

**PLAN SYMBOLS**

- SECTION SUBDIVISION LINE
- EXISTING R/W
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- RAILROAD R/W
- PROPERTY LINE
- ALIGNMENT STATIONS
- ALIGNMENT POINTS
  
- ENTRANCE
- BUILDING
- ORNAMENTAL FENCE
- RETAINING WALL
- GUARDRAIL (W-BEAM)
- WOODS OR BRUSH, NURSERY
- DECIDUOUS TREES
- CONIFER (EVERGREEN) TREES
- BUSH OR SHRUB
- MONUMENT (CI, ACT, ACP, BCP, ...)
- CONCRETE OR STONE MONUMENT
- IRON PIPE
- IRON PIN OR REBAR
- IRON PIN WITH BRASS DISK
- NAIL, PK NAIL, SPIKE, SFP, T-BAR, ...
- VERTICAL CONTROL
- HORIZONTAL CONTROL
- POWER POLE
- LIGHT POLE
- LIGHT AND TELEPHONE POLE
- LIGHT, TELEPHONE AND POWER POLE
- GUY POLE
- POLE ANCHOR
- TELEPHONE POLE
- TELEPHONE AND POWER POLE
- UNDERGROUND CABLE PEDESTAL
- TELEPHONE MANHOLE (VAULT)
- TRAFFIC SIGNAL LIGHT
- HAND HOLE
- CULVERT
- CULVERT WITH APRONS
- DUCT BANK
- BURIED ELECTRIC CABLE
- BURIED FIBER OPTIC CABLE
- BURIED TELEPHONE CABLE
- SANITARY MAIN
- SANITARY SERVICE
- STORM SEWER LINE
- WATER MAIN
- WATER SERVICE
- GAS MAIN
- GAS SERVICE
- STEAM
- HOT WATER SUPPLY
- HOT WATER RETURN
- WATER SHUT-OFF VALVE
- VALVE
- FIRE HYDRANT
- CATCH BASIN
- STORM MANHOLE
- ELECTRICAL MANHOLE / VAULT
- SANITARY MANHOLE
- STEAM MANHOLE
- TELE-COMMUNICATIONS MANHOLE
- INLET PROTECTION
- ROCK LOG
- SILT FENCE
- SOIL BORING

# CITY OF DULUTH

## DEPARTMENT OF PUBLIC WORKS AND UTILITIES

### ENGINEERING DIVISION

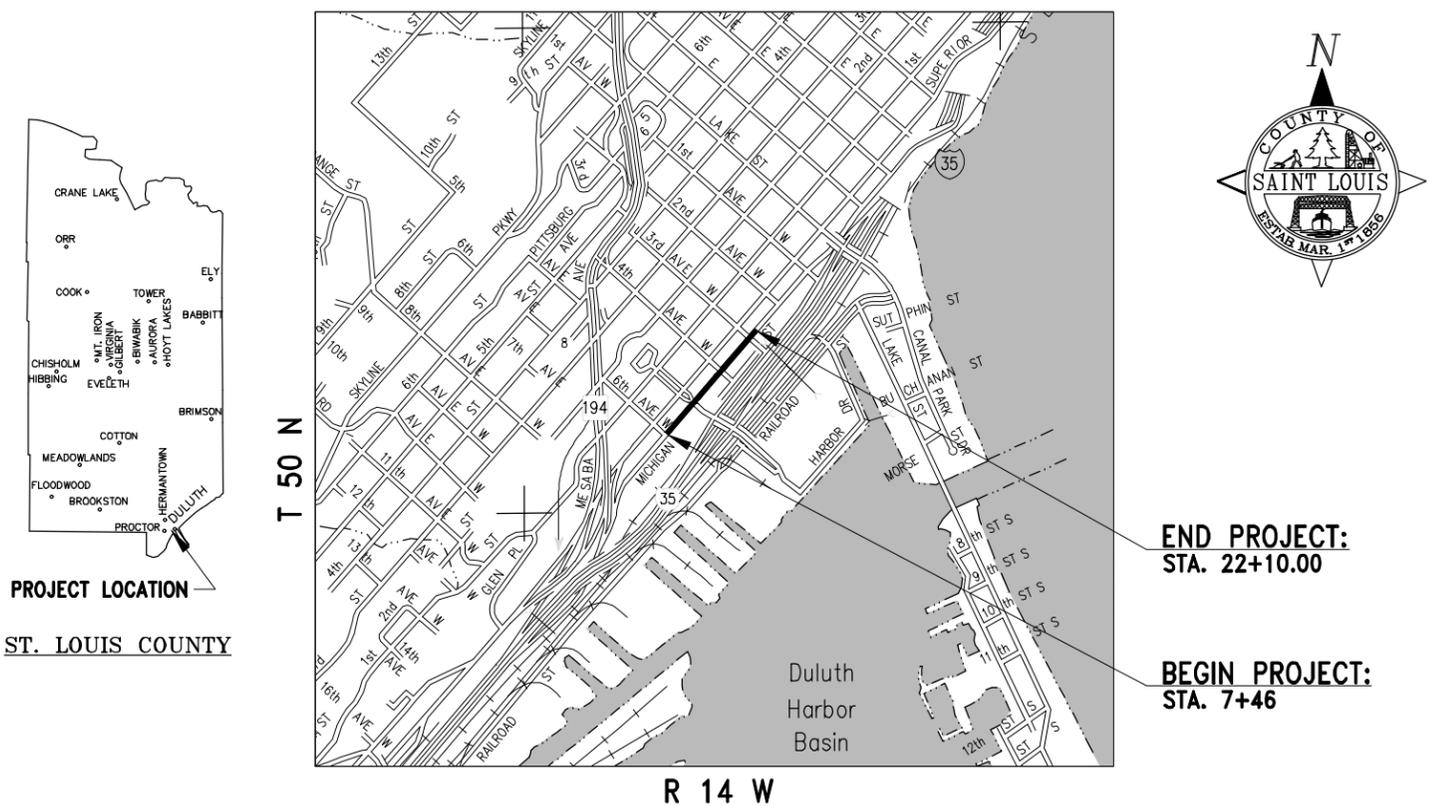
#### 2016 MICHIGAN STREET UTILITY RECONSTRUCTION FROM 3RD AVE WEST TO 6TH AVE WEST

#### CONSTRUCTION PLANS FOR: WATER MAIN REPLACEMENT, GAS MAIN, ELECTRICAL DUCT BANK, STEAM/ HOT WATER DISTRIBUTION PIPING, GRADING, AGGREGATE BASE, AND CONCRETE PAVEMENT

#### LOCATION

#### WEST MICHIGAN STREET - 3RD AVE. WEST TO 6TH AVE. WEST

CITY OF DULUTH PROJECT NO. 1524



**END PROJECT:**  
STA. 22+10.00

**BEGIN PROJECT:**  
STA. 7+46

**GOVERNING SPECIFICATIONS**

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

THE 2016 EDITION OF THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES DEPARTMENT STANDARD CONSTRUCTION SPECIFICATIONS AND SUPPLEMENTS OR ADDENDUMS SHALL APPLY.

AVAILABLE AT:  
<http://www.duluthmn.gov/engineering/standard-construction-specifications/>

ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO THE MN MUTCD, INCLUDING THE FIELD MANUAL DATED JANUARY 2014.

<http://www.dot.state.mn.us/trafficeng/publ/fieldmanual/index.html>

**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	STATEMENT OF ESTIMATED QUANTITIES AND NOTES
4	STANDARD PLATES & NOTES
5-8	TYPICAL SECTIONS
9-16	CONSTRUCTION DETAILS
17-21	EROSION & SEDIMENT CONTROL PLANS
22-28	TEMPORARY WATER SERVICE SYSTEM
29-35	TRAFFIC CONTROL & SEQUENCING PLAN
36-38	EXISTING CONDITIONS & REMOVALS
39-44	CONSTRUCTION PLAN & PROFILE
45-47	CONCRETE PAVING PLAN
S1-S3	STEAM AND HOT WATER PLANS

- THIS PLAN CONTAINS 50 SHEETS -

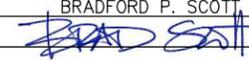
**WARNING**

LOCATION OF ALL UNDERGROUND UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR.  
CALL BEFORE DIGGING

MINNESOTA  
ONE-CALL SYSTEM  
**1-800-252-1166**  
REQUIRED BY  
MN STATUTE 216D

DESIGNERS: (LHB) S. Hohenstein, P. Barden, A. Beissel, M. Goplin

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: BRADFORD P. SCOTT  
SIGNATURE:   
DATE: 2/25/2016 LIC. #: 46198

**CITY APPROVAL**

APPROVED \_\_\_\_\_ CHIEF ENGINEER OF TRANSPORTATION \_\_\_\_\_ DATE \_\_\_\_\_

APPROVED \_\_\_\_\_ CHIEF ENGINEER OF UTILITIES \_\_\_\_\_ DATE \_\_\_\_\_

APPROVED \_\_\_\_\_ CITY ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

**UTILITY NOTE**  
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION OF EXISTING SUBSURFACE UTILITY DATA".

SCALES		
PLAN	10 ft.	
PROFILE	10 ft. HORIZ.	2.5 ft. VERT.
INDEX MAP	1000 ft.	

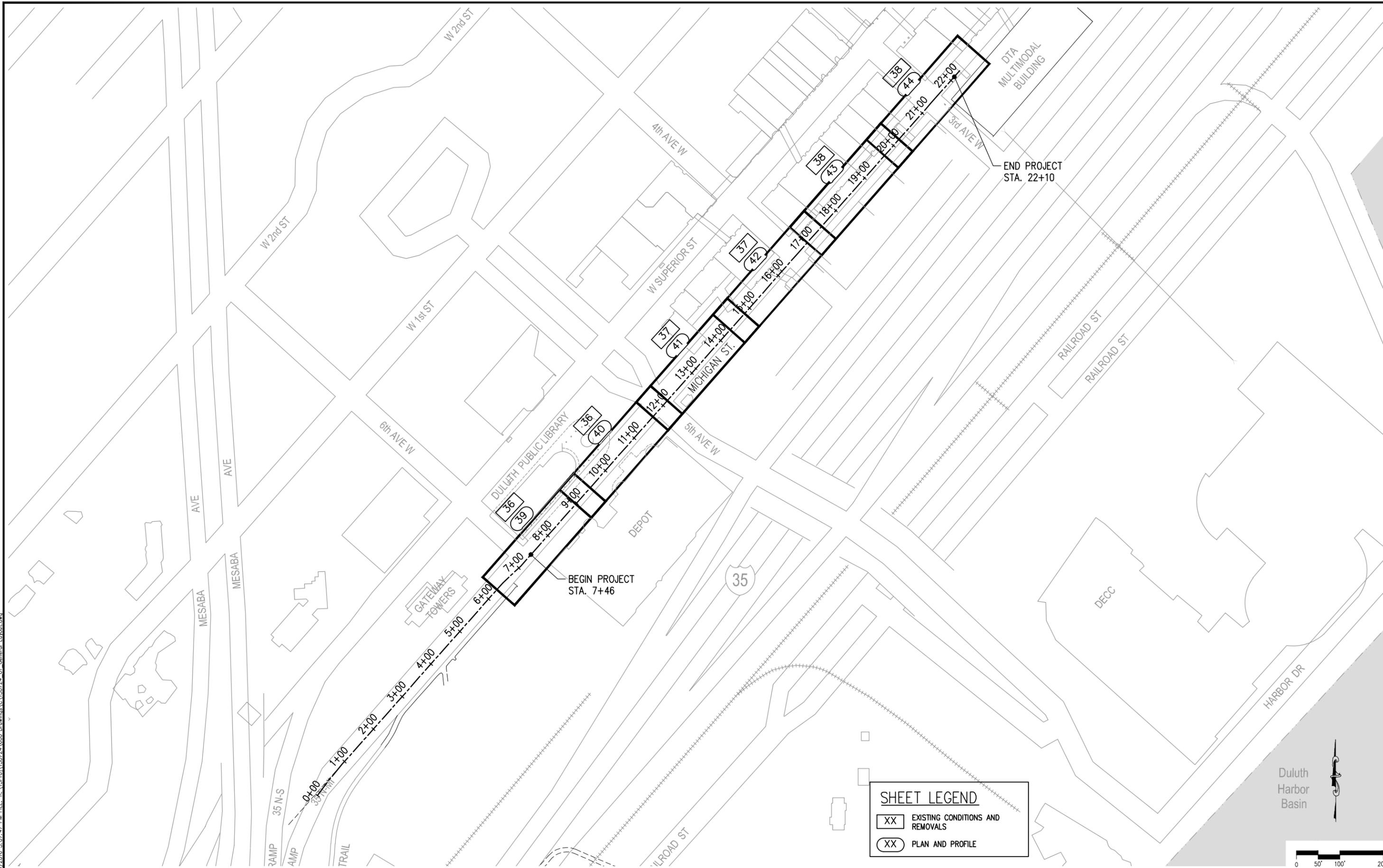
CITY OF DULUTH BID # 2016-0255



21 W. Superior St., Ste. 500 | Duluth, MN 55802 | 218.727.8446

PLAN REVISIONS		
DATE	SHEET NO.	APPROVED BY

PLOT DATE: 2/25/2016 3:07:47 PM FILE: R:\15724\150724\600 Drawings\150724\_01 General Layout.dwg



I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

BRAD SCOTT  
PRINTED NAME

*Brad Scott*  
SIGNATURE

02-25-2016  
DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

GENERAL LAYOUT

SHEET NO. 2 OF 47 SHEETS

STATEMENT OF ESTIMATED QUANTITIES

LINE	NOTES	SHEET	SPEC. NO.	DESCRIPTION	UNIT	TOTAL PROJECT	DUCT BANK	WATER & GAS	STEAM & HOT WATER
						FINAL QUANTITY	ESTIMATED QUANTITY	ESTIMATED QUANTITY	ESTIMATED QUANTITY
1									
2			2021.501	MOBILIZATION	LUMP SUM	1	0.57	0.36	0.07
3									
4	13		2104.501	REMOVE GAS MAIN	LIN FT	120	120		
4	17	37, 38	2104.501	REMOVE WATER MAIN	(P) LIN FT	950		950	
5		36, 37	2104.505	REMOVE BITUMINOUS PAVEMENT	(P) SQ YD	816	816		
6		37, 38	2104.505	REMOVE CONCRETE PAVEMENT	(P) SQ YD	2 139	1 670	44	425
7		37, 38	2104.511	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LIN FT	1 884	1 804	65	15
8	16	51-53	2104.601	REMOVE EXISTING STEAM MAIN	LUMP SUM	1			1
9									
10	3	5	2105.501	COMMON EXCAVATION	(P) CU YD	1 031	833	20	178
11		5	2105.522	SELECT GRANULAR BORROW MOD 7% (CV)	(P) CU YD	713	557	15	141
12									
13		5	2211.503	AGGREGATE BASE (CV) CLASS 5	(P) CU YD	328	276	5	47
14									
15	2	45-47	2301.504	CONCRETE PAVEMENT 8.0"	(P) SQ YD	2 955	2 486	44	425
16	19	9, 45-27	2301.538	DOWEL BAR	EACH	1 496	1 273	14	209
17		45-47	2301.602	DRILL AND GROUT DOWEL BAR (EPOXY COATED)	EACH	153	104	21	28
18		10, 45-47	2301.602	DRILL AND GROUT REINFORCEMENT BAR (EPOXY COATED)	EACH	990	890	10	90
19	7	45-47	2301.602	NO 4 REINF TIE BAR (EPOXY COATED)	EACH	352	296	8	48
20									
21	5,8		2451.521	GRANULAR BACKFILL (CV)	(P) CU YD	1 425		1 425	
22									
23		41,44	2503.603	10" STEEL CASING PIPE	LIN FT	21		21	
24									
25		22-28	2504.601	TEMPORARY WATER SERVICE SYSTEM	LUMP SUM	1		1	
26	6,10	41-44	2504.602	RECONNECT WATER SERVICE	EACH	16		16	
27	10	41,44	2504.602	CONNECT TO EXISTING WATER MAIN	EACH	2		2	
28	9	42-44	2504.602	INSTALL 20" X 2" TAPPING TEE W/ELECTROFUSION SADDLE	EACH	5		5	
29	9	41-44	2504.602	INSTALL 20" x 6" TAPPING TEE W/ ELECTROFUSION SADDLE	EACH	16		16	
30	9	42,43	2504.602	INSTALL 20" x 8" TAPPING TEE W/ ELECTROFUSION SADDLE	EACH	1		1	
31	10	41-44	2504.602	20" BUTTERFLY VALVE AND BOX	EACH	5		5	
32	10	43	2504.602	2" CURB STOP AND BOX	EACH	4		4	
33	10	41-44	2504.602	6" GATE VALVE AND BOX	EACH	16		16	
34	10	43	2504.602	8" GATE VALVE AND BOX	EACH	1		1	
35		41-44	2504.602	WATER TRACER BOX	EACH	24		24	
36		45-47	2504.602	VALVE BOX EXTENSION	EACH	3	2		1
37	16	43	2504.602	STEAM CROSSING INSULATION	EACH	3		2	1
38		42-44	2504.603	2" HDPE SDR 11 SERVICE PIPE	LIN FT	25		25	
39	10	41-44	2504.603	20" DIPS HDPE WATER MAIN SDR 11	LIN FT	950		950	
39									
40		41-44	2505.601	GAS MAIN (6" PE SDR 11.5)	LIN FT	960		960	
41		41,44	2505.601	6" PE GAS VALVE AND BOX	EACH	2		2	
42		41,44	2505.602	RECONNECT TO EXISTING GAS MAIN	EACH	2		2	
43									
44	18	45-47	2506.516	CASTING ASSEMBLY	EACH	7	6		1
45									

STATEMENT OF ESTIMATED QUANTITIES

LINE	NOTES	SHEET	SPEC. NO.	DESCRIPTION	UNIT	TOTAL PROJECT	DUCT BANK	WATER & GAS	STEAM & HOT WATER
						FINAL QUANTITY	ESTIMATED QUANTITY	ESTIMATED QUANTITY	ESTIMATED QUANTITY
46									
47		11,12-15	2550.602	CONNECT INTO EXISTING ELECTRICAL MANHOLE	EACH	8		8	
48		11	2550.602	REPAIR ELECTRICAL MANHOLE -- TYPE A	LUMP SUM	1		1	
49		12	2550.602	REPAIR ELECTRICAL MANHOLE -- TYPE B	LUMP SUM	1		1	
50		14	2550.602	REPAIR ELECTRICAL MANHOLE -- TYPE C	LUMP SUM	1		1	
51		15	2550.602	REPAIR ELECTRICAL MANHOLE -- TYPE D	LUMP SUM	1		1	
52		5,41-44	2550.603	DUCT BANK	(P) LIN FT	849		849	
53	1	41	2550.603	INSTALL PRECAST DUCT BANK	(P) LIN FT	48		48	
54									
55		29-35	2563.601	TRAFFIC CONTROL	LUMP SUM	1	0.57	0.36	0.07
56									
57		17-21	2573.530	STORM DRAIN INLET PROTECTION	EACH	18		18	
58	4	17-21	2573.533	SEDIMENT CONTROL LOG TYPE ROCK	LIN FT	36		36	
59									
60	12		2582.502	12" SOLID LINE WHITE-EPOXY	LIN FT	60		60	
61									
62	14	51-53	2599.601	INSTALL NEW HWS & HWR MAINS	LUMP SUM	1			1
63	15	51-53	2599.601	INSTALL NEW STEAM MAIN	LUMP SUM	1			1
64									

(P) DENOTES PLAN QUANTITY.

NOTES

- REFER TO SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- PROVIDE HIGH EARLY CONCRETE MIX 3A41HE.
- EXCESS MATERIAL SHALL BE DISPOSED OF OFF PROJECT RIGHT-OF-WAY (INCIDENTAL).
- STORM DRAIN INLET PROTECTION TO BE PAID FOR ONCE AT EACH LOCATION REGARDLESS OF QUANTITY USED AT EACH LOCATION OR MAINTENANCE REQUIRED AT EACH LOCATION..
- SHALL MEET MNDOT 3149.2.D.1.
- INCLUDES REMOVAL OF EXISTING SERVICE PIPE AS REQUIRED TO COMPLETE WORK.
- FOR PAVEMENT REINFORCEMENT. REFER TO STANDARD PLATE 1070.
- TO BE USED FOR ALL WATER MAIN AND SERVICE BACKFILL ON THE PROJECT. INCLUDES DISPOSAL OF EXISTING TRENCH MATERIAL.
- SHALL BE FURNISHED BY CITY OF DULUTH F.O.B. GARFIELD AVENUE FOR INSTALLATION BY CONTRACTOR.
- HDPE AND DUCTILE IRON FITTINGS, TRANSITION COUPLINGS, AND ADAPTERS SHALL BE INCIDENTAL. SEE DETAIL 3 ON SHEET 11.
- PRECAST DUCT BANK SHALL BE FURNISHED BY M.P. F.O.B. HERBERT SERVICE CENTER FOR INSTALLATION BY CONTRACTOR.
- PROVIDE TO MATCH INPLACE CROSSWALK STRIPING.
- REMOVAL AS REQUIRED TO RECONSTRUCT WATER OR DUCT BANK. PROVIDE PE JUMPER WHERE MAIN IS REMOVED (INCIDENTAL). MAXIMUM LENGTH OF JUMPER SHALL BE 20 FT. CONNECT TO EXISTING STORM OR CATCH BASIN AS NEEDED (INCIDENTAL).
- MATERIAL SUPPLIED BY DULUTH ENERGY SYSTEMS (DES), F.O.B. DES PLANT, INSTALLATION SHALL BE IN ACCORDANCE WITH LOGSTAR A/S RECOMMENDATIONS AND REQUIREMENTS FOR LIGHT GAUGE STEEL SYSTEM WITH BX JOINT INSULATION KITS AND LEAK DETECTION. INCLUDES EXCAVATION, BACKFILL, BEDDING, SYSTEM INSTALLATION, AND BUILDING WALL PENETRATIONS.
- MATERIAL SUPPLIED BY DULUTH ENERGY SYSTEMS, F.O.B. DES PLANT, INSTALLATION SHALL BE IN ACCORDANCE WITH THERMOCORE SYSTEMS RECOMMENDATIONS AND REQUIREMENTS FOR SCHEDULE 40 STEEL SYSTEM WITH JOINT INSULATION KITS, LEAK DETECTION, AND ANCHORS. INCLUDES EXCAVATION, BACKFILL, BEDDING, SYSTEM INSTALLATION, ANCHOR POINTS, AND BUILDING WALL PENETRATIONS.
- INCLUDES EXCAVATION TO EXPOSE ASBESTOS CONTAINING MATERIAL, COORDINATION OF ACM MATERIAL REMOVAL BY OTHERS, AND REMOVAL AND DISPOSAL OF EXISTING STEAM MAIN SYSTEM.
- INCLUDES VALVE & SERVICE PIPE REMOVAL AS REQUIRED.
- PROVIDE (3) EACH COVER AND CASTING FOR STORM MANHOLE PER CITY DETAIL STRM-1. PROVIDE (1) EACH GAS MANHOLE (MATCH EXISTING), INCLUDES FRAME, RINGS AND CASTING. PROVIDE (2) EACH TV MANHOLE (MATCH EXISTING), INCLUDES FRAME, RINGS AND CASTING. PROVIDE (1) EACH TELEPHONE MANHOLE (MATCH EXISTING), INCLUDES FRAME, RINGS AND CASTING.
- EPOXY COATED.

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I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

BRAD SCOTT  
PRINTED NAME

  
SIGNATURE

02-25-2016  
DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST

LHB PROJECT NO. 150724

STATEMENT OF ESTIMATED QUANTITIES & NOTES

SHEET NO. 3 OF 47 SHEETS

**GENERAL CONSTRUCTION NOTES**

1. WITHIN THE PLAN WHENEVER THE WORD "INCIDENTAL" IS USED IT SHALL MEAN NO DIRECT PAYMENT WILL BE MADE FOR THAT ITEM.
2. CONTRACTOR SHALL PROTECT FROM DAMAGE ALL EXISTING PAVEMENTS AND CURB DESIGNATED TO REMAIN. ANY PAVEMENTS OR CURBS DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO COST TO THE OWNER.
3. GRADES SHOWN ARE FINISH SURFACE ELEVATIONS. THE CONTRACTOR SHALL MAKE APPROPRIATE DEDUCTIONS FOR VARYING SURFACES TO DETERMINE SUBGRADE ELEVATIONS.
4. ALL EXISTING AND PROPOSED STRUCTURE ACCESS COVERS SHALL BE ADJUSTED TO FINISHED GRADE BY THE CONTRACTOR.
5. ALL CONCRETE TRUCKS SHALL WASH OUT WITHIN THE PROJECT LIMITS AWAY FROM ANY WATERS OF THE STATE (INCLUDING HIGHWAY DITCHES), AT A LOCATION SPECIFIED BY THE ENGINEER. HARDENED CONCRETE MUST BE REMOVED FROM THE PROJECT LIMITS AND PROPERLY DISPOSED OF OFF MN/DOT R/W (INCIDENTAL).
6. WHENEVER THE PHRASE "MIN." IS USED IN THIS PLAN, IT SHALL MEAN THE WORD MINIMUM.
7. THE RIGHT-OF-WAY SHOWN IN THE PLAN GIVES A GRAPHICAL LOCATION WITH RESPECT TO THE GEOMETRIC LOCATION.
8. CONSTRUCTION DEWATERING, IF REQUIRED, SHALL BE CONSIDERED INCIDENTAL WITH NO ADDITIONAL COMPENSATION THEREFOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND COMPLYING WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.

**GRADING, BASE, & SURFACE**

1. UNSUITABLE MATERIALS ARE TOPSOILS, DEBRIS, PEAT, MUCK AND ORGANIC OR OTHER UNSTABLE SOILS.
2. SELECT GRANULAR MATERIAL MOD. 7% IS DEFINED AS SELECT GRANULAR BORROW PER MnDOT SPECIFICATION 3149.B2 MODIFIED SUCH THAT THE RATIO OF THE PORTION PASSING THE #200 SIEVE DIVIDED BY THE PORTION PASSING THE 1 INCH SIEVE MAY NOT EXCEED 7 PERCENT BY MASS.
3. ALL GRANULAR MATERIAL, SELECT GRANULAR MATERIAL, SELECT GRANULAR MOD. 7%, AND AGGREGATE BASE, SHALL BE COMPACTED BY THE SPECIFIED DENSITY METHOD.
4. THE BOTTOM OF ALL EXCAVATIONS SHALL BE SHAPED AND COMPACTED.
5. BITUMINOUS, CONCRETE, AND ALL SUBSURFACE SOILS DISTURBED BY CONSTRUCTION SHALL BECOME PROPERTY OF THE CONTRACTOR. THIS MATERIAL MAY BE RECYCLED AND REUSED, TO THE EXTENT ALLOWED BY MN/DOT SPECIFICATIONS AND THESE RECOMMENDATIONS OR SHALL BE DISPOSED OF OUTSIDE MN/DOT RIGHT OF WAY IN ACCORDANCE WITH MN/DOT SPECIFICATION 2104.
6. THE CONTRACTOR SHALL NOT STORE EXCAVATED MATERIAL OUTSIDE THE PLANNED CONSTRUCTION LIMITS UNLESS APPROVED BY THE ENGINEER.
7. PROVIDE A SAWCUT WHERE PLACING NEW PAVEMENT ADJACENT TO INPLACE PAVEMENT TO ENSURE A UNIFORM JOINT.

**ELECTRICAL CONDUIT AND MANHOLE NOTES**

1. ALL CONDUIT AND MANHOLE INSTALLATION SHALL CONFORM TO THE APPLICABLE MnDOT, NECA/NEIS AND NEMA STANDARDS.
2. PROVIDE CONDUIT CONNECTIONS TO PROPOSED MANHOLES/VAULTS IN ACCORDANCE WITH MANHOLE/VAULT MANUFACTURER'S RECOMMENDATIONS.
3. INSTALL CONDUIT TO LOCATE TOP OF CONDUIT AT DEPTHS AS INDICATED ON DRAWINGS.
4. JOIN CONDUIT USING ADHESIVE AS RECOMMENDED BY MANUFACTURER. MINNESOTA POWER SHALL SUPPLY ADHESIVE.
5. CONTRACTOR SHALL NOTIFY MINNESOTA POWER TO OBTAIN ENTRY TO MANHOLES. MP PERSONNEL MUST BE ON SITE WHEN WORK IS PERFORMED IN MANHOLES.

**UTILITIES**

1. THE CONTRACTOR IS HEREBY REMINDED OF HIS RESPONSIBILITY UNDER STATE LAW TO CONTACT ALL UTILITIES THAT MAY HAVE FACILITIES IN THE AREA. CONTACT MUST BE MADE THROUGH GOPHER STATE ONE-CALL.
2. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."
3. THE FOLLOWING UTILITIES HAVE FACILITIES WITHIN THE PROJECT LIMITS:
  - CENTURYLINK
  - CHARTER
  - CITY OF DULUTH
  - MINNESOTA POWER
  - MnDOT
  - DULUTH ENERGY
  - NORTHEAST SERVICE COOPERATIVE
  - COMPUDYNE
  - ZAYO BANDWIDTH
  - ENVENTIS
  - WINDSTREAM
  - PAUL BUNYAN
4. THE CONTRACTOR IS REQUIRED TO FULLY SUPPORT ANY EXISTING UTILITIES ENCOUNTERED DURING THE EXCAVATION TO PREVENT DAMAGE TO THE INPLACE UTILITY. ANY EXPOSED UTILITY SHALL BE REBEDDED IN CLEAN, COMPACTIBLE SAND OR AS REQUIRED BY THE FACILITY OWNER. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SUPPORT AND BACKFILL REQUIREMENTS OF INPLACE UTILITIES. ALL COST OF COORDINATING THE CONSTRUCTION OF THE WORK IN THE VICINITY OF EXISTING UTILITIES TO REMAIN INCLUDING EXPOSING, SUPPORTING, WORKING AROUND, AND BACKFILL SHALL BE CONSIDERED INCIDENTAL.
5. ANY ROADWAY SUBDRAIN PIPE ENCOUNTERED DURING THE WORK THAT IS REMOVED TO CONSTRUCT THE WORK SHALL BE REPLACED TO ITS EXISTING CONFIGURATION AND ALIGNMENT AT NO ADDITIONAL COST (INCIDENTAL).
6. MINOR RELOCATION OR ADJUSTMENT OF BURIED TELEPHONE OR POWER TO ACCOMMODATE THE DUCT BANK IS ANTICIPATED BUT SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO SUPPORT, COORDINATE AND WORK AROUND EXISTING FACILITIES AT DESCRIBED IN NOTE 4 OF THIS SECTION.

**REMOVALS**

1. PROVIDE FOR THE REMOVAL AND DISPOSAL OF ANY INPLACE SURFACING, OTHER STRUCTURES OR DEBRIS THAT WOULD INTERFERE WITH CONSTRUCTION. ALL SUCH MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS NOTED OTHERWISE AND SHALL EITHER BE RECYCLED TO THE EXTENT ALLOWED OR DISPOSED OF OFF THE RIGHT OF WAY IN ACCORDANCE WITH Mn/DOT SPECIFICATION 2104.
2. UNLESS A PAY ITEM IS PROVIDED THEREFOR, REMOVAL OF MISCELLANEOUS ABANDONED UTILITIES AND MATERIAL ENCOUNTERED DURING THE WORK SHALL BE INCIDENTAL.

STANDARD PLATES	
PLATE NO.	DESCRIPTION
MNDOT STANDARD PLATES – THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION SHALL APPLY ON THIS JOB	
1070M	SUPPLEMENTAL PAVEMENT REINFORCEMENT
1103K	TYPICAL DOWEL BAR ASSEMBLY (2 SHEETS)
4110F	COVER CASTING FOR MANHOLE (FOR USE IN ALL TRAFFIC AREAS) – CASTING NO. 715 AND 716
8000I	STANDARD BARRICADES

CITY STANDARD DETAILS	
DETAIL NO.	DESCRIPTION
THE FOLLOWING CITY OF DULUTH STANDARD DETAILS SHALL APPLY ON THIS JOB	
EX-1	DUCTILE IRON, PE WATERMAIN, PRESSURE SEWER, & FORCEMAIN BEDDING
EX-2	ALL STEEL & 4" AND LARGER PE GAS MAIN BEDDING
G-3	GAS MAIN BRANCH CONNECTIONS TO STEEL MAIN
G-4	TYPICAL WELD JOINTS
G-5	PE VALVE BOX SETTING
G-6	TRACER WIRE ACCESS BOX
STRM-1	STORM MANHOLE CASTING
W-2	PLUG BLOKING FOR WATERMAIN
W-17A	WATER VALVE BOX – HDPE MAIN
W-19	CONCRETE ENCASED VALVE BOX COLAR IN ROADWAY

PLOT DATE: 2/25/2016 3:08:30 PM FILE: R:\15Prog\150724\600 Drawings\0150724\_03 Standard Plates & Notes.dwg

I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

BRAD SCOTT  
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MICHIGAN ST. 6TH-3RD AVE WEST

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STANDARD PLATES & NOTES

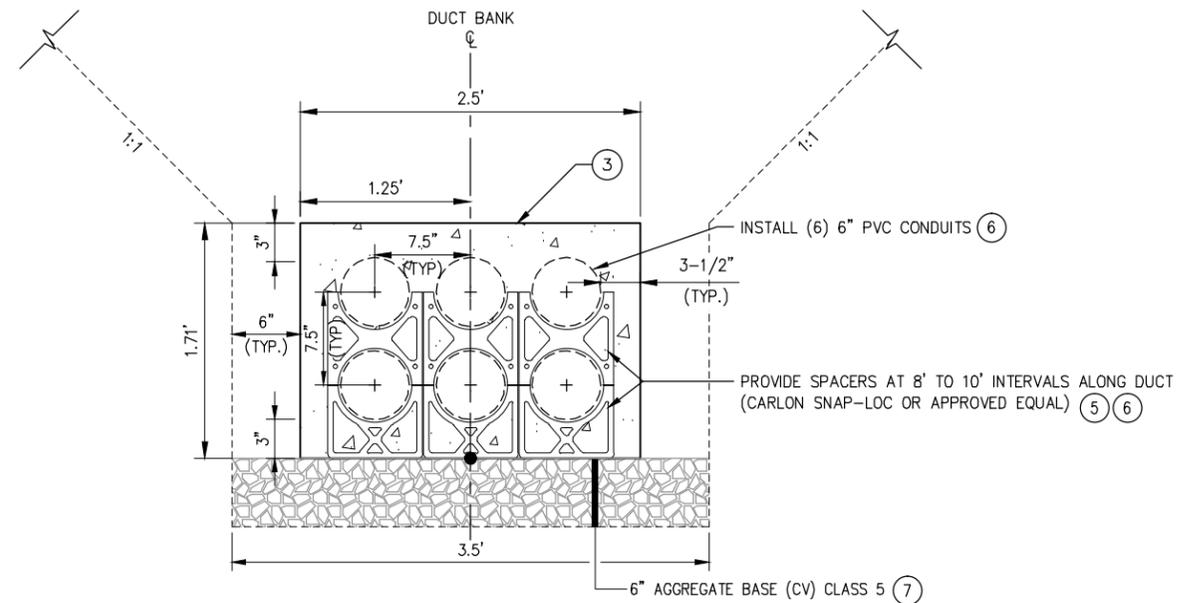
SHEET NO. 4 OF 47 SHEETS

**NOTES:**

- THE TYPICAL DUCT BANK CONSISTS OF (6) 6" CONDUITS IN A 2X3 ARRAY (ROW X COL.). RE-ARRANGEMENT OF THE DUCT BANK ARRAY IS REQUIRED AT CONNECTIONS TO EXISTING MANHOLES AND MAY BE REQUIRED AT UTILITY CROSSINGS OR IF OTHER OBSTRUCTIONS ARE ENCOUNTERED. NO CHANGE ORDERS OR MODIFICATIONS TO THE UNIT PRICE BID FOR DUCT BANK SHALL BE PERMITTED REGARDLESS OF THE NUMBER OR TYPE OF SUCH RE-ARRANGEMENT(S) REQUIRED.

**KEY NOTES (APPLY TO ALL TYPICAL SECTIONS AS NOTED):**

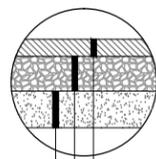
- SHIMMING, BLADING, REMOVING, COMPACTING AND PREPARING IN PLACE BASE PRIOR TO PAVING SHALL BE CONSIDERED INCIDENTAL.
- WHERE SUITABLE MATERIAL FROM EXCAVATION IS NOT AVAILABLE, CONTRACTOR SHALL PROVIDE GRANULAR BACKFILL AT THE DIRECTION OF THE ENGINEER.
- CONCRETE ENCASEMENT SHALL CONSIST OF MIX HIGH EARLY CONCRETE COLORED WITH RED DYE. BACKFILL SHALL COMMENCE WHEN CONCRETE STRENGTH IS 75% OF THE CONCRETE STRENGTH. CONCRETE CYLINDER TESTS FOR EACH DAY'S POUR SHALL ESTABLISH TIMING. REFER TO SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
- NO ADJUSTMENTS (INCREASES) IN PAY QUANTITIES OR PRICES WILL BE MADE FOR TRENCH EXCAVATION LIMITS BEYOND THOSE SHOWN OR AS MAY BE REQUIRED TO FACILITATE THE CONTRACTOR'S OPERATIONS, STABILITY OF SLOPES, PREVENT UNDERMINING OF THE PAVEMENTS TO REMAIN, OR OSHA SAFETY REQUIREMENTS.
- SPACERS SHALL SECURELY SUPPORT AND MAINTAIN UNIFORM SPACING OF THE PIPE ASSEMBLY AND CHAIRS SHALL PROVIDE 3 INCHES ABOVE THE BOTTOM OF THE PREPARED BASE DURING THE CONCRETE POUR. SECURE SPACERS TO PIPES AND EARTH TO PREVENT FLOATING DURING CONCRETE POUR. PROVIDE NONFERROUS TIE WIRES TO PREVENT DISPLACEMENT OF THE PIPE DURING THE CONCRETE POUR. TIE WIRES SHALL NOT ACT AS SUBSTITUTE FOR SPACERS. MAINTAIN 7.5-INCH SPACING BETWEEN CONDUITS (CENTER TO CENTER).
- MINNESOTA POWER SHALL FURNISH 6" CONDUIT AND FITTINGS FOR INSTALLATION BY CONTRACTOR.
- SHALL NOT BE MEASURED SEPARATELY BUT SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 2550.603, "DUCT BANK".
- FINAL GRADES SHALL MATCH EXISTING GRADES UNLESS OTHERWISE NOTED IN THE PLANS.
- INSTALL PRECAST DUCT BANK FROM STA. 12+60 TO 13+20. REFER TO SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- PRESERVE AND PROTECT.
- WHERE ADJACENT PAVEMENT IS UNDERMINED BY THE CONTRACTOR'S OPERATIONS SUCH THAT COMPACTION OF BACKFILL TO THE SPECIFIED DENSITY CANNOT BE ACHIEVED, THE CONTRACTOR SHALL PROVIDE LEAN MIX BACKFILL (INCIDENTAL).
- SAWCUT CONCRETE PAVEMENT (FULL DEPTH).
- PAYMENT FOR COMMON EXCAVATION SHALL BE LIMITED TO REMOVAL OF INPLACE MATERIAL BETWEEN BOTTOM OF INPLACE PAVEMENT AND BOTTOM OF PROPOSED SELECT GRANULAR BORROW.
- REFER TO STEAM AND HOT WATER PLANS FOR STEAM AND HOT WATER DESIGN.
- NESC SHALL RELOCATE EXISTING FACILITIES TO PROVIDE MINIMUM 6-INCHES CLEAR (OUT TO OUT) BETWEEN NESC UTILITIES AND NEW GAS MAIN. CONTRACTOR IS RESPONSIBLE FOR SUPPORTING NESC FACILITIES DURING CONSTRUCTION (REFER TO SPECIAL PROVISIONS).
- REMOVE (INCIDENTAL).



