Seattle City Light
CONSTRUCTION STANDARD

Standard Number: 0222.02
Superseding: November 18, 2016
Effective Date: November 9, 2017
Page: 1 of 10

Requirements for Duct Banks in the Public Right-of-Way

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2. Scope

This standard provides the general requirements for the construction and installation of duct banks in the public right-of-way within the Seattle City Light (SCL) service territory. This includes system duct banks of more than two conduits and primary service duct banks with only two conduits.

Job specific requirements are not covered in this standard. Refer to the SCL Requirements Letter for job specific requirements.

3. Application

This standard provides direction to SCL crews and contractors about where and how to properly install duct banks in the public right-of-way.

For cable and conduit installation on private property, refer to SCL 0224.05.

For secondary conduit installations in the right-of-way, refer to SCL 0224.07.

4. Location

Duct banks shall conform to Figures 4.1 and 4.2.

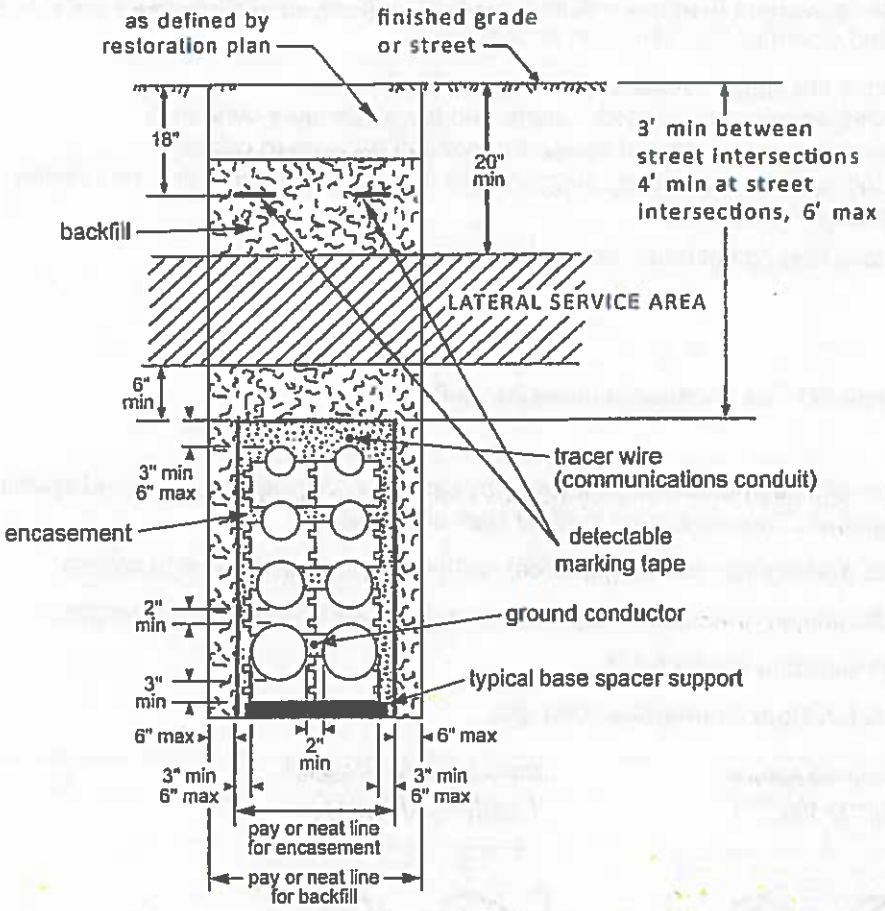
4.1 Depth

A minimum of 3 feet of cover above a duct bank is required between street intersections. A minimum of 4 feet of cover is required at street intersections. Cover shall not exceed 6 feet unless specified by SCL engineer.

4.2 Alignment

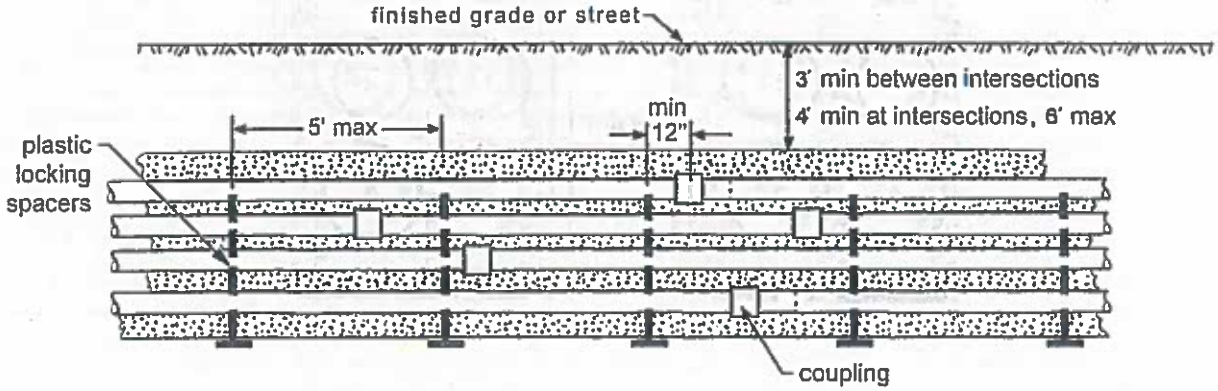
Center line of the duct bank shall be located 15 feet from center line of street on either side of the street unless otherwise specified by the SCL engineer.

Figure 4.1. General Duct Bank, End View



20" W x 12" D duct bank required. Assumed only 12" cover acceptable with steel plating under roadways. 12" cover allowed under planter areas per Technical Requirements.

Figure 4.2. General Duct Bank, Side View



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06/03/18

5. Duct Bank Construction

Duct banks and conduit systems are electrical facilities for power distribution. In order for the electrical system to perform at its full capacity, these systems shall be constructed in a neat and workmanlike manner to ensure that:

- All joints are tightly sealed against water intrusion.
- All joints are properly aligned, square and have adequate cure time.
- All edges are deburred and beveled to prevent damage to cables.
- Conduit runs are adequately supported so they do not become distorted during encasement or backfill.

Installations that do not meet these criteria will be rejected.

5.1 Arrangement

5.1.1 Transposition

Ducts shall NOT be transposed between vaults.

5.1.2 Numbering

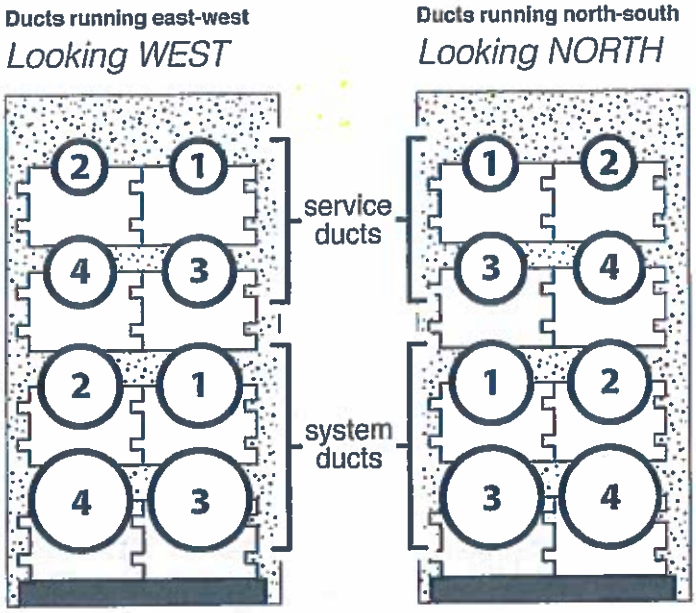
The ducts shall be numbered separately by type; service ducts together and system ducts together. The numbering method shall be as follows:

For ducts running east-west, count from north to south and from top to bottom.

For ducts running north-south, count from west to east and from top to bottom.

Example shown in Figure 5.1.2.

Figure 5.1.2. Duct Numbering Example



5.2 Termination

5.2.1 Permanent

For permanent termination details, see SCL U2-11.3/NDK-30.

The first two feet of all conduits exiting the vault shall be vertically and horizontally perpendicular to the vault face.

If there are multiple duct banks or direct-buried conduits entering horizontally and at right angles to each other in the same corner of a vault, manhole or handhole, they shall enter at different elevations so they are vertically offset to the other.

