

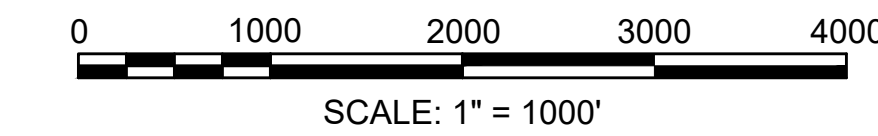
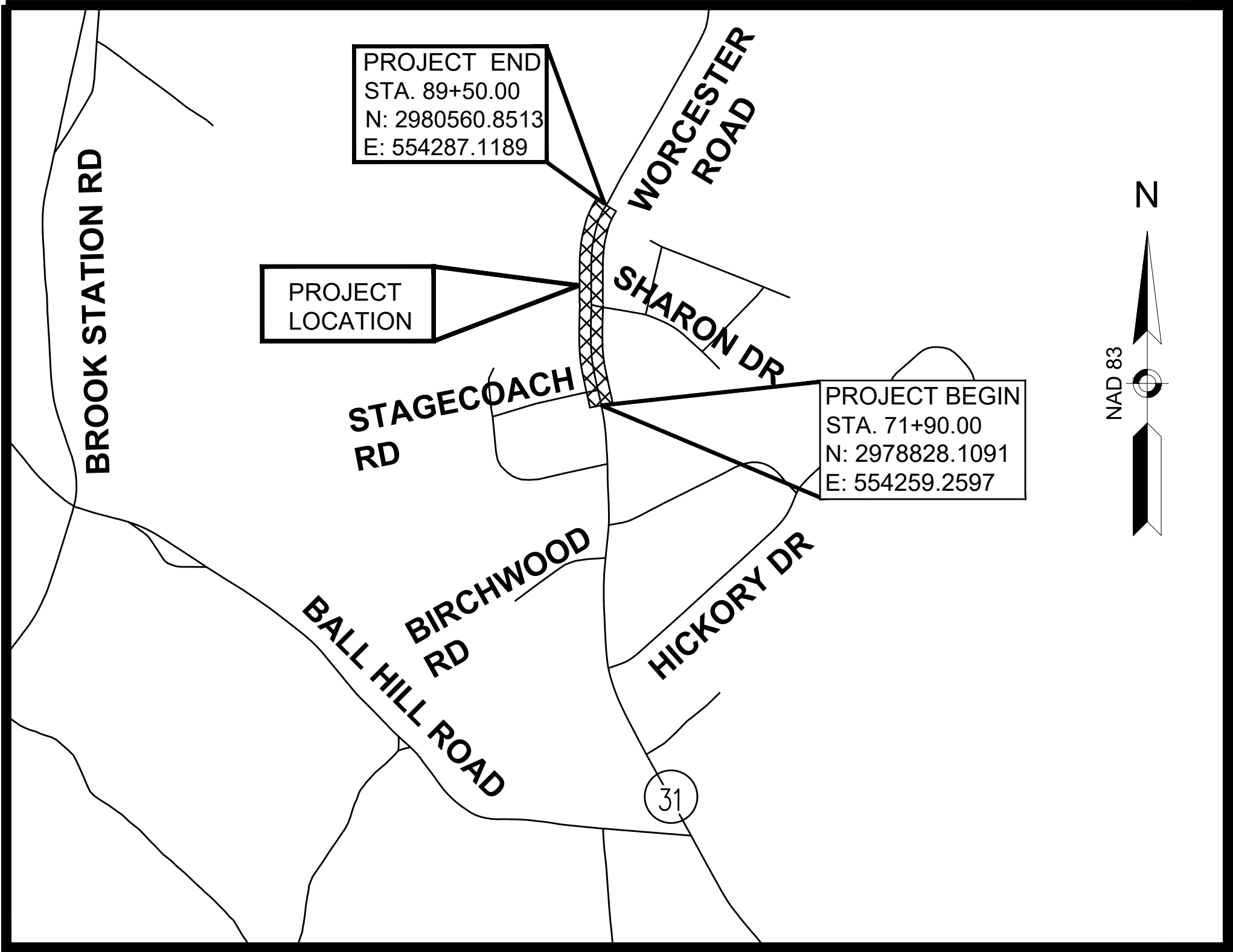
TOWN OF PRINCETON
DEPARTMENT OF PUBLIC WORKS

PLAN AND PROFILE OF
WORCESTER RD/ROUTE 31

IN THE TOWN OF
PRINCETON
WORCESTER COUNTY

FINAL DESIGN

SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	TYPICAL SECTIONS
4-8	CONSTRUCTION PLANS & PROFILES
9-12	TEMPORARY TRAFFIC CONTROL PLANS
13-17	CONSTRUCTION DETAILS
18-19	CRITICAL CROSS SECTIONS




LENGTH OF PROJECT = 1,760 FEET = 0.333 MILES

PRINCETON
WORCESTER RD/ROUTE 31
TITLE SHEET & INDEX
SHEET 1 OF 19


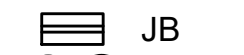





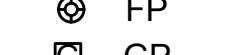



















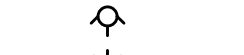















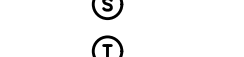



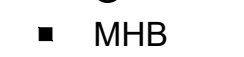







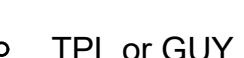







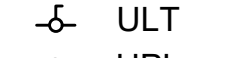









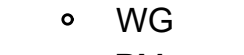





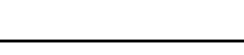

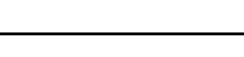

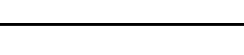

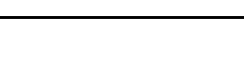

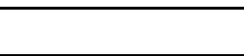



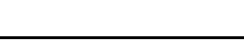



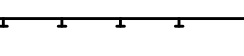

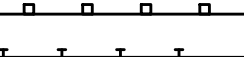

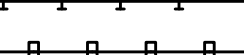

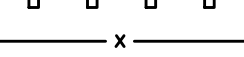

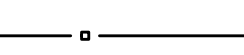

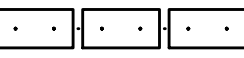



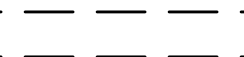












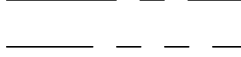

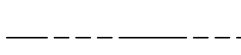

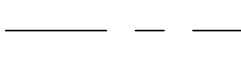

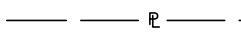

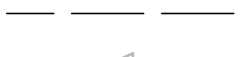






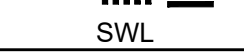
















THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

DESIGN DESIGNATION (WORCESTER RD/ROUTE 31)	
DESIGN SPEED	45 MPH
ADT (2022)	2,267
ADT (2042)	2,766
K	9%
D	57% NB
T (PEAK HOUR)	7.0%
T (AVERAGE DAY)	5.1%
DHV	255
DDHV	145
FUNCTIONAL CLASSIFICATION	RURAL MAJOR COLLECTOR

WORCESTER ROAD IMPROVEMENTS
TOWN OF PRINCETON

 Vanasse Hangen Brustlin, Inc. 120 Front Street, Suite 500 Worcester, MA 01604 508.752.1001 FAX 508.752.1276			
DESIGNED BY PJB	DATE 5/11/23		
DRAWN BY PJB	SCALE 1" = 20'		
CHECKED BY GR	SHEET OF 1 19	JOB NO. 15619	

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT
		FLASHING BEACON
		STOP LINE -WHITE, 12" WIDTH UNLESS OTHERWISE NOTED
		CROSSWALK-WHITE, 12" WIDTH UNLESS OTHERWISE NOTED
		SOLID WHITE LINE, 6" WIDTH

ABBREVIATIONS

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

ABBREVIATIONS (cont.)

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

PRINCETON
WORCESTER RD/ROUTE 31
LEGEND & ABBREVIATIONS
SHEET 2 OF 19

GENERAL NOTES:

- EXISTING CONDITIONS AND TOPOGRAPHICAL INFORMATION FROM AN ACTUAL FIELD SURVEY CONDUCTED BY VHB IN MAY, 2022.
- THE HORIZONTAL CONTROL IS BASED ON THE MASSACHUSETTS MAINLAND STATE PLANE COORDINATE SYSTEM AND THE NATIONAL GEODETIC SURVEY (NAD83). ALL ELEVATION IS US FEET, REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).
- THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND GRADES IN THE FIELD BEFORE COMMENCING WORK AND PROMPTLY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- 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.
- DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH PROPOSED CONDUIT AND SIGNAL EQUIPMENT. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER.
- 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 AND SEWER 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.
- EXISTING UTILITY POLES WILL BE RELOCATED BY OTHERS IF REQUIRED.
- 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 ASPHALT CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH HMA JOINT SEALER IN ACCORDANCE WITH SUBSECTION 450 OF THE MASSDOT STANDARD SPECIFICATIONS.
- EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- IF SUITABLE, EXISTING GRANITE CURB & EDGING SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
- EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.
- DISPOSAL OF ALL SURPLUS MATERIAL SHALL BE AS APPROVED BY THE ENGINEER AND OWNER.
- LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 0.01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE PLANS.
- WHERE EXISTING PAVEMENT MARKNGS CONFLICT WITH PROPOSED MARKINGS, ERADICATE EXISTING MARKINGS BY AN APPROVED METHOD.

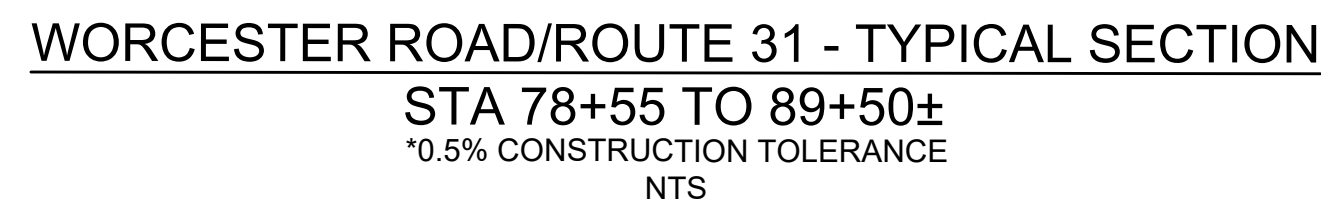
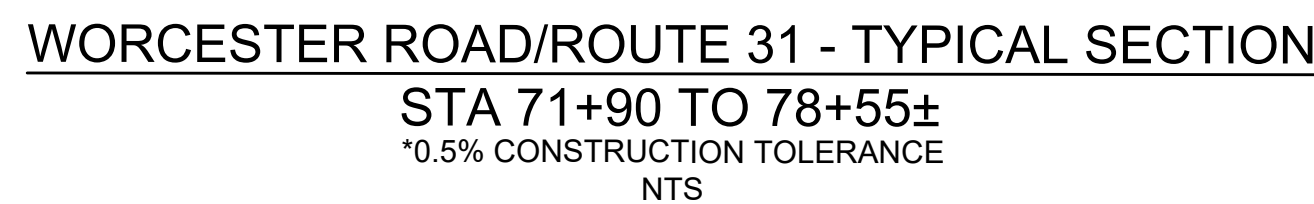
PROPOSED HOT MIX ASPHALT DRIVEWAY

FOUNDATION: 8" GRAVEL BORROW, TYPE b

FOUNDATION: 8" GRAVEL BORROW, TYPE B

FOUNDATION: 8" GRAVEL BORROW, TYPE B

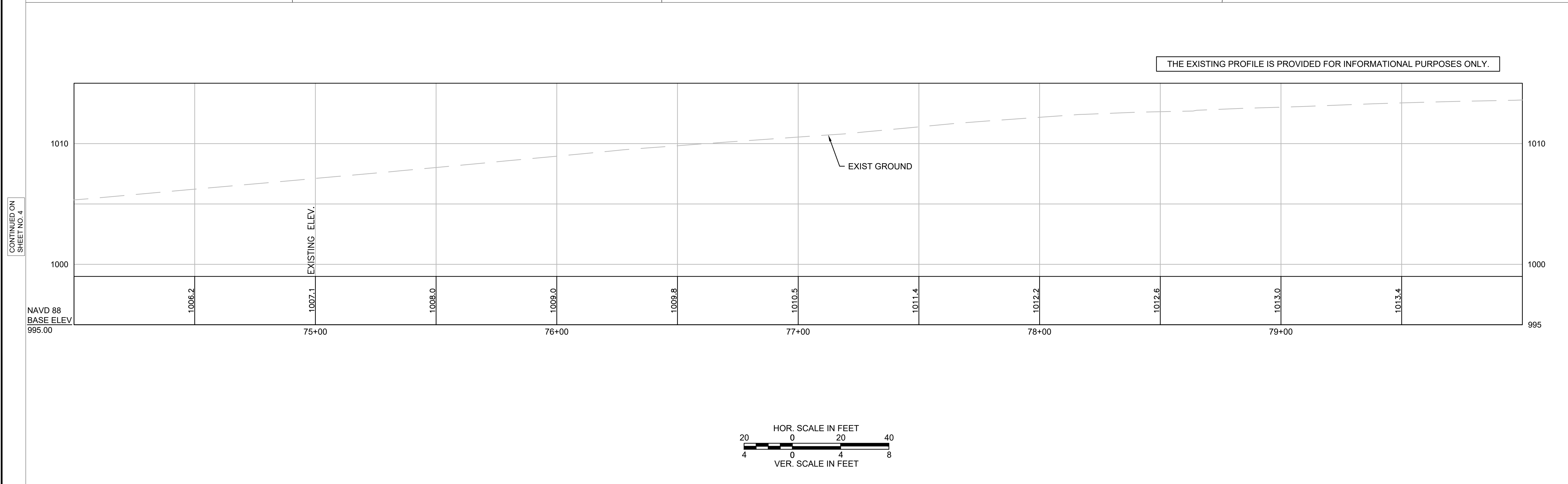
SURFACE: 8" DENSE GRADED CRUSHED STONE FOR SUB-BASE



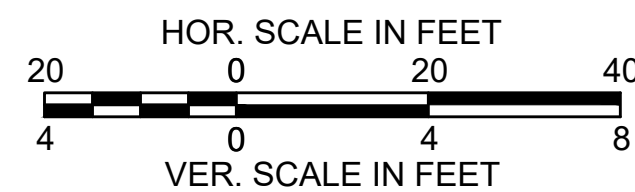
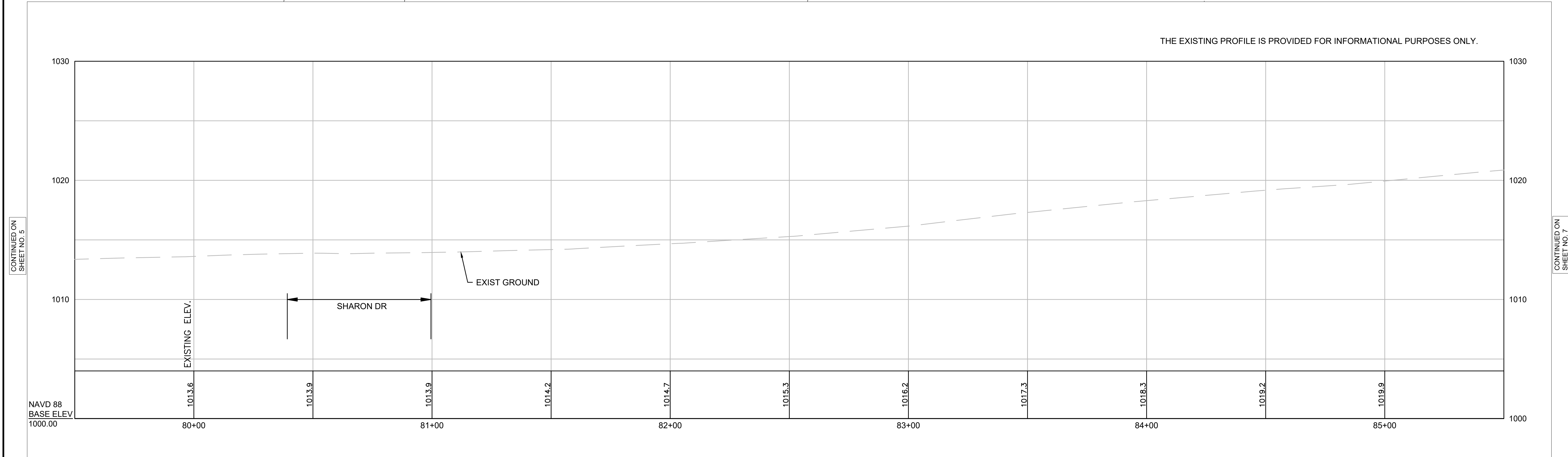
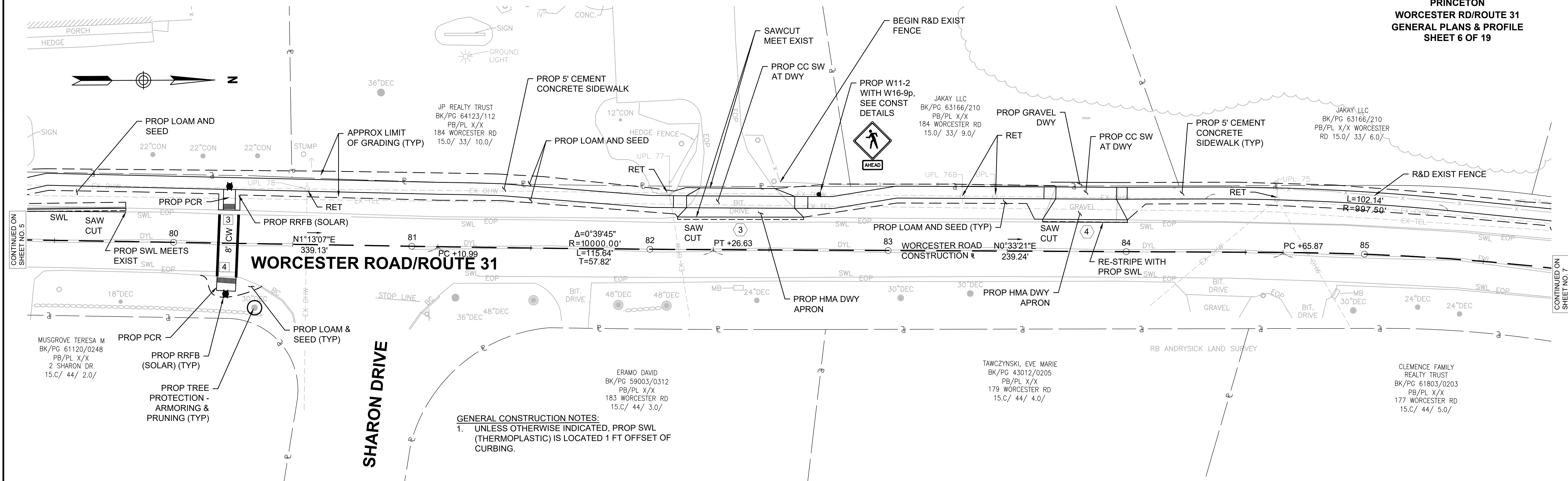
HOR. SCALE IN FEET

