massDOT
Massachusetts Department of Transportation
Highway Division

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		01	71
PROJECT FILE NO. 605637			

TITLE & INDEX SHEET

INTERSECTION & TRAFFIC SIGNAL IMPROVEMENTS

ROUTE 2 AT ROUTES 3 & 16

IN THE CITY AND TOWN OF

CAMBRIDGE AND ARLINGTON

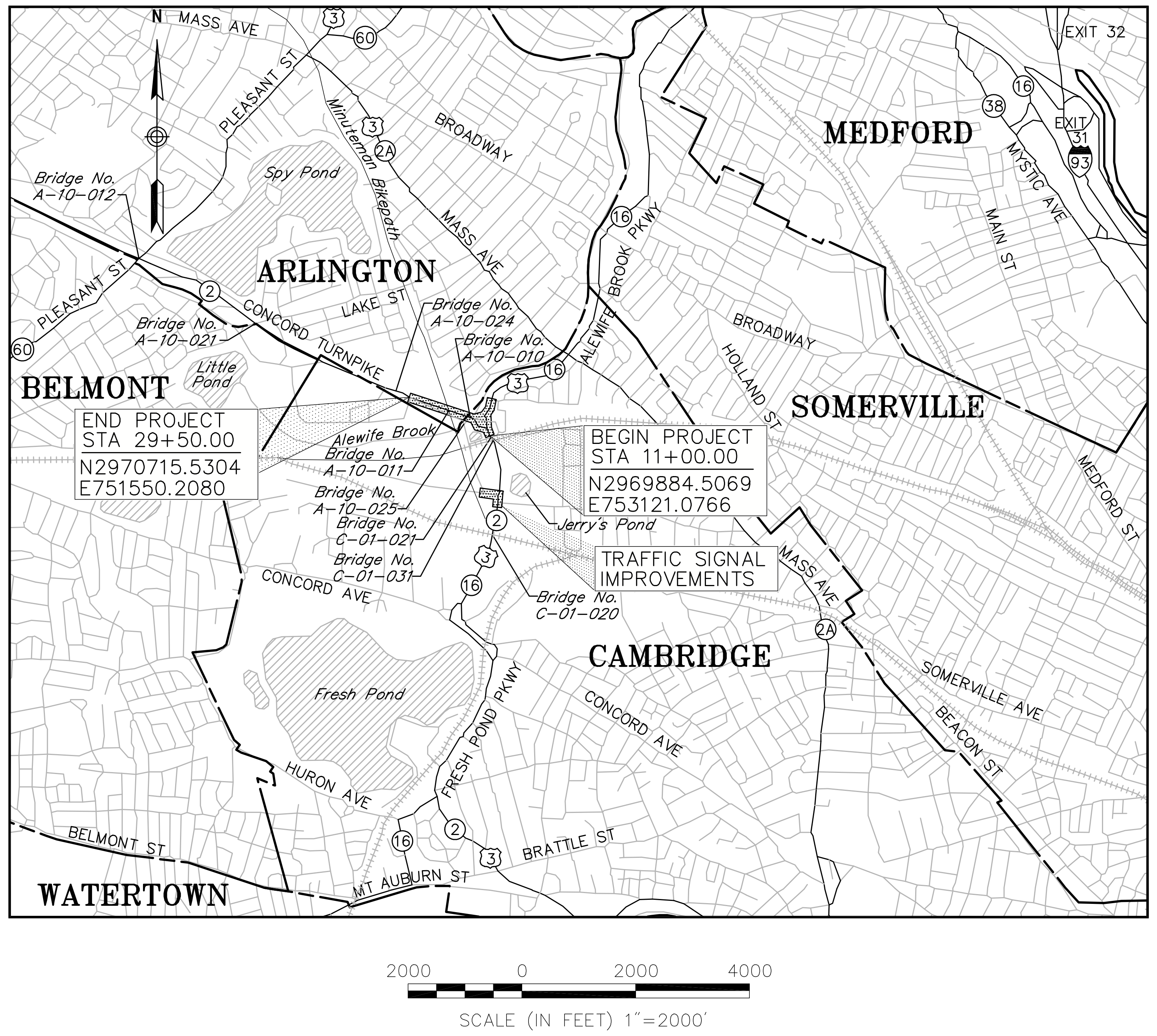
MIDDLESEX COUNTY

FEDERAL AID PROJECT NO:

INDEX

REFERENCE MANUALS

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988; THE SUPPLEMENTAL SPECIFICATIONS DATED JUNE 15, 2012; THE INTERIM SUPPLEMENTAL SPECIFICATIONS DATED JANUARY 25, 2013; 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 (MUTCD) FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS; THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, AS AMENDED; THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING AND THE LATEST EDITION OF AMERICAN STANDARD FOR NURSERY STOCK WILL GOVERN.



DESIGN DESIGNATION

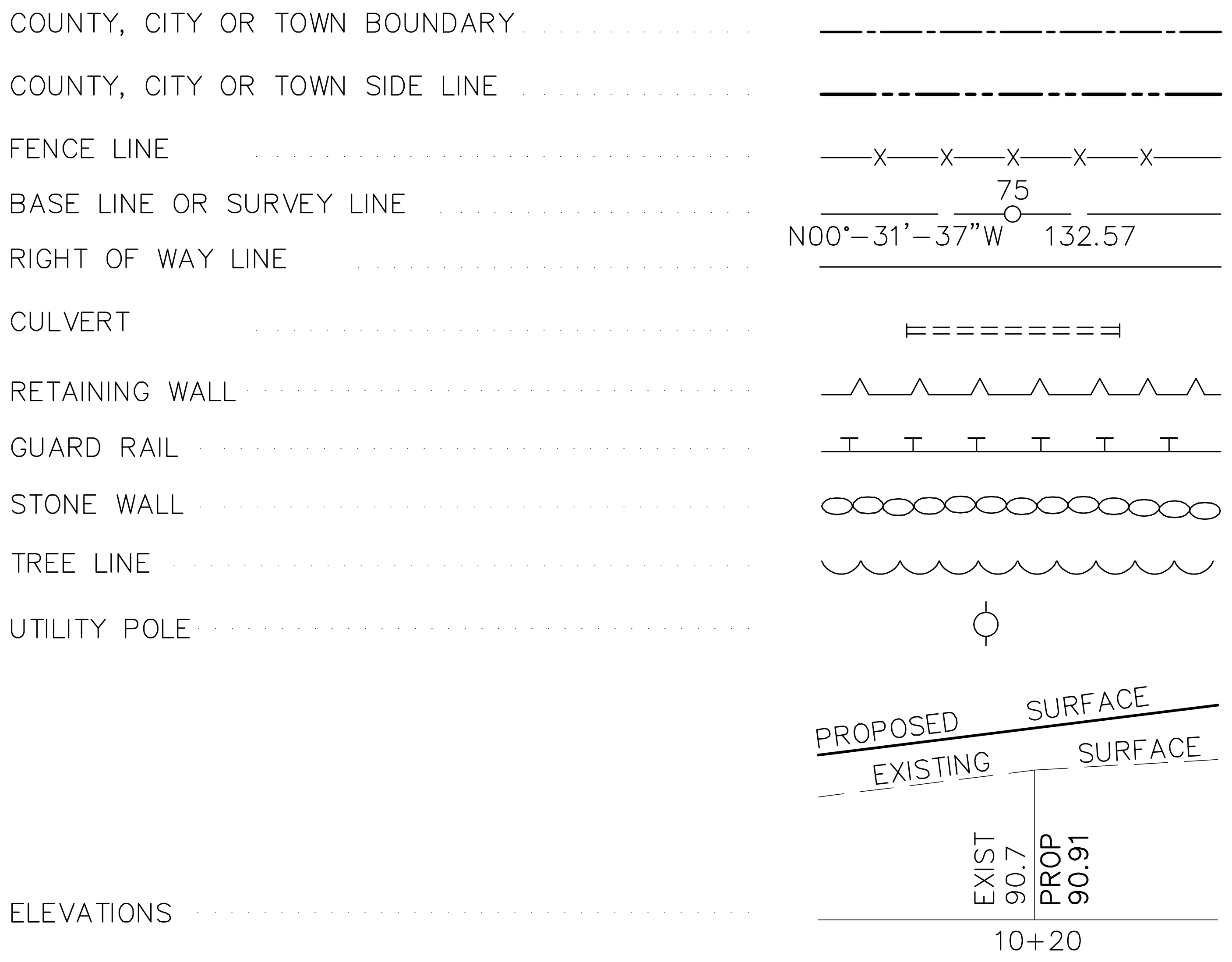
ALEWIFE BROOK PARKWAY (RTE 3 & 16)

SPEED LIMIT = 20–30 MPH
DESIGN SPEED = 25 MPH
ADT (2009) = 39,633 VPD
ADT (2019) = 41,660 VPD
K = 7%
D = 57% (NB)
T (PEAK HOUR) = 1.2%
T (AVERAGE DAY) = 1%
DHV = 2,986 VPD
DDHV = 1,706 VPD (NB)
FUNCTIONAL CLASSIFICATION = PRINCIPAL ARTERIAL

CONCORD TURNPIKE (RTE 2)

SPEED LIMIT = 25 MPH (IN INTERSECTION – NOT POSTED)
= 45 MPH (WESTBOUND)
DESIGN SPEED = 25 MPH (AT INTERSECTION)
= 50 MPH (WEST OF INTERSECTION)
ADT (2009) = 58,277 VPD
ADT (2019) = 61,257 VPD
K = 7%
D = 67% (WB)
T (PEAK HOUR) = 1.1%
T (AVERAGE DAY) = 1%
DHV = 4,527 VPD
DDHV = 3,042 VPD (WB)
FUNCTIONAL CLASSIFICATION = PRINCIPAL ARTERIAL

CONVENTIONAL SIGNS



LENGTH OF PROJECT: 1,850.00 FEET = 0.350 MILES

PS&E SUBMISSION
MARCH 2014

Date

VANASSE HANGEN BRUSTLIN, INC.

massDOT
Massachusetts Department of Transportation
Highway Division

RECOMMENDED FOR APPROVAL

CHIEF ENGINEER Date

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINSTRATION
APPROVED

DIVISION ADMINISTRATOR Date

APPROVED

HIGHWAY ADMINISTRATOR Date

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		02	71
PROJECT FILE NO. 605637			

LEGEND & GENERAL NOTES

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
□ □ □ ▽ ▽ ▽ T T T	T T T	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
PL	PL	PROPERTY LINE
NAME		CITY, TOWN, OR COUNTY BOUNDARY
NAME		STATE BOUNDARY
△ N00°00'00"E		BASE OR SURVEY LINE
	+57.59 10 P.C. N00°00'00"E	CONSTRUCTION BASELINE
	⊕	TREE (SIZE AND TYPE NOTED)
	▨	APPROXIMATE FULL DEPTH AREA
	⊕ B–1	BORINGS, PAVEMENT CORES
	⧓ TP–1	TEST PIT
	—x—x—	EROSION CONTROL BARRIER

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”
□ HH	■ HH	HANDHOLE
⊕	◕	PEDESTRIAN PUSH BUTTON
		PRE–EMPTION DETECTOR
Ⓢ	●	PRE–EMPTION STROBE
▷□	▷▨	VIDEO DETECTION CAMERA
∅	∅	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	
⇒ ONLY	ONLY	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 (10' LINE W/30' GAP) – 4” UNLESS NOTED 6”
SWLL	SWLL	SOLID WHITE LANE LINE – 4”
DWLL	DWLL	DOTTED WHITE LANE LINE (3' LINE W/9' GAP) – 4”
DYCL	DYCL	DOUBLE YELLOW CENTER LINE – 4”
SYEL	SYEL	SOLID YELLOW EDGE LINE – 4” UNLESS NOTED 6”
SWEL	SWEL	SOLID WHITE EDGE LINE – 4” UNLESS NOTED 6”
DWLEx	DWLEx	DOTTED WHITE LINE EXTENSION (2' LINE W/6' GAP) – 4”
DYLEx	DYLEx	DOTTED YELLOW LINE EXTENSION (2' LINE W/6' GAP) – 4”
	← LANE	BICYCLE LANE
		BICYCLE DETECTION LEGEND
Sign	● ● ● ● ● ●	SIGN AND POST
ϕ —	● —	DELINEATOR

ABBREVIATIONS

GENERAL

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

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
DH SET	DRILL HOLE SET
HP	HIGH POINT
HT SET	HUB & TACK SET
IP SET	IRON PIPE SET
LP	LOW POINT
PC	POINT OF CURVE
PI	POINT OF INTERSECTION
PK SET	'PK' NAIL SET
PNT	POINT
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENT
RR SET	RAILROAD SPIKE SET
25.45	SPOT ELEVATION

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

GENERAL NOTES

1. TOPOGRAPHICAL INFORMATION FROM A SURVEY BY VANASSE HANGEN BRUSTLIN, INC., WATERTOWN, MASSACHUSETTS (NOVEMBER 2009). HORIZONTAL: NORTH AMERICAN DATUM OF 1983 (NAD83) VERTICAL: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) 100 YEAR FLOODPLAIN FROM FEMA FIRM MAP 25017C0419E (EFFECTIVE DATE 6/4/10)
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.
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 ASPHALT CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
10. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
11. ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF .01 FEET PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
12. EXISTING GRANITE CURB & EDGING SUITABLE FOR RE–USE 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. THE INVERTS SHOWN ARE PROPOSED AND SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD. THEIR EXACT LOCATION ARE NOT GUARANTEED.
15. CAUTION SHOULD BE EXERCISED WHEN COMPACTING WITH A HEAVY VIBRATORY ROLLER IN AREAS WHERE SHALLOW DEPTHS OF COVER (LESS THAN 2 FEET) EXIST ABOVE THE TOP OF PROPOSED PIPE. THESE AREAS SHOULD BE CLEARLY MARKED WITH STAKING. STAKING SHALL BE PLACED A MINIMUM OF SIX FEET AROUND THE AREA WHERE THE CONDITION EXISTS. THESE AREAS SHALL BE COMPACTED UTILIZING A LIGHTWEIGHT VIBRATORY PLATE COMPACTOR UNTIL THE REQUIRED COMPACTION IS REACHED.
16. BURIED ELECTRICAL CONDUITS SERVING ROADWAY LIGHTING EXIST IN AREAS ADJACENT TO THE ROADWAY AND GUARD RAILS THROUGHOUT THE CONSTRUCTION AREA. THE CONTRACTOR SHOULD PAY CLOSE ATTENTION TO EXISTING ELECTRICAL UTILITIES WHEN EXCAVATING OR INSTALLING VERTICAL SIGN AND GUARD RAIL SUPPORTS. ANY DISRUPTION TO EXISTING ROADWAY LIGHTING DUE TO CONSTRUCTION ACTIVITY WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR IN ACCORDANCE WITH MASSDOT STANDARDS AS APPROVED BY THE DISTRICT 6 ELECTRICAL MAINTENANCE ENGINEER.
17. TREE LOCATIONS ARE FOR SCHEMATIC PURPOSES ONLY. PLANTING AND LOCATIONS SHALL BE PER THE SPECIFICATIONS AND AS DIRECTED BY ENGINEER IN COORDINATION WITH THE MASSDOT LANDSCAPE ARCHITECT.
18. SEED MIX FOR THE TRAFFIC TRIANGLES SHALL BE AS DETERMINED AND DIRECTED BY THE ENGINEER IN COORDINATION WITH THE MASSDOT LANDSCAPE ARCHITECT AND SHALL BE PER THE RELEVANT SPECIFICATIONS.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		03	71

PROJECT FILE NO. 605637

KEY & BORING LOCATION PLAN

LEGEND

- (X) CONSTRUCTION PLANS
- [X] ALIGNMENT PLANS
- ⟨X⟩ TRAFFIC PLANS
- ⊕ SOIL BORING LOCATION
- ⋈ TEST PIT LOCATION
- (X) GRADING PLANS
- ⬠X UTILITY PLANS

	NORTHING	EASTING	ELEV	NOTES
B1	2970049.31	753032.31	21.50	
B2	2970189.11	753038.35	17.66	
B3	2970233.19	753046.45	17.07	
B4	2970168.02	752912.76	18.64	
B5	2970236.10	752863.97	19.25	
B6	2970195.91	752799.23	20.09	
B7	2970260.50	752847.74	19.06	IN-SITU BOREHOLE PERMEABILIBY TEST

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		04	71

PROJECT FILE NO. 605637

KEY & BORING LOCATION PLAN

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-1
Boring Location:
Checked by: G. Mischel
Date Start: October 16, 2012
Date Finish: October 16, 2012
Contractor: New Hampshire Boring, Inc.
Driller: D. Thompson
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 21.5
Datum:

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Spin and Push	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
10/16/12	10:45	Not Encountered	20	22	10 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
S-1	20	0-2	4 9 11 13		TOPSOIL 21.0 / 0.5	S-1A (6"): Medium dense, brown, fine to medium SAND, some Silt, trace roots. moist. (TOPSOIL). S-1B (14"): Medium dense, brown, fine SAND, trace Silt. moist. (FILL).	
S-2	12	5-7	3 3 4 4			S-2A (4"): Loose, brown, fine to coarse SAND, trace Silt. moist. (FILL). S-2B (6"): Medium stiff, olive w/mottled brown, Silty CLAY. moist. (TV=1.5 tsf, PP=0.45 kg/cm^2). S-2C (2"): Loose, black, fine SAND, some Silt. moist.	
S-3	10	10-12	5 6 11 10		FILL	S-3: Medium dense, brown, fine to medium SAND and Silt. few pockets of Silty Clay. moist.	
						Drilled through Cobble from 14'-15'.	
S-4	6	15-17	36 17 10 14			S-4: Medium dense, brown, fine to coarse SAND, some Silt. few pockets of Silty Clay. moist. (Broke through Cobble in top 6").	
					2.5 / 19.0	Easier drilling at 19'.	
S-5	22	20-22	5 8 9 11		ORGANIC SILT	S-5: Medium dense, dark brown, Organic SILT, little fine Sand. moist.	
					CLAY -0.5 / 22.0 ORGANIC SILT	4" layer of Silty CLAY with little fine Sand at 21'-4". Boring terminated at 22 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

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BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-2
Boring Location:
Checked by: G. Mischel
Date Start: October 16, 2012
Date Finish: October 16, 2012
Contractor: New Hampshire Boring, Inc.
Driller: D. Thompson
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 17.66
Datum:

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Spin and Push	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
10/16/12	13:30	Not Encountered	15	17	15 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
S-1	18	0-2	6 30 36 50/3"		TOPSOIL 16.8 / 0.9	S-1A (10"): Very dense, brown, fine to coarse SAND, some Silt, few roots. moist. (TOPSOIL). S-1B (8"): Very dense, brown, fine to coarse SAND, little Gravel, trace Silt. moist. (FILL). (Drove spoon through Cobble).	
S-2	6	5-5.7	11 50/2"			Difficult drilling to 5'. S-2: Very dense, brown, fine to coarse SAND, some Gravel, little Silt. moist.	
S-3	0	10-10.4	50/5"		FILL	Difficult drilling to 10'. S-3: No Recovery. Augered through Cobble to 11'.	
S-4	15	11-13	10 13 25 30			S-4: Dense, olive, fine to coarse SAND, and Clay & Silt, little Gravel. moist.	
S-5	16	15-17	50 26 13 13		2.0 / 15.7 SAND 0.7 / 17.0	Auger cuttings show material similar to S-4 down to 15'. S-5A (8"): Dense, gray, fine to coarse SAND, some Silt & Clay, some Gravel. moist. S-5B (8"): Dense, brown, fine to medium SAND and Silt. trace roots. moist.	
						Boring terminated at 17 feet on equipment failure.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

Page No. 1 of 1

BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-3
Boring Location:
Checked by: G. Mischel
Date Start: October 16, 2012
Date Finish: October 16, 2012
Contractor: New Hampshire Boring, Inc.
Driller: D. Thompson
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 17.07
Datum:

	Drilling Method	Sampler
Type	Casing	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Drive and Wash	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▽ 10/16/12	15:00	8	15	21	15 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
S-1	18	0-2	5 11 27 57		TOPSOIL 16.4 / 0.7	S-1A (8"): Dense, brown, fine to medium SAND, some Silt, trace roots. moist. (TOPSOIL). S-1B (10"): Dense, brown, fine to coarse SAND, some Gravel, trace Silt. moist.	
S-2	18	4-6	45 72 61 47			S-2A (14"): Very dense, brown, fine to coarse SAND, some Gravel, little Silt. wet. S-2B (4"): Very dense, brown, fine to coarse SAND, some Silt, trace Gravel. wet.	
				▽			
S-3	12	9-11	6 6 14 26		FILL	S-3: Very stiff, brown, CLAY & SILT and fine to coarse Sand, trace Gravel, trace organic Silt. wet.	
S-4	6	14-16	20 37 63 39			S-4: Very dense, brown/orange, fine to coarse SAND, and Clay & Silt, some Gravel. wet.	
S-5	12	19-21	33 34 43 50		-1.9 / 19.0 SAND -3.9 / 21.0	S-5: Very dense, gray, fine to medium SAND, little Silt, few roots. wet.	
						Boring terminated at 21 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

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BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-4
Boring Location:
Checked by: G. Mischel
Date Start: October 17, 2012
Date Finish: October 17, 2012
Contractor: New Hampshire Boring, Inc.
Driller: P. Lebossier
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 18.64
Datum:

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Spin and Push	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▽ 10/17/12	12:00	20.7	20	22	20 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
S-1	18	0-2	8 12 12 13		TOPSOIL 18.0 / 0.7	S-1A (8"): Medium dense, brown, fine to medium SAND, little Silt, trace grass. moist. (TOPSOIL). S-1B (10"): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt, few brick fragments. moist. (FILL).	
						Noted gray cuttings at 3.5'.	
S-2	8	5-7	7 7 8 8		FILL	S-2: Stiff, gray/mottled brown, Silty CLAY, trace fine Sand. moist. (Wood chunk at approx. 2" in sample).	
S-3	15	10-12	28 39 34 25		4.6 / 14.0	S-3: Very dense, brown, fine to coarse SAND, little Gravel, trace Silt. moist.	
						Gray cuttings encountered at 14'.	
S-4	15	15-17	5 4 6 7		CLAY/SILT -1.4 / 20.0	S-4: Stiff, gray, Silty CLAY, little Organic Silt, trace fine Sand, trace roots. moist.	
S-5	18	20-22	6 15 17 21	▽	SAND -3.4 / 22.0	S-5A (4"): Dense, brown/gray, fine SAND, and Silt & Clay. moist. S-5B (14"): Dense, gray, fine to medium SAND, some Silt. wet.	
						Boring terminated at 22 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

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BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-5
Boring Location:
Checked by: G. Mischel
Date Start: October 17, 2012
Date Finish: October 17, 2012
Contractor: New Hampshire Boring, Inc.
Driller: P. Lebossier
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 19.25
Datum:

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Spin and Push	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▽ 10/17/12	14:15	21.2	20	22	15 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
S-1	16	0-2	4 12 24 20		TOPSOIL 18.6 / 0.7	S-1A (8"): Dense, brown, fine to medium SAND, some Silt, trace Roots, and grass. moist. (TOPSOIL). S-1B (8"): Dense, brown, fine to coarse SAND, trace Silt, trace Gravel. moist.	
S-2	14	5-7	57 47 31 25			S-2: Very dense, brown, fine to coarse SAND, little Gravel, trace Silt. moist.	
S-3	16	10-12	15 16 21 19		FILL	S-3: Dense, brown, fine to coarse SAND, little Gravel, trace Silt. moist. (2" layer of organic Silt at 11").	
S-4	12	15-16.2	13 17 50/2"			S-4A (5"): Hard, brown/gray, CLAY & SILT, 1/4"-1/8" layers of Sand and organic Silt, trace Gravel. moist. S-4B (7"): Very dense, gray, fine to medium SAND, little Silt & Clay, trace Gravel. moist.	
					-0.8 / 20.0	Difficult drilling from 15-20'.	
S-5	18	20-22	4 11 18 30	▽	CLAY -1.6 / 20.8 SAND -2.8 / 22.0	S-5A (10"): Very stiff, brown/gray, Silty CLAY, and Organic Silt, little Sand, trace roots. wet. Strong odor. S-5B (8"): Medium dense, gray, fine to coarse SAND, trace Silt. wet.	
						Boring terminated at 22 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

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BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-7
Boring Location:
Checked by: G. Mischel
Date Start: October 17, 2012
Date Finish: October 17, 2012
Contractor: New Hampshire Boring, Inc.
Driller: P. Lebossier
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 19
Datum:

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Spin and Push	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
10/17/12	13:30	Not Encountered	18	20	10 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
S-1	20	0-2	4 14 35 47		TOPSOIL 18.1 / 0.9	S-1A (10"): Dense, brown, fine SAND, some Silt, trace roots. moist. (TOPSOIL). (USDA: Sandy LOAM). S-1B (10"): Dense, brown, SAND and Gravel, trace Silt. moist. (USDA: Very Gravelly SAND).	
S-2	15	2-4	42 30 61 46			S-2: Very dense, brown, fine to coarse SAND, some Gravel, trace Silt, few pockets of Clay & Silt, trace brick fragments. moist. (USDA: Gravelly, Loamy SAND).	
S-3	16	4-6	65 100 32 31			S-3A (13"): Very dense, brown, fine to coarse SAND, some Gravel, trace Silt. moist. (USDA: Gravelly SAND). S-3B (3"): Hard, gray/brown mottled, CLAY & SILT. moist. (USDA: CLAY).	
S-4	8	6-8	42 46 38 41		FILL	S-4: Very dense, brown, fine to coarse SAND, some Gravel, pockets of Clay & Silt. moist. (USDA: Gravelly SAND).	
S-5	15	8-10	16 8 10 20			S-5A (3"): Medium dense, brown/orange, fine to coarse SAND, some Silt. moist. (USDA: Sandy LOAM). S-5B (12"): Very stiff, gray, Silty CLAY. moist. (USDA: CLAY).	
S-6	10	10-12	13 10 9 9			S-6: Medium dense, brown/orange, fine to coarse SAND, some Silt, trace Gravel. moist. (USDA: Sandy LOAM).	
S-7	4	12-14	11 15 17 16		5.0 / 14.0	S-7: Hard, brown/gray, CLAY & SILT, little Sand, trace Gravel. moist. (USDA: CLAY).	
S-8	10	14-16	4 6 10 11			S-8: Very stiff, gray/brown, Silty CLAY, and Organic Silt, trace roots. moist. (USDA: CLAY).	
S-9	12	16-18	9 9 10 15		SILTY CLAY w/ORGANICS	S-9: Very stiff, gray/brown, Silty CLAY, and Organic Silt, trace roots. moist. (USDA: CLAY).	
S-10	7	18-20	6 8 9 12		-1.0 / 20.0	S-10: Very stiff, brown, Organic SILT, trace fine Sand, trace roots. moist. (USDA: SILT).	
						Boring terminated at 20 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

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BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

BORING LOG

Engineering a Sustainable Future

Project: MassDOT Route 2/16
Location: Cambridge, MA
Nobis Project No.: 84810.02
Boring No.: B-6
Boring Location:
Checked by: G. Mischel
Date Start: October 18, 2012
Date Finish: October 18, 2012
Contractor: New Hampshire Boring, Inc.
Driller: P. Lebossier
Nobis Rep.: J. Kalafatis
Rig Type / Model: Truck / B-57 Mobile
Hammer Type: Safety Hammer
Hammer Hoist: Rope & Cathead
Ground Surface Elev.: (+/-) 20
Datum:

	Drilling Method	Sampler
Type	Hollow Stem Auger	Split-Spoon
Size ID (in.)	4"	1-3/8
Advancement	Spin and Push	140-lb Hammer

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
10/18/12	11:30	Not Encountered	20	22	10 min

Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Stratum Elev. / Depth (ft.)	SAMPLE DESCRIPTION AND REMARKS (Classification System: Modified Burmister)	NOTES
						Hand dug to 3' to confirm no utilities. Brown, fine to coarse SAND, little Cobbles, trace Bricks, trace Silt. moist. (FILL).	
						Stop post-hole digging at 3', CLAY & SILT present.	
S-1	16	5-7	4 16 27 11			S-1A (8"): Hard, gray, CLAY & SILT. moist. S-1B (8"): Dense, brown, fine to coarse SAND, little Gravel, trace Silt. moist.	
S-2	18	10-12	30 31 20 16		FILL	S-2A (8"): Very dense, brown, fine to coarse SAND, some Gravel, trace Silt. moist. S-2B (4"): Hard, gray, CLAY & SILT, trace fine Sand. moist. S-2C (6"): Very dense, brown, fine to medium SAND, little Silt, trace organics. moist.	
						Difficult augering from 10-13'. Clay in cuttings at 13'.	
S-3	8	15-17	10 7 6 14		0.0 / 20.0	S-3: Medium dense, gray, fine to medium SAND, little Gravel, few pockets of Clay & Silt. moist.	
S-4	20	20-22	4 7 14 23		ORGANIC SILT -1.2 / 21.2 SAND -2.0 / 22.0	S-4A (14"): Very stiff, brown, Organic SILT, pockets of gray Clay & Silt. moist. S-4B (6"): Medium dense, gray, fine to coarse SAND, little Silt. moist.	
						Boring terminated at 22 feet.	

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

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BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 11/9/12 12:03 - O:\ACTIVE\84810.00 MASSDOT STATEWIDE ENGINEERING - VHB 57736\84810.02 ROUTE 2 & 16 CAMBRIDGE, MA\EXPLORATIONS\BORING LOGS - 10-22-12.GPJ

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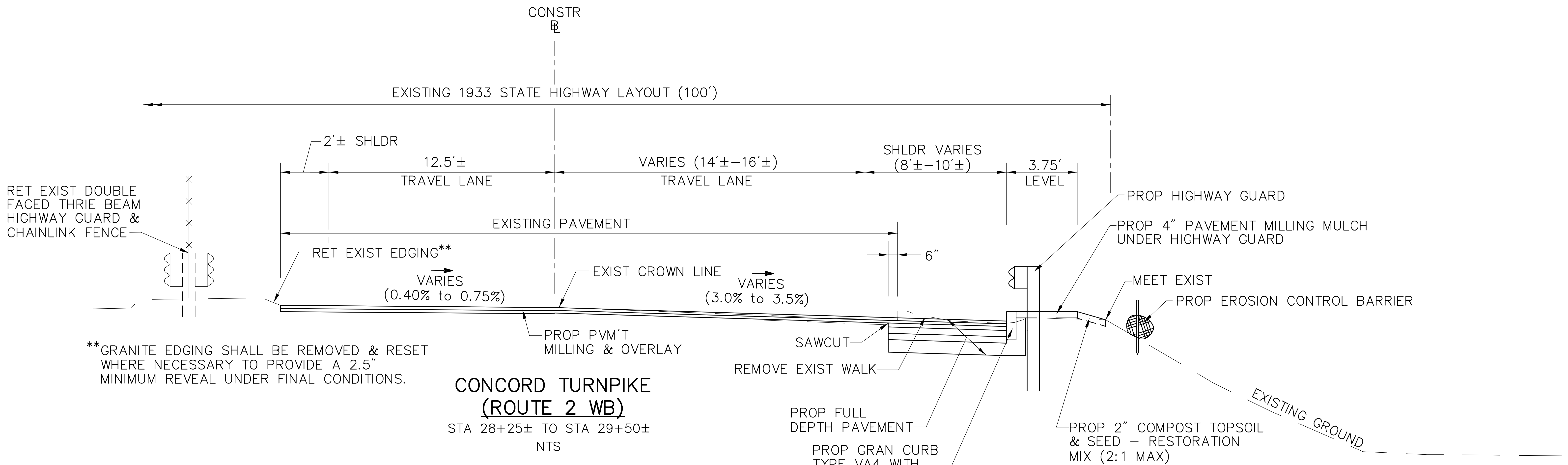
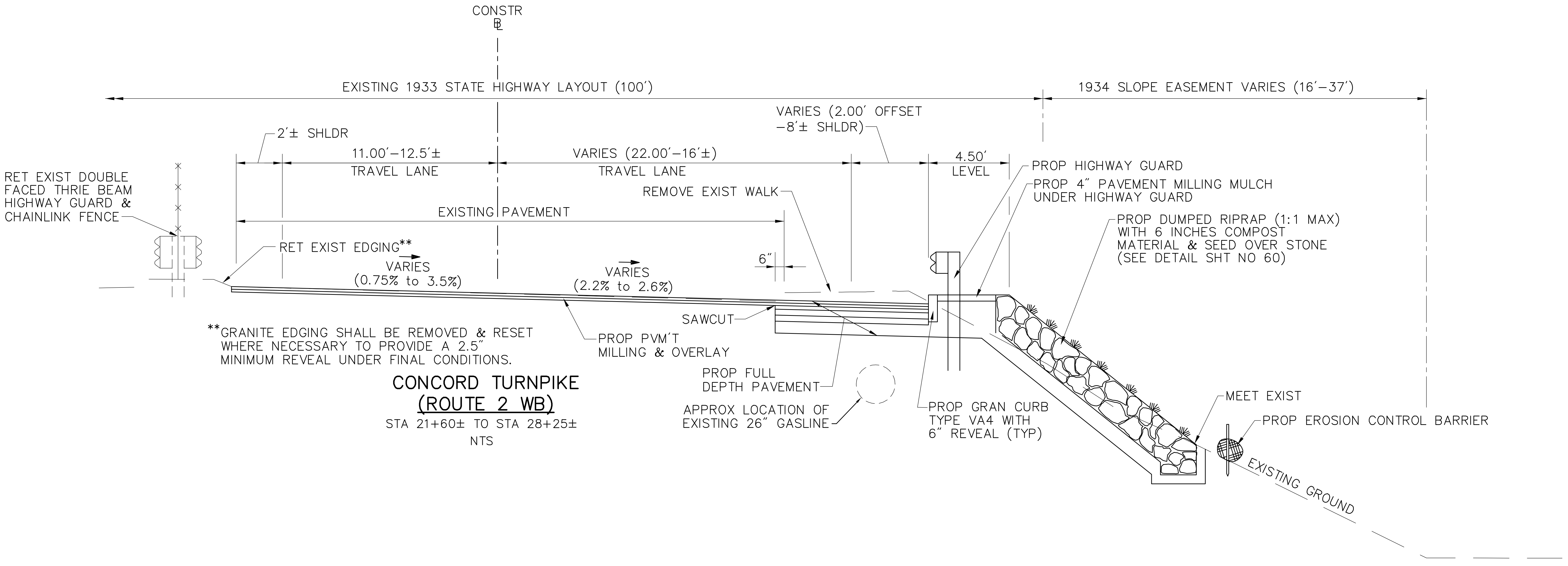
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		05	71
PROJECT FILE NO. 605637			

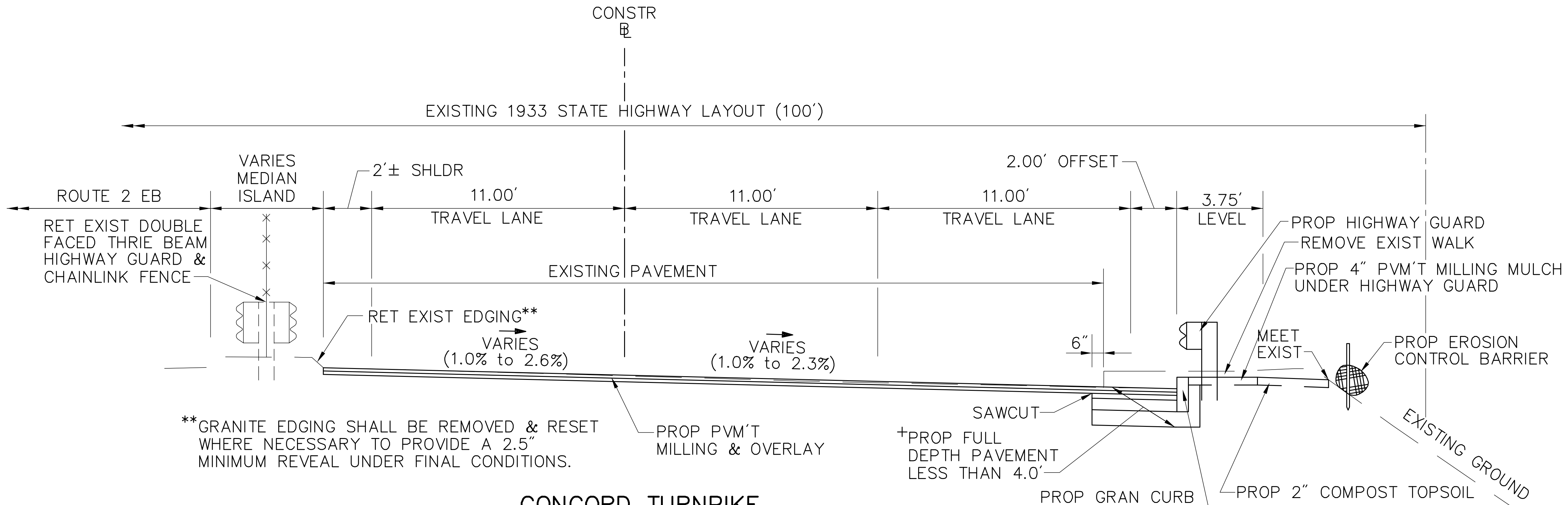
TYPICAL SECTIONS & PAVEMENT NOTES



CONCORD TURNPIKE
(ROUTE 2 WB)
STA 28+25± TO STA 29+50±
NTS



CONCORD TURNPIKE
(ROUTE 2 WB)
STA 21+60± TO STA 28+25±
NTS



CONCORD TURNPIKE
(ROUTE 2 WB)
STA 17+50± TO STA 20+20±
NTS

+PROP FULL DEPTH PAVEMENT
STA 17+50± TO STA 18+90±

PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1¾" SUPERPAVE SURFACE COURSE – 12.5 (SSC–12.5)
INTERMEDIATE: 1¾" SUPERPAVE INTERMEDIATE COURSE – 12.5 (SIC–12.5)
INTERMEDIATE: 2½" SUPERPAVE INTERMEDIATE COURSE – 19.0 (SIC–19.0)
BASE: 4" SUPERPAVE BASE COURSE – 37.5 (SBC–37.5)
SUBBASE: 4" DENSE GRADED CRUSHED STONE FOR SUB-BASE OVER 8" GRAVEL BORROW, TYPE b.

PROPOSED FULL DEPTH PAVEMENT LESS THAN 4.0' WIDE

SURFACE: 1¾" SUPERPAVE SURFACE COURSE – 12.5 (SSC–12.5)
INTERMEDIATE: 1¾" SUPERPAVE INTERMEDIATE COURSE – 12.5 (SIC–12.5)
INTERMEDIATE: 2½" SUPERPAVE INTERMEDIATE COURSE – 19.0 (SIC–19.0)
BASE: 8" HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE
SUBBASE: 8" GRAVEL BORROW, TYPE b.

PROPOSED PAVEMENT MICRO-MILLING & OVERLAY

SURFACE: 1¾" SUPERPAVE SURFACE COURSE – 12.5 (SSC–12.5)
INTERMEDIATE: 1¾" SUPERPAVE INTERMEDIATE COURSE – 12.5 (SIC–12.5)
MILLING: 2½" PAVEMENT MICROMILLING

PROPOSED CEMENT CONCRETE SIDEWALK/ WHEELCHAIR RAMP / ISLAND

SURFACE: 4" CEMENT CONCRETE (6" FOR ISLAND) AIR ENTRAINED 4000 PSI, ¾", 610
FOUNDATION: 8" GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE DRIVEWAY

SURFACE: 6" CEMENT CONCRETE AIR ENTRAINED 4000 PSI, ¾", 610
SUBBASE: 8" GRAVEL BORROW, TYPE b

PROPOSED HOT MIX ASPHALT WALK

SURFACE: 1.0" SUPERPAVE SURFACE COURSE 9.5 (SSC–9.5) OVER 1½" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC–12.5) OVER
FOUNDATION: 8" GRAVEL BORROW, TYPE b

PROPOSED HOT MIX ASPHALT DRIVEWAY

SURFACE: 1½" SUPERPAVE SURFACE COURSE 9.5 (SSC–9.5) OVER 2" SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC–12.5) OVER
SUBBASE: 8" GRAVEL BORROW, TYPE b
BITUMEN FOR TACK COAT (RS–1) AT 0.05 GAL/SY OVER INTERMEDIATE COURSE

PROPOSED SCORED CEMENT CONCRETE (AROUND ISLANDS)

SURFACE: 7" CEMENT CONCRETE AIR ENTRAINED 4000PSI, 3/4", 610
FOUNDATION: 8" GRAVEL BORROW, TYPE b

NOTES:

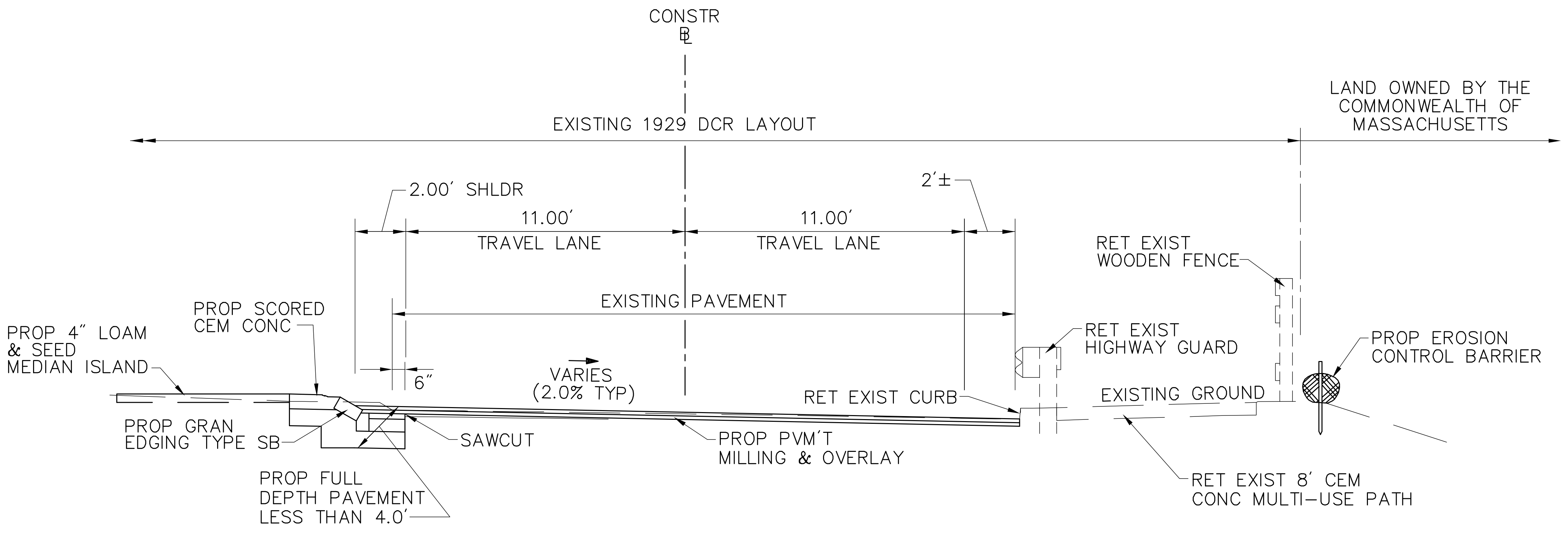
1. ALL SUPERPAVE HOT MIX ASPHALT SHALL BE A WARM MIX ASPHALT TECHNOLOGY. SUPERPAVE SURFACE COURSE–12.5 (SSC–12.5) AND SUPERPAVE INTERMEDIATE COURSE–12.5 (SIC–12.5) SHALL BE LATEX MODIFIED.
2. ALL HOT MIX ASPHALT PAVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 450 QUALITY ASSURANCE FOR HMA AND SECTION 455 SUPERPAVE HMA SPECIFICATIONS.
3. ALL MILLED SURFACES SHALL RECEIVE A TACK COAT APPLIED AT 0.07 GALLONS PER SQUARE YARD AND ALL UNMILLED SURFACES SHALL RECEIVE A TACK COAT APPLIED AT 0.05 GALLONS PER SQUARE YARD PRIOR TO PAVING.
4. ALL HOT MIX ASPHALT WALKS SHALL BE ESTIMATED AND PAID FOR UNDER ITEM 702 OF STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

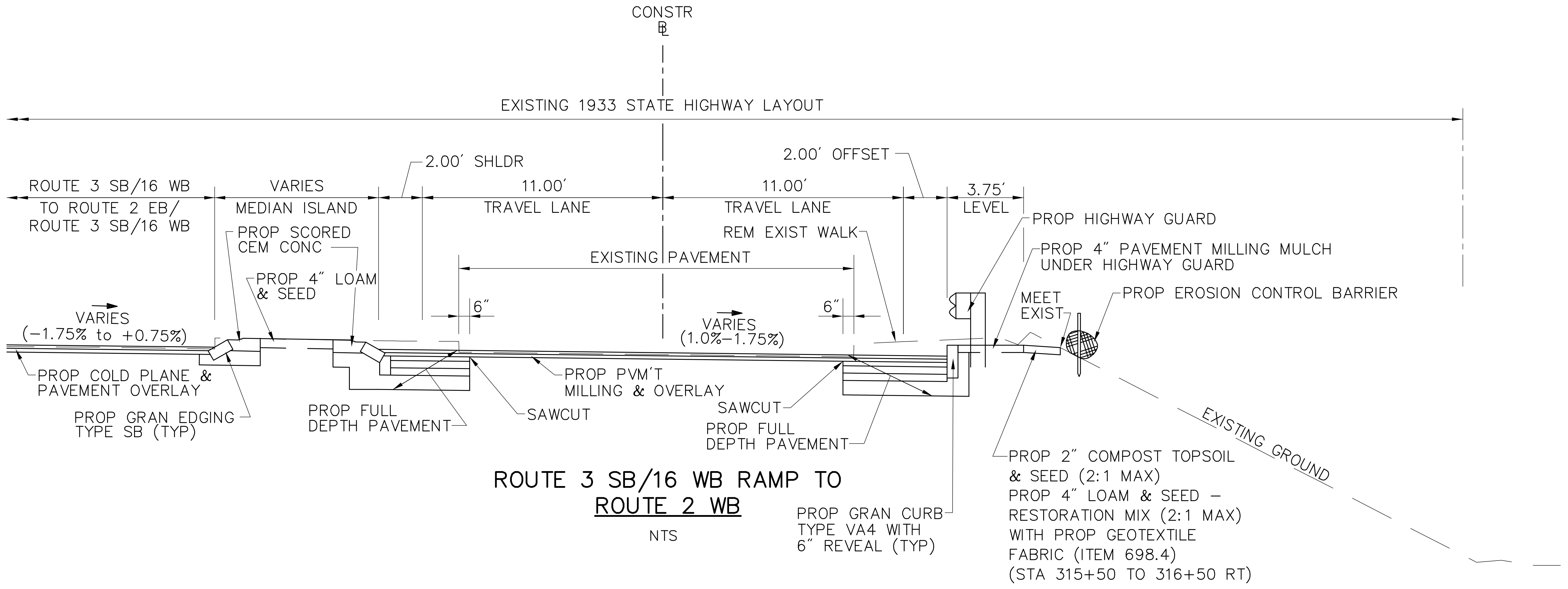
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		06	71
PROJECT FILE NO. 605637			

TYPICAL SECTIONS & PAVEMENT NOTES

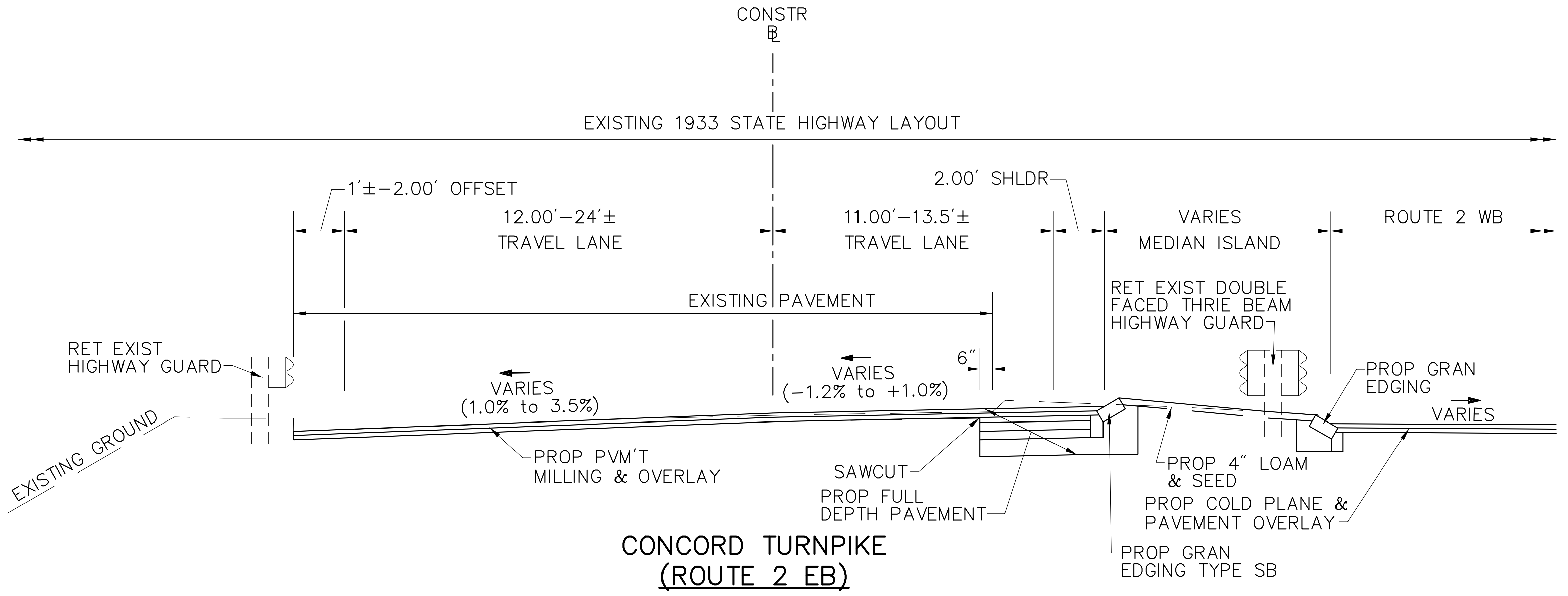
NOTE: SEE SHEET 05 FOR PAVEMENT NOTES.



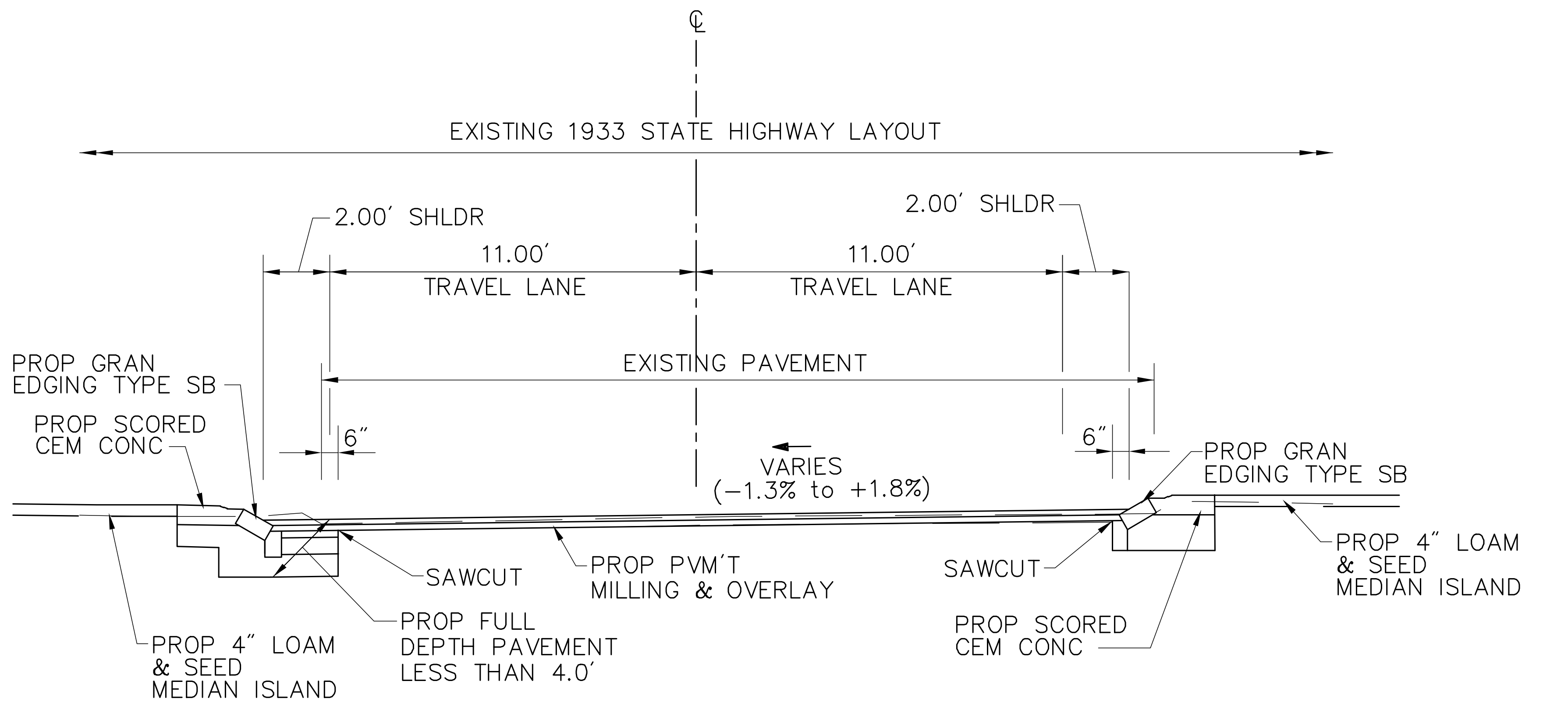
ALEWIFE BROOK PARKWAY
(ROUTE 3 NB/16 EB)
NTS



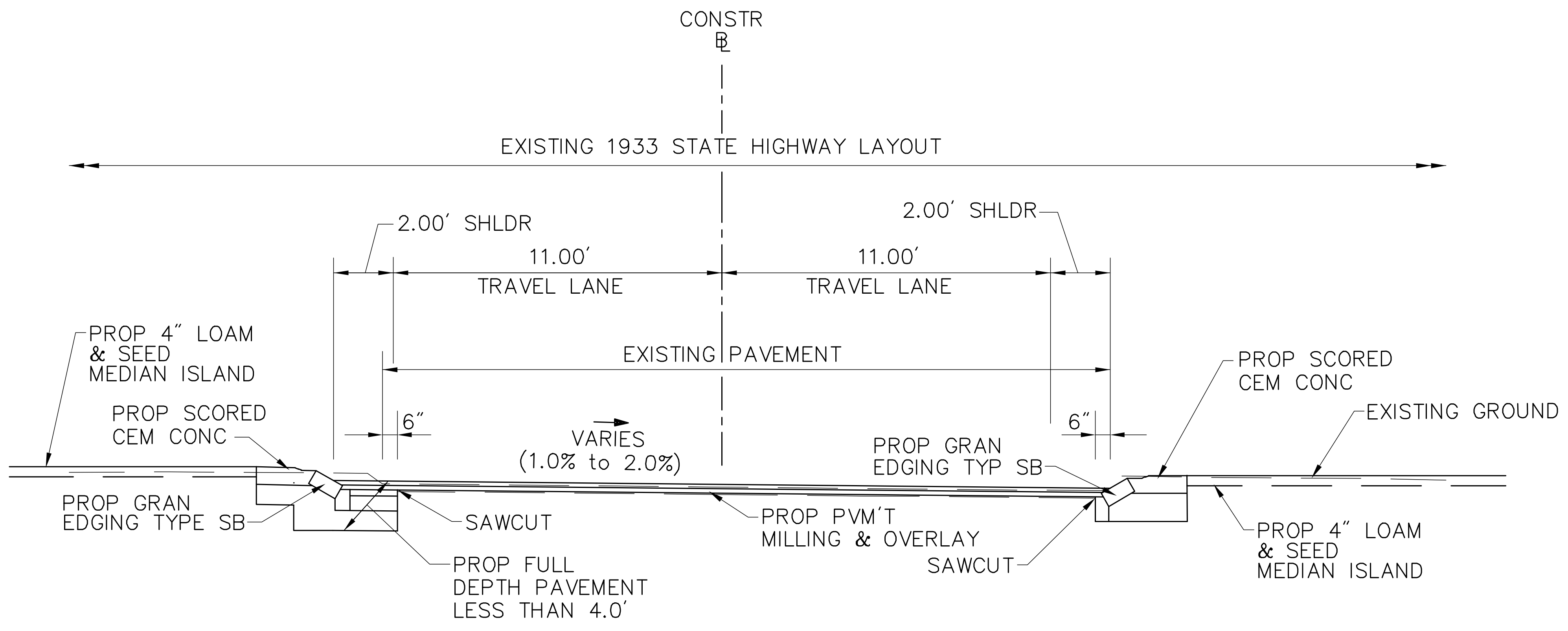
ROUTE 3 SB/16 WB RAMP TO
ROUTE 2 WB
NTS



CONCORD TURNPIKE
(ROUTE 2 EB)
STA 205+00± TO STA 207+35
NTS



ROUTE 3 SB/16 WB RAMP TO
ROUTE 2 EB/3 SB/16 WB RAMP
NTS



ROUTE 2 EB RAMP TO
ROUTE 3 NB/16 EB RAMP
NTS

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		07	71
PROJECT FILE NO. 605637			

INVASIVE SPECIES PLAN

NOTE:

LOCATION AND AREAS SHOWN ARE APPROXIMATE. ACTUAL AREA TO BE TREATED SHALL BE AS DETERMINED DURING THE SITE WALK PRIOR TO SUBMISSION OF THE IPMS AND PER DIRECTION OF THE ENGINEER IN COORDINATION WITH MASSDOT LANDSCAPE ARCHITECT. NO HERBICIDES SHALL BE USED WITHOUT APPROVAL OF IPMS SUBMISSION BY LANDSCAPE DESIGN SECTION.

LEGEND		AREA OF IMPACT	
		CAMBRIDGE	ARLINGTON
○	NORWAY MAPLE (TREES)	0 SF	8,251 SF
▨	PHRAGMITES (HERBACEOUS)	0 SF	4,358 SF
▥	JAPANESE KNOTWEED (HERBACEOUS)	76,758 SF	24,993 SF
△	BITTERSWEET (VINE)	24,703 SF	8,660 SF

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HIGHWAY GUARD TYPE SS
STA 312+67 RT (RTE 16 WB TO RTE 2 WB Ƀ) TANGENT END
TO STA 20+13± RT (RTE 2 WB Ƀ) (MEET EXIST)
STA 103+74 RT RTE 3 NB/16 EB TANGENT END (MEET EXIST)

TRAFFIC SIGNAL CONDUIT
SEE TRAFFIC PLANS

WATER SUPPLY ALTERATIONS
SEE BELOW

DRAINAGE DETAILS
SEE SHEET NO. 23

CROSS SECTIONS
NONE

ALIGNMENT
SEE SHEET NO. 15

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		08	71

PROJECT FILE NO. 605637

CONSTRUCTION PLANS

BORING CHART

	NORTHING	EASTING	ELEV	NOTES
B2	2970189.11	753038.35	17.66	
B3	2970233.19	753046.45	17.07	
B7	2970260.50	752847.73	19.06	IN-SITU BOREHOLE PERMEABILIBY TEST

PLANT MATERIAL SCHEDULE

QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
			TREES	
4	QP	QUERCUS PALUSTRIS	PIN OAK	2–2½" CAL.
3	CP	CRATAEGUS PHAENOPYRUM 'WASHINGTON'	HAWTHORN 'WASHINGTON'	8–10 FOOT CLUMP
1	LS	LIQUIDMABER STYRACIFLUA	AMERICAN SWEETGUM	2–2½" CAL.
3	QC	QUERCUS COCCINEA	OAK SCARLET	2–2½" CAL.
			SHRUBS	
2			EVERGREEN	3 GALLON
4			DECIDUOUS	3 GALLON

NOTES:

1. TREE LOCATIONS ARE FOR SCHEMATIC PURPOSES ONLY. PLANTING AND LOCATIONS SHALL BE PER THE SPECIFICATIONS AND AS DIRECTED BY ENGINEER IN COORDINATION WITH THE MASSDOT LANDSCAPE ARCHITECT.
2. SEED MIX FOR THE TRAFFIC TRIANGLES SHALL BE AS DETERMINED AND DIRECTED BY THE ENGINEER IN COORDINATION WITH THE MASSDOT LANDSCAPE ARCHITECT AND SHALL BE PER THE RELEVANT SPECIFICATIONS.

FOR PROFILE SEE SHEET NO. 14

HIGHWAY GUARD TYPE SS

STA 312+67 RT (RTE 16 WB TO RTE 2 WB ℄) TANGENT END
TO STA 20+13± RT (RTE 2 WB ℄) (MEET EXIST)
R&R STA 101+76 RT TO 101+94 RT (MEET EXIST)
STA 16+02 LT TO 16+94 LT (MEET EXIST)

TRAFFIC SIGNAL CONDUIT

SEE TRAFFIC PLANS

WATER SUPPLY ALTERATIONS

SEE BELOW

DRAINAGE DETAILS

SEE SHEET NO. 24

CROSS SECTIONS

SEE SHEET NO. 63

ALIGNMENT

SEE SHEET NO. 16

CAMBRIDGE

ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		09	71
PROJECT FILE NO. 605637			

CONSTRUCTION PLANS

PLANT MATERIAL SCHEDULE

QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
			TREES	
3	AR	ACER RUBRUM 'FRANKSRED'	RED SUNSET MAPLE	2–2½" CAL.
5	PK	PRUNUS 'KWANZAN'	KWANZAN CHERRY	2½–3" CAL.
2	CP	CRATAEGUS PHAENOPYRUM 'WASHINGTON'	HAWTHORN 'WASHINGTON'	8–10 FOOT CLUMP
2	LS	LIQUIDMABER STYRACIFLUA	AMERICAN SWEETGUM	2–2½" CAL.
			SHRUBS	
13			EVERGREEN	3 GALLON
11			DECIDUOUS	3 GALLON

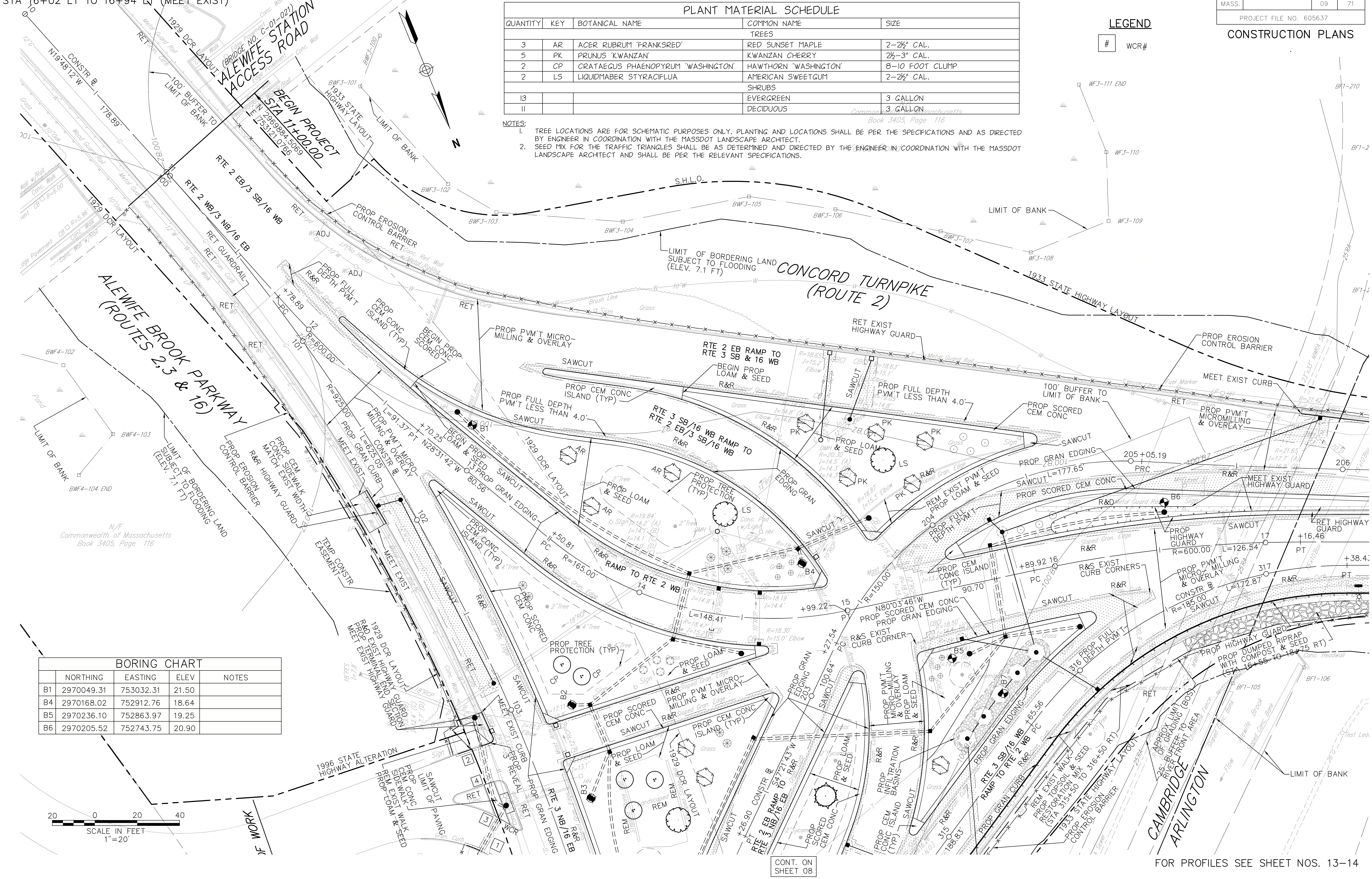
NOTES:
1. TREE LOCATIONS ARE FOR SCHEMATIC PURPOSES ONLY. PLANTING AND LOCATIONS SHALL BE PER THE SPECIFICATIONS AND AS DIRECTED BY ENGINEER IN COORDINATION WITH THE MASSDOT LANDSCAPE ARCHITECT.
2. SEED MIX FOR THE TRAFFIC TRIANGLES SHALL BE AS DETERMINED AND DIRECTED BY THE ENGINEER IN COORDINATION WITH THE MASSDOT LANDSCAPE ARCHITECT AND SHALL BE PER THE RELEVANT SPECIFICATIONS.

