



GENERAL SYMBOLS

EXISTING	PROPOSED	
		CATCH BASIN (OR GUTTER INLET, OR LEACHING BASIN)
		CATCH BASIN (OR GUTTER INLET) WITH CURB INLET (GUTTERMOUTH)
		EDGESTONE—TYPE NOTED
		EDGE OF ROAD
		ELECTRIC HANDHOLE (NUMBER AS NOTED)
		ELECTRIC MANHOLE "
		TELEPHONE MANHOLE "
		WATER MANHOLE "
		SEWER MANHOLE "
		DRAINAGE MANHOLE "
		GAS GATE
		WATER GATE
		CURB STOP
		HYDRANT
		FIRE ALARM BOX
		PARKING METER
		STREET LIGHT POLE
		UTILITY POLE
		GUY POLE
		DRAIN PIPE (UNDER 24")
		DRAIN PIPE (DOUBLE LINE 24" AND OVER)
		SEWER MAIN "
		ELECTRIC DUCT "
		GAS MAIN "
		WATER MAIN "
		TELEPHONE DUCT "
		MAIL BOX
		HIGHWAY GUARD (TYPE NOTED)
		FENCE (SIZE AND TYPE NOTED)
		HIGHWAY/PROPERTY BOUND (TYPE NOTED)
		CITY, TOWN, OR COUNTY LAYOUT
		STATE HIGHWAY LAYOUT (S.H.L.O.)
		EASEMENT LINE
		PROPERTY LINE
		CITY, TOWN, OR COUNTY BOUNDARY
		STATE BOUNDARY
		BASE OR SURVEY LINE
		CONSTRUCTION BASELINE
		TREE (SIZE AND TYPE NOTED)
		APPROXIMATE FULL DEPTH AREA
		BORINGS, PAVEMENT CORES
		TEST PIT
		HAYBALE

TRAFFIC SIGNAL SYMBOLS

EXISTING	PROPOSED	
		CONTROL CABINET GROUND MOUNTED (WITHOUT & WITH CONCRETE PAD)
		CONTROL CABINET POLE MOUNTED
		FLASHING BEACON CONTROL & METER PEDESTAL
		SIGNAL POST & BASE
		MAST ARM, SHAFT, & BASE (ARM LENGTH AS NOTED)
		VEHICULAR SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION NOTED)
		VEHICULAR SIGNAL HEAD OPTICALLY PROGRAMMED "
		LIMIT OF VISIBILITY OF OPTICALLY PROGRAMMED SIGNAL HEAD
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD
		PULL BOX 12" x 12"
		PEDESTRIAN PUSH BUTTON
		PRE-EMPTION DETECTOR
		PRE-EMPTION STROBE
		SINGLE POINT VIDEO DETECTION CAMERA
		CONTROLLER PHASE
		CONDUIT (COND.)
		CONDUIT CROSSING ROADWAY WITH CONTROLLED DENSITY FILL
		"x" DUCT (CONCRETE ENCASED)
		OVERHEAD CABLE
		DIRECT BURIED CABLE

PAVEMENT MARKINGS AND SIGNING SYMBOLS

EXISTING	PROPOSED	
		PAVEMENT ARROW AND LEGEND
		CROSSWALK, 2-12" WHITE LINES (WIDTH NOTED)
		STOP LINE, 12" WHITE LINE 4.0' BEHIND CW (TYP)
		YIELD LINE, 24" x 36" WHITE TRIANGLE, 36" O.C.
		SOLID WHITE CHANNELIZING LINE—SIZE AS NOTED
		SOLID YELLOW CHANNELIZING LINE—SIZE AS NOTED
		BROKEN WHITE LANE LINE - 4"
		SOLID WHITE LANE LINE - 4"
		DOUBLE YELLOW CENTER LINE - 4"
		SOLID YELLOW EDGE LINE - 4"
		SOLID WHITE EDGE LINE - 4"
		BROKEN YELLOW LANE LINE - 4"
		BICYCLE LANE
		BICYCLE DETECTION LEGEND
		SIGN AND POST
		DELINEATOR

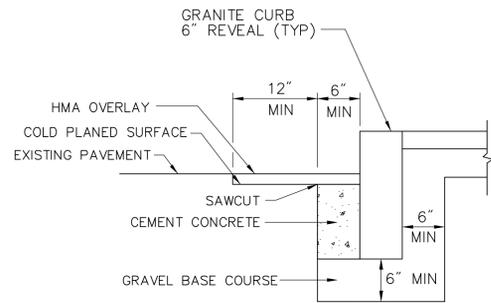
ABBREVIATIONS

GENERAL		UTILITIES		ALIGNMENT/GRADING		TRAFFIC SIGNAL SYSTEMS	
ABAN	ABANDON	NTS	NOT TO SCALE	CC	CENTER OF CURVE	R	STEADY CIRCULAR RED
ADJ	ADJUST	PGL	PROFILE GRADE LINE	HP	HIGH POINT	Y	STEADY CIRCULAR YELLOW
APPROX	APPROXIMATE	PROP	PROPOSED	LP	LOW POINT	G	STEADY CIRCULAR GREEN
BIT	BITUMINOUS	PVM'T	PAVEMENT	PC	POINT OF CURVE	FR	FLASHING CIRCULAR RED
BOS	BOTTOM OF SLOPE	REM	REMOVE	PI	POINT OF INTERSECTION	-FR->	FLASHING RED ARROW
(BO)	BY OTHERS	REMOD	REMODEL	PNT	POINT	FY	FLASHING CIRCULAR YELLOW
CEM	CEMENT	RET	RETAIN	PCC	POINT OF COMPOUND CURVE	-FY->	FLASHING YELLOW ARROW
CLF	CHAINLINK FENCE	R&D	REMOVE AND DISCARD	PRC	POINT OF REVERSE CURVE		STEADY VERTICAL GREEN ARROW
CONC	CONCRETE	R&R	REMOVE AND RESET	PT	POINT OF TANGENT		STEADY LEFT ARROW (RED, YELLOW OR GREEN PREFIX)
ELEV	ELEVATION	R&S	REMOVE AND STACK	-25.45	SPOT ELEVATION		STEADY RIGHT ARROW (RED, YELLOW OR GREEN PREFIX)
EOP	EDGE OF PAVEMENT	RT	RIGHT			W	STEADY WALK-WHITE
EXIST	EXISTING	STA	STATION			DW	STEADY DON'T WALK-PORTLAND ORANGE
FND	FOUNDATION	TEMP	TEMPORARY			FDW	FLASHING DON'T WALK-PORTLAND ORANGE
GRAN	GRANITE	TOS	TOP OF SLOPE				
HMA	HOT MIX ASPHALT	TYP	TYPICAL				
LOAM	LOAM BORROW						
LT	LEFT						
MAX	MAXIMUM						
MIN	MINIMUM						

- GENERAL NOTES**
- TOPOGRAPHICAL INFORMATION FROM A SURVEY BY HANCOCK ASSOCIATES, INC., CHELMSFORD, MASSACHUSETTS IN MARCH 2013.
  - 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.
  - 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.
  - THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET 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.]
  - THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
  - TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
  - 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.
  - 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).
  - JOINTS BETWEEN NEW BITUMINOUS CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDDED.
  - ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
  - ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF [.01 FOOT PER FOOT] (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
  - ALL EXISTING GRANITE CURB SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
  - 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.

PAVEMENT NOTES

- PROPOSED PAVEMENT MILLING & OVERLAY (BY THE CITY)**
- SURFACE: 1-3/4" HOT MIX ASPHALT (SURFACE COURSE TYPE B)
- LEVELING COURSE: VARIABLE DEPTH HOT MIX ASPHALT SURFACE COURSE MATERIAL
- BITUMEN FOR TACK COAT (RS-1) AT 0.07 GAL/SY OVER EXISTING PAVEMENT OR COBBELS
- MILLING VARIABLE DEPTH 1" MIN
- NOTE: COBBLES EXIST BENEATH EXISTING PAVED SURFACE
- PROPOSED CEMENT CONCRETE SIDEWALK**
- SURFACE: 4" CEMENT CONCRETE AIR ENTRAINED 4000 PSI, 3/4", 610 WITH 6"x6" W1.4XW1.4 WWM REINFORCEMENT
- FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED CEMENT CONCRETE WHEELCHAIR RAMP**
- SURFACE: 6" CEMENT CONCRETE AIR ENTRAINED 4000 PSI, 3/4", 610 WITH 6"x6" W1.4XW1.4 WWM REINFORCEMENT
- FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED CEMENT CONCRETE SIDEWALK AT DRIVEWAYS**
- SURFACE: 6" CEMENT CONCRETE AIR ENTRAINED 4000 PSI, 3/4", 610 WITH 6"x6" W1.4XW1.4 WWM REINFORCEMENT
- FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED HOT MIX ASPHALT DRIVEWAY**
- SURFACE: 3-1/2" HOT MIX ASPHALT (1-1/2" TOP COURSE OVER 2" BINDER COURSE)
- FOUNDATION: 8" GRAVEL BORROW, TYPE b



**NOTES:**

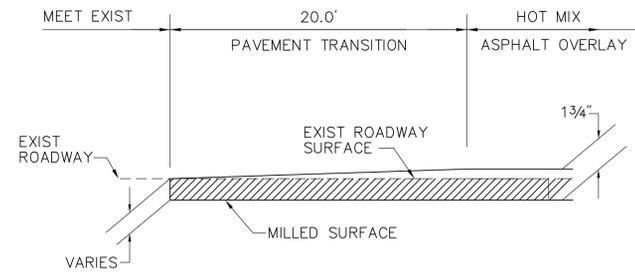
1. CONCRETE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.
2. SAWCUT 6" FROM CURB LINE AND REMOVE EXISTING PAVEMENT AND GRAVEL. REPLACE WITH CEMENT CONCRETE.
3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED. ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.
4. OVERLAY ON CANAL STREET SHALL EXTEND 12" FROM EXCAVATION LIMITS.

**GRANITE CURB IN EXISTING PAVEMENT**

SCALE: NOT TO SCALE

DATE:

DWG:

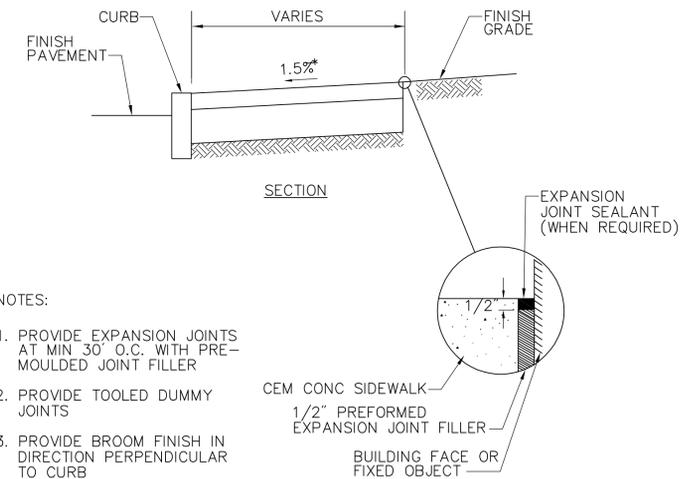


**PVM'T MILLING & OVERLAY TRANSITION SECTION (BY THE CITY)**

SCALE: NOT TO SCALE

DATE:

DWG:



**NOTES:**

1. PROVIDE EXPANSION JOINTS AT MIN 30' O.C. WITH PRE-MOULDED JOINT FILLER
2. PROVIDE TOOLED DUMMY JOINTS
3. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB

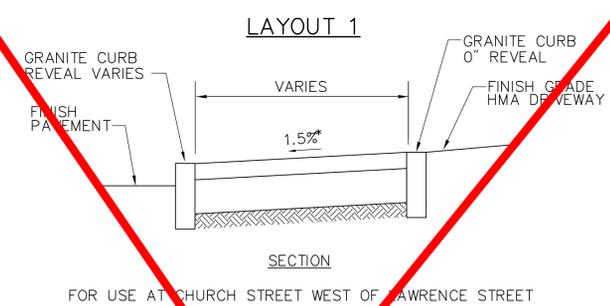
**CEMENT CONCRETE SIDEWALK**

SCALE: NOT TO SCALE

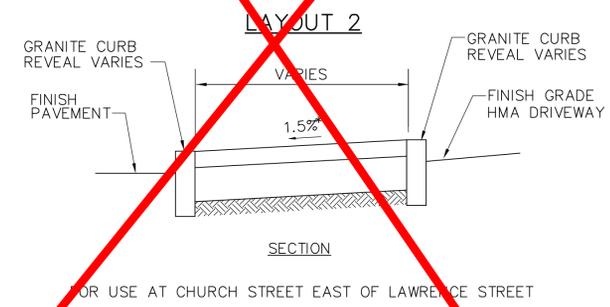
DATE:

DWG:

\* TOLERANCE FOR CONSTRUCTION ±0.5%



FOR USE AT CHURCH STREET WEST OF LAWRENCE STREET



FOR USE AT CHURCH STREET EAST OF LAWRENCE STREET

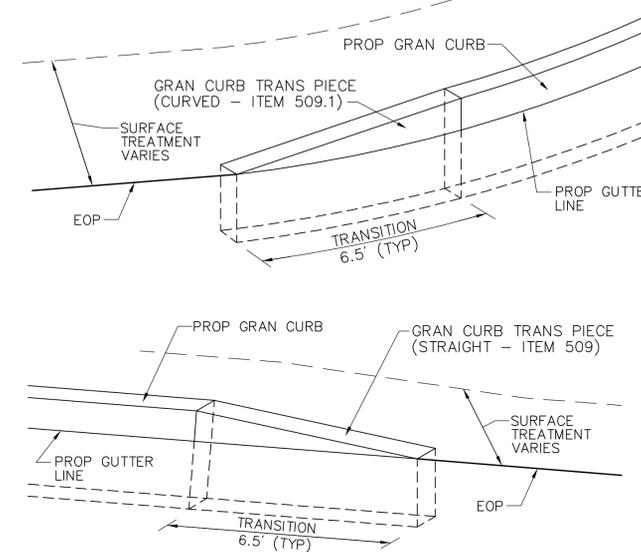
**SIDEWALK WITH GRANITE CURB BUFFER**

SCALE: NOT TO SCALE

DATE:

DWG:

\* TOLERANCE FOR CONSTRUCTION ±0.5%

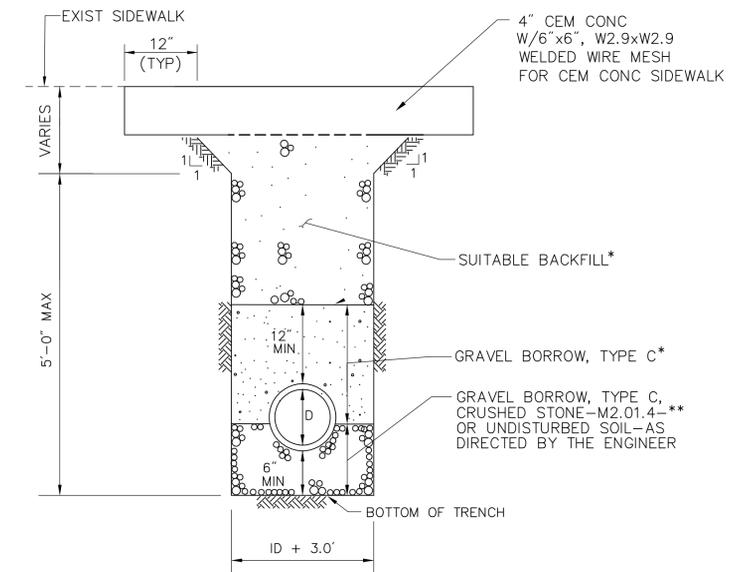


**GRANITE CURB TRANSITION PIECE**

SCALE: NOT TO SCALE

DATE:

DWG:



\* CONTROLLED DENSITY FILL TO BE USED IN WHEN PROPOSED PIPES CROSS EXISTING CEM CONC BASE AND WHEN COMPACTION USING CONVENTIONAL METHODS IS UNUSUALLY DIFFICULT AS DETERMINED BY THE ENGINEER DUE TO OBSTRUCTIONS.

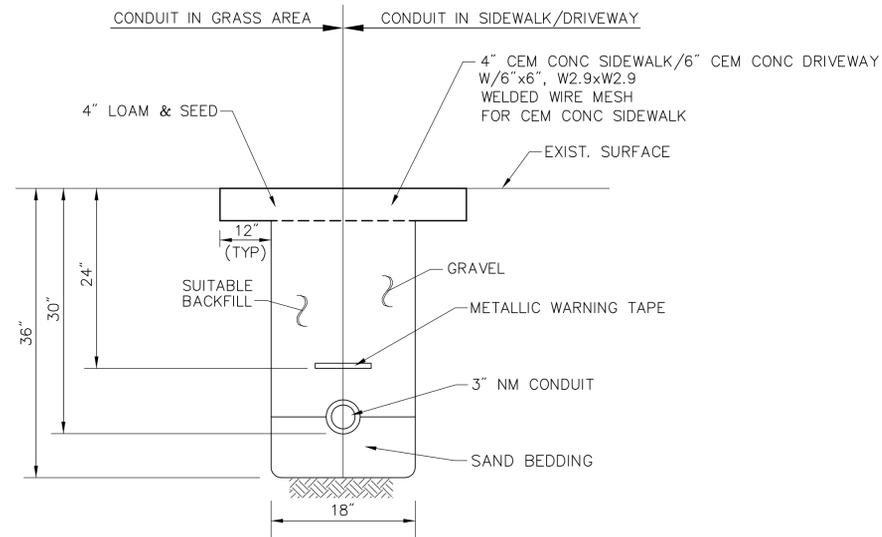
\*\* CRUSHED STONE TO BE USED DURING WET CONDITIONS AS DIRECTED BY THE ENGINEER.

**TRENCH DETAIL IN SIDEWALK**

SCALE: NOT TO SCALE

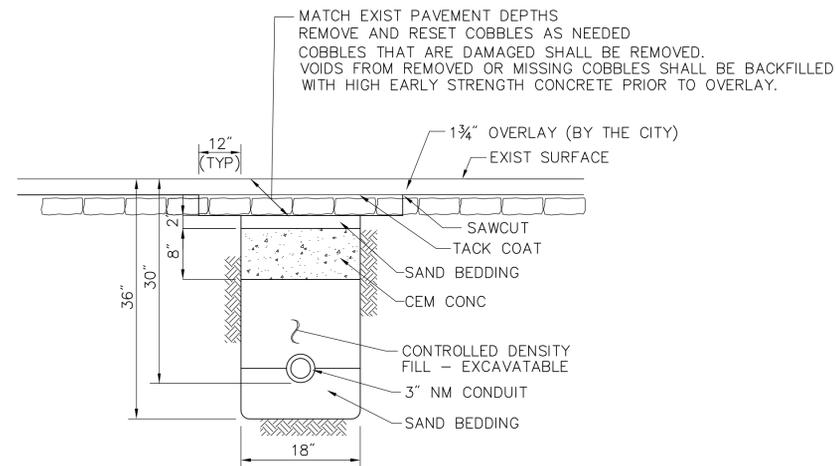
DATE: APRIL 2003

DWG: TRENCH-05



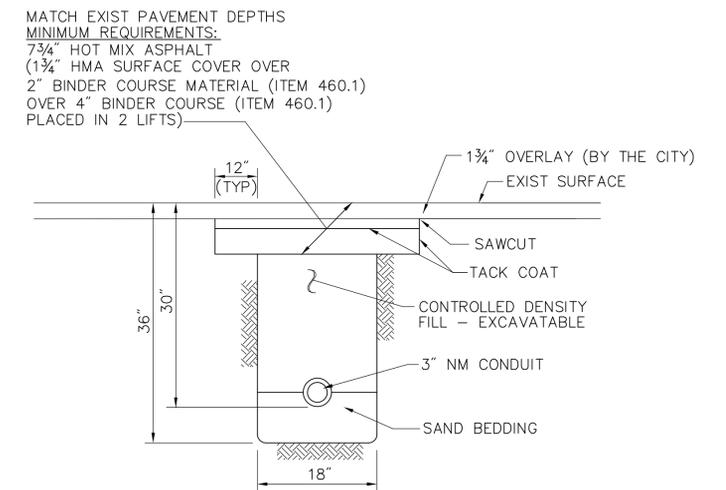
CONDUIT IN GRASS AND  
 SIDEWALK/DRIVEWAY

SCALE: NOT TO SCALE  
 DATE:  
 DWG:



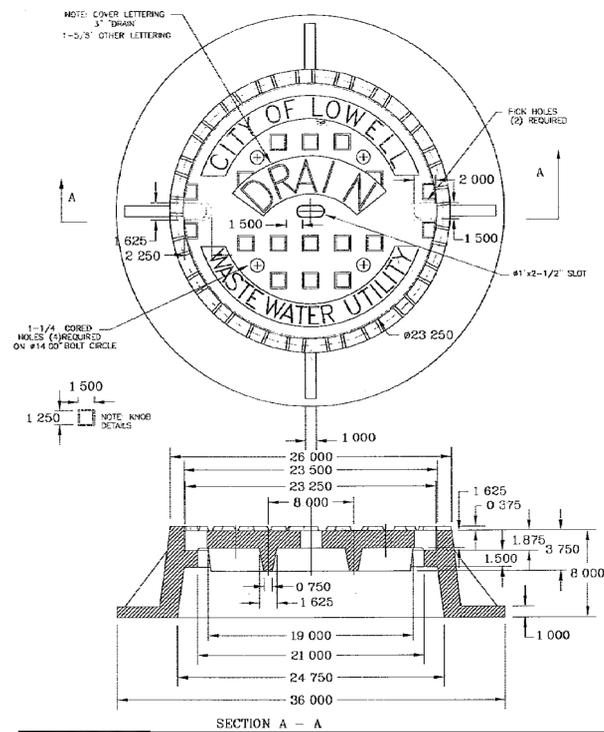
CONDUIT CROSSING ROADWAY  
 IN COBBLE AREAS

SCALE: NOT TO SCALE  
 DATE:  
 DWG:



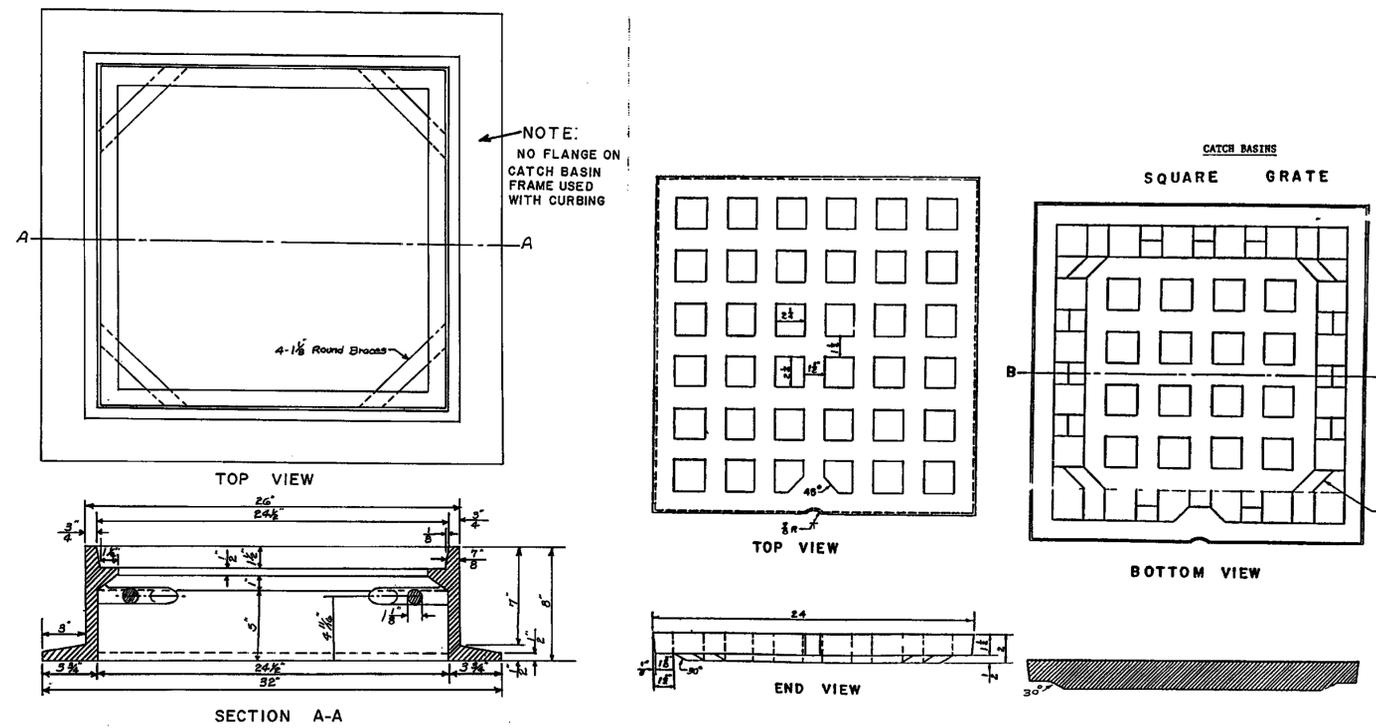
CONDUIT CROSSING ROADWAY

SCALE: NOT TO SCALE  
 DATE:  
 DWG:



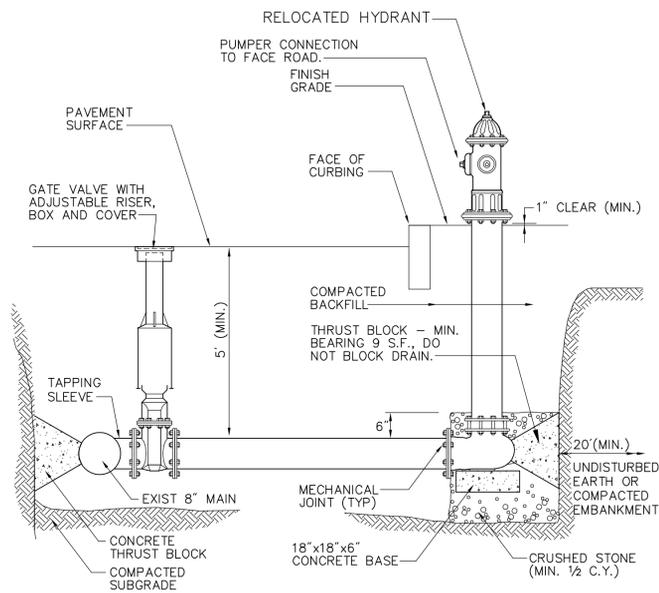
CITY OF LOWELL STANDARD  
 DRAIN FRAME & COVER

SCALE: NOT TO SCALE  
 DATE: 10-22-2008  
 DWG: -



CITY OF LOWELL STANDARD  
 CATCH BASIN FRAME AND GRATE

SCALE: NOT TO SCALE  
 DATE: 4-30-2009  
 DWG: -



**Notes:**

1. CONCRETE THRUST BLOCKS TO BE USED ONLY WHERE THEY CAN BEAR ON UNDISTURBED EARTH AS SHOWN. USE CLAMPS AND TIE RODS OR OTHER ACCEPTABLE METHOD OF JOINT RESTRAINT WHERE SOIL CONDITIONS PROHIBIT THE USE OF THRUST BLOCKS.
2. HYDRANT SHALL BE SET 12" FROM BACK OF CURB.

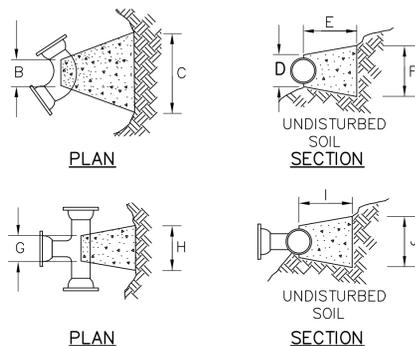
**HYDRANT RELOCATION**

SCALE: NOT TO SCALE  
 DATE: 6-2008  
 DWG: LD-250

BENDS						BENDS					
B	C	D	E	F		B	C	D	E	F	
6"	11-1/4"	8"	15"	12"	24"	6"	45°	8"	30"	12"	24"
6"	22-1/2"	"	19"	"	"	6"	90°	"	30"	"	"
8"	11-1/4"	"	20"	"	"	8"	45°	"	30"	"	"
8"	22-1/2"	"	22"	"	"	8"	90°	"	38"	"	"
12"	11-1/4"	"	30"	"	"	12"	45°	"	40"	"	"
12"	22-1/2"	"	35"	"	"	12"	90°	"	60"	"	"

TEES					TEES				
G	H	I	J		G	H	I	J	
6" x 6" x 6"	12"	24"	24"	18"	12" x 12" x 6"	12"	24"	24"	12"
8" x 8" x 6"	"	"	"	24"	12" x 12" x 8"	"	"	"	24"
8" x 8" x 8"	"	"	"	"	12" x 12" x 12"	"	36"	"	36"

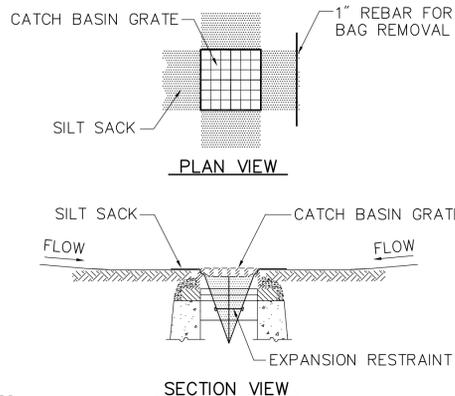


**Notes:**

1. PROVIDE BLOCKS FOR TAPPING SLEEVES, DEAD ENDS, GATE VALVES AND VERTICAL BENDS, SAME SIZE AS REQUIRED FOR TEES.
2. PROVIDE ANCHOR RODS AT VERTICAL BENDS AND GATE VALVES
3. CONCRETE SHALL NOT BE PLACED AGAINST PIPE BEYOND FITTING.

**CONCRETE THRUST BLOCK**

SCALE: NOT TO SCALE  
 DATE: APRIL 2003  
 DWG: WS-02



**NOTES:**

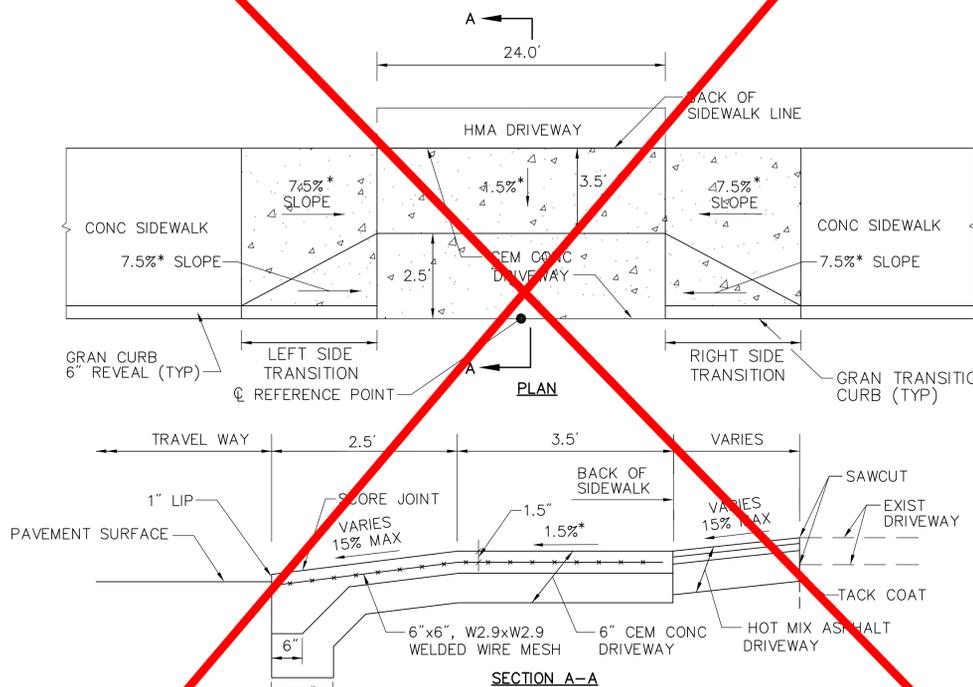
1. INSTALL SILT SACK IN EXISTING CATCH BASINS, BEFORE COMMENCING WORK, AND IN NEW CATCH BASINS, GUTTER INLETS, AND ALL CURB INLETS IMMEDIATELY AFTER INSTALLATION OF STRUCTURE. MAINTAIN UNTIL BINDER COURSE PAVING IS COMPLETE OR A PERMANENT STAND OF GRASS HAS BEEN ESTABLISHED.
2. GRATE TO BE PLACED OVER SILT SACK.
3. SILT SACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.

**SILT SACK IN CATCH BASIN**

SCALE: NOT TO SCALE  
 DATE:  
 DWG:

**TRANSITION CURB FOR DRIVEWAYS WITH SIDEWALK**

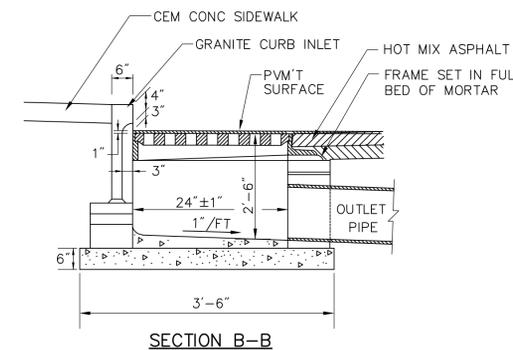
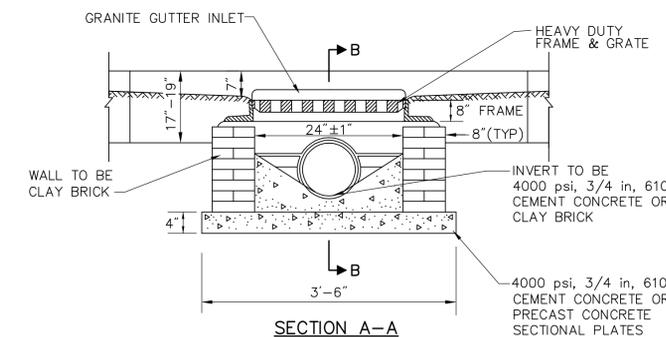
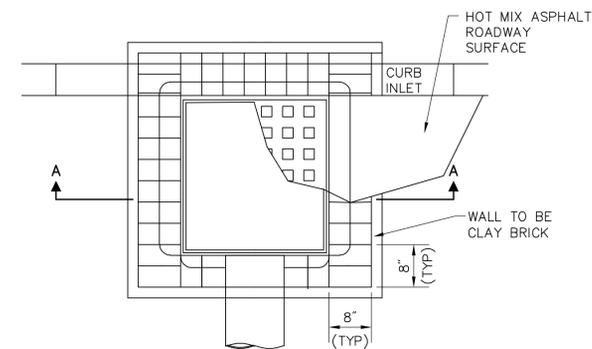
NO.	LOCATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE	
				REVEAL	TRANSITION	REVEAL	TRANSITION
①	CHURCH ST OPPOSITE LAWRENCE ST	LT 0.09% RT -1.93%	6.0'	4"	6.5'	5"	6.0'



**CEM CONC DRIVEWAY WITH SIDEWALK AND GRANITE TRANSITION CURB**

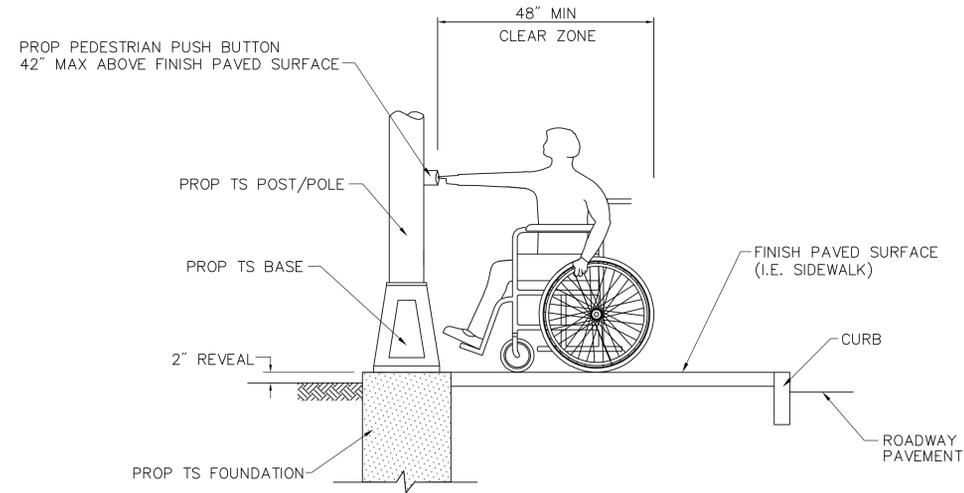
SCALE: NOT TO SCALE  
 DATE: APRIL 2003  
 DWG: DRIVE-04

\* TOLERANCE FOR CONSTRUCTION ±0.5%

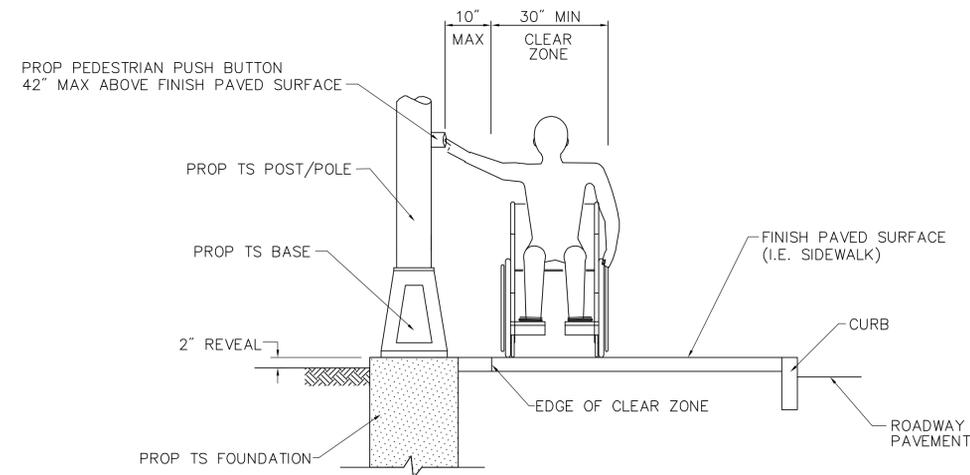


**GUTTER INLET - SPECIAL**

SCALE: NOT TO SCALE  
 S-STD.  
 H-STD.



**FORWARD APPROACH (FORWARD REACH)**

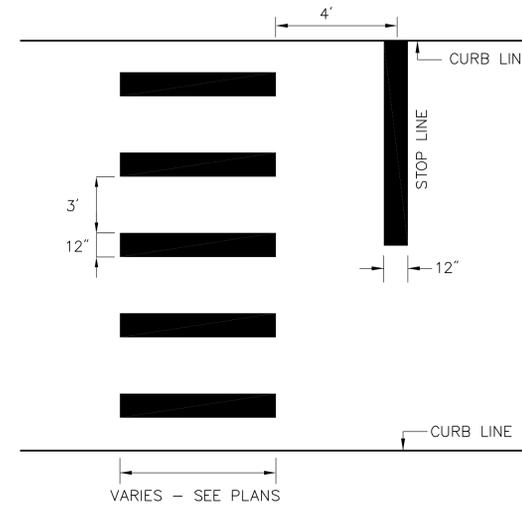


**PARALLEL APPROACH (SIDE REACH)**

NOTE 1: A CLEAR GROUND SPACE SHALL CONSIST OF A STABLE AND FIRM AREA, COMPLYING WITH 521 CMR 6.5 (FORWARD REACH) OR 521 CMR 6.6 (SIDE REACH) AND SHALL BE PROVIDED AT EACH OF THE PEDESTRIAN PUSH BUTTONS.  
 a) WHERE A FORWARD APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL ABUT AND BE CENTERED ON THE CLEAR GROUND SPACE.  
 b) WHERE A PARALLEL APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL BE WITHIN TEN INCHES (10") HORIZONTALLY OF AND CENTERED ON THE CLEAR GROUND SPACE.

**PEDESTRIAN PUSH BUTTON CLEAR ZONE**

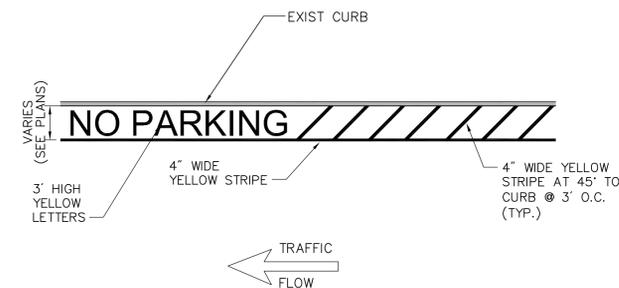
SCALE: NOT TO SCALE  
 DATE:  
 DWG:



- NOTES:
1. ALL 12" THERMOPLASTIC LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6" LINES) WILL BE ACCEPTED.
  2. LAYOUT OF CROSSWALKS SHALL BE APPROVED BY A LOWELL DPW REPRESENTATIVE PRIOR TO APPLICATION OF THERMOPLASTIC.
  3. ALL CROSSWALKS INSTALLED SHALL CONFORM TO THE RELEVANT PROVISIONS OF THE MASSACHUSETTS HIGHWAY DEPARTMENT "STANDARD SPECIFICATION FOR HIGHWAY AND BRIDGES" DATED 1988, SECTION 860 FOR REFLECTORIZED LINE (THERMO-PLASTIC) & MATERIAL M7.01.20, LATEST REVISIONS.

