METROPOLITAN COUNCIL

SOUTHWEST
Green Line LRT Extension

PLAN PACKAGE INDEX / DESCRIPTION
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CIVIL EAST CONSTRUCTION

VOLUME 5
TUNNELS

60% SUBMISSION
DATE : 09/28/15

THE PROPOSED SOUTHWEST LRT PROJECT IS NOT FINAL BUT IS STILL UNDER ENVIRONMENTAL REVIEW AND THE PROJECT IS SUBJECT TO CHANGE. THESE PLANS ARE NOT FINAL.

THE COUNCIL, THROUGH THE DEVELOPMENT OF THESE PLANS, DOES NOT INTEND THAT THEY WILL PREJUDICE OR COMPROMISE ANY STATE OR FEDERAL ENVIRONMENTAL REVIEW OR OTHER LEGAL REQUIREMENTS. THESE PLANS DO NOT LIMIT THE PROJECT DESIGN ALTERNATIVES OR MITIGATIVE MEASURES THAT THE COUNCIL MAY UNDERTAKE IF THE PROPOSED SWLRT PROJECT PROCEEDS TO CONSTRUCTION.

THE COUNCIL WILL NOT TAKE FINAL ACTION ON THIS MATTER UNLESS THE COUNCIL PROCEEDS WITH THE PROJECT AFTER THE FTA'S RECORD OF DECISION AND THE COUNCIL'S DETERMINATION OF ADEQUACY.

AECOM

CIVIL EAST

SHT #	SHEET NAME	SHEET DESCRIPTION	STATION	STATION	REV
		VOLUME 5 - TUNNELS			
1	E0-TUN-CVR-001	COVER SHEET			
2	E0-TUN-IDX-001	VOLUME INDEX OF PLAN SHEETS			
3	E0-GEN-KEY-001	GENERAL KEY MAP			
4	E0-GEN-NTS-001	GENERAL LEGEND AND ABBREVIATIONS SHEET 1			
5	E0-GEN-NTS-002	GENERAL LEGEND AND ABBREVIATIONS SHEET 2			
6	E3-STU-TUNN-TUNK-GPE-002	KEY PLAN			
7	E3-STU-TUN-TUNK-GTE-NTE-001	GENERAL NOTES (1 OF 2)			
8	E3-STU-TUN-TUNK-GTE-NTE-002	GENERAL NOTES (2 OF 2)			
9	E3-STU-TUN-TUNK-GPE-001	GENERAL PLAN AND ELEVATION (1 OF 6)			
10	E3-STU-TUN-TUNK-GPE-002	GENERAL PLAN AND ELEVATION (2 OF 6)			
11	E3-STU-TUN-TUNK-GPE-003	GENERAL PLAN AND ELEVATION (3 OF 6)			
12	E3-STU-TUN-TUNK-GPE-004	GENERAL PLAN AND ELEVATION (4 OF 6)			
13	E3-STU-TUN-TUNK-GPE-005	GENERAL PLAN AND ELEVATION (5 OF 6)			
14	E3-STU-TUN-TUNK-GPE-006	GENERAL PLAN AND ELEVATION (6 OF 6)			
15	E3-STU-TUN-TUNK-TYP-RTS-001	RUNNING TUNNEL SECTION - GEOMETRY			
16	E3-STU-TUN-TUNK-TYP-TTS-001	TRANSITION TUNNEL SECTION - GEOMETRY (1 OF 2)			
17	E3-STU-TUN-TUNK-TYP-TTS-002	TRANSITION TUNNEL SECTION - GEOMETRY (2 OF 2)			
18	E3-STU-TUN-TUNK-TYP-JFN-001	TUNNEL SECTION AT JET FAN LOCATION -GEOMETRY			
19	E3-STU-TUN-TUNK-TYP-BTG-001	BOAT SECTION - GEOMETRY			
20	E3-STU-TUN-TUNK-TYP-PTL-001	TUNNEL PORTALS - GEOMETRY (1 OF 2)			
21	E3-STU-TUN-TUNK-TYP-PTL-002	TUNNEL PORTALS - GEOMETRY (2 OF 2)			
22	E3-STU-TUN-TUNK-TYP-SEC-001	TUNNEL SECTIONS (1 OF 3)			
23	E3-STU-TUN-TUNK-TYP-SEC-002	TUNNEL SECTIONS (2 OF 3)			
24	E3-STU-TUN-TUNK-TYP-SEC-003	TUNNEL SECTIONS (3 OF 3)			
25	E3-STU-TUN-TUNK-DTL-WTP-001	WATERPROOFING (1 OF 2)			
26	E3-STU-TUN-TUNK-DTL-WTP-002	WATERPROOFING (2 OF 2)			
27	E3-STU-TUN-TUNK-BOR- 001	BORINGS (1 OF 6)			
28	E3-STU-TUN-TUNK-BOR-002	BORINGS (2 OF 6)			
29	E3-STU-TUN-TUNK-BOR-003	BORINGS (3 OF 6)			
30	E3-STU-TUN-TUNK-BOR-004	BORINGS (4 OF 6)			
31	E3-STU-TUN-TUNK-BOR-005	BORINGS (5 OF 6)			
32	E3-STU-TUN-TUNK-BOR-006	BORINGS (6 OF 6)			
33	E3-STU-TUN-TUNK-SOE-CRI-001	TEMPORARY EXCAVATION SUPPORT DESIGN CRITERIA			
34	E3-STU-TUN-TUNK-SOE-001	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (1 OF 10)			
35	E3-STU-TUN-TUNK-SOE-002	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (2 OF 10)			
36	E3-STU-TUN-TUNK-SOE-003	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (3 OF 10)			
37	E3-STU-TUN-TUNK-SOE-001	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (4 OF 10)			
38	E3-STU-TUN-TUNK-SOE-005	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (5 OF 10)			
39	E3-STU-TUN-TUNK-SOE-006	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (6 OF 10)			
40	E3-STU-TUN-TUNK-SOE-007	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (7 OF 10)			
41	E3-STU-TUN-TUNK-SOE-008	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (8 OF 10)			
42	E3-STU-TUN-TUNK-SOE-009	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (9 OF 10)			
43	E3-STU-TUN-TUNK-SOE-010	SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (10 OF 10)			
44	E3-STU-TUN-TUNK-SOE-TYP-001	SUGGESTED EXCAVATION SUPPORT SECTIONS (1 OF 2)			
45	E3-STU-TUN-TUNK-SOE-SEQ-001	SUGGESTED EXCAVATION SUPPORT CONSTRUCTION STAGING (1 OF 2)			
46	E3-STU-TUN-TUNK-SOE-SEQ-002	SUGGESTED EXCAVATION SUPPORT CONSTRUCTION STAGING (2 OF 2)			
47	E3-STU-TUN-TUNK-SOE-DTL-001	SUGGESTED EXCAVATION SUPPORT DETAILS			
47	E3-ARC-TYP-001	CROSS PASSAGE DOORS			
48	E3-ARC-TYP-002	FENCING & RAILING DETAILS			
49	E3-STM-TUNK-NTS-001	PLUMBING GENERAL NOTES, ABBREVIATIONS & SYMBOLS			
50	E3-STM-TUNK-GPE-001	TUNNEL DRAINAGE (BRIDGE NO. 27C15) - PLAN & PROFILE	2771+00	2784+00	
51	E3-STM-TUNK-GPE-002	TUNNEL DRAINAGE (BRIDGE NO. 27C15) - PLAN & PROFILE	2784+00	2798+00	
52	E3-STM-TUNK-GPE-003	TUNNEL DRAINAGE (BRIDGE NO. 27C15) - PLAN & PROFILE	2798+00	2805+00	

CIVIL EAST

SHT #	SHEET NAME	SHEET DESCRIPTION	STATION	STATION	REV
53	E3-STM-TUNK-DTL-001	TUNNEL DRAINAGE (BRIDGE NO. 27C15) - SECTIONS & DETAILS			
54	E3-STM-TUNK-DTL-002	TUNNEL DRAINAGE (BRIDGE NO. 27C15) - BOAT SECTIONS & DETAILS			
55	E3-STM-TUNK-SCH-001	TUNNEL DRAINAGE (BRIDGE NO. 27C15) - MATERIAL SCHEDULE			
56	E3-FLS-TUNK-PLN-001	FIRE LIFE SAFETY STANDPIPE NICHE PLAN SHEET 1 OF 5			
57	E3-FLS-TUNK-PLN-002	FIRE LIFE SAFETY STANDPIPE NICHE PLAN SHEET 2 OF 5			
58	E3-FLS-TUNK-PLN-003	FIRE LIFE SAFETY STANDPIPE NICHE PLAN SHEET 3 OF 5			
59	E3-FLS-TUNK-PLN-004	FIRE LIFE SAFETY STANDPIPE NICHE PLAN SHEET 4 OF 5			
60	E3-FLS-TUNK-PLN-005	FIRE LIFE SAFETY STANDPIPE NICHE PLAN SHEET 5 OF 5			
61	E3-FLS-TUNK-SCT-001	FIRE LIFE SAFETY TYPICAL NICHE SECTION AND DETAILS SHEET 1 OF 2			
62	E3-FLS-TUNK-SCT-002	FIRE LIFE SAFETY TYPICAL NICHE SECTION AND DETAILS SHEET 2 OF 2			

CIVIL EAST

SHT #	SHEET NAME	SHEET DESCRIPTION	STATION	STATION	REV

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

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METROPOLITAN COUNCIL

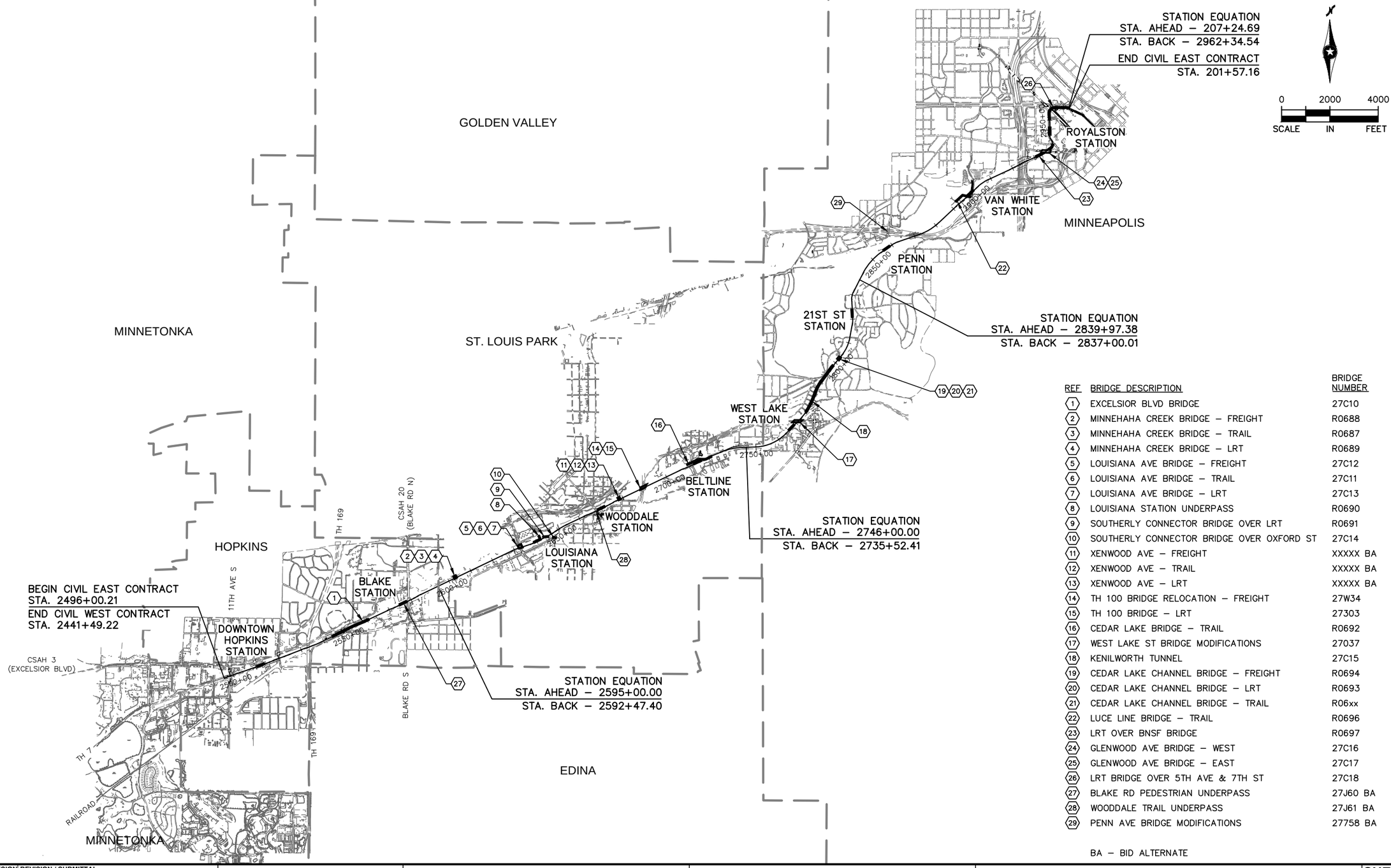
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
TUNNELS
VOLUME INDEX OF PLAN SHEETS

DISCIPLINE: GENERAL

SHEET NAME: E0-TUN-IDX - 001

SHEET 2 OF 63



REF	BRIDGE DESCRIPTION	BRIDGE NUMBER
1	EXCELSIOR BLVD BRIDGE	27C10
2	MINNEHAHA CREEK BRIDGE – FREIGHT	R0688
3	MINNEHAHA CREEK BRIDGE – TRAIL	R0687
4	MINNEHAHA CREEK BRIDGE – LRT	R0689
5	LOUISIANA AVE BRIDGE – FREIGHT	27C12
6	LOUISIANA AVE BRIDGE – TRAIL	27C11
7	LOUISIANA AVE BRIDGE – LRT	27C13
8	LOUISIANA STATION UNDERPASS	R0690
9	SOUTHERLY CONNECTOR BRIDGE OVER LRT	R0691
10	SOUTHERLY CONNECTOR BRIDGE OVER OXFORD ST	27C14
11	XENWOOD AVE – FREIGHT	XXXXX BA
12	XENWOOD AVE – TRAIL	XXXXX BA
13	XENWOOD AVE – LRT	XXXXX BA
14	TH 100 BRIDGE RELOCATION – FREIGHT	27W34
15	TH 100 BRIDGE – LRT	27303
16	CEDAR LAKE BRIDGE – TRAIL	R0692
17	WEST LAKE ST BRIDGE MODIFICATIONS	27037
18	KENILWORTH TUNNEL	27C15
19	CEDAR LAKE CHANNEL BRIDGE – FREIGHT	R0694
20	CEDAR LAKE CHANNEL BRIDGE – LRT	R0693
21	CEDAR LAKE CHANNEL BRIDGE – TRAIL	R06xx
22	LUCE LINE BRIDGE – TRAIL	R0696
23	LRT OVER BNSF BRIDGE	R0697
24	GLENWOOD AVE BRIDGE – WEST	27C16
25	GLENWOOD AVE BRIDGE – EAST	27C17
26	LRT BRIDGE OVER 5TH AVE & 7TH ST	27C18
27	BLAKE RD PEDESTRIAN UNDERPASS	27J60 BA
28	WOODDALE TRAIL UNDERPASS	27J61 BA
29	PENN AVE BRIDGE MODIFICATIONS	27758 BA

BA – BID ALTERNATE

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
GENERAL
KEY MAP

DISCIPLINE: GENERAL

SHEET NAME: E0-GEN-KEY - 001

SHEET 3 OF 63

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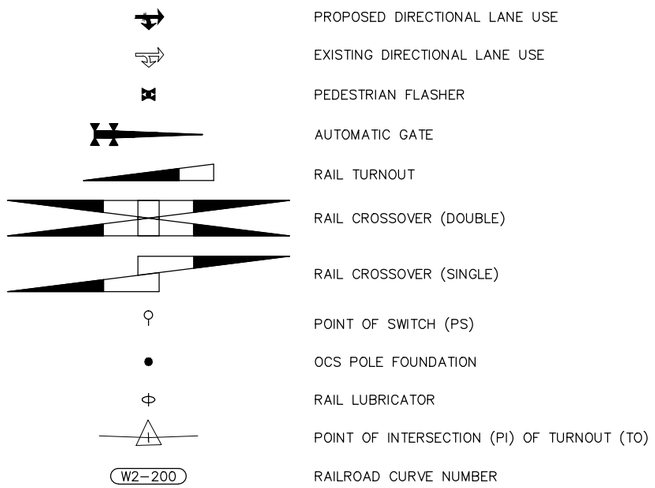
TRACK LINETYPES

- ROADWAY ℄
- TRACK ℄ (LRT)
- TRACK ℄ (FRT)
- RETAINING WALL
- BALLAST CURB
- TUNNEL WALL
- FENCE
- EX ROW
- PROP ROW
- PROP TCE
- PROP PE
- FENCE / RAILING
- ID — ID — INTRUSION DETECTION

CIVIL LINETYPES

- ROADWAY ℄
- TRACK ℄ (LRT)
- TRACK ℄ (FRT)
- RETAINING WALL
- BALLAST CURB
- TUNNEL WALL
- CONCRETE CURB AND GUTTER
- TRAIL
- SIDEWALK
- DRIVEWAY
- BRIDGE
- SAWCUT
- FENCE
- DELINEATED WETLAND
- WATER EDGE
- EX ROW
- PROP ROW
- PROP TCE
- PROP PE
- CROSSWALK
- STOP BAR
- MEDIAN NOSE

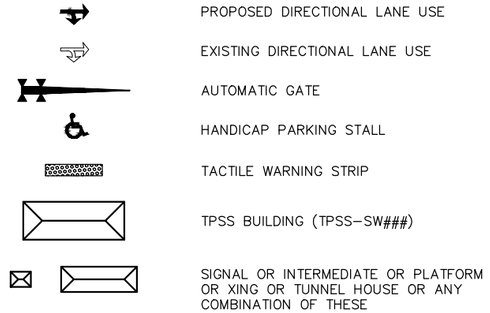
TRACK SYMBOLS



- PROPOSED DIRECTIONAL LANE USE
- EXISTING DIRECTIONAL LANE USE
- PEDESTRIAN FLASHER
- AUTOMATIC GATE
- RAIL TURNOUT
- RAIL CROSSOVER (DOUBLE)
- RAIL CROSSOVER (SINGLE)
- POINT OF SWITCH (PS)
- OCS POLE FOUNDATION
- RAIL LUBRICATOR
- POINT OF INTERSECTION (PI) OF TURNOUT (TO)
- W2–200 RAILROAD CURVE NUMBER

NOTE:
ALL TURNOUTS AND CROSSOVERS TO BE EQUIPPED WITH POWER SWITCH MACHINES AND SWITCH HEATERS

CIVIL SYMBOLS



- ACCESSIBLE PEDESTRIAN CURB RAMP (DESIGN VARIES)
- PROPOSED DIRECTIONAL LANE USE
- EXISTING DIRECTIONAL LANE USE
- AUTOMATIC GATE
- HANDICAP PARKING STALL
- TACTILE WARNING STRIP
- TPSS BUILDING (TPSS–SW###)
- SIGNAL OR INTERMEDIATE OR PLATFORM OR XING OR TUNNEL HOUSE OR ANY COMBINATION OF THESE

SURVEY NOTES

1. THE HORIZONTAL DATUM OF THIS MAP IS BASED ON THE HENNEPIN COUNTY COORDINATE SYSTEM WHICH IS RELATED TO THE MINNESOTA STATE PLANE COORDINATE SYSTEM NAD 83 (2007) ADJUSTMENT SOUTH ZONE.
2. THE PLANIMETRIC FEATURES SHOWN ON THIS MAP ARE AS PREPARED BY AERO–METRIC, INC. FROM AERIAL DATA AND IMAGERY COLLECTED IN APRIL 2012, AS SUPPLEMENTED BY FIELD SURVEYS COMPLETED BY MFRA, INC.
3. HORIZONTAL POSITIONAL ACCURACY: USING THE NATIONAL STANDARD FOR SPATIAL DATA ACCURACY, THE DATA SET TESTED 0.14 FEET HORIZONTAL ACCURACY AT A 95% CONFIDENCE LEVEL.
4. VERTICAL POSITIONAL ACCURACY: USING THE NATIONAL STANDARD FOR SPATIAL DATA ACCURACY, THE DATA SET TESTED 0.10 FEET VERTICAL ACCURACY AT 95% CONFIDENCE LEVEL.

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
GENERAL
LEGEND AND ABBREVIATIONS
SHEET 1

DISCIPLINE: GENERAL

SHEET NAME: E0-GEN-NTS - 001

SHEET 4 OF 63

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ABBREVIATIONS

AD	ALGEBRAIC DIFFERENCE
AVE	AVENUE
BGN	BEGIN
BP	BEGINNING POINT
BVCE	BEGINNING VERTICAL CURVE ELEVATION
BVCS	BEGINNING VERTICAL CURVE STATION
BLVD	BOULEVARD
BNSF	BURLINGTON NORTHERN SANTA FE RAILWAY
C&G	CURB AND GUTTER
℄	CENTERLINE
CIR	CIRCLE
CP	CANADIAN PACIFIC
CPRAIL	CANADIAN PACIFIC RAILWAY
CS	CURVE TO SPIRAL
CSAH	COUNTY STATE AID HIGHWAY
D&U	DRAINAGE AND UTILITY
DF	DIRECT FIXATION
DR	DRIVE
DTL	DETAIL
DWY	DRIVEWAY
E	EAST
Ea	ACTUAL SUPERELEVATION (INCHES)
EB	EAST BOUND
EL or ELEV	ELEVATION
EP	END POINT
ESMT	EASEMENT
Eu	UNBALANCED SUPERELEVATION (INCHES)
EVCE	ENDING VERTICAL CURVE ELEVATION
EVCS	ENDING VERTICAL CURVE STATION
EX	EXISTING
HCRRA	HENNEPIN COUNTY REGIONAL RAILROAD AUTHORITY
LH	LEFT HAND
LN	LANE
LRT	LIGHT RAIL TRANSIT
L_c	CURVE LENGTH (FEET)
L_s	SPIRAL LENGTH (FEET)
MIN	MINIMUM
MPH	MILES PER HOUR
MPLS	CITY OF MINNEAPOLIS
MPRB	MINNEAPOLIS PARK AND RECREATION BOARD
N	NORTH
NB	NORTH BOUND
NIC	NOT IN CONTRACT
NO	NUMBER
OMF	OPERATIONS AND MAINTENANCE FACILITY
OCS	OVERHEAD CONTACT SYSTEM
OH	OVERHEAD
PC	POINT OF CURVE
PE	PERMANENT EASEMENT
PITO	POINT OF INTERSECTION OF TURNOUT
PKWY	PARKWAY
POT	POINT ON TANGENT
PROP	PROPOSED
PS	POINT OF SWITCH
PT	POINT OF TANGENT
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS (FEET)
RD	ROAD
RL	RAIL LUBRICATOR
r	RATE OF CHANGE VERTICAL CURVE
RH	RIGHT HAND
ROW	RIGHT OF WAY
S	SOUTH
SB	SOUTH BOUND
SC	SPIRAL TO CURVE
SIG-COMM	SIGNAL COMMUNICATION
ST	STREET
ST	SPIRAL TO TANGENT
STA	STATION
TCE	TEMPORARY CONSTRUCTION EASEMENT
TH	TRUNK HIGHWAY
THRU	THROUGH
TOR	TOP OF RAIL
TPSS	TRACTION POWER SUBSTATION
TRK	TRACK
TS	TANGENT TO SPIRAL
TYP	TYPICAL
UG	UNDERGROUND
V	DESIGN VELOCITY (MPH)
VC	VERTICAL CURVE
W	WEST
WB	WEST BOUND

TRAIL INDEX

ABBREVIATED NAME	FULL NAME / LOCATION
TRAIL 1	UNDER RED CIRCLE DR, LRT, AND YELLOW CIRCLE DR
TRAIL 2	FROM TRAIL 1 TO GREEN CIRCLE DR
TRAIL 3	OPUS STATION ACCESS FROM BREN RD E
TRAIL 4	FROM BREN RD W TO TRAIL 5
TRAIL 5	FROM OPUS STATION TO GREEN CIRCLE DR
TRAIL 6	FROM TRAIL 5 TO SMETANA RD
CEDAR LAKE TRAIL	CEDAR LAKE LRT REGIONAL TRAIL/FROM SHADY OAK STATION TO 11TH AVE
CEDAR LAKE TRAIL	CEDAR LAKE LRT REGIONAL TRAIL/WEST OF EXCELSIOR
CEDAR LAKE TRAIL	CEDAR LAKE LRT REGIONAL LRT TRAIL/BETWEEN EXCELSIOR AND KENILWORTH TRAIL CONNECTION
MIDTOWN GREENWAY	MIDTOWN GREENWAY/EAST OF KENILWORTH TRAIL CONNECTION
TRAIL A	KENILWORTH TRAIL (SECONDARY)/BETWEEN CEDAR-ISLES CHANNEL AND 21ST STREET STATION
TRAIL B	KENILWORTH TRAIL (SECONDARY)/BETWEEN 21ST STREET STATION AND PENN STATION
TRAIL B	CEDAR LAKE TRAIL (SECONDARY)/EAST OF PENN STATION
TRAIL C	10' CONNECTOR TRAIL FROM CEDAR LAKE LRT REGIONAL TRAIL TO TYLER AVE.
TRAIL D	10' CONNECTOR TRAIL/BELTLINE STATION TO CEDAR LAKE LRT REGIONAL TRAIL
KENILWORTH TRAIL	KENILWORTH TRAIL (MAIN)/W LAKE ST TO PENN STATION
CEDAR LAKE TRAIL	CEDAR LAKE TRAIL (MAIN)/PENN STATION TO TH 394
TRAIL E	KENILWORTH TRAIL (SECONDARY)/EAST OF W LAKE ST
TRAIL F	KENILWORTH TRAIL (SECONDARY)/WEST OF CEDAR LAKE PKWY
TRAIL G	KENILWORTH TRAIL (SECONDARY)/WEST OF PENN STATION
TRAIL G	CEDAR LAKE TRAIL (SECONDARY)/EAST OF PENN STATION
TRAIL H	10' CONNECTOR TRAIL/EAST OF PENN STATION TO KENWOOD PKWY
TRAIL I	NOT USED
CEDAR LAKE TRAIL	CEDAR LAKE TRAIL (MAIN)/AT-GRADE CROSSING AT PENN STATION
TRAIL J	CEDAR LAKE TRAIL (SECONDARY)/NORTHWEST OF PENN STATION
TRAIL K	CEDAR LAKE TRAIL (SECONDARY)/NORTHWEST OF PENN STATION
TRAIL L	CEDAR LAKE TRAIL (SECONDARY)/EAST OF PENN STATION
TRAIL M	NOT USED
TRAIL N	8' CONNECTOR TRAIL FROM CEDAR LAKE TRAIL TO EDGEBROOOK DRIVE
TRAIL O	8' CONNECTOR TRAIL FROM CEDAR LAKE TRAIL TO W LAKE STREET
TRAIL P	8' CONNECTOR TRAIL FROM CEDAR LAKE TRAIL TO LOUISIANA AVE
TRAIL Q	10' CONNECTOR TRAIL FROM CEDAR LAKE TRAIL TO TH 7 SERVICE ROAD
TRAIL R	20' CONNECTOR TRAIL FROM VAN WHITE STATION TO CEDAR LAKE TRAIL
TRAIL S	NOT USED
TRAIL T	8' CONNECTOR TRAIL FROM VAN WHITE STATION TO VAN WHITE MEMORIAL BLVD
TRAIL U	10' TRAIL PARALLEL TO CEDAR LAKE PKWY
LUCE LINE TRAIL	LUCE LINE REGIONAL TRAIL/ON BRIDGE OVER LIGHT RAIL
TRAIL V	CONNECTOR TRAIL TO LUCE LINE REGIONAL TRAIL WEST OF LIGHT RAIL
TRAIL W	CONNECTOR TRAIL TO LUCE LINE REGIONAL TRAIL WEST OF LIGHT RAIL

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60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
GENERAL
LEGEND AND ABBREVIATIONS
SHEET 2

DISCIPLINE: GENERAL

SHEET NAME: E0-GEN-NTS - 002

SHEET 5 OF 63

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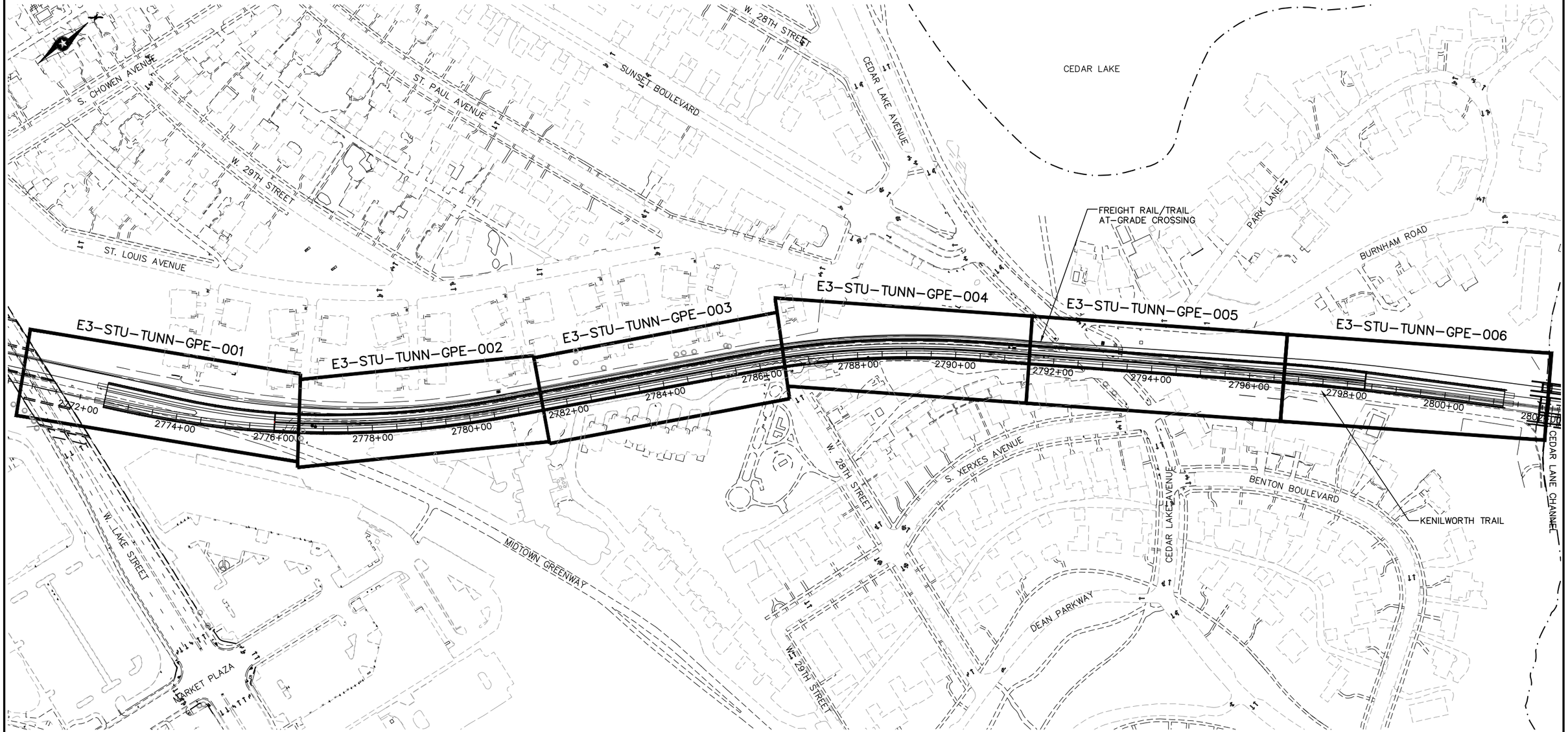

KEY PLAN

0 50 100 200

SCALE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
KEY PLAN

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-002

SHEET 6 OF 63

Sep. 21 2015 10:50 am \\Nadtc2fp001\swlrt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-KEY-PLN.dwg By: lafargues

A. GENERAL NOTES

1. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE CONTRACT DOCUMENTS, DRAWING NOTES HEREWITH, AND THE SYMBOLS & ABBREVIATION DRAWING(S).

2. STRUCTURAL WORK SHALL BE FULLY COORDINATED WITH ALL OTHER TRADES. ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF ENGINEER FOR CLARIFICATION PRIOR TO COMMENCING WORK.

3. ANY PORTION OF EXISTING STRUCTURE WHICH IS REMOVED, DISTURBED OR DAMAGED IN THE COURSE OF CONSTRUCTION OF NEW WORK SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO METRO TRANSIT.

4. NO CONSTRUCTION/STORAGE LOADING SHALL BE IMPOSED DIRECTLY OR VIA SHORING ON PERMANENT STRUCTURAL CONCRETE MEMBERS WHICH HAVE NOT ATTAINED THEIR 28-DAY COMPRESSIVE STRENGTH, UNLESS APPROVED BY ENGINEER. CONTRACTOR SHALL SUBMIT CALCULATIONS FOR APPROVAL BY ENGINEER IN THIS REQUEST.

5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, CONTRACTOR MUST SURVEY AND DOCUMENT ALL EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER. IN THIS REGARD, UNLESS PROVIDED BY SURVEY, ALL INFORMATION ON EXISTING BUILDINGS MUST BE VERIFIED BY CONTRACTOR.

6. CONTRACTOR IS RESPONSIBLE FOR THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION INCLUDING CONTRACTOR'S PROPOSED SEQUENCE OF CONSTRUCTION; FOR THESE STAGES, CONTRACTOR MUST SUBMIT FOR APPROVAL, COMPLETE CALCULATIONS AND DRAWINGS WHICH SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MINNESOTA.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING INTO THE STRUCTURE ALL REQUIRED EMBEDDED ITEMS AND OPENINGS, AND INDICATE THE SAME ON SHOP DRAWINGS. ANY SUCH ITEMS SHOWN ON STRUCTURAL DRAWINGS ARE FOR INFORMATION ONLY. FOR SIZE, LOCATION, AND DETAILS OF ALL EMBEDDED ITEMS AND OPENINGS, REFER TO THE APPROPRIATE DISCIPLINE DRAWINGS.

8. UNLESS NOTED OR SHOWN OTHERWISE, ALL PHASES OF WORK ARE TO CONFORM TO THE MINIMUM STANDARDS OF THE MINNESOTA DOT AS APPLICABLE, AND ANY SPECIFICATIONS WHICH THESE STANDARDS ARE BASED ON. WHERE CONFLICT BETWEEN CODES AND SPECIFICATIONS OCCUR, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN. ALL A.S.T.M. DESIGNATIONS REFERRED TO ON THESE DRAWINGS SHALL BE THE LATEST ADOPTED OR REVISED SPECIFICATION, AS OF THE DATE OF THESE DRAWINGS.

9. CONTRACTOR SHALL REVIEW EXISTING CONDITIONS ON THE SITE DURING THE BIDDING. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING WORK. ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES PRIOR TO PROCEEDING.

10. ALL DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS AND DETAILS. DRAWINGS SHALL NOT BE SCALED FOR CONSTRUCTION PURPOSES. NOTES AND DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

11. CONTRACTOR SHALL, AT HIS OWN EXPENSE, DESIGN, CONSTRUCT AND MAINTAIN ALL SAFETY DEVICES, INCLUDING SHORING AND BRACING AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS.

12. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON FRAMED FLOORS OR ROOF. LOAD SHALL NOT EXCEED DESIGN LIVE LOAD FOR EACH PARTICULAR LEVEL. WHEN WEIGHT OF MATERIALS OR EQUIPMENT MAY EXCEED DESIGN LOAD, STRUCTURAL SYSTEMS SHALL BE SHORED.

13. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF THE WORK. THE DETAILS SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.

B. CONCRETE

1. THE FOLLOWING MINIMUM CONCRETE STRENGTHS SHALL BE USED FOR THE STRUCTURES AS NOTED ON THESE DRAWINGS.

STRUCTURAL CONCRETE FOR TUNNEL SHELL:	f'c = 5,000 PSI
CONCRETE – FOR MUD SLAB AND WATERPROOFING PROTECTION	f'c = 3,000 PSI
LEAN CONCRETE:	f'c = 1,500 PSI
PRECAST CONCRETE:	f'c = 5,000 PSI

CONCRETE SHALL ATTAIN ITS COMPRESSIVE STRENGTH AT 28 DAYS.

2. ALL GROUT SHALL BE NON-SHRINK, NON-METALLIC TYPE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

B. CONCRETE (CONTINUED)

3. MINIMUM CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS:

ELEMENTS	MINIMUM REINFORCEMENT COVER	
	CAST-IN-PLACE CONC	PRECAST CONCRETE
A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH/ROCK,	3"	NOT APPLICABLE
B. FORMED CONCRETE EXPOSED TO EARTH, ROCK, OR WEATHER:		
WALLS & SLABS, INSIDE TUNNEL FACE	2"	1 1/2"
BEAMS & COLUMNS: PRIMARY BARS	2"	2"
BEAMS & COLUMNS: STIRRUPS & TIES	2"	1 1/2"
TOP OF INVERT SLABS AND FOOTINGS	2 1/2"	NOT APPLICABLE
C. ALL OTHER CONDITIONS:		
WALLS & SLABS	1 1/2"	
BEAMS & COLUMNS: PRIMARY BARS	1 1/2"	1 3/4"
BEAMS & COLUMNS: STIRRUPS & TIES	1 1/2"	1 1/4"

4. ALL BARS AT NON-CONTINUOUS ENDS SHALL HAVE A STANDARD HOOK, U.O.N.

5. DOWELS INTO WALLS AND COLUMNS SHALL MATCH THE CORRESPONDING WALL AND COLUMN REINFORCEMENT, AND SHALL BE FULLY DEVELOPED IN TENSION, U.O.N.

6. MINIMUM LAP OF WELDED WIRE REINFORCEMENT SHALL BE 8 INCHES OR ONE FULL MESH, WHICHEVER IS GREATER.

7. ALL REINFORCING BARS SHALL BE SECURED IN THEIR PROPER POSITION DURING CONCRETE PLACEMENT. PROVIDE ADDITIONAL BARS, CHAIRS, TIES AND SPACERS, AS REQUIRED, TO SECURE THE REINFORCING BARS. ALL BAR SUPPORTS AND SPACERS SHALL HAVE NON-CORROSIVE TIPS, AS PER ACI 315 CONCRETE DETAILING MANUAL.

8. THE PROJECTING CORNERS OF COLUMNS, BEAMS, WALLS, ETC., SHALL BE FORMED WITH 3/4" CHAMFER, U.O.N.

9. CONSTRUCTION JOINTS SHOWN ON THE DRAWINGS SHALL NOT BE OMITTED WITHOUT THE APPROVAL OF ENGINEER. CONSTRUCTION JOINTS SUPPLEMENTAL TO THOSE SHOWN ON THE DRAWINGS WILL BE PERMITTED, SUBJECT TO THE ENGINEER'S APPROVAL.

10. CONSTRUCTION JOINTS SHALL BE KEYED (3" MINIMUM) AND THE SURFACES SHALL BE CLEANED, WITH LAITANCE REMOVED. PRIOR TO PLACING NEW CONCRETE, EITHER ROUGHEN THE SURFACES TO 1/4" INCH AMPLITUDE BY MECHANICAL OR HYDROBLASTING METHODS, AND APPLY BONDING AGENT ('WELDCRETE', 'ARMATECH 110', OR AN APPROVED EQUIVALENT) TO EXISTING SURFACES. DETAILS OF SHEAR KEYS SHALL BE AS INDICATED ON DETAIL DRAWINGS. PROVIDE WATERSTOPS FOR ALL EXTERIOR CONSTRUCTION JOINTS BELOW THE WATER TABLE.