LEGEND

\# WCR#

BORING CHART

	NORTHING	EASTING	ELEV	NOTES
B1	2970049.31	753032.31	21.50	
B4	2970168.02	752912.76	18.64	
B5	2970236.10	752863.97	19.25	
B6	2970205.52	752743.75	20.90	



CONT. ON SHEET 08

FOR PROFILES SEE SHEET NOS. 13–14

HIGHWAY GUARD TYPE SS

STA 312+67 RT (RTE 16 WB TO RTE 2 WB ℄) TANGENT END
TO STA 20+13± RT (RTE 2 WB ℄) (MEET EXIST)
STA 22+01± (MEET EXIST) TO 29+30 RT
TERMINAL END (RTE 2 WB ℄)

TRAFFIC SIGNAL CONDUIT

SEE TRAFFIC PLANS

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET NO. 25

CROSS SECTIONS

SEE SHEET NOS. 63–67

ALIGNMENT

SEE SHEET NO. 17

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		10	71
PROJECT FILE NO. 605637			

CONSTRUCTION PLANS

NOTE:
COMPOST AND RESTORATION SEED SHOULD BE APPLIED TO ALL AREAS OF BARE SOIL ALONG THE SLOPE, DISTURBED BY CONSTRUCTION OR NOT AS DIRECTED BY THE ENGINEER.

FOR PROFILE SEE SHEET NO. 13

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HIGHWAY GUARD TYPE SS

STA 22+01± TO 29+30 RT (RTE 2 WB ℄)
STA 29+30 RT TERMINAL END

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET NO. 26

CROSS SECTIONS

SEE SHEETS NOS. 66–71

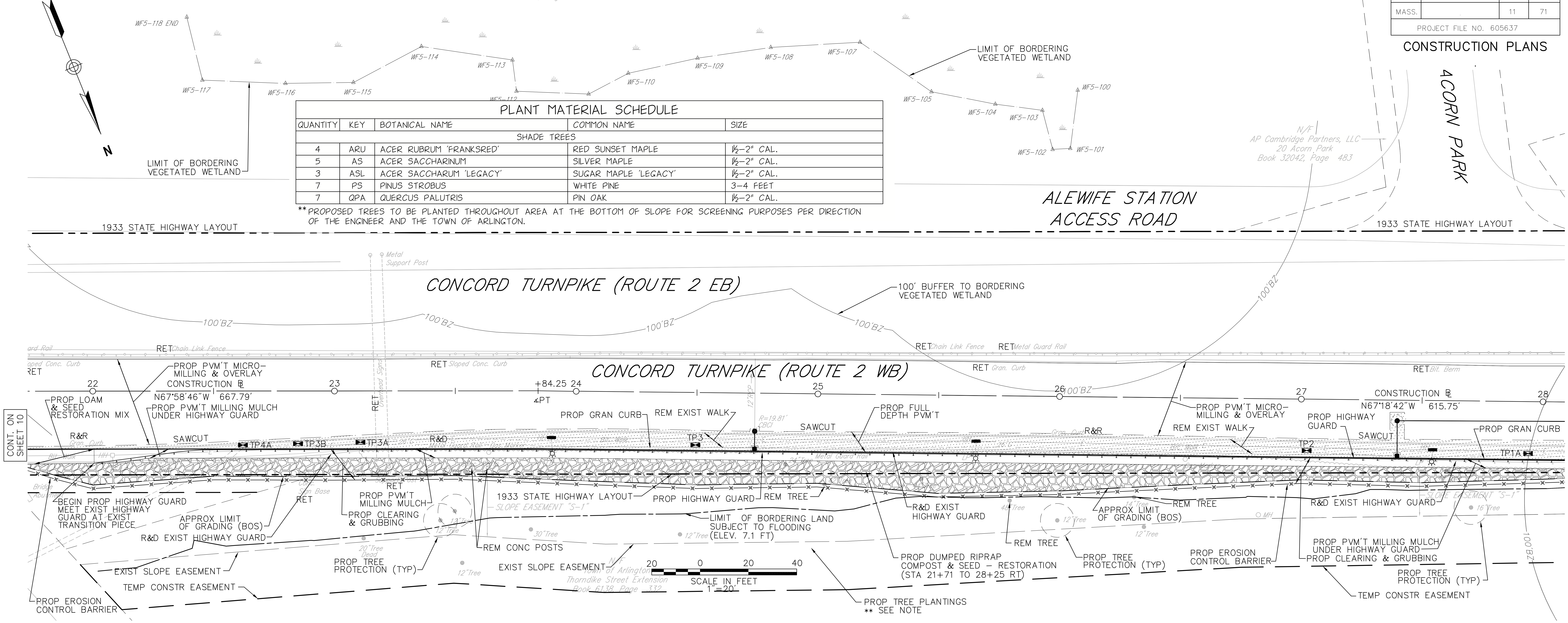
ALIGNMENT

SEE SHEET NO. 18

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		11	71
PROJECT FILE NO. 605637			

CONSTRUCTION PLANS



PLANT MATERIAL SCHEDULE				
QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
SHADE TREES				
4	ARU	ACER RUBRUM 'FRANKSRED'	RED SUNSET MAPLE	1½–2" CAL.
5	AS	ACER SACCHARINUM	SILVER MAPLE	1½–2" CAL.
3	ASL	ACER SACCHARUM 'LEGACY'	SUGAR MAPLE 'LEGACY'	1½–2" CAL.
7	PS	PINUS STROBUS	WHITE PINE	3–4 FEET
7	QPA	QUERCUS PALUTRIS	PIN OAK	1½–2" CAL.

** PROPOSED TREES TO BE PLANTED THROUGHOUT AREA AT THE BOTTOM OF SLOPE FOR SCREENING PURPOSES PER DIRECTION OF THE ENGINEER AND THE TOWN OF ARLINGTON.

NOTE:
COMPOST AND RESTORATION SEED SHOULD BE APPLIED TO ALL AREAS OF BARE SOIL ALONG THE SLOPE, DISTURBED BY CONSTRUCTION OR NOT AS DIRECTED BY THE ENGINEER.

FOR PROFILE SEE SHEET NO. 13

HIGHWAY GUARD TYPE SS
NONE

TRAFFIC SIGNAL CONDUIT
NONE

WATER SUPPLY ALTERATIONS
NONE

DRAINAGE DETAILS
SEE BELOW

CROSS SECTIONS
NONE

ALIGNMENT
NONE

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		12	71

PROJECT FILE NO. 605637

CONSTRUCTION & UTILITY PLAN (ALEWIFE BROOK PARKWAY ROUTES 2, 3 & 16)

PLANT MATERIAL SCHEDULE

QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
SHRUBS				
9	MP	MYRICA PENSYLVANICA	NORTHERN BAYBERRY	2-3' HEIGHT

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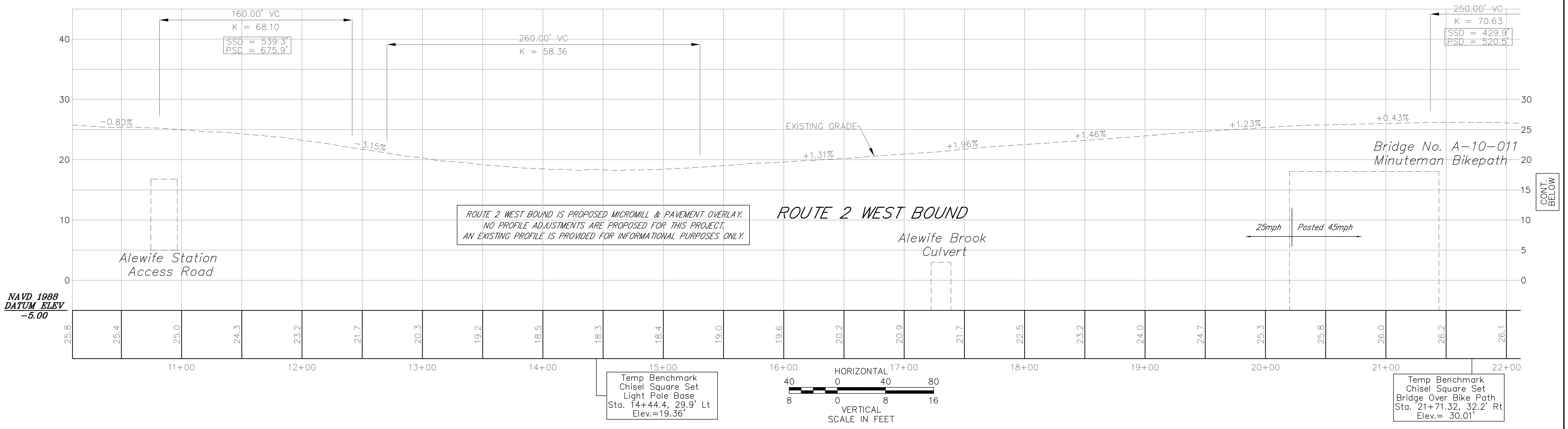
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		13	71
PROJECT FILE NO. 605637			

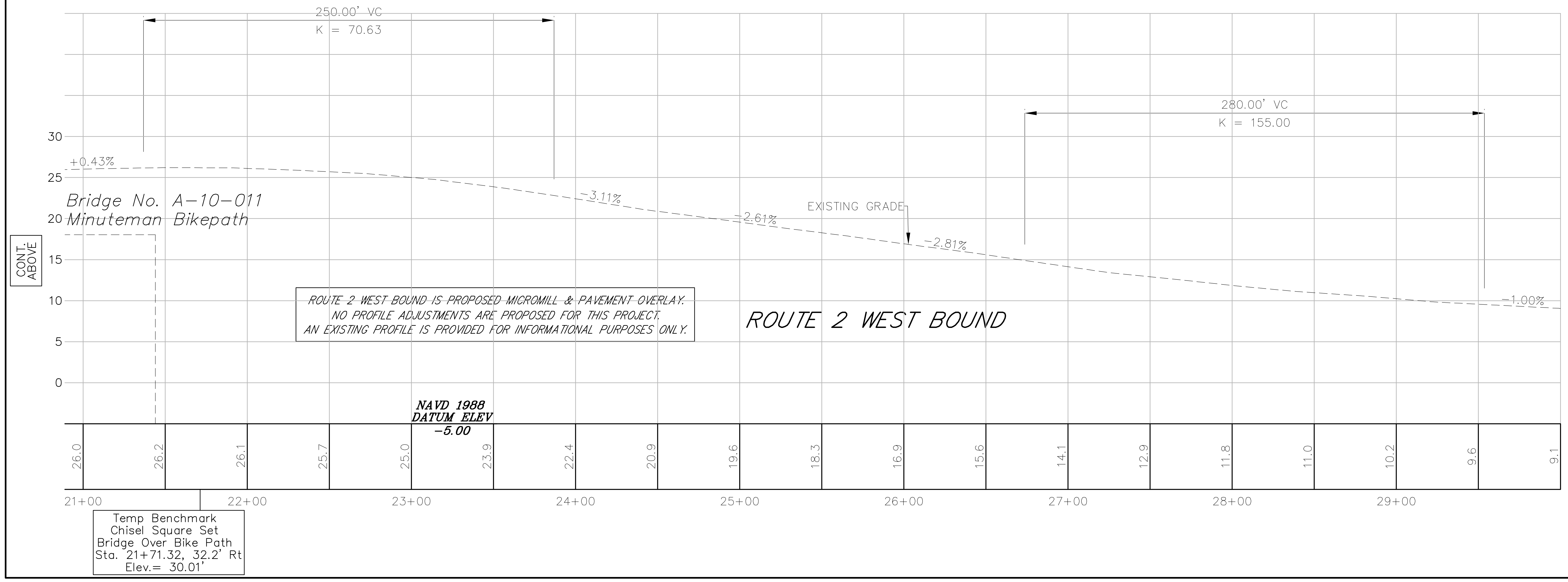
PROFILES



ROUTE 2 WEST BOUND IS PROPOSED MICROMILL & PAVEMENT OVERLAY.
NO PROFILE ADJUSTMENTS ARE PROPOSED FOR THIS PROJECT.
AN EXISTING PROFILE IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

Temp Benchmark
Chisel Square Set
Light Pole Base
Sta. 14+44.4, 29.9' Lt
Elev.=19.36'

Temp Benchmark
Chisel Square Set
Bridge Over Bike Path
Sta. 21+71.32, 32.2' Rt
Elev.= 30.01'



ROUTE 2 WEST BOUND IS PROPOSED MICROMILL & PAVEMENT OVERLAY.
NO PROFILE ADJUSTMENTS ARE PROPOSED FOR THIS PROJECT.
AN EXISTING PROFILE IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

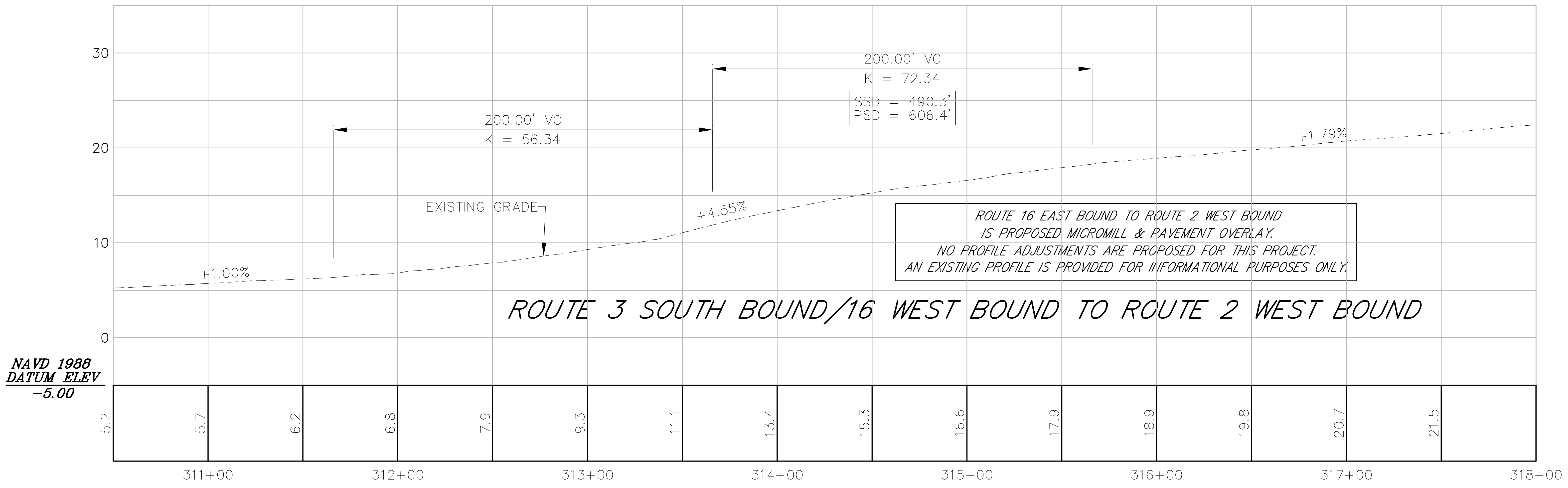
Temp Benchmark
Chisel Square Set
Bridge Over Bike Path
Sta. 21+71.32, 32.2' Rt
Elev.= 30.01'

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		14	71

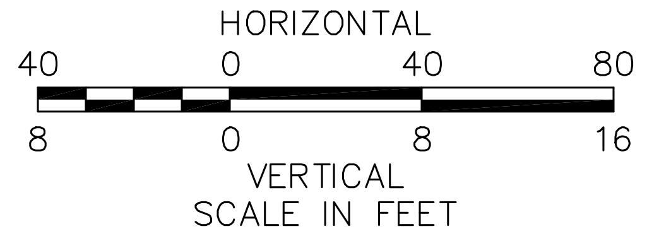
PROJECT FILE NO. 605637

PROFILES



ROUTE 16 EAST BOUND TO ROUTE 2 WEST BOUND IS PROPOSED MICROMILL & PAVEMENT OVERLAY. NO PROFILE ADJUSTMENTS ARE PROPOSED FOR THIS PROJECT. AN EXISTING PROFILE IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

ROUTE 3 SOUTH BOUND/16 WEST BOUND TO ROUTE 2 WEST BOUND



CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		15	71

PROJECT FILE NO. 605637

ALIGNMENT PLANS

ROUTE 2 EB TO ROUTE 3 NB/16 EB CONSTRUCTION ℄

	STATION			NORTHING	EASTING
BEGIN	200+00.00			2970467.1560	753104.8892
		R=425.00' L=226.90'	T=116.22' Δ=30°35'20"		
PT	202+26.90			2970277.1528	752985.8502
		S47°21'43"W	100.64'		
PC	203+27.54			2970208.9847	752911.8164

ROUTE 3 NB/16 EB CONSTRUCTION ℄

	STATION			NORTHING	EASTING
BEGIN	100+00.00			2969886.8336	753120.2388
		R=925.00' L=625.05'	T=324.99' Δ=38°43'00"		
PCC	106+25.05			2970500.0455	753115.4763
		R=525.00' L=174.95'	T=88.29' Δ=19°05'33"		
END	108+00.00			2970653.1384	753198.4597

SURVEY TRAVERSE DATA

POINT	ELEVATION	NORTH	EAST	DESCRIPTION
12	17.81'	2970250.4071	752995.8826	IP SET
13	6.16'	2970537.6352	753149.2830	DH SET

ROUTE 3 SB/16 WB TO ROUTE 2 WB CONSTRUCTION ℄

	STATION			NORTHING	EASTING
BEGIN	310+50.00			2970654.7054	753174.1533
		R=600.00' L=97.70'	T=48.96' Δ=09°19'47"		
PT	311+47.70			2970573.0360	753120.7276
		S28°31'36"W	137.11'		
PC	312+84.81			2970452.5741	753055.2495
		R=380.00' L=91.92'	T=46.18' Δ=13°51'33"		
∡PT	313+76.73			2970377.8840	753002.0597
		S58°28'49"W	188.83'		
PC	315+65.56			2970279.1629	752841.0860
		R=185.00' L=172.87'	T=93.33' Δ=53°32'26"		
PT	317+38.43			2970265.3640	752675.0053

CURVE TABLE

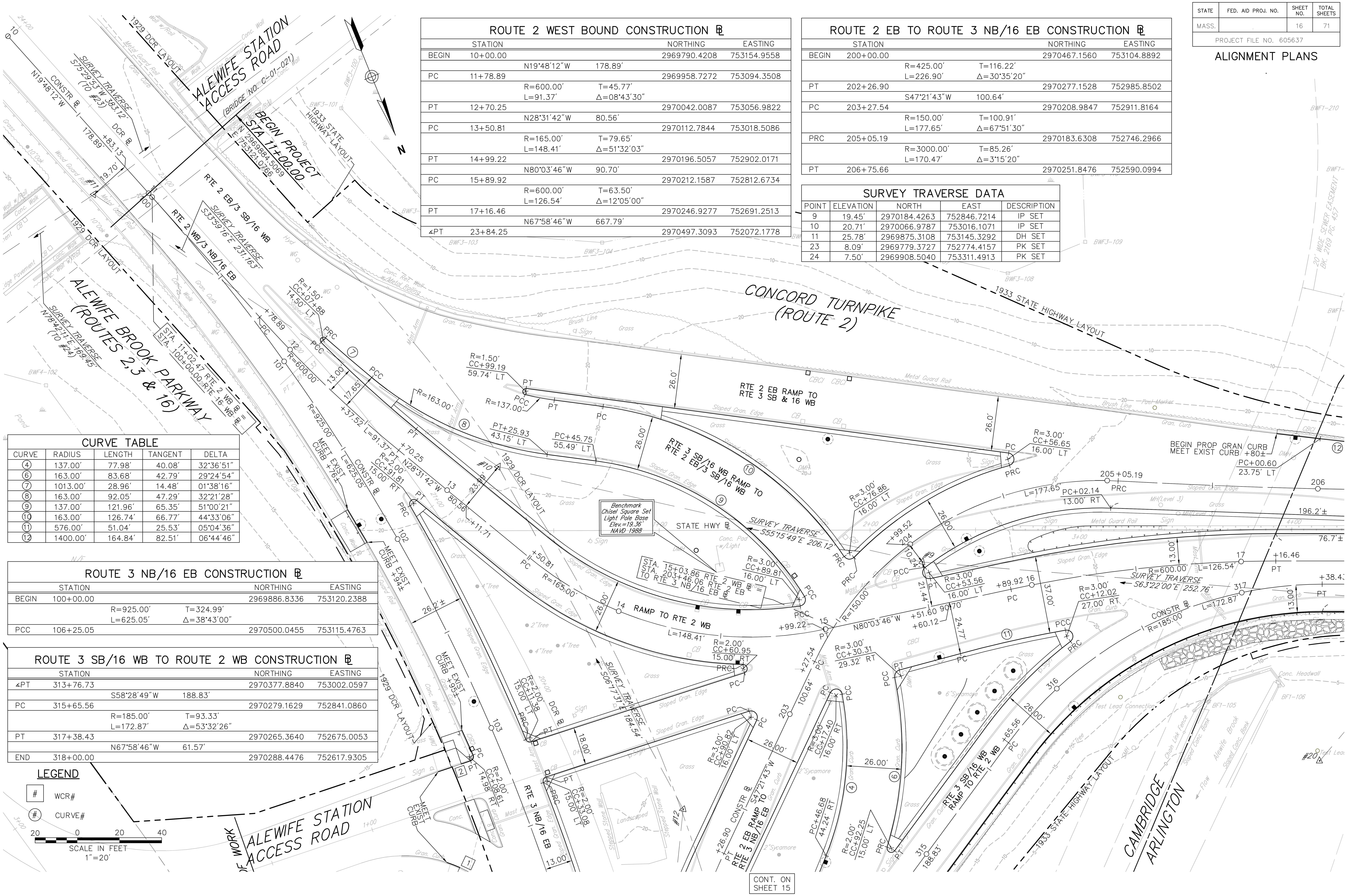
CURVE	RADIUS	LENGTH	TANGENT	DELTA
①	30.00'	35.0'±	19.8'±	66°50'
②	412.00'	249.31'	128.60'	34°40'16"
③	393.00'	112.62'	56.70'	16°25'06"
④	137.00'	77.98'	40.08'	32°36'51"
⑤	300.00'	153.44'	78.44'	29°18'15"
⑥	163.00'	83.68'	42.79'	29°24'54"

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		16	71

PROJECT FILE NO. 605637

ALIGNMENT PLANS



CONT. ON SHEET 15

CONT. ON SHEET 17

ROUTE 2 WEST BOUND CONSTRUCTION ℄					
	STATION			NORTHING	EASTING
BEGIN	10+00.00			2969790.4208	753154.9558
		N19°48'12"W	178.89'		
PC	11+78.89			2969958.7272	753094.3508
		R=600.00' L=91.37'	T=45.77' Δ=08°43'30"		
PT	12+70.25			2970042.0087	753056.9822
		N28°31'42"W	80.56'		
PC	13+50.81			2970112.7844	753018.5086
		R=165.00' L=148.41'	T=79.65' Δ=51°32'03"		
PT	14+99.22			2970196.5057	752902.0171
		N80°03'46"W	90.70'		
PC	15+89.92			2970212.1587	752812.6734
		R=600.00' L=126.54'	T=63.50' Δ=12°05'00"		
PT	17+16.46			2970246.9277	752691.2513
		N67°58'46"W	667.79'		
∡PT	23+84.25			2970497.3093	752072.1778

ROUTE 2 EB TO ROUTE 3 NB/16 EB CONSTRUCTION ℄					
	STATION			NORTHING	EASTING
BEGIN	200+00.00			2970467.1560	753104.8892
		R=425.00' L=226.90'	T=116.22' Δ=30°35'20"		
PT	202+26.90			2970277.1528	752985.8502
		S47°21'43"W	100.64'		
PC	203+27.54			2970208.9847	752911.8164
		R=150.00' L=177.65'	T=100.91' Δ=67°51'30"		
PRC	205+05.19			2970183.6308	752746.2966
		R=3000.00' L=170.47'	T=85.26' Δ=3°15'20"		
PT	206+75.66			2970251.8476	752590.0994

SURVEY TRAVERSE DATA

POINT	ELEVATION	NORTH	EAST	DESCRIPTION
9	19.45'	2970184.4263	752846.7214	IP SET
10	20.71'	2970066.9787	753016.1071	IP SET
11	25.78'	2969875.3108	753145.3292	DH SET
23	8.09'	2969779.3727	752774.4157	PK SET
24	7.50'	2969908.5040	753311.4913	PK SET

CURVE TABLE

CURVE	RADIUS	LENGTH	TANGENT	DELTA
④	137.00'	77.98'	40.08'	32°36'51"
⑥	163.00'	83.68'	42.79'	29°24'54"
⑦	1013.00'	28.96'	14.48'	01°38'16"
⑧	163.00'	92.05'	47.29'	32°21'28"
⑨	137.00'	121.96'	65.35'	51°00'21"
⑩	163.00'	126.74'	66.77'	44°33'06"
⑪	576.00'	51.04'	25.53'	05°04'36"
⑫	1400.00'	164.84'	82.51'	06°44'46"

ROUTE 3 NB/16 EB CONSTRUCTION ℄					
	STATION			NORTHING	EASTING
BEGIN	100+00.00			2969886.8336	753120.2388
		R=925.00' L=625.05'	T=324.99' Δ=38°43'00"		
PCC	106+25.05			2970500.0455	753115.4763

ROUTE 3 SB/16 WB TO ROUTE 2 WB CONSTRUCTION ℄					
	STATION			NORTHING	EASTING
∡PT	313+76.73			2970377.8840	753002.0597
		S58°28'49"W	188.83'		
PC	315+65.56			2970279.1629	752841.0860
		R=185.00' L=172.87'	T=93.33' Δ=53°32'26"		
PT	317+38.43			2970265.3640	752675.0053
		N67°58'46"W	61.57'		
END	318+00.00			2970288.4476	752617.9305

LEGEND

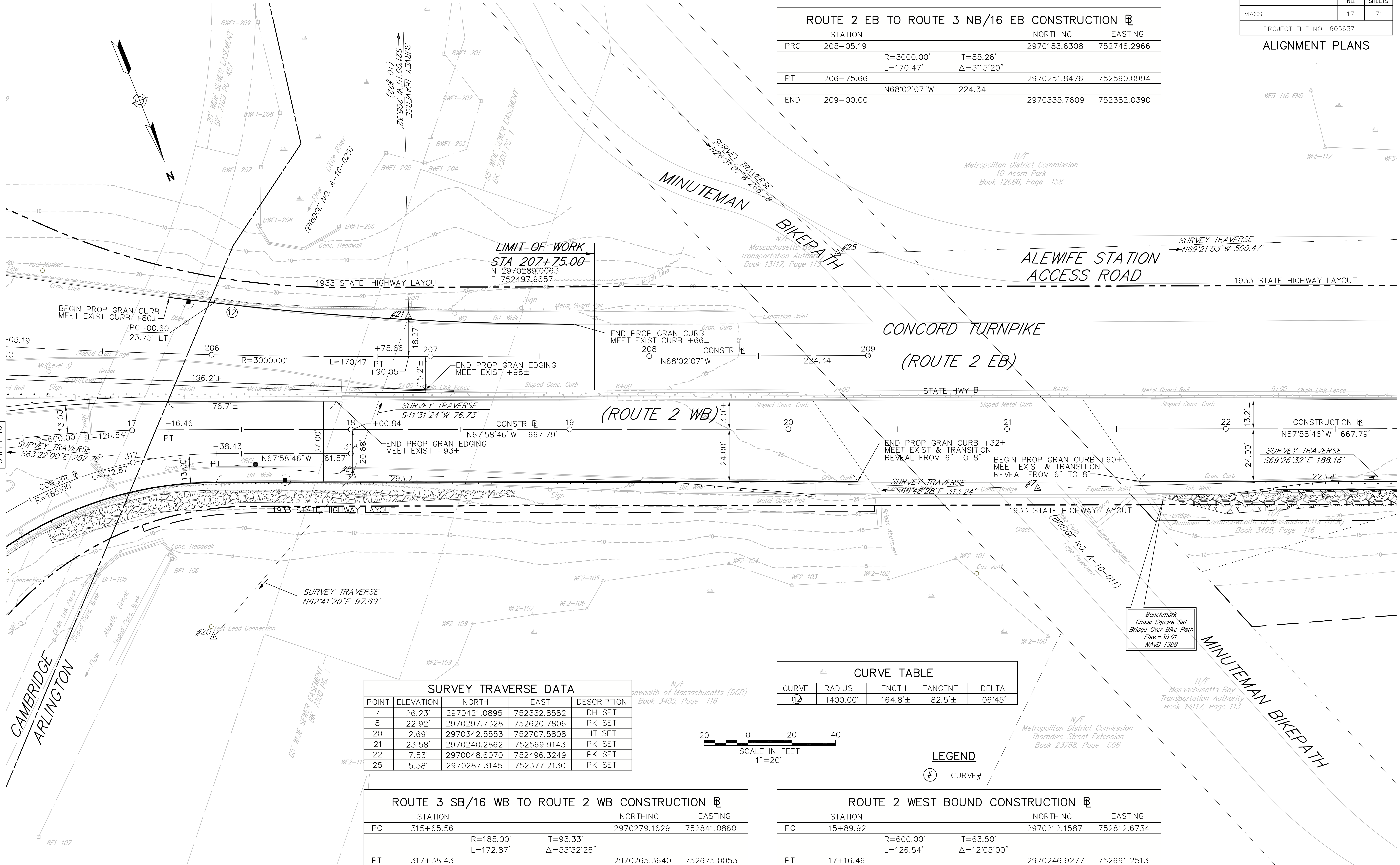
#	WCR#
ⓘ#	CURVE#

20 0 20 40
SCALE IN FEET
1"=20'

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		17	71
PROJECT FILE NO. 605637			

ALIGNMENT PLANS



ROUTE 2 EB TO ROUTE 3 NB/16 EB CONSTRUCTION ℄

	STATION			NORTHING	EASTING
PRC	205+05.19			2970183.6308	752746.2966
		R=3000.00' L=170.47'	T=85.26' Δ=3°15'20"		
PT	206+75.66			2970251.8476	752590.0994
		N68°02'07"W	224.34'		
END	209+00.00			2970335.7609	752382.0390

SURVEY TRAVERSE DATA

POINT	ELEVATION	NORTH	EAST	DESCRIPTION
7	26.23'	2970421.0895	752332.8582	DH SET
8	22.92'	2970297.7328	752620.7806	PK SET
20	2.69'	2970342.5553	752707.5808	HT SET
21	23.58'	2970240.2862	752569.9143	PK SET
22	7.53'	2970048.6070	752496.3249	PK SET
25	5.58'	2970287.3145	752377.2130	PK SET

CURVE TABLE

CURVE	RADIUS	LENGTH	TANGENT	DELTA
⑫	1400.00'	164.8'±	82.5'±	06°45'

20 0 20 40
SCALE IN FEET
1"=20'

LEGEND

(#) CURVE#

ROUTE 3 SB/16 WB TO ROUTE 2 WB CONSTRUCTION ℄

	STATION			NORTHING	EASTING
PC	315+65.56			2970279.1629	752841.0860
		R=185.00' L=172.87'	T=93.33' Δ=53°32'26"		
PT	317+38.43			2970265.3640	752675.0053
		N67°58'46"W	61.57'		
END	318+00.00			2970288.4476	752617.9305

ROUTE 2 WEST BOUND CONSTRUCTION ℄

	STATION			NORTHING	EASTING
PC	15+89.92			2970212.1587	752812.6734
		R=600.00' L=126.54'	T=63.50' Δ=12°05'00"		
PT	17+16.46			2970246.9277	752691.2513
		N67°58'46"W	667.79'		
∡PT	23+84.25			2970497.3093	752072.1778

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

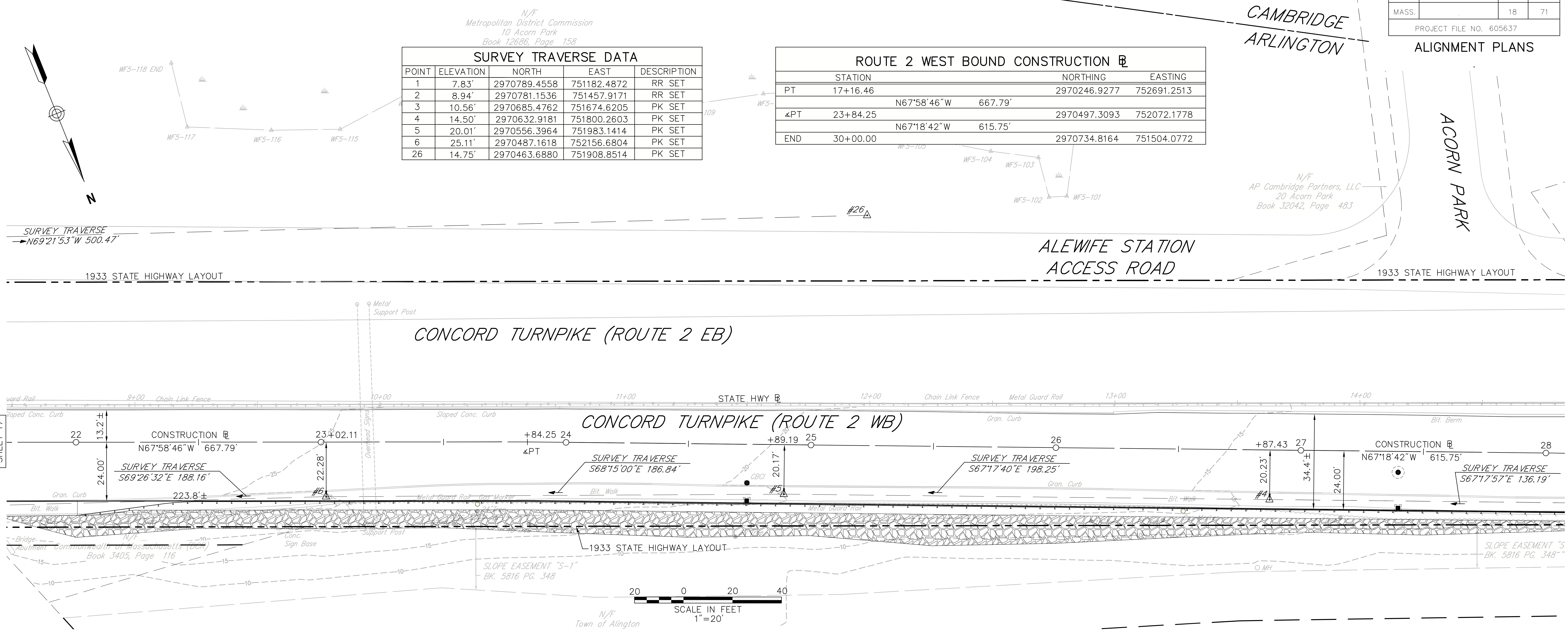
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		18	71

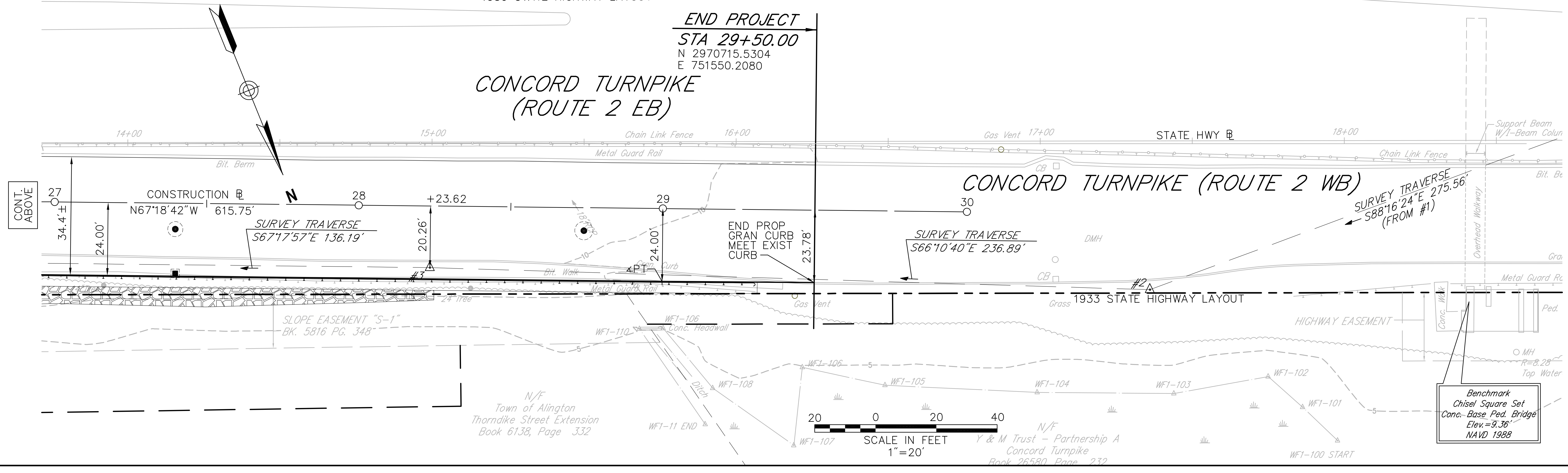
PROJECT FILE NO. 605637

ALIGNMENT PLANS

SURVEY TRAVERSE DATA				
POINT	ELEVATION	NORTH	EAST	DESCRIPTION
1	7.83′	2970789.4558	751182.4872	RR SET
2	8.94′	2970781.1536	751457.9171	RR SET
3	10.56′	2970685.4762	751674.6205	PK SET
4	14.50′	2970632.9181	751800.2603	PK SET
5	20.01′	2970556.3964	751983.1414	PK SET
6	25.11′	2970487.1618	752156.6804	PK SET
26	14.75′	2970463.6880	751908.8514	PK SET

ROUTE 2 WEST BOUND CONSTRUCTION ℄					
	STATION			NORTHING	EASTING
PT	17+16.46			2970246.9277	752691.2513
		N67°58′46″W	667.79′		
∡PT	23+84.25			2970497.3093	752072.1778
		N67°18′42″W	615.75′		
END	30+00.00			2970734.8164	751504.0772





Benchmark
Chisel Square Set
Conc. Base Ped. Bridge
Elev.=9.36'
NAVD 1988

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CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		19	71

PROJECT FILE NO. 605637

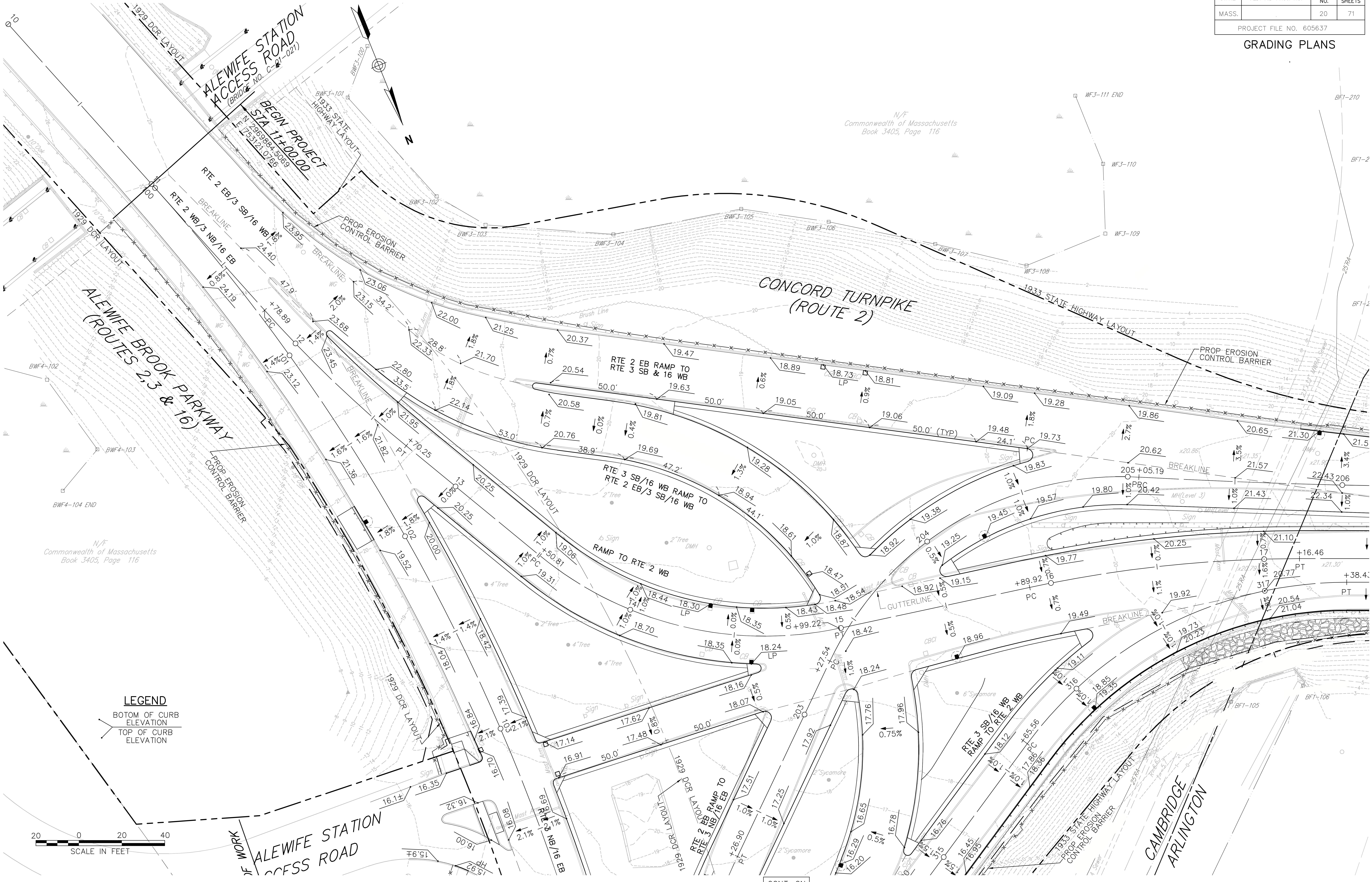
GRADING PLANS

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		20	71

PROJECT FILE NO. 605637

GRADING PLANS



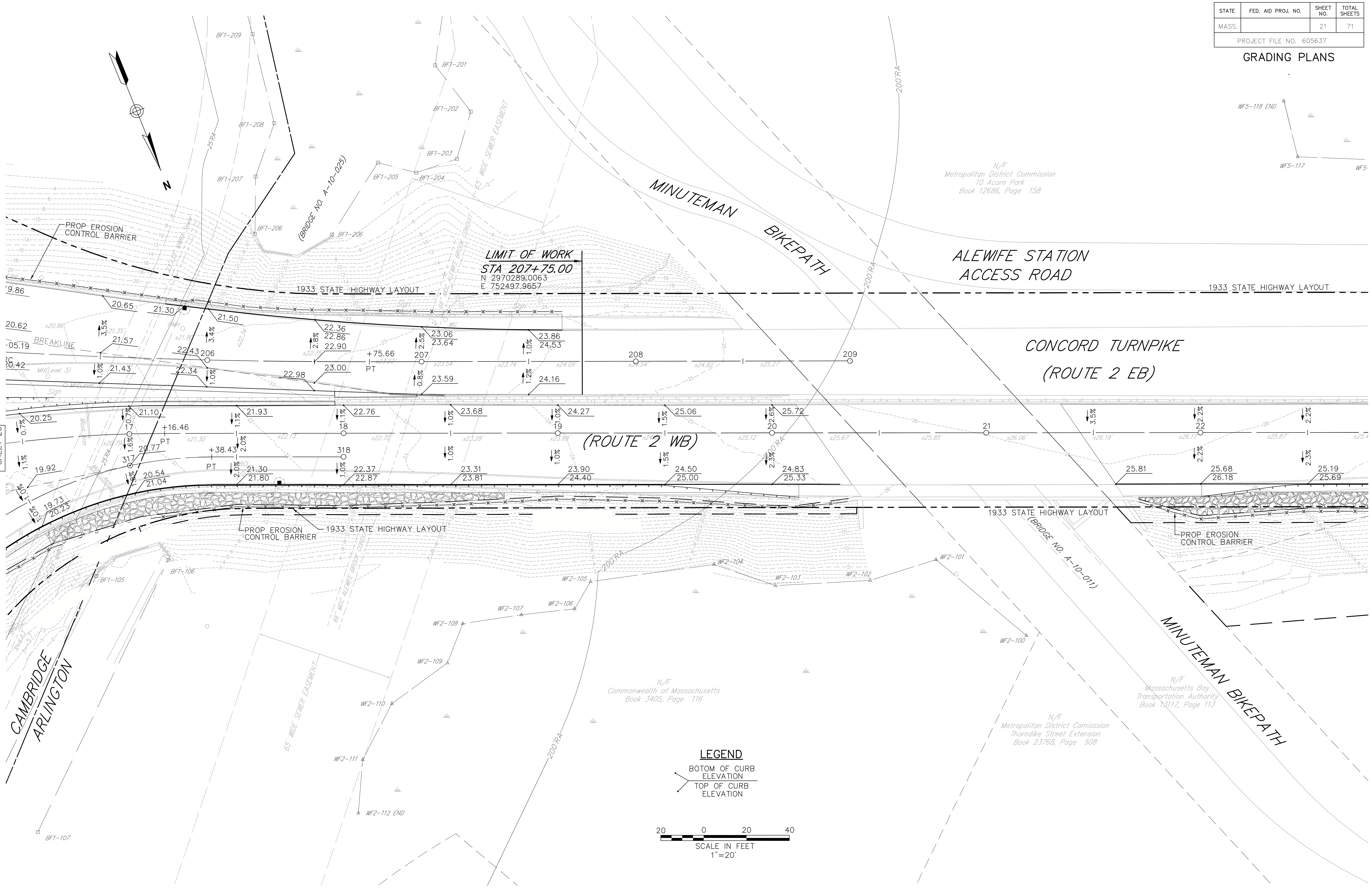
CONT. ON SHEET21

CONT. ON SHEET19

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		21	71
PROJECT FILE NO. 605637			

GRADING PLANS



CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		22	71
PROJECT FILE NO. 605637			

GRADING PLANS

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		23	71

PROJECT FILE NO. 605637

UTILITY PLANS

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
5A	EXIST CB	313+31.9 LT	10.65	--	EXIST 6.7±	REMODEL
5B	CIT	200+96.5 5.5' LT	12.12	EXIST	EXIST	CHANGE CB TO DMH
6	CB	314+68.2 LT	16.29	--	11.99	
7	CBCI	314+73.0 RT	15.70	--	11.4	
8	CIT	314+81.0 7.6' RT	16.00	6 11.57 7 11.34	EXIST	

NOTES:

1. ALL PROPOSED CATCH BASINS SHALL HAVE A 6 FOOT SUMP.
2. THE INVERTS SHOWN ARE PROPOSED AND SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD
3. CURB INLETS LABELED AS REMOVED MAY BE REMOVED, RELOCATED AND RESET ELSEWHERE WITHIN THE PROJECT AS DETERMINED BY THE ENGINEER.

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
1	CBCI	311+94.7 RT	6.80	--	2.80	
2	CBCI	106+15.2 RT	7.37	--	3.07	
3	DMH	312+29.9 4.8' RT	7.47	1 2.51 2 2.61	2.51	
4	DMH	312+84.7 6.4' RT	8.85	3 2.07	2.07	
5	EXIST DMH	313+33.3 31.1' RT	EXIST 11.8±	4 1.71	EXIST 1.7±	

NOTES:

1. ALL PROPOSED CATCH BASINS SHALL HAVE A 6 FOOT SUMP.
2. THE INVERTS SHOWN ARE PROPOSED AND SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD
3. CURB INLETS LABELED AS REMOVED MAY BE REMOVED, RELOCATED AND RESET ELSEWHERE WITHIN THE PROJECT AS DETERMINED BY THE ENGINEER.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		24	71

PROJECT FILE NO. 605637

UTILITY PLANS

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
19	CBCI	205+88.6 LT	21.30	--	17.80	ECCENTRIC CONE
20	CB	204+25.0 RT	19.45	--	15.95	
21	DMH	15+79.1 20.9' LT	19.95	19 15.90 20 15.90	15.80	
22	CB	15+50.0 RT	18.96	--	15.46	
23	CBCI	316+00.0 RT	18.85	--	15.35	ECCENTRIC CONE
24	LEACHING BASIN	315+91.60 19.4' LT	19.40	21 15.25 22 15.25 23 15.15	14.15	

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
25	LEACHING BASIN	315+80.0 20.5' LT	19.20	24 14.15	14.15	
26	LEACHING BASIN	315+68.00 20.5' LT	19.00	25 14.15	14.15	
27	LEACHING BASIN	315+55.5 20.5' LT	18.60	26 14.15	14.15	
28	LEACHING BASIN	315+42.4 20.5' LT	18.30	27 14.15	15.15	
29	EXIST DMH	315+00.00 16.8' RT	17.6±	28 13.20	EXIST	

NOTES:

1. ALL PROPOSED CATCH BASINS SHALL HAVE A 6 FOOT SUMP.
2. THE INVERTS SHOWN ARE PROPOSED AND SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD
3. CURB INLETS LABELED AS REMOVED MAY BE REMOVED, RELOCATED AND RESET ELSEWHERE WITHIN THE PROJECT AS DETERMINED BY THE ENGINEER.

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
9	CBCI	101+85.0 RT	20.07	--	15.07	ECCENTRIC CONE
10	DMH	101+87.3 2.0' RT	20.25	9 15.02	14.25	
11	DMH	102+85.3 2.5' RT	17.40	10 12.85	EXIST 8.5±	BUILD OVER EXIST PIPE
12	EXIST CBCI	204+06.7 95.0' LT	18.73	--	EXIST 15.2±	
13	EXIST DMH	203+87.5 64.6' LT	20.3±	12 EXIST 14.5	EXIST 14.3±	
14	EXIST CBCI	204+16.3 82.0' LT	18.81	--	EXIST 15.1±	
15	DMH	203+99.2 63.3' LT	19.40	14 14.80	EXIST 14.5±	
16	EXIST CB	14+36.9 LT	18.30	--	EXIST 14.9±	REMODEL
17	EXIST CB	14+57.9 LT	18.36	18 EXIST 14.4	EXIST 14.4±	REMODEL
18	EXIST CB	14+58.5 RT	18.24	--	EXIST 15.0±	REMODEL

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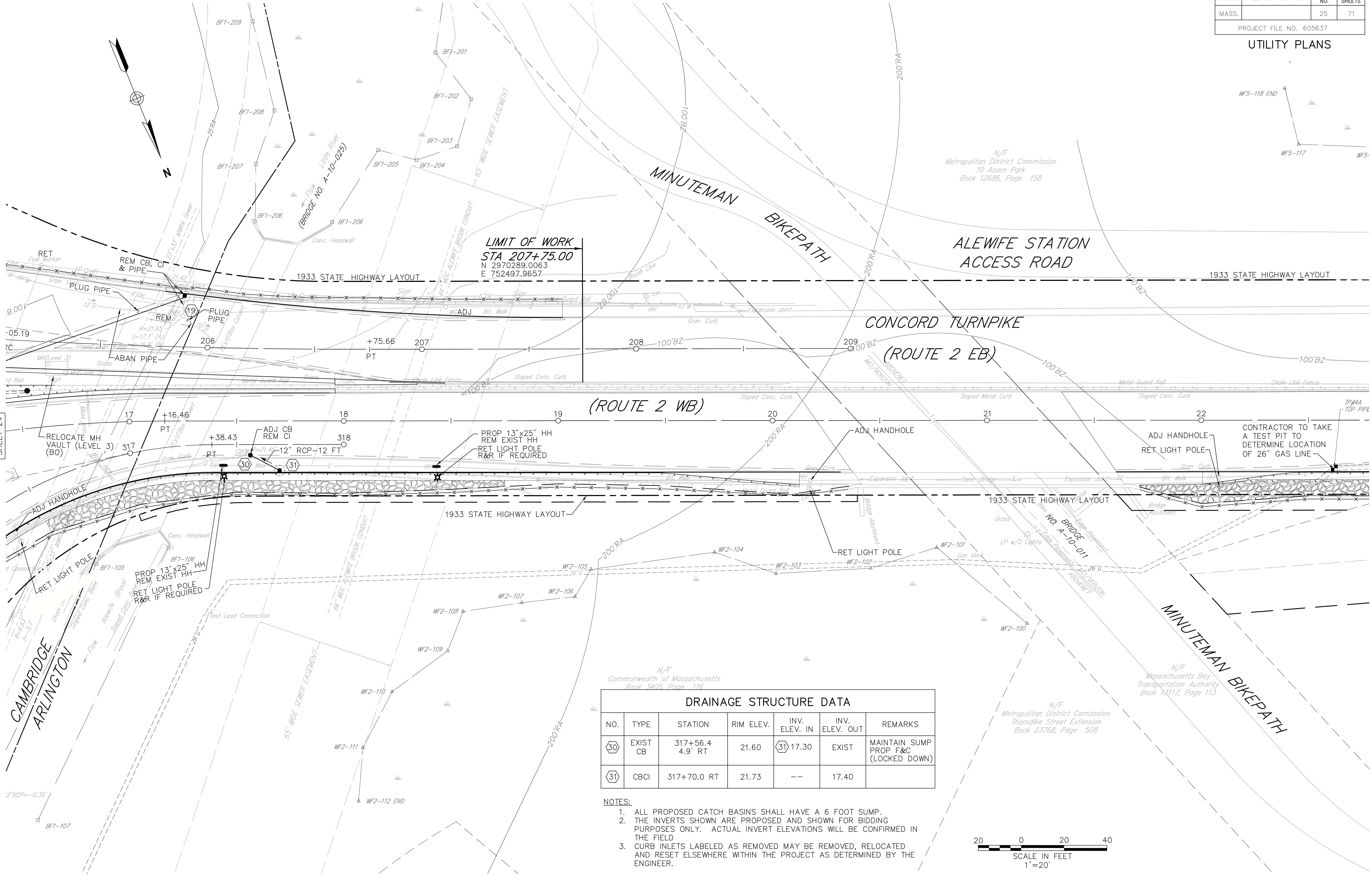
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		25	71

PROJECT FILE NO. 605637

UTILITY PLANS



DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
30	EXIST CB	317+56.4 4.9' RT	21.60	31 17.30	EXIST	MAINTAIN SUMP PROP F&C (LOCKED DOWN)
31	CBCI	317+70.0 RT	21.73	--	17.40	

NOTES:

1. ALL PROPOSED CATCH BASINS SHALL HAVE A 6 FOOT SUMP.
2. THE INVERTS SHOWN ARE PROPOSED AND SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD
3. CURB INLETS LABELED AS REMOVED MAY BE REMOVED, RELOCATED AND RESET ELSEWHERE WITHIN THE PROJECT AS DETERMINED BY THE ENGINEER.

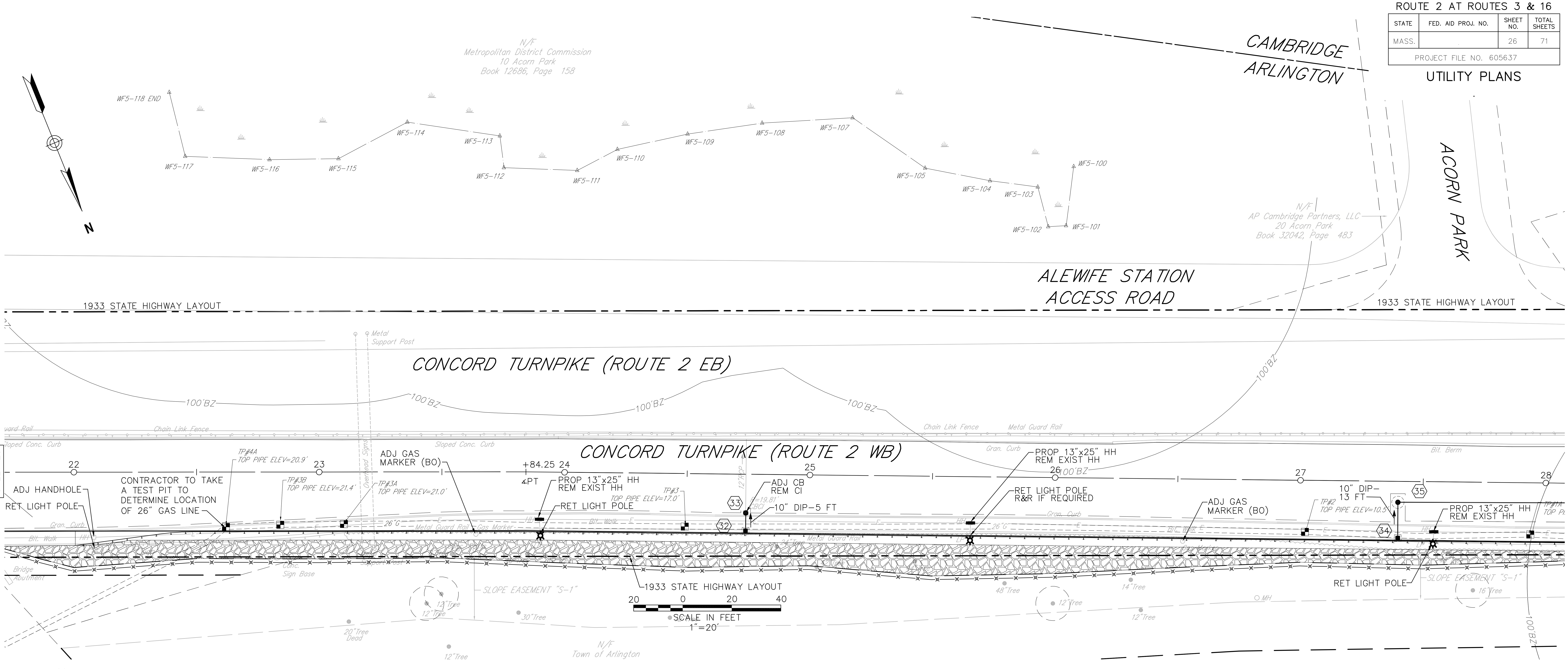
20 0 20 40
SCALE IN FEET
1"=20'

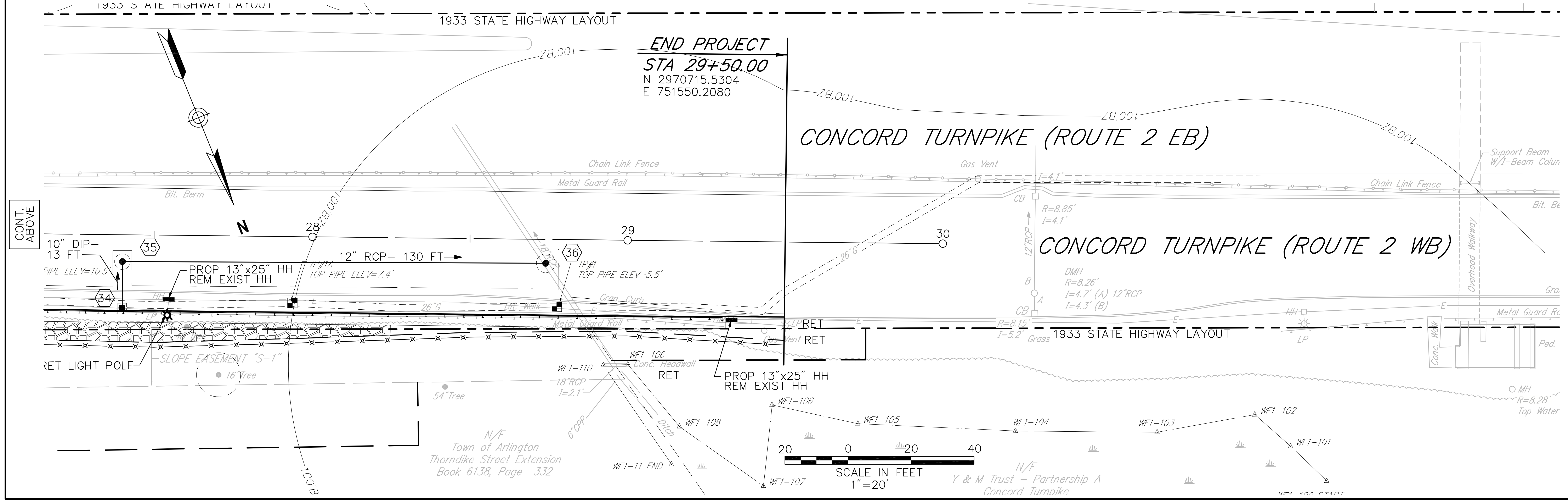
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		26	71

PROJECT FILE NO. 605637

UTILITY PLANS





DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
32	GI	24+74.0 RT	19.67	--	17.57	GI-SPECIAL PROP 6" F&G
33	EXIST CB	24+74.0 15.7' RT	19.89	32 17.52	EXIST	MAINTAIN SUMP PROP F&C (LOCKED DOWN)
34	GI	27+39.9 RT	12.57	--	10.47	GI-SPECIAL PROP 6" F&G
35	CB	27+39.7 8.5' RT	12.97	34 10.34	6.91	PROP CB w/SUMP PROP F&C
36	DMH	28+74.1 7.6' RT	10.35	35 5.71	EXIST 2.0±	6' DIAMETER BUILD OVER EXIST PIPE

NOTES:

1. ALL PROPOSED CATCH BASINS SHALL HAVE A 6 FOOT SUMP.
2. THE INVERTS SHOWN ARE PROPOSED AND SHOWN FOR BIDDING PURPOSES ONLY. ACTUAL INVERT ELEVATIONS WILL BE CONFIRMED IN THE FIELD
3. CURB INLETS LABELED AS REMOVED MAY BE REMOVED, RELOCATED AND RESET ELSEWHERE WITHIN THE PROJECT AS DETERMINED BY THE ENGINEER.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		27	71

PROJECT FILE NO. 605637

TRAFFIC PLANS

CONSTRUCTION NOTES:

1. REMOVE EXISTING TS EQUIPMENT UNLESS OTHERWISE NOTED.
2. RETAIN EXISTING TS CONDUIT & PULLBOXES UNLESS OTHERWISE NOTED.
3. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC UNLESS OTHERWISE NOTED. ALL SWEL, SYEL AND BWLL SHALL BE 4" WIDE UNLESS OTHERWISE NOTED.
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 GRASSY AREAS SHALL BE LOCATED 2"± ABOVE FINISHED GRADE.
7. RETAIN EXISTING SIGNS UNLESS OTHERWISE NOTED.
8. ALL PROPOSED SIGNS, INCLUDING R4-7, SHALL BE MOUNTED WITH 7' VERTICAL CLEARANCE UNLESS OTHER VERTICAL CLEARANCES ARE REQUIRED BY MUTCD OR MASSDOT REQUIREMENTS.

