May-14
11287-COV.DWG 16-May-2014

THE COMMONWEALTH OF MASSACHUSETTS

PLAN AND PROFILE OF

BEDFORD - VARIOUS LOCATIONS

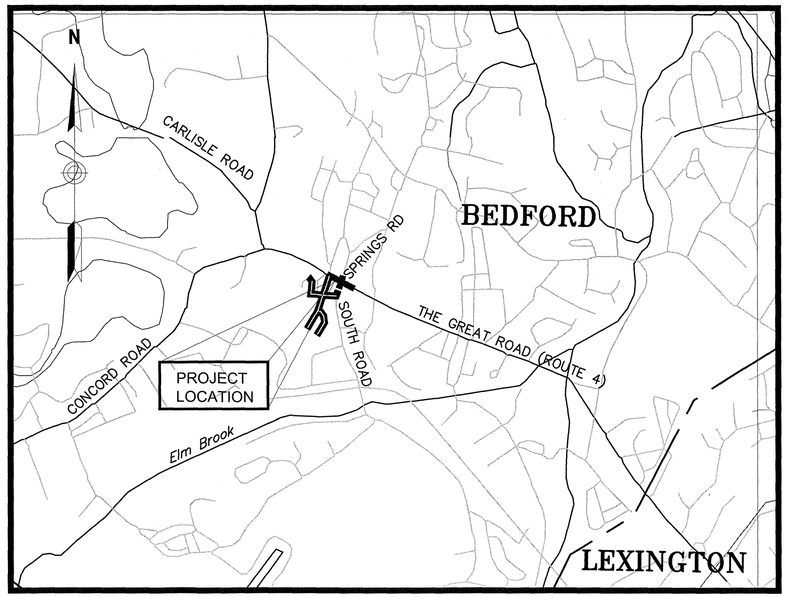
IN THE TOWN OF

BEDFORD

MIDDLESEX COUNTY

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JUNE 15, 2012, THE INTERIM SUPPLEMENTAL SPECIFICATIONS DATED MARCH 21 2014, THE 2012 CONSTRUCTION STANDARD DETAILS, THE 1996 CONSTRUCTION AND TRAFFIC STANDARD DETAILS (AS RELATES TO TRAFFIC STANDARD DETAILS ONLY), THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

INDEX



1500 0 1500 3000

SCALE 1" = 1500'

DESIGN DESIGNATION THE GREAT ROAD (RTE 4)

DESIGN SPEED	35 MPH
ADT (2010)	22,740
ADT (2020)	23,900
K	7%
D	57.2% EB
T (PEAK HOUR)	1.0%
T (AVERAGE DAY)	2.4%
DHV	1,725
DDHV	986
FUNCTIONAL CLASSIFICATION	URBAN MINOR ARTERIAL

DESIGN DESIGNATION MUDGE WAY/ SCHOOL WAY/ ELM STREET/ MAPLE STREET

DESIGN SPEED	25 MPH
POSTED SPEED	N/A
FUNCTIONAL CLASSIFICATION	LOCAL ROADS

NO.	REVISIONS	DATE

COMMONWEALTH OF MASSACHUSETTS
PETER T. BORGESEN
NO. 35132
CIVIL
REGISTERED
PROFESSIONAL ENGINEER

5/21/2014
ENGINEER DATE

VHB Vanasse Hangen Brustlin, Inc.
Transportation · Land Development · Environmental Services
101 Walnut St., P.O. Box 9151
Watertown, MA 02472
617 924 1770 FAX 617 924 2286

DESIGNED BY PTS/SLB	APPROVED BY SHK	SHEET OF 1 52
DRAWN BY SLB	DFTG CHECKED BY PTS	VHB CAD FILE NAME 11287.00–COV.DWG
CHECKED BY SHK	DATE MAY 20, 2014	JOB NO. 11287.00

\\MAWATR\te\11287.00\cad\te\planset\11287–COV.dwg

GENERAL SYMBOLS

EXISTING	PROPOSED	
□ CB (OR GI, LB)	■ CB	CATCH BASIN (OR GUTTER INLET, OR LEACHING BASIN)
□ CBCI (OR GICI)	■ CBCI (OR GICI)	CATCH BASIN (OR GUTTER INLET) WITH CURB INLET (GUTTERMOUTH)
		EDGESTONE–TYPE NOTED
		EDGE OF ROAD
○ EHH	● EHH	ELECTRIC HANDHOLE (NUMBER AS NOTED)
○ EMH	● EMH	ELECTRIC MANHOLE "
○ TMH	● TMH	TELEPHONE MANHOLE "
○ WMH	● WMH	WATER MANHOLE "
○ SMH	● SMH	SEWER MANHOLE "
○ DMH	● DMH	DRAINAGE MANHOLE "
○ GG	● GG	GAS GATE
○ WG	● WG	WATER GATE
○ CS	● CS	CURB STOP
○ Hyd	● HYD	HYDRANT
○ FA	● FA	FIRE ALARM BOX
○ PM	● PM	PARKING METER
☼ LP	✱ LP	STREET LIGHT POLE
○ UP	● UP	UTILITY POLE
○ Guy	● GUY	GUY POLE
12" RCP D	D 21"–12"RCP	DRAIN PIPE (UNDER 24")
	D 21"–24"RCP	DRAIN PIPE (DOUBLE LINE 24" AND OVER)
8" VCP S	S 82'–8"VCP	SEWER MAIN " "
E	E	ELECTRIC DUCT " "
4" HP G	G 8"GAS	GAS MAIN " "
8" C.I. W	W 12"DI	WATER MAIN " "
T	T	TELEPHONE DUCT " "
□ MB	■ MB	MAIL BOX
		HIGHWAY GUARD (TYPE NOTED)
x x	—x— —o—	FENCE (SIZE AND TYPE NOTED)
□ MHB	■ MHB	HIGHWAY/PROPERTY BOUND (TYPE NOTED)
LABEL/DATE	LABEL/DATE	CITY, TOWN, OR COUNTY LAYOUT
		STATE HIGHWAY LAYOUT (S.H.L.O.)
		EASEMENT LINE
ℙ NAME	ℙ	PROPERTY LINE
NAME		CITY, TOWN, OR COUNTY BOUNDARY
N00°00'00"E		STATE BOUNDARY
+57.59 10 P.C. N00°00'00"E		BASE OR SURVEY LINE
		CONSTRUCTION BASELINE
		TREE (SIZE AND TYPE NOTED)
		APPROXIMATE FULL DEPTH AREA
	B–1	BORINGS, PAVEMENT CORES
	TP–1	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
○ TS	●	SIGNAL POST & BASE
		MAST ARM, SHAFT, & BASE (ARM LENGTH AS NOTED)
	A	VEHICULAR SIGNAL HEAD (ALPHA–NUMERIC DESIGNATION NOTED)
	A	VEHICULAR SIGNAL HEAD OPTICALLY PROGRAMMED "
		LIMIT OF VISIBILITY OF OPTICALLY PROGRAMMED SIGNAL HEAD
	A	FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD
□ PB	■ PB	PULL BOX 12" x 12"
		PEDESTRIAN PUSH BUTTON
		PRE–EMPTION DETECTOR
		PRE–EMPTION STROBE
		VIDEO DETECTION CAMERA
ø	Ø	CONTROLLER PHASE
		INDUCTIVE LOOP DETECTOR
m		MAGNETIC DETECTOR (LANE, MULTI–LANE, DIRECTIONAL AS NOTED)
T T		MAGNETOMETER
		CONDUIT (COND.)
		CONDUIT CROSSING ROADWAY WITH CONTROLLED DENSITY FILL
x x	x x	"x" DUCT (CONCRETE ENCASED)
		OVERHEAD CABLE
		DIRECT BURIED CABLE

PAVEMENT MARKINGS AND SIGNING SYMBOLS

EXISTING	PROPOSED	
		PAVEMENT ARROW AND LEGEND
CW	CW	CROSSWALK, 2–12" WHITE LINES (WIDTH NOTED)
SL	SL	STOP LINE, 12" WHITE LINE 4.0' BEHIND CW (TYP)
		YIELD LINE, 24" x 36" WHITE TRIANGLE, 36" O.C.
SWCHL	SWCHL	SOLID WHITE CHANNELIZING LINE–SIZE AS NOTED
SYCHL	SYCHL	SOLID YELLOW CHANNELIZING LINE–SIZE AS NOTED
BWLL	BWLL	BROKEN WHITE LANE LINE – 4"
SWLL	SWLL	SOLID WHITE LANE LINE – 4"
DYCL	DYCL	DOUBLE YELLOW CENTERLINE – 4"
SYEL	SYEL	SOLID YELLOW EDGE LINE – 4"
SWEL	SWEL	SOLID WHITE EDGE LINE – 4"
BYLL	BYLL	BROKEN YELLOW LANE LINE – 4"
		BICYCLE LANE
		BICYCLE DETECTION LEGEND
Sign		SIGN AND POST
		DELINEATOR

ABBREVIATIONS

GENERAL

ABAN	ABANDON	NTS	NOT TO SCALE
ADJ	ADJUST	PGL	PROFILE GRADE LINE
APPROX	APPROXIMATE	PROP	PROPOSED
BIT	BITUMINOUS	PVM'T	PAVEMENT
BOS	BOTTOM OF SLOPE	REM	REMOVE
(BO)	BY OTHERS	REMOD	REMODEL
CEM	CEMENT	RET	RETAIN
CLF	CHAINLINK FENCE	R&D	REMOVE AND DISCARD
CONC	CONCRETE	R&R	REMOVE AND RESET
ELEV	ELEVATION	R&S	REMOVE AND STACK
EOP	EDGE OF PAVEMENT	RT	RIGHT
EXIST	EXISTING	STA	STATION
FND	FOUNDATION	TEMP	TEMPORARY
GRAN	GRANITE	TOS	TOP OF SLOPE
HMA	HOT MIX ASPHALT	TYP	TYPICAL
LOAM	LOAM BORROW		
LT	LEFT		
MAX	MAXIMUM		
MIN	MINIMUM		

UTILITIES

ACCMP	ASHPALT COATED CORRIGATED METAL PIPE
CAP	CORRUGATED ALUMINUM PIPE
CIP	CAST IRON PIPE
CIT	CHANGE IN TYPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT
PVC	POLYVINYLCHLORIDE PIPE
PWW	PAVED WATER WAY
RCP	REINFORCED CONCRETE PIPE
TSV&B	TAPPING SLEEVE VALVE AND BOX
UP	UTILITY POLE

ALIGNMENT/GRADING

CC	CENTER OF CURVE
HP	HIGH POINT
LP	LOW POINT
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
PNT	POINT
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENT
25.45	SPOT ELEVATION

PROFILES

AD	ALGEBRAIC DIFFERENCE IN RATES OF GRADE
ELEV	ELEVATION
HSD	HORIZONTAL SIGHT DISTANCE
K	RATE OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVC	POINT OF VERTICAL CURVE
PVT	POINT OF VERTICAL TANGENT
PVRC	POINT OF VERTICAL REVERSE CURVE
PVCC	POINT OF VERTICAL COMPOUND CURVE
SSD	STOPPING SIGHT DISTANCE
VC	VERTICAL CURVE

TRAFFIC SIGNAL SYSTEMS

R	STEADY CIRCULAR RED
Y	STEADY CIRCULAR YELLOW
G	STEADY CIRCULAR GREEN
FR	FLASHING CIRCULAR RED
–FR→	FLASHING RED ARROW
FY	FLASHING CIRCULAR YELLOW
–FY→	FLASHING YELLOW ARROW
↑ G	STEADY VERTICAL GREEN ARROW
←X–	STEADY LEFT ARROW (RED, YELLOW OR GREEN PREFIX)
–X→	STEADY RIGHT ARROW (RED, YELLOW OR GREEN PREFIX)
W	STEADY WALK–WHITE
DW	STEADY DON'T WALK–PORTLAND ORANGE
FDW	FLASHING DON'T WALK–PORTLAND ORANGE

BEDFORD
BEDFORD – VARIOUS LOCATIONS
LEGEND & GENERAL NOTES
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GENERAL NOTES

1. TOPOGRAPHICAL INFORMATION FROM A SURVEY BY VANASSE HANGEN BRUSTLIN, INC., WATERTOWN, MASSACHUSETTS BETWEEN THE DATES OF JULY 21, 2010, AND SEPTEMBER 22, 2010 AND UPDATED IN 2012.
2. 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.
3. 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.
4. 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.
5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
6. TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
7. 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.
8. 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).
9. JOINTS BETWEEN NEW BITUMINOUS CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
10. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND STACKED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
11. ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF .01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
12. EXISTING GRANITE CURB & EDGING SUITABLE FOR REUSE SHALL BE RE–USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
13. 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.
14. TREE TRIMMING MAY BE REQUIRED AT CERTAIN LOCATIONS TO BE DETERMINED BY THE ENGINEER.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
KEY PLAN
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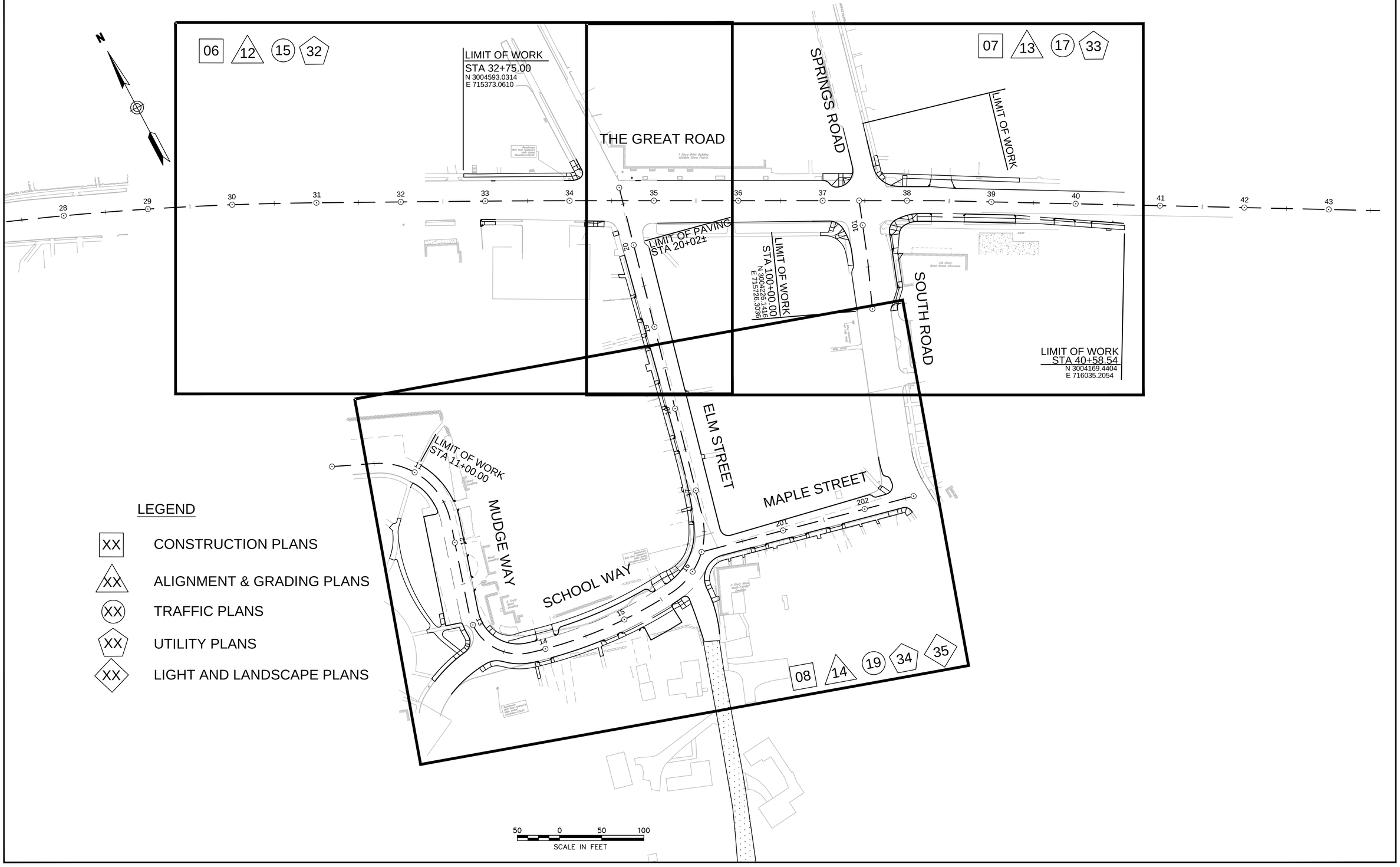
11287-KEY.DWG Plotted on 21-May-2014 4:32 PM



LEGEND

- XX — CONSTRUCTION PLANS
- XX — ALIGNMENT & GRADING PLANS
- XX — TRAFFIC PLANS
- XX — UTILITY PLANS
- XX — LIGHT AND LANDSCAPE PLANS

BEDFORD
BEDFORD – VARIOUS LOCATIONS
TYPICAL SECTIONS
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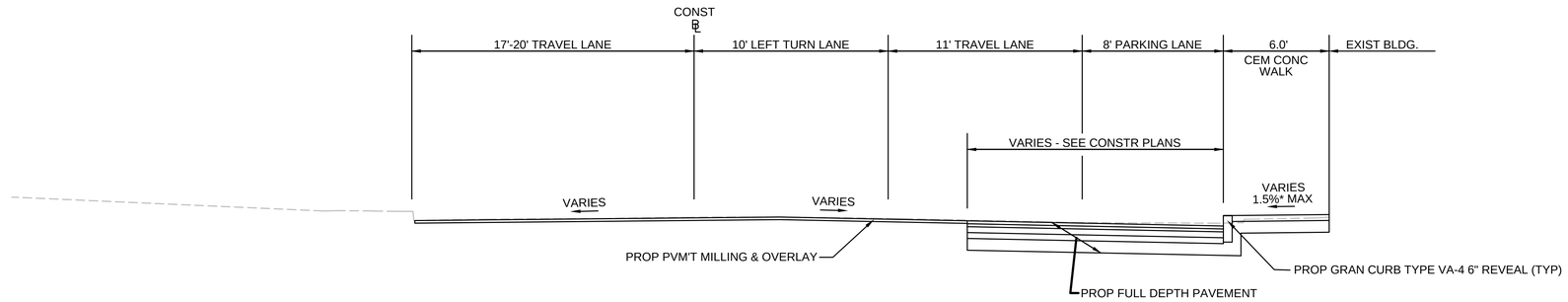
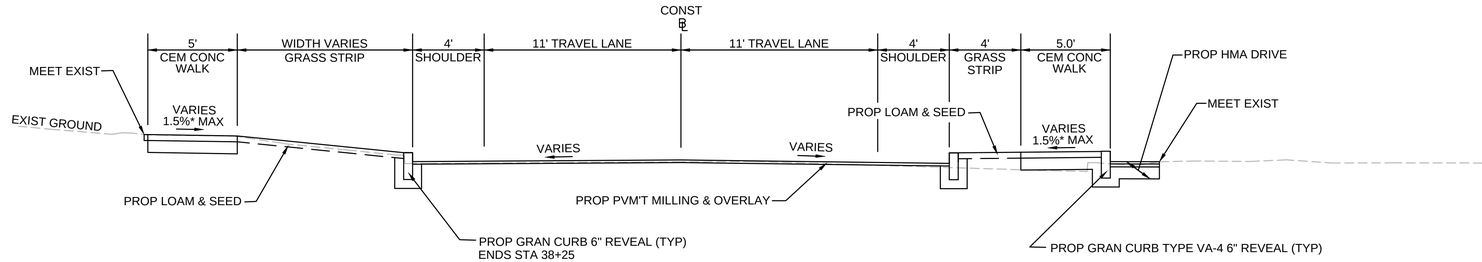
11287-TYP.DWG



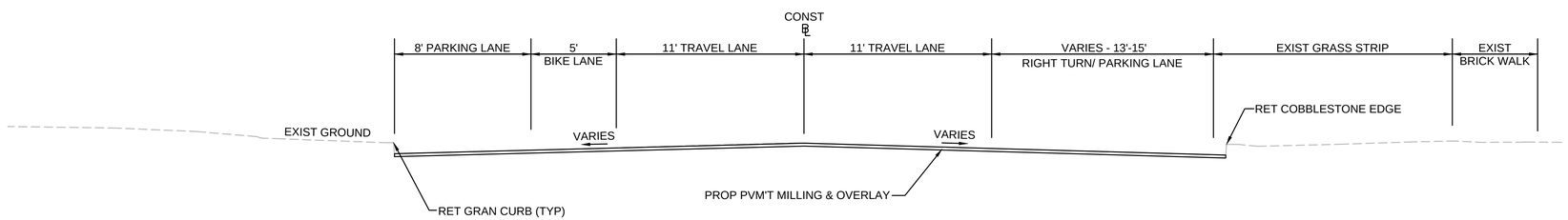
TYPICAL SECTION

SOUTH ROAD
STATION 100+00 TO 101+00



TYPICAL SECTION

THE GREAT ROAD
STATION 38+00 TO 40+58.54



TYPICAL SECTION

THE GREAT ROAD
STATION 35+04 TO 37+00

*CONSTRUCTION TOLERANCE OF ±0.5%

PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT (LESS THAN 3' WIDE)

SURFACE:	2" HOT MIX ASPHALT (SURFACE COURSE TYPE B)
BASE:	6" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE
SUBBASE:	10" GRAVEL BORROW, TYPE b*

PROPOSED FULL DEPTH PAVEMENT - SCHOOL WAY & MAPLE STREET

SURFACE:	4" HOT MIX ASPHALT (1.5" TOP COURSE MATERIAL OVER 2.5" DENSE INTERMEDIATE (BINDER) COURSE.)
SUBBASE:	8" RECLAIM MATERIAL OR GRAVEL BORROW, TYPE b.**
TACK COAT:	BITUMEN FOR TACK COAT (RS-1) AT 0.05 GAL/SY OVER BINDER COURSE.

PROPOSED FULL DEPTH PAVEMENT - MUDGE WAY, ELM STREET, RODNEY ROAD

SURFACE:	4" HOT MIX ASPHALT (1.5" TOP COURSE MATERIAL OVER 2.5" DENSE INTERMEDIATE (BINDER) COURSE.)
SUBBASE:	8" RECLAIM MATERIAL OR GRAVEL BORROW, TYPE b.** RECLAIM EXISTING PAVEMENT TO A 15" DEPTH.
TACK COAT:	BITUMEN FOR TACK COAT (RS-1) AT 0.05 GAL/SY OVER BINDER COURSE.

PROPOSED FULL DEPTH PAVEMENT - THE GREAT ROAD

SURFACE:	4" HOT MIX ASPHALT (2" MODIFIED TOP COURSE MATERIAL OVER 2" BINDER COURSE MATERIAL).
BASE:	4" HOT MIX ASPHALT BASE COURSE MATERIAL PLACED IN ONE COURSE.
SUBBASE:	4" DENSE GRADED CRUSHED STONE OVER 8" GRAVEL BORROW, TYPE b*.

PROPOSED PAVEMENT MILLING & OVERLAY - SCHOOL WAY & SOUTH ROAD

SURFACE:	1.5" HOT MIX ASPHALT (MODIFIED TOP COURSE MATERIAL)
TACK COAT:	BITUMEN FOR TACK COAT (RS-1) AT 0.07 GAL/SY OVER EXISTING PAVEMENT. COLD PLANE VARIABLE DEPTH 1.5" MIN.

PROPOSED PAVEMENT MILLING & OVERLAY THE GREAT ROAD

SURFACE:	2" HOT MIX ASPHALT (MODIFIED TOP COURSE MATERIAL)
TACK COAT:	BITUMEN FOR TACK COAT (RS-1) AT 0.07 GAL/SY OVER EXISTING PAVEMENT. COLD PLANE VARIABLE DEPTH 2" MIN.

PROPOSED HOT MIX ASPHALT DRIVE

SURFACE:	3.5" HOT MIX ASPHALT (1.5" TOP COURSE MATERIAL OVER 2" BINDER COURSE MATERIAL.)
FOUNDATION:	8" GRAVEL BORROW, TYPE b.*

PROPOSED CEMENT CONCRETE WALK /WHEELCHAIR RAMP /DRIVE

SURFACE:	4" CEMENT CONCRETE **6" CEMENT CONCRETE WITHIN DRIVEWAYS AND WCR'S AIR ENTRAINED 4000 PSI, 3/4", 610
FOUNDATION:	8" GRAVEL BORROW, TYPE b.*

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BEDFORD – VARIOUS LOCATIONS
TYPICAL SECTIONS
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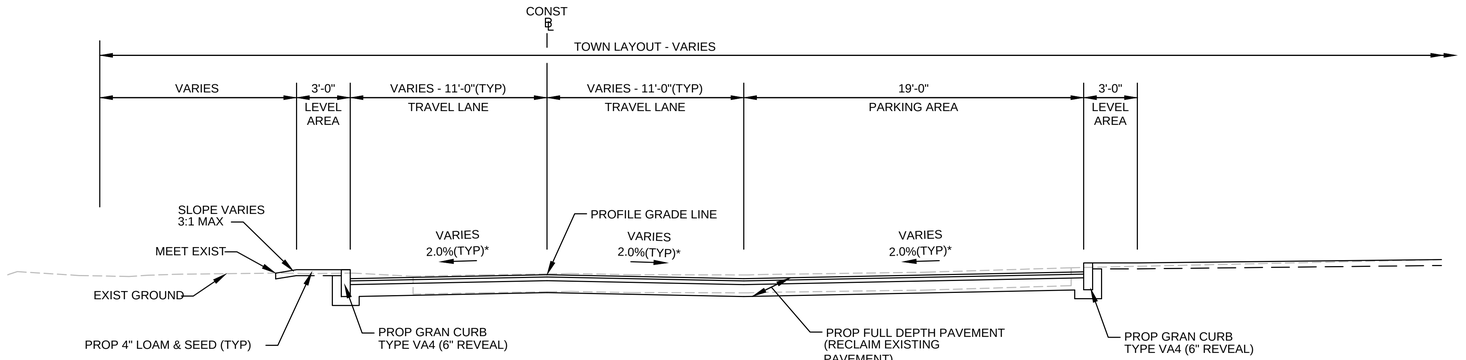
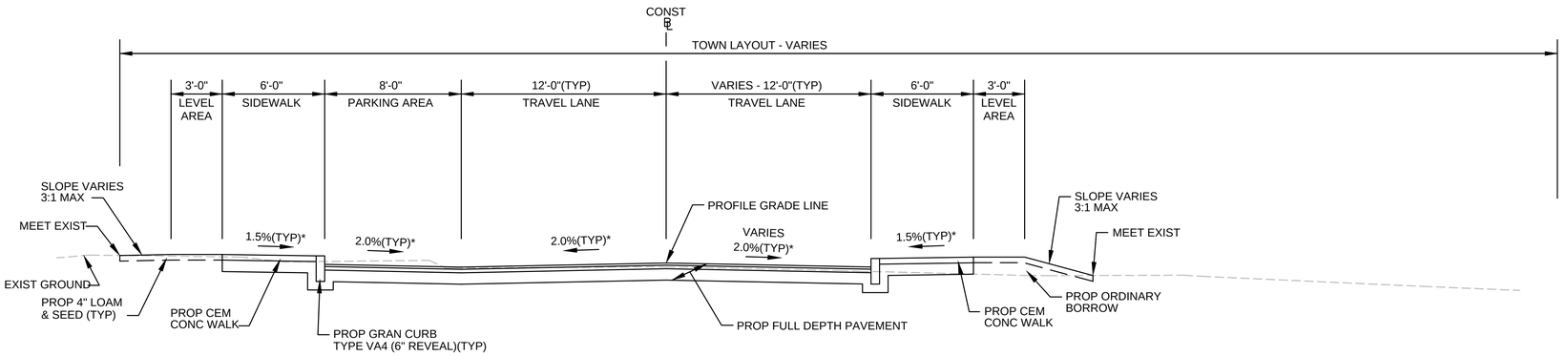
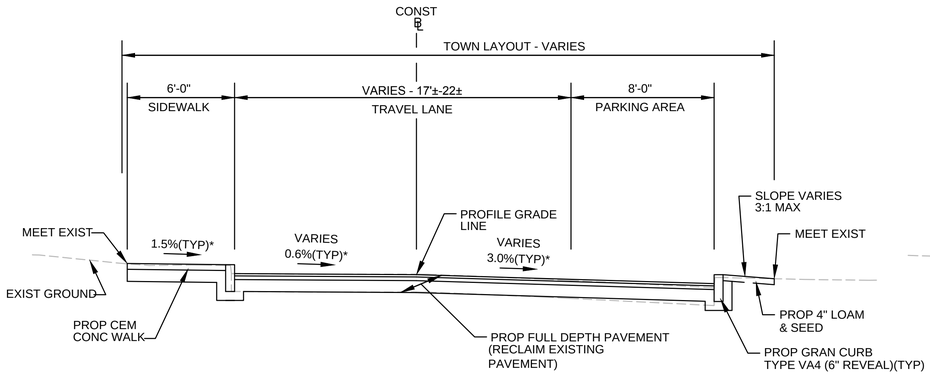


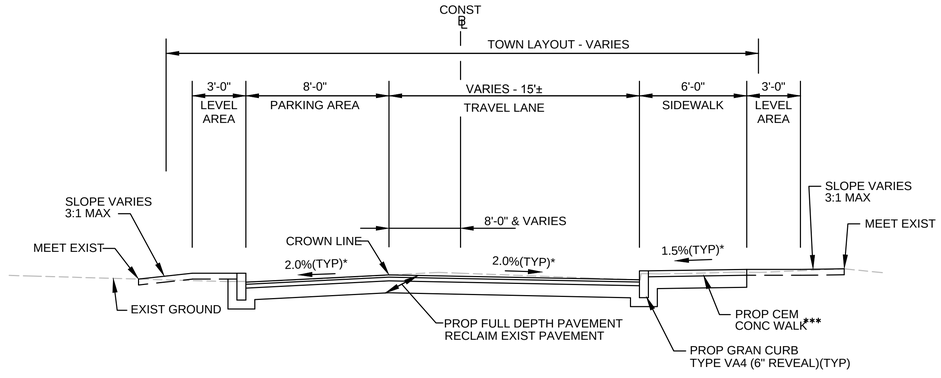
TYPICAL SECTION
MUDGE WAY
STA 11+00± TO STA 13+20±
NTS
* TOLERANCE FOR CONSTRUCTION ±0.5%



TYPICAL SECTION
SCHOOL WAY
STA 13+20± TO STA 16+25±
NTS
* TOLERANCE FOR CONSTRUCTION ±0.5%



TYPICAL SECTION
ELM STREET
STA 16+25± TO STA 19+91±
NTS
* TOLERANCE FOR CONSTRUCTION ±0.5%



TYPICAL SECTION
MAPLE STREET
STA 200+42± TO STA 202+42±
NTS
* TOLERANCE FOR CONSTRUCTION ±0.5%

*** PROP HOT MIX ASPHALT FROM STA 200+79± STA 202+24± RT

PAVEMENT NOTES CONT.

PROPOSED HOT MIX ASPHALT WALK

SURFACE: 3.5" HOT MIX ASPHALT (1.5" TOP COURSE MATERIAL OVER 2" BINDER COURSE MATERIAL.)

FOUNDATION: 8" RECLAIM MATERIAL OR GRAVEL BORROW, TYPE b.*

PROPOSED GRAVEL DRIVE

SURFACE: 4" GRAVEL BORROW, TYPE b.

FOUNDATION: RETAIN AND GRADE EXISTING SUBBASE.

PROPOSED COBBLESTONE DRIVE

SURFACE: COBBLESTONES SET IN 2" MORTAR SETTING BED

FOUNDATION: 8" HIGH EARLY STRENGTH CEMENT CONCRETE
RETAIN AND GRADE EXISTING SUBBASE.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
CONSTRUCTION PLANS
SHEET 06 OF 52

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N

LIMIT OF WORK
STA 32+75.00
N 3004593.0314
E 715373.0610

THE GREAT ROAD

N/F
HARLEY ANDERSON
& NANCY S.
HAYNES
MAP 53, LOT 37
BOOK 12319, PAGE 96

N/F
AGRILLO, IOLANDE
M. & JOSEPH A.
TRUSTEE
BETH-ELLEN
REALTY TRUST
MAP 54, LOT 4
BOOK 9883, PAGE 5

N/F
EDWARD J &
KATHLEEN M
LEBLANC
MAP 54, LOT 5
BOOK 31370, PAGE 162

OSCAR S. DEPRIEST
PARKER ASSOCIATES
REALTY TRUST
MAP 54, LOT 6
BOOK 16949, PAGE 518

N/F
CARE ENTERPRISES
LLC
MAP 54, LOT 7
BOOK 53474, PAGE 378

N/F
BRUCE M. BLAKE
TRUSTEE
ONE FLETCHER ROAD
REALTY TRUST
MAP 54, LOT 35
BOOK 30567, PAGE 386

N/F
BRIANS LLC
MAP 54, LOT 36
BOOK 53306, PAGE 146

1 STORY BRICK BUILDING
MULTIPLE STORE FRONTS

BENCHMARK
BOLT OVER
MAIN OUTLET
ELEVATION=178.59'

MEET EXIST WALK
PROP CEM CONC WALK
MEET EXIST CURB & WALK
PROP LOAM & SEED
R&R GRAN CURB
MEET EXIST CURB
PROP UTILITY PATCH
LIMIT OF MILL & OVERLAY
PROP PVM'T MILLING & OVERLAY
CONT. ON SHEET 07
PROP CEM CONC WALK
R&R GRAN CURB
PROP CEM CONC WALK
R&R GRAN CURB
PROP LOAM & SEED
R&R CURB CORNER
R&R POST & RAIL FENCE
END GRAN CURB MEET EXIST
SAWCUT
FULL DEPTH PVMT TRANSITION
LIMIT OF PAVING STA 20+02±
PROP LOAM & SEED
MEET EXIST
PROP LOAM & SEED
APPROX LIMIT OF GRADING (TYP)
PROP GRAN CURB (TYP)
PROP CEM CONC DRIVE
PROP HMA DRIVE
PROP LOAM & SEED
PROP CEM CONC DRIVE
PROP HMA DRIVE
PROP TEMP CONSTR EASEMENT
PROP 6' CEM CONC WALK (TYP)
MEET EXIST
PROP GRAN CURB CORNER TYPE A (TYP)
PROP LOAM & SEED
APPROX LIMIT OF GRADING (TYP)
PROP GRAN CURB CORNER TYPE A (TYP)
MEET EXIST
BRICK WALK REMOVED AND RELAID
CONT. ON SHEET 08
FOR PROFILE SEE SHEET NO. 10

ELM STREET
ELM STREET CONSTR ℄

THE GREAT ROAD CONSTR ℄
PT +00.26
PC +02.49
PT +99.15
END 70.00
SAWCUT 4+04

N/F
DANIEL M. MURPHY
MAP 53, LOT 38
BOOK 51488, PAGE 225

N/F
ALAN K. AND
CAROL K. LONG
MAP 54, LOT 170
BOOK 32581, PAGE 273

N/F
B & R LLC
MAP 54, LOT 163
BOOK 43823, PAGE 111

N/F
TOWN OF BEDFORD
FIRE DEPARTMENT
MAP 54, LOT 162
BOOK , PAGE

BEDFORD FIRE STATION

N/F
TOWN OF BEDFORD
TOWN COMMON
MAP 54, LOT 144-A
BOOK 12999, PAGE 3

LEGEND

[X] WHEELCHAIR RAMP NO.