VER. SCALE IN FEET

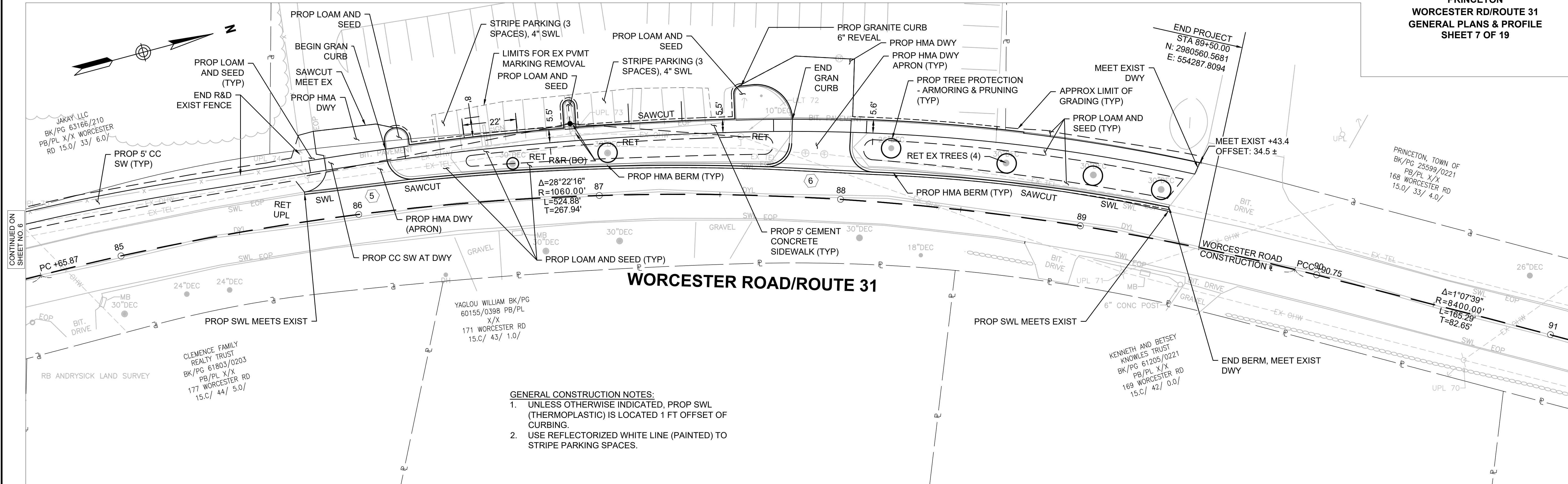
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BK/PG 61120/0248
PB/PL X/X
2 SHARON DR
15.C/ 44/ 2.0/



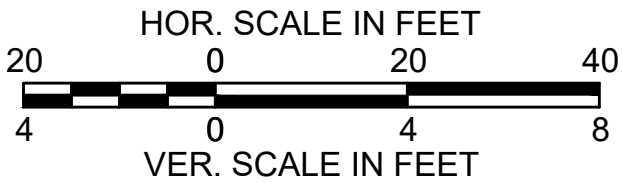
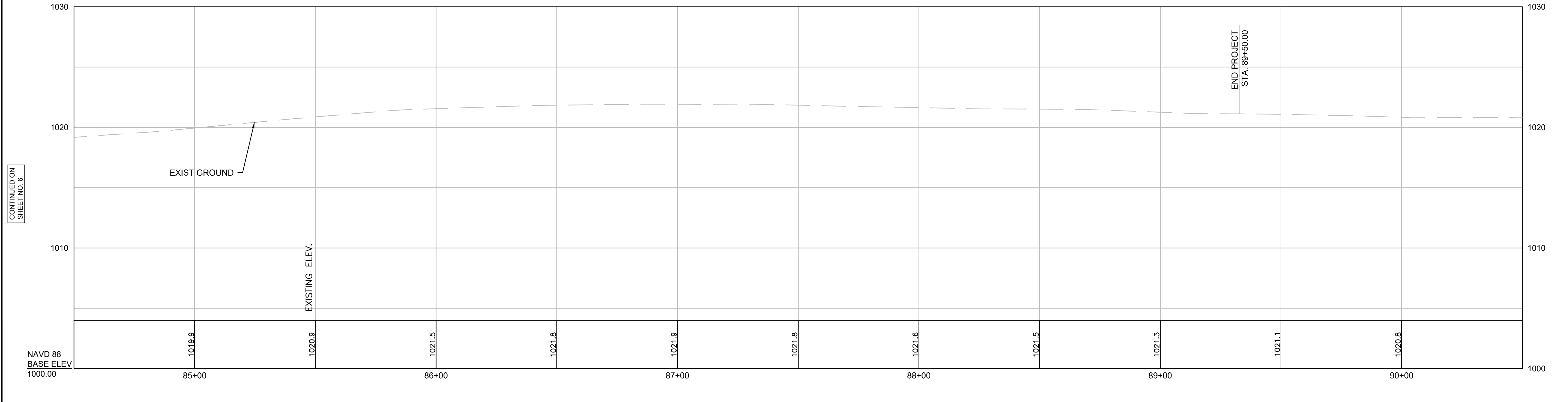
PRINCETON
WORCESTER RD/ROUTE 31
GENERAL PLANS & PROFILE
SHEET 6 OF 19



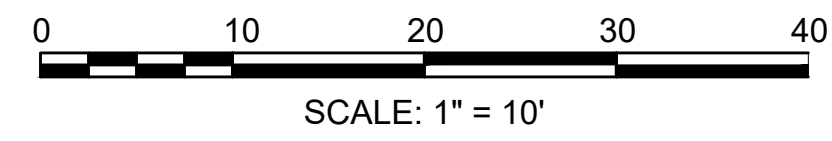
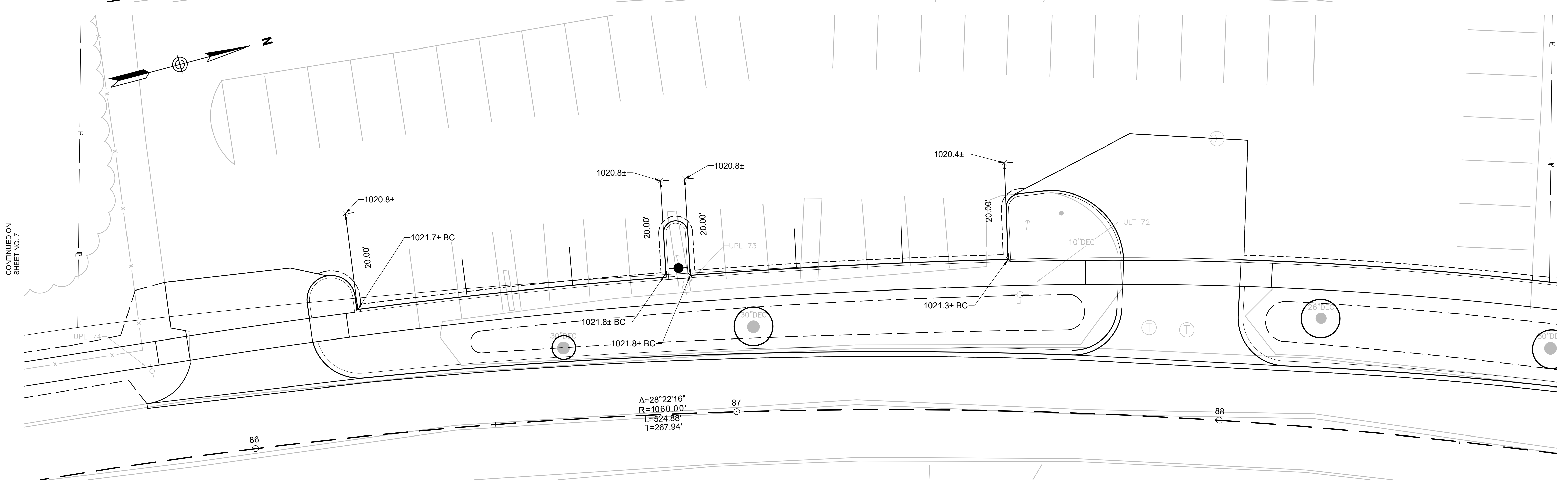
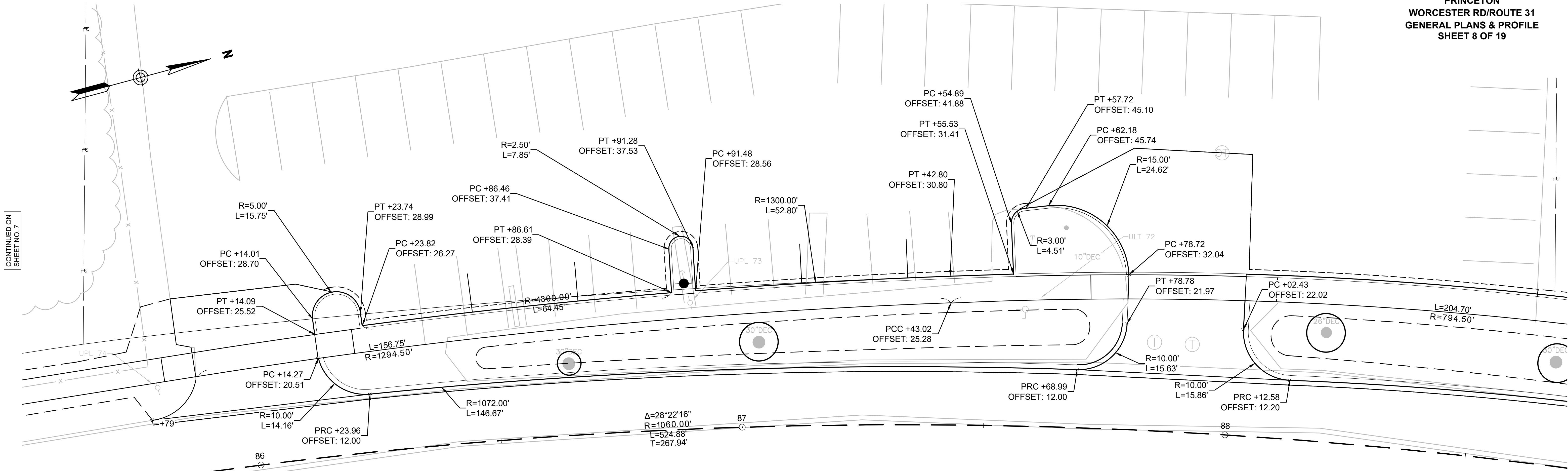
PRINCETON
WORCESTER RD/ROUTE 31
GENERAL PLANS & PROFILE
SHEET 7 OF 19



THE EXISTING PROFILE IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.



PRINCETON
WORCESTER RD/ROUTE 31
GENERAL PLANS & PROFILE
SHEET 8 OF 19

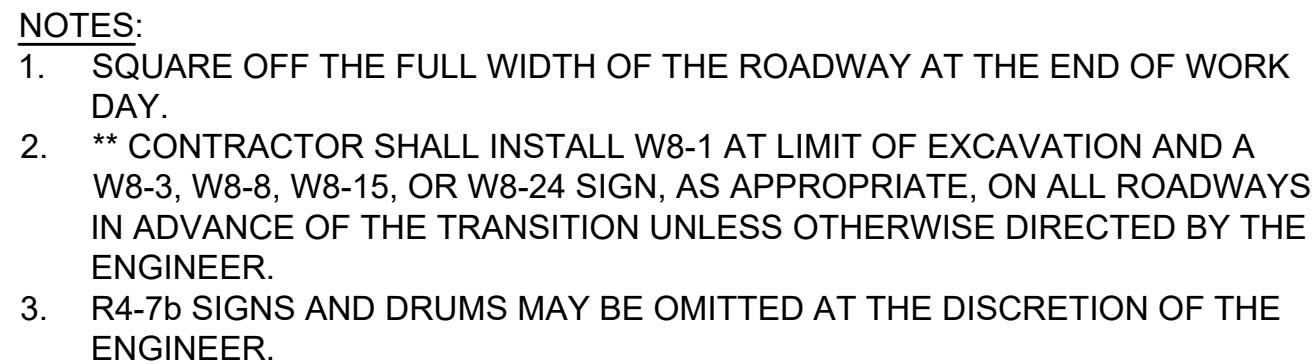


1. ALL CONSTRUCTION SIGNING, TEMPORARY TRAFFIC CONTROL DEVICES, AND ROADSIDE ELEMENTS SHALL CONFORM WITH THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS AMENDED, THE MASSDOT STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TEMPORARY TRAFFIC CONTROL PLANS, THE LATEST REVISIONS OF THE 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).
2. WORK HOURS SHALL BE 7:00AM TO 3:00PM MONDAY THRU FRIDAY UNLESS OTHERWISE APPROVED BY THE TOWN. NO WORK IMPACTING THE TRAVEL WAY WILL BE ALLOWED DURING PEAK TRAFFIC PERIODS. PEAK PERIODS ARE DEFINED AS MONDAY THRU FRIDAY, 6:00AM TO 9:00AM AND 3:00PM TO 7:00PM.
3. NO WORK SHALL OCCUR WITHIN THE PUBLIC WAY THE DAY BEFORE, AFTER OR ON A STATE RECOGNIZED HOLIDAY UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. 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 AND PUBLIC RIGHTS-OF WAY ACCESSIBILITY GUIDELINES (PROWAG).
5. ALL DRUMS OUTSIDE TAPERS SHALL BE SET AT 40' ON CENTER MAX. UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
6. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN SAFE AND REASONABLE ABUTTER ACCESS. 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.
7. THE FIRST 10 DRUMS ON TAPERS SHALL BE REFLECTORIZED DRUMS WITH SEQUENTIAL FLASHING WARNING LIGHTS AND SHALL BE OPERATING, AT A MINIMUM, BETWEEN DUSK AND DAWN, WHEN TAPER IS DEPLOYED.
8. REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
9. CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
10. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 48 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OR RESTRICTION OF ACCESS.
11. FOR DROP-OFFS 3" OR LESS WITHIN THE CLEAR ZONE, CONDITION MAY BE MITIGATED WITH W8-9 (LOW SHOULDER) SIGN OR TEMPORARY CHANNELIZATION DEVICES. FOR DROP-OFFS GREATER THAN 3" BUT NO MORE THAN 36", DETERMINE WHETHER IT IS MORE COST EFFECTIVE TO INSTALL BOTH W8-9 SIGN AND TEMPORARY CHANNELIZATION DEVICES IN ACCORDANCE WITH MASSDOT WORK ZONE SAFETY GUIDE OR W8-9 SIGN WITH A 2H-1V (MIN) WEDGE OR TO REMOVE THE HAZARD.
12. CONTRACTOR SHALL STAGE WORK SUCH THAT A DROP-OFF OF NO MORE THAN 3" AT THE END OF EACH WORK DAY EXISTS WITHIN THE CLEAR ZONE AT ANY TIME AND ENSURE DROP-OFF IS MITIGATED WITHOUT BARRIER PER NOTE 11.
13. CONSTRUCTION CLEAR ZONE SHALL BE IN ACCORDANCE WITH MASSDOT BOSTON TRAFFIC GUIDELINES AS FOLLOWS:
4' IF POSTED SPEED IS LESS THAN 35 MPH
8' IF POSTED SPEED IS 35 MPH
15' IF POSTED SPEED IS 40 MPH
14. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED UNLESS OTHERWISE NOTED.
15. TEMPORARY TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
16. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
17. 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.
18. SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN. CONTRACTOR SHALL MAINTAIN A MINIMUM SIDEWALK HORIZONTAL CLEAR WIDTH OF 36" AT ALL TIMES.
19. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN NCHRP 350 AND/OR MASH CRASH TESTED SIGN SUPPORTS AND INSTALLED IN ACCORDANCE WITH THE MUTCD. SIGNS SHALL NOT BE MOUNTED TO OR LEANED AGAINST DRUMS OR CONES.
20. MA-W20-7b SIGNS SHALL BE REPLACED BY W20-7 SIGNS WHEN FLAGGERS ARE USED IN LIEU OF POLICE OFFICER DETAILS.
21. ARROW BOARD FLASHING CAUTION SHALL FLASH IN FOUR-POINT CAUTION MODE ONLY.