20 0 20 40
SCALE IN FEET

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CONSTRUCTION NOTES:

1. SEE SHEET 29 FOR TRAFFIC SIGNAL DATA.
2. REMOVE EXISTING TS EQUIPMENT UNLESS OTHERWISE NOTED.
3. RETAIN EXISTING TS CONDUIT & PULLBOXES UNLESS OTHERWISE NOTED.
4. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC UNLESS OTHERWISE NOTED. ALL SWEL, SYEL AND BWLL SHALL BE 4" WIDE UNLESS OTHERWISE NOTED.
5. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
6. TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
7. THE TOP OF ALL MAST ARM FOUNDATIONS IN GRASSY AREAS SHALL BE LOCATED 2"± ABOVE FINISHED GRADE.
8. RETAIN EXISTING SIGNS UNLESS OTHERWISE NOTED.
9. ALL PROPOSED SIGNS, INCLUDING R4-7, SHALL BE MOUNTED WITH 7' VERTICAL CLEARANCE UNLESS OTHER VERTICAL CLEARANCES ARE REQUIRED BY MUTCD OR MASSDOT REQUIREMENTS.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		28	71
PROJECT FILE NO. 605637			

TRAFFIC PLANS
LOCATION 1

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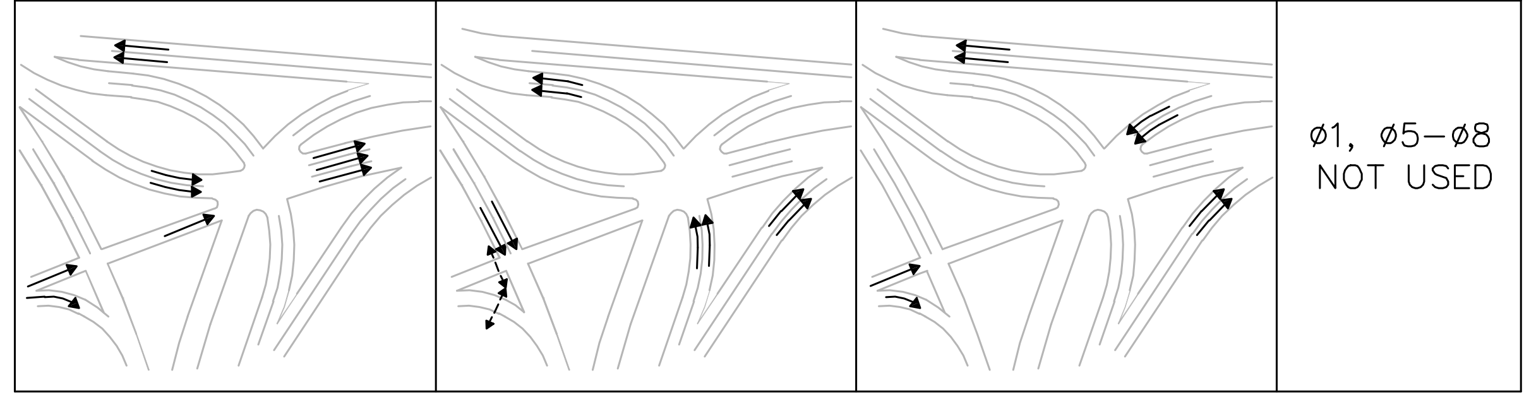
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		29	71
PROJECT FILE NO. 605637			

TRAFFIC PLANS
LOCATION 1

SEQUENCE AND TIMING (COORDINATED)

APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	FLASHING OPERATION
MINIMUM INTERVAL			10			10			10			
VEHICLE EXTENSION			–			–			–			
MAXIMUM 1			35			25			25			
MAXIMUM 2			30			25			20			
YELLOW CLEARANCE				4			4			3.5		
RED CLEARANCE					1			2			1.5	
PEDESTRIAN INTERVAL						7/14						
ROUTE 16	NB	J,K	R	R	R	↑G	Y	R	R	R	R	FR
ROUTE 16/ROUTE 2	NB/WB	L,M,N,P,CC	↑G	Y	R	R	R	R	R	R	R	FR
ROUTE 16	SB	C,D	R	R	R	G↗	Y	R	R	R	R	FR
ROUTE 16	SB	Q,R,S	R	R	R	↖G	Y	R	R	R	R	FR
ROUTE 16	SB	Z,AA,BB	R	R	R	G↗	Y	R	G↗	Y	R	FR
ROUTE 2	EB	A,B	G↗	Y	R	R	R	R	G↗	Y	R	FR
ROUTE 2	EB	T,U,V	R	R	R	R	R	R	↖G	Y	R	FR
ROUTE 2	WB	W,X,Y	↑G	Y	R	R	R	R	R	R	R	FR
ALEWIFE STATION ACCESS RD	WB	E,F	↑G	Y	R	R	R	R	↑G	Y	R	FR
ALEWIFE STATION ACCESS RD	WB	G,H,DD	→G	Y	R	R	R	R	→G	Y	R	FR
PEDESTRIAN X-ING	N–S	P1–P2, P3–P4	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	OUT
DETECTOR			–			–			–			
RECALL			MAX			MAX/PED			MAX			
			ø2			ø3			ø4			ø1, ø5–ø8 NOT USED



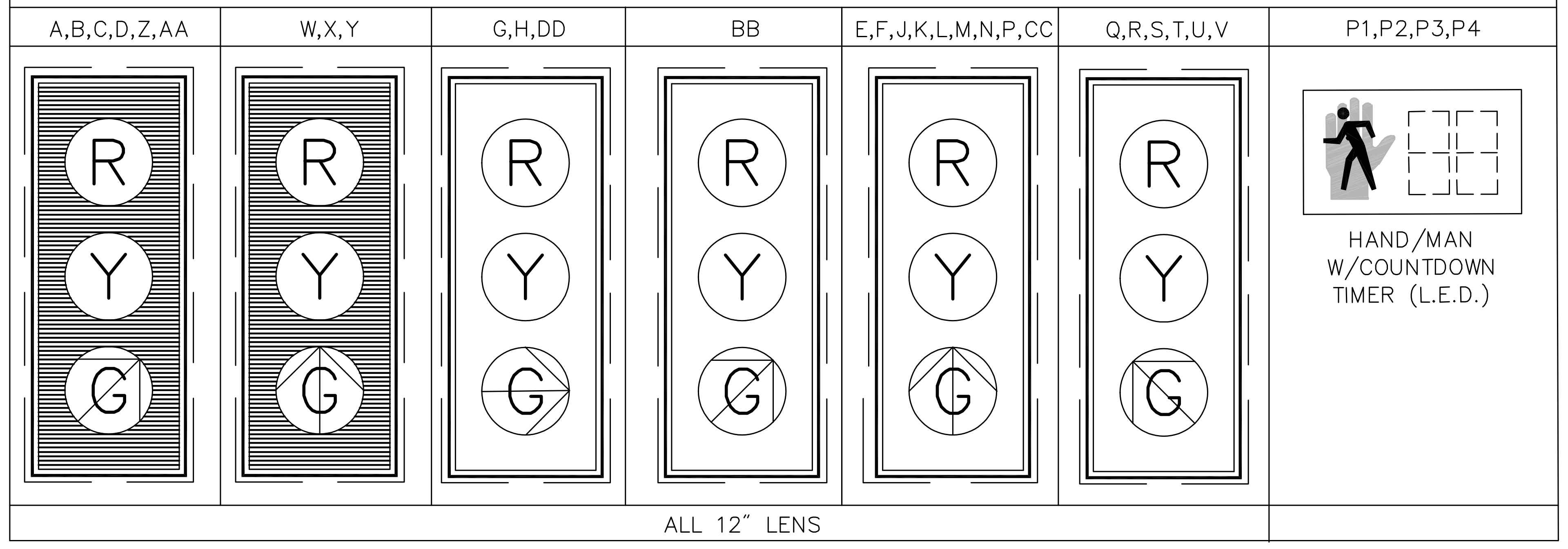
NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D.
2. MAXIMUM 1 = NORMAL OPERATION
3. MAXIMUM 2 = 1:00AM–6:00AM EVERYDAY
4. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.
6. SEE SHEETS 36–38 FOR COORDINATION DATA.

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.

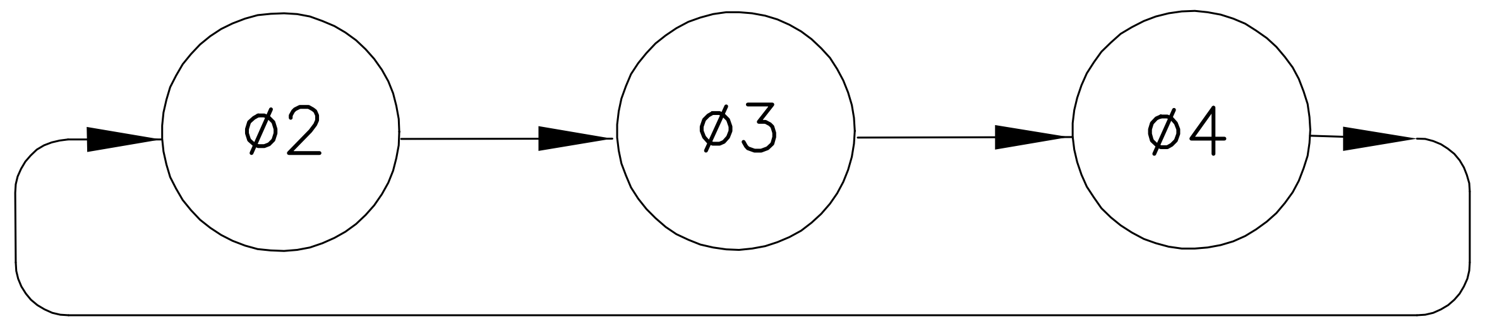
SIGNAL HEAD DATA

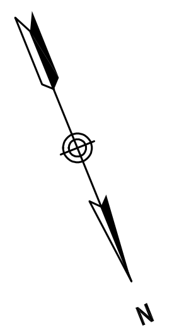
A,B,C,D,Z,AA	W,X,Y	G,H,DD	BB	E,F,J,K,L,M,N,P,CC	Q,R,S,T,U,V	P1,P2,P3,P4
ALL 12" LENS						HAND/MAN W/COUNTDOWN TIMER (L.E.D.)



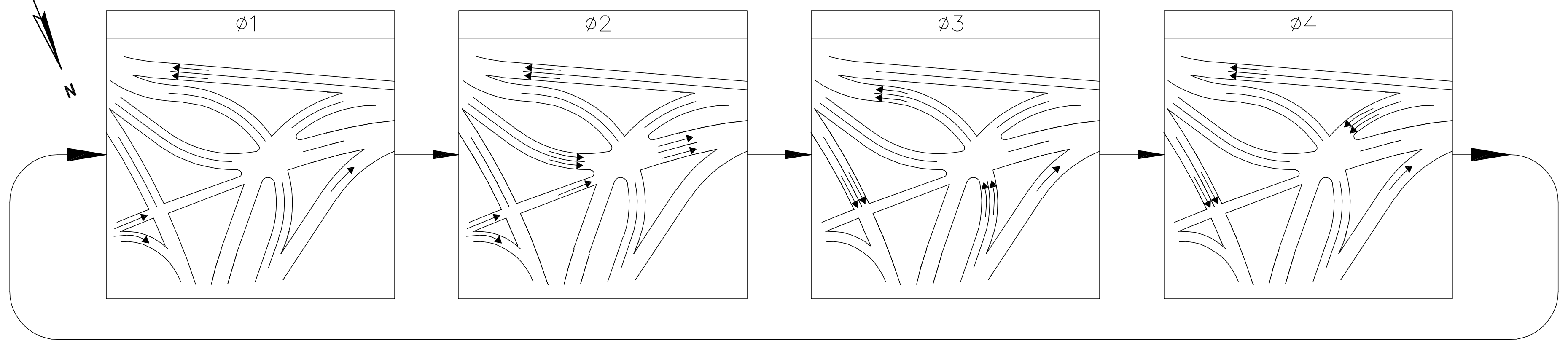
NOTES:
1. ALL SIGNAL HEADS SHALL BE RIGID MOUNTED.
2. ALL SIGNAL HEADS SHALL BE EQUIPPED 5"± LOUVERED BACKPLATES ALL BACKPLATES SHALL CONTAIN A 3" WIDE YELLOW REFLECTIVE BORDERS.
3. ALL SIGNAL HEADS SHALL BE EQUIPPED WITH TUNNEL VISORS.
4. SIGNAL DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES AS NOTED.
5. SIGNAL HEADS A,B,C,D,W,X,Y,Z & AA SHALL HAVE OPTICALLY PROGRAMMABLE DISPLAYS & SHALL BE PROGRAMMED IN THE FIELD.

PROPOSED PREFERENTIAL PHASE SEQUENCE





EXISTING PREFERENTIAL PHASE SEQUENCE



ITEM 816.01
TRAFFIC SIGNAL RECONSTRUCTION
ROUTE 2 AT ROUTE 16
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	MODIFY EXISTING TS CONTROLLER TO ACCOMMODATE PROPOSED TIMING & PHASING
1	TS 15' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
1	TS 25' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
1	TS 30' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
1	TS 40' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
2	TS 45' MAST ARM TYPE 2, HEAVY LOADING, STEEL, INCL. FOUNDATION
1	TS 45' MAST ARM TYPE 2, HEAVY LOADING, STEEL, (SPARE)
2	TS POST 8' STANDARD INCL. FOUNDATION
6	TS POST 10' STANDARD INCL. FOUNDATION
19	SIGNAL HEAD, 3–SECTION, 12" LENSES
9	SIGNAL HEAD, 3–SECTION, 12" LENSES (OPTICALLY PROG.)
4	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER
2	APS PEDESTRIAN PUSH BUTTON W/R10–3e(R)
1	APS PEDESTRIAN PUSH BUTTON W/R10–3e(MOD)
14	PULL BOX–12"x12"

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

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		30	71

PROJECT FILE NO. 605637

TRAFFIC PLANS

CONSTRUCTION NOTES:

1. REMOVE EXISTING TS EQUIPMENT UNLESS OTHERWISE NOTED.
2. RETAIN EXISTING TS CONDUIT & PULL BOXES UNLESS OTHERWISE NOTED.
3. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC UNLESS OTHERWISE NOTED. ALL SWEL, SYEL BWLL AND DWLEx SHALL BE 4" WIDE UNLESS OTHERWISE NOTED. ALL PAVEMENT MARKINGS ON ROUTE 2 WESTBOUND BETWEEN BRIDGE JOINT AT APPROX STA 21+50 AND STA 29+50 SHALL BE 6" RECESSED REFLECTORIZED POLYUREA .
4. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
5. THE TOP OF ALL MAST ARM FOUNDATIONS IN GRASSY AREAS SHALL BE LOCATED 2"± ABOVE FINISHED GRADE.
6. RETAIN EXISTING SIGNS UNLESS OTHERWISE NOTED.
7. ALL PROPOSED SIGNS, INCLUDING R4-7, SHALL BE MOUNTED WITH 7' VERTICAL CLEARANCE UNLESS OTHER VERTICAL CLEARANCES ARE REQUIRED BY MUTCD OR MASSDOT REQUIREMENTS.

20 0 20 40
SCALE IN FEET
1"=20'

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

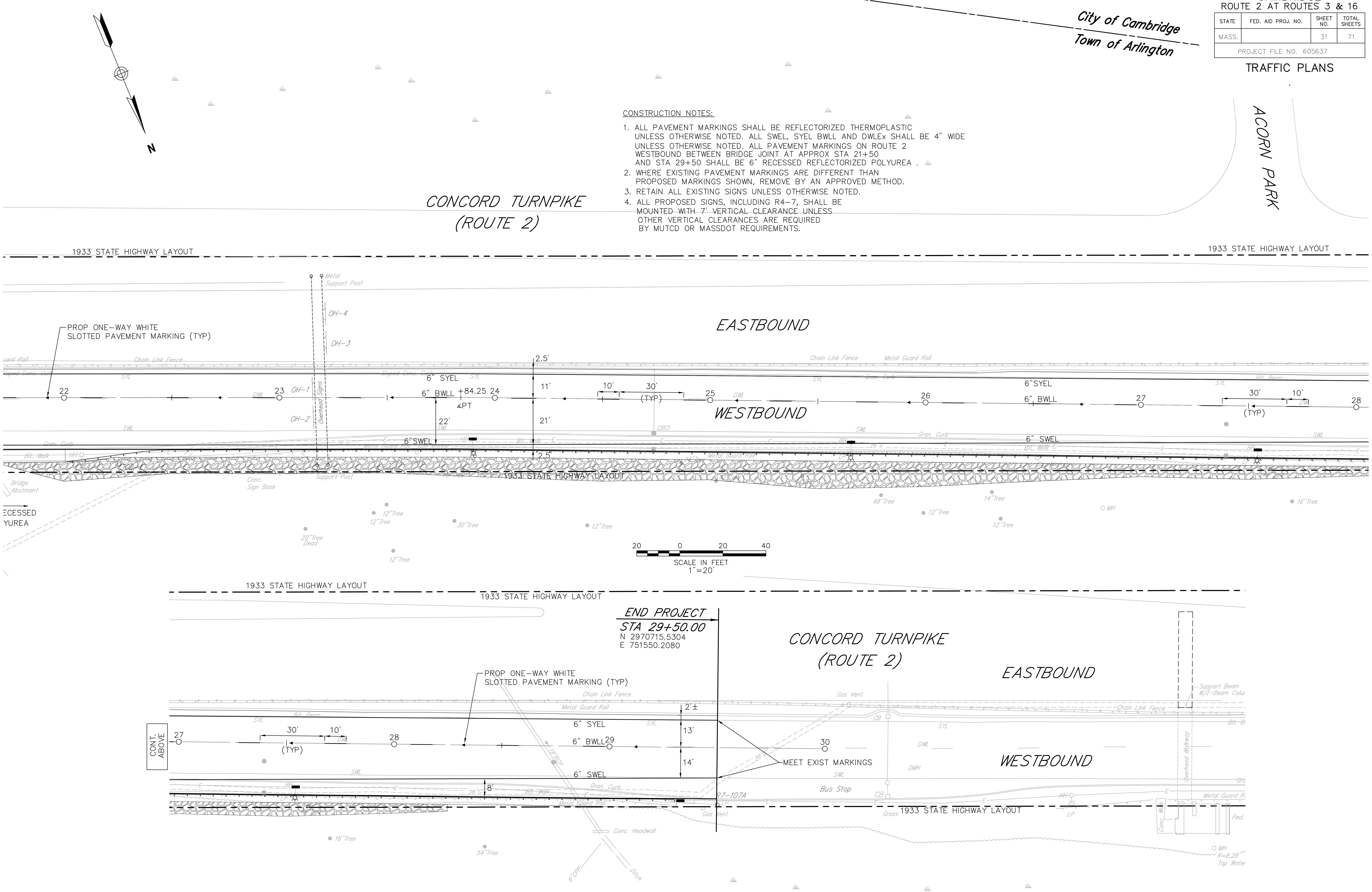
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		31	71

PROJECT FILE NO. 605637

TRAFFIC PLANS

CONSTRUCTION NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE REFLECTORIZED THERMOPLASTIC UNLESS OTHERWISE NOTED. ALL SWEL, SYEL BWLL AND DWLEx SHALL BE 4" WIDE UNLESS OTHERWISE NOTED. ALL PAVEMENT MARKINGS ON ROUTE 2 WESTBOUND BETWEEN BRIDGE JOINT AT APPROX STA 21+50 AND STA 29+50 SHALL BE 6" RECESSED REFLECTORIZED POLYUREA .
2. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
3. RETAIN ALL EXISTING SIGNS UNLESS OTHERWISE NOTED.
4. ALL PROPOSED SIGNS, INCLUDING R4–7, SHALL BE MOUNTED WITH 7' VERTICAL CLEARANCE UNLESS OTHER VERTICAL CLEARANCES ARE REQUIRED BY MUTCD OR MASSDOT REQUIREMENTS.



CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		32	71
PROJECT FILE NO. 605637			

TRAFFIC PLANS
LOCATION 2

CONSTRUCTION NOTES:

1. SEE SHEET 33 FOR TRAFFIC SIGNAL DATA.
2. RETAIN EXISTING TS EQUIPMENT, AND TS CONDUIT UNLESS OTHERWISE NOTED.
3. RETAIN EXISTING SIGNS UNLESS OTHERWISE NOTED.
4. PROP SIGNS BR-1 & BP-1 ARE SHOWN ON THIS PLAN FOR INFORMATIONAL PURPOSES ONLY. SEE SHEET 12 FOR EXACT PLACEMENT.
5. ALL PROPOSED SIGNS, INCLUDING R4-7, SHALL BE MOUNTED WITH 7′ VERTICAL CLEARANCE UNLESS OTHER VERTICAL CLEARANCES ARE REQUIRED BY MUTCD OR MASSDOT REQUIREMENTS.

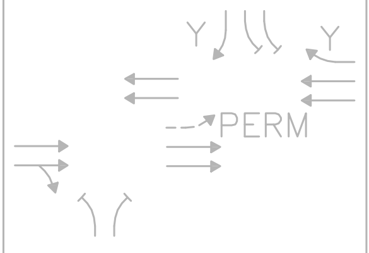
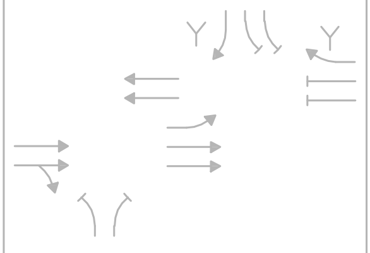
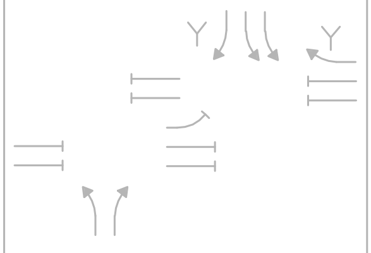
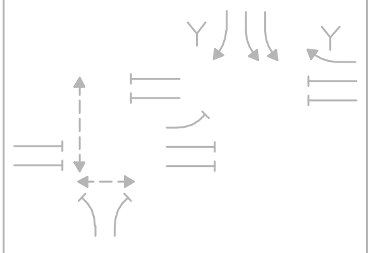
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		33	71
PROJECT FILE NO. 605637			

TRAFFIC PLANS
LOCATION 2

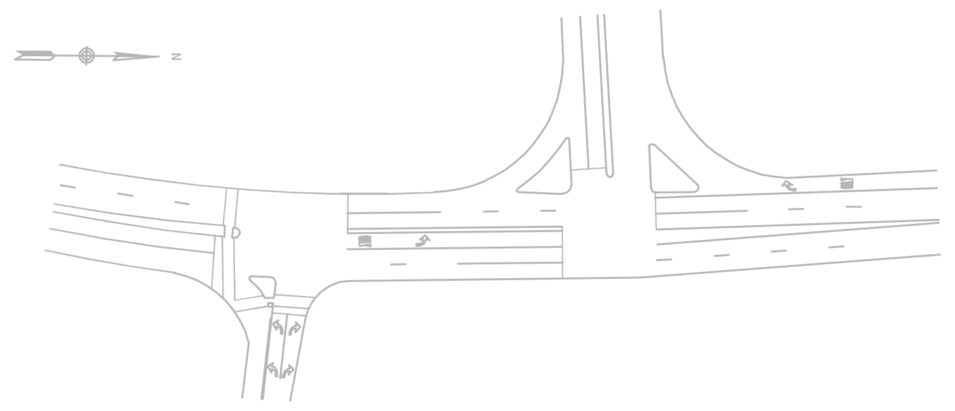
PROPOSED/EXISTING SEQUENCE AND TIMING (COORDINATED)

APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	10	11	12	FLASHING OPERATION
MINIMUM INTERVAL			10			6			6			6			
VEHICLE EXTENSION			–			–			–			–			
MAXIMUM 1			30			10			15			30			
MAXIMUM 2			–			–			–			–			
YELLOW CLEARANCE				4.5			4.5			3			3		
RED CLEARANCE					1.5			1.5			3			1.5	
PEDESTRIAN INTERVAL												7/19			
ALEWIFE BROOK PARKWAY	NB	A	G	Y	R	←G G	Y	R	R	R	R	R	R	R	FY
ALEWIFE BROOK PARKWAY	NB	B,C	G	Y	R	G	Y	R	R	R	R	R	R	R	FY
ALEWIFE BROOK PARKWAY	SB	D,E,F	G	Y	R	R	R	R	R	R	R	R	R	R	FY
CAMBRIDGEPARK DRIVE	EB	G,H,J	R	R	R	R	R	R	G	Y	R	G	Y	R	FR
ALEWIFE BROOK PARKWAY	NB	K,L,M	G	Y	R	G	Y	R	R	R	R	R	R	R	FY
ALEWIFE BROOK PARKWAY	SB	N,P	↑G	Y	R	↑G	Y	R	R	R	R	R	R	R	FY
RINDGE AVENUE	WB	Q,R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
PEDESTRIAN X-ING	N-S	P3,P4,P7,P8	DW	DW	DW	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	OUT
DETECTOR			–			NON-LOCK			NON-LOCK			NON-LOCK			
RECALL			MAX			NONE			NONE			NONE			

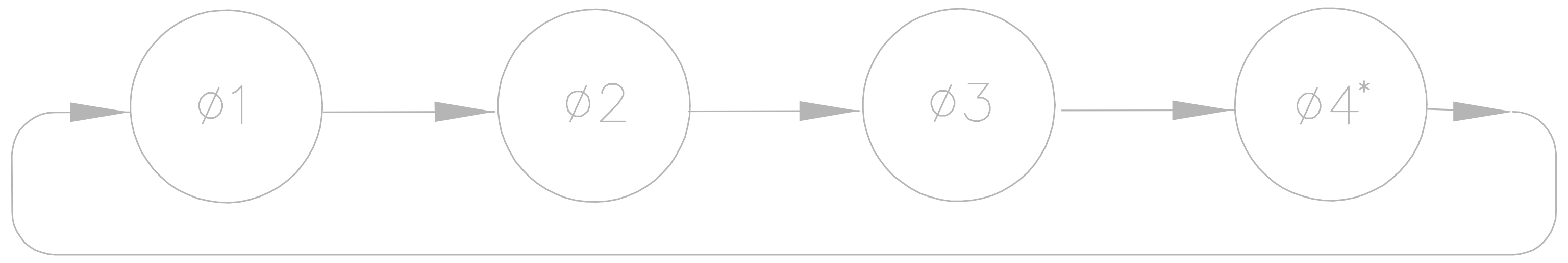
Ø1	Ø2	Ø3	Ø4*	
				Ø5–Ø8 NOT USED

NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D.
2. PERM = PERMISSIVE
3. Y = YIELD CONTROL
4. MAXIMUM 1 = NORMAL OPERATION
5. MAXIMUM 2 = NOT USED
6. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
7. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.
8. SEE SHEETS 36–38 FOR COORDINATION DATA.

INTERSECTION SKETCH



EXISTING PREFERENTIAL PHASE SEQUENCE



* UPON PEDESTRIAN PUSH BUTTON ACTUATION

SEQUENCE & TIMING NOTES:

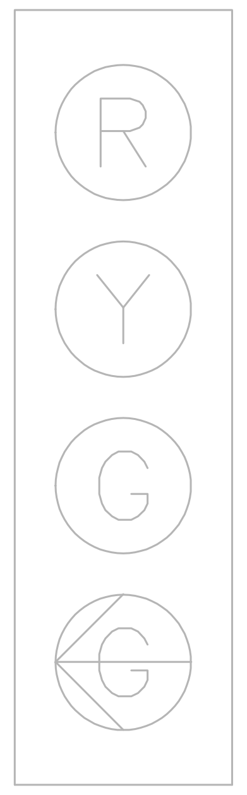
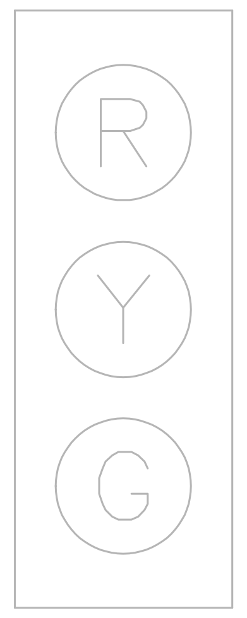
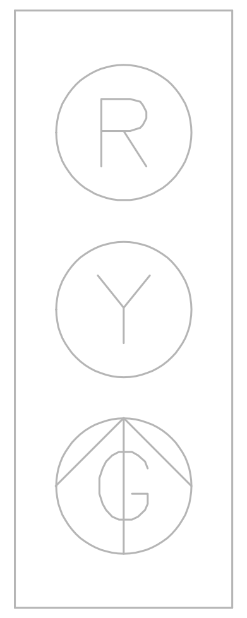
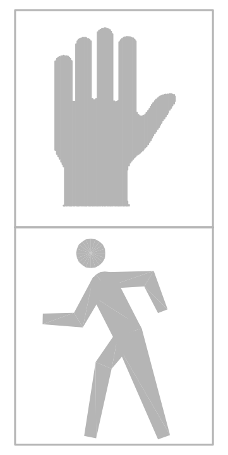
1. IF THE ASSIGNED RIGHT OF WAY FOR ANY TRAFFIC MOVEMENT IS TO REMAIN IN EFFECT DURING THE NEXT CALLED PHASE, THE SIGNAL INDICATIONS FOR THAT TRAFFIC MOVEMENT WILL NOT CHANGE DURING THE CLEARANCE INTERVAL.
2. THE RIGHT OF WAY MAY BE ASSIGNED TO ANY PHASE OR ANY COMBINATION OF NON-CONFLICTING PHASES.
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.

ITEM 816.02
TRAFFIC SIGNAL RECONSTRUCTION
ALEWIFE BROOK PARKWAY AT RINDGE AVENUE/CAMBRIDGEPARK PLACE
LIST OF MAJOR ITEMS REQUIRED

QUANTITY	DESCRIPTION
1	MODIFY EXISTING TS 2 CONTROLLER & TS MASTER TO ACCOMMODATE PROPOSED TIMING & COORDINATION DATA
1	GPS COORDINATION SYSTEM (1 RECEIVER, 1 REFERENCE UNIT, AND CABLE)

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

EXSTING SIGNAL HEAD DATA

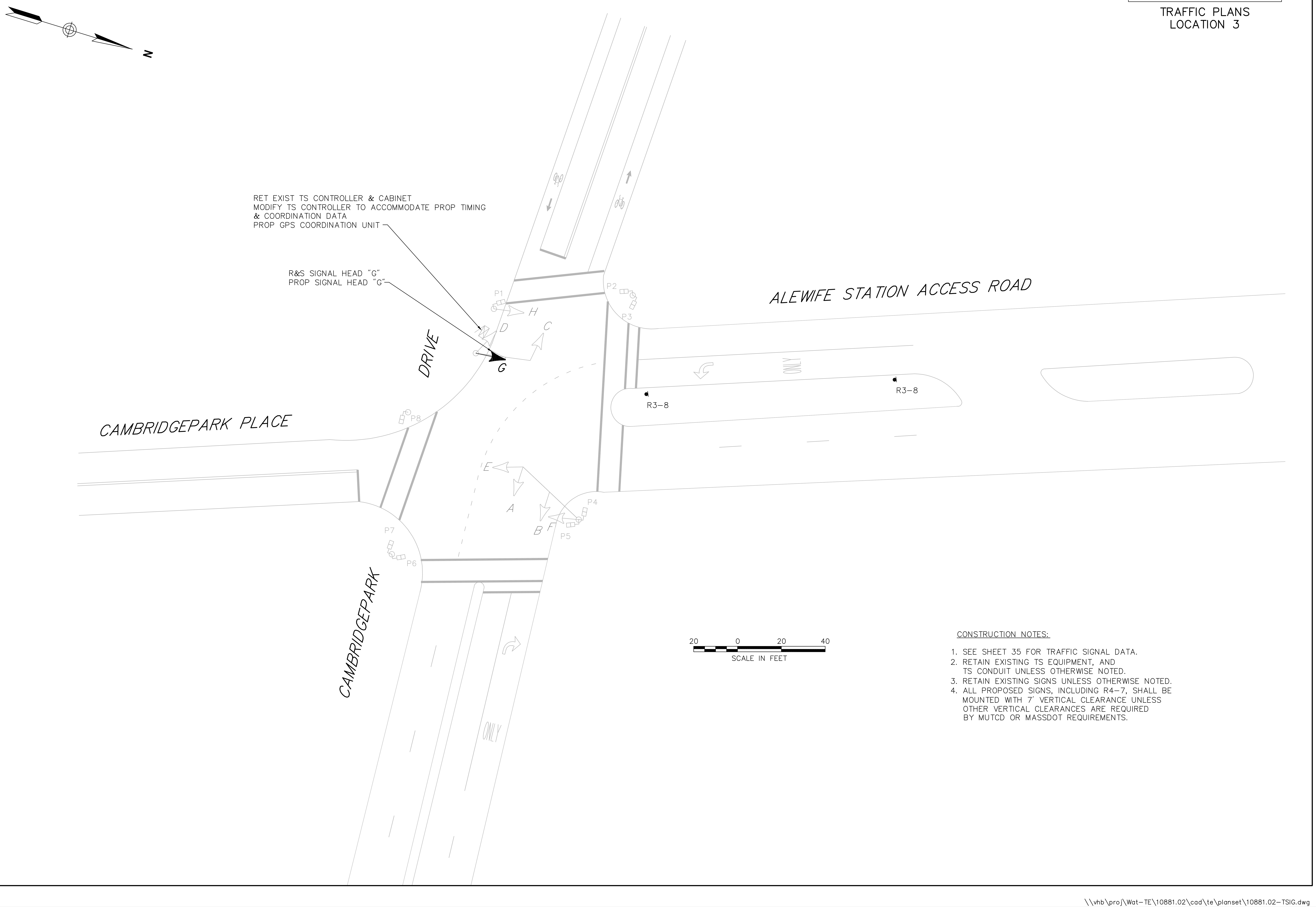
A	B,C,D,E,F,G,H,J, K,L,M,Q,R	N,P	P1–P4
			
ALL 12" LENS			

\\vhb\proj\Wat-TE\10881.02\cad\te\planset\10881.02-TSIG.dwg

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		34	71
PROJECT FILE NO. 605637			

TRAFFIC PLANS
LOCATION 3



CONSTRUCTION NOTES:

1. SEE SHEET 35 FOR TRAFFIC SIGNAL DATA.
2. RETAIN EXISTING TS EQUIPMENT, AND TS CONDUIT UNLESS OTHERWISE NOTED.
3. RETAIN EXISTING SIGNS UNLESS OTHERWISE NOTED.
4. ALL PROPOSED SIGNS, INCLUDING R4–7, SHALL BE MOUNTED WITH 7' VERTICAL CLEARANCE UNLESS OTHER VERTICAL CLEARANCES ARE REQUIRED BY MUTCD OR MASSDOT REQUIREMENTS.

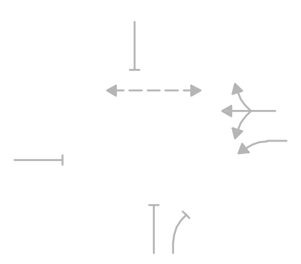
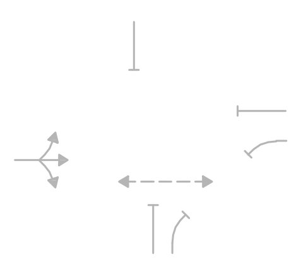
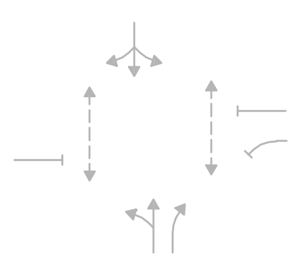
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		35	71
PROJECT FILE NO. 605637			

TRAFFIC PLANS
LOCATION 3

PROPOSED/EXISTING SEQUENCE AND TIMING (COORDINATED)

APPROACH	DIRECTION	HOUSING	1	2	3	4	5	6	7	8	9	FLASHING OPERATION
MINIMUM INTERVAL			10			6			10			
VEHICLE EXTENSION			–			–			–			
MAXIMUM 1			20			20			30			
MAXIMUM 2			–			–			–			
YELLOW CLEARANCE				4			4			4		
RED CLEARANCE					1.5			1.5			2	
PEDESTRIAN INTERVAL			7/7			7/11			7/17			
CAMBRIDGEPARK DRIVE	WB	A,B	R	R	R	R	R	R	G	Y	R	FY
CAMBRIDGEPARK DRIVE	EB	C,D	R	R	R	R	R	R	G	Y	R	FY
CAMBRIDGEPARK PLACE	NB	E,F	R	R	R	G	Y	R	R	R	R	FR
ALEWIFE STATION ACCESS ROAD	SB	~~G~~,H	G	Y	R	R	R	R	R	R	R	FR
ALEWIFE STATION ACCESS ROAD	SB	G	~~←G~~ G	Y	R	R	R	R	R	R	R	FR
PEDESTRIAN X-ING	E-W	P1,P2	W/FDW	DW	DW	DW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	N-S	P5,P6	DW	DW	DW	W/FDW	DW	DW	DW	DW	DW	OUT
PEDESTRIAN X-ING	N-S	P3,P4,P7,P8	DW	DW	DW	DW	DW	DW	W/FDW	DW	DW	OUT

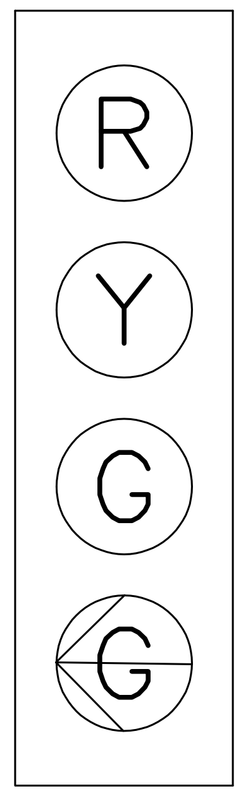
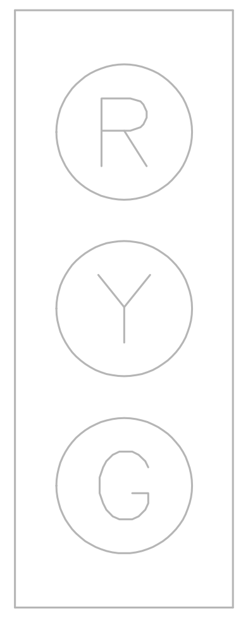
DETECTOR	–	–	–	
RECALL	MAX	MAX	MAX	
	ø2	ø4	ø6	
				ø1,ø3,ø5, ø7&ø8 NOT USED

NOTES:
1. AUTOMATIC FLASHING OPERATION PER M.U.T.C.D.
2. PERM = PERMISSIVE
3. MAXIMUM 1 = NORMAL OPERATION
4. MAXIMUM 2 = NOT USED
5. STOP AND GO OPERATION FOR 24 HOURS PER DAY. FLASHING OPERATION FOR EMERGENCY ONLY.
6. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.
7. SEE SHEETS 36–38 FOR COORDINATION DATA.

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.

PROPOSED/EXISTING SIGNAL HEAD DATA

G	A,B,C,D,E,F,~~G~~,H	P1–P8
	 R&S G	 (L.E.D.)
	ALL 12" LENS	

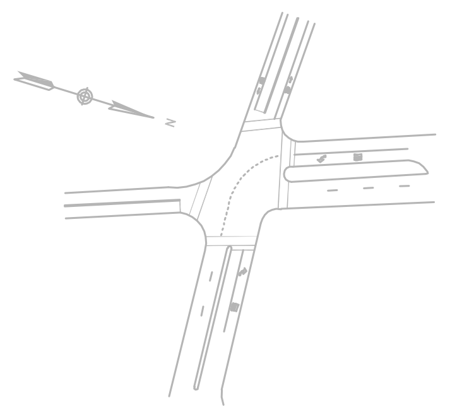
NOTES:
1. PROP SIGNAL HEAD G SHALL BE RIGID MOUNTED AND EQUIPPED WITH TUNNEL VISORS.
2. SIGNAL HEAD G DISPLAYS SHALL BE EQUIPPED W/L.E.D. MODULES.

ITEM 816.03
TRAFFIC SIGNAL RECONSTRUCTION
CAMBRIDGEPARK DRIVE AT ALEWIFE STATION ACCESS ROAD/CAMBRIDGEPARK PLACE
LIST OF MAJOR ITEMS REQUIRED

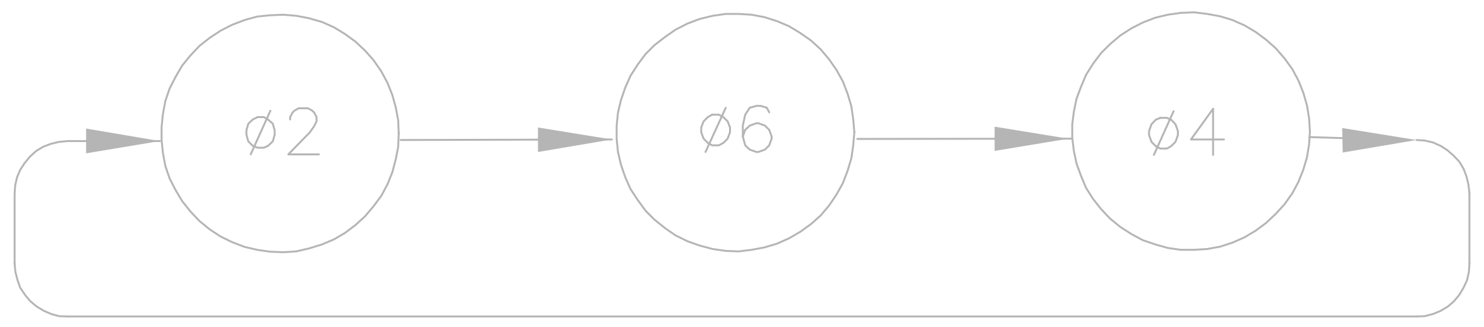
QUANTITY	DESCRIPTION
1	MODIFY EXISTING TS 2 CONTROLLER TO ACCOMMODATE PROPOSED TIMING & COORDINATION DATA
1	GPS COORDINATION SYSTEM (1 RECEIVER, 1 REFERENCE UNIT, AND CABLE)
1	SIGNAL HEAD, 4-SECTION, 12" LENSES

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

INTERSECTION SKETCH



EXISTING PREFERENTIAL PHASE SEQUENCE

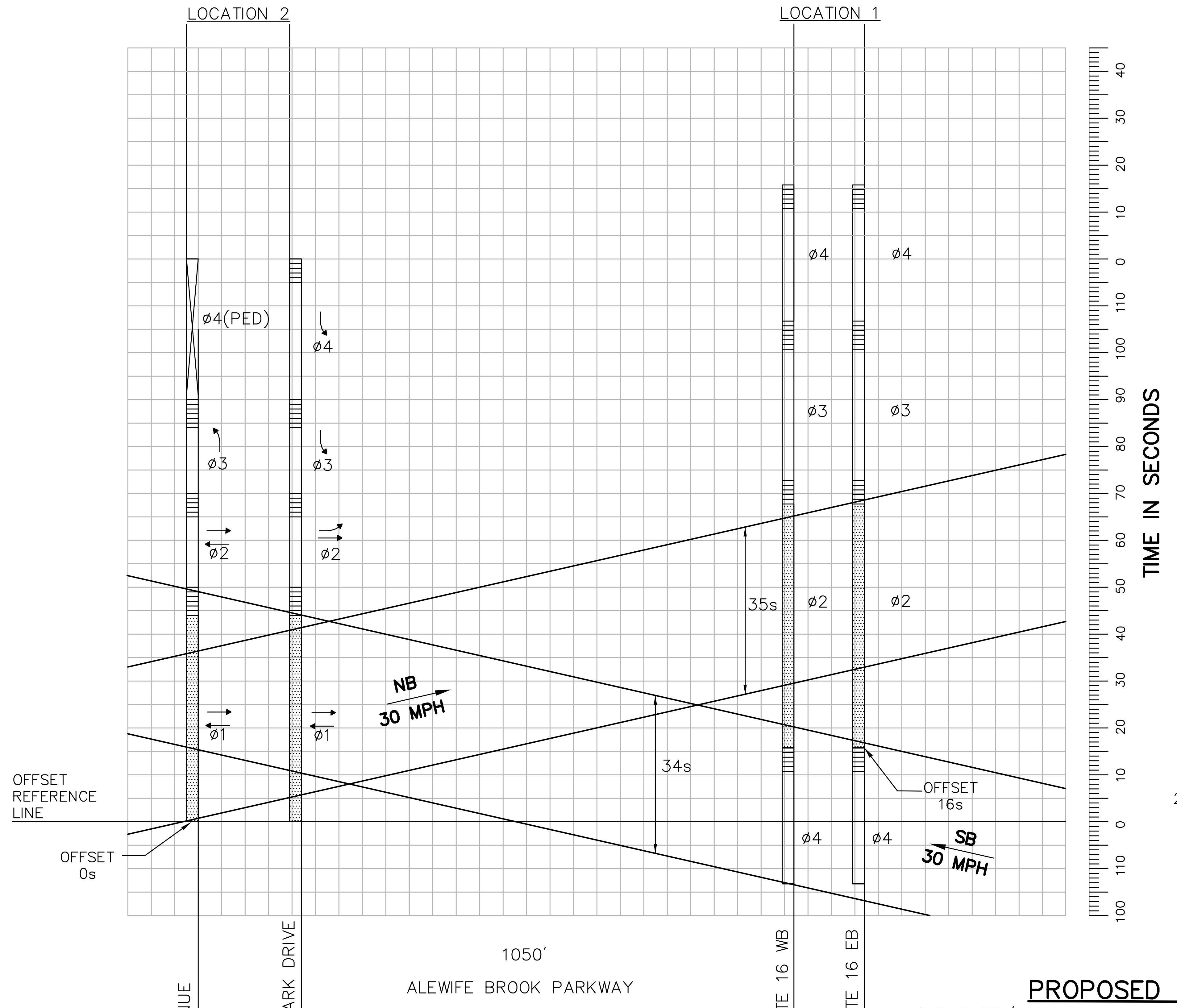


CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

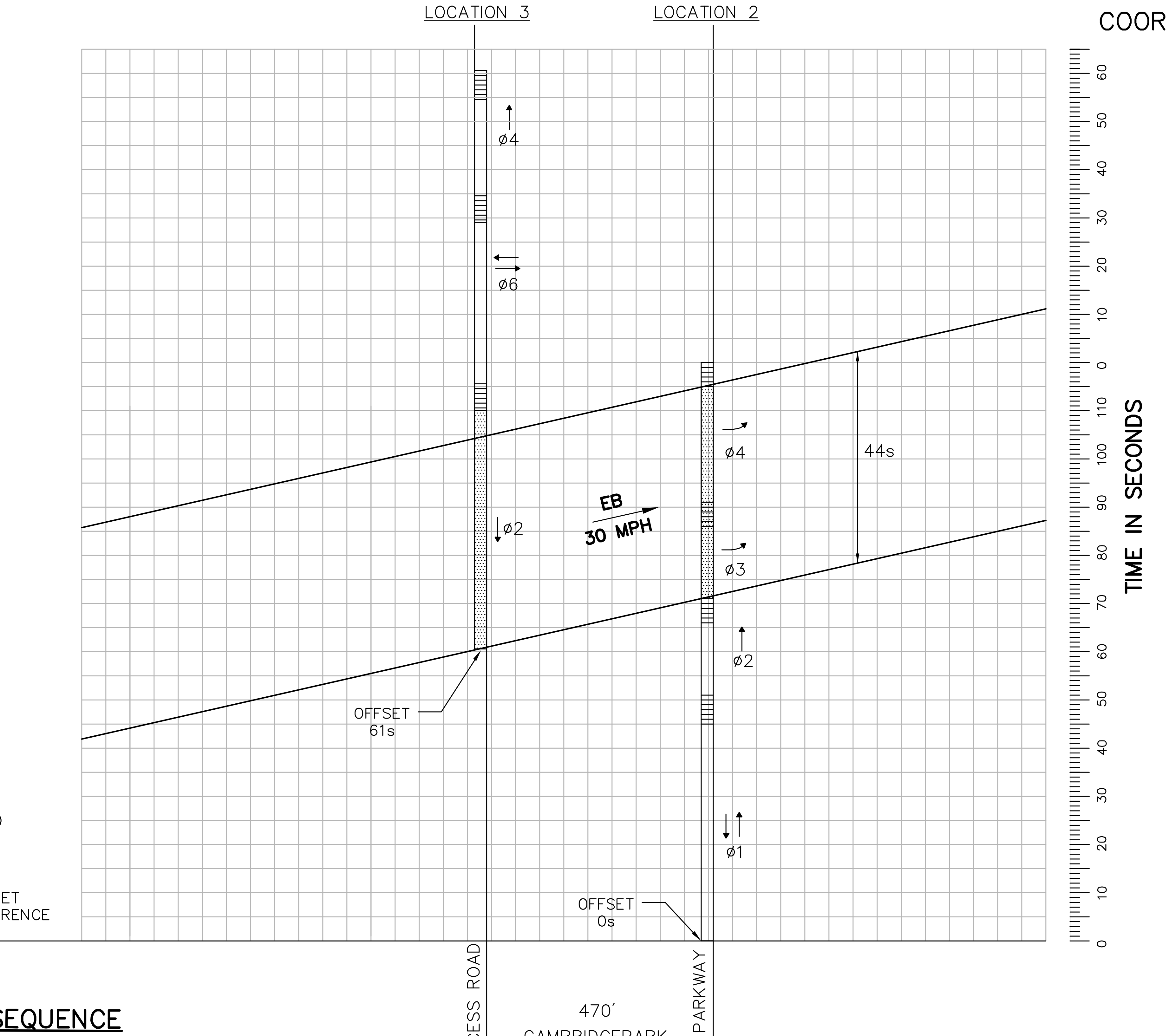
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		36	71
PROJECT FILE NO. 605637			

COORDINATION DATA

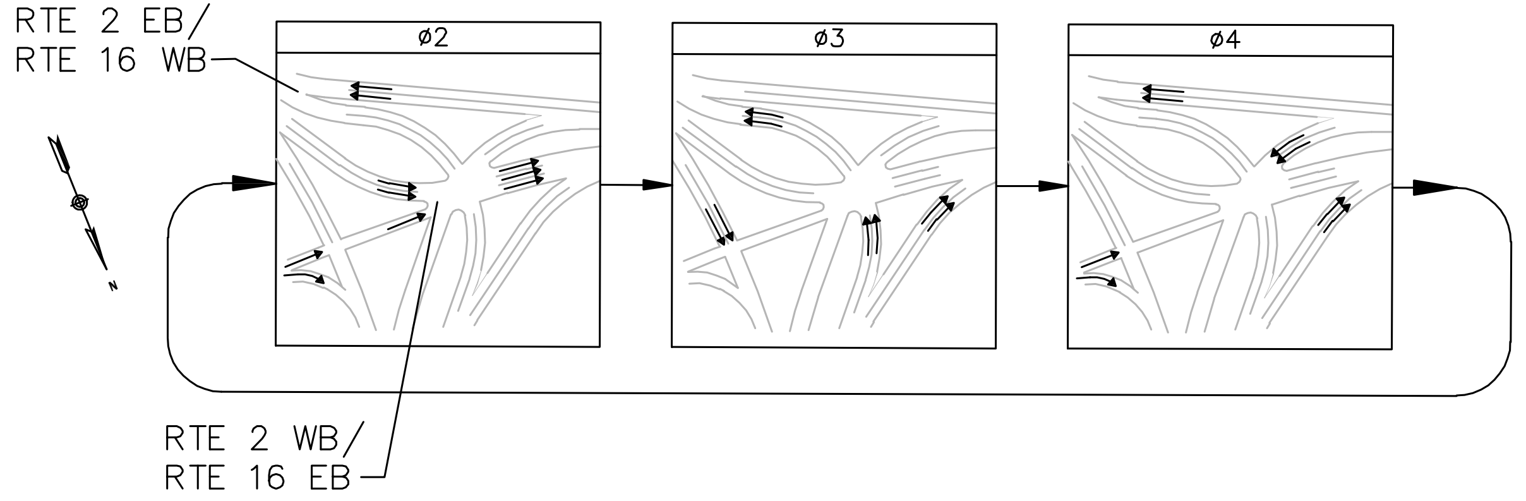
PLAN 1 WEEKDAY MORNING PEAK HOURS
ROUTE 16
120 SECOND CYCLE



PLAN 1 WEEKDAY MORNING PEAK HOURS
CAMBRIDGEPARK DRIVE
120 SECOND CYCLE



LOCATION 1
PROPOSED PREFERENTIAL PHASE SEQUENCE



LOCATION 1
ROUTE 2 AT ROUTE 16

COORDINATION DATA

(ALL ENTRIES IN SECONDS)

	PLAN 1
CYCLE LENGTH	120 SEC
OFFSET	16
SPLIT ø1	57
SPLIT ø2	34
SPLIT ø3	29
COORDINATED PHASE	ø2

NOTES:
1. ø2 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø2 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

LOCATION 2
ALEWIFE BROOK PARKWAY AT CAMBRIDGEPARK DRIVE/RINDGE AVENUE
(MASTER CONTROLLER LOCATION)

COORDINATION DATA

(ALL ENTRIES IN SECONDS)

	PLAN 1
CYCLE LENGTH	120 SEC
OFFSET	0
SPLIT ø1	50
SPLIT ø2	20
SPLIT ø3	20
SPLIT ø4	30
COORDINATED PHASE	ø1

NOTES:
1. ø1 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø1 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

LOCATION 3
CAMBRIDGEPARK DRIVE AT ALEWIFE STATION ACCESS ROAD

COORDINATION DATA

(ALL ENTRIES IN SECONDS)

	PLAN 1
CYCLE LENGTH	120 SEC
OFFSET	61
SPLIT ø2	55
SPLIT ø4	26
SPLIT ø6	39
COORDINATED PHASE	ø2

NOTES:
1. ø2 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø2 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

DAILY & WEEKLY COORDINATION PROGRAM

	MONDAY THRU FRIDAY	SATURDAY	SUNDAY
PLAN 1 120" CYCLE	0600–1000	–	–
PLAN 2 100" CYCLE	1400–2000	–	–
PLAN 3 100" CYCLE	1000–1400	1000–1900	1000–1900
FREE OPERATION	0000–0600 2000–0000	0000–1000 1900–0000	0000–1000 1900–0000
FLASH OPERATION	–	–	–

LEGEND

▒	COORDINATED PHASE(S) GREEN TIME
☐	NON-COORDINATED PHASES(S) GREEN TIME
▥	CLEARANCE TIME (YELLOW + RED)
←	PHASE MOVEMENT
—	INTERSECTION-INTERSECTION COORDINATION BAND

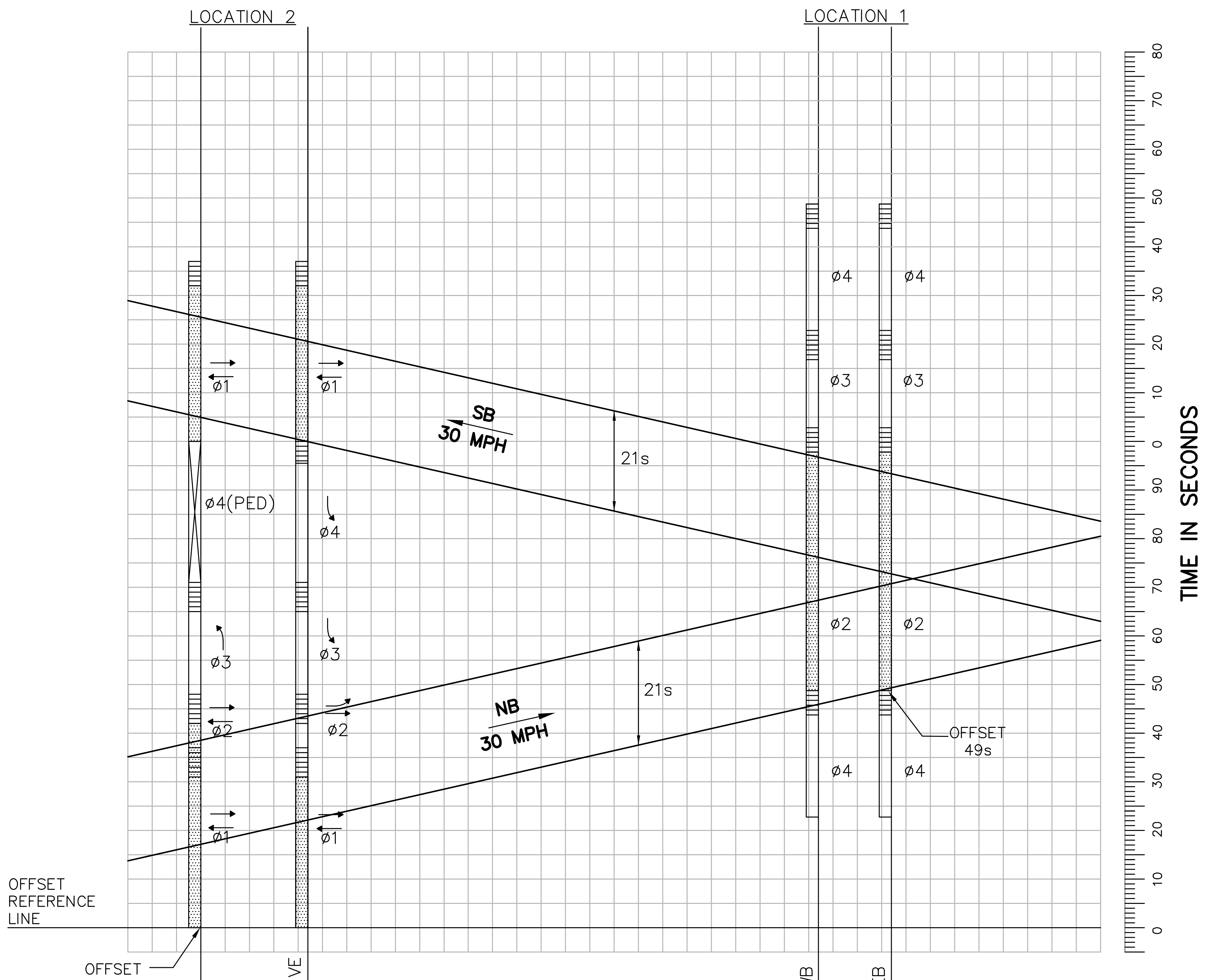
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		37	71

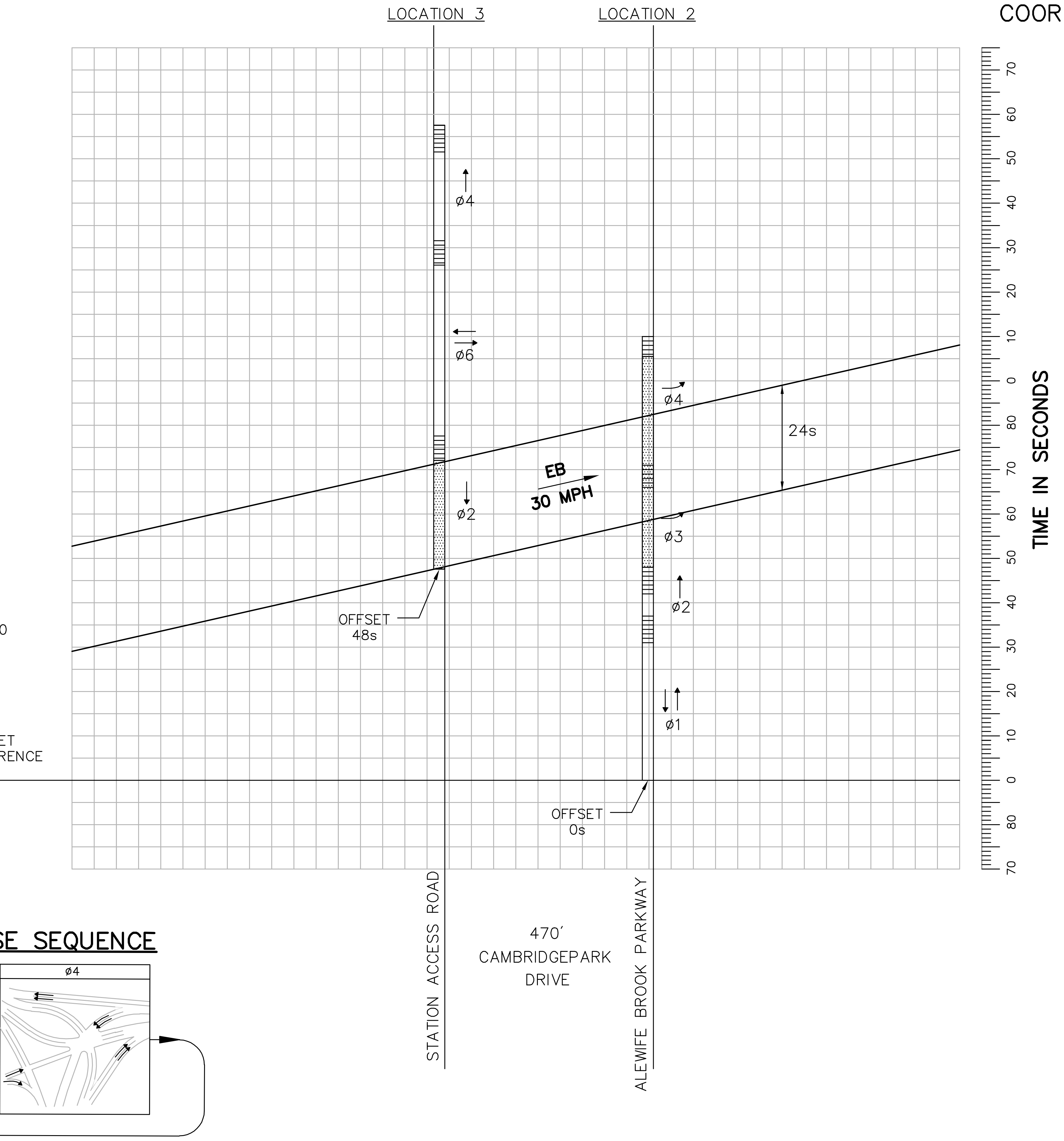
PROJECT FILE NO. 605637

COORDINATION DATA

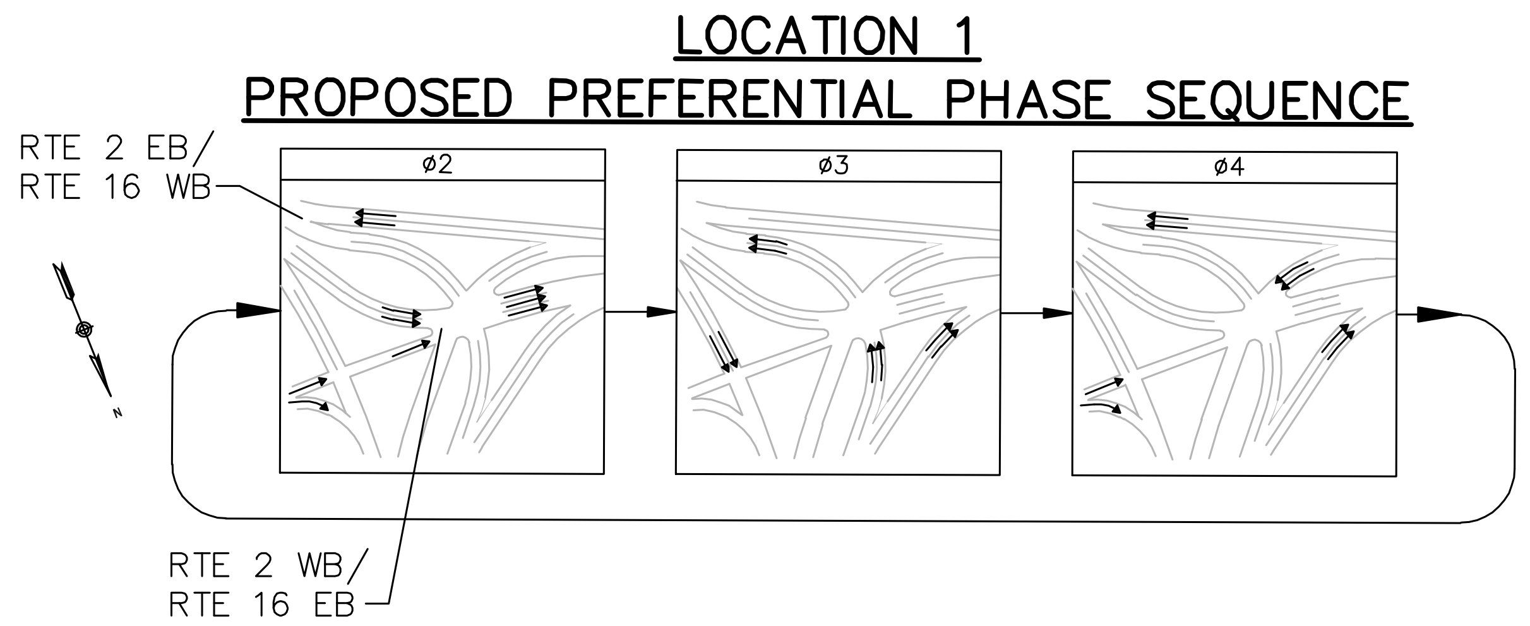
PLAN 2 WEEKDAY EVENING PEAK HOURS
ROUTE 16
100 SECOND CYCLE



PLAN 2 WEEKDAY EVENING PEAK HOURS
CAMBRIDGEPARK DRIVE
100 SECOND CYCLE



LOCATION 1
PROPOSED PREFERENTIAL PHASE SEQUENCE



LOCATION 1
ROUTE 2 AT ROUTE 16

COORDINATION DATA
(ALL ENTRIES IN SECONDS)

	PLAN 2
CYCLE LENGTH	100 SEC
OFFSET	49
SPLIT ø1	54
SPLIT ø2	20
SPLIT ø3	26
COORDINATED PHASE	ø2

NOTES:
1. ø2 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø2 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

LOCATION 2
ALEWIFE BROOK PARKWAY AT CAMBRIDGEPARK DRIVE/RINDGE AVENUE (MASTER CONTROLLER LOCATION)

COORDINATION DATA
(ALL ENTRIES IN SECONDS)

	PLAN 2
CYCLE LENGTH	100 SEC
OFFSET	0
SPLIT ø1	36
SPLIT ø2	11
SPLIT ø3	23
SPLIT ø4	30
COORDINATED PHASE	ø1

NOTES:
1. ø1 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø1 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

LOCATION 3
CAMBRIDGEPARK DRIVE AT ALEWIFE STATION ACCESS ROAD

COORDINATION DATA
(ALL ENTRIES IN SECONDS)

	PLAN 2
CYCLE LENGTH	100 SEC
OFFSET	48
SPLIT ø2	30
SPLIT ø4	26
SPLIT ø6	44
COORDINATED PHASE	ø2

NOTES:
1. ø2 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø2 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

DAILY & WEEKLY COORDINATION PROGRAM

	MONDAY THRU FRIDAY	SATURDAY	SUNDAY
PLAN 1 120" CYCLE	0600–1000	–	–
PLAN 2 100" CYCLE	1400–2000	–	–
PLAN 3 100" CYCLE	1000–1400	1000–1900	1000–1900
FREE OPERATION	0000–0600 2000–0000	0000–1000 1900–0000	0000–1000 1900–0000
FLASH OPERATION	–	–	–

LEGEND

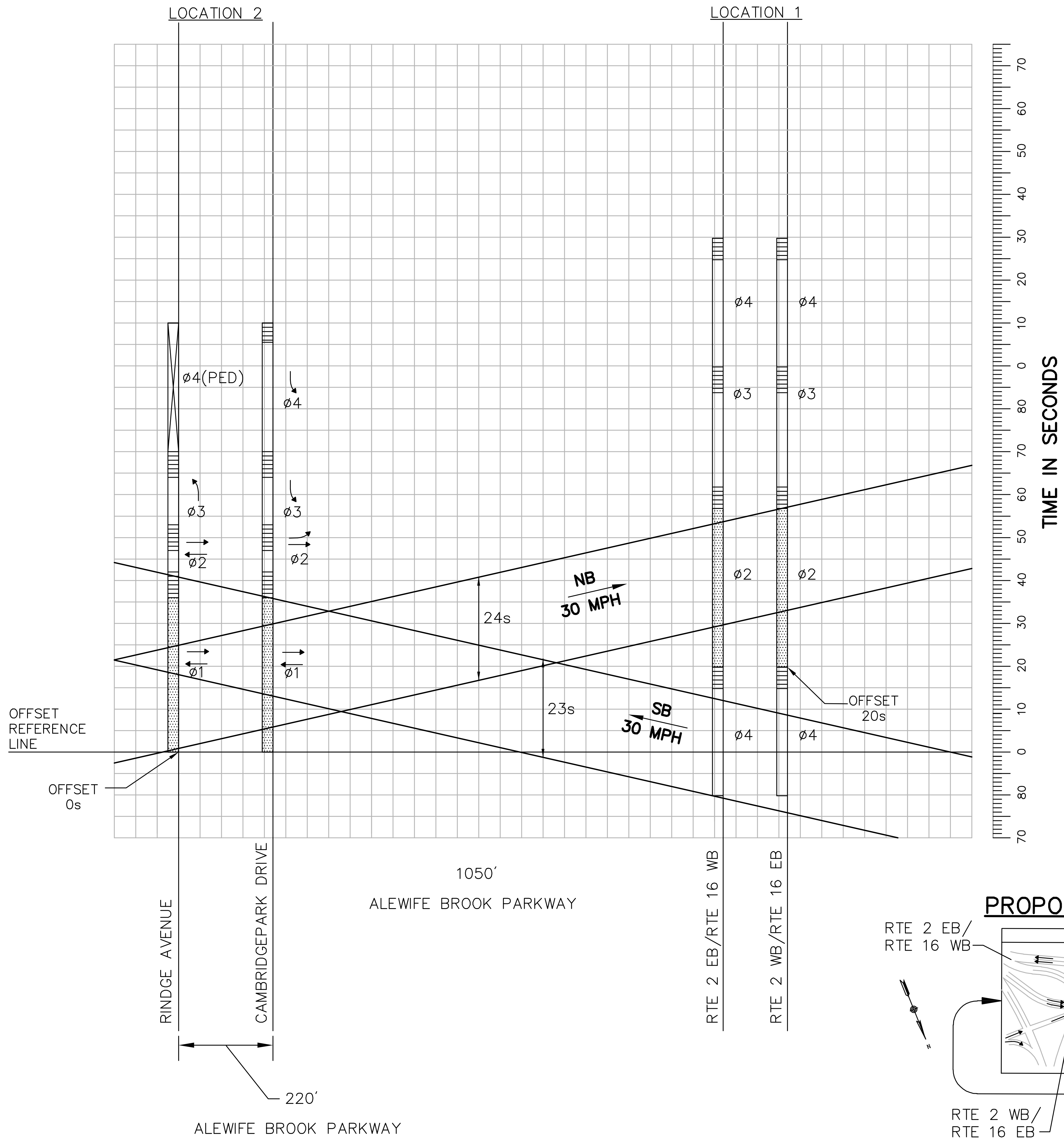
▨	COORDINATED PHASE(S) GREEN TIME
☐	NON-COORDINATED PHASES(S) GREEN TIME
▥	CLEARANCE TIME (YELLOW + RED)
←	PHASE MOVEMENT
—	INTERSECTION-INTERSECTION COORDINATION BAND

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

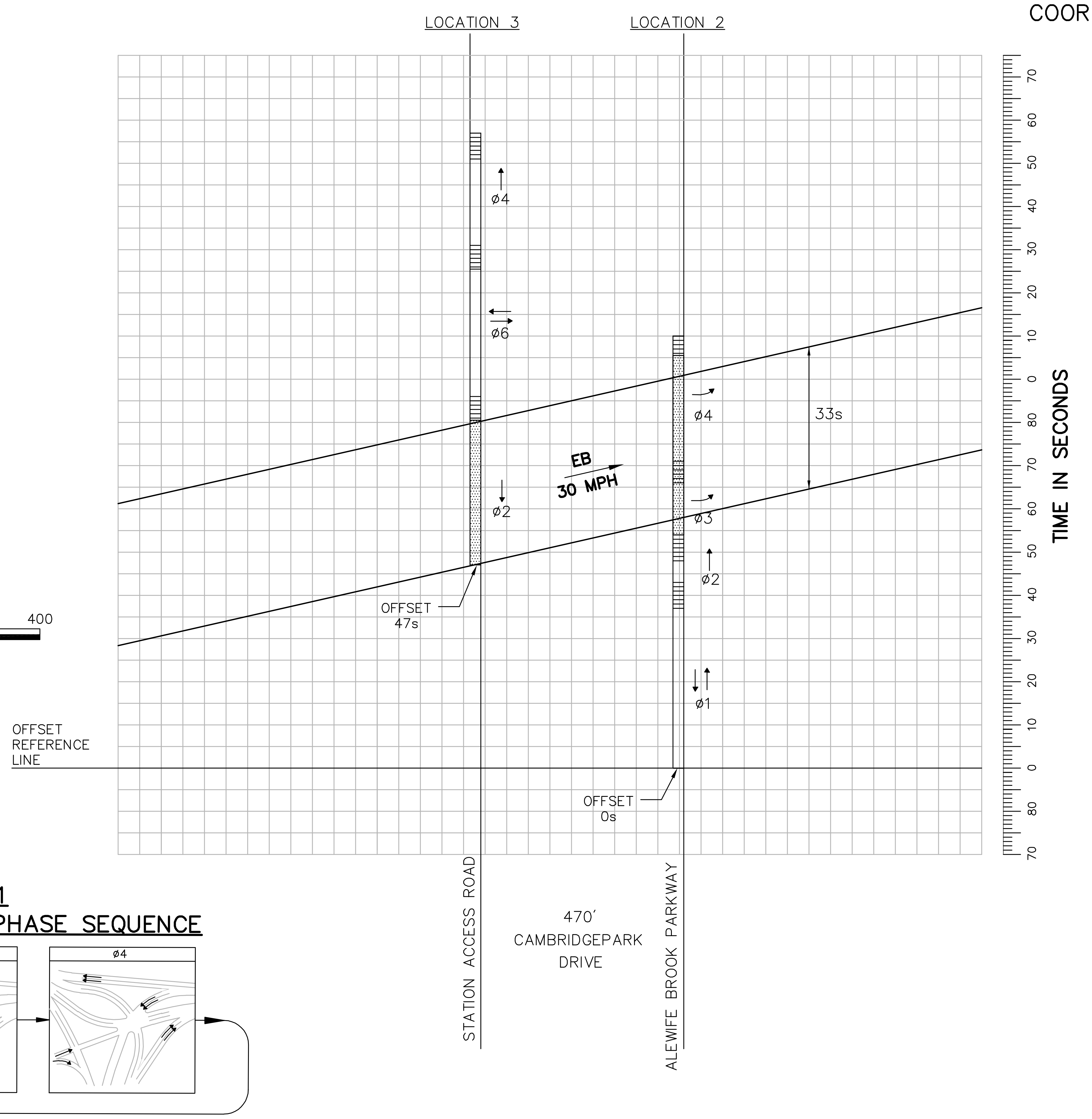
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		38	71
PROJECT FILE NO. 605637			

COORDINATION DATA

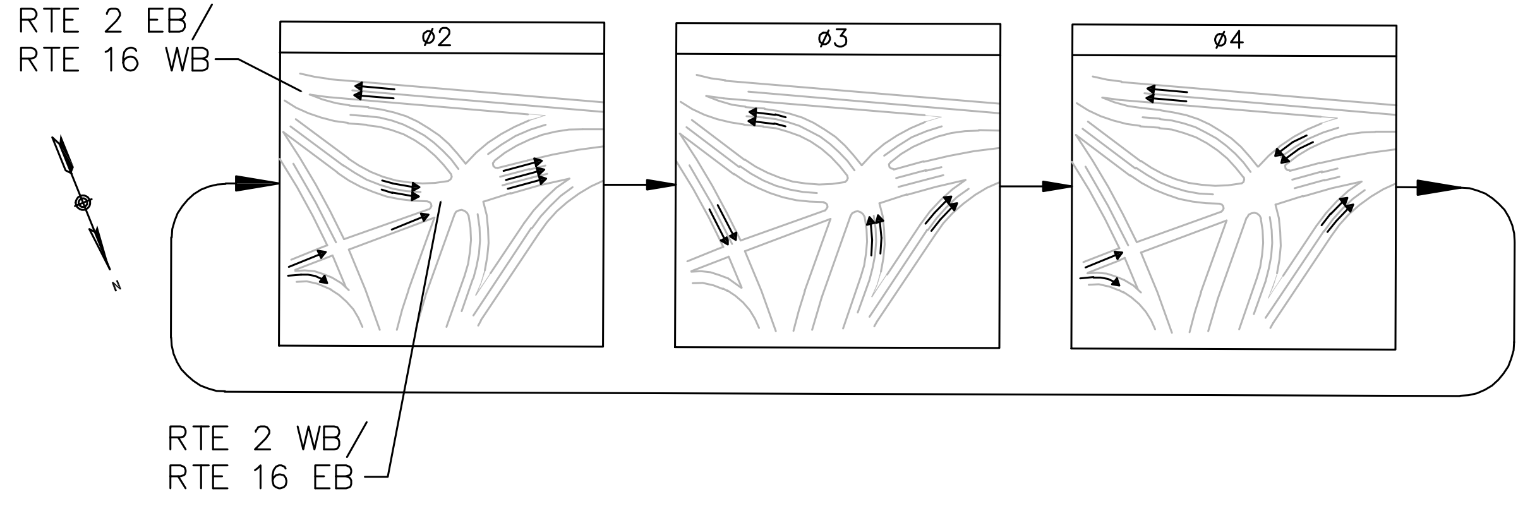
PLAN 3 MIDDAY HOURS (7 DAYS PER WEEK)
ROUTE 16
100 SECOND CYCLE



PLAN 3 MIDDAY HOURS (7 DAYS PER WEEK)
CAMBRIDGEPARK DRIVE
100 SECOND CYCLE



LOCATION 1
PROPOSED PREFERENTIAL PHASE SEQUENCE



LOCATION 1
ROUTE 2 AT ROUTE 16
COORDINATION DATA
(ALL ENTRIES IN SECONDS)

	PLAN 3
CYCLE LENGTH	100 SEC
OFFSET	20
SPLIT ø1	42
SPLIT ø2	28
SPLIT ø3	30
COORDINATED PHASE	ø2

NOTES:
1. ø2 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø2 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

LOCATION 2
ALEWIFE BROOK PARKWAY AT CAMBRIDGEPARK DRIVE/RINDGE AVENUE (MASTER CONTROLLER LOCATION)
COORDINATION DATA
(ALL ENTRIES IN SECONDS)

	PLAN 3
CYCLE LENGTH	100 SEC
OFFSET	0
SPLIT ø1	42
SPLIT ø2	11
SPLIT ø3	17
SPLIT ø4	30
COORDINATED PHASE	ø1

NOTES:
1. ø1 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø1 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

LOCATION 3
CAMBRIDGEPARK DRIVE AT ALEWIFE STATION ACCESS ROAD
COORDINATION DATA
(ALL ENTRIES IN SECONDS)

	PLAN 3
CYCLE LENGTH	100 SEC
OFFSET	47
SPLIT ø2	39
SPLIT ø4	26
SPLIT ø6	35
COORDINATED PHASE	ø2

NOTES:
1. ø2 "CALL NOT ACTUATED" DURING COORDINATION.
2. OFFSET: BEGINNING OF ø2 GREEN.
3. PLAN FORCE OFF SHALL BE IN EFFECT.
4. SPLIT TIMES EQUAL GREEN PLUS CLEARANCES.
5. INHIBIT MAX TERMINATION SHALL BE IN EFFECT DURING COORDINATION.