(X) DRIVEWAY TRANS. NO.

20 0 20 40
SCALE IN FEET

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CONSTRUCTION PLANS
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N/F
BRIANS LLC
MAP 54, LOT 38
BOOK 53306, PAGE 144

N/F
MARGARET C.
HERLIHY
MAP 54, LOT 78
BOOK 8666, PAGE 67

N/F
BRUCE M. BLAKE
TRUSTEE
ONE FLETCHER ROAD
REALTY TRUST
MAP 54, LOT 35
BOOK 30567, PAGE 386

N/F
BRIANS LLC
MAP 54, LOT 36
BOOK 53306, PAGE 146

N/F
RYAN J & SUZANNE
SCHMUHL–KOLLER
MAP 54, LOT 37
BOOK 51127, PAGE 574

N/F
PANAKE INC TRUSTEE
MANSE REALTY TRUST
MAP 54, LOT 80A
BOOK 38219, PAGE 366

N/F
S–BNK BEDFORD LLC
C/O TRAMMELL
CROW CO
MAP 54, LOT 79
BOOK 31687, PAGE 81

N/F
PANAKE INC TRUSTEE
MANSE REALTY TRUST
MAP 54, LOT 80
BOOK 38219, PAGE 366

N/F
TOWN OF BEDFORD
TOWN COMMON
MAP 54, LOT 144–A
BOOK 12999, PAGE 332

N/F
TOWN OF BEDFORD
TOWN HALL
OLD TOWN HALL LOT 131
MAP 54,
BOOK 728, PAGE 436

N/F
GEORGE A.
KOUYOUMJIAN
TRUSTEE
NATALIE REALTY
TRUST
MAP 54, LOT 129
BOOK 1356, PAGE 113

N/F
NATHANIEL K. BROWN
TRUSTEE
GREAT FIELDS REALTY
TRUST
MAP 54, LOT 128
BOOK 681, PAGE 110

SPRINGS ROAD

THE GREAT ROAD

ELM STREET

SOUTH ROAD

1 STORY BRICK BUILDING
MULTIPLE STORE FRONTS

PICKET FENCE

CHAIN LINK FENCE

STONE WALL

WOODED AREA

EDGE PVM'T

BIT. PAVEMENT

BRICK WALK

HEDGE

GRAN. CURB

CONC. APRON

SAWCUT

LIMIT OF WORK

MEET EXIST CURB

PROP LOAM & SEED

SAWCUT
MEET EXIST WALK

PROP CEM CONC WALK

END PROP GRAN CURB
MEET EXIST

PROP TREE PROTECTION (TYP)

TRAFFIC SIGNAL
CONTROL BOX

CONCRETE
"HAYDEN FOUNTAIN"
CONCRETE

R&R HAYDEN FOUNTAIN

PROP CEM CONC DRIVE

PROP HMA DRIVE

PROP LOAM & SEED

PROP 5' CEM CONC WALK

R&R CURB CORNER (TYP)

MEET EXIST WALK
SAWCUT

PROP CEM CONC WALK

R&R GRAN CURB

END +70.00

LIMIT OF MILL
& OVERLAY

PROP UTILITY
POLE

PROP PVM'T MILLING
& OVERLAY

BEGIN PROP GRAN CURB
MEET EXIST

THE GREAT ROAD CONSTR ℄

END +29.42

PI +37.79

PROP 5' CEM CONC WALK

PROP CEM CONC DRIVE

PROP 5' CEM CONC WALK

PROP CEM CONC DRIVE (TYP)

CONT. ON
SHEET 06

CONT. ON
SHEET 08

R&R GRAN CURB

PROP CEM CONC WALK

SAWCUT +04

SAWCUT +57

BEGIN PROP GRAN CURB
MEET EXIST

R&R POST & RAIL FENCE

RET

R&R

PROP GRAN
CURB

PROP LOAM & SEED

PROP HMA DRIVE

PROP CEM CONC WALK

PROP GRAN CURB

PROP CEM CONC DRIVE

R&R CURB CORNER (TYP)

LIMIT OF TRANS CURB
PROP 0" REVEAL

PROP TEMP CONSTR EASEMENT (TYP)

PROP HMA DRIVE

PROP LOAM & SEED

END PROP GR
MEET EXIST C

R&R BRICK WALK

SAWCUT, MEET EXIST WALK

PROP LOAM
& SEED

PROP FULL DEPTH PVMT

PROP STAMPED CONCRETE WALK

RET LP

PI +60.05

STA 37+42.35 THE GREAT RD CONSTR ℄ =
STA 101+00.00 SOUTH ROAD CONSTR ℄

PROP CEM CONC WALK

PROP CEM CONC DRIVE

PROP FULL DEPTH PVMT

PROP 5.5' CEM CONC WALK

PROP CEM CONC DRIVE

SOUTH ROAD CONSTR ℄

MEET EXIST CURB & WALK

LIMIT OF WORK
STA 100+00.00
N 3004226.1416
E 715726.3036

PROP HMA DRIVE (SEE NOTE 1)

PROP PERMANENT EASEMENT

PROP CEM CONC WALK

LIMIT OF WORK
STA 40+58.54
N 3004169.4404
E 716035.2054

END GRAN CURB
MEET EXIST

SAWCUT

TOWN LAYOUT

LIMIT OF PAVING
STA 20+02±

END GRAN CURB
MEET EXIST

FULL DEPTH PVMT
TRANSITION

PROP LOAM
& SEED

MEET EXIST

PROP LOAM
& SEED

APPROX LIMIT
OF GRADING (TYP)

PROP GRAN CURB (TYP)

PROP CEM
CONC DRIVE

PROP HMA DRIVE

PROP LOAM
& SEED

PROP CEM
CONC DRIVE

PROP HMA DRIVE

RET

R&R

ELM STREET CONSTR ℄

PROP TEMP CONSTR
EASEMENT

PROP 6' CEM
CONC WALK (TYP)

MEET EXIST

PROP GRAN CURB
CORNER TYPE A (TYP)

PROP LOAM
& SEED

APPROX LIMIT
OF GRADING (TYP)

PROP GRAN CURB
CORNER TYPE A (TYP)

MEET EXIST

BRICK WALK REMOVED
AND RELAID

NOTE 1:
CONTRACTOR SHALL PROTECT EXISTING DOWNSPOUT AND RISERS DURING CONSTRUCTION, AND SHALL ADJUST EITHER AS REQUIRED TO MEET PROPOSED DRIVEWAY FINISHED GRADE. ALL ASSOCIATED WORK WILL BE CONSIDERED INCIDENTAL TO ITEM 703.

LEGEND

[X] WHEELCHAIR RAMP NO.

(X) DRIVEWAY TRANS. NO.

20 0 20 40
SCALE IN FEET

FOR PROFILE SEE SHEET NO. 10

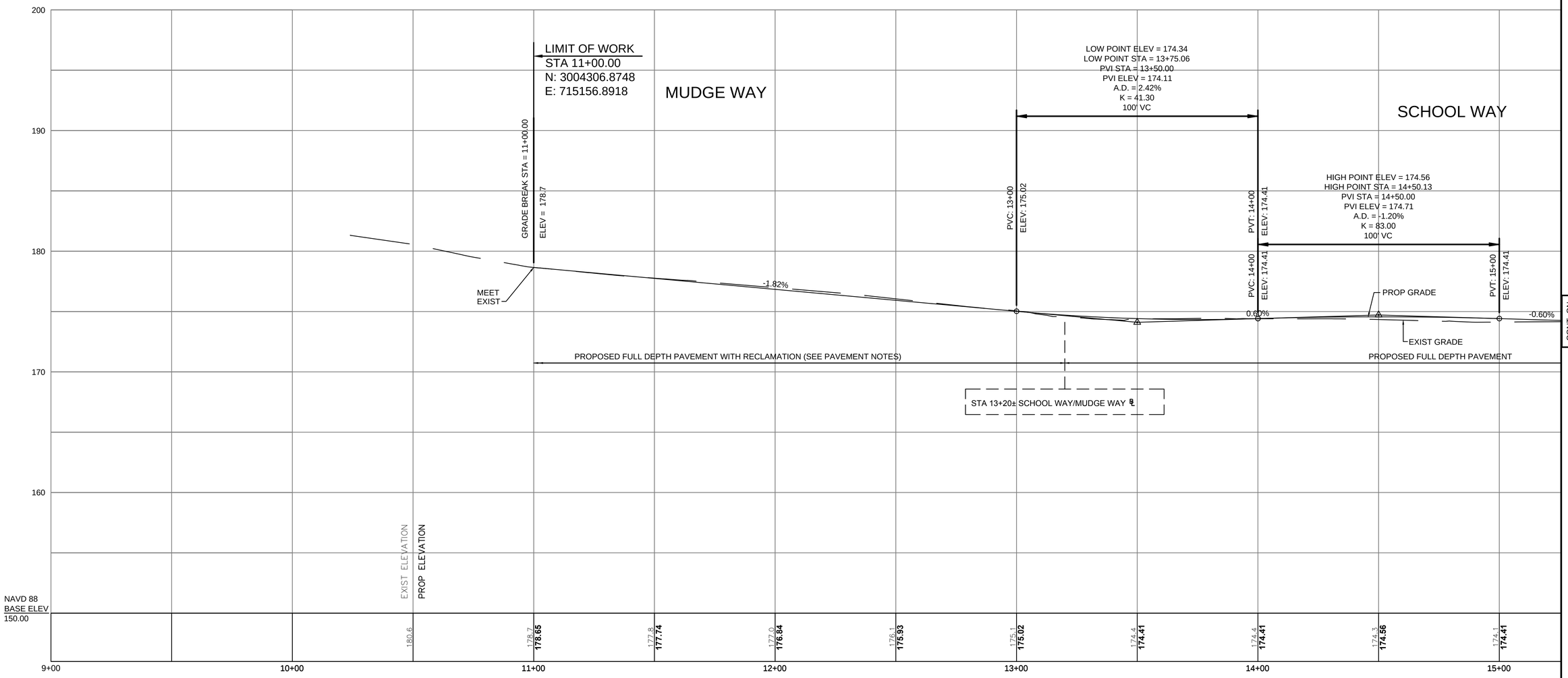
11287-GEN.DWG 21-May-2014

**NOTES

1. CONTINUATION OF FULL DEPTH PAVEMENT ON THE REMAINDER OF ELM STREET, RODNEY ROAD AND FOSTER ROAD ARE INCLUDED IN THIS CONTRACT. THE WORK WILL BE AS DIRECTED BY THE TOWN AT THEIR DISCRETION DURING CONSTRUCTION.
2. ALL ROADWAYS TO BE RECLAIMED TO THE LIMITS DESIGNATED BY THE ENGINEER.
3. THE NEW PAVEMENT SURFACE SHALL MATCH THE EXISTING LINES AND GRADES UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. SAWCUT PAVEMENT AT ALL DRIVEWAYS AND PARKING AREAS.
5. HMA BERM TO BE PLACED TO THE LIMITS DESIGNATED BY THE ENGINEER.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
PROFILES
SHEET 09 OF 52

11287-PROF.DWG 21-May-2014



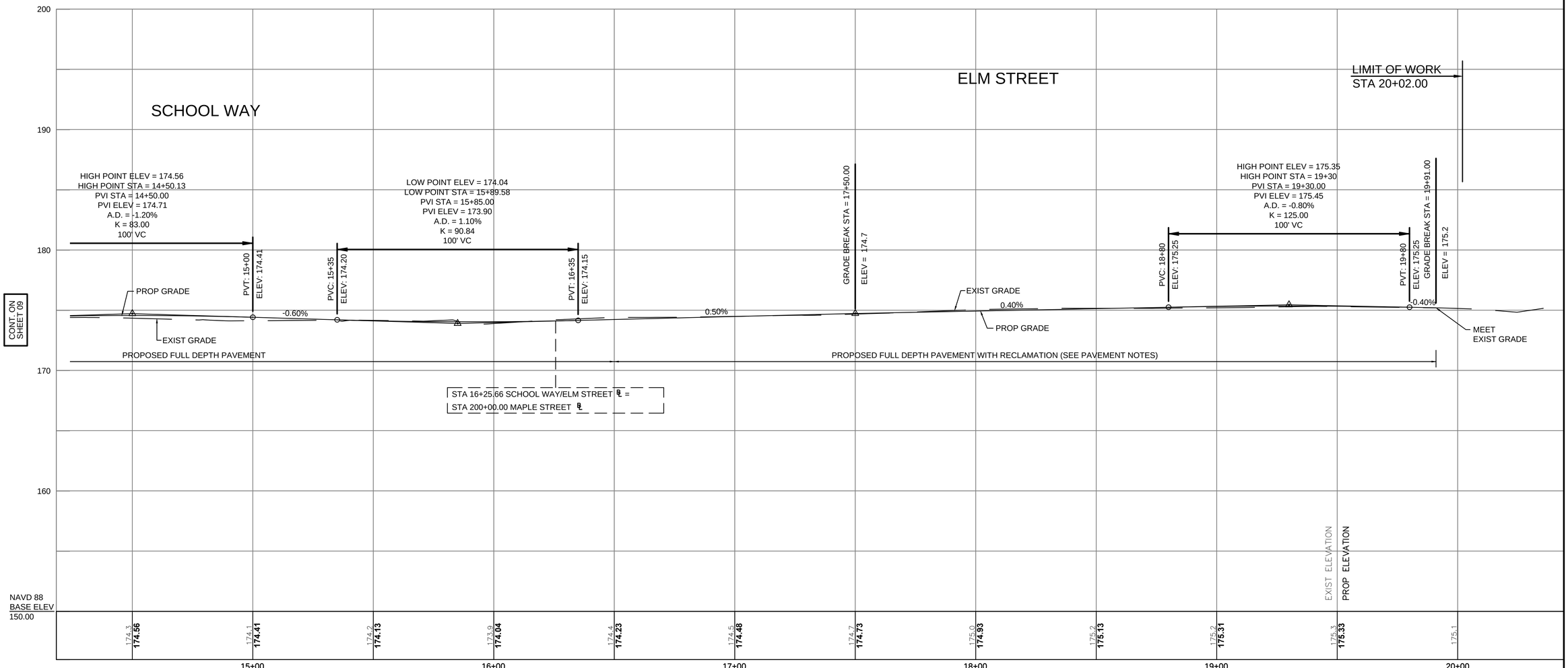
CONT. ON SHEET 10

HORIZONTAL
20 0 20 40
4 0 4 8
VERTICAL
SCALE IN FEET

FOR CONSTRUCTION PLAN SEE SHEET NO. 08

BEDFORD
BEDFORD – VARIOUS LOCATIONS
PROFILES
SHEET 10 OF 52

11287-PROF.DWG 21-May-2014

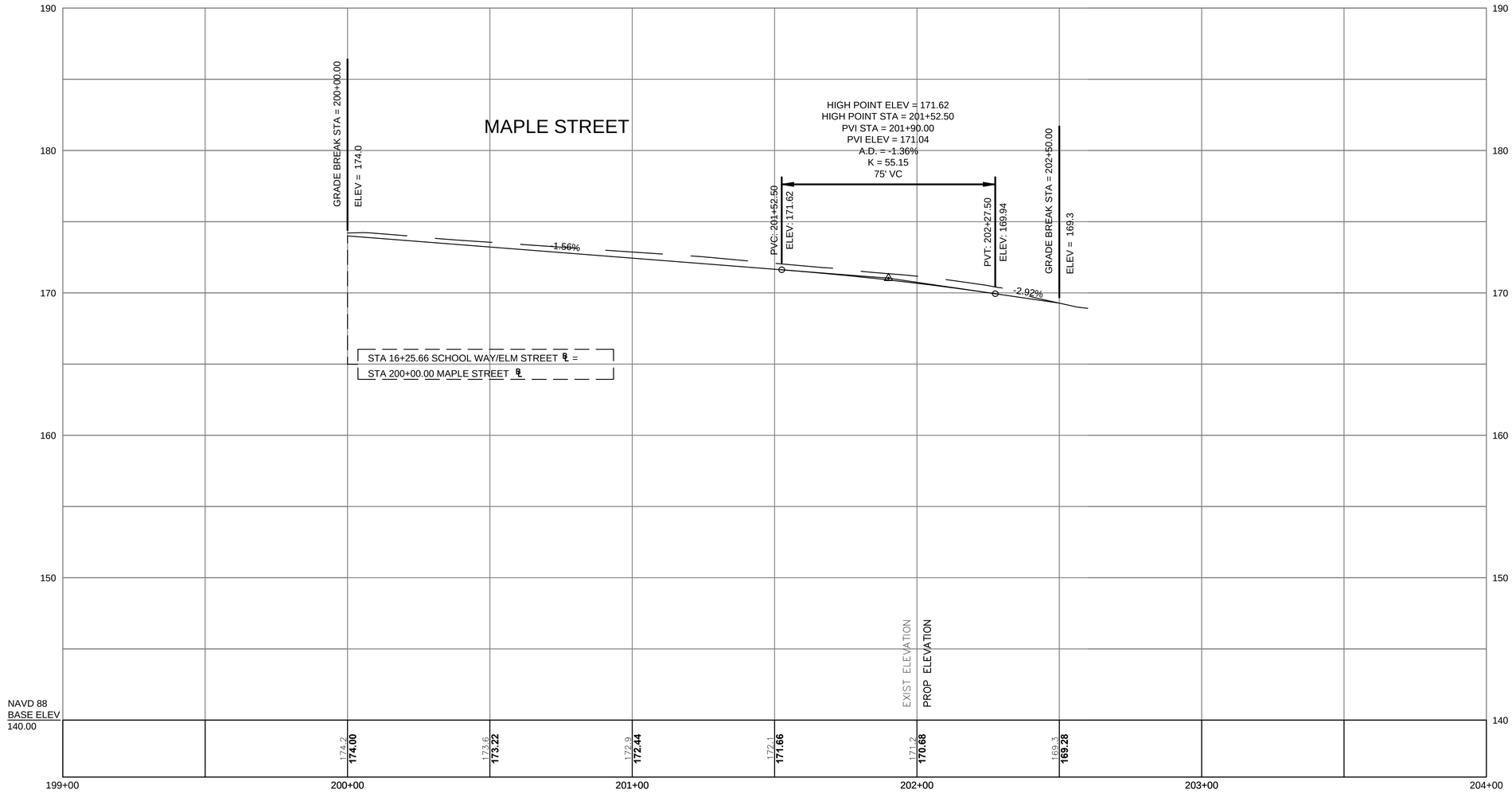


HORIZONTAL
20 0 20 40
4 0 4 8
VERTICAL
SCALE IN FEET

FOR CONSTRUCTION PLAN SEE SHEET NO. 08

BEDFORD
BEDFORD – VARIOUS LOCATIONS
PROFILES
SHEET 11 OF 52

11287-PROF.DWG 21-May-2014



HORIZONTAL
20 0 20 40
4 0 4 8
VERTICAL
SCALE IN FEET

FOR CONSTRUCTION PLAN SEE SHEET NO. 08

BEDFORD
BEDFORD – VARIOUS LOCATIONS
ALIGNMENT & GRADING PLANS
SHEET 12 OF 52

May-14

11287-ALIGN.DWG 21-May-2014

N

SURVEY TRAVERSE TIE
TRAV # 1
NTS

LIMIT OF WORK
STA 32+75.00
N 3004593.0314
E 715373.0610

THE GREAT ROAD
1 STORY BRICK BUILDING
MULTIPLE STORE FRONTS

TOWN LAYOUT LINE

THE GREAT ROAD CONSTR

SURVEY TRAVERSE

BEGIN PROP GRAN CURB MEET EXISTING +78.4, 23.8' LT

END PROP GRAN CURB MEET EXISTING +82.0, 23.8' LT

BEGIN PROP GRAN CURB MEET EXISTING +94.0, 23.9' LT

END PROP GRAN CURB MEET EXISTING +07.8, 49.5' LT

BEGIN PROP GRAN CURB MEET EXISTING +07.6, 23.9' LT

END PROP GRAN CURB MEET EXISTING +12.0, 23.9' LT

BEGIN PROP GRAN CURB +26.1, 21.5' RT

END PROP GRAN CURB MEET EXISTING +11.9, 21.7' RT

BEGIN PROP GRAN CURB MEET EXISTING +17.9, 23.9' RT

END PROP GRAN CURB MEET EXISTING +41.1, 24.4' RT

END PROP GRAN CURB MEET EXISTING +90.9, 13.4' LT

END PROP GRAN CURB MEET EXISTING +91.6, 16.9' RT

LIMIT OF PAVING
STA 20+02±

ELM STREET CONSTR

CONT. ON SHEET 13

CONT. ON SHEET 14

N/F
HARLEY ANDERSON & NANCY S. HAYNES
MAP 53, LOT 37
BOOK 12319, PAGE 96

N/F
AGRILLO, IOLANDE M. & JOSEPH A. TRUSTEE
BETH–ELLEN REALTY TRUST
MAP 54, LOT 4
BOOK 9883, PAGE 5

N/F
EDWARD J & KATHLEEN M LEBLANC
MAP 54, LOT 5
BOOK 31370, PAGE 162

N/F
OSCAR S. DEPRIEST PARKER ASSOCIATES REALTY TRUST
MAP 54, LOT 6
BOOK 16949, PAGE 518

N/F
CARE ENTERPRISES LLC
MAP 54, [illegible]
BOOK 53474, [illegible]

N/F
BRUCE M. BLAKE TRUSTEE
ONE FLETCHER ROAD REALTY TRUST
MAP 54, LOT 35
BOOK 30567, PAGE 386

N/F
BRIANS LLC
MAP 54, LOT 36
BOOK 53306, PAGE 146

N/F
DANIEL M. MURPHY
MAP 53, LOT 38
BOOK 51488, PAGE 225

N/F
ALAN K. AND CAROL K. LONG
MAP 54, LOT 170
BOOK 32581, PAGE 273

N/F
B & R LLC
MAP 54, LOT 163
BOOK 43823, PAGE 111

N/F
TOWN OF BEDFORD FIRE DEPARTMENT
MAP 54, LOT 162
BOOK , PAGE

BEDFORD FIRE STATION

N/F
TOWN OF BEDFORD TOWN COMMON
MAP 54, LOT 144
BOOK 12999, PAGE

N/F
MICHAEL, CHRISTOPHER, & JEFFREY CHEMLEN
MAP 54, LOT 161
BOOK 41326, PAGE 143

20 0 20 40
SCALE IN FEET

BEDFORD
BEDFORD – VARIOUS LOCATIONS
ALIGNMENT & GRADING PLANS
SHEET 13 OF 52

May-14

11287-ALIGN.DWG 21-May-2014

THE GREAT ROAD ALIGNMENT -2 CONSTRUCTION BASELINE DATA

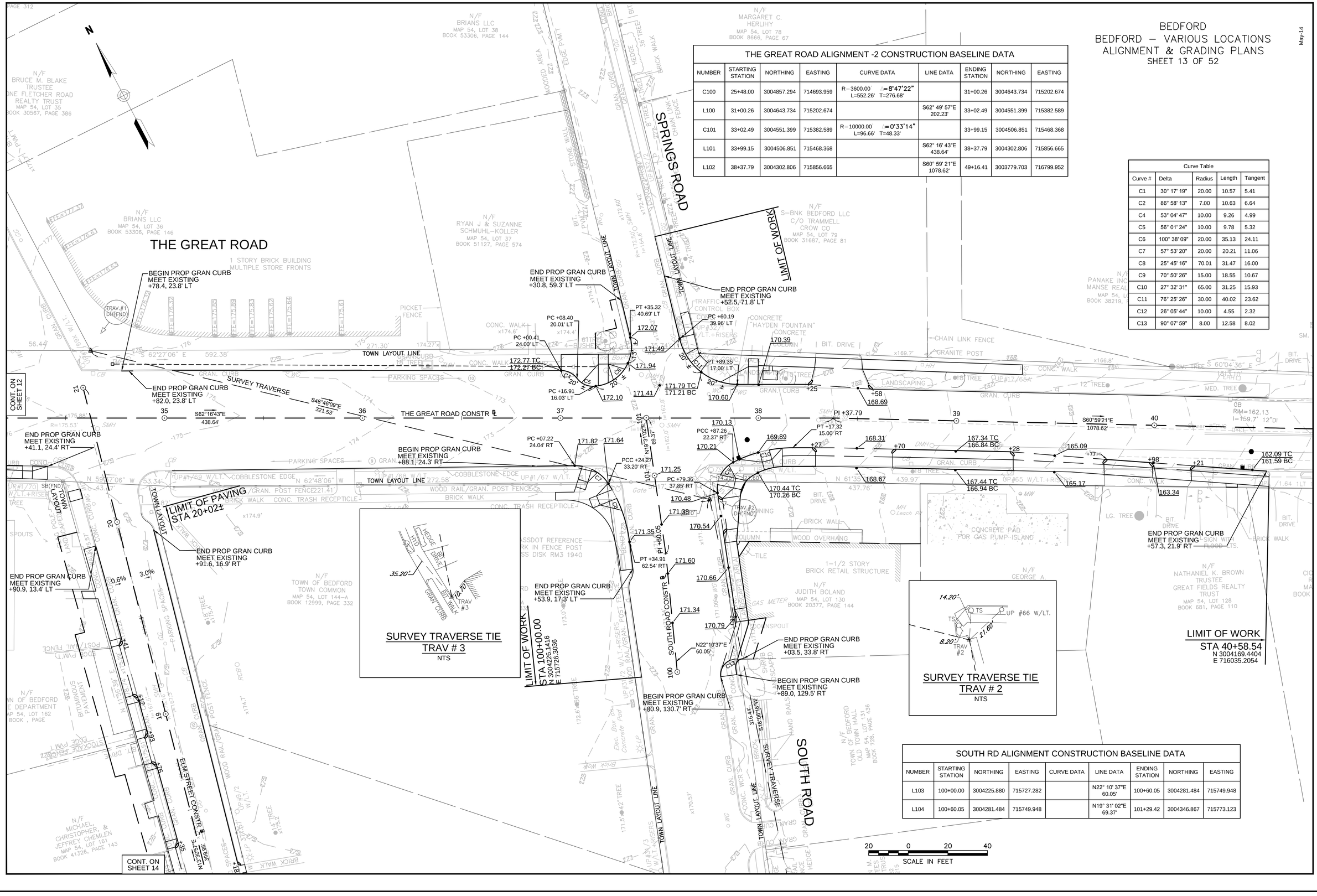
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
C100	25+48.00	3004857.294	714693.959	R=3600.00' Δ=8°47'22" L=552.26' T=276.68'		31+00.26	3004643.734	715202.674
L100	31+00.26	3004643.734	715202.674		S62° 49' 57"E 202.23'	33+02.49	3004551.399	715382.589
C101	33+02.49	3004551.399	715382.589	R=10000.00' Δ=0°33'14" L=96.66' T=48.33'		33+99.15	3004506.851	715468.368
L101	33+99.15	3004506.851	715468.368		S62° 16' 43"E 438.64'	38+37.79	3004302.806	715856.665
L102	38+37.79	3004302.806	715856.665		S60° 59' 21"E 1078.62'	49+16.41	3003779.703	716799.952

Curve Table

Curve #	Delta	Radius	Length	Tangent
C1	30° 17' 19"	20.00	10.57	5.41
C2	86° 58' 13"	7.00	10.63	6.64
C4	53° 04' 47"	10.00	9.26	4.99
C5	56° 01' 24"	10.00	9.78	5.32
C6	100° 38' 09"	20.00	35.13	24.11
C7	57° 53' 20"	20.00	20.21	11.06
C8	25° 45' 16"	70.01	31.47	16.00
C9	70° 50' 26"	15.00	18.55	10.67
C10	27° 32' 31"	65.00	31.25	15.93
C11	76° 25' 26"	30.00	40.02	23.62
C12	26° 05' 44"	10.00	4.55	2.32
C13	90° 07' 59"	8.00	12.58	8.02

SOUTH RD ALIGNMENT CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L103	100+00.00	3004225.880	715727.282		N22° 10' 37"E 60.05'	100+60.05	3004281.484	715749.948
L104	100+60.05	3004281.484	715749.948		N19° 31' 02"E 69.37'	101+29.42	3004346.867	715773.123



BEDFORD
BEDFORD – VARIOUS LOCATIONS
ALIGNMENT & GRADING PLANS
SHEET 14 OF 52

May-14
21-May-2014
11287-ALIGN.DWG

CONT. ON SHEET 12

SCHOOL WAY ALIGNMENT CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L105	10+00.00	3004358.502	715073.297		S66° 34' 12"E 50.00'	10+50.00	3004338.620	715119.174
C102	10+50.00	3004338.620	715119.174	R=86.00' Δ=82°53'54" L=124.43' T=75.95'		11+74.43	3004235.533	715167.509
L106	11+74.43	3004235.533	715167.509		S16° 19' 43"W 110.99'	12+85.42	3004129.022	715136.306
C103	12+85.42	3004129.022	715136.306	R=60.00' Δ=91°22'58" L=95.70' T=61.47'		13+81.11	3004054.183	715178.411
C104	13+81.11	3004054.183	715178.411	R=517.00' Δ=20°19'47" L=183.44' T=92.70'		15+64.55	3004038.973	715360.258
C105	15+64.55	3004038.973	715360.258	R=85.00' Δ=71°06'01" L=105.48' T=60.74'		16+70.03	3004103.733	715434.929
L107	16+70.03	3004103.733	715434.929		N13° 30' 57"E 399.96'	20+70.00	3004492.619	715528.406

MAPLE ST ALIGNMENT CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L108	200+00.00	3004065.169	715414.016		S77° 01' 32"E 260.00'	202+60.00	3004006.793	715667.382

Curve Table				
Curve #	Delta	Radius	Length	Tangent
C14	16° 27' 21"	50.00	14.36	7.23
C15	101° 58' 40"	3.00	5.34	3.70
C16	80° 43' 08"	3.00	4.23	2.55
C17	11° 27' 54"	72.00	14.41	7.23
C18	86° 17' 45"	15.00	22.59	14.06
C19	16° 31' 48"	171.63	49.51	24.93
C20	21° 00' 49"	150.00	55.01	27.82
C21	46° 53' 59"	25.00	20.46	10.84
C22	91° 15' 26"	48.00	76.45	49.07
C23	28° 58' 41"	72.00	36.41	18.61
C24	69° 59' 34"	5.00	6.11	3.50
C25	77° 54' 12"	5.00	6.80	4.04
C26	77° 54' 12"	5.00	6.80	4.04
C27	66° 18' 01"	5.00	5.79	3.27

Curve Table				
Curve #	Delta	Radius	Length	Tangent
C28	106° 23' 07"	5.00	9.28	6.68
C29	21° 18' 50"	150.00	55.80	28.23
C30	101° 35' 19"	28.00	49.65	34.32
C31	92° 09' 43"	10.00	16.09	10.38
C32	11° 34' 54"	150.00	30.32	15.21
C33	5° 21' 44"	750.00	70.19	35.12
C34	60° 03' 10"	5.00	5.24	2.89
C35	60° 01' 59"	5.00	5.24	2.89
C36	67° 43' 35"	10.00	11.82	6.71
C37	100° 27' 24"	10.00	17.53	12.01
C38	2° 32' 19"	100.00	4.43	2.22
C39	63° 53' 46"	5.00	5.58	3.12
C40	68° 59' 49"	5.00	6.02	3.44
C41	10° 45' 47"	106.00	19.91	9.99

SURVEY TRAVERSE CHART

POINT	DISTANCE	BEARING	NORTHING	EASTING
TRAV # 1			3004507.3074	715540.5422
TRAV # 2	L = 321.53'	S48°46'09"E	3004295.3900	715782.3500
TRAV # 3	L = 316.44'	S16°06'18"W	3003991.3700	715694.5700
TRAV # 4	L = 283.35'	N77°58'54"W	3004050.3698	715417.4335
TRAV # 9	L = 364.77'	N86°13'40"W	3004074.3677	715053.4537
TRAV # 8	L = 257.54'	N14°12'22"E	3004324.0368	715116.6578
TRAV # 7	L = 531.36'	N66°35'28"W	3004535.1424	714629.0276
TRAV # 6	L = 350.92'	N11°25'31"E	3004879.1086	714698.5408
TRAV # 5	L = 658.75'	S62°16'41"E	3004572.6712	715281.6769
TRAV # 1	L = 266.99'	S75°49'44"E	3004507.3074	715540.5422

SCALE IN FEET: 20 0 20 40

BEDFORD
BEDFORD – VARIOUS LOCATIONS
TRAFFIC PLANS
SHEET 15 OF 52

11287-TSIG2.DWG 21-May-2014

N

FLETCHER STREET

THE GREAT ROAD

LIMIT OF WORK
STA 32+75.00
N 3004593.0314
E 715373.0610

PROP ORNAMENTAL 10' TS POST
STA 32+76, 27' LT

PROP ORNAMENTAL 10' TS POST
STA 33+68, 27' LT

PROP ORNAMENTAL TS POLE
W/25' MAST ARM
STA 33+90, 27' LT

PROP ORNAMENTAL 10' TS POST
STA 32+93, 27' LT

TOWN LAYOUT LINE

PROP HARDWIRE PRE-EMPTION CABLE(7 CONDUCTOR #14 AWG) BETWEEN FIRE STATION AND CONTROLLER AT THE GREAT ROAD AT SOUTH/SPRINGS STREET

BREAK INTO EXIST MH

1 STORY BRICK BUILDING
MULTIPLE STORE FRONTS

THE GREAT ROAD

PROP POWER SOURCE

PROP SERVICE CONNECTION

PROP TS POLE
W/25' MAST ARM
STA 33+09, 29' RT

PROP TS 2 TYPE 1 CONTROLLER
IN A TYPE 5 CABINET
STA 33+04, 56' RT

BREAK INTO EXISTING
BUILDING

TS CONDUIT TO PROP
PRE-EMPTION PANELS
LOCATED WITHIN BUILDING

PROP FIRE STATION
PRE-EMPTION PANEL

SCHOOL AVENUE

ELM STREET

BEDFORD FIRE STATION

CONSTRUCTION NOTES:

1. SEE SHEET 16 FOR TRAFFIC SIGNAL DATA.
2. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
3. ALL PROPOSED PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC WITHIN ROADWAYS.
4. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
5. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
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. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.