22. W21-7 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.
23. TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT OR SURFACE-APPLIED REMOVEABLE TAPE, AS APPROVED BY THE ENGINEER.
24. ALL TEMPORARY CROSSWALKS AND STOP LINES SHALL BE 12 INCHES WIDE.
25. ALL TEMPORARY DOUBLE YELLOW LINES (DBYL) SHALL BE 6 INCHES WIDE.
26. W20-1c, MA-R2-10a OR MA-R2-10e SIGNS SHOWN ON ADVANCE SIGN SCHEMATIC MAY BE USED IN LIEU OF THOSE SIGNS SHOWN ON TYPICAL DETAILS ON THE TEMPORARY TRAFFIC CONTROL PLANS IF MINIMUM SIGN SPACING IS MET.
27. CONTRACTOR SHALL SECURE WORK AREAS BY APPROPRIATE MEANS, TO PREVENT UNAUTHORIZED ACCESS AT ALL TIMES.
28. THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.
29. NIGHTTIME WORK SHALL REQUIRE PRIOR APPROVAL FROM THE TOWN.
30. ILLUMINATION REQUIRED FOR NIGHTTIME WORK APPROVED BY THE ENGINEER SHALL BE DIFFUSED OR ANTI-GLARE LIGHTING AND IN ACCORDANCE WITH MASSDOT STANDARDS.
31. CONTRACTOR SHALL PROVIDE 2 PORTABLE CHANGE MESSAGE SIGNS (PCMS) A MINIMUM OF 14 DAYS PRIOR TO AND POST START OF CONSTRUCTION. LOCATION AND MESSAGES TO BE COORDINATED WITH THE TOWN.
32. WHEN UTILIZING TYPICAL TRAFFIC CONTROL DETAILS OR STAGING SETUPS, COVER EXISTING CONFLICTING ADVANCE WARNING SIGNS AS REQUIRED TO COMPLETE THE WORK.
33. CONTRACTOR SHALL NOT ALLOW PUBLIC ACCESS ON PORTIONS OF NEWLY BUILT SIDEWALK UNTIL ALL SIDEWALKS WITHIN THE PROJECT LIMITS ARE FULLY CONSTRUCTED AND ADAAG COMPLIANT OR AS DIRECTED BY THE ENGINEER.



SCALE: NTS DWG: TTCP1f DATE: FEB 2022


















SCALE: NTS DWG: TTCP1g DATE: FEB 2022

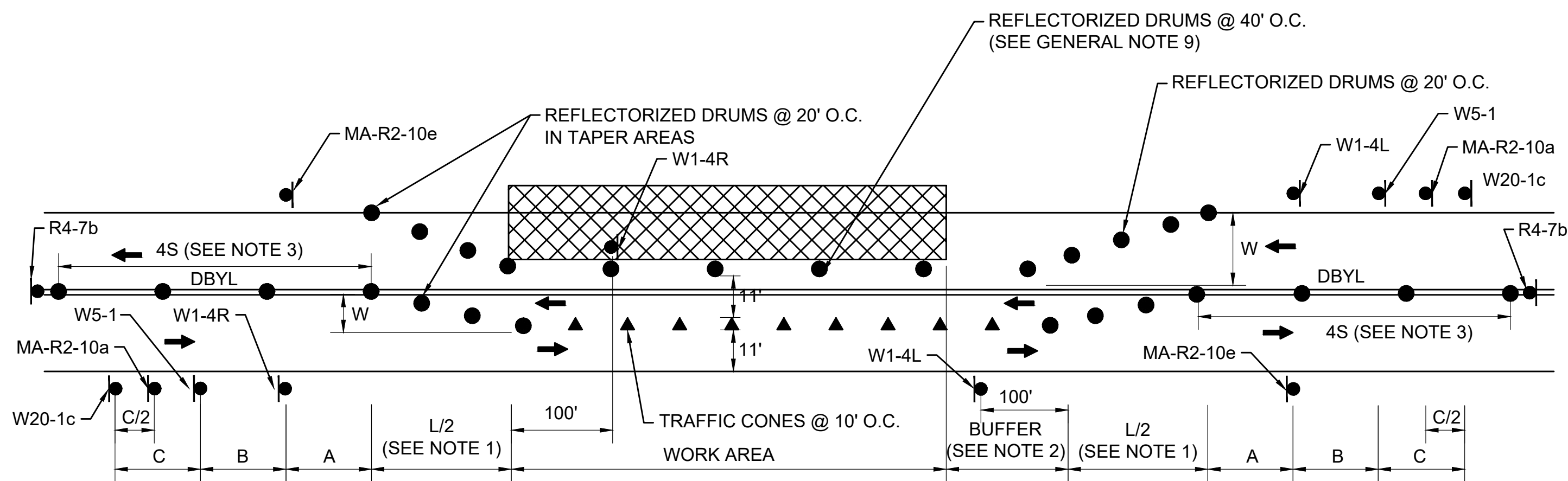
BUFFER SPACING	
SPEED (MPH)	DISTANCE (FEET)
15	80
20	115
25	155
30	200
35	250
40	305
45	360
50	425

	DISTANCE BETWEEN SIGNS (FEET)		
ROADWAY	A	B	C
WORCESTER ROAD	500	500	500
ALL OTHER ROADWAYS	100	100	100

L=	TAPER LENGTH IN FEET	
W=	WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED IN FEET	
S=	POSTED SPEED LIMIT IN MPH	
	POSTED SPEED	
	40 MPH OR LESS	GREATER THAN 40 MPH
	$L = \frac{WS^2}{60}$	L= WS

LEGEND	
	FLAGGER
	POLICE OFFICER
	REFLECTORIZED DRUM
	REFLECTORIZED DRUM WITH SEQUENTIAL FLASHING WARNING LIGHT (SEE NOTE 7)
	TEMPORARY CONSTRUCTION SIGN
	TRAFFIC CONE
	TYPE III BARRICADE
	ARROW BOARD (AB) (CAUTION)
	ARROW BOARD (AB) (DOUBLE)
	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
	WORK AREA (PUBLIC ACCESS RESTRICTED)
	TRAFFIC FLOW
	PEDESTRIAN ROUTE
	CONSTRUCTION FENCE
	TEMPORARY PORTABLE PEDESTRIAN BARRICADE
NTS	NOT TO SCALE
TTCP	TEMPORARY TRAFFIC CONTROL PLAN

**PRINCETON
WORCESTER RD/ROUTE 31
TEMPORARY TRAFFIC CONTROL PLANS
TTCP GENERAL NOTES & LEGEND
SHEET 8 OF 19**



NOTES:

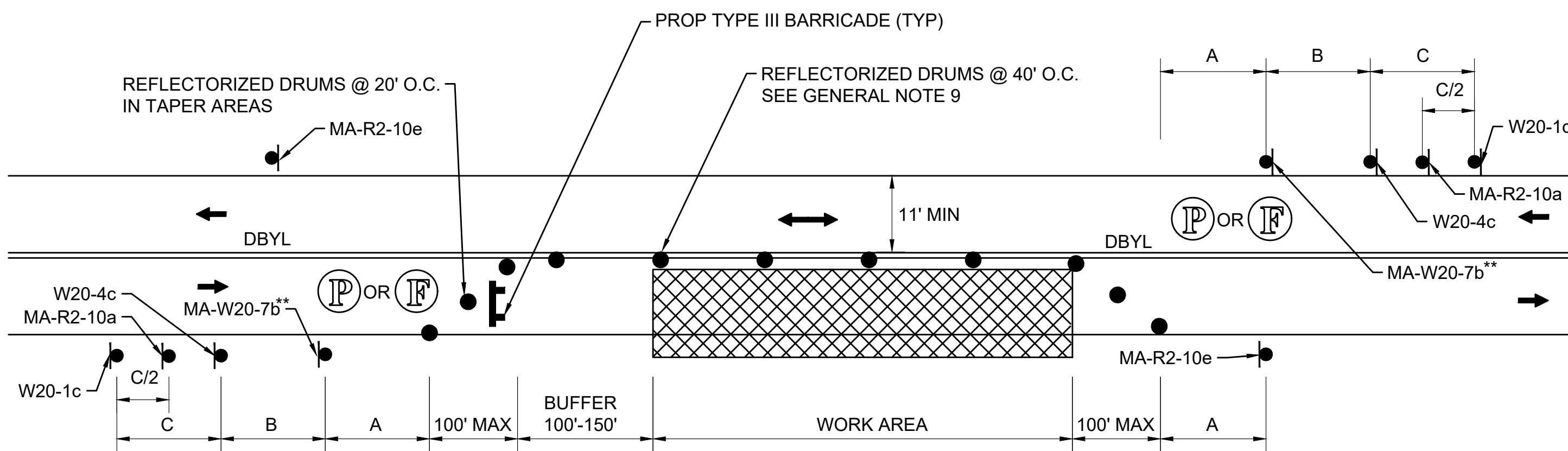
1. SEE TAPER LENGTH FORMULA ON TTCP GENERAL NOTES & LEGEND SHEET.
2. SEE BUFFER SPACING CHART ON TTCP GENERAL NOTES & LEGEND SHEET.
3. S = POSTED SPEED OF ROADWAY IN MPH.
4. REFER TO ADVANCE SIGN SPACING TABLE ON TTCP GENERAL NOTES & LEGEND SHEET.
5. SEE TTCP GENERAL NOTE 26 REGARDING ADVANCE SIGNAGE.

TYPICAL TWO-WAY STREET LANE SHIFT

SCALE: NTS

DWG: TTCP2a

DATE: FEB 2022



NOTES:

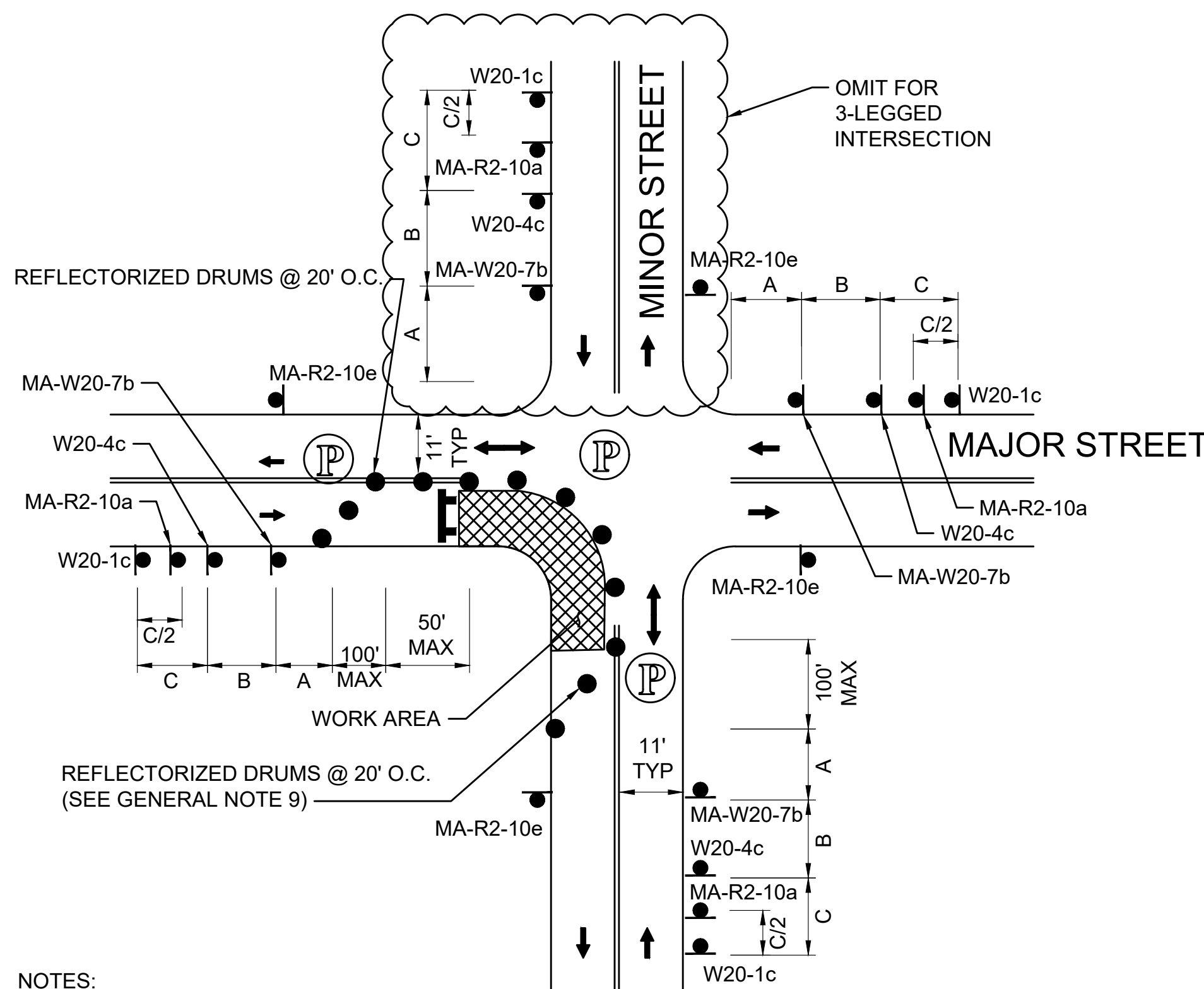
1. REFER TO ADVANCE SIGN SPACING TABLE ON TTCP GENERAL NOTES & LEGEND SHEET.
2. SEE TAPER LENGTH FORMULA ON TTCP GENERAL NOTES & LEGEND SHEET.
3. SEE BUFFER SPACING CHART ON TTCP GENERAL NOTES & LEGEND SHEET.
4. ** SEE NOTE 20 ON TTCP GENERAL NOTES & LEGEND SHEET.
5. SEE TTCP GENERAL NOTE 26 REGARDING ADVANCE SIGNAGE.