**STANDARD CROSSWALK (BY THE CITY)**

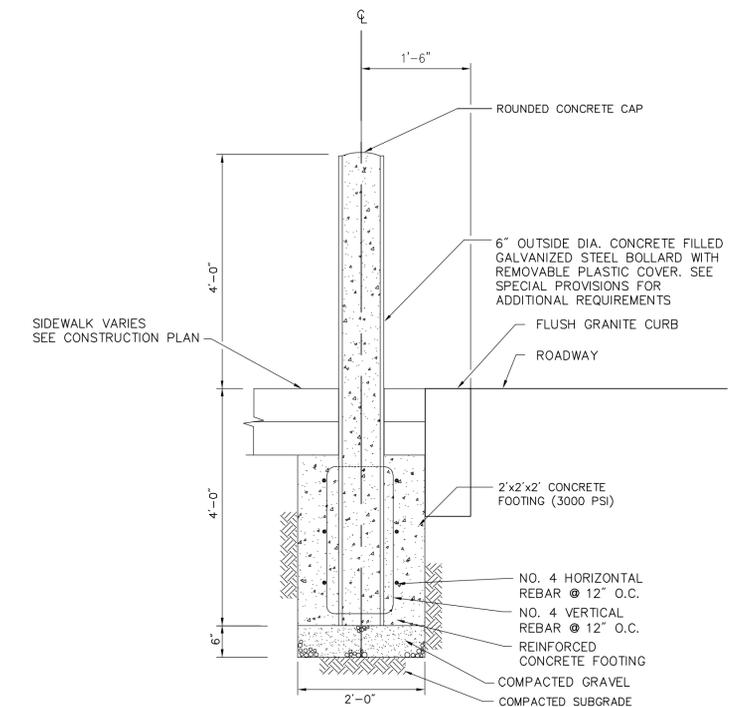
SCALE: NOT TO SCALE  
 DATE: APRIL 2003  
 DWG: PM-07



NOTE:  
 1. 4" YELLOW MARKINGS FOR NO PARKING LANE SHALL BE PAINT

**NO PARKING LANE STRIPING (BY THE CITY)**

SCALE: NOT TO SCALE  
 DATE: JUNE 2008  
 DWG: LD\_556



**STEEL BOLLARD**

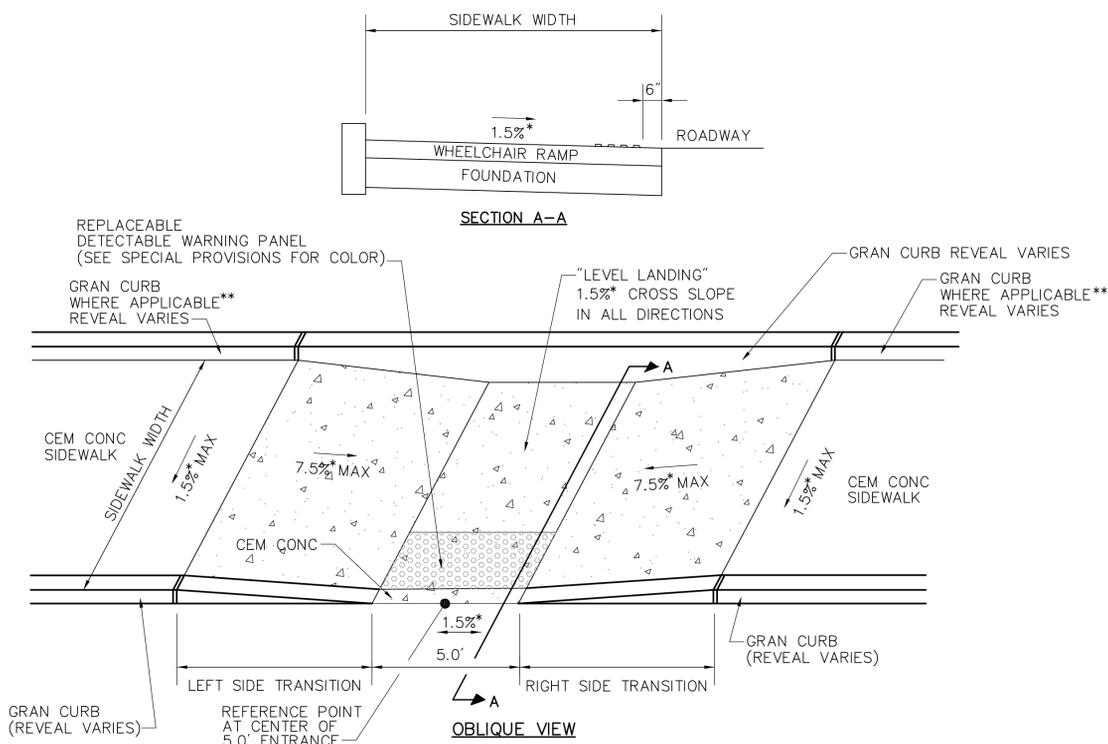
SCALE: NOT TO SCALE  
 DATE:  
 DWG:

LEGEND

-  = DETECTABLE WARNING PANEL
-  = LIMITS OF CEM CONC RAMP

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP WIDTH	LEFT SIDE				RIGHT SIDE			
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
2	N: 3063375.6405 E: 702687.7741	6.6'	5.0'	0.06%	3"	4.0'	122.71'	-0.24%	4"	4.0'	122.69'
3	N: 3063377.5436 E: 702715.6490	6.3'	5.0'	0.62%	4"	5.0'	122.69'	-0.62%	5"	5.5'	122.65'
16	N: 3056624.1726 E: 703257.7987	6.0'	5.0'	-1.07%	4"	4.0'	153.08'	-1.10%	4"	6.5'	153.13'
17	N: 3056601.2172 E: 703232.7618	5.5'	5.0'	2.07%	4"	6.5'	153.02'	-2.16%	3"	3.0'	152.94'
21	N: 3058936.0439 E: 708798.1175	6.0'	5.0'	1.07%	3"	7.5'	153.77'	2.00%	3"	6.5'	153.69'

NOTE: NEGATIVE (-) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.  
 \*\* GRAN CURB TO ACT AS A BUFFER BETWEEN CEM CONC WCR/SIDEWALK AND ADJACENT HMA DRIVEWAY  
 \*\*\* GRAN CURB TO BE PLACED AGAINST BUILDING FLUSH WITH SIDEWALK



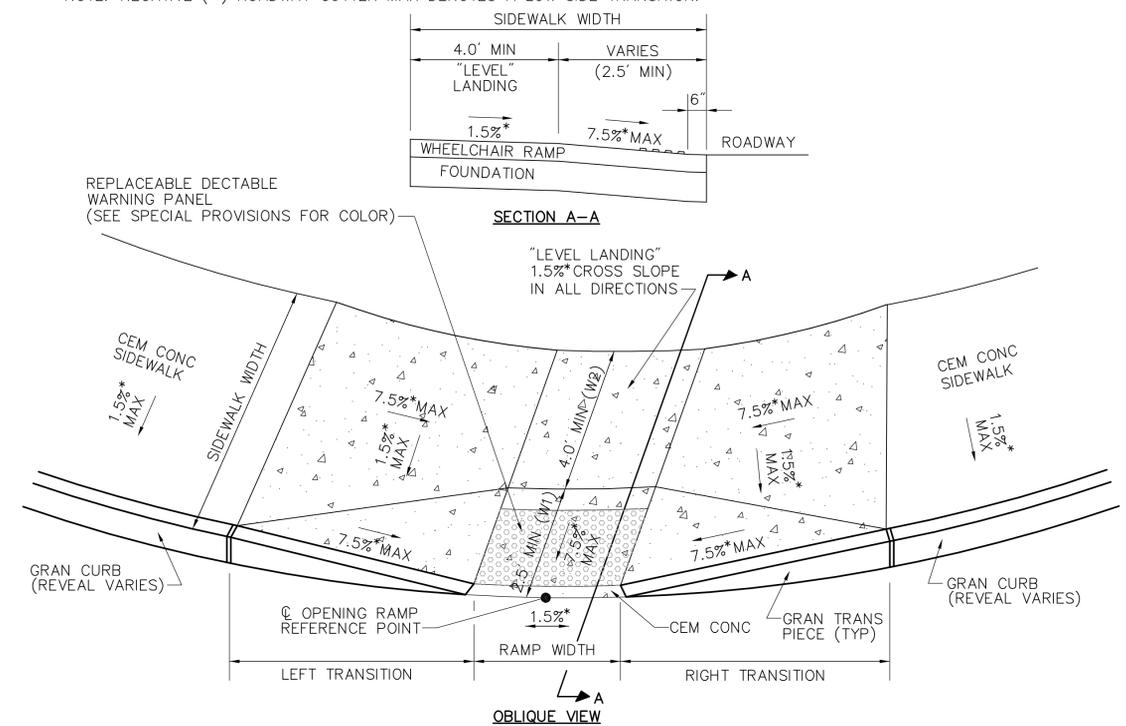
**WHEELCHAIR RAMP  
 LESS THAN 6.50' - STRAIGHT**

SCALE: NOT TO SCALE

\* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA													
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP WIDTH	W1	W2	LEFT SIDE				RIGHT SIDE			
						ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
4	N: 3063354.2035 E: 702743.7802	9.0'- 10.7'	5.0'	5.0'	4.9'	-0.46%	4"	5.0'	122.55'	-0.60%	6"	6.5'	122.52'
9	N: 3061312.6680 E: 702260.7465	6.9'- 7.9'	5.0'	4.0'	4.4'	-0.02%	3"	6.5'	125.37'	0.07%	4"	16.8'	125.45'
12	N: 3061309.3363 E: 702176.7139	6.4'- 6.9'	5.0'	2.5'	4.0'	1.5%	3"	4.5'	123.80'	-1.5%	3.5"	5.0'	123.80'
15	N: 3056670.8862 E: 703260.5136	6.5'	5.0'	2.5'	4.0'	0.11%	2"	4.0'	152.72'	1.55%	2"	4.0'	152.76'
22	N: 3058900.2404 E: 708801.7181	7.0'- 7.5'	5.0'	7.0'	4.0'	0.11%	3"	5.0'	153.61'	2.74%	4"	6.5'	153.71'

NOTE: NEGATIVE (-) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



**WHEELCHAIR RAMP  
 6.50' OR GREATER - CURVED**

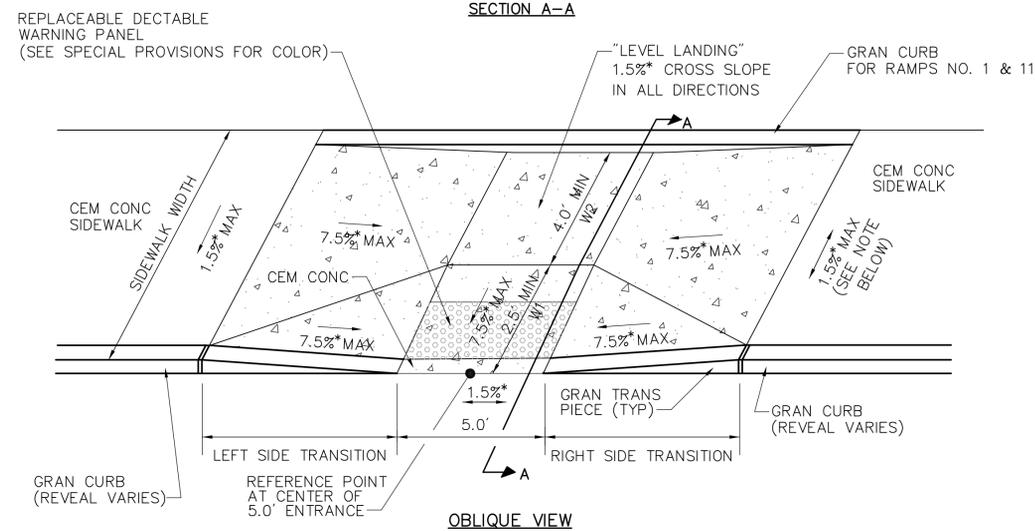
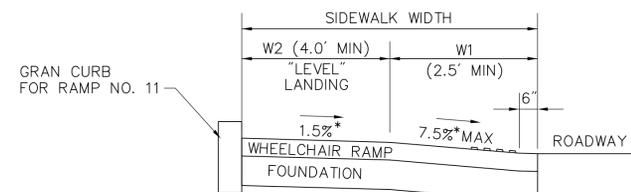
SCALE: NOT TO SCALE

\* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA												
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	W1	W2	LEFT SIDE				RIGHT SIDE			
					ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV
*** 1	N: 3063348.2830 E: 702664.2706	9.3'	5.3'	4.0'	1.32%	6"	8.5'	122.88'	0.49%	5"	6.5'	122.91'
8	N: 3063319.2616 E: 702668.1065	8.9'- 11.0'	5.0'	6.0'	1.52%	4"	6.5'	123.42'	-2.54%	6"	6.5'	123.34'
*** 11	N: 3061278.8119 E: 702198.8720	9.6'- 9.9'	5.5'	4.0'	1.64%	8"	11.0'	124.92'	-1.60%	2"	5.0'	124.84'
13	N: 3061330.9166 E: 702172.4358	8.1'	2.5'	5.6'	-2.86%	3.5"	5.25'	123.10'	-4.67%	3"	6.0'	123.03'
14	N: 3056658.6793 E: 703210.32021	6.5'	2.5'	4.0'	2.25%	4"	6.5'	153.35'	-2.24%	3.5"	4.0'	153.27'
20	N: 3056640.2366 E: 703191.5680	6.5'	2.5'	4.0'	0.41%	4"	5.0'	153.44'	-0.53%	4"	5.0'	153.41'
21	N: 3058872.5310 E: 708752.9020	7.6'	2.0'	4.0'	5.18%	6.5"	15.0'	128.63'	5.18%	4"	6.0'	128.44'

NOTE: NEGATIVE (-) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.

\*\*\* GRAN CURB TO BE PLACED AGAINST BUILDING FLUSH WITH SIDEWALK



NOTE:

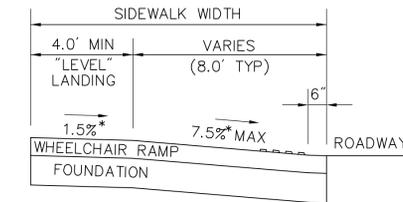
**WHEELCHAIR RAMP  
 6.50' OR GREATER – STRAIGHT**

SCALE: NOT TO SCALE

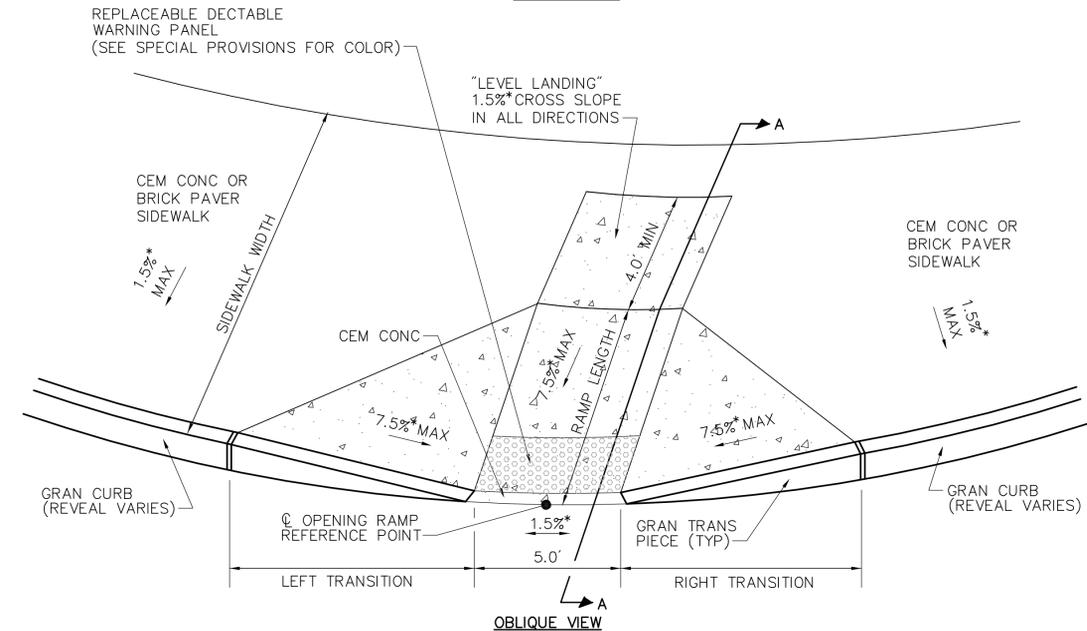
\* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA												
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP LENGTH	LEFT SIDE				RIGHT SIDE				
				ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	ROADWAY GUTTER	REVEAL	TRANS	OPENING ELEV	
5	N: 3063327.7044 E: 702742.3306	VARIES	8.0'	0.69%	6"	6.5'	122.25'	-0.60%	4.5"	6.5'	122.20'	
10	N: 3061285.5602 E: 702227.6970	VARIES	8.0'	4.75%	4"	15.0'	125.77'	-3.60%	8.0"	6.7'	125.69'	

NOTE: NEGATIVE (-) ROADWAY GUTTER MAX DENOTES A LOW SIDE TRANSITION.