20 0 20 40
SCALE IN FEET

CONT. ON SHEET 17

CONT. ON SHEET 19

SEQUENCE AND TIMING							
APPROACH	DIRECTION	HOUSING	NORMAL OPERATION	FIRE PRE–EMPTION			
				PRE–CLEAR	HOLD	CLEAR	ALL RED
PRE–EMPTION INTERVAL				4	●	4	1
THE GREAT ROAD	EB	A,B	FY(8")	Y(12")	R(12")	R(12")	R(12")
THE GREAT ROAD	WB	C,D	FY(8")	Y(12")	R(12")	R(12")	R(12")
FIRE STATION DRIVE	SB	E,F,G	FR(12")	R(12")	G(12")	Y(12")	R(12")
DETECTOR			–	–			
RECALL			–	–			

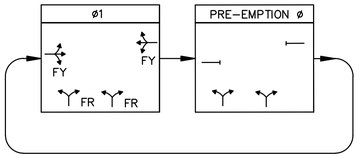
NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D.
2. ● = HOLD PERIOD TO BE DETERMINED BY FIRE CHIEF.
3. FY = FLASHING YELLOW
4. FR = FLASHING RED

ø1	PRE–EMPTION ø
FY FY FR FR	

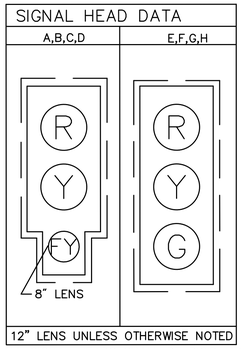
SEQUENCE & TIMING NOTES:

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.

PREFERENTIAL PHASE SEQUENCE



SIGNAL HEAD DATA

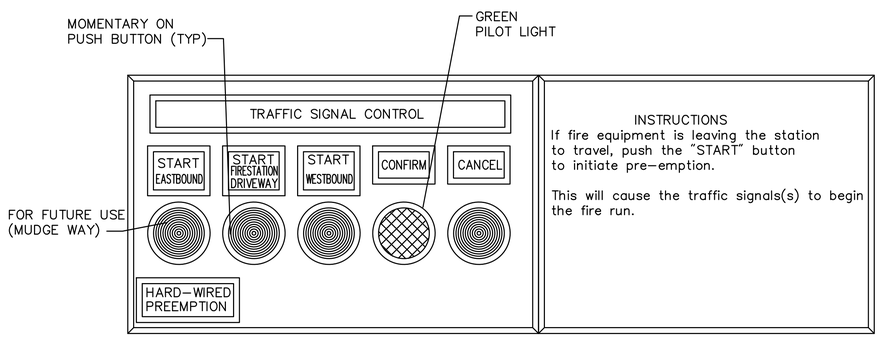


NOTES: 1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED AND EQUIPPED WITH 5"± LOUVERED BACKPLATES & TUNNEL VISORS.
2. ALL SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

ITEM 815.00
EMERGENCY TRAFFIC SIGNAL
THE GREAT ROAD @ FIRE STATION DRIVEWAY/SCHOOL AVENUE
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	TS 2 TYPE 1 CONTROLLER IN A TYPE 5 BASE MOUNTED CABINET, INCL. FOUNDATION
2	ORNAMENTAL TS 25' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
3	ORNAMENTAL TS POST 10' STANDARD INCL. FOUNDATION
4	SIGNAL HEAD, 3–SECTION, 12" LENSES
4	SIGNAL HEAD, 3–SECTION, 12" & 8" LENSES
1	SERVICE CONNECTION (OVERHEAD)
1	PRE–EMPTION CONNECTION (UNDERGROUND) TO FIRE STATION
2	FIRE STATION PRE–EMPTION PANEL (WITHIN FIRE STATION)
1	FIRE STATION PRE–EMPTION PANEL (WITHIN POLICE STATION)
11	FIRE STATION REMOTES (FOR RETURNING VEHICLES)
3	PULL BOX–12"x12"

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

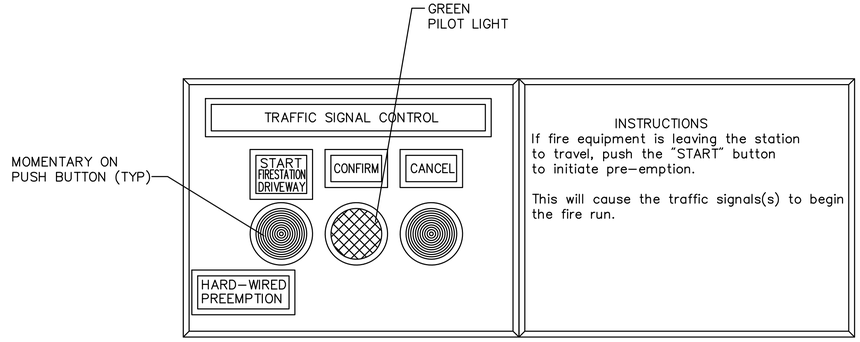


FIRE STATION PRE–EMPTION PANEL (SAMPLE) DETAIL (AT FIRE STATION)

(NEMA ENCLOSURE)
NTS

NOTES: 1. FIRE STATION PANELS WITH START/CANCEL BUTTONS SHALL BE LOCATED ADJACENT TO THE MAIN OVERHEAD DOORS AND AS SHOWN ON THE PLANS. FINAL LOCATIONS AND HEIGHTS TO BE DETERMINED BY THE BEDFORD FIRE DEPARTMENT.

2. ALL NEW CONDUIT AND WIRING WITHIN THE FIRE STATION SHALL BE IN ACCORDANCE WITH THE MASSACHUSETTS ELECTRICAL CODE, AND ALL LOCAL CODES.



FIRE STATION PANEL (SAMPLE) DETAIL (AT POLICE STATION)

(NEMA ENCLOSURE)
NTS

BEDFORD
BEDFORD – VARIOUS LOCATIONS
TRAFFIC PLANS
SHEET 17 OF 52

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SPRINGS ROAD

THE GREAT ROAD

ELM STREET

SOUTH ROAD

N/F BRIANS LLC MAP 54, LOT 38 BOOK 53306, PAGE 144

N/F MARGARET C. HERLIHY MAP 54, LOT 78 BOOK 8666, PAGE 67

N/F BRUCE M. BLAKE TRUSTEE ONE FLETCHER ROAD REALTY TRUST MAP 54, LOT 35 BOOK 30567, PAGE 386

N/F BRIANS LLC MAP 54, LOT 36 BOOK 53306, PAGE 146

N/F RYAN J & SUZANNE SCHMUHL–KOLLER MAP 54, LOT 37

N/F PANAKE INC TRUSTEE MANSE REALTY TRUST MAP 54, LOT 80A BOOK 38219, PAGE 366

N/F PANAKE INC TRUSTEE MANSE REALTY TRUST MAP 54, LOT 80 BOOK 38219, PAGE 366

N/F S–BNK BEDFORD LLC C/O TRAMMELL CROW CO MAP 54, LOT 79 BOOK 31687, PAGE 81

N/F TOWN OF BEDFORD TOWN COMMON MAP 54, LOT 144–A BOOK 12999, PAGE 332

N/F JUDITH BOLAND MAP 54, LOT 130 BOOK 20377, PAGE 144

N/F NATHANIEL K. BROWN TRUSTEE GREAT FIELDS REALTY TRUST MAP 54, LOT 128 BOOK 681, PAGE 110

N/F TOWN OF BEDFORD OLD TOWN HALL MAP 54, LOT 131 BOOK 728, PAGE 436

N/F MICHAEL, CHRISTOPHER, & JEFFREY CHEMLEN MAP 54, LOT 161 MAP 54, LOT 162 BOOK 41326, PAGE 143

PROP HARDWIRE PRE-EMPTION CABLE(7 CONDUCTOR #14 AWG) BETWEEN FIRE STATION AND CONTROLLER AT THE GREAT ROAD AT SOUTH/SPRINGS STREET

MEET EXISTING MARKINGS

PROP TS 2 TYPE 1 TS CONTROLLER W/TYPE 6 CABINET & FOUNDATION STA 37+59, 54' LT

PROP POWER SOURCE

LIMIT OF WORK

PROP ORNAMENTAL TS POST W/PED SIGNAL HEAD W/AUDIBLE PEDESTRIAN DEVICE W/PED PUSH BUTTON W/R10-3e STA 37+26, 26' LT

PROP ORNAMENTAL TS POLE W/20' MAST ARM W/D3-1,D3-3 STA 37+09, 25' LT

PROP ORNAMENTAL TS POLE W/25' MAST ARM W/PED SIGNAL HEAD W/AUDIBLE PEDESTRIAN DEVICE W/PED PUSH BUTTON W/R10-3e STA 37+76, 33.5' LT

PROP ORNAMENTAL 8' TS POST W/PED SIGNAL HEAD W/AUDIBLE PEDESTRIAN DEVICE W/PED PUSH BUTTON W/R10-3e STA 37+94, 27' LT

MEET EXISTING MARKINGS

PROP PRE-EMPTION DETECTOR (TYP)

PROP PRE-EMPTION STROBE

PROP SERVICE CONNECTION

PROP ORNAMENTAL TS POLE W/20' MAST ARM W/PED SIGNAL HEADS W/AUDIBLE PEDESTRIAN DEVICE W/PED PUSH BUTTONS W/R10-3e STA 37+17, 34' RT

LIMIT OF WORK STA 100+00.00 N 3004226.1416 E 715726.3036

MEET EXISTING MARKINGS

PROP ORNAMENTAL 10' TS POST W/PED SIGNAL HEAD W/AUDIBLE PEDESTRIAN DEVICE W/PED PUSH BUTTON W/R10-3e STA 37+90, 29' RT

PROP ORNAMENTAL TS POLE W/20' MAST ARM W/PED SIGNAL HEAD W/AUDIBLE PEDESTRIAN DEVICE W/PED PUSH BUTTON W/R10-3e W/D3-1,D3-2 STA 38+11, 20' RT

ERRADICATE EXISTING MARKINGS

LIMIT OF WORK STA 40+58.54 N 3004169.4404 E 716035.2054

CONT. ON SHEET 15

CONT. ON SHEET 19

CONSTRUCTION NOTES:

1. SEE SHEET 18 FOR TRAFFIC SIGNAL DATA.
2. REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
3. EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
4. PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
5. ALL PROPOSED PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC WITHIN ROADWAYS. ALL PROPOSED PAVEMENT MARKINGS SHALL BE PAINT WITHIN PARKING AREAS.
6. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
7. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
8. 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.
9. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.

20 0 20 40
SCALE IN FEET

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	HARDWIRE FIRE PRE-EMPTION		
MINIMUM INTERVAL			10			6			6			10			6							HOLD	CLEAR	ALL RED
VEHICLE EXTENSION			2			2			2			2			2									
MAXIMUM 1			X			X			X			X			X									
MAXIMUM 2			X			X			X			X			X									
YELLOW CLEARANCE				3			3			3			3			3								
RED CLEARANCE					2			2			2			2			2			1				
PEDESTRIAN INTERVAL																		7	13					
																					●	3	2	
GREAT ROAD	WB	A,B	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	FY	R	R	R
GREAT ROAD	EB	C,D	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY	G	Y	R
SOUTH ROAD	NB	E	R	R	R	G–R	Y–R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR	R	R	R
SOUTH ROAD	NB	F	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR	R	R	R
SPRINGS ROAD	SB	G,H,J	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	FR	R	R	R
PEDESTRIAN X-ING	ALL	P1-P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	FDW	DW	OUT	DW	DW	DW
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK			–				–		
RECALL			SOFT			OFF			OFF			SOFT			OFF			–				–		
			ø2			ø3			ø4			ø6			ø8			ø9(PED)			ø1,ø5 & ø7	PRE-EMPTION		
															PERM						NOT USED			

NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D.
2. * UPON PEDESTRIAN PUSH BUTTON ACTUATION
3. PERM = PERMISSIVE
4. ø4 & ø8 DUAL ENTRY
5. MAXIMUM 1 = NORMAL OPERATION
6. MAXIMUM 2 = NOT USED
7. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
8. DURING PEDESTRIAN INTERVAL, FDW THROUGH YELLOW OPERATION SHALL NOT BE IN EFFECT.

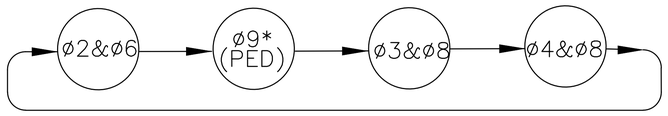
WHERE:
● = AS DETERMINED BY THE FIRE CHIEF

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.

PRE-EMPTION PHASING & PRIORITY			
DETECTOR & PRIORITY	PRE-EMPT PHASE ASSIGNMENT	MOVEMENT	VEHICLE PHASE ASSIGNMENT
HARDWIRE	1		ø6
D1	2		ø2
D2	3		ø6
D3	4		ø4
D4	5		ø3&ø8

PREFERENTIAL PHASE SEQUENCE

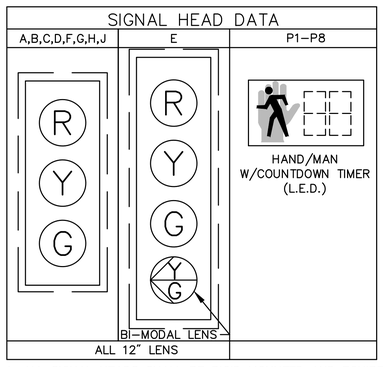


* UPON PEDESTRIAN PUSH BUTTON ACTUATION

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.
6. HARDWIRE BASED FIRE PRE-EMPTION SHALL OVERRIDE OPTICAL BASED PRE-EMPTION.

SIGNAL HEAD DATA



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

DETECTOR DATA						
DETECTOR NO.	NO. SECTION/ SIZE	NO. OF TURNS	OPERATIONS	DELAY /EXT	CALL PHASE	LOOP CONNECTION
1	2–6'X20' QUADRUPOLE	2–4–2	PRESENCE	0	ø2	SERIES
2	2–6'X20' QUADRUPOLE	2–4–2	PRESENCE	0	ø6	SERIES
3	1–6'X20' QUADRUPOLE	2–4–2	PRESENCE	0	ø8	SERIES
4	2–6'X20' QUADRUPOLE	2–4–2	PRESENCE	0	ø8	SERIES
5	1–6'X20' QUADRUPOLE	2–4–2	PRESENCE	0	ø3	SERIES
6	2–6'X20' QUADRUPOLE	2–4–2	PRESENCE	0	ø4	SERIES

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

ITEM 816.1
TRAFFIC SIGNAL RECONSTRUCTION
GREAT ROAD AT SOUTH ROAD/SPRINGS ROAD
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	8ø TS 2 TYPE 1 CONTROLLER IN A TYPE 6 BASE MOUNTED CABINET INCL. FOUNDATION
2	ORNAMENTAL TS 20' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
1	ORNAMENTAL TS 25' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
1	ORNAMENTAL TS 30' MAST ARM TYPE 2, STEEL, INCL. FOUNDATION
2	ORNAMENTAL TS POST 8' STANDARD INCL. FOUNDATION
1	ORNAMENTAL TS POST 10' STANDARD INCL. FOUNDATION
8	SIGNAL HEAD, 3-SECTION, 12" LENSES
1	SIGNAL HEAD, 4-SECTION, 12" LENSES
8	PEDESTRIAN SIGNAL HEAD
6	PEDESTRIAN PUSH BUTTON W/R10-3e
6	AUDIBLE PEDESTRIAN DEVICES
13	PULL BOX-12"x12"
3	TYPE C, 2-CHANNEL CARD RACK LOOP DETECTOR AMPLIFIER
10	WIRE LOOP DETECTOR
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.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
TRAFFIC PLANS
SHEET 19 OF 52

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LIMIT OF WORK
STA 11+00.00

PC +50.00

MUDGE WAY

MOOSE WAY CONSTR ℄

SCHOOL WAY

SCHOOL WAY CONSTR ℄

ELM STREET

ELM STREET CONSTR ℄

MAPLE STREET

MAPLE STREET CONSTR ℄

SOUTH ROAD

TOWN LAYOUT LINE

HANDI-CAP PARKING
STALL SYMBOL (SEE DETAILS)

4" SWL @ 45°
3' O.C. (TYP)

SEE NOTE 3

MEET EXIST
MARKINGS

LIMIT OF WORK
SEE INSET SHEET 08

N/F
CARROLL H DUNHAM
TRUSTEE
CARROLL H DUNHAM FAMILY
TRUST
MAP 53, LOT 166
BOOK 1855, PAGE 8

N/F
MICHAEL,
CHRISTOPHER, &
JEFFREY CHEMLEN
MAP 54, LOT 161
BOOK 41326, PAGE 143

N/F
FRANCISCO J. & MARTINEZ
& SUSAN C. ENGLISH
MAP 54, LOT 160
BOOK 30787, PAGE 114

N/F
JOHN D. & MARY A.
WARDLEY
MAP 54, LOT 159
BOOK 27261, PAGE 428

N/F
DAVID L. WILLIAMS
& ELLEN E. ROYALTY
MAP 54, LOT 167
BOOK 29140, PAGE 69

N/F
FREDRIC B. FLETCHER
& NORMA F. GAHL
MAP 54, LOT 168
BOOK 13829, PAGE 218

N/F
CHRISTOPHER C. YANNONI
& JANET L. POWERS
MAP 54, LOT 158
BOOK 22247, PAGE 53

N/F
IAN M. & CARLOUGH
FAULKNER CARROLL
MAP 54, LOT 156
BOOK 39904, PAGE 40

N/F
MICHAEL A KRIEGER
& ONO KAYA
MAP 54, LOT 156
BOOK 52379, PAGE 314

N/F
FIRST PARISH
CHURCH IN
BEDFORD UNITARIAN
MAP 54, LOT 144
BOOK 12999, PAGE 337

N/F
JOAN B. LARSEN TRUSTEE
JOAN B. LARSEN FAMILY
TRUST
MAP 54, LOT 147
BOOK 48351, PAGE 514

N/F
DORIS S. WEBBER
MAP 54, LOT 146
BOOK 34551, PAGE 340

N/F
MICHAEL C.
O'DONNELL
MAP 54, LOT 145
BOOK 35350, PAGE 49

N/F
MARY T. LETSCHE
MAP 54, LOT 143
BOOK 27933, PAGE 64

Benchmark
Bolt Over Hydrant's
Main Outlet
Elevation=176.54'

Benchmark
Bolt Over Hydrant's
Main Outlet
Elevation=175.20'

CONSTRUCTION NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC UNLESS OTHERWISE NOTED.
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. TEXTURIZED DECORATIVE PAVEMENT CROSSWALK, SEE DETAILS.
4. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE R&S UNLESS OTHERWISE NOTED.

20 0 20 40
SCALE IN FEET

BEDFORD
BEDFORD – VARIOUS LOCATIONS
SIGN SUMMARY

11287-SS.DWG 21-May-2014

TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH	SIZE OF SIGN HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	TEXT DIMENSIONS (INCHES) VERTICAL SPACING	TEXT DIMENSIONS (INCHES) ARROW RTE. MKR.	NUMBER OF SIGNS REQUIRED	COLOR BACKGROUND	COLOR LEGEND	COLOR BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
R1–1	30″	30″	STOP	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			3	RED	WHITE	WHITE	P5–3	5.18	15.54
R3–7L	30″	30″	LEFT LANE MUST TURN LEFT				2	WHITE	BLACK	BLACK	P5–2	6.25	12.50
R5–1	30″	30″	DO NOT ENTER				5	WHITE	WHITE	RED	P5–2 3 MTD W/OTHERS	6.25	31.25
R6–1	36″	12″	ONE WAY				2	BLACK	BLACK	WHITE	P5–1 1 MTD W/OTHERS	3.00	6.00
R7–1d	12″	18″	NO PARKING ANY TIME				2	WHITE	RED	RED	P5–2	1.50	6.00
R7–1L	12″	18″	NO PARKING ANY TIME				2	WHITE	RED	RED	P5–2	1.50	3.00
R7–1R	12″	18″	NO PARKING ANY TIME				1	WHITE	RED	RED	P5–1	1.50	1.50
R7–2	12″	18″	NO PARKING 6 AM TO 9 AM MON–FRI				2	WHITE	RED	RED	P5–2	1.50	3.00
R7–8	12″	18″	RESERVED PARKING				4	WHITE	GREEN/ BLUE	GREEN	P5–4	1.50	6.00
R7–8a	12″	6″	VAN ACCESSIBLE				1	WHITE	GREEN	GREEN	1 MTD W/OTHERS	0.50	0.50
R10–3e	9″	15″		AS PER MASSDOT STANDARD			6	WHITE	WHITE/ BLACK/ ORANGE	BLACK	3 MTD ON TS POLE 3 MTD ON TS POST	INCLUDED UNDER 816 ITEM	
R10–6L	24″	36″	STOP HERE ON RED	SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			2	WHITE	BLACK	BLACK	P5–2	6.00	12.00
R10–12	24″	30″	LEFT TURN YIELD ON GREEN				1	WHITE	BLACK/ GREEN	BLACK	1 MTD ON MAST ARM	2.50	2.50
R10–13	42″	30″	EMERGENCY SIGNAL				2	WHITE	BLACK	BLACK	2 MTD ON MAST ARM	8.75	17.50
R10–22	18″	24″	TO REQUEST GREEN WAIT ON PED	AS PER MASSDOT STANDARD			4	WHITE	BLACK	BLACK	P5–3 1 MTD W/OTHERS	3.00	12.00
W11–8	30″	30″		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			2	YELLOW	BLACK	BLACK	P5–2	6.25	12.50
W11–12P	36″	30″	EMERGENCY SIGNAL AHEAD				2	YELLOW	BLACK	BLACK	2 MTD W/OTHERS	7.50	15.00

NOTE: 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 2003 EDITION, AS AMENDED.

TRAFFIC SIGN SUMMARY

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			
D3–1	VARIES	12″	The Great Rd	6C	3 3	N/A	2	BLUE	WHITE	WHITE	2 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3–2	VARIES	12″	Springs Rd	6C	3 3	N/A	1	BLUE	WHITE	WHITE	1 MTD ON TS POLE	INCLUDED UNDER ITEM 874	
D3–3	VARIES		South Rd	6C	3 3	N/A	2	BLUE	WHITE	WHITE	1 MTD ON TS POLE 1 MTD W/D3–4	INCLUDED UNDER ITEM 874	
D3–4	VARIES	12″	Mudge Way	6C	3 3	N/A	1	BLUE	WHITE	WHITE	P5–1	INCLUDED UNDER ITEM 874	
D3–5	VARIES	12″	School Way	6C	3 3	N/A	2	BLUE	WHITE	WHITE	P5–2	INCLUDED UNDER ITEM 874	
D3–6	VARIES	12″	Elm St	6C	3 3	N/A	2	BLUE	WHITE	WHITE	P5–1 1 MTD W/D3–2	INCLUDED UNDER ITEM 874	
D3–7	VARIES	12″	Maple St	6C	3 3	N/A	2	BLUE	WHITE	WHITE	P5–1 1 MTD W/D3–3	INCLUDED UNDER ITEM 874	
SP–1	30″	48″	RIGHT TURN FROM THIS LANE 6AM – 9AM MON – FRI	4C 4C 4C 3C 3C	3 3 3 3 2 2	9	3	WHITE YELLOW	BLACK BLACK	BLACK BLACK	P5–3	10.00	30.00
R&R SP–2	EXISTING 12″		PARKING BY PERMIT ONLY 7:00AM-5:00PM MONDAY-FRIDAY Town Hall/Police/ Town Center Lots										
R&R SP–3	EXISTING		POLICE TOWN HALL HIGH SCHOOL PUBLIC LIBRARY										

NOTE: 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.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
LOOP DETECTOR DETAILS
SHEET 22 OF 52

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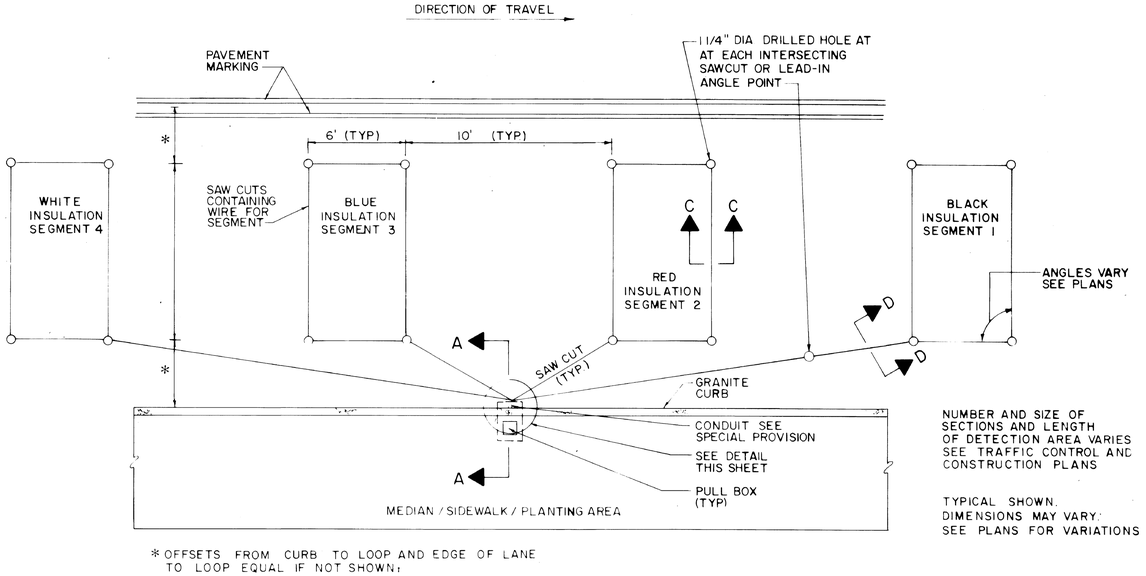
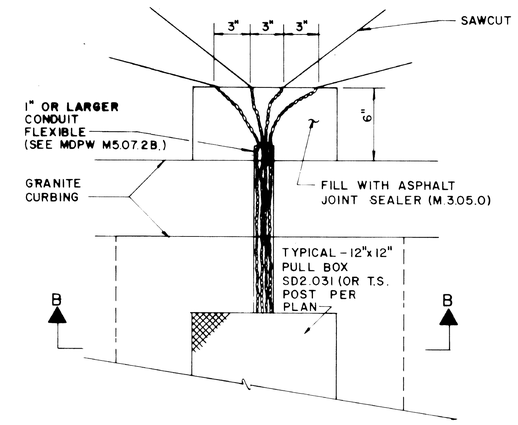


PLAN OF SEGMENTED DETECTOR DETAIL
NOT TO SCALE



DETAIL - PLAN VIEW
NOT TO SCALE

DETECTOR NOTES

1 IN BASE OR HANDHOLE, SPLICE ALL SEGMENTS TO TYPE II-SHIELDED LOOP DETECTOR LEAD-IN CABLE. SEGMENTS SHALL BE SPLICED IN IN PARALLEL, IN SERIES, OR IN A COMBINATION OF PARALLEL & SERIES AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. NUMBER OF TURNS OF WIRE SHALL ALSO BE AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. SEE NOTE 12.

2 SEE SPECIAL PROVISIONS FOR REQUIREMENTS OF DETECTOR AMPLIFIER.

3 LEAD-IN WIRES SHALL BE TWISTED FROM SEGMENT TO SPLICE WITH SHIELDED CABLE. FIVE TURNS PER FOOT. LEAD-IN SHALL BE TYPE II (M8.16.11).

4 BEFOPE STARTING ANY SPLICING THE ELECTRICAL CONTRACTOR SHALL FURNISH DATA SHEETS ON THE MATERIALS AND/OR METHODS TO BE USED IN ACCORDANCE WITH THE DEPARTMENTS STANDARD OPERATING PROCEDURES FOR APPROVAL OF SHOP DRAWINGS. SEE SECTION 815.64, ESPECIALLY PARAGRAPH 1.

5 THE METALLIC SHIELD WHICH SHALL ENCASE THE DETECTOR LEADS FROM A SPLICE (TYPICALLY LOCATED IN A PULL BOX NEAR THE ROAD WAY COMPONENT OF THE DETECTOR) TO THE CONTROLLER, AND THE DRAIN WIRE UNDER THE METALLIC SHIELD, SHALL BE FIRMLY BONDED TO THE EARTH GROUNDING BUS IN THE CONTROLLER. HOWEVER, THE SHIELD AND DRAIN WIRE SHALL BE CAREFULLY INSULATED FROM THE TRANSFORMER NEUTRAL OR FROM EARTH GROUND AT ALL OTHER POINTS ALONG ITS LENGTH. SPECIFICALLY, THIS INCLUDES CAREFUL INSULATION OF THE EXPOSED PORTION OF THE SHIELD AND THE DRAIN WIRE AT THE END AWAY FROM THE CONTROLLER WHERE IT IS SPLICED TO WIRES LEADING TO THE ROADWAY COMPONENT OF THE DETECTOR. THIS IS IMPORTANT TO AVOID A GROUND RETURN LOOP.

6 FILL ALL CONDUIT OPENINGS WITH DUCT SEAL.

7 AFTER SAW CUTS ARE COMPLETE, BLOW OUT OIL AND WATER WITH FREE COMPRESSED AIR UNTIL CUTS ARE CLEAN AND DRY. INSERT WIRE INTO CLEAN SLOT WITH A BLUNT, SMOOTH, ROUND EDGED TOOL OF WOOD OR PLASTIC SUCH AS A PAINT STIRRER, DO NOT USE A SCREWDRIVER. THEN INSERT FOAM PLASTIC HOLD DOWN STRIPS, SIMILAR TO ETHA FOAM 58. STRIPS SHALL BE ABOUT 2" LONG, PLACED IN THE SLOT ABOUT EVERY 2 FEET. THEN POUR SEALER, TAKING CARE TO ELIMINATE BUBBLES.

8 THE COMBINED ROADWAY LOOP, TWISTED LEAD-IN WIRES, SPLICE AND SHIELDED LEAD-IN CABLE SHALL HAVE A RESISTANCE TO GROUND OF AT LEAST 100 MEGOHMS. SEE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

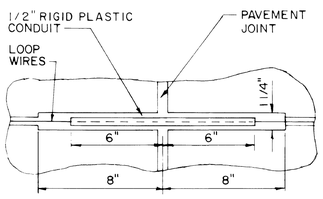
9 FOR INSTALLATION OF SINGLE (ONE SEGMENT) SMALL WIRE LOOP DETECTOR, DETAIL IS THE SAME.

10 CUT LOOPS IN BINDER AND FILL WITH APPROVED FLEXIBLE SEALER.

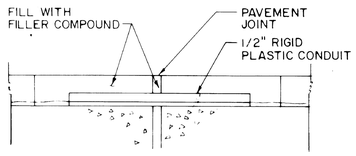
11 DETECTOR WIRE SHALL BE A DIFFERENT COLOR FOR EACH SEGMENT OF A DETECTOR GROUP. SEE DETAIL.

12 SPLICING PATTERN P= SERIES/PARALLEL: SPLICE SEGMENTS 1 AND 3 OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE SEGMENTS 2 AND 4 IN SERIES. SPLICE THE RESULTANT TWO GROUPS IN PARALLEL. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE. CONNECT THIS CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.

