

PROJECT: GOLD LINE BUS RAPID TRANSIT PROJECT

MASTER AGREEMENT: Master Funding Agreement # 19I056 (“MFA”)

**PARTIES TO AGREEMENT: Metropolitan Council (“Council”)
City of St. Paul (“City”)**

**SUBORDINATE FUNDING AGREEMENT #8 TO MFA
City of St. Paul – RE: Traffic Signal Equipment**

This Subordinate Funding Agreement (“SFA”) with the City is entered by and between the above- named Parties.

WHEREAS:

1. The Parties entered a Gold Line Bus Rapid Transit Project (“Project”) Master Funding Agreement (“MFA”) effective on July 7, 2020 (Council Contract #19I056).
2. The Parties provided in the MFA that certain aspects of funding for the Project would be determined in subsequent SFAs.
3. The Council, as part of the Project, requires traffic signal equipment systems to be replaced at a number of roadway intersections along the Project alignment.
4. Five of these traffic signal equipment systems needing replacement are owned and maintained by the City, and detailed in Exhibits C and D.
5. The Parties desire that the City, with funding from the Council provided in this SFA, furnish, manufacture, assemble, test, and inspect these traffic signal equipment systems (“the Signal Systems”).
6. The Parties desire to enter into this SFA to provide funding for aspects of the Project, or features related to but not part of the Project as described below.

NOW, THEREFORE, in reliance on the statements in these recitals, the Parties hereby agree as follows:

1. **Maximum Amount of Authorized Funding.** The activities authorized by this SFA shall not exceed \$406,359.45 unless authorized in a subsequent agreement or an amendment to this SFA.
2. **Project Budget.** The budget for the activities described in this SFA is provided as Exhibit A, which is attached and incorporated into this SFA. Funds provided for this SFA may only be used for costs incurred in accordance with the approved budget, as discussed in the MFA.

3. **Payment.** The funds shall be payable in accordance with the payment schedule set forth in Exhibit E. The parties understand and agree the amount of \$74,059.95 is an excess reserve in the event of unexpected and unplanned increases to the material estimate, damage to the temporary cabinet furnished by the City at Signal System F, or additional labor hours required for completion of work under this SFA (“Contingency Reserve”). The Contingency Reserve may or may not be needed. Invoices against the Contingency Reserve are subject to pre-approval in writing by the Council. The Council is not liable for any amounts not pre-approved in writing by the Council. Payment of the Contingency Reserve will be as stated in Exhibit E: Payment Schedule.
4. **Invoices.** Invoices submitted to the Council from the City shall comply with all requirements outlined in Section 2.06 of the MFA.
5. **General Purpose of Funds:** This SFA provides funding for City staff to furnish, manufacture, assemble, test, and inspect equipment for five (5) Signal Systems at intersections along the Project alignment. Funding is also provided to pay the City’s costs for set-up, installation, and removal of a temporary traffic cabinet that will be furnished by the City at Signal System F. The specific equipment that will be installed for each signal system is outlined in Exhibit B.
6. **Specific Description of Funding Authorization:** Funds provided under this SFA may only be used for costs directly incurred by the City as described in Section 3.01 Allowable Costs: Unspent funds of the MFA.
7. **Agreement Expiration.** The project activity period for purposes of this SFA shall run through December 31, 2026, or until reimbursement of all costs associated with the defined General Purpose of Funds is complete or unless terminated earlier consistent with the terms of the MFA.
8. **Federal Requirements.** Pursuant to Section 4.03 of the MFA, the City agrees to comply with relevant federal requirements set forth in Exhibit C of the MFA, including Buy America Requirements (draft certification form is attached as Exhibit F to this Agreement). The City will provide signed certification forms to the Council from each of its vendors for the Signal Systems.
9. **Ownership and Maintenance.** The final operations and maintenance responsibilities for these Signal Systems will be recorded in future operations and maintenance agreements for the Project.
10. **Contractor Agreement.** This SFA, in conjunction with the MFA, constitutes a contractor agreement for the purposes of any federal grant funds provided to the City.
11. **Incorporation.** The terms, conditions, and definitions of the MFA are expressly incorporated into this SFA except as modified herein.

12. **Authorized Representatives.** Each party's Authorized Representative is responsible for administering this Agreement and is authorized to give and receive any notice required or permitted under this agreement.

Council's Authorized Representative:

Alicia Vap or successor
Gold Line Project Director
METRO Gold Line BRT Project Office
121 7th Place East, Suite 102
St. Paul, MN 55101-2114

St. Paul's Authorized Representative:

Nicholas Peterson, P.E.
City Engineer
Department of Public Works
25 West 4th Street, 800 City Hall Annex
Saint Paul, MN 55102

13. **Counterparts.** The parties may sign this Agreement in counterparts, each of which constitutes an original, but all of which together constitute one instrument.
14. **Electronic Signatures.** The parties agree that the electronic signature of a party to this Agreement shall be as valid as an original signature of such party and shall be effective to bind such party to this Agreement. The parties further agree that any document (including this Agreement and any attachments or exhibits to this Agreement) containing, or to which there is affixed, an electronic signature shall be deemed (i) to be "written" or "in writing," (ii) to have been signed and (iii) to constitute a record established and maintained in the ordinary course of business and an original written record when printed from electronic files. For purposes hereof, "electronic signature" also means a manually signed original signature that is then transmitted by any electronic means, including without limitation a faxed version of an original signature or an electronically scanned and transmitted version (e.g., via PDF) of an original signature. Any party's failure to produce the original signature of any electronically transmitted signature shall not affect the enforceability of this Agreement.

[THE REMAINDER OF THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.]
SIGNATURE PAGE FOLLOWS

CITY OF ST. PAUL

METROPOLITAN COUNCIL

By: _____
Director of Public Works

By: _____

Date: _____

Its: _____

Approved as to form:

Date: _____

By: _____
Assistant City Attorney

Date: _____

By: _____
Director of Financial Services

Date: _____

By: _____
Mayor

Date: _____

LIST OF EXHIBITS

Exhibit	Description
A	Budget for Signal Systems
B	Summary of St. Paul Furnished Traffic Signal Equipment & Associated Labor
C	Signal System Locations
D	Signal System Design Plans
E	Payment Schedule
F	Buy America Certification Form

EXHIBIT A

Budget for Signal Systems

Signal System	Traffic Intersection	Signal System and Labor Cost
D	4 th St/Sibley St.	\$58,305.00
E	Mounds Blvd/Kellogg Blvd/3rd St/BRT Guideway	\$79,059.50
F	Mounds Blvd/I-94 WB Ramp	\$59,525.00
H	Hudson Rd/Earl St/BRT Guideway	\$61,505.00
I	White Bear Ave/I-94 WB Ramps	\$59,505.00
	Subtotal	\$332,299.50
	Contingency Reserve	\$74,059.95
	Total Not-to-Exceed SFA Amount	\$406,359.45

EXHIBIT B

Summary of St. Paul Furnished Traffic Signal Equipment

(Insert Excel Spreadsheet in Final Agreement)

Exhibit B
Summary of St. Paul Furnished Traffic Signal Equipment & Associated Labor*

GBRT Project: 61402
 Metropolitan Council: 171024H

System D			
Intersection 4th St/Sibley St			
Item	Quantity	Unit Cost	Total
332D Cabinet and Peripherals	1	\$40,830.00	\$40,830.00
Polimod 24 Fiber Singlemode	3	\$380.00	\$1,140.00
Fiber Ethernet Switch	1	\$1,995.00	\$1,995.00
SFP	2	\$170.00	\$340.00
Labor (hours) - Cabinet Configuration	40	\$175.00	\$7,000.00
Labor (hours) - Field Support	40	\$175.00	\$7,000.00
Total System D			\$58,305.00

System E			
Intersection Mounds Blvd/Kellogg Blvd/3rd St/BRT Guideway			
Item	Quantity	Unit Cost	Total
332D Cabinet and Peripherals	1	\$40,830.00	\$40,830.00
EVP Phase Selector	1	\$3,074.50	\$3,074.50
EVP Detectors	5	\$660.00	\$3,300.00
Polimod 24 Fiber Singlemode	4	\$380.00	\$1,520.00
Fiber Ethernet Switch	1	\$1,995.00	\$1,995.00
SFP	2	\$170.00	\$340.00
Labor (hours) - Cabinet Configuration	80	\$175.00	\$14,000.00
Labor (hours) - Field Support	80	\$175.00	\$14,000.00
Total System E			\$79,059.50

System F			
Intersection Mounds Blvd/I-94 WB Ramp			
Item	Quantity	Unit Cost	Total
332D Cabinet and Peripherals	1	\$40,830.00	\$40,830.00
EVP Detectors	3	\$660.00	\$1,980.00
Polimod 24 Fiber Singlemode	1	\$380.00	\$380.00
Fiber Ethernet Switch	1	\$1,995.00	\$1,995.00
SFP	2	\$170.00	\$340.00
Labor (hours) - Cabinet Configuration	40	\$175.00	\$7,000.00
Labor (hours) - Field Support	40	\$175.00	\$7,000.00
Labor (hours) - Temp Cabinet Set-up/Tear-Down	80	\$175.00	\$14,000.00
Total System F			\$73,525.00

System H			
Intersection Hudson Rd/Earl St/BRT Guideway			
Item	Quantity	Unit Cost	Total
332D Cabinet and Peripherals	1	\$40,830.00	\$40,830.00
EVP Detectors	6	\$660.00	\$3,960.00
Polimod 24 Fiber Singlemode	1	\$380.00	\$380.00
Fiber Ethernet Switch	1	\$1,995.00	\$1,995.00
SFP	2	\$170.00	\$340.00

Exhibit B

GBRT Project: 61402
Metropolitan Council: 171024H

Summary of St. Paul Furnished Traffic Signal Equipment & Associated Labor*

Labor (hours) - Cabinet Configuration	40	\$175.00	\$7,000.00
Labor (hours) - Field Support	40	\$175.00	\$7,000.00
Total System H			\$61,505.00

System I			
Intersection White Bear Ave/I-94 WB Ramps			
Item	Quantity	Unit Cost	Total
332D Cabinet and Peripherals	1	\$40,830.00	\$40,830.00
EVP Detectors	3	\$660.00	\$1,980.00
Polimod 24 Fiber Singlemode	2	\$380.00	\$760.00
Fiber Ethernet Switch	1	\$1,995.00	\$1,995.00
SFP	2	\$170.00	\$340.00
Labor (hours) - Cabinet Configuration	40	\$175.00	\$7,000.00
Labor (hours) - Field Support	40	\$175.00	\$7,000.00
Total System I			\$59,905.00

TOTAL SYSTEMS D-F, H, I **\$332,299.50**

Contingency Amount	
10% Contingency	\$33,229.95
Cabinet Unit Cost	\$40,830.00
Total Contingency	\$74,059.95

Total Not-to-exceed amount of SFA **\$406,359.45**

**NOTE: All quoted items represent estimated quantities and/or values. All reimbursements shall be based on actual costs.*

EXHIBIT C

Signal System Locations

(Insert map in final agreement)