TYPICAL TWO-WAY STREET LANE CLOSURE ALTERNATING TRAFFIC

SCALE: NTS

DWG: TTCP2b

DATE: FEB 2022



NOTES:

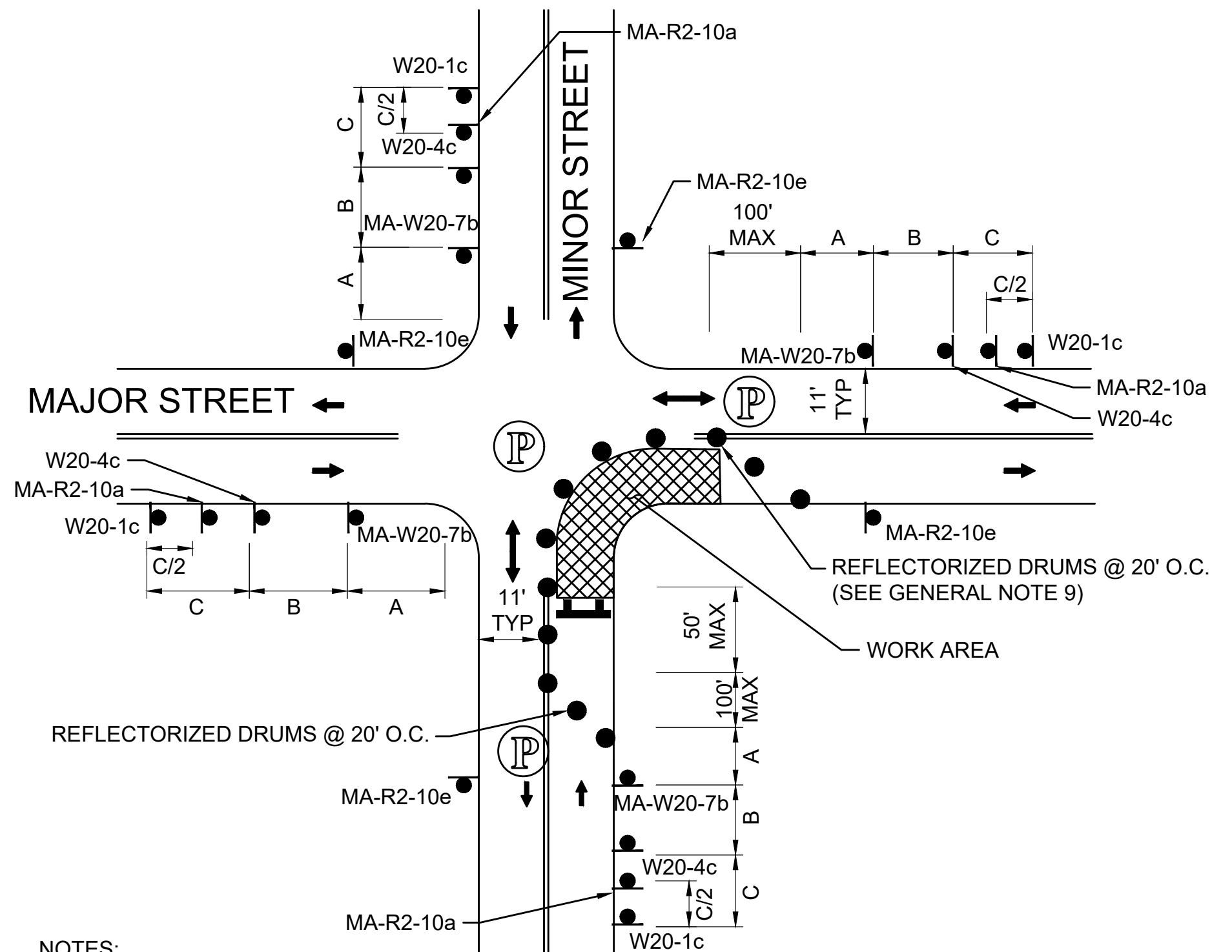
1. ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY.
2. REFER TO ADVANCE SIGN SPACING TABLE ON TTCP GENERAL NOTES & LEGEND SHEET.
3. SEE TTCP GENERAL NOTE 29 REGARDING ADVANCE SIGNAGE.

ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS - NEAR SIDE

SCALE: NTS

DWG: TTCP4d

DATE: FEB 2022



NOTES:

1. ADVANCE WARNING SIGN PLACEMENT TO BE ADJUSTED AS NECESSARY.
2. REFER TO ADVANCE SIGN SPACING TABLE ON TTCP GENERAL NOTES & LEGEND SHEET.
3. SEE TTCP GENERAL NOTE 26 REGARDING ADVANCE SIGNAGE.

ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS - FAR SIDE

SCALE: NTS

DWG: TTCP4c

DATE: FEB 2022

PCMS #1-#2 MESSAGE TEXT

14 DAYS PRIOR
TO START OF WORK

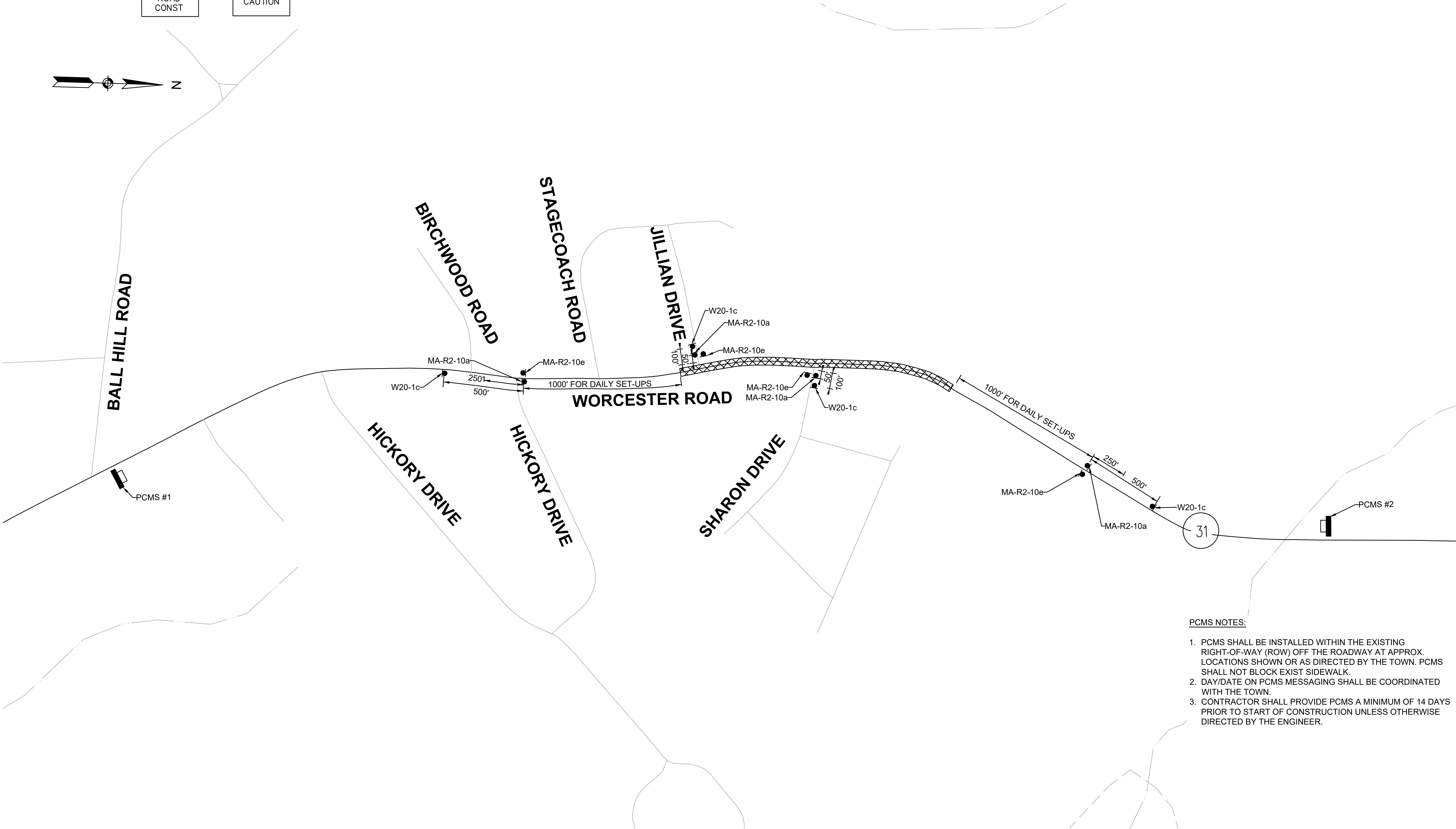
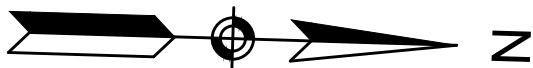
WORCESTER
ROAD
CONST

BEGINS
DAY
DATE

AFTER START OF
CONSTRUCTION

WORCESTER
ROAD
CONST


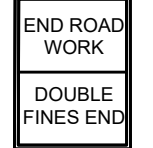


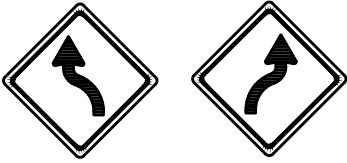








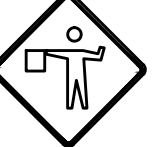


USE
CAUTION



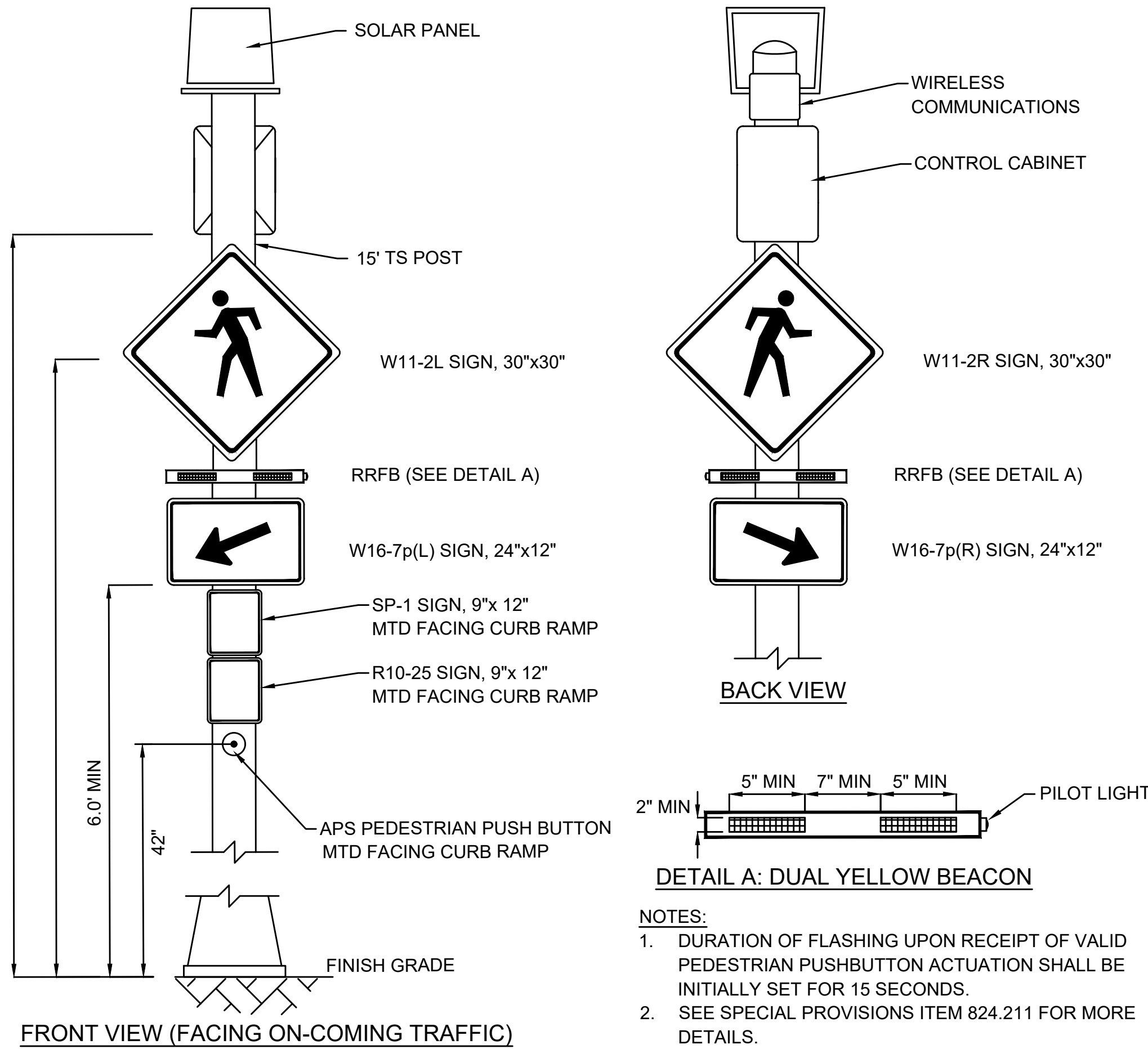
- PCMS NOTES:
1. PCMS SHALL BE INSTALLED WITHIN THE EXISTING RIGHT-OF-WAY (ROW) OFF THE ROADWAY AT APPROX. LOCATIONS SHOWN OR AS DIRECTED BY THE TOWN. PCMS SHALL NOT BLOCK EXIST SIDEWALK.
 2. DAY/DATE ON PCMS MESSAGING SHALL BE COORDINATED WITH THE TOWN.
 3. CONTRACTOR SHALL PROVIDE PCMS A MINIMUM OF 14 DAYS PRIOR TO START OF CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

ADVANCE SIGN SCHEMATIC

300 0 300 600
SCALE IN FEET

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY										
IDENTIFI- CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			COLOR			UNIT AREA (S.F.)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.	BACK- GROUND	LEGEND	BORDER	
MA-R2-10a	48"	36"		AS PER MASSDOT STANDARD			FLUOR- ESCENT ORANGE	BLACK	BLACK	12.00
MA-R2-10e	36"	48"					WHITE	BLACK	BLACK	12.00
							FLUOR- ESCENT ORANGE			
			WHITE							
R4-7b	24"	30"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			WHITE	BLACK	BLACK	5.00
W1-4L/R	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W5-1	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W8-1	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W8-3	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W8-8	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W8-9	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W8-15	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W20-1c	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W20-4c	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
W20-7	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00
MA-W20-7b	36"	36"					FLUOR- ESCENT ORANGE	BLACK	BLACK	9.00

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; THE MASSHIGHWAY DEPARTMENT SIGN LISTINGS 1993 EDITION, AS AMENDED; THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR MOUNTING REQUIREMENTS; AND THE 2017 MassDOT STANDARD SIGNS BOOK, AS AMENDED.
2. ALL SIGNS SHOWN GRAPHICALLY FOR INFORMATION ONLY. SIGN VENDOR SHALL FABRICATE ALL SIGNS IN ACCORDANCE WITH THE APPLICABLE STANDARDS.



(RRFB) RECTANGULAR RAPID FLASHING BEACON (SOLAR)

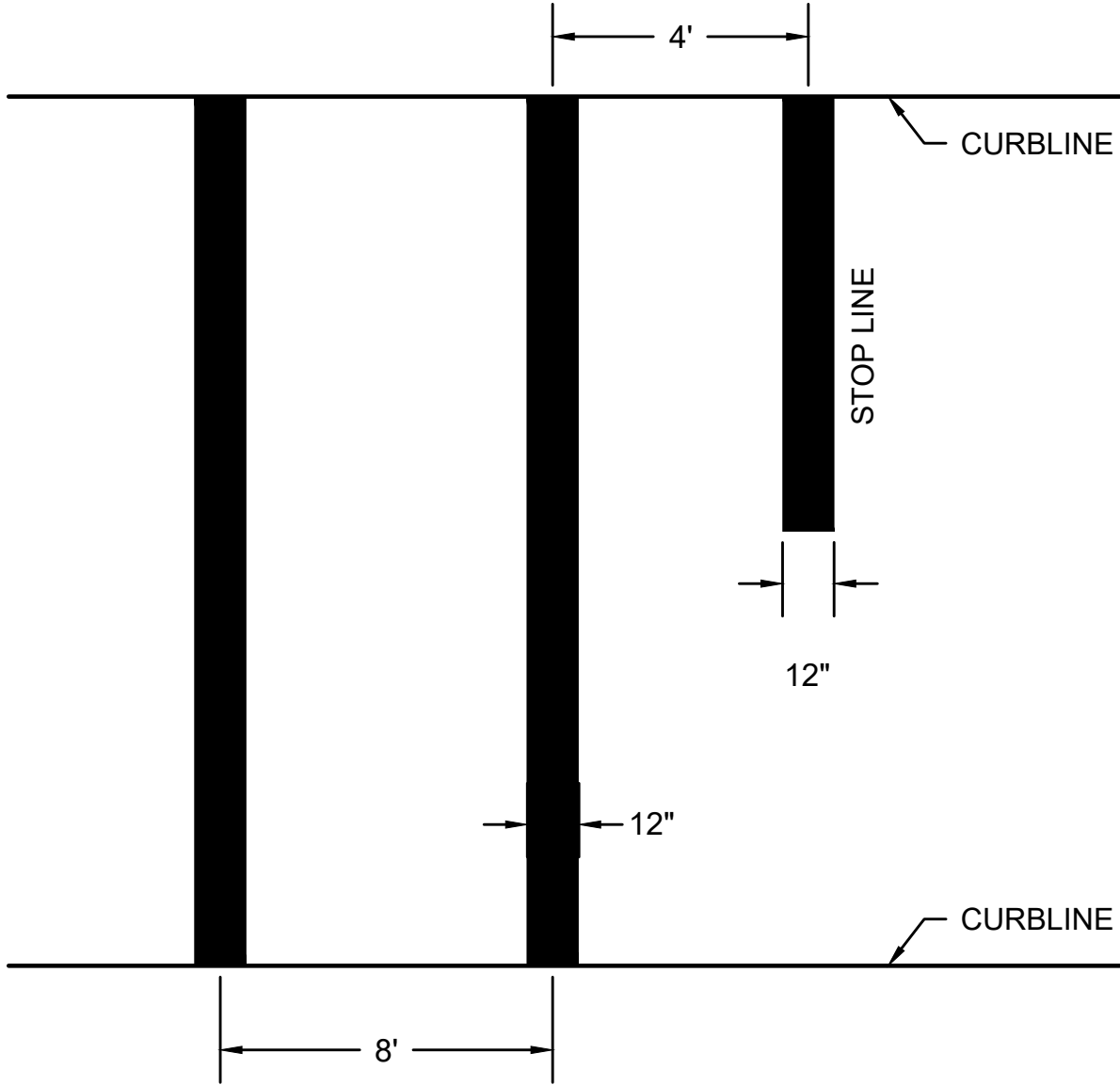
SCALE: NTS

TRAFFIC SIGN SUMMARY - INCLUDED WITH RRFB

IDENTIFI- CATION 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			
R10-25	9"	12"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			2	WHITE	BLACK	BLACK	MTD ON RRFB POST	0.75	1.50
W11-2L	30"	30"					2	FLUOR- ESCENT YELLOW GREEN	BLACK	BLACK	MTD ON RRFB POST	6.25	12.50
W11-2R	30"	30"					2	FLUOR- ESCENT YELLOW GREEN	BLACK	BLACK	MTD ON RRFB POST	6.25	12.50
W16-7p(L)	24"	12"					2	FLUOR- ESCENT YELLOW GREEN	BLACK	BLACK	MTD ON RRFB POST	2.00	4.00
W16-7p(R)	24"	12"					2	FLUOR- ESCENT YELLOW GREEN	BLACK	BLACK	MTD ON RRFB POST	2.00	4.00
SP-1	9"	12"		1.5"	1"	N/A	2	YELLOW	BLACK	BLACK	MTD ON RRFB POST	0.75	1.50

TOTAL AREA = 36 SF

- TRAFFIC SIGN SUMMARY NOTES:
- 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.
 - SEE GENERAL PLANS FOR SIGN PANELS AND POSTS SEPARATE FROM THE RRFB.



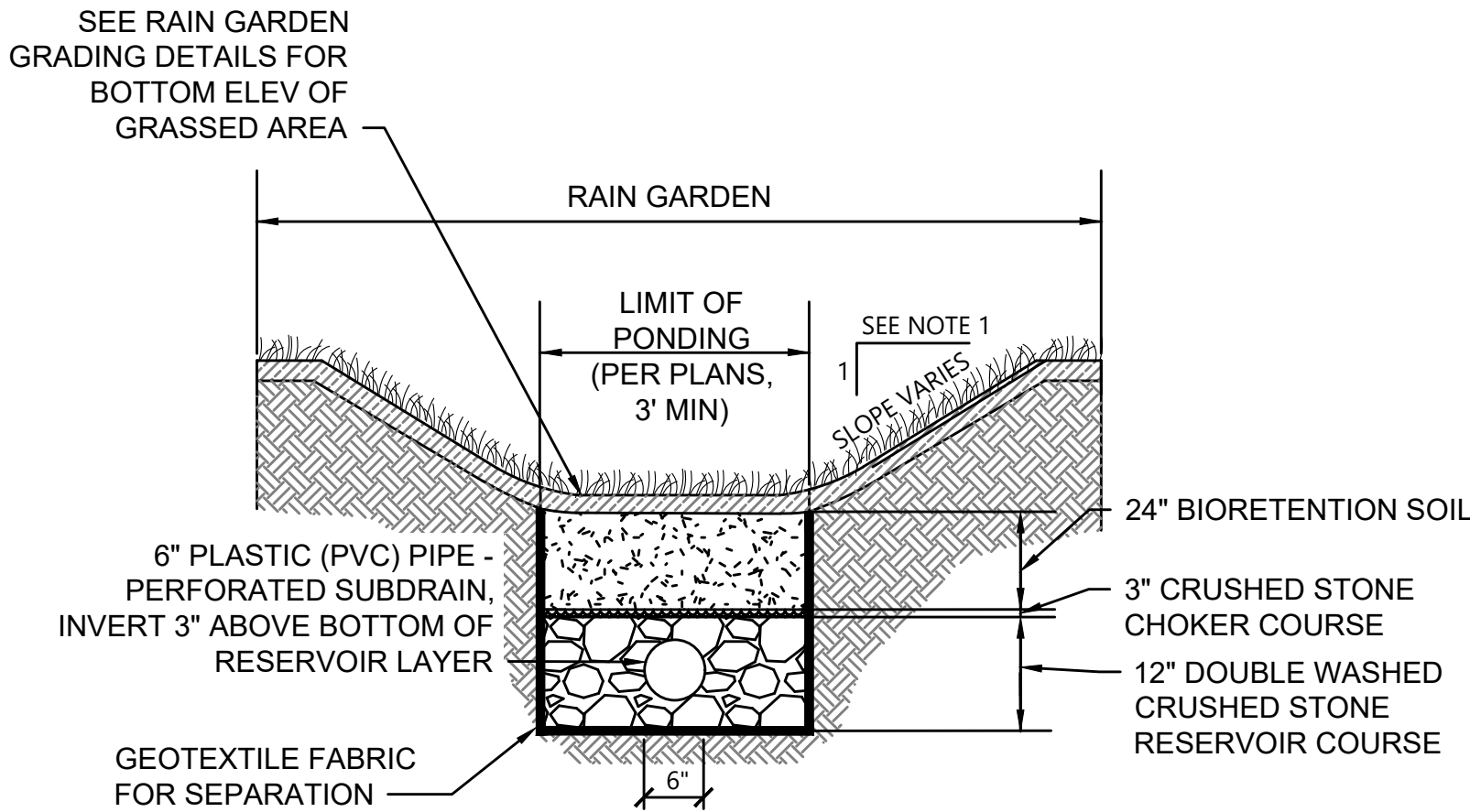
- NOTES:
- ALL 12" RECESSED PAINTED LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6" LINES) WILL BE ACCEPTED.
 - LAYOUT OF CROSSWALKS SHALL BE APPROVED BY THE TOWN PRIOR TO APPLYING TO PAVEMENT.
 - ALL CROSSWALKS INSTALLED SHALL CONFORM TO THE RELEVANT PROVISIONS OF THE MASSACHUSETTS HIGHWAY DEPARTMENT "STANDARD SPECIFICATION FOR HIGHWAY AND BRIDGES" DATED 1988, SECTION 860 FOR REFLECTORIZED LINE (THERMO-PLASTIC) & MATERIAL M7.01.20, LATEST REVISIONS.
 - UNLESS OTHERWISE INDICATED, COLOR IS TO BE WHITE.

STANDARD CROSSWALK

SCALE: N.T.S.

DWG: PM-07

DATE: APRIL 2013

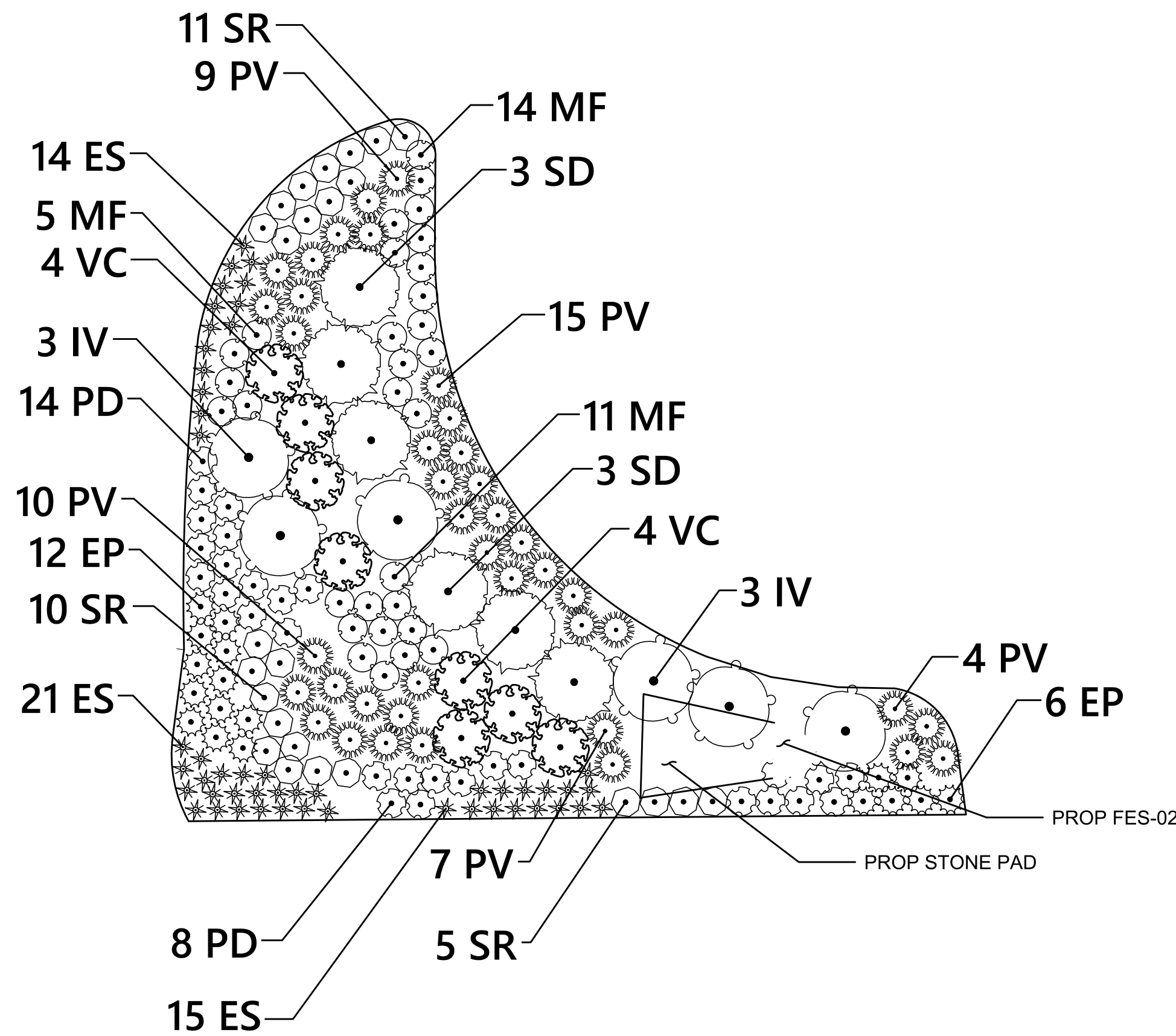


- RAIN GARDEN WITH SUBDRAIN NOTES:
- SIDE SLOPES TO MATCH PROPOSED OR EXISTING GRADE AS SHOWN ON PLANS BUT SHOULD NOT BE STEEPER THAN 2:1.
 - HEAVY EQUIPMENT SHALL BE RESTRICTED FROM TRAVELING OVER THE BIORETENTION SWALES TO PREVENT COMPACTION OF BIORETENTION SWALE SUB-GRADES. VEHICLE/MACHINERY TRAFFIC IN THE DEPRESSION PORTION OF THE BIORETENTION SWALES SHALL BE AVOIDED TO PREVENT COMPACTION OF THE UNDERLYING SOILS. IF MACHINERY MUST BE USED IN THE BIORETENTION SWALES FOR GRADING THE CONTRACTOR SHALL USE WIDE TRACK OR MARSH TRACK EQUIPMENT OR LIGHT EQUIPMENT WITH TURF TYPE TIRES.
 - CRUSHED STONE USED IN BIORETENTION SWALES SHALL BE AASHTO NO. 8 STONE WITH NOMINAL SIZE $\frac{3}{8}$ INCH WASHED CRUSHED STONE FOR CHOKER COURSE AND AASHTO NO. 57 STONE WITH NOMINAL SIZE 1 INCH WASHED CRUSHED STONE FOR RESERVOIR COURSE.
 - SEE RAIN GARDEN GRADING AND PLANTING DETAILS ON SHEET 15.

RAIN GARDEN WITH SUBDRAIN

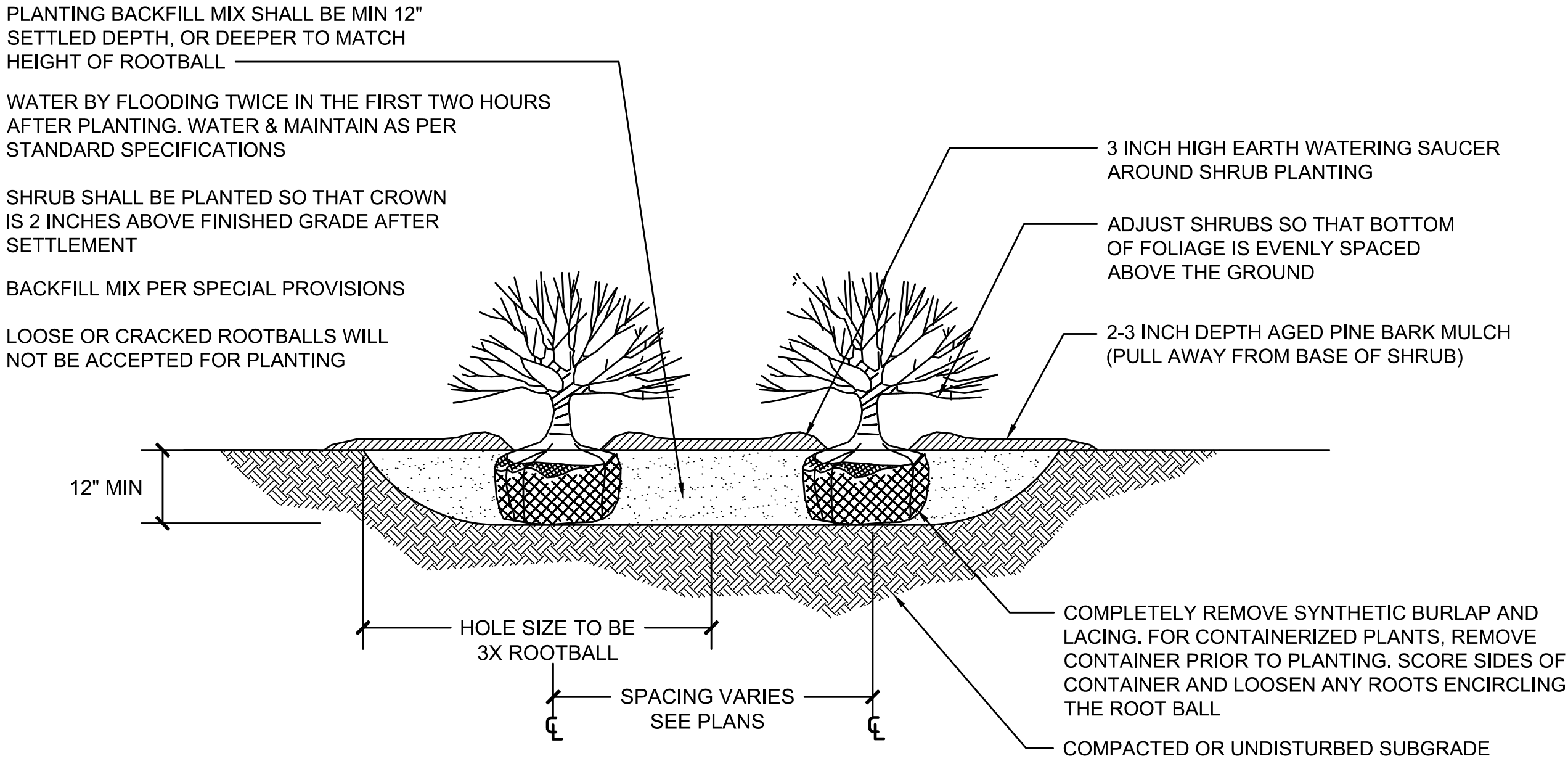
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SOURCE: VHB



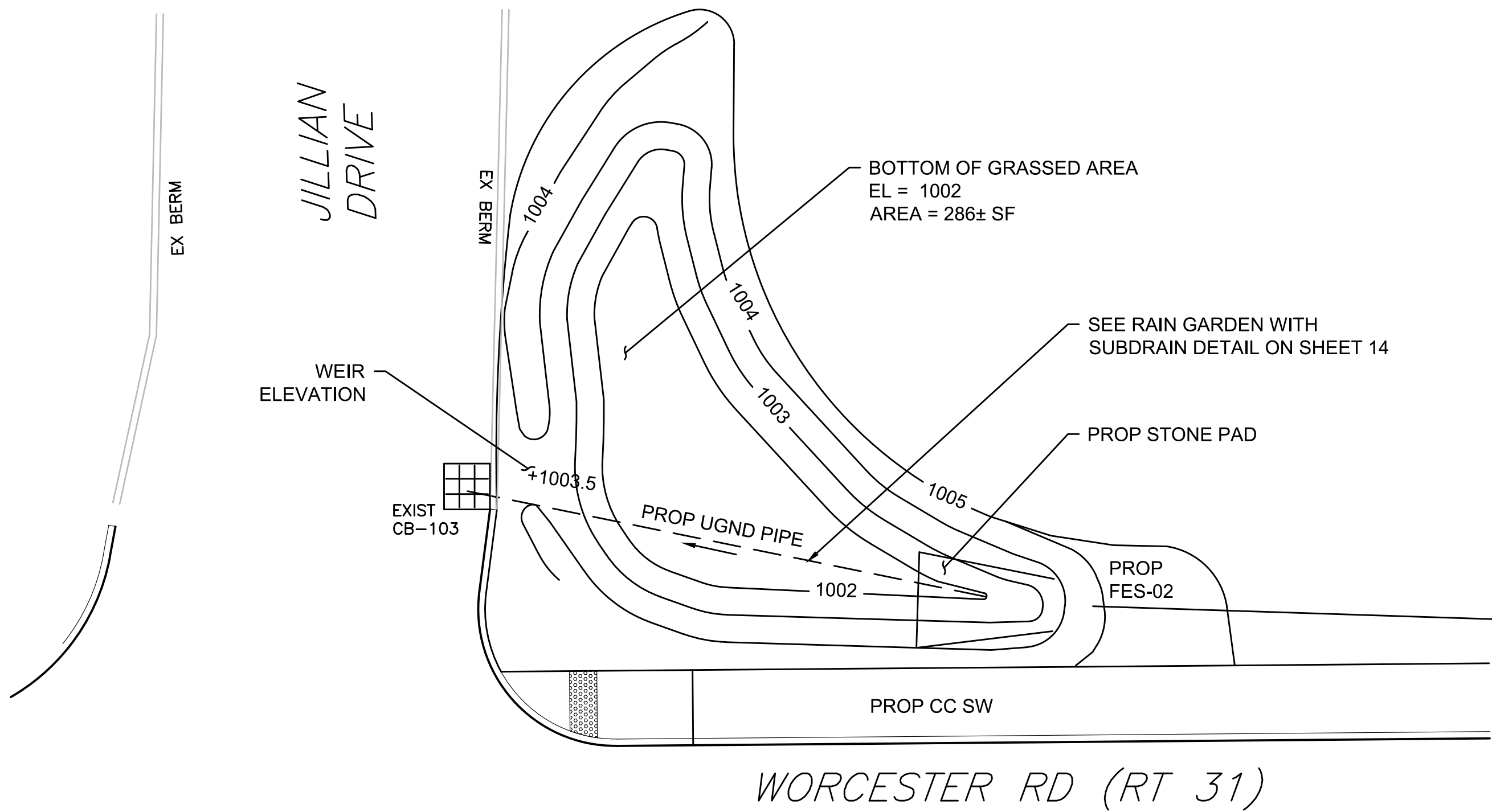
RAIN GARDEN PLANTING PLAN

SCALE: N.T.S.



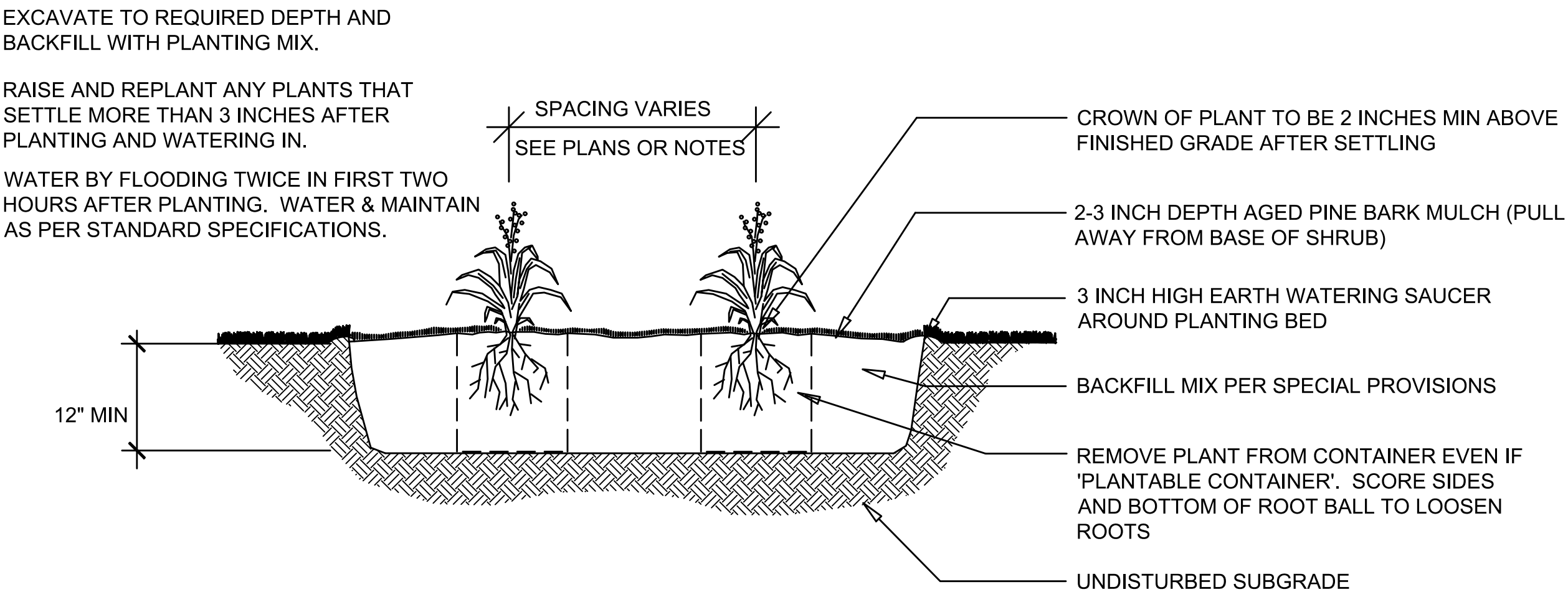
SHRUB PLANTING

SCALE: N.T.S.



RAIN GARDEN GRADING PLAN

SCALE: N.T.S.

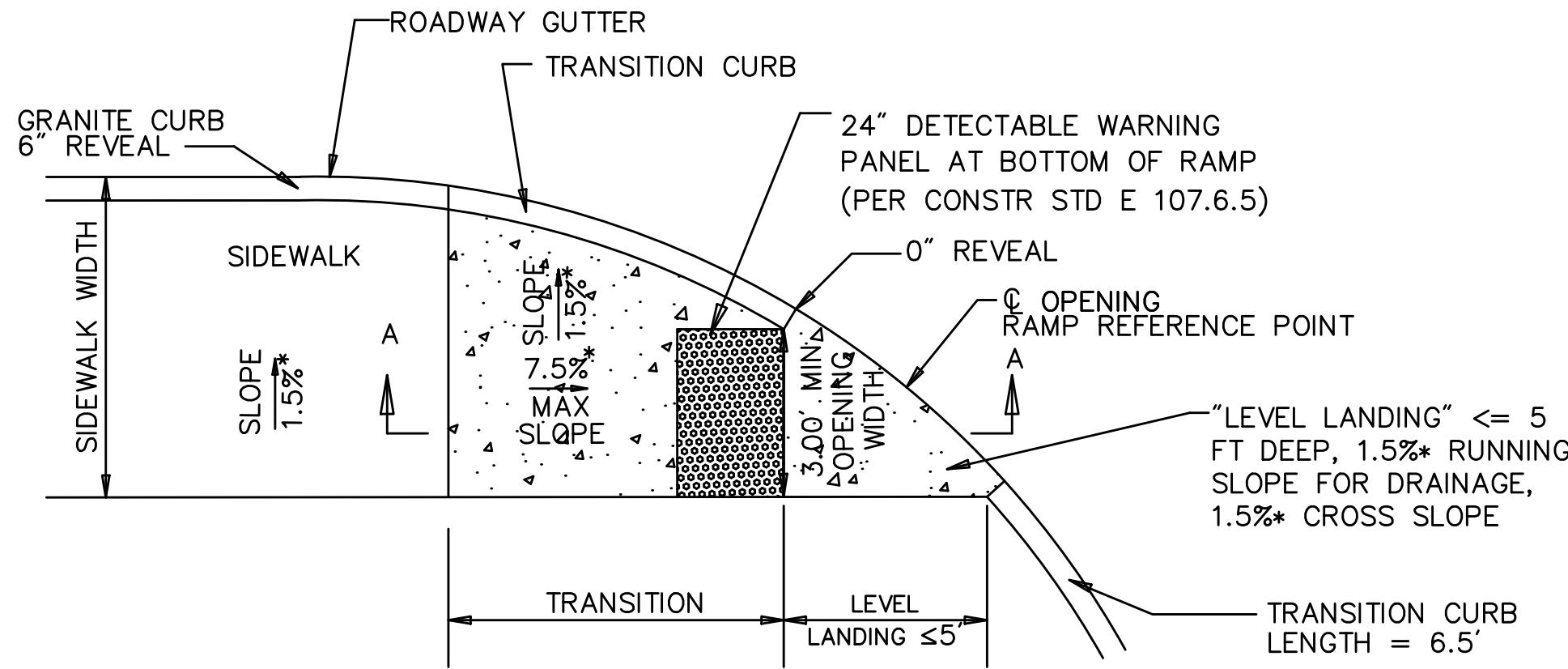


PERENNIAL PLANTING

SCALE: N.T.S.

PLANT SCHEDULE SHEET 5

SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	REMARKS
IV	6	Ilex verticillata 'Sparkleberry'	Sparkleberry Winterberry	18 - 24" HT.	72" o.c.	795.159
SD	6	Salix discolor	Pussy Willow	18 - 24" HT.	72" o.c.	795.259
VC	8	Vaccinium corymbosum	Highbush Blueberry	18 - 24" HT.	48" o.c.	759.359
ORNAMENTAL GRASSES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	REMARKS
ES	40	Eragrostis spectabilis	Purple Lovegrass	2 GAL.	18" o.c.	796.450
PV	45	Panicum virgatum 'Shenandoah'	Shenandoah Switch Grass	2 GAL.	30" o.c.	796.456
PERENNIALS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	REMARKS
EP	18	Echinacea purpurea	Coneflower	1 GAL.	24" o.c.	796.820
MF	30	Monarda fistulosa	Bergamot	1 GAL.	24" o.c.	796.716
PD	22	Penstemon digitalis	Beardtongue	1 GAL.	24" o.c.	796.711
SR	26	Solidago rugosa	Rough-Stemmed Goldenrod	1 GAL.	24" o.c.	796.792

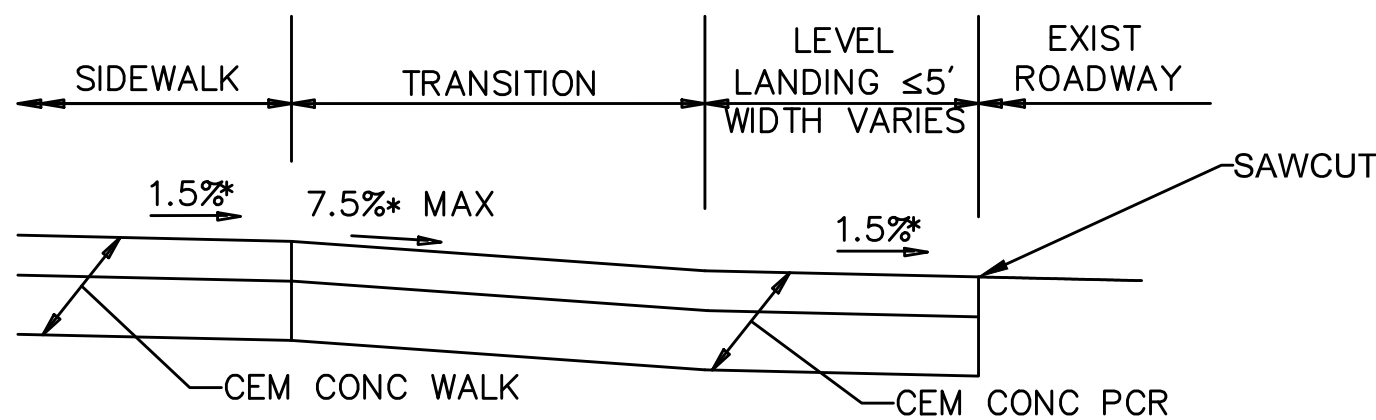


* TOLERANCE FOR CONSTRUCTION ±0.5%

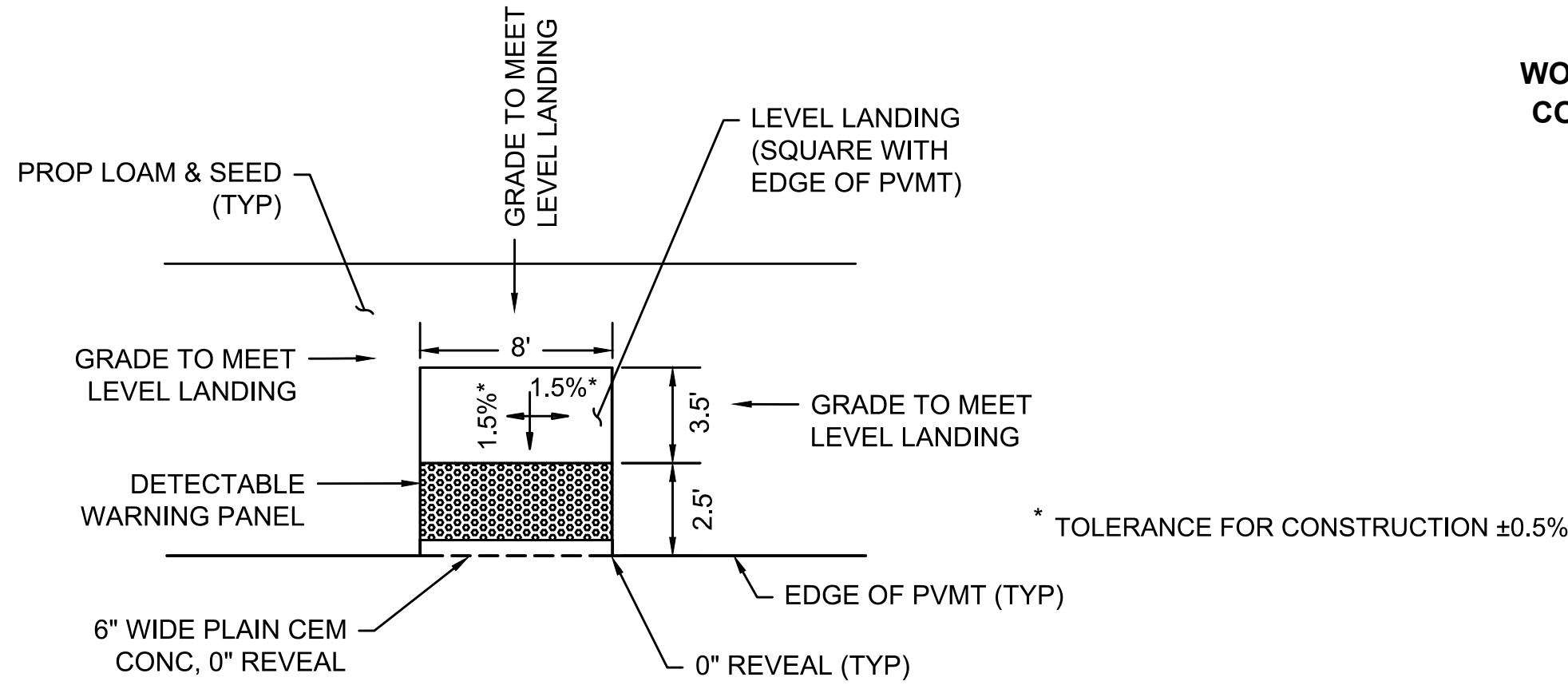
PEDESTRIAN CURB RAMP DATA						
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	REVEAL	TRANS	℄ OPENING ELEVATION
1	73+26.33 17.23' LT	5.5'	1.60%	6"	6'-6"	1003.20
2	73+61.19 15.35' RT	5.5'	1.60%	6"	9'-0"	1004.07

PEDESTRIAN CURB RAMP - SINGLE DIRECTION

SCALE: N.T.S.