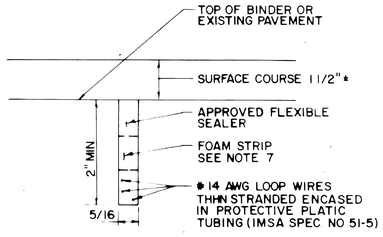
SPLICING PATTERN S=SERIES: SPLICE ALL SEGMENTS (TYPICALLY FOUR, BUT MAY BE LESS) OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.



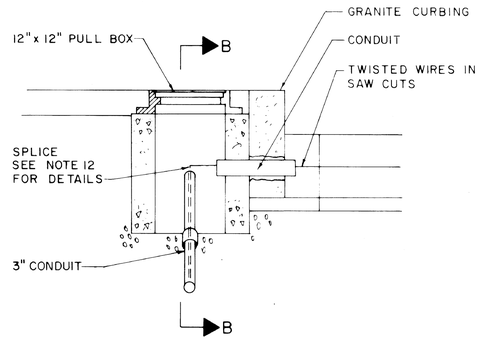
PLAN
TREATMENT AT PAVEMENT JOINTS
NOT TO SCALE



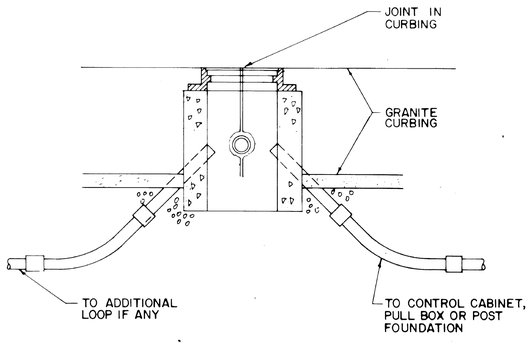
VERTICAL SECTION
TREATMENT AT PAVEMENT JOINTS
NOT TO SCALE



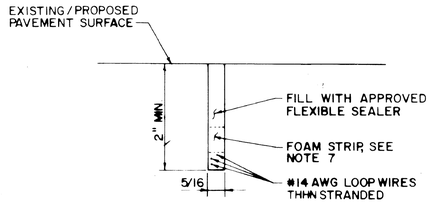
SECTION C-C & D-D
LOOPS IN BINDER COURSE OR EXISTING PAVEMENT TO BE RESURFACE
NOT TO SCALE



SECTION A-A
NOT TO SCALE



SECTION B-B
NOT TO SCALE



SECTION C-C & D-D
LOOPS IN SURFACE COURSE
NOT TO SCALE

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

MASSACHUSETTS DEPARTMENT OF TRANSPORTA
HIGHWAY DIVISION

11287-LMADTL.DWG 21-May-2014

INDEX

THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, THE ENGLISH EDITION OF SUPPLEMENTAL SPECIFICATIONS DATED JUNE 6, 2006, THE AMENDMENTS TO THE STANDARD AND SUPPLEMENTAL SPECIFICATIONS, THE 1977 CONSTRUCTION STANDARDS, THE ENGLISH EDITION OF SUPPLEMENTAL DRAWINGS DATED APRIL 2003, THE 2001 "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" WITH LATEST REVISIONS, THE 2003 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" WITH LATEST REVISIONS, THE 1990 "STANDARD DRAWINGS FOR SIGNS AND SUPPORTS," AND THE 2004 EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

MAST ARM & FOUNDATION

Details Standard Drawings

NOTES

1. For these standard drawings the Design Wind Speed for all Mast Arm Structures shall be **130 MPH**.

2. For these standard drawings the Design Wind Speed for mast arm foundations located in the following counties: Plymouth, Bristol, Barnstable, Dukes, and Nantucket counties in District 5 and Berkshire county in District 1 shall be **130 MPH**. The design wind speed for mast arm foundations for the remainder of the state shall be **110 MPH.**

3. For these standard drawings the mast arm structure design life shall be 25 years.

4. For these standard drawings the Fatigue Category no. 2 was used and truck induced gusts were excluded in the design.

5. These standard drawings do not apply for mast arm structures at intersections with an ADT greater than 40,000 vehicles and a truck percentage of greater than 10%. The responsibility for the design of mast structures and foundations will rest with the design engineer. The structure design life will be 50 years and the fatigue category shall be no. 1. The design wind speed criteria shall be as shown in Notes Nos. 1 & 2. The design will be submitted to MassDOT for review and comment.

6. For strain pole, dual mast arm designs, or mast arms longer than 45 feet, notes 1, 2, 3 and 4 will apply, if ADT (>40,000 vehicles) and truck percentage (10%) criterion is met, note 5 design criteria (50 year design life, fatigue category no. 1, wind design speed notes 1 and 2) will apply. The responsibility for the design of these structures and foundations will rest with the design engineer. The design will be submitted to MassDOT for review and comment.

NO.	REVISION	DATE

Moving Massachusetts Forward. massDOT Highway

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISON

RECOMMENDED FOR APPROVAL

Neil E. Boudreau 2/11/11
TRAFFIC ENGINEER DATE

[signature] 2/17/11
BRIDGE ENGINEER DATE

Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER DATE

BEDFORD
BEDFORD – VARIOUS LOCATIONS
MAST ARM DETAILS
SHEET 24 OF 52

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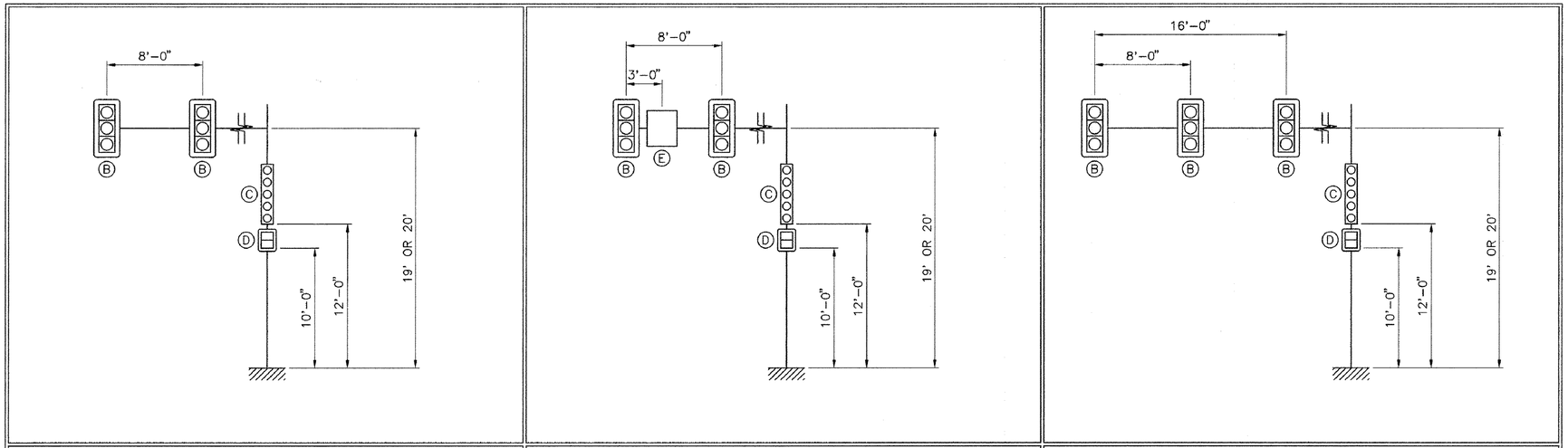
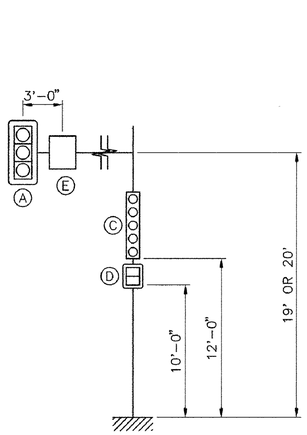


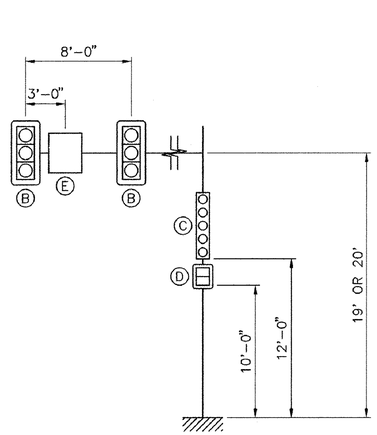
20', 25', 40' & 45' SPANS | 30' SPAN | 35' SPAN

LOAD DEFINITIONS – LIGHT LOADS

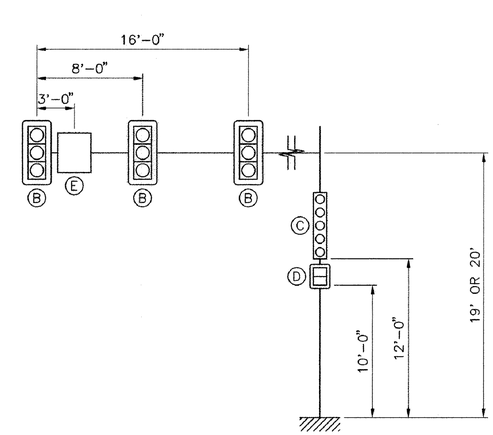


15' SPAN

SHORT SPAN LOADING



20' & 25' SPANS



30', 35', 40' & 45' SPANS

LOAD DEFINITIONS – MEDIUM LOADS

DEVICE	DESCRIPTION	PROJ. AREA (FT~2)	WEIGHT (LBS)
Ⓐ	3 SECTION, 3 WAY SIGNAL	13.50	202
Ⓑ	3 SECTION, 1 WAY SIGNAL	8.67	74
Ⓒ	5 SECTION, 1 WAY SIGNAL	13.33	110
Ⓓ	DUAL PEDESTRIAN SIGNAL	8.00	80
Ⓔ	30" X 36" REGULATORY SIGN	7.50	23

NOTE: ALL SIGNALS HAVE 5.0" BACKPLATES

MONTH_DD,_YYYY	ISSUED FOR CONSTRUCTION

Moving Massachusetts Forward
massDOT Highway

STANDARD DRAWINGS

TYPE II MAST ARMS
LIGHT, MEDIUM & SHORT SPAN
LOAD DIAGRAMS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER

Mark S. Boudreau
TRAFFIC ENGINEER

SHEET 2 OF 5 SHEETS

BEDFORD
BEDFORD – VARIOUS LOCATIONS
MAST ARM DETAILS
SHEET 25 OF 52

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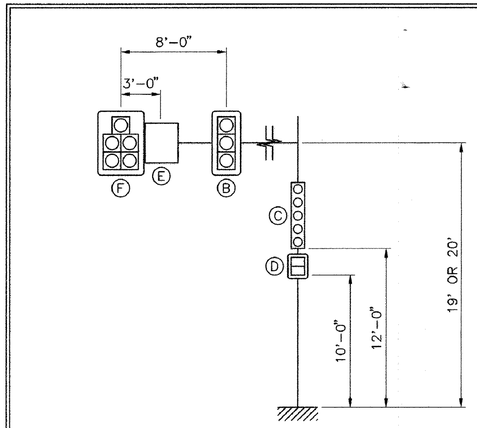
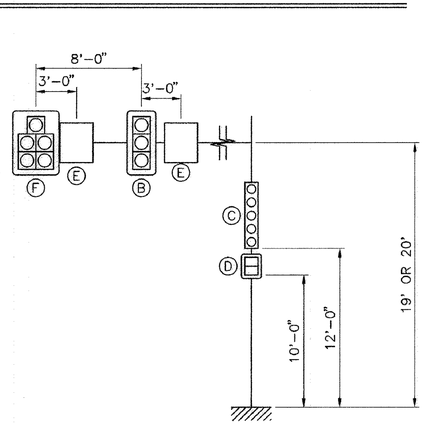
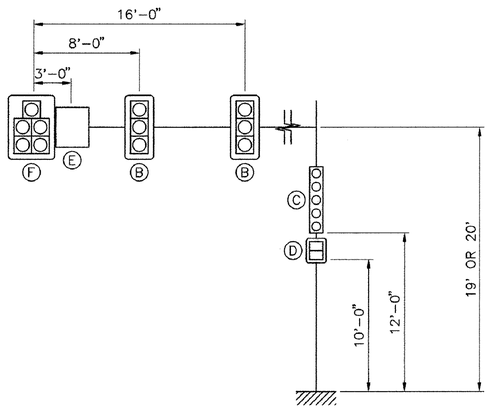


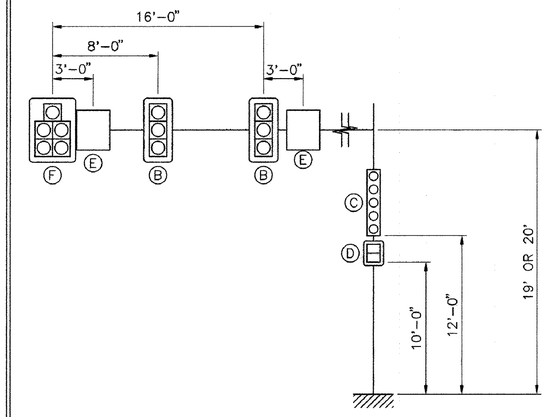
20' SPAN



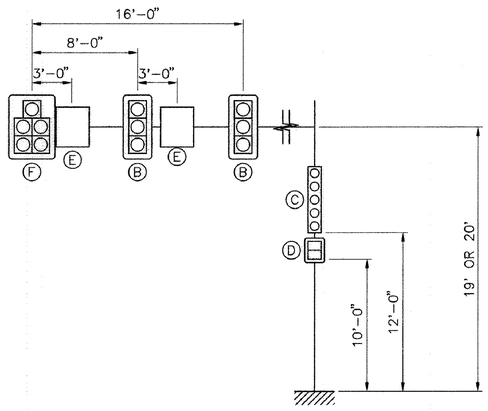
25' SPAN



30' SPAN



35' SPAN



40' & 45' SPANS

LOAD DEFINITIONS – HEAVY LOADS

DEVICE	DESCRIPTION	PROJ. AREA (FT~2)	WEIGHT (LBS)
(A)	3 SECTION, 3 WAY SIGNAL	18.29	202
(B)	3 SECTION, 1 WAY SIGNAL	8.67	74
(C)	5 SECTION, 1 WAY SIGNAL	13.33	110
(D)	DUAL PEDESTRIAN SIGNAL	8.00	80
(E)	30" X 36" REGULATORY SIGN	7.50	23
(F)	5 SECTION, 2 WAY SIGNAL	21.95	215

NOTE: ALL SIGNALS HAVE 5.0" BACKPLATES

MONTH_DD,_YYYY	ISSUED FOR CONSTRUCTION

Moving Massachusetts Forward.
massDOT Highway

STANDARD DRAWINGS

TYPE II MAST ARMS
HEAVY LOAD DIAGRAMS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

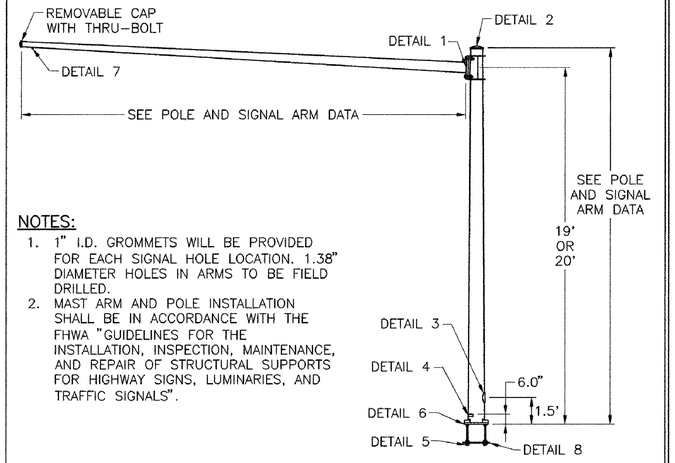
Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER

Neil E. Boudreau
TRAFFIC ENGINEER

SHEET 3 OF 5 SHEETS

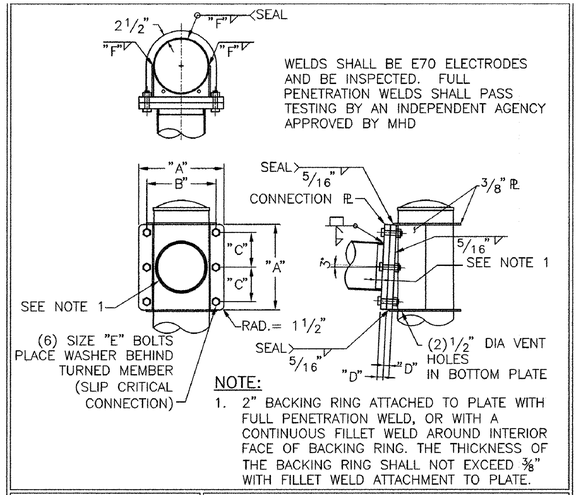
11287-LMADTL.DWG 21-May-2014



NOTES:

1. 1" I.D. GROMMETS WILL BE PROVIDED FOR EACH SIGNAL HOLE LOCATION. 1.38" DIAMETER HOLES IN ARMS TO BE FIELD DRILLED.
2. MAST ARM AND POLE INSTALLATION SHALL BE IN ACCORDANCE WITH THE FHWA "GUIDELINES FOR THE INSTALLATION, INSPECTION, MAINTENANCE, AND REPAIR OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS".

MAST ARM ELEVATION

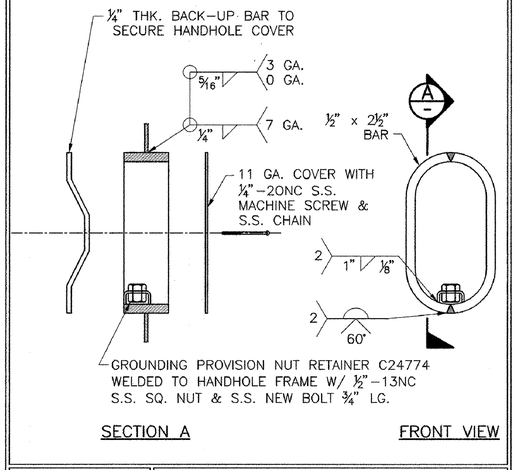


WELDS SHALL BE E70 ELECTRODES AND BE INSPECTED. FULL PENETRATION WELDS SHALL PASS TESTING BY AN INDEPENDENT AGENCY APPROVED BY MHD

NOTE:

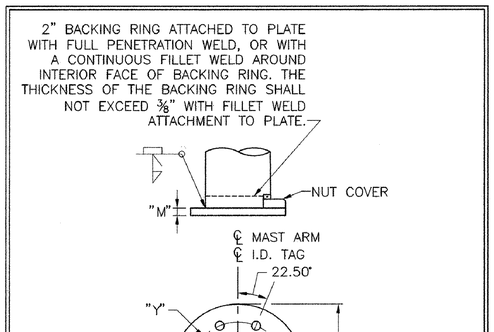
1. 2" BACKING RING ATTACHED TO PLATE WITH FULL PENETRATION WELD, OR WITH A CONTINUOUS FILLET WELD AROUND INTERIOR FACE OF BACKING RING. THE THICKNESS OF THE BACKING RING SHALL NOT EXCEED 3/8" WITH FILLET WELD ATTACHMENT TO PLATE.

DETAIL 1 | SIGNAL ARM ATTACHMENT



SECTION A FRONT VIEW

DETAIL 3 | 4"x8" HANDHOLE

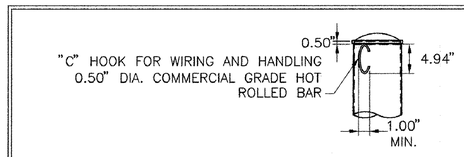


DETAIL 6 | POLE BASE

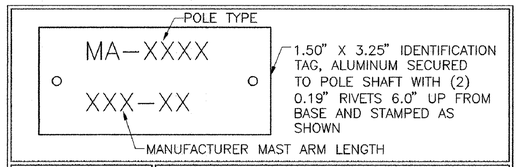
MATERIAL DATA

COMPONENT	DESIGNATION	YIELD (KSI)	COMPONENT	DESIGNATION	YIELD (KSI)
POLE TUBE	ASTM A595 GR. A	55	ARM TUBE	ASTM A595 GR. A	55
POLE BASE PLATE	AASHTO M270	50	ARM CONNECTION PLATE	AASHTO M270	50
ANCHOR BOLTS	AASHTO M314	55	ARM CONNECTING BOLTS	AASHTO M164 **	
GALVANIZING	AASHTO M111 OR M232				

** BOLTS WHICH ACCUMULATE RUST OR DIRT SHALL BE DISCARDED.



DETAIL 2 | POLE TOP



DETAIL 4 | I.D. TAG

POLE AND SIGNAL ARM DATA – LIGHT LOADS

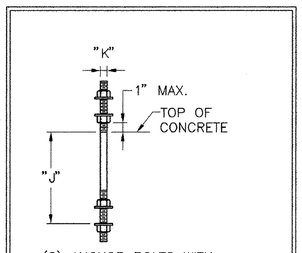
LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. LENGTH "J" (IN)	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
	15.00	9.00	6.90	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	20.00	9.00	6.20	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	25.00	10.00	6.50	7 GA.	13.00	10.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	20.00	16.00	8.00	1.00	1.00	0.188
	30.00	12.50	8.30	3 GA.	15.50	12.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	23.50	19.00	9.50	1.25	1.25	0.250
	35.00	13.00	8.10	3 GA.	16.00	13.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	24.50	20.00	10.00	1.25	1.25	0.250
	40.00	13.00	7.40	3 GA.	16.00	13.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	24.50	20.00	10.00	1.25	1.25	0.250
	45.00	13.50	7.20	3 GA.	16.50	13.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.313

POLE AND SIGNAL ARM DATA – MEDIUM LOADS

LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. LENGTH "J" (IN)	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
	15.00	9.00	6.90	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	20.00	10.00	7.20	3 GA.	13.00	10.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	20.00	16.00	8.00	1.00	1.00	0.250
	25.00	11.00	7.50	3 GA.	14.00	11.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	23.50	19.00	9.50	1.25	1.25	0.250
	30.00	13.00	8.80	3 GA.	16.00	13.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	23.50	19.00	9.50	1.25	1.25	0.250
	35.00	14.00	9.10	3 GA.	17.00	14.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	40.00	15.00	9.40	3 GA.	18.00	15.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	45.00	16.00	9.70	0 GA.	19.00	16.06	21.00	0 GA.	29.50	24.00	1.50	1.813	1.50	36.00	29.50	24.00	12.00	1.75	1.50	0.313

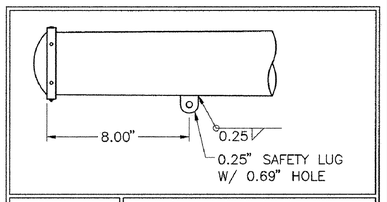
POLE AND SIGNAL ARM DATA – HEAVY LOADS

LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. LENGTH "J" (IN)	"A" (IN)	"B" (IN)	"C" (IN)	"D" (IN)	"E" (IN)	"F" (IN)
	15.00	9.00	6.90	7 GA.	12.00	9.06	21.00	7 GA.	29.50	24.00	1.50	1.813	1.50	36.00	19.00	15.00	7.50	1.00	1.00	0.188
	20.00	12.50	9.70	3 GA.	15.50	12.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	24.00	19.00	9.50	1.25	1.25	0.250
	25.00	14.00	10.50	3 GA.	17.00	14.06	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	30.00	15.50	11.30	3 GA.	18.50	15.56	21.00	3 GA.	29.50	24.00	1.50	1.813	1.50	36.00	27.50	22.00	11.00	1.50	1.50	0.250
	35.00	16.50	11.60	0 GA.	19.50	16.56	21.00	0 GA.	34.50	28.00	1.75	2.063	1.75	36.00	29.50	24.00	12.00	1.75	1.50	0.313
	40.00	17.50	11.90	0 GA.	20.50	17.56	21.00	0 GA.	34.50	28.00	1.75	2.063	1.75	36.00	29.50	24.00	12.00	1.75	1.50	0.313
	45.00	18.50	12.20	0 GA.	21.50	18.56	21.00	0 GA.	34.50	28.00	1.75	2.063	1.75	36.00	31.50	26.00	13.00	2.00	1.50	0.313

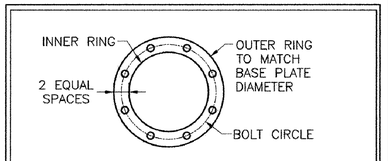


(8) ANCHOR BOLTS WITH (4) HEX NUTS, (4) FLAT WASHERS, AND (1) LOCK-WASHER PER BOLT.

DETAIL 5 | ANCHOR BOLT



DETAIL 7 | SAFETY HANGER LUG



DETAIL 8 | ANCHOR PLATE

MONTH_DD,_YYYY | ISSUED FOR CONSTRUCTION

Moving Massachusetts Forward. massDOT Highway

STANDARD DRAWINGS

TYPE II MAST ARMS
DETAILS

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

Frank A. Tramontozzi 7/29/2011
CHIEF ENGINEER

BRIDGE ENGINEER | TRAFFIC ENGINEER

PIER FOUNDATIONS FOR 110 MPH WIND SPEED ZONE

LIGHT LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	6'-0"	18-#8	3'-6"	8'-0"	18-#8	3'-6"	8'-0"	18-#8	3'-6"	9'-0"	18-#8
WET SAND	3'-6"	7'-0"	18-#8	3'-6"	9'-0"	18-#8	3'-6"	9'-0"	18-#8	3'-6"	9'-0"	18-#8
CLAY (MEDIUM STIFF)	3'-6"	11'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	12'-0"	18-#8
ALLUVIAL	3'-6"	8'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	11'-0"	18-#8

MEDIUM LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	7'-0"	18-#8	3'-6"	9-0"	18-#8	4'-0"	9-0"	18-#9	4'-6"	8'-0"	18-#10
WET SAND	3'-6"	8'-0"	18-#8	3'-6"	9'-0"	18-#8	4'-0"	10'-0"	18-#9	4'-6"	9'-0"	18-#10
CLAY (MEDIUM STIFF)	3'-6"	11'-0"	18-#8	3'-6"	12'-0"	18-#8	4'-0"	13'-0"	18-#9	4'-6"	14'-0"	18-#10
ALLUVIAL	3'-6"	9'-0"	18-#8	3'-6"	10'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	10'-0"	18-#10

HEAVY LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	8'-0"	18-#8	4'-0"	9'-0"	18-#9	4'-6"	10'-0"	18-#10	5'-0"	9'-0"	23-#10
WET SAND	3'-6"	8'-0"	18-#8	4'-0"	10'-0"	18-#9	4'-6"	11'-0"	18-#10	5'-0"	10'-0"	23-#10
CLAY (MEDIUM STIFF)	3'-6"	12'-0"	18-#8	4'-0"	14'-0"	18-#9	4'-6"	15'-0"	18-#10	5'-0"	16'-0"	23-#10
ALLUVIAL	3'-6"	10'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	12'-0"	18-#10	5'-0"	12'-0"	23-#10

PIER FOUNDATIONS FOR 130 MPH WIND SPEED ZONE

LIGHT LOADING CONDITIONS

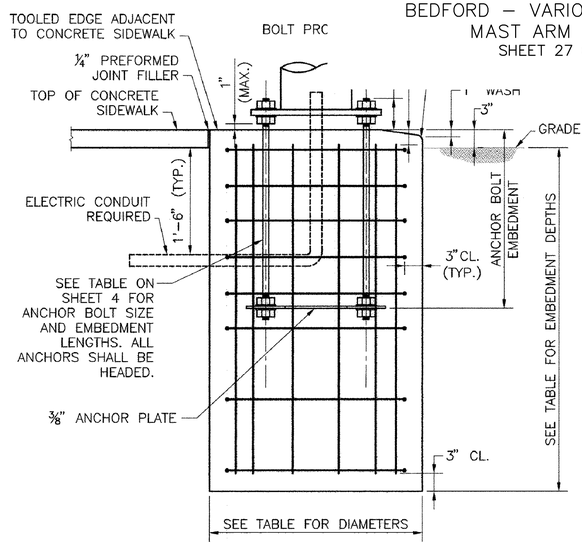
SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	7'-0"	18-#8	3'-6"	9'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	10'-0"	18-#8
WET SAND	3'-6"	8'-0"	18-#8	3'-6"	10'-0"	18-#8	3'-6"	11'-0"	18-#8	3'-6"	11'-0"	18-#8
CLAY (MEDIUM STIFF)	3'-6"	12'-0"	18-#8	3'-6"	13'-0"	18-#8	3'-6"	13'-0"	18-#8	3'-6"	13'-0"	18-#8
ALLUVIAL	3'-6"	9'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	12'-0"	18-#8	3'-6"	13'-0"	18-#8

MEDIUM LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	8'-0"	18-#8	3'-6"	10'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	10'-0"	18-#10
WET SAND	3'-6"	8'-0"	18-#8	3'-6"	11'-0"	18-#8	4'-0"	12'-0"	18-#9	4'-6"	11'-0"	18-#10
CLAY (MEDIUM STIFF)	3'-6"	12'-0"	18-#8	3'-6"	14'-0"	18-#8	4'-0"	15'-0"	18-#9	4'-6"	15'-0"	18-#10
ALLUVIAL	3'-6"	10'-0"	18-#8	3'-6"	13'-0"	18-#8	4'-0"	13'-0"	18-#9	4'-6"	12'-0"	18-#10

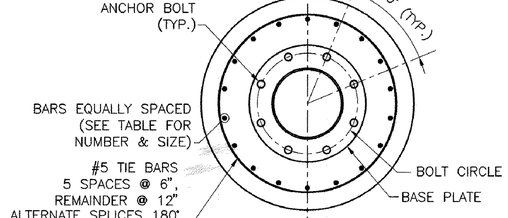
HEAVY LOADING CONDITIONS

SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'-6"	9'-0"	18-#8	4'-0"	11'-0"	18-#9	4'-6"	12'-0"	18-#10	5'-0"	11'-0"	23-#10
WET SAND	3'-6"	10'-0"	18-#8	4'-0"	12'-0"	18-#9	4'-6"	13'-0"	18-#10	5'-0"	12'-0"	23-#10
CLAY (MEDIUM STIFF)	3'-6"	14'-0"	18-#8	4'-0"	15'-0"	18-#9	4'-6"	16'-0"	18-#10	5'-0"	17'-0"	23-#10
ALLUVIAL	3'-6"	11'-0"	18-#8	4'-0"	13'-0"	18-#9	4'-6"	15'-0"	18-#10	5'-0"	14'-0"	23-#10



PIER FOUNDATION DETAIL

NO SCALE



PIER FOUNDATION PLAN

NO SCALE

NOTES:

1. FOUNDATIONS SHALL BE 4000 PSI, 1½", 565 CEMENT CONCRETE.
2. REINFORCEMENT SHALL BE ASTM A615 GRADE 60.
3. ANCHOR BOLTS SHALL BE SET BY TEMPLATE.
4. PROVIDE FOR ELECTRICAL CONDUIT.
5. EXCAVATION SHALL BE BY THE AUGER METHOD TO THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATIONS WITHOUT DISTURBING THE SOIL AROUND AND BELOW THE PROPOSED FOUNDATION BOTTOM. ALTERNATE METHODS OF EXCAVATION MAY BE SUBMITTED TO MASSHIGHWAY FOR APPROVAL IF THEY MEET THE REQUIREMENTS LISTED IN NOTES 6, 7, AND 8.
6. THE EARTH WALLS OF THE FOUNDATION SHALL BE ADEQUATELY AND SECURELY PROTECTED AT ALL TIMES AGAINST CAVE-INS, DISPLACEMENT OF THE SURROUNDING EARTH AND FOR THE EXCLUSION OF GROUND WATER. THIS MAY BE DONE BY THE USE OF STEEL CYLINDER LINERS OR CASINGS THAT ARE APPROVED BY MASSHIGHWAY. IF LINERS ARE USED THEY MAY BE RECLAIMED PROVIDED THAT THEY ARE WITHDRAWN AS THE CONCRETE IS BEING PLACED, MAINTAINING A SUFFICIENT HEAD OF CONCRETE WITHIN THE LINER TO PREVENT REDUCTION IN THE FOUNDATION DIAMETER AND TO PREVENT EXTRANEOUS MATERIAL FROM FALLING IN FROM THE SIDES AND MIXING WITH THE CONCRETE.
7. IF THE SOIL IS DISTURBED OR REMOVED BEYOND THE NEAT LINES OF THE OUTSIDE DIMENSION OF THE FOUNDATION, IT SHALL BE REPLACED WITH CONCRETE. ANY ADDITIONAL COST FOR THE CONCRETE SHALL BE PAID FOR BY THE CONTRACTOR.
8. SPECIAL CARE SHOULD BE GIVEN TO AREAS WHERE WET SOIL IS ENCOUNTERED, TO INSURE THAT THE PREAUGERED HOLE DOES NOT COLLAPSE. THIS MAY REQUIRE THE USE OF STEEL CYLINDER LINERS OR CASINGS TO HOLD THE SOIL IN PLACE UNTIL READY FOR CONCRETE PLACEMENT. THE STEEL CYLINDERS OR CASINGS SHALL BE WITHDRAWN AS THE FOUNDATION CONCRETE IS PLACED.
9. DETERMINATION OF EXISTING SOIL CONDITIONS SHALL BE MADE BY THE DESIGN ENGINEER.
10. IF LEDGE OR POOR SOIL IS ENCOUNTERED (i.e. ONE WHICH DOES NOT APPLY TO THE DESIGN TABLES SHOWN ON THIS SHEET), AN ALTERNATIVE DESIGN SHALL BE PROVIDED BY THE DESIGN ENGINEER. DECISIONS MADE IN NOTES 8 AND 9 SHALL BE SUBMITTED TO MASSHIGHWAY 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 ENGINEER.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
MAST ARM DETAILS
SHEET 27 OF 52