DAILY & WEEKLY COORDINATION PROGRAM

	MONDAY THRU FRIDAY	SATURDAY	SUNDAY
PLAN 1 120" CYCLE	0600–1000	–	–
PLAN 2 100" CYCLE	1400–2000	–	–
PLAN 3 100" CYCLE	1000–1400	1000–1900	1000–1900
FREE OPERATION	0000–0600 2000–0000	0000–1000 1900–0000	0000–1000 1900–0000
FLASH OPERATION	–	–	–

LEGEND

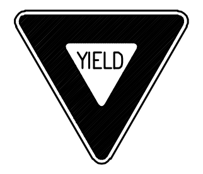
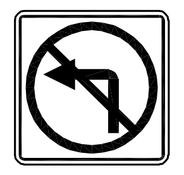
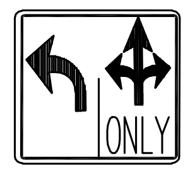
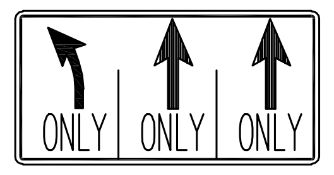
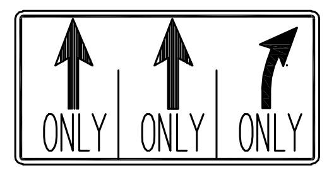
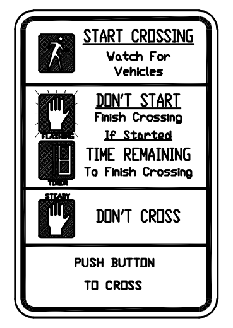
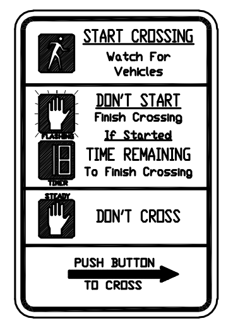
⬚	COORDINATED PHASE(S) GREEN TIME
☐	NON–COORDINATED PHASES(S) GREEN TIME
▥	CLEARANCE TIME (YELLOW + RED)
←	PHASE MOVEMENT
—	INTERSECTION–INTERSECTION COORDINATION BAND

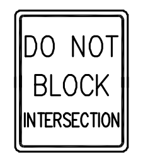
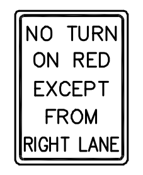
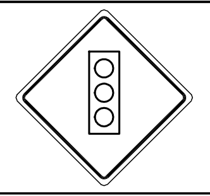
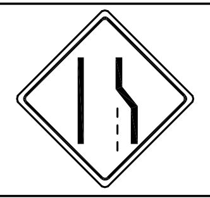
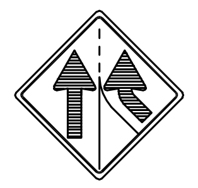
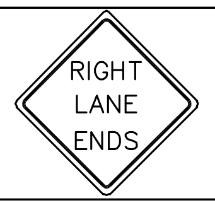
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		39	71
PROJECT FILE NO. 605637			

SIGN SUMMARY

PROPOSED TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACKGROUND	LEGEND	BORDER			
R1-2	36"X36"X36"			SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			2	WHITE	RED	WHITE	P5-2	3.90	7.80
R3-2	24"	24"					2	WHITE	RED/ BLACK	BLACK	1 MTD ON TS POST 1 MTD W/OTHERS	4.00	8.00
R3-5a	30"	36"					7	WHITE	BLACK	BLACK	7 MTD ON MAST ARM	7.50	52.50
R3-3	24"	24"					5	WHITE	BLACK	BLACK	5 MTD W/OTHERS	4.00	20.00
R3-8	30"	30"					2	WHITE	BLACK	BLACK	P5-2	6.25	12.50
R3-8L	30"	30"					2	WHITE	BLACK	BLACK	P5-2	6.25	12.50
R3-8LT	48"	30"					2	WHITE	BLACK	BLACK	P5-4	10.00	20.00
R3-8R	30"	30"					1	WHITE	BLACK	BLACK	P5-1	6.25	6.25
R3-8RT	48"	30"					1	WHITE	BLACK	BLACK	P5-2	10.00	10.00
R4-7	24"	30"					3	WHITE	BLACK	BLACK	P5-3	5.00	15.00
R5-1	30"	30"					10	WHITE	RED/ WHITE	–	10 MTD W/OTHERS	6.25	62.50
R6-1L	36"	12"					12	BLACK	WHITE	WHITE	P5-12	3.00	36.00
R6-1R	36"	12"					12	BLACK	WHITE	WHITE	12 MTD W/OTHERS	3.00	36.00
R10-3e (MOD)	9"	15"					1	WHITE	BLACK	BLACK	1 MTD ON TS POLE/ POST	PAID UNDER ITEM 816.01	
R10-3e(R)	9"	15"					2	WHITE	BLACK	BLACK	2 MTD ON TS POLE/ POST	PAID UNDER ITEM 816.01	

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACKGROUND	LEGEND	BORDER			
R10-6L	24"	36"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			1	WHITE	BLACK	BLACK	P5-1	6.00	6.00
R10-6R	24"	36"					1	WHITE	BLACK	BLACK	P5-1	6.00	6.00
R10-7	24"	30"					2	WHITE	BLACK	BLACK	2 MTD W/OTHERS	5.00	10.00
R10-11c	30"	42"					1	WHITE	BLACK	BLACK	1 MTD ON MAST ARM	8.75	8.75
W3-3	30"	30"					2	YELLOW	RED/ BLACK/ GREEN	BLACK	P5-2	6.25	12.50
W4-2R	48"	48"					1	YELLOW	BLACK	BLACK	P5-2	16.00	16.00
W4-3L	36"	36"					1	YELLOW	BLACK	BLACK	P5-1	9.00	9.00
W4-3R	36"	36"					1	YELLOW	BLACK	BLACK	P5-1	9.00	9.00
W9-1	48"	48"					1	YELLOW	BLACK	BLACK	P5-2	16.00	16.00

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 1993 EDITION, AS AMENDED.

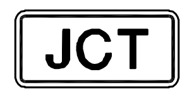
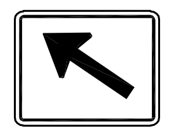
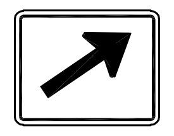
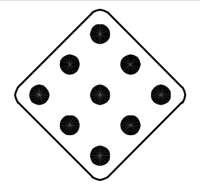
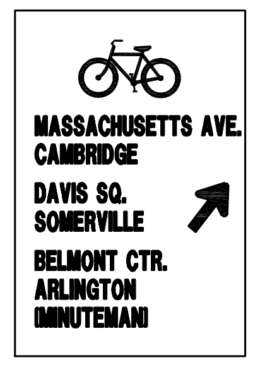
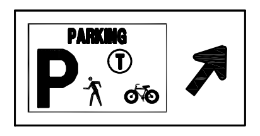
ALL SIGNS, WITH THE EXCEPTION OF H1-2, SHALL BE MOUNTED TO PROVIDE 7' OF CLEARANCE BETWEEN THE BOTTOM OF THE SIGN AND THE GROUND/SIDEWALK.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		40	71
PROJECT FILE NO. 605637			

SIGN SUMMARY

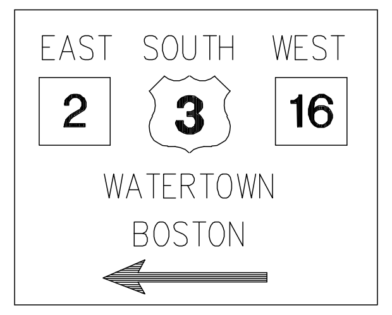
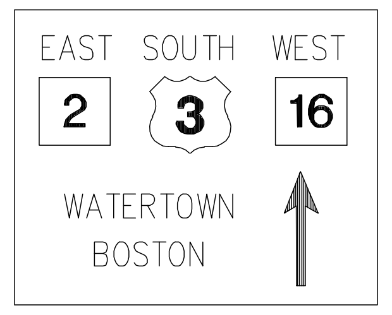
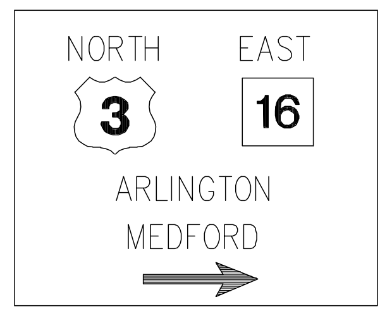
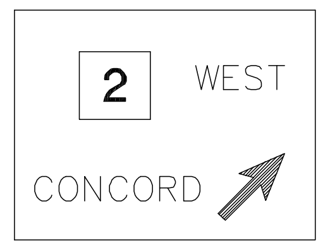
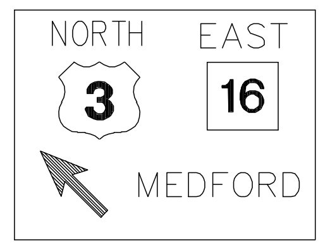
PROPOSED TRAFFIC SIGN SUMMARY

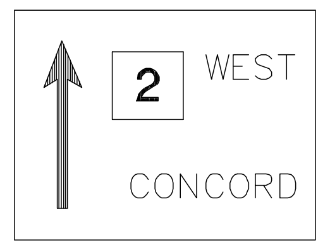
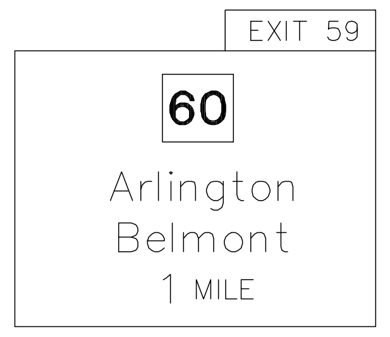
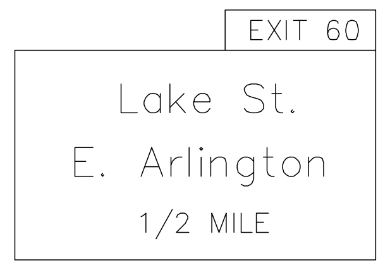
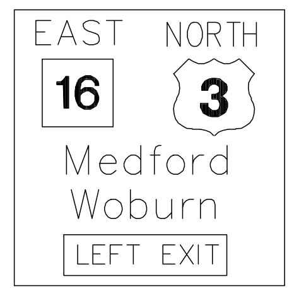
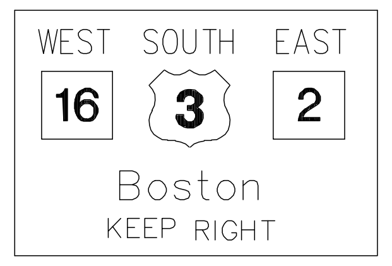
IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT	TEXT DIMENSIONS (INCHES)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (S.F.)	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
M1-4(3)	24"	24"		SEE FHWA "STANDARD HIGHWAY SIGNS, 2004 EDITION"; AS AMENDED			7	WHITE/ BLACK	BLACK	–	7 MTD W/OTHERS	4.00	28.00
M1-5(2)	24"	24"					6	WHITE	BLACK	BLACK	5 MTD W/OTHERS 1 MTD ON TS POLE	4.00	24.00
M1-5(16)	24"	24"					7	WHITE	BLACK	BLACK	7 MTD W/OTHERS	4.00	28.00
M2-1	21"	15"					2	WHITE	BLACK	BLACK	P5-2	2.19	4.38
M3-1	24"	12′					3	WHITE	BLACK	BLACK	P5-6	2.00	6.00
M3-2	24"	12′					5	WHITE	BLACK	BLACK	P5-1 3 MTD W/OTHERS 1 MTD ON TS POLE	2.00	10.00
M3-3	24"	12′					3	WHITE	BLACK	BLACK	P5-5	2.00	6.00
M3-4	24"	12′					6	WHITE	BLACK	BLACK	P5-4 2 MTD W/OTHERS	2.00	12.00
M6-2L	21"	15"					4	WHITE	BLACK	BLACK	4 MTD W/OTHERS	2.19	8.76
M6-2R	21"	15"					3	WHITE	BLACK	BLACK	3 MTD W/OTHERS	2.19	6.57
H1-2	24"	24"		AS PER MASSDOT STANDARD			4	YELLOW	YELLOW CLUSTER	– – –	P5-4	PAID UNDER ITEM 827.21	
BR-1	24"	36"		2B 2B 2B 2B 2B 2B 2B	3" 2" 1" 2" 1" 2" 1" 1" 3"	6" 6"@45°	1	GREEN	WHITE	–	P5-1	6.00	6.00
BP-1	24"	12"		1.5B 6D	1.5" 1.5"	"T" LOGO 2.5" DIA. ARROW-6"@45° PED-3" BIKE-2"	1	BLUE	WHITE	–	1 MTD W/OTHERS	2.00	2.00

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 1993 EDITION, AS AMENDED.

ALL SIGNS, WITH THE EXCEPTION OF H1-2, SHALL BE MOUNTED TO PROVIDE 7′ OF CLEARANCE BETWEEN THE BOTTOM OF THE SIGN AND THE GROUND/SIDEWALK.

EXISTING GUIDE SIGN SUMMARY

IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT
	WIDTH	HEIGHT	
RET D6-1			
RET D6-2			
RET D6-3			
RET D8-1			
RET D8-2			

IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT
	WIDTH	HEIGHT	
RET D8-3			
RET OH-1			
RET OH-2			
RET OH-3			
RET OH-4			

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		41	71

PROJECT FILE NO. 605637

MAST ARM DETAILS

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.

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

NO.	REVISION	DATE

Moving Massachusetts Forward.
massDOT
Highway

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISON

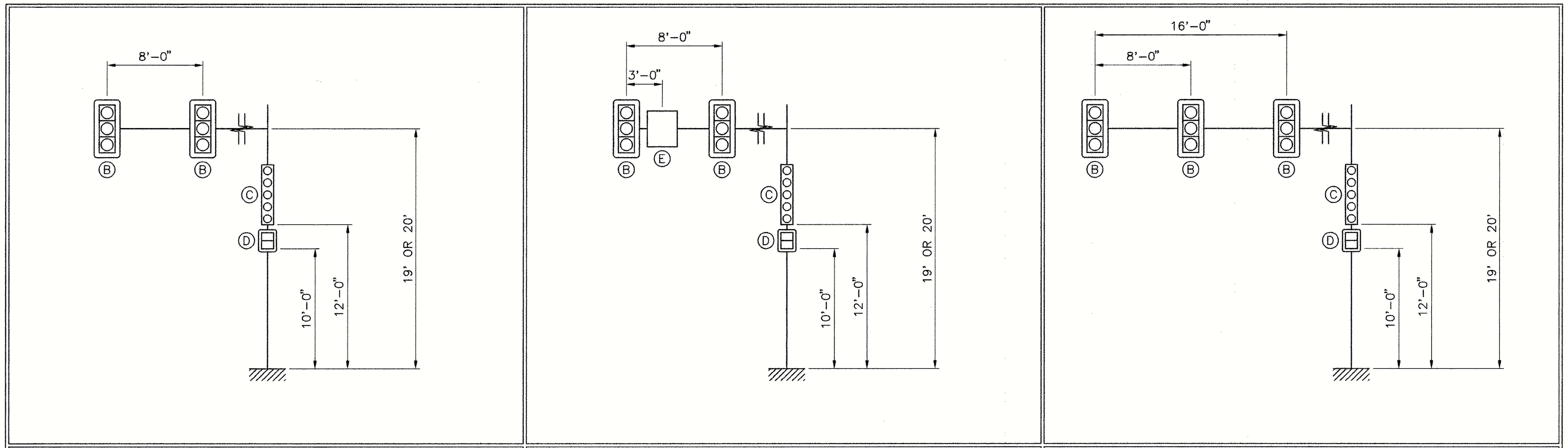
RECOMMENDED FOR APPROVAL

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

2/17/11
BRIDGE ENGINEER **DATE**

2/24/2011
CHIEF ENGINEER **DATE**

\\vhb\proj\Wat-TE\10881.02\cad\te\planset\1088102-mastarmdet.dwg

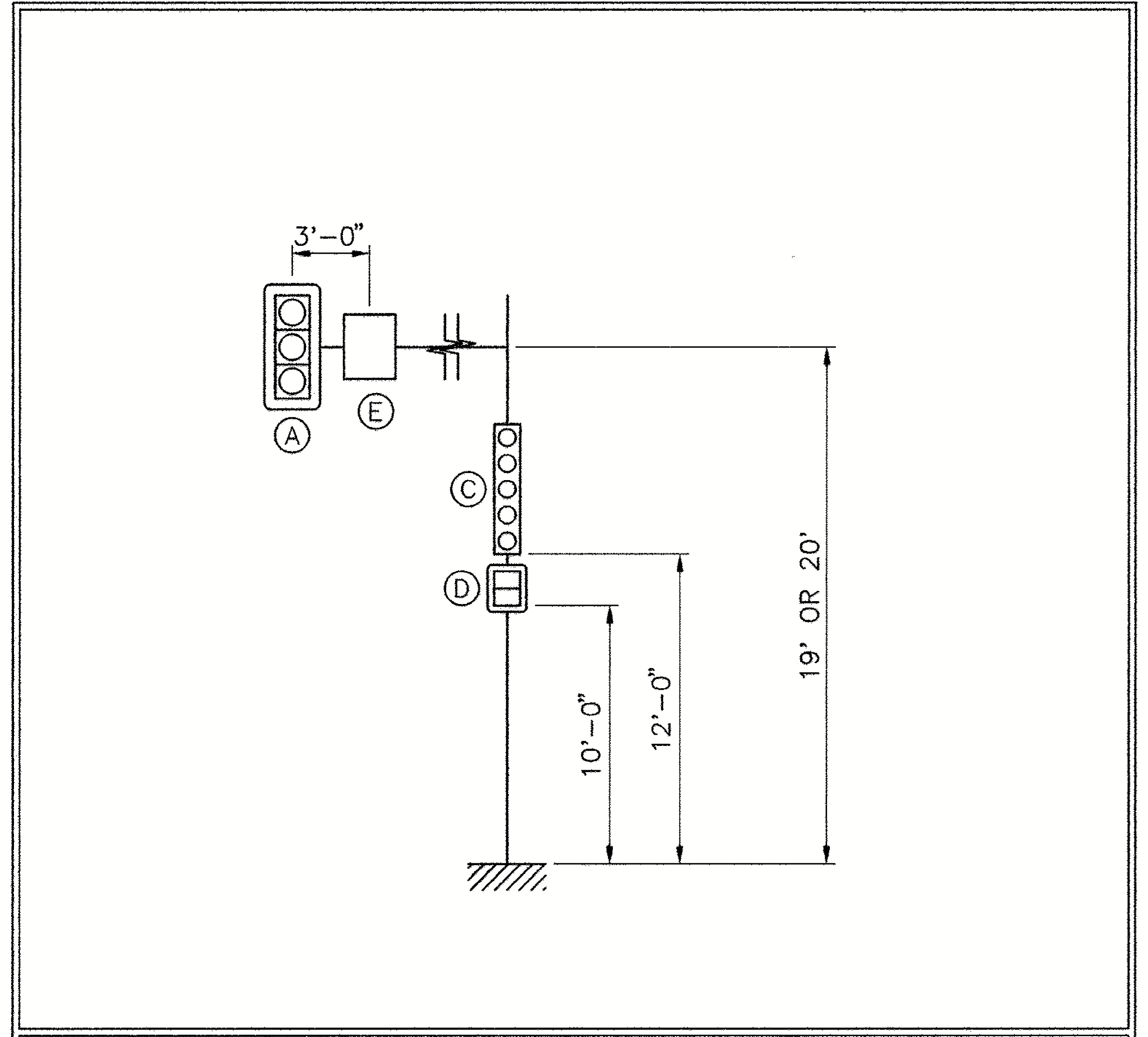


20', 25', 40' & 45' SPANS

30' SPAN

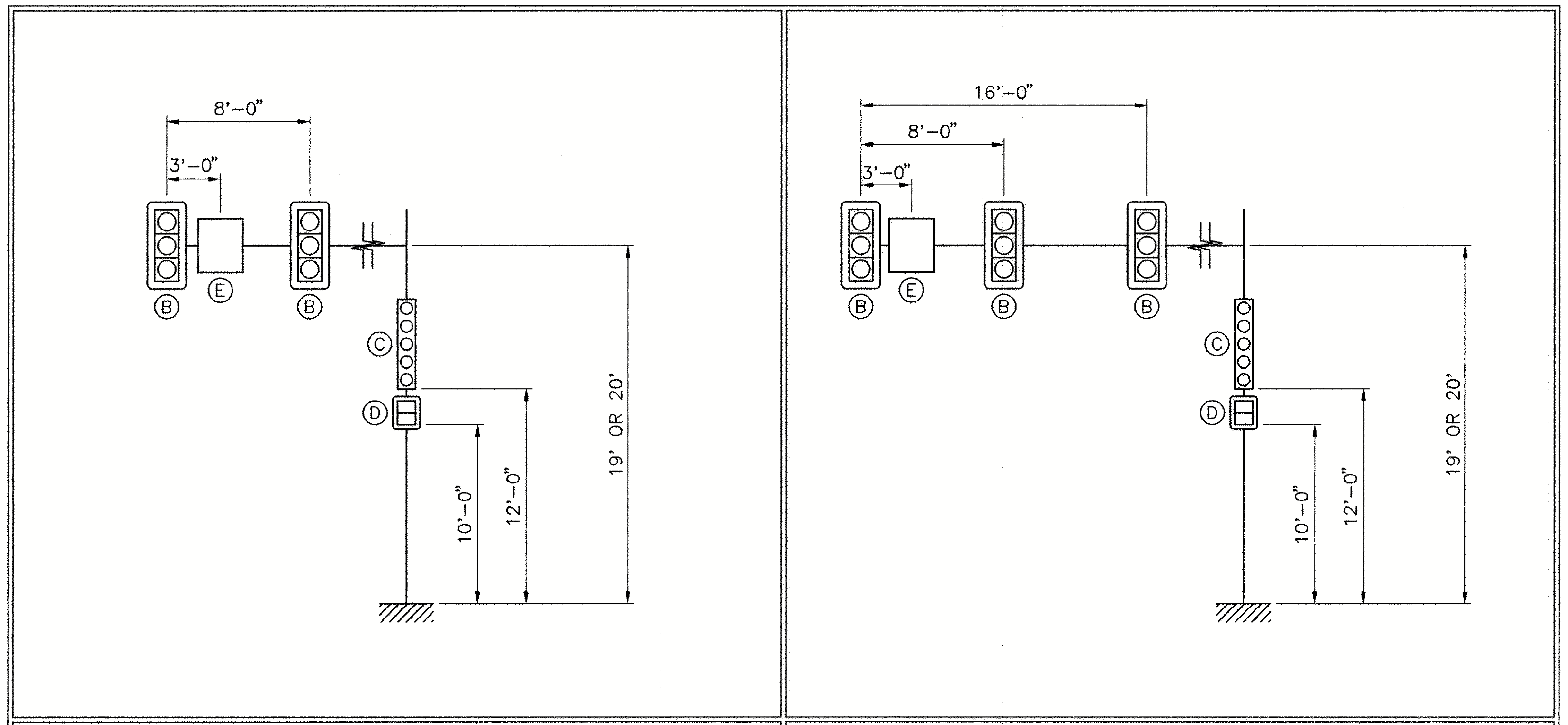
35' SPAN

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

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VANASSE HANGEN BRUSTLIN, INC.
IT WAS PROVIDED BY THE MASSDOT
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HEREIN IS ASSUMED TO BE CORRECT.

MONTH_DD,_YYYY | ISSUED FOR CONSTRUCTION

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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

P.E.
BRIDGE ENGINEER

Neil E. Boudreau
TRAFFIC ENGINEER

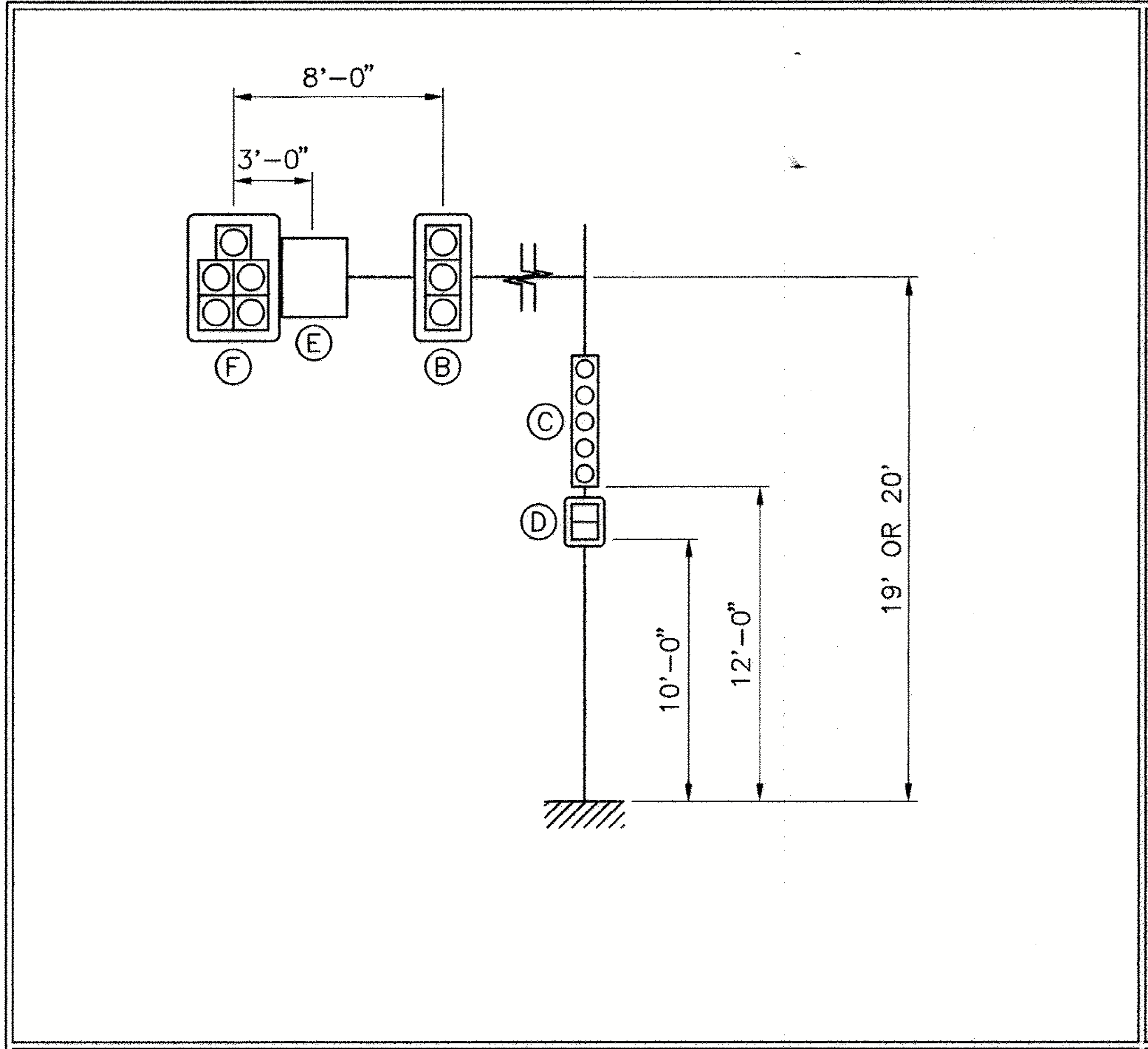
SHEET 2 OF 5 SHEETS

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

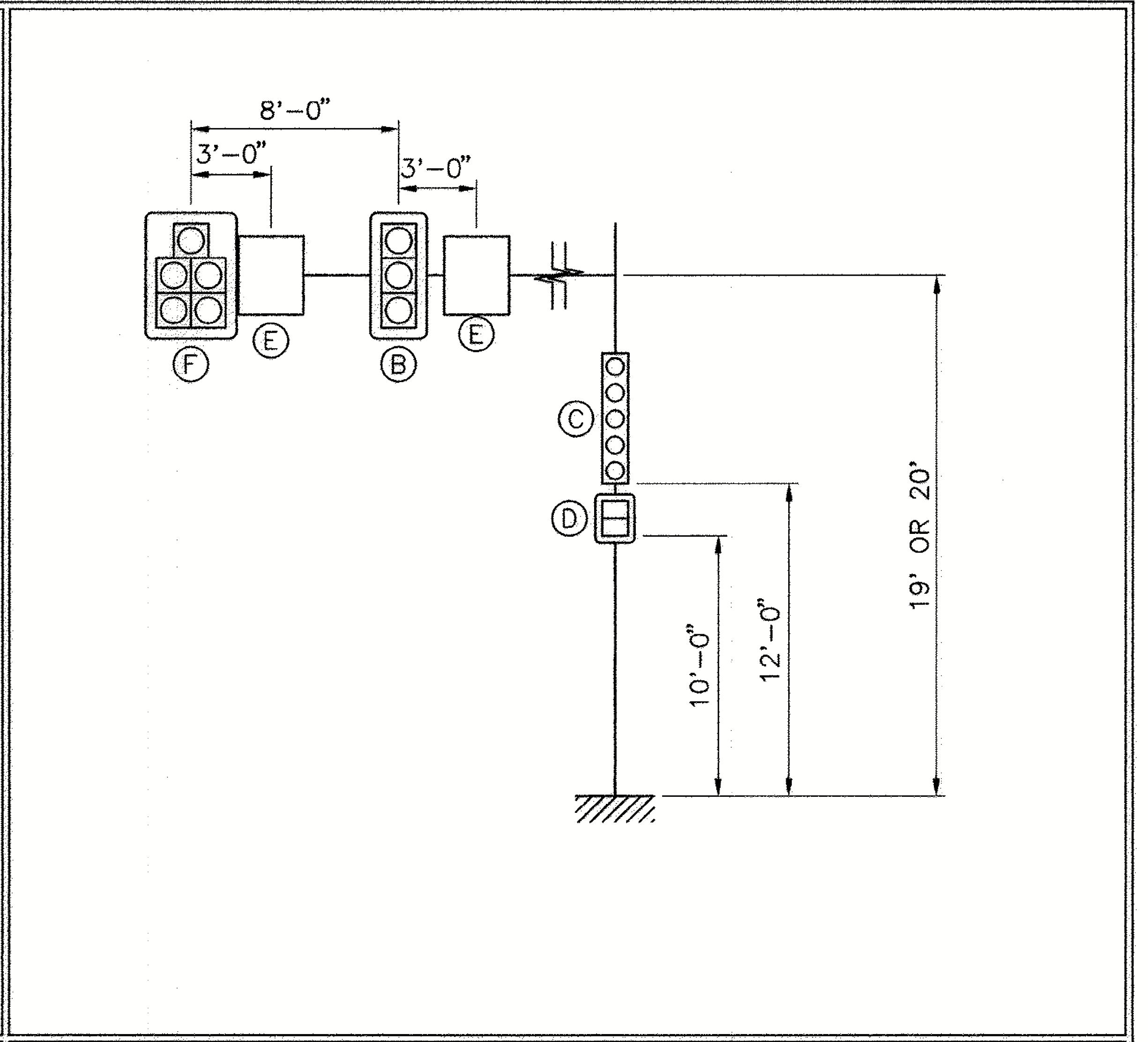
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		43	71

PROJECT FILE NO. 605637

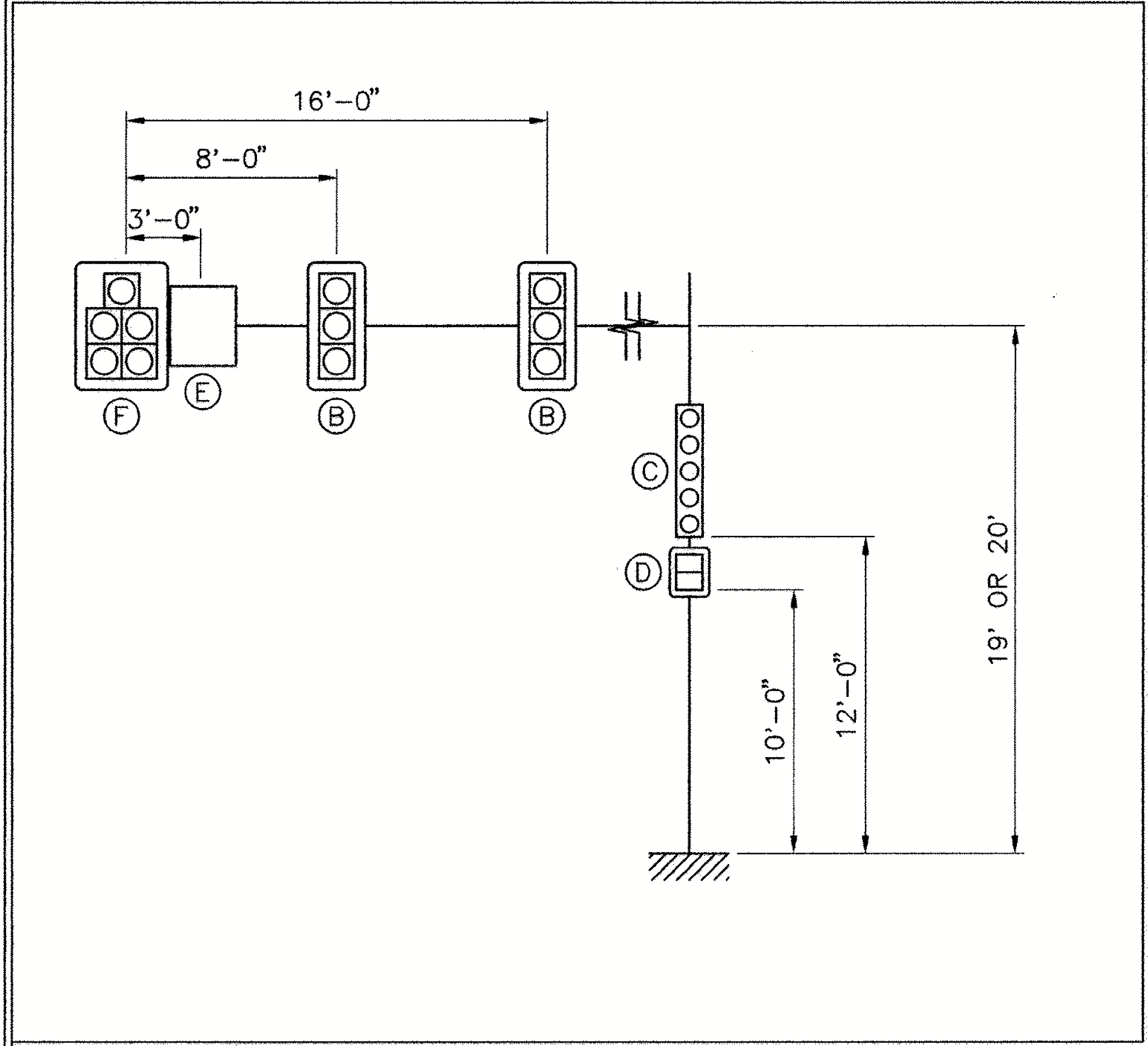
MAST ARM DETAILS



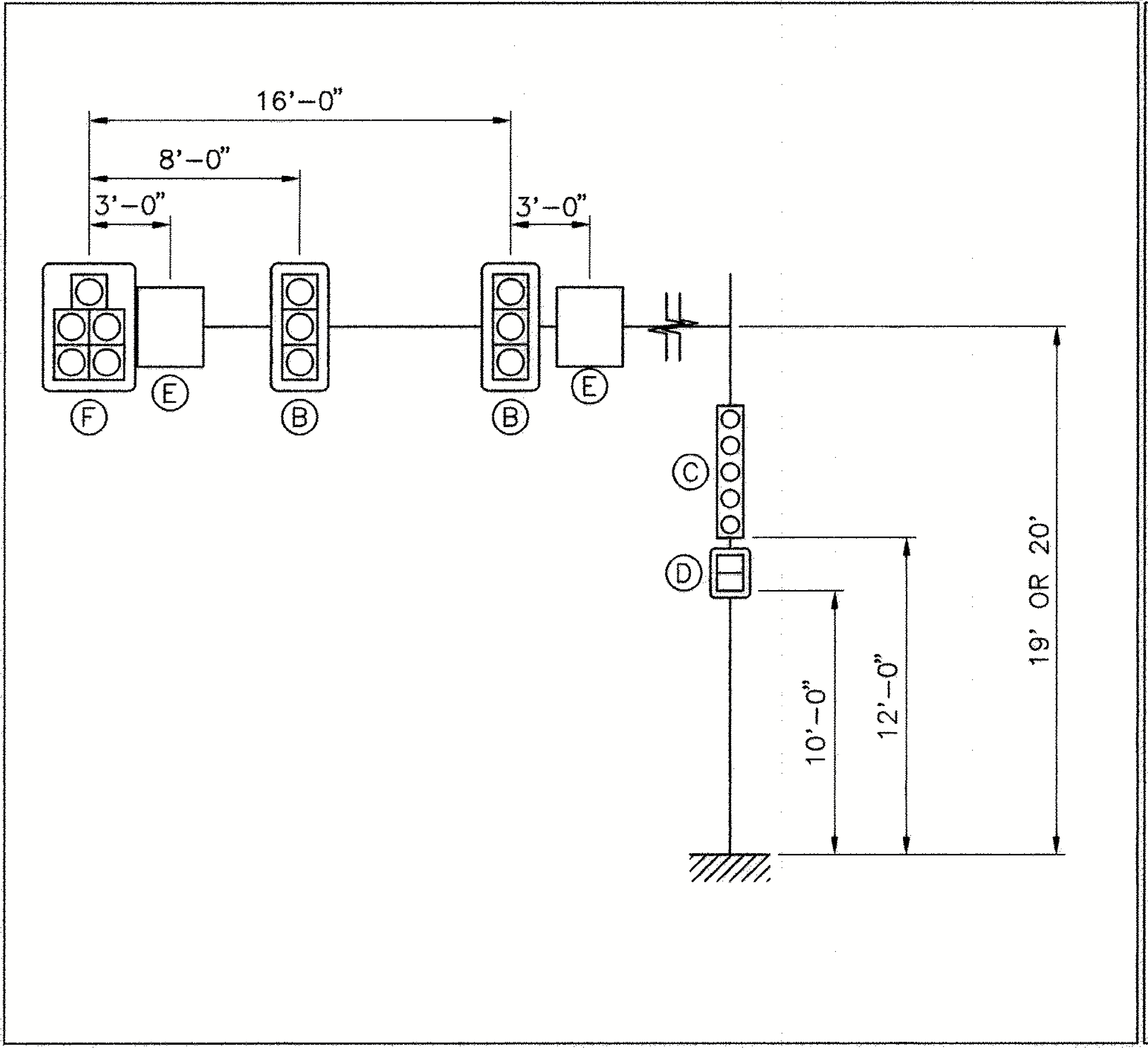
20' SPAN



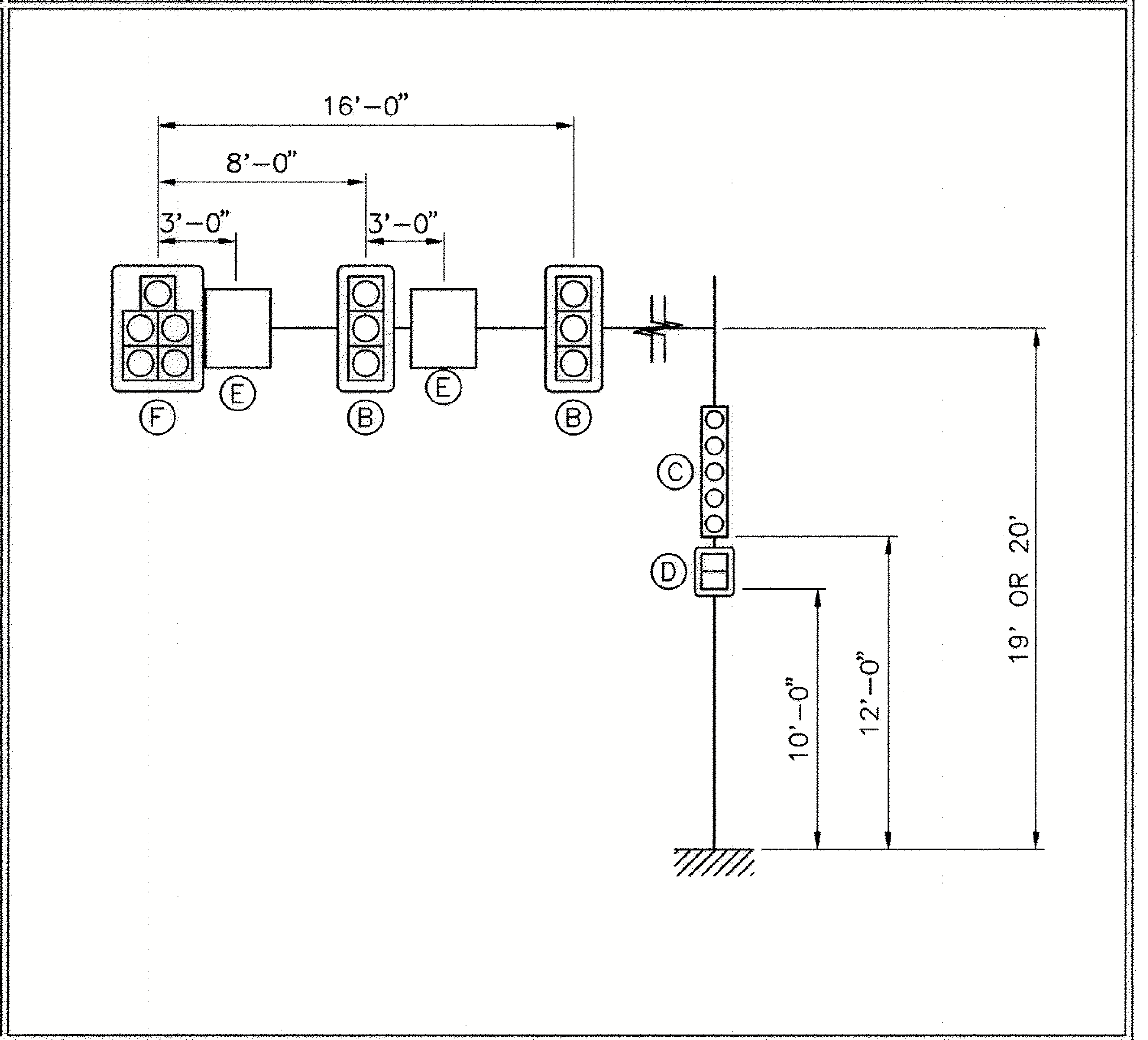
25' SPAN



30' SPAN



35' SPAN



40' & 45' SPANS

LOAD DEFINITIONS – HEAVY LOADS

DEVICE	DESCRIPTION	PROJ. AREA (FT^2)	WEIGHT (LBS)
Ⓐ	3 SECTION, 3 WAY SIGNAL	18.29	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
Ⓕ	5 SECTION, 2 WAY SIGNAL	21.95	215
NOTE: ALL SIGNALS HAVE 5.0" BACKPLATES			

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

MONTH_DD_YYYY ISSUED FOR CONSTRUCTION

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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

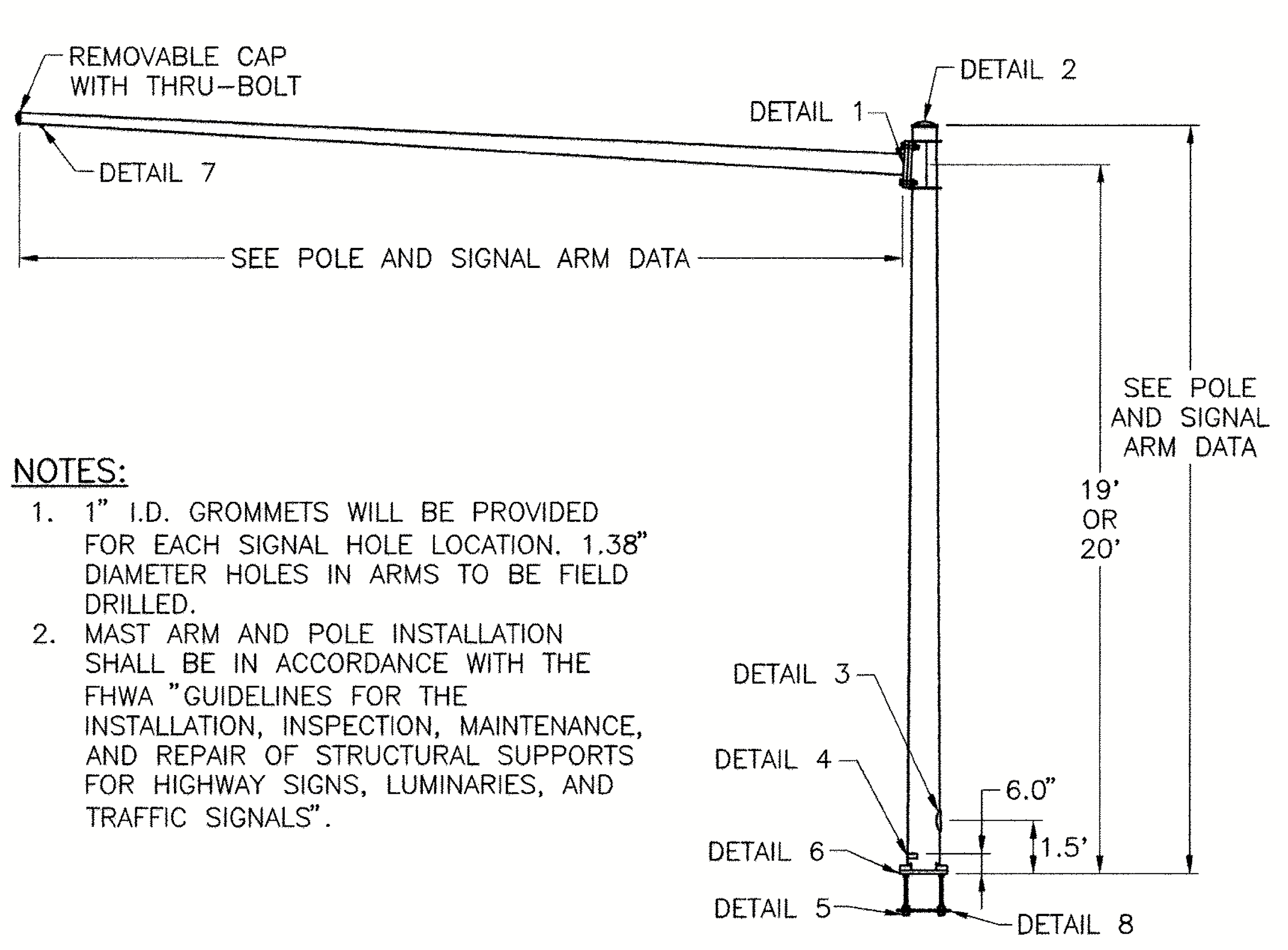
Neil E. Boudreau
TRAFFIC ENGINEER

SHEET 3 OF 5 SHEETS

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		44	71
PROJECT FILE NO. 605637			

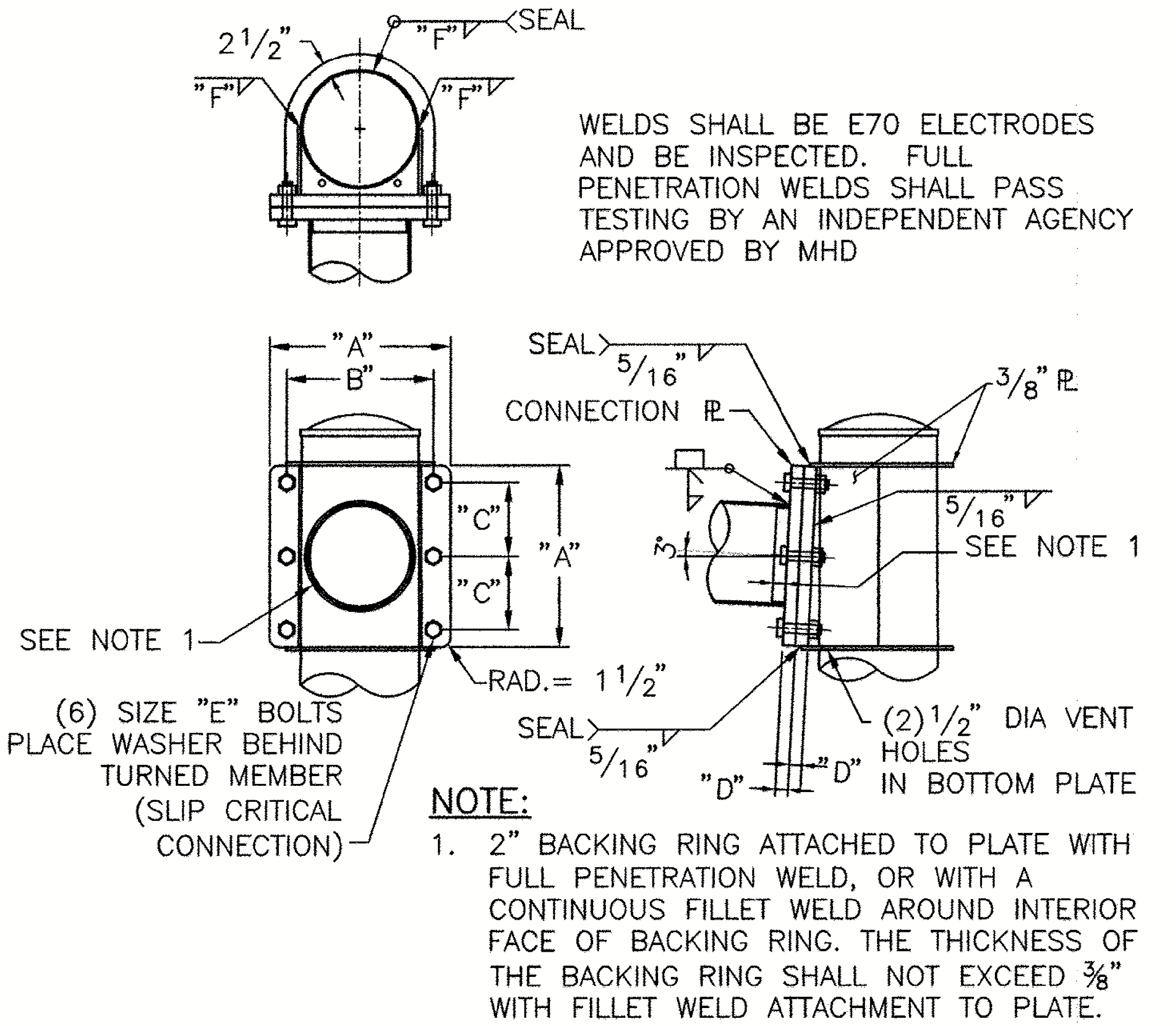
MAST ARM DETAILS



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

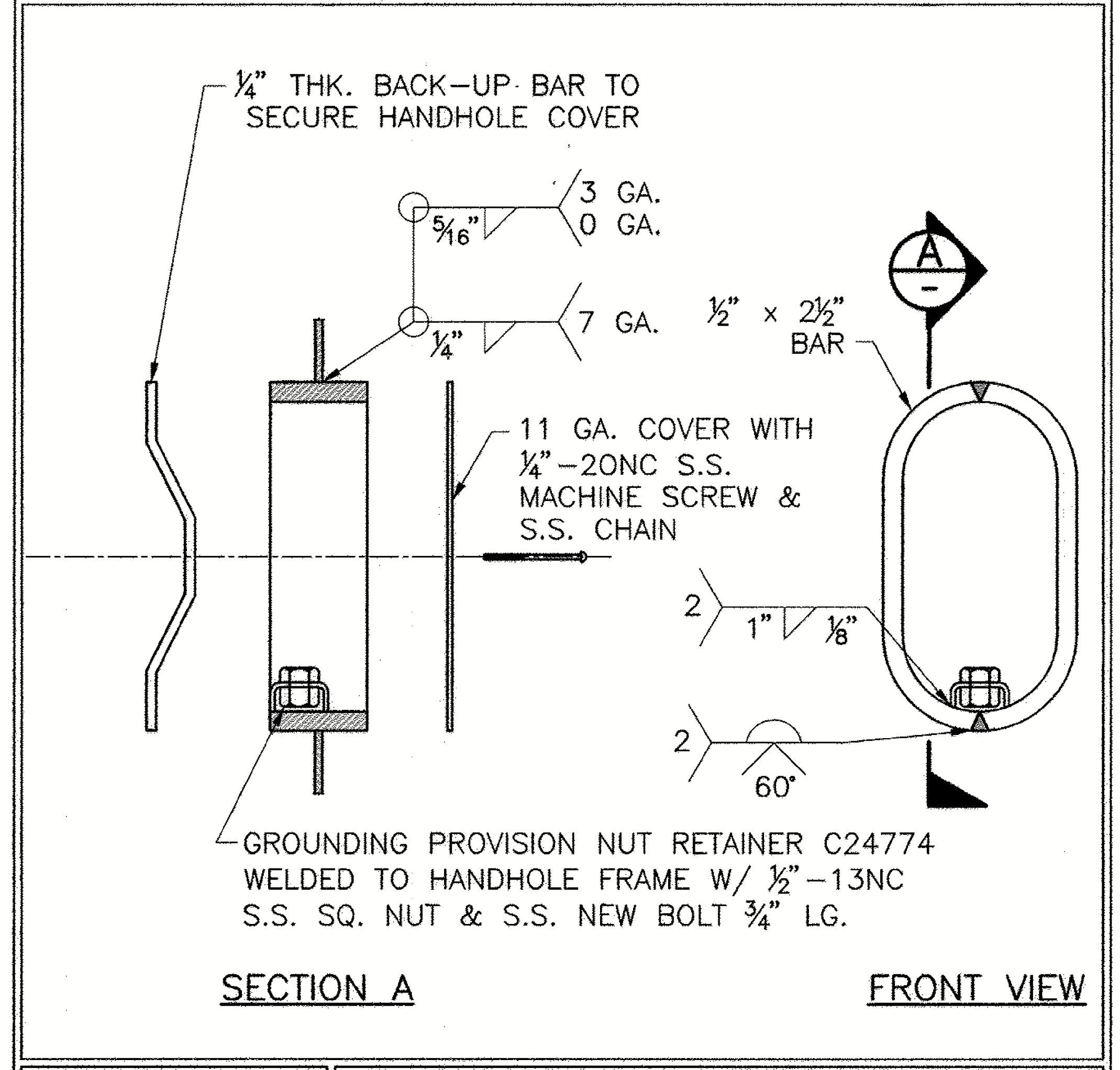


WELDS SHALL BE E70 ELECTRODES AND BE INSPECTED. FULL PENETRATION WELDS SHALL PASS TESTING BY AN INDEPENDENT AGENCY APPROVED BY MHD

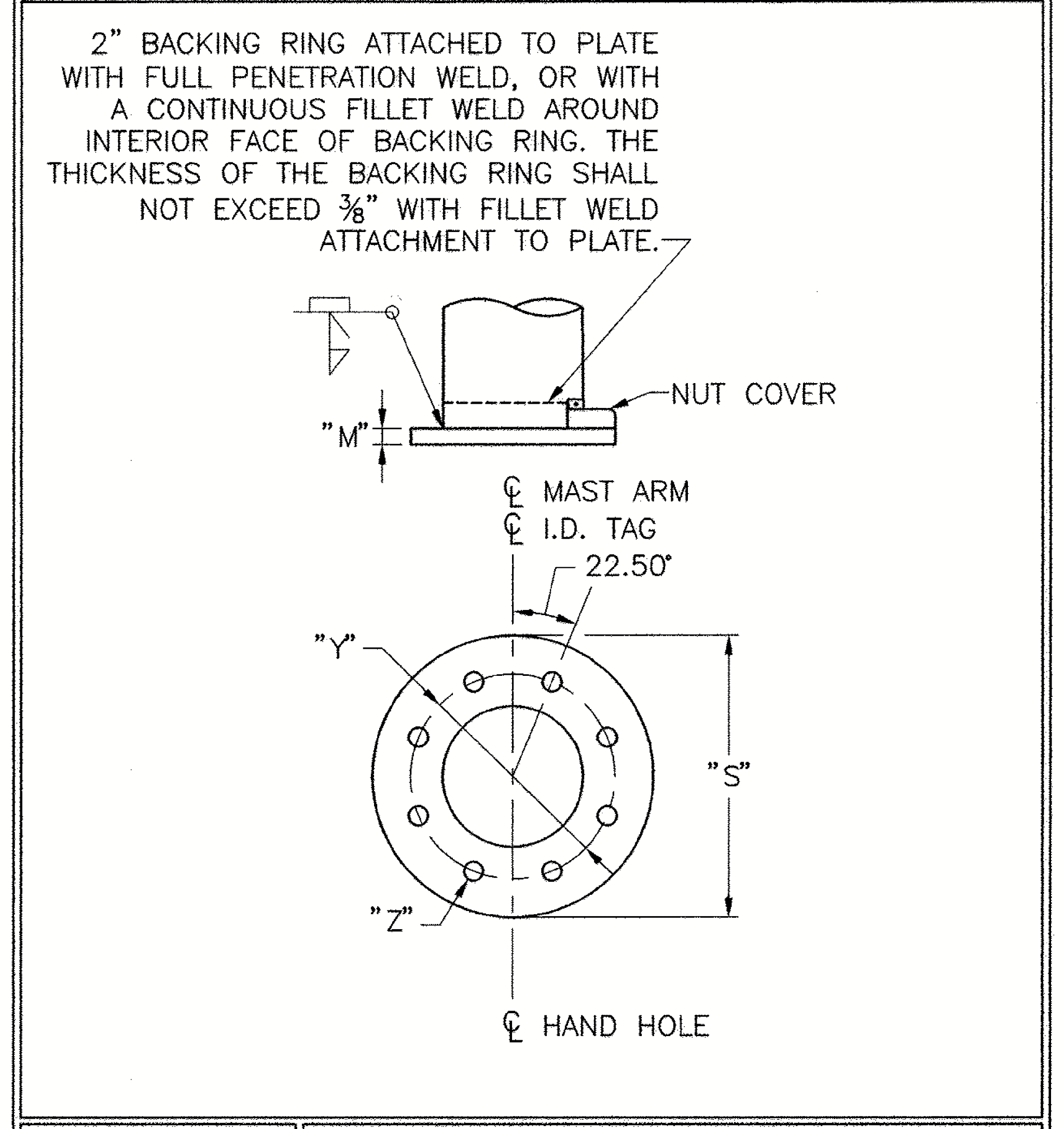
NOTE:

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 ⅜" WITH FILLET WELD ATTACHMENT TO PLATE.