**TYPICAL DUCT BANK SECTION**

APPLIES: STA. 12+45 TO STA. 12+60  
STA. 13+20 TO STA. 21+92

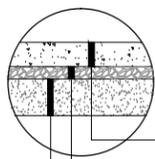
(CONDUIT SPACING & MATERIALS SHALL MEET MINIMUM N.E.C. REQUIREMENTS.)  
NTS



INP. 3.0" TYPE SP 12.5 WEARING COURSE MIXTURE (SPWEB340C) - SPEC. 2360  
INP. 9" AGGREGATE BASE (CV) CLASS 5 - SPEC. 2211  
INP. VAR. DEPTH SELECT MATERIAL FROM EXCAVATION

**INSET A**

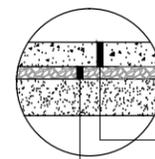
INPLACE BITUMINOUS PAVING, NTS



INP. PLACE CONCRETE PAVEMENT 8" - SPEC. 2301  
INP. 4" AGGREGATE BASE (CV) CLASS 5 - SPEC. 2211  
INP. VAR. DEPTH SELECT MATERIAL FROM EXCAVATION

**INSET B**

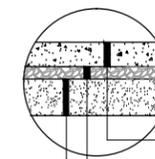
INPLACE CONCRETE PAVING, NTS



CONCRETE PAVEMENT 8" - SPEC. 2301  
4" AGGREGATE BASE (CV) CLASS 5 - SPEC. 2211

**INSET C**

PROPOSED CONCRETE PAVING, NTS



CONCRETE PAVEMENT 8" - SPEC. 2301  
4" AGGREGATE BASE (CV) CLASS 5 - SPEC. 2211  
12" DEPTH SELECT MATERIAL FROM EXCAVATION

**INSET D**

PROPOSED CONCRETE PAVING, NTS

PLOT DATE: 2/25/2016 3:08:50 PM FILE: R:\5Prg\150724\600 Drawings\150724\_04 Typical Sections.dwg

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BRAD SCOTT  
PRINTED NAME

*Brad Scott*  
SIGNATURE

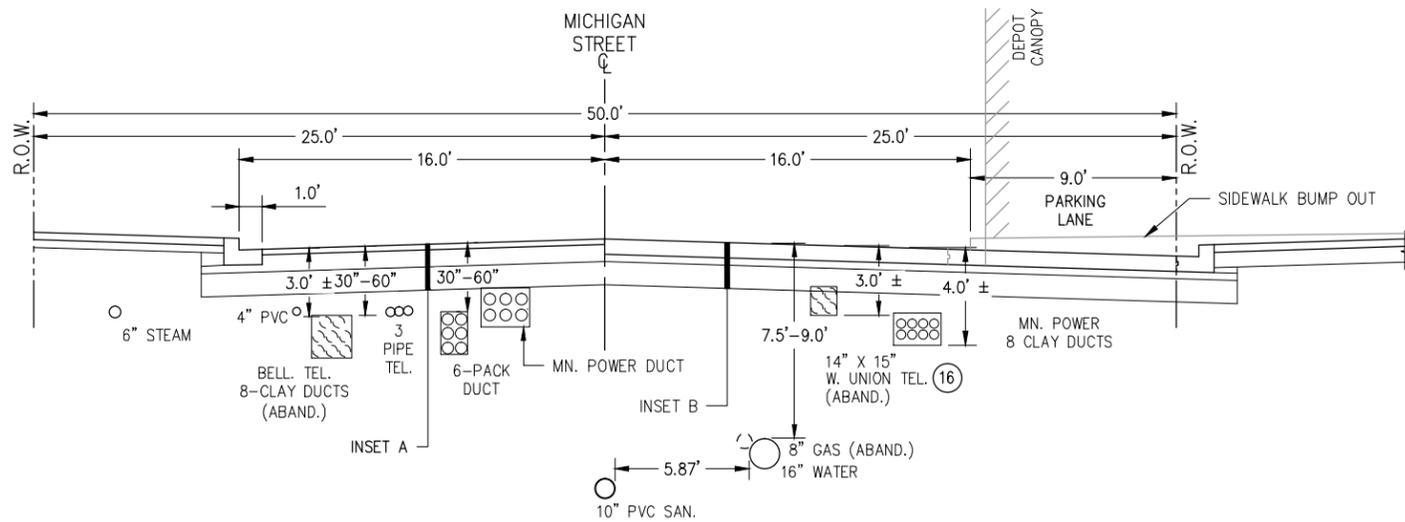
02-25-2016  
DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST

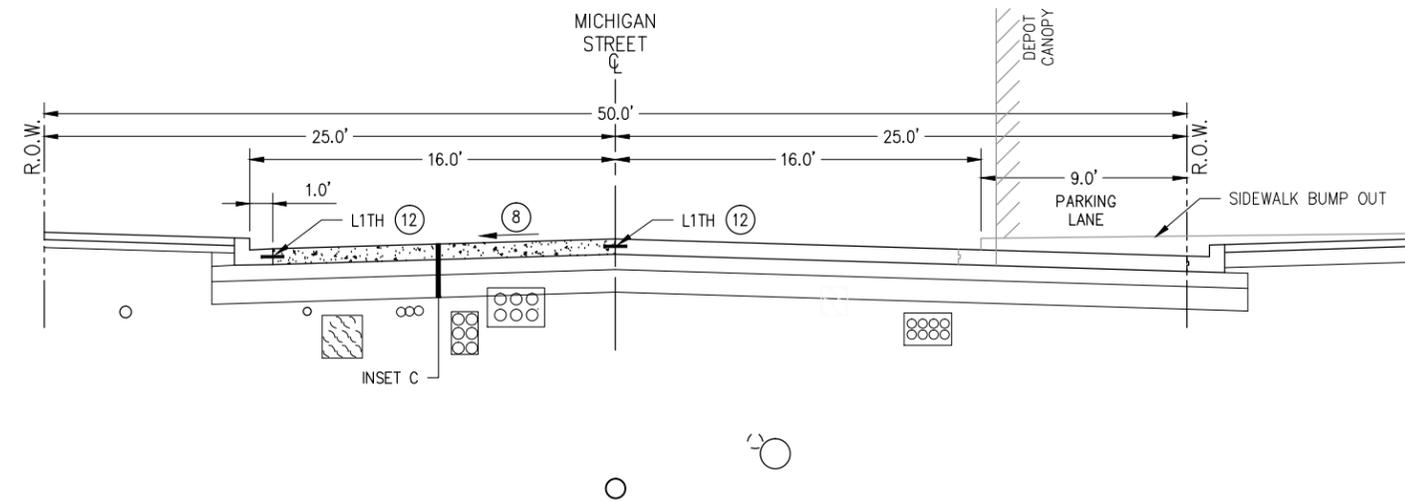
LHB PROJECT NO. 150724

TYPICAL SECTIONS

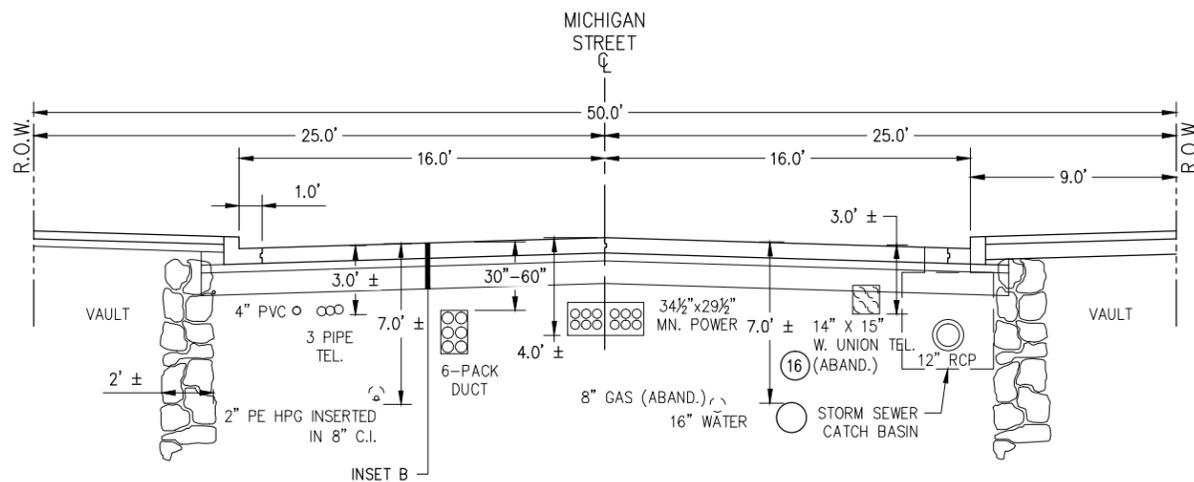
SHEET NO. 5 OF 47 SHEETS



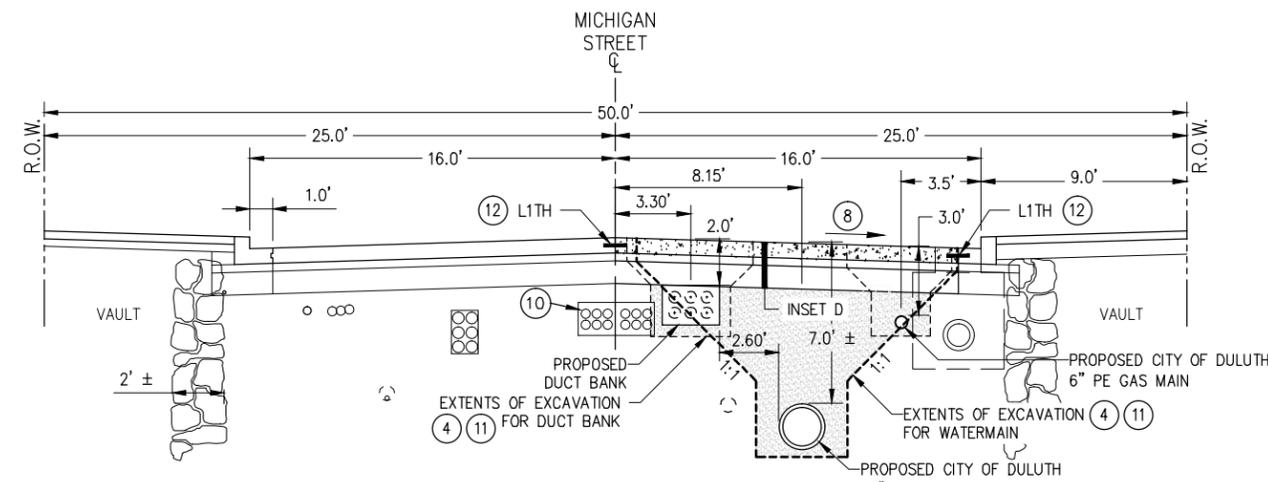
**MICHIGAN STREET EXISTING TYPICAL SECTION**  
6TH AVE. WEST TO 5TH AVE WEST. (STA 11+00)



**MICHIGAN STREET PROPOSED TYPICAL SECTION**  
6TH AVE. WEST TO 5TH AVE WEST. (STA. 7+46 TO STA. 12+29 )



**MICHIGAN STREET EXISTING TYPICAL SECTION**  
5TH AVE. WEST TO 4TH AVE WEST. (STA. 16+00)



**MICHIGAN STREET PROPOSED TYPICAL SECTION**  
5TH AVE. WEST TO 4TH AVE WEST.(STA. 12+46 TO 16+41)

PLOT DATE: 2/25/2016 3:09:01 PM FILE: R:\V\Proj\150724\600 Drawings\150724\_04 Typical Sections.dwg

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BRAD SCOTT  
PRINTED NAME

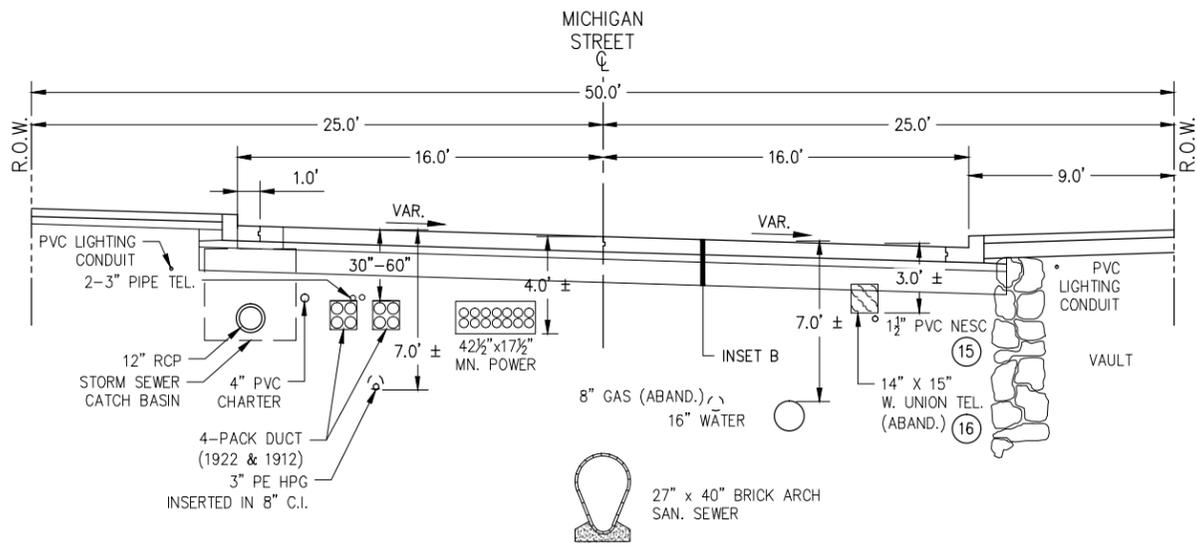
  
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02-25-2016  
DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

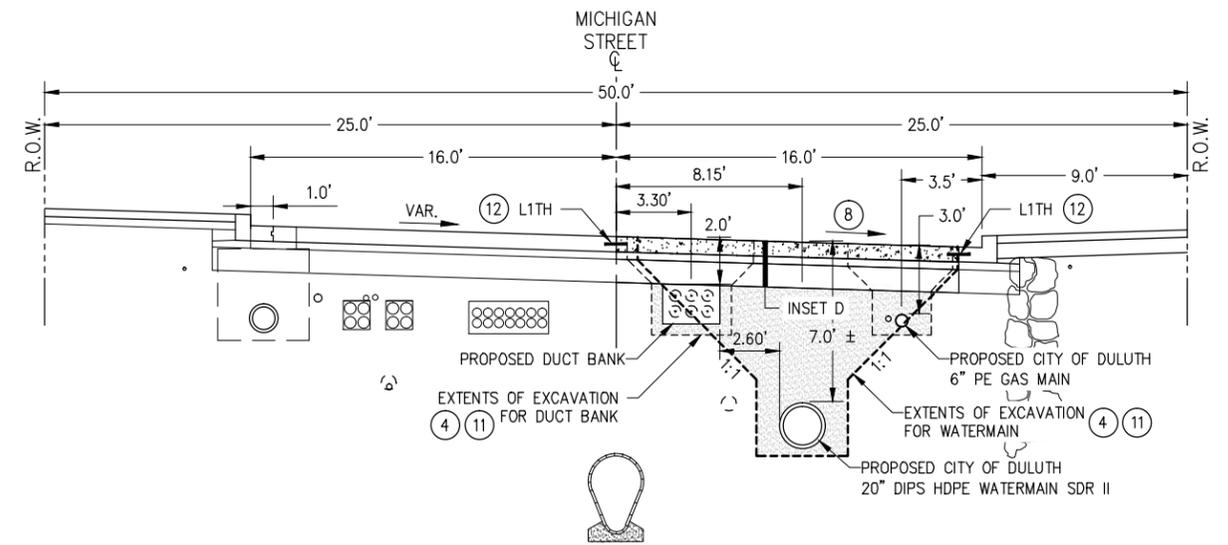
TYPICAL SECTIONS

SHEET NO. 6 OF 47 SHEETS



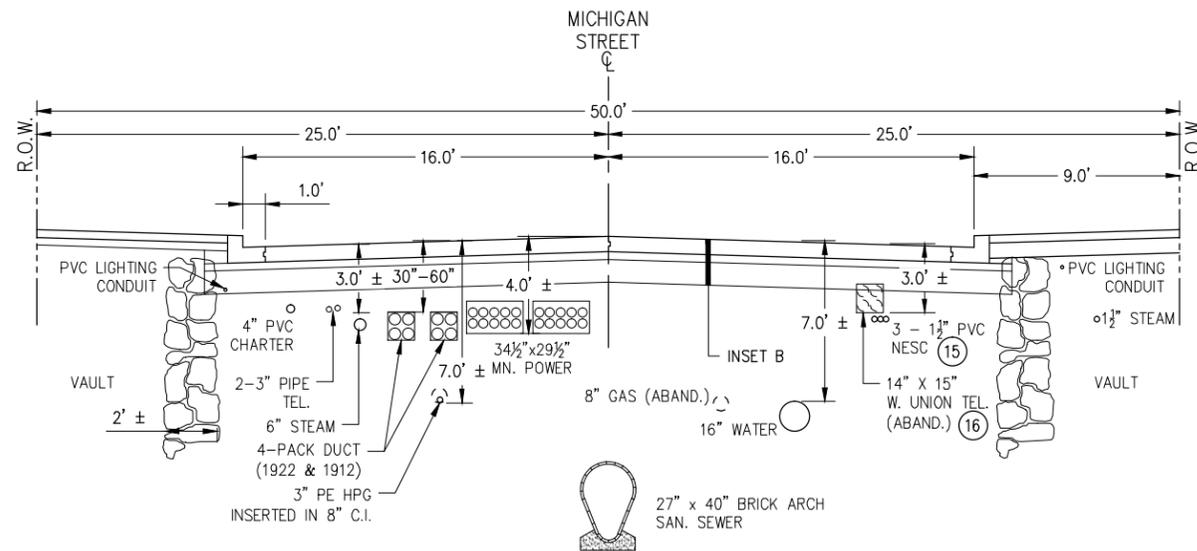
**MICHIGAN STREET EXISTING TYPICAL SECTION**

4TH AVE. WEST TO 3RD AVE WEST. WEST-BLOCK  
 APPX. 80 FT. EAST OF INTERSECTION OF 4TH AVE. WEST.



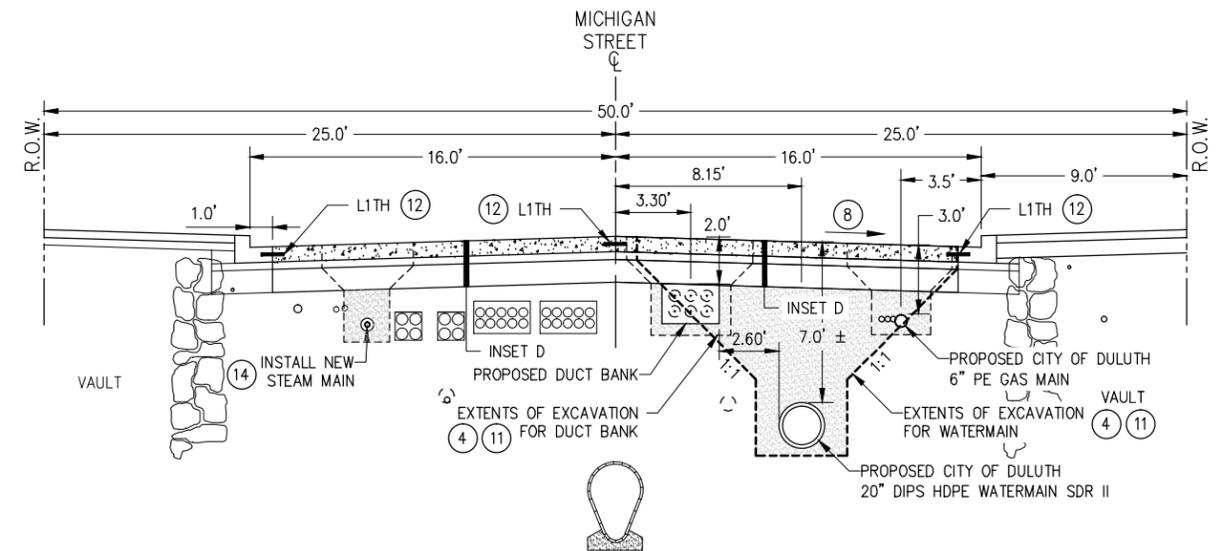
**MICHIGAN STREET PROPOSED TYPICAL SECTION**

4TH AVE. WEST TO 3RD AVE WEST. WEST-BLOCK  
 (STA. 12+46 TO 17+39)



**MICHIGAN STREET EXISTING TYPICAL SECTION**

4TH AVE. WEST TO 3RD AVE WEST. MID-BLOCK



**MICHIGAN STREET PROPOSED TYPICAL SECTION**

4TH AVE. WEST TO 3RD AVE WEST. MID-BLOCK  
 (STA. 17+39 TO 18+90)

PLOT DATE: 2/25/2016 3:09:11 PM FILE: R:\P\proj\150724\600 Drawings\C\150724\_04 Typical Sections.dwg

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*Brad Scott*  
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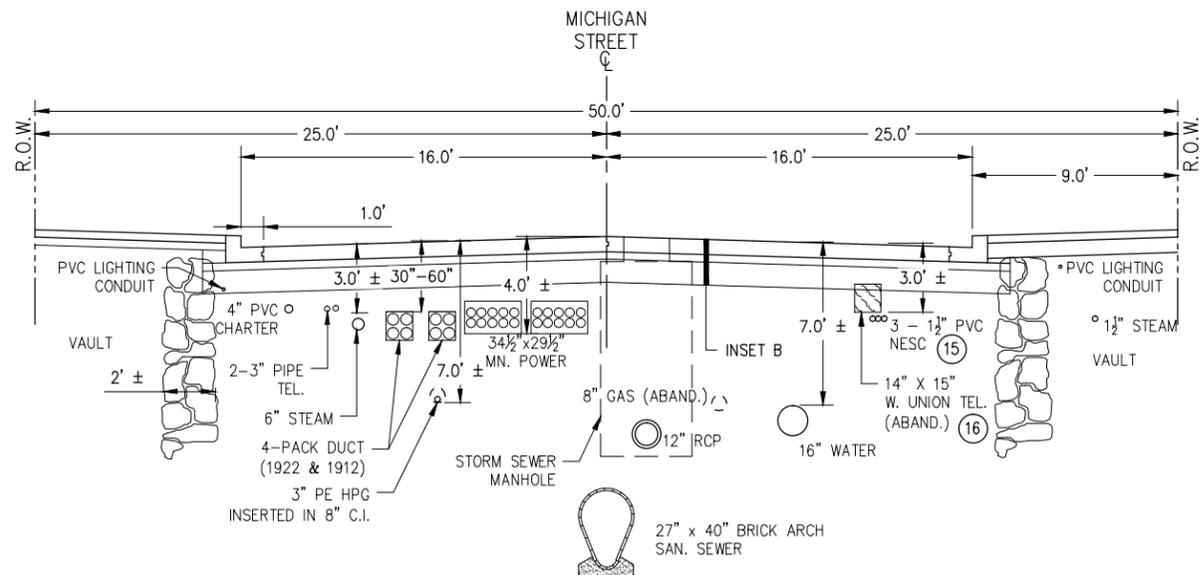
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MICHIGAN ST. 6TH-3RD AVE WEST

LHB PROJECT NO. 150724

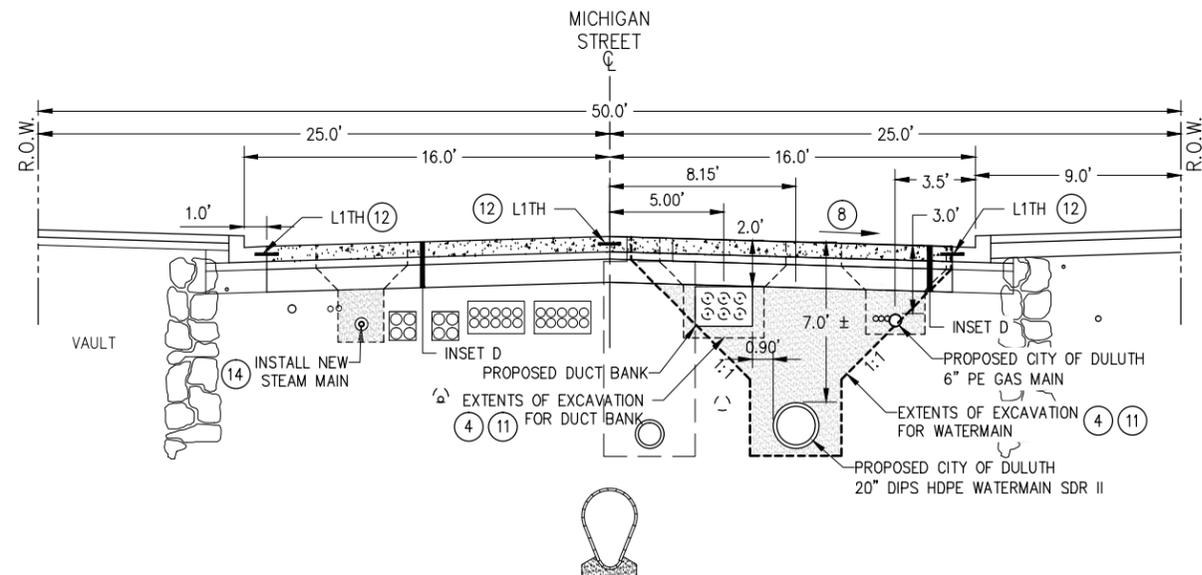
TYPICAL SECTIONS

SHEET NO. 7 OF 47 SHEETS



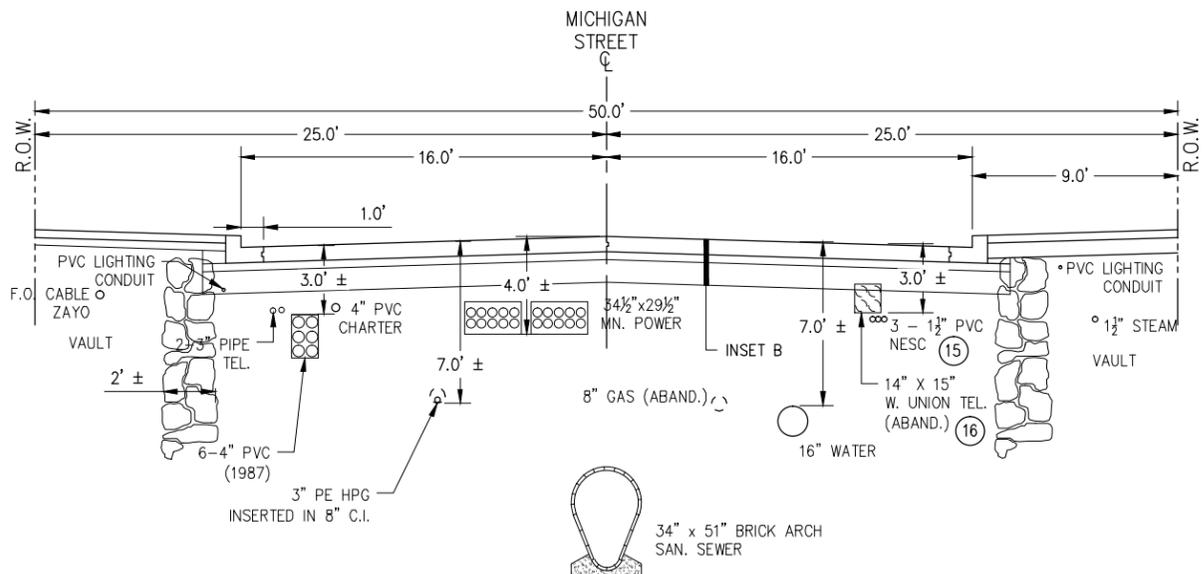
**MICHIGAN STREET EXISTING TYPICAL SECTION**

4TH AVE. WEST TO 3RD AVE WEST. EAST-BLOCK  
 APPX. 80 FT. WEST OF INTERSECTION OF 4TH AVE. WEST.



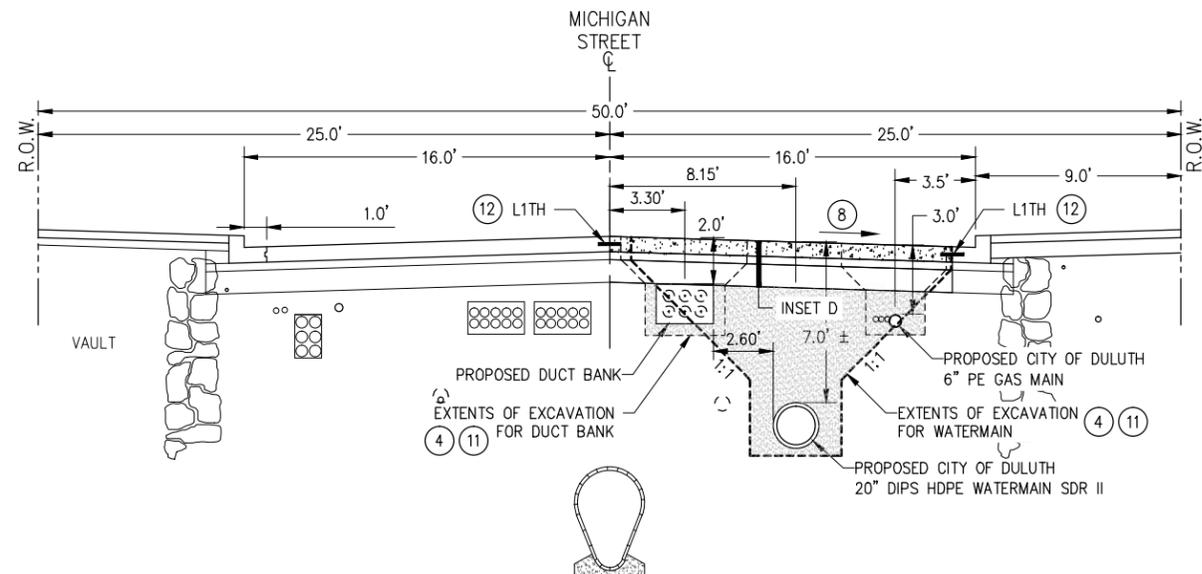
**MICHIGAN STREET PROPOSED TYPICAL SECTION**

4TH AVE. WEST TO 3RD AVE WEST. EAST-BLOCK  
 (STA. 18+90 TO 20+50)



**MICHIGAN STREET EXISTING TYPICAL SECTION**

3RD AVE. WEST TO 2ND AVE WEST. WEST-BLOCK  
 APPX. 50 FT. EAST OF INTERSECTION OF 3RD AVE. WEST.



**MICHIGAN STREET PROPOSED TYPICAL SECTION**

3RD AVE. WEST TO 2ND AVE WEST. WEST-BLOCK  
 (STA. 20+50 TO 22+10)

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BRAD SCOTT  
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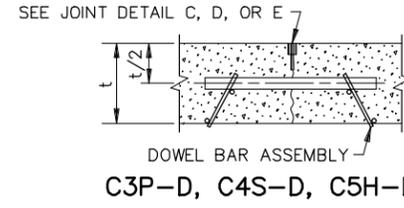
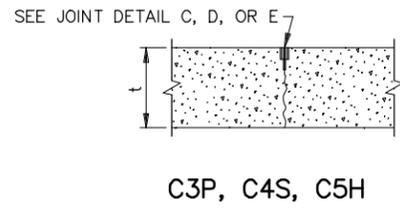
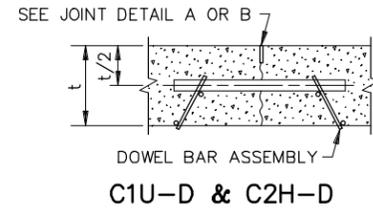
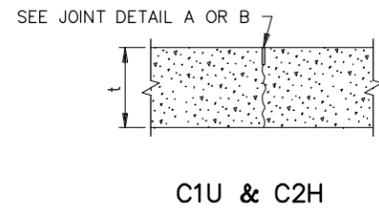


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 46198  
 LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

TYPICAL SECTIONS  
 SHEET NO. 8 OF 47 SHEETS



**CONTRACTION JOINT REFERENCE, DETAIL & SEALER SPEC. TABLE**

JOINT REFERENCE WITHOUT DOWELS	WITH DOWELS	JOINT DETAIL	JOINT SEALER SPEC.	JOINT WIDTH
C1U	C1U-D	A	UNSEALED	1/8"
C2H	C2H-D	B	3725	1/8"
C3P	C3P-D	C	3721	3/8"
C4S	C4S-D	D	3722	3/8"
C5H	C5H-D	E	3725	3/8"

**LEGEND**  
 C = CONTRACTION JOINT NO.  
 U = UNSEALED  
 H = HOT POURED  
 P = PREFORMED  
 S = SILICONE  
 -D = DOWEL BARS

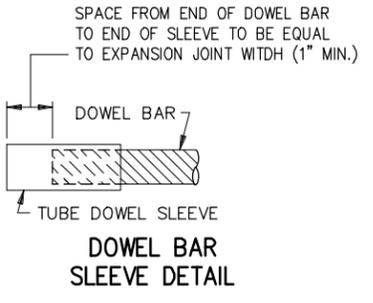
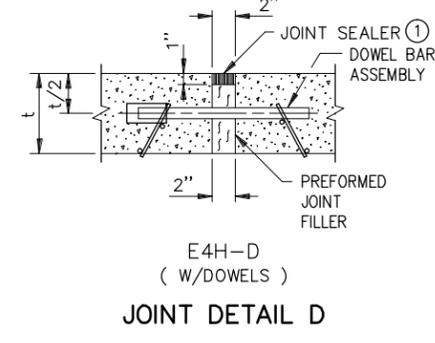
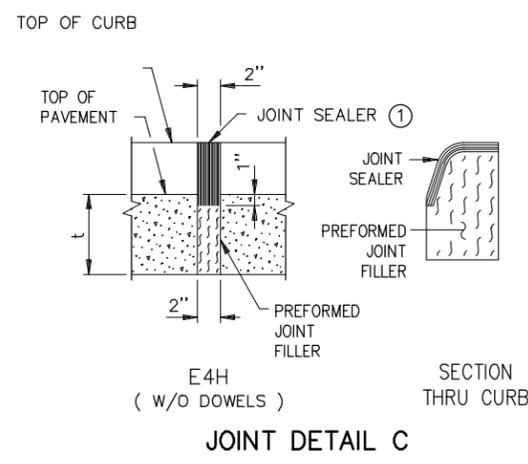
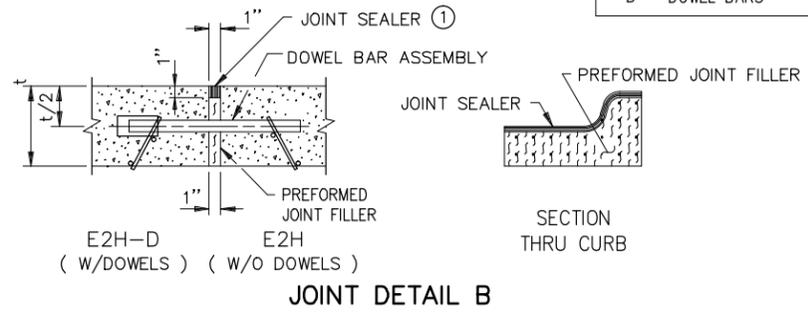
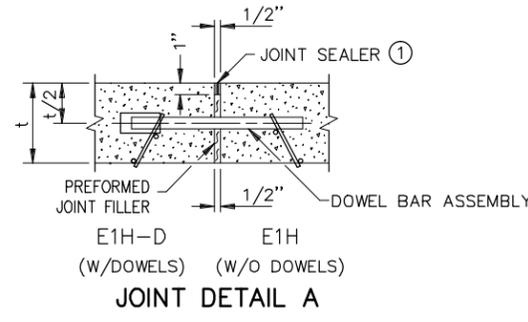
**EXAMPLE**  
 C2H-D

**EXPANSION JOINT REFERENCE, DETAIL & SEALER SPEC. TABLE**

JOINT REFERENCE WITHOUT DOWELS	WITH DOWELS	JOINT DETAIL	JOINT SEALER SPEC.	JOINT WIDTH
E1H	E1H-D	A	3725	1/2"
E2H	E2H-D	B	3725	1"
E4H		C	3725	2"
	E4H-D	D	3725	2"
E8H		STANDARD PLAN 5-297.229	3725	4"

**LEGEND**  
 E = EXPANSION JOINT NO.  
 H = HOT POURED  
 -D = DOWEL BARS

**EXAMPLE**  
 E4H-D



**DOWEL BAR DIAMETER TABLE**

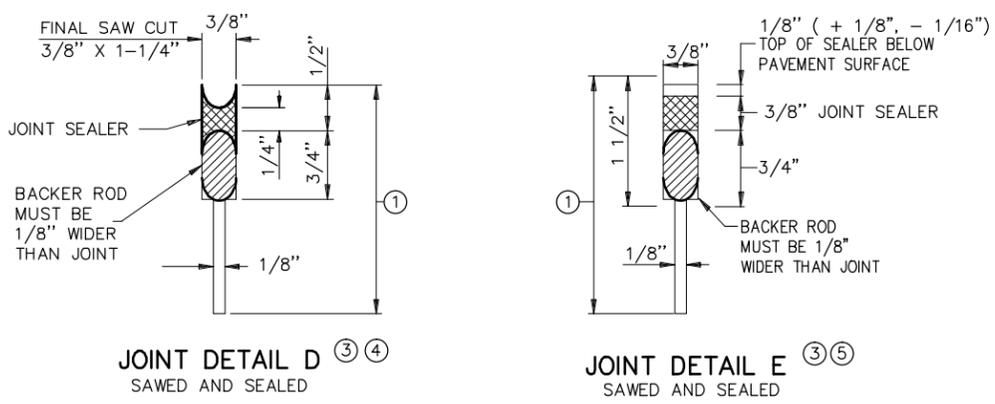
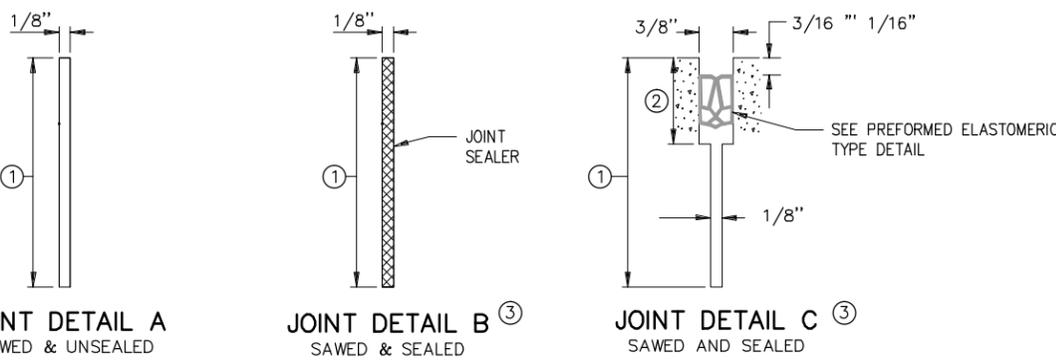
PAVEMENT THICKNESS t	DOWEL BAR DIAMETER
LESS THAN 6"	NONE
6" - 6 1/2"	1"
7" - 10"	1 1/4"
10 1/2" - 14"	1 1/2"

**NOTES:**

- SEE STANDARD PLATE 1103 FOR DOWEL BAR ASSEMBLY.
- SEE STANDARD PLATE 1150 FOR CONSTRUCTION OF HEADER JOINTS.
- JOINT WIDTH TOLERANCE IS + 1/16" TO - 1/32"
- FURNISH AND INSTALL ALL JOINT SEALER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- SEE STANDARD PLANS 5-297.217 AND 5-297.219, FOR CONCRETE MAINLINE/RAMP PAVEMENT.
- SEE PAVING LAYOUTS IN THE PLANS FOR JOINT CLASS DESIGNATION TO BE USED AND SPECIAL REINFORCEMENT REQUIRED.
- JOINT DEPTH SHALL BE:  
 FOR CONCRETE OVERLAYS - 1/3 THE PAVEMENT THICKNESS  
 FOR CONCRETE PAVEMENT - 1/4 THE PAVEMENT THICKNESS
- SEE CONTRACTION JOINT SEALER DETAIL. WHEN USING PREFORMED JOINT SEALER, THE DEPTH SHALL BE 1/4" MORE THAN THE PREFORMED SEALER, WHEN COMPRESSED, TO FIT THE JOINT DESIGN WIDTH. "a" DIMENSION SHALL APPLY AT ANY POINT THROUGHOUT "c" DEPTH. SHARP INTERNAL CORNERS WILL NOT BE PERMITTED. ALL CORNERS SHALL BE PROVIDED WITH SUITABLE FILLET.
- WHEN SEALING, THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING.
- PRIOR TO SEALING THE JOINT, A 1/2" DIA. CLOSED CELL BACKER ROD SHALL BE PLACED SUCH THAT THE TOP OF THE BACKER ROD IS 1/2" BELOW THE SURFACE OF THE PAVEMENT. NON SELF-LEVELING SILICONE SHALL BE TOOLED INTO THE JOINT MAINTAINING A SEAL AND BEAD THICKNESS OF 1/4".
- PRIOR TO SEALING THE JOINT, A 1/2" DIA. CLOSED CELL BACKER ROD CAPABLE OF WITHSTANDING SEALANT TEMPERATURES OF 400 DEGREES F. SHALL BE PLACED 1/2" BELOW THE TOP OF PAVEMENT.

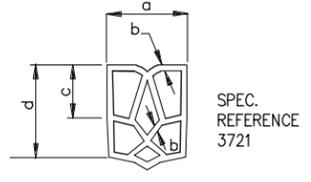
**NOTES:**

- PREFORMED JOINT FILLER MATERIAL, SPEC. 3702.
- FOR DOWEL BAR ASSEMBLY, SEE STANDARD PLATE 1103.
- JOINT SEALER SPEC. 3725. THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING. TOP OF SEALER, FLUSH TO 1/8" BELOW TOP OF PAVEMENT SURFACE. MAKE TOP OF SEALER FOR CURB SECTION D JOINTS FLUSH WITH SURFACE 1/8".



**REQUIRED DIMENSIONS**

JOINT TYPE	TRANSVERSE NOMINAL SEALER SIZE
a	0.69" + 0.13" - 0.05"
b	0.08" ± 0.02"
c	0.25" MIN.
d	0.63" MIN.



