



**DETERMINATION OF NONSIGNIFICANCE (DNS)**

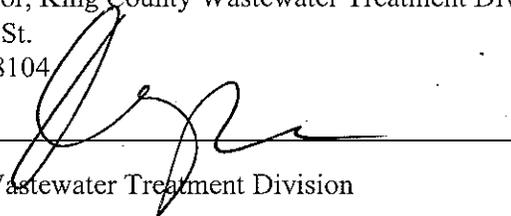
**TITLE OF PROPOSAL:** Ravenna Creek Stream Transfer Pipe Extension Project—Phase B.

**DESCRIPTION OF PROPOSAL:** The King County Wastewater Treatment Division proposes to construct Phase B of the Ravenna Creek Stream Transfer Pipe Extension Project (previously called the “Ravenna Diversion Structure Modification Project”). The proposal involves extending the Ravenna Creek stream transfer pipe and modifying associated flow control structures so that Ravenna Creek flow can travel through an isolated stream pipe without risk of cross-contamination with sewage. The purpose of the project is to prevent overflows of combined sewage from entering the Ravenna Creek stream transfer pipe and discharging to University Slough. Construction of the proposed project is scheduled to start in June 2010 and be completed in October 2010.

**LOCATION OF PROPOSAL, INCLUDING STREET ADDRESS, IF ANY:** The proposal is located in the City of Seattle. The northern end of the proposal includes two construction areas. One is in the southeastern corner of Ravenna Park, which is located on the north side of NE 55th Street between 25th Avenue NE and Ravenna Avenue NE. The other construction area is located one block south of Ravenna Park on NE 54th Street between 25th Avenue NE and Ravenna Place NE. The legal description of these areas is Section 9, Township 25N, Range 4E.

The southern end of the proposal is located at the University Slough drainage canal between NE 45th Street and NE Clark Road, just south of University Village Shopping Center. The legal description of this area is Section 16, Township 25N, Range 4E.

**Responsible Official:** Christie True  
**Position/Title:** Division Director, King County Wastewater Treatment Division  
**Address:** 201 S. Jackson St.  
Seattle, WA 98104

**Date:** 3/12/2010 **Signature:** 

**Proponent and Lead Agency:** King County Wastewater Treatment Division

**Contact Person:** Sue Meyer  
Environmental Planning  
201 S. Jackson St., MS KSC-NR-0505  
Seattle, WA 98104, 206-684-1171

**Issue Date:** March 16, 2010

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under WAC 197-11-340 (2); the lead agency will not act on this proposal for 17 days from the issue date. **Comments must be submitted by 5:00 PM on April 2, 2010.** Submit comments to Wesley Sprague, Supervisor, Community Services and Environmental Planning Unit, 201 S. Jackson St., MS: KSC-NR-0505, Seattle, WA 98104-3855.

Written appeals of this threshold determination must be received by the SEPA Responsible Official at the above address **no later than 5:00 PM on April 2, 2010, and must be accompanied by a \$250 fee.** The appeal must follow the procedure established in King County Public Rule PUT 7-4-1. The rule may be viewed at <http://www.kingcounty.gov/operations/policies/rules/utilities/put741pr.aspx>, or contact Sue Meyer at 206.684.1171 or [sue.meyer@kingcounty.gov](mailto:sue.meyer@kingcounty.gov) to obtain a copy.

**Environmental Checklist**  
**for the**  
**Ravenna Creek Stream Transfer Pipe Extension Project**  
**Phase B**

March 2010

Prepared in compliance with the State Environmental Policy Act (SEPA) (RCW 43.21C), the SEPA Rules (WAC 197-11), and Chapter 20.44 King County Code, implementing SEPA in King County procedures.

This information is available in accessible formats upon request at 206-684-1280 (voice) or 711 (TTY).



**King County**

Department of Natural Resources and Parks

**Wastewater Treatment Division**

King Street Center, KSC-NR-0505

201 South Jackson Street

Seattle, WA 98104

# ENVIRONMENTAL CHECKLIST

## A. BACKGROUND

**1. Name of the proposed project:**

Ravenna Creek Stream Transfer Pipe Extension Project  
(previously called the “Ravenna Diversion Structure Modification Project”)

**2. Name of Applicant:**

King County Department of Natural Resources and Parks  
Wastewater Treatment Division

**3. Address and telephone number of applicant and contact person:**

King County Department of Natural Resources and Parks  
Wastewater Treatment Division  
201 South Jackson  
Seattle, WA 98104

Contact: Sue Meyer, Senior Environmental Planner  
206-684-1171, sue.meyer@kingcounty.gov

**4. Date checklist prepared:**

March 11, 2010

**5. Agency requesting checklist:**

King County Department of Natural Resources and Parks  
Wastewater Treatment Division

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

The proposed project is being constructed in two phases.

Phase A of the project was implemented immediately after a May 2008 sewer spill into University Slough and will continue to be implemented until Phase B is constructed. Phase A activities are described in Section A.11. A SEPA environmental checklist and determination of nonsignificance (DNS) were prepared and issued for Phase A in September 2008.

Construction of Phase B of the project, which includes the activities described in this document, is scheduled to begin in late June 2010 and be completed in October

2010.

**7. Plans for future additions, expansion, or further activity related to or connected with this proposal:**

After Phase B is constructed, flows at the 24<sup>th</sup> Avenue Diversion Structure will be monitored for at least two years to ensure that the 24<sup>th</sup> Avenue Diversion Structure and box culvert can accommodate upstream pipe capacity and normal creek flow.

**8. Environmental information that has been prepared, or will be prepared, directly related to this project:**

Ravenna Creek Storm Drainage Project SEPA Environmental Checklist and Determination of Nonsignificance (DNS), December 1990

Ravenna Diversion Structure Modification Project—Phase A SEPA Environmental Checklist and Determination of Nonsignificance (DNS), September 2008

Draft Geotechnical Investigation, Ravenna Creek Transfer Pipe Extension. Prepared by King County Department of Transportation Engineering Services Section, Materials Laboratory, Seattle, Washington. November 2009.

Water quality sampling was performed by WTD in the Ravenna Creek system between December 2008 and July 2009.

**9. Applications that are pending for governmental approvals or other proposals directly affecting the property covered by the proposal:**

The City of Seattle Department of Transportation (SDOT) is proposing to construct the NE 45<sup>th</sup> Street Viaduct: West Approach Replacement Project between May and October of 2010. During viaduct-related construction activities, the viaduct will be closed and streets near Ravenna Park (including NE 54<sup>th</sup> and NE 55<sup>th</sup> Streets) will experience heavier traffic volumes than usual. This will occur within the planned construction window for the Ravenna Creek Stream Transfer Pipe Extension Project described in this document.