SECTION A-A

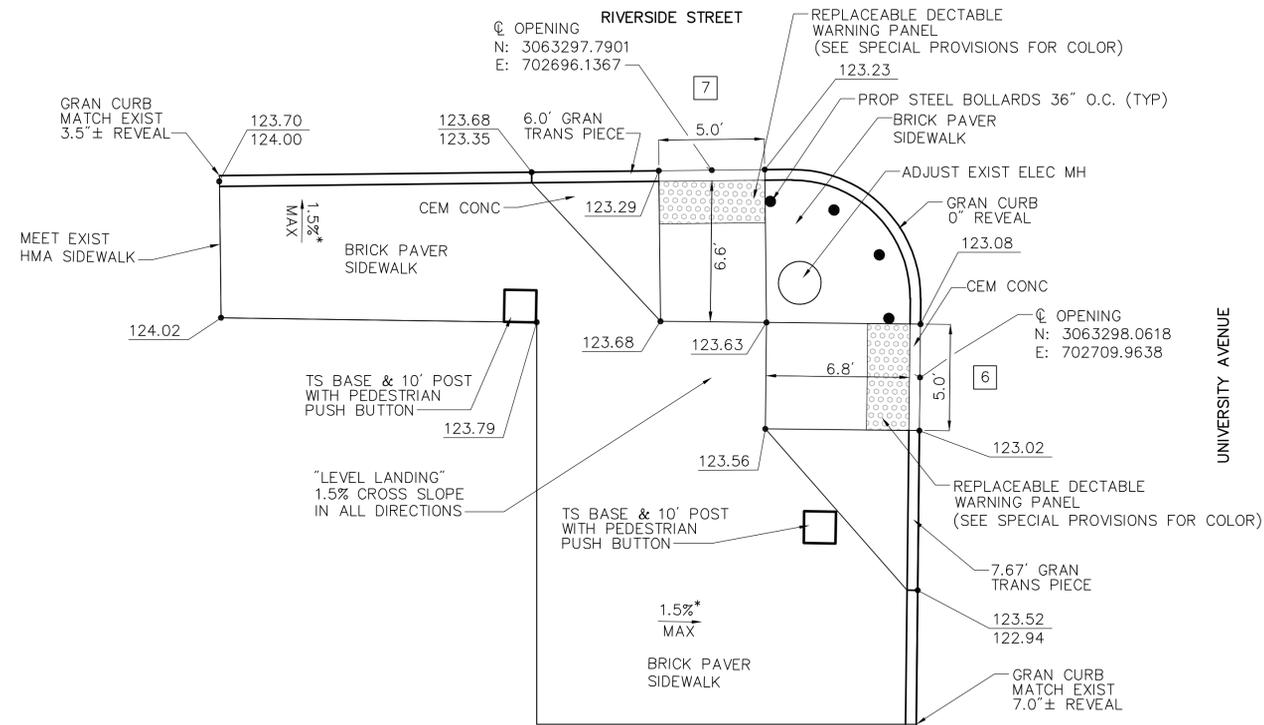


OBLIQUE VIEW

**WHEELCHAIR RAMP  
 12.0' OR GREATER – CURVED**

SCALE: NOT TO SCALE

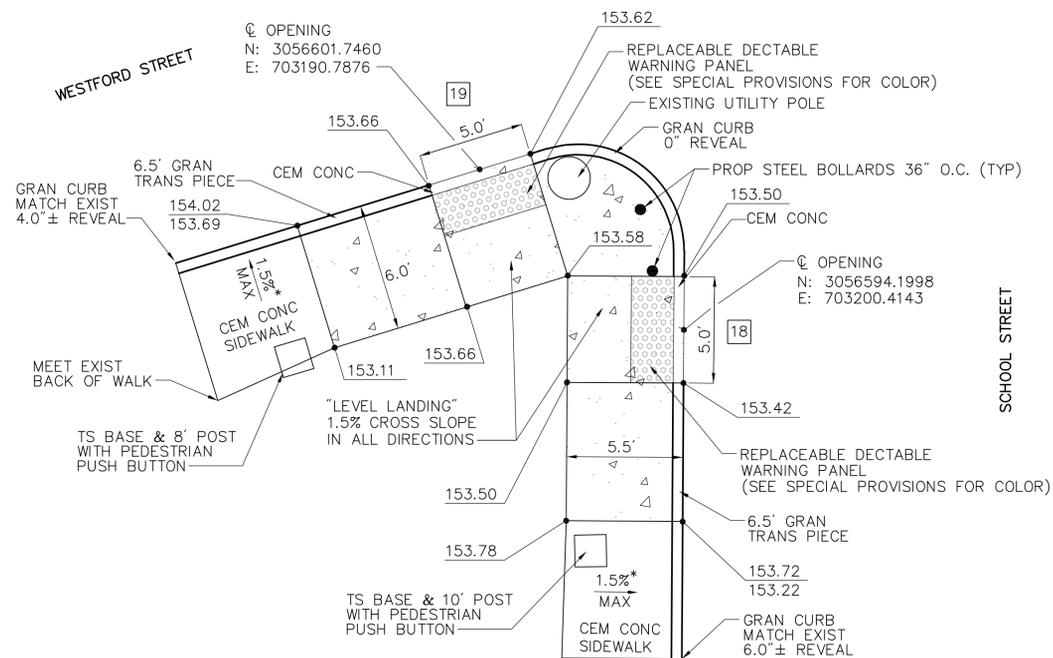
\* TOLERANCE FOR CONSTRUCTION ±0.5%



**WHEELCHAIR RAMP  
 NUMBER 6 AND 7**

SCALE: NOT TO SCALE

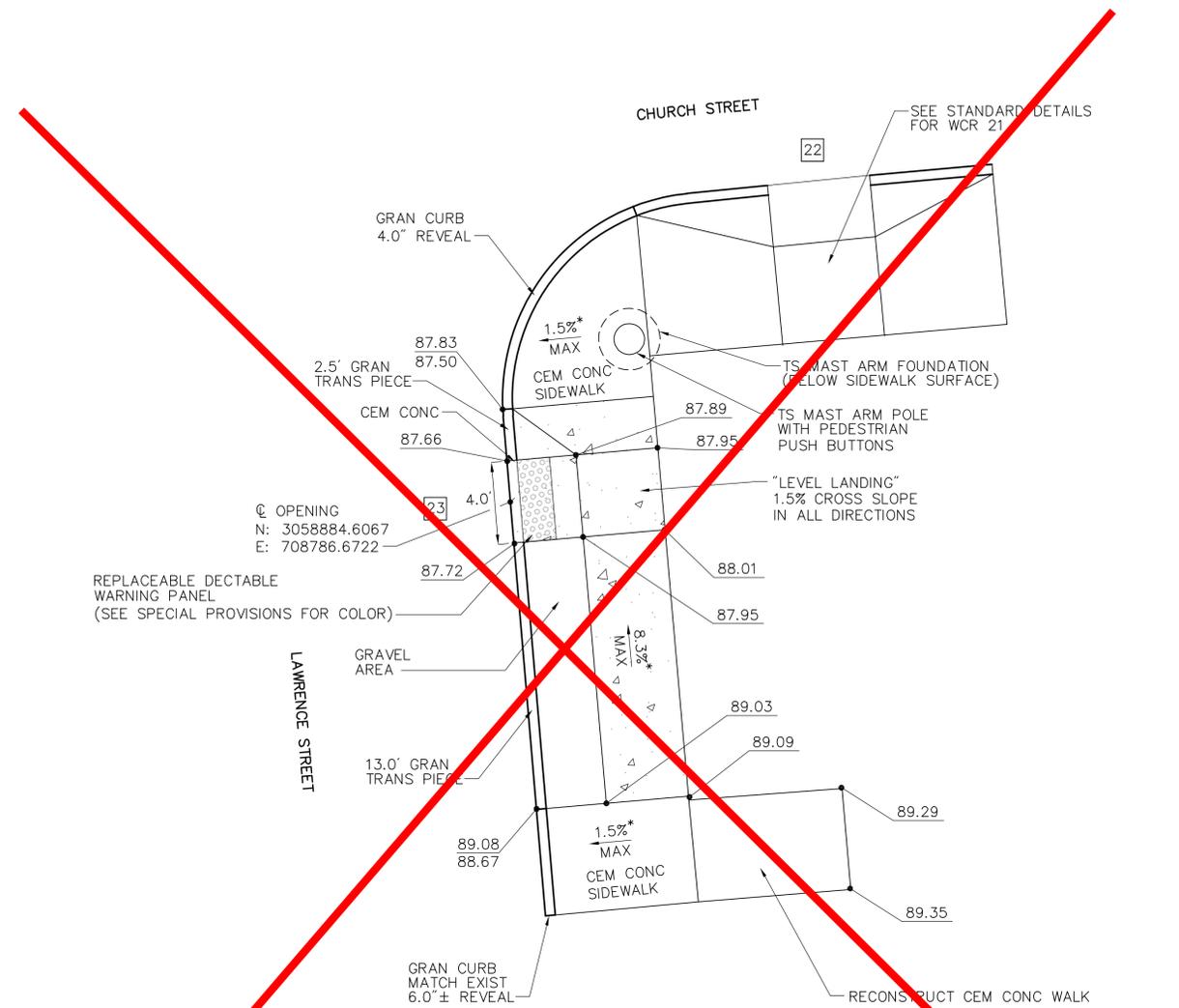
\* TOLERANCE FOR CONSTRUCTION ±0.5%



**WHEELCHAIR RAMP  
 NUMBER 17 AND 18**

SCALE: NOT TO SCALE

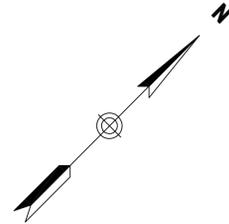
\* TOLERANCE FOR CONSTRUCTION ±0.5%



**WHEELCHAIR RAMP  
 NUMBER 22**

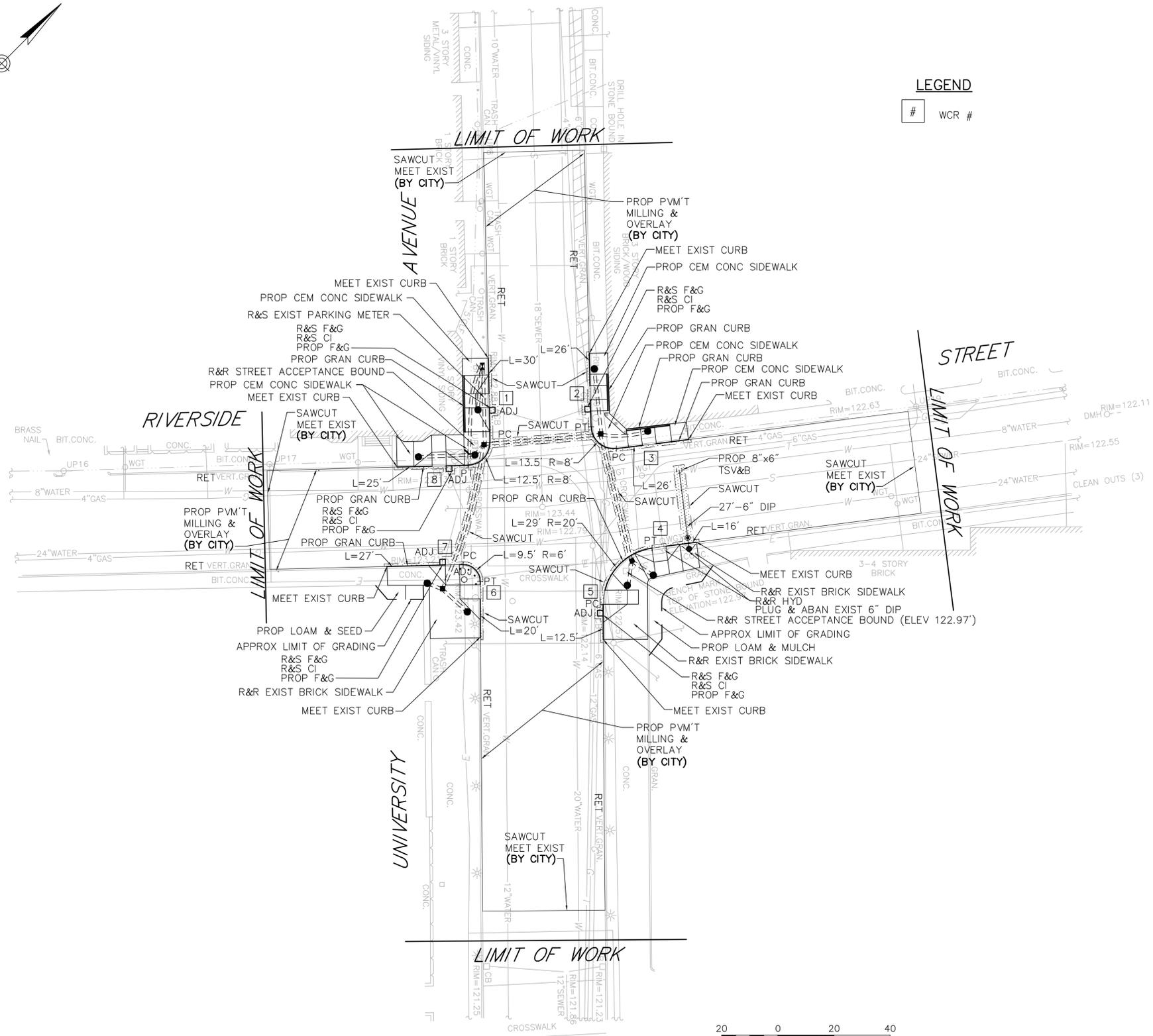
SCALE: NOT TO SCALE

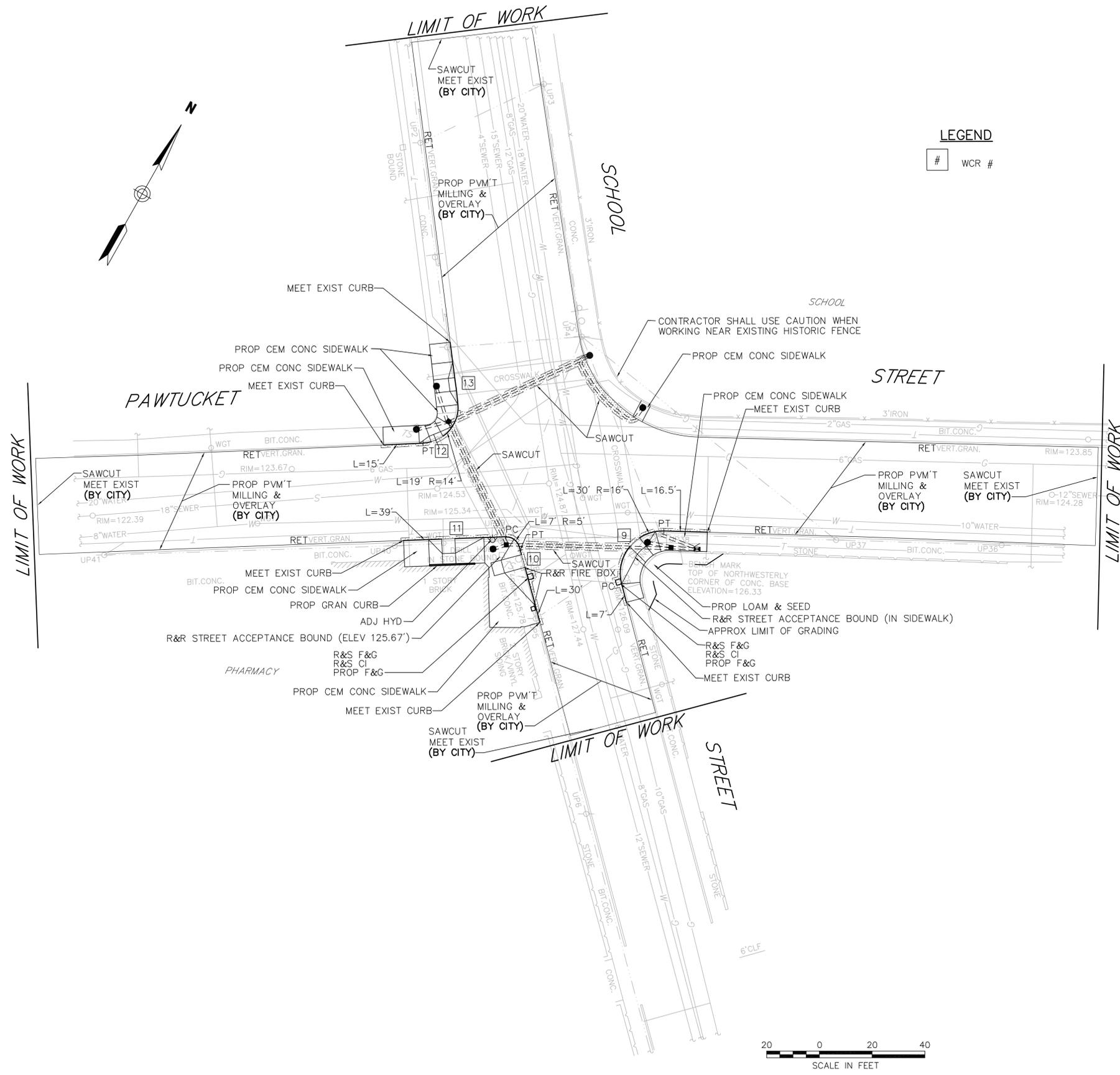
\* TOLERANCE FOR CONSTRUCTION ±0.5%



**LEGEND**

# WCR #





**LEGEND**

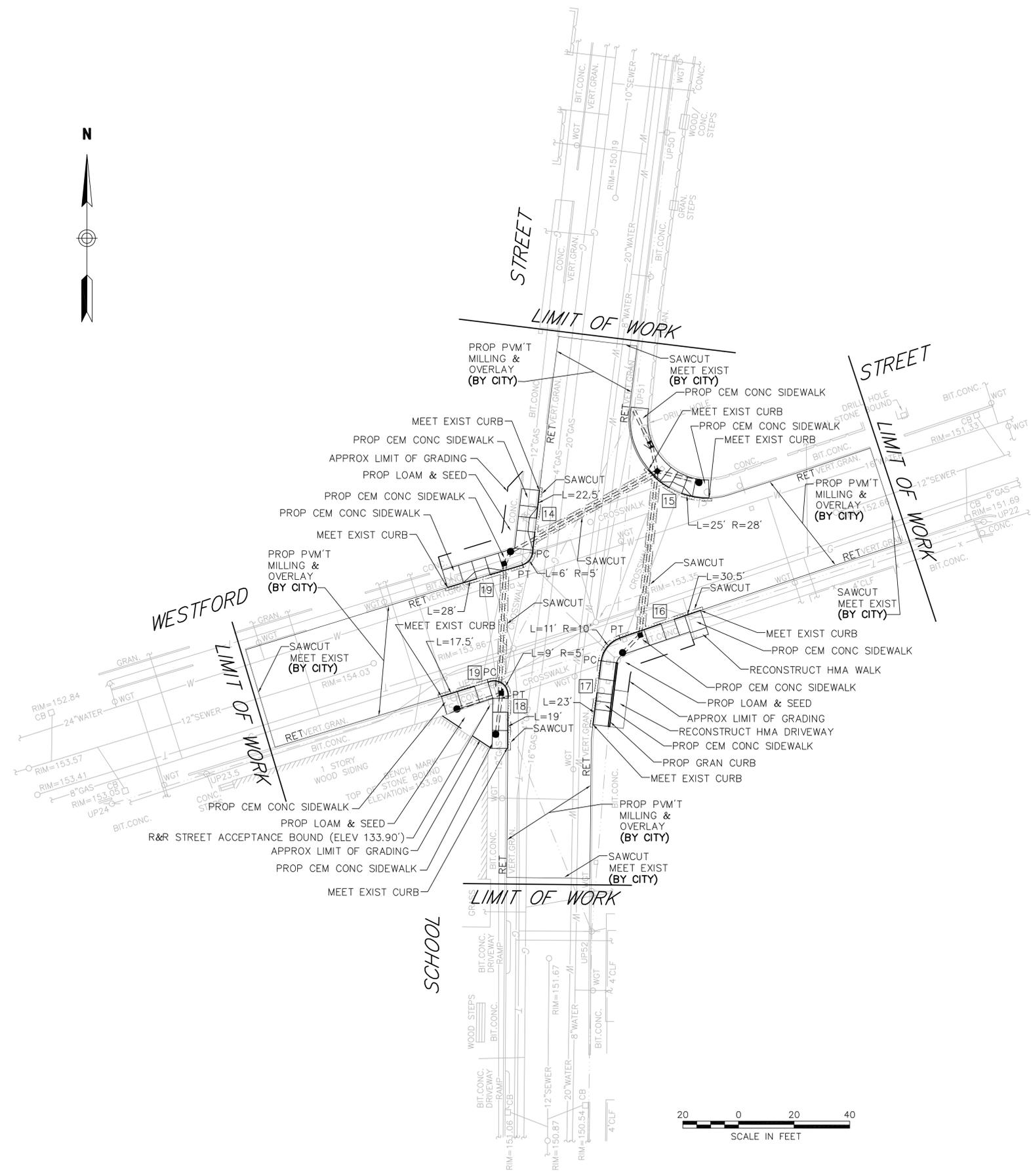
# WCR #

20 0 20 40  
 SCALE IN FEET



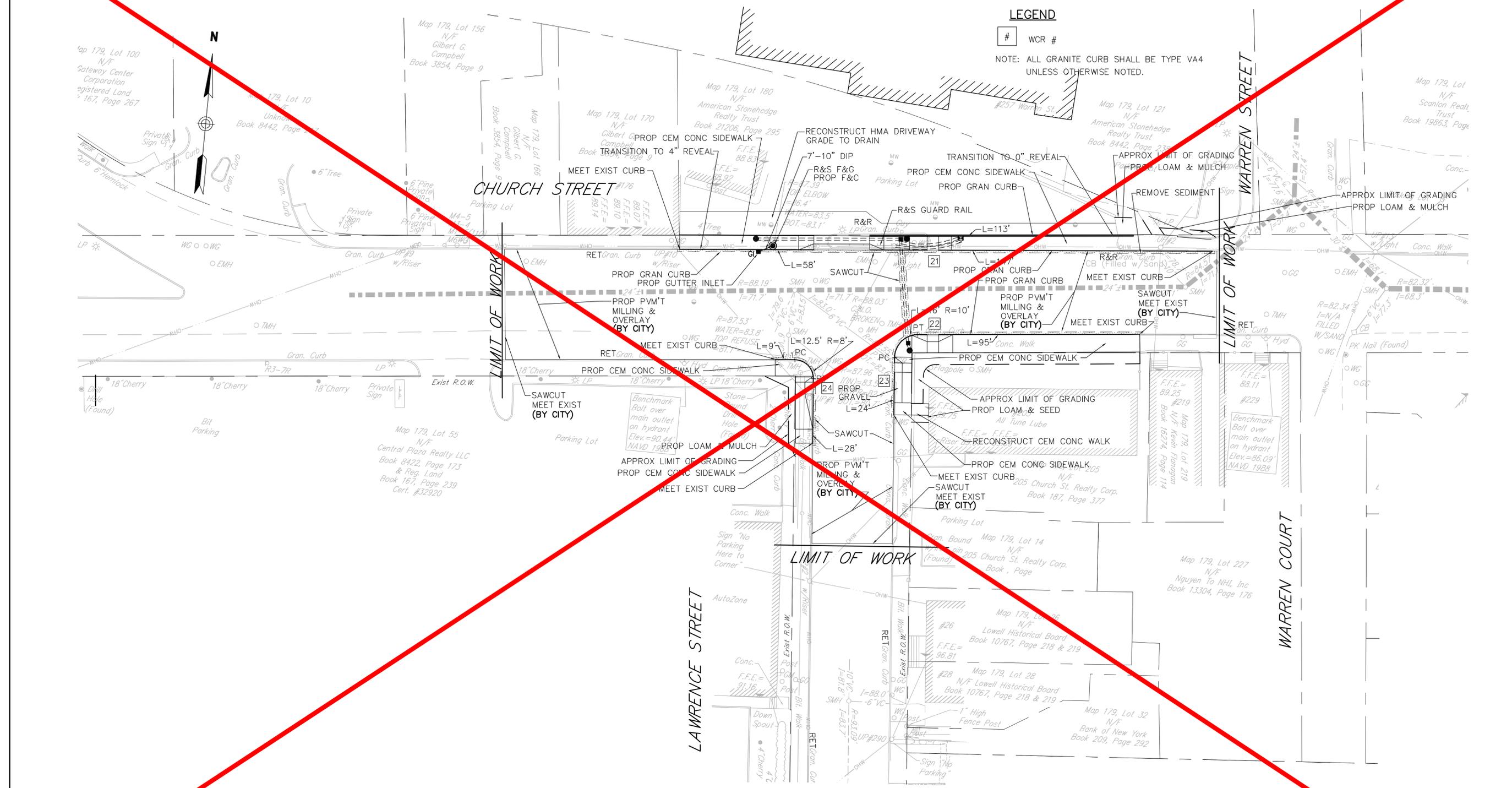
LEGEND

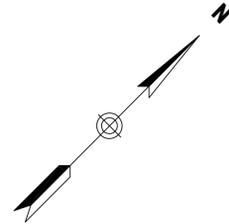
# WCR #



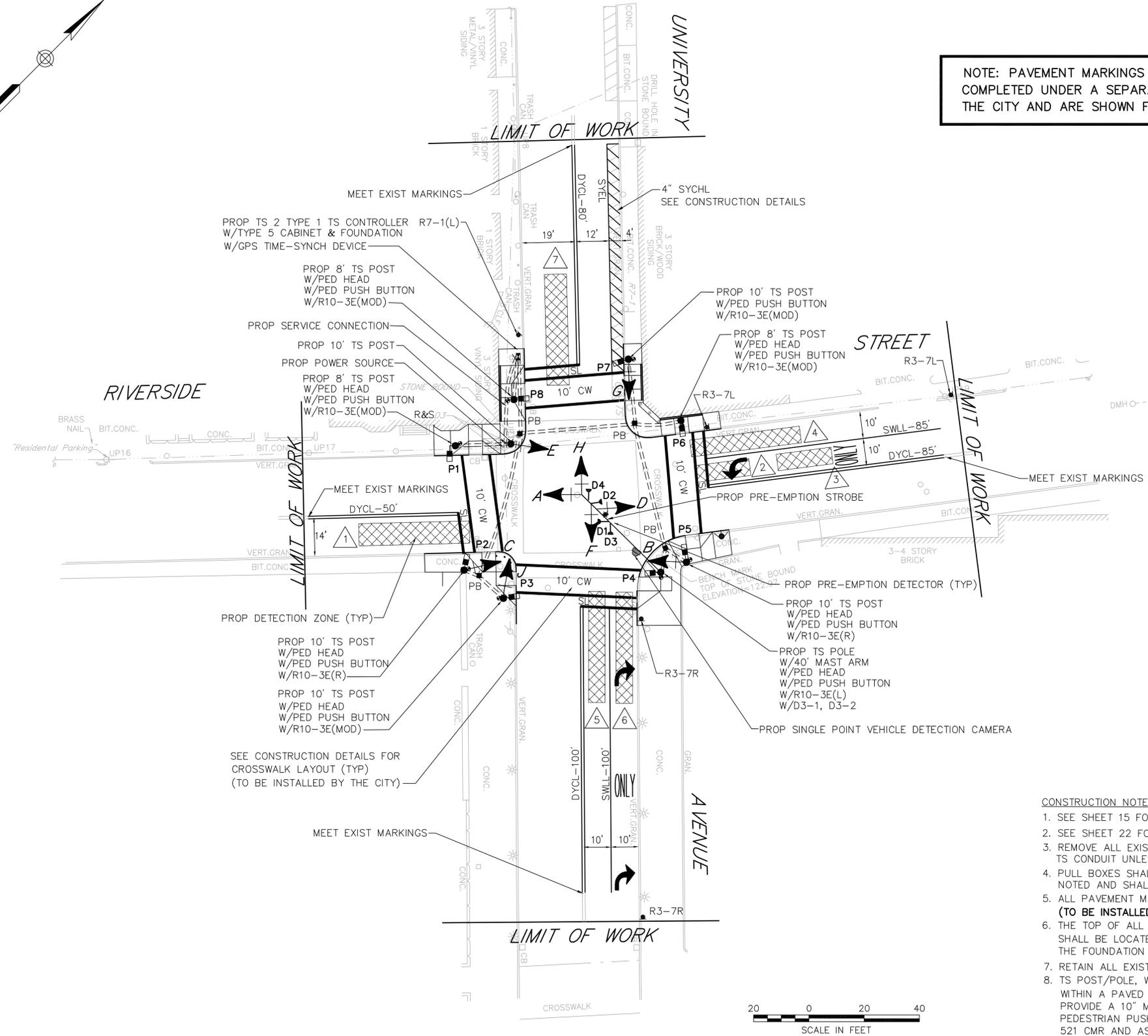
**LEGEND**

# WCR #  
NOTE: ALL GRANITE CURB SHALL BE TYPE VA4 UNLESS OTHERWISE NOTED.





NOTE: PAVEMENT MARKINGS ARE TO BE COMPLETED UNDER A SEPARATE CONTRACT BY THE CITY AND ARE SHOWN FOR REFERENCE ONLY



- CONSTRUCTION NOTES:**
- SEE SHEET 15 FOR TRAFFIC SIGNAL DATA.
  - SEE SHEET 22 FOR TIE PLAN.
  - REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
  - PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
  - ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC. **(TO BE INSTALLED BY THE CITY)**
  - THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
  - RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.
  - TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON THE CONSTRUCTION DETAILS.

		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			6			10			6			10			6							
VEHICLE EXTENSION			2			2			2			2			2							
MAXIMUM 1			15			30			30			30			30							
MAXIMUM 2			15			30			40			30			40							
YELLOW CLEARANCE				3			4			4			4			4				3		
RED CLEARANCE					1			1			1			1			1			1		
PEDESTRIAN INTERVAL						7/9			7/6			7/6			7/6			7/10				
RIVERSIDE STREET	EB	A,B	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
RIVERSIDE STREET	WB	C	←R	←Y	←R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	FY
RIVERSIDE STREET	WB	D,E	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	FY
UNIVERSITY AVENUE	NB	F	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	FR
UNIVERSITY AVENUE	NB	G	R←G	R←Y	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	FR
UNIVERSITY AVENUE	SB	H,J	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	N-S	P1-P2	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT	
PEDESTRIAN X-ING	E-W	P3-P4	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT	
PEDESTRIAN X-ING	N-S	P5-P6	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	W	FDW	DW	OUT	
PEDESTRIAN X-ING	E-W	P7-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	W	FDW	DW	OUT	
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			-				
RECALL			OFF			SOFT			OFF			SOFT			OFF			-				
			ø1			ø2			ø4			ø6			ø8			ø9			ø1 & ø7	
																					NOT USED	

- NOTES:
1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED,
  2. \*\* NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
  3. OL = OVERLAP
  4. PERM = PERMISSIVE
  5. ø4 & ø8 DUAL ENTRY
  6. MAXIMUM 1 = NORMAL OPERATION
  7. MAXIMUM 2 = MON-FRI 7-9 AM; 3-6 PM
  8. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
  9. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.
  10. ø2 SHALL OMIT ø1.

- SEQUENCE & TIMING NOTES:
1. 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.
  2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
  3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
  4. 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.

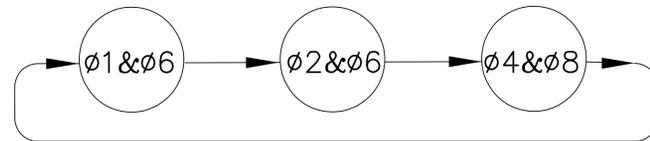
EMERGENCY VEHICLE PRE-EMPTION OPERATION.

1. 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.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. 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 CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

PRE-EMPTION PHASING & PRIORITY			
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		ø2
D2	2		ø1&ø6
D3	3		ø8
D4	4		ø4

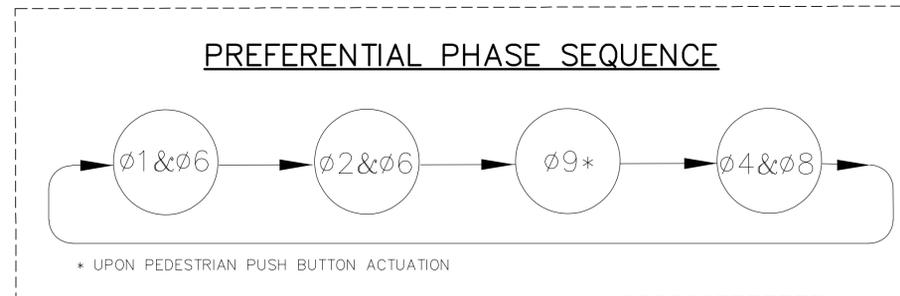
FOR FUTURE USE

PREFERENTIAL PHASE SEQUENCE



FOR FUTURE USE

PREFERENTIAL PHASE SEQUENCE



SIGNAL HEAD DATA			
A,B,D,E,F,H,J	C	G	P1-P8
BI-MODAL LENSES			HAND/MAN W/COUNTDOWN TIMER (L.E.D.) SINGLE SECTION
ALL 12" LENS			

- NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES.
  2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES AND TUNNEL VISORS.

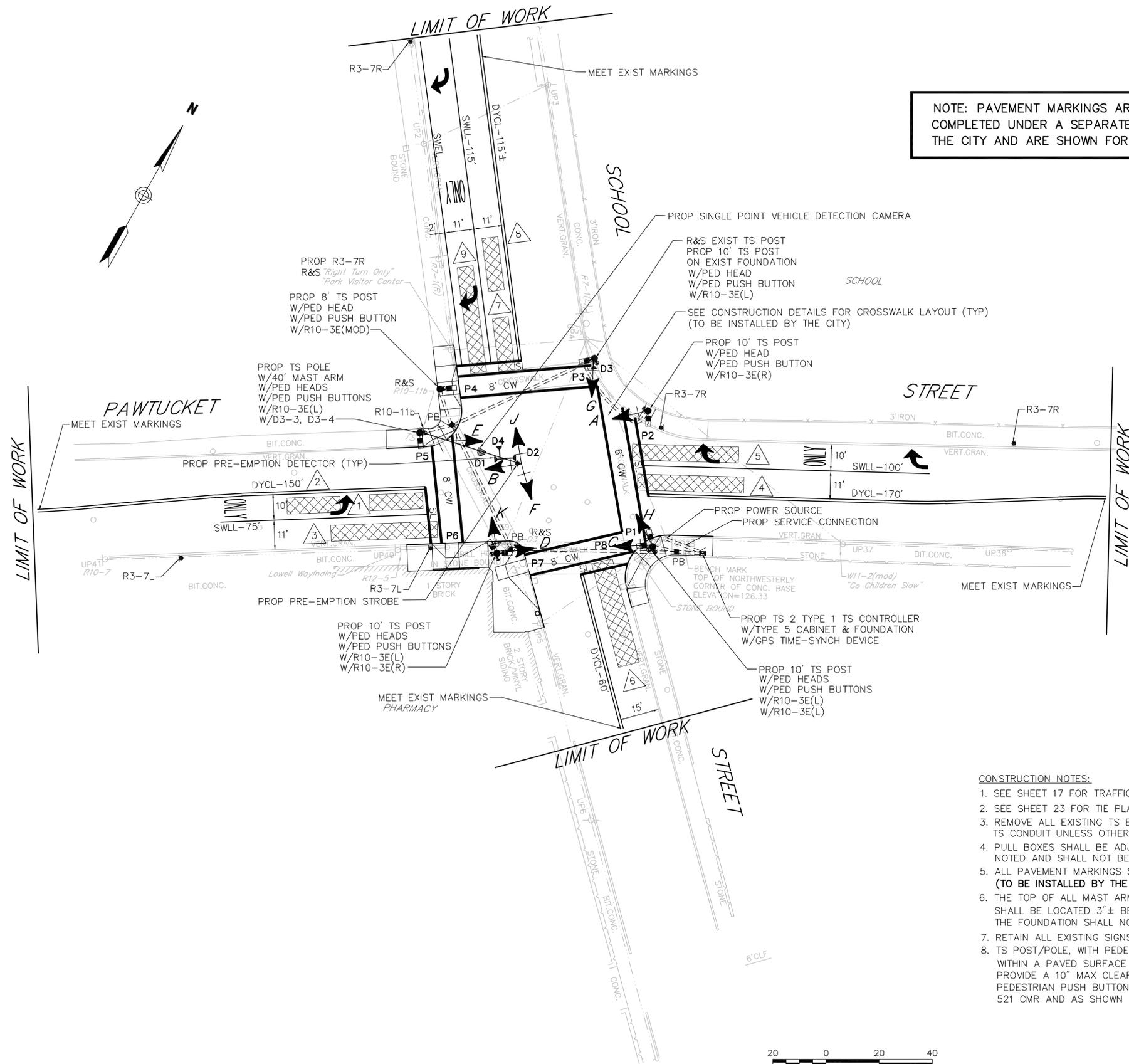
DETECTOR DATA			
DETECTOR NO.	ZONE SIZE	DELAY /EXT	CALL PHASE
1	TO BE FIELD ADJUSTED	0	ø2
2	TO BE FIELD ADJUSTED	0	ø1
3	TO BE FIELD ADJUSTED	0	ø6
4	TO BE FIELD ADJUSTED	0	ø6
5	TO BE FIELD ADJUSTED	0	ø8
6	TO BE FIELD ADJUSTED	DELAY 5 SEC	ø8
7	TO BE FIELD ADJUSTED	0	ø4

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

ITEM 816.01  
TRAFFIC SIGNAL RECONSTRUCTION  
UNIVERSITY AVENUE AT RIVERSIDE STREET  
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	8ø TS 2 TYPE 1 CONTROLLER IN A TYPE 5 BASE MOUNTED CABINET INCL. FOUNDATION
1	GPS TIME-SYNCH DEVICE
1	TS 40' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
3	TS POST 8' STANDARD INCL. FOUNDATION
5	TS POST 10' STANDARD INCL. FOUNDATION
7	SIGNAL HEAD, 3-SECTION, 12" LENSES
2	SIGNAL HEAD, 4-SECTION BI-MODAL, 12" LENSES
8	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER
1	PEDESTRIAN PUSH BUTTON W/R10-3E(L) AND SIGN SADDLE
2	PEDESTRIAN PUSH BUTTON W/R10-3E(R) AND SIGN SADDLE
5	PEDESTRIAN PUSH BUTTON W/R10-3E(MOD) AND SIGN SADDLE
4	PULL BOX-12"x12"
1	SINGLE POINT VIDEO DETECTION (1 CAMERA, VDP AND CABLES)
4	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
1	EMERGENCY PRE-EMPTION 4 CHANNEL PHASE SELECTOR
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	SERVICE CONNECTION (OVERHEAD)

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

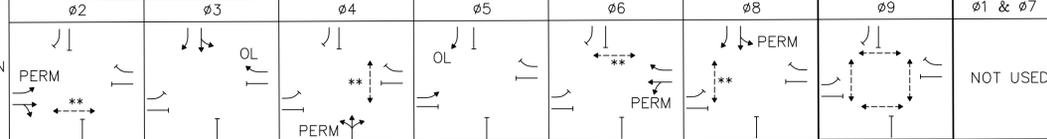


NOTE: PAVEMENT MARKINGS ARE TO BE COMPLETED UNDER A SEPARATE CONTRACT BY THE CITY AND ARE SHOWN FOR REFERENCE ONLY

- CONSTRUCTION NOTES:
1. SEE SHEET 17 FOR TRAFFIC SIGNAL DATA.
  2. SEE SHEET 23 FOR TIE PLAN.
  3. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
  4. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
  5. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC. **(TO BE INSTALLED BY THE CITY)**
  6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
  7. RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.
  8. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON THE CONSTRUCTION DETAILS.

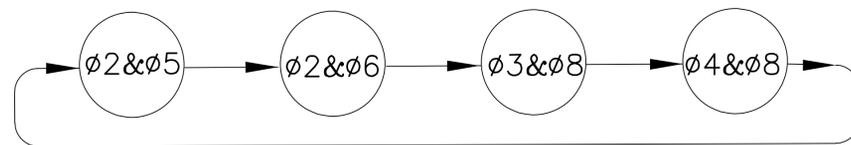
SEQUENCE AND TIMING																								
APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	FLASHING OPERATION
MINIMUM INTERVAL			10			6			6			6			10			6						
VEHICLE EXTENSION			2			2			2			2			2			2						
MAXIMUM 1			30			15			20			15			20			40						
MAXIMUM 2			45			30			25			20			35			55						
YELLOW CLEARANCE				4			3			5			3			4			5				3	
RED CLEARANCE					1			1			1			1			1			1			1	
PEDESTRIAN INTERVAL			7/6						7/11						7/11							7/13		
PAWTUCKET STREET	EB	A	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	RY
PAWTUCKET STREET	EB	B,C	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	RY
PAWTUCKET STREET	WB	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	RY
PAWTUCKET STREET	WB	E	R	R	R	R-G	R-Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	RY
SCHOOL STREET	NB	F,G	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
SCHOOL STREET	SB	H	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
SCHOOL STREET	SB	J	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
SCHOOL STREET	SB	K	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	N-S	P1-P2	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
PEDESTRIAN X-ING	E-W	P3-P4	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
PEDESTRIAN X-ING	N-S	P5-P6	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	W	FDW	DW	OUT
PEDESTRIAN X-ING	E-W	P7-P8	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			-			
RECALL			SOFT			OFF			OFF			OFF			SOFT			OFF			-			

- NOTES:
1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED,
  2. \*\* NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
  3. OL = OVERLAP
  4. PERM = PERMISSIVE
  5.  $\phi 4$  &  $\phi 8$  DUAL ENTRY
  6. MAXIMUM 1 = NORMAL OPERATION
  7. MAXIMUM 2 = MON-FRI 7-9 AM; 3-6 PM
  8. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
  9. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.
  10.  $\phi 6$  SHALL OMIT  $\phi 5$ .
  11.  $\phi 4$  SHALL OMIT  $\phi 3$ .



FOR FUTURE  
USE

PREFERENTIAL PHASE SEQUENCE



SEQUENCE & TIMING NOTES:

1. 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.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. 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.

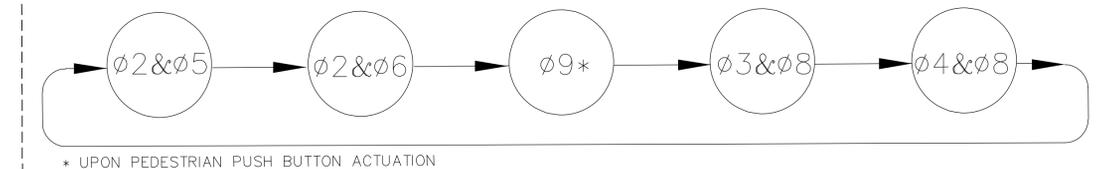
EMERGENCY VEHICLE PRE-EMPTION OPERATION:

1. 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.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. 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 CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

PRE-EMPTION PHASING & PRIORITY			
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		$\phi 2$ & $\phi 5$
D2	2		$\phi 6$
D3	3		$\phi 4$
D4	4		$\phi 3$ & $\phi 8$

FOR FUTURE USE

PREFERENTIAL PHASE SEQUENCE



ITEM 816.02  
TRAFFIC SIGNAL RECONSTRUCTION  
PAWTUCKET STREET AT SCHOOL STREET  
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	8 $\phi$ TS 2 TYPE 1 CONTROLLER IN A TYPE 5 BASE MOUNTED CABINET INCL. FOUNDATION
1	GPS TIME-SYNCH DEVICE
1	TS 40' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
1	TS POST 8' STANDARD INCL. FOUNDATION
3	TS POST 10' STANDARD INCL. FOUNDATION
1	TS POST 10' STANDARD ON EXIST FOUNDATION
6	SIGNAL HEAD, 3-SECTION, 12" LENSES
4	SIGNAL HEAD, 4-SECTION BI-MODAL, 12" LENSES
8	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER
5	PEDESTRIAN PUSH BUTTON W/R10-3E(L) AND SIGN SADDLE
2	PEDESTRIAN PUSH BUTTON W/R10-3E(R) AND SIGN SADDLE
1	PEDESTRIAN PUSH BUTTON W/R10-3E(MOD) AND SIGN SADDLE
3	PULL BOX-12"x12"
1	SINGLE POINT VIDEO DETECTION (1 CAMERA, VDP AND CABLES)
4	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
1	EMERGENCY PRE-EMPTION 4 CHANNEL PHASE SELECTOR
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	SERVICE CONNECTION (OVERHEAD)
2	12" GEOMETRICALLY PROGRAMMABLE LOUVERS (SEE NOTE 1 BELOW)

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

NOTE:

1. GEOMETRICALLY PROGRAMMABLE LOUVERS SHALL BE INSTALLED AT THE PEDESTRIAN CROSSING SIGNAL ON SCHOOL STREET, JUST NORTH OF PAWTUCKET STREET. LOUVERS SHALL BE INSTALLED ON THE GREEN SIGNAL DISPLAYS FOR THE SCHOOL STREET NORTHBOUND APPROACH AND POSITIONED TO BLOCK THE VIEW OF THE GREEN DISPLAY, WHEN ILLUMINATED, FROM NORTHBOUND VEHICLES TRAVELING ON SCHOOL STREET, SOUTH OF PAWTUCKET STREET.

SIGNAL HEAD DATA			
A,H	B,C,D,F,G,J	E,K	P1-P8
ALL 12" LENS			

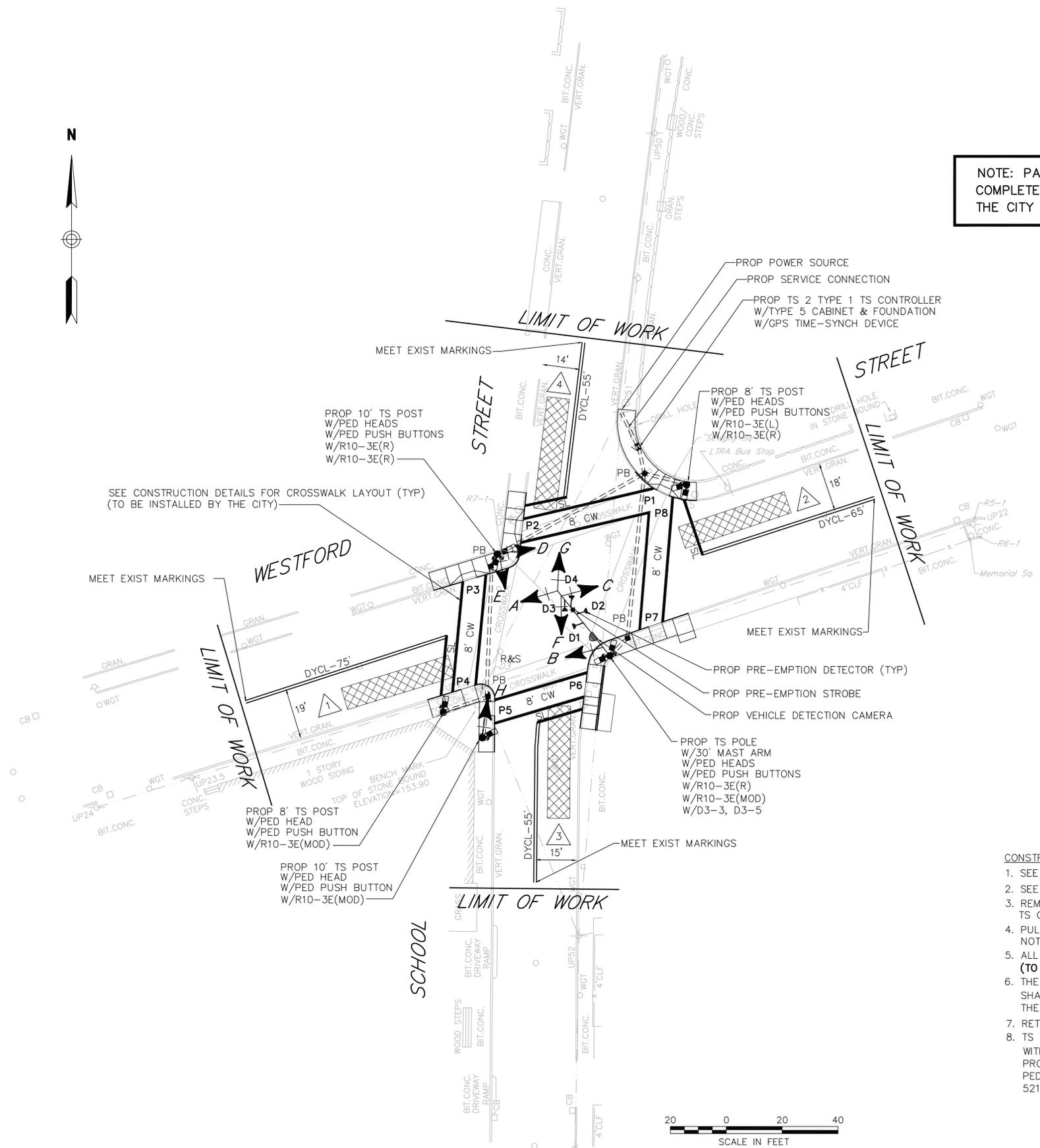
- NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES.
  2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES AND TUNNEL VISORS.

DETECTOR DATA			
DETECTOR NO.	ZONE SIZE	DELAY /EXT	CALL PHASE
1	TO BE FIELD ADJUSTED	0	$\phi 5$
2	TO BE FIELD ADJUSTED	0	$\phi 2$
3	TO BE FIELD ADJUSTED	0	$\phi 2$
4	TO BE FIELD ADJUSTED	0	$\phi 6$
5	TO BE FIELD ADJUSTED	DELAY 5 SEC	$\phi 6$
6	TO BE FIELD ADJUSTED	0	$\phi 4$
7	TO BE FIELD ADJUSTED	0	$\phi 3$
8	TO BE FIELD ADJUSTED	0	$\phi 8$
9	TO BE FIELD ADJUSTED	DELAY 5 SEC	$\phi 8$

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



NOTE: PAVEMENT MARKINGS ARE TO BE COMPLETED UNDER A SEPARATE CONTRACT BY THE CITY AND ARE SHOWN FOR REFERENCE ONLY



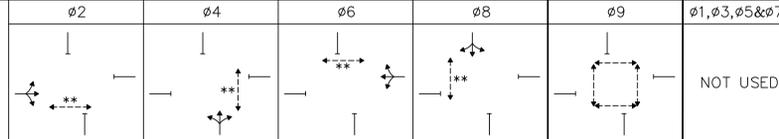
**CONSTRUCTION NOTES:**

1. SEE SHEET 19 FOR TRAFFIC SIGNAL DATA.
2. SEE SHEET 24 FOR TIE PLAN.
3. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
4. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
5. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC. **(TO BE INSTALLED BY THE CITY)**
6. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
7. RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.
8. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON THE CONSTRUCTION DETAILS.

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			6			10			6						
VEHICLE EXTENSION			2			2			2			2						
MAXIMUM 1			30			30			30			30						
MAXIMUM 2			40			30			40			30						
YELLOW CLEARANCE				4			3			4			3				3	
RED CLEARANCE					1			1			1			1				1
PEDESTRIAN INTERVAL			7/5			7/10			7/11			7/8			7/12			
WESTFORD STREET	EB	A,B	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	RY
WESTFORD STREET	WB	C,D	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	RY
SCHOOL STREET	NB	E,F	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR
SCHOOL STREET	SB	G,H	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
PEDESTRIAN X-ING	E-W	P5-P6	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	N-S	P7-P8	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	E-W	P1-P2	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	N-S	P3-P4	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	OUT
DETECTOR			NON-LOCK		NON-LOCK		NON-LOCK		NON-LOCK									
RECALL			SOFT		OFF		SOFT		OFF									

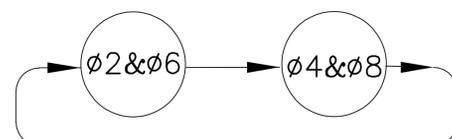
NOTES:

1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED,
2. \*\* NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. PERM = PERMISSIVE
4.  $\phi 4$  &  $\phi 8$  DUAL ENTRY
5. MAXIMUM 1 = NORMAL OPERATION
6. MAXIMUM 2 = MON-FRI 7-9 AM; 3-6 PM
7. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
8. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.



FOR FUTURE USE

PREFERENTIAL PHASE SEQUENCE



SEQUENCE & TIMING NOTES:

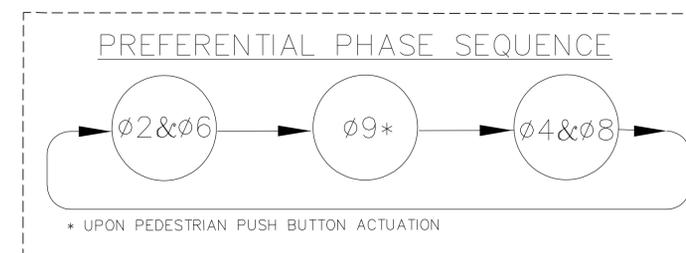
1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
4. 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.

EMERGENCY VEHICLE PRE-EMPTION OPERATION.

1. 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.
2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2, D3 OR D4 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D4 LOWEST)
3. 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 CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
4. MINIMUM GREEN AND NORMAL VEHICLE CLEARANCE SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

PRE-EMPTION PHASING & PRIORITY			
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		$\phi 2$
D2	2		$\phi 6$
D3	3		$\phi 4$
D4	4		$\phi 8$

FOR FUTURE USE



SIGNAL HEAD DATA	
A,B,C,D,E,F,G,H	P1-P8
ALL 12" LENS	HAND/MAN W/COUNTDOWN TIMER (L.E.D.) SINGLE SECTION

1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5" ± LOUVERED BACKPLATES.
2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES AND TUNNEL VISORS.

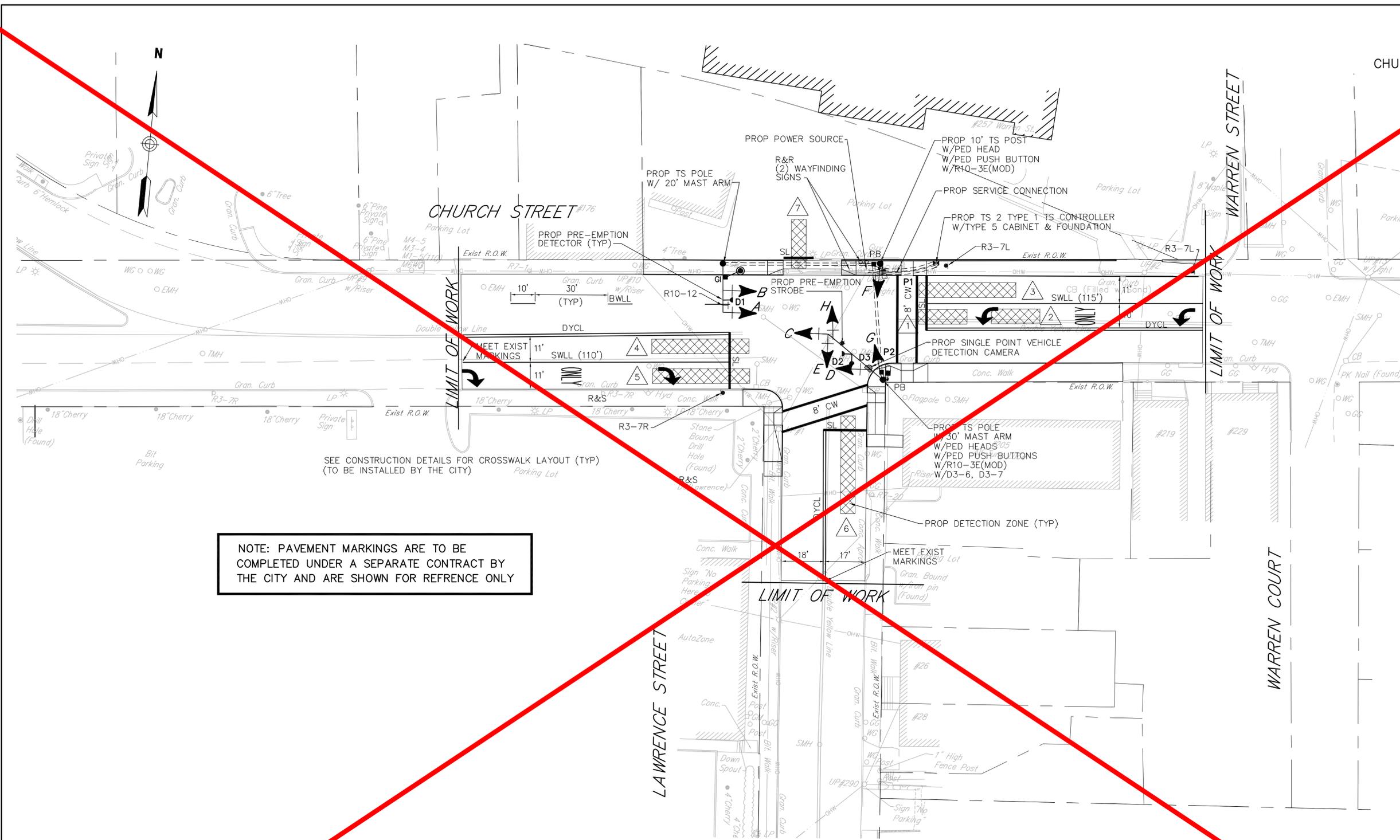
DETECTOR DATA			
DETECTOR NO.	ZONE SIZE	DELAY /EXT	CALL PHASE
1	TO BE FIELD ADJUSTED	0	$\phi 2$
2	TO BE FIELD ADJUSTED	0	$\phi 6$
3	TO BE FIELD ADJUSTED	0	$\phi 4$
4	TO BE FIELD ADJUSTED	0	$\phi 8$

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

ITEM 816.03  
TRAFFIC SIGNAL RECONSTRUCTION  
WESTFORD STREET AT SCHOOL STREET  
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	80 TS 2 TYPE 1 CONTROLLER IN A TYPE 5 BASE MOUNTED CABINET INCL. FOUNDATION
1	GPS TIME-SYNCH DEVICE
1	TS 30' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
2	TS POST 8' STANDARD INCL. FOUNDATION
2	TS POST 10' STANDARD INCL. FOUNDATION
8	SIGNAL HEAD, 3-SECTION, 12" LENSES
8	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER
1	PEDESTRIAN PUSH BUTTON W/R10-3E(L) AND SIGN SADDLE
4	PEDESTRIAN PUSH BUTTON W/R10-3E(R) AND SIGN SADDLE
3	PEDESTRIAN PUSH BUTTON W/R10-3E(MOD) AND SIGN SADDLE
4	PULL BOX-12"x12"
1	SINGLE POINT VIDEO DETECTION (1 CAMERA, VDP AND CABLES)
4	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
1	EMERGENCY PRE-EMPTION 4 CHANNEL PHASE SELECTOR
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	SERVICE CONNECTION (OVERHEAD)

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



NOTE: PAVEMENT MARKINGS ARE TO BE COMPLETED UNDER A SEPARATE CONTRACT BY THE CITY AND ARE SHOWN FOR REFERENCE ONLY

SEE CONSTRUCTION DETAILS FOR CROSSWALK LAYOUT (TYP) (TO BE INSTALLED BY THE CITY)



- CONSTRUCTION NOTES:
1. SEE SHEET 21 FOR TRAFFIC SIGNAL DATA.
  2. SEE SHEET 25 FOR TIE PLAN.
  3. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
  4. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC. (TO BE INSTALLED BY THE CITY)
  5. THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED 3"± BELOW FINISH GRADE. THE TOP OF THE FOUNDATION SHALL NOT BE EXPOSED TO THE SIDEWALK.
  6. RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.
  7. TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN ON THE CONSTRUCTION DETAILS.

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			6			10			6			10			6			
VEHICLE EXTENSION			2			2			2			2			2			
MAXIMUM 1			15			35			25			35			25			
MAXIMUM 2			20			50			25			50			25			
YELLOW CLEARANCE				4			4			4			4			4		
RED CLEARANCE					1			1			2			1			2	
PEDESTRIAN INTERVAL															7/6			
CHURCH STREET	WB	A	G	Y	R	R	R	R	R	R	R	G	Y	R	R	R	R	FY
CHURCH STREET	WB	B	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FY
CHURCH STREET	EB	C,D	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FY
LAWRENCE STREET	NB	E,F	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR
DRIVEWAY	SB	G,H	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	N-S	P1-P2	DW	W/FDW	DW	DW	OUT											

DETECTOR	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK	NON-LOCK
RECALL	OFF	SOFT	OFF	SOFT	OFF
	ø1	ø2	ø4	ø6	ø8 ø3,ø5 & ø7

- NOTES:
1. AUTOMATIC FLASHING OPERATION PER 2009 M.U.T.C.D., AS AMENDED
  2. \*\* NORMALLY DW, W/FDW UPON PEDESTRIAN PUSH BUTTON ACTUATION
  3. PERM = PERMISSIVE
  4. ø4 & ø8 DUAL ENTRY
  5. MAXIMUM 1 = NORMAL OPERATION
  6. MAXIMUM 2 = MON-FRI 7-9 AM; 3-6 PM
  7. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
  8. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL BE IN EFFECT.
  9. ø2 SHALL OMIT ø1.

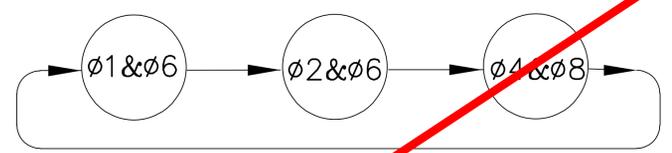
- SEQUENCE & TIMING NOTES:
1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
  2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
  3. IF CALLS EXIST ON ALL PHASES, THE ASSIGNMENT OF RIGHT OF WAY SHALL BE IN ACCORDANCE WITH THE PREFERENTIAL PHASE SEQUENCE.
  4. 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.

- EMERGENCY VEHICLE PRE-EMPTION OPERATION.
1. 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.
  2. PRE-EMPTION SIGNALS SHALL BE SERVICED ON A PRIORITY BASIS WITH DETECTORS D1, D2 OR D3 ASSIGNED DESCENDING PRIORITIES AS FOLLOWS: (D1 HIGHEST AND D3 LOWEST)
  3. 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 CLEARANCES FOR THE ASSOCIATED PHASE(S) AS SHOWN IN THE SEQUENCE AND TIMING CHART AND SERVICE SUBSEQUENT EMERGENCY VEHICLE PRE-EMPTION PHASES AS NECESSARY.
  4. MINIMUM GREEN AND NORMAL VEHICLE AND PEDESTRIAN CLEARANCE TIMES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PRE-EMPTION DEMAND.
  5. PRE-EMPTION STROBE SHALL BE ILLUMINATED WHENEVER ANY EMERGENCY VEHICLE PRE-EMPTION GREEN IS ON.

PRE-EMPTION PHASING & PRIORITY

DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
D1	1		ø1&ø6
D2	2		ø2
D3	3		ø8

PREFERENTIAL PHASE SEQUENCE



SIGNAL HEAD DATA

A	B,C,D,E,F,G,H	P1-P2
BI-MODAL LENSES ALL 12" LENS		HAND/MAN W/COUNTDOWN TIMER (L.E.D.) SINGLE SECTION

- NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES.
  2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES AND TUNNEL VISORS.

DETECTOR DATA

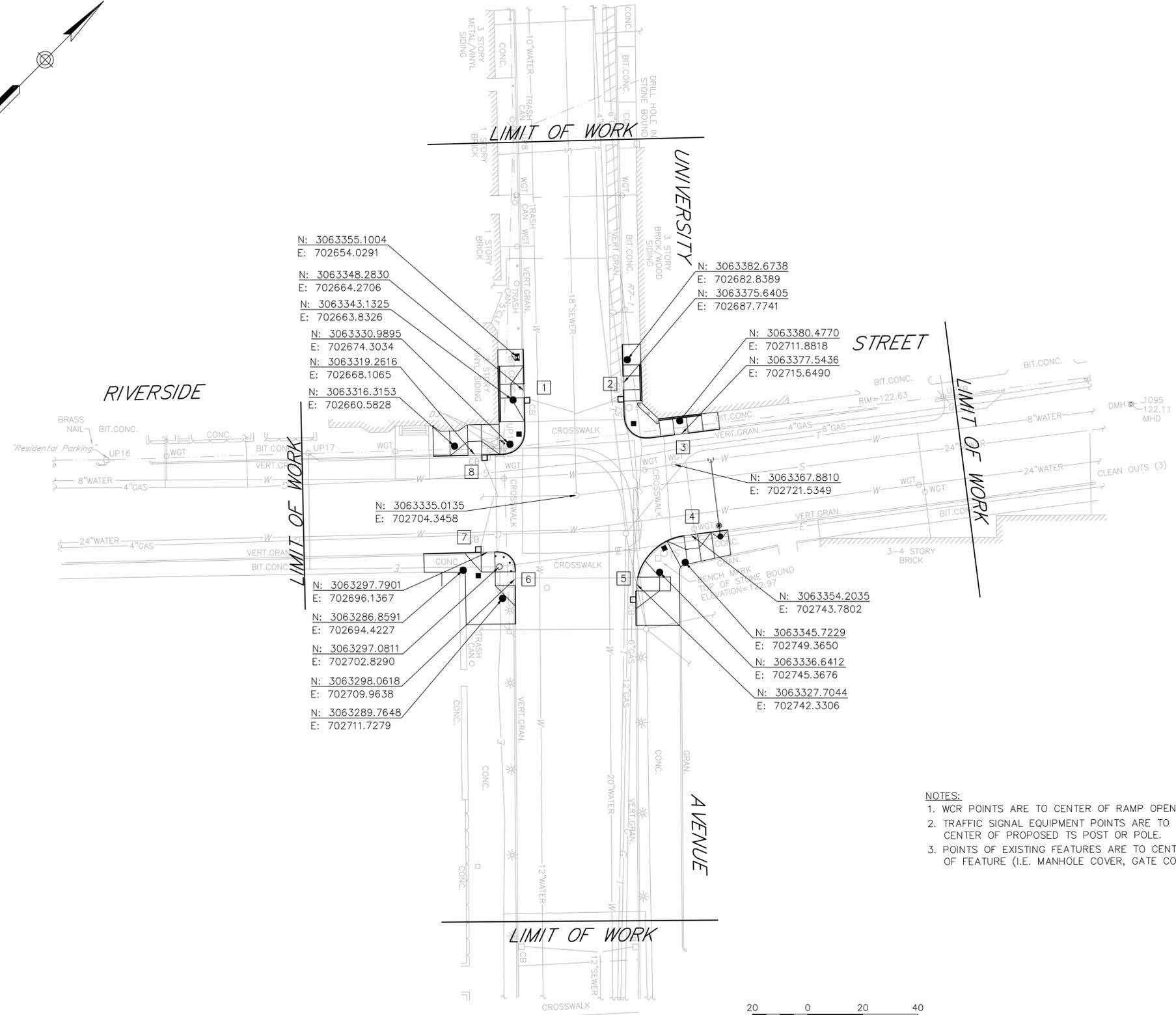
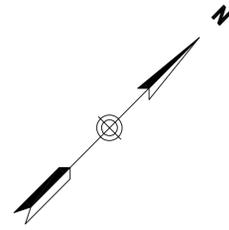
DETECTOR NO.	ZONE SIZE	DELAY /EXT	CALL PHASE
1	TO BE FIELD ADJUSTED	0	ø1
2	TO BE FIELD ADJUSTED	0	ø6
3	TO BE FIELD ADJUSTED	0	ø6
4	TO BE FIELD ADJUSTED	0	ø2
5	TO BE FIELD ADJUSTED	DELAY 5 SEC	ø2
6	TO BE FIELD ADJUSTED	0	ø8
7	TO BE FIELD ADJUSTED	0	ø4

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

ITEM 815.1  
TRAFFIC SIGNAL  
CHURCH STREET AT LAWRENCE STREET  
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	8ø TS TYPE 1 CONTROLLER IN A TYPE 5 BASE MOUNTED CABINET INCL. FOUNDATION AND CONCRETE PAD
1	TS 20' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
1	TS 30' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
1	TS POST 10' STANDARD INCL. FOUNDATION
7	SIGNAL HEAD, 3-SECTION, 12" LENSES
1	SIGNAL HEAD, 4-SECTION BI-MODAL, 12" LENSES
2	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER
2	PEDESTRIAN PUSH BUTTON W/R10-3e(MOD)
2	PULL BOX-12"x12"
1	SINGLE POINT VIDEO DETECTION (1 CAMERA, VDI AND CABLES)
3	EMERGENCY PRE-EMPTION OPTICAL DETECTORS & DETECTOR CABLE
1	EMERGENCY PRE-EMPTION 4 CHANNEL PHASE SELECTOR
1	EMERGENCY PRE-EMPTION SYSTEM CHASSIS
1	EMERGENCY PRE-EMPTION STROBE (WHITE LENS)
1	SERVICE CONNECTION (OVERHEAD)

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



N: 3063355.1004  
E: 702654.0291

N: 3063348.2830  
E: 702664.2706

N: 3063343.1325  
E: 702663.8326

N: 3063330.9895  
E: 702674.3034

N: 3063319.2616  
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E: 702704.3458

N: 3063297.7901  
E: 702696.1367

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E: 702702.8290

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E: 702682.8389

N: 3063375.6405  
E: 702687.7741

N: 3063380.4770  
E: 702711.8818

N: 3063377.5436  
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E: 702721.5349

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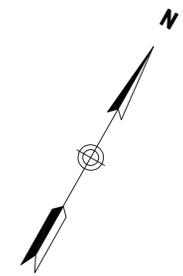
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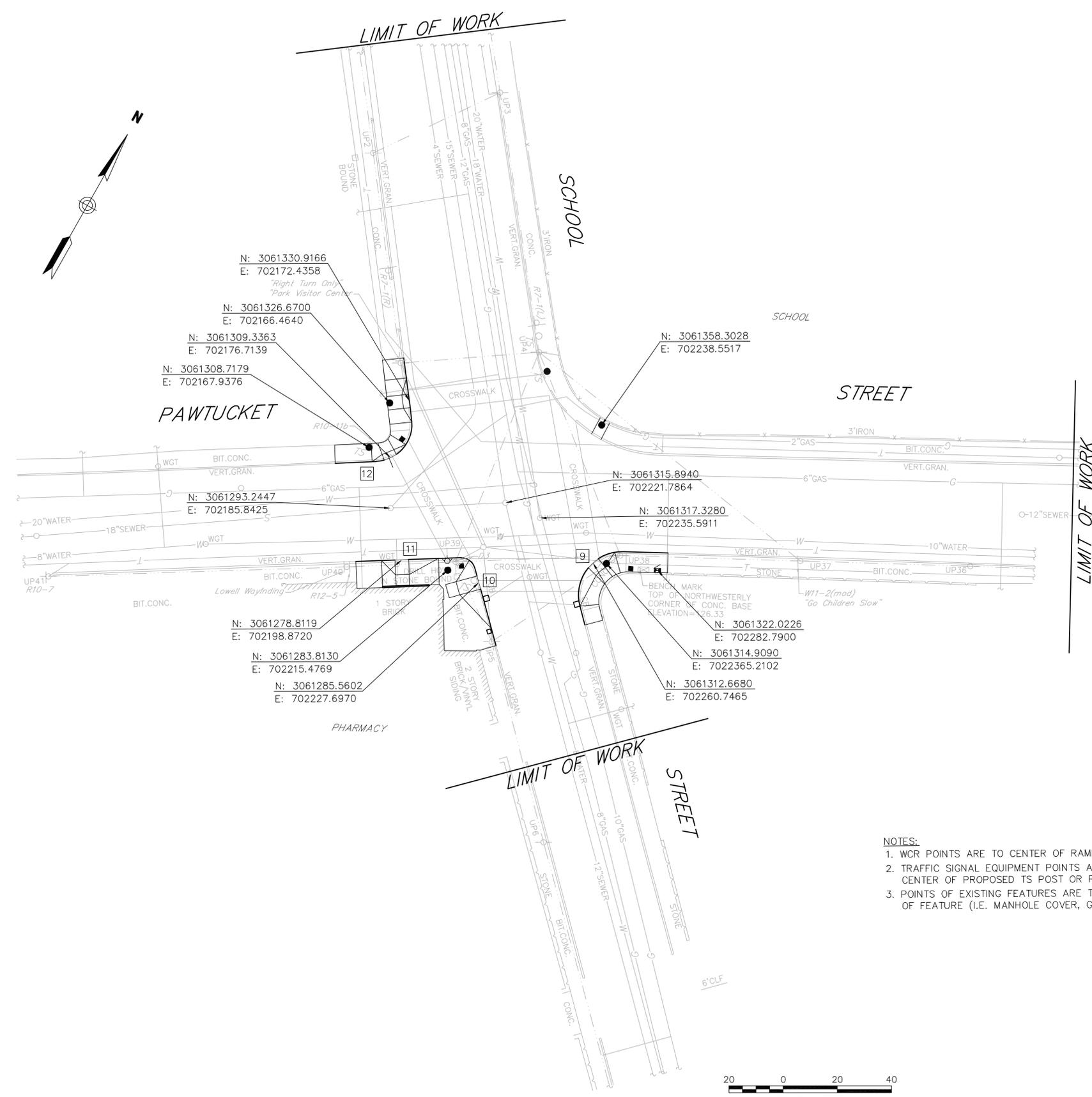
N: 3063327.7044  
E: 702742.3306

- NOTES:**
1. WCR POINTS ARE TO CENTER OF RAMP OPENING.
  2. TRAFFIC SIGNAL EQUIPMENT POINTS ARE TO CENTER OF PROPOSED TS POST OR POLE.
  3. POINTS OF EXISTING FEATURES ARE TO CENTER OF FEATURE (I.E. MANHOLE COVER, GATE COVER).





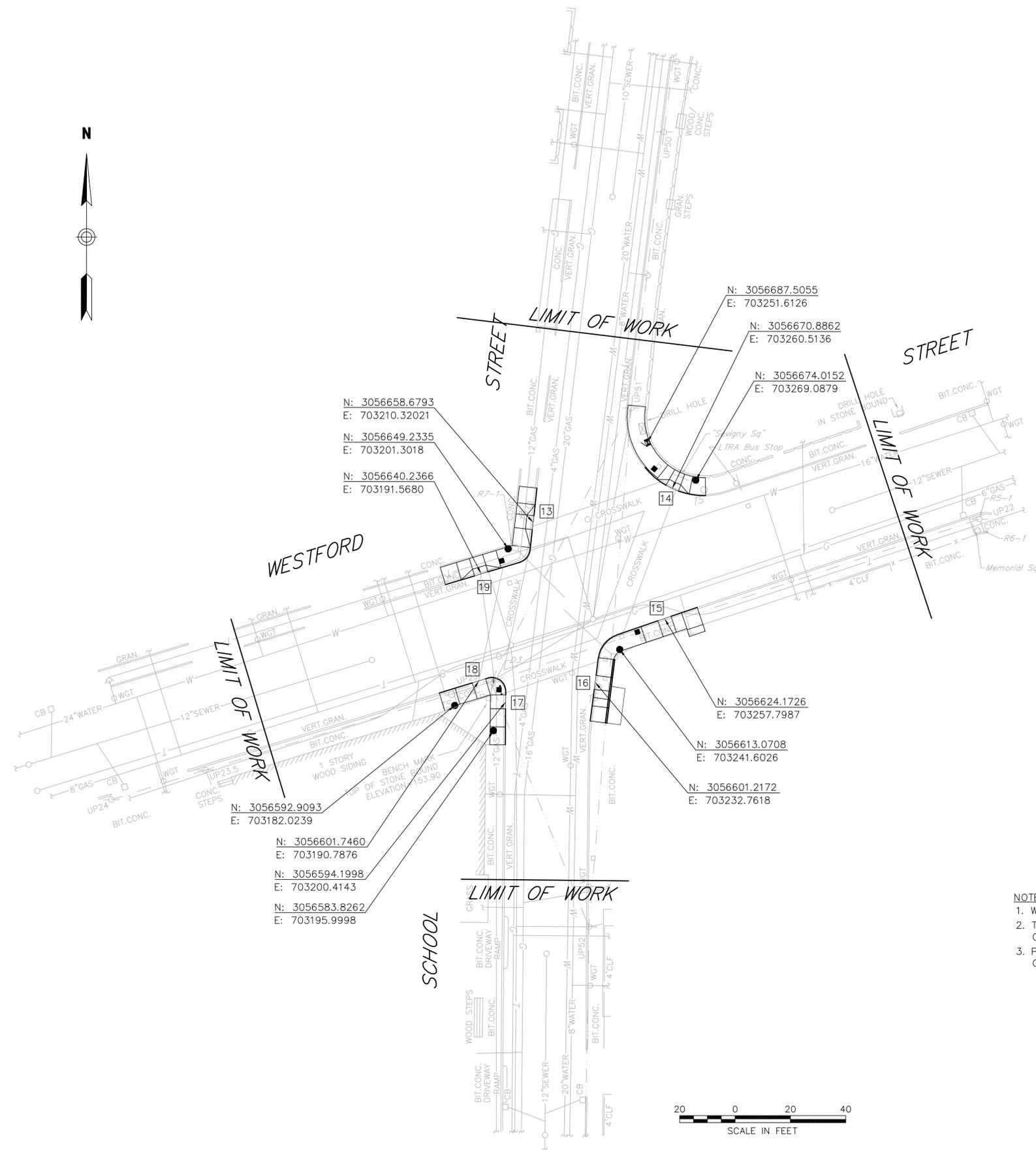
LIMIT OF WORK



LIMIT OF WORK

- NOTES:**
1. WCR POINTS ARE TO CENTER OF RAMP OPENING.
  2. TRAFFIC SIGNAL EQUIPMENT POINTS ARE TO CENTER OF PROPOSED TS POST OR POLE.
  3. POINTS OF EXISTING FEATURES ARE TO CENTER OF FEATURE (I.E. MANHOLE COVER, GATE COVER).





N: 3056658.6793  
E: 703210.32021  
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N: 3056640.2366  
E: 703191.5680

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E: 703260.5136  
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N: 3056613.0708  
E: 703241.6026  
N: 3056601.2172  
E: 703232.7618

- NOTES:
1. WCR POINTS ARE TO CENTER OF RAMP OPENING.
  2. TRAFFIC SIGNAL EQUIPMENT POINTS ARE TO CENTER OF PROPOSED TS POST OR POLE.
  3. POINTS OF EXISTING FEATURES ARE TO CENTER OF FEATURE (I.E. MANHOLE COVER, GATE COVER).

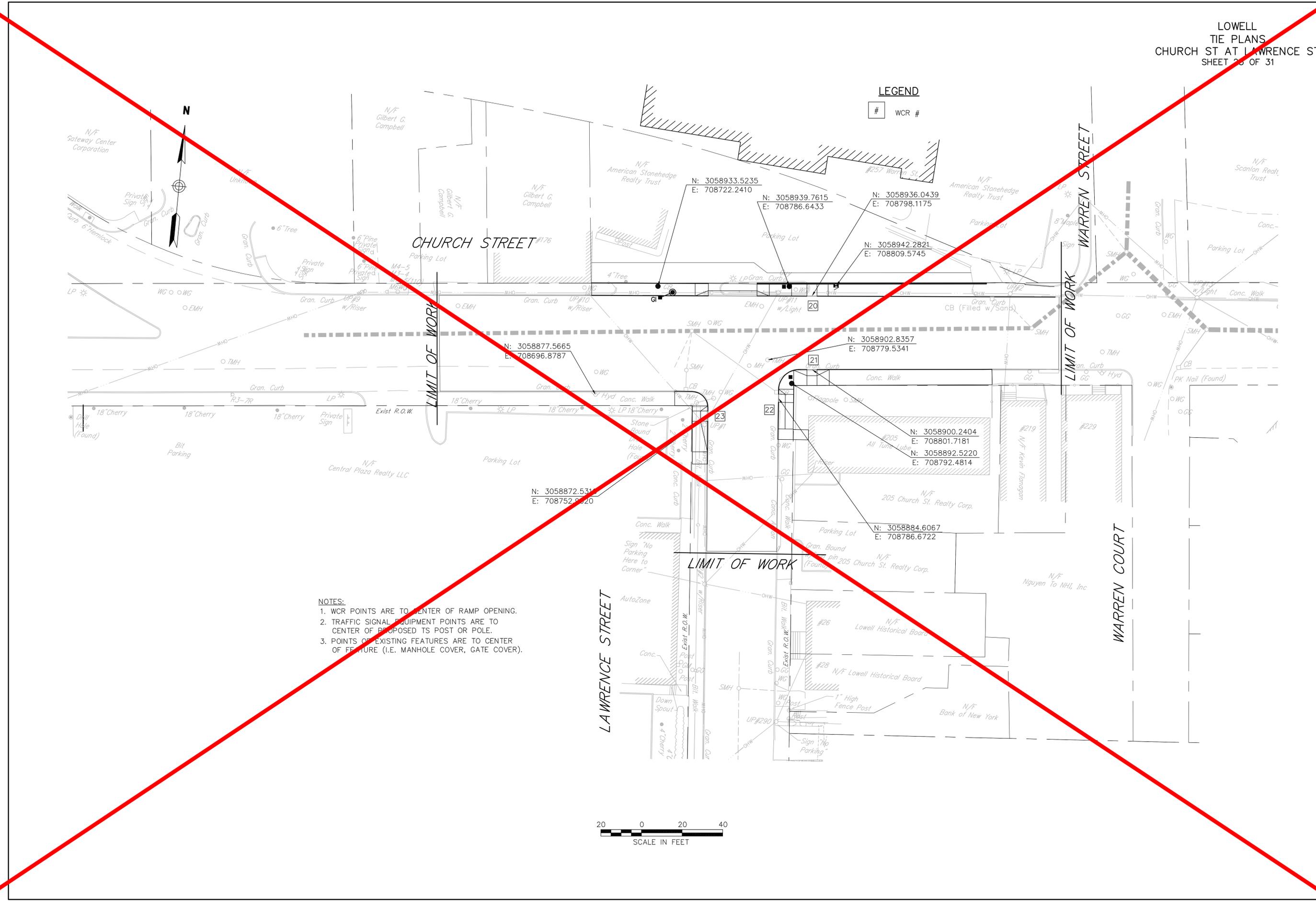


LEGEND

# WCR #



- NOTES:**
1. WCR POINTS ARE TO CENTER OF RAMP OPENING.
  2. TRAFFIC SIGNAL EQUIPMENT POINTS ARE TO CENTER OF PROPOSED TS POST OR POLE.
  3. POINTS OF EXISTING FEATURES ARE TO CENTER OF FEATURE (I.E. MANHOLE COVER, GATE COVER).

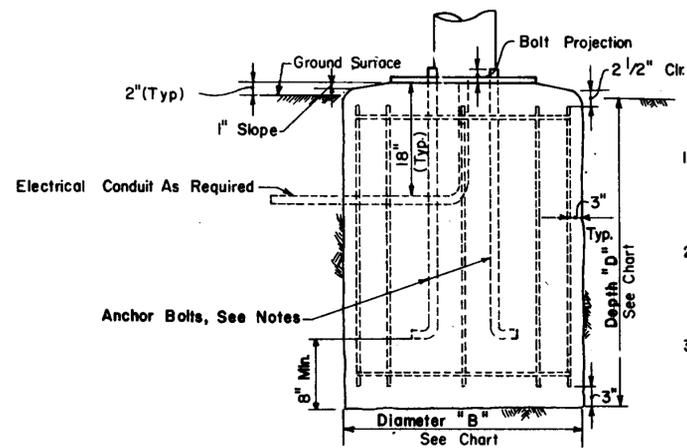


TRAFFIC SIGN SUMMARY

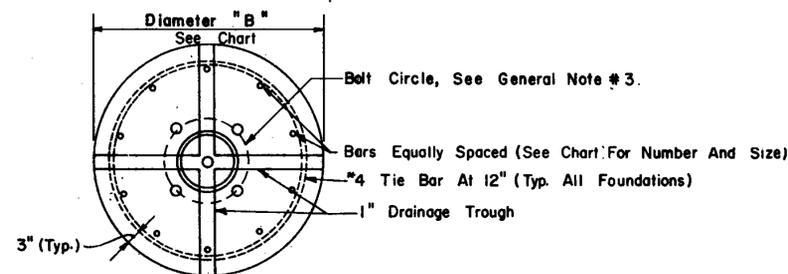
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R3-7L	30"	30"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			4	WHITE	BLACK	BLACK	P5-14	6.25	<del>37.50</del>
R3-7R	30"	30"					6	WHITE	BLACK	BLACK	P5-15 1 MTD ON UP	6.25	<del>37.50</del>
R7-1L	12"	18"					1	WHITE	RED	RED	P5-1	1.50	1.50
R10-3e(L)	9"	15"					9	WHITE	WHITE/BLACK/ORANGE	BLACK	9 MTD ON TS POLE/POST	INCLUDED UNDER ITEMS 816.01-816.03 & 815.1	
R10-3e(R)	9"	15"					8	WHITE	WHITE/BLACK/ORANGE	BLACK	8 MTD ON TS POLE/POST	INCLUDED UNDER ITEMS 816.01-816.03 & 815.1	
R10-3e(MOD)	9"	15"					9	WHITE	WHITE/BLACK/ORANGE	BLACK	9 MTD ON TS POLE/POST	INCLUDED UNDER ITEMS 816.01-816.03 & 815.1	
R10-11b	24"	24"					1	WHITE	BLACK	BLACK	1 MTD ON TS POLE	4.00	4.00
<del>R10-12</del>	<del>30"</del>	<del>30"</del>	<del></del>				<del>1</del>	<del>WHITE</del>	<del>BLACK/GREEN</del>	<del>BLACK</del>	<del>1 MTD ON TS MAST ARM</del>	<del>7.50</del>	<del>7.50</del>
D3-1	VARIABLE	12"	University Ave	6"	3	N/A	1	GREEN	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-2	VARIABLE	12"	Riverside St	6"	3	N/A	1	GREEN	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-3	VARIABLE	12"	School St	6"	3	N/A	2	GREEN	WHITE	WHITE	2 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-4	VARIABLE	12"	Pawtucket St	6"	3	N/A	1	GREEN	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3-5	VARIABLE	12"	Westford St	6"	3	N/A	1	GREEN	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
<del>D3-6</del>	<del>VARIABLE</del>	<del>12"</del>	<del>Church St</del>	<del>6"</del>	<del>3</del>	<del>N/A</del>	<del>1</del>	<del>BLACK</del>	<del>WHITE</del>	<del>WHITE</del>	<del>1 MTD ON TS POLE</del>	<del>INCLUDED UNDER ITEM 874</del>	
<del>D3-7</del>	<del>VARIABLE</del>	<del>12"</del>	<del>Lawrence St</del>	<del>6"</del>	<del>3</del>	<del>N/A</del>	<del>1</del>	<del>BLACK</del>	<del>WHITE</del>	<del>WHITE</del>	<del>1 MTD ON TS POLE</del>	<del>INCLUDED UNDER ITEM 874</del>	

25.00  
 37.50

NOTES: 1. HIGH INTENSITY REFLECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION" FOR TEXT DIMENSIONS, AS AMENDED; THE 1977 MASSHIGHWAY DEPARTMENT CONSTRUCTION AND TRAFFIC STANDARD DETAILS, AS AMENDED, FOR SIGNS AND SUPPORTS; AND THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED.



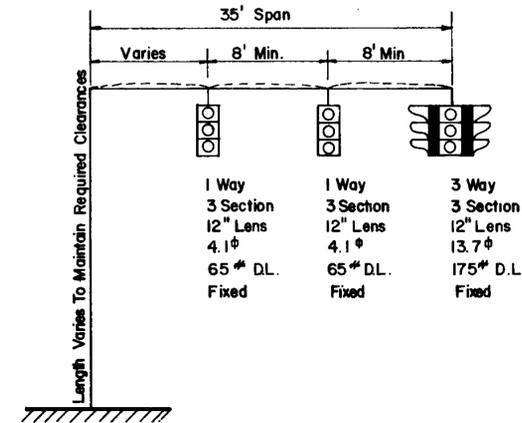
**ELEVATION**  
 NOT TO SCALE



**PLAN**  
 NOT TO SCALE

**NOTES:**

1. Pole, Base Plate And Anchor Bolts Shall Be Designed By The Pole Manufacturer
2. Minimum Foundation Depth Shall Be Checked To Insure Adequate Anchor Bolt Embedment - Clearance, And Projection
3. Optional End Anchorage For Anchor Bolts Can Be A Steel Plate With Threaded Holes Designed By The Pole Manufacturer



**GENERAL NOTES:**

1. Foundations Shall Be Class "A" Cement Concrete Masonry.
2. Reinforcement Shall Be A.S.T.M. A615- Gr. 60.
3. Bolt Circle And Anchor Bolts To Be Provided By The Contractor The Anchor Bolts Shall Be Supplied With A Template For Setting The Bolts And Necessary Bolt Projections.
4. Provide For Electrical Conduit As Required.
5. Excavation Shall Be By The Auger Method To The Neat Lines Of The Outside Dimension Of The Foundation Without Disturbing The Soil Around And Below The Proposed Foundation Bottom. Alternate Methods Of Excavation May Be Submitted For Approval If They Meet The Requirements Listed In The General Notes Of Sheets 3 & 4 Of The Span Wire Assembly Foundation Details & Design Charts.
6. If The Soil Is Disturbed Or Removed Beyond The Neat Lines Of The Outside Dimension Of The Foundation As Specified, It Shall Be Replaced With Concrete. Any Additional Cost For The Concrete Shall Be Paid For By The Contractor.
7. Determination Of Existing Soil Conditions Shall Be Made By The Design Engineer.
8. Vertical Reinforcement Bars Are To Be Evenly Spaced In The Foundation As Shown.
9. The Smallest Diameter Foundation Shall Be Used That Will Meet The Moment Requirement And Be At Least 16" Greater In Diameter Than The Bolt Circle Diameter.
10. If A Poor Soil Or Ledge Is Encountered, (i.e., One Which Does Not Apply To The Design Charts Shown On This Sheet), An Alternative Design Shall Be Developed By The Design Engineer. Decisions Made In Notes #7 & #10, Shall Be Submitted To The M.D.P.W. For Approval. If Utilities Or Other Underground Obstructions Are Encountered, The Contractor Shall Backfill The Area To Its Original Condition Until An Alternate Design Has Been Provided By The Design Engineer.
11. The Foundations Shown On This Drawing Are For A 35-Foot Cantilevered Type II Mast Arm Carrying A Three Way, Three Section, Twelve Inch (12") Lens Traffic Signal Housing Fixed At The End Of The Arm, And A One-Way, Three-Section, Twelve Inch (12") Lens Traffic Signal Fixed Twelve Feet (12') Away, And Another One-Way, Three-Section Twelve Inch (12") Lens Traffic Signal Fixed Twelve Feet (12') Away From That.

SOIL TYPE (SEE GENERAL NOTE NO.7)	DIA. (B)= 2'- 6"		DIA. (B)= 3'- 0"		DIA. (B)= 3'- 6"	
	DEPTH (D)	VERTICAL BARS	DEPTH (D)	VERTICAL BARS	DEPTH (D)	VERTICAL BARS
DRY SANDY SOIL	5'- 9"	10 #5	5'- 0"	10 #6	4'- 9"	10 #7
WET SANDY SOIL	6'- 9"	10 #5	6'- 0"	10 #6	5'- 6"	10 #7
CLAYEY SOIL (MEDIUM STIFF)	9'-9"	10 #5	8'-9"	10 #6	8'-0"	10 #7
ALLUVIAL SOIL	14'-3"	10 #5	12'-9"	10 #6	11'-9"	10 #7

**FOUNDATION DESIGN CHART**

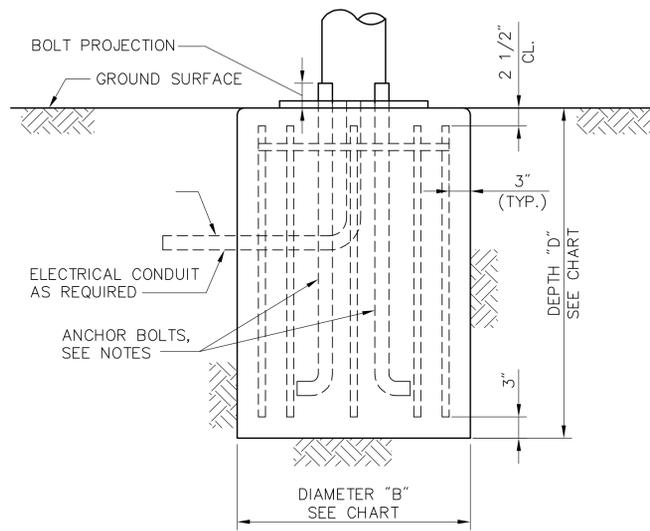
BY: J BELCASTRO-BTP&D & G.N. TSAKOS-BRIDGE SECTION

THIS PLAN NOT DESIGNED BY  
 VANASSE HANGEN BRUSTLIN, INC.  
 IT WAS PROVIDED BY THE MASSACHUSETTS  
 HIGHWAY DEPARTMENT AND ALL INFORMATION  
 CONTAINED HEREIN IS ASSUMED TO BE CORRECT.

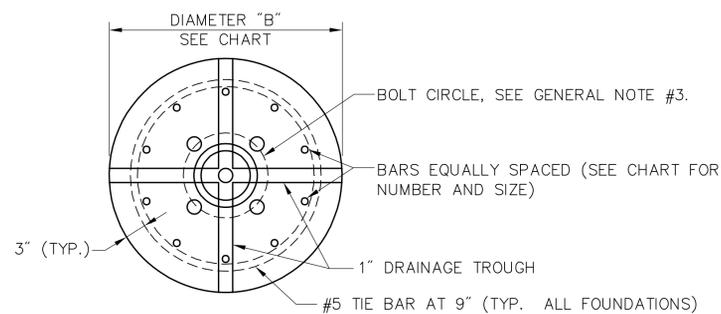
COMMONWEALTH OF MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS

STANDARD DRAWINGS  
 35' FOOT-TYPE II MAST ARM  
 CORED PIER FOUNDATIONS

Revised Date: January 2, 1985  
 [Signatures]  
 TRAFFIC ENGINEER BRIDGE ENGINEER  
 DIRECTOR BTP&D CHIEF ENGINEER



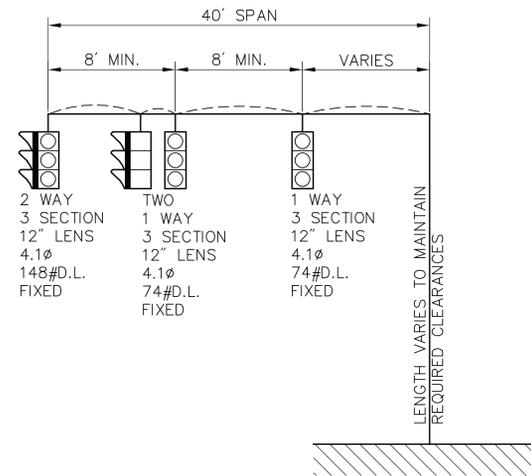
**ELEVATION**  
NOT TO SCALE



**PLAN**  
NOT TO SCALE

**NOTES:**

1. POLE, BASE PLATE AND ANCHOR BOLTS SHALL BE DESIGNED BY THE POLE MANUFACTURER.
2. MINIMUM FOUNDATION DEPTH SHALL BE CHECKED TO INSURE ADEQUATE ANCHOR BOLT EMBEDMENT CLEARNACE, AND PROJECTION.
3. OPTIONAL END ANCHORAGE FOR ANCHOR BOLTS CAN BE A STEEL PLATE WITH THREADED HOLES DESIGNED BY THE POLE MANUFACTURER



**SIGNAL**  
NOT TO SCALE

**GENERAL NOTES:**

1. FOUNDATIONS SHALL BE CLASS 4000-1½-565 CEMENT CONCRETE MASONRY.
2. REINFORCEMENT SHALL BE A.S.T.M. A615-GR. 60.
3. BOLT CIRCLE AND ANCHOR BOLTS TO BE PROVIDED BY THE CONTRACTOR. THE ANCHOR BOLTS SHALL BE SUPPLIED WITH A TEMPLATE FOR SETTING THE BOLTS AND NECESSARY BOLT PROJECTIONS.
4. PROVIDE FOR ELECTRICAL CONDUIT AS REQUIRED.
5. EXCAVATION SHALL BE BY THE AUGER METHOD TO THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATION WITHOUT DISTURBING THE SOIL AROUND AND BELOW THE PROPOSED FOUNDATION BOTTOM.
6. IF THE SOIL IS DISTURBED OR REMOVED BEYOND THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATION AS SPECIFIED, IT SHALL BE REPLACED WITH CONCRETE. ANY ADDITIONAL COST FOR THE CONCRETE SHALL BE PAID FOR BY THE CONTRACTOR.
7. DETERMINATION OF EXISTING SOIL CONDITIONS SHALL BE MADE BY THE ENGINEER.
8. VERTICAL REINFORCEMENT BARS ARE TO BE EVENLY SPACED IN THE FOUNDATION AS SHOWN.
9. IF UTILITIES OR OTHER UNDERGROUND OBSTRUCTIONS ARE ENCOUNTERED, THE CONTRACTOR SHALL BACKFILL THE AREA TO ITS ORIGINAL CONDITION UNTIL AN ALTERNATE DESIGN HAS BEEN PROVIDED BY THE DESIGN ENGINEER.
10. THE FOUNDATIONS SHOWN ON THIS DRAWING ARE FOR A 40-FOOT CANTILEVERED TYPE II MAST ARM CARRYING TRAFFIC SIGNALS AS SHOWN.
11. ALL SIGNALS SHALL BE ATTACHED TO THE MAST ARM WITH FIXED LOUVERED BACKPLATES.

SOIL TYPE (SEE GENERAL NOTE NO. 7)	DIA. (B)=3'-6"		DIA. (B)=4'-0"		DIA. (B)=4'-6"	
	DEPTH (D)	VERTICAL BARS	DEPTH (D)	VERTICAL BARS	DEPTH (D)	VERTICAL BARS
DRY SANDY SOIL	15'-3"	10#7	11'-6"	12#7	10'-0"	16#7
WET SANDY SOIL	20'-3"	10#7	14'-9"	12#7	13'-0"	16#7
CLAY SOIL (MEDIUM STIFF)	23'-0"	10#7	16'-3"	12#7	15'-0"	16#7

**FOUNDATION DESIGN CHART**  
NOT TO SCALE

VANASSE HANGEN BRUSTLIN, INC.  
101 WALNUT STREET  
WATERTOWN, MASSACHUSETTS 02471

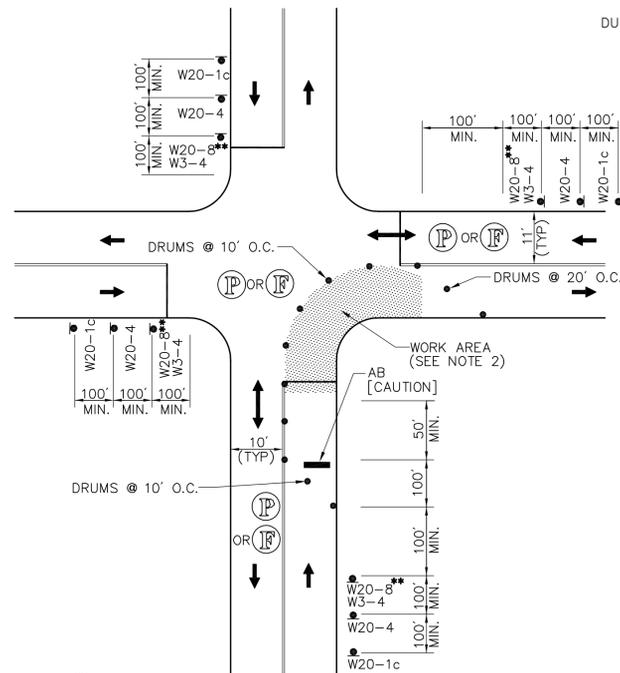
**40' FOOT-TYPE II MAST ARM  
CORED PIER FOUNDATIONS**

DATE \_\_\_\_\_

--- TRAFFIC ENGINEER ---      --- STRUCTURAL ENGINEER ---

**OPERATIONAL SIGNING**

LANE CLOSURES SHOWN ARE FOR TEMPORARY CONSTRUCTION.  
 ALL DRUMS AND SIGNS ARE SHOWN AS THEY SHOULD APPEAR  
 DURING THE WORKING DAY, OR WHILE OPERATING IN THE WORK ZONE.



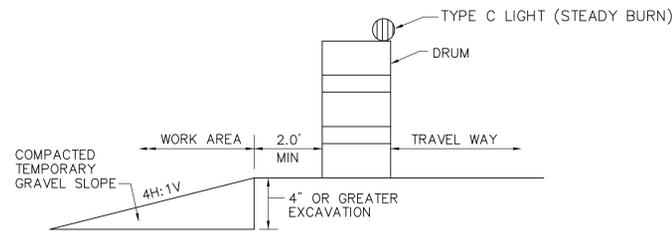
\*\*SEE NOTE 16

**ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS**

NOT TO SCALE

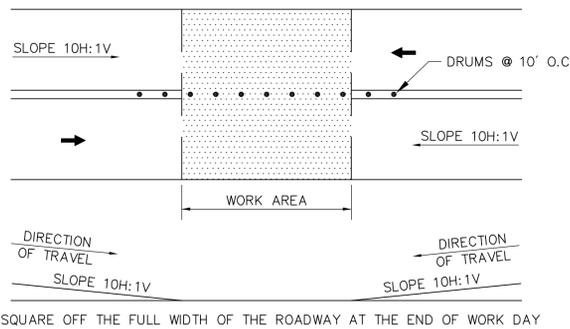
NOTE:

- ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY
- ANY EXCAVATION GREATER THAN 3' DEEP ADJACENT TO TRAFFIC SHALL BE PROTECTED BY TEMPORARY CONCRETE BARRIER



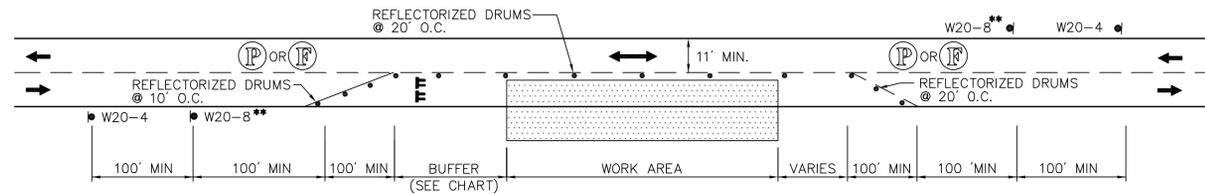
**ROADWAY SLOPE PROTECTION**

NOT TO SCALE



**TEMPORARY PAVEMENT TRANSITION DETAIL**

NOT TO SCALE



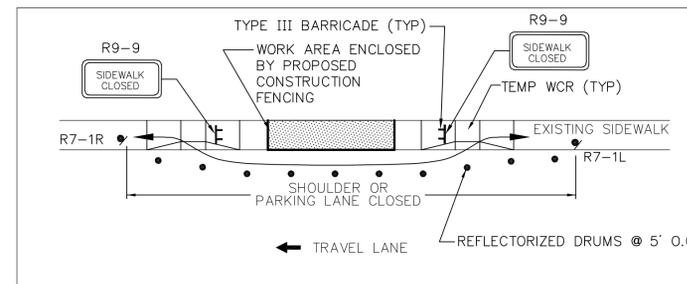
\*\*SEE NOTE 16

**TYPICAL TWO WAY STREET LANE CLOSURE**

NOT TO SCALE

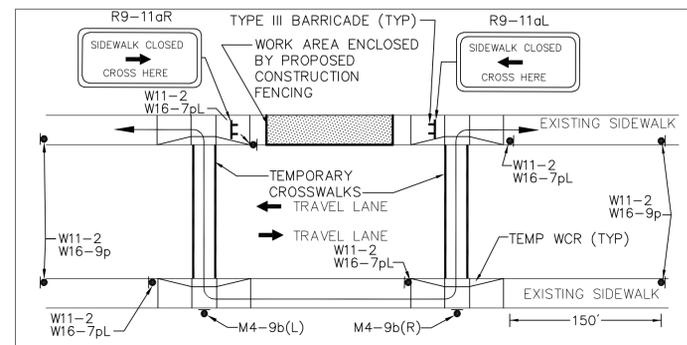
**PEDESTRIAN BYPASS**

TO BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING AND AS DIRECTED BY THE ENGINEER.



**TYPE I**

NTS



**TYPE II**

NOT TO SCALE

NOTES:

- ADDITIONAL ADVANCE WARNING SIGNS MAY BE NECESSARY AS DETERMINED BY THE ENGINEER.
- CONTROLS FOR PEDESTRIAN TRAFFIC ONLY, ARE SHOWN. VEHICULAR TRAFFIC SHALL BE MAINTAINED AS SHOWN ELSEWHERE.
- STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
- ← DIRECTION OF PEDESTRIAN TRAVEL.
- PROPOSED TEMPORARY CROSSWALKS SHALL BE 12" WIDE SURFACE APPLIED TAPE OR REFLECTORIZED PAINT AS DIRECTED BY THE ENGINEER.
- ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MAAB AND ADAAG REQUIREMENTS.
- CONTRACTOR SHALL MAINTAIN AS WIDE OF A PEDESTRIAN ACCESS AS POSSIBLE AT ALL TIMES. EXCEPT WHERE NECESSARY, THE CONTRACTOR MAY TEMPORARILY REDUCE PEDESTRIAN PATHWAYS TO 4 FEET IN WIDTH (EXCLUDING CURB) FOR NO MORE THAN 200 LINEAR FEET AT A TIME IN ACCORDANCE WITH ALL STANDARDS.
- TEMPORARY WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MASSDOT, MAAB, AND ADAAG REQUIREMENTS.
- W16-7pR SIGNS SHALL BE USED IN COMBINATION WITH W11-2 SIGNS AS DIRECTED BY THE ENGINEER.

**TEMPORARY TRAFFIC CONTROL PLAN GENERAL NOTES**

- ALL CONSTRUCTION SIGNING, TEMPORARY TRAFFIC CONTROL DEVICES, AND ROADSIDE ELEMENTS SHALL CONFORM WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), WITH MASSACHUSETTS STATE AMENDMENTS, AS AMENDED, THE LATEST REVISIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, (AASHTO) ROADSIDE DESIGN GUIDE, AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AND NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE (MASH).
- ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB) AND AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) REQUIREMENTS.
- WORK HOURS SHALL BE 9:30AM TO 3:00PM MONDAY THRU FRIDAY UNLESS OTHERWISE APPROVED BY THE ENGINEER. WORK SHALL NOT AFFECT TRAFFIC PATTERNS DURING PEAK TRAFFIC PERIODS. PEAK TRAFFIC PERIODS ARE DEFINED AS MONDAY THRU FRIDAY 7:00AM-9:00AM AND 3:00PM-6:00PM.
- ALL DRUMS SHALL BE SET AT 20' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
- ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNS, DRUMS AND OTHER TRAFFIC CONTROL DEVICES, GRADING AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR AND EMERGENCY TRAFFIC THROUGH THE WORK AREAS, BOTH DURING AND AFTER WORKING HOURS, TO MAINTAIN SUCH ACCESS.
- THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS.
- FOR RESTORATIVE WORK ON LOCAL ROADWAYS, A MINIMUM OF ONE LANE OF TRAFFIC IN EACH DIRECTION ON TWO WAY STREETS SHALL BE MAINTAINED AT ALL TIMES, EXCEPT THAT DURING WORKING HOURS, TRAFFIC MAY BE REDUCED TO ONE LANE UNDER POLICE CONTROL FOR SHORT TIME PERIODS WHEN REQUIRED FOR THE WORK, AS SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
- EXCAVATION EDGES IN EXCESS OF 4 INCHES DEEP SHALL BE PROTECTED DURING NON-WORKING HOURS BY BACKFILLING WITH A WEDGE OF COMPACTED GRAVEL BORROW AT A 4:1 SLOPE PER THE DETAIL SHOWN.
- 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED UNLESS OTHERWISE NOTED.
- TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
- ADVISORY SPEED PLATES (W13-1) SHALL BE USED IF APPROPRIATE AND AS DIRECTED BY THE ENGINEER.
- SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
- SIGNS INSTALLED ON PORTABLE STANDS PLACED AMONG CHANNELIZATION DEVICES REQUIRE A 36 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
- SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
- W20-8 SIGNS SHALL BE REPLACED BY W20-7a SIGNS WHEN FLAGGERS ARE USED IN LIEU OF POLICE OFFICER DETAILS.
- REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
- CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
- W20-8a SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF AREAS WHERE UTILITY CASTINGS HAVE BEEN RAISED IN ADVANCE OF PAVING OPERATIONS OR AS REQUESTED BY THE ENGINEER.
- W20-8b SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.
- THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.

**BUFFER SPACING**

SPEED (MPH)	DISTANCE (FEET)
15	80
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

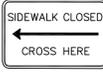
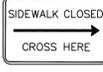
**LEGEND**

- REFLECTORIZED DRUM
- ▲ REFLECTORIZED TRAFFIC CONE
- TEMPORARY TRAFFIC CONTROL SIGN
- ▬ TYPE III BARRICADES
- ▬ WORK AREA PUBLIC ACCESS RESTRICTED
- ← PROPOSED TRAFFIC FLOW
- | ARROW BOARD (AB) [MODE]

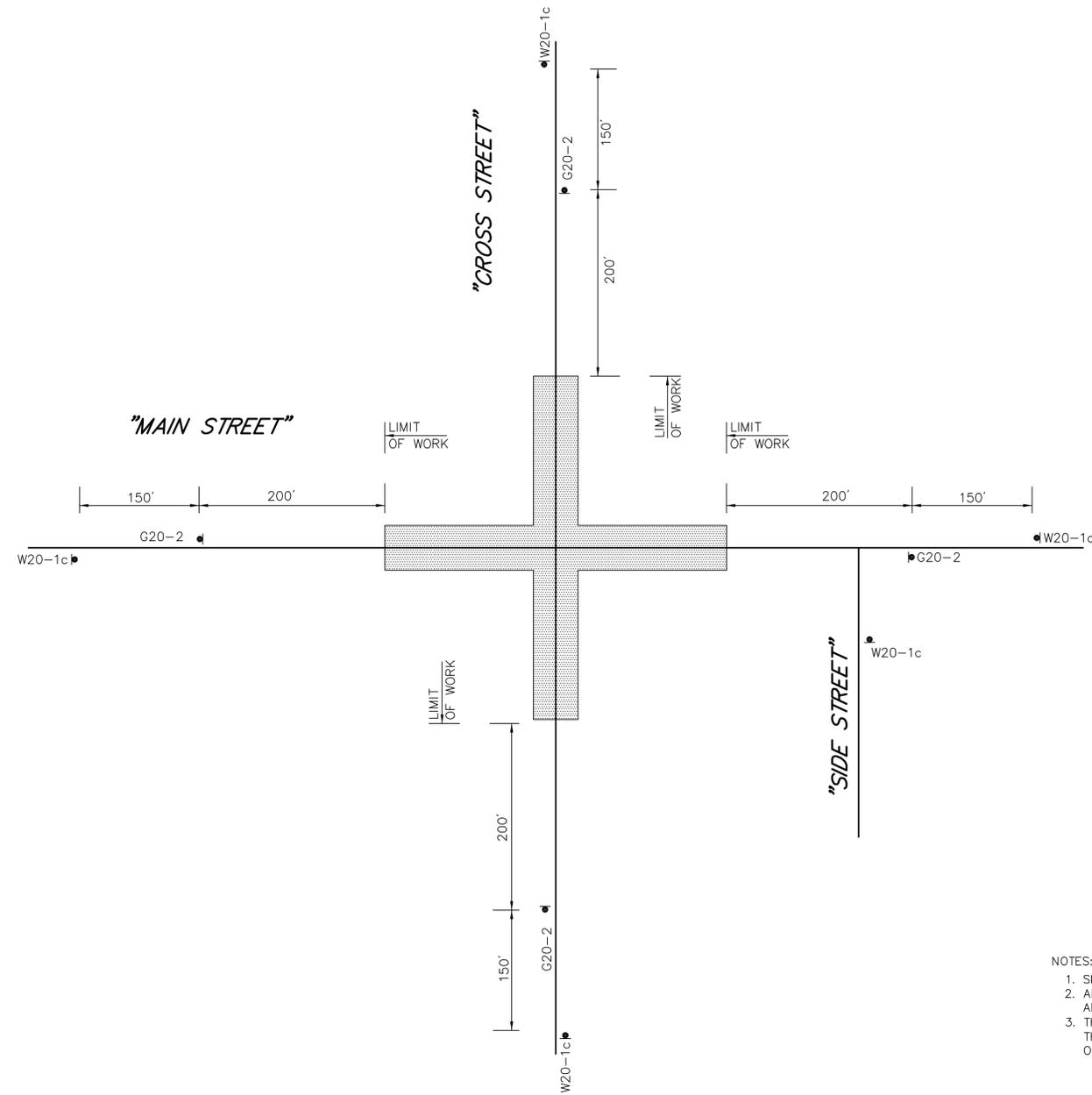
**TAPER LENGTH CALCULATION**

\*L =  $\frac{WS^2}{60}$  L=TAPER LENGTH  
 W=WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED  
 S=30 MPH

TEMPORARY SIGNS

IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	COLOR		
	WIDTH	HEIGHT		BACK- GROUND	LEGEND	BORDER
G20-2	36"	18"		ORANGE	BLACK	BLACK
M4-9b(R)	30"	24"		ORANGE	BLACK	BLACK
M4-9b(L)	30"	24"		ORANGE	BLACK	BLACK
R7-1R	12"	18"		WHITE	RED	RED
R7-1L	12"	18"		WHITE	RED	RED
R9-9	30"	18"		WHITE	BLACK	BLACK
R9-11aL	48"	24"		WHITE	BLACK	BLACK
R9-11aR	48"	24"		WHITE	BLACK	BLACK
W3-4	36"	36"		ORANGE	BLACK	BLACK
W11-2	30"	30"		ORANGE	BLACK	BLACK

IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	COLOR		
	WIDTH	HEIGHT		BACK- GROUND	LEGEND	BORDER
W13-1(XX)	24"	30"		ORANGE	BLACK	BLACK
W16-7pR	24"	12"		ORANGE	BLACK	BLACK
W16-7pL	24"	12"		ORANGE	BLACK	BLACK
W16-9p	24"	12"		ORANGE	BLACK	BLACK
W20-1c	36"	36"		ORANGE	BLACK	BLACK
W20-4	36"	36"		ORANGE	BLACK	BLACK
W20-7a	36"	36"		ORANGE	BLACK	BLACK
W20-8	36"	36"		ORANGE	BLACK	BLACK
W20-8a	36"	36"		ORANGE	BLACK	BLACK
W20-8b	36"	36"		ORANGE	BLACK	BLACK



TYPICAL ADVANCE SIGN SCHEMATIC

NTS

PROJECT LIMITS

NOTES:

1. SIGNS TO BE INSTALLED FROM THE LIMIT OF WORK AS SHOWN
2. ALL ADVANCE SIGNS TO BE IN PLACE FOR THE DURATION OF THE PROJECT AND REMOVED UPON COMPLETION OF THE WORK.
3. THE CONTRACTOR SHALL INSTALL W20-1c SIGNS ON ALL "SIDE STREETS" THAT FALL WITHIN 350' FROM THE LIMIT OF WORK ON THE "MAIN STREET" OR "CROSS STREET." THESE "SIDE STREETS" INCLUDE:

- UNIVERSITY AVENUE AT RIVERSIDE STREET
- GERSHOM AVENUE
- STANDISH STREET
- SCHOOL STREET AT PAWTUCKET STREET
- WANNALANCIT STREET
- FANNING STREET
- ARLINGTON STREET
- SCHOOL STREET AT WESTFORD STREET
- CORAL STREET
- OSGOOD STREET
- LANE STREET
- QUEEN STREET
- FERNALD STREET
- LAWSON STREET
- ~~MURCH STREET AT LAWSON STREET~~
- ~~MURCH STREET~~