



**City of Bellevue  
Development Services Department  
Land Use Staff Report**

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**Proposal Name:** SE 7<sup>th</sup> Streetlights

**Proposal Address:** SE 7<sup>th</sup> Place unimproved Right-of-Way east of Lake Hills Connector

**Proposal Description:** The applicant requests a Critical Areas Land Use Permit for the installation of 10 streetlights to illuminate the public right-of-way and improve pedestrian, bicycle and automobile safety.

**File Number:** 10-115397 XE

**Applicant:** Kam Szabo, Bellevue Transportation Department

**Decisions Included:** Critical Areas Land Use Permit  
(Process II. LUC 20.30P)

**Planner:** Kevin LeClair, Planner

**State Environmental Policy Act  
Threshold Determination:** SEPA Exempt Per WAC 197-11-800(2)(c)

**Director's Decision:** **Approval with Conditions**  
Michael A. Brennan, Director  
Development Services Department

By:   
Carol V. Helland, Land Use Director

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Application Date: June 18, 2010  
Notice of Application Publication Date: July 8, 2010  
Decision Publication Date: July 29, 2010  
Project/SEPA Appeal Deadline: August 12, 2010

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For information on how to appeal a proposal, visit Development Services Center at City Hall or call (425) 452-6800. Comments on State Environmental Policy Act (SEPA) Determinations can be made with or without appealing the proposal within the noted comment period for a SEPA Determination. Appeal of the Decision must be received in the City's Clerk's Office by 5 PM on the date noted for appeal of the decision.

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1. Construction Plans
2. Applicant's Alternatives Analysis

## I. Proposal Description

The SE 7<sup>th</sup> Place Streetlights project limits are from Lake Hills Connector to the 12600 block, where the residential area begins. This project proposes to install 10 light-emitting diode (LED) streetlights and poles in total - 9 along SE 7<sup>th</sup> Place and 1 on the trail/path leading to the bus stop on Lake Hills Connector. Construction of the project would consist of trenching from the intersection of SE 7<sup>th</sup> Place and Lake Hills Connector and the installation of streetlight poles, foundations, junction boxes, and conduit for wiring.

The Land Use Code (LUC) 20.25H.055 characterizes the proposal as “new or expanded public right-of-way.” The code allows for this type of use within critical areas and their buffers, provided there is no other technically feasible alternative with less impact on the critical area or buffer and if specific performance standards are met. This report details the alternative analysis conducted for this proposal and the applicable performance standards.

## II. Site Description, Zoning, Land Use and Critical Areas

### A. Site Description

SE 7th Place is one of the main entrances into the Wilburton neighborhood. This roadway consists of a two lane roadway with asphalt shoulders ranging from 2 feet to 8 feet on each side. There is a 5-ft wide asphalt pathway on the south side of the street starting from Lake Hills Connector and approximately 600 feet in length. This roadway serves the adjacent Wilburton neighborhood as well as public transit and school transportation.

The project is within the Kelsey Creek Drainage Basin. There is a Type N stream that crosses under SE 7th Place in a culvert, approximately 460 feet east of Lake Hills Connector (dark blue line in Fig. 1 below). This stream is not fish-bearing, but has a surface water connection to Kelsey Creek, a Type F stream. The roadway exists between the Hyak Jr. High School Wetland and the Kelsey Creek Park Wetland (blue-green shaded area in Fig. 1 below).



Figure 1: Project Area with stream and wetlands shown

## **B. Zoning**

The project area contains two zoning designations. The western half of the project area is zoned R-10 and the eastern half is zoned R-4.

The SE 7<sup>th</sup> streetlights are proposed to be installed within the existing publicly-owned right-of-way on the roadway prism outside of the “improved” right-of-way. In accordance with LUC 20.25H.095.C.2.b, “the edge of the improved right-of-way shall be the extent of the buffer.” The proposed streetlights are in the buffer of the adjacent wetlands.

## **C. Land Use Context**

The project area is a gateway entrance to the Wilburton neighborhood. It is characterized by forested wetlands that border each side of the roadway. The area is rural in character and connects the single-family residential neighborhood on the east to arterial roadways on the west.

## **D. Critical Areas Functions and Values**

### **i. Wetlands**

Wetlands provide important functions and values for both the human and biological environment—these functions include flood control, water quality improvement, and nutrient production. These “functions and values” to both the environment and the citizens of Bellevue depend on their size and location within a basin, as well as their diversity and quality. While Bellevue’s wetlands provides various beneficial functions, not all wetlands perform all functions, nor do they perform all functions equally well. However, the combined effect of functional processes of wetlands within basins provides benefits to both natural and human environments. For example, wetlands provide significant stormwater control, even if they are degraded and comprise only a small percentage of area within a basin.

### **ii. Habitat Associated with Species of Local Importance**

Urbanization, the increase in human settlement density and associated intensification of land use, has a profound and lasting effect on the natural environment and wildlife habitat, is a major cause of native species local extinction, and is likely to become the primary cause of extinctions in the coming century.

**III. Consistency with Land Use Code Requirements:**

**A. Zoning District Dimensional Requirements:**

The site is located in both the R-10 and R-4 land use zoning districts.

**B. Critical Areas Requirements LUC 20.25H:**

**i. Analysis of Technical Feasibility for New or Expanded Public Right-of-Way LUC 20.25H.055.C.2**

New or expanded facilities are allowed within the critical area buffer only where no technically feasible alternative with less impact on the critical area or critical area buffer exists.

The applicant has provided a narrative and matrix analyzing the various alternatives. The analysis considered factors such as: light trespass, wetland disturbance, energy consumption, light control and neighborhood aesthetics.

<b>Description</b>	<b>Light Trespass</b>	<b>Wetland Disturbance</b>	<b>Energy Consumption</b>	<b>Light Control</b>	<b>Aesthetical Look</b>
<b>A</b> - 250W Shoebox lights on 40ft tall square concrete poles, placed 10ft clear of traveled way	Large trespass behind each light and 'extra' light being cast beyond the road in the direction of the light	Large disturbance due to the poles being placed 10ft back, and because of weight factor of using concrete poles.	Approximately 6400 kWh/year = \$ 261/year	Not easily controlled without retrofitting ballast in each light.	Arterial style street lighting, not in sync with the wetland or a 'rural' neighborhood setting.
<b>B</b> - 100W & 150W cobra heads lights on 30ft tall metal poles, placed 10ft clear of traveled way	Less trespass than shoebox lights, but still large trespass behind each light	Large disturbance due to the poles being placed 10ft back.	More energy efficient than shoebox lights. Approximately 3600 kWh/year = \$ 147/year	Not easily controlled without retrofitting ballast in each light.	Similar to existing lights on PSE poles, but higher and brighter.
<b>C</b> - Cyclone LED street lights on 22ft metal poles, placed 10ft clear where possible, and within the road prism along the east end of the project	Less bright spots on the road (more uniform light) with slightly less trespass than cobrahead lights	Minimum disturbance because poles are being placed in the roadway prism or improved surfaces with break-away bases.	Approximately 2748 kWh/year = \$ 112/year	Not currently dimmable without a new driver in each light (custom from the manufacturer )	Shorter poles with smaller/less intense lights for the rural setting.
<b>D</b> - Leotek LED Street lights on 23ft metal poles, placed 10ft clear where possible, and within the road prism along the east	Less trespass than cobrahead lights, but multiple light and dark spots on the road	Minimum disturbance because poles are being placed in the roadway prism or improved surfaces with break-away bases.	Approximately 2774 kWh/year = \$ 113/ year	Dimmable, but with added on part and cost	Shorter poles with smaller/less intense lights for the rural setting.

end of the project					
E - Philips Lumec LED Street lights on 30ft metal poles, placed 10ft clear where possible, and within the road prism along the east end of the project	Excellent light control on street, small amount of light trespass behind the light which is being mitigated by plantings. Includes the option to use 'controls' on the lights to dim or turn them off in the middle of the night, or dim them for more energy efficiency and less trespass.	Minimum disturbance because poles are being placed in the roadway prism or improved surfaces with break-away bases.	Approximately 3000 kWh/year = \$ 122/ year	Dimmable driver included with pre-programmed night time dimming feature.	Medium poles with fixtures that are flat, but slightly less 'rural'

Based on a review of the table above, the Philips Lumec LED street lights (Option E) was selected to be the best option for this project for several reasons. One factor in the decision was that the Phillips product was considerably more effective at controlling light trespass and also provided an even light pattern on the roadway.

Another major factor was the dimmability function of the Phillips product with no aftermarket modifications. The other comparable model in terms of light trespass and operational costs offered by Leotek and Cyclone require aftermarket modification to allow them to be dimmable. The Phillips product comes standard with the ability to allow the lights to be lowered in intensity during the early-morning hours when pedestrian and vehicle traffic is at its lowest and nocturnal wildlife are moving through the project area.

The project area underwent a geotechnical analysis and the foundations were designed to minimize impacts to the adjacent wetlands. Based on the soil conditions, either a spread-footing foundation or a deep foundation was necessary. The deep foundations were chosen to minimize the impacts to existing wetland vegetation. This design results in the least possible square footage required for pole-footings.

The LED fixtures being proposed for this project cause little light trespass on the wetland and will help illuminate pedestrians walking along the paved shoulder of SE 7<sup>th</sup> Place. Although situated within the vicinity of a wetland, there is no technically feasible alternative with less impact on the wetland.

**ii. Wetland Performance Standards LUC 20.25H.100**

The following performance standards apply to development on sites with a wetland or wetland critical area buffer. The design has incorporated the following applicable standards as described.

- a. Lights shall be directed away from the wetland.

*The design was modified to the maximum extent practical to meet the intended*

*function of enhancing pedestrian and vehicular safety through this segment of roadway, while minimizing the amount of light trespass into the adjacent wetlands and wetland buffers. This is accomplished by deviating from the City's standard lighting equipment to use a light-emitting diode technology that is more controllable from both a directional and dimmable standpoint. This allows the light to be emitted where it is needed instead of where it isn't. The dimming functionality allows the operator to lower the light output on the facility during the overnight hours when use of the roadway and safety concerns from pedestrian and vehicle conflicts are at their lowest.*

- b. The outer edge of the wetland critical area buffer shall be planted with dense vegetation to limit pet or human use.

*The applicant has submitted a mitigation and restoration plan that provides for dense native plantings behind each light pole that will add buffer functionality to the wetland, and also block some of the light that may escape from the facilities.*

- c. Use of pesticides, insecticides and fertilizers within 150 feet of the edge of the wetland buffer shall be in accordance with the City of Bellevue's "Environmental Best Management Practices," now or as hereafter amended.

*The City is the applicant and follows the vegetation management BMPs in the Environmental Best Management Practices.*

**iii. Performance Standards for Habitat Associate with Species of Local Importance LUC 20.25H.160**

No specific habitat for species of local importance is directly impacted by the proposal; therefore compliance with the performance standards for the wetland buffer will constitute compliance with this part.

**IV. Public Notice and Comment**

Application Date:	June 18, 2010
Public Notice (500 feet):	July 8, 2010
Minimum Comment Period:	July 22, 2010

The Notice of Application for this project was published in the City of Bellevue weekly permit bulletin on July 8, 2010. It was mailed to property owners within 500 feet of the project site. No comments have been received from the public as of the writing of this staff report.

**V. Summary of Technical Reviews**

**Clearing and Grading:**

The Clearing and Grading Division of the Development Services Department has

reviewed the proposed development for compliance with Clearing and Grading codes and standards. The Clearing and Grading staff found that the accumulated cutting and filling associated with the pole foundations and electrical conduits should be shown on the subsequent development plans and be accompanied by temporary erosion and sediment control plans that ensure no migration of soil into the adjacent wetland.

The review of these finalized clearing and grading plans will be completed under the review of the Right-of-Way use permit.

### **Utilities**

The Utilities Department's Development Review Division has reviewed the proposed development for compliance with Bellevue Utilities' codes and standards. The Utilities Development Review staff requested that the subsequent development permit submittal include information relative to the location of existing underground utilities in the project area. They also specified that the pole structures be located at a distance greater than or equal to 5 feet from any existing underground utilities.

## **VI. State Environmental Policy Act (SEPA)**

The proposal is categorically exempt from SEPA environmental review because is street lighting is included as minor new construction in WAC 197-11-800(2)(c).

## **VII. Changes to proposal as a result of City review**

No changes were made to the proposal as a result of City review. The applicant made significant design modifications and analysis prior to application submittal to ensure compliance with applicable codes and standards.

## **VIII. Decision Criteria**

### **A. Critical Areas Land Use Permit Decision Criteria 20.30P**

The Director may approve or approve with modifications an application for a critical areas land use permit if:

#### **1. The proposal obtains all other permits required by the Land Use Code;**

**Finding:** The proposal is required to obtain subsequent Right-of-Way Use Permi that includes clearing and grading review for the pole installation and electrical work in the undeveloped ROW, because there will be clearing and grading in a critical area buffer per Bellevue City Code 23.76.

**2. The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer;**

**Finding:** Based on the preapplication design review and the applicant's alternatives analysis that resulted in the proposed alternative, the applicant has demonstrated that the proposal is utilizing the best available technology that results in the least impact to critical areas and their buffers.

**3. The proposal incorporates the performance standards of Part 20.25H to the maximum extent applicable, and ;**

**Finding:** Section III of this report discusses how the proposal incorporates the applicable performance standards for the use of new or expanded public rights of way and for wetlands and wetland buffers.

**4. The proposal will be served by adequate public facilities including street, fire protection, and utilities; and;**

**Finding:** The proposal does not require any additional public services.

**5. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC Section 20.25H.210; and**

**Finding:** The proposal includes a mitigation and restoration plan that includes 4,063 SF of mitigation planting in exchange for approximately 1,650 SF of disturbance. The mitigation planting also serves the dual purpose of additional light trespass shielding due to the strategic location of the plantings.

**6. The proposal complies with other applicable requirements of this code.**

**Finding:** As discussed in Section IV & V of this report, the proposal complies with all other applicable requirements of the Land Use Code.

## **IX. Conclusion and Decision**

After conducting the various administrative reviews associated with this proposal, including Land Use Code consistency, SEPA, City Code and Standard compliance reviews, the Director of Development Services does hereby **approve with conditions** the proposal to install 10 streetlights within the wetland critical area buffer of the undeveloped right-of-way of SE 7<sup>th</sup> Place.

**Note- Expiration of Approval:** In accordance with LUC 20.30P.150 a Critical Areas Land Use Permit automatically expires and is void if the applicant fails to file for necessary development permits within one year of the effective date of the approval.

## X. Conditions of Approval

The applicant shall comply with all applicable Bellevue City Codes and Ordinances including but not limited to:

<u>Applicable Ordinances</u>	<u>Contact Person</u>
Clearing and Grading Code- BCC 23.76	Janney Gwo, 425-452-6190
Land Use Code- BCC 20.25H	Kevin LeClair, 425-452-2928
Noise Control- BCC 9.18	Kevin LeClair, 425-452-2928

The following conditions are imposed under the Bellevue City Code authority referenced:

**1. Restoration for Areas of Temporary Disturbance:** A restoration plan for all areas of temporary disturbance is required to be submitted for review and approval by the City of Bellevue prior to the issuance of the Right-of-Way Use Permit. The plan shall include documentation of existing site conditions and shall identify the restoration measures to return the site to its existing conditions per LUC 20.25H.220.H.

Authority: Land Use Code 20.25H.220.H  
Reviewer: Kevin LeClair, Land Use

**2. Mitigation for New Permanent Disturbance:** A restoration plan for all areas of permanent new disturbance is required to be submitted for review and approval by the City of Bellevue prior to issuance of the Right-of-Way Use Permit. The plan shall document the total area of permanent disturbance and area of new critical area buffer to satisfy a replacement ratio of one to one, at a minimum.

Authority: Land Use Code 20.25H.210  
Reviewer: Kevin LeClair, Land Use

**3. Rainy Season restrictions:** Due to the proximity to a wetland critical area, no clearing and grading activity may occur during the rainy season, which is defined as November 1 through April 30 without written authorization of the Development Services Department. Should approval be granted for work during the rainy season, increased erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

Authority: Bellevue City Code 23.76.093.A,  
Reviewer: Janney Gwo, Clearing and Grading

**4. Pesticides, Insecticides, and Fertilizers:** The applicant must submit as part of the required Right-of-Way Use Permit information regarding the use of pesticides, insecticides, and fertilizers in accordance with the City of Bellevue’s “Environmental Best Management Practices”.

Authority: Land Use Code 20.25H.220.H  
Reviewer: Kevin LeClair, Land Use

**5. Noise Control:** Noise related to construction is exempt from the provisions of BCC 9.18 between the hours of 7 am to 6 pm Monday through Friday and 9 am to 6 pm on Saturdays, except for Federal holidays and as further defined by the Bellevue City Code. Noise emanating from construction is prohibited on Sundays or legal holidays unless expanded hours of operation are specifically authorized in advance. Requests for construction hour extension must be done in advance with submittal of a construction noise expanded exempt hours permit.

Authority: Bellevue City Code 9.18  
Reviewer: Kevin LeClair, Land Use

# CITY OF BELLEVUE TRANSPORTATION DEPARTMENT



# SE 7TH PLACE STREET LIGHTING

## CITY MANAGER

STEVEN R. SARKOZY

## MAYOR

DON DAVIDSON

## DIRECTOR OF TRANSPORTATION

GORAN SPARRMAN

## CITY COUNCIL

CLAUDIA BALDUCCI

JOHN CHELMINIAK

GRANT DEGGINGER

CONRAD LEE

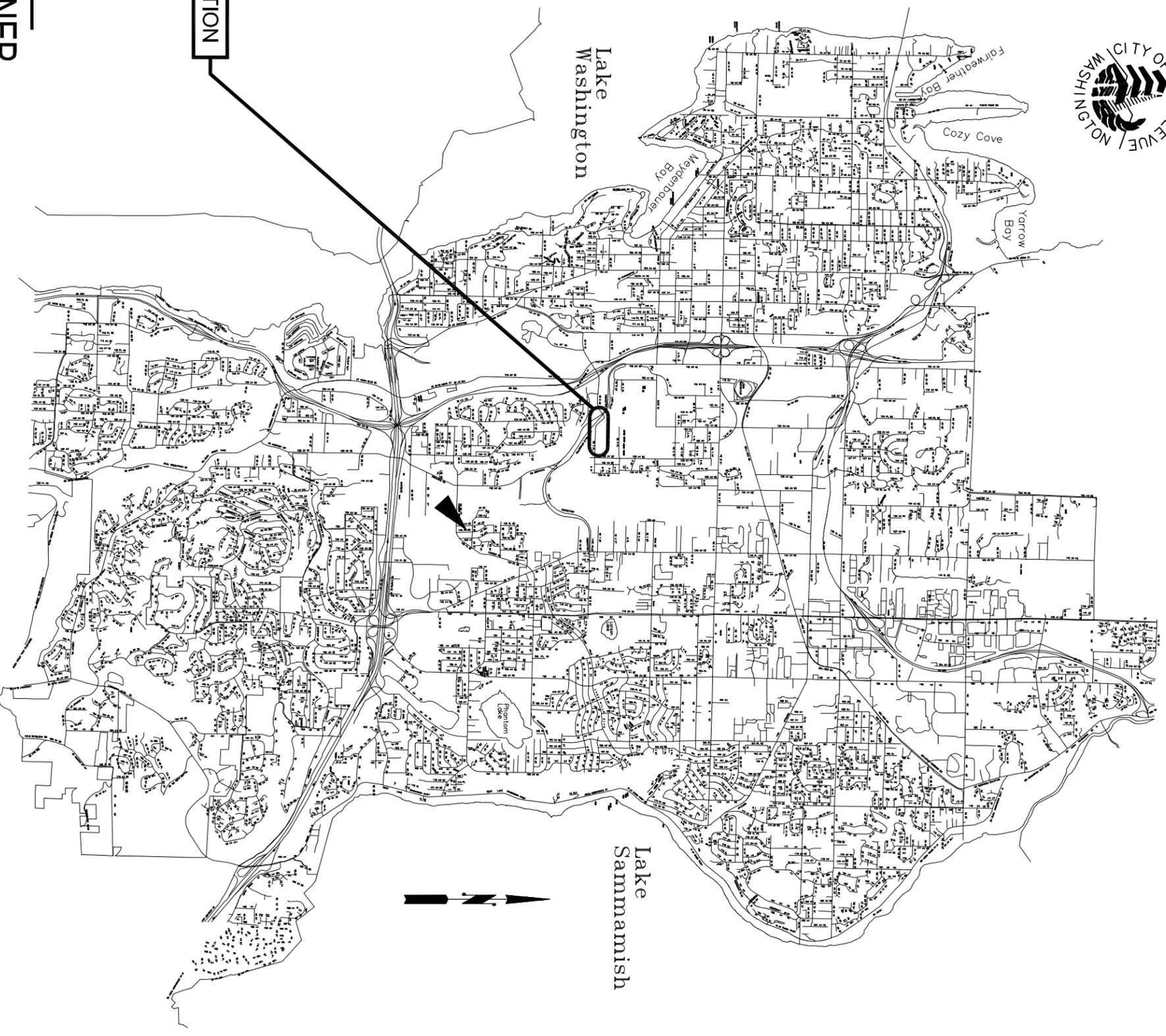
JENNIFER ROBERTSON

KEVIN WALLACE

## SCHEDULE OF DRAWINGS

- | NO. | TITLE              |
|-----|--------------------|
| 1   | COVER SHEET        |
| 2   | ILLUMINATION PLAN  |
| 3   | FOUNDATION DETAILS |

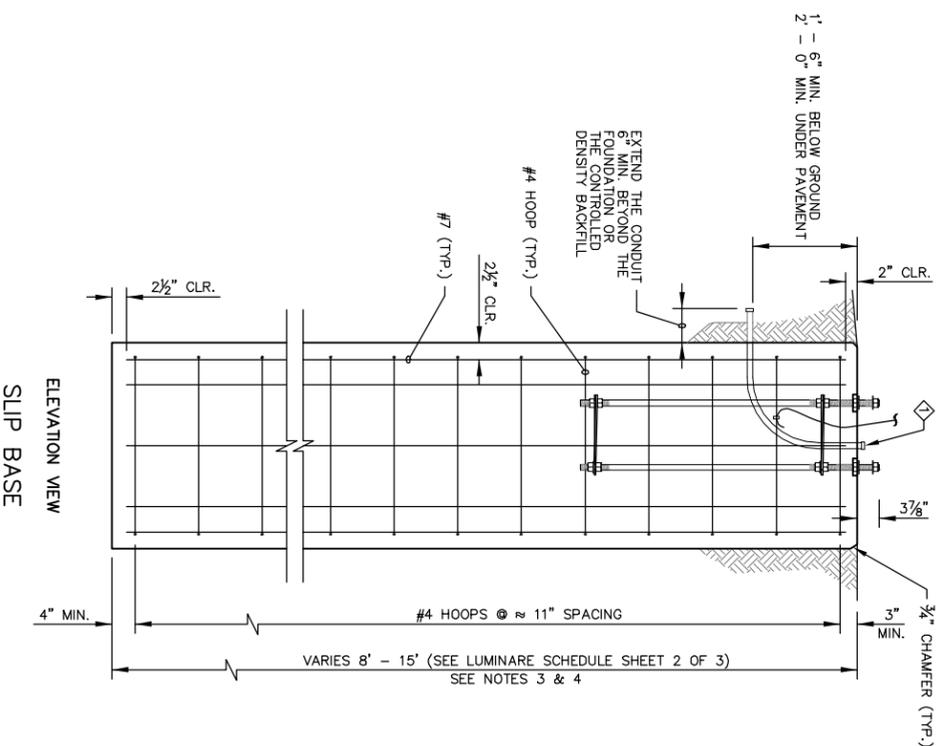
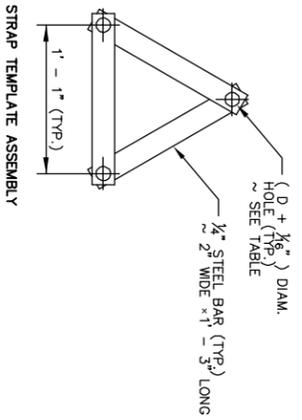
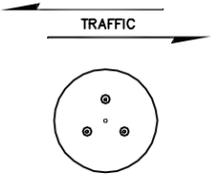
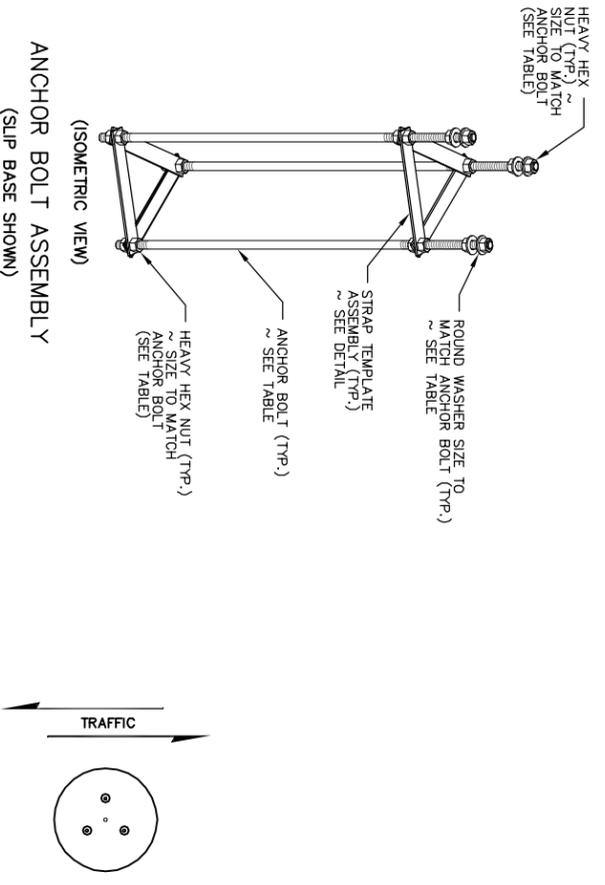
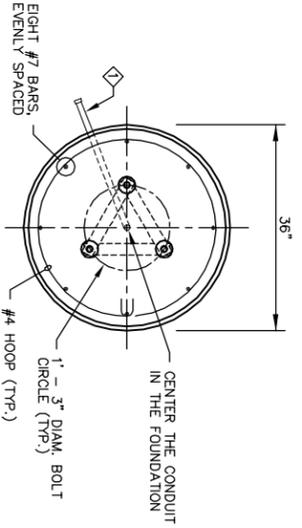
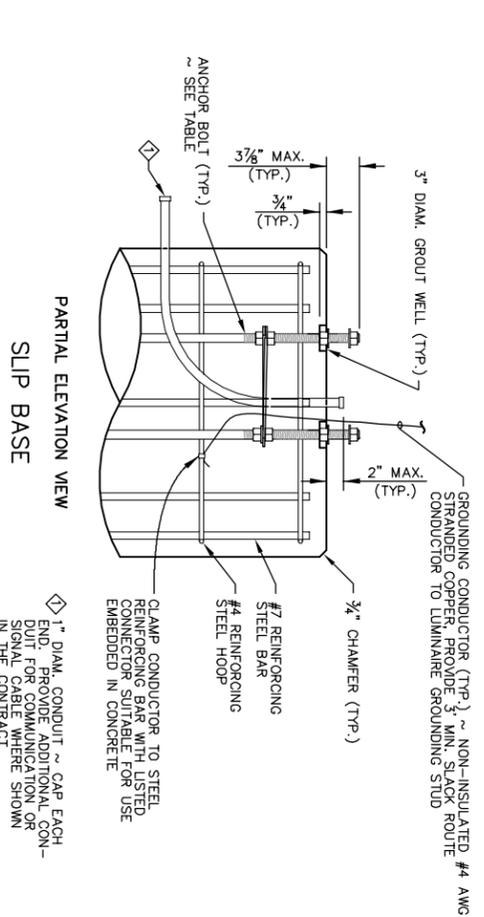
PROJECT LOCATION



BID NO. 10

C.I.P. NO. PW-NEP

# Attachment 1 - Construction Plans



### GENERAL NOTES

- SEE STANDARD PLAN J-28.40 FOR LUMINAIRE POLE BASE MOUNTING DETAILS.
- THE STRAP TEMPLATES SHALL BE HELD IN PLACE BY NUTS, 6" FROM THE TOP OF THE FOUNDATION AND 3" FROM THE BOTTOM OF THE ANCHOR BOLTS. 8 HEAVY DUTY HEX NUTS AND 8 ROUND WASHERS ARE REQUIRED FOR A SLIP BASE ASSEMBLY. 18 HEAVY DUTY HEX NUTS AND 8 FLATE WASHERS ARE REQUIRED FOR A FIXED BASE ASSEMBLY.
- USE STEEL LIGHT STANDARD FOUNDATION TYPE A ON LEVEL GROUND OR SLOPES NOT EXCEEDING 4H:1V. USE TYPE B FOR SLOPES STEEPER THAN 4H:1V, BUT NOT EXCEEDING 2H:1V. SLOPES STEEPER THAN 2H:1V SHALL REQUIRE A SPECIAL DESIGN.
- THESE FOUNDATIONS ARE DESIGNED FOR A MINIMUM OF 2,000 PSF (TYPE A) OR 1,500 PSF (TYPE B) ALLOWABLE LATERAL BEARING PRESSURE FOR THE SOIL. A SPECIAL FOUNDATION SHALL BE REQUIRED FOR SOIL WITH LOWER ALLOWABLE LATERAL BEARING PRESSURE THAN 1,500 PSF.
- THE LUMINAIRE POLE HEIGHT SHALL NOT EXCEED 50' (H1).
- SLIP BASES SHALL NOT BE INSTALLED ON 50' (H1) POLES WITH DOUBLE MAST ARMS, NOR ON POLES WEIGHING MORE THAN 1000 LBS.
- SLIP BASES ARE NOT REQUIRED ON POLES PLACED OUTSIDE OF THE DESIGN CLEAR ZONE, NOR ON POLES INSTALLED BEHIND TRAFFIC BARRIER.
- FOUNDATIONS CONSTRUCTED WITHIN ECOLOGY EMBANKMENTS SHALL BE INCREASED IN DEPTH BY THE DEPTH OF THE ECOLOGY EMBANKMENT.
- EXPOSED PORTIONS OF THE FOUNDATION SHALL BE FORMED TO CREATE A CLASS 2 SURFACE FINISH. ALL FORMING SHALL BE REMOVED UPON COMPLETION OF FOUNDATION CONSTRUCTION.
- FOR EXCAVATION, CONCRETE PLACEMENT, AND BACKFILL OPTIONS, SEE METHOD 1 AND METHOD 2 ON SHEET 2 OF 2.
- THE ANCHOR BOLTS SHALL BE HIGH STRENGTH STEEL, MANUFACTURED FROM ASTM A449, WITH HEAVY HEX NUTS AND HARDENED WASHERS. GALVANIZE THE ANCHOR BOLTS ACCORDING TO AASHTO M292.
- THE FOUNDATION SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF STANDARD SPECIFICATION SECT. 8-20.3(4).
- SEE STANDARD PLAN C-8B AND C-14H FOR STEEL LIGHT STANDARDS ON TRAFFIC BARRIER.

### ANCHOR BOLT TABLE

LUMINAIRE HEIGHT (H1)	MAST ARM TYPE	MAST ARM LENGTH	ANCHOR BOLT DIAMETER "D"
20' TO 50'	SINGLE	6' TO 16'	1"
20' TO 50'	DOUBLE	6' TO 8'	1"
20' TO 45'	DOUBLE	10' TO 16'	1"
46' TO 50'	DOUBLE	10' TO 16'	1 1/8"

NO.	DATE	BY	APPR.	REVISIONS
<b>Approved By</b>				
ENGINEERING MANAGER	DATE	DESIGNED BY	DATE	PROJECT MANAGER
CHECKED BY	DATE	DRAWN BY	DATE	

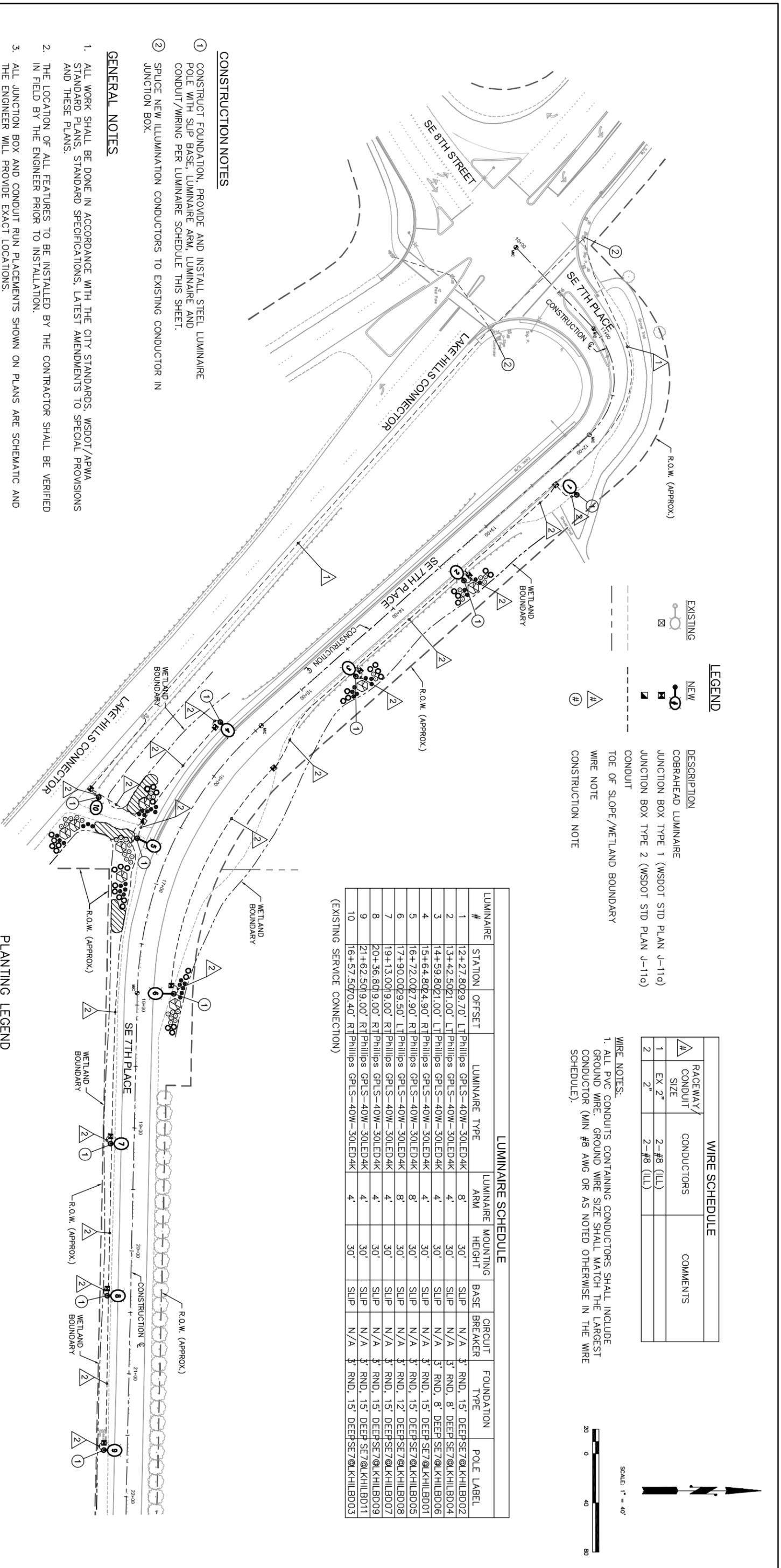
**City of Bellevue**  
TRANSPORTATION DEPARTMENT

**SE 7th Place**

**FOUNDATION DETAILS**

SHT 3 OF 3

# Attachment 1 - Construction Plans



### LEGEND

- EXISTING
  - COBRAHEAD LUMINAIRE
  - JUNCTION BOX TYPE 1 (WSDOT STD PLAN J-110)
  - JUNCTION BOX TYPE 2 (WSDOT STD PLAN J-110)
  - CONDUIT
  - TOE OF SLOPE / WETLAND BOUNDARY
  - WIRE NOTE
  - CONSTRUCTION NOTE
- NEW
  - CONSTRUCTION NOTE

WIRE SCHEDULE		
#	RACEWAY / CONDUIT SIZE	CONDUCTORS
1	EX 2"	2-#8 (ILL)
2	2"	2-#8 (ILL)



SCALE: 1" = 40'

- WIRE NOTES:
- ALL PVC CONDUITS CONTAINING CONDUCTORS SHALL INCLUDE GROUND WIRE. GROUND WIRE SIZE SHALL MATCH THE LARGEST CONDUCTOR (MIN #8 AWG OR AS NOTED OTHERWISE IN THE WIRE SCHEDULE).

LUMINAIRE #	STATION	OFFSET	LUMINAIRE TYPE	ARM	MOUNTING HEIGHT	BASE	CIRCUIT BREAKER	FOUNDATION TYPE	POLE LABEL
1	12+27.80	29.70' LT	Philips GPLS-40W-30LED4K	8'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD02	
2	13+42.50	21.00' LT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	8' DEEP SET @ LKHILBD04	
3	14+59.80	21.00' LT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	8' DEEP SET @ LKHILBD06	
4	15+64.80	24.90' RT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD01	
5	16+72.00	27.90' RT	Philips GPLS-40W-30LED4K	8'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD05	
6	17+90.00	29.50' RT	Philips GPLS-40W-30LED4K	8'	30'	SLIP	N/A	12' DEEP SET @ LKHILBD08	
7	19+13.00	9.00' RT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD07	
8	20+36.80	9.00' RT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD09	
9	21+62.50	9.00' RT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD11	
10	16+57.50	70.40' RT	Philips GPLS-40W-30LED4K	4'	30'	SLIP	N/A	15' DEEP SET @ LKHILBD03	

(EXISTING SERVICE CONNECTION)

### CONSTRUCTION NOTES

- CONSTRUCT FOUNDATION, PROVIDE AND INSTALL STEEL LUMINAIRE POLE WITH SLIP BASE, LUMINAIRE ARM, LUMINAIRE AND CONDUIT/WIRING PER LUMINAIRE SCHEDULE THIS SHEET.
- SPlice NEW ILLUMINATION CONDUCTORS TO EXISTING CONDUCTOR IN JUNCTION BOX.

### GENERAL NOTES

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY STANDARDS, WSDOT/APWA STANDARD PLANS, STANDARD SPECIFICATIONS, LATEST AMENDMENTS TO SPECIAL PROVISIONS AND THESE PLANS.
- THE LOCATION OF ALL FEATURES TO BE INSTALLED BY THE CONTRACTOR SHALL BE VERIFIED IN FIELD BY THE ENGINEER PRIOR TO INSTALLATION.
- ALL JUNCTION BOX AND CONDUIT RUN PLACEMENTS SHOWN ON PLANS ARE SCHEMATIC AND THE ENGINEER WILL PROVIDE EXACT LOCATIONS.
- TWO WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES.
- CALL ONE CALL, 1-800-424-5555, PRIOR TO CONSTRUCTION.
- ALL VEGETATION REMOVAL OR TRIMMING SHALL BE APPROVED BY THE ENGINEER.
- A TRAFFIC/PEDESTRIAN CONTROL PLAN MUST BE PROVIDED TO THE TRANSPORTATION DEPARTMENT FOR APPROVAL AT LEAST 10 DAYS PRIOR TO START OF WORK.
- RIGHT OF WAY WORK HOURS: THE HOURS FOR CONSTRUCTION ACTIVITY, LANE CLOSURES OR ACTIVITIES THAT IMPEDE OR MAY POTENTIALLY IMPEDE TRAFFIC SHALL BE MONDAY THROUGH FRIDAY, 7:00 AM TO 6:00 PM. THE HOURS FOR CONSTRUCTION ACTIVITY IN THE RIGHT OF WAY THAT DOES NOT IMPEDE TRAFFIC SHALL BE MONDAY THROUGH FRIDAY, 7:00 AM TO 6:00 PM. THE INSPECTOR ASSIGNED TO THIS PROJECT MAY CHANGE THESE WORK HOURS TO A MORE SUITABLE TIME FOLLOWING APPROVAL BY THE R.O.W. USE OFFICE.

### PLANTING LEGEND

- FRAXINUS LATIFOLIA / OREGON ASH (9' O.C.)
- PHYSOCARPUS / CAPITATUS / PACIFIC NINEBARK (4' O.C.)
- ROSA NUT KANA / NOOTKA ROSE (4.5' O.C.)
- CORNUS SERICEA / RED-OSIER DOGWOOD (4' O.C.)
- ATHYRIUM FILIX-FEMINA / LADY FERN

NO.	DATE	BY	APPR.	REVISIONS

<b>Approved By</b>	<b>Approved By</b>
ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE

DESIGNED BY	DATE
AKS, DJR	4/10
DRAWN BY	DATE
AKS	4/10
CHECKED BY	DATE
AKS	4/10

**City of Bellevue**  
TRANSPORTATION DEPARTMENT

STATE OF WASHINGTON  
PROFESSIONAL ENGINEER  
NO. 48714  
JAMES A. KISH

**SE 7th Place**

ILLUMINATION PLAN	SHT 2 OF 3
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# Attachment 2 - Alternatives Analysis

City of Bellevue Transportation Department  
Neighborhood Services, Traffic Management Division  
P.O. Box 90012  
Bellevue, WA 98009-9012

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July 1, 2010

To: City of Bellevue  
Planning and Community Development Department

From: Kam Szabo/Vangie Garcia  
City of Bellevue  
Transportation Department

RE: **SE 7<sup>th</sup> PI Streetlights Design Memorandum**

## Project Description

This design memorandum presents the design basis for the SE 7<sup>th</sup> Place Streetlights project. The SE 7<sup>th</sup> Place Streetlights project limits are from Lake Hills Connector to the 12600 block, where the residential area begins. This project proposes to install 10 light-emitting diode (LED) streetlights and poles in total – 9 along SE 7<sup>th</sup> Place and 1 on the trail/path leading to the bus stop on Lake Hills Connector. Construction of the project would consist of trenching from the intersection of SE 7<sup>th</sup> Place and Lake Hills Connector and the installation of streetlight poles, foundations, junction boxes, and conduit for wiring.

This project was funded through the Neighborhood Enhancement Program (NEP) and is the highest priority project for the Wilburton neighborhood.

## Site Description

SE 7<sup>th</sup> Place is one of the main entrances into the Wilburton neighborhood. The project is located in the southern half of Section 33, Township 25 North, Range 5 East. This roadway consists of a two lane roadway with asphalt shoulders ranging from 2 feet to 8 feet on each side. There is a 5-ft wide asphalt pathway on the south side of the street starting from Lake Hills Connector and approximately 600 feet in length. This roadway serves the adjacent Wilburton neighborhood as well as public transit and school transportation.



# Attachment 2 - Alternatives Analysis

The project is within the Kelsey Creek Drainage Basin. There is a Wilburton stream tributary that crosses under SE 7<sup>th</sup> Place in a culvert, approximately 460 feet east of Lake Hills Connector. According to City Drainage maps, this tributary is not fish-bearing. The roadway exists between the Hyak Jr. High School Wetland and the Kelsey Creek Park Wetland.

## Land Use Criteria

This project utilizes the best available construction, and design to result in the least impact on the critical area and critical area buffer in accordance with Part 20.30P.140 LUC. This project will meet the performance standards in LUC 20.25H.100 by directing proposed lighting away from the wetland and installing further screening with vegetation.

## Design Selection Process

Various designs have been considered for the street lights along SE 7<sup>th</sup> place before the current design was selected as the best alternative. The main factors influencing the design decision were: light trespass into the wetland, wetland disturbance (and mitigation), energy consumption, ability to dim or turn off the light remotely, and aesthetical look with respect to the neighborhood and wetland. Below is a table outlining the various design alternatives and how they 'scored' against our main factors.

Description	Light Trespass	Wetland Disturbance	Energy Consumption	Light Control	Aesthetical Look
<b>A</b> - 250W Shoebox lights on 40ft tall square concrete poles, placed 10ft clear of traveled way	Large trespass behind each light and 'extra' light being cast beyond the road in the direction of the light	Large disturbance due to the poles being placed 10ft back, and because of weight factor of using concrete poles.	Approximately 6400 kWh/year = \$ 261/year	Not easily controlled without retrofitting ballast in each light.	Arterial style street lighting, not in sync with the wetland or a 'rural' neighborhood setting.
<b>B</b> - 100W & 150W cobra heads lights on 30ft tall metal poles, placed 10ft clear of traveled way	Less trespass than shoebox lights, but still large trespass behind each light	Large disturbance due to the poles being placed 10ft back.	More energy efficient than shoebox lights. Approximately 3600 kWh/year = \$ 147/year	Not easily controlled without retrofitting ballast in each light.	Similar to existing lights on PSE poles, but higher and brighter.
<b>C</b> - Cyclone LED street lights on 22ft metal poles, placed 10ft clear where possible, and within the road prism along the east end of the project	Less bright spots on the road (more uniform light) with slightly less trespass than cobrahead lights	Minimum disturbance because poles are being placed in the roadway prism or improved surfaces with break-away bases.	Approximately 2748 kWh/year = \$ 112/year	Not currently dimmable without a new driver in each light (custom from the manufacturer)	Shorter poles with smaller/less intense lights for the rural setting.
<b>D</b> - Leotek LED Street lights on 23ft metal poles, placed 10ft clear where possible, and within the	Excellent light control (almost no trespass off the road)	Minimum disturbance because poles are being placed in the roadway prism or improved surfaces	Approximately 1956 kWh/year = \$ 80/ year	Not currently dimmable. First generation of dimming will be in pre-set	Shorter poles with smaller/less intense lights for the rural setting.

## Attachment 2 - Alternatives Analysis

road prism along the east end of the project		with break-away bases.		steps, not a full range.	
E - Philips Lumec LED Street lights on 30ft metal poles, placed 10ft clear where possible, and within the road prism along the east end of the project	Excellent light control on street, small amount of light trespass behind the light which is being mitigated by plantings. Includes the option to use 'controls' on the lights to dim or turn them off during the night.	Minimum disturbance because poles are being placed in the roadway prism or improved surfaces with break-away bases.	Approximately 3000 kWh/year = \$ 122/ year	Dimmable driver included with pre-programmed night time dimming feature.	Medium poles with fixtures that are flat, but slightly less 'rural'

The Philips Lumec LED Street lights (Option E) was selected to be the best option for this project. Once the design was agreed upon, the geotechnical findings were reviewed and foundations were designed to minimize impacts. Because of the soil conditions, either a spread-footing foundation or a deep foundation was necessary. The deep foundations were chosen to minimize the impacts to existing wetland vegetation.

### Minimum Impacts to Critical Area

The SE 7<sup>th</sup> Place Streetlights Project will be installed within the improved roadway prism or within already improved areas along the roadway. The lights will be on during hours of darkness. The LED fixtures being proposed for this project cause little light trespass on the wetland and will help illuminate pedestrians walking along the paved shoulder of SE 7<sup>th</sup> Place. Although situated within the vicinity of a wetland, there is no technically feasible alternative with less impact on the wetland.

The bases will be designed with the least square footage to minimize impacts to the adjacent land. The poles will be designed to be break away due to some lights being located within the clear zone of the travelled roadway.

### Restoration/Mitigation Plan

The project shall mitigate the disturbance area within the wetland by restoring the square footage of impacted area with plants from Template C2 of the Critical Areas Handbook. The amount of disturbance is approximately 1,650 SF and the mitigation square footage is 4,063 SF. See attached plans for detail.