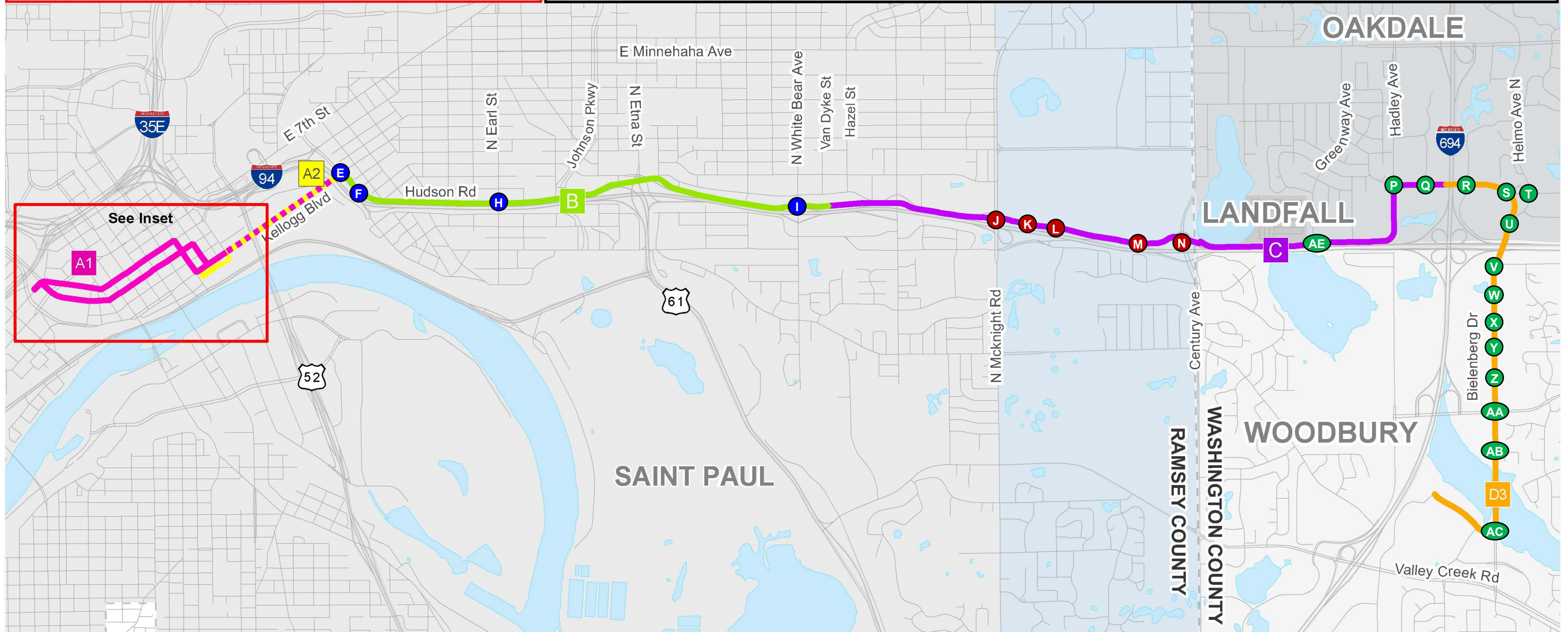
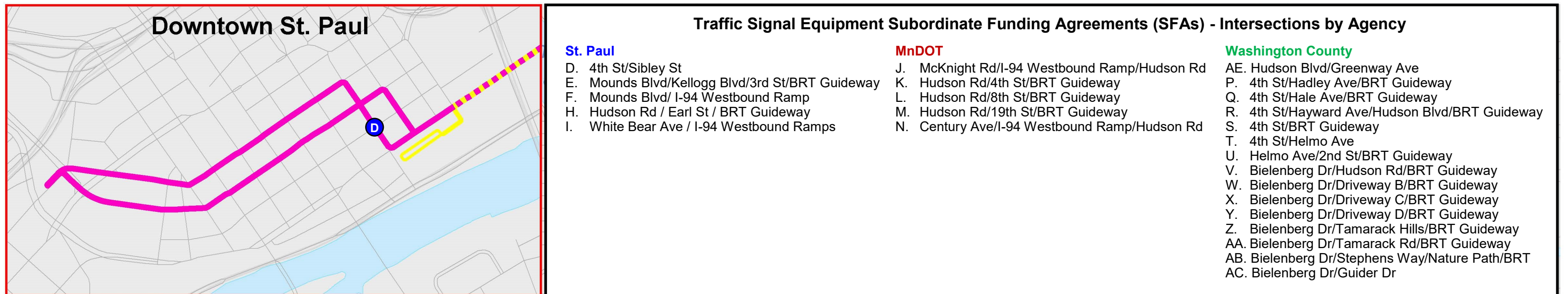


EXHIBIT D

Signal System Design Plans

(Insert design plans in final agreement)

SIGNAL HEAD CHART

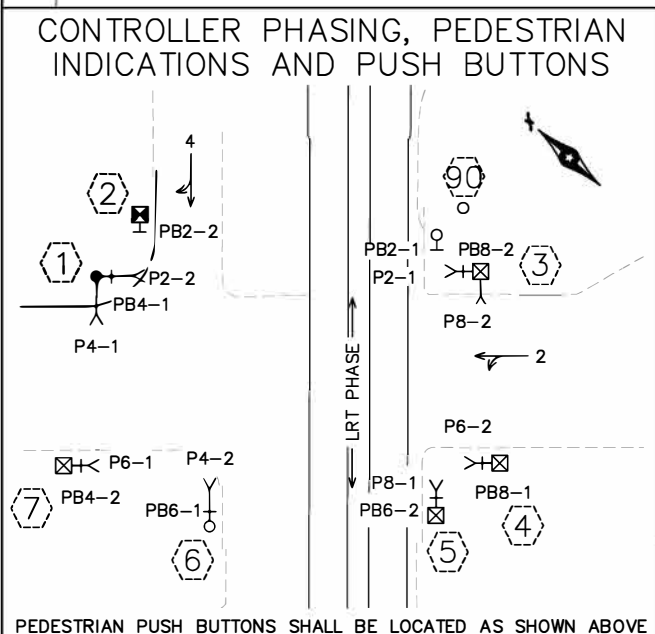
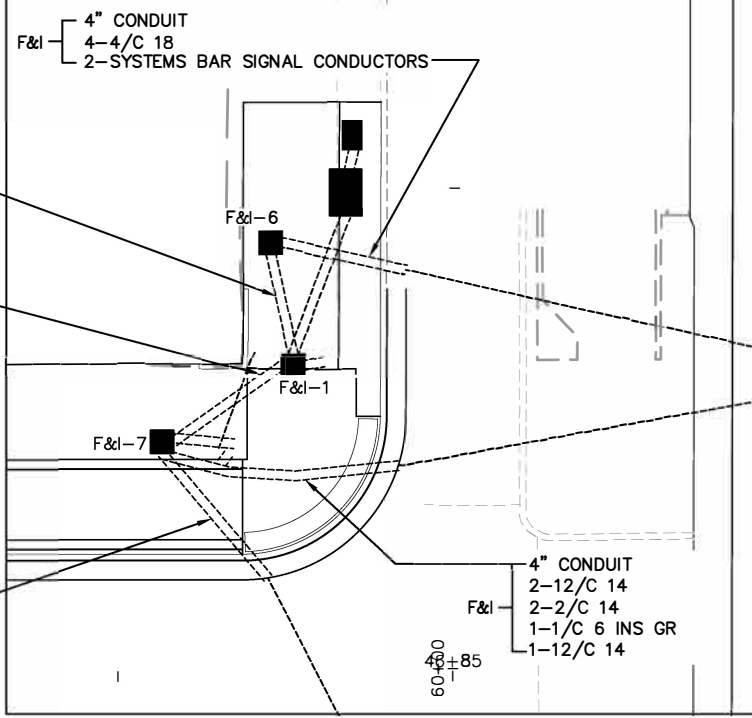
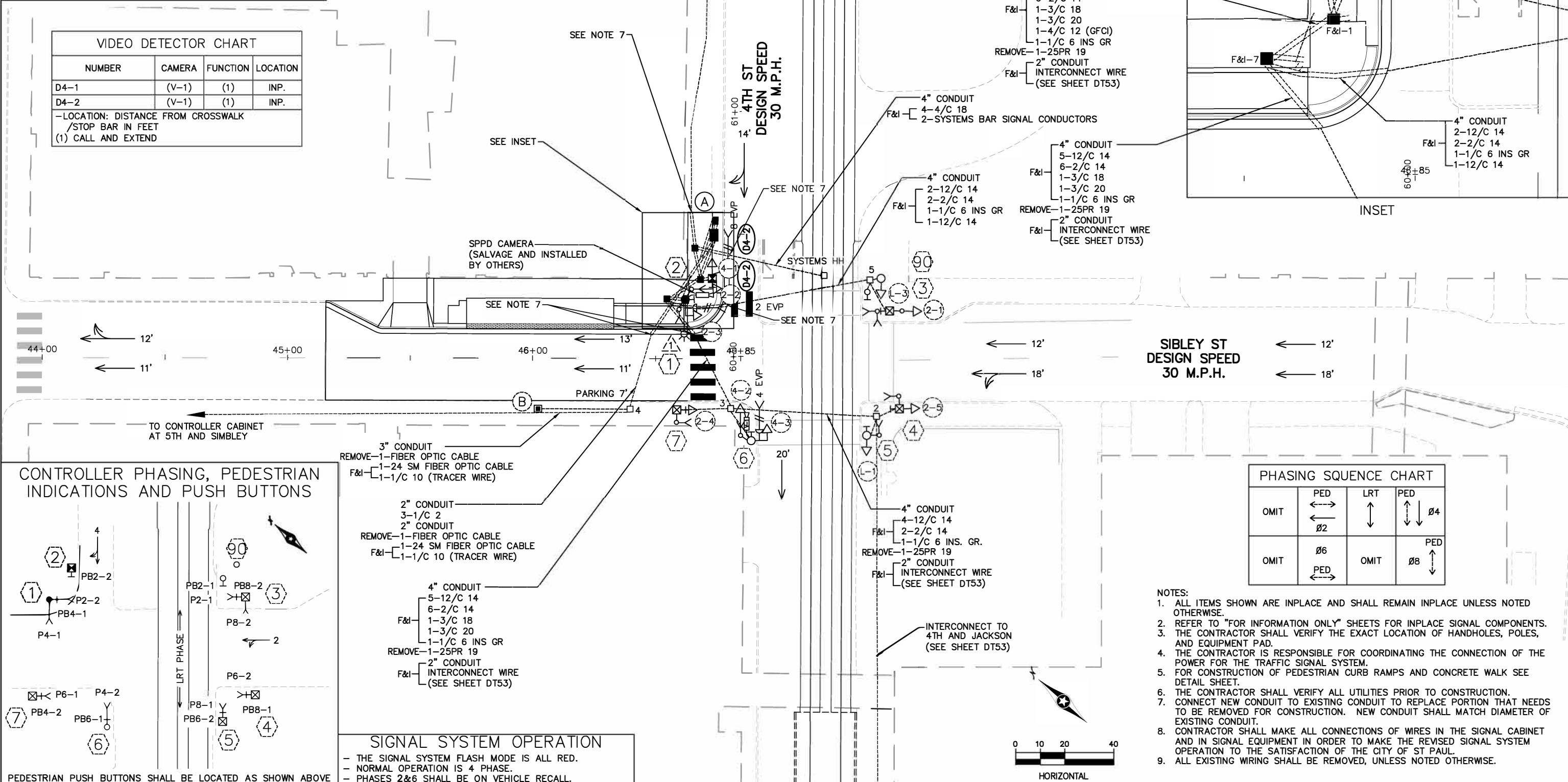
FACE	R	Y	G	LRT STOP	LRT PTS	LRT GO
2-1	○	○	○			
2-2, 2-3, 2-4, 2-5	○	○	○			
4-1,4-2,4-3	○	○	○			
L-1, L-3				⊖	⊕ (1)	⊕

-(1) = FLASHING LRT GO SIGNAL

VIDEO DETECTOR CHART

NUMBER	CAMERA	FUNCTION	LOCATION
D4-1	(V-1)	(1)	INP.
D4-2	(V-1)	(1)	INP.