11287-LMADTL.DWG 21-May-2014

MONTH_DD,_YYYY | ISSUED FOR CONSTRUCTION

Moving Massachusetts Forward. massDOT Highway

STANDARD DRAWINGS

TYPE II MAST ARMS
CORED PIER FOUNDATIONS

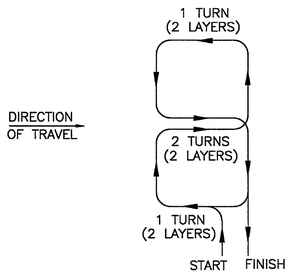
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

CHIEF ENGINEER 3/24/2011
BRIDGE ENGINEER
TRAFFIC ENGINEER

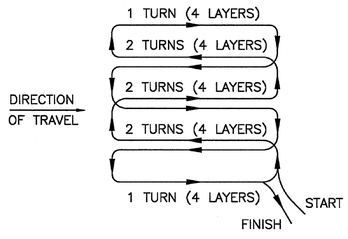
BEDFORD
BEDFORD – VARIOUS LOCATIONS
BICYCLE LOOP DETECTOR DETAILS
SHEET 28 OF 52

11287-BDTL02-22-06.DWG 21-May-2014

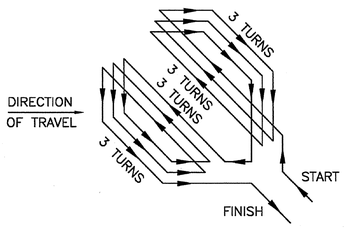
WINDING DETAILS



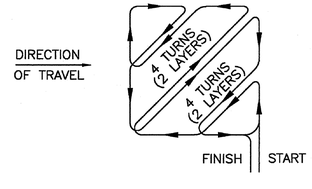
TYPE Q DETECTOR



TYPE D–Q DETECTOR

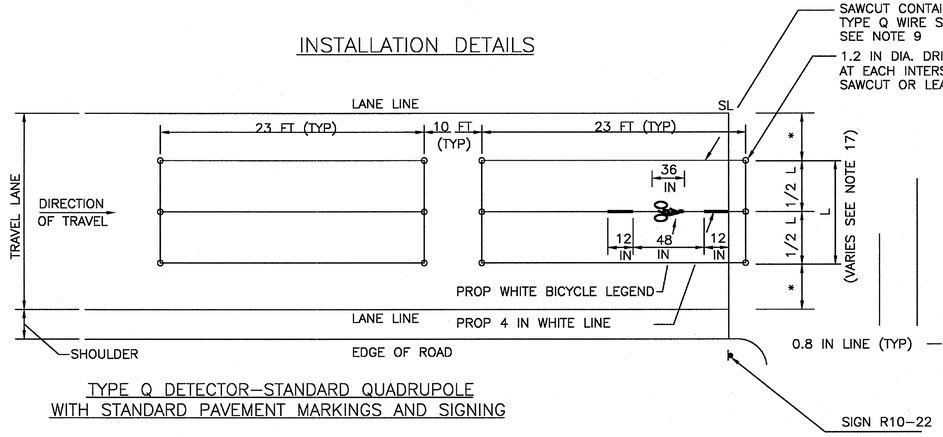


TYPE D–1 DETECTOR



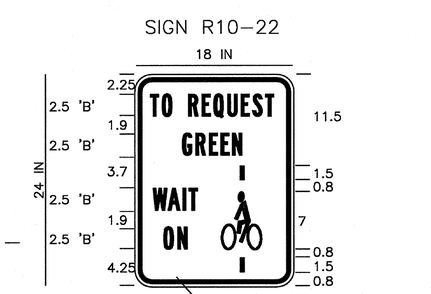
TYPE D–2 DETECTOR

INSTALLATION DETAILS



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

SIGN R10–22

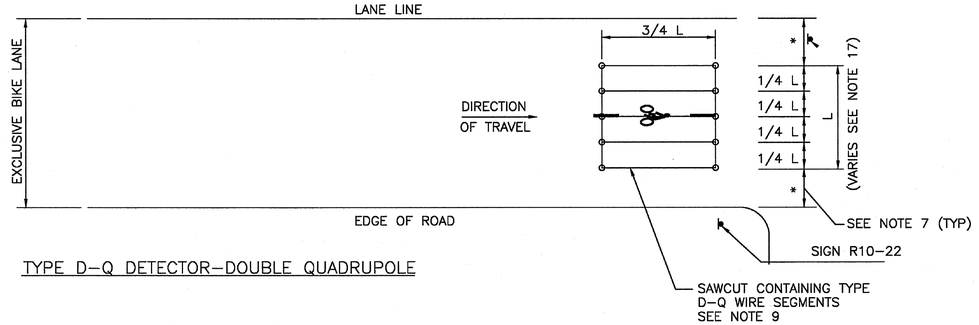


SIGN BORDER:
R=1.5, TH=0.5, INS=.38

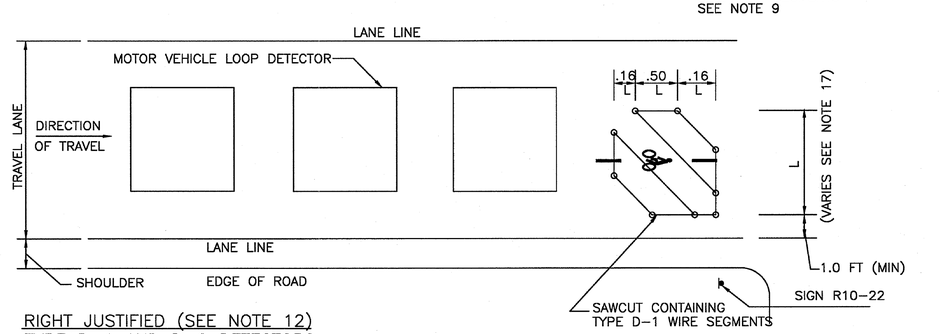
WHITE BACKGROUND
BLACK LEGEND AND LINES

NOTE: ALL SIGN DIMENSIONS IN INCHES

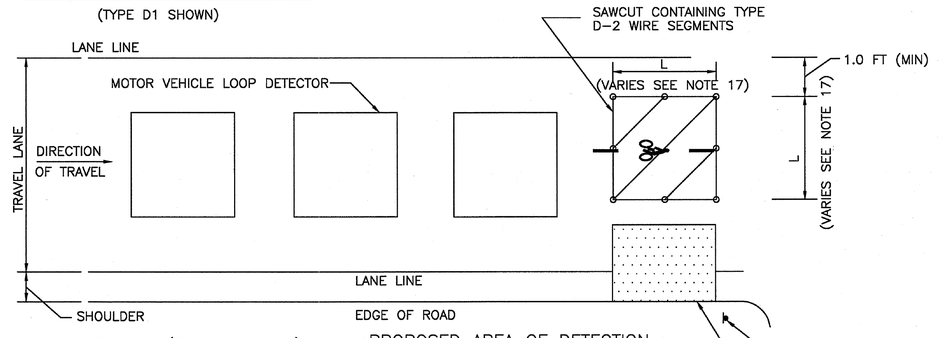
NOTE: SIGN PANEL NOT SHOWN TO SCALE



TYPE D–Q DETECTOR–DOUBLE QUADRUPOLE

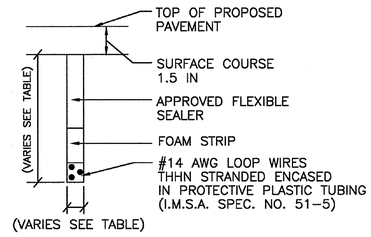


RIGHT JUSTIFIED (SEE NOTE 12)
TYPE D–1 AND D–2 DETECTORS
(TYPE D1 SHOWN)



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

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



SECTION THRU LOOP DETECTOR

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

BICYCLE LOOP DETECTOR DETAILS

NOTES:

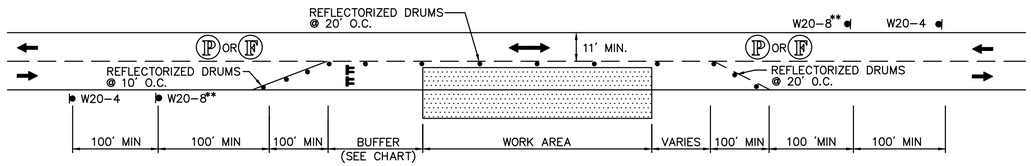
1. REFER TO VEHICLE LOOP DETECTOR DETAIL SHEET FOR ADDITIONAL NOTES AND CONSTRUCTION DETAILS.
2. ALL DETAILS ARE GRAPHICAL WITH NO SCALE.
3. THE NUMBER, SIZE, LOCATION AND LENGTH OF DETECTION AREA VARIES AND SHALL BE DETERMINED BY THE DESIGNER REFER TO TRAFFIC SIGNAL PLAN.
4. BICYCLE LOOPS SHALL BE CONNECTED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

NOTE: REVISED FEBRUARY 22, 2006

MASSACHUSETTS HIGHWAY DEPARTMENT
TRAFFIC ENGINEERING
REVISED FEBRUARY 22, 2006

OPERATIONAL SIGNING

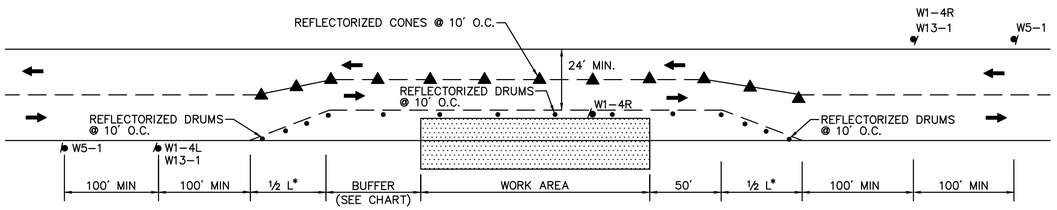
LANE CLOSURES SHOWN ARE FOR TEMPORARY CONSTRUCTION.
ALL DRUMS AND SIGNS ARE SHOWN AS THEY SHOULD APPEAR
DURING THE WORKING DAY, OR WHILE OPERATING IN THE WORK ZONE.



SEE NOTE 16

TYPICAL TWO WAY STREET LANE CLOSURE

NOT TO SCALE



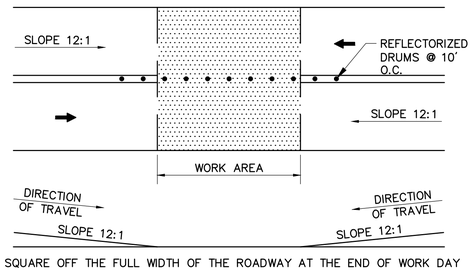
TYPICAL TWO WAY STREET LANE SHIFT

NOT TO SCALE

FOR POSTED SPEEDS OF 40 MPH OR LESS

$*L = \frac{WS^2}{60}$

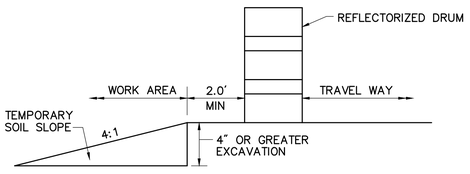
L=TAPER LENGTH
W=WIDTH OF ROADWAY TO BE SHIFTED OR REDIRECTED
S=POSTED SPEED LIMIT



SQUARE OFF THE FULL WIDTH OF THE ROADWAY AT THE END OF WORK DAY

TEMPORARY PAVEMENT TRANSITION DETAIL

NOT TO SCALE

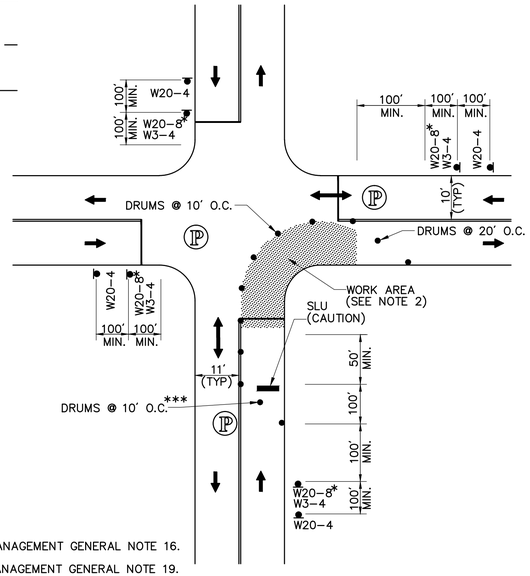


ROADWAY SLOPE PROTECTION

NOT TO SCALE

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



*SEE TRAFFIC MANAGEMENT GENERAL NOTE 16.
***SEE TRAFFIC MANAGEMENT GENERAL NOTE 19.

ONE LANE BI-DIRECTIONAL TRAFFIC AT INTERSECTIONS

NOT TO SCALE

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

LEGEND

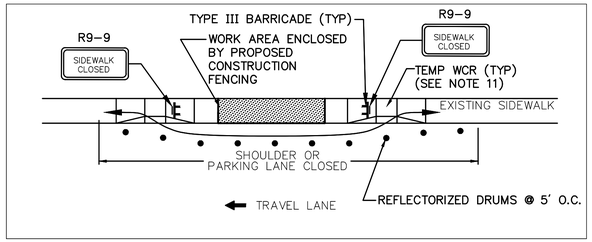
- REFLECTORIZED DRUM
- REFLECTORIZED CONE
- POLICE OFFICER/FLAGGER
- TEMPORARY TRAFFIC CONTROL SIGN
- TEMPORARY IMPACT ATTENUATOR
- MOVEABLE IMPACT ATTENUATOR
- TEMPORARY CONCRETE BARRIER
- TYPE III BARRICADES
- WORK ZONE
- PROPOSED TRAFFIC FLOW
- SPECIAL LIGHTING UNIT (SLU)
- NTS NOT TO SCALE

GENERAL NOTES

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 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 HARDWIRE (MASH).
2. 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.
3. 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.
4. ALL DRUMS SHALL BE SET AT 20' ON CENTER MAX. ON LOCAL ROADWAY UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
5. 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.
6. 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.
7. 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.
8. GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
9. 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.
10. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED.
11. TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
12. ADVISORY SPEED PLATES (W13-1) SHALL BE USED IF APPROPRIATE AND AS DIRECTED BY THE ENGINEER.
13. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
14. 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.
15. SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
16. W20-8 SIGNS SHALL BE REPLACED BY W20-7a SIGNS WHEN FLAGGERS ARE USED IN LIEU OF POLICE OFFICER DETAILS.
17. TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT.
18. REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
19. CONES MAY BE USED IN LIEU OF DRUMS OUTSIDE OF TAPER AREAS.
20. 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.
21. W8-15 SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.
22. THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC.

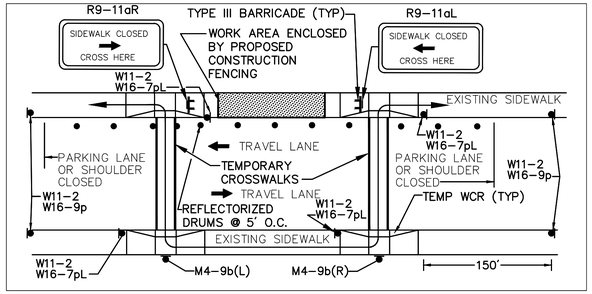
PEDESTRIAN BYPASS

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 III

NTS

NOTES:

1. ADDITIONAL ADVANCE WARNING SIGNS MAY BE NECESSARY AS DETERMINED BY THE ENGINEER.
2. CONTROLS FOR PEDESTRIAN TRAFFIC ONLY, ARE SHOWN. VEHICULAR TRAFFIC SHALL BE MAINTAINED AS SHOWN ELSEWHERE.
3. STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
4. ⟵⟶ INDICATES DIRECTION OF PEDESTRIAN TRAVEL.
5. IF THE WORK ZONE DOES NOT PERMIT PEDESTRIANS TO TRAVEL ADJACENT TO IT AS SHOWN IN PEDESTRIAN BYPASS TYPE I, TEMPORARY CROSSWALKS WITH APPROPRIATE SIGNS SHALL BE INSTALLED TO CROSS PEDESTRIANS TO THE OPPOSITE SIDE OF THE STREET AS SHOWN IN PEDESTRIAN BYPASS TYPE II AND TYPE III, AND AS DIRECTED BY THE ENGINEER.
6. PROPOSED TEMPORARY CROSSWALKS SHALL BE 12" WIDE SURFACE APPLIED TAPE OR REFLECTORIZED PAINT AS DIRECTED BY THE ENGINEER.
7. ALL TEMPORARY PEDESTRIAN PATHWAYS SHALL COMPLY FULLY WITH ALL REQUIREMENTS OF THE MUTCD AND ALL APPLICABLE MAAB AND ADAAG REQUIREMENTS.
8. 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.
9. TEMPORARY WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MASSDOT, MAAB, AND ADAAG REQUIREMENTS.
10. W16-7pR OR W16-7pL SIGNS SHALL BE USED IN COMBINATION WITH W11-2 SIGNS AS DIRECTED BY THE ENGINEER.
11. EXISTING WHEELCHAIR RAMPS (WCR) MAY BE USED IN LIEU OF TEMPORARY WHEELCHAIR RAMPS FOR TEMPORARY DETOURS UNLESS OTHERWISE DRIECTED BY THE ENGINEER.

TEMPORARY SIGNS

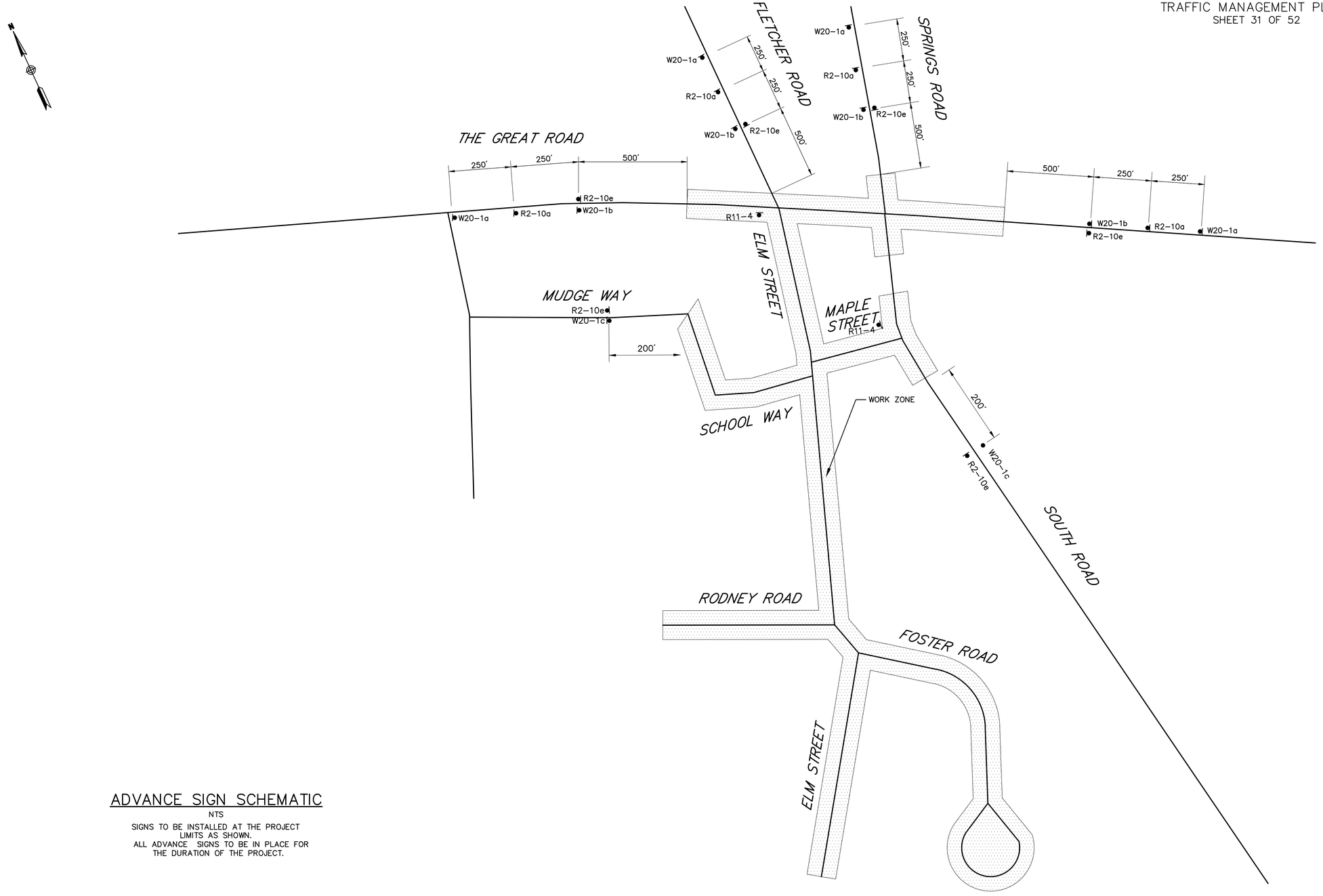
IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	COLOR		
	WIDTH	HEIGHT		BACKGROUND	LEGEND	BORDER
W20-7a	36"	36"		ORANGE	BLACK	BLACK
W11-2	30"	30"		ORANGE	BLACK	BLACK
W16-9p	12"	24"	AHEAD	ORANGE	BLACK	BLACK
W16-7pL	12"	24"		ORANGE	BLACK	BLACK

TEMPORARY SIGNS CONTINUED

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	COLOR		
	WIDTH	HEIGHT		BACKGROUND	LEGEND	BORDER
W20-1a	36"	36"	ROAD WORK 1000 FT	ORANGE	BLACK	BLACK
W20-1b	36"	36"	ROAD WORK AHEAD	ORANGE	BLACK	BLACK
R2-10e	36"	48"	END ROAD WORK DOUBLE FINES END	WHITE	BLACK	BLACK
R2-10a	36"	48"	WORK ZONE SPEEDING FINES DOUBLED	WHITE	BLACK	BLACK
W20-4	36"	36"	ONE LANE ROAD AHEAD	ORANGE	BLACK	BLACK
W20-8	36"	36"	POLICE OFFICER AHEAD	ORANGE	BLACK	BLACK
W5-1	36"	36"	ROAD NARROWS	ORANGE	BLACK	BLACK
W1-4L	36"	36"		ORANGE	BLACK	BLACK
W1-4R	36"	36"		ORANGE	BLACK	BLACK
W13-1(XX)	24"	24"	XX MPH	ORANGE	BLACK	BLACK
W20-1c	36"	36"	ROAD WORK AHEAD	ORANGE	BLACK	BLACK
W3-4	36"	36"	BE PREPARED TO STOP	ORANGE	BLACK	BLACK
W20-8a	36"	36"	CAUTION RAISED CASTINGS AHEAD	ORANGE	BLACK	BLACK
R9-11a	24"	12"	SIDEWALK CLOSED CROSS HERE	ORANGE	BLACK	BLACK
W8-15	36"	36"	GROOVED PAVEMENT	ORANGE	BLACK	BLACK
R11-4	60"	30"	ROAD CLOSED LOCAL TRAFFIC ONLY	WHITE	BLACK	BLACK

BEDFORD
BEDFORD – VARIOUS LOCATIONS
TRAFFIC MANAGEMENT PLANS
SHEET 31 OF 52

11287-TMP.DWG 21-May-2014



ADVANCE SIGN SCHEMATIC

NTS

SIGNS TO BE INSTALLED AT THE PROJECT LIMITS AS SHOWN.
ALL ADVANCE SIGNS TO BE IN PLACE FOR THE DURATION OF THE PROJECT.

BEDFORD
BEDFORD – VARIOUS LOCATIONS
UTILITY PLANS
SHEET 32 OF 52

11287-UTIL.DWG Plotted on 21-May-2014 4:36 PM

N

LIMIT OF WORK
STA 32+75.00
N 3004593.0314
E 715373.0610

THE GREAT ROAD

TIE INTO EXIST TMH

PROP SIGNAL CONDUIT - SEE TRAFFIC PLANS FOR DETAIL

PROP SIGNAL CONDUIT - SEE TRAFFIC PLANS FOR DETAIL

CONNECT INTO EXISTING BUILDING
TOWN TO COORDINATE WITH CONTRACTOR

LIMIT OF PAVING
STA 20+02±

PROP 4" PVC CONDUIT

PROP 32"x 20" HH (TYP)

ELM STREET

THE GREAT ROAD CONSTR ℄

ELM STREET CONSTR ℄

PT +00.26

PC #02.49

PT +99.15

TOWN LAYOUT LINE

TOWN LAYOUT

N/F
HARLEY ANDERSON & NANCY S. HAYNES
MAP 53, LOT 37
BOOK 12319, PAGE 96

N/F
AGRILLO, IOLANDE M. & JOSEPH A. TRUSTEE
BETH-ELLEN REALTY TRUST
MAP 54, LOT 4
BOOK 9883, PAGE 5

N/F
EDWARD J & KATHLEEN M LEBLANC
MAP 54, LOT 5
BOOK 31370, PAGE 162

N/F
OSCAR S. DEPRIEST PARKER ASSOCIATES REALTY TRUST
MAP 54, LOT 6
BOOK 16949, PAGE 518

N/F
CARE ENTERPRISES LLC
MAP 54, LOT 7
BOOK 53474, PAGE 378

N/F
BRUCE M. BLAKE TRUSTEE
ONE FLETCHER ROAD REALTY TRUST
MAP 54, LOT 35
BOOK 30567, PAGE 386

BOOK 8324, PAGE 312

N/F
BRIANS LLC
MAP 54, LOT 36
BOOK 53306, PAGE 146

1 STORY BRICK BUILDING
MULTIPLE STORE FRONTS

N/F
DANIEL M. MURPHY
MAP 53, LOT 38
BOOK 51488, PAGE 225

N/F
ALAN K. AND CAROL K. LONG
MAP 54, LOT 170
BOOK 32581, PAGE 273

N/F
B & R LLC
MAP 54, LOT 163
BOOK 43823, PAGE 111

N/F
TOWN OF BEDFORD FIRE DEPARTMENT
MAP 54, LOT 162
BOOK , PAGE

BEDFORD FIRE STATION

N/F
TOWN OF BEDFORD TOWN COMMON
MAP 54, LOT 144
BOOK 12999, PAGE

N/F
MICHAEL, CHRISTOPHER, & JEFFREY CHEMLEN
MAP 54, LOT 161
BOOK 41326, PAGE 143

20 0 20 40
SCALE IN FEET

CONT. ON SHEET 33

CONT. ON SHEET 34

BEDFORD
BEDFORD – VARIOUS LOCATIONS
UTILITY PLANS
SHEET 33 OF 52

11287-UTIL.DWG Plotted on 22-May-2014 12:53 PM

SPRINGS ROAD

THE GREAT ROAD

ELM STREET

SOUTH ROAD

LIMIT OF WORK
STA 100+00.00
N 3004226.1416
E 715726.3056

LIMIT OF WORK
STA 40+58.54
N 3004169.4404
E 716035.2054

LIMIT OF PAVING
STA 20+02±

TOWN LAYOUT LINE

TIE INTO EXIST TMH

PROP SIGNAL CONDUIT -
SEE TRAFFIC PLANS FOR DETAIL

PROP 4" PVC CONDUIT

PROP 32"x 20" HH (TYP)

RET HYDRANT
R&R HAYDEN FOUNTAIN
1" COPPER TUBING TYPE K
PROP CORPORATION STOP
& CURB STOP

REMOD

PROP GAS RELOCATION (BO)

THE GREAT ROAD CONSTR ℄

ELM STREET CONSTR ℄

6FT - 12"RCP

89FT - 12"RCP

5FT - 12"RCP

REM MH

REM CB

ADJ (BO)

CONT. ON SHEET 32

CONT. ON SHEET 34

N/F
BRIANS LLC
MAP 54, LOT 38
BOOK 53306, PAGE 144

N/F
MARGARET C. HERLIHY
MAP 54, LOT 78
BOOK 8666, PAGE 67

N/F
BRUCE M. BLAKE TRUSTEE
ONE FLETCHER ROAD REALTY TRUST
MAP 54, LOT 35
BOOK 30567, PAGE 386

N/F
BRIANS LLC
MAP 54, LOT 36
BOOK 53306, PAGE 146

N/F
RYAN J & SUZANNE SCHMUHL–KOLLER
MAP 54, LOT 37
BOOK 51127, PAGE 574

N/F
S–BNK BEDFORD LLC
C/O TRAMMELL CROW CO
MAP 54, LOT 79
BOOK 31687, PAGE 81

N/F
PANAKE INC TRUSTEE
MANSE REALTY TRUST
MAP 54, LOT 80A
BOOK 38219, PAGE 366

N/F
PANAKE INC TRUSTEE
MANSE REALTY TRUST
MAP 54, LOT 80
BOOK 38219, PAGE 366

N/F
TOWN OF BEDFORD
TOWN COMMON
MAP 54, LOT 144–A
BOOK 12999, PAGE 332

N/F
JUDITH BOLAND
MAP 54, LOT 130
BOOK 20377, PAGE 144

N/F
GEORGE A. KOUYOUMJIAN TRUSTEE
NATALIE REALTY TRUST
MAP 54, LOT 129
BOOK 1356, PAGE 113

N/F
NATHANIEL K. BROWN TRUSTEE
GREAT FIELDS REALTY TRUST
MAP 54, LOT 128
BOOK 681, PAGE 110

N/F
TOWN OF BEDFORD
OLD TOWN HALL
MAP 54, LOT 131
BOOK 728, PAGE 436

N/F
MICHAEL, CHRISTOPHER, & JEFFREY CHEMLEN
MAP 54, LOT 161
BOOK 41326, PAGE 143

1 STORY BRICK BUILDING
MULTIPLE STORE FRONTS

1–1/2 STORY
BRICK RETAIL STRUCTURE

CONCRETE PAD
FOR GAS PUMP ISLAND

MASSDOT REFERENCE
MARK IN FENCE POST
3"BRASS DISK RM3 1940

DRAINAGE STRUCTURE DATA

NO.	TYPE	LOCATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
1	CBCI	STA 37+81.4 RT	170.13	EXIST	166.07	CONSTR OVER EXIST PIPE
2	DMH	STA 37+84.49 10.58' RT	170.55	1 166.01	165.91	
3	EXIST DMH	STA 38+87.92 12.29' RT	167.14	2 162.81	EXIST (162.71)	
4	CBCI	STA 39+78.0 RT	161.54	- -	157.27	
5	DMH	STA 39+80.07 11.78' RT	164.17	3 EXIST 4 157.24	EXIST	CONSTR OVER EXIST PIPE