**CONTRACTION JOINTS DESIGN C**

**EXPANSION JOINTS DESIGN E**

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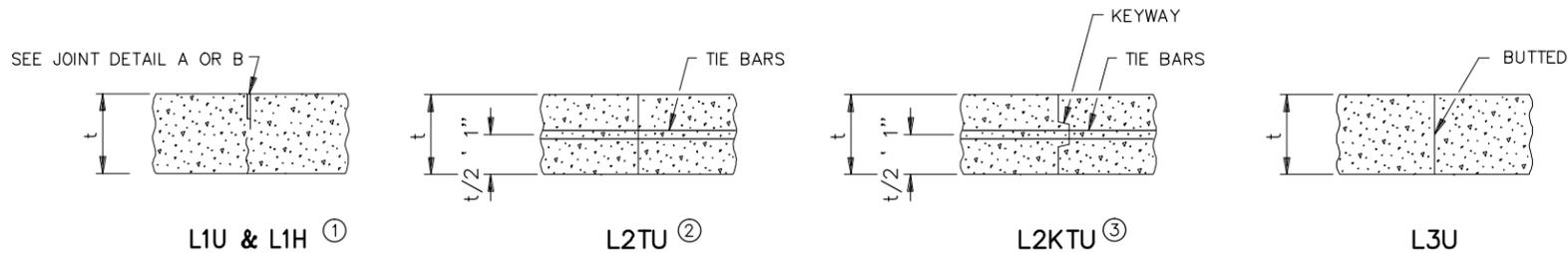
BRAD SCOTT  
 PRINTED NAME

*Brad Scott*  
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 46198  
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MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

CONSTRUCTION DETAILS  
 SHEET NO. 9 OF 47 SHEETS

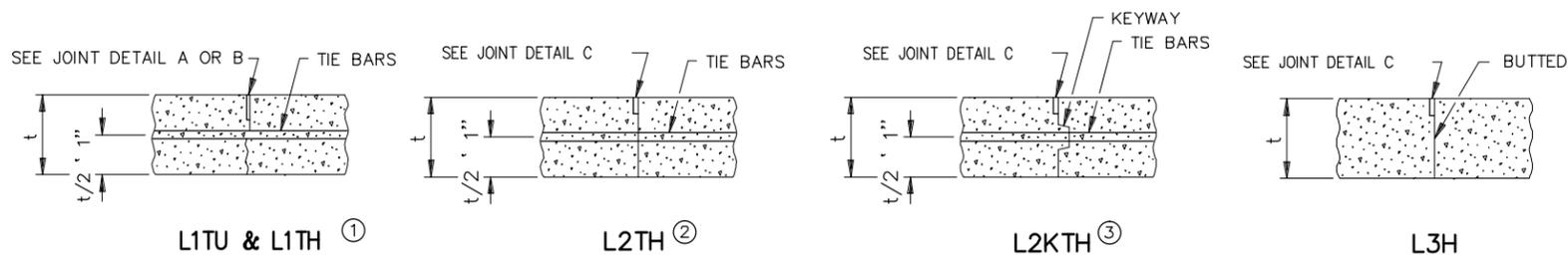


L1U & L1H ①

L2TU ②

L2KTU ③

L3U



L1TU & L1TH ①

L2TH ②

L2KTH ③

L3H

TIEBAR TABLE

PAVEMENT THICKNESS	TIEBAR SIZE	LENGTH
< 10-1/2"	NO. 13	30"
≥ 10-1/2"	NO. 16	36"
ALL THICKNESS WHEN TYING TO CURB AND GUTTER	NO. 13	30"

ALL REBARS ARE IN METRIC DESIGNATIONS

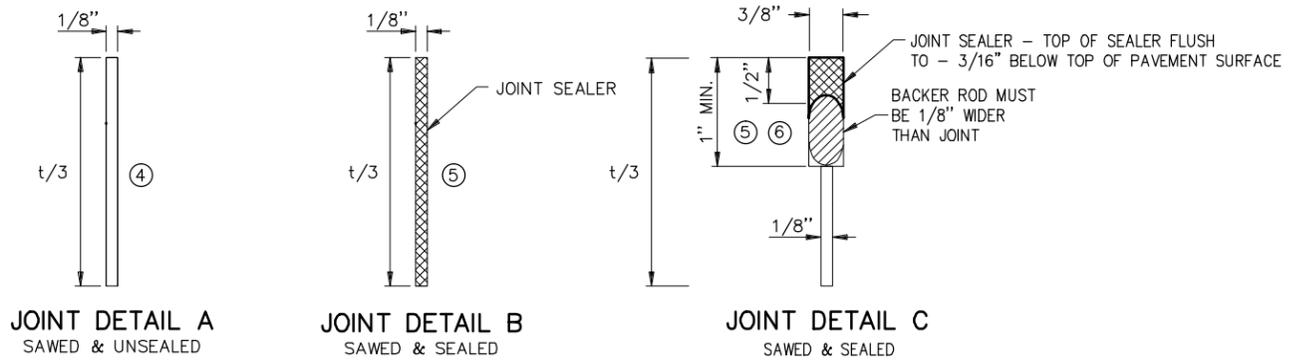
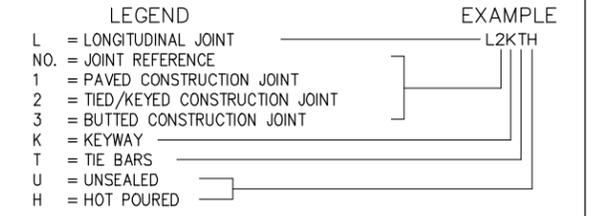
THE TIE BAR SPACING FOR ALL L2T AND L2KT JOINTS SHALL BE 3'-0" CENTER TO CENTER AND BENT 60° AS SHOWN, EXCEPT WHEN NOTED OTHERWISE IN THE PLANS.

TIE BARS IN THE L2T AND L2KT JOINTS SHALL BE THE SAME SIZE AND LENGTH AS USED FOR THE L1T JOINTS, WHEN TYING PAVEMENT TO PAVEMENT. TIE BARS IN THE L2KT JOINTS SHALL BE NO. 13 X 2' - 6", WHEN TYING CURB & GUTTER TO PAVEMENT.

ALL TIE BARS SHALL BE EPOXY COATED AND COMPLY WITH SPEC. 3301.

LONGITUDINAL JOINT REFERENCE, DETAIL & SEALER SPECIFICATION TABLE

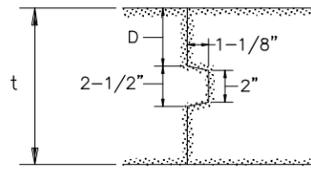
JOINT REFERENCE			JOINT DETAIL	JOINT SEALER SPEC	JOINT WIDTH
WITHOUT TIE BARS	WITH TIE BARS	WITH KEYWAY & TIE BARS			
L1U	L1TU		A	UNSEALED	1/8"
L1H	L1TH		B	3725	1/8"
	L2TU	L2KTU	NONE	UNSEALED	
	L2TH	L2KTH	C	3725	3/8"
L3U			NONE	UNSEALED	
L3H			C	3725	3/8"



JOINT DETAIL A  
SAWED & UNSEALED

JOINT DETAIL B  
SAWED & SEALED

JOINT DETAIL C  
SAWED & SEALED



PAVEMENT KEYWAY DETAIL

KEYWAY DIMENSION TABLE

t PAVEMENT THICKNESS	D (TOLERANCE ± 1/4")
< 7"	NO KEYWAY
7" TO 7-1/2"	3"
8" TO 10"	4"
≥ 10-1/2"	5"

KEYWAY ( 1-1/8" x 2" x 2-1/2") MAY BE FORMED WITH MOLD OR METAL FORM. OTHER APPROVED KEYWAY SHAPES GIVING EQUIVALENT CONSTRUCTION FEATURES MAY BE USED WITH APPROVAL OF THE ENGINEER.

NOTES:

NORMALLY, TIED PAVEMENT WIDTHS SHALL NOT EXCEED FOUR LANES, EXCEPT BRIDGE APPROACH PANELS AND PAVEMENT TAPERS.

JOINT WIDTH TOLERANCE IS + 1/16 IN. TO - 1/32 IN.

FURNISH AND INSTALL ALL JOINT SEALER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

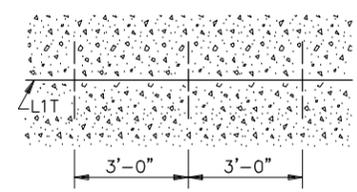
TIED/KEYED AND BUTTED CONSTRUCTION JOINTS SHALL BE UNSEALED EXCEPT AS OTHERWISE NOTED IN THE PLAN OR REQUIRED BY THE ENGINEER.

SEE STANDARD PLANS 5-297.217 AND 5-297.219 FOR CONCRETE MAINLINE AND RAMP PAVEMENT.

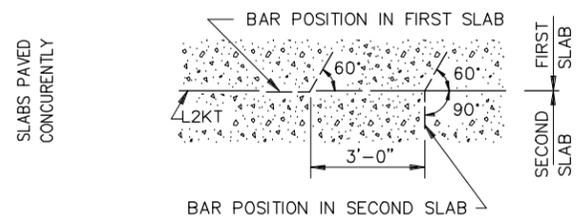
SEE PAVING LAYOUTS IN THE PLANS FOR JOINT CLASS DESIGNATIONS TO BE USED AND SPECIAL REINFORCEMENT REQUIRED.

WHEN CURB AND GUTTER IS PLACED ADJACENT TO CONCRETE MAINLINE, THE TIEBARS SHALL BE PLACED A MINIMUM OF 2" ABOVE THE CURB AND GUTTER GRADE.

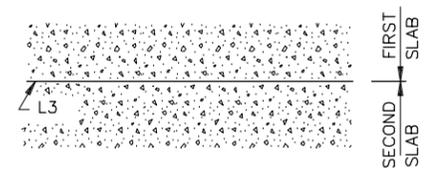
- SEE THE LONGITUDINAL JOINT REFERENCE, DETAIL & SEALER SPECIFICATION TABLE TO DETERMINE JOINT DETAIL.
- CONCRETE PAVEMENTS LESS THAN 7" SHALL USE L2TU AND L2TH JOINTS UNLESS OTHERWISE ALLOWED BY THE ENGINEER.
- CONCRETE PAVEMENTS GREATER THAN OR EQUAL TO 7" SHALL USE L2KTU AND L2KTH JOINTS UNLESS OTHERWISE ALLOWED BY THE ENGINEER.
- THE JOINT FACES SHALL BE CLEANED WITH WATER DURING THE SAW CUTTING OPERATION OR BY WATER BLASTING AFTER SAWING.
- THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING.
- PRIOR TO SEALING THE JOINT, A 1/2" DIAMETER CLOSED CELL BACKER ROD CAPABLE OF WITHSTANDING SEALANT TEMPERATURES OF 400 DEGREES F. SHALL BE PLACED 1/2" BELOW THE TOP OF THE PAVEMENT.



L1T PAVING DETAIL



L2T & L2KT TIE BAR BENDING AND PAVING DETAIL



L3 PAVING DETAIL

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BRAD SCOTT  
PRINTED NAME

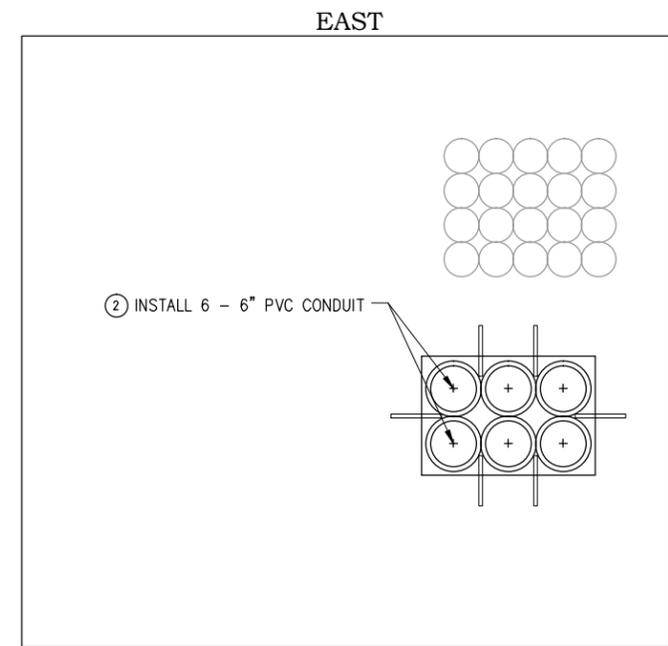
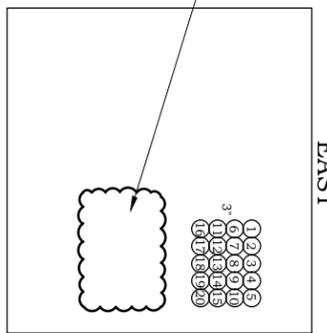
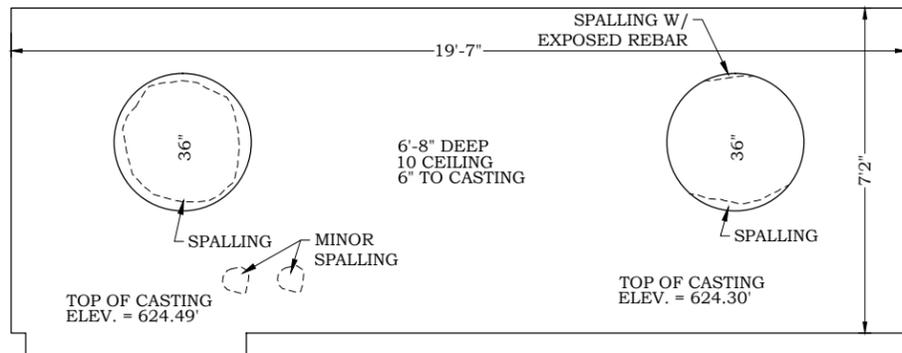
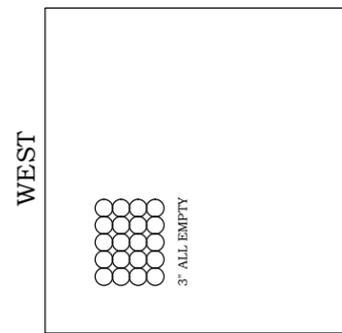
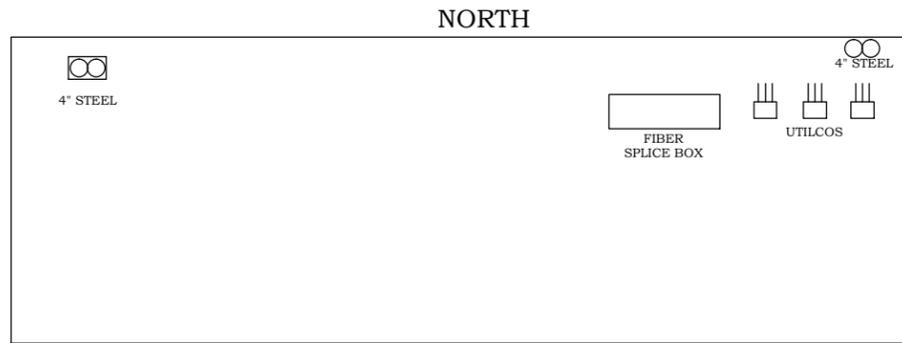
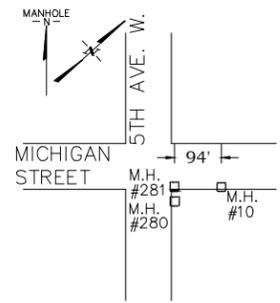


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46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

CONSTRUCTION DETAILS  
SHEET NO. 10 OF 47 SHEETS

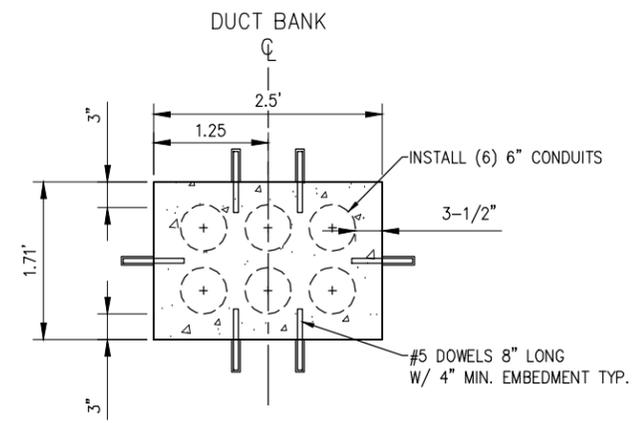


- 26) ELECTRICAL WIRE
- 25) EMPTY (ABANDONED)
- 24) NEUTRAL
- 23) 261, 3/C
- 22) EMPTY
- 21) EMPTY
- 20) 222, 2/C
- 19) 222, 1/C
- 18) 260, 3C
- 17) 226, 3C
- 16) EMPTY
- 15) EMPTY
- 14) EMPTY
- 13) EMPTY
- 12) EMPTY
- 11) 2 FIBER OPTIC
- 10) CONTROL WIRE
- 9) 8) 1 FIBER OPTIC
- 8) EMPTY
- 7) ABN
- 6) 5) 4) 3) 2) 1) EMPTY

- 1F
- 226, 2/C
- 2) NEUTRAL, CONTROL WIRE
- 3) 4) 5) 6) 7) 8) 9) 10) 11) 12) 13) 14) 15) 16) 17) 18) 19) 20) 222, 1/C
- 260
- 261, 2/C
- 222, 1/C
- 222, 2/C
- 260
- 261, 1/C
- 222, 1/C
- 222, 2/C
- 260
- 261, 2/C
- 222, 1/C
- 222, 2/C

2 MH-281 EAST WALL CONNECTION DETAIL  
NOT TO SCALE

1 MH-281 BUTTERFLY DIAGRAM  
NOT TO SCALE



3 TYPICAL CONNECTION DETAIL  
NOT TO SCALE

**WORK TO BE DONE**

- SPALL REPAIR 1**
- REMOVE ALL LOOSE/SPALLING CONCRETE TO SOLID CONCRETE.
  - REMOVE ALL CORROSION/RUST FROM EXPOSED REBAR SURFACES.
  - COAT EXPOSED REBAR WITH SIKA ARMATEC 110 EPOCEM OR APPROVED EQUIVALENT EPOXY TO ALL EXPOSED REBAR SURFACES.
  - CLEAN ALL EXPOSED CONCRETE SURFACES OF DUST & DEBRIS.
  - USE FIVE STAR STRUCTURAL CONCRETE V/O OR APPROVED EQUAL TO FILL ALL SPALLED CONCRETE AREAS.

- DUCT BANK PENETRATION 2**
- CUT 20 1/2" X 30" HOLE IN THE EAST CONCRETE WALL & REMOVE ALL LOOSE CONCRETE.
  - INSTALL #5 EPOXY COATED REBAR DOWELS INTO THE CONCRETE WITH 4" MINIMUM EMBEDMENT USING HILTI HIT-HY-500 INJECTABLE MORTAR OR APPROVED EQUAL.
  - PLACE 6 - 6" DIAMETER PVC CONDUITS IN THE HOLE.
  - USE 4000 PSI CONCRETE TO ENCASE THE NEW CONDUITS.

**KEY NOTES:**

- SHALL BE INCLUDED FOR PAYMENT UNDER THE SINGLE LUMP SUM PAY ITEM, "REPAIR ELECTRICAL MANHOLE TYPE A".
- PAID FOR AS "CONNECT TO EXIST'G ELECTRICAL MANHOLE" BY THE EACH FOR CONNECTING (6) CONDUITS AS SHOWN.

PLOT DATE: 2/25/2016 3:10:01 PM FILE: R:\Epro\150724\600 Drawings\150724\_05 Construction Details.dwg

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BRAD SCOTT  
PRINTED NAME

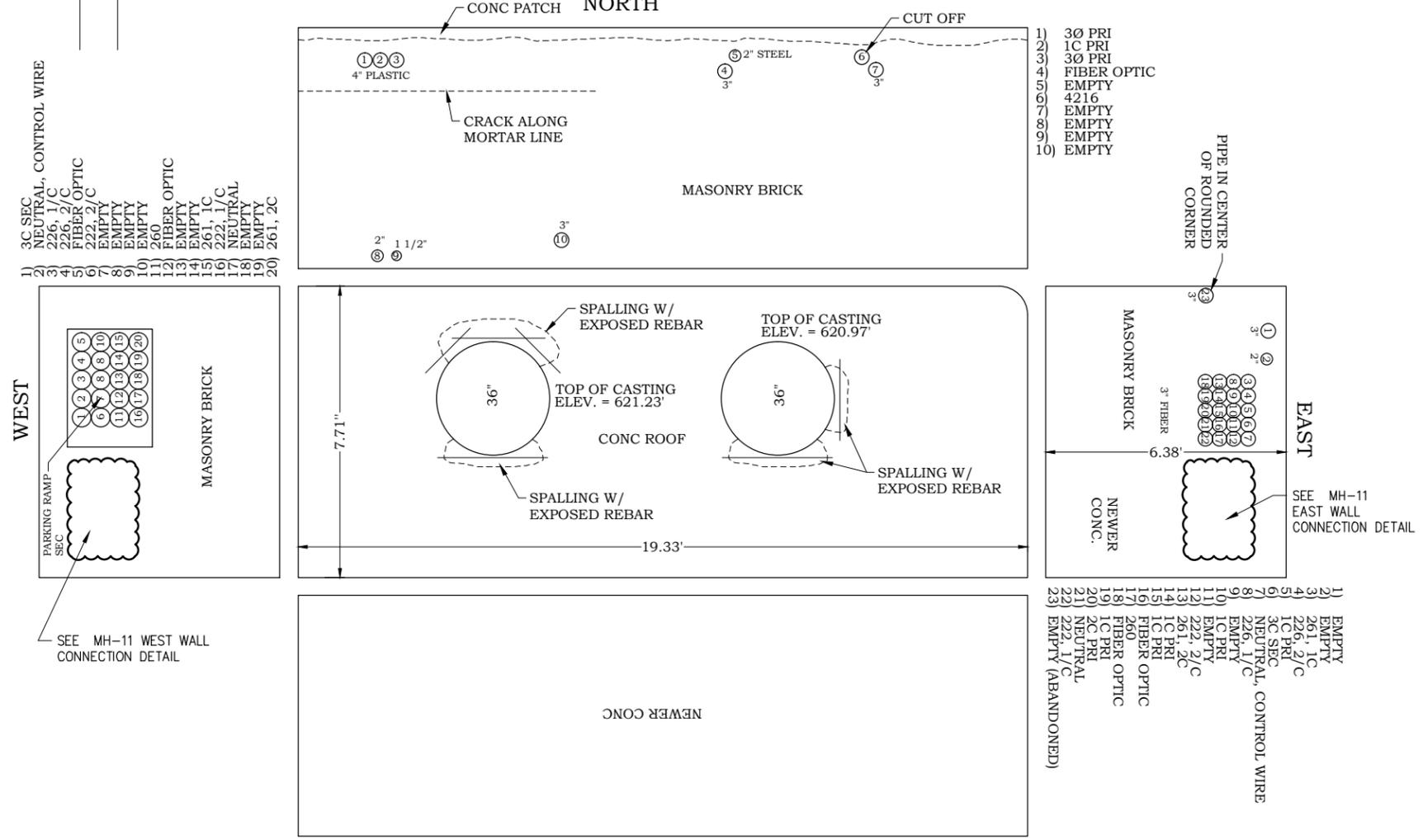
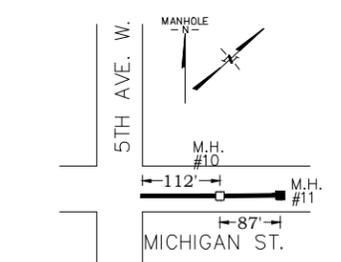
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MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

CONSTRUCTION DETAILS  
SHEET NO. 11 OF 47 SHEETS

PLOT DATE: 2/25/2016 3:10:12 PM FILE: R:\EPROJ\150724\600 Drawings\150724\_05 Construction Details.dwg



**1 MH-11 BUTTERFLY DIAGRAM**  
NOT TO SCALE

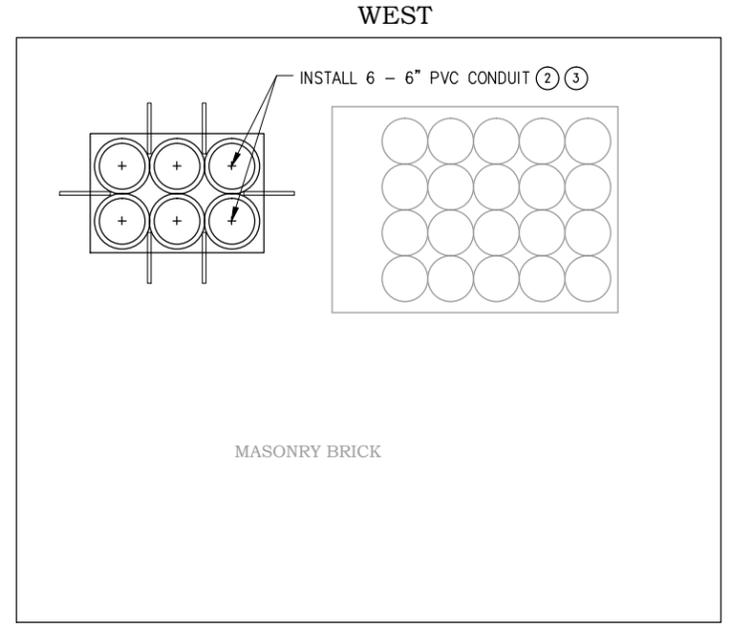
**WORK TO BE DONE**

- SPALL REPAIR ①**
- REMOVE ALL LOOSE/SPALLING CONCRETE TO SOLID CONCRETE.
  - REMOVE ALL CORROSION/RUST FROM EXPOSED REBAR SURFACES.
  - COAT EXPOSED REBAR WITH SIKA ARMATEC 110 EPOCEM OR APPROVED EQUIVALENT EPOXY TO ALL EXPOSED REBAR SURFACES.
  - CLEAN ALL EXPOSED CONCRETE SURFACES OF DUST & DEBRIS.
  - USE FIVE STAR STRUCTURAL CONCRETE V/O OR APPROVED EQUAL TO FILL ALL SPALLED CONCRETE AREAS.
- CRACK REPAIR ①**
- REMOVE LOOSE/CRACKING MASONRY MORTAR.
  - CLEAN OUT THE CRACK/Joint OF ALL DUST/DEBRIS.
  - USE HIGH STRENGTH MORTAR TO FILL THE CRACK AREA.

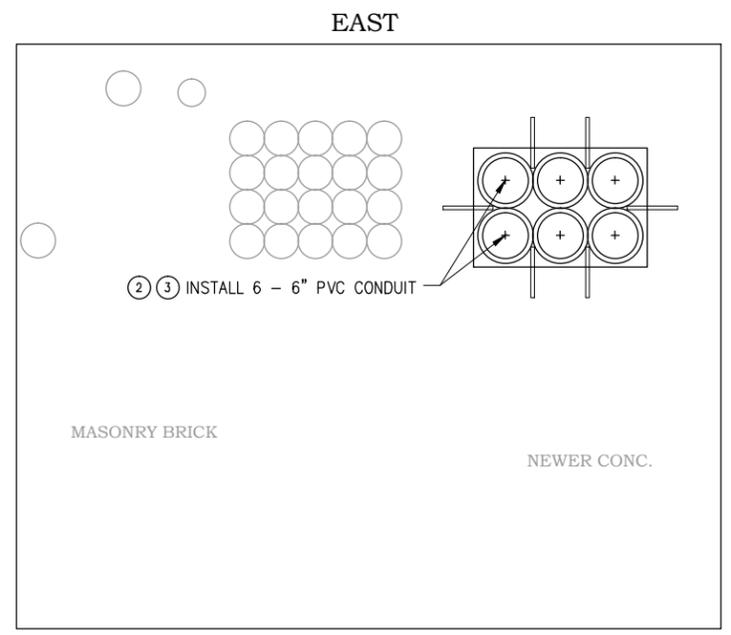
- DUCT BANK PENETRATION ②**
- CUT 20.5" x 30" HOLE IN EAST & WEST MASONRY WALLS & REMOVE ALL LOOSE CONCRETE/MASONRY.
  - INSTALL #5 EPOXY COATED REBAR DOWELS INTO THE MASONRY WITH 4" MIN. EMBEDMENT USING HILTI HIT-HY-70 INJECTABLE MORTAR OR APPROVED EQUAL.
  - PLACE 6-6" DIAMETER PVC CONDUITS.
  - USE 4000 PSI CONCRETE TO ENCASE THE NEW CONDUITS.

**KEY NOTES:**

- SHALL BE INCLUDED FOR PAYMENT UNDER THE SINGLE LUMP SUM PAY ITEM, "REPAIR ELECTRICAL MANHOLE TYPE B".
- PAID FOR AS "CONNECT TO EXIST'G ELECTRICAL MANHOLE" BY THE EACH FOR CONNECTING (6) CONDUITS AS SHOWN.
- SEE TYPICAL CONNECTION DETAIL ON SHEET 11.



**2 MH-11 WEST WALL CONNECTION DETAIL**  
NOT TO SCALE



**3 MH-11 EAST WALL CONNECTION DETAIL**  
NOT TO SCALE

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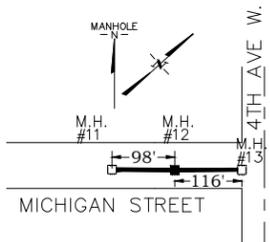
BRAD SCOTT  
PRINTED NAME

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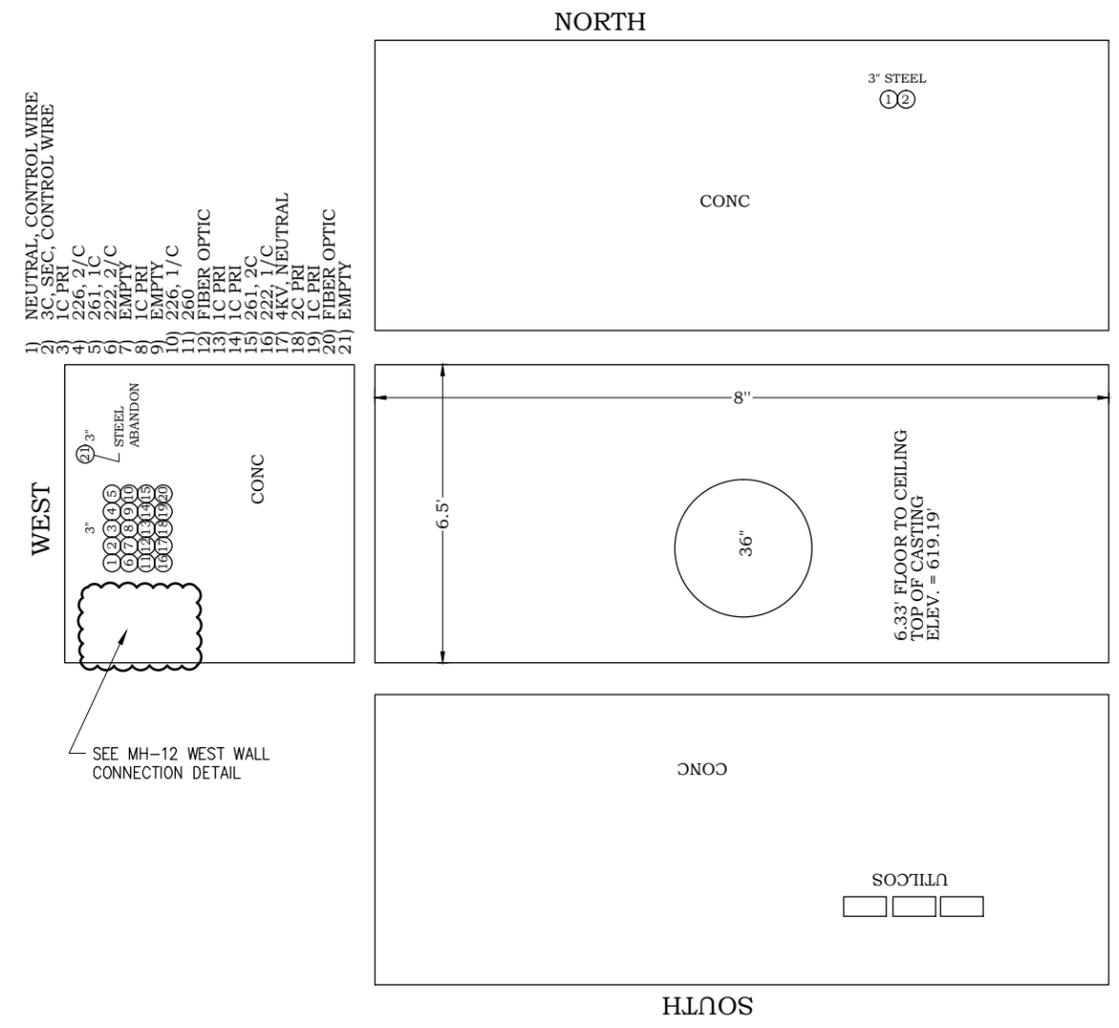
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MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

CONSTRUCTION DETAILS  
SHEET NO. 12 OF 47 SHEETS

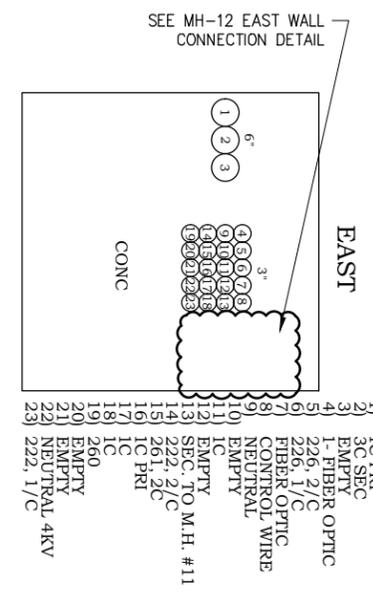


NOTE: VAULT LOOKED TO BE IN GOOD SHAPE STRUCTURALLY.

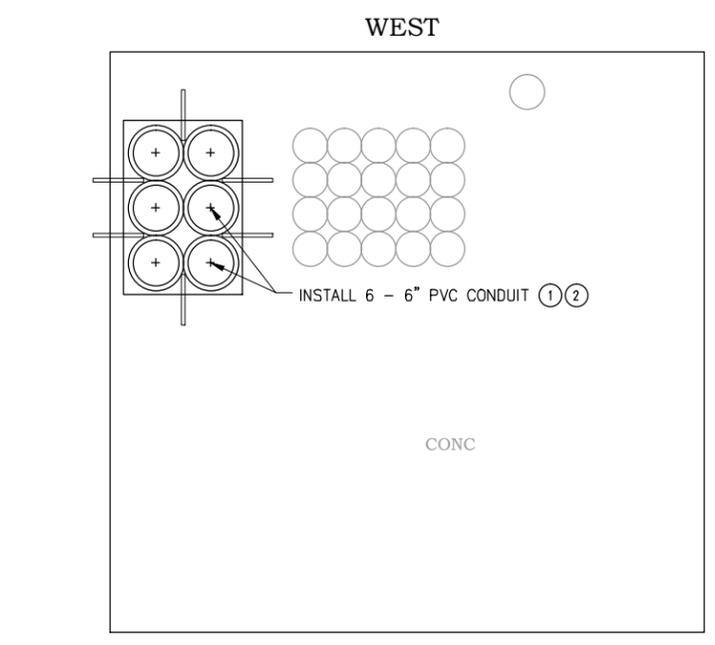


- 1) EMPTY
- 2) EMPTY

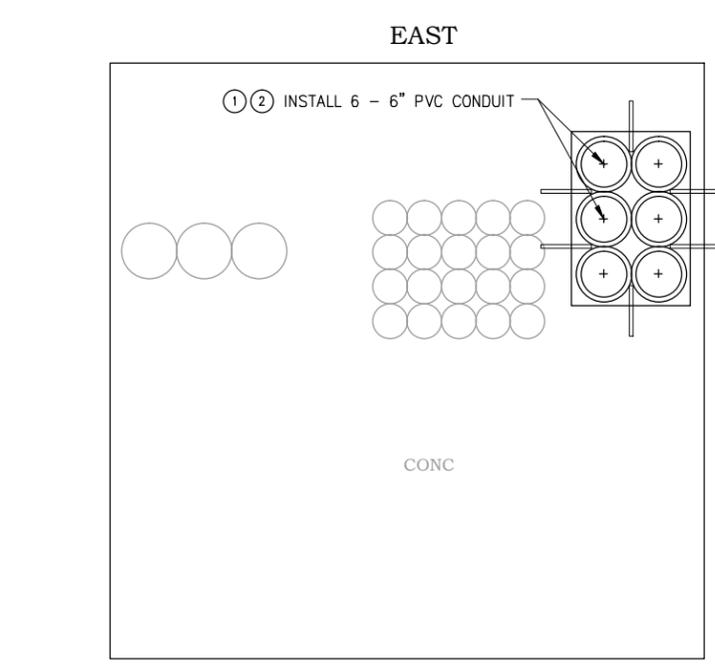
- 1) NEUTRAL, CONTROL WIRE
- 2) 3C, SEC, CONTROL WIRE
- 3) 1C PRI
- 4) 226, 2/C
- 5) 261, 1/C
- 6) 222, 2/C
- 7) EMPTY
- 8) 1C PRI
- 9) EMPTY
- 10) 226, 1/C
- 11) 260
- 12) FIBER OPTIC
- 13) 1C PRI
- 14) 261, 2C
- 15) 222, 1/C
- 16) 222, 1/C
- 17) 4KV, NEUTRAL
- 18) 2C PRI
- 19) 1C PRI
- 20) FIBER OPTIC
- 21) EMPTY



- 1) 1C PRI
- 2) 3C SEC
- 3) EMPTY
- 4) 1- FIBER OPTIC
- 5) 226, 2/C
- 6) 226, 1/C
- 7) FIBER OPTIC
- 8) CONTROL WIRE
- 9) NEUTRAL
- 10) EMPTY
- 11) 1C
- 12) SEC. TO M.H. #11
- 13) 222, 2/C
- 14) 222, 2/C
- 15) 261, 2C
- 16) 1C PRI
- 17) 1C
- 18) 1C
- 19) 260
- 20) EMPTY
- 21) FIBER OPTIC
- 22) NEUTRAL 4KV
- 23) 222, 1/C



2) MH-12 WEST WALL CONNECTION DETAIL  
NOT TO SCALE



3) MH-12 EAST WALL CONNECTION DETAIL  
NOT TO SCALE

1) MH-12 BUTTERFLY DIAGRAM  
NOT TO SCALE

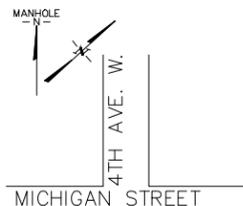
**WORK TO BE DONE**

- DUCT BANK PENETRATION ①
1. CUT 20.5" X 30" HOLE IN EAST AND WEST CONCRETE WALLS.
  2. INSTALL #5 EPOXY COATED REBAR DOWELS BETWEEN CONDUITS WITH MIN. 4" OF EMBEDMENT USING HILTI HIT-HY-500 INJECTABLE MORTAR OR APPROVED EQUAL.
  3. PLACE 6-6" DIAMETER PVC CONDUITS.
  4. USE 4000 PSI CONCRETE TO ENCASE THE NEW CONDUITS.

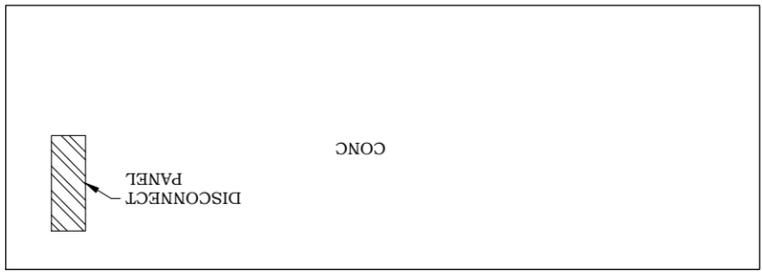
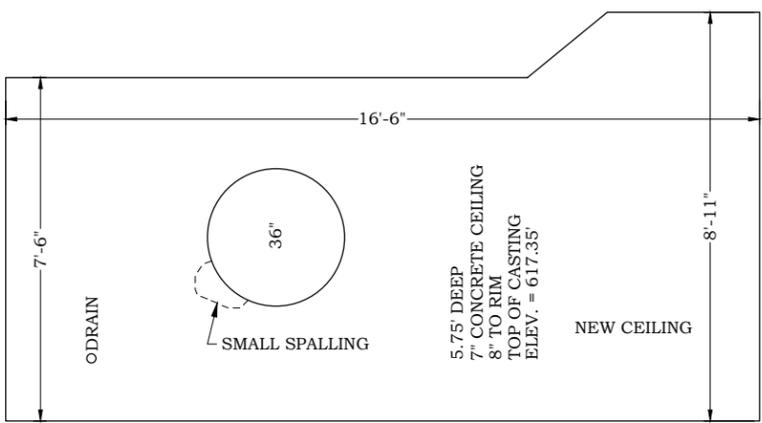
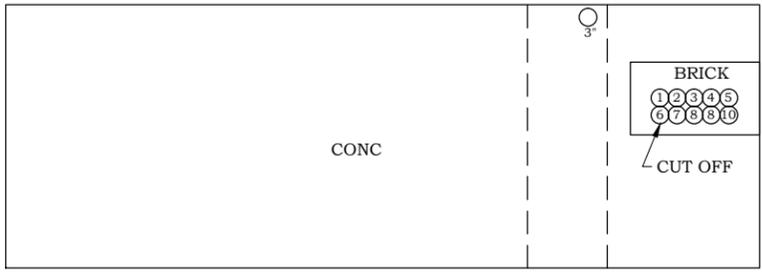
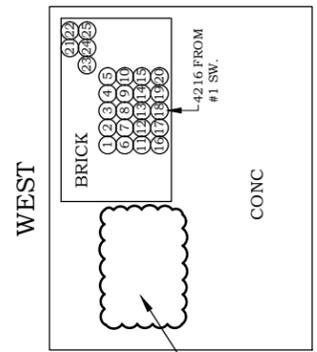
**KEY NOTES:**

- ① PAID FOR AS "CONNECT TO EXIST'G ELECTRICAL MANHOLE" BY THE EACH FOR CONNECTING (6) CONDUITS AS SHOWN.
- ② SEE TYPICAL CONNECTION DETAIL ON SHEET 11.