The SDOT project also includes plans to repave 22<sup>nd</sup> Avenue NE beginning at NE 45<sup>th</sup> Street, continuing east along NE 54<sup>th</sup> Street, then along NE 55<sup>th</sup> Street to 25<sup>th</sup> Avenue NE. Repaving work is scheduled to be completed by mid-June 2010, before construction of the Ravenna Creek Stream Transfer Pipe Extension Project is scheduled to begin.

WTD and SDOT staff members have communicated with each other about their respective projects and will continue to coordinate with each other before and during construction to minimize impacts to the extent feasible.

**10. List of governmental approvals or permits that will be needed for the proposal:**

Washington Department of Fish and Wildlife

- Hydraulic Project Approval (existing permit will be amended)

King County

- Industrial Waste Discharge Permit

City of Seattle

- Street Use Permit
- Fill and Grade Permit
- Revocable Use Permit
- Noise Variance

**11. Brief, complete description of the proposal, including the proposed uses and the size of the project and site:**

Background and Purpose

The King County Wastewater Treatment Division (WTD) proposes to construct Phase B of the Ravenna Creek Stream Transfer Pipe Extension Project (previously called the “Ravenna Diversion Structure Modification Project”). The purpose of the project is to prevent overflows of combined sewage from entering the Ravenna Creek stream transfer pipe and discharging to University Slough.

In 2004, King County day-lighted a section of Ravenna Creek in the southeast corner of Ravenna Park. The County also redirected a portion of the creek flow that was conveyed by the combined sewer system to the West Point Treatment Plant in Magnolia to University Slough.

At the present time, Ravenna Creek flow can follow several possible courses from the southeast part of Ravenna Park, depending on various factors. Low flows follow the day-lighted stream channel to a point near the southeast corner of the park and are then routed to University Slough via a box culvert, the NE 54<sup>th</sup> Street Diversion Structure and a stream transfer pipe. Higher flows can either follow this course or be directed to the combined sewer system via either the 24<sup>th</sup> Avenue Diversion Structure or the NE 54<sup>th</sup> Street Diversion Structure (see attached conveyance system schematic for flows under normal conditions).

During investigation of a May 2008 sewer spill into University Slough, WTD learned that during storm events combined storm water and sewage can overtop a gate in the 24<sup>th</sup> Avenue Diversion Structure and enter the box culvert that carries Ravenna Creek flows. When this happens, the combined storm water and sewage is conveyed and discharged to University Slough.

The phased project described below was designed to address the conveyance system design issues that were discovered during investigation of the May 2008 sewer spill.

#### Phase A

Phase A was implemented immediately after the May 2008 sewer spill. It consists of inserting an inflatable plug in the Ravenna Creek stream transfer pipe when wet weather is expected and removing a slide gate at the bottom of the box culvert leading to the Laurelhurst Trunk sewer line. When the plug is in place and the gate removed, all flow in the box culvert (including Ravenna Creek flow) is directed to the combined sewer and routed to the West Point Treatment Plant in Magnolia. The purpose of Phase A is to prevent sewage and storm water from entering the Ravenna Creek stream transfer pipeline during the time that a permanent solution to the problem is designed and constructed (Phase B). The temporary plug will be in place and creek flow diverted to the combined sewer for the duration of Phase B construction.

#### Phase B

Phase B, the project described in this document, addresses system design issues that allow combined sewage to be discharged to University Slough during storm events. It involves extending the Ravenna Creek stream transfer pipe and modifying associated flow control structures (see attached site plan and proposed conveyance system schematic). After this project is completed, creek flows of up to five cubic feet per second (cfs) will travel continuously through an isolated stream pipe to University Slough without risk of cross-contamination with sewage during periods of heavy rain. Combined storm water and sewage may still overtop the gate in the 24<sup>th</sup> Avenue Diversion Structure during storm events and enter the box culvert, but they would be isolated from Ravenna Creek flows carried by the new stream transfer pipe extension.

Phase B consists of the following modifications to the conveyance system (all existing and proposed new facilities are located below ground):

- Extension of the existing 18-inch-diameter Ravenna Creek stream transfer pipe through approximately 280 feet of the existing box culvert. This will be done by fusing sections of 12-inch-diameter high density polyethylene (HDPE) pipe together in Ravenna Park and feeding the pipe through the box culvert to the NE 54<sup>th</sup> Street Drop Structure.
- Modification of the stream conveyance system at the downstream end of the day-lighted portion of Ravenna Creek to ensure that high creek flow can be accommodated in the event that it does not enter the combined sewer system upstream at the 24<sup>th</sup> Avenue Diversion Structure. These modifications will include construction of the following new features:
  - A Flow Split Structure that will direct Ravenna Creek flow to either a new “low flow pipe” or a new “high flow pipe.”
  - An approximately 40-foot-long 14-inch-diameter “low flow pipe” that will

carry creek flow of five cfs or less and an approximately 40-foot-long 24-inch-diameter “high flow pipe” that will carry creek flow in excess of five cfs.

- A Flow Junction Structure that will connect the new “low creek flow” pipe to the new 12-inch-diameter Ravenna Creek stream transfer pipe in the box culvert and connect the new “high creek flow” pipe to the interior of the box culvert (which will carry the creek flow exceeding 5 cfs to WTD’s Laurelhurst Trunk).
- Reconfiguration of the interior of the NE 54<sup>th</sup> Street Drop Structure to improve access to the facility. The drop structure will be used to access the downstream end of the new portion of the Ravenna Creek stream transfer pipe.
- Reconfiguration of the interior of the 24<sup>th</sup> Avenue Diversion Structure to improve flow to the Lake City Tunnel.
- Restoration of areas disturbed during construction.
- Weeding of the Ravenna Creek native plant buffer installed during construction of the Ravenna Creek day-lighting project.
- Replanting of the University Slough native plant buffer that was planted by King County in 2008 as mitigation for the May 2008 sewer spill.

The majority of construction activities for Phase B, including staging and excavation, will occur in the southeast corner of Ravenna Park. The construction and staging area will be fenced and public access to this area will be prohibited for the duration of the approximately four-month construction period. This area will include the eastern half of the ball field and part of the paved walking trail adjacent to Ravenna Creek. An access ramp will be created between the ball field and NE 55<sup>th</sup> Street so construction equipment can enter and exit the construction and staging area.

A smaller construction area will be fenced off around the NE 54<sup>th</sup> Street Drop Structure. This area will be approximately 60’ x 20’ in size and temporarily block one lane of NE 54<sup>th</sup> Street.

**12. Location of the proposal, including street address, if any, and section, township, and range; legal description; site plan; vicinity map; and topographical map, if reasonably available:**

The proposal is located in the City of Seattle. See attached project location and vicinity map.

The northern end of the proposal includes two construction areas. One, referred to in this document as the “Ravenna Park site,” is in the southeastern corner of the City of Seattle’s Ravenna Park, which is located on the north side of NE 55<sup>th</sup> Street between 25<sup>th</sup> Avenue NE and Ravenna Avenue NE. The legal description of this site is Section 9, Township 25N, Range 4E.