DETAIL 1 SIGNAL ARM ATTACHMENT



DETAIL 3 4"x8" HANDHOLE

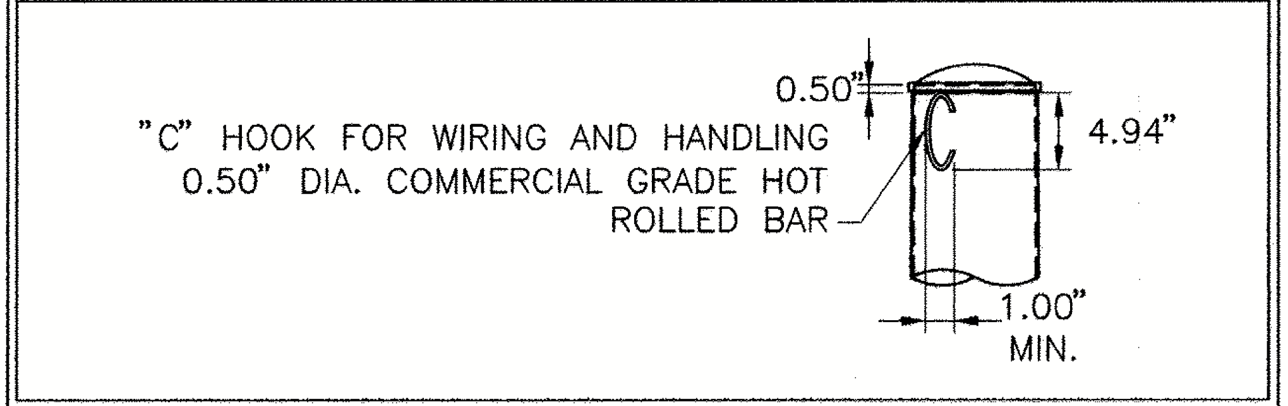


DETAIL 6 POLE BASE

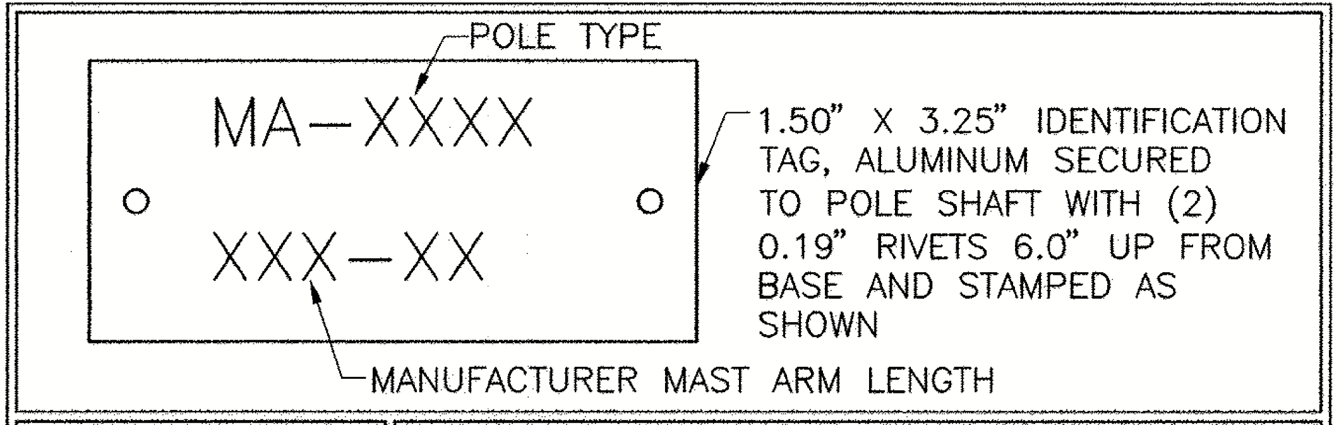
MATERIAL DATA

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



1.50" X 3.25" IDENTIFICATION TAG, ALUMINUM SECURED TO POLE SHAFT WITH (2) 0.19" RIVETS 6.0" UP FROM BASE AND STAMPED AS SHOWN

DETAIL 4 I.D. TAG

POLE AND SIGNAL ARM DATA – LIGHT LOADS

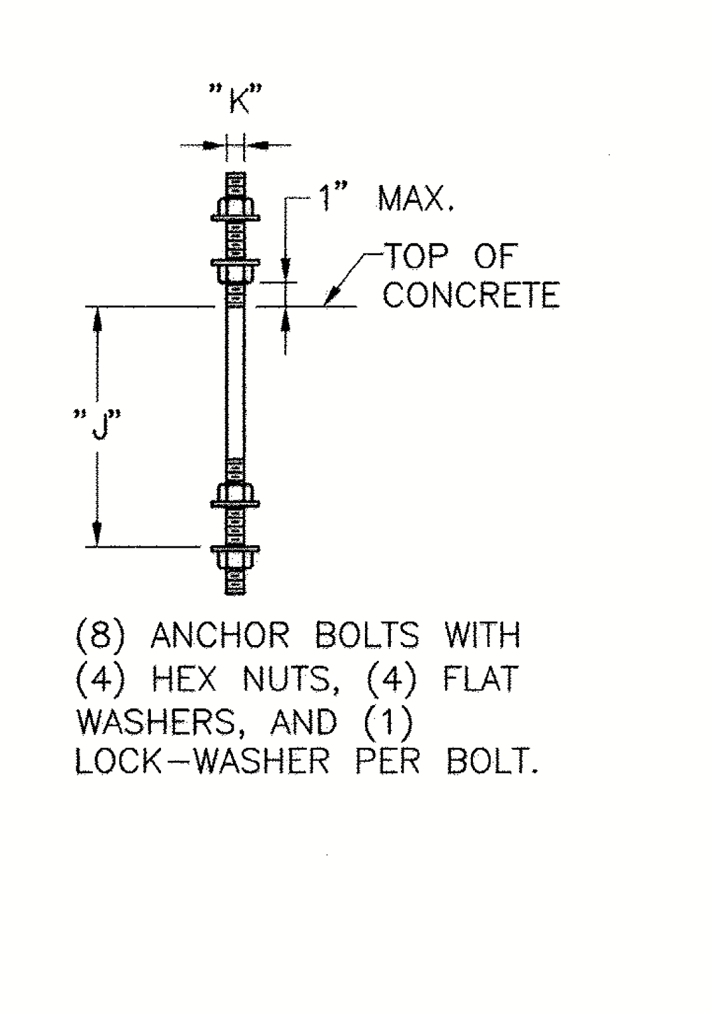
LOCATIONS	SIGNAL ARM TUBE				POLE TUBE				POLE BASE				ANCHOR BOLT		SIGNAL ARM ATTACHMENT DATA					
	SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	WALL THK.	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	WALL THK.	PLATE CIRCLE "S" (IN)	BOLT CIRCLE "Y" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	EMBED. 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

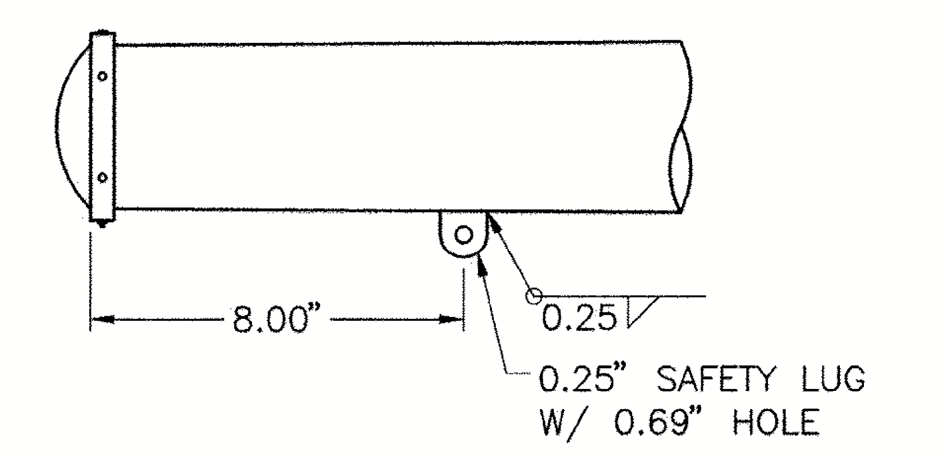
POLE AND SIGNAL ARM DATA – HEAVY LOADS

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

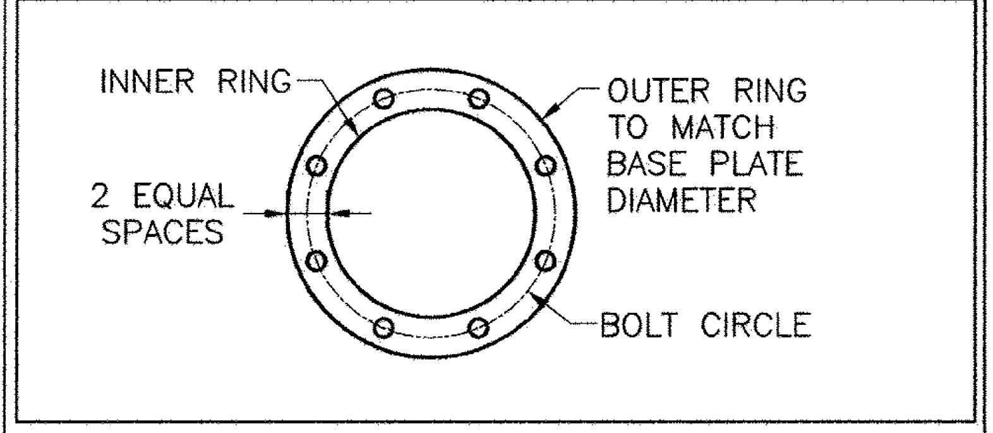


(8) ANCHOR BOLTS WITH (4) HEX NUTS, (4) FLAT WASHERS, AND (1) LOCK-WASHER PER BOLT.

DETAIL 5 ANCHOR BOLT



DETAIL 7 SAFETY HANGER LUG



DETAIL 8 ANCHOR PLATE

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

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 2/24/2011
CHIEF ENGINEER

Alexander K. Bardow, P.E.
BRIDGE ENGINEER

Neil E. Boudreau
TRAFFIC ENGINEER

SHEET 4 OF 5 SHEETS

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		45	71

PROJECT FILE NO. 605637

MAST ARM DETAILS

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

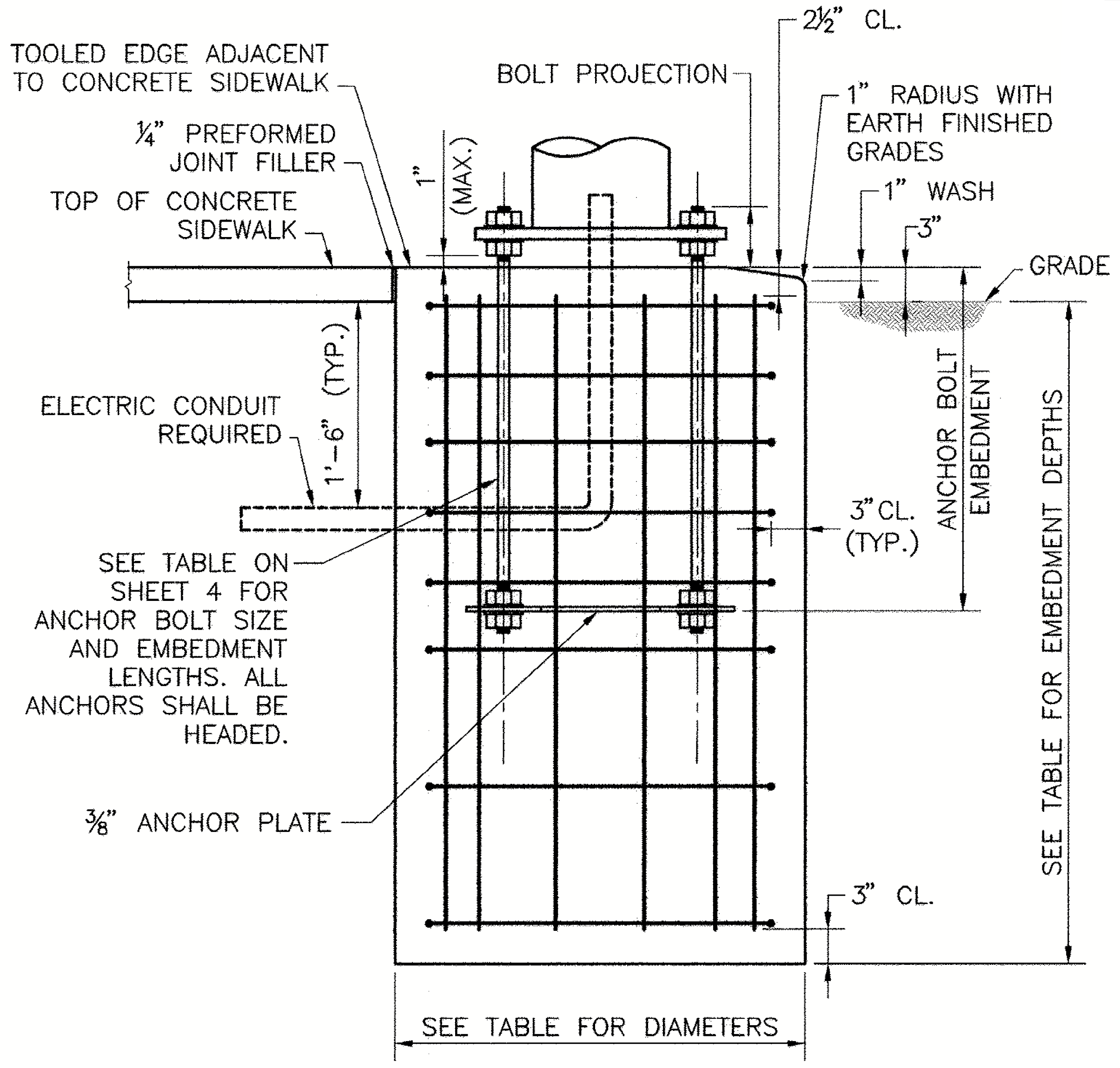
SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'–6"	7'–0"	18–#8	3'–6"	9'–0"	18–#8	3'–6"	10'–0"	18–#8	3'–6"	10'–0"	18–#8
WET SAND	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

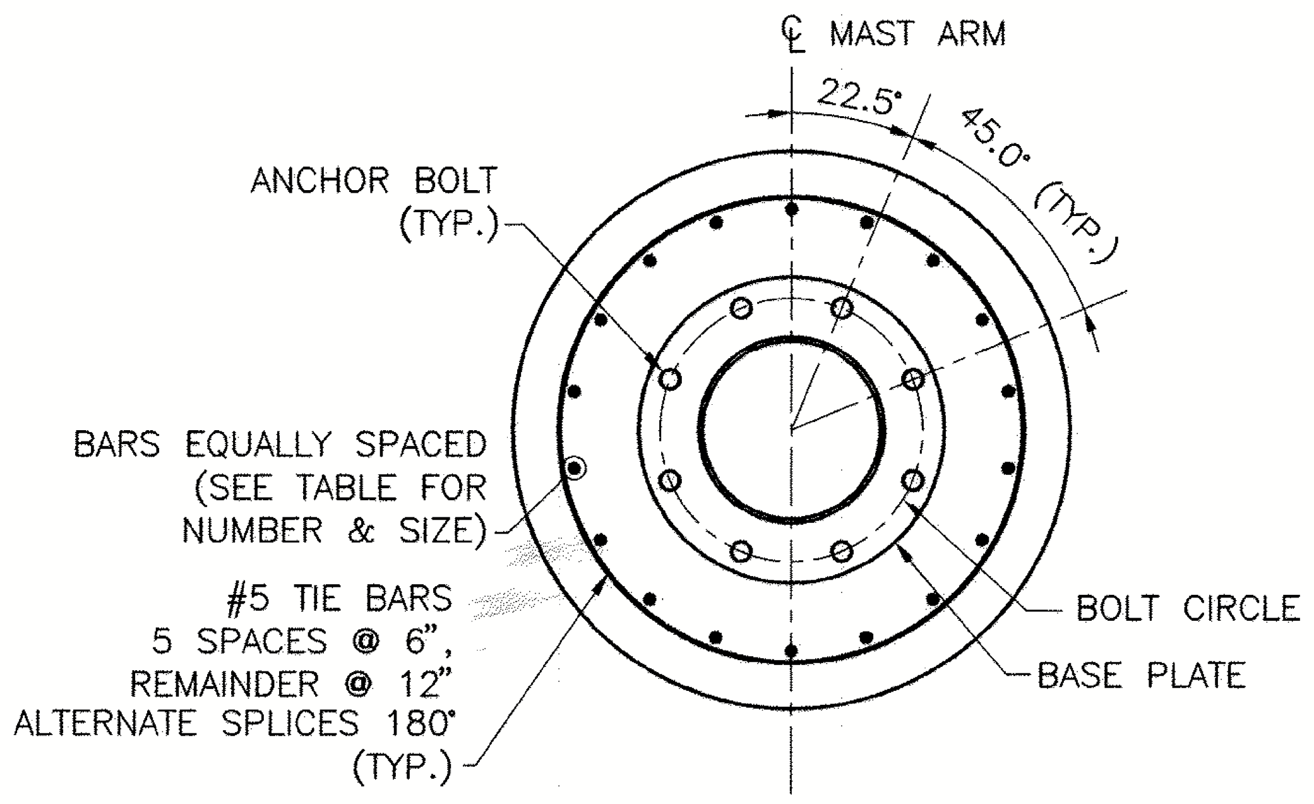
SOIL TYPE	15' & 20' MAST ARMS			25' & 30' MAST ARMS			35' & 40' MAST ARMS			45' MAST ARMS		
	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS	DIAMETER	DEPTH	VERTICAL BARS
DRY SAND	3'–6"	8'–0"	18–#8	3'–6"	10'–0"	18–#8	4'–0"	11'–0"	18–#9	4'–6"	10'–0"	18–#10
WET SAND	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.

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

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

Frank A. Tramontozzi 2/24/2011
CHIEF ENGINEER

BRIDGE ENGINEER

Neil E. Boudreau
TRAFFIC ENGINEER

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		46	71
PROJECT FILE NO. 605637			

TEMPORARY TRAFFIC CONTROL PLANS
CONSTRUCTION SEQUENCING
& GENERAL NOTES

CONSTRUCTION SEQUENCING NOTES

1. ALL WORK TO BE COMPLETED DURING OFF PEAK NIGHT-TIME WORKING HOURS SUNDAY THROUGH THURSDAY FROM 7:00PM TO 5:00AM USING TYPICAL LANE CLOSURES/SHIFTS AND ROAD CLOSURES SHOWN UNLESS OTHERWISE NOTED.
2. NO WORK SHALL OCCUR WITHIN THE PUBLIC WAY ON STATE OR COUNTY HOLIDAYS UNLESS OTHERWISE APPROVED BY THE ENGINEER.
3. NO WORK AFFECTING THE PUBLIC WAY SHALL BE COMPLETED ON ROUTE 2 WESTBOUND FROM BETWEEN CAMBRIDGE PARK DRIVE AND LAKE STREET FROM 7:00PM TO 10:00PM UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. COMPLETE THE INSTALLATION OF ALL TRAFFIC SIGNAL CONDUIT, PULL BOXES, AND ROADWAY DRAINAGE ELEMENTS WITHIN ROADWAY AREAS AS SHOWN ON THE PLANS PRIOR TO REMOVING AND RESETTING OR PLACEMENT OF ALL ROADWAY CURB/EDGING AND ROADWAY WIDENING.
5. PRIOR TO INSTALLATION OF ROUTE 2 WESTBOUND STAGE 1 WORK AREA SHOWN COMPLETE AS MUCH OF THE PROPOSED ROADWAY DRAINAGE, TRAFFIC SIGNAL CONDUIT AND PULL BOX INSTALLATION AS NEEDED TO COMPLETE THE ROADWAY WIDENING AROUND THE EXISTING ISLAND AS SHOWN ON THE PLANS. MODIFIED TRAFFIC ISLAND SHALL BE DELINEATED BY USE OF REFLECTORIZED DRUMS UNTIL THE INSTALLATION OF CURB/EDGING IS COMPLETE.
6. ROUTE 2 WESTBOUND STAGE 1 WORK AREA HAS BEEN ESTABLISHED TO PROTECT WORK AREA AND HAZARDS DURING CONSTRUCTION. CONSTRUCTION OF PROPOSED ELEMENTS SHOWN ON THE PLANS SHALL BE COMPLETED USING OFF PEAK LANE CLOSURES ADJACENT TO THE WORK AREA UNLESS OTHERWISE APPROVED BY THE ENGINEER.
7. UPON COMPLETION OF ALL WORK WITHIN AND IMMEDIATELY ADJACENT TO THE ROUTE 2 WESTBOUND STAGE 1 WORK AREA PROVIDED THE CONTRACTOR SHALL ESTABLISH THE ROUTE 2 WESTBOUND STAGE 2 WORK AREA SHOWN TO COMPLETE LEACHING BASIN, REMAINING TRAFFIC SIGNAL AND DRAINAGE ELEMENT CONSTRUCTION AND CURB/EDGING INSTALLATION.
8. CONTRACTOR MAY CLOSE AND DETOUR ONE DIRECTION (EASTBOUND OR WESTBOUND) OF ROUTE 2 AT A TIME UNLESS OTHERWISE APPROVED BY THE ENGINEER.

TEMPORARY TRAFFIC CONTROL PLAN 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) WITH MASSACHUSETTS AMENDMENTS, 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. DRUMS AND CONES SHALL BE SET AT 20' ON CENTER MAX UNLESS OTHERWISE NOTED OR ADJUSTED BY THE ENGINEER.
3. DRUMS AND CONES SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE 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.
4. 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, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
5. GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF DRUMS.
6. 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. EXCAVATIONS IN EXCESS OF 3 FEET SHOULD BE PROTECTED BY AN APPROVED TEMPORARY BARRIER WITH A MINIMUM LEVEL LATERAL OFFSET AS REQUIRED BY THE MANUFACTURER OR TYPE OF BARRIER FROM THE EDGE OF EXCAVATION. TEMPORARY BARRIER PLACED WITH LESS THAN THE RECOMMENDED LATERAL OFFSET TO THE EDGE OF EXCAVATION SHALL BE ANCHORED/RESTRAINED TO PREVENT LATERAL MOVEMENT WHEN STRUCK BY ERRANT VEHICLES TRAVELING AT THE POSTED SPEED.
7. 11' MINIMUM LANE WIDTHS SHALL BE MAINTAINED.
8. TRAFFIC CONTROL DEVICES AND SIGNS SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS WHEN NOT IN USE.
9. SIGNS INSTALLED ON PORTABLE STANDS REQUIRE 12 INCH MINIMUM MOUNTING HEIGHT FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE SIGN.
10. 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.
11. SIGNS MOUNTED ON POSTS REQUIRE A MINIMUM 84 INCH MOUNTING HEIGHT FROM THE ROADWAY OR SIDEWALK SURFACE TO THE BOTTOM OF THE SIGN.
12. TEMPORARY MARKINGS SHALL BE WATER-BORNE PAINT.
13. REFLECTORIZED CONES SHALL BE A MINIMUM OF 36 INCHES IN HEIGHT.
14. 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.
15. W8-15 SIGNS SHALL BE INSTALLED IN ADVANCE (100' MIN) OF PAVEMENT MILLING AREAS OR AS REQUESTED BY THE ENGINEER.
16. THERE IS NO DESIGNATED BICYCLE LANE ON THE ROADWAY WITHIN THE PROJECT LIMITS. BICYCLES ARE EXPECTED TO SHARE THE ROAD WITH GENERAL VEHICULAR TRAFFIC OR TO TRAVEL ALONG EXISTING BICYCLE FACILITIES IN THE VICINITY OF THE PROJECT.
17. THE CONTRACTOR SHALL SECURE THE WORK AREA TO PREVENT UNAUTHORIZED ACCESS AT ALL TIMES.
18. ARROW BOARD (CAUTION) SHALL OPERATE IN FOUR-POINT CAUTION DISPLAY ONLY.
19. WHEN UTILIZING TYPICAL TRAFFIC CONTROL DETAILS OR ROAD CLOSURE PLANS, COVER EXISTING CONFLICTING ADVANCE WARNING SIGNS AS REQUIRED TO COMPLETE THE WORK.
20. THE CONTRACTOR SHALL PROVIDE TEMPORARY IMPACT ATTENUATORS TO PROTECT ALL BLUNT-ENDS OF TEMPORARY BARRIER OR AS REQUIRED ON THE TEMPORARY TRAFFIC CONTROL PLANS. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO THE START OF WORK. ALL TEMPORARY IMPACT ATTENUATORS ON ROUTE 2 THAT ARE NORTH OF ALEWIFE BROOK PARKWAY SHALL BE DESIGNED FOR TEST LEVEL 3 (TL-3). ALL OTHER ATTENTUATORS SHALL BE DESIGNED FOR TEST LEVEL 2 (TL-2).
21. POLICE DETAILS SHALL BE USED FOR ALL WORK WITHIN THE DEPARTMENT OF CONSERVATION AND RECREATION (DCR) LAYOUT UNLESS OTHERWISE APPROVED BY DCR.
22. THE CONTRACTOR SHALL COORDINATE WITH THE MBTA TO FACILITATE BUS OPERATIONS.
23. CONTRACTOR SHALL HAVE MOVEABLE IMPACT ATTENUATORS (1 PER CLOSED LANE) WITHIN AND IN ADVANCE OF THE WORK AREA FOR ALL TEMPORARY WORK ZONES ON ROUTE 2 WEST OF THE ROUTE 16/ROUTE 3 INTERSECTION, OR AS REQUESTED BY THE ENGINEER.
24. CONTRACTOR SHALL PROVIDE CLEAR ZONES AROUND MOVEABLE IMPACT ATTENUATOR DEVICES AS REQUIRED BY THE MANUFACTURER AT ALL TIMES.

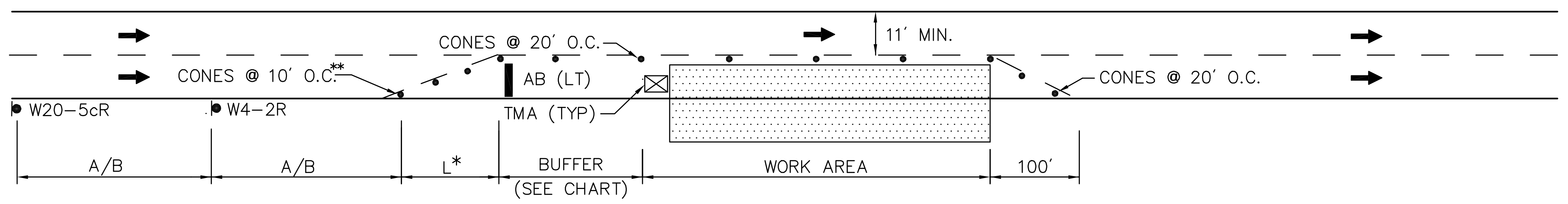
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		47	71
PROJECT FILE NO. 605637			

TEMPORARY TRAFFIC CONTROL PLANS

OPERATIONAL SIGNING

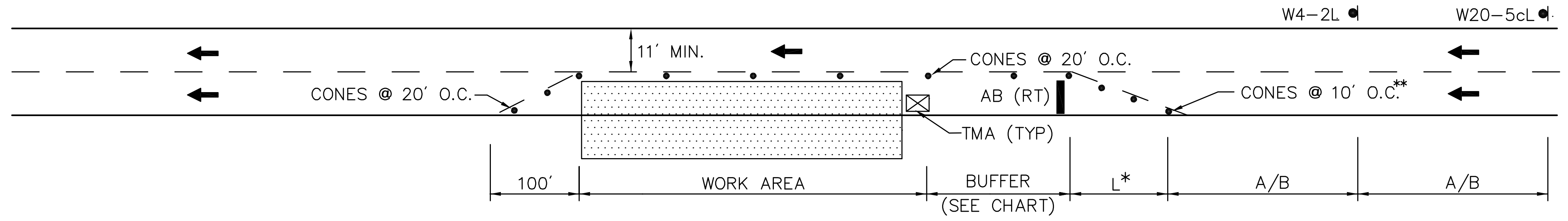
LANE CLOSURES SHOWN ARE FOR TEMPORARY CONSTRUCTION.
ALL DRUMS AND SIGNS ARE SHOWN AS THEY SHOULD APPEAR
DURING THE WORKING DAY, OR WHILE OPERATING IN THE WORK ZONE.



A = 500' (ROUTE 2)
B = 100' (ROUTE 16)

ONE LANE CLOSURE – RIGHT

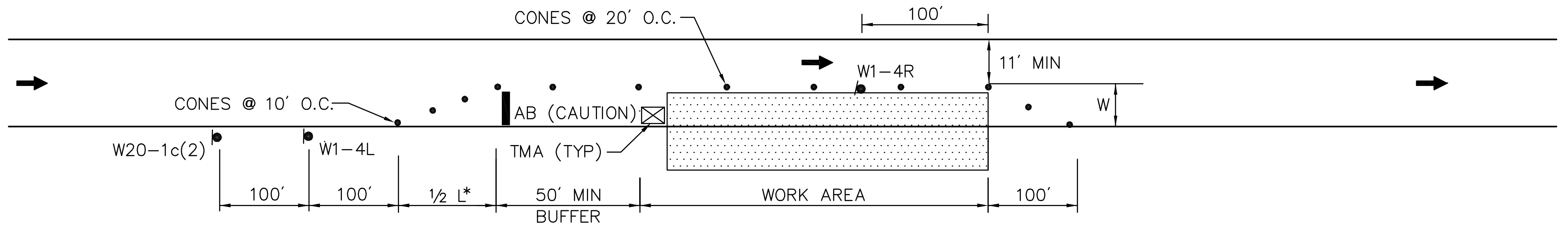
NOT TO SCALE



A = 500' (ROUTE 2)
B = 100' (ROUTE 16)

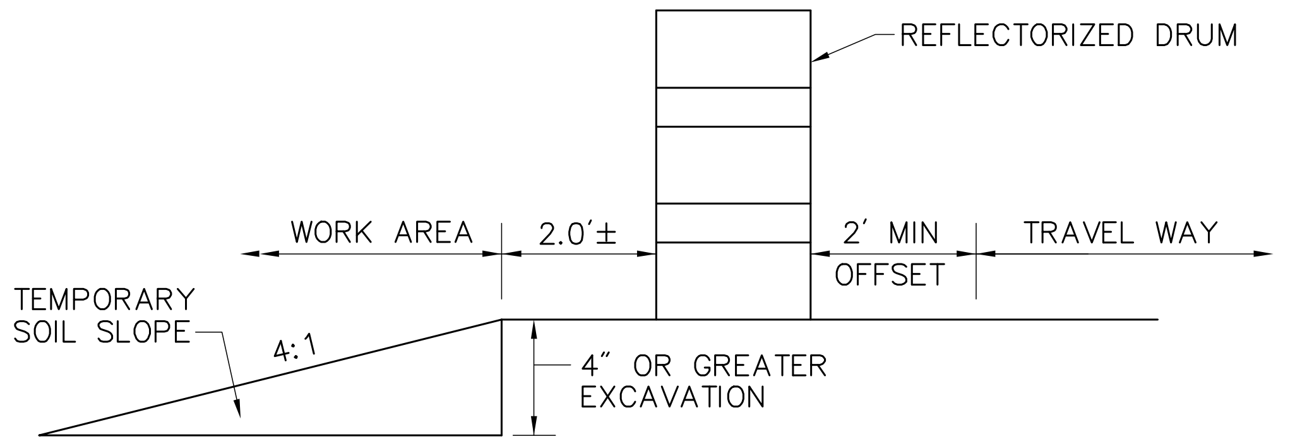
ONE LANE CLOSURE – LEFT

NOT TO SCALE



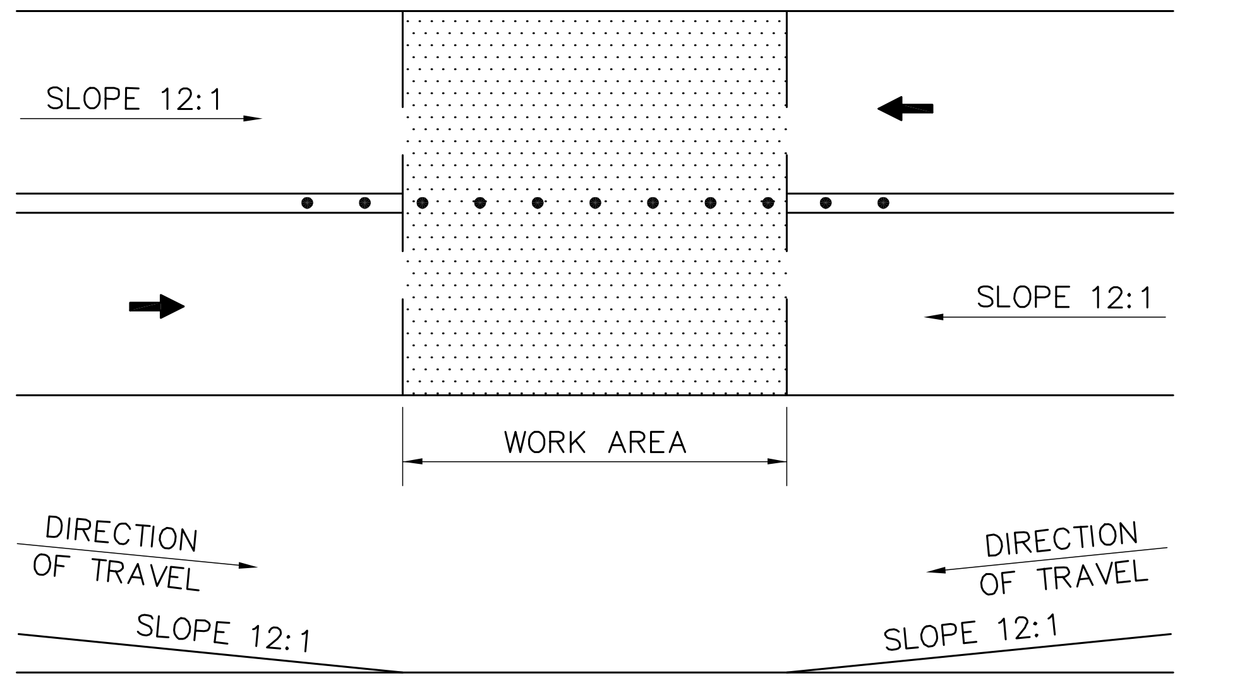
ONE WAY STREET LANE SHIFT

NOT TO SCALE



ROADWAY SLOPE PROTECTION

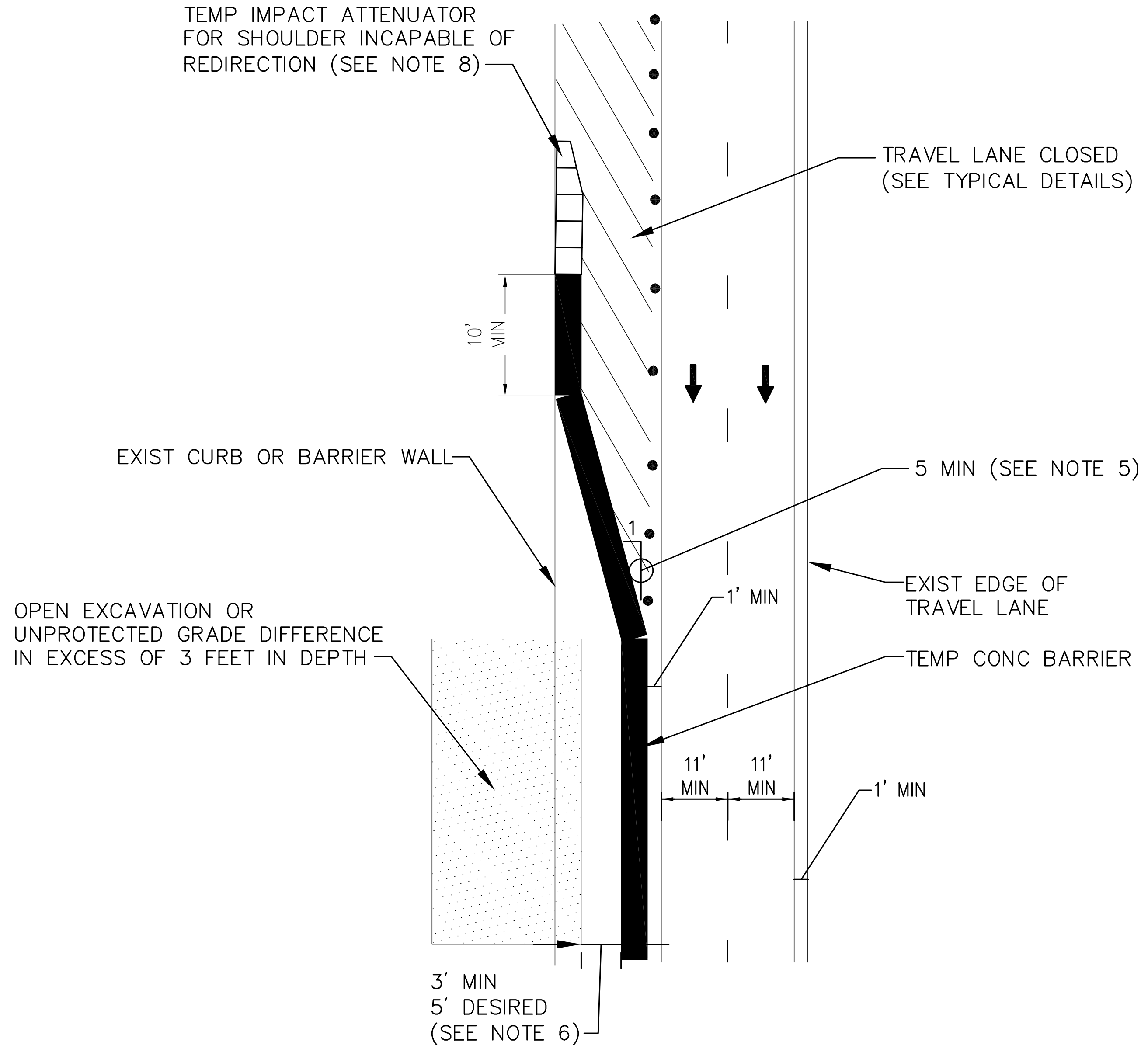
NOT TO SCALE



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

TEMPORARY PAVEMENT TRANSITION DETAIL

NOT TO SCALE



BARRIER ADJACENT TO LIVE TRAVEL LANE DETAIL

NOT TO SCALE

NOTES:

1. ANY EXCAVATION GREATER THAN 4' DEEP ADJACENT TO TRAFFIC SHALL BE PROTECTED BY TEMPORARY CONCRETE BARRIER.
2. ALL BLUNT ENDS OF BARRIER SHALL BE PROTECTED AT ALL TIMES IN ACCORDANCE WITH THE LATEST EDITION OF THE AASHTO ROADSIDE DESIGN GUIDE.
3. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED FOR TEST LEVEL 2 (TL–2) ON ROADWAYS HAVING A POSTED LESS THAN OR EQUAL TO 45 MPH.
4. TEMPORARY IMPACT ATTENUATORS SHALL BE DESIGNED FOR TEST LEVEL 3 (TL–3) ON ROADWAYS HAVING A POSTED SPEED IN EXCESS OF 45 MPH.
5. BARRIER TAPER RATES SHALL BE:
   - 5:1 IF POSTED SPEED IS LESS THAN 40 MPH
   - 9:1 IF POSTED SPEED IS GREATER THAN OR EQUAL TO 40 MPH
   - 11:1 IF POSTED SPEED IS GREATER THAN OR EQUAL TO 50 MPH
   - 13:1 IF POSTED SPEED IS GREATER THAN OR EQUAL TO 60 MPH
6. LEVEL ASPHALT CLEAR SLIDE SPACE FOR BARRIER SHALL BE FREE FROM OBSTRUCTIONS AT ALL TIMES. 3 FEET CLEAR SHALL BE PROVIDED FOR SPEEDS LESS THAN OR EQUAL TO 45 MPH. 5 FEET CLEAR SHALL BE PROVIDED FOR SPEEDS IN EXCESS OF 45 MPH.
7. IF MINIMUM CLEAR SLIDE SPACE CANNOT BE PROVIDED TEMP CONC BARRIER SHALL BE ANCHORED OR RESTRAINED BY A MASSDOT APPROVED METHOD.
8. TEMP IMPACT ATTENUATOR SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

LEGEND

●	REFLECTORIZED DRUM OR TRAFFIC CONE (LABELED)
Ⓟ	POLICE OFFICER
●	TEMPORARY TRAFFIC CONTROL SIGN
⊫	PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)
⇐	DETOUR ROUTE
┻┻	TYPE III BARRICADE
⊠	TRUCK MOUNTED ATTENUATOR (TMA)
▨	WORK AREA PUBLIC ACCESS RESTRICTED
←	PROPOSED TRAVEL LANE AND DIRECTION OF TRAVEL
▮	ARROW BOARD (AB) [MESSAGE]
NTS	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

FOR POSTED SPEEDS GREATER THAN 40 MPH

$* L = W \times S$

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

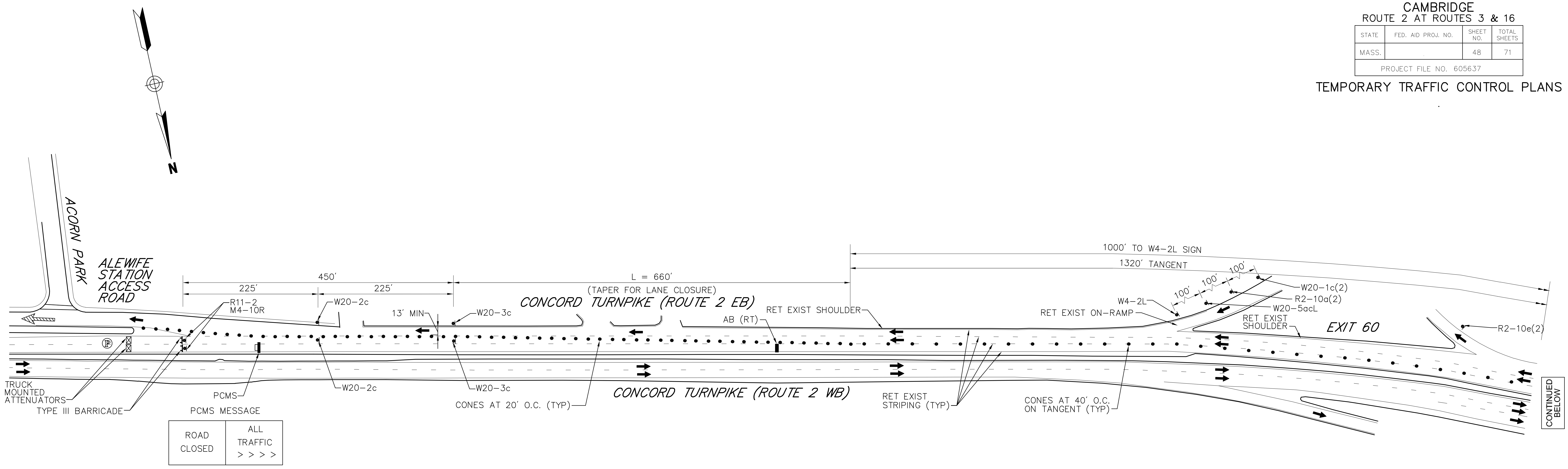
BUFFER SPACING

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

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

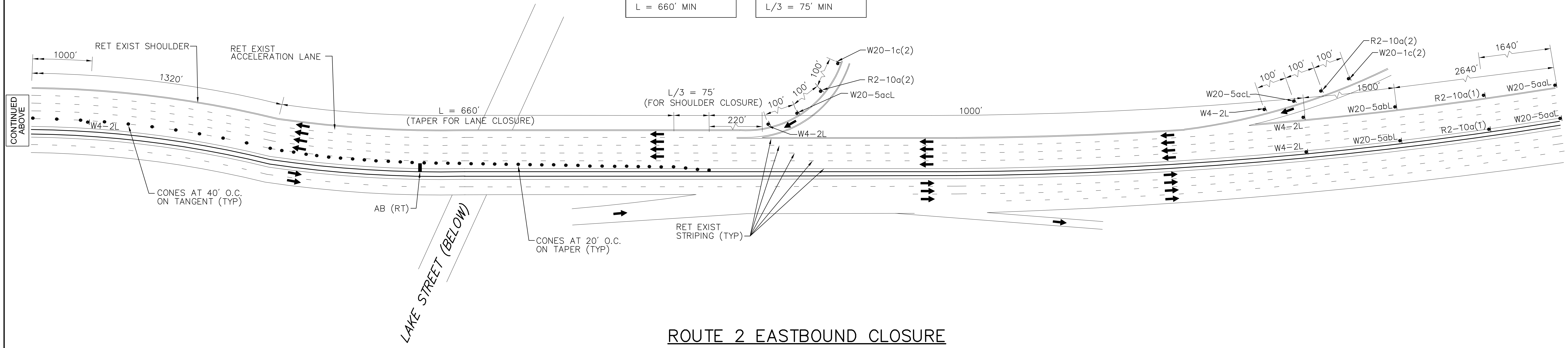
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		48	71
PROJECT FILE NO. 605637			

TEMPORARY TRAFFIC CONTROL PLANS



TAPER CALCULATIONS
W = 12'
S = 55 MPH
L = WS = 660'
L = 660' MIN

TAPER CALCULATIONS
W = 4'
S = 55 MPH
L = WS = 220'
L/3 = 75' MIN



ROUTE 2 EASTBOUND CLOSURE

NOT TO SCALE

NOTE:

1. ALL WORK TO BE COMPLETED DURING OFF PEAK NIGHT-TIME WORKING HOURS SUNDAY THROUGH THURSDAY FROM 10:00PM TO 5:00AM USING TYPICAL LANE CLOSURES/SHIFTS AND ROAD CLOSURES SHOWN UNLESS OTHERWISE NOTED.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		49	71

PROJECT FILE NO. 605637

TEMPORARY TRAFFIC CONTROL PLANS
ADVANCED SIGN PLAN

NOTES:

1. NOT TO SCALE.
2. SIGNS TO BE INSTALLED AT PROJECT LIMITS AS SHOWN.
3. ALL ADVANCE SIGNS TO BE IN PLACE FOR THE DURATION OF THE PROJECT.
4. SEE NOTE 19 OF THE TEMPORARY TRAFFIC CONTROL PLAN GENERAL NOTES ON SHEET 46.

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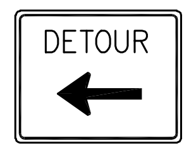
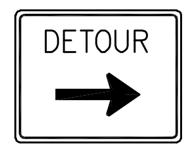
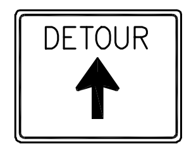
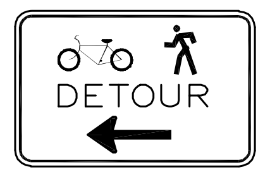
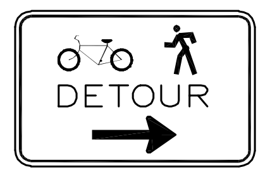
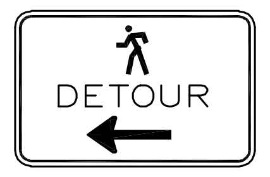
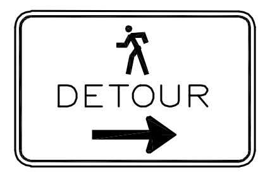
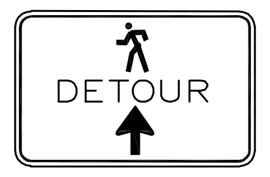
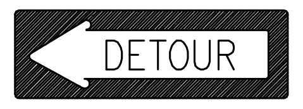
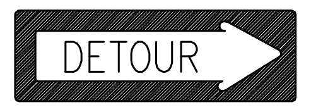
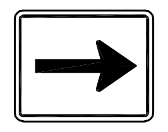
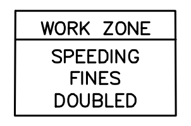
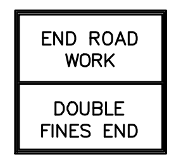
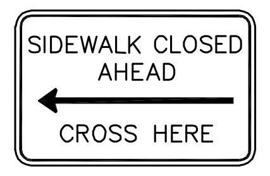
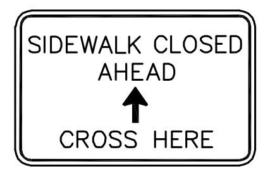
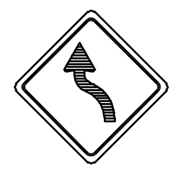
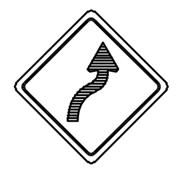
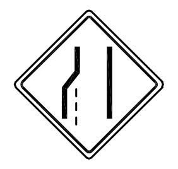
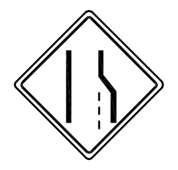
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		50	71
PROJECT FILE NO. 605637			

TEMPORARY TRAFFIC CONTROL PLANS
SIGN SUMMARY

TEMPORARY TRAFFIC CONTROL SIGNS

IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT	COLOR			TEXT DIMENSIONS (INCHES)		
	WIDTH	HEIGHT		BACK-GROUND	LEGEND	BORDER	LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.
M1-5(2)	24"	24"		WHITE	BLACK	BLACK	SEE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS		
M3-2	24"	12"		WHITE	BLACK	BLACK			
M3-3	24"	12"		WHITE	BLACK	BLACK			
M4-8a	24"	18"		ORANGE	BLACK	BLACK			
M4-9L	30"	24"		ORANGE	BLACK	BLACK			
M4-9R	30"	24"		ORANGE	BLACK	BLACK			
M4-9V	30"	24"		ORANGE	BLACK	BLACK			
M4-9a(L)	30"	24"		ORANGE	BLACK	BLACK			
M4-9a(R)	30"	24"		ORANGE	BLACK	BLACK			
M4-9b(L)	30"	24"		ORANGE	BLACK	BLACK			
M4-9b(R)	30"	24"		ORANGE	BLACK	BLACK			
M4-9b(V)	30"	30"		ORANGE	BLACK	BLACK			
M4-10L	48"	18"		ORANGE	BLACK	–			
M4-10R	48"	18"		ORANGE	BLACK	–			
M6-1R	21"	15"		WHITE	BLACK	BLACK			

IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT	COLOR			TEXT DIMENSIONS (INCHES)		
	WIDTH	HEIGHT		BACK-GROUND	LEGEND	BORDER	LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.
R1-2	36"x36"x36"			RED	RED/ WHITE	WHITE	SEE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS		
R2-10a(1)	60"	48"		ORANGE WHITE	BLACK	BLACK	AS PER MASSDOT STANDARD		
R2-10a(2)	48"	36"							
R2-10e(1)	48"	60"		ORANGE WHITE	BLACK	BLACK	AS PER MASSDOT STANDARD		
R2-10e(2)	36"	48"							
R5-1	30"	30"		WHITE	RED/ WHITE	–	SEE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS		
R9-9	24"	12"		WHITE	BLACK	BLACK			
R9-11L	24"	18"		WHITE	BLACK	BLACK			
R9-11V	24"	18"		WHITE	BLACK	BLACK			
R11-2	48"	30"		WHITE	BLACK	BLACK			
W1-4L	48"	48"		ORANGE	BLACK	BLACK			
W1-4R	48"	48"		ORANGE	BLACK	BLACK			
W4-2L	48"	48"		ORANGE	BLACK	BLACK			
W4-2R	48"	48"		ORANGE	BLACK	BLACK			
W8-15	36"	36"		ORANGE	BLACK	BLACK			
W20-1a	48"	48"		ORANGE	BLACK	BLACK			
W20-1b	48"	48"		ORANGE	BLACK	BLACK			

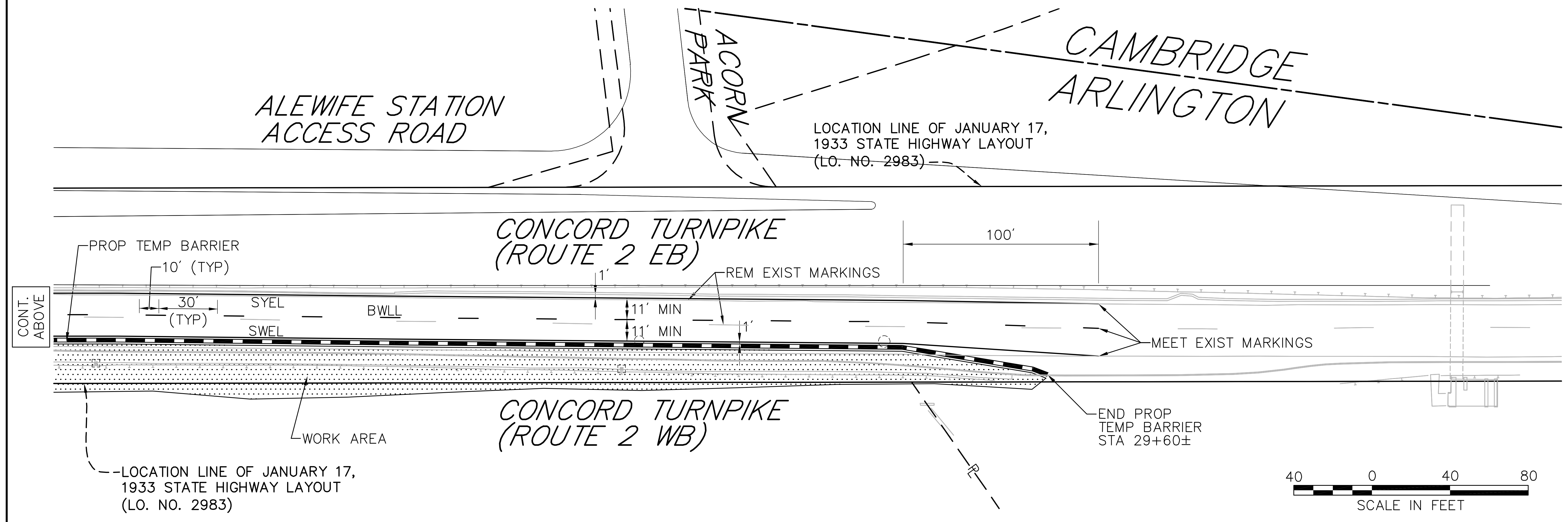
IDENTIFI-CATION NUMBER	SIZE OF SIGN		TEXT	COLOR			TEXT DIMENSIONS (INCHES)		
	WIDTH	HEIGHT		BACK-GROUND	LEGEND	BORDER	LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.
W20-1c(1)	48"	48"		ORANGE	BLACK	BLACK	SEE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS		
W20-1c(2)	36"	36"							
W20-1d	36"	36"		ORANGE	BLACK	BLACK			
W20-1e	36"	36"		ORANGE	BLACK	BLACK			
W20-2c	36"	36"		ORANGE	BLACK	BLACK			
W20-3c	36"	36"		ORANGE	BLACK	BLACK			
W20-5aaL	48"	48"		ORANGE	BLACK	BLACK			
W20-5abL	48"	48"		ORANGE	BLACK	BLACK			
W20-5acL	48"	48"		ORANGE	BLACK	BLACK			
W20-5cL	48"	48"		ORANGE	BLACK	BLACK			
W20-5cR	48"	48"		ORANGE	BLACK	BLACK			
W20-8a	36"	36"		ORANGE	BLACK	BLACK			
SP-1	60"	60"		ORANGE	BLACK/ WHITE	BLACK	8C 7C/6C 18/9	4 4 4 4 3	8"@ 180°

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		51	71

PROJECT FILE NO. 605637

TEMPORARY TRAFFIC CONTROL PLANS
ROUTE 2 WESTBOUND
STAGE 1 WORK AREA



40 0 40 80
SCALE IN FEET

NOTES:

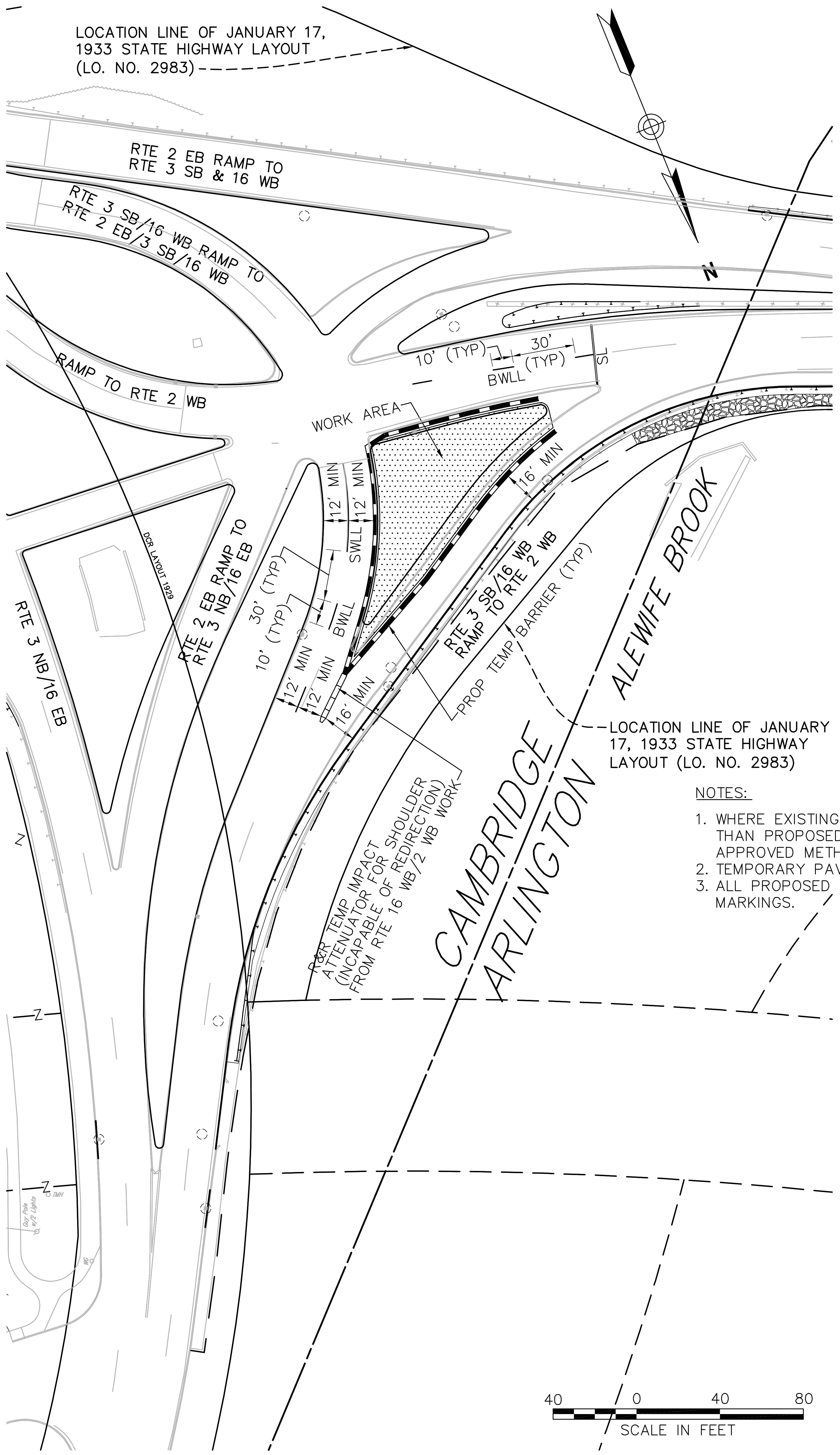
1. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
2. TEMPORARY PAVEMENT MARKINGS SHALL BE PAINT UNLESS OTHERWISE NOTED.
3. ALL PROPOSED MARKINGS SHOWN ARE TEMPORARY MARKINGS.
4. LANE CLOSURES FOR WORK ZONE ACCESS SHALL BE PERMITTED ONLY DURING OFF PEAK NIGHT–TIME TRAFFIC HOURS SUNDAY THROUGH THURSDAY FROM 10:00PM TO 5:00AM UNLESS OTHERWISE APPROVED BY THE ENGINEER.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		52	71

PROJECT FILE NO. 605637

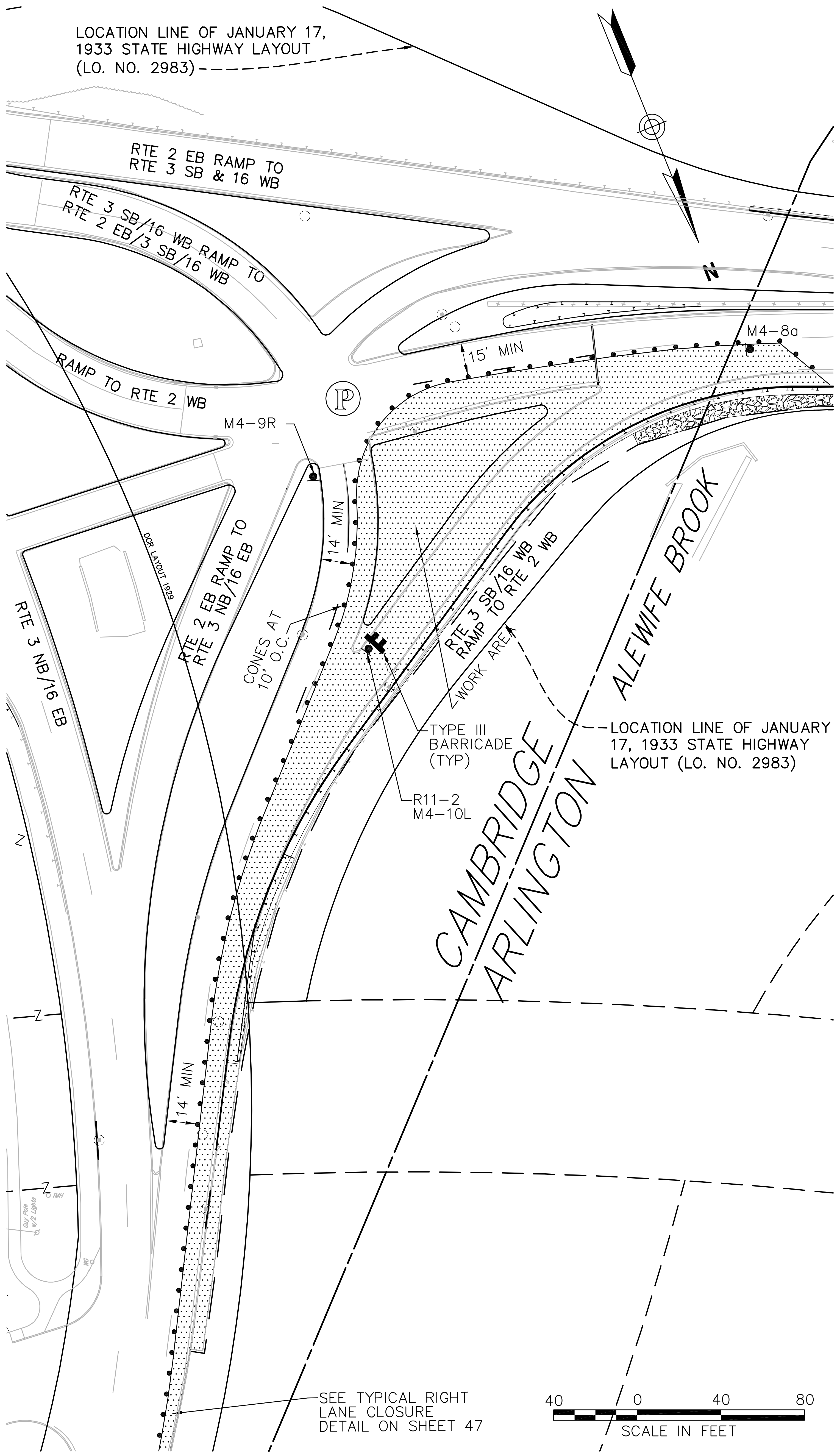
TEMPORARY TRAFFIC CONTROL PLANS
ROUTE 2 WESTBOUND
STAGE 2 WORK AREA & TYPICAL LANE CLOSURE



NOTES:
1. WHERE EXISTING PAVEMENT MARKINGS ARE DIFFERENT THAN PROPOSED MARKINGS SHOWN, REMOVE BY AN APPROVED METHOD.
2. TEMPORARY PAVEMENT MARKINGS SHALL BE PAINT.
3. ALL PROPOSED MARKINGS SHOWN ARE TEMPORARY MARKINGS.