All duct terminations into vaults, handholes, etc., shall be done by core drill.

Provide and install PVC-type DB-120 conduit end bells flush with the interior walls on all conduits entering the vault. The conduits shall be grouted both inside and outside of the vault. See SCL 7055.09 for approved manufacturers.

5.2.2 Temporary

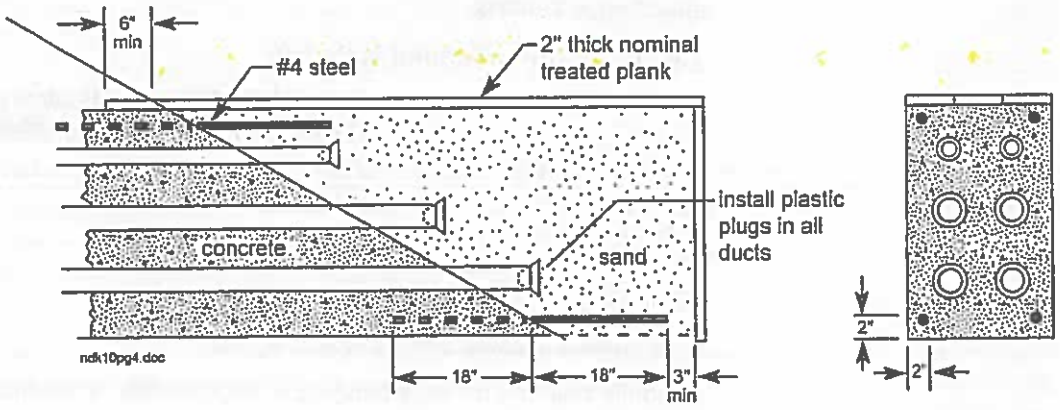
Install reinforcement steel dowels whenever placing of encasement is to be delayed beyond initial set.

Spacers shall be placed as close to the temporary termination as possible in order to maintain proper conduit spacing.

Lower conduit shall be flush or protrude beyond the conduit above it to ease reattachment.

See Figure 5.2.2 for details.

Figure 5.2.2. Temporary Termination



5.3 Changes in Direction

Any changes in direction must consist of only one type of conduit material and all bends must have the radius of the largest conduit. See Table 5.3 for minimum bend radius requirements.

For a horizontal change in direction, the PVC conduit may be cold-formed, provided the deflection does not exceed 15 degrees per 10-ft section.

For standard wall fiberglass conduit, lateral deflection shall not exceed 1 ft per 20-ft section.

Each conduit bend shall be mandreled prior to placement and encasement. See SCL U2-11.40/NDK-40.

Table 5.3. Minimum Bend Radius

Conduit (in)	System[1, 3] (in)	Service[2, 3] (in)
2.5	–	24
3	144	36
4	144	48
5	150	60
6	144	60

Notes:
1. PVC conduit is not allowed for system conduit bends.
2. Bending PVC conduits with heat is not allowed.
3. Typical unless otherwise specified by SCL engineer.

6. Conduits

Schedule 40 PVC, rigid steel or fiberglass conduits can be used in duct banks as specified in Table 6.

Table 6. Allowed Conduit Materials

	Schedule 40 PVC (SCL 7015.05)	Rigid Steel (RGS) (SCL 7050.05)	Fiberglass (SCL 7025.05)
System – Straight	Yes	Yes	Yes
System – Bend	No	Yes	No[1]
Service – Straight	Yes	Yes	Yes
Primary Service – Bend	No	Yes	No[1]
Secondary Service – Bend	No[1]	Yes	Yes

[1] Typical unless otherwise specified by SCL engineer.

Conduits entering an in-building vault and/or within a building shall be steel.

Conduits exposed under aerial structures (bridges, etc.) shall be steel and effectively grounded.

Factory and field straight-cut ends shall be chamfered throughout the duct run.

The conduit shall be RGS if there is 10 ft or less between bends.

Allow two hours minimum to cure conduit adhesive prior to encasement.

7. Trench

The bottom of the trench shall be free of debris and fine-graded by hand to remove sharp, embedded rocks and loose stones over 1/2 inches in size. Or, the trench shall be over-excavated and replaced with bedding material to cover protruding rocks and stones by a minimum of 2 in. The bottom shall be graded even. Bedding material shall be sand.

8. Spacers

Spacers for conduit separation shall be plastic lock-type (see SCL 7015.80) of such configuration to give the required separation between conduit and earth, as shown in Figure 4.1.

Horizontally, spacers shall be placed 5 ft apart in both straight and bending sections of duct banks and a minimum of one foot away from any coupling, fitting or end bell, as shown in Figure 4.2.

Base spacers shall be used to obtain clearance to subgrade material under the conduit for the placement of the 3-in minimum of encasement.

Base spacers may also be used to obtain 3-in side cover of conduit in bends.

Two-inch concrete blocking, twice the area of the foot, shall be provided under the base spacers.

Secure conduit to spacers in order to prevent floatation and deflection during encasing.

9. Encasement

Conduit encasement is required if the conduits used are for cable rated 600 V or higher.

The encasement shall be red High Strength Fluidized Thermal Backfill (HSFTB). HSFTB is a concrete mix and is the only allowed material for encasement.

- Refer to Material Standard 7150.00 for HSFTB requirements.
- Refer to Construction Standard 0226.06 for HSFTB installation.
- Allow 48 hours to cure prior to pulling cable.

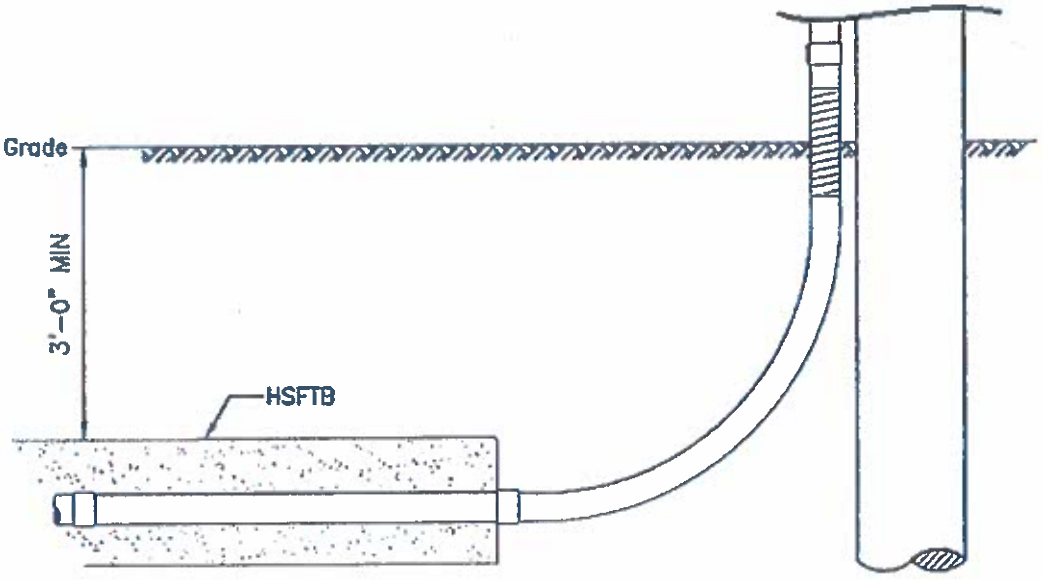
Forming is required for encasement:

- No forming or shoring structures shall be left in the trench after encasement.
- Metallic leave-in-place type forms may be allowed with permission of an SCL engineer. After curing, all forms and staking shall be cut flush with the top of the duct bank.

The encasement shall be a minimum of 3 in and a maximum of 6 in around all conduits in a duct bank.

The encasement shall end before the elbow of the conduit riser.

Figure 9. Encasement at the Conduit Riser



10. Backfill

10.1 Types of Backfill

Low Strength Fluidized Thermal Backfill (LSFTB) Refer to SCL 7150.00 for LSFTB specification.

Controlled Density Fill (CDF) – A self-compacting material used for backfill. Where CDF is used for backfill, comply with current City of Seattle standard specifications.

10.2 Requirements

System duct bank backfill shall be Low Strength Fluidized Thermal Backfill (LSFTB), and primary service duct bank backfill shall be CDF, unless otherwise specified by an SCL engineer.

Do not mix low strength and high strength FTB.

LSFTB shall be poured on top of set HSFTB.

11. Identification

Install two 3-in-wide red detectable underground marking tapes over the corners of the duct bank at 18 in below the finished grade.

12. Inspection

Inspections shall be done by Seattle City Light. Duct bank installations require that the inspection be done when laying conduit, prior to pouring encasement and prior to pouring backfill. Additional inspections may be done for more complex installations. Inspection approvals are required prior to moving on to the next stage of duct bank construction. An inspection may include verification of proper construction, adherence to engineer design and SCL standards and conduit mandreling and cleaning. See SCL U2-11.40/NDK-40 for mandreling and cleaning details.

13. Communications

On all new underground installations of duct banks, two 4-in PVC conduits shall be installed for communication uses. The two communication conduits shall be placed above the power conduits in looped radial duct banks and above the 2-in conduits in network duct banks. A 4 x 4 x 4 handhole is required for splicing when specified by the SCL engineer. If the communication conduits leave the duct bank, they shall be encased in red HSFTB and an orange, #12 stranded copper tracer wire shall be attached directly above one of the two communication conduits using electrical tape or cable ties.

14. Additional Network Conduits

On all new underground network installations of duct banks, two 2-in PVC conduits shall be installed. The two conduits shall be placed below the communication conduits in network duct banks. The 2-in conduits are typically used for system grounds, vault lighting and vault discharge. If the bend radius is greater than 10 ft, the 2-in PVC conduit may be cold-formed to match the rest of the duct run. If the bend radius is less than 10 ft, RGS elbows are required.

The 2-in conduit shall be terminated with a coupling.

15. References

SCL Construction Standard 0224.05; "Requirements for Underground Services on Private Property"

SCL Construction Standard 0224.07; "Requirements for Secondary Conduits in the Right-of-Way"

SCL Construction Standard 0226.06; "Installation of Fluidized Thermal Backfill"

SCL Construction Standard U2-11.3/NDK-30; "Termination of Existing Duct Banks in New Vaults or Manholes"

SCL Construction Standard U2-11.40/NDK-40; "Mandreling and Cleaning Of Ducts and Conduits"

SCL Material Standard 7015.05; "Schedule 40 PVC Conduit and Fittings"

SCL Material Standard 7025.05; Fiberglass Conduit and Fittings, Standard-Wall, Five-Inch IPS

SCL Material Standard 7050.05; "Zinc-Coated Steel Conduit and Fittings"

SCL Material Standard 7150.00; "Fluidized Thermal Backfill"

SCL Material Standard 7015.80; "Conduit Spacers for PVC and FG Conduit"

16. Sources

City of Seattle Plans for Municipal Construction; City of Seattle, 2011 edition

Edwards, Tommy; SCL Inspector and subject matter expert for 0222.02, (tommy.edwards@seattle.gov)

Lu, Curtis; SCL Engineer and originator of 0222.02 (curtis.lu@seattle.gov)

SCL Construction Standard NDK-10 (canceled) "Installation of Nonmetallic Conduit with FTB Concrete Encasement"

SCL Construction Standard U2-11 (canceled) "Installation of Nonmetallic Conduit with Concrete or FTB Encasement"

Stewart, Bob; SCL Inspector and subject matter expert for 0222.02, (bob.stewart@seattle.gov)

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Seattle City Light

CONSTRUCTION STANDARD

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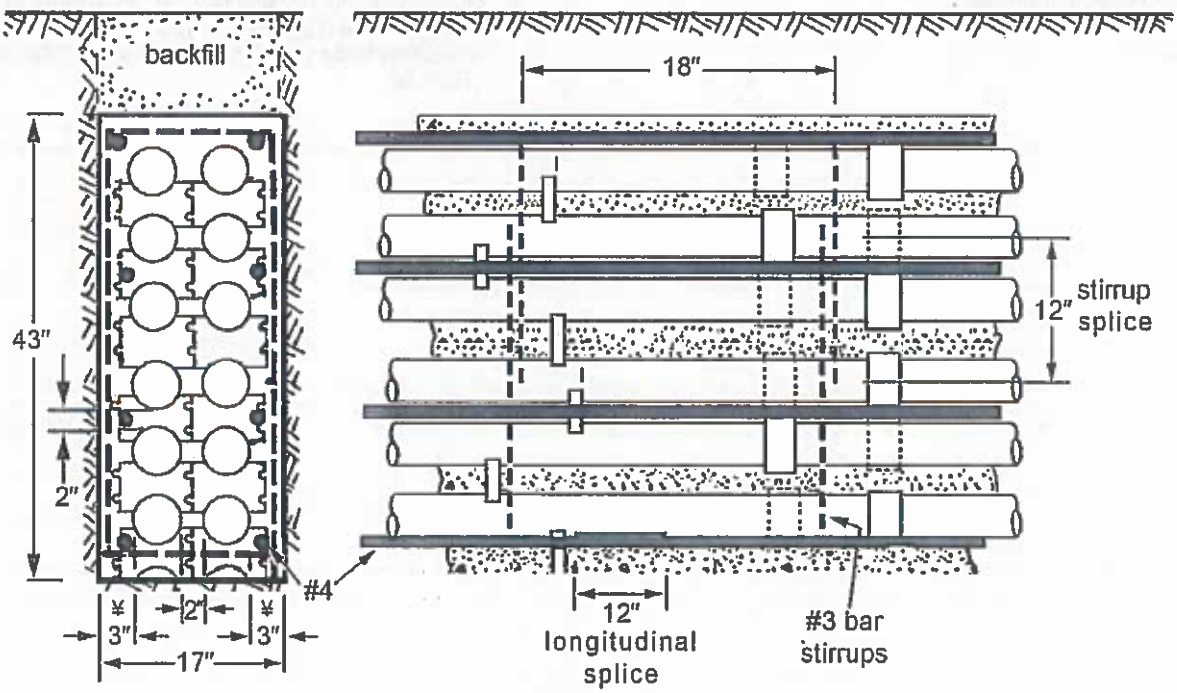
page: 1 of 1

REINFORCEMENT OF CONCRETE ENCASED DUCT RUNS

1. When the engineer determines that concrete encased duct runs need reinforcement, the reinforcement shall consist of #4 Grade 40 or Grade 60 deformed bars placed longitudinally in the duct run and tied with #3 closed stirrup at 18 inches on center. All reinforcing shall conform to ASTM Specification A 615-82.
2. The number of longitudinal bars per duct section shall be the next highest even number to that number determined by the equation N = 0. 12 (W+D) - 0.72, where N = number of bars, W = width of duct, and D = depth of duct envelope in inches.
3. The first four bars shall be placed in the corners of the concrete envelope. All bars thereafter shall be equally spaced between the corner bars. The longitudinal bars shall have a minimum of 2 inches of concrete cover. Minimum splice length for #3 and #4 bars shall be 12 inches. Longitudinal splices are to be staggered 6 inches or increase overlap to 18 inches. Rebar shall be embedded in vault structure around duct penetration.
4. Red dye shall be added to the concrete mix at the rate of 4 pounds per yard.

5. Example: Assume duct envelope is 17 inches wide and 43 inches deep
   N = 0.12 (17 + 43) - 0.72 = 0.12 (60) - 0.72 = 7.20 - 0.72 = 6.48
   Use 8 - #4 bars



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Seattle City Light
CONSTRUCTION STANDARD

Standard Number: U2-11.40/NDK-40
Superseding: December 11, 2013
Effective Date: January 14, 2016

Mandreling and Cleaning of Ducts and Conduits

1. After the concrete has been poured or the trench backfilled over conduit, each duct run and conduit shall be tested for obstructions or flattening by pulling a proofing mandrel sized and constructed per Material Standard 7645.40 through the duct or conduit within 5 days of installation. If an obstruction is found in a duct or conduit, that section shall be replaced.
2. Cleaning ducts shall be performed by drawing a brush with stiff bristles and a swab through each duct and conduit to make certain no foreign materials are left in the duct.
3. Conduit runs of 5 inches or larger shall be flushed with a water jet type system such as the "Jet Rodder" equipment. Completion subject to SCL inspector's approval.
4. Cleaning and mandreling operations may be performed simultaneously.
5. After cleaning and mandreling, each conduit shall have left in it a flat, pre-lubricated, polyester or Aramid pull tape of 2,500 lb. minimum tensile strength (Fibertek Inc. or equal; City Light Stock Nos. 012293 and 012480. Note: there is no material standard for these items.) The pull tape shall be printed with sequential footage markings. Every conduit not part of a duct bank shall contain a 3-inch wide detectable underground marking tape, red-colored, Reef Industries "Sentry Line" #42-0110 or Pro-Line Safety or equal (City Light Stock No. 736800. Note: there is no material standard for this item.)
6. After cleaning and mandreling, each conduit shall be plugged with plugs of the type and manufacturer specified in Seattle City Light Material Standard 7055.09.