11. MAXIMUM SPACING BETWEEN CONSTRUCTION JOINTS SHALL BE AS FOLLOWS, U.O.N.:
    WALLS: 50 FEET
    SLABS: 50 FEET

12. ALL CUTS IN CONCRETE SHALL BE MADE BY SAWCUTTING, LINE CUTTING, OR OTHER MEANS AS APPROVED BY ENGINEER.

13. COORDINATE AND INSTALL ALL ANCHOR BOLTS, SLEEVES, PLATES, INSERTS, ETC., AS REQUIRED FOR THE VARIOUS TRADES. THESE AND ANY OTHER RELEVANT ACCESSORY ITEMS SHALL BE INDICATED ON SHOP DRAWINGS.

14. NO UTILITY SERVICE CONDUITS OR PIPES SHALL PASS THROUGH OR BE EMBEDDED WHOLLY OR PARTIALLY WITHIN CONCRETE MEMBERS, UNLESS THEY ARE IN COMPLIANCE WITH TYPICAL DETAILS INDICATED OR SPECIFICALLY DETAILED ON STRUCTURAL OR MEP DRAWINGS. IN CASE OF NONCOMPLIANCE, CONTRACTOR SHALL SUBMIT CALCULATIONS FOR THE PROPOSED ALTERNATIVE, FOR APPROVAL BY ENGINEER.

15. NO ALUMINUM ELEMENT(S) SHALL BE EMBEDDED IN CONCRETE.

16. CONCRETE PADS SHALL BE PROVIDED WHERE SHOWN ON STRUCTURAL OR MEP DRAWINGS.

17. NOT USED.

18. ALL EXPOSED CONCRETE SHALL HAVE A SMOOTH FORM FINISH USING B-B PLYFORM, CLASS I, EXT-A.P.A. PLYWOOD.

B. CONCRETE (CONTINUED)

19. ALL CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 318-LATEST EDITION "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS", EXCEPT AS MODIFIED BY THE SUPPLEMENTAL REQUIREMENTS CONTAINED HEREIN OR SHOWN ON THE DRAWINGS.

20. PROVIDE WATERSTOPS IN ALL BELOW GROUNDWATER TABLE FOUNDATION WALL CONSTRUCTION JOINTS, UNLESS NOTED OTHERWISE ON THE DRAWINGS.

21. NO BRICK OR POROUS MATERIAL SHALL BE USED TO SUPPORT FOUNDATION STEEL OFF THE GROUND. CEMENT CUBES CALLED "DOBIES" ARE PERMITTED.

C. REINFORCING STEEL

1. ALL REINFORCING STEEL SHALL BE PLACED IN CONFORMANCE WITH THE I.B.C., AND THE "MANUAL OF STANDARD PRACTICE" BY THE C.R.S.I. OR AS MODIFIED BY THE CONSTRUCTION DOCUMENTS.

2. WELDING OF REINFORCEMENT SHALL BE IN ACCORDANCE WITH ASTM A-706 WITH LOW HYDROGEN ELECTRODES AND SHALL CONFORM TO I.B.C. STANDARD 19-1 AND STRUCTURAL WELDING CODE REINFORCING STEEL BY A.N.S.I. / A.W.S. D1.4. MINIMUM TENSILE STRENGTH OF WELD METAL SHALL BE 90 K.S.I. ALL WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS.

3. REINFORCEMENT BARS SHALL CONFORM TO ASTM A615, GRADE 60, WITH A MINIMUM YIELD STRENGTH OF 60 KSI. WELDED REINFORCEMENT SHALL CONFORM TO ASTM A706, GRADE 60, WITH MINIMUM YIELD FY=60 KSI.

4. WELDED WIRE REINFORCEMENT SHALL CONFORM TO ASTM A185, WITH A MINIMUM YIELD STRENGTH OF 60,000 PSI, AND SHALL BE UNCOATED.

5. ALL REINFORCING BAR BENDS SHALL BE MADE COLD, UNLESS OTHERWISE PERMITTED BY ENGINEER.

6. PIPING AND CONDUIT SHALL BE SO FABRICATED AND INSTALLED THAT CUTTING, BENDING, OR DISPLACEMENT OF REINFORCEMENT FROM ITS PROPER LOCATION WILL NOT BE REQUIRED.

7. ALL REINFORCING STEEL LAP SPLICES NOT DETAILED ON THE DRAWINGS, SHALL BE AS PER TABLE BELOW. WHERE A DEVELOPMENT LENGTH IS NOT SHOWN ON THE DRAWINGS, USE TENSION DEVELOPMENT LENGTH. TOP BARS ARE DEFINED AS ALL HORIZONTAL REINFORCEMENT PLACED SUCH THAT A TOTAL OF 12 INCHES OR MORE OF CONCRETE IS CAST IN THE MEMBER BELOW. WHERE BARS OF DIFFERENT SIZES ARE SPLICED, THE SPLICE LENGTH SHALL BE THAT REQUIRED FOR THE SMALLER BAR.

f'c=4,000 fy=60,000 (in psi)	BARS IN TENSION (INCHES)				BARS IN COMPRESSION (INCHES)	
	DEVELOPMENT LENGTH		SPLICE LENGTH			
BAR SIZE	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	DEVELOPMENT LENGTH	SPLICE LENGTH
	Ld	1.3 Ld	1.3 Ld	1.7 Ld	Ldc	Lpc
#3	13	17	17	22	8	12
#4	17	22	22	29	9	15
#5	22	28	28	36	12	19
#6	26	33	33	43	14	23
#7	38	48	48	63	16	27
#8	43	55	55	72	18	30
#9	48	62	62	81	21	34
#10	54	70	70	91	23	39
#11	60	78	78	101	26	43

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL NOTES (1 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-GTE-NTE-001

SHEET 7 OF 63

E. TEMPORARY EXCAVATION SUPPORT

1. THE DESIGN OF TEMPORARY EXCAVATION SUPPORT SYSTEMS SHALL BE THE RESPONSIBILITY OF CONTRACTOR. THE DESIGN SHOWN ON THE CONTRACT DRAWINGS IS ONLY SUGGESTED.

2. CONTRACTOR SHALL SUBMIT COMPLETE COMPUTATIONS, CONSTRUCTION SEQUENCE DRAWINGS, AND WORKING DRAWINGS FOR ALL SUPPORT OF EXCAVATION SYSTEMS AND GROUND WATER CONTROL SYSTEMS TO ENGINEER FOR APPROVAL. CALCULATIONS AND DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MINNESOTA. APPROVAL SHALL NOT BE DEEMED TO RELEASE CONTRACTOR FROM FULL RESPONSIBILITY FOR COMPLETE AND ACCURATE DESIGN AND FOR PERFORMANCE OF THE WORK IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS.

3. COORDINATE SUPPORT OF EXCAVATION SYSTEM WITH UTILITY REQUIREMENTS.

4. THE CONSTRUCTION SEQUENCE SHOULD BE SUCH THAT ANY TEMPORARY WALL BRACING OR ROADWAY DECK SUPPORT SHOULD NOT PENETRATE THROUGH THE WALLS, AND/OR ROOF OF THE PERMANENT STRUCTURE.

I. STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE PROVIDED AS FOLLOWS:

SHAPE	ASTM STANDARD	Fy (KSI)
STRUCTURAL STEEL SHAPES	A572, GR.50	50
PLATES AND BARS	A36	36
RECTANGULAR AND ROUND HSS	A500 GRADE B	46
PIPES	A53 TYPE E OR S	35
SHEET PILING	A328	36
STAINLESS STEEL	A167 TYPE 316	30

WHERE Fy IS THE MINIMUM TENSILE YIELDING STRESS TO BE PROVIDED, U.O.N.

2. ALL BOLTED CONNECTIONS SHALL BE MADE WITH HIGH STRENGTH BOLTS CONFORMING TO ASTM A325. BOLTED CONNECTIONS SHALL BE SLIP CRITICAL ('F' TYPE) CLASS A SURFACE, FULLY PRETENSIONED, U.O.N. MINIMUM BOLT DIAMETER SHALL BE 3/4", U.O.N.

3. ANCHOR BOLTS SHALL BE GRADE 36, ROUND BAR STOCK, THREADED, CONFORMING TO ASTM F1554. ANCHOR BOLTS SHALL BE SUPPLIED WITH CORRESPONDING NUTS AND WASHERS.

4. WELDING SHALL CONFORM TO AWS D1.1. ELECTRODES SHALL HAVE A MINIMUM TENSILE STRENGTH OF 70 KSI AND BE OF LOW HYDROGEN TYPE.

5. GALVANIZING WHERE NOTED SHALL CONFORM TO SPECIFICATIONS.

J. PAINTING

1. ALL EXPOSED STEEL WHICH IS TO BE ENCLOSED AND WILL REMAIN INACCESSIBLE AFTER THE COMPLETION OF THE WORK SHALL BE PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS.

2. THE FOLLOWING STEEL SURFACES SHALL NOT BE PAINTED:

   a. STEEL SURFACES TO BE IN CONTACT WITH CONCRETE.
   b. CONTACT SURFACES OF MILLED ENDS OF COMPRESSION MEMBERS.
   c. CONTACT SURFACES FOR SLIP CRITICAL TYPE CONNECTIONS.
   d. CONTACT SURFACES FOR FIELD WELDING.
   e. STEEL DESIGNATED TO BE STAINLESS STEEL CONSTRUCTION.

3. SPOT PAINT DAMAGED SURFACES AND UNPAINTED PORTIONS OF WELDED AND BOLTED CONNECTIONS IN THE FIELD AFTER ERECTION USING THE SAME PAINT SYSTEM AND ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

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SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL NOTES (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-GTE-NTE-002

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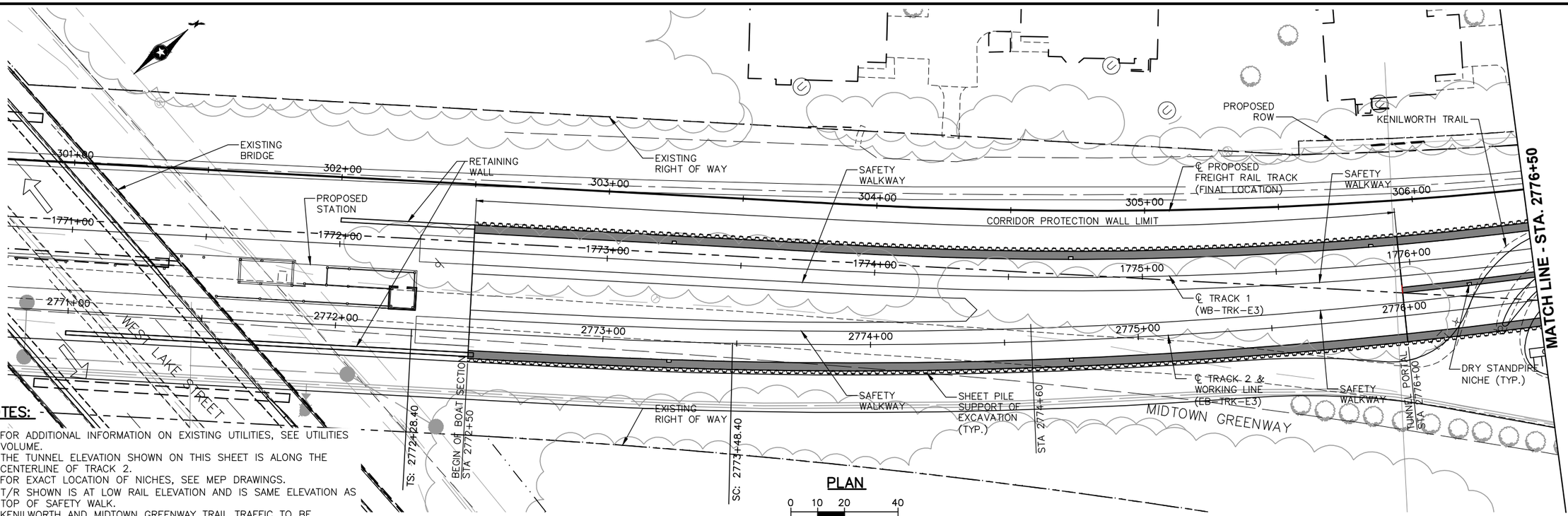
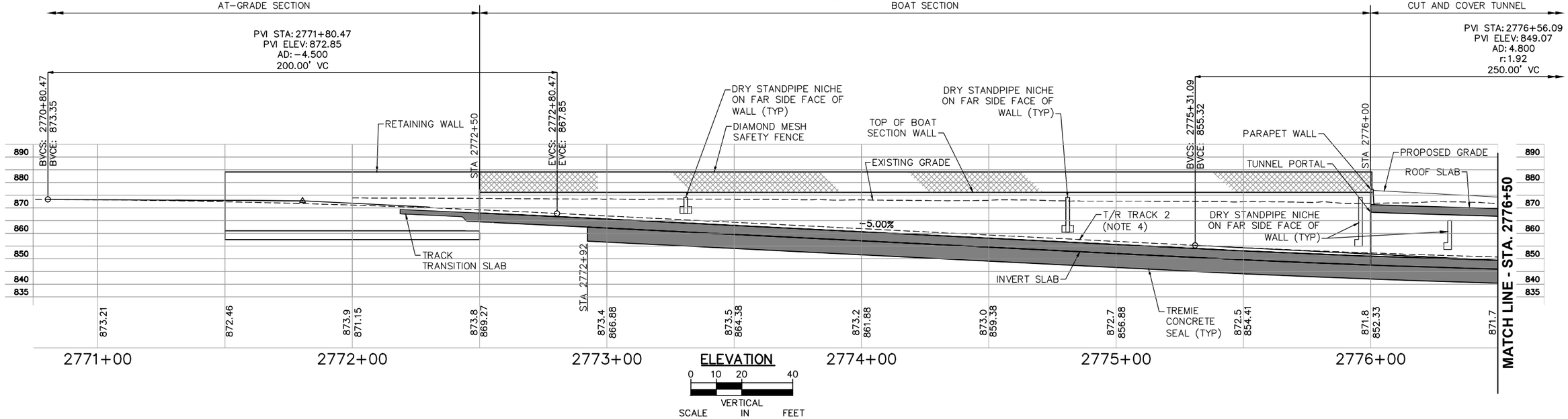


PLAN

SCALE 0 10 20 40

NOTES:

1. FOR ADDITIONAL INFORMATION ON EXISTING UTILITIES, SEE UTILITIES VOLUME.
2. THE TUNNEL ELEVATION SHOWN ON THIS SHEET IS ALONG THE CENTERLINE OF TRACK 2.
3. FOR EXACT LOCATION OF NICHES, SEE MEP DRAWINGS.
4. T/R SHOWN IS AT LOW RAIL ELEVATION AND IS SAME ELEVATION AS TOP OF SAFETY WALK.
5. KENILWORTH AND MIDTOWN GREENWAY TRAIL TRAFFIC TO BE DETOURED DURING TUNNEL CONSTRUCTION.



ELEVATION

SCALE VERTICAL 0 10 20 40 IN FEET

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL PLAN AND ELEVATION - SHEET 1 OF 6

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-001

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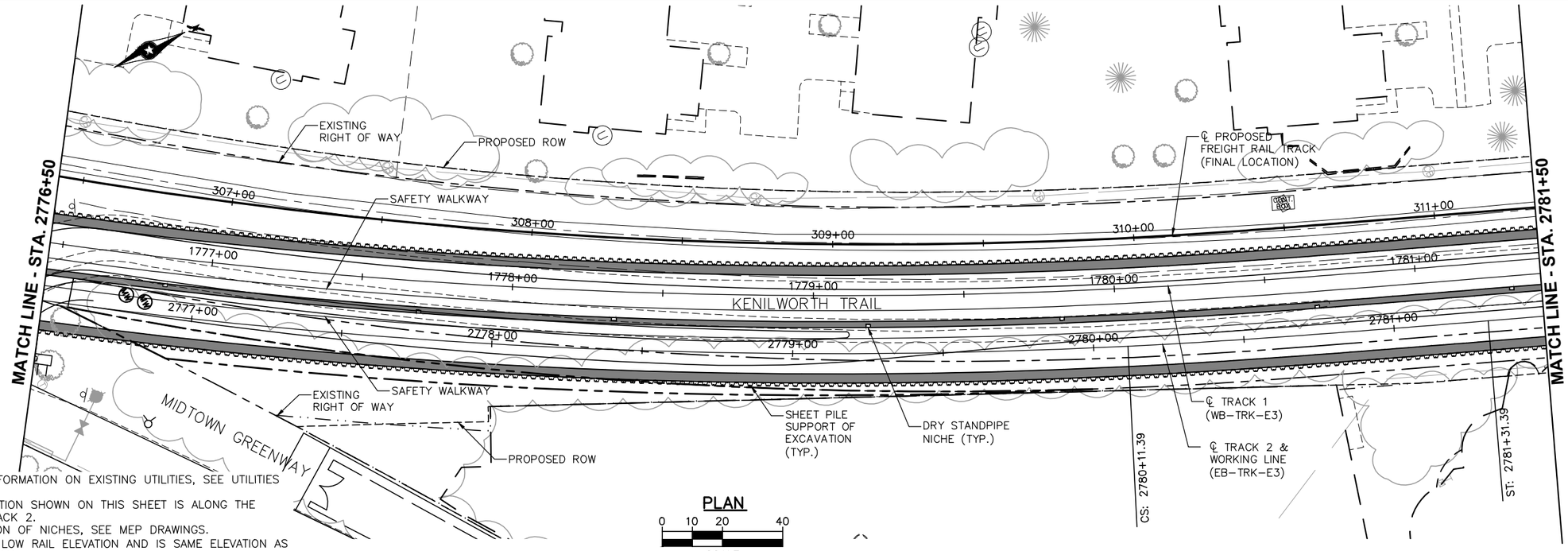

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SCALE

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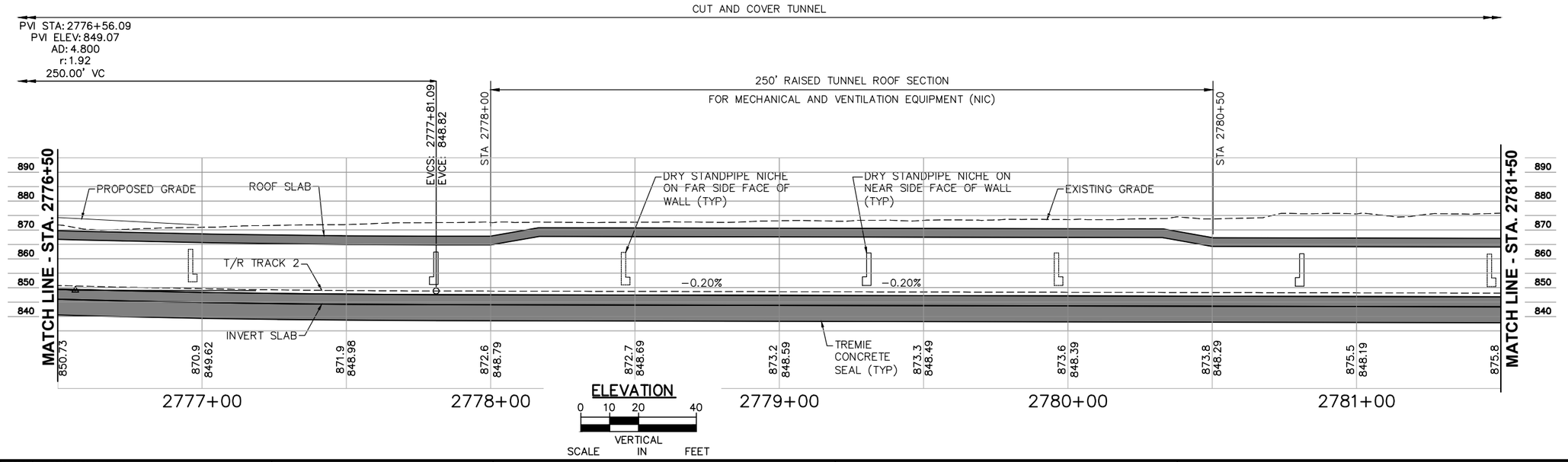

ELEVATION

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL PLAN AND ELEVATION - SHEET 2 OF 6

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-002

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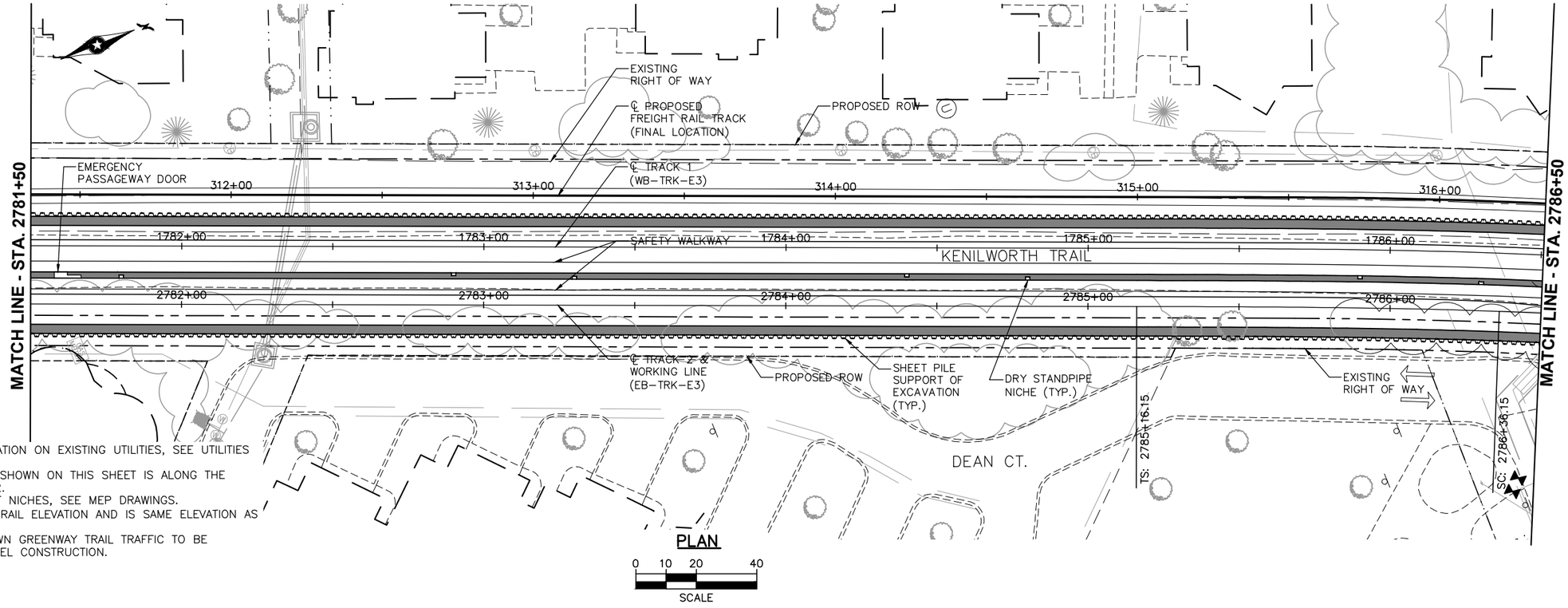
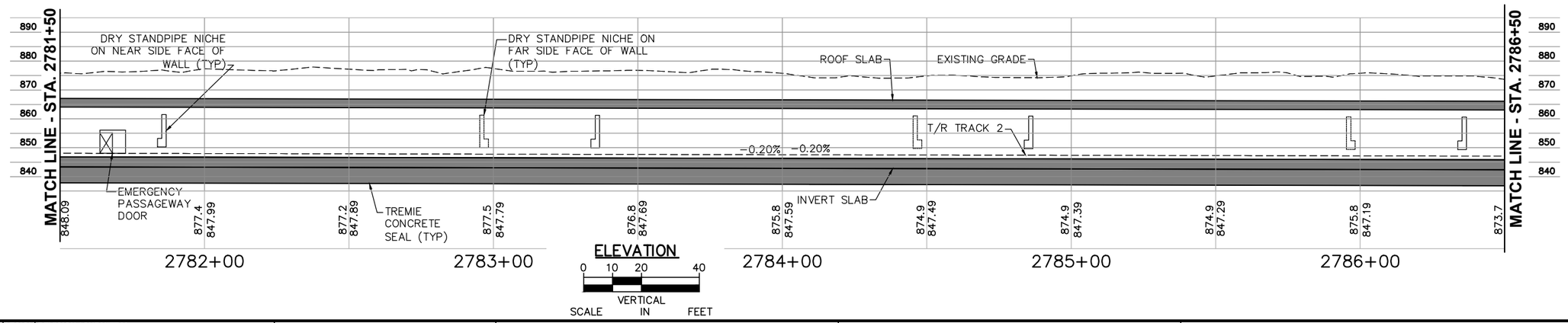


PLAN

SCALE 0 10 20 40

CUT AND COVER TUNNEL



ELEVATION

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SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL PLAN AND ELEVATION - SHEET 3 OF 6

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-003

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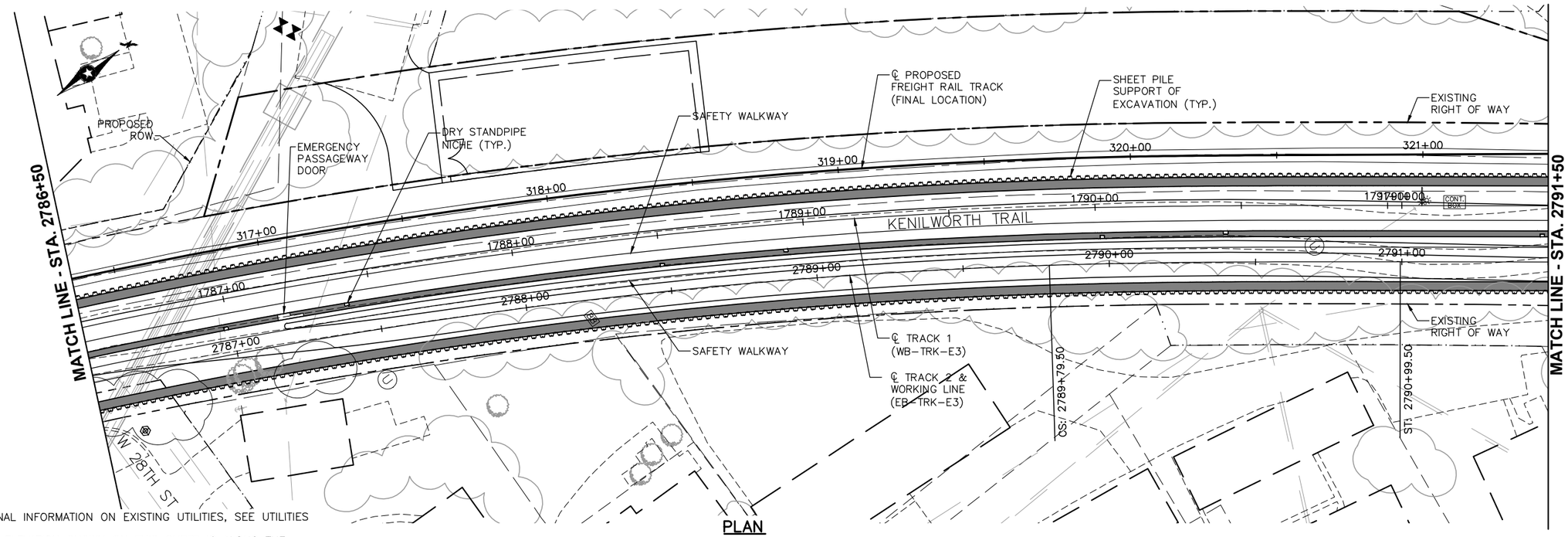

PLAN

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SCALE

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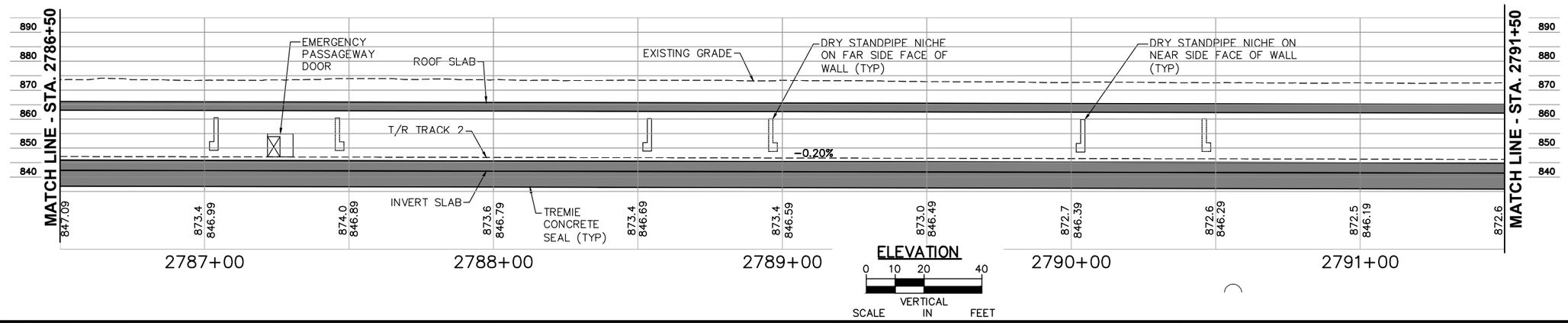
CUT AND COVER TUNNEL



ELEVATION

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SCALE VERTICAL IN FEET

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL PLAN AND ELEVATION - SHEET 4 OF 6

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-004

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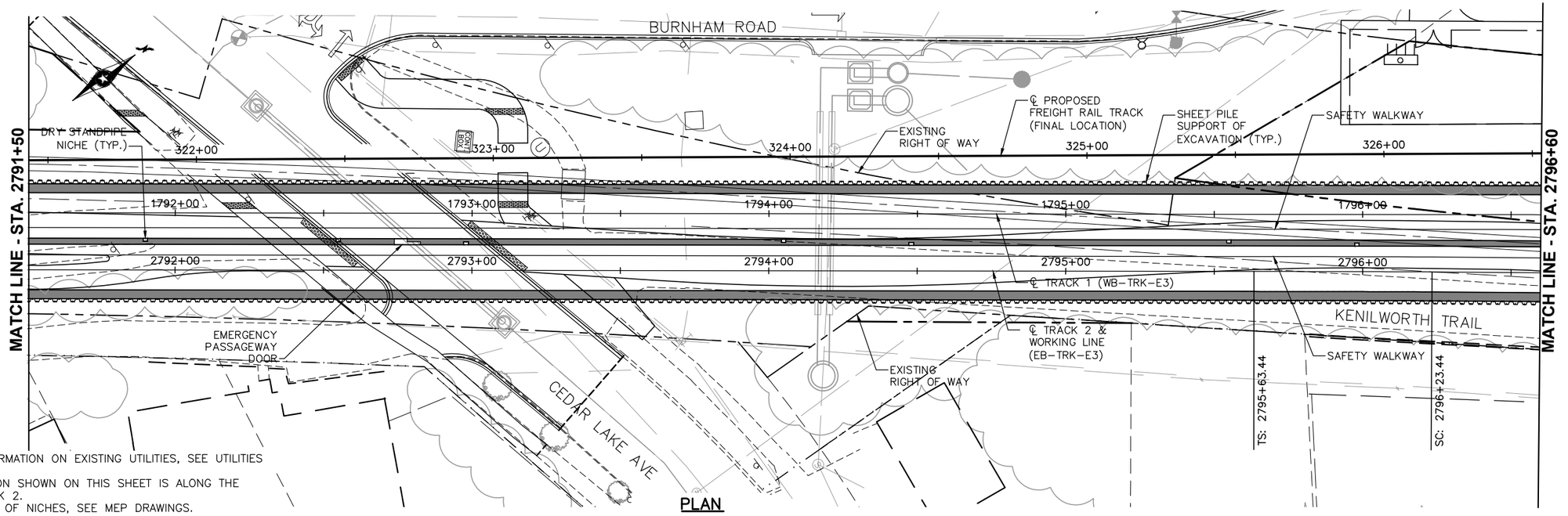

PLAN

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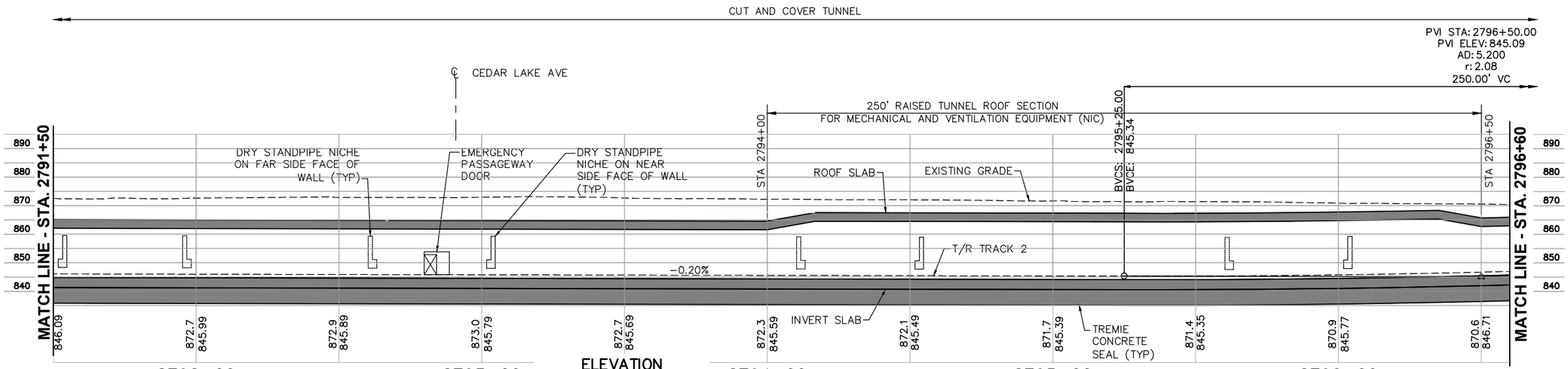

ELEVATION

SCALE 0 10 20 40 VERTICAL IN FEET

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL PLAN AND ELEVATION - SHEET 5 OF 6

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-005

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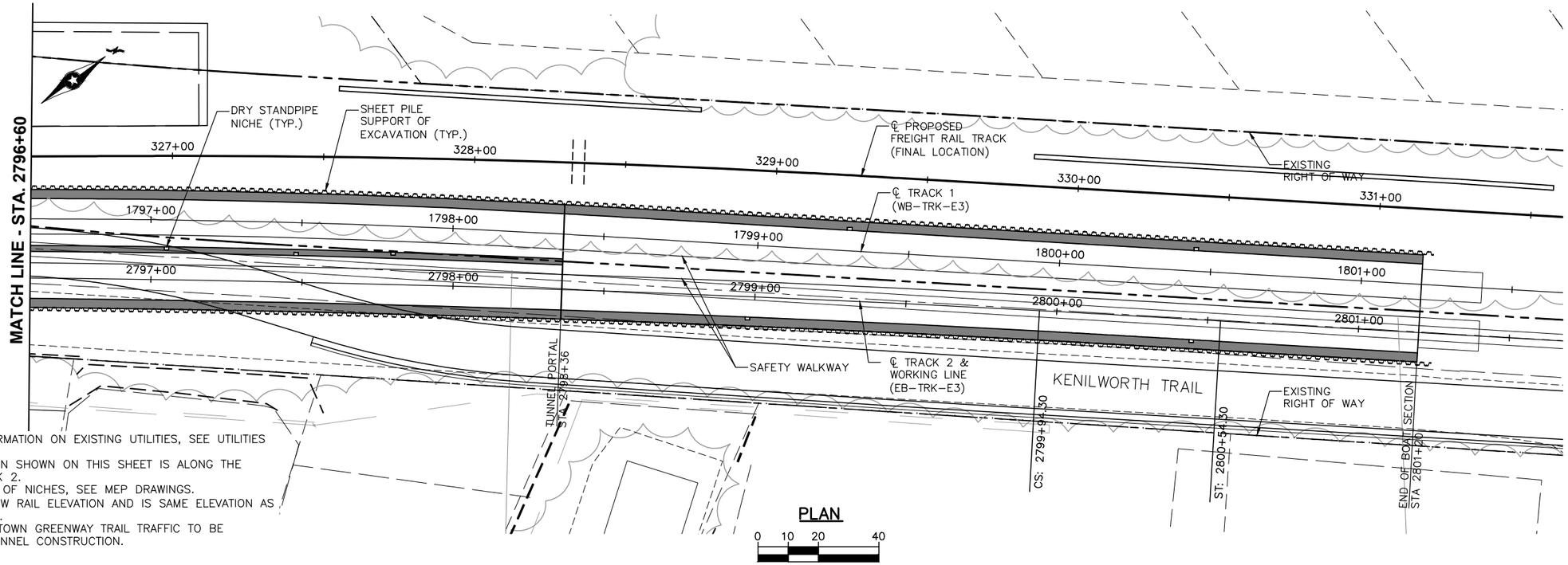

PLAN

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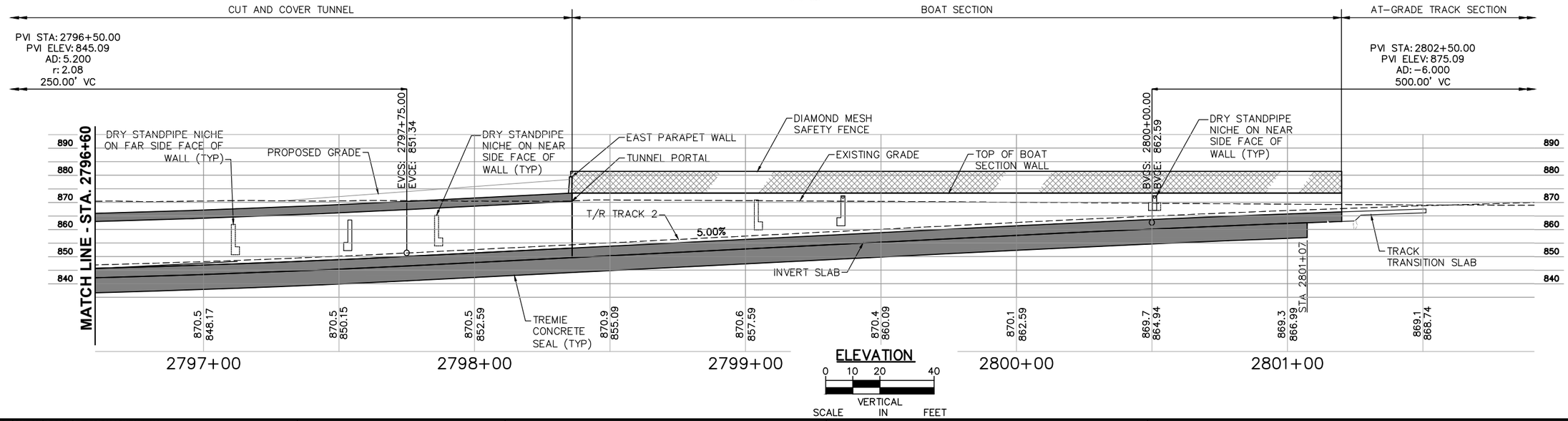
SCALE

NOTES:

1. FOR ADDITIONAL INFORMATION ON EXISTING UTILITIES, SEE UTILITIES VOLUME.
2. THE TUNNEL ELEVATION SHOWN ON THIS SHEET IS ALONG THE CENTERLINE OF TRACK 2.
3. FOR EXACT LOCATION OF NICHES, SEE MEP DRAWINGS.
4. T/R SHOWN IS AT LOW RAIL ELEVATION AND IS SAME ELEVATION AS TOP OF SAFETY WALK.
5. KENILWORTH AND MIDTOWN GREENWAY TRAIL TRAFFIC TO BE DETOURED DURING TUNNEL CONSTRUCTION.