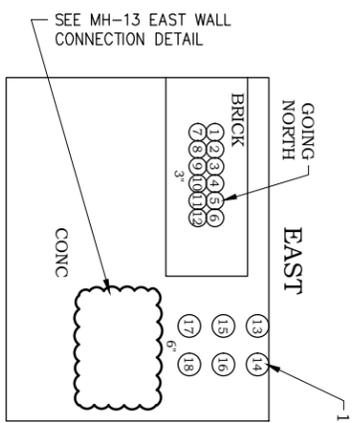
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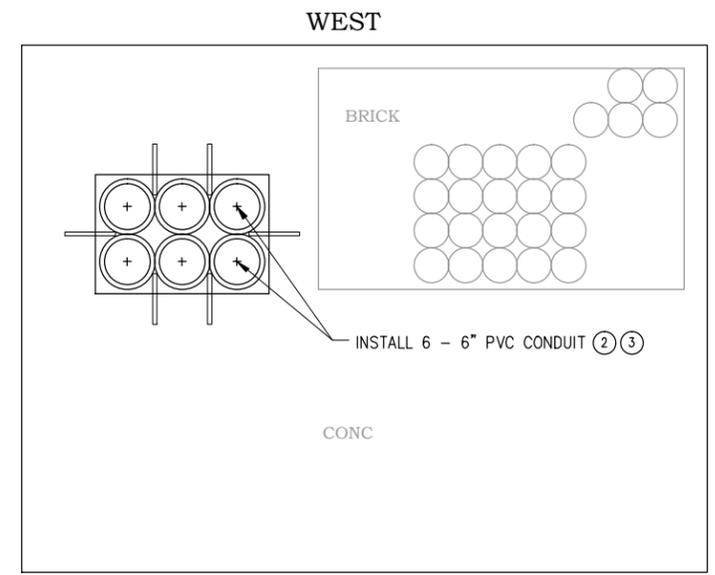
- CONTROL WIRE
- 1) 226, 1/C
  - 2) 226, 2/C
  - 3) FIBER OPTIC
  - 4) 222, 2/C
  - 5) EMPTY
  - 6) 1C
  - 7) NEURAL
  - 8) 260
  - 9) 1C
  - 10) 1C
  - 11) 2C
  - 12) 2C
  - 13) 2C
  - 14) 222, 1/C
  - 15) 4KV N
  - 16) 2C
  - 17) 2C
  - 18) 2C
  - 19) 2C
  - 20) 2C
  - 21) 2C
  - 22) 2C
  - 23) 2C
  - 24) 2C
  - 25) 2C



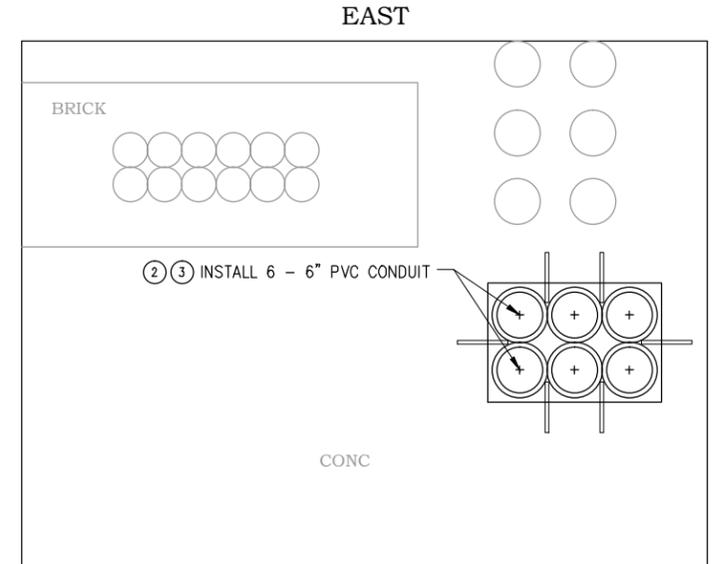
- 1) CUT OFF
- 2) LGT
- 3) LGT
- 4) EMPTY
- 5) FIBER OPTIC
- 6) FIBER OPTIC
- 7) 4216, 2/C
- 8) 42106, 1/C
- 9) FIBER OPTIC
- 10) 4 KV N
- 11) EMPTY



- 1) 226, 1/C
- 2) 226, 2/C
- 3) FIBER OPTIC
- 4) 222, 2/C
- 5) EMPTY
- 6) 1C
- 7) NEURAL
- 8) 260
- 9) 1C
- 10) 1C
- 11) 2C
- 12) 2C
- 13) 2C
- 14) 222, 1/C
- 15) 4KV N
- 16) 2C
- 17) 2C
- 18) 2C
- 19) 2C



2 MH-13 WEST WALL CONNECTION DETAIL  
NOT TO SCALE



3 MH-13 SOUTH WALL CONNECTION DETAIL  
NOT TO SCALE

1 MH-13 BUTTERFLY DIAGRAM  
NOT TO SCALE

**WORK TO BE DONE**

- SPALL REPAIR (1)**
- REMOVE ALL LOOSE/SPALLING CONCRETE TO SOLID CONCRETE.
  - REMOVE ALL CORROSION/RUST FROM EXPOSED REBAR SURFACES.
  - APPLY A COAT OF SIKA ARMATEC 110 EPO CEM OR APPROVED EQUAL EPOXY TO ALL EXPOSED REBAR SURFACES.
  - CLEAN ALL EXPOSED CONCRETE SURFACES OF DUST & DEBRIS.
  - USE FIVE STAR STRUCTURAL CONCRETE V/O OR APPROVED EQUAL TO FILL ALL SPALLED CONCRETE AREAS.

- DUCT BANK PENETRATION (2)**
- CUT 20.5" X 30" HOLE IN THE EAST & WEST CONCRETE WALLS & REMOVE ALL LOOSE CONCRETE.
  - INSTALL #5 EPOXY COATED REBAR DOWELS INTO THE CONCRETE WITH 4" MINIMUM EMBEDMENT USING HILTI HIT-HY-500 INJECTABLE MORTAR OR APPROVED EQUAL.
  - PLACE 6 - 6" DIAMETER PVC CONDUITS IN HOLE.
  - USE 4000 PSI CONCRETE TO ENCASE THE NEW CONDUITS.

**KEY NOTES:**

- SHALL BE INCLUDED FOR PAYMENT UNDER THE SINGLE LUMP SUM PAY ITEM, "REPAIR ELECTRICAL MANHOLE TYPE C".
- PAID FOR AS "CONNECT TO EXIST'G ELECTRICAL MANHOLE" BY THE EACH FOR CONNECTING (6) CONDUITS AS SHOWN.
- SEE TYPICAL CONNECTION DETAIL ON SHEET 11.

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BRAD SCOTT  
PRINTED NAME

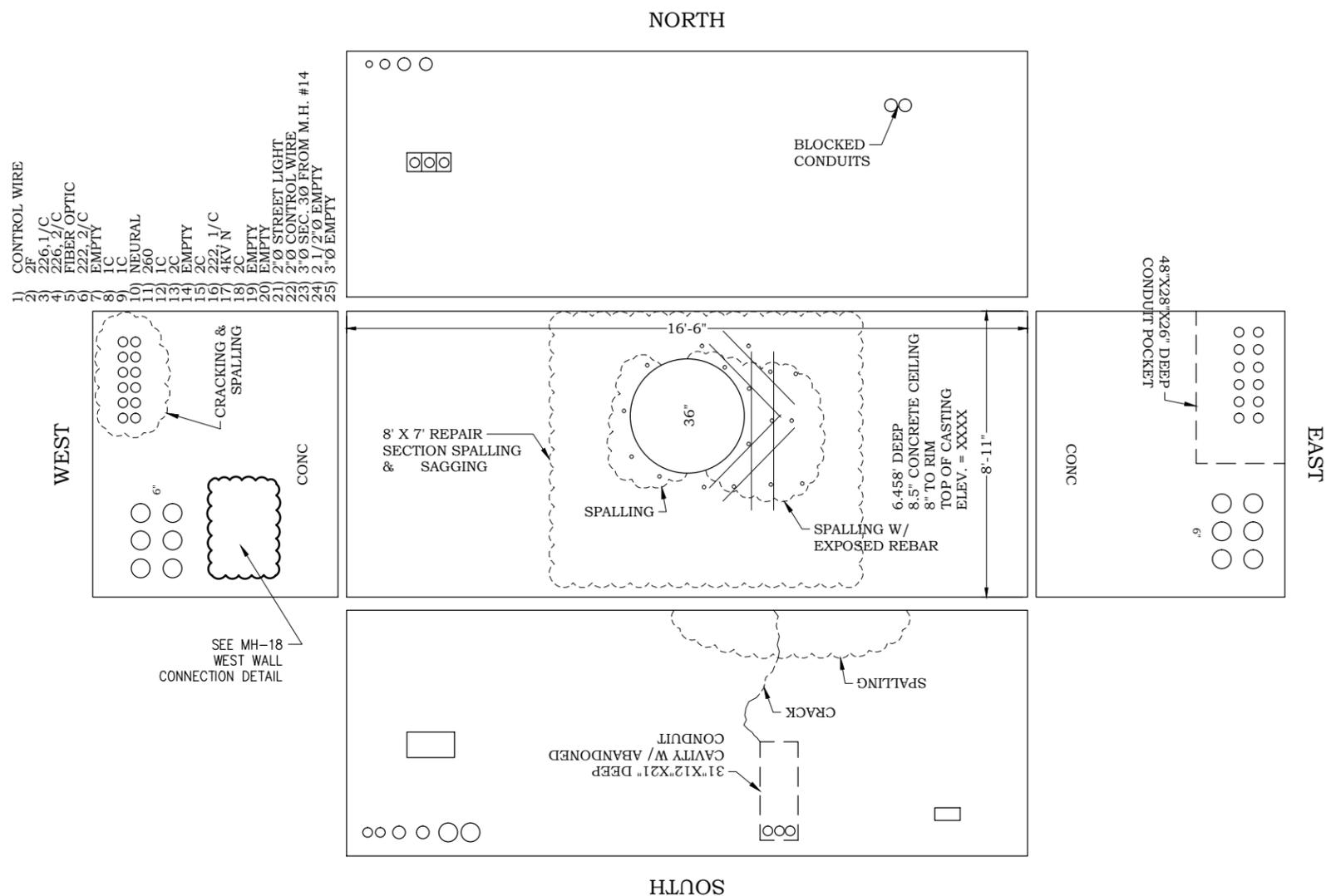
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DATE  
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LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

CONSTRUCTION DETAILS  
SHEET NO. 14 OF 47 SHEETS

PLOT DATE: 2/25/2016 3:10:41 PM FILE: R:\EPC\150724\600 Drawings\150724\_05 Construction Details.dwg



**1 MH-18 BUTTERFLY DIAGRAM**  
NOT TO SCALE

**WORK TO BE DONE**

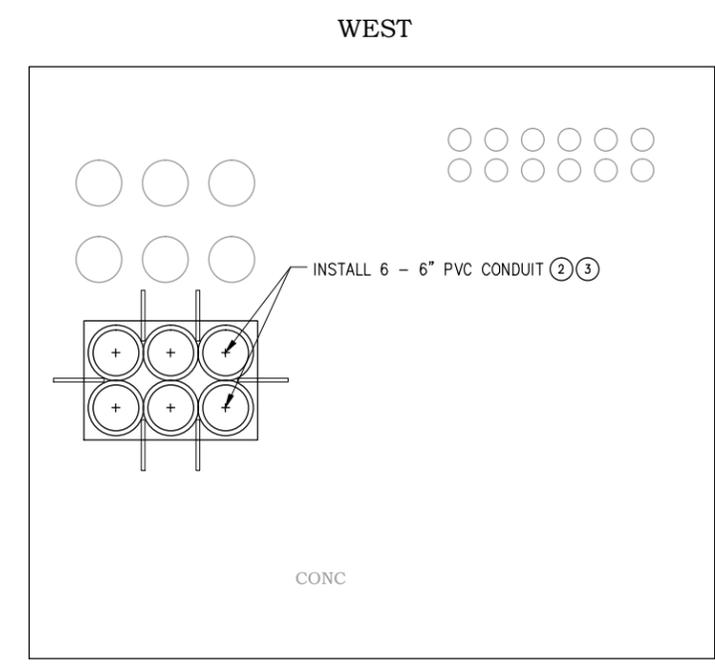
- SPALL REPAIR ①**
- REMOVE ALL LOOSE/SPALLING CONCRETE TO SOLID CONCRETE.
  - REMOVE ALL CORROSION/RUST FROM EXPOSED REBAR SURFACES.
  - COAT EXPOSED REBAR WITH SIKA ARMATEC 110 EPOCEM OR APPROVED EQUIVALENT EPOXY TO ALL EXPOSED REBAR SURFACES.
  - INSTALL #5 EPOXY COATED REBAR DOWELS AND TIE #8 EPOXY COATED REBAR (N.S.) TO THE DOWELS WHERE EXPOSED REINFORCING HAS CORRODED EXISTING STEEL TO LESS THAN 5/8" DIAMETER. EMBEDMENT MUST BE 4" MIN. USING HILTI HIT-HY-500 EPOXY OR APPROVED EQUAL. ALL REINFORCING MUST HAVE A MINIMUM COVER OF 1 1/2". SEE DETAIL ON THIS SHEET.
  - CLEAN ALL EXPOSED CONCRETE SURFACES OF DUST/DEBRIS.
  - USE FIVE STAR STRUCTURAL CONCRETE V/O OR APPROVED EQUAL TO FILL ALL SPALLED CONCRETE AREAS.

**DUCT BANK PENETRATION ②**

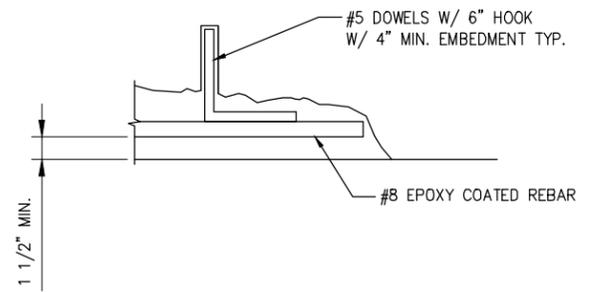
- CUT 20.5" X 30" HOLE IN THE WEST CONCRETE WALL & REMOVE ALL LOOSE CONCRETE.
- INSTALL #5 EPOXY COATED REBAR DOWELS INTO THE CONCRETE WITH 4" MINIMUM EMBEDMENT USING HILTI HIT-HY-500 INJECTABLE MORTAR OR APPROVED EQUAL.
- PLACE 6 - 6" DIAMETER PVC CONDUITS IN HOLE.
- USE 4000 PSI CONCRETE TO ENCASE THE NEW CONDUITS.

**KEY NOTES:**

- SHALL BE INCLUDED FOR PAYMENT UNDER THE SINGLE LUMP SUM PAY ITEM, "REPAIR ELECTRICAL MANHOLE TYPE D".
- PAID FOR AS "CONNECT TO EXIST'G ELECTRICAL MANHOLE" BY THE EACH FOR CONNECTING (6) CONDUITS AS SHOWN.
- SEE TYPICAL CONNECTION DETAIL ON SHEET 11.



**2 MH-18 WEST WALL CONNECTION DETAIL**  
NOT TO SCALE



**3 SPALL REINFORCEMENT DETAIL ③**  
NOT TO SCALE

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BRAD SCOTT  
PRINTED NAME

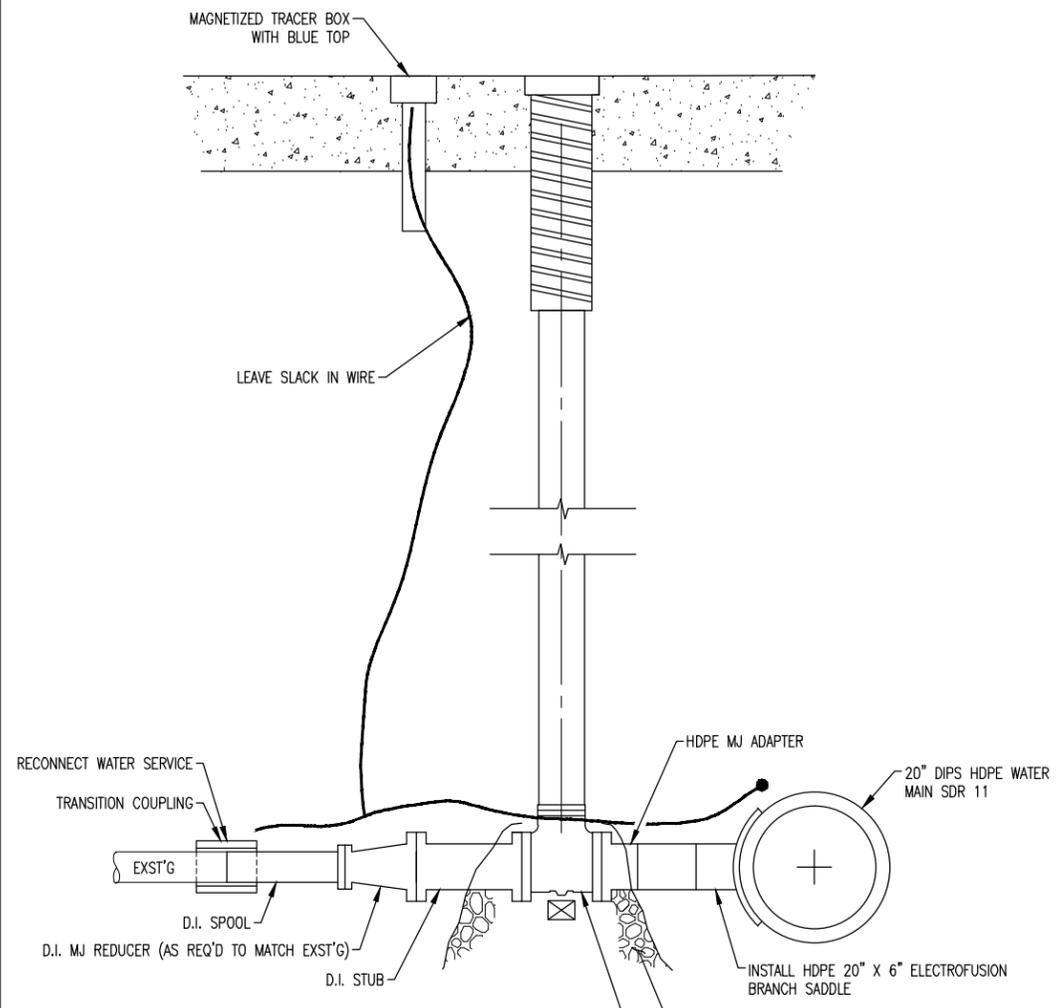
*Brad Scott*  
SIGNATURE

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LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

CONSTRUCTION DETAILS  
SHEET NO. 15 OF 47 SHEETS

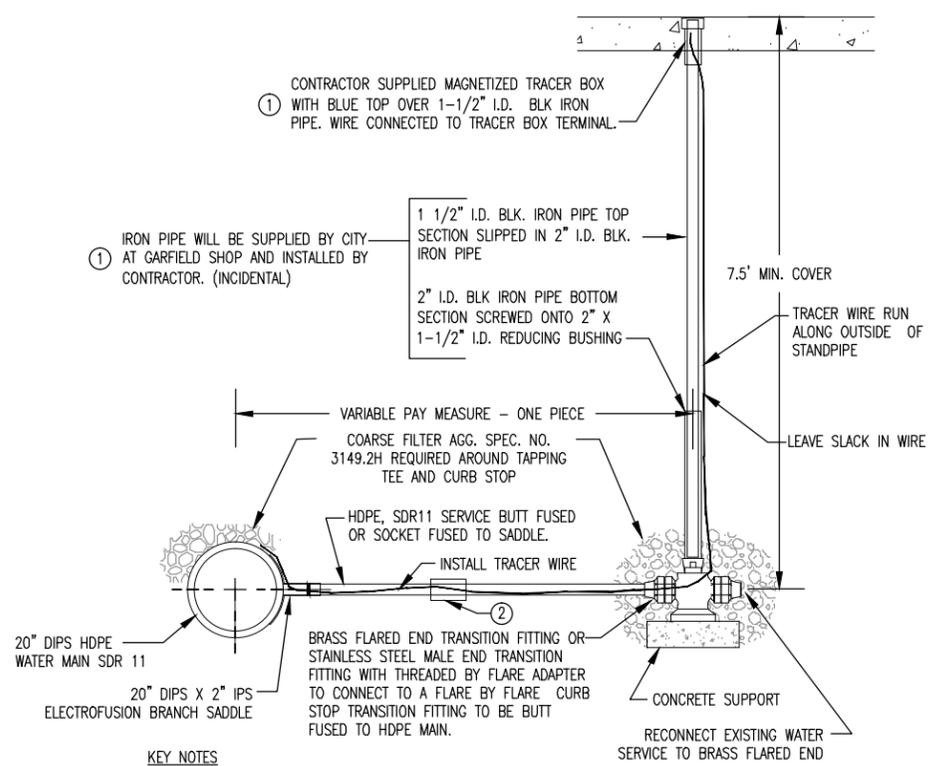
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- NOTES
- VALVES SHALL BE CONNECTED DIRECTLY TO MECHANICAL JOINT ADAPTERS.
  - ALL BOLTS SHALL BE COR-TEN WITH 6 OUNCE ZINC ANODE CAPS CONFORMING TO ASTM B-418 FOR ALL MECHANICAL JOINT FITTINGS.

**1** TYPICAL PERMANENT WATER SERVICE CONNECTION (3" AND LARGER)  
NOT TO SCALE

NOTE: EXCAVATE 6" UNDER IN-PLACE MAIN AND BACKFILL WITH COURSE FILTER AGGREGATE MNDOT SPEC. # 3149.2H. CONTRACTOR SHALL PROVIDE & PLACE A TRENCH BOX WHEN REQUIRED.

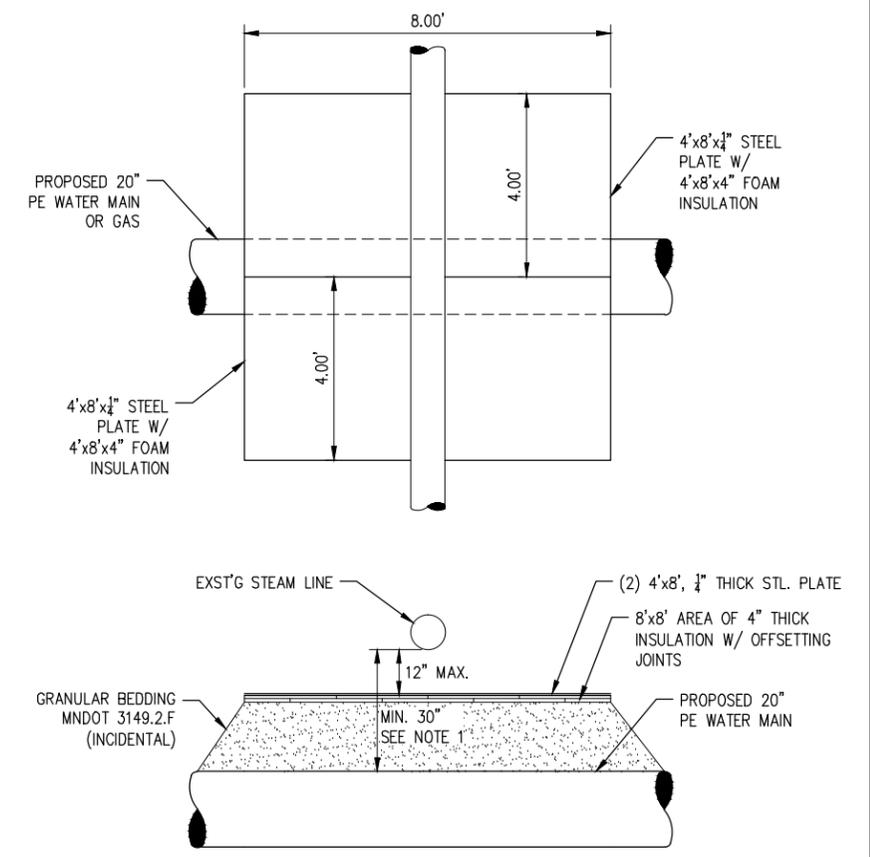


- KEY NOTES
- ONLY REQUIRED IF EXISTING SHUTOFF IS REMOVED AS PART OF WORK. IF EXISTING SHUTOFF IS OUTSIDE OF CONSTRUCTION LIMITS, RECONNECT SERVICE.
  - CONNECT TO EXISTING SERVICE WHEN NEW CURB STOP IS NOT REQUIRED.

NOTE: SERVICE TO BE AIR TESTED PRIOR TO TAPPING MAIN

THE TRACER WIRE SHALL REMAIN CONTINUOUS TO THE GREATEST EXTENT POSSIBLE. SPLICES IN THE TRACER WIRE SHOULD BE MADE WITH SPLIT BOLT CONNECTORS. WIRE NUTS OR CLIP TYPE CONNECTOR SHALL NOT BE USED. A WATER-PROOF CONNECTION IS NECESSARY TO PREVENT CORROSION.

**2** TYPICAL PERMANENT WATER SERVICE CONNECTION (2" AND SMALLER)  
NOT TO SCALE



- NOTES:
- ENGINEER MUST APPROVE ANY DEVIATION LESS THAN THE MINIMUM CLEARANCES SPECIFIED.
  - INSULATION PROVIDED BY CITY OF DULUTH FOR CONTRACTOR INSTALLATION.
  - ALL WORK SHALL BE INCLUDED FOR PAYMENT UNDER ITEM "STEAM CROSSING INSULATION" BY THE EACH AT EACH CROSSING LOCATION.

**3** INSULATING WATER MAIN AT STEAM CROSSING  
NOT TO SCALE

**EROSION CONTROL NOTES**

1. MNDOT (2016 EDITION) STND. SPEC. 1717.2. EROSION CONTROL, SHALL APPLY.
2. THE CONTRACTOR IS RESPONSIBLE FOR EC QUALITY CONTROL ON THIS PROJECT (MNDOT 1717.2 B). CONTRACTOR SHALL PHASE/SEQUENCE THE PROJECT TO MINIMIZE EXPOSURE TO EROSION. CONTRACTOR SHALL PLACE OR OTHERWISE CONSTRUCT EROSION CONTROL AND SEDIMENT CONTAINMENT DEVICES TO MINIMIZE THE RUNOFF, TRACKING, AND SEDIMENT LOSS FROM DISTURBED AREAS OF THE PROJECT SITE.
3. SEDIMENT AND EROSION CONTROL DEVICES SHALL BE FUNCTIONAL BEFORE SITE IS DISTURBED.
4. RECEIVING WATER FOR STORM WATER FROM THE PROJECT AREA INCLUDES EXISTING STORM SEWER SYSTEMS, AND LAKE SUPERIOR.
5. DISTURBED SLOPES NOT ACTIVELY WORKED SHALL BE PROTECTED FROM SOIL EROSION WITH TEMPORARY OR PERMANENT COVER WITHIN PERMIT REQUIREMENTS BUT IN NO CASE GREATER THAN 7 DAYS OF BEING WORKED. USE EROSION CONTROL BLANKET WITH SOIL STAPLES OR ENGINEER APPROVED EQUAL.
6. AT MINIMUM, THE FOLLOWING CONTROLS WILL BE IMPLEMENTED AT THE CONSTRUCTION SITE:
  - EROSION CONTROL BLANKETS SHALL BE USED ON ALL SLOPES 1:3 OR STEEPER.
  - SILT FENCES SHALL BE USED IN CONJUNCTION WITH OTHER EROSION BMP'S.
  - ROCK DITCH CHECKS OR APPROVED EQUAL ARE TO BE USED TO REDUCE DITCH VELOCITIES AND EROSION.
  - STORM INLET AND OUTLET AREAS SHALL BE PROTECTED WITH ROCK RIPRAP.
  - STABILIZED CONSTRUCTION ENTRANCES SHALL BE USED TO REDUCE SEDIMENT TRACKING.
  - PERMANENT VEGETATION WILL BE ESTABLISHED RIGHT AFTER TOPSOIL IS RE-SPREAD.
  - CONTROL ALL SITE WASTED, DEBRIS, MATERIAL STORAGE AND CONCRETE WASHOUT TO PREVENT IMPACTS TO ANY DRAINAGE.
7. ALL SLOPES AND DITCHES SHALL BE STABILIZED PRIOR TO OPENING NEW CULVERTS INTO EXISTING DRAINAGE WAYS.
8. IF ANY STOCKPILE IS TO REMAIN IN PLACE FOR MORE THAN 3 DAYS, SEDIMENT AND EROSION CONTROL DEVICES SHALL BE USED.
9. WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING SHALL BE DIRECTED THROUGH EFFECTIVE FILTERING DEVICE(S).
10. THE CONTRACTOR SHALL TAKE ALL POSSIBLE PRECAUTIONS TO PREVENT APPRECIABLE SOIL TRACKING ONTO ROADWAYS. APPRECIABLE SOIL, MUD, OR DEBRIS WASHED, TRACKED, OR DEPOSITED ONTO PAVED SURFACES SHALL BE REMOVED PRIOR TO THE END OF EACH WORKDAY.
11. STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE REMOVED AND AREA RESTORED AFTER GRADING IS COMPLETE.
12. MNDOT 1717.2 B, THE CONTRACTOR QC PROGRAM SHALL ENSURE THAT A COMPETENT INDIVIDUAL SHALL INSPECT EROSION AND SEDIMENT CONTROL DEVICES WEEKLY AND AFTER EACH RAIN EVENT. ALL NONFUNCTIONAL DEVICES SHALL BE REPAIRED, REPLACED, OR CLEANED.
13. WHERE NOT OTHERWISE SPECIFIED, RAPID STABILIZATION METHOD 4 SHALL BE USED WHEN QUICK STABILIZATION IS NEEDED. USE CATEGORY 3 EROSION CONTROL BLANKET (ECB) [NORTH AMERICAN GREEN S150 OR APPROVED EQUAL]. USE WITH SEED MIXTURE 22-112 PER MNDOT 2575.3. THE UPGRADE END OF EACH BLANKET STRIP SHALL BE BURIED AT LEAST 6-INCHES IN A VERTICAL CHECK SLOT. STAPLES SHALL BE PLACED AT SEAMS AND THROUGHOUT THE BLANKET AT A MAXIMUM SPACING IN ALL DIRECTIONS OF 3- FEET. PAYMENT ALLOWED SHALL BE \$2.50 PER SY.
14. THIS EROSION CONTROL PLAN IS A STARTING POINT FOR EROSION PREVENTION AND SEDIMENT CONTROL ON THE SITE, AND THE CONTRACTOR'S OPERATIONS AND PHASING OF THE CONSTRUCTION ACTIVITY SHALL REQUIRE THE CONTRACTOR TO MODIFY AND AMEND THIS PLAN AS CONDITIONS WARRANT AND AS BMP'S ARE ADDED, DELETED, OR MODIFIED ON THE SITE. ANY AMENDMENTS SHALL BE NOTED ON THE PLAN AND KEPT AS A RECORD AVAILABLE AT THE SITE.

**CONSTRUCTION PRACTICES TO MINIMIZE STORM WATER CONTAMINATION**

TO PREVENT STORM WATER CONTAMINATION FROM OCCURRING, THE FOLLOWING BMP'S WILL BE IMPLEMENTED.

1. ALL AREAS THAT ARE ROUGH GRADED MUST BE KEPT IN A SMOOTH CONDITION TO ALLOW SHEET FLOW OF STORM WATER WHEREVER PRACTICAL AND ALWAYS READY FOR SURFACE APPLICATION OF DEGRADABLE OR NON-DEGRADABLE BLANKETS, MULCH, OR OTHER PROTECTIVE COVERS.
2. A STABILIZED CONSTRUCTION ENTRANCE/EXIT WILL BE CONSTRUCTED TO REDUCE VEHICLE TRACKING OF SEDIMENTS OFF THE PROJECT RIGHT-OF-WAY.
3. ALL NON-HAZARDOUS WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER OR OTHER APPROVED CONTAINMENT METHOD AT THE END OF EACH DAY. ANY ALTERNATIVE TO A METAL DUMPSTER MUST BE SUBMITTED IN WRITING FOR APPROVAL BY THE PROJECT ENGINEER. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY TO FUNCTION AS INTENDED FOR DEBRIS COLLECTION. NO CONSTRUCTION MATERIALS WILL BE BURIED ON-SITE. THE CONTRACTOR'S EROSION CONTROL SUPERVISOR WILL INSTRUCT ALL PERSONNEL REGARDING THE CORRECT PROCEDURE FOR DISPOSAL.
4. A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR WILL COLLECT ALL SANITARY WASTE FROM THE PORTABLE UNITS AT A RATE NECESSARY TO MAINTAIN DESIGNED FUNCTION.
5. ALL VEHICLES ON SITE WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE.
6. FERTILIZERS WILL BE STORED IN A COVERED SHED AND PARTIALLY USED BAGS WILL BE TRANSFERRED TO A SEALABLE BIN TO REDUCE THE CHANCE OF SPILLAGE.
7. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS, WHICH ARE CLEARLY LABELED.
8. SPILL KITS WILL BE INCLUDED WITH ALL FUELING SOURCES AND MAINTENANCE ACTIVITIES. SECONDARY CONTAINMENT MEASURES WILL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR.
9. ANY ASPHALT SUBSTANCES USED ON SITE WILL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
10. ALL PAINT CONTAINERS AND CURING COMPOUNDS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM WATER SYSTEM BUT WILL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTION.
11. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEAN-UP WILL BE KEPT IN AN ENCLOSED TRAILER OR SHED ON SITE. EQUIPMENT WILL INCLUDE, BUT NOT BE LIMITED TO, BROOMS, MOPS, DUST PANS, RAGS, GLOVES, GOGGLES, ABSORBENT MATERIAL (KITTY LITTER), OIL ABSORBENT BROOMS AND DIAPERS, AND BUCKETS.
12. ALL SPILLS WILL BE CONTAINED AND CLEANED UP IMMEDIATELY UPON DISCOVERY. SPILLS LARGE ENOUGH TO REACH THE STORM WATER CONVEYANCE SYSTEM WILL BE REPORTED TO THE MINNESOTA DUTY OFFICER AT (800) 422-0798.
13. CONCRETE TRUCKS WILL NOT BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASTE WATER ON THE SITE, UNLESS DONE IN AN ENGINEERED CONTAINMENT SYSTEM. THE ENGINEERED SYSTEM MUST INCLUDE SITE DRAWINGS FOR THE PROJECT FILE AND WRITTEN ASSURANCE THAT THE SYSTEM WILL WORK AS DESIGNED AND LEAVE NO DISCHARGE OF CONCRETE OR CONCRETE RESIDUE POTENTIAL TO WATERS OF THE STATE DURING A MINIMUM OF A 100-YEAR STORM EVENT.
14. FORM RELEASE OIL USED FOR CONCRETE WORK MUST BE APPLIED FOR A PALLET CONTAINING ABSORBENT TO COLLECT EXCESS LIQUID. THE ABSORBENT MATERIAL WILL BE REPLACED AND PROPERLY DISPOSED OF WHEN SATURATED.
15. DISCHARGES FROM BASIN DEWATERING OPERATIONS THAT ARE TURBID OR SEDIMENT LADEN SHALL BE DISCHARGED TO A TEMPORARY SEDIMENT BASINS CONSTRUCTED ON THE SITE TO PROVIDE TREATMENT PRIOR TO DISCHARGE TO A WATER OF THE STATE. IF BASINS ARE NOT FEASIBLE, DISCHARGES WILL BE DISPERSED OVER NATURAL ROCK RIPRAP, SHEETING, PLASTIC OR OTHER ENERGY DISSIPATION MEASURES.

**PROJECT DETAILS**

| SUMMARY OF PERVIOUS AND IMPERVIOUS |                               |  |   |
|------------------------------------|-------------------------------|--|---|
| TOTAL DISTURBED AREA (Ac)          | EXISTING IMPERVIOUS AREA (Ac) | POST CONSTRUCTION IMPERVIOUS AREA (Ac) | NET INCREASE/ DECREASE IMPERVIOUS AREA (Ac) |
| 0.53                               | 0.53                          | 0.53                                   | 0.00  |

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BRAD SCOTT  
PRINTED NAME

  
SIGNATURE

02-25-2016  
DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST

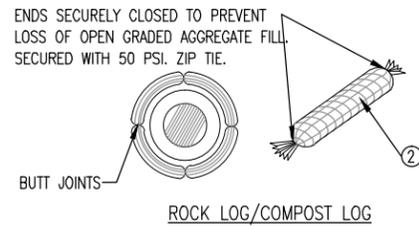
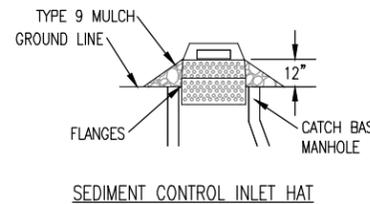
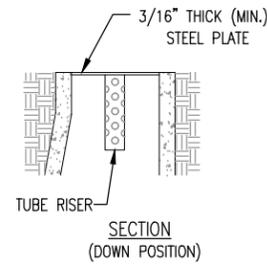
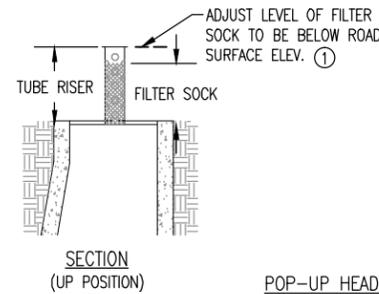
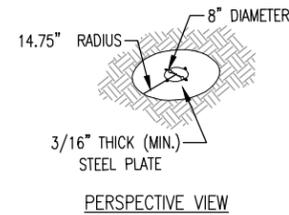
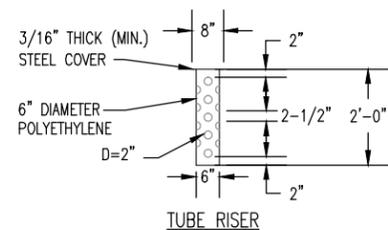
LHB PROJECT NO. 150724

EROSION & SEDIMENT CONTROL PLAN

SHEET NO. 17 OF 47 SHEETS

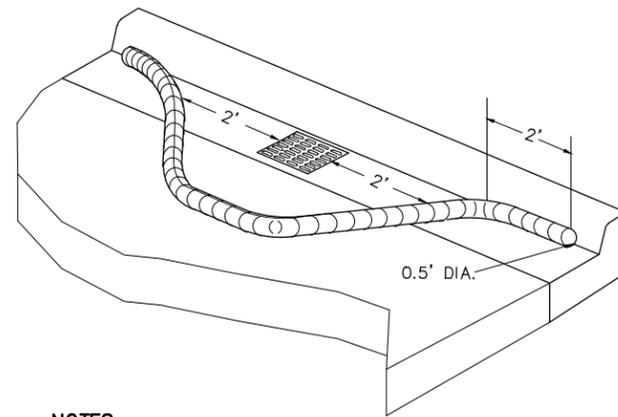
**KEY NOTES:**

- ① PAID FOR AS STORM DRAIN INLET PROTECTION ONCE AT EACH LOCATION REGARDLESS OF THE NUMBER OR TYPE USED. INCLUDES PERIODIC MAINTENANCE AND CLEANING AS REQUIRED.

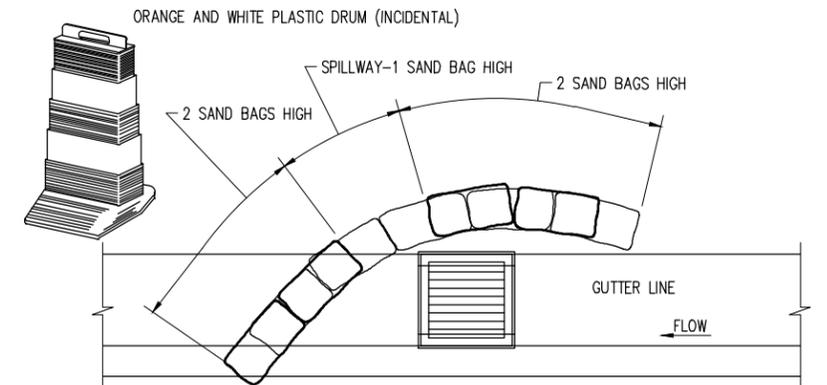


NOTE:  
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.

- NOTES:  
SEE SPECS. 2573, 3137, 3886 & 3891.  
MANUFACTURED ALTERNATIVES LISTED ON MNDOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED.
- ① SOCK HEIGHT MUST NOT BE SO HIGH AS TO SLOW DOWN WATER FILTRATION TO CAUSE FLOODING OF THE ROADWAY.
  - ② GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.



- NOTES:
- 1. COMPOST LOG, TYPE B ARE APPROX. 10' LONG & 0.5' DIAMETER
  - 2. GEOTEXTILE FABRIC USED IS THE SAME AS THE MACHINE SLICED FABRIC. FILL WITH GRADE 2 COMPOST. FABRIC AND COMPOST ARE INCIDENTAL. PAYMENT IS PER EACH INSTALLED.
  - 3. TO BE USED ON ALL INLETS WITH CURB CUT OPENINGS.



- NOTES:
- 1. CATCH BASIN INLET PROVIDE SEDIMENT SACK DANDY BAG II/DANDY SACK OR EQUIVALENT (INCIDENTAL).

