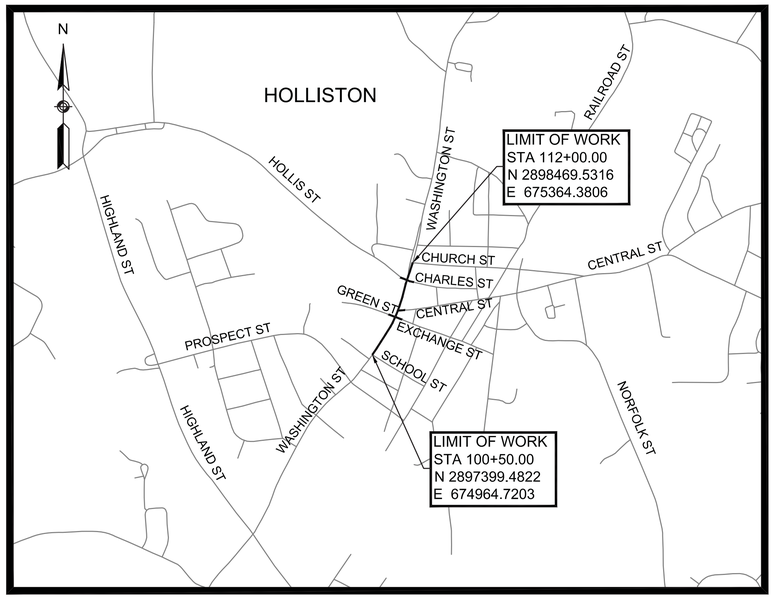
WASHINGTON STREET CORRIDOR IMPROVEMENTS

IN THE TOWN OF

HOLLISTON

MIDDLESEX COUNTY

INDEX



0 1000 2000 2500 3000

SCALE: 1" = 1000'

LENGTH OF PROJECT = 1450.00 FEET = 0.275 MILES

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE LATEST EDITION OF THE SUPPLEMENTAL SPECIFICATIONS, THE DECEMBER 2016 CONSTRUCTION STANDARD DETAILS, THE 1996 CONSTRUCTION AND TRAFFIC STANDARD DETAILS (AS RELATES TO TRAFFIC STANDARD DETAILS ONLY), THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

FEBRUARY 2017

PREPARED BY:

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DRAFT 100% SUBMISSION

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
1	1	CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
	*	EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
RRSG	RRSG	RAILROAD SIGNAL
OR		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
	20'	MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
	20'	MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWLL	SOLID WHITE LANE LINE - 6"
	SYLL	SOLID YELLOW LANE LINE - 6"
	BWLL	BROKEN WHITE LANE LINE - 6" (10' LINE, 30' SPACE)
	BYLL	BROKEN YELLOW LANE LINE - 6" (10' LINE, 30' SPACE)
	DWLL	DOTTED WHITE LANE LINE - 6" (2' LINE, 6' SPACE)
	DYLL	DOTTED YELLOW LANE LINE - 6" (2' LINE, 6' SPACE)
	DYCL	DOUBLE YELLOW CENTER LINE - 6"
	YGL	YELLOW GORE LINE - 12" (15' SPACING, 1:3 SLOPE)

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX	APPROXIMATE
AC	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT	BITUMINOUS
BC	BOTTOM OF CURB
BD	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DWY	DRIVEWAY
ELEV (or EL)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PGL	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PSEL	PARKING SOLID EDGE LINE - 4"
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
2	17

LEGEND AND ABBREVIATIONS

ABBREVIATIONS (cont)

GENERAL

R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
VGC	VERTICAL GRANITE CURB
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
EB	EASTBOUND
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR AMBER
FYL	FLASHING AMBER LEFT ARROW
FYR	FLASHING AMBER RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
NB	NORTHBOUND
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
SB	SOUTHBOUND
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
WB	WESTBOUND
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW

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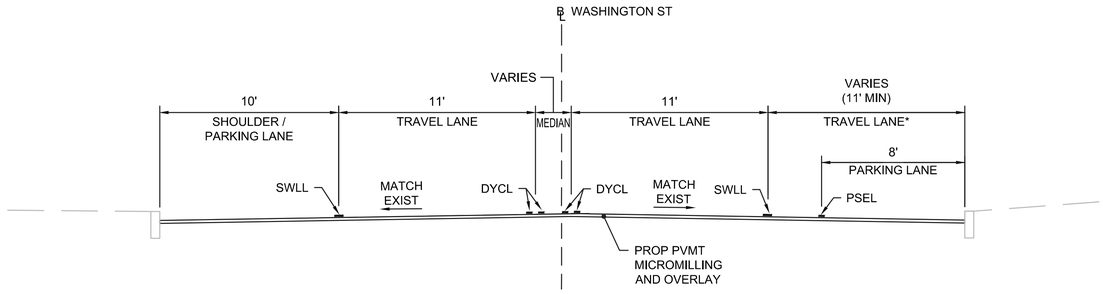
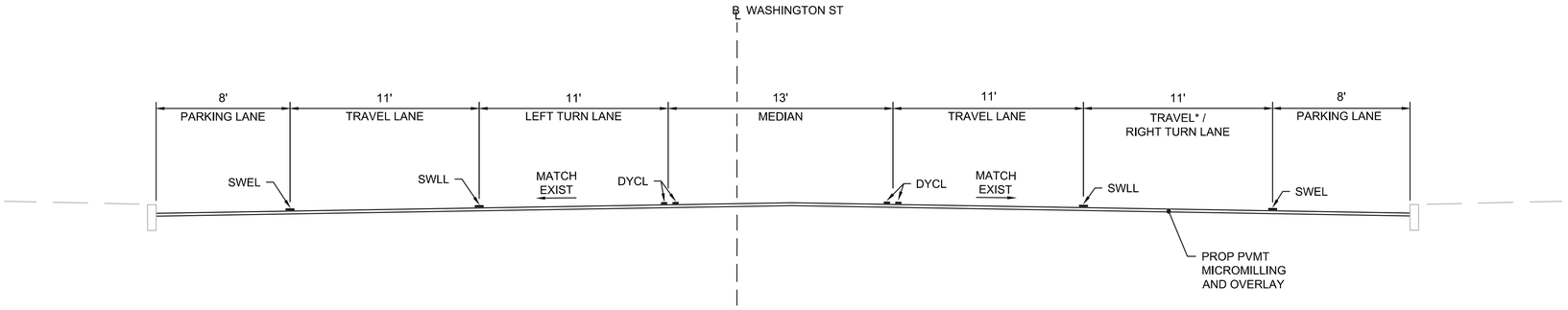


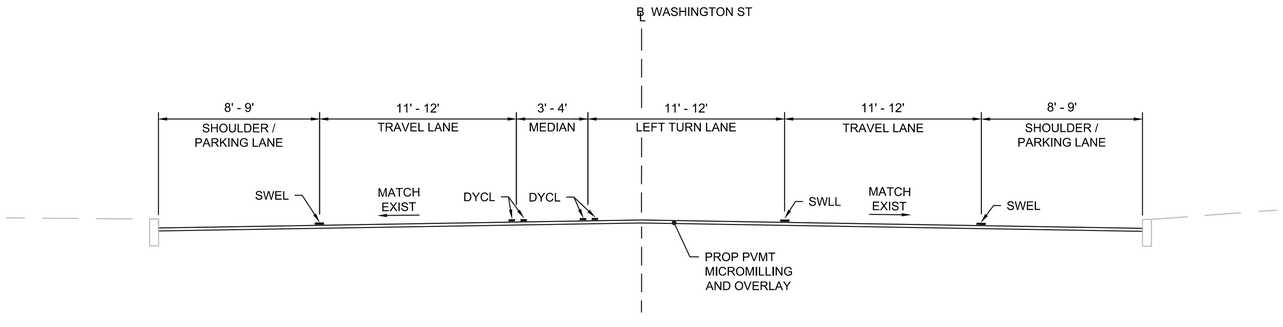
* TRAVEL PERMITTED IN THIS LANE DURING PEAK PERIODS ONLY

WASHINGTON ST
SOUTH OF GREEN ST/EXCHANGE ST



* THROUGH TRAVEL PERMITTED IN THIS LANE DURING PEAK PERIODS ONLY

WASHINGTON ST
GREEN ST/EXCHANGE ST TO CENTRAL ST



WASHINGTON ST
CENTRAL ST TO HOLLIS ST/CHARLES ST

PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 2" HMA SURFACE COURSE - STANDARD TOP ASPHALT EMULSION FOR TACK COAT (RS-1H) AT 0.05 GAL/SY

BASE: 6" CEMENT CONCRETE BASE COURSE

SUBBASE: 8" GRAVEL BORROW (TYPE b)

PROPOSED PAVEMENT MICROMILLING AND OVERLAY

SURFACE: 2" HMA SURFACE COURSE - STANDARD TOP ASPHALT EMULSION FOR TACK COAT (RS-1H) AT 0.07 GAL/SY OVER MILLED PAVEMENT
2" PAVEMENT MICROMILLING

PROPOSED CEMENT CONCRETE SIDEWALK AND WHEELCHAIR RAMPS

SURFACE: 4" CEMENT CONCRETE (4,000 PSI, 3/4", 610)

SUBBASE: 8" GRAVEL BORROW (TYPE b)

PROPOSED BRICK WALK

SURFACE: BRICK PAVERS (MATCH EXIST BRICK)
1" COMPACTED STONE DUST

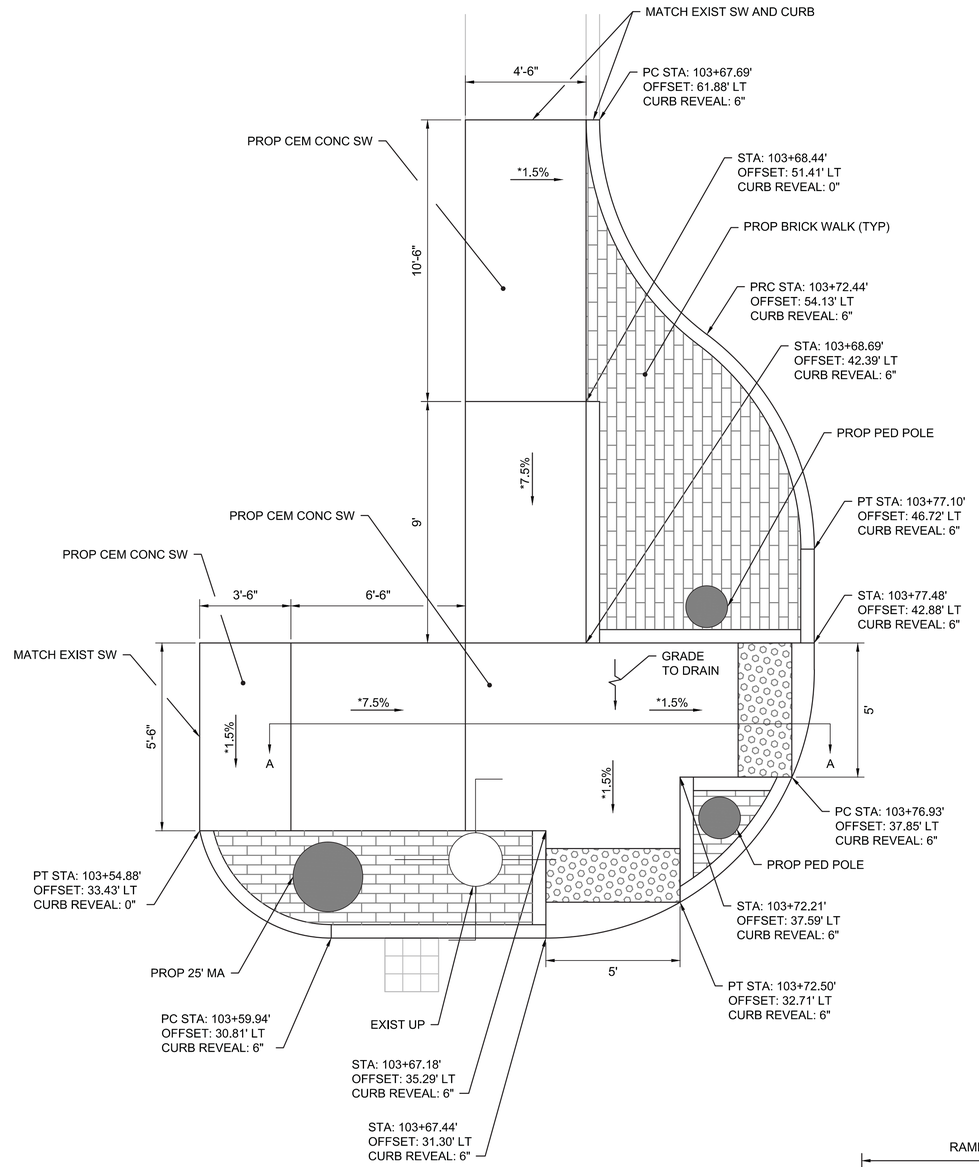
SUBBASE: 8" GRAVEL BORROW (TYPE b)

4 0 4 8
SCALE IN FEET

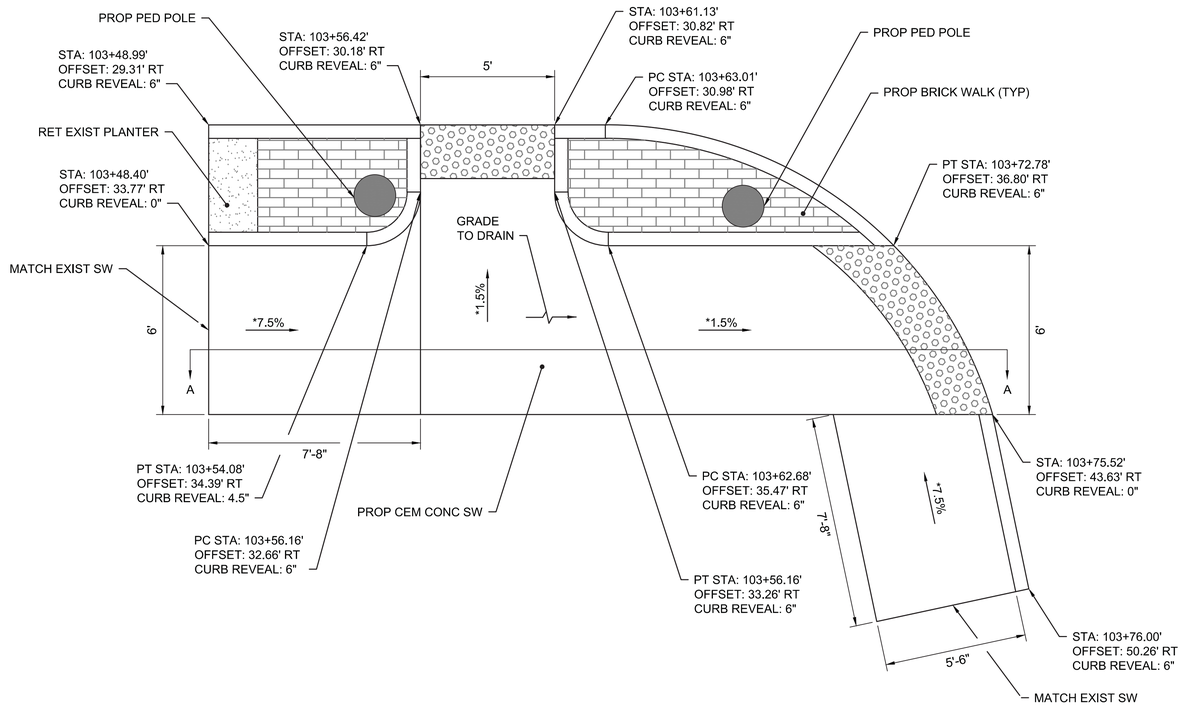
HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
4	17

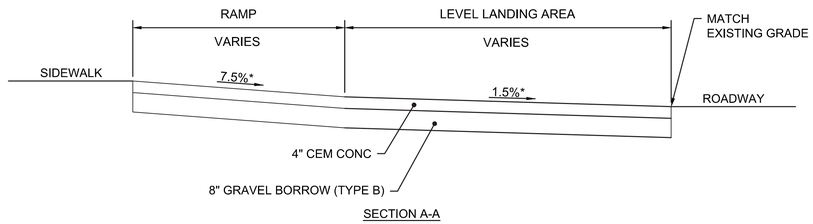
CONSTRUCTION DETAILS
SHEET 1 OF 2



WHEELCHAIR RAMP #1
NOT TO SCALE



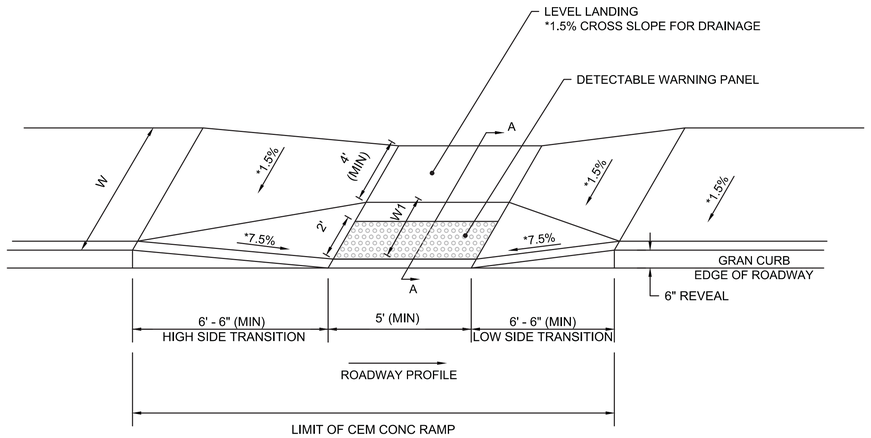
WHEELCHAIR RAMP #2
NOT TO SCALE

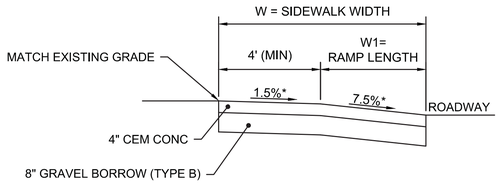


SECTION A-A

* TOLERANCE FOR CONSTRUCTION = ±0.5%

CURB RAMP NOTES:
1. ALL CURB RAMP CONSTRUCTION SHALL CONFORM TO MASSDOT ENGINEERING DIRECTIVE E-12-005.
2. DETECTABLE WARNING PANELS ARE REQUIRED ON ALL PROPOSED CURB RAMPS AND SHALL CONFORM TO THE DIMENSIONS SHOWN IN MASSDOT CONSTRUCTION STANDARD E 107.6.5R. REFER TO THE SPECIAL PROVISIONS.





SECTION A-A

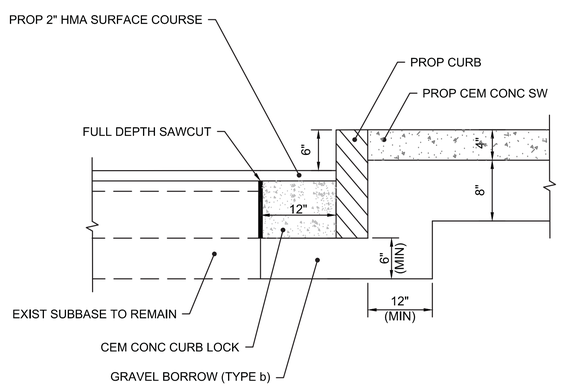
* TOLERANCE FOR CONSTRUCTION = ±0.5%

WCR #	WHEELCHAIR RAMP LOCATION		SIDEWALK WIDTH	LEVEL LANDING WIDTH	RAMP LENGTH	ROADWAY GUTTER SLOPE	TRANSITION LENGTH	
	STATION	OFFSET					LEFT SIDE	RIGHT SIDE
4	108+62	31' L	6' - 0"	4' - 0"	2' - 0"	1.6%	6' - 6"	9' - 0"
5	108+76	29' R	6' - 0"	4' - 0"	2' - 0"	0.9%	7' - 8"	6' - 6"

CURB RAMP NOTES:
1. ALL CURB RAMP CONSTRUCTION SHALL CONFORM TO MASSDOT ENGINEERING DIRECTIVE E-12-005.
2. DETECTABLE WARNING PANELS ARE REQUIRED ON ALL PROPOSED CURB RAMPS AND SHALL CONFORM TO THE DIMENSIONS SHOWN IN MASSDOT CONSTRUCTION STANDARD E 107.6.5R. REFER TO THE SPECIAL PROVISIONS.

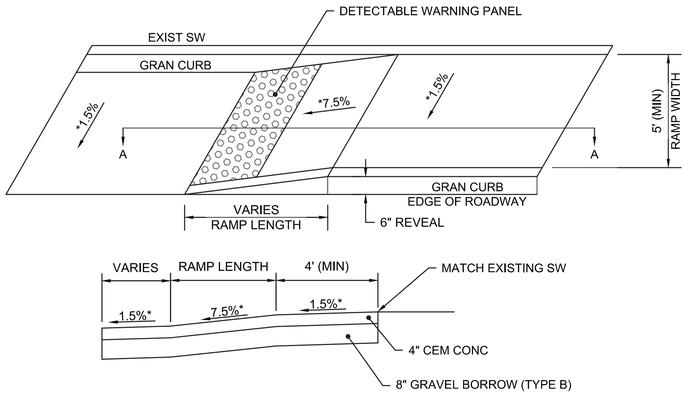
WHEELCHAIR RAMP #4 AND #5

NOT TO SCALE



CURB SETTING

NOT TO SCALE



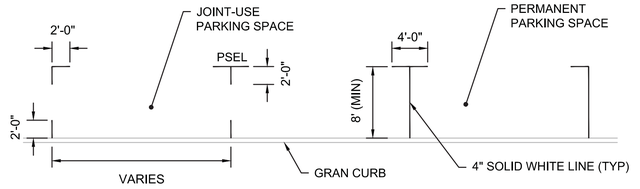
SECTION A-A

* TOLERANCE FOR CONSTRUCTION = ±0.5%

WCR #	WHEELCHAIR RAMP LOCATION		RAMP WIDTH	LEVEL LANDING WIDTH	RAMP LENGTH	ROADWAY GUTTER SLOPE
	STATION	OFFSET				
3	104+51	44' R	8' - 0"	4' - 0"	7' - 8"	0.4%
6	110+63	31' L	5' - 0"	4' - 0"	9' - 0"	1.4%

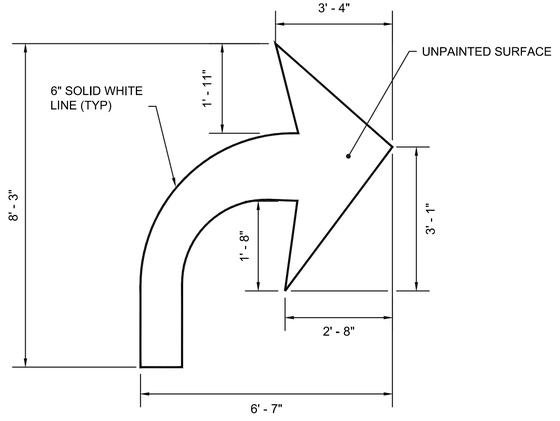
WHEELCHAIR RAMP #3 AND #6

NOT TO SCALE



PARKING SPACE PAVEMENT MARKINGS

NOT TO SCALE



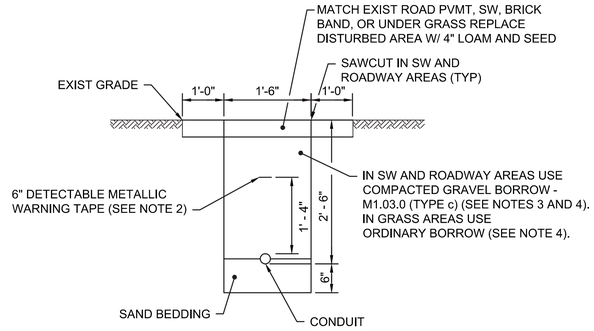
VARIABLE TURN ARROW PAVEMENT MARKING

NOT TO SCALE

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
5	17

CONSTRUCTION DETAILS
SHEET 2 OF 2



NOTES:
1. SCHEDULE 80 ELECTRICAL CONDUIT TYPE NM-PLASTIC (UL) W/ PULL ROPE.
2. WARNING TAPE SHALL BE PER CURRENT APWA STANDARDS.
3. CONTROL DENSITY FILL SHALL BE USED IN ROADWAY AREAS AS DETERMINED BY THE ENGINEER AND MEET THE REQUIREMENTS OF SUBSECTION M4.08.0
4. ALL STONES TO BE LESS THAN 2" UNDER SW AND ROADWAY. ALL STONES TO BE LESS THAN 3" UNDER GRASS.

CONDUIT INSTALLATION

NOT TO SCALE

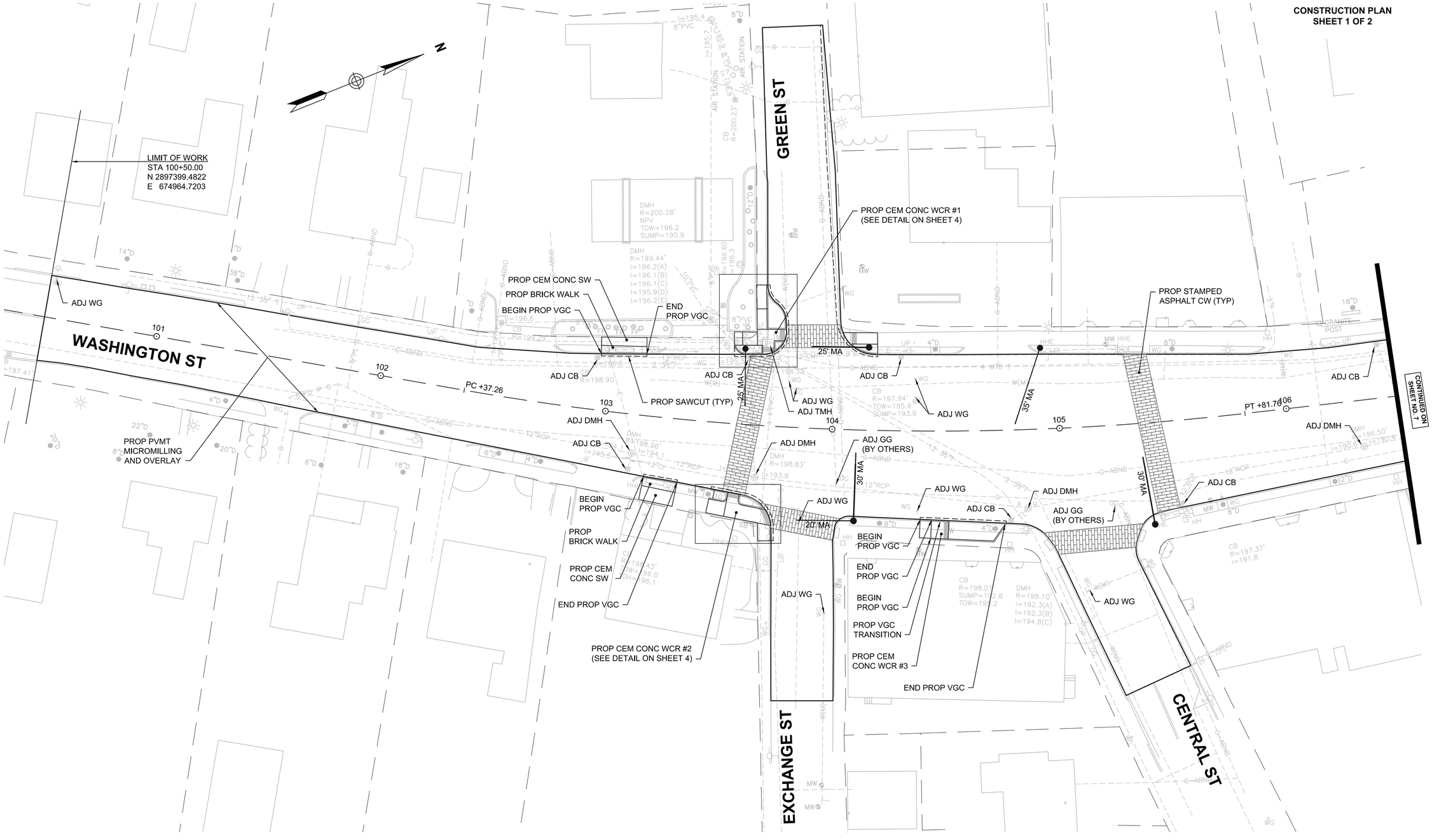
NOTES:
1. THE CONTRACTOR SHALL VERIFY, PRIOR TO CONSTRUCTION, THE EXISTING CONDITIONS WITHIN THE PROJECT AREA AND IMMEDIATELY NOTIFY THE ENGINEER OF DISCREPANCIES WHICH ARE FOUND.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY "DIG-SAFE" AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO ANY EXCAVATION WITHIN THE PROJECT AREA.
3. ALL SITE FEATURES WHICH ARE TO BE DISPOSED OF, INCLUDING EXISTING PAVEMENT, SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
4. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS. EXISTING AND NEWLY CONSTRUCTED DRAINAGE SYSTEMS IN THE PROXIMITY OF THE CONSTRUCTION SHALL BE LEFT CLEAN AND IN GOOD OPERABLE CONDITION.
5. NO EXCAVATIONS SHALL BE LEFT UNPROTECTED AT THE END OF ANY WORK PERIOD. A STEEL PLATE OR DECKING SHALL BE TEMPORARILY PLACED OVER ALL EXCAVATIONS WHEN NOT ACTIVELY IN USE.
6. ALL EXISTING FEATURES WHICH ARE "TO REMAIN" AND WHICH ARE DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
8. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
9. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
10. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE AND SANITARY SEWER STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND ADJUST ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2.
11. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
12. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
13. THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
14. JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
15. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
16. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING ROADWAY LIGHTING WITHIN THE PROJECT LIMITS UNTIL OTHERWISE DIRECTED IN WRITING BY THE ENGINEER.
17. ALL EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
18. ALL TREE PROTECTION IS TO BE LOCATED WITHIN THE EXISTING STATE AND/OR TOWN LAYOUTS.

Y13449.2[50%]HD(CONSTRUCTION DETAILS)DWG Plotted on 7-Feb-2017 12:30 PM

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
6	17

CONSTRUCTION PLAN
SHEET 1 OF 2



NOTE: ALL PEDESTRIAN PATHS OF TRAVEL SHALL PROVIDE A 3' MINIMUM CLEARANCE AS REQUIRED BY ADA.

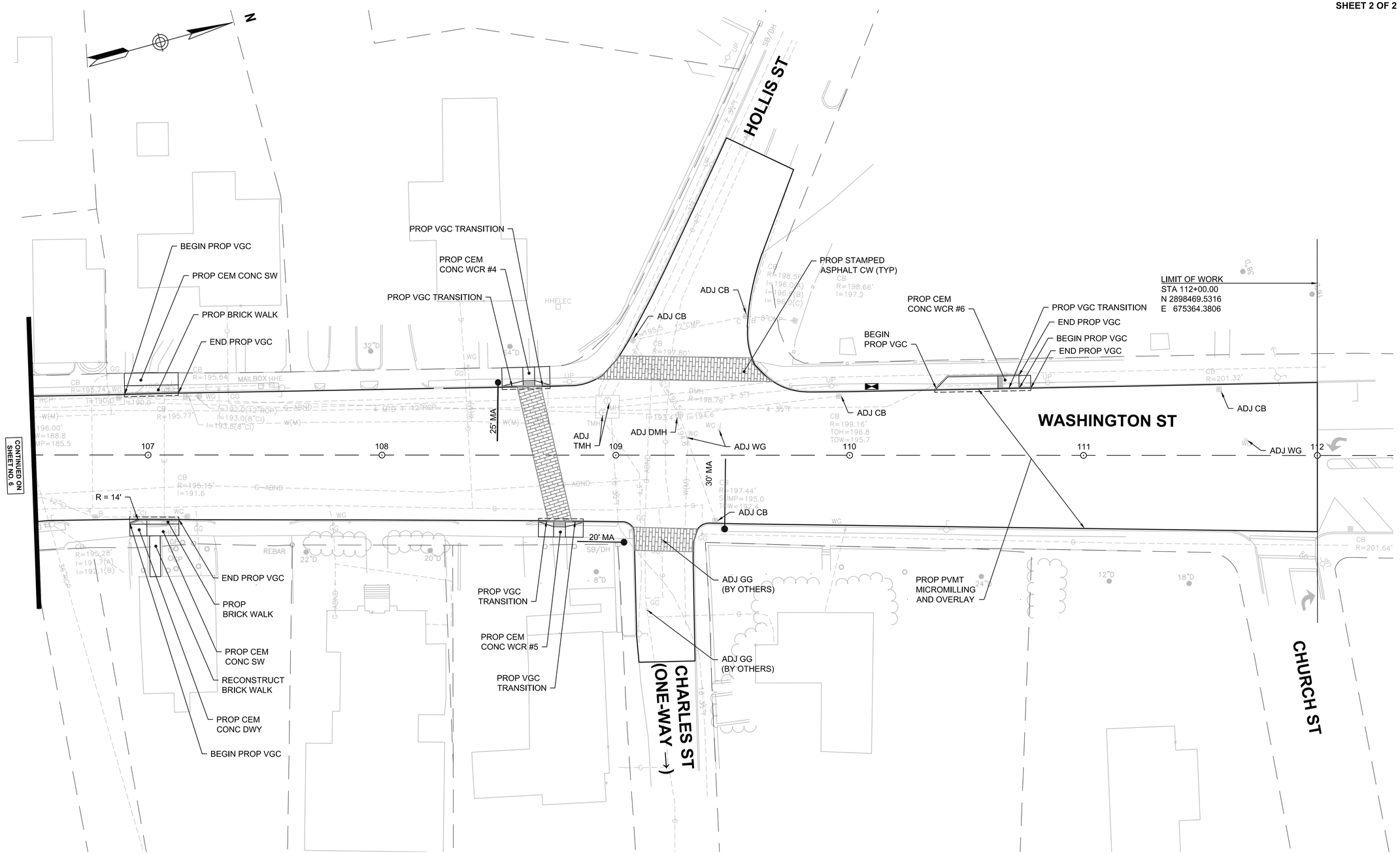
DRAFT 100% SUBMISSION

20 0 20 40
SCALE IN FEET

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
7	17

CONSTRUCTION PLAN
SHEET 2 OF 2



NOTE: ALL PEDESTRIAN PATHS OF TRAVEL SHALL PROVIDE A 3' MINIMUM CLEARANCE AS REQUIRED BY ADA.

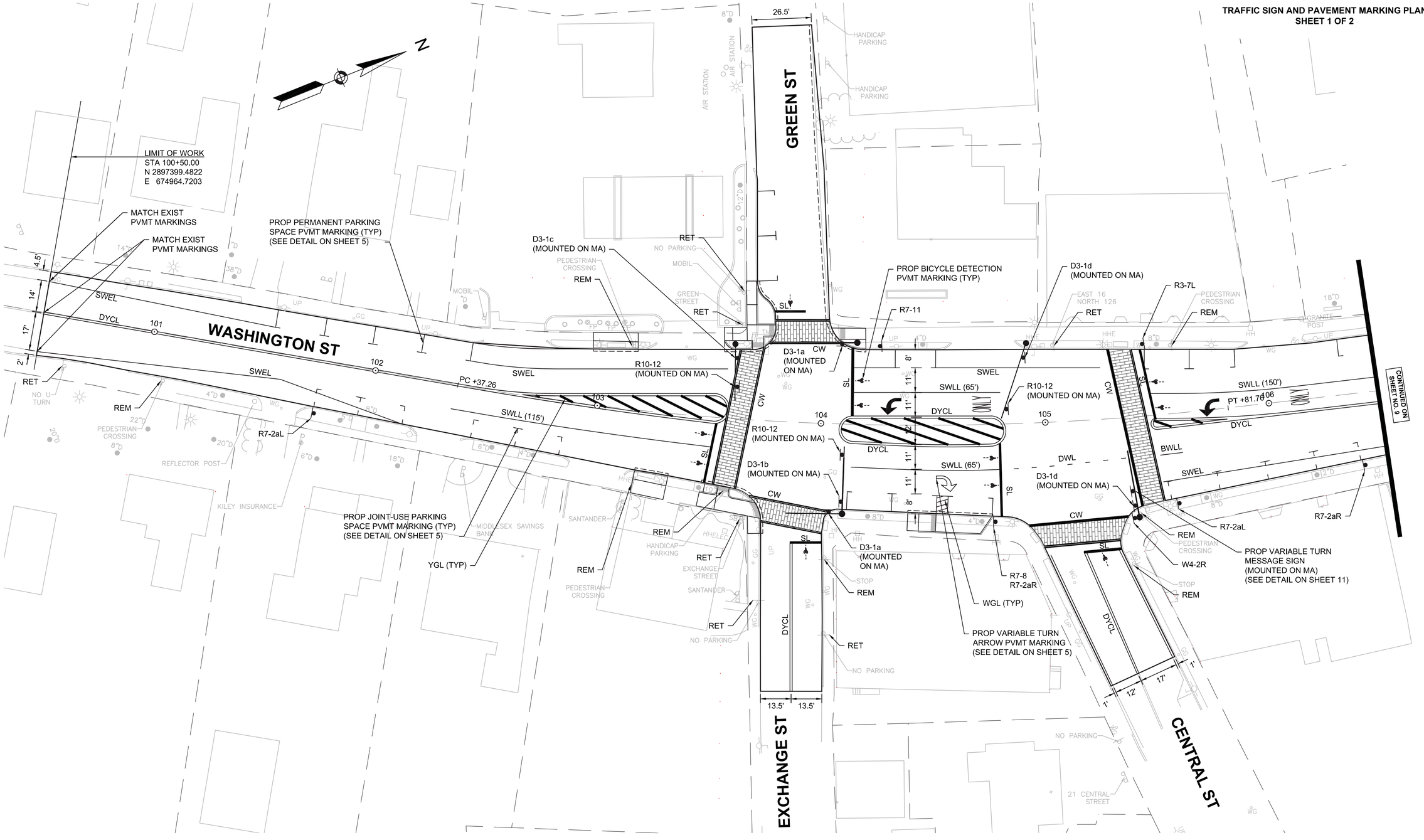
DRAFT 100% SUBMISSION

20 0 20 40
SCALE IN FEET

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
8	17

TRAFFIC SIGN AND PAVEMENT MARKING PLAN
SHEET 1 OF 2



DRAFT 100% SUBMISSION

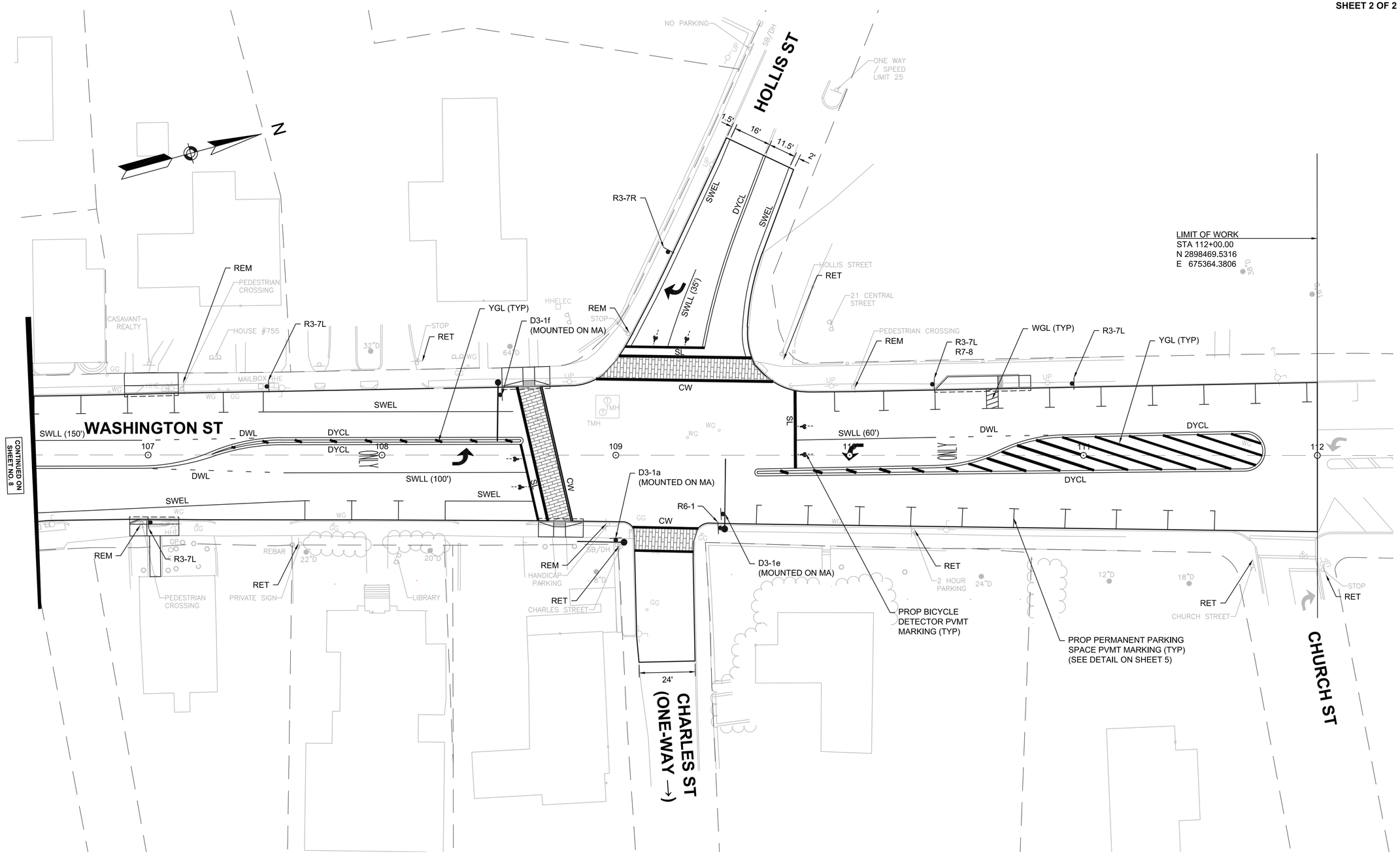
HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
9	17

TRAFFIC SIGN AND PAVEMENT MARKING PLAN
SHEET 2 OF 2

Plotted on 7-Feb-2017 5:16 PM

Y:\13449.21\[50%]HD\SIGNING AND MARKINGS\.DWG



DRAFT 100% SUBMISSION

20 0 20 40
SCALE IN FEET

TRAFFIC SIGN SUMMARY

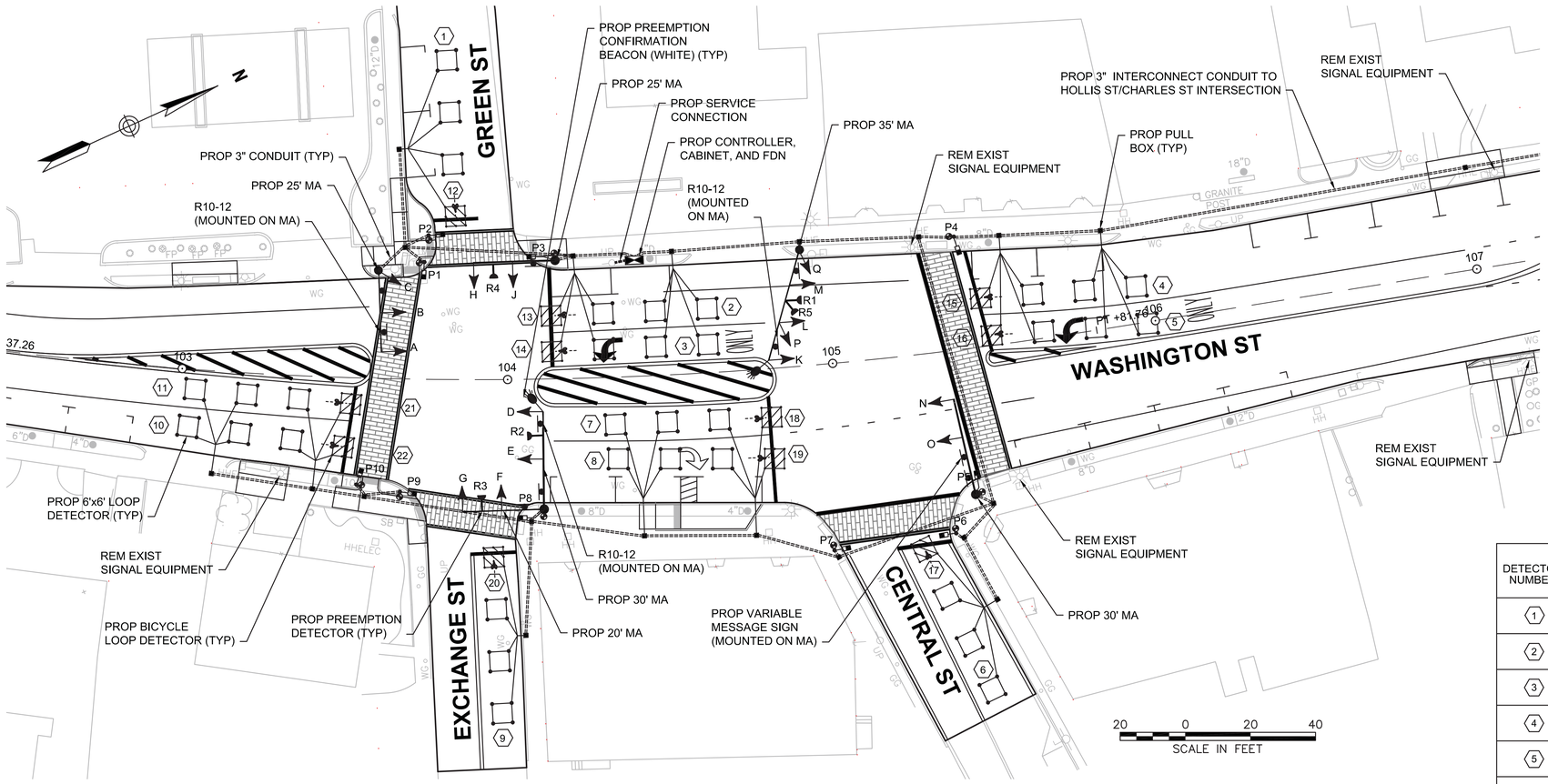
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (SF)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE MKR		BACK-GROUND	LEGEND	BORDER			
R3-7L	36"	36"		SEE 2009 MUTCD			4	SEE 2009 MUTCD			P5 - 1 4 - REQ	9.00	36.00
R3-7R	36"	36"					1				P5 - 1 1 - REQ	9.00	9.00
R6-1	36"	12"					1				1-MOUNT ON MA POST	3.00	3.00
R7-2aL	12"	18"					2				P5 - 1 2 - REQ	1.50	3.00
R7-2aR	12"	18"					2				P5 - 1 2 - REQ	1.50	3.00
R7-8	12"	18"					2				1 - MOUNT W/ R7-2aR 1 - MOUNT W/ R3-7L	1.50	3.00
R7-8P	12"	6"					1				1 - MOUNT W/ R7-8	0.50	0.50
R7-11	12"	18"					1				P5 - 1 1 - REQ	1.50	1.50
R10-12	30"	36"					3				3 - MOUNT ON MA	9.00	27.00
W4-2R	36"	36"					1				1-MOUNT ON MA	9.00	9.00
D3-1a	TBD	18"	Washington St				3				3-MOUNT ON MA	TBD	TBD
D3-1b	TBD	18"	Exchange St				1				1-MOUNT ON MA	TBD	TBD
D3-1c	TBD	18"	Green St				1				1-MOUNT ON MA	TBD	TBD
D3-1d	TBD	18"	Central St				1				1-MOUNT ON MA	TBD	TBD
D3-1e	TBD	18"	Charles St				1				1-MOUNT ON MA	TBD	TBD
D3-1f	TBD	18"	Hollis St				1				1-MOUNT ON MA	TBD	TBD
												TOTAL: 95.00 SF	

DRAFT 100% SUBMISSION

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
11	17

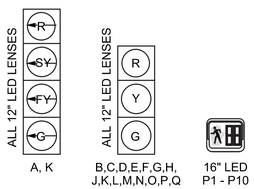
TRAFFIC SIGNAL PLAN
WASHINGTON ST/EXCHANGE ST
GREEN ST/CENTRAL ST
SHEET 1 OF 3



LOOP DETECTOR DATA

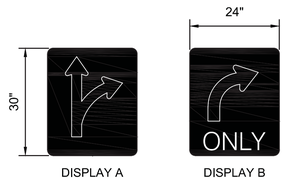
DETECTOR NUMBER	AMPLIFIER NUMBER	CHANNEL NUMBER	LOOP SIZE	NUM OF TURNS	Ø CALLED	Ø EXT	MODE A=PULSE B=PRES	DELAY TIME	EXT TIME
1	1	1	3@6'X6"	3	4	4	B	5	0
2	1	2	3@6'X6"	3	6	8	B	0	0
3	2	1	3@6'X6"	3	1	6	B	0	0
4	2	2	3@6'X6"	3	6	6	B	0	0
5	3	1	3@6'X6"	3	1	6	B	0	0
6	3	2	3@6'X6"	3	8	8	B	5	0
7	4	1	3@6'X6"	3	2	4	B	0	0
8	4	2	3@6'X6"	3	2	4	B	0	0
9	5	1	3@6'X6"	3	4	4	B	5	0
10	5	2	3@6'X6"	3	2	2	B	0	0
11	6	1	3@6'X6"	3	2	2	B	0	0
12	6	2	1@6'X6"	D-2	4	4	BICYCLE	5	0
13	7	1	1@6'X6"	D-2	6	6	BICYCLE	0	0
14	7	2	1@6'X6"	D-2	1	1	BICYCLE	0	0
15	8	1	1@6'X6"	D-2	6	6	BICYCLE	0	0
16	8	2	1@6'X6"	D-2	1	1	BICYCLE	0	0
17	9	1	1@6'X6"	D-2	8	8	BICYCLE	5	0
18	9	2	1@6'X6"	D-2	2	2	BICYCLE	0	0
19	10	1	1@6'X6"	D-2	2	2	BICYCLE	0	0
20	10	2	1@6'X6"	D-2	4	4	BICYCLE	5	0
21	11	1	1@6'X6"	D-2	2	2	BICYCLE	0	0
22	11	2	1@6'X6"	D-2	2	2	BICYCLE	0	0

SIGNAL IDENTIFICATION



NOTES:
1. ALL SIGNALS SHALL HAVE CUT AWAY VISORS.
2. ALL SIGNALS SHALL HAVE 5" LOUVERED BACK PLATES WITH 3" RETROREFLECTIVE BORDERS.

VARIABLE MESSAGE SIGN



NOTES:
1. VARIABLE MESSAGE SIGN TO BE OVERHEAD MOUNTED ON MAST ARM.
2. DISPLAY A SHALL BE SHOWN 6:00 AM - 9:00 AM.
3. DISPLAY B SHALL BE SHOWN AT ALL OTHER TIMES.

	MAJOR ITEMS REQUIRED	
PAY ITEM	QUANTITY	ITEM
815.1	1	NEMA TS2 (TYPE 1) CONTROLLER, CABINET AND FDN
	1	SERVICE CONNECTION
	1	TWO-WAY, GALV STEEL MAST ARM ASSEMBLY W/ 20 FT AND 30 FT TYPE II MAST ARMS, BASE AND FDN
	2	25 FT TYPE II, GALV STEEL MAST ARM ASSEMBLY, BASE AND FDN
	1	30 FT TYPE II, GALV STEEL MAST ARM ASSEMBLY, BASE AND FDN
	1	35 FT TYPE II, GALV STEEL MAST ARM ASSEMBLY, BASE AND FDN
	10	PEDESTRIAN SIGNAL HEAD, SINGLE SECTION W/ COUNTDOWN TIMER
	6	8' SIGNAL POLE, BASE AND FDN
	10	APS PUSH BUTTON ASSEMBLY
	14	1 WAY, 3 SECTION, SIGNAL HOUSING (12" LED)
	2	1 WAY, 4 SECTION, SIGNAL HOUSING (12" LED)
	15	5" LOUVERED SIGNAL BACKPLATES W/ RETROREFLECTIVE BORDERS
	11	DUAL CHANNEL LOOP DETECTOR AMPLIFIER
	33	LOOP DETECTOR (6'x6')
	11	BICYCLE LOOP DETECTOR (6'x6')
	5	OPTICOM OPTICAL DETECTOR, UNIDIRECTIONAL, SINGLE CHANNEL
	4	OPTICOM PHASE SELECTOR MODULE-DUAL CHANNEL
	2	OPTICOM CARD RACK
	2	EMERGENCY PREEMPTION CONFIRMATION BEACON (WHITE)

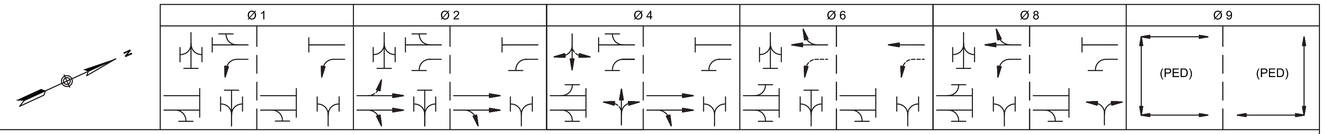
PLUS ALL NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION.

DRAFT 100% SUBMISSION

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
12	17

TRAFFIC SIGNAL PLAN
WASHINGTON ST/EXCHANGE ST
GREEN ST/CENTRAL ST
SHEET 2 OF 3



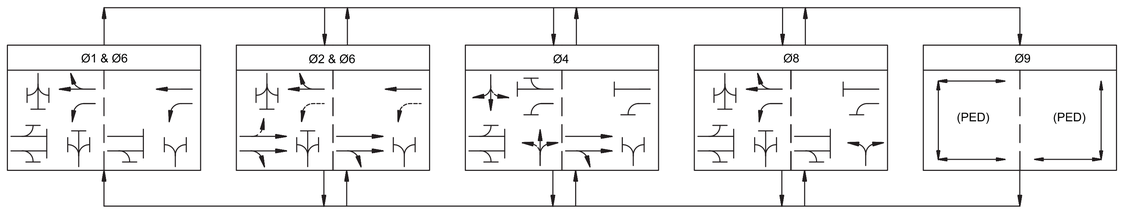
SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)

STREET	DIRECTION	HEAD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASH OP
WASHINGTON ST AT EXCHANGE ST	SB LEFT	A	◄ G—	◄SY—	◄ R —	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄FY—	◄SY—	◄ R—	◄ G—	◄SY—	◄ R—	◄ R—	◄ R—	◄ R—	◄FR—
WASHINGTON ST AT CENTRAL ST	SB LEFT	K	◄ G—	◄SY—	◄ R —	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄FY—	◄SY—	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄ R—	◄FR—
WASHINGTON ST AT EXCHANGE ST	SB	B,C	R	R	R	R	R	R	R	R	R	G	Y	R	G	Y	R	R	R	R	FY
WASHINGTON ST AT CENTRAL ST	SB	L,M	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
WASHINGTON ST AT EXCHANGE ST	NB	D,E	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
WASHINGTON ST AT CENTRAL ST	NB	N,O	R	R	R	G	Y	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
GREEN ST	EB	F,G	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
EXCHANGE ST	WB	H,J	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
CENTRAL ST	WB	P,Q	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
PEDESTRIAN	P1 - P10	ALL	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
TIMING IN SECONDS																					
MINIMUM GREEN (INITIAL)			7			10			7			10			7						EMERGENCY ONLY
PASSAGE TIME (VEHICLE)			2			4			4			4			4						
MAXIMUM 1			10			25			10			35			10						
MAXIMUM 2			9			36			10			47			12						
YELLOW CLEARANCE				3			3			3			3			3					
RED CLEARANCE					1			1			1			1			1				
WALK (W)																		7			
PEDESTRIAN CLEARANCE																			18	1	
RECALL			NONE			SOFT			NONE			SOFT			NONE			NONE			
MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			LOCK			

COORDINATION DATA			COORDINATION PHASE TIMING (SEC)					
TIMING PLAN	CYCLE LENGTH	REF/OFFSET	Ø 1	Ø 2	Ø 4	Ø 6	Ø 8	Ø 9
TP1 (M-F 6 AM - 9 AM)	100	0	11	40	11	51	12	26
TP2 (M-F 4 PM - 6 PM)	100	88	11	33	14	44	16	26
TP3 (ALL OTHER TIMES)	FREE	-						

COORDINATION NOTES:
1. OFFSET TO BEGINNING OF FIRST COORDINATED PHASE TO THE BEGINNING OF GREEN.
2. PHASE 2 TO BE COORDINATED PHASE.
3. ALL COORDINATION PHASE TIMES INCLUDE YELLOW AND RED CLEARANCE TIME.
4. COORDINATED PHASE DETECTORS SHALL BE DISABLED DURING COORDINATION.
5. COORDINATION MODE SHALL BE PERMISSIVE. FLOATING FORCE OFFS SHALL BE IN EFFECT DURING COORDINATION.
6. OFFSET SEEKING SHALL BE THE SHORTWAY METHOD.
7. MAXIMUM GREEN #1 FOR FREE OPERATION. MAXIMUM GREEN #2 IN EFFECT DURING COORDINATION.

PREFERENTIAL PHASING SEQUENCE



EMERGENCY PREEMPTION SCHEDULE

APPROACH	PREEMPTION PHASE	NEXT PHASE CALLED
NORTHBOUND	Ø 2	Ø 4
SOUTHBOUND	Ø 1 & Ø 6	Ø 2 & Ø 6
EASTBOUND	Ø 4	Ø 8
WESTBOUND	Ø 8	Ø 1 & Ø 6

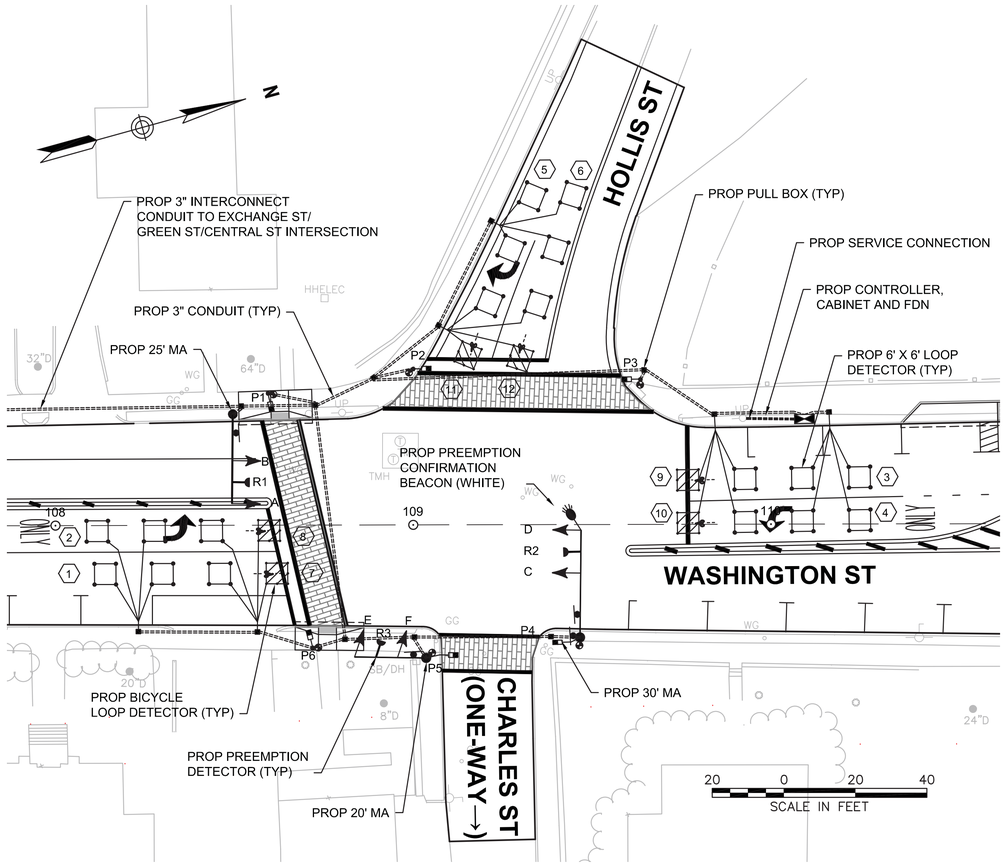
EMERGENCY PREEMPTION OPERATION:
1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
2. PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY AN OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED). OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
4. PREEMPTION MINIMUM GREENS SHALL BE 6 SECONDS.
5. NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
6. ACTUAL TIMING FOR PREEMPTION SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT.

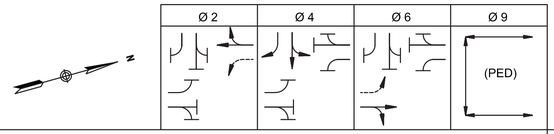
DRAFT 100% SUBMISSION

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
13	17

TRAFFIC SIGNAL PLAN
WASHINGTON ST/CHARLES ST/HOLLIS ST
SHEET 3 OF 3





SEQUENCE AND TIMING FOR FULL ACTUATED CONTROL (ISOLATED)

STREET	DIRECTION	HSGS	1	2	3	4	5	6	7	8	9	10	11	12	FLASH OP
WASHINGTON ST	SB	A,B	G	Y	R	R	R	R	R	R	R	R	R	R	FY
WASHINGTON ST	NB	C,D	R	R	R	R	R	R	G	Y	R	R	R	R	FY
HOLLIS ST	EB	E,F	R	R	R	G	Y	R	R	R	R	R	R	R	FR
PEDESTRIAN	P1 - P6	ALL	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
MINIMUM GREEN (INITIAL)			10			7			10						EMERGENCY ONLY
PASSAGE TIME (VEHICLE)			4			4			4						
MAXIMUM 1			25			10			25						
MAXIMUM 2			58			16			58						
YELLOW CLEARANCE				3			3			3					
RED CLEARANCE					1			1			1				
WALK (W)												7			
PEDESTRIAN CLEARANCE													16	1	
RECALL			SOFT			NONE			SOFT			NONE			
MEMORY			NON-LOCK			NON-LOCK			NON-LOCK			LOCK			

COORDINATION DATA			COORDINATION PHASE TIMING (SEC)			
TIMING PLAN	CYCLE LENGTH	REF/OFFSET	Ø 2	Ø 4	Ø 6	Ø 9
TP1 (M-F 6 AM - 9 AM)	100	0	56	20	56	24
TP2 (M-F 4 PM - 6 PM)	100	0	62	14	62	24
TP3 (ALL OTHER TIMES)	FREE	-				

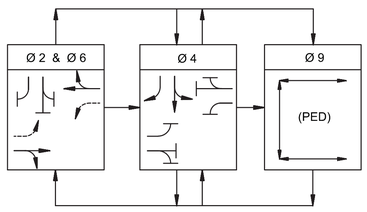
EMERGENCY PREEMPTION SCHEDULE

APPROACH	PREEMPTION PHASE	NEXT PHASE CALLED
NORTHBOUND	Ø 6	Ø 2 & Ø 6
SOUTHBOUND	Ø 2	Ø 2 & Ø 6
EASTBOUND	Ø 4	Ø 2 & Ø 6

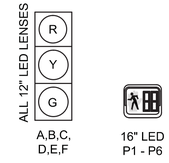
EMERGENCY PREEMPTION OPERATION:
1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT THE INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
2. PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY AN OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT FROM THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED). OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
4. PREEMPTION MINIMUM GREENS SHALL BE 6 SECONDS.
5. NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TERMINATED BY PREEMPTION DEMAND.
6. ACTUAL TIMING FOR PREEMPTION SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FIRE DEPARTMENT.

COORDINATION NOTES:
1. OFFSET TO BEGINNING OF FIRST COORDINATED PHASE TO THE BEGINNING OF GREEN.
2. PHASES 2 AND 6 TO BE COORDINATED PHASES.
3. ALL COORDINATION PHASE TIMES INCLUDE YELLOW AND RED CLEARANCE TIME.
4. COORDINATED PHASE DETECTORS SHALL BE DISABLED DURING COORDINATION.
5. COORDINATION MODE SHALL BE PERMISSIVE. FLOATING FORCE OFFS SHALL BE IN EFFECT DURING COORDINATION.
6. OFFSET SEEKING SHALL BE THE SHORTWAY METHOD.
7. MAXIMUM GREEN #1 FOR FREE OPERATION. MAXIMUM GREEN #2 IN EFFECT DURING COORDINATION.

PREFERENTIAL PHASING SEQUENCE



SIGNAL IDENTIFICATION



NOTES:
1. ALL SIGNALS SHALL HAVE CUT AWAY VISORS.
2. ALL SIGNALS SHALL HAVE 5" LOUVERED BACK PLATES WITH 3" RETROREFLECTIVE BORDERS.

LOOP DETECTOR DATA

DETECTOR NUMBER	AMPLIFIER NUMBER	CHANNEL NUMBER	LOOP SIZE	NUM OF TURNS	Ø CALLED	Ø EXT	MODE A=PULSE B=PRES	DELAY TIME	EXT TIME
1	1	1	3@6'X6"	3	6	6	B	0	0
2	1	2	3@6'X6"	3	6	6	B	0	0
3	2	1	3@6'X6"	3	2	2	B	0	0
4	2	2	3@6'X6"	3	2	2	B	0	0
5	3	1	3@6'X6"	3	4	4	B	0	5
6	3	2	3@6'X6"	3	4	4	B	0	0
7	4	1	1@6'X6"	D-2	6	6	BICYCLE	0	0
8	4	2	1@6'X6"	D-2	6	6	BICYCLE	0	0
9	5	1	1@6'X6"	D-2	2	2	BICYCLE	0	0
10	5	2	1@6'X6"	D-2	2	2	BICYCLE	0	0
11	6	1	1@6'X6"	D-2	4	4	BICYCLE	0	5
12	6	2	1@6'X6"	D-2	4	4	BICYCLE	0	0

	MAJOR ITEMS REQUIRED	
PAY ITEM	QUANTITY	ITEM
815.2	1	NEMA TS2 (TYPE 1) CONTROLLER, CABINET AND FDN
	1	SERVICE CONNECTION
	1	20 FT TYPE II, GALV STEEL MAST ARM ASSEMBLY, BASE AND FDN
	1	25 FT TYPE II, GALV STEEL MAST ARM ASSEMBLY, BASE AND FDN
	1	30 FT TYPE II, GALV STEEL MAST ARM ASSEMBLY, BASE AND FDN
	6	PEDESTRIAN SIGNAL HEAD, SINGLE SECTION W/ COUNTDOWN TIMER
	4	8' SIGNAL POLE, BASE AND FDN
	6	APS PUSH BUTTON ASSEMBLY
	6	1 WAY, 3 SECTION, SIGNAL HOUSING (12" LED)
	6	5" LOUVERED SIGNAL BACKPLATES W/ RETROREFLECTIVE BORDERS
	18	LOOP DETECTOR (6'X6')
	6	BICYCLE LOOP DETECTOR (6'X6')
	6	DUAL CHANNEL LOOP DETECTOR AMPLIFIER
	3	OPTICOM OPTICAL DETECTOR, UNIDIRECTIONAL, SINGLE CHANNEL
	2	OPTICOM PHASE SELECTOR MODULE-DUAL CHANNEL
	1	OPTICOM CARD RACK
	1	EMERGENCY PREEMPTION CONFIRMATION BEACON (WHITE)

PLUS ALL NECESSARY DUCT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION.

DRAFT 100% SUBMISSION

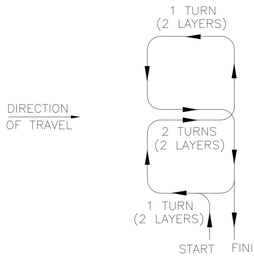
HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

SHEET NO.	TOTAL SHEETS
14	17

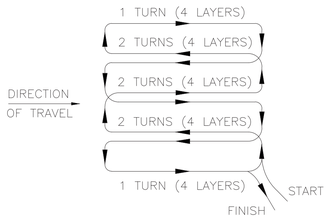
TRAFFIC SIGNAL DETAILS
BIKE LOOP DETECTOR

Y:\3449.21\50%\HD\SIGNAL\.DWG Plotted on 3-Feb-2017 3:11 PM

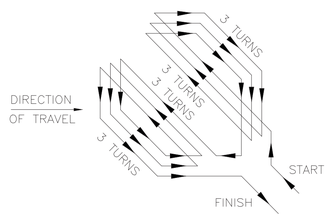
WINDING DETAILS



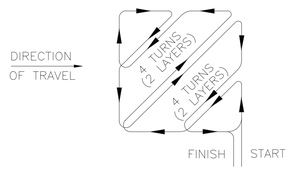
TYPE Q DETECTOR



TYPE D-Q DETECTOR

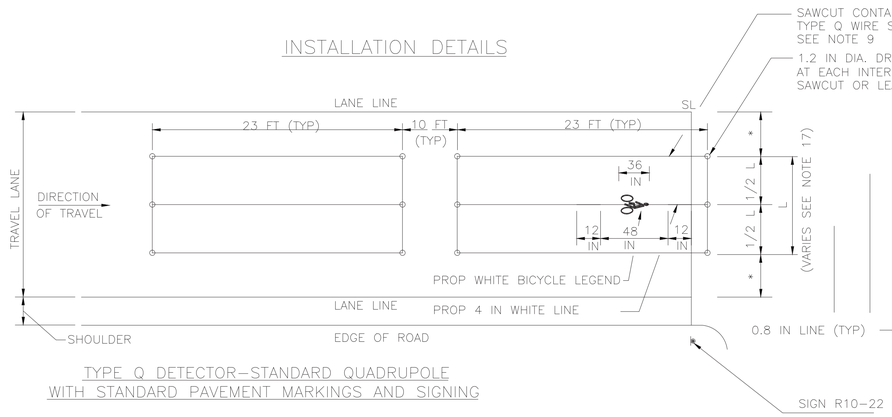


TYPE D-1 DETECTOR

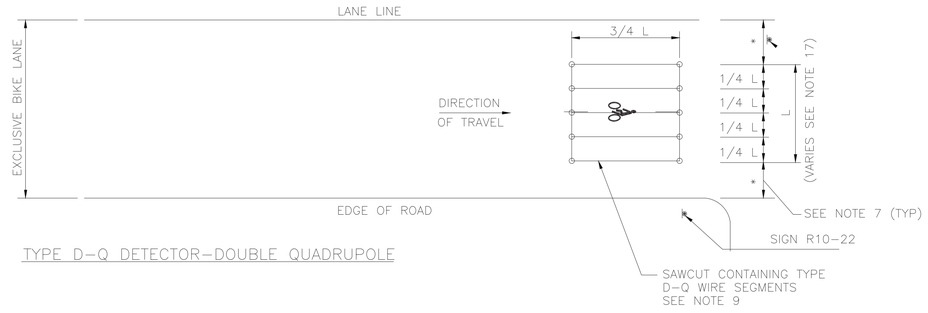


TYPE D-2 DETECTOR

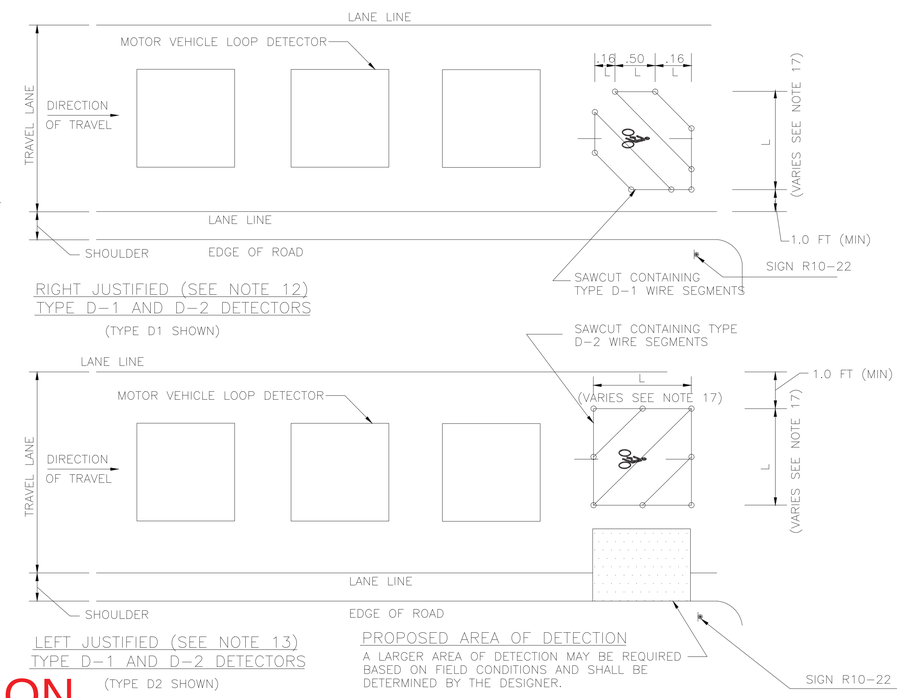
INSTALLATION DETAILS



TYPE Q DETECTOR-STANDARD QUADRUPOLE
WITH STANDARD PAVEMENT MARKINGS AND SIGNING



TYPE D-Q DETECTOR-DOUBLE QUADRUPOLE



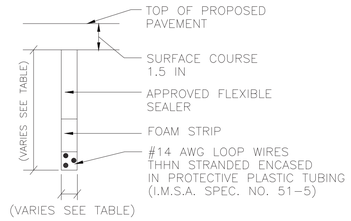
RIGHT JUSTIFIED (SEE NOTE 12)
TYPE D-1 AND D-2 DETECTORS
(TYPE D1 SHOWN)

LEFT JUSTIFIED (SEE NOTE 13)
TYPE D-1 AND D-2 DETECTORS
(TYPE D2 SHOWN)

PROPOSED AREA OF DETECTION
A LARGER AREA OF DETECTION MAY BE REQUIRED BASED ON FIELD CONDITIONS AND SHALL BE DETERMINED BY THE DESIGNER.

SIGN R10-22

NOTE: ALL SIGN DIMENSIONS IN INCHES
NOTE: SIGN PANEL NOT SHOWN TO SCALE

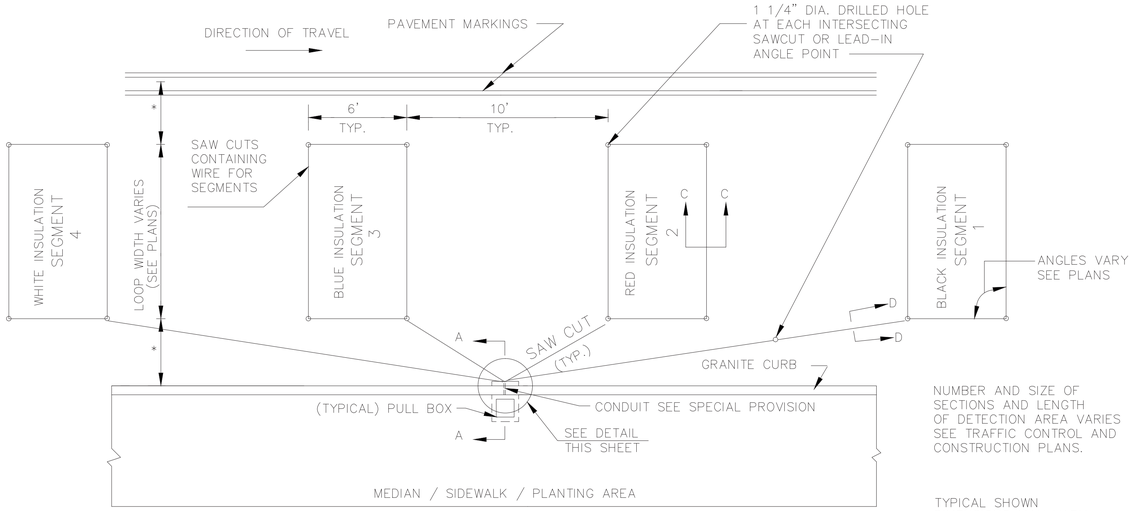


SECTION THRU LOOP DETECTOR

SAWCUT SLOT DEPTH GUIDE		
TURNS OF WIRE	SLOT SIZE	
	DEPTH (IN)	WIDTH (IN)
1	1.5	0.5
2	1.5	0.5
3	1.5	0.5
4	2.0	0.5
5	2.0	0.5
6	2.0	0.5
7	2.0	0.5
8	2.0	0.5

NOTES:

1. REFER TO VEHICLE LOOP DETECTOR DETAIL SHEET FOR ADDITIONAL NOTES AND CONSTRUCTION DETAILS.
2. ALL DETAILS ARE GRAPHICAL WITH NO SCALE.
3. THE NUMBER, SIZE, LOCATION AND LENGTH OF DETECTION AREA VARIES AND SHALL BE DETERMINED BY THE DESIGNER REFER TO TRAFFIC SIGNAL PLAN.
4. BICYCLE LOOPS SHALL BE CONNECTED TO SEPARATE LOOP DETECTOR AMPLIFIERS CAPABLE OF HIGHER LEVELS OF SENSITIVITY.
5. BICYCLE LOOPS SHALL BE INSTALLED IN THE BASE COURSE OF EXISTING PAVEMENT. THE EXISTING PAVEMENT SHALL BE COLD PLANED TO THE BASE COURSE AND SAWCUT FOR LOOP INSTALLATION.
6. SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED FOR ALL BICYCLE DETECTORS TO INFORM CYCLISTS OF THE DETECTION AREA.
7. * OFFSETS FROM LANE LINE EQUAL UNLESS OTHERWISE NOTED. SEE PLANS.
8. TYPE Q DETECTORS SHALL BE WIRED IN A FIGURE EIGHT PATTERN WITH A DOUBLE LAYER DESIGN ("2-4-2") WITH 2 TURNS IN THE PERIMETER SLOTS AND 4 TURNS IN THE CENTER SLOT AS SHOWN IN THE WINDING DETAIL.
9. BICYCLES WILL BE DETECTED WITHIN 4 IN. OF THE INTERIOR LONGITUDINAL LOOP WIRES FOR TYPE Q AND D-Q DETECTORS.
10. PROVIDE 3 TURNS FOR TYPE D-1 DETECTORS.
11. INSTALL 2 LAYERS OF WIRE WOUND IN THE SAME DIRECTION IN BOTH LAYERS FOR TYPE D-2 DETECTORS. THE RESULT IS 4 TURNS IN EACH DIAGONAL.
12. RIGHT JUSTIFIED LOOP DETECTORS SHALL BE CONSIDERED FOR THE FOLLOWING CONDITIONS:
    a) BICYCLE STOPPING ON THE RIGHT SIDE OF A THRU TRAVEL LANE.
    b) BICYCLE STOPPING ON THE RIGHT SIDE OF AN EXCLUSIVE LEFT TURN LANE.
13. LEFT JUSTIFIED LOOP DETECTORS SHALL BE CONSIDERED FOR THE FOLLOWING CONDITIONS:
    a) BICYCLE STOPPING ON THE LEFT SIDE OF A SHARED LEFT/THRU LANE.
    b) BICYCLE STOPPING JUST TO THE RIGHT OF THE CENTERLINE WHEN TURNING LEFT ON A TWO-LANE ROADWAY.
14. RECTANGULAR LOOP DETECTORS SHALL BE CONSIDERED FOR BICYCLES STOPPING ON EITHER THE LEFT OR RIGHT SIDE OF A TWO-LANE ROADWAY. THE MINIMUM OFFSET FROM LANE LINE OR CURB LINE SHALL BE 1.0 FT.
15. PAVEMENT CORES OR TEST PITS MAY BE REQUIRED TO DETERMINE THE DEPTH OF EXISTING PAVEMENT AND CONFIRM THAT THE DETECTION OPTION CHOSEN AND CORRESPONDING WINDING PATTERN CAN BE ACCOMMODATED.
16. THESE DETAILS APPLY TO BICYCLE LOOPS INSTALLED IN ROADWAYS. PUSH BUTTON ACTUATION SHALL BE CONSIDERED FOR RECREATIONAL BIKE PATHS.
17. THE MINIMUM DIMENSION FOR L SHALL BE 6 FT MIN. FOR DETECTORS TYPE D-Q, D-1 & D-2. FINAL DIMENSIONS SHALL BE DETERMINED BY THE DESIGN ENGINEER.

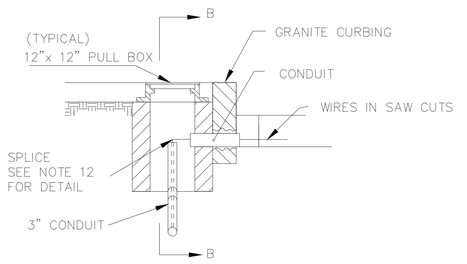


* OFFSETS FROM CURB TO LOOP AND EDGE OF LANE TO LOOP EQUAL IF NOT SHOWN.

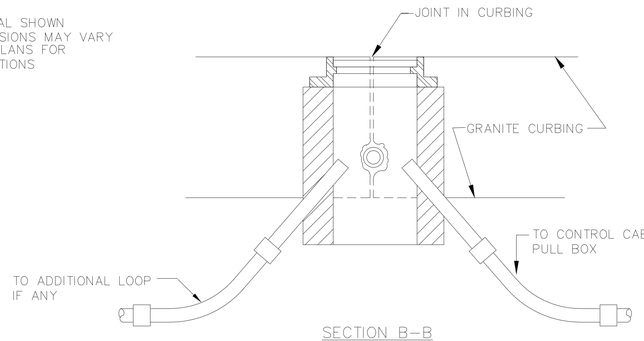
PLAN OF SEGMENTED DETECTOR DETAIL
NOT TO SCALE

NUMBER AND SIZE OF SECTIONS AND LENGTH OF DETECTION AREA VARIES SEE TRAFFIC CONTROL AND CONSTRUCTION PLANS.

TYPICAL SHOWN DIMENSIONS MAY VARY SEE PLANS FOR VARIATIONS



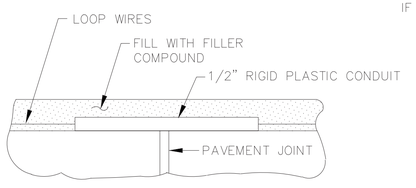
SECTION A–A
NOT TO SCALE



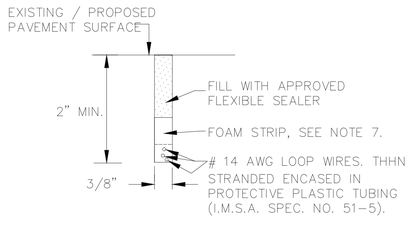
SECTION B–B
NOT TO SCALE

SECTION C–C & D–D

LOOPS IN BINDER COURSE OR EXISTING PAVEMENT TO BE RESURFACED
NOT TO SCALE

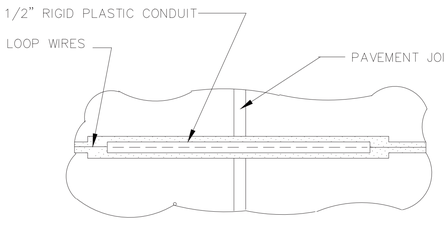


VERTICAL SECTION
TREATMENT AT PAVEMENT JOINTS
NOT TO SCALE

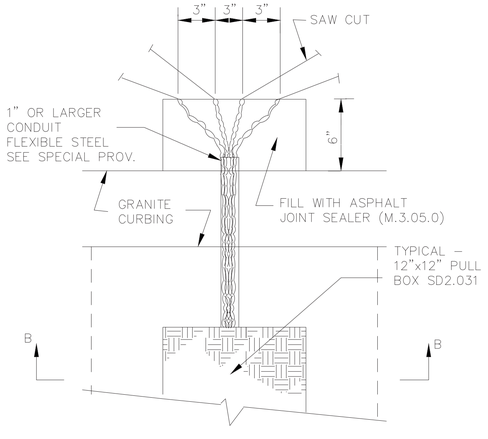


SECTION C–C & D–D

LOOPS IN SURFACE COURSE
NOT TO SCALE



PLAN
TREATMENT AT PAVEMENT JOINTS
NOT TO SCALE



DETAIL – PLAN VIEW
NOT TO SCALE

DETECTOR NOTES

1. IN HANDHOLE, SPLICE ALL SEGMENTS TO TYPE II–SHIELDED LOOP DETECTOR DETECTOR LEAD–IN CABLE. SEGMENTS SHALL BE SPLICED IN PARALLEL, IN SERIES, OR IN A COMBINATION OF PARALLEL & SERIES AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. NUMBER OF TURNS OF WIRE SHALL ALSO BE AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. SEE NOTE 12.
2. SEE SPECIAL PROVISIONS FOR REQUIREMENTS OF DETECTOR AMPLIFIER
3. LEAD IN WIRES SHALL BE TWISTED FROM SEGMENT TO SPLICE WITH SHIELDED CABLE FIVE TURNS PER FOOT. LEAD–IN SHALL BE TYPE II (M8. 16. II).
4. BEFORE STARTING ANY SPLICING, THE ELECTRICAL CONTRACTOR SHALL FURNISH DATA SHEETS ON THE MATERIALS AND/OR METHODS TO BE USED IN ACCORDANCE WITH THE DEPARTMENTS STANDARD OPERATING PROCEDURES FOR APPROVAL OF SHOP DRAWINGS SEE SECTION 815.64, ESPECIALLY PARAGRAPH 1.
5. THE METALLIC SHIELD WHICH SHALL ENCASE THE DETECTOR LEADS FROM A SPLICE (TYPICALLY LOCATED IN A PULL BOX NEAR THE ROADWAY COMPONENT OF THE DETECTOR) THE METALLIC SHIELD WHICH SHALL INCASE THE DETECTOR LEADS FROM A SPLICE (TYPICALLY LOCATED IN A PULL BOX NEAR THE ROADWAY COMPONENT OF THE DETECTOR) OT THE CONTROLLER, AND THE DRAIN WIRE UNDER THE METALLIC SHIELD, SHALL NOT BE GROUNDED TO THE EARTH GROUNDING BUSS IN THE CONTROLLER, AND THE SHIELD AND DRAIN WIRE SHALL BE CAREFULLY INSULATED FROM THE TRANSFORMER NEUTRAL OR FROM EARTH GROUND AT ALL POINTS ALONG IT'S LENGTH. SPECIFICALLY, THIS INCLUDES CAREFUL INSULATION OF THE EXPOSED PORTION OF THE SHIELD AND THE AND THE DRAIN WIRE AT THE END AWAY FROM THE CONTROLLER WHERE IT IS SPLICED TO WIRES LEADING TO THE ROADWAY COMPONENT OF THE DETECTOR. THIS IS IMPORTANT TO AVOID A GROUND RETURN LOOP.
6. FILL ALL CONDUIT OPENINGS WITH DUCT SEAL.
7. AFTER SAW CUTS ARE COMPLETE, BLOW OUT WATER WITH OIL – FREE COMPRESSED AIR UNTIL CUTS ARE CLEAN AND DRY. INSERT WIRE INTO CLEAN SLOT WITH A BLUNT, SMOOTH, ROUND EDGED TOOL OF WOOD OR PLASTIC SUCH AS A PAINT STIRRER. DO NOT USE A SCREWDRIVER, THEN INSERT FOAM PLASTIC HOLD DOWN STRIPS, SIMILAR TO ETHA FOAM SB. STRIPS SHALL BE ABOUT 2" LONG, PLACED IN THE SLOT ABOUT EVERY 2 FEET THEN POUR SEALER, TAKING CARE TO ELIMINATE BUBBLES.
8. THE COMBINED ROADWAY LOOP, TWISTED LEAD–IN WIRES, SPLICE AND SHIELDED LEAD–IN CABLE SHALL HAVE A RESISTANCE TO GROUND OF AT LEAST 100 MEGOHMS. SEE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
9. FOR INSTALLATION OF SINGLE (ONE SEGMENT) SMALL WIRE LOOP DETECTOR DETAIL IS THE SAME
10. CUT LOOPS IN BINDER AND FILL WITH APPROVED FLEXIBLE SEALER.
11. DETECTOR WIRE SHALL BE A DIFFERENT COLOR FOR EACH SEGMENT OF A DETECTOR GROUP. SEE DETAIL
12. SPLICING PATTERN P = SERIES/PARALLEL: SPLICE SEGMENTS 1 AND 3 OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE SEGMENTS 2 AND 4 IN SERIES. SPLICE THE RESULTANT TWO GROUPS IN PARALLEL. SPLICE THE RESULTANT COMBINATION TO ONE LEAD–IN CABLE. CONNECT THIS CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.

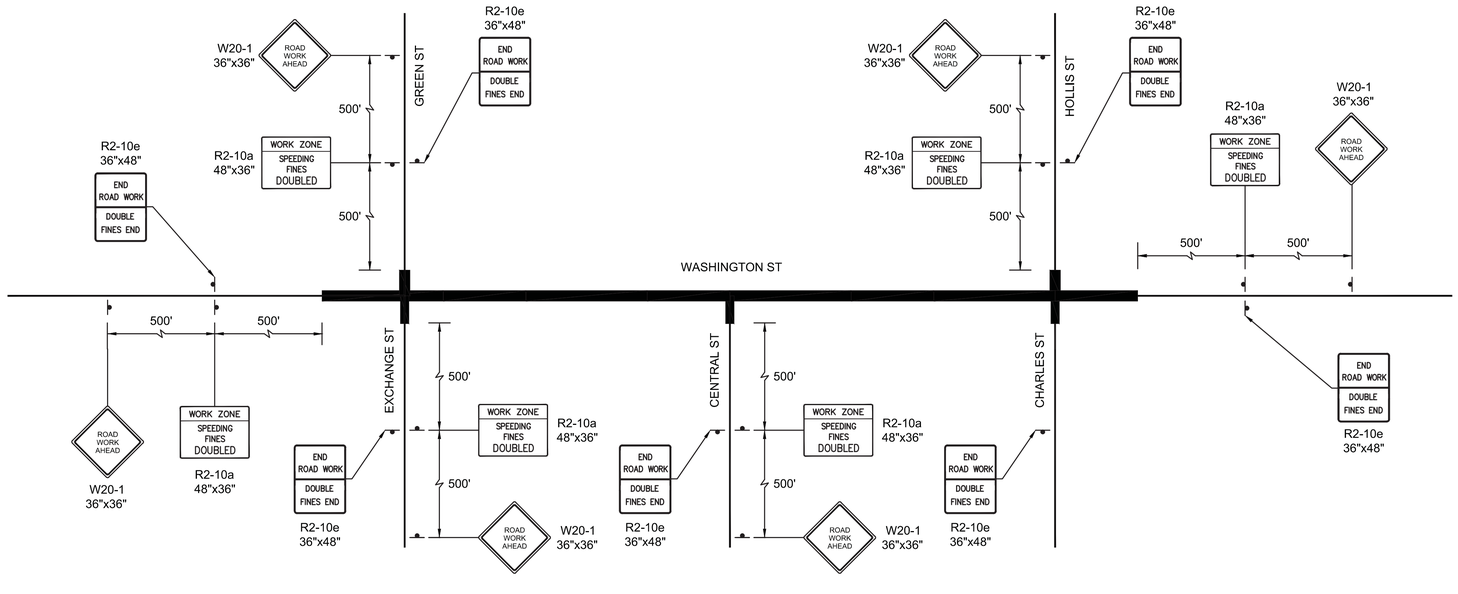
SPLICING PATTERN S = SERIES: SPLICE ALL SEGMENTS (TYPICALLY FOUR, BUT MAY BE LESS) OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE THE RESULTANT COMBINATION TO ONE LEAD–IN CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.

DRAFT 100% SUBMISSION

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

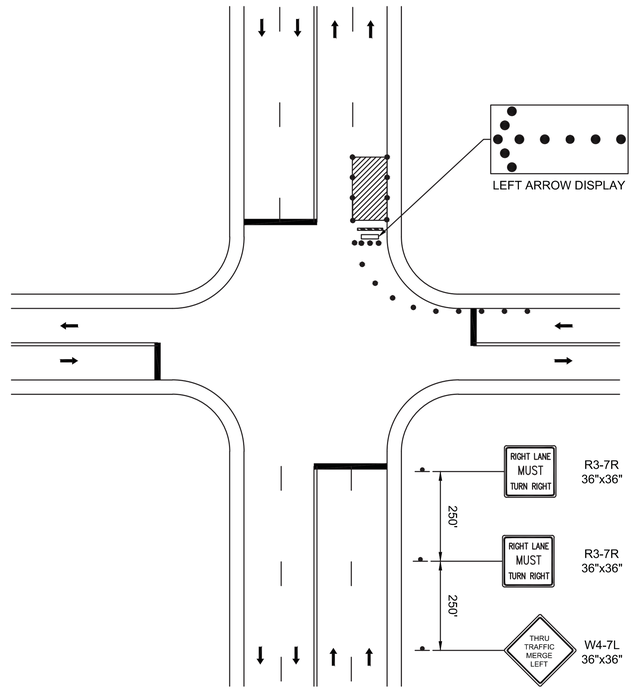
SHEET NO.	TOTAL SHEETS
16	17

TEMPORARY TRAFFIC CONTROL PLAN
SHEET 1 OF 2



PROJECT LIMIT SIGNING

NOT TO SCALE



DOUBLE LANE APPROACH FAR SIDE RIGHT LANE CLOSURE

NOT TO SCALE

LEGEND:

- WORK AREA
- SIGN
- CHANNELIZING DEVICE
- FLASHING ARROW BOARD
- TYPE III BARRICADE
- POLICE
- ARROW PANEL SUPPORT TRAILER
- FLOW DIRECTION

NOTES:

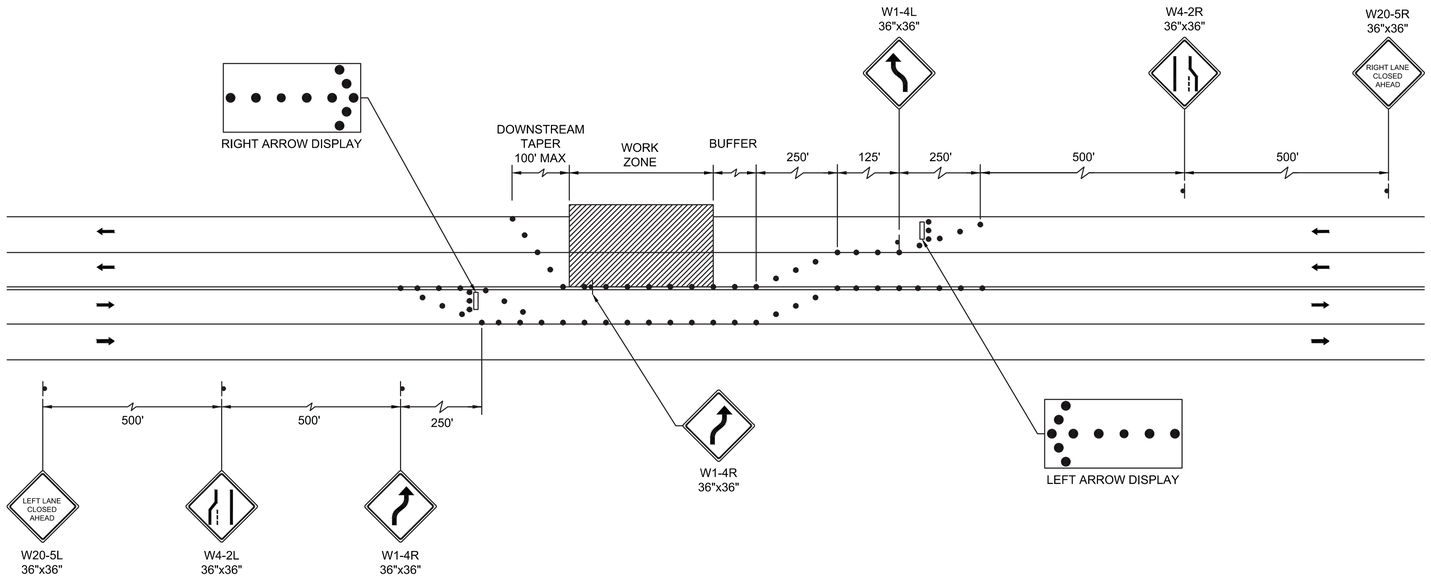
1. ALL TRAFFIC CONTROL DEVICES AND WORK ZONE SET-UPS ARE TO BE IN ACCORDANCE WITH MUTCD AND MASSDOT STANDARDS.
2. MAXIMUM SPACING OF TRAFFIC CONTROL DEVICES (DRUMS AND CONES) SHALL BE 35 FEET.
3. ALL SIGNS SHOWN SHALL BE MOUNTED ON SUITABLE TEMPORARY SUPPORTS SUCH THAT SIGNS ARE CLEARLY VISIBLE TO APPROACHING TRAFFIC.
4. MAINTAIN ACCESS TO ALL DRIVEWAYS AND PEDESTRIAN SIDEWALKS AT ALL TIMES, UNLESS OTHERWISE NOTED.
5. THE FIRST FIVE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
6. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
7. MINIMUM LANE WIDTH IS 10 FEET, MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
8. TEMPORARY PEDESTRIAN ACCESS ROUTE SHALL BE PROVIDED IN ACCORDANCE WITH MUTCD AND MASSDOT STANDARDS WHERE WORK IMPACTS THE EXISTING PEDESTRIAN ACCESS ROUTE.

DRAFT 100% SUBMISSION

HOLLISTON
WASHINGTON ST CORRIDOR IMPROVEMENTS

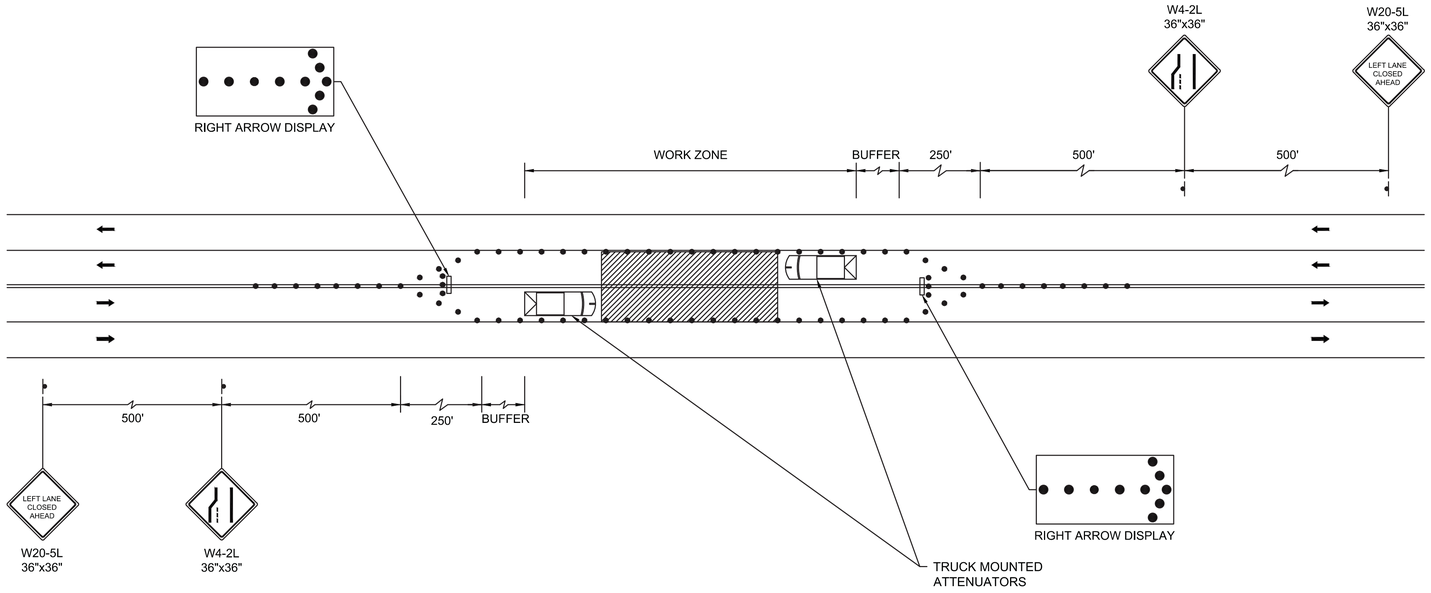
SHEET NO.	TOTAL SHEETS
17	17

TEMPORARY TRAFFIC CONTROL PLAN
SHEET 2 OF 2



MULTIPLE LANE ROAD - 1/2 ROAD CLOSURE

NOT TO SCALE



MULTIPLE LANE ROAD - INTERIOR LANE CLOSURE

NOT TO SCALE

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