-LOCATION: DISTANCE FROM CROSSWALK /STOP BAR IN FEET
(1) CALL AND EXTEND



PHASING SEQUENCE CHART

	PED	LRT	PED
OMIT	↔	↕	↕ ⌀4
	↔ ⌀2		
OMIT	⌀6	OMIT	PED
	↔		↕ ⌀8

SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 4 PHASE.
- PHASES 2&6 SHALL BE ON VEHICLE RECALL.

- ### NOTES:
- ALL ITEMS SHOWN ARE INPLACE AND SHALL REMAIN INPLACE UNLESS NOTED OTHERWISE.
 - REFER TO "FOR INFORMATION ONLY" SHEETS FOR INPLACE SIGNAL COMPONENTS.
 - THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF HANDHOLES, POLES, AND EQUIPMENT PAD.
 - THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE TRAFFIC SIGNAL SYSTEM.
 - FOR CONSTRUCTION OF PEDESTRIAN CURB RAMPS AND CONCRETE WALK SEE DETAIL SHEET.
 - THE CONTRACTOR SHALL VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION.
 - CONNECT NEW CONDUIT TO EXISTING CONDUIT TO REPLACE PORTION THAT NEEDS TO BE REMOVED FOR CONSTRUCTION. NEW CONDUIT SHALL MATCH DIAMETER OF EXISTING CONDUIT.
 - CONTRACTOR SHALL MAKE ALL CONNECTIONS OF WIRES IN THE SIGNAL CABINET AND IN SIGNAL EQUIPMENT IN ORDER TO MAKE THE REVISED SIGNAL SYSTEM OPERATION TO THE SATISFACTION OF THE CITY OF ST PAUL.
 - ALL EXISTING WIRING SHALL BE REMOVED, UNLESS NOTED OTHERWISE.

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NO.	REVISIONS	BY	APP	DATE	CHECKED: ASP
1	REVISED FOR ADDENDUM	MAB	ASP	4/8/2022	

DRAWN: BMSB
DESIGNED: NAP
CHECKED: ASP

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.

CERTIFIED BY: *Adrian S. Potter*
ADRIAN S. POTTER
LIC. NO. 42785 DATE 09/24/2021

SIGNAL PLAN - SIGNAL SYSTEM D
INTERSECTION LAYOUT

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

DT42-R1 OF DT300

INTERSECTION NOTES

① REMOVE—LIGHT STANDARD FOUNDATION
F & I—LIGHT STANDARD FOUNDATION
LIGHT STANDARD WITH LUMINAIRE
1—5' MINI-ARM
1—ONE WAY SIGNAL OVERHEAD AT 0'
1—ONE WAY SIGNAL AT 225 DEG
2—ONE WAY CD PED INDICATIONS MOUNTED
AT 45 DEG AND 225 DEG
1—ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 2)
1—APS PB AND SIGN
(LT ARROW) (PB4-1)
1—R3-1 SIGN (FACING SOUTH)
SALVAGE AND INSTALL (BY OTHERS)—SPPD CAMERA
1—GFCI OUTLET MOUNTED ON LUMINAIRE EXTENSION
3" CONDUIT TO HH 7:
2-12/C 14
2-2/C 14
F&I — 1-3/C 20
2-1/C 4 (LIGHTING FEED)
1-4/C 12 (GFCI)
2-1/C 6 INS GR

② REMOVE—LIGHT STANDARD FOUNDATION
F & I—LIGHT STANDARD FOUNDATION
DECORATIVE LIGHT POLE AND BASE
1—APS PB AND SIGN
(RT ARROW) (PB2-2)
1—ONE WAY SIGN (RT)
2—SIGN TYPE SPECIAL (4TH ST)
2—SIGN TYPE SPECIAL (SIBLEY ST)
3" CONDUIT TO HH 1:
F&I — 1-12/C 14
1-2/C 14
2-1/C 6 INS GR

③ LIGHT STANDARD FOUNDATION
DECORATIVE LIGHT POLE AND BASE
1—TYPE 1E WITH CD PED INDICATION
1—APS PB AND SIGN
(RT ARROW) (PB8-2)
1—NO RIGHT TURN SIGN (R3-1) FACING SOUTH
3" CONDUIT TO INP. HH 5:
2-12/C 14
F&I — 1-2/C 14
1-1/C 6 INS GR

Ⓐ REMOVE—CABINET FOUNDATION
F & I—CABINET FOUNDATION
REMOVE—CONTROLLER AND CABINET
INSTALL—CONTROLLER AND CABINET (CITY FURNISHED)
F & I—SERVICE CABINET
3-3" CONDUIT:
12-12/C 14
10-2/C 14
1-3/C 18
2-3/C 20
2-1/C 6 INS GR
F&I — 2—SYSTEMS BAR SIGNAL CONDUCTORS
1-4/C 12 (GFCI)
2" CONDUIT
1-1/C 10 (TRACER WIRE)
2-24 SM FIBER OPTIC CABLE
3" CONDUIT STUBBED OUT (CAPPED BOTH ENDS)
2" CONDUIT TO SERVICE CABINET
2-1/C 6 INS GR
REMOVE—1-25PR 19
1-FIBER OPTIC CABLE
INSTALL SALVAGED—1-24 SM FIBER OPTIC CABLE
1-1/C 10 (TRACER WIRE)

④ LIGHT STANDARD FOUNDATION
DECORATIVE LIGHT POLE AND BASE
1—TYPE 1B WITH CD PED INDICATION
1—APS PB AND SIGN
(LT ARROW) (PB8-1)
2—SIGNS TYPE SPECIAL (4TH ST)
2—SIGNS TYPE SPECIAL (SIBLEY ST)
2" CONDUIT TO INP. HH 2:
F&I — 1-12/C 14
1-2/C 14
2-1/C 6 INS GR

⑤ OCS FOUNDATION
LIGHT STANDARD POLE
ONE WAY LRT SIGNAL (L-1) AT 225 DEG
1—CD PED INDICATION AT 45 DEG
1—APS PB AND SIGN
(RT ARROW) (PB6-2)
1—ONE WAY SIGN FACING 4TH ST
3" CONDUIT TO INP. HH 2:
F&I — 2-12/C 14
1-2/C 14
1-1/C 6 INS GR

⑥ OCS POLE FOUNDATION
OCS POLE
1—5' MINI-ARM
1—ONE WAY SIGNAL OVERHEAD AT 0'
1—ONE WAY SIGNAL AT 225 DEG
1—ONE WAY C.D. PED HEAD AT 225 DEG
1—VIDEO DETECTION CAMERA (V-1)
1—ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 4)
1—APS PB AND SIGN
(LT ARROW) (PB6-1)
1—OUTLET
3" CONDUIT TO INP. HH 3:
F&I — 2-12/C 14
2-2/C 14
1-3/C 18
1-3/C 20
2-1/C 4
2-1/C 6 INS GR

Ⓑ INPLACE SOP
2" CONDUIT
2" CONDUIT INTO INP. HH 4
F&I — 3-1/C 2

⑦ LIGHT STANDARD FOUNDATION
DECORATIVE LIGHT POLE AND BASE
1—TYPE 1C WITH CD PED INDICATION
1—APS PB AND SIGN
(RT ARROW) (PB4-2)
1—SIGN (R3-1) FACING SOUTH
2" CONDUIT TO INP. HH 3:
F&I — 1-12/C 14
1-2/C 14
2-1/C 6 INS GR

⑧ OCS POLE FOUNDATION
TYPE OCS POLE
1—LRT SIGNAL (L-3)
2" CONDUIT TO INP. HH 5:
F&I — 1-12/C 14
1-1/C 6 INS GR

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NO.	REVISIONS	BY	APP	DATE
2	REVISED FOR ADDENDUM	BMSB	ASP	5/6/2022
1	REVISED FOR ADDENDUM	MAB	ASP	4/8/2022

DRAWN: BMSB
DESIGNED: NAP
CHECKED: ASP

Kimley»Horn

METRO Gold Line

SRF METROPOLITAN COUNCIL

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.

CERTIFIED BY: *Adrian S. Potter*
ADRIAN S. POTTER
LIC. NO. 42785 DATE 09/24/2021

SIGNAL PLAN — SIGNAL SYSTEM D
INTERSECTION NOTES

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

DT43-R2 OF DT300

SIGNAL HEAD CHART									
FACE	R	Y	FYA	G	Y	G	BRT STOP	BRT PTS	BRT GO
1-1,1-2	←	←	←	←					
2-1,2-2,2-3	●	●	●	●					
3-1,3-2	←	←	←	←					
4-1,4-2	●	●	●	●					
5-1,5-2	←	←	←	←					
6-1,6-2	●	●	●	●					
7-1,7-2	←	←	←	←					
8-1,8-2	●	●	●	●	→	→			
8-3	●	●	●	●					
B2-1,B2-2							⊖	⊕ (1)	⊕