ELEVATION

0 10 20 40

VERTICAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

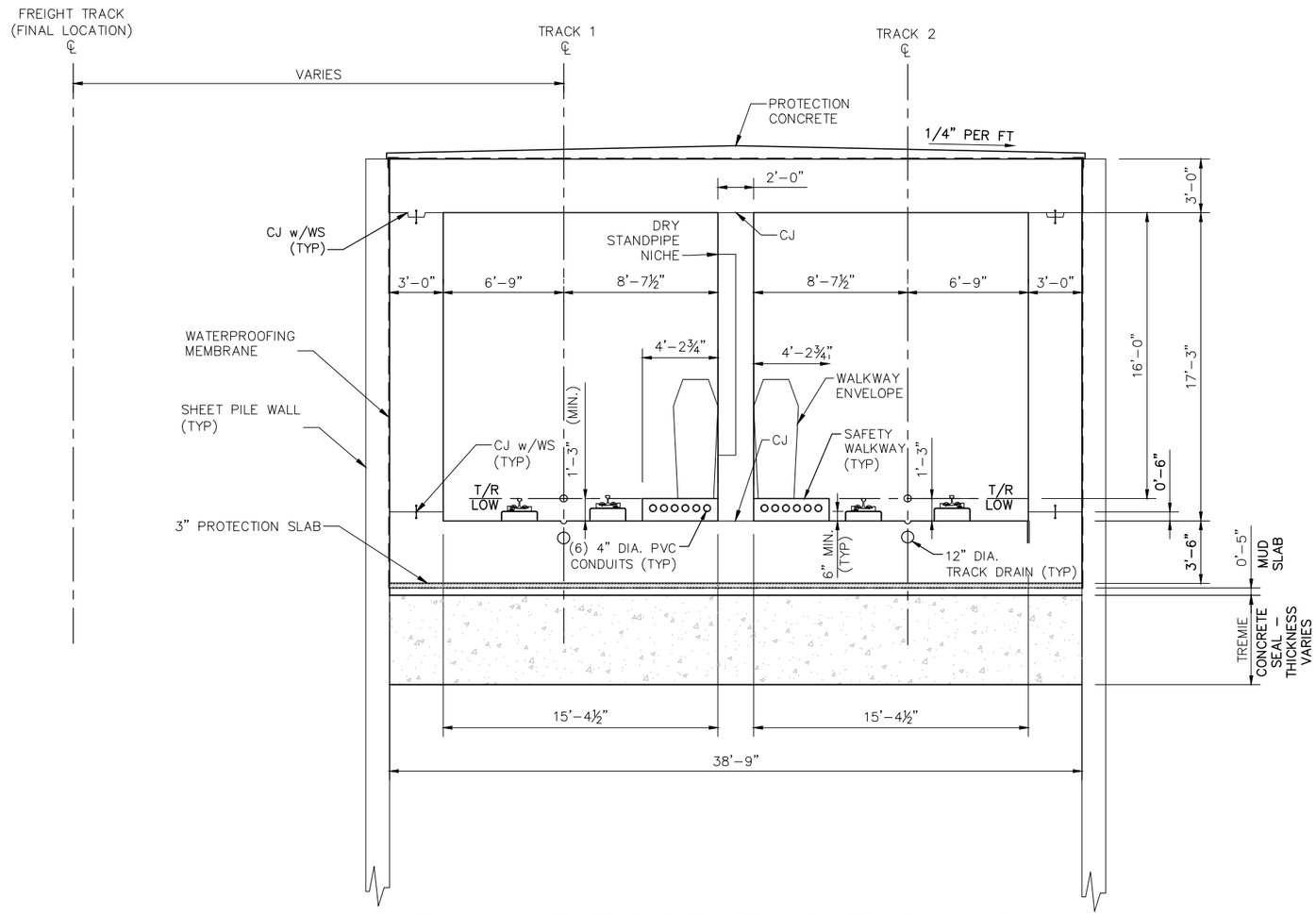
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
GENERAL PLAN AND ELEVATION - SHEET 6 OF 6

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUNN-TUNK-GPE-006

SHEET 14 OF 63

Sep. 21 2015 03:28 pm \\Wadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUNN-GPE.dwg By: lafargues



TYPICAL TUNNEL CROSS SECTION LOOKING UPSTATION – GEOMETRY
1 – FROM STA 2777+01.00 TO STA 2778+00.00
2 – FROM STA 2780+50.00 TO STA 2794.00.00
3 – FROM STA 2796+50.00 TO STA 2796+53.36

0 2 4 8
HORIZONTAL
SCALE IN FEET

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

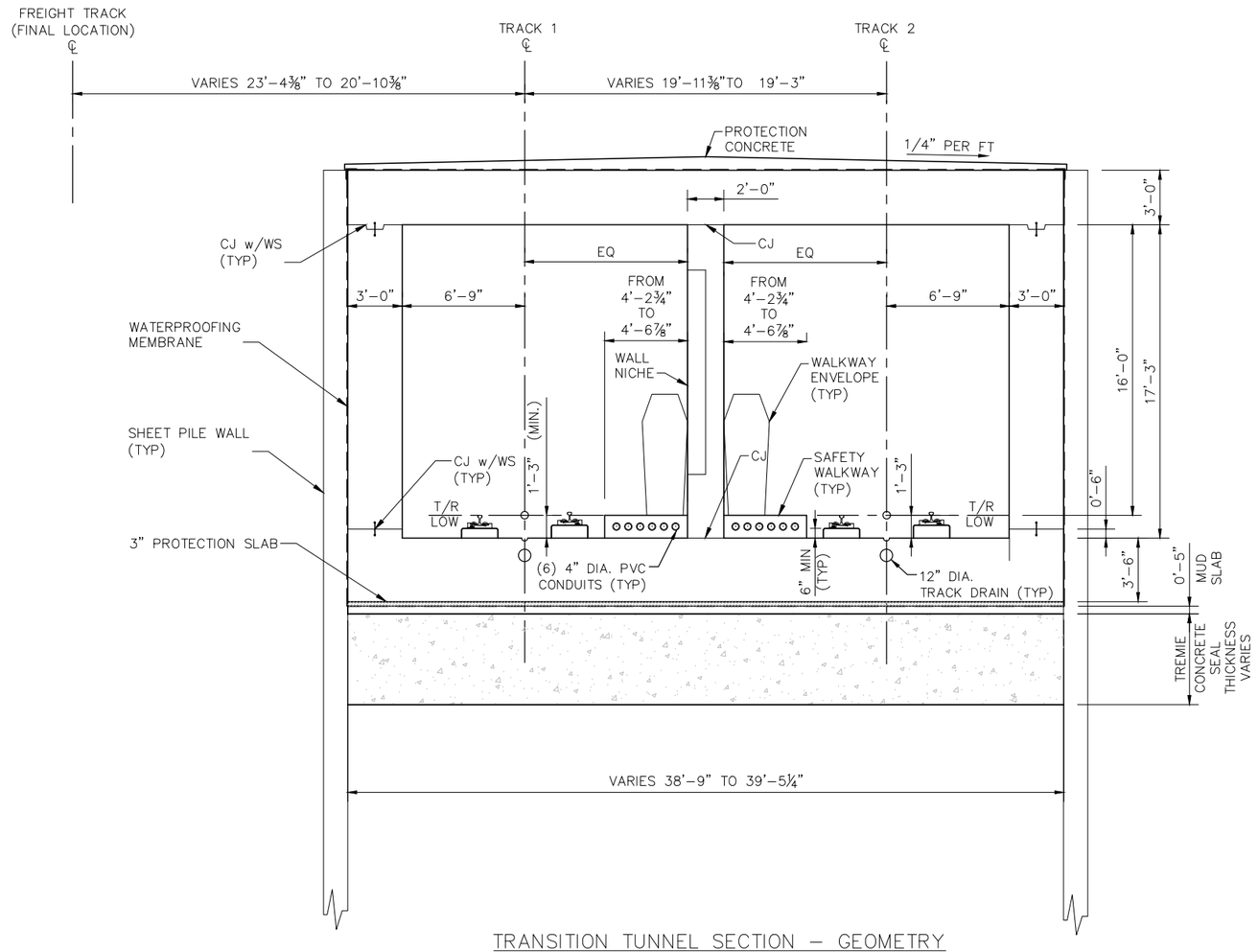
METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
RUNNING TUNNEL SECTION - GEOMETRY

DISCIPLINE: STRUCTURES
SHEET NAME: E3-STU-TUN-TUNK-TYP-RTS-001

SHEET 15 OF 63



TRANSITION TUNNEL SECTION – GEOMETRY
FROM STA 2776+00 TO STA 2777+01

0 2 4 8
HORIZONTAL
SCALE IN FEET

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

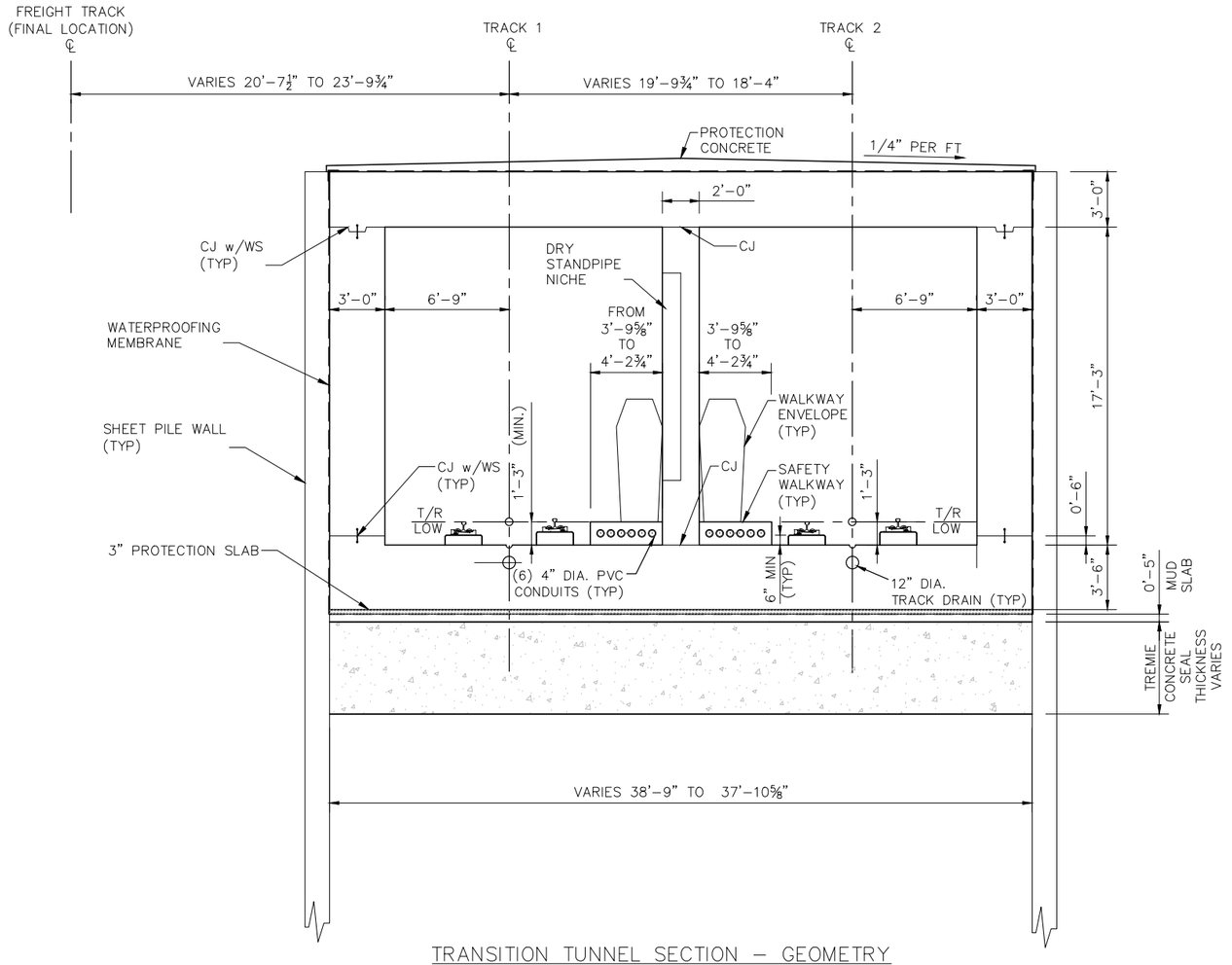
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TRANSITION TUNNEL SECTION - GEOMETRY
(1 OF 2)

DISCIPLINE: STRUCTURES
SHEET NAME: E3-STU-TUN-TUNK-TYP-TTS-001

SHEET 16 OF 63

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.



TRANSITION TUNNEL SECTION – GEOMETRY
FROM STA 2796+53.36 TO STA 2798+36.06

0 2 4 8
HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TRANSITION TUNNEL SECTION - GEOMETRY
(2 OF 2)

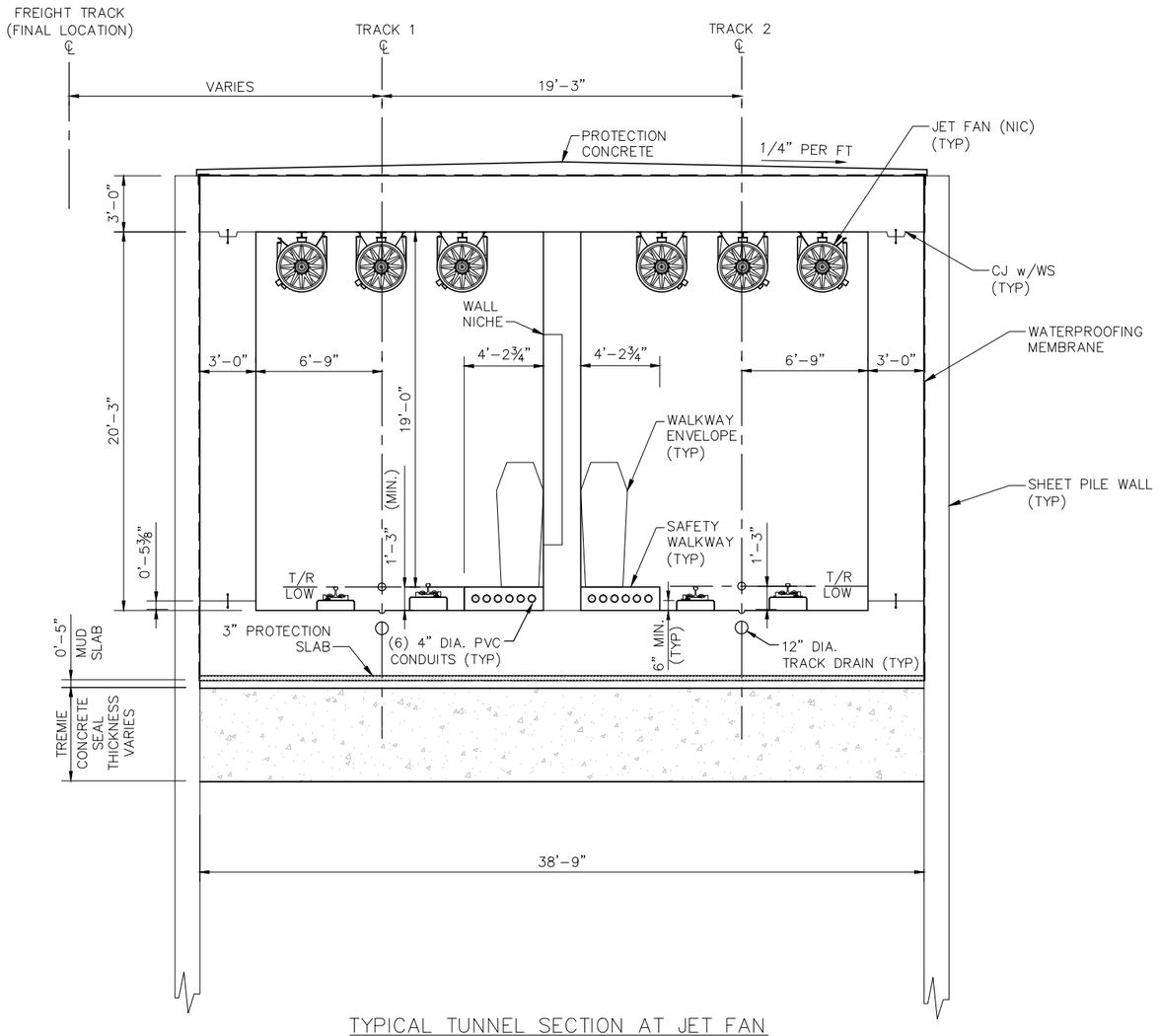
DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-TTS-002

SHEET 17 OF 63

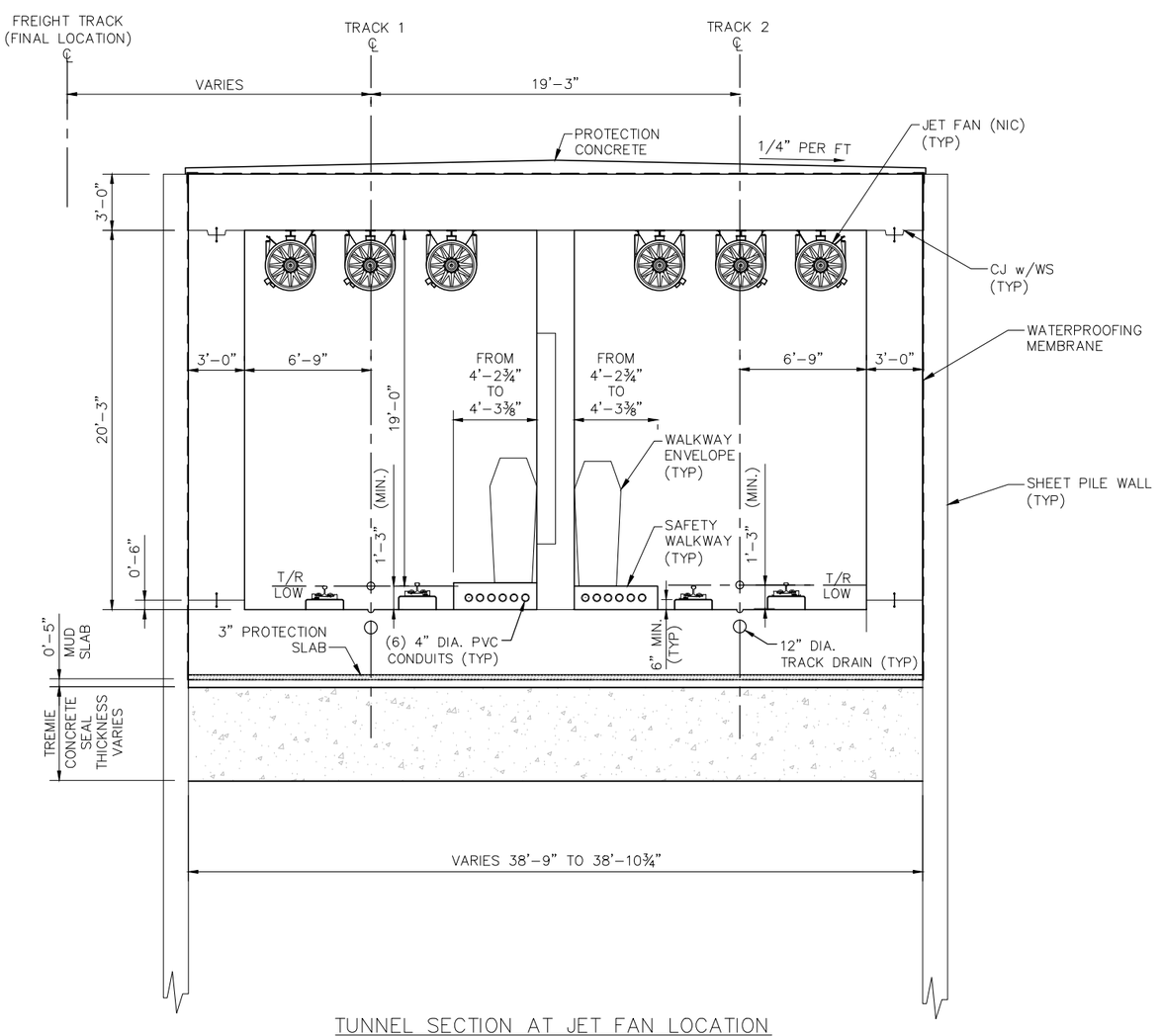
NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.



TYPICAL TUNNEL SECTION AT JET FAN
STA 2778+00.00 TO STA 2780+50.00

0 2 4 8
SCALE HORIZONTAL IN FEET



TUNNEL SECTION AT JET FAN LOCATION
STA 2794+00.00 TO STA 2796+50.00

0 2 4 8
SCALE HORIZONTAL IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TUNNEL SECTION AT JET FAN LOCATION GEOMETRY

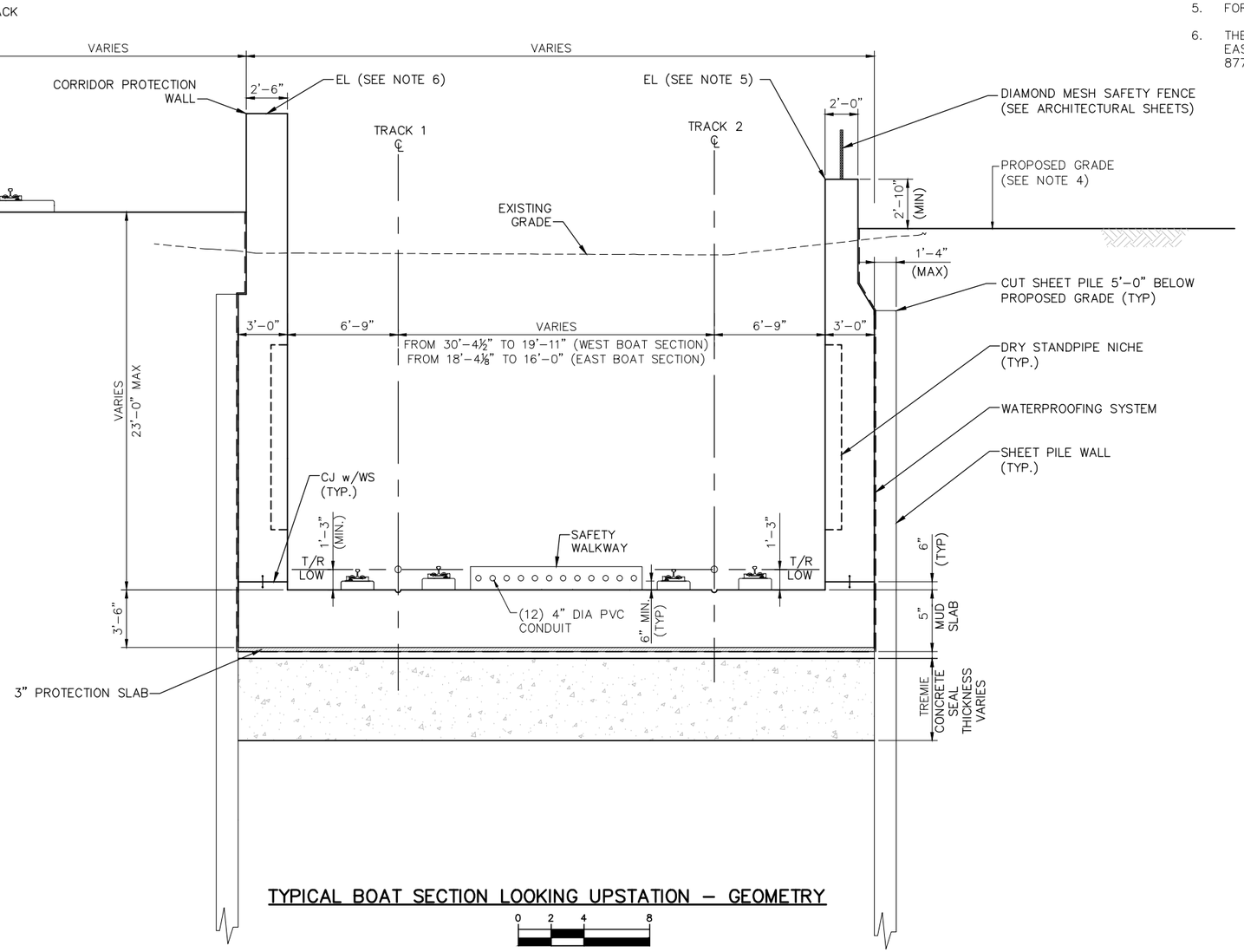
DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-JFN-001

SHEET 18 OF 63

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.
4. FOR PROPOSED GRADE, SEE CIVIL DRAWINGS.
5. FOR TOP OF WALL ELEVATION, SEE CIVIL DRAWINGS.
6. THE TOP OF CORRIDOR PROTECTION WALL ELEVATION AT EAST AND WEST BOAT SECTIONS ARE RESPECTIVELY 877.68 AND 878.76.



TYPICAL BOAT SECTION LOOKING UPSTATION – GEOMETRY

0 2 4 8

HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

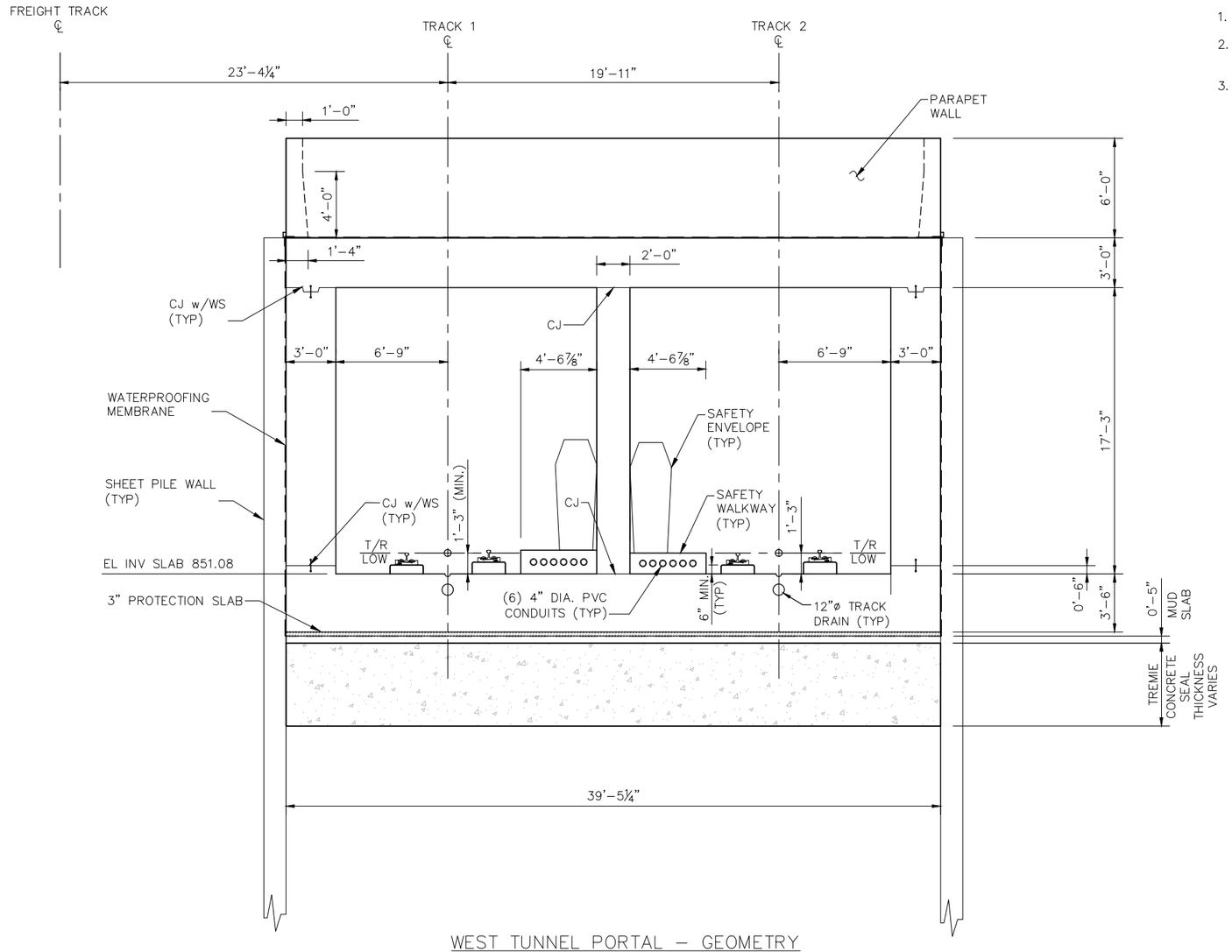
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BOAT SECTION - GEOMETRY

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-BTG-001

SHEET 19 OF 63

Sep. 21 2015 11:10 am \\Nadtc2fp001\swlrt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-TYP-BTG-001.dwg By: lafargues



WEST TUNNEL PORTAL – GEOMETRY
STA 2776+00

0 2 4 8
HORIZONTAL SCALE IN FEET

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TUNNEL PORTALS - GEOMETRY
(1 OF 2)

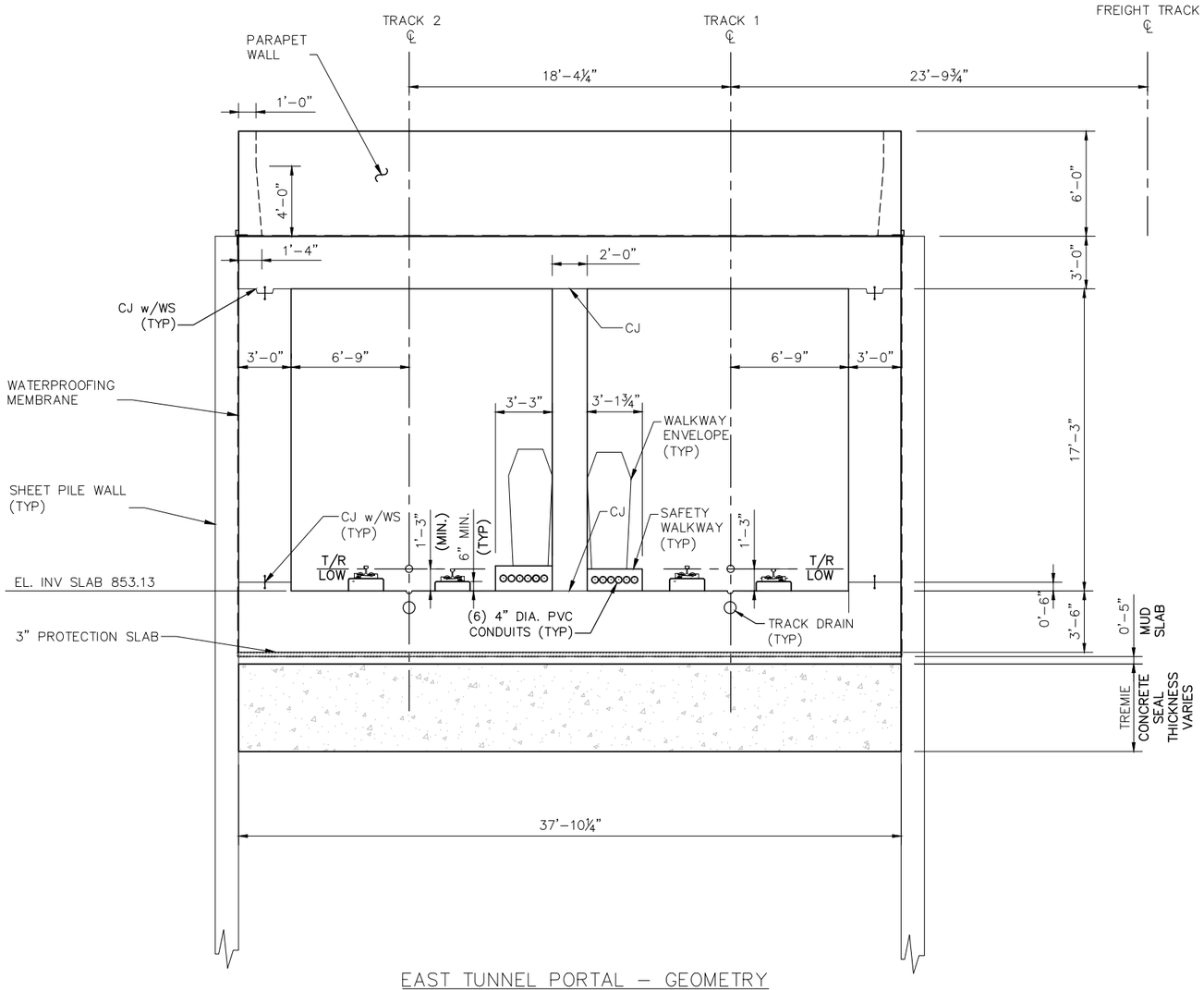
DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-PTL-001

SHEET 20 OF 63

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.



EAST TUNNEL PORTAL – GEOMETRY
STA 2798+36.06 (LOOKING DOWNSTATION)

0 2 4 8
HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

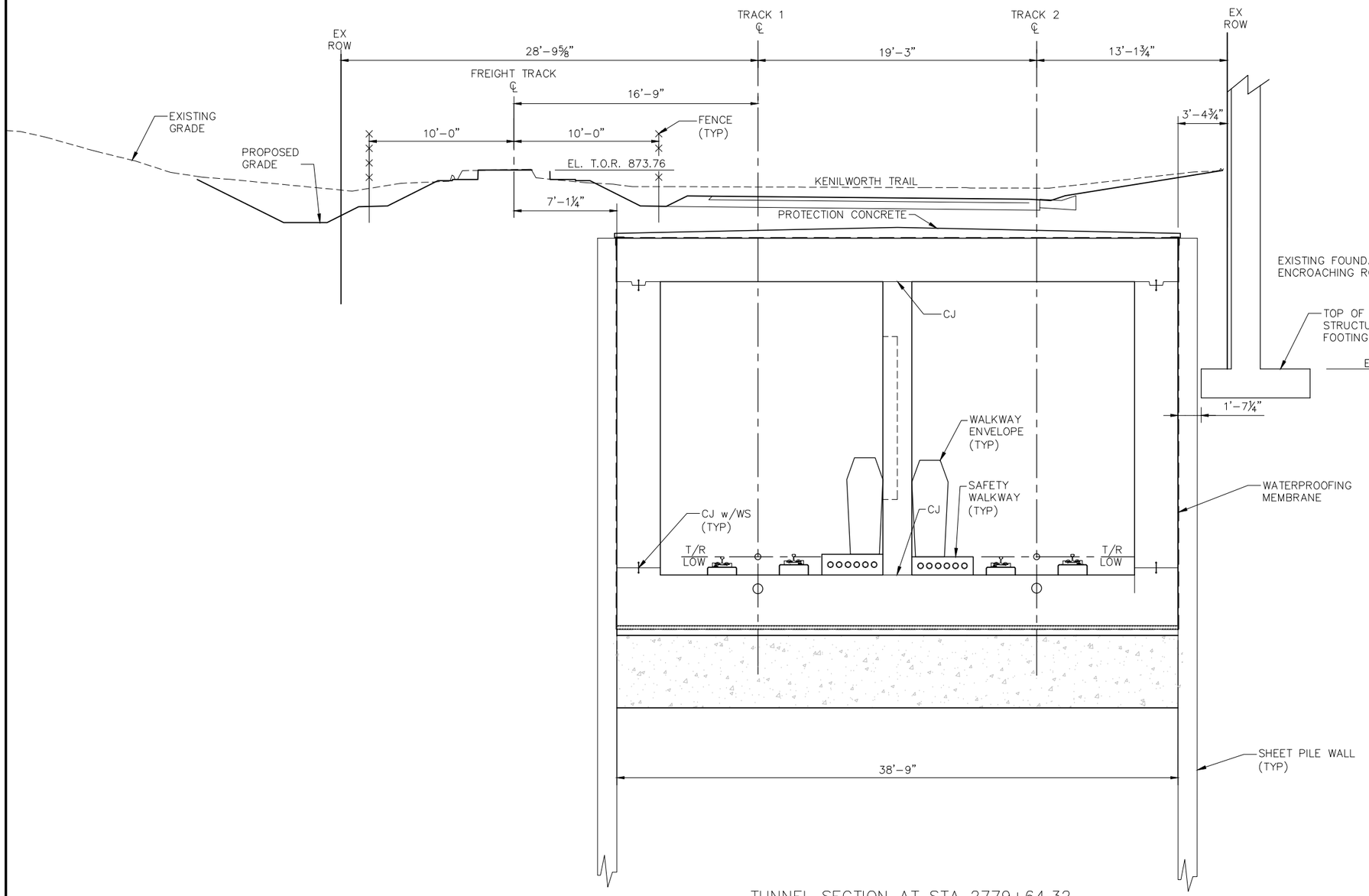
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TUNNEL PORTALS - GEOMETRY
(2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-PTL-002

SHEET 21 OF 63



NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.
4. THE LOCATION AND SIZE OF THE EXISTING FOOTING SHOWN ON THIS DRAWING IS APPROXIMATE. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND SIZE PRIOR TO CONSTRUCTION.