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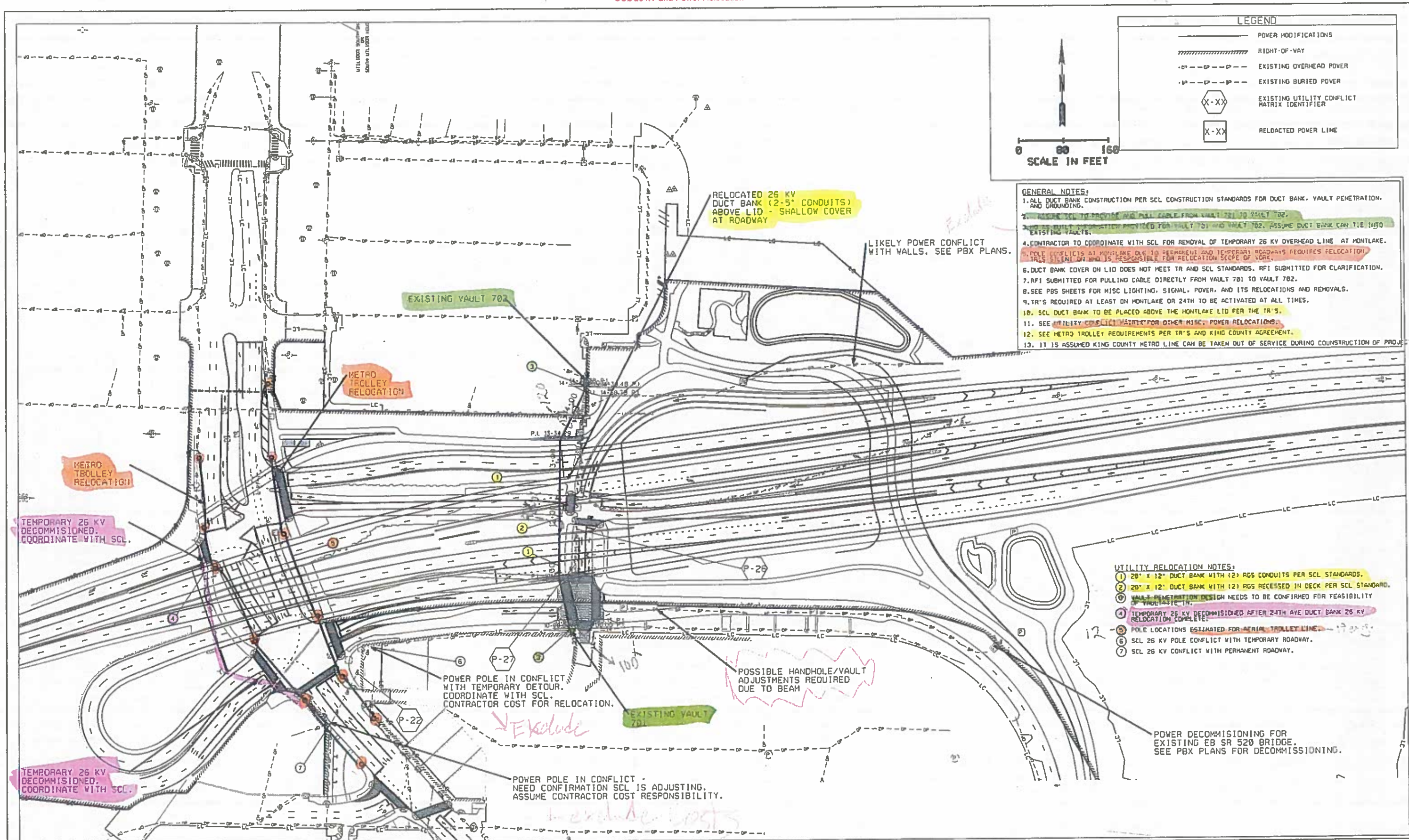
NOT FOR CONSTRUCTION

SCL 26 kV and Power Relocation



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10	WASH	
JOB NUMBER		
18A802		
CONTRACT NO.		LOCATION NO.

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Washington State Department of Transportation

SR 520 U1
MONTLAKE TO LAKE WASHINGTON
I/C AND BRIDGE REPLACEMENT

26 kV RELOCATION

PLAN REF. NO.

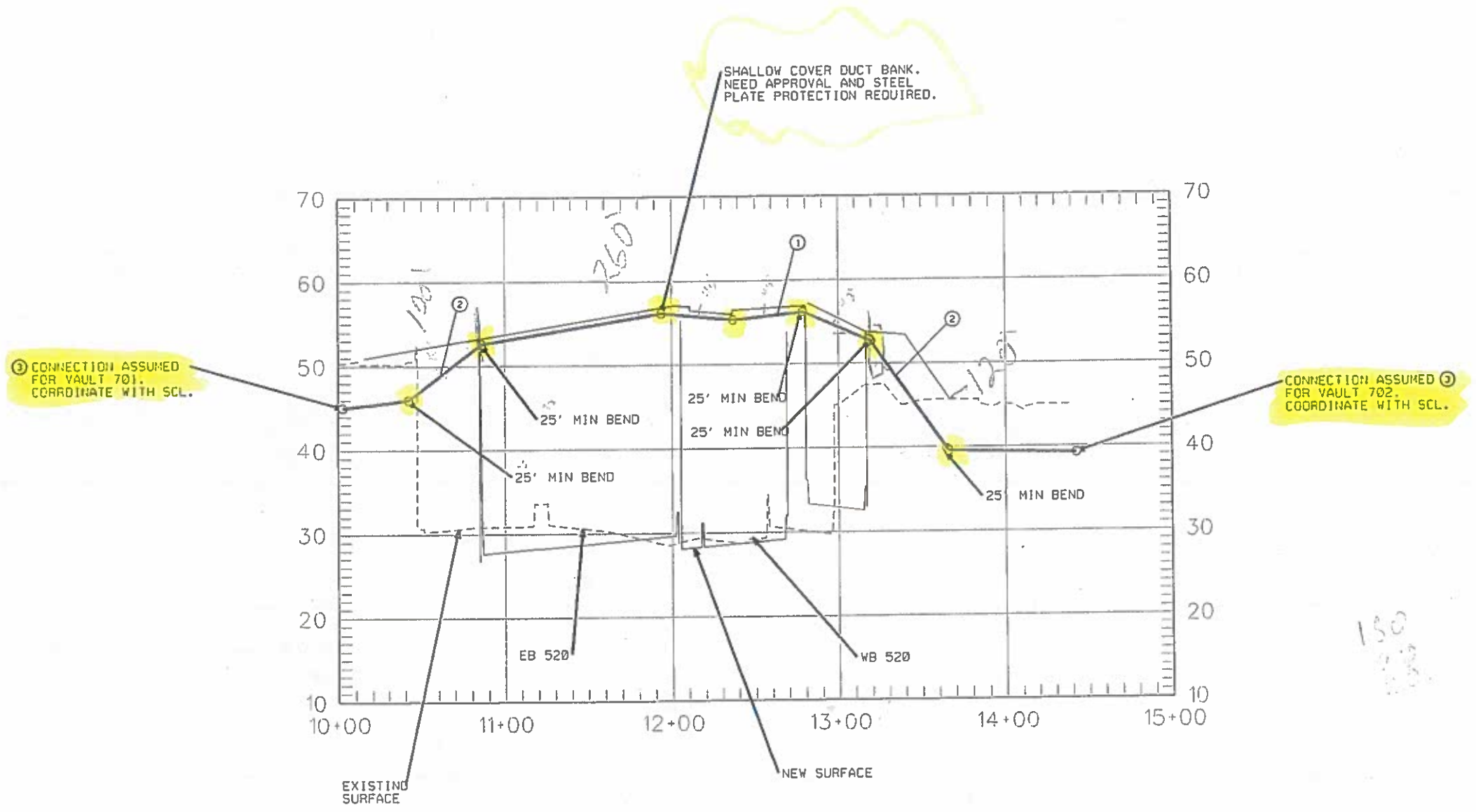
SHEET 1 OF 2 SHEETS

NOT FOR CONSTRUCTION

09/03/18

GENERAL NOTES:
1. 3' STANDARD COVER REQUIRED FOR DUCT BANK.
2. ASSUMED LESS THAN 3' COVER ACCEPTABLE OVER MONTLAKE LID.
3. SEE PLAN FOR FURTHER INFORMATION.
4. SHALLOW COVER ON LID ASSUMED ACCEPTABLE.

UTILITY RELOCATION NOTES:
(1) DUCT BANK 28" X 12" WITH TWO RGS CONDUITS AND 12" MINIMUM COVER.
(2) DUCT BANK TO MEET SCL CONSTRUCTION STANDARDS.
(3) CONNECTION OF DUCT BANK TO VAULTS NEED TO BE CONFIRMED.



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SR 520 U2
MONTLAKE TO LAKE WASHINGTON
I/C AND BRIDGE REPLACEMENT

26 kV RELOCATION

PLAN REF. NO.

SHEET 2 OF 2 SHEETS

CONSTRUCTION SEQUENCE NOTES:

1. CONSTRUCT LOOP RAMP DETOUR ROADWAY.
2. CONSTRUCT WB & EB TEMPORARY ROADWAY DETOURS. BUILD TO FINAL GRADE PER PROFILE/SECTIONS BETWEEN MONTLAKE & 24TH AVE.
3. CONSTRUCT EB MONTLAKE OFF RAMP TEMPORARY ROADWAY.
4. CONSTRUCT TEMPORARY EB MONTLAKE ON RAMP.
5. CONSTRUCT 54" WATERLINE RELOCATION - PROTECT IN PLACE EXISTING 54" UNTIL RELOCATION AND TR CONDITION APPROVED.
6. REMOVE EXISTING EB SR 520 BRIDGE.
7. START CONSTRUCTION OF WABS BRIDGE.
8. CONSTRUCT PIER 2 OF LID BETWEEN 24TH AND MONTLAKE.
9. BUILD WB OFF RAMP TEMPORARY DETOUR ROADWAY.
10. CONSTRUCT PED BRIDGE PIER 4.
11. BUILD TEMPORARY RSUP CONNECTION.
12. REMOVE TRANSIT CENTERS.
13. CONSTRUCT EB S-CURVE DETOUR ROADWAY (TEMPORARY).
14. BUILD 24TH AVE SHARED USE PATH DETOUR FOR WABN BRIDGE.
15. CONSTRUCT WB RAMP WALL. CONSTRUCT WALL TO BE COMPATIBLE WITH DETOUR RAISE IN GRADE.

PBX ENGINEERING

18097-SR 520 & LID BRIDGE
BID DESIGN

DATE: 20/07/2018

SHEET 1 OF 6

26kV LINE RELOCATION STAGING Rev00

0 80 160
SCALE IN FEET

LEGEND - PHASE 1

- CEMENT CONCRETE PAVEMENT
- TEMPORARY LANE
- TEMPORARY SHARED USE PATH
- EDGE OF PAVEMENT OF BARRIER
- CONSTRUCTION ACCESS
- CONSTRUCTION AREA
- STRUCTURE BEING BUILT
- BUILT STRUCTURE
- EXISTING PIER

MDT WORK NOTES:

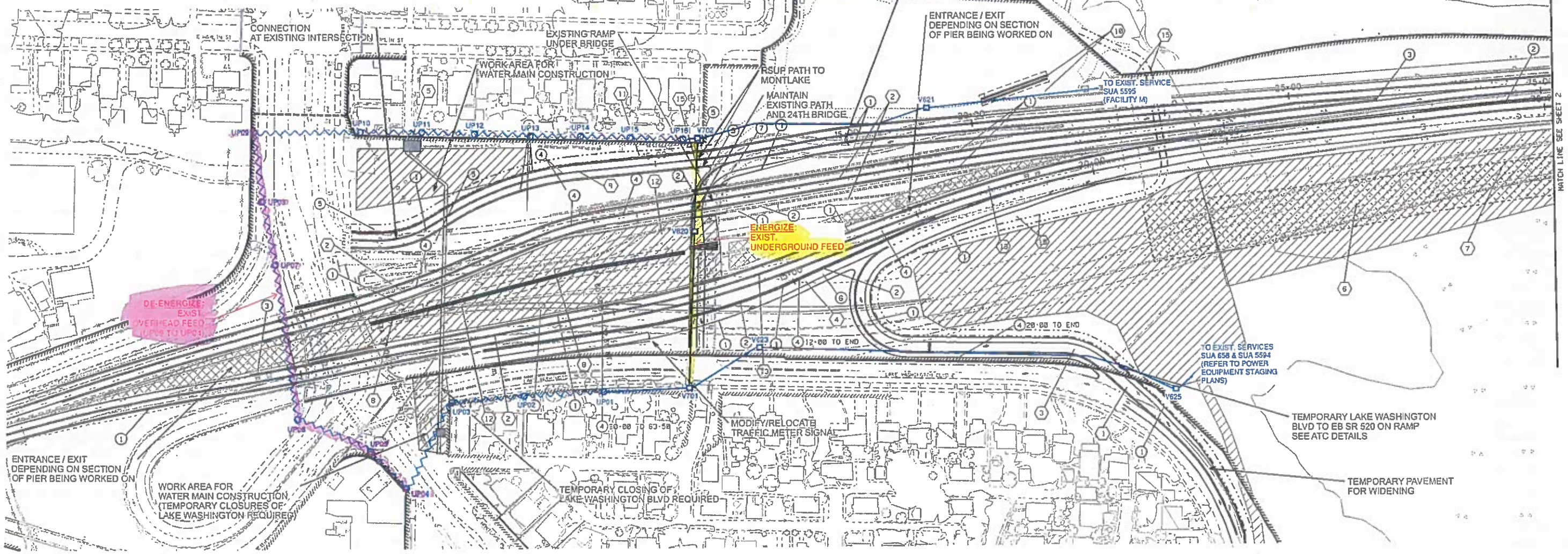
1. TEMPORARY CONCRETE BARRIER.
2. PINNED TEMPORARY CONCRETE BARRIER.
3. TEMPORARY IMPACT ATTENUATOR.
4. TEMPORARY SR 520 HMA PAVEMENT.
5. TEMPORARY SHARED USE PATH.
6. TEMPORARY DRAINAGE (SEE DRAINAGE PLANS).

SYMBOLS LEGEND

- VAULT (UTILITY ID AS INDICATED)
- POLE (ARBITRARY REFERENCE ID ASSIGNED)
- 26kV OVERHEAD LINE
- 26kV UNDERGROUND LINE

COLORS LEGEND

- EXISTING
- NEW
- TO BE REMOVED



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Washington State Department of Transportation

SR 520 U3
MONTLAKE TO LAKE WASHINGTON
I/C AND BRIDGE REPLACEMENT

MOT PHASE 1

PLAN REF. NO.

SHEET 1 OF 4 SHEETS

CONSTRUCTION SEQUENCE NOTES:

1. ADJUST WB & EB 520 DETOURS TO INSIDE PIER NEAR MONTLAKE LID AREA TO MATCH FUTURE GRADE.
2. ADJUST LOOP RAMP CURVE. ALLOW DRAINAGE THROUGH SCUPPERS.
3. ADJUST EB MONTLAKE ON RAMP.
4. ADJUST RSVP DETOUR.
5. SHIFT MONTLAKE ROADWAY TO WEST CURB. REMOVE TRANSIT STOP (END OF PHASE).
6. BUILD PIER 3 BETWEEN MONTLAKE AND 24TH.
7. BUILD EASTERN HALF OF RSUP TUNNEL.
8. BUILD LID 1 PIER BETWEEN 24TH AND MONTLAKE (WESTERN LIMITS AT END OF PHASE).
9. CONTINUE CONSTRUCTION OF WABS BRIDGE.
10. MODIFY INTERSECTION AT MONTLAKE AND LAKE WASHINGTON BLVD (END OF PHASE).
11. SELECT DEMOLITION OF SE CORNER OF MONTLAKE BRIDGE (END OF PHASE).
12. CONSTRUCT PORTION OF MONTLAKE LID FROM MONTLAKE TO 24TH AVE.
13. PERFORM COMMUNICATION, WATER, AND GAS UTILITY RELOCATIONS FROM MONTLAKE BRIDGE. MAINTAIN TEMPORARY 26 KV.
14. RELOCATE SCL POWER POLES NEAR INTERSECTION.
15. CONSTRUCT FIRE PROTECTION 12" MAIN RELOCATION AND TEMPORARY SERVICE FOR LID.

PBX ENGINEERING

18097-SR 520 & LID BRIDGE
BID DESIGN

DATE: 20/07/2018

SHEET 2 OF 6

26kV LINE RELOCATION STAGING Rev00

0 80 160
SCALE IN FEET

LEGEND - PHASE 2A

- CEMENT CONCRETE PAVEMENT
- TEMPORARY LANE
- TEMPORARY SHARED USE PATH
- EDGE OF PAVEMENT OF BARRIER
- CITY DETOUR
- CITY PEDESTRIAN ROUTE
- CONSTRUCTION A
- CONSTRUCTION B
- BUILT STRUCTURE
- EXISTING PIER
- CONSTRUCTION ACCESS

SYMBOLS LEGEND

- VAULT (UTILITY ID AS INDICATED)
- POLE (ARBITRARY REFERENCE ID ASSIGNED)
- 26kV OVERHEAD LINE
- 26kV UNDERGROUND LINE

COLORS LEGEND

- EXISTING
- NEW
- TO BE REMOVED

MOT WORK NOTES:

1. TEMPORARY CONCRETE BARRIER.
2. PINNED TEMPORARY CONCRETE BARRIER.
3. TEMPORARY IMPACT ATTENUATOR.
4. TEMPORARY SR 520 HMA PAVEMENT.
5. TEMPORARY PATH PAVEMENT.
6. TEMPORARY HMA/SIDEWALK.
7. TEMPORARY TRAFFIC ISLAND.
8. MODIFIED MONTLAKE SIGNAL SYSTEM.
9. TEMPORARY TRANSIT STOP.

MAINTAIN EXISTING TRANSIT STOP
RSUP PATH TO MONTLAKE
MAINTAIN EXISTING PATH
EXISTING RAMP UNDER BRIDGE
MAINTAIN EXISTING PATH
TO EXIST. SERVICE SUA 5595 (FACILITY M)
UP09 UP10 UP11 UP12 UP13 UP14 UP15 UP16 V702
V621
RELOCATE: CONFLICTING UTILITY POLE & 26kV OVERHEAD CONDUCTORS
UP06 UP07
MAINTAIN TEMP SCL 26 KV
EXIST. OVERHEAD FEED (UP09 TO UP04) DE-ENERGIZED
V620
EXIST. UNDERGROUND FEED ENERGIZED
ASSUME RE-USE OF PAVEMENT OVER SUPER ELEVATION
CONSTRUCTION OF WABS BRIDGE/ REMOVAL OF EXISTING EB BRIDGE
V623
TO MODIFIED SERVICE SUA 658 (REFER TO POWER EQUIPMENT STAGING PLANS)
V625
TEMPORARY LAKE WASHINGTON BLVD TO EB 520 ON RAMP
UP03 UP02 UP01 V701
UP05 UP08
REMOVE: CONFLICTING UTILITY POLE & OVERHEAD CONDUCTORS
INSTALL: OVERHEAD CONDUCTORS
UP04
CONTINUE WORK ON 54" WATER LINE.
TEMPORARY TRANSIT STOP LOCATION
MATCH LINE SEE PHASE 1 SHEETS 2-4 FOR CONTINUATION

FILE NAME	c:\bms\tyll-pw\gavin.hill@pbsusa.com\dms365751\SR 520 Detour Phase 2a-Sheet.dgn
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REGION NO.	STATE
10	WASH

JOB NUMBER 18A802
CONTRACT NO.
FED.AID PROJ.NO.
LOCATION NO.

P.E. STAMP BOX DATE
P.E. STAMP BOX DATE

Washington State Department of Transportation

SR 520 U4
MONTLAKE TO LAKE WASHINGTON I/C AND BRIDGE REPLACEMENT

MOT PHASE 2A

PLAN REF. NO.

SHEET 1 OF 1 SHEETS

PBSX ENGINEERING

18097-SR 520 & LID BRIDGE
BID DESIGN

DATE: 20/07/2018

SHEET 3 OF 6

26kV LINE RELOCATION STAGING Rev00

CONSTRUCTION SEQUENCE NOTES:

1. BURY EASTERN PART OF MONTLAKE RSUP TUNNEL AND EAST PORTAL FOR HOT SEQUENCING.
2. BUILD MONTLAKE DETOUR ON LID (DIRECTLY ON LID).
3. BUILD EB SR 520 OFF RAMP TEMPORARY INTERSECTION WITH TEMPORARY TRAFFIC SIGNAL SYSTEM.
4. BUILD PERMANENT WALL FOR EB MONTLAKE OFF RAMP.
5. WEEKEND CLOSURE FILL AT MONTLAKE INTERSECTION. USED WITH ROUTE DETOURS.
6. PILLOW WRAP FILL ROADWAYS WITH REDUCED TRAFFIC CONFIGURATION. WEEKEND CLOSURE WORK TO RAISE MONTLAKE INTERSECTION.
7. TEMPORARY MONTLAKE TRAFFIC SIGNAL SYSTEM.
8. COMPLETE TEMPORARY LID FIRE STAND PIPE SYSTEM. TEMPORARY SERVICE CONNECTION.

80 160
SCALE IN FEET

LEGEND - PHASE 2B

- EDGE OF PAVEMENT/BARRIER
- CHANNELIZATION
- TRANSIT
- RSUP DETOUR
- RIGHT-OF-WAY
- CITY TRAFFIC CONTROL
- CITY PEDESTRIAN ROUTE
- CONSTRUCTION AREA
- STRUCTURE BEING BUILT
- BUILT STRUCTURE
- EXISTING PIER
- CONSTRUCTION ACCESS
- WEEKEND CLOSURE WORK

SYMBOLS LEGEND
- VAULT (UTILITY ID AS INDICATED)
- POLE (ARBITRARY REFERENCE ASSIGNED)
- 26kV OVERHEAD LINE
- 26kV UNDERGROUND LINE

COLORS LEGEND
- EXISTING
- NEW
- TO BE REMOVED

RSUP PATH CONNECTION

CONSTRUCT WEST THIRD OF PIER 4

DETOUR WB OFF RAMPS (SAME STORAGE CAPACITY)

TEMPORARY SHARED USE PATH

TO EXIST SERVICE SUA 5595 (FACILITY M)

RAISE GRADE OUTSIDE OF EXSTING WALL ON UP TO LID

RAISE GRADE OUTSIDE OF EXSTING WALL ON UP TO LID

1 LANE NB AND SB FOR WEEKEND CLOSURE ON NEW DETOUR

ENERGIZE: MODIFIED OVERHEAD FEED (UP09 TO UP04)

DE-ENERGIZE EXIST. UNDERGROUND FEED

CONSTRUCTION OF WABS BRIDGE/ REMOVAL OF EXISTING EB BRIDGE

TO MODIFIED SERVICE SUA 658 (REFER TO POWER EQUIPMENT STAGING PLANS)

TEMP. LAKE WASHINGTON BLVD TO EB SR 520 ON RMAP

SEL CLOSURE OF ONE LAKE WASHINGTON BLVD LANE

WEEKEN DETOUR FOR LEFT FOR WB LAKE WASH TO SB MONTLAKE

W EKEN DETOUR FOR ON P FROM NB M N E

FULL WEEKEND CLOSURE WITH DETOURS PROVIDED

FULL WEEKEND CLOSURE OF MONTLAKE

RAISED ROADWAY GRADE FOR MONTLAKE PERMANENT GRADE

ONLY ONE LEFT TURN FOR OFF RAMP

MODIFICATIONS TO MONTLAKE / LAKE WASH BLVD TO RAISE ROADWAY PROFILE TO PERMANENT GRADE

SMALL CLOSURE OF NB LAN

WEEKEND DETOUR TO ROANOKE

SHIFTED BUS STOP SOUTH

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Washington State Department of Transportation

SR 520 U5
MONTLAKE TO LAKE WASHINGTON
I/C AND BRIDGE REPLACEMENT

MOT PHASE 2B

PLAN REF. NO.

SHEET 1 OF 1 SHEETS

PBX ENGINEERING

18097-SR 520 & LID BRIDGE
BID DESIGN

DATE: 20/07/2018

SHEET 4 OF 6

26kV LINE RELOCATION STAGING Rev00

CONSTRUCTION SEQUENCE NOTES:

1. FILE CHANGES TO WB OFF RAMP FOR DETOUR CONNECTION.
2. LD EASTERN REMAINING PORTIONS OF PIERS 1, 3, AND 4 FOR MONTLAKE LID.
3. LD WESTERN PORTIONS OF MONTLAKE PIERS 1 & 3.
4. ITALL PROTECT AND PLACE MEASURES FOR COMBINED SEWER.
5. ISTRUCT WEST HALF OF RSUP.
6. ISTRUCT PIERS 1 & 2 OF PEDESTRIAN LAND BRIDGE.
7. ITINUE CONSTRUCTION OF WABS BRIDGE.
8. REMOVE MONTLAKE BRIDGE.
9. REMOVE 24TH BRIDGE.
10. DECOMMISION MONTLAKE 26 KV.
11. RELOCATE 24TH AVE 26 KV.
12. 24TH AVE GAS CONSTRUCTION.
13. DECOMMISSION MONTLAKE AVE 26 KV.
14. BUILD PERMANENT WALL.

0 80 160
SCALE IN FEET

LEGEND - PHASE 2C

- EDGE OF PAVEMENT/BARRIER
- CHANNELIZATION
- TRANSIT
- RSUP DETOUR
- RIGHT-OF-WAY
- CITY TRAFFIC CONTROL
- CITY PEDESTRIAN ROUTE
- CONSTRUCTION AREA
- STRUCTURE BEING BUILT
- BUILT STRUCTURE
- EXISTING PIER
- CONSTRUCTION ACCESS

SYMBOLS LEGEND

- VAULT (UTILITY ID AS INDICATED)
- POLE (ARBITRARY REFERENCE ID ASSIGNED)
- 26kV OVERHEAD LINE
- 26kV UNDERGROUND LINE

COLORS LEGEND

- EXISTING
- NEW
- TO BE REMOVED

SHIFT BUS STOP FURTHER NORTH
TEMPORARY ROADWAY ON LID DECK
TEMP. RAMP ACCESS ON BRIDGE
RSUP PATH DETOUR
POSSIBLE TEMPORARY INTERSECTION FOR MONTLAKE BRIDGE DEMO AND LID CONSTRUCTION
USEABLE SPACE ON LID (ABOVE) AND IN CENTER OF EB/WB 520 (BELOW)
TEMPORARY SHARED USE PATH
CONSTRUCT REMAINING PORTION OF PIER 4 (COMPLET BRIDGE
DETOUR WB OFF RAMPS
TO EXIST. SERVICE SUA 5595 (FACILITY M)
CONSTRUCT WALLS AND NEW ON RAMP
MODIFIED OVERHEAD FEED (UP09 TO UP04) ENERGIZED
REMOVE, DE-ENERGIZED AND UNDERGROUND CONDUCTORS
CONSTRUCTION OF WABS BRIDGE/ REMOVAL OF EXISTING EB BRIDGE
TO MODIFIED SERVICE SUA 658 (REFER TO POWER EQUIPMENT STAGING PLANS)
BUILD PIER 2 FOR PEDESTRIAN BRIDGE
BUILD PIER 1 FOR PEDESTRIAN BRIDGE
TEMPORARY LAKE WASHINGTON BLVD TO EB SR 520 ON RAMP SEE ATC DETAILS
CONSTRUCT PIER 1
CONFLICT WITH SCL POWER LINE POLE
TEMPORARY OFF-SET INTERSECTION
TEMPORARY ROADWAY ON LID DECK
TEMPORARY INTERSECTION FOR MONTLAKE BRIDGE DEMO AND LID CONSTRUCTION
USEABLE SPACE ON LID (ABOVE) AND IN CENTER OF EB/WB 520 (BELOW)
SHIFTED BUS STOP SOUTH
MONTLAKE INTERCHANGE
MATCH LINE SEE PHASE 1 SHEETS 2-4 FOR CONTINUATION

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Washington State Department of Transportation

SR 520
MONTLAKE TO LAKE WASHINGTON
I/C AND BRIDGE REPLACEMENT

MOT PHASE 2C

U6

PLAN REF. NO.

SHEET 1 OF 1 SHEETS

PBX ENGINEERING

18097-SR 520 & LID BRIDGE
BID DESIGN

DATE: 20/07/2018

SHEET 5 OF 6

26kV LINE RELOCATION STAGING Rev00

CONSTRUCTION SEQUENCE NOTES:

- ST WB & EB SR 520 MAINLINE TO OUTSIDE LID PIER. ING ON PREVIOUSLY BUILT RMA.
- ST LOOP RAMP CURVE TO TIE INTO DETOUR.
- ICH WB TO LAKE WASHINGTON OFF RAMP FULLY ONTO MONTLAKE LID. DRIVE ON LID.
- PLETE RSUP WEST PORTAL WABS AND WB OFF RAMP ROADWAY.
- STRUCT MONTLAKE LID PIER 2 WESTERN LIMITS. FINISH WESTERN PART ID SUPERSTRUCTURE.
- STRUCT MONTLAKE LID PIER 2 EASTERN LIMITS. COMPLETE SUPERSTRUCTURE ONTLAKE LID.
- PLETE PERMANENT MONTLAKE AVE ROADWAY.
- PLETE PIER 3 OF PEDESTRIAN LAND BRIDGE.
- (9) COMPLETE PEDESTRIAN LAND BRIDGE SUPERSTRUCTURE.
- (10) COMPLETE PART OF SOUTH APPROACH TO PEDESTRIAN LAND BRIDGE.
- (11) COMPLETE DETENTION LAND BRIDGE NORTH AND SOUTH APPROACHES.
- (12) BUILD DRAINAGE POND IMPROVEMENTS.
- (13) COMPLETE WABS BRIDGE.
- (14) COMPLETE WB ON RAMP ROADWAY.
- (15) COMPLETE IMPROVEMENTS TO EB MONTLAKE ON RAMP AND EB OFF RAMP.
- (16) COMPLETE CIVIL IMPROVEMENTS AT ROANOKE ST.

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SCALE IN FEET

LEGEND - PHASE 3

- EDGE OF PAVEMENT/BARRIER
- CHANNELIZATION
- BUS ROUTE
- RSUP DETOUR
- RIGHT-OF-WAY
- CITY TRAFFIC CONTROL
- CITY PEDESTRIAN ROUTE
- CONSTRUCTION AREA
- STRUCTURE BEING BUILT
- BUILT STRUCTURE
- CONSTRUCTION ACCESS

