

TRANSPORTATION IMPROVEMENT PROJECT

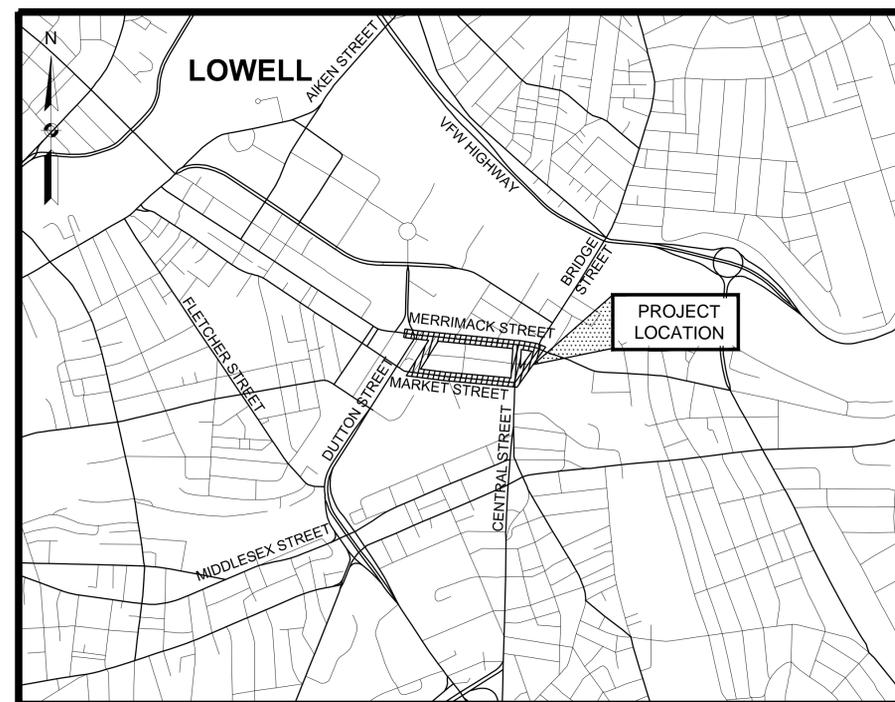
LOWELL
TWO-WAY CONVERSION
TITLE SHEET & INDEX
SHEET 1 OF 18

PLAN OF
DOWNTOWN TWO-WAY CONVERSION
IN THE CITY OF
LOWELL
MIDDLESEX COUNTY

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JUNE 15, 2012, THE 2012 CONSTRUCTION STANDARD DETAILS, THE 1996 CONSTRUCTION AND TRAFFIC STANDARD DETAILS (AS RELATES TO TRAFFIC STANDARD DETAILS ONLY), THE 2009 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.

25% PROGRESS SET

SHEET NO.	INDEX	DESCRIPTION
1	TITLE SHEET & INDEX	
2	KEY PLAN	
3-6	SIGNING & PAVEMENT MARKINGS PLANS	
7	SIGN SUMMARY SHEET	
8-18	TRAFFIC SIGNAL PLANS	



DESIGN DESIGNATION	MERRIMACK STREET	PRESCOTT STREET	CENTRAL STREET	MARKET STREET
DESIGN SPEED	30 MPH	30 MPH	30 MPH	30 MPH
ADT (2012)	13,375 VPD	9,023 VPD	13,055 VPD	10,202 VPD
ADT (2022)	14,774 VPD	9,967 VPD	14,421 VPD	11,269 VPD
K	7%	7%	9%	8%
D	100%	100%	55%	100%
DHV	1049 VPH	748 VPH	1298 VPH	902 VPH
DDHV	1049 VPH	748 VPH	714 VPH	902 VPH



SCALE 1" = 1000'

LENGTH OF PROJECT = 4,300.00 FEET = 0.814 MILES

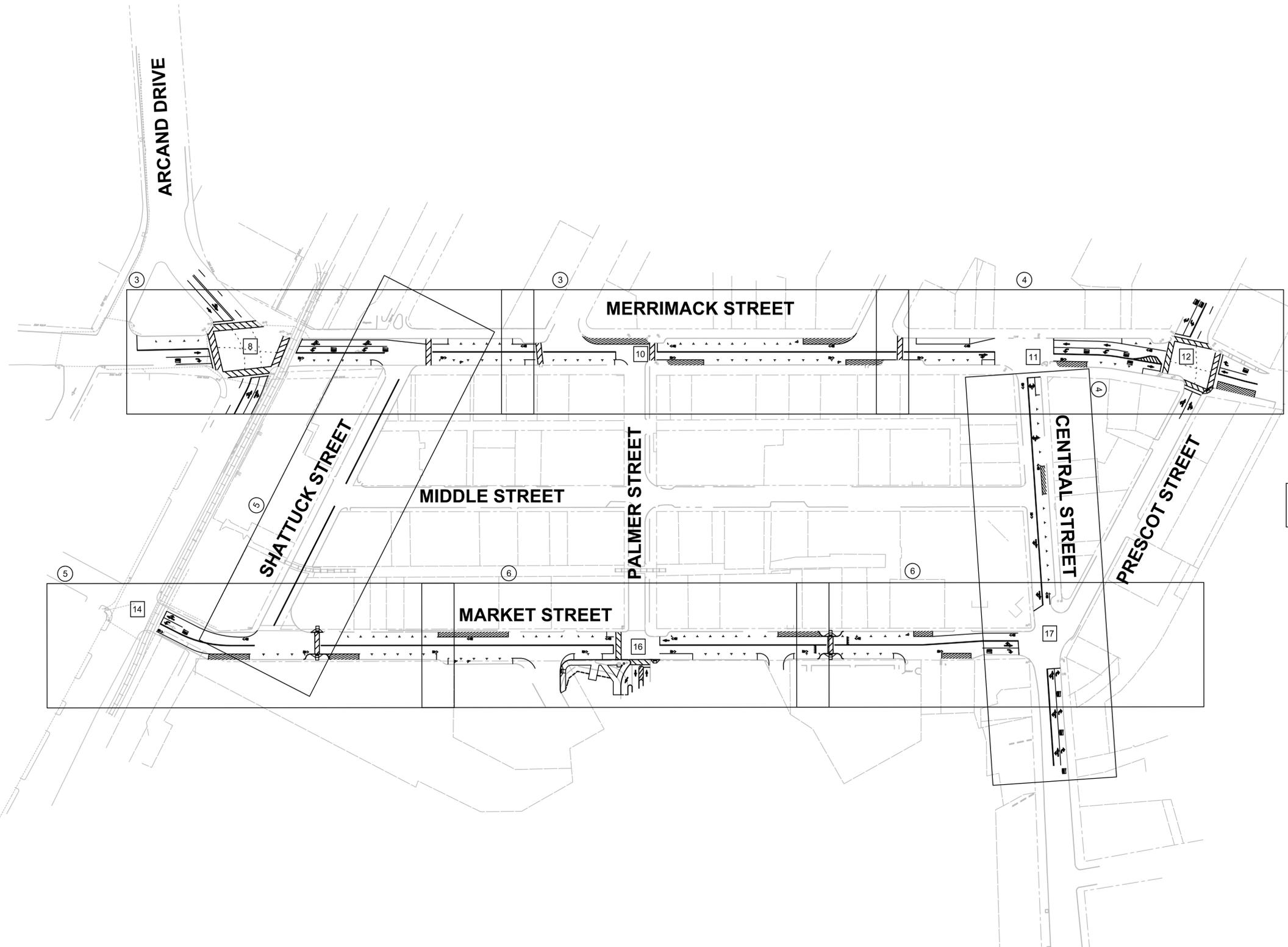
NO.	DESCRIPTION	DATE

ENGINEER DATE

TEC

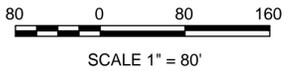
TEC, INC.
65 GLENN STREET
LAWRENCE, MA 01843

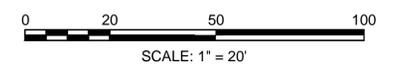
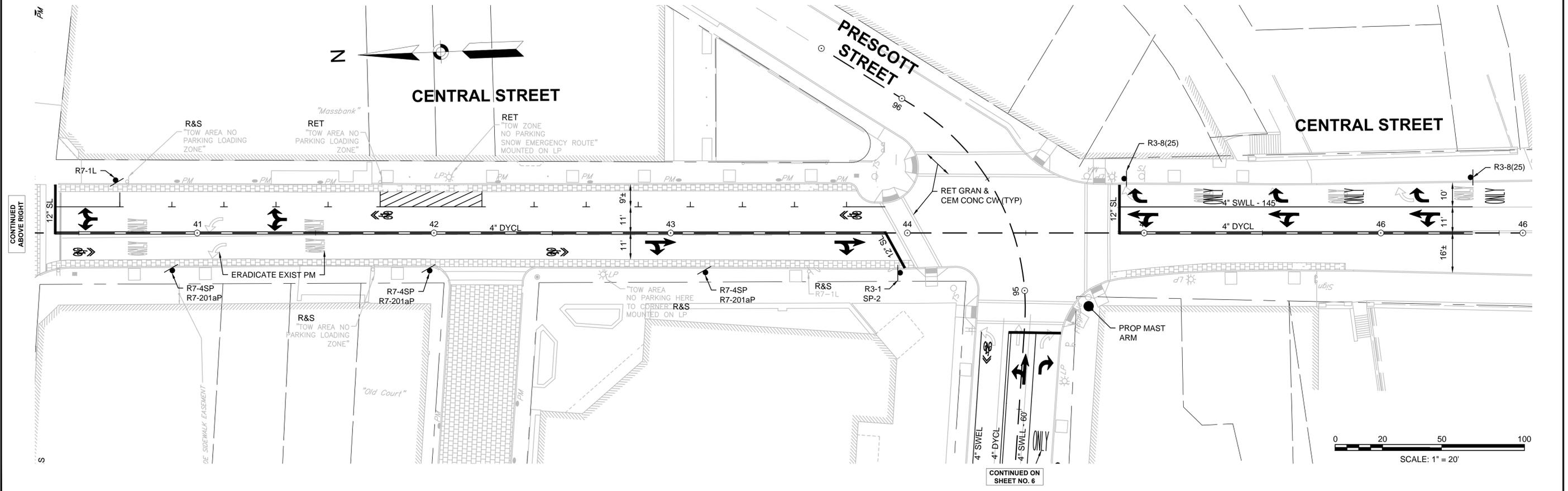
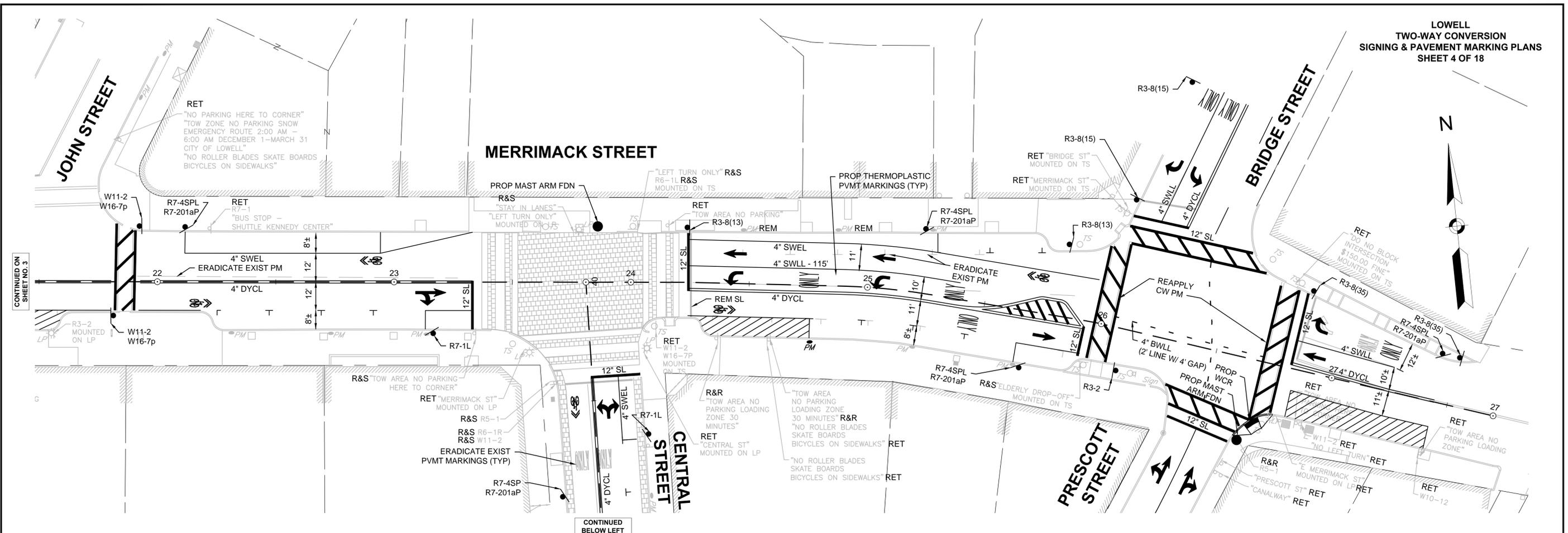
DESIGNED BY KKR/SWG	CHECKED BY MCM	DATE JULY 18, 2013
DRAWN BY KKR/SWG	APPROVED BY KRD	PROJECT NO. T0462



LEGEND

(X)	SIGNING & PAVEMENT MARKING PLANS
(X)	TRAFFIC SIGNAL PLANS



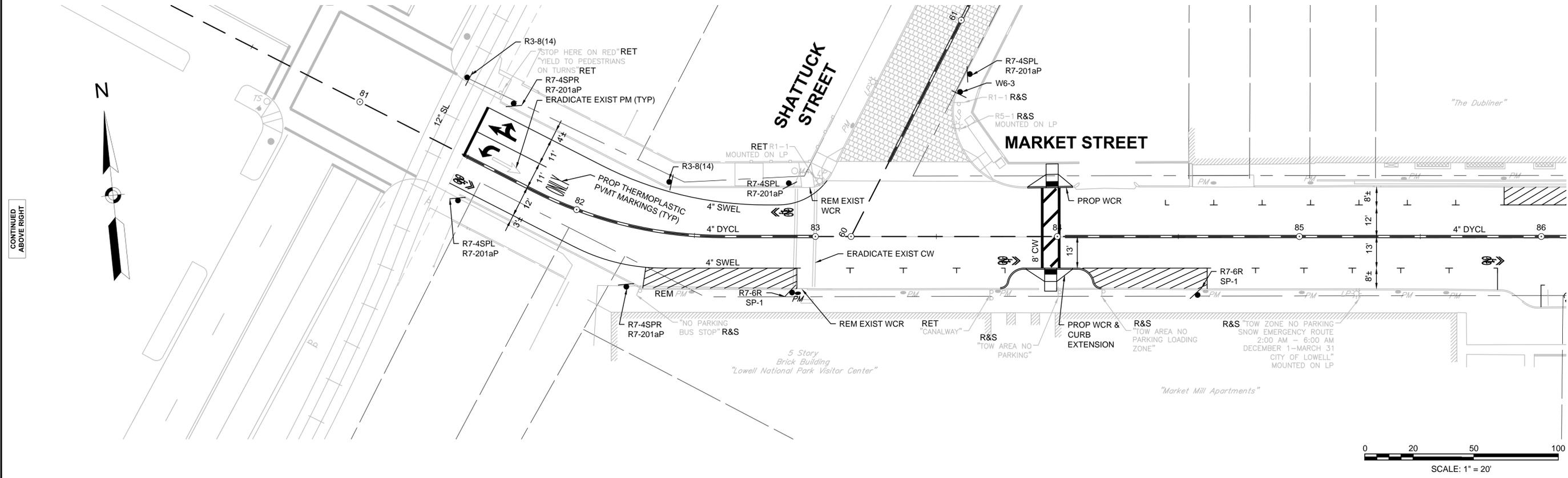
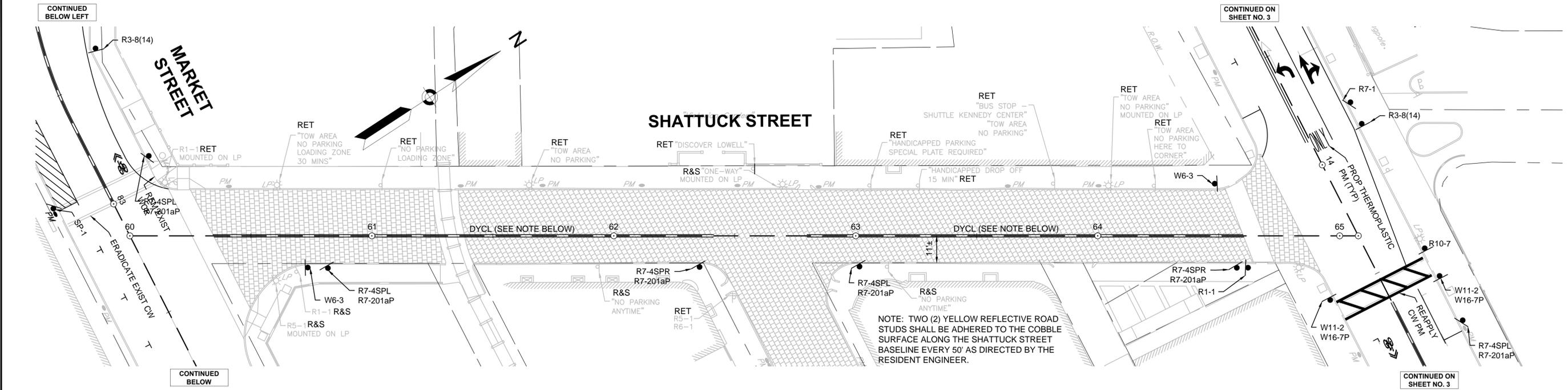


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SHEET NO. 3

CONTINUED
BELOW LEFT

CONTINUED
ABOVE RIGHT

CONTINUED ON
SHEET NO. 6



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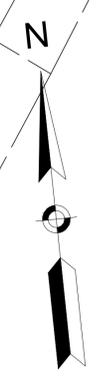
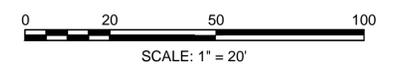
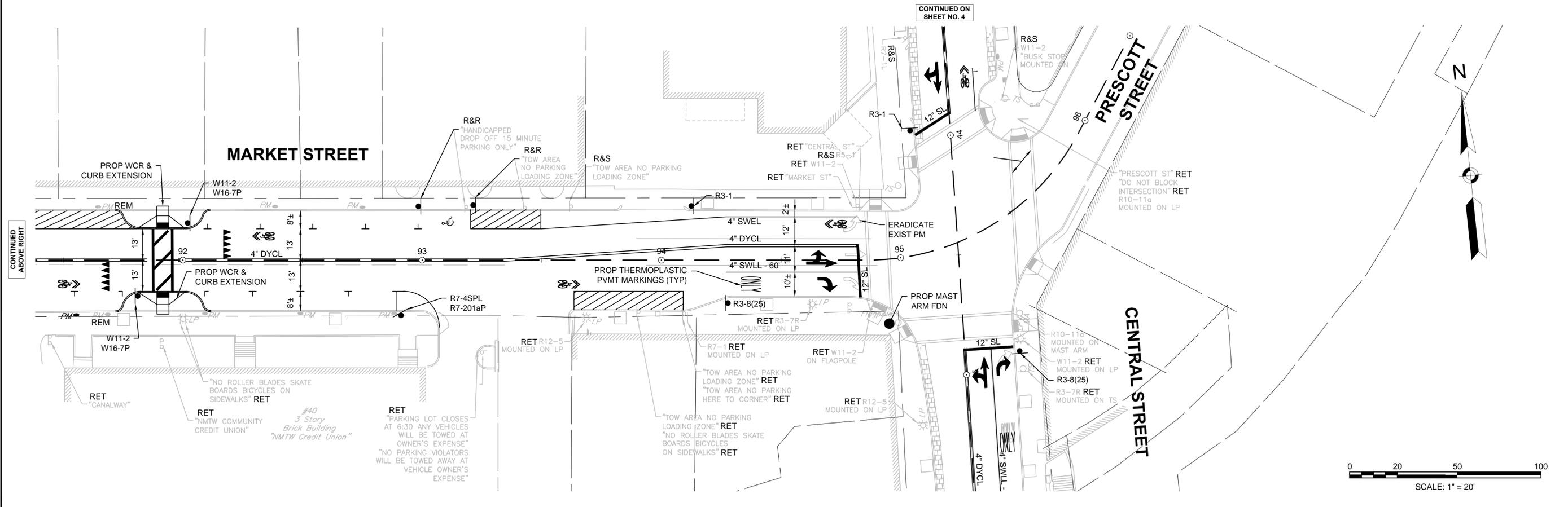
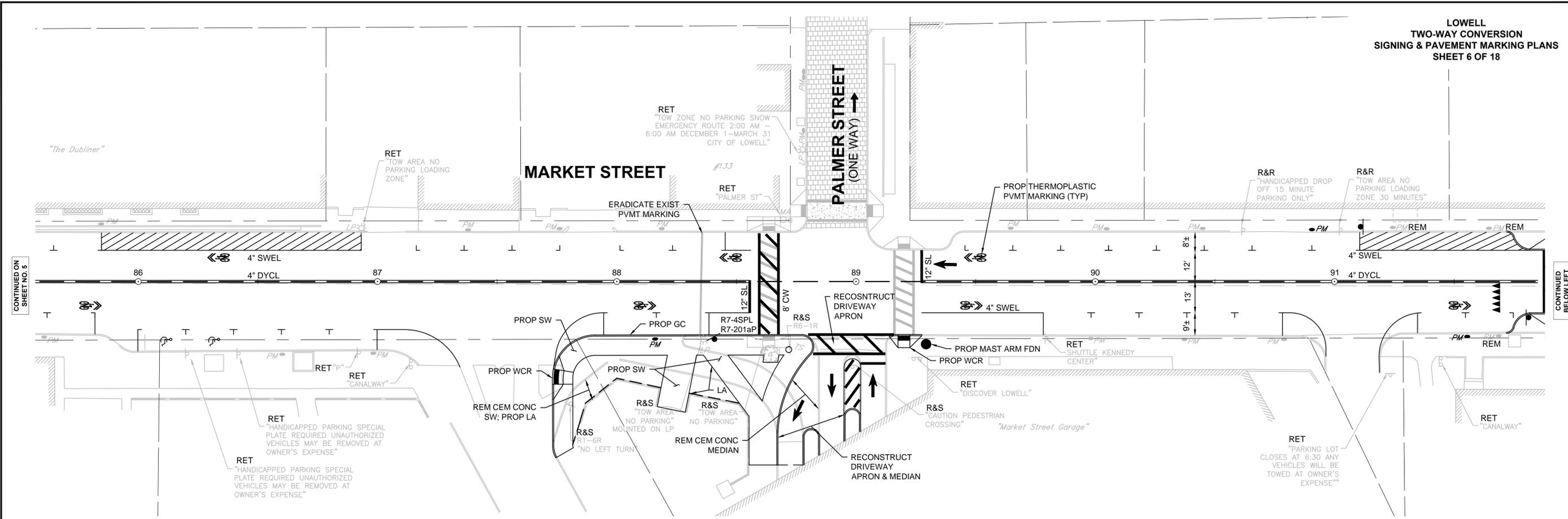
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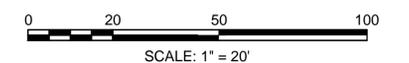
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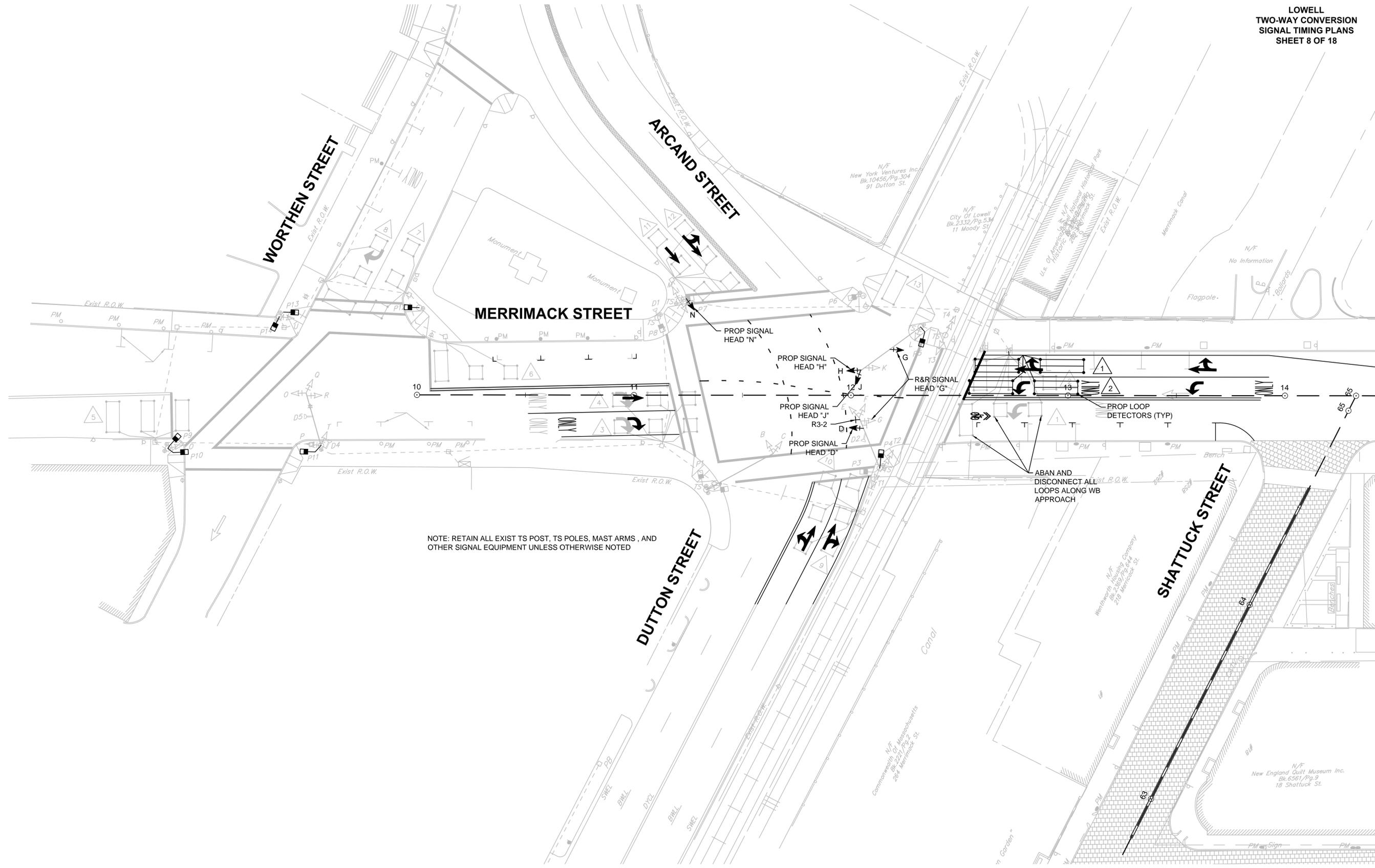
TRAFFIC SIGN SUMMARY													
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACKGROUN D	LEGEND	BORDER			
R1-1	30	30			①				①			6.2500	#####
R3-1	24	24										4.0000	
R3-2	24	24										4.0000	
R3-8(13)	30	30										6.2500	
R3-8(14)	30	30										6.2500	
R3-8(23)	30	30										6.2500	
R3-8(25)	30	30										6.2500	
R3-8(35)	30	30										6.2500	
R3-8(45)	30	30										6.2500	
R6-1 (PBS)	36	12										3.0000	
R7-6R	12	18											
R10-7	15	21										2.1875	
W6-3	30	30										6.2500	
W11-2	30	30										6.2500	
W16-7P	24	12										2.0000	

TRAFFIC SIGN SUMMARY													
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACKGROUN D	LEGEND	BORDER			
R7-4SP	12	18										1.5000	
R7-4SPL	12	18										1.5000	
R7-4SPR	12	18										1.5000	
R7-201aP	6	12										0.5000	
SP-1	12	18										1.5000	
SP-2	6	12										0.5000	

NOTES:

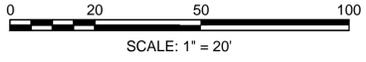
- SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS FOR TEXT AND LEGEND DIMENSIONS.
- MASSDOT STANDARD SIGN
- THE MINIMUM MOUNTING HEIGHT OF POST-MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE TOP OF CURB OR SIDEWALK, OR THE ELEVATION OF THE NEAR EDGE OF TRAVEL WAY, SHALL BE 7 FEET UNLESS OTHERWISE SPECIFIED.
- ALL SIGN ASSEMBLY POSTS SHALL BE P-5 POSTS AND SHALL BE INSTALLED IN ACCORDANCE WITH SUBSECTION 840.60 OF THE MASSDOT SUPPLEMENTAL SPECIFICATIONS, DATED JUNE 15, 2012.





NOTE: RETAIN ALL EXIST TS POST, TS POLES, MAST ARMS, AND OTHER SIGNAL EQUIPMENT UNLESS OTHERWISE NOTED

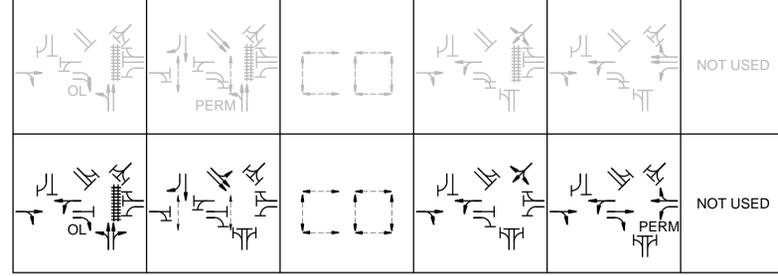
ABANDON AND DISCONNECT ALL LOOPS ALONG WB APPROACH



EXISTING / PROPOSED SEQUENCE AND TIMING																		
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	FLASHING OPERATION
MINIMUM INTERVAL			10			10						4			10			
VEHICLE EXTENSION			3			3						2			3			
MAXIMUM 1			30			30						8			30			
MAXIMUM 2			30			30						8			30			
YELLOW CLEARANCE				3.0			3.0						3.0			3.0		
RED CLEARANCE					1.5			1.5						1.0			2.0	
WALK						7			7									
PEDESTRIAN CLEARANCE							24	1		21	1							
MERRIMACK STREET WEST	EB	P,R	G	Y	R	G	Y	R	R	R	R	G	Y	R	G	Y	R	FY
MERRIMACK STREET WEST	WB	O,T,U	G	Y	R	R	R	R	R	R	R	G	Y	R	G	Y	R	FY
MERRIMACK STREET EAST	EB-T	H	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
MERRIMACK STREET EAST	EB-R	D	$\overset{R}{\leftarrow}$	$\overset{R}{\rightarrow}$	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
MERRIMACK STREET EAST	WB	A,G,K	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
DUTTON STREET	NB	J,N,L	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
ARCAND DRIVE	SB	B,E,M	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
WORTHEN STREET	SB	Q,S	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
COBBLESTONES	SWB	C,F	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	FR
TROLLEY	ALL	T1-T4	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	OUT
CONCURRENT PEDESTRIAN	Ø2 PED	P1,P8,P9,P14	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN	ALL	P1-P14	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	OUT

DETECTOR	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK
RECALL	OFF	SOFT	OFF	OFF	SOFT
	Ø1	Ø2	Ø3	Ø4	Ø5

- NOTES:
- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
 - PEDESTRIAN PHASE UPON PUSH BUTTON ACTIVATION ONLY
 - MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = DURING COORDINATION
 - PERM = PERMISSIVE LEFT-TURN
 - OL = OVERLAP
 - T = TROLLEY



MERRIMACK STREET AT ARCAND STREET DUTTON STREET
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
3	SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES, BACK PLATES
1	SIGNAL HEAD, 4-SECTION, 12" L.E.D. MODULES, BACK PLATES
2	R&S SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES
2	R&S SIGNAL HEAD, 5-SECTION, 12" L.E.D. MODULES
8	16" L.E.D. PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
13	PEDESTRIAN PUSH BUTTON (VIBRATORY) W/ R10-3e AND SIGN SADDLE
4	WIRE LOOP DETECTOR (6' X 20')
X	12" x 12" PULLBOX
XXX FT	3" SCH. 80 PVC CONDUIT
1	CONTROLLER/COORDINATION PROGRAMMING & FINE TUNING
1	INTERSECTION CABLING FOR NEW SIGNAL HEADS/LOOPS / PRE-EMPTION

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

SEQUENCE & TIMING NOTES:

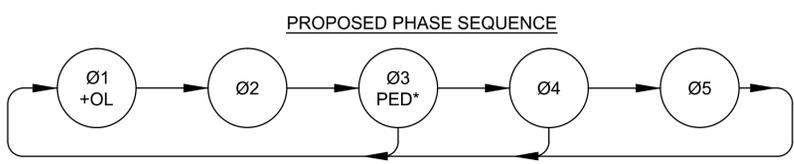
- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- PEDESTRIAN PHASE WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION. UPON PUSH BUTTON ACTIVATION.

CONSTRUCTION NOTES:

- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
- ALL SIGNAL HEADS AND SIGNS SHALL BE RIGIDLY MOUNTED.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND CITY OF LOWELL REPRESENTATIVES FOLLOWING INSTALLATION.

EXISTING / PROPOSED DETECTOR DATA						
DETECTOR NO.	NO. SECTION/ SIZE	NO. OF TURNS	OPERATIONS	DELAY/ EXT.	PHASE CALLED	LOOP CONNECTION
1	2-6'X20'	2-4-2	PRESENCE	0	Ø5	SERIES
2	2-6'X20'	2-4-2	PRESENCE	0	Ø5	SERIES
3	3-6'X6'	UNKNOWN	PRESENCE	0	Ø1&Ø5	SERIES
4	3-6'X6'	UNKNOWN	PRESENCE	0	Ø5	SERIES
5	3-14'X6'	UNKNOWN	PRESENCE	0	Ø1,Ø4&Ø5	SERIES
6	2-6'X6' 1-6'X14'	UNKNOWN	PRESENCE	0	Ø1,Ø4&Ø5	SERIES
7	3-6'X6'	UNKNOWN	PRESENCE	0	Ø2	SERIES
8	2-6'X6' 1-6'X14'	UNKNOWN	PRESENCE	0	Ø2	SERIES
9	3-6'X6'	UNKNOWN	PRESENCE	0	Ø1	SERIES
10	3-6'X6'	UNKNOWN	PRESENCE	0	Ø1	SERIES
11	4-6'X6'	UNKNOWN	PRESENCE	0	Ø2	SERIES
12	3-6'X6'	UNKNOWN	PRESENCE	0	Ø2	SERIES
13	6'X14'	UNKNOWN	PRESENCE	0	Ø4	SERIES

NOTE: EXISTING LOOP DETECTORS SHOULD BE VERIFIED IN THE FIELD.



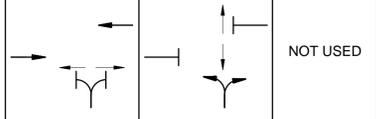
PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		Ø2
D2	2		Ø1
D3	3		Ø5
D4	4		Ø2
D5	5		Ø5

- EMERGENCY VEHICLE PRE-EMPTION NOTES:
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
 - EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVE BASIS.
 - IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4, D5) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4, #5) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 2 SECONDS: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
 - NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
 - CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

EXISTING / PROPOSED SIGNAL HEAD DATA										
T1-T4	U	A-C,E,G,K-M,O-T	D,H	J,N	D	H,J,N	P1-P3,P6,P8	P4-P5, P9-P14	P7	P4-P5,P9-P14
ALL 12" LENSES		ALL 12" LENSES W/ 5" LOUVERED BACKPLATES	REMOVED & STACK	REMOVED & STACK	BI-MODEL			REMOVED & STACK		
					ALL 12" LENSES W/ 5" LOUVERED BACKPLATES (FREE-SWINGING ON MAST ARM)				16" L.E.D. W/ COUNTDOWN INDICATORS	ALL 16" L.E.D. W/ COUNTDOWN INDICATORS

PROPOSED SEQUENCE AND TIMING									
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	FLASHING OPERATION
MINIMUM INTERVAL			10			6			
VEHICLE EXTENSION			2			2			
MAXIMUM 1			50			20			
MAXIMUM 2			-			-			
YELLOW CLEARANCE				3.0			3.0		
RED CLEARANCE					1.0			1.0	
WALK			7			7			
PEDESTRIAN CLEARANCE				8	1		8	1	
MERRIMACK STREET	EB	F,G	G	Y	R	R	R	R	FY
MERRIMACK STREET	WB	B,C,E	G	Y	R	R	R	R	FY
PALMER STREET	NB	A,D	R	R	R	G	Y	R	FR
CONCURRENT PEDESTRIAN	Ø2&Ø6 PED	P3-P4	W	FDW	DW	DW	DW	DW	OUT
CONCURRENT PEDESTRIAN	Ø4 PED	P1-P2	DW	DW	DW	W	FDW	DW	OUT
DETECTOR			NON-LOCK			NON-LOCK			
RECALL			SOFT			OFF			
			Ø1			Ø2			Ø3,Ø4,Ø5, Ø6,Ø7,Ø8

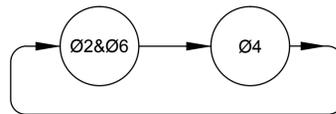
- NOTES:
- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
 - PEDESTRIAN CALL UPON PUSH BUTTON ACTIVATION ONLY
 - MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = NOT USED
 - Ø2&Ø6 OPERATE IN DUAL ENTRY MODE



QUANTITY	DESCRIPTION
1	8' TS POLE, PAINTED BLACK, INCL. FOUNDATION
1	10' TS POLE, PAINTED BLACK, INCL. FOUNDATION
2	SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES, LOUVERED BACK PLATES
2	R&R SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES
2	16" L.E.D. PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
2	R&R PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
4	PEDESTRIAN PUSH BUTTON (VIBRATORY) W/ R10-3e AND SIGN SADDLE
3	VIDEO DETECTION CAMERA W/ EXTENSION ARM
1	VIDEO DETECTION CHASSIS AND CABLING
1	VIDEO DETECTION PROCESSOR MODULE
3	EMERGENCY PRE-EMPTION DETECTORS AND DETECTOR CABLES
2	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTORS
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
X	12" x 12" PULLBOX
XXX FT	3" SCH. 80 PVC CONDUIT
1	CONTROLLER PROGRAMMING & FINE TUNING
1	INTERSECTION CABLING FOR ALL SIGNAL HEADS / CAMERAS / PRE-EMPTION

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

PROPOSED PHASE SEQUENCE



- 25% DESIGN NOTES:
- PULL BOX AND CONDUIT NETWORKS WILL BE SHOWN AT THE 90% DESIGN LEVEL UPON ACCEPTANCE OF TRAFFIC SIGNAL LOCATIONS.

VIDEO DETECTOR DATA						
DETECTOR NO.	CAMERA NO.	APPROX. SIZE	Ø CALLED	Ø EXTENDED	OPERATIONS	DELAY/ EXT.
1	C1	±6'X50'	Ø1	Ø1	PRESENCE	0
2	C3	±10'X50'	Ø2	Ø2	PRESENCE	0
3	C2	±6'X50'	Ø1	Ø1	PRESENCE	0

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.

CONSTRUCTION NOTES:

- PULL BOXES SHALL NOT BE LOCATED WITHIN WHEELCHAIR RAMPS.
- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- ALL MAST ARM FOUNDATIONS SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION "MAST ARM & FOUNDATION DETAILS STANDARD DRAWINGS", DATED FEBRUARY 24, 2011
- EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
- ALL SIGNAL HEADS AND SIGNS SHALL BE RIGIDLY MOUNTED.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND MASSDOT REPRESENTATIVES FOLLOWING INSTALLATION.

SEQUENCE & TIMING NOTES:

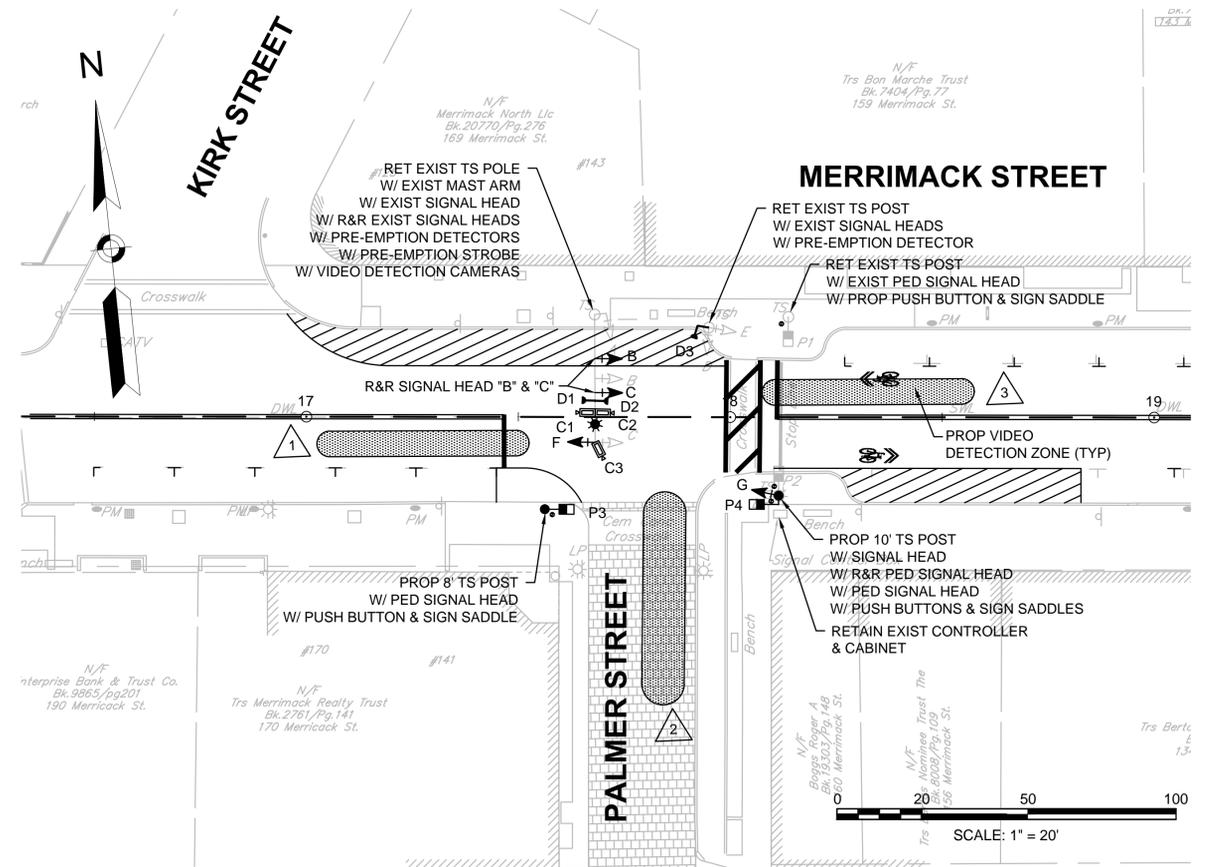
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- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- CONCURRENT PEDESTRIAN PHASE WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION. UPON PUSH BUTTON ACTIVATION.

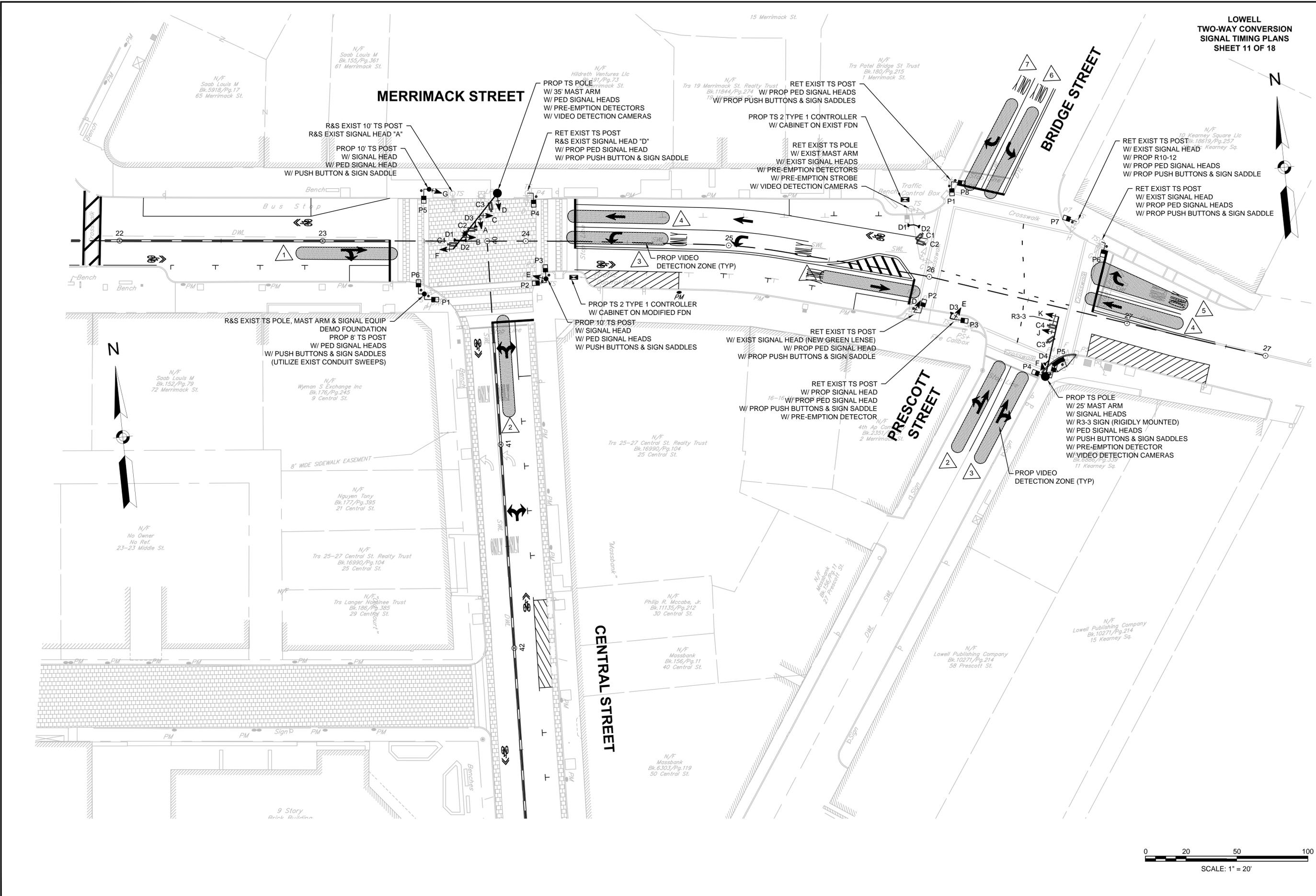
EXISTING / PROPOSED SIGNAL HEAD DATA				
A,D,E	B,C	F,G	P1-P2	P3-P4
	REMOVED & RESET 	 HOUSING "F" SHALL BE FREE SWINGING		
		ALL 12" LENSES W/ 5" LOUVERED BACKPLATES		ALL 16" L.E.D. W/ COUNTDOWN INDICATORS

PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1	→	Ø2
D2	2	←	Ø6
D3	3	Y	Ø4

EMERGENCY VEHICLE PRE-EMPTION NOTES:

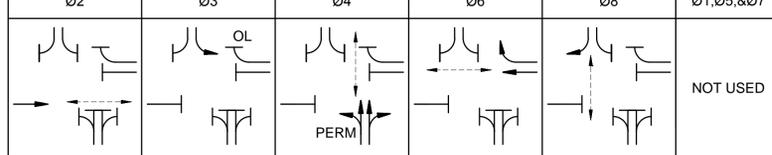
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 1 SECOND: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.





PROPOSED SEQUENCE AND TIMING																FLASHING OPERATION		
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13		14	15
MINIMUM INTERVAL			10			6			10			10			10			
VEHICLE EXTENSION			2			2			2			2			2			
MAXIMUM 1			40			25			40			40			40			
MAXIMUM 2			40			25			40			40			40			
YELLOW CLEARANCE				3.0			3.0			3.0			3.0			3.0		
RED CLEARANCE					1.0			1.5			1.0			1.0			1.0	
WALK			7						7			7			7			
PEDESTRIAN CLEARANCE				9	1					15	1		16	1		15	1	
MERRIMACK STREET	EB	J,K	↑	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
MERRIMACK STREET	WB	A,C	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FY
PRESCOTT STREET	NB	G,H	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
BRIDGE STREET	SB-L	E,F	R	R	R	←G-	←Y-	←R-	R	R	R	R	R	R	R	R	R	FR
BRIDGE STREET	SB-R	B,D	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
CONCURRENT PEDESTRIAN	Ø2 PED	P3-P4	W	FDW	DW	DW	OUT											
CONCURRENT PEDESTRIAN	Ø4 PED	P5-P6	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	
CONCURRENT PEDESTRIAN	Ø6 PED	P7-P8	DW	W	FDW	DW	DW	DW	DW									
CONCURRENT PEDESTRIAN	Ø8 PED	P1-P2	DW	W	FDW	DW	DW											
DETECTOR			NON-LOCK	NON-LOCK														
RECALL			SOFT	OFF	SOFT	SOFT												

- NOTES:
- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
 - PEDESTRIAN CALL UPON PUSH BUTTON ACTIVATION ONLY
 - MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = DURING COORDINATION
 - PERM = PERMISSIVE LEFT-TURN
 - OL = OVERLAP
 - OVERLAP SHALL NOT BE ACTIVE DURING ANY PED INTERVAL.



SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- CONCURRENT PEDESTRIAN PHASE WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION. UPON PUSH BUTTON ACTIVATION.

PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1	→	Ø2
D2	2	←	Ø6
D3	3	↙	Ø3&Ø8
D4	4	↘	Ø4

EMERGENCY VEHICLE PRE-EMPTION NOTES:

- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVE BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 1.5 SECONDS: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

CONSTRUCTION NOTES:

- PULL BOXES SHALL NOT BE LOCATED WITHIN WHEELCHAIR RAMPS.
- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- ALL NEW MAST ARM FOUNDATIONS SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION "MAST ARM & FOUNDATION DETAILS STANDARD DRAWINGS", DATED FEBRUARY 24, 2011
- ALL NEW SIGNAL HEADS AND SIGNS ON PROPOSED MAST ARMS SHALL BE RIGIDLY MOUNTED. R&R SIGNAL HEADS SHALL BE ATTACHED TO MAST ARMS SIMILAR TO EXISTING ATTACHMENT.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND CITY OF LOWELL REPRESENTATIVES FOLLOWING INSTALLATION.
- PEDESTRIAN INDICATIONS SHALL REMAIN IN SOLID "DON'T WALK" DURING ACTIVE PRE-EMPTION INTERVAL.

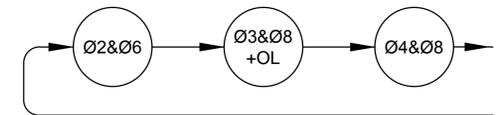
MERRIMACK STREET AT PRESCOTT STREET AT BRIDGE STREET
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	Ø2 TS 2 TYPE 1 CONTROLLER IN A TYPE P BASE MOUNTED CABINET ON EXIST FND, PAINTED BLACK
1	R&S EXIST CONTROLLER AND CABINET
1	TS POLE W/ 25' MAST ARM TYPE 2, PAINTED BLACK, INCL. FOUNDATION
1	SIGNAL HEAD, 4-SECTION, 12" L.E.D. MODULES, LOUVERED BACK PLATES
4	SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES, LOUVERED BACK PLATES
2	R&S SIGNAL HEAD, 4-SECTION, 12" L.E.D. MODULES
1	R&S SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES
1	12" L.E.D. GREEN BALL MODULE
8	16" L.E.D. PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
8	PEDESTRIAN PUSH BUTTON (VIBRATORY) W/ R10-3e AND SIGN SADDLE
1	R10-12 SIGN (POST MOUNTED)
1	R3-3 SIGN (RIGIDLY MOUNTED ON MAST ARM)
4	VIDEO DETECTION CAMERA W/ EXTENSION ARM
1	VIDEO DETECTION CHASSIS AND CABLING
1	VIDEO DETECTION PROCESSOR MODULE
4	EMERGENCY PRE-EMPTION DETECTORS AND DETECTOR CABLES
2	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTORS
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	MALFUNCTION MANAGEMENT UNIT (MMU)
1	SPARE B.I.U. (BUS INTERFACE UNITS)
X	12" x 12" PULLBOX
XXX FT	3" SCH. 80 PVC CONDUIT
1	CONTROLLER/COORDINATION PROGRAMMING & FINE TUNING
1	INTERSECTION CABLING FOR ALL NEW SIGNAL HEADS/ CAMERAS / PRE-EMPTION

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

- 25% DESIGN NOTES:
- PULL BOX AND CONDUIT NETWORKS WILL BE SHOWN AT THE 90% DESIGN LEVEL UPON ACCEPTANCE OF TRAFFIC SIGNAL LOCATIONS.
 - COORDINATION TIMINGS WILL BE FINALIZED AT THE 90% DESIGN LEVEL.

PROPOSED PHASE SEQUENCE



EXISTING / PROPOSED SIGNAL HEAD DATA							
A	B,C,G,H	D	E,F	A	E,F	J,K	P1-P8
REMOVED & STACK			REMOVED & STACK				
		REPLACE GREEN ARROW W/ 12" LENSE GREEN BALL INDICATION				RIGID-MOUNTED ON MAST-ARM	
ALL 12" LENSES W/ 5" LOUVERED BACKPLATES							ALL 16" L.E.D. W/ COUNTDOWN INDICATORS

VIDEO DETECTOR DATA						
DETECTOR NO.	CAMERA NO.	APPROX. SIZE	Ø CALLED	Ø EXTENDED	OPERATIONS	DELAY/ EXT.
1	C4	±6'X50'	Ø2	Ø2	PRESENCE	0
2	C3	±6'X50'	Ø4	Ø4	PRESENCE	0
3	C3	±6'X50'	Ø4	Ø4	PRESENCE	0
4	C1	±6'X50'	Ø6	Ø6	PRESENCE	0
5	C1	±6'X50'	Ø6	Ø6	PRESENCE	0
6	C2	±6'X50'	Ø3	Ø3	PRESENCE	0
7	C2	±6'X50'	Ø8	Ø8	PRESENCE	0

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.

MERRIMACK STREET AT CENTRAL STREET
LIST OF MAJOR ITEMS REQUIRED

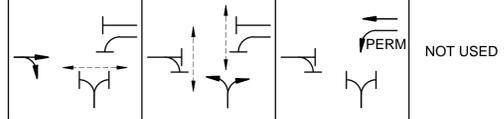
QUANTITY	DESCRIPTION
1	80 TS 2 TYPE 1 CONTROLLER IN A TYPE P BASE MOUNTED CABINET ON MODIFIED FND, PAINTED BLACK
1	R&S EXIST CONTROLLER AND CABINET
1	TS POLE W/ 35' MAST ARM TYPE 2, PAINTED BLACK, INCL. FOUNDATION
3	10' TS POLE, PAINTED BLACK, INCL. FOUNDATION
7	SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES, LOUVERED BACK PLATES
4	R&S SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES
6	16" L.E.D. PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
6	PEDESTRIAN PUSH BUTTON (VIBRATORY) W/ R10-3e AND SIGN SADDLE
3	VIDEO DETECTION CAMERA W/ EXTENSION ARM
1	VIDEO DETECTION CHASSIS AND CABLING
1	VIDEO DETECTION PROCESSOR MODULE
3	EMERGENCY PRE-EMPTION DETECTORS AND DETECTOR CABLES
2	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTORS
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	MALFUNCTION MANAGEMENT UNIT (MMU)
1	SPARE B.I.U. (BUS INTERFACE UNITS)
X	12" x 12" PULLBOX
XXX FT	3" SCH. 80 PVC CONDUIT
1	CONTROLLER/COORDINATION PROGRAMMING & FINE TUNING
1	INTERSECTION CABLING FOR ALL NEW SIGNAL HEADS/ CAMERAS / PRE-EMPTION

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

PROPOSED SEQUENCE AND TIMING												
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	FLASHING OPERATION
MINIMUM INTERVAL			10			6			10			
VEHICLE EXTENSION			2			2			2			
MAXIMUM 1			50			40			50			
MAXIMUM 2			50			40			50			
YELLOW CLEARANCE				3.0			3.0			3.0		
RED CLEARANCE					1.0			1.0			1.0	
WALK			7			7						
PEDESTRIAN CLEARANCE				13	1		12	1				
MERRIMACK STREET	EB	E,F	G	Y	R	R	R	R	R	R	R	FY
MERRIMACK STREET	WB-L	B	R	R	R	R	R	R	G	Y	R	FY
MERRIMACK STREET	WB-T	C,G	R	R	R	R	R	R	G	Y	R	FY
CENTRAL STREET	NB	A,D	R	R	R	G	Y	R	R	R	R	FR
CONCURRENT PEDESTRIAN	Ø2&Ø6 PED	P1-P2	W	FDW	DW	DW	DW	DW	DW	DW	DW	OUT
CONCURRENT PEDESTRIAN	Ø4 PED	P3-P6	DW	DW	DW	W	FDW	DW	DW	DW	DW	OUT
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			
RECALL			SOFT			OFF			SOFT			

NOTES:

- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
- PEDESTRIAN CALL UPON PUSH BUTTON ACTIVATION ONLY
- MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = DURING COORDINATION
- Ø2&Ø6 TO OPERATE IN DUAL ENTRY MODE
- PERM = PERMISSIVE LEFT-TURN



25% DESIGN NOTES:

- PULL BOX AND CONDUIT NETWORKS WILL BE SHOWN AT THE 90% DESIGN LEVEL UPON ACCEPTANCE OF TRAFFIC SIGNAL LOCATIONS.
- COORDINATION TIMINGS WILL BE FINALIZED AT THE 90% DESIGN LEVEL.

SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- CONCURRENT PEDESTRIAN PHASE WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION. UPON PUSH BUTTON ACTIVATION.

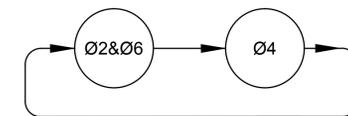
EXISTING / PROPOSED SIGNAL HEAD DATA		
A,B,C,D	A,B,C,D,E,F,G	P1-P6
REMOVED & STACK		
	ALL 12" LENSES W/ 5" LOUVERED BACKPLATES	ALL 16" L.E.D. W/ COUNTDOWN INDICATORS

PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		Ø2
D2	2		Ø6
D3	3		Ø4

EMERGENCY VEHICLE PRE-EMPTION NOTES:

- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVE BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 1 SECOND: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
- PEDESTRIAN INDICATIONS SHALL REMAIN IN SOLID "DON'T WALK" DURING ACTIVE PRE-EMPTION INTERVAL.

PROPOSED PHASE SEQUENCE

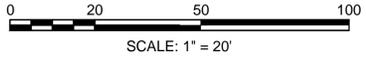
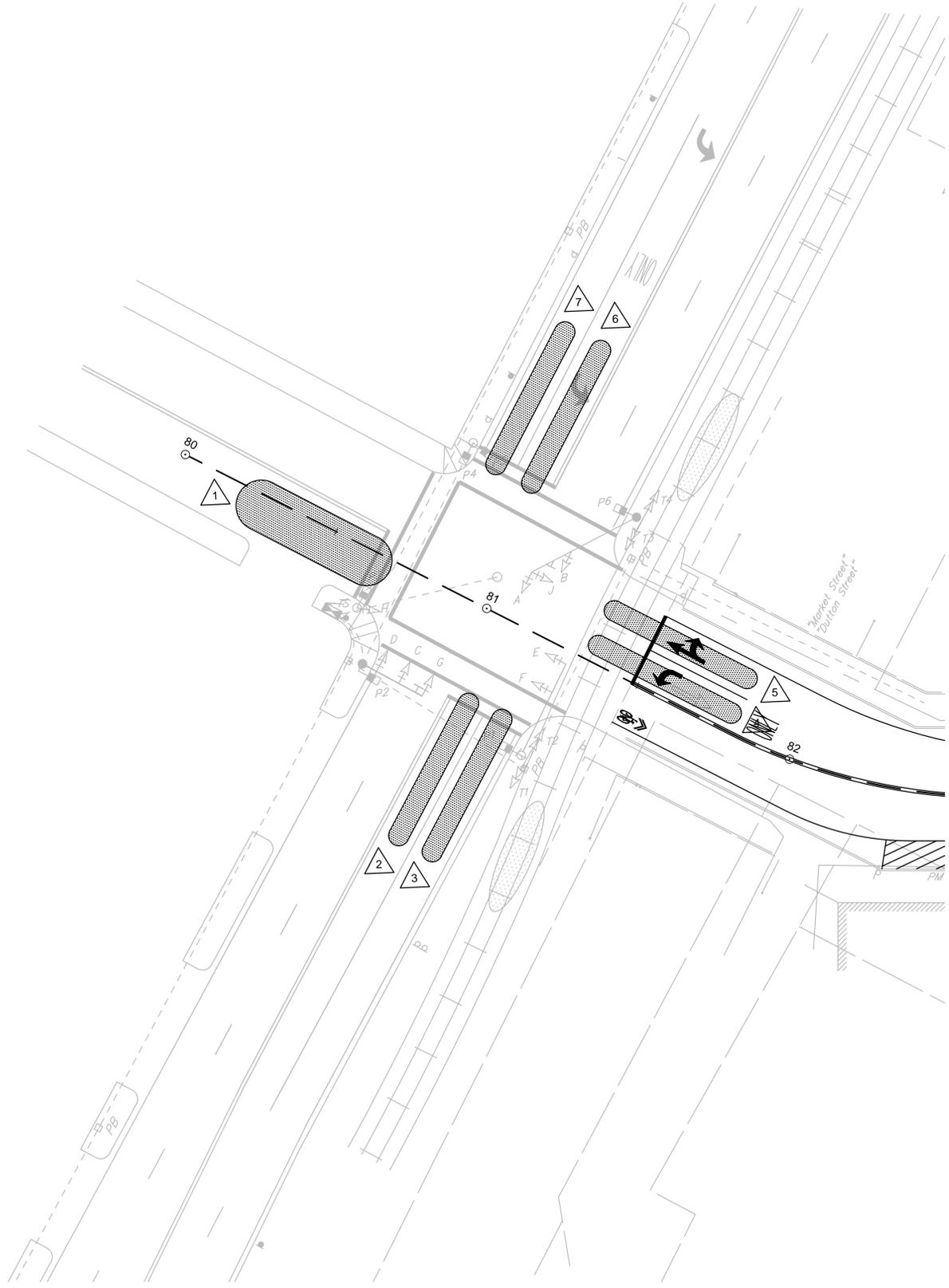


CONSTRUCTION NOTES:

- PULL BOXES SHALL NOT BE LOCATED WITHIN WHEELCHAIR RAMPS.
- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- ALL NEW MAST ARM FOUNDATIONS SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION "MAST ARM & FOUNDATION DETAILS STANDARD DRAWINGS", DATED FEBRUARY 24, 2011
- EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
- ALL SIGNAL HEADS AND SIGNS SHALL BE RIGIDLY MOUNTED.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND MASSDOT REPRESENTATIVES FOLLOWING INSTALLATION.

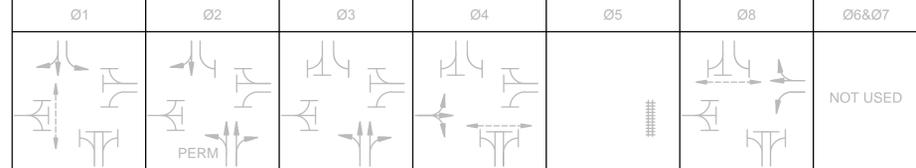
VIDEO DETECTOR DATA						
DETECTOR NO.	CAMERA NO.	APPROX. SIZE	Ø CALLED	Ø EXTENDED	OPERATIONS	DELAY/ EXT.
1	C1	±6'X50'	Ø2	Ø2	PRESENCE	0
2	C2	±6'X50'	Ø4	Ø4	PRESENCE	0
3	C2	±6'X50'	Ø6	Ø6	PRESENCE	0
4	C3	±6'X50'	Ø6	Ø6	PRESENCE	0

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.



PROPOSED SEQUENCE AND TIMING																						
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	FLASHING OPERATION	
MINIMUM INTERVAL			10			10			10			10			6			16				
VEHICLE EXTENSION			2			2			2			2			0			2				
MAXIMUM 1			20			20			15			20			15			20				
MAXIMUM 2			20			20			15			20			15			20				
YELLOW CLEARANCE				3.0			3.0			3.0			3.0			4.0			3.0			
RED CLEARANCE					2.0			2.0			2.0			2.0			2.0			2.0		
WALK			7									7						7				
PEDESTRIAN CLEARANCE				6									11						11			
MARKET STREET	EB	E,F	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
MARKET STREET	WB	H,J	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
DUTTON STREET	NB-L	A	R	R	R	G	Y	R	←G- ^G	Y	R	R	R	R	R	R	R	R	R	R	R	FY
DUTTON STREET	NB-T/R	B	R	R	R	G	Y	R	←G- ^G	Y	R	R	R	R	R	R	R	R	R	R	R	FY
DUTTON STREET	SB-L	G	←G-	←Y-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	←R-	FRA
DUTTON STREET	SB-T/R	C,D	G	Y	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
TROLLEY	ALL	T1-T4	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	OUT
CONCURRENT PEDESTRIAN	Ø1 PED	P3-P4	W	FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
CONCURRENT PEDESTRIAN	Ø4 PED	P1-P2	DW	DW	DW	DW	W	FDW	DW	OUT												
CONCURRENT PEDESTRIAN	Ø8 PED	P5-P6	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	OUT						
DETECTOR			NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK							
RECALL			OFF	MIN	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	

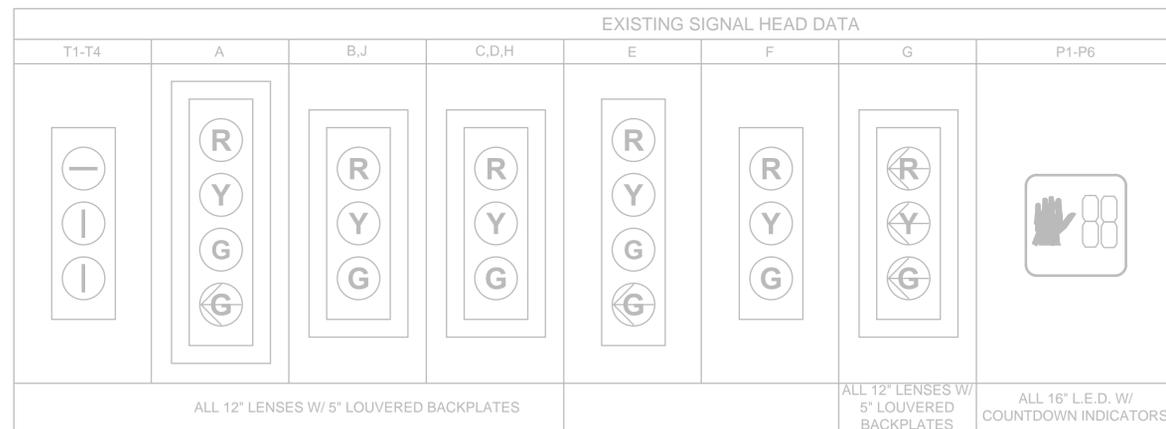
- NOTES:
- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
 - PEDESTRIAN PHASE UPON PUSH BUTTON ACTIVATION ONLY
 - PERM = PERMISSIVE LEFT-TURN
 - MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = DURING COORDINATION
 - Ø4&Ø8 TO OPERATE IN DUAL ENTRY MODE



SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- PEDESTRIAN PHASE WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION. UPON PUSH BUTTON ACTIVATION, COORDINATION WILL TERMINATE AND SERVICE PEDESTRIAN PHASE. COORDINATION WILL RESUME FOLLOWING TERMINATION OF PEDESTRIAN PHASE.

PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1	←	Ø4
D2	2	↔	Ø8
D3	3	↕	Ø1
D4	4	↕	Ø3

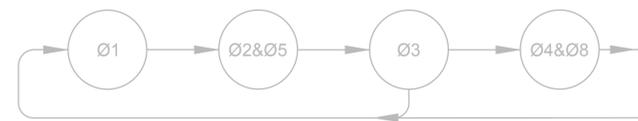


MARKET STREET AT DUTTON STREET
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
4	VIDEO DETECTION CAMERA W/ EXTENSION ARM
1	VIDEO DETECTION CHASSIS AND CABLING
1	VIDEO DETECTION PROCESSOR MODULE
4	EMERGENCY PRE-EMPTION DETECTORS AND DETECTOR CABLES
2	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTORS
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	CONTROLLER/COORDINATION PROGRAMMING & FINE TUNING

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

EXISTING PHASE SEQUENCE



- 25% DESIGN NOTES:
- COORDINATION TIMINGS WILL BE FINALIZED AT THE 90% DESIGN LEVEL.

EMERGENCY VEHICLE PRE-EMPTION NOTES:

- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVE BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3, D4) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 2 SECONDS: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

CONSTRUCTION NOTES:

- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND CITY OF LOWELL REPRESENTATIVES FOLLOWING INSTALLATION.

VIDEO DETECTOR DATA						
DETECTOR NO.	CAMERA NO.	APPROX. SIZE	Ø CALLED	Ø EXTENDED	OPERATIONS	DELAY/ EXT.
1	C2	15'X50'	Ø4	Ø4	PRESENCE	0
2	C3	6'X50'	Ø2&Ø3	Ø2&Ø3	PRESENCE	0
3	C3	6'X50'	Ø2	Ø2	PRESENCE	0
4	C4	6'X50'	Ø8	Ø8	PRESENCE	0
5	C4	6'X50'	Ø8	Ø8	PRESENCE	0
6	C1	6'X50'	Ø1	Ø1	PRESENCE	0
7	C1	6'X50'	Ø8	Ø8	PRESENCE	0

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.

MARKET STREET AT PALMER STREET
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	8Ø TS 2 TYPE 1 CONTROLLER IN A TYPE M BASE MOUNTED CABINET ON EXIST FND, PAINTED BLACK
1	R&S EXIST CONTROLLER AND CABINET
1	TS POLE W/ 20' MAST ARM TYPE 2, PAINTED BLACK, INCL. FOUNDATION
1	10' TS POLE, PAINTED BLACK, INCL. FOUNDATION
4	SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES, LOUVERED BACK PLATES
2	R&R SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES
8	16" L.E.D. PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
4	PEDESTRIAN PUSH BUTTON (VIBRATORY) W/ R10-3e AND SIGN SADDLE
3	VIDEO DETECTION CAMERA W/ EXTENSION ARM
1	VIDEO DETECTION CHASSIS AND CABLING
1	VIDEO DETECTION PROCESSOR MODULE
1	7" VIDEO DETECTION L.C.D. MONITOR (TO BE USED FOR ALL INTERSECTIONS)
2	EMERGENCY PRE-EMPTION DETECTORS AND DETECTOR CABLES
1	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTORS
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	MALFUNCTION MANAGEMENT UNIT (MMU)
1	SPARE B.I.U. (BUS INTERFACE UNITS)
X	12" x 12" PULLBOX
XXX FT	3" SCH. 80 PVC CONDUIT
1	CONTROLLER PROGRAMMING & FINE TUNING
1	INTERSECTION CABLING FOR ALL SIGNAL HEADS / CAMERAS / PRE-EMPTION

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

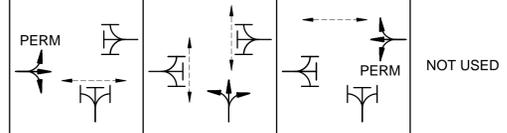
25% DESIGN NOTES:
1. PULL BOX AND CONDUIT NETWORKS WILL BE SHOWN AT THE 90% DESIGN LEVEL UPON ACCEPTANCE OF TRAFFIC SIGNAL LOCATIONS.

PROPOSED SEQUENCE AND TIMING												
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	FLASHING OPERATION
MINIMUM INTERVAL			10			6			10			
VEHICLE EXTENSION			2			3			2			
MAXIMUM 1			50			30			50			
MAXIMUM 2			-			-			-			
YELLOW CLEARANCE				3.0			3.0			3.0		
RED CLEARANCE					1.0			1.0			1.0	
WALK			7			7			7			
PEDESTRIAN CLEARANCE				10	1		12	1		10	1	
MARKET STREET	EB	E,D	G	Y	R	R	R	R	R	R	R	FY
MARKET STREET	WB	A,B	R	R	R	R	R	R	G	Y	R	FY
ROY PARKING GARAGE	NB	C,F	R	R	R	G	Y	R	R	R	R	FR
CONCURRENT PEDESTRIAN	Ø2 PED	P3-P4	W	FDW	DW	DW	DW	DW	DW	DW	DW	OUT
CONCURRENT PEDESTRIAN	Ø6 PED	P7-P8	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
CONCURRENT PEDESTRIAN	Ø4 PED	P1-P2,P5-P6	DW	DW	DW	W	FDW	DW	DW	DW	DW	OUT

DETECTOR	NON-LOCK	NON-LOCK	NON-LOCK
RECALL	SOFT	OFF	SOFT

NOTES:

- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
- PEDESTRIAN CALLS UPON PUSH BUTTON ACTIVATION ONLY
- MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = NOT USED
- Ø2&Ø6 TO OPERATE IN DUAL ENTRY MODE
- PERM = PERMISSIVE LEFT-TURN



SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- CONCURRENT PEDESTRIAN PHASES WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION.

PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1	←	Ø6
D2	2	←	Ø2

EMERGENCY VEHICLE PRE-EMPTION NOTES:

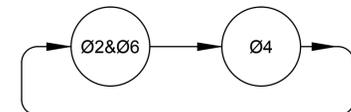
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVE BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 1 SECOND: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
- PEDESTRIAN INDICATIONS SHALL REMAIN IN SOLID "DON'T WALK" DURING ACTIVE PRE-EMPTION INTERVAL.

EXISTING / PROPOSED SIGNAL HEAD DATA		
A,B	C,D,E,F	P1-P8
REMOVE & RESET		
FREE-SWINGING	RIGID-MOUNTED	
	ALL 12" LENSES W/ 5" LOUVERED BACKPLATES	ALL 16" L.E.D. W/ COUNTDOWN INDICATORS

CONSTRUCTION NOTES:

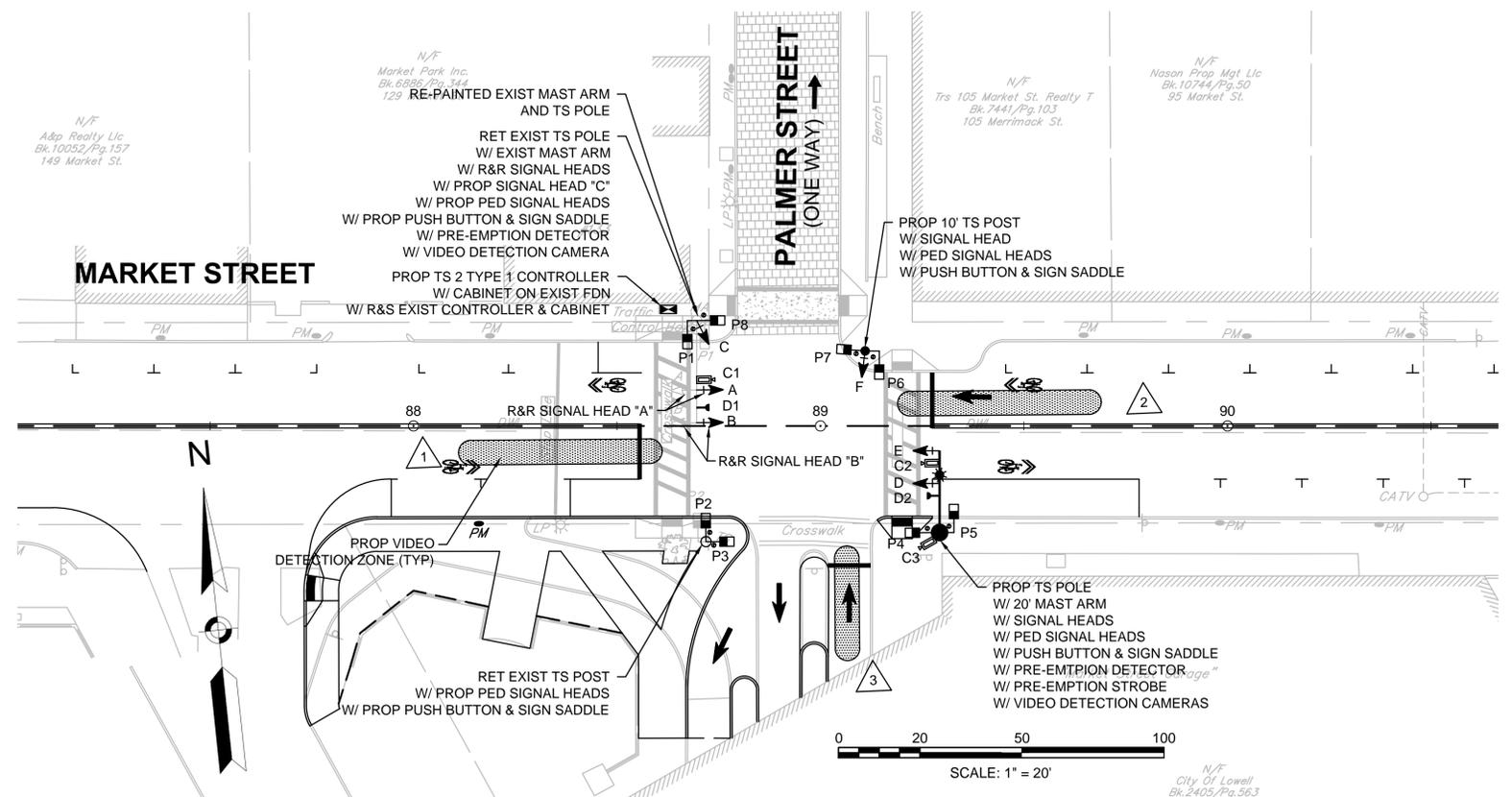
- PULL BOXES SHALL NOT BE LOCATED WITHIN WHEELCHAIR RAMPS.
- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- ALL NEW MAST ARM FOUNDATIONS SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION "MAST ARM & FOUNDATION DETAILS STANDARD DRAWINGS", DATED FEBRUARY 24, 2011
- ALL NEW SIGNAL HEADS AND SIGNS ON PROPOSED MAST ARMS SHALL BE RIGIDLY MOUNTED. R&R SIGNAL HEADS SHALL BE ATTACHED TO MAST ARMS SIMILAR TO EXISTING ATTACHMENT.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND CITY OF LOWELL REPRESENTATIVES FOLLOWING INSTALLATION.

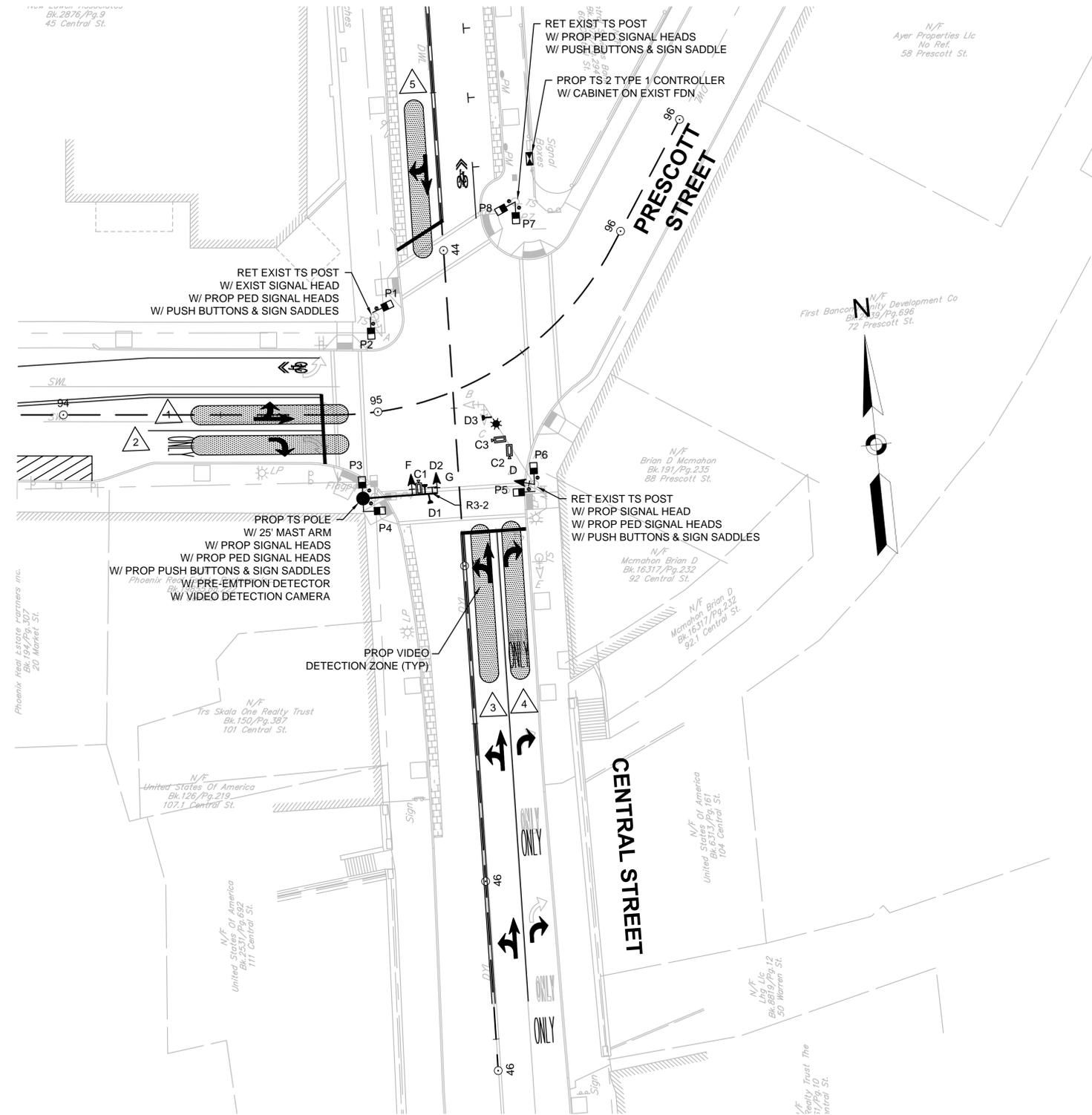
PROPOSED PHASE SEQUENCE



VIDEO DETECTOR DATA						
DETECTOR NO.	CAMERA NO.	APPROX. SIZE	Ø CALLED	Ø EXTENDED	OPERATIONS	DELAY/ EXT.
1	C2	±6'X50'	Ø2	Ø2	PRESENCE	0
2	C1	±6'X50'	Ø6	Ø6	PRESENCE	0
3	C3	±6'X30'	Ø4	Ø4	PRESENCE	0

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.



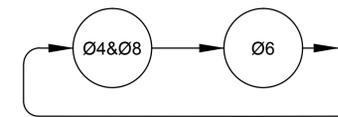


MARKET STREET AT CENTRAL STREET AT PRESCOTT STREET
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	8Ø TS 2 TYPE 1 CONTROLLER IN A TYPE P BASE MOUNTED CABINET ON EXIST FND, PAINTED BLACK
1	R&S EXIST CONTROLLER AND CABINET
1	TS POLE W/ 25' MAST ARM TYPE 2, PAINTED BLACK, INCL. FOUNDATION
2	SIGNAL HEAD, 3-SECTION, 12" L.E.D. MODULES, LOUVERED BACK PLATES
1	R&S SIGNAL HEAD, 4-SECTION, 12" L.E.D. MODULES
8	16" L.E.D. PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN INDICATOR & AUDIBLE WARNING DEVICES
8	PEDESTRIAN PUSH BUTTON (VIBRATORY) W/ R10-3e AND SIGN SADDLE
1	R3-2 SIGN (RIGIDLY MOUNTED ON MAST ARM)
3	VIDEO DETECTION CAMERA W/ EXTENSION ARM
1	VIDEO DETECTION CHASSIS AND CABLING
1	VIDEO DETECTION PROCESSOR MODULE
3	EMERGENCY PRE-EMPTION DETECTORS AND DETECTOR CABLES
2	EMERGENCY PRE-EMPTION 2 CHANNEL PHASE SELECTORS
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	MALFUNCTION MANAGEMENT UNIT (MMU)
1	SPARE B.I.U. (BUS INTERFACE UNITS)
1	GPS UNIT (GARMIN)
XX	12' x 12' PULLBOX
XXX FT	3" SCH. 80 PVC CONDUIT
1	CONTROLLER/COORDINATION PROGRAMMING & FINE TUNING
1	INTERSECTION CABLING FOR ALL NEW SIGNAL HEADS/ CAMERAS / PRE-EMPTION

PLUS NECESSARY CONDUIT, CABLE, LABOR, MISCELLANEOUS MATERIAL AND EQUIPMENT TO COMPLETE THE INSTALLATION AND PROVIDE AN OPERATING TRAFFIC CONTROL SIGNAL.

PROPOSED PHASE SEQUENCE



VIDEO DETECTOR DATA

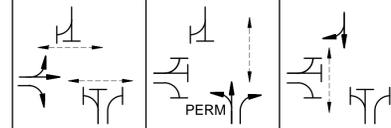
DETECTOR NO.	CAMERA NO.	APPROX. SIZE	Ø CALLED	Ø EXTENDED	OPERATIONS	DELAY/ EXT.
1	C3	6'X50'	Ø2	Ø2	PRESENCE	0
2	C3	6'X50'	Ø2	Ø2	PRESENCE	5 SEC
3	C2	6'X50'	Ø4	Ø4	PRESENCE	0
4	C2	6'X50'	Ø4	Ø4	PRESENCE	0
5	C1	6'X50'	Ø8	Ø8	PRESENCE	0

NOTE: DELAY AND EXTENSION TIMINGS SHALL BE PROGRAMMED IN THE CONTROLLER ONLY.

PROPOSED SEQUENCE AND TIMING												
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	FLASHING OPERATION
MINIMUM INTERVAL			10			10			10			
VEHICLE EXTENSION			2			2			2			
MAXIMUM 1			30			40			40			
MAXIMUM 2			30			40			40			
YELLOW CLEARANCE				3.0			3.0			3.0		
RED CLEARANCE					1.0			1.0			1.0	
WALK			7			7			7			
PEDESTRIAN CLEARANCE				12	1		13	1		10	1	
MARKET STREET	EB	B,D	G	Y	R	R	R	R	R	R	R	FR
CENTRAL STREET	NB	A,C,E	R	R	R	G	Y	R	R	R	R	FY
CENTRAL STREET	SB	F,G	R	R	R	R	R	R	G	Y	R	FY
CONCURRENT PEDESTRIAN	Ø2 PED	P1,P4,P5,P8	W	FDW	DW	DW	DW	DW	DW	DW	DW	OUT
CONCURRENT PEDESTRIAN	Ø4 PED	P6-P7	DW	DW	DW	W	FDW	DW	DW	DW	DW	OUT
CONCURRENT PEDESTRIAN	Ø8 PED	P2-P3	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			
RECALL			SOFT			SOFT			SOFT			
			Ø2			Ø4			Ø8			Ø1,Ø3,Ø5,Ø6,Ø7

NOTES:

- AUTOMATIC FLASHING OPERATION PER M.U.T.C.D. SECTIONS 4D.28 THRU 4D.31.
- PEDESTRIAN CALL UPON PUSH BUTTON ACTIVATION ONLY
- MAXIMUM 1 = NORMAL OPERATION
MAXIMUM 2 = DURING COORDINATION
- PERM = PERMISSIVE LEFT-TURN



NOT USED

25% DESIGN NOTES:

- PULL BOX AND CONDUIT NETWORKS WILL BE SHOWN AT THE 90% DESIGN LEVEL UPON ACCEPTANCE OF TRAFFIC SIGNAL LOCATIONS.
- COORDINATION TIMINGS WILL BE FINALIZED AT THE 90% DESIGN LEVEL.

CONSTRUCTION NOTES:

- PULL BOXES SHALL NOT BE LOCATED WITHIN WHEELCHAIR RAMPS.
- THE CONSTRUCTION SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION SPECIFICATIONS UNLESS OTHERWISE NOTED.
- ALL NEW MAST ARM FOUNDATIONS SHALL CONFORM WITH MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION "MAST ARM & FOUNDATION DETAILS STANDARD DRAWINGS", DATED FEBRUARY 24, 2011
- ALL NEW SIGNAL HEADS AND SIGNS ON PROPOSED MAST ARMS SHALL BE RIGIDLY MOUNTED. R&R SIGNAL HEADS SHALL BE ATTACHED TO MAST ARMS SIMILAR TO EXISTING ATTACHMENT.
- CONTRACTOR SHALL FINE-TUNE THE TIMING AND COORDINATION PARAMETERS IN THE PRESENCE OF THE ENGINEER AND CITY OF LOWELL REPRESENTATIVES FOLLOWING INSTALLATION.

SEQUENCE & TIMING NOTES:

- IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
- THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
- IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
- IF THE ASSIGNED RIGHT-OF-WAY FOR ANY TRAFFIC MOVEMENT IS TO CHANGE DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATION FOR THAT MOVEMENT WILL DISPLAY THE APPROPRIATE CLEARANCE INTERVALS.
- CONCURRENT PEDESTRIAN PHASES WILL ONLY BE CALLED UPON PUSH BUTTON ACTIVATION. UPON PUSH BUTTON ACTIVATION.

EXISTING / PROPOSED SIGNAL HEAD DATA			
A,B,C,E	D	D,F,G	P1-P8
	REMOVED & STACK 	 RIGIDLY MOUNTED ON MAST ARM	
ALL 12" LENSES W/ 5" LOUVERED BACKPLATES			ALL 16" L.E.D. W/ COUNTDOWN INDICATORS

PREEMPTION PHASING & PRIORITY			
DETECTOR	PREEMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		Ø4
D2	2		Ø8
D3	3		Ø2

EMERGENCY VEHICLE PRE-EMPTION NOTES:

- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS LOCATED AT EACH INTERSECTION.
- EMERGENCY VEHICLE PRE-EMPTION SIGNALS SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVE BASIS.
- IN RESPONSE TO A PRE-EMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR D1 (OR D2, D3) THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PRE-EMPTION PHASE #1 (OR #2, #3) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PRE-EMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME PRE-EMPTION PHASE CLEARANCE (3 SECONDS: YELLOW AND 1.5 SECONDS: ALL RED) AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
- NORMAL CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
- CONFIRMATION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.
- PEDESTRIAN INDICATIONS SHALL REMAIN IN SOLID "DON'T WALK" DURING ACTIVE PRE-EMPTION INTERVAL.