TUNNEL SECTION AT STA 2779+64.32

0 2 4 8
HORIZONTAL SCALE IN FEET

Sep. 21 2015 09:31 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-TYP-001.dwg By: lafargues

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

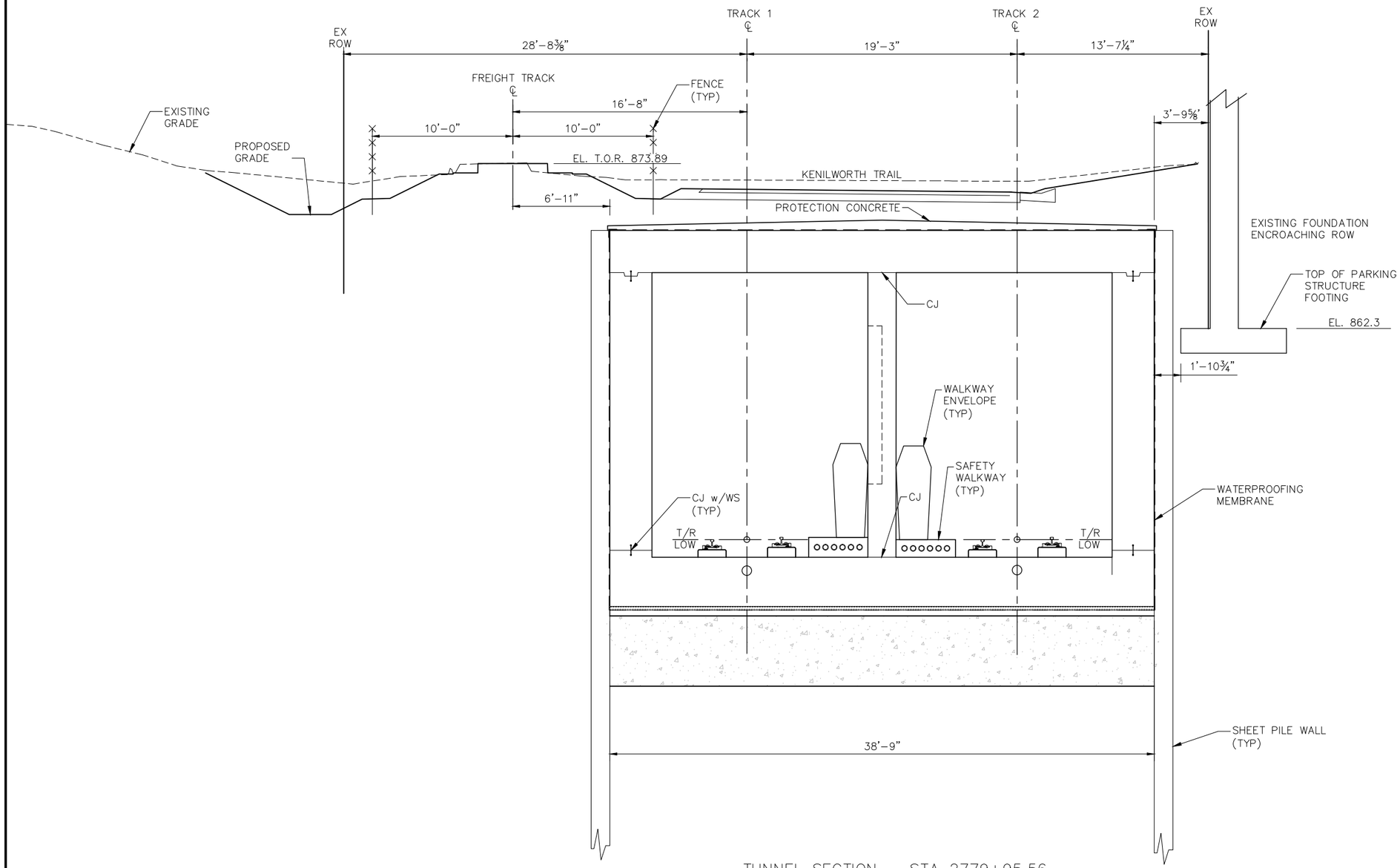
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TUNNEL SECTIONS
(1 OF 3)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-001

SHEET 22 OF 63



TUNNEL SECTION – STA 2779+95.56

0 2 4 8
HORIZONTAL SCALE IN FEET

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.
4. THE LOCATION AND SIZE OF THE EXISTING FOOTING SHOWN ON THIS DRAWING IS APPROXIMATE. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND SIZE PRIOR TO CONSTRUCTION.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

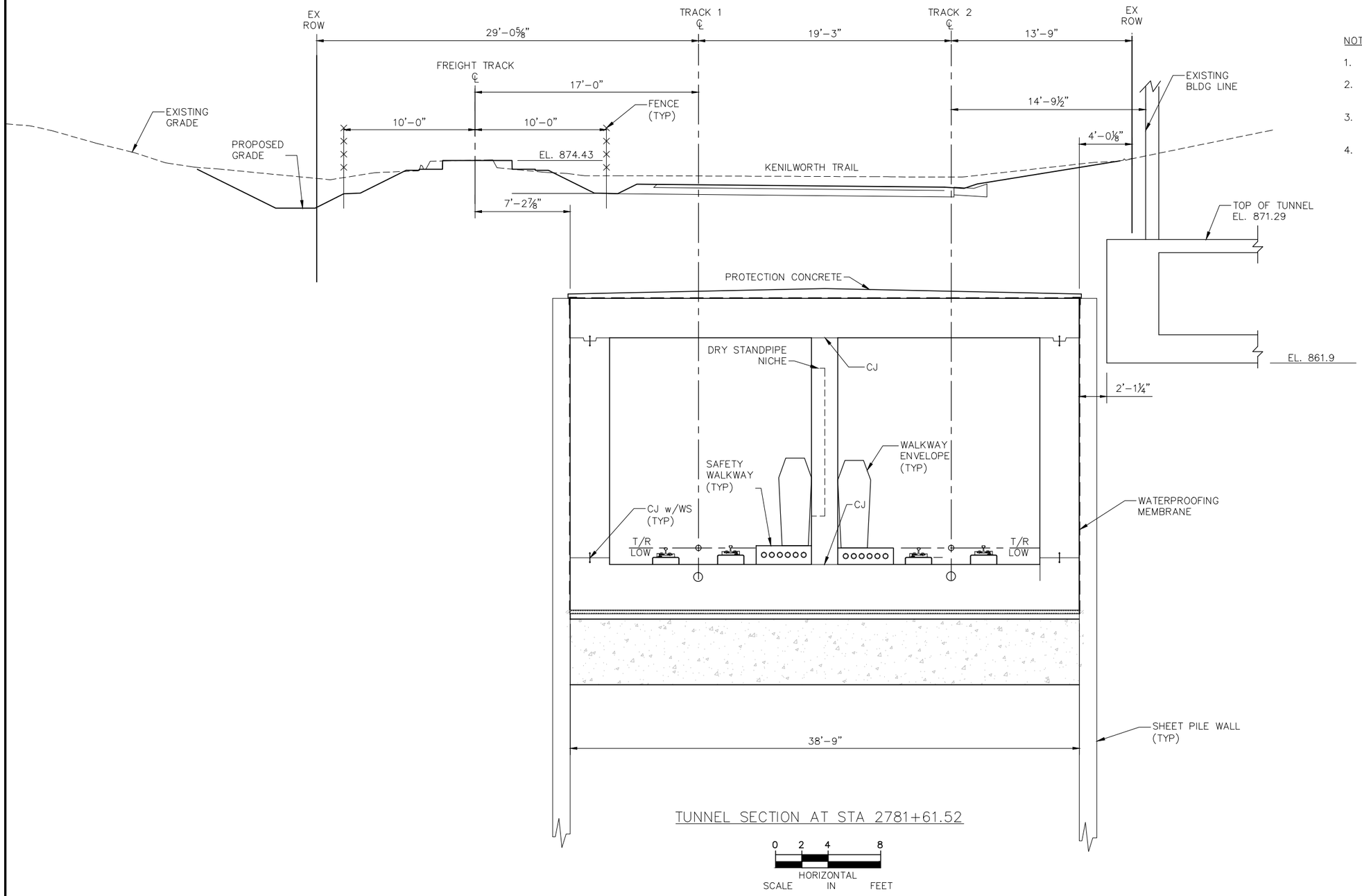
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TUNNEL SECTIONS
(2 OF 3)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-002

SHEET 23 OF 63



TUNNEL SECTION AT STA 2781+61.52

0 2 4 8
HORIZONTAL SCALE IN FEET

NOTES:

1. FOR WATERPROOFING DETAILS, SEE SHEETS 25 AND 26.
2. FOR TEMPORARY EXCAVATION SUPPORT SECTION, SEE SHEET 44.
3. FOR EMBEDDED CONDUITS, PIPES, AND OPENINGS, SEE MEP DRAWINGS.
4. THE LOCATION AND SIZE OF THE EXISTING FOOTING SHOWN ON THIS DRAWING IS APPROXIMATE. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND SIZE PRIOR TO CONSTRUCTION.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

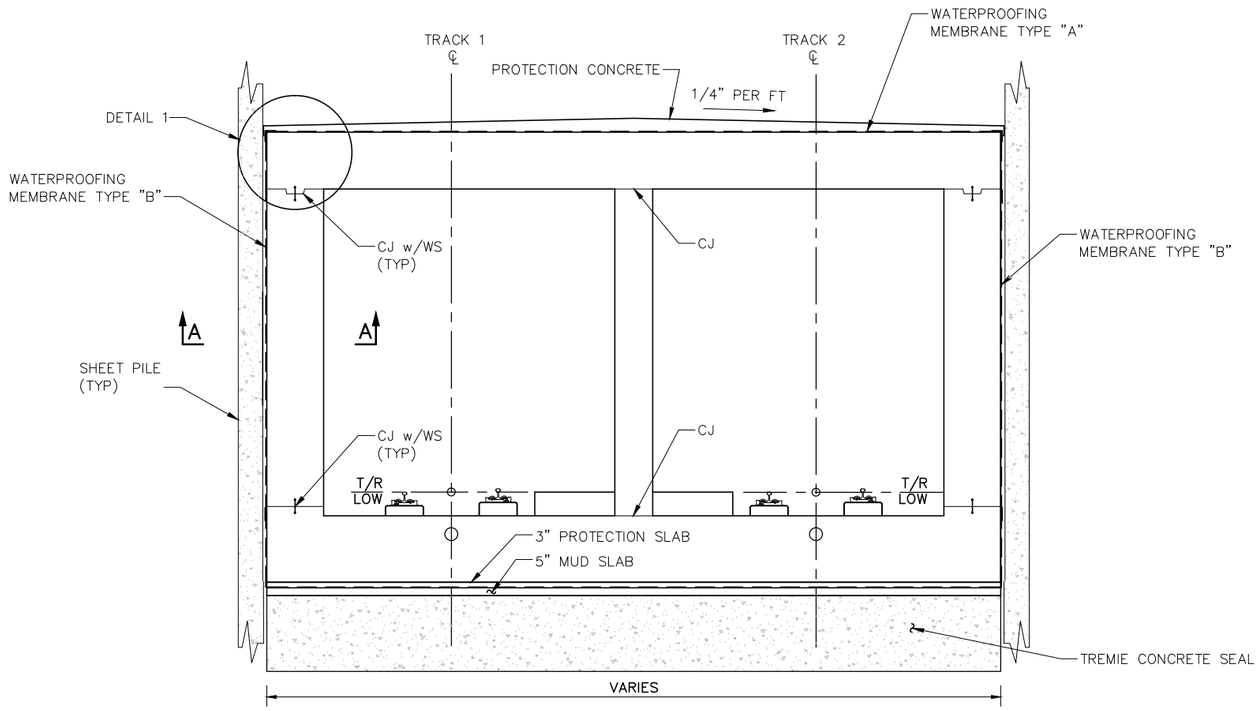
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TUNNEL SECTIONS
(3 OF 3)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-TYP-003

SHEET 24 OF 63

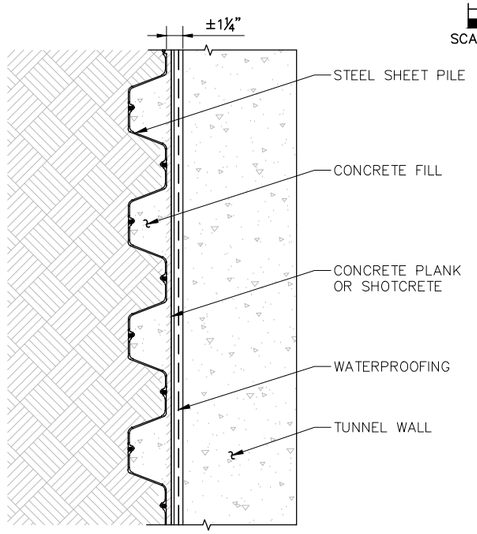


TYPICAL TUNNEL CROSS SECTION – WATERPROOFING

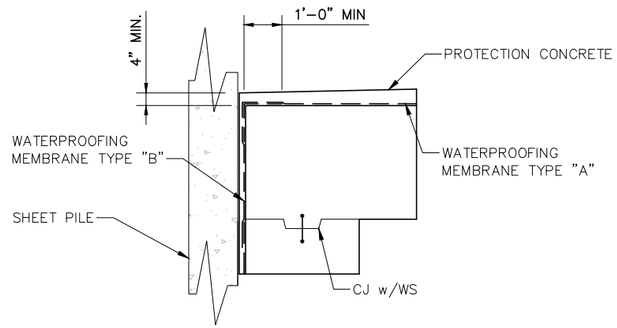
0 2 4 8
SCALE IN FEET

NOTES:

1. FOR GENERAL NOTES, SEE SHEETS 7 AND 8.
2. TYPE "A" TO BE PLACED AFTER CONCRETE POUR. TYPE "B" IS FOR BLINDSIDE APPLICATION PRIOR TO CONCRETE POUR. SEE WATERPROOFING SPECIFICATION.
3. WATERPROOFING MATERIALS, PROCEDURES AND CONSTRUCTION METHODS SHALL CONFORM TO THE TECHNICAL SPECIFICATIONS AND MANUFACTURER'S REQUIREMENTS.
4. PRIOR TO INSTALLATION OF WATERPROOFING SYSTEM, CONCRETE SURFACE IS TO BE PREPARED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. SURFACES SHALL BE FREE OF VOIDS, SPALLED AREAS, LOOSE AGGREGATE AND SHARP PROTRUSIONS.
5. SPLICE LENGTH AND LAP TAPE SIZE WILL VARY DEPENDING UPON PRODUCT SELECTED.



SECTION A–A
NO SCALE



DETAIL 1
TOP SLAB WATERPROOFING
NO SCALE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
WATERPROOFING
(1 OF 2)

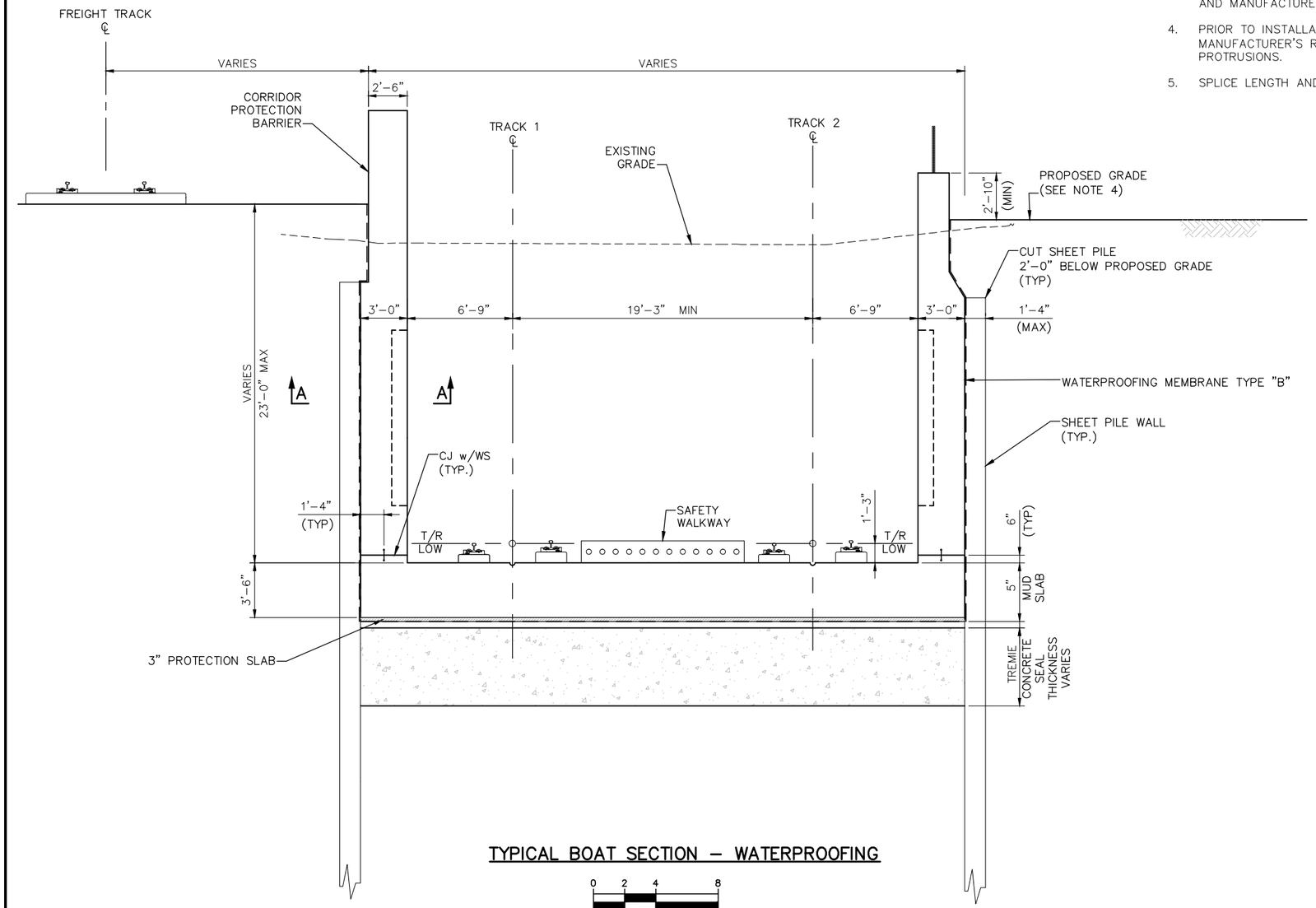
DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-DTL-WTP-001

SHEET 25 OF 63

NOTES:

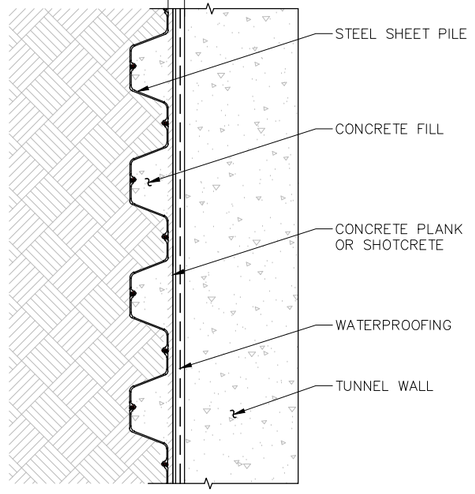
1. FOR GENERAL NOTES, SEE SHEETS 7 AND 8.
2. TYPE "A" TO BE PLACED AFTER CONCRETE POUR. TYPE "B" IS FOR BLINDSIDE APPLICATION PRIOR TO CONCRETE POUR. SEE WATERPROOFING SPECIFICATION.
3. WATERPROOFING MATERIALS, PROCEDURES AND CONSTRUCTION METHODS SHALL CONFORM TO THE TECHNICAL SPECIFICATIONS AND MANUFACTURER'S REQUIREMENTS.
4. PRIOR TO INSTALLATION OF WATERPROOFING SYSTEM, CONCRETE SURFACE IS TO BE PREPARED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. SURFACES SHALL BE FREE OF VOIDS, SPALLED AREAS, LOOSE AGGREGATE AND SHARP PROTRUSIONS.
5. SPLICE LENGTH AND LAP TAPE SIZE WILL VARY DEPENDING UPON PRODUCT SELECTED.



TYPICAL BOAT SECTION – WATERPROOFING

0 2 4 8

HORIZONTAL SCALE IN FEET



SECTION A–A
NOT TO SCALE

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

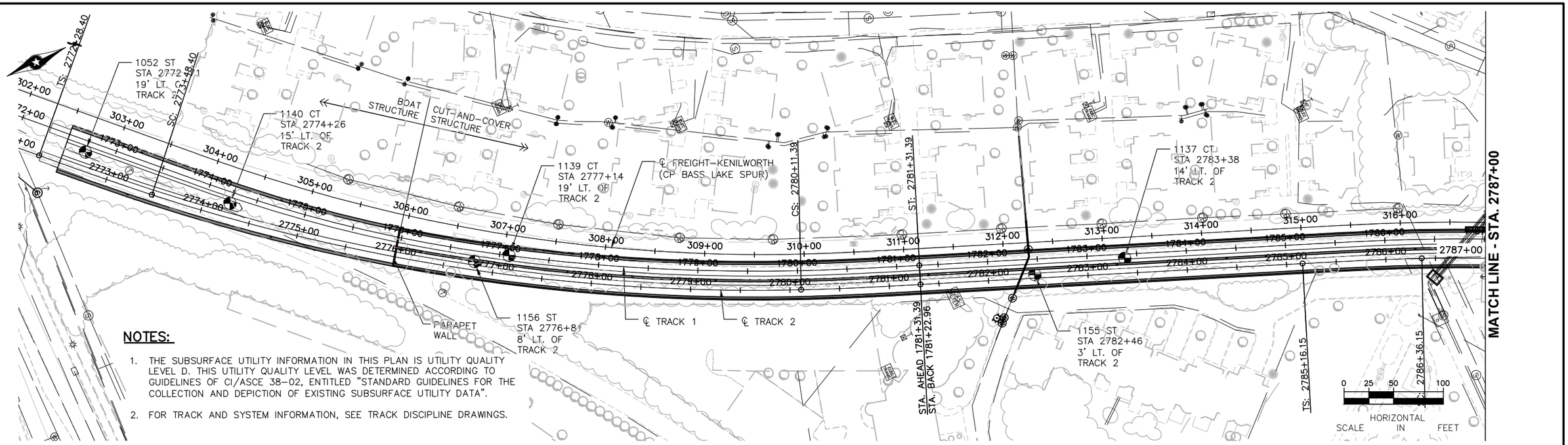
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
WATERPROOFING
(2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-DTL-WTP-002

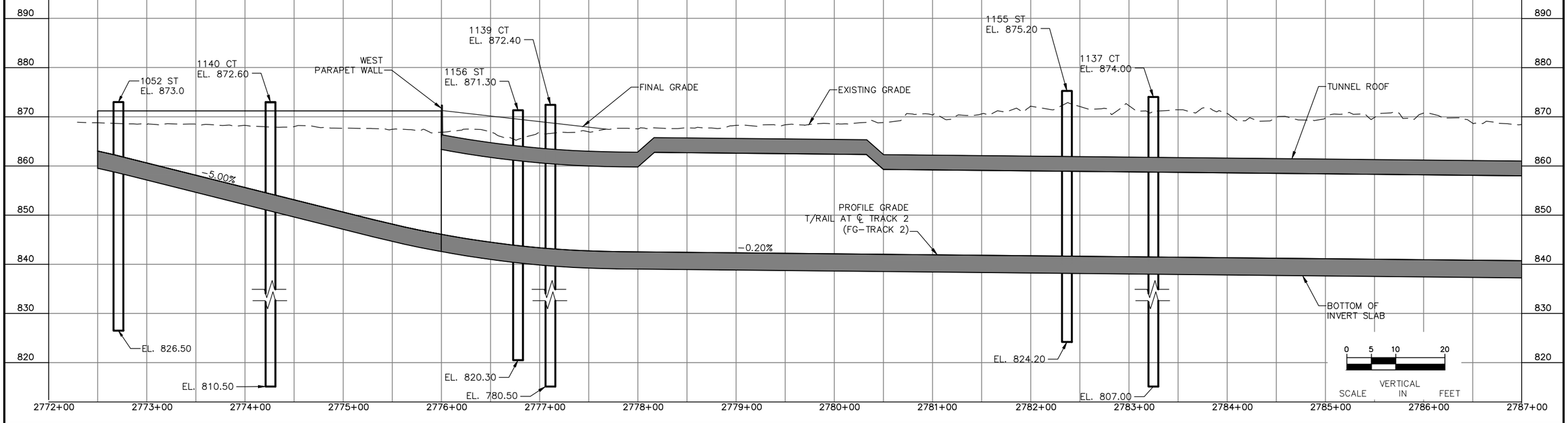
SHEET 26 OF 63

Sep. 21 2015 09:44 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-DTL-WTP-002.dwg By: lafargues



NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. FOR TRACK AND SYSTEM INFORMATION, SEE TRACK DISCIPLINE DRAWINGS.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

DESIGNED BY: | CHECKED BY:
DRAWN BY: | DATE:

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

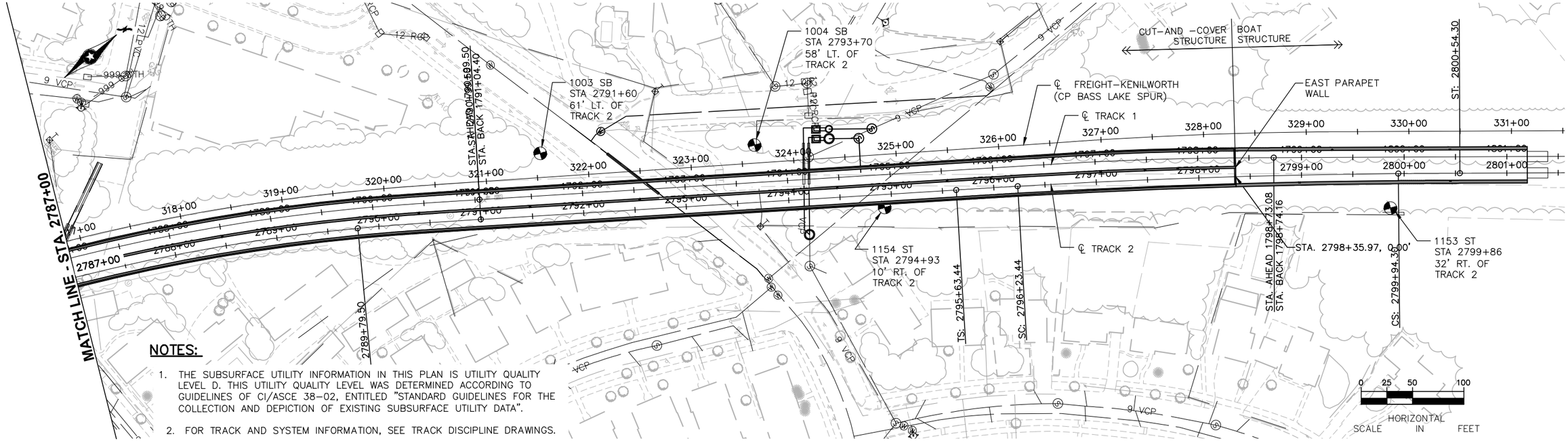
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BORINGS
(1 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-BOR-001

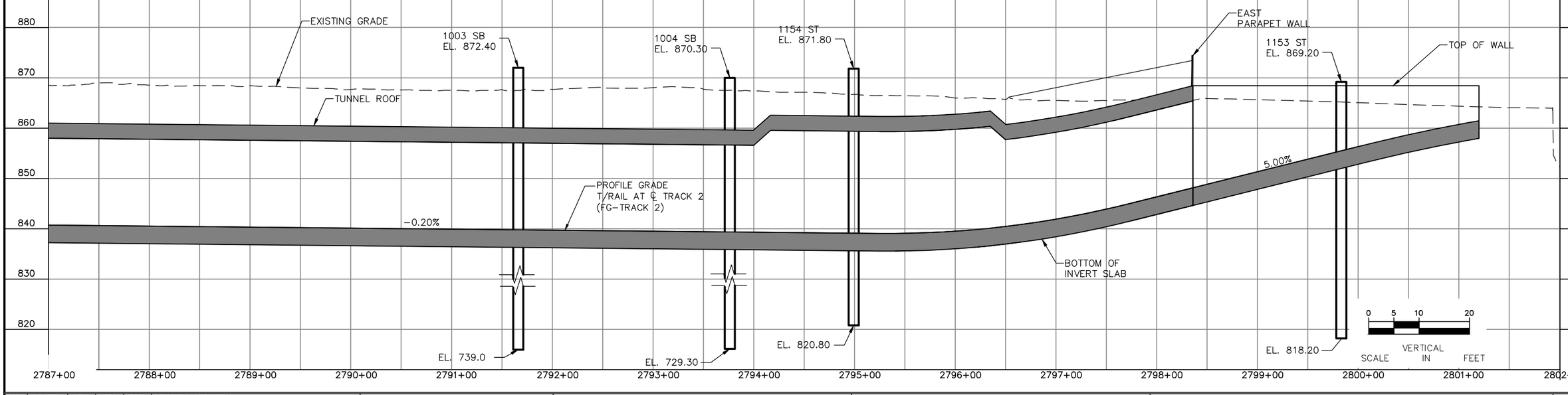
SHEET 27 OF 63

Sep, 21 2015 09:36 am \\Nadtc2fp001\swlrt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-BOR-001.dwg By: lafargues



NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO GUIDELINES OF CI/ASCE 38–02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
2. FOR TRACK AND SYSTEM INFORMATION, SEE TRACK DISCIPLINE DRAWINGS.



NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

DESIGNED BY: | CHECKED BY:
DRAWN BY: | DATE:

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

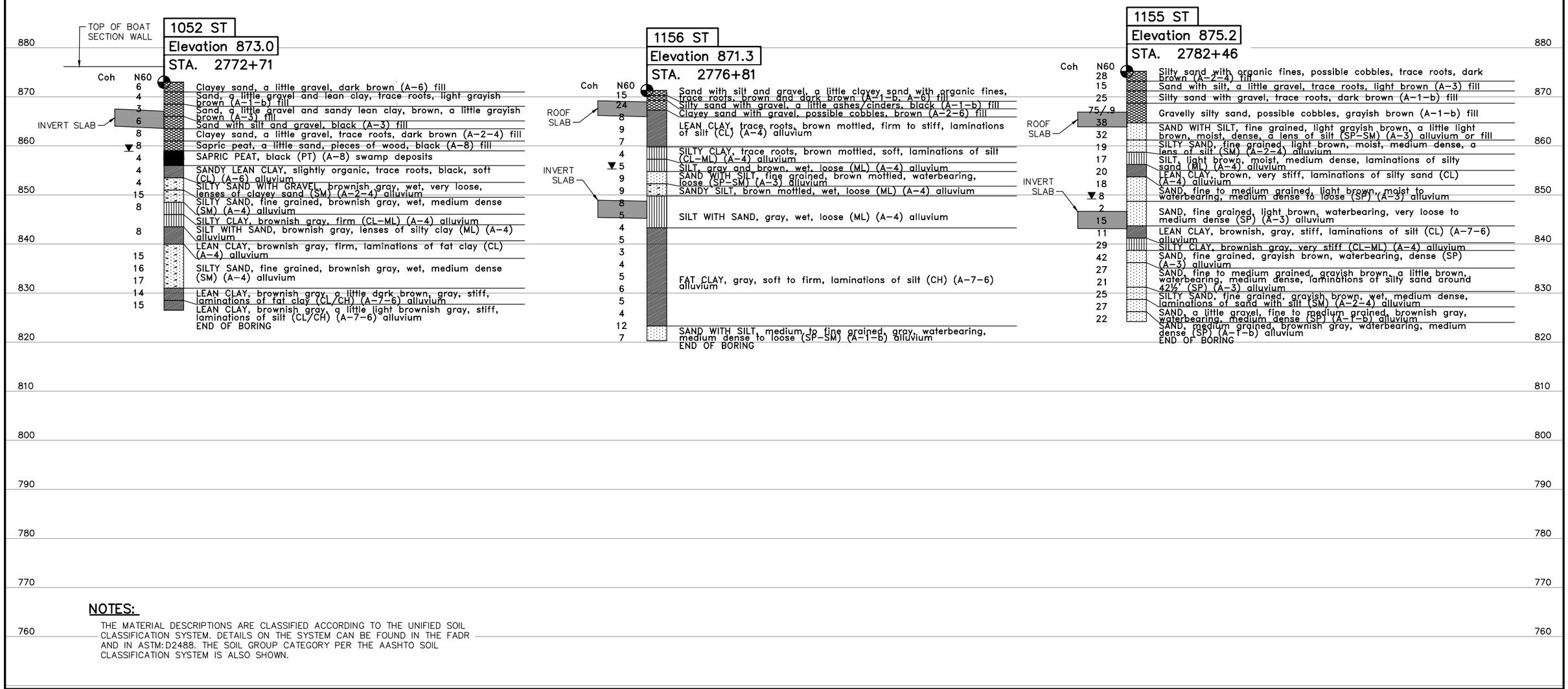
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BORINGS
(2 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-BOR-002

SHEET 28 OF 63

Sep. 21 2015 09:40 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUNK-BOR-002.dwg By: lafargues



NOTES:

THE MATERIAL DESCRIPTIONS ARE CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. DETAILS ON THE SYSTEM CAN BE FOUND IN THE FADR AND IN ASTM:D2488. THE SOIL GROUP CATEGORY PER THE AASHTO SOIL CLASSIFICATION SYSTEM IS ALSO SHOWN.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BORINGS
(3 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-BOR-003

SHEET 29 OF 63

1003 SB
Elevation 872.4
STA. 2791+60

Coh	N60	
		Silty sand with organic fines, trace roots, dark brown, frozen (A–2–4) fill
ROOF SLAB	11	Mixture of silty sand and clayey sand, with gravel, trace roots, dark brown and black, frozen to 1.5' (A–2–4) fill
	11	
	23	Silty sand, a little gravel and ashes/cinders, pieces of glass, dark brown (A–2–4) fill
	23	Silty sand with gravel, pieces of glass, brown (A–2–4) fill
	8	SAND WITH SILT AND GRAVEL, fine to medium grained, light grayish brown, moist, medium dense (SP–SM) (A–1–b) alluvium or fill
	7	
	15	
INVERT SLAB	20	SAND WITH SILT, a little gravel, medium grained, grayish brown, moist, loose (SP–SM) (A–1–b) alluvium
▼	15	
	12	SAND WITH SILT, a little gravel, fine to medium grained, light brownish gray, moist, loose, laminations of clayey sand (SP–SM) (A–3) alluvium
	13	
	15	SAND WITH SILT AND GRAVEL, medium to fine grained, grayish brown to light grayish brown, moist, medium dense (SP–SM) (A–1–b) alluvium
	14	
	12	
	19	SAND, fine grained, light brown, moist to waterbearing, medium dense (SP) (A–3) alluvium
	15	
	27	SAND, a little gravel, medium to fine grained, brownish gray to gray, waterbearing, medium dense (SP) (A–1–b) alluvium
	21	
	21	SAND WITH SILT, fine grained, brownish gray, waterbearing, medium dense (SP–SM) (A–3) alluvium
	22	SANDY SILT, brownish gray, wet, medium dense (ML) (A–4) alluvium
	11	SILTY CLAY, brownish gray, stiff (CL–ML) (A–4) alluvium
		SAND WITH GRAVEL, medium grained, brownish gray, waterbearing, medium dense, a lens of fine grained sand (SP) (A–1–b) alluvium
	31	
	17	SAND, a little gravel, medium to fine grained, brownish gray, waterbearing, medium dense (SP) (A–1–b) alluvium
	17	SAND, fine to medium grained, grayish brown, waterbearing, medium dense (SP) (A–3) alluvium
	30	SAND, a little gravel, fine grained, grayish brown, waterbearing, medium dense (SP) (A–3) alluvium
		SAND, a little gravel, medium to fine grained, brownish gray, waterbearing, medium dense to dense (SP) (A–1–b) alluvium
	34	
	26	SAND, a little gravel, medium grained, brownish gray, waterbearing, medium dense (SP) (A–1–b) alluvium
	26	SAND, fine to medium grained, brownish gray, waterbearing, medium dense to dense (SP) (A–3) alluvium
	26	SAND, a little gravel, medium to fine grained, brownish gray, waterbearing, medium dense (SP) (A–1–b) alluvium
	32	SAND, apparent cobbles and gravel at 94', medium grained, brownish gray, waterbearing, medium dense to dense, lenses of medium to fine grained sand (SP) (A–1–b) alluvium
	37	
		SAND WITH GRAVEL, medium to fine grained, brownish gray, waterbearing, dense, a lens of fine to medium grained (SP) (A–1–b) alluvium
	35	
		SAND WITH GRAVEL, apparent cobbles at 114', medium to fine grained, brownish gray, waterbearing, dense, a lens of fine to medium grained (SP) (A–1–b) alluvium
	65	GRAVELLY SAND, apparent cobbles at 123', medium grained, brownish gray, waterbearing, very dense (SP) (A–1–b) alluvium
	63	GRAVELLY SAND, apparent cobbles, medium to coarse grained, dark brownish gray, waterbearing, very dense (SP) (A–1–b) alluvium
		END OF BORING

1004 SB
Elevation 870.3
STA. 2793+70

Coh	N60	
		Gravelly silty sand, a little lean clay, trace roots, dark brown, a little black, frozen to 1.5' (A–1–b) fill
ROOF SLAB	24	Gravelly sand with silt, apparent cobbles, light brown to light brownish gray (A–1–b) fill
	22	
	15	Sand with silt, a little gravel, light brownish gray (A–1–b) fill
	16	SAND, a little gravel, medium grained, light brown, moist, medium dense (SP) (A–1–b) alluvium
	22	
	20	SAND WITH SILT AND GRAVEL, fine to medium grained, light brownish gray, moist, medium dense (SP–SM) (A–3) alluvium
	18	
▼	17	SILT, brown, moist, medium dense, laminations of sandy silt (ML) (A–4) alluvium
INVERT SLAB	12	
	18	SAND, fine grained, brown, moist, medium dense, lenses of sand with silt (SP) alluvium
	20	SAND, a little gravel, medium to fine grained, brown, waterbearing, medium dense (SP) (A–1–b) alluvium
	18	
	20	SAND, a little gravel, fine to medium grained, brown, waterbearing, medium dense (SP) (A–3) alluvium
	17	
	26	SAND, fine grained, light brown to brown, waterbearing, medium dense (SP) (A–3) alluvium
	23	SILT, brownish gray to brown, wet, medium dense (ML) alluvium
	18	
	20	SAND, a little gravel, medium grained, grayish brown, waterbearing, medium dense (SP) (A–1–b) alluvium
	32	
	30	SAND, a little gravel, medium grained, grayish brown, alluvium
	62	SAND, fine to medium grained, grayish brown, waterbearing, medium dense (SP) (A–3) alluvium
	29	SAND, fine grained, brown, waterbearing, very dense (SP) (A–3) alluvium
	24	SAND, a little gravel, fine to medium grained, brown to grayish brown, waterbearing, medium dense (SP) (A–3) alluvium
	29	SAND, a little gravel, medium to fine grained, brownish gray, waterbearing, medium dense, lenses of fine to medium grained sand (SP) (A–1–b) alluvium
	23	
	26	
	16	SAND, medium grained, brownish gray, waterbearing, medium dense, lenses of fine to medium grained sand (SP) (A–1–b) alluvium
	25	
	26	
	37	SAND WITH GRAVEL, apparent cobble at 98', fine to medium grained, brownish gray, waterbearing, dense (SP) (A–1–b) alluvium
		SAND, medium grained, brownish gray, waterbearing, medium dense, lenses of fine to medium grained sand (SP) (A–1–b) alluvium
	18	
	12	SAND WITH GRAVEL, medium grained, brownish gray, waterbearing, medium dense (SP) (A–1–b) alluvium
	15	
	44	GRAVEL WITH SAND, apparent cobbles, brownish gray, waterbearing, dense (GP) (A–1–a) alluvium or colluvium
		END OF BORING

1154 ST
Elevation 871.8
STA. 2794+93

Coh	N60	
	25	Clayey sand with organic fines, a little gravel, trace roots, black (A–2–6) fill
	28	Gravelly silty sand, pieces of wood, trace roots, brown (A–1–b) fill
ROOF SLAB	26	GRAVELLY SAND WITH SILT, fine to medium grained, brown, moist, medium dense (SP–SM) (A–1–b) alluvium
	33	SAND WITH SILT AND GRAVEL, fine to medium grained, grayish brown, moist, medium dense (SP–SM) alluvium
	47	
	20	SAND WITH SILT AND GRAVEL, fine to medium grained, brown to grayish brown, moist, dense (SP–SM) (A–1–b) alluvium
	19	
	27	SAND, fine grained, light brown, a little brown, moist, medium dense, laminations of silt (SP) (A–3) alluvium
▼	21	
INVERT SLAB	29	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense, laminations of silt (SP) (A–3) alluvium
	23	SAND, a little gravel, medium grained, light brown, waterbearing, medium dense (SP) (A–1–b) alluvium
	21	
	26	GRAVELLY SAND, medium grained, light brown, waterbearing, medium dense (SP) (A–1–b) alluvium
	23	
	64	SAND WITH SILT, fine grained, brown to gray, waterbearing, medium dense (SP–SM) (A–3) alluvium
	68	SANDY SILT, gray to grayish brown, wet, very dense (ML) (A–4) alluvium
	49	
	57	SAND, fine grained, grayish brown, waterbearing, dense (SP) (A–3) alluvium
	23	SILTY CLAY, grayish brown, hard (CL–ML) (A–4) alluvium
	13	SAND, fine to medium grained, brown, waterbearing, medium dense (SP) (A–3) alluvium
		SAND WITH GRAVEL, medium to coarse grained, brown, waterbearing, medium dense (SP) (A–1–b) alluvium
		END OF BORING

NOTES:

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NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BORINGS
(4 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-BOR-004

SHEET 30 OF 63

1153 ST

Elevation 869.2

STA. 2799+86

TOP OF BOAT SECTION WALL

INVERT SLAB

Elev.	Coh	N60	
870		9	Gravelly silty sand, pieces of concrete, trace roots, dark brown (A–1–b) fill
		8	Sand with silt, a little gravel, silty sand and ashes/cinders, dark brown, a little black, fill
860		13	Gravelly sand with silt, brown (A–1–b) fill
		24	Silty sand with gravel, brown (A–1–b) fill
850		9	Gravelly sand with silt, a little clayey sand, brown (A–1–b) fill
		12	Clayey sand, a little gravel, dark brown (A–6) fill
840		9	Gravelly sand with silt, a little hemic peat, brown, a little dark brown (A–1–b) fill
		3	ORGANIC CLAY, black, soft (OH) (A–8) swamp deposits
830		▼13	SANDY LEAN CLAY WITH GRAVEL, dark brownish gray, stiff (CL) (A–7–6) till
		12	GRAVELLY SAND WITH SILT, gray, medium dense, a lens of silty sand (SP–SM) (A–1–b) alluvium
820		21	GRAVEL WITH SILT AND SAND, gray, waterbearing, medium dense (GP–GM) alluvium
		22	GRAVELLY SAND, medium grained, gray, waterbearing, medium dense (SP) alluvium
810		19	SAND WITH SILT, a little gravel, medium to fine grained, dark gray, waterbearing, medium dense (SP–SM) (A–1–b) alluvium
		28	
800		36	GRAVEL WITH SILT AND SAND, gray, waterbearing, medium dense to dense (GP–GM) (A–1–b) alluvium
		27	
790		27	SAND, a little gravel, medium to fine grained, brown, waterbearing, medium dense (SP) (A–1–b) alluvium
		26	SAND WITH GRAVEL, medium to coarse grained, dark gray, waterbearing, medium dense (SP) (A–1–b) alluvium
780		26	SAND, a little gravel, medium to fine grained, light brown, waterbearing, medium dense, laminations of lean clay (SP) (A–1–b) alluvium
		36	SAND WITH GRAVEL, medium grained, brown, waterbearing, medium dense (SP) (A–1–b) alluvium
770		27	SAND, a little gravel, medium to fine grained, brown, a little gray, waterbearing, dense, lenses of lean clay (SP) (A–1–b) alluvium
			SAND, fine grained, grayish brown, waterbearing, medium dense, laminations of medium grained sand (SP) (A–3) alluvium END OF BORING
760			
750			
740			
730			
720			