SECTION A-A



* TOLERANCE FOR CONSTRUCTION ±0.5%

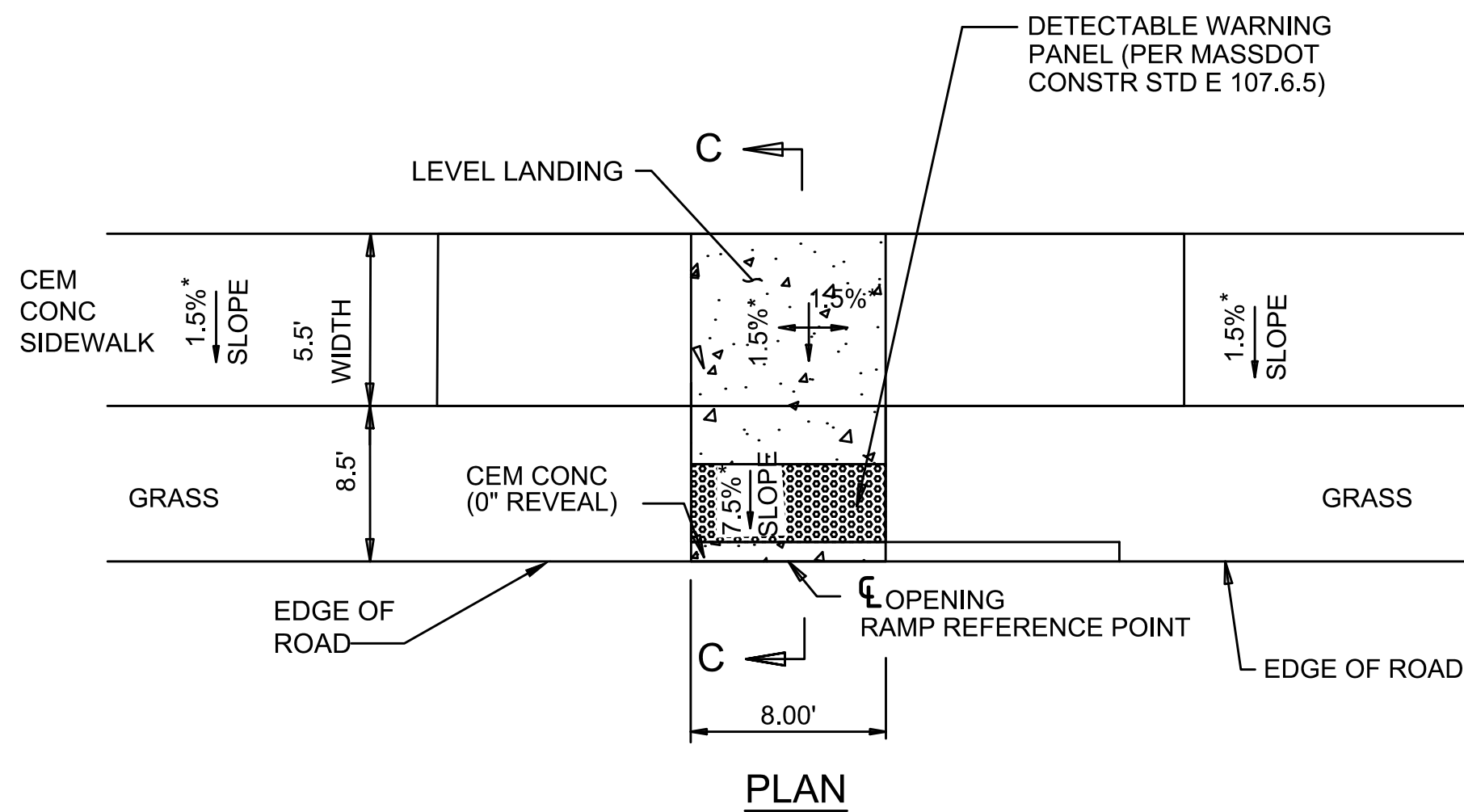
PEDESTRIAN CURB RAMP DATA				
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	℄ OPENING ELEVATION
4	80+23.30 13.76' LT	6' MIN	-0.10%	1013.03

THE ROADWAY GUTTER SLOPE IS IN THE DIRECTION OF THE PROFILE.

NOTES:
FOR DETECTABLE WARNING PANEL, SEE MASSDOT STD
CONSTRUCTION DETAILS E107.6.5

PEDESTRIAN CURB RAMP - LEVEL LANDING ONLY

SCALE: N.T.S.



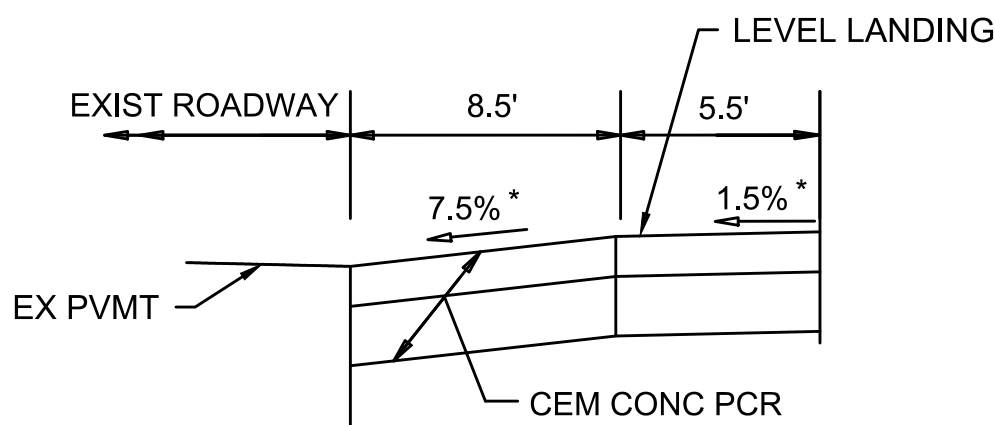
* TOLERANCE FOR CONSTRUCTION ±0.5%

PEDESTRIAN CURB RAMP DATA						
NO.	LOCATION	SIDEWALK WIDTH	ROADWAY GUTTER	LEFT REVEAL	RIGHT REVEAL	℄ OPENING ELEVATION
3	80+23.30 13.76' LT	5.5'	-0.50%	6"	6"	1013.41

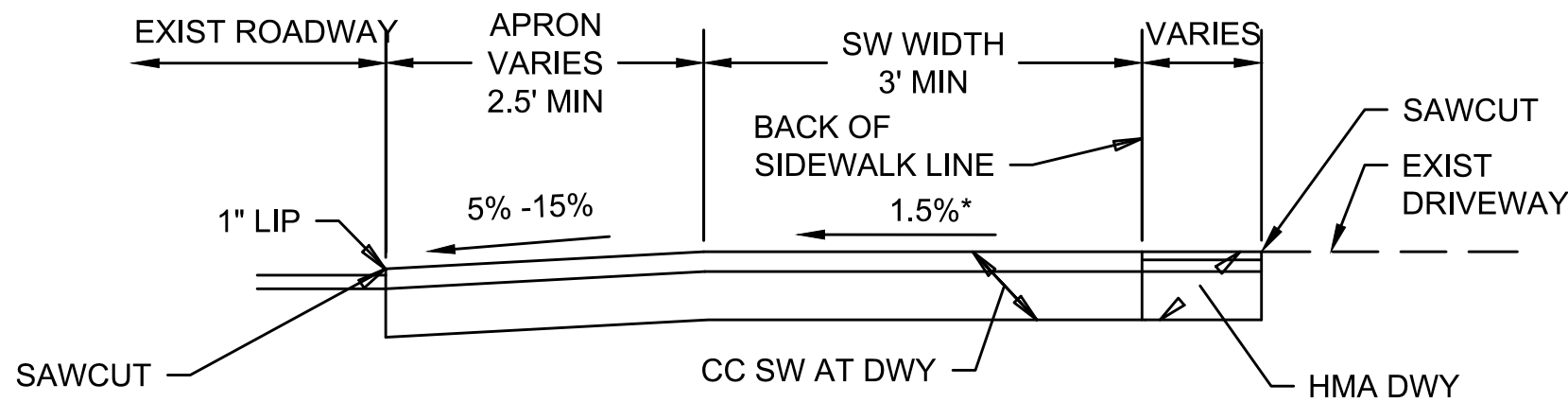
THE ROADWAY GUTTER SLOPE IS IN THE DIRECTION OF THE PROFILE.

PEDESTRIAN CURB RAMP WITH GRASS STRIP

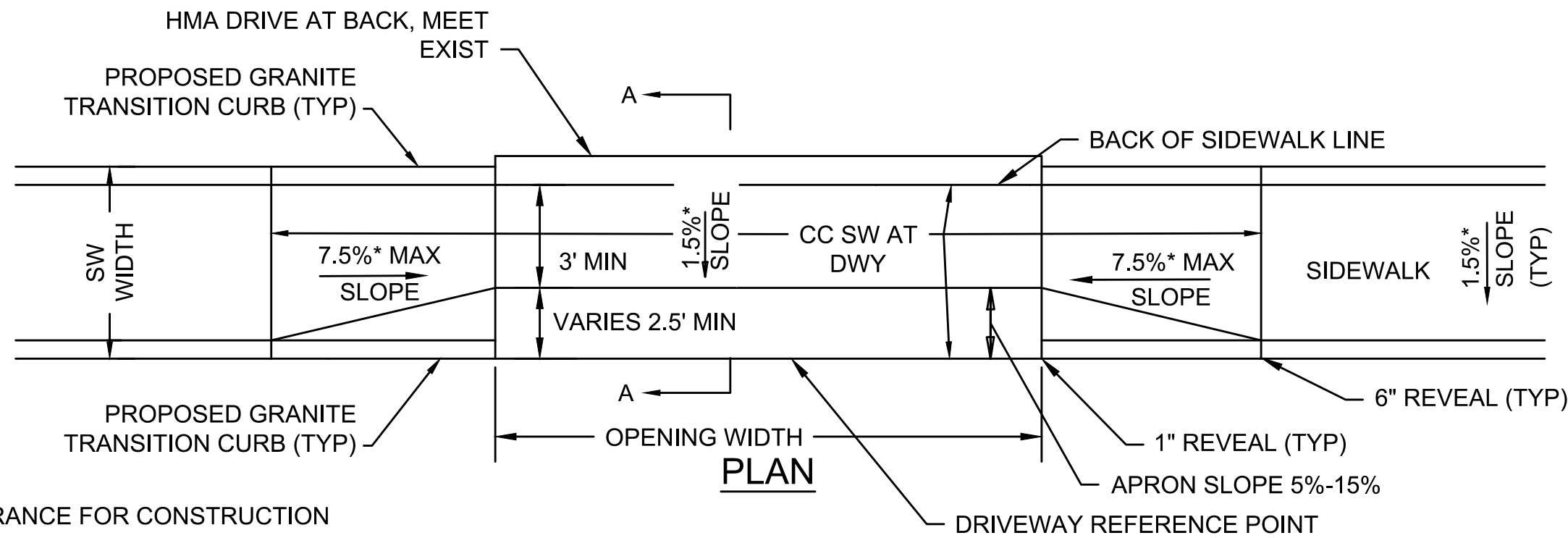
SCALE: N.T.S.



SECTION C-C



SECTION A-A

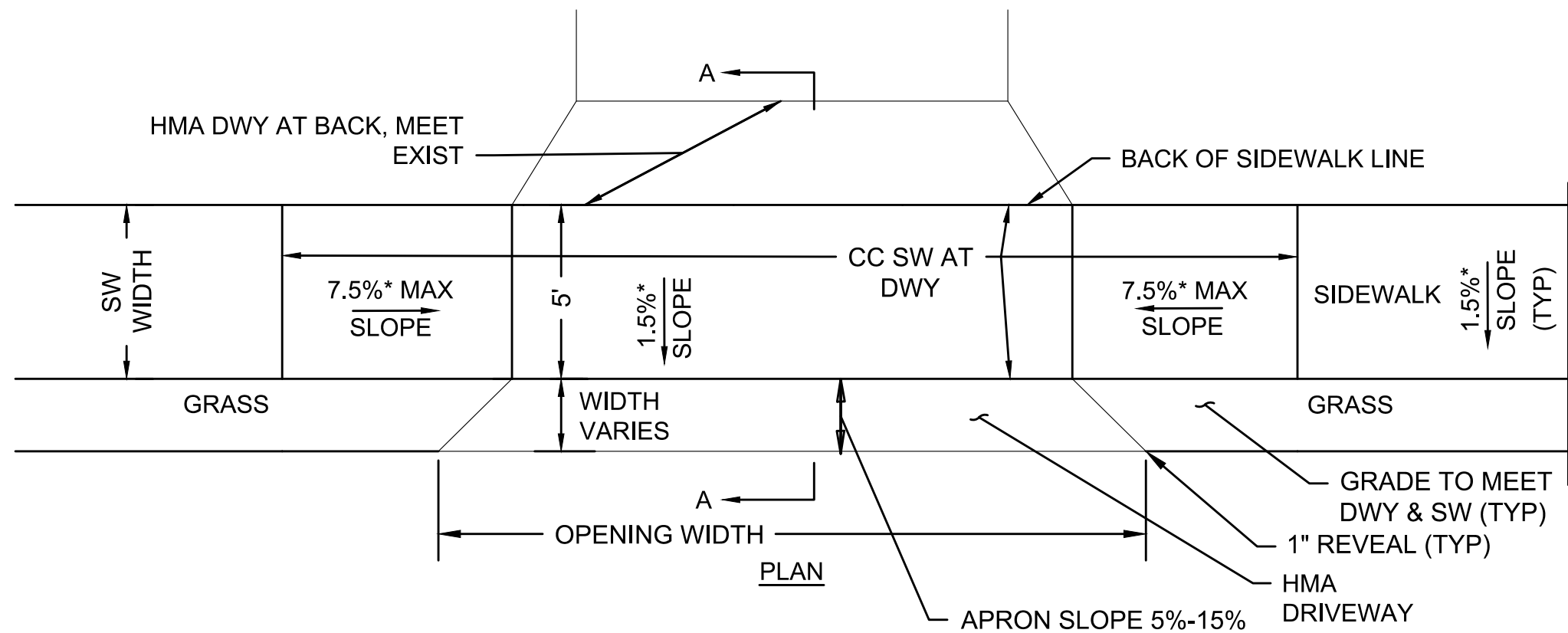


* 0.5% TOLERANCE FOR CONSTRUCTION

DRIVEWAY TRANSITION CHART									
NO.	DRIVEWAY (REF. POINT)	OPENING WIDTH	SIDEWALK WIDTH	ROADWAY GUTTER SLOPE	APRON SLOPE	REVEAL		TRANS.	
						LEFT SIDE	RT SIDE	LEFT SIDE	RT SIDE
①	76+13.38, 13.4' LT	24'-0"	5'-5"	2.04%	5.0%	6"	6"	6.5'	9.0'
②	78+72.19, 12.0' LT	24'-0"	5'-5"	2.25%	5.0%	6"	6"	6.5'	11.0'