① **INLET PROTECTION, TYPE I** ①  
NOT TO SCALE

② **INLET PROTECTION COMPOST LOG, TYPE II** ①  
NOT TO SCALE

③ **SAND BAG INLET PROTECTION, TYPE III** ①  
NOT TO SCALE

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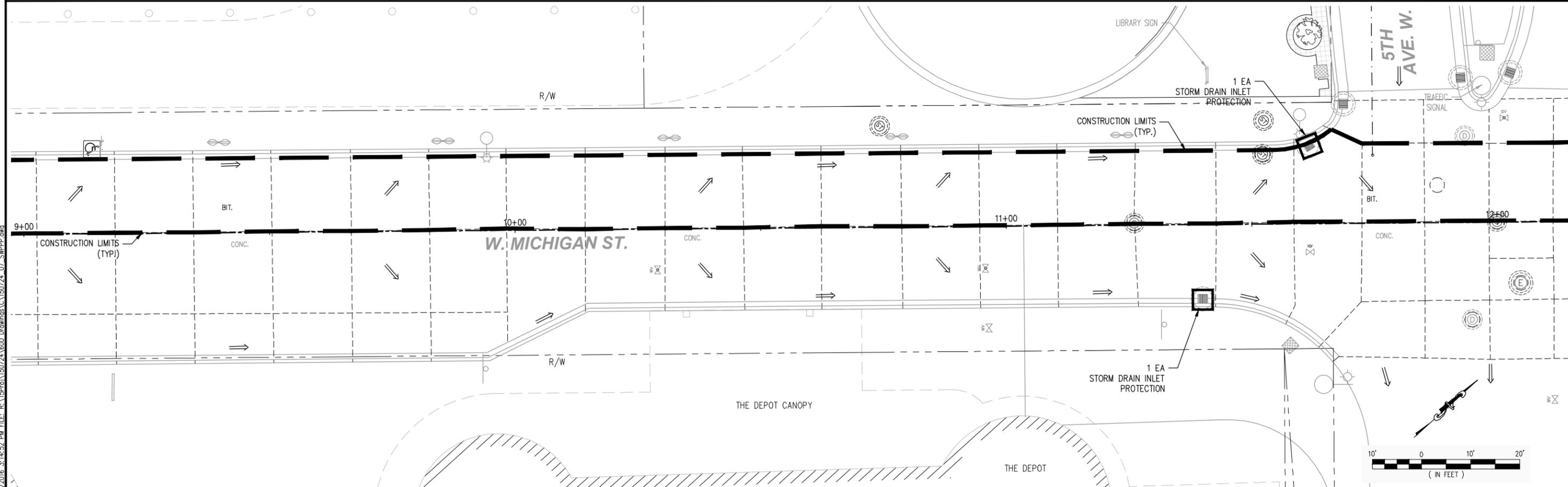
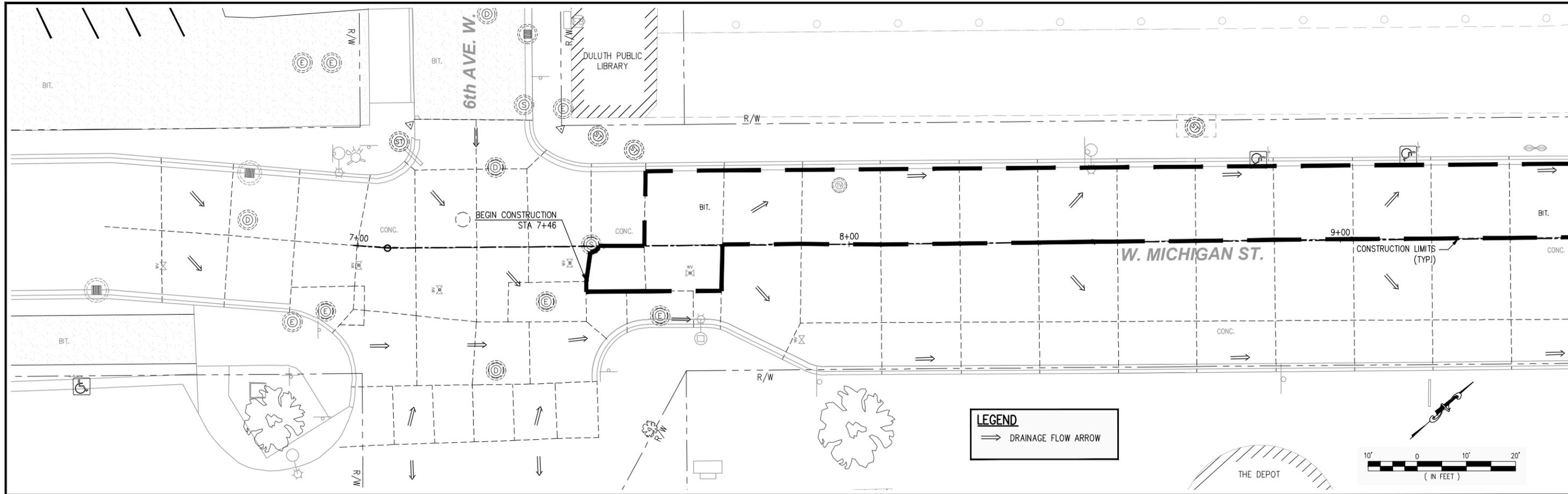
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MICHIGAN ST. 6TH-3RD AVE WEST

LHB PROJECT NO. 150724

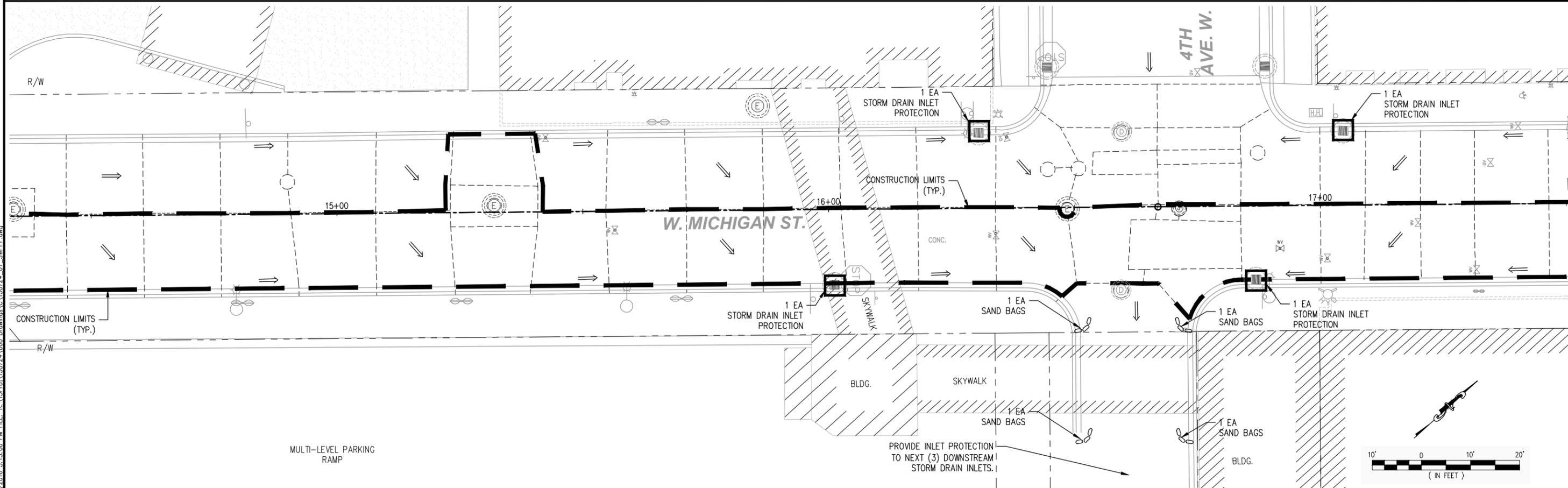
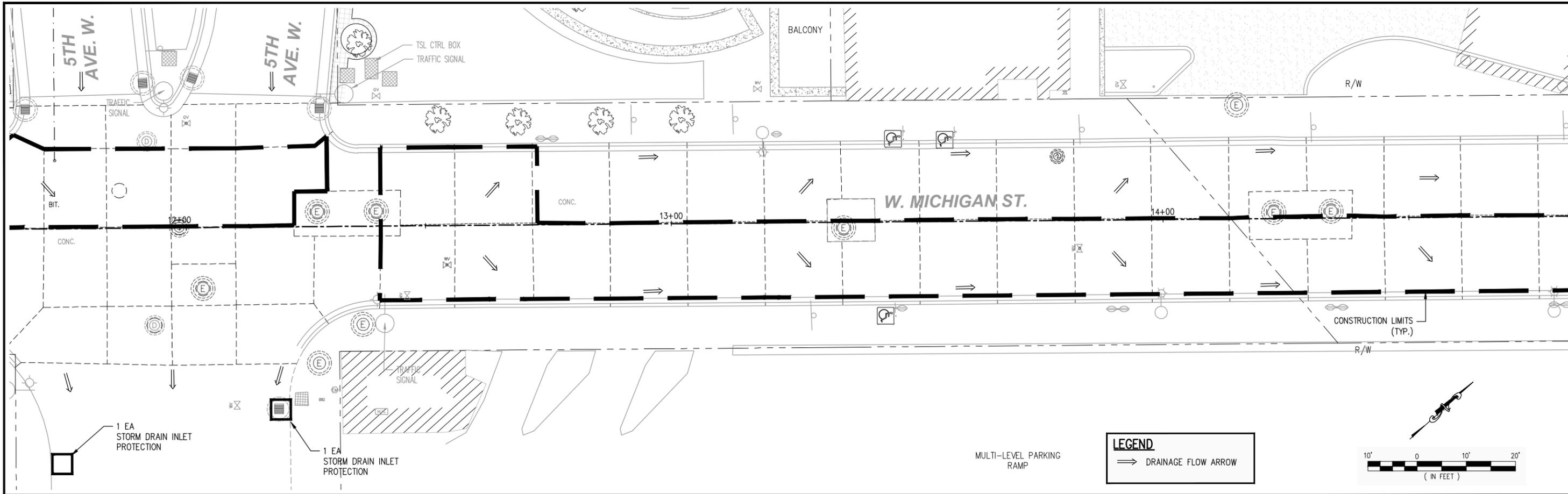
EROSION & SEDIMENT CONTROL PLAN

SHEET NO. 18 OF 47 SHEETS



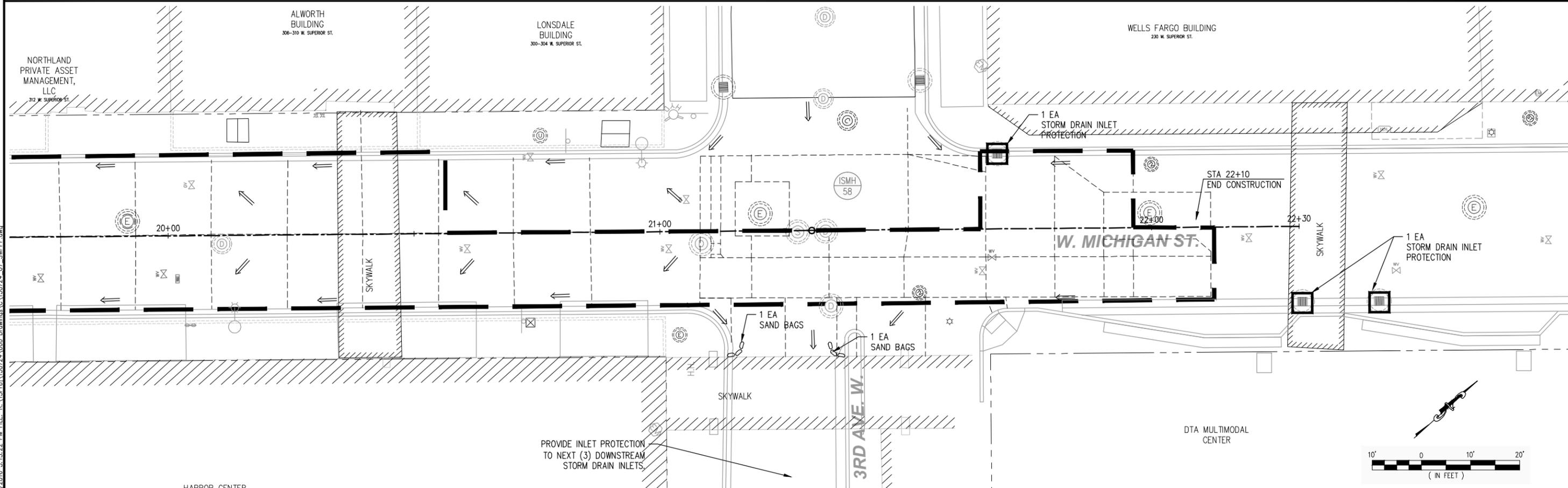
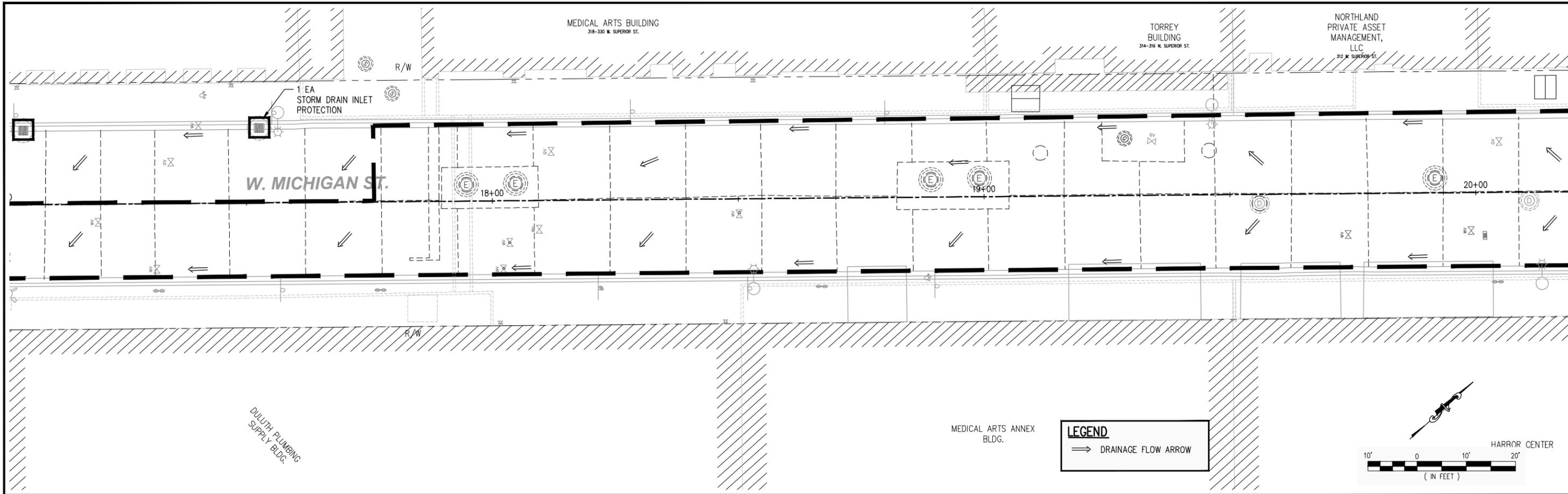
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|  |   | 46198<br>LIC. NO.  | LHB PROJECT NO. 150724               |  |



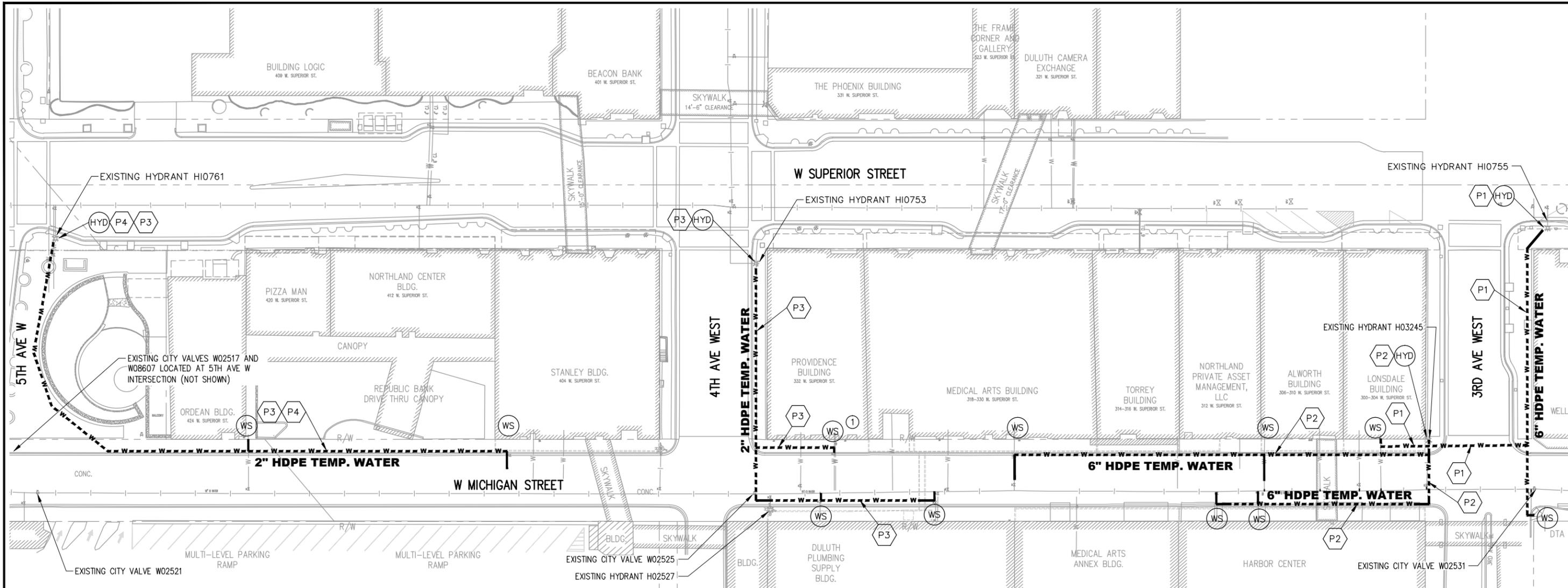
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|  |                            |   | 46198<br>LIC. NO.  | LHB PROJECT NO. 150724               |  |



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|---|--|--|--|--|--|



**TEMPORARY WATER SERVICE SYSTEM STAGING REQUIREMENTS:**

1. THE CONTRACTOR SHALL WORK WITH THE CITY TO ENSURE CONTINUED SERVICE TO ALL BUILDINGS AFFECTED BY THE WORK.
2. STAGES SHALL BE COMPLETED SEQUENTIALLY. NEW WATER MAINS SHALL BE TESTED AND PLACED IN SERVICE PRIOR TO SUBSEQUENT STAGES BEING STARTED.
3. REFER TO SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

**TEMPORARY WATER SERVICE SYSTEM NOTES**

1. THE CONTRACTOR SHALL PROVIDE A WRITTEN PLAN INCLUDING A SCHEDULE, PRODUCT INFORMATION AND EQUIPMENT LIST TO THE ENGINEER FOR APPROVAL AT LEAST 14 DAYS PRIOR TO INSTALLATION OF TEMPORARY WATER SERVICE.
2. THE CONTRACTOR SHALL ATTEND A PRE-INSTALLATION MEETING WITH THE CITY OF DULUTH PRIOR TO THE INSTALLATION OF THE TEMPORARY WATER SYSTEM.
3. TEMPORARY WATER SERVICE SHALL BE FULLY ESTABLISHED FOR EACH WATER MAIN CONSTRUCTION STAGE PRIOR TO THE CONSTRUCTION OF THE NEW WATER MAINS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING THE TEMPORARY WATER SERVICE SYSTEM AS SHOWN ON THE PLAN. THE CONTRACTOR SHALL TAKE ADEQUATE STEPS TO PROTECT TEMPORARY WATER SERVICE LINES DURING CONSTRUCTION.
5. THE TEMPORARY WATER SYSTEM MUST MEET THE PRESSURE AND BACTERIA TEST REQUIREMENTS AS SPECIFIED IN THE CITY OF DULUTH STANDARD CONSTRUCTION SPECIFICATIONS SECTION 2504.
6. PRIOR TO MOVING ANY SEGMENT OF TEMPORARY WATER SERVICE PIPE THE ENDS SHALL BE CAPPED WITH WATER TIGHT CAPS (DUCT TAPE IS NOT ACCEPTABLE). IF THE PIPE BECOMES CONTAMINATED WITH DIRT OR DEBRIS WHILE BEING MOVED IT SHALL BE RE-DISINFECTED AND RETESTED FOR BACTERIA BEFORE BEING PUT INTO SERVICE.
7. THE CONTRACTOR SHALL PROVIDE TWO (2) EMERGENCY BACKUP CONTACT PERSONNEL FOR THE TEMPORARY WATER SYSTEM. THE EMERGENCY CONTACTS SHALL BE AVAILABLE 24 HOURS A DAY 7 DAYS A WEEK. IF CITY OF DULUTH STAFF ARE CALLED TO THE PROJECT SITE TO REPAIR THE TEMPORARY WATER SERVICE SYSTEM THE CONTRACTOR WILL BE BACK CHARGED THE COST OF THE REPAIR.
8. TEMPORARY MAIN SHALL BE LOCATED ALONG CURB LINE TO AVOID CONFLICT WITH PEDESTRIAN AND VEHICLE CONFLICTS. WHERE TEMPORARY MAINS CROSS ACTIVE VEHICLE AND PEDESTRIAN PATHS, THE CONTRACTOR SHALL PROVIDE VEHICLE RATED AND/OR ADA ACCESSIBLE RAMPS TO FACILITATE CROSSING.

**KEY NOTES:**

- ① TWO EXISTING SERVICES WILL BE SERVED BY THIS SINGLE CONNECTION VIA EXISTING MANIFOLD. COORDINATE WITH BUILDING OWNER TO FACILITATE.

**LEGEND**

- PHASE 1 – TEMPORARY WATER SERVICE SYSTEM
- PHASE 2 – TEMPORARY WATER SERVICE SYSTEM
- PHASE 3 – TEMPORARY WATER SERVICE SYSTEM
- PHASE 4 – TEMPORARY WATER SERVICE SYSTEM
- PROVIDE TEMPORARY WATER SERVICE CONNECTION (SEE TEMPORARY WATER CONSTRUCTION DETAILS)
- CONNECT TEMPORARY MAIN TO EXISTING HYDRANT

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02-25-2016  
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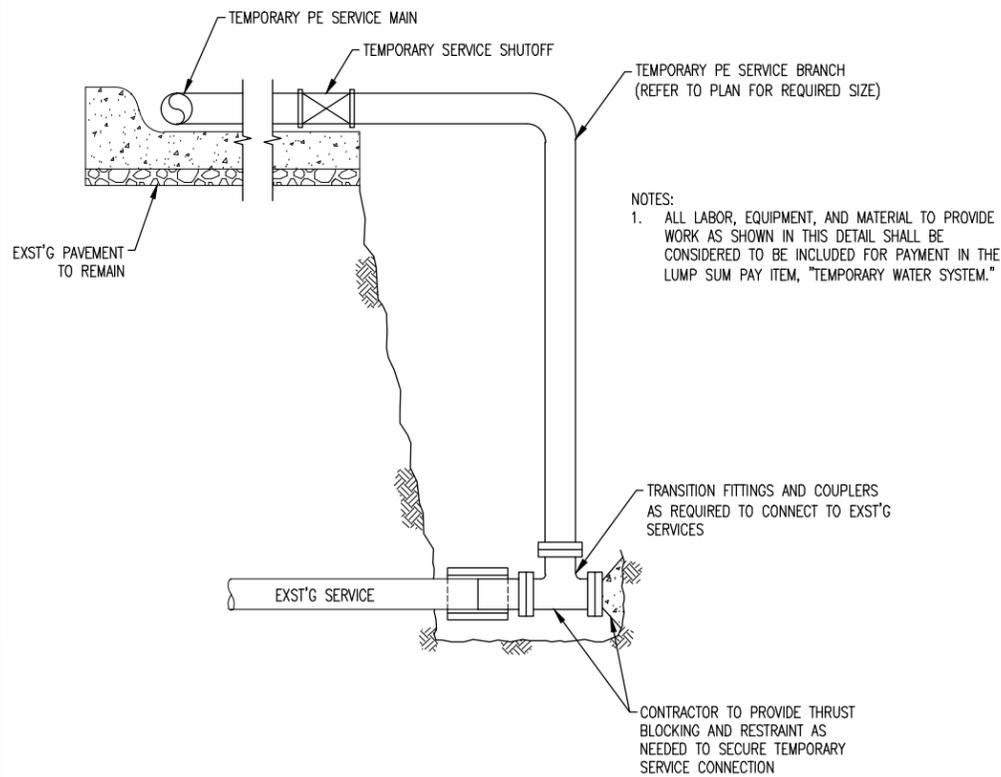
LHB PROJECT NO. 150724

GENERAL LAYOUT

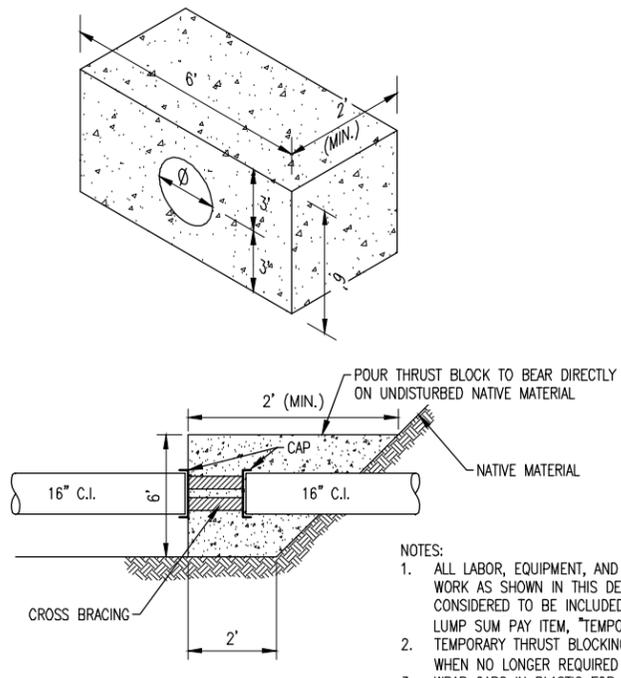
TEMPORARY WATER SERVICE SYSTEM

SHEET NO. 22 OF 47 SHEETS

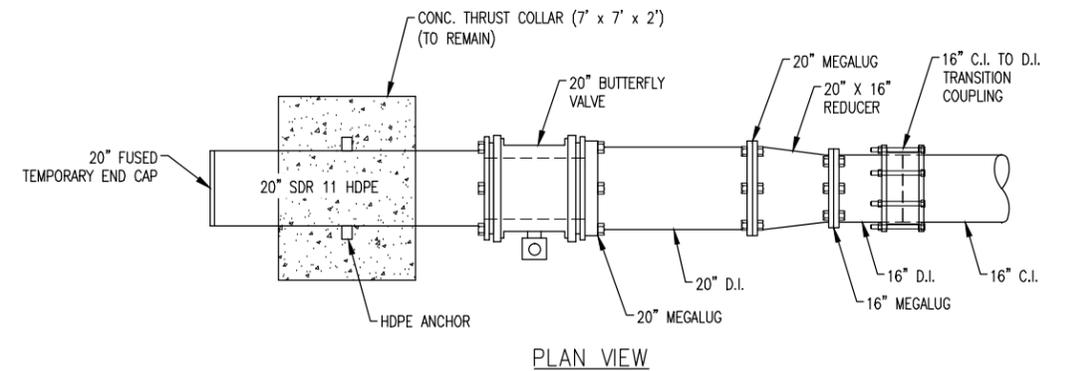
| TEMPORARY AND RECONNECT WATER SERVICES |                            |                |                             |                   |                |         |    |               |          |              |      |                                |
|--|----------------------------|----------------|-----------------------------|-------------------|----------------|---------|----|---------------|----------|--------------|------|--------------------------------|
| ADDRESS                                | TEMP SERVICE DIAM (INCHES) | CONNEX POINT   | RECON SERVICE DIAM (INCHES) | TAP SIZE (INCHES) | VALVE (INCHES) | REDUCER | MJ | SIZE (INCHES) | MATERIAL | SERVICE TYPE |      | REMARKS                        |
|  |                            |                |                             |                   |                |         |    |               |          | DOMESTIC     | FIRE |                                |
| 424 W Superior Street                  | 2                          | HOSE BIB       | 6                           | 20 X 6            | 6              | X       | X  | 4             | CI       |              |      | ORDEAN BUILDING                |
| 404 W Superior Street                  | 2                          | SERVICE        | 6                           | 20 X 6            | 6              |         | X  | 6             | DI       | X            | X    | STANLEY BUILDING               |
| 332 W Superior Street                  | NO                         |                | 6                           | 20 X 6            | 6              |         | X  | 6             | CI       |              | X    | PROVIDENCE BUILDING            |
| 332 W Michigan Street                  | 2                          | SERVICE        | 2                           | 20 X 2            | 2              |         |    | 1 1/4         | CU       | X            |      | DULUTH PLUMBING                |
| 332 W Superior Street                  | NO                         |                | 2                           | 20 X 2            | 2              |         |    | 2             | CU       | X            |      | PROVIDENCE (WEST)              |
| 332 W Superior Street                  | 2                          | SERVICE        | 2                           | 20 X 2            | 2              |         |    | 2             | CU       | X            |      | PROVIDENCE (EAST)              |
| 332 W Michigan Street                  | NO                         |                | 6                           | 20 X 6            | 6              |         | X  | 6             | CI       |              | X    | DULUTH PLUMBING (UPPER FLOORS) |
| 332 W Michigan Street                  | 2                          | SERVICE        | 2                           | 20 X 2            | 2              |         |    | 1             | ?        | X            |      | DULUTH PLUMBING (UPPER FLOORS) |
| 324 W Superior Street                  | NO                         |                | 6                           | 20 X 6            | 6              |         | X  | 6             | DI       |              |      | MEDICAL ARTS                   |
| 324 W Superior Street                  | 6                          | SERVICE        | 6                           | 20 X 6            | 6              |         | X  | 6             | DI       | X            | X    | MEDICAL ARTS                   |
| 314 W Michigan Street                  | NO                         |                | 6                           | 20 X 6            | 6              |         | X  | 6             | DI       |              | X    | MEDICAL ARTS ANNEX             |
| 314 W Superior Street                  | 6                          | SERVICE        | 8                           | 20 X 8            | 6              |         | X  | 8             | DI       |              | X    | TORREY BLDG                    |
| 306 W Michigan Street                  | 6                          | SERVICE        | 6                           | 20 X 6            | 6              |         | X  | 6             | CI       | X            | X    | HARBOR CENTER                  |
| 306 W Michigan Street                  | 6                          | SERVICE        | 6                           | 20 X 6            | 6              | X       | X  | 4             | DI       | X            |      | HARBOR CENTER                  |
| 306 W Superior Street                  | 6                          | SERVICE        | 6                           | 20 X 6            | 6              | X       | X  | 4             | DI       | X            | X    | ALWORTH BUILDING               |
| 302 W Superior Street                  | NO                         |                | 6                           | 20 X 6            | 6              |         | X  | 6             | DI       |              | X    | LONSDALE BUILDING              |
| 302 W Superior Street                  | 2                          | METER MANIFOLD | 2                           | 20 X 2            | 2              |         | X  | 6             | CU       | X            |      | LONSDALE BUILDING              |
| 230 W Michigan Street                  | 6                          | SERVICE        | 6                           | 20 X 6            | 6              |         | X  | 6             | DI       | X            | X    | DTA                            |



1 TEMPORARY WATER SERVICE CONNECTION  
NOT TO SCALE



2 TEMPORARY DEAD END THRUST BLOCKING  
NOT TO SCALE



3 PERMANENT WATER CONNECTION ASSEMBLY  
NOT TO SCALE

CONSTRUCTION DETAILS

TEMPORARY WATER SERVICE SYSTEM

SHEET NO. 23 OF 47 SHEETS

PLOT DATE: 2/25/2016 3:49:42 PM FILE: R:\55p\150724\600 Drawings\Temporary Water Plans\150724\_08b\_Details.dwg

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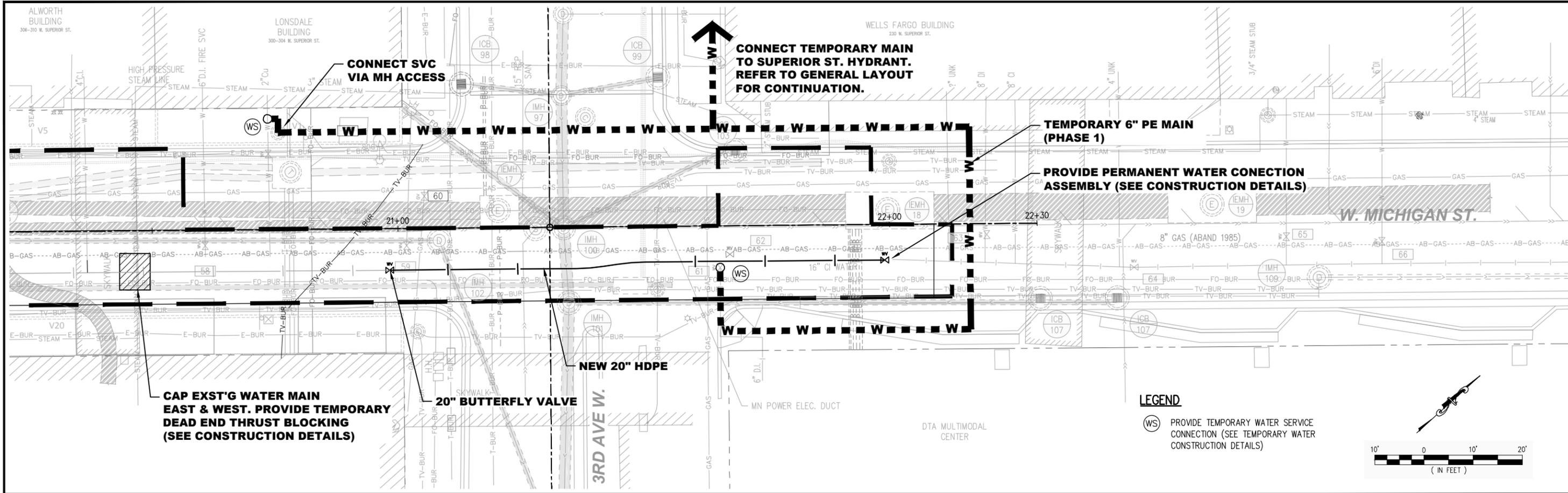
BRAD SCOTT  
PRINTED NAME

*Brad Scott*  
SIGNATURE

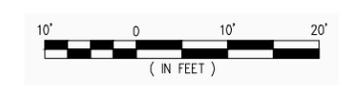
02-25-2016  
DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST

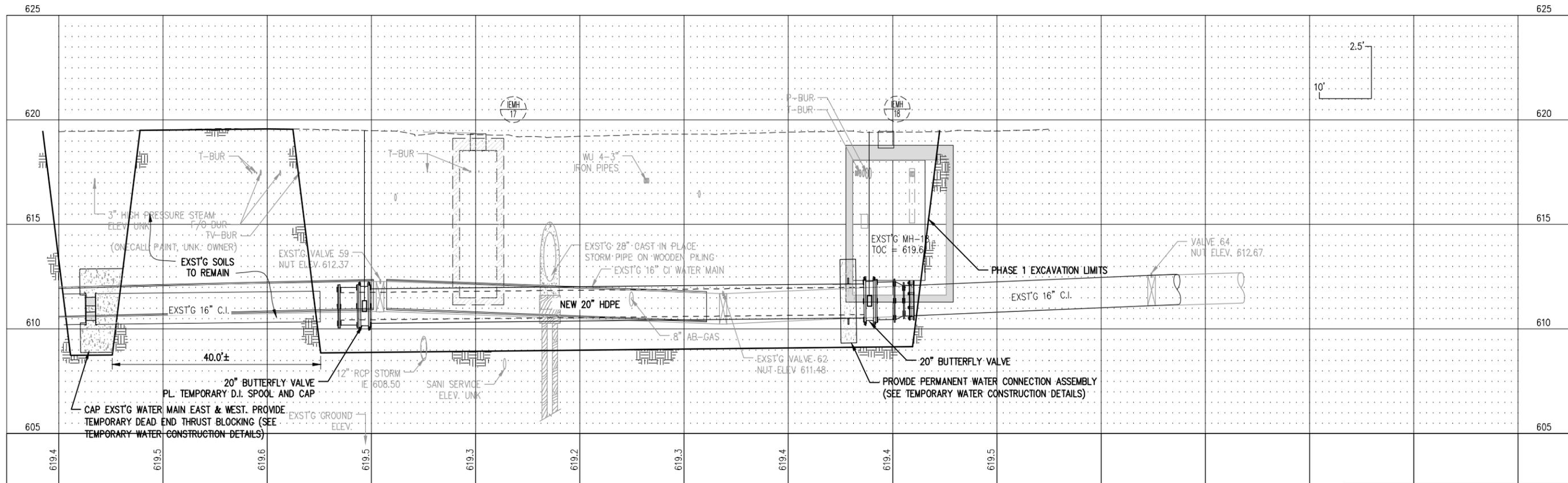
LHB PROJECT NO. 150724



**LEGEND**  
 (WS) PROVIDE TEMPORARY WATER SERVICE CONNECTION (SEE TEMPORARY WATER CONSTRUCTION DETAILS)



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BRAD SCOTT  
 PRINTED NAME

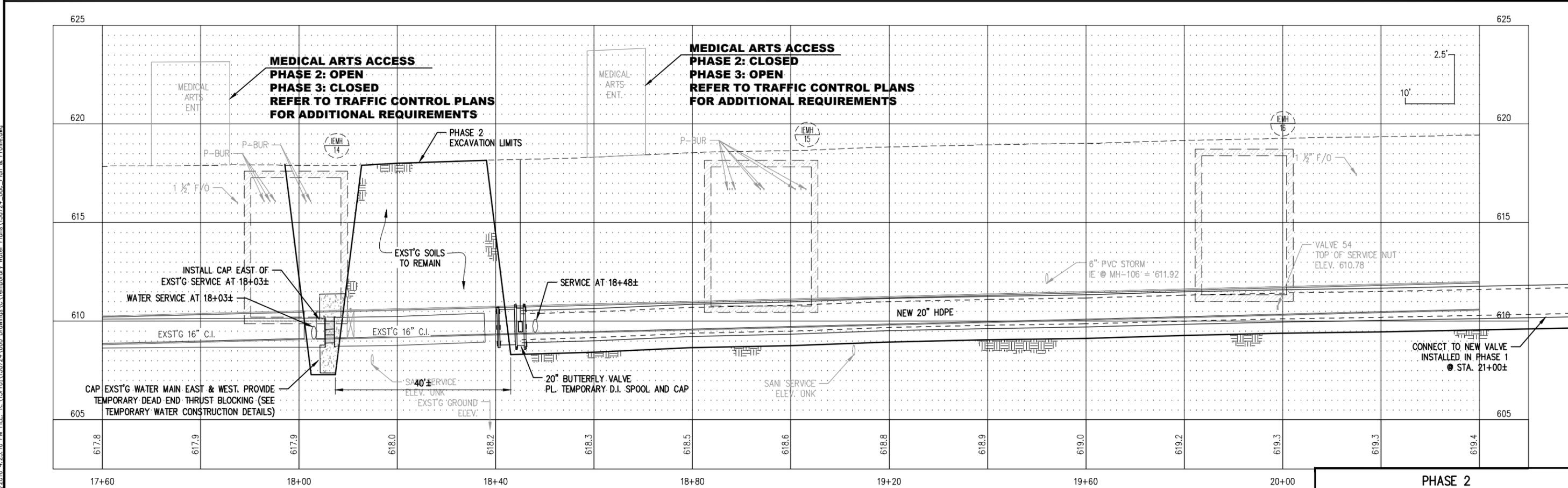
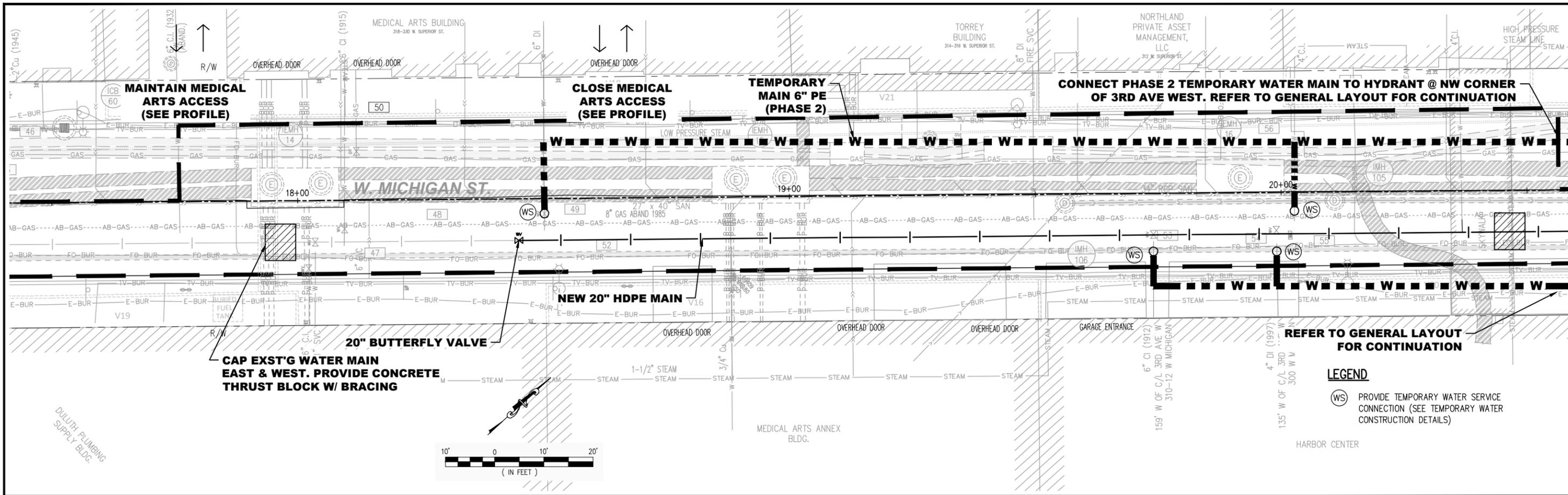