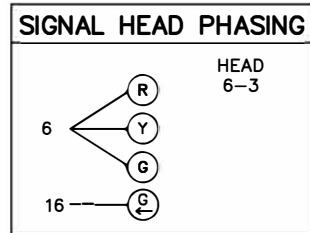
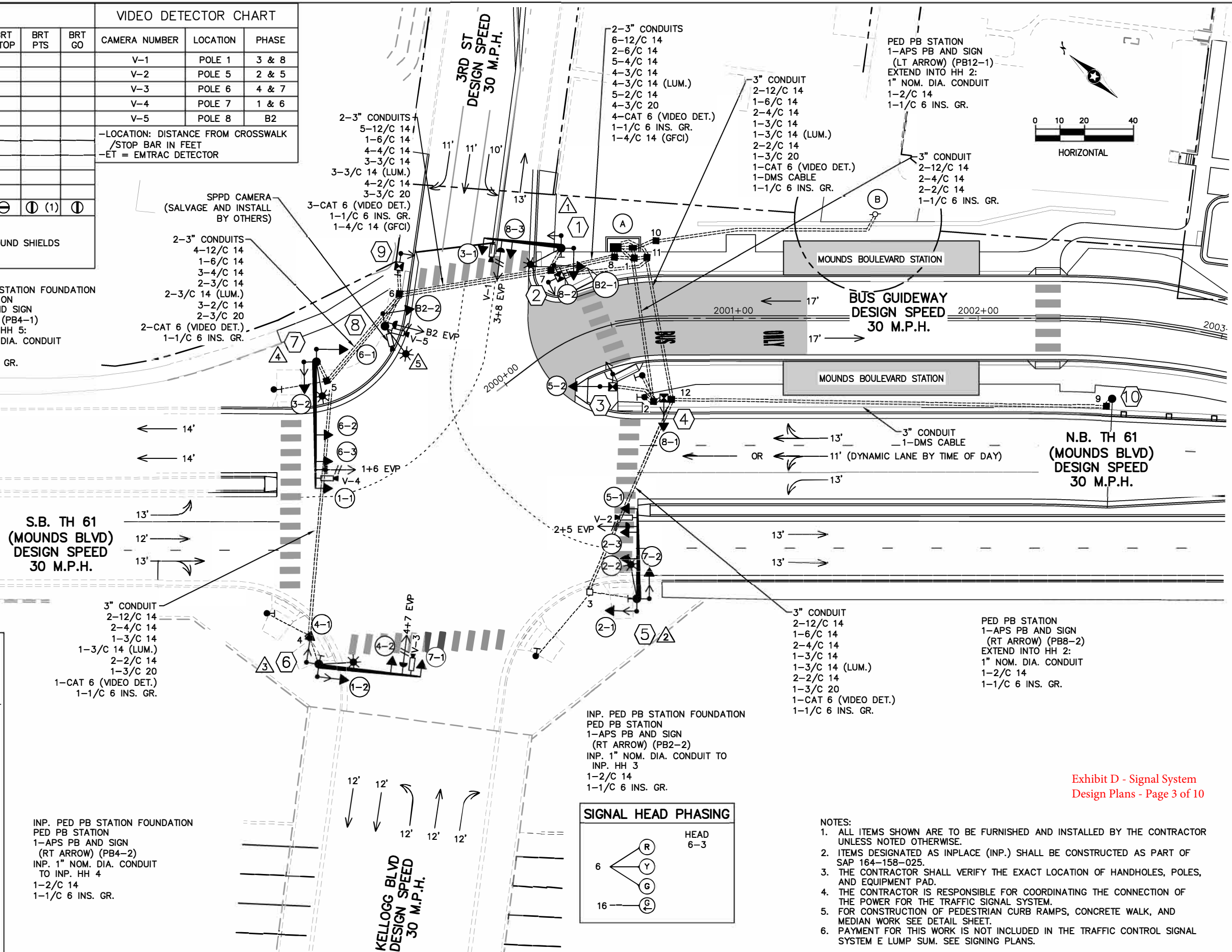
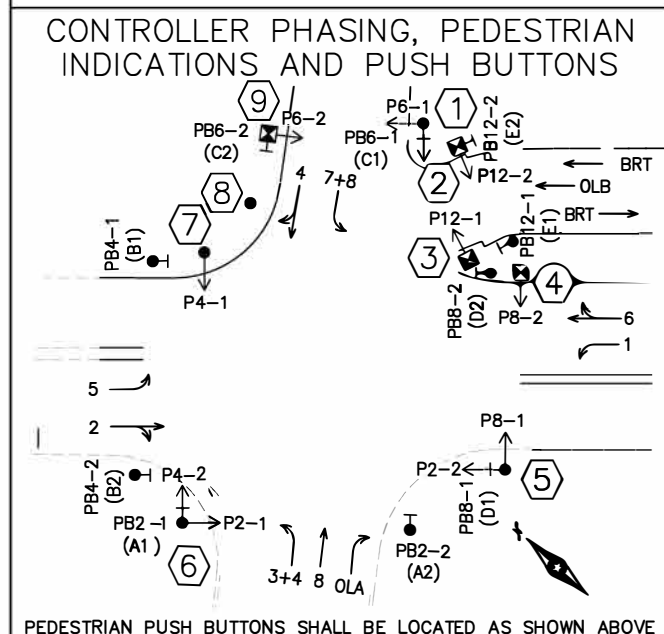
RING & BARRIER										
1	2	15	9	16	10	3	4	11		
5	6	13	14	7	8					
12										

AM OPERATION (SPLIT PHASE)										
OMIT: 1, 2, 5, 6, 12										
PED CARRYOVER: 13 TO 14										

STANDARD OPERATION										
OMIT: 9, 13, 14, 15, 16										

VIDEO DETECTOR CHART		
CAMERA NUMBER	LOCATION	PHASE
V-1	POLE 1	3 & 8
V-2	POLE 5	2 & 5
V-3	POLE 6	4 & 7
V-4	POLE 7	1 & 6
V-5	POLE 8	B2

-LOCATION: DISTANCE FROM CROSSWALK /STOP BAR IN FEET
-ET = EMTRAC DETECTOR



- NOTES:
- ALL ITEMS SHOWN ARE TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
 - ITEMS DESIGNATED AS INPLACE (INP.) SHALL BE CONSTRUCTED AS PART OF SAP 164-158-025.
 - THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF HANDHOLES, POLES, AND EQUIPMENT PAD.
 - THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE TRAFFIC SIGNAL SYSTEM.
 - FOR CONSTRUCTION OF PEDESTRIAN CURB RAMPS, CONCRETE WALK, AND MEDIAN WORK SEE DETAIL SHEET.
 - PAYMENT FOR THIS WORK IS NOT INCLUDED IN THE TRAFFIC CONTROL SIGNAL SYSTEM E LUMP SUM. SEE SIGNING PLANS.

Exhibit D - Signal System Design Plans - Page 3 of 10

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NO.	REVISIONS	BY	APP	DATE
2	REVISED FOR ADDENDUM	NAP	ASP	5/18/2022
1	REVISED FOR ADDENDUM	MAB	ASP	4/8/2022

DRAWN: MAB
DESIGNED: NAP
CHECKED: ASP

Kimley»Horn

METRO Gold Line

SRF **METROPOLITAN COUNCIL** 100% SUBMITTAL

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.

CERTIFIED BY: *Adrian S. Potter*
ADRIAN S. POTTER
LIC. NO. 42785 DATE 09/24/2021

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

2220-R2 OF 2649

INTERSECTION NOTES

SIGNAL SYSTEM OPERATION

① PA90 POLE FOUNDATION
TYPE PA90-A-30-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 10'
1-ANGLE MOUNT SIGNAL AT 180 DEG
1-ANGLE MOUNT C.D. PED HEAD AT 90 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 3+8)
1-APS PB AND SIGN (LT ARROW) (PB6-1)
AND APS PB POLE MOUNT ADAPTOR
1-VIDEO DETECTION CAMERA (V-1)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R10-X12 SIGN ADJACENT TO HEAD (3-1)
1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
3" CONDUIT TO HH 7:
1-12/C 14
1-6/C 14
1-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-2/C 14
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

② PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT SIGNAL
1-STRAIGHT MOUNT C.D. PED HEAD
1-APS PB AND SIGN (LT ARROW) (PB12-2)
AND APS PB MOUNTING SPACERS
3" CONDUIT TO HH 11:
1-12/C 14
1-4/C 14
1-2/C 14
2-1/C 6 INS. GR.

③ PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT SIGNAL
1-STRAIGHT MOUNT C.D. PED HEAD
3" CONDUIT TO HH 2:
1-12/C 14
1-4/C 14
2-1/C 6 INS. GR.

④ PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT SIGNAL
1-STRAIGHT MOUNT C.D. PED HEAD
1-R10-11b SIGN FACING NB TH 61
3" CONDUIT TO HH 2:
1-12/C 14
1-4/C 14
1-1/C 6 INS. GR.

⑤ INP. PA100 POLE FOUNDATION
TYPE PA100-A-50-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
2-STRAIGHT MOUNT SIGNALS OVERHEAD
AT 10' AND 21'
2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
2-ANGLE MOUNT C.D. PED HEADS AT 90 AND 180 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 2+5)
1-APS PB AND SIGN (LT ARROW) (PB8-1)
AND APS PB POLE MOUNT ADAPTOR
1-VIDEO DETECTION CAMERA (V-2)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R10-X12 SIGN ADJACENT TO HEAD (5-1)
1-TYPE D SIGN (D-2)(SEE SIGN DETAILS)
INP. 3" CONDUIT TO INP. HH 3:
2-12/C 14
1-6/C 14
2-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-2/C 14
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

⑥ INP. PA100 POLE FOUNDATION
TYPE PA100-A-40-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11'
2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
2-ANGLE MOUNT C.D. PED HEADS AT 90 AND 180 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 4+7)
1-APS PB AND SIGN (LT ARROW) (PB2-1)
AND APS PB POLE MOUNT ADAPTOR
1-VIDEO DETECTION CAMERA (V-3)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R10-X12 SIGN ADJACENT TO HEAD (7-1)
1-R10-11b SIGN FACING WB 3RD ST
1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
INP. 3" CONDUIT TO INP. HH 4:
2-12/C 14
2-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-2/C 14
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

⑦ BA50 POLE FOUNDATION
TYPE BA50-A-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
2-STRAIGHT MOUNT SIGNALS OVERHEAD
AT 11' AND 23'
2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
1-ANGLE MOUNT C.D. PED HEAD AT 90 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 1+6)
1-VIDEO DETECTION CAMERA (V-4)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R10-X12 SIGN ADJACENT TO HEAD (1-1)
1-R10-11b SIGN FACING NB TH 61
1-DYNAMIC SIGN ADJACENT TO HEAD 6-3 (R3-5a, R3-6L)
1-TYPE D SIGN (D-3)(SEE SIGN DETAILS)
3" CONDUIT TO HH 5:
2-12/C 14
1-6/C 14
1-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

⑧ PA85 POLE FOUNDATION
TYPE PA85-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL AT 180 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE B2)
1-VIDEO DETECTION CAMERA (V-5)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-GFCI OUTLET MOUNTED ON LUMINAIRE EXTENSION
AT 0 DEG OPPOSITE ACCESS DOOR
1-R10-11b SIGN FACING WB 3RD ST
SALVAGE AND INSTALL (BY OTHERS)-SPPD CAMERA
3" CONDUIT TO HH 6:
1-12/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-4/C 12 (GFCI)
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.
SPPD CAMERA WIRE (BY OTHERS)

⑨ PEDESTAL FOUNDATION
10' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT C.D. PED HEAD
1-APS PB AND SIGN (RT ARROW) (PB6-2)
AND APS PB MOUNTING SPACERS
1-R10-6 (L) SIGN
3" CONDUIT TO HH 6:
1-4/C 14
1-2/C 14
2-1/C 6 INS. GR.