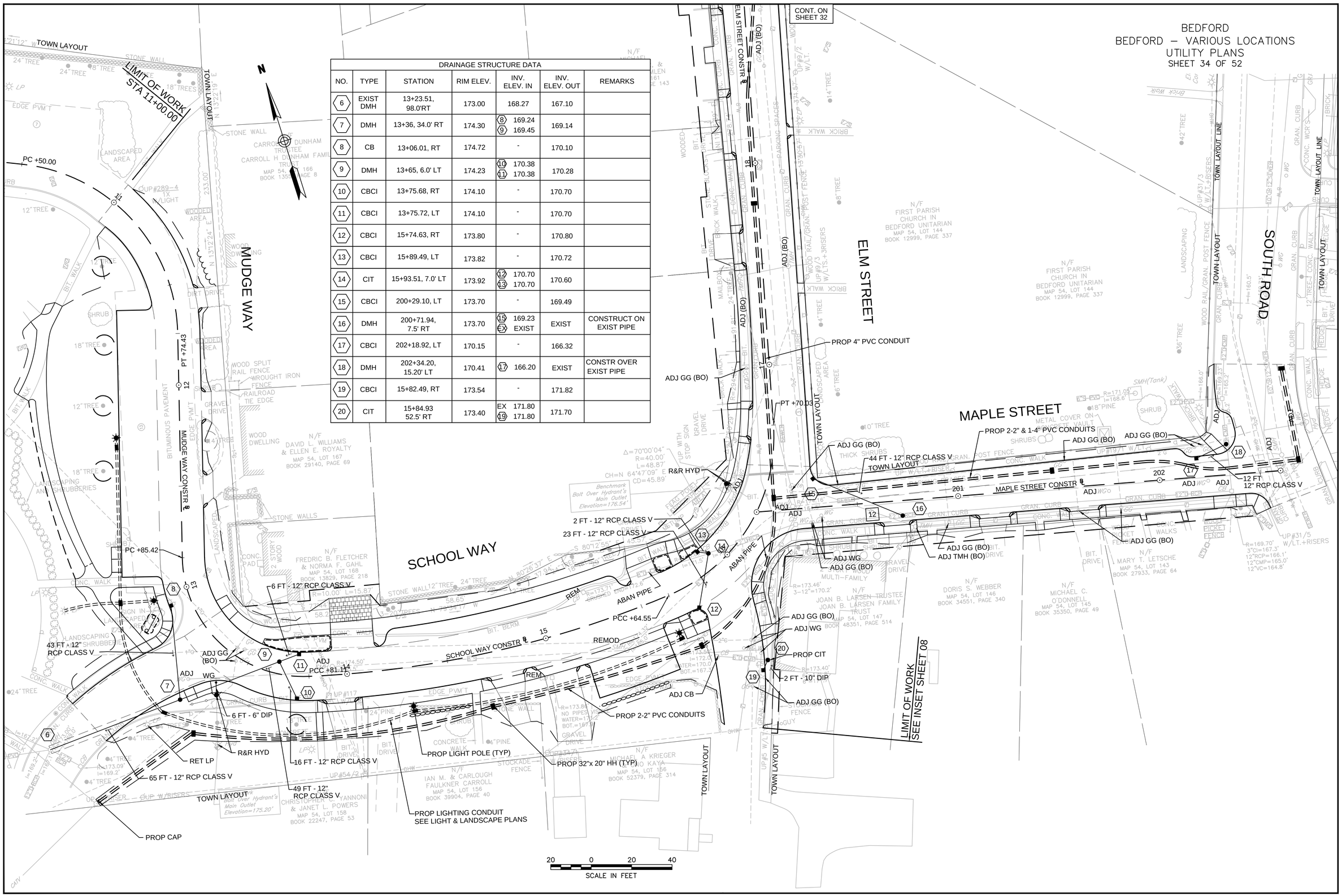
20 0 20 40
SCALE IN FEET

NOTE:
CONTRACTOR TO ADJUST STRUCTURES WITHIN MILL & OVERLAY AREAS AS DIRECTED

BEDFORD
BEDFORD – VARIOUS LOCATIONS
UTILITY PLANS
SHEET 34 OF 52

11287-UTIL.DWG Plotted on 21-May-2014 4:37 PM

DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
6	EXIST DMH	13+23.51, 98.0'RT	173.00	168.27	167.10	
7	DMH	13+36, 34.0' RT	174.30	8 169.24 9 169.45	169.14	
8	CB	13+06.01, RT	174.72	-	170.10	
9	DMH	13+65, 6.0' LT	174.23	10 170.38 11 170.38	170.28	
10	CBCI	13+75.68, RT	174.10	-	170.70	
11	CBCI	13+75.72, LT	174.10	-	170.70	
12	CBCI	15+74.63, RT	173.80	-	170.80	
13	CBCI	15+89.49, LT	173.82	-	170.72	
14	CIT	15+93.51, 7.0' LT	173.92	12 170.70 13 170.70	170.60	
15	CBCI	200+29.10, LT	173.70	-	169.49	
16	DMH	200+71.94, 7.5' RT	173.70	15 169.23 EX EXIST	EXIST	CONSTRUCT ON EXIST PIPE
17	CBCI	202+18.92, LT	170.15	-	166.32	
18	DMH	202+34.20, 15.20' LT	170.41	17 166.20	EXIST	CONSTR OVER EXIST PIPE
19	CBCI	15+82.49, RT	173.54	-	171.82	
20	CIT	15+84.93 52.5' RT	173.40	EX 171.80 19 171.80	171.70	



BEDFORD
BEDFORD – VARIOUS LOCATIONS
LIGHT AND LANDSCAPE PLAN
SHEET 35 OF 52

11287-LIGHT AND LANDSCAPE.DWG Plotted on 21-May-2014 4:37 PM

MUDGE WAY
SCHOOL WAY
ELM STREET
MAPLE STREET
SOUTH ROAD

LIMIT OF WORK STA 11+00.00
PC +50.00
Δ=82° 53' 54"
L=124.43' R=86.00'
PT +74.43
MUDGE WAY CONSTR ℄ N 16° 19' 43" W 110.99'
PC +85.42
PROP SERVICE CONNECTION
PROP TREE TRIMMING
75 FT-2" PVC CONDUIT
58 FT-2" PVC CONDUIT
20-HH 2' O.C.
Δ=91° 22' 58"
L=95.70' R=60.00'
PCC +81.11
SCHOOL WAY CONSTR ℄
56-HH 2' O.C.
50 FT-2" PVC CONDUIT
124 FT-2" PVC CONDUIT
PROP LIGHT POLE (TYP)
1-AR
Δ=20° 19' 47"
L=183.44' R=517.00'
PCC +64.55
136 FT-2" PVC CONDUIT
14-HH 2' O.C.
10-HH 2' O.C.
8-HH 2' O.C.
N 13° 30' 57" E 399.96'
PT +70.03
Δ=71° 06' 01"
L=105.48' R=85.00'
MAPLE STREET CONSTR ℄ S 77° 01' 32" E 260.00'
LIMIT OF WORK SHOWN ON PLANS
TOWN LAYOUT LINE

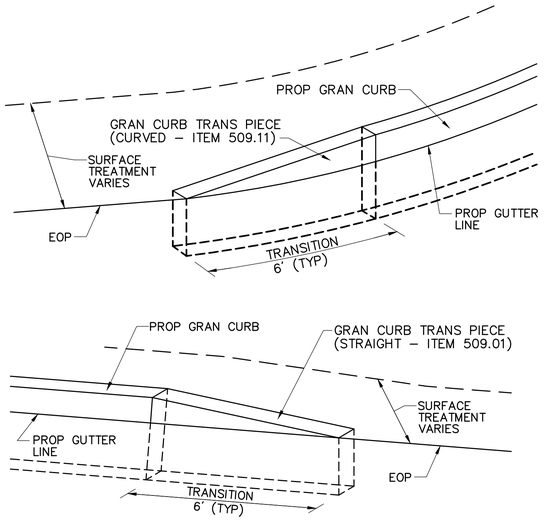
N/F CARROLL H DUNHAM TRUSTEE CARROLL H DUNHAM FAMILY TRUST
N/F MICHAEL, CHRISTOPHER, & JEFFREY CHEMLEN
N/F FRANCISCO J. & MARTINEZ & SUSAN C. ENGLISH
N/F JOHN D. & MARY A. WARDLEY
N/F DAVID L. WILLIAMS & ELLEN E. ROYALTY
N/F FREDRIC B. FLETCHER & NORMA
N/F FIRST PARISH CHURCH IN BEDFORD UNITARIAN
N/F DORIS S. WEBBER
N/F MICHAEL C. O'DONNELL
N/F MARY T. LETSCHE
N/F JOAN B. LARSEN TRUSTEE JOAN B. LARSEN FAMILY TRUST
N/F MICHAEL A KRIEGER & ONO KAYA

PLANT LIST

QTY.	KEY	BOTANICAL NAME	COMMON NAME	SIZE
2	AR	ACER RUBRUM 'RED SUNSET MAPLE'	RED SUNSET MAPLE	3" CAL.
20	HH	HEMEROCALLIS APRICOT SPARKLES	APRICOT SPARKLES DAYLILY	1 GAL.
22	HH	HEMEROCALLIS CHICAGO APACHE	CHICAGO APACHE DAYLILY	1 GAL.
22	HH	HEMEROCALLIS HAPPY RETURNS	HAPPY RETURNS DAYLILY	1 GAL.
22	HH	HEMEROCALLIS JOAN SENIOR	JOAN SENIOR DAYLILY	1 GAL.
22	HH	HEMEROCALLIS PURPLE D'ORO	PURPLE D'ORO DAYLILY	1 GAL.

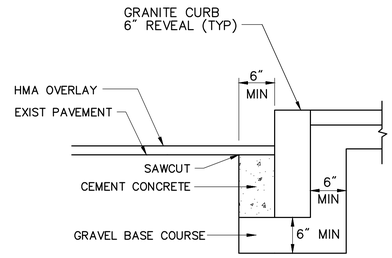
1. TREES SHALL BE LOCATED SUCH THAT THEY DO NOT CONFLICT WITH OVERHEAD UTILITY LINES.
2. TYPES OF DAYLILIES SHALL BE DISTRIBUTED EVENLY THROUGHOUT EACH PLANTED AREA, AS DIRECTED BY THE LANDSCAPE ARCHITECT.

20 0 20 40
SCALE IN FEET



GRANITE CURB TRANSITION PIECE

SCALE: NOT TO SCALE
DATE:
DWG:

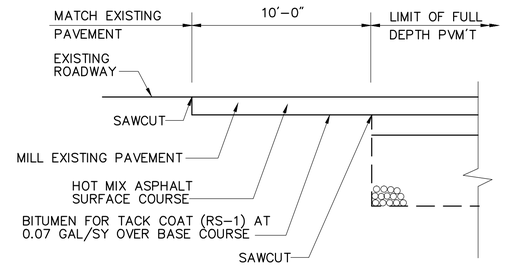


NOTES:

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.

GRANITE CURB IN EXISTING PAVEMENT–WITH OVERLAY

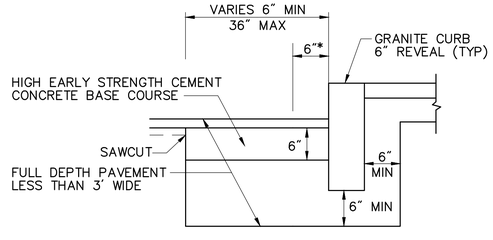
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: CURB–04



LONGITUDINAL SECTION

FULL DEPTH PAVEMENT TRANSITION

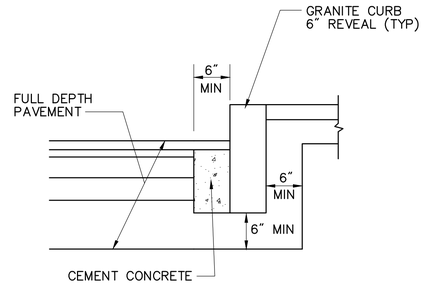
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: PVMT–03



* 6" OF HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.

GRANITE CURB IN FULL DEPTH PAVEMENT LESS THAN 3' WIDE

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: CURB–06

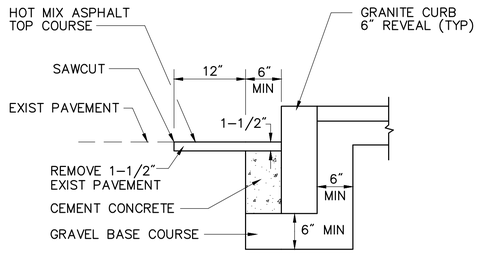


NOTES:

1. CEM CONC TO BE PLACED IF CURB IS INSTALLED AFTER HOT MIX ASPHALT
2. CONCRETE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB

GRANITE CURB IN FULL DEPTH PAVEMENT

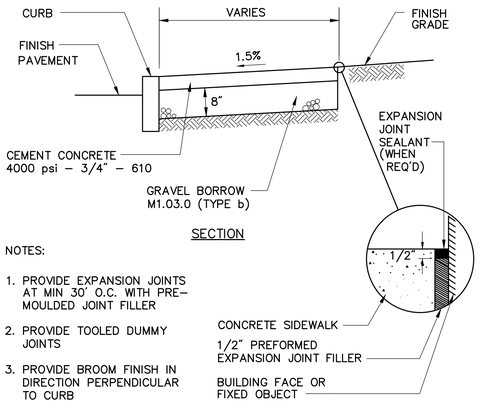
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: CURB–05



* CONCRETE SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.

GRANITE CURB IN EXISTING PAVEMENT

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: CURB–03

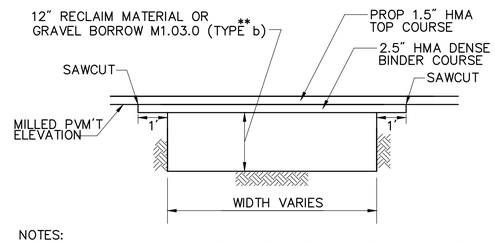


NOTES:

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: APRIL 2003
DWG: WALK–01



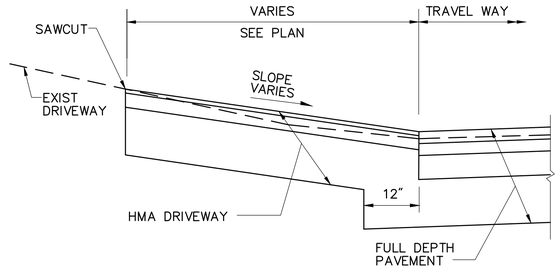
NOTES:

1. HMA PAVEMENT PATCH SHALL BE INSTALLED ON MILLED & OVERLAY STREETS AS REQUIRED BY THE ENGINEER.
2. HMA DEPTH MAY BE ADJUSTED IN THE FIELD AS REQUIRED BY THE ENGINEER IN ORDER TO MATCH THE MILLED PAVEMENT DEPTH.
3. SWEEP AND CLEAN SAWCUT PAVEMENT EDGE, APPLY UNIFORM COAT OF RS–1 ASPAHLT EMULSION PRIOR TO PLACING HOT MIX ASPHALT.

**GRAVEL BORROW, TYPE b SHALL BE USED IN PLACE OF RECLAIMED MATERIAL ONLY IF SURPLUS RECLAIMED MATERIAL IS NOT AVAILABLE, AFTER APPROVAL BY THE ENGINEER.

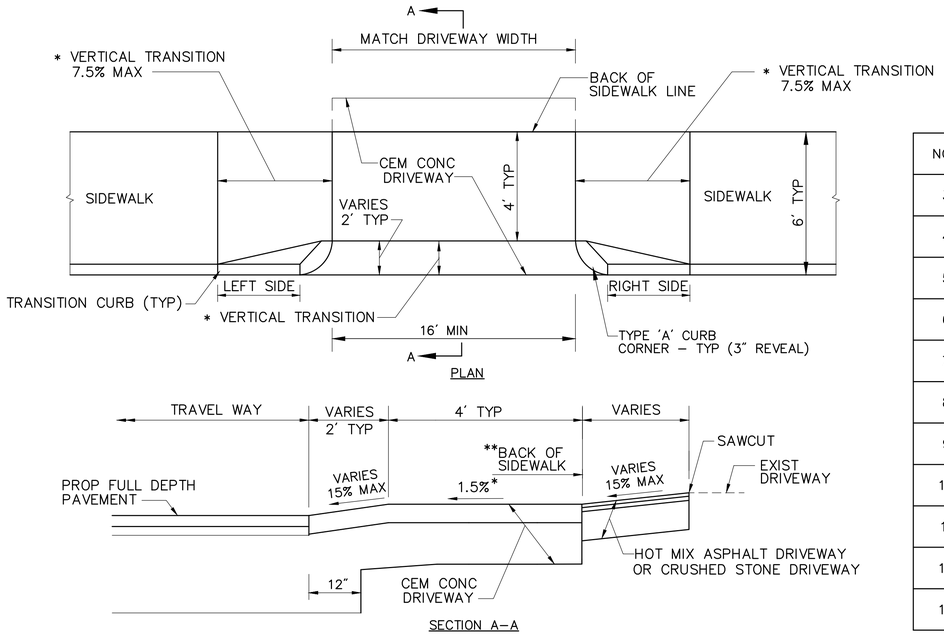
HOT MIX ASPHALT PAVEMENT PATCH

SCALE: NOT TO SCALE
DATE: FEB 2009
NAME: PVM'T PATCH



TYPICAL DRIVEWAY SECTION WITHOUT SIDEWALK TYPE I

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: DRIVE-03

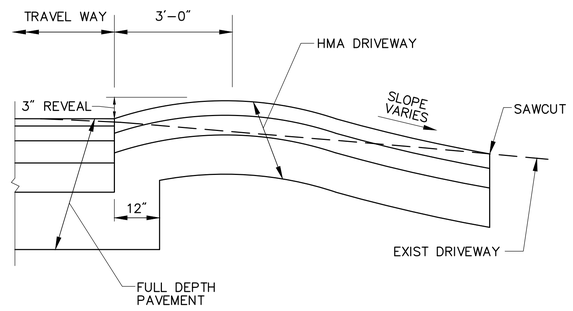


*TOLERANCE FOR CONSTRUCTION ±0.5%
**DRIVEWAY SLOPED TO MEET BACK OF SIDEWALK GRADE

NO.	STATION	ROADWAY GUTTER	LEFT SIDE		RIGHT SIDE	
			REVEAL	TRANSITION	TRANSITION	REVEAL
3	13+95.91 RT	0.50%	6"	3'–3"	3'–10"	6"
4	14+77.29 RT	0.60%	3"	N/A	3'–10"	6"
5	15+23.93 RT	0.60%	3"	N/A	N/A	3"
6	200+68.66 RT	1.56%	6"	3'–3"	4'–6"	6"
7	201+17.23 RT	1.56%	6"	3'–3"	4'–6"	6"
8	201+61.61 RT	1.70%	6"	3'–3"	4'–6"	6"
9	16+71.82 LT	0.50%	6"	3'–3"	3'–10"	6"
10	17+58.98 LT	0.40%	6"	3'–3"	3'–10"	6"
11	18+19.66 LT	0.40%	6"	3'–3"	3'–10"	6"
12	18+84.47 LT	0.40%	6"	3'–3"	3'–10"	6"
13	19+26.32 LT	0.40%	6"	3'–10"	3'–3"	6"

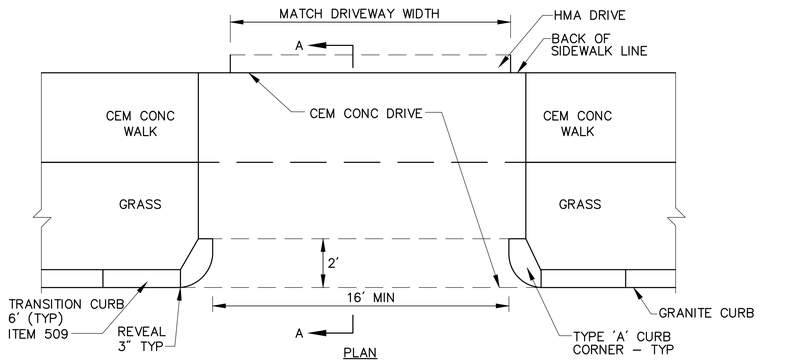
TYPICAL DRIVEWAY WITH SIDEWALK AND GRANITE CURB CORNERS

SCALE: NOT TO SCALE
DATE:
DWG:

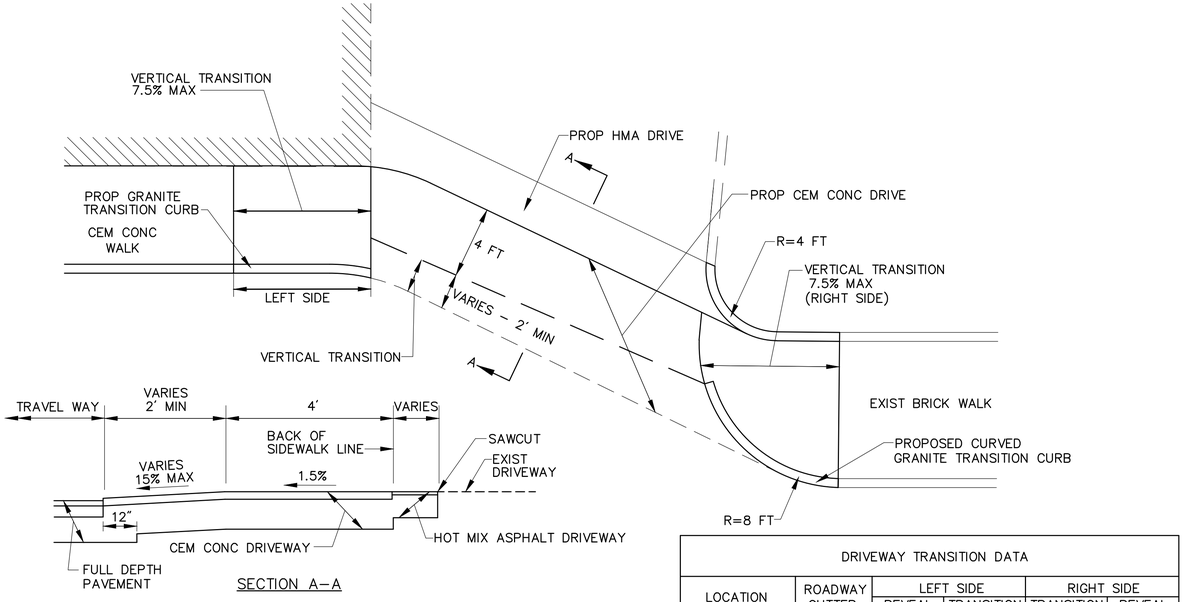


TYPICAL DRIVEWAY SECTION WITHOUT SIDEWALK TYPE II

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

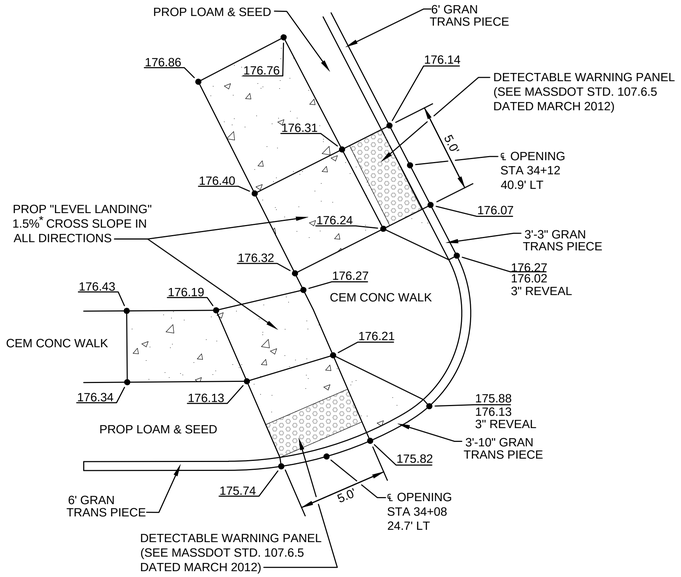


	TYPICAL DRIVEWAY WITH SIDEWALK, GRASS STRIP AND GRANITE CURB CORNER
	SCALE: NOT TO SCALE
	DATE:
	DWG:



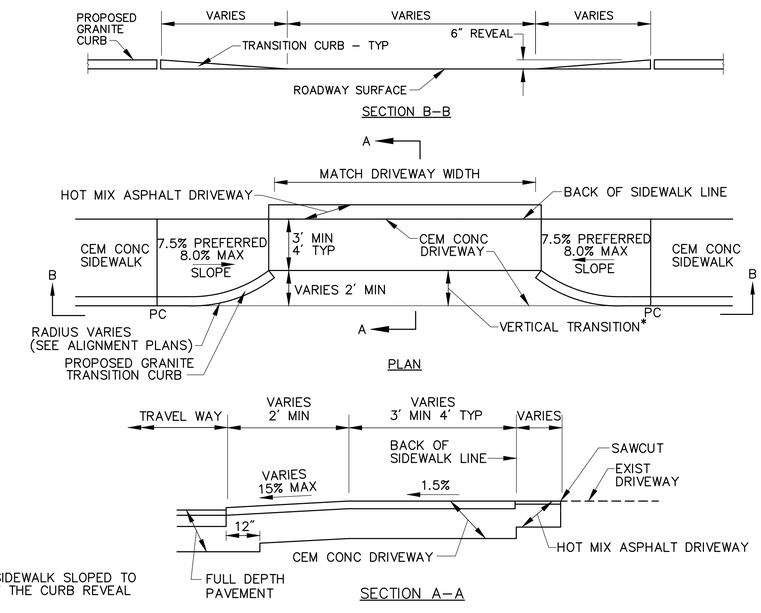
DRIVEWAY TRANSITION DATA					
LOCATION	ROADWAY GUTTER	LEFT SIDE		RIGHT SIDE	
		REVEAL	TRANSITION	TRANSITION	REVEAL
100+09, RT	0.5%	6"	6'–6"	6'–6"	4"

	DRIVEWAY NO. 1 DETAIL
	SCALE: SCALE
	DATE: DATE
	DWG: DWG



WHEELCHAIR RAMPS 2 & 3

SCALE: SCALE
DATE: DATE
DWG: DWG

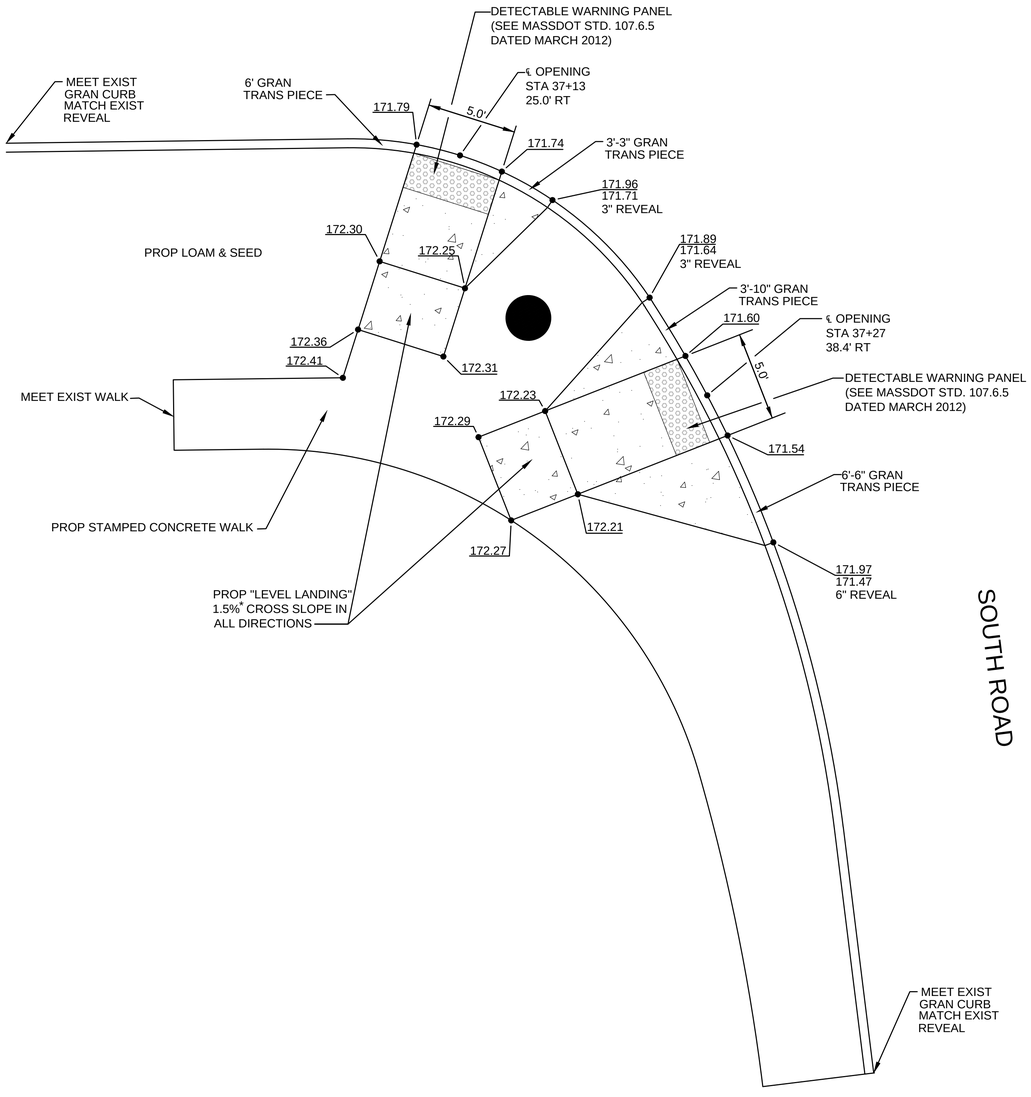


* DRIVEWAY AND SIDEWALK SLOPED TO MEET AT 1/2 OF THE CURB REVEAL

TYPICAL DRIVEWAY WITH SIDEWALK AND CURVED TRANSITION CURB

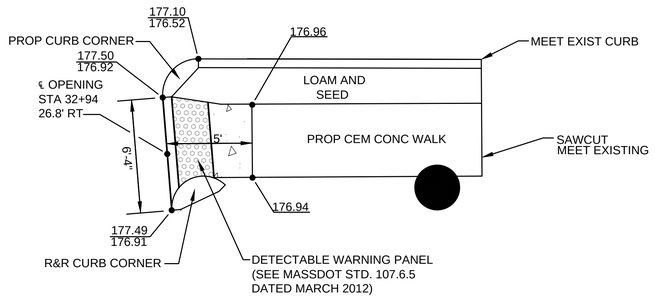
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: DRIVE–09

THE GREAT ROAD



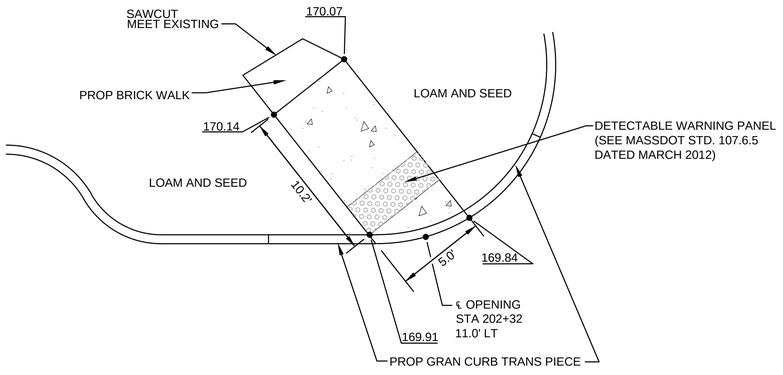
WHEELCHAIR RAMPS 5 & 7

SCALE: SCALE
DATE: DATE
DWG: DWG



WHEELCHAIR RAMP 1

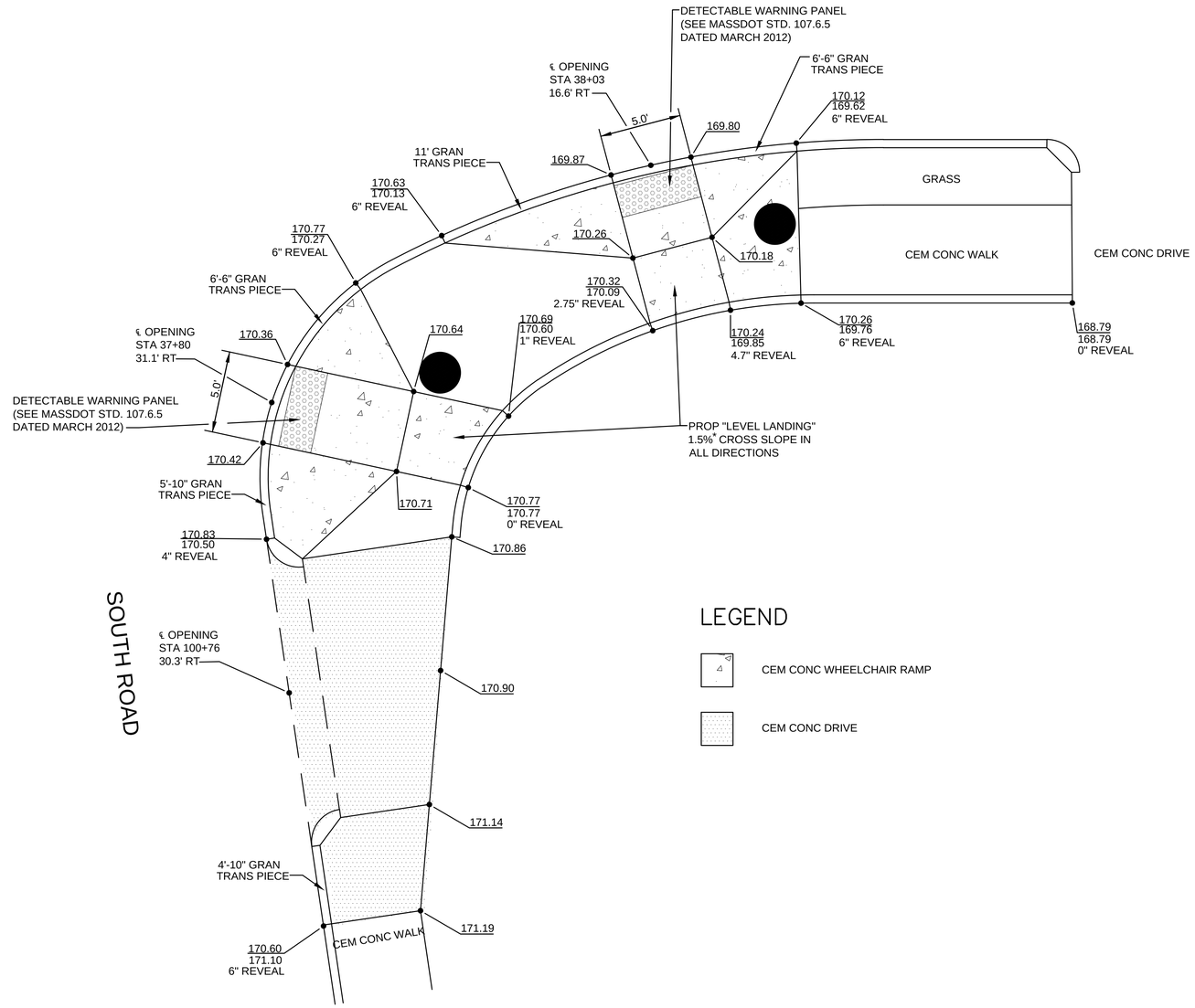
SCALE: SCALE
DATE: DATE
DWG: DWG



WHEELCHAIR RAMP 21

SCALE: SCALE
DATE: DATE
DWG: DWG

THE GREAT ROAD



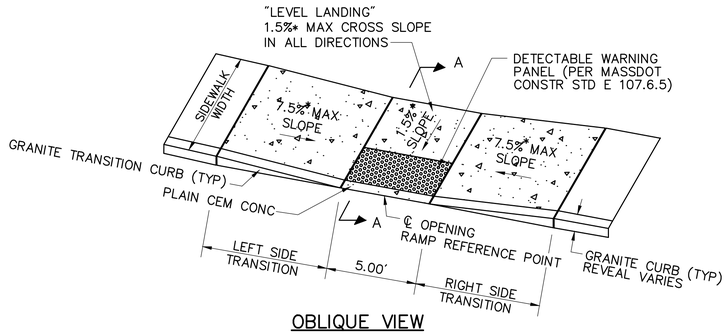
LEGEND

CEM CONC WHEELCHAIR RAMP

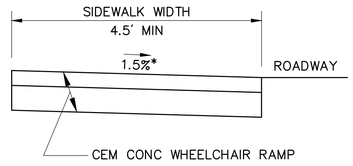
CEM CONC DRIVE

WHEELCHAIR RAMPS 11 & 12, DRIVEWAY NO. 2

SCALE: SCALE
DATE: DATE
DWG: DWG



OBLIQUE VIEW



SECTION A–A

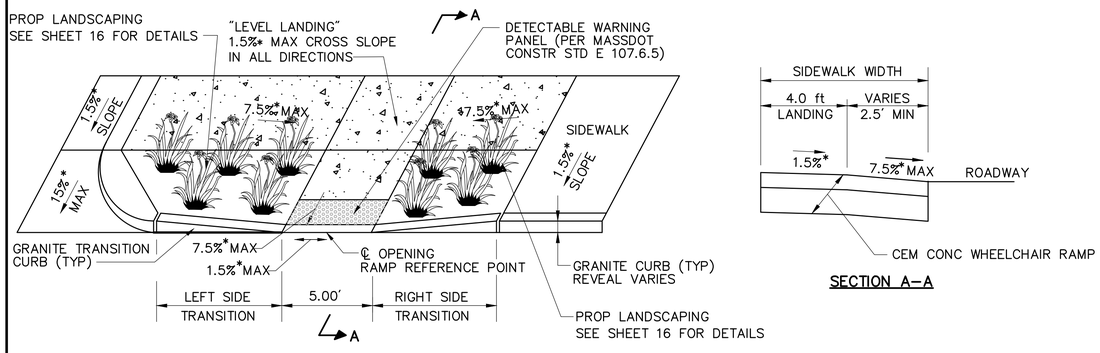
* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA									
NO.	LOCATION	SIDEWALK WIDTH	LEFT SIDE			RIGHT SIDE			℄ OPENING ELEVATION
			ROADWAY GUTTER	REVEAL	TRANS	ROADWAY GUTTER	REVEAL	TRANS	
9	37+64 30' LT	VARIES	1.4%	6"	9'–0"	–1.4%	6"	6'–6"	171.33
13	12+76 30' RT	5'	–2%	6"	6'–6"	N/A	N/A	N/A	175.64
15	13+16 11' LT	6'	N/A	N/A	N/A	–1.48%	6"	6'–6"	174.56
14	13+14 14' RT	5'	–3.13%	3"	3'–3"	3.13%	6"	14'–0"	174.39
16	13+18 30' RT	5'	–6.09%	6"	6'–6"	2.61%	3"	5'–6"	173.89
17	13+36 27' RT	6'	1.42%	6"	9'–0"	N/A	N/A	N/A	173.82
20	15+94 25' RT	6'	–2.0%	6"	6'–6"	2.0%	6"	11'–0"	174.02
22	202+39 10' RT	6'	–2.87%	6"	6'–6"	2.87%	6"	11'–0"	169.57

NOTE: NEGATIVE (–) ROADWAY GUTTER SLOPE DENOTES A LOW SIDE TRANSITION.