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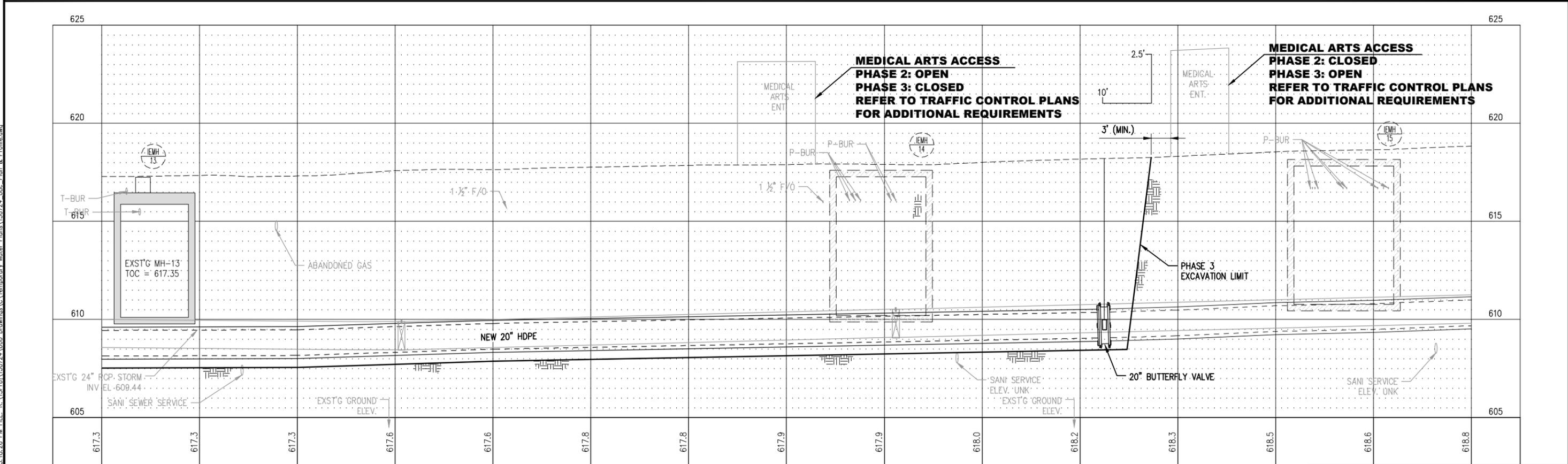
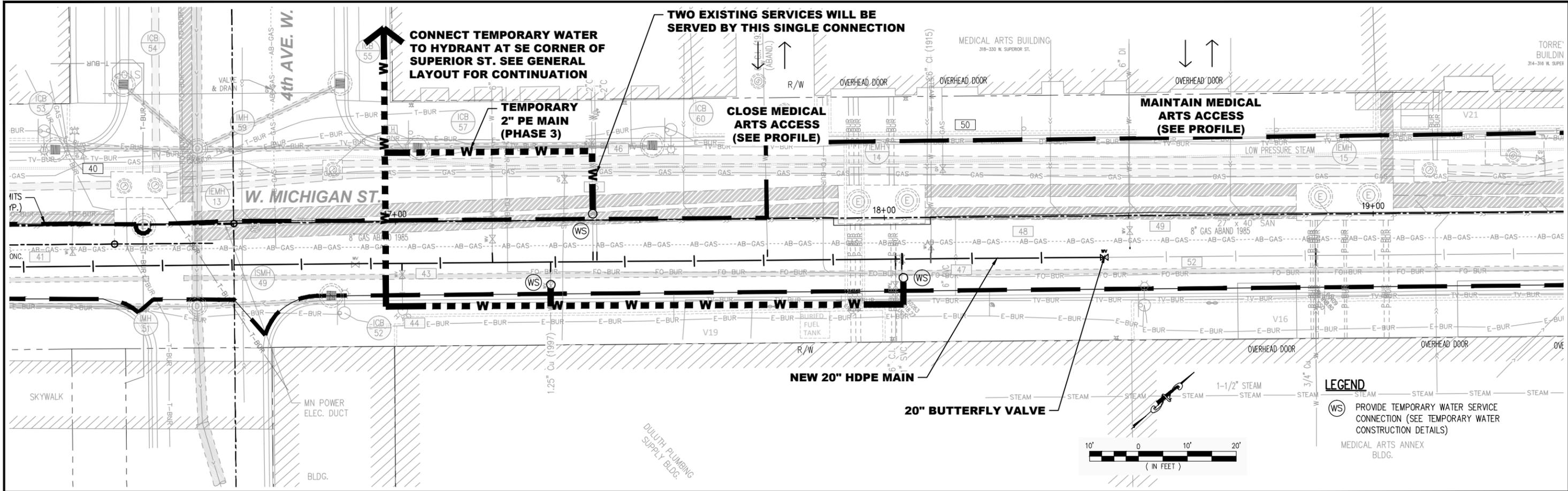
MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

PHASE 1  
 TEMPORARY WATER SERVICE SYSTEM  
 SHEET NO. 24 OF 47 SHEETS



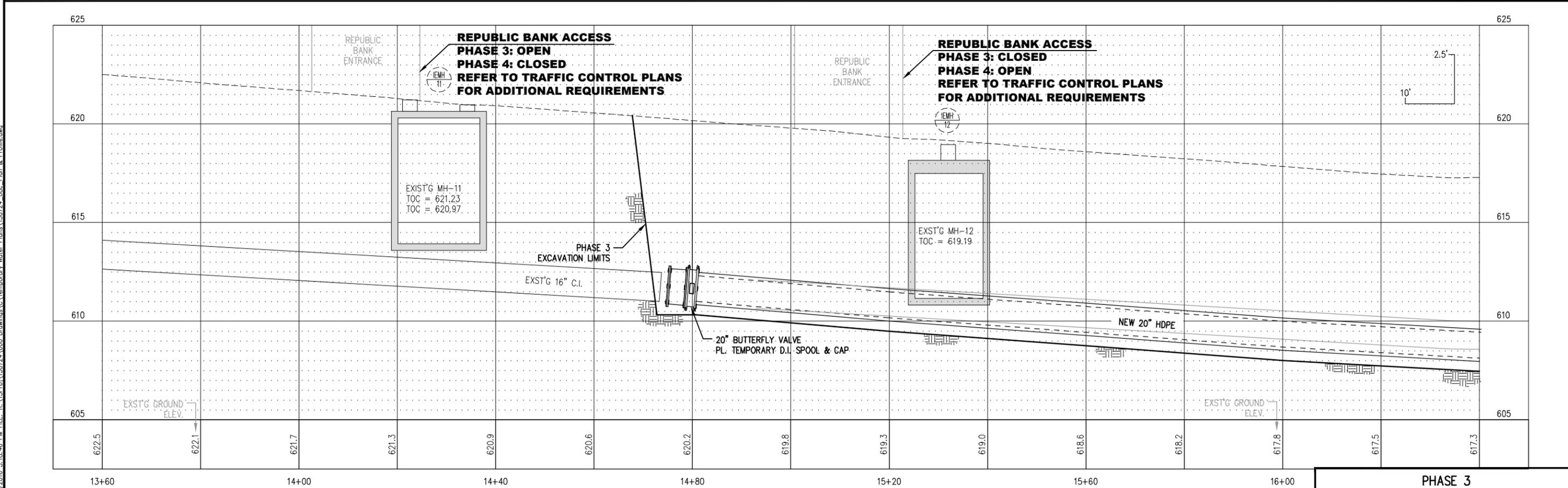
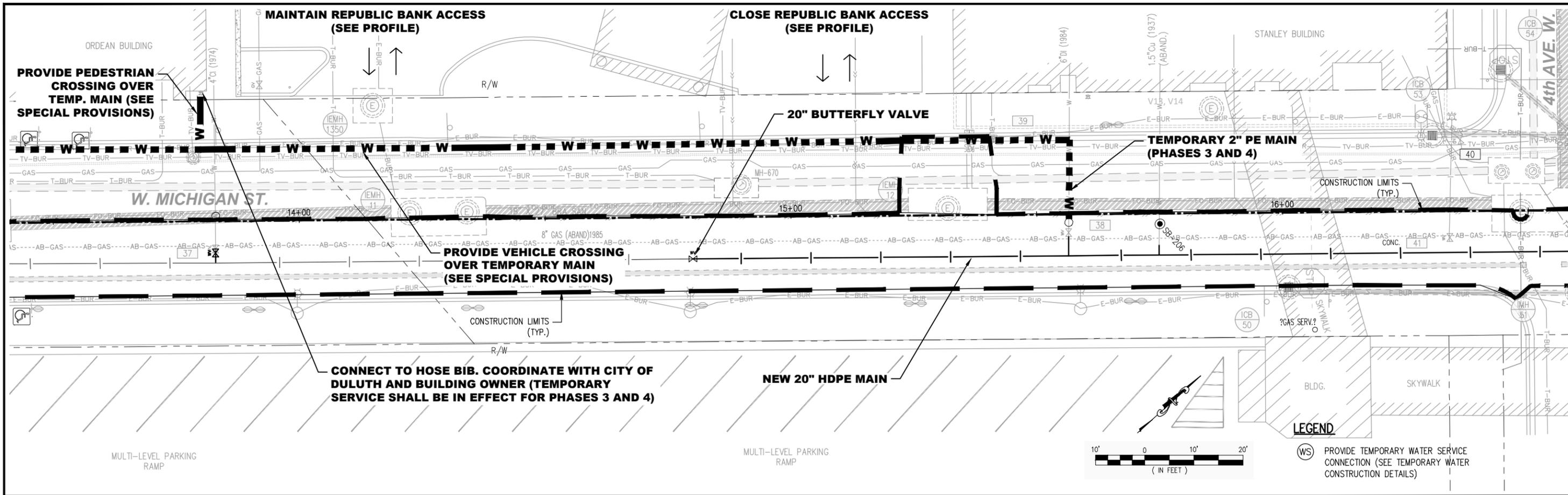
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| 17+60  |  |  |  |  |  |  |  |  |  |  |  | 18+00                      |  |  |  |  |  |  |  |  |  |  |  | 18+40 |  |  |  |  |  |  |  |  |  |  |  | 18+80              |  |  |  |  |  |  |  |  |  |  |  | 19+20             |  |  |  |  |  |  |  |  |  |  |  | 19+60                         |  |  |  |  |  |  |  |  |  |  |  | 20+00                  |  |  |  |  |  |  |  |  |  |  |  | <b>PHASE 2</b>                 |  |  |  |  |  |  |  |  |  |  |  |                           |  |  |  |  |  |  |  |  |  |  |  |
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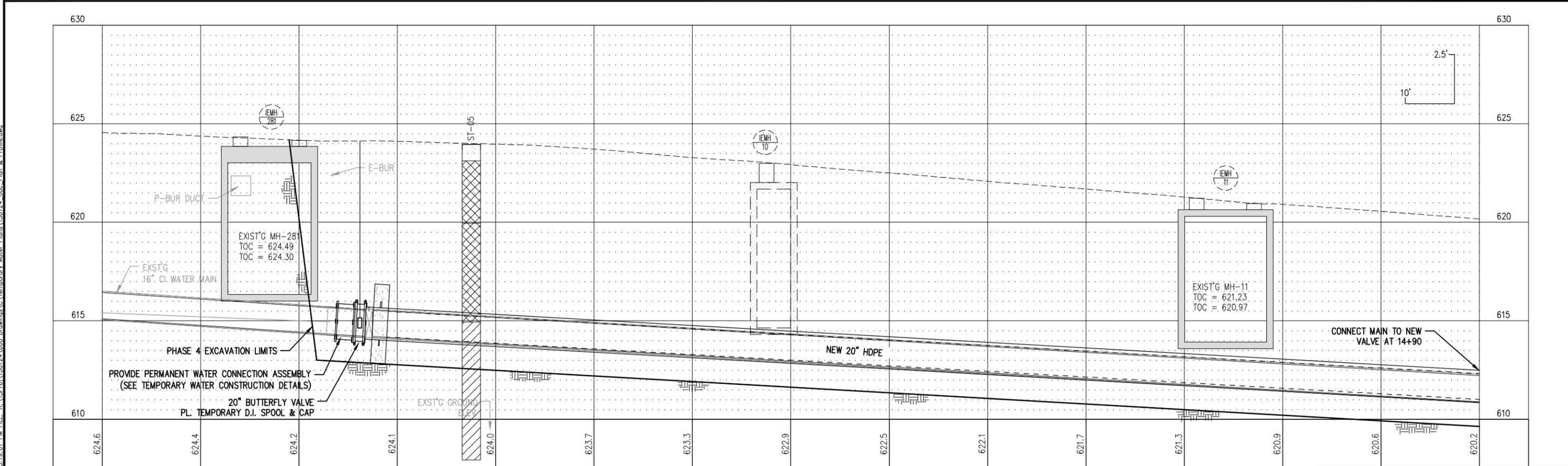
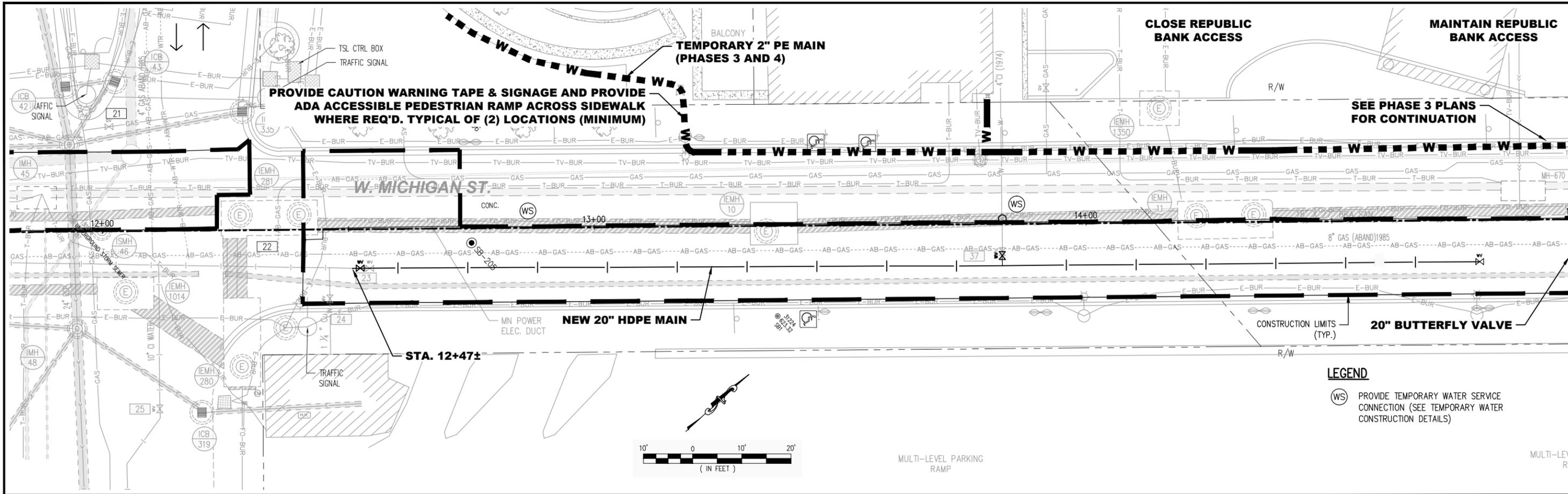
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| <p>I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.</p> <p><b>BRAD SCOTT</b><br/>PRINTED NAME</p><br>SIGNATURE | <p>02-25-2016<br/>DATE</p> <p>46198<br/>LIC. NO.</p> | <p><b>MICHIGAN ST. 6TH-3RD AVE WEST</b></p> <p>LHB PROJECT NO. 150724</p> | <p><b>PHASE 3</b></p> <p><b>TEMPORARY WATER SERVICE SYSTEM</b></p> <p>SHEET NO. 26 OF 47 SHEETS</p> |
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|  |  |                            | SIGNATURE | 46198<br>LIC. NO.  | LHB PROJECT NO. 150724        |                           | TEMPORARY WATER SERVICE SYSTEM |
|  |  |                            |           |                    |                               | SHEET NO. 28 OF 47 SHEETS |                                |

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# TRAFFIC CONTROL NOTES

1. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN THE DEVICES IN THIS TRAFFIC CONTROL PLAN UNLESS OTHERWISE NOTED.
2. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) INCLUDING "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS" DATED JANUARY 2014. AVAILABLE AT: (<http://www.dot.state.mn.us/trafficeng/publ/fieldmanual/fieldmanual.pdf>)
3. FIELD CONDITIONS MAY REQUIRE MODIFICATIONS OF THIS LAYOUT AS DEEMED NECESSARY BY THE ENGINEER.
4. THE NUMBER AND PLACEMENT OF TRAFFIC CONTROL DEVICES WILL DEPEND UPON THE SEQUENCE OF THE CONTRACTOR'S OPERATION.
5. ALL DISTANCES DEPICTED ARE APPROXIMATE.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ANY WORK AREAS NEAR TRAFFIC IN ACCORDANCE WITH THE MMUTCD.
7. IF THE CONTRACTOR DECIDES TO PERFORM THE CONSTRUCTION WORK IN A SEQUENCE OTHER THAN SHOWN IN THIS TRAFFIC CONTROL PLAN, THE CONTRACTOR SHALL PROVIDE COMPLETE REVISED TRAFFIC CONTROL PLANS TO BE APPROVED BY THE ENGINEER.
8. ALL TRAFFIC CONTROL DEVICES, INCLUDING OVERHEAD SIGNS ON ROADS OPEN TO TRAFFIC THAT ARE NOT CONSISTENT WITH TRAFFIC OPERATION, SHALL BE COVERED, REMOVED OR REVISED AS DIRECTED BY THE ENGINEER.
9. "ROAD WORK AHEAD" SIGNS SHALL BE MOUNTED APPROX. 300 FT (1 BLOCK) IN ADVANCE OF THE CONSTRUCTION AND SHALL HAVE A TYPE "A" LOW INTENSITY FLASHING AMBER WARNING LIGHT MOUNTED ON THEM.
10. "ROAD CLOSED AHEAD" SIGNS SHALL BE ERECTED APPROX. 300 FT (1 BLOCK) IN ADVANCE OF THE CLOSURE.
11. "ROAD CLOSED TO THRU TRAFFIC" SIGNS SHALL BE INSTALLED ON TYPE III BARRICADES AND SHALL BE LOCATED AT A POINT IN THE STREET AS TO PERMIT LOCAL TRAFFIC USE BUT EFFECTIVELY DISCOURAGE THRU TRAFFIC USE.
12. WHEN A "ROAD CLOSED TO THRU TRAFFIC" SIGN IS USED, THE "STOP" OR "YIELD" SIGN AT THAT INTERSECTION SHALL BE LEFT IN PLACE OR MOVED TO A SUITABLE LOCATION WHERE THE DRIVER CAN STILL SEE THE SIGN.
13. "ROAD CLOSED" SIGNS MAY BE USED WHERE THE ROADWAY IS CLOSED TO ALL TRAFFIC EXCEPT CONTRACTOR'S EQUIPMENT OR OFFICIALLY AUTHORIZED VEHICLES.
14. TYPE "A" LOW INTENSITY AMBER WARNING LIGHTS SHALL BE MOUNTED ON ALL ADVANCE WARNING SIGNS AND ON ALL TYPE I AND TYPE III BARRICADES WHEN USED AT NIGHT OR TO IDENTIFY HAZARDS.
15. ADDITIONAL SIGNING MAY BE REQUIRED FOR SEPARATE LANE CLOSURES. THE SIGNING SHALL BE IN CONFORMANCE WITH "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS" FIELD MANUAL DATED JANUARY 2014 AND SHALL BE CONSIDERED INCIDENTAL.
16. THE CONTRACTOR SHALL PLACE DRUMS THROUGHOUT THE PROJECT TO DELINEATE HAZARDOUS AREAS AND FACILITATE DAY-TO-DAY CHANNELIZATION OF TRAFFIC (INCIDENTAL).
17. THE CONTRACTOR SHALL PLACE PRECAST BARRIER OR BARRIERS ADJACENT TO ANY DROP OFFS OR OPEN EXCAVATION WITHIN 10-FT OF A LANE CARRYING TRAFFIC (INCIDENTAL).
18. FOR CONVERSION OF MICHIGAN STREET TO TWO-WAY TRAFFIC, THE CONTRACTOR SHALL OBTAIN NO-PARKING SIGNS FROM CITY OF DULUTH AND POST AT METERED STALLS AND LOADING ZONES AND OTHER LOCATIONS AS NEEDED TO KEEP STREET CLEAR.

### TRAFFIC CONTROL PHASING ①

THE PHASES OF WORK DEPICTED FOR TRAFFIC CONTROL DIRECTLY CORRELATE WITH THE PHASES IDENTIFIED IN THE PROJECT TEMPORARY WATER SERVICE SYSTEM PLANS AND THE TWO PLANS COMPLEMENT ONE ANOTHER WITH REGARD TO WATER SERVICE WORK AND TO ENSURE ACCESS TO ADJACENT BUSINESSES AND PARKING. NO DEVIATIONS FROM THE TRAFFIC CONTROL PLAN SHALL BE PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.

THE FOLLOWING PRIMARY SCOPE OF WORK SHALL BE COMPLETED UNDER EACH PHASE (REFER TO SPECIAL PROVISIONS UNDER TEMPORARY WATER SERVICE SYSTEM AND TRAFFIC CONTROL FOR TIMING AND INTERMEDIATE COMPLETION DATE REQUIREMENTS):

PHASE 1: INSTALLATION OF UTILITIES AND PAVEMENT RESTORATION AT 3RD AVE WEST.

PHASE 2: INSTALLATION OF UTILITIES AND PAVEMENT RESTORATION FROM THE APPROXIMATE MID-BLOCK BETWEEN 3RD AVE WEST AND 4TH AVE WEST TO 3RD AVE WEST.

PHASE 3: INSTALLATION OF UTILITIES AND PAVEMENT RESTORATION FROM THE APPROXIMATE MID-BLOCK BETWEEN 3RD AVE WEST AND 4TH AVE WEST TO THE APPROXIMATE MID-BLOCK BETWEEN 5TH AVE WEST AND 4TH AVE WEST.

PHASE 4: INSTALLATION OF UTILITIES AND PAVEMENT RESTORATION FROM THE APPROXIMATE MID-BLOCK BETWEEN 5TH AVE WEST AND 4TH AVE WEST TO 5TH AVE WEST.

PHASE 5: PAVEMENT RESTORATION BETWEEN 6TH AVE WEST AND 5TH AVE WEST.

① CONTRACTOR SHALL PROVIDE TEMPORARY BITUMINOUS SURFACING FOR ALL ROADWAY SURFACES CARRYING TRAFFIC PRIOR TO FINAL PAVING (INCIDENTAL). GRAVEL/AGGREGATE SURFACING SHALL NOT BE PERMITTED.

| "M" SERIES |          |                     |           |
|------------|----------|---------------------|-----------|
| SIGN       | SIGN NO. | COLOR               | SIZE      |
|            | M1-1     | WHITE ON BLUE & RED | 24" X 24" |
|            | M4-8a    | BLACK ON ORANGE     | 24" X 18" |
|            | M4-9L    | BLACK ON ORANGE     | 30" X 24" |
|            | M4-9R    | BLACK ON ORANGE     | 30" X 24" |
|            | M4-9S    | BLACK ON ORANGE     | 30" X 24" |
|            | M4-10L   | BLACK ON ORANGE     | 48" X 18" |

| "R" SERIES |                |                 |           |
|------------|----------------|-----------------|-----------|
| SIGN       | SIGN NO.       | COLOR           | SIZE      |
|            | R1-1           | WHITE ON RED    | 30" X 30" |
|            | R1-3P          | WHITE ON RED    | 18" X 6"  |
|            | R3-1           | BLACK ON WHITE  | 24" X 24" |
|            | R3-1           | BLACK ON WHITE  | 30" X 36" |
|            | R3-18 MODIFIED | BLACK ON WHITE  | 24" X 24" |
|            | R4-7           | BLACK ON WHITE  | 18" X 24" |
|            | R11-2          | BLACK ON WHITE  | 48" X 30" |
|            | R11-4          | BLACK ON ORANGE | 60" X 30" |
|            | R9-9           | BLACK ON WHITE  | 24" X 12" |

| "D" SERIES |          |                 |            |
|------------|----------|-----------------|------------|
| SIGN       | SIGN NO. | COLOR           | SIZE       |
|            | D3-1     | BLACK ON ORANGE | VAR. x 12" |
|            | D3-1     | BLACK ON ORANGE | VAR. x 12" |
|            | D3-1     | BLACK ON ORANGE | VAR. x 12" |

| "W" SERIES |          |                 |           |
|------------|----------|-----------------|-----------|
| SIGN       | SIGN NO. | COLOR           | SIZE      |
|            | W1-6L    | BLACK ON ORANGE | 48" X 24" |
|            | W20-2    | BLACK ON ORANGE | 36" x 36" |
|            | W20-3    | BLACK ON ORANGE | 36" x 36" |

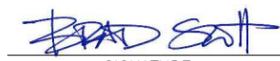
| "G" SERIES |          |                 |           |
|------------|----------|-----------------|-----------|
| SIGN       | SIGN NO. | COLOR           | SIZE      |
|            | G20-2A   | BLACK ON ORANGE | 36" X 18" |

| DEVICES |                      |       |      |
|---------|----------------------|-------|------|
| ITEM    | SIGN NO.             | COLOR | SIZE |
|         | DLC                  |       |      |
|         | TYPE III             |       |      |
|         | PCMS                 |       |      |
|         | TYPE IV              |       |      |
|         | WEIGHTED CHANNELIZER |       |      |

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BRAD SCOTT  
PRINTED NAME



SIGNATURE

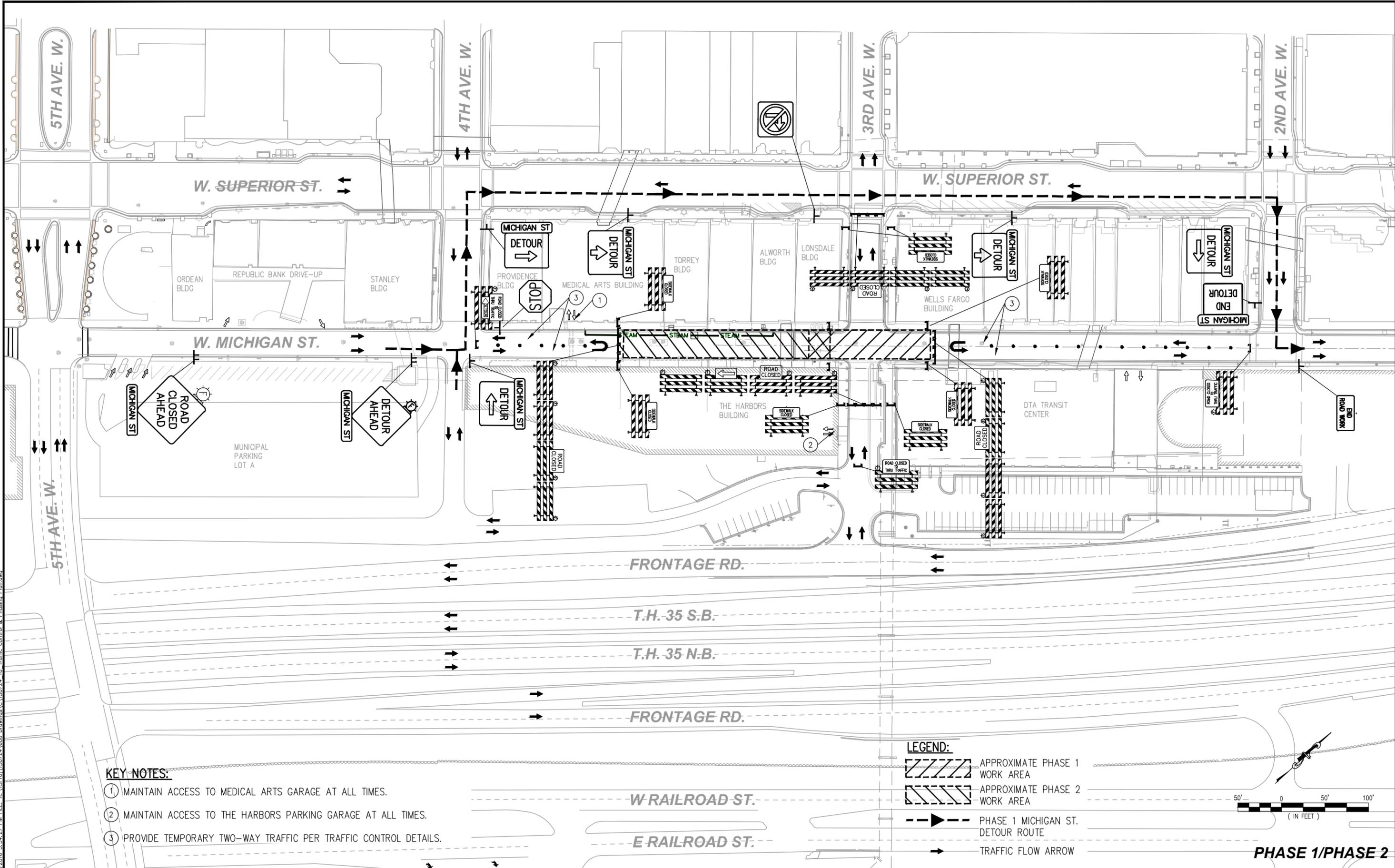
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DATE  
46198  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

TRAFFIC CONTROL

SHEET NO. 29 OF 47 SHEETS

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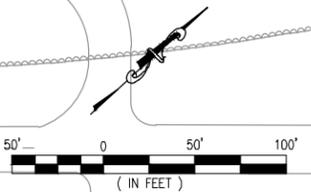


**KEY NOTES:**

- ① MAINTAIN ACCESS TO MEDICAL ARTS GARAGE AT ALL TIMES.
- ② MAINTAIN ACCESS TO THE HARBORS PARKING GARAGE AT ALL TIMES.
- ③ PROVIDE TEMPORARY TWO-WAY TRAFFIC PER TRAFFIC CONTROL DETAILS.

**LEGEND:**

-  APPROXIMATE PHASE 1 WORK AREA
-  APPROXIMATE PHASE 2 WORK AREA
-  PHASE 1 MICHIGAN ST. DETOUR ROUTE
-  TRAFFIC FLOW ARROW



**PHASE 1/PHASE 2**

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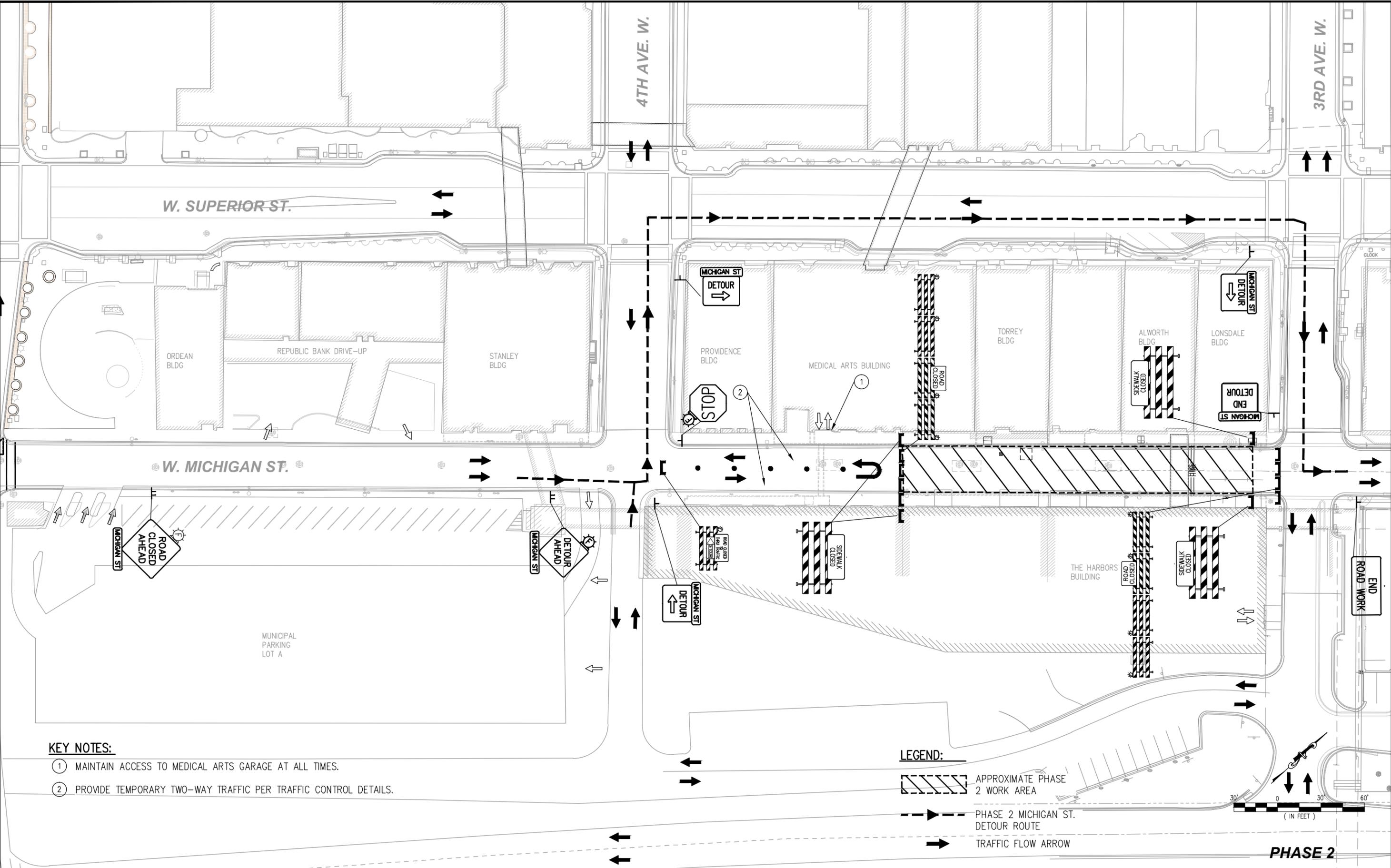
  
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MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

TRAFFIC CONTROL  
SHEET NO. 30 OF 47 SHEETS

PLOT DATE: 2/25/2016 3:33:40 PM FILE: R:\15724\150724\600 Drawings\150724\_10 Traffic Control & Phasing Plan.dwg



**KEY NOTES:**

- ① MAINTAIN ACCESS TO MEDICAL ARTS GARAGE AT ALL TIMES.
- ② PROVIDE TEMPORARY TWO-WAY TRAFFIC PER TRAFFIC CONTROL DETAILS.

**LEGEND:**

-  APPROXIMATE PHASE 2 WORK AREA
-  PHASE 2 MICHIGAN ST. DETOUR ROUTE
-  TRAFFIC FLOW ARROW

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PRINTED NAME

  
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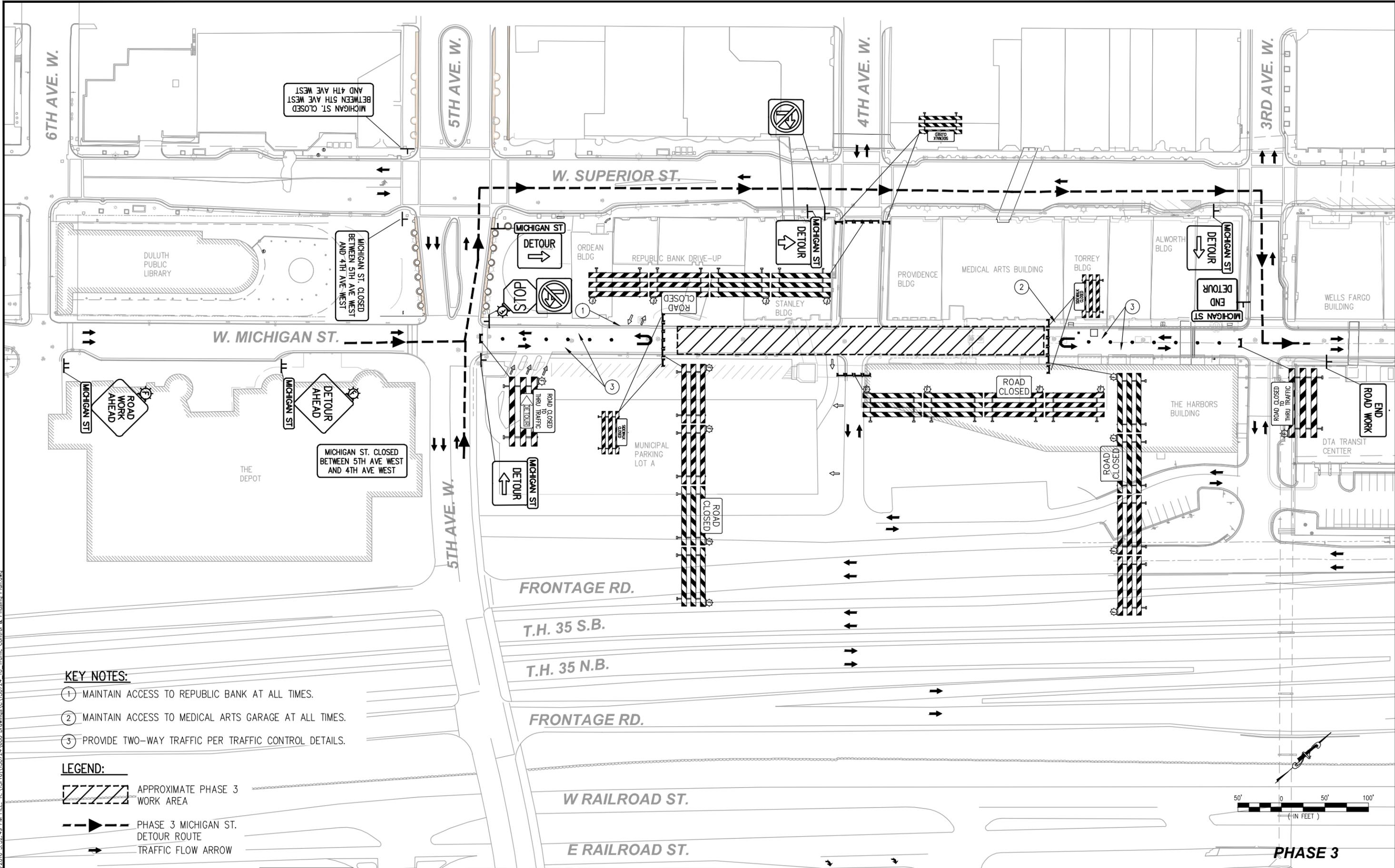
MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

TRAFFIC CONTROL

SHEET NO. 31 OF 47 SHEETS

**PHASE 2**

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**KEY NOTES:**

- ① MAINTAIN ACCESS TO REPUBLIC BANK AT ALL TIMES.
- ② MAINTAIN ACCESS TO MEDICAL ARTS GARAGE AT ALL TIMES.
- ③ PROVIDE TWO-WAY TRAFFIC PER TRAFFIC CONTROL DETAILS.

**LEGEND:**

- APPROXIMATE PHASE 3 WORK AREA
- PHASE 3 MICHIGAN ST. DETOUR ROUTE
- TRAFFIC FLOW ARROW



**PHASE 3**

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BRAD SCOTT  
PRINTED NAME

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LIC. NO.