Ⓐ EQUIPMENT PAD (SEE CITY OF ST PAUL STANDARD PLATE 5054)
SERVICE CABINET (SSB) WITH BATTERY BACKUP SYSTEM AND BATTERIES
ATC CONTROLLER AND CABINET (32-CHANNEL)
3" CONDUIT TO HH 1:
2-12/C 14
2-4/C 14
2-2/C 14
1-1/C 6 INS. GR.
3-3" CONDUITS TO HH 8:
6-12/C 14
2-6/C 14
5-4/C 14
1-4/C 12 (GFCI)
4-3/C 14
5-2/C 14
4-3/C 20
4-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.
2-3" CONDUITS TO HH 11:
3-12/C 14
1-6/C 14
3-4/C 14
1-3/C 14
3-2/C 14
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-DMS CABLE
1-1/C 6 INS. GR.
2" NMC TO INTERCONNECT HH 1:
2-24SM (FO)
1-1/C 10 (TRACER WIRE)

GROUND WIRE AND GROUND ROD - MIN 8' OUT FROM PAD
2-2" AND 1-3" CONDUIT STUBBED OUT (CAPPED BOTH ENDS)
CONTROLLER CABINET TO SERVICE CABINET:
2" CONDUIT
3-1/C 6
CONTROLLER CABINET TO SERVICE CABINET (COMMS.)
2" CONDUIT
1-6PR 19
SERVICE CABINET TO POLE MOUNTED TRANSFORMER:
2" CONDUIT
3-1/C 2

SERVICE CABINET TO HH 1:
2" CONDUIT
5-3/C 14 (LUM.)
SERVICE CABINET TO EXTERNAL GR. RD.:
1" CONDUIT
1-1/C 6 INS. GR.
(SEE EQUIPMENT PAD LAYOUT)
HH 1 TO HH 8
2" CONDUIT
4-3/C 14 (LUM.)
HH 1 TO HH 11
2" CONDUIT
1-3/C 14 (LUM.)

Ⓑ SOP-POLE MOUNTED
TRANSFORMER
2" CONDUIT INTO SERVICE CABINET
VIA HH 10:
3-1/C 2

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- SIGNAL SYSTEM SHALL BE FULLY ACTUATED.
- NB CENTER APPROACH IS DYNAMIC LANE ASSIGNMENT BY TIME OF DAY. SHARED LEFT/THRU DURING AM PEAK (SPLIT PHASE OPERATION), DEDICATED THRU AT OTHER TIMES (NON-SPLIT PHASE OPERATION).
- PHASES 12 AND 13 SHALL BE ON PEDESTRIAN RECALL.
- CONTROLLER LOGIC SHALL BE USED TO ENABLE ONE OF THE TWO DYNAMIC LANE USE SIGN OPTIONS AT ALL TIMES VIA LOAD SWITCH CHANNELS 25 GREEN OR YELLOW
- NO SERVE PHASES:
PHASE 13: DO NOT SERVE WITH PHASE 9 OR PHASE 10 (ALL SEQUENCES)
- OVERLAPS:
OVERLAP A = EBR (1+8+9+10+11+16) (PHASE 8 PED PROTECT)
OVERLAP B = NB BRT (9+10+11)
OVERLAP C = [NOT USED]
OVERLAP D = [NOT USED]
OVERLAP E = NBL FYA (PHASE 1 PROT, PHASE 2 PERM)
OVERLAP F = EBL FYA (PHASE 3 PROT, PHASE 4 PERM)
OVERLAP G = SBL FYA (PHASE 5 PROT, PHASE 6 PERM)
OVERLAP H = WBL FYA (PHASE 7 PROT, PHASE 8 PERM)
- PED OVERLAP 2 = PED 2 + PED 15
PED OVERLAP 6 = PED 6 + PED 16
PED OVERLAP 12 = PED 12 + PED 13
- LOAD SWITCH CHANNEL 25 GREEN = NB LANE ASSIGNMENT
BLANKOUT STATE 1 (SHARED LANE)
LOAD SWITCH CHANNEL 25 YELLOW = NB LANE ASSIGNMENT
BLANKOUT STATE 2 (THRU LANE)
- PHASE REDIRECTS (EOS MM 2-1-8):
PHASE 1 <- PHASE 16
PHASE 2 <- PHASE 15
PHASE 5 <- PHASE 15
PHASE 6 <- PHASE 16
- SPECIAL VEHICLE DETECTORS:
VEH DET 2 CALLS VEH PHASES 2, 15
VEH DET 6 CALLS VEH PHASES 6, 16
VEH DET 9 CALLS VEH PHASES 9, 10, 11 (NON-LOCKING)
- SPECIAL PED DETECTORS:
PED DET 2 CALLS PED PHASE 2 AND PED PHASE 15
PED DET 6 CALLS PED PHASE 6 AND PED PHASE 16
PED DET 12 (CROSSING BRT) CALLS PED PHASE 12 AND PED PHASE 13
- OTHER:
REST IN WALK: PHASES 2, 6, 12, 13

⑩ SEE NOTE 6
PA100 POLE FOUNDATION
TYPE PA100-A-40
1-R3-5L SIGN
1-R3-6R SIGN
1-CHANGEABLE MESSAGE SIGN
3" CONDUIT TO HH 9:
1-DMS CABLE
1-1/C 6 INS. GR.

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NO.	REVISIONS	BY	APP	DATE
3	REVISED FOR ADDENDUM	NAP	ASP	5/18/2022
2	REVISED FOR ADDENDUM	BMSB	ASP	5/6/2022
1	REVISED FOR ADDENDUM	MAB	ASP	4/8/2022

DRAWN: MAB
DESIGNED: NAP
CHECKED: ASP

Kimley»Horn **METRO** **Gold Line**
SRF **METROPOLITAN COUNCIL** 100% SUBMITTAL

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CERTIFIED BY *Adrian S. Potter*
LIC. NO. 42785 DATE 09/24/2021

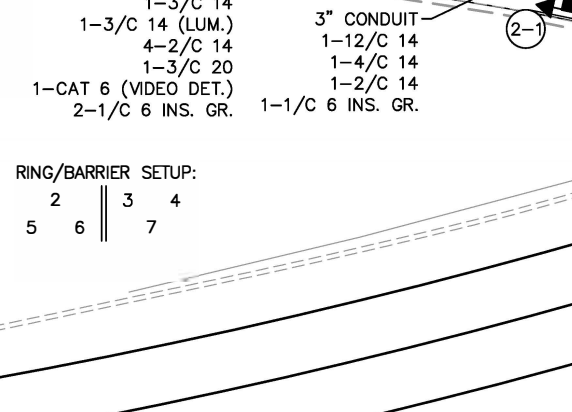
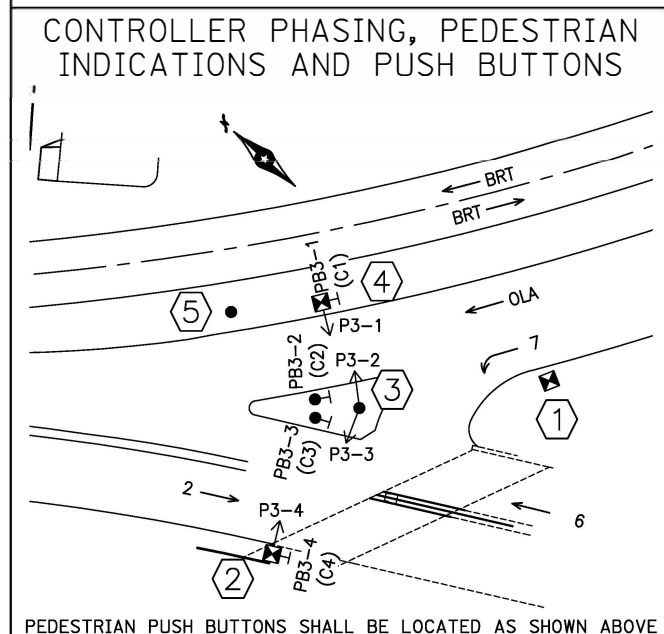
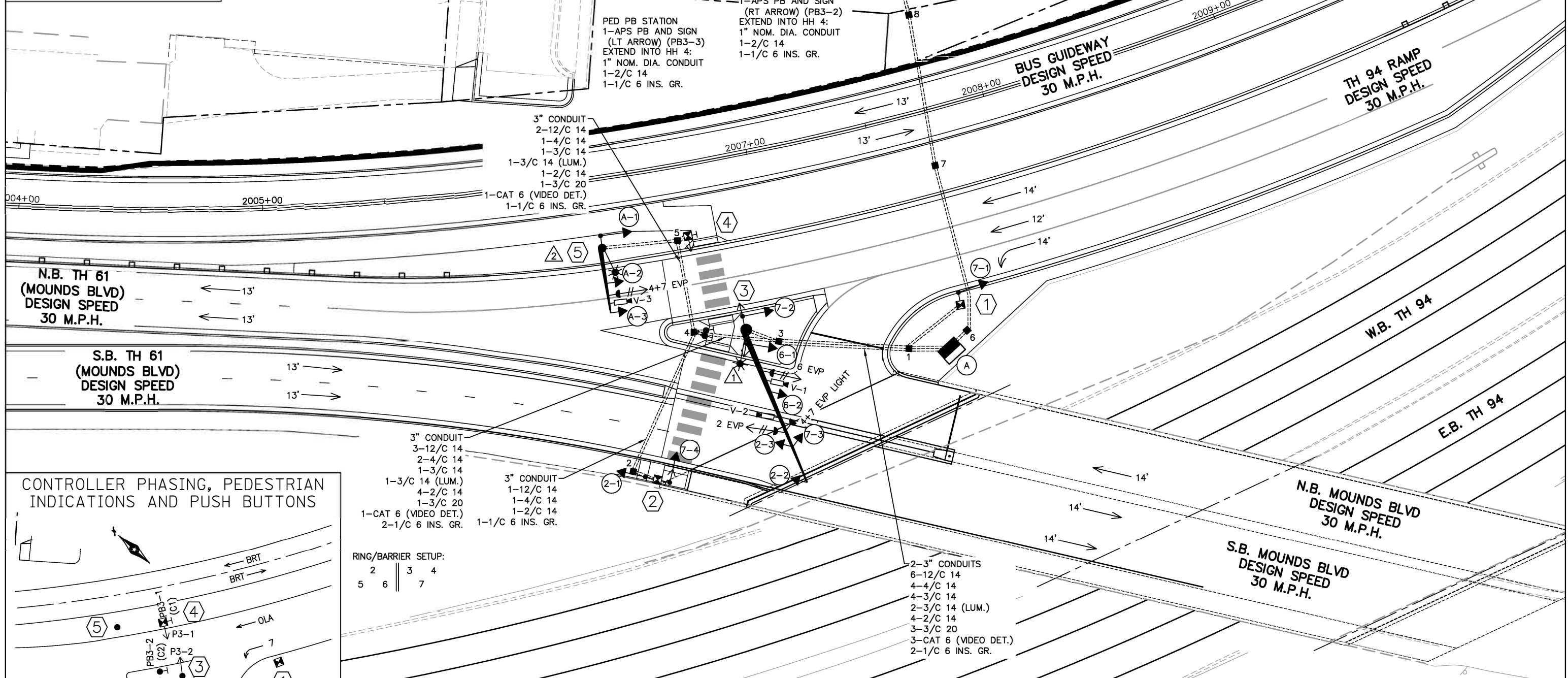
SIGNAL PLAN - SIGNAL SYSTEM E
INTERSECTION NOTES
STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)
2221-R3 OF 2649

SIGNAL HEAD CHART			
FACE	R	Y	G
A-1,A-2,A-3	●	●	▲
2-1,2-2,2-3	●	●	▲
6-1,6-2	●	●	▲
7-1,7-2,7-3,7-4	◀	◀	◀

-ALL SIGNAL INDICATIONS SHALL BE 12" LED
 -ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BACKGROUND SHIELDS

VIDEO DETECTOR CHART		
CAMERA NUMBER	LOCATION	PHASE
V-1	POLE 3	6
V-2	POLE 3	2
V-3	POLE 5	4 & 7

-LOCATION: DISTANCE FROM CROSSWALK /STOP BAR IN FEET
 -ET = EMTRAC DETECTOR



SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 6 PHASE
- OVERLAP A (OLA) = PHASES 4+5
- SIGNAL SYSTEM SHALL BE FULLY ACTUATED.
- PHASES 2 AND 5 ON SOFT RECALL.
- DUAL ENTRY ON 4/7

- NOTES:**
1. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF HANDHOLES, POLES, AND EQUIPMENT PAD.
 2. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE TRAFFIC SIGNAL SYSTEM.
 3. FOR CONSTRUCTION OF PEDESTRIAN CURB RAMPS, CONCRETE WALK, AND MEDIAN WORK SEE DETAIL SHEET.
 4. THE CONTRACTOR SHALL VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION.

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NO.	REVISIONS	BY	APP	DATE

DRAWN: MAB
 DESIGNED: NAP
 CHECKED: ASP

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METRO Gold Line
SRF METROPOLITAN COUNCIL 100% SUBMITTAL

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CERTIFIED BY: *Adrian S. Potter*
 ADRIAN S. POTTER
 LIC. NO. 42785 DATE 09/24/2021

SIGNAL PLAN — SIGNAL SYSTEM F INTERSECTION LAYOUT

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

Exhibit D - Signal System Design Plans - Page 5 of 10

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INTERSECTION NOTES

① PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT SIGNAL
1-R9-3 SIGN FACING POLE 3
3" CONDUIT TO HH 1:
1-12/C 14
1-1/C 6 INS. GR.

② PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
2-STRAIGHT MOUNT SIGNALS
1-STRAIGHT MOUNT C.D. PED HEAD
1-APS PB AND SIGN (RT ARROW) (PB3-4)
AND APS PB MOUNTING SPACERS
1-R10-6 (L) SIGN
3" CONDUIT TO HH 2:
1-12/C 14
1-4/C 14
1-2/C 14
1-1/C 6 INS. GR.

③ BA65 POLE FOUNDATION
TYPE BA65-A-X30-6 (ARM AT 30 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
2-STRAIGHT MOUNT SIGNALS OVERHEAD AT 15'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 39'
2-ANGLE MOUNT SIGNALS AT 0 AND 180 DEG
2-ANGLE MOUNT C.D. PED HEADS
AT 0 AND 180 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 2)
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 6)
1-EVP CONFIRMATORY LIGHT (PHASES 4+7)
2-VIDEO DETECTION CAMERAS (V-1)(V-2)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R9-3 SIGN FACING POLE 1
3" CONDUIT TO HH 3:
3-12/C 14
2-4/C 14
3-3/C 14
1-3/C 14 (LUM.)
2-3/C 20
2-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

Ⓐ EQUIPMENT PAD (SEE CITY OF ST PAUL STANDARD PLATE 5054)
SERVICE CABINET (SSB) WITH BATTERY BACKUP SYSTEM AND BATTERIES
332D CONTROLLER AND CABINET
2-3" CONDUITS TO HH 1:
7-12/C 14
4-4/C 14
4-3/C 14
4-2/C 14
3-3/C 20
3-CAT 6 (VIDEO DET.)
2-1/C 6 INS. GR.

④ PEDESTAL FOUNDATION
10' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT C.D. PED HEAD
1-APS PB AND SIGN (LT ARROW) (PB3-1)
AND APS PB MOUNTING SPACERS
1-R10-6 (L) SIGN
3" CONDUIT TO HH 5:
1-4/C 14
1-2/C 14
1-1/C 6 INS. GR.

⑤ PA85 POLE FOUNDATION
TYPE PA85-A-25-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11'
1-ANGLE MOUNT SIGNAL AT 180 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 4+7)
1-VIDEO DETECTION CAMERA (V-3)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-TYPE D SIGN (D-1)(SEE SIGNING DETAILS)
3" CONDUIT TO HH 5:
2-12/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

GROUND WIRE AND GROUND ROD - MIN 8' OUT FROM PAD
2-2" AND 1-3" CONDUIT STUBBED OUT (CAPPED BOTH ENDS)
CONTROLLER CABINET TO SERVICE CABINET:
2" CONDUIT
3-1/C 6
CONTROLLER CABINET TO SERVICE CABINET (COMMS.)
2" CONDUIT
1-6PR 19
SERVICE CABINET TO HH 6 TO POLE MOUNTED TRANSFORMER:
2" CONDUIT
3-1/C 2

SERVICE CABINET TO HH 1:
2" CONDUIT
2-3/C 14 (LUM.)
SERVICE CABINET TO EXTERNAL GR. RD.:
1" CONDUIT
1-1/C 6 INS. GR.

Ⓑ SOP-POLE MOUNTED
TRANSFORMER
2" CONDUIT INTO SERVICE CABINET
VIA HH 8, HH 7 AND HH 6:
3-1/C 2

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NO.	REVISIONS	BY	APP	DATE

DRAWN:
MAB
DESIGNED:
NAP
CHECKED:
ASP



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CERTIFIED BY Adrian S. Potter
LIC. NO. 42785 DATE 09/24/2021

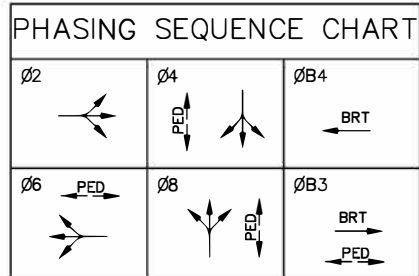
SIGNAL PLAN - SIGNAL SYSTEM F
INTERSECTION NOTES
STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)
2227 OF 2649

SIGNAL HEAD CHART						VIDEO DETECTOR CHART			
FACE	R	Y	G	BRT STOP	BRT PTS	BRT GO	CAMERA NUMBER	LOCATION	PHASE
2-1,2-2,2-3	●	●	●				V-1	POLE 1	6
4-1,4-2,4-3	●	●	●				V-2	POLE 2	8
6-1,6-2,6-3	●	●	●				V-3	POLE 3	2
8-1,8-2,8-3,8-4	●	●	●				V-4	POLE 3	B3
B3-1,B3-2,B3-3				⊖	⊕ (1)	⊕	V-5	POLE 7	B4
B4-1,B4-2,B4-3				⊖	⊕ (1)	⊕	V-6	POLE 7	4

-(1) FLASHING BAR SIGNAL. PTS=PREPARE TO STOP
 -ALL SIGNAL INDICATIONS SHALL BE 12" LED
 -ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BACKGROUND SHIELDS
 -B3 = EASTBOUND BAR SIGNAL; B4 = WESTBOUND BAR SIGNAL

CAMERA NUMBER	LOCATION	PHASE
V-1	POLE 1	6
V-2	POLE 2	8
V-3	POLE 3	2
V-4	POLE 3	B3
V-5	POLE 7	B4
V-6	POLE 7	4

-LOCATION: DISTANCE FROM CROSSWALK /STOP BAR IN FEET
 -ET = EMTRAC DETECTOR



PED PB STATION
 1-APS PB AND SIGN
 (RT ARROW) (PB6-2)
 EXTEND INTO HH 1:
 1" NOM. DIA. CONDUIT
 1-2/C 14
 1-1/C 6 INS. GR.

PED PB STATION
 1-APS PB AND SIGN
 (LT ARROW) (PB6-1)
 EXTEND INTO HH 2:
 1" NOM. DIA. CONDUIT
 1-2/C 14
 1-1/C 6 INS. GR.

PED PB STATION
 1-APS PB AND SIGN
 (RT ARROW) (PB8-3)
 EXTEND INTO HH 3:
 1" NOM. DIA. CONDUIT
 1-2/C 14
 1-1/C 6 INS. GR.

2-3" CONDUITS
 6-12/C 14
 6-4/C 14
 3-3/C 14
 2-3/C 14 (LUM.)
 5-2/C 14
 3-3/C 20
 3-CAT 6 (VIDEO DET.)
 1-1/C 6 INS. GR.

2-3" CONDUITS
 3-12/C 14
 4-4/C 14
 2-3/C 14
 1-3/C 14 (LUM.)
 3-2/C 14
 2-3/C 20
 2-CAT 6 (VIDEO DET.)
 1-1/C 6 INS. GR.

2-3" CONDUITS
 4-12/C 14
 4-4/C 14
 2-3/C 14
 1-3/C 14 (LUM.)
 4-2/C 14
 2-3/C 20
 2-CAT 6 (VIDEO DET.)
 1-1/C 6 INS. GR.

2-3" CONDUITS
 4-12/C 14
 4-4/C 14
 2-3/C 14
 1-3/C 14 (LUM.)
 3-2/C 14
 2-3/C 20
 2-CAT 6 (VIDEO DET.)
 1-1/C 6 INS. GR.

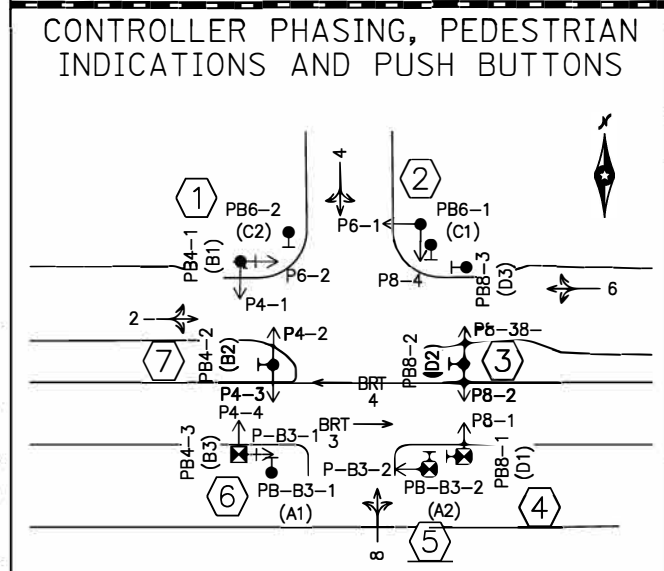
2" CONDUIT
 1-12/C 14
 1-4/C 14
 1-3/C 14
 1-2/C 14
 1-3/C 20
 1-1/C 6 INS. GR.

3" CONDUIT
 1-12/C 14
 2-4/C 14
 1-3/C 14
 2-2/C 14
 1-3/C 20
 1-1/C 6 INS. GR.

PED PB STATION
 1-APS PB AND SIGN
 (LT ARROW) (PB-B3-1)
 EXTEND INTO HH 6:
 1" NOM. DIA. CONDUIT
 1-2/C 14
 1-1/C 6 INS. GR.

SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 6 PHASE
- SIGNAL SYSTEM SHALL BE FULLY ACTUATED.
- BRT SHALL OPERATE ON EXCLUSIVE PHASES.