WHEELCHAIR RAMP WIDTH LESS THAN 6.5 FT

SCALE: NOT TO SCALE
DATE: OCT 2008
DWG: WCR–03



OBLIQUE VIEW

SECTION A–A

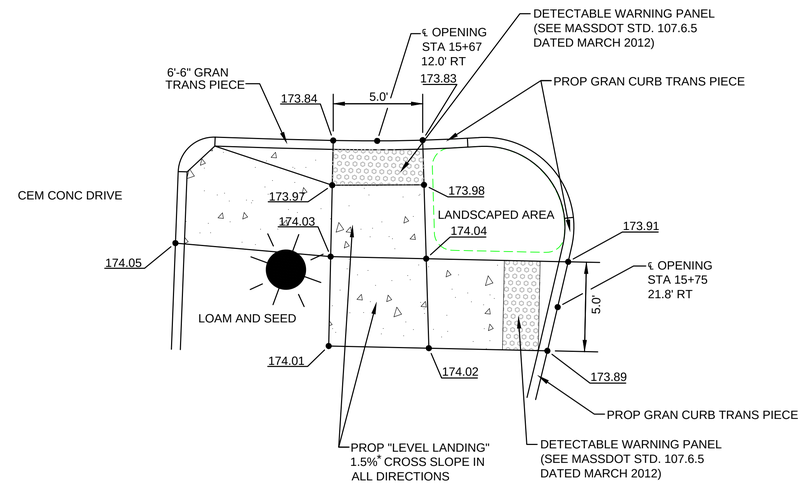
* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA									
NO.	LOCATION	SIDEWALK WIDTH	LEFT SIDE			RIGHT SIDE			℄ OPENING ELEVATION
			ROADWAY GUTTER	REVEAL	TRANS	ROADWAY GUTTER	REVEAL	TRANS	
19	15+76 12' LT	VARIES	0.23%	3"	6'–6"	–0.23%	6"	6'	173.82

NOTE: NEGATIVE (–) ROADWAY GUTTER SLOPE DENOTES A LOW SIDE TRANSITION.

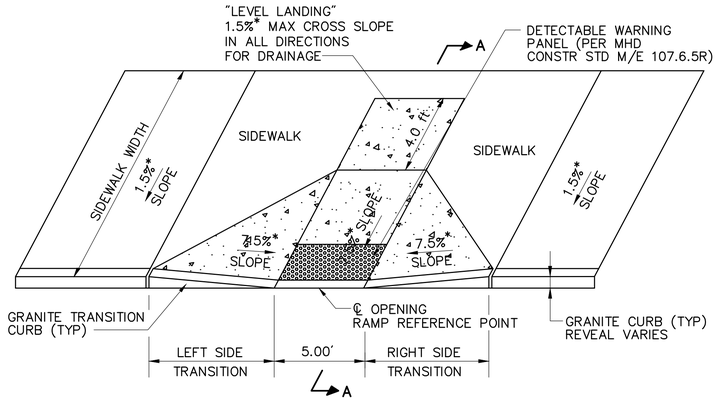
SPECIAL WHEEL CHAIR RAMP

SCALE: NOT TO SCALE
DATE: OCT 2008
DWG: WCR–02

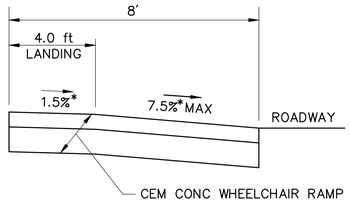


WHEELCHAIR RAMPS 18 & 23

SCALE: SCALE
DATE: DATE
DWG: DWG



OBLIQUE VIEW



SECTION A–A

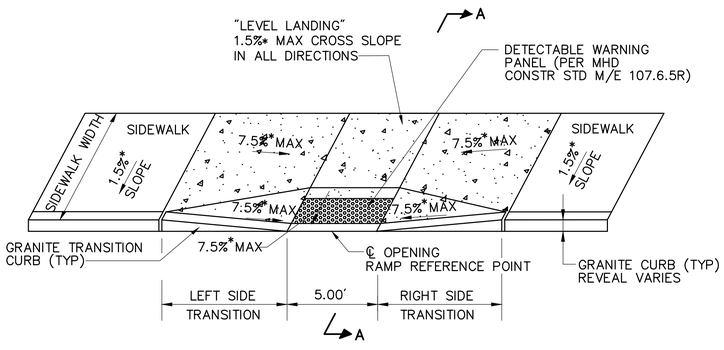
* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA									
NO.	LOCATION	SIDEWALK WIDTH	LEFT SIDE			RIGHT SIDE			℄ OPENING ELEVATION
			ROADWAY GUTTER	REVEAL	TRANS	ROADWAY GUTTER	REVEAL	TRANS	
6	37+22 17' LT	VARIES	1.2%	6"	9'–0"	–0.4%	3"	3'–0"	172.01
8	37+35 30' LT	VARIES	–1.0%	3"	3'–0"	1.0%	6"	6'–6"	171.97
10	37+92 17' LT	VARIES	3.7%	6"	14'–0"	–3.7%	6"	6'–6"	170.48

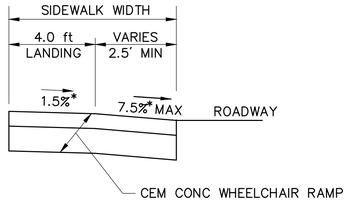
NOTE: NEGATIVE (–) ROADWAY GUTTER SLOPE DENOTES A LOW SIDE TRANSITION.

WHEELCHAIR RAMP
WITH SIDEWALK GREATER THAN 12.0 FT

SCALE: SCALE
DATE: DATE
DWG: DWG



OBLIQUE VIEW



SECTION A–A

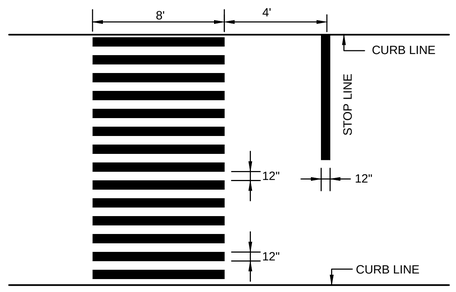
* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA									
NO.	LOCATION	SIDEWALK WIDTH	LEFT SIDE			RIGHT SIDE			℄ OPENING ELEVATION
			ROADWAY GUTTER	REVEAL	TRANS	ROADWAY GUTTER	REVEAL	TRANS	
4	34+31 24.1' RT	6.5'	–1.2%	7"	7'–8"	1.2%	7"	10'–6"	175.34

NOTE: NEGATIVE (–) ROADWAY GUTTER SLOPE DENOTES A LOW SIDE TRANSITION.

WHEELCHAIR RAMP
WITH SIDEWALK WIDTH GREATER THAN 6.5 FT

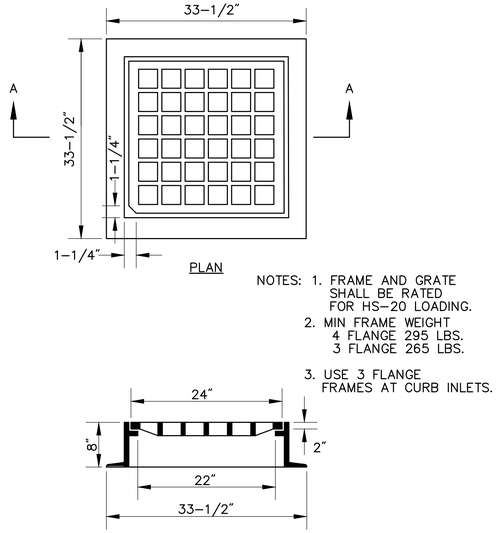
SCALE: NOT TO SCALE
DATE: OCT 2008
DWG: WCR–02



NOTES
1. THE CONTRACTOR SHALL INSTALL PAVEMENT MARKINGS AS SHOWN ON THE WHITE THERMOPLASTIC.
2. LAYOUT OF CROSSWALKS SHALL BE APPROVED BY A BEDFORD DPW REPRESENTATIVE PRIOR TO APPLICATION.

STANDARD CROSSWALK

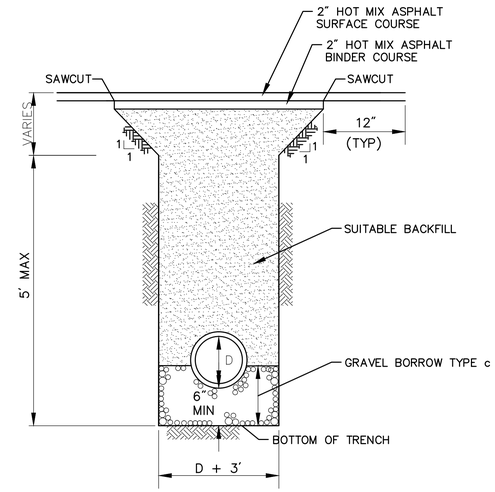
SCALE: NTS



NOTES: 1. FRAME AND GRATE SHALL BE RATED FOR HS–20 LOADING.
2. MIN FRAME WEIGHT
4 FLANGE 295 LBS.
3 FLANGE 265 LBS.
3. USE 3 FLANGE FRAMES AT CURB INLETS.

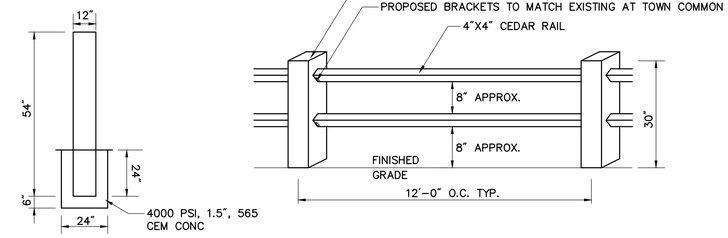
MUNICIPAL STANDARD CATCH BASIN FRAME & GRATE

SCALE: NOT TO SCALE
DATE: 10–28–2008
DWG: –



TRENCH DETAIL IN EXISTING HOT MIX ASPHALT

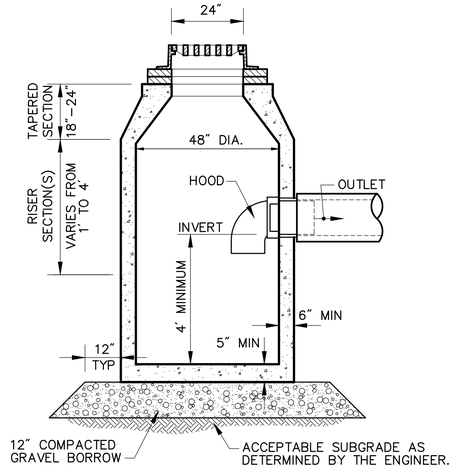
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH–04



SECTION – POST ELEVATION

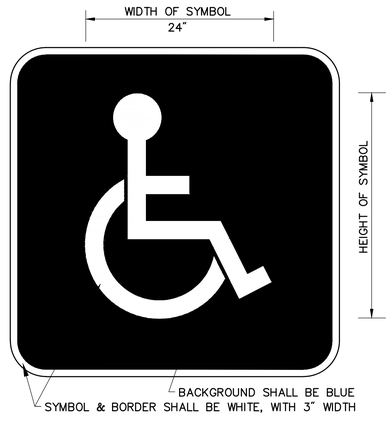
SPLIT RAIL FENCE WITH GRANITE POSTS

SCALE: NOT TO SCALE



DEEP SUMP CATCH BASIN WITH HOOD

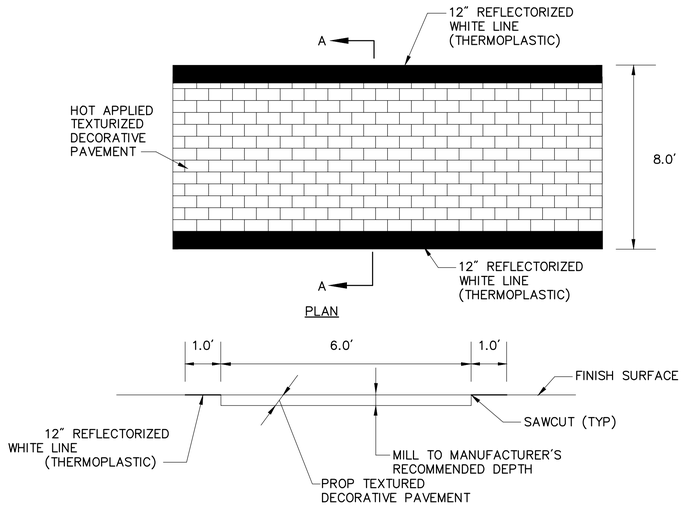
SCALE: NOT TO SCALE
DATE: 10–22–2008
DWG: LD–105



NOTE: 1. SYMBOL SHALL BE CENTERED IN THE PARKING STALL.
2. ALL MARKINGS SHALL BE PAINT.
3. SEE 2004 MUTCD STANDARD HIGHWAY SIGNS MANUAL (APPENDIX, PAGE 10–22) FOR MORE DETAILS.

HANDICAPPED PARKING STALL SYMBOL

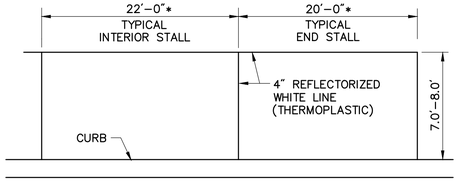
SCALE: NOT TO SCALE
S–STD
H–STD PM–02–ENGLISH



SECTION A–A

TEXTURIZED DECORATIVE PAVEMENT CROSSWALK

SCALE: NOT TO SCALE
DATE:
DWG:



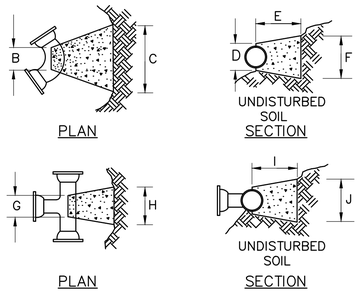
* UNLESS OTHERWISE NOTED ON THE PLANS

PARALLEL PARKING STALL MARKINGS

SCALE: NOT TO SCALE
S–STD
H–STD PM–01–ENGLISH

11287-DET.DWG 21-May-2014

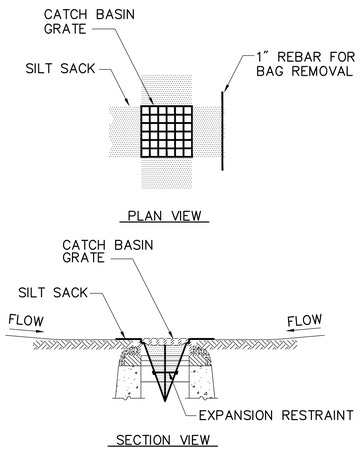
BENDS	B	C	D	E	F	BENDS	B	C	D	E	F
6" 11-1/4°	8"	15"	12"	24"	12"	6" 45°	8"	30"	12"	24"	14"
6" 22-1/2°	"	19"	"	"	13"	6" 90°	"	30"	"	"	27"
8" 11-1/4°	"	20"	"	"	12"	8" 45°	"	30"	"	"	24"
8" 22-1/2°	"	22"	"	"	17"	8" 90°	"	38"	"	"	36"
12" 11-1/4°	"	30"	"	"	15"	12" 45°	"	40"	"	"	40"
12" 22-1/2°	"	35"	"	"	25"	12" 90°	"	60"	"	"	52"
TEES	G	H	I	J		TEES	G	H	I	J	
6"x 6"x 6"	12"	24"	24"	18"		12"x12"x6"	12"	24"	24"	12"	
8"x 8"x 6"	"	"	"	"		12"x12"x8"	"	"	"	24"	
8"x 8"x 8"	"	"	"	24"		12"x12"x12"	"	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

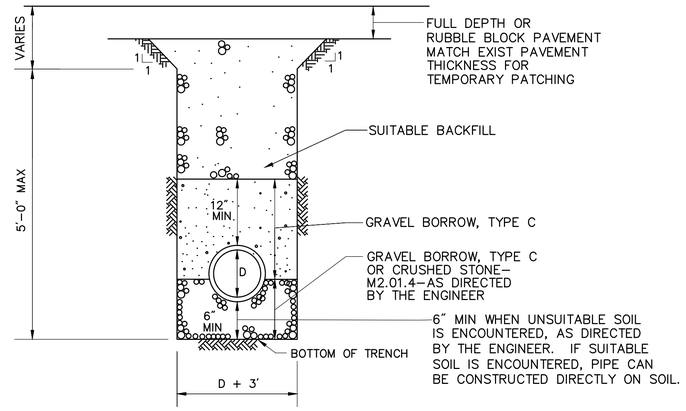
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: WS-02



NOTES:
1. INSTALL SILT SACK IN EXISTING CATCH BASINS BEFORE COMMENCING WORK, AND IN NEW CATCH BASINS 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 PER SPECIAL PROVISION.

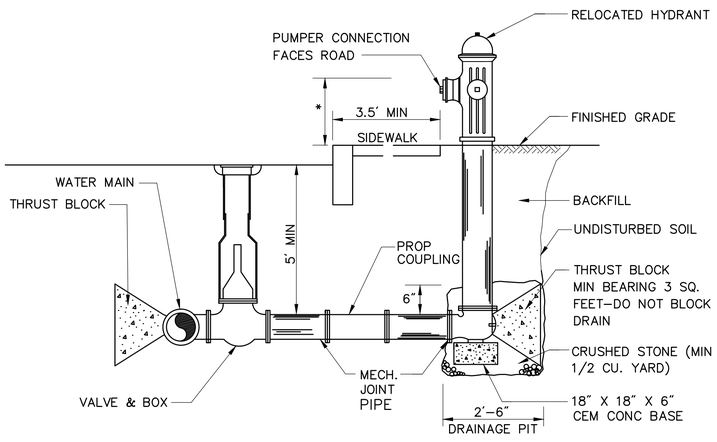
SILT SACK

SCALE: NOT TO SCALE
DATE: –
DWG: –



TRENCH DETAIL

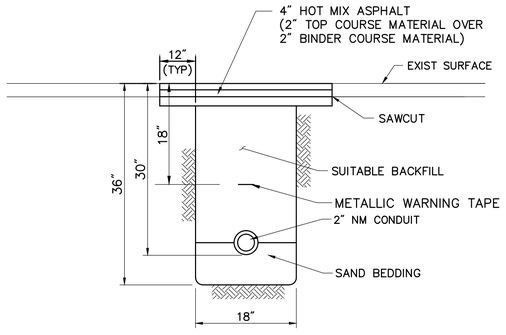
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH-05



* AS PER TOWN STANDARD

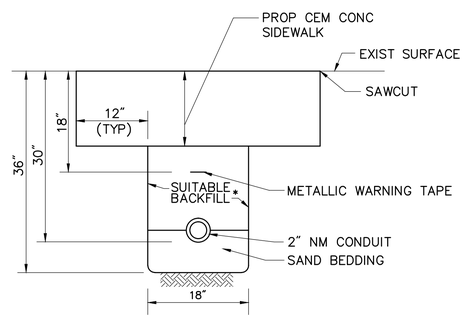
HYDRANT CONNECTION DETAIL

SCALE: NOT TO SCALE
S-STD.
H-STD. H80



CONDUIT CROSSING ROADWAY/DRIVEWAY

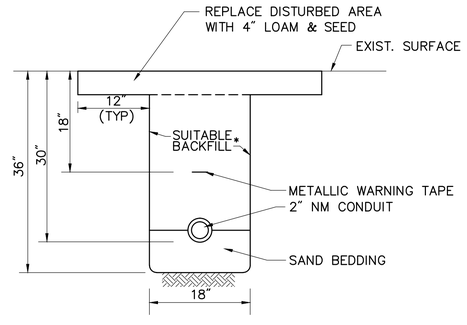
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH-01



*EXISTING MATERIAL OBTAINED FROM EXCAVATION THAT IS DETERMINED SUITABLE AND APPROVED BY THE ENGINEER.

CONDUIT CROSSING SIDEWALK

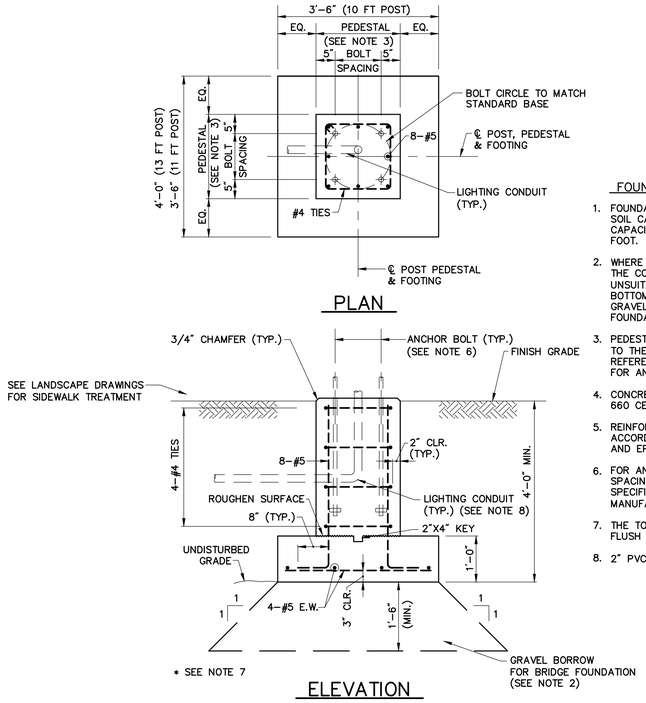
SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG: TRENCH-02



*EXISTING MATERIAL OBTAINED FROM EXCAVATION THAT IS DETERMINED SUITABLE AND APPROVED BY THE ENGINEER.

CONDUIT IN GRASS

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

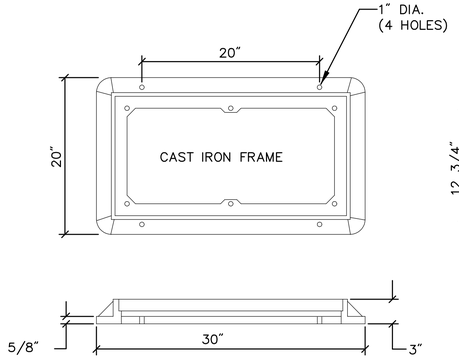


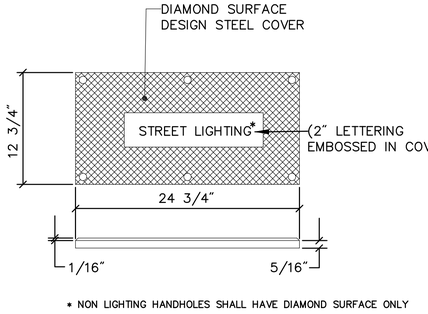
FOUNDATION NOTES:

1. FOUNDATION SHALL BEAR ON UNDISTURBED SOIL CAPABLE OF OBTAINING A BEARING CAPACITY OF 2000 POUNDS PER SQUARE FOOT.
2. WHERE UNSUITABLE SOIL IS ENCOUNTERED, THE CONTRACTOR SHALL EXCAVATE ALL UNSUITABLE MATERIAL TO 1'–6" BELOW BOTTOM OF FOOTING, AND REPLACE WITH GRAVEL BORROW FOR BRIDGE FOUNDATIONS.
3. PEDESTAL DIMENSIONS SHALL BE EQUAL TO THE ANCHOR BOLT SPACING PLUS 10". REFERENCE POLE MANUFACTURERS DATA FOR ANCHOR BOLT SPACING.
4. CONCRETE SHALL BE 5000 PSI, 1½ IN, 660 CEMENT CONCRETE MASONRY.
5. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ASTM A615 GRADE 60 AND EPOXY COATED.
6. FOR ANCHOR BOLT EMBEDMENT, SIZE, SPACING, PROJECTION & MATERIAL SPECIFICATION, SEE LIGHT POLE MANUFACTURER'S INFORMATION.
7. THE TOP OF FOUNDATION WILL BE SET FLUSH WITH THE GROUND SURFACE.
8. 2" PVC SCH–80 CONDUIT

LIGHT STANDARD FOUNDATION DETAILS

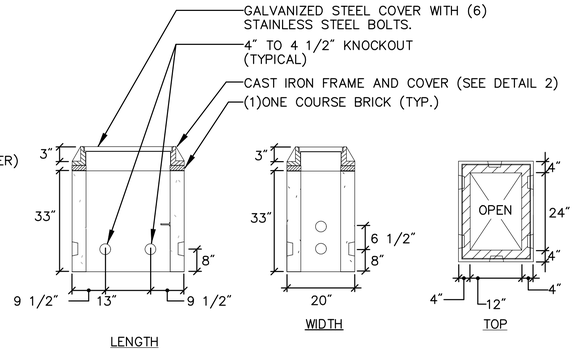
SCALE: NOT TO SCALE
S–STD.
H–STD.





* NON LIGHTING HANDHOLES SHALL HAVE DIAMOND SURFACE ONLY

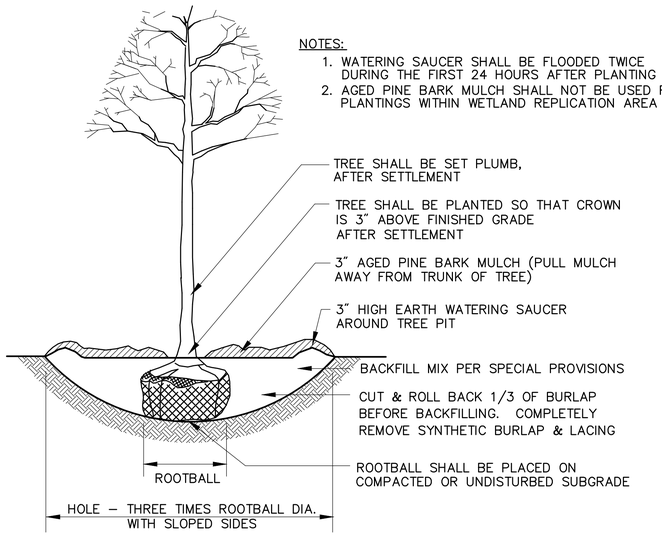
TYPICAL HANDHOLE COVER
NOT TO SCALE



TYPICAL PRE–CAST CONCRETE HANDHOLE
NOT TO SCALE

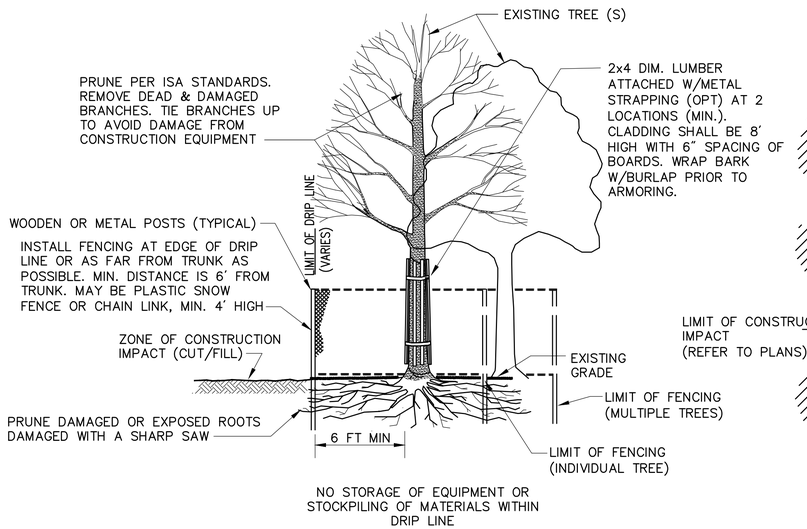
NOTES:

1. WATERING SAUCER SHALL BE FLOODED TWICE DURING THE FIRST 24 HOURS AFTER PLANTING
2. AGED PINE BARK MULCH SHALL NOT BE USED FOR PLANTINGS WITHIN WETLAND REPLICATION AREA

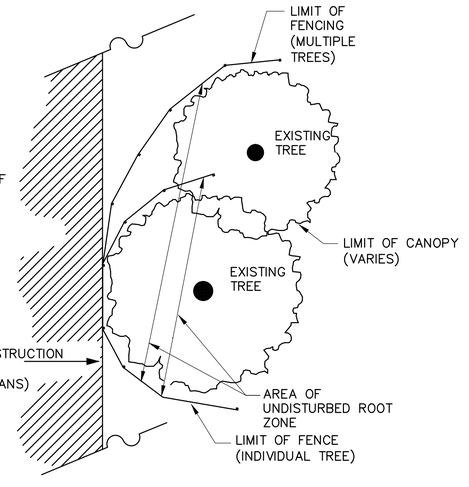


TREE PLANTING

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG:



NO STORAGE OF EQUIPMENT OR STOCKPILING OF MATERIALS WITHIN DRIP LINE



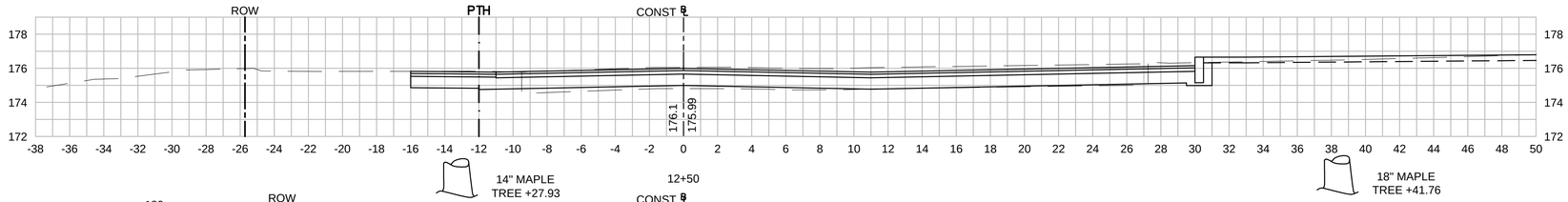
PLAN VIEW

TREE PROTECTION – EXISTING TREE(S)

SCALE: NOT TO SCALE
DATE:
DWG:

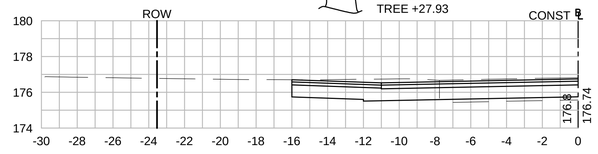
BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 46 OF 52
SCHOOL WAY