The other construction area is located one block south of Ravenna Park on NE 54<sup>th</sup>

Street between 25<sup>th</sup> Avenue NE and Ravenna Place NE. The legal description of this site is Section 9, Township 25N, Range 4E.

The southern end of the proposal is located at the University Slough drainage canal between NE 45<sup>th</sup> Street and NE Clark Road, just south of University Village Shopping Center. The legal description of this site is Section 16, Township 25N, Range 4E.

## B. ENVIRONMENTAL ELEMENTS

### 1. Earth

#### a. **General description of the site (underline):**

flat, rolling, hilly, steep slopes, mountainous, other: moderate slopes

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

The steepest slopes on the Ravenna Park and NE 54<sup>th</sup> Street sites are approximately 35% and 7%, respectively.

The steepest slope on the University Slough site is approximately 50%.

#### c. **What general types of soils are found on the site (for example clay, sand, gravel, peat, muck)? Specify the classification of agricultural soils and note any prime farmland.**

According to the 2005 United States Geological Survey (USGS) *Geologic Map of Seattle—a Progress Report* by K.G. Troost, D.B. Booth, A.P. Wisher, and S.A. Shimel, three geologic units are found within or near the Ravenna Park site. They include Artificial Fill (Af), Vashon Till (Qvt), and Advance Outwash Deposits (QVA).

Two exploratory borings drilled in the southeast corner of the Ravenna Park ball field for the proposed project in 2009 encountered approximately 20 feet of loose fill overlaying very dense native silty sand and gravel.

The NE 54<sup>th</sup> Street site is paved. The top approximately five feet of soil at the site is loose sandy fill. Below five feet, the soils are very dense fine to medium sand.

Soils at the University Slough site consist of fill placed on top of municipal solid waste that is part of an abandoned landfill site.

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

Yes. All three sites are located in areas identified as “liquefaction prone” by the City of Seattle.

**e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate the source of the fill.**

An approximately 450-square-foot vegetated area will be cleared and graded to create the temporary access ramp between NE 55<sup>th</sup> Street and the Ravenna Park site. After the area has been graded, it will be covered with approximately 10 cubic yards of ballast rock.

Two pits and a trench will be excavated in the Ravenna Park site to construct the project. One pit will be excavated to expose the box culvert, install the new 12-inch-diameter stream transfer pipe inside the box culvert, and construct the new Flow Junction Structure. The approximate size of this pit will be 16 feet (l) x 16 feet (w) x 25 feet (d). A second pit will be excavated to construct the new Flow Split Structure. The approximate size of this pit will be 14 feet (l) x 14 feet (w) x 20 feet (d). A trench will be excavated to install the two new pipes that will carry Ravenna Creek flow from the Flow Split Structure to the Flow Junction Structure and the box culvert. Excavations will be shored with trench boxes and/or sheet piles installed by a vibratory hammer. Shoring methods will be determined by the contractor. A total of approximately 800 cubic yards of soil will be excavated during construction. Approximately 800 cubic yards of fill material obtained from local commercial sources will be used to backfill the excavations.

**f. Could erosion occur as a result of clearing, construction, or use?**

Yes. Some erosion could occur during excavation and filling activities, or when the temporary access ramp is cleared and graded.

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

Less than approximately 5% of the Ravenna Park site is covered with impervious surfaces. No increase in impervious surfaces will result from the proposed project.

Nearly 100% of the NE 54<sup>th</sup> Street site is covered with impervious surfaces and will remain covered with impervious surfaces after project construction.

None of the University Slough site is covered with impervious surface and the proposed project will not result in any impervious surface.

**h. Describe the proposed measures to reduce or control erosion, or other**

**impacts to the earth, if any.**

Temporary erosion and sediment control measures will be employed throughout project construction. For example, to minimize the chances of sediment entering Ravenna Creek construction activities will be set back from the creek, to the extent possible, and a silt fence will be installed between the creek and areas where excavation will take place. Other measures that could be used include the following:

- Install silt traps in storm drainage inlets;
- Cover soil stockpiles and exposed soils;
- Clean streets regularly for mud and dust control;
- Inspect erosion and sediment control measures regularly;
- Restore disturbed areas by repaving or replanting as soon as practical after construction is completed;
- Designate personnel to inspect and maintain temporary erosion and sediment control measures;
- Use appropriate means to minimize tracking of sediment onto public roadways by construction vehicles;
- Store materials away from surface waters;
- Refuel construction equipment and vehicles away from surface waters whenever practicable; and
- Maintain spill containment and clean up material at the construction site.

Temporary erosion and sediment control measures will be identified in the project's construction plans and specifications and will be implemented as required by the permitting jurisdiction. Appropriate erosion control and sediment control measures will be installed prior to clearing, grading or excavation activities.

Any part of the porous concrete walkway in the Ravenna Park ball field that is damaged during construction will be replaced with porous concrete so that impervious surface is not increased as a result of the project.

The project is designed so that the majority of the stream transfer pipe extension is located inside of an existing structure instead of in soil. This minimizes earth disturbance and the potential for erosion.

Settlement monitoring will be conducted before and during construction to avoid impacts to nearby structures from construction activities that produce vibration. If sheet piles are used as shoring, vibration monitoring will be conducted during installation to control vibration levels and avoid impacts to nearby structures.

The project itself is a measure to minimize potential impacts to University

Slough sediments. The purpose of the project is to prevent overflows of combined sewage into University Slough.

## 2. Air

- a. What types of emissions to the air would result from the proposal (e.g., dust, automobile, odors, industrial, wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.**

The proposal will involve temporary construction-related air emissions. These will include dust generated by construction activities and exhaust from construction equipment. Emissions will consist primarily of soil particles, carbon monoxide and hydrocarbons.

Sewage odors could be temporarily emitted from the NE 54<sup>th</sup> Street Drop Structure, box culvert and 24<sup>th</sup> Avenue Diversion Structure when they are opened during construction.

A King County Greenhouse Gas Emissions worksheet is attached.

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

Increased vehicular traffic near Ravenna Park associated with construction of the SDOT NE 45<sup>th</sup> Street Viaduct: West Approach Replacement Project will result in increased automobile emissions in the project area. However, this will not affect the proposal.

- c. Describe proposed measures to reduce or control emissions or other impacts to air, if any.**

Short term construction-related air pollutant emissions will be addressed by requiring proper maintenance of equipment, avoiding prolonged idling of vehicles and equipment, and using spray water to minimize dust if necessary.

To minimize sewer odors, manholes would remain covered when possible. If necessary, a temporary odor control unit could be used to control sewer odors at the NE 54<sup>th</sup> Street site.

## 3. Water

- a. Surface:**

- 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, and wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.**

Yes. The Ravenna Park site is adjacent to Ravenna Creek, which is a “Type Np Water,” as defined in WAC 222-16-030(3) (i.e., perennial non-fish habitat stream). Ravenna Creek travels in its stream bed from the northern end of the park through a forested ravine until it reaches the southeastern corner of Ravenna Park. At that point, creek flow takes one of the following two paths: (1) Low creek flow (flow less than approximately 3 cfs) drops into the stream transfer system and is conveyed to University Slough, which flows into Union Bay on Lake Washington, and (2) High creek flow (flow more than approximately three cfs) enters the combined sewer system, is conveyed to the West Point Treatment Plant in the City of Seattle’s Magnolia neighborhood, is treated and then discharged to Puget Sound.

The University Slough is a drainage canal that flows into Union Bay on Lake Washington. The Ravenna Creek stream transfer pipe discharges to University Slough just south of NE 45<sup>th</sup> Street.

**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. Work will be performed within 200 feet of Ravenna Creek. Most of the project work, including excavation, will take place in the ball field located on the west side of Ravenna Creek. This is where the box culvert will be unearthed, the new section of stream transfer pipe will be constructed and installed, and the Flow Split Structure and Flow Junction Structure will be constructed. The area further west, but still within 200 feet of the creek, will be used for project staging.

Work will also be performed at the 24<sup>th</sup> Avenue Diversion Structure, which is located on the west bank of Ravenna Creek. However, this work will not require any excavation and all project work will take place inside of the existing structure.

Work will be performed adjacent to University Slough between NE 45<sup>th</sup> Street and NE Clark Road. The slough’s native plant buffer in this area is failing and will be replanted. No in-water work will be required.

**3. Estimate the amount of fill and dredge material that could 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 materials.**

None

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

Yes. Ravenna Creek flow will be temporarily diverted to keep flow out of conveyance facilities when they are being modified or constructed. Creek flow will be diverted when modifications are being made to the NE 54<sup>th</sup> Street Diversion Structure and when the 12-inch-diameter stream transfer pipe is being inserted into the box culvert. Creek flow may also need to be diverted when the Flow Split Structure and the Flow Junction Structure are constructed.

Creek flow will be pumped from the existing 18-inch-diameter storm drain pipe (near where the new Flow Split Structure will be constructed) and conveyed to a discharge point in the combined sewer system by a temporary above-ground pipe. Potential discharge locations include the 24<sup>th</sup> Avenue Diversion Structure, the existing 18-inch-diameter storm drain pipe, a storm drain located next to the proposed new Flow Junction Structure site, and a storm drain located on NE 55<sup>th</sup> Street. Pumps will be powered by a diesel fuel generator. It is estimated that creek flow will be between 1.0 and 2.5 cfs during the construction period. If creek flow exceeds 2.5 cfs, then diversion of the creek may be stopped until creek flow is 2.5 cfs or less to ensure adequate pumping capacity is available. The creek will need to be diverted for approximately 6-8 weeks and the contractor will avoid diverting the creek during nighttime hours if practicable.

During construction, all Ravenna Creek flow will be routed to the combined sewer system and conveyed to the West Point Treatment Plant (as described in Sections A.6 and A.11).

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

No

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

No waste materials will be intentionally discharged to surface waters. Small amounts of construction-related materials may enter surface waters (e.g., oils, greases, lubricants, etc. from construction equipment) as a result of runoff from the site. See Section C.3.d for measures to minimize the

potential for these materials to be discharged to surface waters.

**b. Ground**

**1. Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.**

Yes. Groundwater will be withdrawn from excavations to allow construction to be carried out in dry conditions. This water will be conveyed to a discharge point in the combined sewer system by a temporary above-ground pipe. The discharge location will partially depend on the construction activities taking place. Potential discharge locations include the 24<sup>th</sup> Avenue Diversion Structure, the existing 18-inch-diameter storm drain pipe, a storm drain located next to the proposed new Flow Junction Structure site, and a storm drain located on NE 55<sup>th</sup> Street. The groundwater level at the Ravenna Park site, where excavation will occur, is approximately 21 feet below the present ground surface. The volume and rate of groundwater withdrawal will depend on the dewatering method, which will be determined by the contractor. It is expected that the dewatering rate will be less than 25,000 gallons per day and dewatering is expected to occur for approximately five weeks.

**2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any. 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) is expected to serve.**

Small spills or leaks of fluids used by construction equipment (e.g., motor oil, diesel fuel, hydraulic fluid, lubricant) could occur during construction. See Section C.3.d for measures to minimize the potential for these materials to be discharged into the ground.

**c. Water Runoff (including storm water)**

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

The source of runoff will be storm water, as is currently the case at both project sites. During construction, runoff will be directed to the local storm water collection system, the sanitary sewer system, Ravenna Creek, or vegetated areas into which it can infiltrate. The storm water collection

system and Ravenna Creek convey flows to the sanitary sewer system or to University Slough, which flows into Union Bay on Lake Washington. The sanitary sewer system conveys flows to the West Point Treatment Plant, which treats the water and discharges it to Puget Sound.

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

Runoff from construction sites has the potential to contain small amounts of motor oil, diesel fuel, hydraulic fluid, and other equipment-related materials, as well as sediment. These substances could enter ground or surface waters. See Section C.3.d for measures to minimize this potential.

**d. Describe proposed measures to reduce or control surface, ground, and runoff water impacts, if any.**

The project will be constructed in accordance with applicable state and local permits, which will specify a range of measures designed to reduce or control potential surface, ground, and/or runoff water impacts. Potential Best Management Practices and other erosion and sediment control measures are described in Section B.1.h.

Water discharged from the project site during construction will be monitored and, if necessary, treated. Settling tanks and/or other treatment measures will be used if needed to ensure that this water meets King County Industrial Waste discharge requirements.

Project plans and specifications related to the diversion of Ravenna Creek will require that creek flow be diverted from a point downstream of the day-lighted portion of the creek channel in order to minimize impacts to the creek.

During construction, an inflatable device will be used to plug the existing 18-inch-diameter stream transfer pipe. This will prevent sewage from entering the pipe and being discharged to University Slough. The plug will be removed after project construction has been completed.

Flow levels in the 24<sup>th</sup> Avenue Diversion Structure will be monitored for at least two years after the project is constructed to ensure that the 24<sup>th</sup> Avenue Diversion Structure, the box culvert, and the stream transfer pipe can accommodate upstream pipe capacity.

The project itself is a measure to minimize potential impacts to surface waters. The purpose of the project is to prevent overflows of combined sewage into University Slough.

#### 4. Plants

##### a. Check or circle types of vegetation found on the site:

- deciduous tree: alder, oak, aspen, other: Pacific dogwood  
 evergreen tree: fir, cedar, pine, spruce, other  
 shrubs: snowberry, salmonberry, twinberry, Pacific ninebark, Red-osier dogwood, thimbleberry, red-flowering currant, tall Oregon grape, hazelnut  
 grass  
 pasture  
 crop or grain  
 wet soil plants: cattail, buttercup, bullrush,  
 skunk cabbage, other  
 water plants: water lily, eelgrass, milfoil  
 other types of vegetation: fern, other: bindweed, nightshade, ivy

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

Approximately 12,000 square feet of grass in the ball field will be removed or altered and approximately 450 square feet of vegetation will be cleared to create the construction vehicle access ramp between the ball field and NE 55<sup>th</sup> Street. Vegetation to be removed in this area includes shrubs (mostly snowberry), ferns, and approximately five small trees (quaking aspen, grand fir, and garry oak).

Vegetation next to the 24<sup>th</sup> Avenue Diversion Structure may be temporarily disturbed during construction when the structure is accessed and/or by the presence of a temporary above-ground pipe if the structure is used as a discharge point for diverted creek water or water pumped from excavations.

Weeds will be removed and approximately 10 dead conifers replaced in an approximately 15,000-square-foot area of the Ravenna Creek native plant buffer installed during construction of the creek day-lighting project. This will be done as mitigation for partial closure of the park during construction (see Section 12.c).

The approximately 16,000-square-foot University Slough native plant buffer that was planted as mitigation following the May 2008 sewer spill is failing and will be replanted with native vegetation. This work will be done to mitigate the diversion of Ravenna Creek flow from University Slough to the West Point Treatment Plant during Phase A of this project (see Section A.11).

##### c. List threatened or endangered species or critical habitat known to be on or near the site.

None known

**d. Describe proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on site.**

Requiring Ravenna Creek flow to remain in the day-lighted portion of the creek bed will minimize the impacts of the creek diversion on plants in and near the creek bed.

All grass in the Ravenna Park project area that is removed or altered will be replaced after the project is constructed. Any part of the irrigation system in this area that is damaged during construction will also be replaced.

Vegetation removed to create the construction vehicle access ramp will be replaced after the project is constructed. The quarry spill pad will be removed and the area will be restored with mulch and native plants similar to those that were there prior to construction. Large trees on either side of the access ramp will be protected during construction.

An approximately 15,000-square-foot area of the Ravenna Creek native plant buffer installed during construction of the creek day-lighting project will be weeded and approximately 10 conifers that died will be replaced. This will be done as mitigation for partial closure of the park during construction (see Section 12.c).

The approximately 16,000-square-foot University Slough native plant buffer that was planted as mitigation for the May 2008 sewer spill is failing and will be replanted with native vegetation. This work will be done to mitigate the diversion of Ravenna Creek flow from University Slough to the West Point Treatment Plant during Phase A of this project (see Section A.11).

**5. Animals**

**a. Underline any birds and animals which have been observed on or near the site or are known to be on or near the site:**

Fish: bass, salmon, trout (cutthroat), herring, other: stickleback, sculpin (these fish have been observed in University Slough)

Amphibians: frogs, salamanders, other

Reptiles: lizards, snakes, turtles, other

Birds: hawks, heron, eagle, songbirds, ducks, other

Mammals: deer, bear, elk, beaver, raccoon, other: rats, squirrels

**b. List any threatened or endangered species or critical habitat near the site.**

None known

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

Yes. The entire Puget Sound area is part of the Pacific Flyway for migratory birds.

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

The proposed measures to reduce or control surface, ground, and runoff water impacts (described in Section 3.d) and the proposed measures to preserve or enhance vegetation on site (described in Section 4.c) will help preserve and enhance wildlife.

The project itself is a measure to minimize potential impacts to wildlife. The purpose of the project is to prevent overflows of combined sewage into University Slough.

**6. Energy and Natural Resources**

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

During construction, fossil fuels will power construction vehicles, equipment, and haul trucks. Electricity and/or diesel fuel-driven generators will be used to power excavation dewatering pumps, the creek diversion pump, and the ventilation system.

The only energy used by the completed project will be fossil fuels used in maintenance staff vehicles during periodic site visits.

**b. Would the project affect the potential use of solar energy by adjacent properties? If so, explain.**

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, spills, or hazardous waste that could occur as a result of this proposal? If so, describe.**

**1. Describe special emergency services that might be required.**

None will be required

**2. Describe proposed measures to reduce or control environmental health hazards.**

As described in Sections B.1.h and B.3.d above, best management practices and other measures will be used to avoid or contain/control any spills or other releases of hazardous materials during project construction.

During construction, ventilation systems will be used as necessary to ensure that workers are not exposed to hazardous levels of harmful sewer gases.

During construction, the outlet pipe to the box culvert at the 24<sup>th</sup> Avenue Diversion Structure will be plugged to prevent wastewater flows from entering the construction area during high flow periods that could be triggered by an unlikely heavy storm event. Project construction is scheduled for the dry season to avoid such events.

The project itself is a measure to reduce environmental health hazards. The purpose of the project is to prevent overflows of combined sewage into University Slough.

**b. Noise**

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

Urban traffic noises exist in the project area, but they will not affect the project.

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

All noise impacts will be temporary and occur during project construction. Construction will mainly occur during normal weekday working hours. Weekend or overtime work may be required at times and would require a noise variance from the City of Seattle.

Construction noise levels will vary depending on the specific equipment

used for particular activities. Construction noise will typically consist of engine noise, reverse gear warning systems, and mechanical and scraping noises associated with the use of heavy construction equipment such as bulldozers, graders, and loaders. Based on previous construction projects, typical noise levels generated by this type of equipment can be expected to range from about 70 to 90 dBA measured at a distance of 50 feet from the source. If sheet piles are installed as excavation shoring, use of a vibratory pile driver in combination with other equipment could temporarily increase noise levels to as much as 97 dBA. It would take approximately five days to install sheet piles.

Noise will also be generated during construction by pumps used to divert Ravenna Creek and dewater excavations. The pump used to divert the creek will generate noise levels measuring less than 60 dBA at a distance of 23 feet. The pumps that will be used to dewater excavations are expected to generate even lower noise levels. Exact noise levels will depend on the dewatering method used, which will be determined by the contractor. It is likely that one or two generators will be used to power the dewatering pumps and/or the creek diversion pump. The generators would create noise levels measuring up to 60 dBA at a distance of 23 feet. Noise associated with diversion of the creek will be limited to daytime hours, if practicable.

The ventilation system used to ensure that workers are not exposed to hazardous levels of harmful sewer gases at the NE 54<sup>th</sup> Street site would produce noise levels measuring up to 84 dBA at a distance of five feet.

Materials hauling activities and workers' vehicles will add slightly to traffic noise on roads used to access the site during project construction.

### **3. Describe proposed measures to reduce or control noise impacts, if any.**

All construction activities will comply with applicable noise regulations.

If practicable, the creek will not be diverted during nighttime hours. Additional measures to reduce or control noise impacts during construction could include the following:

- Use noise barriers if needed;
- Ensure that all gas powered equipment use mufflers;
- Notify residents and businesses near project areas of upcoming noisy construction activities; and
- Create a 24-hour construction hotline to promptly respond to questions and complaints.

## **8. Land and Shoreline Use**

**a. What is the current use of the properties adjacent to the site?**

The Ravenna Park site is surrounded by open space and residential and commercial properties.

The NE 54<sup>th</sup> Street site is surrounded by residential and commercial properties.

The University Slough site is bordered by a golf driving range, University of Washington athletic field, parking lot, open space and commercial properties.

**b. Has the site been used for agriculture? If so, describe.**

No

**c. Describe any structures on the site.**

Above-ground structures located on the Ravenna Park site include a paved walking path, concrete benches built into the hill on the southern side of the ball field, and a concrete stairway that connects the ball field to NE 55<sup>th</sup> Street. Below ground structures include the sewer and stream conveyance facilities described in Section A.11 and an irrigation system used for the ball field.

The NE 54<sup>th</sup> Street site is located in the paved street and does not contain any above-ground structures. Below ground structures include the sewer and stream conveyance facilities described in Section A.11.

The Clark Road Bridge borders the southern edge of the University Slough site.

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

Below-ground structures will be demolished at the Ravenna Park site. They include an existing manhole near the site of the new Flow Split Structure and approximately 40 feet of the box culvert near the site of the new Flow Junction Structure.

An existing concrete weir in the NE 54<sup>th</sup> Street Drop Structure will be demolished.

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

The Ravenna Park site's zoning classification is "open space."

The NE 54<sup>th</sup> Street site's zoning classification is "residential multifamily low-rise," "residential-commercial," and "neighborhood commercial."

The University Slough site's zoning classification is "major institutions overlay, low-rise residential/commercial."

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

The Ravenna Park site's comprehensive plan designation is "open space."

The NE 54<sup>th</sup> Street site's comprehensive plan designation is "multi-family residential" and "commercial/mixed use."

The University Slough site's comprehensive plan designation is "major institutions."

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

Not applicable

**h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.**

Yes. Both the Ravenna Park and NE 54<sup>th</sup> Street sites are classified as "geologic hazard areas" due to their liquefaction potential. Most of the Ravenna Park site is classified as a "fish and wildlife habitat conservation area." The Ravenna Park site also includes areas classified as "steep slope areas" and "wetlands." These areas are located adjacent to Ravenna Creek.

The University Slough site is classified as a "geologic hazard area" due to its liquefaction and peat settlement potential, "wetland," and "abandoned landfill." Part of the site is classified as a "steep slope area."

**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. Describe proposed measures to avoid or reduce displacement impacts, if any.**

None proposed

**1. Describe proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.**

The proposal will not result in any long-term changes to land uses. The proposed measures to reduce or control surface, ground, and runoff water impacts (described in Section 3.d) and the proposed measures to preserve or enhance vegetation on site (described in Section 4.c) will help minimize construction impacts to environmentally sensitive areas.

**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. Describe proposed measures to reduce or control housing impacts, if any.**

None proposed

**10. Aesthetics**

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

All proposed structures are at or below grade.

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

None

**c. Describe proposed measures to reduce aesthetic impacts, if any.**

Several benches and pieces of art are located on and beside the paved walkway in the Ravenna Park site. These include granite rocks with plaques mounted on them, granite rocks designed to serve as seats, decorative granite rocks, and an approximately 4' x 8' strip of decorative blue pavement that marks the location where Ravenna Creek passes under the walkway. These objects will be temporarily removed, if necessary, and/or protected during project construction.

The strip of blue pavement will be cut from the walkway, stored during construction, and then restored to its original position at the end of construction.

**11. Light and Glare**

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

Temporary lighting will be used at the Ravenna Park site if overtime construction work takes place during hours of darkness.

The completed project will not use lighting or produce glare.

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

No

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

None

**d. Describe the proposed measures to reduce or control light and glare impacts, if any.**

None proposed

**12. Recreation**

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

The Ravenna Park site contains a ball field which will be used for project construction and staging. Annual little league tournaments take place at the ball field in the month of June and the ball field is reserved for league play during the summer months. When not used for baseball or softball, the ball field is used informally by people playing Frisbee, walking dogs, etc.

The east end of the Ravenna Park site contains a paved path that parallels the course of Ravenna Creek. The path connects the park entrance at NE 55<sup>th</sup> Street to the dirt road and paths located to the north of the project site in a forested ravine. Walkers, joggers, hikers, bikers and others use the paths to recreate and sometimes for commuting.

The heavily used Burke-Gilman trail is located approximately four blocks south

of the NE 54<sup>th</sup> Street site. Walkers, joggers, bikers, and others use the trail for recreation and commuting.

The University Slough site is bordered to the west by a golf driving range and to the east by a University of Washington athletic field.

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

Yes. The majority of the ball field and the walkway around the east end of the ball field will be fenced off and inaccessible to the public during construction. Baseball and softball games will not be scheduled for the months of July, August, September or October in 2010 to accommodate the construction schedule. League play will be scheduled at alternative ball fields in Northeast Seattle.

Other fields and trails located nearby in the park will be available for use. These include a field located to the west of the ball field and a paved path on the west end of the ball field that connects the park entrance at NE 55<sup>th</sup> Street to the dirt road and paths located to the north of the project site.

**c. Describe proposed measures to reduce or control impacts on recreation, including recreational opportunities to be provided by the project or applicant.**

Project construction will not begin until June 21, 2010 or later so that the Ravenna Park ball field can be used for little league tournaments that take place annually in the first part of June.

Mitigation for impacts to Ravenna Park during project construction, including partial closure of the park, will include weeding of the native plant buffer that was installed during construction of the Ravenna Creek day-lighting project; replacement of several conifers in the Ravenna Creek buffer that have died; mulching and planting of the vegetated area used by construction equipment to access Ravenna Park; restoration of the ball field, walkways, and any other areas disturbed by construction; and replacement of any parts of the ball field irrigation system damaged during construction.

**13. Historic and Cultural Preservation**

**a. Are there any places or objects listed on or eligible for national, state, or local preservation registers known to be on or next to the site? If so, generally describe.**

No listed or eligible places or objects are known to be on or next to the Ravenna

Park or NE 54<sup>th</sup> Street sites. Burke Museum records identify archaeological sites that have been discovered 0.25 mile north of the Ravenna Park site and 0.5 mile southeast of the NE 54<sup>th</sup> Street site.

**b. Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.**

Records indicate that a marsh was previously located immediately south of the Ravenna Park site. This area has been filled. No other evidence of archaeological or cultural importance is known to be on or next to the Ravenna Park or NE 54<sup>th</sup> Street sites. Ethnographic places identified approximately 0.75-1.0 mile from the project sites include a village site, prairie, creek and burial site.