ROUTE 2 WESTBOUND
STAGE 2 WORK AREA

NOTE:
1. ALL WORK TO BE COMPLETED DURING OFF PEAK NIGHT-TIME WORKING HOURS SUNDAY THROUGH THURSDAY FROM 7:00PM TO 5:00AM USING TYPICAL LANE CLOSURES/SHIFTS AND ROAD CLOSURES SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. LANE CLOSURES FOR WORK ZONE ACCESS SHALL BE PERMITTED ONLY DURING OFF PEAK NIGHT-TIME TRAFFIC HOURS SUNDAY THROUGH THURSDAY FROM 10:00PM TO 5:00AM UNLESS OTHERWISE APPROVED BY THE ENGINEER



ROUTE 2 WESTBOUND
TYPICAL LANE CLOSURE

NOTES:
1. ALL WORK TO BE COMPLETED DURING OFF PEAK NIGHT-TIME WORKING HOURS SUNDAY THROUGH THURSDAY FROM 10:00PM TO 5:00AM USING TYPICAL LANE CLOSURES/SHIFTS AND ROAD CLOSURES SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		53	71

PROJECT FILE NO. 605637

TEMPORARY TRAFFIC CONTROL PLANS
DETOUR PLANS
PEDESTRIAN DETOURS

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CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		54	71
PROJECT FILE NO. 605637			

TEMPORARY TRAFFIC CONTROL PLANS
DETOUR PLANS
ROUTE 2 WESTBOUND DETOUR

NOTE:

1. SIGNALS AT THE INTERSECTIONS OF ALEWIFE BROOK PARKWAY AT RINDGE AVENUE, ALEWIFE BROOK PARKWAY AT CAMBRIDGEPARK DRIVE AND CAMBRIDGE PARK DRIVE AT ALEWIFE STATION ACCESS ROAD SHALL OPERATE IN FLASHING MODE FOR DURATION OF DETOUR. INTERSECTION TO BE CONTROLLED BY POLICE DETAIL UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. ALL WORK TO BE COMPLETED DURING OFF PEAK NIGHT–TIME WORKING HOURS SUNDAY THROUGH THURSDAY FROM 10:00PM TO 5:00AM USING TYPICAL LANE CLOSURES/SHIFTS AND ROAD CLOSURES SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.

TAPER CALCULATIONS
W = 11'
S = 30 MPH
$L = \frac{WS^2}{60} = 165'$
L = 165' MIN
L/2 = 82.5' MIN
L/3 = 55' MIN

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		55	71

PROJECT FILE NO. 605637

TEMPORARY TRAFFIC CONTROL PLANS
DETOUR PLANS
ROUTE 2 EASTBOUND DETOUR

NOTE:

1. ALL WORK TO BE COMPLETED DURING OFF PEAK NIGHT-TIME WORKING HOURS SUNDAY THROUGH THURSDAY FROM 9:00PM TO 5:00AM USING TYPICAL LANE CLOSURES/SHIFTS AND ROAD CLOSURES SHOWN UNLESS OTHERWISE APPROVED BY THE ENGINEER.

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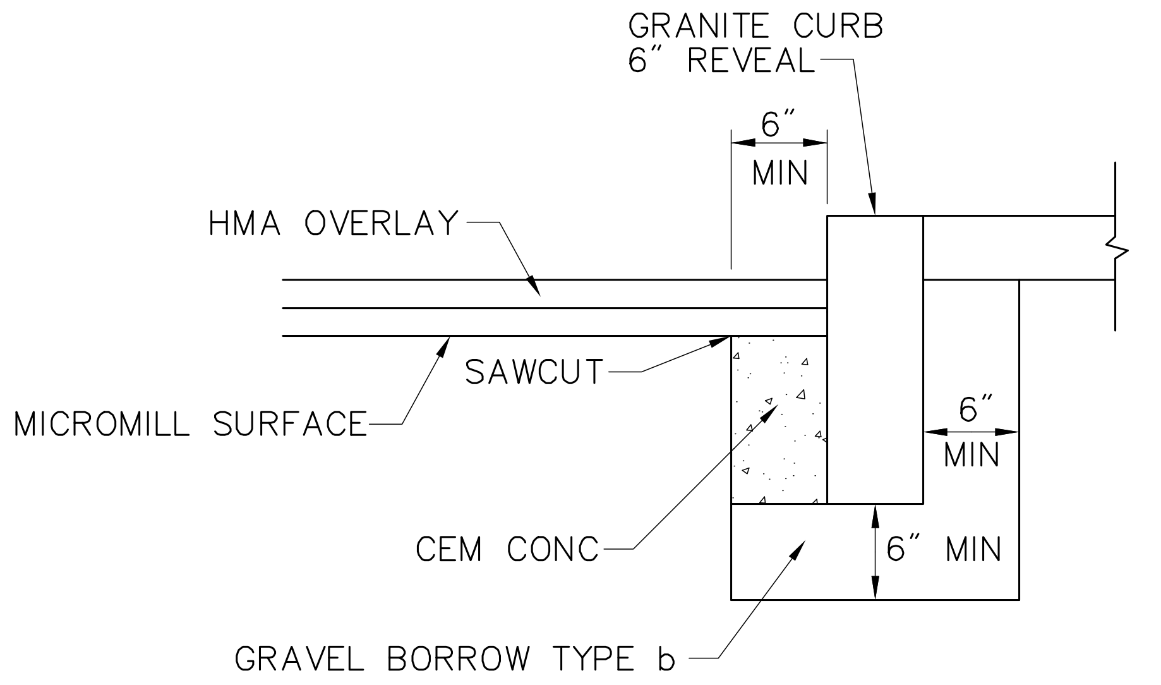
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		56	71
PROJECT FILE NO. 605637			

CONSTRUCTION DETAILS

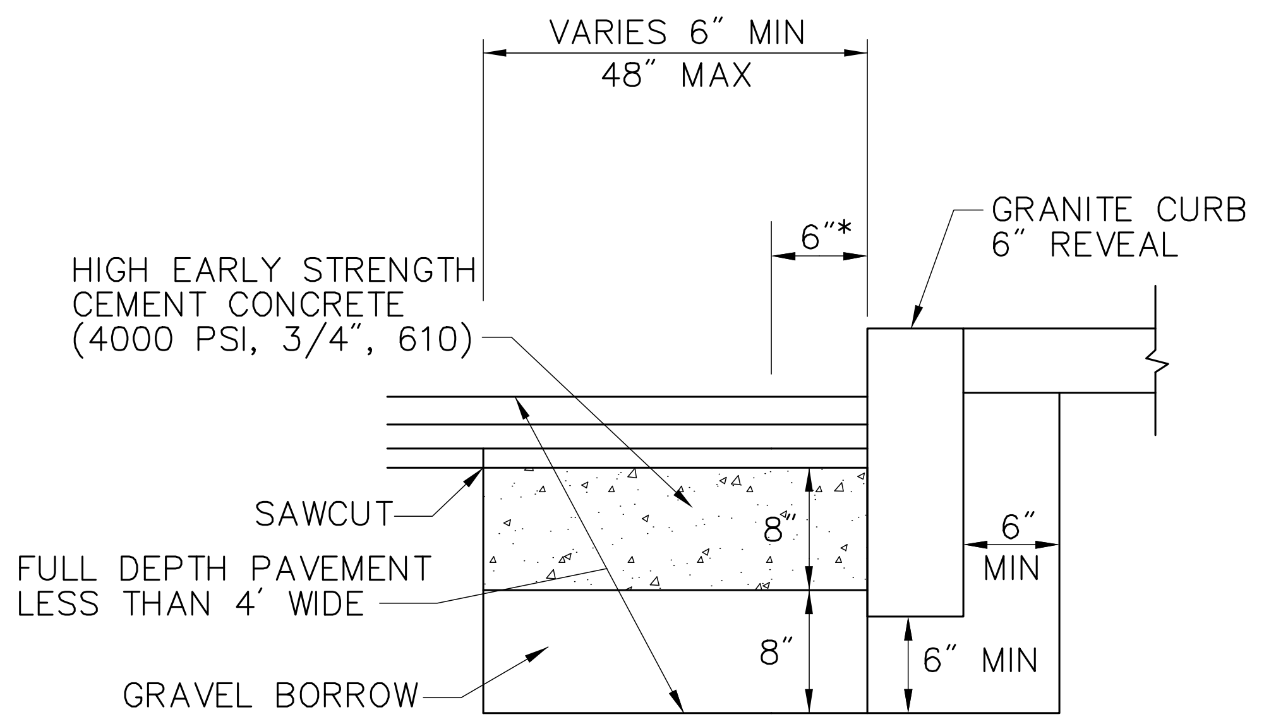


NOTES:

1. SAWCUT 6" FROM CURB LINE AND REMOVE EXISTING PAVEMENT AND GRAVEL. REPLACE WITH 6" (MIN) CEMENT CONCRETE.

GRANITE CURB IN MICROMILL & PAVEMENT OVERLAY

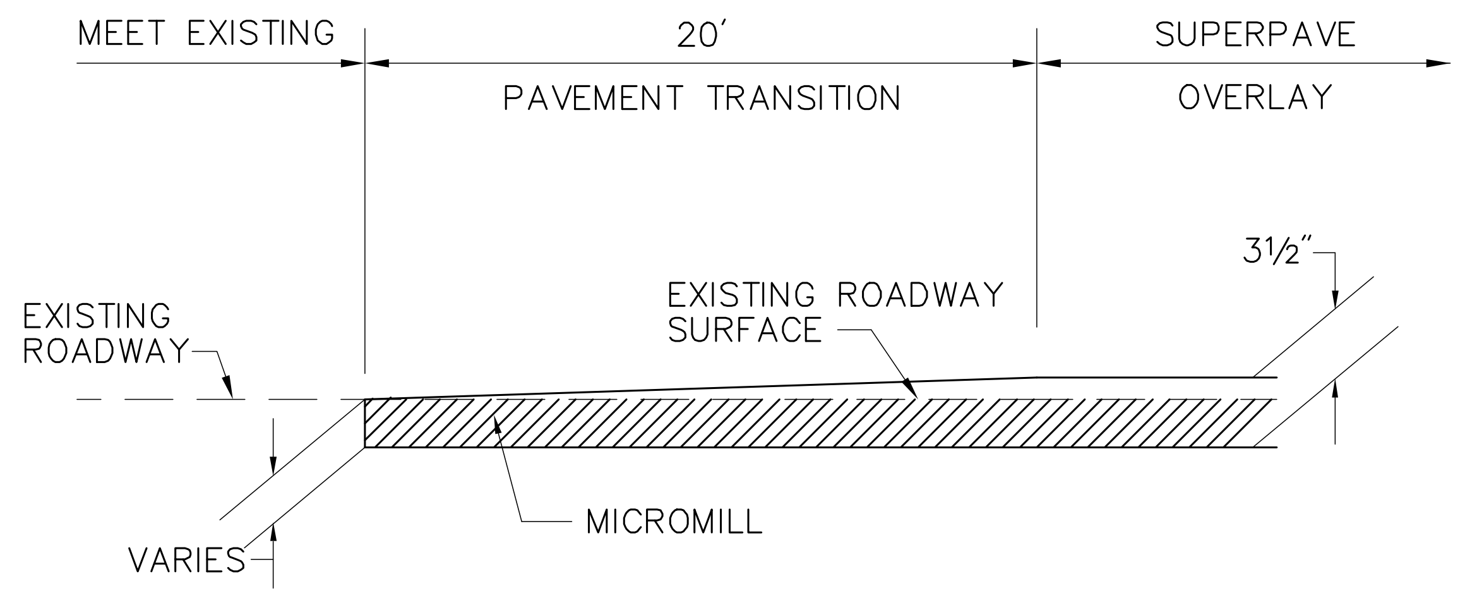
SCALE: NOT TO SCALE



*6" OF CEMENT CONCRETE (IF SET PRIOR TO FULL DEPTH PVM'T LESS THAN 4' WIDE) SHALL BE INCLUDED IN PRICE BID FOR GRANITE CURB.

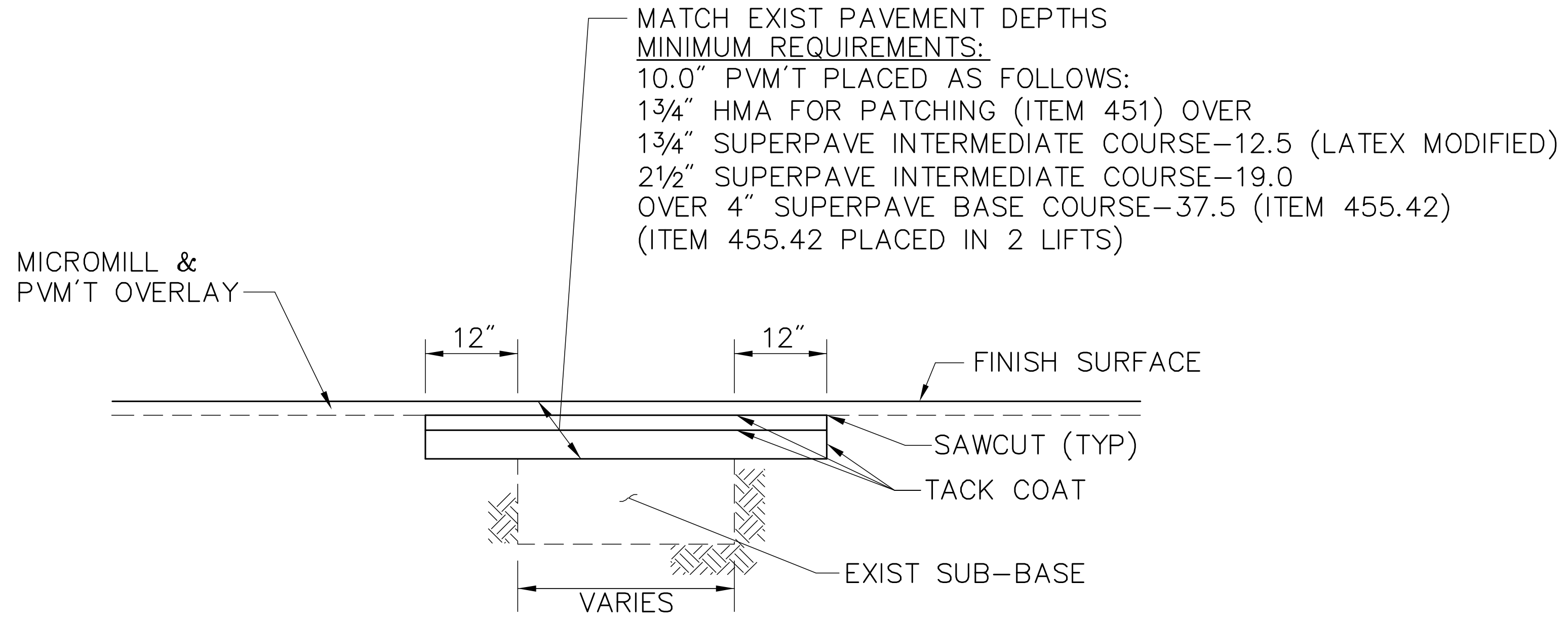
GRANITE CURB IN FULL DEPTH PAVEMENT LESS THAN 4' WIDE

SCALE: NOT TO SCALE



MICROMILLING & PVM'T OVERLAY TRANSITION SECTION

SCALE: NOT TO SCALE

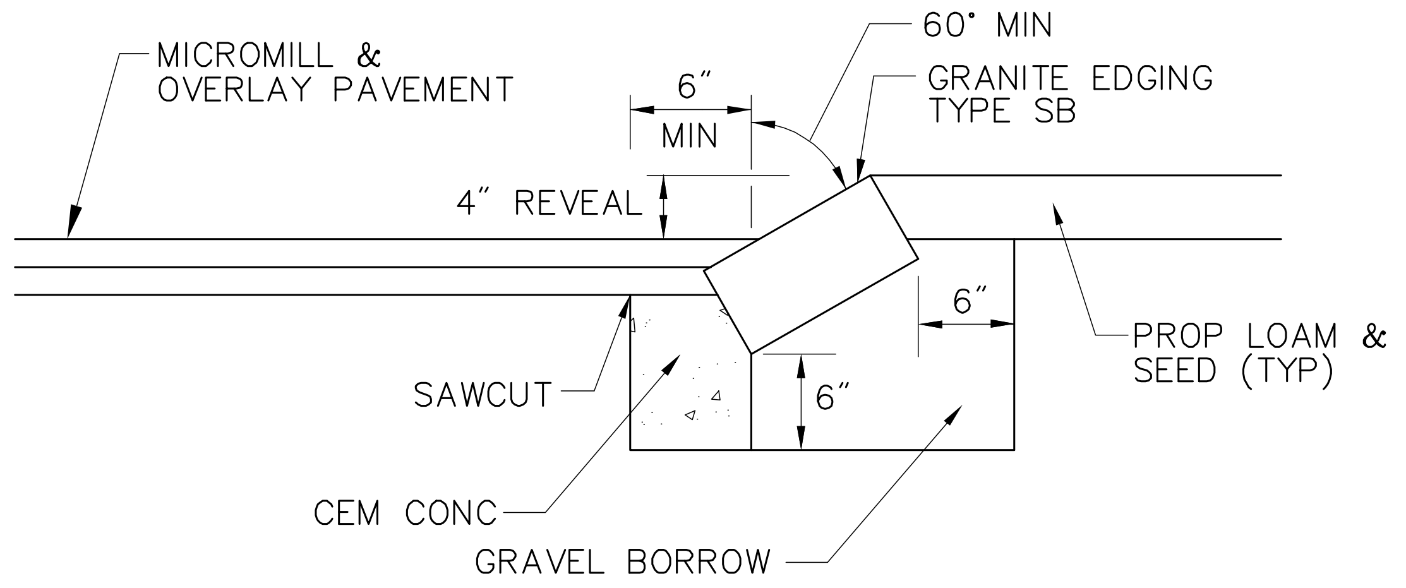


NOTE:

1. LOCATION OF PAVEMENT PATCH SHALL BE AS REQUIRED BY THE ENGINEER.

PARTIAL DEPTH PAVEMENT PATCH (AT DETERIORATED PAVEMENT)

SCALE: NOT TO SCALE

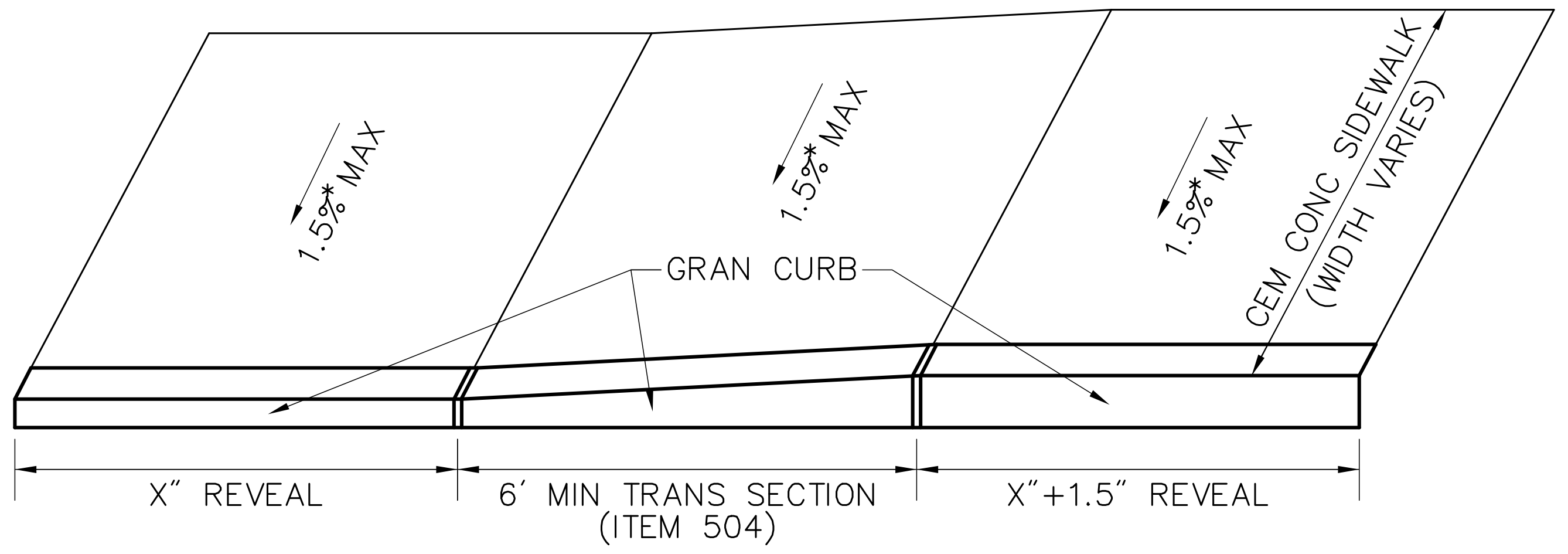


NOTE:

1. SAWCUT 6" FROM CURB LINE AND REMOVE EXISTING PAVEMENT AND GRAVEL. REPLACE WITH 6" (MIN) CEMENT CONCRETE.

GRANITE EDGING IN MICROMILL & PAVEMENT OVERLAY

SCALE: NOT TO SCALE



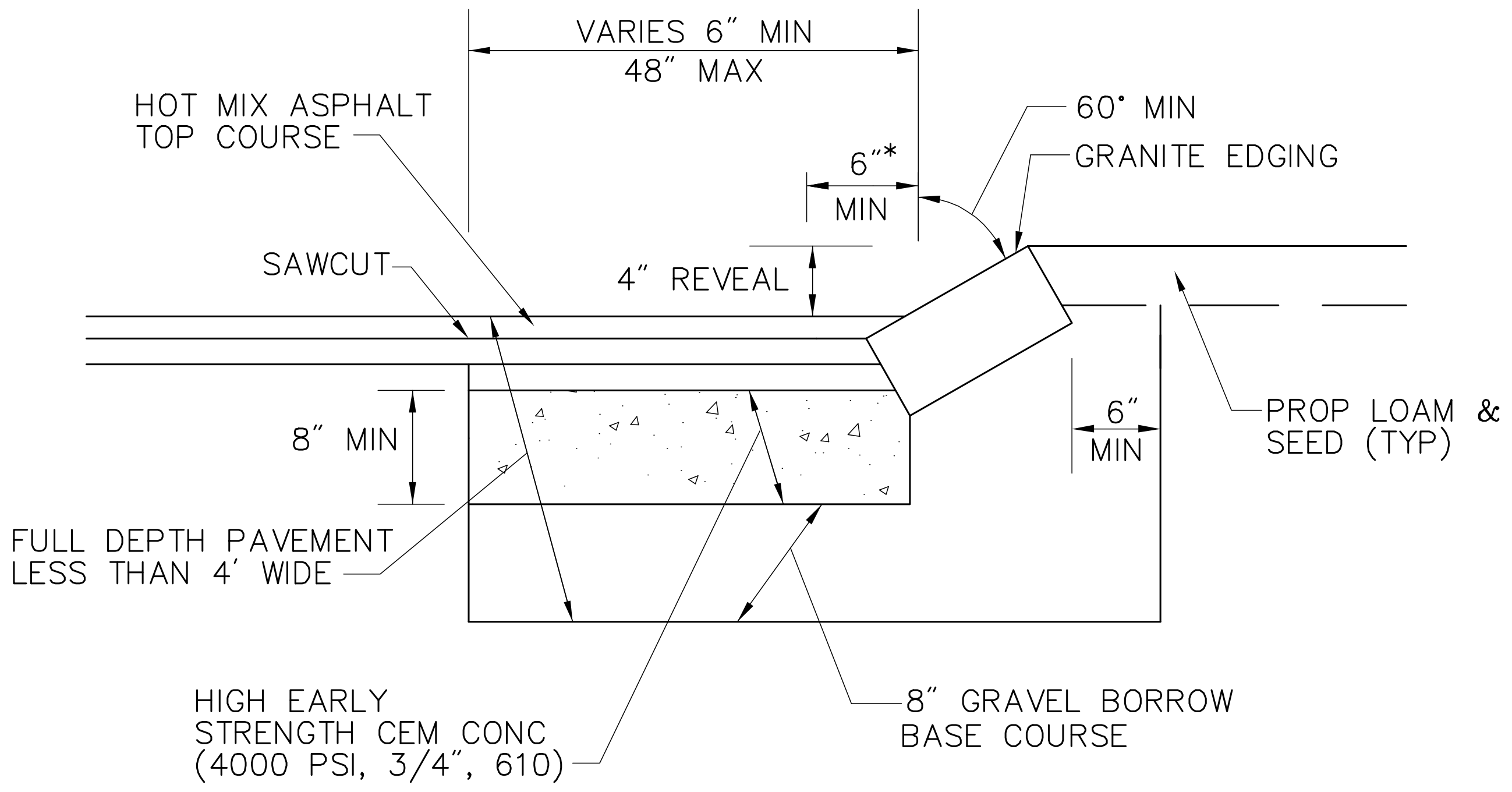
NOTE:

GRANITE CURB SHALL BE TRANSITIONED AT A RATE OF 1.5" OF REVEAL PER 6.0' MINIMUM CURB LENGTH.

TYPICAL GRAN CURB REVEAL TRANSITION

SCALE: NOT TO SCALE

* TOLERANCE FOR CONSTRUCTION ±0.5%



*6" OF CEMENT CONCRETE (IF SET PRIOR TO FULL DEPTH PVM'T LESS THAN 4' WIDE) SHALL BE INCLUDED IN PRICE BID FOR GRANITE EDGING.

GRANITE EDGING IN FULL DEPTH PAVEMENT LESS THAN 4' WIDE

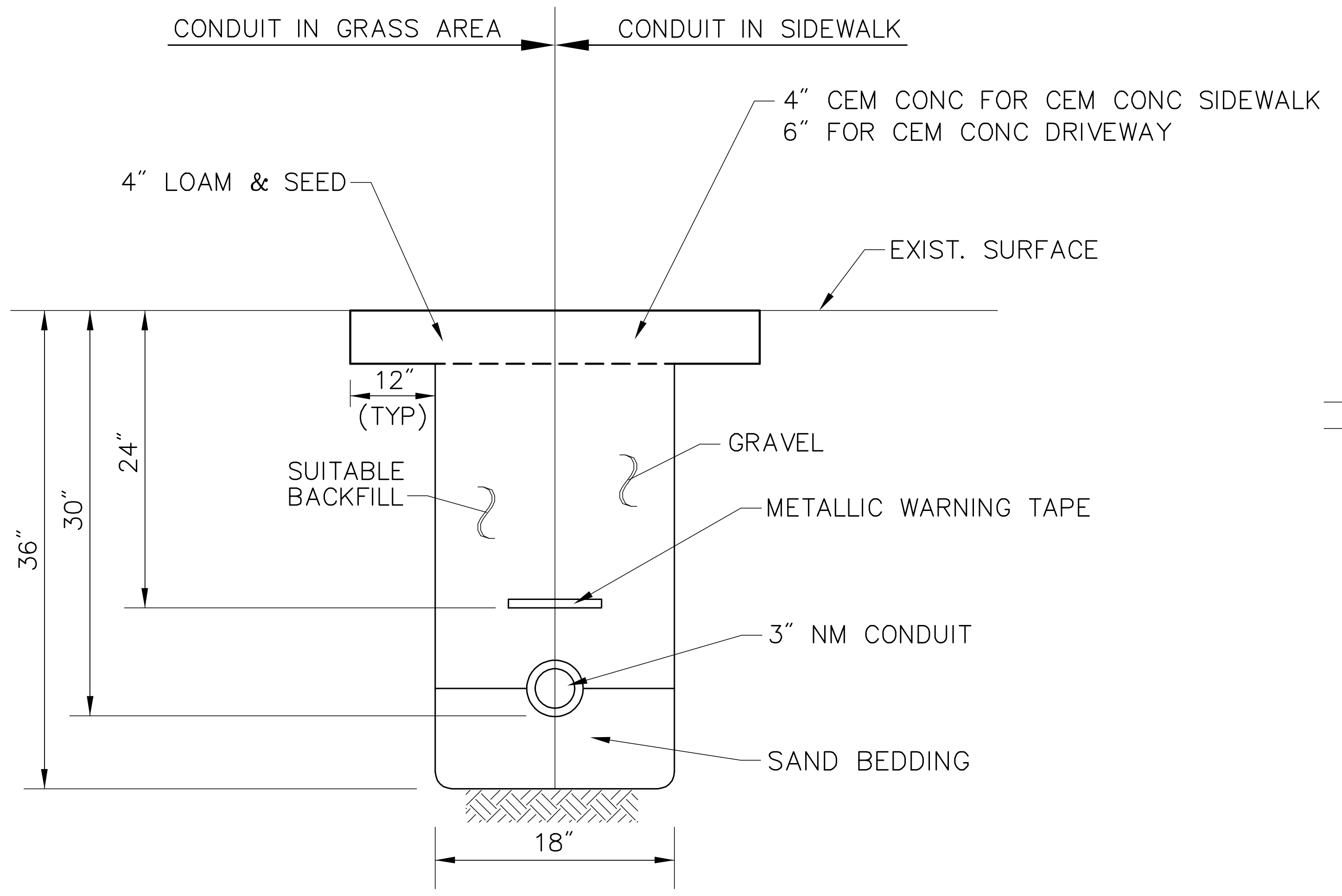
SCALE: NOT TO SCALE

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		57	71

PROJECT FILE NO. 605637

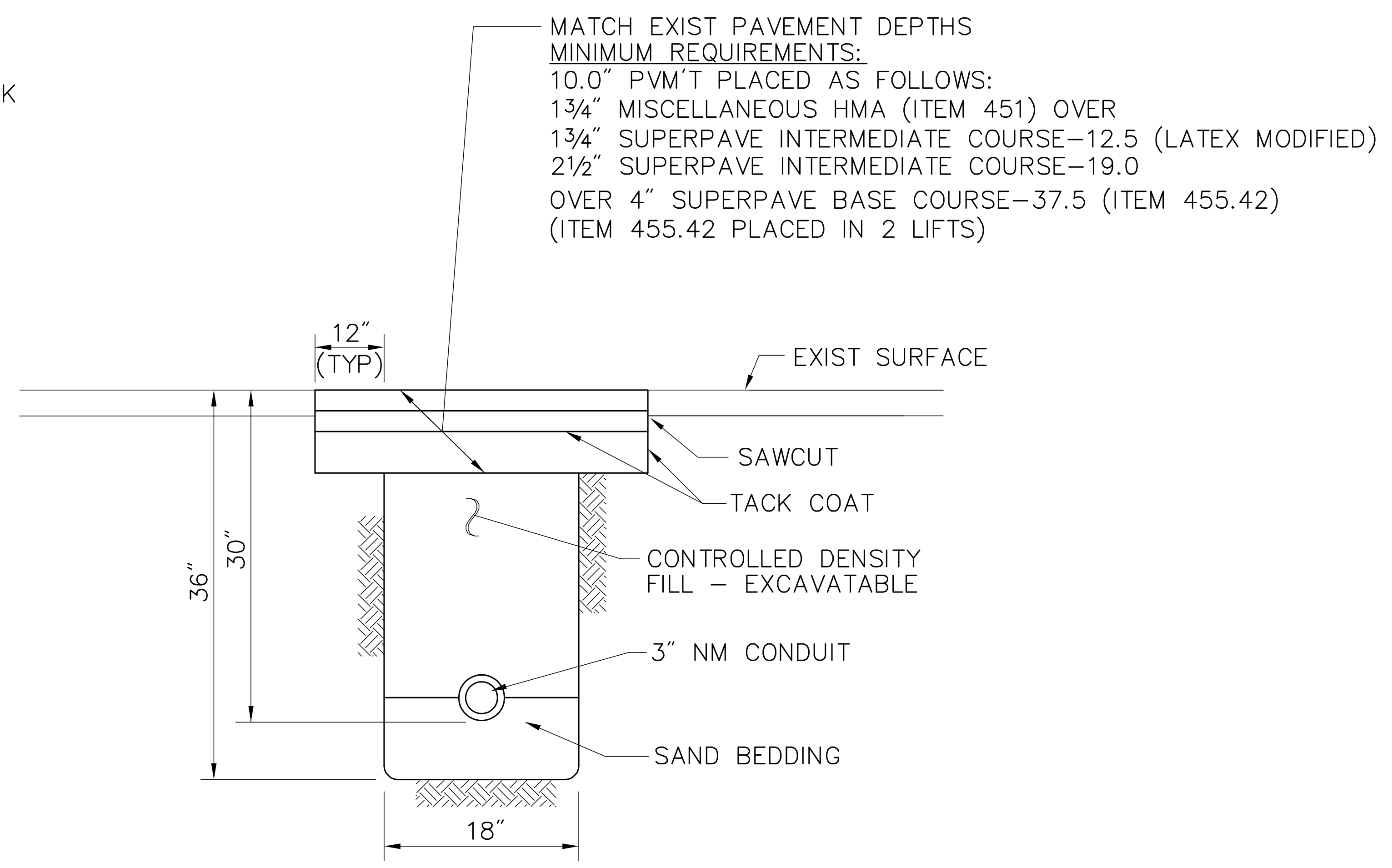
CONSTRUCTION DETAILS



CONDUIT IN GRASS AND SIDEWALK/DRIVEWAY

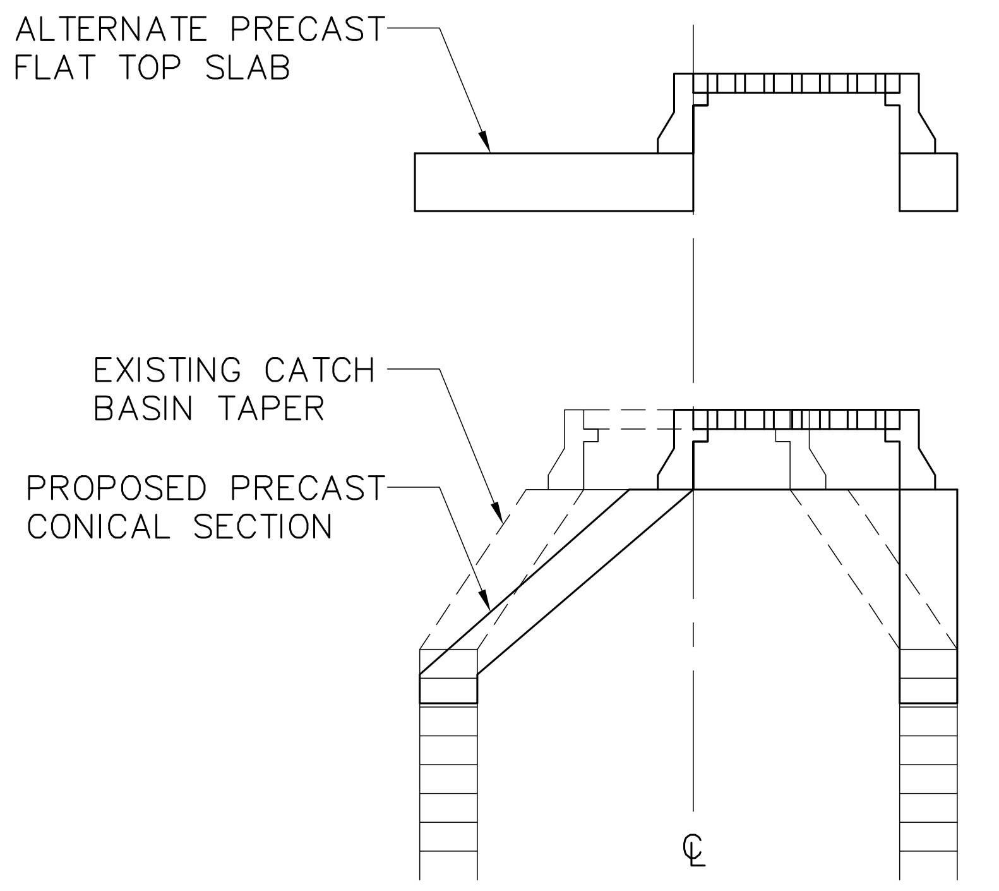
SCALE: NOT TO SCALE

DWG: TRENCH-02


MATCH EXIST PAVEMENT DEPTHS
MINIMUM REQUIREMENTS:
10.0" PVM'T PLACED AS FOLLOWS:
1¾" MISCELLANEOUS HMA (ITEM 451) OVER
1¾" SUPERPAVE INTERMEDIATE COURSE–12.5 (LATEX MODIFIED)
2½" SUPERPAVE INTERMEDIATE COURSE–19.0
OVER 4" SUPERPAVE BASE COURSE–37.5 (ITEM 455.42)
(ITEM 455.42 PLACED IN 2 LIFTS)

CONDUIT CROSSING ROADWAY

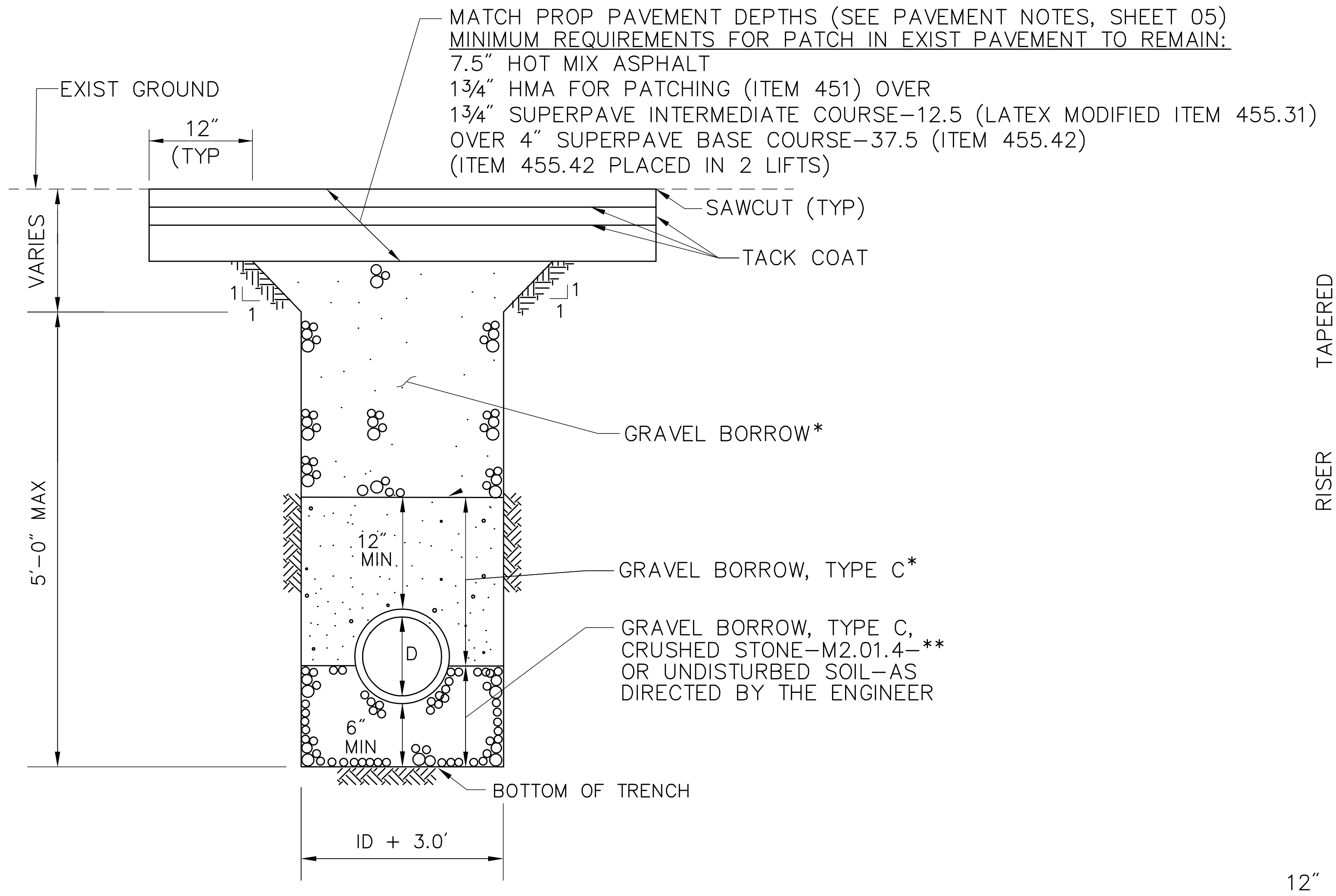
SCALE: NOT TO SCALE



NOTE:
BASED ON ACTUAL FIELD CONDITIONS; THE CONTRACTORS SHALL DETERMINE WHICH STYLE OF TOP SECTION SHOULD BE USED.

DRAINAGE STRUCTURE REMODEL

SCALE: NOT TO SCALE

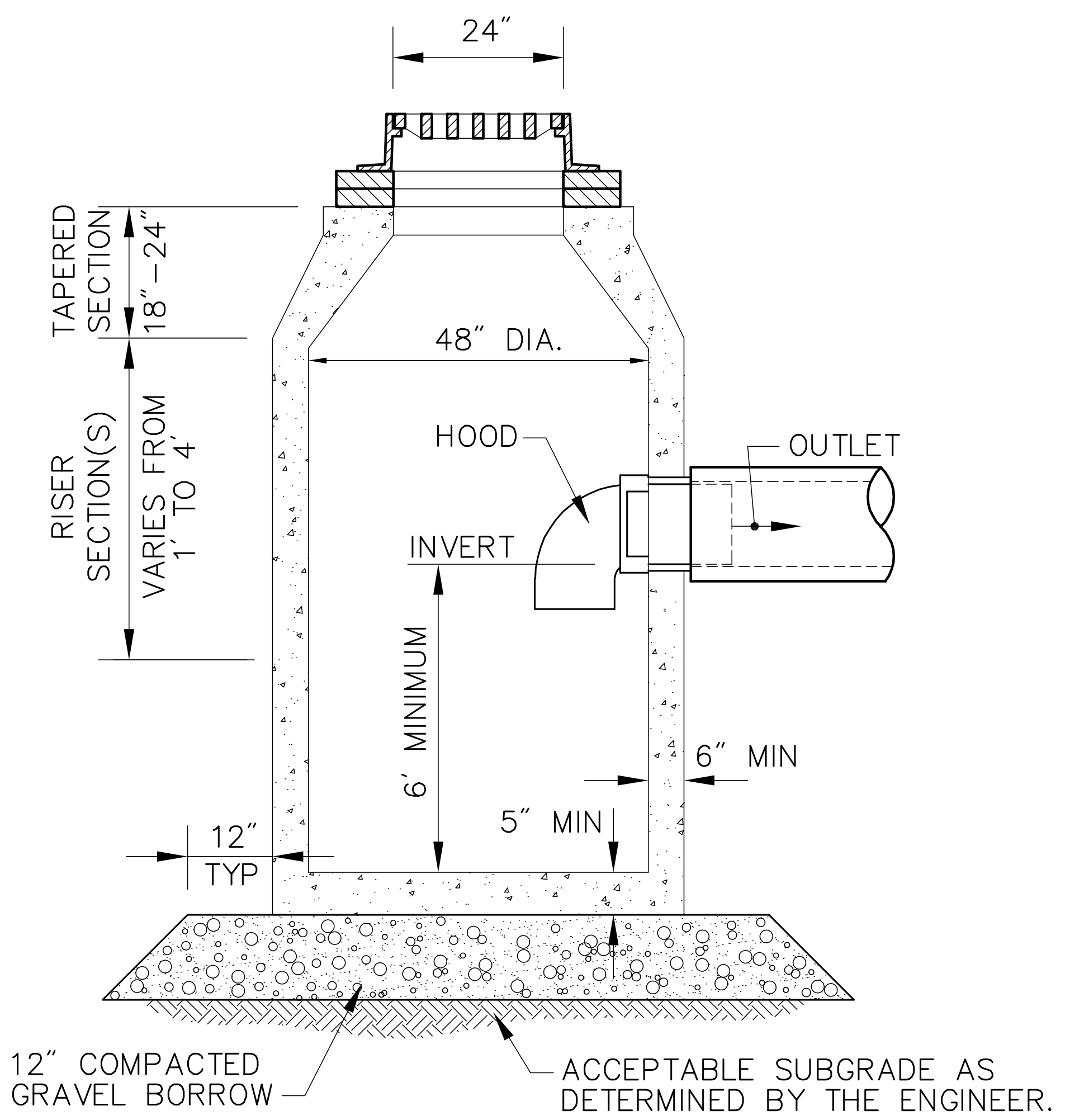

MATCH PROP PAVEMENT DEPTHS (SEE PAVEMENT NOTES, SHEET 05)
MINIMUM REQUIREMENTS FOR PATCH IN EXIST PAVEMENT TO REMAIN:
7.5" HOT MIX ASPHALT
1¾" HMA FOR PATCHING (ITEM 451) OVER
1¾" SUPERPAVE INTERMEDIATE COURSE–12.5 (LATEX MODIFIED ITEM 455.31)
OVER 4" SUPERPAVE BASE COURSE–37.5 (ITEM 455.42)
(ITEM 455.42 PLACED IN 2 LIFTS)

*CONTROLLED DENSITY FILL TO BE USED WHEN CONVENTIONAL METHODS ARE UNUSUALLY DIFFICULT AS DETERMINED BY THE ENGINEER DUE TO OBSTRUCTIONS.

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

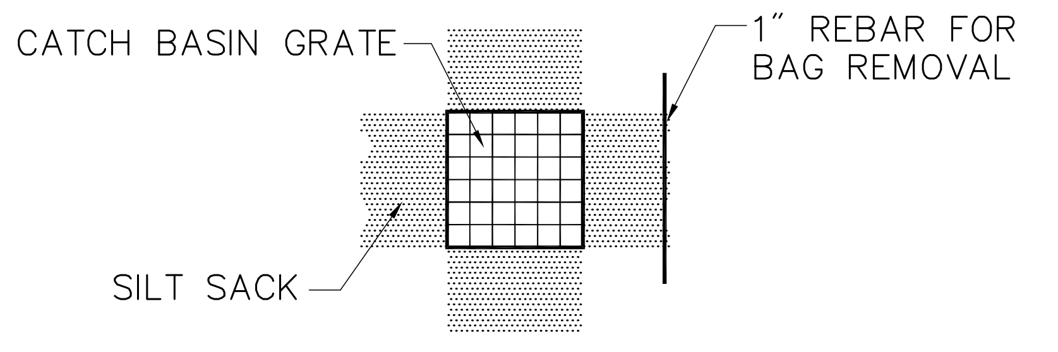
TRENCH DETAIL

SCALE: NOT TO SCALE

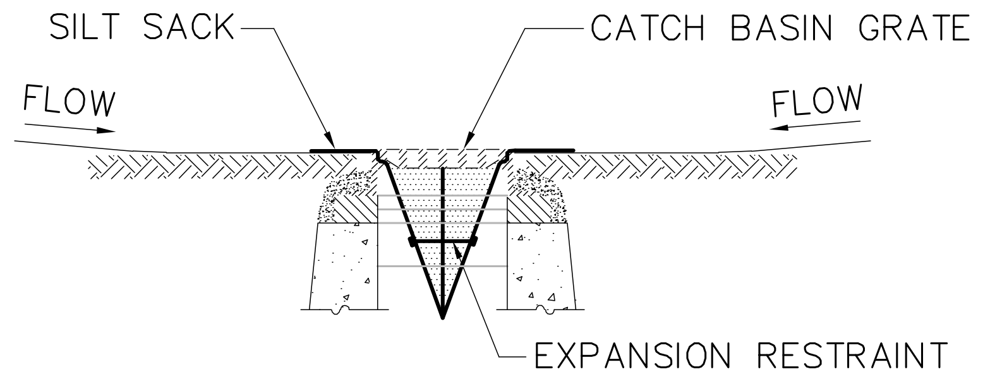


DEEP SUMP CATCH BASIN WITH HOOD

SCALE: NOT TO SCALE



PLAN VIEW



SECTION VIEW

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

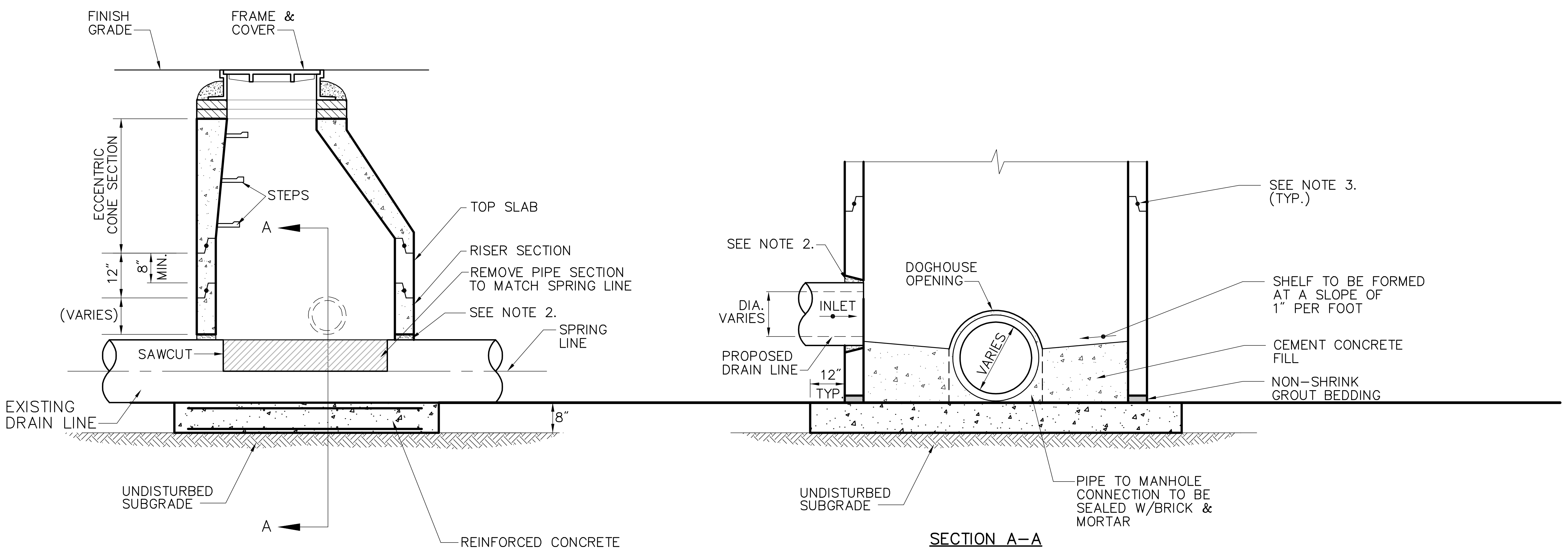
SILT SACK IN CATCH BASIN

SCALE: NOT TO SCALE

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		58	71
PROJECT FILE NO. 605637			

CONSTRUCTION DETAILS



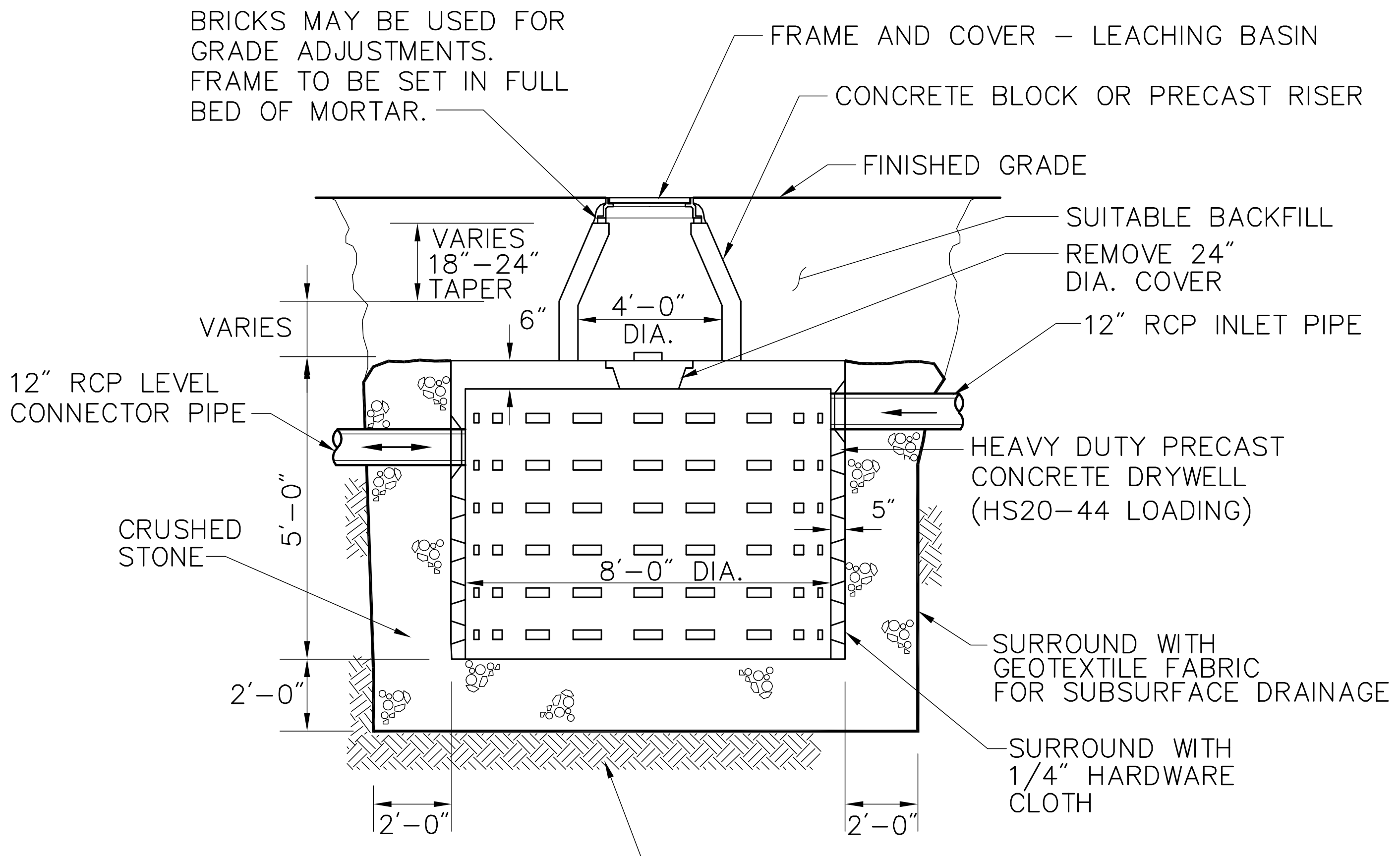
SECTION A-A

NOTES:

1. STRUCTURE SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS (NON-SHRINK GROUT).
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.

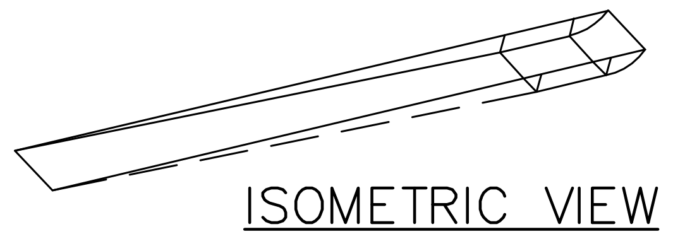
DRAIN MANHOLE OVER EXISTING PIPE

SCALE: NOT TO SCALE

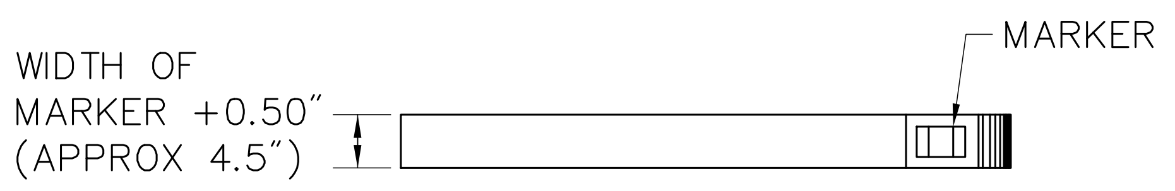


LEACHING BASIN

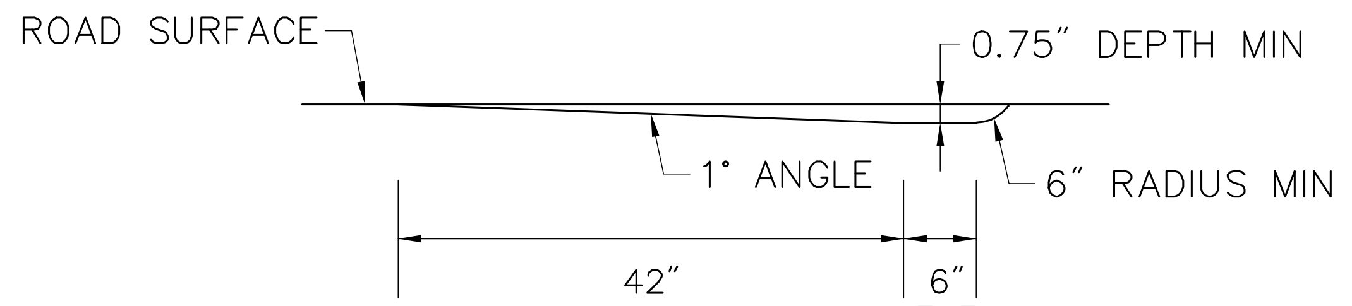
SCALE: NOT TO SCALE



ISOMETRIC VIEW



PLAN VIEW



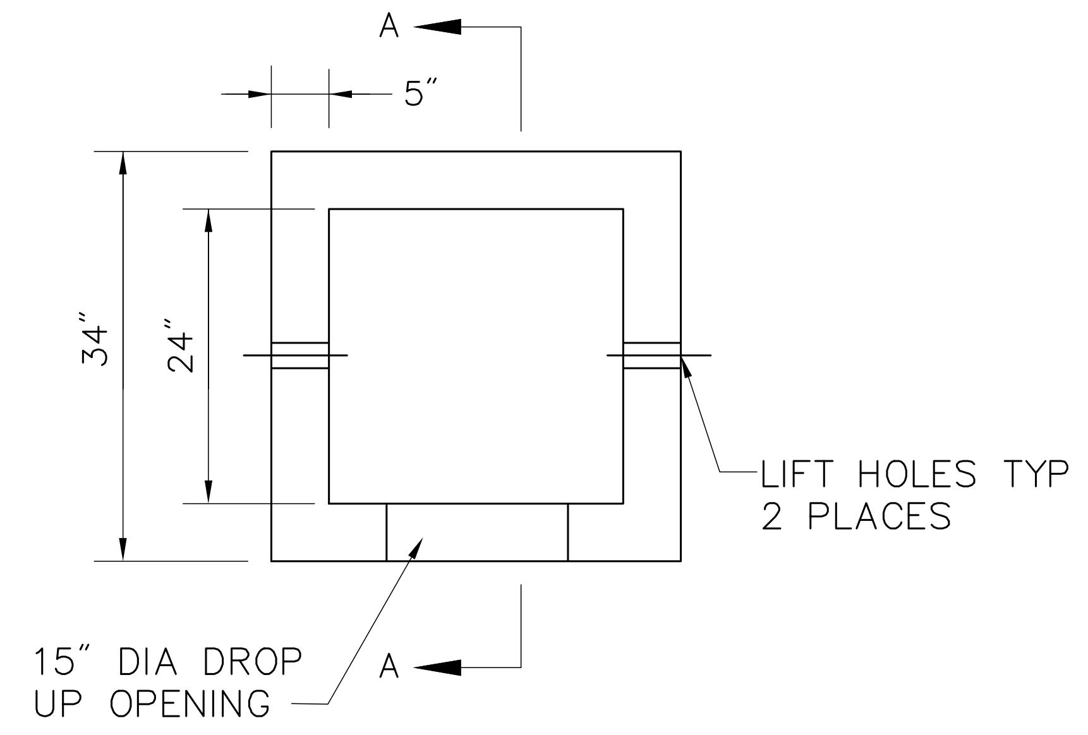
SECTION VIEW

ONE-WAY MARKER APPLICATION

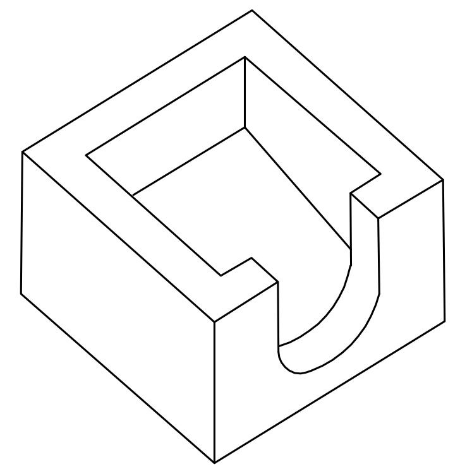
NOTES:
1. THE GROOVE AREA MUST BE DRY AND FREE OF DUST, DIRT, OR ANY MATERIAL WHICH WILL ADVERSELY AFFECT THE BOND OF THE ADHESIVE.
2. INSTALL MARKERS WITH APPROVED ADHESIVE. ADHESIVE SHOLD NOT BE ALLOWED TO BUILD UP IN FRONT OF MARKER LENS.
3. THE MARKER AND THE ADHESIVE PAD SHALL NOT EXCEED THE TOP OF THE PAVEMENT SURFACE (DEPTH = 0.75" MIN).

SLOTTED PAVEMENT MARKERS (ONE-WAY)

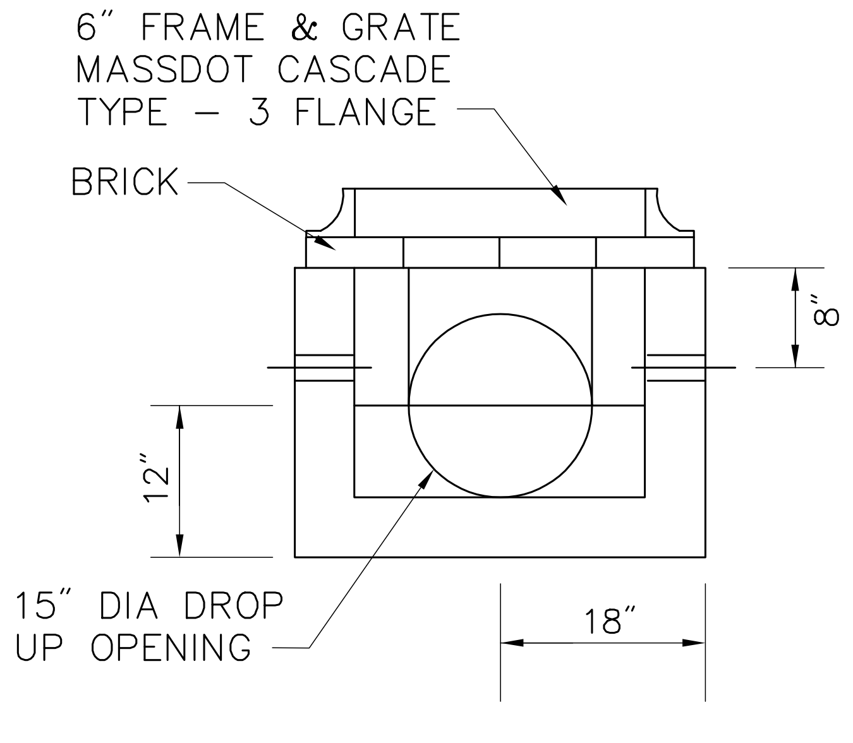
SCALE: NOT TO SCALE



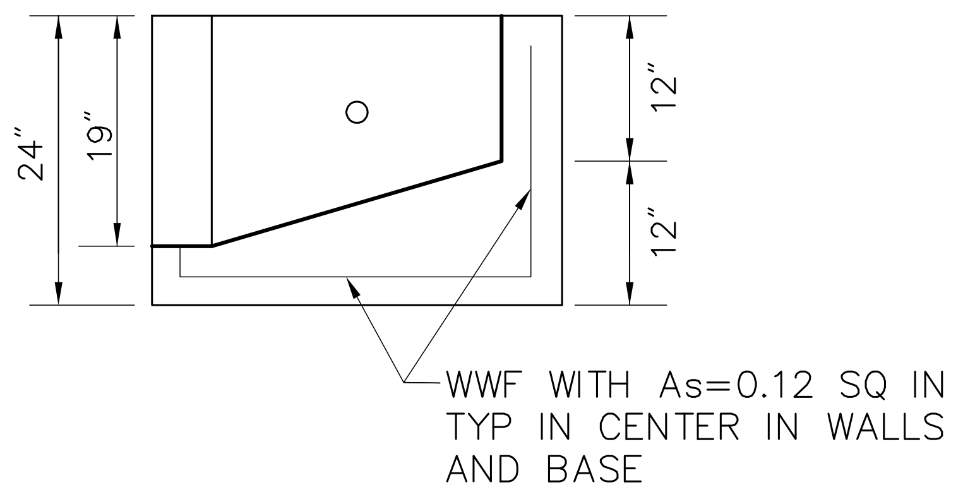
PLAN VIEW



ISOMETRIC



ELEVATION



SECTION A-A

NOTES:

1. DESIGNED FOR AASHTO HS25-44 LOADING.
2. CONCRETE STRENGTH f'c=4000 PSI
3. REINFORCING STEEL: ASTM A185 (wwf) fy=60,000 PSI

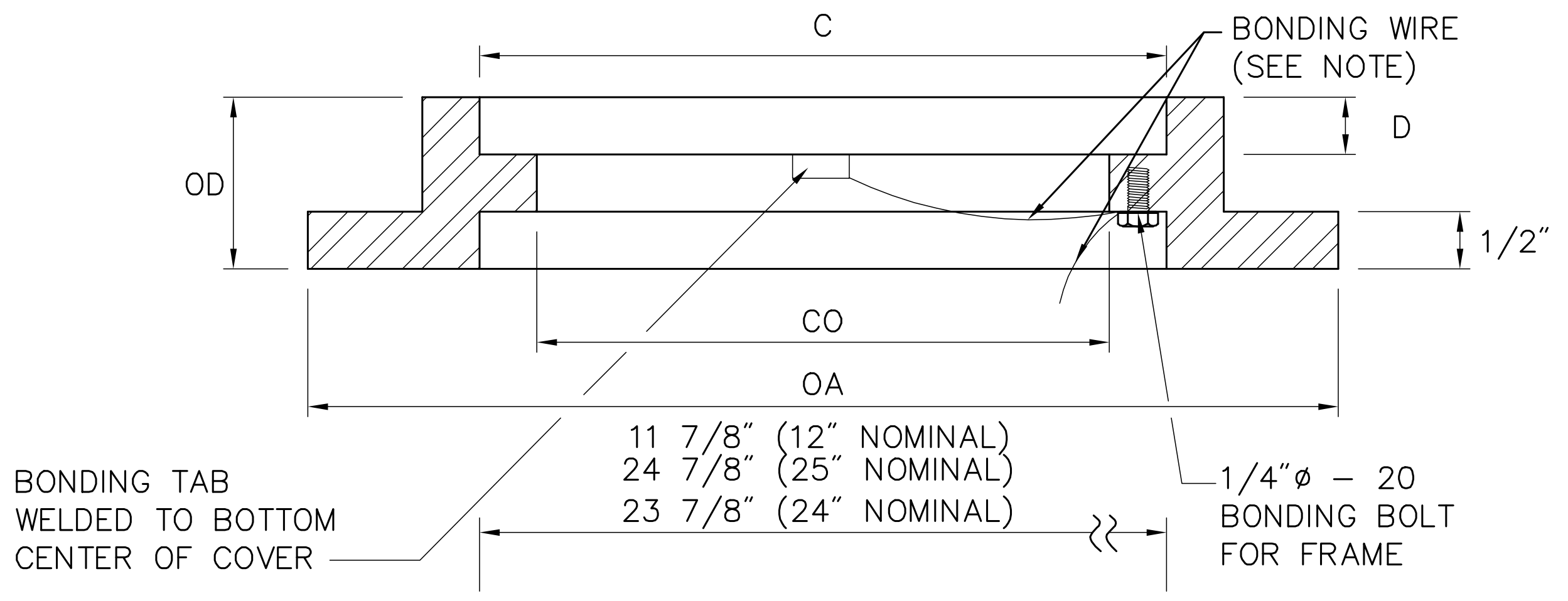
SPECIAL GUTTER INLET

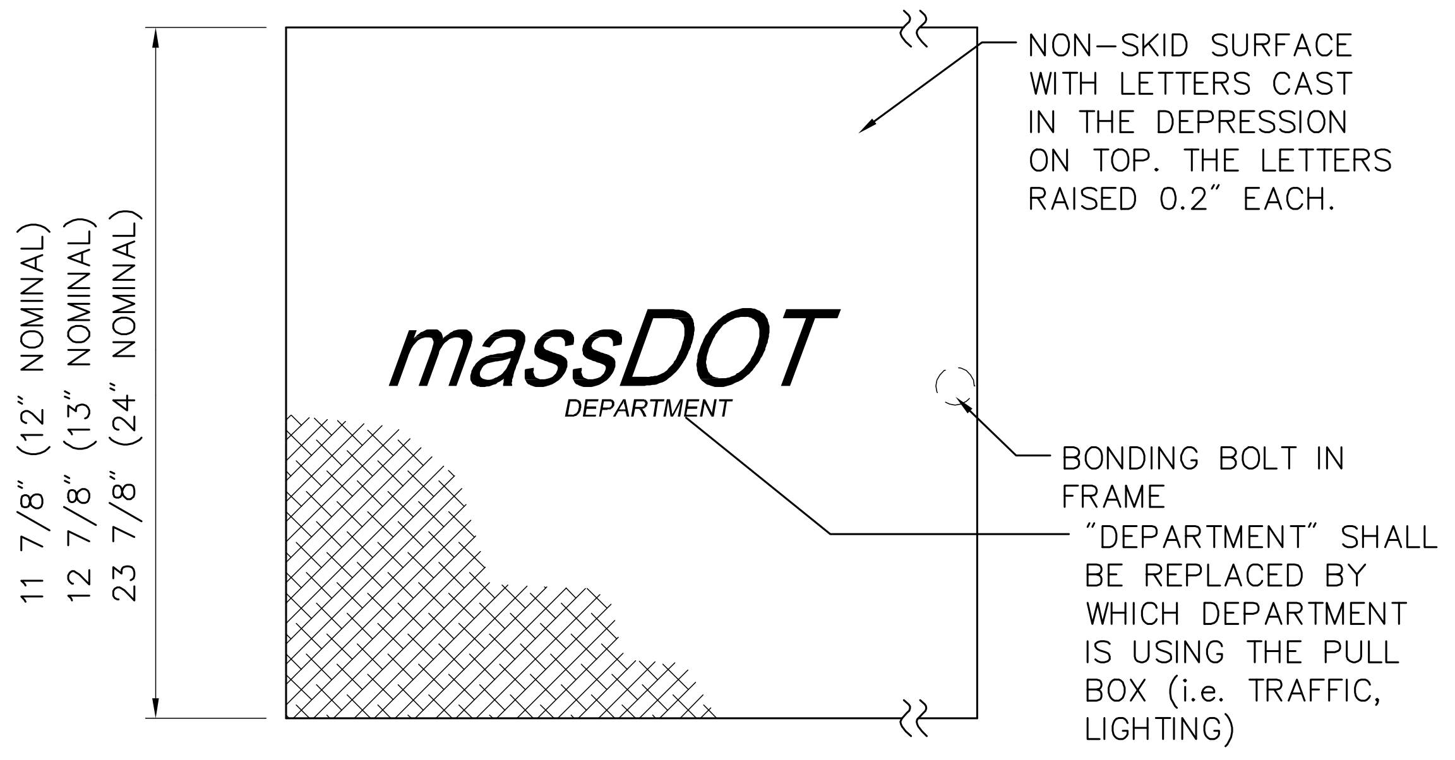
SCALE: NOT TO SCALE

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		59	71
PROJECT FILE NO. 605637			

CONSTRUCTION DETAILS





NOTES:
1. ATTACH 3 FEET OF NO. 8 BONDING WIRE FROM COVER TAB TO BONDING BOLT ON FRAME. ATTACH SUFFICIENT LENGTH OF NO. 8 BONDING WIRE FROM BONDING BOLT ON FRAME TO THE BONDING WIRE ROUTED THROUGH THE PULL BOX.
2. WHEN INSTALLED IN ROADWAY, COVER SHALL BE BOLTED DOWN PER MANUFACURERS REQUIREMENTS.
3. LOGO AND TEXT SHALL BE CENTERED WITHIN THE COVER.
4. LOGO AND TEXT SHALL BE RAISED 0.2 INCHES FROM THE COVER SURFACE.
5. LOGO AND TEXT SHALL BE ITALICIZED AND SHALL UTILIZE THE "ERAS DEMI" STYLE FONT.

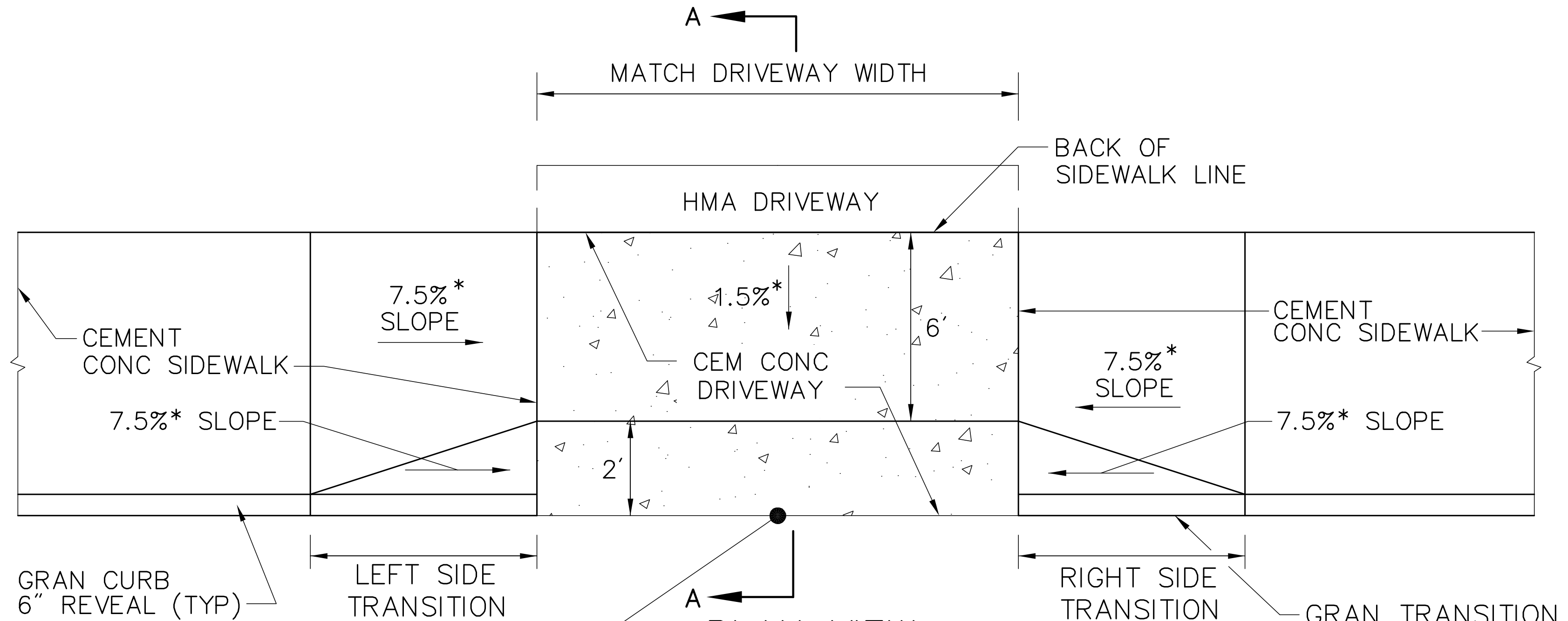
SIZE OF COVER	COVER DEPTH	OVERALL DEPTH	CLEAR OPENING	OVERALL	APPROX. WEIGHT	MASSDOT LOGO	DEPARTMENT TEXT SIZE
C	D	OD	CO	OA	W		
12" x 12"	1"	3 1/2"	10 1/2" x 10 1/2"	17 1/4" x 17 1/4"	89 lb	9" WIDE x 1.3" HIGH	TRAFFIC: 3" WIDE x 0.5" HIGH LIGHTING: 3.5" WIDE x 0.5" HIGH
13" x 25"	1 1/2"	3"	12" x 24"	20" x 29 3/4"	159 lb	6" WIDE x 0.85" HIGH	TRAFFIC: 2" WIDE x 0.35" HIGH LIGHTING: 2.25" WIDE x 0.35" HIGH
24" x 24"	1"	3"	22" x 22"	28 1/2" x 28 1/2"	463 lb	13.25" WIDE x 2" HIGH	TRAFFIC: 3" WIDE x 0.5" HIGH LIGHTING: 3.5" WIDE x 0.5" HIGH

PULL BOX FRAME & COVER H-20 & HS-20 LOAD

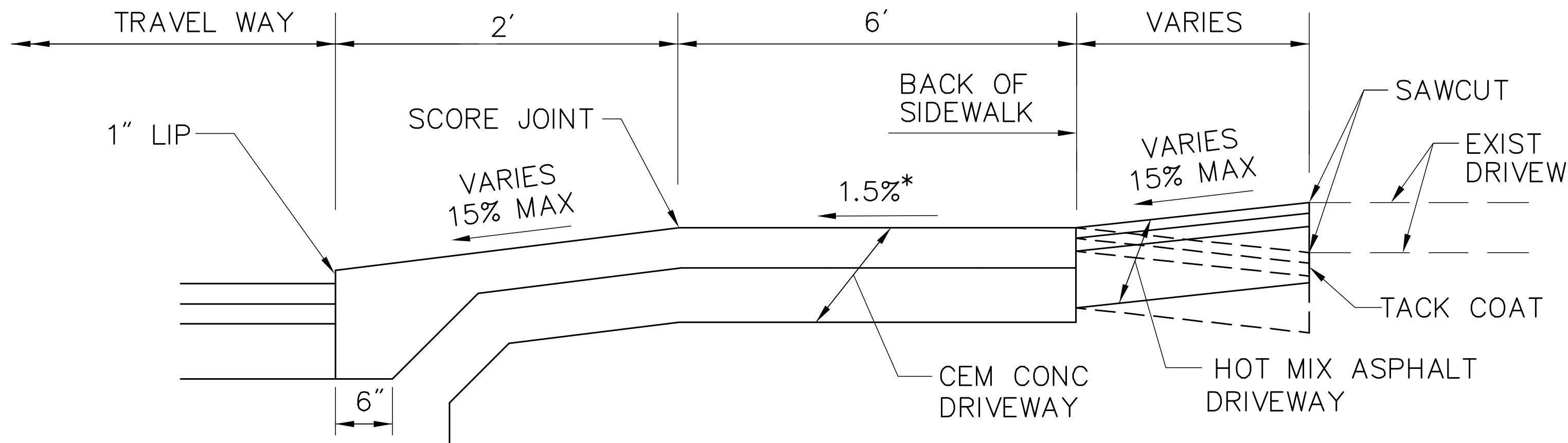
SCALE: NOT TO SCALE

TRANSITION CURB FOR DRIVEWAYS WITH SIDEWALK

NO.	STATION	ROADWAY GUTTER	SIDEWALK WIDTH	LEFT SIDE		RIGHT SIDE	
				REVEAL	TRANSITION	REVEAL	TRANSITION
△1	ACROSS FROM CAMBRIDGE PARK DRIVE	1.9% LT –0.5% RT	8.0′	6″	9.0′	6″	6.5′



PLAN VIEW



SECTION A–A

CEM CONC DRIVEWAY WITH SIDEWALK AND GRANITE TRANSITION CURB

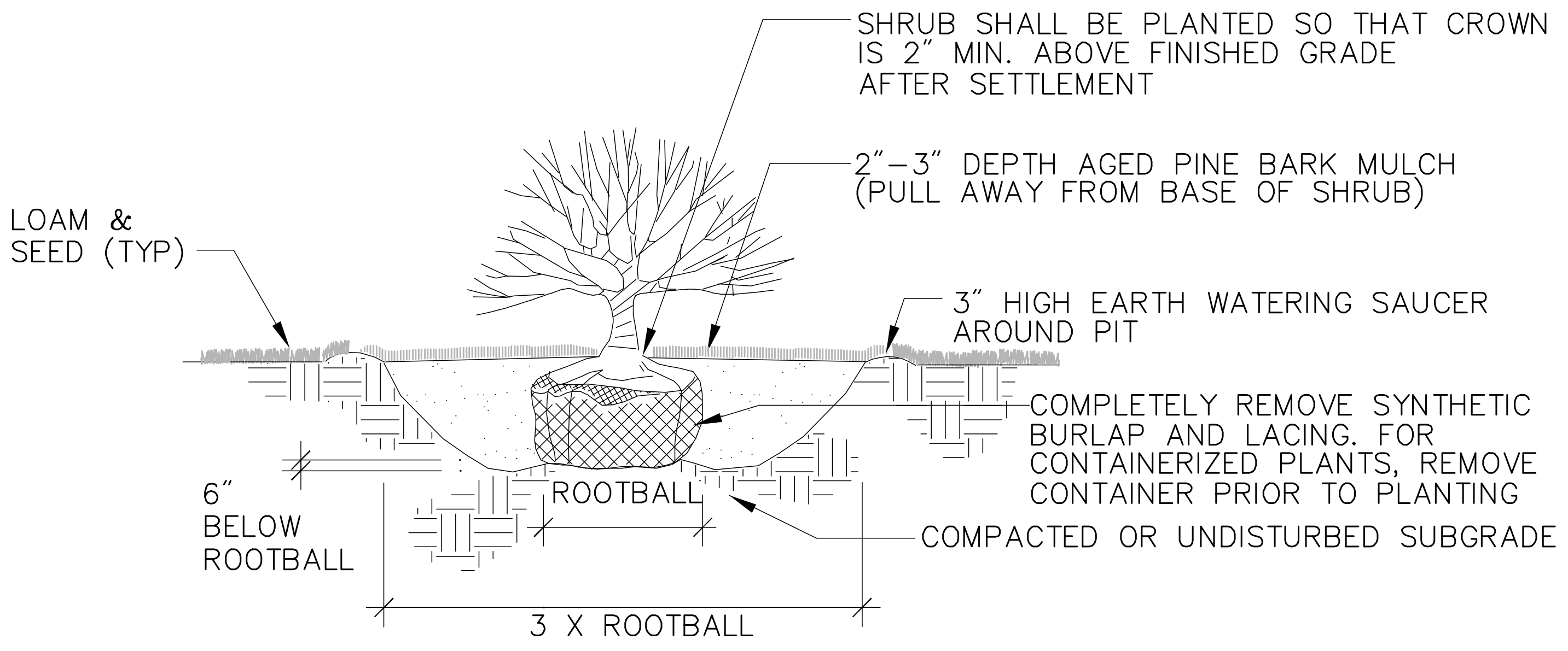
SCALE: NOT TO SCALE

*TOLERANCE FOR CONSTRUCTION ±0.5%

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		60	71
PROJECT FILE NO. 605637			

CONSTRUCTION DETAILS



NOTES:

1. RAISE AND REPLANT ANY SHRUBS WHICH SETTLE MORE THAN 2" AFTER PLANTING & WATERING.
2. SHRUBS SHALL BE SET PLUMB
3. WATER BY FLOODING TWICE IN FIRST TWO HOURS AFTER PLANTING. WATER & MAINTAIN AS PER STANDARD SPECIFICATIONS.
4. EXCAVATE TO REQUIRED DEPTH AND BACKFILL WITH PLANTING MIX
5. LOOSE OR CRACKED ROOTBALLS WILL NOT BE ACCEPTED FOR PLANTING.

SHRUB PLANTING

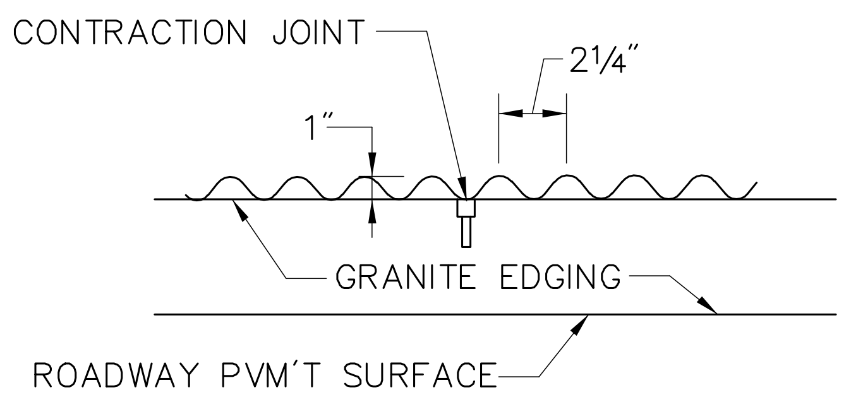
SCALE: NOT TO SCALE

PLANT MATERIAL SCHEDULE

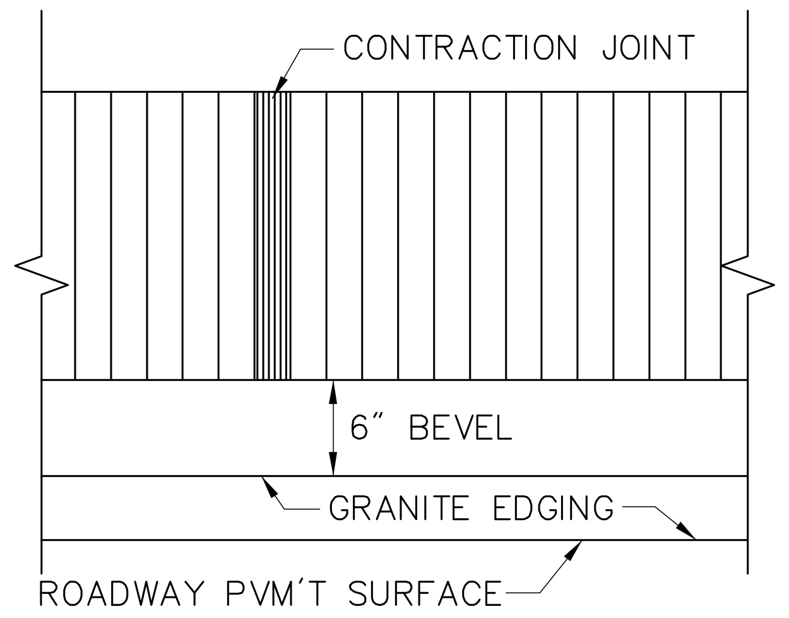
QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE
	TREES			
7	PS	PINUS STROBUS	WHITE PINE	23–4 FEET
4	ARU	ACER RUBRUM 'FRANKSRED'	RED SUNSET MAPLE	1½–2" CAL.
3	AR	ACER RUBRUM 'FRANKSRED'	RED SUNSET MAPLE	2–2½" CAL.
5	AS	ACER SACCHARINUM	SILVER MAPLE	1½–2" CAL.
3	ASL	ACER SACCHARUM 'LEGACY'	SUGAR MAPLE 'LEGACY'	1½–2" CAL.
7	QPA	QUERCUS PALUTRIS	PIN OAK	1½–2" CAL.
4	QP	QUERCUS PALUSTRIS	PIN OAK	2–2½" CAL.
3	QC	QUERCUS COCCINEA	OAK SCARLET	2–2½" CAL.
3	LS	LIQUIDMABER STYRACIFLUA	AMERICAN SWEETGUM	2–2½" CAL.
5	PK	PRUNUS 'KWANZAN'	KWANZAN CHERRY	2½–3" CAL.
5	CP	CRATAEGUS PHAENOPYRUM 'WASHINGTON'	HAWTHORN 'WASHINGTON'	8–10 FOOT CLUMP
SHRUBS				
9	MP	MYRICA PENNSYLVANICA	NORTHERN BAYBERRY	2–3' HT
15			SHRUB – DECIDUOUS	3 GALLON
15			SHRUB – EVERGREEN	3 GALLON

MASTER PLANTING LIST

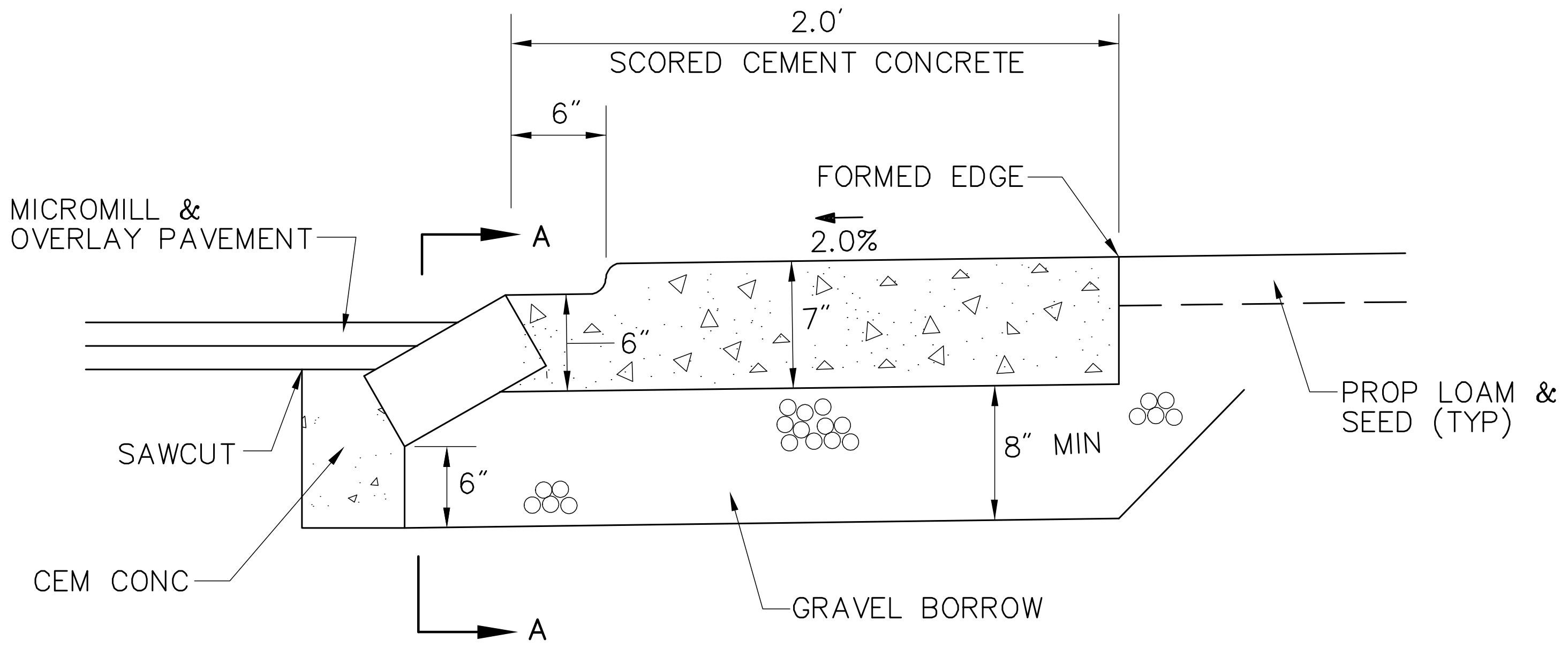
SCALE: NOT TO SCALE



SECTION A–A



PLAN VIEW

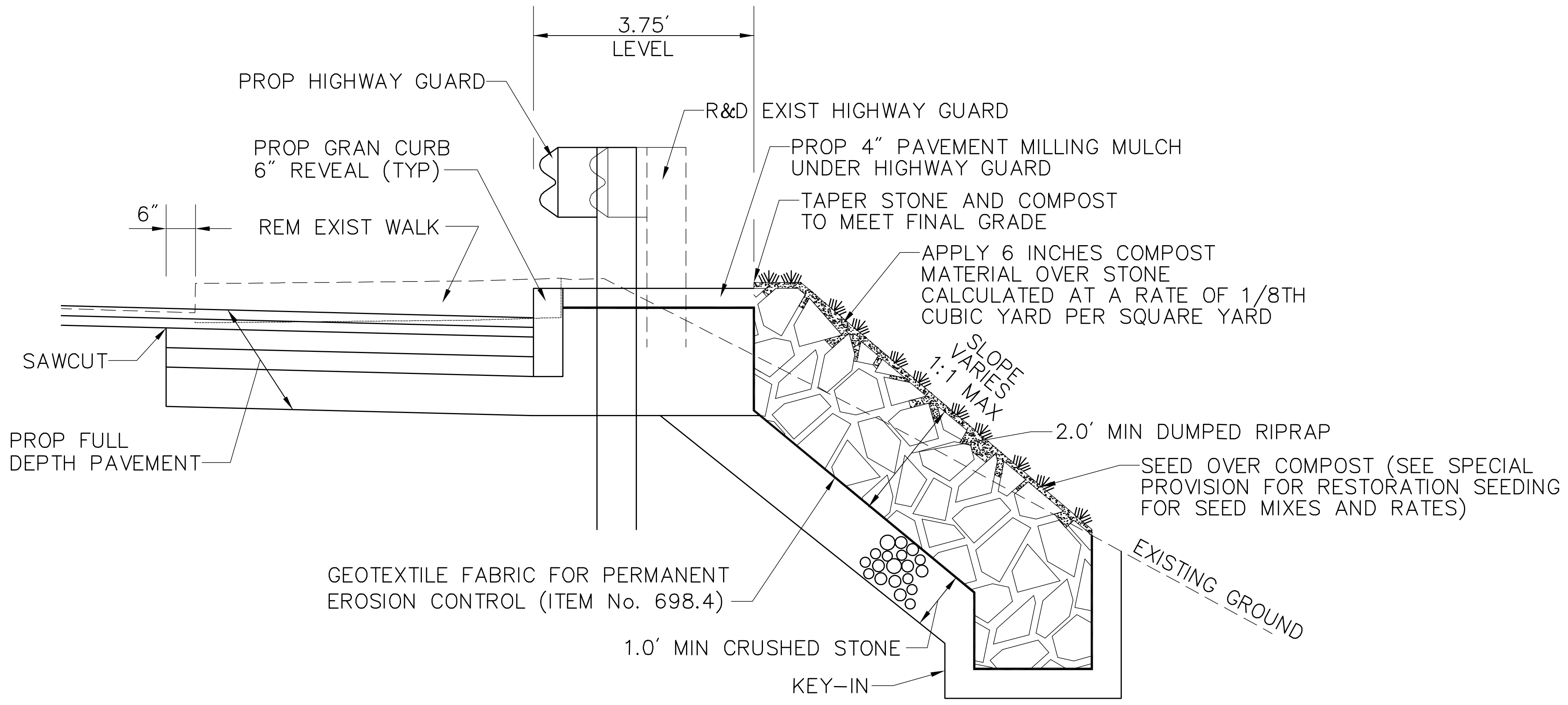


SECTION

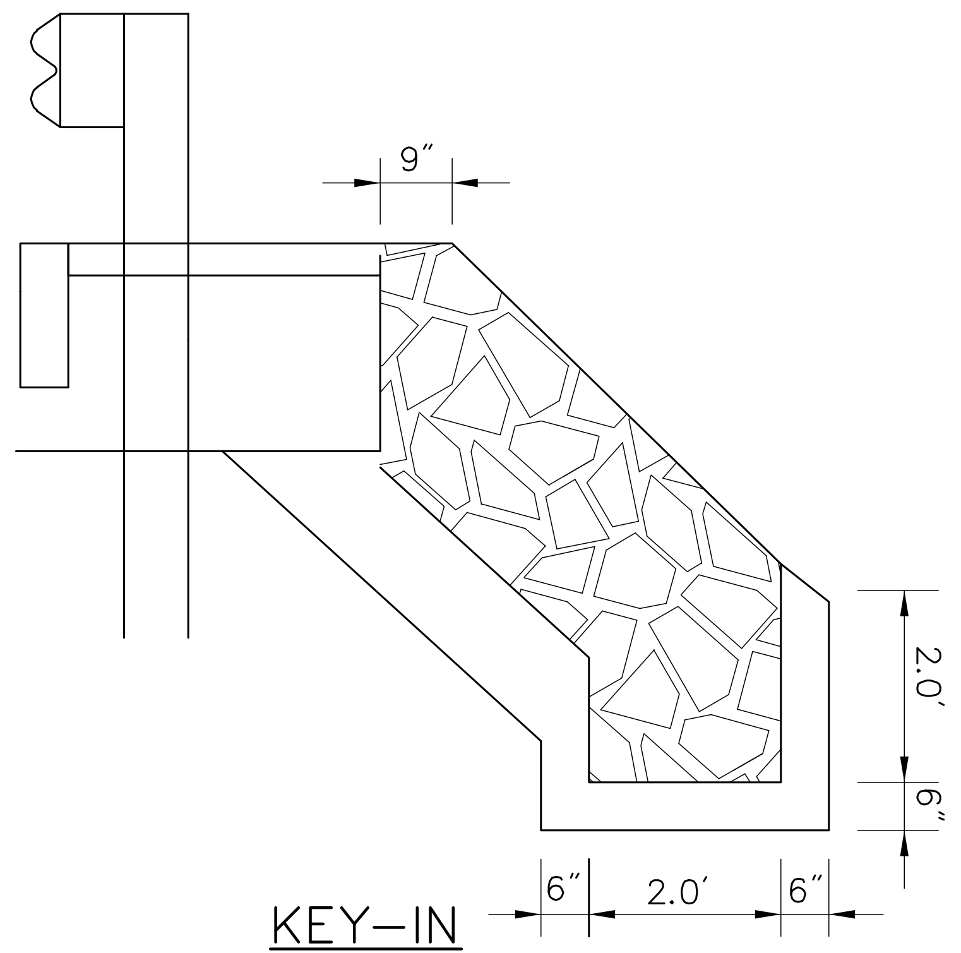
NOTE:
SEE MASSDOT CONSTRUCTION STANDARD E105.2.0 FOR CONTRACTION JOINT AND MATERIAL INFORMATION.

SCORED CONCRETE PAVEMENT AROUND ISLANDS

SCALE: NOT TO SCALE



SECTION



KEY–IN

COMPOST AND SEED OVER RIPRAP SLOPE

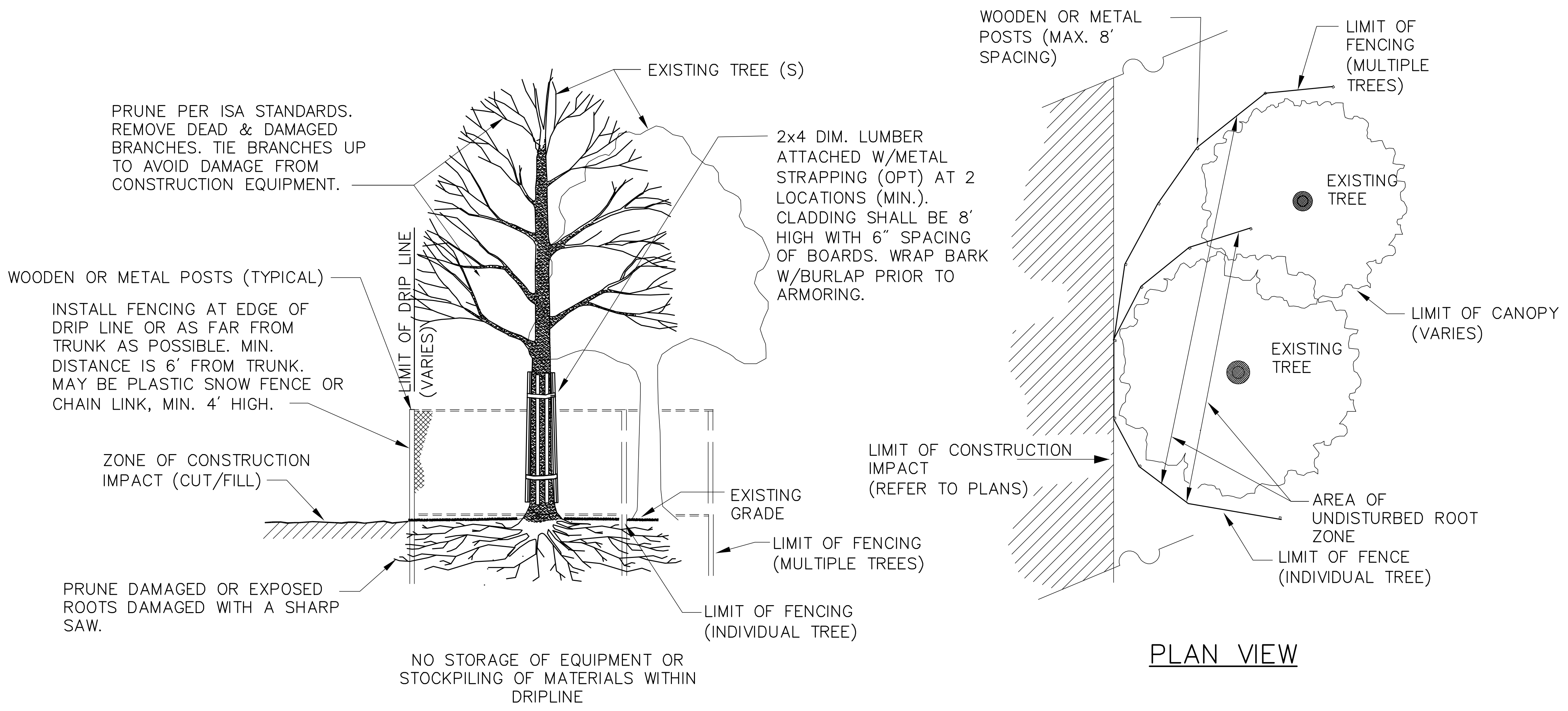
SCALE: 1"=2'

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		61	71

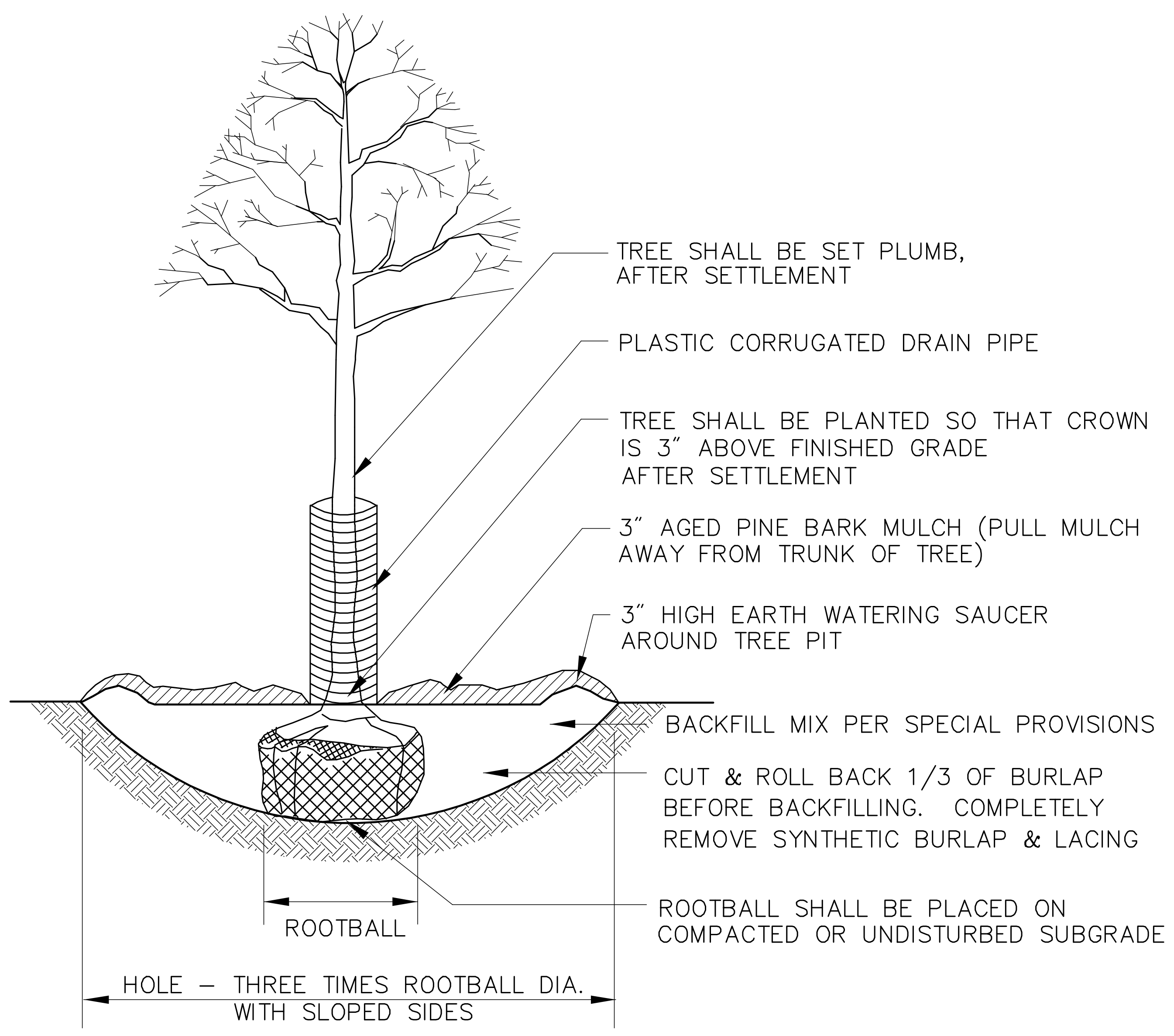
PROJECT FILE NO. 605637

CONSTRUCTION DETAILS



INDIVIDUAL TREE PROTECTION

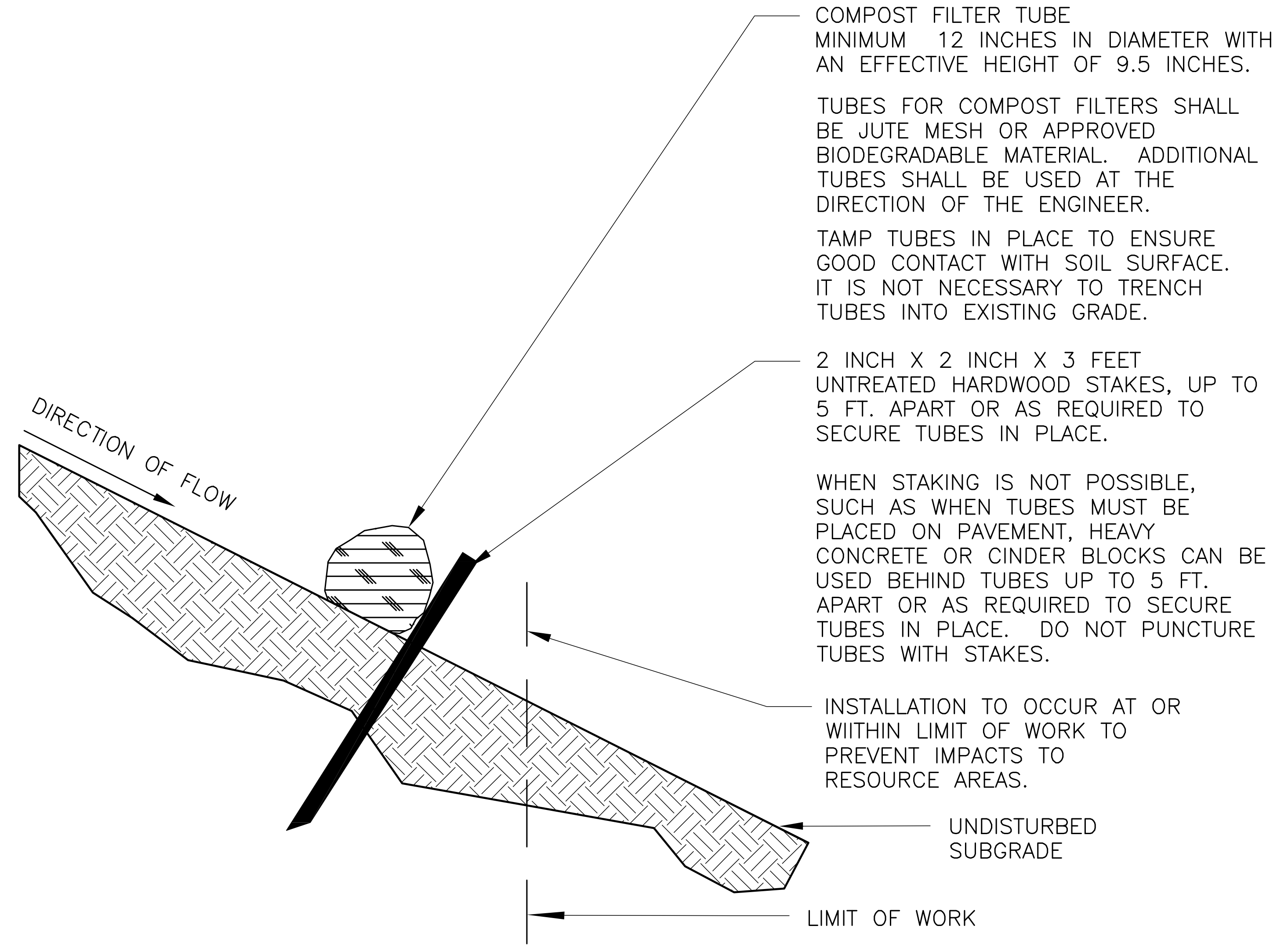
SCALE: NOT TO SCALE

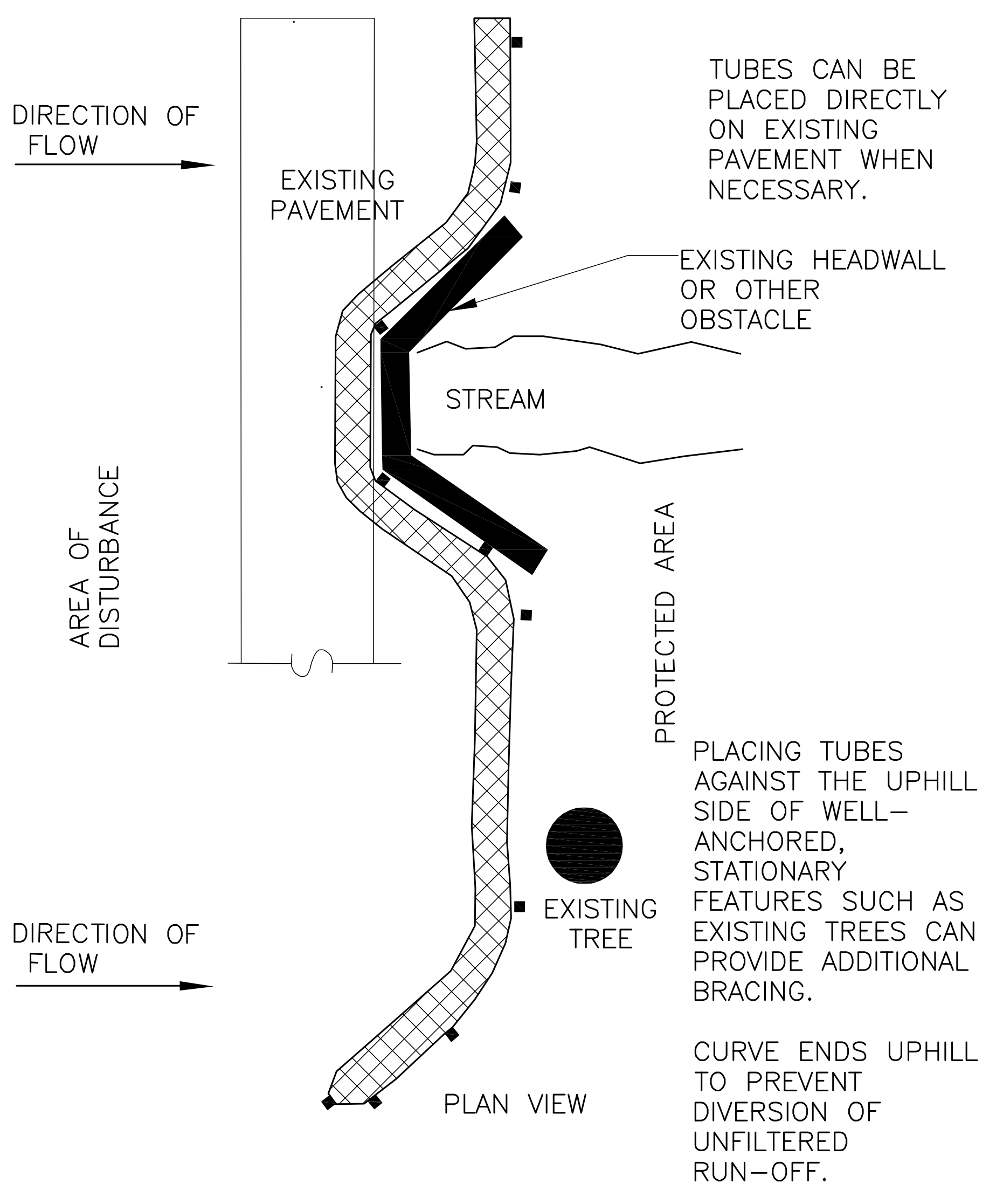


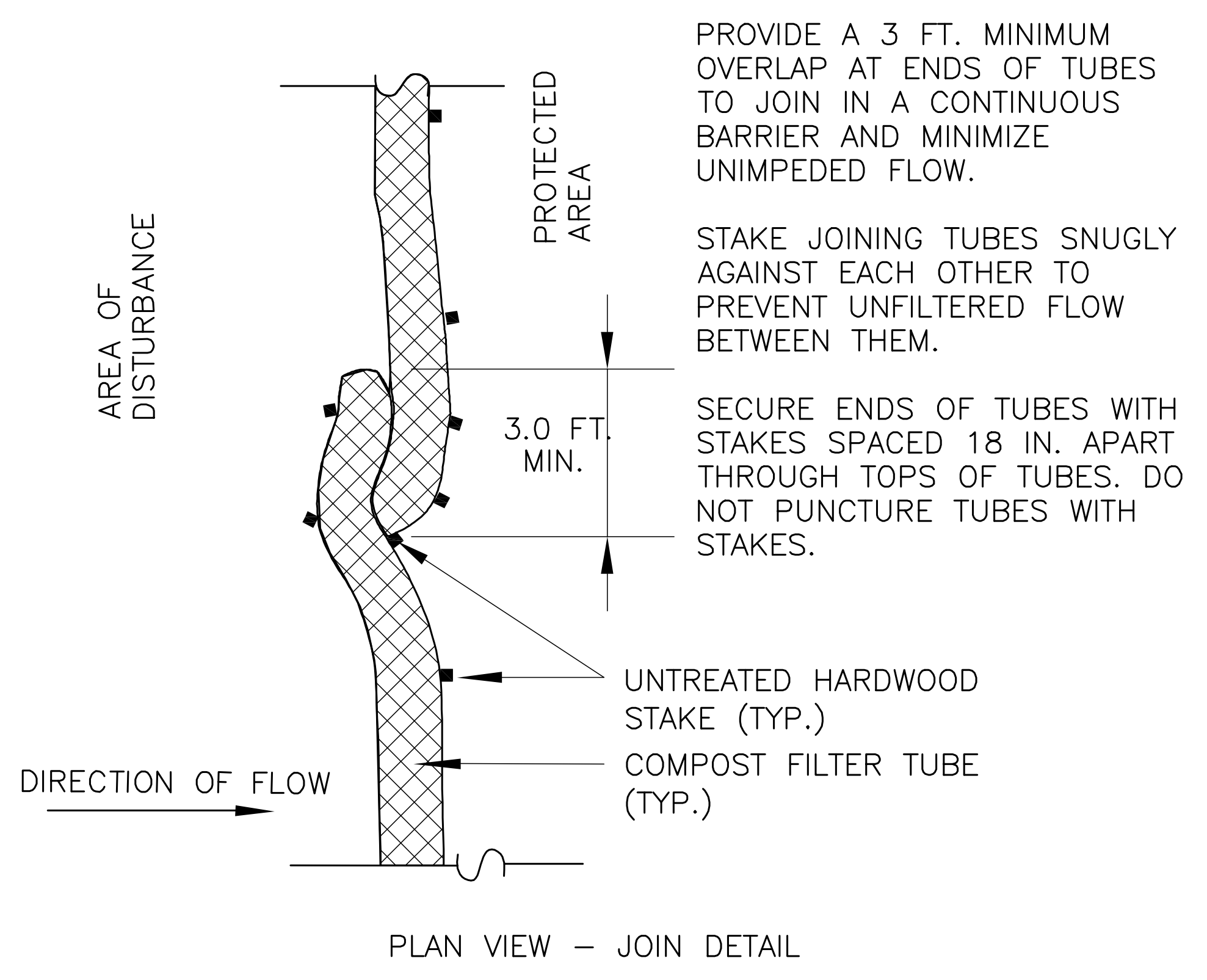
NOTE: WATERING SAUCER SHALL BE FLOODED TWICE DURING THE FIRST 24 HOURS AFTER PLANTING

TREE PLANTING

SCALE: NOT TO SCALE







GENERAL NOTES:
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN–OFF.

EROSION CONTROL BARRIER

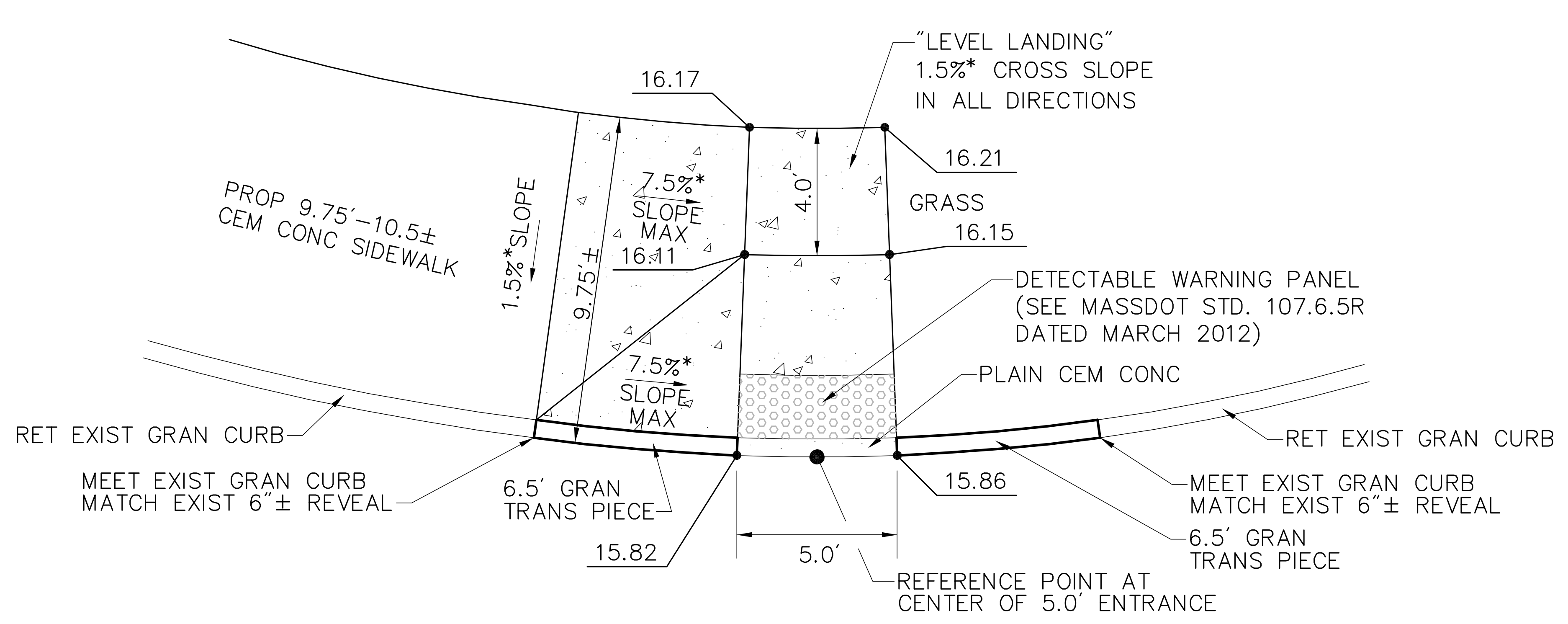
SCALE: NOT TO SCALE

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		62	71

PROJECT FILE NO. 605637

WHEELCHAIR RAMP DETAILS



* TOLERANCE FOR CONSTRUCTION ±0.5%

WHEELCHAIR RAMP DATA

NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP WIDTH	LEFT SIDE ROADWAY GUTTER	LEFT SIDE REVEAL	LEFT SIDE TRANS	LEFT SIDE OPENING ELEV	RIGHT SIDE ROADWAY GUTTER	RIGHT SIDE REVEAL	RIGHT SIDE TRANS	RIGHT SIDE OPENING ELEV
1	103+59.2 36.4' RT	9.75'±	5.0'	−0.77%	6"± EXIST	6.5'	15.82	0.92%	6"± EXIST	6.5'	15.86

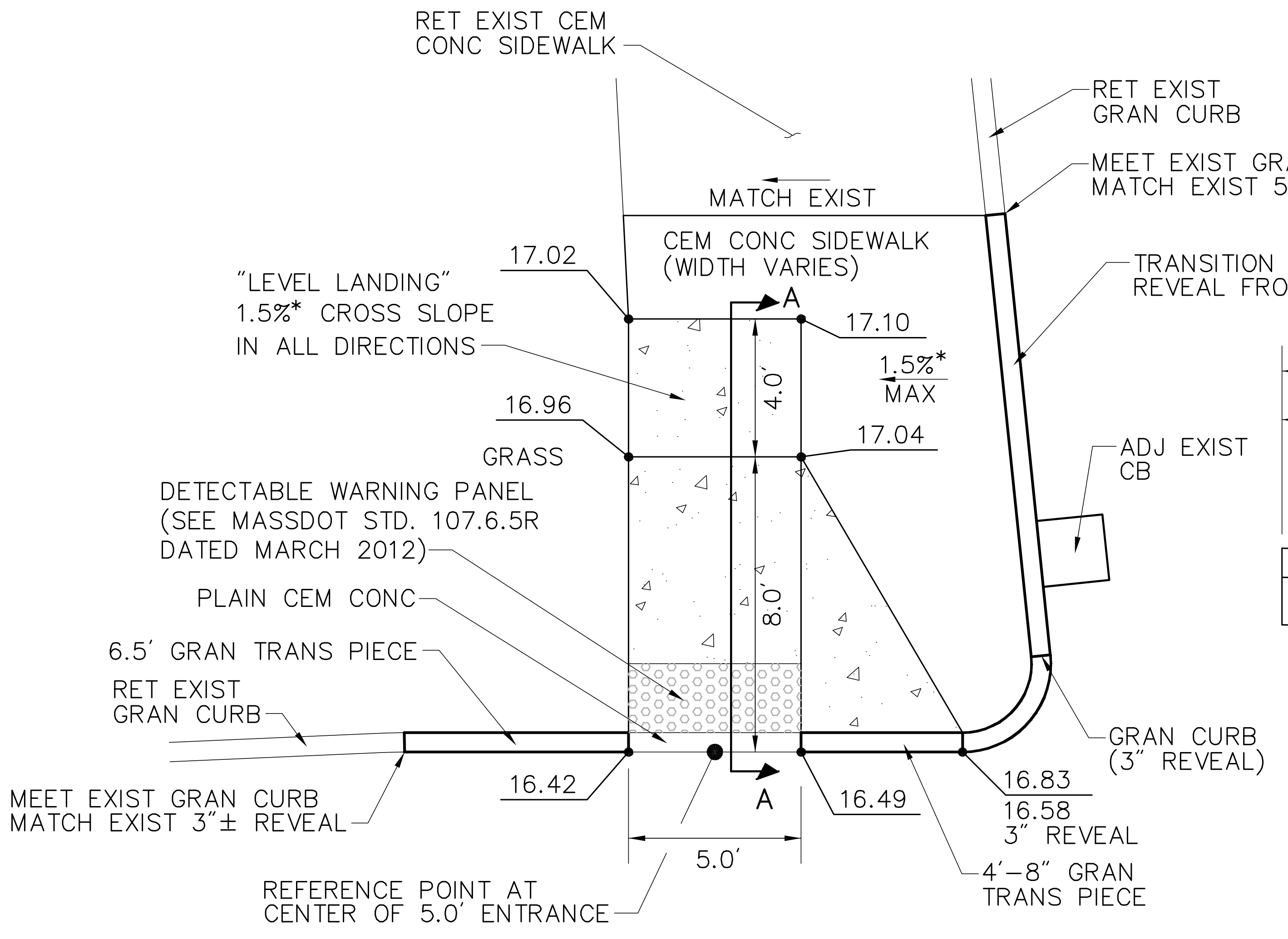
NOTE: NEGATIVE (−) ROADWAY GUTTER SLOPE DENOTES A LOW SIDE TRANSITION.

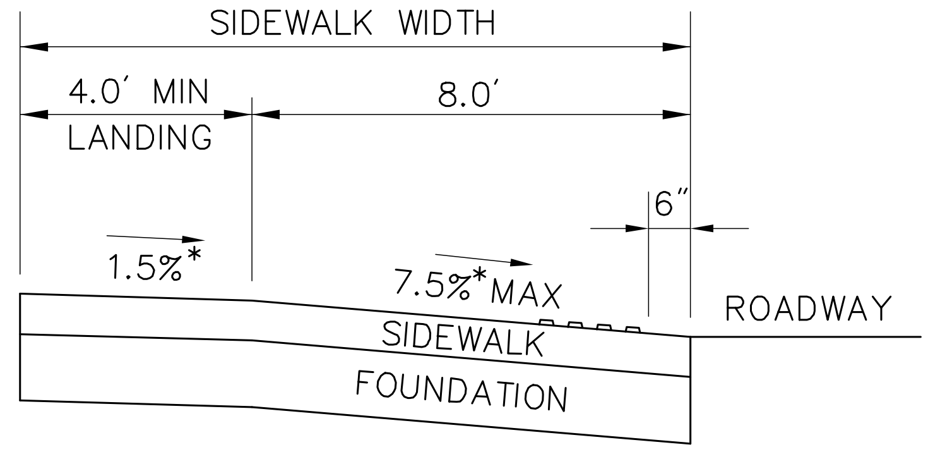
WHEELCHAIR RAMP NUMBER 1

SCALE: NOT TO SCALE

LEGEND

- ▨ = LIMITS OF CEM CONC RAMP
- ▦ = DETECTABLE WARNING PANEL
- ░ = LIMITS OF CEM CONC WALK





SECTION A–A

* TOLERANCE FOR CONSTRUCTION ±0.5%

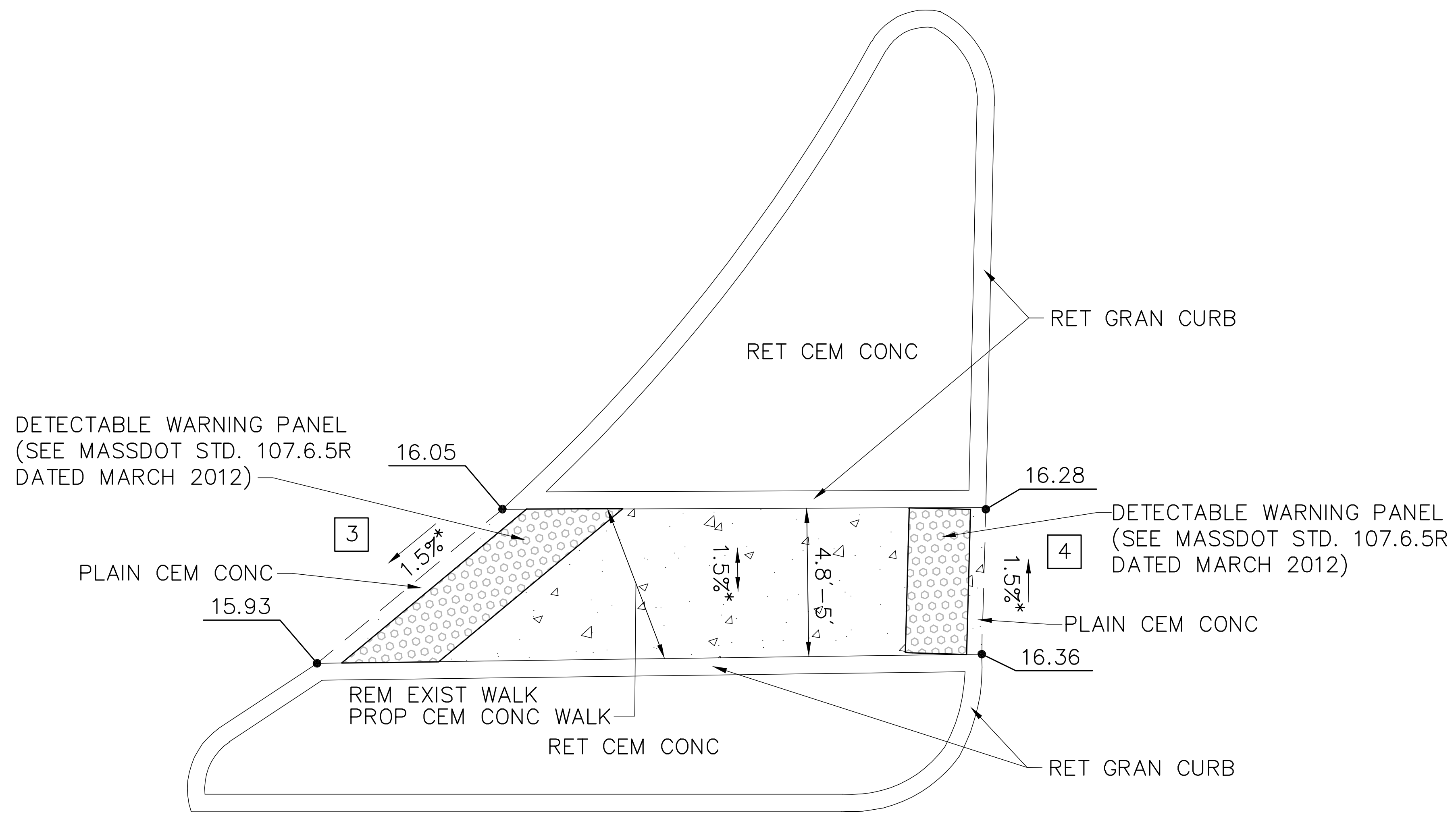
WHEELCHAIR RAMP DATA

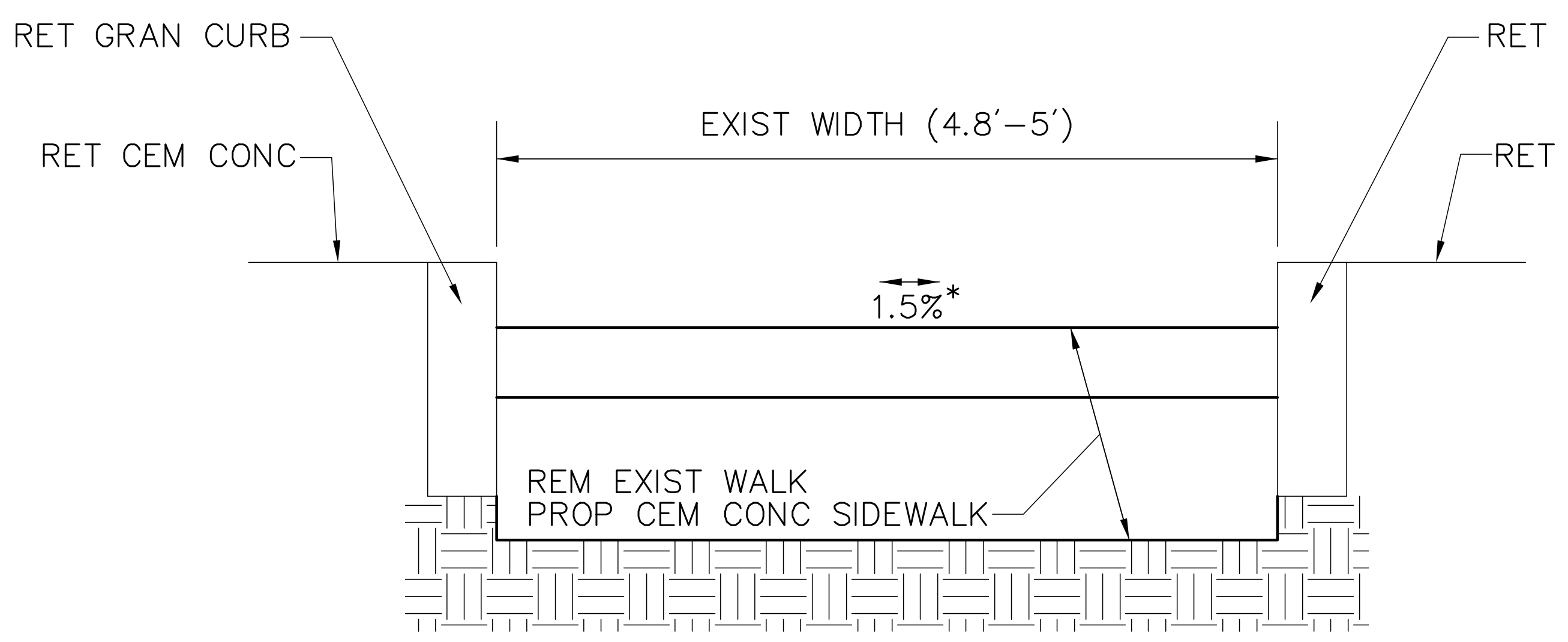
NO.	LOCATION (REF. POINT)	SIDEWALK WIDTH	RAMP WIDTH	LEFT SIDE ROADWAY GUTTER	LEFT SIDE REVEAL	LEFT SIDE TRANS	LEFT SIDE OPENING ELEV	RIGHT SIDE ROADWAY GUTTER	RIGHT SIDE REVEAL	RIGHT SIDE TRANS	RIGHT SIDE OPENING ELEV
2	103+10.1 22.3' RT	VARIES	5.0'	−1.1%	3"	6.5'	16.42	1.9%	3"	4'–8"	16.49

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

WHEELCHAIR RAMP NUMBER 2

SCALE: NOT TO SCALE





WHEELCHAIR RAMP NUMBERS 3 & 4
CEMENT CONCRETE WALKWAY THROUGH EXISTING ISLAND

SCALE: NOT TO SCALE
DATE: APRIL 2003
DWG:

* TOLERANCE FOR CONSTRUCTION ±0.5%

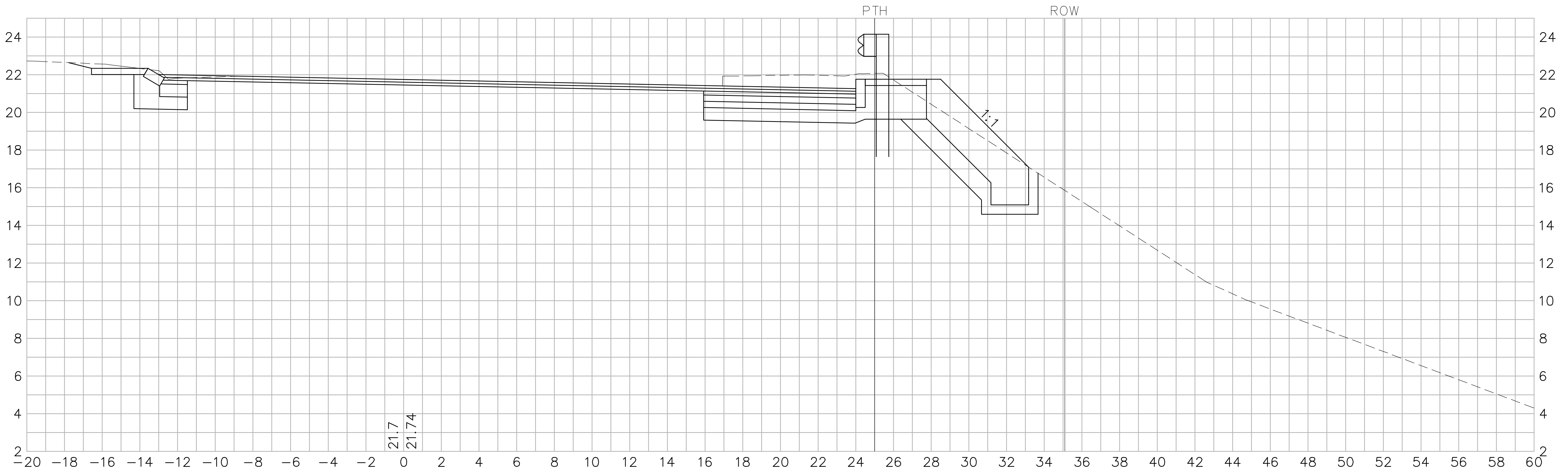
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		63	71

PROJECT FILE NO. 605637

CROSS SECTIONS

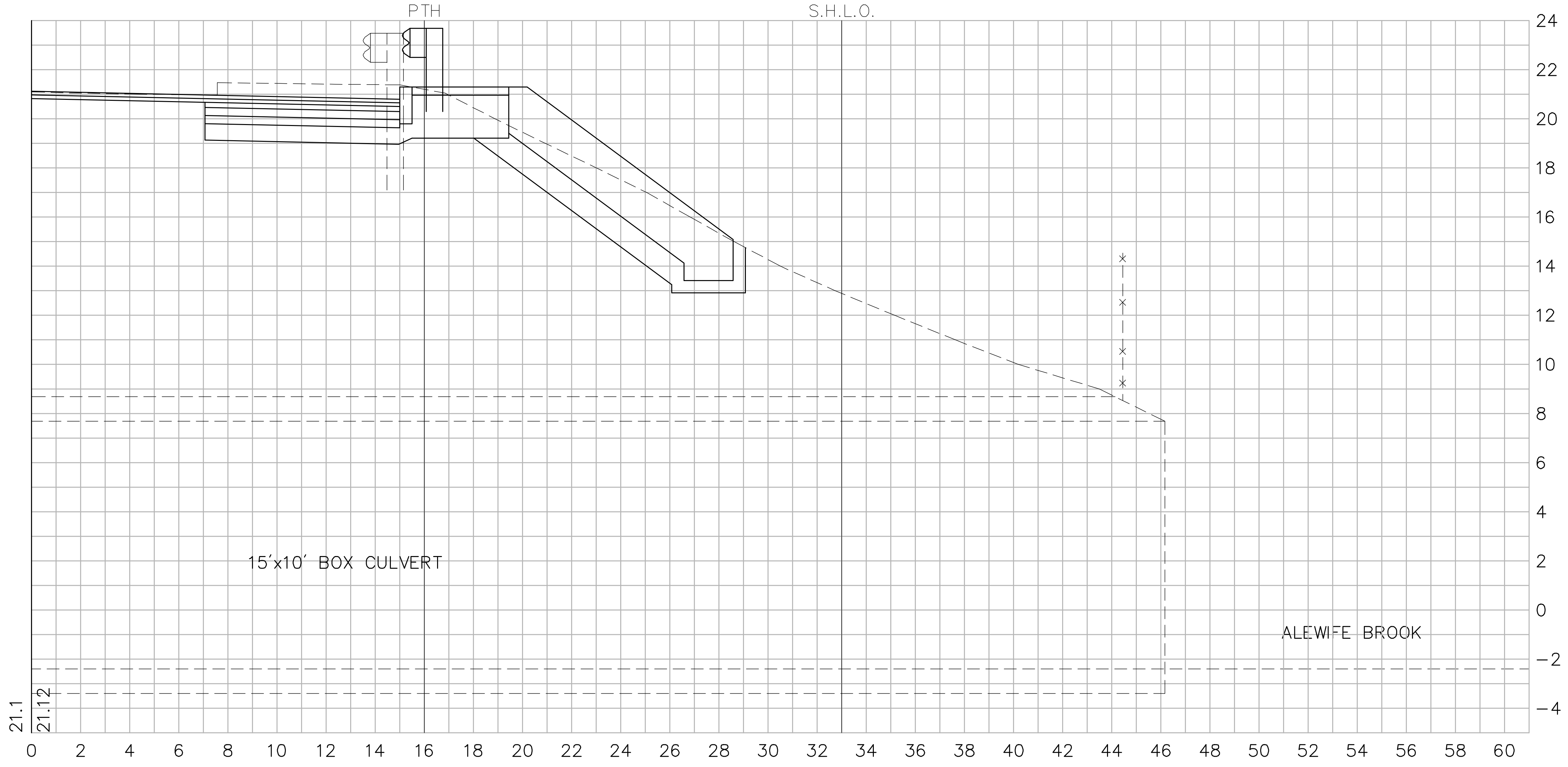
17+50



SLOPE
EXCAVATION: 23.65 SF

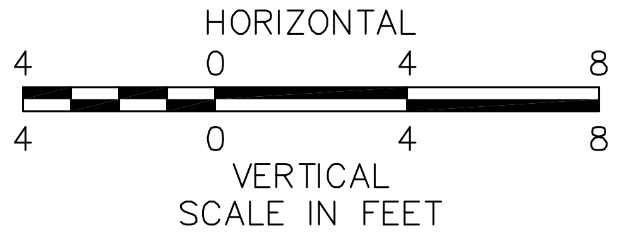
GRAVEL
UNDER
GUARDRAIL: 4.93 SF

317+25 SKEWED



CLASS A TRENCH
EXCAVATION: 29.41 SF

GRAVEL
UNDER
GUARDRAIL: 6.02 SF

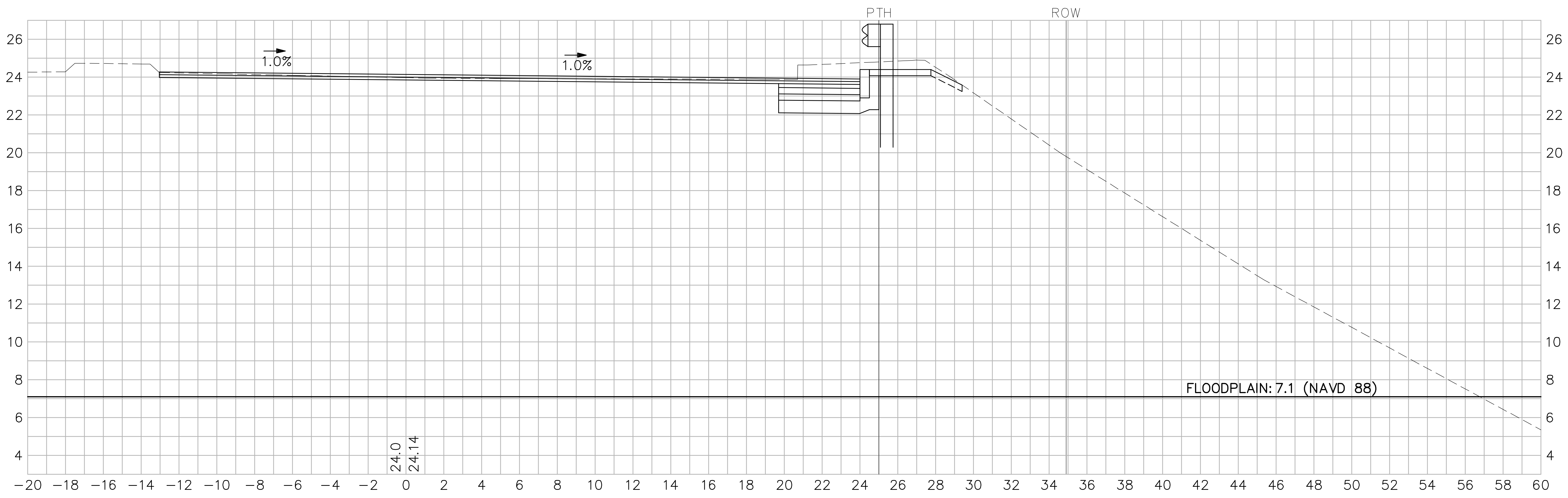


CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

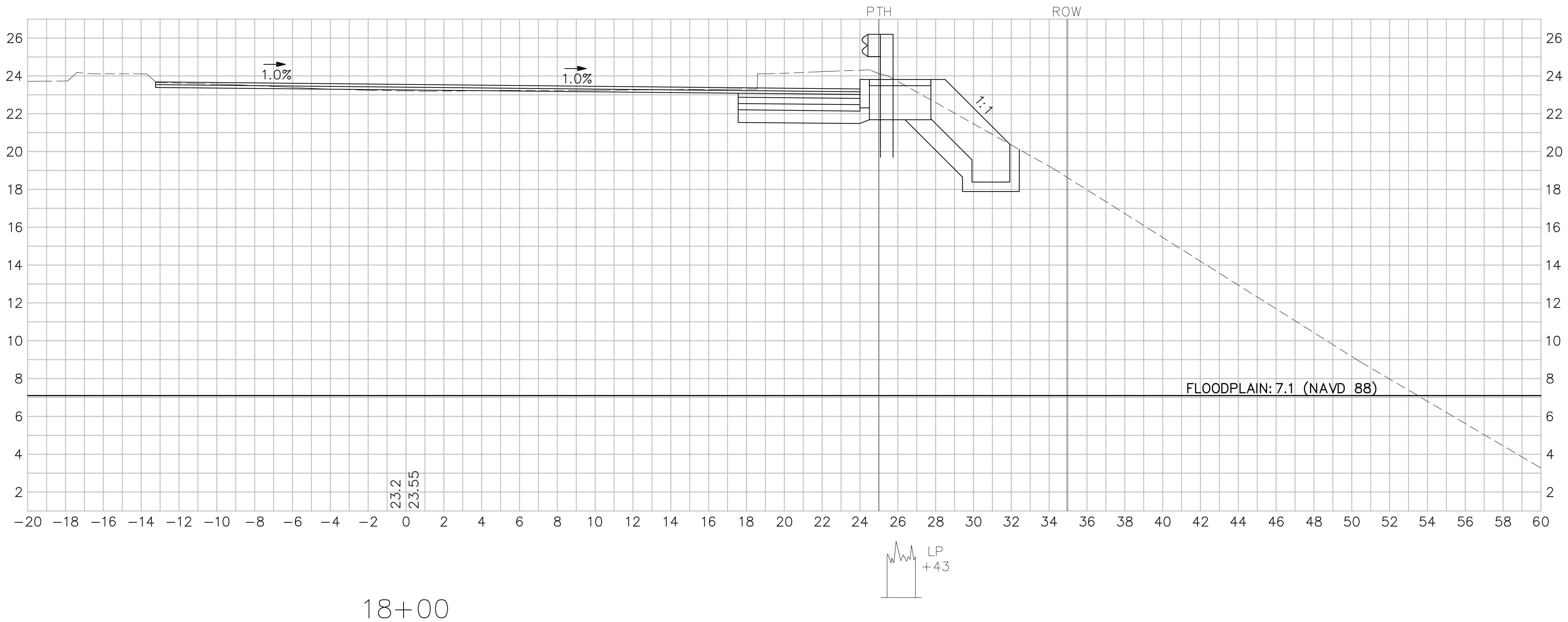
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		64	71
PROJECT FILE NO. 605637			

CROSS SECTIONS

19+00



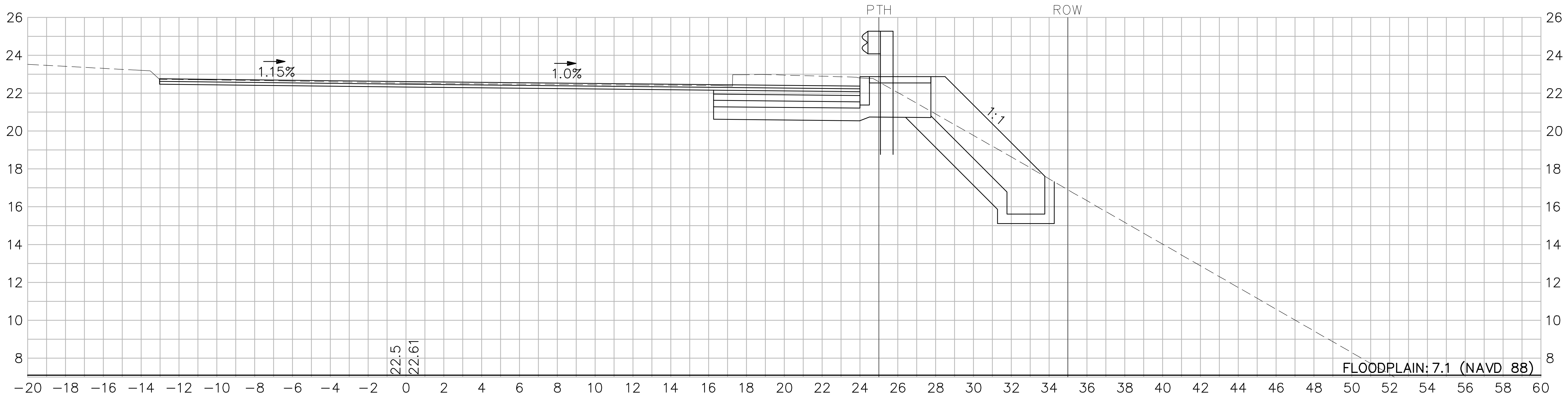
18+50



CLASS A TRENCH
EXCAVATION: 19.70 SF

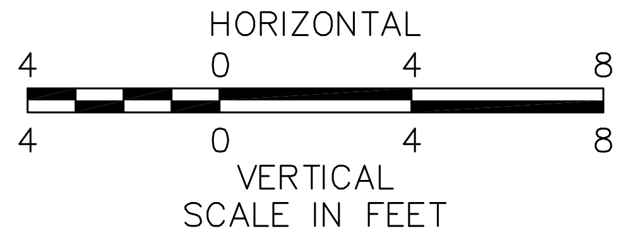
GRAVEL
UNDER
GUARDRAIL: 4.93 SF

18+00



CLASS A TRENCH
EXCAVATION: 21.65 SF

GRAVEL
UNDER
GUARDRAIL: 4.99 SF

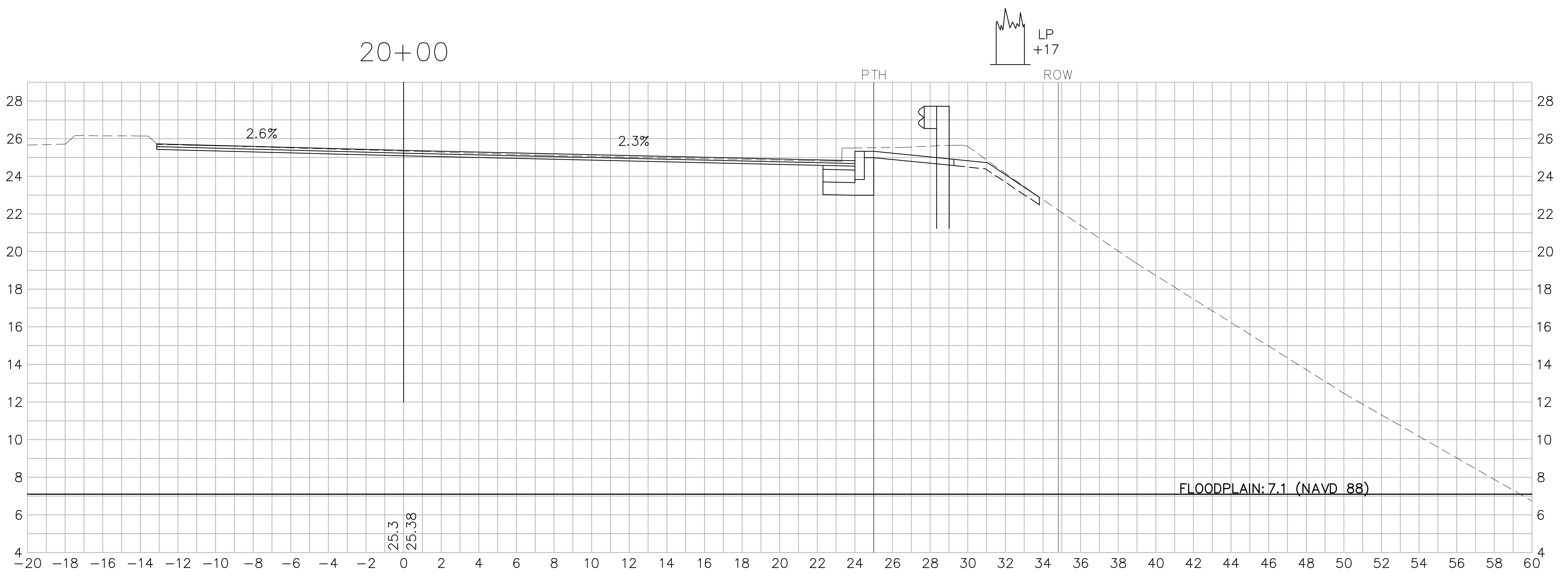


CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		65	71
PROJECT FILE NO. 605637			

CROSS SECTIONS

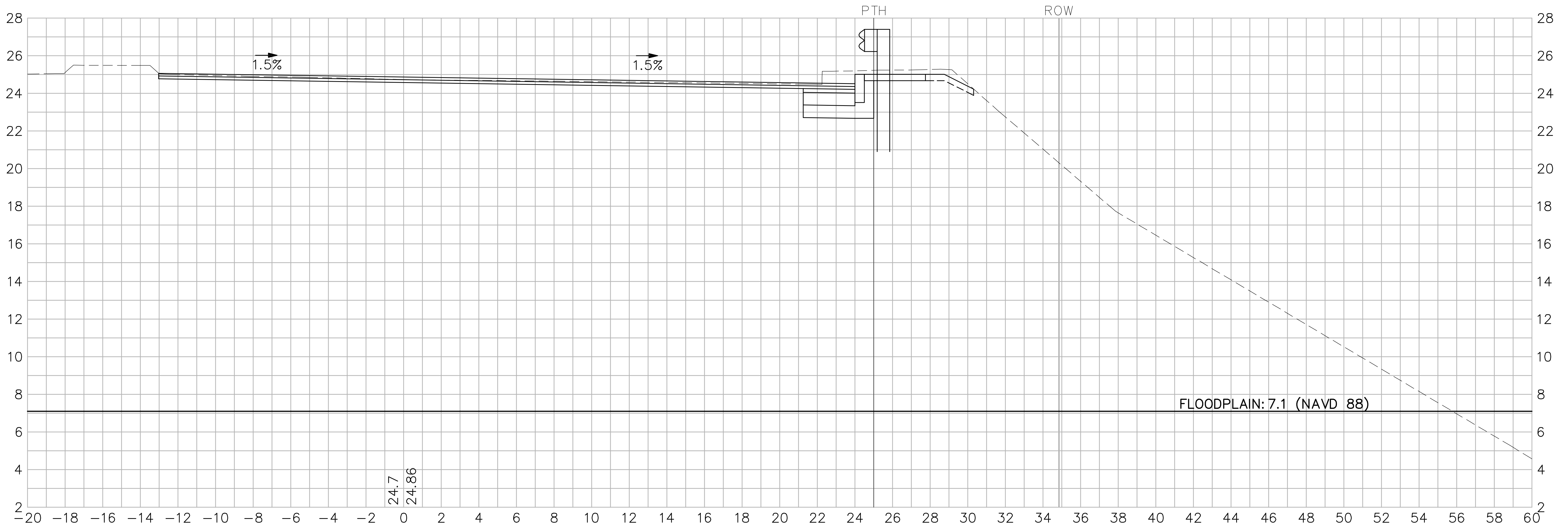
20+00



CLASS A TRENCH
EXCAVATION: 6.27 SF

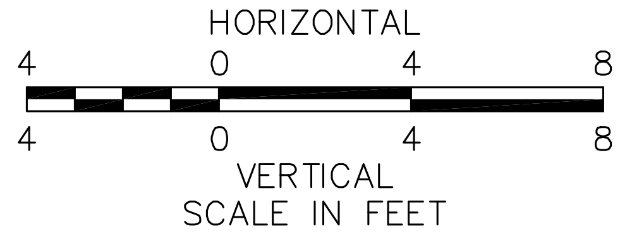
GRAVEL
UNDER
GUARDRAIL: 0.00 SF

19+50



CLASS A TRENCH
EXCAVATION: 3.08 SF

GRAVEL
UNDER
GUARDRAIL: 0.00 SF



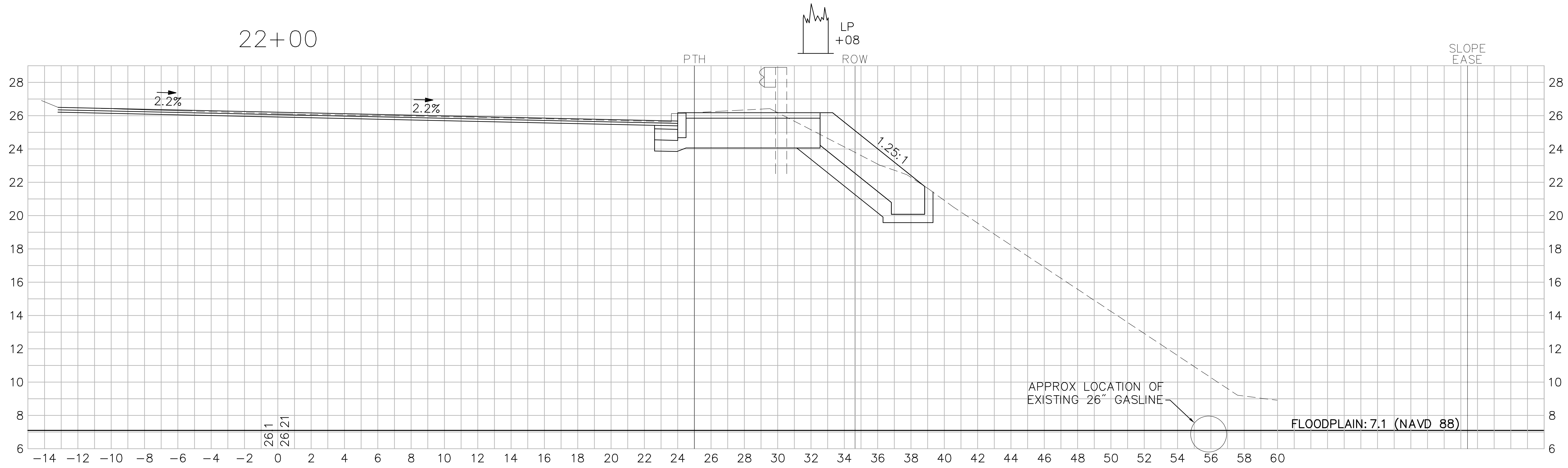
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		66	71

PROJECT FILE NO. 605637

CROSS SECTIONS

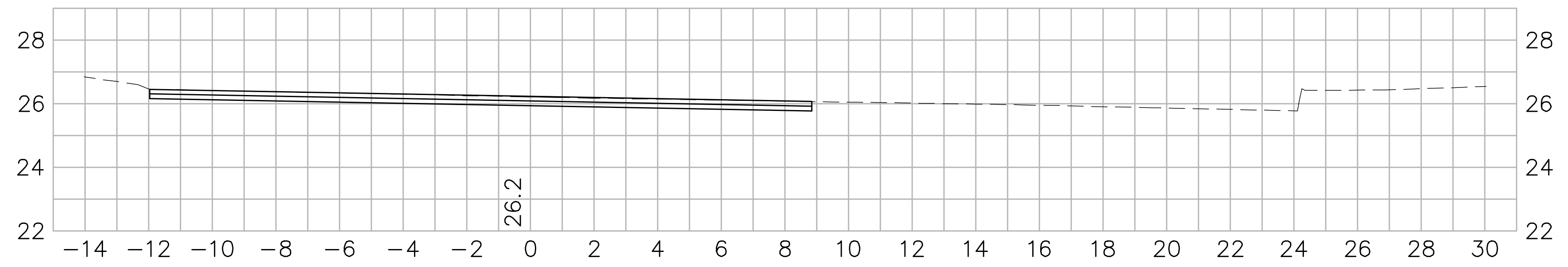
22+00



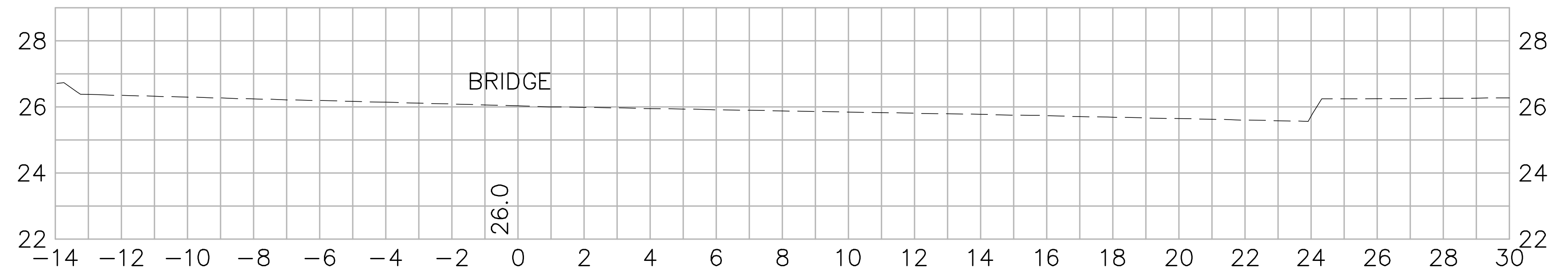
CLASS A TRENCH
EXCAVATION: 33.30 SF

GRAVEL
UNDER
GUARDRAIL: 13.50 SF

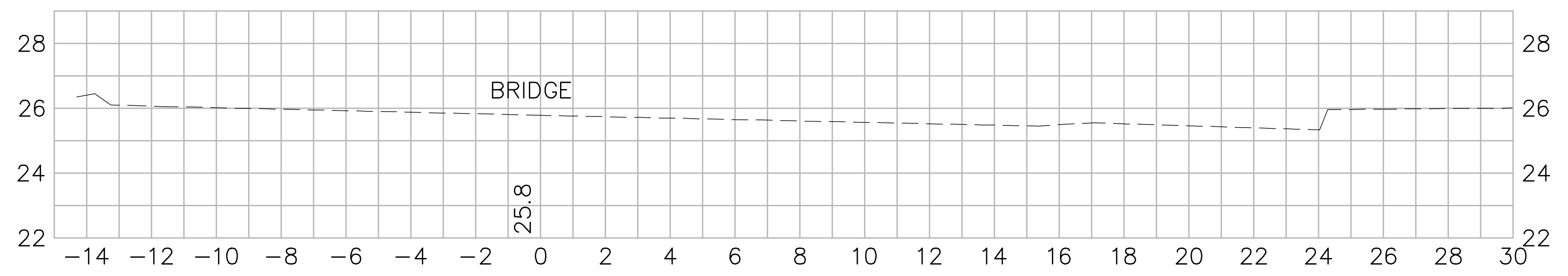
21+50

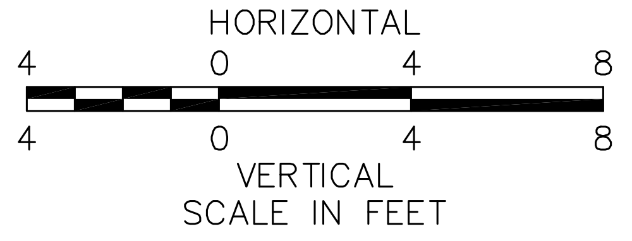


21+00



20+50



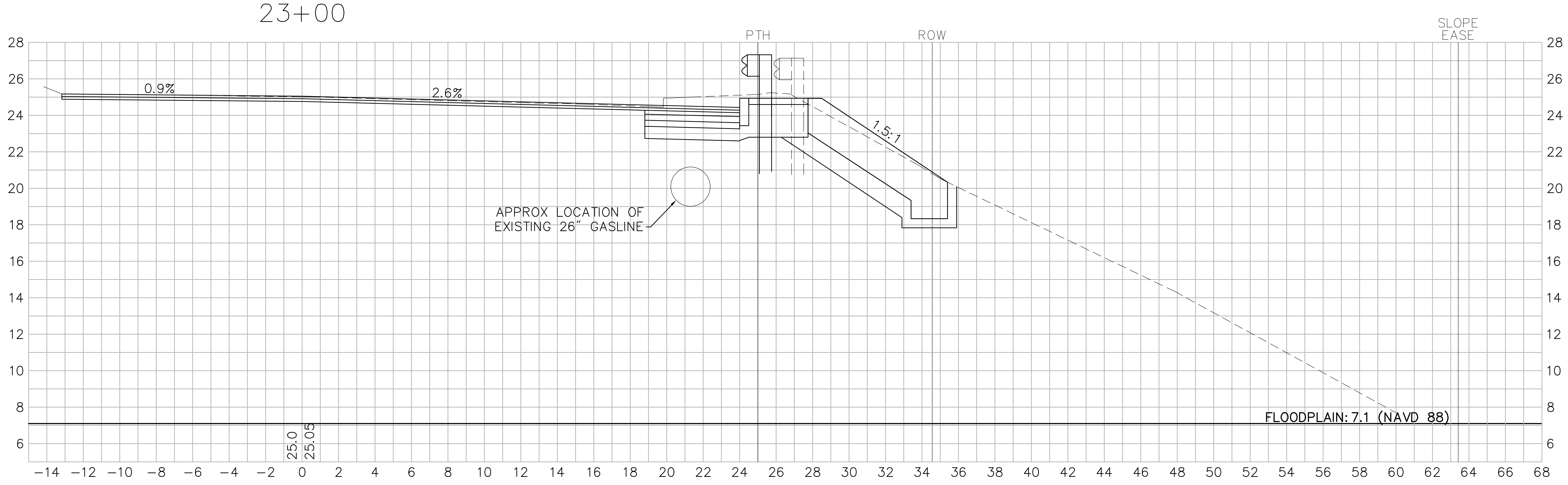


CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		67	71
PROJECT FILE NO. 605637			

CROSS SECTIONS

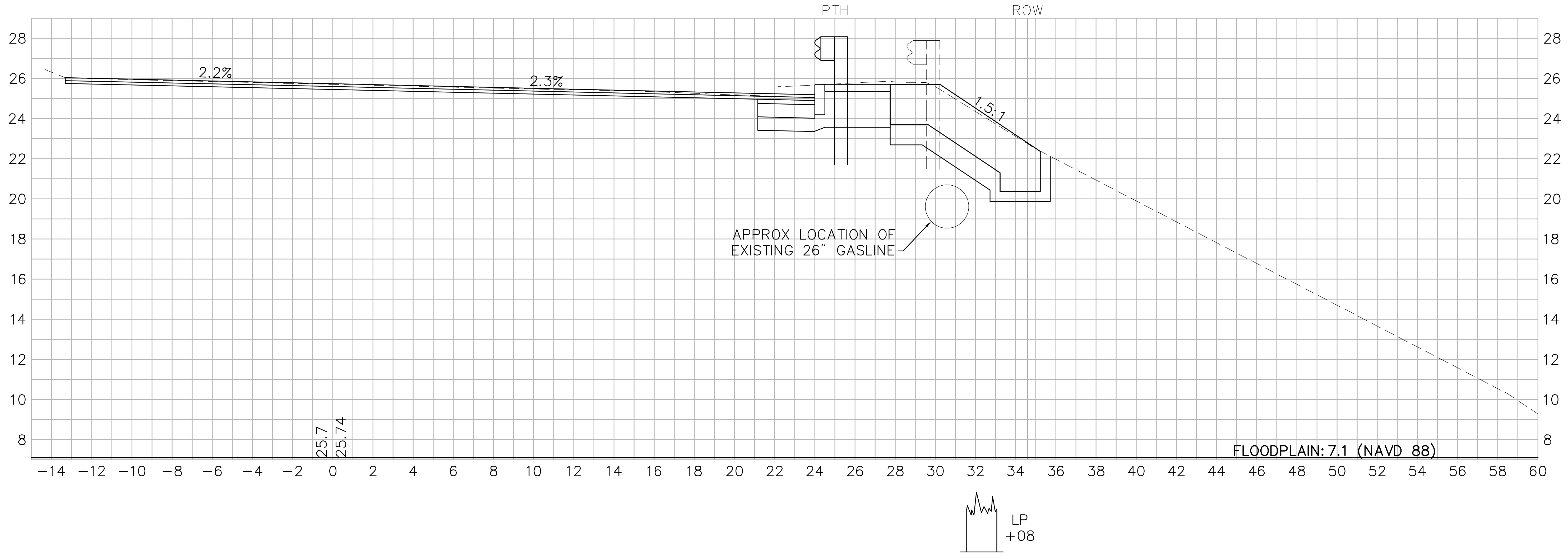
23+00



CLASS A TRENCH EXCAVATION: 32.13 SF

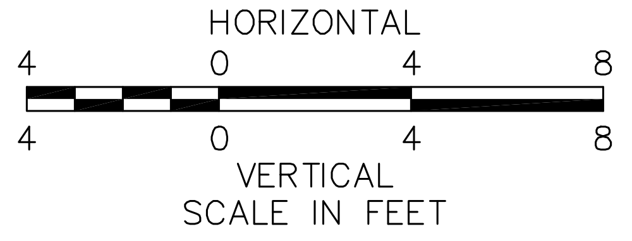
GRAVEL UNDER GUARDRAIL: 4.93 SF

22+50



CLASS A TRENCH EXCAVATION: 31.86 SF

GRAVEL UNDER GUARDRAIL: 4.93 SF



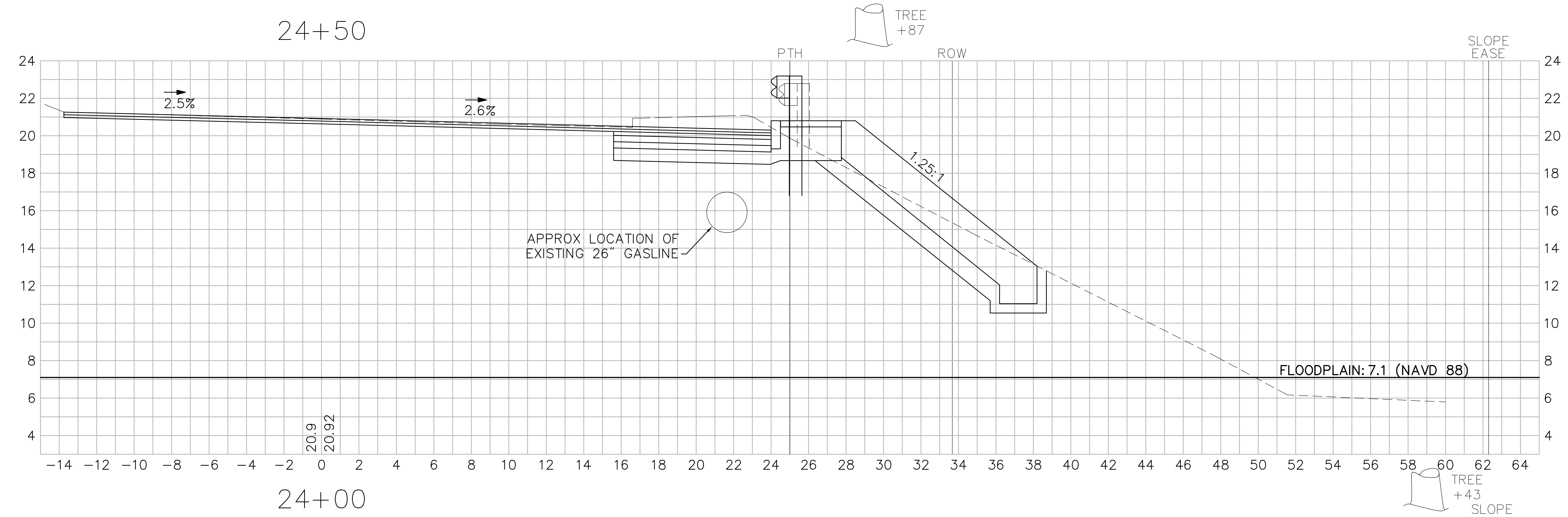
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		68	71

PROJECT FILE NO. 605637

CROSS SECTIONS

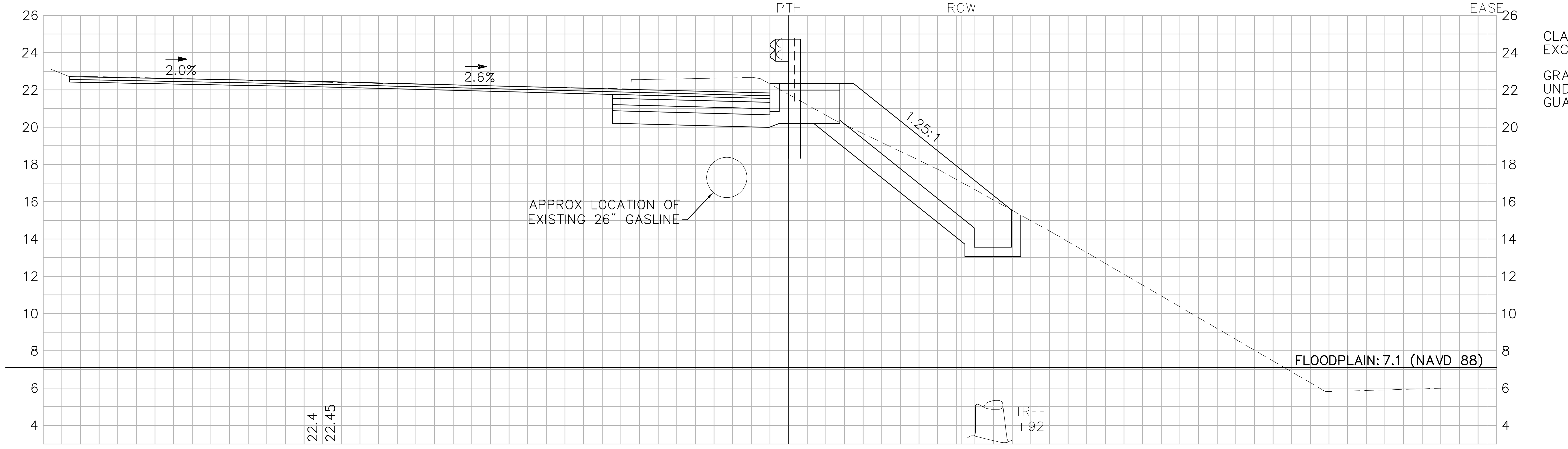
24+50



CLASS A TRENCH
EXCAVATION: 26.88 SF

GRAVEL
UNDER
GUARDRAIL: 4.93 SF

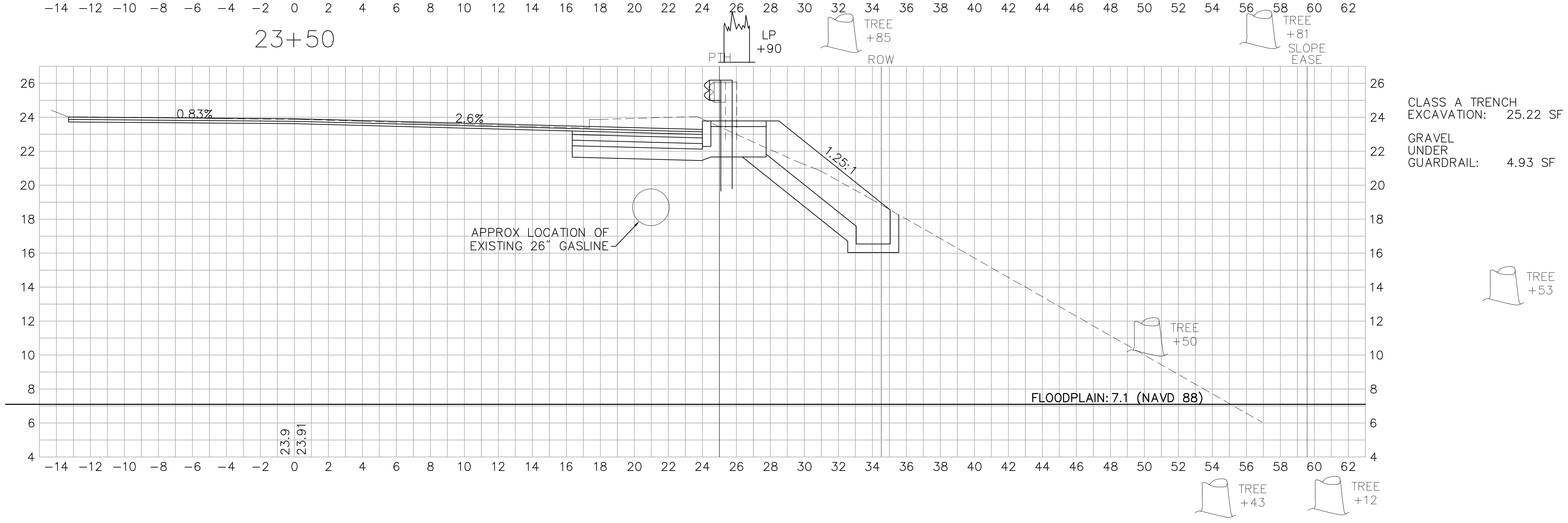
24+00



CLASS A TRENCH
EXCAVATION: 27.12 SF

GRAVEL
UNDER
GUARDRAIL: 4.93 SF

23+50



CLASS A TRENCH
EXCAVATION: 25.22 SF

GRAVEL
UNDER
GUARDRAIL: 4.93 SF

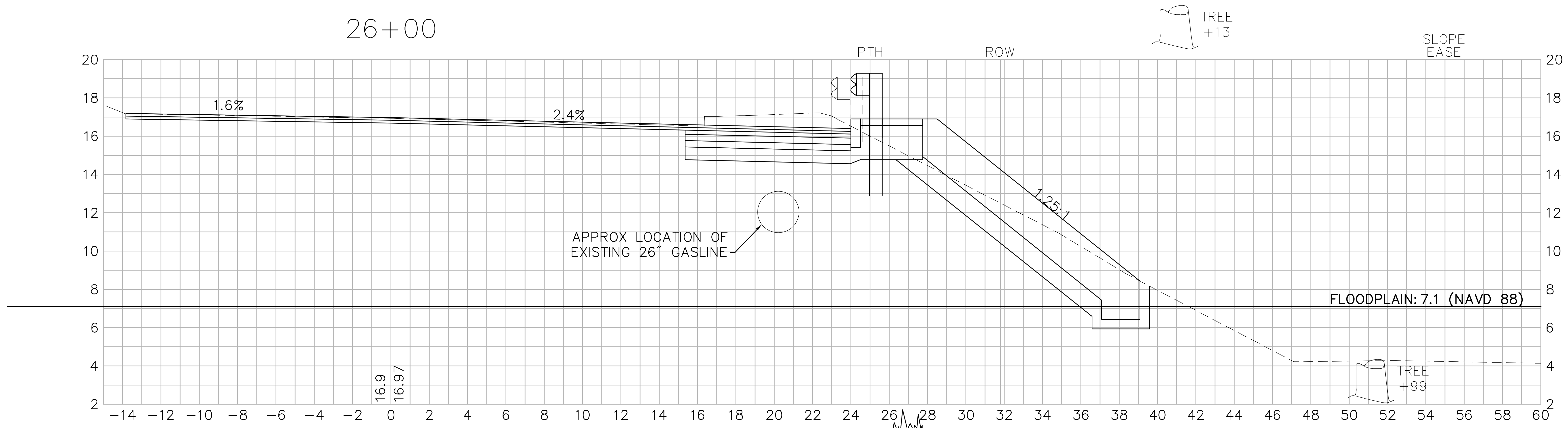
HORIZONTAL
4 0 4 8
4 0 4 8
VERTICAL
SCALE IN FEET

CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		69	71
PROJECT FILE NO. 605637			

CROSS SECTIONS

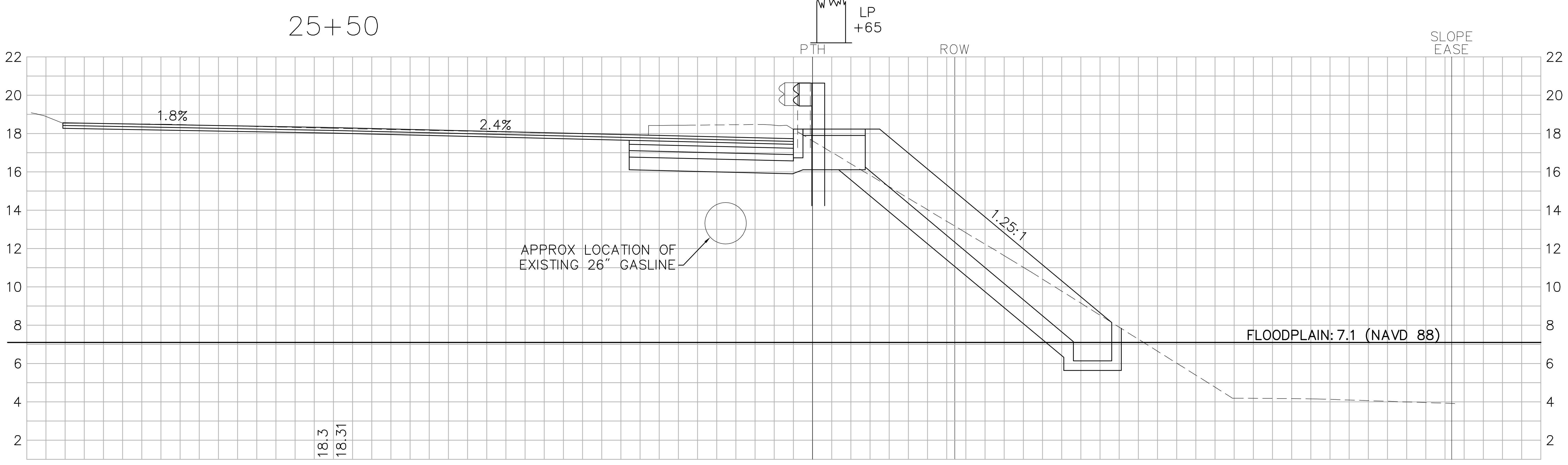
26+00



CLASS A TRENCH
EXCAVATION: 30.64 SF

GRAVEL
UNDER
GUARDRAIL: 4.93 SF

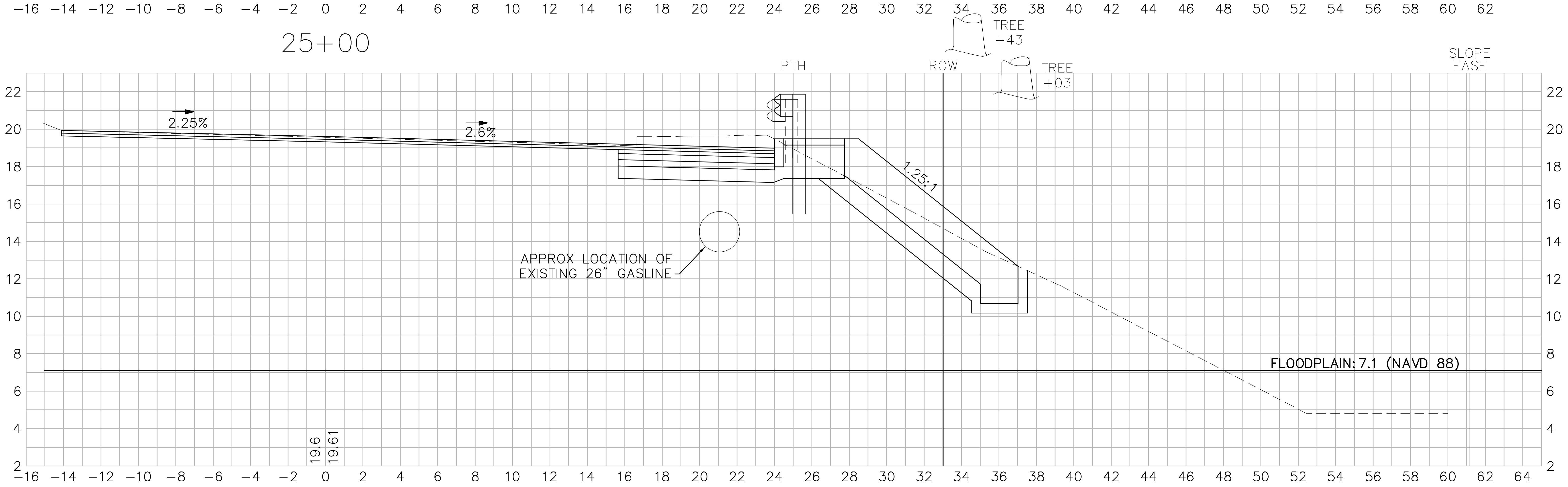
25+50



CLASS A TRENCH
EXCAVATION: 35.11 SF

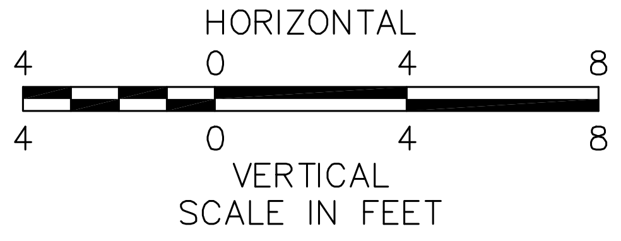
GRAVEL
UNDER
GUARDRAIL: 4.93 SF

25+00



CLASS A TRENCH
EXCAVATION: 26.71 SF

GRAVEL
UNDER
GUARDRAIL: 4.93 SF

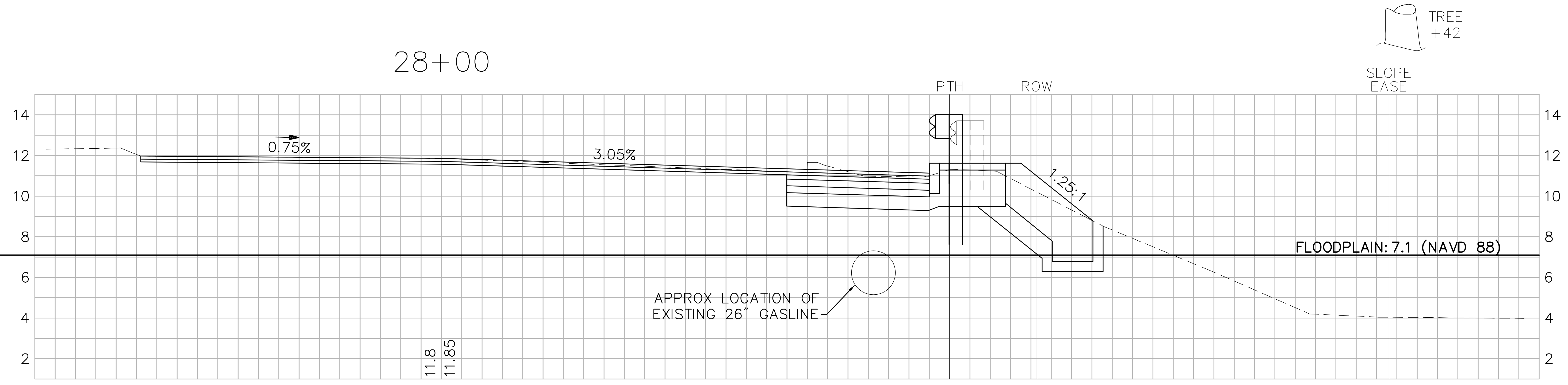


CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		70	71
PROJECT FILE NO. 605637			

CROSS SECTIONS

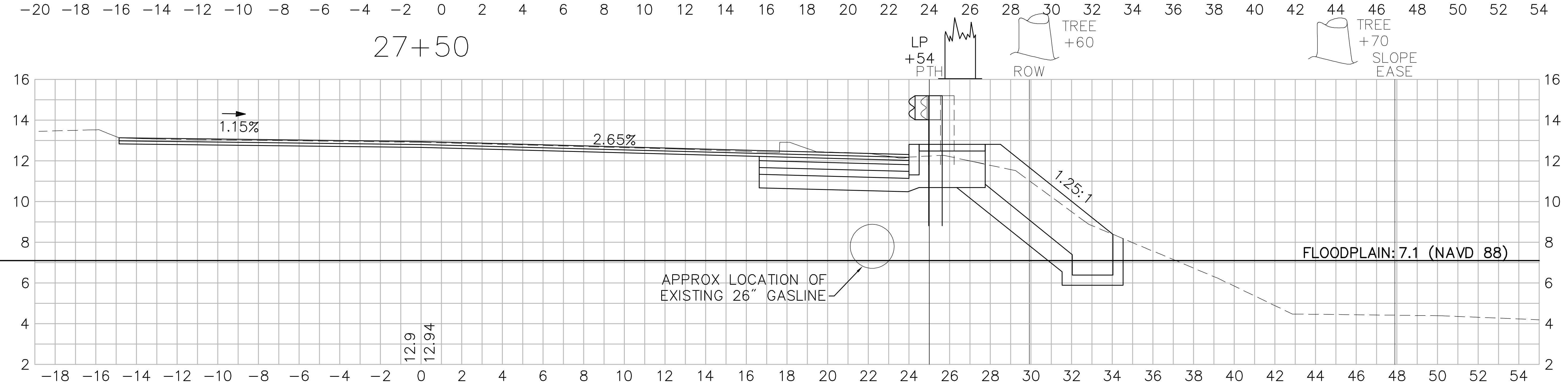
28+00



CLASS A TRENCH EXCAVATION: 19.82 SF

GRAVEL UNDER GUARDRAIL: 4.91 SF

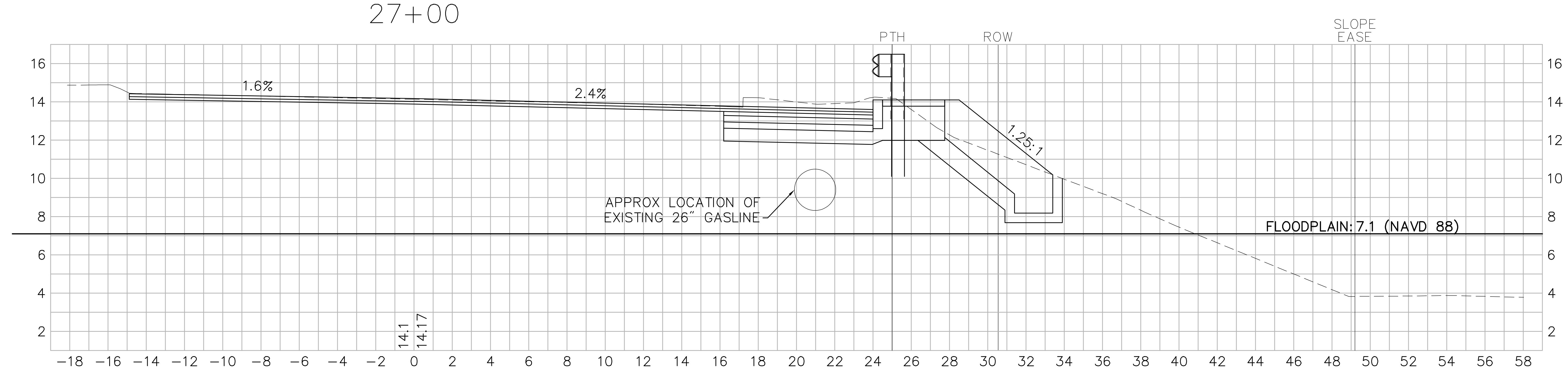
27+50



CLASS A TRENCH EXCAVATION: 25.06 SF

GRAVEL UNDER GUARDRAIL: 4.93 SF

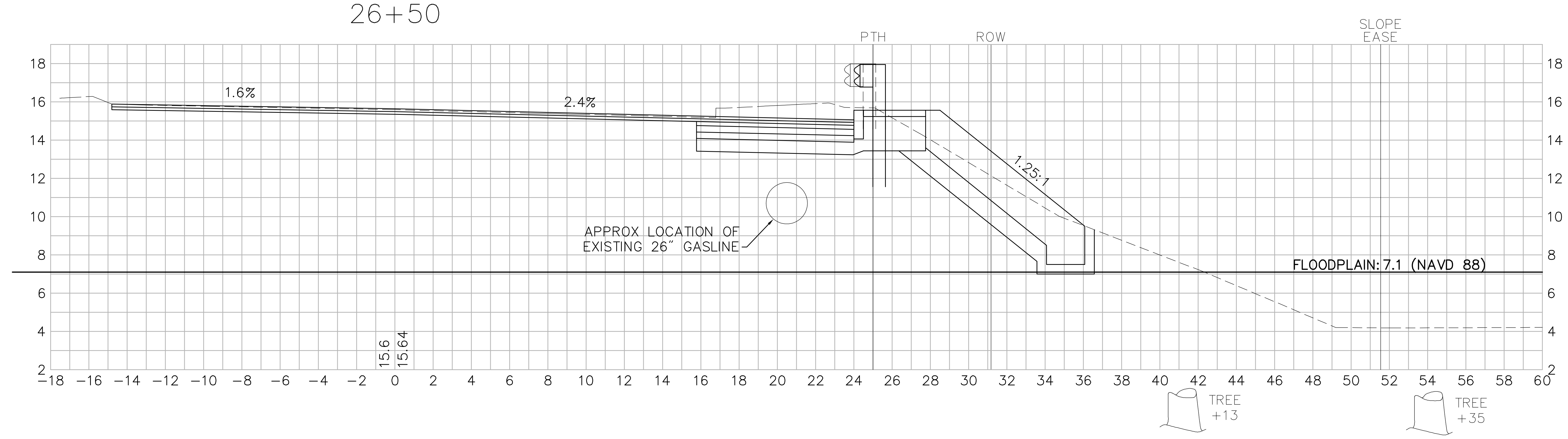
27+00



CLASS A TRENCH EXCAVATION: 19.84 SF

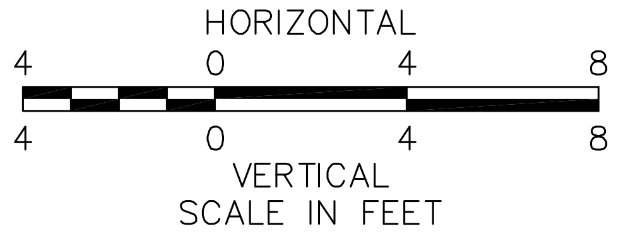
GRAVEL UNDER GUARDRAIL: 4.93 SF

26+50



CLASS A TRENCH EXCAVATION: 27.97 SF

GRAVEL UNDER GUARDRAIL: 4.93 SF



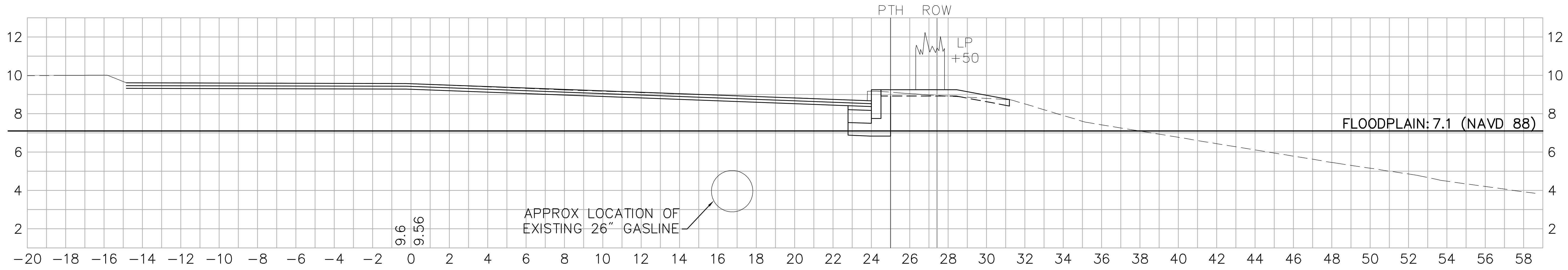
CAMBRIDGE
ROUTE 2 AT ROUTES 3 & 16

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.		71	71

PROJECT FILE NO. 605637

CROSS SECTIONS

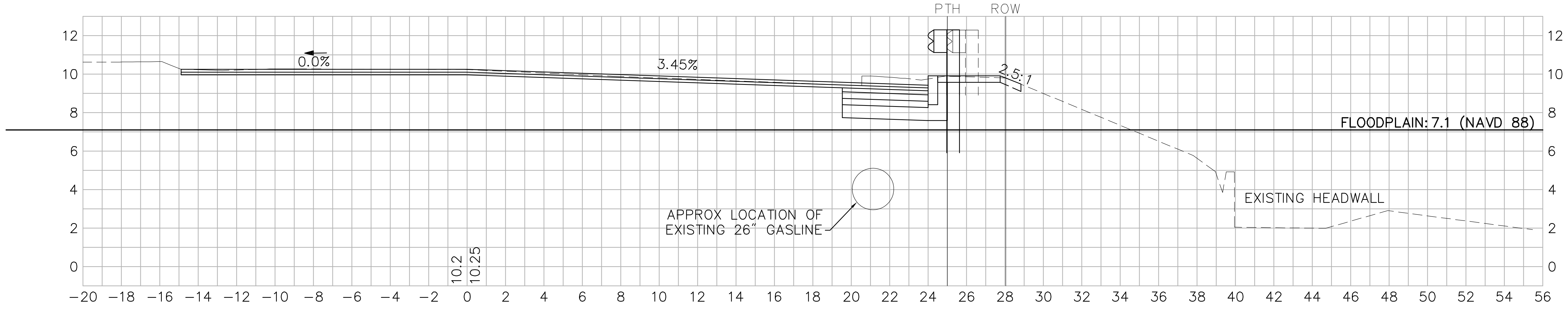
29+50



CLASS A TRENCH
EXCAVATION: 0.71 SF

GRAVEL
UNDER
GUARDRAIL: 0.00 SF

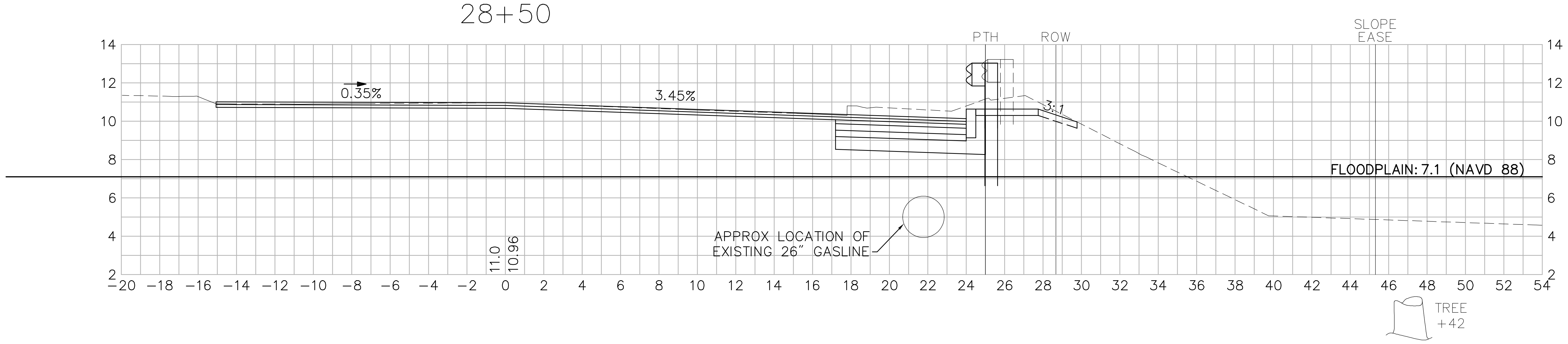
29+00



CLASS A TRENCH
EXCAVATION: 1.12 SF

GRAVEL
UNDER
GUARDRAIL: 0.00 SF

28+50



CLASS A TRENCH
EXCAVATION: 3.51 SF

GRAVEL
UNDER
GUARDRAIL: 0.00 SF