NOTES:

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NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

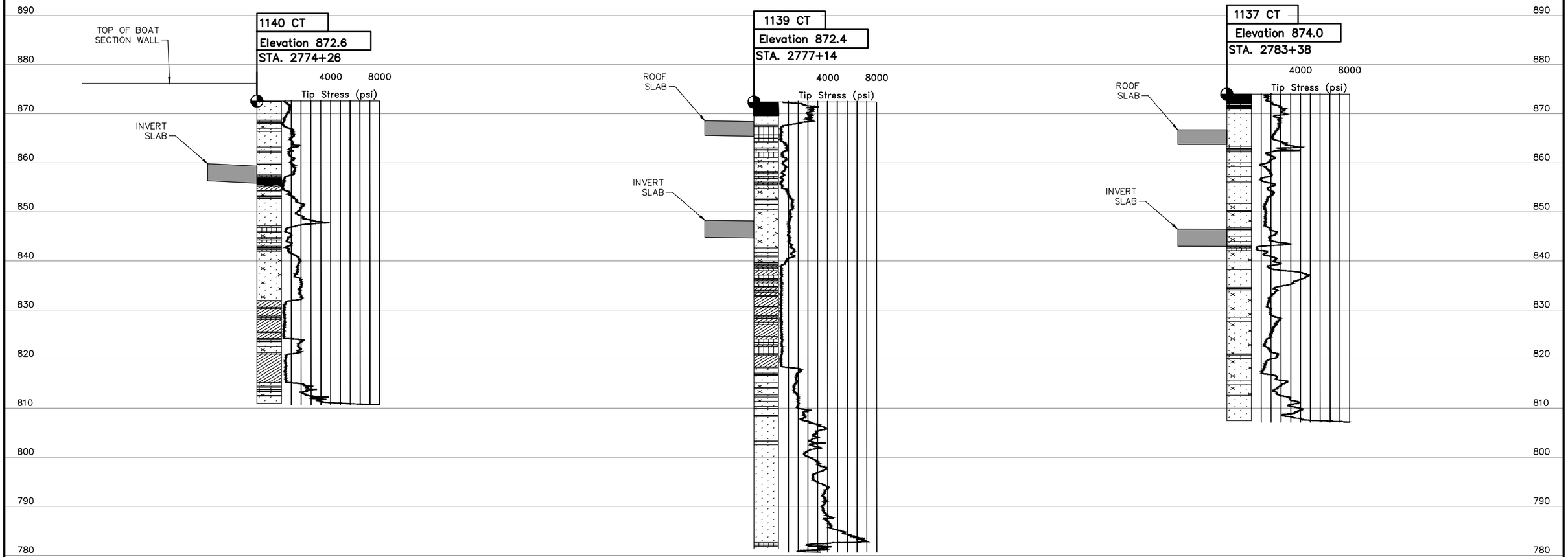
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BORINGS
(5 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-BOR-005

SHEET 31 OF 63

Sep. 21 2015 09:42 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-BOR-005.dwg By: lafargues



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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
BORINGS
(6 OF 6)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-BOR-006

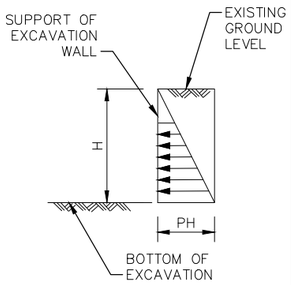
SHEET 32 OF 63

MINIMUM DESIGN LATERAL PRESSURE FOR SUPPORT OF EXCAVATION ABOVE BOTTOM OF EXCAVATION

DUE TO SOIL AND WATER

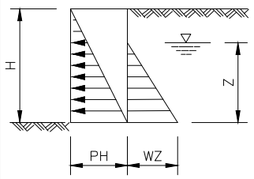
CANTILEVER WALL SYSTEMS

DEWATERED



P=35

NOT DEWATERED

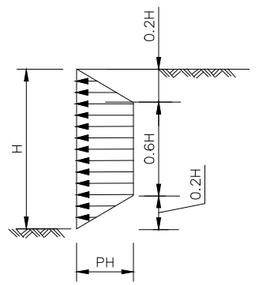


P=35

P=62.4

BRACED WALL SYSTEMS

DEWATERED



P=31

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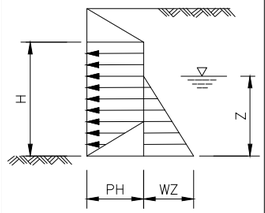
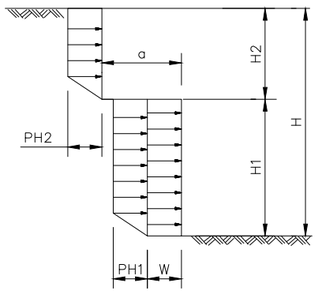


P=USE VALUES SPECIFIED FOR DEWATERED CASE

W=62.4



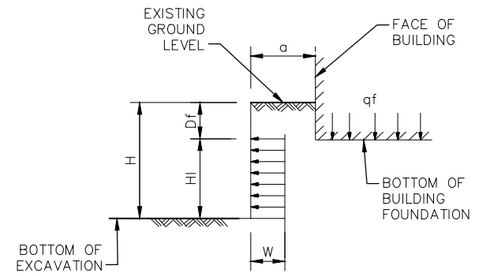
DUE TO BENCH EXCAVATION

1. THE DESIGN PRESSURE (P) TO BE DETERMINED FOR SPECIFIC CONFIGURATION.
2. THE SURCHARGE (W) FROM THE UPPER BENCH MAY BE NEGLECTED IF THE WIDTH OF THE BENCH (a) IS GREATER THAN HEIGHT OF THE LOWER EXCAVATION (H1).

GENERAL NOTES:

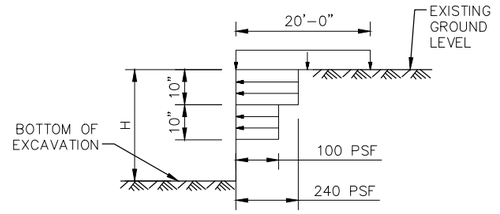
1. VALUES SHOWN FOR PRESSURE GRADIENTS P, W, Pp & Pp' ARE IN POUNDS PER SQUARE FOOT PER FOOT OF DEPTH.
2. VALUES FOR DISTANCES ARE IN FEET.
3. BRACE LEVELS ARE NOT SHOWN; THE DIAGRAMS SHOWN ABOVE "FOR SUPPORT OF EXCAVATION ABOVE BOTTOM OF EXCAVATION" ARE APPLICABLE TO MULTIPLE-BRACED SYSTEMS.
4. LATERAL SURCHARGE PRESSURE FROM TRAFFIC & CONSTRUCTION EQUIPMENT IS BASED ON AN ASSUMED TRAFFIC SURFACE SURCHARGE OF 600 PSF ACTING OVER THE TRAFFIC LANES. FOR MORE SEVERE CONSTRUCTION EQUIPMENT LOADING, SPECIAL ANALYSIS MUST BE PERFORMED.
5. ALL VALUES GIVEN FOR LATERAL PRESSURES ARE MINIMUM. INCREASE, AS REQUIRED, TO SUIT ACTUAL CONDITIONS ENCOUNTERED IN THE FIELD. INCREASED LATERAL LOAD DUE TO ADVERSE BEDDING CONDITION SHOULD BE CONSIDERED.
6. PRELOADING OF BRACED SHORING SYSTEM IS REQUIRED.

DUE TO SURCHARGE, EARTHQUAKE AND BUILDINGS

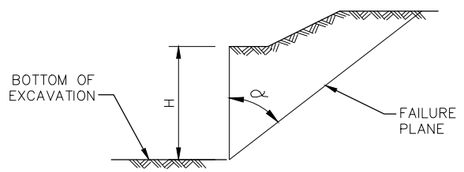


PRESSURES (W) DUE TO BUILDING FOUNDATION ARE TO BE DETERMINED BY THE CONTRACTOR ON A CASE-BY-CASE BASIS. CONTRACTOR SHALL DETERMINE BUILDING FOUNDATION PRESSURE (qf), DISTANCE FROM THE EXCAVATION (a), AND DEPTH OF FOUNDATION (Df) BY EXAMINATION OF EXISTING PLANS AND BY ON-SITE FIELD INSPECTION. PRESSURES USED FOR DESIGN SHALL BE SUBJECT TO APPROVAL BY ENGINEER.

TRAFFIC AND CONSTRUCTION EQUIPMENT



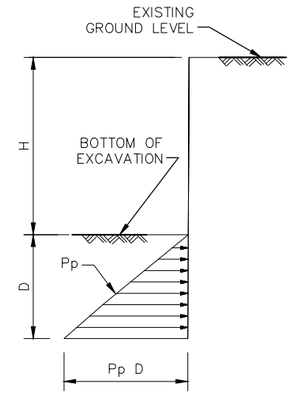
EMBANKMENT



ANGLE "α" FOR FAILURE PLANE SHALL BE DETERMINED BY THE CULMANN GRAPHICAL METHOD; SEE "SOIL MECHANICS IN ENGINEERING PRACTICE" 3RD. ED. BY TERZAGHI PECK & MASRI. ALL SURCHARGES AFFECTING AND WITHIN THE FAILURE PLANE SHALL BE CONSIDERED IN ESTIMATING LATERAL LOAD.

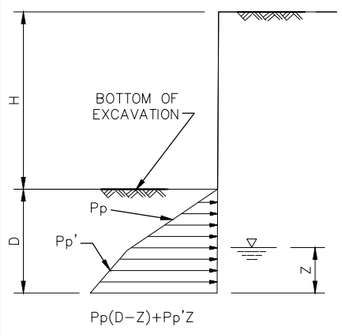
DESIGN PASSIVE RESISTANCE

RETAINED DEWATERED



Pp=300 FOR EMBEDMENT IN SOIL, 3 KSF MAXIMUM PRESSURE

RETAINED, NOT DEWATERED



Pp=180 FOR EMBEDMENT IN SOIL, 3 KSF MAXIMUM PRESSURE

NOTES:

A. FOR CANTILEVER SHEETING DESIGN THE PENETRATION FOUND BY USING DIAGRAMS ABOVE SHALL BE INCREASED BY 20%.

B. FOR SOLDIER PILE AND LAGGING SHEETING SYSTEMS, ACTIVE PRESSURE ABOVE THE SUBGRADE ELEVATION IS TO BE APPLIED TO THE FULL PANEL WIDTH FROM CENTER TO CENTER OF SOLDIER PILE AND BELOW SUBGRADE IT IS TO BE APPLIED TO THE WIDTH OF THE SOLDIER PILE OR ENCASEMENT PASSIVE RESISTANCE TAKEN AS ACTING ON 1.5 X DIAMETER FOR CIRCULAR SOLDIER PILE CONCRETE ENCASEMENT.

C. FOR HORIZONTALLY CONTINUOUS WALLS, BOTH ACTIVE AND PASSIVE PRESSURES AS SHOWN ON THIS DRAWING SHALL BE APPLIED ON A ONE FOOT LENGTH OF WALL BASIS.

D. MINIMUM PENETRATIONS FOR PASSIVE RESISTANCE:
VERTICAL RESISTING ELEMENTS OF SUPPORT OF EXCAVATION WALL SYSTEMS SHALL SATISFY THE MINIMUM PENETRATION DEPTH OUTLINED AS FOLLOWS UNLESS ANALYSIS SHOWS SMALLER PENETRATION CAN BE USED.

1. BELOW BOTTOM OF EXCAVATION DEEPER THAN 40 FEET
   12 FEET FOR SOLDIER PILES
   8 FEET FOR CONTINUOUS WALL SYSTEMS.
2. BELOW BOTTOM OF EXCAVATION LESS THAN 40 FEET
   10 FEET FOR SOLDIER PILES
   7 FEET FOR CONTINUOUS WALL SYSTEMS.
3. BELOW BOTTOM OF EXCAVATION LESS THAN 20 FEET
   8 FEET FOR SOLDIER PILES
   6 FEET FOR CONTINUOUS WALL SYSTEMS.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

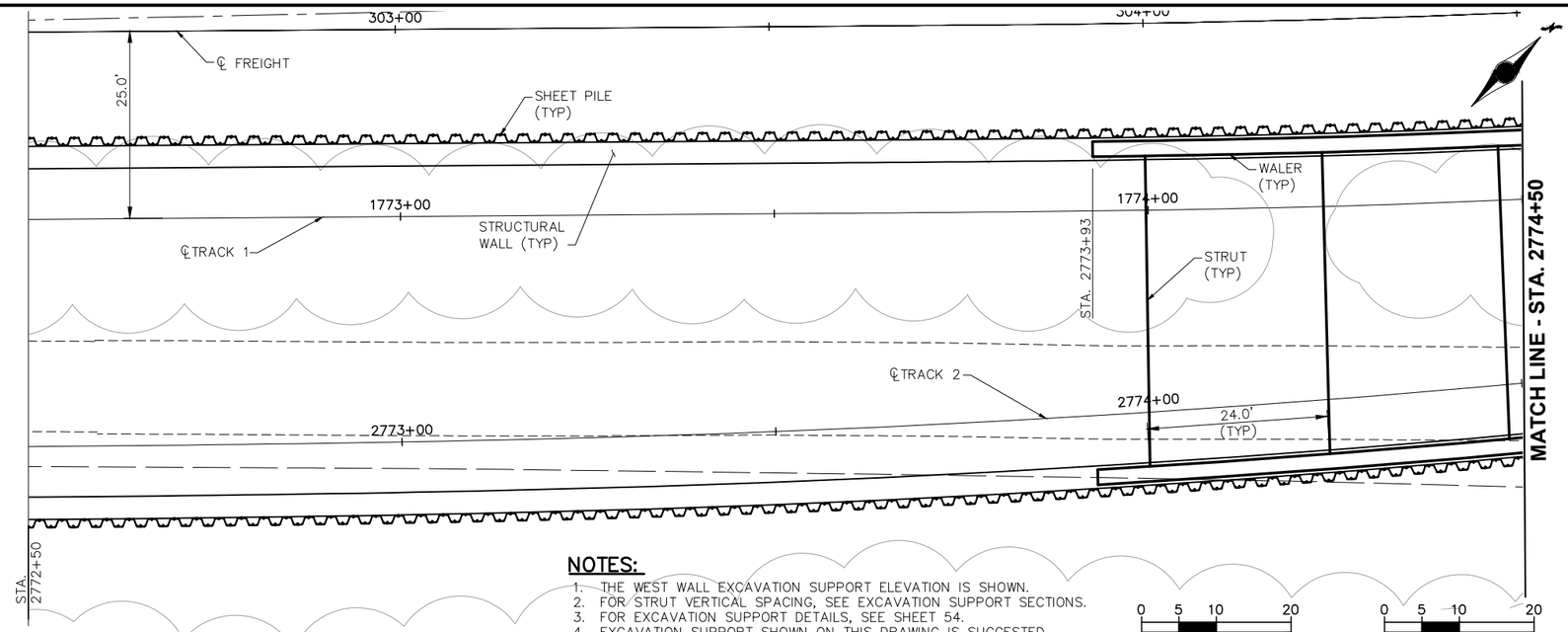
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
TEMPORARY EXCAVATION SUPPORT DESIGN CRITERIA

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-CRI-001

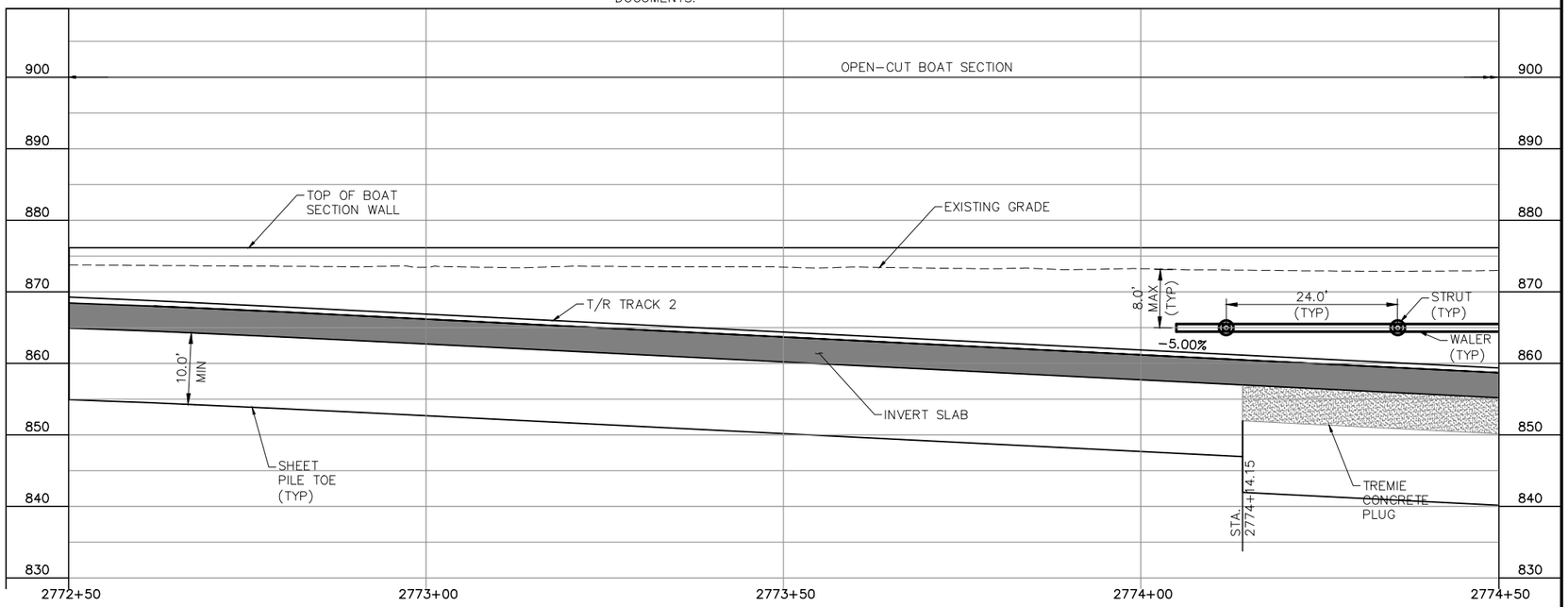
SHEET 33 OF 63



PLAN

NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

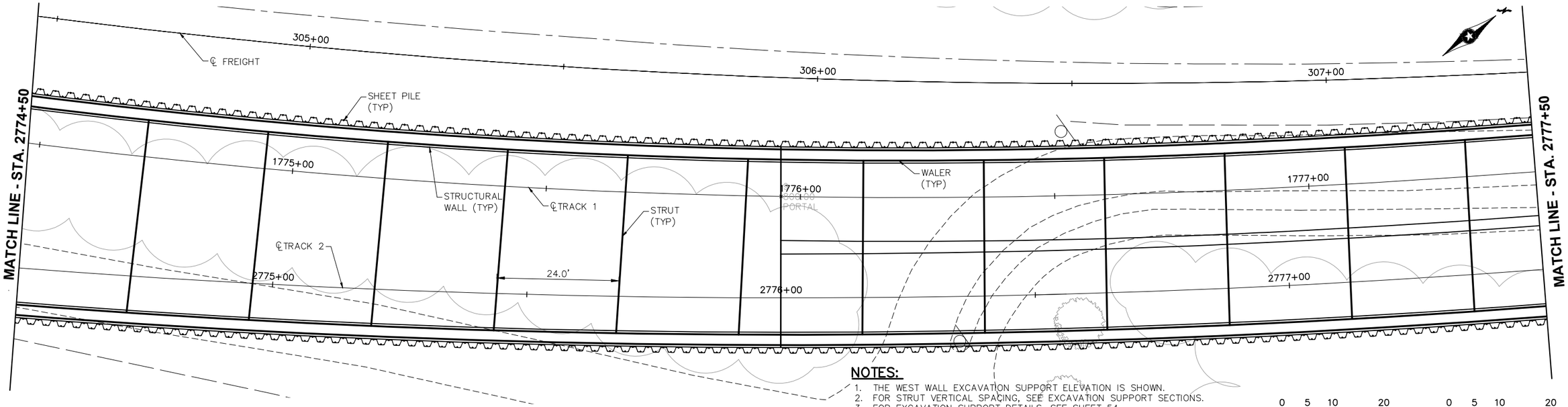
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (1 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-001

SHEET 34 OF 63

Sep. 21 2015 09:47 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-001.dwg By: lafargues



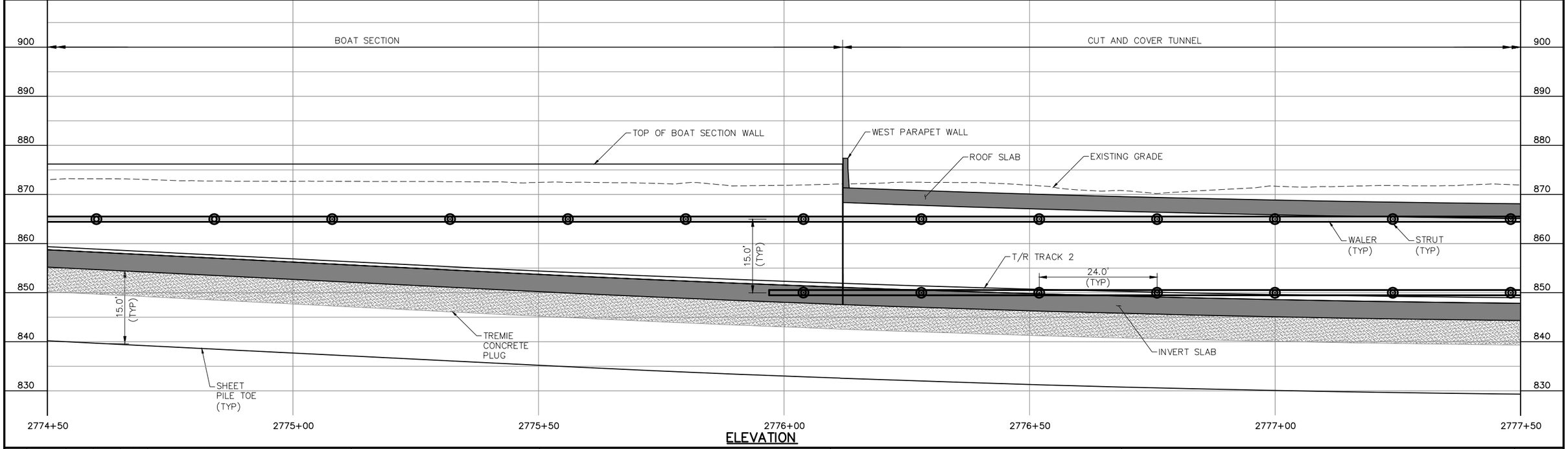
PLAN

NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

0 5 10 20
HORIZONTAL SCALE IN FEET

0 5 10 20
VERTICAL SCALE IN FEET



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

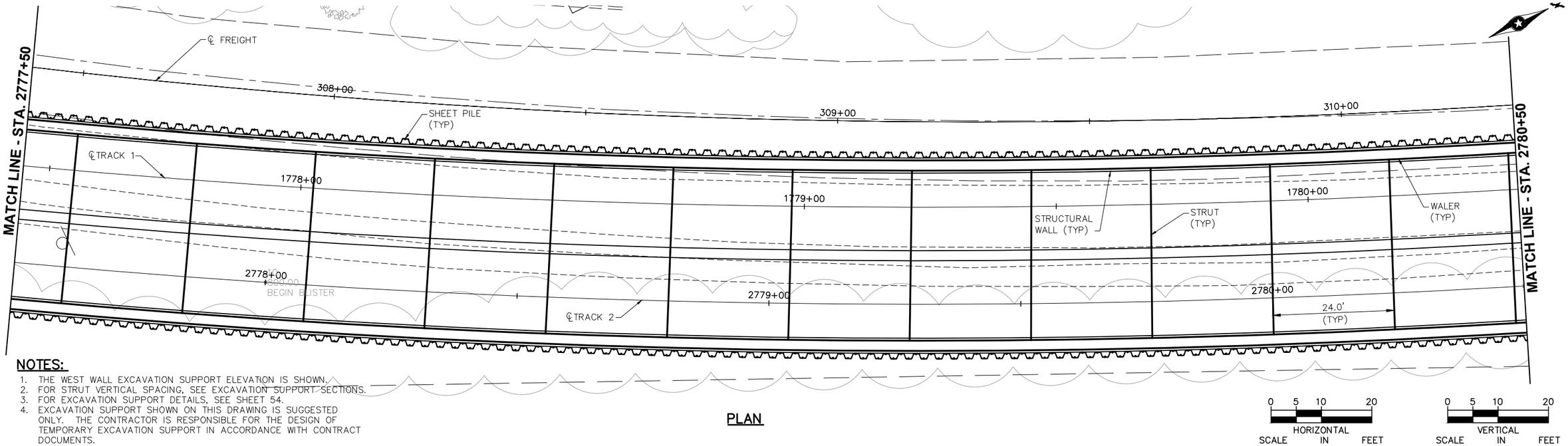
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (2 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-002

SHEET 35 OF 63

Sep. 21 2015 09:50 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-002.dwg By: lafargues



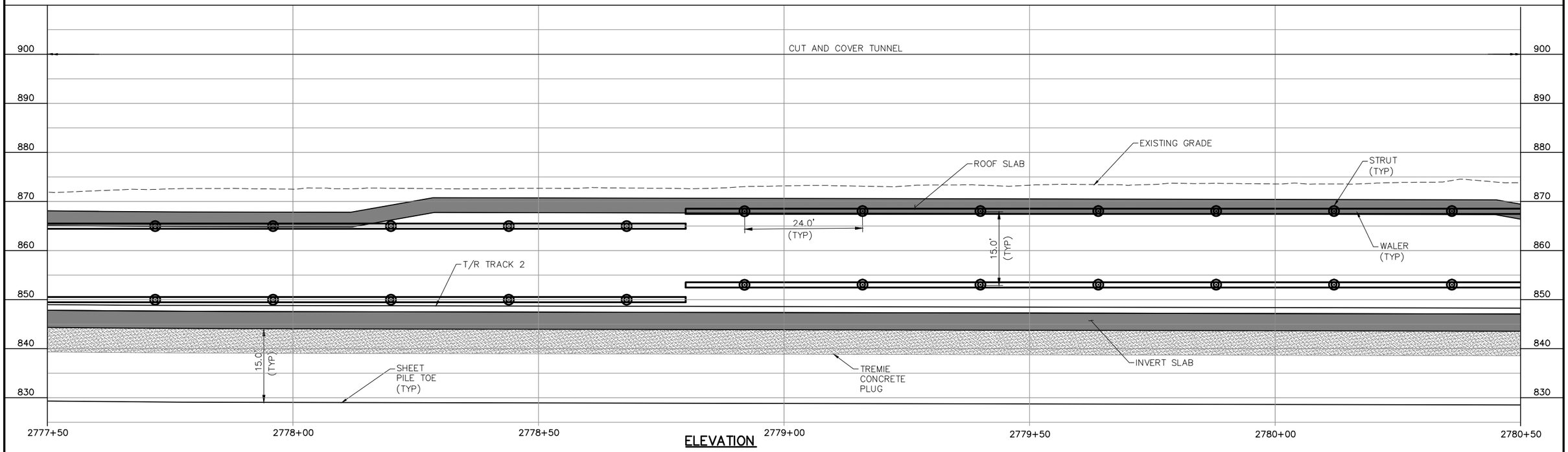
NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

PLAN

0 5 10 20
HORIZONTAL SCALE IN FEET

0 5 10 20
VERTICAL SCALE IN FEET



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

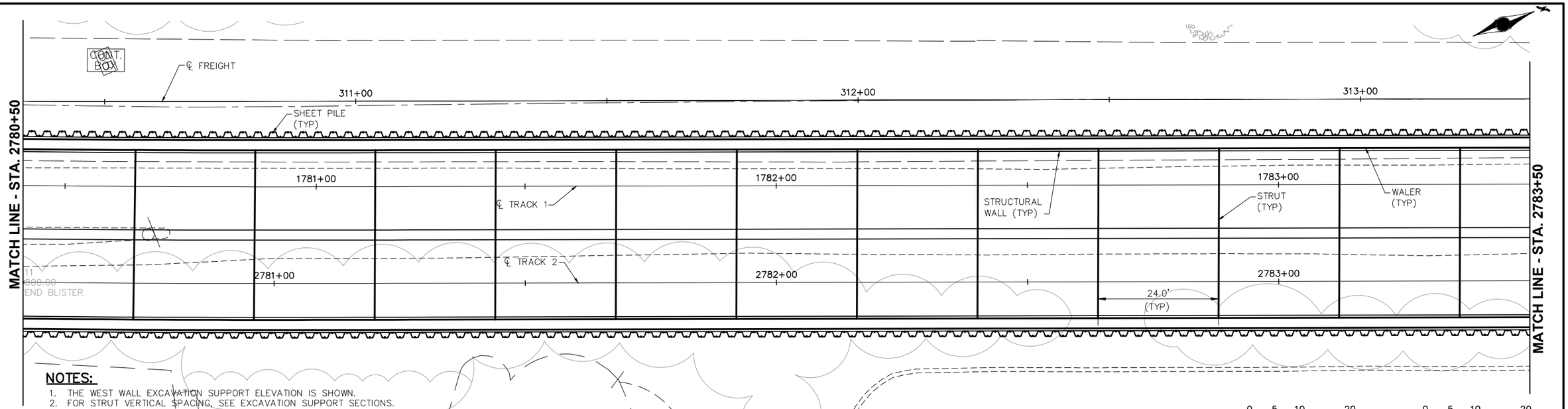
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (3 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-003

SHEET 36 OF 63

Sep. 21 2015 09:52 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-003.dwg By: lafargues



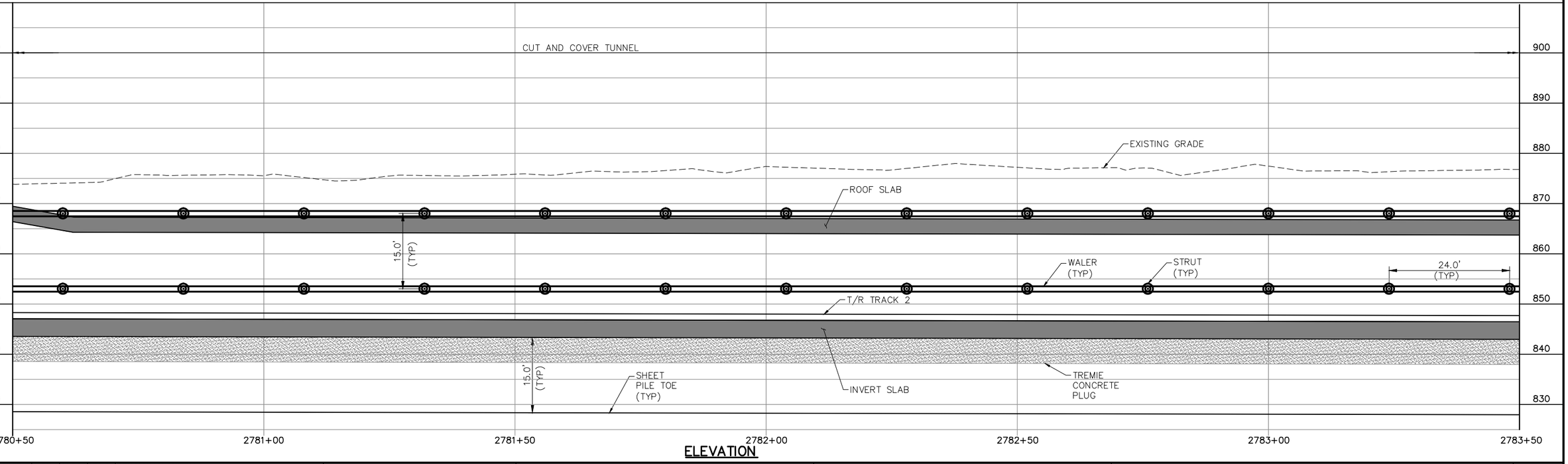
PLAN

NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

0 5 10 20
HORIZONTAL SCALE IN FEET

0 5 10 20
VERTICAL SCALE IN FEET



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

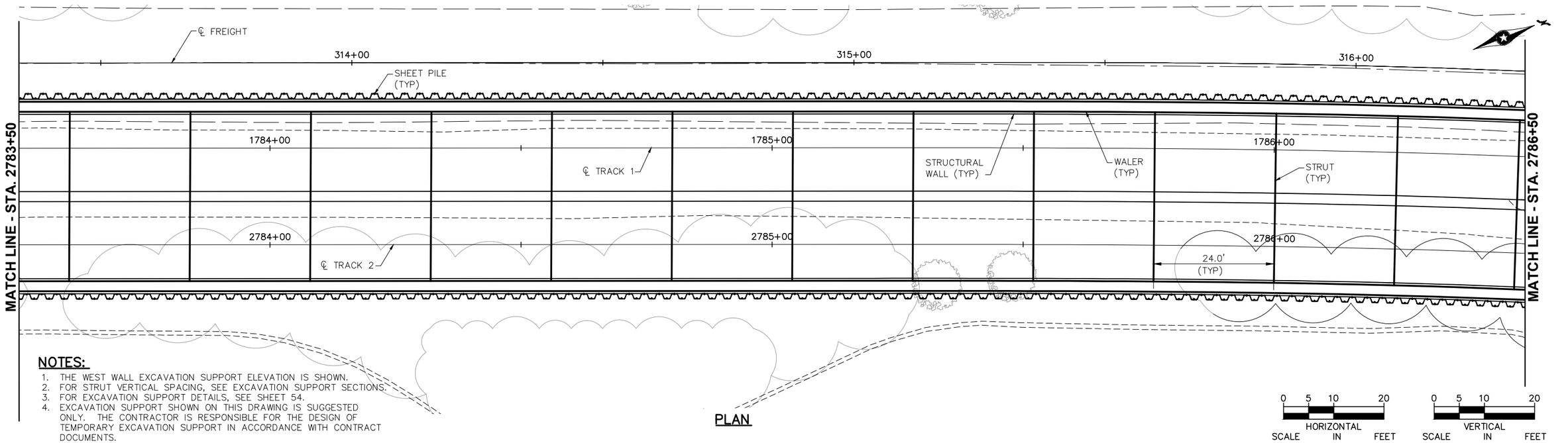
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (4 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-001

SHEET 37 OF 63

Sep. 21 2015 09:54 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-004.dwg By: lafargues



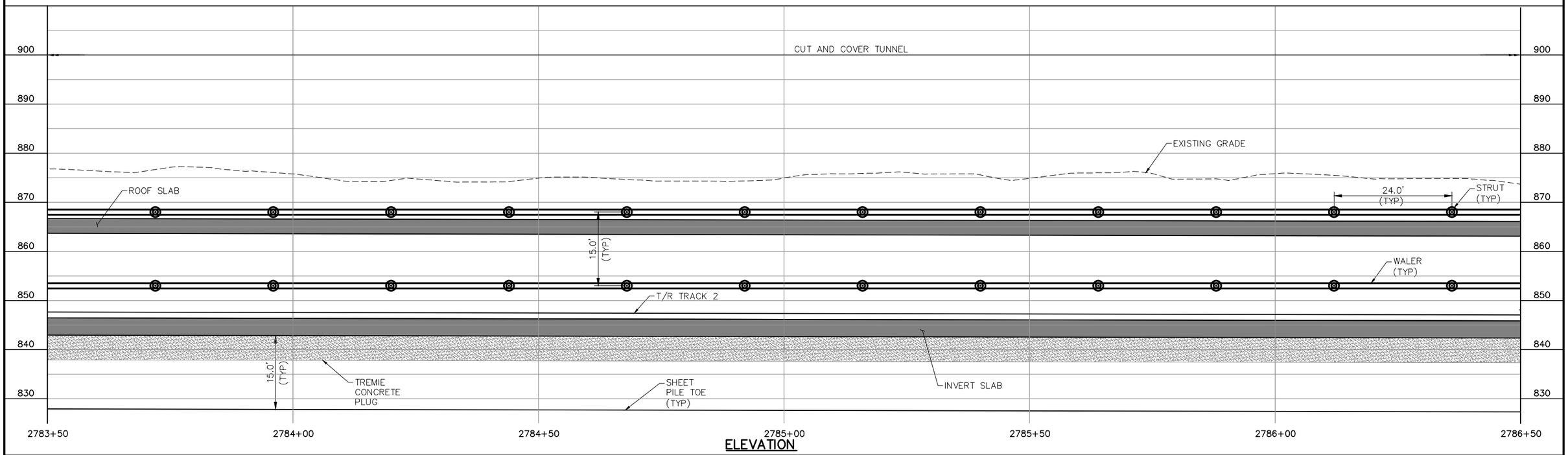
NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

PLAN

HORIZONTAL SCALE IN FEET: 0 5 10 20

VERTICAL SCALE IN FEET: 0 5 10 20



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

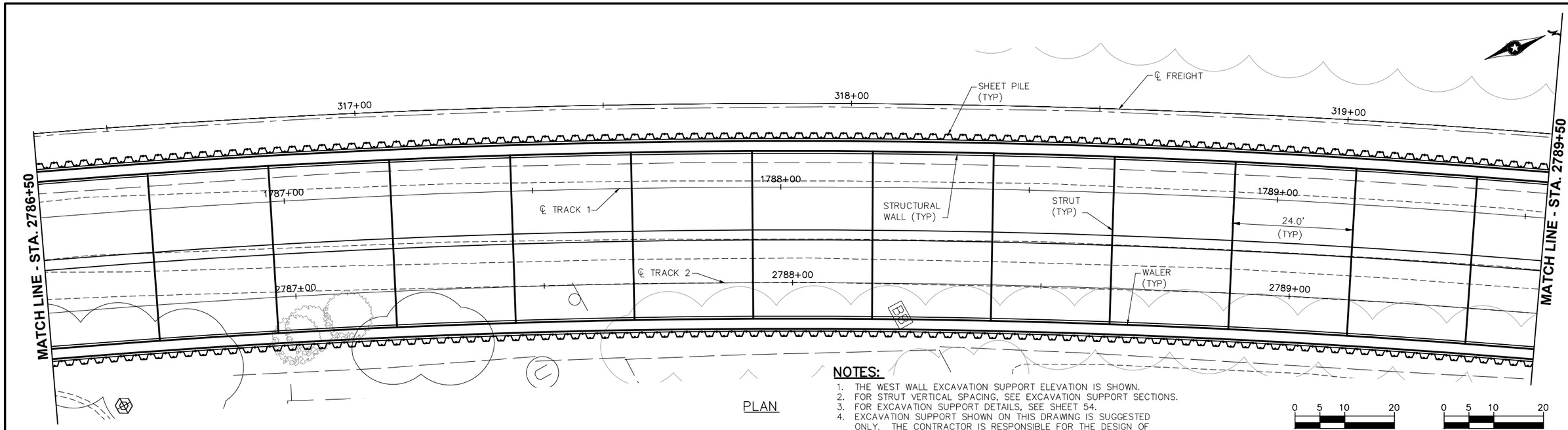
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (5 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-005

SHEET 38 OF 63

Sep. 21 2015 09:57 am \\Wadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-005.dwg By: lafargues