The University Slough site is located in an area classified by the City of Seattle as an “Archaeological Buffer Overlay District.”

**c. Describe proposed measures to reduce or control impacts, if any.**

Most excavation activities in the Ravenna Park site will occur in fill material, which is present to a depth of approximately 20 feet in the area that will be excavated. A professional archaeologist will monitor any excavation activities that take place in native soils that have not been previously disturbed.

Project activities at the University Slough site will be limited to planting of the University Slough buffer. Minor amounts of soil may be moved to place individual plants, but no excavation will occur and only fill material will be disturbed.

## **14. Transportation**

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

The Ravenna Park site is served by NE 55<sup>th</sup> Street. The site will be accessed by a ramp that is constructed between NE 55<sup>th</sup> Street and the Ravenna Park ball field.

Streets serving the NE 54<sup>th</sup> Street site are NE 54<sup>th</sup> Street, 25<sup>th</sup> Avenue NE, Ravenna Avenue NE and NE 55<sup>th</sup> Street. Construction will take place in the southern lane of NE 54<sup>th</sup> Street and that lane will be closed to traffic for the duration of the construction period.

The University Slough site is served by NE Clark Road. NE Clark Road is accessed from Union Bay Place NE which connects to NE 45<sup>th</sup> Street. These

streets will be used to access the site. Trucks may also drive on the western edge of the athletic field next to University Slough to access the site.

**b. Is the site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?**

Yes. Stops on the following Metro Transit routes are located within 0.2 mile of the Ravenna Park and NE 54<sup>th</sup> Street sites: 30, 68, 74, 83, 243 and 372.

Stops on the following Metro Transit routes are located within 0.2 mile of the University Slough site: 25, 65, 67 and 75.

**c. How many parking spaces would the completed project have? How many would the project eliminate?**

The completed project will not have any parking spaces and will not eliminate any parking spaces.

During construction, approximately six parking spots on NE 55<sup>th</sup> Street and approximately six parking spots on NE 54<sup>th</sup> Street will be temporarily eliminated.

**d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe.**

The proposal will not require any new permanent roads or streets. A temporary access ramp will be created between NE 55<sup>th</sup> Street and the Ravenna Park site for use during construction. After the access ramp is removed, NE 55<sup>th</sup> Street and its northern sidewalk will be restored in accordance with City of Seattle requirements.

Work at the NE 54<sup>th</sup> Street site will be performed in the southern lane of NE 54<sup>th</sup> Street. After project work is completed, NE 54<sup>th</sup> Street and its sidewalk (if damaged by construction activities) will be restored in accordance with City of Seattle requirements.

**e. Will the project 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? If known, indicate when peak volumes would occur.**

After the project is completed, it is expected that trips will be made to the Ravenna Park and NE 54<sup>th</sup> Street sites for maintenance and flow monitoring twice per month, on average.

During construction, the project will generate between 10 and 40 one-way truck trips per day.

**g. Describe proposed measures to reduce or control transportation impacts, if any.**

Transportation impact mitigation will include, at a minimum, the following activities during construction:

- Develop a traffic control plan describing lane closures, vehicle and pedestrian detours, sidewalk closures, signage, flagging, hauling routes, etc. prior to construction;
- To the extent possible, schedule construction trips to avoid peak commuter hours and minimize weekday truck traffic during rush hours; and
- Provide advance notice of the project through postings and other means to alert potentially affected residences and businesses, users of affected roadways, and people affected by the temporary elimination of parking spaces during construction.

As described in Section A.9, the proposed project will be constructed during the same time period that the SDOT NE 45<sup>th</sup> Street Viaduct: West Approach Replacement Project will be constructed. WTD will communicate and coordinate with SDOT before and during construction to minimize transportation impacts to the extent feasible.

**15. Public Services**

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

No

**b. Describe proposed measures to reduce or control direct impacts on public services.**

None proposed

**16. Utilities**

**a. Underline utilities currently available at the site: Electricity, natural gas,**

water, refuse service, telephone, sanitary sewer, septic systems, 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 proposal is a wastewater utility project. Proposed utilities and associated construction activities are described in Section A.11. King County owns, operates and maintains the combined sewer system in the project area, including the 24<sup>th</sup> Avenue Diversion Structure and the NE 54<sup>th</sup> Street Drop Structure. The City of Seattle owns, operates and maintains the constructed creek within Ravenna Park, the existing 18-inch-diameter Ravenna Creek stream transfer pipe and the existing box culvert. King County intends to transfer ownership and maintenance of the proposed new stream transfer pipe to the City of Seattle five years after the project has been completed.

During construction, electricity will be provided by Seattle City Light and/or diesel-fueled generators. Water will be provided by Seattle Public Utilities.

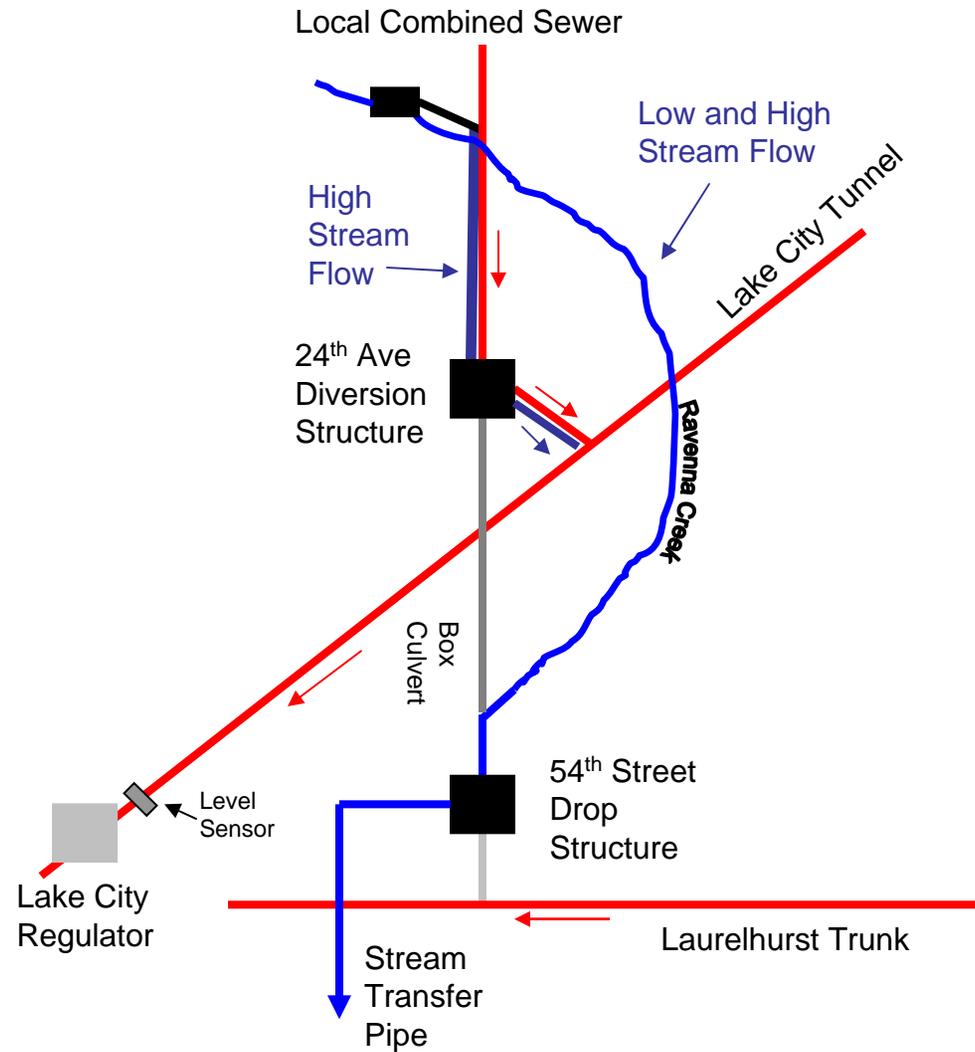
C. SIGNATURE

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.

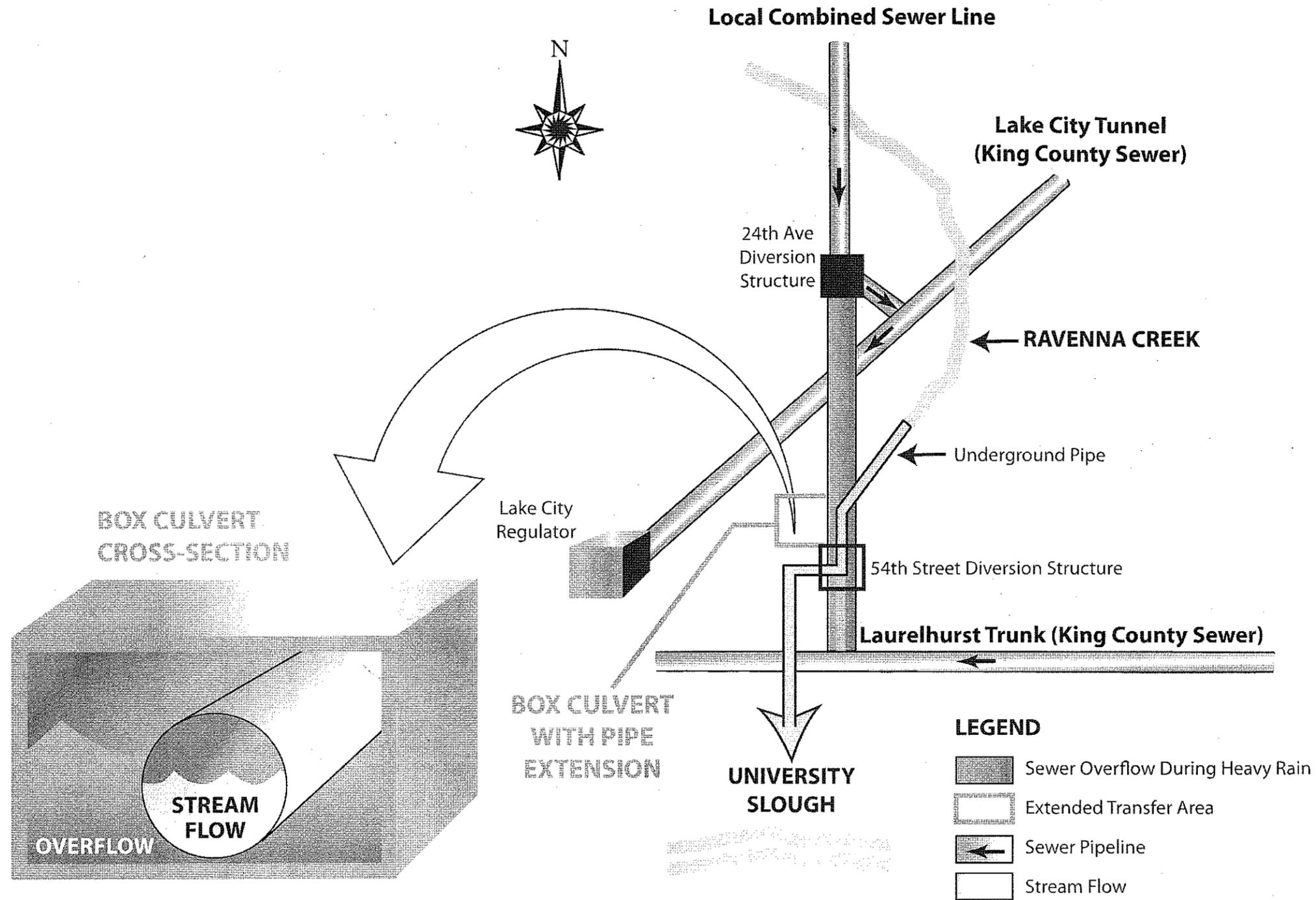
Signature: Wesley Sprague

Date Submitted: 3/10/10

# Conveyance System Schematic for Flows Under Normal Conditions







# Ravenna Creek Stream Transfer Pipe Extension Project

## Project Location & Vicinity Map



**Ravenna Creek Stream Transfer Pipe Extension Project—Phase B**

Greenhouse Gas Emissions Worksheet

**Section I: Buildings**

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e)			Lifespan Emissions (MTCO2e)
			Embodied	Energy	Transportation	
Single-Family Home.....	0		98	672	792	0
Multi-Family Unit in Large Building .....	0		33	357	766	0
Multi-Family Unit in Small Building .....	0		54	681	766	0
Mobile Home.....	0		41	475	709	0
Education .....		0.0	39	646	361	0
Food Sales .....		0.0	39	1,541	282	0
Food Service .....		0.0	39	1,994	561	0
Health Care Inpatient .....		0.0	39	1,938	582	0
Health Care Outpatient .....		0.0	39	737	571	0
Lodging .....		0.0	39	777	117	0
Retail (Other Than Mall).....		0.0	39	577	247	0
Office .....		0.0	39	723	588	0
Public Assembly .....		0.0	39	733	150	0
Public Order and Safety .....		0.0	39	899	374	0
Religious Worship .....		0.0	39	339	129	0
Service .....		0.0	39	599	266	0
Warehouse and Storage .....		0.0	39	352	181	0
Other .....		0.0	39	1,278	257	0
Vacant .....		0.0	39	162	47	0

**Section II: Pavement.....**

Pavement.....		3.00				150
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**Total Project Emissions\*:**

**150**