SYMBOLS LEGEND

- VAULT (UTILITY ID AS INDICATED)
- POLE (ARBITRARY REFERENCE ID ASSIGNED)
- 26kV OVERHEAD LINE
- 26kV UNDERGROUND LINE

COLORS LEGEND

- EXISTING
- NEW
- TO BE REMOVED

SHIFT BUS STOP FURTHER NORTH
RSUP TUNNEL COMPLETED
USEABLE SPACE ON LID (ABOVE) AND IN CENTER OF EB/WB 520 (BELOW)
POSSIBLE TEMPORARY INTERSECTION FOR MONTLAKE BRIDGE DEMO AND LID CONSTRUCTION
TEMP RAMP ACCESS ON BRIDGE
RSUP PATH DETOUR
RSUP PATH DETOUR
POSSIBLE ADDTIONAL STAGING AREA
TEMPORARY SHARED USE PATH
RSUP PATH CONNECTION CONSTRUCT PIER 3 FOR LID
DETOUR WB OFF RAMPS
TO EXIST. SERVICE SUA 5595 (FACILITY M)
CONSTRUCT WEST HALF OF RSUP TUNNEL
CONSTRUCT PIER 3 FOR LID
CONSTRUCT PIER 2 FOR LID
REMOVE MONTLAKE BRIDGE
MODIFIED OVERHEAD FEED (UP09 TO UP04) ENERGIZED
INSTALL 26kV UNDERGROUND CONDUCTORS DURING LID CONSTRUCTION
CONSTRUCT PIER 2 FOR LID
TO MODIFIED SERVICE SUA 658 (REFER TO POWER EQUIPMENT STAGING PLANS)
BUILD WALLS SOUTH OF EB SR 520
CONFLICT WITH SCL POWER LINE FOLE
CONSTRUCT PIER 1 FOR LID
BUILD EAST PART OF LID
TEMPORARY INTERSECTION FOR MONTLAKE BRIDGE DEMO AND LID CONSTRUCTION
COMPLETE FINAL GRADING ON SOUTH SIDE OF MONTLAKE ON WEEKEND CLOSURE
TEMPORARY INTERSECTION FOR MONTLAKE BRIDGE DEMO AND LID CONSTRUCTION
SHIFTED BUS STOP SOUTH
MATCH LINE SEE PHASE 1 SHEETS 2-4 FOR CONTINUATION

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CONTRACT NO. | LOCATION NO.

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Washington State Department of Transportation

SR 520 U7
MONTLAKE TO LAKE WASHINGTON I/C AND BRIDGE REPLACEMENT

MOT PHASE 3

PLAN REF. NO.

SHEET 1 OF 1 SHEETS

PBX ENGINEERING

18097-SR 520 & LID BRIDGE
BID DESIGN

DATE: 20/07/2018

SHEET 6 OF 6

26kV LINE RELOCATION STAGING Rev00

CONSTRUCTION SEQUENCE NOTES:

1. IMPROVE GEOMETRIC ROADWAY CONFIGURATION OF WB TO LAKE WASHINGTON OFF RAMP.
2. RECONFIGURE NB DETOUR TO OUTSIDE OF WABN BRIDGE AND MONTLAKE LID.
3. SWTICH EB TRAFFIC TO OUTSIDE OF NEW WABS BRIDGE AND MONOTLAKE LID.
4. BUILD HOV BRIDGE.
5. BUILD HOV BRIDGE APPROACH.
6. BUILD WABN BRIDGE WIDENING.
7. COMPLETE CONNECTION OF WB TO MONTLAKE OFF RAMP.
8. COMPLETE HOV ROADWAY AND TRANSIT STOPS ON MONTLAKE LID.
9. COMPLETE 24TH AVE ROADWAY ON MONTLAKE LID.
10. COMPLETE BERM, WALL, AND PEDESTRIAN BRIDGE APPROACH WORK ALONG LAKE WASHINGTON BLVD.
11. COMPLETE MONTLAKE BRIDGE WORK.
12. FINAL LANDSCAPING AND ROADWAY CONSTRUCTION ON LID AND NEAR MONTLAKE.
13. COMPLETE DRAINAGE DETENTION FACILITIES NEAR PEDESTRIAN BRIDGE.
14. FINAL INTERSECTION IMPROVEMENTS FOR HOV FACILITIES ON MONTLAKE.
15. CONSTRUCT HOV & 24TH AVE INTERSECTION.
16. FINAL INTERSECTION IMPROVEMENTS ON LAKE WASHINGTON BLVD AND 24TH AVE.

LEGEND - PHASE 4

- EDGE OF PAVEMENT/BARRIER
- CHANNELIZATION
- BUS ROUTE
- RSUP DETOUR
- RIGHT-OF-WAY
- CITY COMPLETED WORK
- CONSTRUCTION AREA
- STRUCTURE BEING BUILT
- BUILT STRUCTURE
- CONSTRUCTION ACCESS

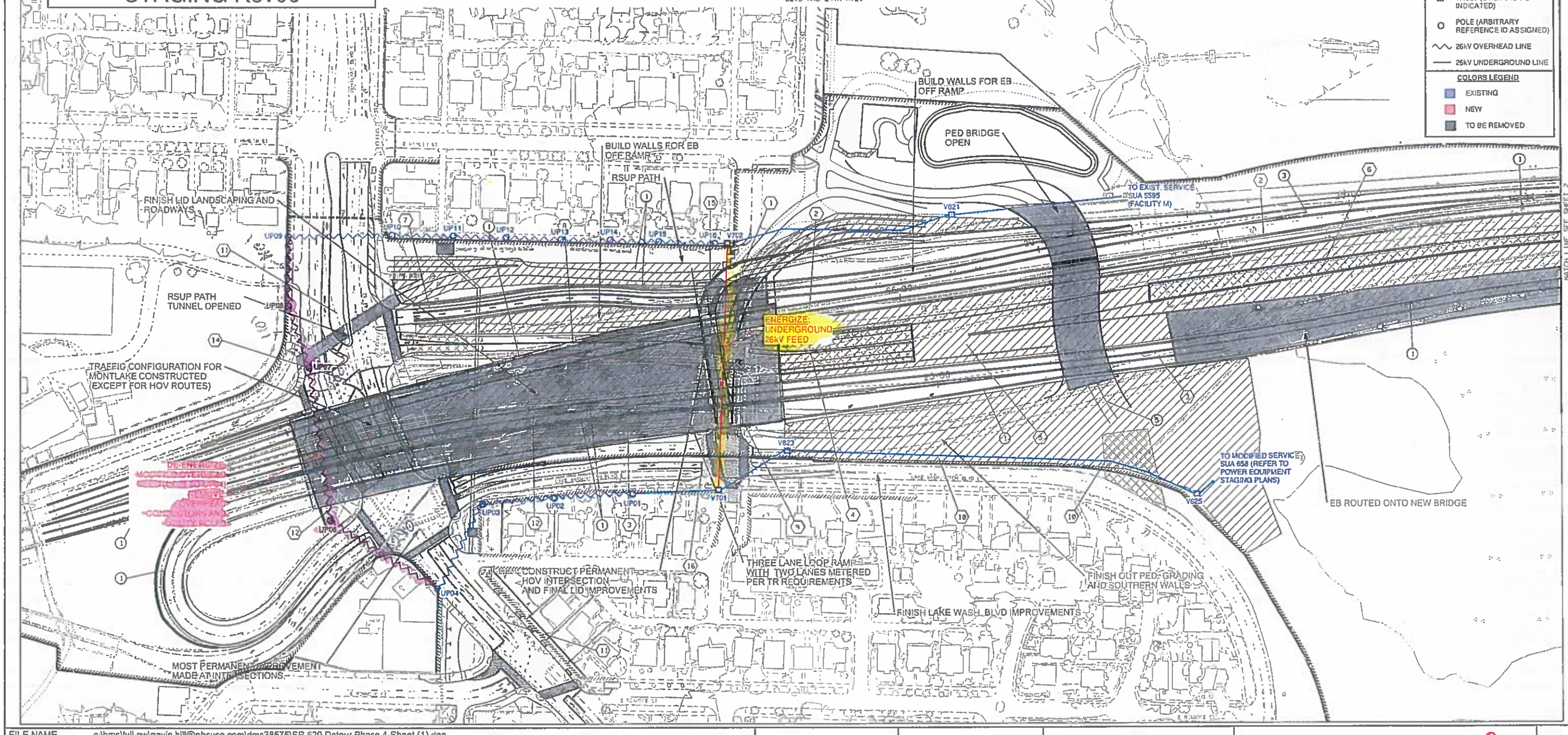
0 80 160
SCALE IN FEET

SYMBOLS LEGEND

- VAULT (UTILITY ID AS INDICATED)
- POLE (ARBITRARY REFERENCE ID ASSIGNED)
- 26kV OVERHEAD LINE
- 26kV UNDERGROUND LINE

COLORS LEGEND

- EXISTING
- NEW
- TO BE REMOVED



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Washington State Department of Transportation

SR 520 U8
MONTLAKE TO LAKE WASHINGTON I/C AND BRIDGE REPLACEMENT

MOT PHASE 4

PLAN REF. NO.

SHEET 1 OF 2 SHEETS