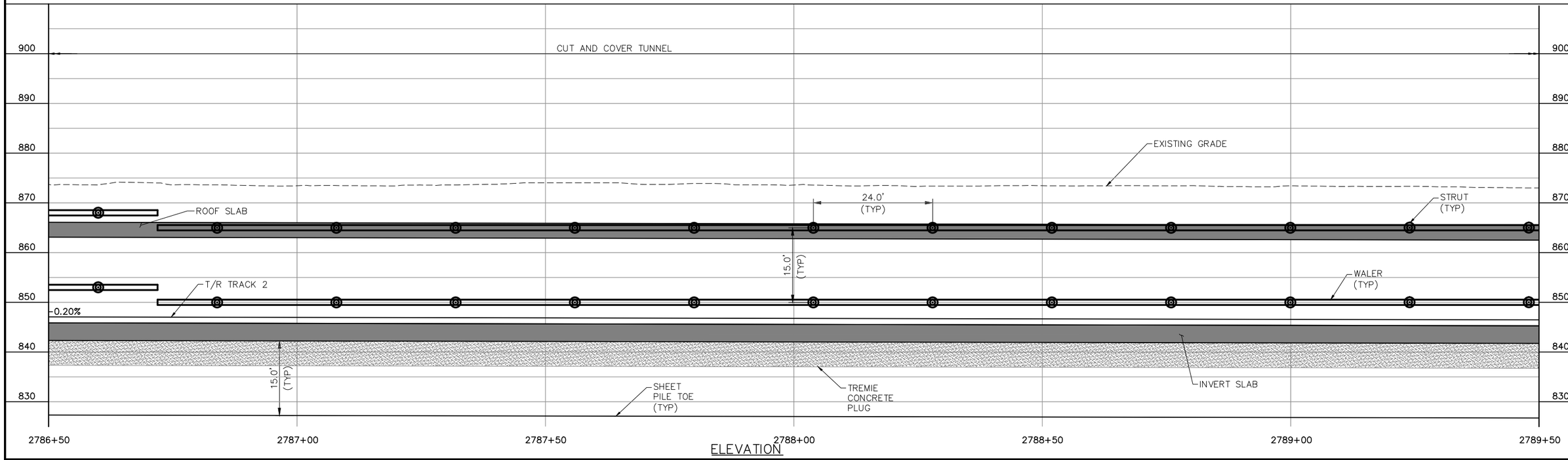


NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

0 5 10 20
HORIZONTAL SCALE IN FEET

0 5 10 20
VERTICAL SCALE IN FEET



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

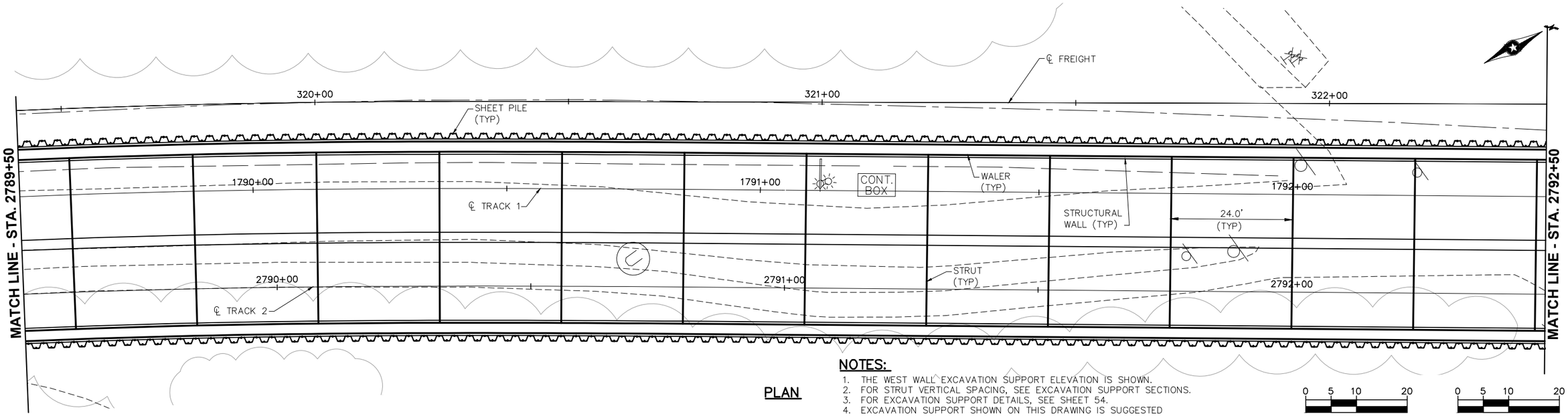
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (6 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-006

SHEET 39 OF 63

Sep. 21 2015 09:59 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-006.dwg By: lafargues



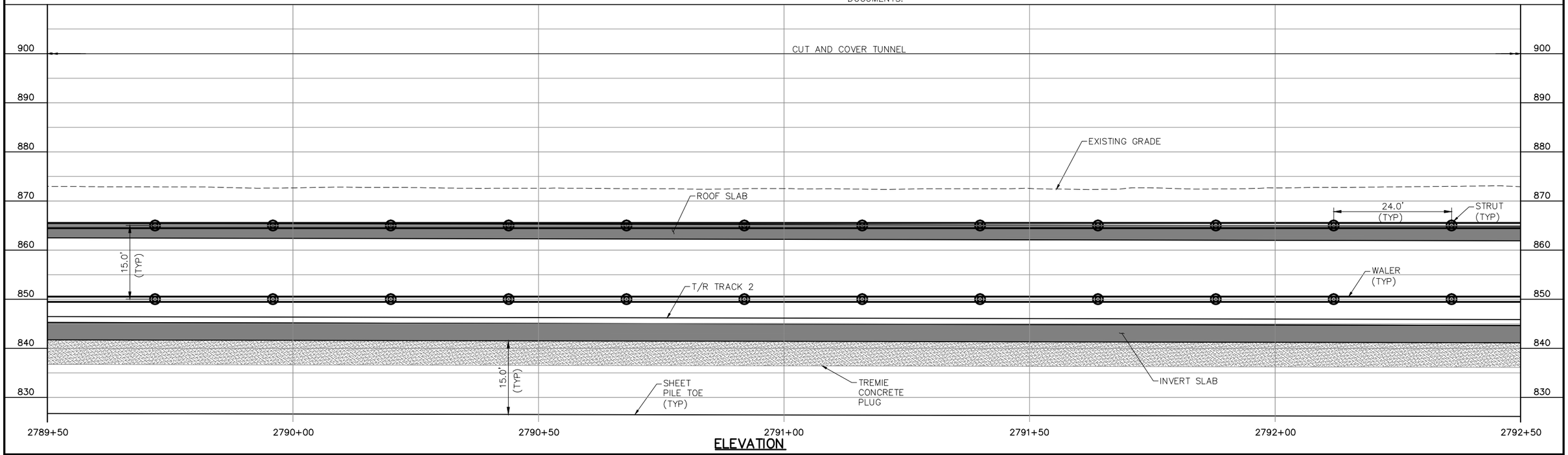
PLAN

NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

HORIZONTAL SCALE IN FEET: 0 5 10 20

VERTICAL SCALE IN FEET: 0 5 10 20



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

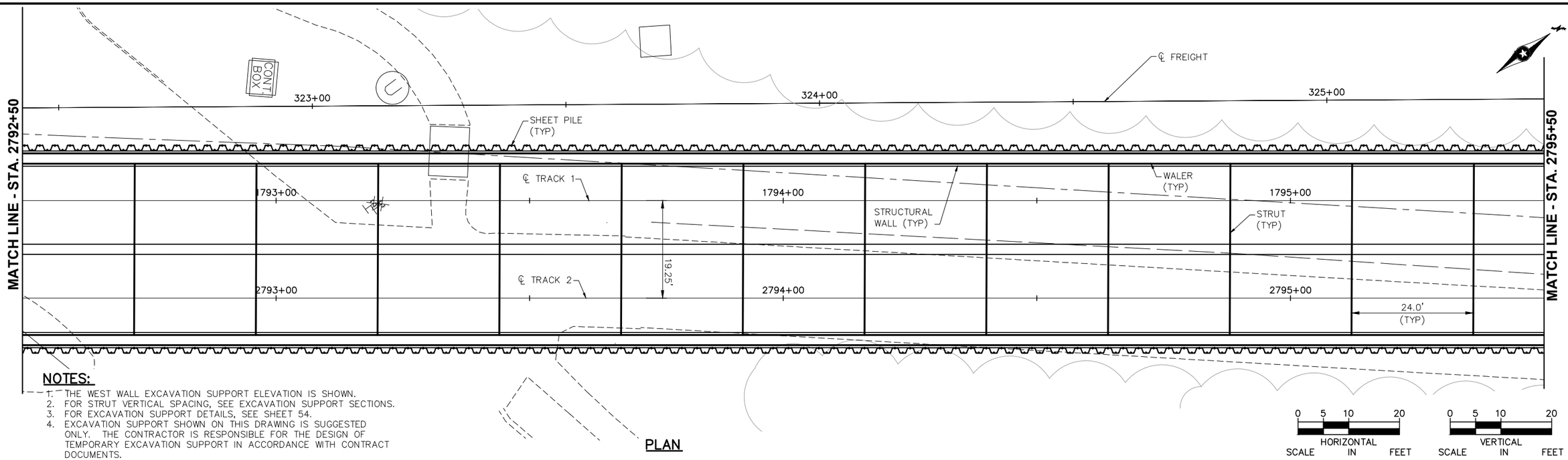
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (7 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-007

SHEET 40 OF 63

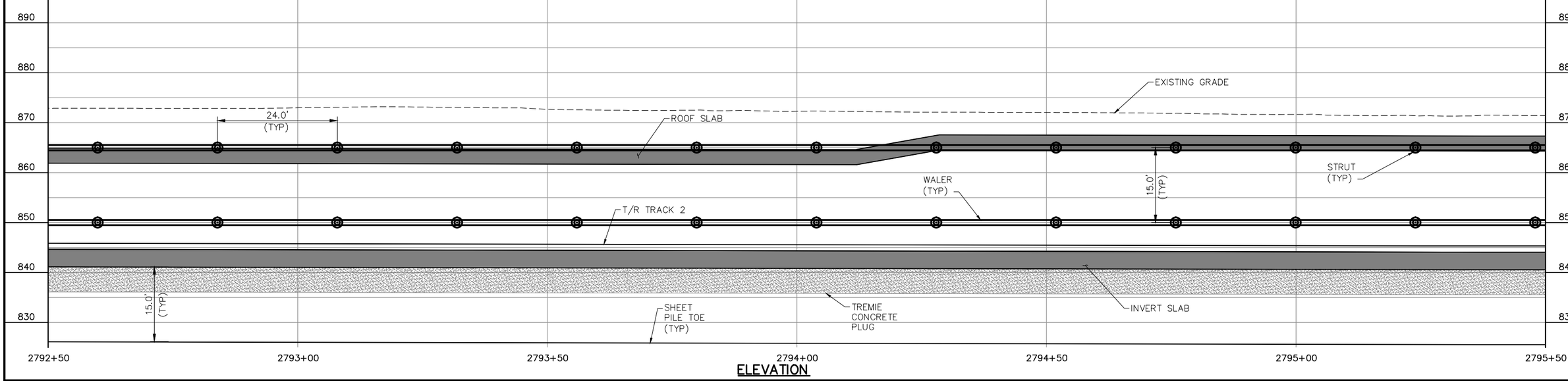
Sep. 21 2015 10:02 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-007.dwg By: lafargues



NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

PLAN



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

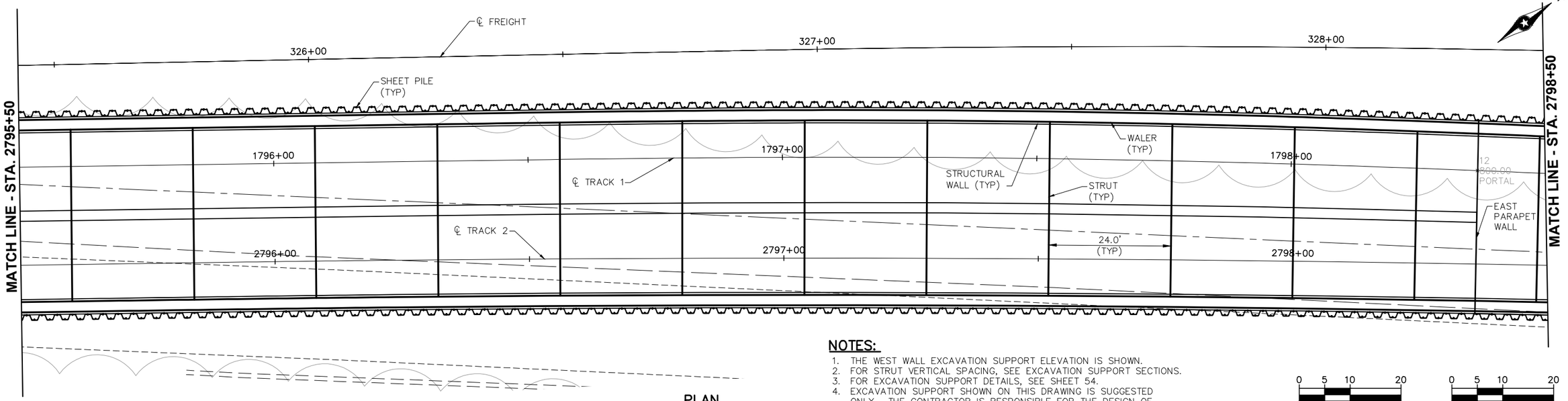
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (8 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-008

SHEET 41 OF 63

Sep. 21 2015 10:05 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-008.dwg By: lafargues



PLAN

NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
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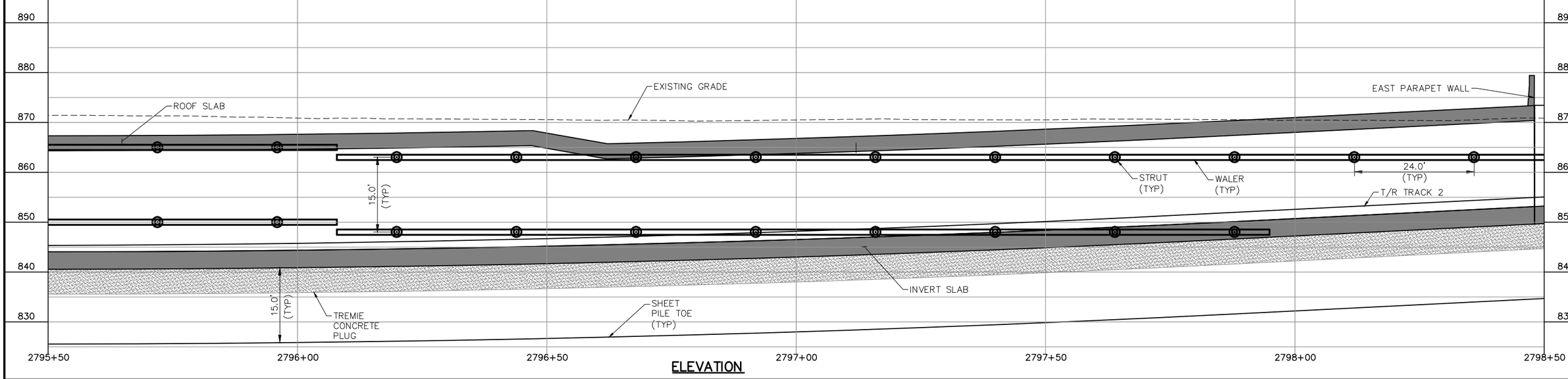
0 5 10 20
HORIZONTAL SCALE IN FEET

0 5 10 20
VERTICAL SCALE IN FEET



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

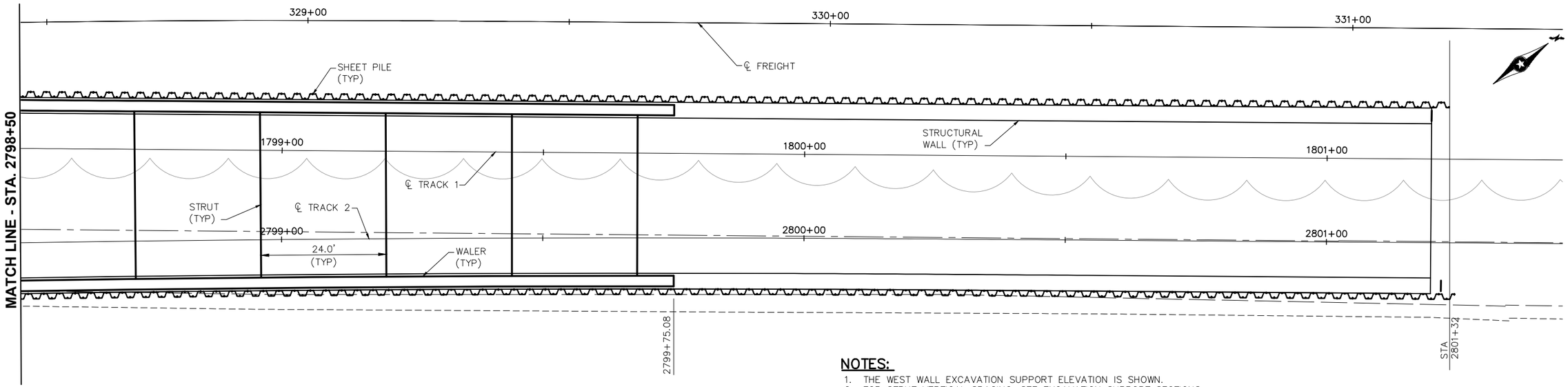
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (9 OF 10)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-009

SHEET 42 OF 63

Sep. 21 2015 10:08 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-009.dwg By: lafargues



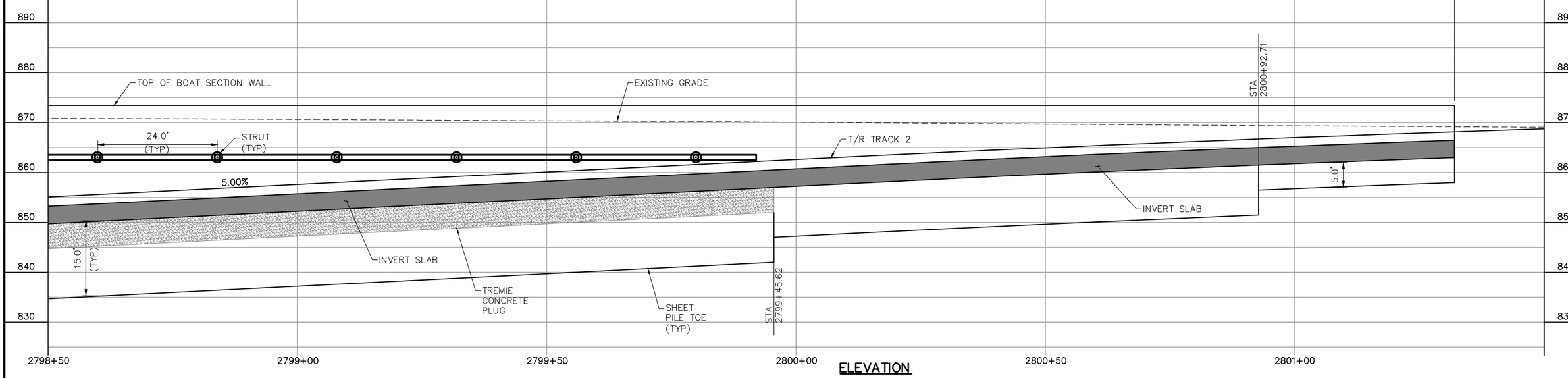
PLAN

NOTES:

1. THE WEST WALL EXCAVATION SUPPORT ELEVATION IS SHOWN.
2. FOR STRUT VERTICAL SPACING, SEE EXCAVATION SUPPORT SECTIONS.
3. FOR EXCAVATION SUPPORT DETAILS, SEE SHEET 54.
4. EXCAVATION SUPPORT SHOWN ON THIS DRAWING IS SUGGESTED ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF TEMPORARY EXCAVATION SUPPORT IN ACCORDANCE WITH CONTRACT DOCUMENTS.

0 5 10 20
HORIZONTAL SCALE IN FEET

0 5 10 20
VERTICAL SCALE IN FEET



ELEVATION

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT PLAN AND PROFILE (10 OF 10)

DISCIPLINE: STRUCTURES

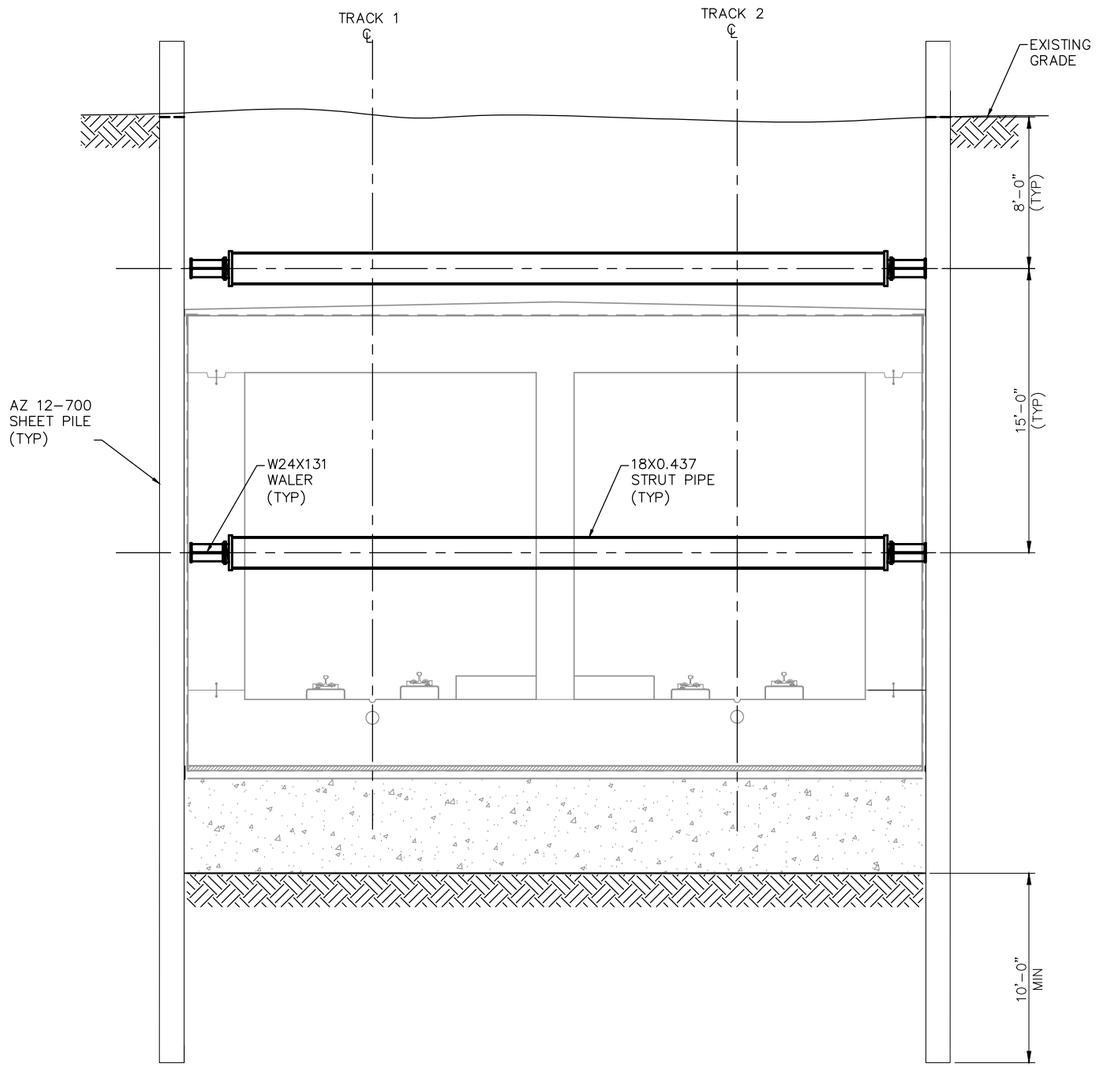
SHEET NAME: E3-STU-TUN-TUNK-SOE-010

SHEET 43 OF 63

Sep. 21 2015 10:11 am \\Wadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-010.dwg By: lafargues

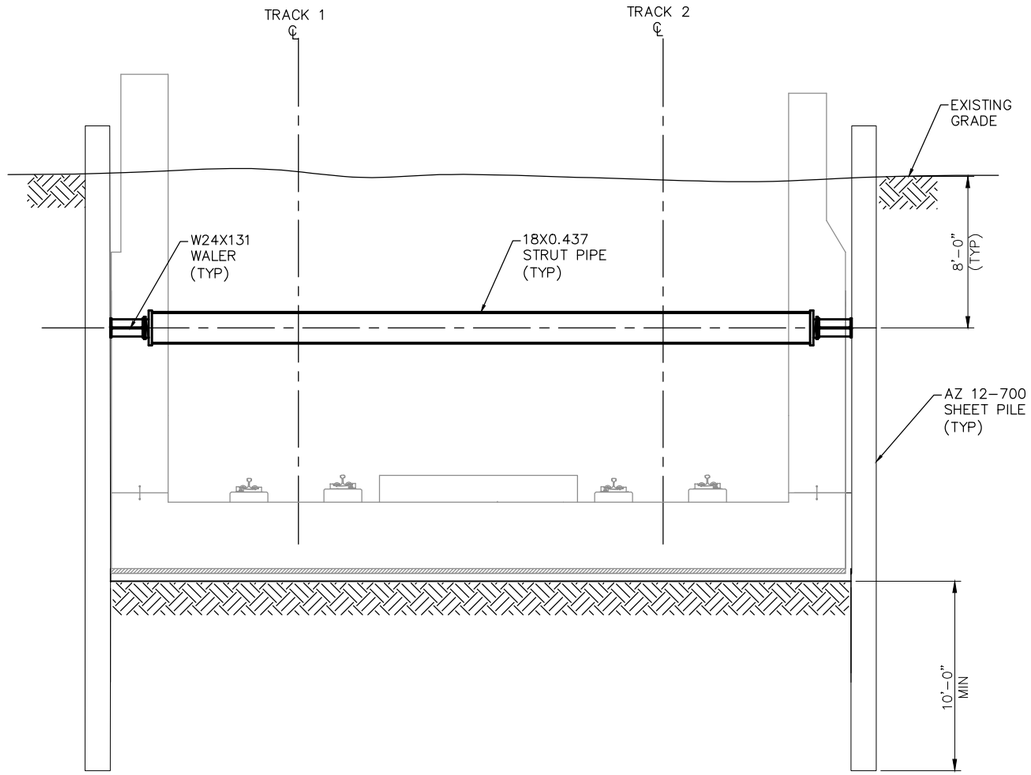
NOTES

1. FOR STRUT CONFIGURATION, SEE PLAN AND PROFILE.



TYPICAL TUNNEL TRANSVERSE SECTION SUPPORT OF EXCAVATION

0 2 4 8
HORIZONTAL SCALE IN FEET



TYPICAL BOAT TRANSVERSE SECTION SUPPORT OF EXCAVATION

0 2 4 8
HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

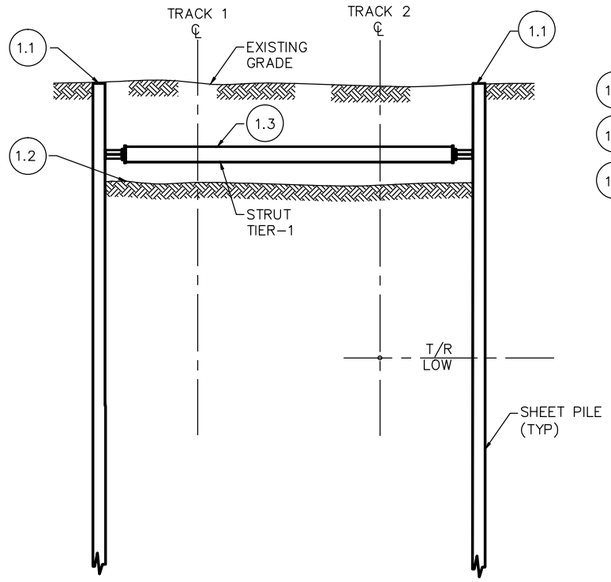
CIVIL WEST- VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT SECTIONS

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-TYP-001

SHEET 44 OF 63

Sep. 21 2015 10:13 am \\Wadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-TYP-001.dwg By: lafargues

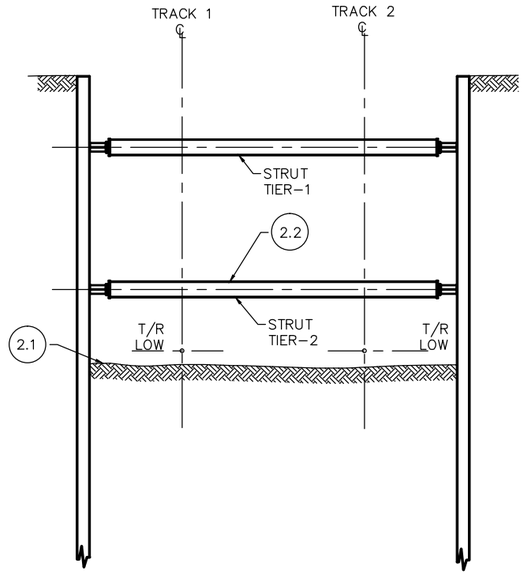


1.1 INSTALL SHEET PILES

1.2 EXCAVATE TO LEVEL SHOWN

1.3 INSTALL WALES AND STRUTS FOR TIER–1

STAGE 1



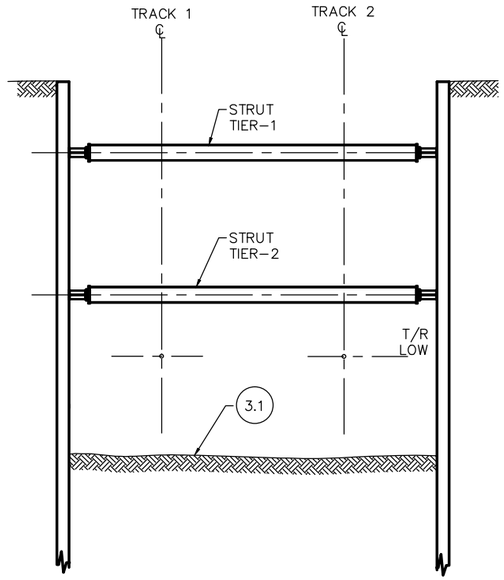
2.1 EXCAVATE TO LEVEL SHOWN

2.2 INSTALL WALES AND STRUTS FOR TIER–2

NOTES

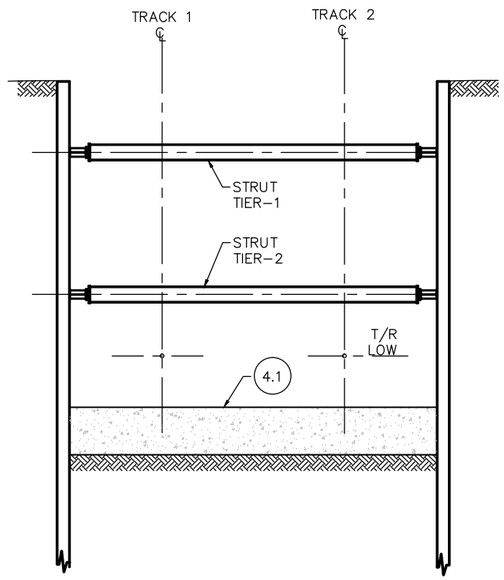
1. FOR PRECISE LOCATION OF OF STRUTS, SEE SOE PLAN AND PROFILE.

STAGE 2



3.1 EXCAVATE TO BOTTOM OF EXCAVATION

STAGE 3



4.1 CONSTRUCT TREMIE CONCRETE PLUG

STAGE 4

0 4 8 16

HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

DESIGNED BY: | CHECKED BY:

DRAWN BY: | DATE:

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

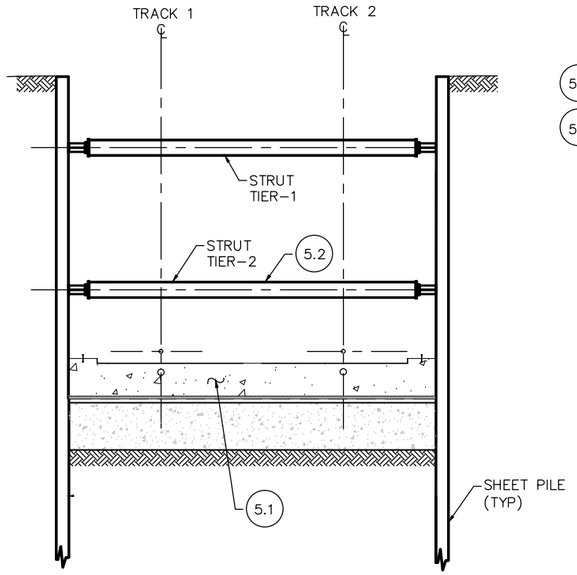
CIVIL EAST- VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT CONSTRUCTION STAGING (1 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-SEQ-001

SHEET 45 OF 63

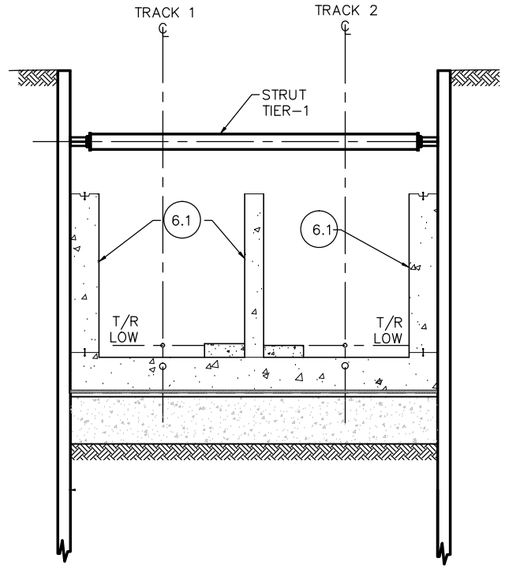
Sep. 21 2015 10:12 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-SEQ-001.dwg By: lafargues



5.1 CONSTRUCT BASE SLAB

5.2 REMOVE STRUT TIER–2

STAGE 5

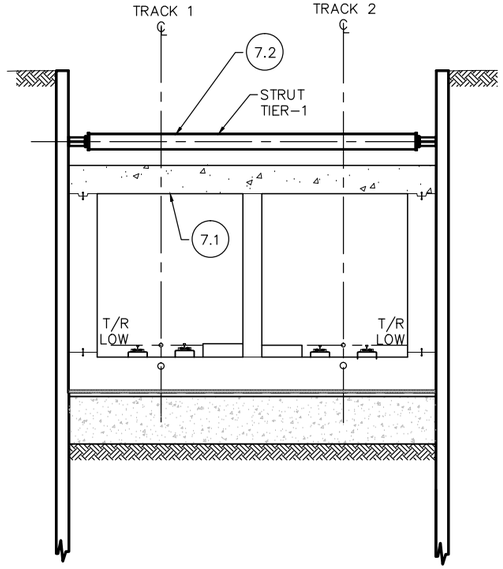


6.1 CONSTRUCT STRUCTURAL WALL

NOTES

1. FOR PRECISE LOCATION OF OF STRUTS, SEE SOE PLAN AND PROFILE.

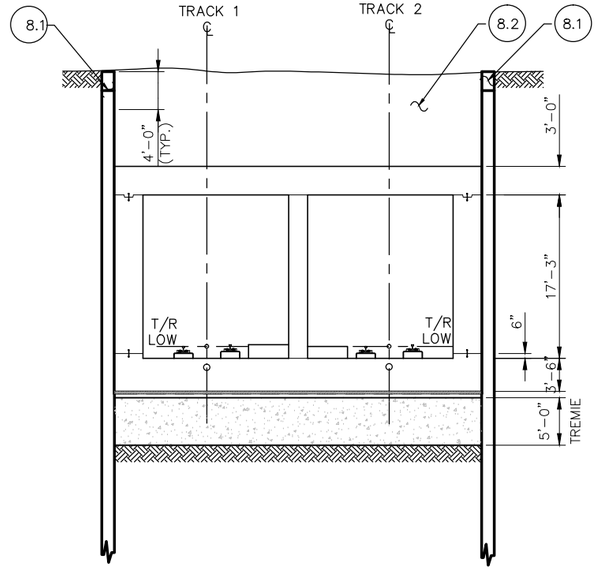
STAGE 6



7.1 CONSTRUCT ROOF SLAB

7.2 REMOVE STRUT TIER–1

STAGE 7



8.1 CUT SHEET PILES 2 FEET BELOW PROPOSED GRADE

8.2 BACKFILL OVER ROOF SLAB

STAGE 8

0 4 8 16

HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

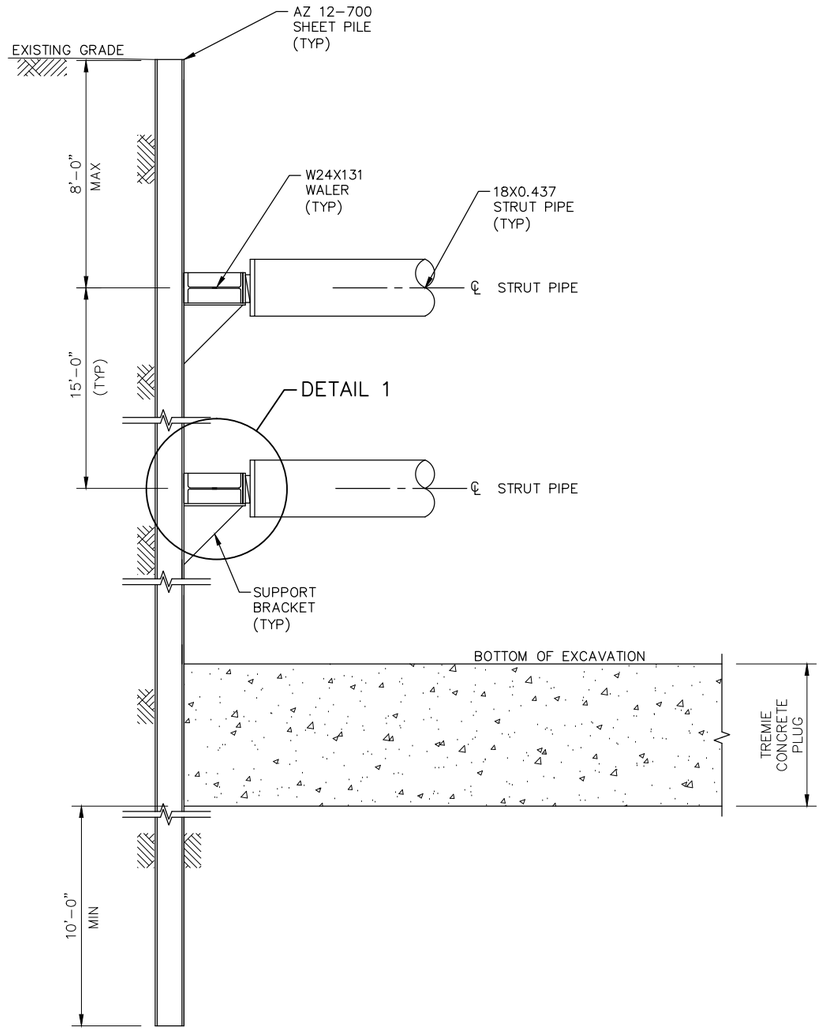
CIVIL EAST- VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT CONSTRUCTION STAGING (2 OF 2)

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-SEQ-002

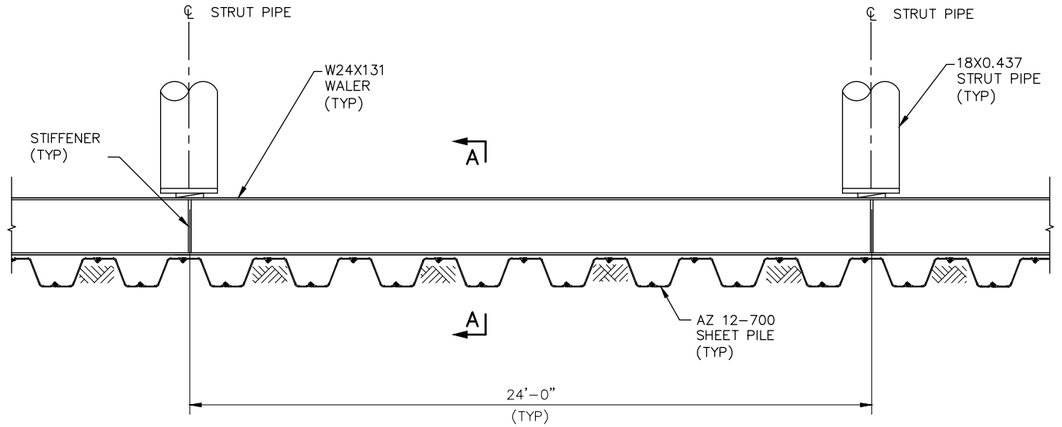
SHEET 46 OF 63

Sep. 21 2015 10:13 am \\Nadtc2fp001\swirt\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\STRUCTURES\E3-STU-TUN\E3-STU-TUN-TUNK-SOE-SEQ-002.dwg By: lafargues



SECTION A–A

0 1 2 3 4 5
HORIZONTAL
SCALE IN FEET



PLAN – SHEET PILE WALL DETAIL

0 1 2 3 4 5
HORIZONTAL
SCALE IN FEET

DETAIL 1

0 1 2
HORIZONTAL
SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

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METROPOLITAN COUNCIL

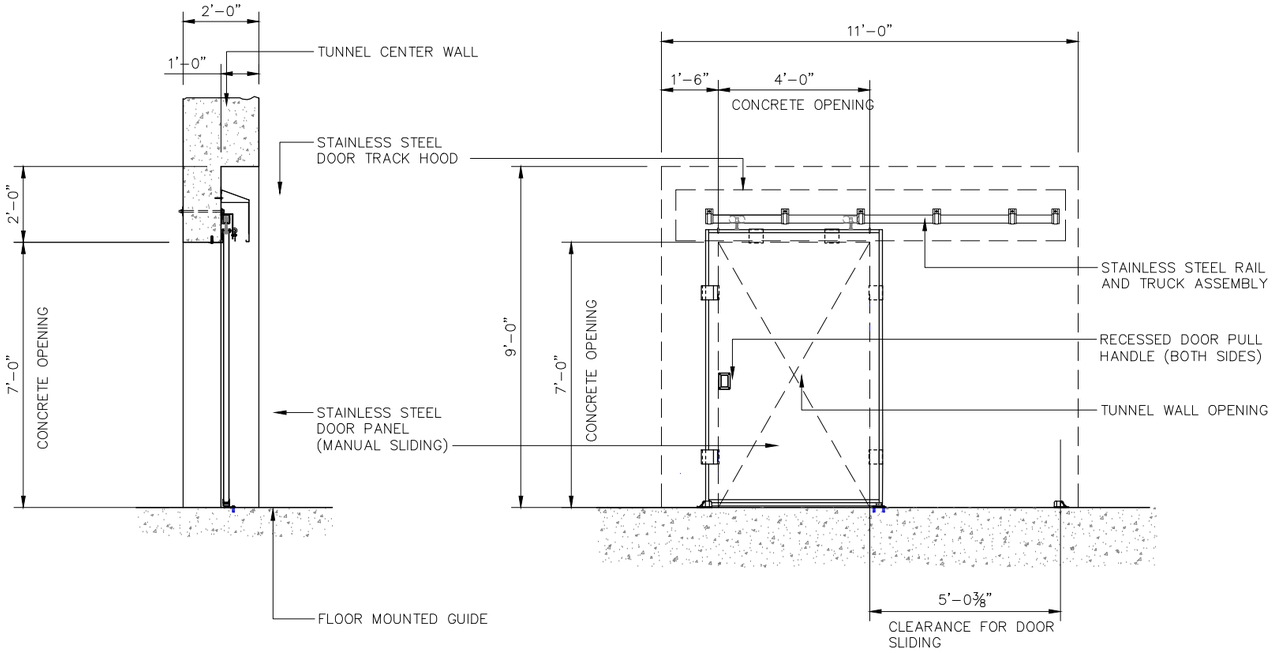
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
SUGGESTED EXCAVATION SUPPORT DETAILS

DISCIPLINE: STRUCTURES

SHEET NAME: E3-STU-TUN-TUNK-SOE-DTL-001

SHEET 47 OF 63



NOTES:
TYPE: 304 STAINLESS STEEL
CONSTRUCTION B LABEL UL RATED
FIRE RATED DOOR

0 1 2 4
HORIZONTAL
SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

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METROPOLITAN COUNCIL

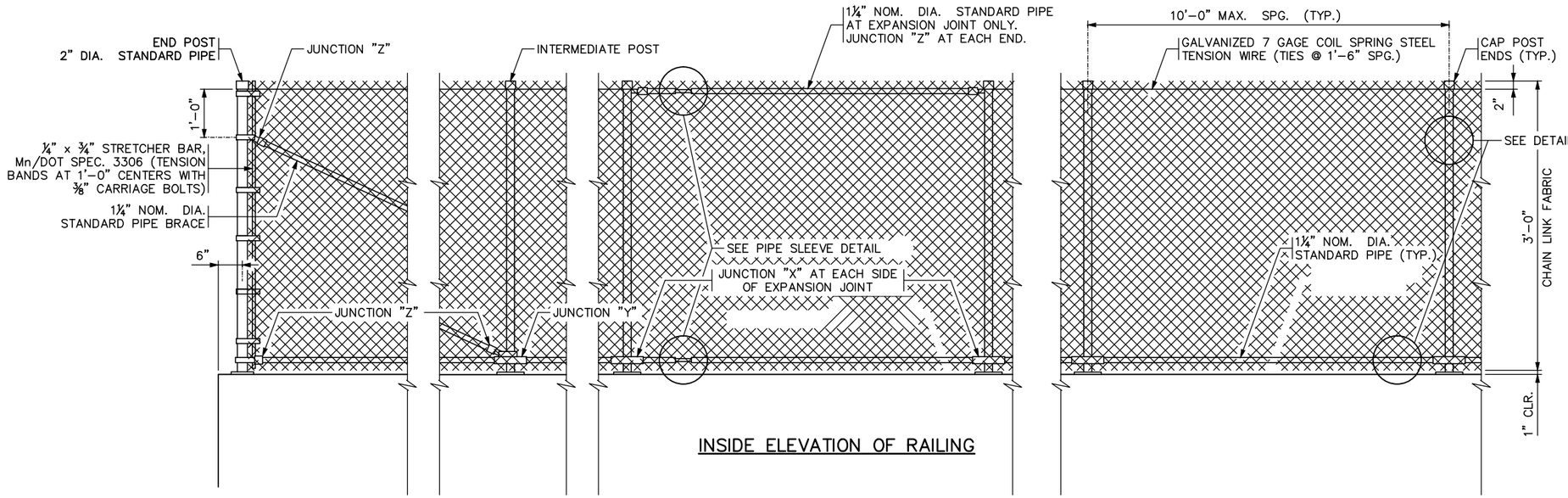
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
CROSS PASSAGE DOORS

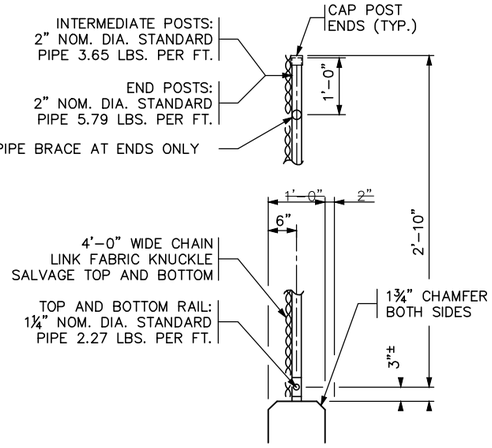
DISCIPLINE: ARCHITECTURE

SHEET NAME: E3-ARC-TYP-001

SHEET 47 OF 63

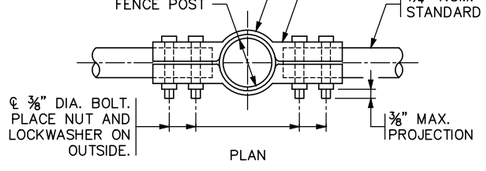


INSIDE ELEVATION OF RAILING



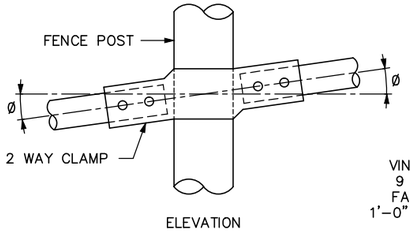
TYPICAL SECTION THROUGH FENCE

INTERMEDIATE POST SHOWN



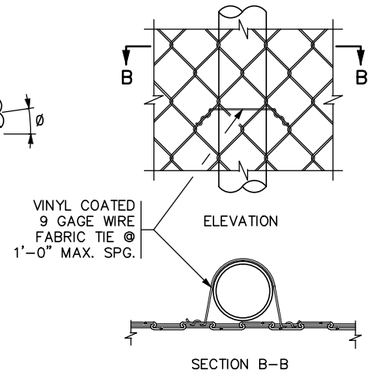
PLAN

2 WAY CLAMP BENDING TABLE	
GRADE OF FENCE	Ø
0° TO 2°	0°
2° TO 6°	4°
6° TO 10°	8°



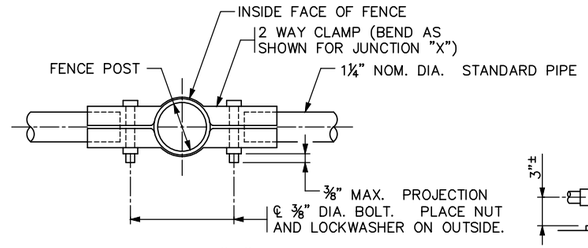
ELEVATION

JUNCTION "X"

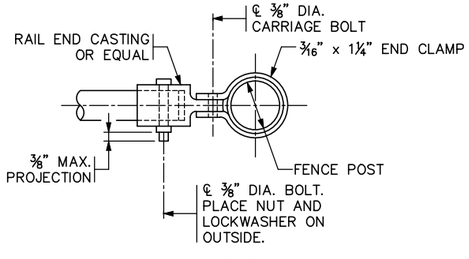


SECTION B-B

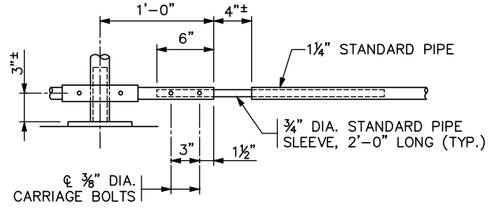
DETAIL "A"



JUNCTION "Y"



JUNCTION "Z"



PIPE SLEEVE DETAIL

GENERAL NOTES

SEE CONCRETE STRUCTURAL DRAWINGS FOR NOTES, DIMENSIONS AND LIMITS OF WORK.

FENCE POST ANCHORAGES SHALL BE TYPE A.

FENCE POSTS AND FENCE POST ANCHORAGES SHALL BE SET VERTICAL, UNLESS OTHERWISE NOTED.

℄ OF FENCE POST ANCHORAGE SHALL BE A MINIMUM OF 6" FROM JOINTS.

ALL POSTS SHALL HAVE A MEANS TO SECURELY HOLD THE TOP TENSION WIRE IN POSITION AND ALLOW FOR THE REMOVAL AND REPLACEMENT OF A POST WITHOUT DAMAGING THE TOP WIRE.

WIRE TIES MAY BE 9 GAGE GALVANIZED STEEL OR 0.179" MIN. ALUMINUM ALLOY CONFORMING TO A.S.T.M. B211, ALLOY 1100-H18. USE 12½ GAGE GALVANIZED HOG RINGS FOR TENSION WIRE TIES.

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FENCING AND RAILING DETAILS

DISCIPLINE: ARCHITECTURE

SHEET NAME: E3-ARC-TYP-002

SHEET 48 OF 63

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. MAINTAIN A MINIMUM 1'–10" COVER FOR ALL PROPOSED STORM DRAINS EMBEDDED IN THE TUNNEL SLAB.
3. INVERT OF PIPE EMBEDDED IN THE TUNNEL SLAB SHALL BE A MINIMUM 8" FROM THE BOTTOM OF SLAB.
4. HEAT TRACER WIRE SHALL BE INSTALLED IN THE KENILWORTH TUNNEL AND BOAT SECTION PER THE ELECTRICAL PLANS LOCATED IN VOLUME 12 "SYSTEMS" AND PER SPECIFICATION SECTION 220533 "HEAT TRACING FOR TUNNEL DRAINAGE."

ABBREVIATIONS

AWWA	AMERICAN WATER WORKS ASSOCIATION
BSDI	BOAT SECTION DRAINAGE INLET
DI	DRAINAGE INLET
EB	EAST BOUND
EL	ELEVATION
EX/EXIST	EXISTING
IE	INVERT ELEVATION
LI	LINEAR
LT	LEFT
NTS	NOT TO SCALE
PROP	PROPOSED
STA	STATION
TOR	TOP OF RAIL
TRK	TRACK
VAR	VARIES
WB	WEST BOUND

PLAN SYMBOLS

PROPOSED STORM DRAIN

PROPOSED DRAINAGE INLET

PROPOSED CAP

GENERAL SYMBOLS

A / - SECTION NOT TO SCALE — SECTION A

1 / XXXX — DETAIL No. 1 ON XXXX = SHEET NO.

1 DETAIL SCALE: NTS — DETAIL No. 1 (WHERE INDICATED OR SHOWN)

(1) — SHEET NOTES

(XX) — KEY NOTES

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METROPOLITAN COUNCIL

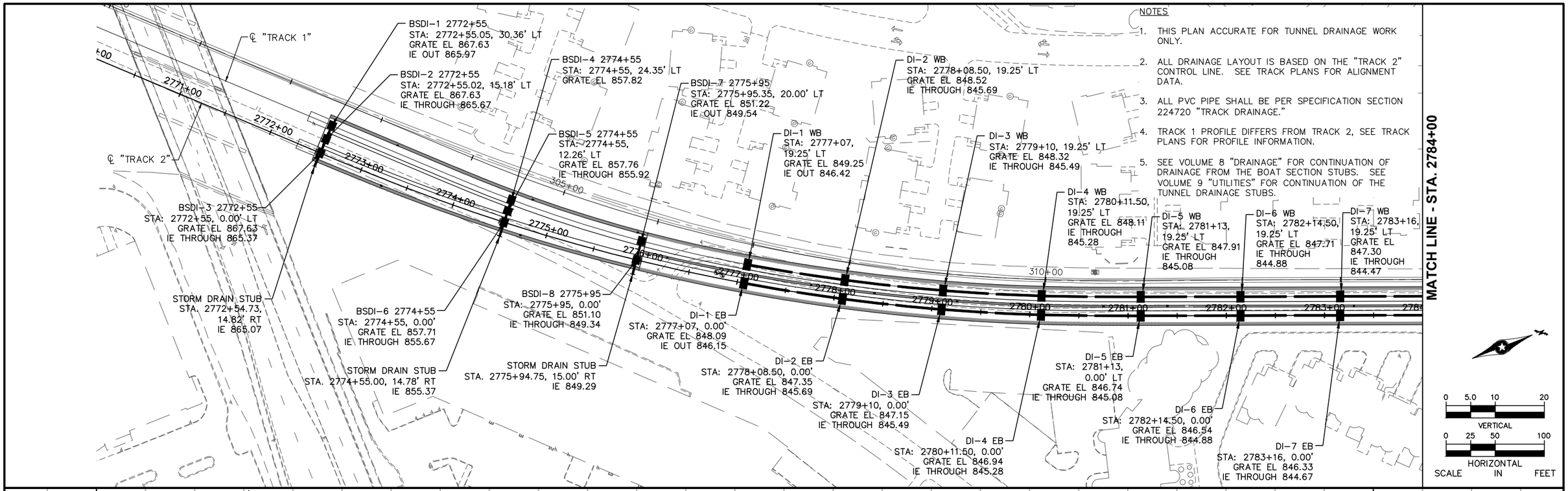
SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
PLUMBING GENERAL NOTES , ABBREVIATIONS & SYMBOLS

DISCIPLINE: PLUMBING

SHEET NAME: E3-STM-TUNK-NTS-001

SHEET 49 OF 62



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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
TUNNEL DRAINAGE (BRIDGE No. 27C15)
PLAN AND PROFILE
STA. 2771+00 TO STA. 2784+00

DISCIPLINE: PLUMBING

SHEET NAME: E3-STM-TUNK-GPE-001

SHEET 50 OF 62

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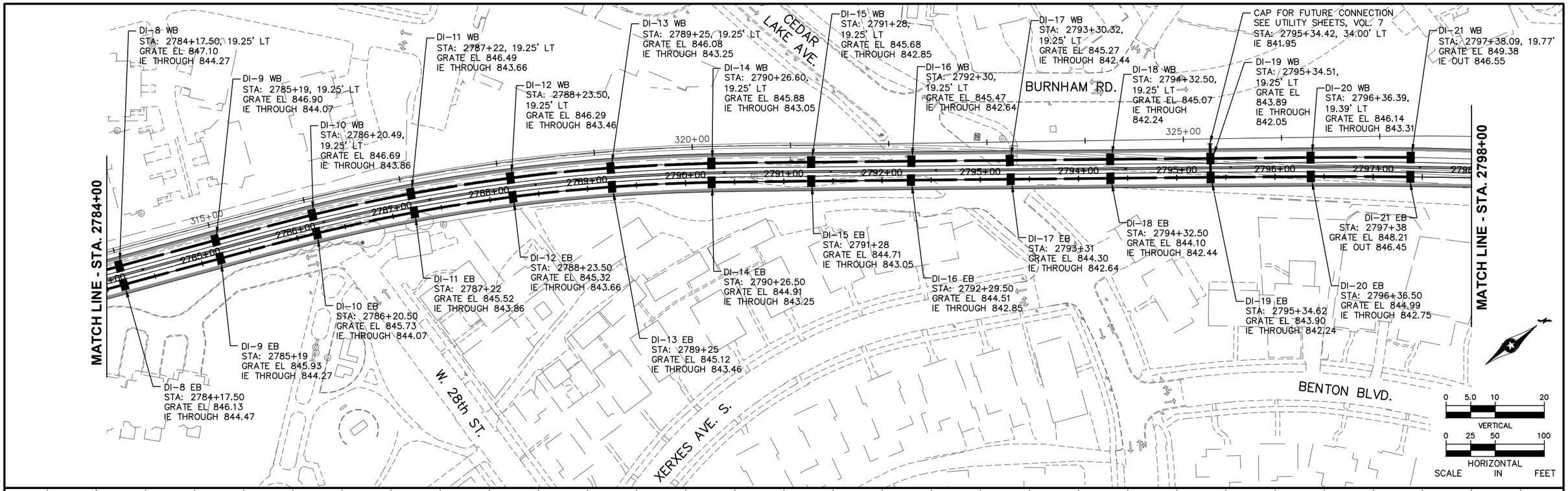

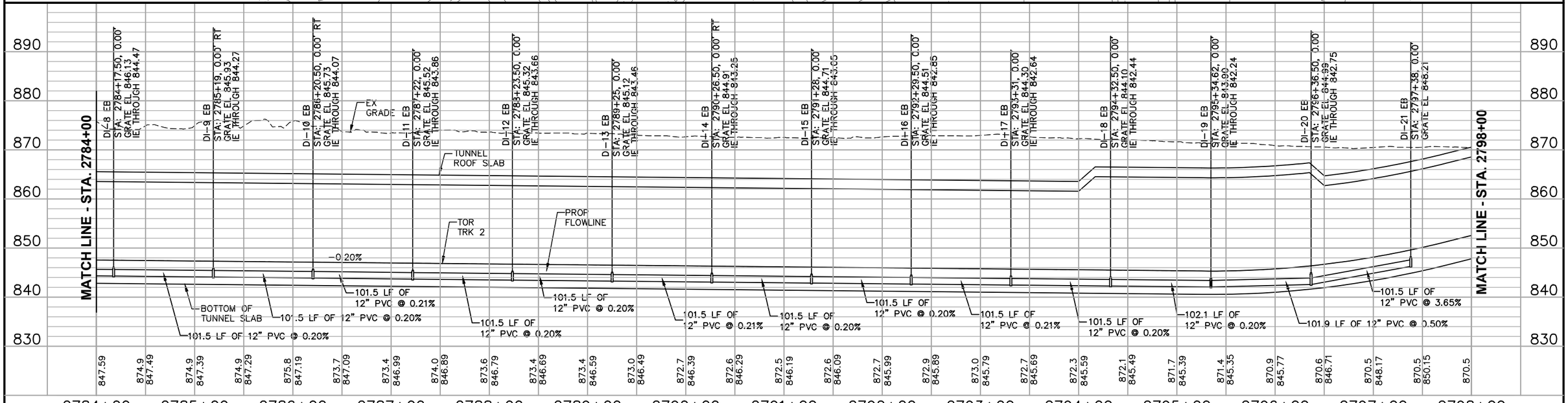

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SOUTHWEST Green Line LRT Extension

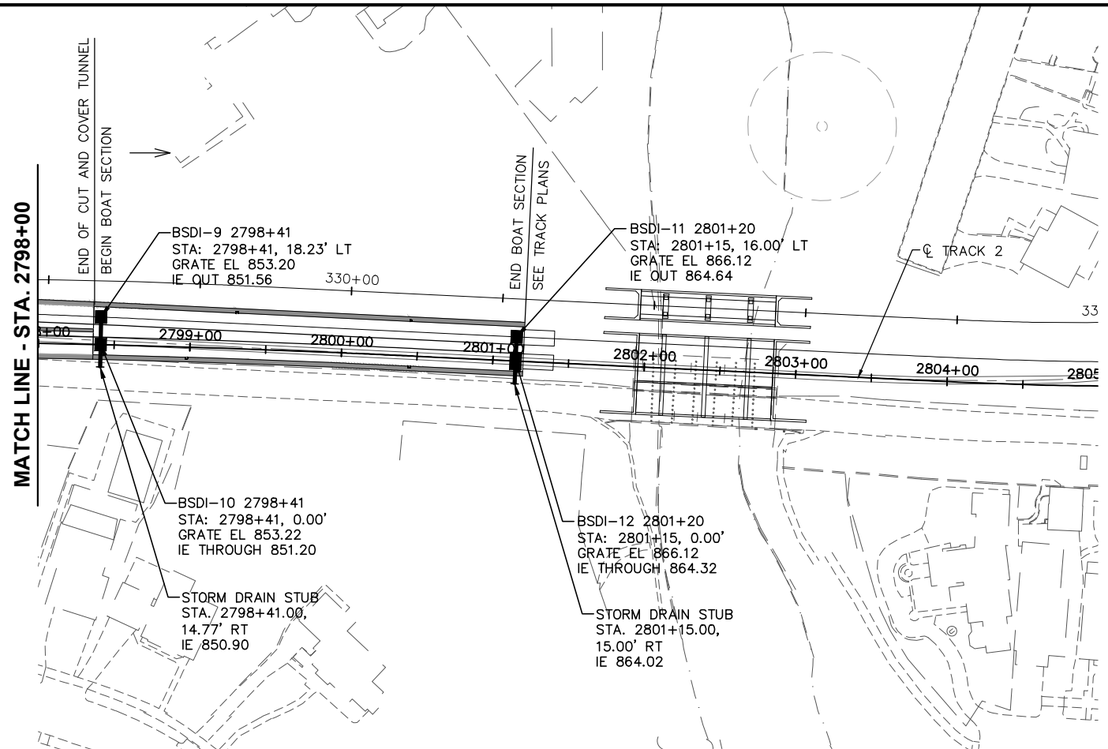
CIVIL EAST - VOLUME 5
TUNNEL DRAINAGE (BRIDGE No. 27C15)
PLAN AND PROFILE
STA. 2784+00 TO STA. 2798+00

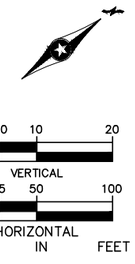
DISCIPLINE: PLUMBING

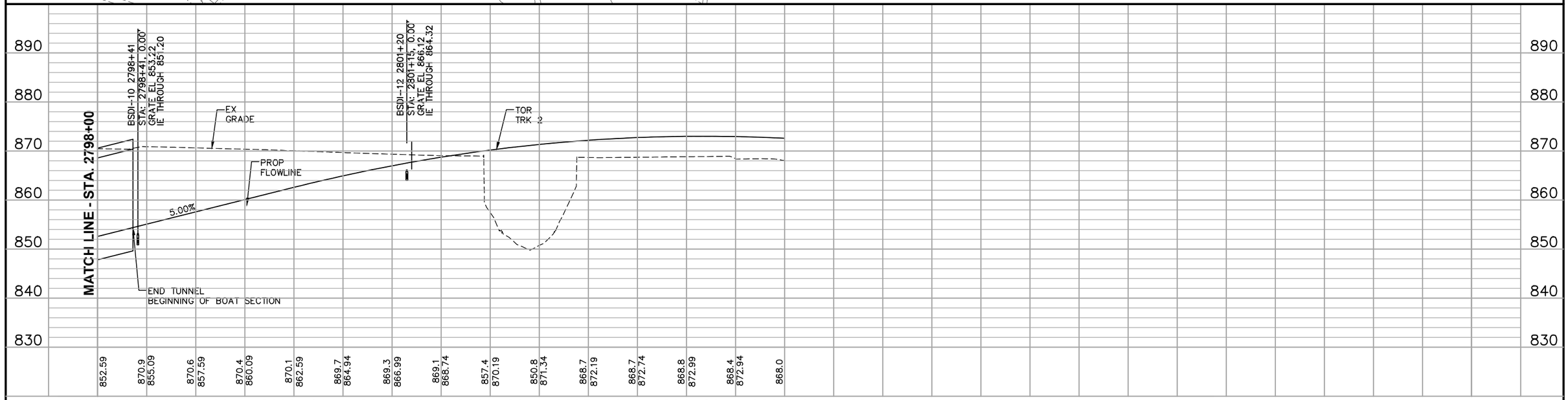
SHEET NAME: E3-STM-TUNK-GPE-002

SHEET 51 OF 62

Sep. 21 2015 06:12 pm V:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\TUN DRAINAGE\E3-STM-TUNK-GPE.dwg By: tangj







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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

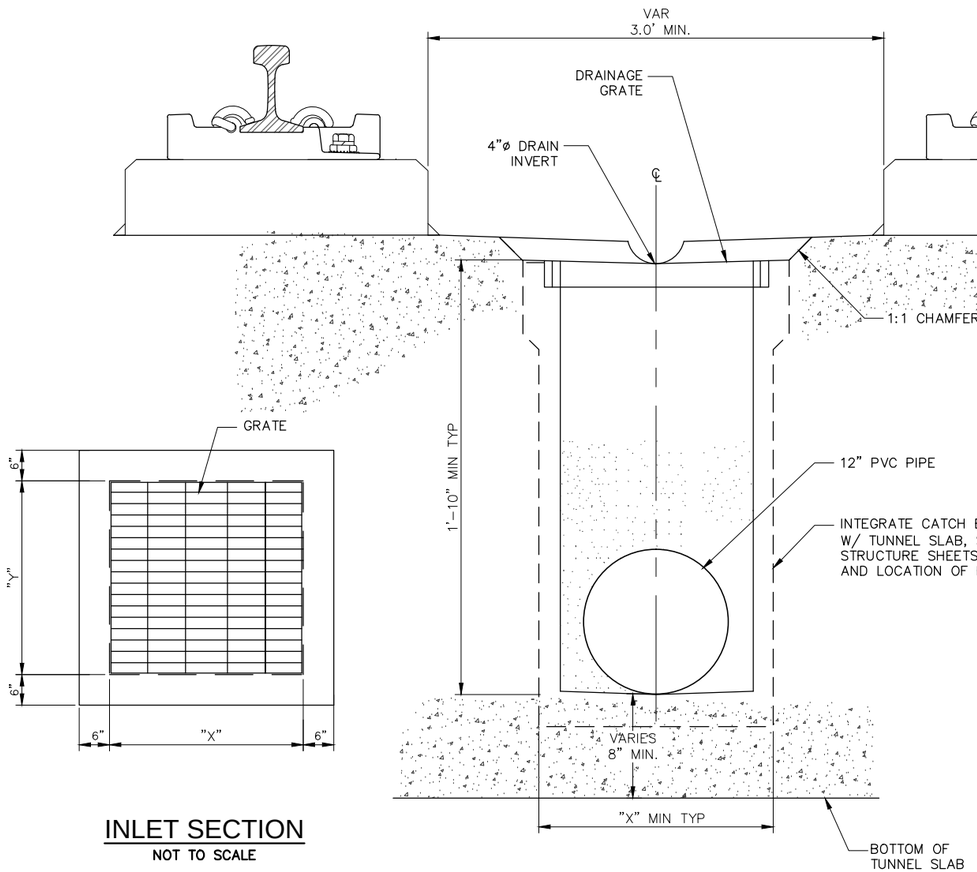
CIVIL EAST - VOLUME 5
TUNNEL DRAINAGE (BRIDGE No. 27C15)
PLAN AND PROFILE
STA. 2798+00 TO STA. 2805+00

DISCIPLINE: PLUMBING

SHEET NAME: E3-STM-TUNK-GPE-003

SHEET 52 OF 62

Sep. 21 2015 06:12 pm V:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\TUN DRAINAGE\E3-STM-TUNK-GPE.dwg By: tangj



INLET SECTION
NOT TO SCALE

1 TUNNEL DRAINAGE INLET
NOT TO SCALE

TABLE OF DIMENSIONS

INLET TYPE	DIMENSIONS	GRATE
TYPE A	"X"=18" "Y"=18"	20" X 20"
TYPE B	"X"=24" "Y"=24"	30" X 30"

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SOUTHWEST Green Line LRT Extension

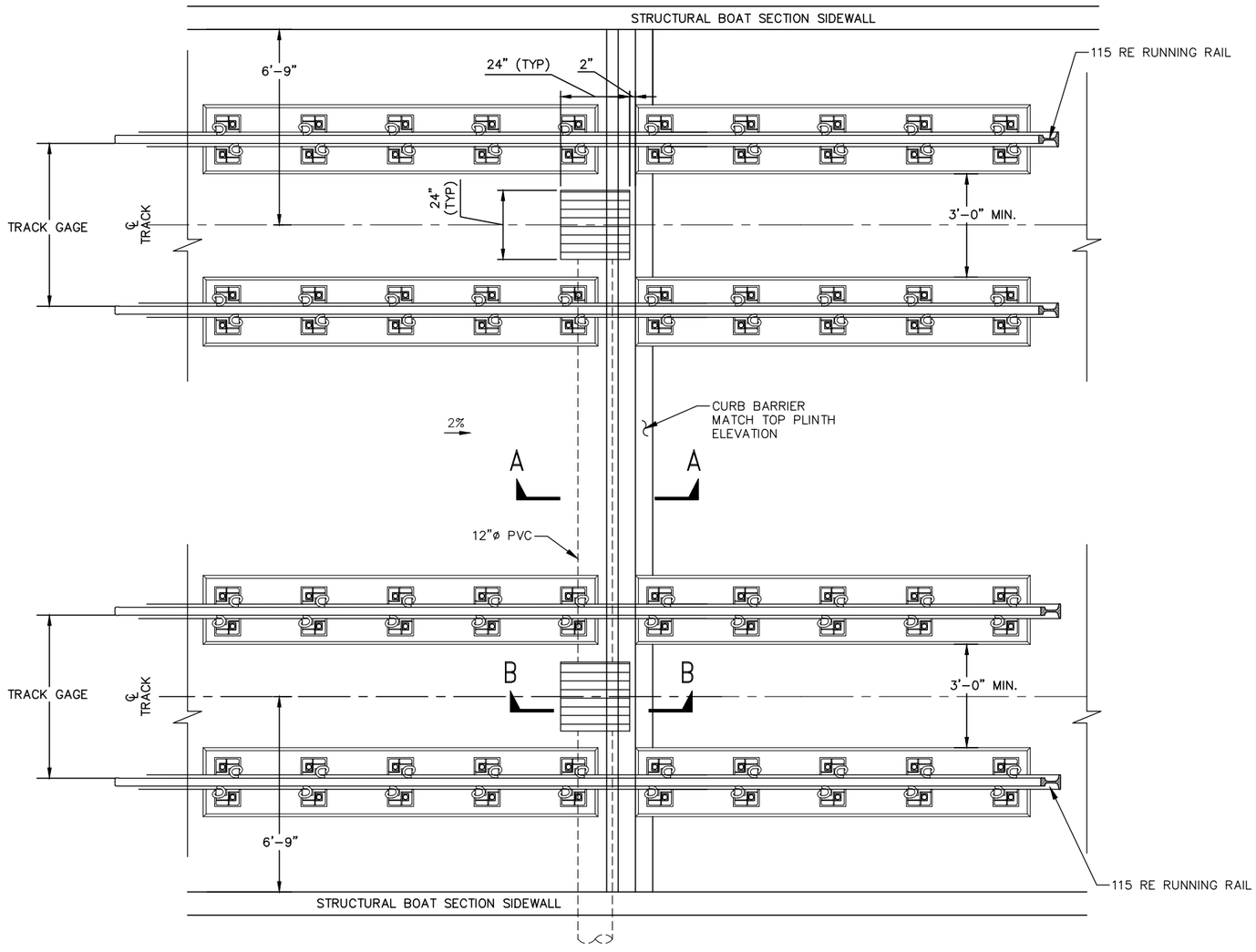
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE NO. 27C15)
TUNNEL DRAINAGE
SECTIONS & DETAILS

DISCIPLINE: PLUMBING

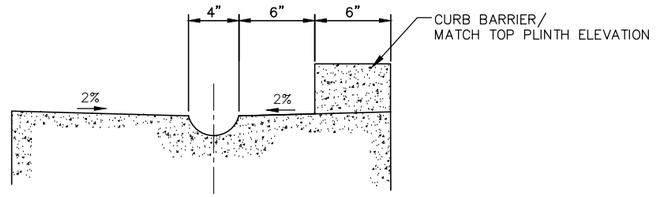
SHEET NAME: E3-STM-TUNK-DTL-001

SHEET 53 OF 62

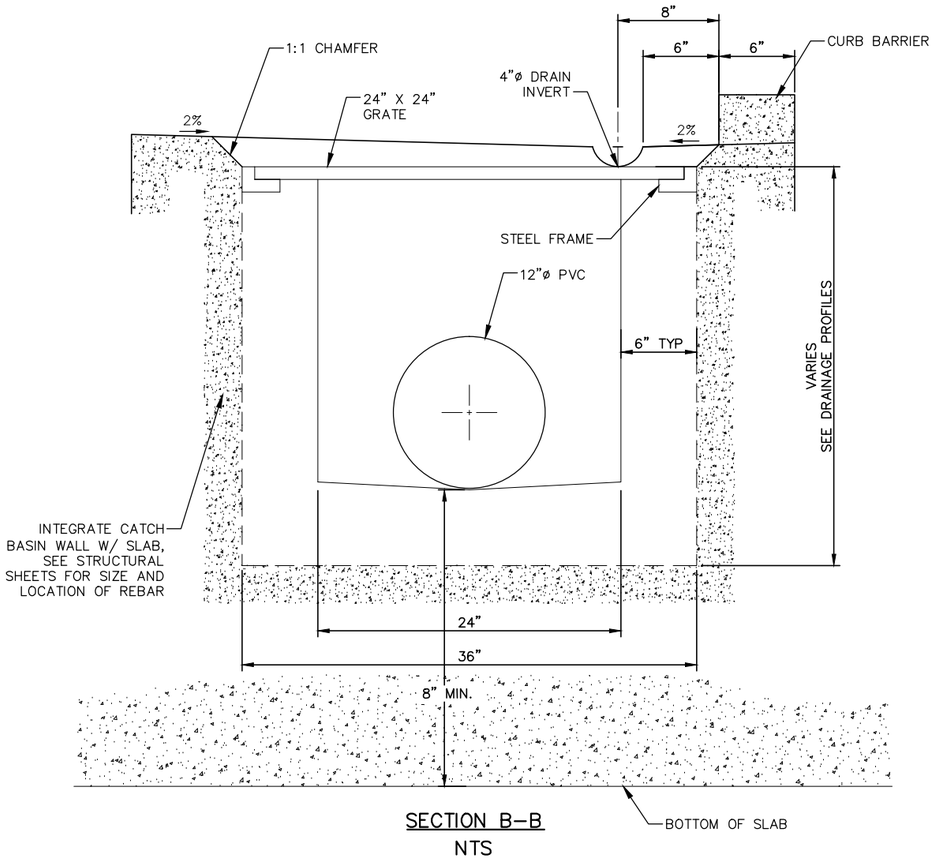
Sep. 21 2015 06:12 pm V:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\TUN DRAINAGE\E3-STM-TUNK-DTL-001.dwg By: tangj



1 BOAT SECTION DRAINAGE INLET
NOT TO SCALE



SECTION A–A
NTS



SECTION B–B
NTS

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE NO. 27C15)
TUNNEL DRAINAGE
BOAT SECTION & DETAILS

DISCIPLINE: PLUMBING

SHEET NAME: E3-STM-TUNK-DTL-002

SHEET 54 OF 62

KENILWORTH BOAT SECTION DRAINAGE SCHEDULE						
Name	Description	Detail No.	Detail Sheet No.	Station	Grate Elevation	Sump Elevation
BSDI–1 2772+55	24" X 24" Drainage Inlet	1	1	2772+55.05'	867.63'	865.97'
BSDI–2 2772+55	24" X 24" Drainage Inlet	1	1	2772+55.02'	867.63'	865.67'
BSDI–3 2772+55	24" X 24" Drainage Inlet	1	1	2772+55.00'	867.63'	865.37'
CAP 2772+55	Storm Drain Stub	NA	NA	2772+54.73'		865.07'
BSDI–4 2774+55	24" X 24" Drainage Inlet	1	1	2774+55.00'	857.82'	856.16'
BSDI–5 2774+55	24" X 24" Drainage Inlet	1	1	2774+55.00'	857.76'	855.92'
BSDI–6 2774+55	24" X 24" Drainage Inlet	1	1	2774+55.00'	857.71'	855.67'
CAP 2774+55	Storm Drain Stub	NA	NA	2798+41.00'		855.37'
BSDI–7 2775+95	24" X 24" Drainage Inlet	1	1	2775+95.35'	851.22'	849.54'
BSDI–8 2775+95	24" X 24" Drainage Inlet	1	1	2775+95.00'	851.10'	849.34'
CAP 2775+95	Storm Drain Stub	NA	NA	2775+95.00'		849.19'
BSDI–9 2798+41	24" X 24" Drainage Inlet	1	1	2798+41.00'	853.20'	851.56'
BSDI–10 2798+41	24" X 24" Drainage Inlet	1	1	2798+41.00'	853.22'	851.20'
CAP 2798+41	Storm Drain Stub	NA	NA	2798+41.00'		850.90'
BSDI–11 2801+20	24" X 24" Drainage Inlet	1	1	2801+15.00'	866.12'	864.64'
BSDI–12 2801+20	24" X 24" Drainage Inlet	1	1	2801+15.00'	866.12'	864.32'
CAP 2801+20	Storm Drain Stub	NA	NA	2801+15.00'		864.02'
	TOTAL	24" X 24" INLETS = 12 EA				

KENILWORTH TUNNEL DRAINAGE SCHEDULE							
Structure ID	Description	Detail No.	Inlet Type	Detail Sheet No.	Station	Grate Elevation	Sump Elevation
DI–1 EB	Tunnel Drainage Inlet	1	Type A	2	2777+07.00'	848.09'	846.15'
DI–1 WB	Tunnel Drainage Inlet	1	Type A	2	2777+07.00'	849.25'	846.42'
DI–2 EB	Tunnel Drainage Inlet	1	Type A	2	2778+08.50'	847.35'	845.69'
DI–2 WB	Tunnel Drainage Inlet	1	Type A	2	2778+08.50'	848.52'	845.69'
DI–3 EB	Tunnel Drainage Inlet	1	Type A	2	2779+10.00'	847.15'	845.49'
DI–3 WB	Tunnel Drainage Inlet	1	Type A	2	2779+10.00'	848.32'	845.49'
DI–4 EB	Tunnel Drainage Inlet	1	Type B	2	2780+11.50'	846.94'	845.28'
DI–4 WB	Tunnel Drainage Inlet	1	Type B	2	2780+11.50'	848.11'	845.28'
DI–5 EB	Tunnel Drainage Inlet	1	Type A	2	2781+13.00'	846.74'	845.08'
DI–5 WB	Tunnel Drainage Inlet	1	Type A	2	2781+13.00'	847.91'	845.08'
DI–6 EB	Tunnel Drainage Inlet	1	Type A	2	2782+14.50'	846.54'	844.88'
DI–6 WB	Tunnel Drainage Inlet	1	Type A	2	2782+14.50'	847.71'	844.88'
DI–7 EB	Tunnel Drainage Inlet	1	Type A	2	2783+16.00'	846.33'	844.67'
DI–7 WB	Tunnel Drainage Inlet	1	Type A	2	2783+16.00'	847.30'	844.47'
DI–8 EB	Tunnel Drainage Inlet	1	Type B	2	2784+17.50'	846.13'	844.47'
DI–8 WB	Tunnel Drainage Inlet	1	Type B	2	2784+17.50'	847.10'	844.27'
DI–9 EB	Tunnel Drainage Inlet	1	Type A	2	2785+19.00'	845.93'	844.27'
DI–9 WB	Tunnel Drainage Inlet	1	Type A	2	2785+19.00'	846.90'	844.07'
DI–10 EB	Tunnel Drainage Inlet	1	Type A	2	2786+20.50'	845.73'	844.07'
DI–10 WB	Tunnel Drainage Inlet	1	Type A	2	2786+20.50'	846.69'	843.86'
DI–11 EB	Tunnel Drainage Inlet	1	Type A	2	2787+22.00'	845.52'	843.86'
DI–11 WB	Tunnel Drainage Inlet	1	Type A	2	2787+22.00'	846.49'	843.66'
DI–12 EB	Tunnel Drainage Inlet	1	Type B	2	2788+23.50'	845.32'	843.66'
DI–12 WB	Tunnel Drainage Inlet	1	Type B	2	2788+23.50'	846.29'	843.46'
DI–13 EB	Tunnel Drainage Inlet	1	Type A	2	2789+25.00'	845.12'	843.46'
DI–13 WB	Tunnel Drainage Inlet	1	Type A	2	2789+25.00'	846.08'	843.25'
DI–14 EB	Tunnel Drainage Inlet	1	Type A	2	2790+26.50'	844.91'	843.25'
DI–14 WB	Tunnel Drainage Inlet	1	Type A	2	2790+26.50'	845.88'	843.05'
DI–15 EB	Tunnel Drainage Inlet	1	Type A	2	2791+28.00'	844.71'	843.05'
DI–15 WB	Tunnel Drainage Inlet	1	Type A	2	2791+28.00'	845.68'	842.85'
DI–16 EB	Tunnel Drainage Inlet	1	Type B	2	2792+29.50'	844.51'	842.85'
DI–16 WB	Tunnel Drainage Inlet	1	Type B	2	2792+29.50'	845.47'	842.64'
DI–17 EB	Tunnel Drainage Inlet	1	Type A	2	2793+31.00'	844.30'	842.64'
DI–17 WB	Tunnel Drainage Inlet	1	Type A	2	2793+31.00'	845.27'	842.44'
DI–18 EB	Tunnel Drainage Inlet	1	Type A	2	2794+32.50'	844.10'	842.44'
DI–18 WB	Tunnel Drainage Inlet	1	Type A	2	2794+32.50'	845.07'	842.24'
DI–19 EB	Tunnel Drainage Inlet	1	Type B	2	2795+34.62'	843.90'	842.24'
DI–19 WB	Tunnel Drainage Inlet	1	Type B	2	2795+34.62'	843.89'	842.05'
CAP 2795+35	Tunnel Drain Stub	NA		2	2795+34.42'		841.90'
DI–20 EB	Tunnel Drainage Inlet	1	Type A	2	2796+36.50'	844.99'	842.75'
DI–20 WB	Tunnel Drainage Inlet	1	Type A	2	2796+36.50'	846.14'	843.31'
DI–21 EB	Tunnel Drainage Inlet	1	Type A	2	2797+38.00'	848.21'	846.55'
DI–21 WB	Tunnel Drainage Inlet	1	Type A	2	2797+38.00'	849.38'	846.45'
	TOTAL	TYPE A (18" X 18" DRAINAGE INLETS) = 32 EA TYPE B (24" X 24" DRAINAGE INLETS) = 10 EA					

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/2015

SOUTHWEST

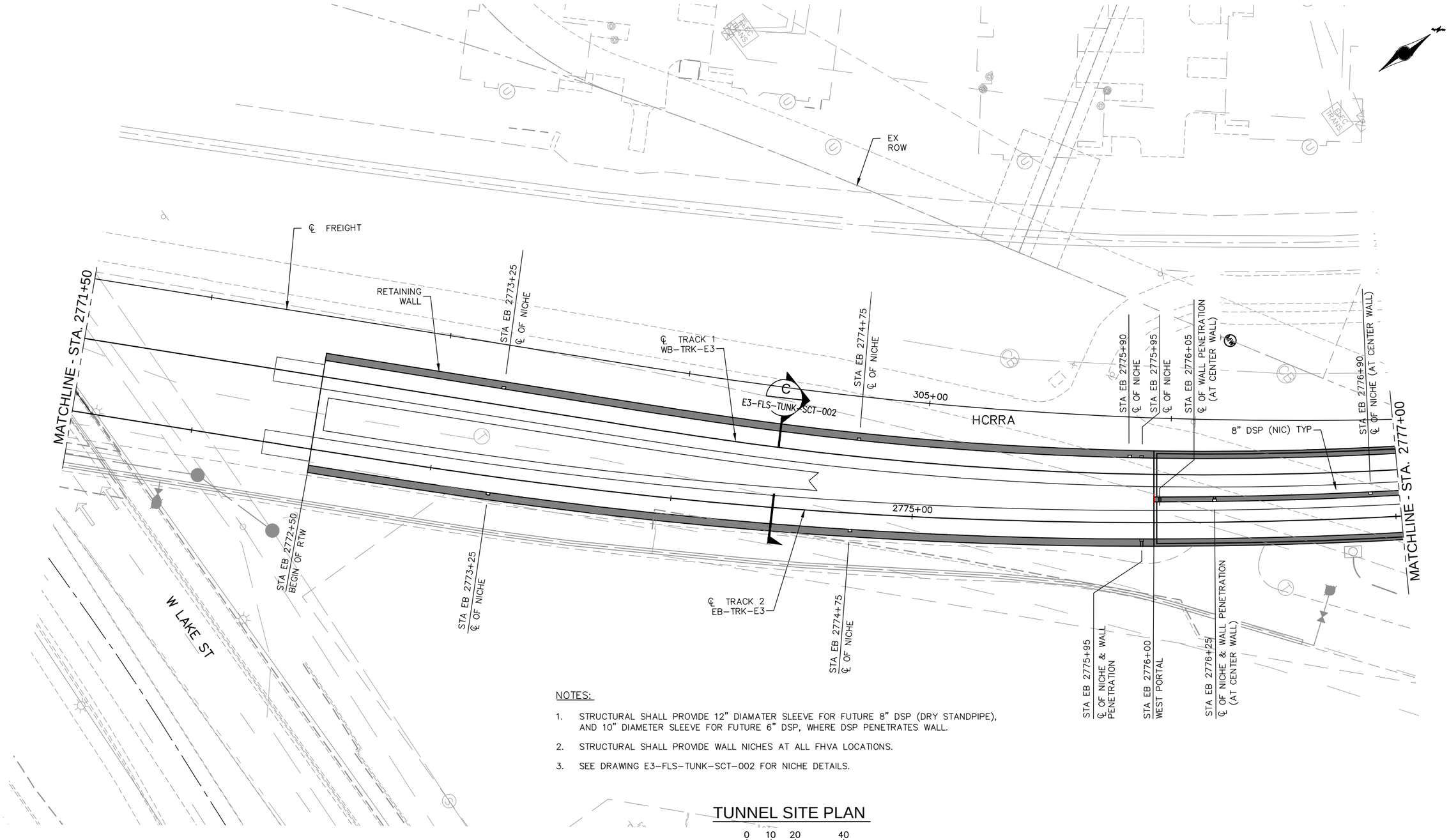
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE NO. 27C15)
TUNNEL DRAINAGE
MATERIAL SCHEDULE

DISCIPLINE: PLUMBING

SHEET NAME: E3-STM-TUNK-SCH-001

SHEET 55 OF 62

Sep. 21 2015 06:13 pm V:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\TUN DRAINAGE\E3-STM-TUNK-SCH-001.dwg By: tangj



NOTES:

1. STRUCTURAL SHALL PROVIDE 12" DIAMATER SLEEVE FOR FUTURE 8" DSP (DRY STANDPIPE), AND 10" DIAMETER SLEEVE FOR FUTURE 6" DSP, WHERE DSP PENETRATES WALL.
2. STRUCTURAL SHALL PROVIDE WALL NICHES AT ALL FHVA LOCATIONS.
3. SEE DRAWING E3–FLS–TUNK–SCT–002 FOR NICHE DETAILS.

TUNNEL SITE PLAN

0 10 20 40

HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - STANDPIPE NICHE PLAN
SHEET 1 OF 5

DISCIPLINE: MECHANICAL

SHEET NAME: E3-FLS-TUNK-PLN-001

SHEET 56 OF 62

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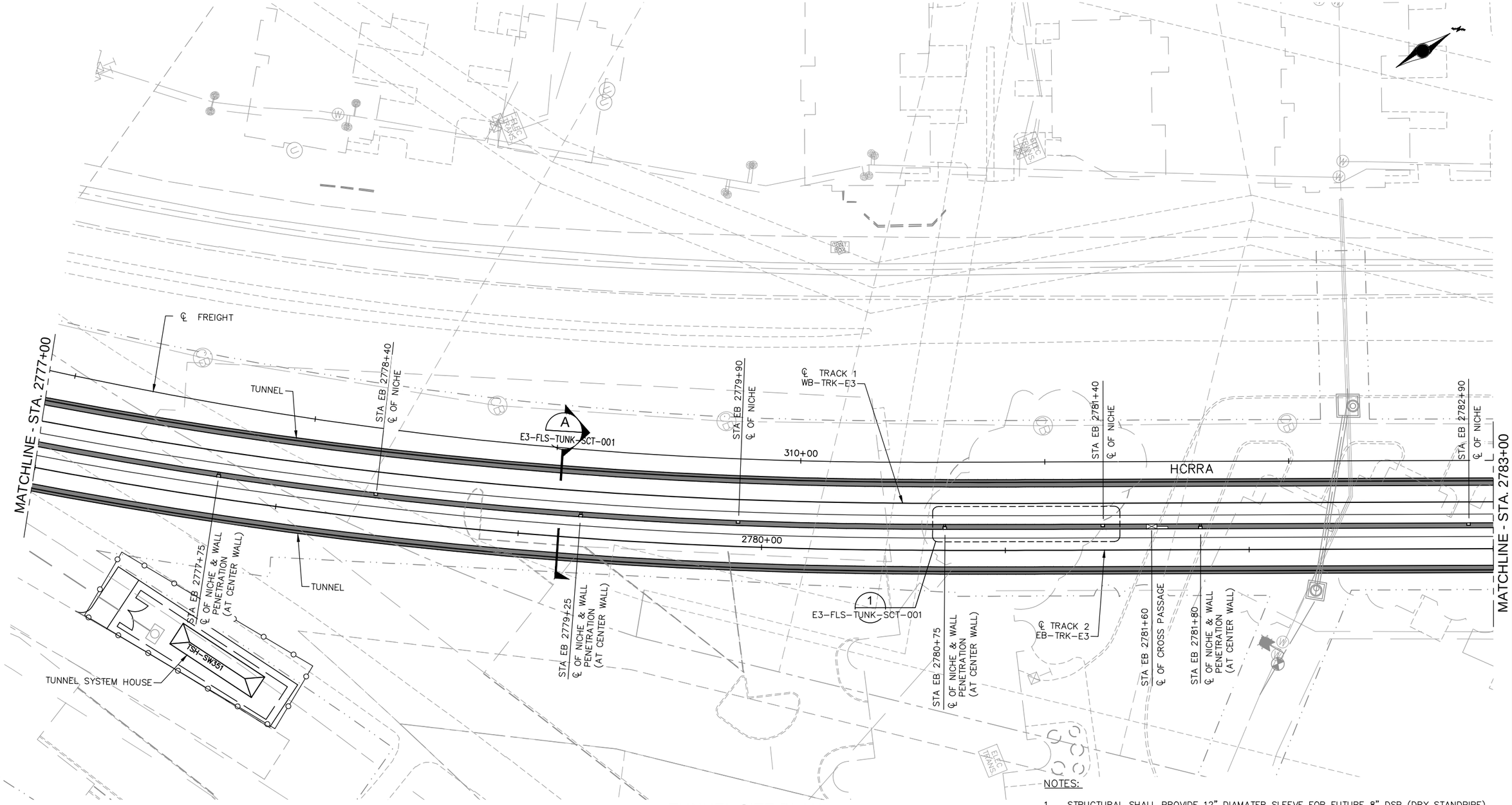

TUNNEL SITE PLAN

0 10 20 40

HORIZONTAL SCALE IN FEET

NOTES:

1. STRUCTURAL SHALL PROVIDE 12" DIAMATER SLEEVE FOR FUTURE 8" DSP (DRY STANDPIPE), AND 10" DIAMETER SLEEVE FOR FUTURE 6" DSP, WHERE DSP PENETRATES WALL.
2. STRUCTURAL SHALL PROVIDE WALL NICHES AT ALL FHVA LOCATIONS.
3. SEE DRAWING E3–FLS–TUNK–SCT–001 FOR NICHE DETAILS.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

AECOM

60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - STANDPIPE NICHE PLAN
SHEET 2 OF 5

DISCIPLINE: MECHANICAL

SHEET NAME: E3-FLS-TUNK-PLN-002

SHEET 57 OF 62

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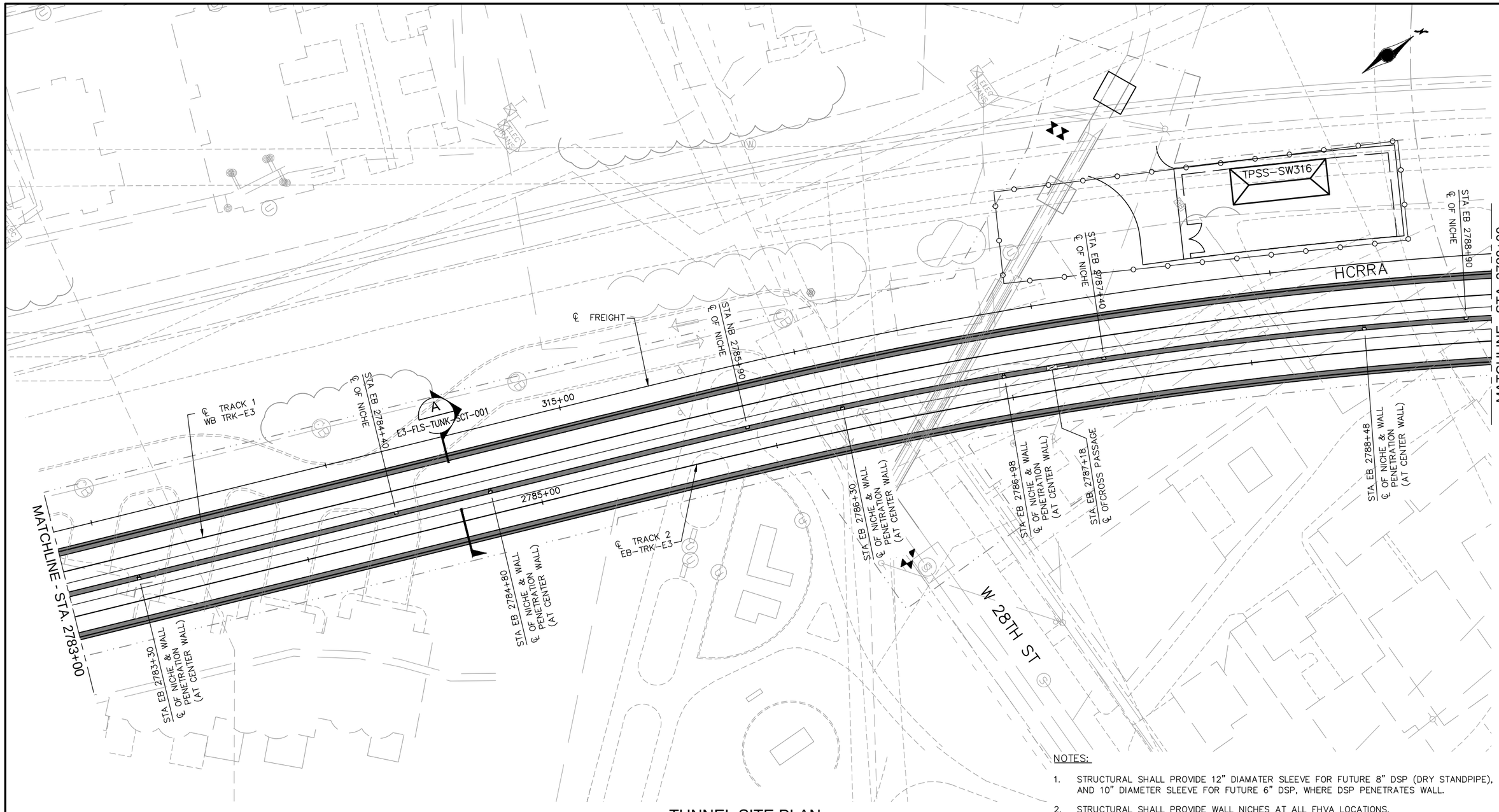

TUNNEL SITE PLAN

0 10 20 40

HORIZONTAL SCALE IN FEET

NOTES:

1. STRUCTURAL SHALL PROVIDE 12" DIAMATER SLEEVE FOR FUTURE 8" DSP (DRY STANDPIPE), AND 10" DIAMETER SLEEVE FOR FUTURE 6" DSP, WHERE DSP PENETRATES WALL.
2. STRUCTURAL SHALL PROVIDE WALL NICHES AT ALL FHVA LOCATIONS.
3. SEE DRAWING E3–FLS–TUNK–SCT–001 FOR NICHE DETAILS.

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

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60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - STANDPIPE NICHE PLAN
SHEET 3 OF 5

DISCIPLINE: MECHANICAL

SHEET NAME: E3-FLS-TUNK-PLN-003

SHEET 58 OF 62

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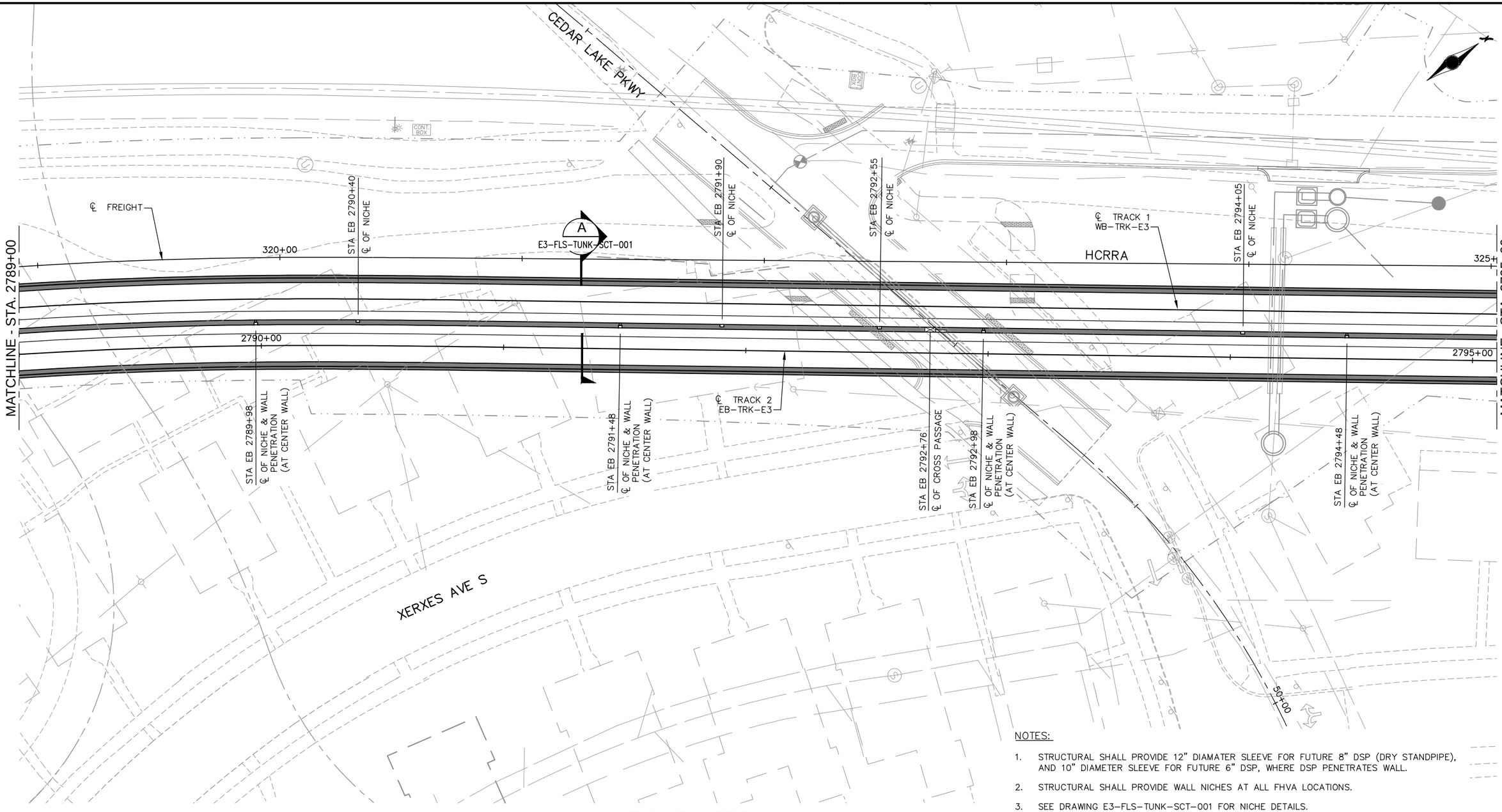

TUNNEL SITE PLAN

0 10 20 40

HORIZONTAL SCALE IN FEET

NOTES:

1. STRUCTURAL SHALL PROVIDE 12" DIAMATER SLEEVE FOR FUTURE 8" DSP (DRY STANDPIPE), AND 10" DIAMETER SLEEVE FOR FUTURE 6" DSP, WHERE DSP PENETRATES WALL.
2. STRUCTURAL SHALL PROVIDE WALL NICHES AT ALL FHVA LOCATIONS.
3. SEE DRAWING E3-FLS-TUNK-SCT-001 FOR NICHE DETAILS.

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - STANDPIPE NICHE PLAN
SHEET 4 OF 5

DISCIPLINE: MECHANICAL

SHEET NAME: E3-FLS-TUNK-PLN-004

SHEET 59 OF 62

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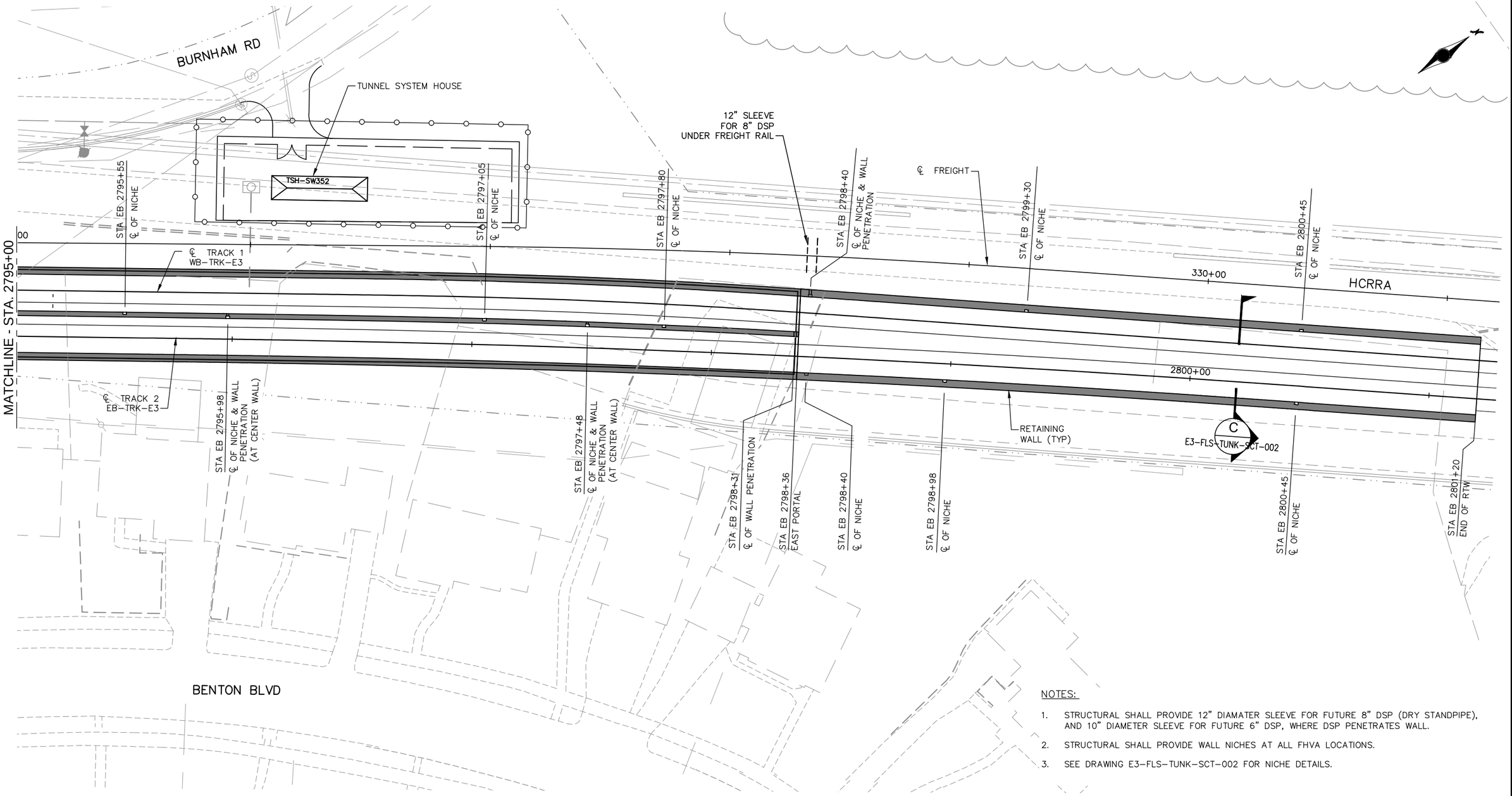

NOTES:

1. STRUCTURAL SHALL PROVIDE 12" DIAMATER SLEEVE FOR FUTURE 8" DSP (DRY STANDPIPE), AND 10" DIAMETER SLEEVE FOR FUTURE 6" DSP, WHERE DSP PENETRATES WALL.
2. STRUCTURAL SHALL PROVIDE WALL NICHES AT ALL FHVA LOCATIONS.
3. SEE DRAWING E3-FLS-TUNK-SCT-002 FOR NICHE DETAILS.

TUNNEL SITE PLAN

0 10 20 40

HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

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METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

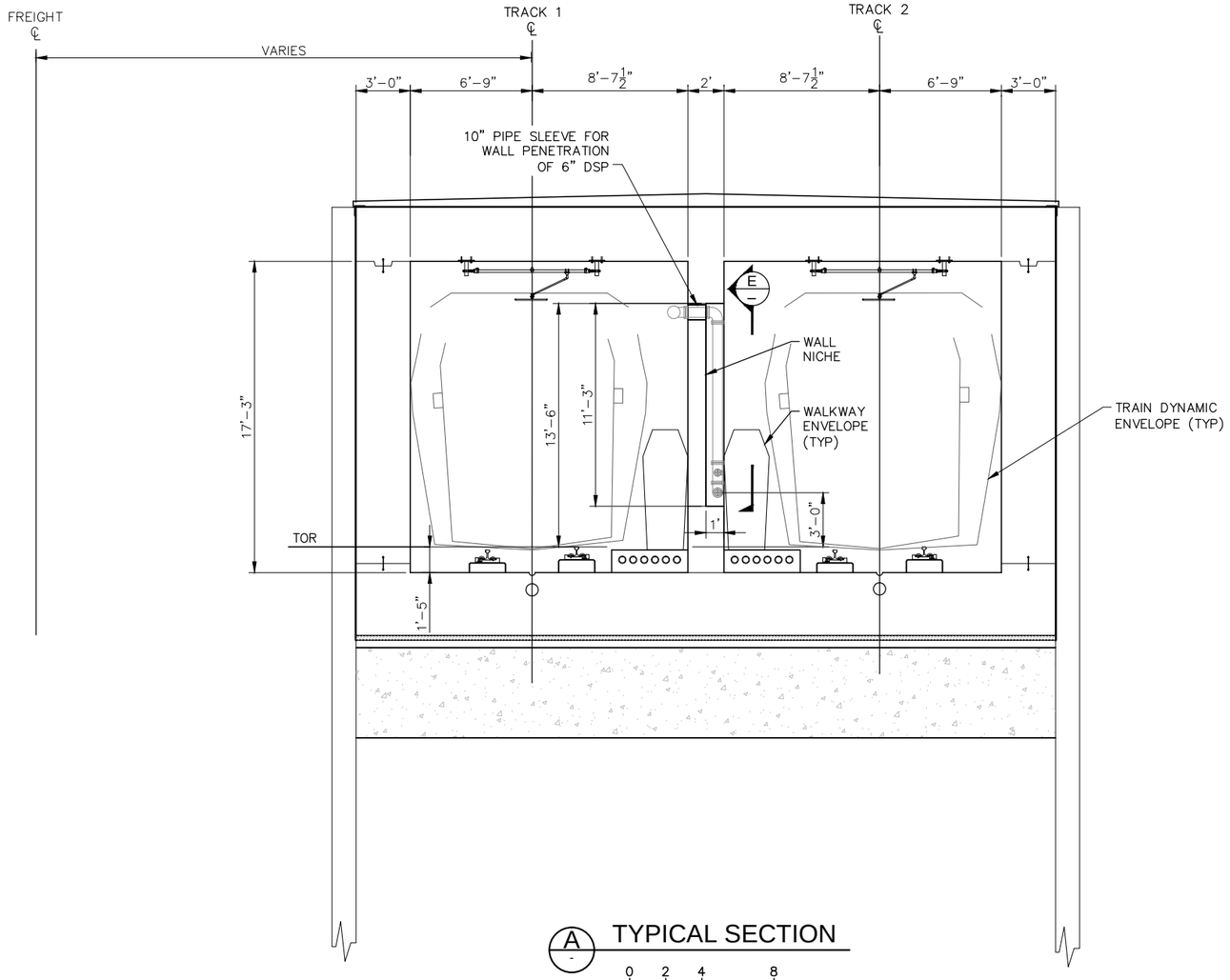
CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - STANDPIPE NICHE PLAN SHEET 5 OF 5

DISCIPLINE: MECHANICAL

SHEET NAME: E3-FLS-TUNK-PLN-005

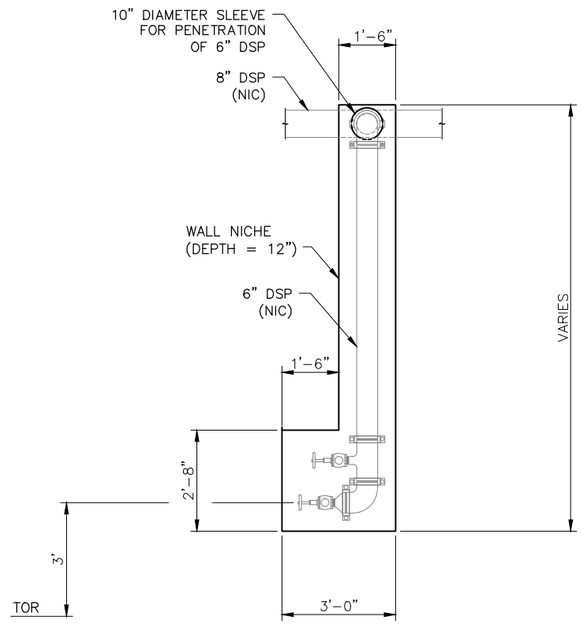
SHEET 60 OF 62

Sep. 21 2015 05:31 pm V:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\MECHANICAL\CE-E3-FLS-TUNK-PLN.dwg By: tangj



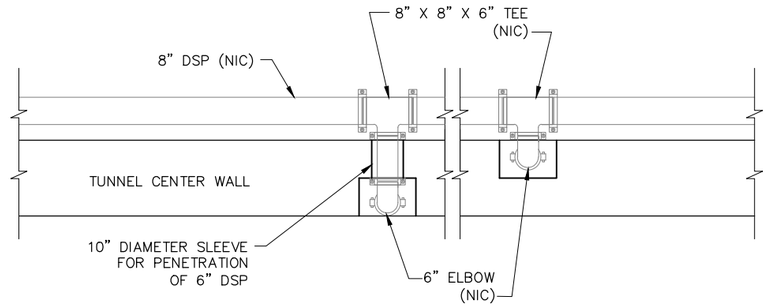
A TYPICAL SECTION

SCALE IN FEET 0 2 4 8



E SIDE VIEW / ELEVATION

SCALE IN FEET 0 1 2 4



1 ENLARGED PLAN DETAIL

NOT TO SCALE

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60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - TYPICAL NICHE SECTION AND DETAILS SHEET I OF 2

DISCIPLINE: MECHANICAL

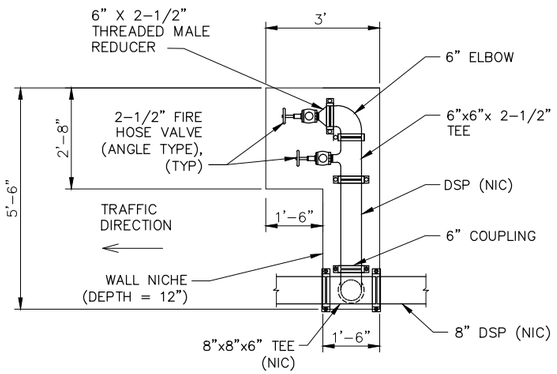
SHEET NAME: E3-FLS-TUNK-SCT-001

SHEET 61 OF 62

Sep. 21 2015 05:32 pm v:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\MECHANICAL\CE-E3-FLS-TUNK-SCT.dwg By: tangj

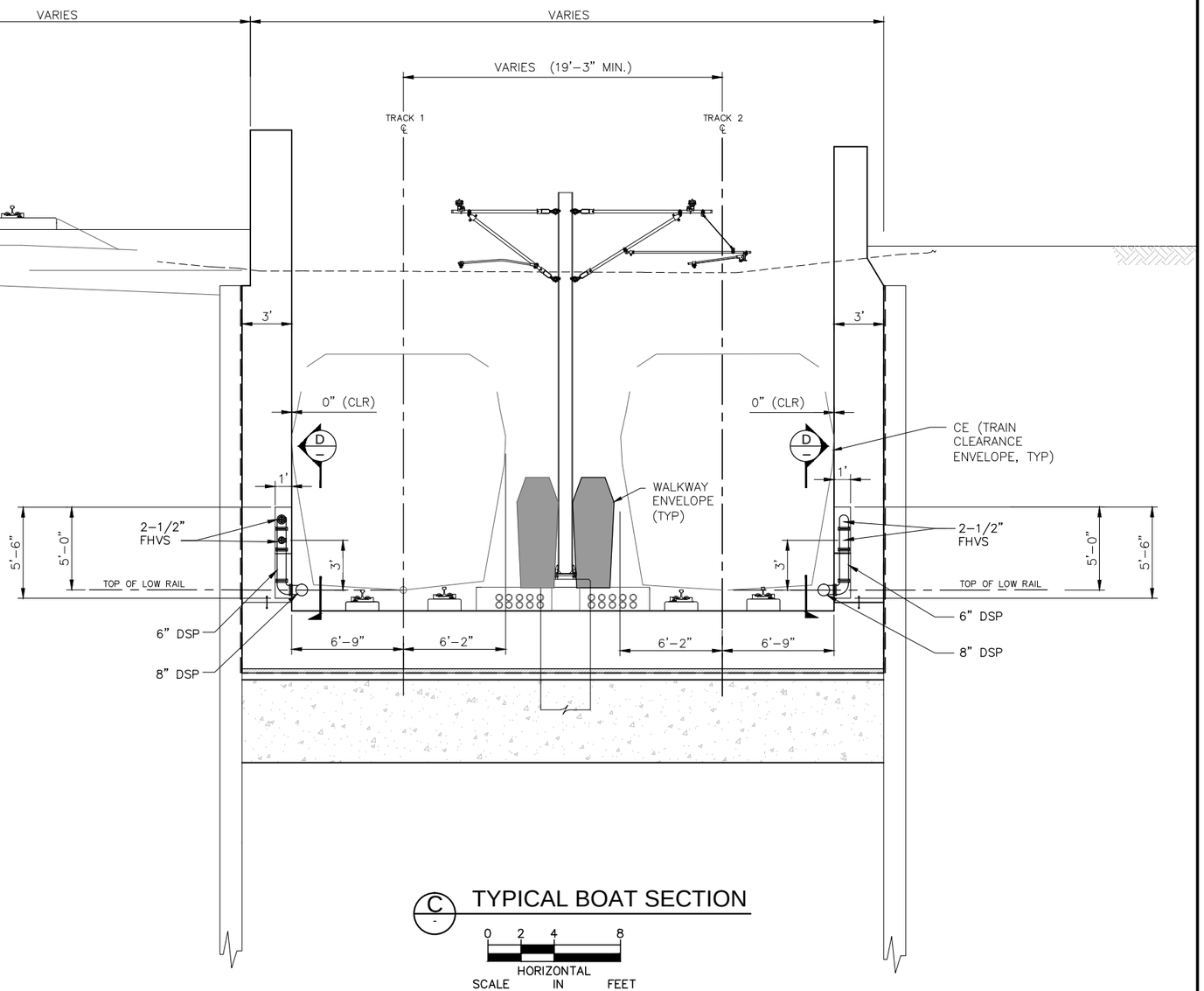
NOTE:

1. ALL DRY STANDPIPE (DSP) EQUIPMENT SHOWN ARE NIC.



D SIDE VIEW / ELEVATION

0 1 2 4
HORIZONTAL SCALE IN FEET



C TYPICAL BOAT SECTION

0 2 4 8
HORIZONTAL SCALE IN FEET

NO.	DATE	BY	CHECK	DESIGN	REVISION / SUBMITTAL

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60% SUBMISSION - 09/28/15

METROPOLITAN COUNCIL

SOUTHWEST Green Line LRT Extension

CIVIL EAST - VOLUME 5
KENILWORTH TUNNEL (BRIDGE 27C15)
FIRE LIFE SAFETY - TYPICAL NICHE SECTION AND DETAILS SHEET 2 OF 2

DISCIPLINE: MECHANICAL

SHEET NAME: E3-FLS-TUNK-SCT-002

SHEET 62 OF 62

Sep. 21 2015 05:32 pm v:\3400_ADC\CAD\SEGMENT E3\PLAN SHEETS\MECHANICAL\CE-E3-FLS-TUNK-SCT-002.dwg By: tangj