PEDESTRIAN PUSH BUTTONS SHALL BE LOCATED AS SHOWN ABOVE

NO.	REVISIONS	BY	APP	DATE

DRAWN: MAB
 DESIGNED: NAP
 CHECKED: ASP

Kimley»Horn
METRO Gold Line
SRF METROPOLITAN COUNCIL 100% SUBMITTAL

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CERTIFIED BY: *Adrian S. Potter*
 LIC. NO. 42785 DATE 09/24/2021

SIGNAL PLAN - SIGNAL SYSTEM H INTERSECTION LAYOUT

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

2233 OF 2649

Exhibit D - Signal System Design Plans - Page 7 of 10

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INTERSECTION NOTES

① PA85 POLE FOUNDATION
TYPE PA85-A-15-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
2-ANGLE MOUNT SIGNALS AT 180 AND 270 DEG
2-ANGLE MOUNT C.D. PED HEADS AT 180 AND 270 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 6)
1-APS PB AND SIGN (LT ARROW) (PB4-1)
AND APS PB POLE MOUNT ADAPTOR
1-VIDEO DETECTION CAMERA (V-1)
TSP RECEIVER ANTENNA (EMTRAC)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
3" CONDUIT TO HH 8:
2-12/C 14
2-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-2/C 14
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-COAXIAL CABLE (EMTRAC)
1-1/C 6 INS. GR.

② PA85 POLE FOUNDATION
TYPE PA85-A-20-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
2-ANGLE MOUNT SIGNALS AT 180 AND 270 DEG
2-ANGLE MOUNT C.D. PED HEADS AT 180 AND 270 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 8)
1-VIDEO DETECTION CAMERA (V-2)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R10-11b SIGN FACING NB EARL ST
1-TYPE D SIGN (D-2)(SEE SIGN DETAILS)
3" CONDUIT TO HH 2:
2-12/C 14
2-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-3/C 20
1-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

③ PA85 POLE FOUNDATION
TYPE PA85-A-15-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
3-ANGLE MOUNT SIGNALS AT 0, 180 AND 270 DEG
1-STRAIGHT MOUNT SIGNAL AT 90 DEG
2-ANGLE MOUNT C.D. PED HEADS AT 90 AND 270 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 2)
1-APS PB AND SIGN (DBL ARROW) (PB8-2)
AND APS PB POLE MOUNT ADAPTOR
2-VIDEO DETECTION CAMERAS (V-3) (V-4)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-R10-11b SIGN FACING NB EARL ST
1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
3" CONDUIT TO HH 4:
2-12/C 14
2-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-2/C 14
1-3/C 20
2-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

④ PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT SIGNAL
1-STRAIGHT MOUNT C.D. PED HEAD
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE B4)
1-APS PB AND SIGN (LT ARROW)(PB8-1)
AND APS PB MOUNTING SPACERS
3" CONDUIT TO HH 5:
1-12/C 14
1-4/C 14
1-3/C 14
1-2/C 14
1-3/C 20
2-1/C 6 INS. GR.

Ⓐ EQUIPMENT PAD (SEE CITY OF ST PAUL STANDARD PLATE 5054)
SERVICE CABINET (SSB) NO BATTERY BACKUP SYSTEM OR BATTERIES
332D CONTROLLER AND CABINET
TSP DETECTOR (EMTRAC)
TSP COMMUNICATIONS (CELL MODEM)
2-3" CONDUITS TO HH 1:
6-12/C 14
6-4/C 14
3-3/C 14
6-2/C 14
3/C 20
3-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.
2-3" CONDUITS TO HH 8:
5-12/C 14
6-4/C 14
3-3/C 14
4-2/C 14
3-3/C 20
3-CAT 6 (VIDEO DET.)
1-COAXIAL CABLE (EMTRAC)
1-1/C 6 INS. GR.

⑤ PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-STRAIGHT MOUNT SIGNAL
1-STRAIGHT MOUNT C.D. PED HEAD
1-APS PB AND SIGN (RT ARROW)(PB-B3-2)
AND APS PB MOUNTING SPACERS
1-R10-6L SIGN
3" CONDUIT TO HH 5:
1-12/C 14
1-4/C 14
1-2/C 14
1-1/C 6 INS. GR.

⑥ PEDESTAL FOUNDATION
13' PEDESTAL POLE PLUS BASE
1-ANGLE MOUNT SIGNAL
1-STRAIGHT MOUNT SIGNAL
2-STRAIGHT MOUNT C.D. PED HEADS
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE B3)
1-APS PB AND SIGN (RT ARROW)(PB4-3)
AND APS PB MOUNTING SPACERS
3" CONDUIT TO HH 6:
1-12/C 14
2-4/C 14
1-3/C 14
1-2/C 14
1-3/C 20
1-1/C 6 INS. GR.

⑦ PA90 POLE FOUNDATION
TYPE PA90-A-30-X30-6 (ARM AT 350 DEG)
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
3-ANGLE MOUNT SIGNALS AT 0, 90 AND 270 DEG
2-ANGLE MOUNT C.D. PED HEADS AT 0 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASE 4)
1-APS PB AND SIGN (DBL ARROW) (PB4-2)
AND APS PB POLE MOUNT ADAPTOR
2-VIDEO DETECTION CAMERAS (V-5) (V-6)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-TYPE D SIGN (D-2)(SEE SIGN DETAILS)
1-R10-11b SIGN FACING EB HUDSON RD
3" CONDUIT TO HH 7:
2-12/C 14
2-4/C 14
1-3/C 14
1-3/C 14 (LUM.)
1-2/C 14
1-3/C 20
2-CAT 6 (VIDEO DET.)
1-1/C 6 INS. GR.

GROUND WIRE AND GROUND ROD - MIN 8' OUT FROM PAD
2-2" AND 1-3" CONDUIT STUBBED OUT (CAPPED BOTH ENDS)
CONTROLLER CABINET TO SERVICE CABINET:
2" CONDUIT
3-1/C 6
CONTROLLER CABINET TO SERVICE CABINET (COMMS.)
2" CONDUIT
1-6PR 19
SERVICE CABINET TO GROUND MOUNTED TRANSFORMER:
2" CONDUIT
3-1/C 2

SERVICE CABINET TO HH 8:
2" CONDUIT
4-3/C 14 (LUM.)
SERVICE CABINET TO EXTERNAL GR. RD.:
1" CONDUIT
1-1/C 6 INS. GR.
(SEE EQUIPMENT PAD LAYOUT)
HH 1 TO HH 8:
2" CONDUIT
2-3/C 14 (LUM.)

Ⓑ SOP-GROUND MOUNTED
TRANSFORMER
2" CONDUIT INTO SERVICE CABINET
VIA HH 9:
3-1/C 2

Sep. 22 2021 10:22 am C:\caddlib\pw\gic3d\d0218562\SEG2-TFC-SIG-001.dwg By: npoole

NO.	REVISIONS	BY	APP	DATE

DRAWN:
MAB
DESIGNED:
NAP
CHECKED:
ASP



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.
CERTIFIED BY Adrian S. Potter
LIC. NO. 42785 DATE 09/24/2021

SIGNAL PLAN - SIGNAL SYSTEM H
INTERSECTION NOTES

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

SIGNAL HEAD CHART

FACE	R	Y	G	Y	G
1-1, 1-2	●	●	●	←	←
2-1, 2-2, 2-3	●	●	●		
4-1, 4-2	●	●	●		
4-3, 4-4	←	←	←		
6-1, 6-2	●	●	●		

-ALL SIGNAL INDICATIONS SHALL BE 12" LED
 -ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BACKGROUND SHIELDS

VIDEO DETECTOR CHART

CAMERA NUMBER	LOCATION	PHASE
V-1	POLE 2	1 & 6
V-2	POLE 4	2
V-3	POLE 5	4

SIGNAL HEAD PHASING

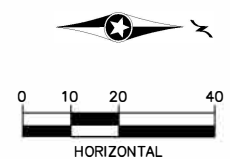
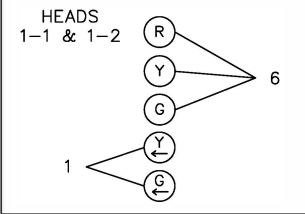
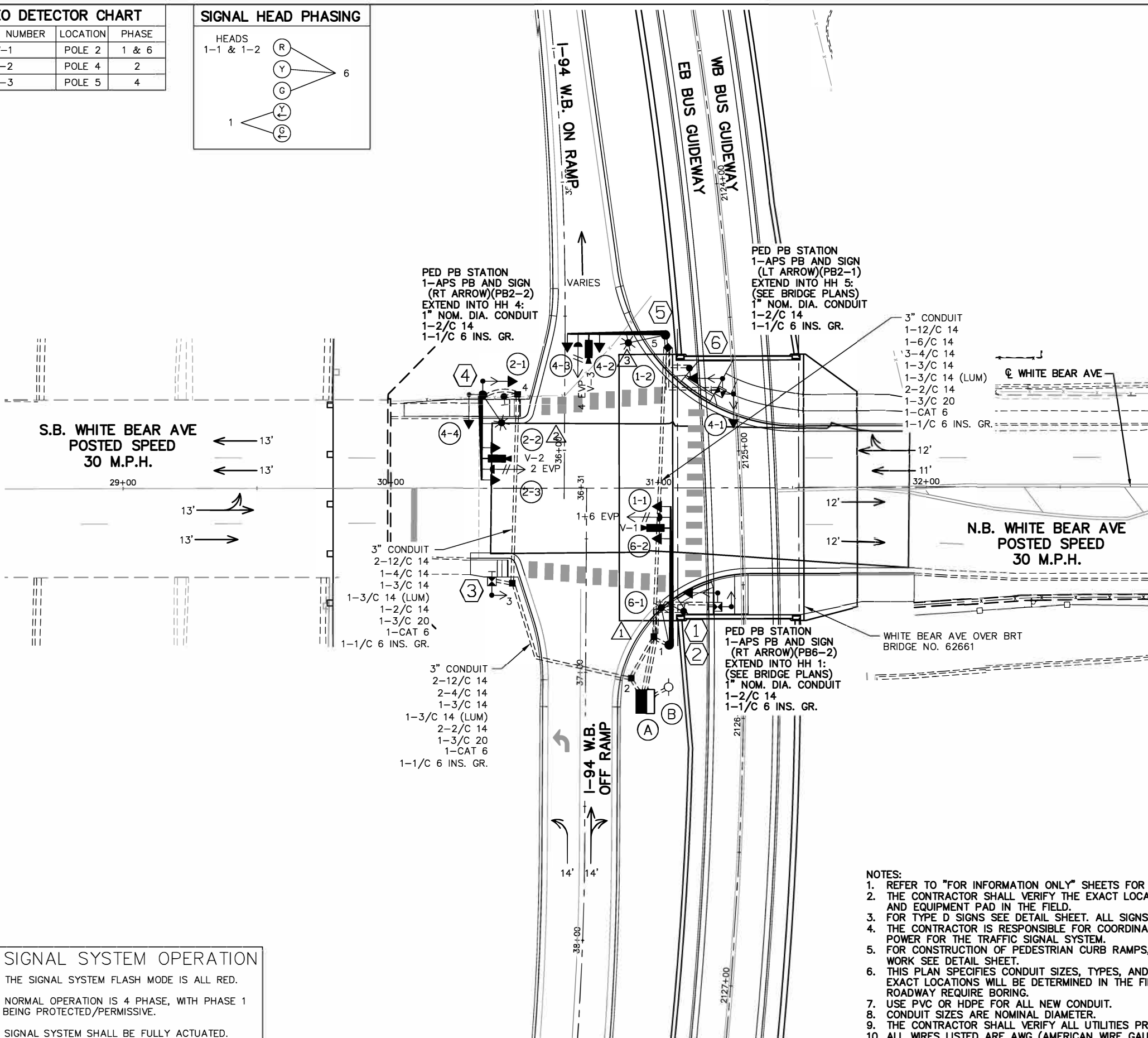
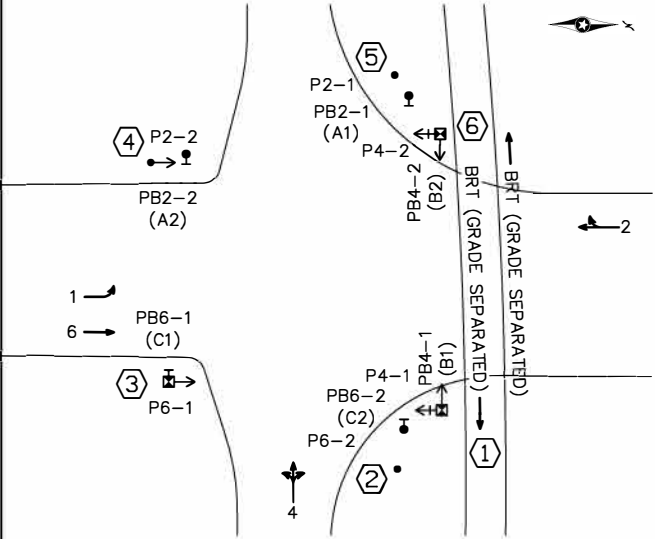