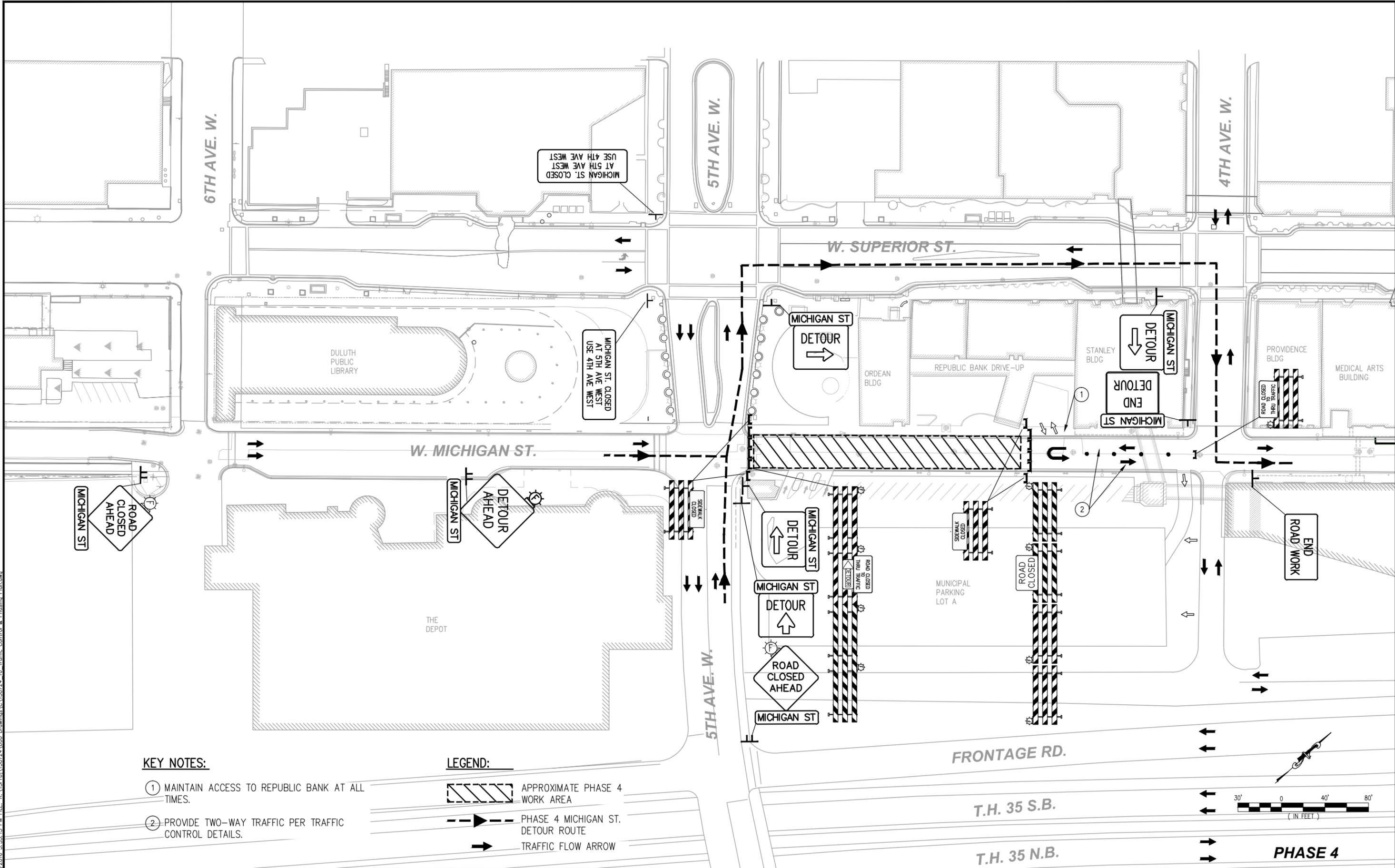
MICHIGAN ST. 6TH-3RD AVE WEST

LHB PROJECT NO. 150724

TRAFFIC CONTROL

SHEET NO. 32 OF 47 SHEETS

PLOT DATE: 2/25/2016 3:33:13 PM FILE: R:\V\proj\150724\600 Drawings\150724\_10 Traffic Control & Phasing Plan.dwg



**KEY NOTES:**

- ① MAINTAIN ACCESS TO REPUBLIC BANK AT ALL TIMES.
- ② PROVIDE TWO-WAY TRAFFIC PER TRAFFIC CONTROL DETAILS.

**LEGEND:**

- APPROXIMATE PHASE 4 WORK AREA
- PHASE 4 MICHIGAN ST. DETOUR ROUTE
- TRAFFIC FLOW ARROW

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PRINTED NAME

SIGNATURE

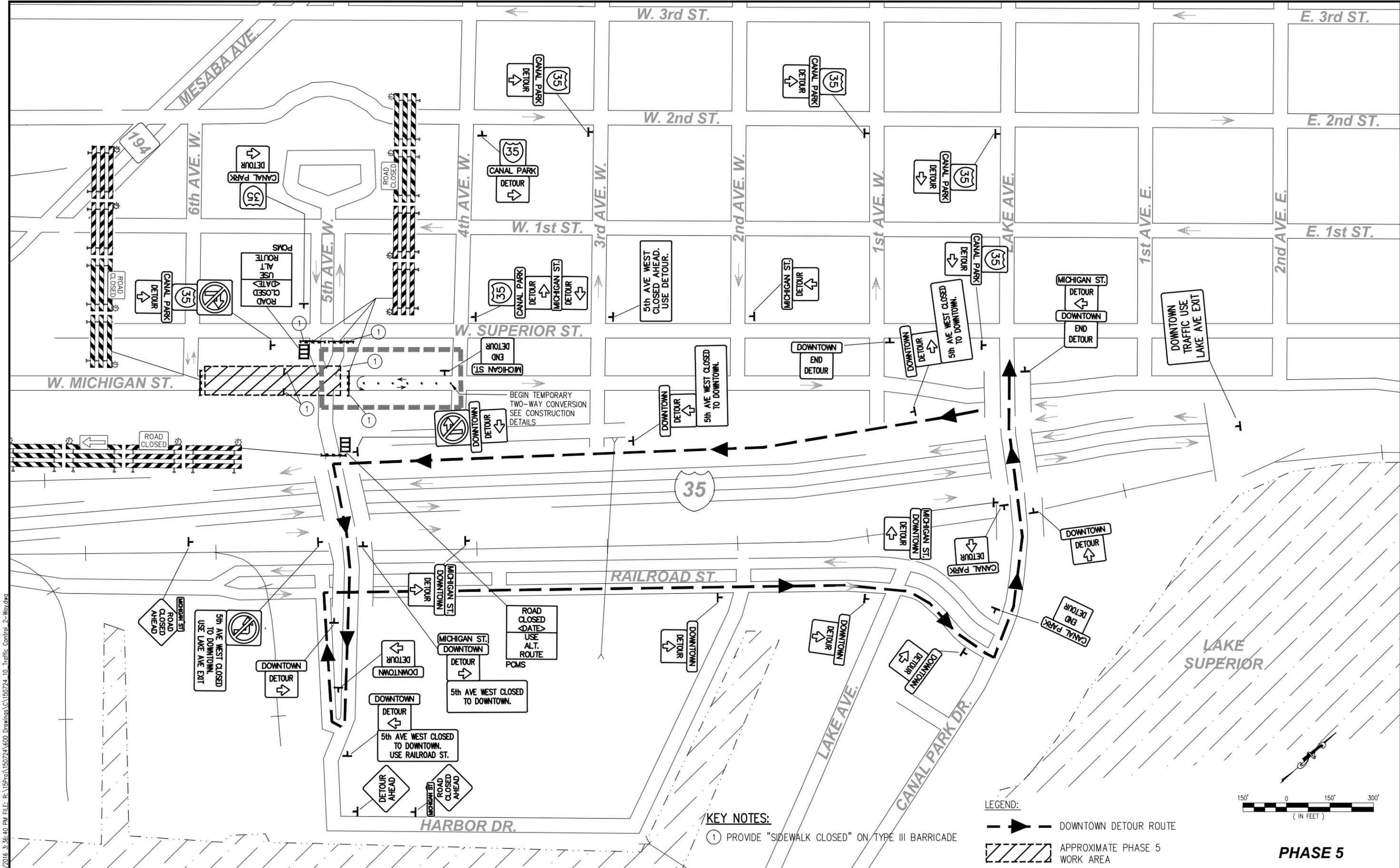
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MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

TRAFFIC CONTROL

SHEET NO. 33 OF 47 SHEETS

**PHASE 4**



PLOT DATE: 2/25/2016 3:36:40 PM FILE: R:\15724\150724\600 Drawings\150724\_10\_Traffic Control\_2-11-16.dwg

**KEY NOTES:**  
 ① PROVIDE "SIDEWALK CLOSED" ON TYPE III BARRICADE

**LEGEND:**  
 - - - - - DOWNTOWN DETOUR ROUTE  
 [Hatched Box] APPROXIMATE PHASE 5 WORK AREA

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BRAD SCOTT  
 PRINTED NAME  
  
 SIGNATURE

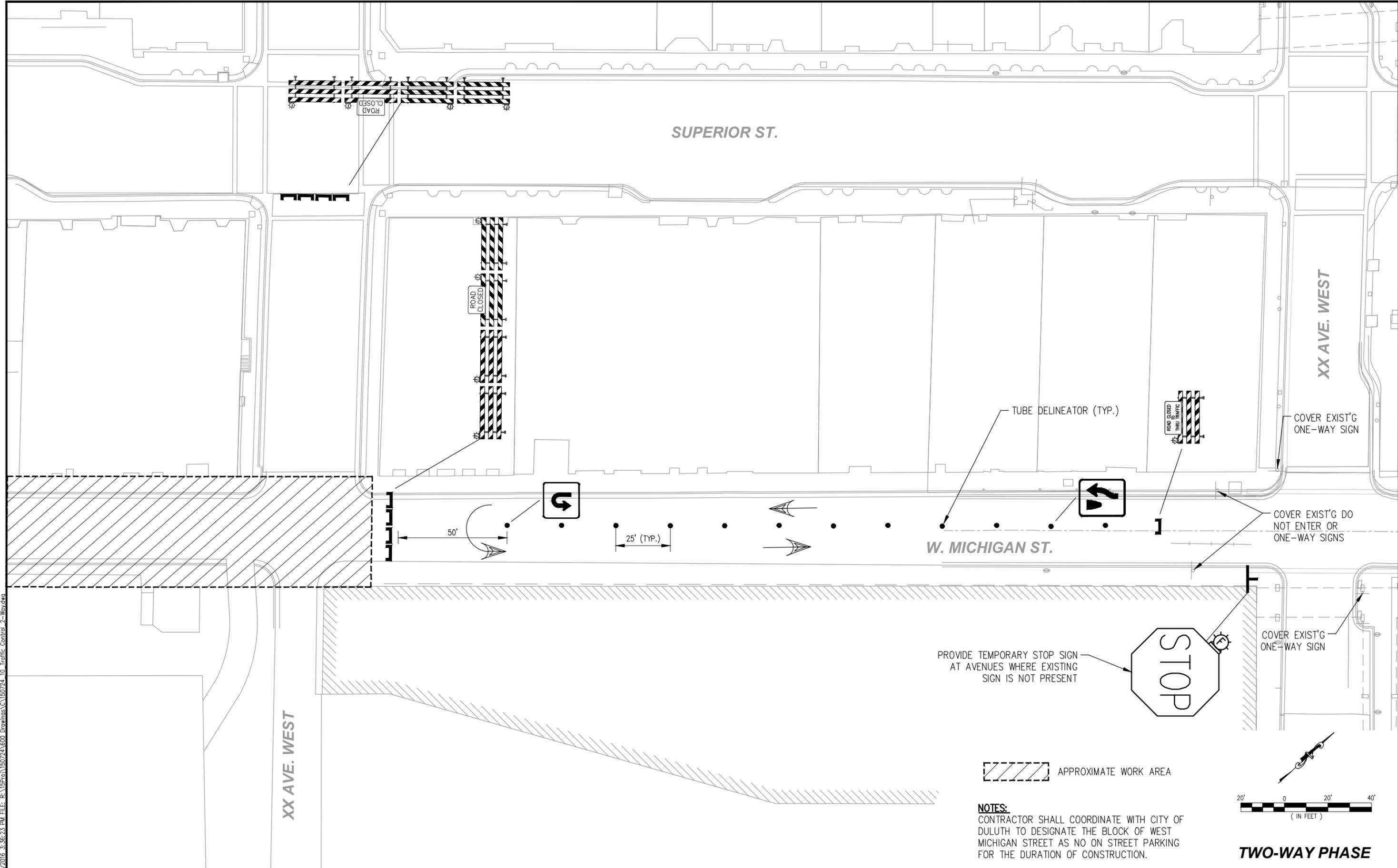
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MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

TRAFFIC CONTROL  
 SHEET NO. 34 OF 47 SHEETS

PHASE 5

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BRAD SCOTT  
 PRINTED NAME



SIGNATURE

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 LIC. NO.

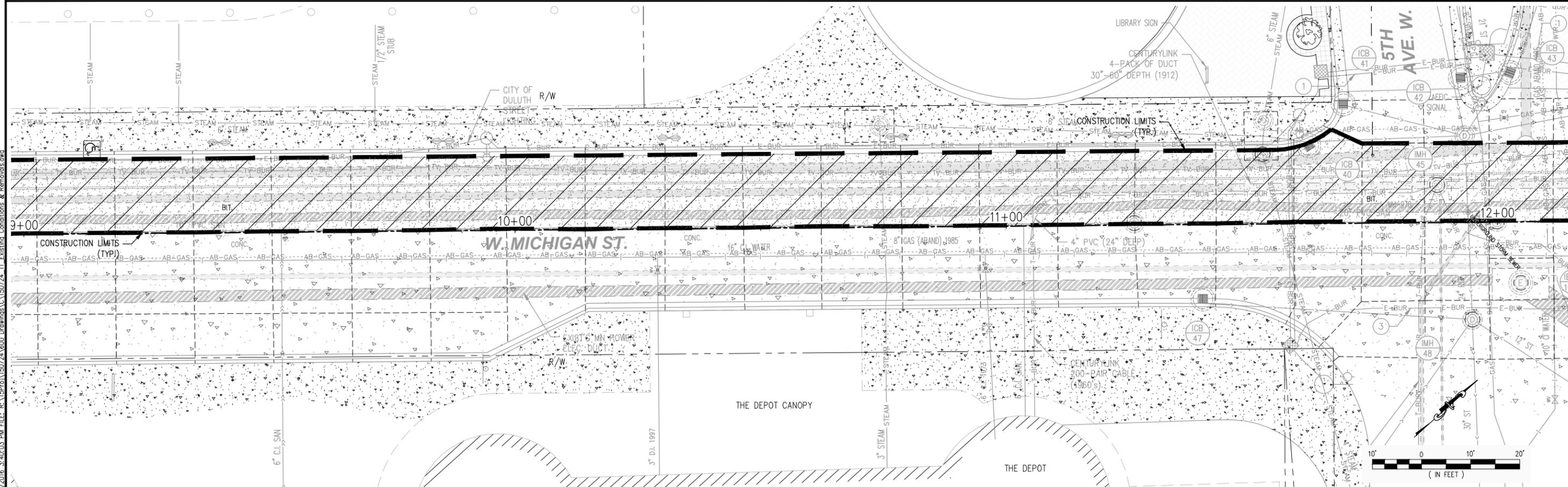
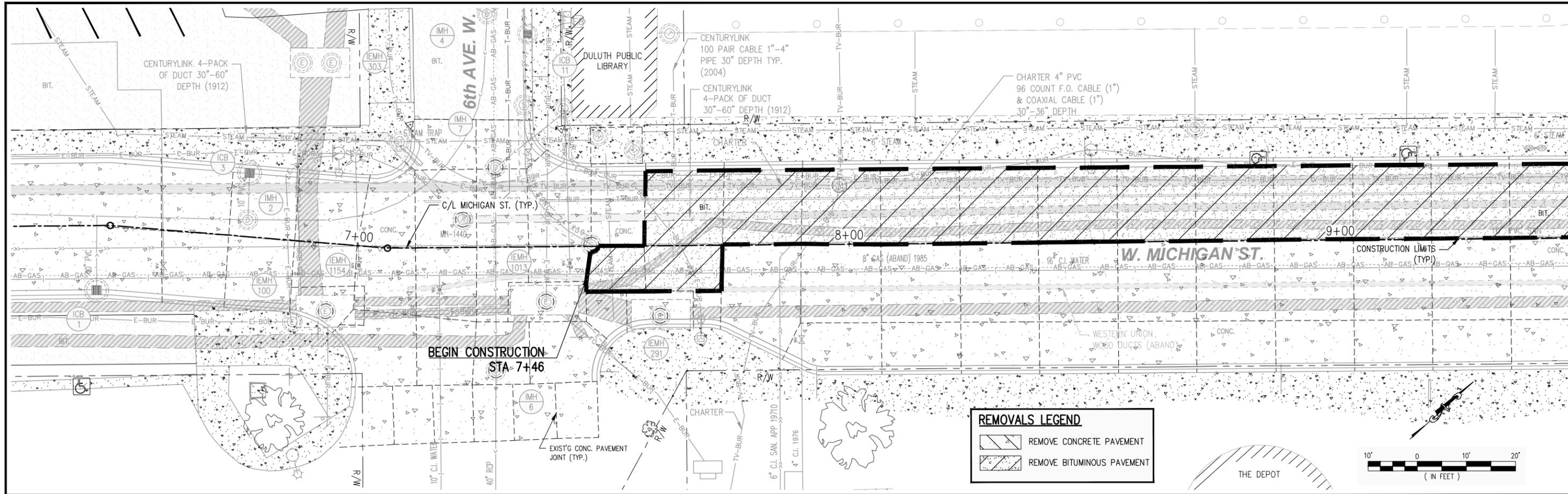
MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

TRAFFIC CONTROL

SHEET NO. 35 OF 47 SHEETS

**NOTES:**  
 CONTRACTOR SHALL COORDINATE WITH CITY OF DULUTH TO DESIGNATE THE BLOCK OF WEST MICHIGAN STREET AS NO ON STREET PARKING FOR THE DURATION OF CONSTRUCTION.

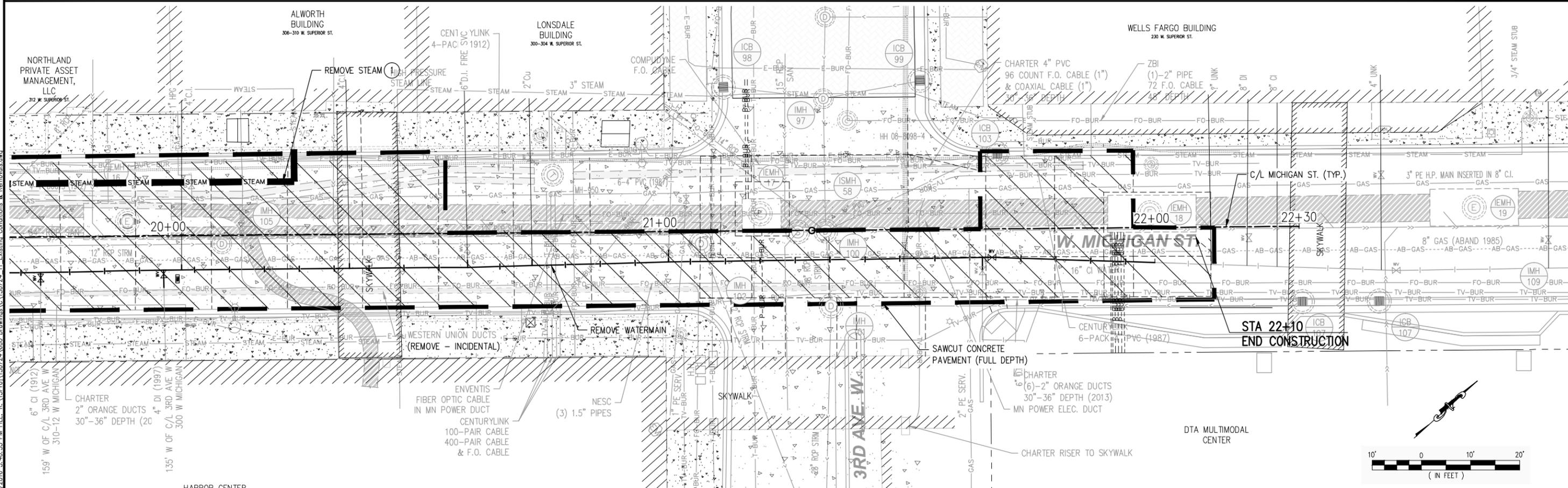
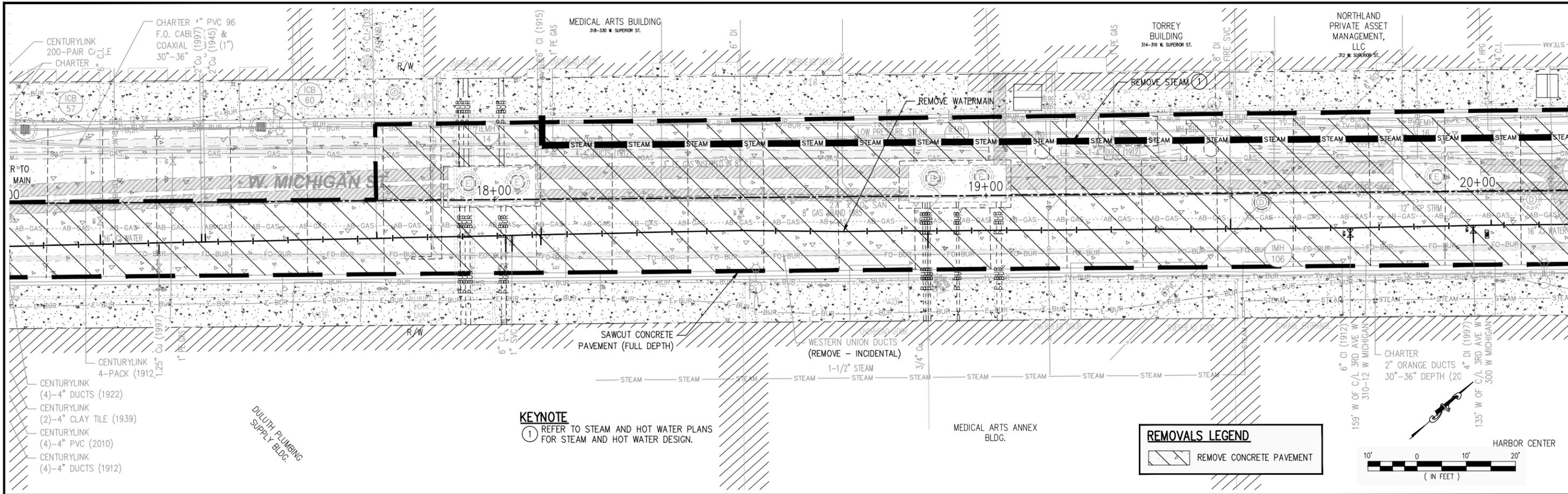
**TWO-WAY PHASE**



PLOT DATE: 2/25/2016 3:40:03 PM FILE: R:\SPR\150724\600 Drawings\150724-11 Existing Conditions & Removals.dwg

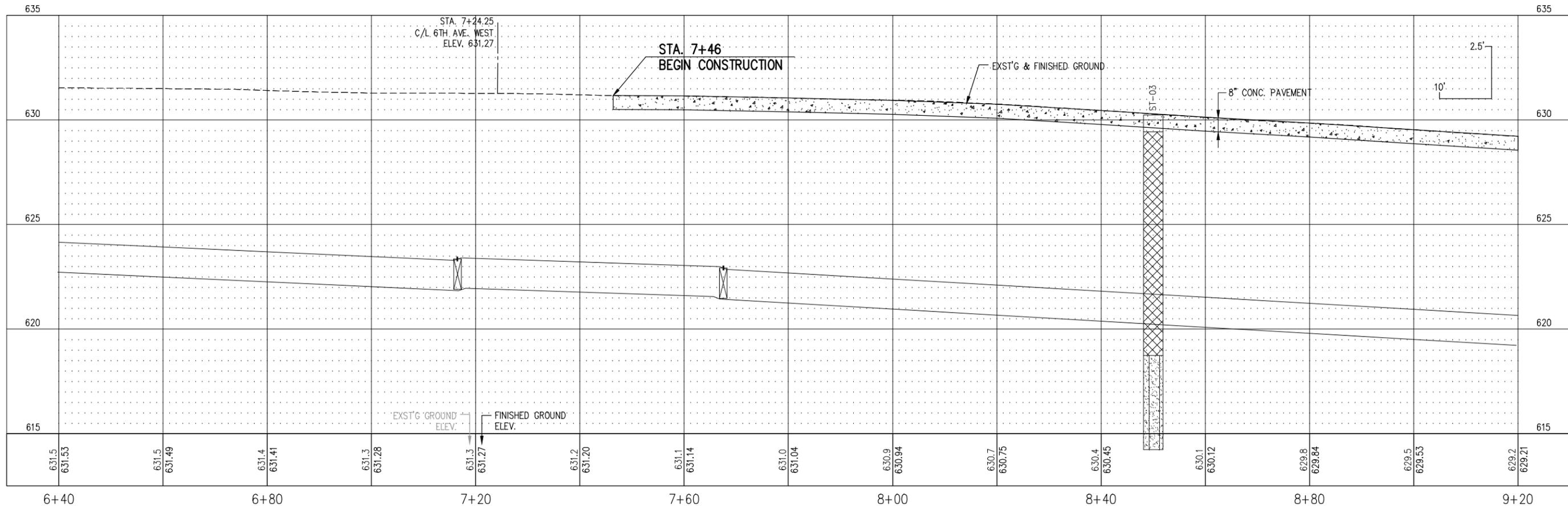
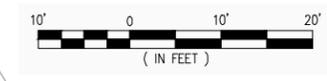
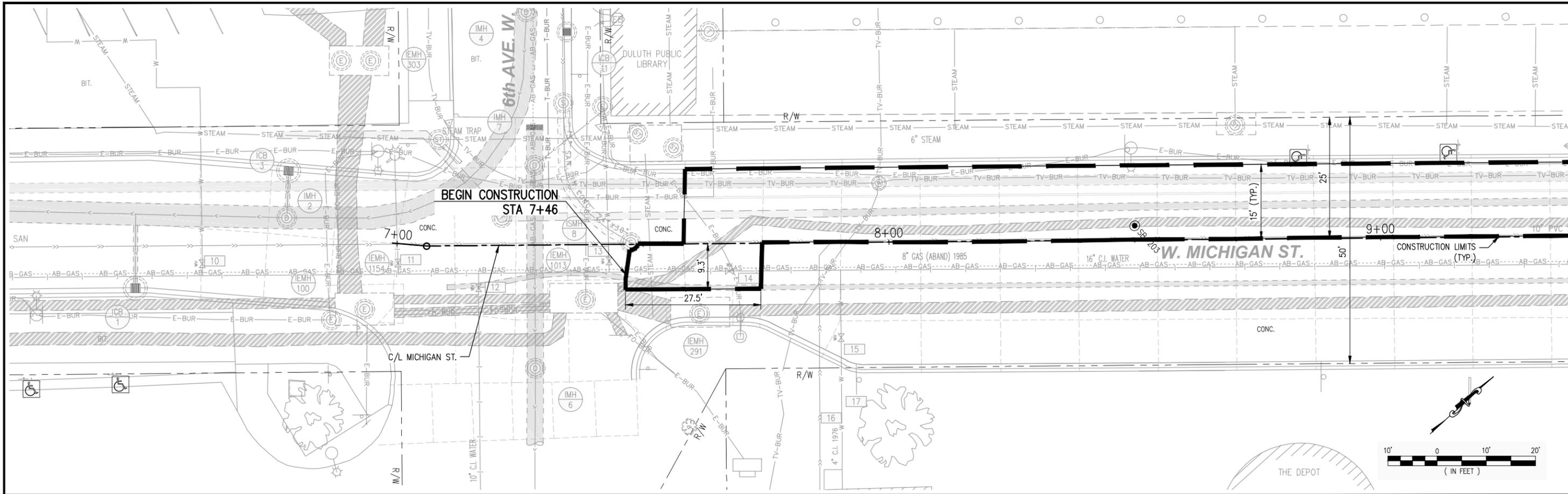
|  |   |   |                               |   |
|--|---|---|-------------------------------|---|
| I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.<br>BRAD SCOTT<br>PRINTED NAME | <br>SIGNATURE | 02-25-2016<br>DATE<br>46198<br>LIC. NO. | MICHIGAN ST. 6TH-3RD AVE WEST | EXISTING CONDITIONS & REMOVALS<br>SHEET NO. 36 OF 47 SHEETS |
|  |   |   | LHB PROJECT NO. 150724        |   |





|  |   |   |                               |   |
|--|---|---|-------------------------------|---|
| I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.<br>BRAD SCOTT<br>PRINTED NAME | <br>SIGNATURE | 02-25-2016<br>DATE<br>46198<br>LIC. NO. | MICHIGAN ST. 6TH-3RD AVE WEST | EXISTING CONDITIONS & REMOVALS<br>SHEET NO. 38 OF 47 SHEETS |
|  |   |   | LHB PROJECT NO. 150724        |   |

PLOT DATE: 2/25/2016 3:40:35 PM FILE: R:\150724\150724\600 Drawings\150724\600 Existing Conditions & Removals.dwg



PLOT DATE: 2/25/2016 3:41:28 PM FILE: R:\EProj\150724\600 Drawings\150724\_12 Plan&Profile.dwg

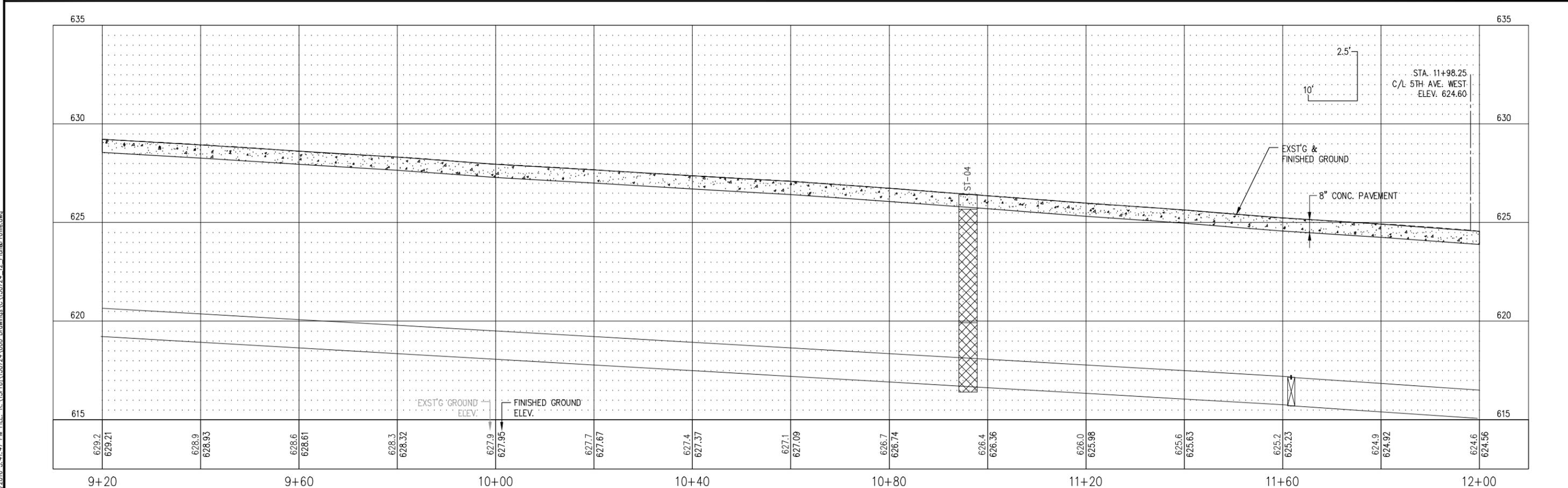
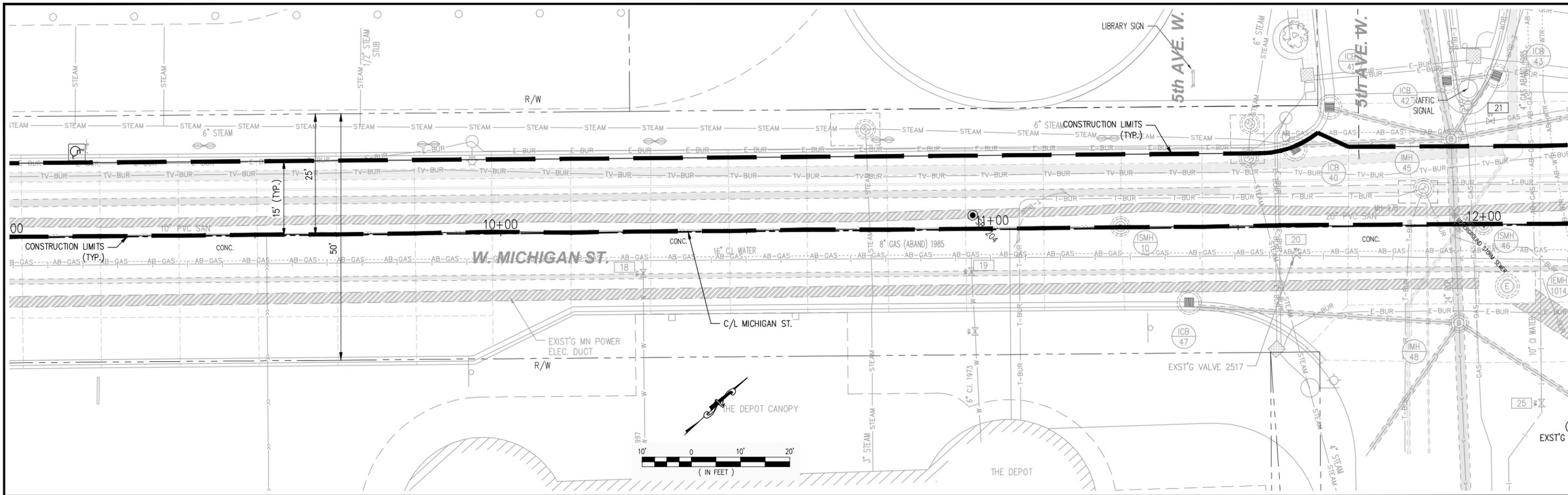
I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

BRAD SCOTT  
 PRINTED NAME  
  
 SIGNATURE

02-25-2016  
 DATE  
 46198  
 LIC. NO.

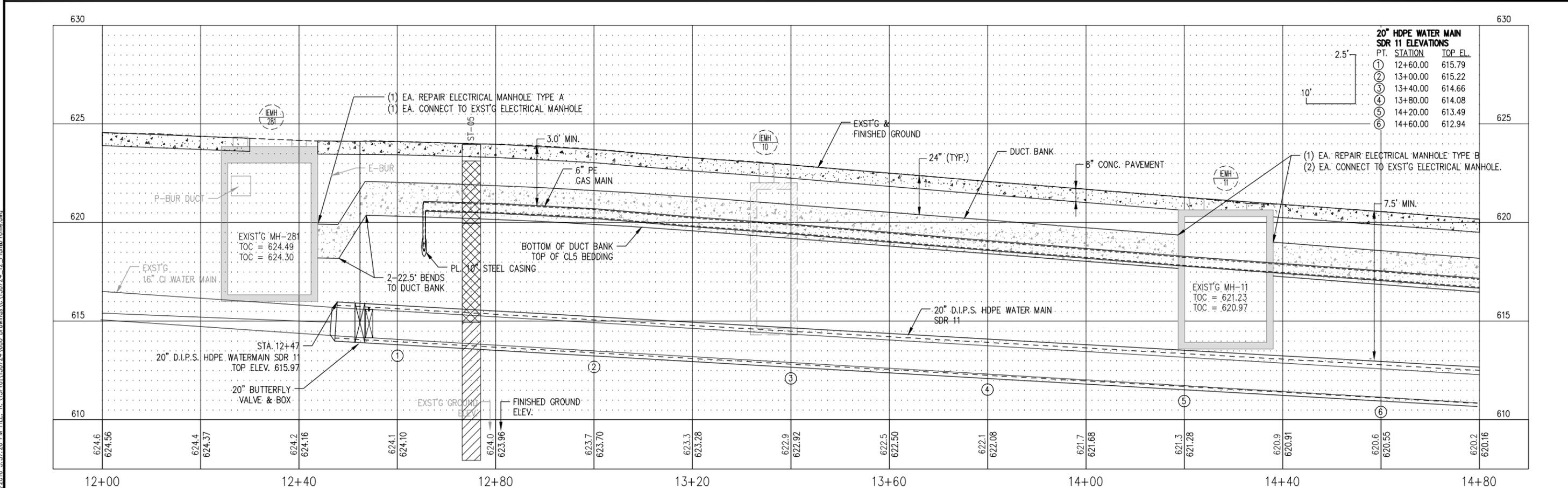
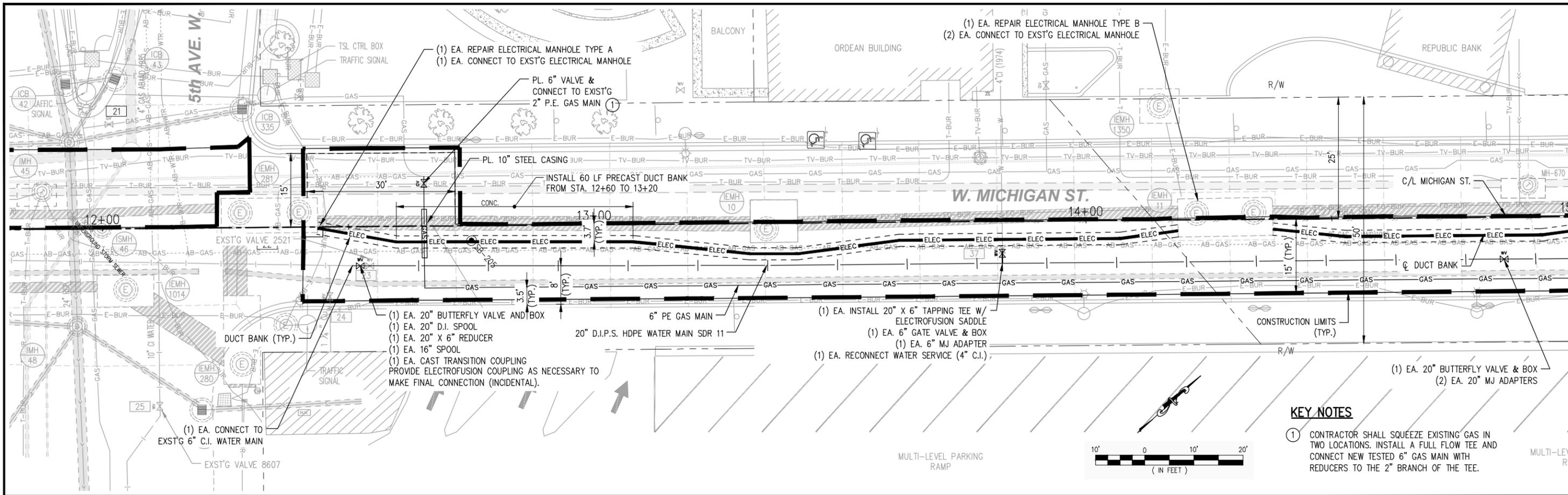
MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

PLAN & PROFILE  
 SHEET NO. 39 OF 47 SHEETS



PLOT DATE: 2/25/2016 3:41:47 PM FILE: R:\VProj\150724\600 Drawings\150724\_12 Plan&Profile.dwg

|  |                                   |   |   |  |  |  |
|--|-----------------------------------|---|---|--|--|--|
| I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. | <b>BRAD SCOTT</b><br>PRINTED NAME | <br>SIGNATURE | 02-25-2016<br>DATE<br>46198<br>LIC. NO. | <b>MICHIGAN ST. 6TH-3RD AVE WEST</b><br>LHB PROJECT NO. 150724 |  | <b>PLAN &amp; PROFILE</b><br>SHEET NO. 40 OF 47 SHEETS |
|--|-----------------------------------|---|---|--|--|--|



I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

BRAD SCOTT  
PRINTED NAME

*Brad Scott*  
SIGNATURE

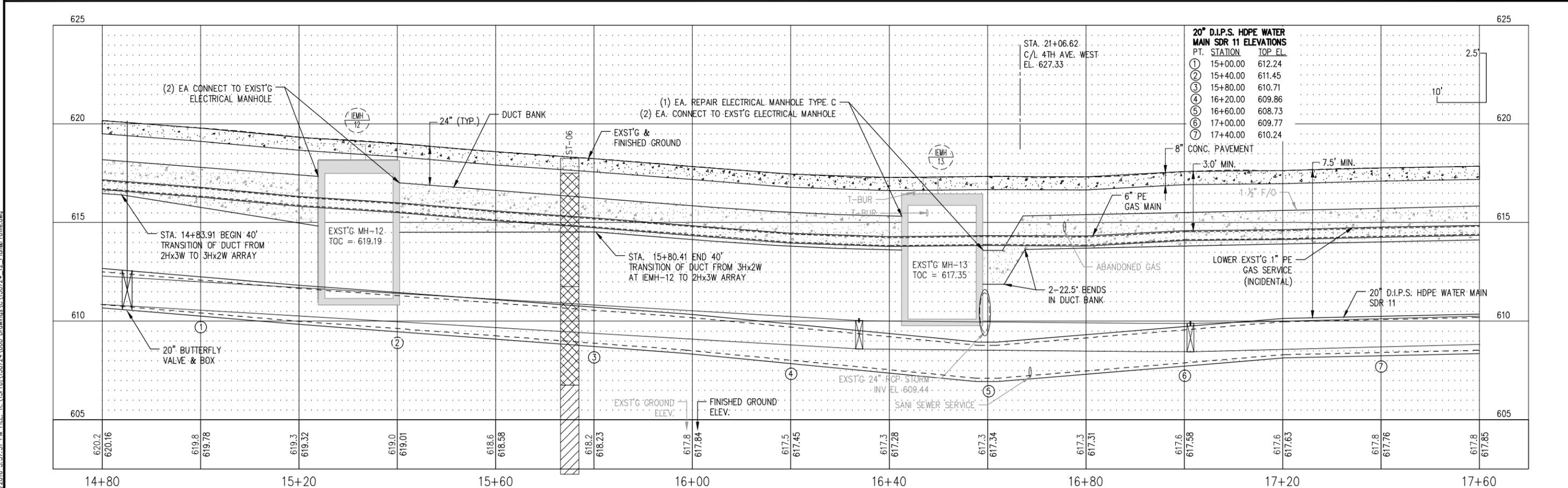
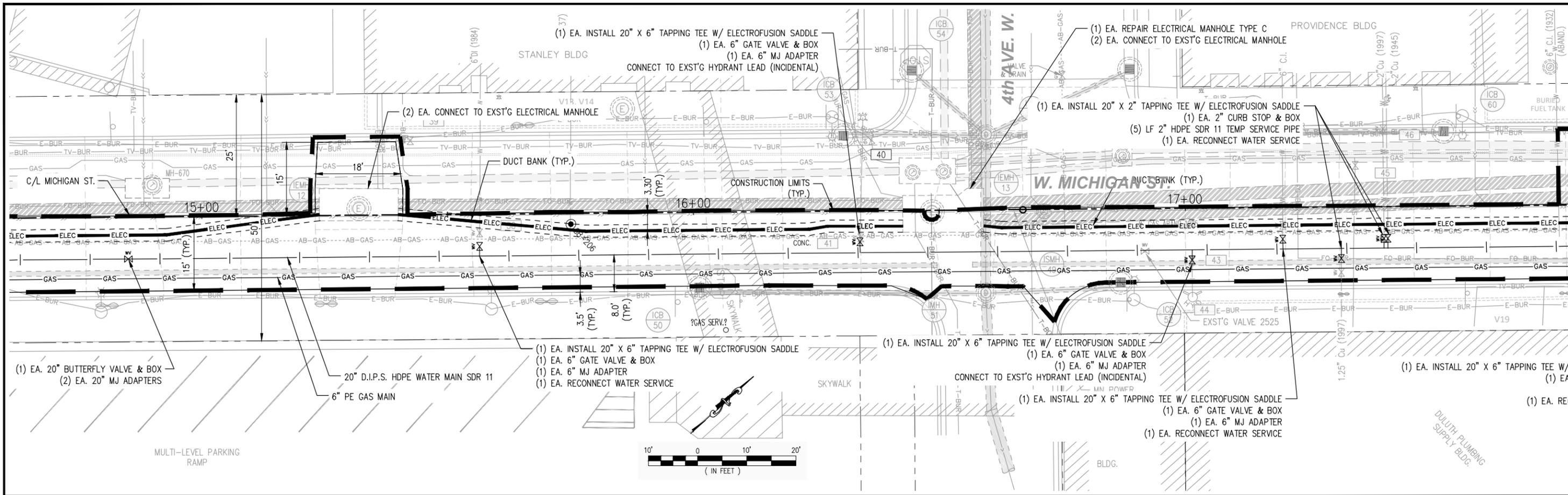
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LIC. NO.