TYPICAL DRIVEWAY WITH SIDEWALK AND STRAIGHT TRANSITION CURB

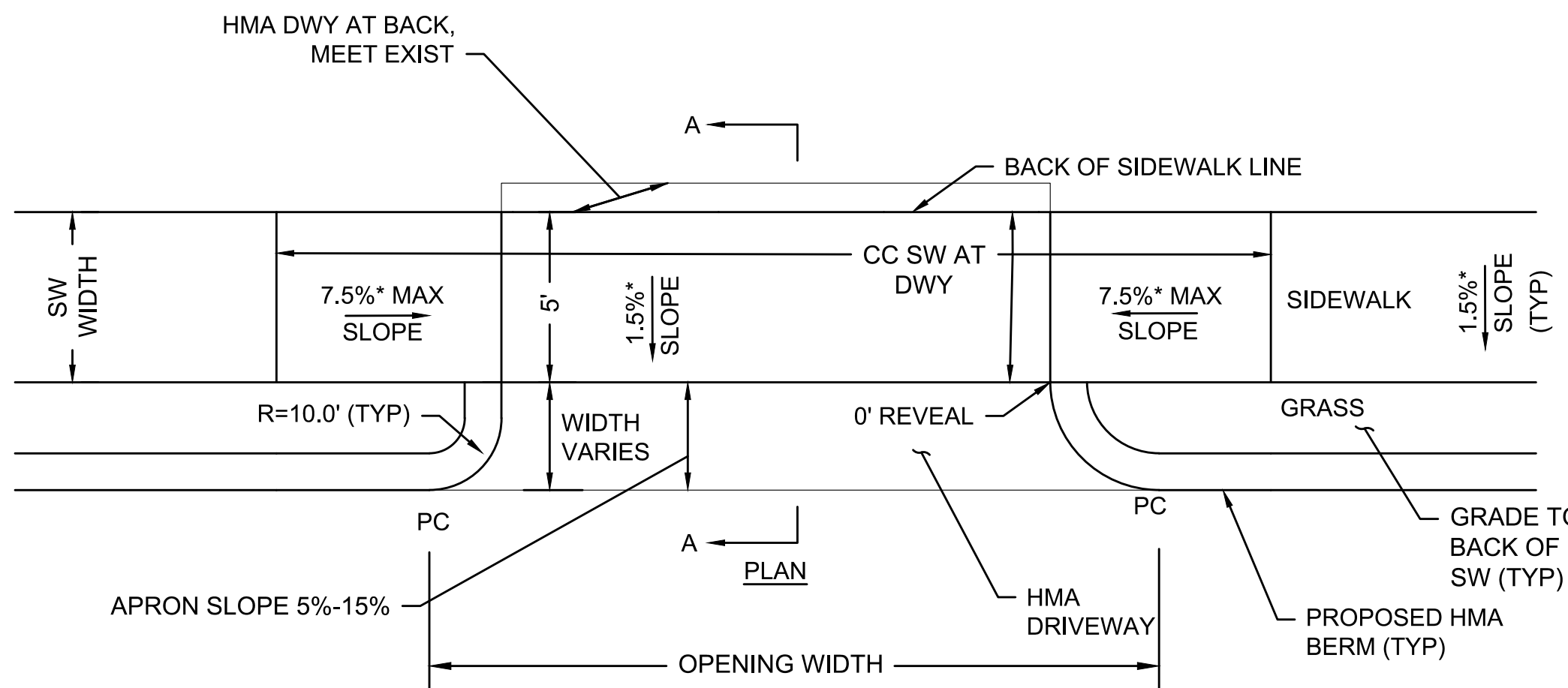
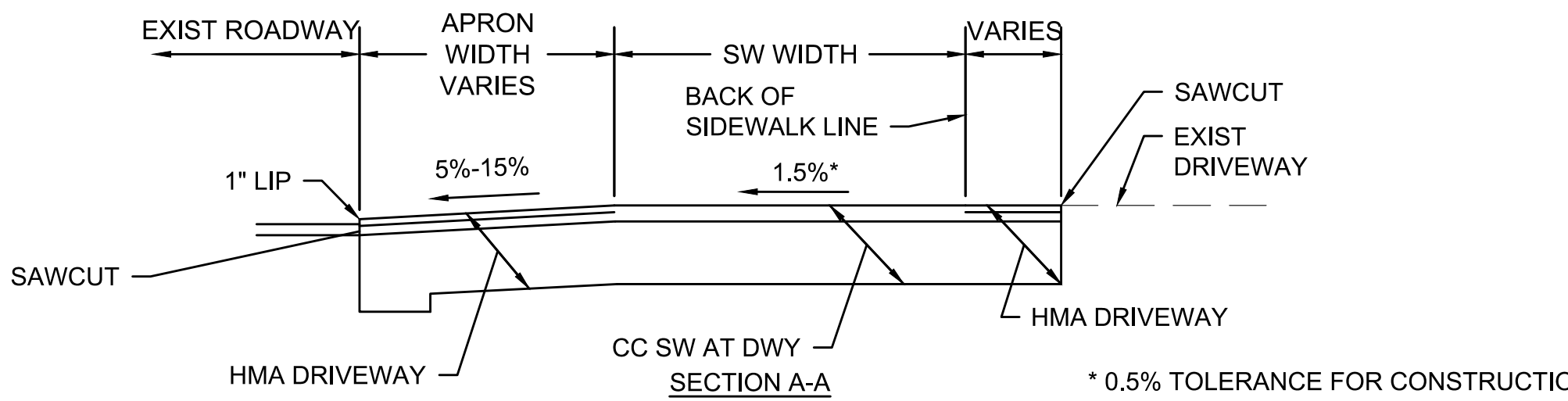
SCALE: N.T.S.



DRIVEWAY TRANSITION CHART								
NO.	DRIVEWAY (REFERENCE POINT)	OPENING WIDTH	SIDEWALK WIDTH	ROADWAY GUTTER SLOPE	APRON SLOPE	TRANS.		
						LEFT SIDE	RT SIDE	
③	82+38.03, 13.7' LT	31'-3"	5'-0"	1.29%	5.0%	9'-0"	6'-6"	
④	83+82.94, 13.7' LT	25'-0"	5'-0"	1.90%	5.0%	9'-0"	6'-6"	

TYPICAL DRIVEWAY WITH SIDEWALK AND NO CURB

SCALE: N.T.S.

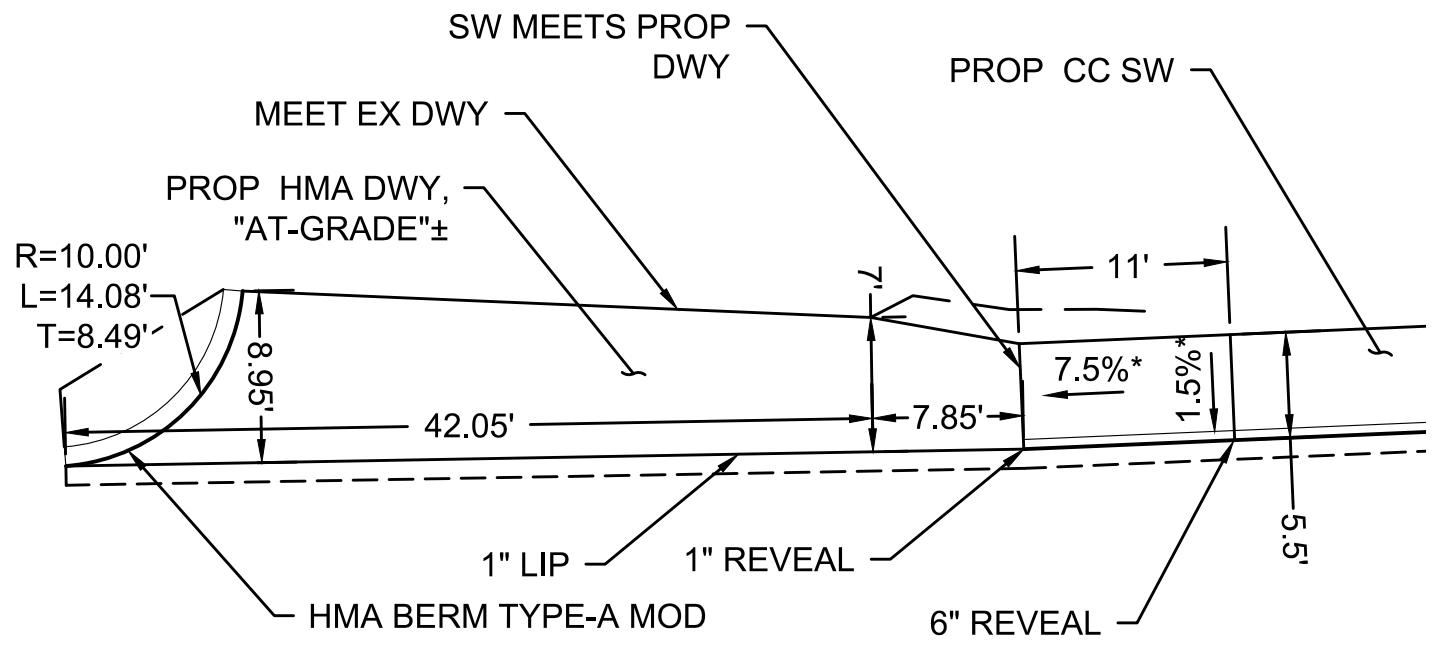
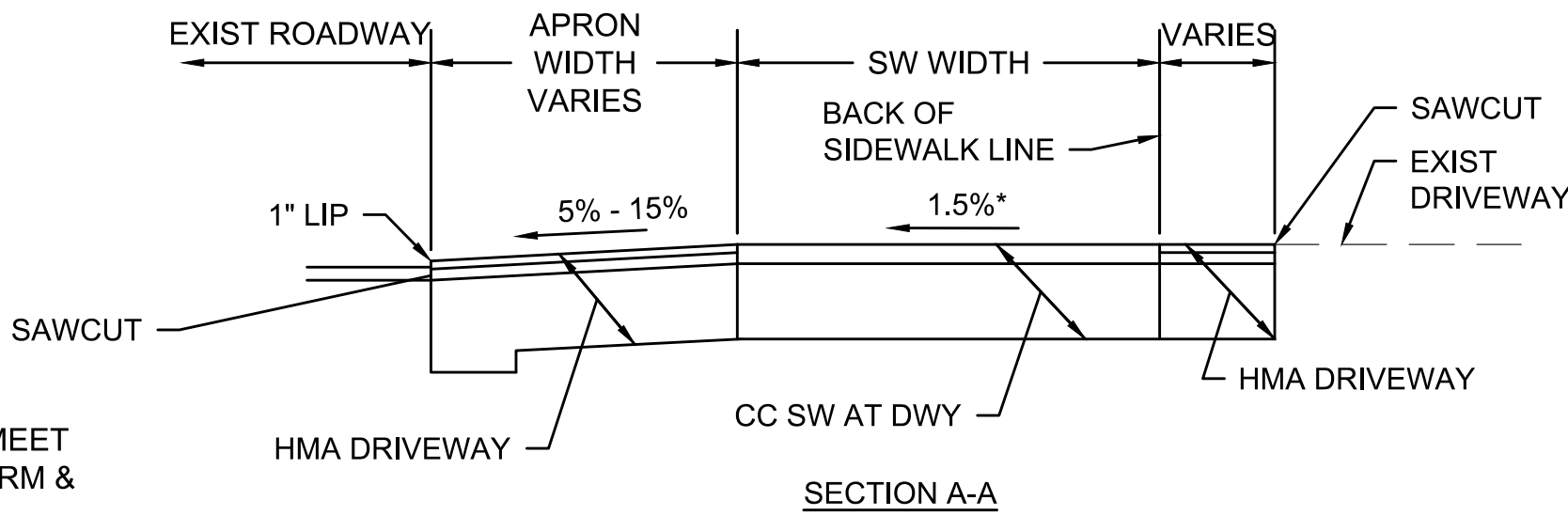


DRIVEWAY TRANSITION CHART								
NO.	DRIVEWAY (REFERENCE POINT)	OPENING WIDTH	SIDEWALK WIDTH	ROADWAY GUTTER SLOPE	APRON SLOPE	TRANS.		
						LEFT SIDE	RT SIDE	
⑤	85+99.15, 12.0' LT	25'-6"	5'-0"	0.80%	5.0%	6'-6"	7'-8"	
⑥	87+90.73, 12.0' LT	24'-4"	5'-0"	-0.12%	5.0%	7'-8"	6'-6"	

* 0.5% TOLERANCE FOR CONSTRUCTION

TYPICAL DRIVEWAY WITH SIDEWALK AND CURVED TRANSITION BERM

SCALE: N.T.S.

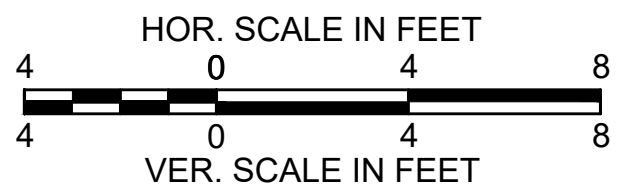
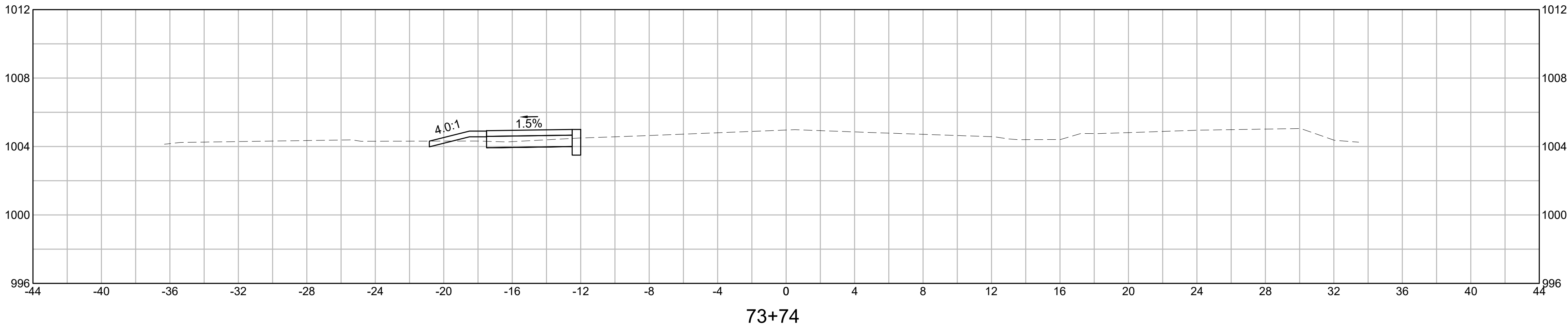
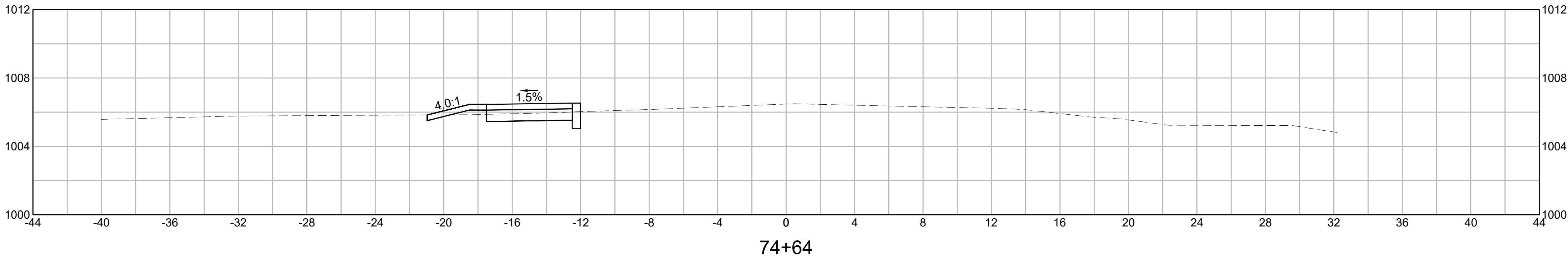
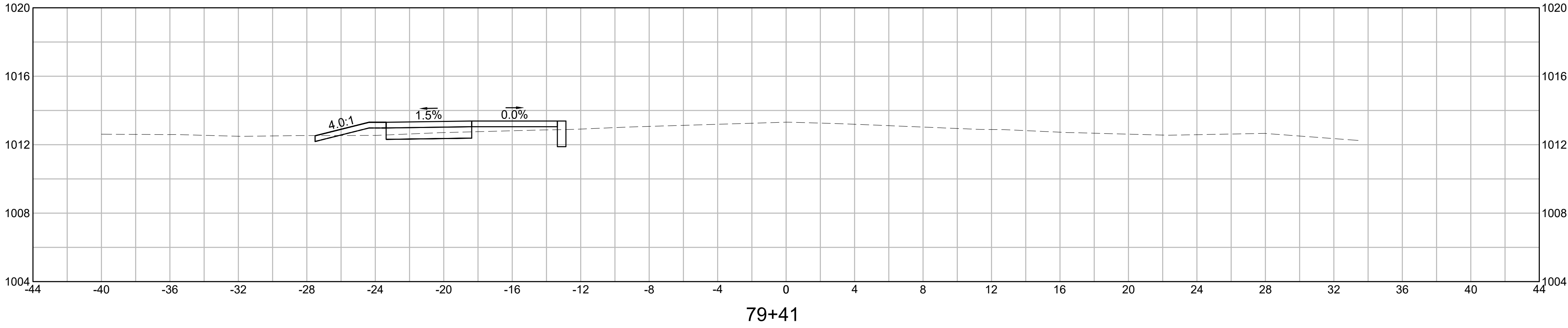


* 0.5% TOLERANCE FOR CONSTRUCTION

DRIVEWAY 7

SCALE: N.T.S.

PRINCETON
WORCESTER RD/ROUTE 31
CRITICAL SECTIONS
SHEET 18 OF 19



PRINCETON
WORCESTER RD/ROUTE 31
CRITICAL SECTIONS
SHEET 19 OF 19