Exhibit D - Signal System Design Plans - Page 9 of 10



CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSH BUTTONS



SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 4 PHASE, WITH PHASE 1 BEING PROTECTED/PERMISSIVE.
- SIGNAL SYSTEM SHALL BE FULLY ACTUATED.

- NOTES:**
1. REFER TO "FOR INFORMATION ONLY" SHEETS FOR INPLACE SIGNAL COMPONENTS.
 2. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF HANDHOLES, POLES, AND EQUIPMENT PAD IN THE FIELD.
 3. FOR TYPE D SIGNS SEE DETAIL SHEET. ALL SIGNS REQUIRED ARE INCIDENTAL.
 4. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE TRAFFIC SIGNAL SYSTEM.
 5. FOR CONSTRUCTION OF PEDESTRIAN CURB RAMPS, CONCRETE WALK AND MEDIAN WORK SEE DETAIL SHEET.
 6. THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER THE ROADWAY REQUIRE BORING.
 7. USE PVC OR HDPE FOR ALL NEW CONDUIT.
 8. CONDUIT SIZES ARE NOMINAL DIAMETER.
 9. THE CONTRACTOR SHALL VERIFY ALL UTILITIES PRIOR TO CONSTRUCTION.
 10. ALL WIRES LISTED ARE AWG (AMERICAN WIRE GAUGE).

Aug. 26 2021 12:16 pm C:\eaddlib\pw\gic3d\d0218562\SEG2-TFC-SIG-002.dwg By: Bryce Stutz

NO.	REVISIONS	BY	APP	DATE

DRAWN: BWS
DESIGNED: BKV
CHECKED: JLK

Kimley»Horn
 METROPOLITAN ENGINEERS

METRO Gold Line
 100% SUBMITTAL

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.

CERTIFIED BY: *Jonette L. Kuhrau*
 JONETTE L. KUHAU
 LIC. NO. 44250 DATE 09/24/2021

SIGNAL PLAN - SIGNAL SYSTEM I INTERSECTION LAYOUT

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

2238 OF 2649

INTERSECTION NOTES

① PEDESTAL FOUNDATION
(SEE BRIDGE PLANS)
13' PEDESTAL POLE PLUS BASE
1-ANGLE MOUNT SIGNAL AT 90 DEG
2-ANGLE MOUNT C.D. PED HEADS
AT 90 AND 180 DEG
1-APS PB AND SIGN (LT ARROW)(PB4-1)
AND APS PB MOUNTING SPACERS
2" CONDUIT TO HH 1:
(SEE BRIDGE PLANS)
3-4/C 14
1-2/C 14
1-1/C 6 INS. GR.

② PA100 POLE FOUNDATION
TYPE PA100-A-50-X30-6
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 12'
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 1+6)
1-VIDEO DETECTOR CAMERA (V-1)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
3" CONDUIT TO HH 1:
1-6/C 14
1-4/C 14
1-3/C 14
1-3/C 14 (LUM)
1-3/C 20
1-CAT 6
1-1/C 6 INS. GR.

③ PEDESTAL FOUNDATION
10' PEDESTAL POLE PLUS BASE
1-ANGLE MOUNT C.D. PED HEAD AT 180 DEG
1-APS PB AND SIGN (LT ARROW)(PB6-1)
AND APS PB MOUNTING SPACERS
2-R6-1 SIGNS (54" X 18")(BACK TO BACK)
3" CONDUIT TO HH 3:
1-4/C 14
1-2/C 14
1-1/C 6 INS. GR.

Ⓐ EQUIPMENT PAD (SEE CITY OF SAINT PAUL STANDARD PLATE 5054)
SERVICE CABINET (SSB) WITH BATTERY BACK UP SYSTEM AND BATTERIES
332D CONTROLLER AND CABINET

3" CONDUIT TO HH 1: 1-12/C 14 1-6/C 14 4-4/C 14 1-3/C 14 2-2/C 14 1-3/C 20 1-CAT 6	3" CONDUIT TO HH 2: 2-12/C 14 2-4/C 14 1-3/C 14 2-2/C 14 1-3/C 20 1-CAT 6 1-1/C 6 INS. GR.
---	---

④ PA85 POLE FOUNDATION
TYPE PA90-A-30-X30-6
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 12'
2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
1-ANGLE MOUNT C.D. PED HEAD AT 180 DEG
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 2)
1-VIDEO DETECTOR CAMERA (V-2)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-TYPE D SIGN (D-2)(SEE SIGN DETAILS)
3" CONDUIT TO HH 4:
2-12/C 14
1-4/C 14
1-3/C 14
1-3/C 14 (LUM)
1-3/C 20
1-CAT 6
1-1/C 6 INS. GR.

⑤ PA90 POLE FOUNDATION
TYPE PA90-A-35-X30-6
1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 12'
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 4)
1-VIDEO DETECTOR CAMERA (V-3)
LUMINAIRE-LED (FOR 30' MOUNTING HEIGHT)
1-TYPE D SIGN (D-3)(SEE SIGN DETAILS)
2-R6-1 SIGNS (54" X 18")(BACK TO BACK)
3" CONDUIT TO HH 5:
1-12/C 14
1-3/C 14
1-3/C 14 (LUM)
1-3/C 20
1-CAT 6
1-1/C 6 INS. GR.

⑥ PEDESTAL FOUNDATION
(SEE BRIDGE PLANS)
13' PEDESTAL POLE PLUS BASE
2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
2-ANGLE MOUNT C.D. PED HEADS
AT 90 AND 180 DEG
1-APS PB AND SIGN (RT ARROW)(PB4-2)
AND APS PB MOUNTING SPACERS
2" CONDUIT TO HH 5:
(SEE BRIDGE PLANS)
1-6/C 14
3-4/C 14
1-2/C 14
1-1/C 6 INS. GR.

3" CONDUIT TO HH 1:
1-12/C 14
1-6/C 14
3-4/C 14
1-3/C 14
2-2/C 14
1-3/C 20
1-CAT 6
1-1/C 6 INS. GR.

GROUND WIRE AND GROUND ROD - MIN 8' OUT FROM PAD
2-2" AND 1-3" CONDUIT STUBBED OUT (CAPPED BOTH ENDS)
CONTROLLER CABINET TO SERVICE CABINET:
2" CONDUIT
3-1/C 6
SERVICE CABINET TO SOP:
2" CONDUIT
3-1/C 2

SERVICE CABINET TO HH 1:
2" CONDUIT
3-3/C 14 (LUM)
SERVICE CABINET TO EXTERNAL GR. RD.:
1" CONDUIT
1-1/C 6 INS. GR.
HH 1 TO HH 2:
2" CONDUIT
1-3/C 14 (LUM)

CONTROLLER CABINET TO INTERCONNECT HH 1
SEE INTERCONNECT PLAN

Ⓑ SOP - WOOD POLE:
(XCEL ENERGY)
2" CONDUIT, RISER WEATHERHEAD
AND CONDUIT TO SERVICE CABINET:
3-1/C 2

Jun. 28 2022 10:45 am C:\caddlib\pw\gic3d\d0218562\SEG2-TFC-SIG-002.dwg By: cpeterson

NO.	REVISIONS	CSP	LMW	05/18/22	05/18/22	05/18/22	05/18/22	05/18/22	05/18/22	05/18/22	05/18/22
1	REVISED FOR ADDENDUM										
		BY	APP	DATE	CHECKED:						
					JLK						

DRAWN: BWS
DESIGNED: BKV
CHECKED: JLK

Kimley»Horn

METROPOLITAN ENGINEERS

METRO Gold Line

100% SUBMITTAL

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.

CERTIFIED BY:
JUNE L. KUHAU
LIC. NO. 44250 DATE 09/24/2021

SIGNAL PLAN - SIGNAL SYSTEM I
INTERSECTION NOTES

STATE PROJ. NO. 6217-45 (TH 3), 6221-110 (TH 61), 6283-254 (TH 94), 6220-87 (TH 61), 8282-139 (TH 94), 8286-93 (TH 694)

2239-R1 OF 2649

EXHIBIT E

Payment Schedule

Payment #	Payable on or before:	Amount
1	On or before 30 days following execution of this agreement	\$332,299.50
2	Contingency Reserve – within 35 days receipt of undisputed invoice(s) as per MN Stat. 471.425	Not-to-exceed \$74,059.95

EXHIBIT F

Buy America Certification Form

Company Name: _____

Contract Number: _____ Project Number: _____

Certificate of Compliance with 49 U.S.C. § 5323(j)(1)

The Vendor hereby certifies that it will comply with the requirements of 49 U.S.C. § 5323(j)(1) and the applicable regulations in 49 C.F.R. Part 661.

Date: _____

Signature: _____

Name: _____

Title: _____

Company Name: _____

Certificate of Non-Compliance with 49 U.S.C. §5323(j)(1)

The Vendor hereby certifies that it cannot comply with the requirements of 49 U.S.C. § 5323(j)(1), but it may qualify for an exception pursuant to 49 U.S.C. § 5323(j)(2)(B) or 49 U.S.C. § 5323(j)(2)(D) and the regulations in 49 C.F.R. Part 661.7.

Date: _____

Signature: _____

Name: _____

Title: _____

Company Name: _____