designed: TC
Checked: SC
Approved: SC

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12507 Bel-Red RD., Suite 101, Bellevue, WA 98005
www.chsengineers.com Ph: 425-637-3693

CITY OF BELLEVUE

SE 41ST ST CULVERT REPAIR
PLAN AND PROFILE

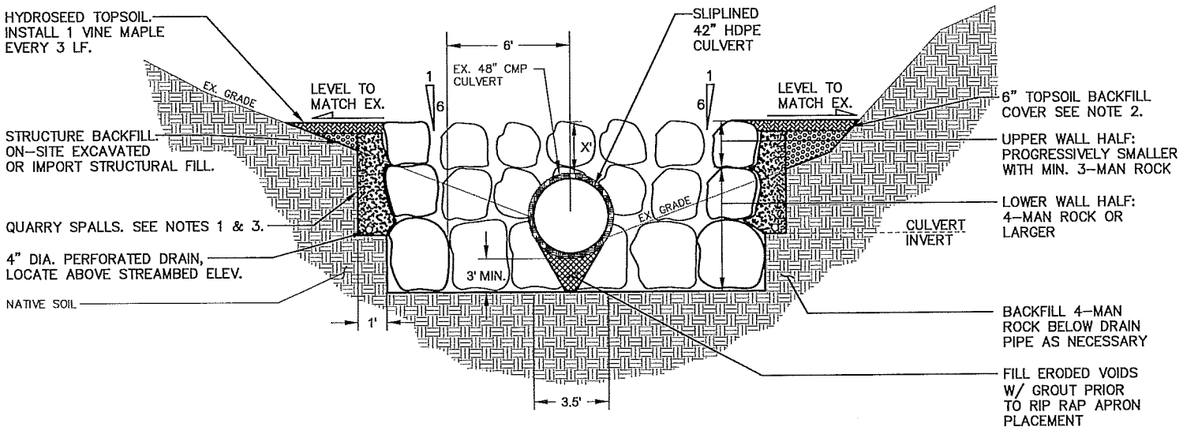
Sheet 3 Of 5

Job No. 221601

X-XX

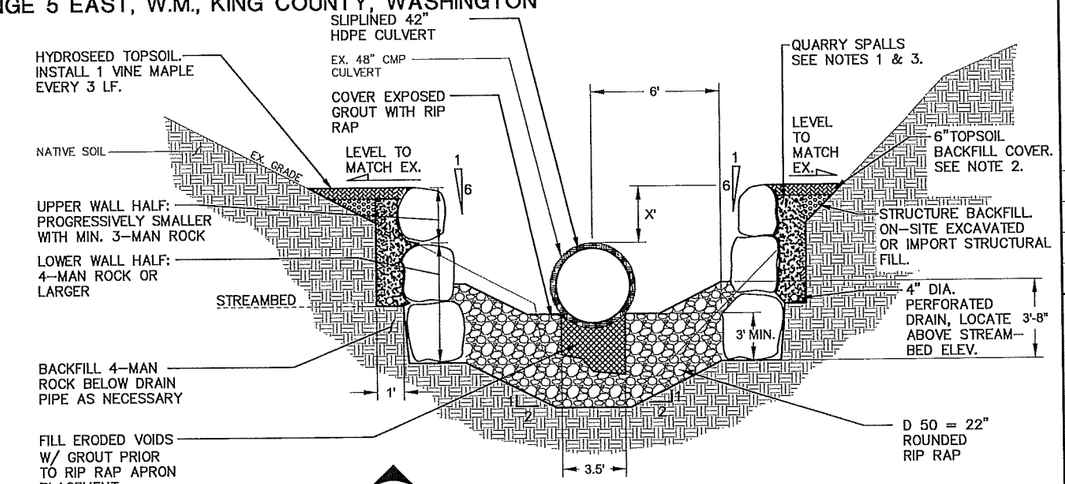
USER: Scott.Christensen PLOTTING DATE: 5/30/2017 FILE LOCATION: K:\22-Bellevue\2016\221601-Trenchless On-call Utility Design\Task C - SE 41st Design\CAD\221601 - 2016 CULVERT REPAIR.dwg

A PORTION OF NW 1/4 SECTION 13, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., KING COUNTY, WASHINGTON



A / - SECTION - A-A

NTS

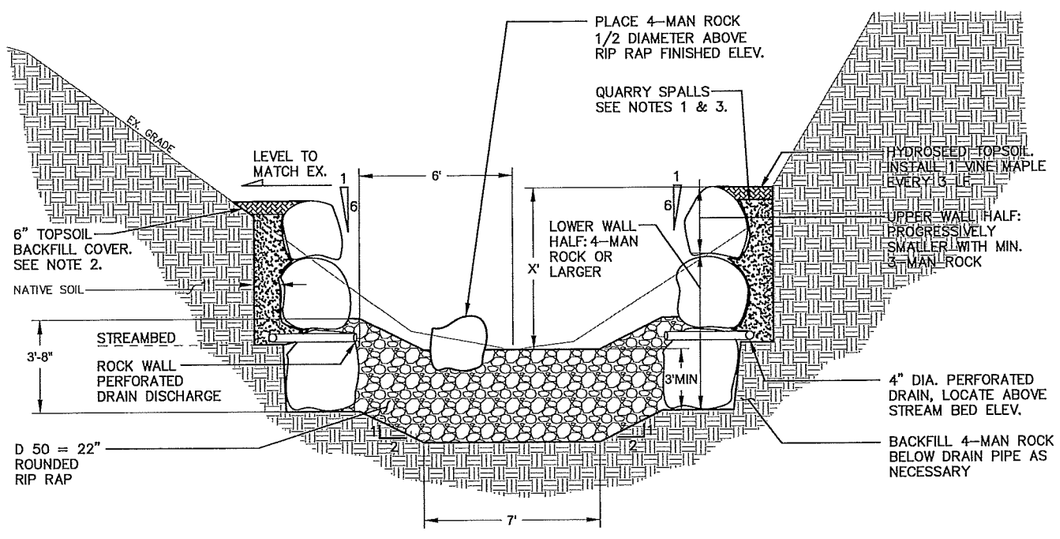


B / - SECTION - B-B

NTS

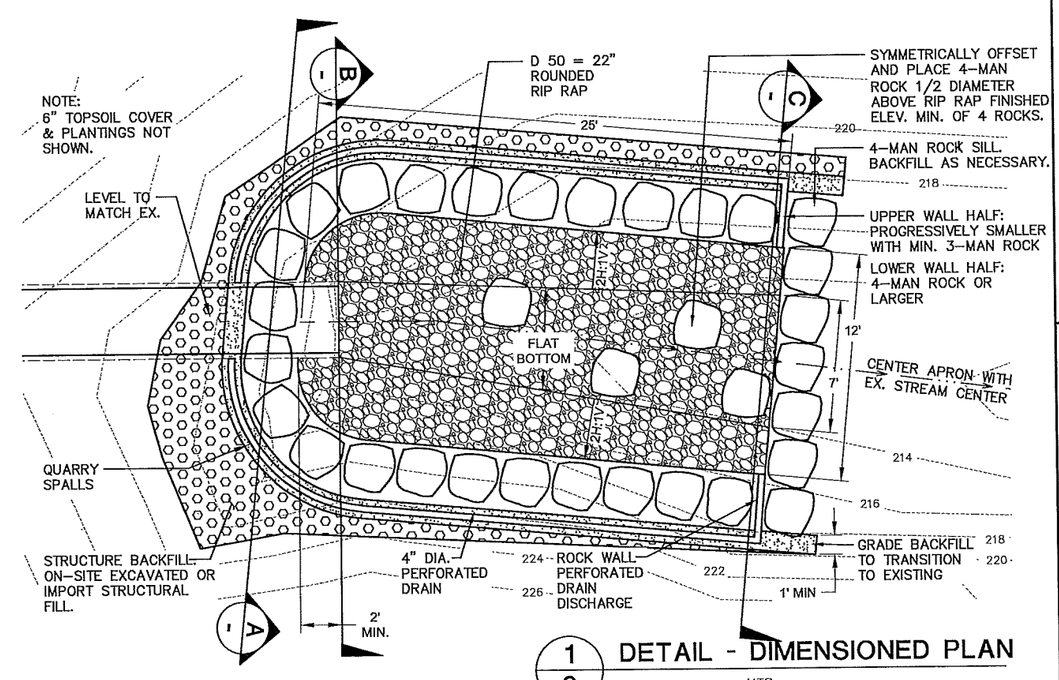
NOTES:

1. QUARRY SPALLS SHALL BE ENVELOPED IN MEDIUM WEIGHT (6-8 OZ.) NONWOVEN GEOTEXTILE FABRIC.
2. HEAVY WEIGHT (10-16 OZ.) NONWOVEN GEOTEXTILE FABRIC SHALL BE INSTALLED BETWEEN TOPSOIL AND ALL BACKFILLED MATERIAL.
3. QUARRY SPALLS SHALL BE PLACED SUCH THAT THE MATERIAL SIZE IS LARGEST AT THE WALL CONTACT FACE AND SMALLEST AT THE NATIVE SOIL CONTACT FACE. AGGREGATE SIZE SHALL RANGE FROM 2-6 IN.
4. DRAIN PIPING SHALL BE PACIFIC PLASTICS 4" DRAIN SCH40 PERFORATED WHITE SOLVENT WELD OR EQUAL.
5. BEDROCK SHALL NOT BE EXCAVATED. INSTALL WALL AND APRON TO CONFORM TO BEDROCK AS NECESSARY.



C / - SECTION - C-C

NTS



1/3 DETAIL - DIMENSIONED PLAN

NTS

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No.	Date	By	Ckd	Revision

City of Bellevue UTILITIES

SCOTT CHRISTENSEN STATE OF WASHINGTON 16877 REGISTERED PROFESSIONAL ENGINEER

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12507 Bel-Red RD., Suite 101, Bellevue, WA 98005
www.chsengineers.com Ph: 425-637-3693

CITY OF BELLEVUE

SE 41ST ST CULVERT REPAIR
OUTLET PROTECTION PLAN AND SECTIONS

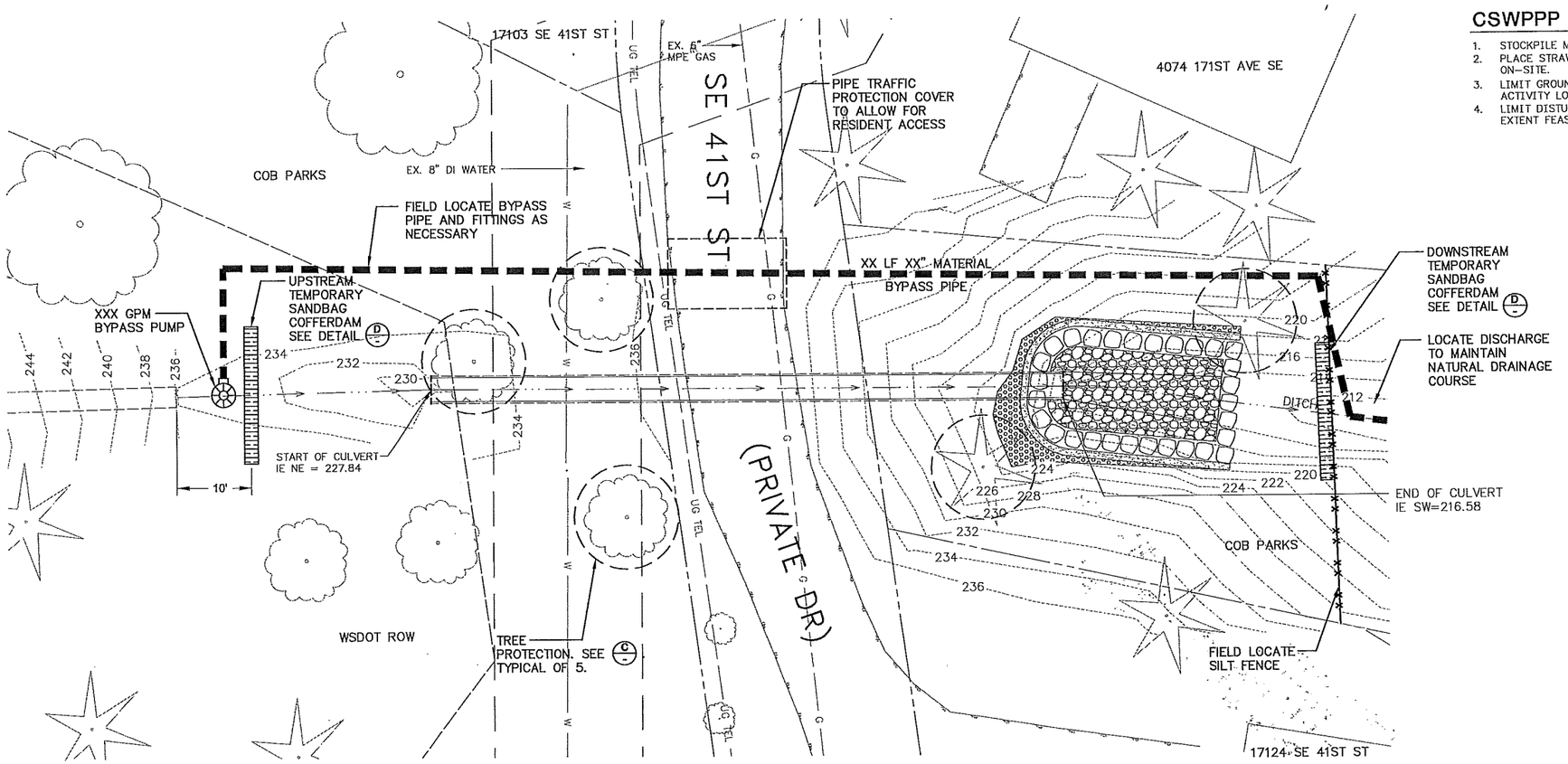
Sheet 4 Of 5

Job No. 221601

X-XX

USER: Scott Sicherbrine PLOTTING DATE: 5/31/2017 FILE LOCATION: K:\22-Bellevue\2016\221601-Trenchless On-call Utility Design\Task C - SE 41st Design\CAD\221601 - 2016 CULVERT REPAIR.dwg

A PORTION OF NW 1/4 SECTION 13, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., KING COUNTY, WASHINGTON

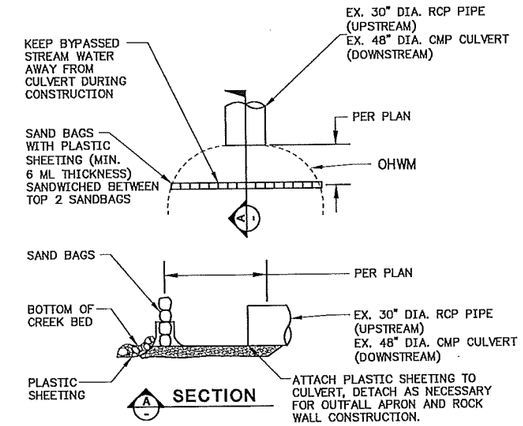


CSWPPP, TREE PROTECTION, TEMPORARY BYPASS

SCALE 1"=10'

CSWPPP NOTES

1. STOCKPILE MATERIALS ON COB PARKS PROPERTY.
2. PLACE STRAW WATTLE AT BASE OF ANY STOCKPILED MATERIALS ON-SITE.
3. LIMIT GROUND DISTURBANCE FOR INGRESS/EGRESS TO CONSTRUCTION ACTIVITY LOCATIONS TO MAXIMUM EXTENT FEASIBLE.
4. LIMIT DISTURBANCE OF STEEP SLOPE OF STREAM BANK TO MAXIMUM EXTENT FEASIBLE.



NOTES:
1. DO NOT ALLOW CONSTRUCTION DEBRIS TO ENTER CREEK BED.
2. ALL SANDBAGS, REBAR AND PLASTIC SHEETING SHALL BE REMOVED FOLLOWING CONSTRUCTION.
3. DOWNSTREAM SILT FENCE NOT SHOWN.

D DETAIL - TEMORARY COFFERDAM

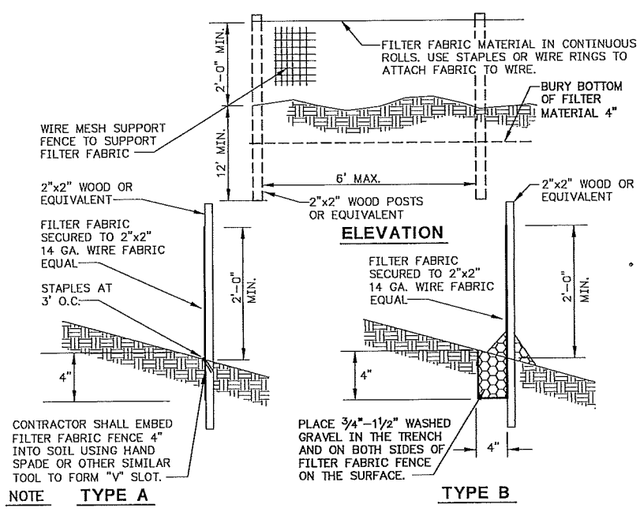
NOT TO SCALE

NOTES:

1. TREE PROTECTION DURING CONSTRUCTION: A SIX FOOT HIGH TEMPORARY CHAIN LINK FENCE SHALL BE ERECTED AT DRIP LINE OF TREE(S) TO BE SAVED, OR A DISTANCE OF 15 FEET FROM THE TRUNK, WHICHEVER IS GREATER. THE FENCE SHALL COMPLETELY ENCIRCLE THE TREE(S). INSTALL FENCE POSTS USING BLOCKS ONLY. IF INSTALLING POSTS DIRECTLY INTO GROUND IS NECESSARY, AVOID DRIVING INTO MAJOR ROOTS. AT THE DISCRETION OF THE CITY INSPECTOR, FENCING MAY BE EXTENDED BEYOND THE DRIP LINE OR 15 FEET. THE CITY INSPECTOR MAY PERMIT ALTERNATIVE FENCING METHODS IF SITE CONDITIONS PROHIBIT THE INSTALLATION OF PIER BLOCKS (STEEP SLOPES, SOFT SOILS, ETC.
2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER 1 INCH IN DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH MOIST BURLAP TO PREVENT DRYING AND COVERED WITH SOIL AS SOON AS POSSIBLE.
3. WORK WITHIN THE PROTECTION FENCE SHALL BE DONE MANUALLY. NO EXCAVATION, MATERIAL STOCKPILING, VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT/MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING.

C TREE PROTECTION

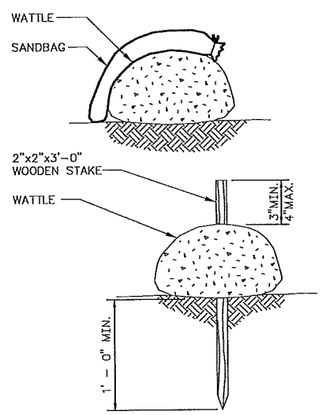
NOT TO SCALE



USE FILTER FABRIC FENCE TYPE A OR B AS WARRANTED/DIRECTED DURING CONSTRUCTION

A DETAIL - FILTER FABRIC FENCE

NOT TO SCALE



NOTES:

1. WATTLES SHALL BE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATION 9-14.5(5).
2. SECURELY KNOT EACH END OF WATTLE. ABUT ADJACENT WATTLES TIGHTLY, END TO END, WITHOUT OVERLAPPING THE ENDS. RUNOFF SHALL NOT BE ALLOWED UNDER OR AROUND ROLL ENDS.
3. PILOT HOLES MAY BE DRIVEN THROUGH THE WATTLES AND INTO THE SOIL WHEN SOIL CONDITIONS REQUIRE.
4. WATTLES SHALL BE INSPECTED REGULARLY, AND IMMEDIATELY AFTER A RAINFALL PRODUCES RUNOFF, TO ENSURE THEY REMAIN THOROUGHLY IN CONTACT WITH THE SURFACE.
5. PERFORM MAINTENANCE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATION 8-01.3(15).

B DETAIL - STRAW WATTLE

NOT TO SCALE

10 5 0 10 20
SCALE IN FEET

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DATUM NAVD 88

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No.	Date	By	Ckd	Revision

City of Bellevue UTILITIES

SCOTT CHRISTENSEN STATE OF WASHINGTON 10677 REGISTERED PROFESSIONAL ENGINEER

Drawn: SS Designed: TC Checked: SC Approved: SC

CHS ENGINEERS
12507 Bel-Red RD., Suite 101, Bellevue, WA 98005
www.chsengineers.com Ph: 425-637-3693

CITY OF BELLEVUE

SE 41ST ST CULVERT REPAIR
CSWPPP, TREE PROTECTION AND TEMPORARY BYPASS

PRELIMINARY
NOT FOR CONSTRUCTION
5-23-17

Sheet 5 Of 5
Job No. 221601
X-XX

USER: Scott SlotterbrinkFLOTING DATE: 5/23/2017 FILE LOCATION: K:\22-Bellevue\2016\221601-Trenchless On-call Utility Design\Task C - SE 41st Design\CAD\221601 - 2016 CULVERT REPAIR.dwg

HWA GEOSCIENCES INC.

Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental Services • Inspection & Testing

May 31, 2017
HWA Project No. 2017-000 Task 007

CHS Engineers
12507 Bel-Red Rd Suite 101
Bellevue, Washington 98005

Attn: Tucker Collins, Scott Christiansen

Subject: **GEOTECHNICAL EVALUATION OF SLOPES**
SE 41ST STREET CULVERT OUTFALL REPAIR PROJECT
17124 SE 41st Street
Bellevue, Washington 98008

Dear Gentlemen:

In accordance with your request, HWA GeoSciences Inc. (HWA) performed an evaluation of steep slopes adjacent to an existing culvert outlet downstream of SE 41st Street in Bellevue, immediately west of 17124 SE 41st Street. We understand that the existing culvert, comprised of a 48-inch diameter CMP, had become corroded along the bottom, and the adjacent stream ravine slope to the east had become eroded. CHS Engineers prepared preliminary plans (dated 2-12-16) to slip-line the culvert with 42-inch HDPE pipe, build an angular rock splash pad, and establish a rock wall in a horseshoe shape around the outfall to face the slopes to prevent further erosion. The purpose of our evaluation was to determine if HWA concurs with the energy dissipater protection of the culvert outfall, in relation to the steep slopes.

The field evaluation was conducted by engineering geologist Brad Thurber, L.G., L.E.G., on May 3, 2017. We performed a traverse of the stream area and both adjoining slopes. The stream at the outfall is in a ravine approximately 18 feet deep, and the 41st Street embankment fill is of similar height. There is a house to either side of ravine, above top of the ravine side slopes. The CMP culvert was corroded along the bottom, with the water having eroded sand and gravel from beneath the culvert such that the outfall was approximately 2 feet above stream bottom. Bedrock was observed in the stream bottom approximately 40 feet downstream of, and a few feet lower than, the outfall.

The slope on the eastern side of the stream has become eroded with sloughing having occurred, such that the bank was oversteepened to approximately ¾:H:1V (Horizontal:Vertical) with a two-foot overhang, approximately 10 feet high above the stream bottom (see Photos 1 through 3). The oversteepened area was approximately 15 feet long. Woody debris consisting of tree branches was present at the slope toe, which appeared to have been placed there, as well as a mostly rotten log. Soils exposed in the lower 6 feet of slope consisted of very

21312 30th Drive SE
Suite 110
Bothell, WA 98021.7010
Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com
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dense, light olive gray, non-plastic SILT, moist. Above this to a height of approximately 10 feet was medium dense to dense, yellow brown, clean, gravelly SAND, moist. The overhanging portion consisted of colluvium (loose to medium dense, brown, silty SAND) temporarily anchored by tree and native perennial roots (see Photo 4).

The slope above the overhang was inclined at approximately 1:1 for about five feet, then became less steep until level at an RV parking pad next to the house. There was no visual or probing evidence of ground cracks above the overhang. The slope above the overhang to the house was vegetated with mature evergreens up to approximately 30 inches in diameter, having straight trunks. Ground vegetation consisted of native plants such as Oregon grape and sword fern, and native shrubs were also present, with no signs of surface soil erosion. There was no evidence of ground water seepage on the slope. One large woody shrub had partially slumped (see Photo 3).

Photo 1. Culvert outlet and east slope. Note RV, parked adjacent to house (17124 SE 41st St).

Photo 2. East slope, above culvert outlet (at right). Note RV at upper left.

Photo 3. Oversteepened east slope, with slumped deciduous shrub. Looking southeast.

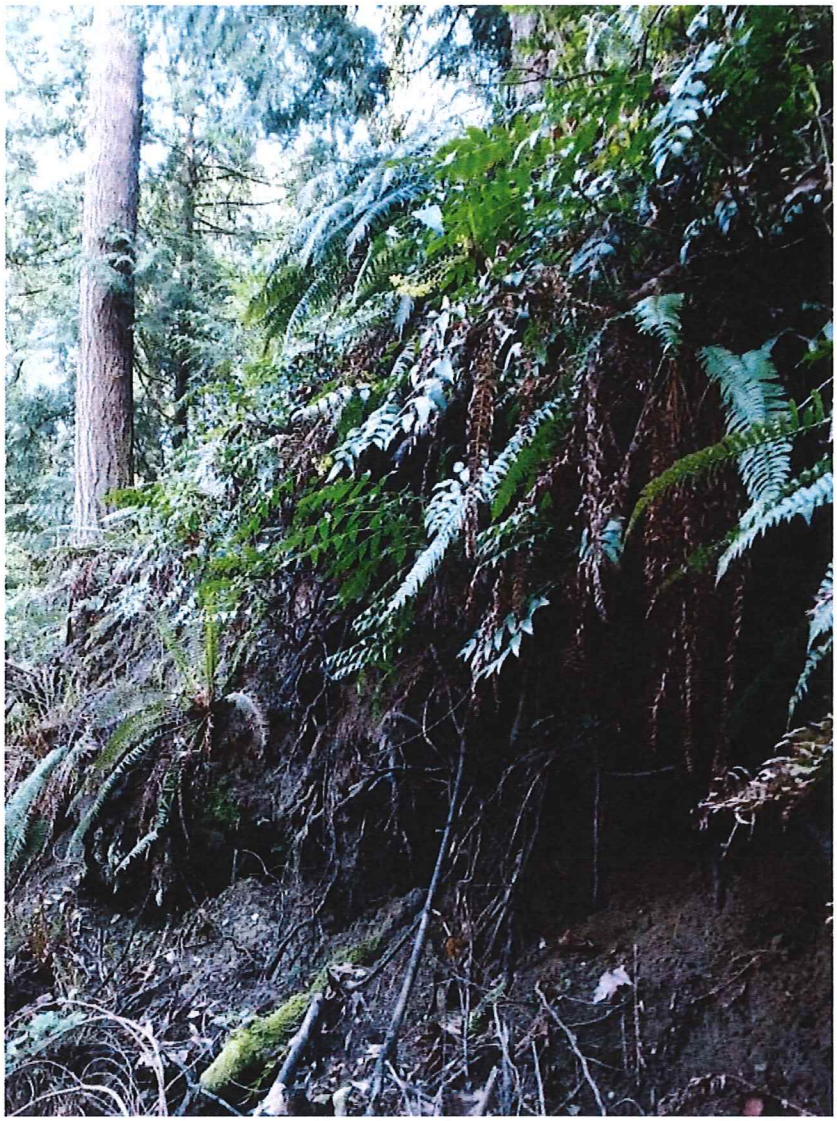

Photo 4. Overhang temporarily reinforced by tree and perennial roots. Looking northeast.

CONCLUSIONS AND RECOMMENDATIONS

There do not appear to be any apparent deep-seated slide conditions. The core of the slope appears inherently stable. However, the eroded and oversteepened portion of the slope can be expected to continue to ravel and erode if not protected.

In our opinion, the preliminary plan of building up a rock splash pad and facing the slope with a rockery will serve to protect the slope from further erosion. The rockery will need to be built high enough, approximately 10 feet above present streambed, in order to face the colluvium (which forms an overhang) and thus prevent future raveling of the upslope colluvium. Loose soils beneath and behind proposed rockery rocks will need to be removed, and backfill behind the rocks sufficiently compacted.

In our opinion, the preliminary plans meet the performance standards for landslide hazards and steep slopes as defined in LUC 20.25H.125. In particular, the proposed outfall improvements are designed to prevent future erosion and potential sliding of the slope that would occur if left unprotected, and construction of the proposed rockery will avoid impacts to the existing slope.

CONDITIONS AND LIMITATIONS

We have prepared this report for CHS Engineers and the City of Bellevue for use in design of a portion of this project. No subsurface explorations were performed as part of this assessment. Our scope of work was limited to visual observations, probing and a literature review. It is not possible to fully define the stability of slopes such as at this site without a much larger study. In our opinion the site is not subject to deep seated sliding. However, with any slope, conditions may exist soon or in the future that may cause sliding and that risk must be recognized and appreciated by the City and the adjacent homeowners. The conclusions and interpretations presented should not be construed as a warranty of the slope and subsurface conditions.

The scope of work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or ground water at this site. No indications of potentially hazardous materials were observed in the explorations performed for this study.

May 31, 2017
HWA Project No. 2017-000-21 Task 007

We appreciate the opportunity to provide geotechnical services on this project. Should you have any questions, or if we may be of further service, please call.

Sincerely,

HWA GEOSCIENCES INC.

State of Washington
Engineering Geologist
1943
Licensed Geologist
5/31/17
BRADLEY W. C. THURBER

BRYAN KEITH HAWKINS
STATE OF WASHINGTON
39862
REGISTERED
PROFESSIONAL ENGINEER

Brad W. Thurber, L.G., L.E.G.
Senior Engineering Geologist

Bryan K. Hawkins, P.E.
Senior Geotechnical Engineer