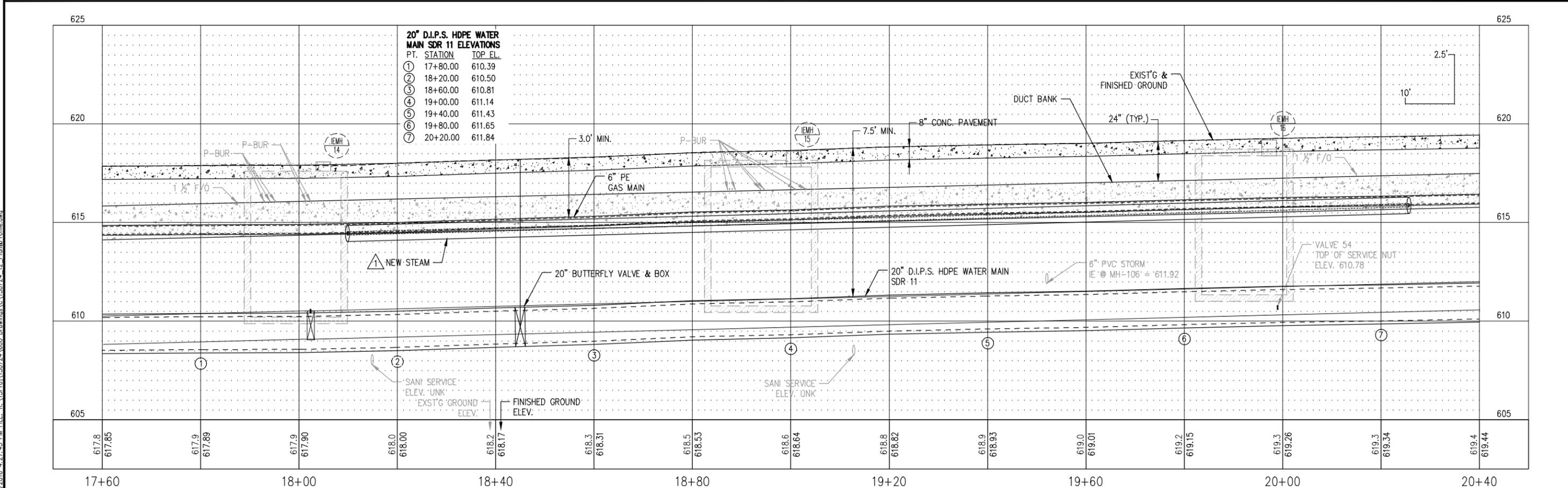
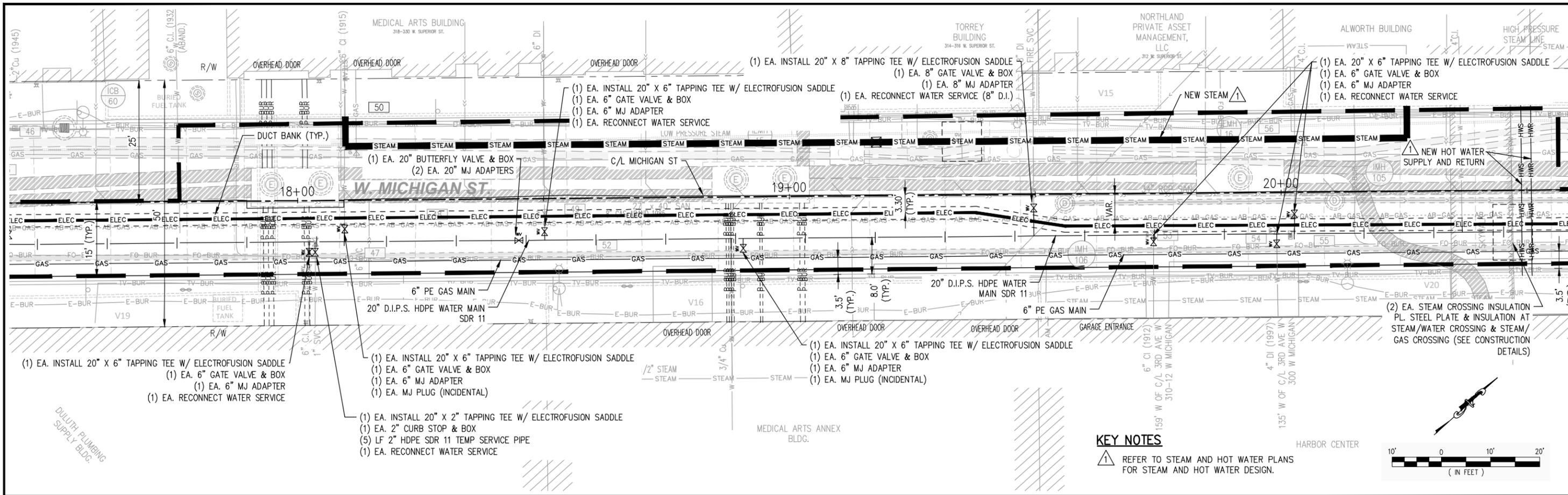
MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

PLAN & PROFILE  
SHEET NO. 41 OF 47 SHEETS

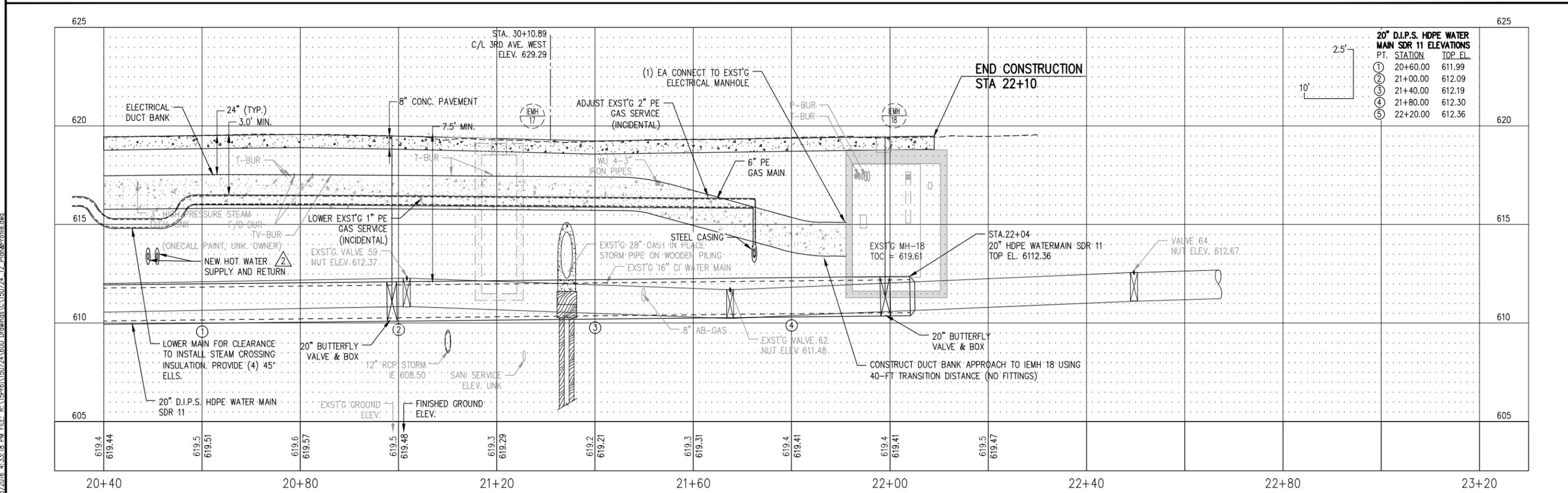
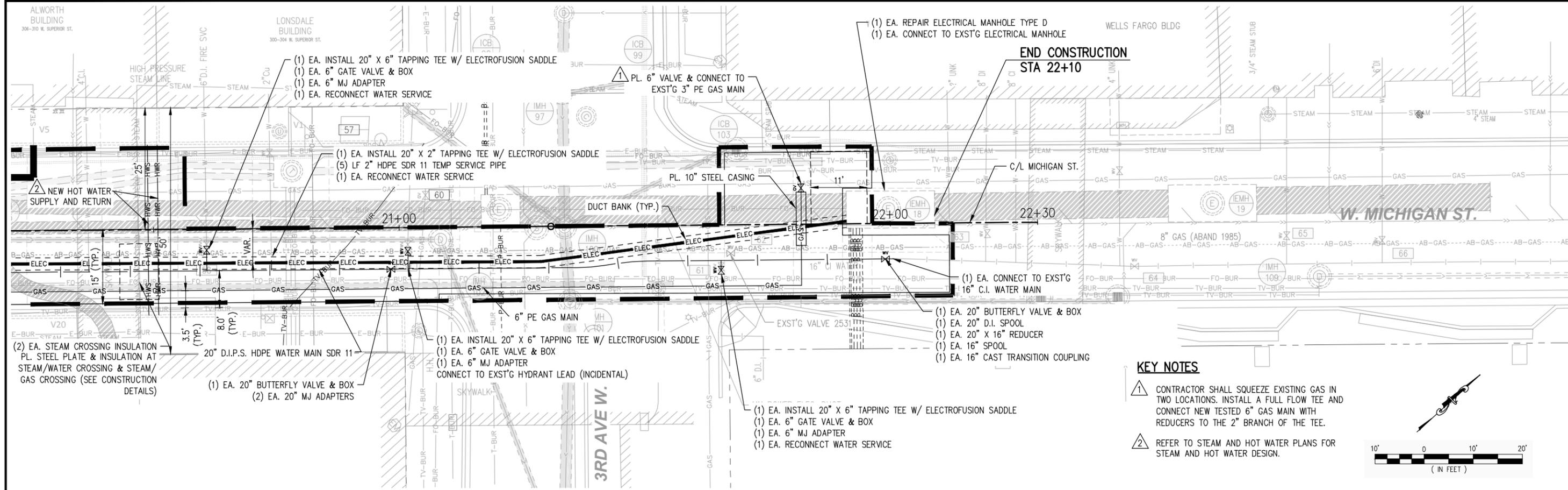
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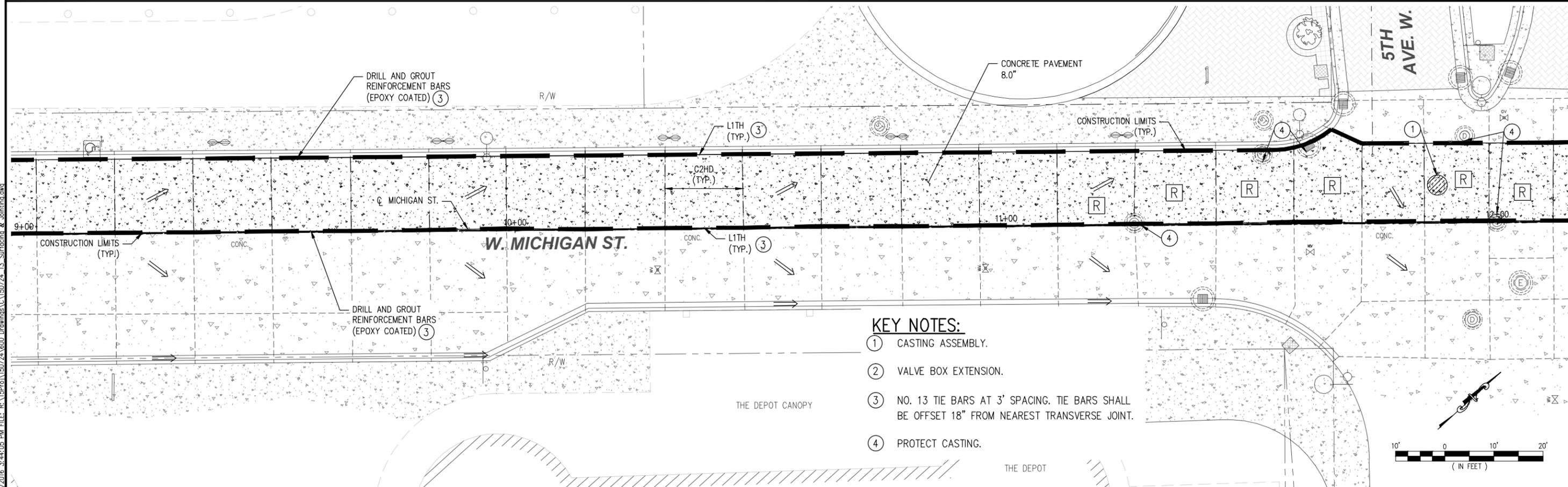
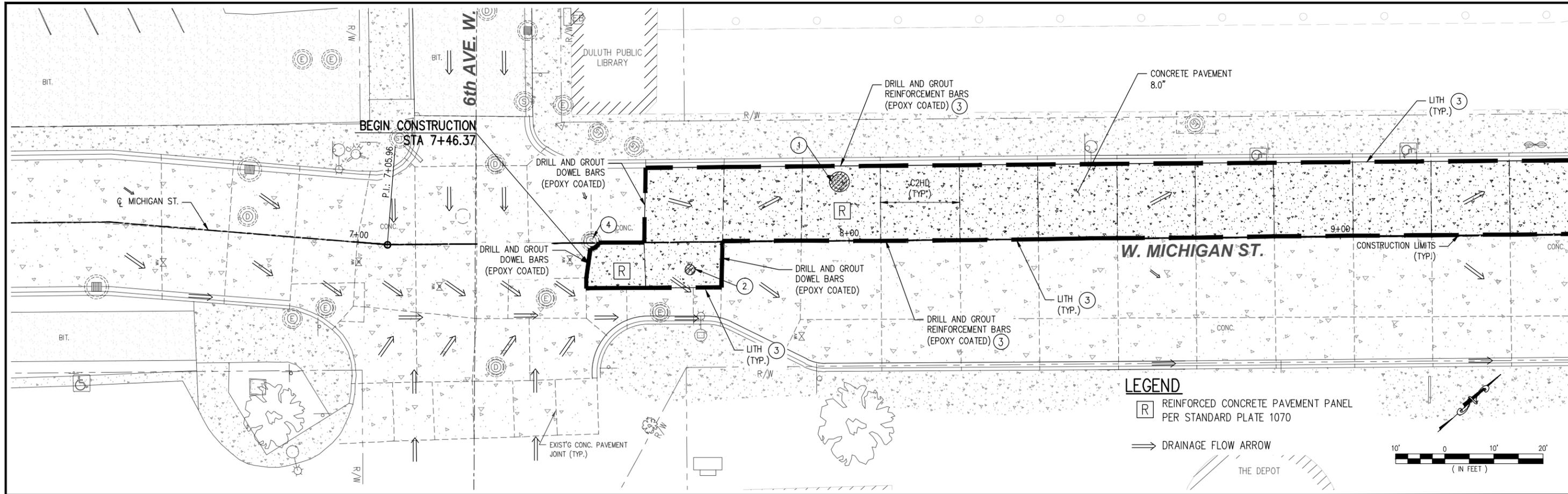


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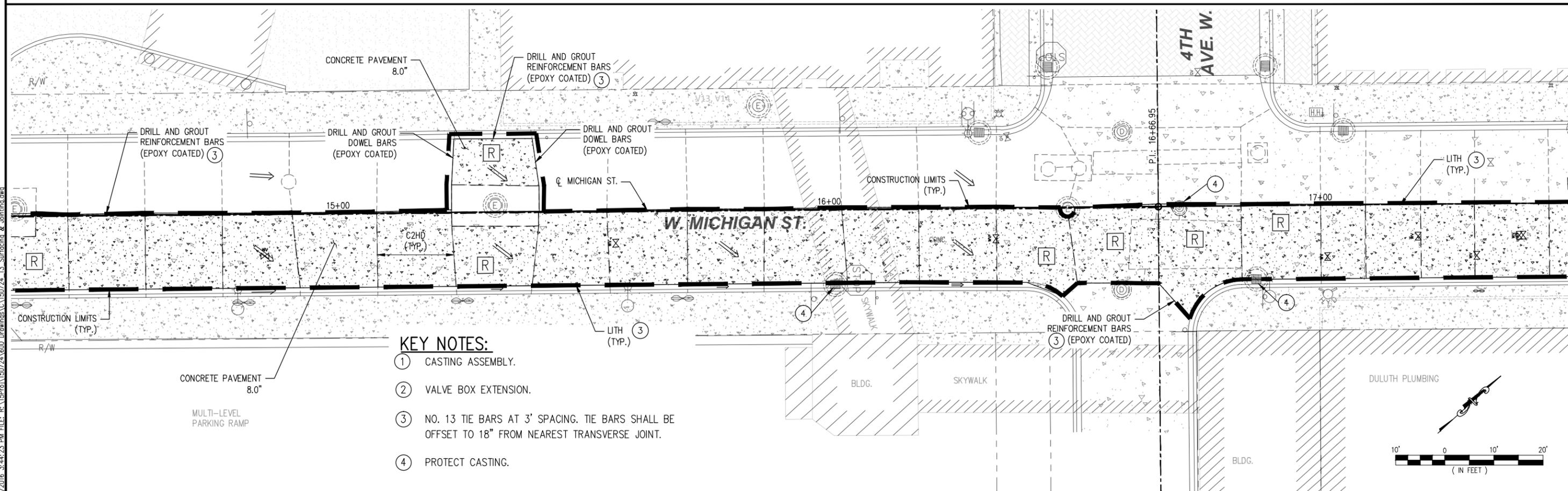
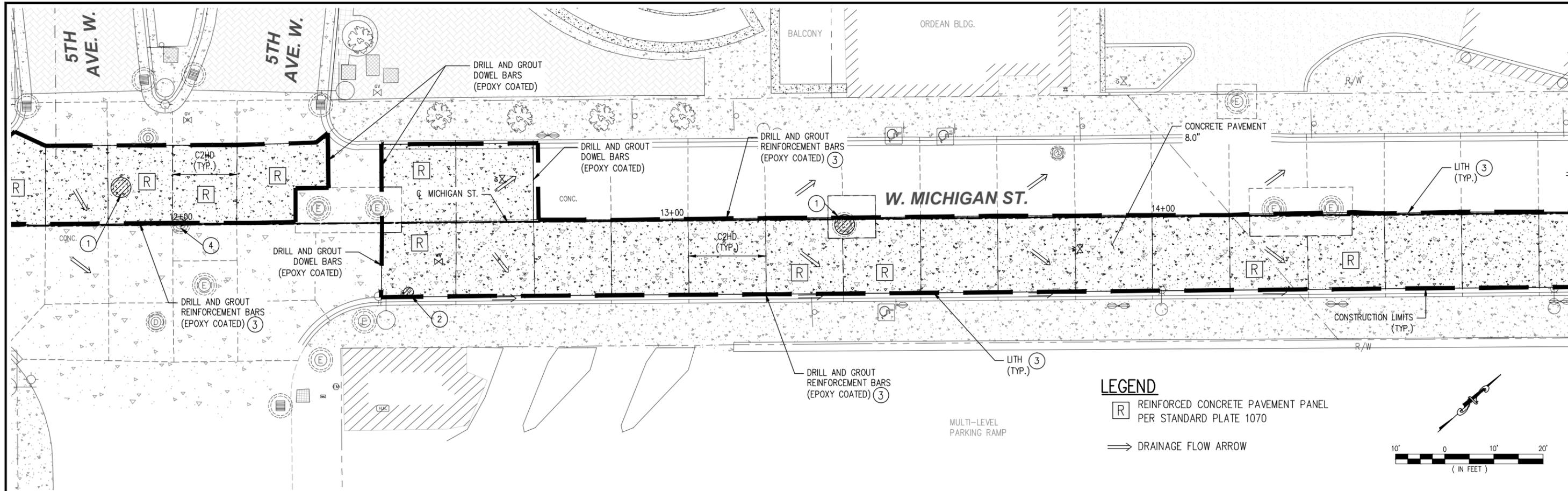
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PLOT DATE: 2/25/2016 3:44:05 PM FILE: R:\15724\15724A\600 Drawings\15724-13 Surfacing & Utilities.dwg

|   |   |   |                                      |  |
|---|---|---|--------------------------------------|--|
| I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.<br><b>BRAD SCOTT</b><br>PRINTED NAME | <br>SIGNATURE | 02-25-2016<br>DATE<br>46198<br>LIC. NO. | <b>MICHIGAN ST. 6TH-3RD AVE WEST</b> | <b>CONCRETE PAVING PLAN</b><br>SHEET NO. 45 OF 47 SHEETS |
|   |   |   | LHB PROJECT NO. 150724               |  |



**KEY NOTES:**

- ① CASTING ASSEMBLY.
- ② VALVE BOX EXTENSION.
- ③ NO. 13 TIE BARS AT 3' SPACING. TIE BARS SHALL BE OFFSET TO 18" FROM NEAREST TRANSVERSE JOINT.
- ④ PROTECT CASTING.

**LEGEND**

- R REINFORCED CONCRETE PAVEMENT PANEL PER STANDARD PLATE 1070
- $\Rightarrow$  DRAINAGE FLOW ARROW



PLOT DATE: 2/25/2016 3:44:23 PM FILE: R:\15724\15724.600 Drawings\15724-13 Surfacing & Utilities.dwg

I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

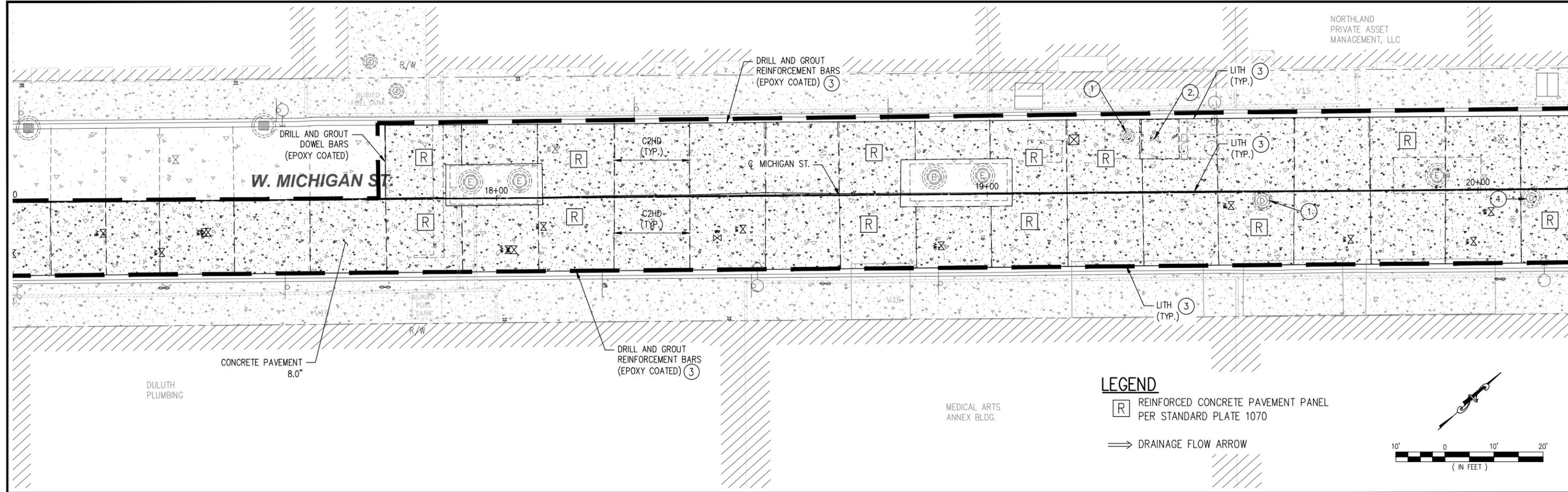
BRAD SCOTT  
PRINTED NAME

*Brad Scott*  
SIGNATURE

02-25-2016  
DATE  
46198  
LIC. NO.

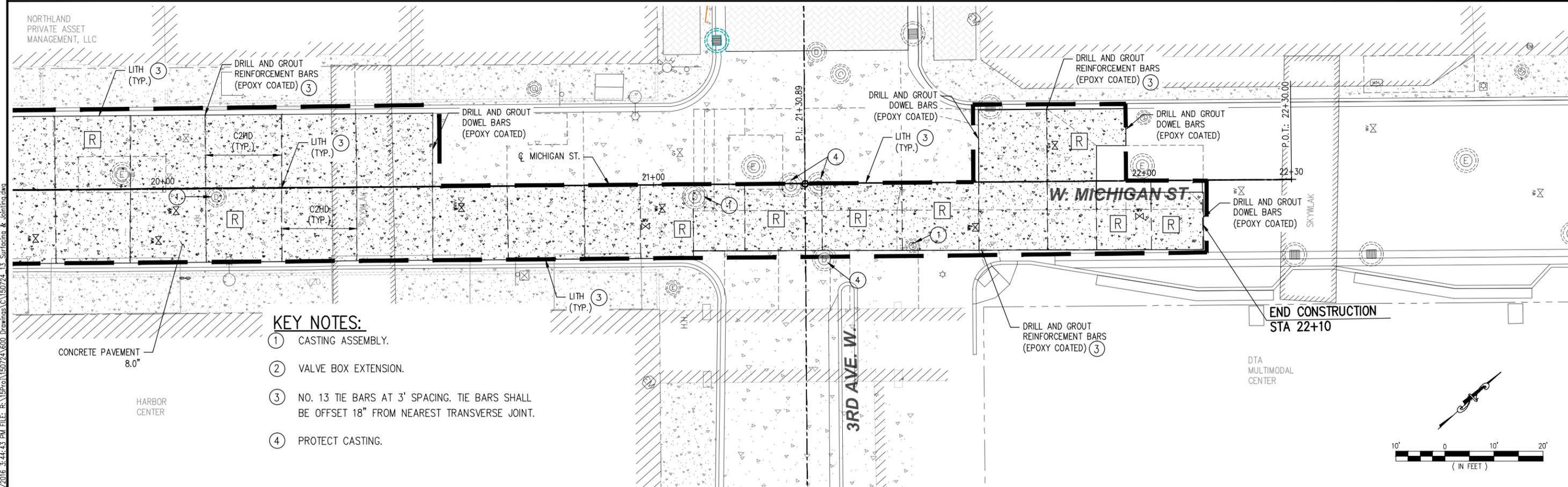
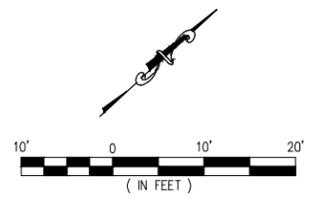
MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

CONCRETE PAVING PLAN  
SHEET NO. 46 OF 47 SHEETS



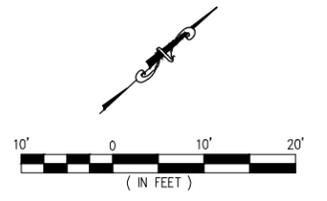
**LEGEND**

- R REINFORCED CONCRETE PAVEMENT PANEL PER STANDARD PLATE 1070
- $\Rightarrow$  DRAINAGE FLOW ARROW



**KEY NOTES:**

- ① CASTING ASSEMBLY.
- ② VALVE BOX EXTENSION.
- ③ NO. 13 TIE BARS AT 3' SPACING. TIE BARS SHALL BE OFFSET 18" FROM NEAREST TRANSVERSE JOINT.
- ④ PROTECT CASTING.



PLOT DATE: 2/25/2016 3:44:43 PM FILE: R:\15724\150724.600 Drawings\150724-13 Surfacing & Utilities.dwg

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BRAD SCOTT  
 PRINTED NAME

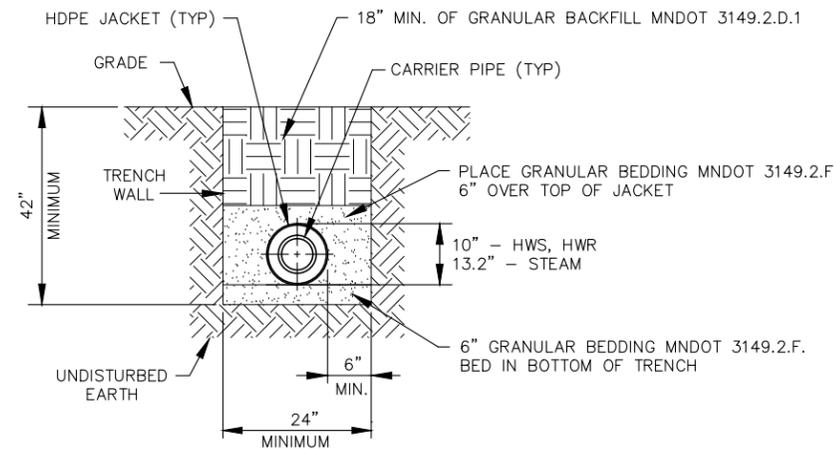


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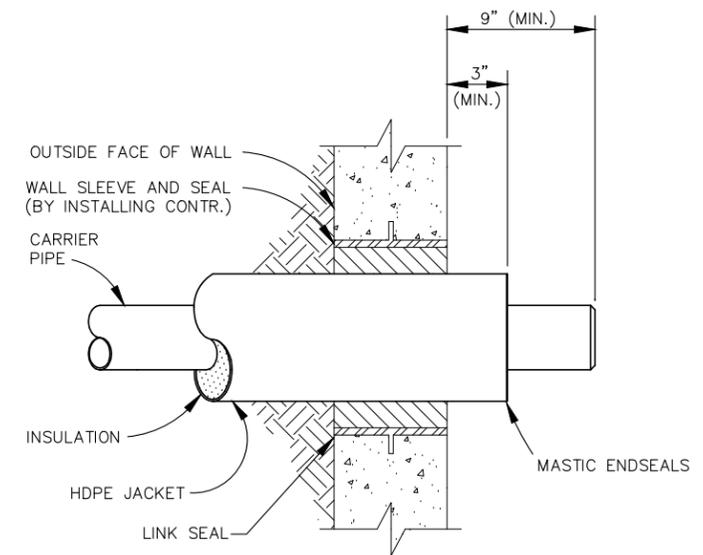
02-25-2016  
 DATE  
 46198  
 LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
 LHB PROJECT NO. 150724

CONCRETE PAVING PLAN  
 SHEET NO. 47 OF 47 SHEETS



① STEAM / HOT WATER TRENCH SECTION  
NOT TO SCALE



② BUILDING WALL PENETRATION DETAIL  
NOT TO SCALE

PLOT DATE: 2/25/2016 9:34:27 AM FILE: R:\5Pro\150724\600 Drawings\150724\_S1\_Steam\_Details.dwg

I HEREBY CERTIFY that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

DAVID WILLIAMS  
PRINTED NAME

*David Williams*  
SIGNATURE

02-25-2016  
DATE  
18929  
LIC. NO.

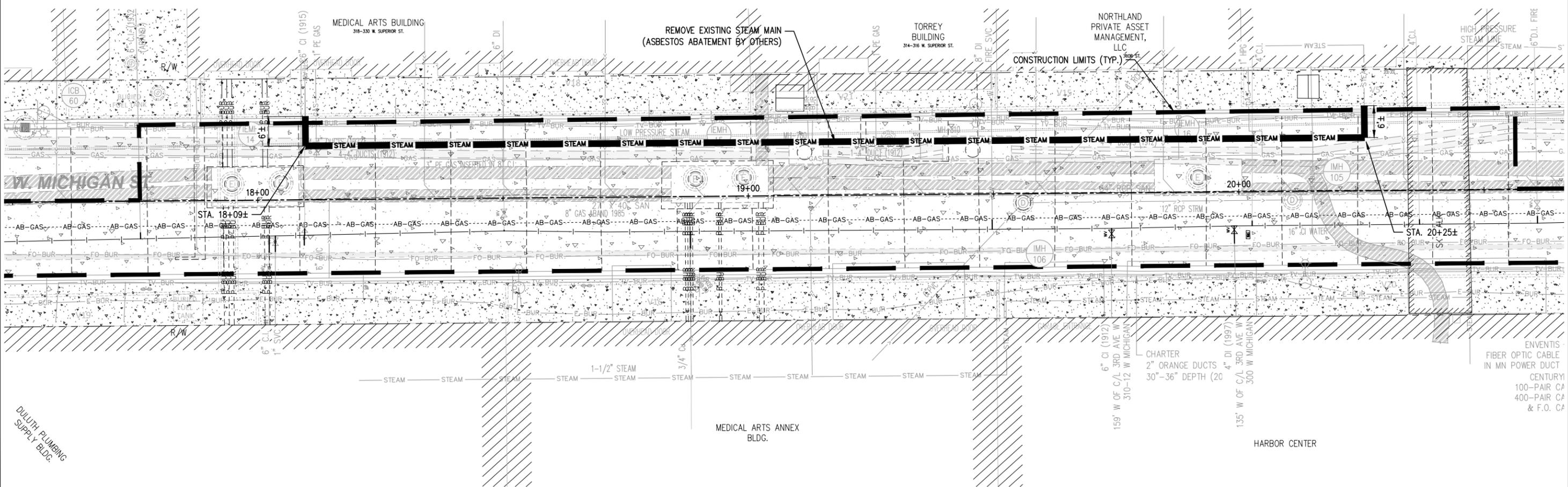
MICHIGAN ST. 6TH-3RD AVE WEST

LHB PROJECT NO. 150724

STEAM DETAILS

SHEET NO. S1 OF S3 SHEETS

PLOT DATE: 2/25/2016 10:05:59 AM FILE: R:\15Proj\150724\600 Drawings\C\150724\_S2\_Steam Removal.dwg



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DAVID WILLIAMS  
 PRINTED NAME



SIGNATURE

02-25-2016  
 DATE

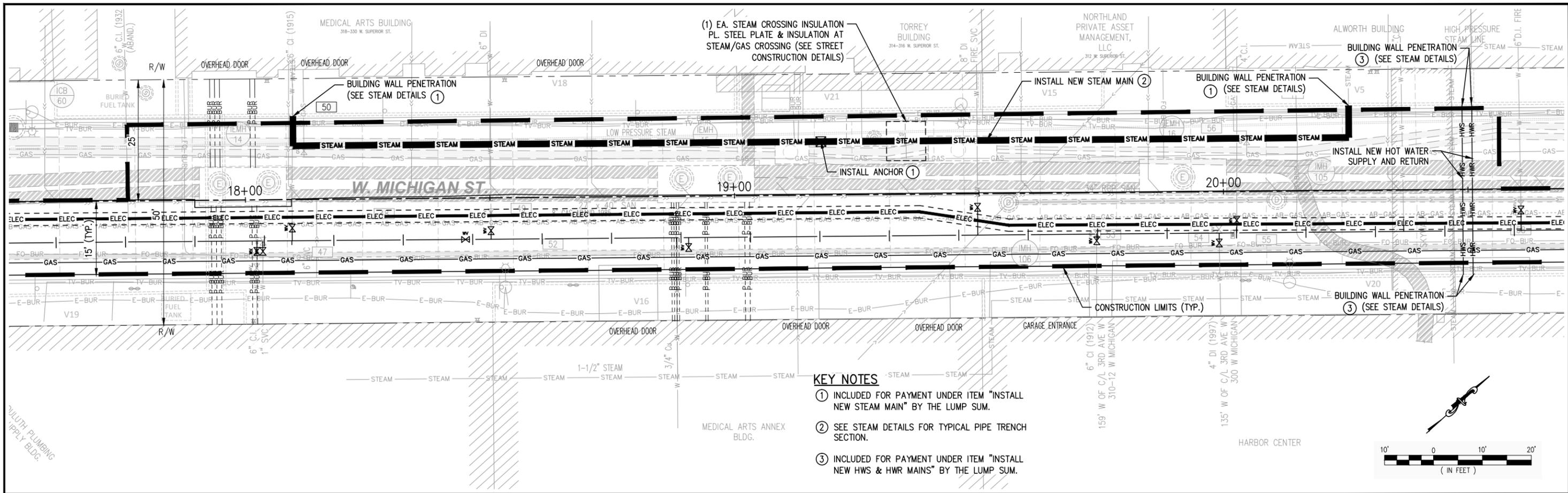
18929  
 LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST

LHB PROJECT NO. 150724

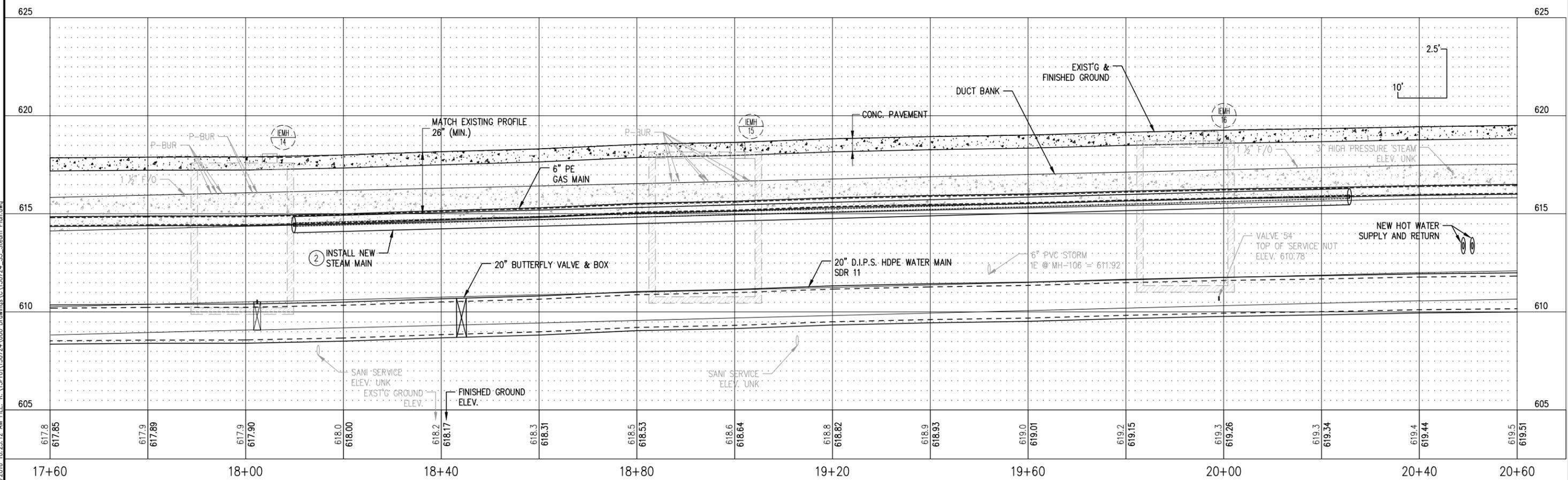
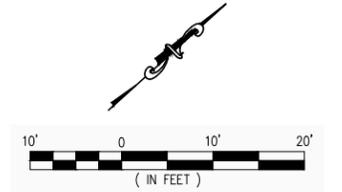
STEAM REMOVALS

SHEET NO. S2 OF S3 SHEETS



**KEY NOTES**

- ① INCLUDED FOR PAYMENT UNDER ITEM "INSTALL NEW STEAM MAIN" BY THE LUMP SUM.
- ② SEE STEAM DETAILS FOR TYPICAL PIPE TRENCH SECTION.
- ③ INCLUDED FOR PAYMENT UNDER ITEM "INSTALL NEW HWS & HWR MAINS" BY THE LUMP SUM.



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DAVID WILLIAMS  
PRINTED NAME



SIGNATURE

02-25-2016  
DATE  
18929  
LIC. NO.

MICHIGAN ST. 6TH-3RD AVE WEST  
LHB PROJECT NO. 150724

STEAM PLAN & PROFILE  
SHEET NO. S3 OF S3 SHEETS

PLOT DATE: 2/25/2016 10:25:12 AM FILE: R:\15Pro\150724\600 Drawings\C\150724\_S3\_Steam\_Plan.dwg