11287-XSEC.DWG Plotted on 21-May-2014 4:37 PM

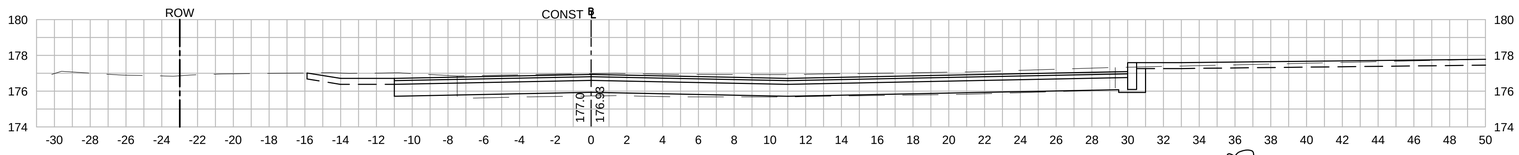


EXCAVATION: 33.23 SF
EMBANKMENT: 3.18 SF

12+50

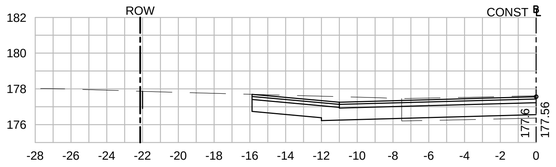


12+10

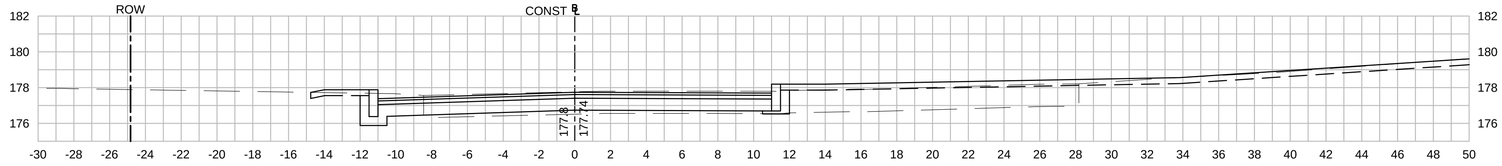


EXCAVATION: 35.23 SF
EMBANKMENT: 2.02 SF

12+00

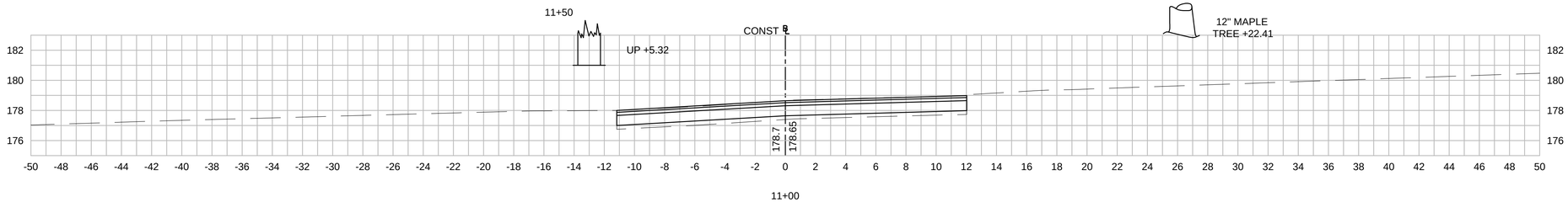


11+60



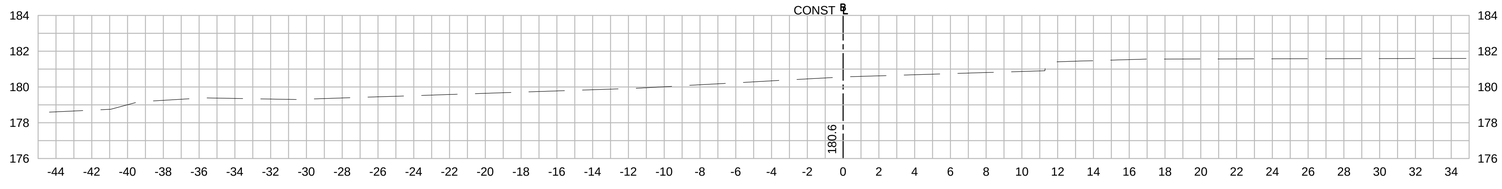
EXCAVATION: 20.01 SF
EMBANKMENT: 17.01 SF

11+50



EXCAVATION: 10.98 SF
EMBANKMENT: 5.84 SF

11+00

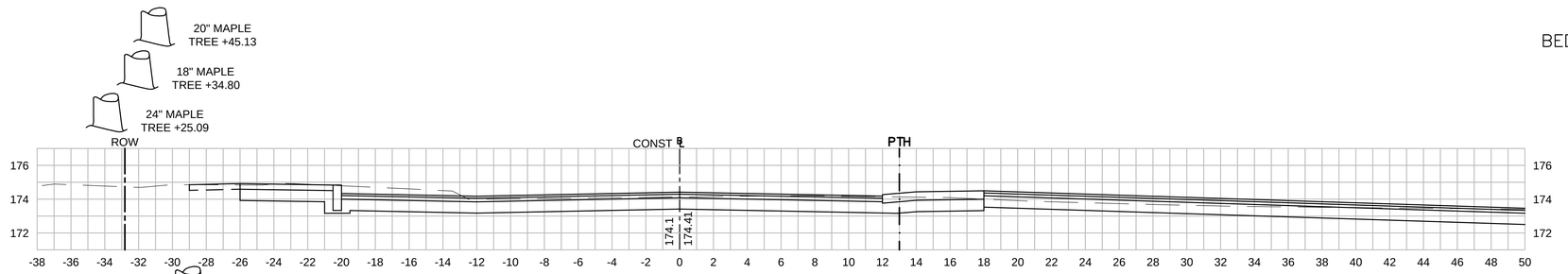


10+50

HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

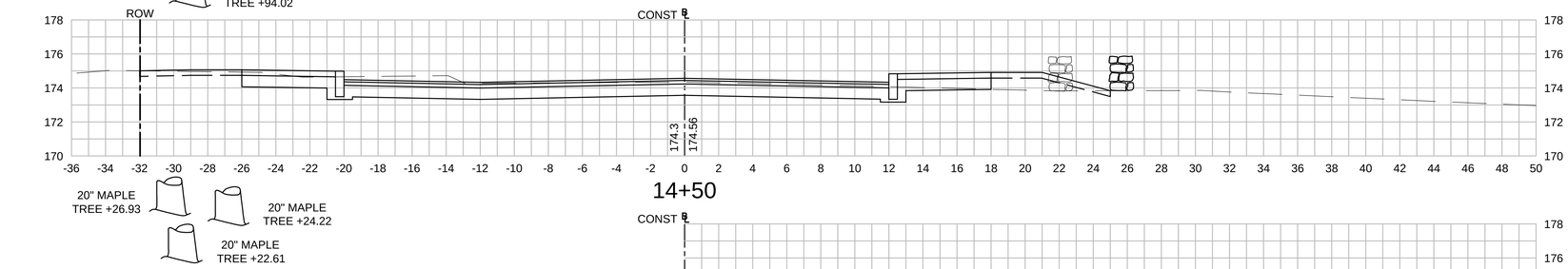
BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 47 OF 52
SCHOOL WAY

11287-XSEC.DWG Plotted on 21-May-2014 4:38 PM



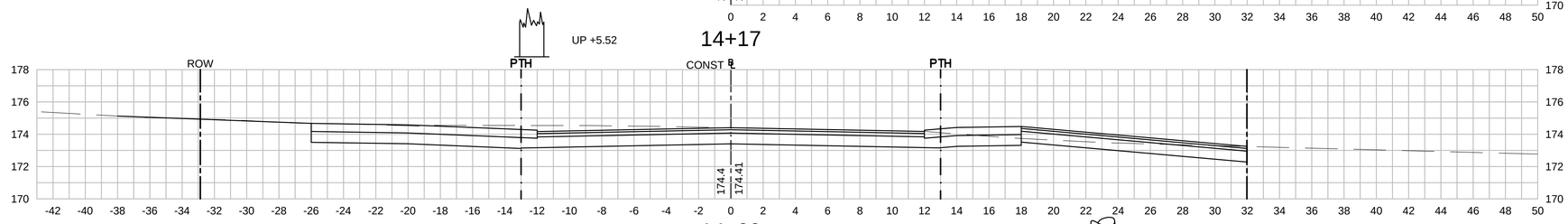
15+00

EXCAVATION: 50.01 SF
EMBANKMENT: 0.12 SF



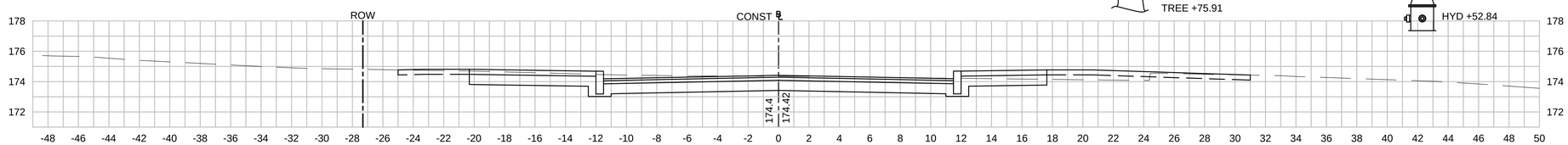
14+50

EXCAVATION: 52.64 SF
EMBANKMENT: 6.86 SF



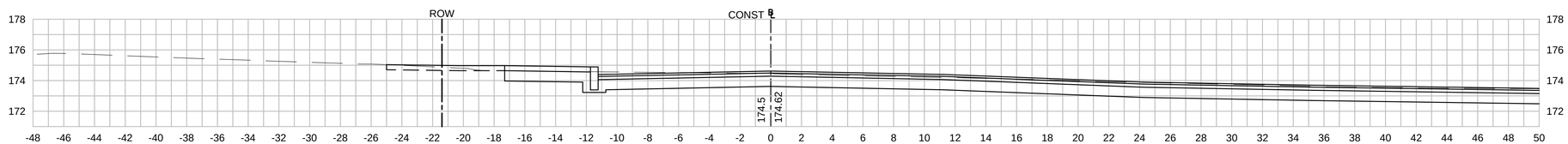
14+17

EXCAVATION: 37.44 SF
EMBANKMENT: 00.00 SF

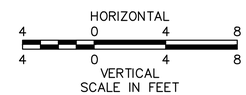


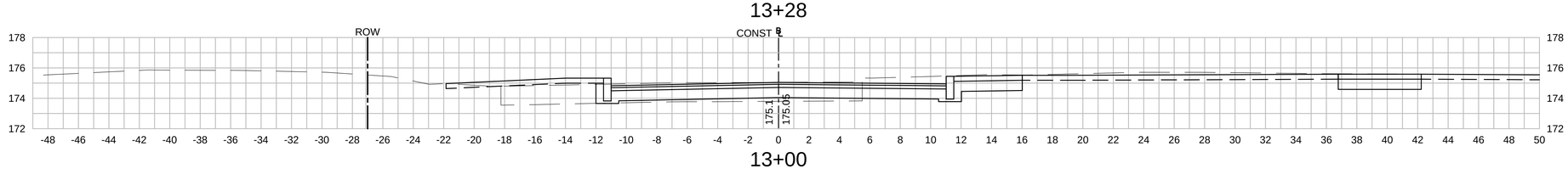
14+00

EXCAVATION: 49.85 SF
EMBANKMENT: 4.92 SF



13+50



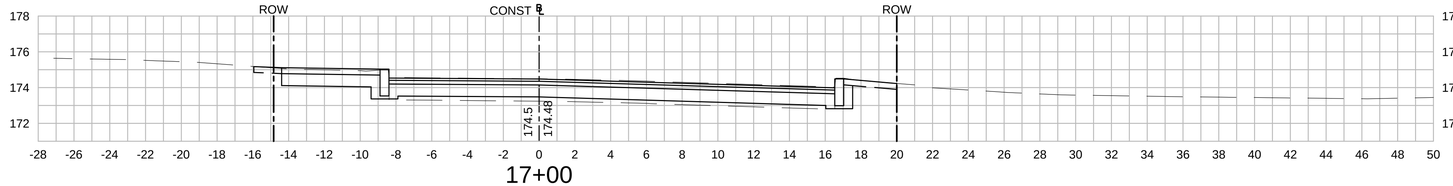


13+28

EXCAVATION: 41.67 SF
EMBANKMENT: 1.11 SF

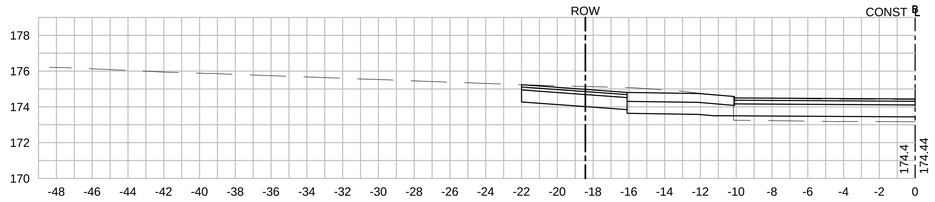
13+00

BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 48 OF 52
SCHOOL WAY

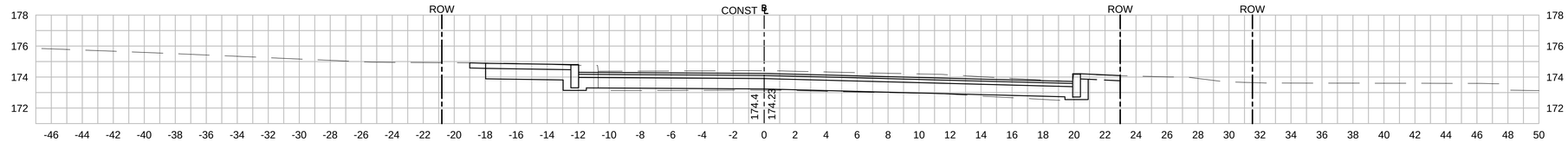


17+00

EXCAVATION: 19.35 SF
EMBANKMENT: 0.03 SF



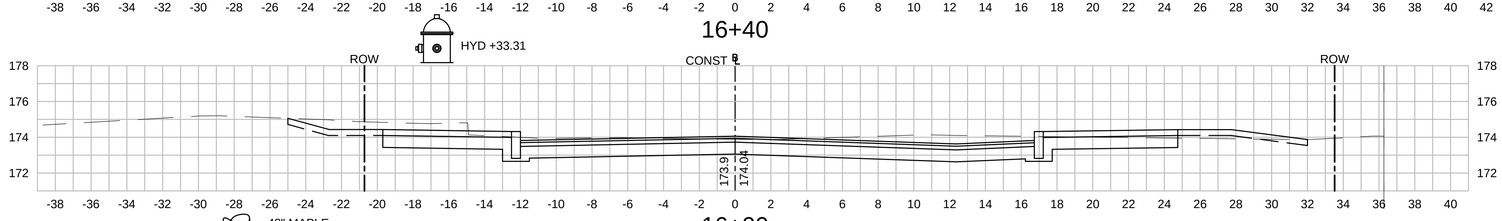
16+74



16+50

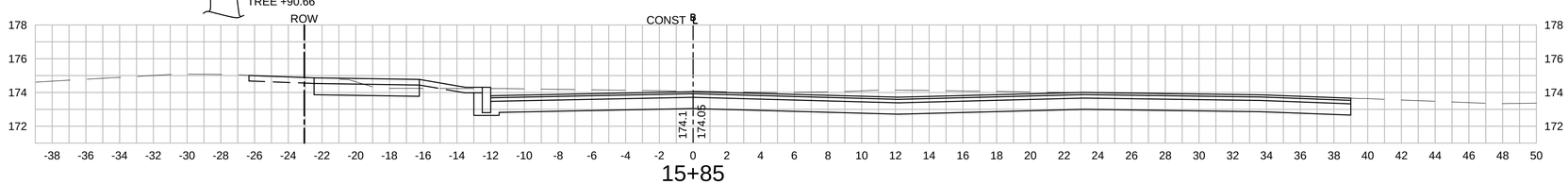
EXCAVATION: 27.24 SF
EMBANKMENT: 0.04 SF

16+40



EXCAVATION: 63.97 SF
EMBANKMENT: 2.55 SF

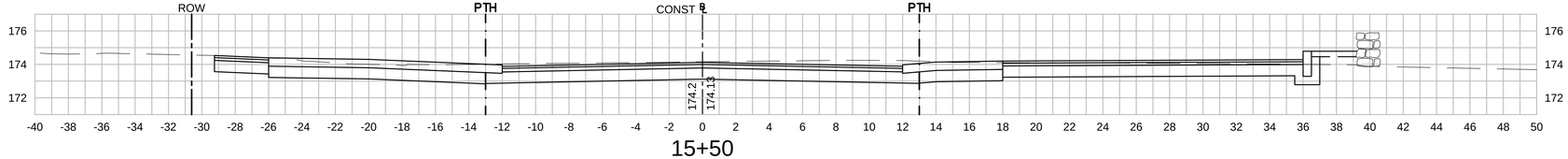
16+00



15+85

EXCAVATION: 83.44 SF
EMBANKMENT: 0.85 SF

HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET



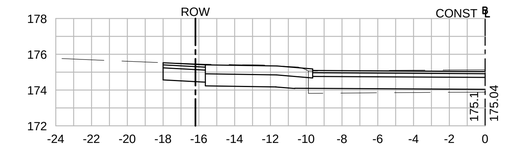
15+50

EXCAVATION: 38.69 SF
EMBANKMENT: 00.00 SF

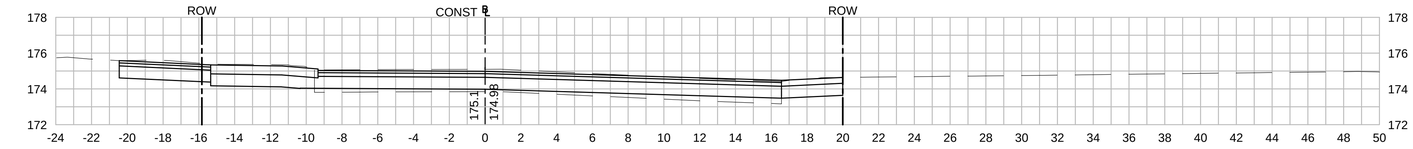
11287-XSEC.DWG Plotted on 21-May-2014 4:38 PM

BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 49 OF 52
SCHOOL WAY

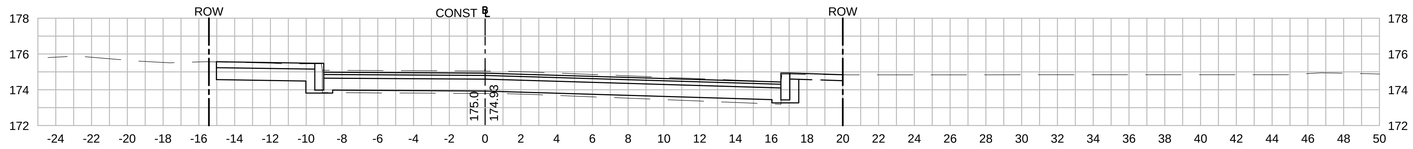
11287-XSEC.DWG Plotted on 21-May-2014 4:38 PM



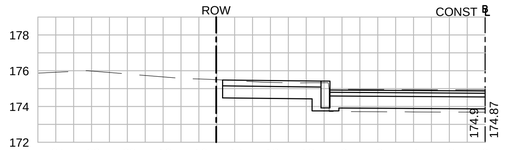
18+27



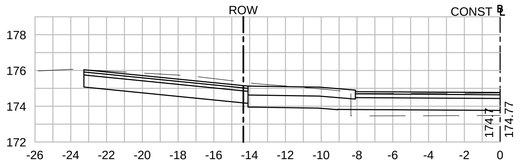
18+14



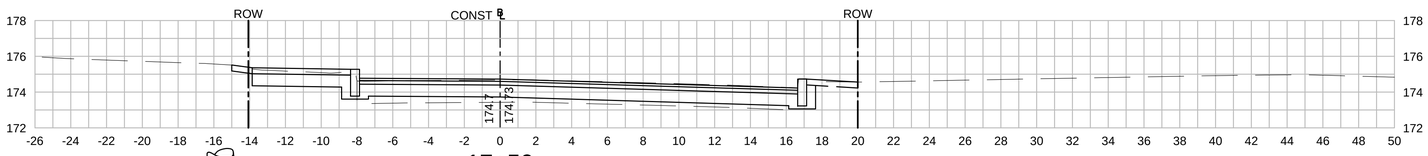
18+00

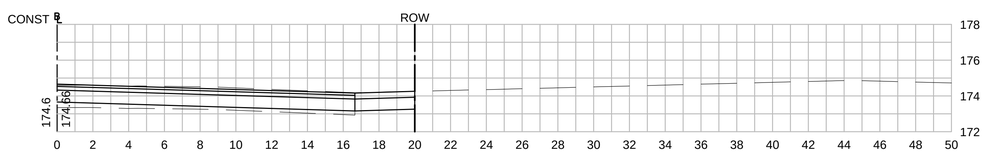


17+85

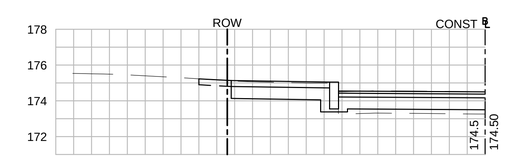


17+60





17+37



17+05

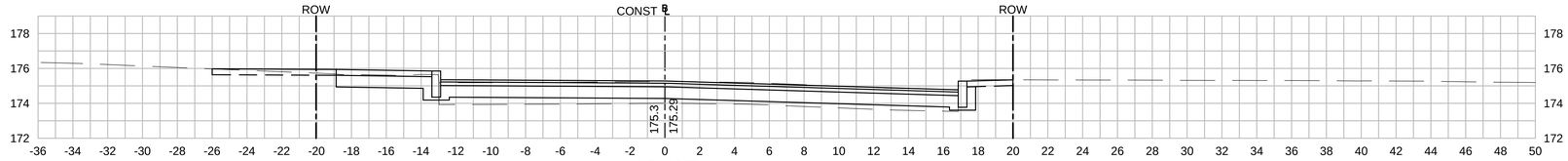
EXCAVATION: 20.53 SF
EMBANKMENT: 0.07 SF

EXCAVATION: 16.73 SF
EMBANKMENT: 0.11 SF

HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

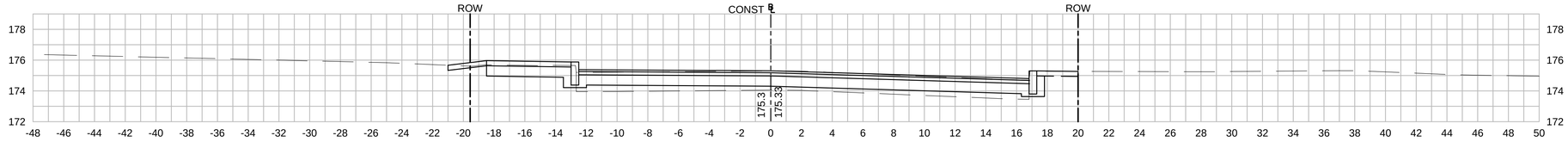
BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 50 OF 52
SCHOOL WAY

11287-XSEC.DWG Plotted on 21-May-2014 4:38 PM

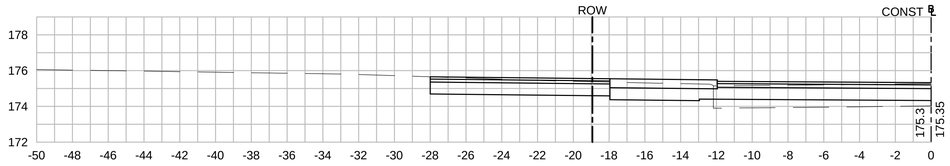


19+67

EXCAVATION: 15.75 SF
EMBANKMENT: 0.45 SF

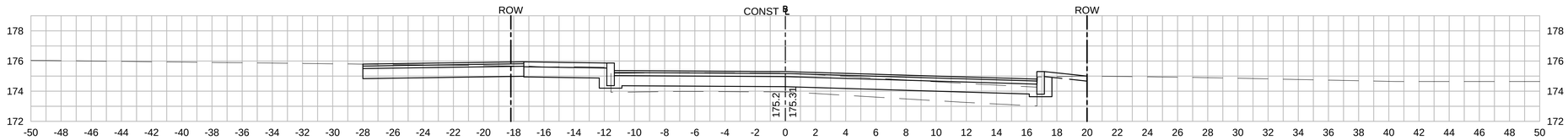


19+50

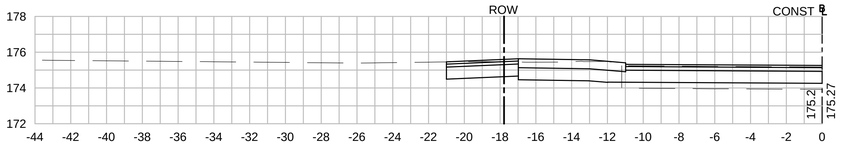


19+27

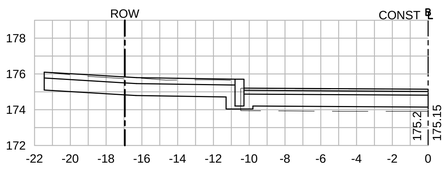
EXCAVATION: 10.85 SF
EMBANKMENT: 0.77 SF



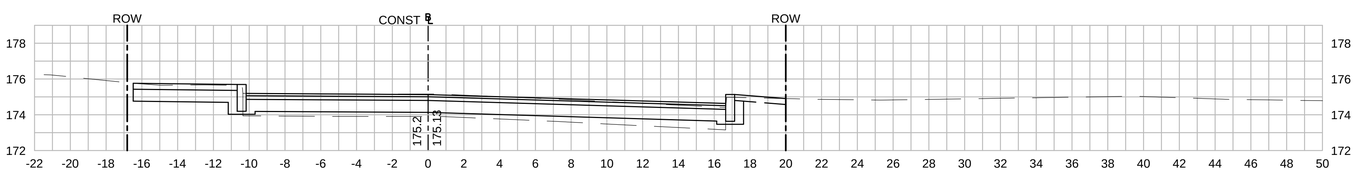
19+00



18+85



18+55



18+50

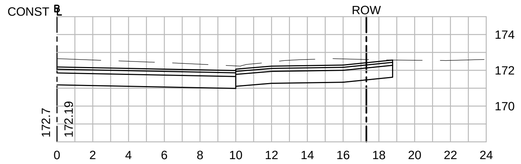
EXCAVATION: 17.22 SF
EMBANKMENT: 0.15 SF

UP +43.39

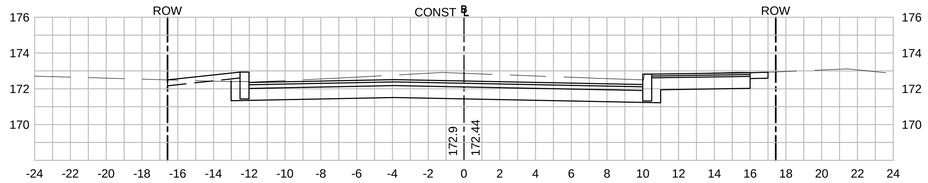
HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 51 OF 52
MAPLE STREET

11287-XSEC.DWG Plotted on 21-May-2014 4:38 PM



201+16



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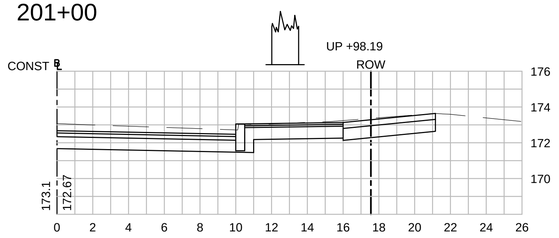

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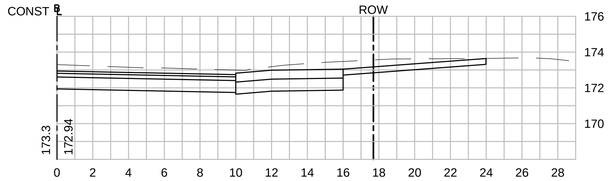
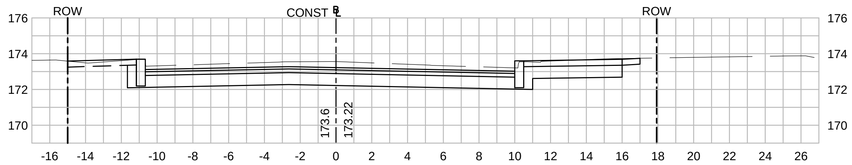


200+68



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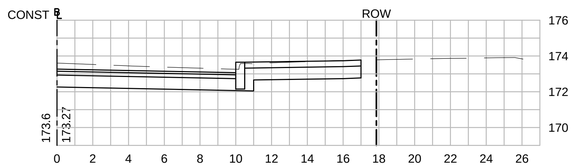
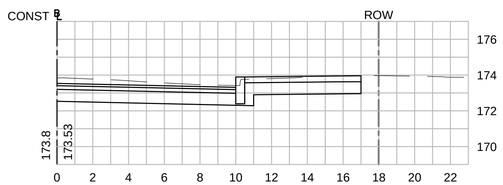


200+47



200+30

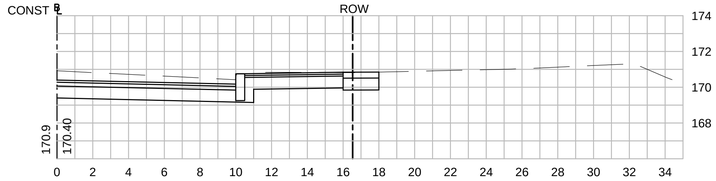
EXCAVATION: 36.59 SF
EMBANKMENT: 0.19 SF

EXCAVATION: 35.33 SF
EMBANKMENT: 0.00 SF

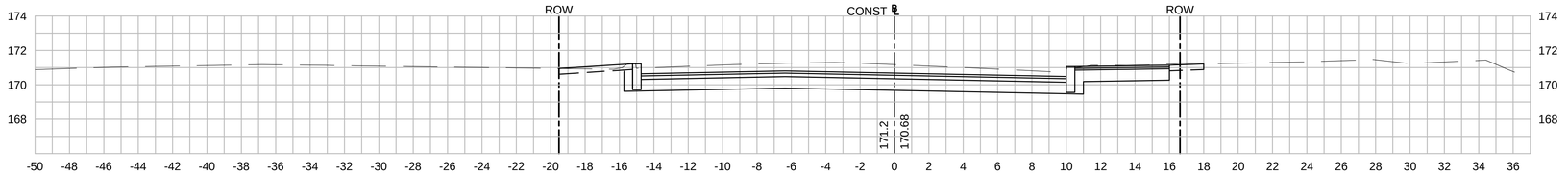
HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

BEDFORD
BEDFORD – VARIOUS LOCATIONS
CROSS SECTIONS
SHEET 52 OF 52
MAPLE STREET

11287-XSEC.DWG Plotted on 21-May-2014 4:38 PM

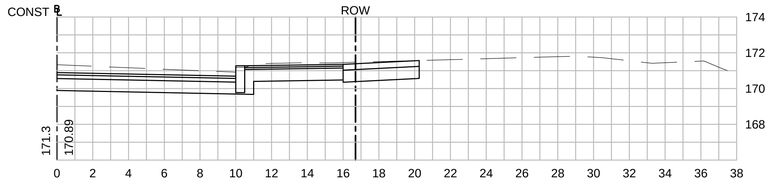


202+11

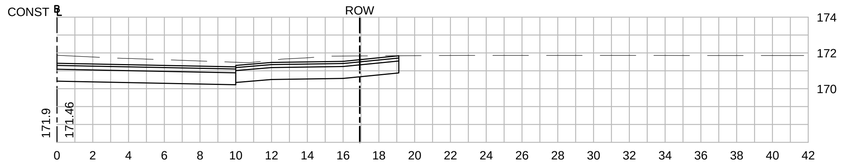


202+00

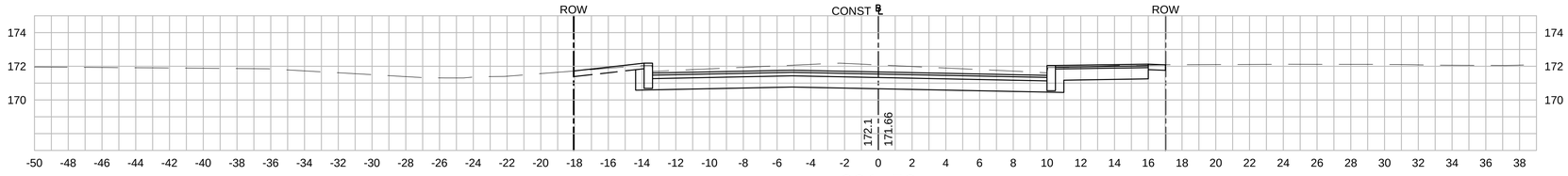
EXCAVATION: 44.70 SF
EMBANKMENT: 0.11 SF



201+91

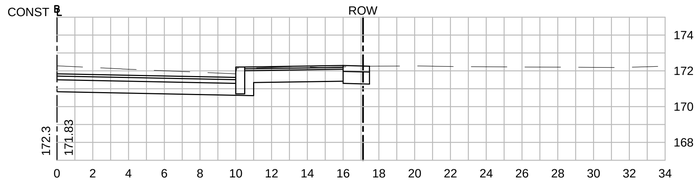


201+62



201+50

EXCAVATION: 38.39 SF
EMBANKMENT: 0.06 SF



201+39

HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET