



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Jamey Tesler, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator



November 15, 2021

RE: Sudbury- Concord- Shared Use Path Construction, Bruce Freeman Rail Trail

Dear Secretary Theoharides,

Enclosed for your review is the Environmental Notification Form (ENF) describing the proposed construction of a Shared Use Path in Sudbury and Concord. This ENF has been prepared pursuant to the Massachusetts Environmental Policy Act and Section 11.05(4)(a) of the MEPA regulations (301 CMR 11.00). This project exceeds the following thresholds for ENF review:

- 11.03(1)(b)(2): Creation of five or more acres of impervious area
- 11.03(30)(b)(1)(f): Provided a permit is required, alteration of one half or more acres of any other wetland

Please notice the ENF in the Environmental Monitor to be published on November 22, 2021. If you need any addition information regarding the subject project, please contact me at Bryan.Cordeiro@dot.state.ma.us.

Sincerely,

Bryan Cordeiro
Senior Environmental Planner
Environmental Services Division

Sudbury-Bruce Freeman Rail Trail
Environmental Notification Form
MassDOT Project # 608164

Bruce Freeman Rail Trail
Sudbury, Massachusetts

Town of Sudbury, Massachusetts

November 15, 2021



in conjunction with the Town of Sudbury

190 High Street
Boston, MA 02110

Table of Contents

Sudbury-Bruce Freeman Rail Trail
Environmental Notification Form

Town of Sudbury, Massachusetts

Environmental Notification Form

Attachments

- 1. List of Attachments**
- 2. Topographic Locus Map**
- 3. Existing Conditions Plans**
- 4. Existing Environmental Constraints**
- 5. Proposed Conditions Plan**
- 6. Circulation List to Agencies**
- 7. List of Municipal and Federal Permits and Review**
- 8. RMAT Report**
- 9. Alternatives Analysis Documentation**
- 10. Amended ORAD**
- 11. Impact Summary Tables**
- 12. Broadacres Farm Parking Area Stormwater Report**

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act (MEPA) Office

Environmental Notification Form

For Office Use Only

EEA#: _____

MEPA Analyst: _____

The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: Sudbury Bike Path Construction (Bruce Freeman Rail Trail-Phase 2D),
MassDOT Project # 608164

Street Address: MassDOT Rail Division Right-of-Way

Municipality: Sudbury, MA

Watershed: Concord (SuAsCo)

Universal Transverse Mercator

Latitude/Longitude:

Coordinates:

Northern Terminus (Sudbury-Concord Boundary)

Northern Terminus (Sudbury-Concord Boundary)

Latitude: 42.424033

Easting: 302865.49

Longitude: -71.396256

Northing: 4699639.70

Zone: 19T

Southern Terminus (Station Road)

Latitude: 42.363282

Southern Terminus (Station Road)

Easting: 300497.85

Longitude: -71.422695

Northing: 4692955.31

Zone: 19T

Estimated commencement date: 11/2022

Estimated completion date: 4/2025

Project Type: Shared-use Path / Rail Trail

Status of project design: 75 %complete

Proponent: MassDOT and Town of Sudbury

Street Address: 10 Park Plaza, RM 4260

Municipality: Boston

State: MA

Zip Code: 02116

Name of Contact Person: Bryan Cordeiro

Firm/Agency: MassDOT Highway Division

Street Address: 10 Park Plaza, RM 4260

Municipality: Boston

State: MA

Zip Code: 02116

Phone: (857)-368-8813

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bryan.cordeiro@state.ma.us

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?

Yes No

If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:

a Single EIR? (see 301 CMR 11.06(8))

Yes No

a Special Review Procedure? (see 301CMR 11.09)

Yes No

a Waiver of mandatory EIR? (see 301 CMR 11.11)

Yes No

a Phase I Waiver? (see 301 CMR 11.11)

Yes No

(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?

11.03(1)(b)(2): Creation of five or more acres of impervious area.

11.03(30)(b)(1)(f): "Provided a permit is required, alteration of one half or more acres of any other wetland"

Which State Agency Permits will the project require?

Determination of Applicability for Chapter 91 Waterways License-MassDEP, MBTA Access Permit

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres: **MassDOT will fund 20% of the construction costs and the Federal Highway Administration will fund the remaining 80% of the construction costs. There will be no land transfer from any Agency of the Commonwealth.**

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	37.53		
New acres of land altered		14.78	
Acres of impervious area	0.43	5.97	6.40
Square feet of new bordering vegetated wetlands alteration		2,710 SF (1,190 SF Perm, 1,520 SF Temp)	
Square feet of new other wetland alteration		485 LF Bank (149 LF Perm- 336 LF Temp) 1,821 SF LUW (474 SF Perm- 1,347 SF Temp) 109,626 SF RA (65,857 SF Perm- 43,769 SF Temp) 1,946 SF BLSF (3 CY total of pervious fill, comp storage proposed offsetting fill volume in respective BLSF areas)	
Acres of new non-water dependent use of tidelands or waterways		N/A	
STRUCTURES			
Gross square footage	N/A	1032 SF (waterless restroom & pavilion)	1032 SF (waterless restroom & pavilion)
Number of housing units	N/A	N/A	N/A
Maximum height (feet)	N/A	14	14
TRANSPORTATION			
Vehicle trips per day	N/A	N/A	N/A
Parking spaces	0	32	32
WASTEWATER			
Water Use (Gallons per day)	N/A	N/A	N/A
Water withdrawal (GPD)	N/A	N/A	N/A
Wastewater generation/treatment (GPD)	N/A	N/A	N/A
Length of water mains (miles)	N/A	N/A	N/A
Length of sewer mains (miles)	N/A	N/A	N/A

Has this project been filed with MEPA before?

Yes (EEA # 12109, 15196, 15819, 15437) No

The Bruce Freeman Rail Trail Project was the subject of MEPA review through the following filings:

EEA #12109. In 1999 when the Towns of Chelmsford and Westford submitted an ENF that described a 6.8 mile long recreational trail to be located within an inactive railroad right-of-way (ROW).

EEA #15196. In 2014 when the Towns of Westford, Carlisle, and Acton submitted an ENF that described a 4.9 mile long recreational trail located within an inactive railroad ROW.

EEA #15437. In 2015 when the Town of Concord submitted an ENF that described a 3 mile long recreational trail located within an inactive railroad ROW.

EEA #15819. In 2018 when the Towns of Concord and Acton submitted an ENF that described a 0.9 mile recreational trail located within an inactive railroad ROW.

Has any project on this site been filed with MEPA before?

Yes (EEA # _____) No

GENERAL PROJECT INFORMATION – all proponents must fill out this section

PROJECT DESCRIPTION:

The purpose of this project is to provide a non-motorized, ADA-accessible, shared-use path through the Town of Sudbury which will serve as a historical, recreational and alternative transportation resource for residents and visitors of all ages and abilities. The design of the rail trail seeks to maximize the benefits of such trails for the community and public at large while minimizing its impacts to Sudbury residents and the natural environment. The Town of Sudbury, in conjunction with MassDOT, are the proponents of this project.

This project consists of a new segment of The Bruce Freeman Rail Trail (BFRT) in the Town of Sudbury, Massachusetts. A rail trail is a shared-use path for non-motorized users of all abilities built for the purposes of providing safety for users and reducing traffic congestion on overtaxed roadways. The project is also identified as Phase 2D of the BFRT and as MassDOT Project #608164. The MEPA applicant for this project is MassDOT.

The project is proposed to be constructed in a single phase as a segment of an envisioned 25-mile shared-use recreational rail trail between Lowell and Framingham, Massachusetts along the former Lowell Secondary Track ROW of Old Colony Rail Road. At present, approximately 12 miles of The BFRT has been constructed in the municipalities of Lowell, Chelmsford, Westford, Carlisle, Acton, and Concord. The BFRT has been planned to be constructed in the following six phases: 1, 2A, 2B, 2C, 2D, and 3. Each of the six phases have been planned to be constructed independently with separate Environmental Notification Forms (ENFs). This ENF is inclusive of the 4.4 mile rail trail through the Town of Sudbury from the Sudbury/Concord Town Line to the ROW of the Massachusetts Central Rail Trail (MCRT), also known as Phase 2D of the BFRT.

There is a 0.5 mile section of the BFRT in Concord that is proposed to be under construction simultaneously with this project. The 0.5 mile section in Concord was previously reviewed under phase 2C of the BFRT, EEA #15819 in 2018.

The project also serves the objectives of MassDOT's Healthy Transportation Policy Directive, P-13-0001, which formalized MassDOT's commitment to the implementation of transportation networks that serve all mode choices including walking and bicycling. Under the directive, MassDOT established a statewide goal to triple the distance traveled by walking, bicycling, and transit between 2013 and 2030.

Describe the existing conditions and land uses on the project site:

The project site consists of an inactive rail ROW starting from the north at the Sudbury/Concord town line to the ROW of the Massachusetts Central Rail Trail near Station Road. The rail ROW is presently owned by MassDOT's Rail Division. The rail ROW is approximately 65 feet wide and the project area will extend 4.4 miles. The rail ROW contains a raised earthen embankment topped with typically 16ft wide dense graded and crushed ballast stone in which wood rail ties are embedded. The wood rail ties anchor two steel rails (a single track), except where they have been removed at road crossings.

The rail ROW is predominantly a wooded corridor of mixed oak, white pine, and red maple passing near various wetland resource areas including intermittent and perennial streams, bordering vegetated wetlands, vernal pools (certified, eligible, and potential), and flood plain.

The surrounding land use of the rail ROW is suburban with adjacent parcels of single-family residential, agricultural use, protected open space, and commercial/industrial use. Generally,

the adjacent land use becomes more industrial toward the south of the ROW.

The rail ROW crosses four perennial streams as defined in the Amended Order of Resource Area Delineation (ORAD), see *Attachment 10*.

The rail ROW crosses Hop Brook, a perennial stream, and designated Coldwater Fisheries Resource, via a rail bridge. The existing bridge deck is structurally unsound and deteriorated. The existing granite block abutment walls are structurally sound.

The rail ROW crosses Pantry Brook, a perennial stream, via a rail bridge. The existing granite block bridge abutment walls are partially collapsed into Pantry Brook.

The rail ROW crosses two smaller perennial streams conveyed under the rail embankment via culverts: an unnamed tributary to Cold Brook and an unnamed tributary to Pantry Brook.

There is an additional designated Cold-Water Fisheries Resource crossing the project site ROW, an unnamed tributary to Hop Brook. There was formerly a box culvert at the tributary crossing which collapsed and caused the tributary to cut through the rail embankment.

Vernal pool surveys were conducted in the project area in 2015, 2017, and 2018 as detailed in the Amended ORAD in *Attachment 10*. Twenty-two potential, eligible to be certified, or certified vernal pools have been documented in or near the project site. Vernal pool 13 is a Certified Vernal Pool, while vernal pools 4, 11, and 12a are eligible to be certified.

There are four cement concrete cattle crossings which pass underneath the rail embankment. No longer used for livestock, the passages allow for wildlife crossing.

There are 18 existing hydraulic culverts traversing the existing project site ROW, not including the two aforementioned bridges. Site inspections found 6 in need of cleaning, 1 in need of headwall replacement, and 4 in need of replacement, with the remaining culverts proposed to be retained as is.

The rail ROW has 9 at-grade road crossings. Starting from the north, the road crossings are: A driveway to Fairview Farm, North Rd (Route 117), Pantry Rd, Haynes Rd, Morse Rd, Hudson Rd (Route 27), Old Lancaster Road, Codjer Lane, and the industrial driveway of 71 Union Ave.

There are three adjacent parcels to the rail ROW to which the project proposes to connect to via shared-use paths which spur off of the main shared-use path:

- 1) Davis Field is a 29 acre multi-use recreational area on North Rd with an entrance 500ft east of the rail ROW crossing of North Rd. Davis Field is owned by the Town of Sudbury. There is an existing sidewalk connection from the rail ROW to the parking area of Davis Field. Davis Field hosts various Town sporting activities and recreational leagues. There is also a trail through conservation land that connects to Davis Field.
- 2) Broadacres Farm, a former horse farm on the north side of Morse Rd abutting the rail ROW is owned by the Town. The parcel is currently maintained as a field and was acquired for the purposes of recreation consistent with the proposed design.
- 3) The Parkinson Parcel is located just north of Hudson Rd (Route 27) and abuts the rail ROW. The property is open to the public, is used as a general recreational field, and has an existing parking area.

Describe the proposed project and its programmatic and physical elements:

Phase 2D of the BFRT proposes to construct a 4.44 mile shared-use path that will begin at the Sudbury/Concord Town Line and travel south to the ROW of the Massachusetts Central Rail Trail near Station Rd in Sudbury, where the two trails will intersect at a roundabout for bicycles and pedestrians.

The proposed project will include the following elements:

- A 10-foot-wide hot-mix asphalt paved shared-use path conveying drainage via sheet-flow to adjacent shoulders and swales
- Crushed gravel path shoulders will vary in width from 1ft to 3ft. The 1ft wide shoulder sections have been designed to minimize wetland impacts. The 3ft shoulder sections occur where timber post guard rails parallel the trail to protect trail users
- Trailside rest areas that provide bench seating and bicycle racks
- Wayfinding signage and granite mile-marker posts for navigation
- A 268ft long and 10-foot-wide shared-use path connection is proposed from the main trail to the existing parking area at the Parkinson Parcel. The path connection will travel through the lawn area of Parkinson parcel to reach the existing parking area
- A 15,625 SF parking area containing 32 spaces is proposed adjacent to the trail at Morse Rd, a parcel of former Broadacres Farm. The parking area is proposed to include a waterless restroom and a recreational pavilion structure consisting of a gabled roof supported by wood beam columns
- The existing sidewalk from the BFRT crossing at North Rd to Davis Field recreational area is proposed to be converted into an 8ft wide shared-use path. This 750ft long shared-use path connection will join the main trail with the existing parking and recreation area at Davis Field
- The existing rail bridge at Hop Brook is proposed to be rehabilitated with a new bridge deck. The existing granite block wall abutments are proposed to be repaired and retained
- The existing rail bridge at Pantry Brook is proposed to be replaced. The existing abutment walls are proposed to be cut to a lower height and retained. The superstructure of the bridge is proposed to be replaced by a concrete arch bridge spanning over the remaining abutment walls. The design intent is to minimize impact to the Bank of Pantry Brook and provide enhanced wildlife crossing
- Native tree and vegetative plantings are proposed throughout the project. The proposed plantings are mainly parallel to the shared-use path within the rail ROW for screening and to improve the natural environment within the riverfront areas
- Cedar rail fencing is proposed to protect users from steep slopes and screen sensitive adjacent properties such as industrial abutters or sensitive environmental areas
- Signage indicating the location of sensitive environmental areas off-trail are proposed to inform the public

- The intersection of Hudson Rd and Peakham Rd is proposed to be reconstructed at the proposed shared-use path crossing. The intersection will receive fully accessible wheelchair ramps and a new traffic signal
- The shared-use path intersection at North Rd is proposed to receive a high-intensity activated crosswalk (HAWK) signal for enhanced pedestrian crossing safety
- Rectangular Rapid Flashing Beacon (RRFB) pedestrian warnings are proposed at all other road crossings
- 4 failing culverts beneath the trail are proposed to be replaced
- Damaged or failing culvert headwalls are proposed to be replaced or rehabilitated
- 3,395 LF of new 1-foot-wide grass infiltration swales are proposed to line the trail for improved drainage
- A wetland replication area is proposed on the former site of Broadacres Farm adjacent to the rail ROW, to the south of Morse Rd and to the west of the rail ROW.

Summary of Impacts:

There are no NHESP priority/estimated habitat areas for state listed species, Areas of Critical Environmental Concern, or critical habitat for federally listed species within the proposed limits of work. However, Priority Habitat of Rare Species #1349 borders the rail ROW and proposed wetland replication area. Existing environmental conditions are included in *Attachment 4*.

As described in the Amended ORAD for this project, MassDOT is not subject to local bylaws. The following summary of impacts therefore quantifies impacts to resource areas jurisdictional to the Wetlands Protection Act (WPA). Summary tables of impacts by WPA resource area are provided in *Attachment 11*.

The project proposes the following impacts in the Town of Sudbury according to WPA Jurisdiction.

Bank

Impacts to bank are proposed totaling 485 LF with 149 LF of permanent impacts and 336 LF of temporary impacts.

The 149 LF permanent impacts to bank include:

- 101 LF of impact to occur from culvert renovation and reconstruction pursuant to 310 CMR 10.54(4)(b) at an unnamed tributary to Hop Brook.
- 17LF of impact at Pantry Brook where rip-rap is proposed for scour protection at the limit of bank as part of the proposed bridge replacement. The rip-rap is proposed to be transitioned to modified rock fill with compost cover to allow for enhanced wildlife passage beneath the proposed bridge.
- 25 LF at an unnamed intermittent stream near the Morse Rd crossing with the path, BF#23-300 series and BF#23-200 series, the impact is from grading of earth from the proposed trail shoulder back to existing ground elevation which will encroach upon the existing bank line. A new bank will be established by the proposed grading.
- 6LF of impact to occur from culvert renovation and reconstruction pursuant to 310 CMR 10.54(4)(b) an unnamed intermittent stream, BF#15-6 series.

Permanent impacts to bank have been minimized wherever possible by steepening grading slopes, narrowing proposed trail shoulders, and minimizing work areas on the bank during culvert repair or replacement.

Temporary impacts to bank are proposed to occur from erosion control measures located on bank and for proposed temporary work areas at the Hop Brook and Pantry Brook bridge abutments. The contractor will be required to return all temporarily impacted bank prior condition.

BVW

Impacts to bordering vegetative wetland (BVW) are proposed totaling 2,710 SF with 1,190 SF of permanent impact and 1,520 SF of temporary impact.

The 1,190 SF of permanent impacts to BVW include:

- 1,100 SF of impact to occur at section of the proposed trail where existing BVW most closely parallels the proposed path. This section of the proposed path, between plan stations 293+00 and 305+00, incurs permanent impacts due to the construction of the shared-use path and path shoulders encroaching on BVW. The path shoulder design was narrowed to the greatest extent possible to minimize impacts in this section. The

impacted resource areas included the WF#6-100 series and WF#7-100 series.

- 85 SF of impact to occur at the proposed reconstruction of the Pantry Brook Bridge. These impacts occur surrounding the proposed footings of the renovated bridge structure which encroach surrounding BVW at the minimum extent practicable.
- 5 SF of impact at resource area WF#36-200 near station 105+10 due to embankment grading encroachment on BVW adjacent to the proposed path at the minimum extent practicable.

Temporary impacts to BVW are proposed to occur primarily in the form of erosion controls placed on BVW boundaries for the purpose of allowing embankment grading up to the limit of BVW. The contractor will be required to return temporarily impacted BVW to prior condition.

LUW

Impacts to land under water (LUW) are proposed totaling 1,821 SF with 474 SF of permanent impacts and 1,347 SF of temporary impacts.

The 474 SF of permanent impacts to LUW include:

- 404 SF of impact to LUW due to the renovation and reconstruction of a collapsed culvert near station 167+20 where an intermittent stream has washed through the existing rail embankment. The culvert is located on an unnamed tributary to Hop Brook, designated as an intermittent stream and Cold Water Fishery. The proposed culvert will consist of a buried pipe with a natural stream bottom in keeping with Massachusetts Stream Crossing Standards
- 25 SF of impact due to renovation and reconstruction of a culvert near the proposed parking area at Broadacres Farm, just north of Morse Rd. The impacted stream is unnamed, intermittent and designated by the BF#23-300 series
- 25 SF of impact due to the embankment grading from the path shoulder near the proposed parking area at Broadacres Farm, just north of Morse Rd. Grading slopes from the path shoulder were made as steep as practicable, however this impact could not be avoided. The impacted stream is unnamed, intermittent and designated by the BF#23-200 series

Temporary impacts to LUW are proposed to occur at work areas for bridge abutment work and culvert work. At the Pantry Brook bridge for example, where redirection of water measures are needed to ensure that water does not enter the poured concrete footings of the proposed new bridge. The contractor will be required to return temporarily impacted LUW within work areas to previous condition.

Vernal Pools

No direct impacts to WPA certified or eligible vernal pools or habitat areas are proposed.

Impacts within 100 feet of a certified or eligible vernal pools total 22,076 SF with 14,545 SF of permanent impacts and 7,531 SF of temporary impacts. All of the proposed permanent impacts within 100 feet of a certified or eligible vernal pool occur in previously developed areas of the rail ROW within the area of existing rail ballast. Impacts within 100ft of eligible vernal pools occur near Vernal Pools 4 and 11, as defined in the amended ORAD of *Attachment 10*. The temporary impacts within 100 feet of eligible vernal pools will be replanted with loam and native seed.

100ft Buffer Zone

Impacts to the 100ft Buffer Zone of BVW total 427,270 SF with 254,639 SF of permanent and 172,631 SF of temporary impact. A majority of the proposed permanent impacts within the 100ft Buffer Zone occur in previously developed areas of the rail ROW within the area of existing rail

ballast.

The project contains extensive proposed tree plantings of native species within the impacted 100ft Buffer Zone lining the proposed trail. Loam and native seed will be planted at all temporary impacts to 100ft Buffer Zone.

Three areas where permanent impacts to the 100ft Buffer Zone to BVW occur outside of the previously developed rail ROW but within previously disturbed areas include:

- 9,177 SF of proposed permanent impact within the 100 foot Buffer Zone for the construction of a parking lot surface at the former Broadacres Farm Site just north of Morse Rd in previously disturbed pasture area. The impervious parking surface will shed storm drainage to two adjacent earthen infiltration basins. The parking area is proposed to make the trail accessible to all users.
- 4,386 SF of proposed permanent impact within the 100 foot Buffer Zone for the construction of a 8-foot-wide connecting shared-use path from the BFRT to the existing Davis Field parking area. The proposed connector path is located in a previously developed area containing an existing sidewalk and the lawn covered embankment of North Rd.
- The proposed wetland replication area is located within the 100 foot Buffer Zone area of an existing pond within previously disturbed pasture area. The proposed wetland replication area will improve the existing condition of the 100 foot Buffer Area with native wetland plantings and seeding.

Riverfront Area

Impacts to riverfront front area (RFA) total 109,626 SF, with 65,857 SF of permanent and 43,769 SF of temporary impacts.

The permanent RFA impacts result from the construction of the impervious shared-use path surface and crushed stone shoulders, however the proposed path with shoulders is located on top of a previously developed and degraded RFA surface of ballast stone, rail ties, and steel rails as defined by 310 CMR 10.58(5). Furthermore, the proposed condition will improve upon the existing by eliminating the vertical protrusion of the rails. The surface of the trail will allow wildlife such as turtles or small invertebrates to more easily cross the RFA. Extensive native vegetative plantings are proposed in the RFA lining the proposed trail including native tree species and seed.

The individual affected riverfront areas are as follows:

The Hop Brook bank series BF#32 creates two RFAs in the project area.

The first Hop Brook RFA encompasses STA 121+35 to STA 134+13 in the plans. Within this RFA there is 19,384 SF of permanent impacts caused by the construction of the impervious trail surface and crushed stone shoulder and 8,682 SF of temporary impacts consisting of loam & native seed to existing ground. Cleaning of the existing abutments will result in 441 SF of temporary impacts. Native trees plantings are proposed in the temporary impact area.

The second Hop Brook RFA encompasses STA 157+91 to STA 164+89. Within this RFA there is 10,577 SF of permanent impacts caused by the construction of the impervious trail surface and crushed stone shoulder and 5,218 SF of temporary impacts consisting of loam & native seed to existing ground. Native trees plantings are proposed in the temporary impact area.

The Pantry Brook RFA is measured from flag series PS1-1 and PS1-1A and encompasses STA 254+79 to STA 266+53. Within this RFA there is 16,791 SF of permanent impacts caused by the construction of the impervious trail surface and crushed stone shoulder and 17,571 SF of

temporary impacts consisting of loam & native seed to existing ground. The proposed bridge renovation at Pantry Brook will result in an additional 1,412 SF of permanent impacts and 179 SF of temporary impacts. Native tree plantings are proposed in the temporary impact area.

The unnamed tributary to Pantry Brook RFA is measured from the BF#12 flag series, it encompasses STA 268+64 to STA 275+39. Within this RFA there is 9,867 SF of permanent impacts caused by the construction of the impervious trail surface and crushed stone shoulder and 6,951 SF of temporary impacts consisting of loam & native seed to existing ground. Native trees plantings are proposed in the temporary impact area.

The unnamed tributary to Cold Brook RFA is measured from the BF#3 flag series, it encompasses STA 311+33 to STA 316+40. Within this RFA there is 7,826 SF of permanent impacts caused by the construction of the impervious trail surface and crushed stone shoulder and 4,727 SF of temporary impacts consisting of loam & native seed to existing ground. Native trees plantings are proposed within the temporary impact area.

Bordering Land Subject to Flooding

The project contains the following Bordering Land Subject to Flooding (BLSF) areas and impacts.

Hop Brook, 100-yr base flood elevation (BFE) of 138.0 ft on both sides of the trail

- The project proposes a 325 SF area of fill on the west side of the trail between elevations 138.0 ft and 137.0 ft. The fill is loam & seed covered earthwork. The proposed fill has a volume of 0.63 CY. Compensatory storage equaling the proposed fill is proposed at the same elevation within the same BLSF area.

Mineway Brook, 100-yr base flood elevation BFE of 171.9 ft on the west side of the trail
There are no impacts to this BLSF area.

Mineway Brook, 100-yr base flood elevation BFE of 174.3 ft on the east side of the trail

- The project proposes a 469 SF total area of fill on the east side of the trail between elevations 174.3 ft and 173.3 ft. The fill is loam & seed covered earthwork. The proposed fill has a volume of 2.37 CY. Compensatory storage equaling the proposed fill is proposed at the same elevation within the same BLSF area.

Pantry Brook, 100-yr base flood elevation BFE of 123.7ft on both sides of the trail

- The project proposes a 1,152 SF total area of cut on the landward sides of the Pantry Brook banks beneath the existing rail embankment. The cut is proposed as part of the bridge renovation and reconstruction and totals a net cut of 78.4CY below BLSF between elevation 123.7 ft and elevation 119.7 ft. The volume of cut earth is proposed to be removed behind or landward of the existing bridge abutments. A hydraulic analysis and no rise flood analysis was performed as part of the Pantry Brook Bridge Design.

There are two areas of Zone A BLSF (No BFE) within the project site near STA 272+60 west side, and STA 284+55 east side. There are no impacts to the Zone A BLSF areas.

Tributary to Cold Brook, 100-yr base flood elevation BFE 139.1ft on the east side of the trail and BFE 140.7 on the west side of the trail. There are no impacts to this BLSF area.

Stormwater

The project in total proposes to add 5.99 acres of new impervious area and remove 0.024 acres of impervious area, resulting in a net difference of 5.97 acres of impervious area. Stormwater

within the project area discharges to Hop Brook and Pantry Brook. Hop Brook is a Category 5 water body impaired by excess algal growth, phosphorus, and dissolved oxygen saturation. Pantry brook is a Category 5 water body impaired by fecal coliform.

The project within the rail ROW qualifies as a redevelopment project pursuant to the Massachusetts Department of Environmental Protection (MassDEP) 2008 Stormwater Handbook. As such, the redevelopment status requires the project to meet DEP Stormwater Standards 2 through 6 to the maximum extent practicable.

Within the rail ROW, existing sheet-flow drainage patterns will be maintained. Repaired culverts will be cleared of blocking debris and headwall repairs will be performed. New 1-foot-wide grass infiltration swales are proposed at trail shoulders where existing wetlands are absent totaling 3,395 LF of new infiltration swale.

Four failing culverts are proposed to be replaced:

A new 48" buried pipe with natural bottom is proposed at plan station 167+20. This culvert will replace a collapsed box culvert which caused an intermittent stream to wash out the rail embankment. The stream is an unnamed tributary to Hop Brook designated as the BF#30 series.

A new 15" reinforced concrete pipe (RCP) culvert with MassDOT standard headwall is proposed to replace the existing failing 12" corrugated metal culvert at plan station 216+50. The stream is an unnamed intermittent stream designated as BF#23 series.

A new 15" RCP culvert with MassDOT standard headwall is proposed to replace the existing failing 12" Clay culvert at plan station 301+50. The stream is an unnamed intermittent stream designated as BF#15-6 and BF#15-7 series.

A new 15" RCP culvert with MassDOT standard headwall is proposed to replace the existing failing 12" Clay culvert at plan station 306+63. The stream is an unnamed intermittent stream designated as BF#5-200 and BF#6-100 series.

A new 12" RCP is proposed to be placed at plan station 257+50 for the conveyance of drainage from a new proposed grass swale along the trailside, this culvert will not convey the waters of a stream.

Hudson Rd is proposed to gain 0.02 acres of impervious area from widening less than the width of 1 lane. Two new catch basins and one replaced catch basin at the corner of Hudson Rd and Peakham Rd are proposed to improve the drainage and stormwater treatment at this location.

The Parkinson Parcel is proposed to gain 0.06 acres of impervious area from a proposed 268ft long and 10ft wide shared-use path connection from the BFRT path to the existing parking area. The path will convey drainage by sheet flow for infiltration into the surrounding grass field.

The proposed Morse Rd parking area at Broadacres Farm will add 0.36 acres of impervious area to the existing grass field. Earthen infiltration basins have been designed adjacent to the parking area to meet the Stormwater Standards, as well as the more stringent local Bylaw.

The proposed 8ft wide shared-use path connection along North Rd from the BFRT path to the Davis field parking area will result in a net gain of 0.05 acres of impervious area over the existing sidewalk. The path will drain by sheet flow onto a grass covered embankment area on the south side of North Rd.

Environmental Justice Populations

The project site is not within 1-mile of an Environmental Justice (EJ) Population and therefore will not harm an EJ population. The project is not anticipated to harm air quality as a non-motorized shared-use path project, therefore EJ populations within 5 miles will not be harmed. A map of the project site and surrounding EJ population areas was generated from the Executive Office of Energy Affairs (EEA) EJ mapping tool and is included in *Attachment 4*.

Alternatives Analysis:

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

The purpose of this project is to provide a safe non-motorized, ADA-and emergency vehicle-accessible, shared-use path through the Town of Sudbury which will serve as a historical, recreational, and alternative transportation resource for residents and visitors of all ages and abilities. The design of the rail trail seeks to maximize the benefits of such trails for the community and public at large while minimizing its impacts to Sudbury residents and the natural environment.

The alignment of Phase 2D is centered on the existing rail ballast for the purpose of utilizing previously altered land. This project presents an opportunity to provide continuity to the constructed and proposed phases of the BFRT while incorporating a resource sensitive design.

Cross Section Design

Trail surface and width were selected to be nearly consistent with other sections of the BFRT. While the shared-use path is proposed to be surfaced with hot mix asphalt, the shoulders have been designed as dense grade crushed stone with native grass buffers. The pavement width is proposed to be 10ft wide, the minimum standard width per MassDOT design guidelines for a bi-directional shared-use trail. Sections of the BFRT in other Towns are 12-footwide, but the abundance of wetland resources adjacent to the Sudbury railroad embankment resulted in the proposal of a 10ft wide path for The Project.

The dense graded crushed stone shoulder varies from 1ft wide to 3ft wide depending on the condition of the slopes and resources adjacent to the path. Adjacent to wetlands, shoulders were narrowed to 1ft to avoid impacts to wetland resources, which reduced the impacts to BVW by approximately 2,500 square feet overall. The shoulders not only provide for user safety but facilitate drainage sheet flow to the adjacent grass buffers and slopes, slowing the water flow and enhancing infiltration. Sections of the path with a 3ft wide shoulder design contain a timber guardrail for safety and to discourage off-trail use in nearby sensitive environmental areas. Where proposed, the guardrail necessitates the wider 3ft shoulder for bicycle clear-zone safety.

Alternatives for Shared-use Path Alignment

The preferred alternative to align the path along the already disturbed railroad corridor on the existing railroad ballast avoids impacts to many resources while new construction would in general have more significant environmental and ROW acquisition consequences for previously unaltered areas. Alternative roadway-associated alignments outside of the railroad corridor were evaluated at the major stream crossing locations to potentially avoid impacts to the Riverfront Areas.

Selected Alternative: Rail Trail along the Lowell Secondary Railroad Line

The need for a shared-use path has been identified by the Town of Sudbury community and region to offer safe off-road recreational and non-vehicular travel. Such paths improve healthy

transportation options and reduce roadway congestion and greenhouse gas emissions. The BFRT proposes to convert previously disturbed land into a recreational and healthy transportation facility that can also be used as a shared-use path corridor for continuous non-motorized commuter travel between municipalities.

The preferred alternative was selected because it avoids, minimizes, and mitigates impacts to the environment and other resources while achieving the purpose of The Project. The existing rail ballast provides an ideal foundation for minimizing disturbance of unaltered wetland areas and utilizes an existing continuous ROW owned by MassDOT.

Alternative B: On-Road Project Location

On-road non-motorized multi-use passive recreational trails were examined but were found not feasible while simultaneously ensuring public safety with motorized traffic. This alternative did not realize the benefit of using existing railroad ROW to create a continuous regional shared-use path. Additionally, this alternative would require significant roadside land easements or purchases and the widening of existing roadway impervious area along with the associated environmental impacts. Standard on-road bike lanes are 5ft wide for each direction of travel. For these reasons, this alternative was dismissed.

Alternative C: Adjacent to Roadway

Alternative partially on-road alignments utilizing a combination of the existing railroad ROW and nearby roadway layouts were considered, but ultimately proved not feasible. Potential avoidance of the two main riverfront areas along the railroad ROW was considered. To avoid the railroad bed crossings of Pantry Brook and Hop Brook, a design of shared-use paths adjacent to roadway alternative was considered, an illustration is included in *Attachment 9*.

In order to avoid the railroad ROW crossing of Hop Brook, an alternative of a shared-use path adjacent to the roadways from Old Lancaster Road to Union Avenue to The Project terminus (Option 1) near Station Road and a variation on this utilizing adjacent conservation land (Option 3) was considered.

To avoid the use of the railroad bed crossing of Pantry Brook, an alternative of a shared-use path adjacent to the roadways from Haynes Road to Concord Road to Morse Road (Option 2) was considered.

These adjacent to road non-motorized shared-use paths were examined but were ultimately not feasible, as they would require significant land easements or purchases along with environmental impacts from the newly developed areas. Options 1-3 do not have the benefit of using existing and previously developed railroad ROW to create a continuous regional shared-use path.

Additionally, at the roadway crossings of Pantry Brook and Hop Brook, new bridges or extensions of existing bridges would be required which would result in additional wetland and waterway impacts. There are numerous wetlands adjacent to the roadways that would be impacted if they were widened for adjacent shared-use paths, which commonly have a pavement width of 10-12ft.

Finally, avoiding the restoration of Pantry Brook Bridge on the railroad ROW would avoid minor wetland impacts there, but retaining the failed bridge and abutments collapsing into the stream would not be a desired outcome for the environmental integrity of the stream or human safety. For these reasons, the alternatives considering shared-use paths adjacent to roadways were dismissed.

Alternative D: No Build Scenario

The no-build scenario does not fulfill the overall project purpose of constructing a shared-use

recreational trail to provide safe pedestrian and bicycle facilities. It also doesn't allow for the rehabilitation of the dilapidated structures and redevelopment and restoration of previously developed impacts. There are no existing facilities that may be designated to meet The Project purpose.

Alternatives for Wetlands Area, plan stations 293+00 to 305+00, south of North Road (Route 117)

This section of the rail embankment is approximately 1,200 linear feet constrained by wetland resource areas and more limited railroad embankment than other sections of the corridor. It was identified by the Town prior to the 25 percent design and alternative treatments to avoid and minimize impacts along this section were considered.

Alternatives included reduced path width, reduced shoulder width, and retaining walls. The Americans with Disabilities Act (ADA) and emergency vehicle-accessible path requires the 10-ft-wide trail cross section. It is proposed that the shoulder width will be reduced to 1-foot in this section to avoid additional wetland resource area impacts. The slimmed shoulder reduced the BVW impacts by approximately 2,500 square feet in this area.

While retaining walls were considered in this section and proposed at the 25 percent design stage to avoid and minimize wetland impacts, they are no longer proposed as it was determined that: 1) permanent impacts are largely reduced with the 1-foot shoulder at grade option, 2) temporary impacts are largely equivalent whether the 1-foot shoulder or retaining walls are proposed, and 3) avoiding any change in grade associated with short retaining walls was desirable from a movement of wildlife and habitat perspective, and 4) the drainage swales along the slightly elevated rail in this section are not high-quality wetlands, but remnants of the creation of the railroad embankments.

In summary, to avoid and minimize impacts and still achieve the goals of The Project, in this challenge area, it is proposed the path will be 10ft wide, the shoulder will be reduced to 1ft wide and there will be no retaining walls used. Other alternative treatments, such as the retaining walls or a reduced width path, were dismissed as they didn't meet project goals or sufficiently reduce wetland impacts.

Bridge Alternatives

For the crossing at Pantry Brook, the existing bridge has failed with the abutments collapsing in the stream. Full replacement is proposed, and bridge type options were evaluated. The proposal for the bridge at Pantry Brook involves retaining the existing abutments at a reduced height and constructing a new structure with a precast concrete arch structure supported on shallow footings inland of the existing abutment.

Pantry Brook Crossing (Bridge S-31-013)

A Pantry Brook Bridge study was completed to MassDOT standards and resulted in two final alternatives being considered: Alternative 1, a precast concrete buried arch and Alternative 2, Steel deck girders with a timber deck. Considerations for structure selection included environmental impacts, constructability, aesthetics, structure depths, bike ride quality, and estimated cost and maintenance. The two alternatives are anticipated to have similar impacts to land under water and bank. Alternative 2 would require larger equipment to deliver and erect the longer steel beams and more clearing to create access for this equipment. Both alternatives satisfy hydraulic requirements and provide wildlife crossing accommodations below the trail. Based on these factors, Alternative 1 – precast concrete buried arch is the selected alternative for final design.

Hop Brook Crossing (Bridge S-31-007)

With the abutments and wing walls at the Hop Brook crossing of the trail remaining in place and

being restored, permanent impacts to the stream and associated wetland resources are avoided. Alternatives for the superstructure at Hop Brook were evaluated to MassDOT standards and generally included two final options: retaining the existing steel girders with new beams and decking or replacing the existing steel girders with lower profile steel girders and new beams and decking. It was determined that reuse of the steel girders will result in a path profile change once the new decking is put in place and potential modifications to the wing walls, which are not desirable as they would result in environmental impacts, which are otherwise avoided. New steel girders with a lower profile and avoidance of environmental impacts are proposed.

Alternatives Summary

The Bruce Freeman Rail Trail project offers an opportunity to convert an unused railroad corridor into a passive, 4.4-mile-long multimodal transportation and recreational trail in Sudbury, while providing a continuous 25-mile alternative transportation corridor. The selected alternatives for this phase avoid, minimize and mitigate impacts while achieving the goals of the project.

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:

Setting

The need for facilities to promote non-motorized modes of transportation has been identified by the Town and by MassDOT, which the proposed project provides. Phase 2D of the BFRT proposes to redevelop previously disturbed land into a multimodal path with a context sensitive design. The setting of abandoned rail lines avoids and minimizes impact to non-disturbed land to the maximum extent practical. This project also conserves financial resources by reusing an inactive rail ROW.

Wetlands

Impacts to wetlands in the rail ROW are proposed to be minimized by narrowing the path shoulders to 1-foot at several critical segments of the trail. This reduced trailside wetland impacts significantly by reducing the grading slopes.

Wildlife

Earlier alternatives proposed a segment of the path to be raised by a retaining wall. The proposed alternative does not use retaining walls in this way, and as a result will provide small wildlife with a better design to cross the trail without a vertical obstruction. Wildlife crossing at Pantry Brook will be improved due to the design of the lowered existing bridge abutments to be left in place under the proposed new superstructure. The lowered bridge abutments may be used as a walkway for wildlife to pass beneath the renovated bridge.

Wetland Impact Mitigation

A wetland mitigation area is proposed for the Town property adjacent to the BFRT to the south of Morse Rd, located on the former Broadacres Farm property. The replication site is former pastureland with an existing pond and adjacent to existing BVW. The proposed wetland mitigation area would create a replicated BVW area adjacent to an existing BVW. Details of the proposed mitigation area are provided in the proposed plans set sheet Wetland Replication Plan in *Attachment 5*. The permanent BVW impacts of the project totaled 1,190 SF. The proposed mitigation area can comfortably accommodate an area equal to project impact area or larger.

Although MassDOT is not subject to Town of Sudbury Bylaw, MassDOT has agreed to provide

additional mitigation equal to 1.5 times the sum of the WPA jurisdictional BVW permanent impacts and the Town Bylaw jurisdictional BVW permanent impacts. Under Town Bylaw, there would be an additional 859 SF of permanent BVW impact. In total, the proposed wetland mitigation area is therefore proposed to be an area of 3,074 SF $((1,190 \text{ SF} + 859 \text{ SF}) * 1.5)$.

If the project is proposed to be constructed in phases, please describe each phase:

The project is proposed to be constructed in a single phase beginning in the Fall of 2022 to be completed by Spring 2025.

Best management practices for erosion and sedimentation control will be required for all phases of construction to minimize potential impacts to wetland resource areas and receiving waterbodies. Compost filter tubes with silt fences will be used to reduce migration of sediments, and all slopes will be stabilized with loam and seed. Erosion and sedimentation controls will be installed and maintained as indicated on the proposed construction plans. Use of clean machinery at project limits to avoid introduction of invasive species will be required with avoidance of machinery refueling in buffer zones. MassDOT inspectors will assess conditions and identify problems in the field during and after construction activities.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:

Is the project within or adjacent to an Area of Critical Environmental Concern?

- Yes (Specify _____)
- No

if yes, does the ACEC have an approved Resource Management Plan? ___ Yes **_X_ No**;
If yes, describe how the project complies with this plan.

Will there be stormwater runoff or discharge to the designated ACEC? ___ Yes **_X_ No**;
If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.

RARE SPECIES:

Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species? (see http://www.mass.gov/dfwele/dfw/nhosp/regulatory_review/priority_habitat/priority_habitat_home.htm)
 Yes (Specify _____) No

HISTORICAL /ARCHAEOLOGICAL RESOURCES:

Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

Yes (Specify: **Old Sudbury Historic District and Maenpaa Farm - Haynes Farm - Broadacres Farm are both adjacent to the project limits and are identified as state historical resources**) No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources? Yes (Specify _____) No

WATER RESOURCES:

Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site?
X Yes ___ No;

if yes, identify the ORW and its location. **There are vernal pools eligible to be certified within 1/2 mile of the project from plan station 208+11 to plan station 213+29 and from plan station 285+10 to plan station 290+10. There is a certified vernal pool within 1/2 mile of the project at plan station 209+30** _____

(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)

Are there any impaired water bodies on or within a half-mile radius of the project site? **_X_ Yes** ___ No; if yes, identify the water body and pollutant(s) causing the impairment: **Hop Brook, impaired by non-native aquatic plants, aquatic plants (Macrophytes), E. Coli, and Turbidity. Pantry Brook, impaired by Fecal Coliform.**

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission? **_X_ Yes** ___ No

STORMWATER MANAGEMENT:

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations: **The project proposes to increase impervious area by 5.97 acres from the total area of shared-use paths and proposed parking area. Stormwater from the proposed project discharges to Hop Brook and Pantry Brook. Neither Hop Brook or Pantry Brook have a Total Daily Maximum Load (TDML). Per DEP Stormwater Management Standards, the portion of the project within the rail ROW (5.48 acres of impervious area) is considered a redevelopment project and therefore must comply with Stormwater Management Standards 2-6 to the maximum extent practicable. The project proposes**

to remove debris from existing culvert headwalls and repair failing culverts on-site. Furthermore more than 3,000 linear feet of new grass drainage swales are proposed. The portion of the project outside of the rail ROW proposes to meet the Sudbury Town Stormwater Standards by including infiltration basins at the proposed Morse Rd parking lot designed per the standards. Erosion and sediment controls will be used during construction.

The following is a description of how the proposed project conforms to the Standards outlined in the Stormwater Handbook to the maximum extent practicable:

Standard 1: No Untreated Discharge or Erosion to Wetlands

Perimeter erosion controls will be installed during construction to protect resource areas from sedimentation until construction is completed and the site is stabilized.

There are no new untreated conveyances proposed. Proposed conveyances have been designed to ensure no erosion will occur to existing resource areas. At the new parking lot at Broadacre farms, Post-construction stormwater flows and water quality will be managed by two (2) new bioretention basins which ultimately discharge into the existing drainage swales along the railroad right-of-way, mimicking existing drainage patterns at the site.

Standard 2: Peak Rate Attenuation

Post-development discharge rates will be maintained or reduced in post-development conditions. Mitigation of post-development peak runoff flows are achieved through stormwater storage provided by the two (2) proposed bioretention basins at Broadacre Farms

Standard 3: Stormwater Recharge

For new development at Broadacre farms, due to relatively high groundwater elevations at the site, the proposed design has not accounted for on-site groundwater recharge, although given the presence of HSG type A soils within the project area, it is presumed that some groundwater recharge takes place in both existing and post-construction conditions. Each of the bioretention basins have been designed to drawdown within 72 hours.

Standard 4: Water Quality

Water quality treatment and removal of suspended solids will be provided by the new bioretention basins with pretreatment forebays at Broadacre Farms parking Lot. For the Bruce Freeman Rail Trail, water quality treatment and removal of suspended solids will be via overland flow to the existing swales and within the existing swales.

Standard 5: Land Uses with Higher Potential Pollutant Loads

This project does not include areas which would be classified as having higher potential pollutant loading as the proposed parking area will have low intensity use and as the trail is anticipated to see 275 users per day.

Standard 6: Critical Areas

This project does not contain any critical areas as defined by the Massachusetts Stormwater Handbook.

Standard 7: Redevelopment

The proposed project is not considered a redevelopment project per the Stormwater Handbook.

Standard 8: Construction Period Controls

It is anticipated that there will be no proposed pollution created during the construction of the proposed development. General erosion and sedimentation controls will be implemented and maintained in accordance with local, state, and federal requirements until construction is complete and disturbed areas have been stabilized.

Prior to the start of construction the Contractor will be required to obtain coverage under the NPDES Construction General Permit and prepare a formal SWPPP, further specifying the details of construction phasing, limits of soil disturbance, erosion and sediment controls and other stabilization measures, stockpile locations, construction waste management procedures, and hazardous materials storage procedures during construction activities.

Standard 9: Operation and Maintenance Plan

A suggested Construction Operation and Maintenance (O&M) Plan has been developed for the development of the site. The contractor shall be responsible for construction operation and maintenance of the site.

A suggested Long Term O&M Plan, which includes recommended maintenance activities and schedule of maintenance as outlined within the Stormwater Handbook, is also provided for the Contractor as part of the design specifications. The Town of Sudbury will be responsible for long term operation and maintenance of the site.

Standard 10: Illicit Discharge to Drainage System

The project does not include any proposed illicit discharges to Stormwater Management Systems as defined in the Stormwater Handbook.

MASSACHUSETTS CONTINGENCY PLAN:

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes ___ No **X**; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response Action Outcome classification): _____

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes ___ No **X**; if yes, describe which portion of the site and how the project will be consistent with the AUL:

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN? Yes ___ No **X**; if yes, please describe: _____

SOLID AND HAZARDOUS WASTE:

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood: **MassDOT adopted its GreenDOT Policy Directive on June 2, 2010, with the primary goal to Reduce greenhouse gas emissions; promote the healthy transportation options of walking, bicycling, and public transit; and to support smart growth development. As part of that policy Sustainable Design and Construction Best Practices, MassDOT currently uses a range of recycled materials in pavement, including recycled asphalt pavement, recycled tires, and shingles, as well as warm mix asphalt. MassDOT is working to increase the use of environmentally-friendly technologies, and continues to conduct research so that it can maximize use of recycled materials and warm-mix asphalt paving.**

(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)

Will your project disturb asbestos containing materials? Yes ___ No **X**; if yes, please consult state asbestos requirements at <http://mass.gov/MassDEP/air/asbhom01.htm>

Describe anti-idling and other measures to limit emissions from construction equipment:

As stated in MassDOT's GreenDOT Policy Directive, MassDOT requires that contractors install emission control devices in all off-road vehicles. MassDOT's Revised Diesel Retrofit Specification states emissions control standards must be met or technology must be used for non-road, diesel powered construction equipment in excess of 50 horsepower on MassDOT job sites. As a result, private construction companies have retrofitted over 800 vehicles. Potential air quality impacts from diesel exhausts will be addressed by requiring the proper operation and maintenance of construction equipment, and prohibition of excessive idling of engines following Massachusetts General Law (MGL), Chapter 90, Section 16A, 310 Code of Massachusetts Regulation (CMR),

Section 7.11 and MGL, Chapter 111, Sections 142A – 142M, which limit the idling of motor vehicles to 5 minutes.

DESIGNATED WILD AND SCENIC RIVER:

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? Yes ___ **No** **X** ___ ;
if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the “outstandingly remarkable” resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River?

Yes ___ **No** **X** ___ ; if yes, specify name of river and designation: _____;

if yes, will the project will result in any impacts to any of the designated “outstandingly remarkable” resources of the Wild and Scenic River or the stated purposes of a Scenic River.

Yes ___ **No** **X** ___ ;

if yes, describe the potential impacts to one or more of the “outstandingly remarkable” resources or stated purposes and mitigation measures proposed.

ATTACHMENTS:

Attachment 1: List of all attachments

Attachment 2: U.S.G.S. Topographic Locus Map (good quality color copy, 8-½ x 11 inches or larger, at a scale of 1:24,000) indicating the project location and boundaries

Attachment 3: Existing conditions plan set

Attachment 4: Existing environmental constraints

Attachment 5: Proposed conditions plan set

Attachment 6: List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2)

Attachment 7: List of municipal and federal permits and reviews required by the project, as applicable

Attachment 8: RMA Climate Resistance Design Standards Tool Report

Attachment 9: Alternatives Analysis Documentation

Attachment 10: Amended Order of Resource Area Delineation (ORAD)

Attachment 11: Environmental Impact Summary Tables

Attachment 12: Broadacres Farm Parking Area Stormwater Report

LAND SECTION – all proponents must fill out this section

I. Thresholds / Permits

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1)) **X** Yes ___ No; if yes, specify each threshold:

This project will result in the creation of more than 5 acres of impervious area surpassing the threshold of 301CMR 11.03(1)(b)(2).

II. Impacts and Permits

A. Describe, in acres, the current and proposed character of the project site, as follows:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Footprint of buildings	<u>0</u>	<u>0.02</u>	<u>0.02</u>
Internal roadways	<u>0</u>	<u>0</u>	<u>0</u>
Parking and other paved areas	<u>0.43</u>	<u>5.97</u>	<u>6.40</u>
Other altered areas	<u>0</u>	<u>8.38</u>	<u>8.38</u>
Undeveloped areas	<u>37.10</u>	<u>-14.35</u>	<u>22.75</u>
Total: Project Site Acreage	<u>37.53</u>	<u>0</u>	<u>37.53</u>

B. Has any part of the project site been in active agricultural use in the last five years? ___ Yes **X** No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use? ___ Yes **X** No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? ___ Yes **X** No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction? ___ Yes **X** No; if yes, does the project involve the release or modification of such restriction? ___ Yes **X** No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? ___ Yes **X** No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes ___ No **X**; if yes, describe:

III. Consistency

A. Identify the current municipal comprehensive land use plan
Title: Sudbury Master Plan linked ___ Date 2/19/2021

B. Describe the project's consistency with that plan with regard to:

1) economic development One of Sudbury's goals for economic development is to "support development" that "offers opportunities to access desired retail, services, and other amenities within Sudbury". The proposed rail trail will create a more complete network for bicycles and pedestrians to access local businesses especially near

Sudbury Town Center.

2) adequacy of infrastructure _ **A transportation infrastructure goal in the Master Plan is to “create a safe network of walking, biking, and public transportation options to get people out of their cars to travel around Sudbury”. The proposed rail trail will create a safe place for bicycle users to ride.**

3) open space impacts __ **One of Sudbury’s goals outlined in the 2021 Master Plan is to “Preserve, protect, and develop the historical and cultural assets of Sudbury to foster appreciation of the Town’s heritage for enjoyment today and by future generations.” The proposed rail trail helps highlight the old railroad and uses interpretive signage to inform people of all ages.**

4) compatibility with adjacent land uses_ **The proposed shared-use path will better connect pedestrians and cyclists to Sudbury Town Center, Broadacres Farms, recreational facilities, local schools, and the other phases of the Bruce Freeman Rail Trail.**

C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA) Boston Region Metropolitan Planning Organization (CTPS)

Title: [Destination 2040](#)

Date: August 2019

D. Describe the project’s consistency with that plan with regard to:

1) economic development _ **The Destination 2040 Plan includes the goal to “Minimize burden of housing/transportation costs for residents in the region” The proposed trail is free for users and provides access to Sudbury Town Center.**

2) adequacy of infrastructure _ **The proposed project will enhance adequacy of infrastructure in the Boston Region by providing bicycle and pedestrian accommodations that are in compliance with current MassDOT design and safety standards.**

3) open space impacts _ **A goal of the Destination 2040 Plan is to support land development that will “create an environmentally friendly transportation system” and “reduce greenhouse gases.” The construction of this rail trail will promote transportation alternatives and create outdoor spaces for people to use.**

RARE SPECIES SECTION

I. Thresholds / Permits

- A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? ___ Yes **_X_ No**; if yes, specify, in quantitative terms:

(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)

- B. Does the project require any state permits related to **rare species or habitat**? ___ Yes **_X_ No**
- C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes **_X_ No**.
- D. If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

II. Impacts and Permits

- A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes ___ No. If yes,
1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? ___ Yes ___ No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? ___ Yes ___ No; if yes, attach the letter of determination to this submission.
 2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts
 3. Which rare species are known to occur within the Priority or Estimated Habitat?
 4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? ___ Yes ___ No
 4. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? ___ Yes ___ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? ___ Yes ___ No
- B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

WETLANDS, WATERWAYS, AND TIDELANDS SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? **Yes** ___ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**? **Yes** ___ No; if yes, specify which permit: **Order of Conditions, Determination of Applicability for Chapter 91 Waterways License**

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

II. Wetlands Impacts and Permits

A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)? **Yes** ___ No; if yes, has a Notice of Intent been filed? ___ Yes **No**; if yes, list the date and MassDEP file number: **TBD at filing**; if yes, has a local Order of Conditions been issued? **TBD at filing** Yes ___ No; Was the Order of Conditions appealed? ___ Yes ___ No. Will the project require a Variance from the Wetlands regulations? ___ Yes **No**.

B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site: **Within the rail ROW, the project proposes permanent and temporary impacts Bank, Riverfront Area, Land Under Water, & BWW resulting from the construction of the 10ft paved shared-use path and associated grading. Two bridges will be reconstructed over perennial streams, culverts will be replaced and repaired. An existing intersection will be reconstructed. Outside of the rail ROW, two shared-use path connections are proposed and one new parking area is proposed.**

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

<u>Coastal Wetlands</u>	<u>Area (square feet) or Length (linear feet)</u>	<u>Temporary or Permanent Impact?</u>
Land Under the Ocean	_____	_____
Designated Port Areas	_____	_____
Coastal Beaches	_____	_____
Coastal Dunes	_____	_____
Barrier Beaches	_____	_____
Coastal Banks	_____	_____
Rocky Intertidal Shores	_____	_____
Salt Marshes	_____	_____
Land Under Salt Ponds	_____	_____
Land Containing Shellfish	_____	_____
Fish Runs	_____	_____
Land Subject to Coastal Storm Flowage	_____	_____
 <u>Inland Wetlands</u>		
Bank (lf)	149 LF/ 336 LF ___	Perm/ Temp _____
Bordering Vegetated Wetlands	1,190 SF/ 1,520 SF ___	Perm/Temp _____
Isolated Vegetated Wetlands	N/A _____	N/A _____
Land under Water	474 SF/ 1,347 SF ___	Perm/Temp _____
Isolated Land Subject to Flooding	N/A _____	N/A _____
Bordering Land Subject to Flooding	1,946 SF (3CY fill)	Temp (comp. storage proposed) ___
Riverfront Area	64,676 SF/ 44,122 SF	Perm/Temp _____

D. Is any part of the project:

1. proposed as a **limited project**? ___ Yes **X** No; if yes, what is the area (in sf)? _____
2. the construction or alteration of a **dam**? ___ Yes **X** No; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? ___ Yes **X** No

Compensatory storage is proposed totaling 3CY where the project will result in fill below BLSF, resulting in no permanent fill condition. The compensatory storage is proposed in the same regulatory areas and elevations as the proposed fill. A no rise flood analysis was performed.

4. dredging or disposal of dredged material? ___ Yes **X** No; if yes, describe the volume of dredged material and the proposed disposal site:
5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**? ___ Yes **X** No
6. subject to a wetlands restriction order? ___ Yes **X** No; if yes, identify the area (in sf):
7. located in buffer zones? **X** Yes ___ No; if yes, how much (in sf) _____

E. Will the project:

1. be subject to a local wetlands ordinance or bylaw? ___ Yes **X** No
MassDOT has offered to provide wetland replication of local bylaw impacts (and WPA jurisdictional impacts) as a good faith measure at a ratio of 1.5x.
2. alter any federally-protected wetlands not regulated under state law? ___ Yes **X** No; if yes, what is the area (sf)?

III. Waterways and Tidelands Impacts and Permits

- A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? **X** Yes ___ No; if yes, is there a current Chapter 91 License or Permit affecting the project site? ___ Yes **X** No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands:
- B. Does the project require a new or modified license or permit under M.G.L.c.91? ___ Yes **X** No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use? Current ___ Change ___ Total ___
If yes, how many square feet of solid fill or pile-supported structures (in sf)?

C. For non-water-dependent use projects, indicate the following:

Area of filled tidelands on the site: N/A

Area of filled tidelands covered by buildings: N/A

For portions of site on filled tidelands, list ground floor uses and area of each use:

Does the project include new non-water-dependent uses located over flowed tidelands?

Yes ___ **No** **X**

Height of building on filled tidelands _____

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

D. Is the project located on landlocked tidelands? ___ Yes **X** No; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations? ___ Yes

No; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

F. Is the project non-water-dependent **and** located on landlocked tidelands **or** waterways or tidelands subject to the Waterways Act **and** subject to a mandatory EIR? Yes **No**;

(NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)

G. Does the project include dredging? Yes **No**; if yes, answer the following questions:

What type of dredging? Improvement Maintenance Both

What is the proposed dredge volume, in cubic yards (cys) _____

What is the proposed dredge footprint _____ length (ft) _____ width (ft) _____ depth (ft);

Will dredging impact the following resource areas?

Intertidal Yes No ; if yes, _____ sq ft

Outstanding Resource Waters Yes No ; if yes, _____ sq ft

Other resource area (i.e. shellfish beds, eel grass beds) Yes No ; if yes _____ sq ft

If yes to any of the above, have you evaluated appropriate and practicable steps to: 1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation?

If no to any of the above, what information or documentation was used to support this determination?

Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis.

Sediment Characterization

Existing gradation analysis results? Yes No; if yes, provide results.

Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? Yes No; if yes, provide results.

Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? If yes, check the appropriate option.

Beach Nourishment

Unconfined Ocean Disposal

Confined Disposal:

Confined Aquatic Disposal (CAD)

Confined Disposal Facility (CDF)

Landfill Reuse in accordance with COMM-97-001

Shoreline Placement

Upland Material Reuse

In-State landfill disposal

Out-of-state landfill disposal

(NOTE: This information is required for a 401 Water Quality Certification.)

IV. Consistency:

A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? Yes **No**; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:

B. Is the project located within an area subject to a Municipal Harbor Plan? Yes **No**; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Municipal or regional water supply	_____	_____	_____
Withdrawal from groundwater	_____	_____	_____
Withdrawal from surface water	_____	_____	_____
Interbasin transfer	_____	_____	_____

(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ___ Yes ___ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? ___ Yes ___ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results. _____

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? _____ Will the project require an increase in that withdrawal? ___ Yes ___ No; if yes, then how much of an increase (gpd)? _____

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? ___ Yes ___ No. If yes, describe existing and proposed water supply facilities at the project site:

	<u>Permitted Flow</u>	<u>Existing Avg Daily Flow</u>	<u>Project Flow</u>	<u>Total</u>
Capacity of water supply well(s) (gpd)	_____	_____	_____	_____
Capacity of water treatment plant (gpd)	_____	_____	_____	_____

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? ___ Yes ___ No
2. a Watershed Protection Act variance? ___ Yes ___ No; if yes, how many acres of alteration?
3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? ___ Yes ___ No

III. Consistency

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

WASTEWATER SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? ___ Yes **_X_ No**; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **wastewater**? ___ Yes **_X_ No**; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

II. Impacts and Permits

A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge of sanitary wastewater	_____	_____	_____
Discharge of industrial wastewater	_____	_____	_____
TOTAL	_____	_____	_____

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Discharge to groundwater	_____	_____	_____
Discharge to outstanding resource water	_____	_____	_____
Discharge to surface water	_____	_____	_____
Discharge to municipal or regional wastewater facility	_____	_____	_____
TOTAL	_____	_____	_____

B. Is the existing collection system at or near its capacity? ___ Yes ___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

C. Is the existing wastewater disposal facility at or near its permitted capacity? ___ Yes ___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? ___ Yes ___ No; if yes, describe as follows:

	<u>Permitted</u>	<u>Existing Avg Daily Flow</u>	<u>Project Flow</u>	<u>Total</u>
Wastewater treatment plant capacity (in gallons per day)	_____	_____	_____	_____

E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is

located.)

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district? ___ Yes ___ No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? ___ Yes ___ No; if yes, what is the capacity (tons per day):

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? ___ Yes ___ No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

TRANSPORTATION SECTION (TRAFFIC GENERATION)

I. Thresholds / Permit

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **state-controlled roadways**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

II. Traffic Impacts and Permits

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Number of parking spaces	_____	_____	_____
Number of vehicle trips per day	_____	_____	_____
ITE Land Use Code(s):	_____	_____	_____

B. What is the estimated average daily traffic on roadways serving the site?

	<u>Roadway</u>	<u>Existing</u>	<u>Change</u>	<u>Total</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____

C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement:

D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site?

E. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? ___ Yes ___ No; if yes, describe if and how will the project will participate in the TMA:

F. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? ___ Yes ___ No; if yes, generally describe:

G. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)?

III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? ___ Yes **X** No; if yes, specify, in quantitative terms: **As a shared-use path project, the project does not exceed the thresholds of 301 CMR 11.03(6) .**

B. Does the project require any state permits related to **roadways or other transportation facilities**? **X** Yes ___ No; if yes, specify which permit: **Notice of intent, MBTA Access Permit**

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

II. Transportation Facility Impacts

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

The proposed Bruce Freeman Rail Trail is a 10' wide paved shared-use path that will occupy the existing inactive rail bed. The project site consists of a non-operational rail ROW that extends from Massachusetts Central Rail Trail (Station Road) north to the Sudbury/Concord town line. The length of the trail within the Sudbury Town Limits is approximately 4.4 mi and there is currently no active transportation facility along this corridor.

Geometric and signal upgrades to the intersection of Hudson Road and Peakham Road are also included in this project. Peakham Road is a two-lane paved road with 150 linear feet in the project limits. Hudson Road is a two-lane paved road with 400 linear feet in the project limits. There is a sidewalk along the south side of Hudson Road. A left turn lane is proposed for the westbound Hudson Road leg of the intersection. Other proposed work includes pavement widening less than one lane, reconstruction of wheelchair ramps, installation of granite curbing, and a traffic signal installation. The project site ROW has 9 at-grade road crossings. Starting from the north, the road crossings are: Driveway to Fairview Farm, North Rd (Route 117), Pantry Rd, Haynes Rd, Morse Rd, Hudson Rd (Route 27), Old Lancaster Road, Codjer Lane, and the industrial driveway of 71 Union Ave.

- B. Will the project involve any
1. Alteration of bank or terrain (in linear feet)? **149 LF Perm / 336 LF Temp Bank**
 2. Cutting of living public shade trees (number)? **No**
 3. Elimination of stone wall (in linear feet)? **No**

III. Consistency -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

Municipal

The project is compliant with the goals and policies in the Town of Sudbury's most recent plan, the 2021 Master Plan. A transportation infrastructure goal in the Master Plan is to "create a safe network of walking, biking, and public transportation options to get people out of their cars to

travel around Sudbury”. The proposed rail trail will create a safe place for bicycle users to ride.

Regional

A goal of the Boston Region Metropolitan Planning Organization’s Destination 2040 Plan is to support land development that will “create an environmentally friendly transportation system” and “reduce greenhouse gases.” The construction of this rail trail will promote transportation alternatives and create outdoor spaces for people to use.

State

The project advances Initiative 1 of the Massachusetts Bicycle Transportation Plan (MassDOT 2019) to build connected, safe, and comfortable bicycle networks.

The project serves the objectives of MassDOT’s Healthy Transportation Policy Directive, P-13-0001, which formalized MassDOT’s commitment to the implementation of transportation networks that serve all mode choices including walking and bicycling. Under the directive, MassDOT established a statewide goal to triple the distance traveled by walking, bicycling, and transit between 2013 and 2030.

The proposed project will enhance adequacy of infrastructure in the Boston Region by providing bicycle and pedestrian accommodations that are in compliance with current MassDOT design and safety standards under Engineering Directive E-20-001.

Federal

By creating a shared-use path for bicycle and pedestrian use where there was previously no accommodation for bicycle users, the project is closely related to the principles promoted by the Interagency Partnership for Sustainable Communities, a joint endeavor involving the U.S. Department of Transportation (USDOT), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Environmental Protection Agency (EPA) which seeks to promote more transportation choices beyond the single occupancy automobile and promote investment in walkable neighborhoods.

ENERGY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))?
___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

II. Impacts and Permits

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are:

1. the facility's current and proposed fuel source(s)?
2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? ___ Yes ___ No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

III. Consistency

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

AIR QUALITY SECTION

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

II. Impacts and Permits

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? ___ Yes ___ No; if yes, describe existing and proposed emissions (in tons per day) of:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

III. Consistency

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

SOLID AND HAZARDOUS WASTE SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? ___ Yes **X** No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? ___ Yes **X** No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

II. Impacts and Permits

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? ___ Yes ___ No; if yes, what is the volume (in tons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? ___ Yes ___ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	<u>Existing</u>	<u>Change</u>	<u>Total</u>
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos?
___ Yes ___ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

III. Consistency

Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION

I. Thresholds / Impacts

A. Have you consulted with the Massachusetts Historical Commission? **Yes** ___ No; if yes, attach correspondence. For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources? **Yes** ___ No; if yes, attach correspondence

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes **No**; if yes, does the project involve the demolition of all or any exterior part of such historic structure? ___ Yes **No**; if yes, please describe:

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? **Yes** ___ No; if yes, does the project involve the destruction of all or any part of such archaeological site? ___ Yes **No**; if yes, please describe:

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

II. Impacts

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

Old Sudbury Historic District and Maenpaa Farm - Haynes Farm – Broadacres Farm are both adjacent to the project limits and are identified as state historical resources. Indirect impacts are that the shared-use path trail pavement adjacent to the sites will be constructed/reconstructed. A parcel near Broadacres Farm is proposed for a wetland mitigation site.

III. Consistency

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

As part of the MassDOT project development process a letter describing the project and soliciting questions and comments has been sent to the Town of Sudbury Historical Commission, the MassDOT Cultural Resources Unit, and the State Historic Preservation Officer as part of Section 106 compliance. The Town has coordinated the project design with the Historical Commission. MassDOT has conducted an archaeological survey of the impact areas outside of the rail ROW, namely at Broadacres Farm, Davis Field, and Parkinson Field.

CLIMATE CHANGE ADAPTATION AND RESILIENCY SECTION

This section of the Environmental Notification Form (ENF) solicits information and disclosures related to climate change adaptation and resiliency, in accordance with the MEPA Interim Protocol on Climate Change Adaptation and Resiliency (the “MEPA Interim Protocol”), effective October 1, 2021. The Interim Protocol builds on the analysis and recommendations of the 2018 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan (SHMCAP), and incorporates the efforts of the Resilient Massachusetts Action Team (RMAT), the inter-agency steering committee responsible for implementation, monitoring, and maintenance of the SHMCAP, including the “Climate Resilience Design Standards and Guidelines” project. The RMAT team recently released the RMAT Climate Resilience Design Standards Tool, which is available *here*.

The MEPA Interim Protocol is intended to gather project-level data in a standardized manner that will both inform the MEPA review process and assist the RMAT team in evaluating the accuracy and effectiveness of the RMAT Climate Resilience Design Standards Tool. Once this testing process is completed, the MEPA Office anticipates developing a formal Climate Change Adaptation and Resiliency Policy through a public stakeholder process. Questions about the RMAT Climate Resilience Design Standards Tool can be directed to rmat@mass.gov.

All Proponents must complete the following section, referencing as appropriate the results of the output report generated by the RMAT Climate Resilience Design Standards Tool and attached to the ENF. In completing this section, Proponents are encouraged, but not required at this time, to utilize the recommended design standards and associated Tier 1/2/3 methodologies outlined in the RMAT Climate Resilience Design Standards Tool to analyze the project design. However, Proponents are requested to respond to a respond to a *user feedback survey* on the RMAT website or to provide feedback to rmat@mass.gov, which will be used by the RMAT team to further refine the tool. Proponents are also encouraged to consult general guidance and best practices as described in the *RMAT Climate Resilience Design Guidelines*.

Climate Change Adaptation and Resiliency Strategies

- I. Has the project taken measures to adapt to climate change for all of the climate parameters analyzed in the RMAT Climate Resilience Design Standards Tool (sea level rise/storm surge, extreme precipitation (urban or riverine flooding), extreme heat)? **Yes** No

Note: Climate adaptation and resiliency strategies include actions that seek to reduce vulnerability to anticipated climate risks and improve resiliency for future climate conditions. Examples of climate adaptation and resiliency strategies include flood barriers, increased stormwater infiltration, living shorelines, elevated infrastructure, increased tree canopy, etc. Projects should address any planning priorities identified by the affected municipality through the Municipal Vulnerability Preparedness (MVP) program or other planning efforts, and should consider a flexible adaptive pathways approach, an adaptation best practice that encourages design strategies that adapt over time to respond to changing climate conditions. General guidance and best practices for designing for climate risk are described in the RMAT Climate Resilience Design Guidelines.

A. If no, explain why.

B. If yes, describe the measures the project will take, including identifying the planning horizon and climate data used in designing project components. If applicable, specify the return period and design storm used (e.g., 100-year, 24-hour storm).

The project will create 3,395 linear feet of new grass lined infiltration swales parallel to the proposed trail for increased stormwater infiltration, renovate and reconstruct 4 existing deficient culverts, and result in a net gain in flood storage below BLSF at the Pantry Brook Bridge as part of the proposed bridge renovation. The project will also add trees to the canopy surrounding the proposed trail with native tree plantings. The infiltration basins at the proposed parking lot at Broadacres Farm (Morse Rd) was designed using the 100-year, 24 hour storm per the more stringent local bylaw. RMA report output included in Appendix

C. Is the project contributing to regional adaptation strategies? ___ Yes No; If yes, describe.

II. Has the Proponent considered alternative locations for the project in light of climate change risks?
 Yes ___ No

A. If no, explain why.

B. If yes, describe alternatives considered.

On-road non-motorized multi-use passive recreational trails were examined but were found not feasible while simultaneously ensuring public safety with motorized traffic. This alternative did not realize the benefit of using existing railroad ROW to create a continuous regional shared-use path. Additionally, this alternative would require significant roadside land easements or purchases and the widening of existing roadway impervious area along with the associated environmental impacts. Standard on-road bike lanes are 5ft wide for each direction of travel. An on-road alternative would result in more stormwater surcharge to existing roadway closed drainage systems. For these reasons, this alternative was dismissed.

Alternative partially on-road alignments utilizing a combination of the existing railroad ROW and nearby roadway layouts were considered, but ultimately proved not feasible. Potential avoidance of the two main riverfront areas along the railroad ROW was considered. To avoid the railroad bed crossings of Pantry Brook and Hop Brook, a design of shared-use paths adjacent to roadway alternative was considered, an illustration is included in *Attachment 9*.

In order to avoid the railroad ROW crossing of Hop Brook, an alternative of a shared-use path adjacent to the roadways from Old Lancaster Road to Union Avenue to The Project terminus (Option 1) near Station Road and a variation on this utilizing adjacent conservation land (Option 3) was considered. To avoid the use of the railroad bed crossing of Pantry Brook, an alternative of a shared-use path adjacent to the roadways from Haynes Road to Concord Road to Morse Road (Option 2) was considered.

These adjacent to road non-motorized shared-use paths were examined but were ultimately not feasible, as they would require significant land easements or purchases along with environmental impacts from the newly developed areas. Options 1-3 do not have the benefit of using existing and previously developed railroad ROW to create a

continuous regional shared-use path.

Additionally, at the roadway crossings of Pantry Brook and Hop Brook, new bridges or extensions of existing bridges would be required which would result in additional wetland and waterway impacts. There are numerous wetlands adjacent to the roadways that would be impacted if they were widened for adjacent shared-use paths, which commonly have a pavement width of 10-12ft.

Finally, avoiding the restoration of Pantry Brook Bridge on the railroad ROW would avoid minor wetland impacts there, but retaining the failed bridge and abutments collapsing into the stream would not be a desired outcome for the environmental integrity of the stream or human safety. For these reasons, the alternatives considering shared-use paths adjacent to roadways were dismissed.

III. Is the project located in Land Subject to Coastal Storm Flowage (LSCSF) or Bordering Land Subject to Flooding (BLSF) as defined in the Wetlands Protection Act? **Yes** **No**

If yes, describe how/whether proposed changes to the site's topography (including the addition of fill) will result in changes to floodwater flow paths and/or velocities that could impact adjacent properties or the functioning of the floodplain. General guidance on providing this analysis can be found in the CZM/MassDEP Coastal Wetlands Manual, available *here*.

A hydraulic analysis and no-rise flood analysis was performed as part of the design of the Pantry Brook Bridge renovation. The proposed work will result in a net gain in flood storage below BFE of 78.4 CY.

Minor impact to BLSF is proposed in the vicinity of Hop Brook totaling 0.63 CY. The proposed fill is pervious loam & seed. Compensatory storage of offsetting volume is proposed at the same elevation in the same regulatory floodway.

Minor impact to BLSF is proposed in the vicinity of Mineway Brook totaling 2.37 CY. The proposed fill is pervious loam & seed. Compensatory storage of offsetting volume is proposed at the same elevation in the same regulatory floodway.


CERTIFICATIONS:

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

(Name) Metro West Daily News (Date) 11/22/2021

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

<u>11/15/21</u>	<u><i>Bryan Cordeiro</i></u>	<u>11/15/21</u>	
Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing ENF (if different from above)

<u>Bryan Cordeiro</u>	<u>Nicholas J. Lapointe</u>
Name (print or type)	Name (print or type)

<u>MassDOT Highway Division</u>	<u>Fuss & O'Neill</u>
Firm/Agency	Firm/Agency

<u>10 Park Plaza, Room 4260</u>	<u>190 High Street</u>
Street	Street

<u>Boston, MA ,02116</u>	<u>Boston, MA 02210</u>
Municipality/State/Zip	Municipality/State/Zip

<u>857-368-8813 cell: 774-993-9632</u>	<u>413-452-0445 x 4452</u>
Phone	Phone

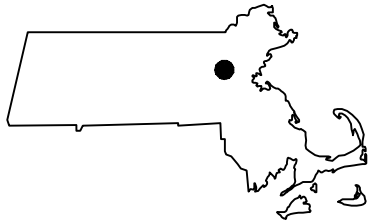
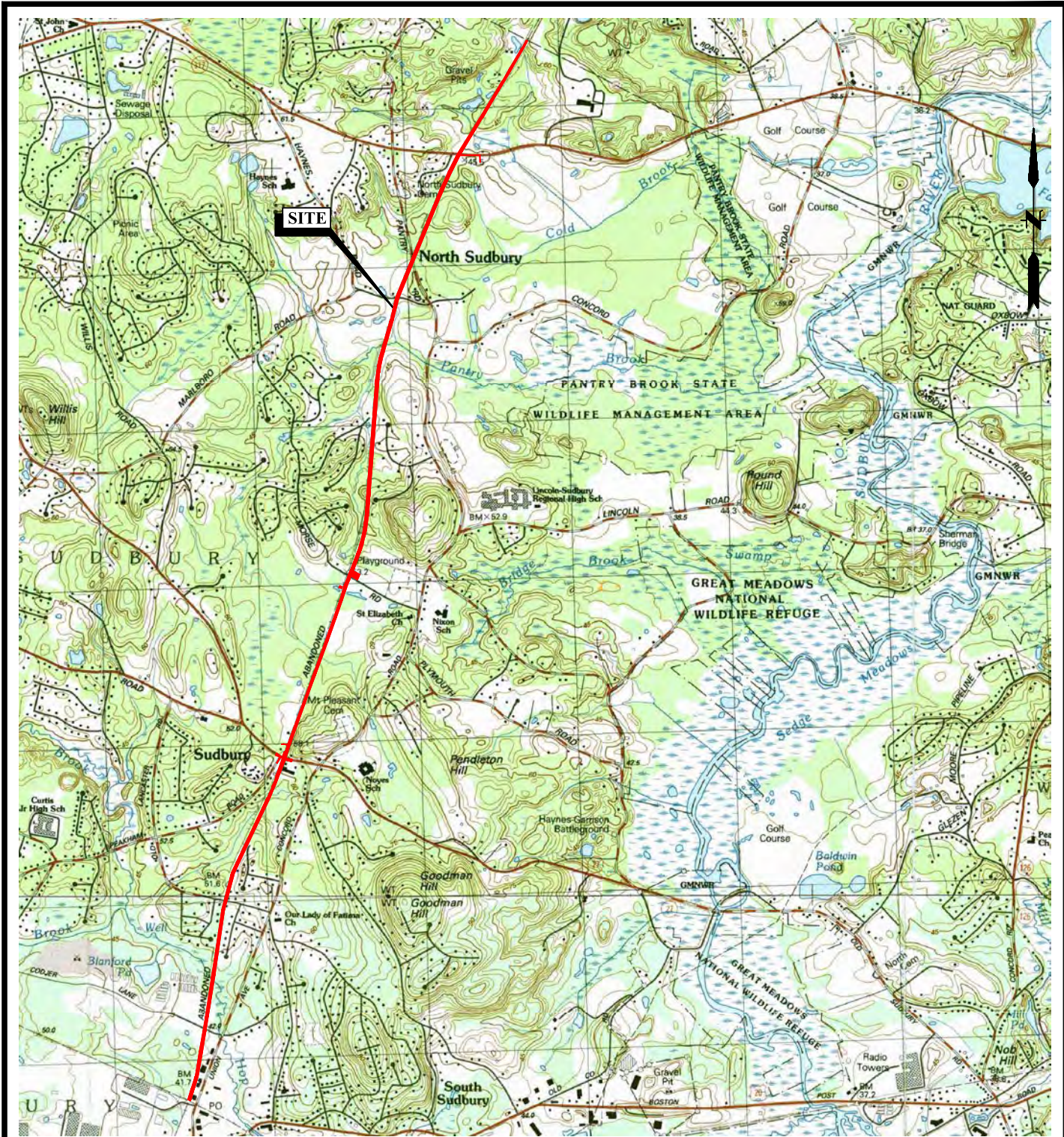
Attachment 1

List of Attachments

1. List of attachments to the ENF
2. U.S.G.S. topographic locus map
3. Existing conditions plan set
4. Existing environmental constraints
5. Proposed conditions plan set
6. Circulation list to agencies
7. List of municipal and federal permits and reviews required by the project, as applicable
8. RMAAT climate resistance design standards tool report
9. Alternatives analysis documentation
10. Amended Order of Resource Area Delineation (ORAD)
11. Environmental impact summary tables
12. Broadacres Farm Parking Area Stormwater Report

Attachment 2

Topographic Locus Map



MAP REFERENCE
 THIS MAP WAS PREPARED FROM THE FOLLOWING USGS TOPOGRAPHIC QUADRANGLE IMAGES: q209898, q209902, q209906, q209910, q213898, q213902, q213906 AND q213910.
 QUADRANGLE IMAGES WERE PREPARED FROM MASS GIS DATA RECEIVED FROM OLIVER GIS ON 04/16/2021.
 ORIGINAL MAP UNITS IN METERS.

SCALE:
HORZ.: 1" = 3000'
VERT.:
DATUM:
HORZ.:
VERT.:
0 1500 3000
GRAPHIC SCALE



FUSS & O'NEILL
 1550 MAIN STREET, SUITE 400
 SPRINGFIELD, MA 01103
 413.452.0445
 www.fando.com

TOWN OF SUDBURY
 SITE LOCATION MAP
 BRUCE FREEMAN RAIL TRAIL
 SUDBURY MASSACHUSETTS

PROJ. No.: 20200785.A10
DATE: 10/27/2021
FIG.1

Attachment 3

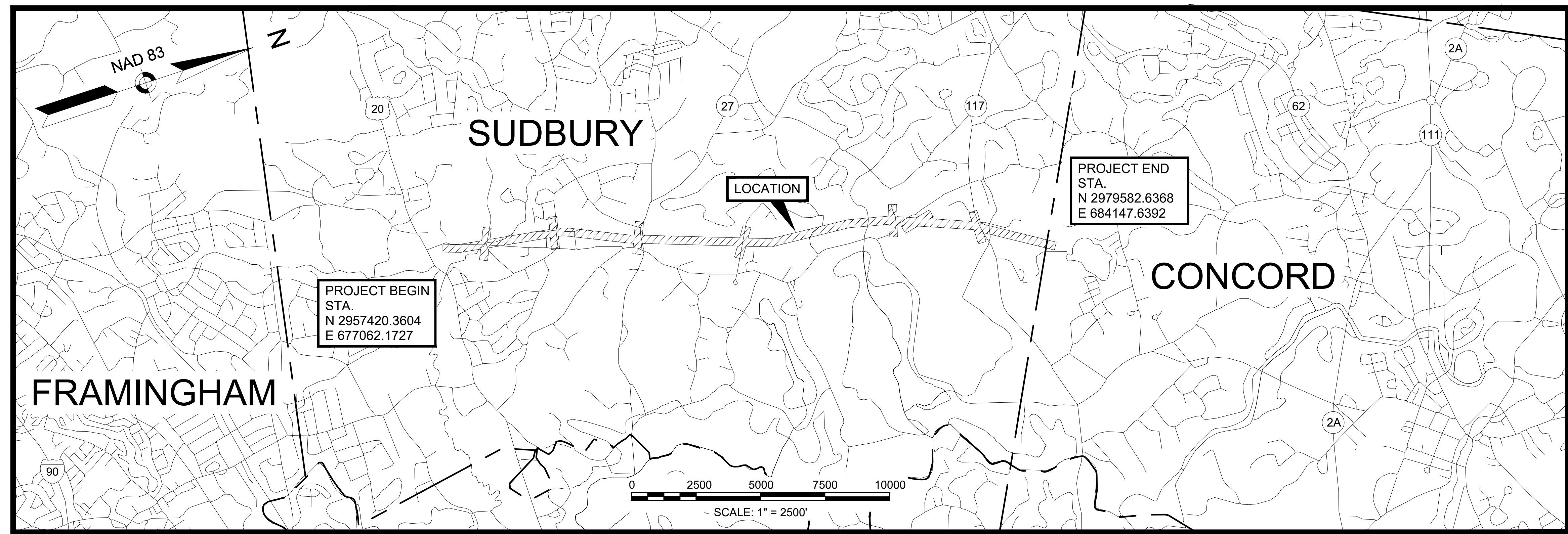
Existing Conditions Plans

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	55

PROJECT FILE NO.

TITLE SHEET, LEGEND & ABBREVIATIONS





ABBREVIATIONS

AUX	AUXILIARY	GMH	GAS MANHOLE	SHLD	SHOULDER
BD	BOUND	GRAN	GRANITE	SHLO	STATE HIGHWAY LAYOUT
BIT	BITUMINOUS	GRV	GRAVEL	SK	SKEW
BLDG	BUILDING	GRD	GUARD	SL	STOP LINE
BM	BENCHMARK	GRL	GUARDRAIL	SMH	SEWER MANHOLE
BR	BRIDGE	HDW	HEADWALL	SPK	SPIKE
BRK	BRICK	HYD	HYDRANT	STA	STATION
BWL	BROKEN WHITE LINE	INV	INVERT	STN	STONE
BYL	BROKEN YELLOW LINE	IP	IRON PIPE	SW	SIDEWALK
CAB	CABINET	JB	JERSEY BARRIER	SWL	SOLID WHITE LINE
CB	CATCH BASIN	L	LENGTH OF CURVE	SYL	SOLID YELLOW LINE
CC	CEMENT CONCRETE	LB	LEACHING BASIN	T	TANGENT DISTANCE
CCB	CAPE COD BERM	LC	LAND COURT	TAN	TANGENT
CEN	CENTER	LCB	LAND COURT BOUND	TEMP	TEMPORARY
CI	CURB INLET	LCD	LAND COURT DISK	TMH	TELEPHONE MANHOLE
CIP	CAST IRON PIPE	LO	LAYOUT	TR	TOP OF RAIL
CL	CENTER LINE	LP	LIGHT POLE	TSC	TRAFFIC SIGNAL CONDUIT
CLF	CHAIN LINK FENCE	LPD	LIGHT POLE DOUBLE LIGHT	TYP	TYPICAL
CMH	CABLE MANHOLE	LSA	LANDSCAPED AREA	VAR	VARIABLE
CMP	CORRUGATED METAL PIPE	MAG	MAG NAIL	VCP	VITRIFIED CLAY PIPE
CO	COUNTY	MBE	MIDDLE BACK EDGE	VGC	VERTICAL GRANITE CURB
CO BD	COUNTY BOUND	MED	MEDIAN	VL	VAULT
CON	CONIFEROUS	MH	MANHOLE	WB	WESTBOUND
CONC	CONCRETE	MP	MILE POST	WCR	WHEELCHAIR RAMP
CPP	CORRUGATED PLASTIC PIPE	MTL	METAL	WD	WOOD
CSP	CORRUGATED STEEL PIPE	N/F	NOW OR FORMERLY	WIP	WROUGHT IRON PIPE
CULV	CULVERT	NB	NORTHBOUND	APPROX.	APPROXIMATE
CW	CROSSWALK	OH	OVERHANG		
DBWL	DOUBLE WHITE LINE	OHV	OVERHEAD WIRE		
DBYL	DOUBLE YELLOW LINE	PC	POINT OF CURVATURE		
DEC	DECIDUOUS	PCC	POINT OF COMPOUND CURVATURE		
DI	DRILL HOLE	PED	PEDESTRIAN		
DI	DROP INLET	PI	POINT OF INTERSECTION		
DIA	DIAMETER	PK	PK NAIL		
DIP	DUCTILE IRON PIPE	PL	PROPERTY LINE		
DMH	DRAIN MANHOLE	PP	PRICK PUNCH		
DSK	DISK	PRC	POINT OF REVERSE CURVATURE		
DWL	DOTTED WHITE LINE	PT	POINT OF TANGENCY		
DYL	DOTTED YELLOW LINE	PVC	POLYVINYL CHLORIDE PIPE		
EB	EASTBOUND	PVMT	PAVEMENT		
EL	ELEVATION	PWW	PAVED WATERWAY		
EMH	ELECTRIC MANHOLE	PZ	PIEZOMETER		
EP	EDGE OF PAVEMENT	R	RADIUS OF CURVATURE		
EPLP	ESCUTCHEON PIN IN LEAD PLUG	RB	REBAR		
ETW	EDGE OF TRAVELED WAY	RC	REINFORCED CONCRETE		
EX	EXISTING	RCP	REINFORCED CONCRETE PIPE		
FF	FINISH FLOOR	RET	RETAINING		
FGS	FLAGSTONE	ROW	RIGHT OF WAY		
FL	FLOWLINE	RR	RAILROAD		
FLDSTN	FIELDSTONE	RRS	RAILROAD SPIKE		
GAR	GARAGE	S BD	SOUTHBOUND		
GD	GROUND	SB	STONE BOUND		
GIP	GALVANIZED IRON PIPE	SD	SUBDRAIN		
		SGE	SLOPED GRANITE EDGING		

LEGEND

● BF#	BANK FLAG	○ MB	MAG NAIL	○ TS	TRAFFIC SIGNAL
○ BHL #	BORE HOLE	□ MB	MAIL BOX	○ TS	TRAFFIC SIGNAL MAST ARM/SPAN WIRE POLE
○ BUSH	BUSH	■ MHB	MASSACHUSETTS HIGHWAY BOUND	○	SIGN
◆ BM #	BENCHMARK	⊕ MW	MONITORING WELL	○	SIGN - DOUBLE POST
□	BOUND (CONC, STONE, LAND COURT, ETC.)	○ OIL	OIL FILL	○	UTILITY POLE W/ FIRE PULL BOX
○	CABLE MANHOLE	○	OTHER MANHOLE	○ U1200	UTILITY POLE W/ LIGHT
□ CB	CATCH BASIN - SQUARE	○	PULL BOX	○ UPDL#	UTILITY POLE W/ DOUBLE LIGHT
□ CB	CATCH BASIN - D-FRAME	○	PEDESTRIAN SIGNAL	○ UPL#	UTILITY POLE
○ CB	CATCH BASIN - ROUND	○	PHOTO CONTROL - H & V	○ VP	VENT PIPE
○ DSK	DISK (CAT, USC&GS, LAND COURT, ETC.)	○	PHOTO CONTROL - V ONLY	○	WATER MANHOLE
● DH	DRILL HOLE	○	PK NAIL	○	WATER GATE
○	DRAIN MANHOLE	○ PK	PARKING METER	○	WATER METER
□ EHH	ELECTRIC HANDHOLE	○ PM	CIRCULAR POST	○	WATER SHUTOFF
○	ELECTRIC MANHOLE	□ POST	SQUARE POST	○	WELL (POTABLE)
○	ELECTRIC METER	○ RB	REBAR/IRON PIN	○ WF#	WETLAND FLAG
○ EPLP	ESCUTCHEON PIN IN LEAD PLUG	○ RRS	RAILROAD SPIKE	○ X-CUT	X-CUT
⊕ FB	FLASHING BEACON	⊕ RRS	RAILROAD SIGNAL		
△ FES	FLARED END SECTION	⊕ RRSW	RAILROAD SWITCH		
○ FP	FLAG POLE	○ SN	STAKE AND NAIL		
○ GF	GAS FILL	○ SP	STAND PIPE		
○ GC	GAS GATE	○	SEWER MANHOLE		
○ GM	GAS METER	○	STEAM MANHOLE		
○ GP	GAS PUMP	○	STUMP		
○ GPL	GAS MANHOLE	■ TB	TOWN LINE BOUND (CORNER)		
○	GUY POLE	⊕ TCB	TRAFFIC SIGNAL CONTROL CABINET		
○	HANDICAP SYMBOL	○	TELEPHONE MANHOLE		
○ HTP	HIGH TENSION POWER POLE	⊕ TFMR	TRANSFORMER		
○ IP	IRON PIPE	○ TLRS	TOWN LINE ROAD STONE		
○	LIGHT POLE	⊕ TPIT #	TEST PIT		
○	LIGHT POLE DOUBLE LIGHT	○ TPL	TROLLEY POLE		
		○	TRAVERSE POINT		
		● 22" M	TREE		

- NOTES**
- 1) THE RAILROAD RIGHT-OF-WAY LINES AND BASELINES SHOWN ON THIS PLAN ARE BASED ON RIGHT OF WAY AND TRACK MAPS FOR OLD COLONY R.R. CO. OPERATED BY THE NEW YORK NEW HAVEN AND HARTFORD R.R. CO., DATED JUNE 30, 1915 THE MONUMENTS FOUND ON THIS PLAN WERE FIELD LOCATED AND USED TO ESTABLISH THE RIGHT-OF-WAY LINES. THE PROPERTY LINES OF INDIVIDUAL OWNERS ALONG THE RIGHT-OF-WAY ARE TAKEN FROM MASS-GIS DATA AND ARE NOT FIELD SURVEYED.
 - 2) THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL FIELD SURVEY CONDUCTED BY VANASSE HANGEN BRUSTLIN, INC. BETWEEN NOVEMBER 2014 AND JUNE, 2016.
 - 3) HORIZONTAL DATUM IS BASED ON MASS. GRID SYSTEM, NAD 1983 (2011) 2010.00 EPOCH. ELEVATIONS SHOWN ON THIS PLAN REFER TO NAVD OF 1988.
 - 4) THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE BASED ON FIELD OBSERVATIONS AND INFORMATION OF RECORD. THEY ARE NOT WARRANTED TO BE EXACTLY LOCATED NOR IS IT WARRANTED THAT ALL UNDERGROUND UTILITIES OR OTHER STRUCTURES ARE SHOWN ON THIS PLAN.
 - 5) THE DRAINAGE INVERT ELEVATIONS ARE LISTED IN A CLOCKWISE DIRECTION WITH THE OUTLET ELEVATION LAST.

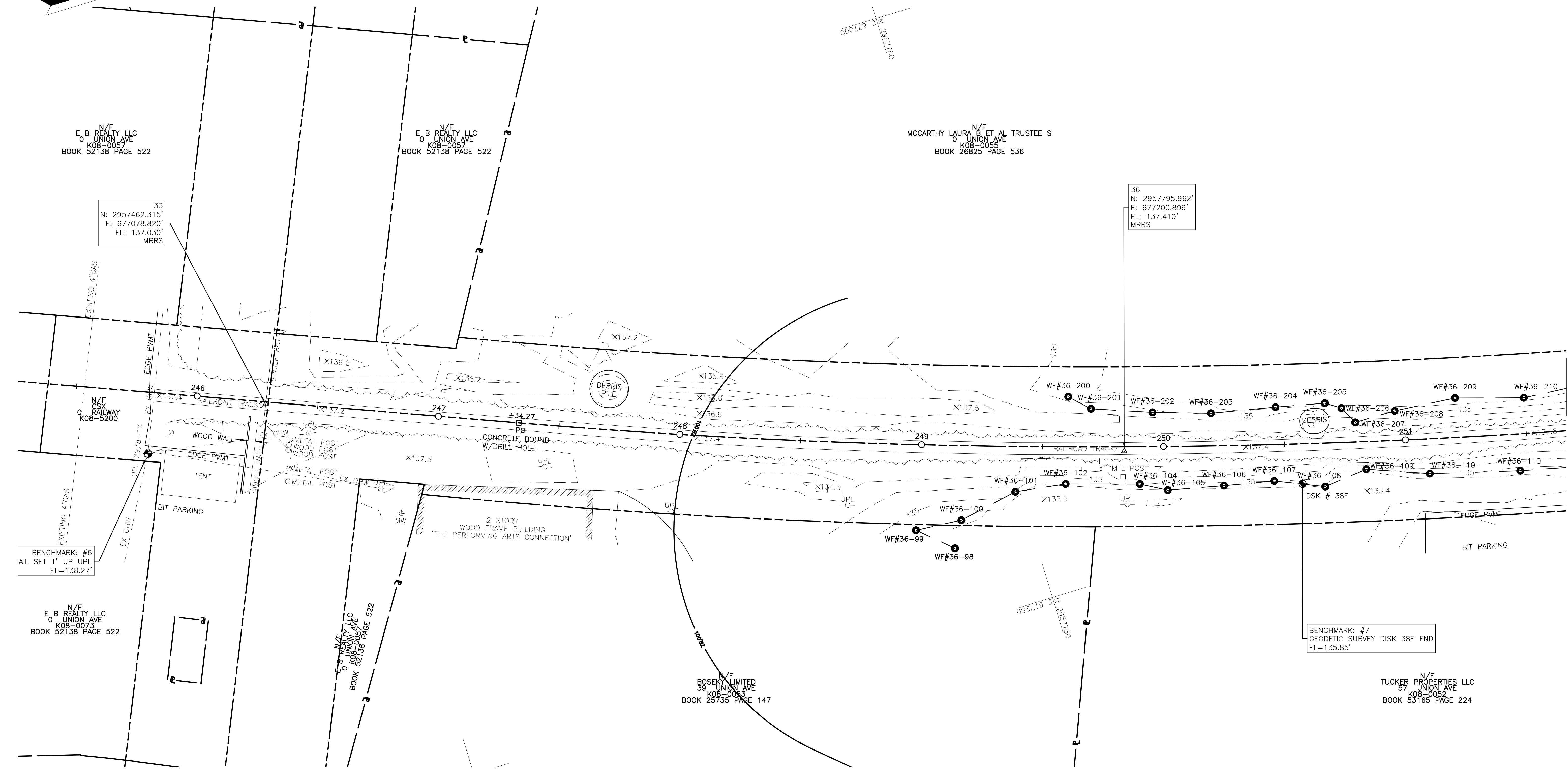
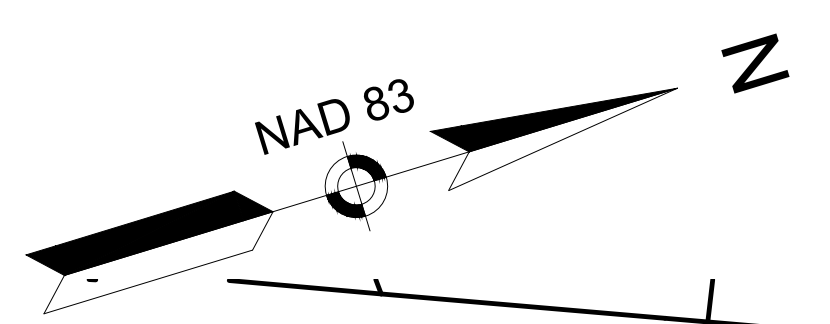
 		PREPARED BY: Vanasse Hangen Brustlin, Inc. 101 Walnut St., PO Box 9151 Watertown, MA 02472 617.924.1770 FAX 617.924.2286		MASSACHUSETTS DEPARTMENT OF TRANSPORTATION PLAN OF TOPOGRAPHIC SURVEY OF PROPOSED BIKE PATH																			
REVISIONS <table border="1"> <thead> <tr> <th>REV.</th> <th>COMMENTS</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>		REV.	COMMENTS	DATE																SCALE: 2500 FEET TO THE INCH		IN THE TOWN OF SUDBURY AS ORDERED BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION	
REV.	COMMENTS	DATE																					
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**SUDBURY
PROPOSED BIKE PATH**

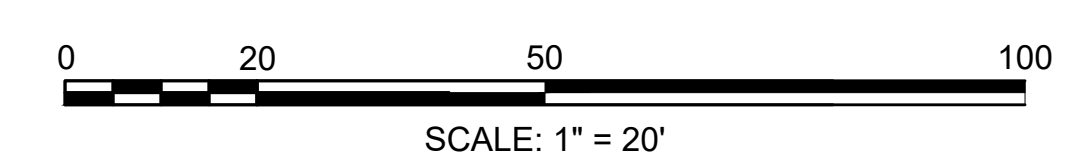
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PROJECT FILE NO.

SURVEY BASEPLAN



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SHEET NO. 3



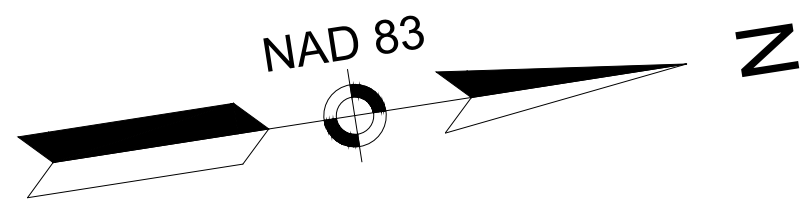
PREPARED BY:
Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

REVISIONS		
REV.	COMMENTS	DATE

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FIELD BOOK NO.: 1200 & 1225
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FIELD CHIEF: RPT/DJS PARS. NO.:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION



**SUDBURY
PROPOSED BIKE PATH**

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PROJECT FILE NO.
SURVEY BASEPLAN

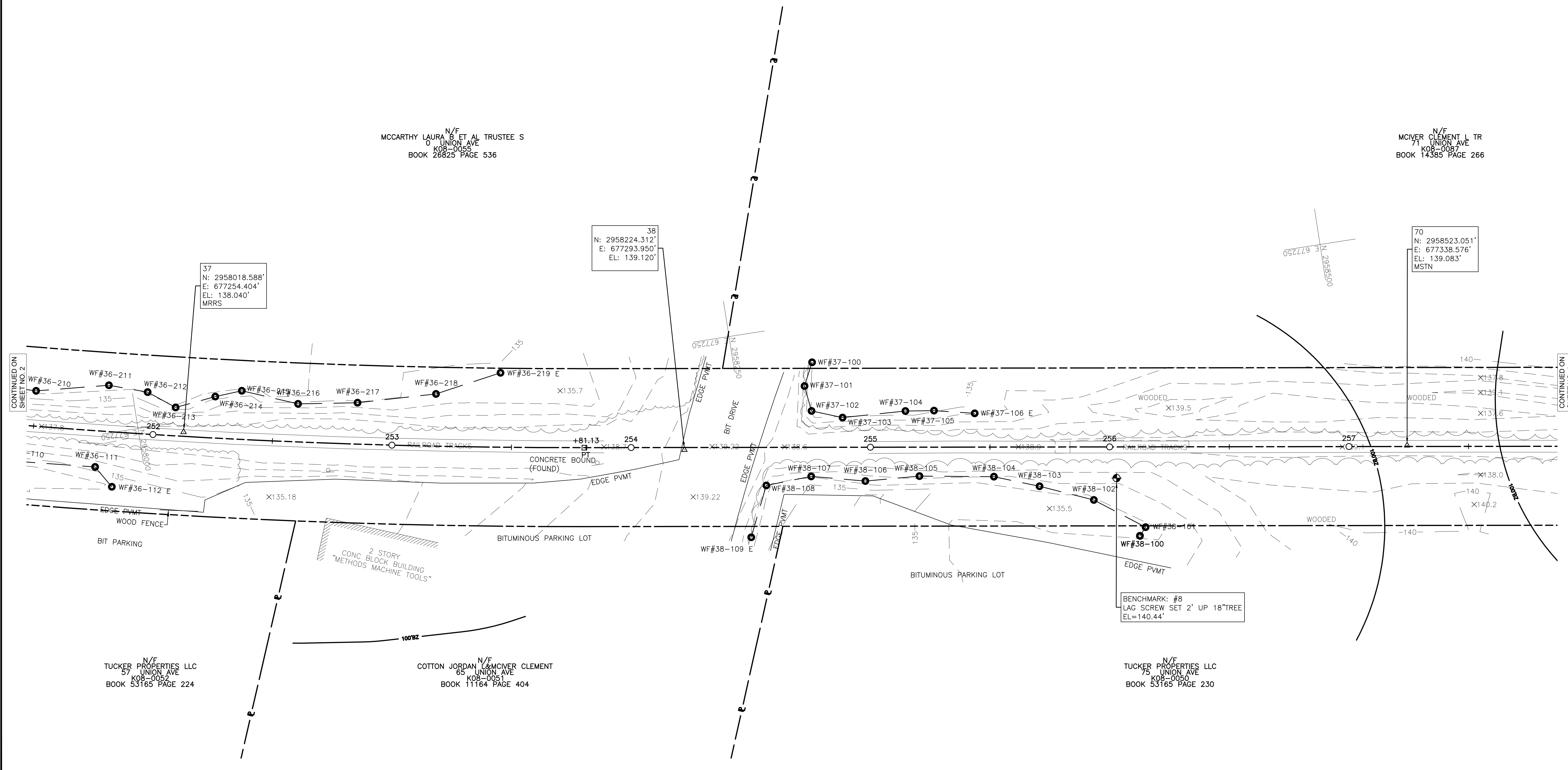
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K08-0055
BOOK 26825 PAGE 536

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K08-0087
BOOK 14365 PAGE 266

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EL: 139.120'

37
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MRRS

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MSTN

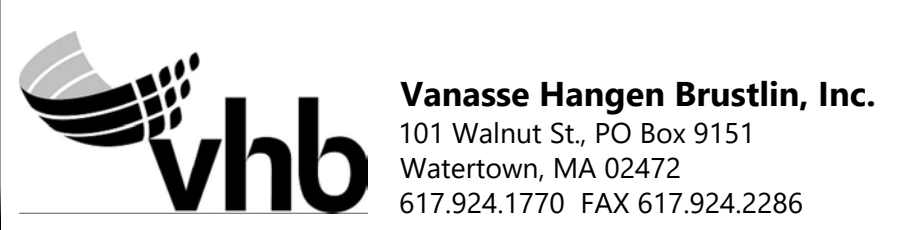
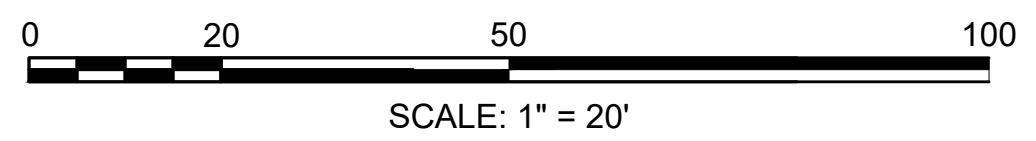


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TUCKER PROPERTIES LLC
57 UNION AVE
K08-0052
BOOK 53165 PAGE 224

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COTTON JORDAN L & MCIVER CLEMENT
65 UNION AVE
K08-0051
BOOK 11164 PAGE 404

BENCHMARK: #8
LAG SCREW SET 2' UP 18" TREE
EL=140.44'

N/F
TUCKER PROPERTIES LLC
75 UNION AVE
K08-0050
BOOK 53165 PAGE 230



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MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
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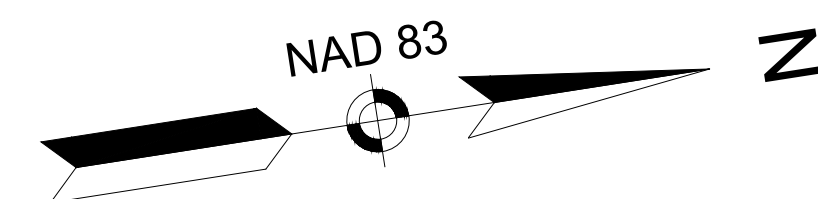
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SHEET 3 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	4	55
PROJECT FILE NO.			

SURVEY BASEPLAN



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SHEET NO. 6

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71 UNION AVE
K08-0087
BOOK 14385 PAGE 266

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CAVICCHIO PAUL F JR
0 CODJER LN
J08-0501
BOOK 25172 PAGE 58

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EL: 139.083'
MSTN

16
N: 2958774.999'
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EL: 139.590'
MSTN

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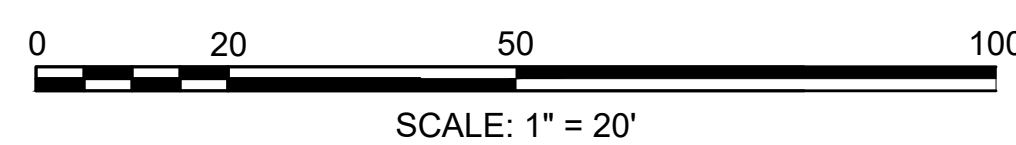
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J08-0502
BOOK 25172 PAGE 58

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J08-0503
BOOK 25172 PAGE 58

CONTINUED ON
SHEET NO. 3

CONTINUED ON
SHEET NO. 7

CONTINUED ON
SHEET NO. 5



PREPARED BY:

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MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
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TRANSPORTATION, HIGHWAY DIVISION

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FIELD BOOK NO.: 1200 & 1225

DRAWN BY: JEC

CHECKED BY: CDKR

FIELD CHIEF: RPT/DJS

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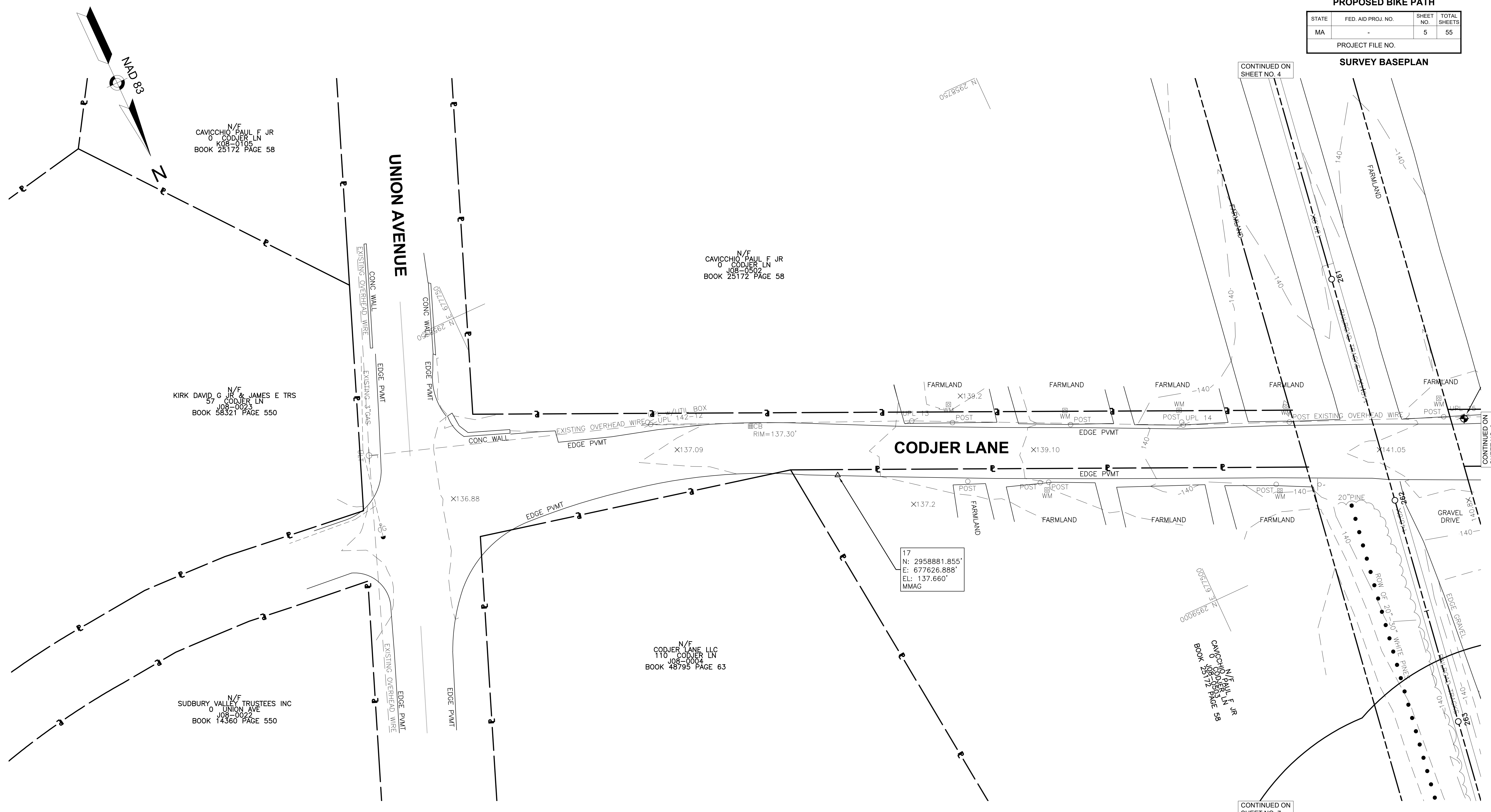
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SHEET 4 OF 55

**SUDBURY
PROPOSED BIKE PATH**

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MA	-	5	55

SURVEY BASEPLAN



N/F
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CODJER LN
K08-0105
BOOK 25172 PAGE 58

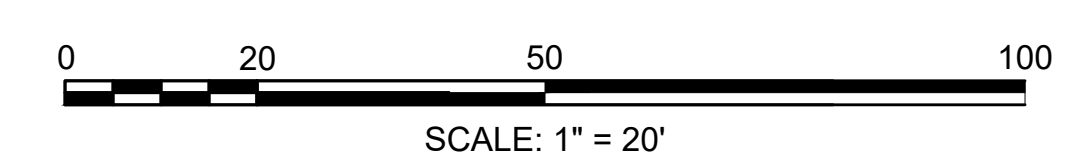
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J08-0502
BOOK 25172 PAGE 58

N/F
KIRK DAVID G JR & JAMES E TRS
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CODJER LN
J08-0023
BOOK 58321 PAGE 550

N/F
CODJER LANE LLC
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CODJER LN
J08-0004
BOOK 48795 PAGE 63

N/F
SUDBURY VALLEY TRUSTEES INC
0
UNION AVE
J08-0022
BOOK 14360 PAGE 550

17
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E: 677626.888'
EL: 137.660'
MMAG



Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

REVISIONS		
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SCALE: 20 FEET TO THE INCH

FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

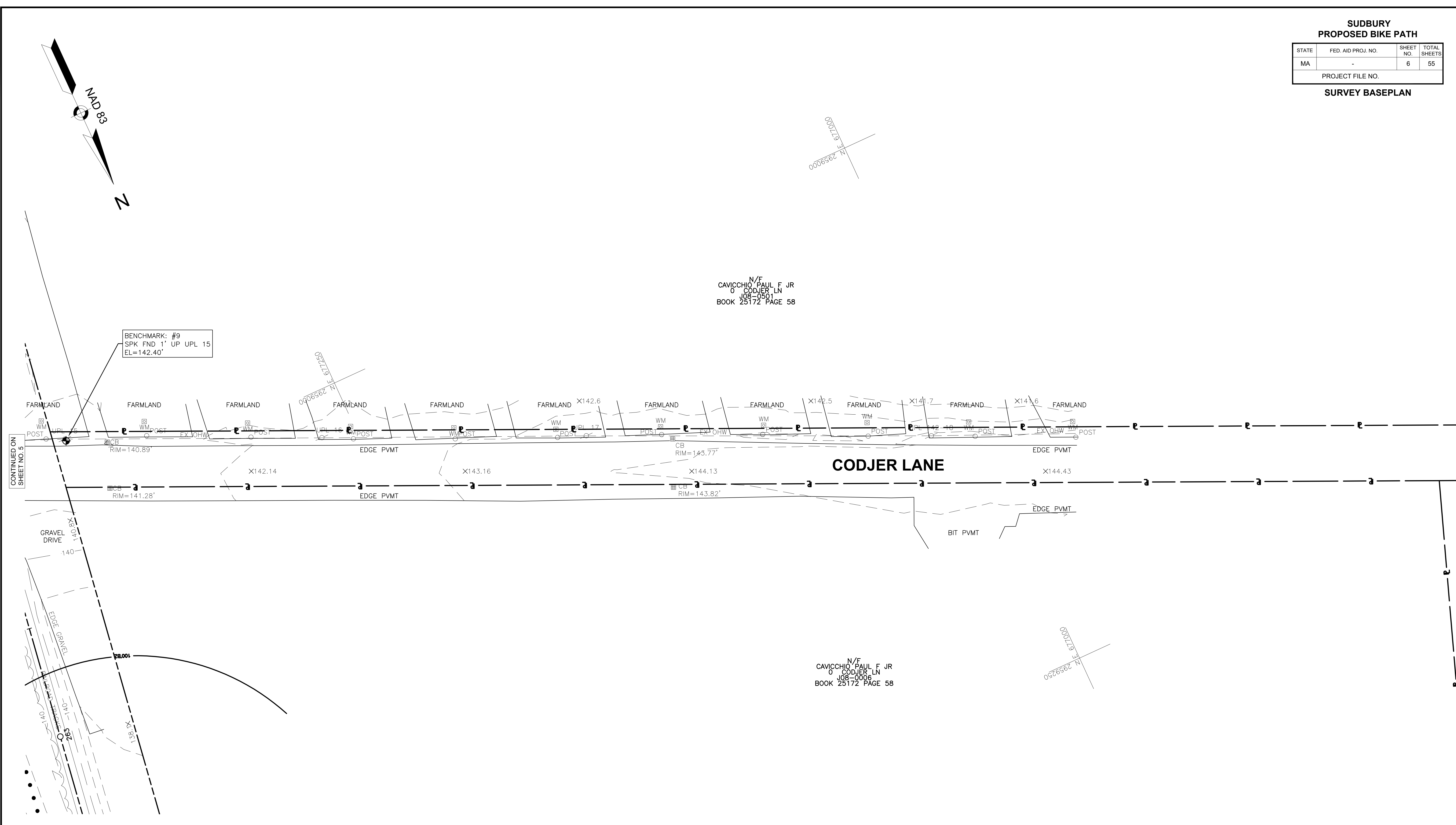
**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	6	55

PROJECT FILE NO.

SURVEY BASEPLAN

12984.00-EX.DWG Plotted on 19-Jul-2016 11:24 AM



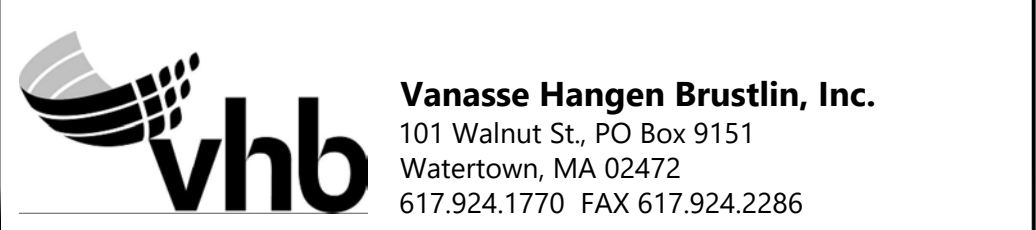
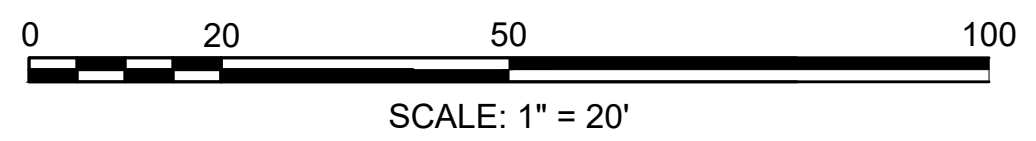
CONTINUED ON
SHEET NO. 5

GRAVEL
DRIVE

EDGE GRAVEL

N/F
CAVICCHIO PAUL F JR
0
CODJER LN
JOB-0501
BOOK 25172 PAGE 58

N/F
CAVICCHIO PAUL F JR
0
CODJER LN
JOB-0006
BOOK 25172 PAGE 58



REVISIONS		
REV.	COMMENTS	DATE

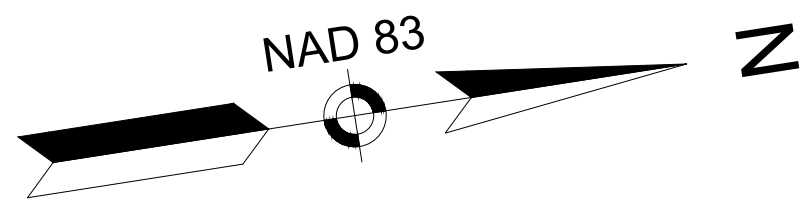
SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 6 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	55

PROJECT FILE NO.
SURVEY BASEPLAN

N/F
CAVICCHIO PAUL F JR
0
CODJER LN
JOB-0006
BOOK 25172 PAGE 58

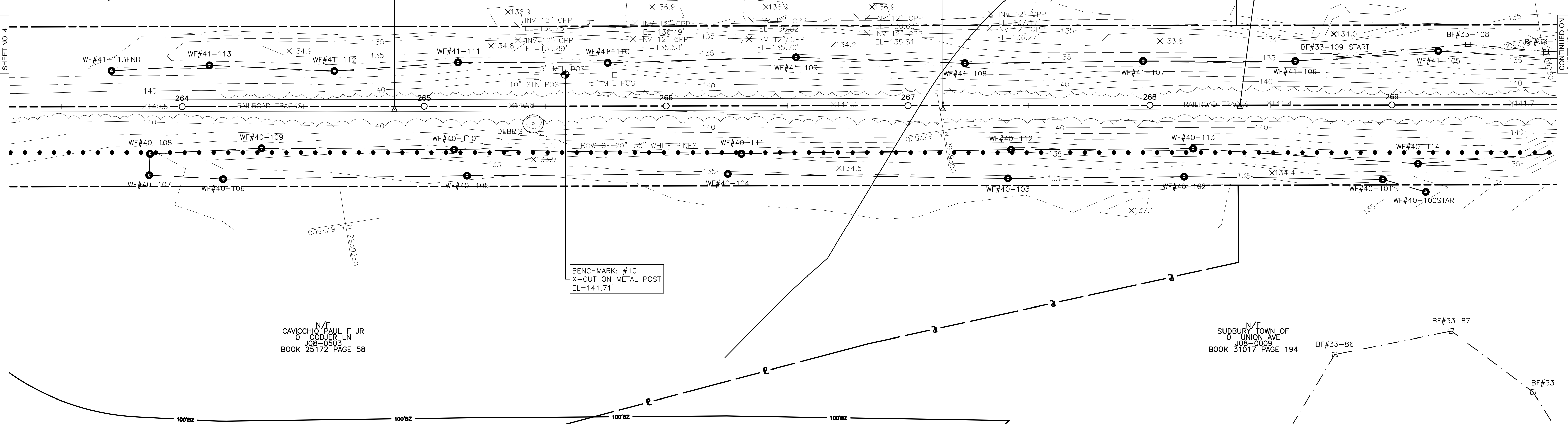
39
N: 2959277.292'
E: 677456.654'
EL: 140.730'
MRRS

71
N: 2959501.251'
E: 677491.372'
EL: 141.879'
MRRS

40
N: 2959622.685'
E: 677509.220'
EL: 141.430'
MRRS

CONTINUED ON
SHEET NO. 4

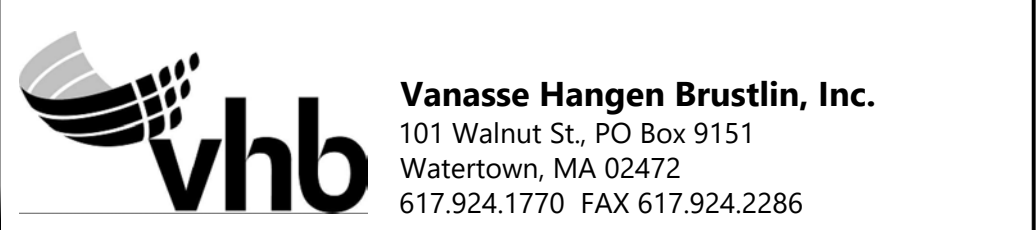
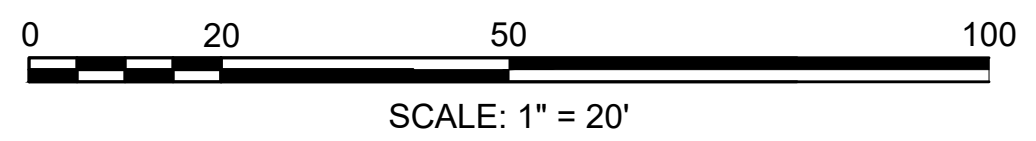
CONTINUED ON
SHEET NO. 8



N/F
CAVICCHIO PAUL F JR
0
CODJER LN
JOB-0503
BOOK 25172 PAGE 58

N/F
SUDBURY TOWN OF
0
UNION AVE
JOB-0009
BOOK 31017 PAGE 194

BENCHMARK: #10
X-CUT ON METAL POST
EL=141.71'



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

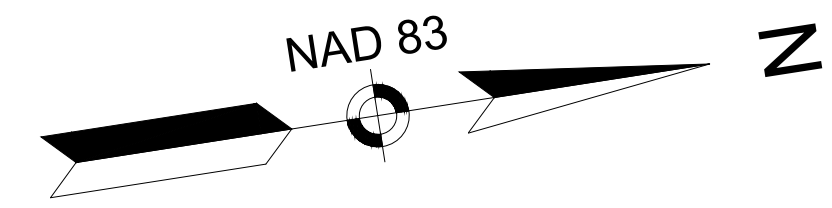
SHEET 7 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	8	55

PROJECT FILE NO.

SURVEY BASEPLAN



N/F
CAVICCHIO PAUL F JR
0
CODJER LN
JOB-0006
BOOK 25172 PAGE 58

N/F
SUDBURY WATER DISTRICT
0
WASH BROOK RD
JOB-0007
BOOK 12668 PAGE 388

72
N: 2959870.195'
E: 677546.230'
EL: 141.939'
MSTN

32
N: 2960074.313'
E: 677577.466'
EL: 142.670'
MSTN

31
N: 2960273.082'
E: 677605.272'
EL: 144.190'
MIPE

N/F
SUDBURY TOWN OF
0
UNION AVE
JOB-0009
BOOK 31017 PAGE 194

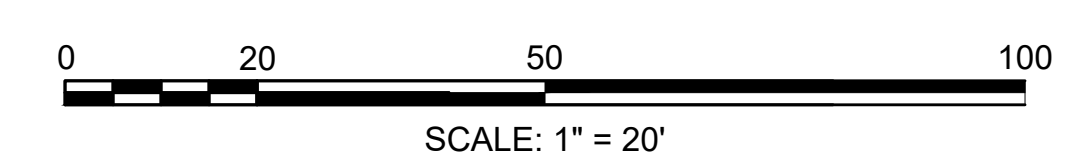
N/F
SUDBURY TOWN OF
0
UNION AVE
JOB-0009
BOOK 31017 PAGE 194

N/F
PENDLETON DAVID B
& CAROLE E
41
MEADOW DR
JOB-0011
BK 32089 PG 419

BENCHMARK: #11
MAG NAIL SET 1' UP
IN NW SIDE OF 10" OAK
EL=142.48'

BENCHMARK: #5
CHISEL SQUARE FOUND
FEMA RM 6-1
EL=141.73'

BENCHMARK: #12
CHISEL SQUARE SET ON
SW COR. OF POST
EL=147.70'



PREPARED BY:
Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

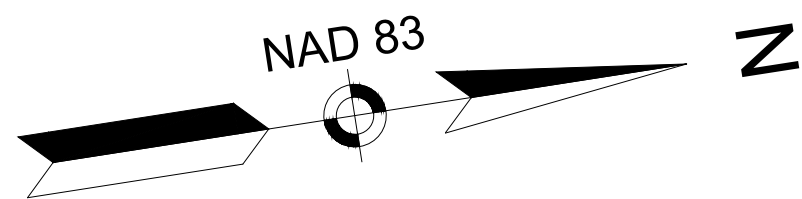
SCALE: 20 FEET TO THE INCH

FILE NAME: 12984-00-EX
FIELD BOOK NO.: 1200 & 1225
DRAWN BY: JEC
FIELD CHIEF: RPT/DJS

CHECKED BY: CDKR
PARS. NO.:

DATE: MAY 19, 2016

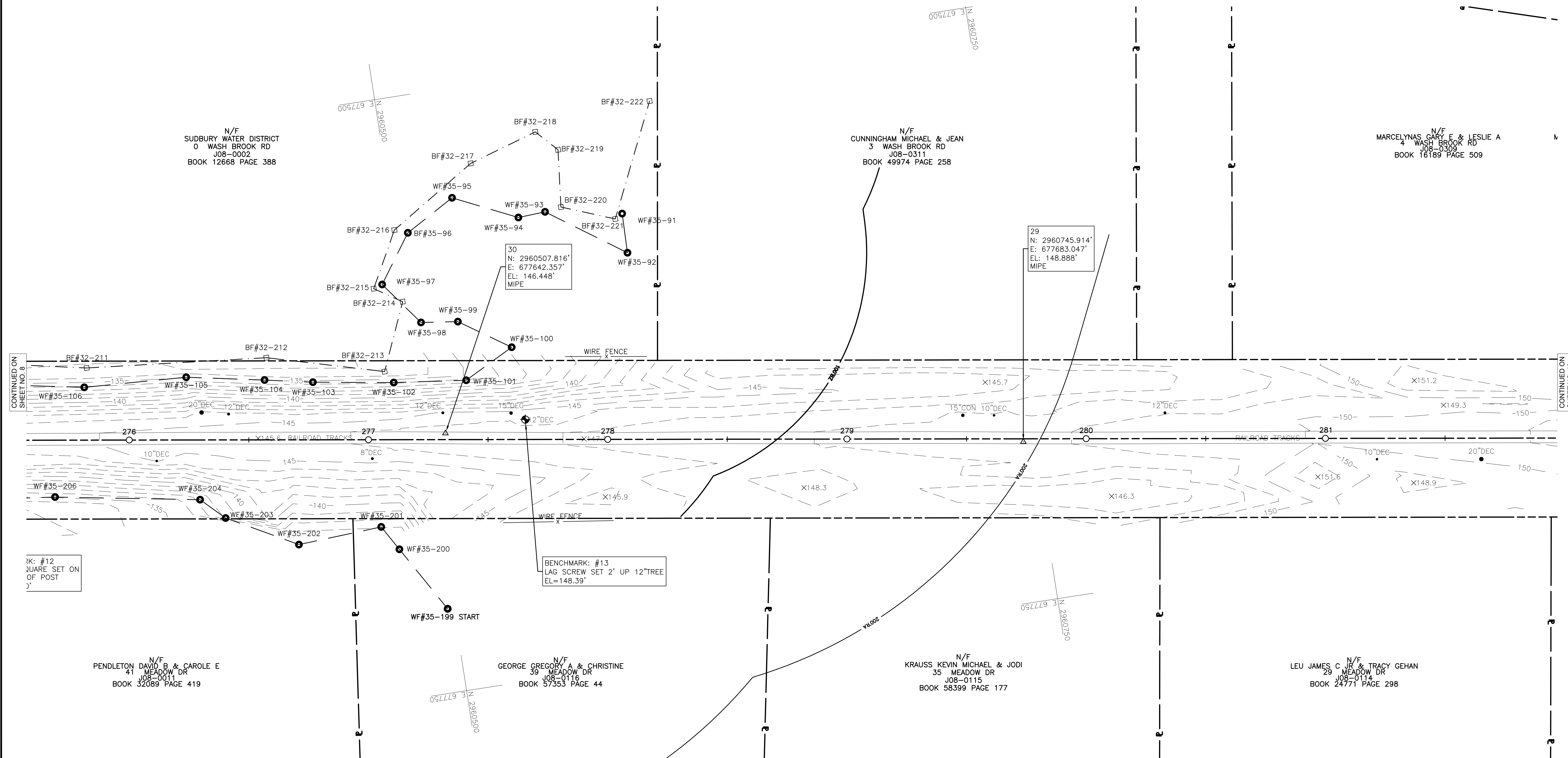
SHEET 8 OF 55



**SUDBURY
PROPOSED BIKE PATH**

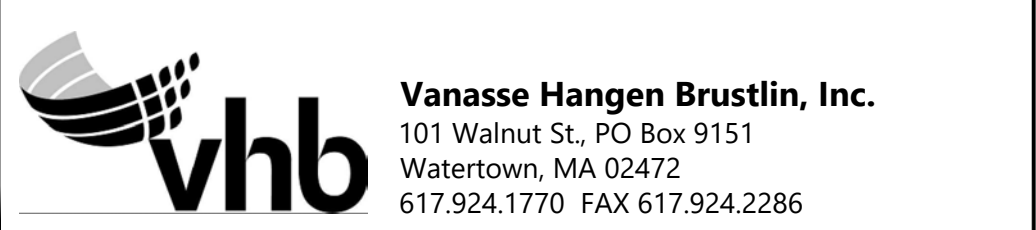
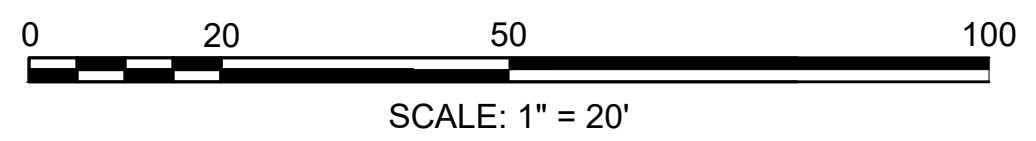
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	55

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 8

CONTINUED ON
SHEET NO. 10



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MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
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TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

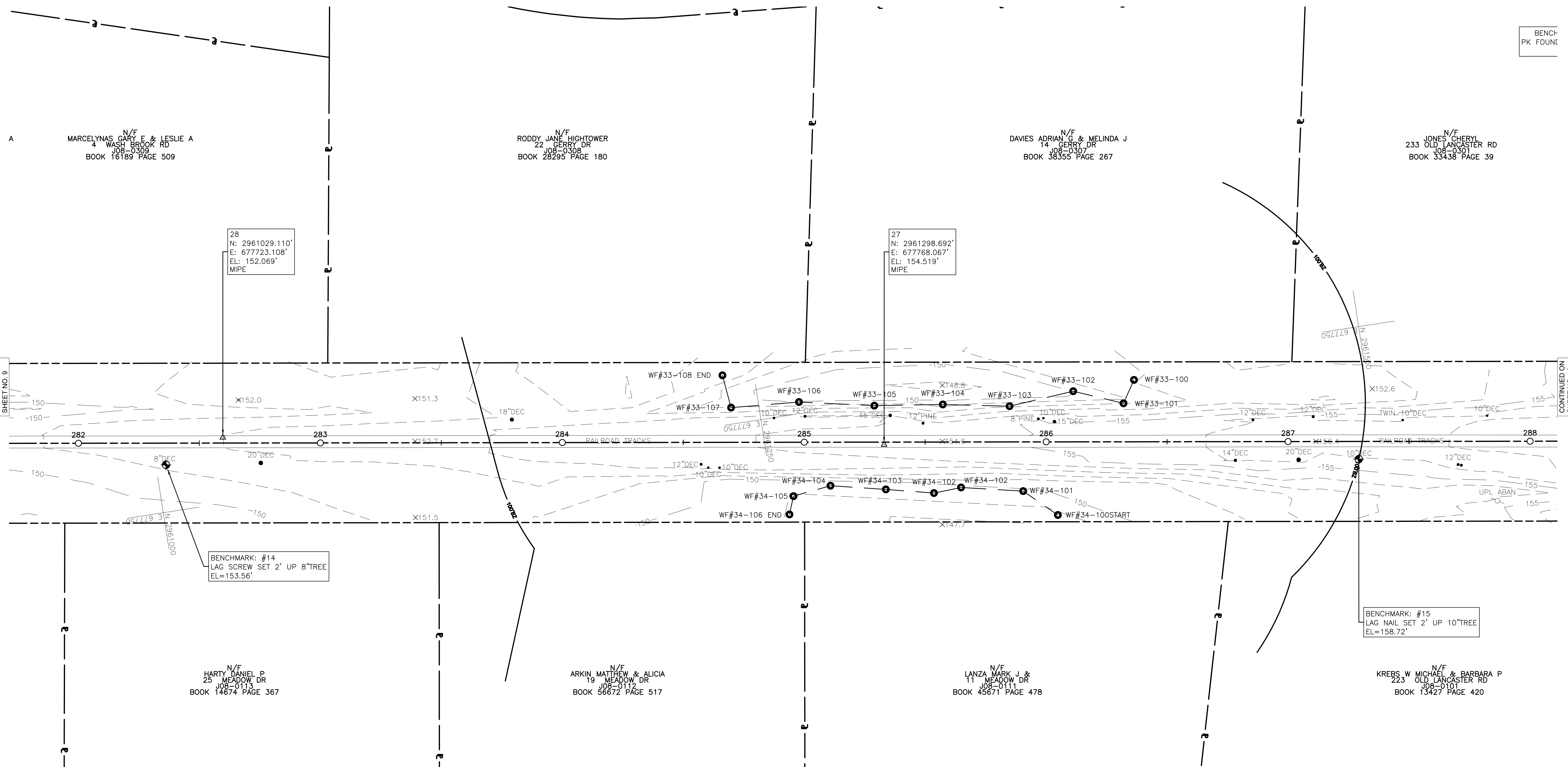
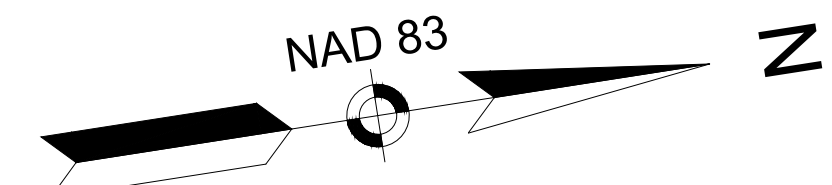
**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	55

PROJECT FILE NO.

SURVEY BASEPLAN

BENCH
PK FOUND



CONTINUED ON
SHEET NO. 9

CONTINUED ON
SHEET NO. 13

N/F
MARCELYNAS GARY E & LESLIE A
4 WASH BROOK RD
JOB-0309
BOOK 16189 PAGE 509

N/F
RODDY JANE HIGHTOWER
22 GERRY DR
JOB-0308
BOOK 28295 PAGE 180

N/F
DAVIES ADRIAN G & MELINDA J
14 GERRY DR
JOB-0307
BOOK 38355 PAGE 267

N/F
JONES CHERYL
233 OLD LANCASTER RD
JOB-0501
BOOK 35438 PAGE 39

28
N: 2961029.110'
E: 677723.108'
EL: 152.069'
MIPE

27
N: 2961298.692'
E: 677768.067'
EL: 154.519'
MIPE

BENCHMARK: #14
LAG SCREW SET 2' UP 8" TREE
EL=153.56'

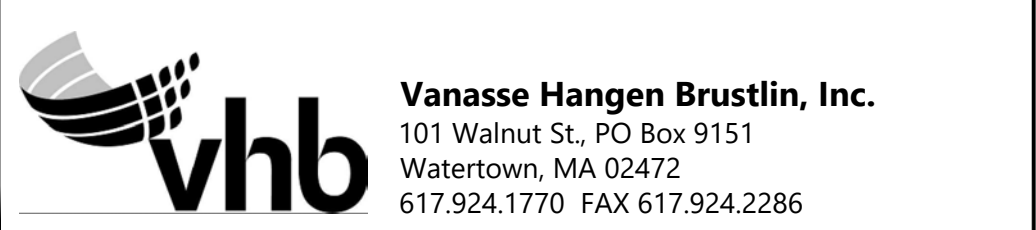
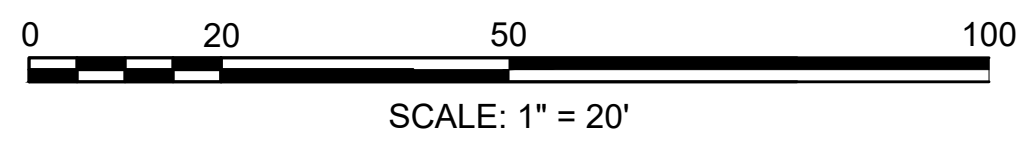
BENCHMARK: #15
LAG NAIL SET 2' UP 10" TREE
EL=158.72'

N/F
HARTY DANIEL P
25 MEADOW DR
JOB-0113
BOOK 14674 PAGE 367

N/F
ARKIN MATTHEW & ALICIA
19 MEADOW DR
JOB-0112
BOOK 56672 PAGE 517

N/F
LANZA MARK J &
11 MEADOW DR
JOB-0111
BOOK 45671 PAGE 478

N/F
KREBS W MICHAEL & BARBARA P
223 OLD LANCASTER RD
JOB-0101
BOOK 13427 PAGE 420



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

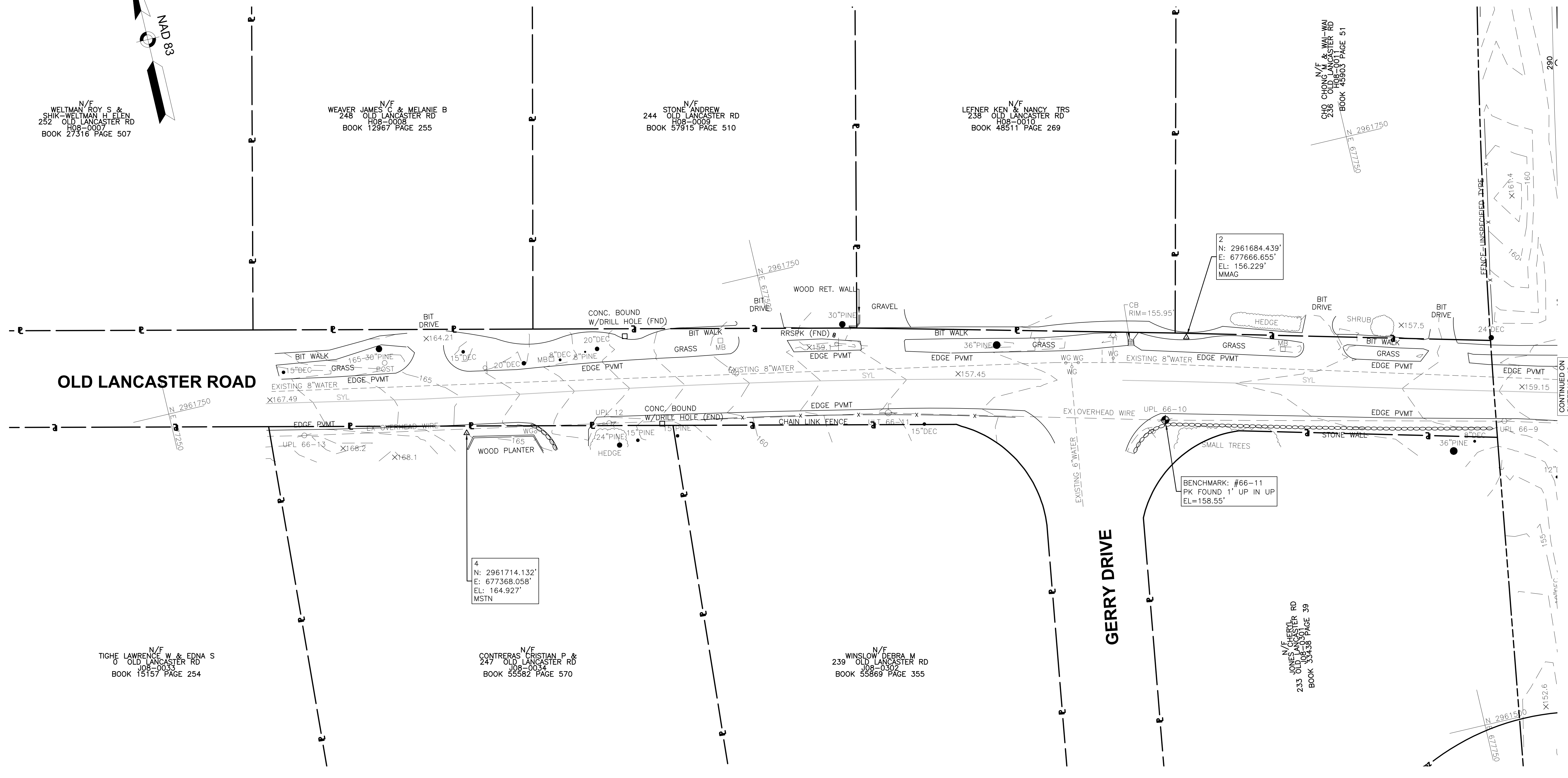
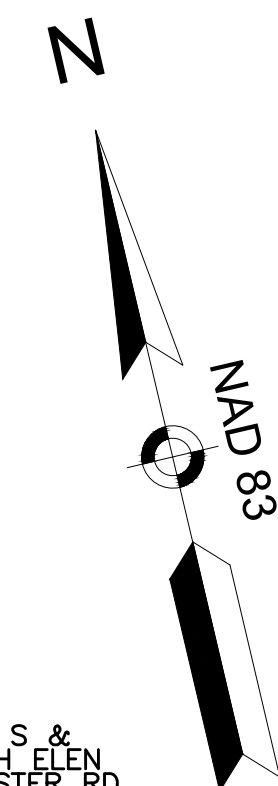
SHEET 10 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	55

SURVEY BASEPLAN

PROJECT FILE NO.



N/F
WELTMAN ROY S &
SHIK-WELTMAN H ELEN
252 OLD LANCASTER RD
H08-0007
BOOK 27316 PAGE 507

N/F
WEAVER JAMES G & MELANIE B
248 OLD LANCASTER RD
H08-0008
BOOK 12967 PAGE 255

N/F
STONE ANDREW
244 OLD LANCASTER RD
H08-0009
BOOK 57915 PAGE 510

N/F
LEFNER KEN & NANCY TRS
238 OLD LANCASTER RD
H08-0010
BOOK 48511 PAGE 269

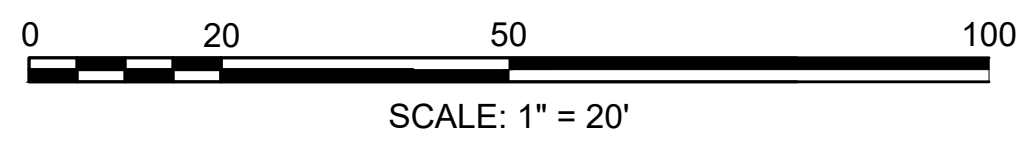
N/F
CHO CHONG W & WAI-WAI
236 OLD LANCASTER RD
H08-0010
BOOK 45800 PAGE 51

N/F
TIGHE LAWRENCE W & EDNA S
0 OLD LANCASTER RD
H08-0033
BOOK 15157 PAGE 254

N/F
CONTRERAS CRISTIAN P &
247 OLD LANCASTER RD
H08-0034
BOOK 55582 PAGE 570

N/F
WINSLOW DEBRA M
239 OLD LANCASTER RD
H08-0302
BOOK 55869 PAGE 355

N/F
JONES LANCELOT
233 OLD LANCASTER RD
H08-0001
BOOK 33438 PAGE 39



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Watertown, MA 02472
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REVISIONS		
REV.	COMMENTS	DATE

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PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

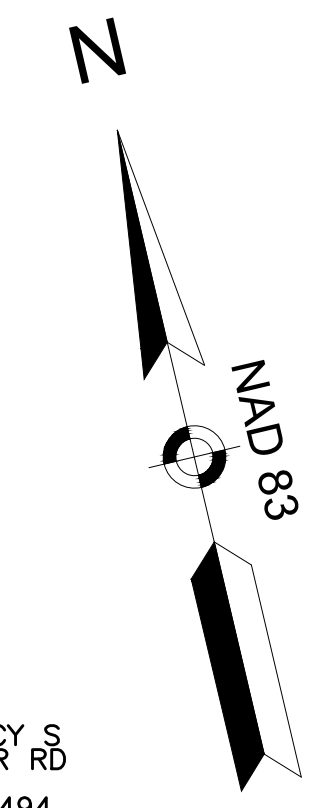
AS ORDERED BY
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TRANSPORTATION, HIGHWAY DIVISION

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	55

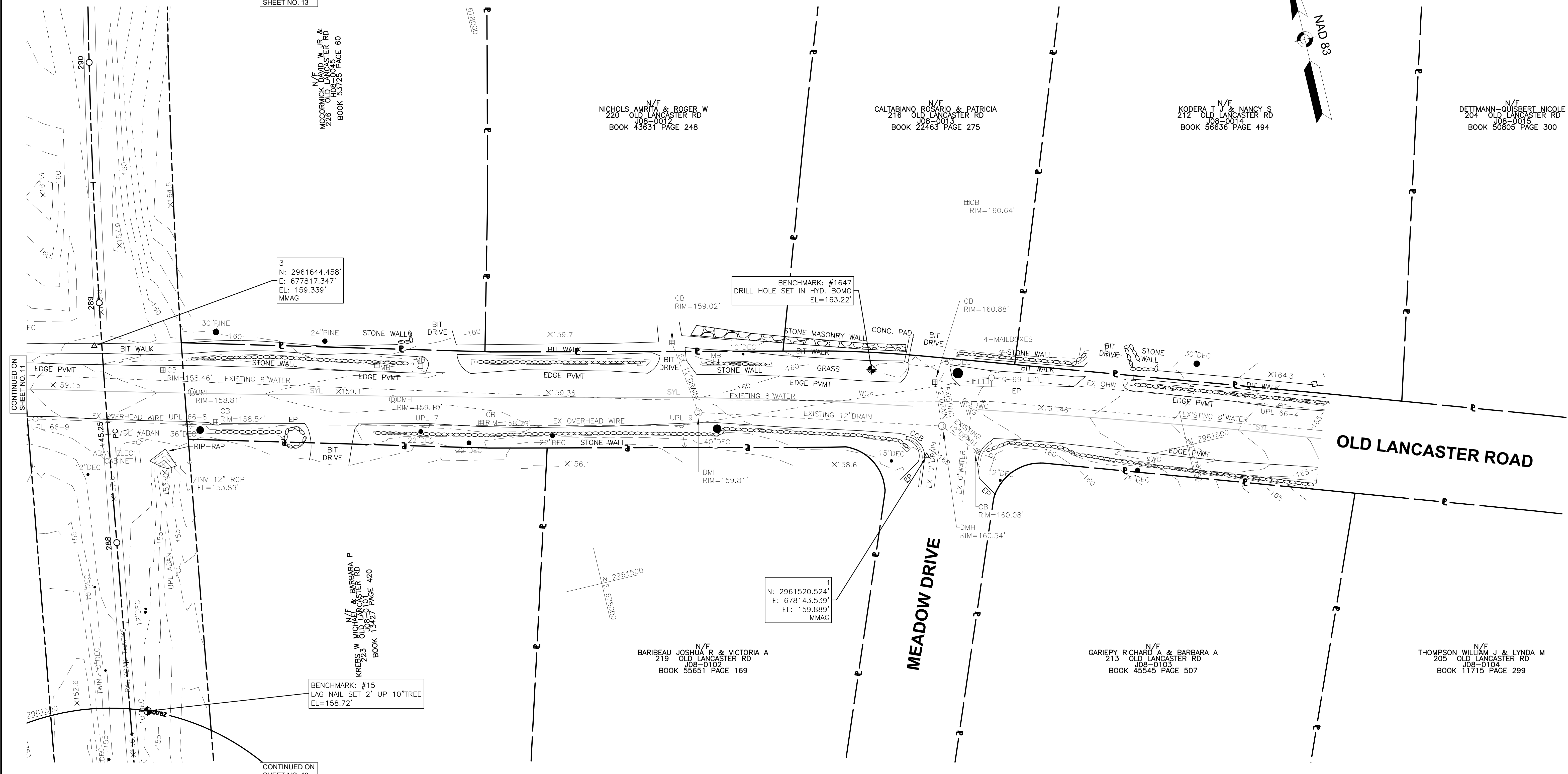
PROJECT FILE NO.

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 13

CONTINUED ON
SHEET NO. 10



N/F
MCCORMICK DAVID W JR &
226 OLD LANCASTER RD
JOB-0012
BOOK 53723 PAGE 60

N/F
NICHOLS AMRITA & ROGER W
220 OLD LANCASTER RD
JOB-0012
BOOK 43831 PAGE 248

N/F
CALTABIANO ROSARIO & PATRICIA
216 OLD LANCASTER RD
JOB-0013
BOOK 22463 PAGE 275

N/F
KODERA T J & NANCY S
212 OLD LANCASTER RD
JOB-0014
BOOK 56636 PAGE 494

N/F
DETMANN-QUIBERT NICOLE
204 OLD LANCASTER RD
JOB-0015
BOOK 50805 PAGE 300

3
N: 2961644.458'
E: 677817.347'
EL: 159.339'
MMAG

BENCHMARK: #1647
DRILL HOLE SET IN HYD. BOMO
EL=163.22'

1
N: 2961520.524'
E: 678143.539'
EL: 159.889'
MMAG

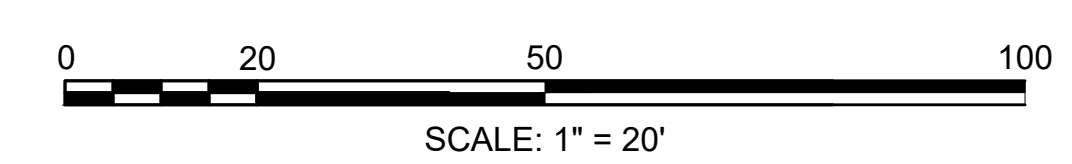
BENCHMARK: #15
LAG NAIL SET 2' UP 10" TREE
EL=158.72'

N/F
KREBS W MICHAEL & BARBARA P
223 OLD LANCASTER RD
JOB-0101
BOOK 13427 PAGE 420

N/F
BARIBEAU JOSHUA R & VICTORIA A
219 OLD LANCASTER RD
JOB-0102
BOOK 55651 PAGE 169

N/F
GARIPEY RICHARD A & BARBARA A
213 OLD LANCASTER RD
JOB-0103
BOOK 45545 PAGE 507

N/F
THOMPSON WILLIAM J & LYNDY M
205 OLD LANCASTER RD
JOB-0104
BOOK 11715 PAGE 299



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Watertown, MA 02472
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REVISIONS		
REV.	COMMENTS	DATE

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PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY

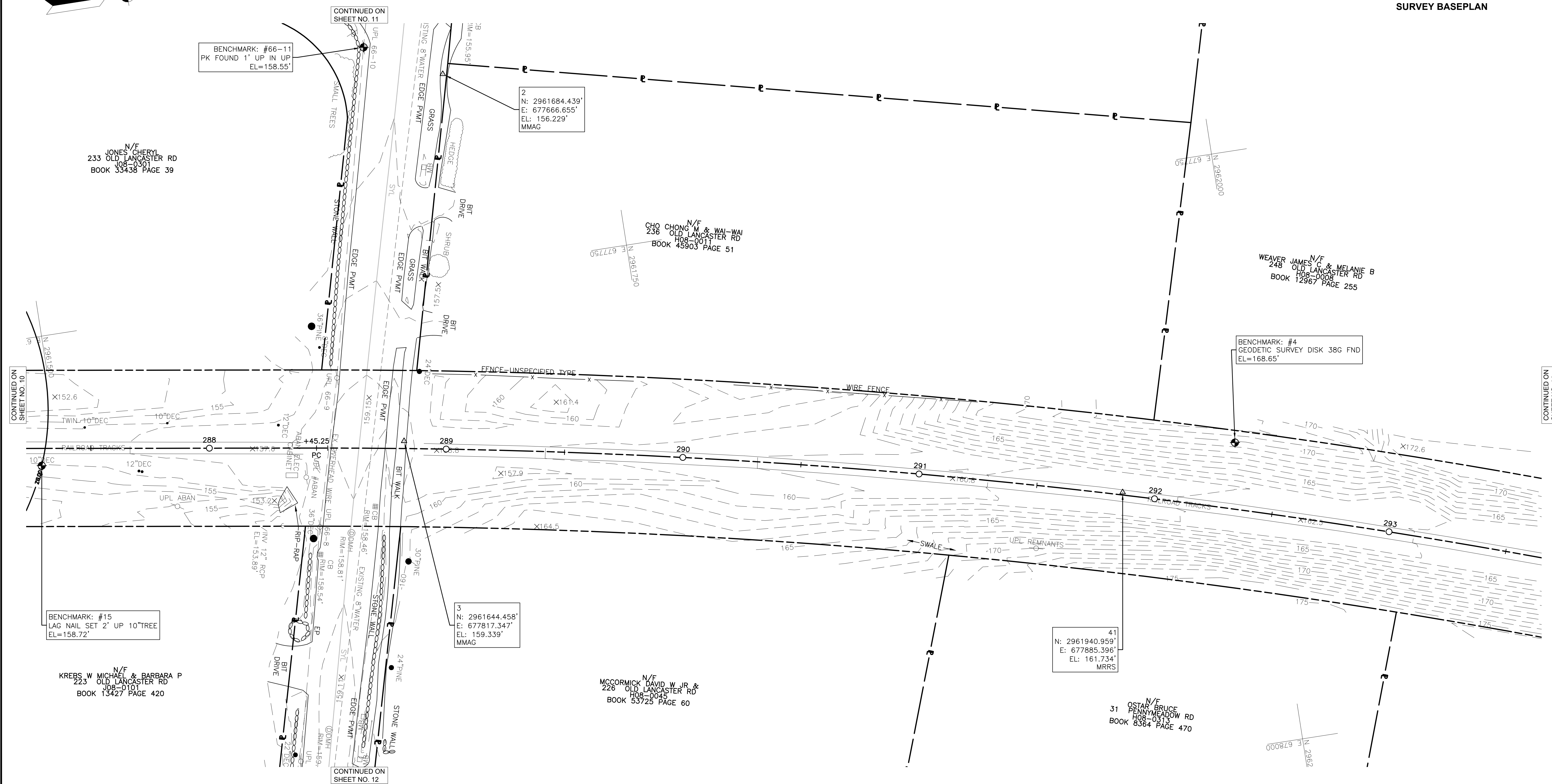
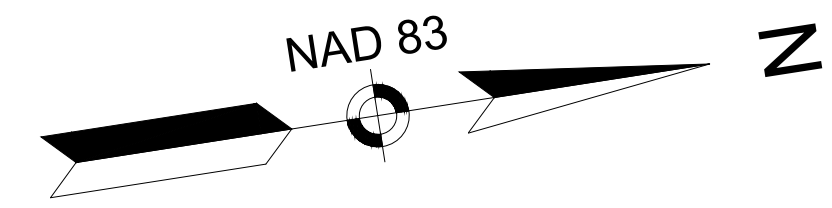
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**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	55

PROJECT FILE NO.

SURVEY BASEPLAN



BENCHMARK: #66-11
PK FOUND 1" UP IN UP
EL=158.55'

2
N: 2961684.439'
E: 677666.655'
EL: 156.229'
MMAG

BENCHMARK: #4
GEODETIC SURVEY DISK 386 FND
EL=168.65'

BENCHMARK: #15
LAG NAIL SET 2" UP 10" TREE
EL=158.72'

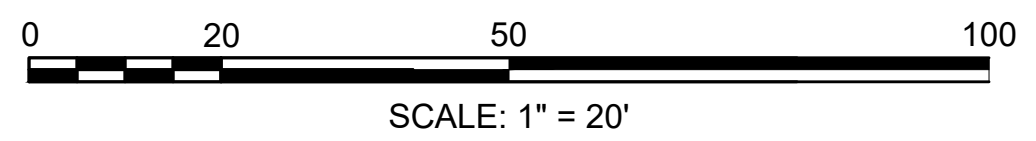
3
N: 2961644.458'
E: 677817.347'
EL: 159.339'
MMAG

41
N: 2961940.959'
E: 677885.396'
EL: 161.734'
MRRS

31
OSTAR BRUCE
PENNYMEADOW RD
BOOK 8364 PAGE 470

N/F
KREBS W MICHAEL & BARBARA P
223 OLD LANCASTER RD
JOB-0101
BOOK 13427 PAGE 420

N/F
MCCORMICK DAVID W JR &
226 OLD LANCASTER RD
JOB-9045
BOOK 53725 PAGE 60



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MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

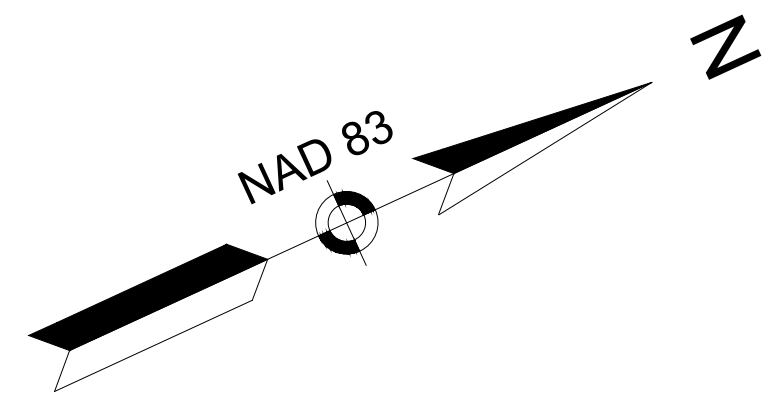
IN THE TOWN OF
SUDBURY
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TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME: 12984-00-EX
FIELD BOOK NO.: 1200 & 1225
DRAWN BY: JEC CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS PARS. NO.:

DATE: MAY 19, 2016 SHEET 13 OF 55

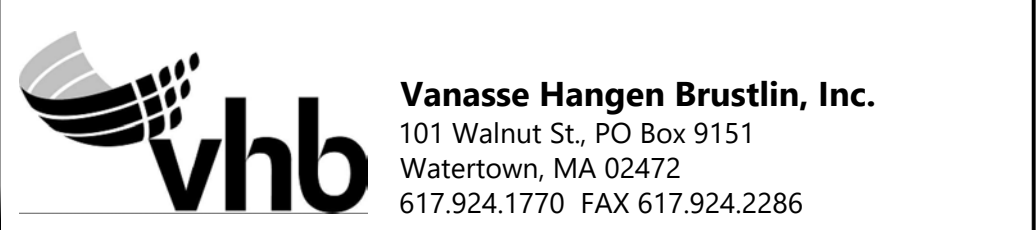
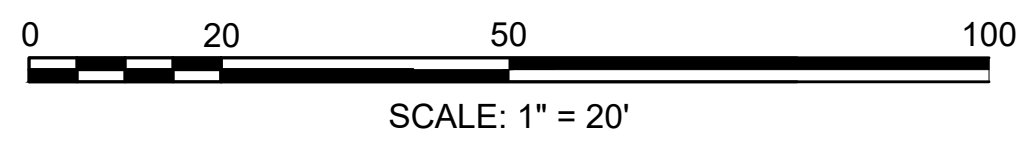
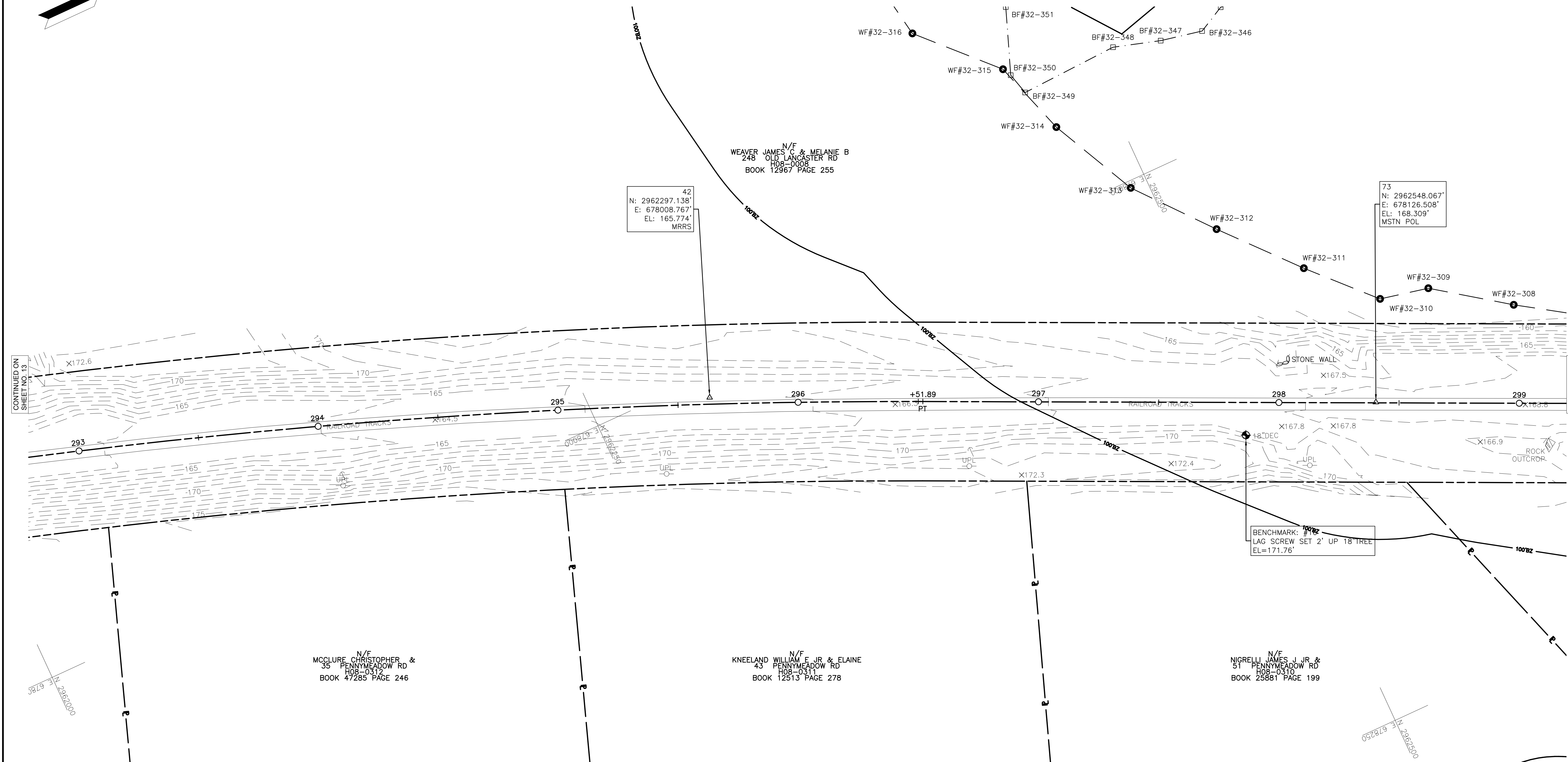


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	55

PROJECT FILE NO.

SURVEY BASEPLAN



PREPARED BY:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

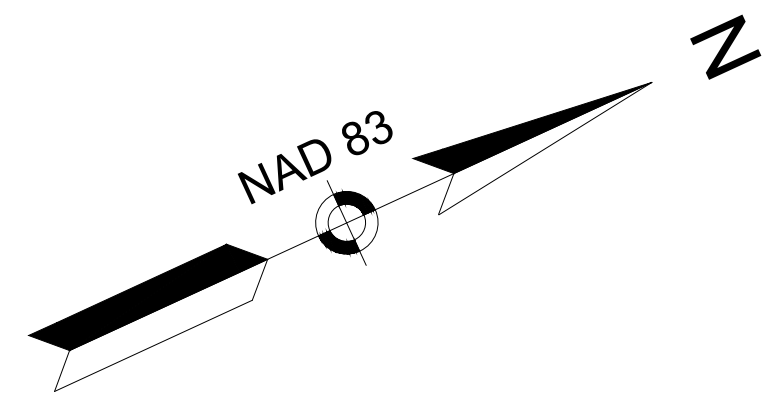
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REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

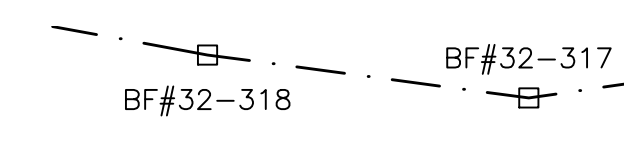
DATE: MAY 19, 2016 SHEET 14 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	55

SURVEY BASEPLAN



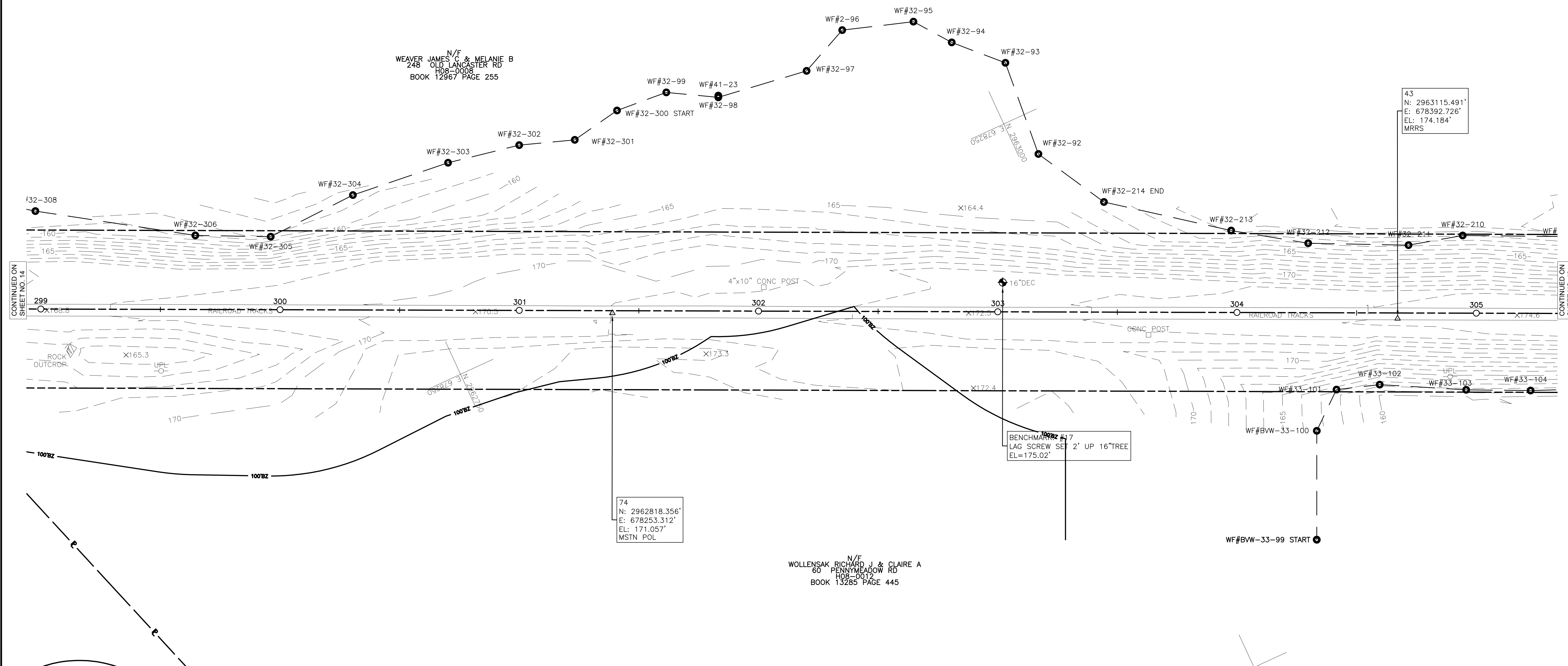
N/F
WEAVER JAMES C & MELANIE B
248 OLD LANCASTER RD
HOB-0008
BOOK 12967 PAGE 255

N/F
WOLLENSAK RICHARD J & CLAIRE A
60 PENNYMEADOW RD
HOB-0012
BOOK 13285 PAGE 445

43
N: 2963115.491'
E: 678392.726'
EL: 174.184'
MRRS

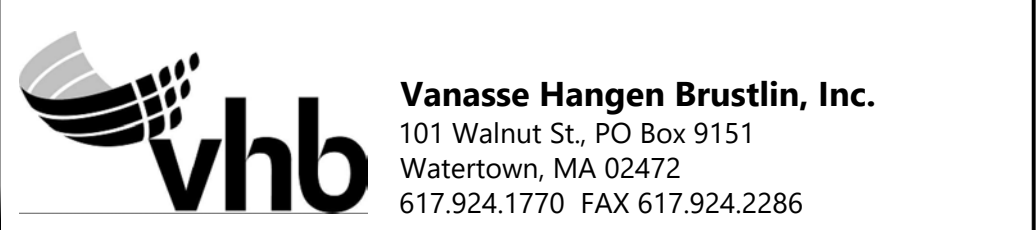
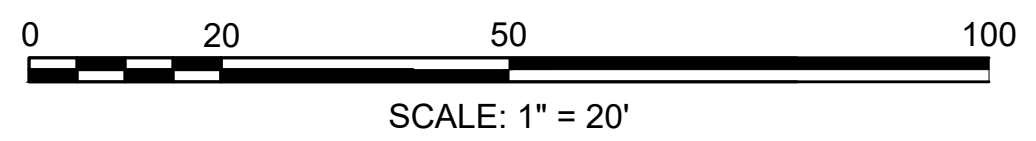
BENCHMARK #17
LAG SCREW SET 2' UP 16" TREE
EL=175.02'

74
N: 2962818.356'
E: 678253.312'
EL: 171.057'
MSTN POL



CONTINUED ON
SHEET NO. 14

CONTINUED ON
SHEET NO. 16



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

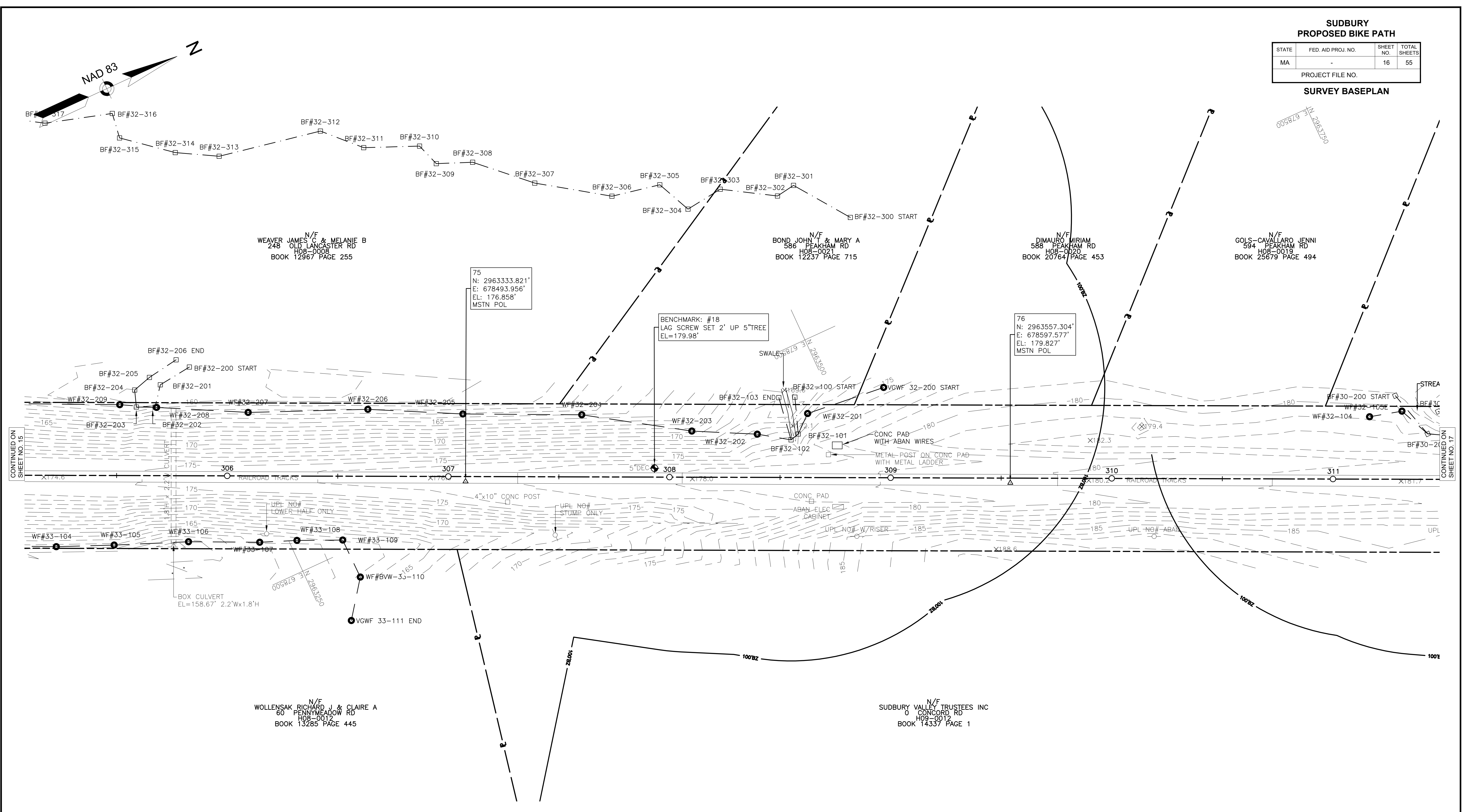
SHEET 15 OF 55

**SUBURRY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	55

PROJECT FILE NO.

SURVEY BASEPLAN

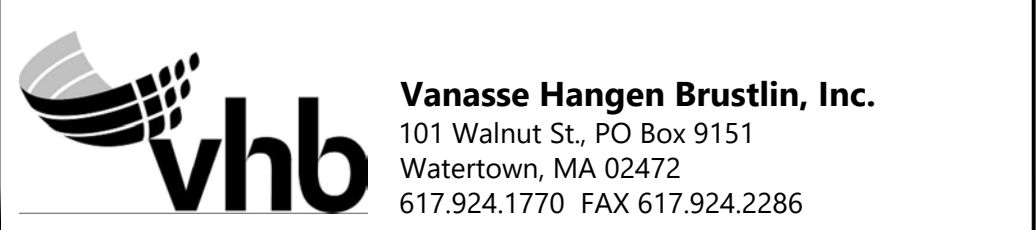
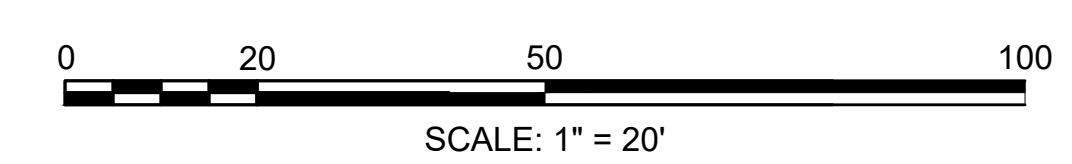


CONTINUED ON SHEET NO. 15

CONTINUED ON SHEET NO. 17

N/F
WOLLENSAK RICHARD J & CLAIRE A
60 PENNYMEADOW RD
H08-0012
BOOK 13285 PAGE 445

N/F
SUBURRY VALLEY TRUSTEES INC
0 CONCORD RD
H09-0012
BOOK 14337 PAGE 1



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUBURRY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

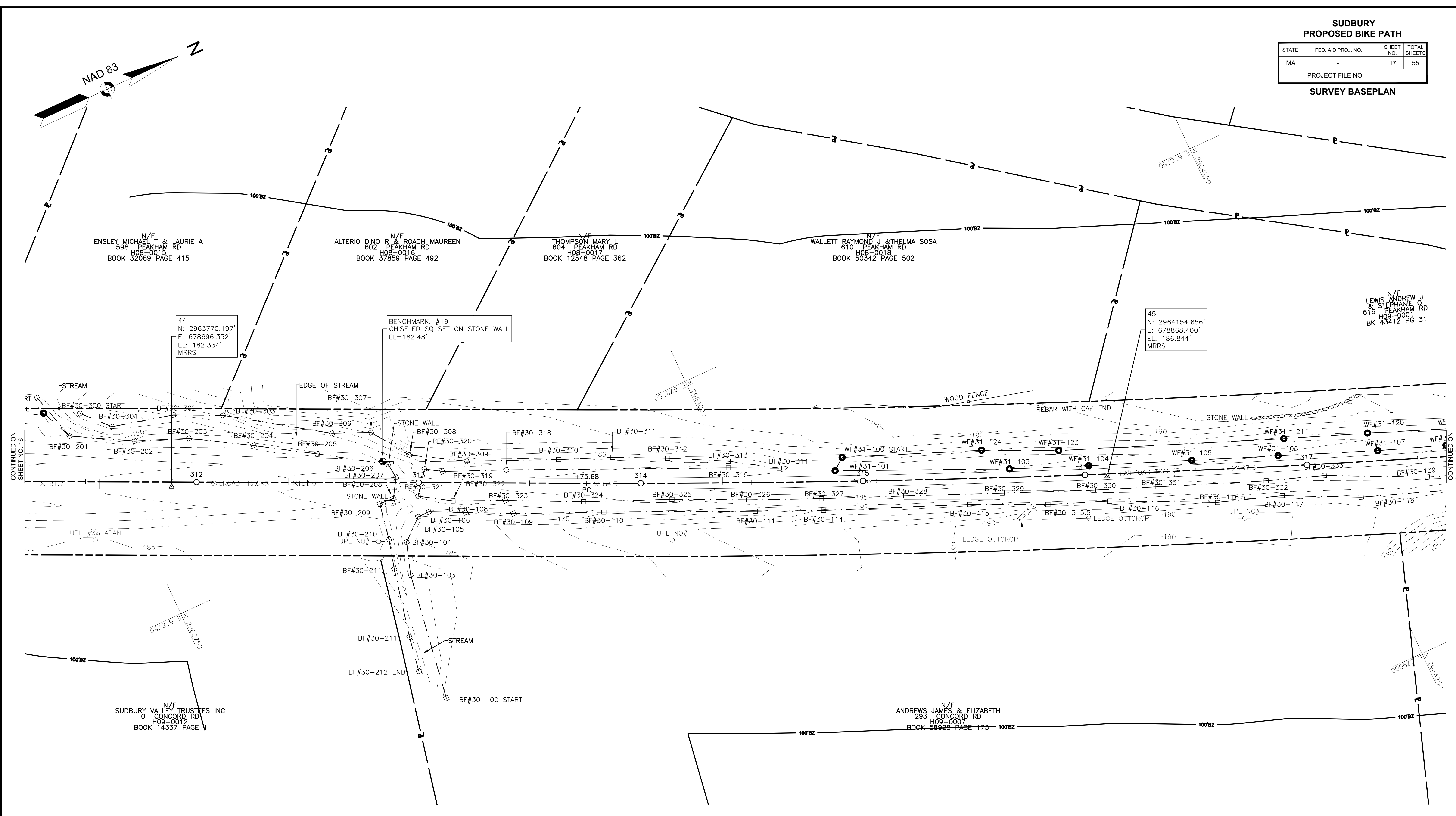
DATE: MAY 19, 2016 SHEET 16 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	17	55

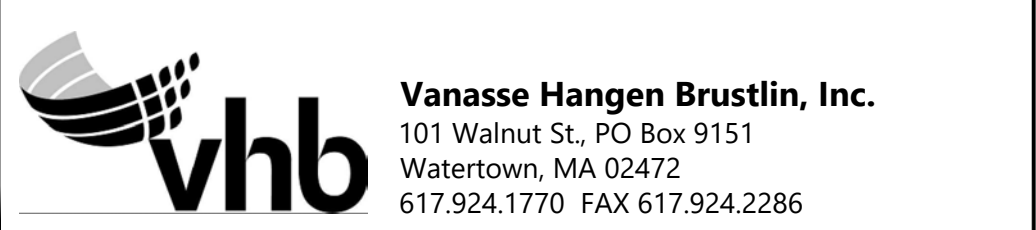
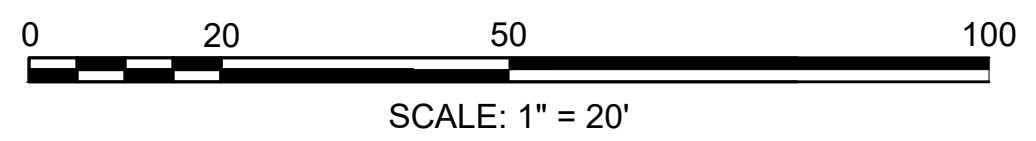
PROJECT FILE NO.

SURVEY BASEPLAN



CONTINUED ON SHEET NO. 16

CONTINUED ON SHEET NO. 18



REVISIONS		
REV.	COMMENTS	DATE

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FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 17 OF 55

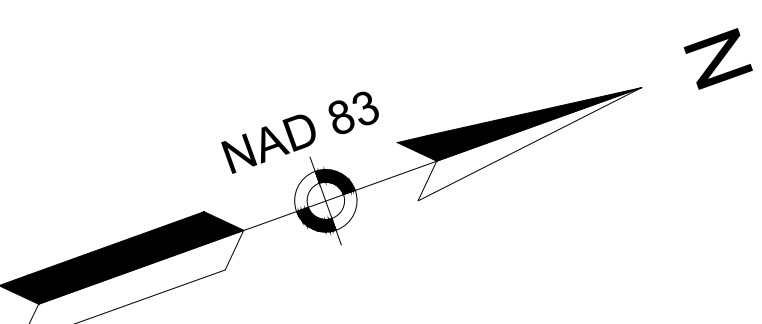
**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	18	55

PROJECT FILE NO.

SURVEY BASEPLAN

N/F
TIGHE LAWRENCE W
40 HUDSON RD
09-001
BOOK 33228 PAGE 333



CONTINUED ON
SHEET NO. 19

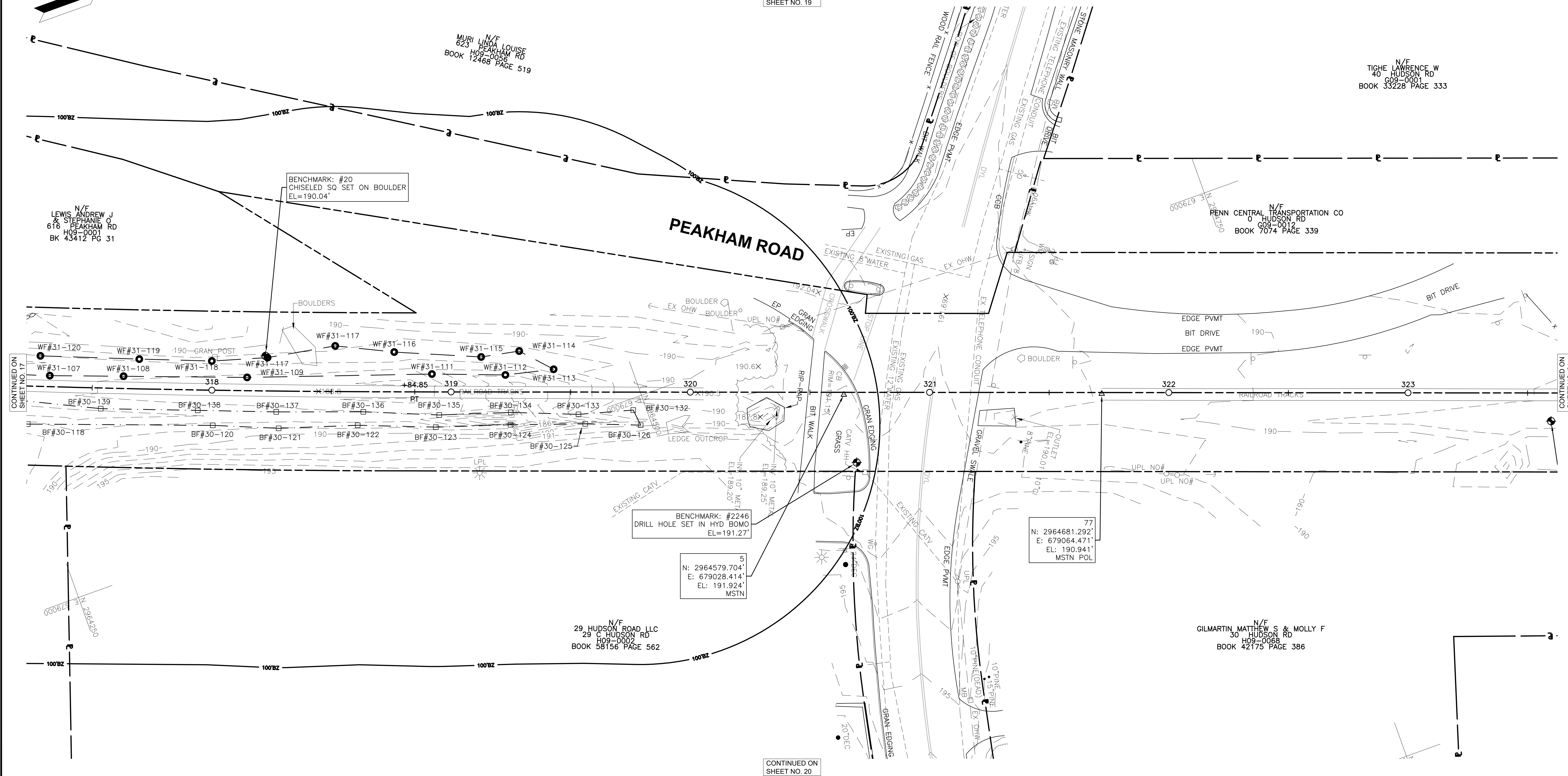
N/F
MURI LINDA LOUISE
623 PEAKHAM RD
H09-0068
BOOK 12468 PAGE 519

N/F
LEWIS ANDREW J
& STEPHANIE O
616 PEAKHAM RD
H09-0001
BK 43412 PG 31

BENCHMARK: #20
CHISELED SQ SET ON BOULDER
EL=190.04'

N/F
PENN CENTRAL TRANSPORTATION CO
0 HUDSON RD
09-0012
BOOK 7074 PAGE 339

PEAKHAM ROAD



CONTINUED ON
SHEET NO. 17

CONTINUED ON
SHEET NO. 21

BENCHMARK: #2246
DRILL HOLE SET IN HYD BOMO
EL=191.27'

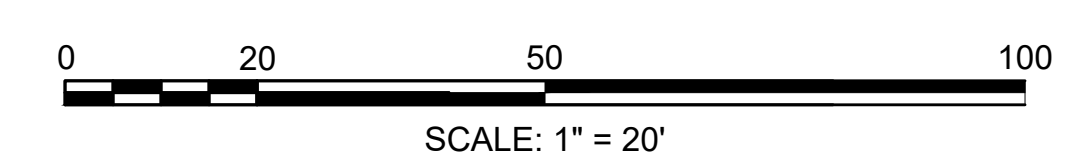
5
N: 2964579.704'
E: 679028.414'
EL: 191.924'
MSTN

77
N: 2964681.292'
E: 679064.471'
EL: 190.941'
MSTN POL

N/F
29 HUDSON ROAD LLC
29 HUDSON RD
H09-0002
BOOK 58156 PAGE 562

N/F
GILMARTIN MATTHEW S & MOLLY F
30 HUDSON RD
H09-0068
BOOK 42175 PAGE 386

CONTINUED ON
SHEET NO. 20



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Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO.: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO.:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

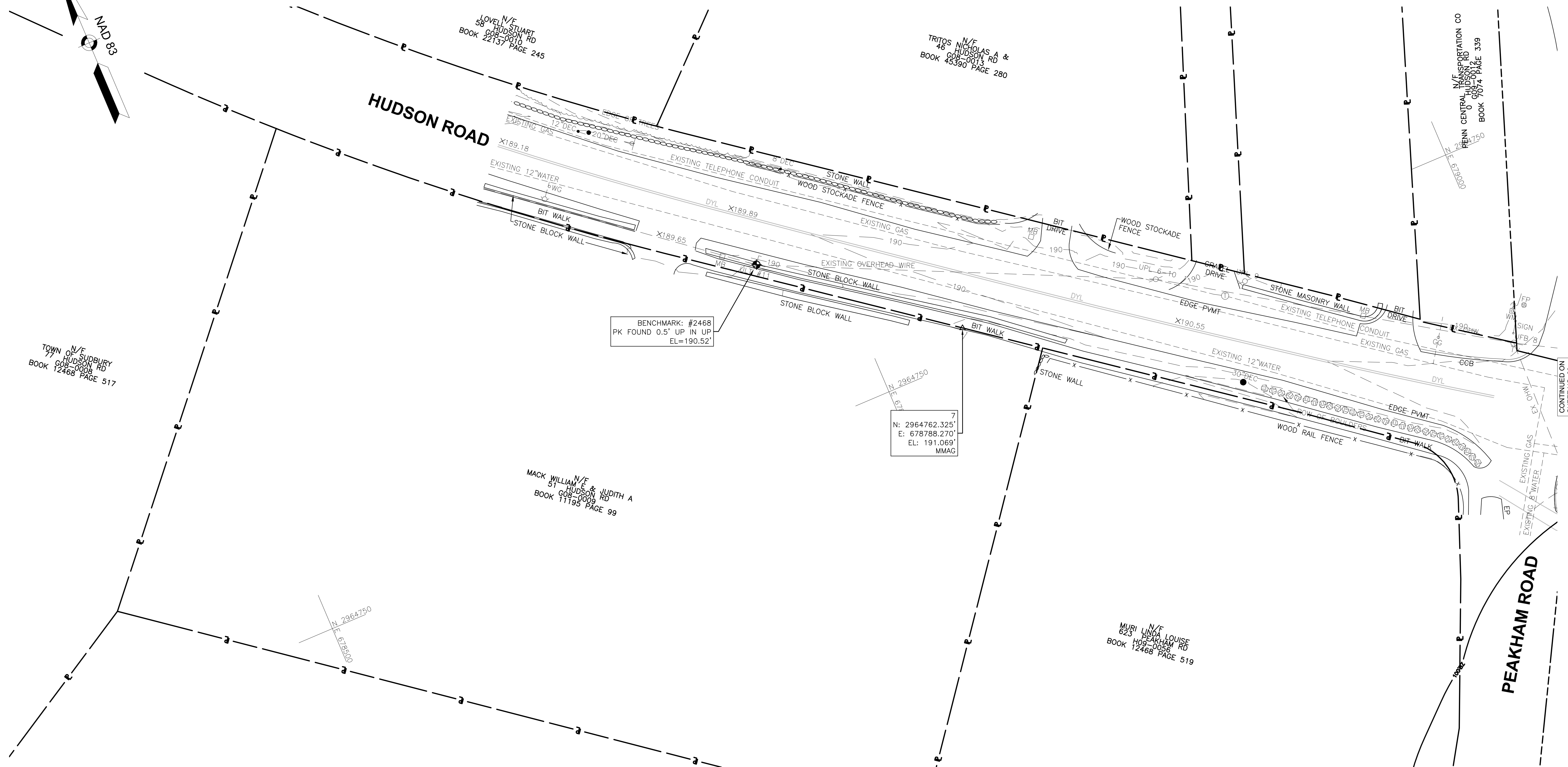
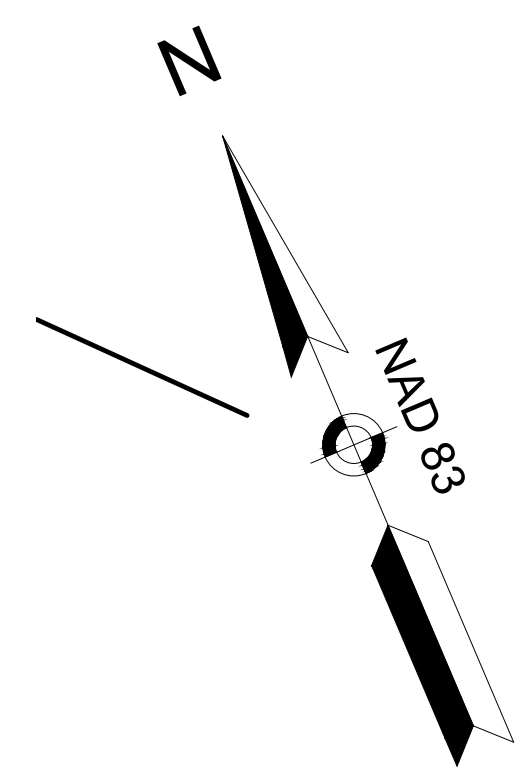
IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	19	55
PROJECT FILE NO.			

SURVEY BASEPLAN



TOWN OF SUDBURY
77 HUDSON RD
G08-0008
BOOK 12468 PAGE 517

LOVELLY STUART
58 HUDSON RD
G08-0010
BOOK 22137 PAGE 245

TRITOS NICHOLAS A &
46 HUDSON RD
G08-0013
BOOK 45390 PAGE 280

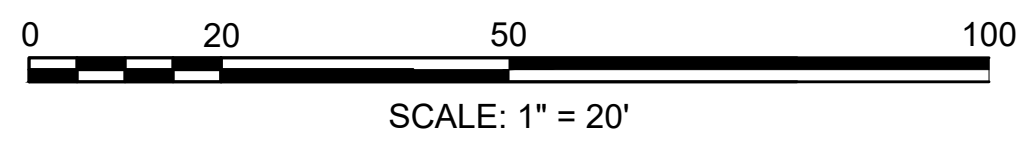
TRANSPORTATION CO
0 HUDSON RD
G08-0014
BOOK 10074 PAGE 339

MACK WILLIAM E & JUDITH A
51 HUDSON RD
G08-0009
BOOK 11195 PAGE 99

MURI LINDA LOUISE
623 PEAKHAM RD
H09-0058
BOOK 12468 PAGE 519

BENCHMARK: #2468
PK FOUND 0.5' UP IN UP
EL=190.52'

7
N: 2964762.325'
E: 678788.270'
EL: 191.069'
MMAG



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Watertown, MA 02472
617.924.1770 FAX 617.924.2286

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME: 12984.00-EX
FIELD BOOK NO: 1200 & 1225
DRAWN BY: JEC
CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS
PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

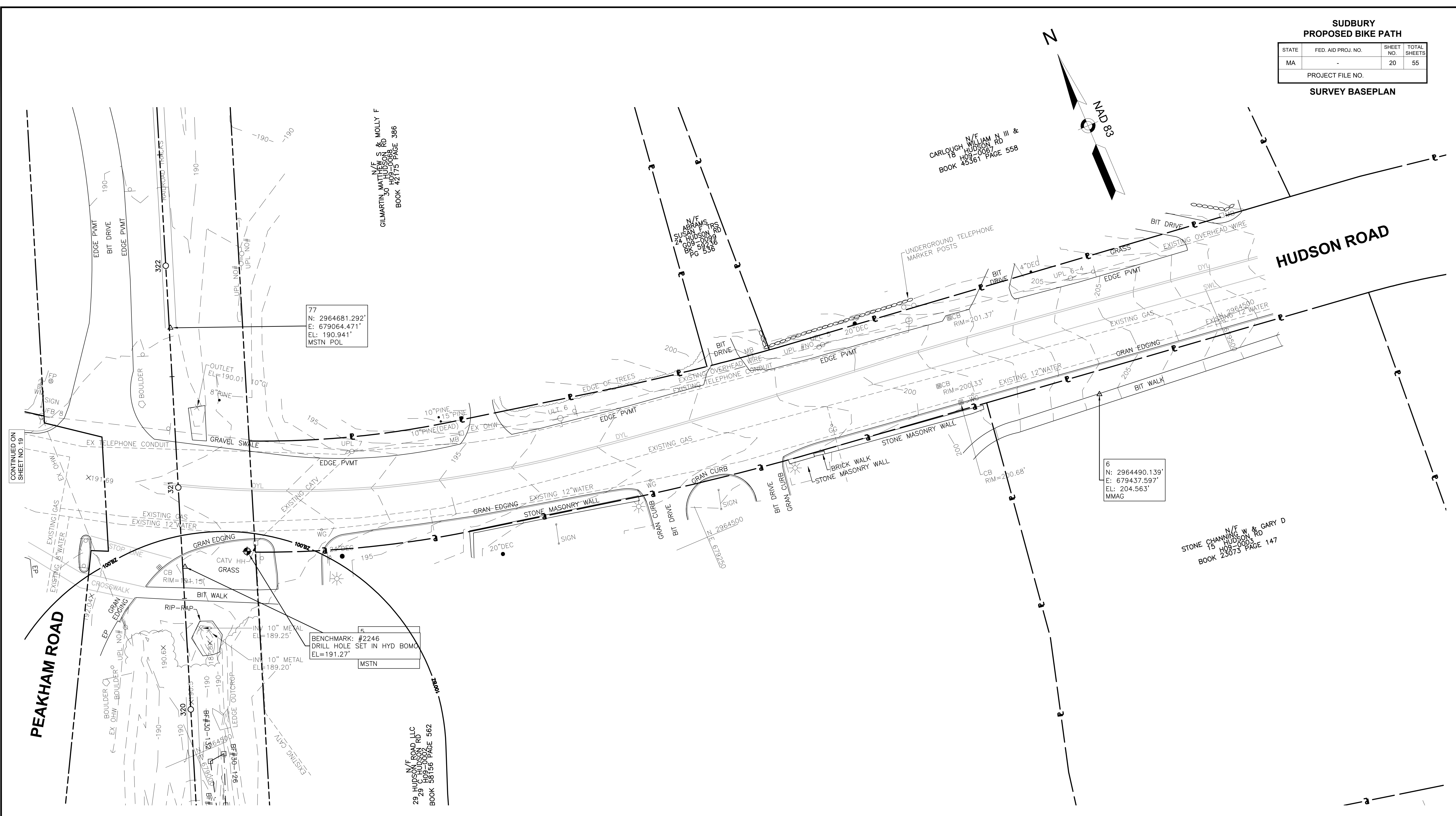
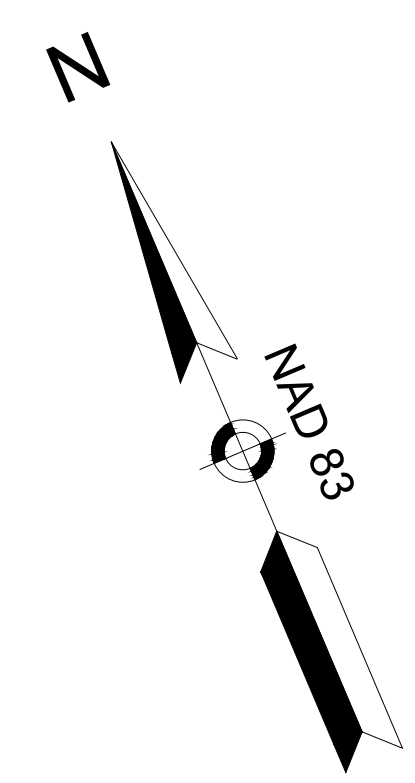
IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	20	55

PROJECT FILE NO.

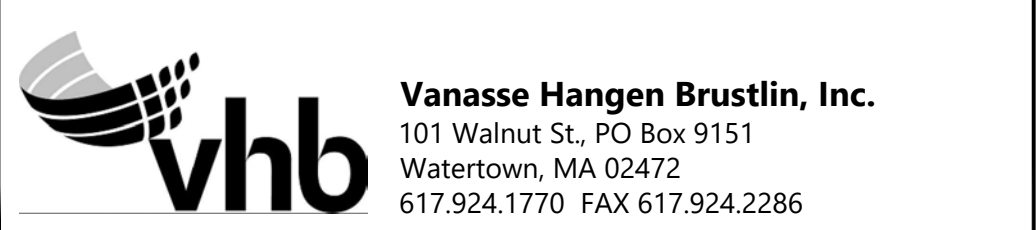
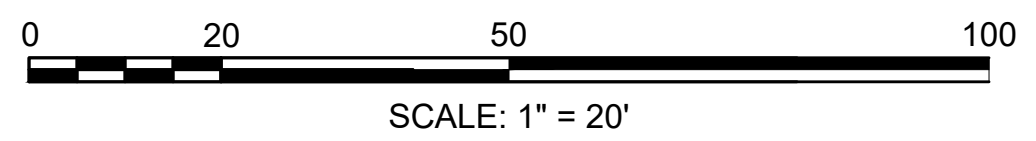
SURVEY BASEPLAN



77
N: 2964681.292'
E: 679064.471'
EL: 190.941'
MSTN POL

6
N: 2964490.139'
E: 679437.597'
EL: 204.563'
MMAG

BENCHMARK: #2246
DRILL HOLE SET IN HYD BOM
EL=191.27'
MSTN



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

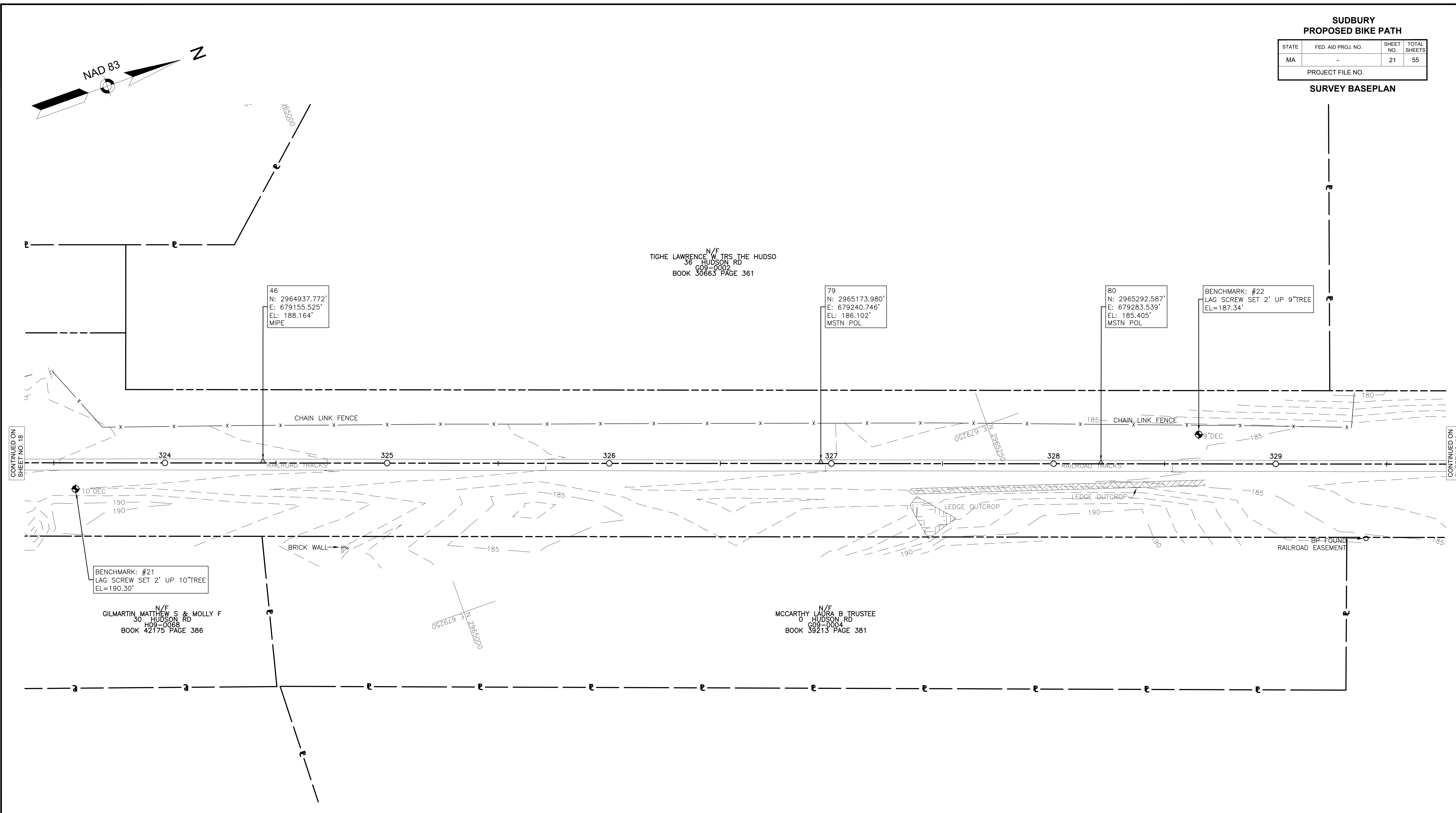
DATE: MAY 19, 2016

SHEET 20 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	21	55

PROJECT FILE NO.
SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 18

CONTINUED ON
SHEET NO. 22

BENCHMARK: #21
LAG SCREW SET 2' UP 10" TREE
EL=190.30'

46
N: 2964937.772'
E: 679155.525'
EL: 188.164'
MIPE

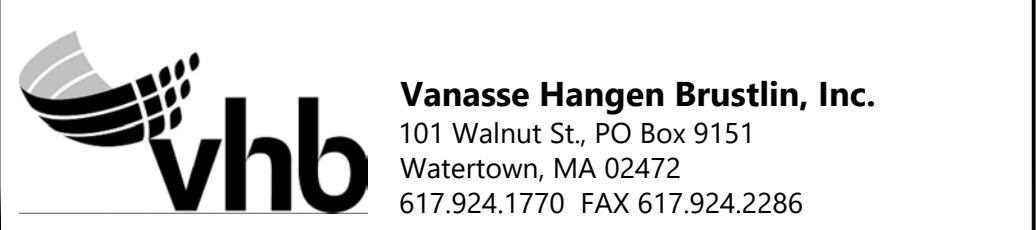
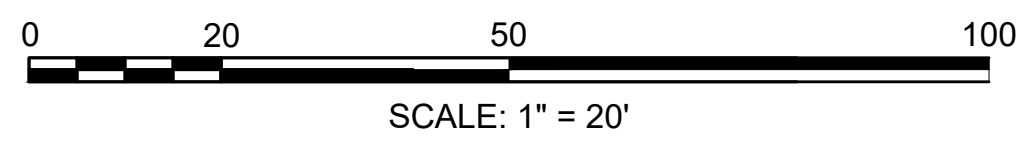
79
N: 2965173.980'
E: 679240.746'
EL: 186.102'
MSTN POL

80
N: 2965292.587'
E: 679283.539'
EL: 185.405'
MSTN POL

BENCHMARK: #22
LAG SCREW SET 2' UP 9" TREE
EL=187.34'

GILMARTIN MATTHEW S & MOLLY F
30 HUDSON RD
H09-0068
BOOK 42175 PAGE 386

MCCARTHY LAURA B TRUSTEE
0 HUDSON RD
G09-0004
BOOK 39213 PAGE 381



REVISIONS		
REV.	COMMENTS	DATE

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Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
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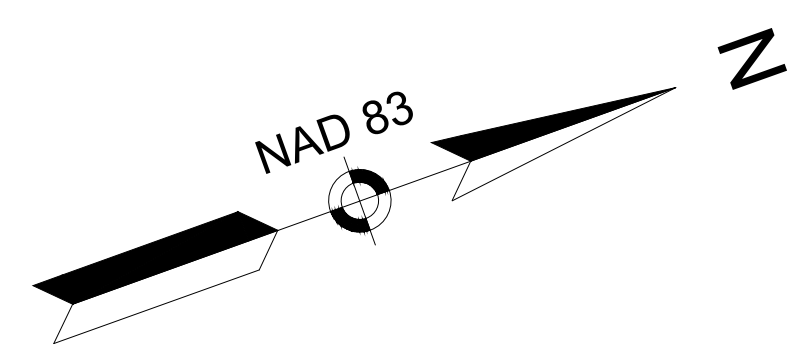
SCALE: 20 FEET TO THE INCH

FILE NAME: 12984.00-EX
FIELD BOOK NO: 1200 & 1225
DRAWN BY: JEC CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

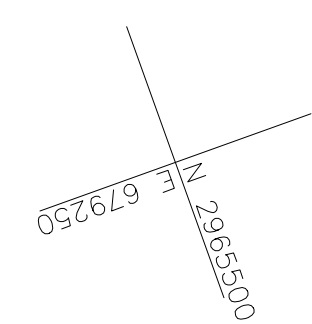
DATE: MAY 19, 2016 SHEET 21 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	22	55

PROJECT FILE NO.
SURVEY BASEPLAN



N/F
TOWN OF SUDBURY
HUDSON RD
G09-0200
BOOK 13189 PAGE 604

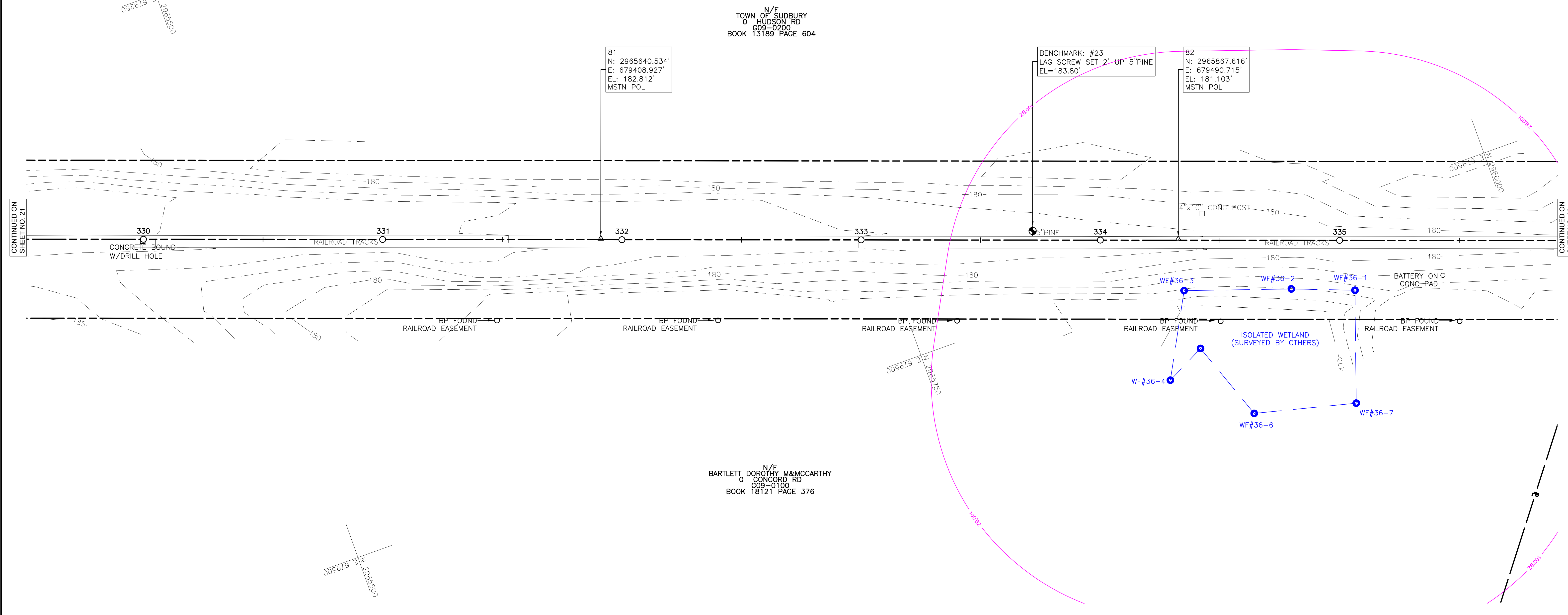
81
N: 2965640.534'
E: 679408.927'
EL: 182.812'
MSTN POL

BENCHMARK: #23
LAG SCREW SET 2'-UP 5" PINE
EL=183.80'

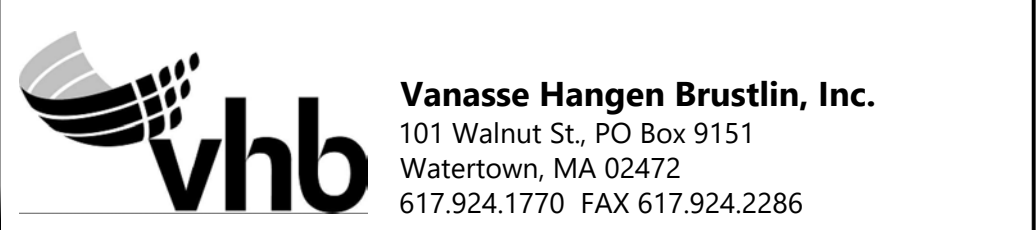
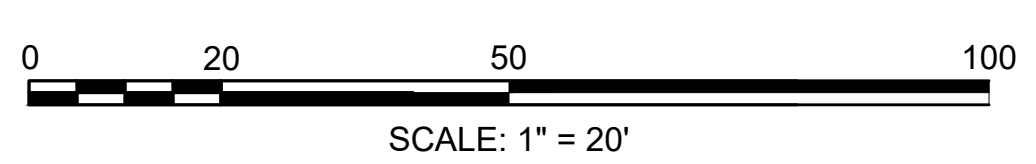
82
N: 2965867.616'
E: 679490.715'
EL: 181.103'
MSTN POL

CONTINUED ON
SHEET NO. 21

CONTINUED ON
SHEET NO. 23



N/F
BARTLETT, DOROTHY M & MCCARTHY
CONCORD RD
G09-0100
BOOK 18121 PAGE 376



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

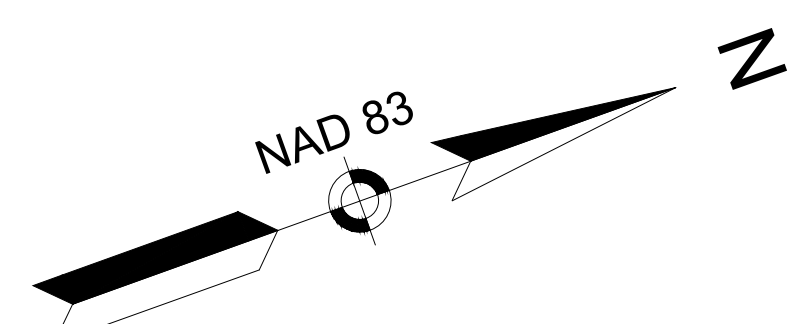
DATE: MAY 19, 2016

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	23	55

PROJECT FILE NO.

SURVEY BASEPLAN



N/F
TOWN OF SUDBURY
HUDSON RD
G09-0200
BOOK 13189 PAGE 604

N/F
SUDBURY TOWN OF
CONCORD RD
G09-0003
BOOK 24441 PAGE 588

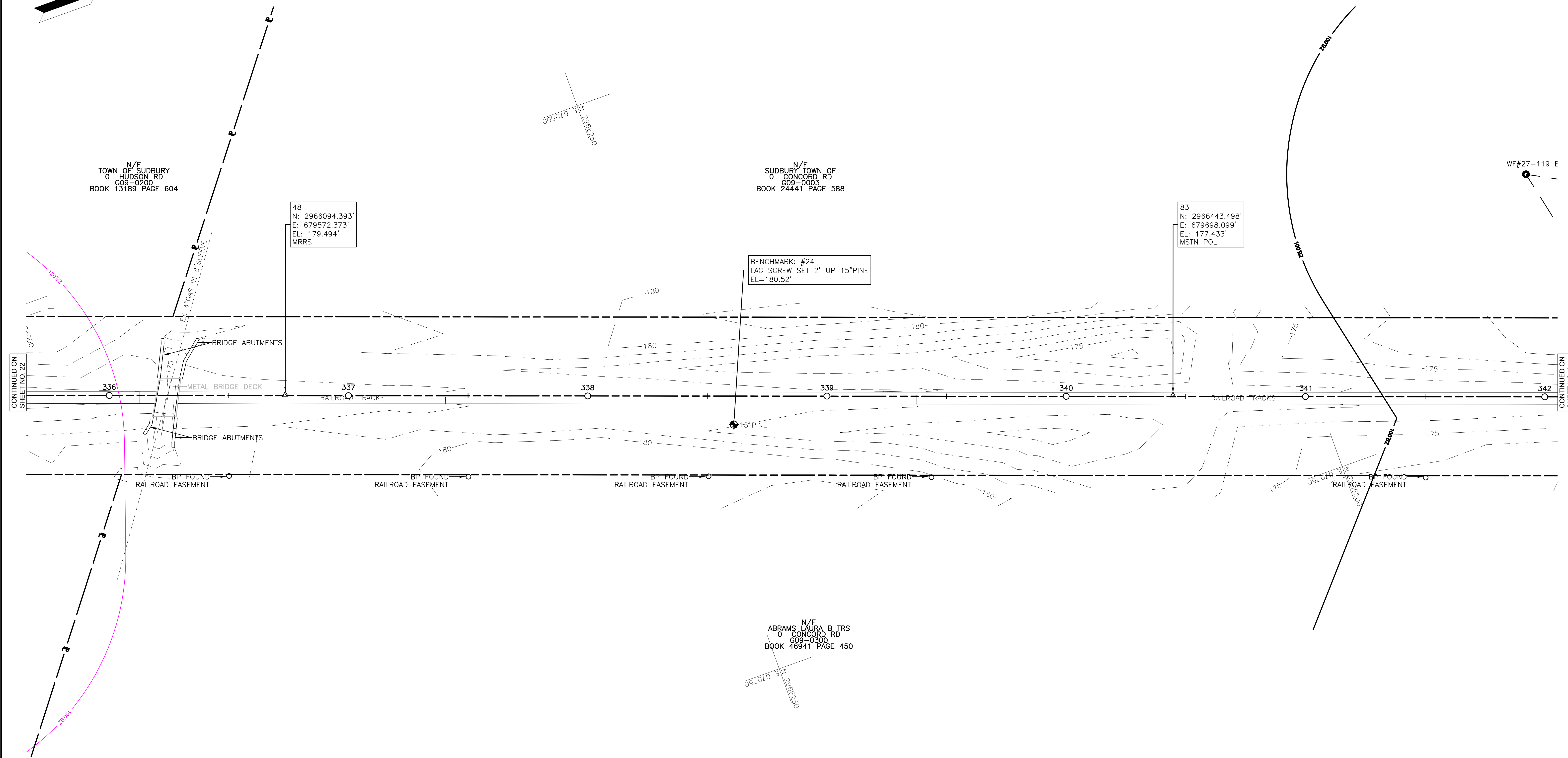
WF#27-119 E

48
N: 2966094.393'
E: 679572.373'
EL: 179.494'
MRRS

83
N: 2966443.498'
E: 679698.099'
EL: 177.433'
MSTN POL

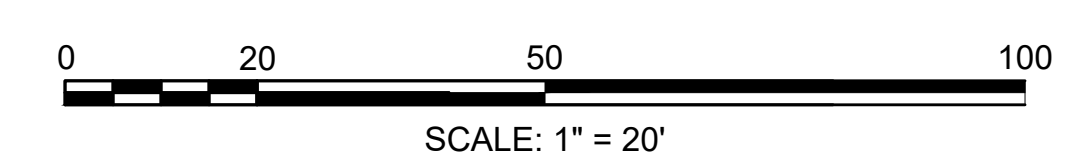
BENCHMARK: #24
LAG SCREW SET 2' UP 15" PINE
EL=180.52'

N/F
ABRAMS LAURA B TRS
CONCORD RD
G09-0300
BOOK 46941 PAGE 450



CONTINUED ON
SHEET NO. 22

CONTINUED ON
SHEET NO. 24



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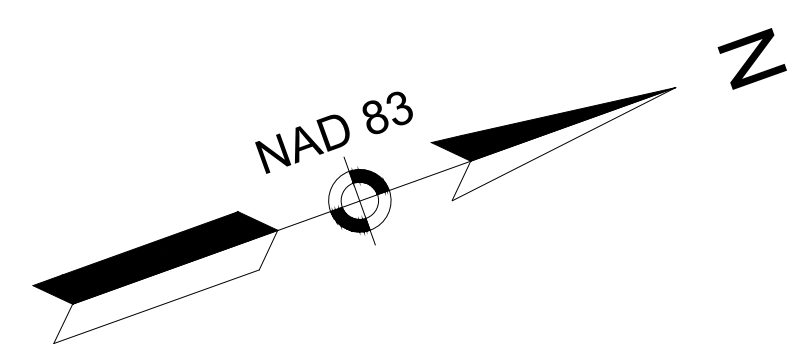
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

DATE: MAY 19, 2016 SHEET 23 OF 55

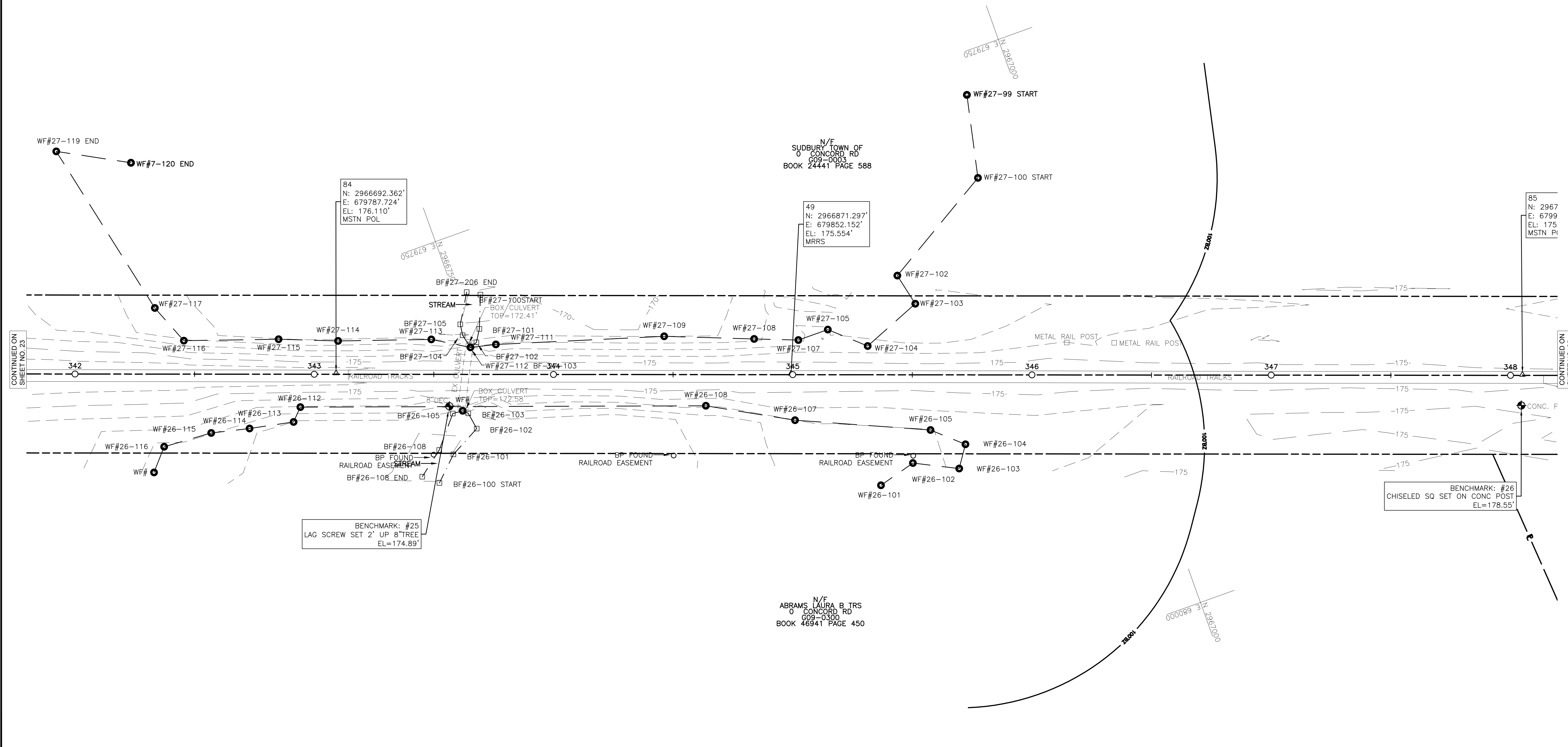


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	24	55

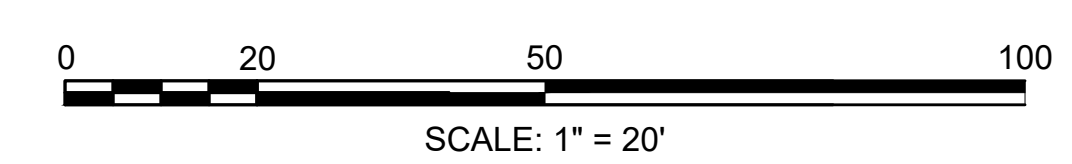
PROJECT FILE NO.

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 23

CONTINUED ON
SHEET NO. 25



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Vanasse Hangen Brustlin, Inc.
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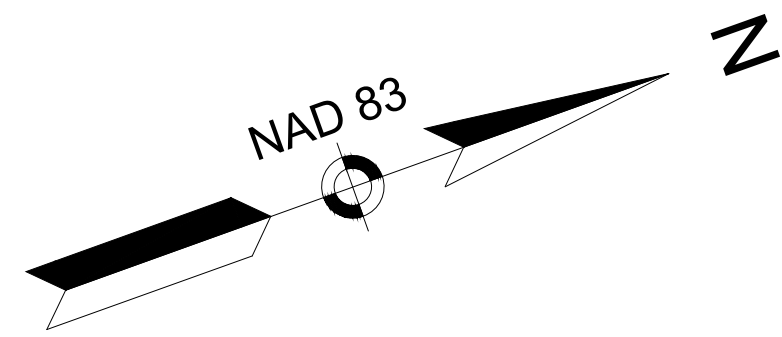
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

DATE: MAY 19, 2016 SHEET 24 OF 55



SUDBURY PROPOSED BIKE PATH			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	25	55
PROJECT FILE NO.			
SURVEY BASEPLAN			

TOWN OF SUDBURY
WAKE ROBIN RD
G09-0001
BOOK 12501 PAGE 703

N/F
SUDBURY TOWN OF
CONCORD RD
G09-0003
BOOK 24441 PAGE 588

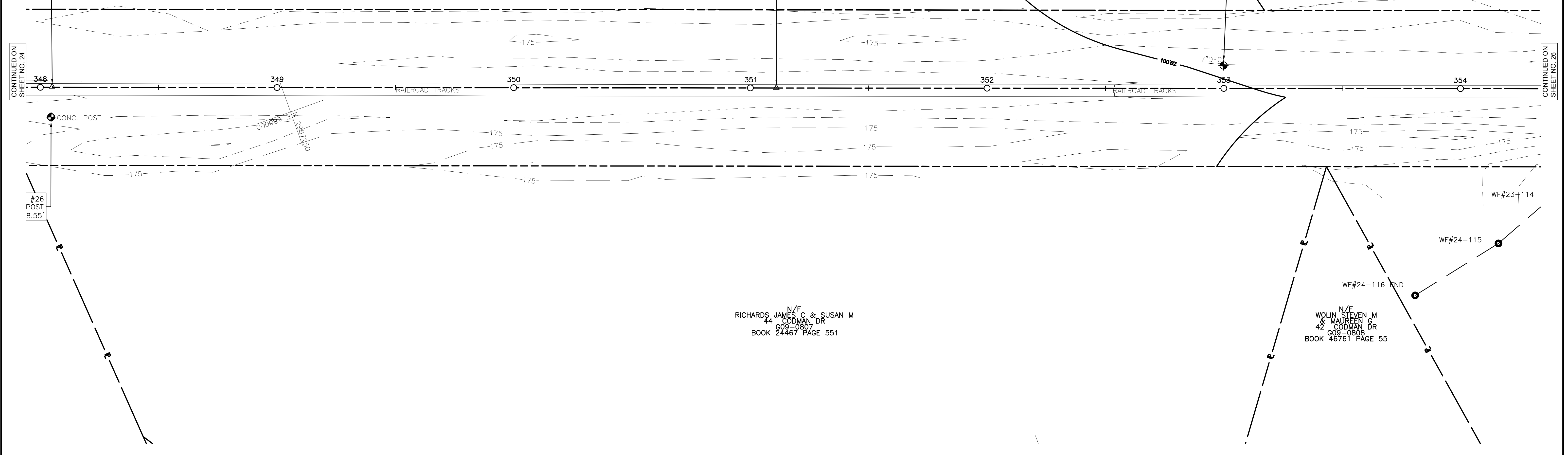
85
N: 2967158.846'
E: 679955.889'
EL: 175.157'
MSTN POL

50
N: 2967446.659'
E: 680059.723'
EL: 174.364'
MRRS

BENCHMARK: #27
LAG SCREW SET 2' UP 7" TREE
EL=175.05'

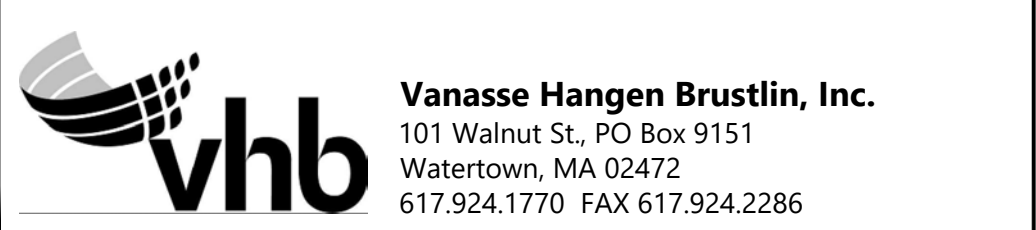
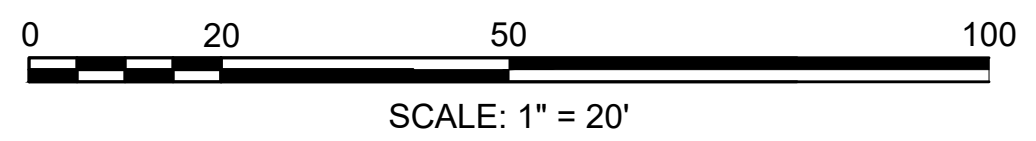
CONTINUED ON
SHEET NO. 24

CONTINUED ON
SHEET NO. 26



N/F
RICHARDS JAMES C & SUSAN M
44 CODMAN DR
G09-0807
BOOK 24467 PAGE 551

N/F
WOLIN STEVEN M
& MAUREEN G
42 CODMAN DR
G09-0808
BOOK 46761 PAGE 55



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO.: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO.:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

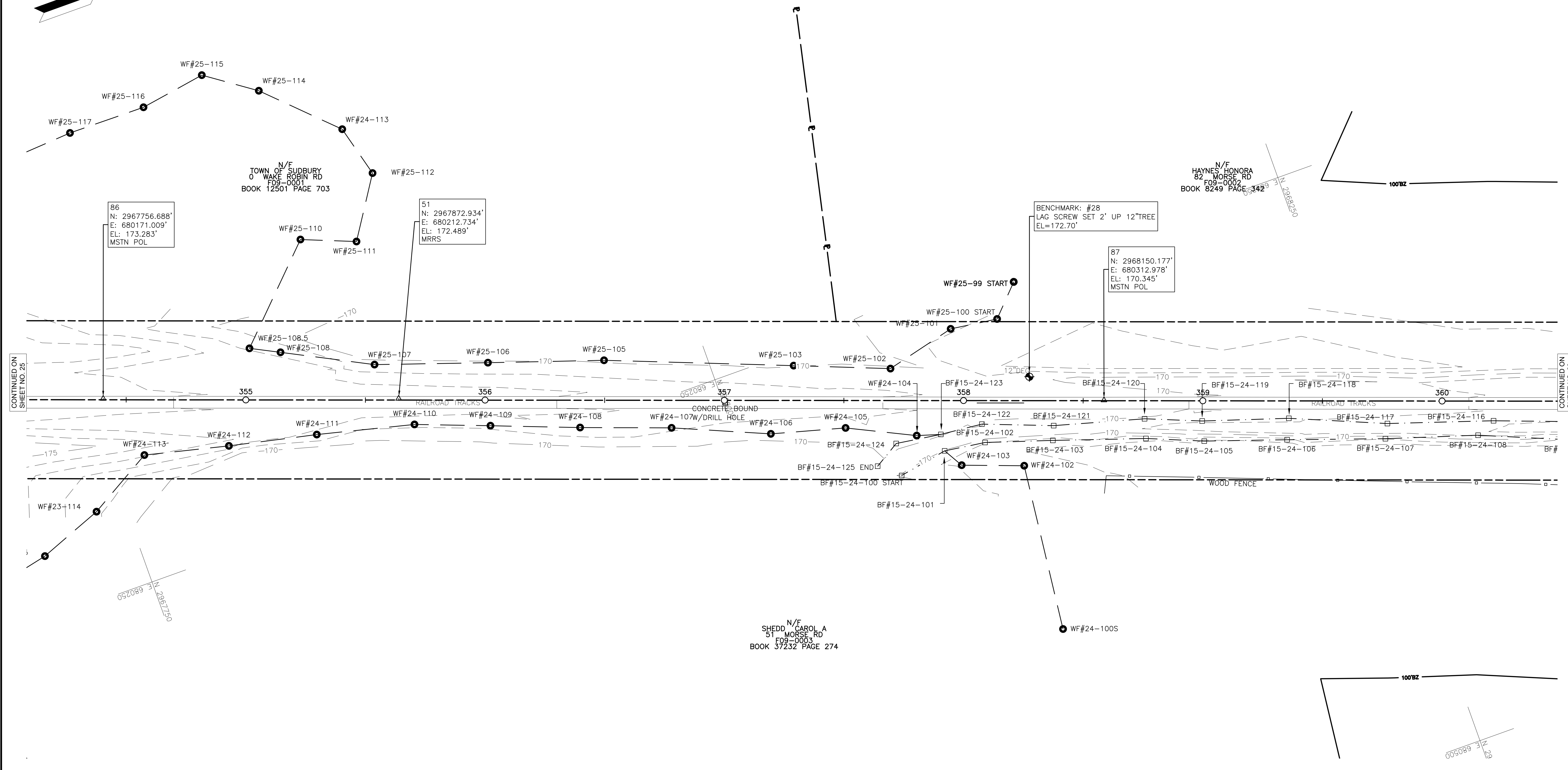
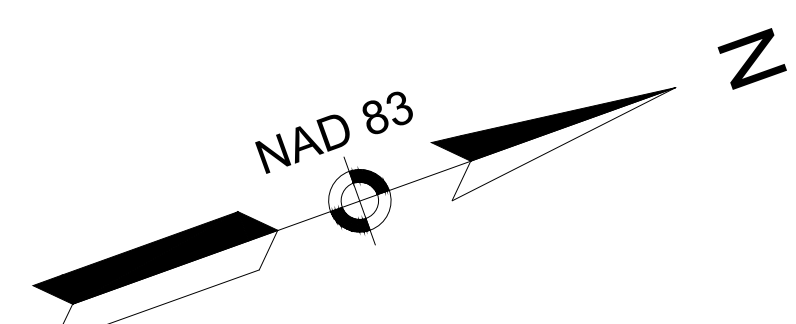
SHEET 25 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	26	55

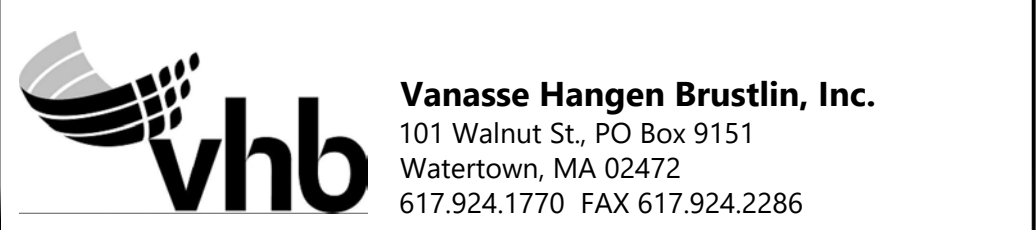
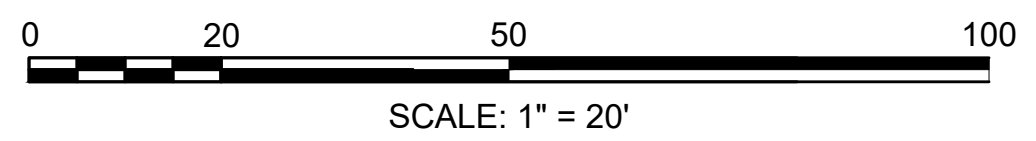
PROJECT FILE NO.

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 25

CONTINUED ON
SHEET NO. 29



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

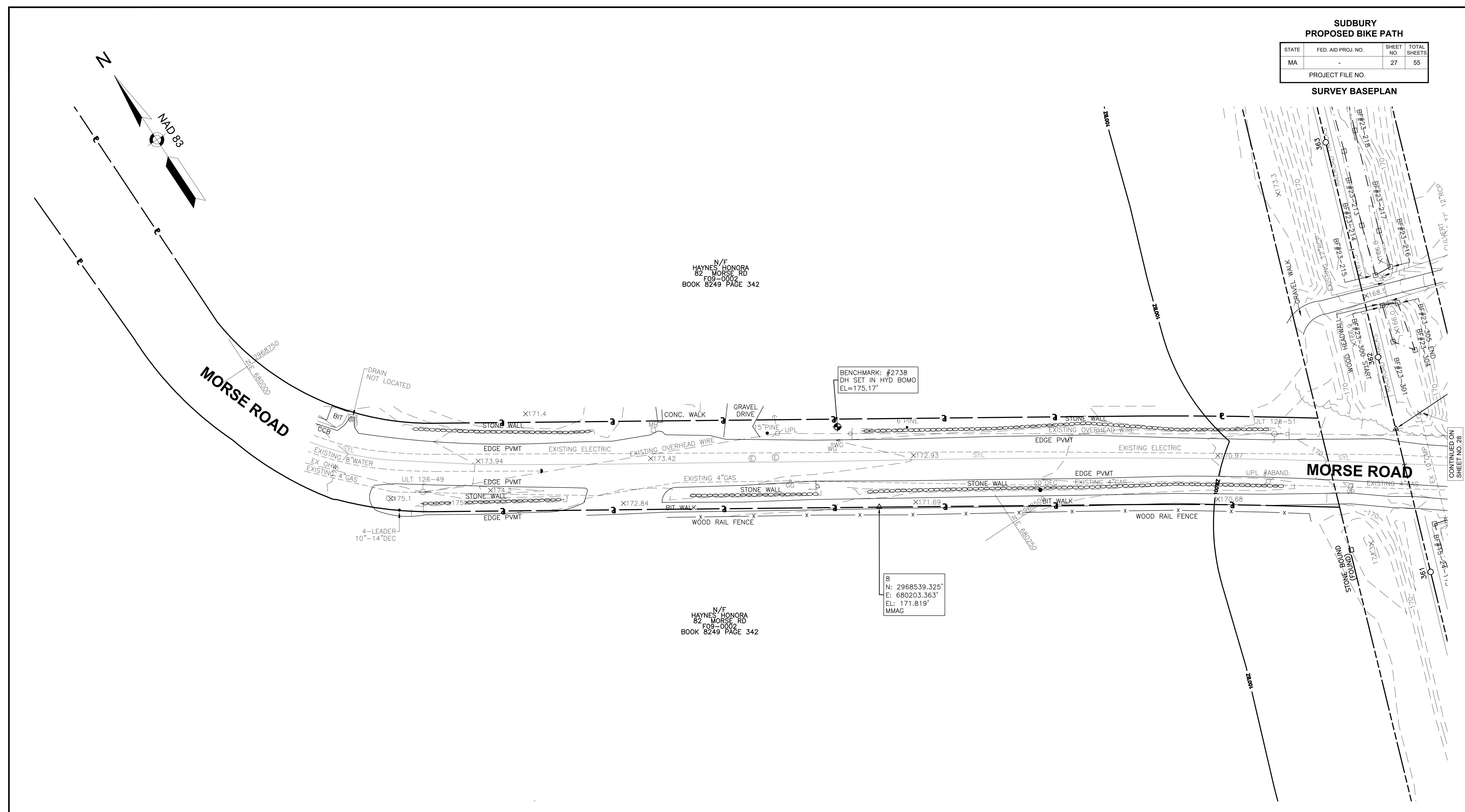
SHEET 26 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	27	55

SURVEY BASEPLAN

PROJECT FILE NO.



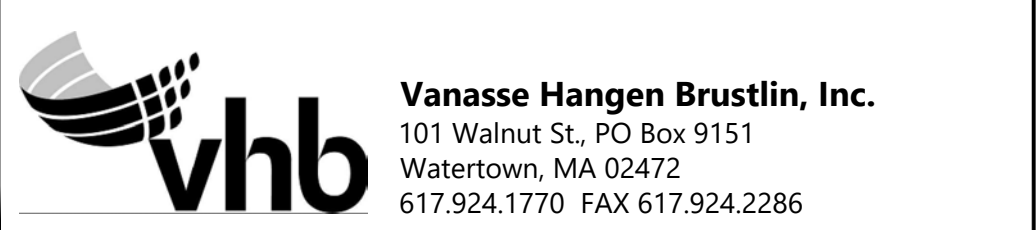
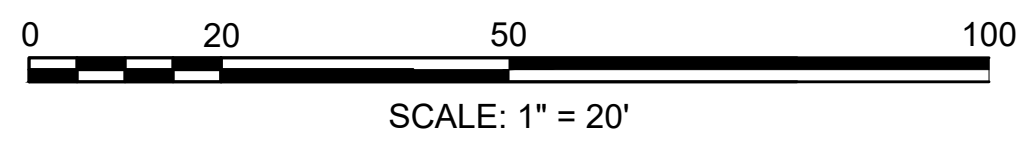
N/F
HAYNES HONORA
82 MORSE RD
FO9-0002
BOOK 8249 PAGE 342

BENCHMARK: #2738
DH SET IN HYD BOMO
EL=175.17'

N/F
HAYNES HONORA
82 MORSE RD
FO9-0002
BOOK 8249 PAGE 342

8
N: 2968539.325'
E: 680203.363'
EL: 171.819'
MMAG

CONTINUED ON
SHEET NO. 28



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

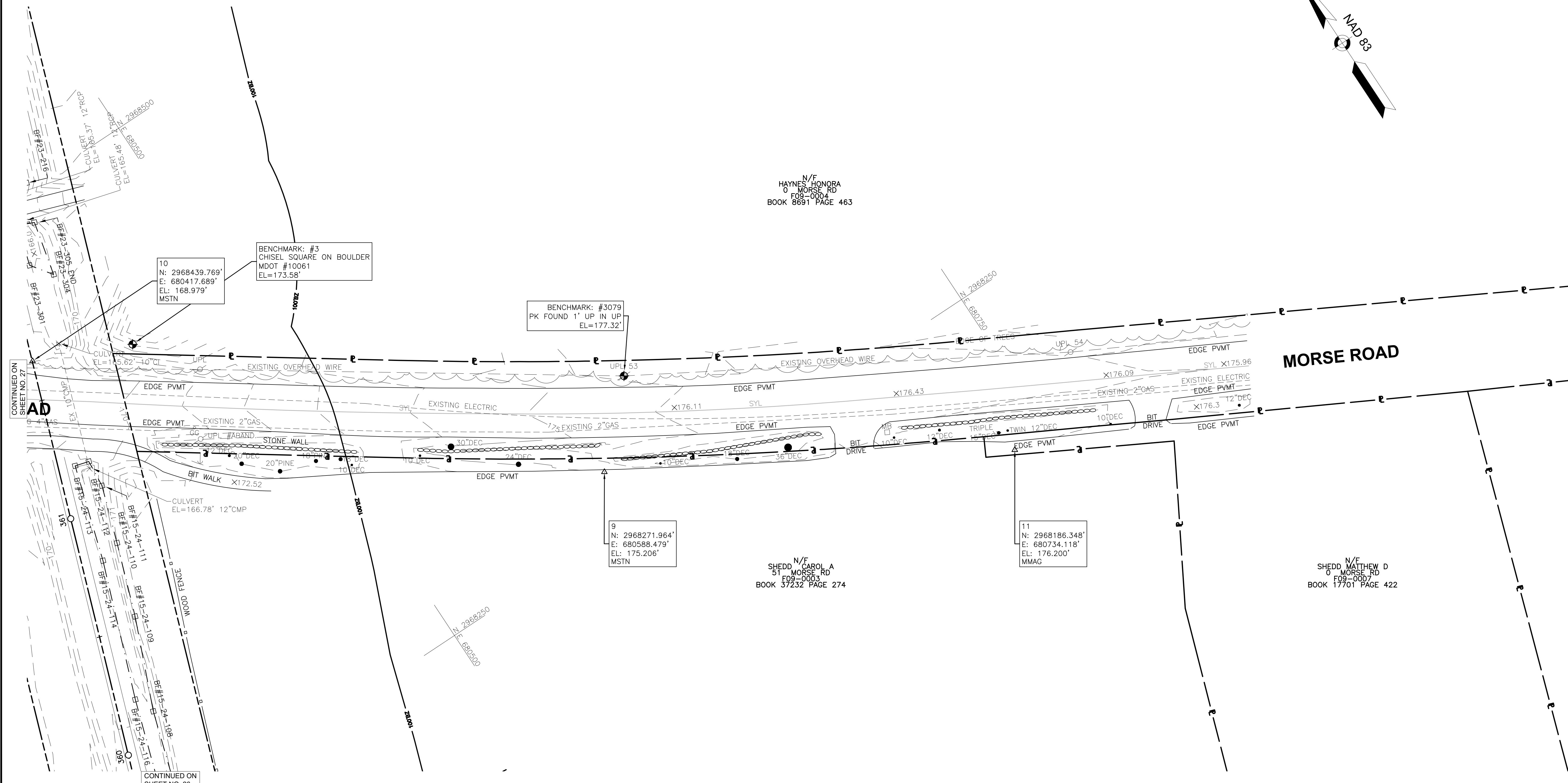
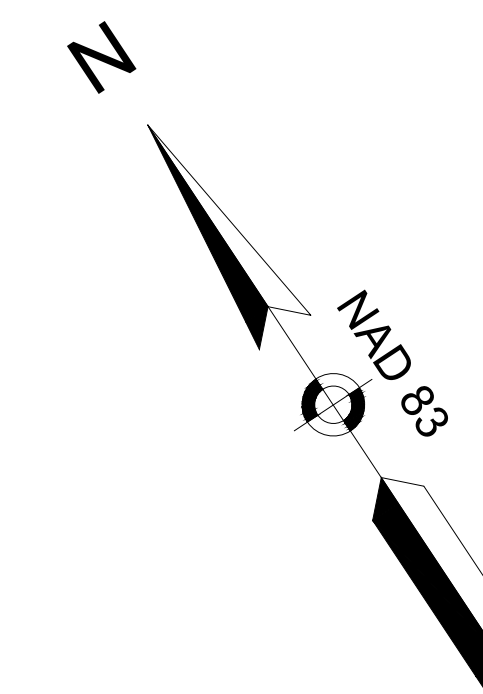
SHEET 27 OF 55

**SUBURRY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	28	55

PROJECT FILE NO.

SURVEY BASEPLAN



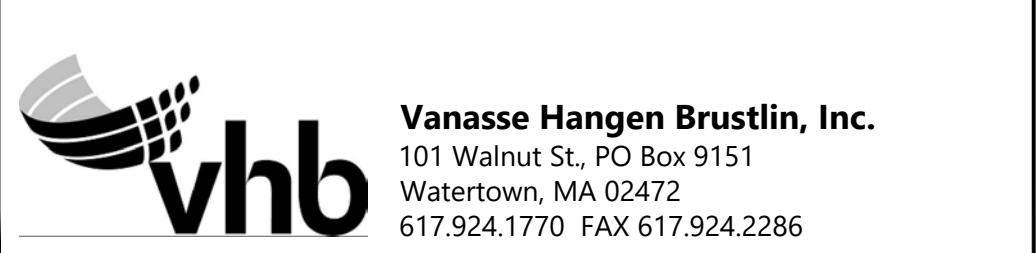
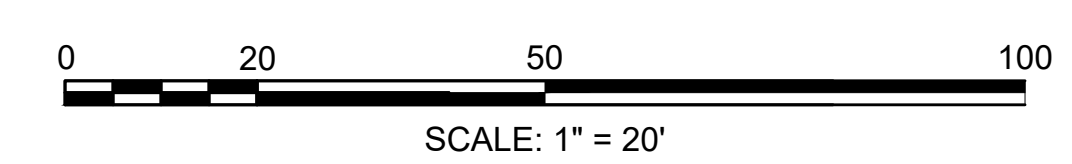
N/F HAYNES HONORA MORSE RD
FO9-0004
BOOK 8691 PAGE 463

N/F SHEDD CAROL A MORSE RD
FO9-0003
BOOK 37232 PAGE 274

N/F SHEDD MATTHEW D MORSE RD
FO9-0007
BOOK 17701 PAGE 422

CONTINUED ON SHEET NO. 27

CONTINUED ON SHEET NO. 26



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

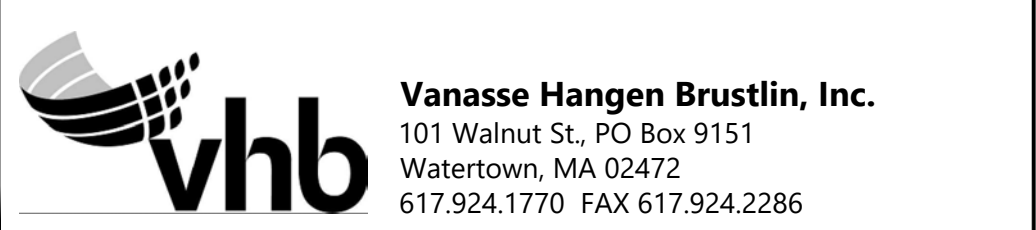
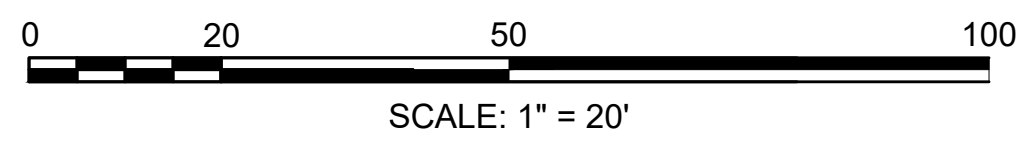
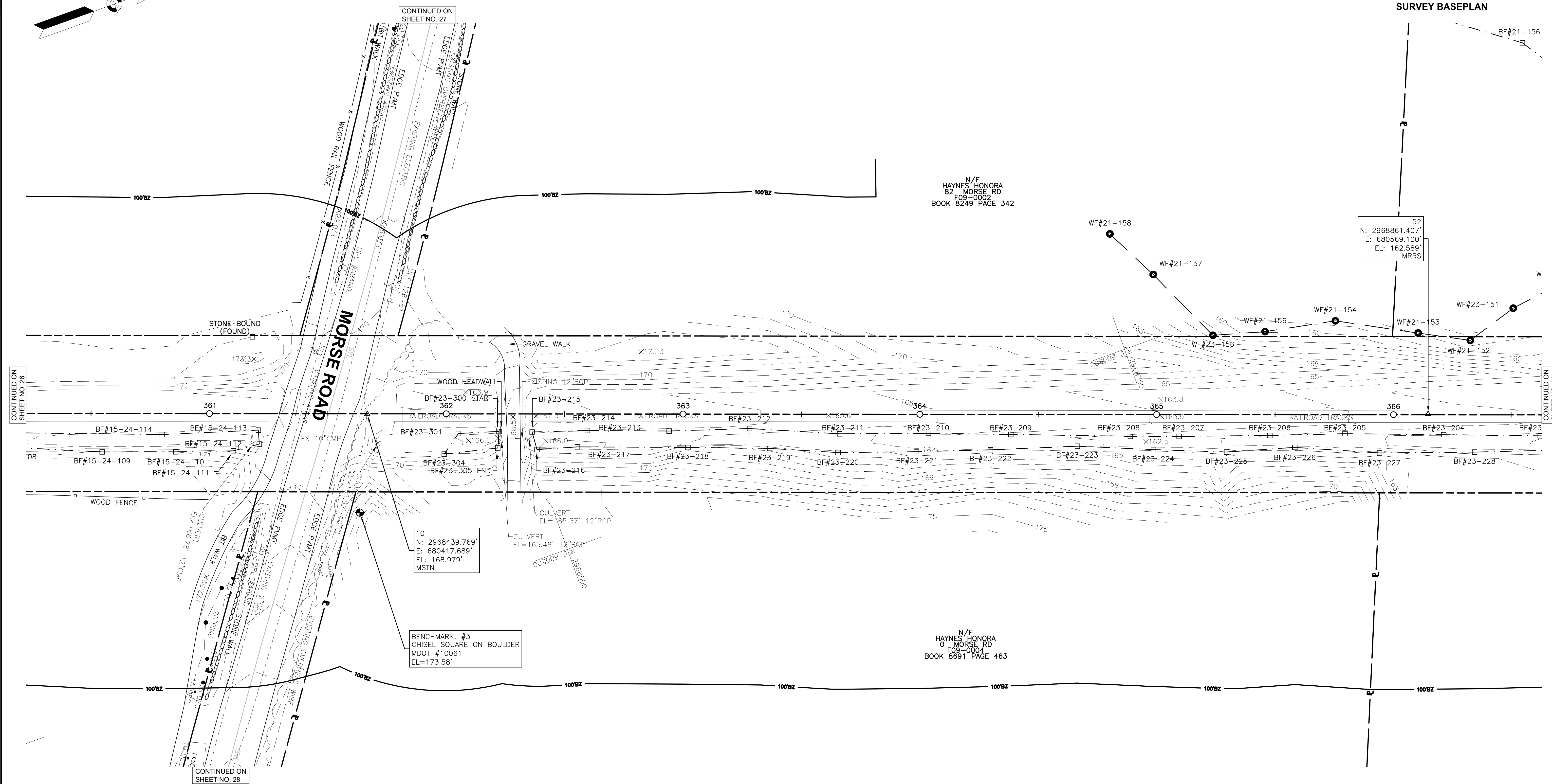
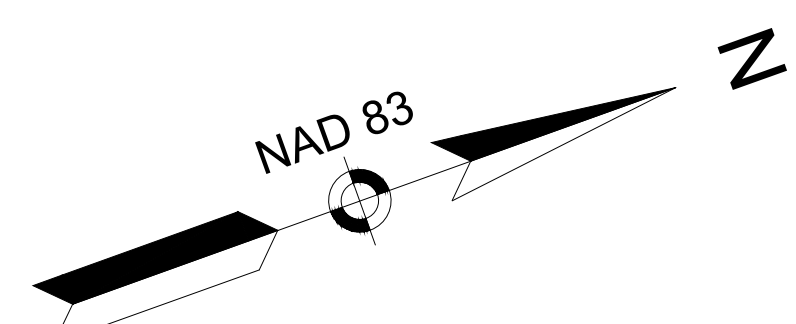
IN THE TOWN OF
SUBURRY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	29	55

SURVEY BASEPLAN



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

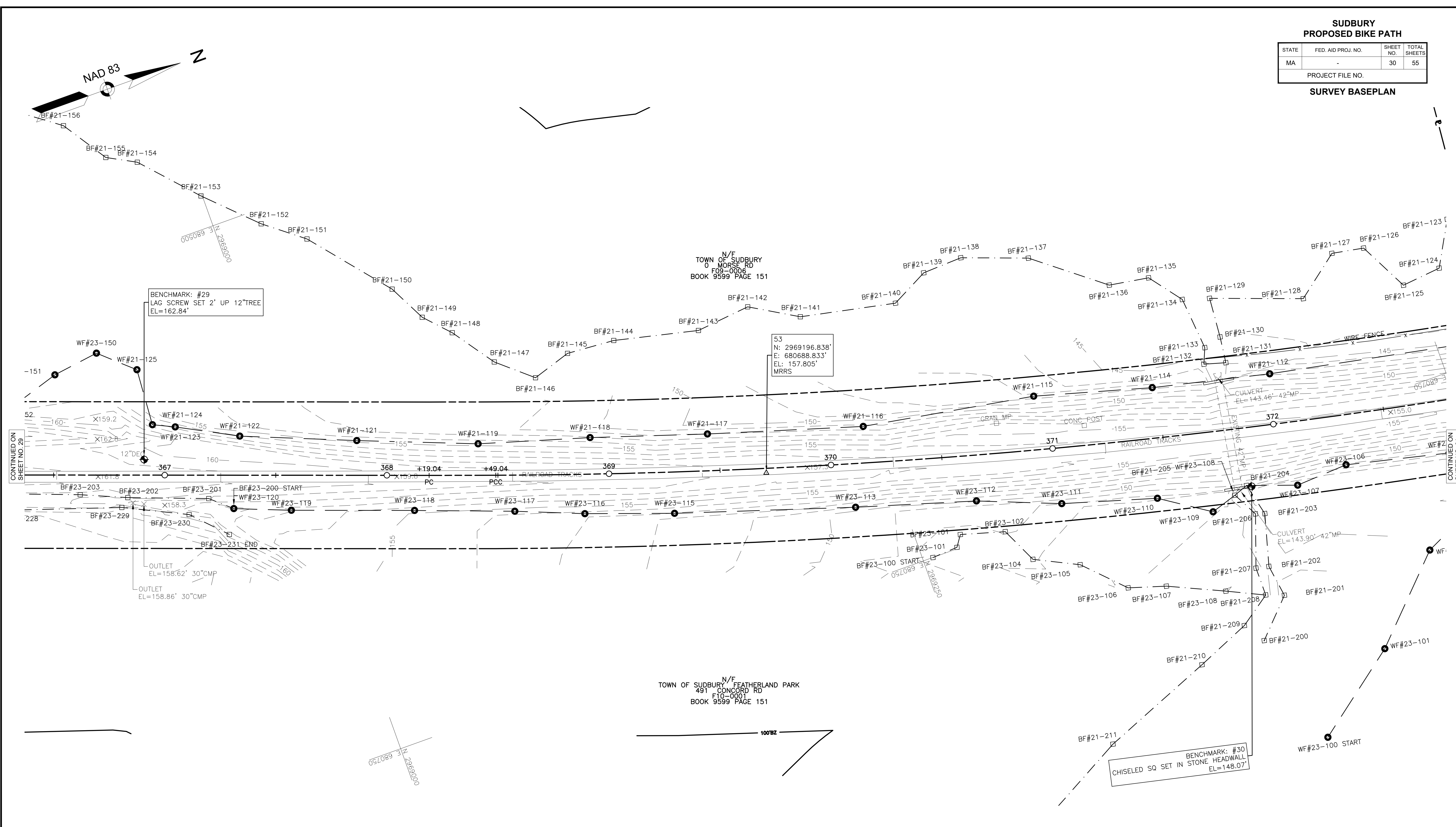
SHEET 29 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	30	55

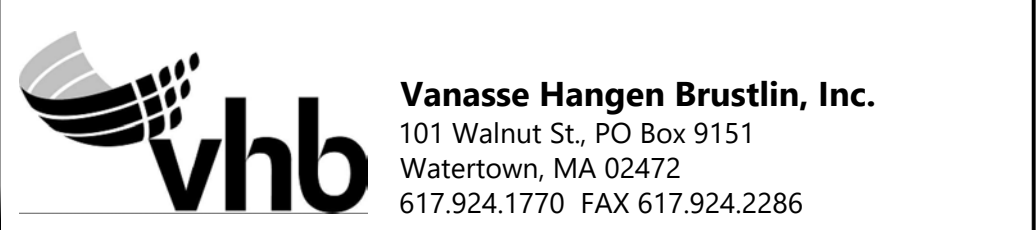
PROJECT FILE NO.

SURVEY BASEPLAN



CONTINUED ON SHEET NO. 28

CONTINUED ON SHEET NO. 31



PREPARED BY:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

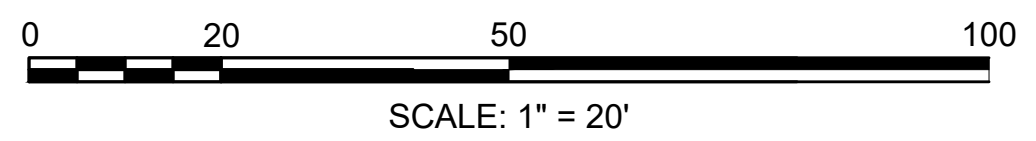
REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

DATE: MAY 19, 2016

SHEET 30 OF 55

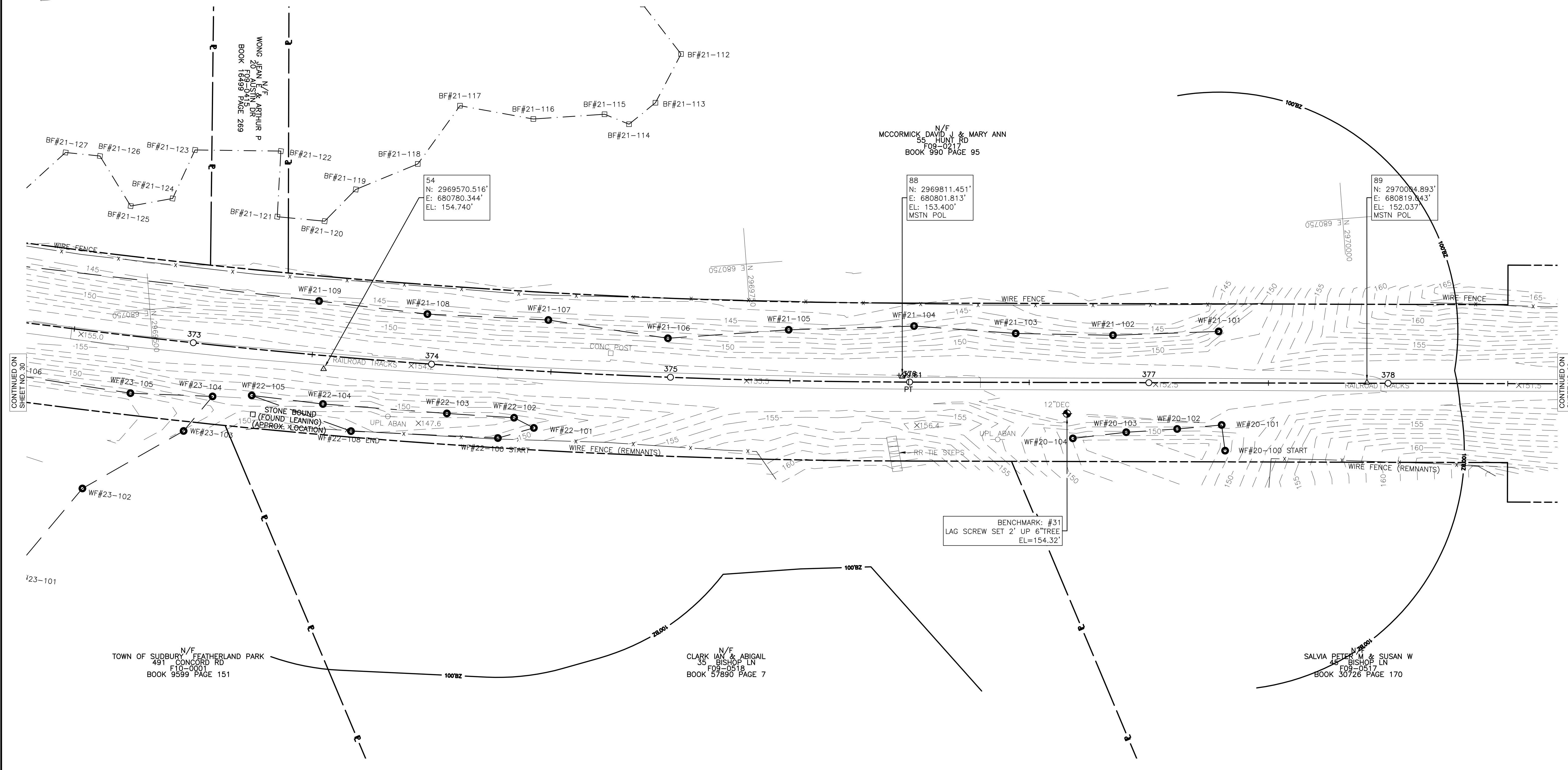
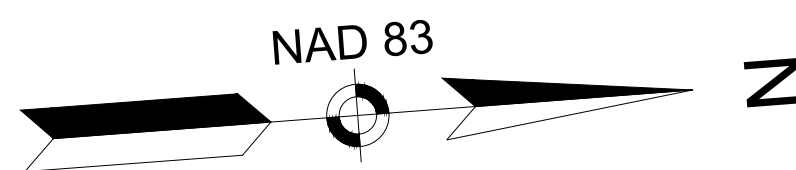


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	31	55

PROJECT FILE NO.

SURVEY BASEPLAN



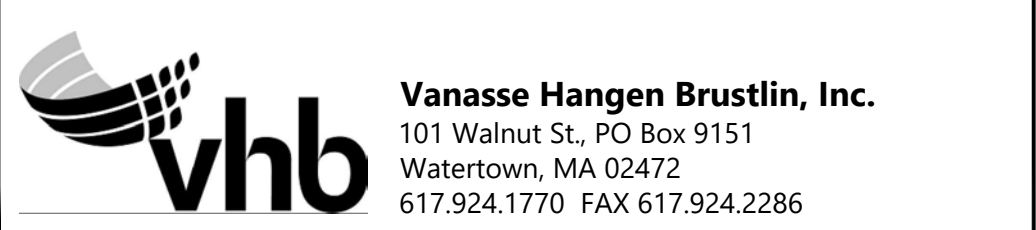
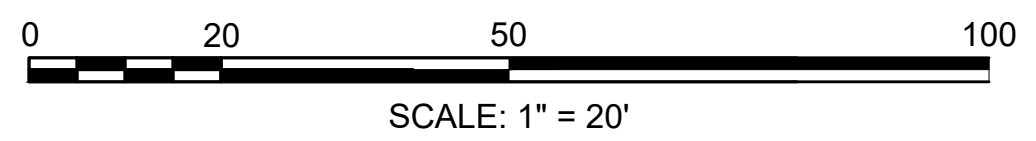
CONTINUED ON
SHEET NO. 30

CONTINUED ON
SHEET NO. 32

N/F
TOWN OF SUDBURY FEATHERLAND PARK
491 CONCORD RD
F10-0001
BOOK 9599 PAGE 151

N/F
CLARK IAN & ABIGAIL
35 BISHOP LN
F09-0518
BOOK 57890 PAGE 7

N/F
SALVIA PETER M & SUSAN W
45 BISHOP LN
F09-0517
BOOK 50726 PAGE 170



PREPARED BY:

Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

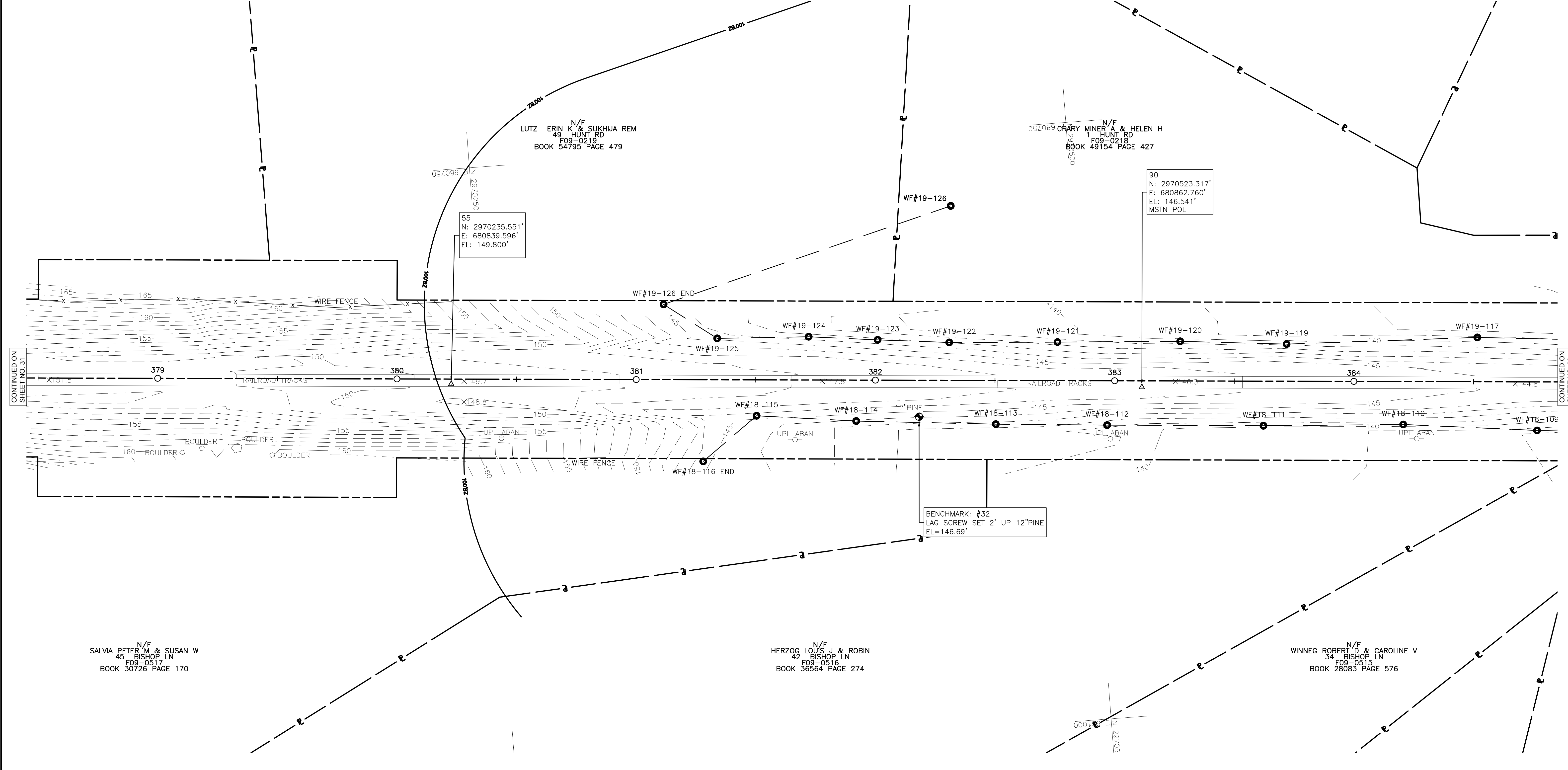
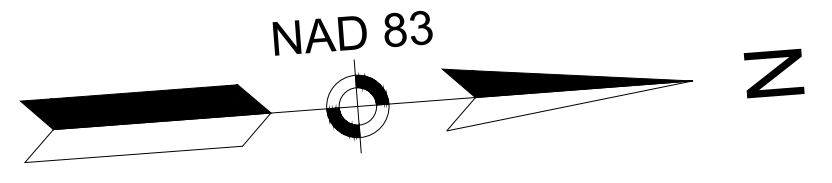
DATE: MAY 19, 2016 SHEET 31 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	32	55

PROJECT FILE NO.

SURVEY BASEPLAN



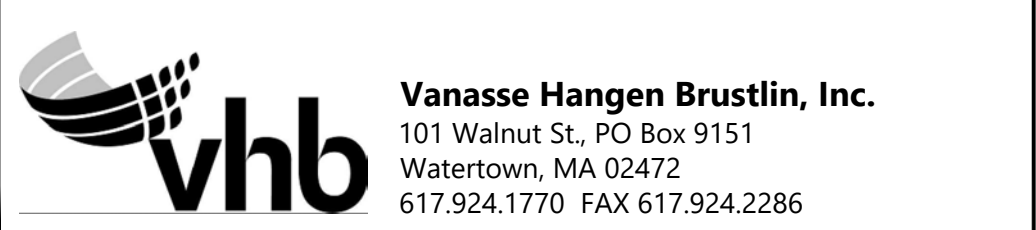
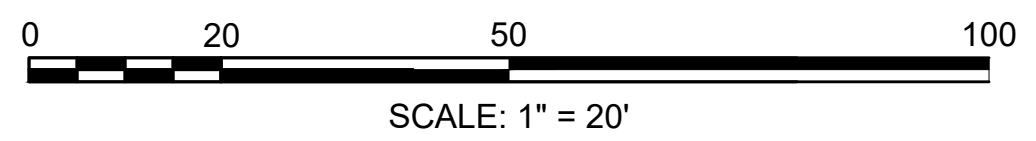
CONTINUED ON
SHEET NO. 31

CONTINUED ON
SHEET NO. 33

N/F
SALVIA PETER M & SUSAN W
45 BISHOP LN
FO9-0517
BOOK 30726 PAGE 170

N/F
HERZOG LOUIS J & ROBIN
42 BISHOP LN
FO9-0516
BOOK 36564 PAGE 274

N/F
WINNEG ROBERT D & CAROLINE V
34 BISHOP LN
FO9-0515
BOOK 28083 PAGE 576



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

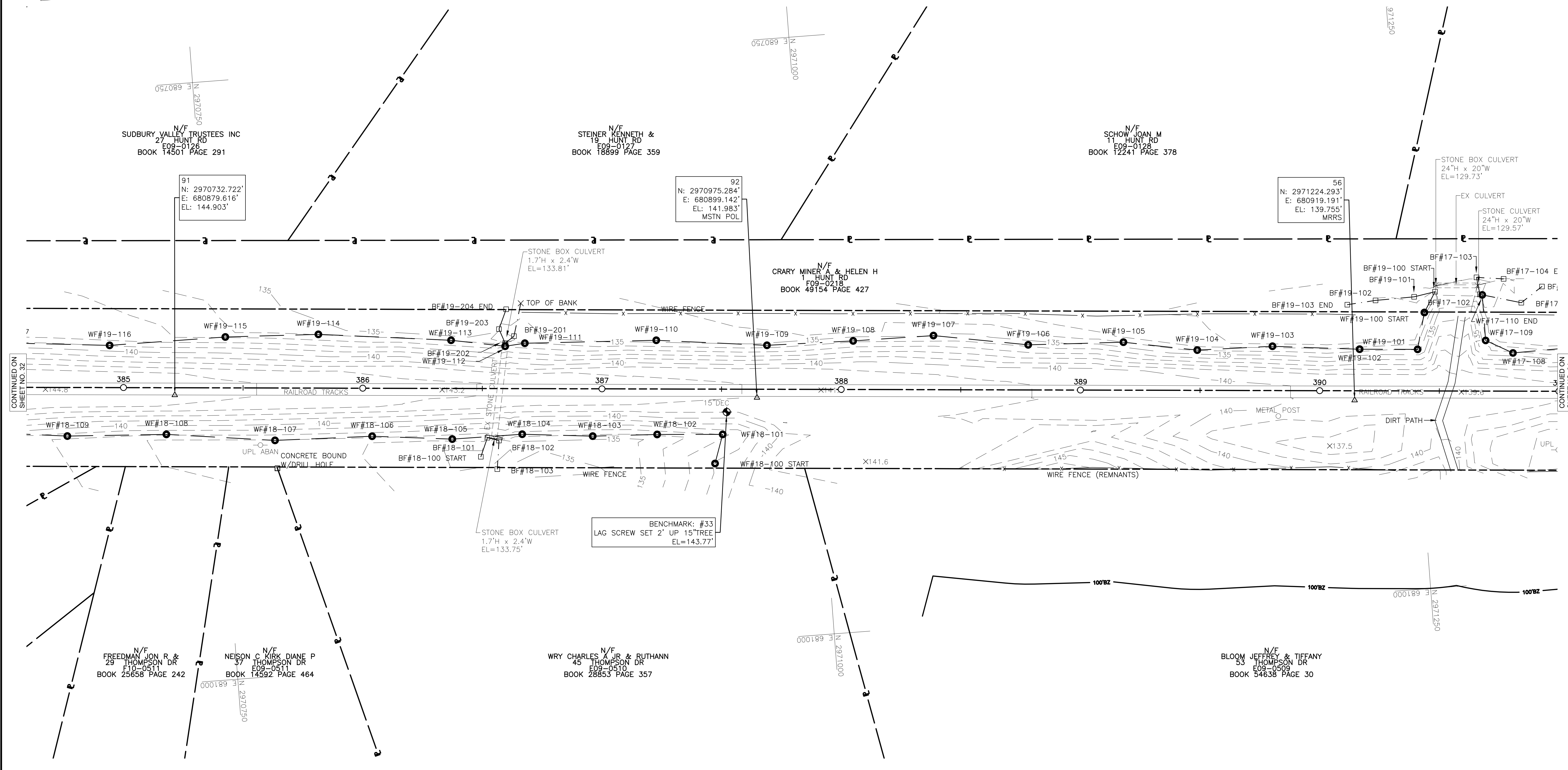
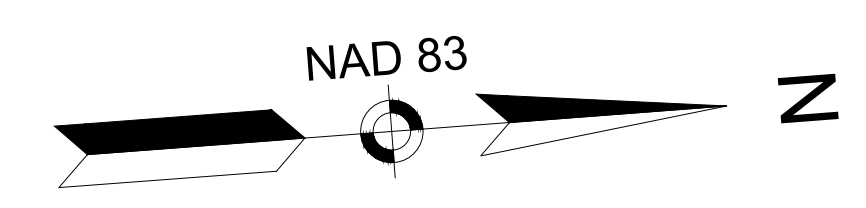
DATE: MAY 19, 2016

SHEET 32 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	33	55
PROJECT FILE NO.			

SURVEY BASEPLAN



N/F
SUDBURY VALLEY TRUSTEES INC
27 HUNT RD
E09-0126
BOOK 14501 PAGE 291

N/F
STEINER KENNETH &
19 HUNT RD
E09-0127
BOOK 18899 PAGE 359

N/F
SCHOW JOAN M
11 HUNT RD
E09-0128
BOOK 12241 PAGE 378

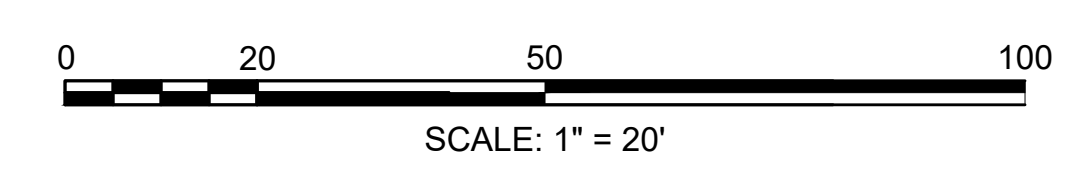
N/F
CRARY MINER A & HELEN H
1 HUNT RD
E09-0218
BOOK 49154 PAGE 427

N/F
FREEDMAN JON R &
29 THOMPSON DR
E10-0511
BOOK 25658 PAGE 242

N/F
NEISON C KIRK DIANE P
37 THOMPSON DR
E09-0511
BOOK 14592 PAGE 464

N/F
WRY CHARLES A JR & RUTHANN
45 THOMPSON DR
E09-0510
BOOK 28853 PAGE 357

N/F
BLOOM JEFFREY & TIFFANY
53 THOMPSON DR
E09-0509
BOOK 54638 PAGE 30



PREPARED BY:
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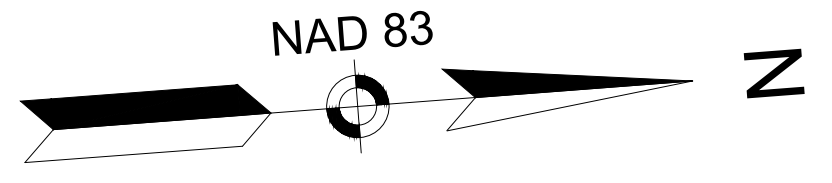
REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

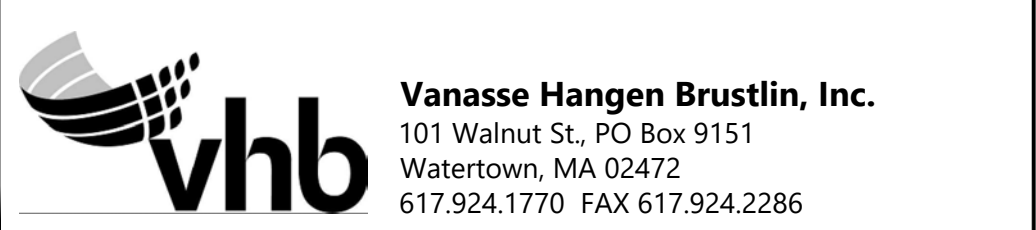
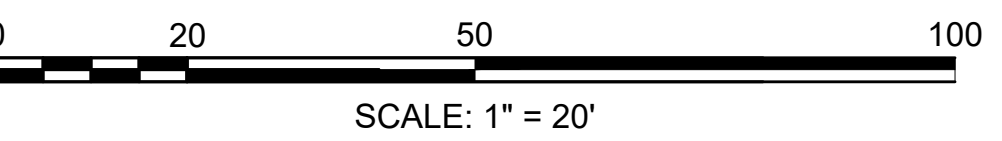
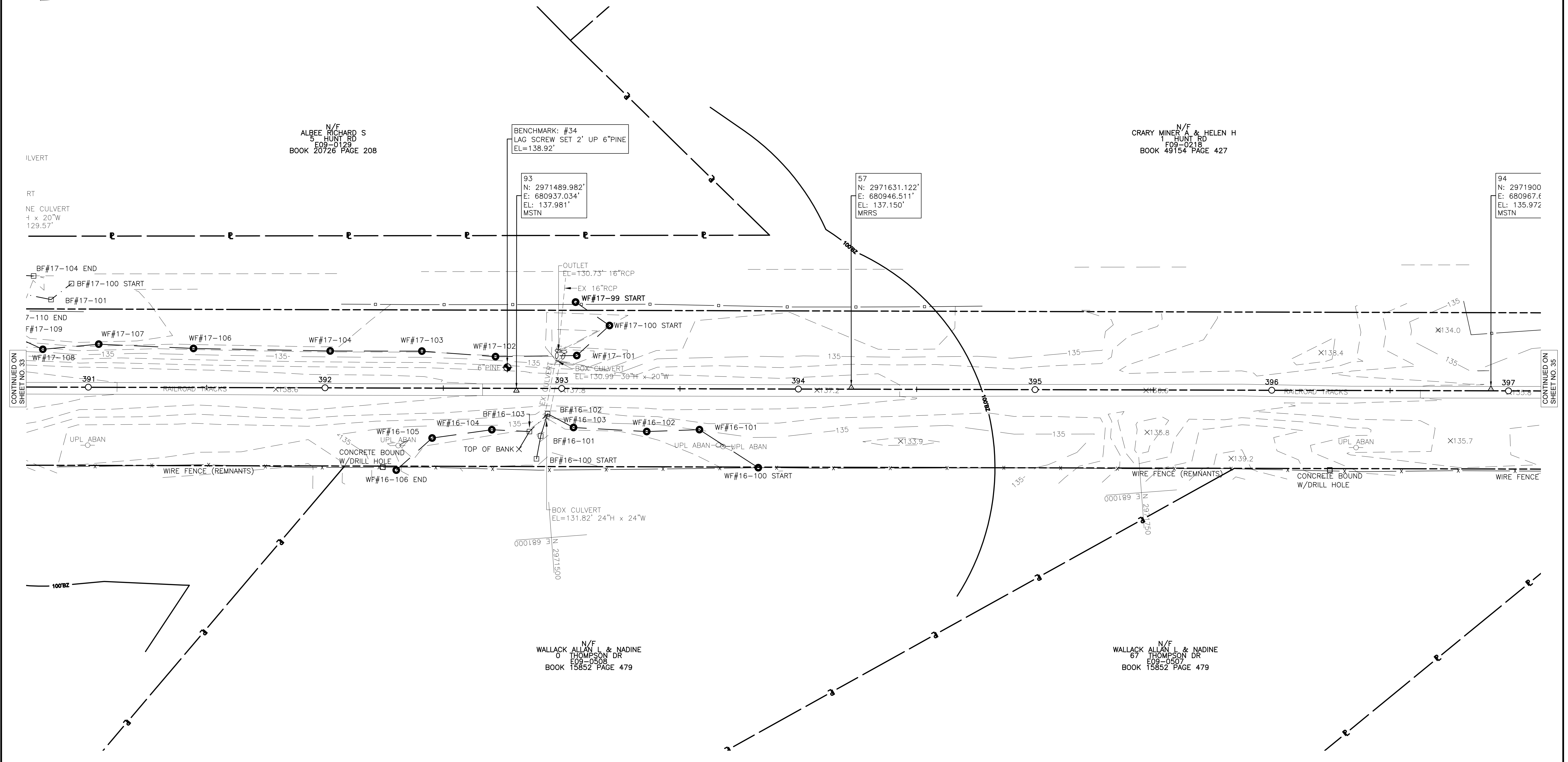


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	34	55

PROJECT FILE NO.

SURVEY BASEPLAN



REVISIONS		
REV.	COMMENTS	DATE

PREPARED BY:
Vanasse Hangen Brustlin, Inc.
 101 Walnut St., PO Box 9151
 Watertown, MA 02472
 617.924.1770 FAX 617.924.2286

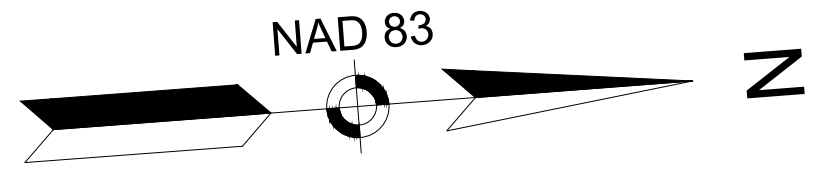
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FILE NAME: 12984-00-EX
 FIELD BOOK NO: 1200 & 1225
 DRAWN BY: JEC CHECKED BY: CDKR
 FIELD CHIEF: RPT/DJS PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
 PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
 AS ORDERED BY
 THE MASSACHUSETTS DEPARTMENT OF
 TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016 SHEET 34 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	35	55

PROJECT FILE NO.

SURVEY BASEPLAN

N/F
CRARY MINER & HELEN H
HUNT RD
F09-0218
BOOK 49154 PAGE 427

N/F
WEST PANTRY BROOK FARM LIMITED
667 CONCORD RD
E10-0200
BOOK 49200 PAGE 410

94
N: 2971900.542'
E: 680967.619'
EL: 135.972'
MSTN

95
N: 2972123.996'
E: 680985.126'
EL: 134.924'
MSTN

58
N: 2972365.820'
E: 681004.071'
EL: 133.745'
MIPE

BENCHMARK: #36
LAG SCREW SET 2' UP 6" TREE
EL=134.86'

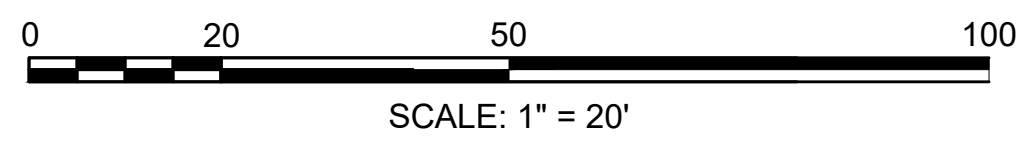
97
N: 2972481.850'
E: 681014.572'
EL: 133.232'
MSTN

BENCHMARK: #35
LAG SCREW SET 2' UP 13" TREE
EL=139.00'

N/F
WEST PANTRY BROOK FARM LIMITED
667 CONCORD RD
E10-0200
BOOK 49200 PAGE 410

CONTINUED ON
SHEET NO. 34

CONTINUED ON
SHEET NO. 36



PREPARED BY:
Vanasse Hangen Brustlin, Inc.
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617.924.1770 FAX 617.924.2286

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

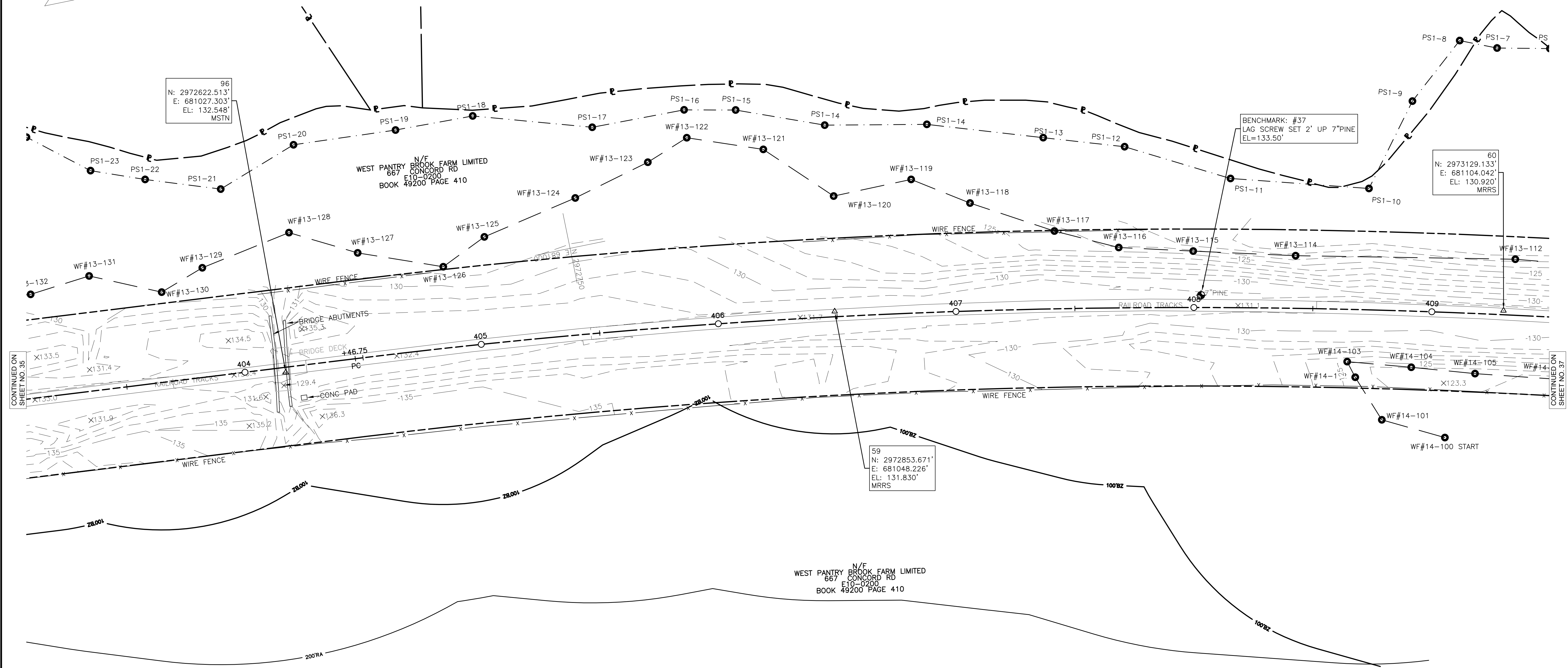
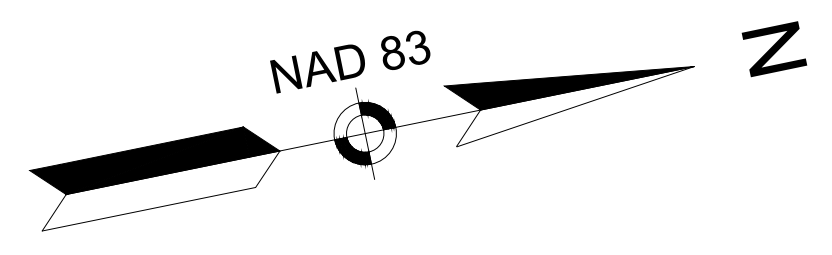
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FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	36	55

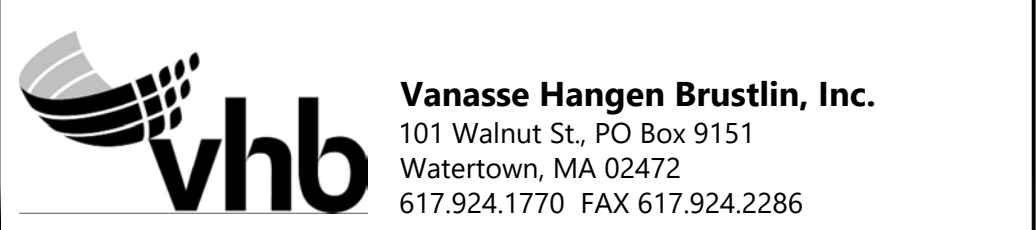
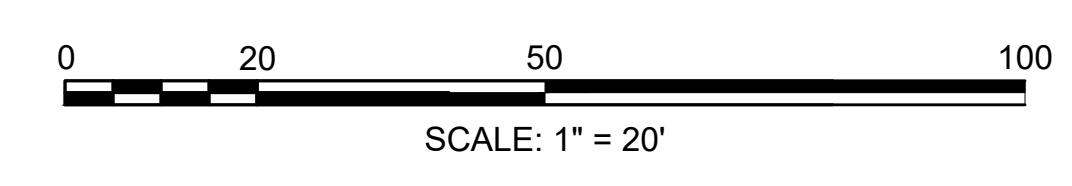
PROJECT FILE NO.

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 35

CONTINUED ON
SHEET NO. 37



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
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DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

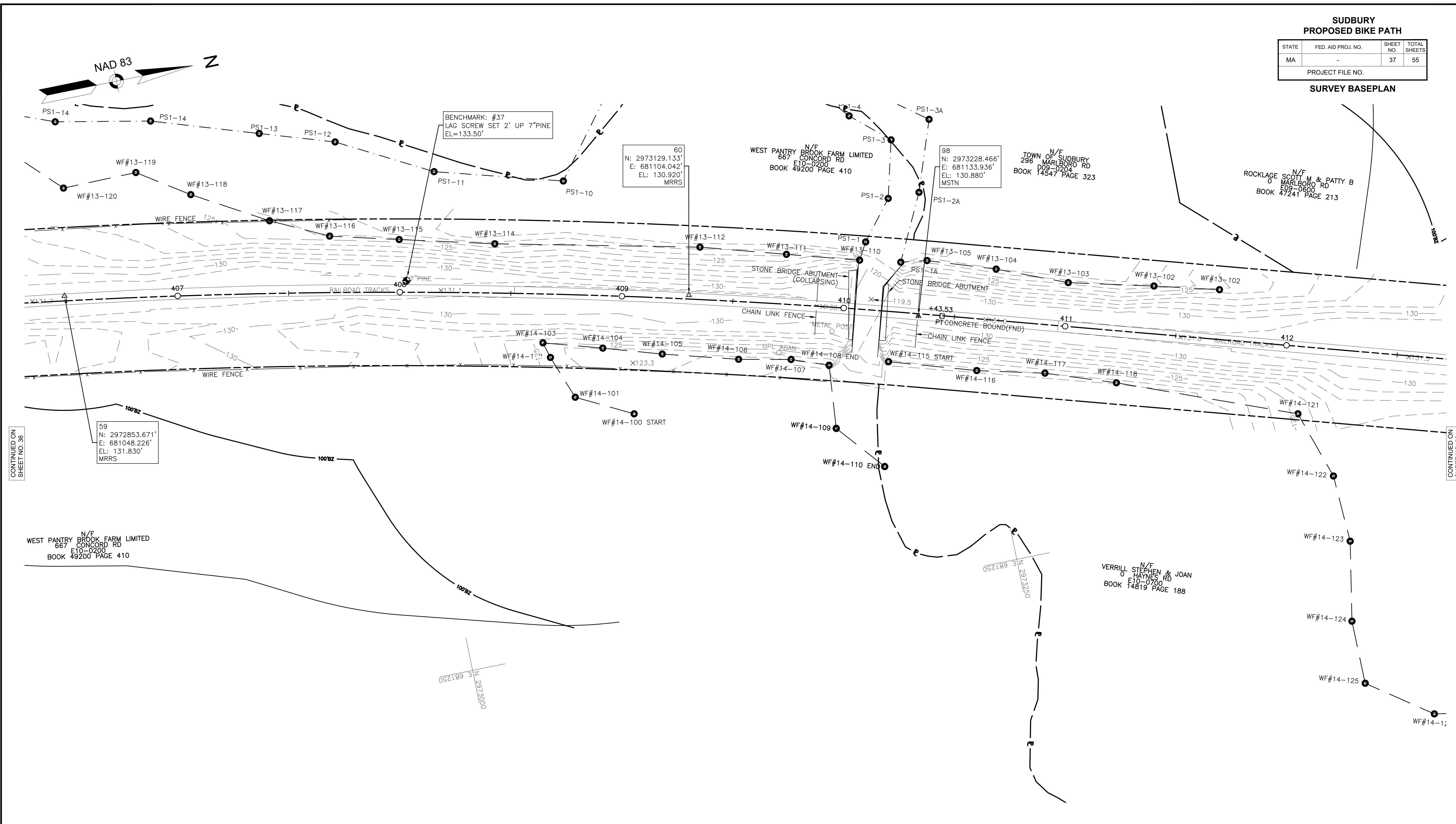
IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016 SHEET 36 OF 55

**SUDBURY
PROPOSED BIKE PATH**

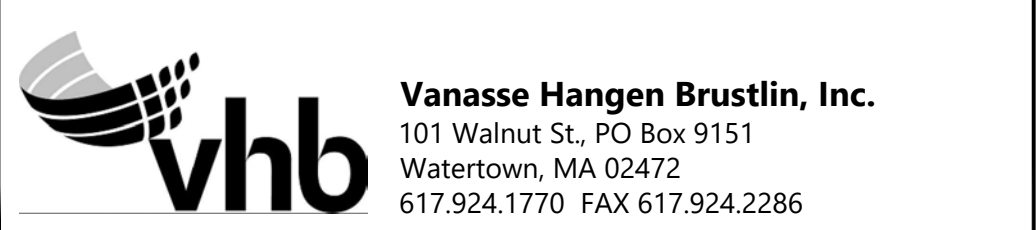
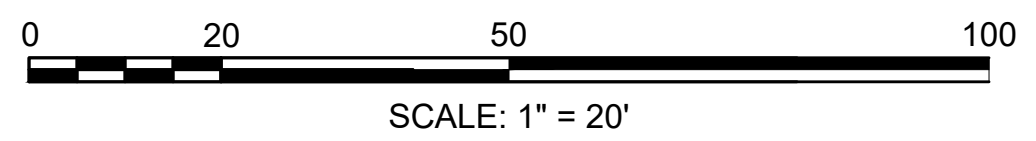
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	37	55
PROJECT FILE NO.			

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 36

CONTINUED ON
SHEET NO. 38



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

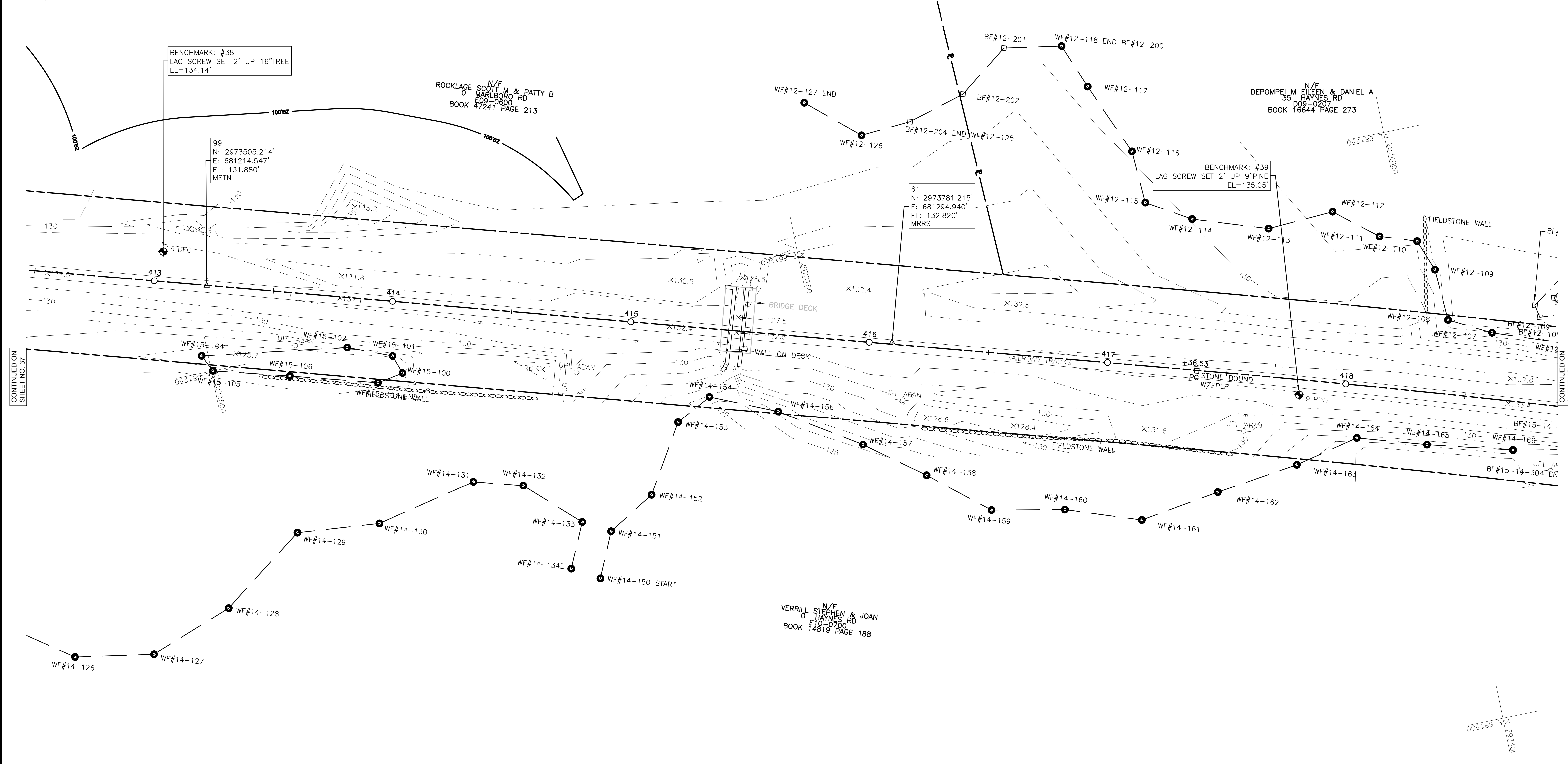
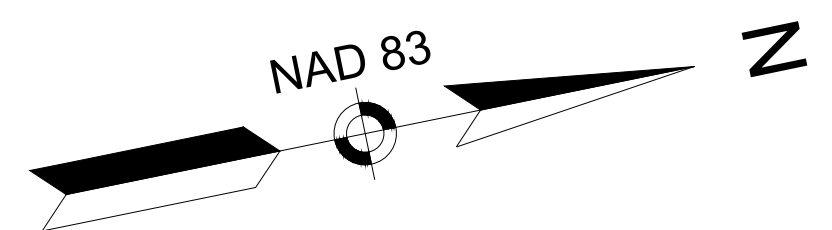
DATE: MAY 19, 2016

SHEET 37 OF 55

**SUDBURY
PROPOSED BIKE PATH**

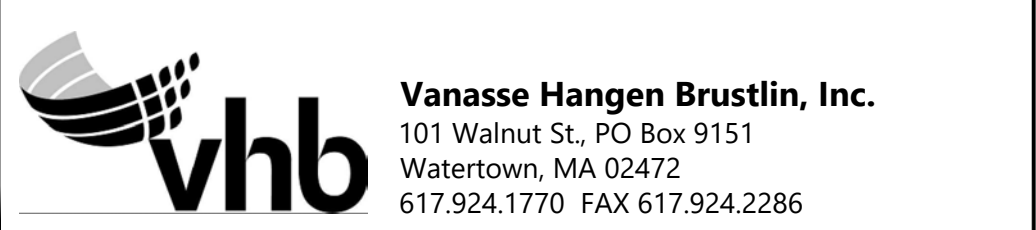
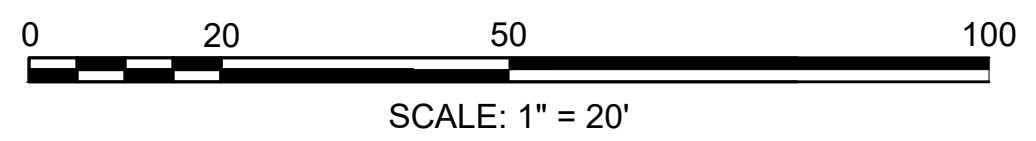
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	38	55
PROJECT FILE NO.			

SURVEY BASEPLAN



CONTINUED ON
SHEET NO. 37

CONTINUED ON
SHEET NO. 41



PREPARED BY:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

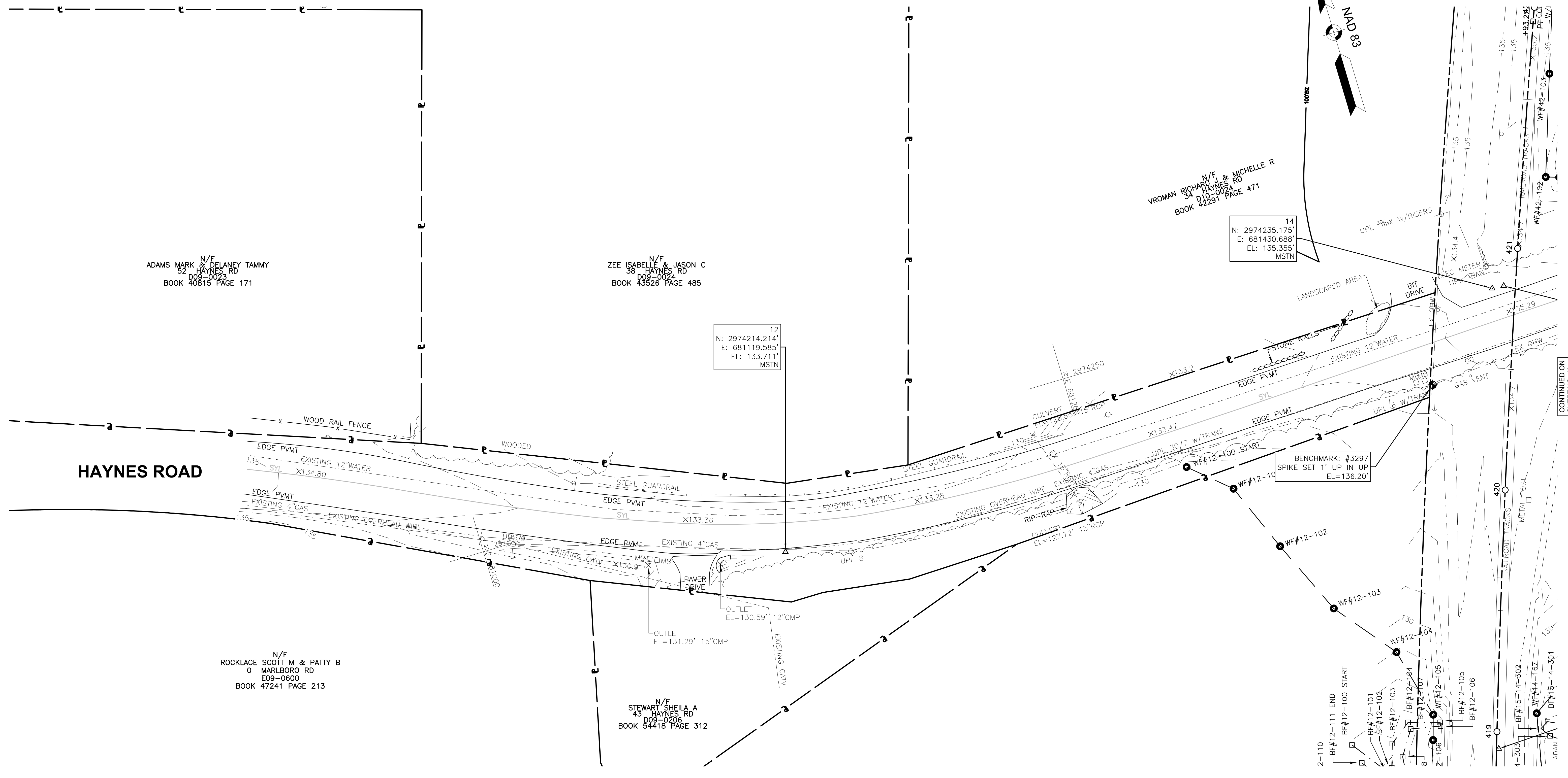
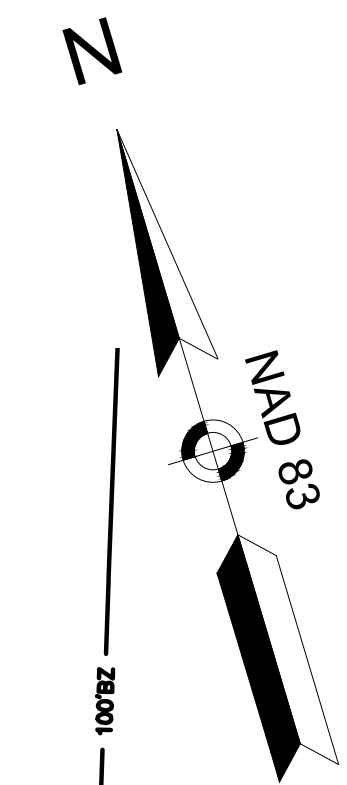
SCALE: 20 FEET TO THE INCH

FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

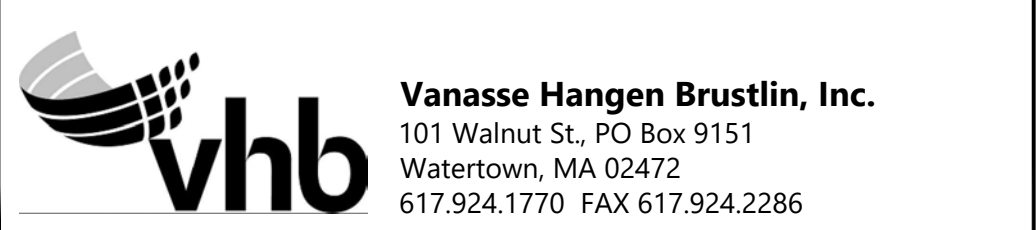
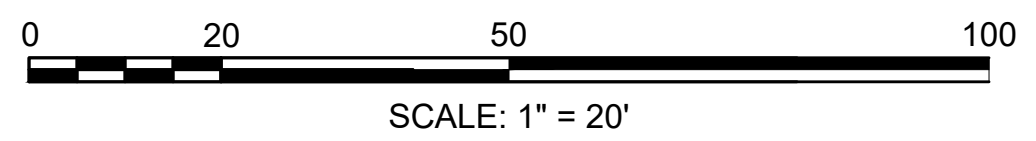
**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	39	55
PROJECT FILE NO.			

SURVEY BASEPLAN



HAYNES ROAD



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

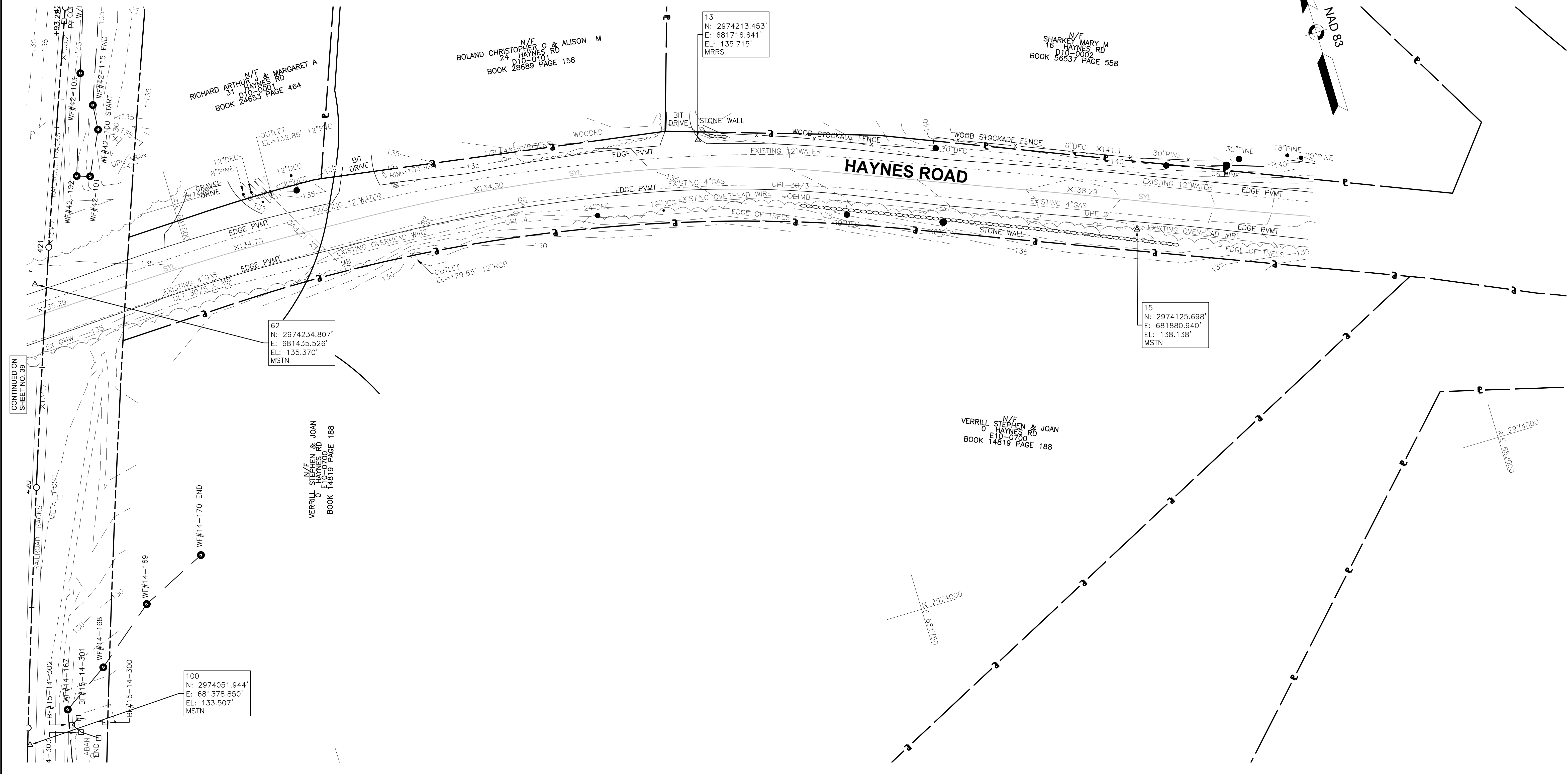
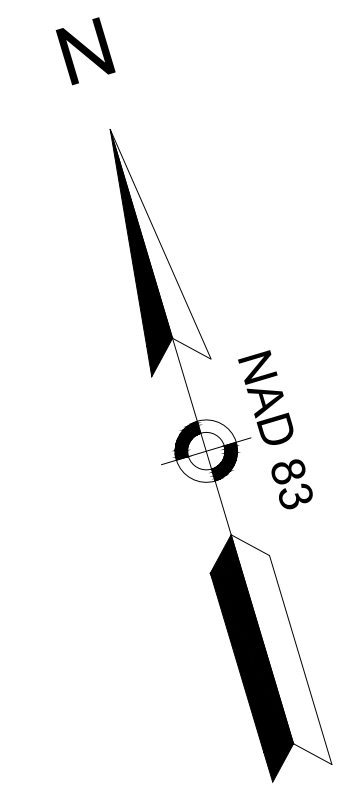
DATE: MAY 19, 2016

SHEET 39 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	40	55

PROJECT FILE NO.
SURVEY BASEPLAN



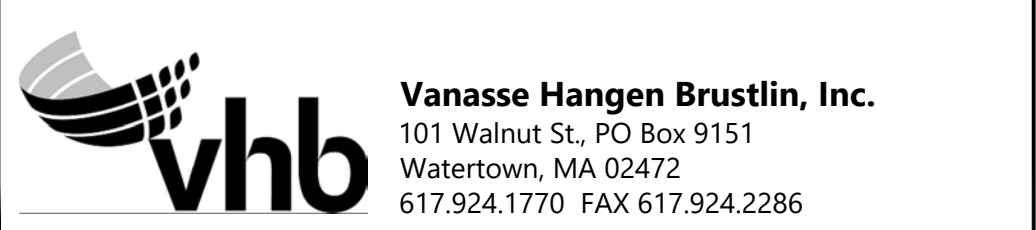
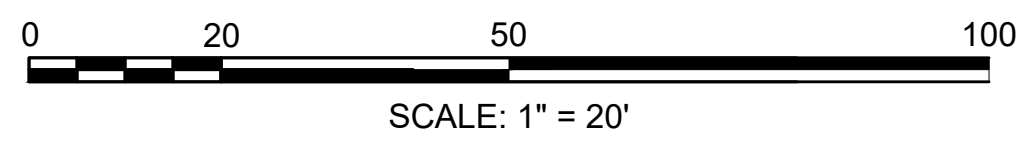
62
N: 2974234.807'
E: 681435.526'
EL: 135.370'
MSTN

13
N: 2974213.453'
E: 681716.641'
EL: 135.715'
MRRS

15
N: 2974125.698'
E: 681880.940'
EL: 138.138'
MSTN

100
N: 2974051.944'
E: 681378.850'
EL: 133.507'
MSTN

CONTINUED ON
SHEET NO. 39



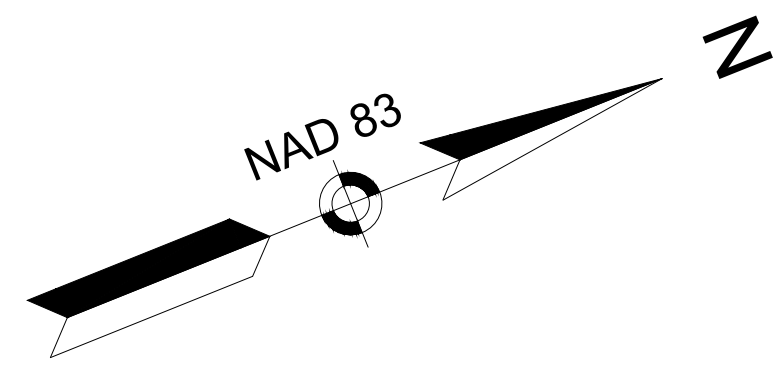
REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

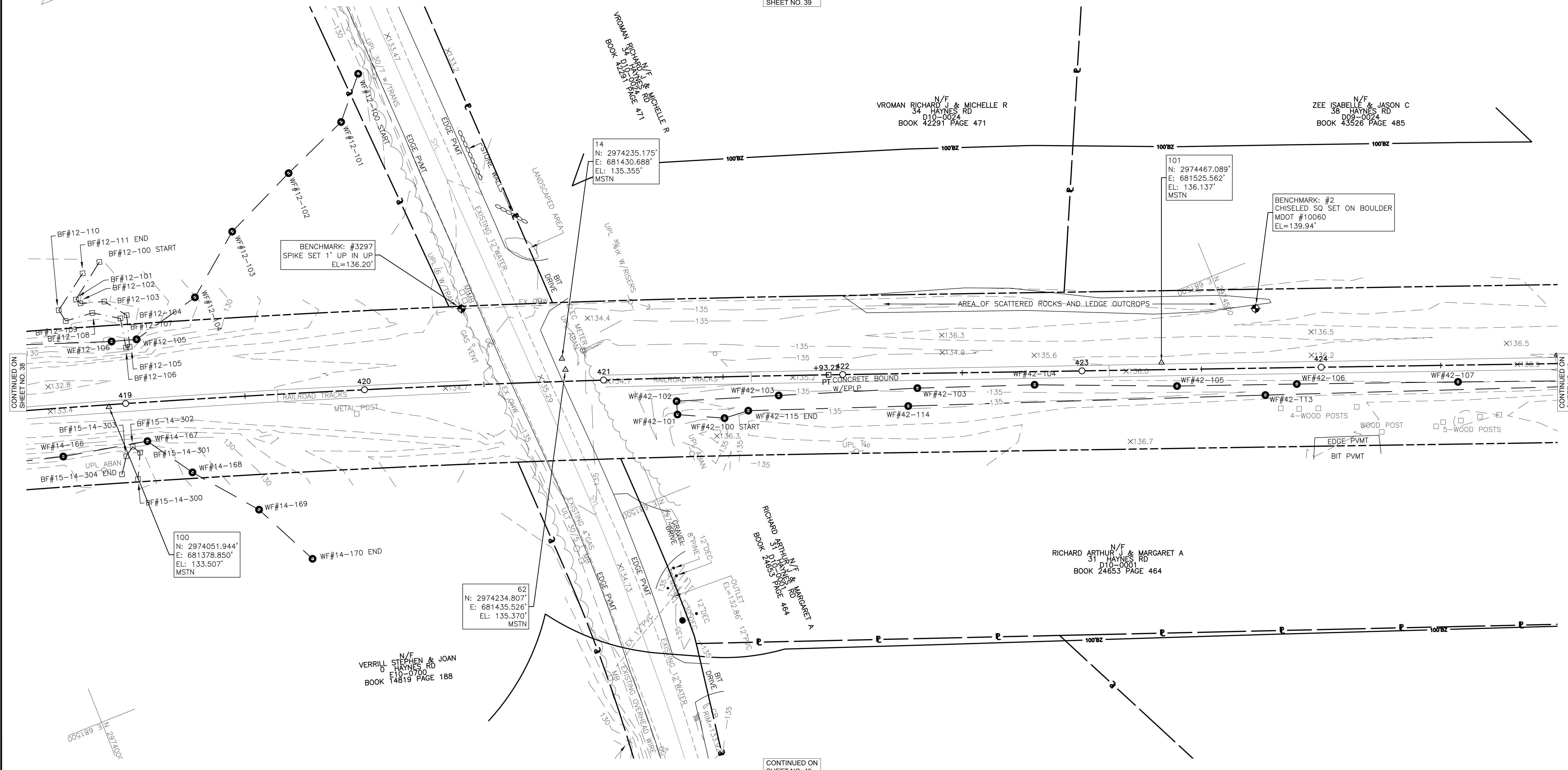


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	41	55

PROJECT FILE NO.
SURVEY BASEPLAN

CONTINUED ON
SHEET NO. 39

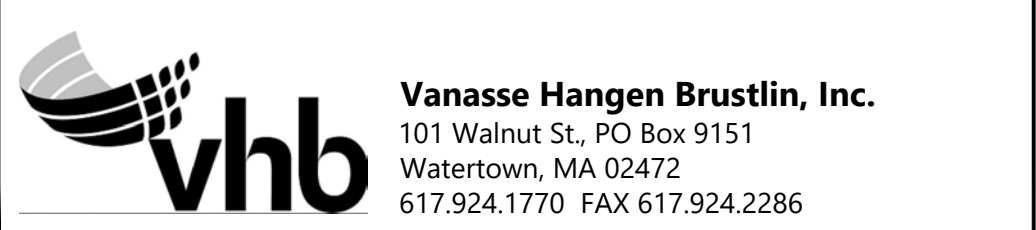
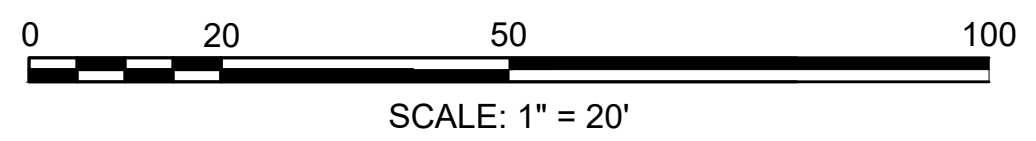


12984.00-EX.DWG Picked on 19-Jul-2016 11:30 AM

CONTINUED ON
SHEET NO. 38

CONTINUED ON
SHEET NO. 42

CONTINUED ON
SHEET NO. 40



REVISIONS		
REV.	COMMENTS	DATE

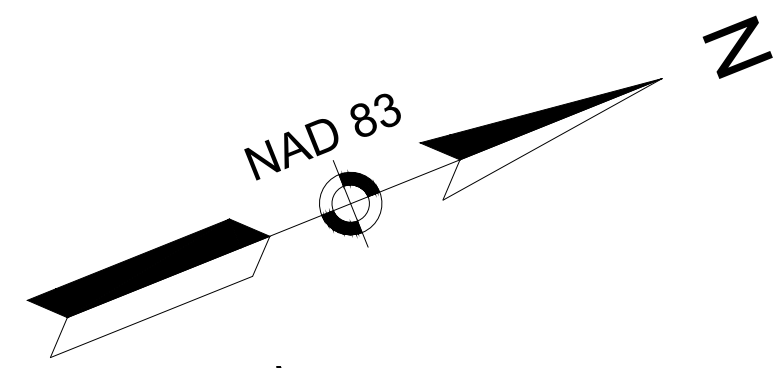
SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 41 OF 55

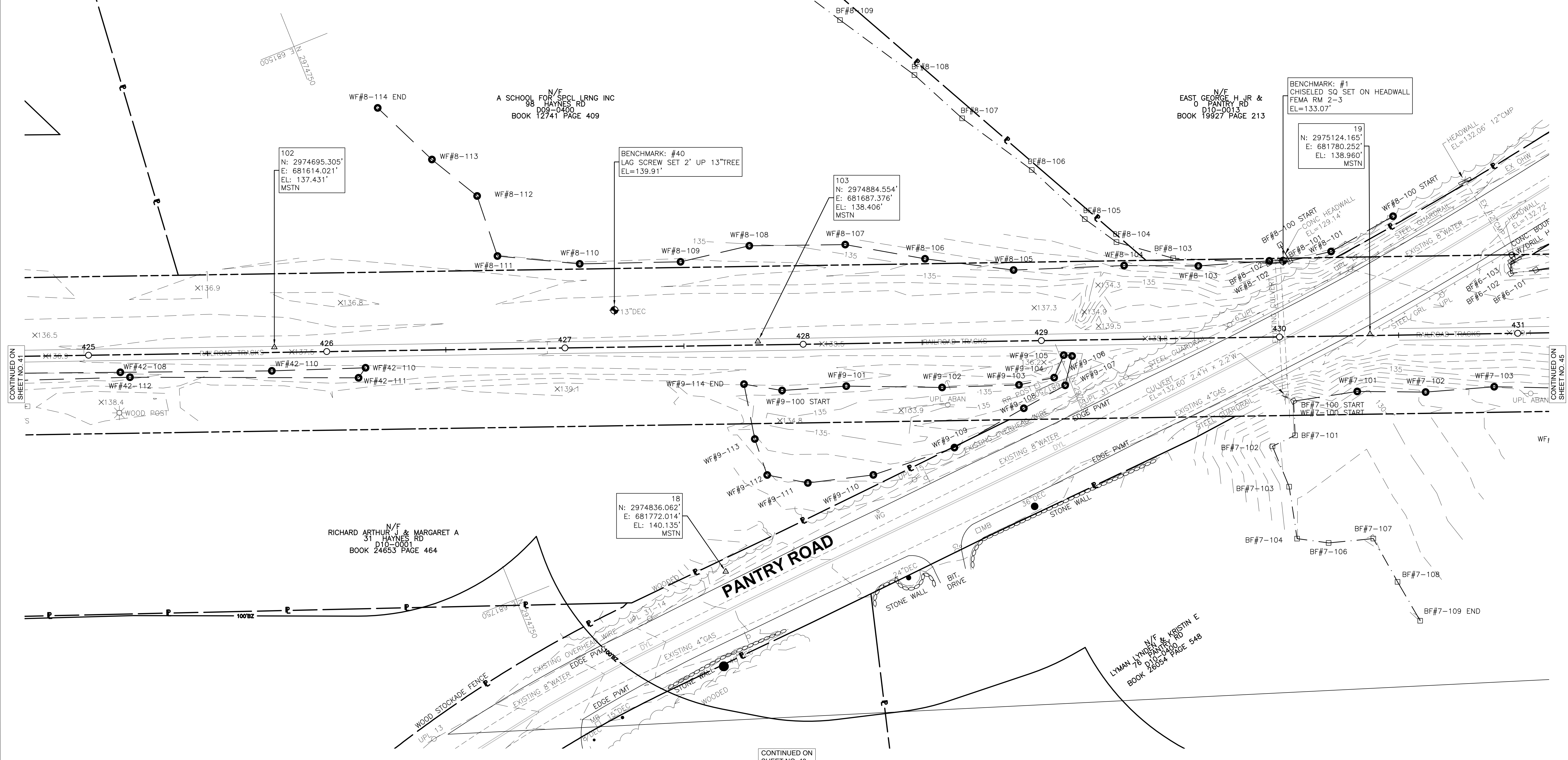


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	42	55

PROJECT FILE NO.

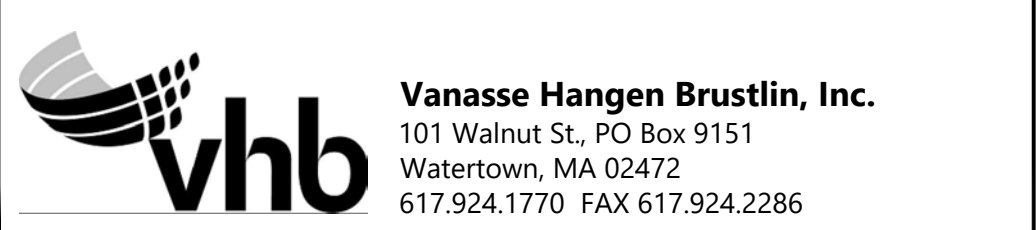
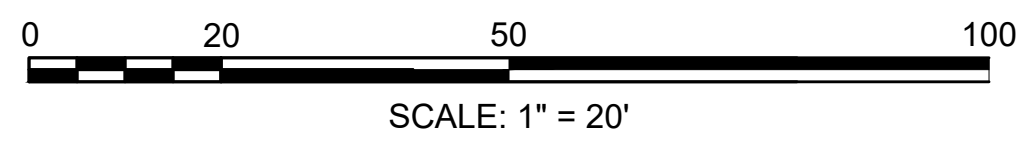
SURVEY BASEPLAN



CONTINUED ON SHEET NO. 41

CONTINUED ON SHEET NO. 45

CONTINUED ON SHEET NO. 43



REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984-00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

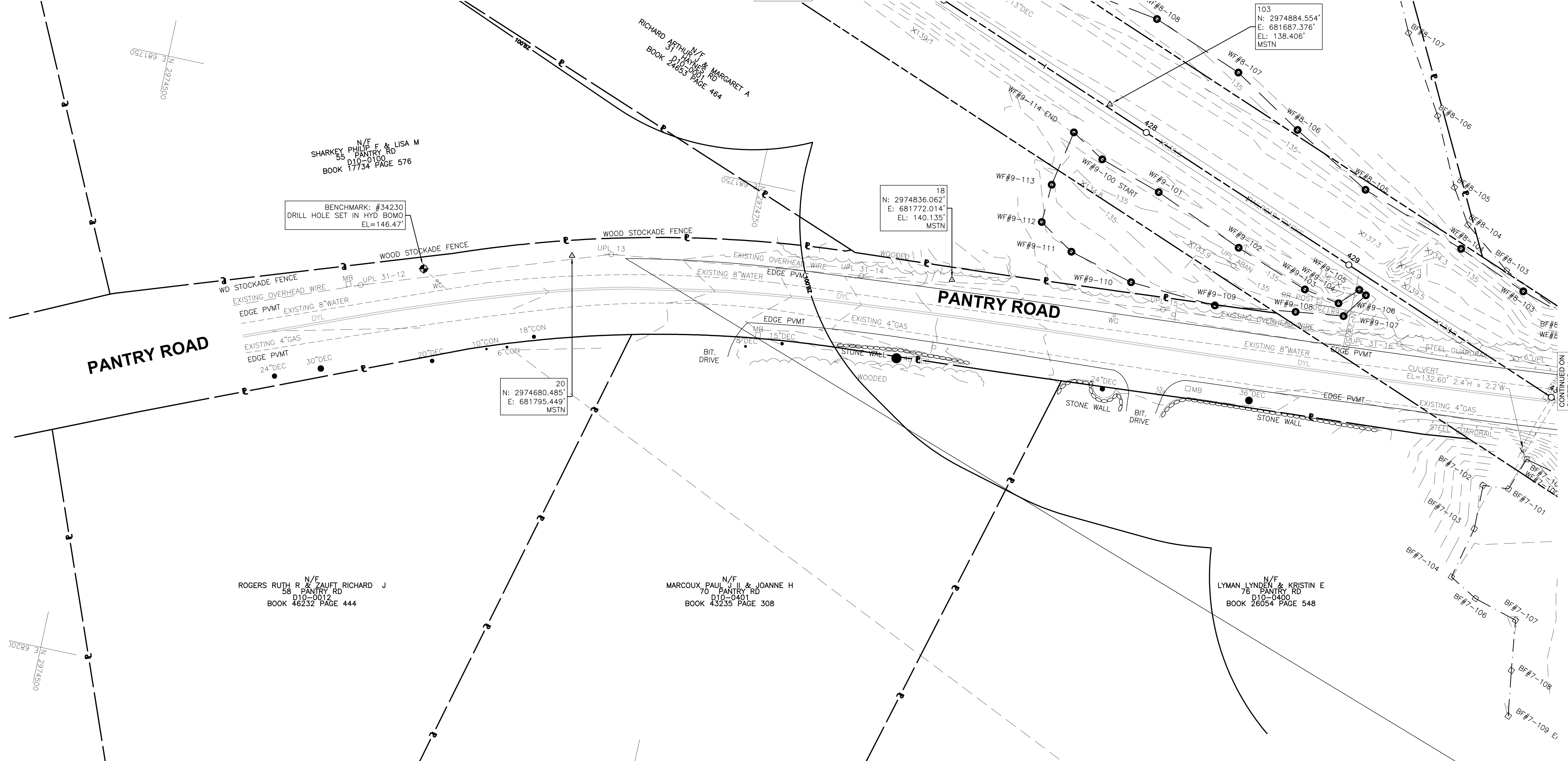
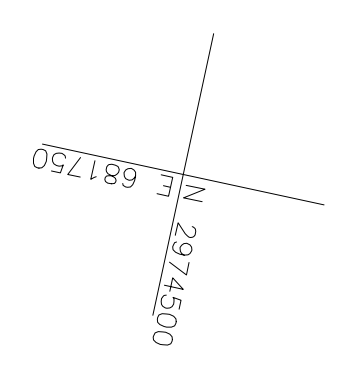
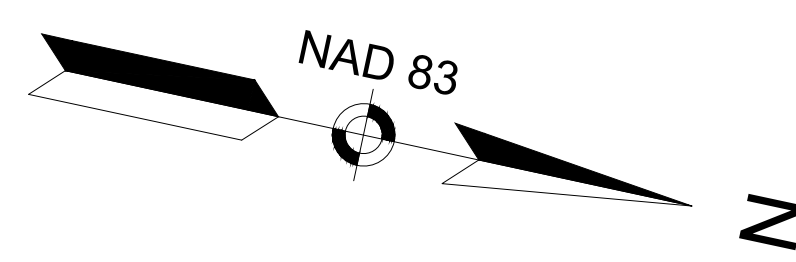
DATE: MAY 19, 2016

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	43	55

PROJECT FILE NO.

SURVEY BASEPLAN



BENCHMARK: #34230
DRILL HOLE SET IN HYD BOMO
EL=146.47'

18
N: 2974836.062'
E: 681772.014'
EL: 140.135'
MSTN

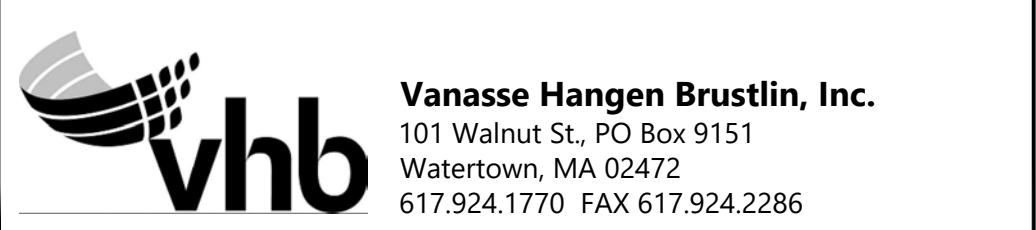
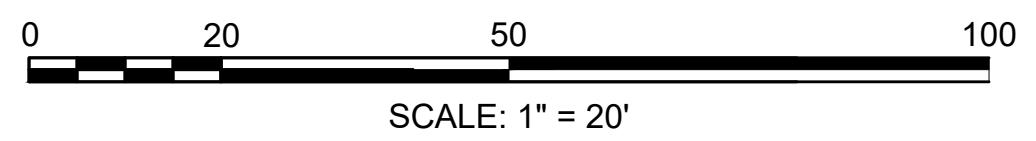
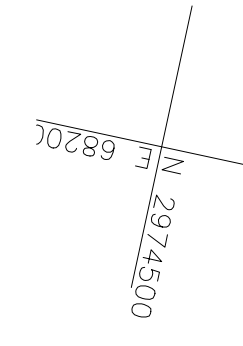
20
N: 2974680.485'
E: 681795.449'
MSTN

103
N: 2974884.554'
E: 681687.376'
EL: 138.406'
MSTN

N/F
ROGERS RUTH R & ZAUFF RICHARD J
58 PANTRY RD
D19-0012
BOOK 46232 PAGE 444

N/F
MARCoux PAUL J II & JOANNE H
70 PANTRY RD
D19-0401
BOOK 43235 PAGE 308

N/F
LYMAN LYNDEN & KRISTIN E
76 PANTRY RD
D19-0400
BOOK 26054 PAGE 548



PREPARED BY:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

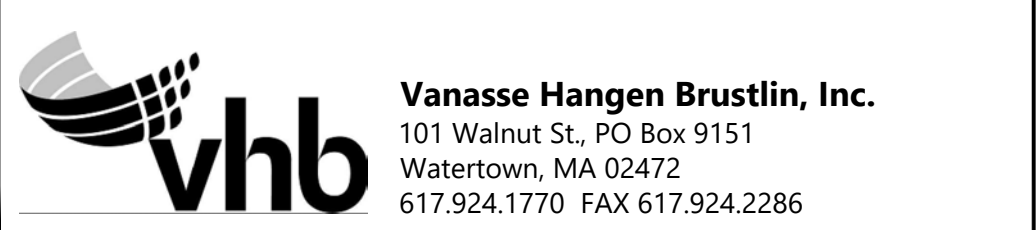
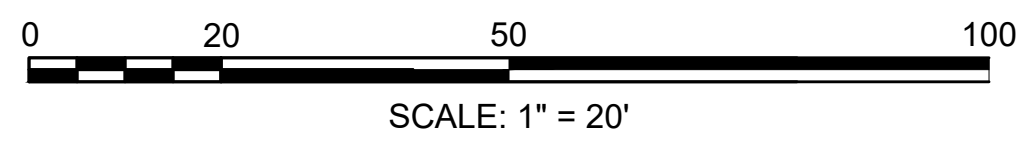
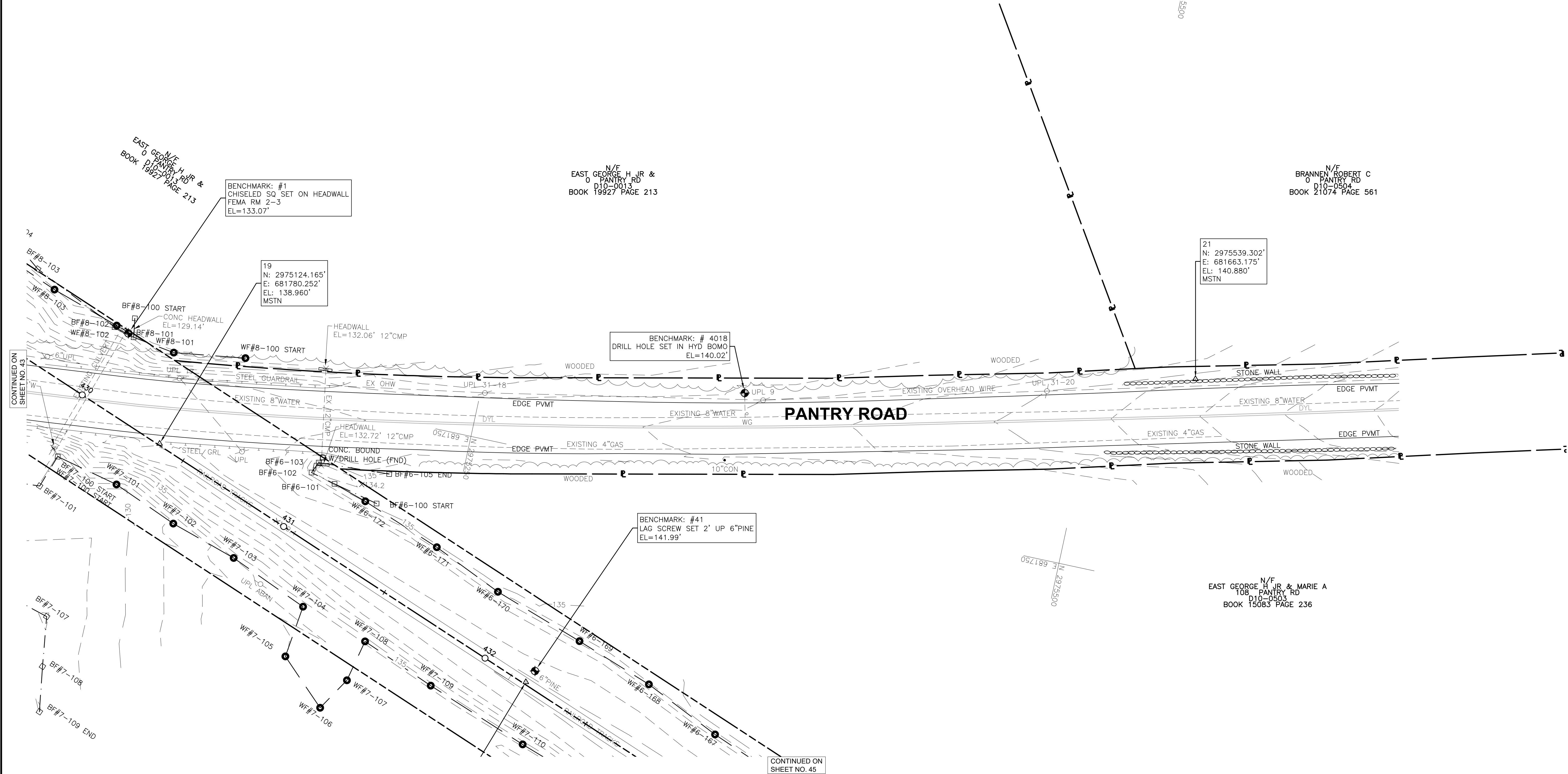
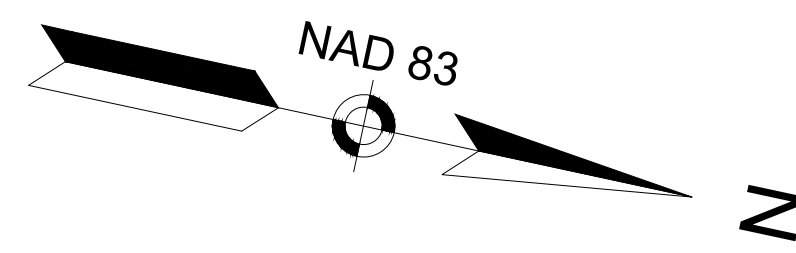
SCALE: 20 FEET TO THE INCH

FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	44	55

PROJECT FILE NO.
SURVEY BASEPLAN



REVISIONS		
REV.	COMMENTS	DATE

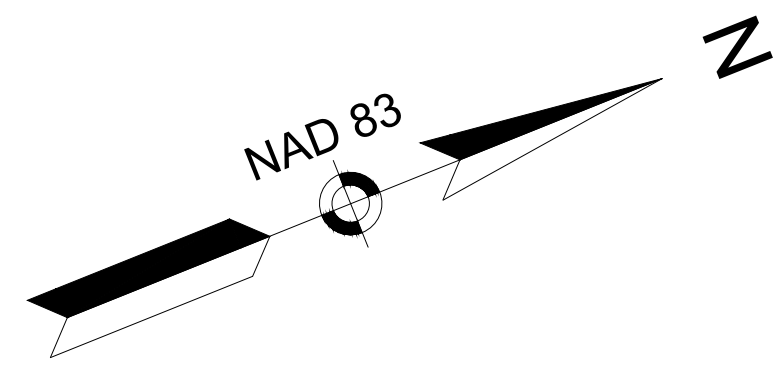
SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984-00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

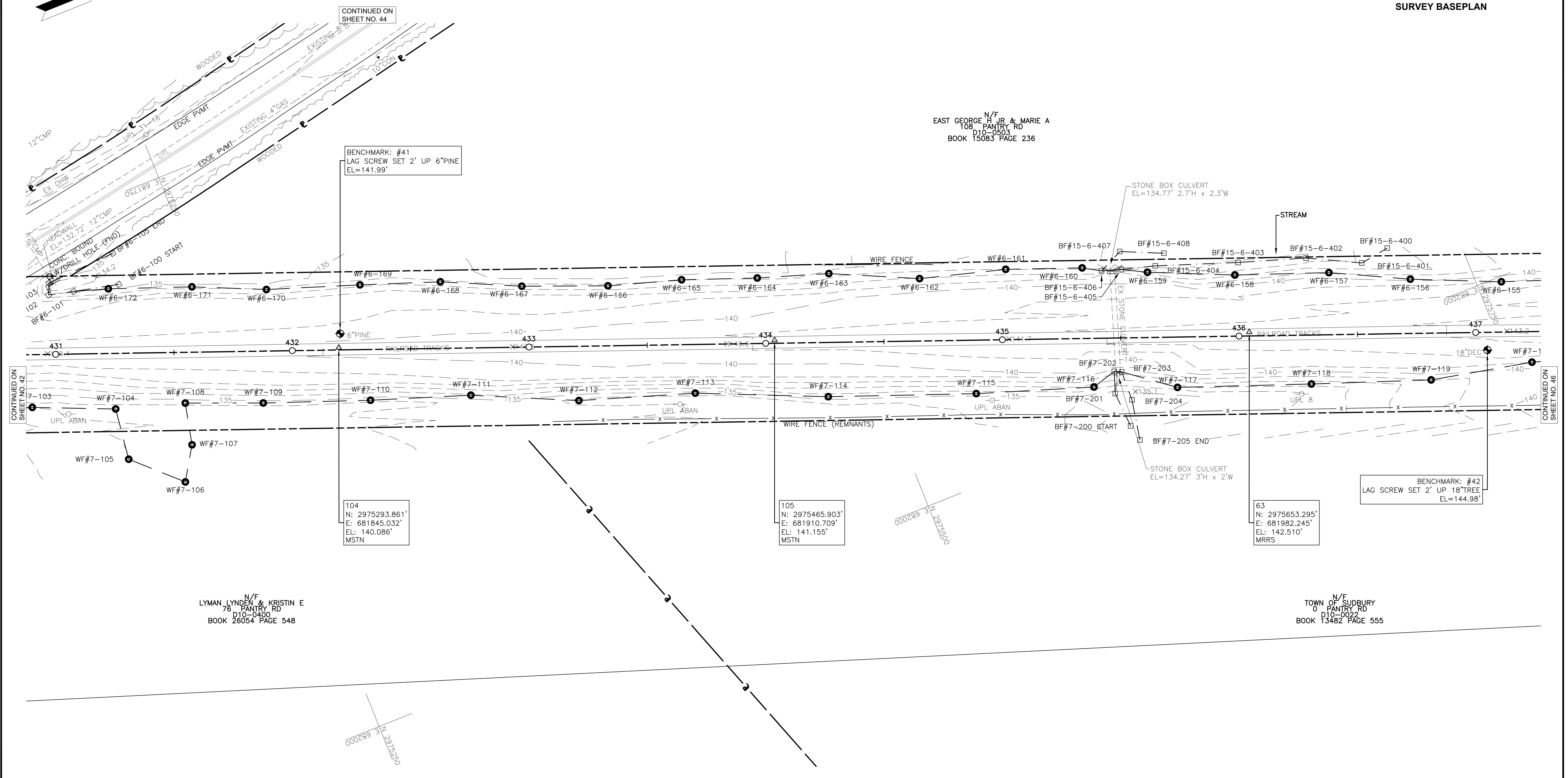
SHEET 44 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	45	55

PROJECT FILE NO.
SURVEY BASEPLAN



BENCHMARK: #41
LAG SCREW SET 2' UP 6" PINE
EL=141.99'

104
N: 2975293.861'
E: 681845.032'
EL: 140.086'
MSTN

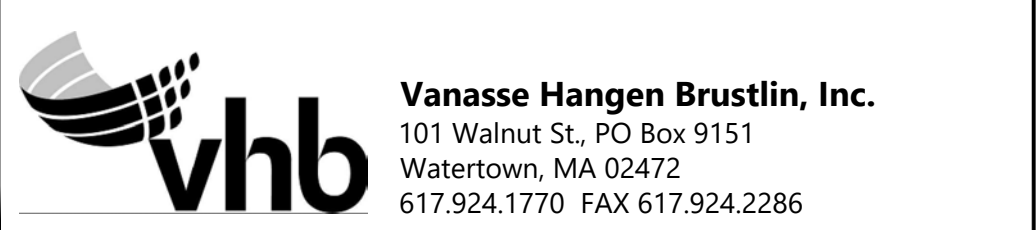
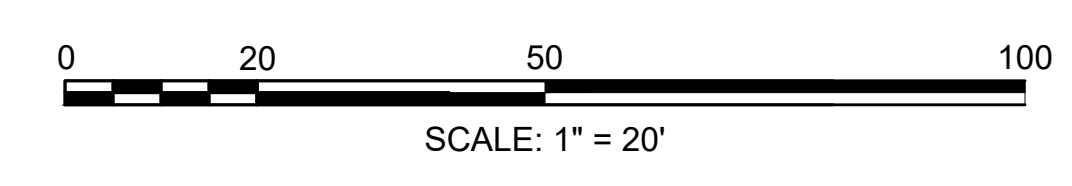
105
N: 2975465.903'
E: 681910.709'
EL: 141.155'
MSTN

63
N: 2975653.295'
E: 681982.245'
EL: 142.510'
MRRS

BENCHMARK: #42
LAG SCREW SET 2' UP 18" TREE
EL=144.98'

N/F
LYMAN LYNDEN & KRISTIN E
76 PANTRY RD
D10-0400
BOOK 26054 PAGE 548

N/F
TOWN OF SUDBURY
PANTRY RD
D10-0022
BOOK 13482 PAGE 555

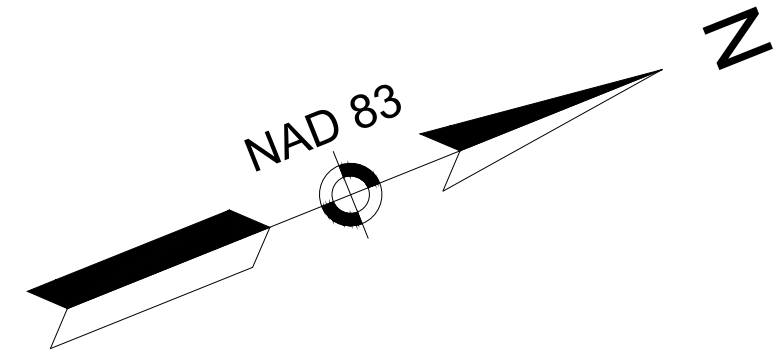


REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	46	55

PROJECT FILE NO.

SURVEY BASEPLAN

N/F
EAST GEORGE H. JR. & MARIE A
108 PANTRY RD
D10-0503
BOOK 15083 PAGE 236

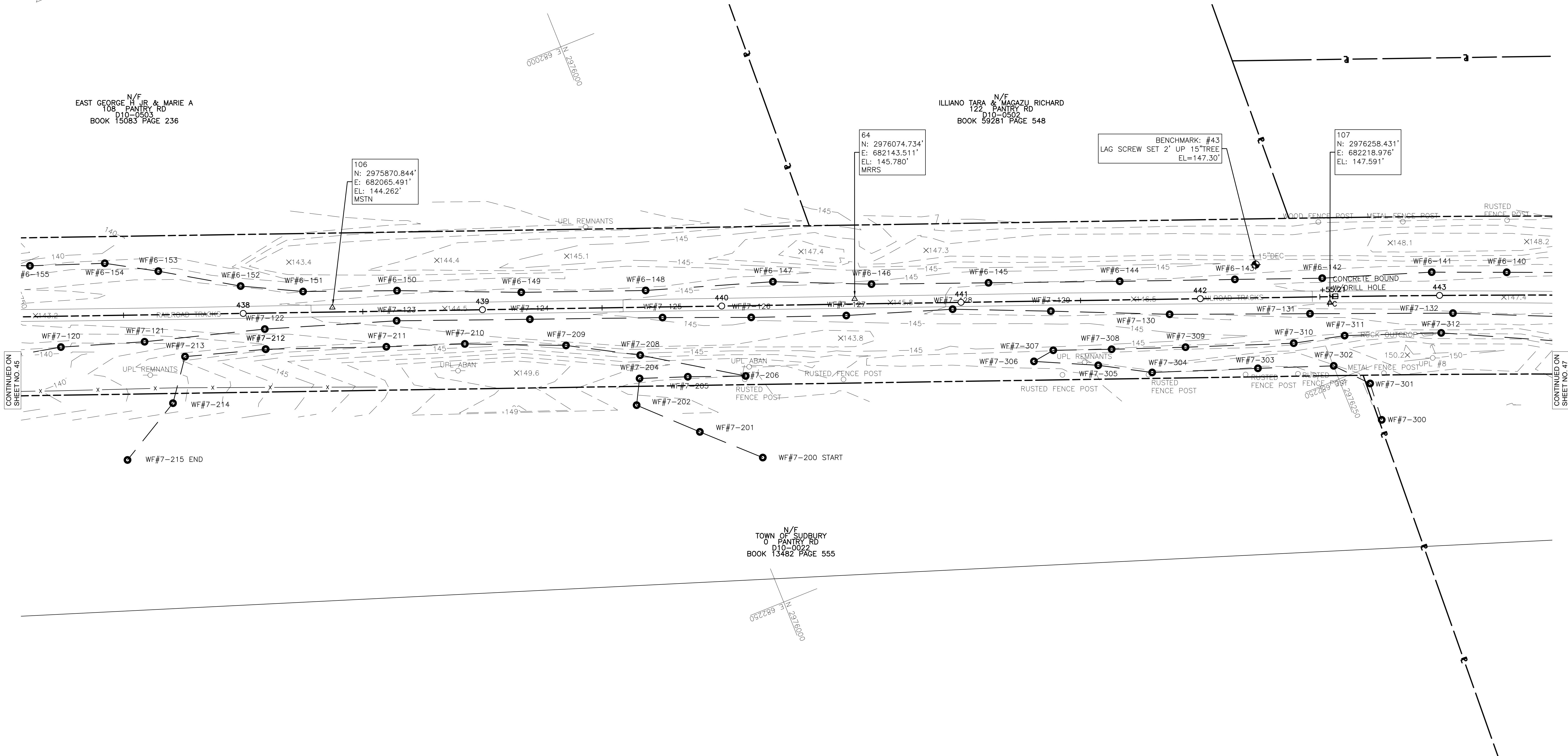
N/F
ILLIANO TARA & MAGAZU RICHARD
122 PANTRY RD
D10-0502
BOOK 59281 PAGE 548

106
N: 2975870.844'
E: 682065.491'
EL: 144.262'
MSTN

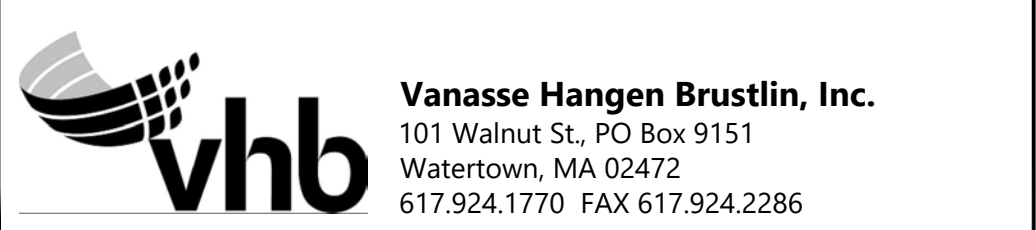
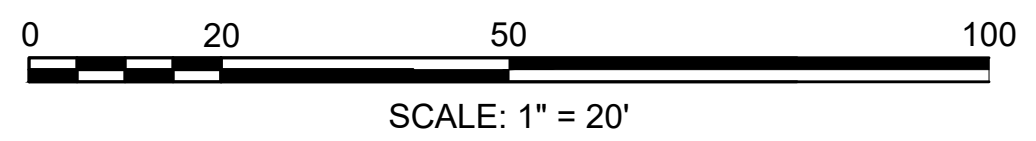
64
N: 2976074.734'
E: 682143.511'
EL: 145.780'
MRRS

BENCHMARK: #43
LAG SCREW SET 2' UP 15" TREE
EL=147.30'

107
N: 2976258.431'
E: 682218.976'
EL: 147.591'



N/F
TOWN OF SUDBURY
PANTRY RD
D10-0022
BOOK 13482 PAGE 555



REVISIONS		
REV.	COMMENTS	DATE

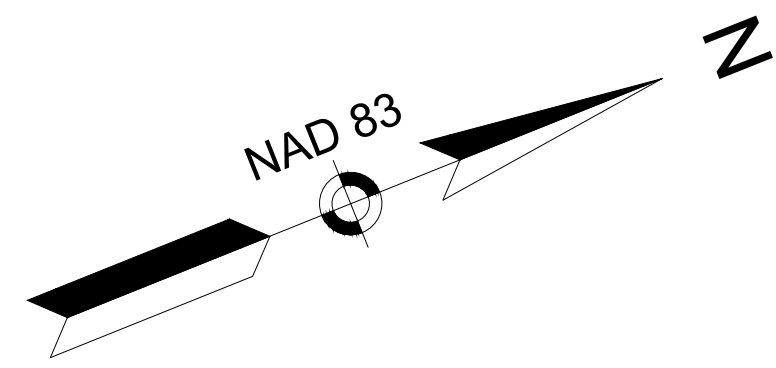
SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 46 OF 55

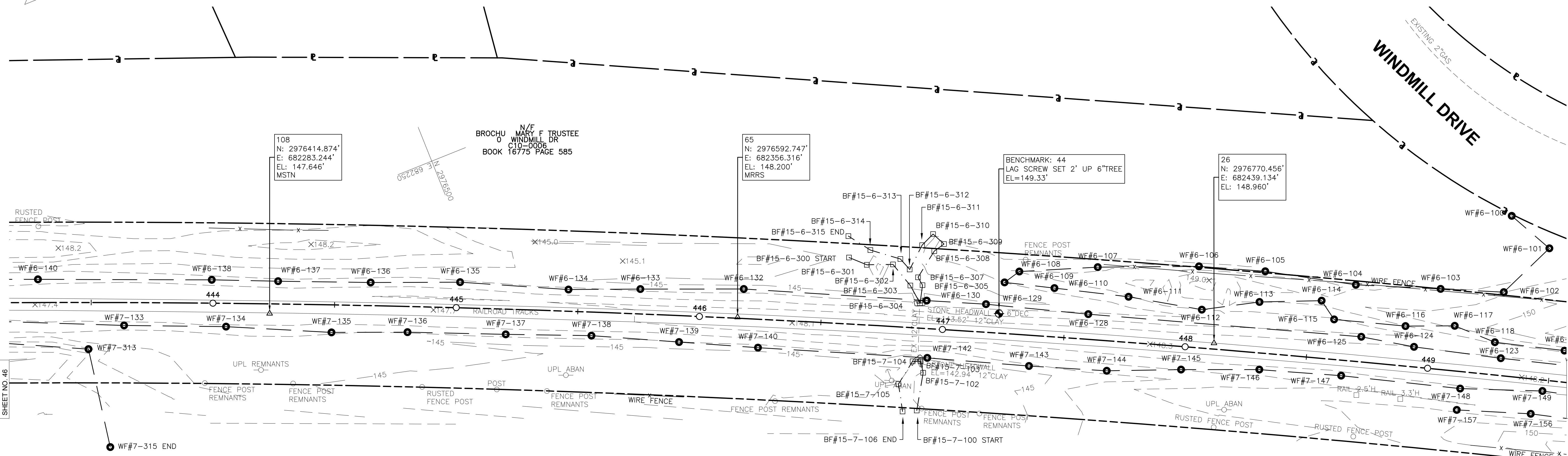


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	47	55

PROJECT FILE NO.

SURVEY BASEPLAN



108
N: 2976414.874'
E: 682283.244'
EL: 147.646'
MSTN

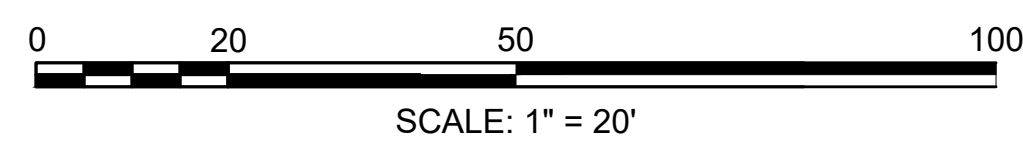
BROCHU N/E
MARY F TRUSTEE
0 WINDMILL DR
C10-0006
BOOK 16775 PAGE 585

65
N: 2976592.747'
E: 682356.316'
EL: 148.200'
MRRS

BENCHMARK: 44
LAG SCREW SET 2' UP 6" TREE
EL=149.33'

26
N: 2976770.456'
E: 682439.134'
EL: 148.960'

N/E
TOWN OF SUDBURY
211 NORTH RD
D10-0300
BOOK 12726 PAGE 603



SCALE: 1" = 20'



REVISIONS		
REV.	COMMENTS	DATE

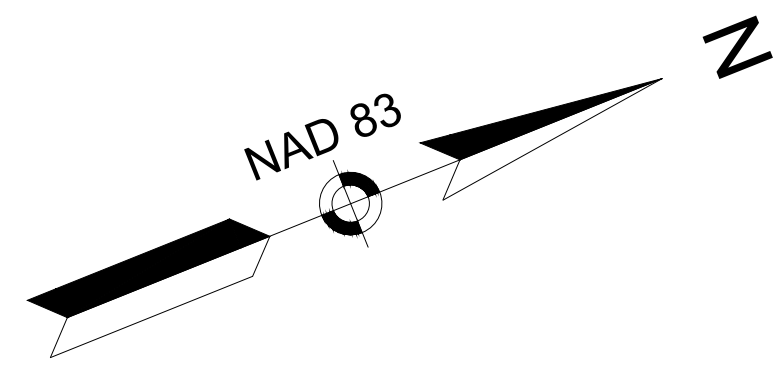
SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

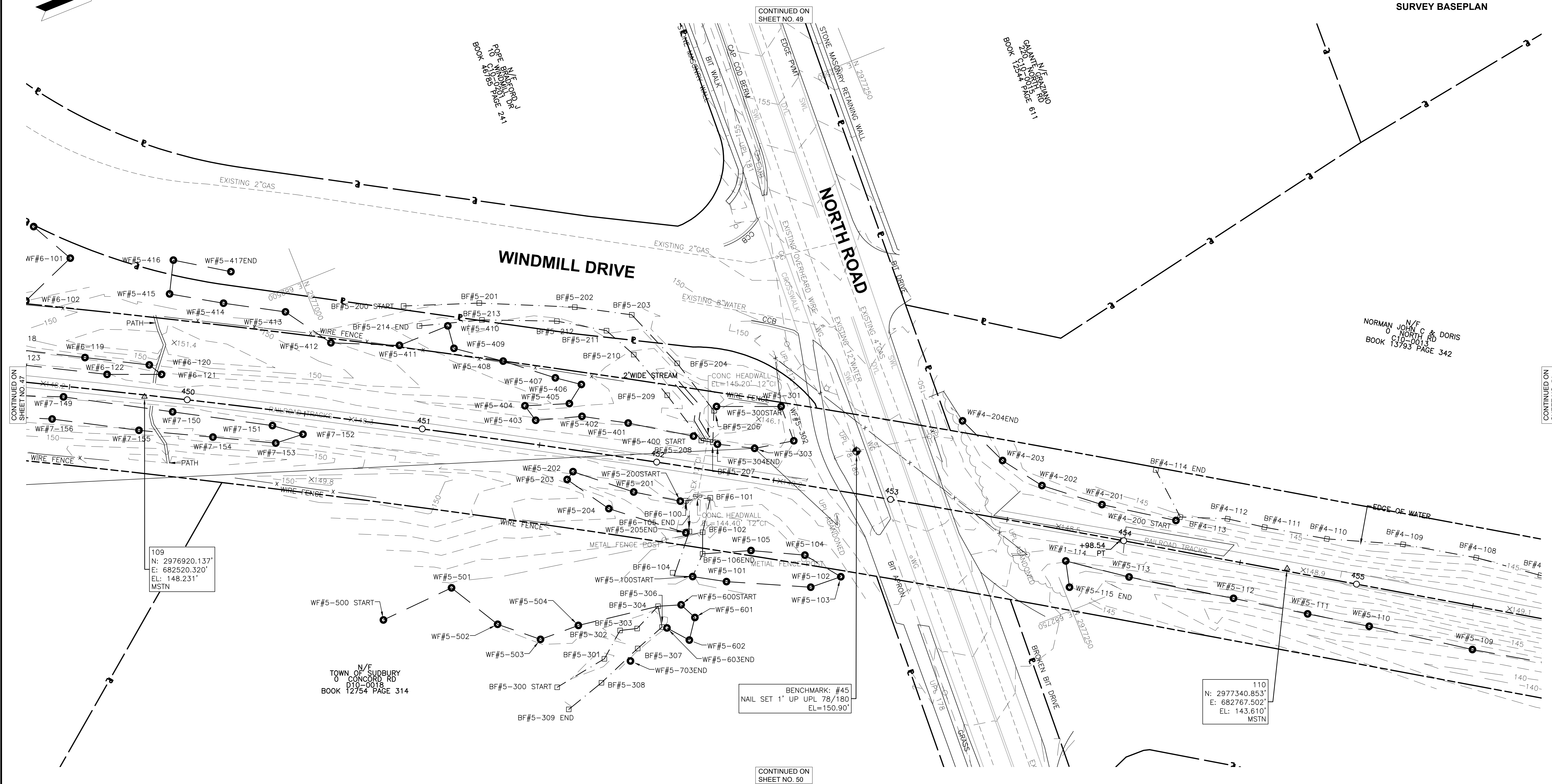
SHEET 47 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	48	55

PROJECT FILE NO.
SURVEY BASEPLAN

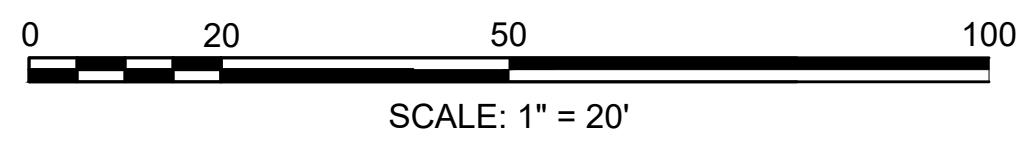


109
N: 2976920.137'
E: 682520.320'
EL: 148.231'
MSTN

N/F
TOWN OF SUDBURY
CONCORD RD
D10-0018
BOOK 12754 PAGE 314

BENCHMARK: #45
NAIL SET 1" UP UPL 78/180
EL=150.90'

110
N: 2977340.853'
E: 682767.502'
EL: 143.610'
MSTN



CONTINUED ON
SHEET NO. 50



PREPARED BY:
Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

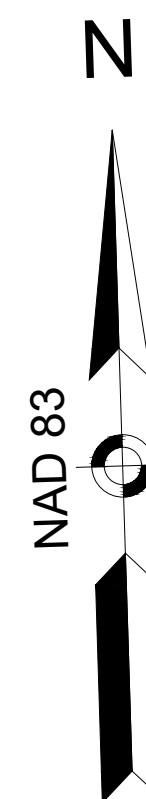
IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	49	55

PROJECT FILE NO.
SURVEY BASEPLAN



N/F
GALANTE, GRAZIANO TRS&
236 NORTH RD
C10-0017
BOOK 29598 PAGE 50

N/F
MYLES, SCOTT A
228 NORTH RD
C10-0016
BOOK 54169 PAGE 396

N/F
GALANTE, GRAZIANO
220 NORTH RD
C10-0015
BOOK 12544 PAGE 611

NORTH ROAD

NORTH ROAD

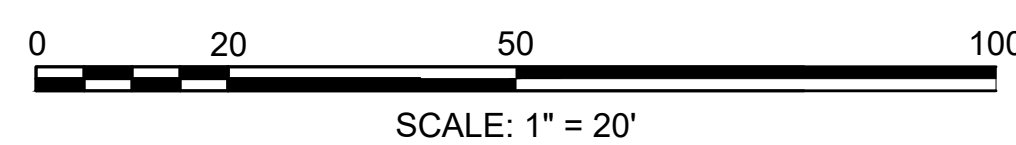
WINDMILL DRIVE

24
N: 2977206.658'
E: 682202.886'
EL: 172.490'
MMAG

N/F
MORABITO, THOMAS P & SHEILA M
237 NORTH RD
C10-0004
BOOK 45292 PAGE 103

N/F
KING THOMAS M & REBECCA L
231 NORTH RD
C10-0005
BOOK 17449 PAGE 194

N/F
POPE, BRADFORD J
10 WINDMILL DR
C10-0201
BOOK 46785 PAGE 241



PREPARED BY:

Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME: 12984.00-EX

FIELD BOOK NO.: 1200 & 1225

DRAWN BY: JEC

CHECKED BY: CDKR

FIELD CHIEF: RPT/DJS

PARS. NO.:

DATE: MAY 19, 2016

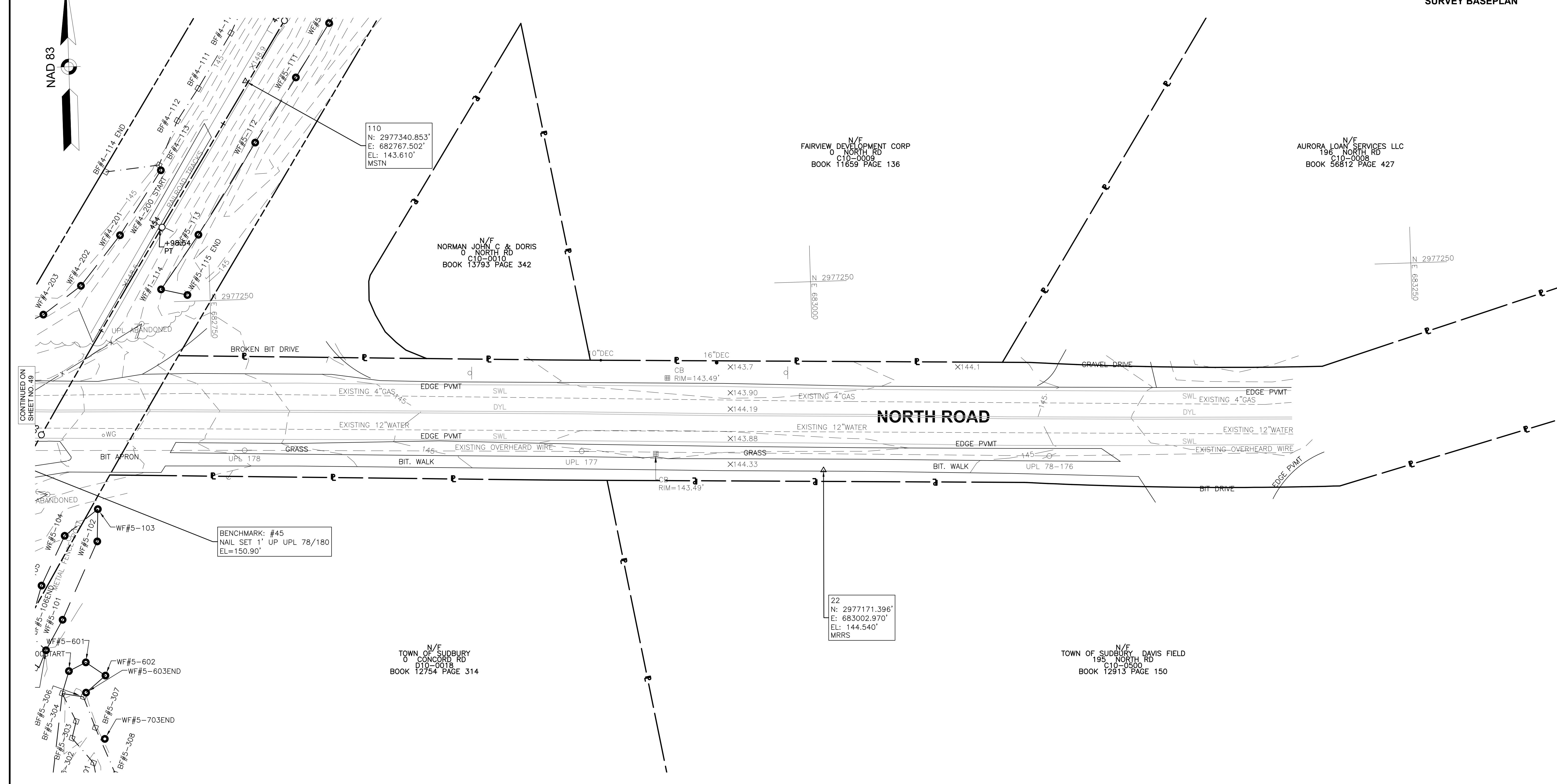
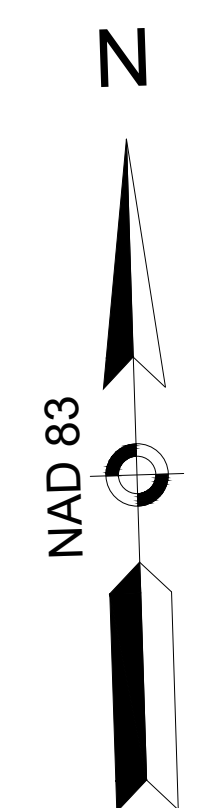
SHEET 49 OF 55

CONTINUED ON
SHEET NO. 50

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	50	55

PROJECT FILE NO.
SURVEY BASEPLAN



110
N: 2977340.853'
E: 682767.502'
EL: 143.610'
MSTN

N/F
FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0009
BOOK 11659 PAGE 136

N/F
AURORA LOAN SERVICES LLC
196 NORTH RD
C10-0008
BOOK 56812 PAGE 427

N/F
NORMAN JOHN C & DORIS
0 NORTH RD
C10-0010
BOOK 13793 PAGE 342

N 2977250
E 683000

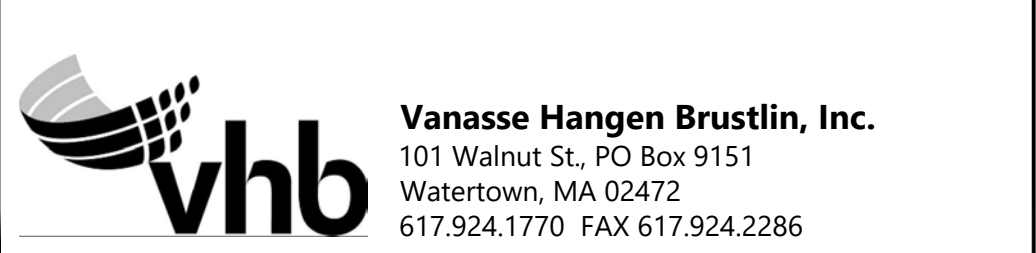
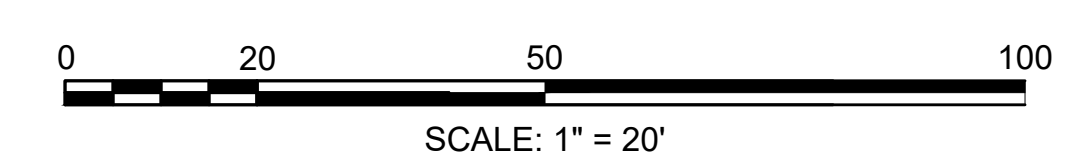
N 2977250
E 683250

BENCHMARK: #45
NAIL SET 1' UP UPL 78/180
EL=150.90'

22
N: 2977171.396'
E: 683002.970'
EL: 144.540'
MRRS

N/F
TOWN OF SUDBURY
0 CONCORD RD
D10-0018
BOOK 12754 PAGE 314

N/F
TOWN OF SUDBURY, DAVIS FIELD
195 NORTH RD
C10-0500
BOOK 12913 PAGE 150



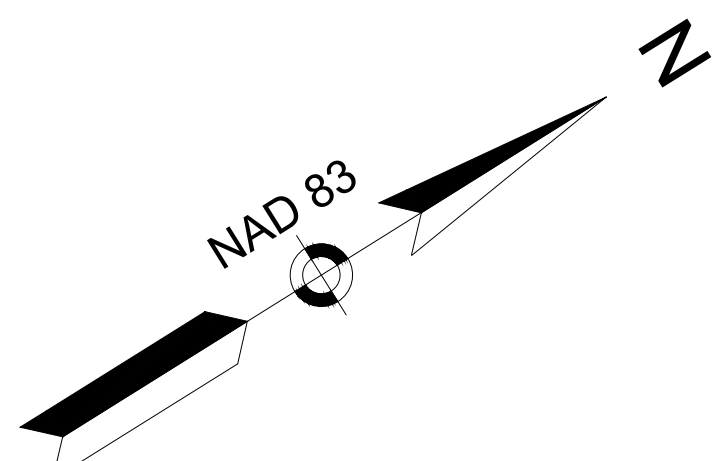
REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016



**SUDBURY
PROPOSED BIKE PATH**

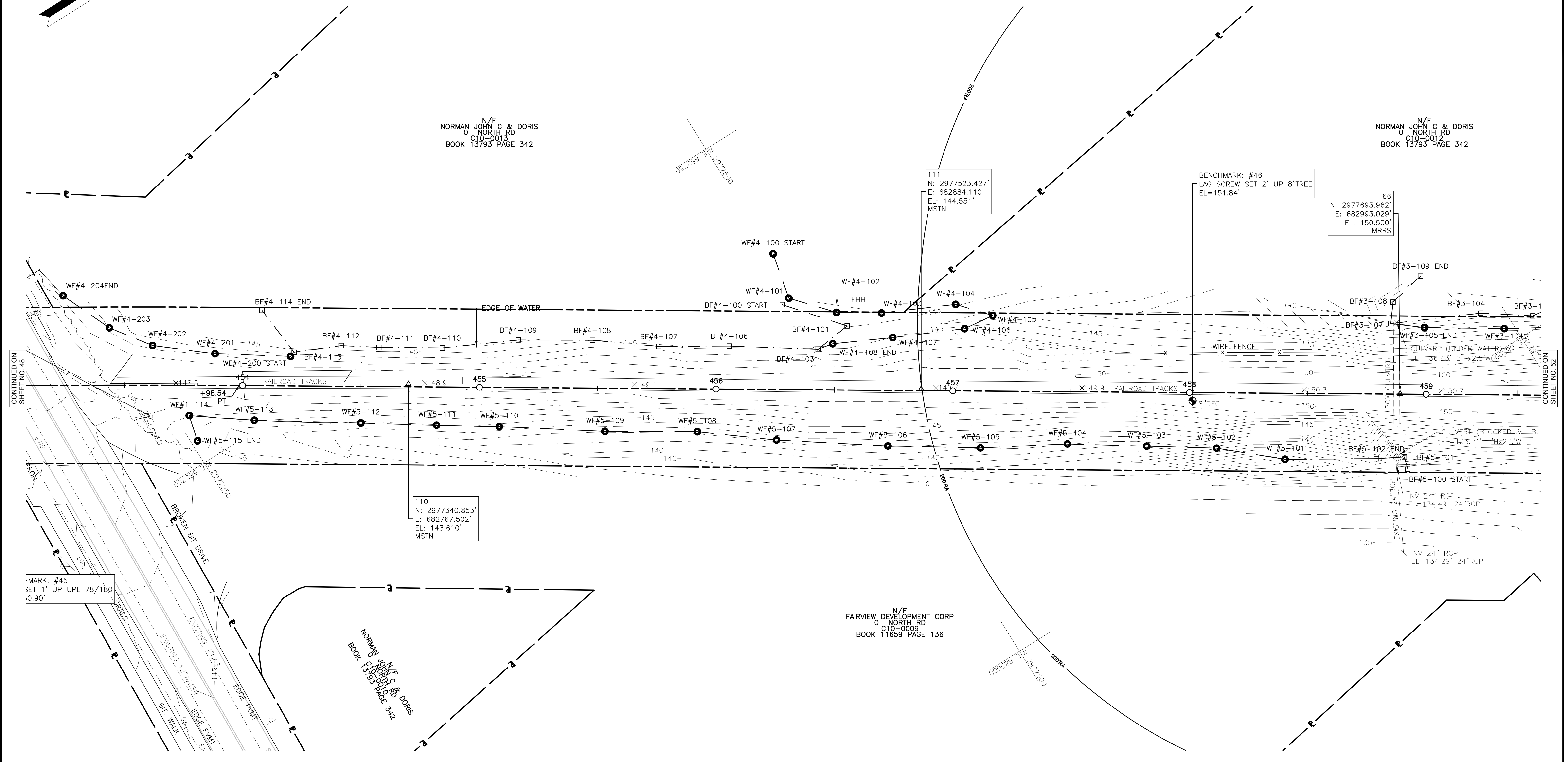
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	51	55

PROJECT FILE NO.

SURVEY BASEPLAN

N/F
NORMAN JOHN C & DORIS
0 NORTH RD
C10-0013
BOOK 13793 PAGE 342

N/F
NORMAN JOHN C & DORIS
0 NORTH RD
C10-0012
BOOK 13793 PAGE 342



CONTINUED ON
SHEET NO. 48

CONTINUED ON
SHEET NO. 52

MARK: #45
SET 1' UP UPL 78/180
@0.90'

110
N: 2977340.853'
E: 682767.502'
EL: 143.610'
MSTN

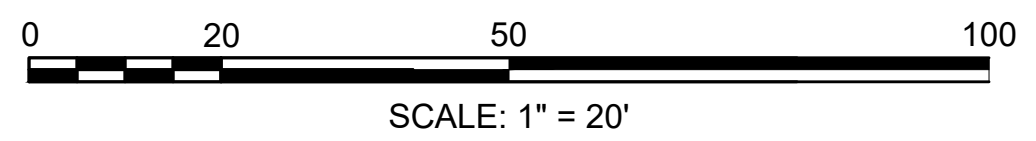
111
N: 2977523.427'
E: 682884.110'
EL: 144.551'
MSTN

BENCHMARK: #46
LAG SCREW SET 2' UP 8" TREE
EL=151.84'

66
N: 2977693.962'
E: 682993.029'
EL: 150.500'
MRRS

N/F
FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0009
BOOK 11659 PAGE 136

N/F
NORMAN JOHN C & DORIS
0 NORTH RD
C10-0013
BOOK 13793 PAGE 342



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REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME:	12984.00-EX
FIELD BOOK NO.:	1200 & 1225
DRAWN BY:	JEC
CHECKED BY:	CDKR
FIELD CHIEF:	RPT/DJS
PARS. NO.:	

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

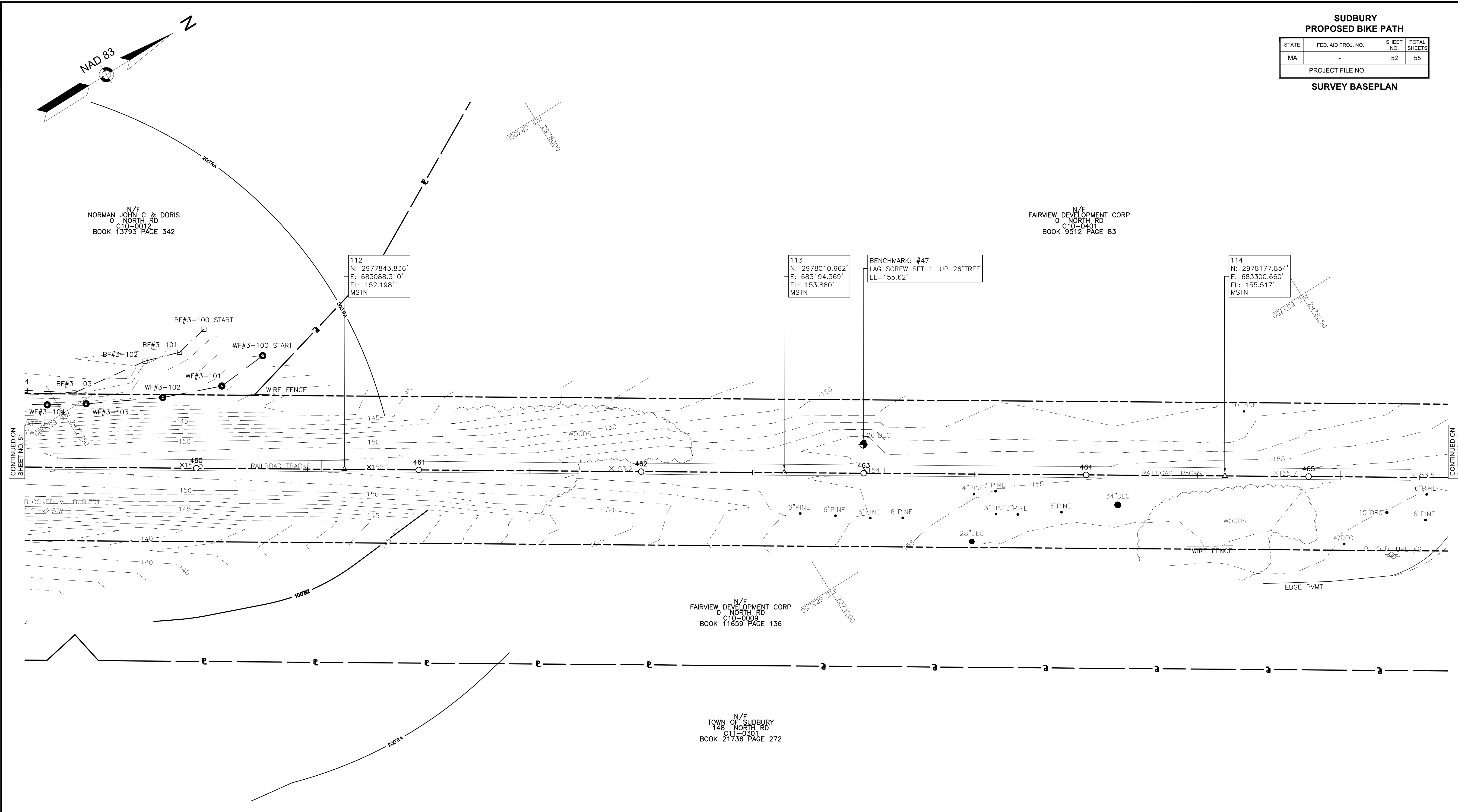
SHEET 51 OF 55

**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	52	55

PROJECT FILE NO.

SURVEY BASEPLAN



NAD 83
N/F
NORMAN JOHN C & DORIS
0 NORTH RD
C19-0017
BOOK 13793 PAGE 342

N/F
FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0401
BOOK 9512 PAGE 83

112
N: 2977843.836'
E: 683088.310'
EL: 152.198'
MSTN

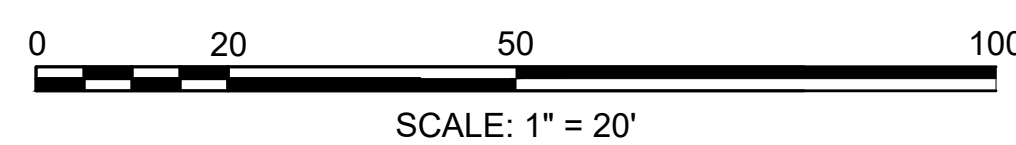
113
N: 2978010.662'
E: 683194.369'
EL: 153.880'
MSTN

BENCHMARK: #47
LAG SCREW SET 1' UP 26" TREE
EL=155.62'

114
N: 2978177.854'
E: 683300.660'
EL: 155.517'
MSTN

N/F
FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0009
BOOK 11659 PAGE 136

N/F
TOWN OF SUDBURY
148 NORTH RD
C11-0301
BOOK 21736 PAGE 272



PREPARED BY:

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REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME: 12984-00-EX
FIELD BOOK NO: 1200 & 1225
DRAWN BY: JEC
FIELD CHIEF: RPT/DJS

CHECKED BY: CDKR
PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF

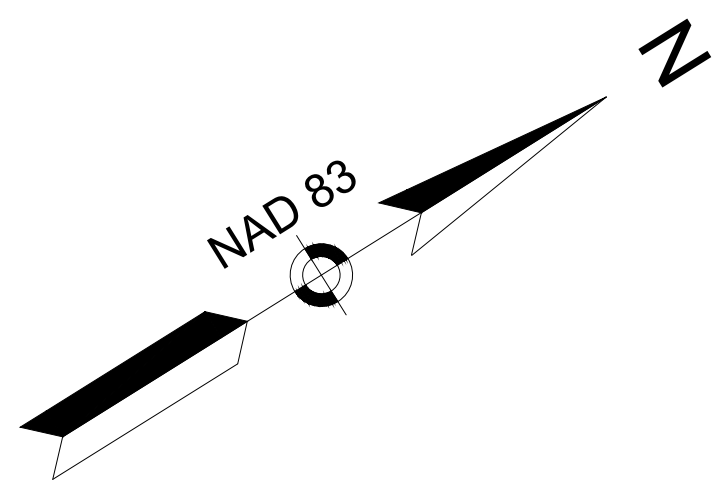
SUDBURY

AS ORDERED BY

THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 52 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	53	55

PROJECT FILE NO.
SURVEY BASEPLAN

N/F
FAIRVIEW DEVELOPMENT CORP
206 NORTH RD
C10-0401
BOOK 9512 PAGE 83

N/F
FAIRVIEW DEVELOPMENT CORP
206 NORTH RD
C10-0400
BOOK 45910 PAGE 223

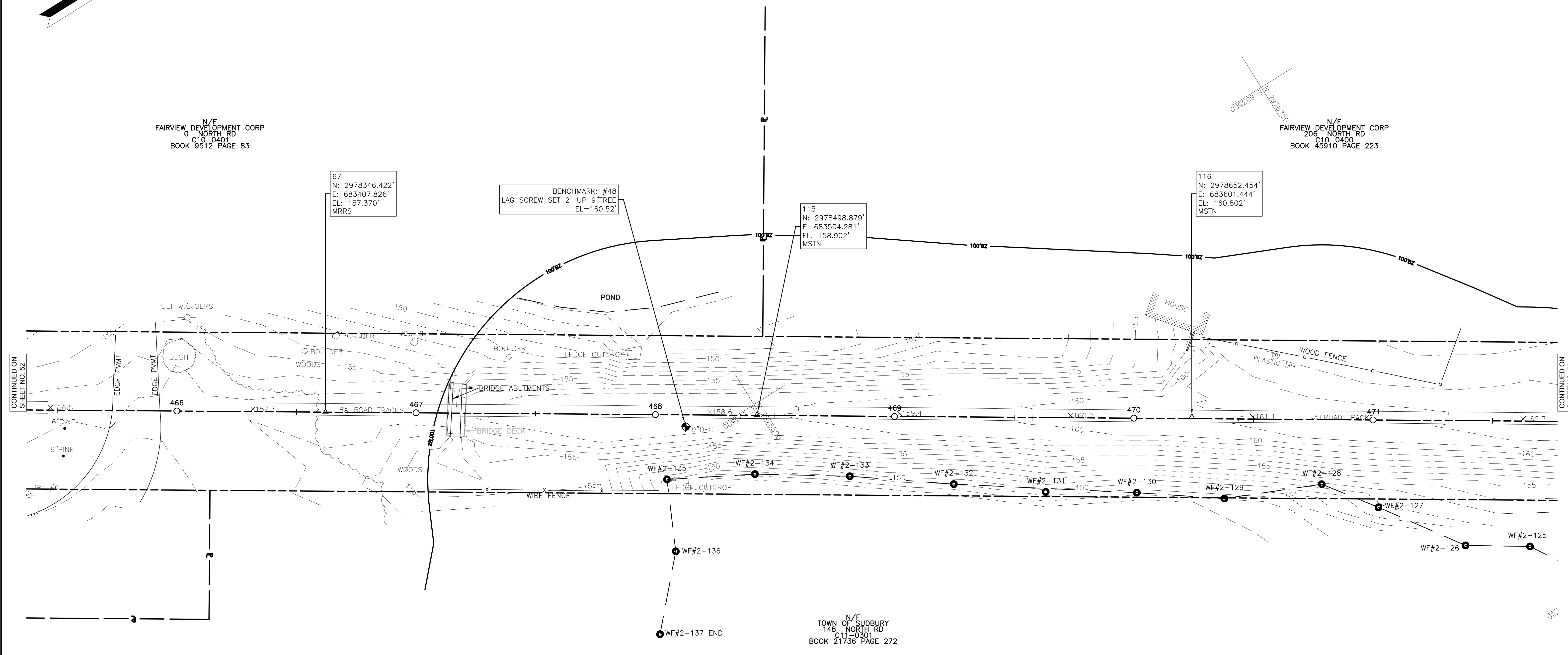
67
N: 2978346.422'
E: 683407.826'
EL: 157.370'
MRRS

BENCHMARK: #48
LAG SCREW SET 2' UP 9" TREE
EL=160.52'

115
N: 2978498.879'
E: 683504.281'
EL: 158.902'
MSTN

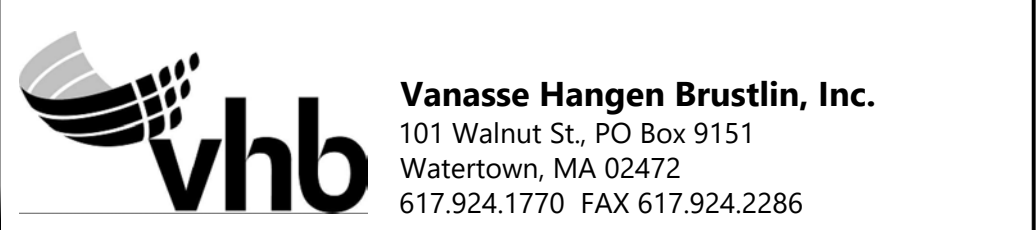
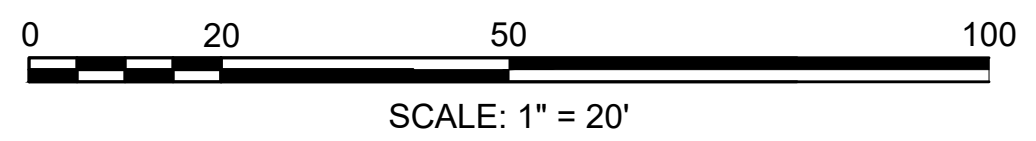
116
N: 2978652.454'
E: 683601.444'
EL: 160.802'
MSTN

N/F
TOWN OF SUDBURY
148 NORTH RD
C11-0301
BOOK 21736 PAGE 272



CONTINUED ON
SHEET NO. 52

CONTINUED ON
SHEET NO. 54



REVISIONS		
REV.	COMMENTS	DATE

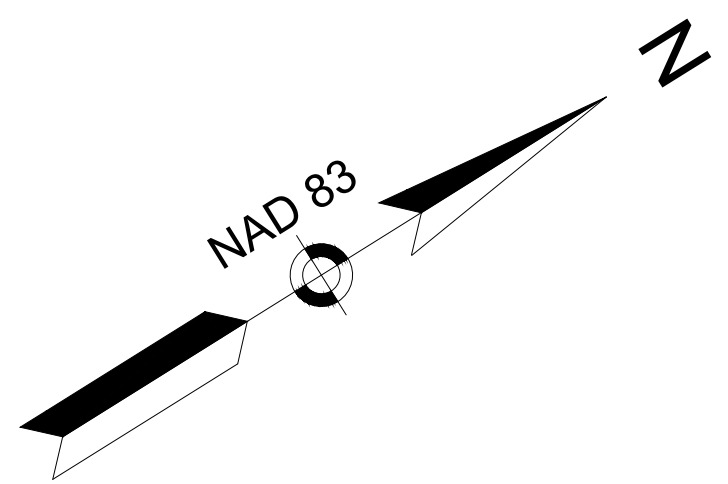
SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 53 OF 55



**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	54	55

PROJECT FILE NO.

SURVEY BASEPLAN

N/F
FAIRVIEW DEVELOPMENT CORP
206 NORTH RD
C10-0400
BOOK 43910 PAGE 223

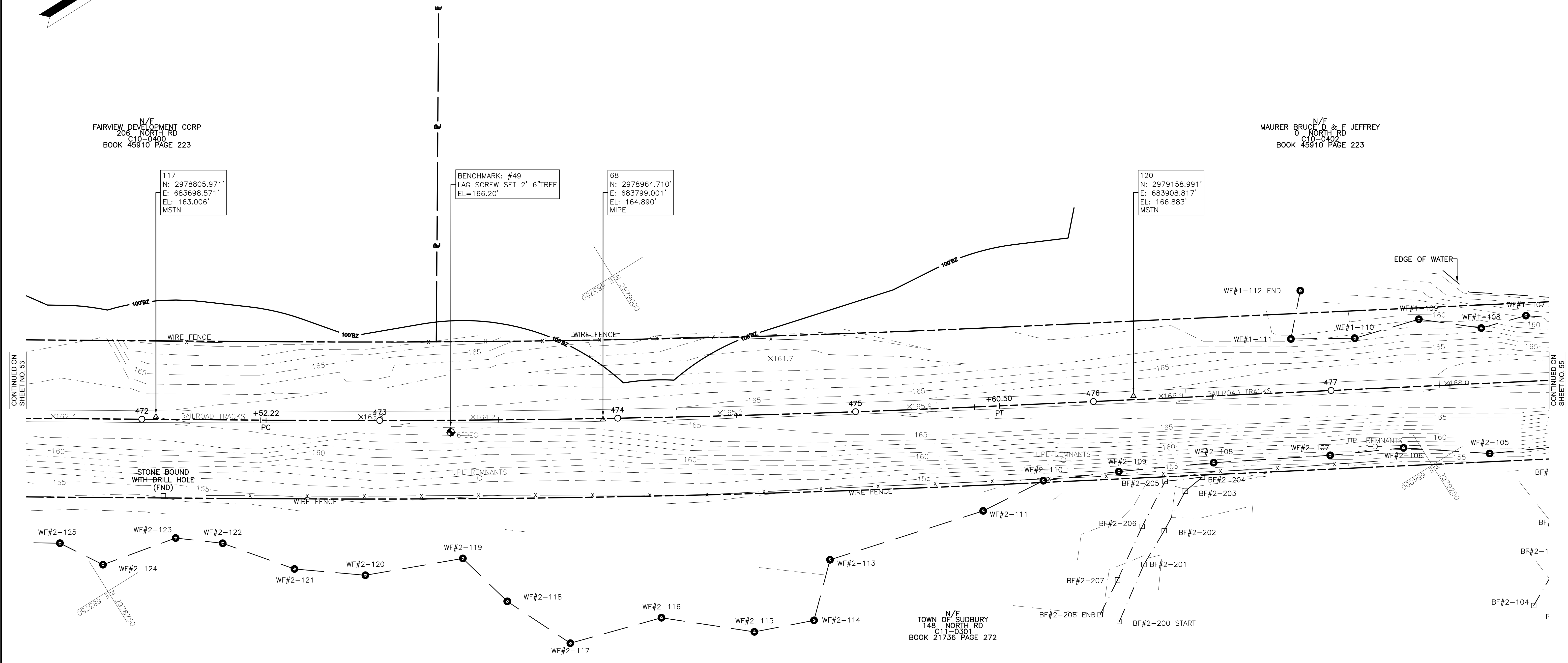
N/F
MAURER BRUCE D & F JEFFREY
0 NORTH RD
C10-0402
BOOK 43910 PAGE 223

117
N: 2978805.971'
E: 683698.571'
EL: 163.006'
MSTN

BENCHMARK: #49
LAG SCREW SET 2" 6" TREE
EL=166.20'

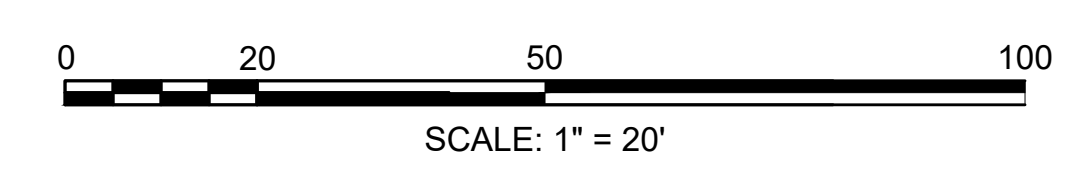
68
N: 2978964.710'
E: 683799.001'
EL: 164.890'
MIPE

120
N: 2979158.991'
E: 683908.817'
EL: 166.883'
MSTN



CONTINUED ON
SHEET NO. 53

CONTINUED ON
SHEET NO. 55



PREPARED BY:
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Watertown, MA 02472
617.924.1770 FAX 617.924.2286

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

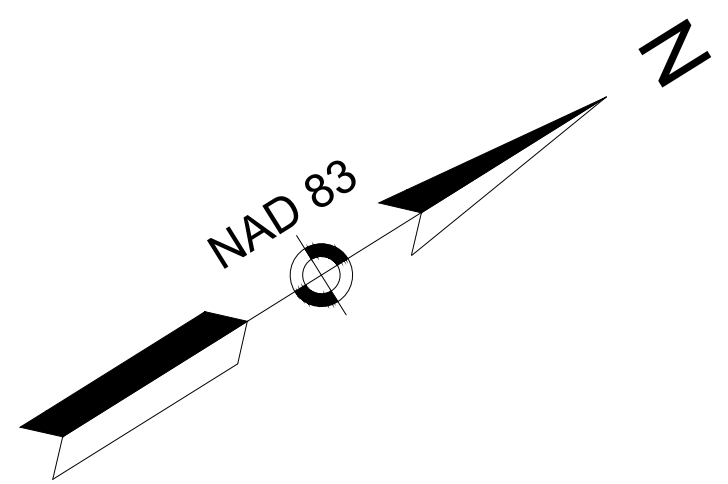
IN THE TOWN OF
SUDBURY

AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: 20 FEET TO THE INCH

FILE NAME: 12984.00-EX
FIELD BOOK NO: 1200 & 1225
DRAWN BY: JEC CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS PARS. NO:

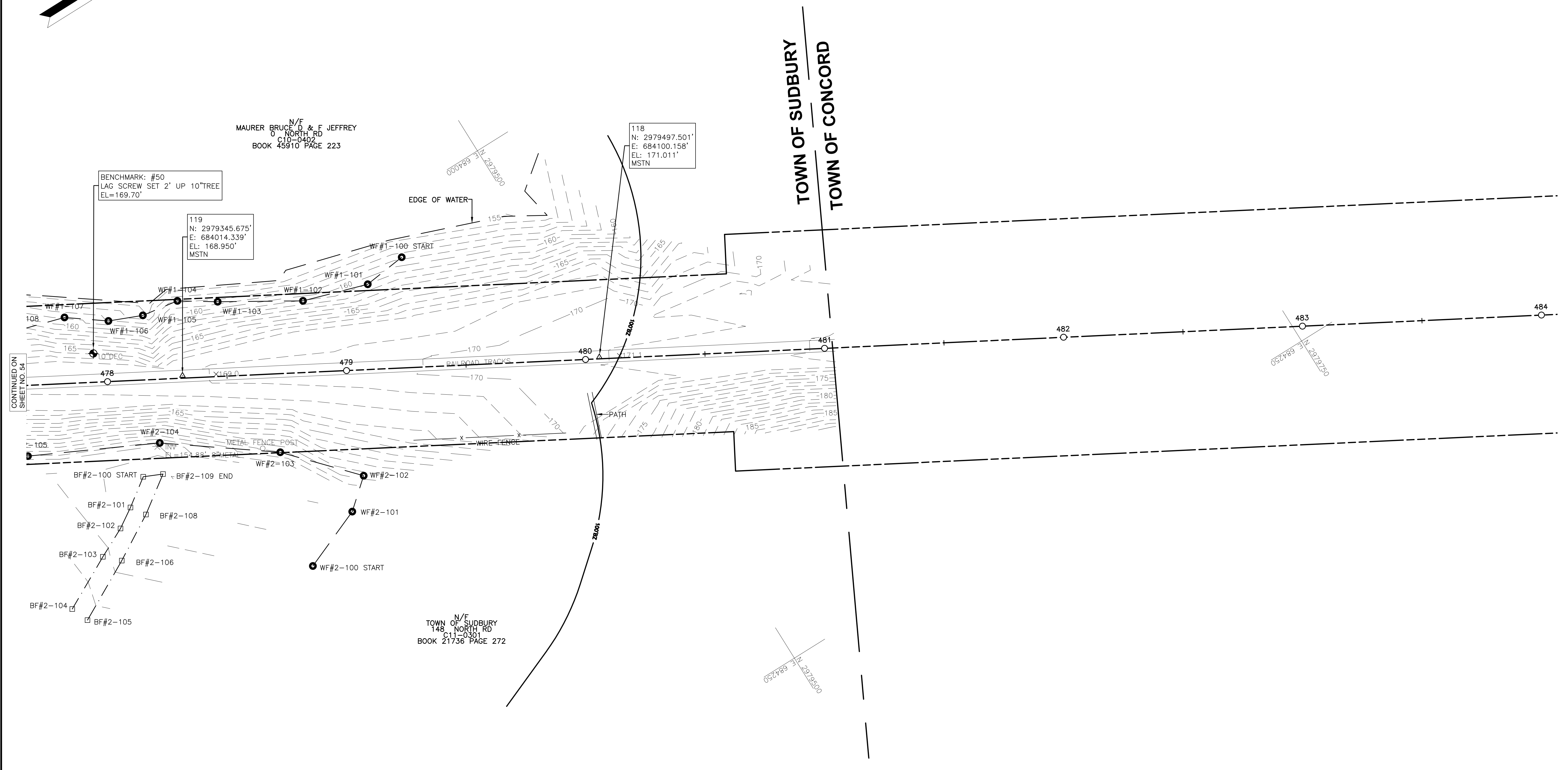


**SUDBURY
PROPOSED BIKE PATH**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	55	55

PROJECT FILE NO.

SURVEY BASEPLAN



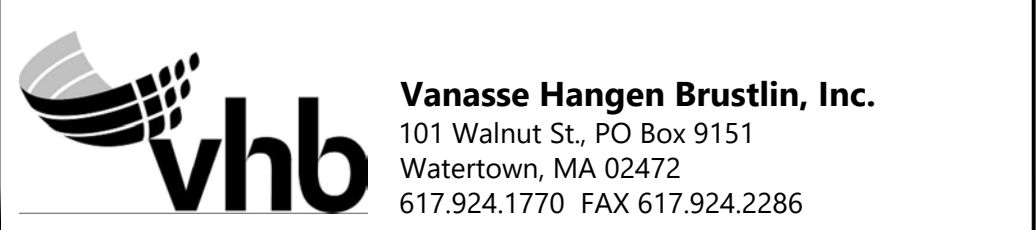
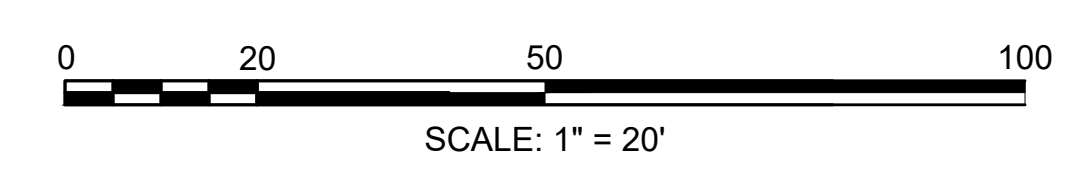
CONTINUED ON
SHEET NO. 54

N/E
MAURER BRUCE D. & F. JEFFREY
0 NORTH RD
C10-0402
BOOK 45910 PAGE 223

118
N: 2979497.501'
E: 684100.158'
EL: 171.011'
MSTN

119
N: 2979345.675'
E: 684014.339'
EL: 168.950'
MSTN

N/E
TOWN OF SUDBURY
148 NORTH RD
C11-0301
BOOK 21736 PAGE 272



REVISIONS		
REV.	COMMENTS	DATE

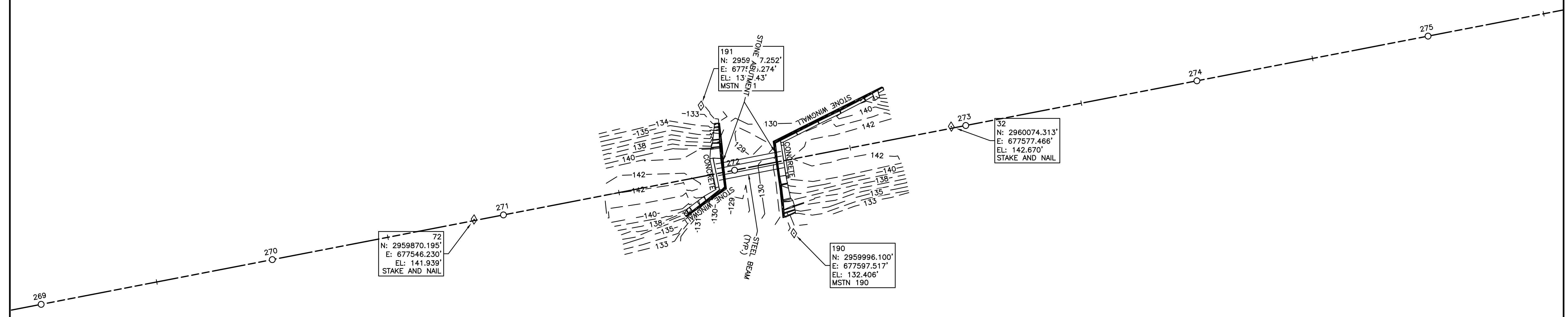
SCALE: 20 FEET TO THE INCH	
FILE NAME: 12984.00-EX	
FIELD BOOK NO: 1200 & 1225	
DRAWN BY: JEC	CHECKED BY: CDKR
FIELD CHIEF: RPT/DJS	PARS. NO:

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
PROPOSED BIKE PATH

IN THE TOWN OF
SUDBURY
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MAY 19, 2016

SHEET 55 OF 55

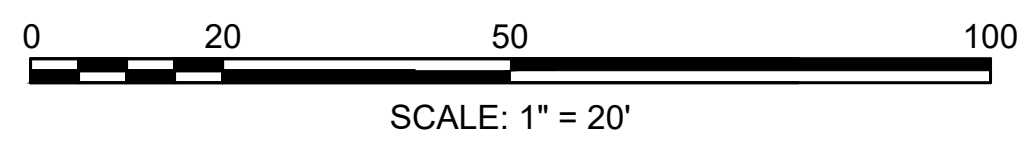


72
N: 2959870.195'
E: 677546.230'
EL: 141.939'
STAKE AND NAIL

191
N: 2959727.252'
E: 677577.274'
EL: 137.43'
MSTN 1

32
N: 2960074.313'
E: 677577.466'
EL: 142.670'
STAKE AND NAIL

190
N: 2959996.100'
E: 677597.517'
EL: 132.406'
MSTN 190



HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318



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84 MAIN STREET
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PHONE: (978) 657-9714
FAX: (978) 657-7915

REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH	
FILE NAME: XXXXXSV	
FIELD BOOK NO: XXXX	
DRAWN BY: XXX	CHECKED BY: XXX
FIELD CHIEF: XXX	PARS. NO: XXXXXX

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MONTH DD, YEAR SHEET X OF X

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	X	X
PROJECT FILE NO. XXXXXX			

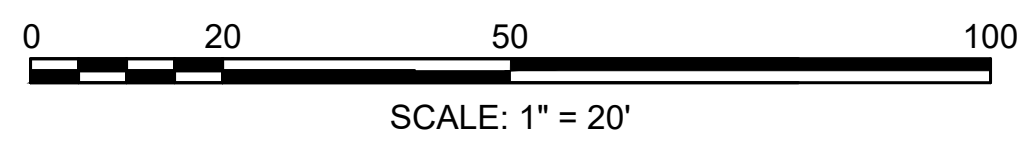
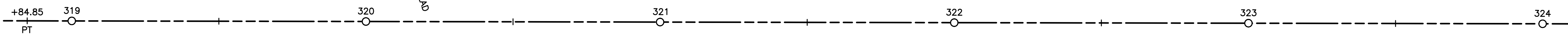
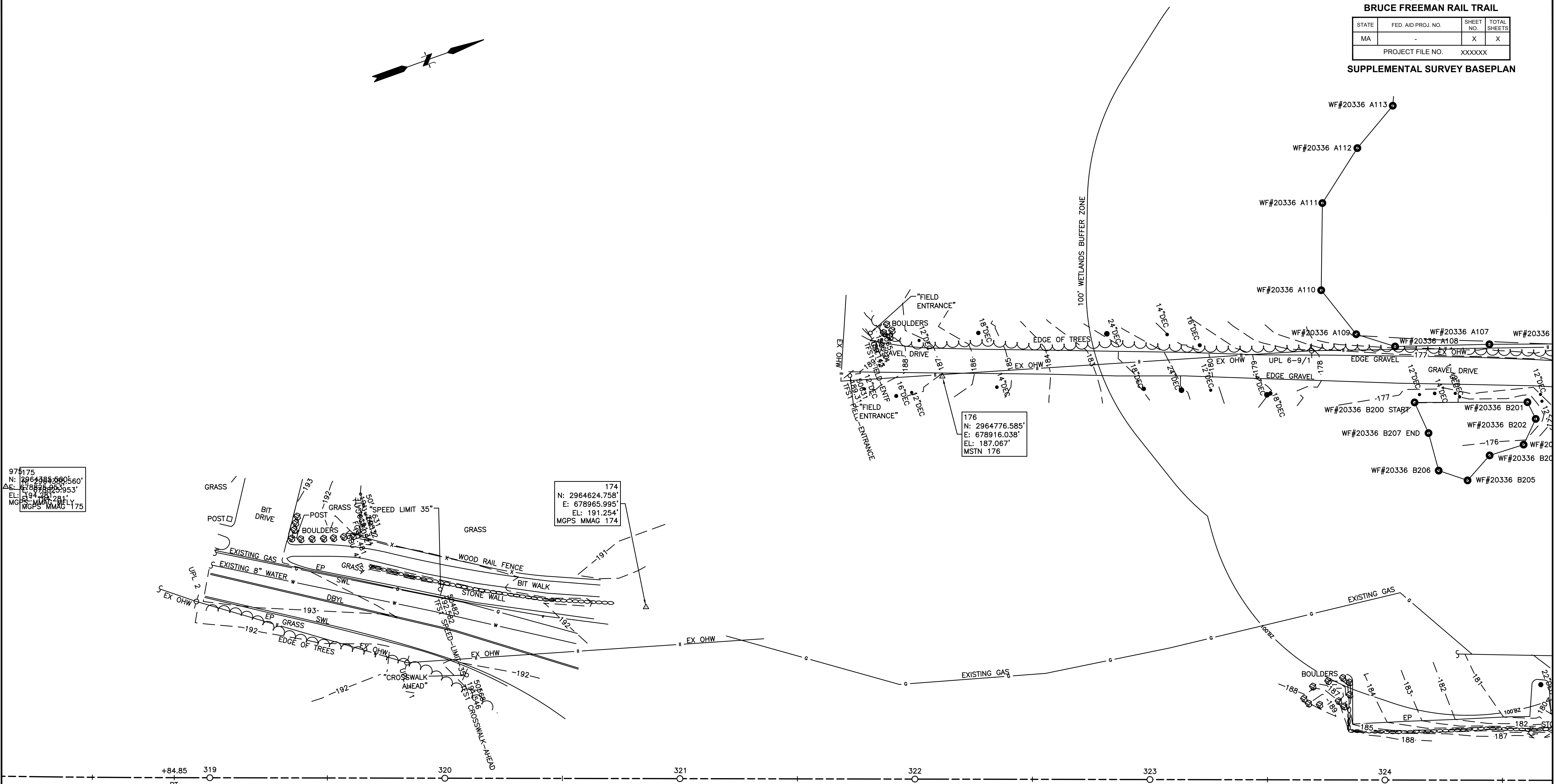
SUPPLEMENTAL SURVEY BASEPLAN

BFRS SUPPLEMENTAL SURVEY.DWG Plotted on 19-Apr-2021 1:54 PM

975175
N: 2964385.560'
E: 678895.953'
EL: 194.881'
MGPS MMAG 175

174
N: 2964624.758'
E: 678965.995'
EL: 191.254'
MGPS MMAG 174

176
N: 2964776.585'
E: 678916.038'
EL: 187.067'
MSTN 176



HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318



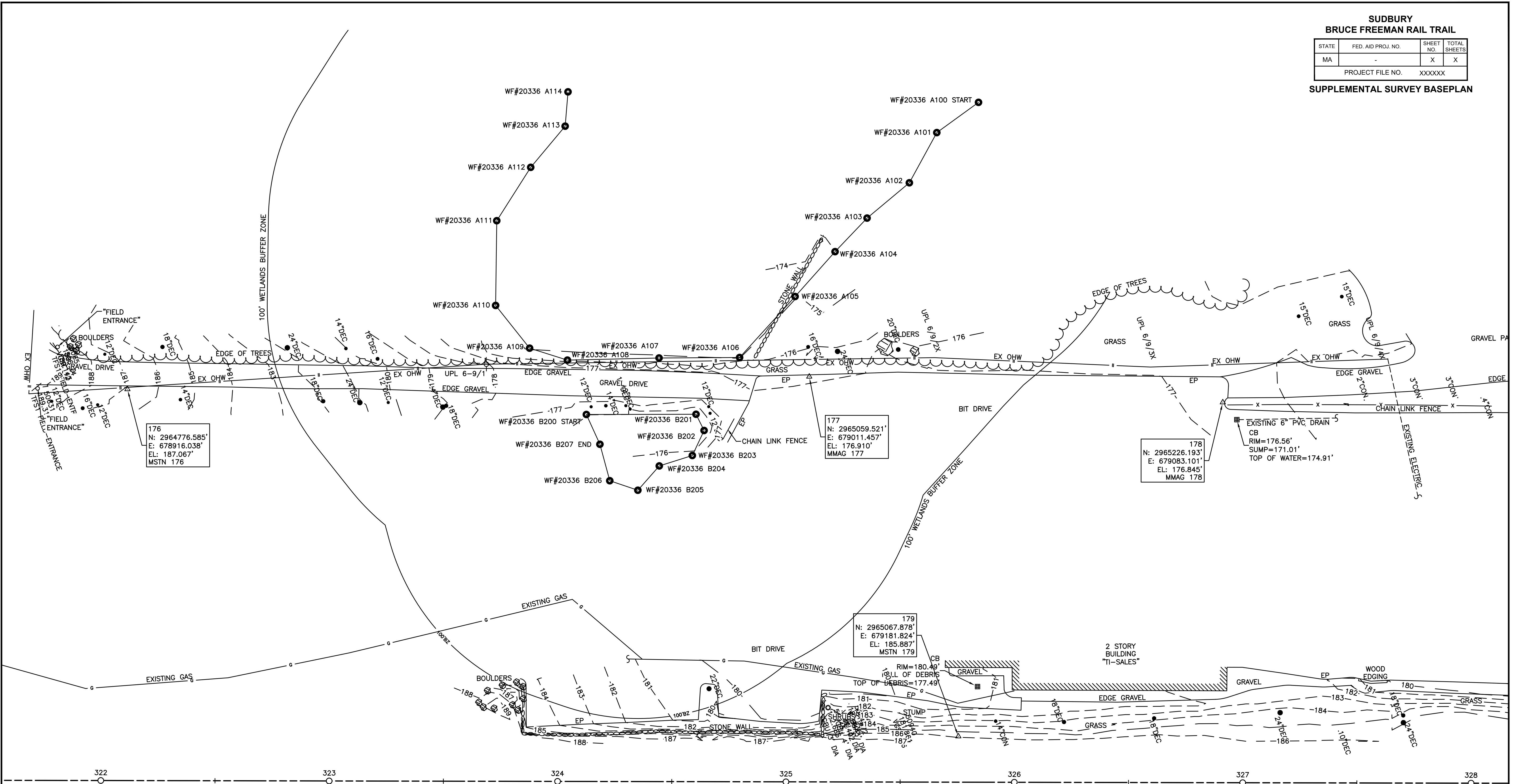
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PHONE: (978) 657-9714
FAX: (978) 657-7915

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH	
FILE NAME: XXXXXSV	
FIELD BOOK NO: XXXX	
DRAWN BY: XXX	CHECKED BY: XXX
FIELD CHIEF: XXX	PARS. NO: XXXXXX

DATE: MONTH DD, YEAR SHEET X OF X

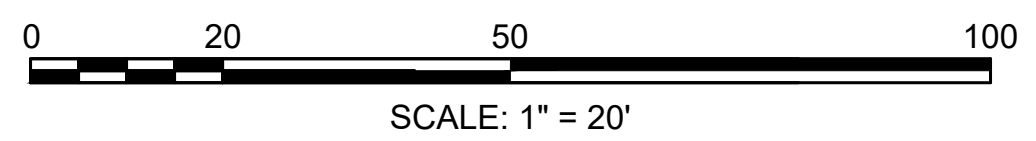


176
N: 2964776.585'
E: 678916.038'
EL: 187.067'
MSTN 176

177
N: 2965059.521'
E: 679011.457'
EL: 176.910'
MMAG 177

178
N: 2965226.193'
E: 679083.101'
EL: 176.845'
MMAG 178

179
N: 2965067.878'
E: 679181.824'
EL: 185.887'
MSTN 179



HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318



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PHONE: (978) 657-9714
FAX: (978) 657-7915

REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH

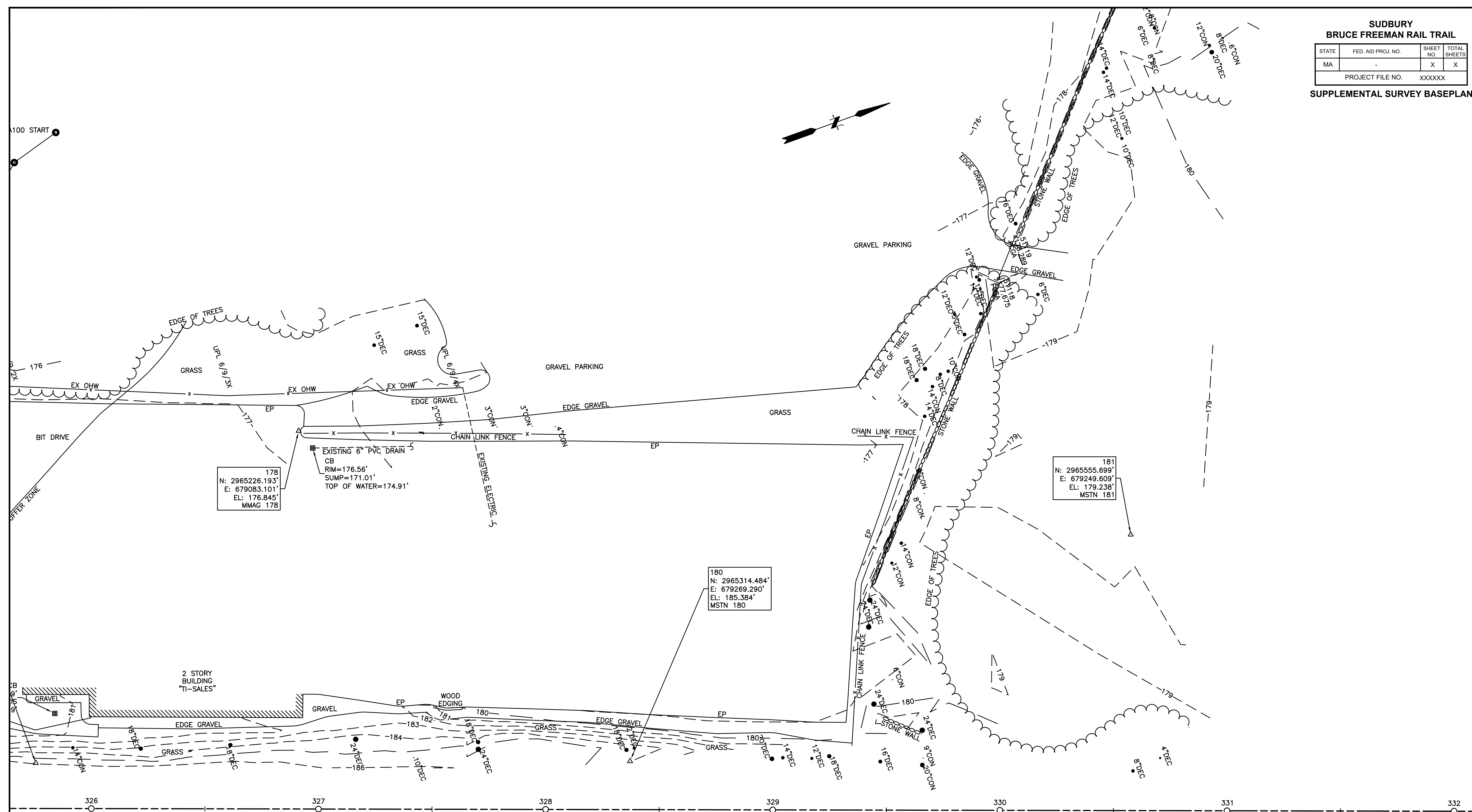
FILE NAME: XXXXXXSV
FIELD BOOK NO: XXXX
DRAWN BY: XXX CHECKED BY: XXX
FIELD CHIEF: XXX PARS. NO: XXXXXX

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	X	X
PROJECT FILE NO. XXXXXX		XXXXXX	

SUPPLEMENTAL SURVEY BASEPLAN

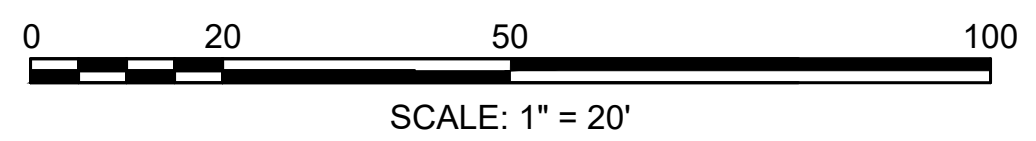


178
N: 2965226.193'
E: 679083.101'
EL: 176.845'
MMAG 178

EXISTING 6" PVC DRAIN
CB
RIM=176.56'
SUMP=171.01'
TOP OF WATER=174.91'

180
N: 2965314.484'
E: 679269.290'
EL: 185.384'
MSTN 180

181
N: 2965555.699'
E: 679249.609'
EL: 179.238'
MSTN 181



HAVELOCK J. PURSEGLOVE, PLS
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PHONE: (978) 657-9714
FAX: (978) 657-7915

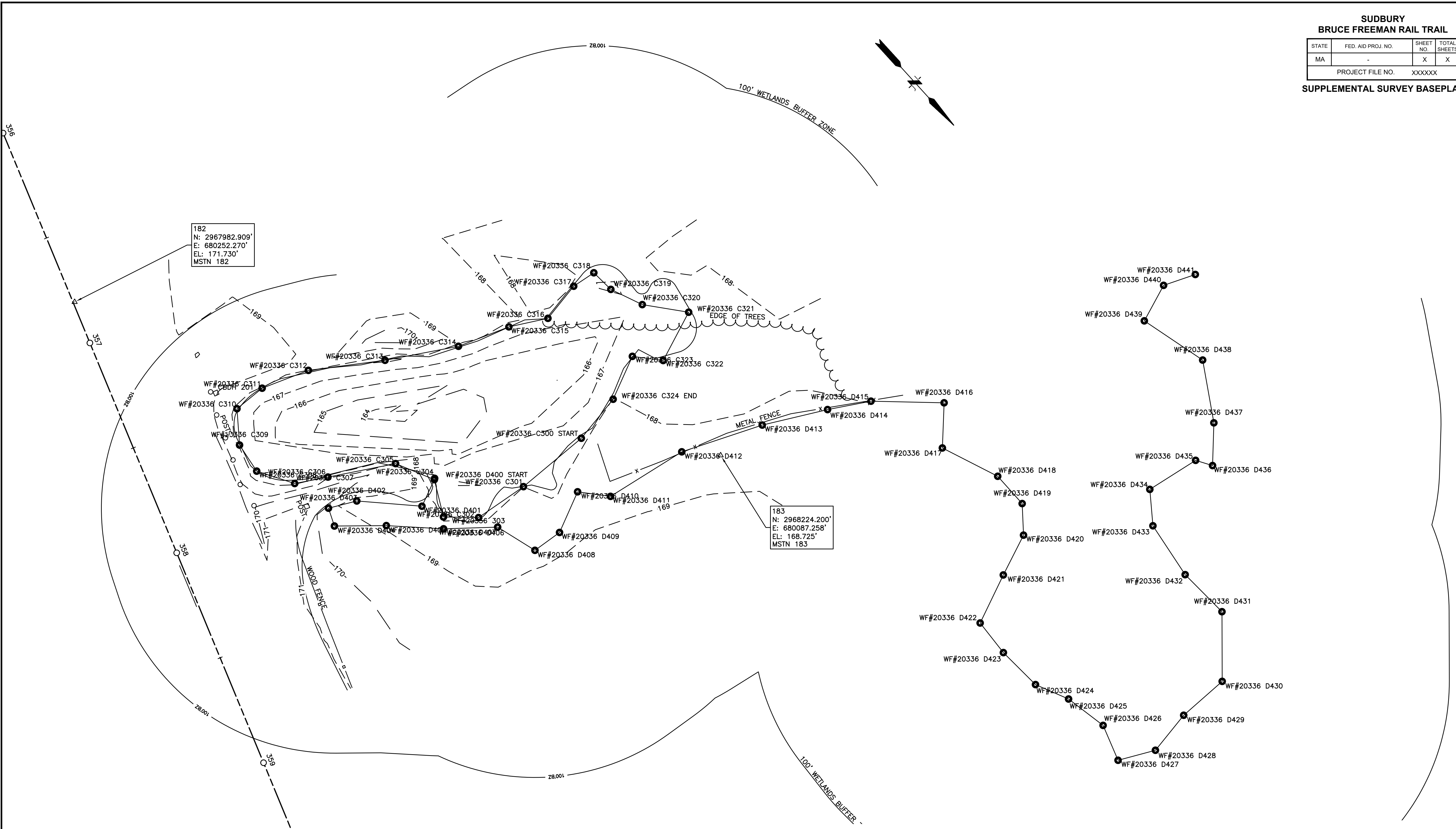
REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH

FILE NAME: XXXXXSV	
FIELD BOOK NO: XXXX	
DRAWN BY: XXX	CHECKED BY: XXX
FIELD CHIEF: XXX	PARS. NO: XXXXXX

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MONTH DD, YEAR SHEET X OF X



PREPARED BY:
GCG ASSOCIATES
84 MAIN STREET
WILMINGTON, MASSACHUSETTS 01887
PHONE: (978) 657-9714
FAX: (978) 657-7915

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH

FILE NAME: XXXXXXSV
FIELD BOOK NO: XXXX
DRAWN BY: XXX
FIELD CHIEF: XXX

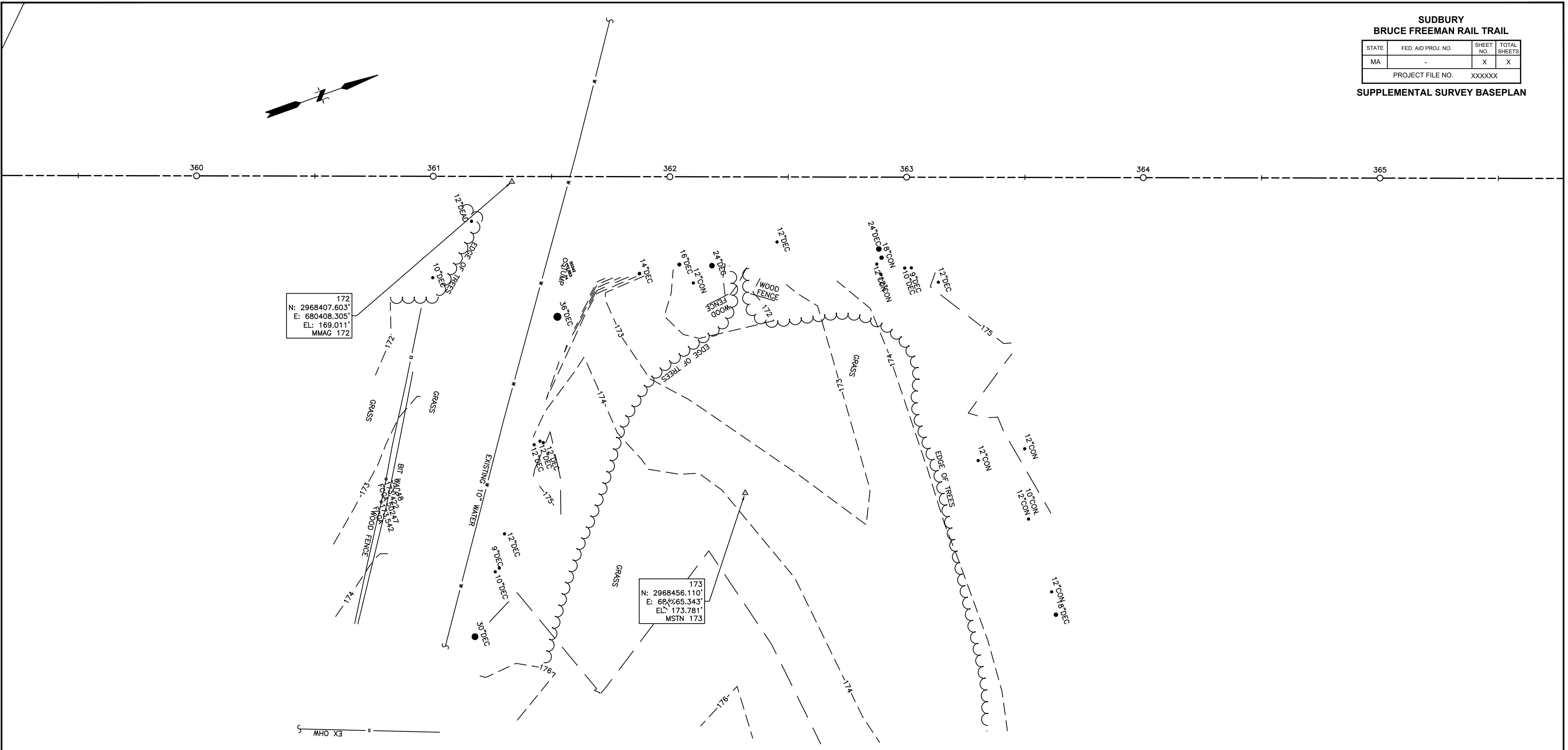
CHECKED BY: XXX
PARS. NO: XXXXXX
DATE: MONTH DD, YEAR
SHEET X OF X

HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

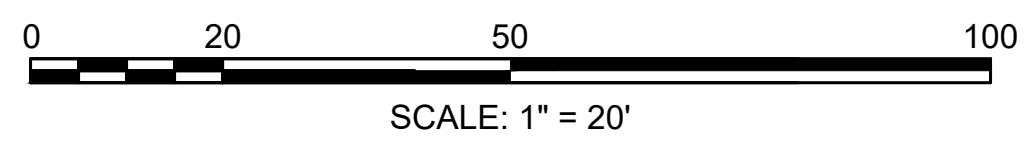
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	X	X
PROJECT FILE NO. XXXXXX		XXXXXX	

SUPPLEMENTAL SURVEY BASEPLAN



172
N: 2968407.603'
E: 680408.305'
EL: 169.011'
MMAG 172

173
N: 2968456.110'
E: 680465.343'
EL: 173.781'
MSTN 173



HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318



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84 MAIN STREET
WILMINGTON, MASSACHUSETTS 01887
PHONE: (978) 657-9714
FAX: (978) 657-7915

REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH	
FILE NAME: XXXXXSV	
FIELD BOOK NO: XXXX	
DRAWN BY: XXX	CHECKED BY: XXX
FIELD CHIEF: XXX	PARS. NO: XXXXXX

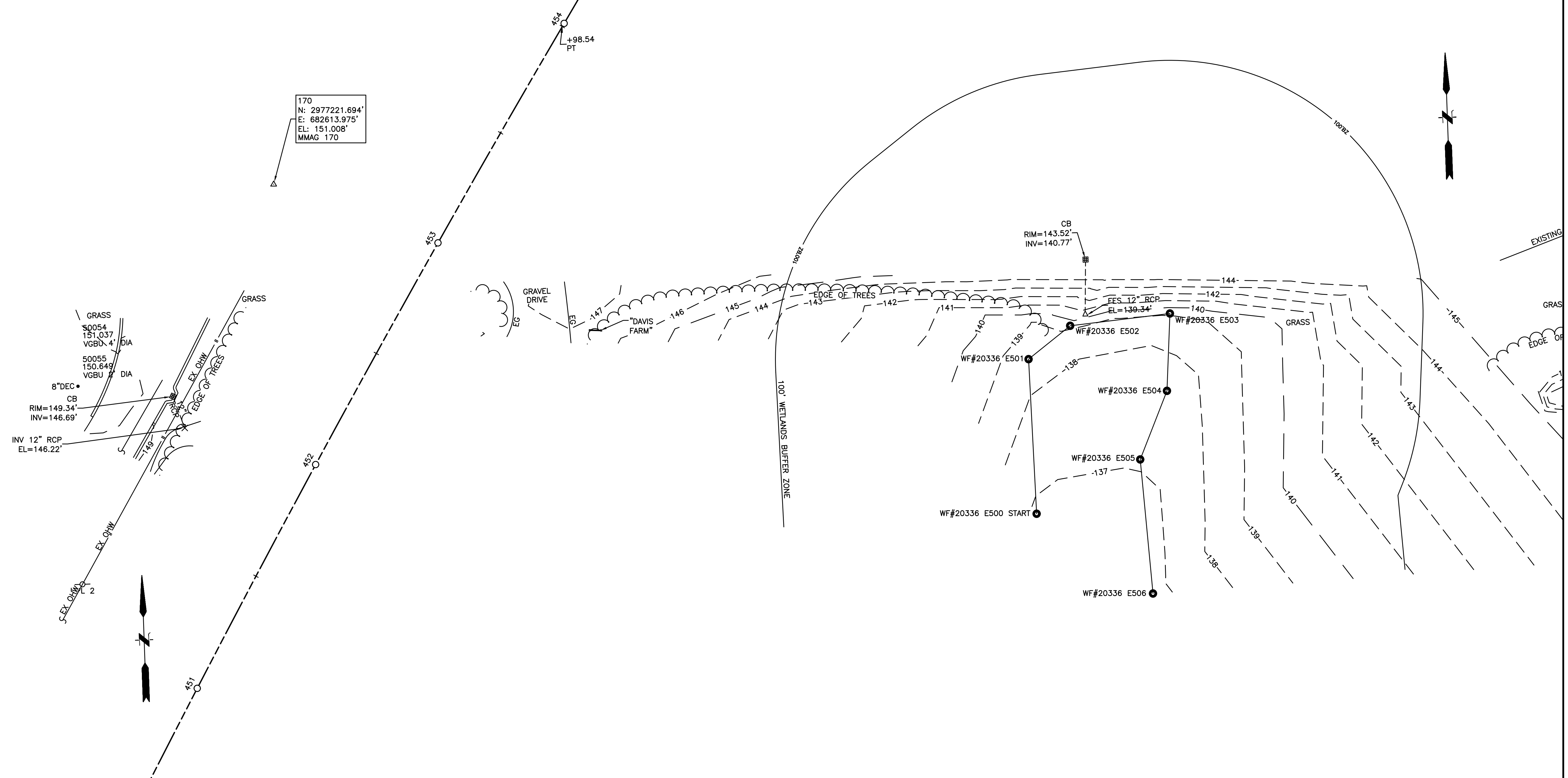
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MONTH DD, YEAR SHEET X OF X

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

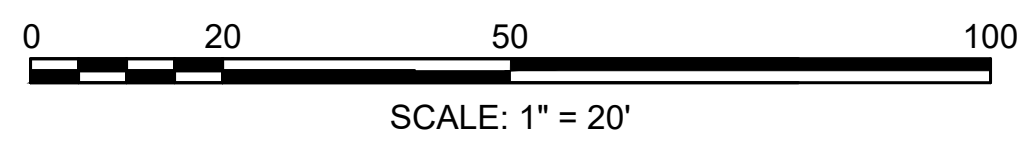
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	X	X
PROJECT FILE NO. XXXXXX		XXXXXX	

SUPPLEMENTAL SURVEY BASEPLAN



GRASS
S0054
151.037
VGBU 4' DIA
50055
150.649
VGBU 4' DIA
8"DEC
CB
RIM=149.34'
INV=146.69'
INV 12" RCP
EL=146.22'

170
N: 2977221.694'
E: 682613.975'
EL: 151.008'
MMAG 170



HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318



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84 MAIN STREET
WILMINGTON, MASSACHUSETTS 01887
PHONE: (978) 657-9714
FAX: (978) 657-7915

REVISIONS		
REV.	COMMENTS	DATE

SCALE: XX FEET TO THE INCH
FILE NAME: XXXXXXSV
FIELD BOOK NO: XXXX
DRAWN BY: XXX
FIELD CHIEF: XXX
CHECKED BY: XXX
PARS. NO: XXXXXX

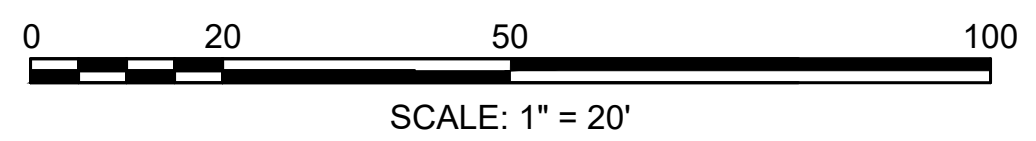
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MONTH DD, YEAR SHEET X OF X

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	X	X
PROJECT FILE NO. XXXXXX		XXXXXX	

SUPPLEMENTAL SURVEY BASEPLAN



HAVELOCK J. PURSEGLOVE, PLS
MASSACHUSETTS REG. No. 54318



PREPARED BY:
GCG ASSOCIATES
84 MAIN STREET
WILMINGTON, MASSACHUSETTS 01887
PHONE: (978) 657-9714
FAX: (978) 657-7915

REVISIONS		
REV.	COMMENTS	DATE

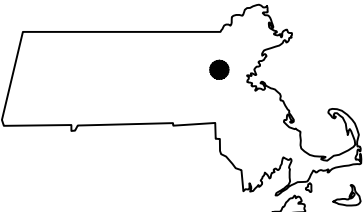
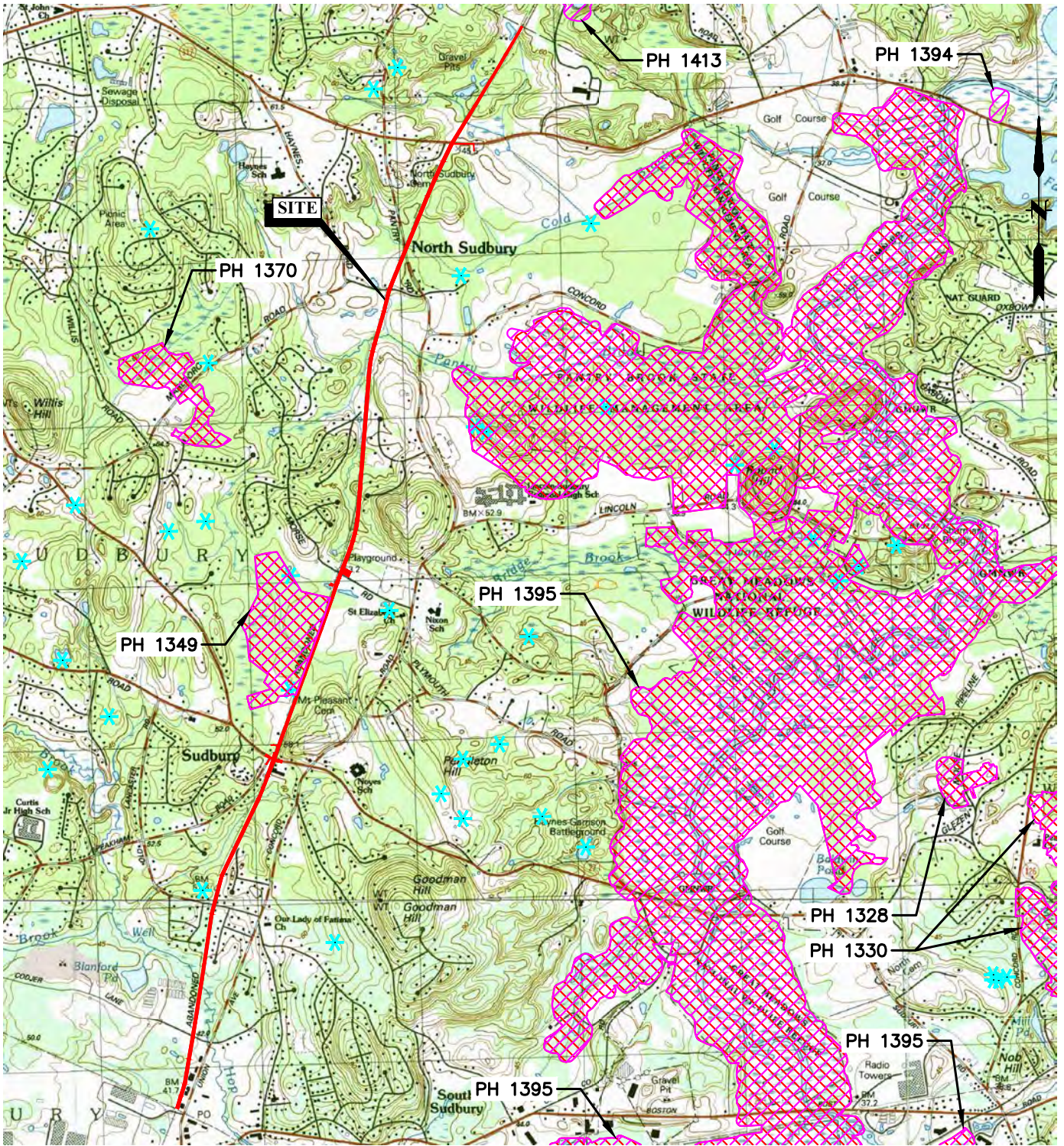
SCALE: XX FEET TO THE INCH	
FILE NAME: XXXXXSV	
FIELD BOOK NO: XXXX	
DRAWN BY: XXX	CHECKED BY: XXX
FIELD CHIEF: XXX	PARS. NO: XXXXXX

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
PLAN OF TOPOGRAPHIC SURVEY OF
STREET/ROUTE # OR NAME
(BRIDGE NO. X-XX-XXX)
IN THE (T/C) OF
(TOWN/CITY NAME)
AS ORDERED BY
THE MASSACHUSETTS DEPARTMENT OF
TRANSPORTATION, HIGHWAY DIVISION

DATE: MONTH DD, YEAR SHEET X OF X

Attachment 4

Existing Environmental Constraints



MAP REFERENCE
 THIS MAP WAS PREPARED FROM THE FOLLOWING USGS TOPOGRAPHIC QUADRANGLE IMAGES: q209898, q209902, q209906, q209910, q213898, q213902, q213906 AND q213910. QUADRANGLE IMAGES WERE PREPARED FROM MASS GIS DATA RECEIVED FROM OLIVER GIS ON 04/16/2021. NHESP DATA WERE PREPARED FROM MASS GIS DATA RECEIVED FROM OLIVER GIS ON 10/27/2021
 ORIGINAL MAP UNITS IN METERS.

- LEGEND**
- NHESP MA PRIORITY HABITATS FOR STATE-PROTECTED RARE SPECIES
 - NHESP MA ESTIMATED HABITATS OF RARE WILDLIFE
 - NHESP MA CERTIFIED VERNAL POOL

SCALE:
 HORZ.: 1" = 3000'
 VERT.:
 DATUM:
 HORZ.:
 VERT.:

GRAPHIC SCALE

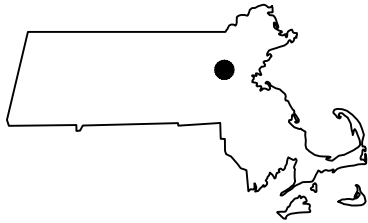
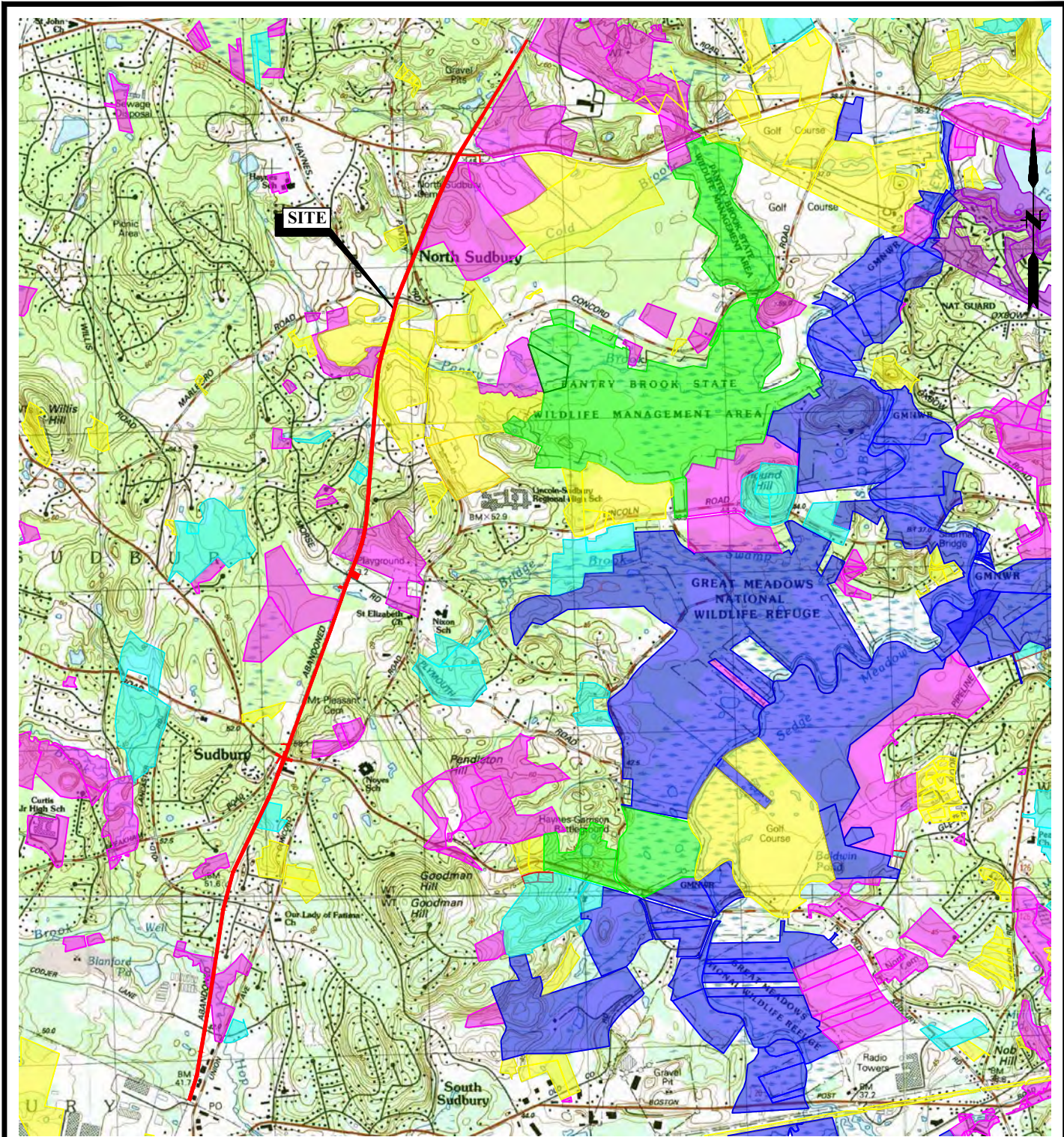


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 SPRINGFIELD, MA 01103
 413.452.0445
 www.fando.com

TOWN OF SUDBURY
 NHESP MAP
 BRUCE FREEMAN RAIL TRAIL
 SUDBURY MASSACHUSETTS

PROJ. No.: 20200785.A10
 DATE: 10/27/2021

FIG.2



MAP REFERENCE
 THIS MAP WAS PREPARED FROM THE FOLLOWING USGS TOPOGRAPHIC QUADRANGLE IMAGES: q209898, q209902, q209906, q209910, q213898, q213902, q213906 AND q213910. QUADRANGLE IMAGES WERE PREPARED FROM MASS GIS DATA RECEIVED FROM OLIVER GIS ON 04/16/2021. ORIGINAL MAP UNITS IN METERS.

LEGEND	
	PUBLIC NON-PROFIT
	PRIVATE
	FEDERAL
	MUNICIPAL
	LAND TRUST
	DCR-URBAN PARKS RECREATION

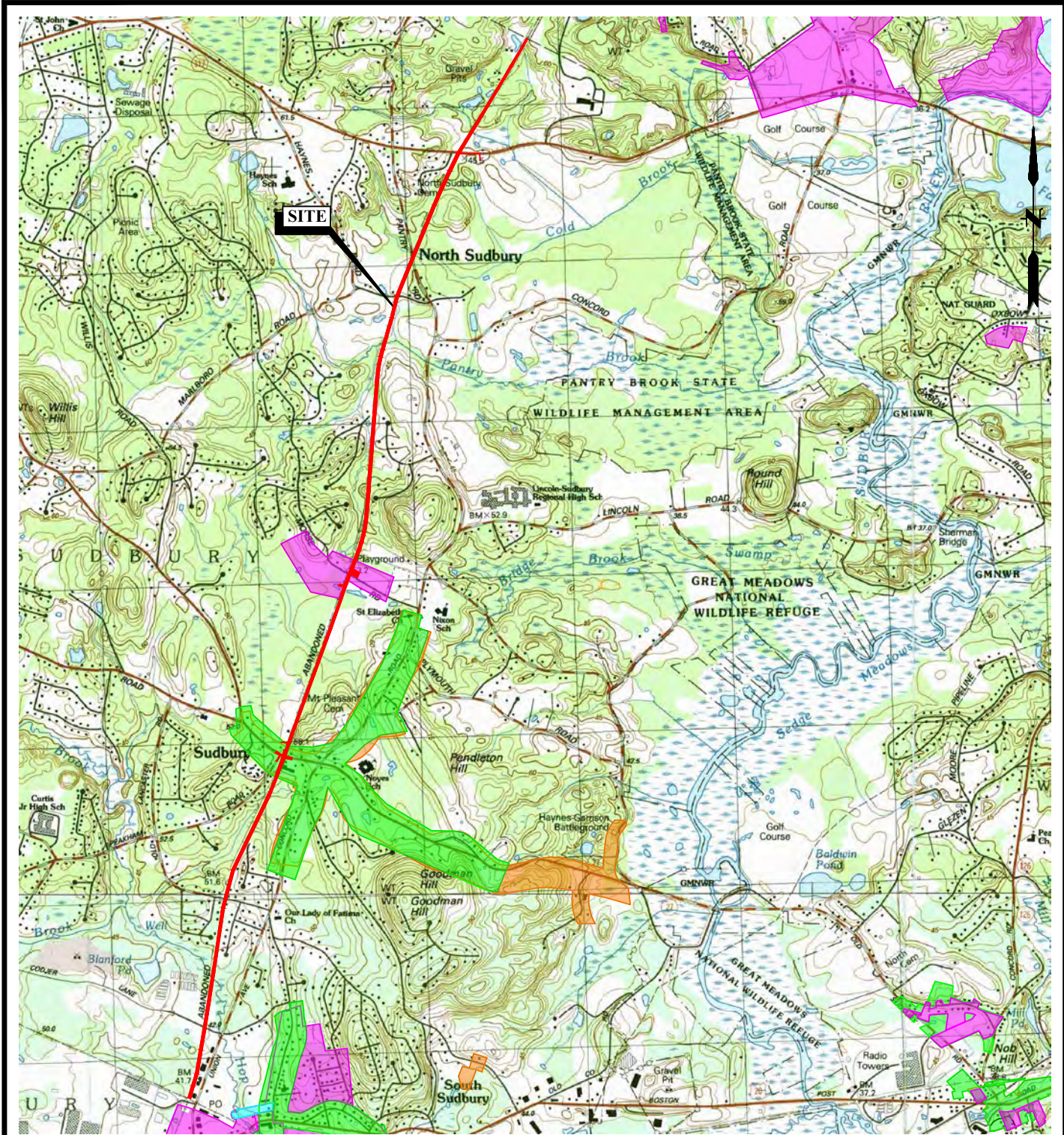
SCALE:	
HORZ.:	1" = 3000'
VERT.:	
DATUM:	
HORZ.:	
VERT.:	
GRAPHIC SCALE	



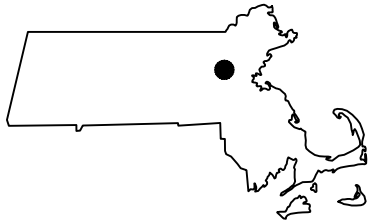
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 1550 MAIN STREET, SUITE 400
 SPRINGFIELD, MA 01103
 413.452.0445
 www.fando.com

TOWN OF SUDBURY
 OPEN SPACE MAP
 BRUCE FREEMAN RAIL TRAIL
 SUDBURY MASSACHUSETTS

PROJ. No.: 20200785.A10
DATE: 10/27/2021
FIG.3



LAYER STATE:



MAP REFERENCE
 THIS MAP WAS PREPARED FROM THE FOLLOWING USGS TOPOGRAPHIC QUADRANGLE IMAGES: q209898, q209902, q209906, q209910, q213898, q213902, q213906 AND q213910. QUADRANGLE IMAGES WERE PREPARED FROM MASS GIS DATA RECEIVED FROM OLIVER GIS ON 04/16/2021. ORIGINAL MAP UNITS IN METERS.

LEGEND

- NATIONAL REGISTER OF HISTORIC PLACES
- LOCAL HISTORIC DISTRICT
- INVENTORIED PROPERTIES
- NRHP AND LHD

SCALE:
 HORZ.: 1" = 3000'
 VERT.:
 DATUM:
 HORZ.:
 VERT.:

GRAPHIC SCALE

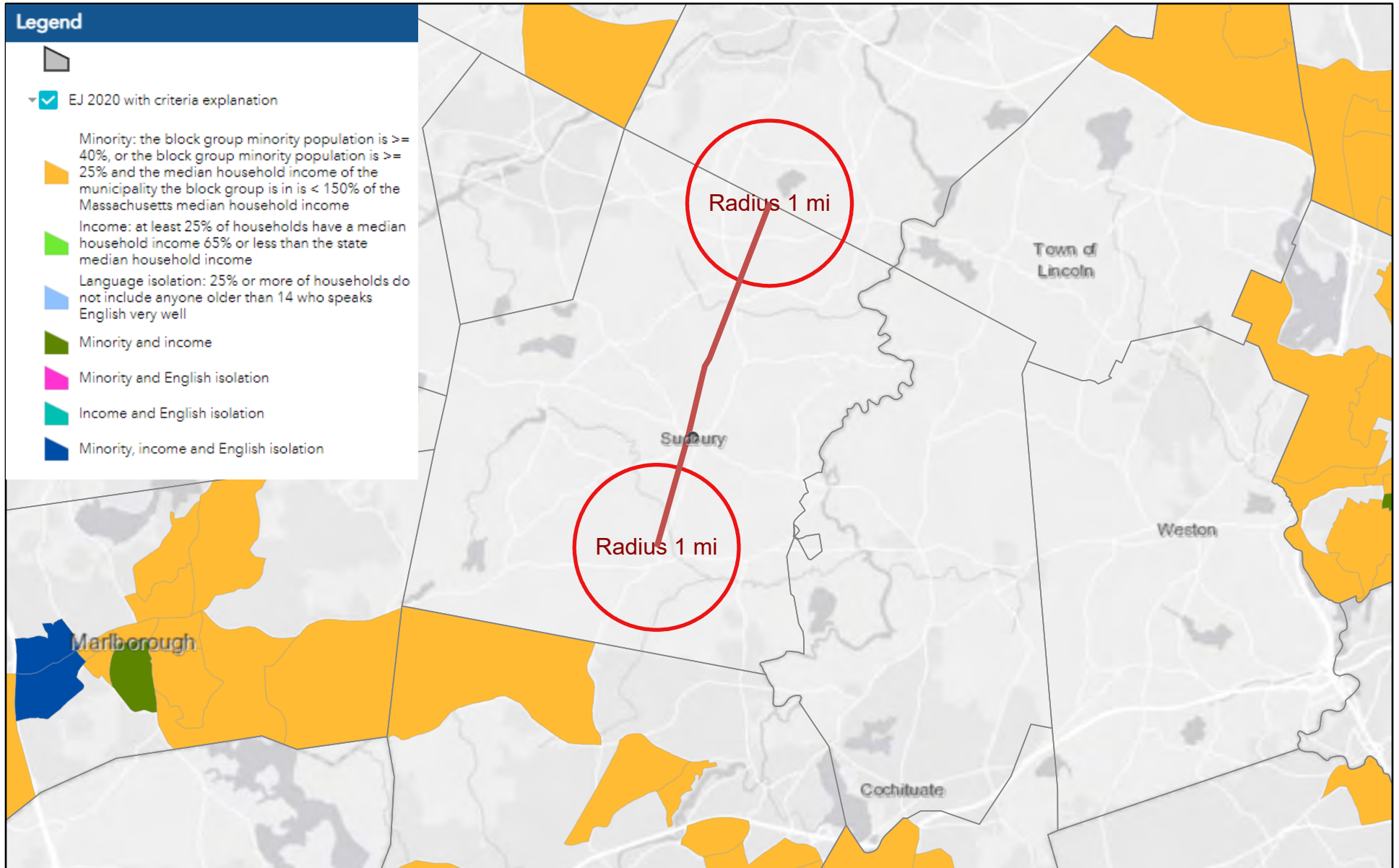


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TOWN OF SUDBURY
HISTORICAL RESOURCES MAP
 BRUCE FREEMAN RAIL TRAIL
 SUDBURY MASSACHUSETTS

PROJ. No.: 20200785.A10
 DATE: 10/27/2021
FIG.4

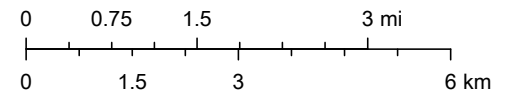
BFRT Phase 2D 2020 Environmental Justice Populations



10/27/2021

 PROJECT LIMITS

1:144,448



MassGIS, Esri, HERE, Garmin, USGS, EPA, NPS, Esri, HERE, NPS

MA Executive Office of Energy and Environmental Affairs
 MassGIS, Esri, HERE, Garmin, USGS, EPA, NPS | Esri, HERE, NPS | EEA GIS |

Attachment 5

Proposed Conditions Plan

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	1	XX
PROJECT FILE NO.		608164	

TITLE SHEET & INDEX

PLAN AND PROFILE OF
BRUCE FREEMAN RAIL TRAIL
IN THE TOWN OF
SUDBURY
MIDDLESEX COUNTY

FEDERAL AID PROJECT NO. XXX-XXXX(XXX)X

PERMITTING PLAN SET

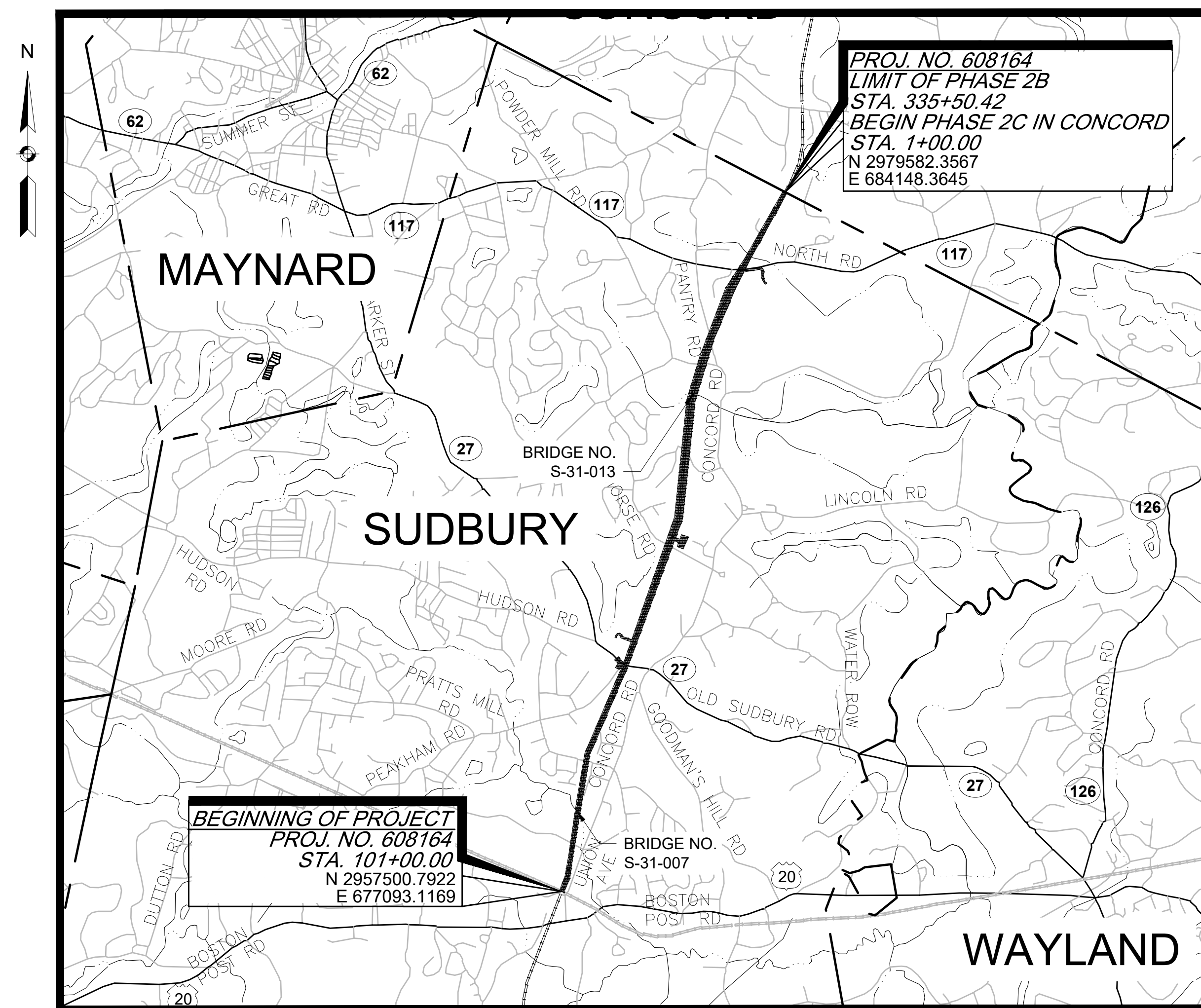
100% SUBMISSION

THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES 2021 EDITION, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

PERMITTING PLAN SET PAGE NO.	SHEET NO.	DESCRIPTION
1	1	TITLE SHEET & INDEX*
2	2	GENERAL NOTES*
3	3	LEGEND & ABBREVIATIONS*
4-5	4-5	KEY PLAN & BORING LOCATIONS*
	6-8	BORING LOGS
6-9	9-12	TYPICAL SECTIONS*
10-38	1-29	ENVIRONMENTAL IMPACTS*
39-67	14-42	CONSTRUCTION PLANS*
68-79	49-60	PROFILES*
	64-92	CURB & BASELINE TIE PLANS
80-108	96-124	GRADING PLANS*
	125-151	PAVEMENT MARKING & SIGNING PLANS
	157-152	TRAFFIC SIGN SUMMARY
	160-165	TRAFFIC SIGNAL PLANS
	166-171	TEMPORARY TRAFFIC CONTROL PLANS
109-137	172-200	DRAINAGE & UTILITY PLANS*
138-139	204A-B	WETLAND REPLICATION PLAN*
140-151	205-209	CONSTRUCTION DETAILS*
152-153	219-220	WHEELCHAIR RAMP DETAILS*
154-175	221-242	BRIDGE PLANS*
176-241	243-309	CROSS SECTIONS*

*INCLUDED IN THE PERMITTING PLAN SET

INDEX



0 3000 6000 9000 12000
SCALE: 1" = 3000'
LENGTH OF PROJECT = 23,542.00 FEET = 4.459 MILES

DATE	DESCRIPTION	REV #
11-15-2021	ENF SUBMISSION	1
05-12-2021	75% SUBMISSION	1

f **FUSS & O'NEILL**
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01105
413.452.0445
www.fando.com



RECOMMENDED FOR APPROVAL

CHIEF ENGINEER DATE

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

GENERAL ABBREVIATIONS

ABAN	ABANDON
ADJ	ADJUST
APPROX	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS / CONTINUED
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DIA	DIAMETER
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EXIST (or EX)	EXISTING
EXC	EXCAVATION
FDN.	FOUNDATION
FDP	FULL DEPTH PAVEMENT
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HWY	HIGHWAY
JCT	JUNCTION
LOAM	LOAM BORROW
LSA	LANDSCAPED AREA
LT	LEFT
MAHWL	MEAN AVERAGE HIGH WATER LINE
MAX	MAXIMUM
MB	MAILBOX
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
MOD	MODIFIED
MSE	MECHANICALLY STABILIZED EARTH
NERR	NEW ENGLAND RAILROAD
NIC	NOT IN CONTRACT
NO.	NUMBER
NTS	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
P.G.L.	PROFILE GRADE LINE
PREV	PREVIOUS/PREVIOUSLY
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PVMT	PAVEMENT
R&D	REMOVE AND DISCARD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RD	ROAD
RDWY	ROADWAY
REB	REBUILD
REM	REMOVE
REMOD	REMODEL
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SHLO/S.H.L.O.	STATE HIGHWAY LAYOUT LINE

GENERAL ABBREVIATIONS (CONT)

ST	STREET
STA	STATION
STD	STANDARD
SW	SIDEWALK
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TRANS	TRANSITION
TRM	TURF REINFORCING MAT
TYP	TYPICAL
VAR	VARIES
VERT	VERTICAL
WCR	WHEEL CHAIR RAMP
WP	WORKING POINT
X-SECT	CROSS SECTION

UTILITY ABBREVIATIONS

CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CIP	CAST IRON PIPE
CIT	CHANGE IN TYPE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
DI	DROP INLET
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HDW	HEADWALL
HYD	HYDRANT
INV	INVERT
LB	LEACH BASIN
LP	LIGHT POLE
MH	MANHOLE
MW	MONITORING WELL
OHW	OVERHEAD WIRE
PVC	POLYVINYLCHLORIDE PIPE
PWW	PAVED WATER WAY
RCP	REINFORCED CONCRETE PIPE
SMH	SEWER MANHOLE
TSV&B	TAPPING SLEEVE VALVE & BOX
UP	UTILITY POLE
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN

ALIGNMENT & GRADING ABBREVIATIONS

CC	CENTER OF CURVE
HP	HIGH POINT
I.T.	INTERSECTION OF TANGENT
LP	LOW POINT
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PI	POINT OF INTERSECTION
PNT	POINT
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PT	POINT OF TANGENCY
LPT	ANGLE POINT
R	RADIUS OF CURVATURE
T	TANGENT DISTANCE OF CURVE
TAN	TANGENT
25.45	SPOT ELEVATION

PROFILE ABBREVIATIONS

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

TRAFFIC SIGNAL

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
← FR →	FLASHING RED LEFT ARROW
→ FR →	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
← FY →	FLASHING YELLOW LEFT ARROW
→ FY →	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
← G →	STEADY GREEN LEFT ARROW
→ G →	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
↑ G ↓	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
← R →	STEADY RED LEFT ARROW
→ R →	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR YELLOW
← Y →	STEADY YELLOW LEFT ARROW
→ Y →	STEADY YELLOW RIGHT ARROW

SUBBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	2	318
PROJECT FILE NO.		608164	

GENERAL NOTES

GENERAL NOTES:

- EXISTING CONDITIONS AND TOPOGRAPHICAL INFORMATION FROM AN ACTUAL FIELD SURVEY CONDUCTED BY VHB, INC. IN DECEMBER 2015 THROUGH APRIL 2016. SUPPLEMENTARY FIELD SURVEY WAS CONDUCTED BY GCG ASSOCIATES FROM NOVEMBER 2020 THROUGH DECEMBER 2020.
- THE HORIZONTAL CONTROL IS BASED ON THE MASSACHUSETTS MAINLAND STATE PLANE COORDINATE SYSTEM AND THE NATIONAL GEODETIC SURVEY (NAD83). ALL ELEVATION IS US FEET, REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).
- THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND GRADES IN THE FIELD BEFORE COMMENCING WORK AND PROMPTLY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED. ANY FIELD ADJUSTMENTS TO LINE & GRADE UP TO A DEPTH OF 5' SHALL BE INCLUDED IN THE COST OF THE PIPE. PIPE EXCAVATION GREATER THAN 5' WILL BE PAID UNDER CLASS B TRENCH EXCAVATION.
- THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH PROPOSED CONDUIT AND SIGNAL EQUIPMENT. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE AND SEWER STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
- EXISTING UTILITY POLES WILL BE RELOCATED BY OTHERS IF REQUIRED.
- PRIOR TO ONSET OF TREE REMOVAL ACTIVITIES, THE CONTRACTOR, RESIDENT ENGINEER AND MASSDOT LANDSCAPE ARCHITECT AND TOWN REPRESENTATIVE SHALL WALK SITE TO IDENTIFY TREES TO BE REMOVED.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
- THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- JOINTS BETWEEN NEW ASPHALT CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDS.
- AFTER MILLING OPERATIONS AND PRIOR TO PAVING THE SUPERPAVE INTERMEDIATE OR SURFACES COURSES THE ENGINEER SHALL EVALUATE THE MILLED SURFACE AND SHALL APPLY THE APPROPRIATE REPAIR METHOD IF REQUIRED.
- EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- IF SUITABLE, ALL EXISTING GRANITE CURB & EDGING SHALL BE RE-USED IN THE PROPOSED WORK, EXCEPT CURVED STONES OF A DIFFERENT RADIUS THAN PROPOSED CURB.
- ALL PROPOSED HOT MIX ASPHALT CURB SHALL BE MASSDOT TYPE 3.
- ALL EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.
- ALL PROPOSED BOUNDS SHALL BE PLACED BY A LICENSED PROFESSIONAL SURVEYOR. THE CONTRACTOR SHALL EXERCISE DUE CARE WHEN WORKING AROUND ALL PROPERTY BOUNDS WHICH ARE TO REMAIN. SHOULD ANY DAMAGE TO A BOUND RESULT FROM THE ACTIONS OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE THE BOUND REPLACED AND/OR REALIGNED BY A LICENSED PROFESSIONAL SURVEYOR AS DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST.
- DISPOSAL OF ALL SURPLUS MATERIAL SHALL BE AS APPROVED BY THE ENGINEER AND OWNER.
- LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 0.01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE PLANS.

GENERAL SYMBOLS

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

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

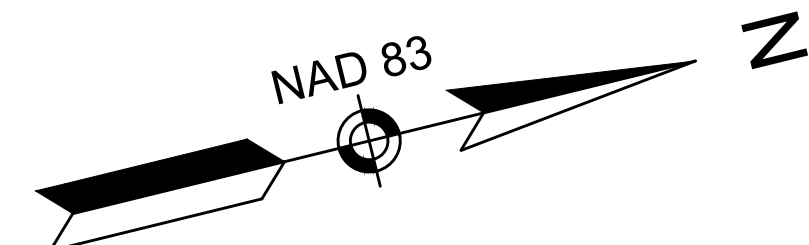
PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE
		LONG DASHED YELLOW LINE

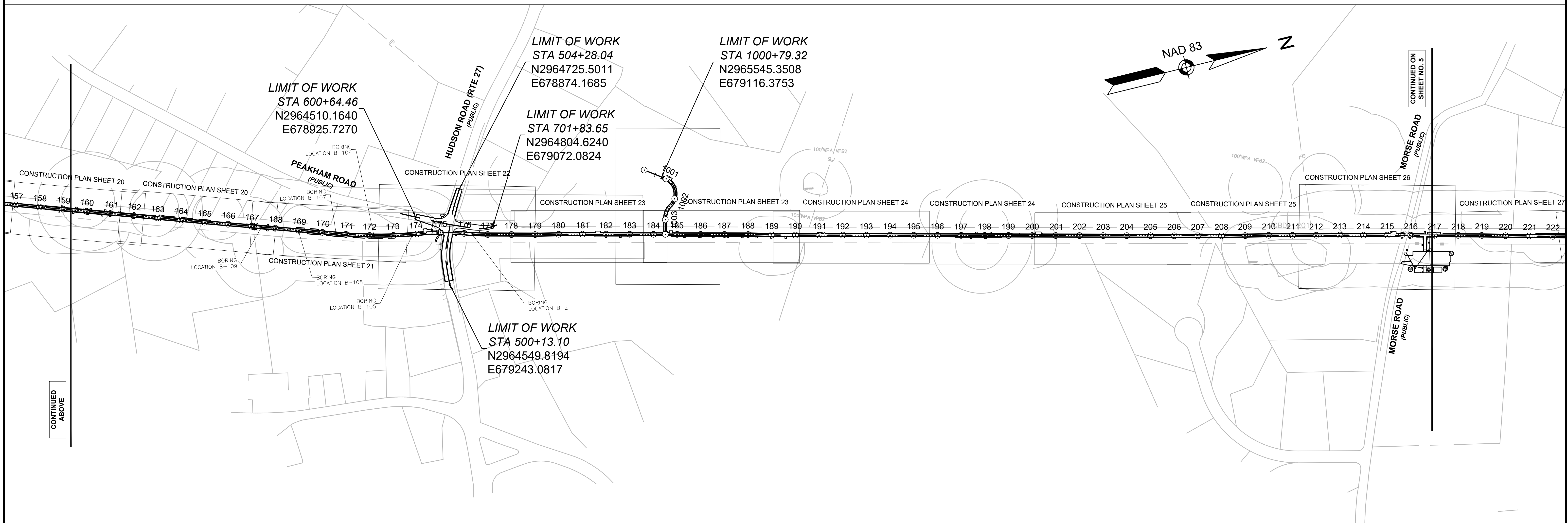
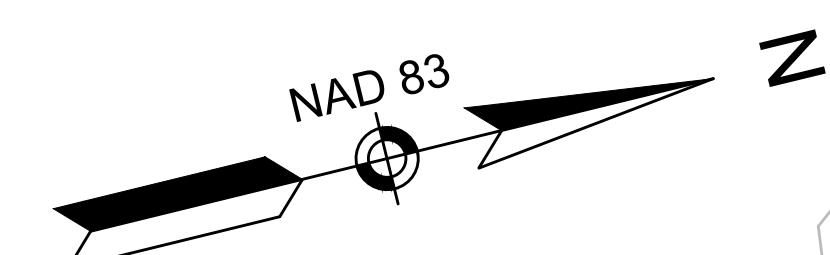
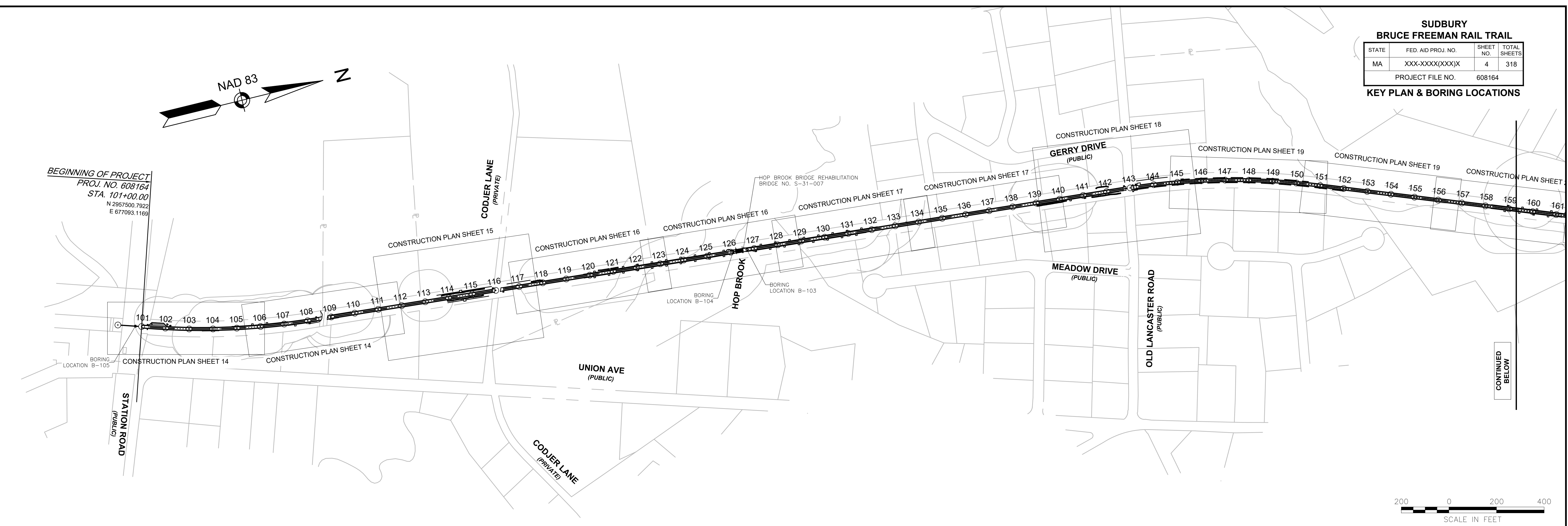
**SUBURRY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	4	318
PROJECT FILE NO.		608164	

KEY PLAN & BORING LOCATIONS



BEGINNING OF PROJECT
PROJ. NO. 608164
STA. 101+00.00
N 2957500.7922
E 677093.1169



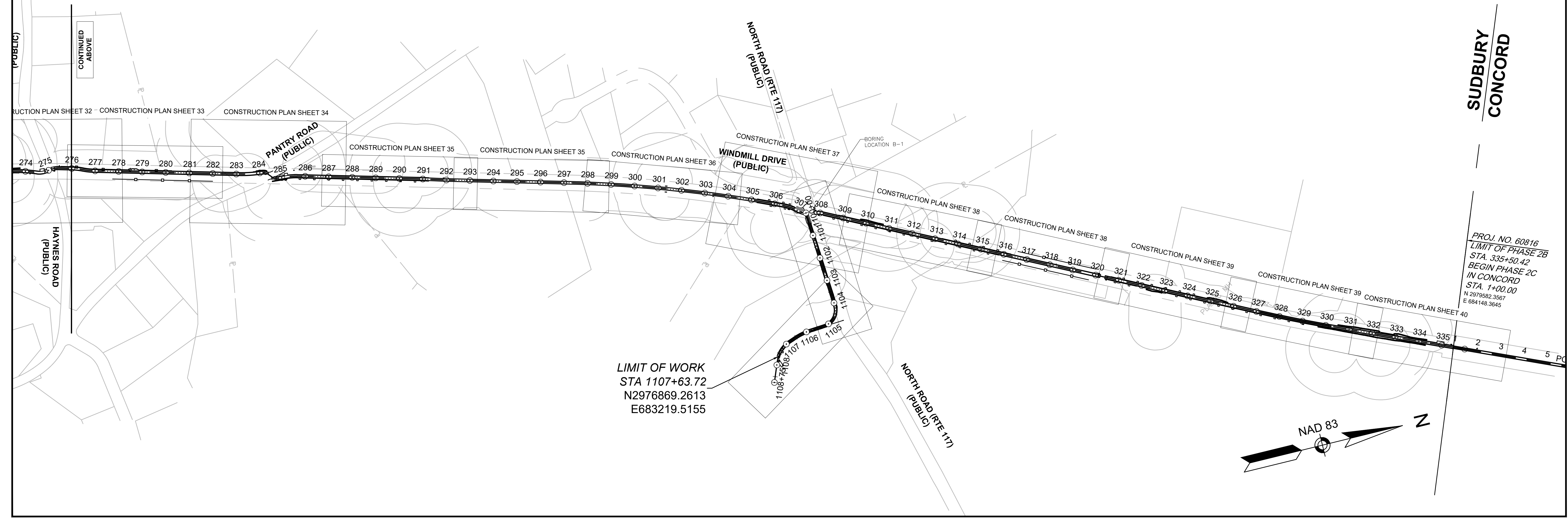
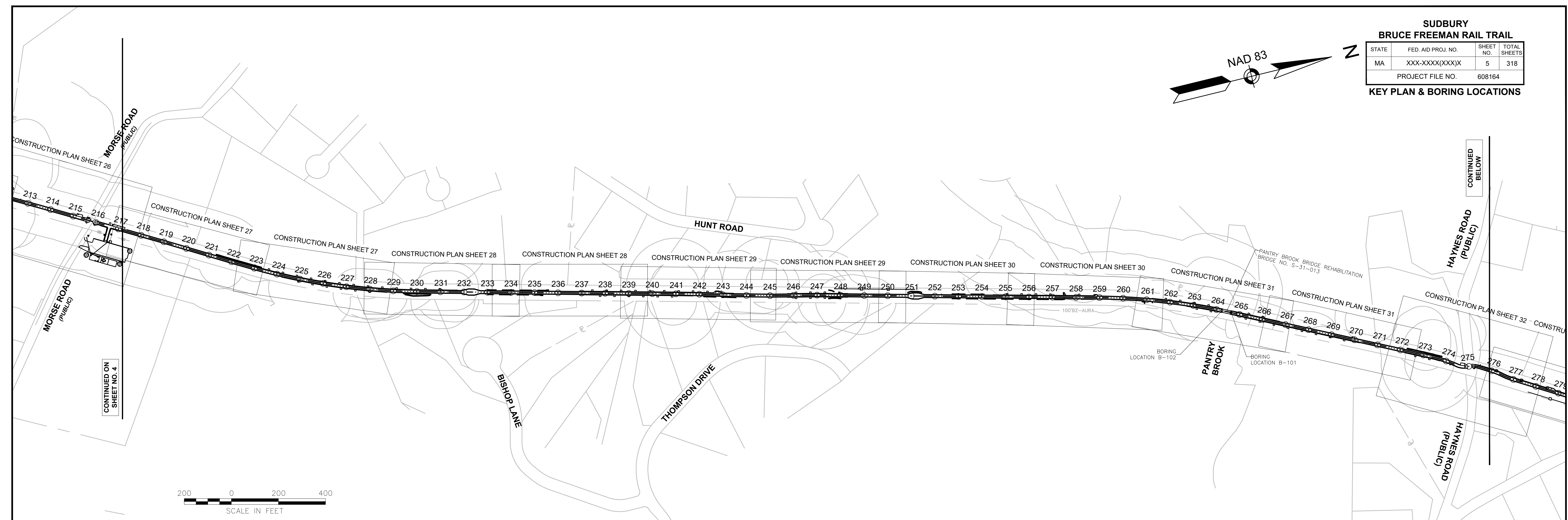
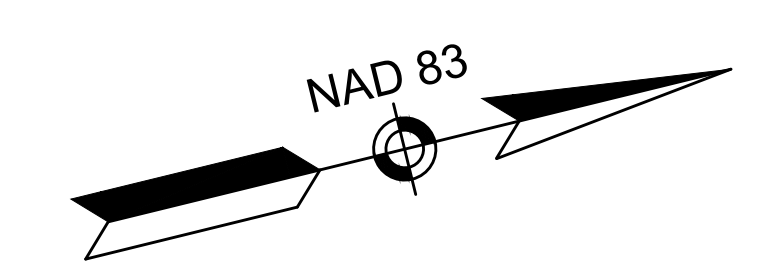
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CONTINUED ON SHEET NO. 5

**SUBURRY
BRUCE FREEMAN RAIL TRAIL**

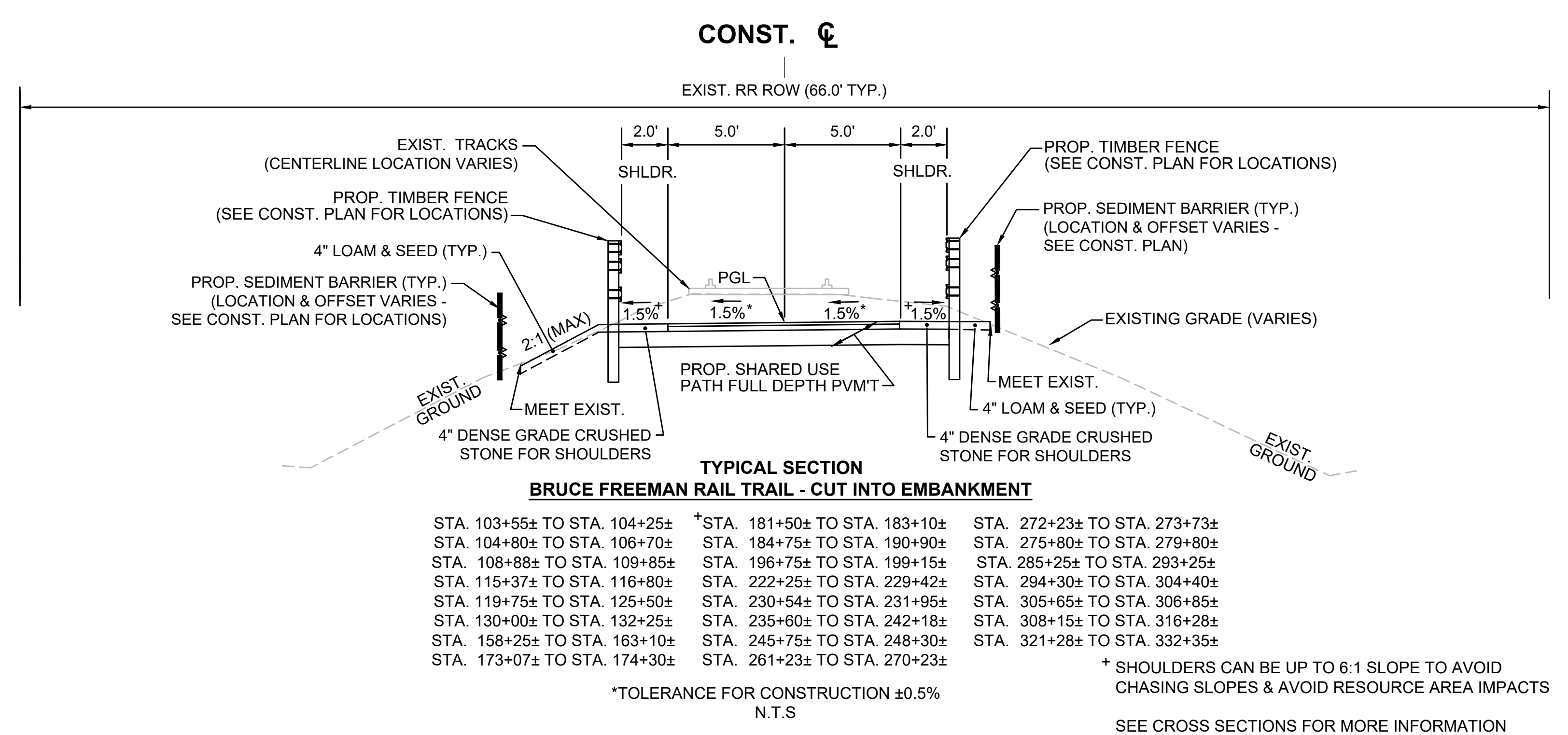
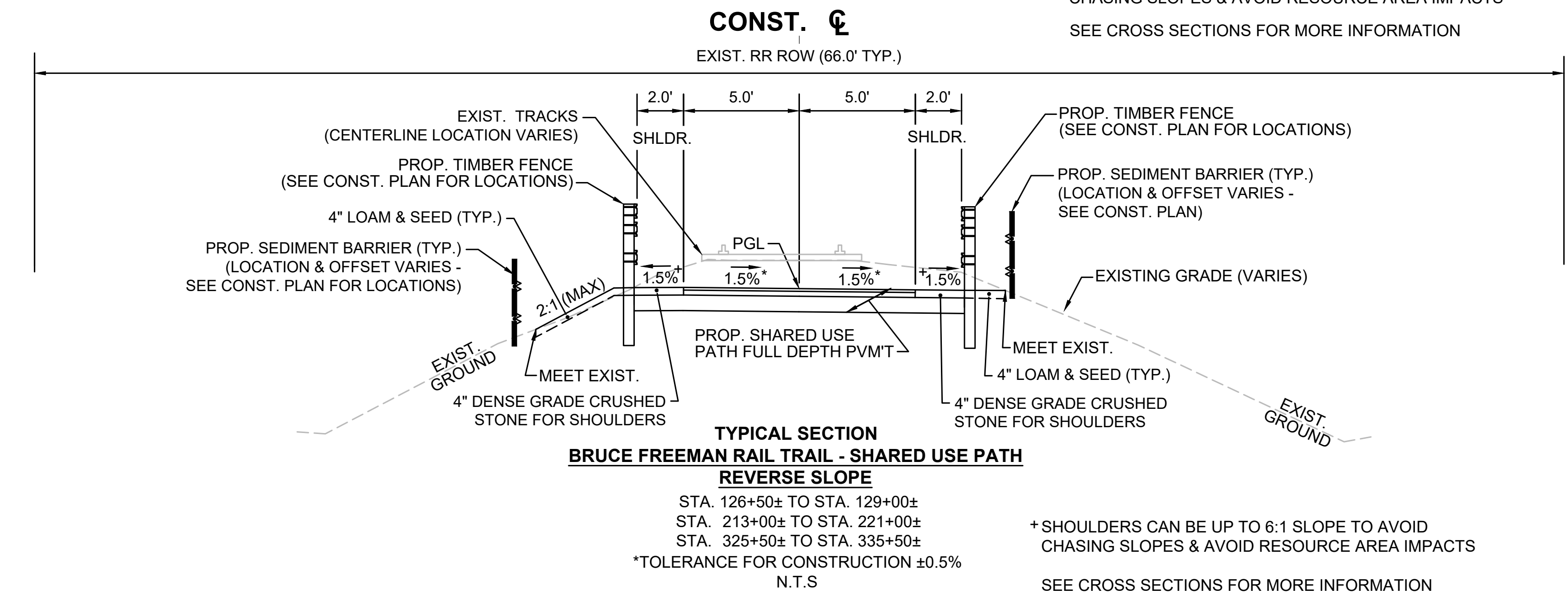
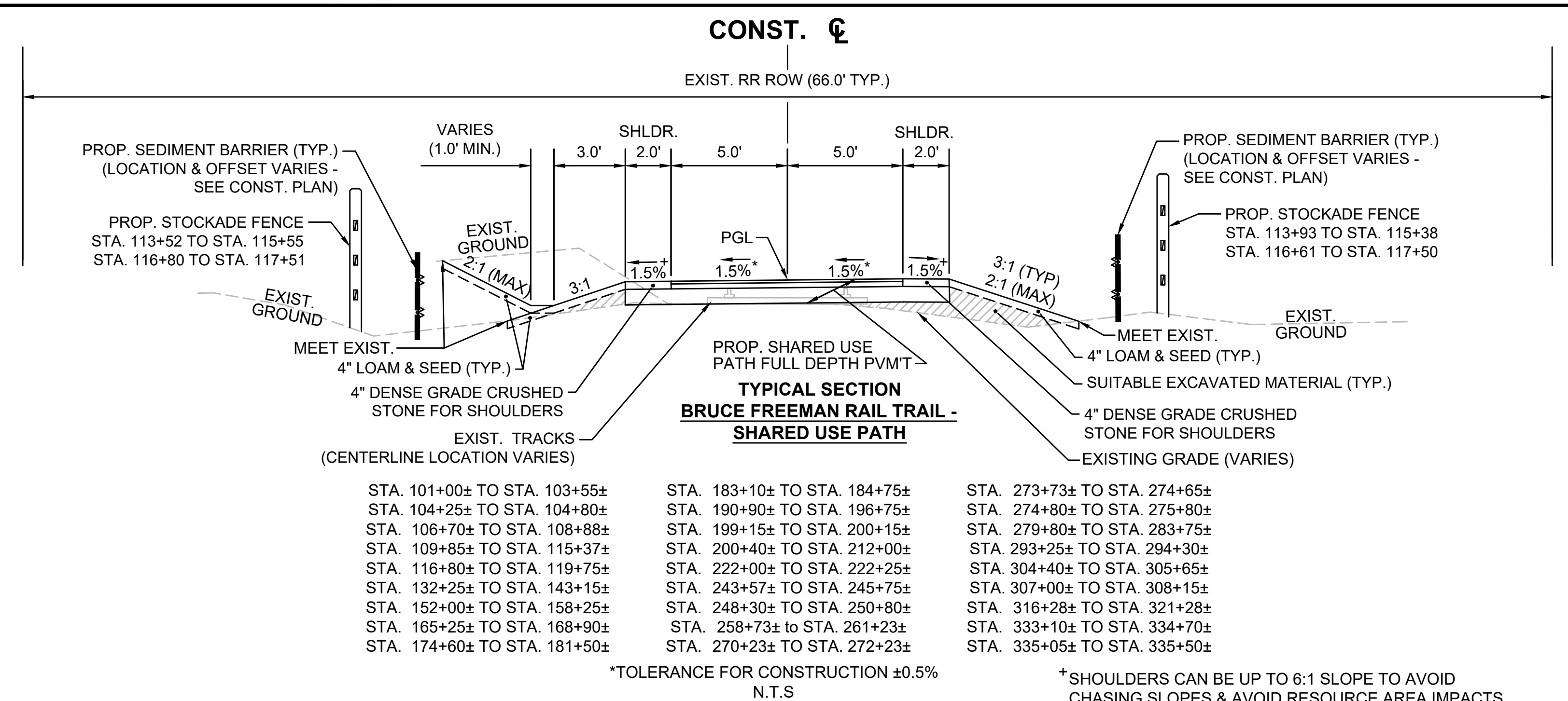
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	5	318
PROJECT FILE NO.		608164	

KEY PLAN & BORING LOCATIONS



PROJ. NO. 60816
 LIMIT OF PHASE 2B
 STA. 335+50.42
 BEGIN PHASE 2C
 IN CONCORD
 STA. 1+00.00
 N 2979582.3567
 E 684148.3645

SUBBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	9	318
PROJECT FILE NO.		608164	



PAVEMENT NOTES:

- PROPOSED SHARED-USE PATH**
SURFACE: 1-1/2" SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5)
INTERMEDIATE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0)
SUBBASE: 4" TO 8" GRAVEL BORROW, TYPE b (FOR LEVELING) OVER RESHAPED EXISTING RAILROAD BALLAST
- PROPOSED PARKING LOT FULL DEPTH PAVEMENT**
SURFACE: 1-1/2" SUPERPAVE SURFACE COURSE (SSC-12.5-P) - OVER
BASE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE (19.0) - OVER
FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED FULL DEPTH CONSTRUCTION (LESS THAN 4.00' WIDE) - PEAKHAM ROAD & HUDSON ROAD**
SURFACE: 1-3/4" SUPERPAVE SURFACE COURSE (12.5 POLYMER) - OVER
INTERMEDIATE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE (19.0) - OVER
BASE: 6" CEMENT CONCRETE BASE COURSE 4000psi, 610, 3/4" OVER
SUBBASE: 8" GRAVEL BORROW, TYPE b.
- PROPOSED PAVEMENT MILLING & OVERLAY - PEAKHAM ROAD & HUDSON ROAD**
1-3/4" PAVEMENT MILLING
1-3/4" SUPERPAVE SURFACE COURSE (SSC - 12.5 - P)
- PROPOSED HOT MIX ASPHALT SIDEWALK & DRIVEWAY**
SURFACE: 1-1/2" SUPERPAVE SURFACE COURSE (9.5) - OVER
2-1/2" SUPERPAVE INTERMEDIATE COURSE (12.5)
FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED CEMENT CONCRETE WALK, REST AREA & WHEELCHAIR RAMP**
SURFACE: 4" CEMENT CONCRETE AIR ENTRAINED 4000 PSI, 3/4", 610
SUBBASE: 8" GRAVEL BORROW, TYPE b

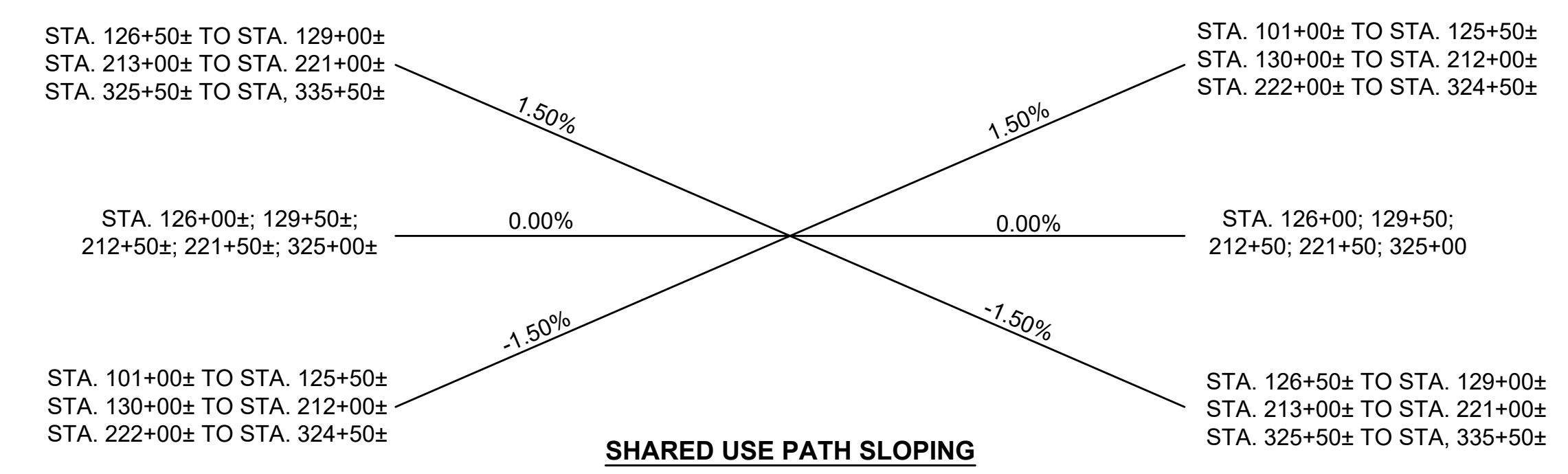
NOTES: EXIST. GRAVEL/BALLAST SUBGROUND MATERIAL DETERMINED BY THE ENGINEER TO BE SUITABLE SHALL REMAIN. THE DEPTH OF THE GRAVEL BORROW WILL BE AS REQUIRED BASED ON THE PROPOSED SUB-BASE ELEVATIONS.

AFTER REMOVAL OF STEEL RAILS AND WOOD TIMBER, ROUGH GRADE AND COMPACT SUBGROUND AREA. THEN PLACE AND COMPACT GRAVEL BORROW SUB-BASE MATERIAL IN MULTIPLE LIFTS.

ASPHALT EMULSION FOR TACK COAT AND HMA JOINT SEALANT SHALL BE APPLIED PER SECTION 450 QA OF THE SPECIAL PROVISIONS.

HMA FOR PATCHING SHALL BE USED FOR ALL PERMANENT, PARTIAL, AND FULL DEPTH PAVEMENT REPAIRS OF UNSOUND PAVEMENT PER SECTION 450 IN AREAS OUTSIDE OF PROP. OSED FULL DEPTH RECLAMATION OR RECONSTRUCTION ROADWAY AREAS.

HMA FOR MISCELLANEOUS WORK SHALL BE USED FOR ALL TEMPORARY CONSTRUCTION, TAPER RAMPS, CURB CUT RAMPS, TEMPORARY TRENCH REPAIR, ETC.

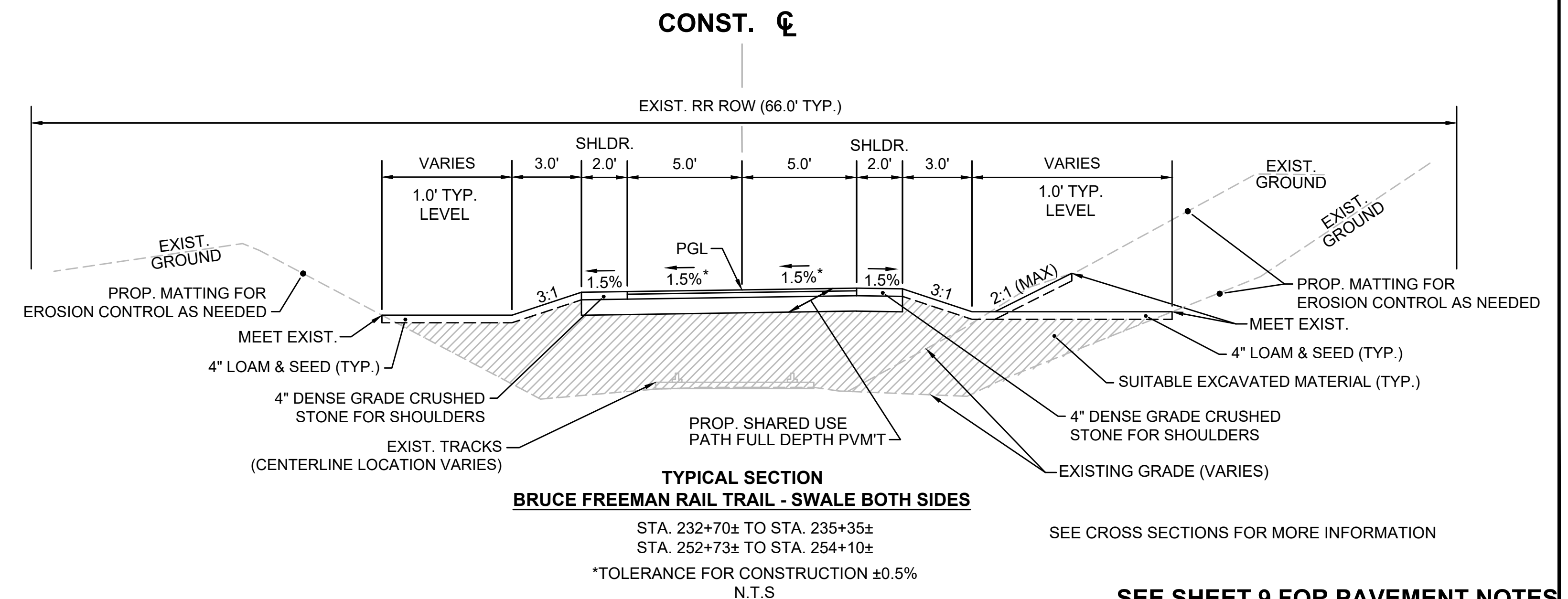
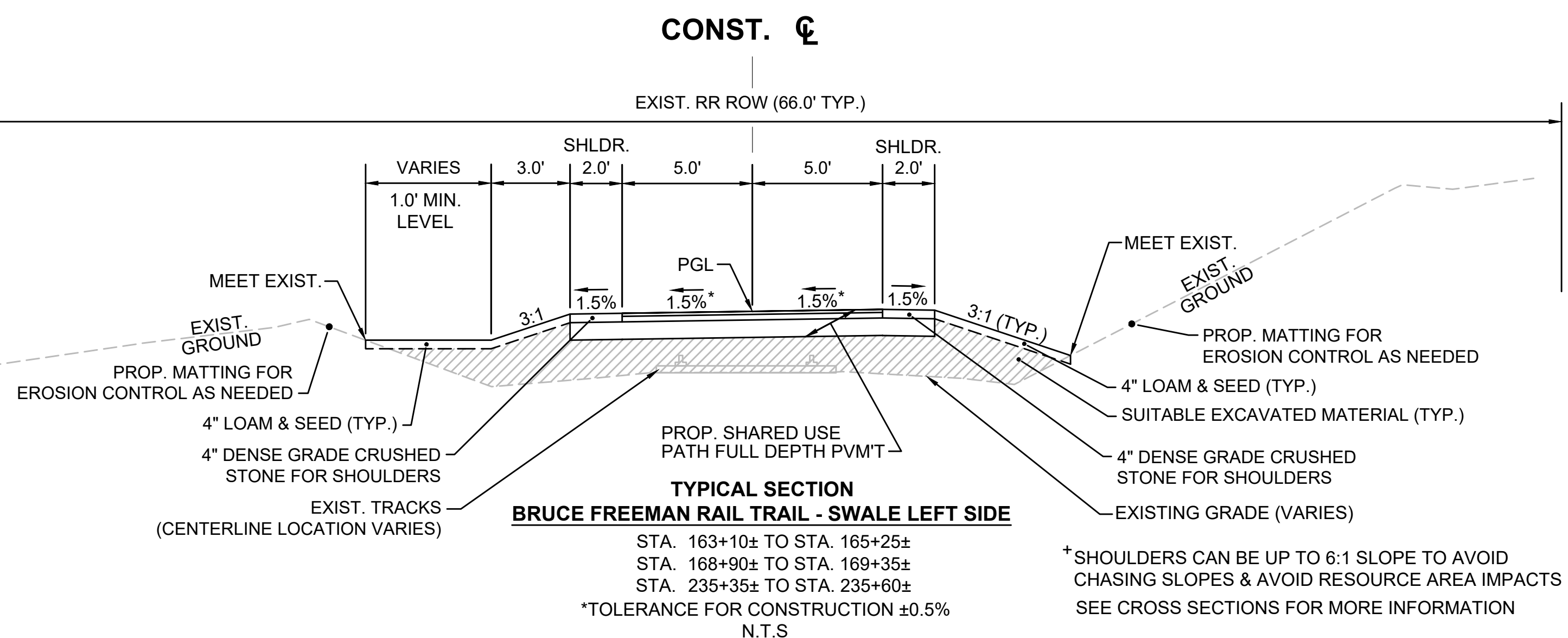
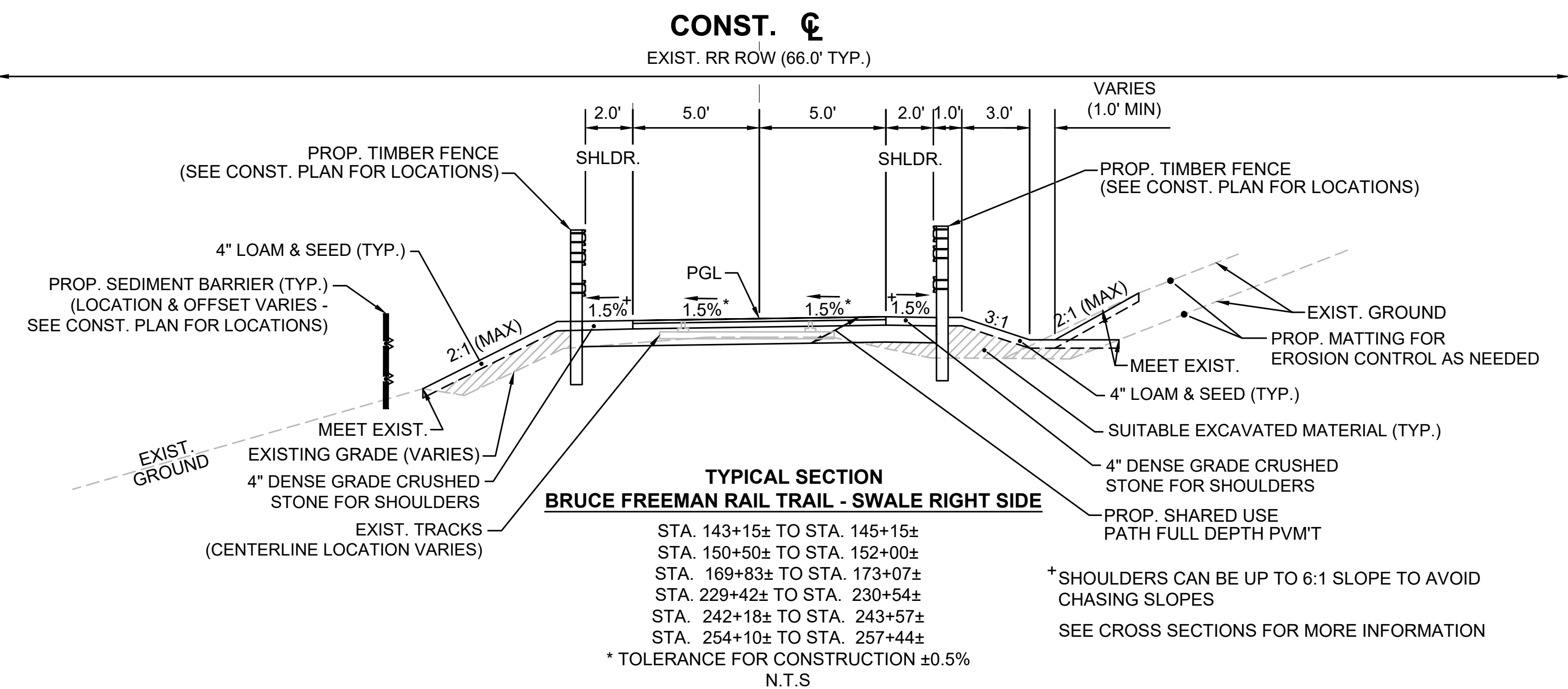
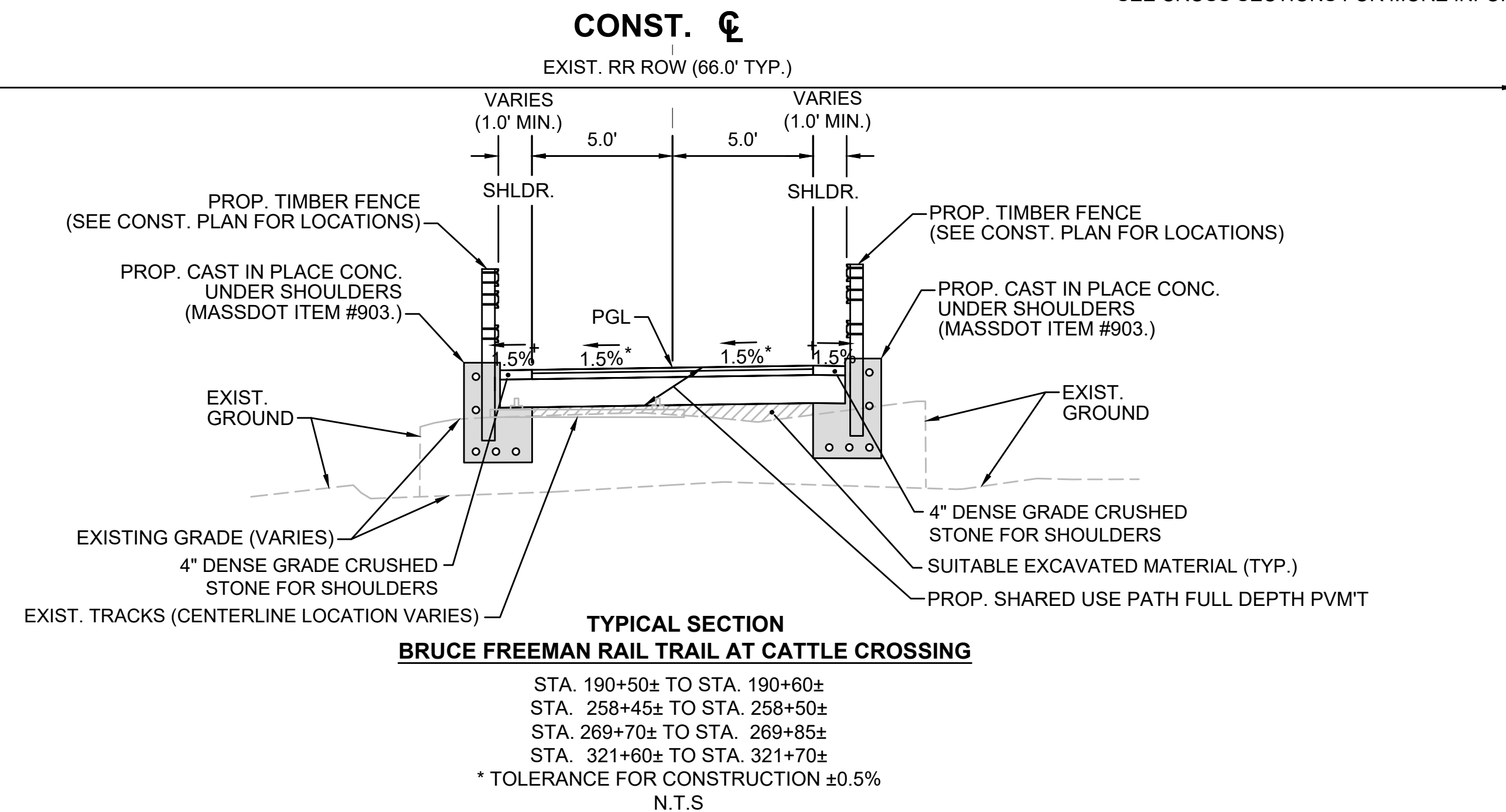
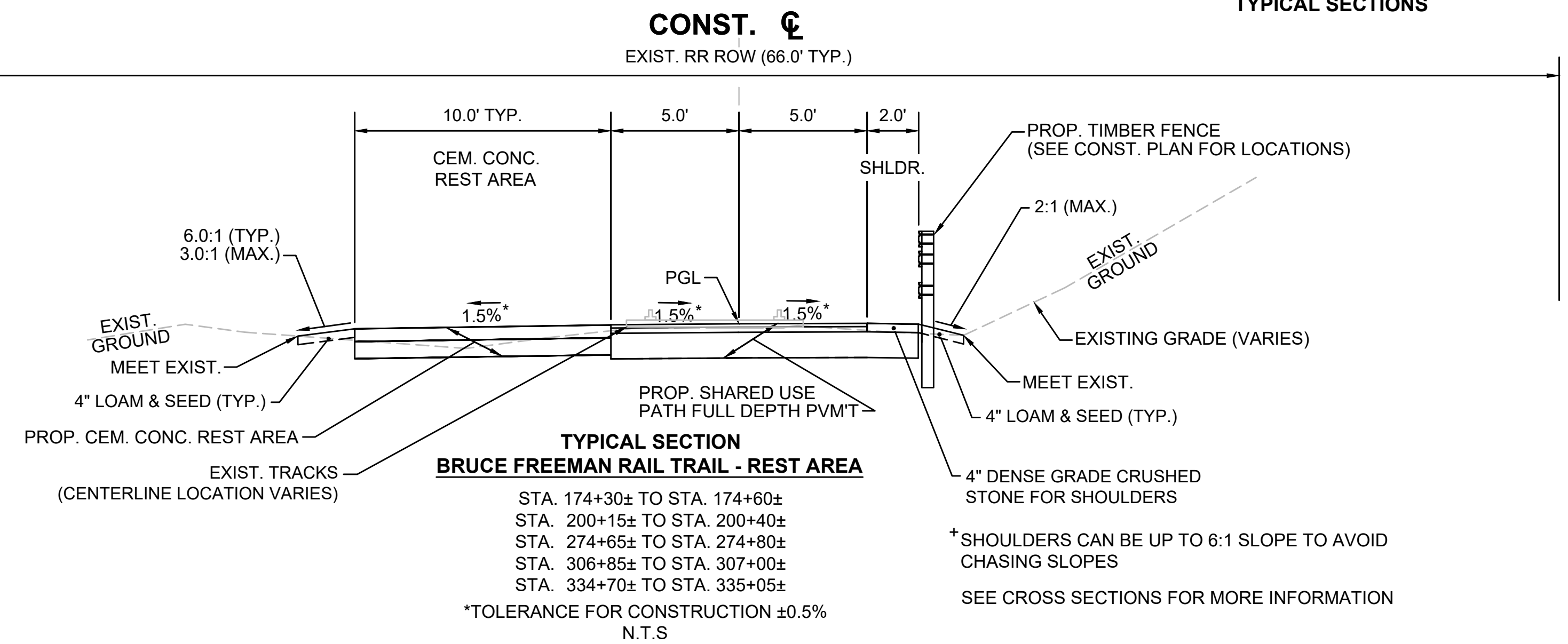
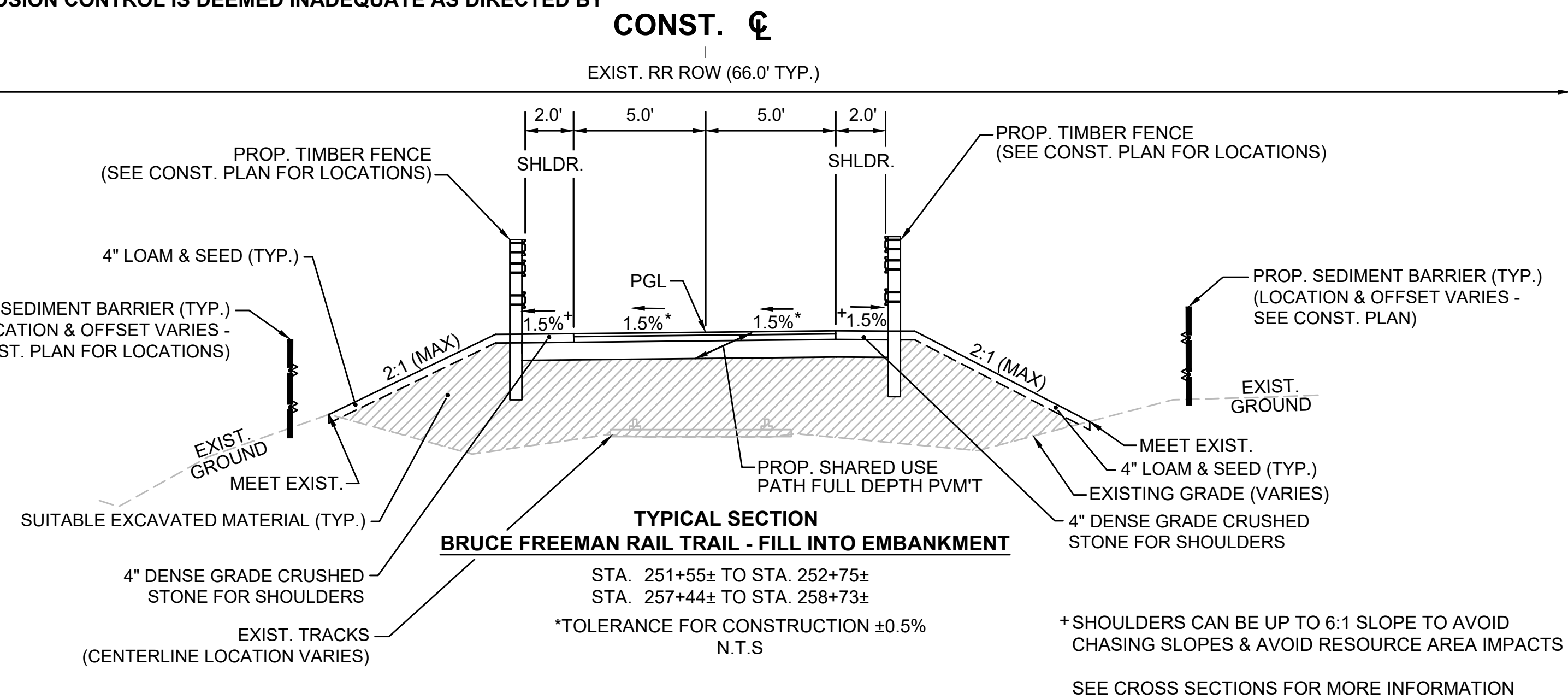


NOTE:
 1. THE SECTIONS OF PROPOSED ROADWAY NOT COVERED IN THE RANGE OF STATIONS ASSOCIATED WITH THE TYPICAL SECTIONS ARE EITHER IN TRANSITION OR ARE LOCATED AT INTERSECTIONS AND THEREFOR HAVE NOT BEEN SHOWN. REFER TO CROSS SECTION SHEETS FOR MORE DETAILS.

NOTES:

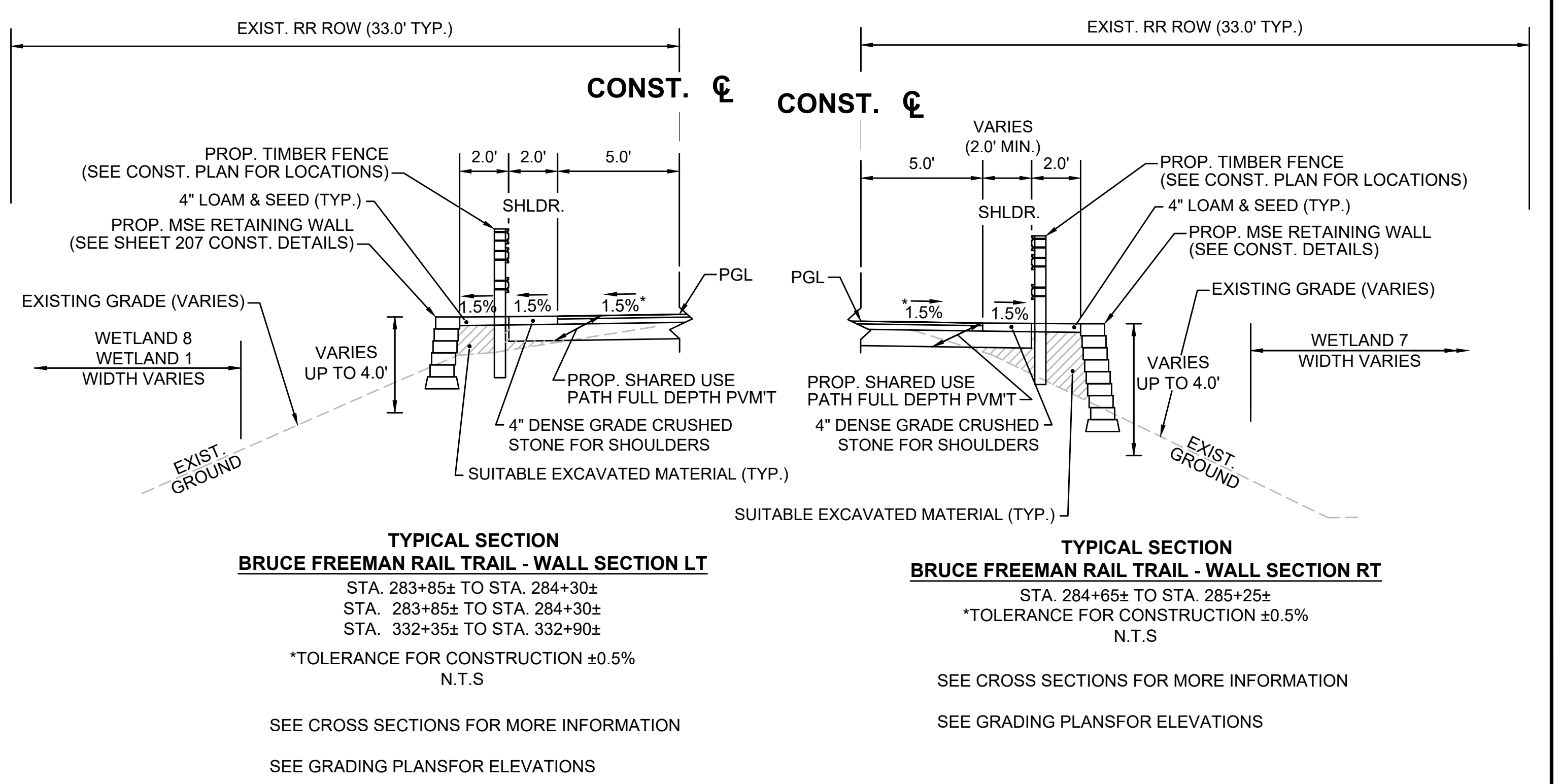
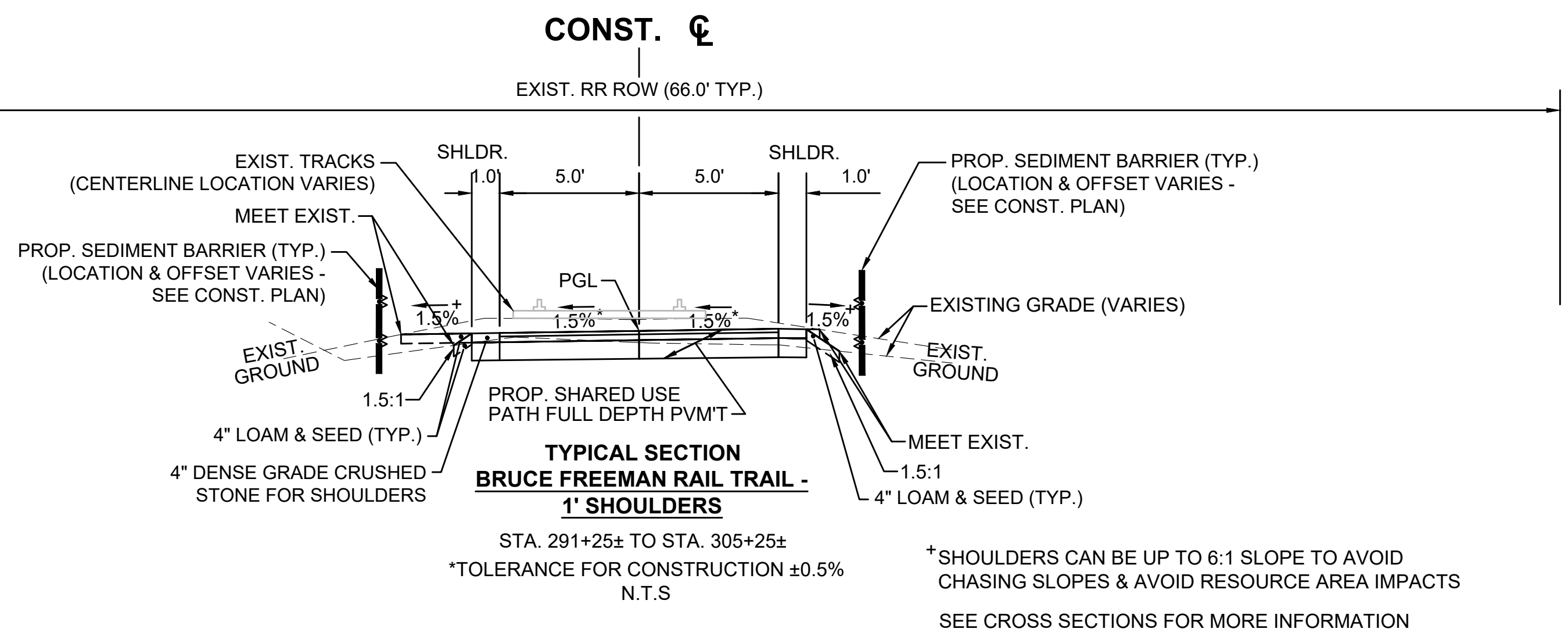
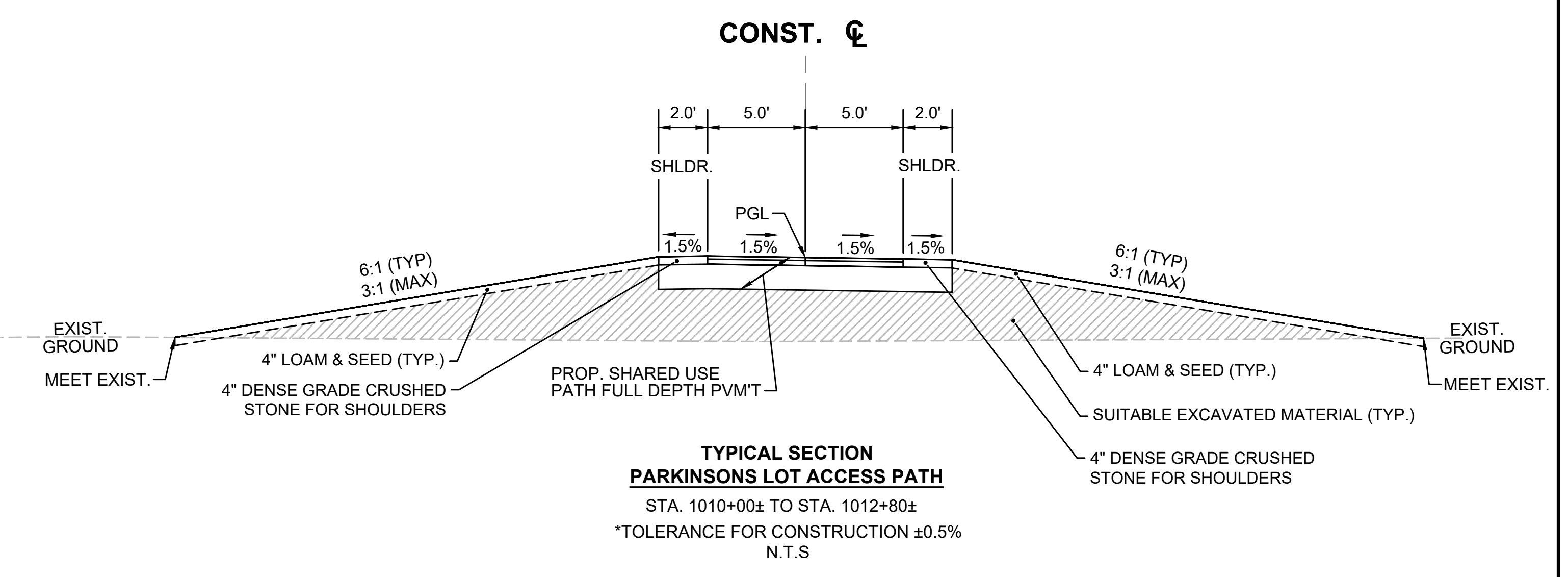
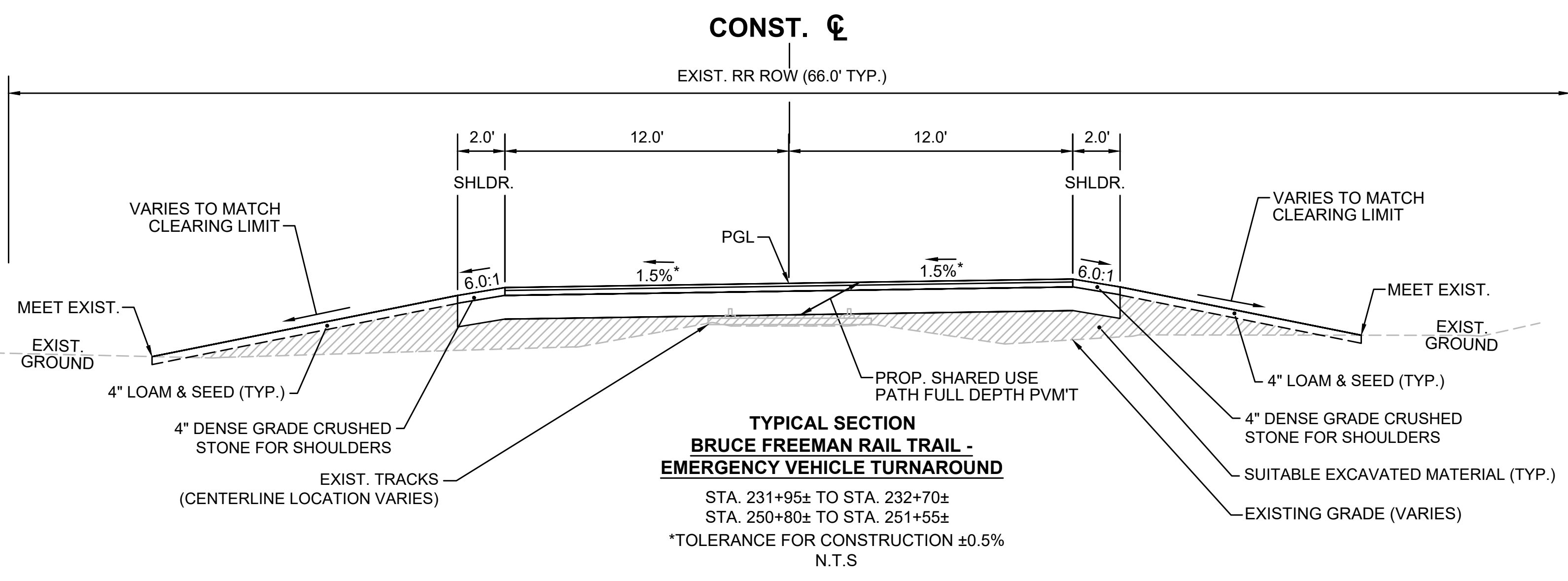
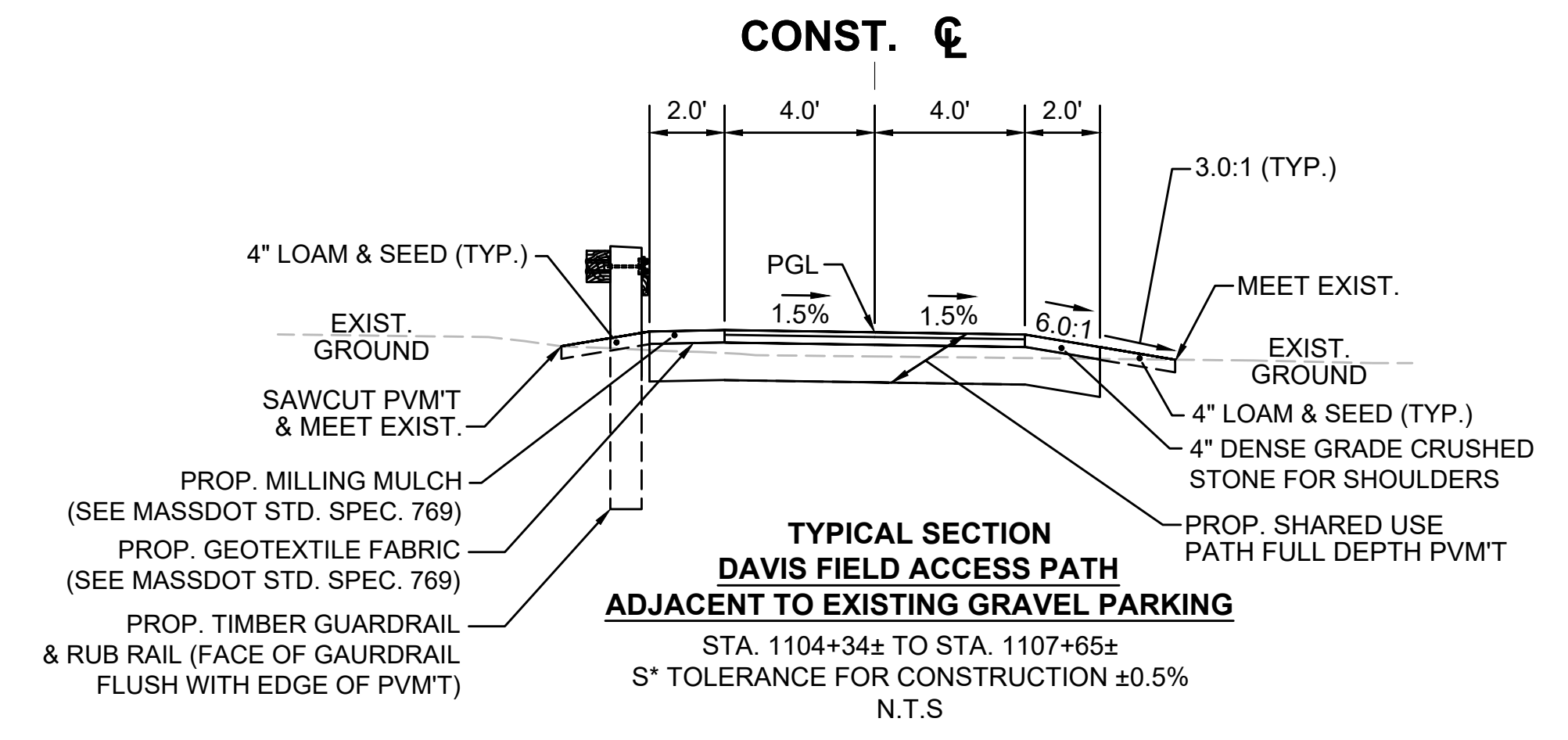
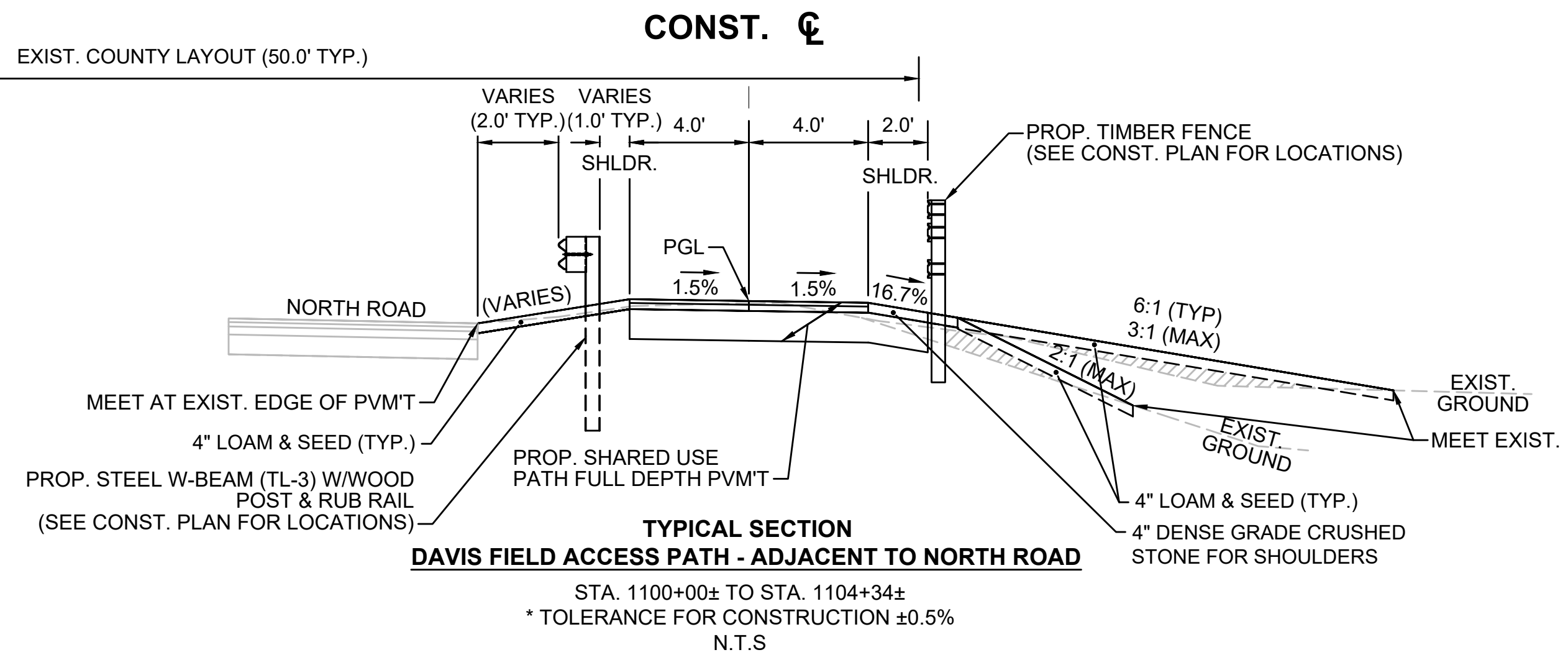
- MATTING FOR EROSION CONTROL SHALL BE INSTALLED ON EXISTING SIDE SLOPES THAT ARE 2:1 OR STEEPER THAT ARE NOT WITHIN JUTE MESH WATERWAY AREAS.
- MODIFIED ROCK FILL SHALL BE USED AS NEEDED ON ANY CUT OR FILL SLOPES STEEPER THAN 2:1 WHERE POOR SOIL CONDITIONS EXIST AND MATTING FOR EROSION CONTROL IS DEEMED INADEQUATE AS DIRECTED BY THE ENGINEER.

SUBURBY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	10	318
PROJECT FILE NO.		608164	
TYPICAL SECTIONS			



SEE SHEET 9 FOR PAVEMENT NOTES

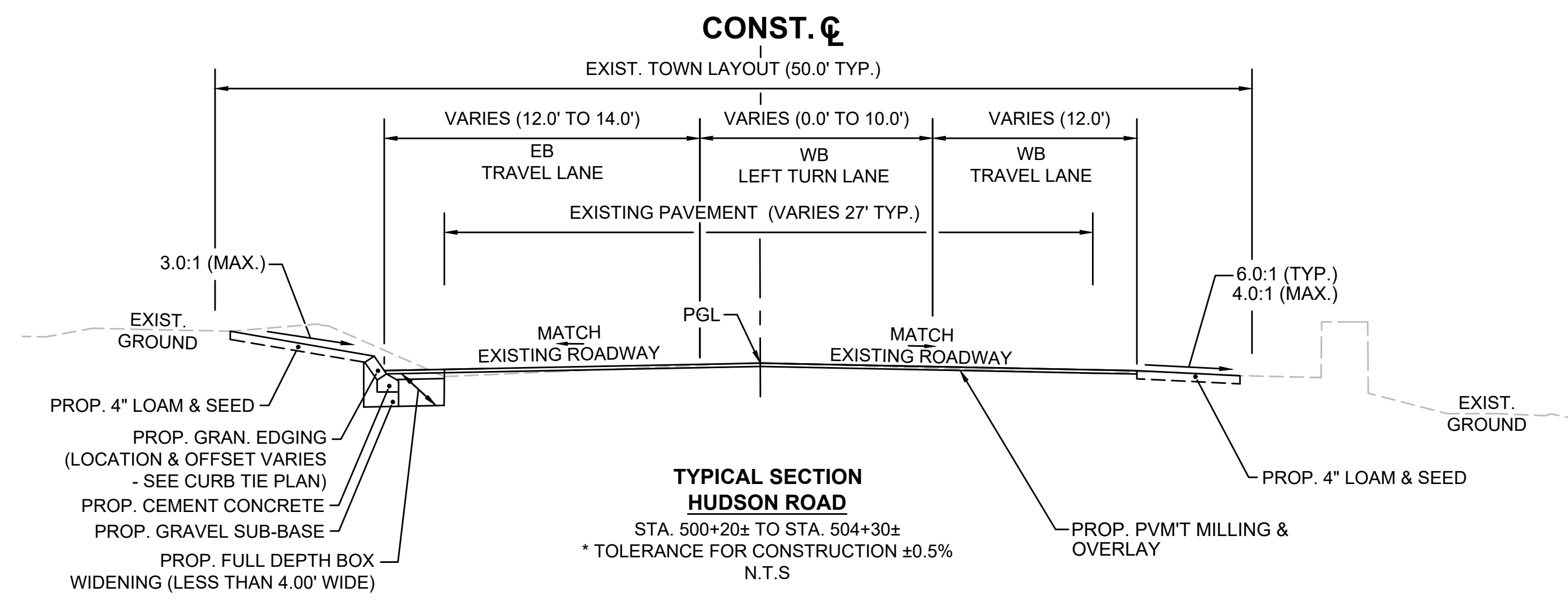
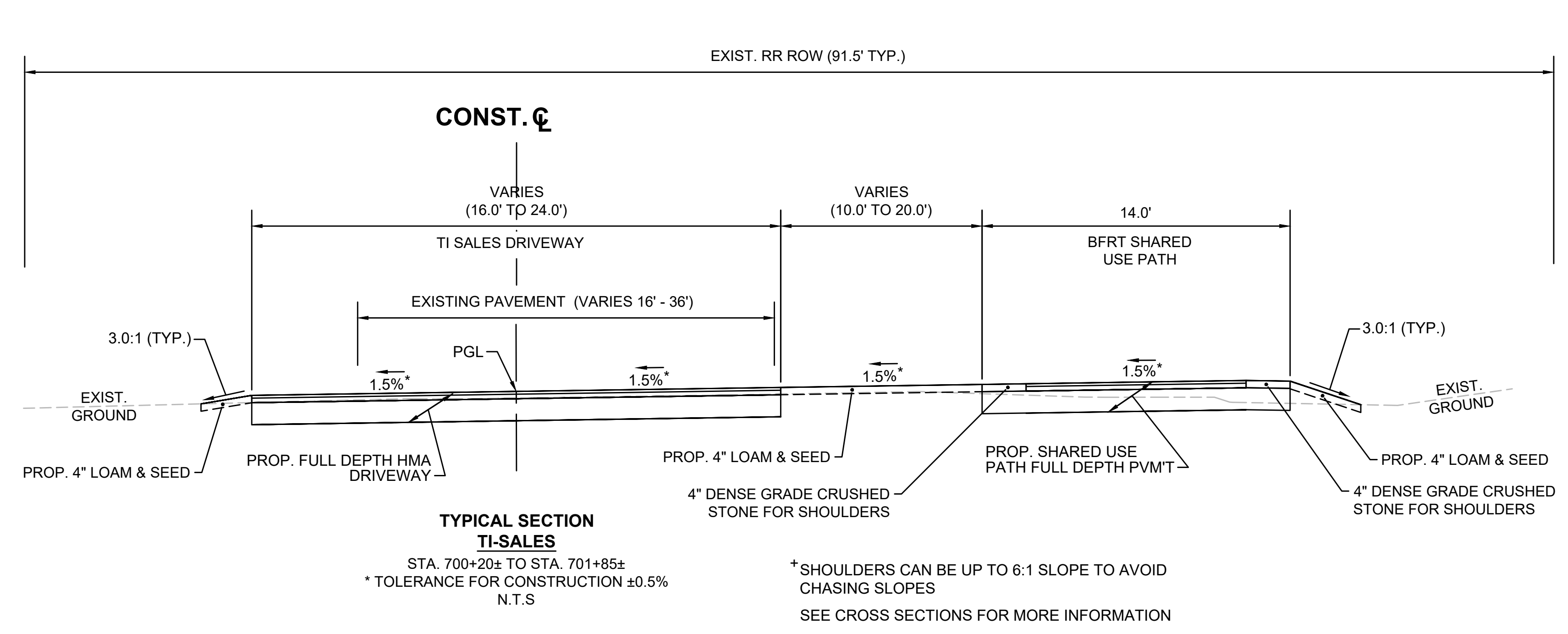
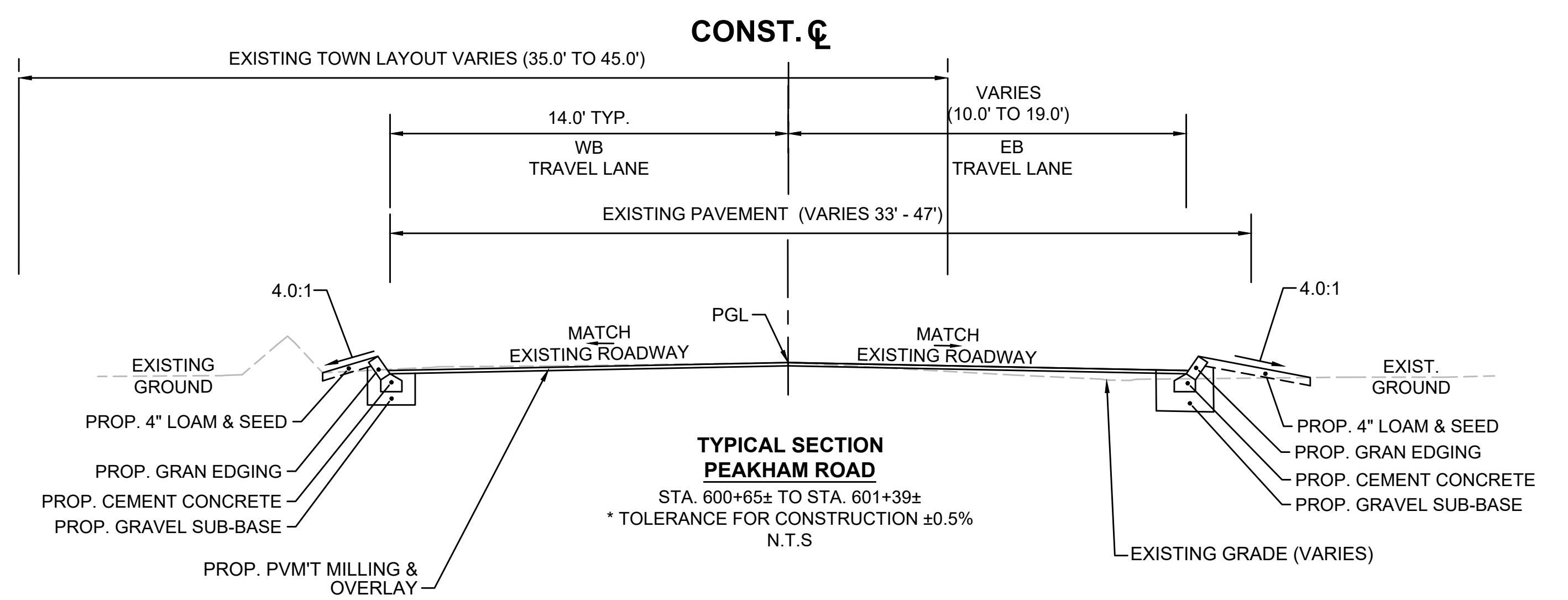
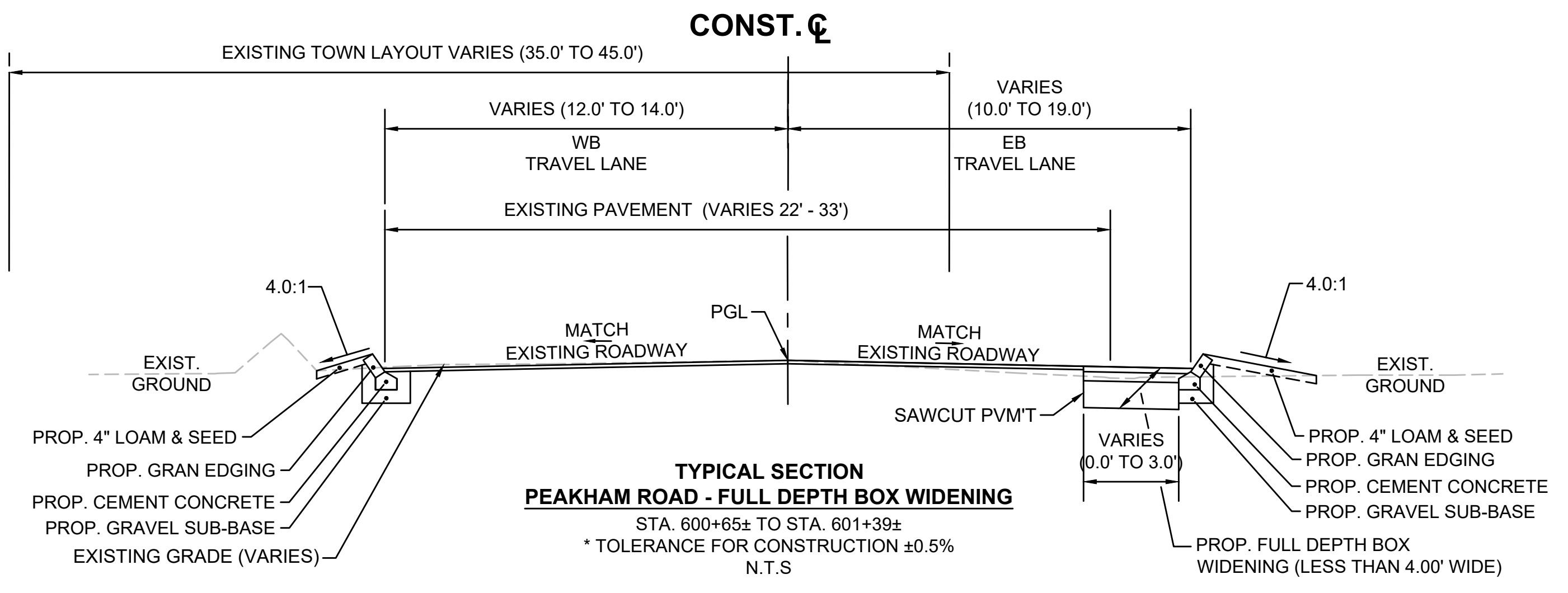
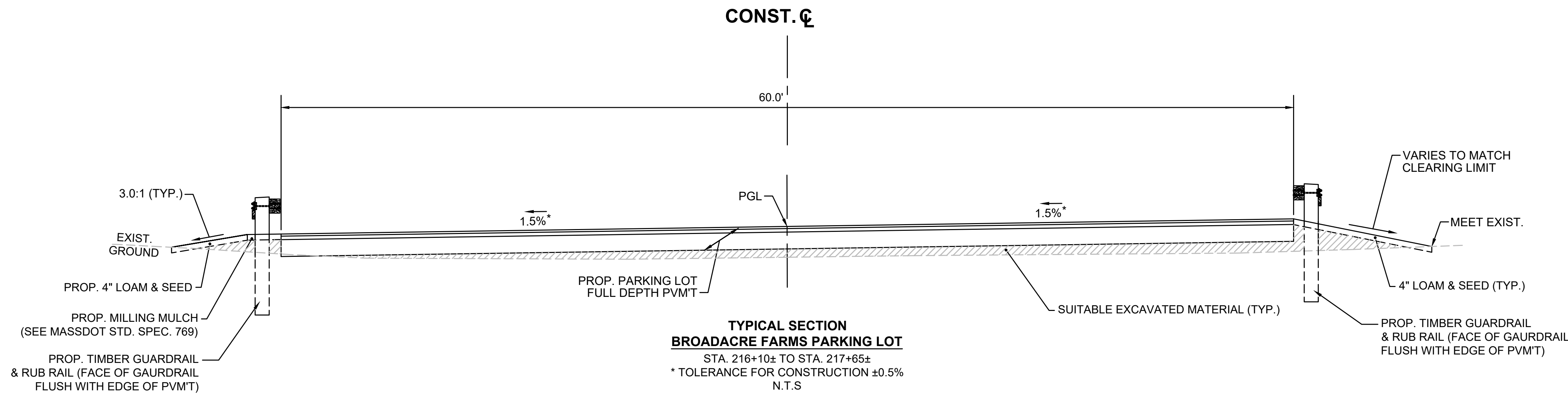
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	11	318
PROJECT FILE NO.		608164	
TYPICAL SECTIONS			



SEE SHEET 9 FOR PAVEMENT NOTES

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	12	318
PROJECT FILE NO.		608164	

TYPICAL SECTIONS



SEE SHEET 9 FOR PAVEMENT NOTES

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	1	318
PROJECT FILE NO.		608164	

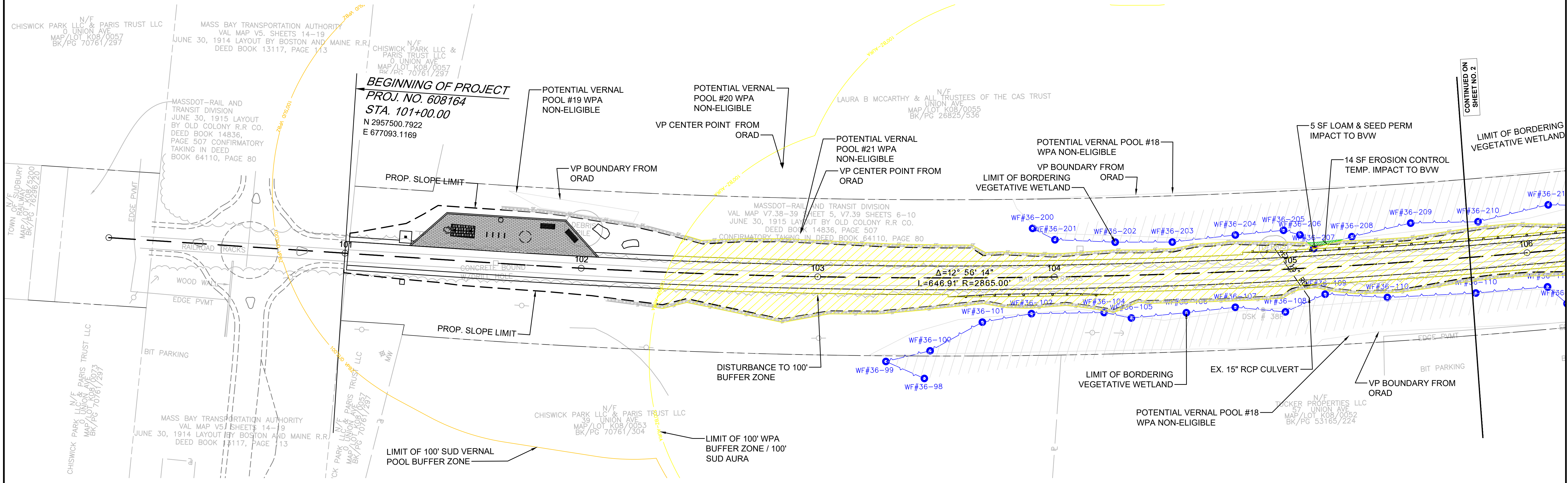
ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION
---	LIMIT OF BORDERING VEGETATED WETLAND (BVW)
---	EDGE OF BORDERING LAND SUBJECT TO FLOODING
---	LIMIT OF BANK
---	LIMIT OF FEMA FLOODWAY
---	ZONE A FLOOD LIMIT (NO BFE)
---	APPROX. LIMIT OF GRADING
---	100' WPA BZ
---	100' WPA BZ-SUD RA
---	100' WPA VPBZ
---	100' WPA RA
---	200' WPA RA
---	100' SUD RA
---	200' SUD RA
---	100' SUD VPBZ
---	AURA

LINETYPE	DESCRIPTION
●	DRIVE SAMPLE BORING LOCATION
■	TEST PIT LOCATION

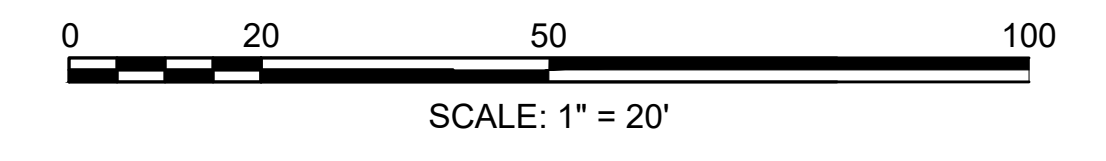
HATCH	DESCRIPTION
[Hatched Box]	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
[Hatched Box]	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
[Hatched Box]	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
[Hatched Box]	DISTURBANCE TO BLSF
[Hatched Box]	BORDERING VEGETATED WETLAND
[Hatched Box]	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
[Hatched Box]	TEMPORARY DISTURBANCE TO BVW/LUW
[Hatched Box]	PERMANENT DISTURBANCE TO BVW/LUW
[Hatched Box]	DISTURBANCE TO 100' WPA VERNAL POOL BZ
[Hatched Box]	PROPOSED WETLAND REPLICATON AREA



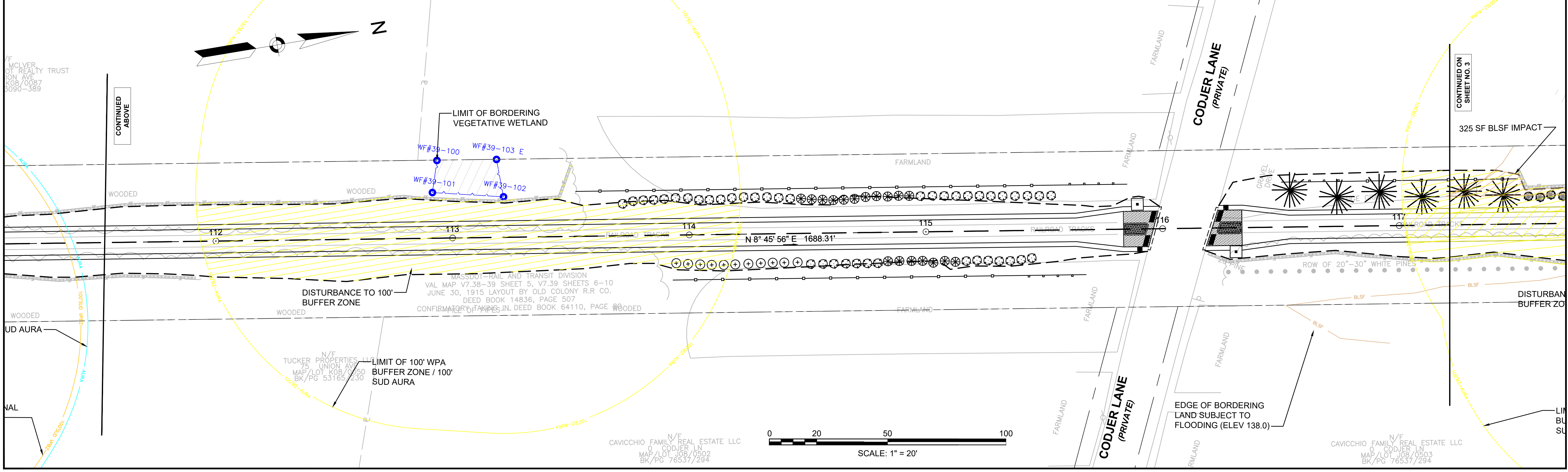
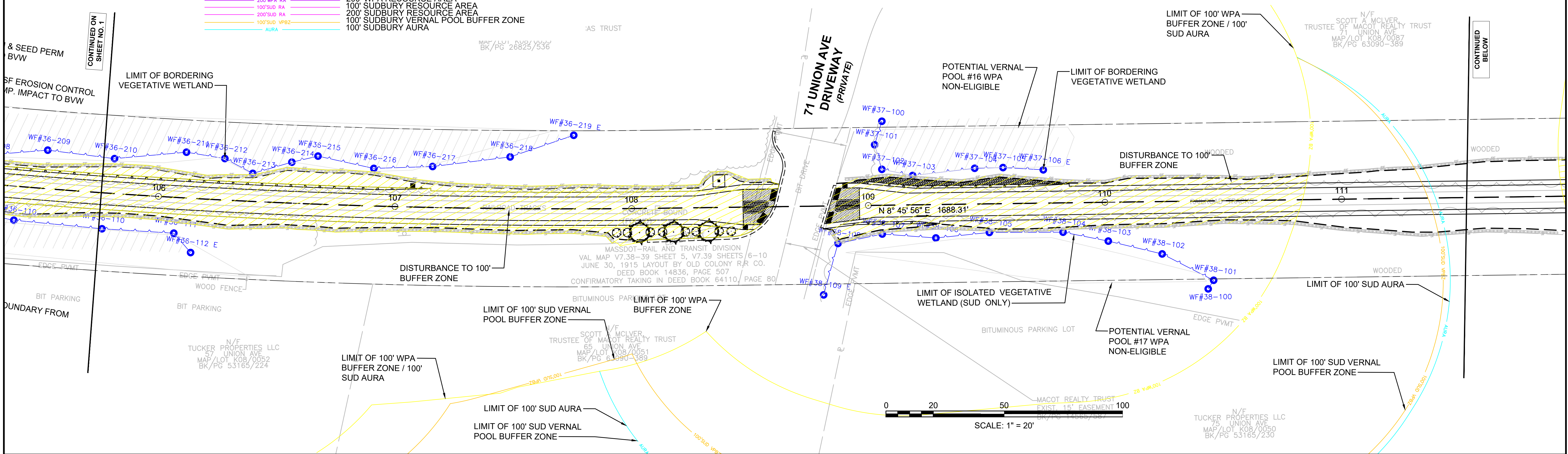
NOTES:

1. FOR THIS PROJECT, WPA RESOURCE AREAS ARE JURISDICTIONAL. TOWN BYLAW RESOURCE AREA BOUNDARIES ARE SHOWN FOR REFERENCE ONLY.
2. FOR PLANT LIST SEE CONSTRUCTION PLANS



ENVIRONMENTAL IMPACTS LEGEND		ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	LIMIT OF BANK			(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)			(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	APPROX. LIMIT OF GRADING			(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	100' WPA BUFFER ZONE			(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA						
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA						
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE						
(Symbol)	100' WPA RESOURCE AREA						
(Symbol)	200' WPA RESOURCE AREA						
(Symbol)	100' SUDBURY RESOURCE AREA						
(Symbol)	200' SUDBURY RESOURCE AREA						
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE						
(Symbol)	100' SUDBURY AURA						

SUBURBY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	2	318
PROJECT FILE NO.		608164	



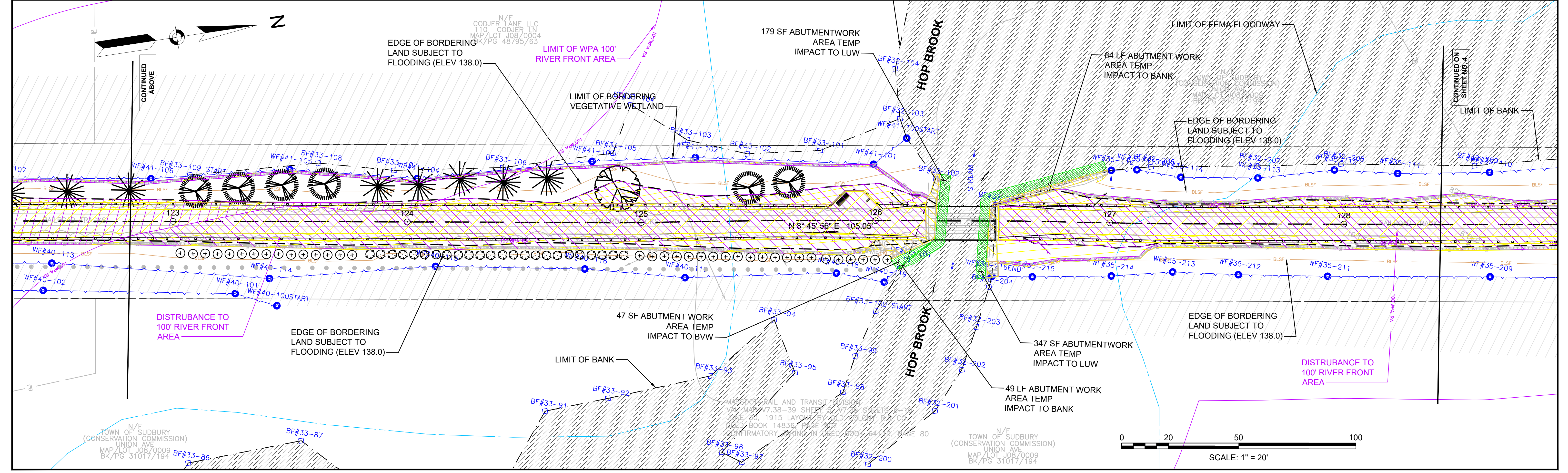
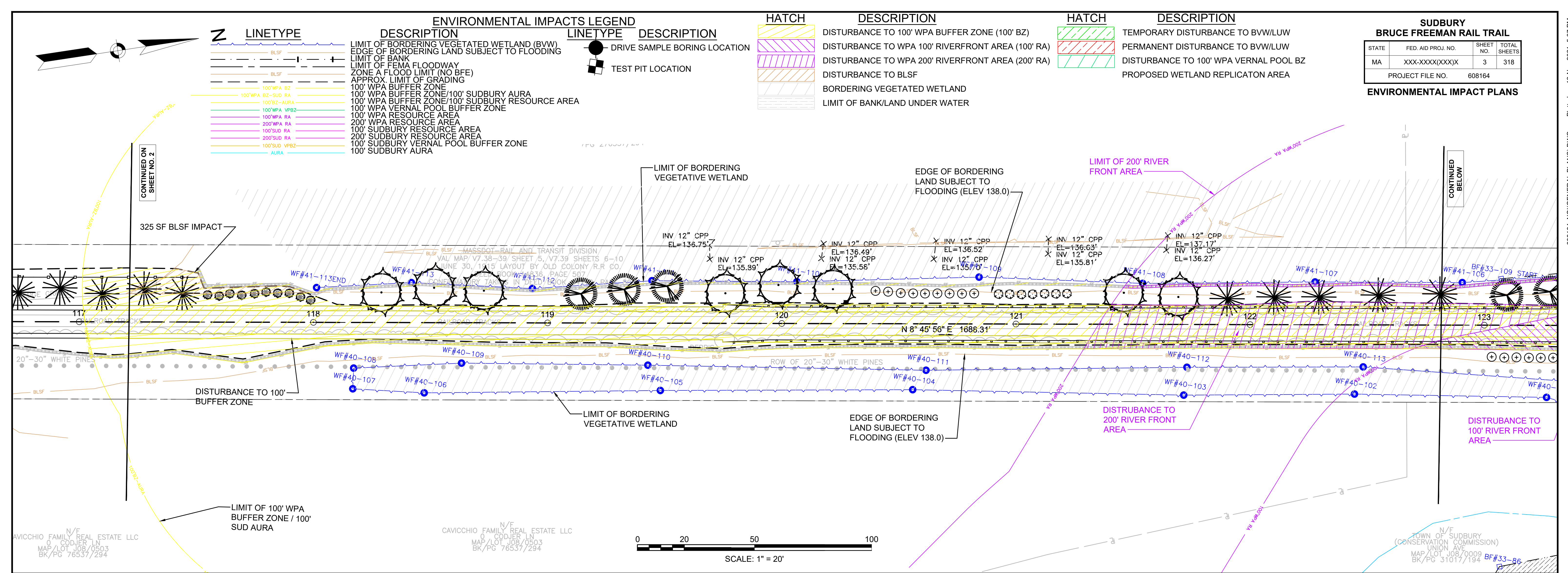
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BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	3	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION
(Symbol)	LIMIT OF BANK		
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		
(Symbol)	APPROX. LIMIT OF GRADING		
(Symbol)	100' WPA BUFFER ZONE		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE		
(Symbol)	100' WPA RESOURCE AREA		
(Symbol)	200' WPA RESOURCE AREA		
(Symbol)	100' SUDBURY RESOURCE AREA		
(Symbol)	200' SUDBURY RESOURCE AREA		
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE		
(Symbol)	100' SUDBURY AURA		

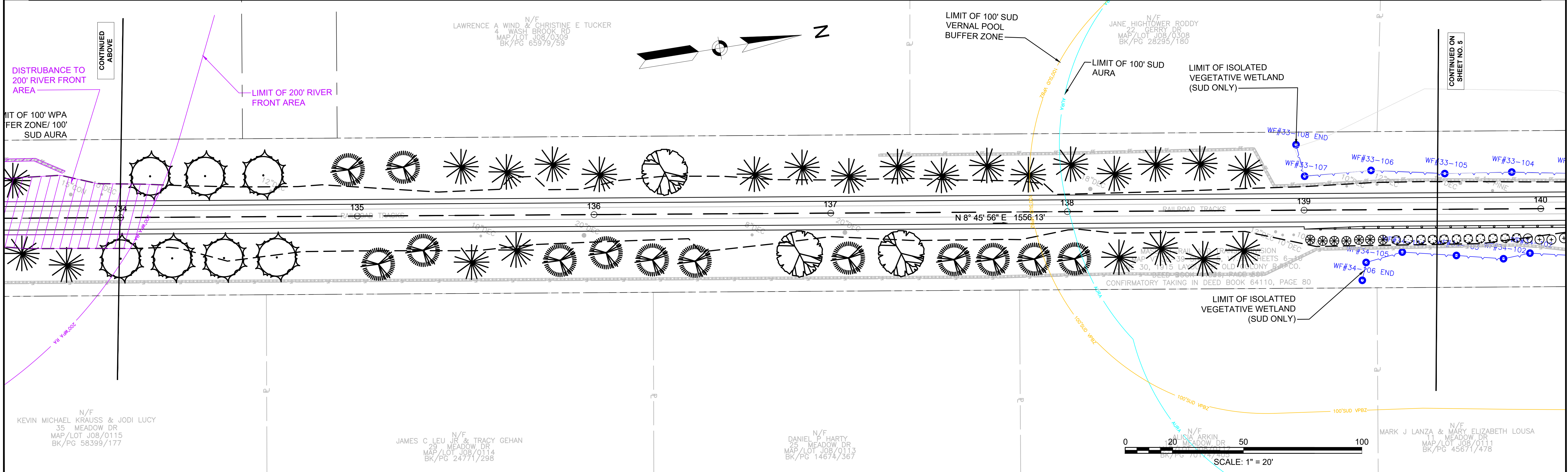
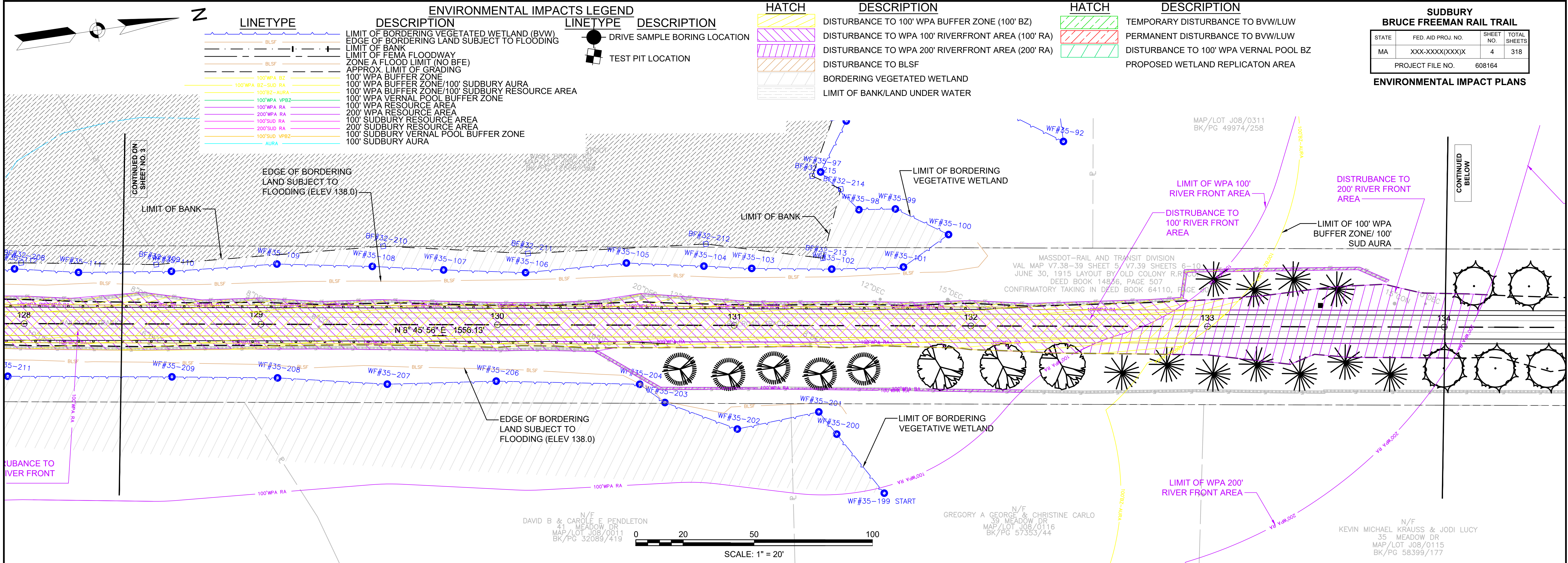
HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	LIMIT OF BANK/LAND UNDER WATER		

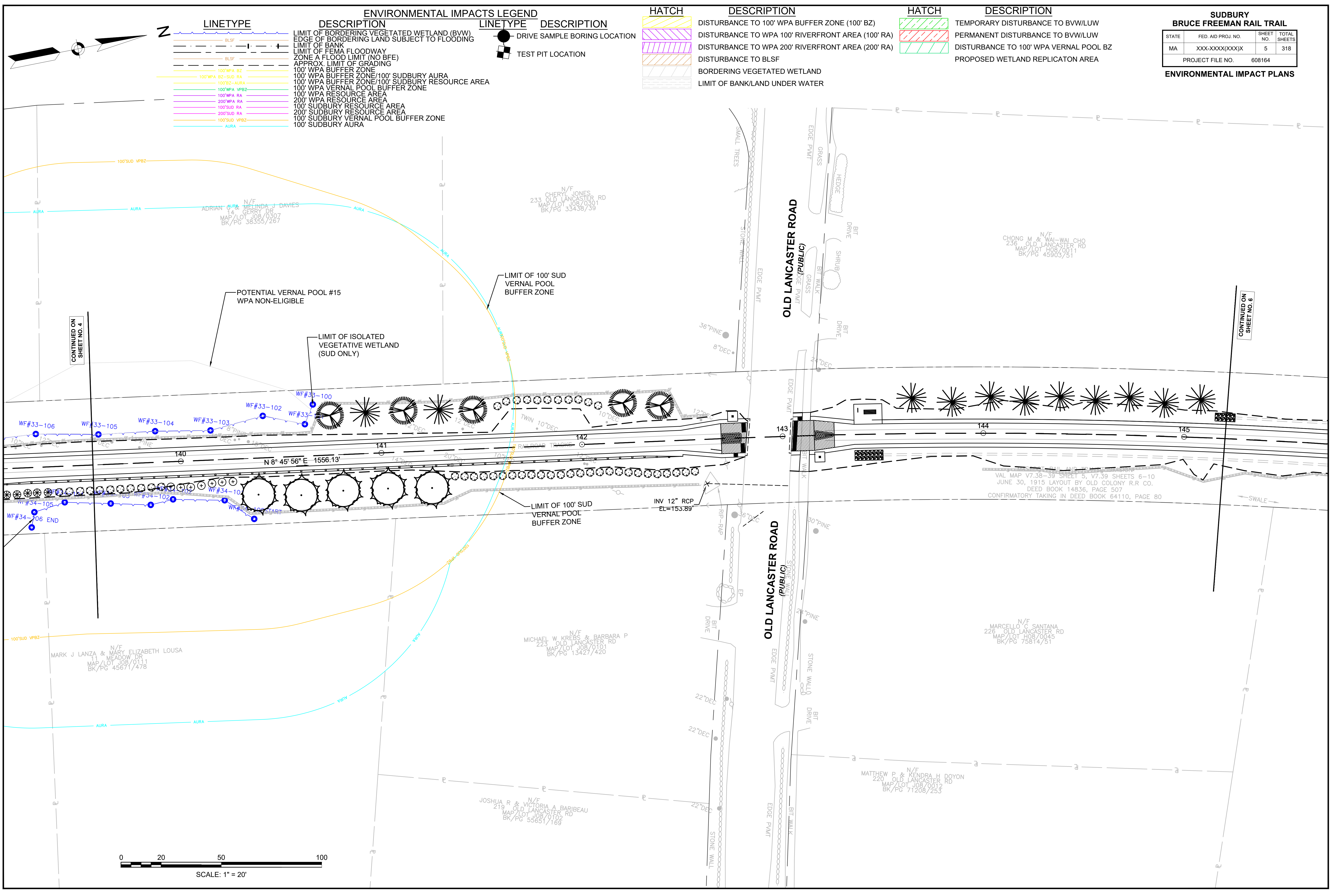


BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	4	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LW
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LW
(Symbol)	LIMIT OF BANK			(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)			(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	APPROX. LIMIT OF GRADING			(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	100' WPA BUFFER ZONE			(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA						
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA						
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE						
(Symbol)	100' WPA RESOURCE AREA						
(Symbol)	200' WPA RESOURCE AREA						
(Symbol)	100' SUDBURY RESOURCE AREA						
(Symbol)	200' SUDBURY RESOURCE AREA						
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE						
(Symbol)	100' SUDBURY AURA						





LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION
(Symbol)	LIMIT OF BANK		
(Symbol)	LIMIT OF FEMA FLOODWAY		
(Symbol)	ZONE A FLOOD LIMIT (NO BFE)		
(Symbol)	APPROX. LIMIT OF GRADING		
(Symbol)	100' WPA BUFFER ZONE		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE		
(Symbol)	100' WPA RESOURCE AREA		
(Symbol)	200' WPA RESOURCE AREA		
(Symbol)	100' SUDBURY RESOURCE AREA		
(Symbol)	200' SUDBURY RESOURCE AREA		
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE		
(Symbol)	100' SUDBURY AURA		

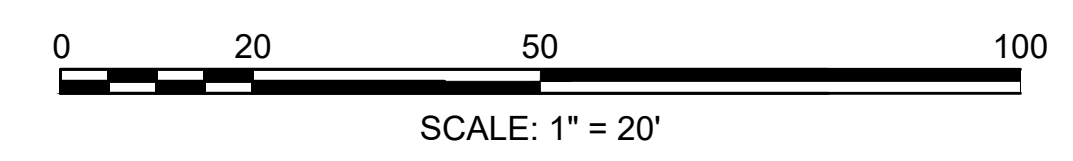
HATCH	DESCRIPTION
(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
(Symbol)	DISTURBANCE TO BLSF
(Symbol)	BORDERING VEGETATED WETLAND
(Symbol)	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	PROPOSED WETLAND REPLICATON AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	5	318
PROJECT FILE NO.		608164	
ENVIRONMENTAL IMPACT PLANS			

CONTINUED ON SHEET NO. 4

CONTINUED ON SHEET NO. 6

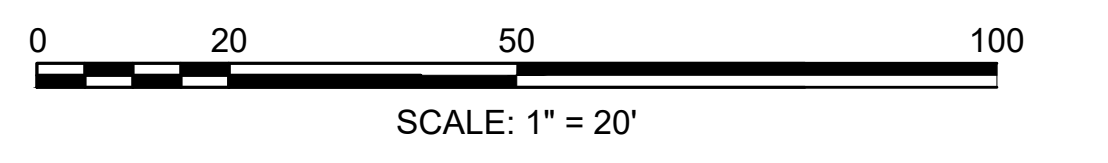
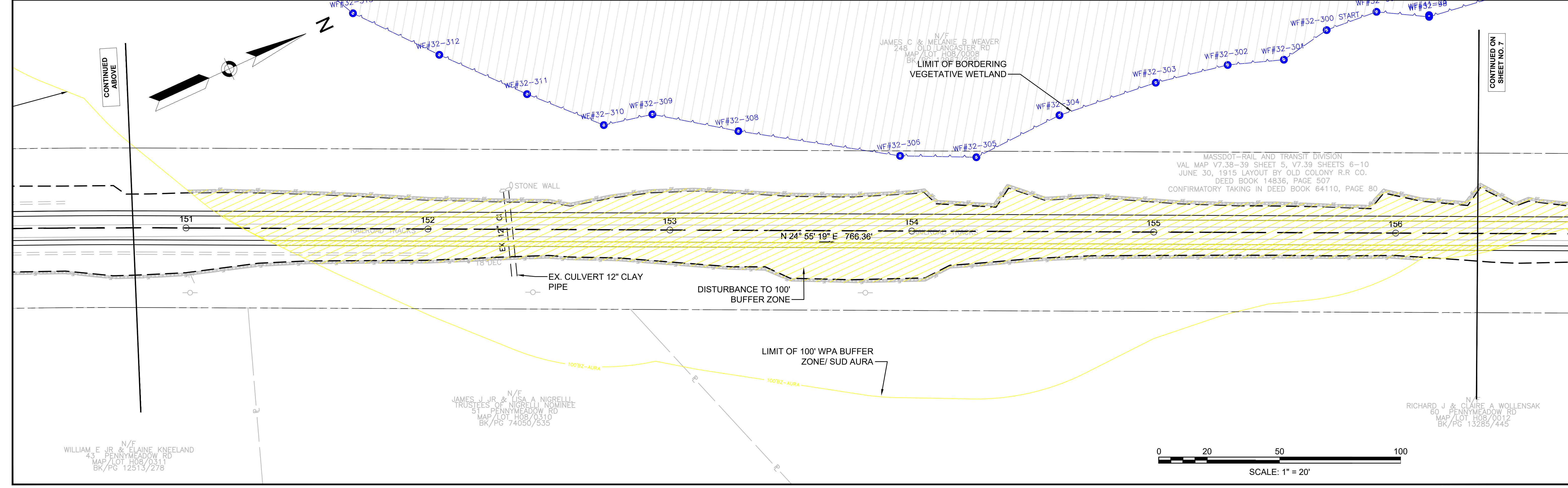
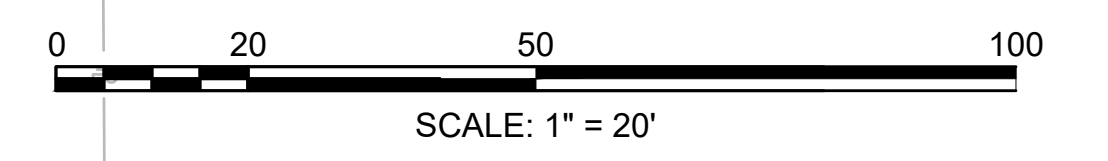
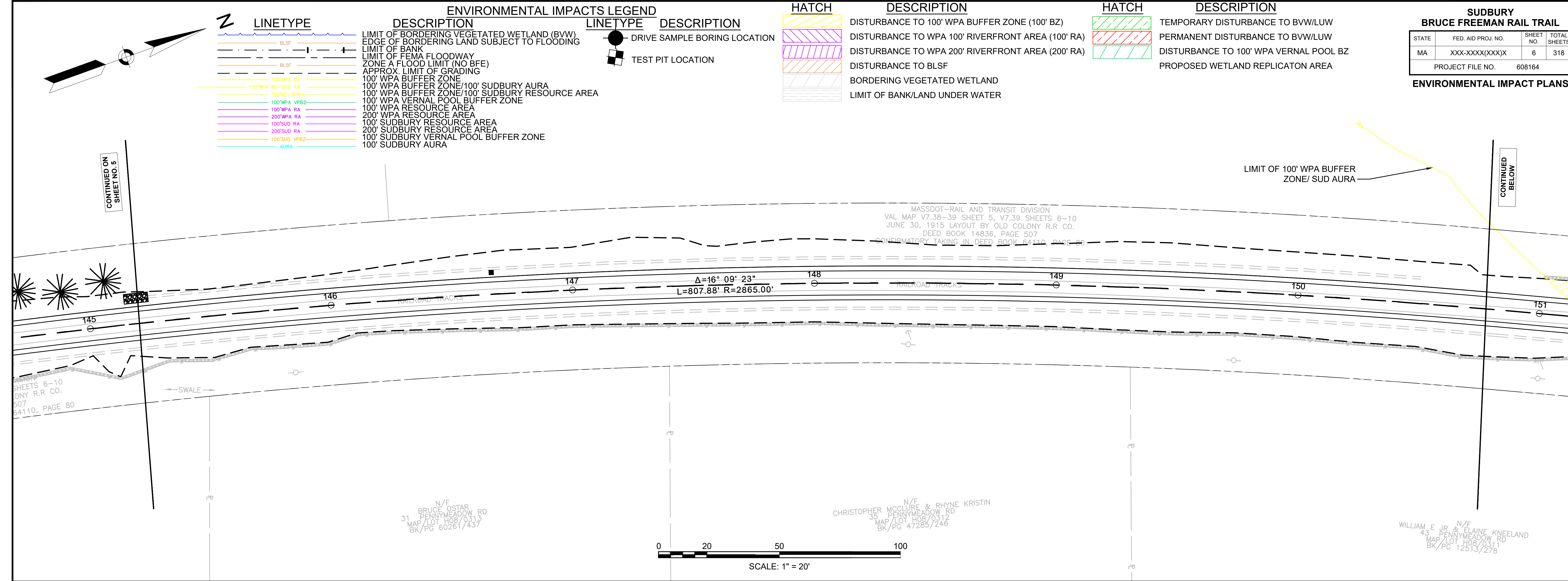


VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
DEED BOOK 14836, PAGE 507
CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	6	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

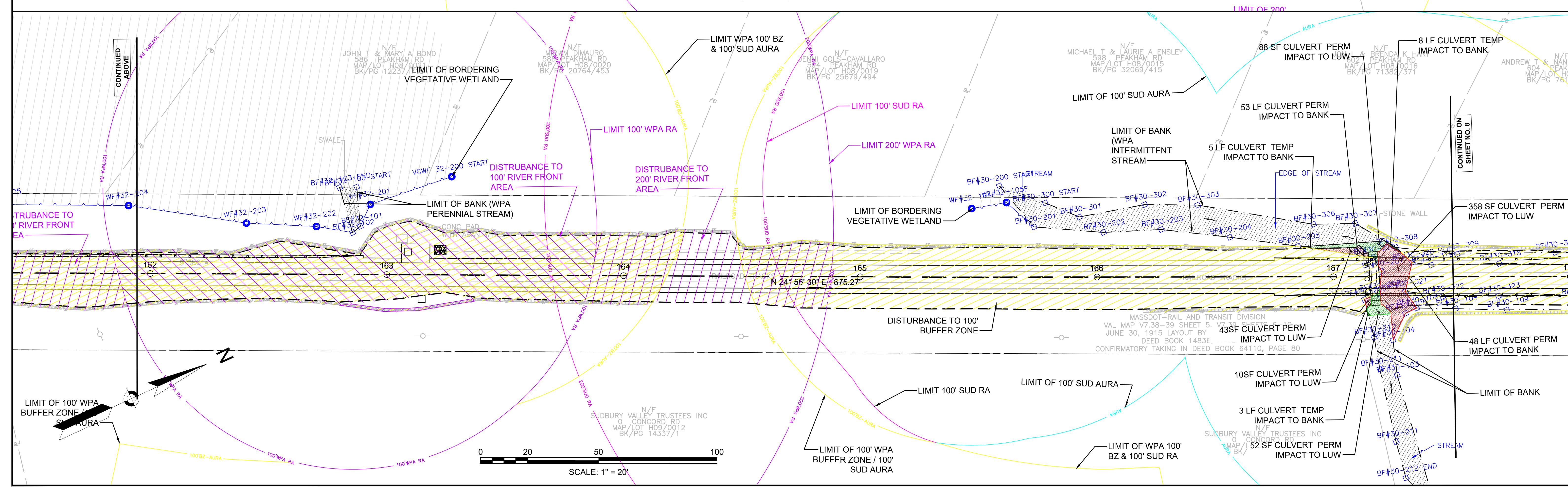
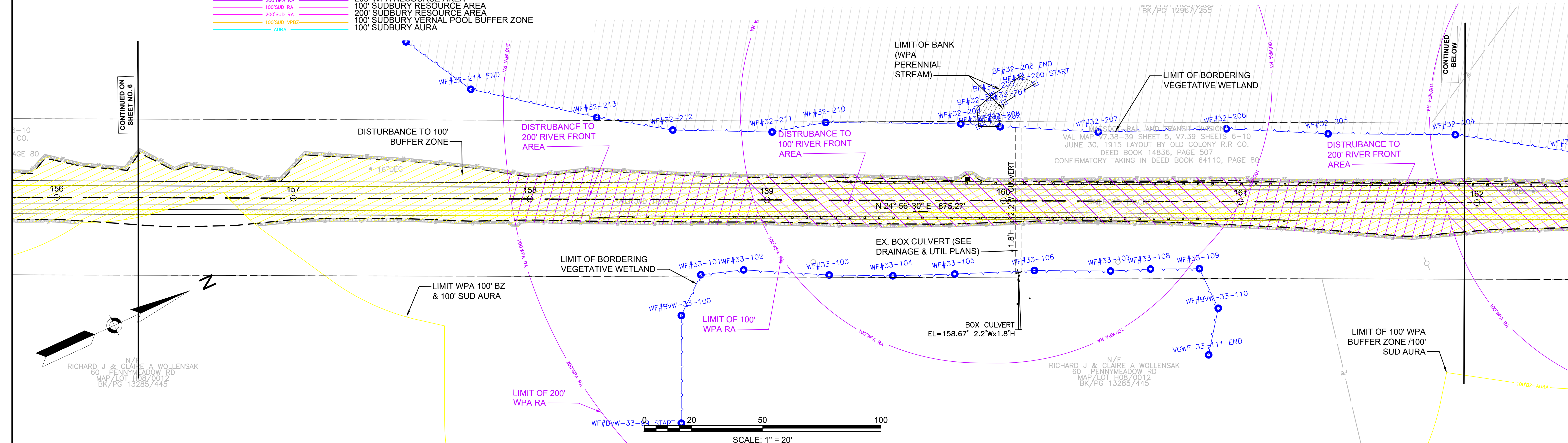
ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
--- (dashed)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	[Diagonal Hatching]	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	[Green Diagonal Hatching]	TEMPORARY DISTURBANCE TO BVW/LUW
--- (dashed)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	[Purple Diagonal Hatching]	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	[Red Diagonal Hatching]	PERMANENT DISTURBANCE TO BVW/LUW
--- (dashed)	LIMIT OF BANK	[Pink Diagonal Hatching]	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	[Green Diagonal Hatching]	DISTURBANCE TO 100' WPA VERNAL POOL BZ
--- (dashed)	LIMIT OF FEMA FLOODWAY	[Orange Diagonal Hatching]	DISTURBANCE TO BLSF	[Green Diagonal Hatching]	PROPOSED WETLAND REPLICATON AREA
--- (dashed)	ZONE A FLOOD LIMIT (NO BFE)	[Blue Diagonal Hatching]	BORDERING VEGETATED WETLAND		
--- (dashed)	APPROX. LIMIT OF GRADING	[Blue Diagonal Hatching]	LIMIT OF BANK/LAND UNDER WATER		
--- (dashed)	100' WPA BUFFER ZONE				
--- (dashed)	100' WPA BUFFER ZONE/100' SUDBURY AURA				
--- (dashed)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
--- (dashed)	100' WPA VERNAL POOL BUFFER ZONE				
--- (dashed)	100' WPA RESOURCE AREA				
--- (dashed)	200' WPA RESOURCE AREA				
--- (dashed)	100' SUDBURY RESOURCE AREA				
--- (dashed)	200' SUDBURY RESOURCE AREA				
--- (dashed)	100' SUDBURY VERNAL POOL BUFFER ZONE				
--- (dashed)	100' SUDBURY AURA				



ENVIRONMENTAL IMPACTS LEGEND		ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)			(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	APPROX. LIMIT OF GRADING			(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	100' WPA BUFFER ZONE			(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA			(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA						
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE						
(Symbol)	100' WPA RESOURCE AREA						
(Symbol)	200' WPA RESOURCE AREA						
(Symbol)	100' SUDBURY RESOURCE AREA						
(Symbol)	200' SUDBURY RESOURCE AREA						
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE						
(Symbol)	100' SUDBURY AURA						

BRUCE FREEMAN TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	7	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

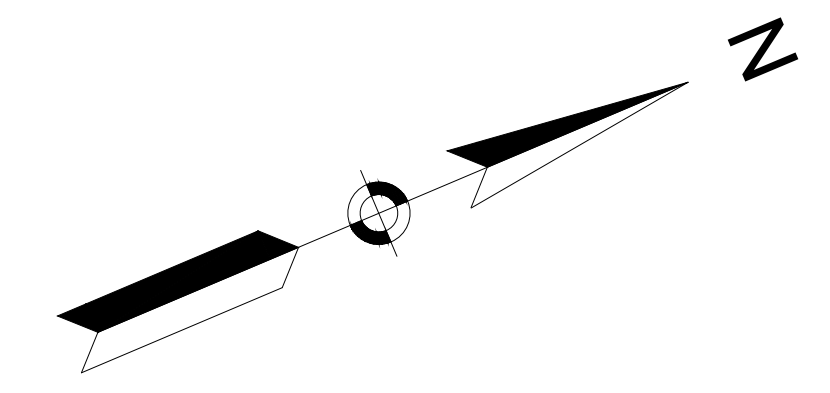
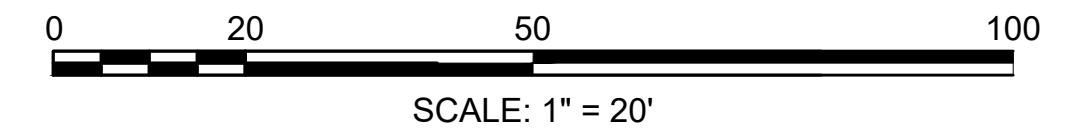
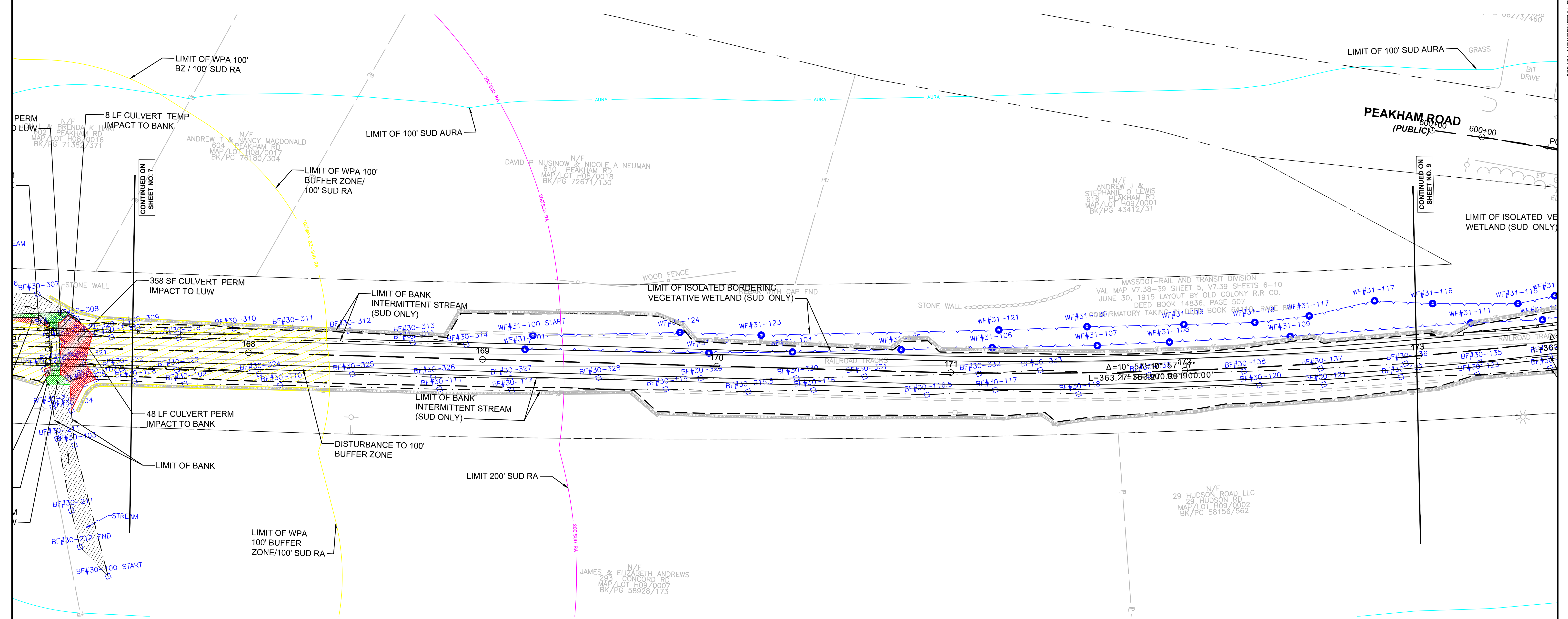


ENVIRONMENTAL IMPACTS LEGEND	
LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)
	EDGE OF BORDERING LAND SUBJECT TO FLOODING
	LIMIT OF BANK
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)
	APPROX. LIMIT OF GRADING
	100' WPA BUFFER ZONE
	100' WPA BUFFER ZONE/100' SUDBURY AURA
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA
	100' WPA VERNAL POOL BUFFER ZONE
	100' WPA RESOURCE AREA
	200' WPA RESOURCE AREA
	100' SUDBURY RESOURCE AREA
	200' SUDBURY RESOURCE AREA
	100' SUDBURY VERNAL POOL BUFFER ZONE
	100' SUDBURY AURA

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LUW
	PERMANENT DISTURBANCE TO BVW/LUW
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATION AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	8	318
PROJECT FILE NO.		608164	
ENVIRONMENTAL IMPACT PLANS			

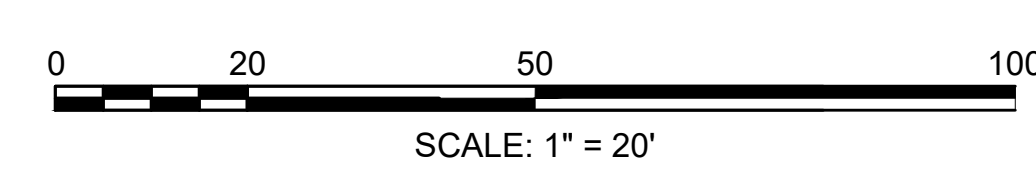
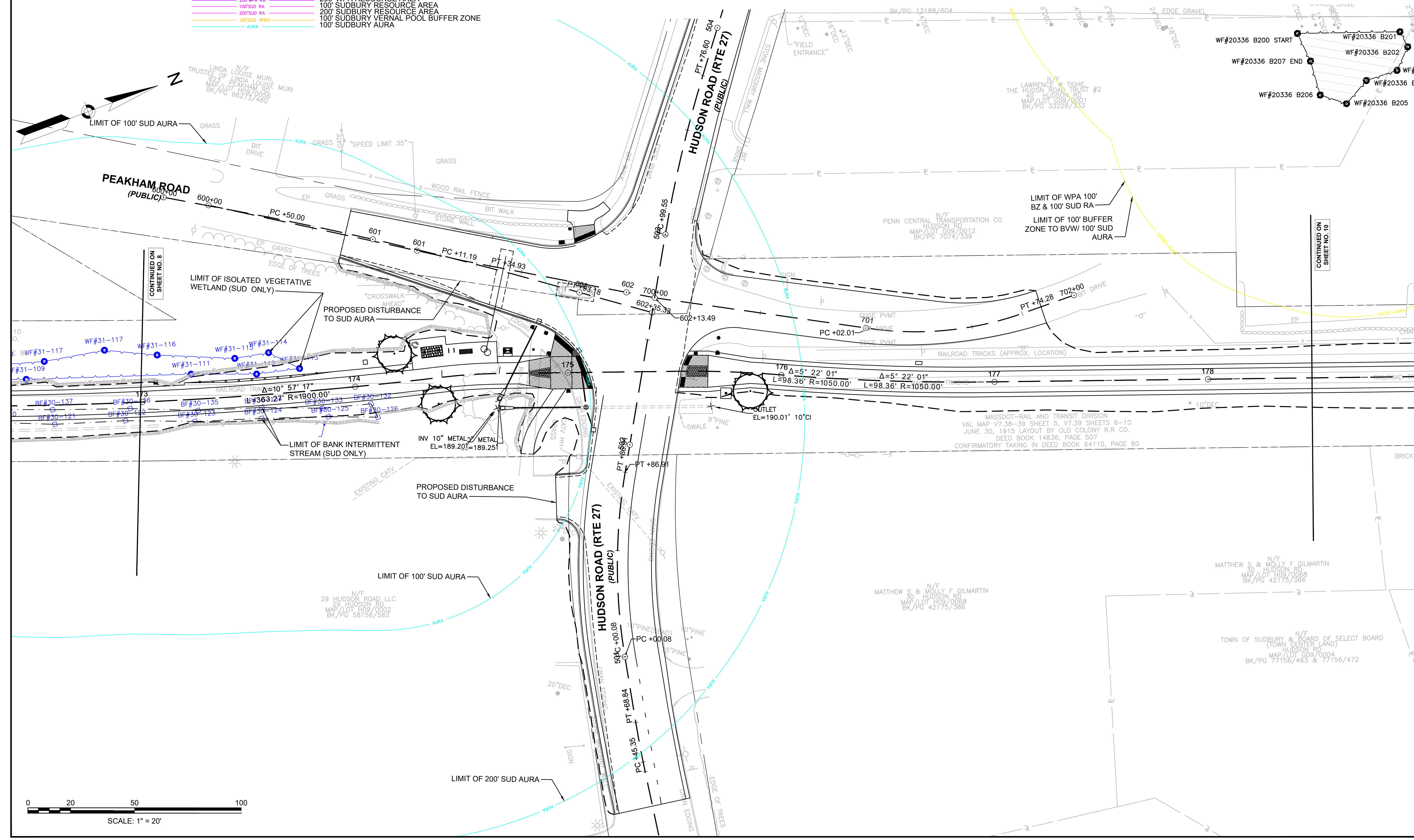


LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DRIVE SAMPLE BORING LOCATION
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		TEST PIT LOCATION
	LIMIT OF BANK		
	LIMIT OF FEMA FLOODWAY		
	ZONE A FLOOD LIMIT (NO BFE)		
	APPROX. LIMIT OF GRADING		
	100' WPA BUFFER ZONE		
	100' WPA BUFFER ZONE/100' SUDBURY AURA		
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
	100' WPA VERNAL POOL BUFFER ZONE		
	100' WPA RESOURCE AREA		
	200' WPA RESOURCE AREA		
	100' SUDBURY RESOURCE AREA		
	200' SUDBURY RESOURCE AREA		
	100' SUDBURY VERNAL POOL BUFFER ZONE		
	100' SUDBURY AURA		

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LUW
	PERMANENT DISTURBANCE TO BVW/LUW
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	9	318
PROJECT FILE NO.		608164	
ENVIRONMENTAL IMPACT PLANS			



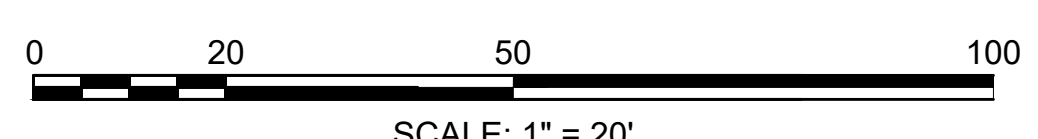
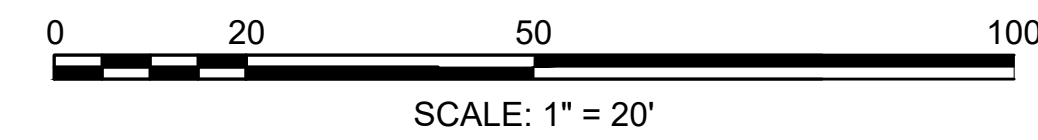
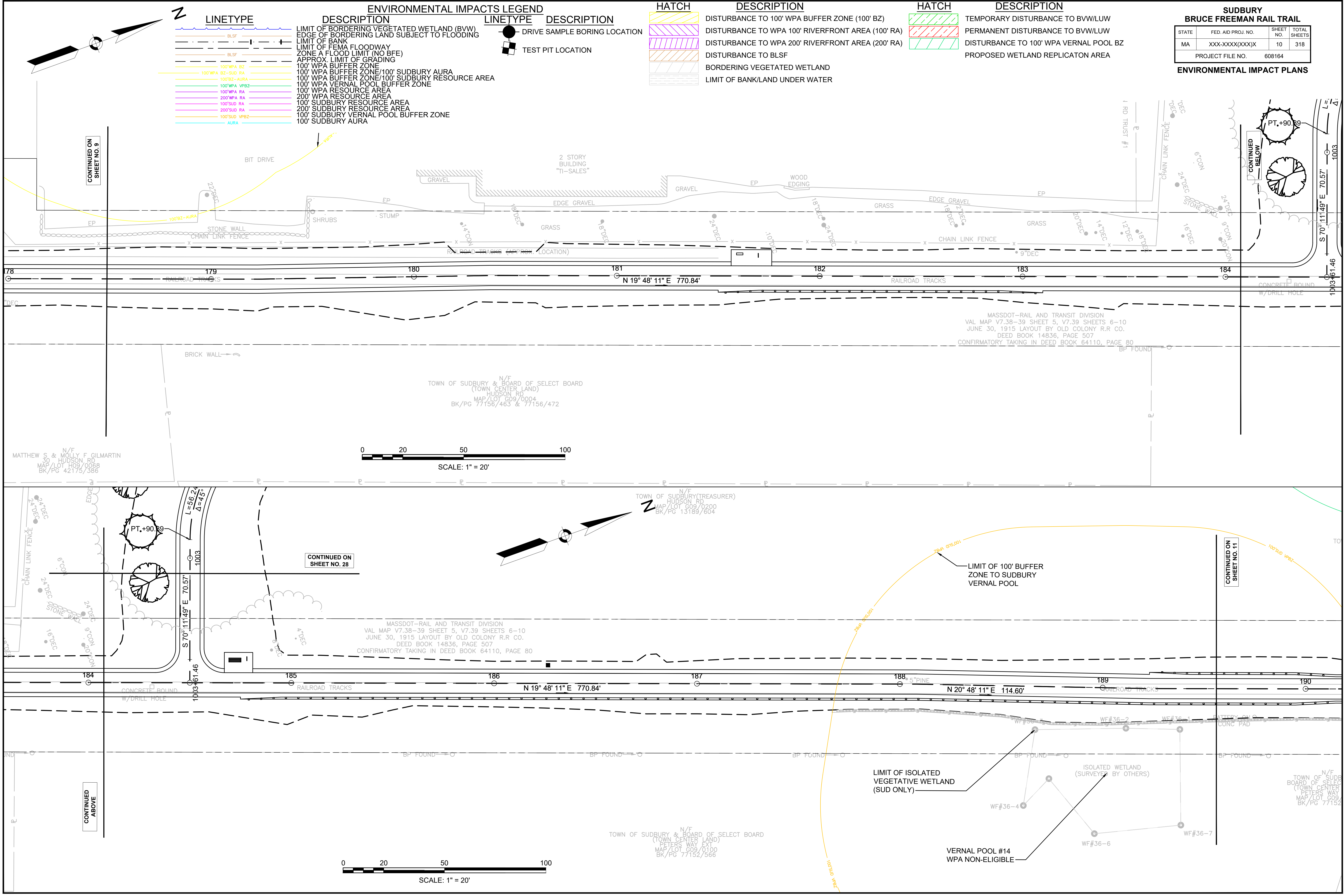
CONTINUED ON
SHEET NO. 8

CONTINUED ON
SHEET NO. 10

BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	10	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

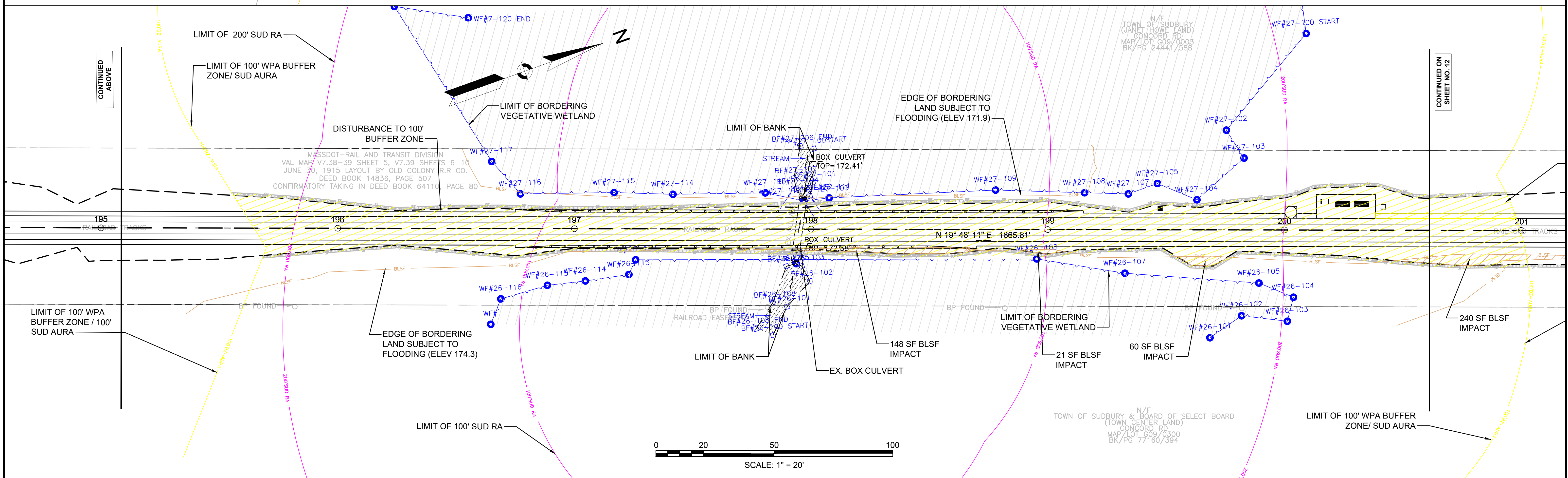
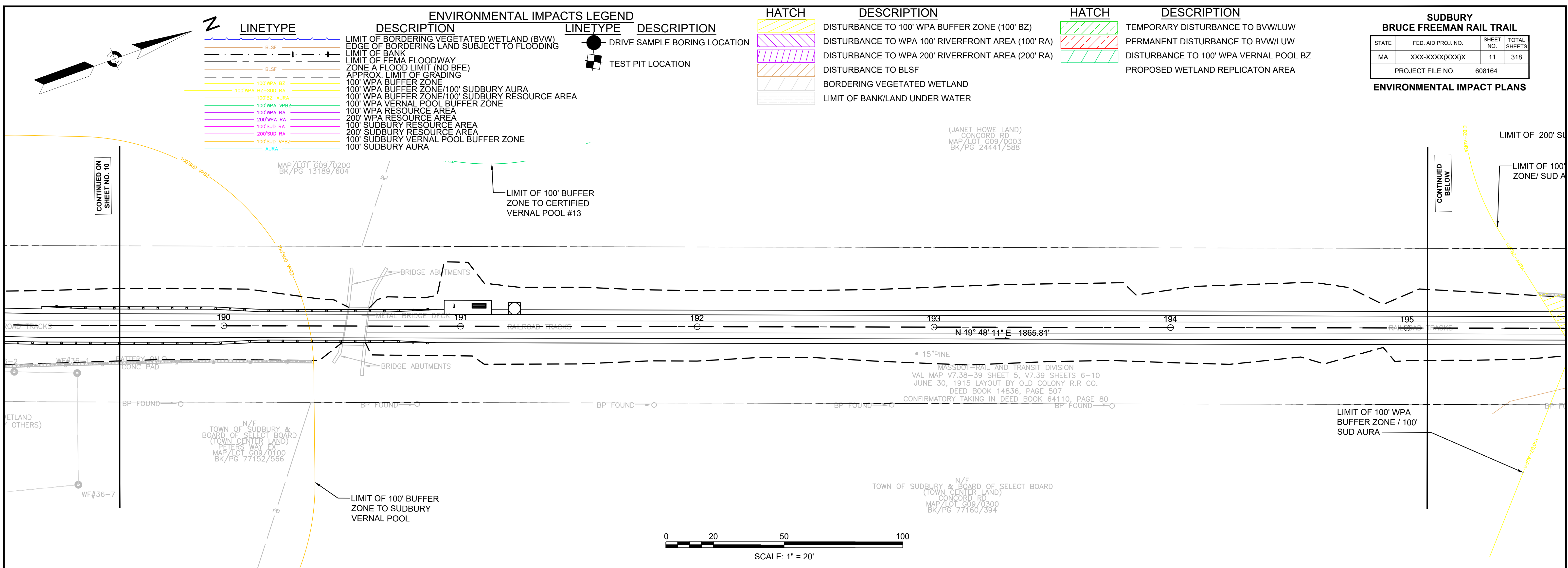
ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LW
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LW
(Symbol)	LIMIT OF BANK	(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	LIMIT OF FEMA FLOODWAY	(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	ZONE A FLOOD LIMIT (NO BFE)	(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	APPROX. LIMIT OF GRADING	(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BUFFER ZONE				
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA				
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE				
(Symbol)	100' WPA RESOURCE AREA				
(Symbol)	200' WPA RESOURCE AREA				
(Symbol)	100' SUDBURY RESOURCE AREA				
(Symbol)	200' SUDBURY RESOURCE AREA				
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE				
(Symbol)	100' SUDBURY AURA				



SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	11	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	LIMIT OF BANK	(Symbol)		(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)			(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	APPROX. LIMIT OF GRADING			(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	100' WPA BUFFER ZONE			(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA						
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA						
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE						
(Symbol)	100' WPA RESOURCE AREA						
(Symbol)	200' WPA RESOURCE AREA						
(Symbol)	100' SUDBURY RESOURCE AREA						
(Symbol)	200' SUDBURY RESOURCE AREA						
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE						
(Symbol)	100' SUDBURY AURA						

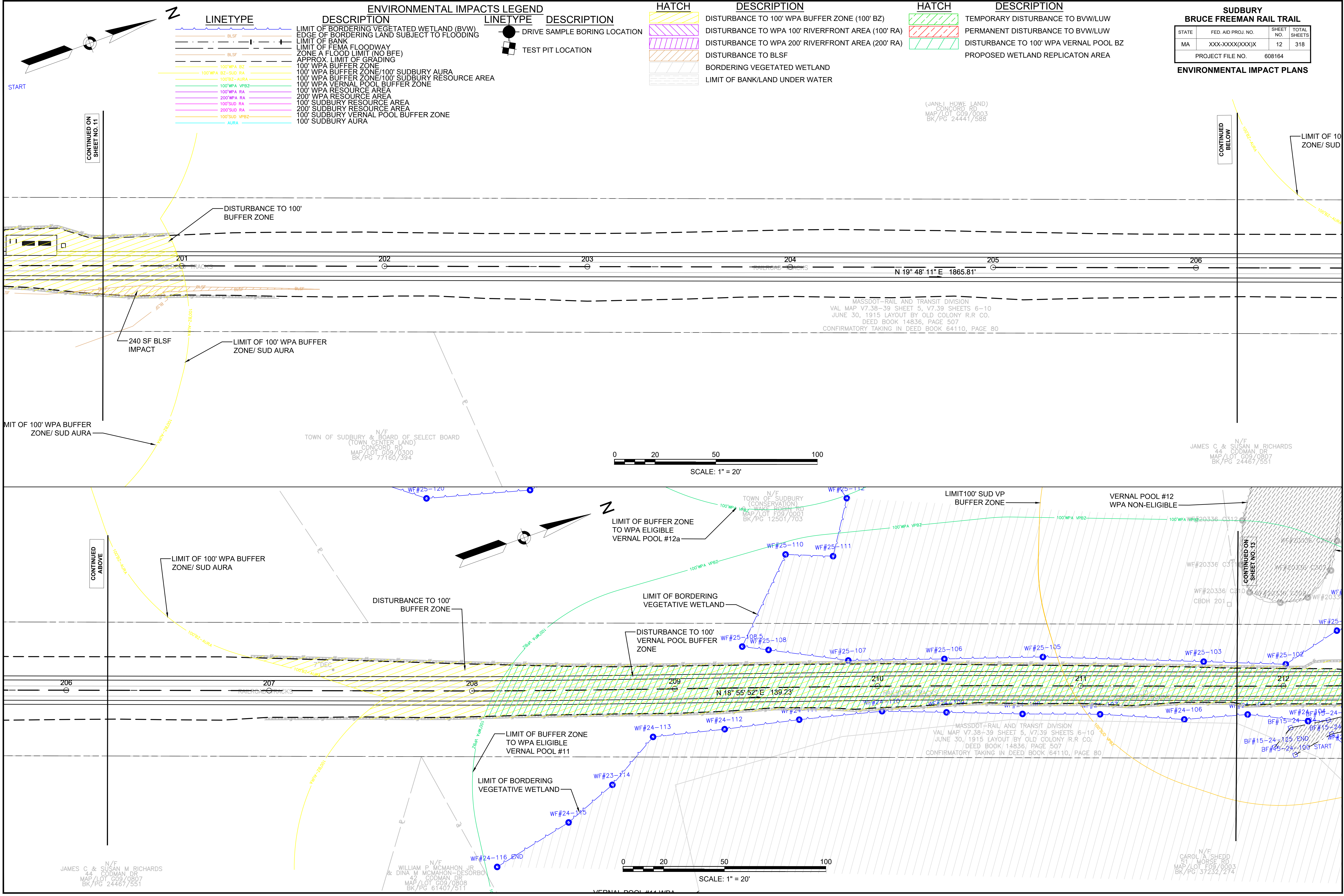


SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	12	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)		TEMPORARY DISTURBANCE TO BVW/LWU
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)		PERMANENT DISTURBANCE TO BVW/LWU
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)		DISTURBANCE TO 100' WPA VERNAL POOL BZ
	APPROX. LIMIT OF GRADING		DISTURBANCE TO BLSF		PROPOSED WETLAND REPLICATON AREA
	100' WPA BUFFER ZONE		BORDERING VEGETATED WETLAND		
	100' WPA BZ-SUD-RA		LIMIT OF BANK/LAND UNDER WATER		
	100' BZ-AURA				
	100' WPA VPBZ				
	100' WPA RA				
	200' WPA RA				
	100' SUD RA				
	200' SUD RA				
	100' SUD VPBZ				
	AURA				
	DRIVE SAMPLE BORING LOCATION				
	TEST PIT LOCATION				

(JANEI HOWE LAND)
CONCORD RD
MAP/LOT G99/0003
BK/PG 24441/588



CONTINUED ON
SHEET NO. 11

CONTINUED
BELOW

LIMIT OF 10
ZONE/ SUD

0 20 50 100
SCALE: 1" = 20'

0 20 50 100
SCALE: 1" = 20'

CONTINUED ON
SHEET NO. 13

CONTINUED ON
SHEET NO. 14

CONTINUED ON
SHEET NO. 15

CONTINUED ON
SHEET NO. 16

CONTINUED ABOVE

JAMES C & SUSAN M RICHARDS
44 CODMAN DR
MAP/LOT G08/0807
BK/PG 24467/551

WILLIAM P MCMAHON JR
& DINA M MCMAHON-DESORBO
42 CODMAN DR
MAP/LOT G09/0808
BK/PG 61407/511

N/F
CAROL A SHEDD
51 MORSE RD
MAP/LOT F09/0003
BK/PG 37232/274

MASSDOT-RAIL AND TRANSIT DIVISION
VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
JUNE 30, 1915 LAYOUT BY OLD COLONY R.R CO.
DEED BOOK 14836, PAGE 507
CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80

N/F
TOWN OF SUDBURY
(CONSERVATION)
WPA-MADE RIGHT TO
MAP/LOT F09/0001
BK/PG 12501/703

N/F
TOWN OF SUDBURY & BOARD OF SELECT BOARD
(TOWN CENTER LAND)
CONCORD RD
MAP/LOT G09/0300
BK/PG 77160/394

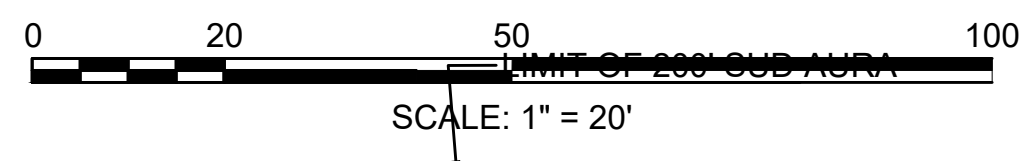
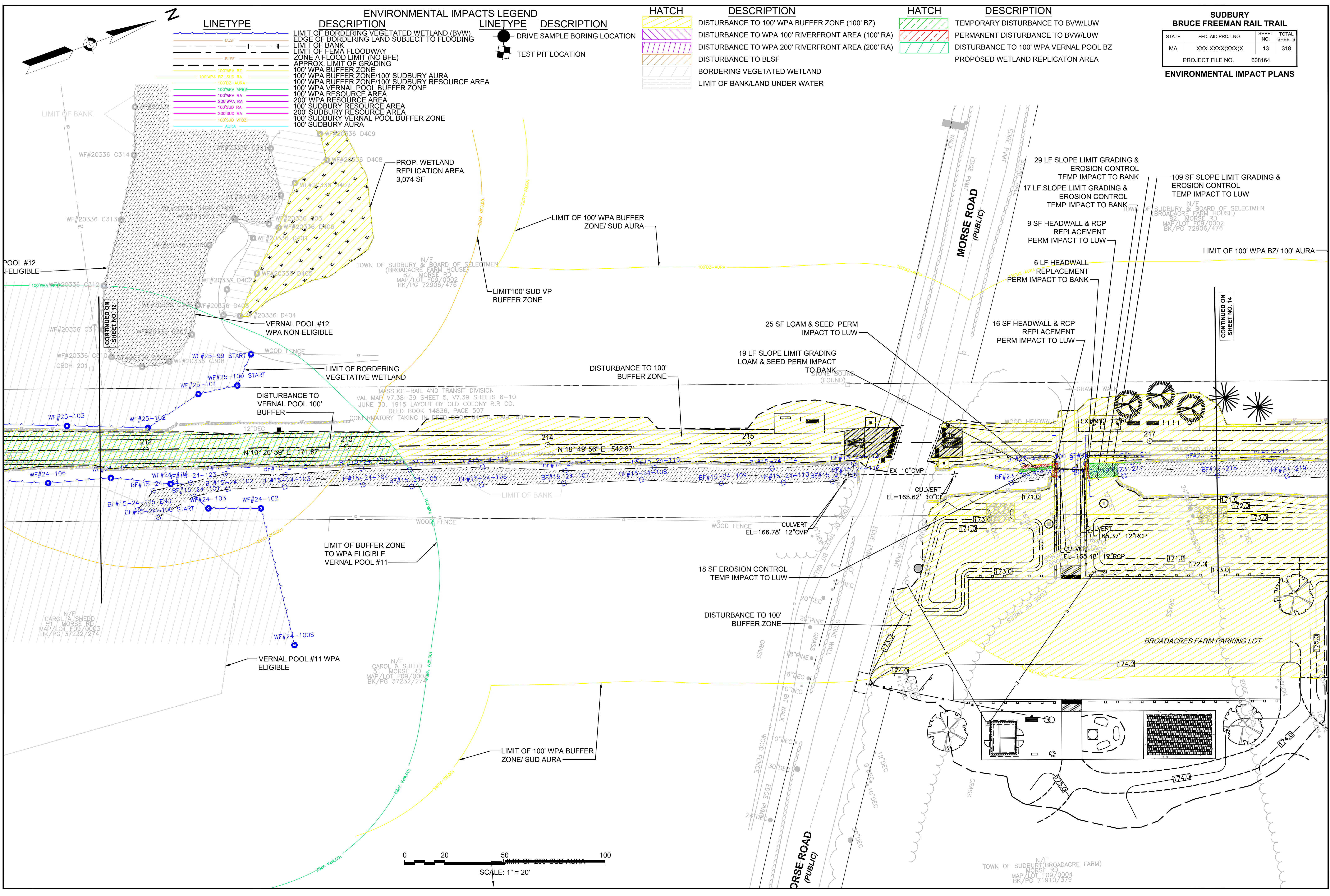
N/F
JAMES C & SUSAN M RICHARDS
44 CODMAN DR
MAP/LOT G08/0807
BK/PG 24467/551

BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	13	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION
(Symbol)	LIMIT OF BANK		
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		
(Symbol)	APPROX. LIMIT OF GRADING		
(Symbol)	100' WPA BUFFER ZONE		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE		
(Symbol)	100' WPA RESOURCE AREA		
(Symbol)	200' WPA RESOURCE AREA		
(Symbol)	100' SUDBURY RESOURCE AREA		
(Symbol)	200' SUDBURY RESOURCE AREA		
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE		
(Symbol)	100' SUDBURY AURA		

HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATION AREA
(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	LIMIT OF BANK/LAND UNDER WATER		



CONTINUED ON SHEET NO. 12

CONTINUED ON SHEET NO. 14

N/F
TOWN OF SUDBURY (BROADACRE FARM)
MORSE RD
MAP/LOT F09/0004
BK/PG 71910/379

N/F
CAROL A SHEDD
51 MORSE RD
MAP/LOT F09/0003
BK/PG 37232/274

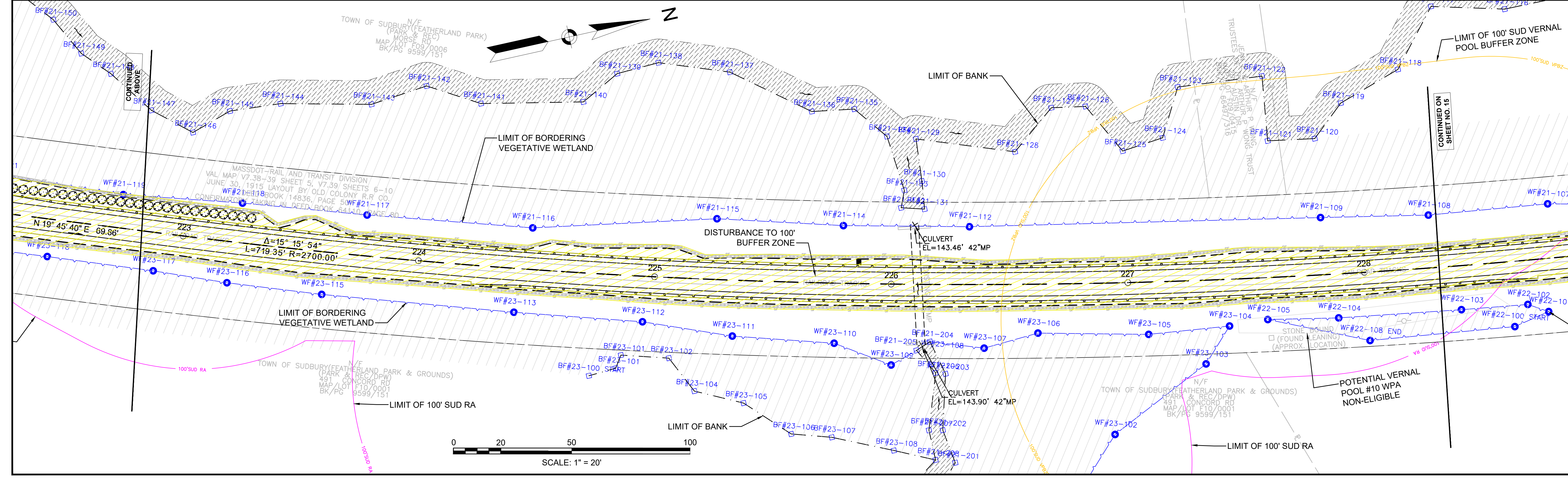
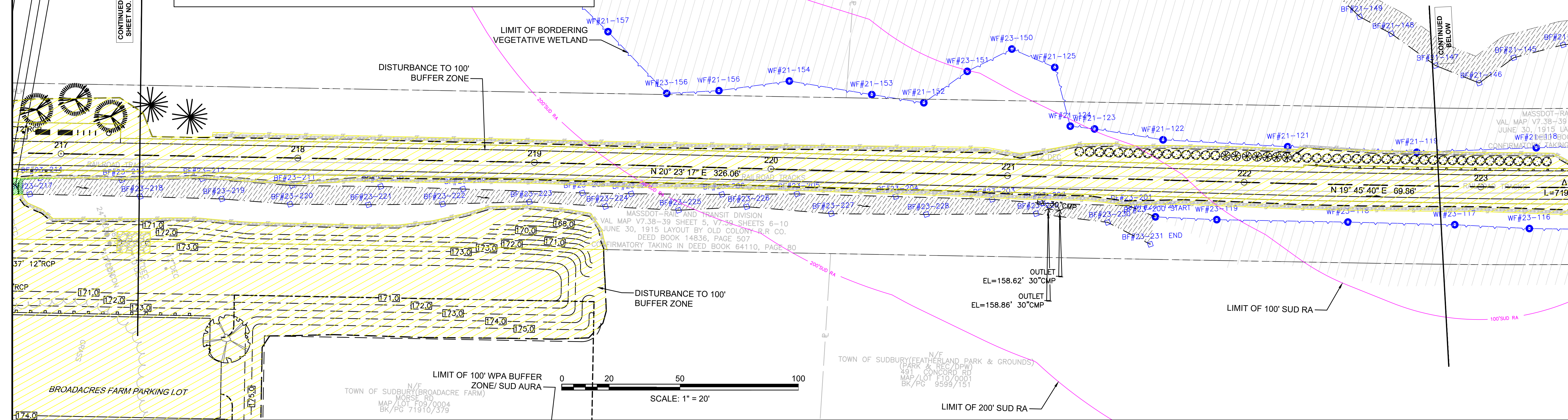
N/F
CAROL A SHEDD
51 MORSE RD
MAP/LOT F09/0004
BK/PG 72906/476

N/F
SUDBURY & BOARD OF SELECTMEN
(BROADACRE FARM HOUSE)
82 MORSE RD
MAP/LOT F09/0002
BK/PG 72906/476

MASSDOT—RAIL AND TRANSIT DIVISION
VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
DEED BOOK 14836, PAGE 507
CONFORMATORY TAKING IN DEED BOOK 14836, PAGE 507

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	14	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACTS LEGEND		HATCH		DESCRIPTION	
	DESCRIPTION		DESCRIPTION		DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)		TEMPORARY DISTURBANCE TO BVW/LW
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)		PERMANENT DISTURBANCE TO BVW/LW
	LIMIT OF BANK		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)		DISTURBANCE TO 100' WPA VERNAL POOL BZ
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		DISTURBANCE TO BLSF		PROPOSED WETLAND REPLICATON AREA
	APPROX. LIMIT OF GRADING		BORDERING VEGETATED WETLAND		
	100' WPA BUFFER ZONE		LIMIT OF BANK/LAND UNDER WATER		
	100' WPA BUFFER ZONE/100' SUDBURY AURA				
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
	100' WPA VERNAL POOL BUFFER ZONE				
	100' WPA RESOURCE AREA				
	200' WPA RESOURCE AREA				
	100' SUDBURY RESOURCE AREA				
	200' SUDBURY RESOURCE AREA				
	100' SUDBURY VERNAL POOL BUFFER ZONE				
	100' SUDBURY AURA				
	DRIVE SAMPLE BORING LOCATION				
	TEST PIT LOCATION				



CONTINUED ON SHEET NO. 13

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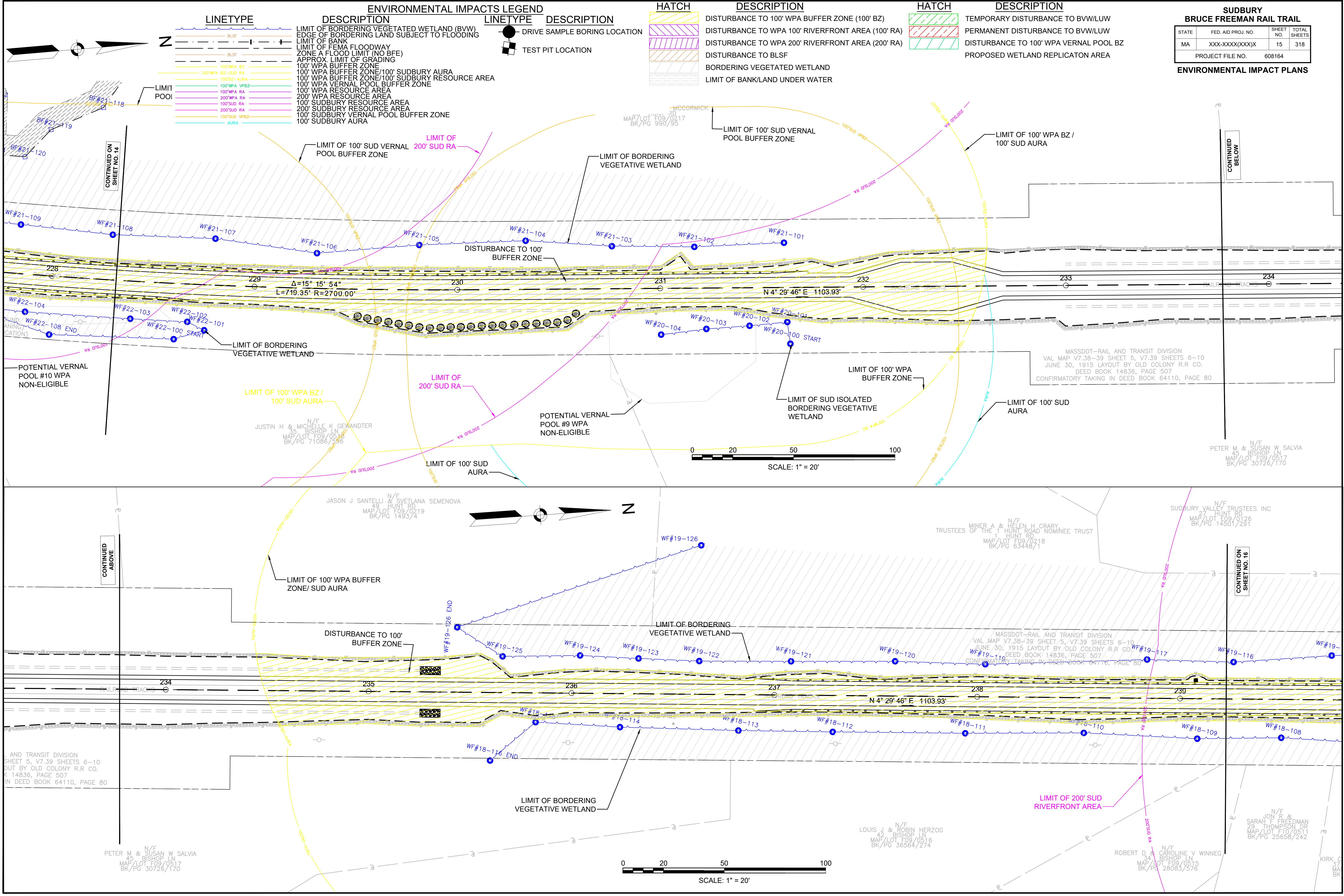
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CONTINUED ON SHEET NO. 15

BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	15	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LWU
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LWU
(Symbol)	LIMIT OF BANK			(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)			(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	APPROX. LIMIT OF GRADING			(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	100' WPA BUFFER ZONE			(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BZ-SUD RA						
(Symbol)	100' BZ-AURA						
(Symbol)	100' WPA VPBZ						
(Symbol)	100' WPA RA						
(Symbol)	200' WPA RA						
(Symbol)	100' SUD RA						
(Symbol)	200' SUD RA						
(Symbol)	100' SUD VPBZ						
(Symbol)	AURA						



CONTINUED ON SHEET NO. 14

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CONTINUED ON SHEET NO. 16

AND TRANSIT DIVISION
SHEET 5, V7.39 SHEETS 6-10
OUT BY OLD COLONY R.R. CO.
K 14836, PAGE 507
IN DEED BOOK 64110, PAGE 80

MASSDOT-RAIL AND TRANSIT DIVISION
VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
DEED BOOK 14836, PAGE 507
CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80

PETER M. & SUSAN W. SALVIA
45 BISHOP LN
MAP/LOT F09/0517
BK/PG 30726/170

LOUIS J. & ROBIN HERZOG
42 BISHOP LN
MAP/LOT F09/0516
BK/PG 36564/274

ROBERT D. & CAROLINE V. WINNEG
34 BISHOP LN
MAP/LOT F09/0515
BK/PG 28083/576

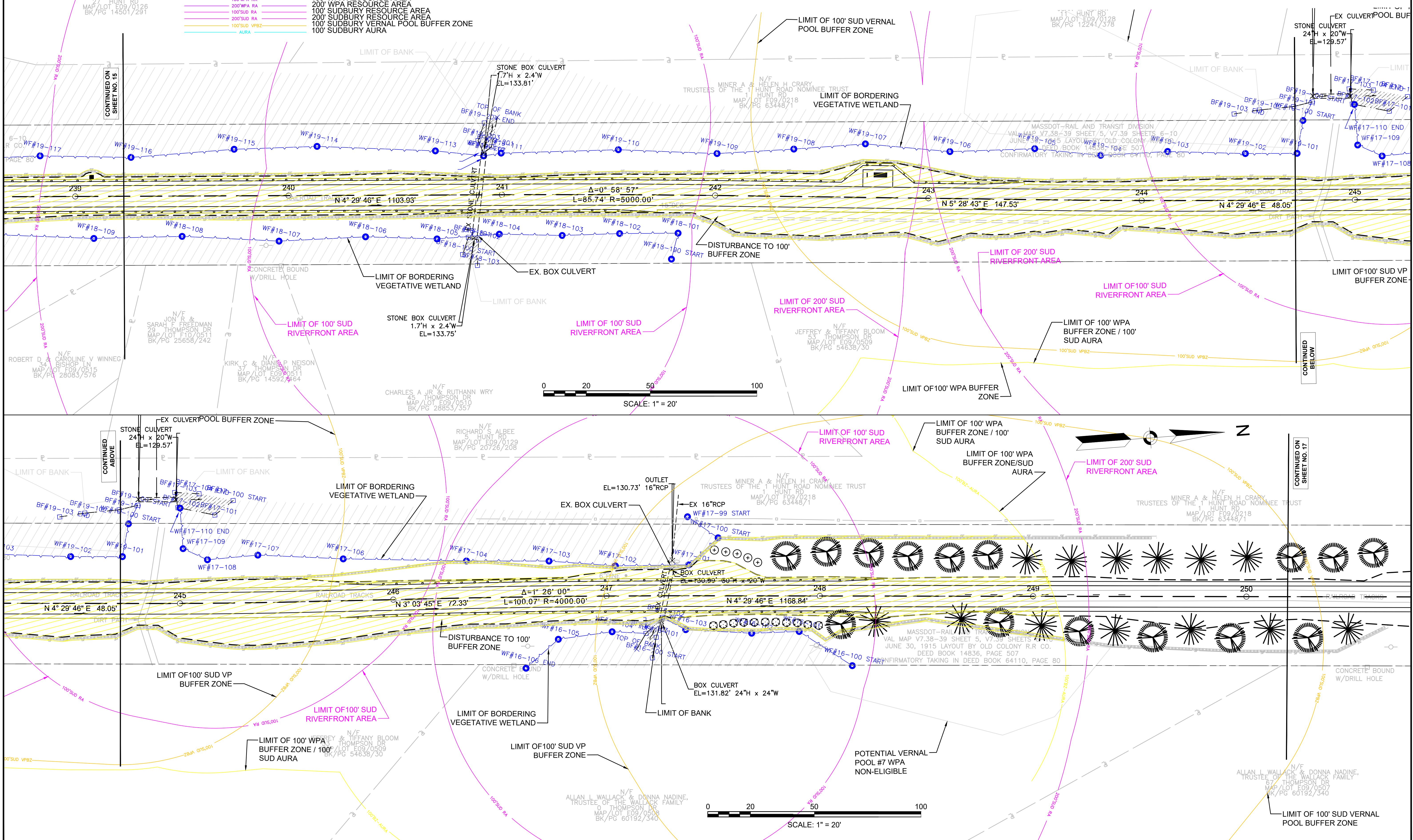
N/F
JON R. &
SARAH F. FRIEDMAN
29 THOMPSON DR
MAP/LOT F10/0511
BK/PG 25658/242

KIRK C.
37 MA
BK

ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION		DESCRIPTION		DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)		TEMPORARY DISTURBANCE TO BVW/LW
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)		PERMANENT DISTURBANCE TO BVW/LW
	LIMIT OF BANK		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)		DISTURBANCE TO 100' WPA VERNAL POOL BZ
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		DISTURBANCE TO BLSF		PROPOSED WETLAND REPLICATION AREA
	APPROX. LIMIT OF GRADING		BORDERING VEGETATED WETLAND		
	100' WPA BUFFER ZONE		LIMIT OF BANK/LAND UNDER WATER		
	100' WPA BUFFER ZONE/100' SUDBURY AURA				
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
	100' WPA VERNAL POOL BUFFER ZONE				
	100' WPA RESOURCE AREA				
	200' WPA RESOURCE AREA				
	100' SUDBURY RESOURCE AREA				
	200' SUDBURY RESOURCE AREA				
	100' SUDBURY VERNAL POOL BUFFER ZONE				
	100' SUDBURY AURA				

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	16	318
PROJECT FILE NO.		608164	

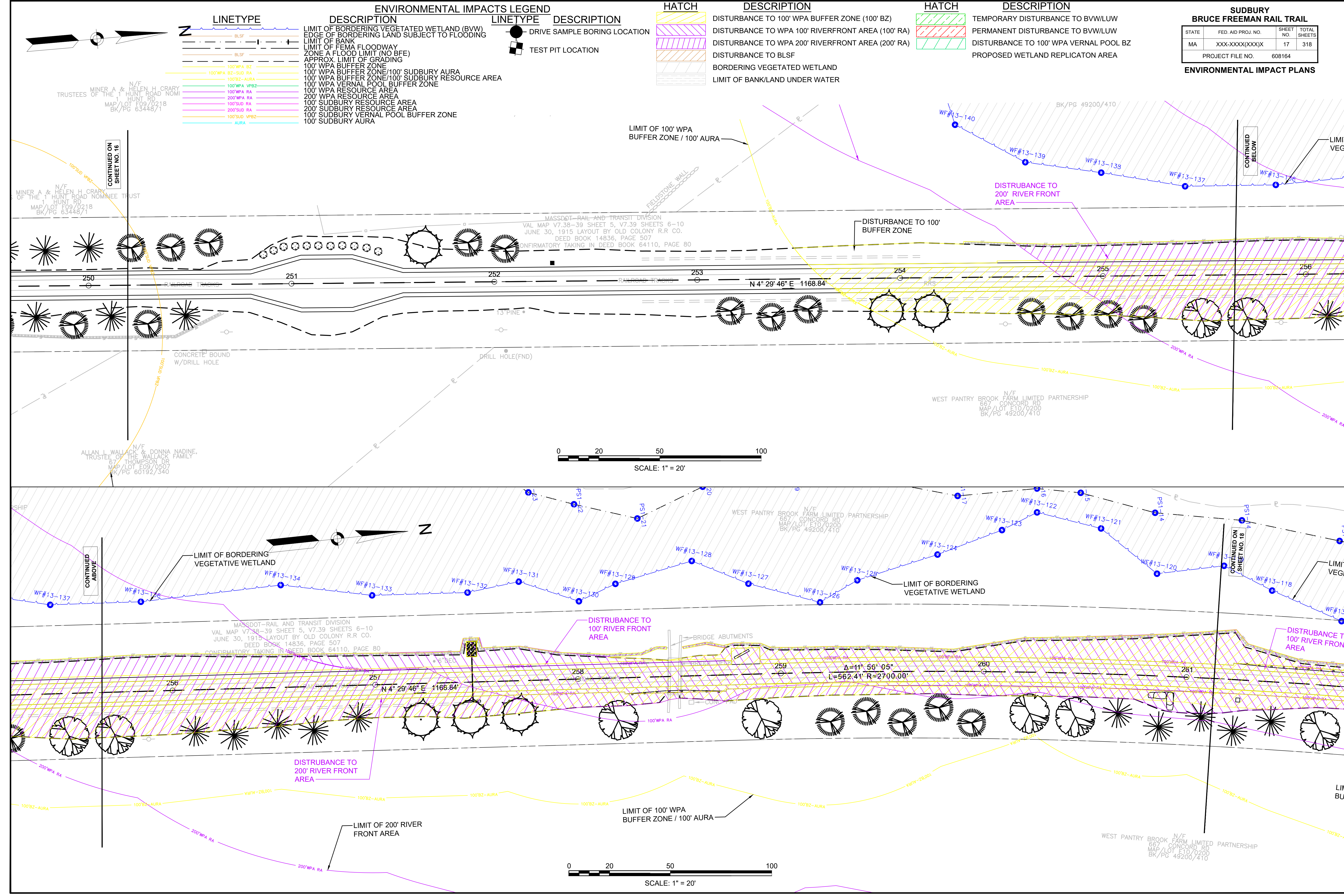
ENVIRONMENTAL IMPACT PLANS



SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	17	318
PROJECT FILE NO.		608164	

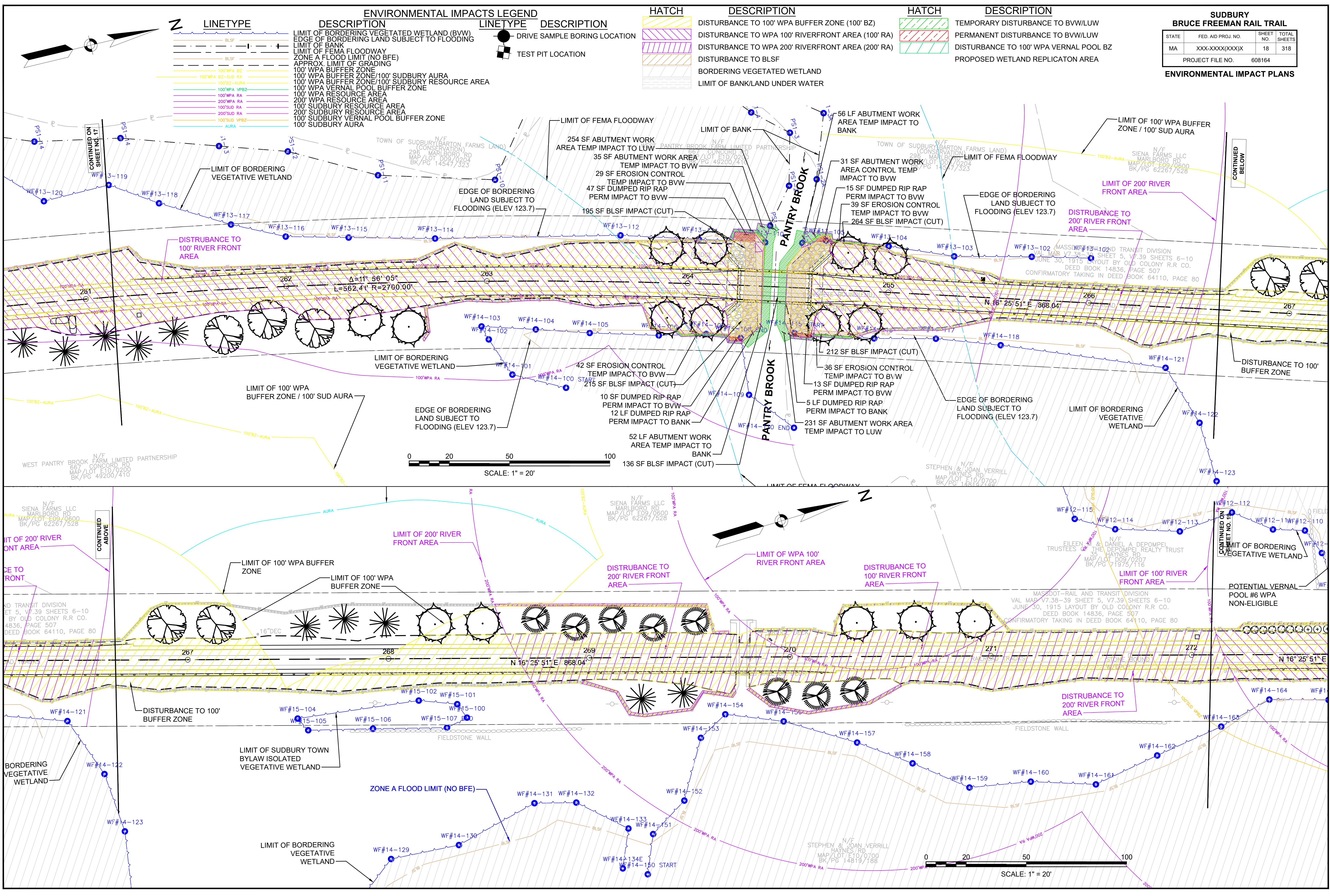
ENVIRONMENTAL IMPACT PLANS

ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION		DESCRIPTION		DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)		TEMPORARY DISTURBANCE TO BVW/LW
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)		PERMANENT DISTURBANCE TO BVW/LW
	LIMIT OF BANK		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)		DISTURBANCE TO 100' WPA VERNAL POOL BZ
	LIMIT OF FEMA FLOODWAY		DISTURBANCE TO BLSF		PROPOSED WETLAND REPLICATON AREA
	ZONE A FLOOD LIMIT (NO BFE)		BORDERING VEGETATED WETLAND		
	APPROX. LIMIT OF GRADING		LIMIT OF BANK/LAND UNDER WATER		
	100' WPA BUFFER ZONE				
	100' WPA BUFFER ZONE/100' SUDBURY AURA				
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
	100' WPA VERNAL POOL BUFFER ZONE				
	100' WPA RESOURCE AREA				
	200' WPA RESOURCE AREA				
	100' SUDBURY RESOURCE AREA				
	200' SUDBURY RESOURCE AREA				
	100' SUDBURY VERNAL POOL BUFFER ZONE				
	100' SUDBURY AURA				



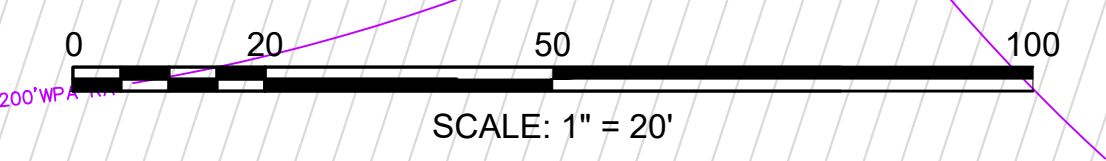
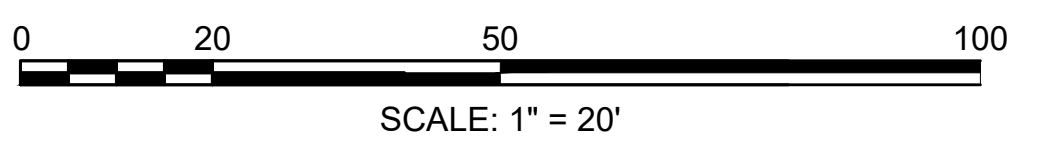
BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	18	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS



LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION
(Symbol)	LIMIT OF BANK		
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		
(Symbol)	APPROX. LIMIT OF GRADING		
(Symbol)	100' WPA BUFFER ZONE		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE		
(Symbol)	100' WPA RESOURCE AREA		
(Symbol)	200' WPA RESOURCE AREA		
(Symbol)	100' SUDBURY RESOURCE AREA		
(Symbol)	200' SUDBURY RESOURCE AREA		
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE		
(Symbol)	100' SUDBURY AURA		

HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATION AREA
(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	LIMIT OF BANK/LAND UNDER WATER		

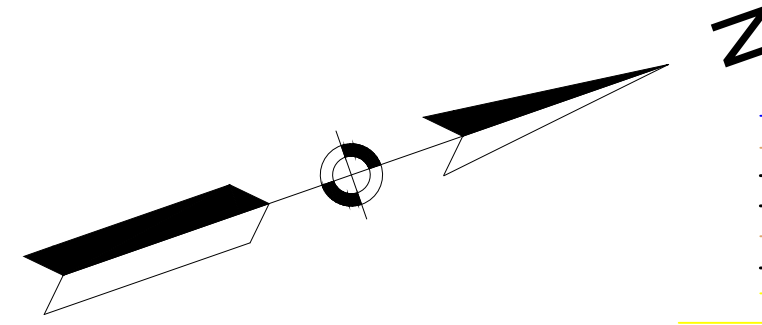


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CONTINUED ON SHEET NO. 19

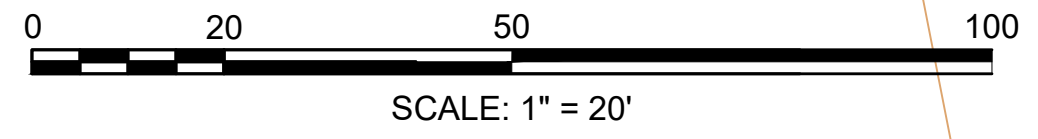
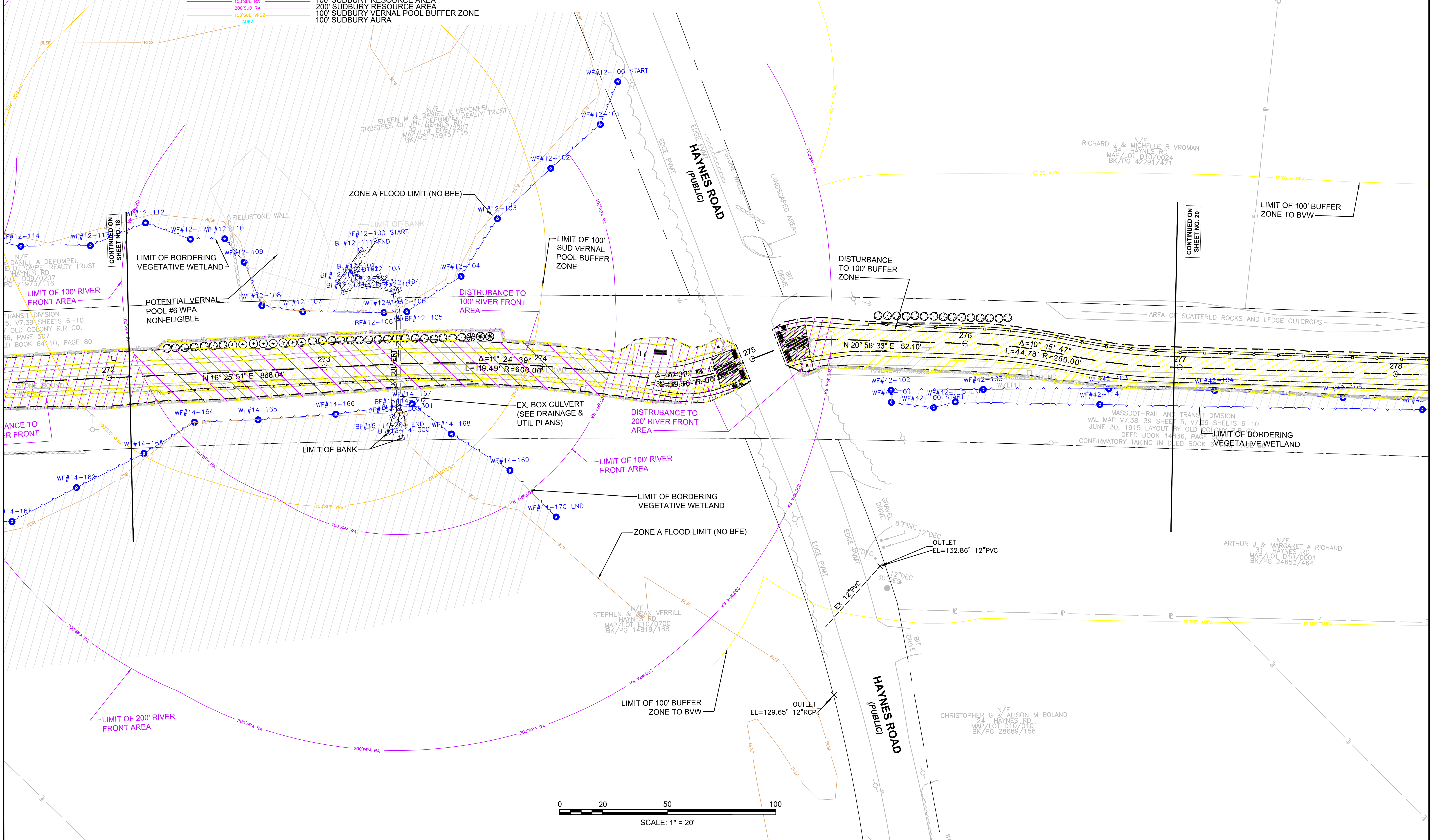


LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
(Symbol: Dashed line with dots)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol: Circle with crosshair)	DRIVE SAMPLE BORING LOCATION
(Symbol: Dashed line)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol: Square with crosshair)	TEST PIT LOCATION
(Symbol: Dashed line with dots)	LIMIT OF FEMA FLOODWAY		
(Symbol: Dashed line with dots)	ZONE A FLOOD LIMIT (NO BFE)		
(Symbol: Dashed line)	APPROX. LIMIT OF GRADING		
(Symbol: Solid line)	100' WPA BUFFER ZONE		
(Symbol: Solid line)	100' WPA BUFFER ZONE/100' SUDBURY AURA		
(Symbol: Solid line)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
(Symbol: Solid line)	100' WPA VERNAL POOL BUFFER ZONE		
(Symbol: Solid line)	100' WPA RESOURCE AREA		
(Symbol: Solid line)	200' WPA RESOURCE AREA		
(Symbol: Solid line)	100' SUDBURY RESOURCE AREA		
(Symbol: Solid line)	200' SUDBURY RESOURCE AREA		
(Symbol: Solid line)	100' SUDBURY VERNAL POOL BUFFER ZONE		
(Symbol: Solid line)	100' SUDBURY AURA		

HATCH	DESCRIPTION
(Symbol: Yellow diagonal lines)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
(Symbol: Purple diagonal lines)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
(Symbol: Blue diagonal lines)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
(Symbol: Orange diagonal lines)	DISTURBANCE TO BLSF
(Symbol: Green diagonal lines)	BORDERING VEGETATED WETLAND
(Symbol: White background)	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
(Symbol: Green diagonal lines)	TEMPORARY DISTURBANCE TO BVW/LW
(Symbol: Red diagonal lines)	PERMANENT DISTURBANCE TO BVW/LW
(Symbol: Blue diagonal lines)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol: White background)	PROPOSED WETLAND REPLICATON AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	19	318
PROJECT FILE NO.		608164	
ENVIRONMENTAL IMPACT PLANS			



CONTINUED ON SHEET NO. 18

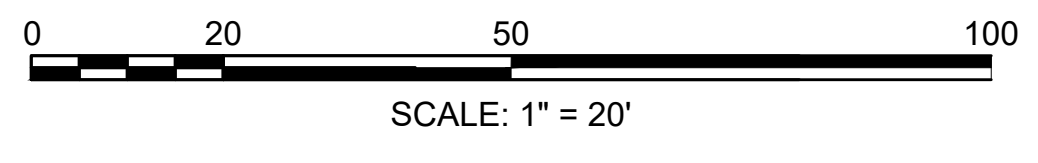
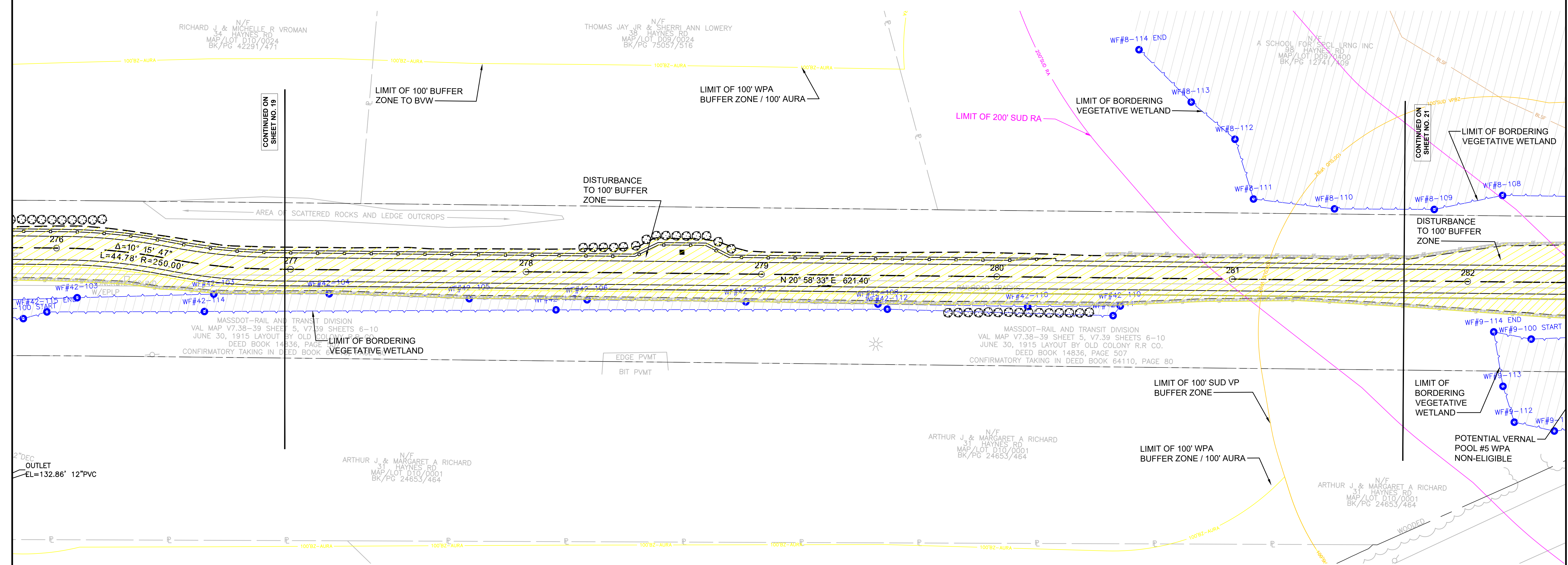
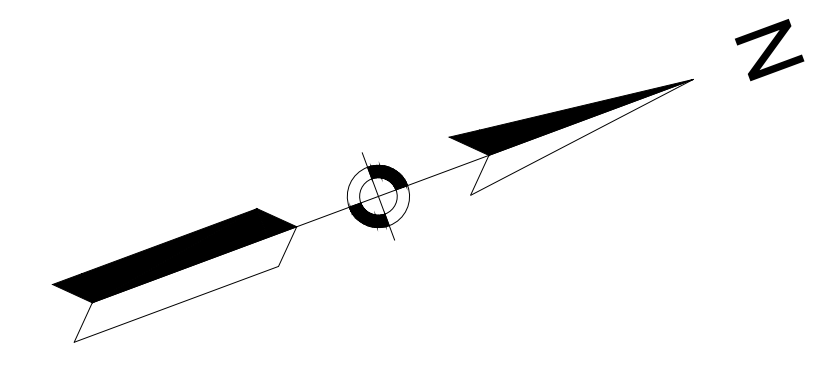
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ENVIRONMENTAL IMPACTS LEGEND	
LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)
	EDGE OF BORDERING LAND SUBJECT TO FLOODING
	LIMIT OF BANK
	LIMIT OF FEMA FLOODWAY
	ZONE A FLOOD LIMIT (NO BFE)
	APPROX. LIMIT OF GRADING
	100' WPA BUFFER ZONE
	100' WPA BUFFER ZONE/100' SUDBURY AURA
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA
	100' WPA VERNAL POOL BUFFER ZONE
	100' WPA RESOURCE AREA
	200' WPA RESOURCE AREA
	100' SUDBURY RESOURCE AREA
	200' SUDBURY RESOURCE AREA
	100' SUDBURY VERNAL POOL BUFFER ZONE
	100' SUDBURY AURA

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LUW
	PERMANENT DISTURBANCE TO BVW/LUW
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	20	318
PROJECT FILE NO.		608164	
ENVIRONMENTAL IMPACT PLANS			



CONTINUED ON
SHEET NO. 19

CONTINUED ON
SHEET NO. 21

2" DEC
OUTLET
EL=132.86' 12" PVC

POTENTIAL VERNAL
POOL #5 WPA
NON-ELIGIBLE

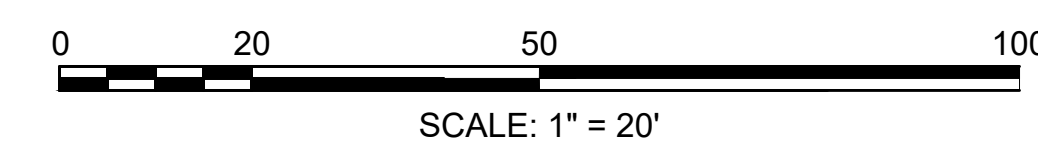
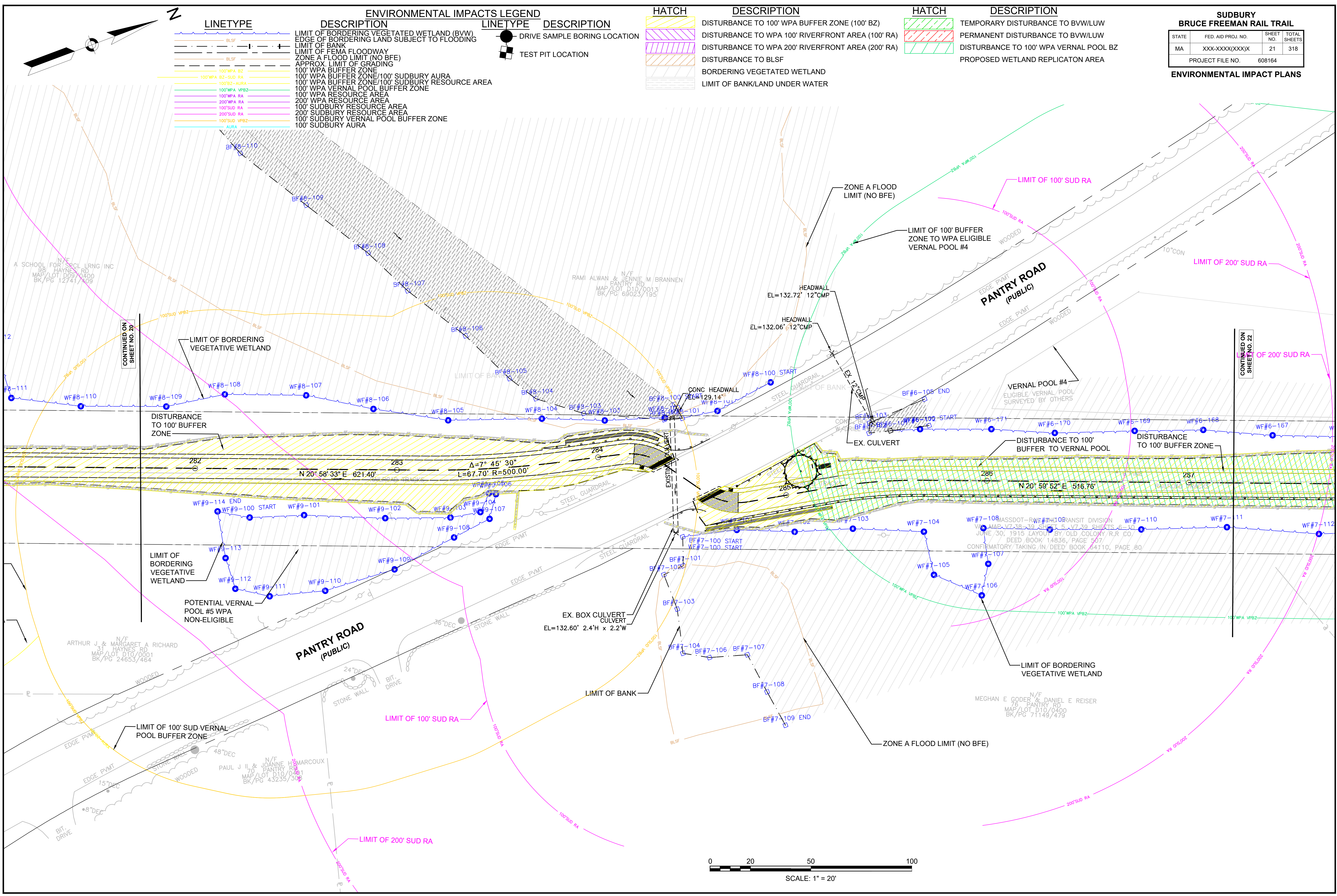
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	21	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DRIVE SAMPLE BORING LOCATION
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		TEST PIT LOCATION
	LIMIT OF FEMA FLOODWAY		
	ZONE A FLOOD LIMIT (NO BFE)		
	APPROX. LIMIT OF GRADING		
	100' WPA BUFFER ZONE		
	100' WPA BUFFER ZONE/100' SUDBURY AURA		
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
	100' WPA VERNAL POOL BUFFER ZONE		
	100' WPA RESOURCE AREA		
	200' WPA RESOURCE AREA		
	100' SUDBURY RESOURCE AREA		
	200' SUDBURY RESOURCE AREA		
	100' SUDBURY VERNAL POOL BUFFER ZONE		
	100' SUDBURY AURA		

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LWU
	PERMANENT DISTURBANCE TO BVW/LWU
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA



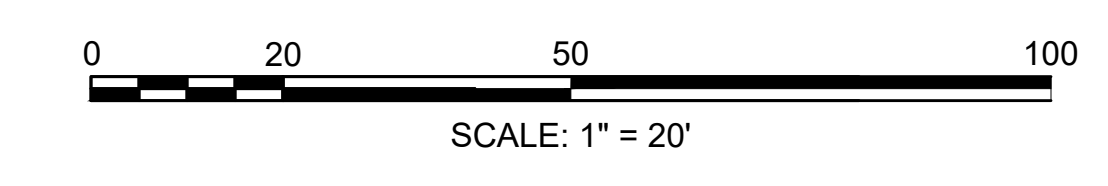
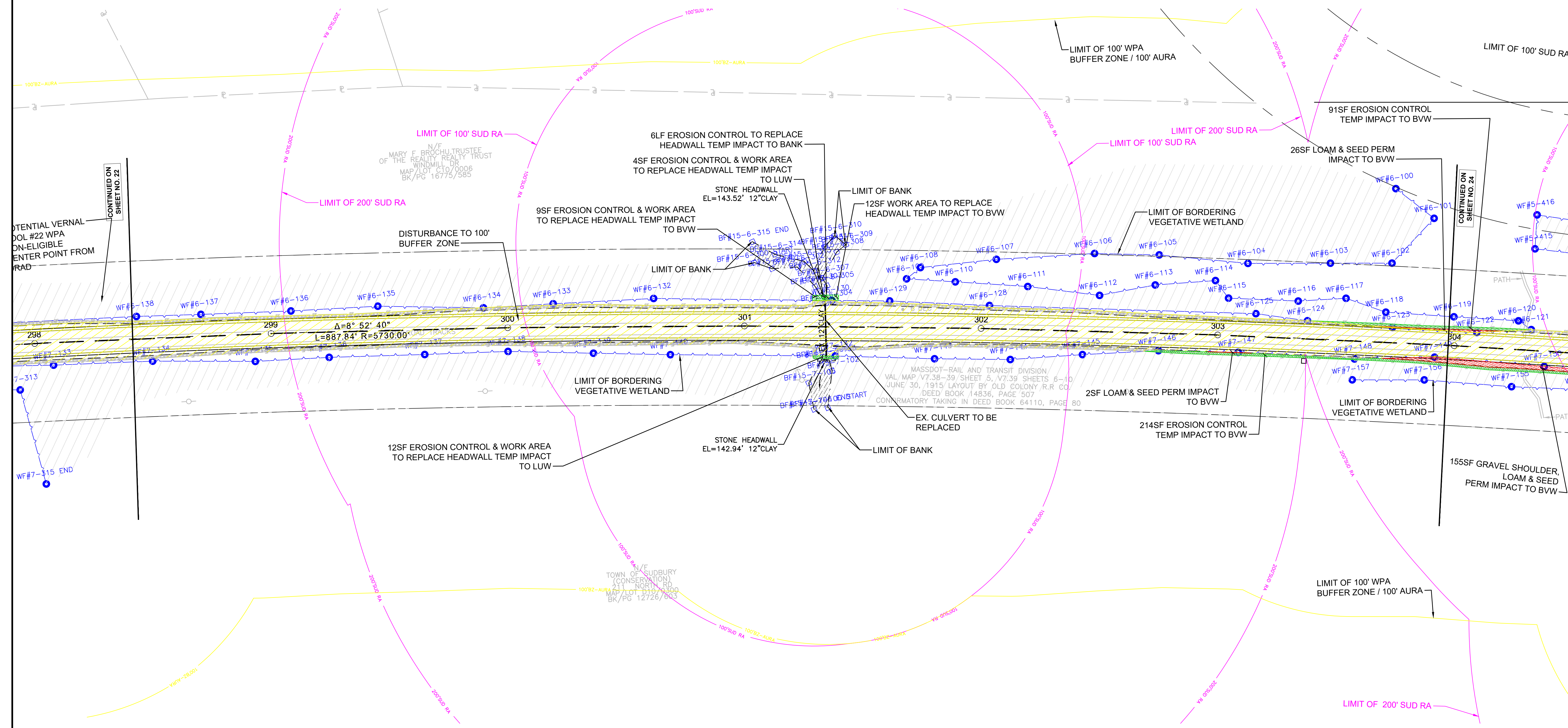
CONTINUED ON SHEET NO. 20

CONTINUED ON SHEET NO. 22

BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	23	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION	HATCH	DESCRIPTION	HATCH	DESCRIPTION
(Symbol)	LIMIT OF BORDERING VEGETATED WETLAND (BVW)	(Symbol)	DRIVE SAMPLE BORING LOCATION	(Symbol)	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)	(Symbol)	TEMPORARY DISTURBANCE TO BVW/LUW
(Symbol)	EDGE OF BORDERING LAND SUBJECT TO FLOODING	(Symbol)	TEST PIT LOCATION	(Symbol)	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)	(Symbol)	PERMANENT DISTURBANCE TO BVW/LUW
(Symbol)	LIMIT OF BANK			(Symbol)	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)	(Symbol)	DISTURBANCE TO 100' WPA VERNAL POOL BZ
(Symbol)	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)			(Symbol)	DISTURBANCE TO BLSF	(Symbol)	PROPOSED WETLAND REPLICATON AREA
(Symbol)	APPROX. LIMIT OF GRADING			(Symbol)	BORDERING VEGETATED WETLAND		
(Symbol)	100' WPA BUFFER ZONE			(Symbol)	LIMIT OF BANK/LAND UNDER WATER		
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY AURA						
(Symbol)	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA						
(Symbol)	100' WPA VERNAL POOL BUFFER ZONE						
(Symbol)	100' WPA RESOURCE AREA						
(Symbol)	200' WPA RESOURCE AREA						
(Symbol)	100' SUDBURY RESOURCE AREA						
(Symbol)	200' SUDBURY RESOURCE AREA						
(Symbol)	100' SUDBURY VERNAL POOL BUFFER ZONE						
(Symbol)	100' SUDBURY AURA						



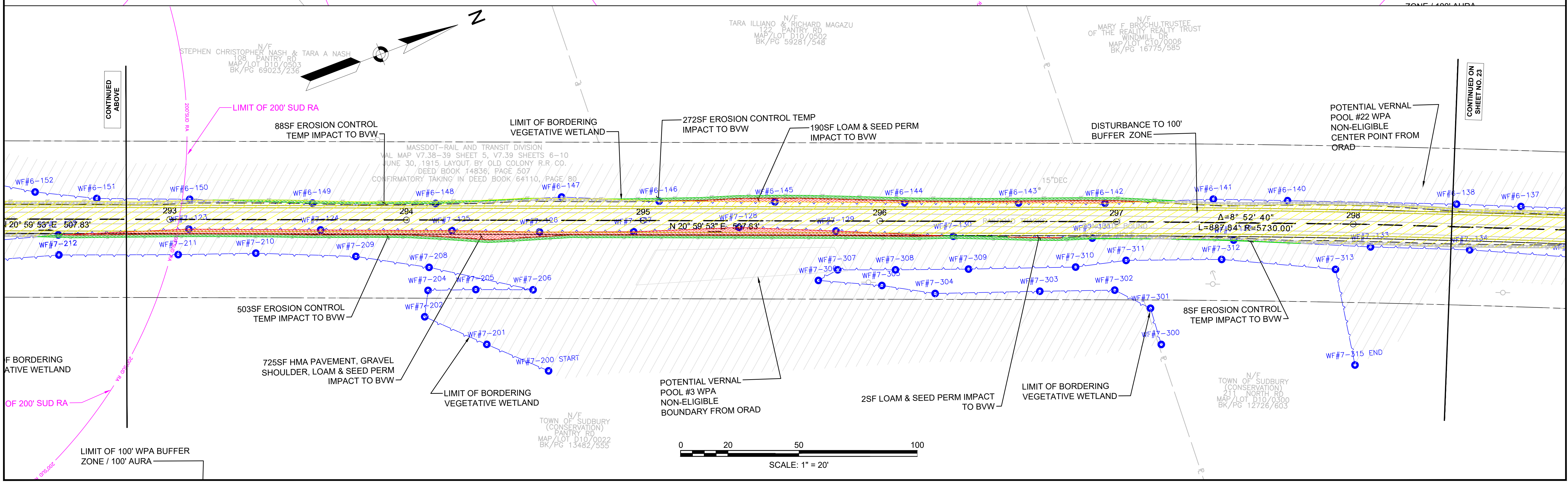
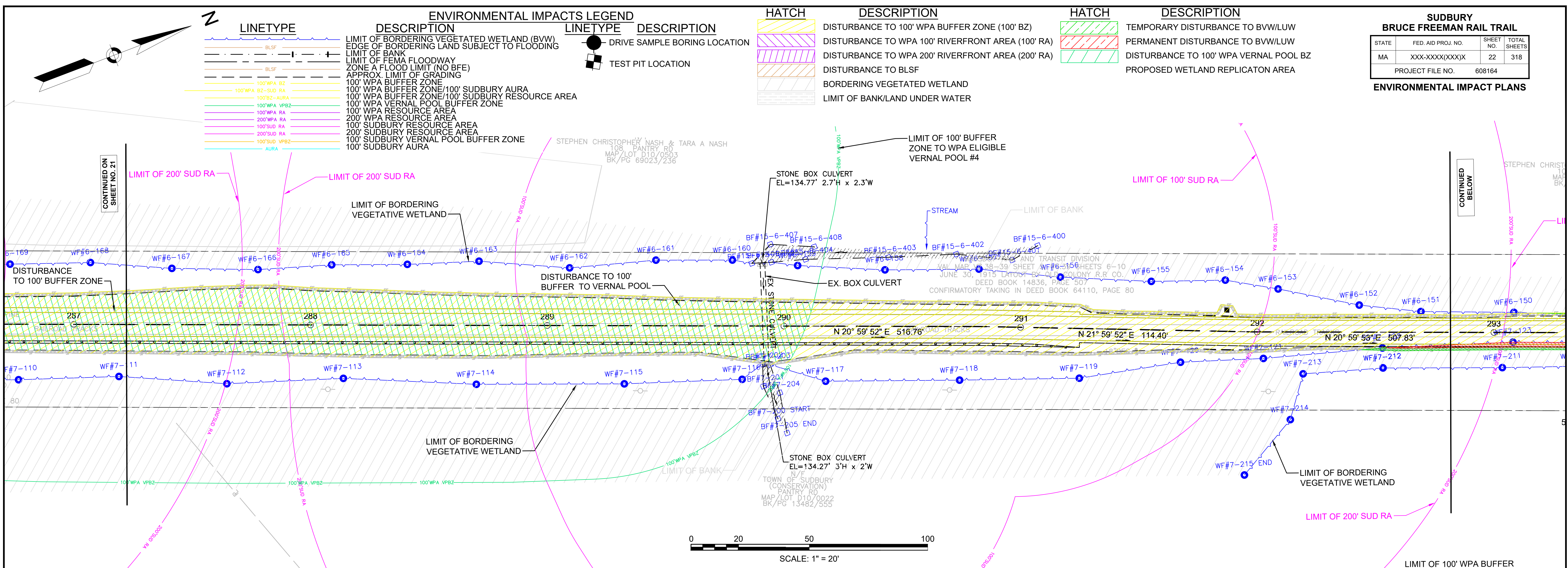
CONTINUED ON SHEET NO. 22

CONTINUED ON SHEET NO. 24

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	22	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION		DESCRIPTION		DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)		TEMPORARY DISTURBANCE TO BVW/LW
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)		PERMANENT DISTURBANCE TO BVW/LW
	LIMIT OF BANK		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)		DISTURBANCE TO 100' WPA VERNAL POOL BZ
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		DISTURBANCE TO BLSF		PROPOSED WETLAND REPLICATON AREA
	APPROX. LIMIT OF GRADING		BORDERING VEGETATED WETLAND		
	100' WPA BUFFER ZONE		LIMIT OF BANK/LAND UNDER WATER		
	100' WPA BUFFER ZONE/100' SUDBURY AURA				
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
	100' WPA VERNAL POOL BUFFER ZONE				
	100' WPA RESOURCE AREA				
	200' WPA RESOURCE AREA				
	100' SUDBURY RESOURCE AREA				
	200' SUDBURY RESOURCE AREA				
	100' SUDBURY VERNAL POOL BUFFER ZONE				
	100' SUDBURY AURA				

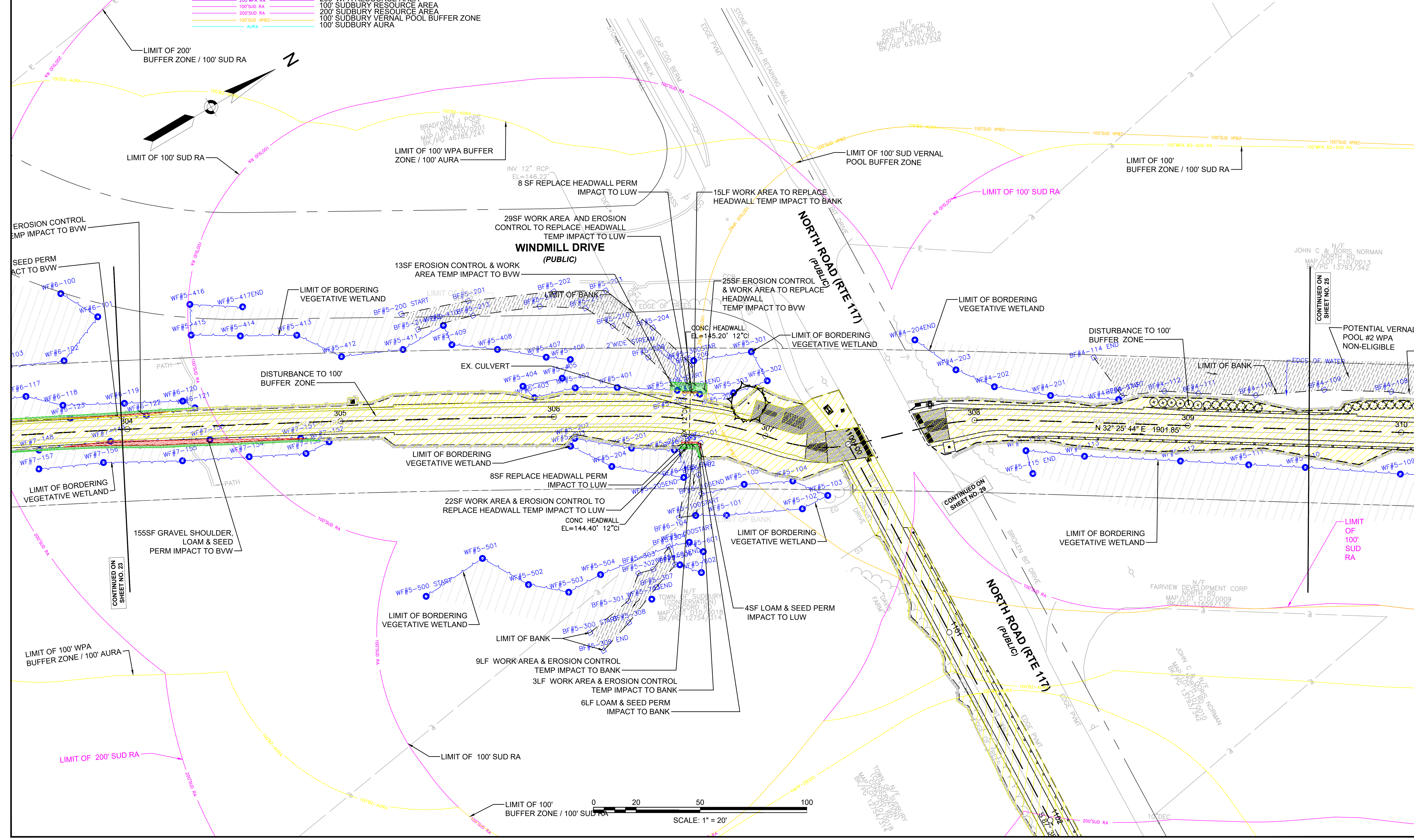


ENVIRONMENTAL IMPACTS LEGEND	
LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)
	EDGE OF BORDERING LAND SUBJECT TO FLOODING
	LIMIT OF BANK
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)
	APPROX. LIMIT OF GRADING
	100' WPA BUFFER ZONE
	100' WPA BUFFER ZONE/100' SUDBURY AURA
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA
	100' WPA VERNAL POOL BUFFER ZONE
	100' WPA RESOURCE AREA
	200' WPA RESOURCE AREA
	100' SUDBURY RESOURCE AREA
	200' SUDBURY RESOURCE AREA
	100' SUDBURY VERNAL POOL BUFFER ZONE
	100' SUDBURY AURA

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LUW
	PERMANENT DISTURBANCE TO BVW/LUW
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA

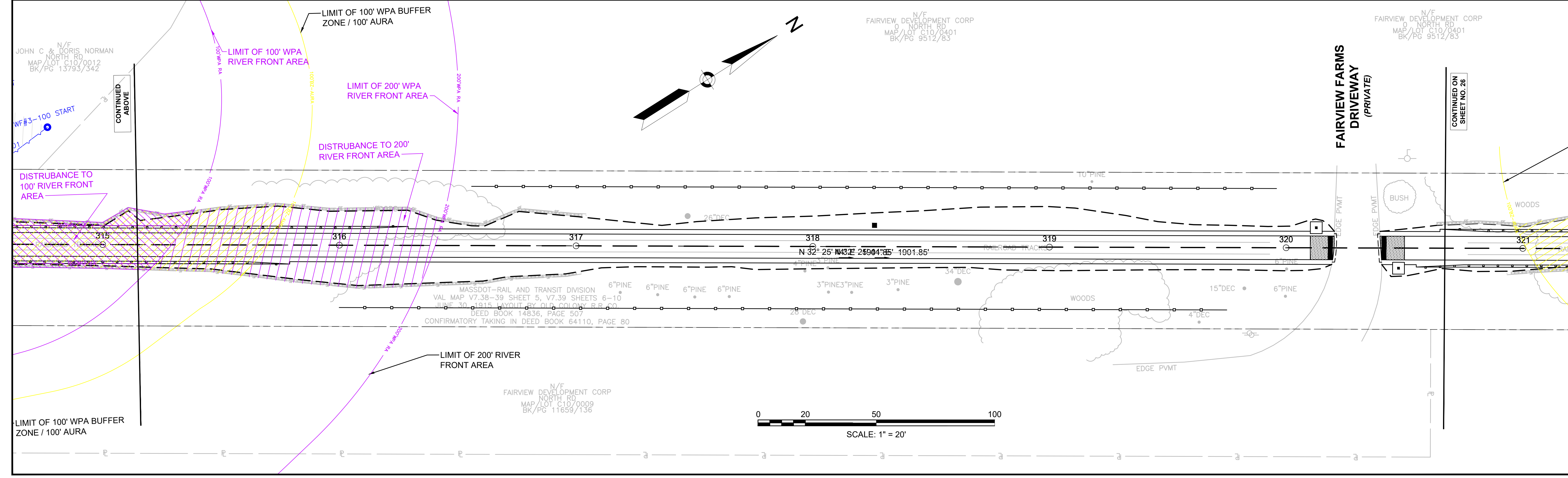
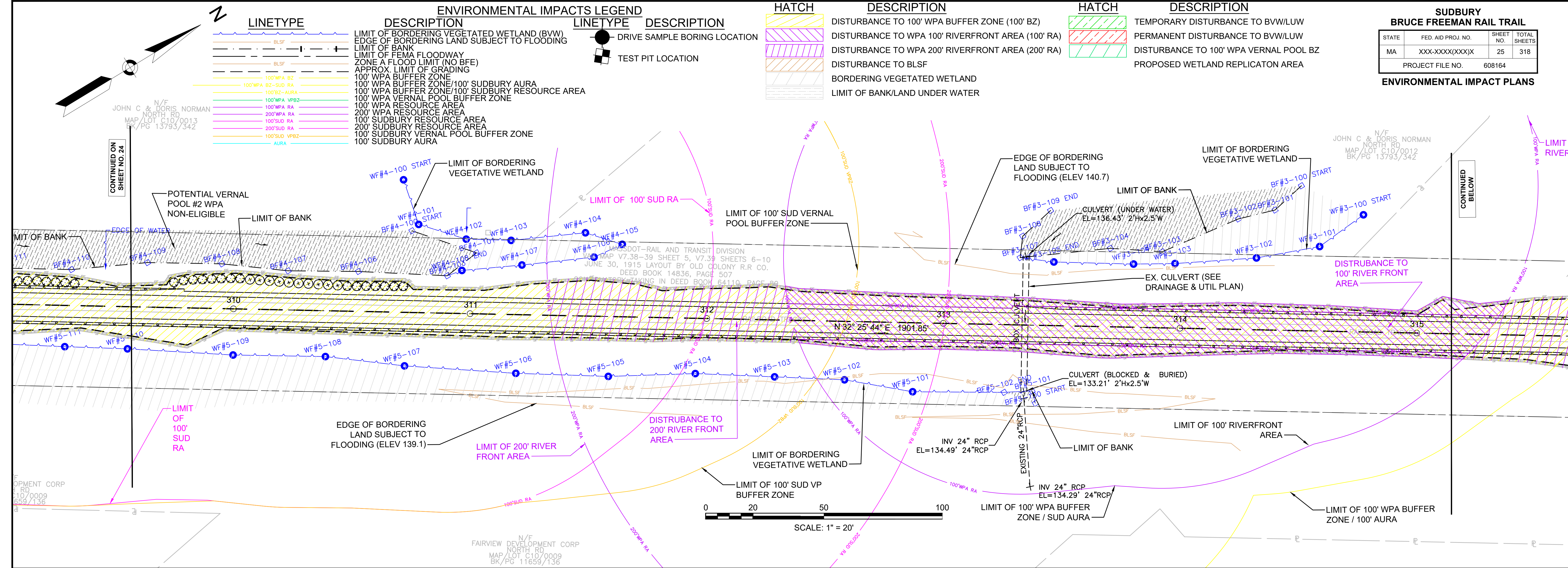
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	24	318
PROJECT FILE NO.		608164	
ENVIRONMENTAL IMPACT PLANS			



BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	25	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

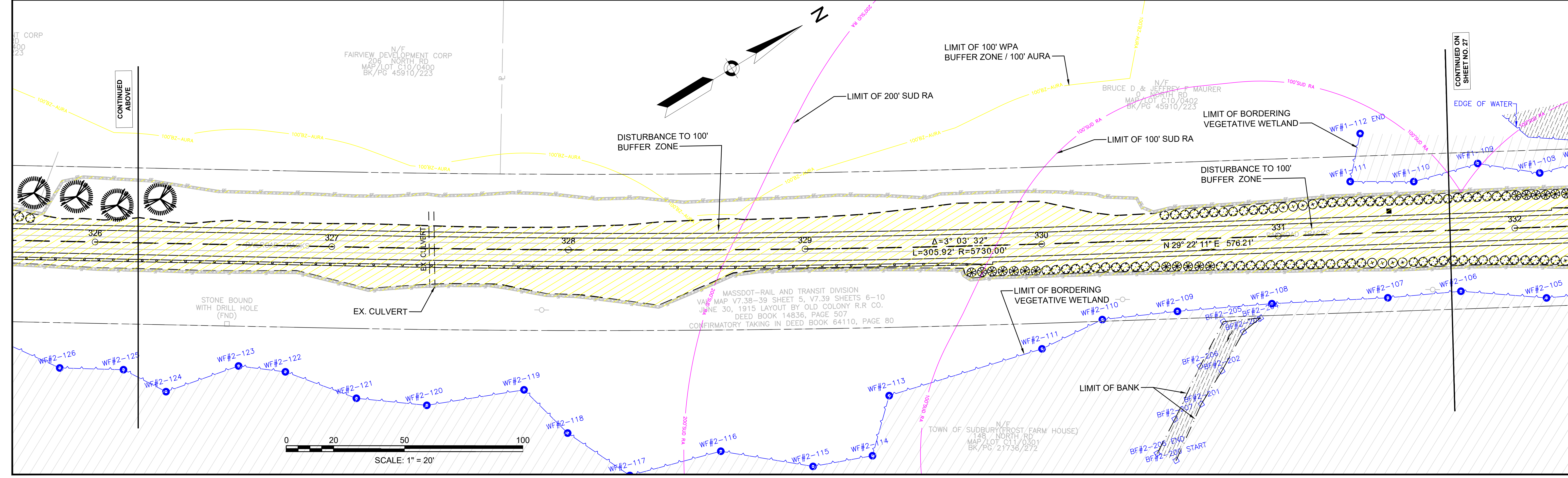
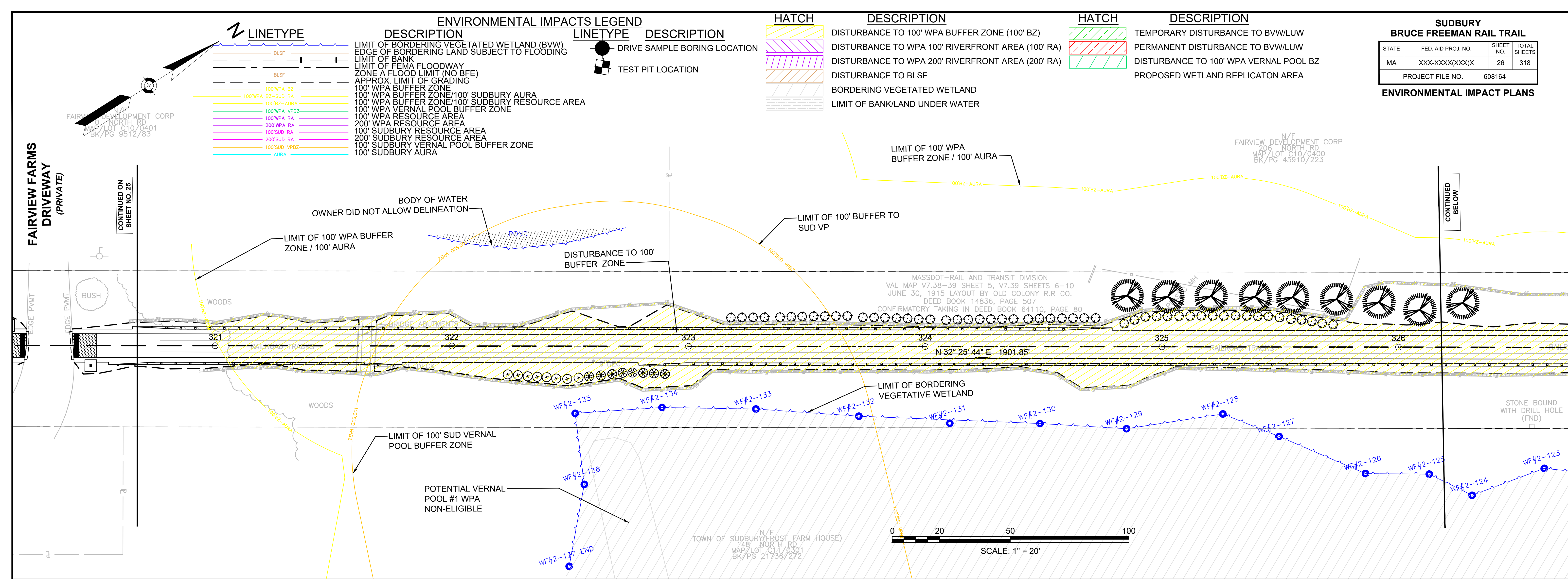
ENVIRONMENTAL IMPACTS LEGEND		HATCH	
LINETYPE	DESCRIPTION	HATCH	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	LIMIT OF BANK		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		DISTURBANCE TO BLSF
	APPROX. LIMIT OF GRADING		BORDERING VEGETATED WETLAND
	100' WPA BUFFER ZONE		LIMIT OF BANK/LAND UNDER WATER
	100' WPA BUFFER ZONE/100' SUDBURY AURA		
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
	100' WPA VERNAL POOL BUFFER ZONE		
	100' WPA RESOURCE AREA		
	200' WPA RESOURCE AREA		
	100' SUDBURY RESOURCE AREA		
	200' SUDBURY RESOURCE AREA		
	100' SUDBURY VERNAL POOL BUFFER ZONE		
	200' SUDBURY VERNAL POOL BUFFER ZONE		
	100' SUDBURY AURA		



SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	26	318
PROJECT FILE NO.		608164	

ENVIRONMENTAL IMPACT PLANS

ENVIRONMENTAL IMPACTS LEGEND		HATCH		HATCH	
LINETYPE	DESCRIPTION		DESCRIPTION		DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)		TEMPORARY DISTURBANCE TO BVW/LW
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)		PERMANENT DISTURBANCE TO BVW/LW
	LIMIT OF BANK		DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)		DISTURBANCE TO 100' WPA VERNAL POOL BZ
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		DISTURBANCE TO BLSF		PROPOSED WETLAND REPLICATON AREA
	APPROX. LIMIT OF GRADING		BORDERING VEGETATED WETLAND		
	100' WPA BUFFER ZONE		LIMIT OF BANK/LAND UNDER WATER		
	100' WPA BUFFER ZONE/100' SUDBURY AURA				
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA				
	100' WPA VERNAL POOL BUFFER ZONE				
	100' WPA RESOURCE AREA				
	200' WPA RESOURCE AREA				
	100' SUDBURY RESOURCE AREA				
	200' SUDBURY RESOURCE AREA				
	100' SUDBURY VERNAL POOL BUFFER ZONE				
	100' SUDBURY AURA				



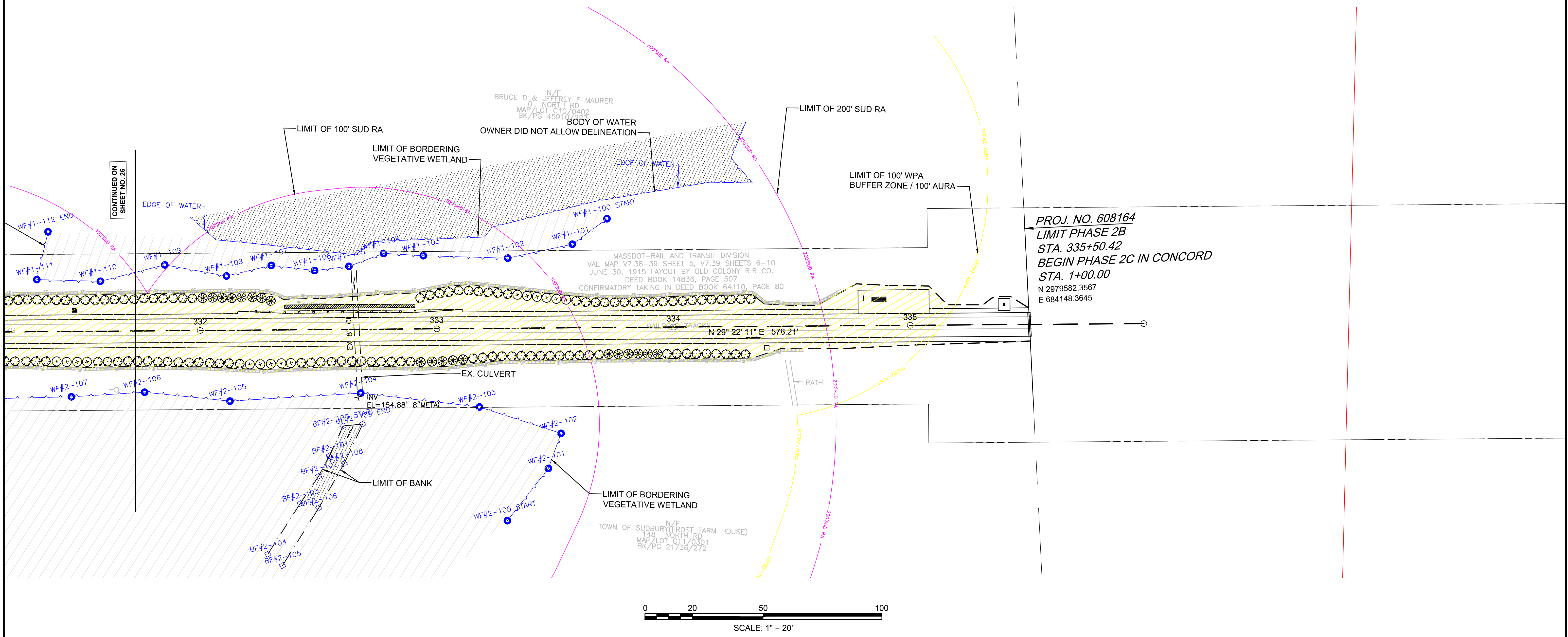
LINETYPE	DESCRIPTION	LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)		DRIVE SAMPLE BORING LOCATION
	EDGE OF BORDERING LAND SUBJECT TO FLOODING		TEST PIT LOCATION
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)		
	APPROX. LIMIT OF GRADING		
	100' WPA BUFFER ZONE		
	100' WPA BUFFER ZONE/100' SUDBURY AURA		
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA		
	100' WPA VERNAL POOL BUFFER ZONE		
	100' WPA RESOURCE AREA		
	200' WPA RESOURCE AREA		
	100' SUDBURY RESOURCE AREA		
	200' SUDBURY RESOURCE AREA		
	100' SUDBURY VERNAL POOL BUFFER ZONE		
	100' SUDBURY AURA		

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LWU
	PERMANENT DISTURBANCE TO BVW/LWU
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	27	318
PROJECT FILE NO. 608164			

ENVIRONMENTAL IMPACT PLANS



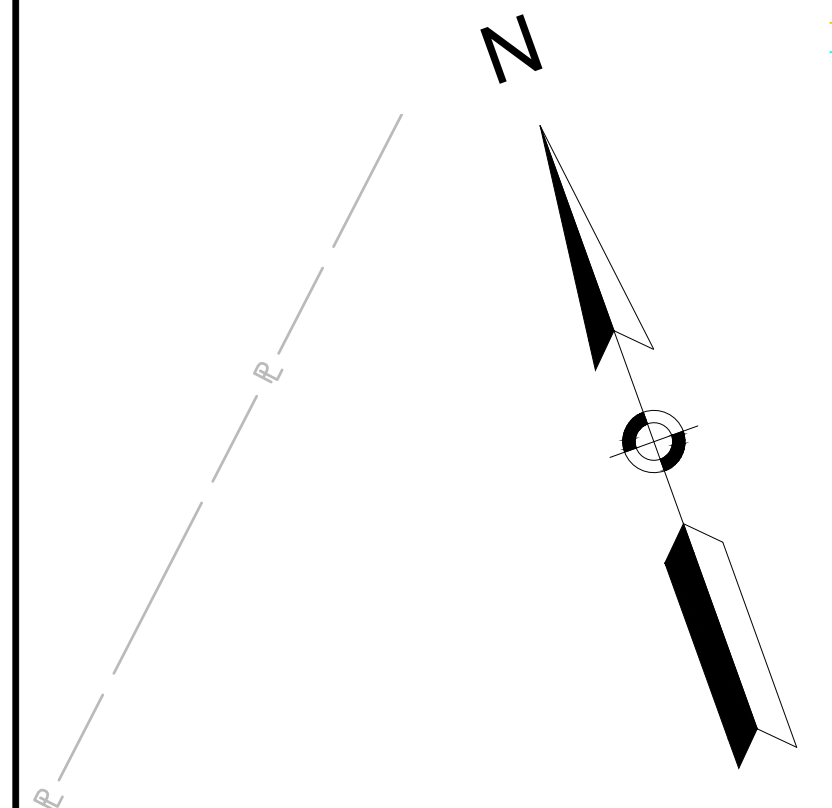
ENVIRONMENTAL IMPACTS LEGEND	
LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)
	EDGE OF BORDERING LAND SUBJECT TO FLOODING
	LIMIT OF BANK
	LIMIT OF FEMA FLOODWAY
	ZONE A FLOOD LIMIT (NO BFE)
	APPROX. LIMIT OF GRADING
	100' WPA BUFFER ZONE
	100' WPA BUFFER ZONE/100' SUDBURY AURA
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA
	100' WPA VERNAL POOL BUFFER ZONE
	100' WPA RESOURCE AREA
	200' WPA RESOURCE AREA
	100' SUDBURY RESOURCE AREA
	200' SUDBURY RESOURCE AREA
	100' SUDBURY VERNAL POOL BUFFER ZONE
	100' SUDBURY AURA

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LUW
	PERMANENT DISTURBANCE TO BVW/LUW
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA

SUBBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	28	318
PROJECT FILE NO. 608164			

ENVIRONMENTAL IMPACT PLANS

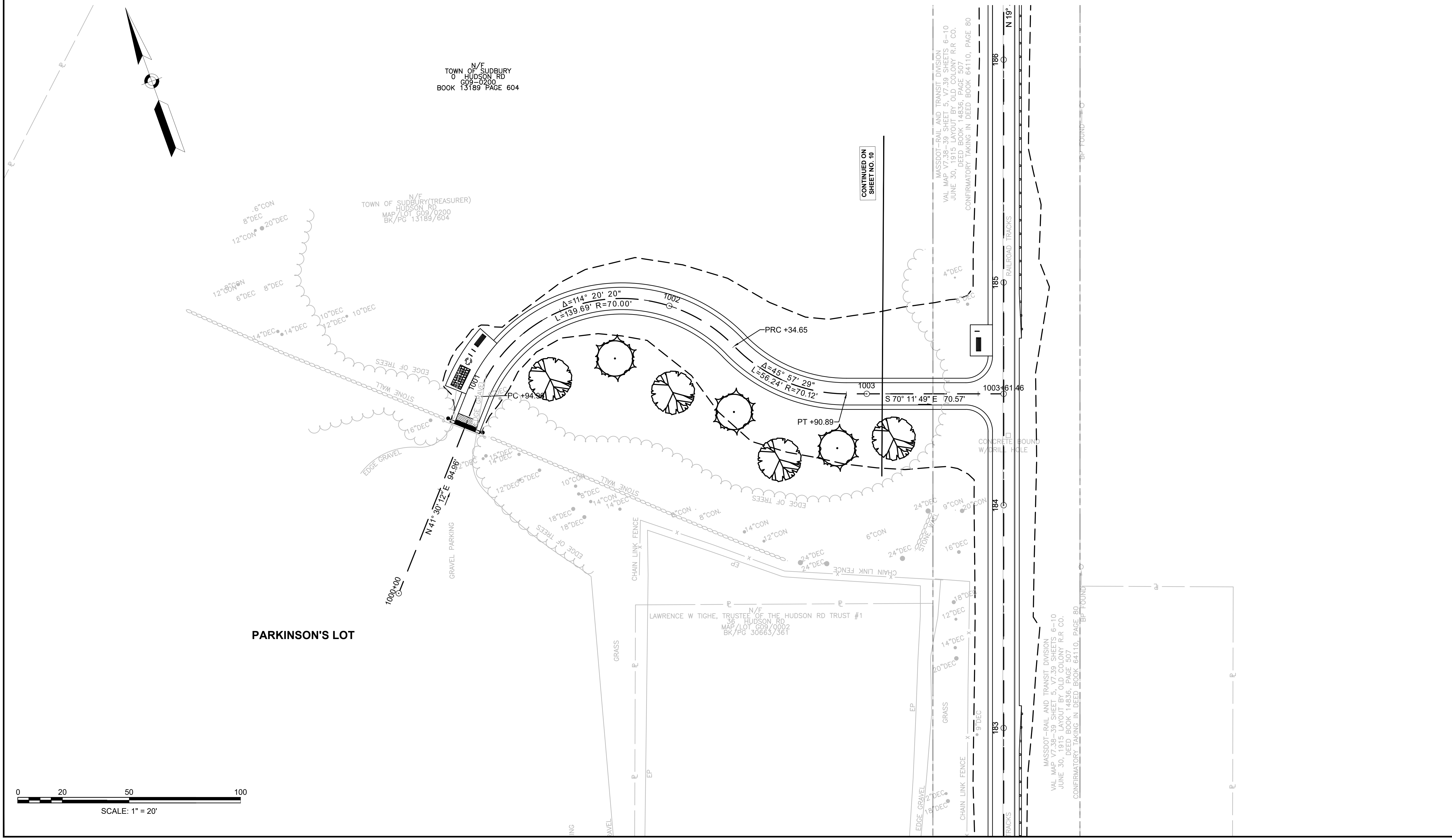
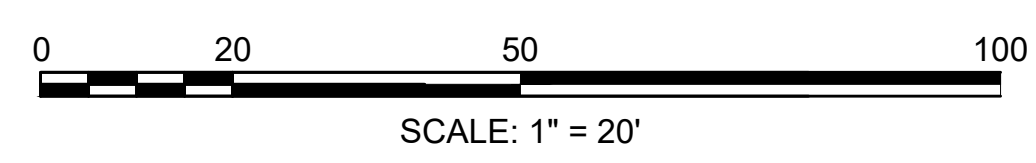


N/F
TOWN OF SUDBURY
0 HUDSON RD
009-0200
BOOK 13189 PAGE 604

N/F
TOWN OF SUDBURY (TREASURER)
0 HUDSON RD
009-0200
BK/PG 13189/604

N/F
LAWRENCE W TIGHE, TRUSTEE OF THE HUDSON RD TRUST #1
38 HUDSON RD
MAP/LOT G09/0002
BK/PG 30663/361

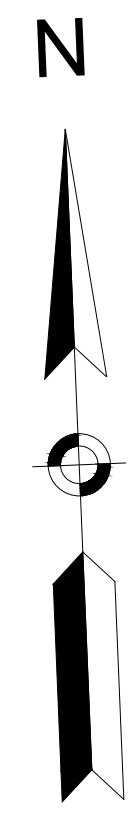
PARKINSON'S LOT



CONTINUED ON
SHEET NO. 10

MASSDOT-RAIL AND TRANSIT DIVISION
VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
DEED BOOK 14836, PAGE 507
CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80

MASSDOT-RAIL AND TRANSIT DIVISION
VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
DEED BOOK 14836, PAGE 507
CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80



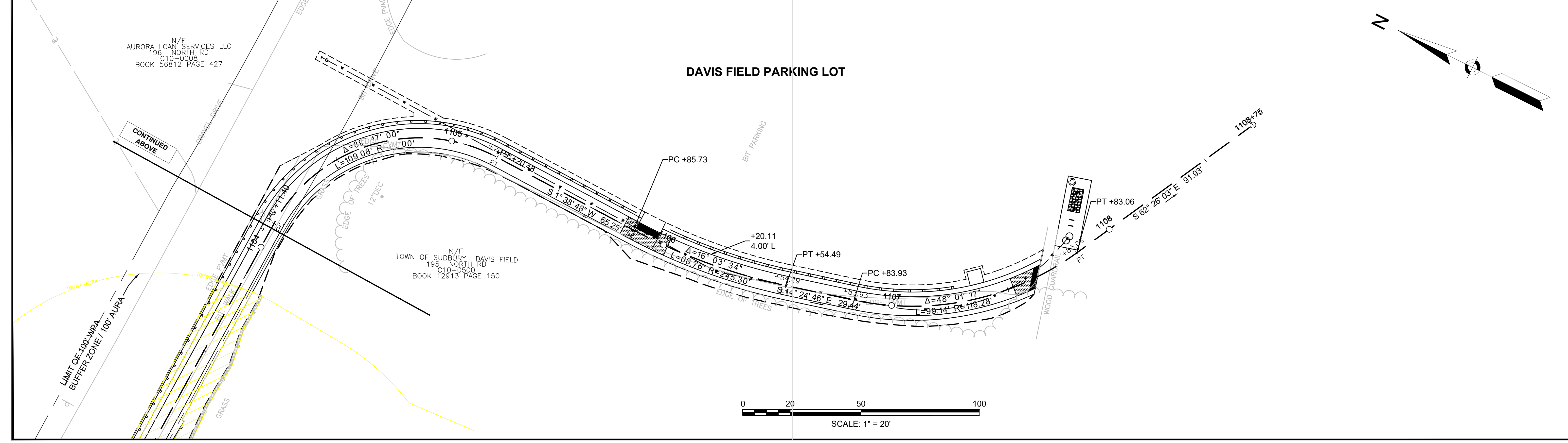
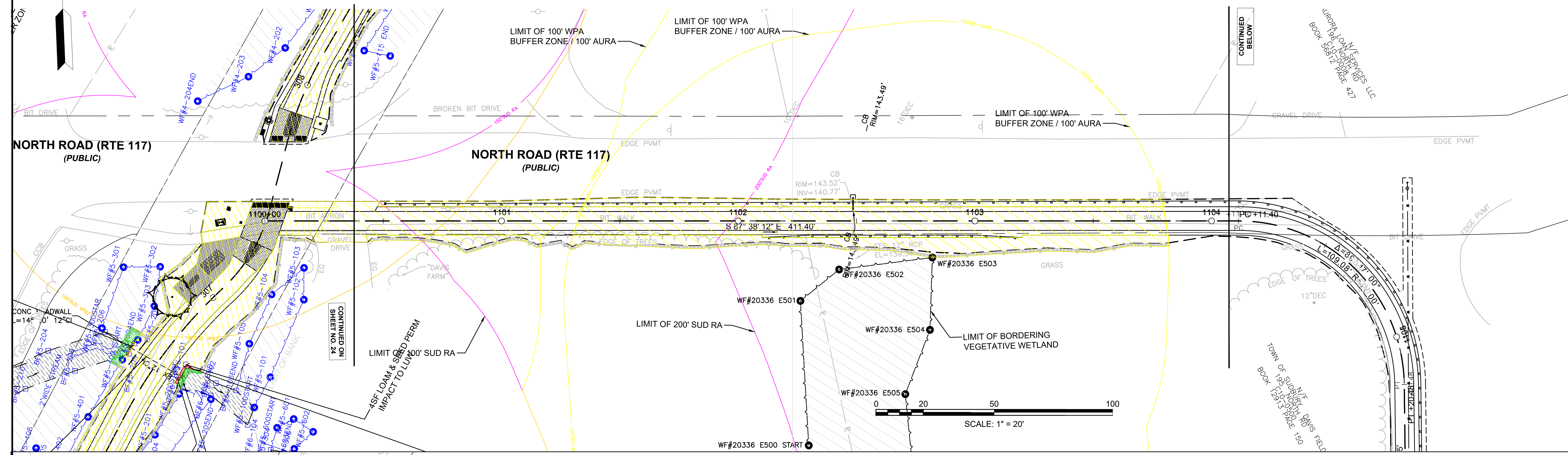
LINETYPE	DESCRIPTION
	LIMIT OF BORDERING VEGETATED WETLAND (BVW)
	EDGE OF BORDERING LAND SUBJECT TO FLOODING
	LIMIT OF BANK
	LIMIT OF FEMA FLOODWAY ZONE A FLOOD LIMIT (NO BFE)
	APPROX. LIMIT OF GRADING
	100' WPA BUFFER ZONE
	100' WPA BUFFER ZONE/100' SUDBURY AURA
	100' WPA BUFFER ZONE/100' SUDBURY RESOURCE AREA
	100' WPA VERNAL POOL BUFFER ZONE
	100' WPA RESOURCE AREA
	200' WPA RESOURCE AREA
	100' SUDBURY RESOURCE AREA
	200' SUDBURY RESOURCE AREA
	100' SUDBURY VERNAL POOL BUFFER ZONE
	100' SUDBURY AURA

LINETYPE	DESCRIPTION
	DRIVE SAMPLE BORING LOCATION
	TEST PIT LOCATION

HATCH	DESCRIPTION
	DISTURBANCE TO 100' WPA BUFFER ZONE (100' BZ)
	DISTURBANCE TO WPA 100' RIVERFRONT AREA (100' RA)
	DISTURBANCE TO WPA 200' RIVERFRONT AREA (200' RA)
	DISTURBANCE TO BLSF
	BORDERING VEGETATED WETLAND
	LIMIT OF BANK/LAND UNDER WATER

HATCH	DESCRIPTION
	TEMPORARY DISTURBANCE TO BVW/LUW
	PERMANENT DISTURBANCE TO BVW/LUW
	DISTURBANCE TO 100' WPA VERNAL POOL BZ
	PROPOSED WETLAND REPLICATON AREA

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	29	318
PROJECT FILE NO.		608164	
RESOURCE AREA IMPACTS			



FENCING DETAILS

TIMBER FENCE (TWO-RAIL) 103+55 RT TO STA. 104+25 RT
 TIMBER FENCE (TWO-RAIL) 104+80 LT TO STA. 106+70 LT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

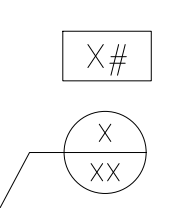
NONE

NOTES:

1. REMOVE AND DISCARD ALL EXISTING RAILS LOCATED WITHIN THE PROJECT LIMITS. COST FOR R&D SHALL BE PAID UNDER ITEM 129.5 TRACK EXCAVATION.
2. SEE TYPICAL SECTIONS FOR FORMATION OF SHARED USE PATH SHOULDERS AND MATERIAL SPECIFICATIONS
3. ALL EXISTING STRUCTURES WITHIN CURB RAMP AREAS SHALL BE ADJUSTED TO BE FLUSH WITH CURB RAMP SURFACE.
4. ALL TREES WITHIN SLOPE LIMITS/CLEARING LIMITS SHALL BE REMOVED UNLESS OTHERWISE NOTED ON PLANS. PAYMENT FOR TREE REMOVALS IN THESE AREAS SHALL BE PAID FOR UNDER CLEARING & GRUBBING ITEM PER STANDARD SPECIFICATIONS.
5. ALL TREES OUTSIDE OF SLOPE LIMITS/CLEARING LIMITS SHALL BE RETAINED.

LEGEND:

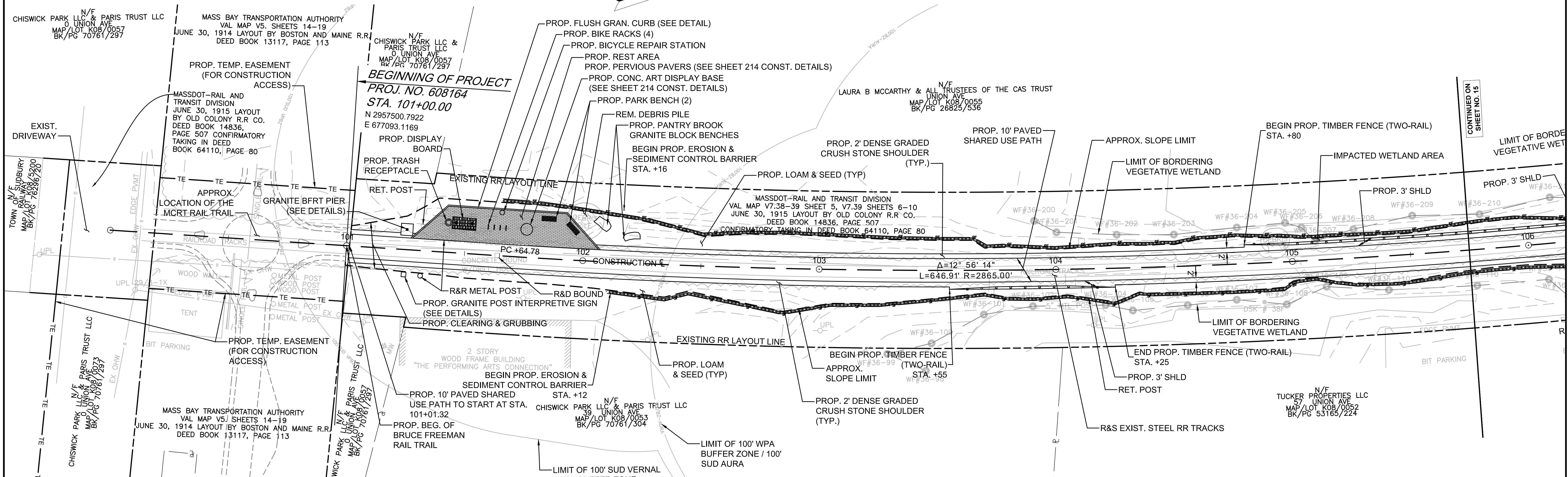
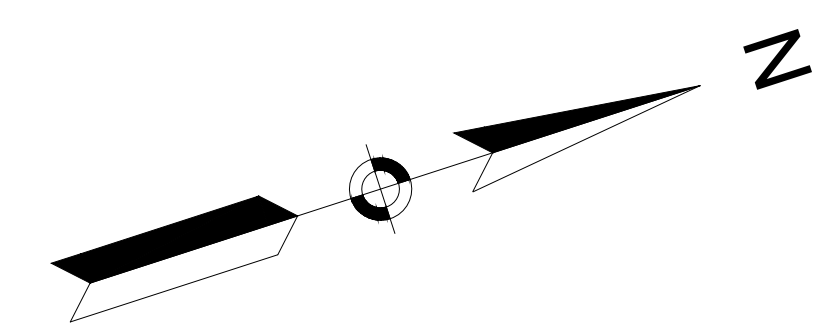
PROPOSED WHEELCHAIR RAMP DETAIL #
 PLANT QUANTITY AND SPECIES



SUDBURY
BRUCE FREEMAN RAIL TRAIL

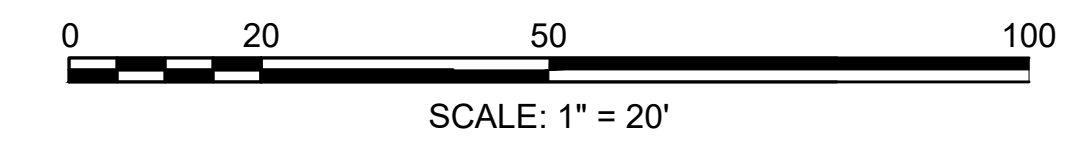
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	14	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



PROJECT SUMMARY PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
AR	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	7	1.5-2" CAL.
AS	ACER SACCHARUM	LEGACY SUGAR MAPLE	15	1.5-2" CAL.
QR	QUERCUS RUBRA	NORTHERN RED OAK	11	1.5-2" CAL.
QA	QUERCUS ALBA	WHITE OAK	11	1.5-2" CAL.
TA	TILIA AMERICANA	AMERICAN LINDEN	62	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	90	5-6" HT.
AC	AMELANCHIER CANADENSIS	CANADIAN SERVICEBERRY	23	12-25" HT.
CC	CERCIS CANADENSIS	REDBUD	18	12-25" HT.
PG	PICEA GLAUCA	WHITE SPRUCE	39	4-5" HT.
MA	MALUS 'IVORY SPEAR'	IVORY SPEAR CRABAPPLE	2	2.5"-3" CAL.
SHRUBS				
IG	ILEX GLABRA	INKBERRY	64	2-3" HT.
RA	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	32	2-3" HT.
ARA	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	24	2-3" HT.
CLA	CLETHRA ALNIFOLIA	SUMMERSWEET	89	18"-24" HT.
CP	CAREX PENNSYLVANICA	PENNSYLVANIA SEDGE	36	1' HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	182	18"-24" HT.
VAC	VGACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	54	18"-24" HT.
SEED MIX				
LOW UPLAND SEED MIX			26,340 SQ. FT.	1 LB/ 2,500 SQ. FT
WETLAND/ BASIN MIX (SEASONALLY FLOODED)			440 SQ. FT.	1 LB/ 2,500 SQ. FT



FOR PROFILE SEE SHEET NO. 49

FENCING DETAILS

TIMBER FENCE (TWO-RAIL) STA. 104+80 LT TO STA. 107+15 LT
 TIMBER FENCE (THREE-RAIL) STA. 108+88 RT TO STA. 109+30 RT
 TIMBER FENCE (THREE-RAIL) STA. 109+00 LT TO STA. 109+85 LT
 STOCKADE FENCE STA. 113+52 LT TO STA. 115+55 LT
 TIMBER FENCE (TWO-RAIL) STA. 115+55 LT TO STA. 115+85 LT
 TIMBER FENCE (TWO-RAIL) STA. 116+50 LT TO STA. 116+80 LT
 STOCKADE FENCE STA. 116+80 LT TO STA. 117+50 LT
 STOCKADE FENCE STA. 113+93 RT TO STA. 115+37 RT
 TIMBER FENCE (TWO-RAIL) STA. 115+37 RT TO STA. 115+67 RT

HIGHWAY GUARD DETAILS

NONE
 TRAFFIC SIGNAL CONDUIT
 NONE

WATER SUPPLY ALTERATIONS

NONE
 DRAINAGE DETAILS
 NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
PS	PINUS STROBUS	WHITE PINE	4	5-6" HT.
AC	AMELANCHIER CANADENSIS	CANADIAN SERVICEBERRY	3	15-25" HT.
SHRUBS				
IG	ILEX GLABRA	INKBERRY	11	2-3" HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	42	18"-24" HT.
RA	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	8	2-3" HT.
VAC	VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	18	18"-24" HT.

LEGEND:

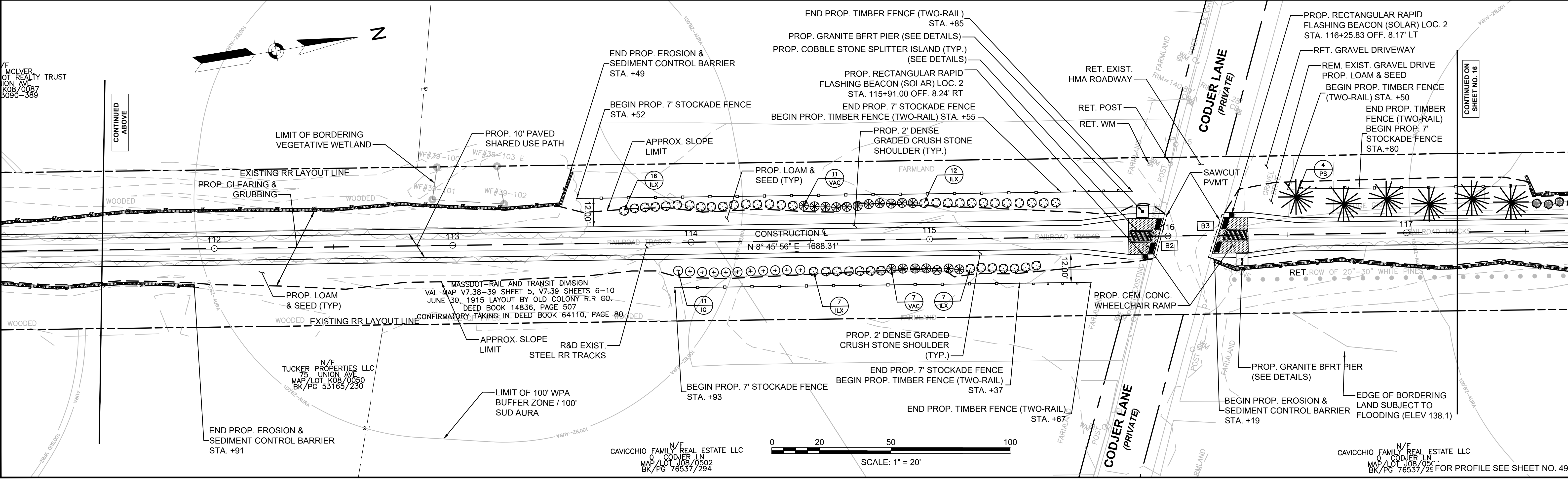
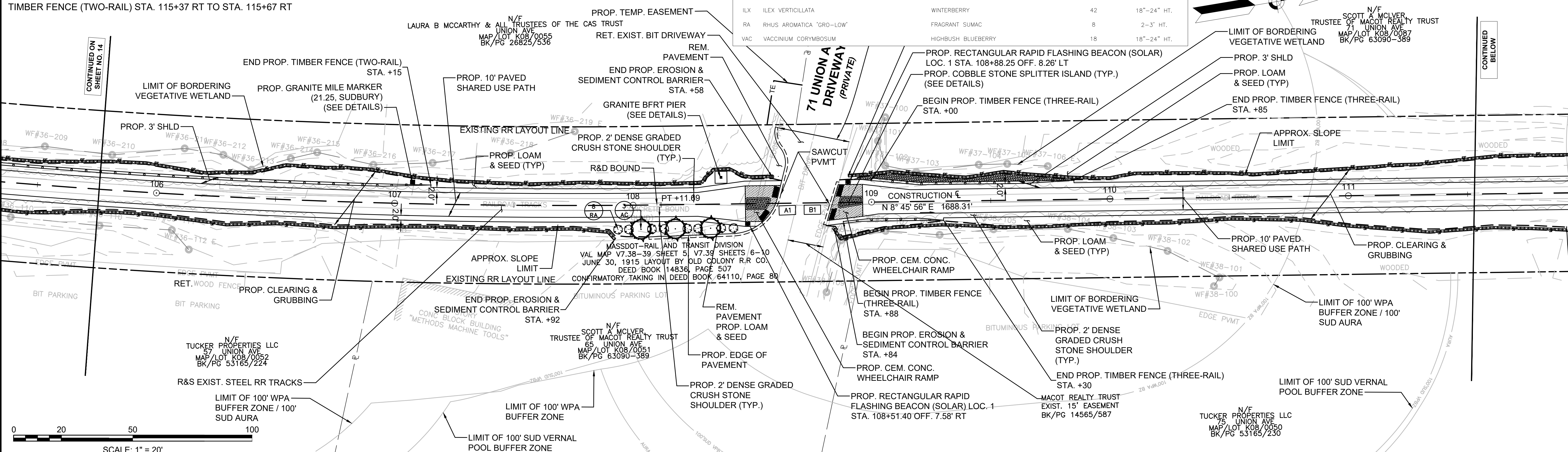
PROPOSED WHEELCHAIR RAMP DETAIL # [Symbol]
 PLANT QUANTITY AND SPECIES [Symbol]

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	15	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



FENCING DETAILS

STOCKADE FENCE STA. 116+80 LT TO STA. 117+50 LT
 TIMBER FENCE (THREE-RAIL) STA. 119+75 LT TO STA. 132+25 LT
 TIMBER FENCE (THREE-RAIL) STA. 119+75 RT TO STA. 131+75 RT

HIGHWAY GUARD DETAILS

NONE

WATER SUPPLY ALTERATIONS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
AS	ACER SACCHARUM	LEGACY SUGAR MAPLE	8	1.5-2" CAL.
QA	QUERCUS ALBA	WHITE OAK	1	1.5-2" CAL.
TA	TILIA AMERICANA	AMERICAN LINDEN	10	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	10	5-6' HT.
PG	PICEA GLAUCA	WHITE SPRUCE	17	4-5' HT.
SHRUBS				
CP	CAREX PENNSYLVANICA	PENNSYLVANIA SEDGE	36	1' HT.
IG	ILEX GLABRA	INKBERRY	9	2-3' HT.
RA	RHUS AROMATICA 'GRO-LOW'	FRAGRANT SUMAC	24	2-3' HT.

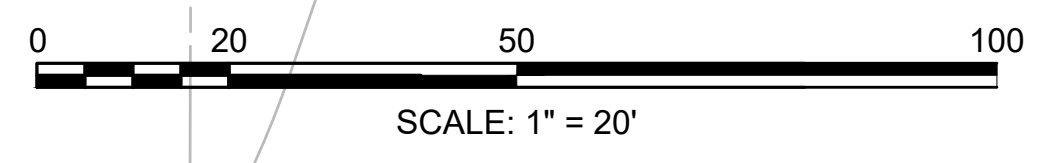
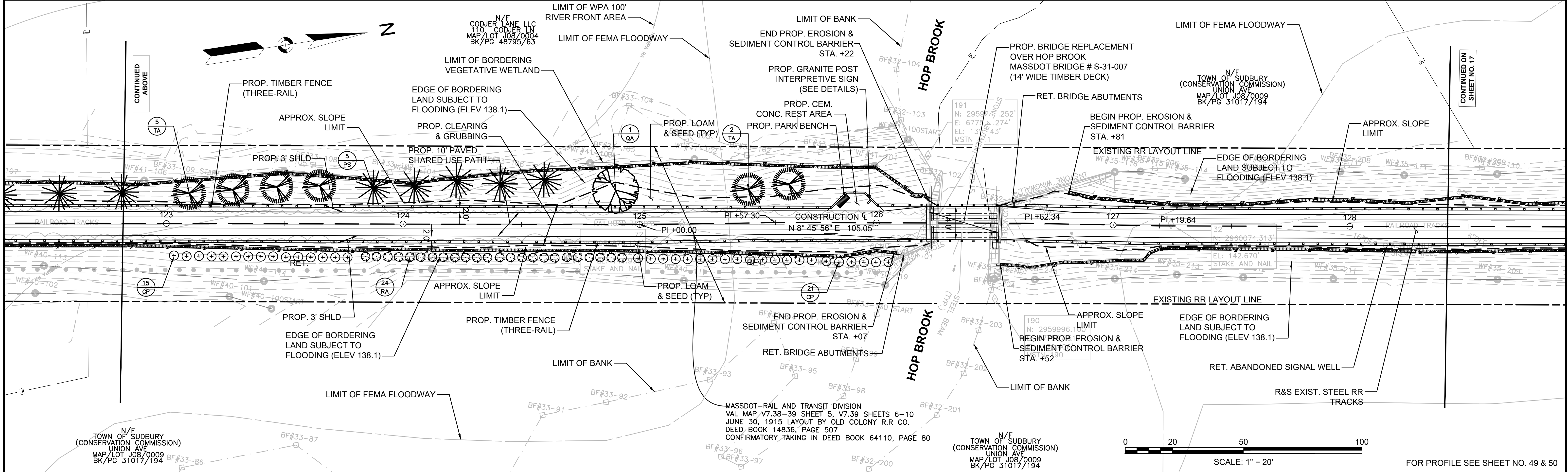
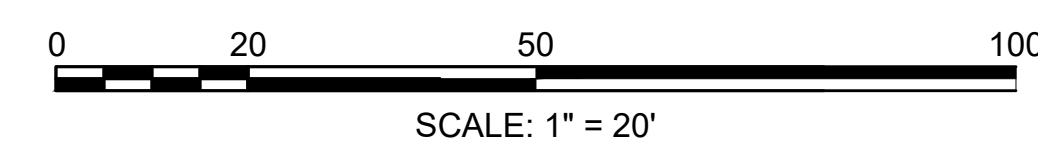
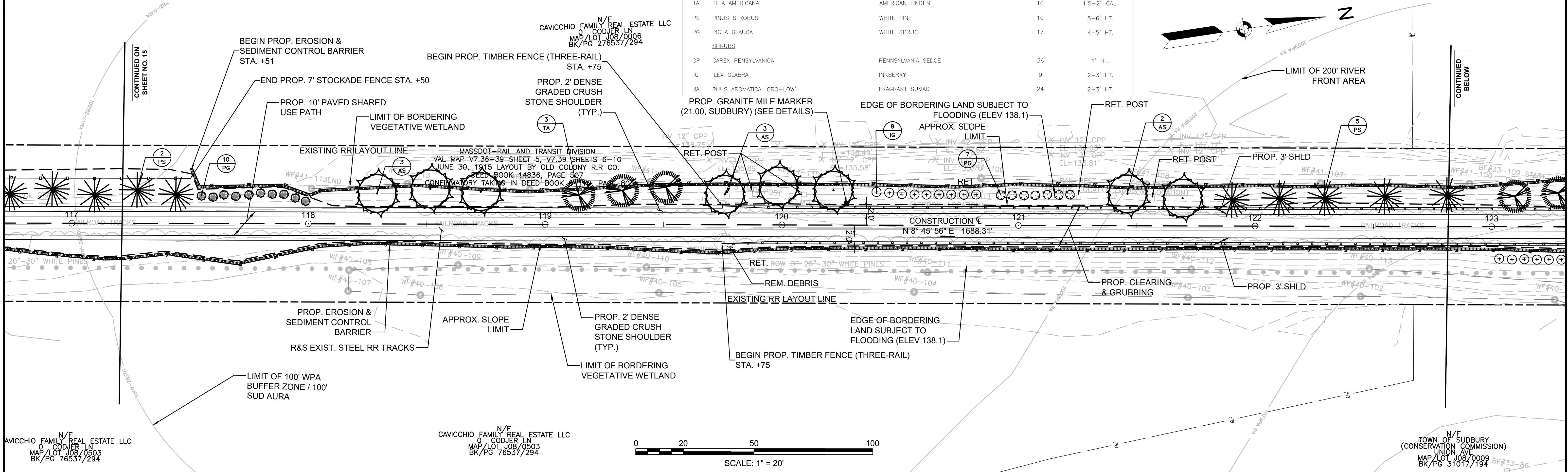
LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#
 PLANT QUANTITY AND SPECIES X XX

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	16	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



FOR PROFILE SEE SHEET NO. 49 & 50

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 119+75 LT TO STA. 132+25 LT
 TIMBER FENCE (THREE-RAIL) STA. 119+75 RT TO STA. 130+75 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
AC	AMELANCHIER CANADENSIS	CANADIAN SERVICEBERRY	7	1.5-2" CAL.
QA	QUERCUS ALBA	WHITE OAK	6	1.5-2" CAL.
CC	CERCIS CANADENSIS	REDBUD	18	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	33	5-6" HT.
SHRUBS				
ILX	ILEX VERTICILLATA	WINTERBERRY	4	18"-24" HT.
VAC	VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	7	18"-24" HT.

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#
 PLANT QUANTITY AND SPECIES X
 XX

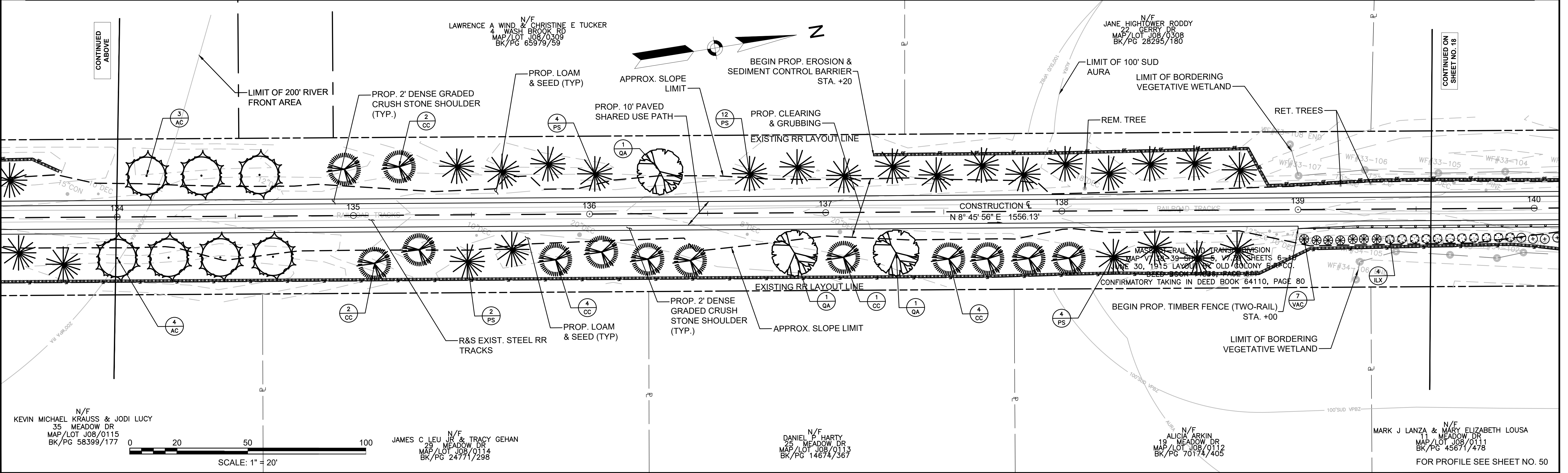
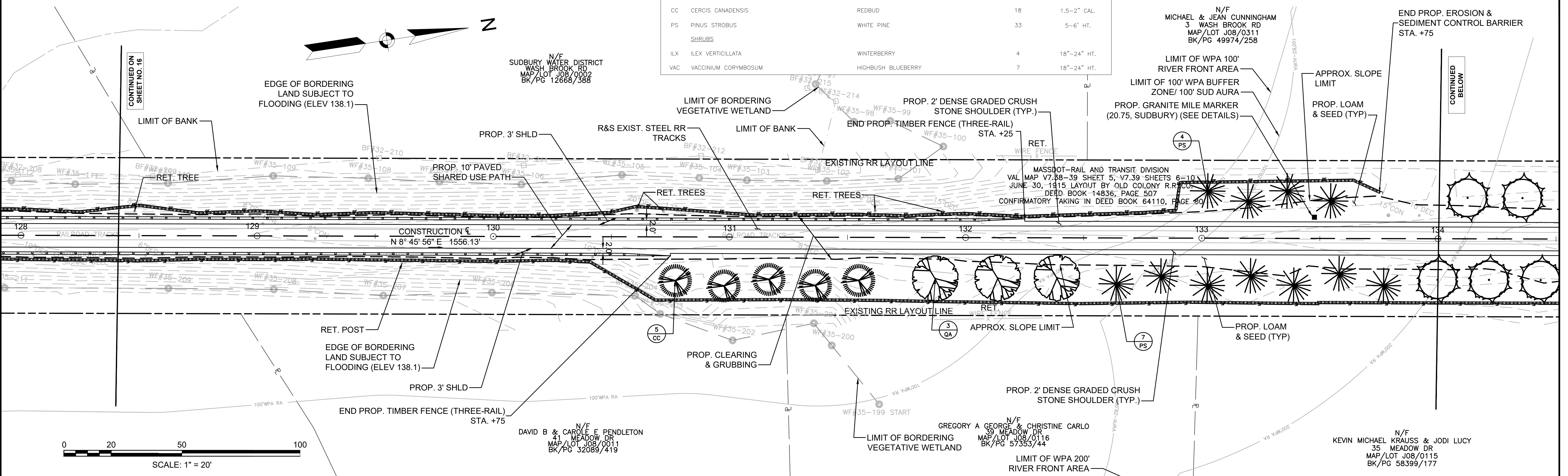
SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	17	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS

END PROP. EROSION & SEDIMENT CONTROL BARRIER STA. +75



FENCING DETAILS

TIMBER FENCE (TWO-RAIL) STA. 139+00 RT TO STA. 142+50 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

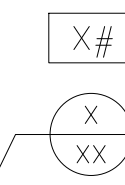
NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
AC	AMELANCHIER CANADENSIS	CANADIAN SERVICEBERRY	5	1.5-2" CAL.
TA	TILIA AMERICANA	AMERICAN LINDEN	5	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	11	5-6" HT.
SHRUBS				
IG	ILEX GLABRA	INKBERRY	7	2-3' HT.
CLA	CLETHRA ALNIFOLIA	SUMMERSWEET	26	18"-24" HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	18	18"-24" HT.

LEGEND:

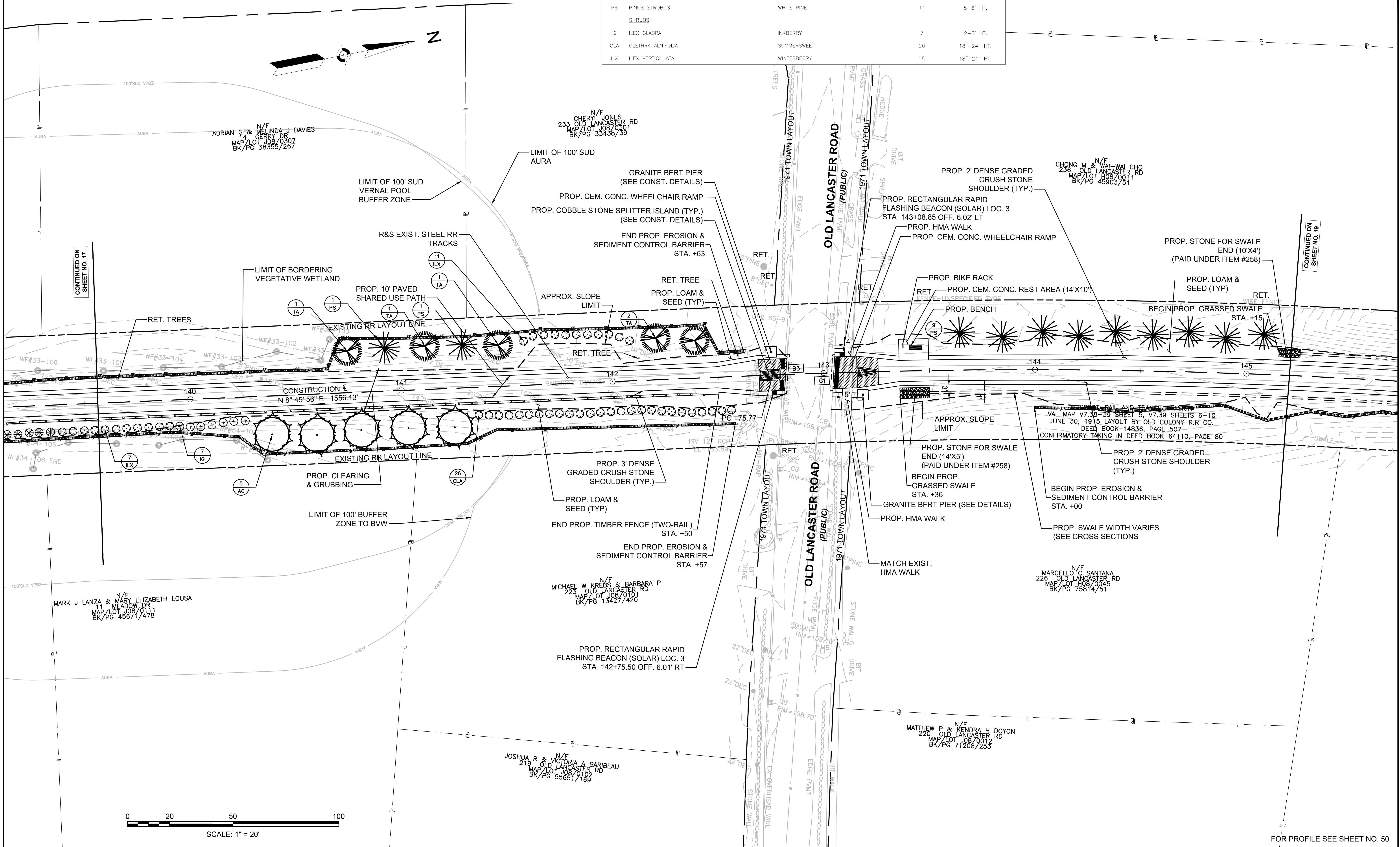
PROPOSED WHEELCHAIR RAMP DETAIL #
 PLANT QUANTITY AND SPECIES



SUDBURY
BRUCE FREEMAN RAIL TRAIL

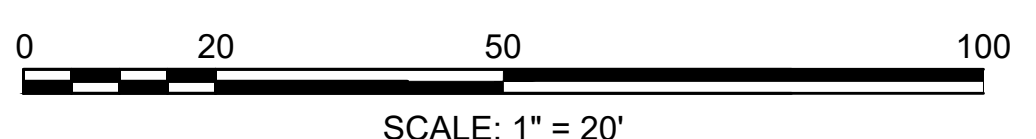
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	18	318

PROJECT FILE NO. 608164
CONSTRUCTION PLANS



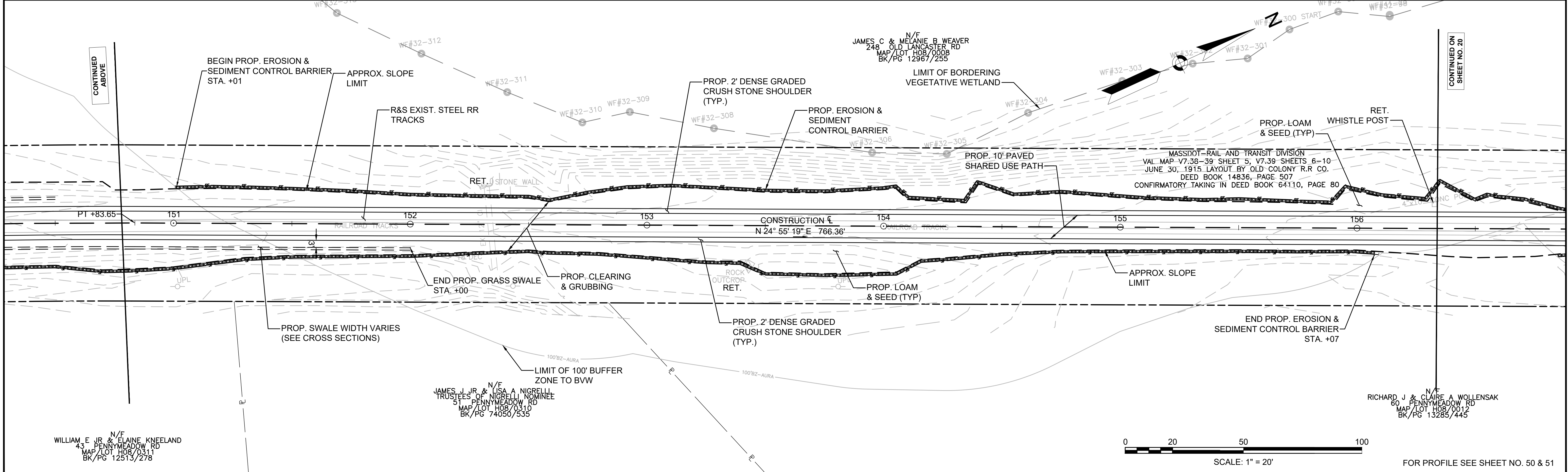
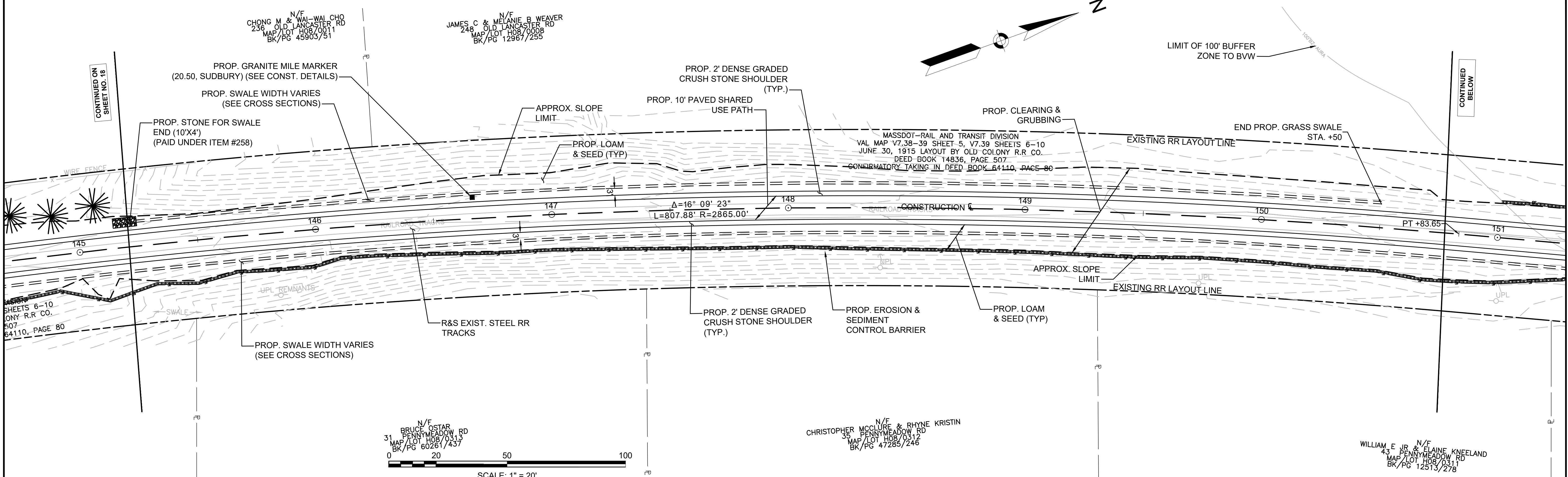
CONTINUED ON SHEET NO. 17

CONTINUED ON SHEET NO. 19



FOR PROFILE SEE SHEET NO. 50

HIGHWAY GUARD DETAILS NONE
 TRAFFIC SIGNAL CONDUIT NONE
 WATER SUPPLY ALTERATIONS NONE
 DRAINAGE DETAILS NONE



CONTINUED ON
SHEET NO. 18

CONTINUED
BELOW

CONTINUED
ABOVE

CONTINUED ON
SHEET NO. 20

0 20 50 100
SCALE: 1" = 20'

FOR PROFILE SEE SHEET NO. 50 & 51

FENCING DETAILS

HIGHWAY GUARD DETAILS

TRAFFIC SIGNAL CONDUIT

WATER SUPPLY ALTERATIONS

DRAINAGE DETAILS

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	20	318

CONSTRUCTION PLANS

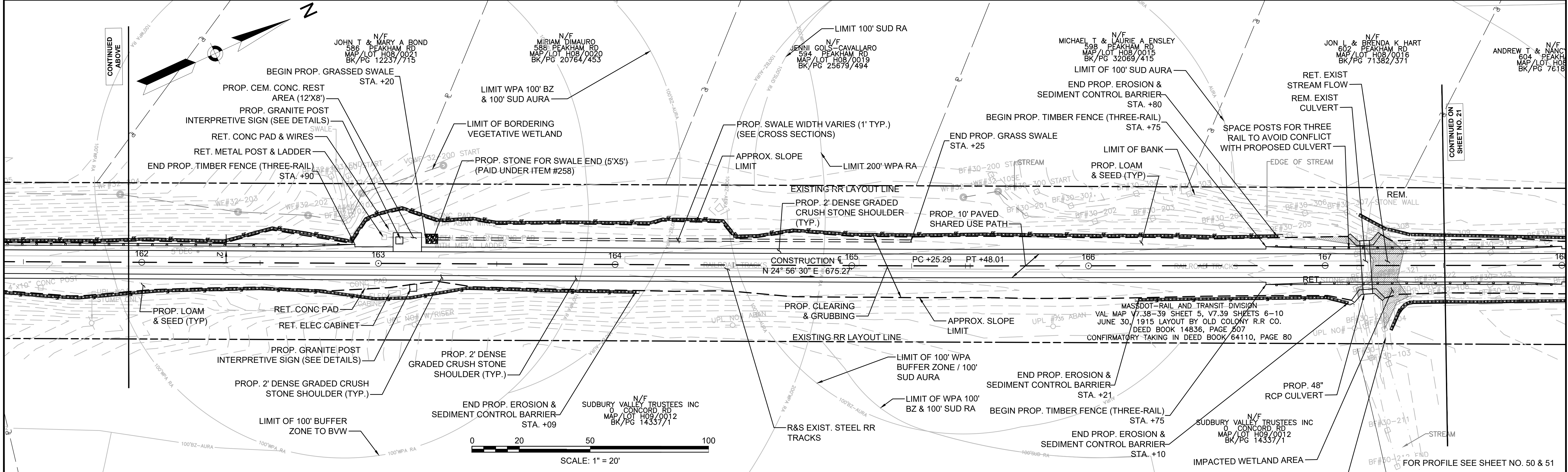
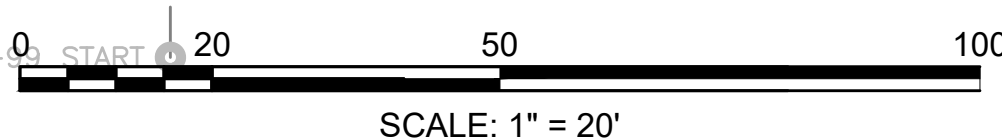
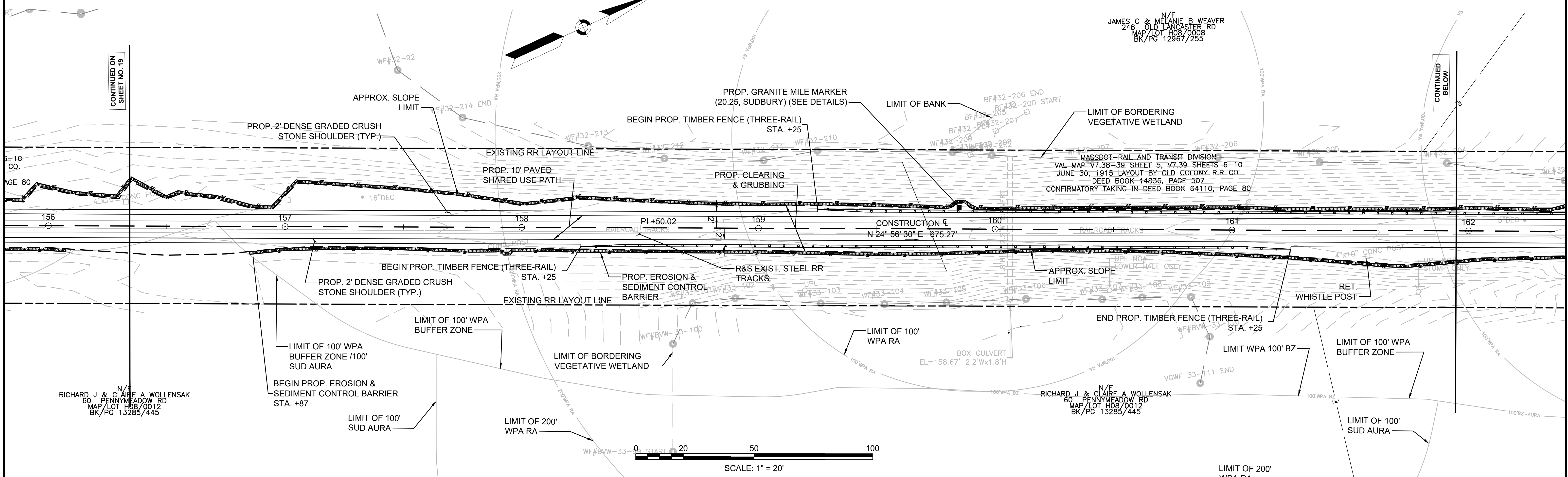
TIMBER FENCE (THREE-RAIL) STA. 159+25 LT TO STA. 163+10 LT
TIMBER FENCE (THREE-RAIL) STA. 158+25 RT TO STA. 161+25 RT

NONE

NONE

SHEET 178

SHEET 178



CONTINUED ON SHEET NO. 19

CONTINUED BELOW

CONTINUED ABOVE

CONTINUED ON SHEET NO. 21

FENCING DETAILS

HIGHWAY GUARD DETAILS

TRAFFIC SIGNAL CONDUIT

WATER SUPPLY ALTERATIONS

DRAINAGE DETAILS

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	21	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS

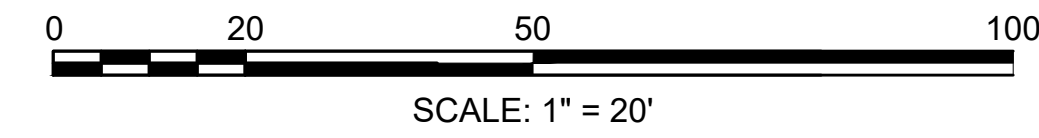
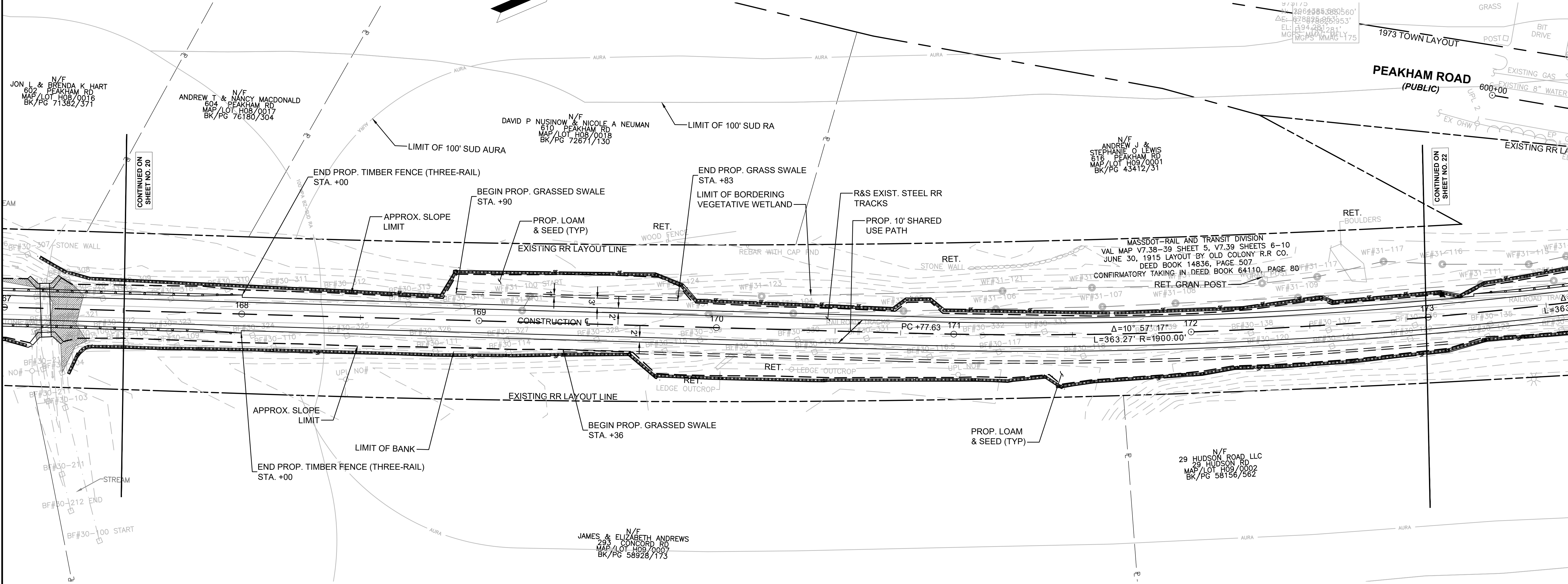
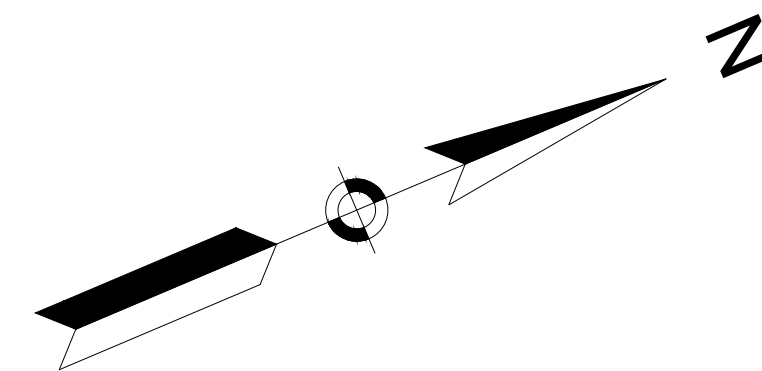
TIMBER FENCE (THREE-RAIL) STA. 166+75 RT TO STA. 168+00 RT
TIMBER FENCE (THREE-RAIL) STA. 166+75 LT TO STA. 168+00 LT

NONE

NONE

NONE

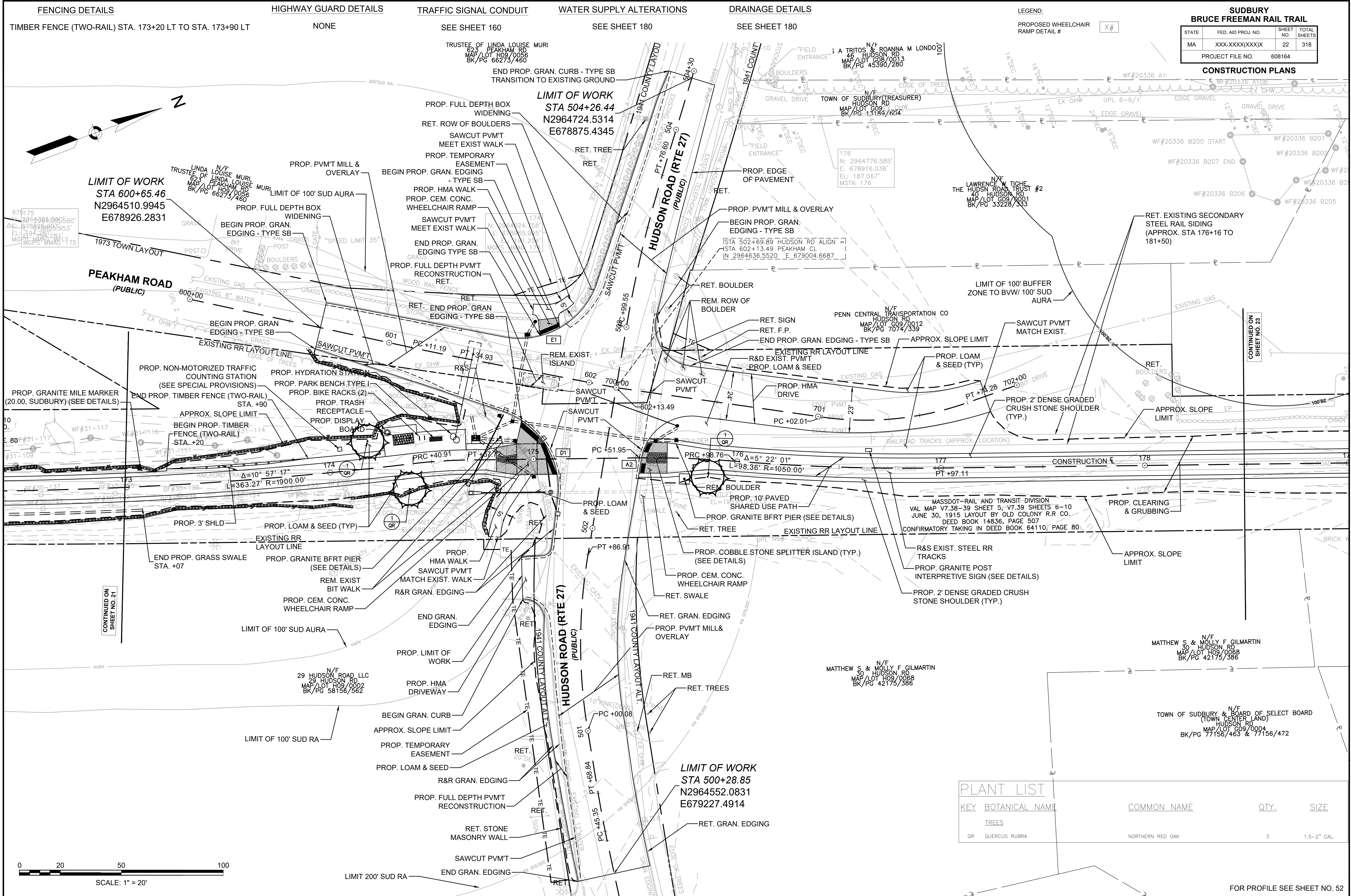
NONE



CONTINUED ON SHEET NO. 20

CONTINUED ON SHEET NO. 22

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	22	318
PROJECT FILE NO.		608164	



FENCING DETAILS

HIGHWAY GUARD DETAILS

TRAFFIC SIGNAL CONDUIT

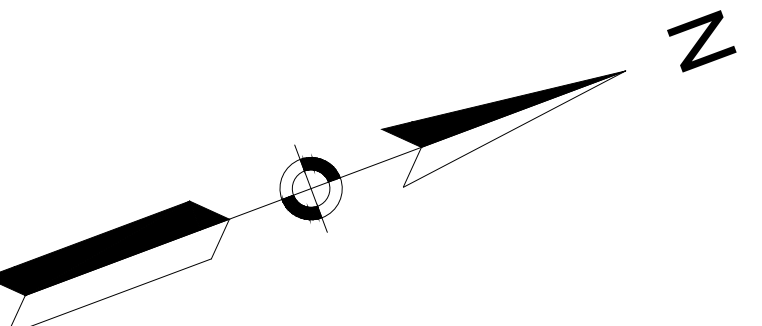
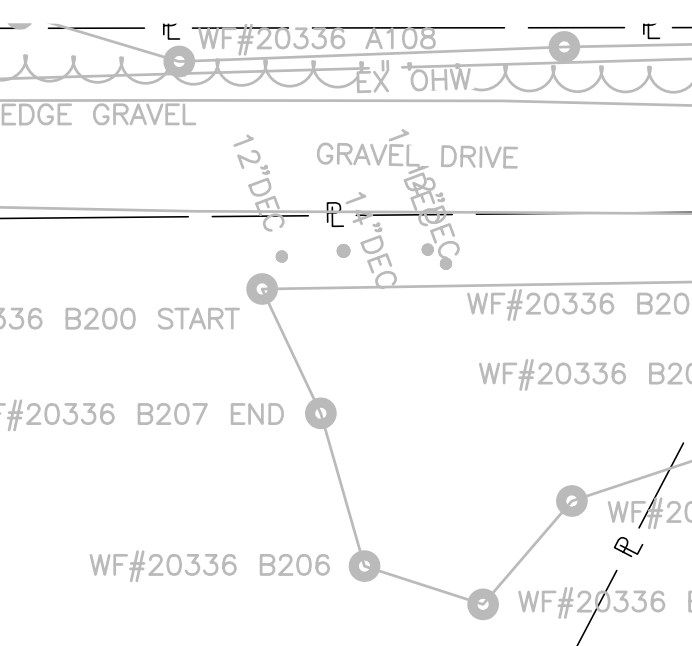
WATER SUPPLY ALTERATIONS

DRAINAGE DETAILS

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

CONSTRUCTION PLANS



LIMIT OF WORK
STA 600+65.46
N2964510.9945
E678926.2831

LIMIT OF WORK
STA 504+26.44
N2964724.5314
E678875.4345

LIMIT OF WORK
STA 500+28.85
N2964552.0831
E679227.4914

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
QR	QUERCUS RUBRA	NORTHERN RED OAK	3	1.5-2" CAL.



FOR PROFILE SEE SHEET NO. 52

FENCING DETAILS

TIMBER FENCE (TWO-RAIL) STA. 181+50 RT TO STA. 183+10 RT
TIMBER FENCE (TWO-RAIL) STA. 184+75 RT TO STA. 190+90 RT
TIMBER FENCE (TWO-RAIL) STA. 189+23 LT TO STA. 190+90 LT

HIGHWAY GUARD DETAILS

NONE
TRAFFIC SIGNAL CONDUIT
NONE

WATER SUPPLY ALTERATIONS

NONE
DRAINAGE DETAILS
NONE

PLANT LIST

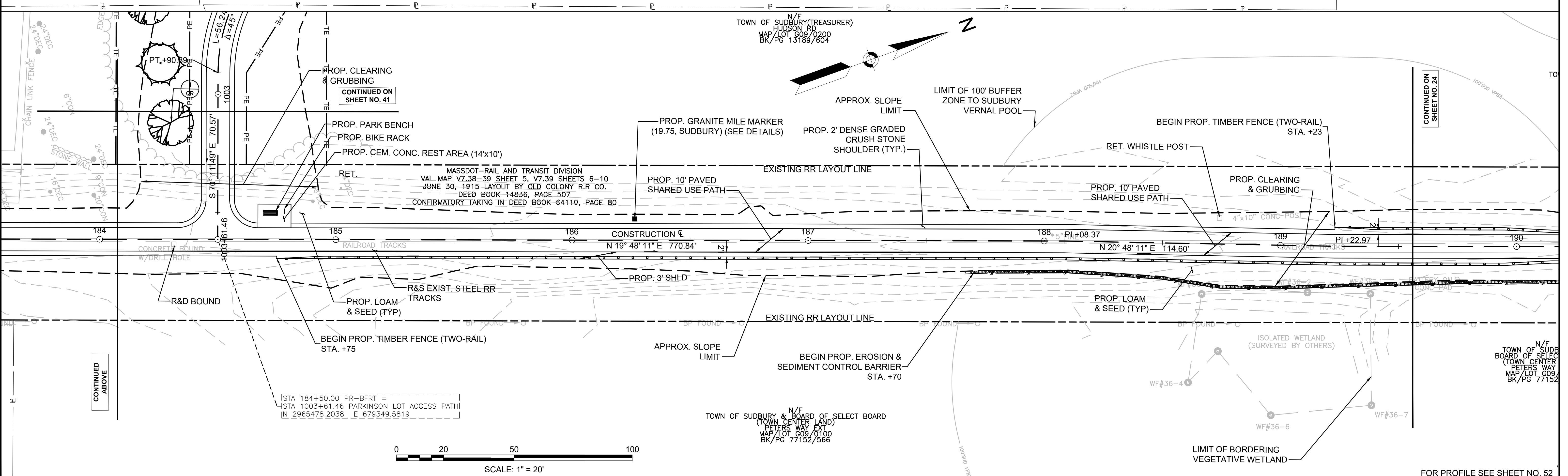
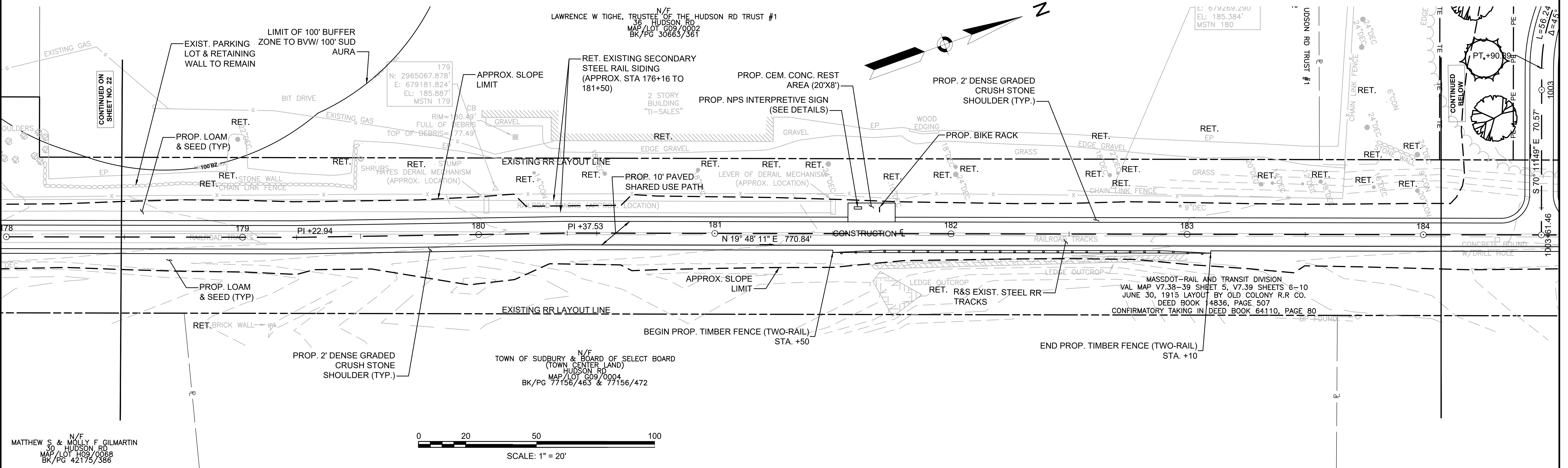
KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
QR	QUERCUS RUBRA	NORTHERN RED OAK	1	1.5-2" CAL.

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#
PLANT QUANTITY AND SPECIES X XX

BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	23	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



608164_HD(CONSTRUCTION PLANS).DWG Plotted on 15-Nov-2021 10:49 AM

FOR PROFILE SEE SHEET NO. 52

FENCING DETAILS

HIGHWAY GUARD DETAILS

TRAFFIC SIGNAL CONDUIT

WATER SUPPLY ALTERATIONS

DRAINAGE DETAILS

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

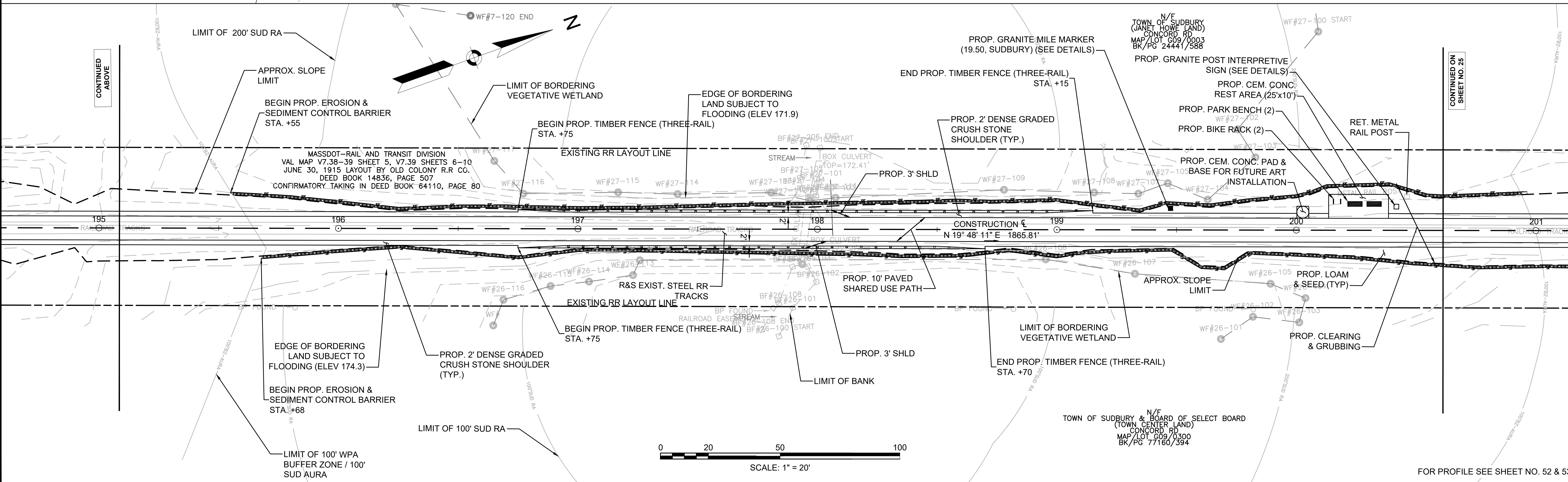
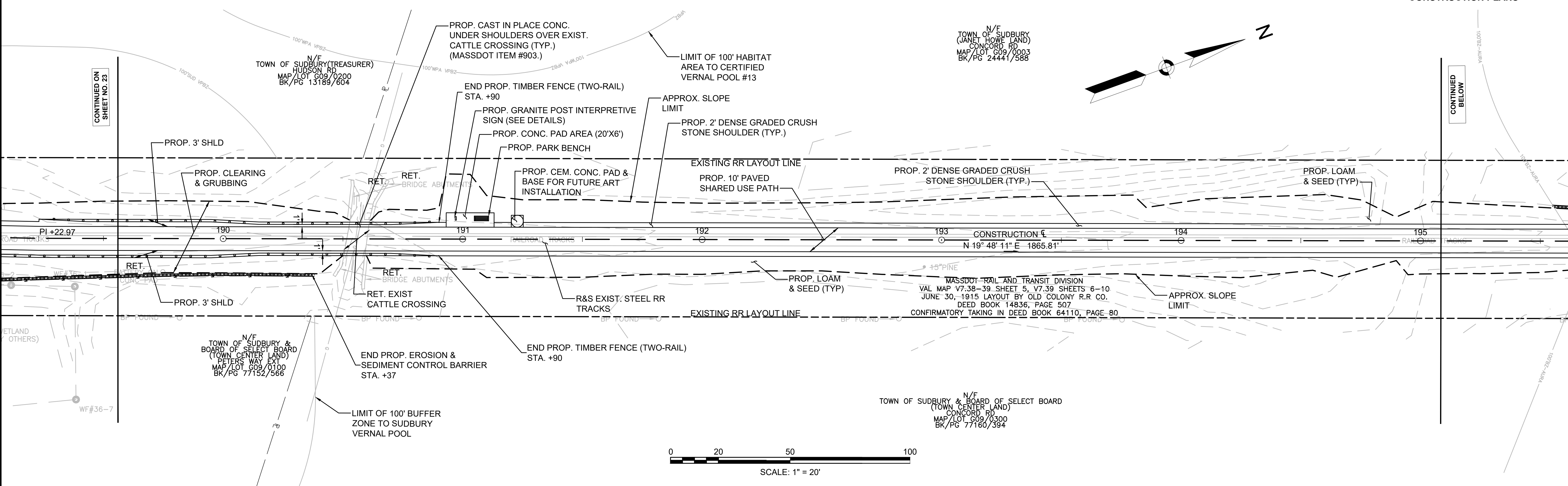
SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	24	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS

TIMBER FENCE (TWO-RAIL) STA. 184+75 RT TO STA. 190+90 RT
 TIMBER FENCE (TWO-RAIL) STA. 189+23 LT TO STA. 190+90 LT
 TIMBER FENCE (THREE-RAIL) STA. 196+75 RT TO STA. 198+70 RT
 TIMBER FENCE (THREE-RAIL) STA. 196+75 LT TO STA. 199+15 LT



FOR PROFILE SEE SHEET NO. 52 & 53

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

LEGEND:

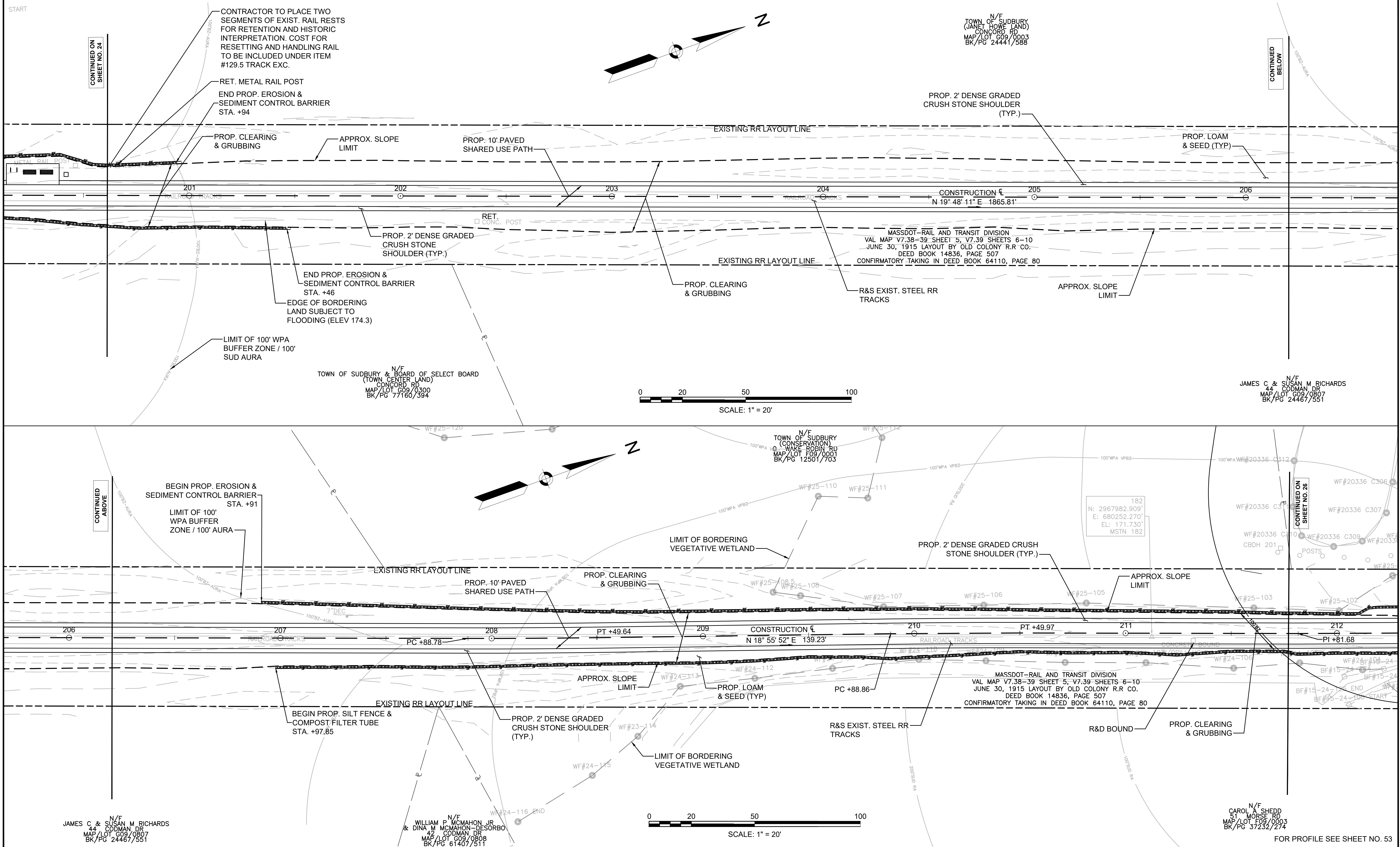
PROPOSED WHEELCHAIR RAMP DETAIL # X#

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	25	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



CONTINUED ON SHEET NO. 24

CONTINUED BELOW

CONTINUED ABOVE

CONTINUED ON SHEET NO. 26

JAMES C & SUSAN M RICHARDS
44 CODMAN DR
MAP/LOT G09/0807
BK/PG 24467/551

WILLIAM P MCMAHON JR
& DINA M MCMAHON-DESORBO
42 CODMAN DR
MAP/LOT G09/0808
BK/PG 61407/511

CAROL A SHEDD
51 MORSE RD
MAP/LOT F09/0003
BK/PG 37232/274

FOR PROFILE SEE SHEET NO. 53

NOTES:
 1. PROP. MILLING MULCH TO BE PLACED UNDER GUARDRAIL (SEE TYPICAL SECTIONS & MASSDOT STD. SPEC. ITEM 469.)

FENCING DETAILS
 TIMBER FENCE (THREE-RAIL)
 STA. 216+25 RT TO STA. 216+53 RT
 TIMBER FENCE (THREE-RAIL)
 STA. 216+89 RT TO STA. 217+00 RT

HIGHWAY GUARD DETAILS
 TIMBER GUARDRAIL
 STA. 216+09 RT TO STA. 216+53 RT
 TIMBER GUARDRAIL
 STA. 216+68 RT TO STA. 217+64 RT
 TIMBER GUARDRAIL
 STA. 216+01 RT TO STA. 216+52 RT
 TIMBER GUARDRAIL
 STA. 216+68 RT TO STA. 217+64 RT

TRAFFIC SIGNAL CONDUIT
 NONE

WATER SUPPLY ALTERATIONS
 SHEET 184

DRAINAGE DETAILS
 SHEET 184

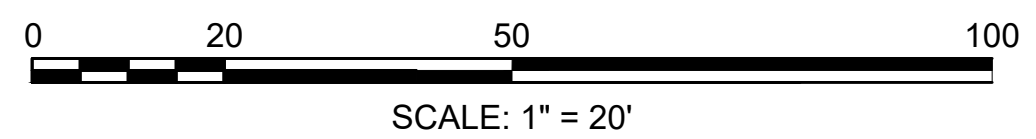
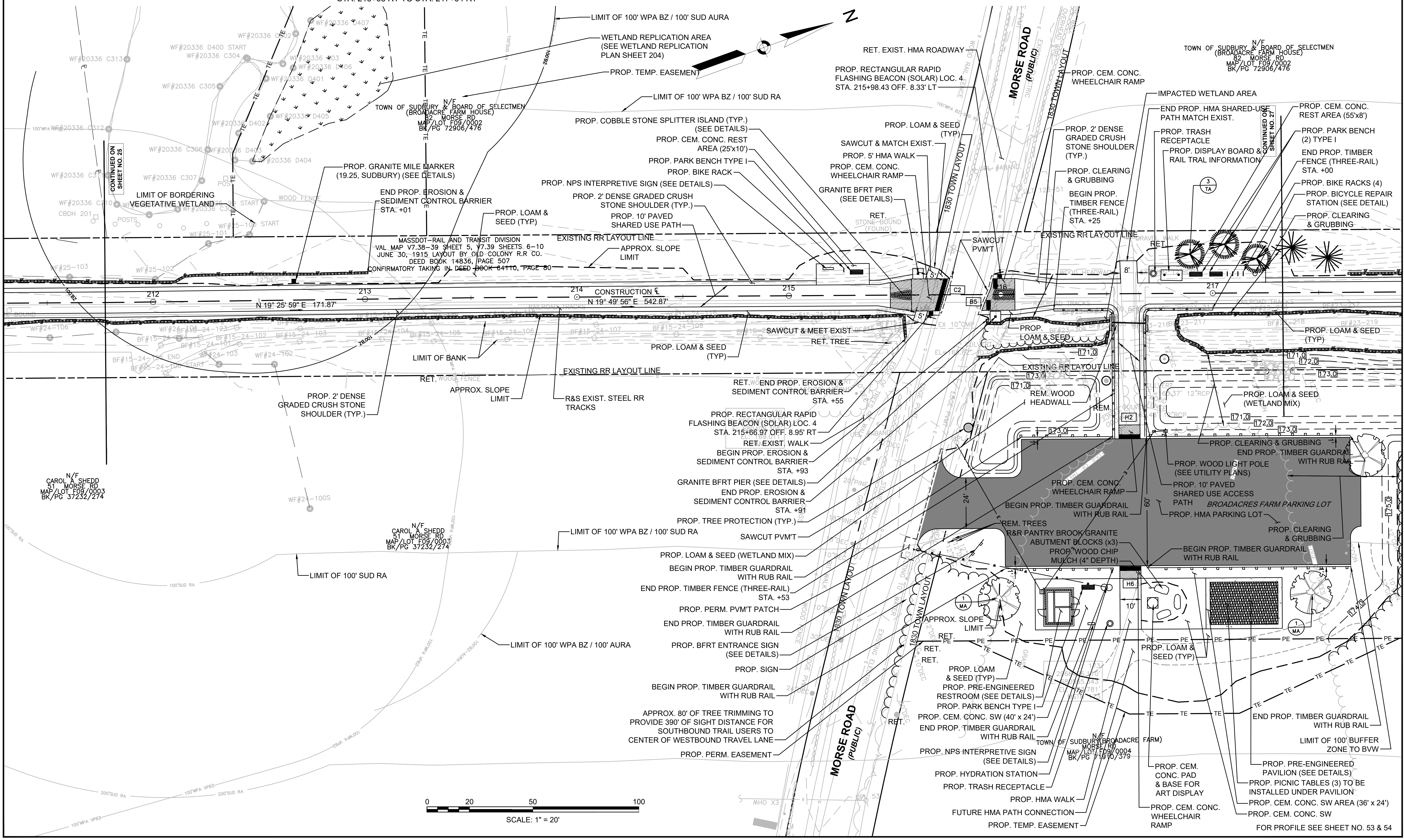
PLANT LIST				
KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
TA	TILIA AMERICANA	AMERICAN LINDEN	4	1.5-2" CAL.
MA	MALUS 'IVORY SPEAR'	IVORY SPEAR CRABAPPLE	2	1.5-2" CAL.

LEGEND:
 PROPOSED WHEELCHAIR RAMP DETAIL # [Symbol]
 PLANT QUANTITY AND SPECIES [Symbol]

SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	26	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 222+25 LT TO STA. 231+73 LT
 TIMBER FENCE (THREE-RAIL) STA. 224+23 RT TO STA. 228+73 RT

HIGHWAY GUARD DETAILS

NONE

WATER SUPPLY ALTERATIONS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
TA	TILIA AMERICANA	AMERICAN LINDEN	1	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	2	5-6' HT.
MA	MALUS 'IVORY SPEAR'	IVORY SPEAR CRABAPPLE	1	1.5-2" CAL.
SHRUBS				
ARA	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	7	3-4' HT. B&B
ILX	ILEX VERTICILLATA	WINTERBERRY	42	18"-24" HT.

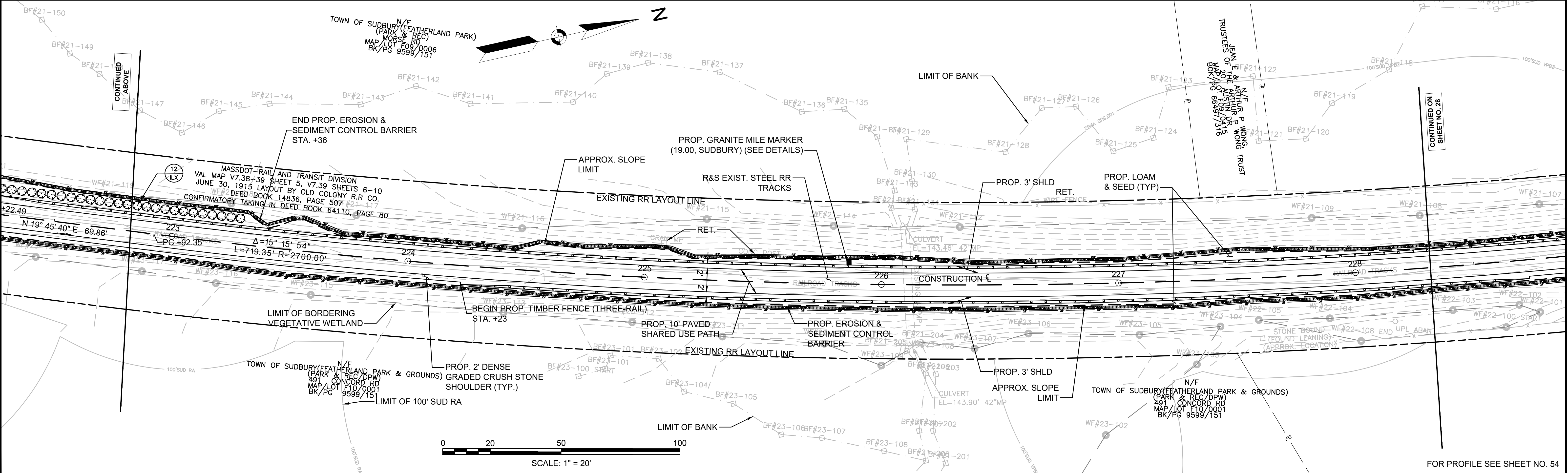
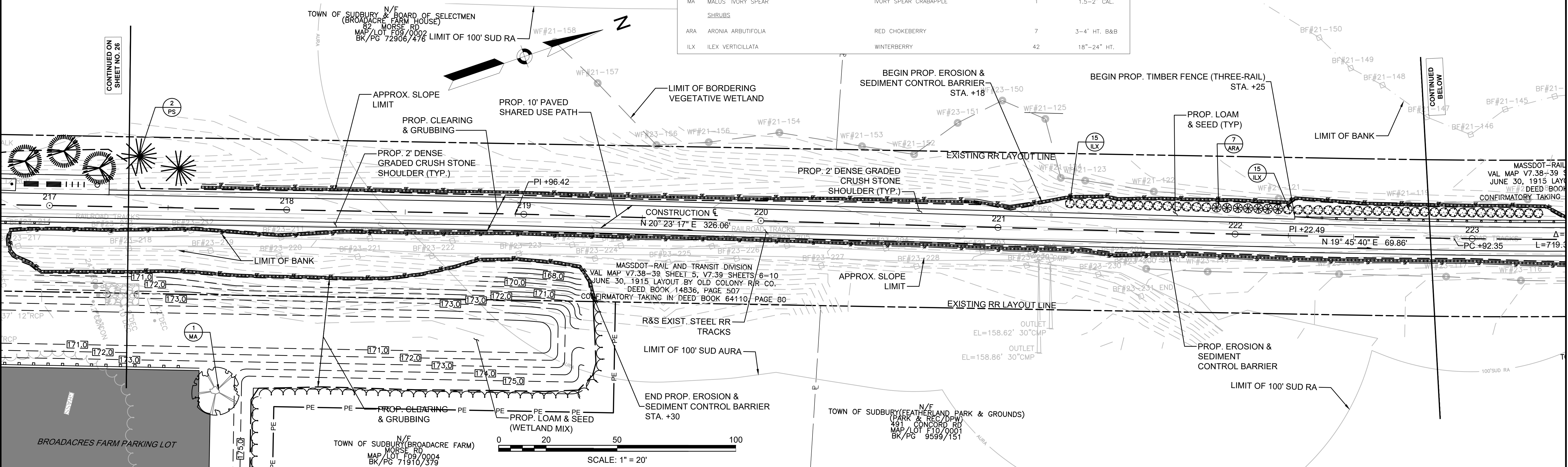
LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#
 PLANT QUANTITY AND SPECIES X XX

SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	27	318

PROJECT FILE NO. 608164
CONSTRUCTION PLANS

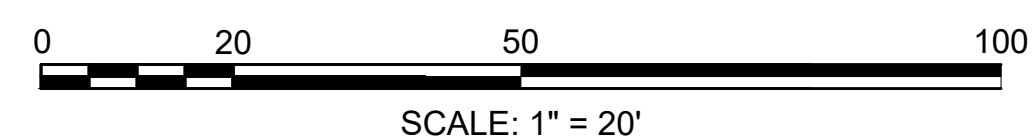


CONTINUED ON SHEET NO. 26

CONTINUED BELOW

CONTINUED ABOVE

CONTINUED ON SHEET NO. 28



FOR PROFILE SEE SHEET NO. 54

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 222+25 LT TO STA. 231+73 LT
TIMBER FENCE (THREE-RAIL) STA. 224+23 RT TO STA. 228+73 RT
TIMBER FENCE (TWO-RAIL) STA. 236+90 LT TO STA. 241+73 LT
TIMBER FENCE (TWO-RAIL) STA. 236+90 RT TO STA. 241+73 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

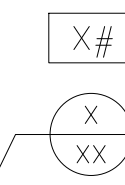
NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
PG	PICEA GLAUC	WHITE SPRUCE	22	4-5' HT.

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL #
PLANT QUANTITY AND SPECIES

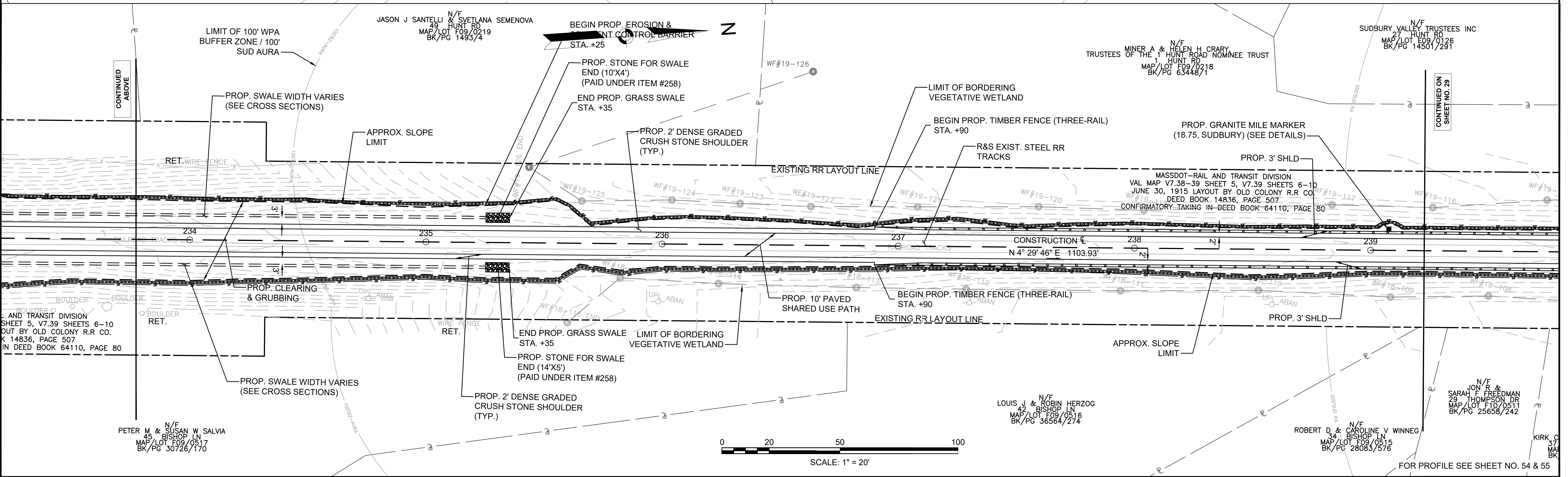
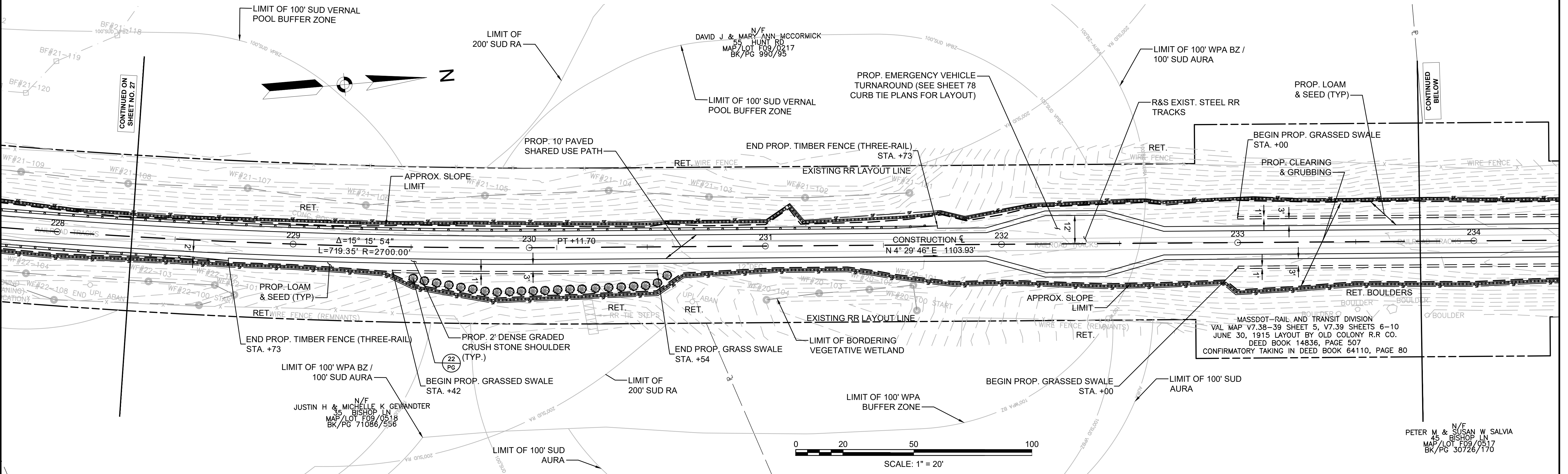


SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	28	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 236+90 LT TO STA. 243+45 LT
 TIMBER FENCE (THREE-RAIL) STA. 236+90 RT TO STA. 241+73 RT
 TIMBER FENCE (TWO-RAIL) STA. 245+75 LT TO STA. 248+30 LT
 TIMBER FENCE (TWO-RAIL) STA. 245+75 RT TO STA. 248+30 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
TA	TILIA AMERICANA	AMERICAN LINDEN	12	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	12	5-6" HT.
SHRUBS				
IG	ILEX GLABRA	INKBERRY	5	2-3" HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	11	18"-24" HT.

LEGEND:

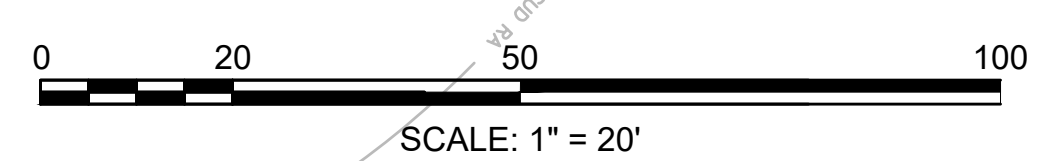
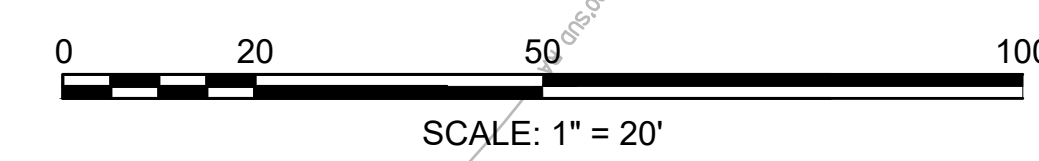
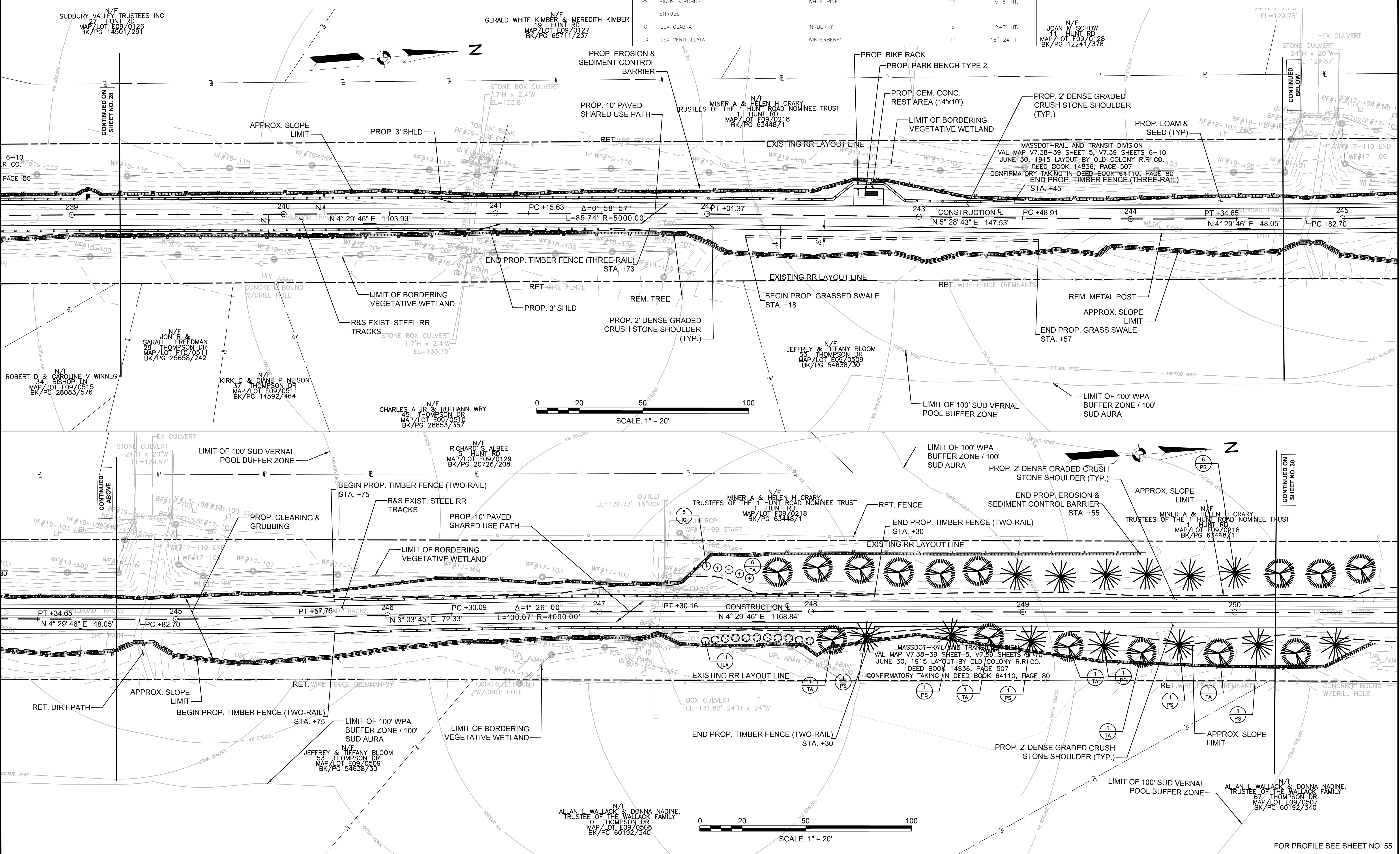
PROPOSED WHEELCHAIR RAMP DETAIL # [Symbol]
 PLANT QUANTITY AND SPECIES [Symbol]

SUBURRY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	29	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



FOR PROFILE SEE SHEET NO. 55

FENCING DETAILS
TIMBER FENCE (THREE-RAIL) STA. 258+23 RT TO STA. 258+73 RT

HIGHWAY GUARD DETAILS

WATER SUPPLY ALTERATIONS

PLANT LIST

NOTES:

1. ANY GRANITE ABUTMENT BLOCKS NOT BEING MODIFIED OR LEFT IN PLACE AS PART OF THE BRIDGE REPLACEMENT (SEE BRIDGE PLANS) SHALL BE REMOVED AND STACKED AT THE SUDBURY DPM YARD. THE CONTRACTOR SHALL ALSO TAKE SEVEN OF THE GRANITE BLOCKS AND REMOVE AND RESET AS FOLLOWS: TWO BLOCKS TO BE RESET AS BENCHES AT APPROX. STA. 102+08 LT AND APPROX. STA. 102+20 LT. THREE BLOCKS TO BE RESET AS BENCHES AT APPROX. STA. 216+77 RT. APPROX. FIVE TO SEVEN BLOCKS TO BE RESET AS A HISTORIC INTERPRETATION AT APPROX. STA. 280+89 RT. PAYMENT FOR R&R GRANITE ABUTMENT BLOCKS SHALL BE MADE UNDER ITEM 707.4

NONE

NONE

TRAFFIC SIGNAL CONDUIT

NONE

DRAINAGE DETAILS

SHEET 188

KEY BOTANICAL NAME

TREES

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
AR	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	3	1.5-2" CAL.
AS	ACER SACCHARUM	LEGACY SUGAR MAPLE	3	1.5-2" CAL.
QR	QUERCUS RUBRA	NORTHERN RED OAK	2	1.5-2" CAL.
QA	QUERCUS ALBA	WHITE OAK	4	1.5-2" CAL.
TA	TILIA AMERICANA	AMERICAN LINDEN	14	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	13	5-6" HT.
SHRUBS				
ARA	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	11	3-4' HT. B&B

LEGEND:

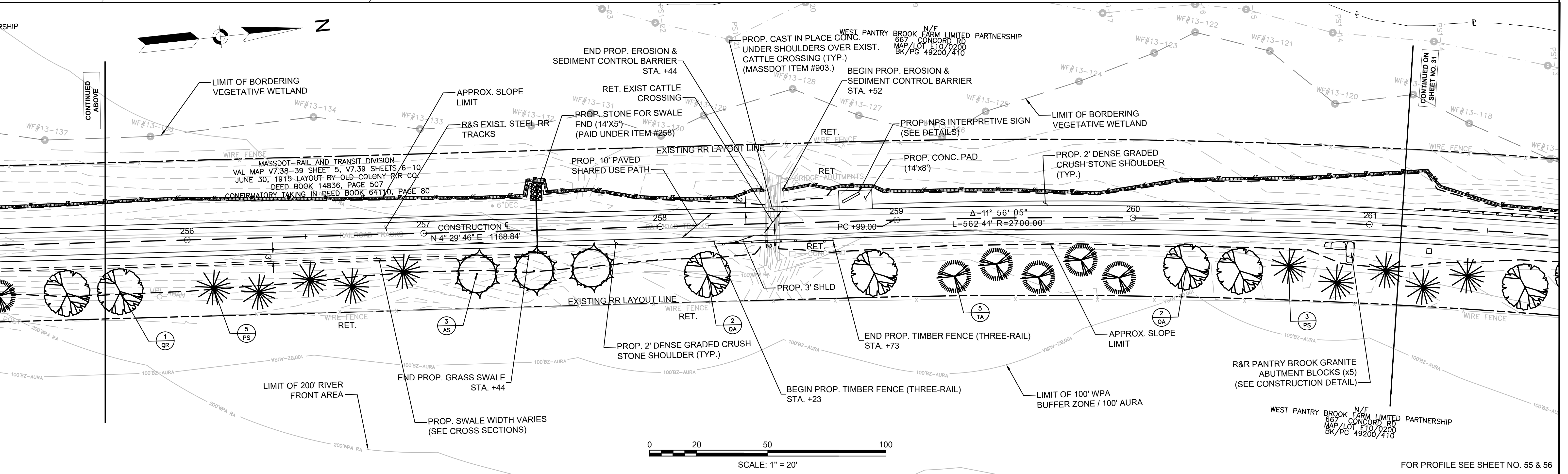
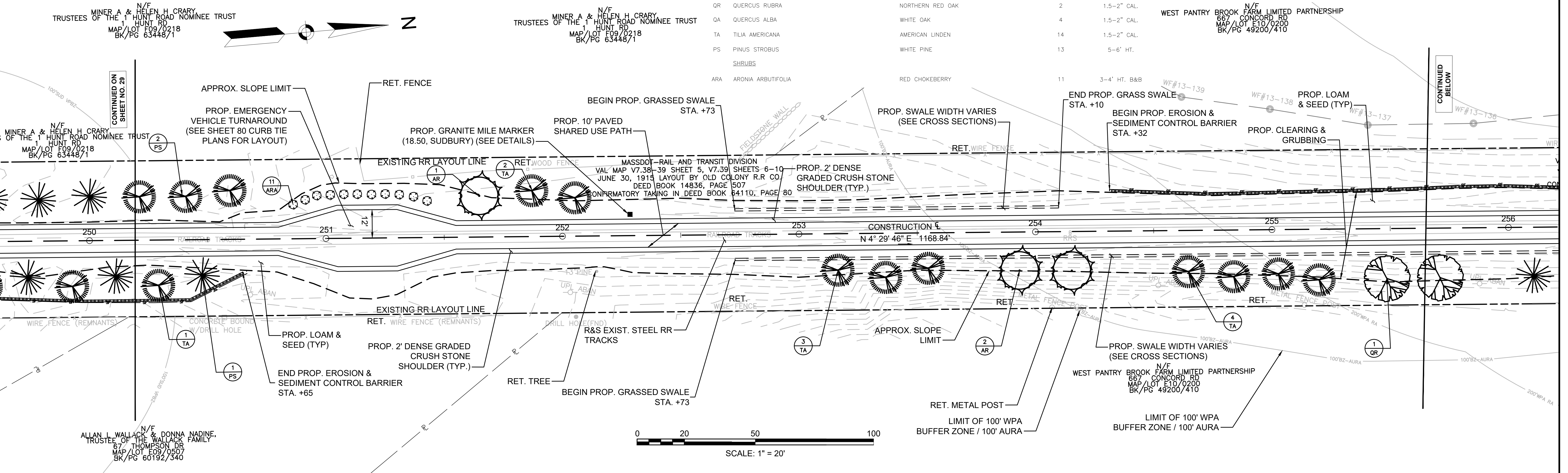
PROPOSED WHEELCHAIR RAMP DETAIL #

X#

PLANT QUANTITY AND SPECIES

X#

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	30	318
PROJECT FILE NO.		608164	
CONSTRUCTION PLANS			



FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 261+23 LT TO STA. 266+73 LT
 TIMBER FENCE (THREE-RAIL) STA. 262+73 RT TO STA. 270+23 RT

HIGHWAY GUARD DETAILS

NONE

WATER SUPPLY ALTERATIONS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
AR	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	4	1.5-2" CAL.
AS	ACER SACCHARUM	LEGACY SUGAR MAPLE	11	1.5-2" CAL.
QR	QUERCUS RUBRA	NORTHERN RED OAK	5	1.5-2" CAL.
TA	TILIA AMERICANA	AMERICAN LINDEN	8	1.5-2" CAL.
PS	PINUS STROBUS	WHITE PINE	7	5-6' HT.

LEGEND:

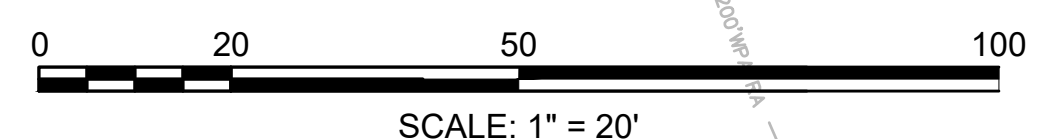
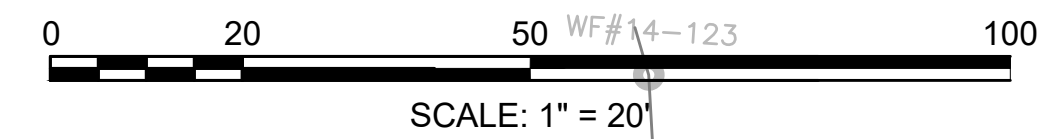
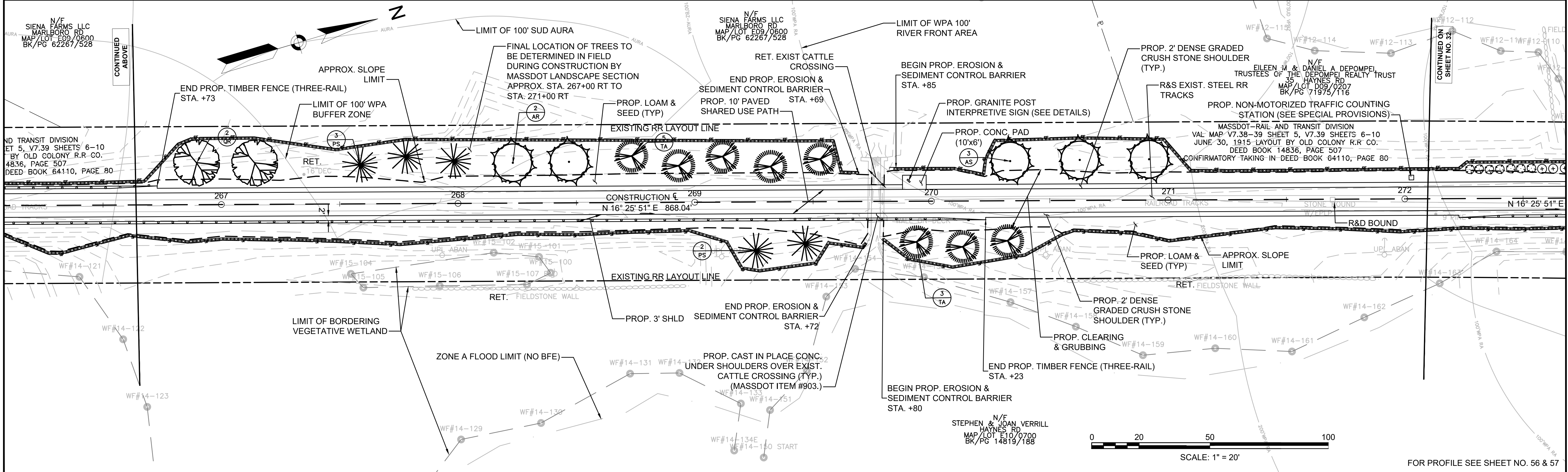
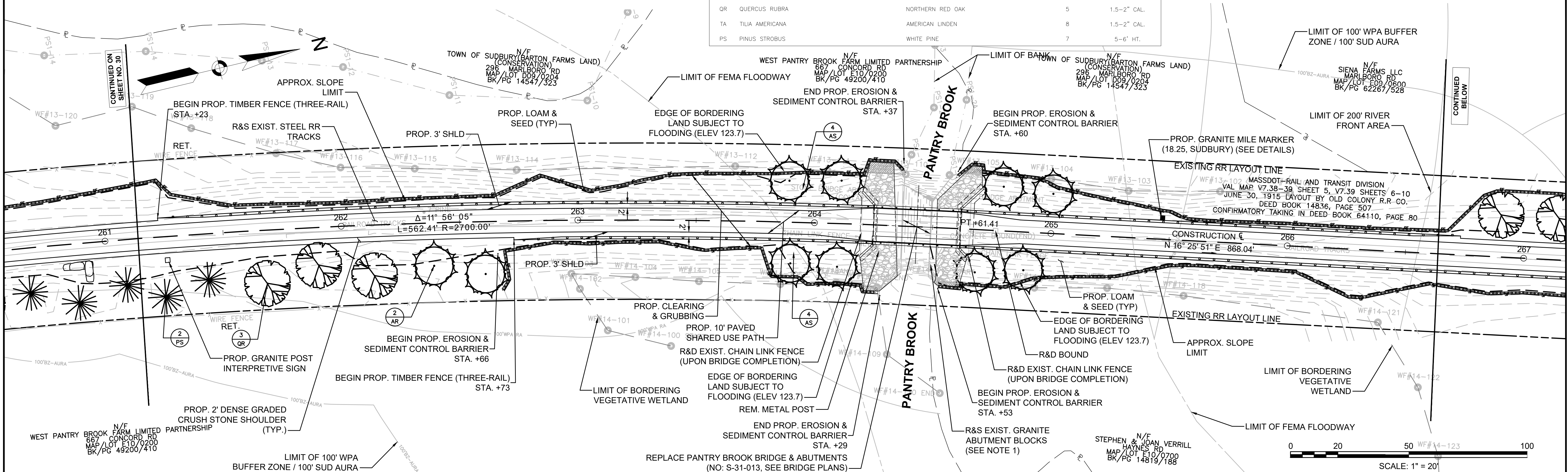
PROPOSED WHEELCHAIR RAMP DETAIL # X#
 PLANT QUANTITY AND SPECIES X
 XX

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	31	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



FOR PROFILE SEE SHEET NO. 56 & 57

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 272+23 RT TO STA. 273+73 RT
 STOCKADE FENCE STA. 275+55 LT TO STA. 280+25 LT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
SHRUBS				
IG	ILEX GLABRA	INKBERRY	8	2-3' HT.
CLA	CLETHRA ALNIFOLIA	SUMMERSWEET	3	18"-24" HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	39	18"-24" HT.

LEGEND:

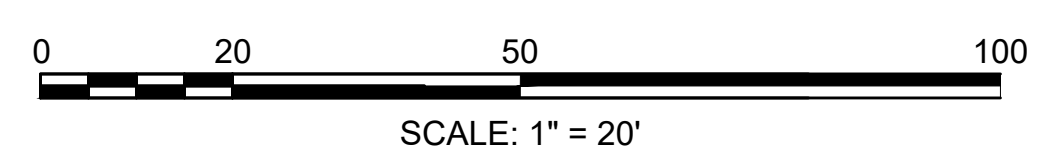
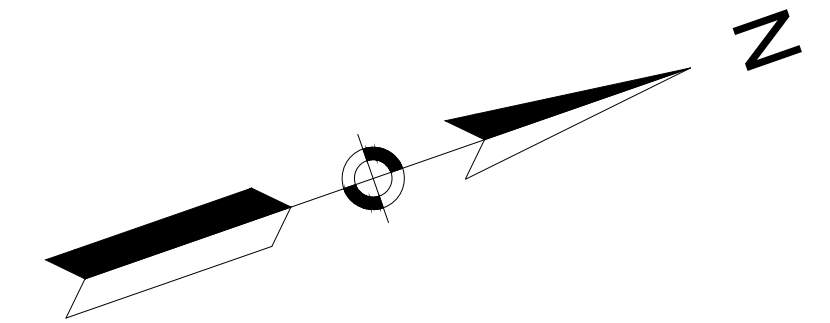
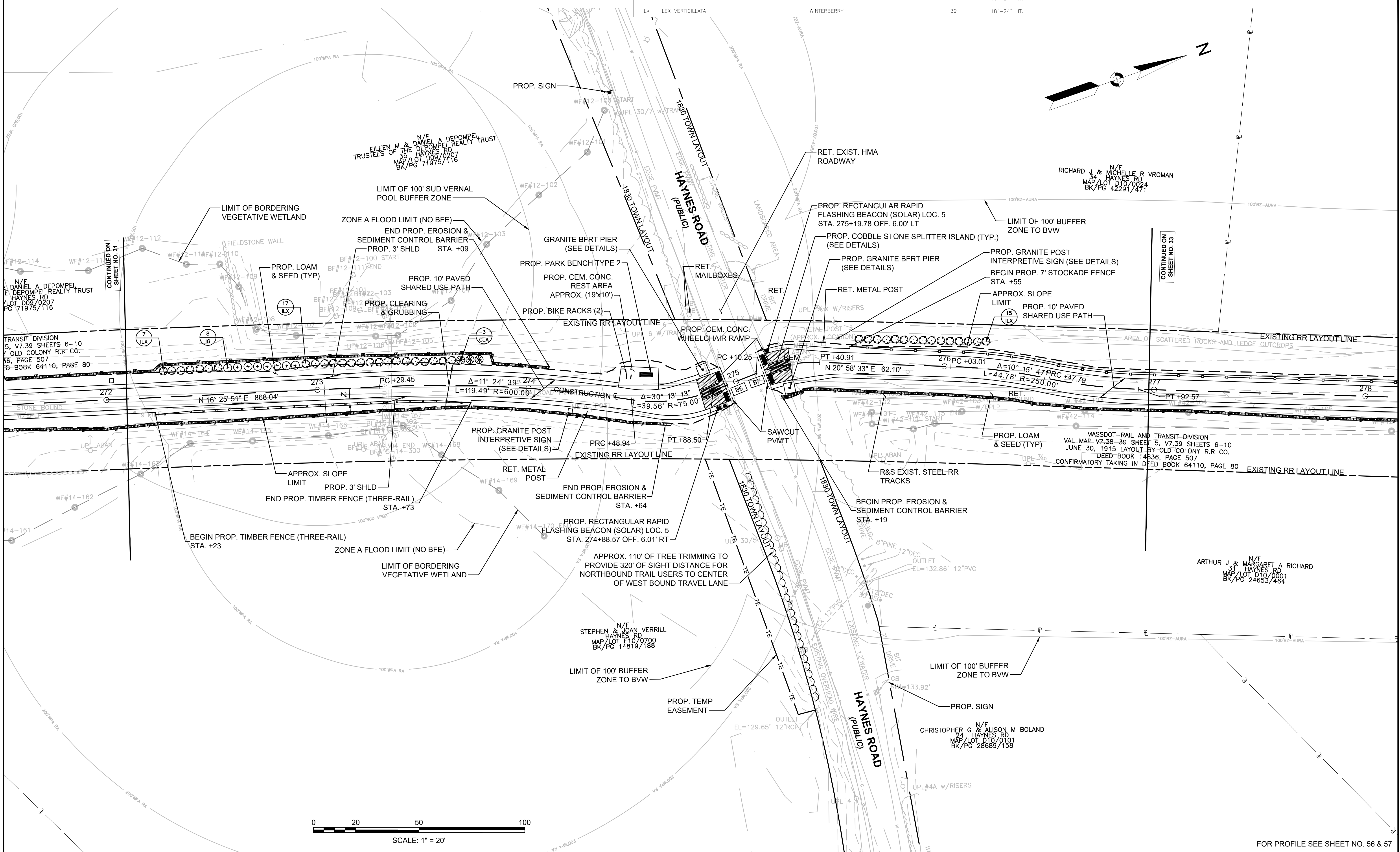
PROPOSED WHEELCHAIR RAMP DETAIL # X#
 PLANT QUANTITY AND SPECIES X
 XX

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	32	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



FOR PROFILE SEE SHEET NO. 56 & 57

FENCING DETAILS

STOCKADE FENCE STA. 275+55 LT TO STA. 280+25 LT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

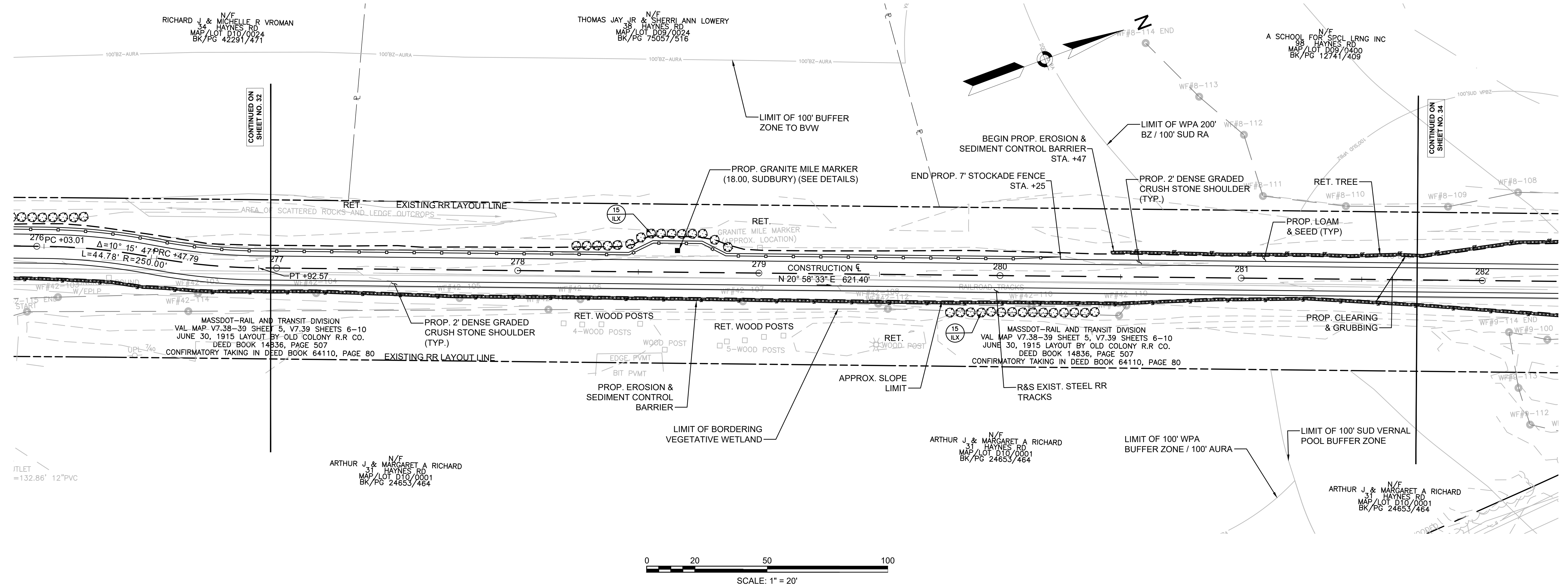
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	33	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
ILX	ILEX VERTICILLATA	WINTERBERRY	30	18"-24" HT.



FOR PROFILE SEE SHEET NO. ## AND ##

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 283+73 LT TO STA. 284+28 LT
 TIMBER FENCE (THREE-RAIL) STA. 284+65 RT TO STA. 285+50 RT
 TIMBER FENCE (TWO-RAIL) STA. 285+50 RT TO STA. 288+00 RT

HIGHWAY GUARD DETAILS

STEEL W-BEAM GUARDRAIL (TL-2) W/ WOOD POST STA. 284+28 LT TO STA. 284+46 LT
 STEEL W-BEAM GUARDRAIL (TL-2) W/ WOOD POST STA. 284+75 LT TO STA. 285+18 LT
 STEEL W-BEAM GUARDRAIL (TL-2) W/ WOOD POST STA. 284+51 RT TO STA. 284+63 RT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

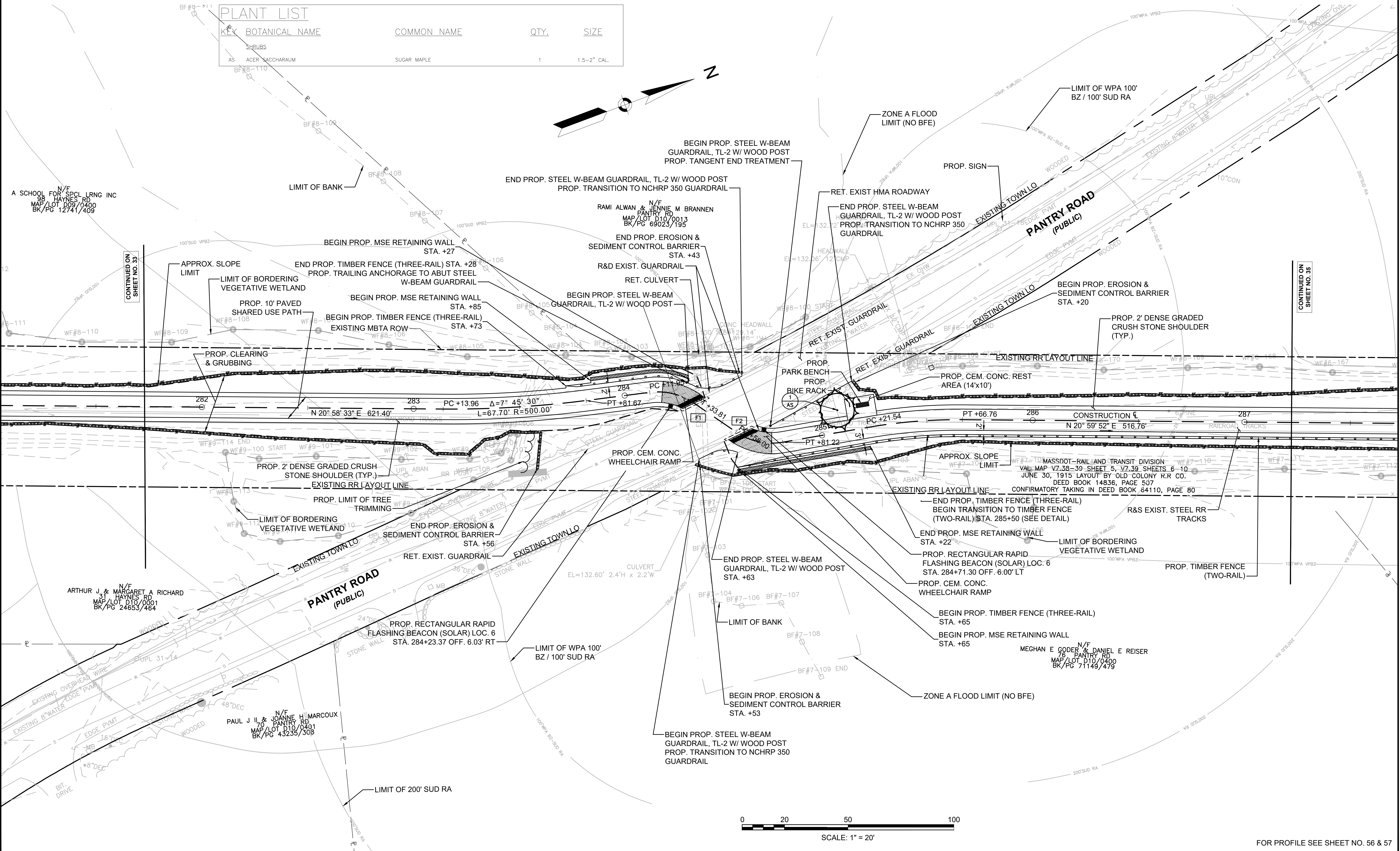
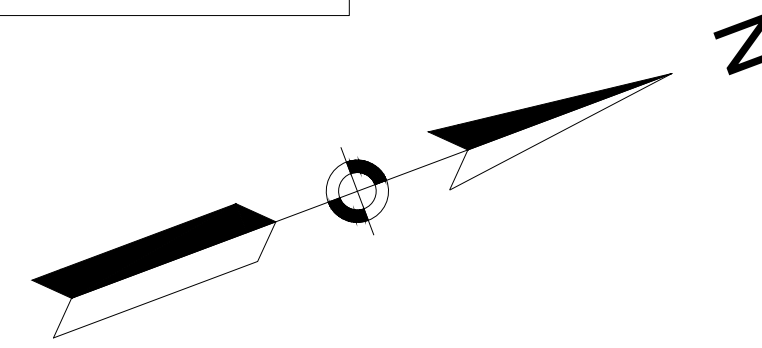
LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUBURBY			
BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	34	318
PROJECT FILE NO.		608164	
CONSTRUCTION PLANS			

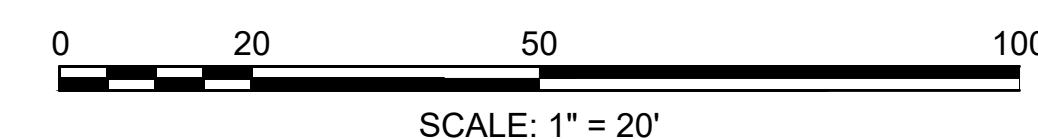
PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
SHRUBS				
AS	ACER SACCCHARUM	SUGAR MAPLE	1	1.5-2" CAL.



CONTINUED ON SHEET NO. 33

CONTINUED ON SHEET NO. 35



FOR PROFILE SEE SHEET NO. 56 & 57

FENCING DETAILS

TIMBER FENCE (TWO-RAIL) STA. 284+68 RT TO STA. 288+00 RT
TIMBER FENCE (THREE-RAIL) STA. 288+00 RT TO STA. 291+25 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

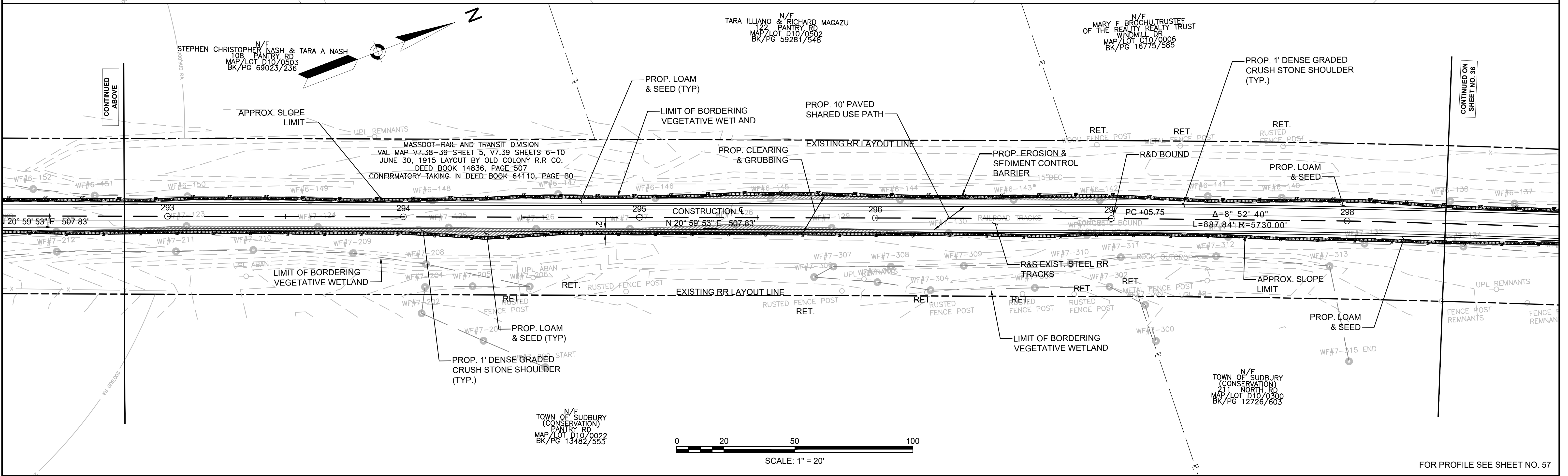
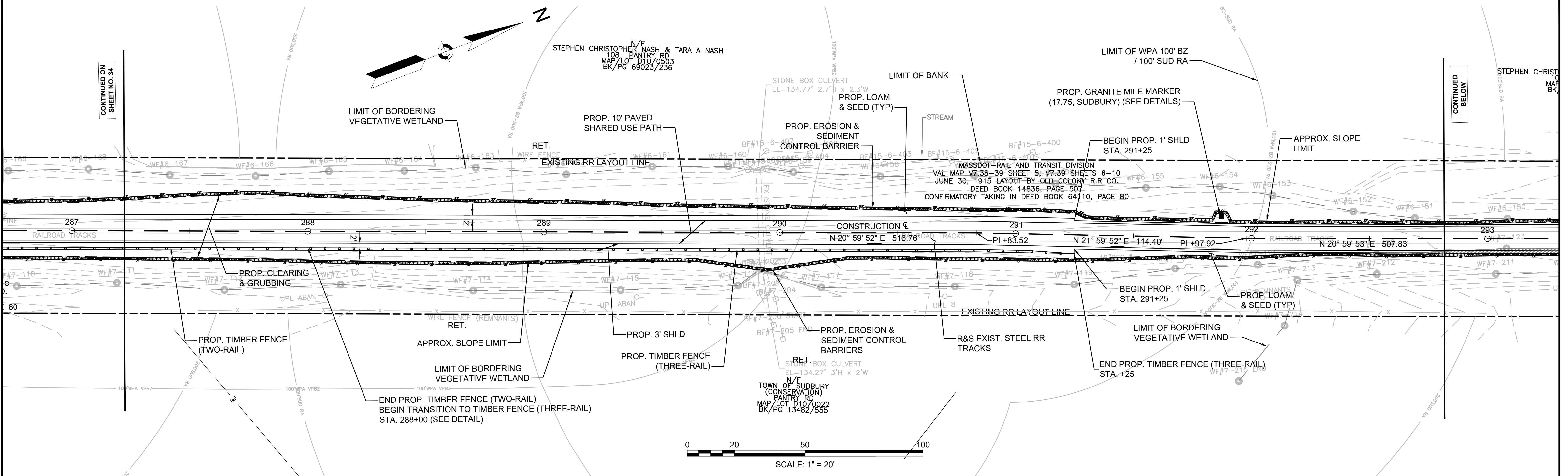
LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	35	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



FOR PROFILE SEE SHEET NO. 57

FENCING DETAILS

NONE

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 194

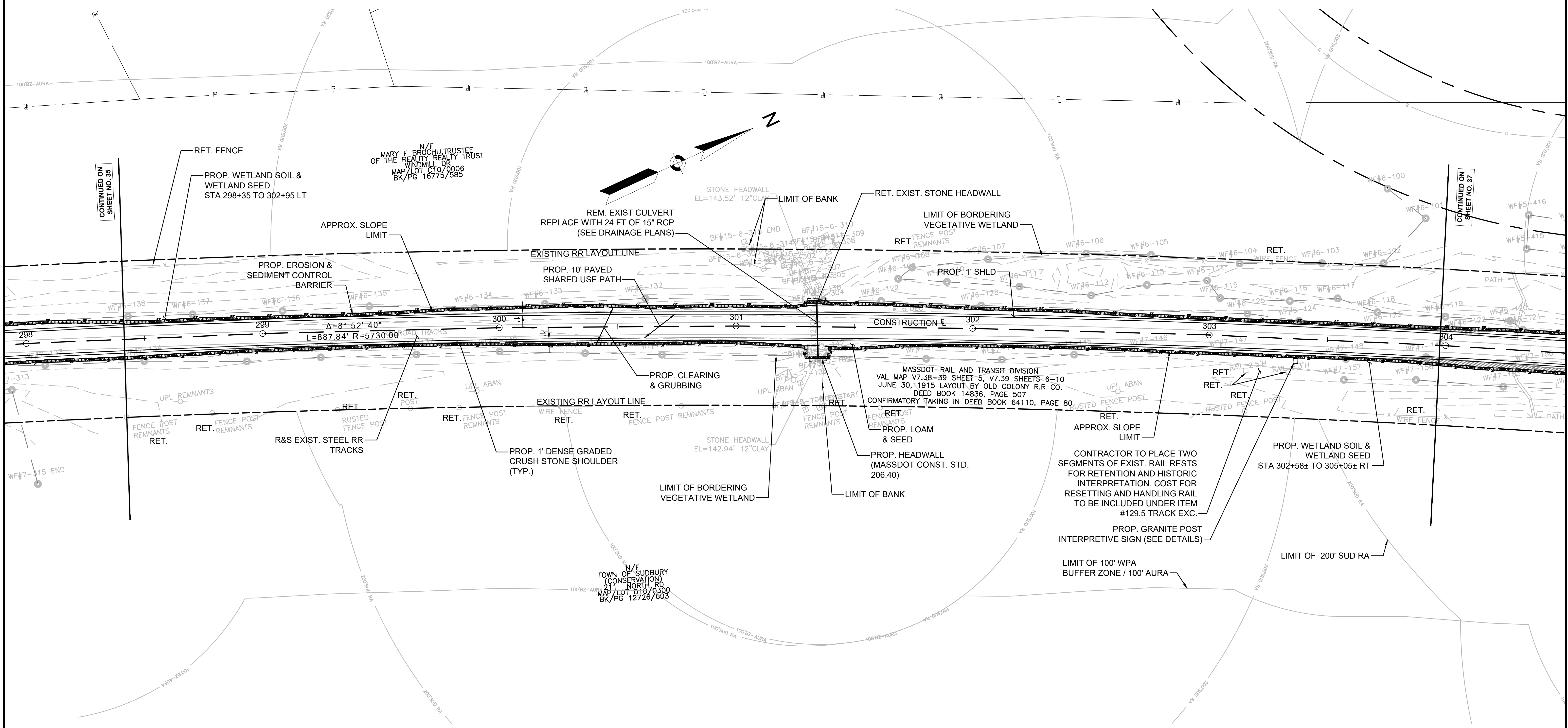
LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUDBURY BRUCE FREEMAN RAIL TRAIL

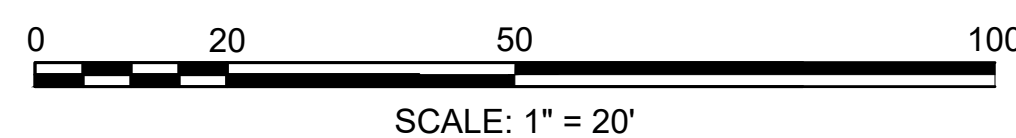
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	36	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



CONTINUED ON SHEET NO. 35

CONTINUED ON SHEET NO. 37



FOR PROFILE SEE SHEET NO. 57 & 58

608164_HD.CONSTRUCTION PLANS.DWG Plotted on 15-Nov-2021 10:56 AM

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 308+79 LT TO STA. 309+78 LT
 TIMBER FENCE (THREE-RAIL) STA. 308+16 RT TO STA. 315+78 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE SHEET 162

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE SHEET 195

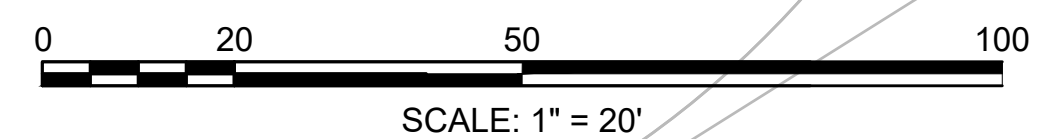
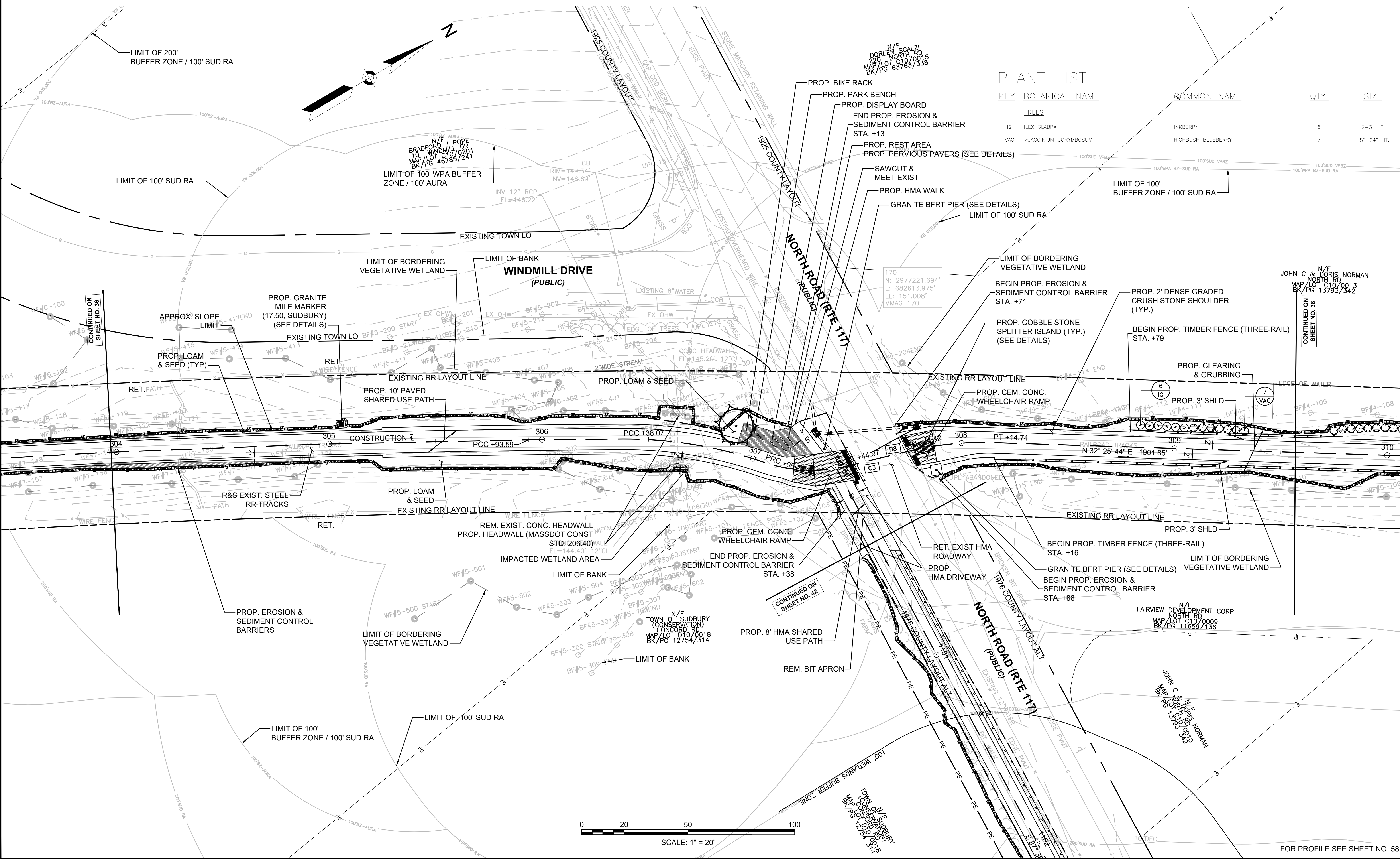
LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	37	318
PROJECT FILE NO.		608164	
CONSTRUCTION PLANS			

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
IG	ILEX GLABRA	INKBERRY	6	2-3' HT.
VAC	VGACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	7	18"-24" HT.



FOR PROFILE SEE SHEET NO. 58

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 308+79 LT TO STA. 309+79 LT
 TIMBER FENCE (THREE-RAIL) STA. 313+29 LT TO STA. 316+29 LT
 TIMBER FENCE (THREE-RAIL) STA. 308+16 RT TO STA. 315+79 RT
 STOCKADE FENCE STA. 316+56 LT TO STA. 319+96 LT
 STOCKADE FENCE STA. 316+00 RT TO STA. 319+75 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

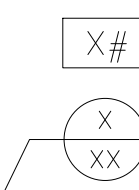
NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
IG	ILEX GLABRA	INKBERRY	10	2-3' HT.
VAC	VGACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	15	18"-24" HT.

LEGEND:

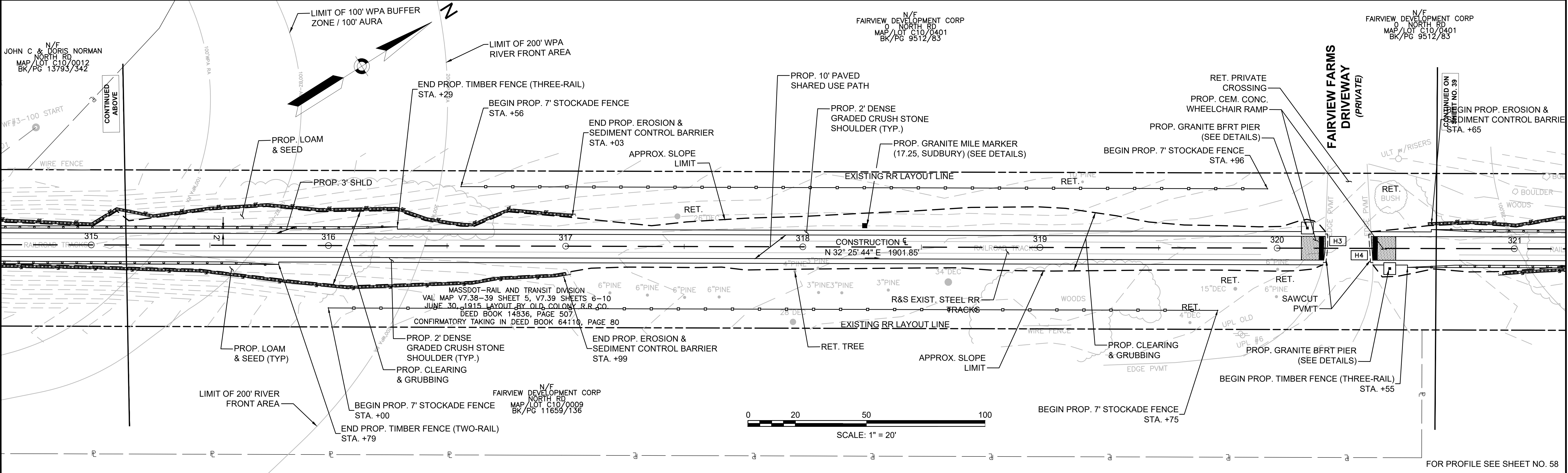
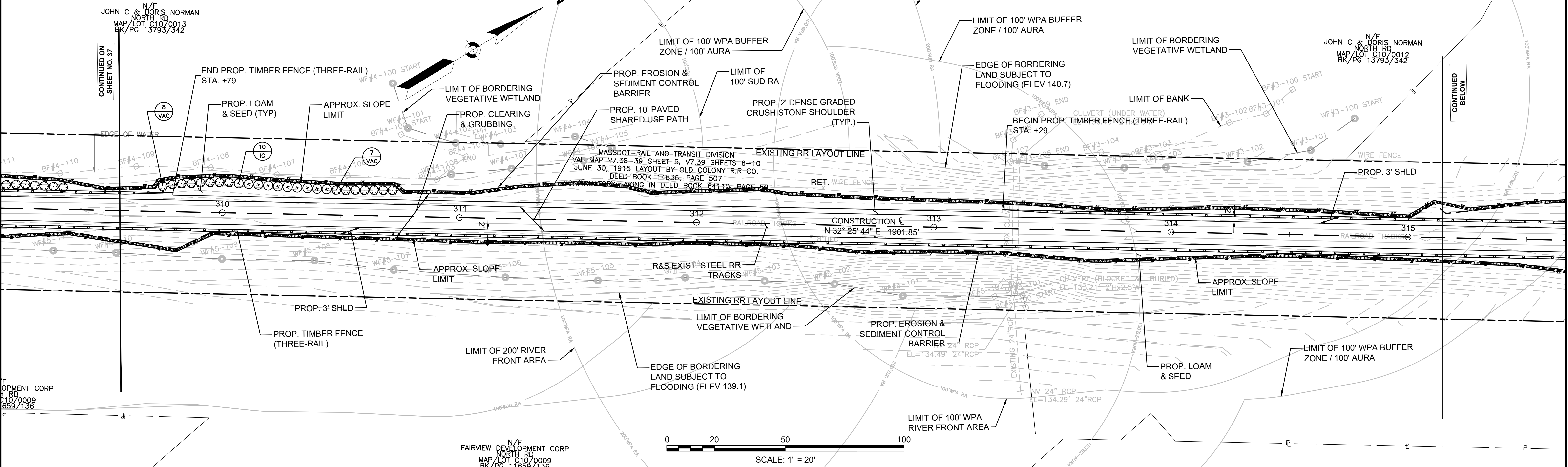
PROPOSED WHEELCHAIR RAMP DETAIL #
 PLANT QUANTITY AND SPECIES



SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	38	318
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS



FOR PROFILE SEE SHEET NO. 58

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 320+65 LT TO STA. 324+79 RT
 TIMBER FENCE (THREE-RAIL) STA. 320+55 RT TO STA. 321+79 RT
 TIMBER FENCE (THREE-RAIL) STA. 322+79 RT TO STA. 329+79 RT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

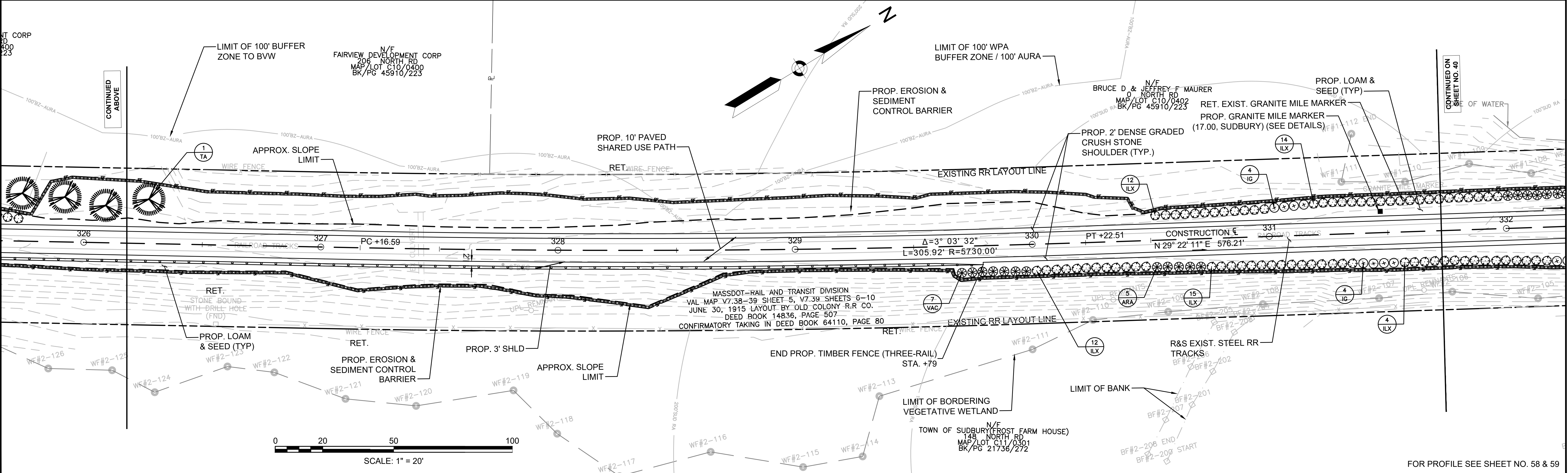
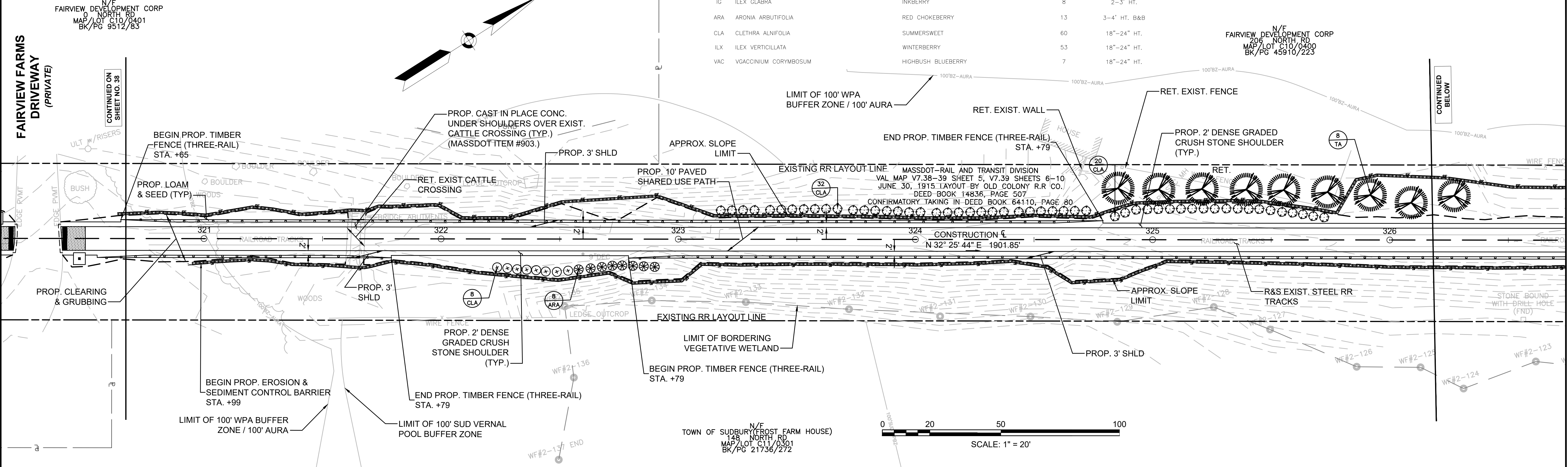
PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
TA	TILIA AMERICANA	AMERICAN LINDEN	9	5-6' HT.
SHRUBS				
IG	ILEX GLABRA	INKBERRY	8	2-3' HT.
ARA	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	13	3-4' HT. B&B
CLA	CLETHRA ALNIFOLIA	SUMMERSWEET	60	18"-24" HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	53	18"-24" HT.
VAC	VGACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	7	18"-24" HT.

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL # [Symbol]
 PLANT QUANTITY AND SPECIES [Symbol]

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	39	318
PROJECT FILE NO.		608164	
CONSTRUCTION PLANS			



FOR PROFILE SEE SHEET NO. 58 & 59

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 332+16 LT TO STA. 333+11 LT

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
SHRUBS				
IG	ILEX GLABRA	INKBERRY	14	2-3' HT.
ARA	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	5	3-4' HT. B&B
CLA	CLETHRA ALNIFOLIA	SUMMERSWEET	6	18"-24" HT.
ILX	ILEX VERTICILLATA	WINTERBERRY	81	18"-24" HT.
VAC	VGACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	6	18"-24" HT.

LEGEND:

PROPOSED WHEELCHAIR RAMP DETAIL #

X#

PLANT QUANTITY AND SPECIES

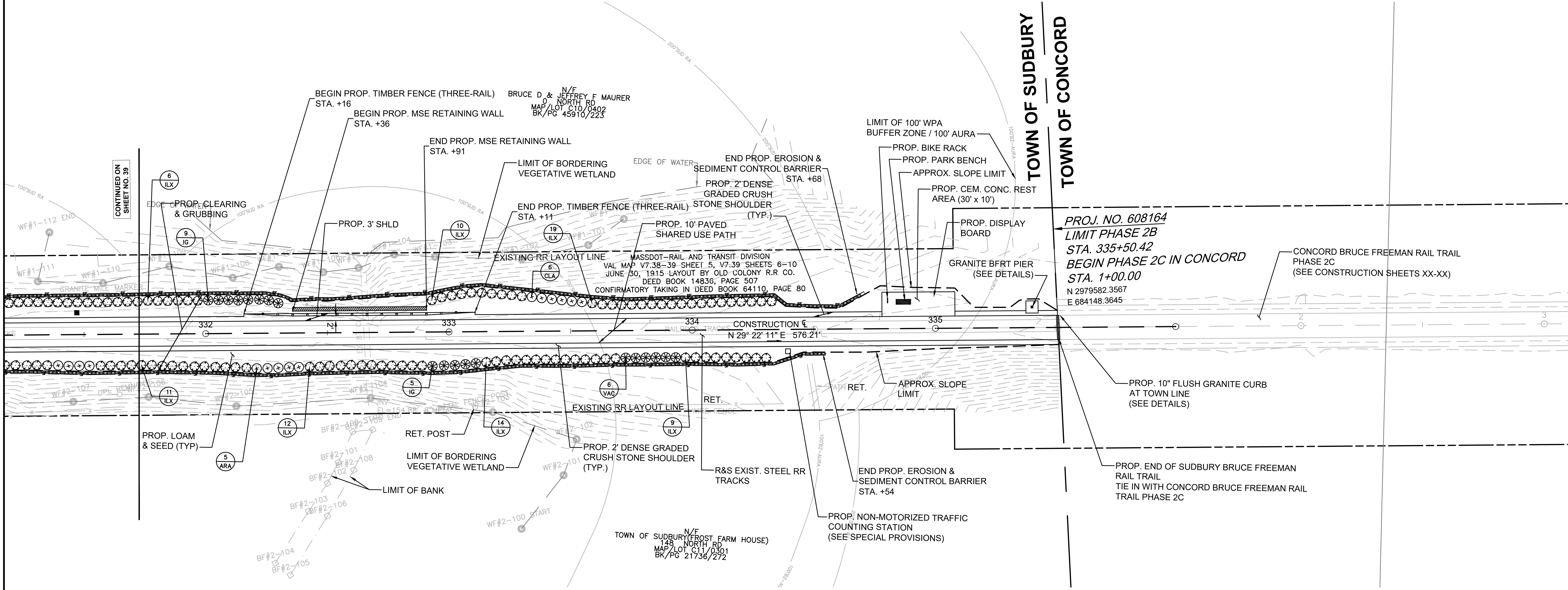
X
XX

SUDBURY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	40	318

PROJECT FILE NO. 608164

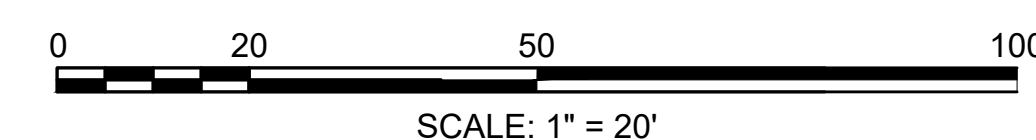
CONSTRUCTION PLANS



CONTINUED ON SHEET NO. 39

TOWN OF SUDBURY
TOWN OF CONCORD

PROJ. NO. 608164
LIMIT PHASE 2B
STA. 335+50.42
BEGIN PHASE 2C IN CONCORD
STA. 1+00.00
N 29°58'2.3567
E 68°41'48.3645



FENCING DETAILS NONE
 HIGHWAY GUARD DETAILS NONE
 TRAFFIC SIGNAL CONDUIT NONE
 WATER SUPPLY ALTERATIONS NONE
 DRAINAGE DETAILS NONE

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
TREES				
AR	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY MAPLE	3	1.5-2" CAL.
OR	QUERCUS RUBRA	NORTHERN RED OAK	3	1.5-2" CAL.

LEGEND:

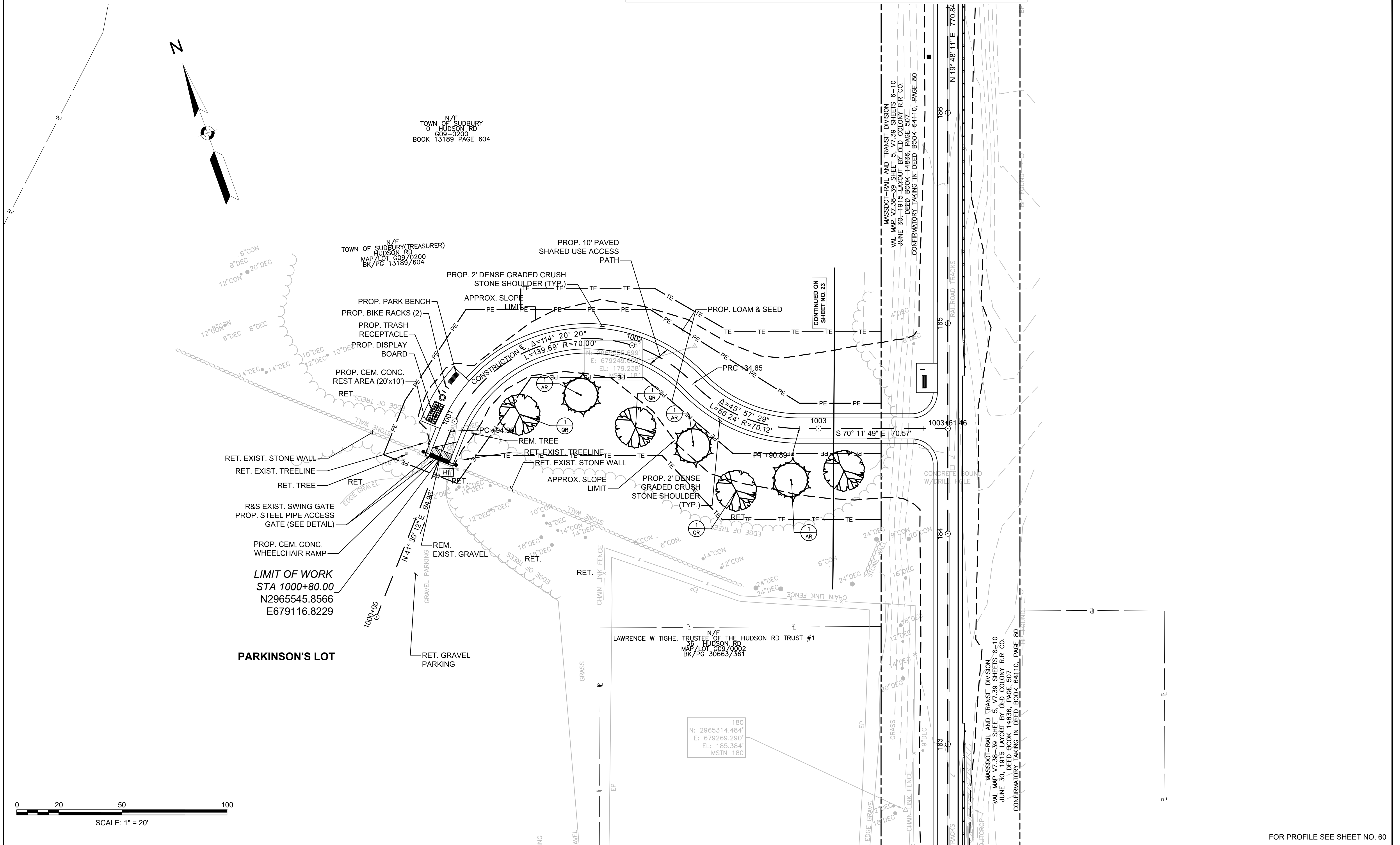
PROPOSED WHEELCHAIR RAMP DETAIL # X#
 PLANT QUANTITY AND SPECIES X
 XX

SUBURBY BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	41	318

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



MASSDOT-RAIL AND TRANSIT DIVISION
 VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
 JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
 DEED BOOK 14636, PAGE 507
 CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80

MASSDOT-RAIL AND TRANSIT DIVISION
 VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
 JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
 DEED BOOK 14636, PAGE 507
 CONFIRMATORY TAKING IN DEED BOOK 64110, PAGE 80

N: 2965314.484'
 E: 679269.290'
 EL: 185.384'
 MSTN 180

FENCING DETAILS

TIMBER FENCE (THREE-RAIL) STA. 1102+10 RT TO STA. 1103+20 RT

HIGHWAY GUARD DETAILS

STEEL W-BEAM (TL-2) W/WOOD POST & RUB RAIL
 STA. 1100+51 LT TO STA. 1105+84 LT
 TIMBER GUARDRAIL W/ RUB RAIL
 STA. 1106+00 LT TO STA. 1107+27 LT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

SEE SHEET 200

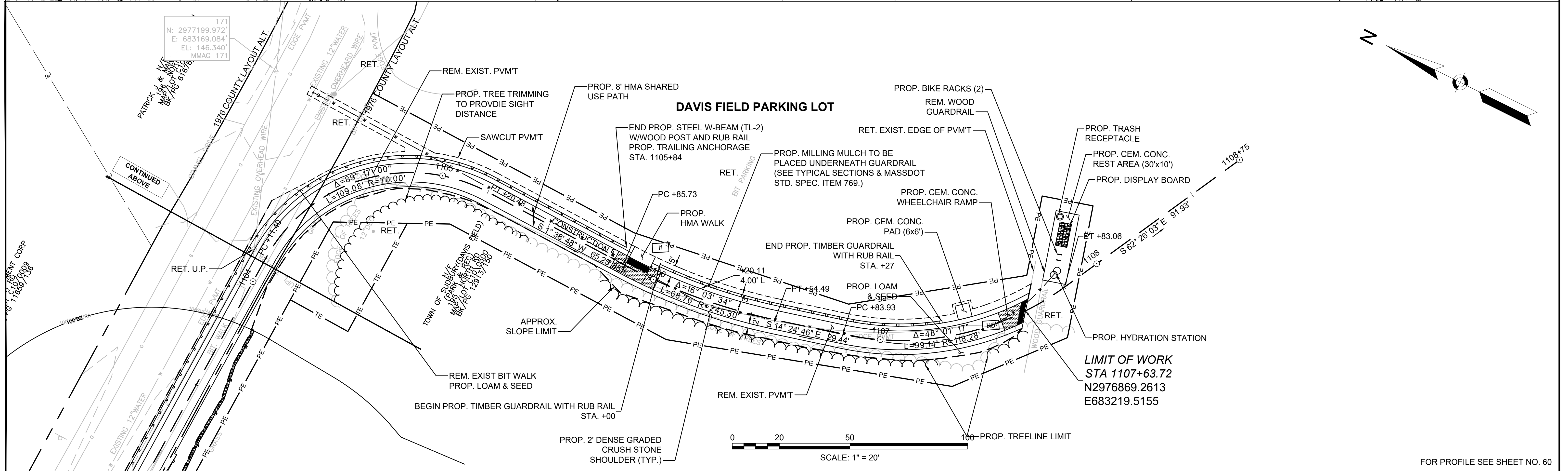
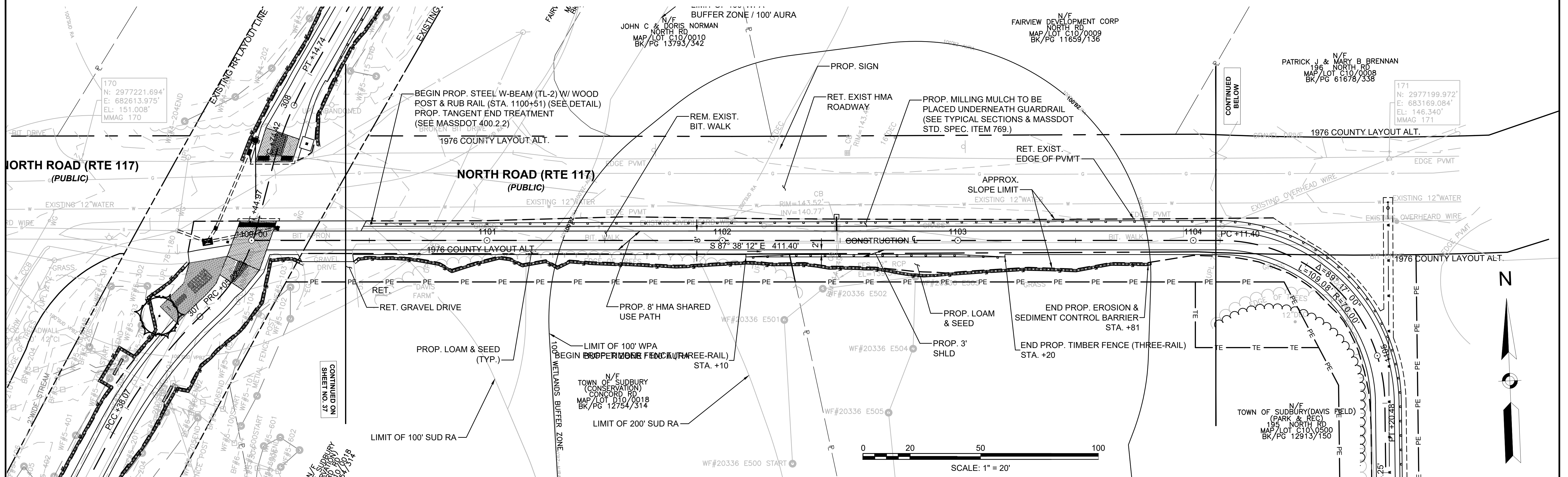
DRAINAGE DETAILS

SEE SHEET 200

LEGEND:

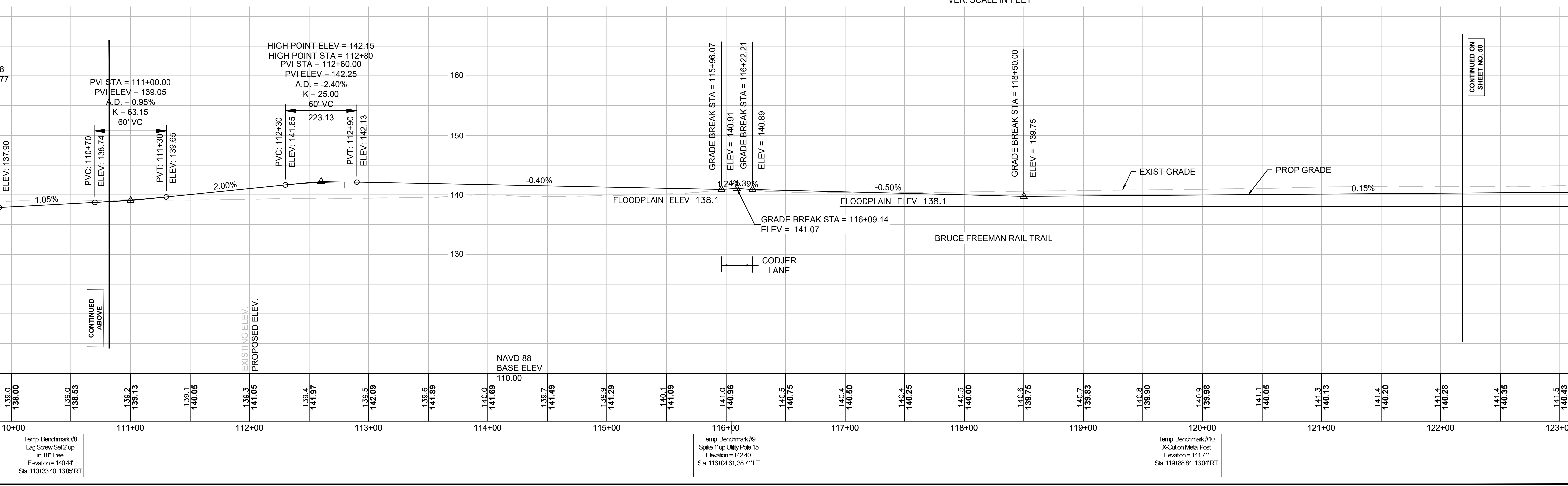
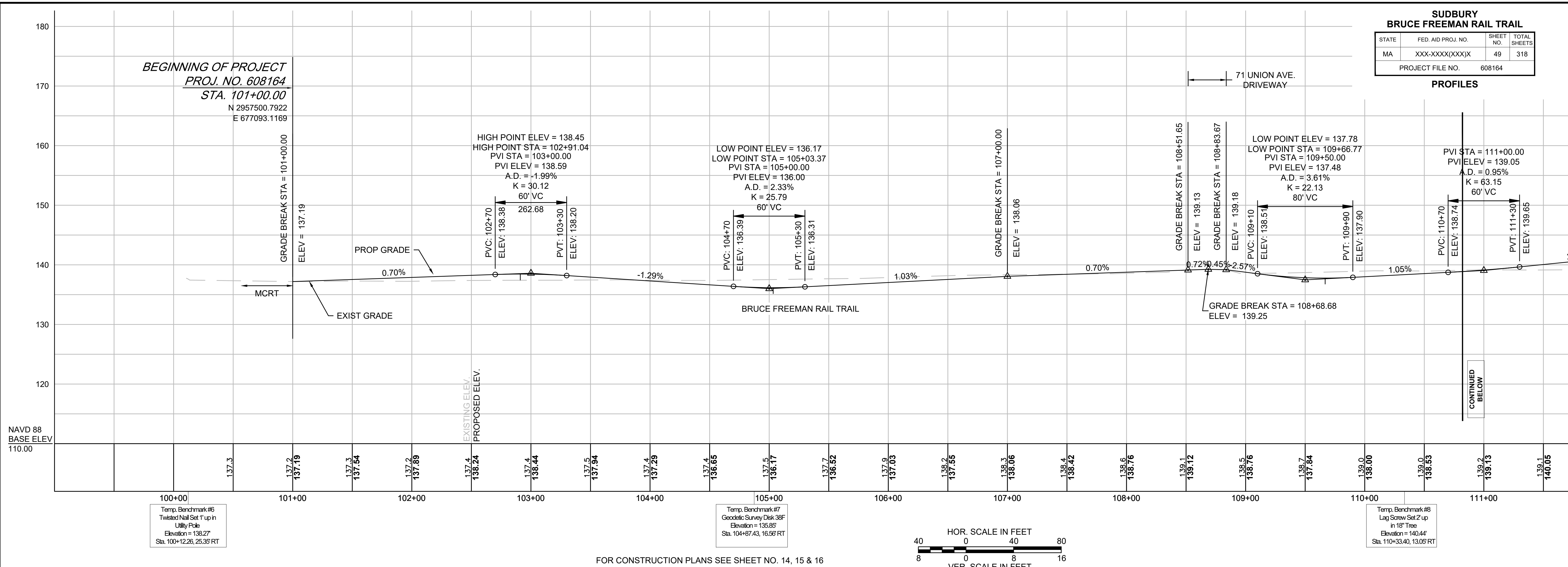
PROPOSED WHEELCHAIR RAMP DETAIL # X#

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	42	318
PROJECT FILE NO.		608164	
CONSTRUCTION PLANS			



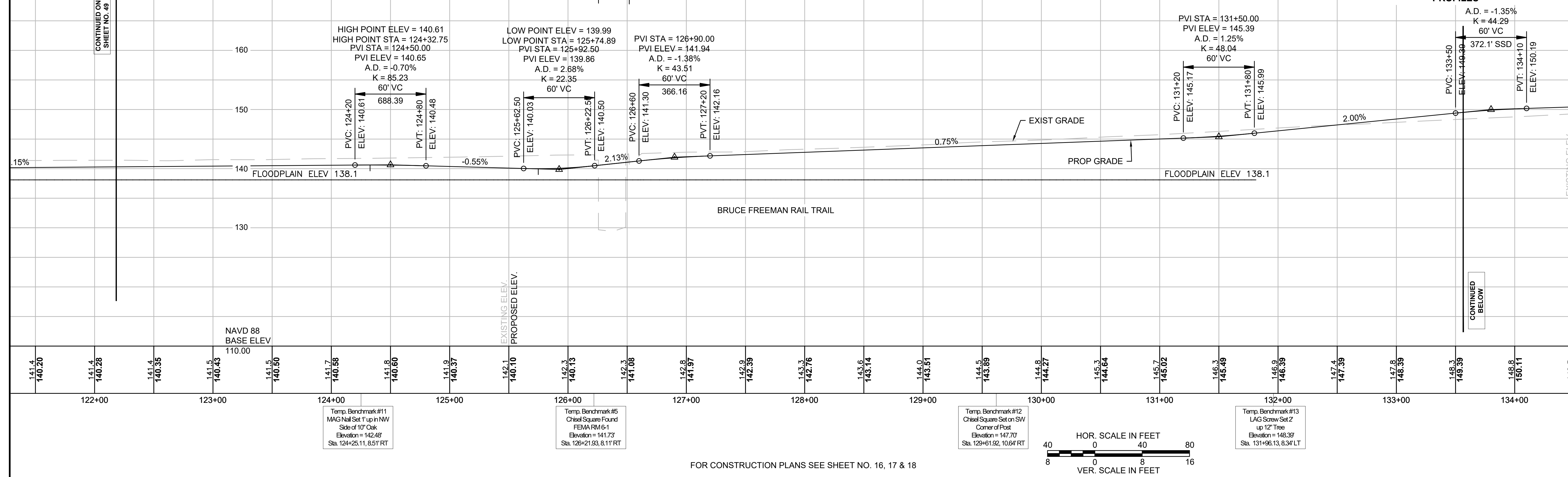
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	49	318
PROJECT FILE NO.		608164	

PROFILES

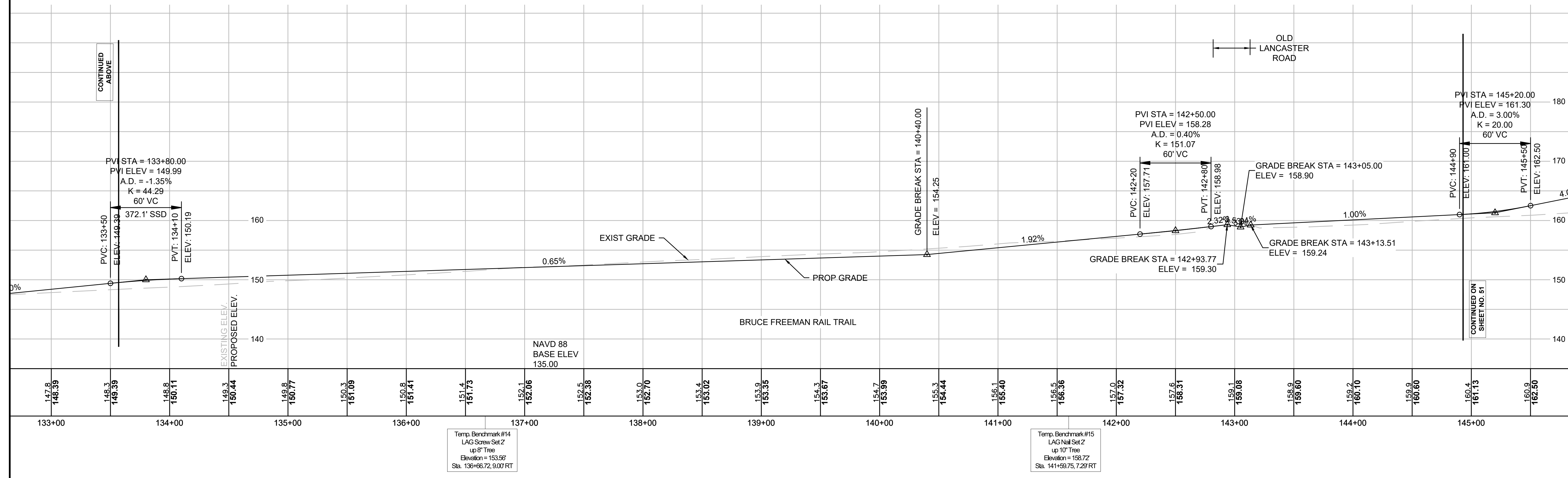


SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	50	318
PROJECT FILE NO.		608164	

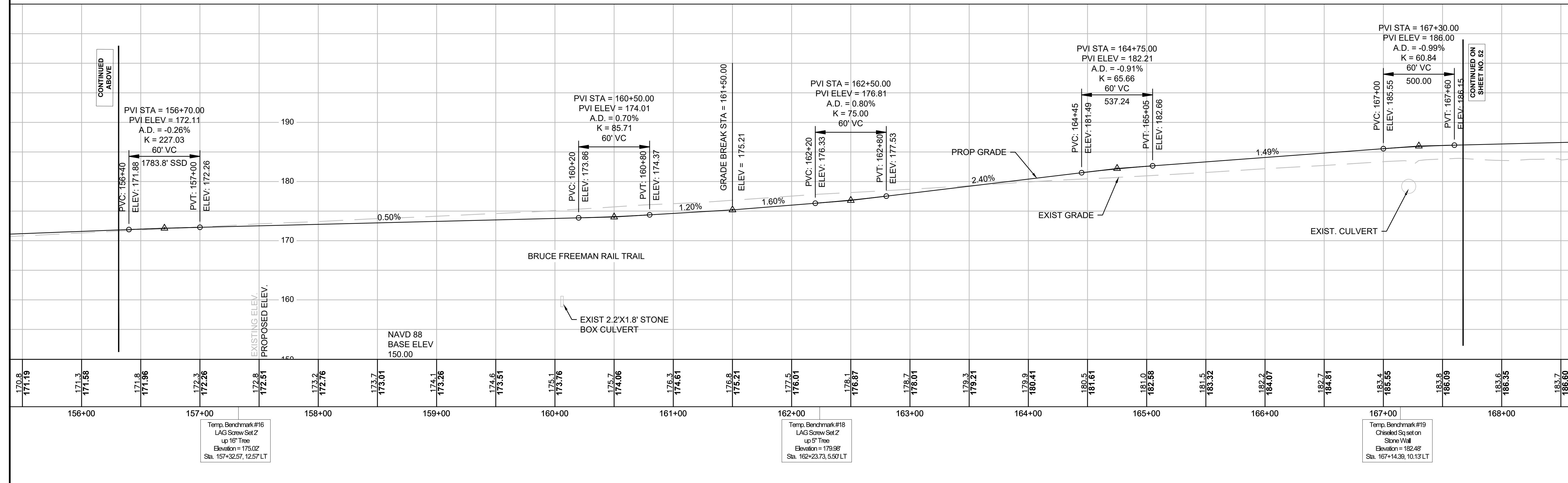
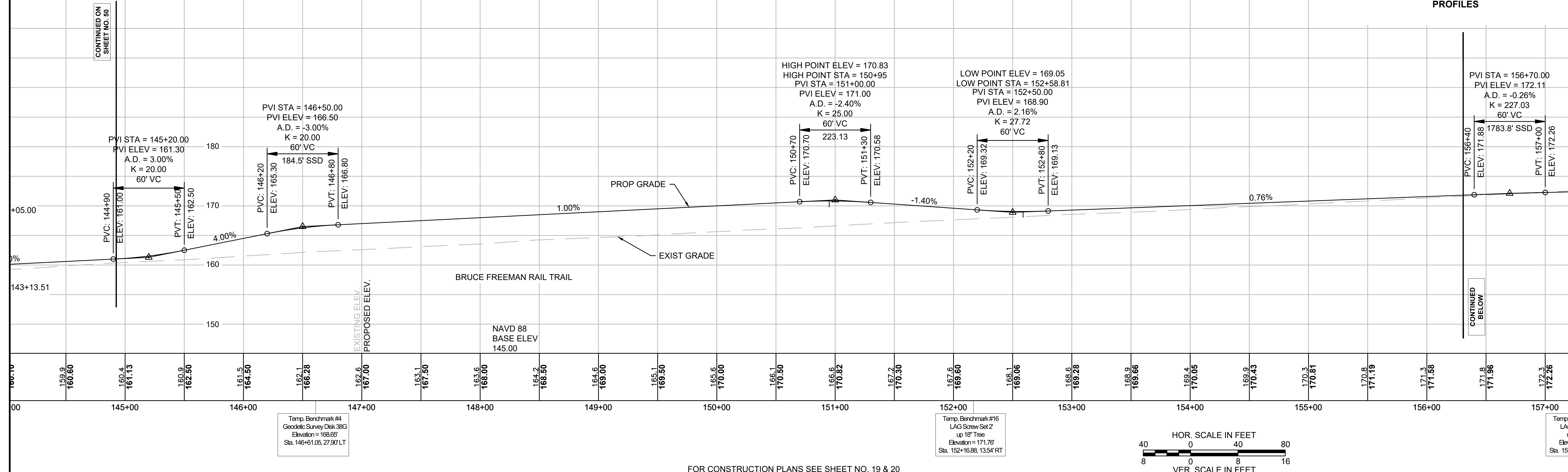
PROFILES



FOR CONSTRUCTION PLANS SEE SHEET NO. 16, 17 & 18

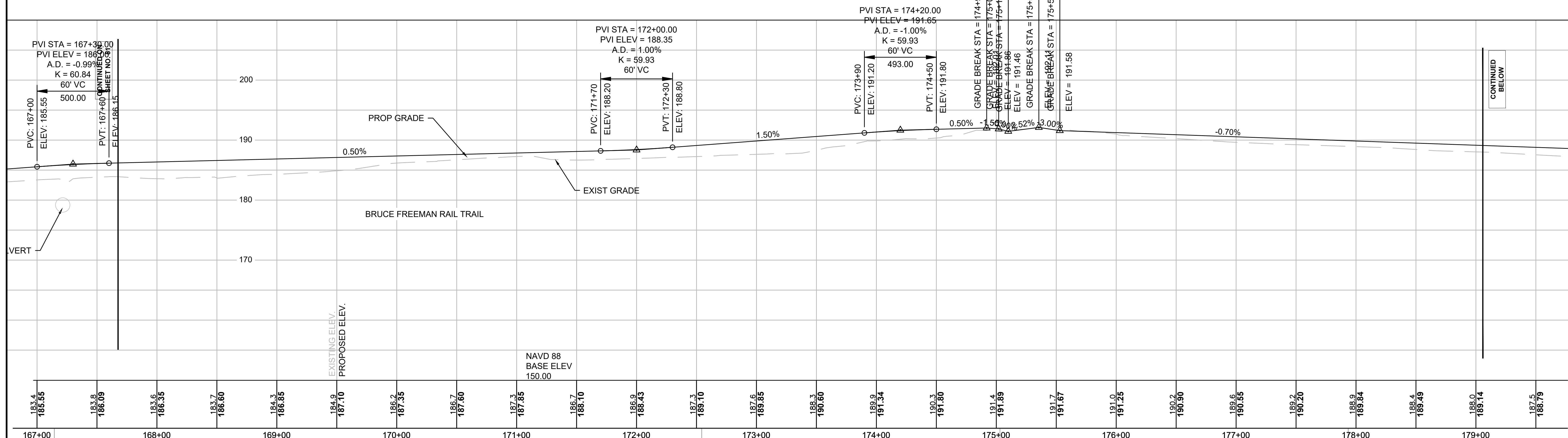


PROFILES



SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	52	318
PROJECT FILE NO.		608164	

PROFILES



Temp. Benchmark #19
Checked Sq set on
Stone Wall
Elevation = 182.48'
Sta. 167+14.39, 10.13' LT

Temp. Benchmark #20
Checked Sq set on
Boulder
Elevation = 190.04'
Sta. 172+54.34, 24.71' LT

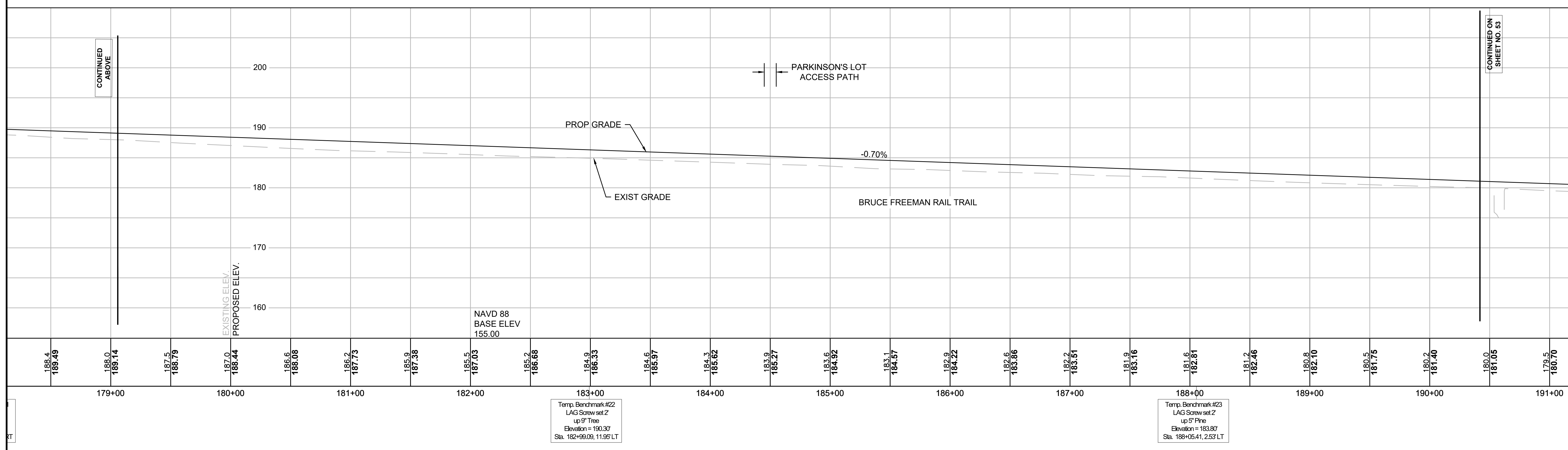
Temp. Benchmark #22/46
Dill Hole set in Bolt Over
Fire Hydrant's Main Outlet
Elevation = 191.27'
Sta. 175+03.09, 35.32' RT

Temp. Benchmark #21
LAG Screw set 2'
up 10" Tree
Elevation = 190.30'
Sta. 177+93.51, 10.98' RT

HOR. SCALE IN FEET: 1" = 40'

VER. SCALE IN FEET: 1" = 16'

FOR CONSTRUCTION PLANS SEE SHEET NO. 20, 21, 22 & 23

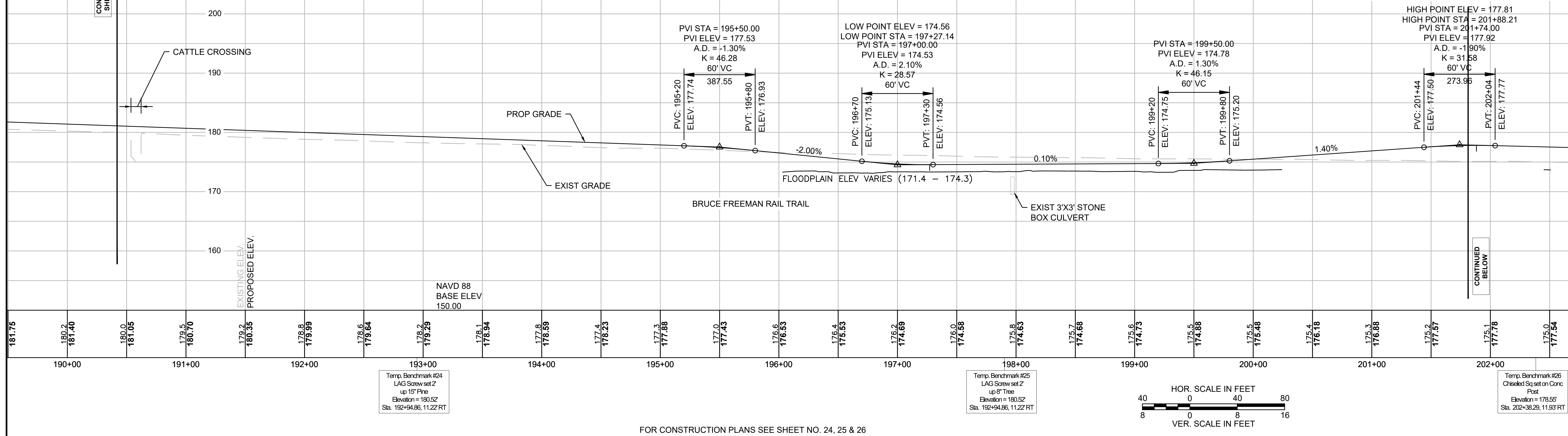


Temp. Benchmark #22
LAG Screw set 2'
up 5" Tree
Elevation = 190.30'
Sta. 182+99.09, 11.95' LT

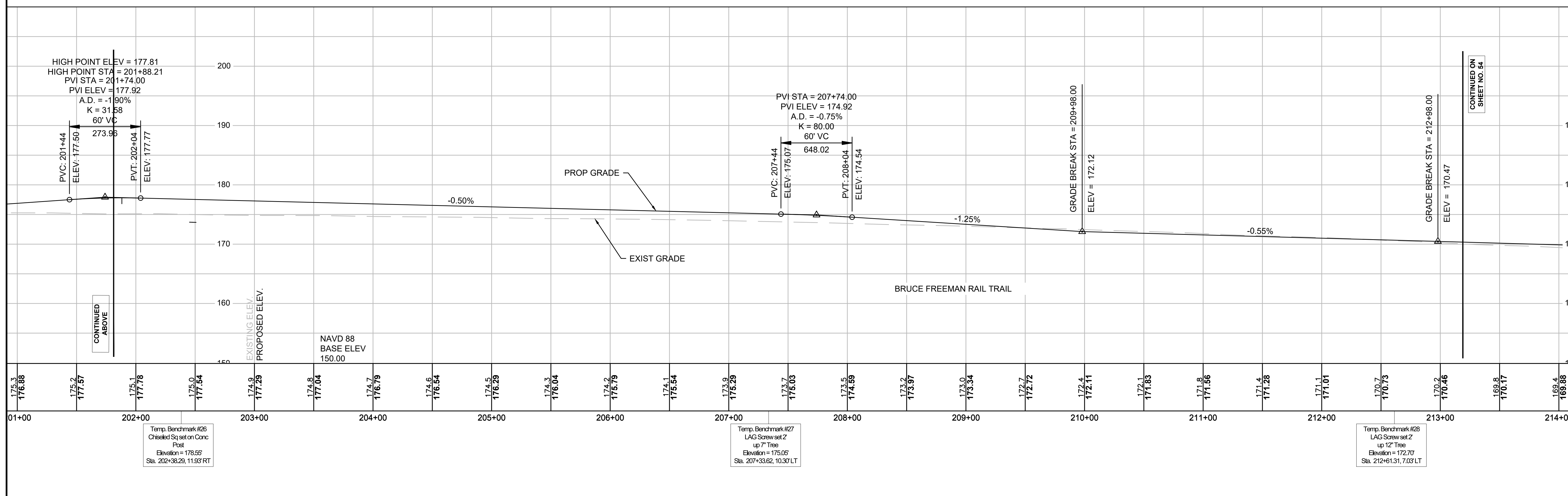
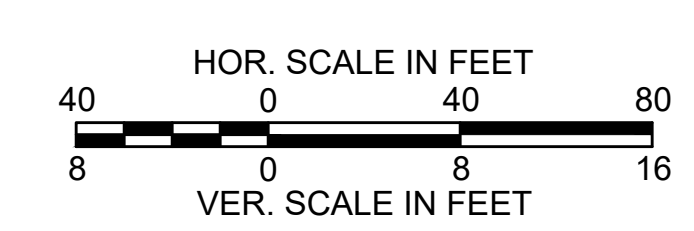
Temp. Benchmark #23
LAG Screw set 2'
up 5" Tree
Elevation = 183.80'
Sta. 188+05.41, 2.53' LT

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	53	318
PROJECT FILE NO.		608164	

PROFILES



FOR CONSTRUCTION PLANS SEE SHEET NO. 24, 25 & 26



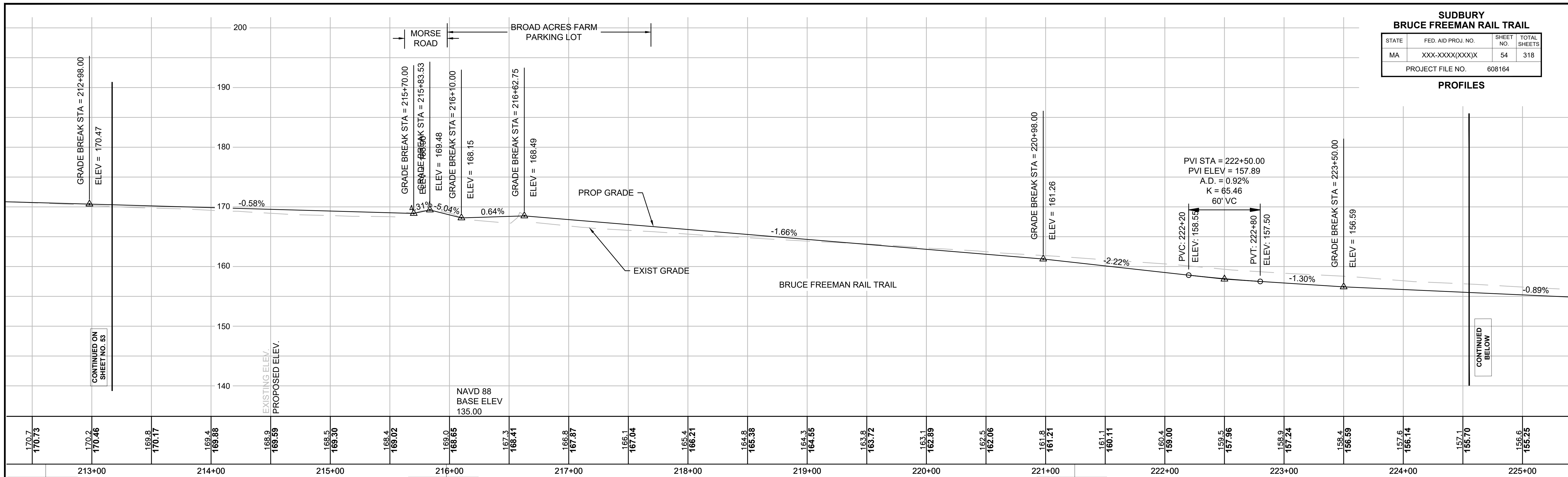
Temp. Benchmark #26
Chiseled Sq set on Conc Post
Elevation = 178.55'
Sta. 202+38.29, 11.93' RT

Temp. Benchmark #27
LAG Screw set 2 up 7" Tree
Elevation = 175.05'
Sta. 207+33.62, 10.30' LT

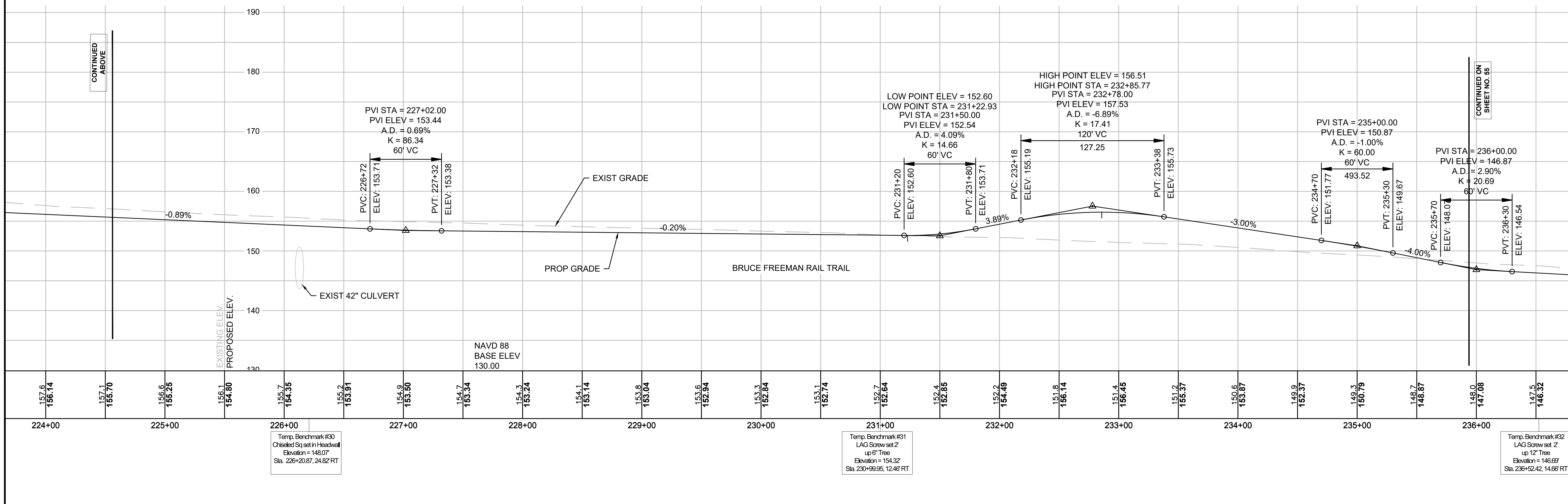
Temp. Benchmark #28
LAG Screw set 2 up 12" Tree
Elevation = 172.70'
Sta. 212+61.31, 7.03' LT

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	54	318
PROJECT FILE NO.		608164	

PROFILES

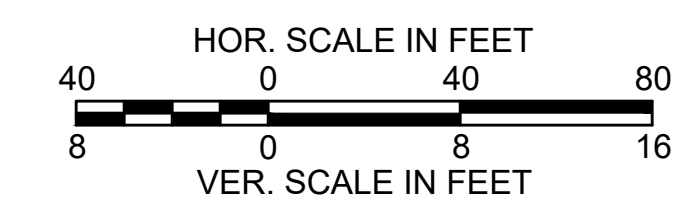


Station	Existing Elev.	Proposed Elev.
213+00	170.7	170.73
214+00	169.8	170.17
215+00	169.4	169.88
216+00	168.9	169.59
217+00	168.5	169.30
218+00	168.4	169.02
219+00	168.0	168.65
220+00	167.3	168.41
221+00	166.8	167.87
222+00	166.1	167.04
223+00	165.4	166.21
224+00	164.8	165.38
225+00	164.3	164.55



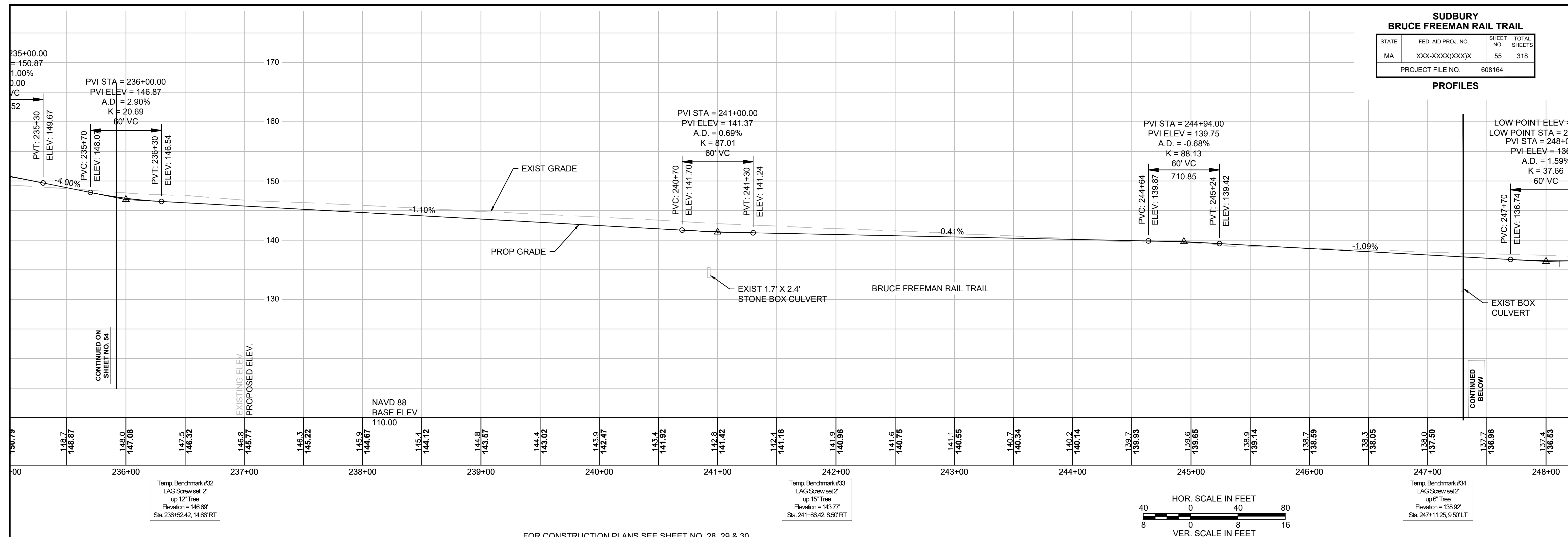
Station	Existing Elev.	Proposed Elev.
224+00	157.6	156.14
225+00	157.1	155.70
226+00	156.6	155.25
227+00	156.1	154.80
228+00	155.7	154.35
229+00	155.2	153.91
230+00	154.9	153.50
231+00	154.7	153.34
232+00	154.3	153.24
233+00	154.1	153.14
234+00	153.8	153.04
235+00	153.6	152.94
236+00	153.3	152.84

FOR CONSTRUCTION PLANS SEE SHEET NO. 26, 27 & 28

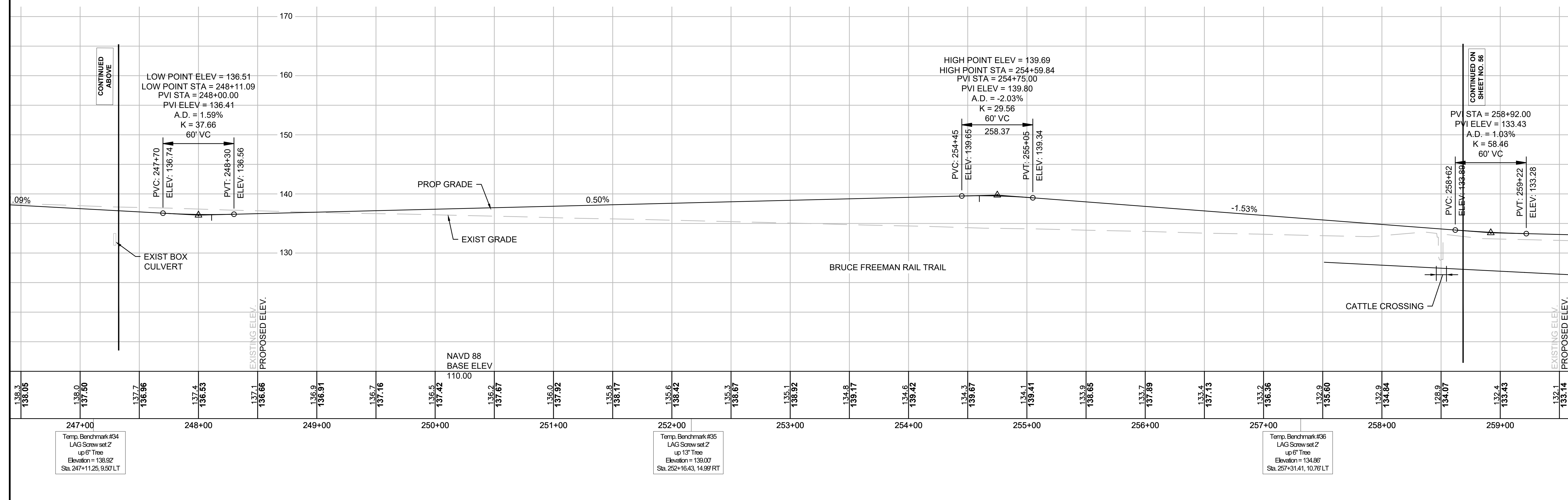


SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	55	318
PROJECT FILE NO.		608164	

PROFILES

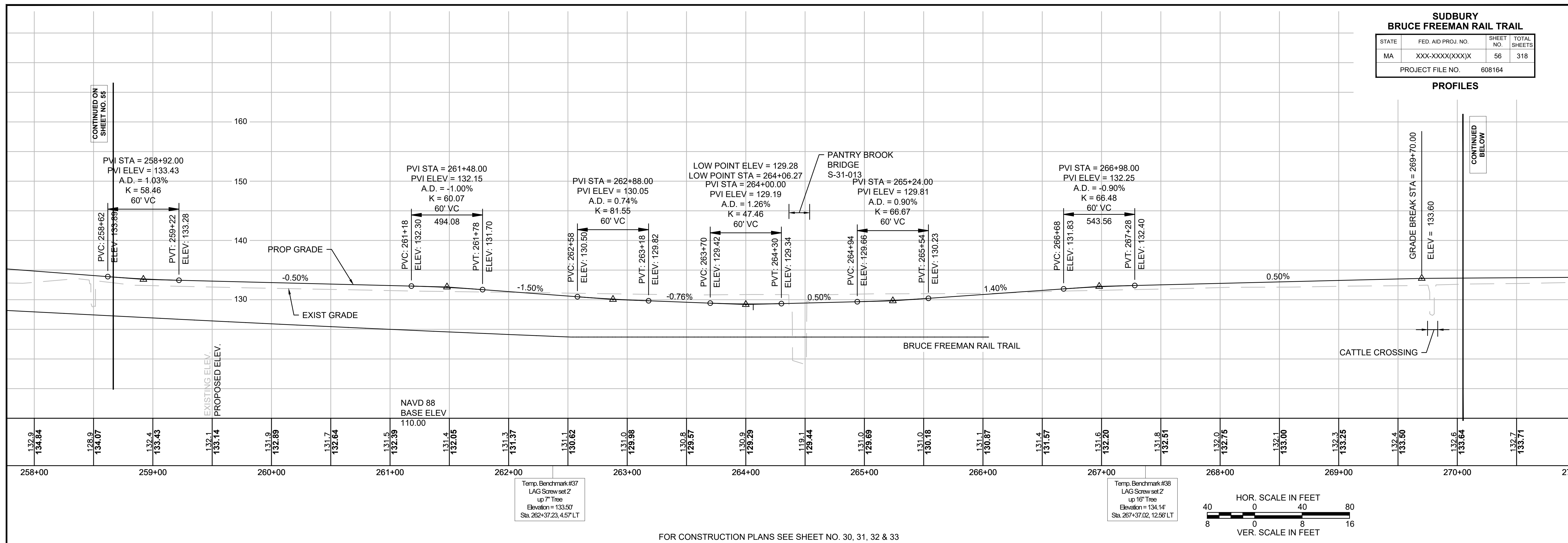


FOR CONSTRUCTION PLANS SEE SHEET NO. 28, 29 & 30

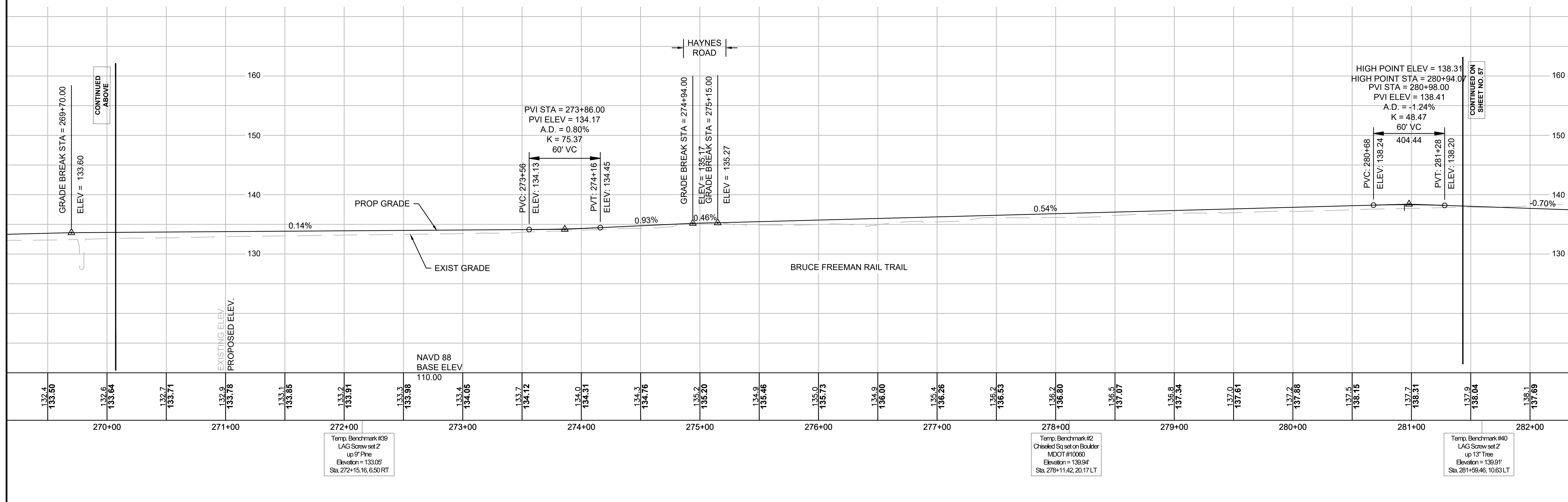
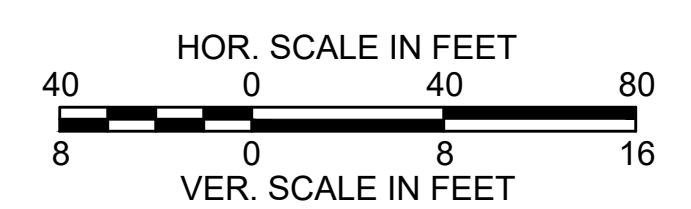


SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	56	318
PROJECT FILE NO.		608164	

PROFILES



FOR CONSTRUCTION PLANS SEE SHEET NO. 30, 31, 32 & 33



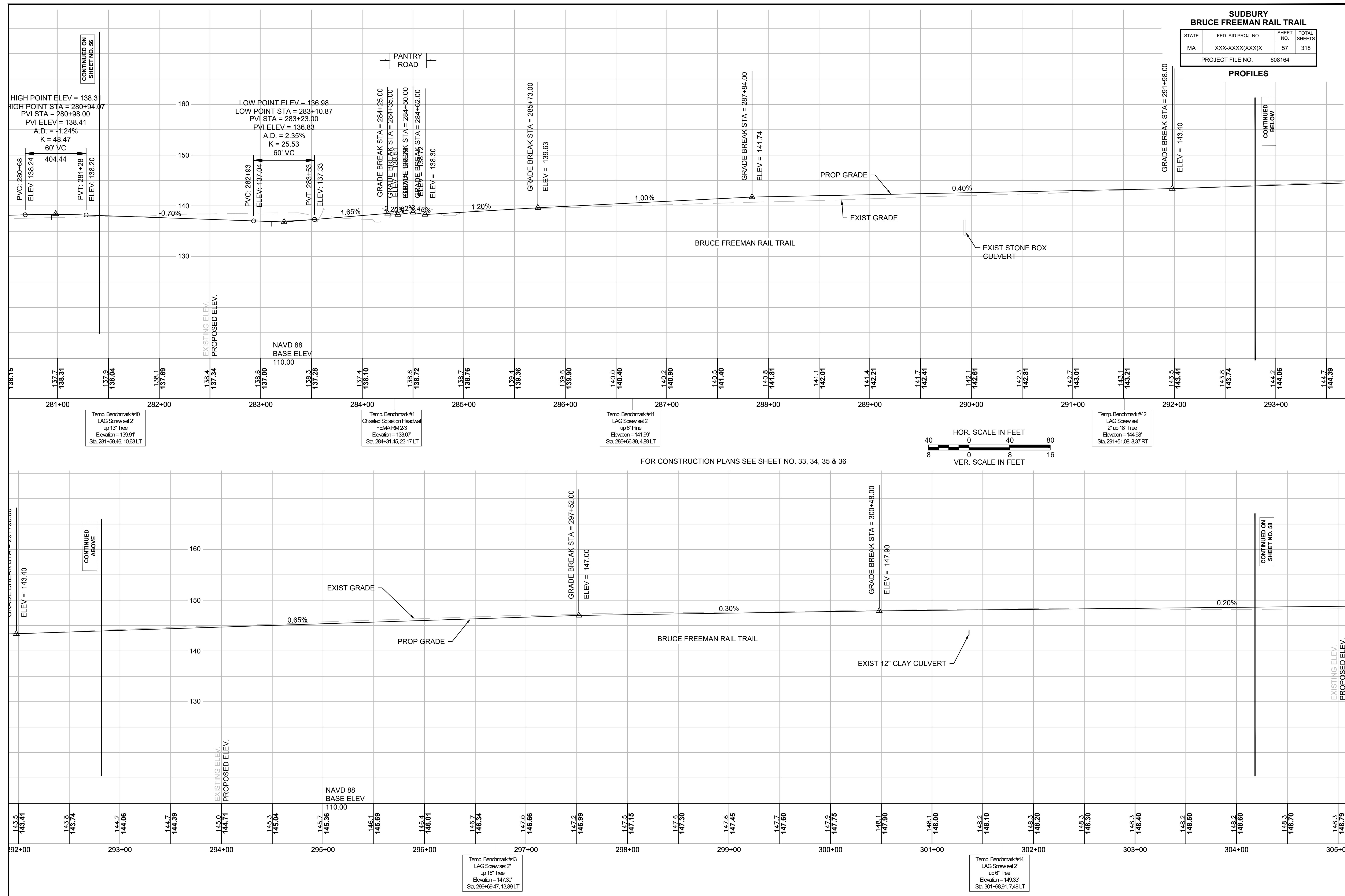
Temp. Benchmark #39
LAG Screw set 2
up 9" Pine
Elevation = 133.05'
Sta. 272+15.16, 6.50 RT

Temp. Benchmark #2
Chiseled Set set on Boulder
MDOT #10060
Elevation = 139.94'
Sta. 278+11.42, 20.17 LT

Temp. Benchmark #40
LAG Screw set 2
up 13" Tree
Elevation = 139.91'
Sta. 281+59.46, 10.63 LT

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	57	318
PROJECT FILE NO.		608164	

PROFILES



CONTINUED ON
SHEET NO. 56

CONTINUED
BELOW

Temp. Benchmark #40
LAG Screw set 2
up 13" Tree
Elevation = 139.91'
Sta. 281+59.46, 10.63 LT

Temp. Benchmark #1
Chisled Sq set on Headwall
FEAR RM/23
Elevation = 133.07'
Sta. 284+31.45, 23.17 LT

Temp. Benchmark #41
LAG Screw set 2
up 6" Tree
Elevation = 141.97'
Sta. 286+66.39, 4.89 LT

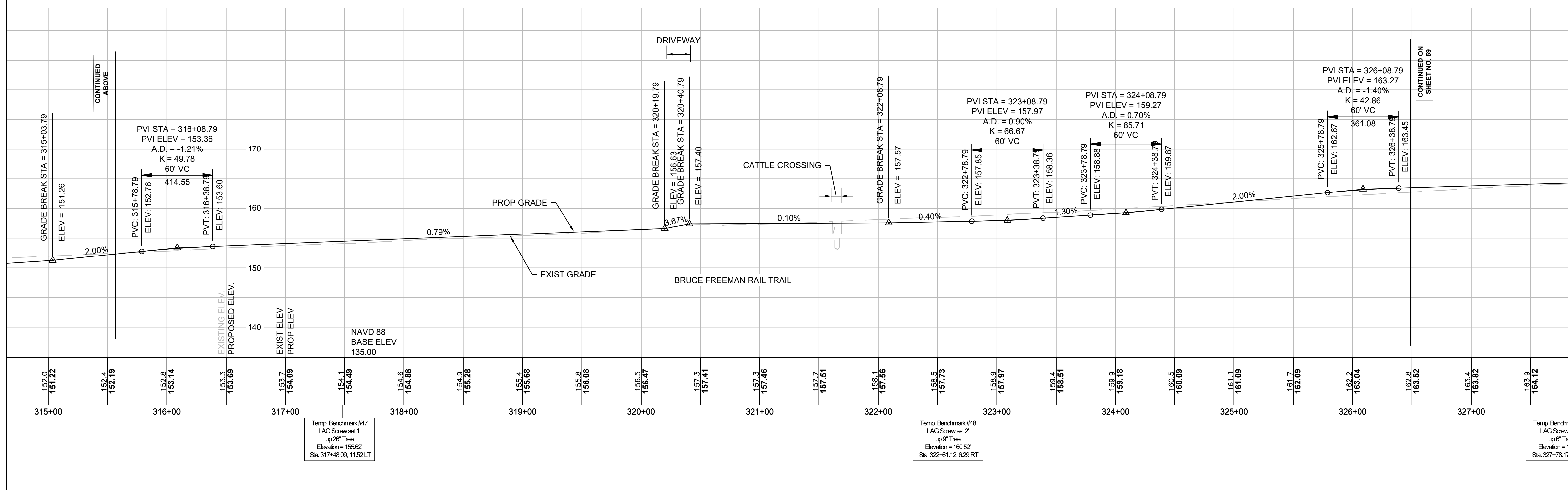
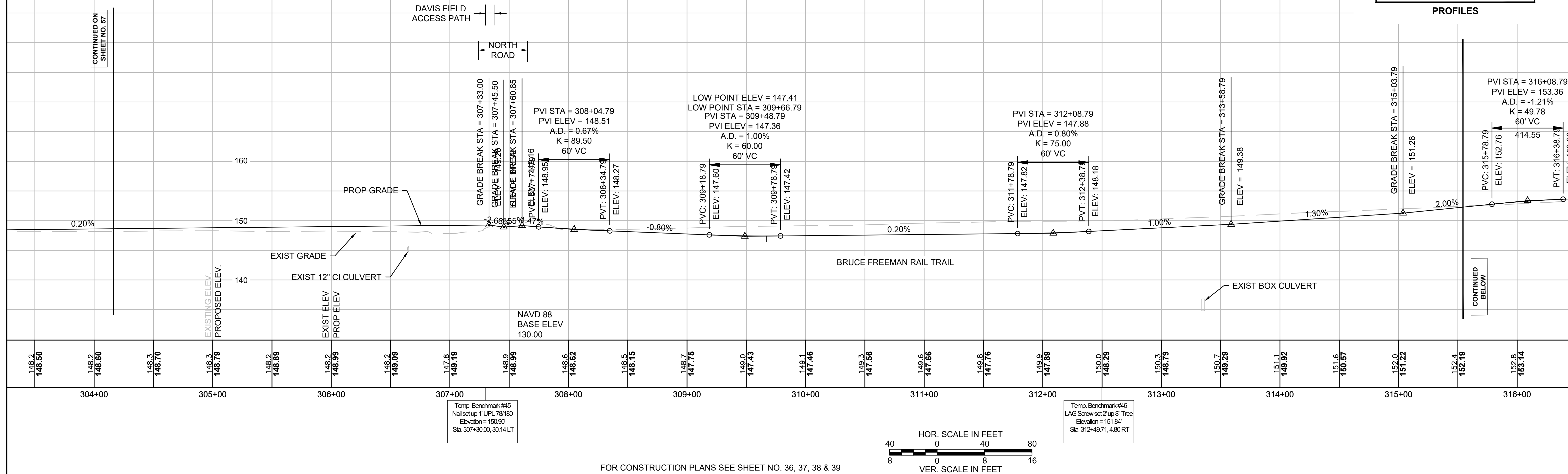
Temp. Benchmark #42
LAG Screw set
2" up 18" Tree
Elevation = 144.98'
Sta. 291+51.08, 8.37 RT

Temp. Benchmark #43
LAG Screw set 2
up 15" Tree
Elevation = 147.30'
Sta. 296+69.47, 13.89 LT

Temp. Benchmark #44
LAG Screw set 2
up 6" Tree
Elevation = 149.33'
Sta. 301+68.91, 7.48 LT

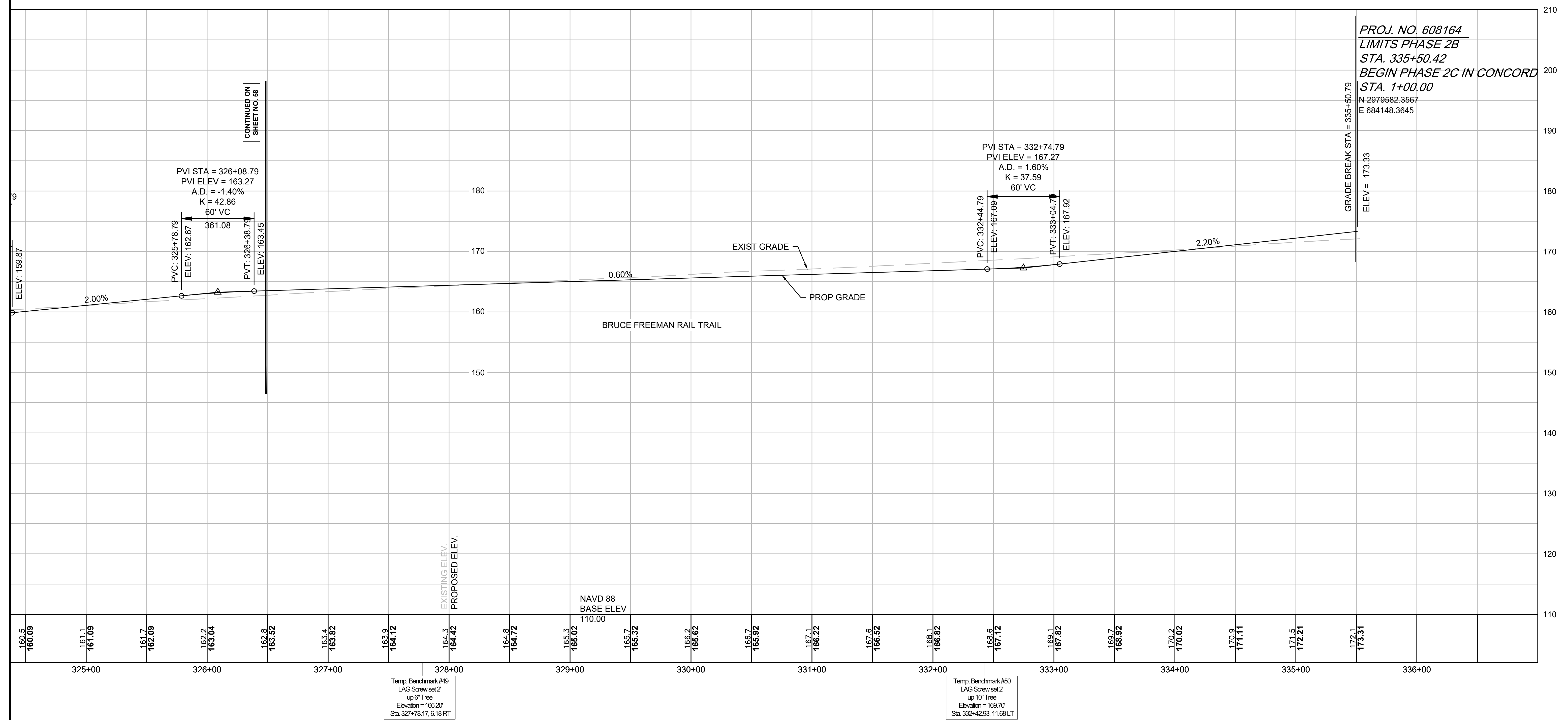
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	58	318
PROJECT FILE NO.		608164	

PROFILES

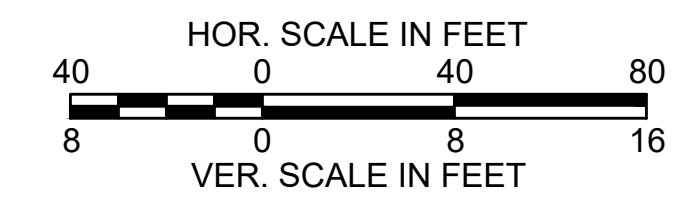


SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	59	318
PROJECT FILE NO.		608164	

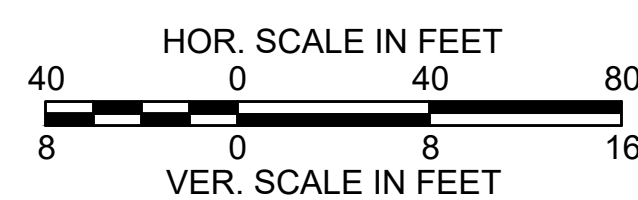
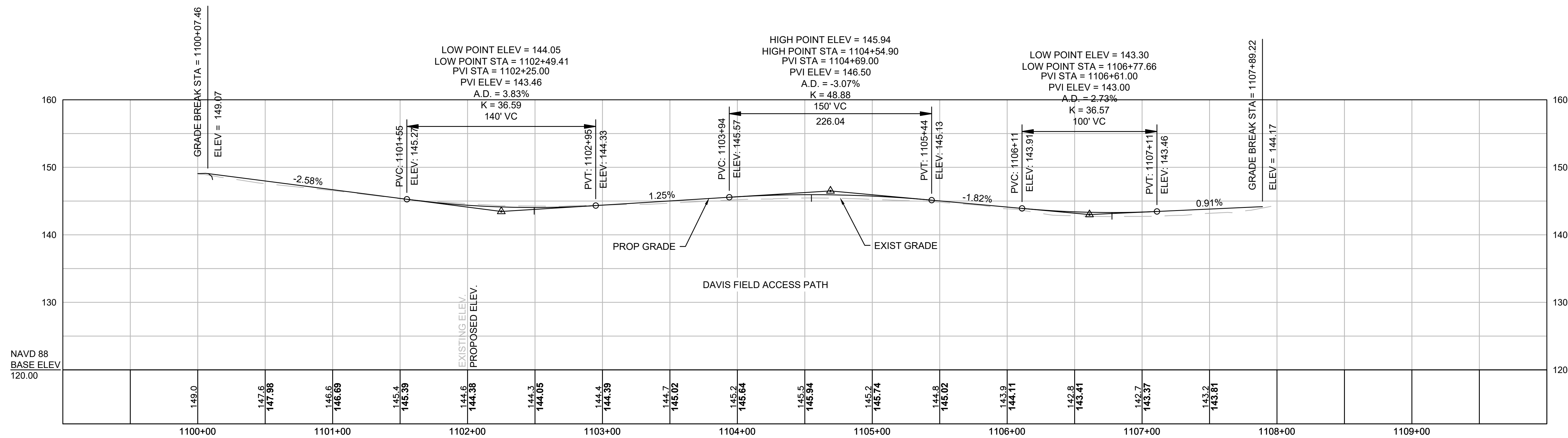
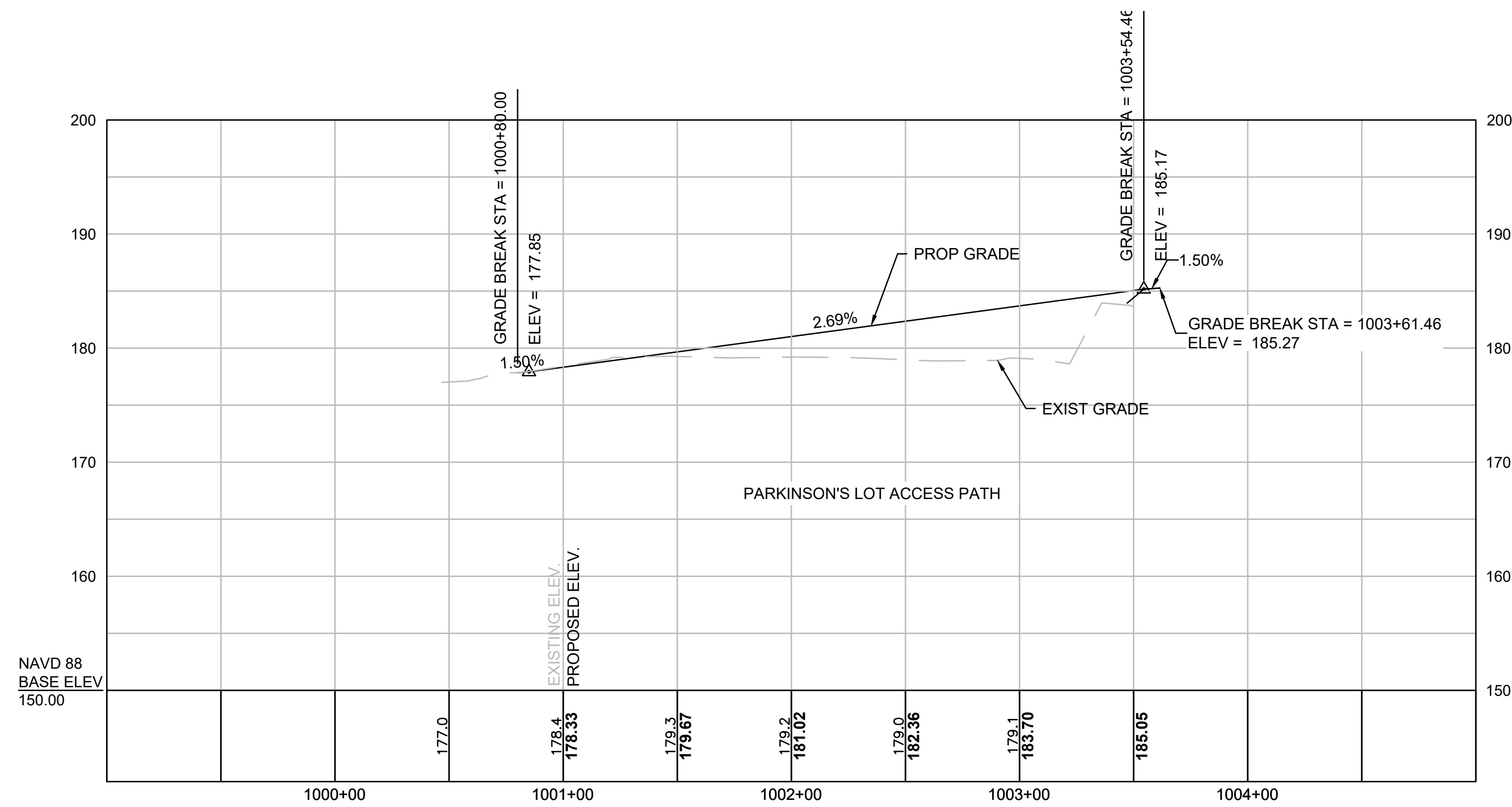
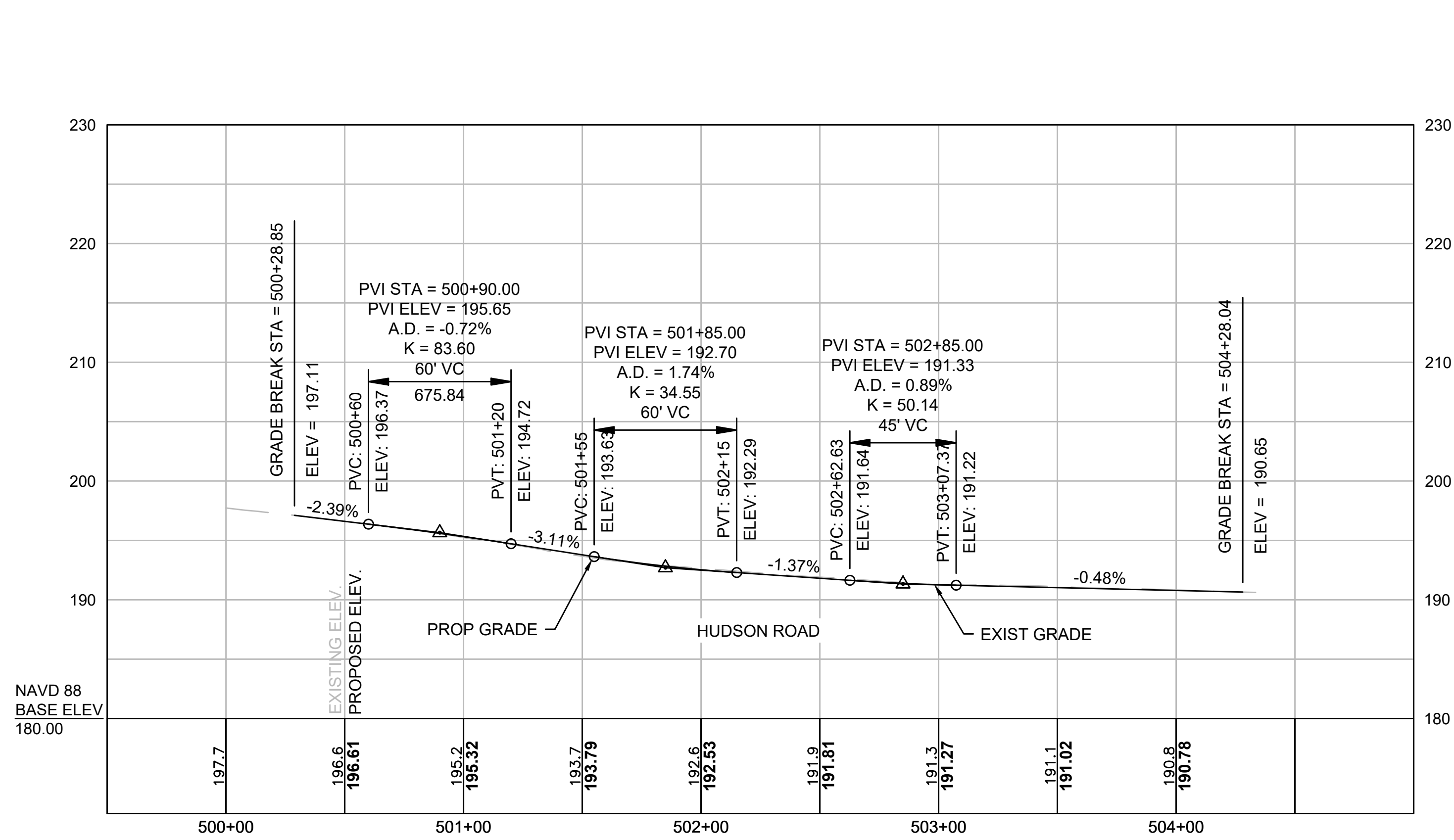
PROFILES



PROJ. NO. 608164
 LIMITS PHASE 2B
 STA. 335+50.42
 BEGIN PHASE 2C IN CONCORD
 STA. 1+00.00
 N 2979582.3567
 E 684148.3645



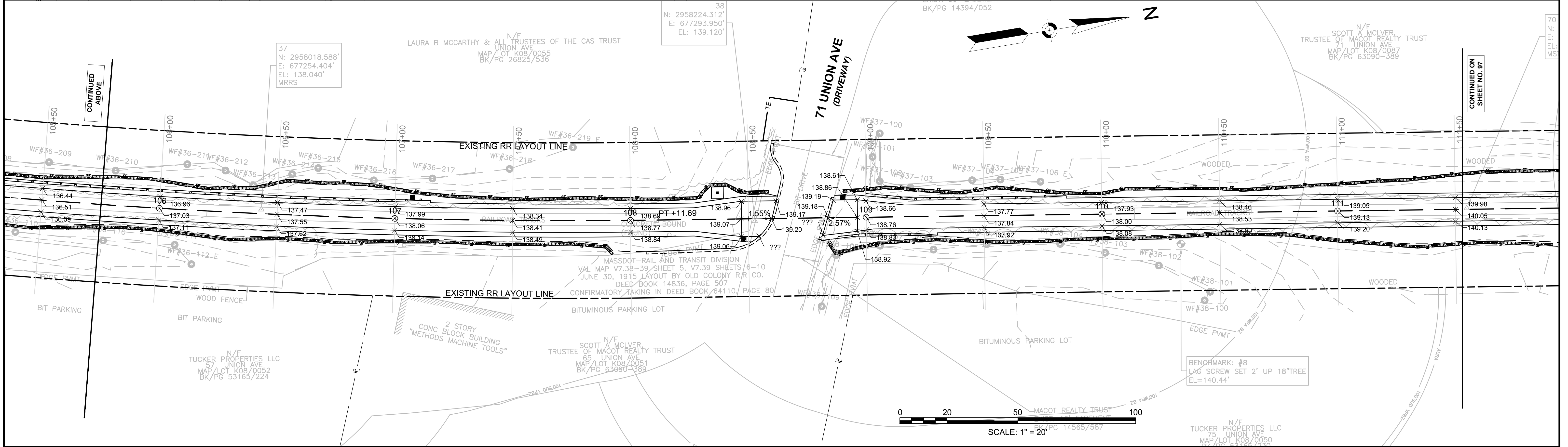
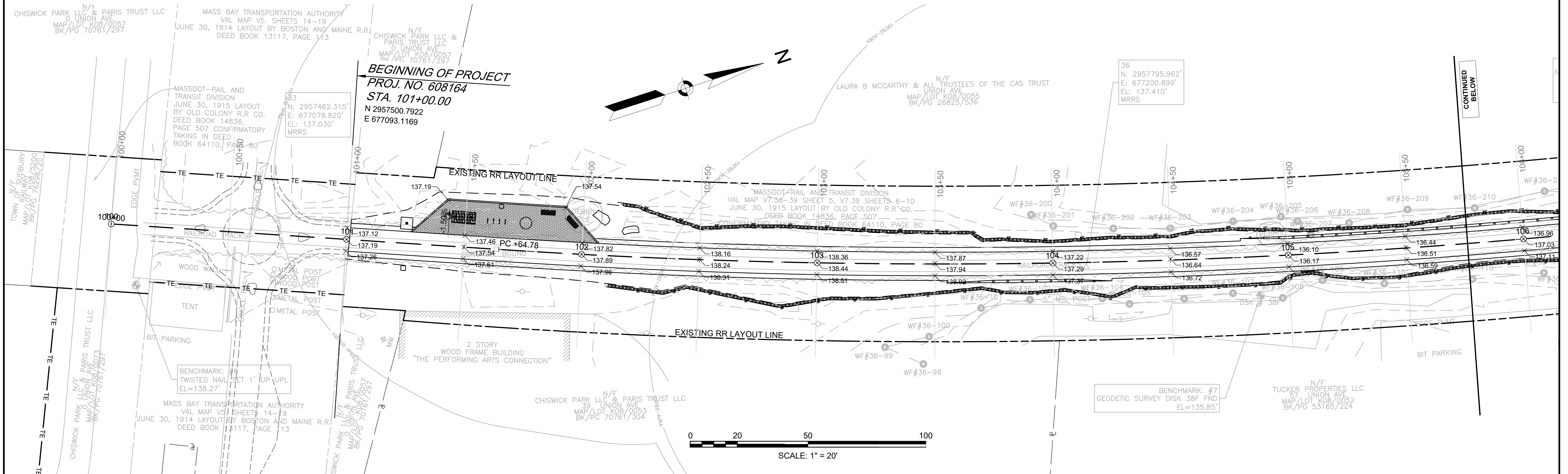
FOR CONSTRUCTION PLANS SEE SHEET NO. 39 & 40

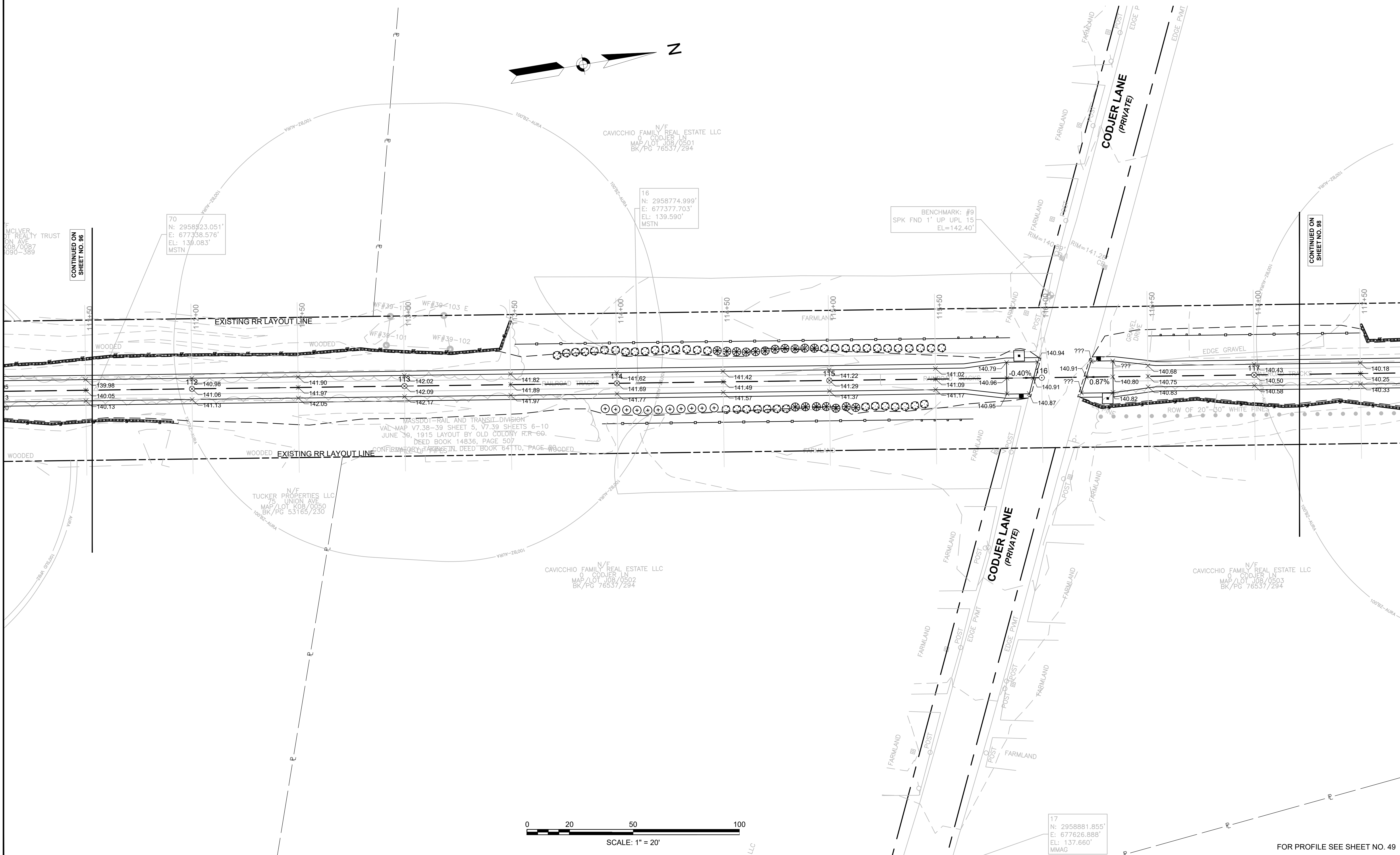
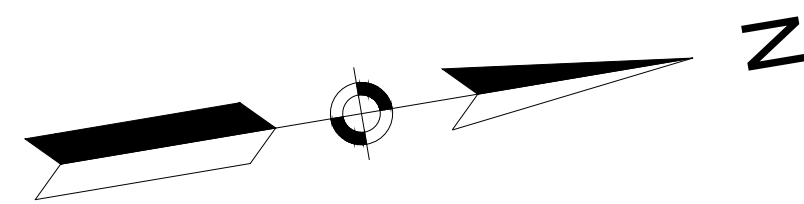


SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	96	318
PROJECT FILE NO.		608164	

GRADING PLANS





CONTINUED ON
SHEET NO. 96

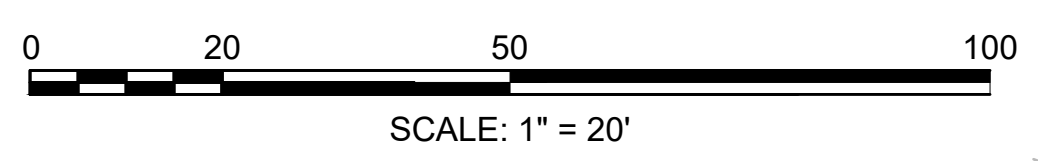
CONTINUED ON
SHEET NO. 98

70
N: 2958823.051'
E: 677338.576'
EL: 139.083'
MSTN

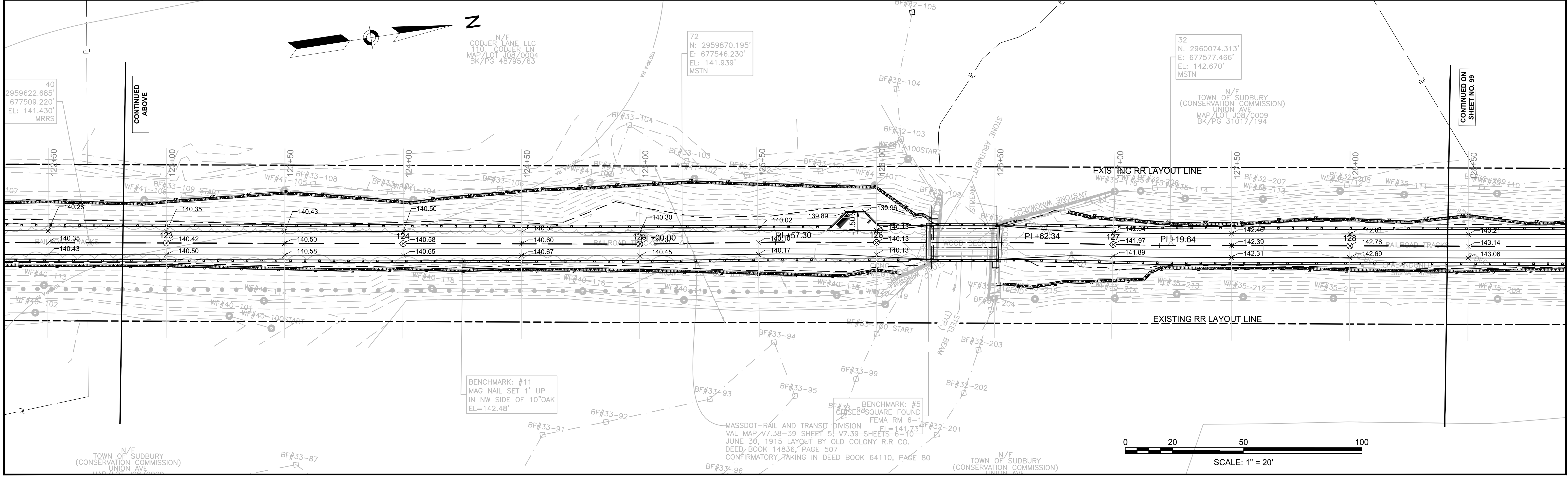
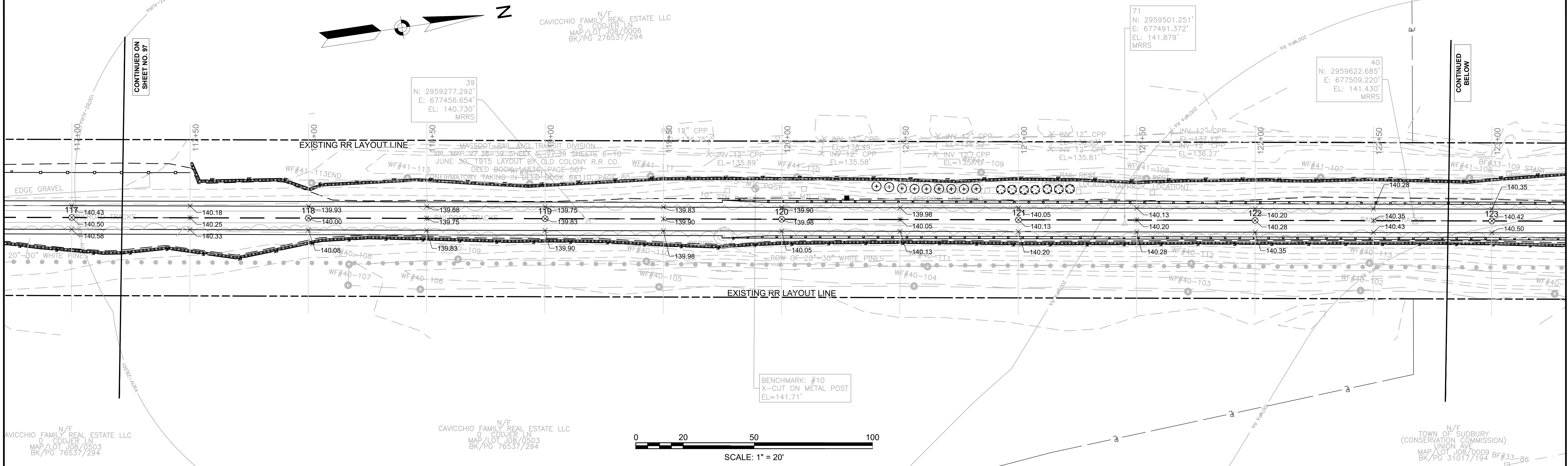
16
N: 2958774.999'
E: 677377.703'
EL: 139.590'
MSTN

BENCHMARK: #9
SPK FND 1' UP UPL 15
EL=142.40'

17
N: 2958881.855'
E: 677626.888'
EL: 137.660'
MMAG



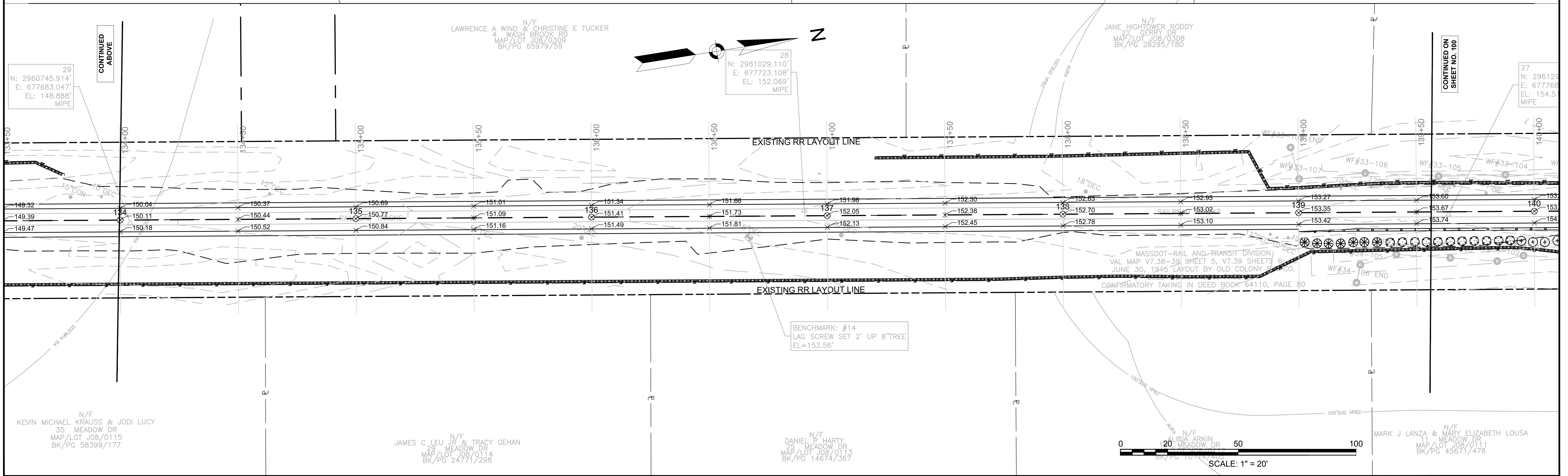
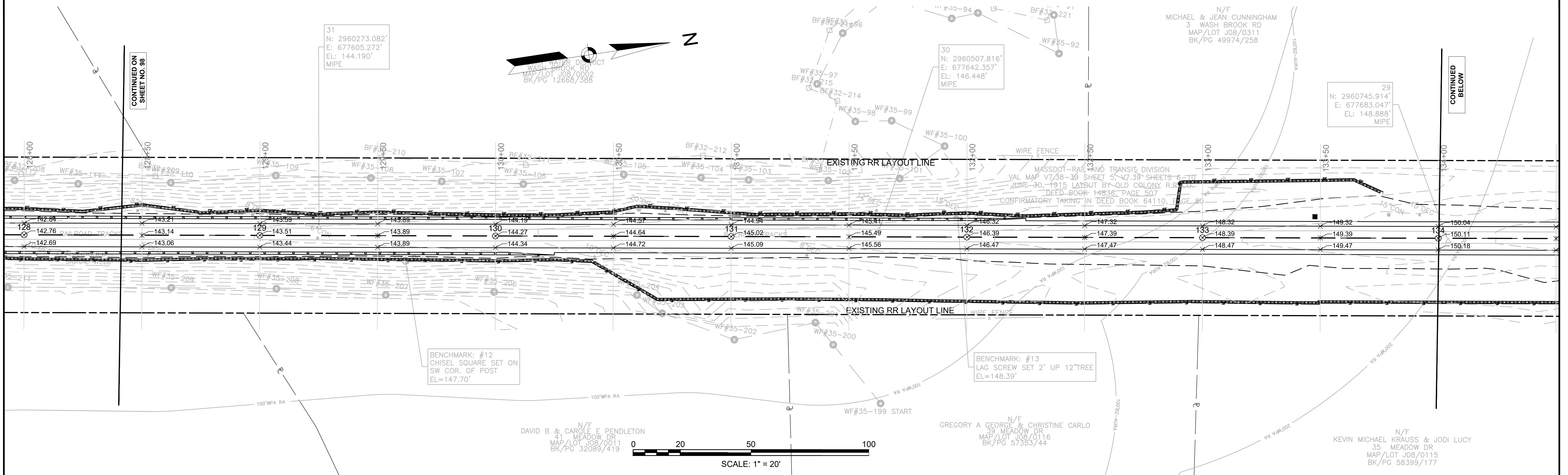
FOR PROFILE SEE SHEET NO. 49

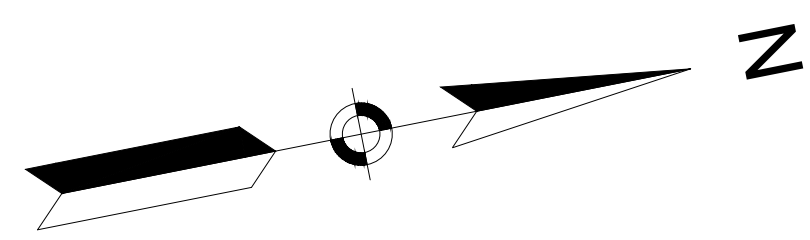


**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	99	318
PROJECT FILE NO.		608164	

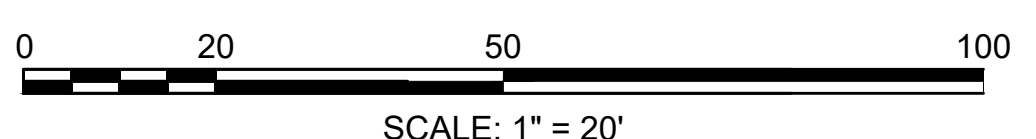
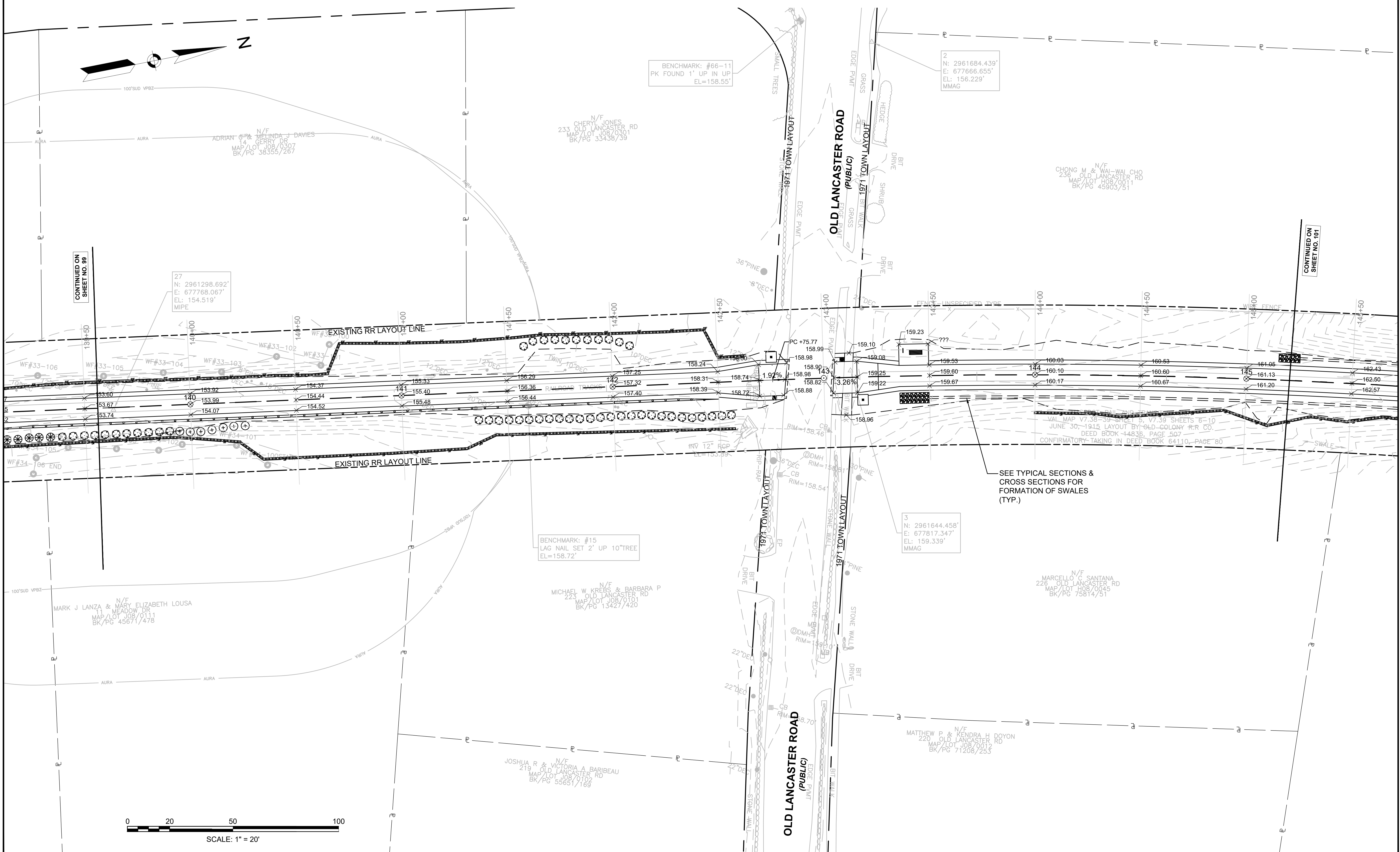
GRADING PLANS





CONTINUED ON SHEET NO. 99

CONTINUED ON SHEET NO. 101

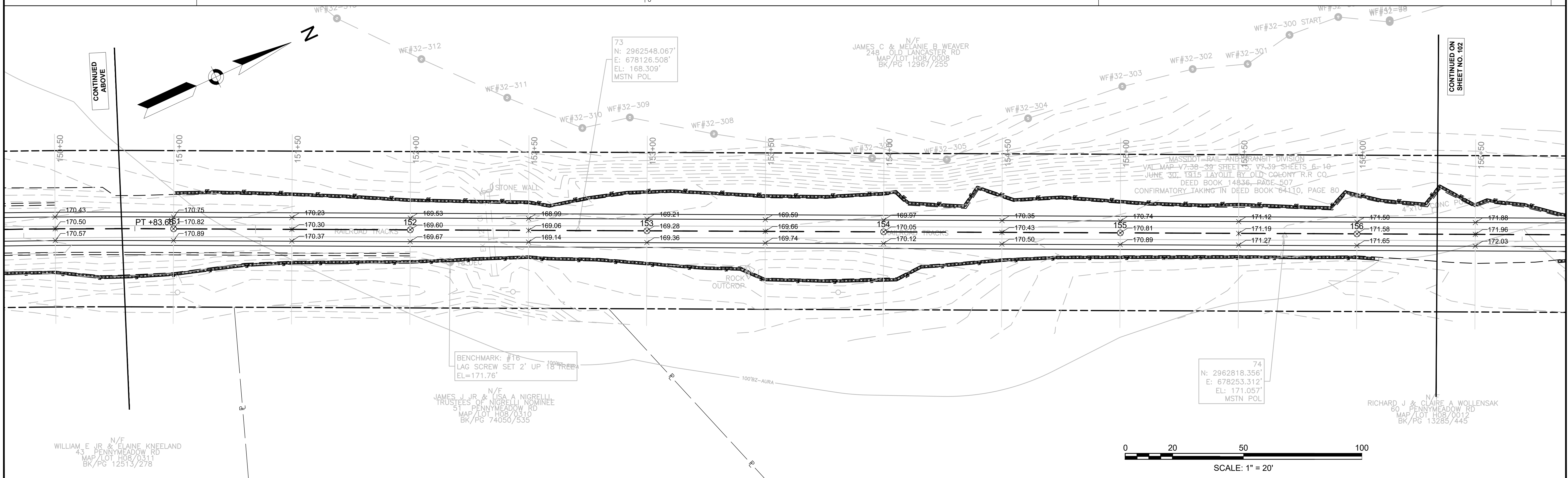
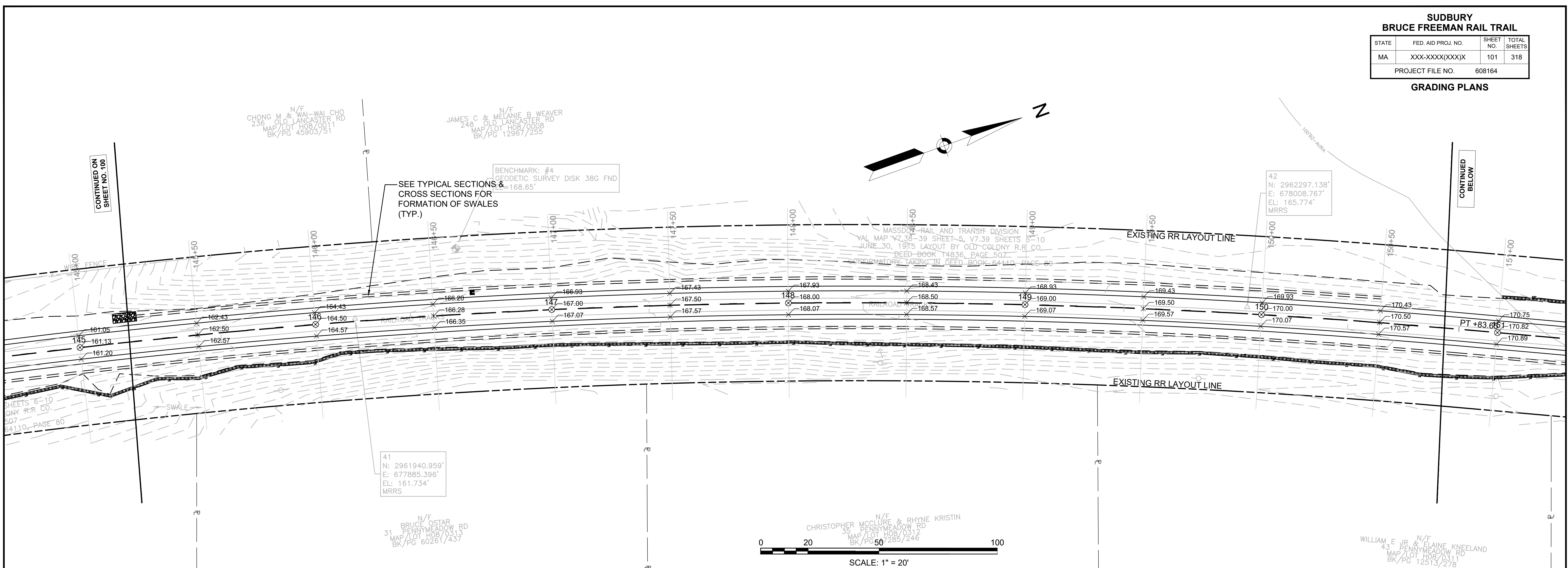


**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	101	318

PROJECT FILE NO. 608164

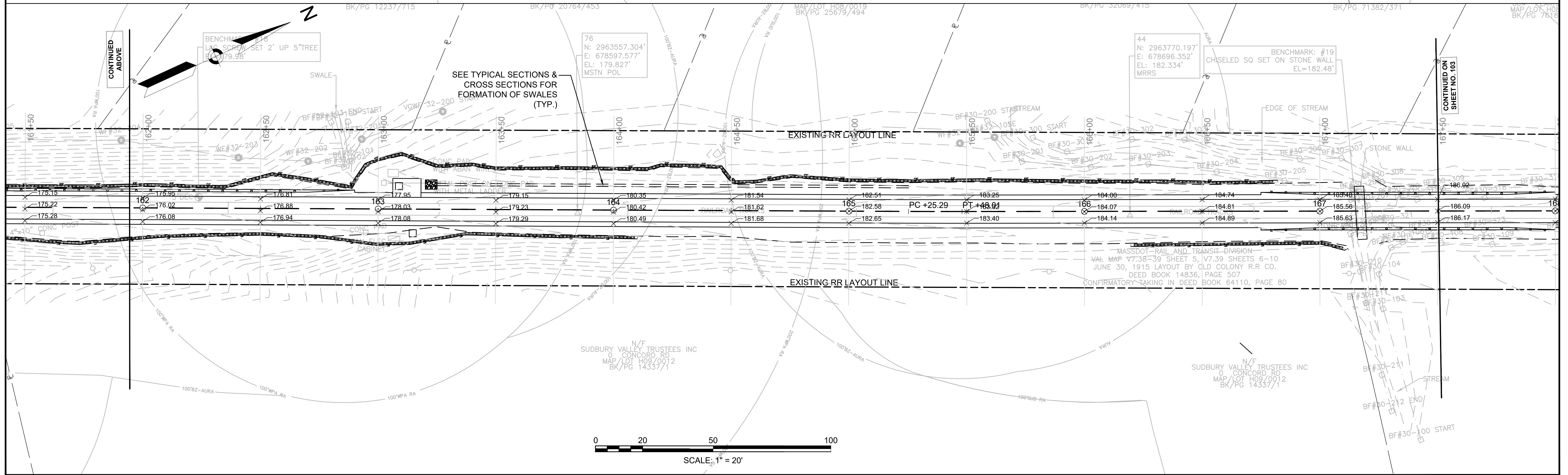
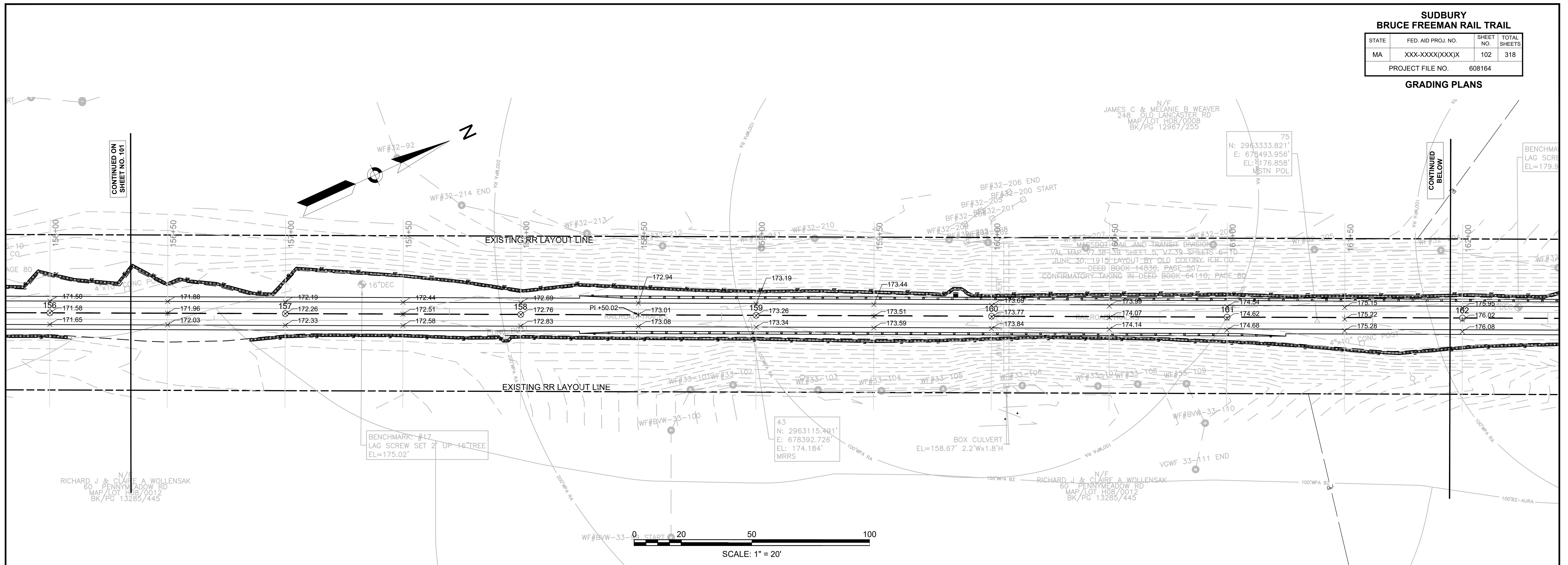
GRADING PLANS

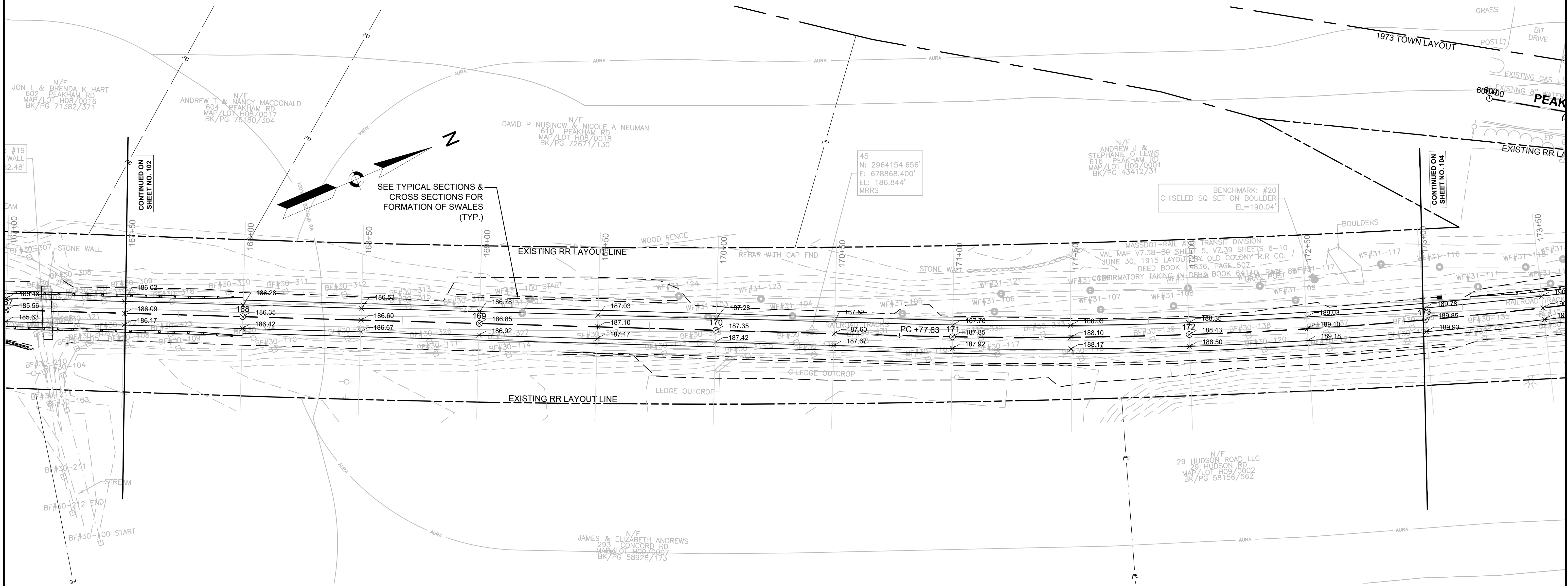


**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	102	318
PROJECT FILE NO.		608164	

GRADING PLANS





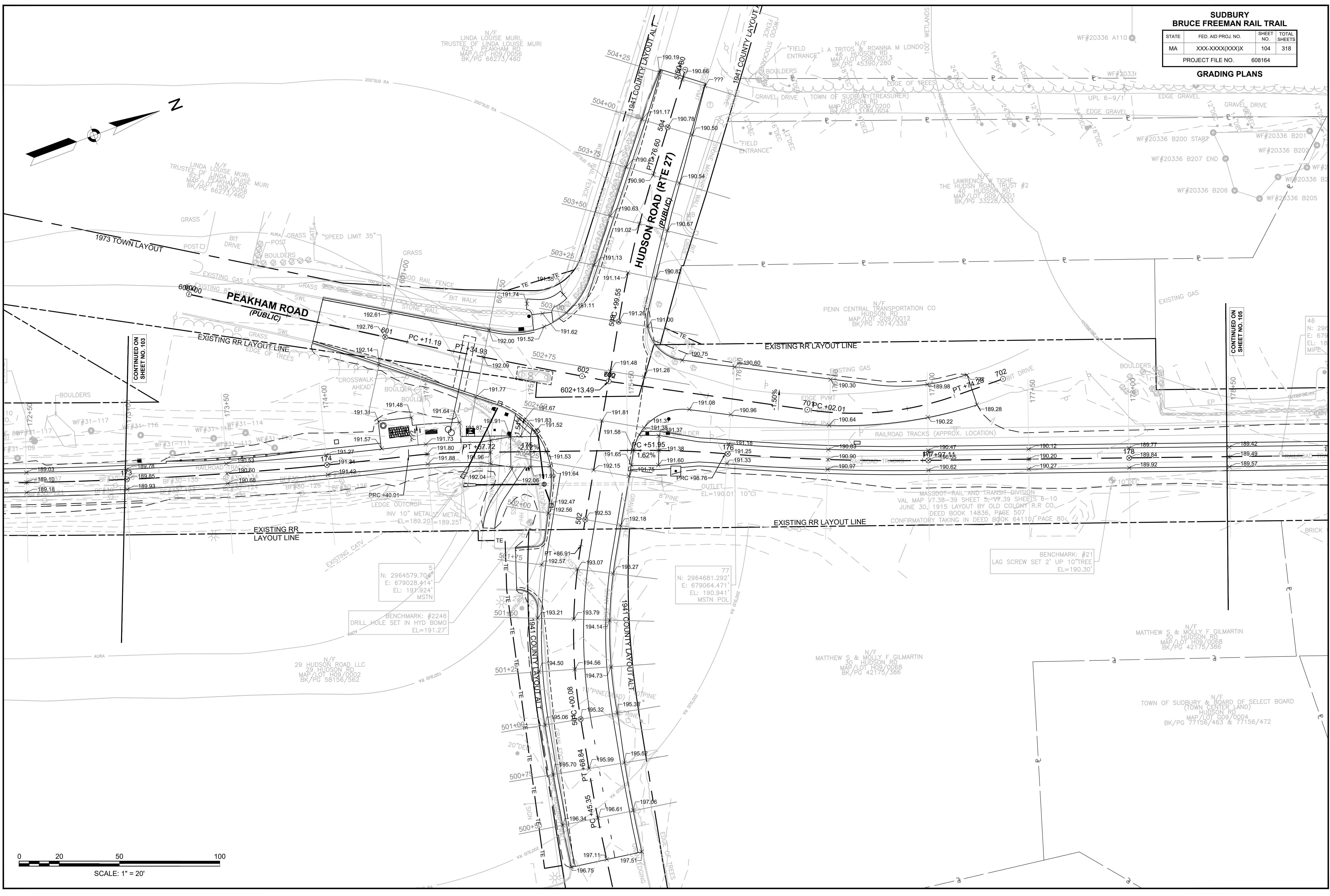
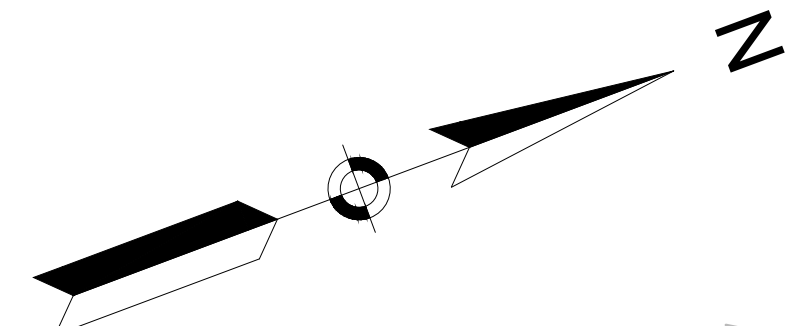
CONTINUED ON SHEET NO. 102

CONTINUED ON SHEET NO. 104

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

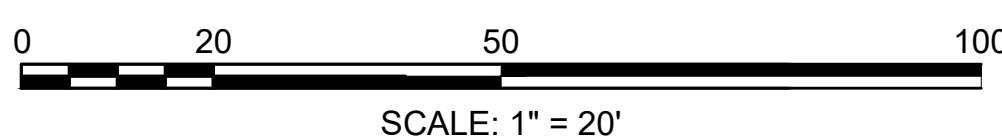
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	104	318
PROJECT FILE NO.		608164	

GRADING PLANS



CONTINUED ON
SHEET NO. 103

CONTINUED ON
SHEET NO. 105

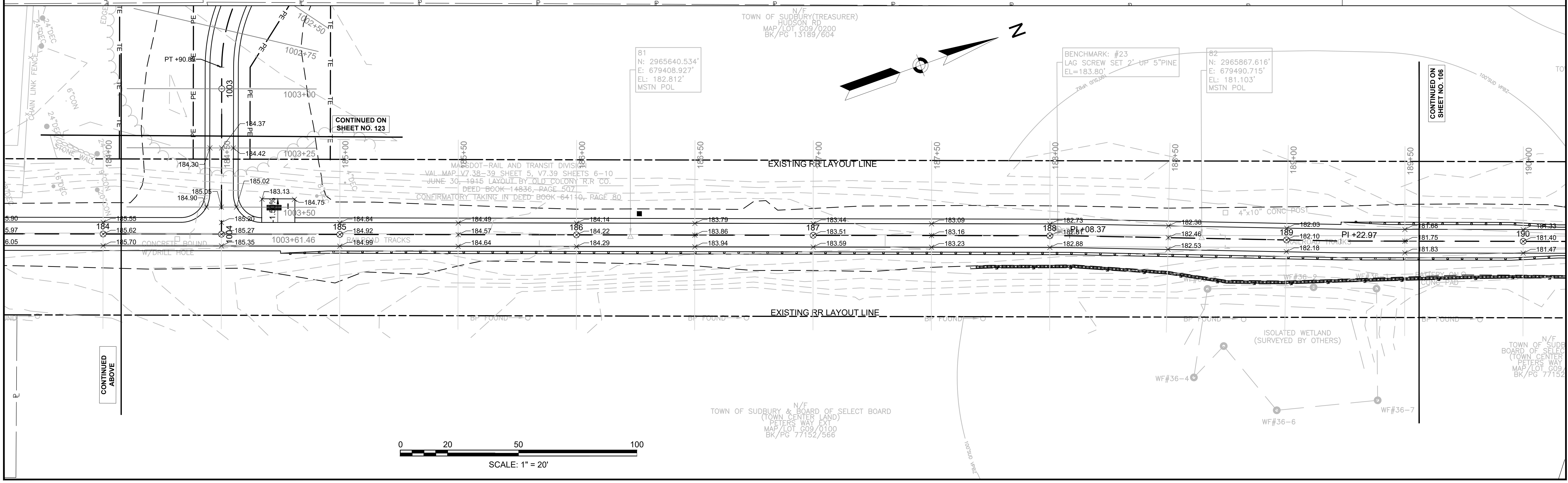
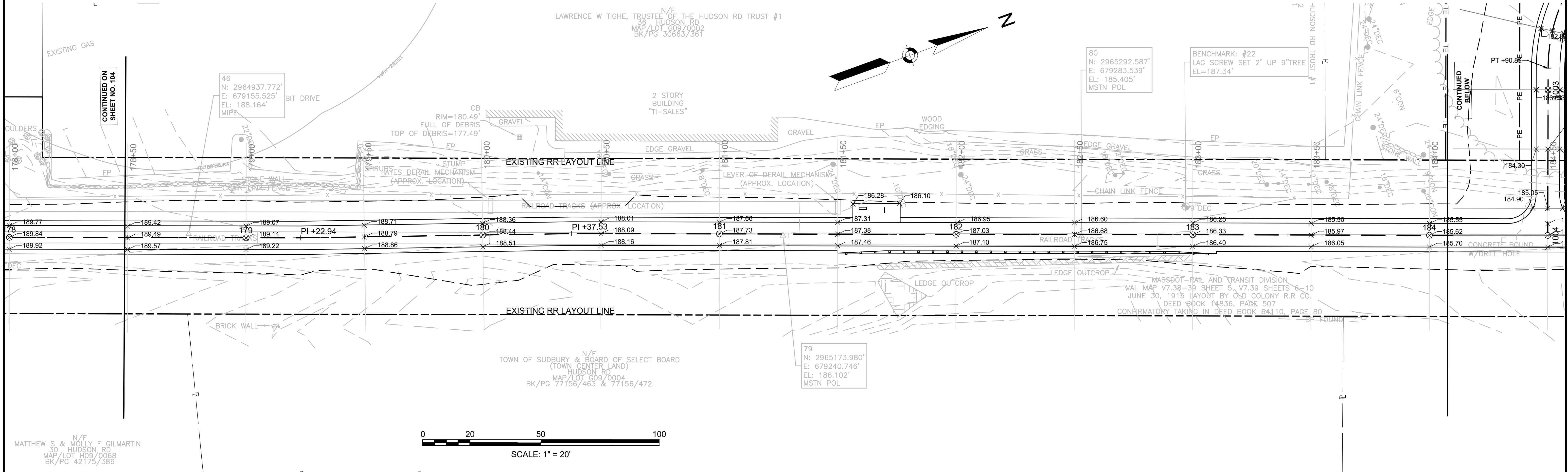


SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	105	318

PROJECT FILE NO. 608164

GRADING PLANS

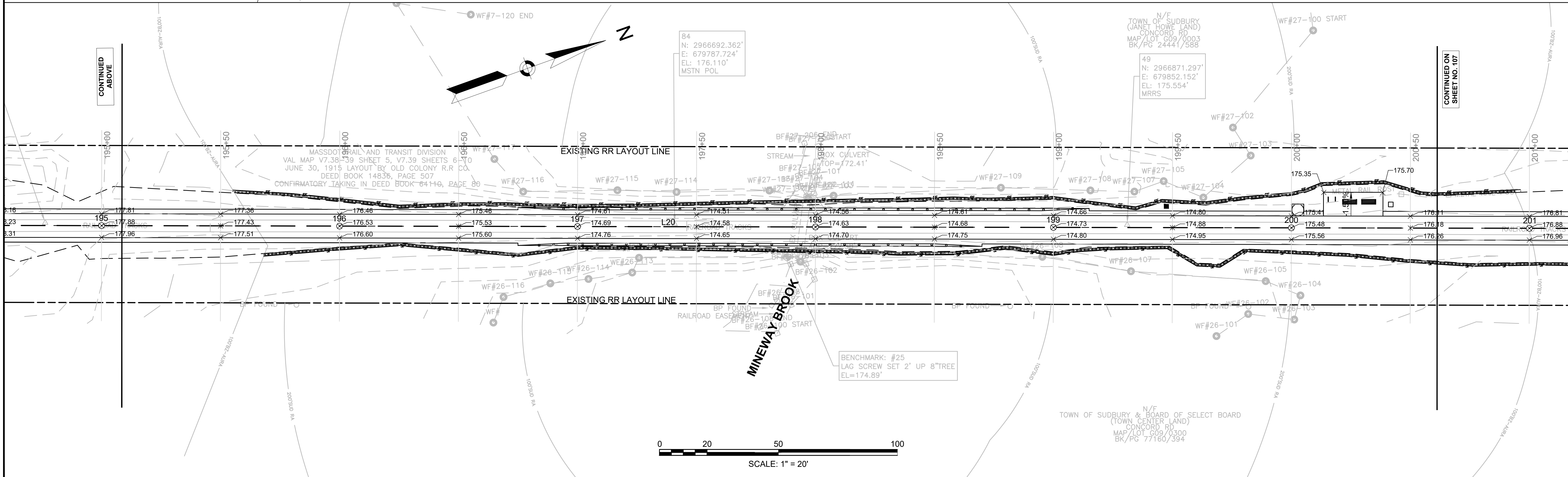
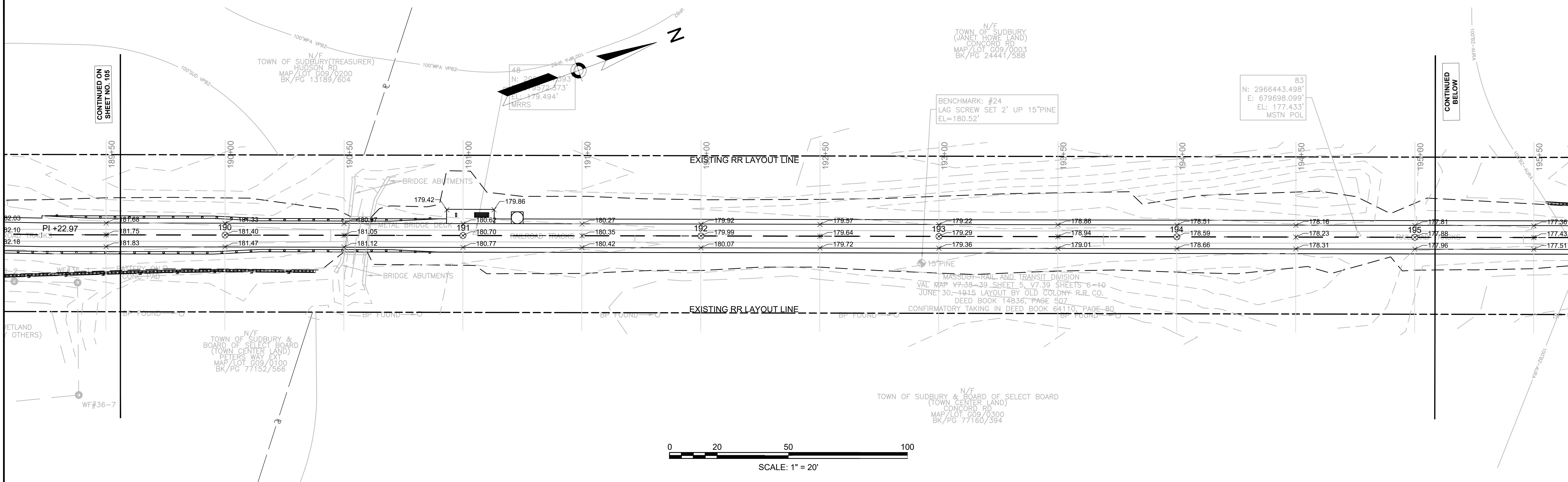


SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	106	318

PROJECT FILE NO. 608164

GRADING PLANS

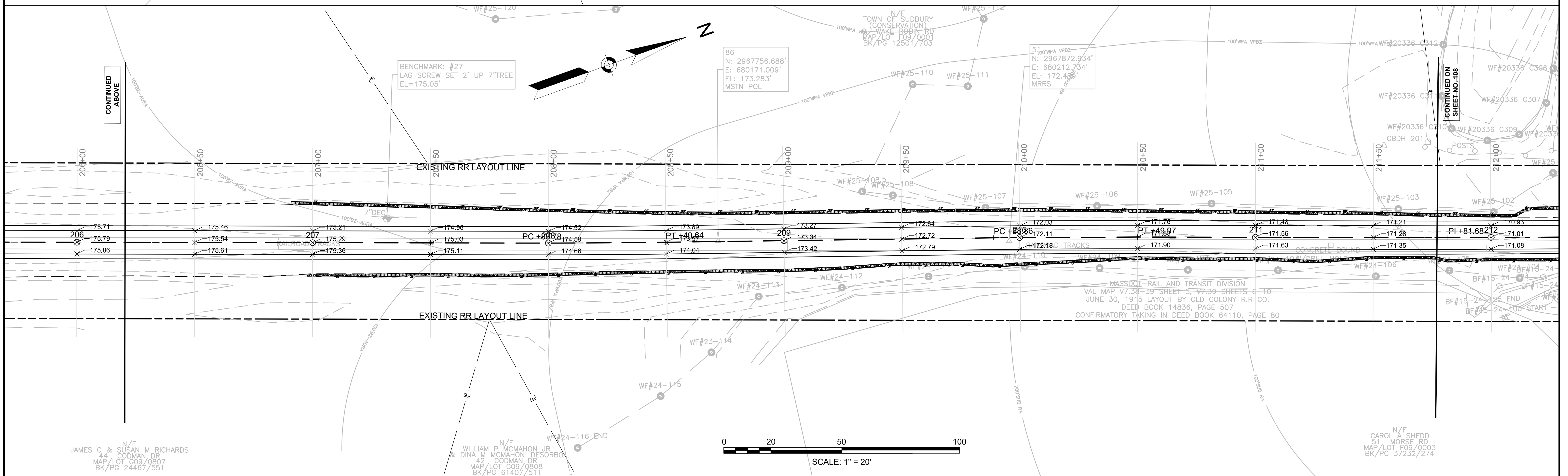
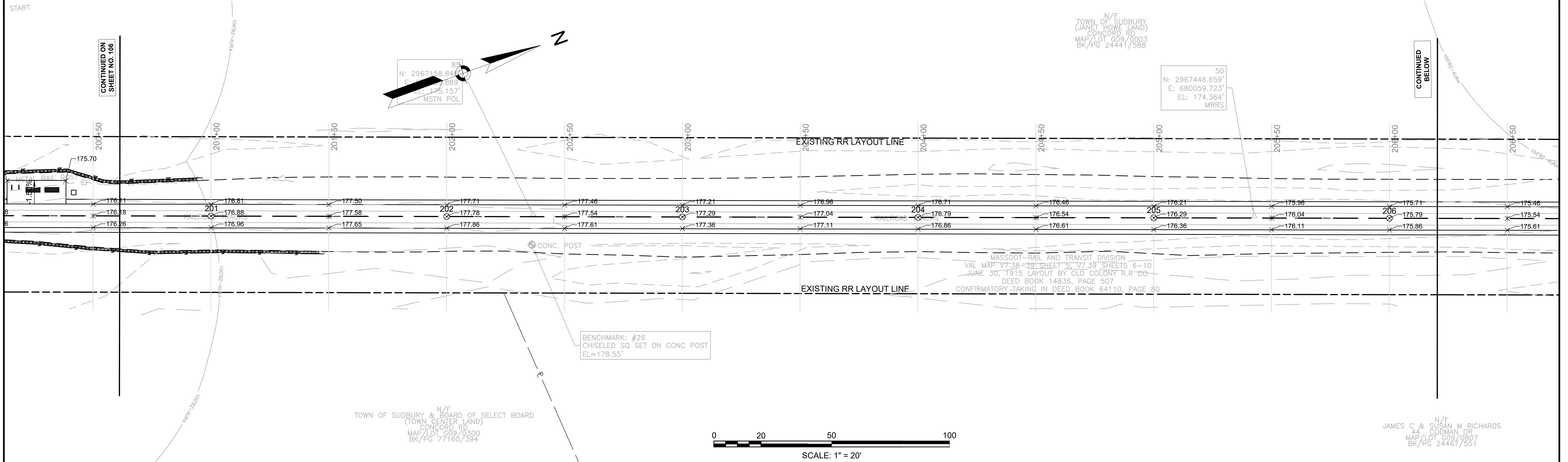


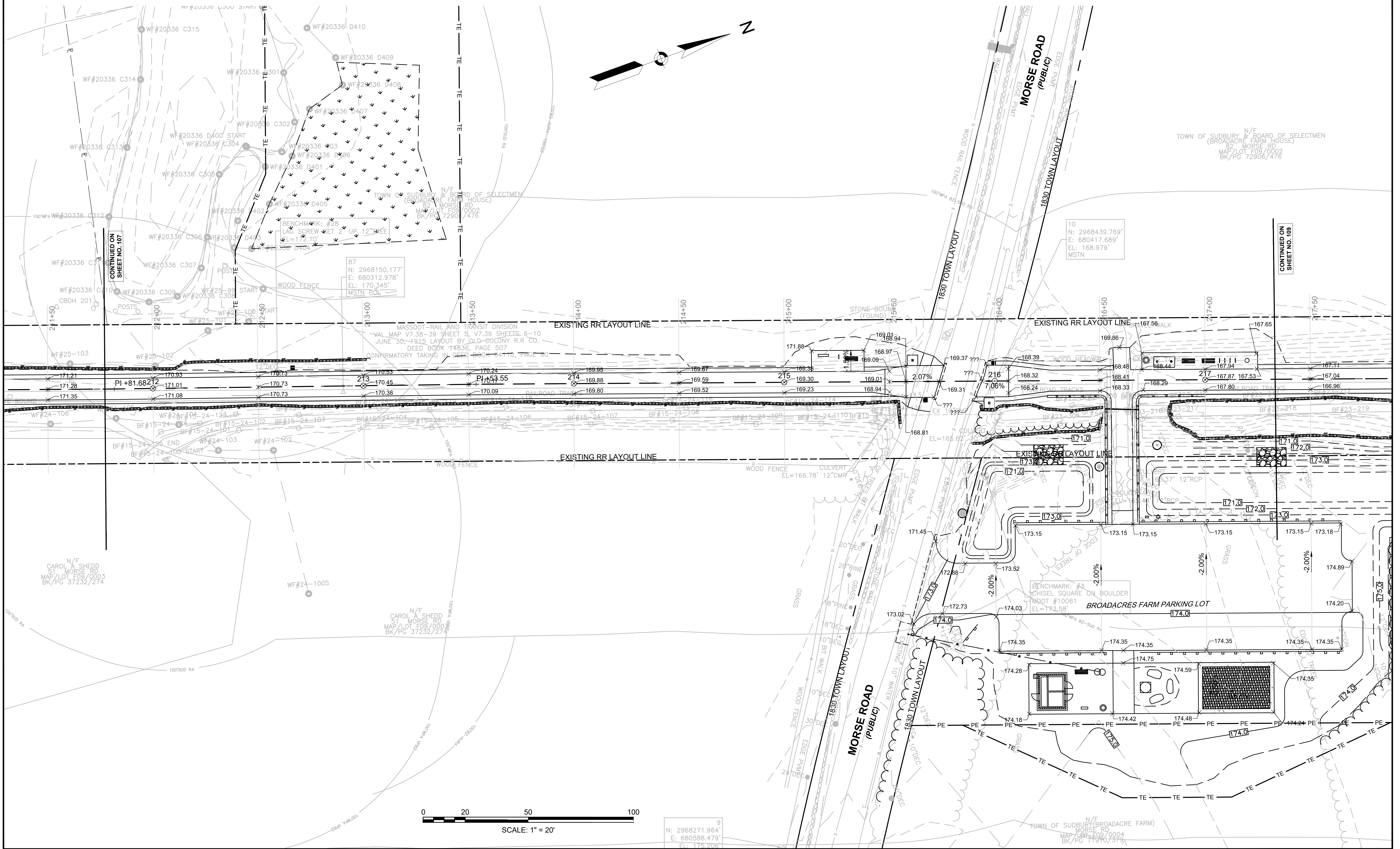
**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	107	318

PROJECT FILE NO. 608164

GRADING PLANS



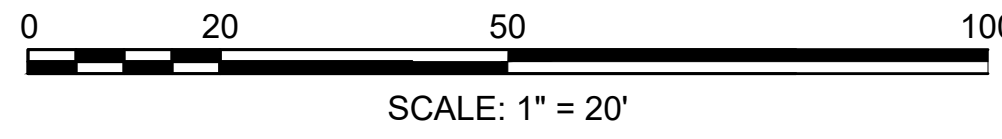


TOWN OF SUDBURY N/E BOARD OF SELECTMEN
 (BROADACRES FARM HOUSE)
 87 MORSE RD
 MAP/LOT F09/0002
 BK/PG 7290/476

10
 N: 2968439.769'
 E: 680417.689'
 EL: 168.979'
 MSTN

CONTINUED ON
 SHEET NO. 107

CONTINUED ON
 SHEET NO. 109

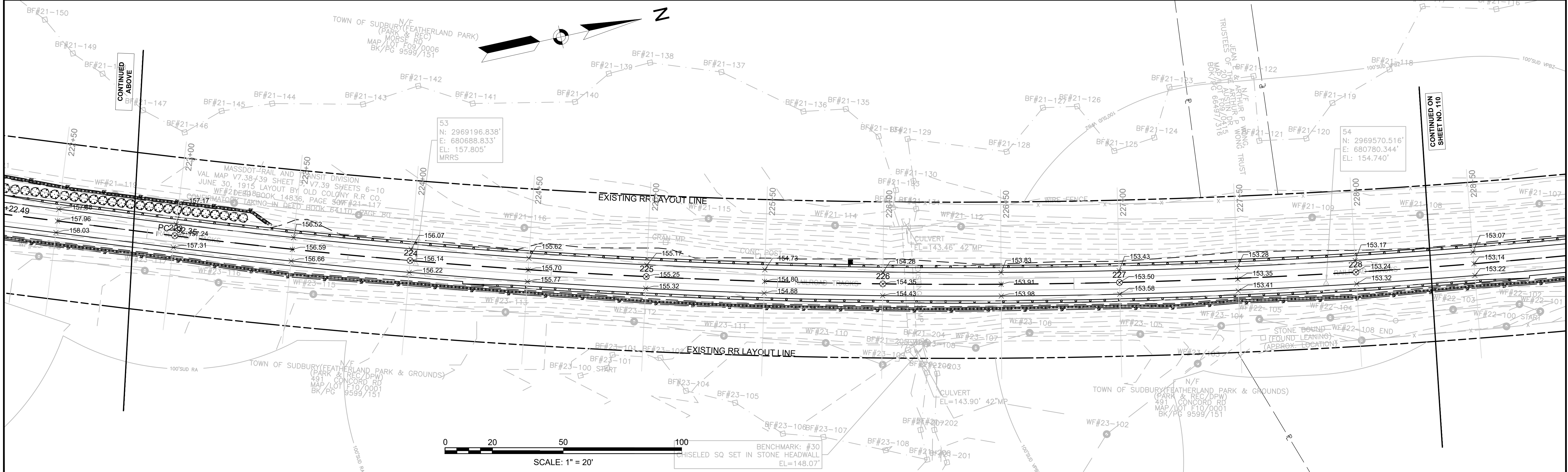
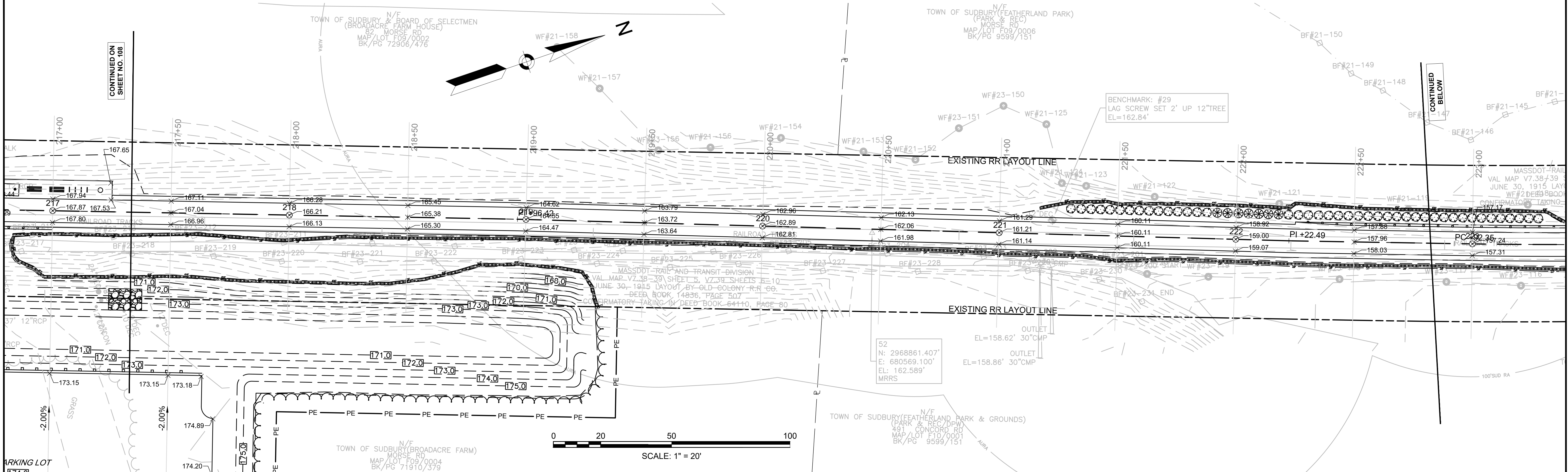


9
 N: 2968271.964'
 E: 680588.479'
 EL: 175.203'

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	109	318
PROJECT FILE NO.		608164	

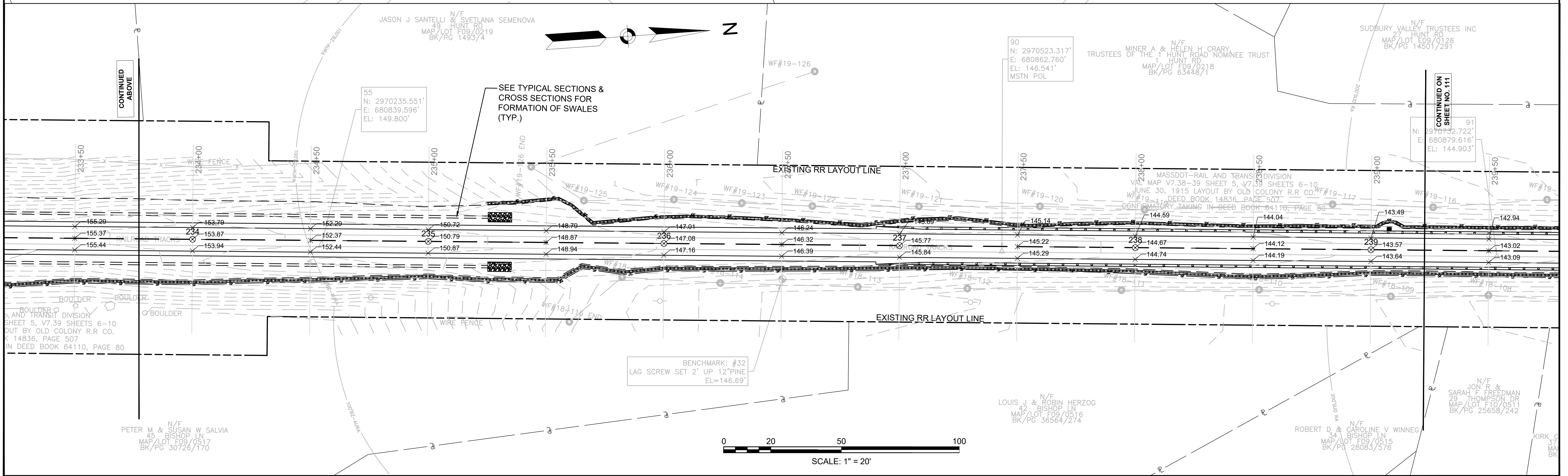
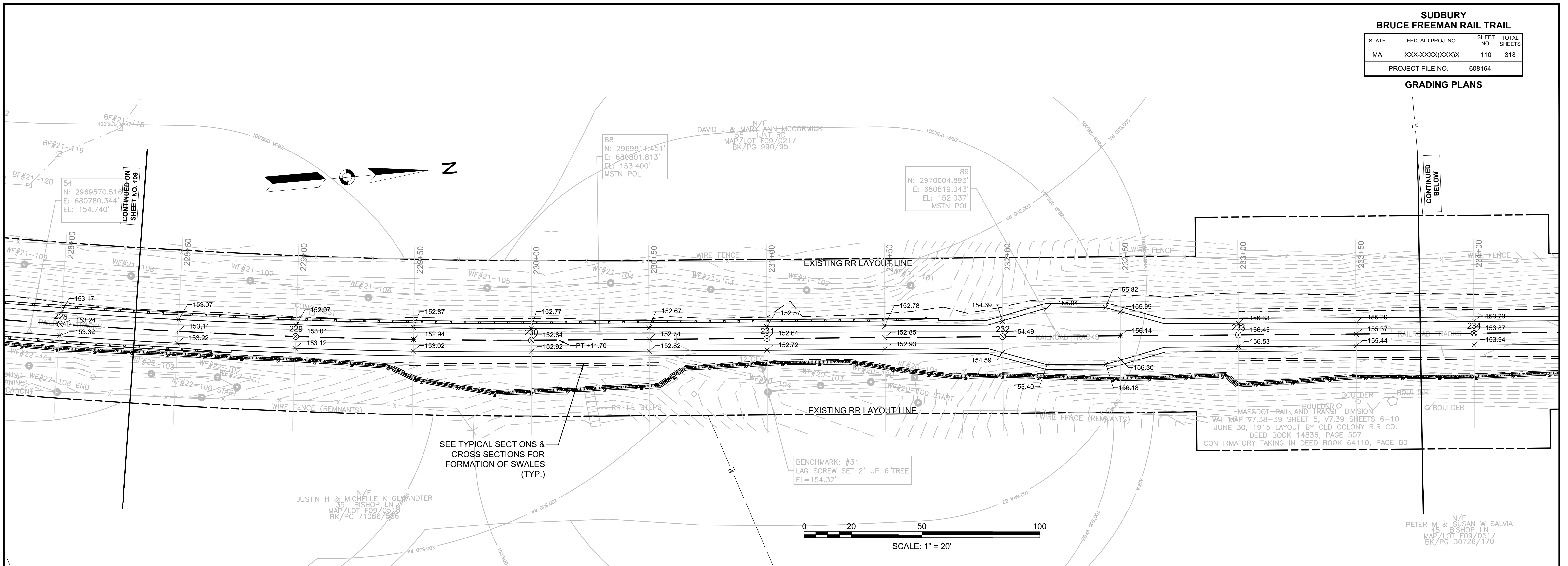
GRADING PLANS



**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

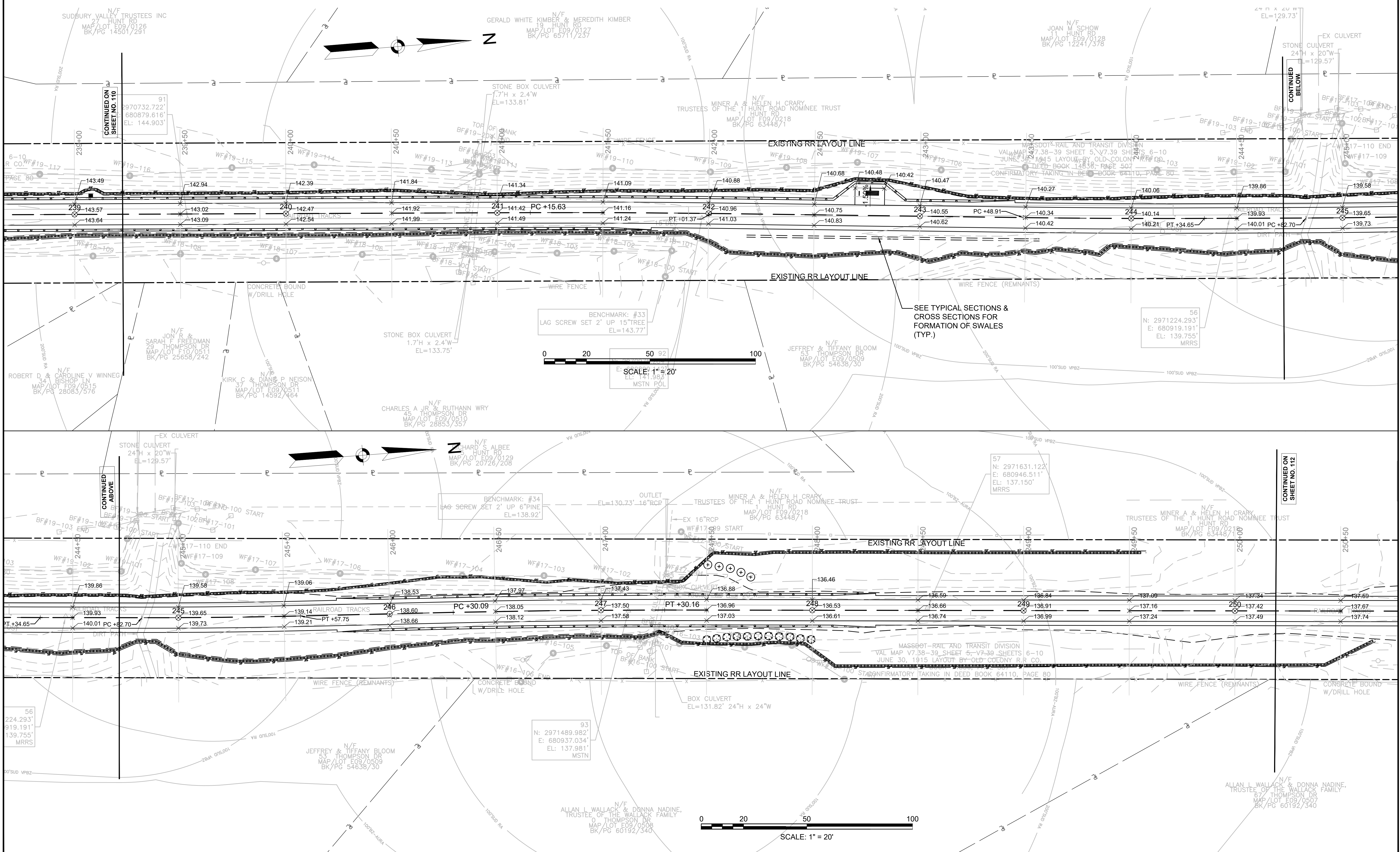
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	110	318
PROJECT FILE NO.		608164	

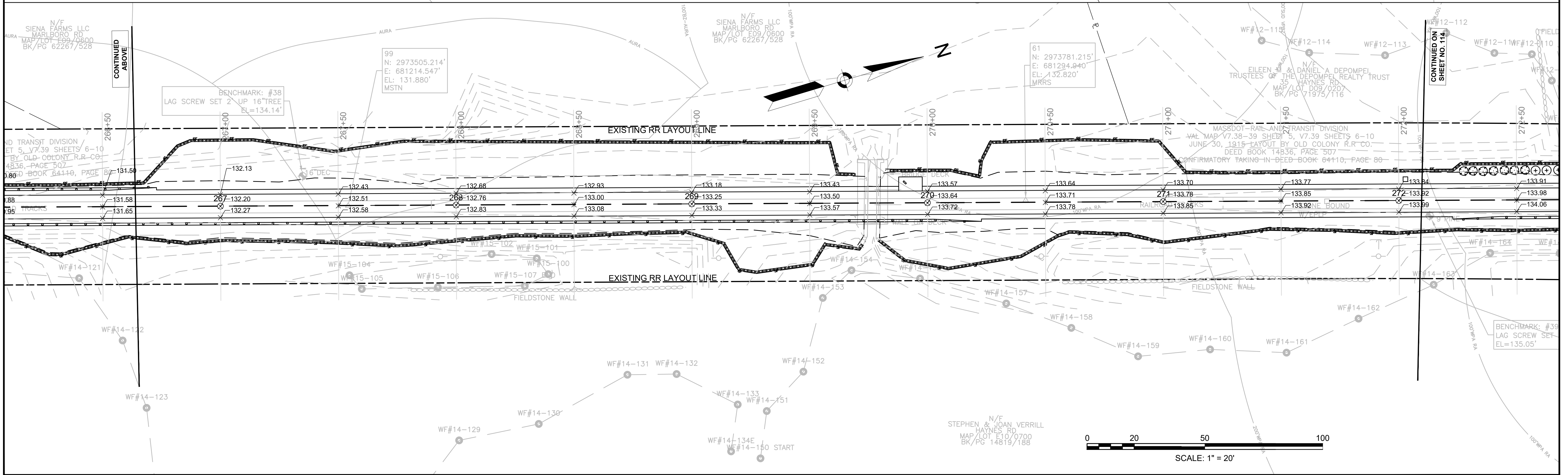
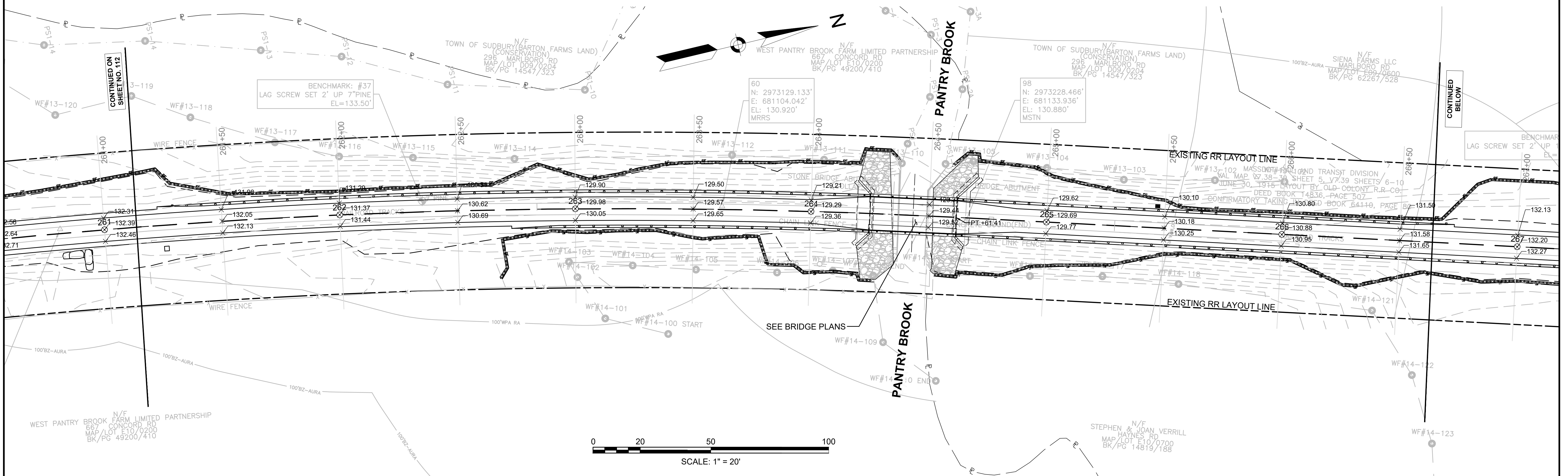
GRADING PLANS



SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	111	318
PROJECT FILE NO.		608164	

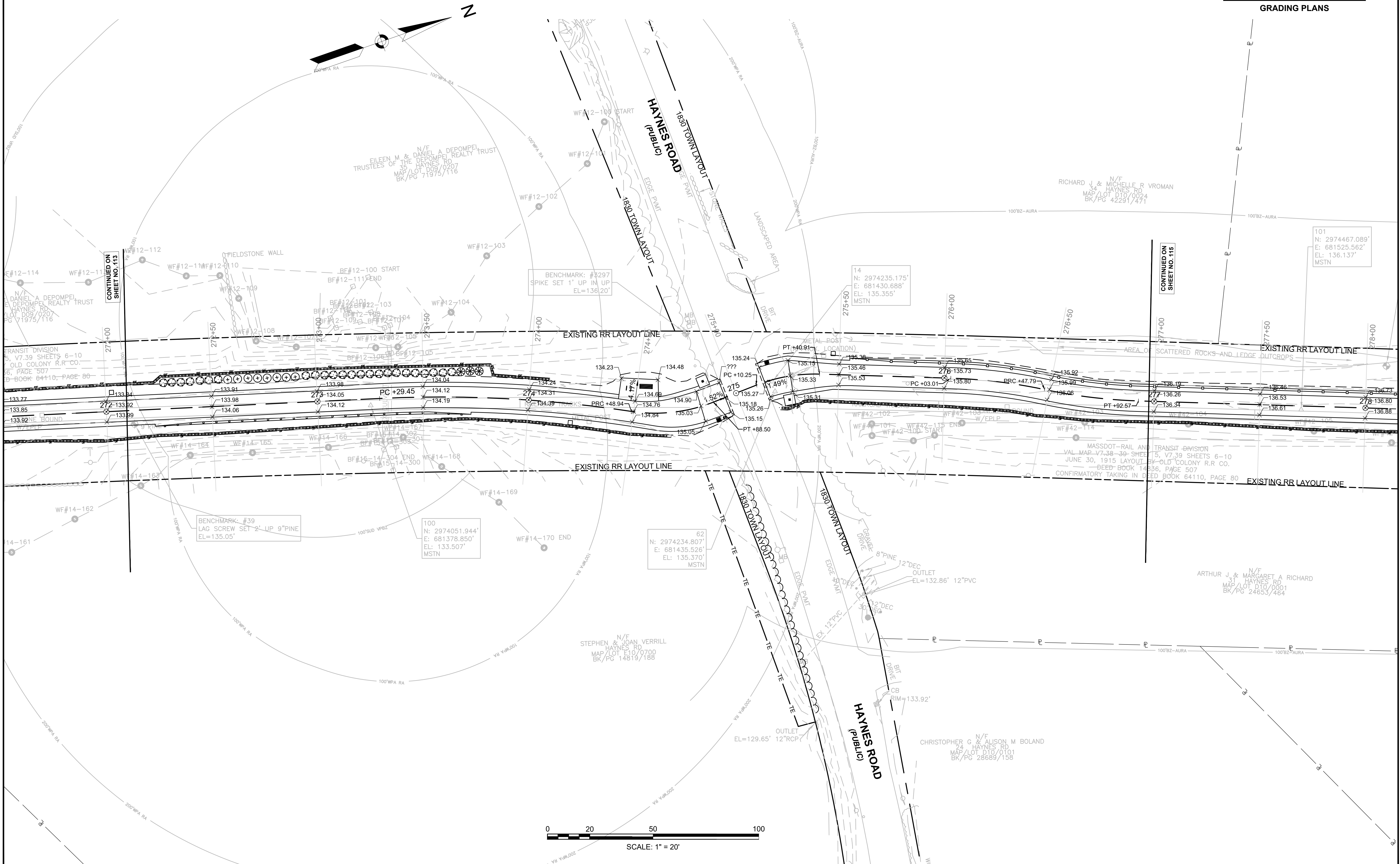
GRADING PLANS





SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	114	318
PROJECT FILE NO.		608164	

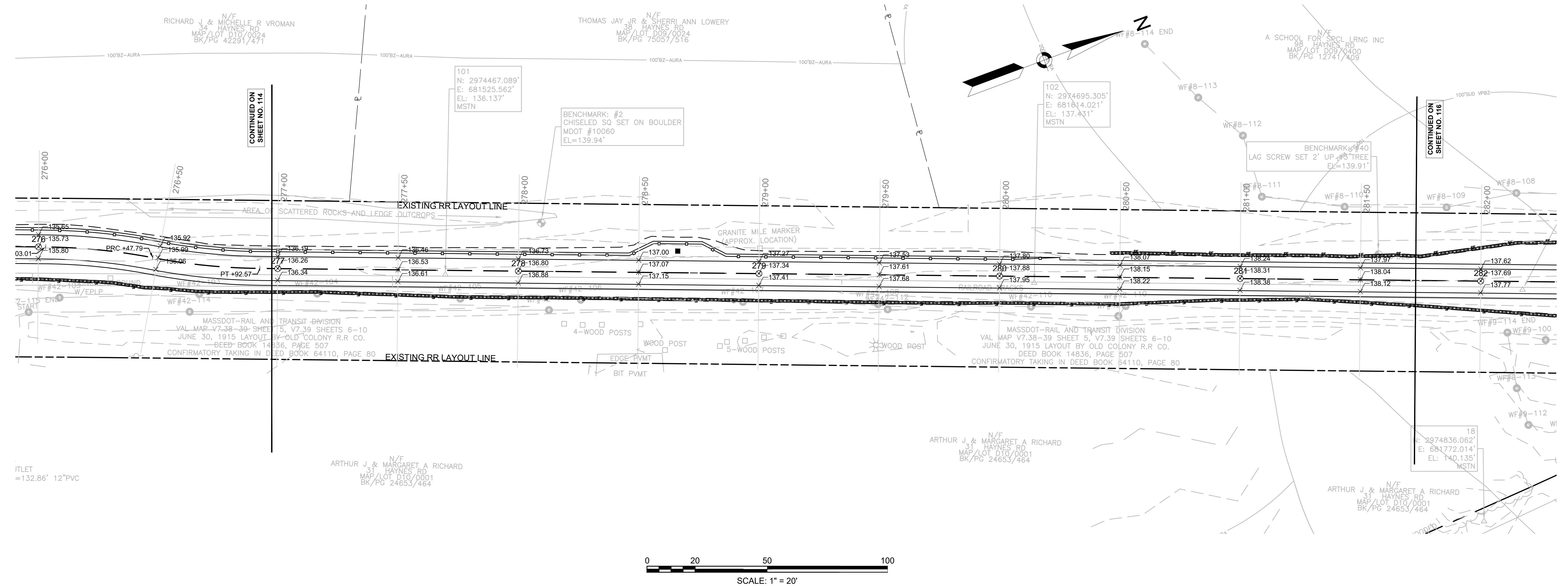
GRADING PLANS



**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	115	318
PROJECT FILE NO.		608164	

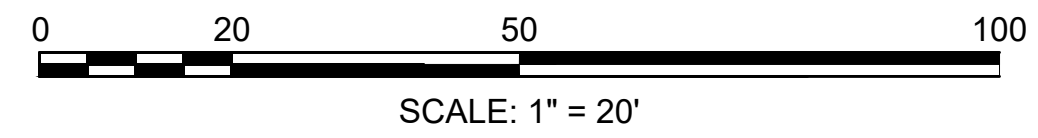
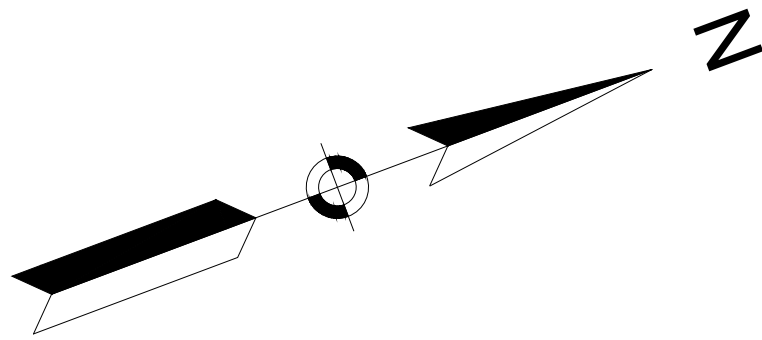
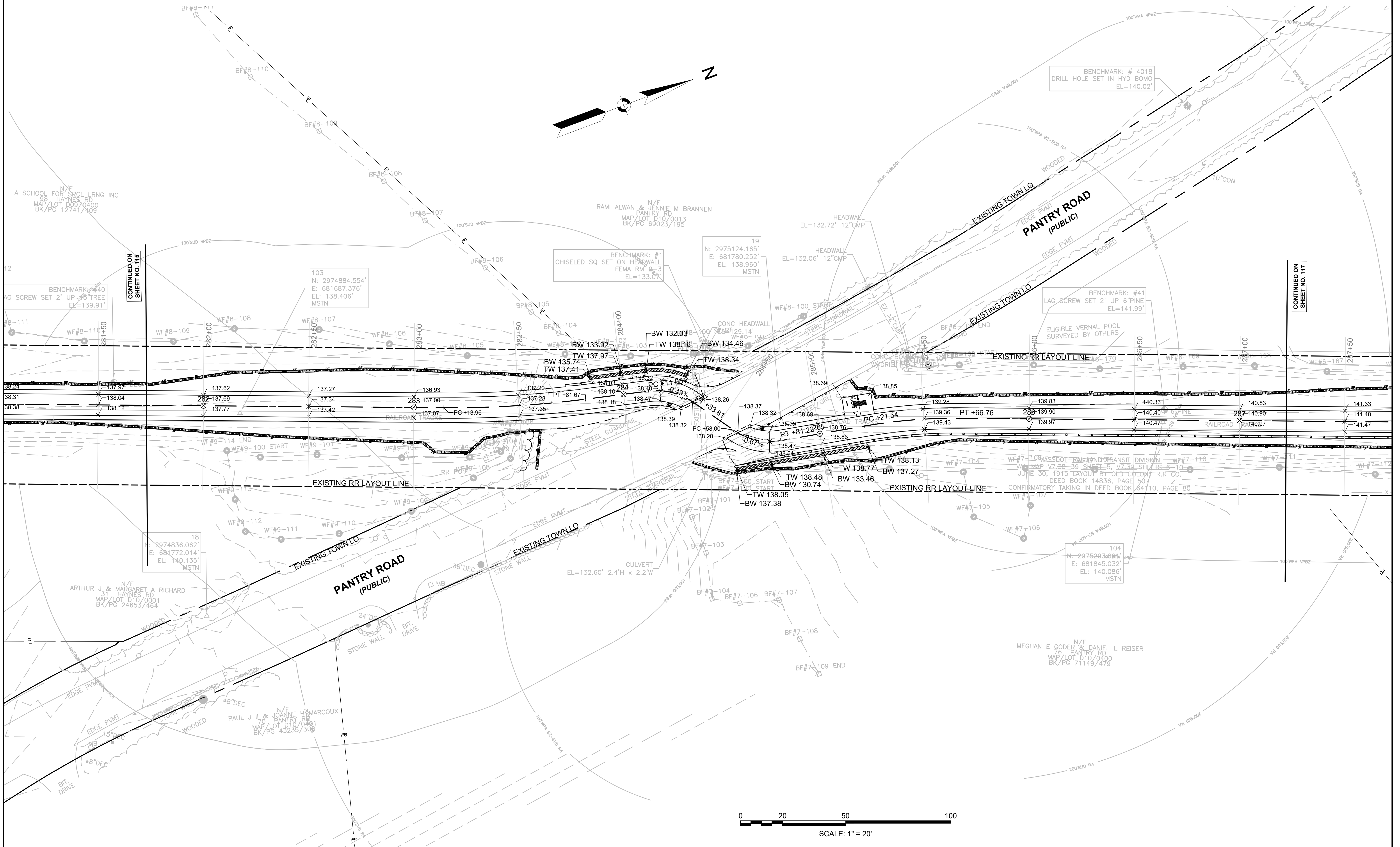
GRADING PLANS

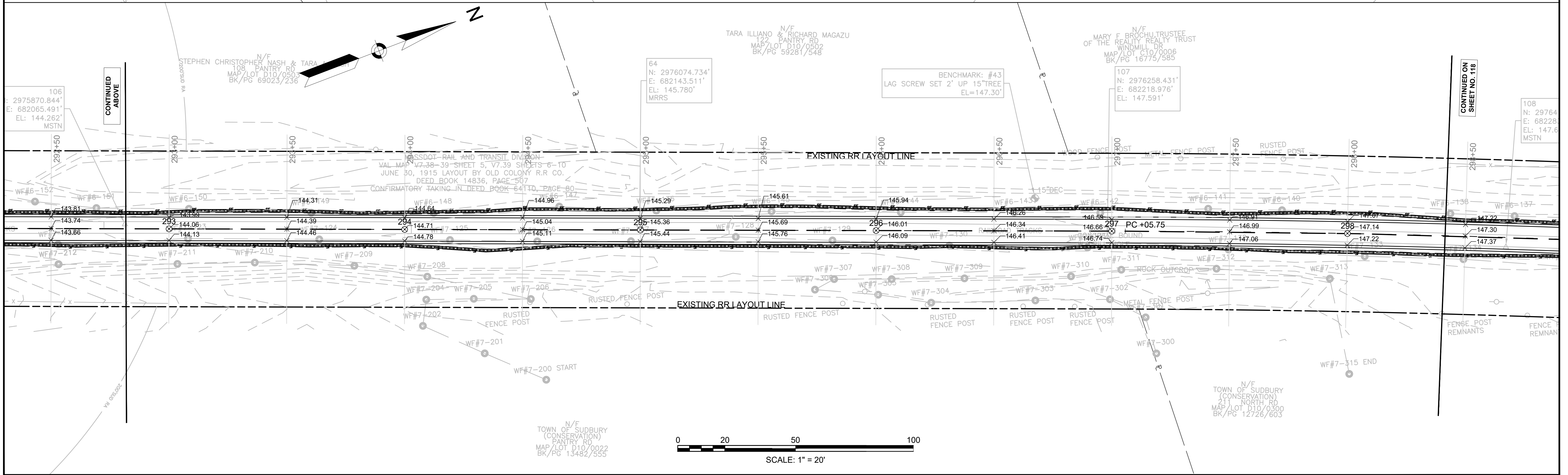
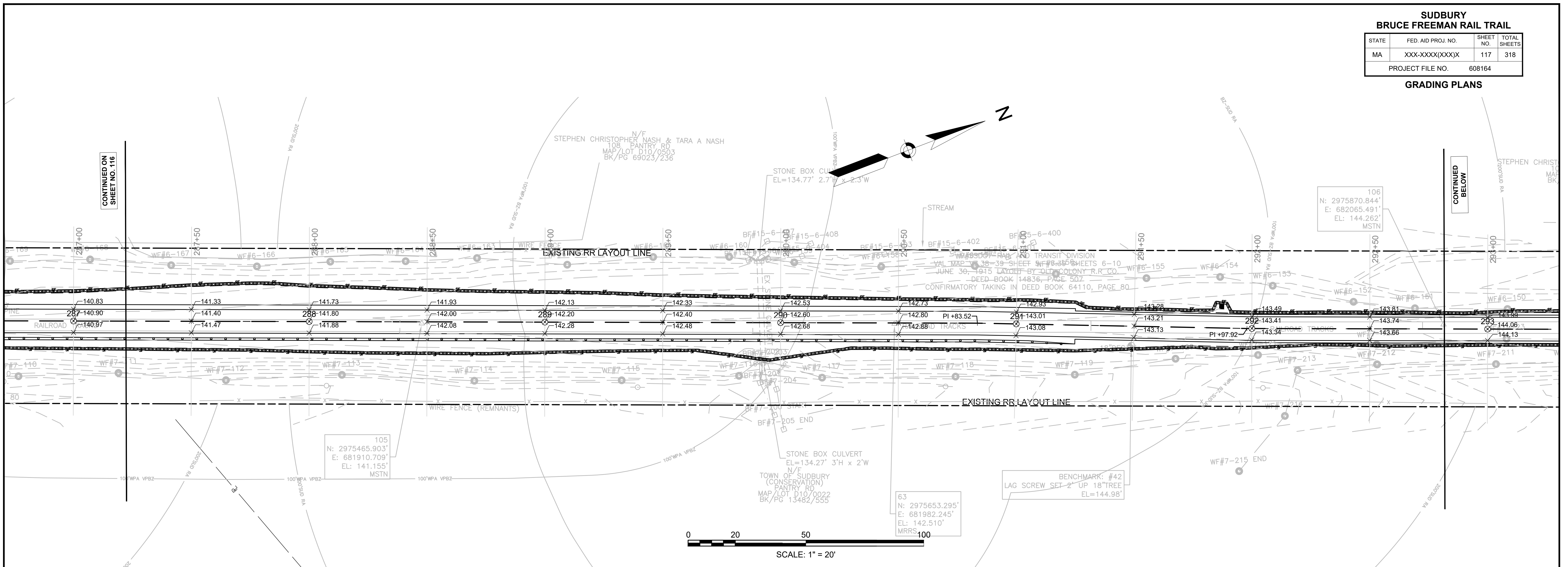


SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	116	318
PROJECT FILE NO.		608164	

GRADING PLANS

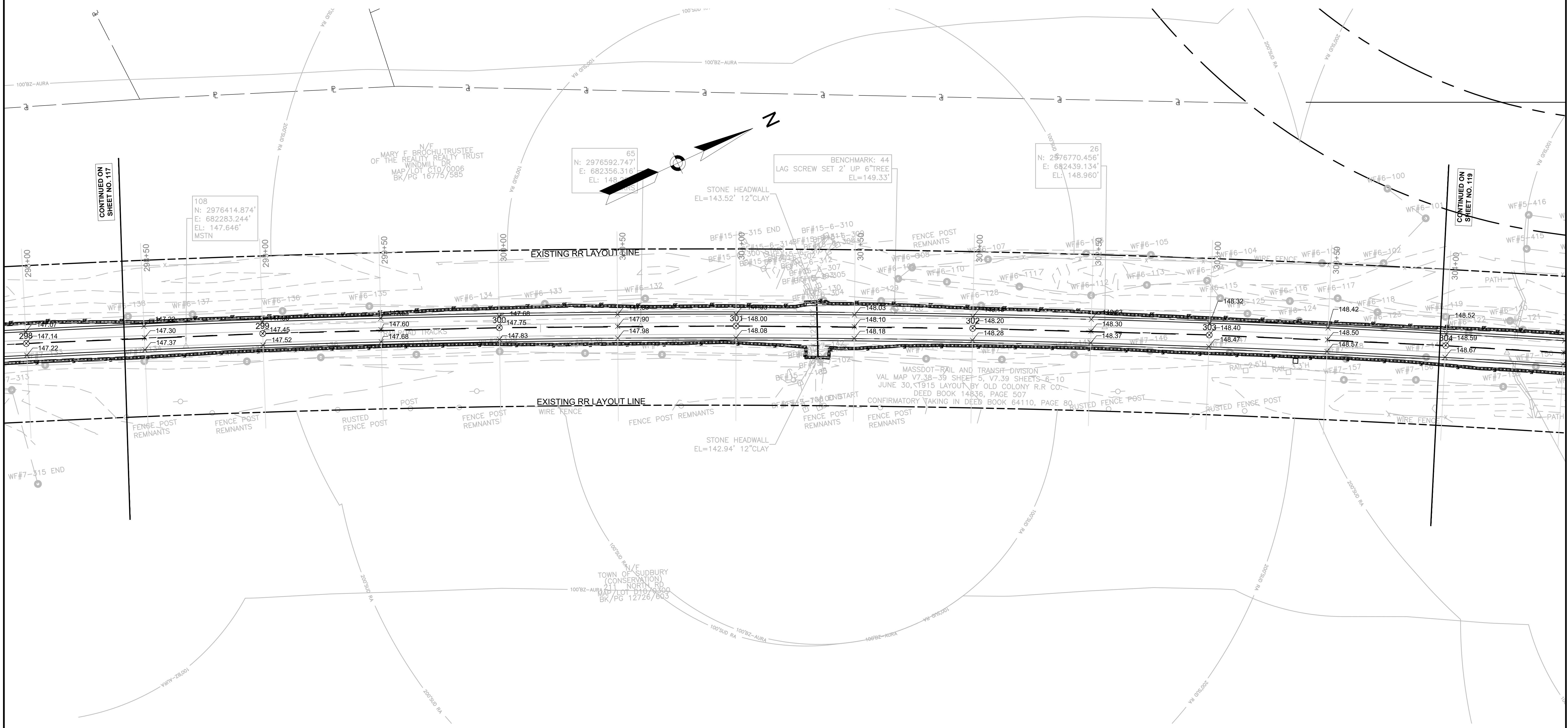




**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

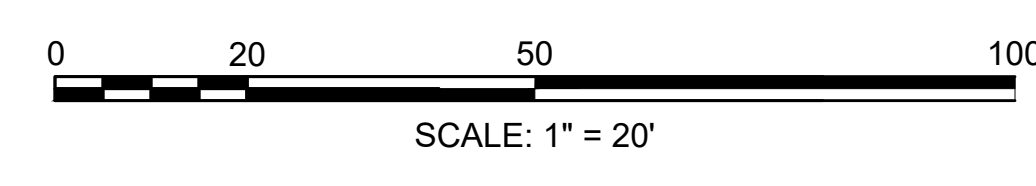
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	118	318
PROJECT FILE NO.		608164	

GRADING PLANS



CONTINUED ON
SHEET NO. 117

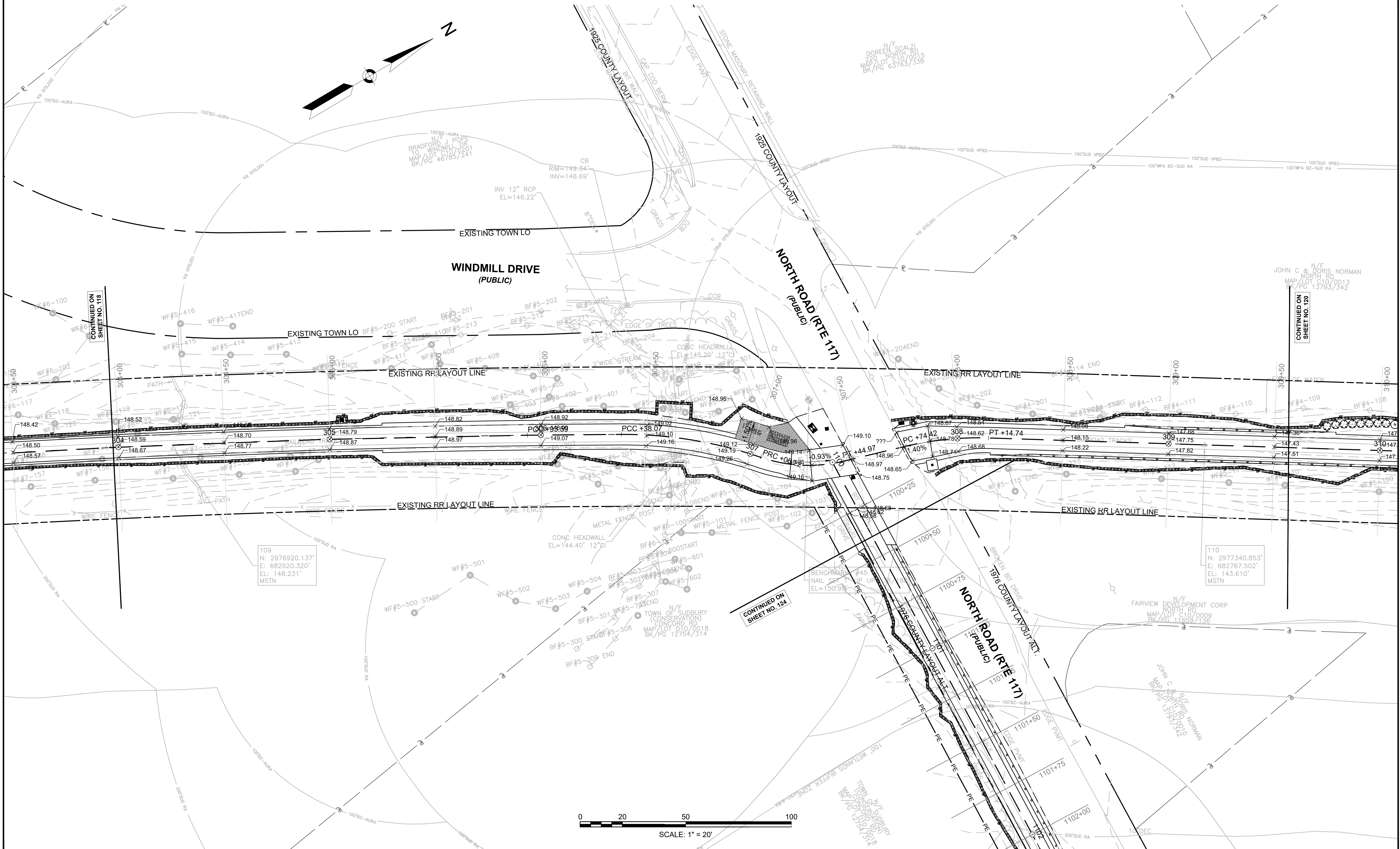
CONTINUED ON
SHEET NO. 119



SUDBURY
BRUCE FREEMAN RAIL TRAIL

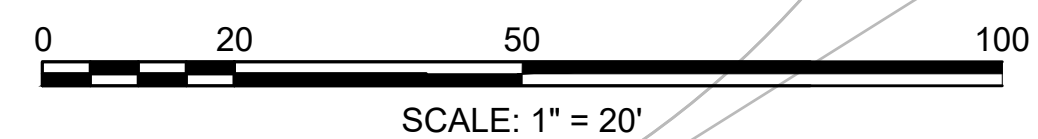
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	119	318
PROJECT FILE NO.		608164	

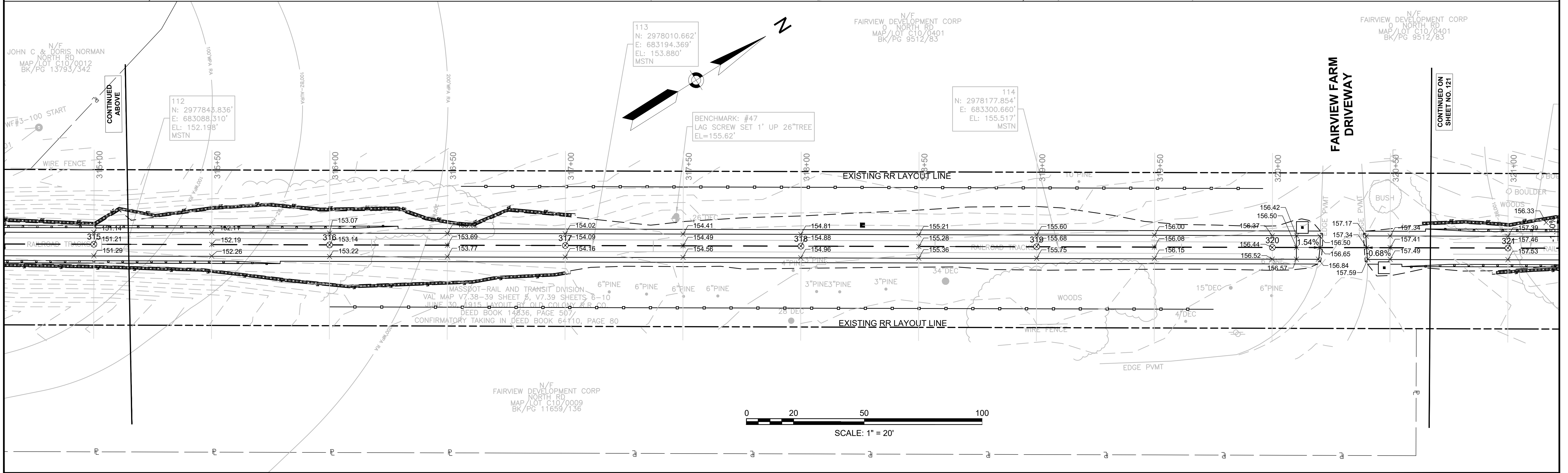
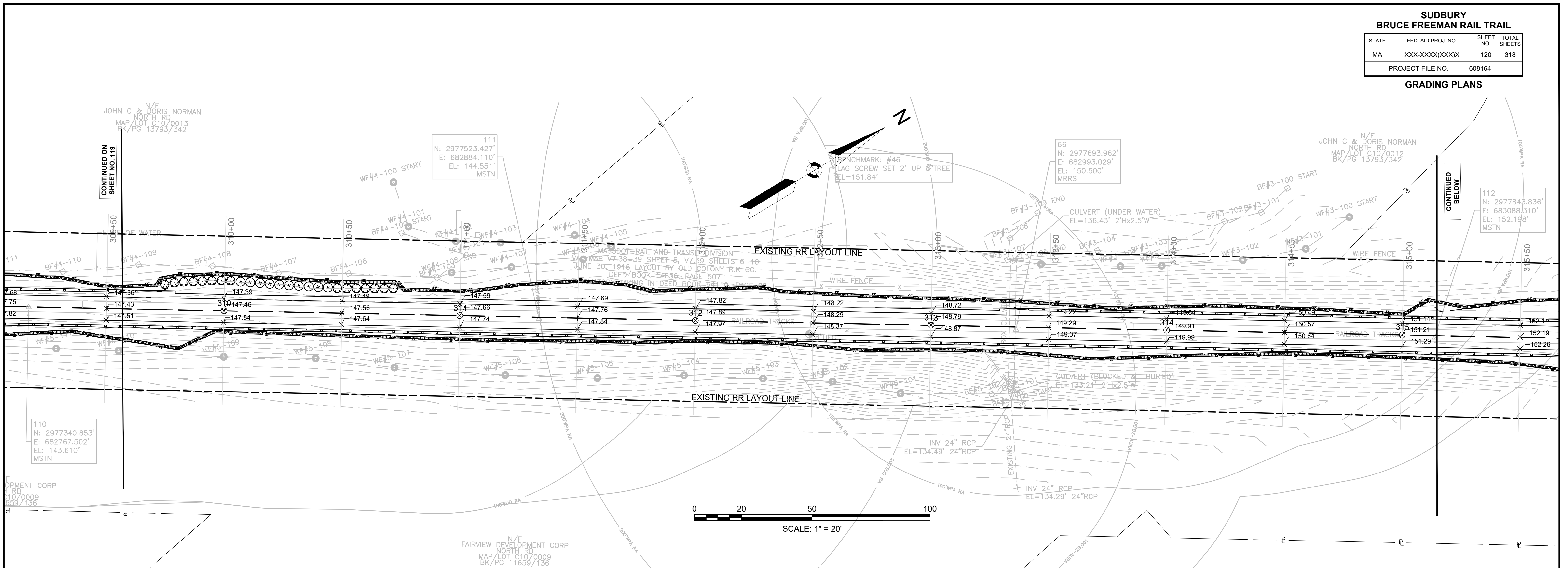
GRADING PLANS

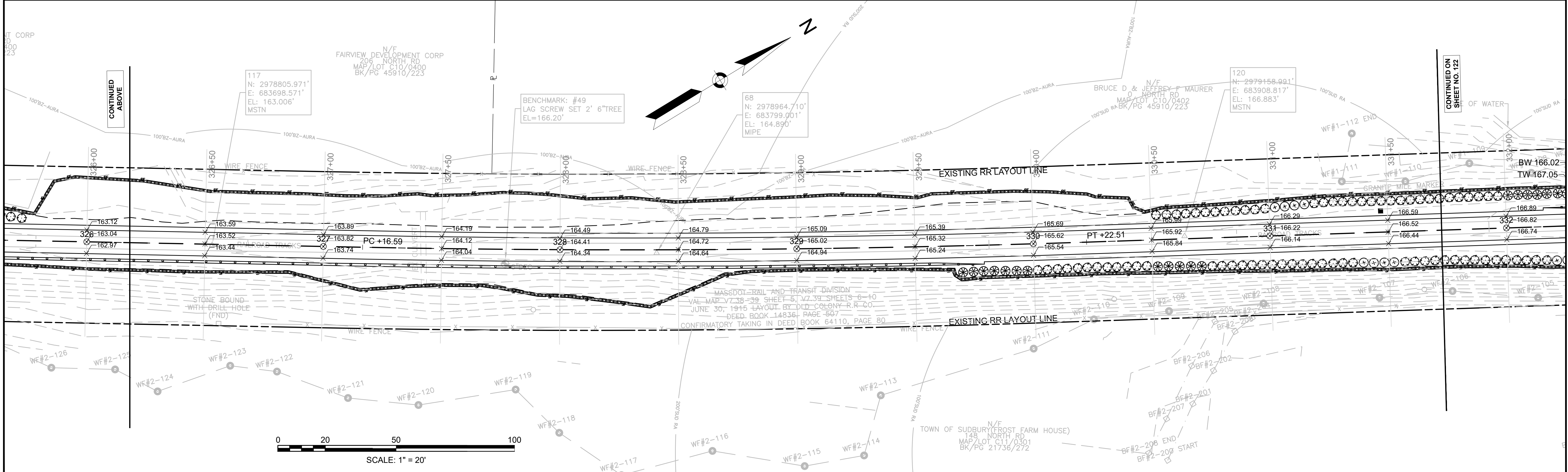
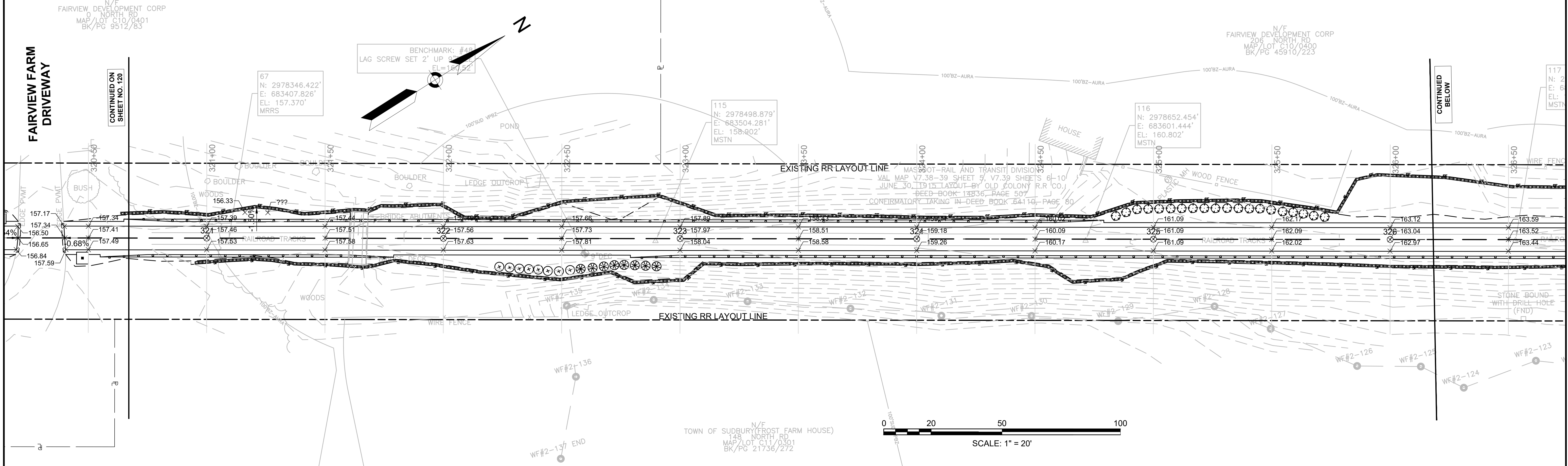


109
N: 2976920.137'
E: 682520.320'
EL: 148.231'
MSTN

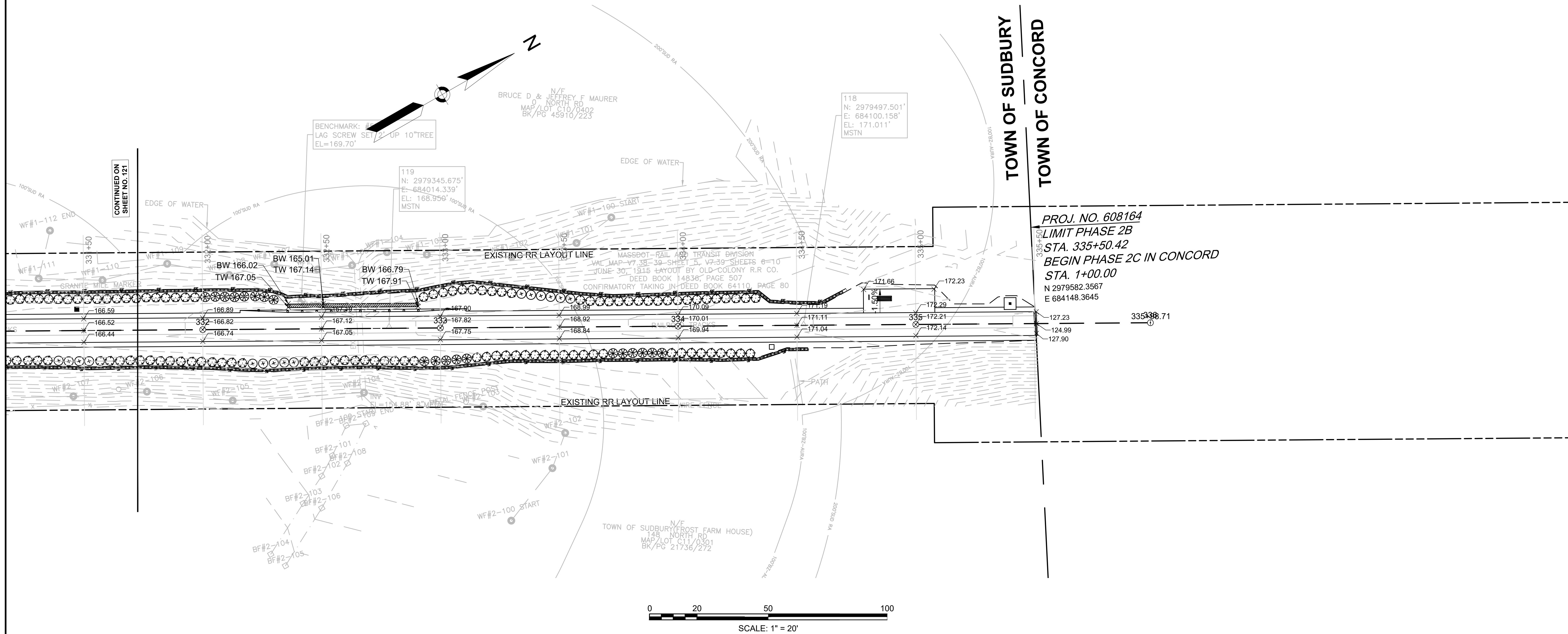
110
N: 2977340.853'
E: 682767.502'
EL: 143.610'
MSTN







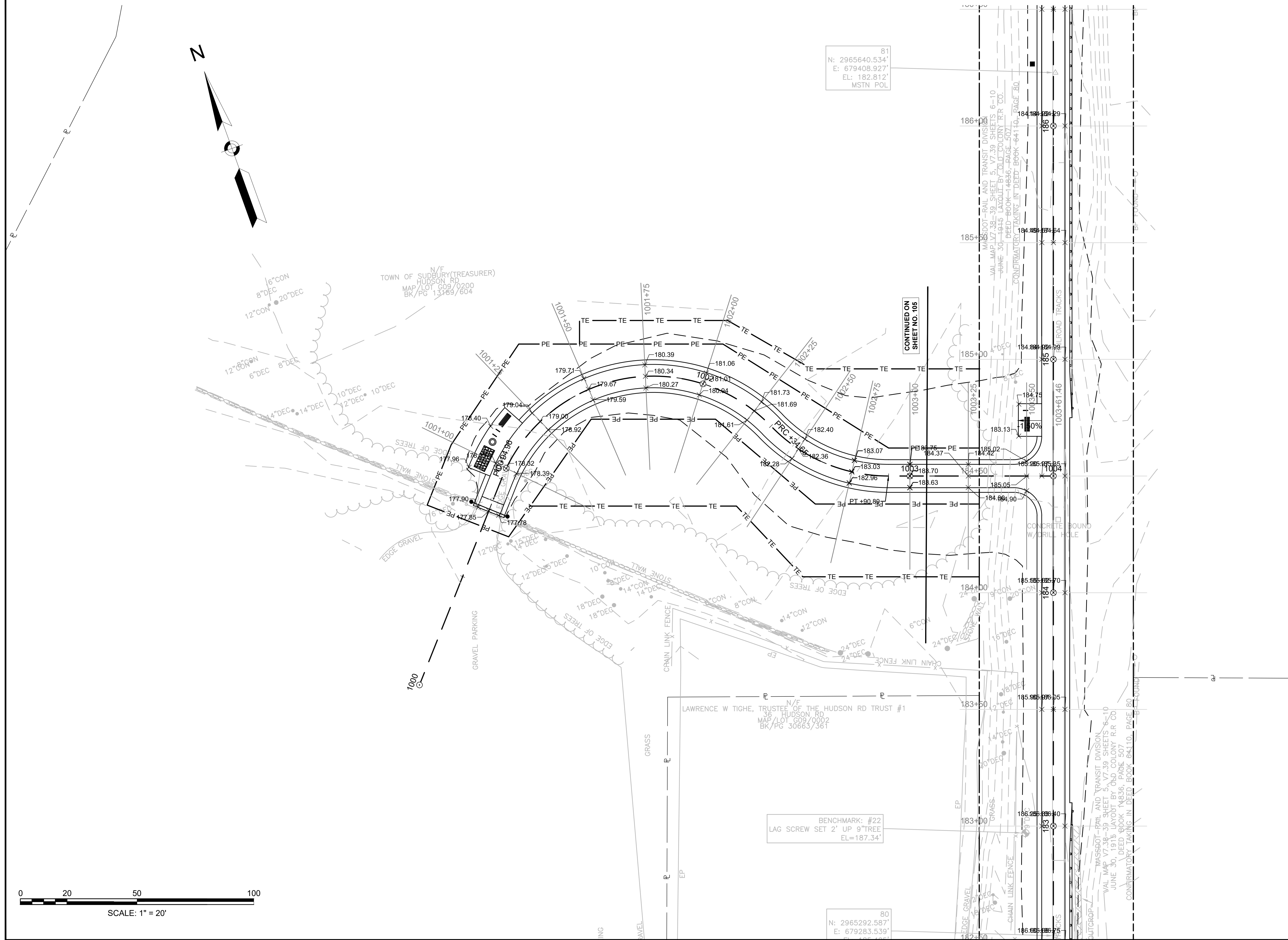
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	122	318
PROJECT FILE NO.		608164	
GRADING PLANS			



**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	123	318
PROJECT FILE NO.		608164	

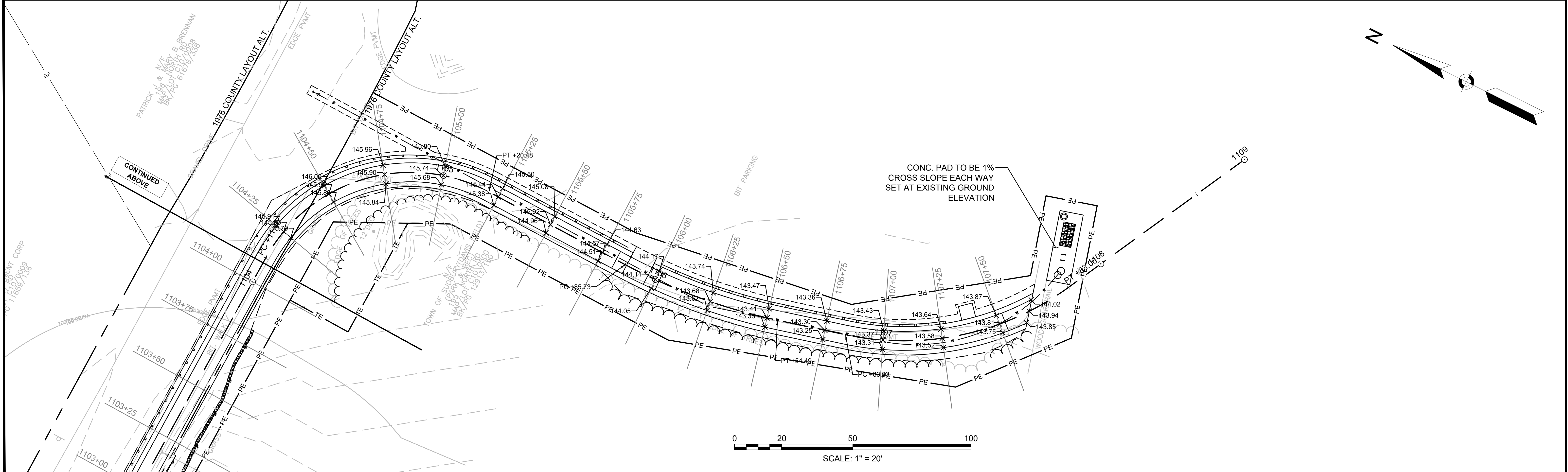
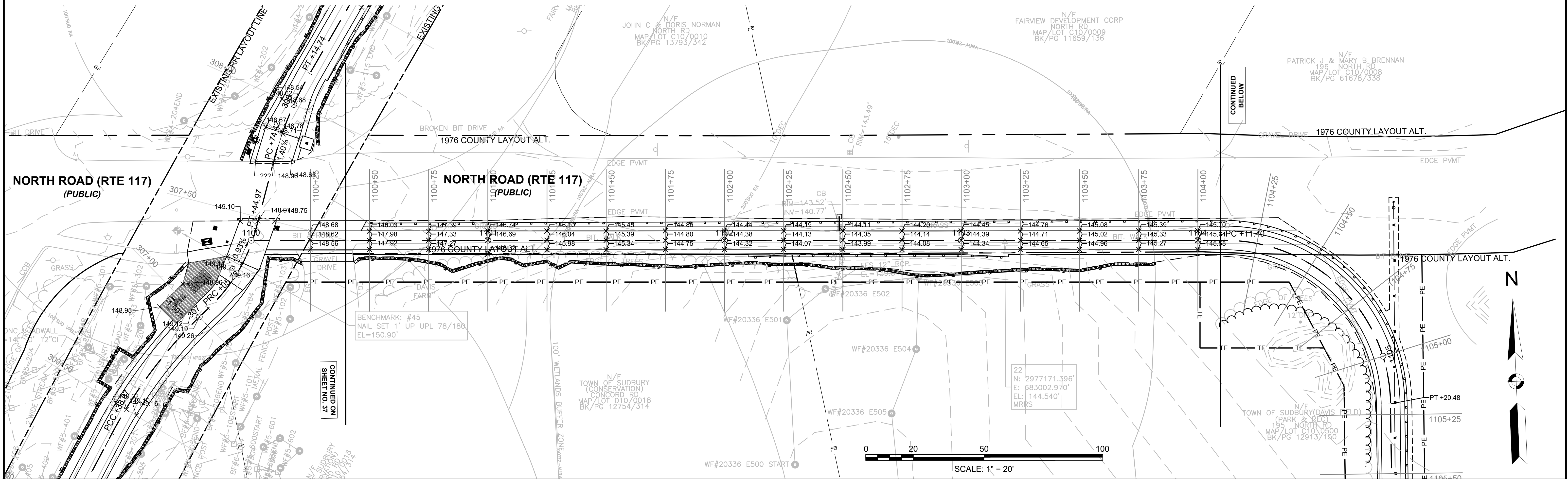
GRADING PLANS



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	124	318
PROJECT FILE NO.		608164	

GRADING PLANS



DRAINAGE AND UTL NOTES:

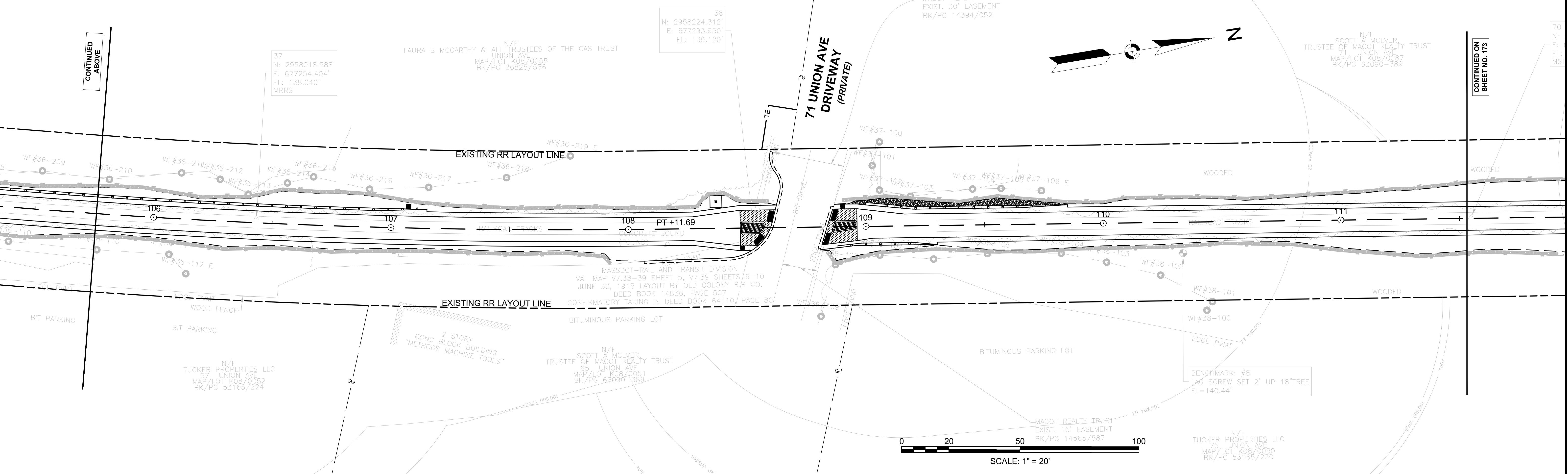
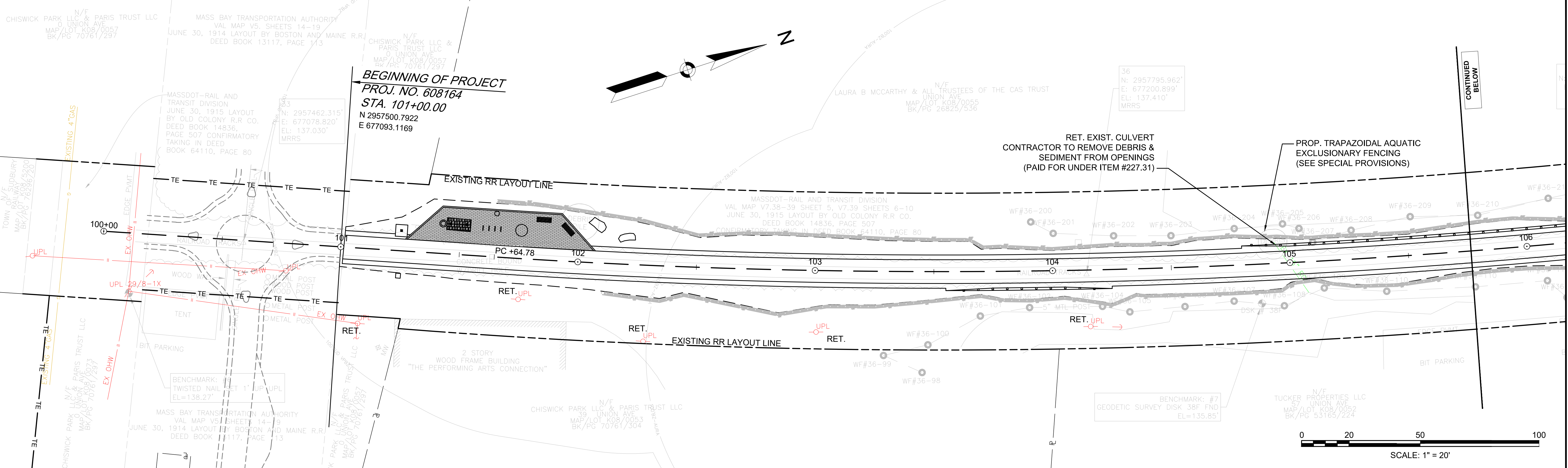
1. HEADWALL RIM ELEVATIONS REFER TO THE CENTER AND TOP OF CONCRETE.
2. PROP. CONCRETE HEADWALLS SHALL CONFORM TO MASSDOT DETAIL E 206.4.0
3. PROP STONE FOR PIPE ENDS SHALL MATCH THE GENERAL DIMENSIONS SHOWN ON MASSDOT DETAIL E 206.7.0. THEY MAY BE ADJUSTED ACCORDINGLY BASED ON FIELD CONDITIONS AND AS DIRECTED BY THE RESIDENT ENGINEER.
4. ALL CATCH BASIN FRAME AND GRATES TO BE MASSDOT CASCADE TYPE.

SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	172	318

PROJECT FILE NO. 608164

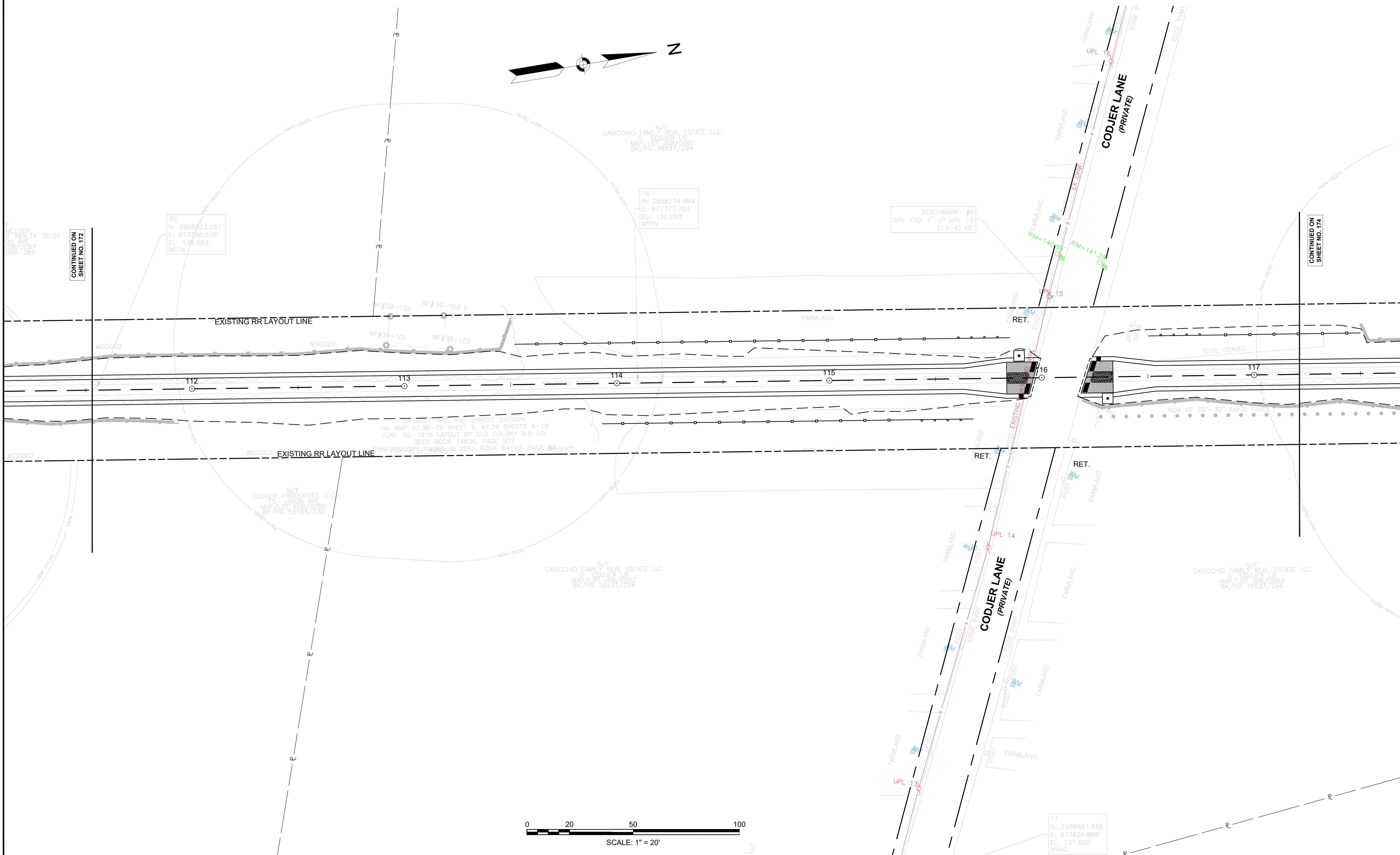
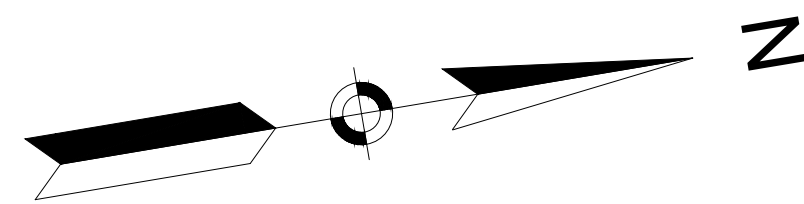
DRAINAGE & UTILITY PLANS



SUDBURY
BRUCE FREEMAN RAIL TRAIL

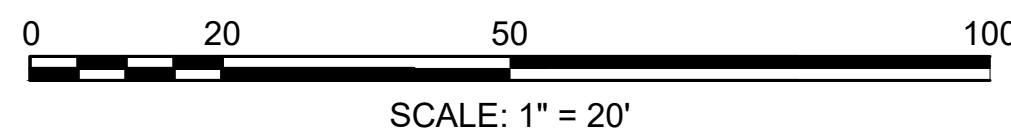
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	173	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



CONTINUED ON SHEET NO. 172

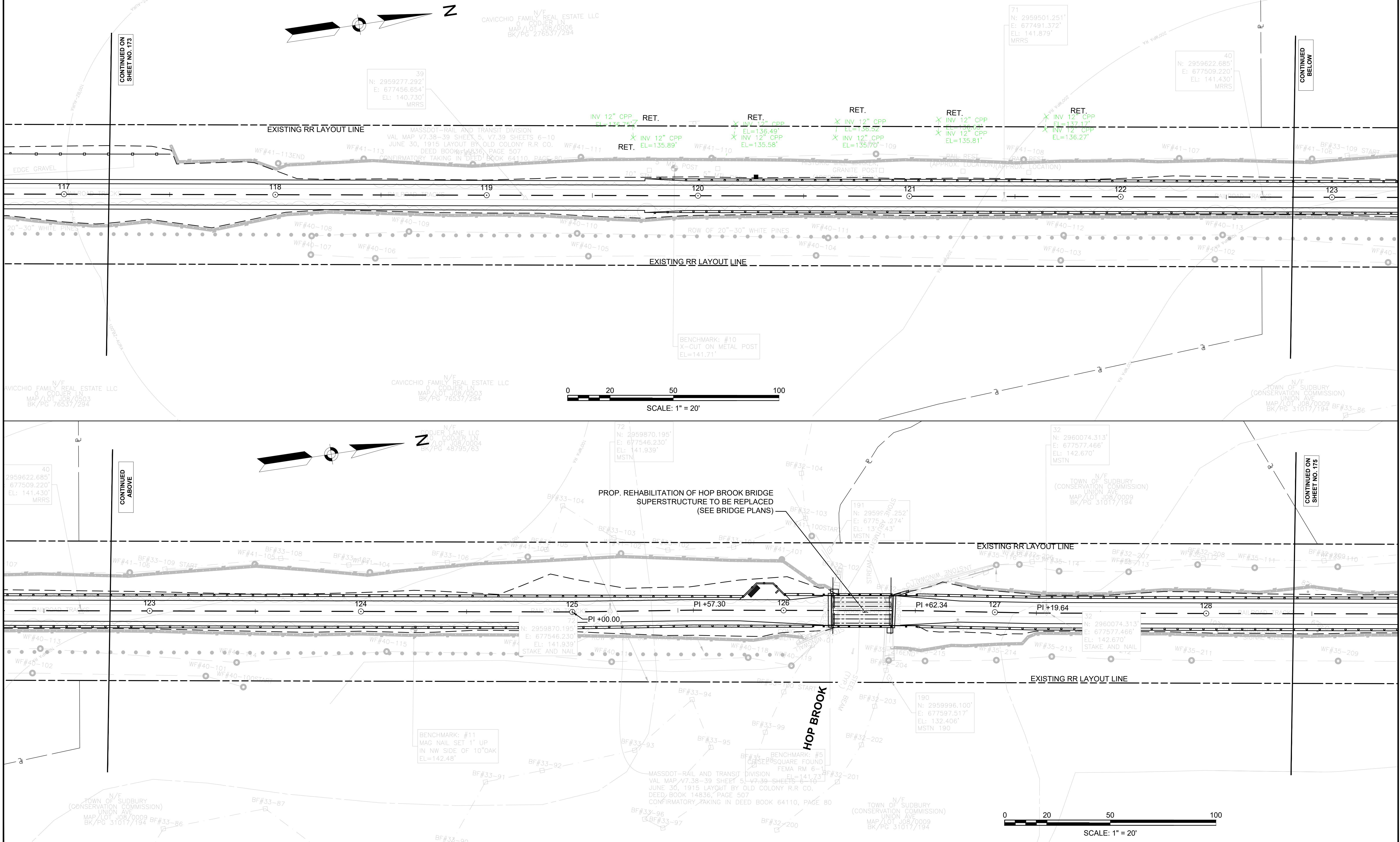
CONTINUED ON SHEET NO. 174



**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	174	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



CONTINUED ON
SHEET NO. 173

CONTINUED
BELOW

CONTINUED
ABOVE

CONTINUED ON
SHEET NO. 175

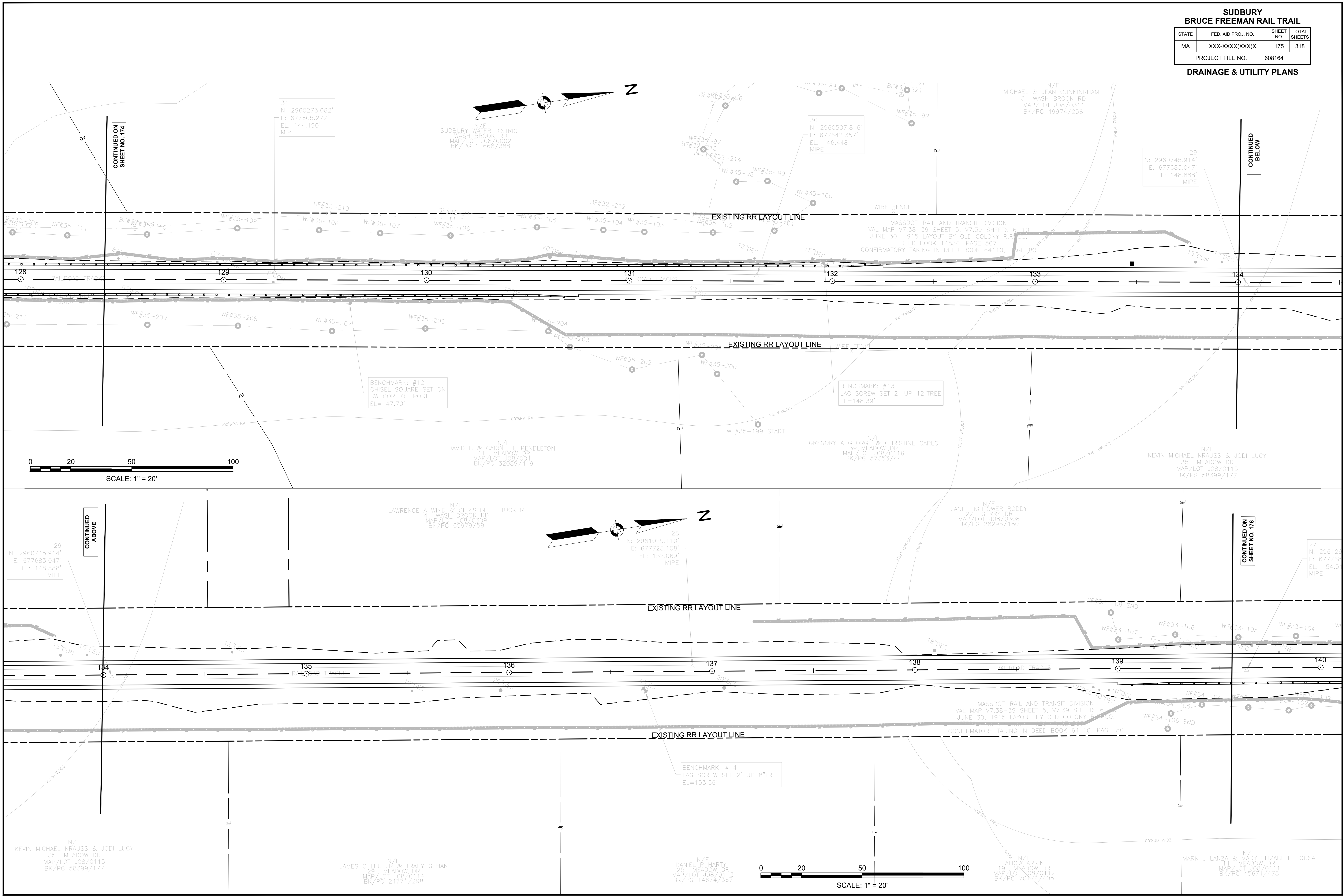
0 20 50 100
SCALE: 1" = 20'

0 20 50 100
SCALE: 1" = 20'

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	175	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS

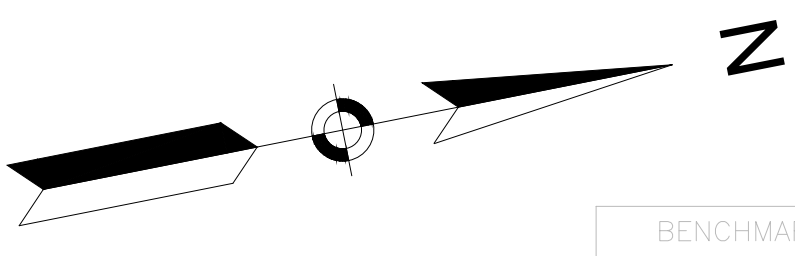


CONTINUED ON
SHEET NO. 174

CONTINUED
BELOW

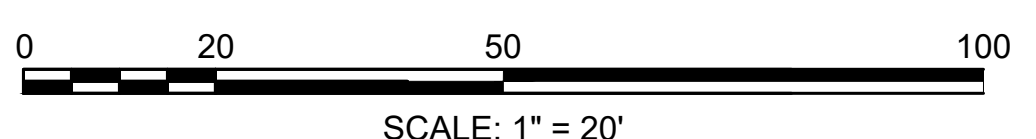
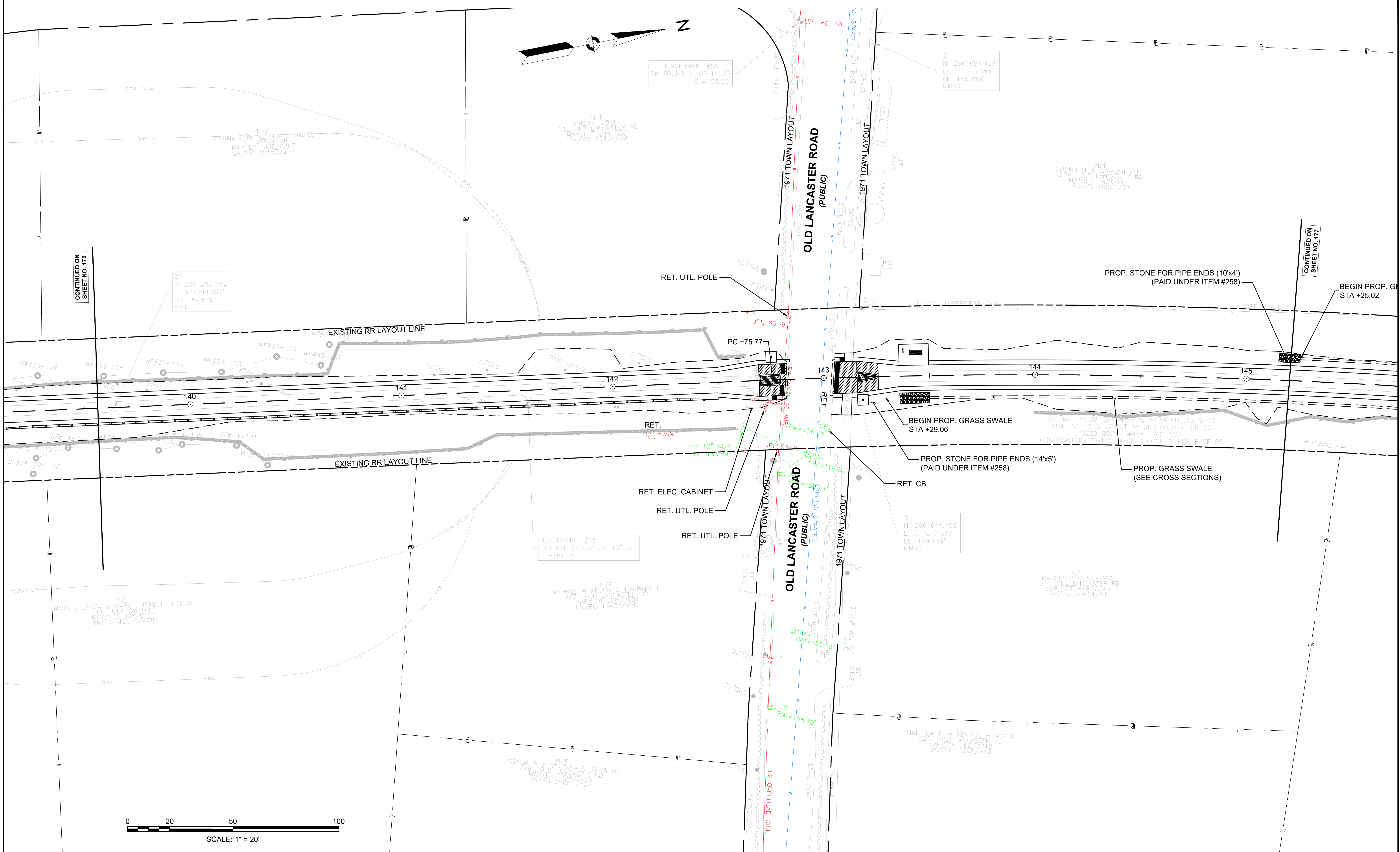
CONTINUED
ABOVE

CONTINUED ON
SHEET NO. 176



CONTINUED ON SHEET NO. 175

CONTINUED ON SHEET NO. 177



BENCHMARK: #66-11
 PK FOUND 1" UP IN UP
 EL=158.55'

2
 N: 2961684.439'
 E: 677666.655'
 EL: 156.229'
 MMAG

27
 N: 2961298.692'
 E: 677768.067'
 EL: 154.519'
 MIPE

BENCHMARK: #15
 LAG NAIL SET 2' UP 10" TREE
 EL=158.72'

3
 N: 2961644.458'
 E: 677817.347'
 EL: 159.339'
 MMAG

N/F
 MARCELLO C SANTANA
 226 OLD LANCASTER RD
 MAP/LOT 108/0045
 BK/PG 75814/51

N/F
 MATTHEW P & KENDRA H DOYON
 220 OLD LANCASTER RD
 MAP/LOT 108/0019
 BK/PG 71208/253

N/F
 JOSHUA R & VICTORIA A BARIBEAU
 219 OLD LANCASTER RD
 MAP/LOT 108/0102
 BK/PG 55651/163

N/F
 MICHAEL W KREBS & BARBARA P
 223 OLD LANCASTER RD
 MAP/LOT 108/0101
 BK/PG 13427/420

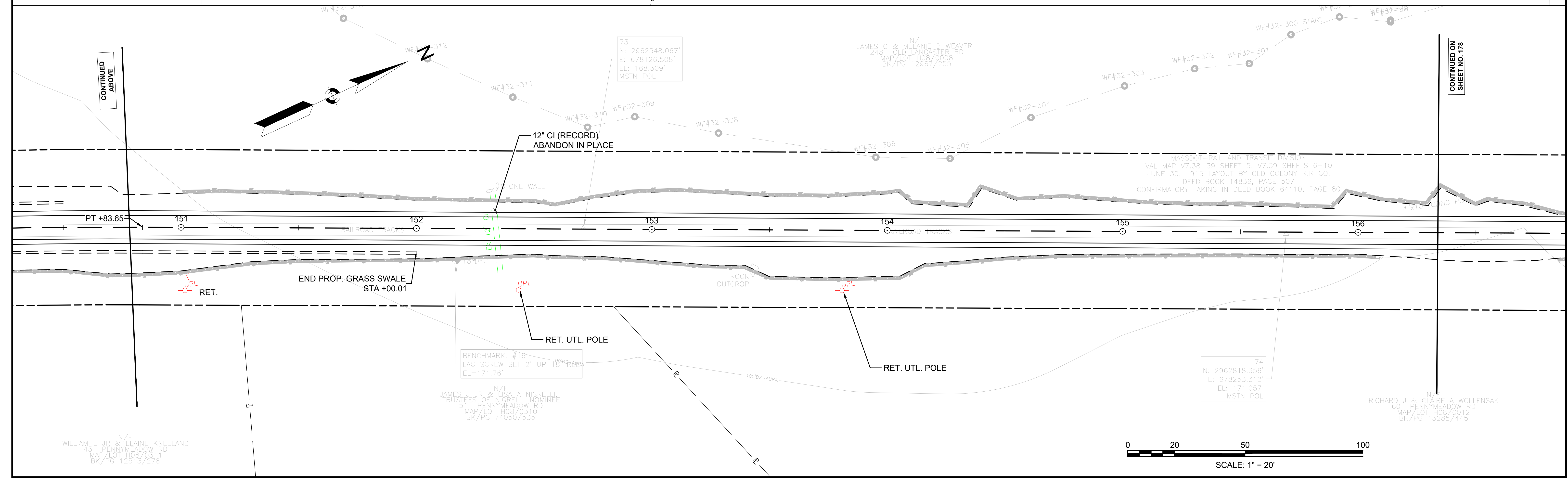
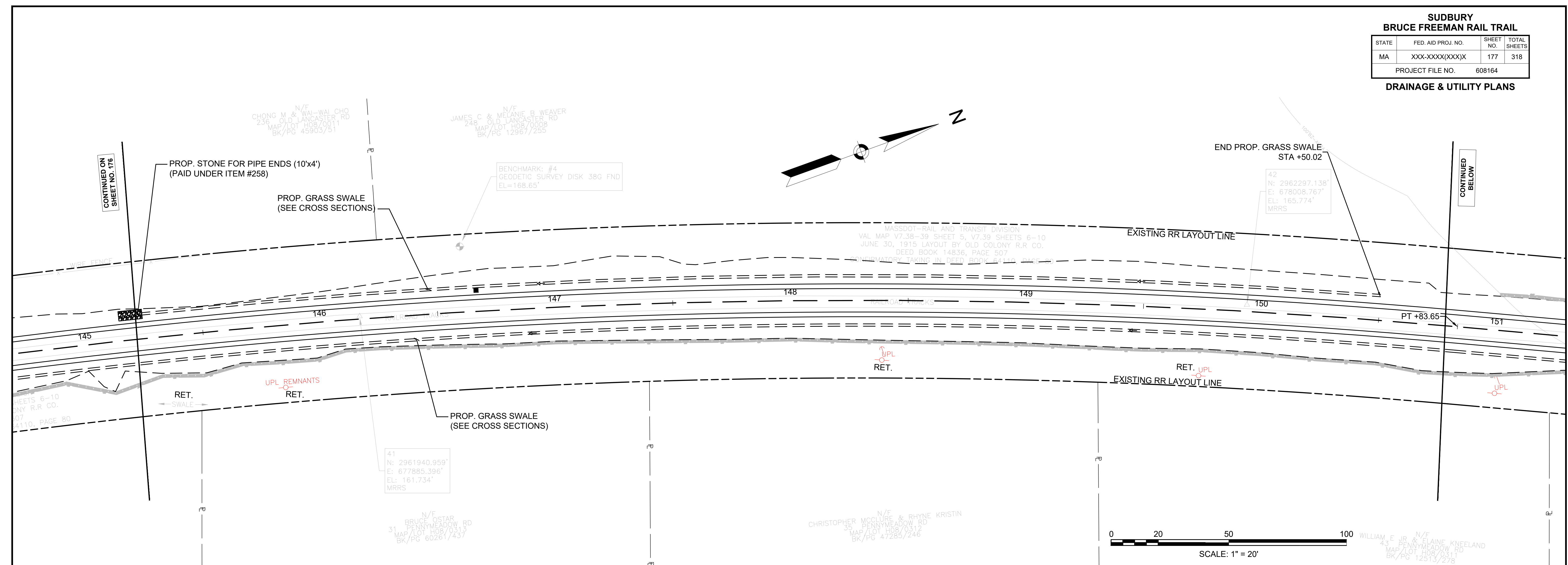
N/F
 CHERYL JONES
 233 OLD LANCASTER RD
 MAP/LOT 108/0301
 BK/PG 33438/39

N/F
 CHONG M & WAI-WAI CHO
 236 OLD LANCASTER RD
 MAP/LOT 108/0011
 BK/PG 45903/51

N/F
 ADRIAN A & MELINDA J DAVIES
 14 GERRY DR
 MAP/LOT 105/0307
 BK/PG 38355/267

N/F
 MARK J LANZA & MARY ELIZABETH LOUSA
 11 MEADOW DR
 MAP/LOT 108/0111
 BK/PG 45671/478

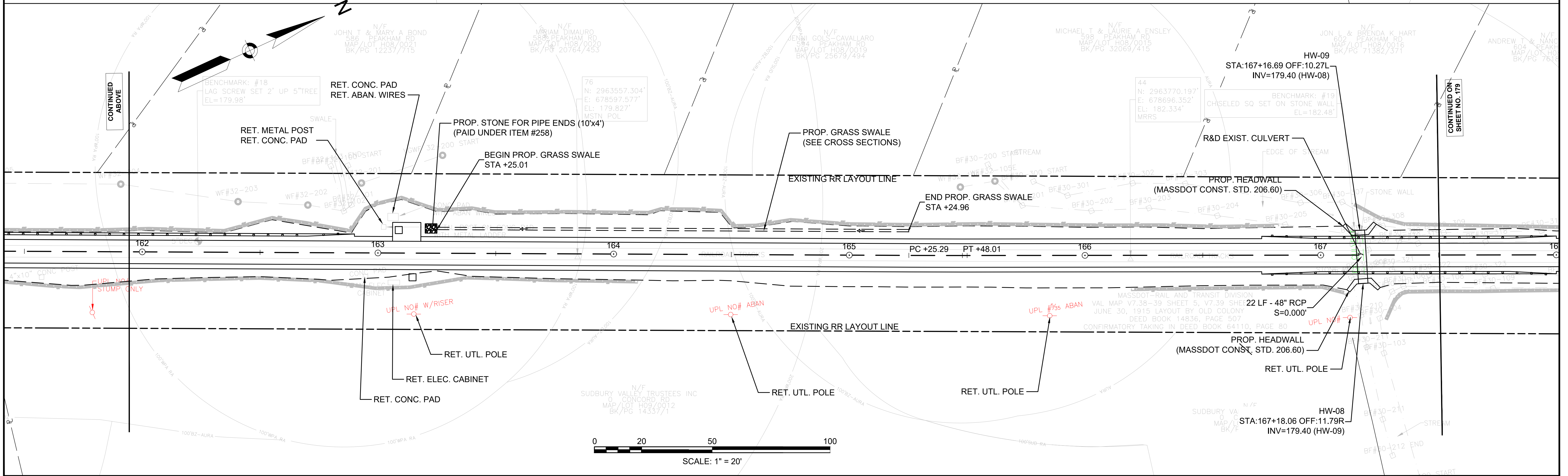
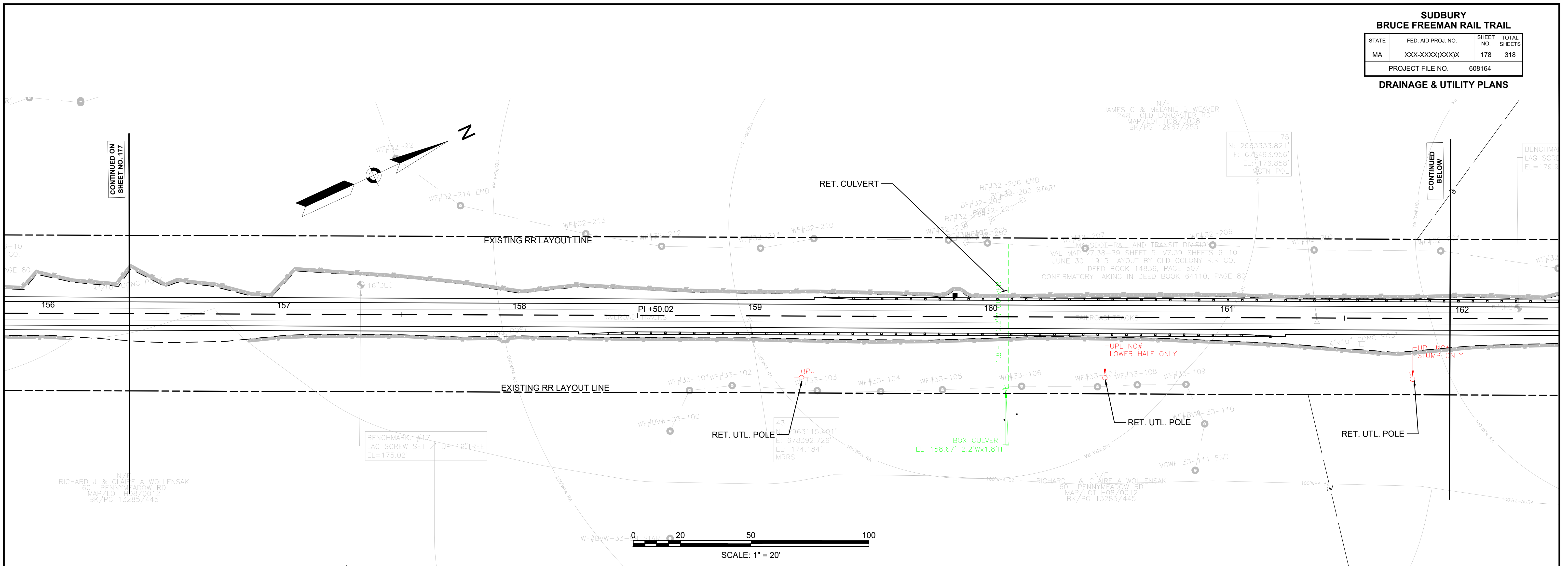
VAL MAP V7.38-39 SHEET 5, V7.39 SHEETS 6-10
 JUNE 30, 1915 LAYOUT BY OLD COLONY R.R. CO.
 DEED BOOK 14836, PAGE 507
 CONFIRMATORY TAKING OF DEED BOOK 64110, PAGE 80



**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

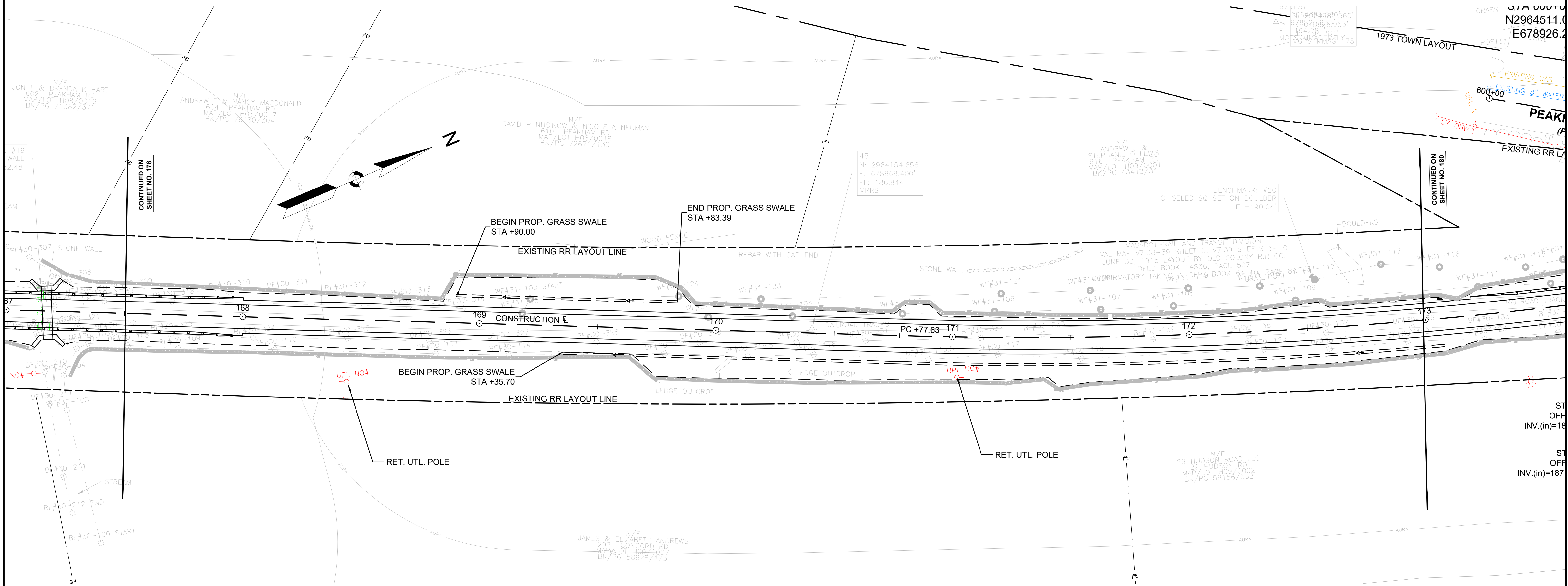
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	178	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



SUDBURY
BRUCE FREEMAN RAIL TRAIL
DRAINAGE & UTILITY PLANS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	179	318
PROJECT FILE NO.		608164	

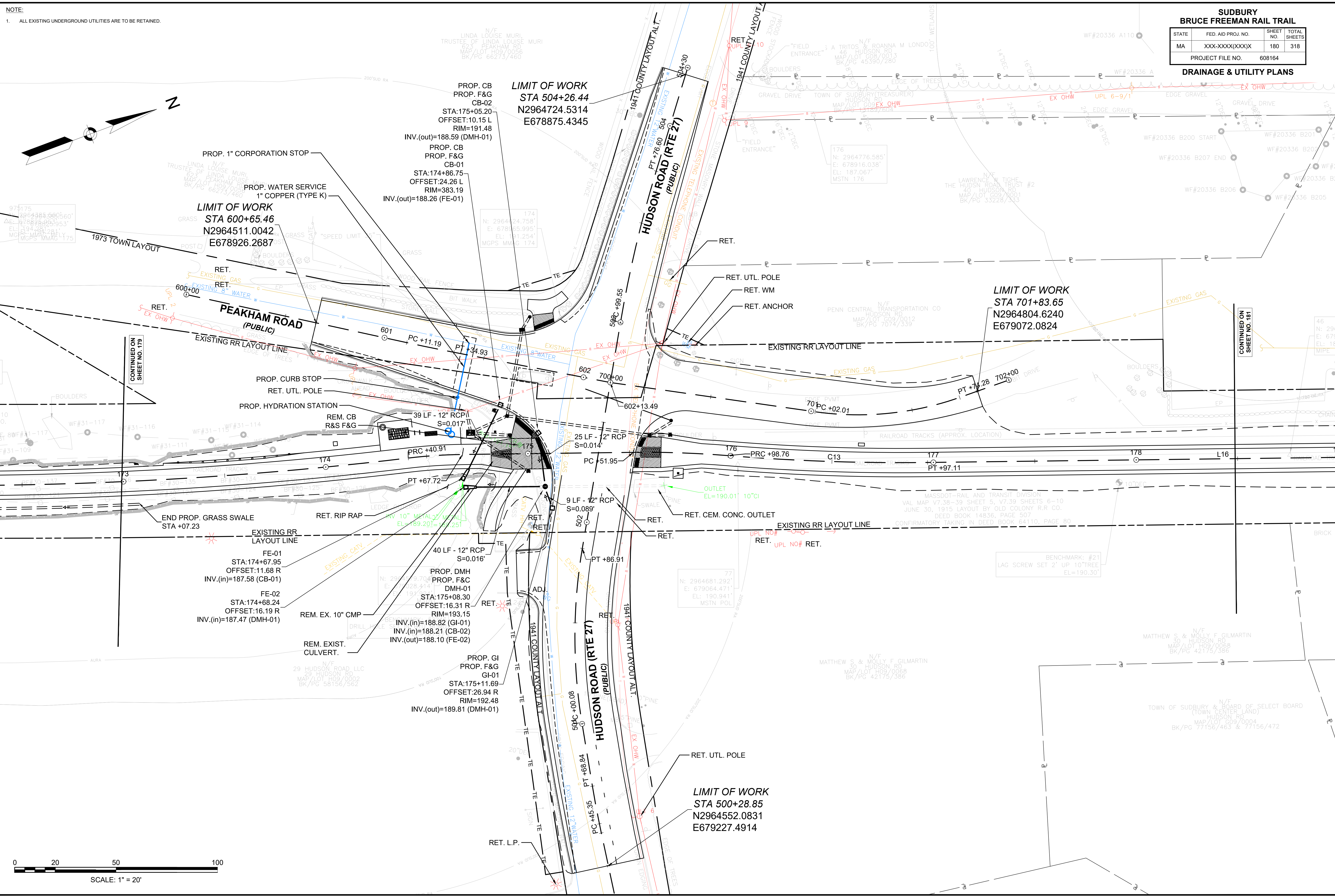
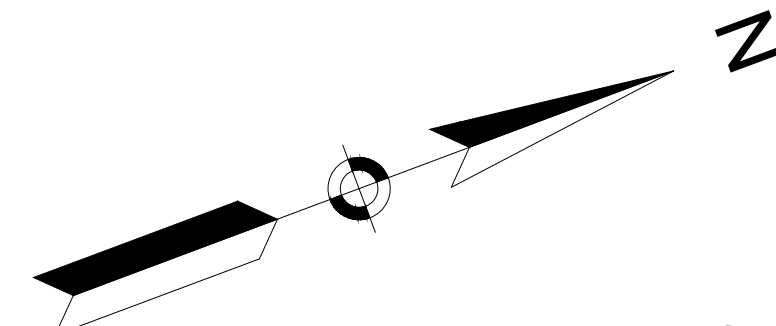


CONTINUED ON SHEET NO. 178

CONTINUED ON SHEET NO. 180

NOTE:
1. ALL EXISTING UNDERGROUND UTILITIES ARE TO BE RETAINED.

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	180	318
PROJECT FILE NO.		608164	
DRAINAGE & UTILITY PLANS			



PROP. 1" CORPORATION STOP
PROP. WATER SERVICE
1" COPPER (TYPE K)
LIMIT OF WORK
STA 600+65.46
N2964511.0042
E678926.2687

PROP. CB
PROP. F&G
CB-02
STA:175+05.20
OFFSET:10.15 L
RIM=191.48
INV.(out)=188.59 (DMH-01)
PROP. CB
PROP. F&G
CB-01
STA:174+86.75
OFFSET:24.26 L
RIM=383.19
INV.(out)=188.26 (FE-01)

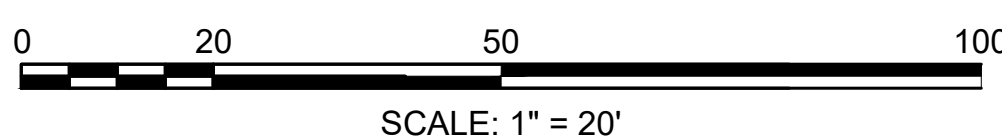
LIMIT OF WORK
STA 504+26.44
N2964724.5314
E678875.4345

LIMIT OF WORK
STA 701+83.65
N2964804.6240
E679072.0824

LIMIT OF WORK
STA 500+28.85
N2964552.0831
E679227.4914

CONTINUED ON
SHEET NO. 179

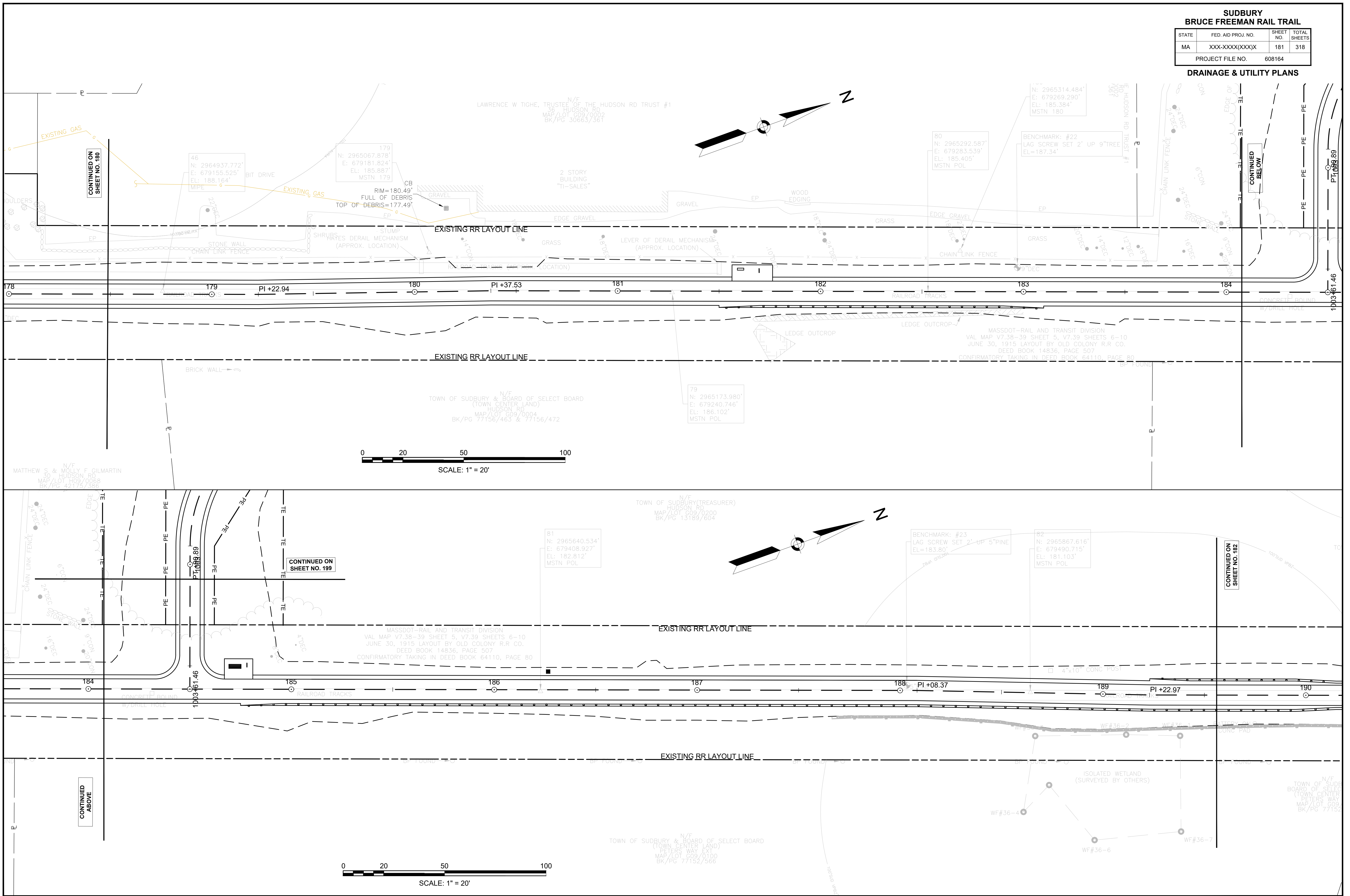
CONTINUED ON
SHEET NO. 181

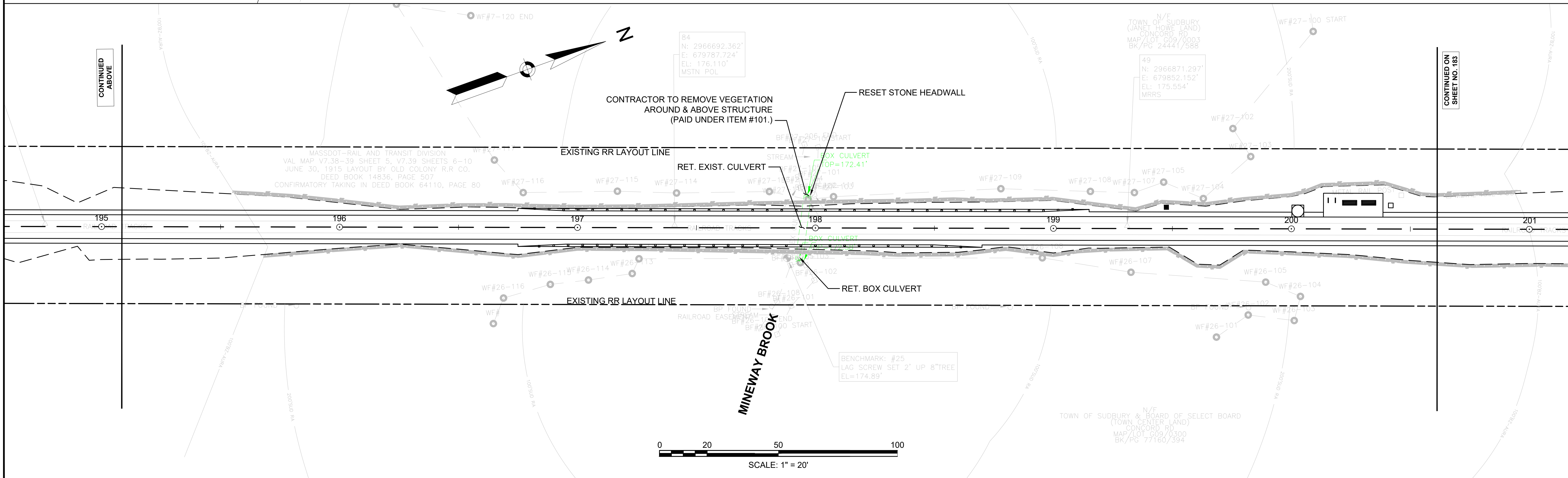
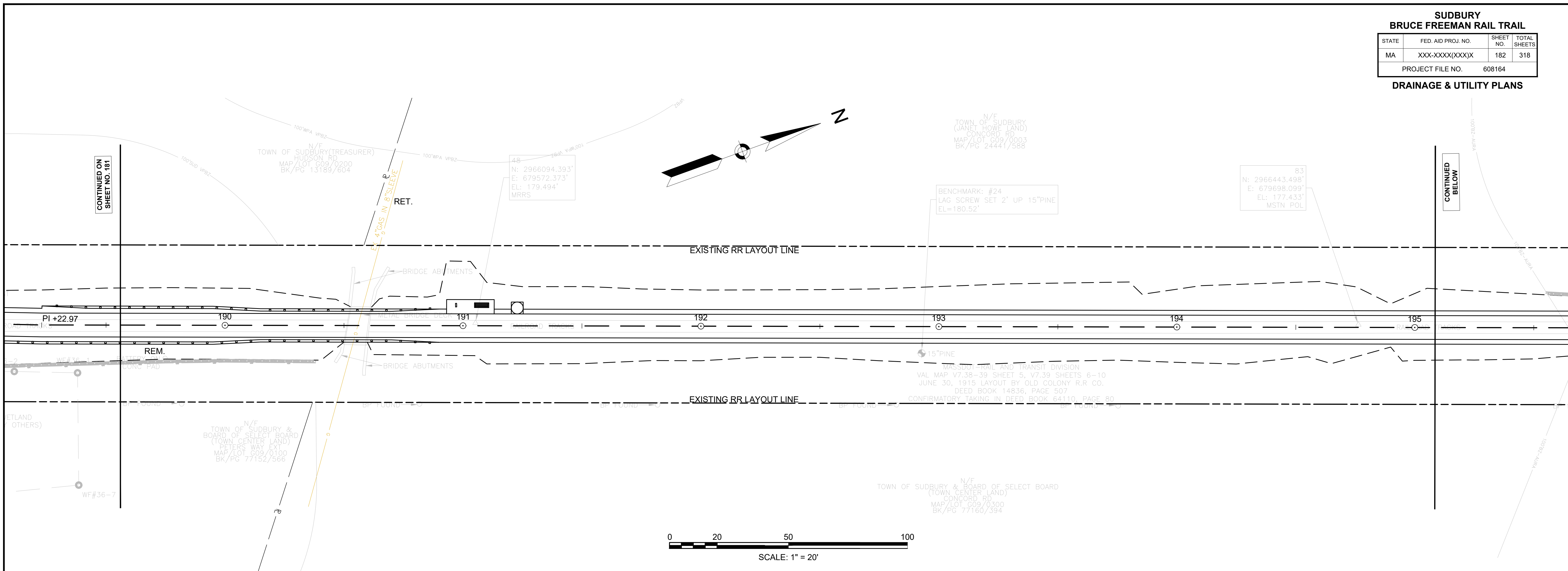


SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	181	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS

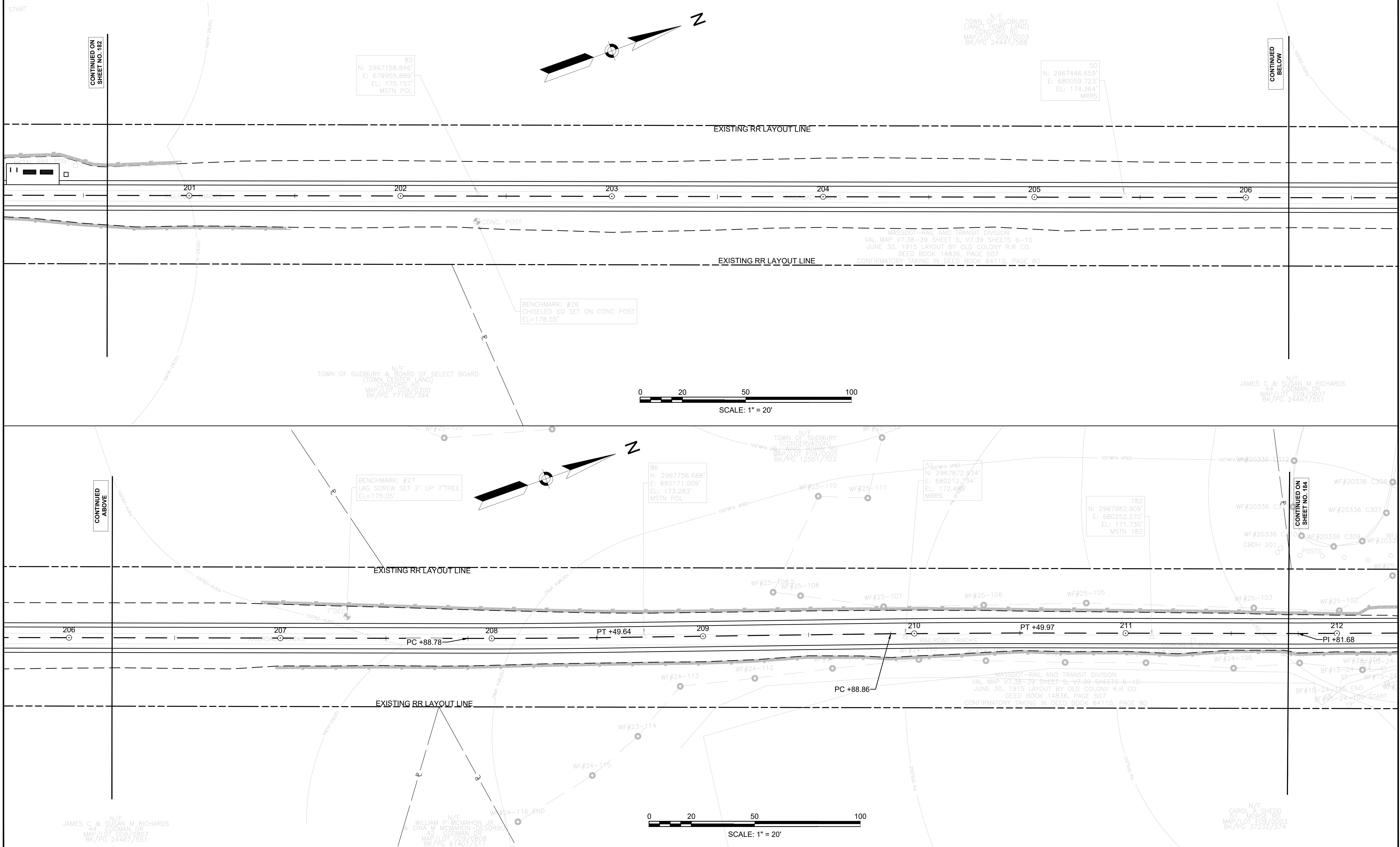




**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	183	318

PROJECT FILE NO. 608164
DRAINAGE & UTILITY PLANS



N/F
TOWN OF SUDBURY
(JANET HOWE LAND)
CONCORD RD
MAP/LOT 099/0003
BK/PG 24421/588

50
N: 2967446.659'
E: 680059.723'
EL: 174.364'
MRRS

85
N: 2967158.846'
E: 679955.889'
EL: 175.157'
MSTN POL

BENCHMARK: #26
CHISELED SO SET ON CONC POST
EL=178.55'

N/F
TOWN OF SUDBURY & BOARD OF SELECT BOARD
(TOWN CENTER LAND)
CONCORD RD
MAP/LOT 009/0300
BK/PG 77160/394

0 20 50 100
SCALE: 1" = 20'

N/F
JAMES C & SUSAN M RICHARDS
44 CODMAN DR
MAP/LOT 038/0917
BK/PG 24467/551

86
N: 2967756.688'
E: 680171.009'
EL: 173.283'
MSTN POL

51
N: 2967872.934'
E: 680212.734'
EL: 172.488'
MRRS

182
N: 2967982.909'
E: 680252.270'
EL: 171.730'
MSTN 182

N/F
JAMES C & SUSAN M RICHARDS
44 CODMAN DR
MAP/LOT 009/0807
BK/PG 24467/551

N/F
WILLIAM P. MCMAHON JR.
& DINA M. MCMAHON-BESORBE
42 CODMAN DR
MAP/LOT 009/0808
BK/PG 61407/511

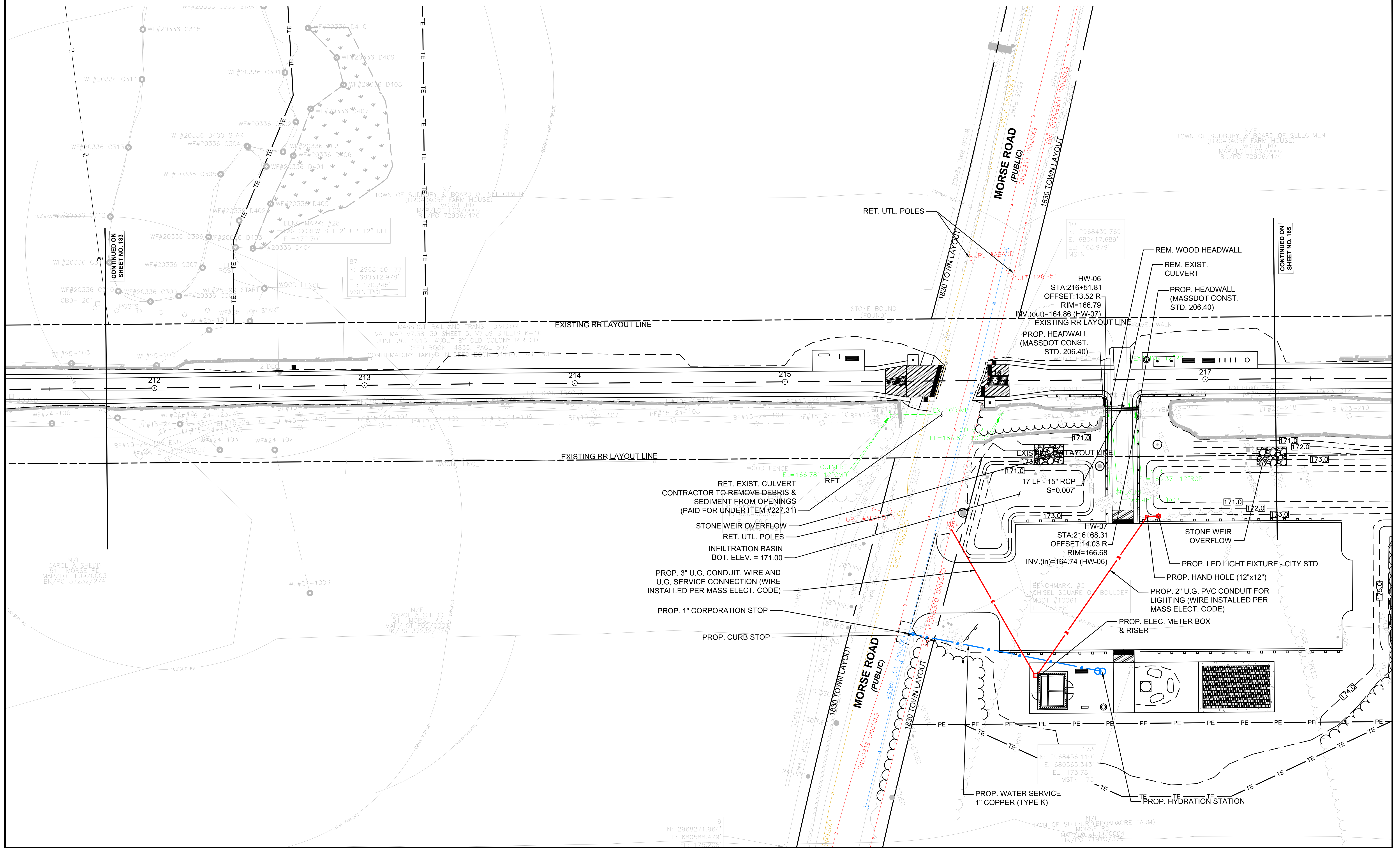
0 20 50 100
SCALE: 1" = 20'

N/F
CAROL A. SHEDD
51 MORSE RD
MAP/LOT 009/0003
BK/PG 37232/274

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	184	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



TOWN OF SUDBURY & BOARD OF SELECTMEN
(BROADACRE FARM HOUSE)
82 MORSE RD
MAP/LOT F09/0002
BK/PG 72906/476

N/F
CAROL A SHEDD
51 MORSE RD
MAP/LOT F09/0003
BK/PG 37232/274

N/F
CAROL A SHEDD
51 MORSE RD
MAP/LOT F09/0004
BK/PG 37232/274

N/F
TOWN OF SUDBURY (BROADACRE FARM)
MORSE RD
MAP/LOT F09/0004
BK/PG 71090/375

9
N: 2968271.964'
E: 680588.479'
EL: 173.781'

173
N: 2968456.110'
E: 680565.343'
EL: 173.781'
MSTN 173

10
N: 2968439.769'
E: 680417.689'
EL: 168.979'
MSTN

CONTINUED ON
SHEET NO. 183

CONTINUED ON
SHEET NO. 185

RET. EXIST. CULVERT
CONTRACTOR TO REMOVE DEBRIS &
SEDIMENT FROM OPENINGS
(PAID FOR UNDER ITEM #227.31)

STONE WEIR OVERFLOW
RET. UTL. POLES
INFILTRATION BASIN
BOT. ELEV. = 171.00

PROP. 3" U.G. CONDUIT, WIRE AND
U.G. SERVICE CONNECTION (WIRE
INSTALLED PER MASS ELECT. CODE)

PROP. 1" CORPORATION STOP

PROP. CURB STOP

RET. UTL. POLES

HW-06
STA:216+51.81
OFFSET:13.52 R
RIM=166.79
INV.(out)=164.86 (HW-07)

PROP. HEADWALL
(MASSDOT CONST.
STD. 206.40)

REM. WOOD HEADWALL

REM. EXIST.
CULVERT

PROP. HEADWALL
(MASSDOT CONST.
STD. 206.40)

HW-07
STA:216+68.31
OFFSET:14.03 R
RIM=166.68
INV.(in)=164.74 (HW-06)

STONE WEIR
OVERFLOW

PROP. LED LIGHT FIXTURE - CITY STD.

PROP. HAND HOLE (12"x12")

PROP. 2" U.G. PVC CONDUIT FOR
LIGHTING (WIRE INSTALLED PER
MASS ELECT. CODE)

PROP. ELEC. METER BOX
& RISER

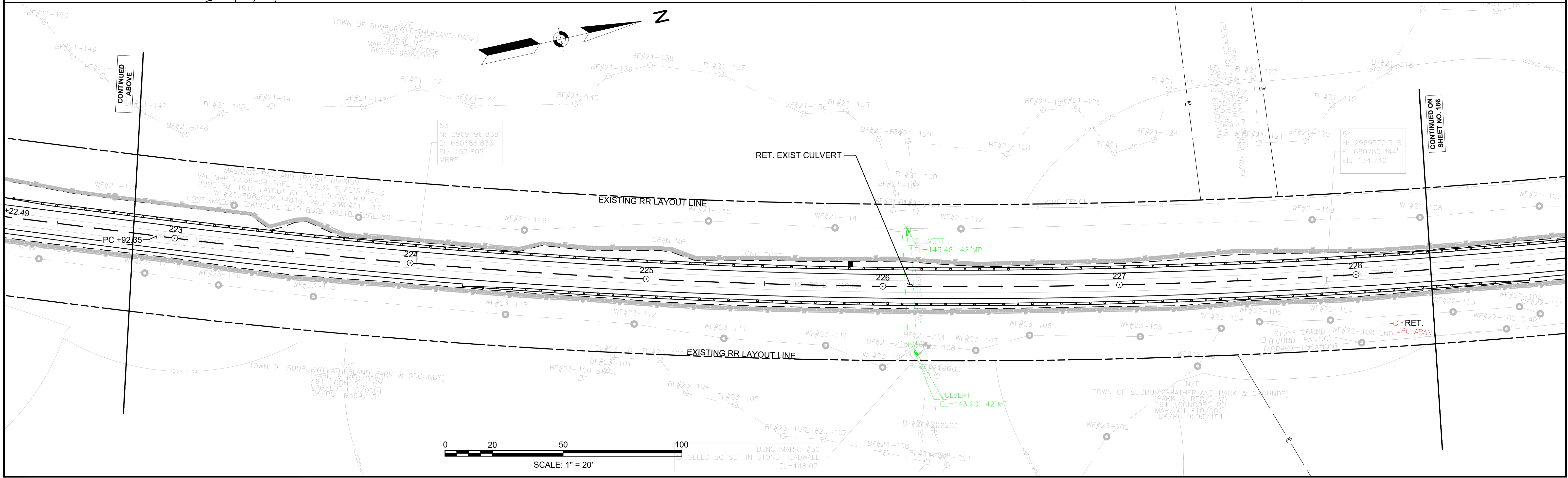
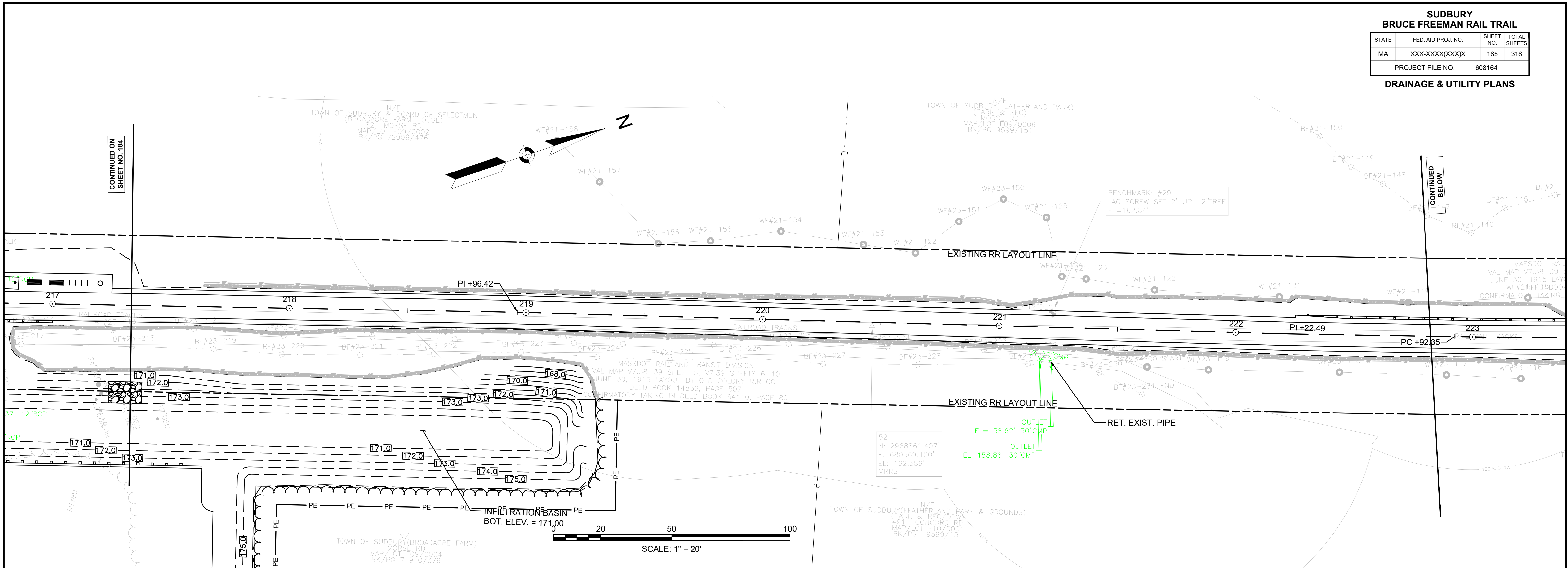
PROP. WATER SERVICE
1" COPPER (TYPE K)

PROP. HYDRATION STATION

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	185	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



CONTINUED ON SHEET NO. 184

CONTINUED BELOW

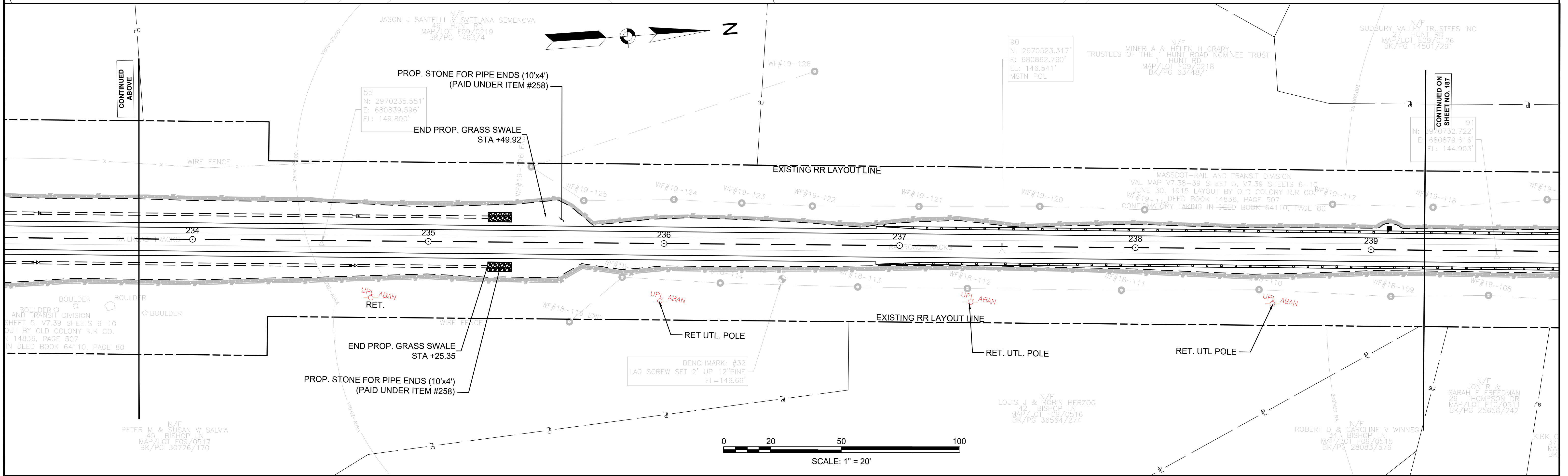
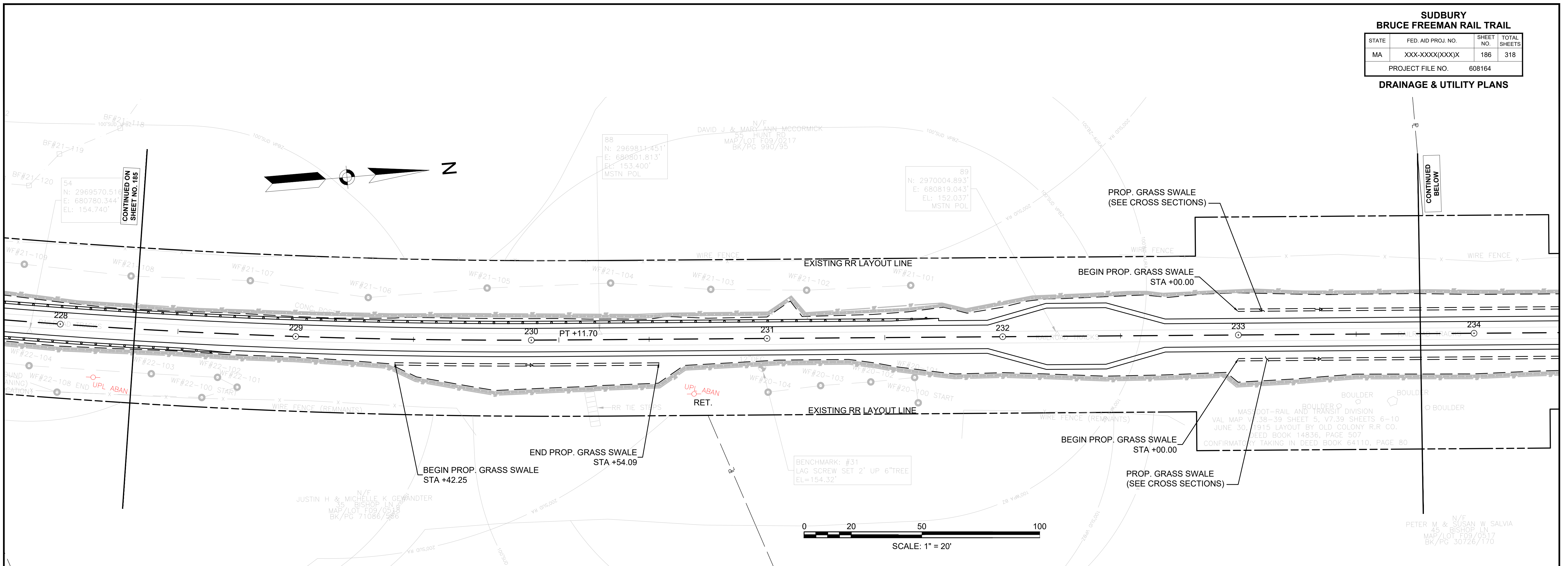
CONTINUED ABOVE

CONTINUED ON SHEET NO. 186

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	186	318
PROJECT FILE NO.		608164	

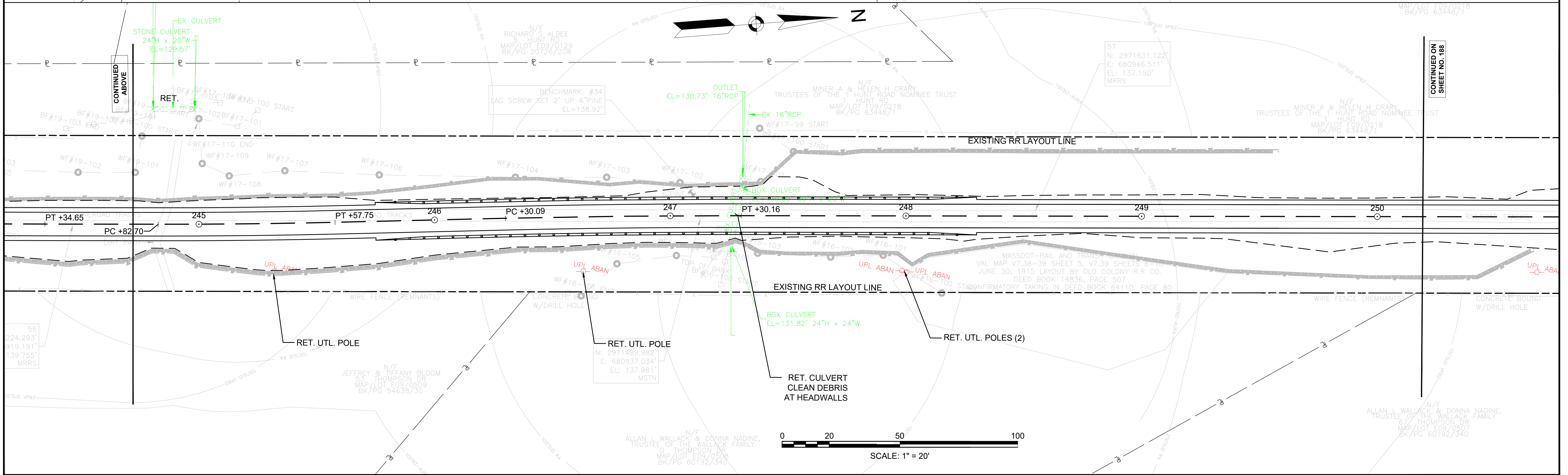
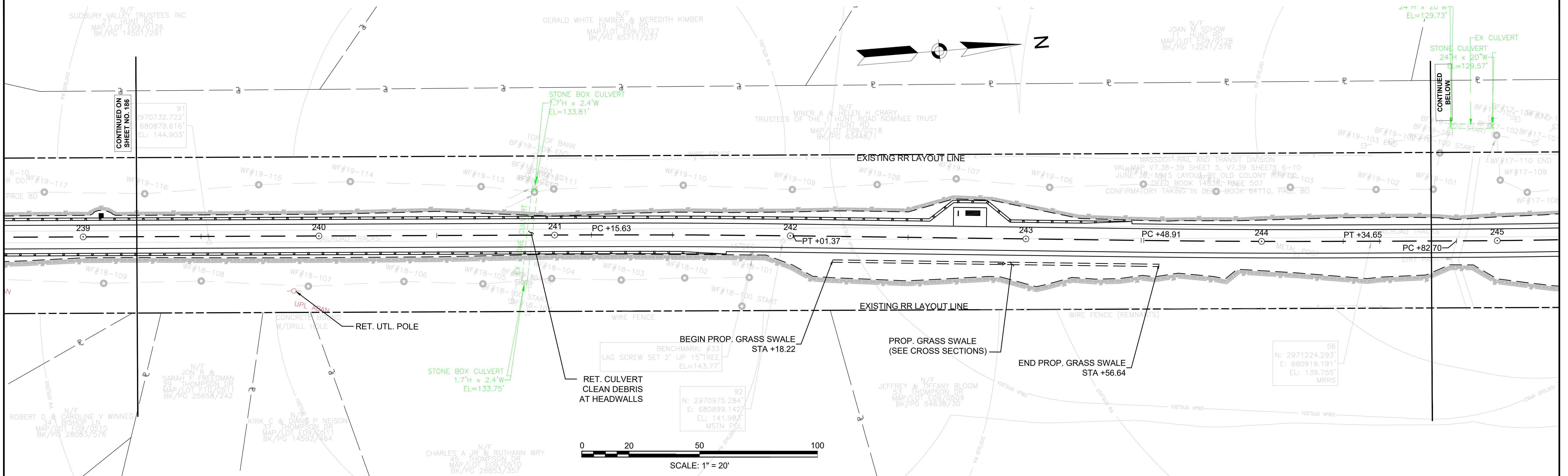
DRAINAGE & UTILITY PLANS



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	187	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS

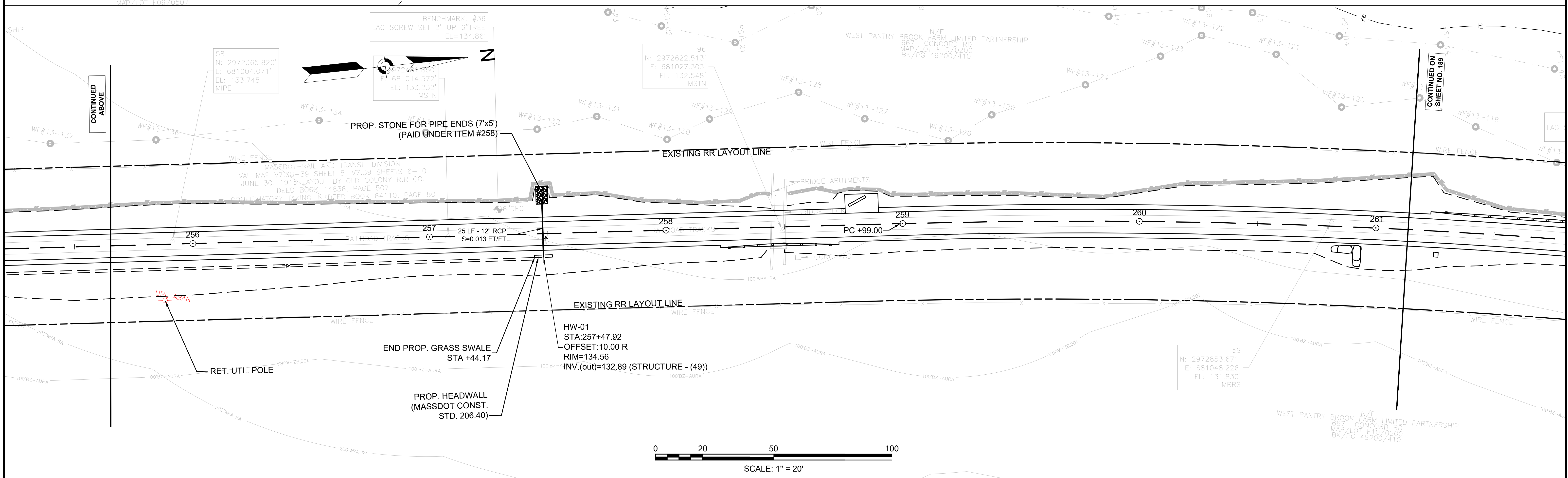
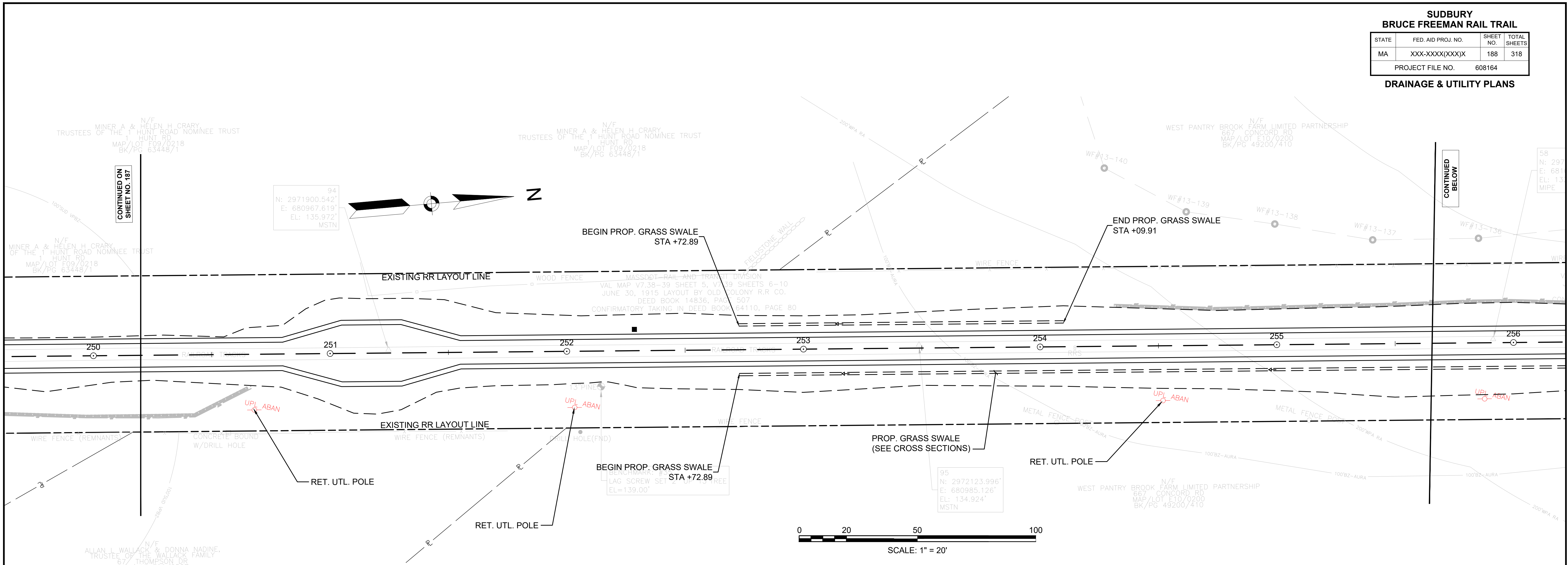


**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	188	318

PROJECT FILE NO. 608164

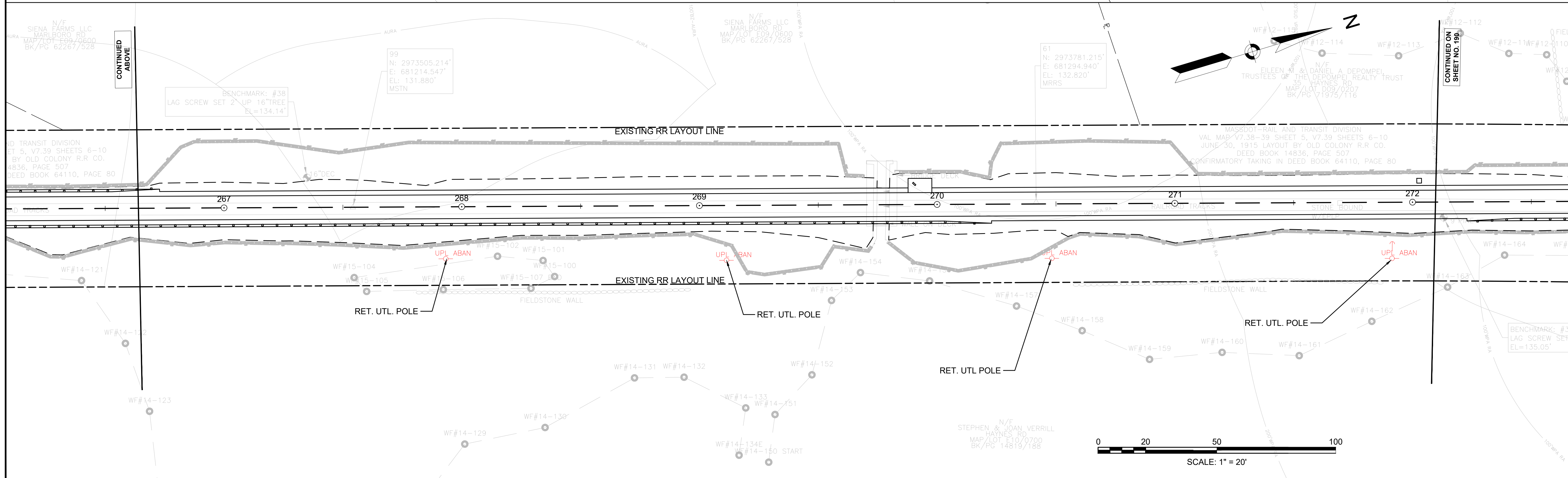
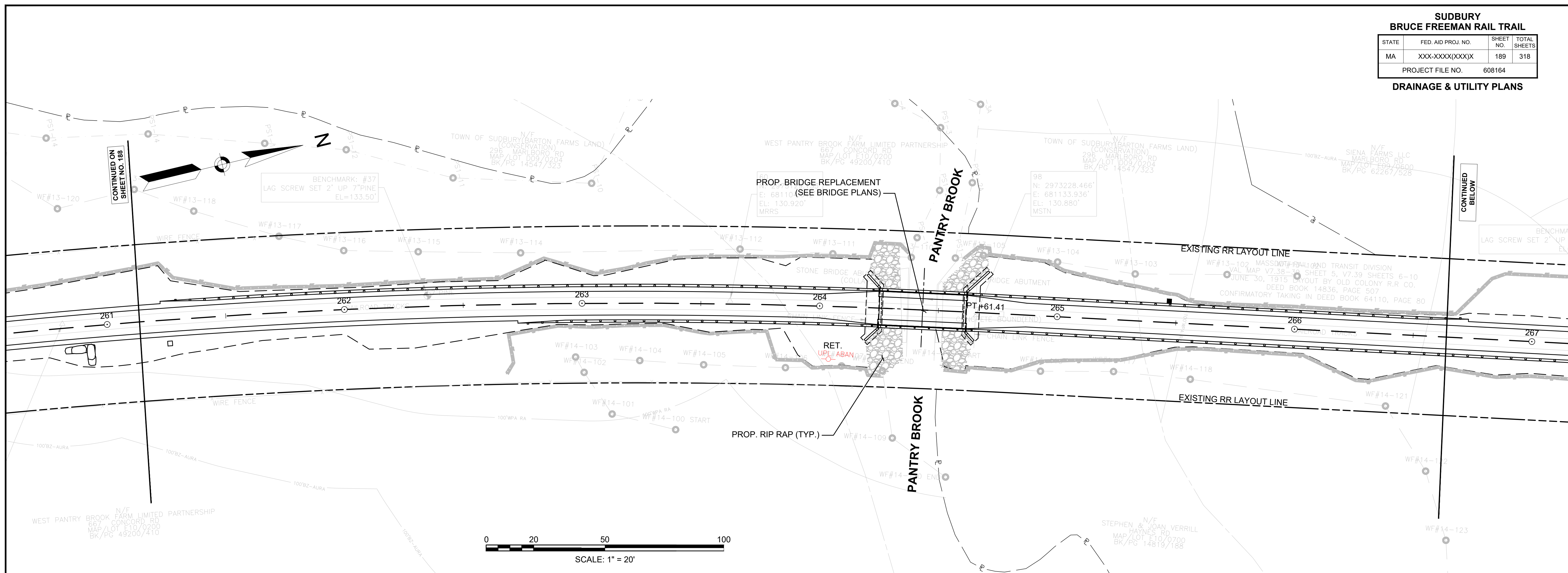
DRAINAGE & UTILITY PLANS



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BRUCE FREEMAN RAIL TRAIL**

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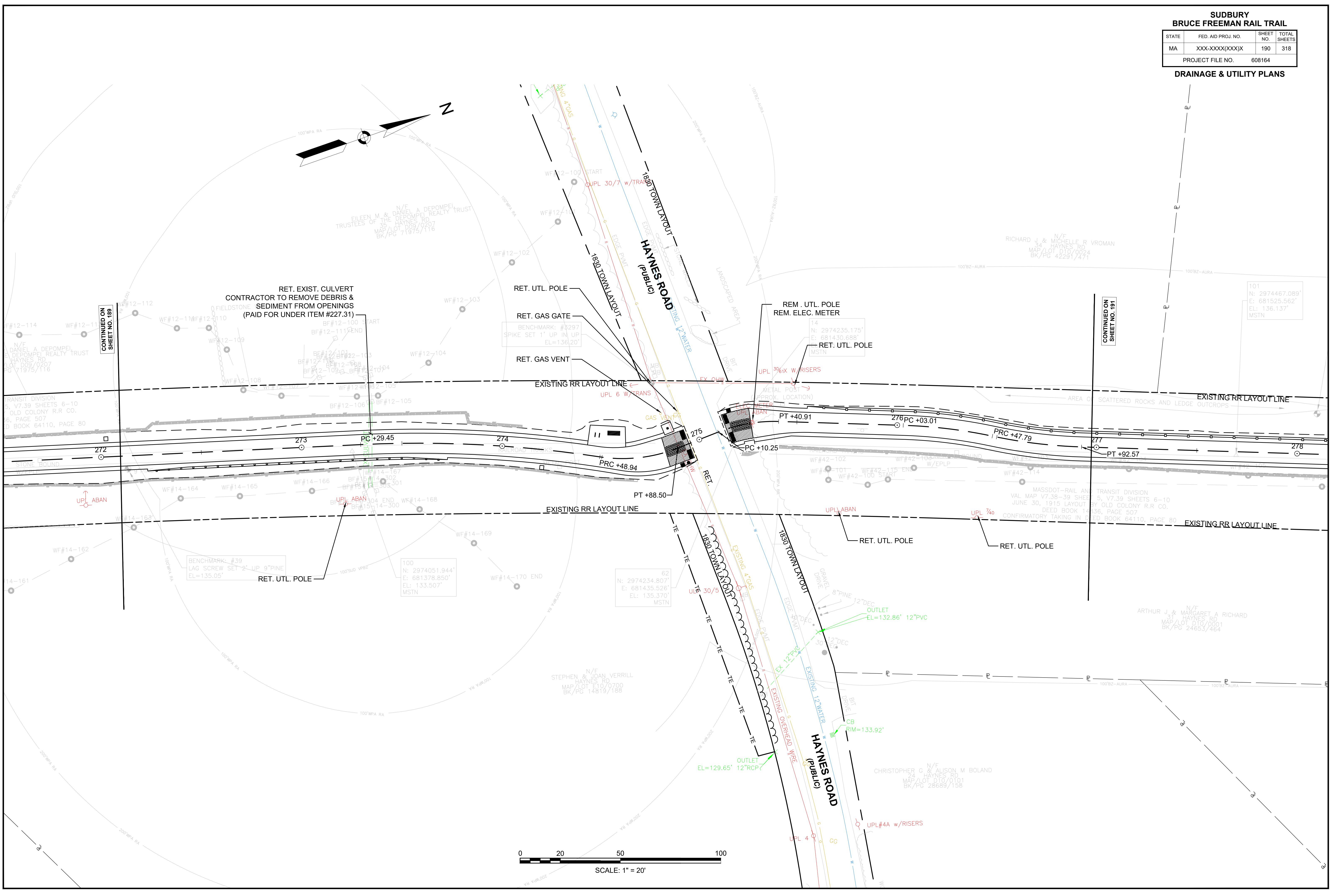
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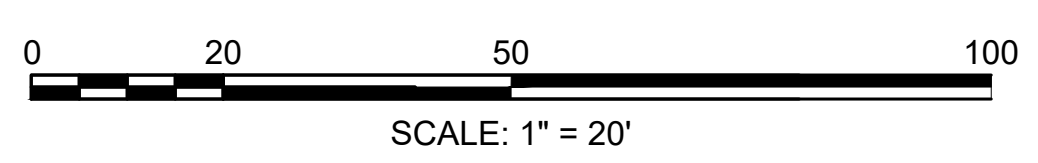
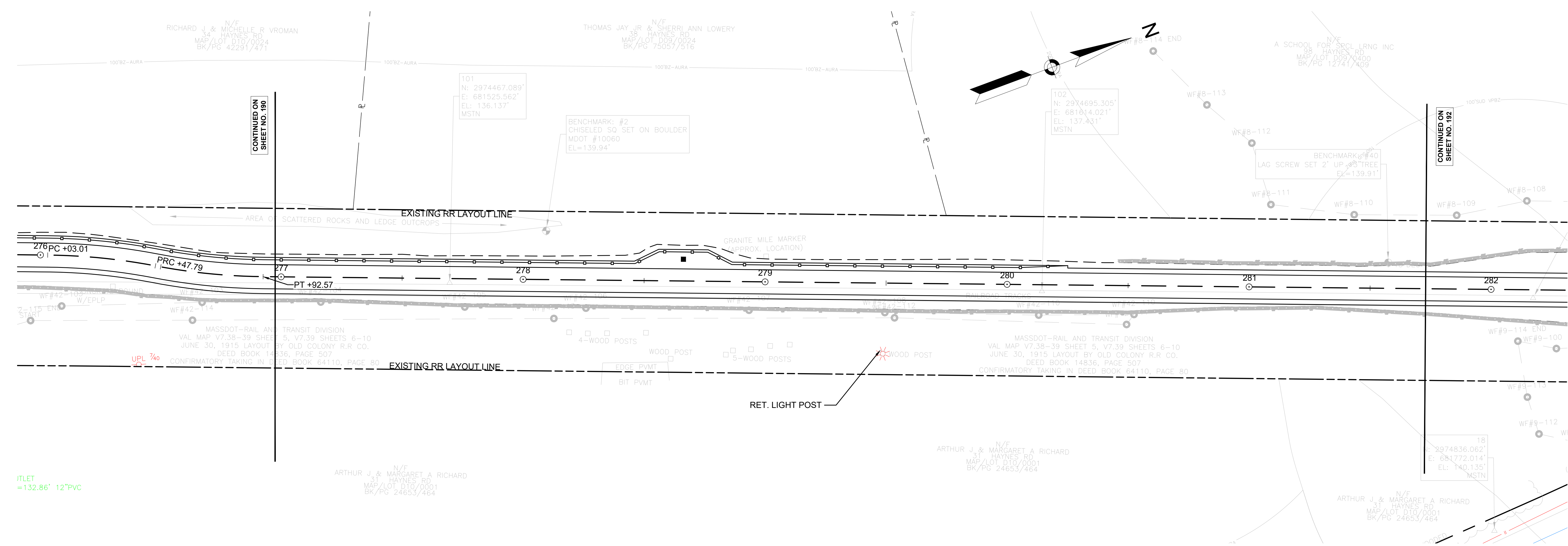


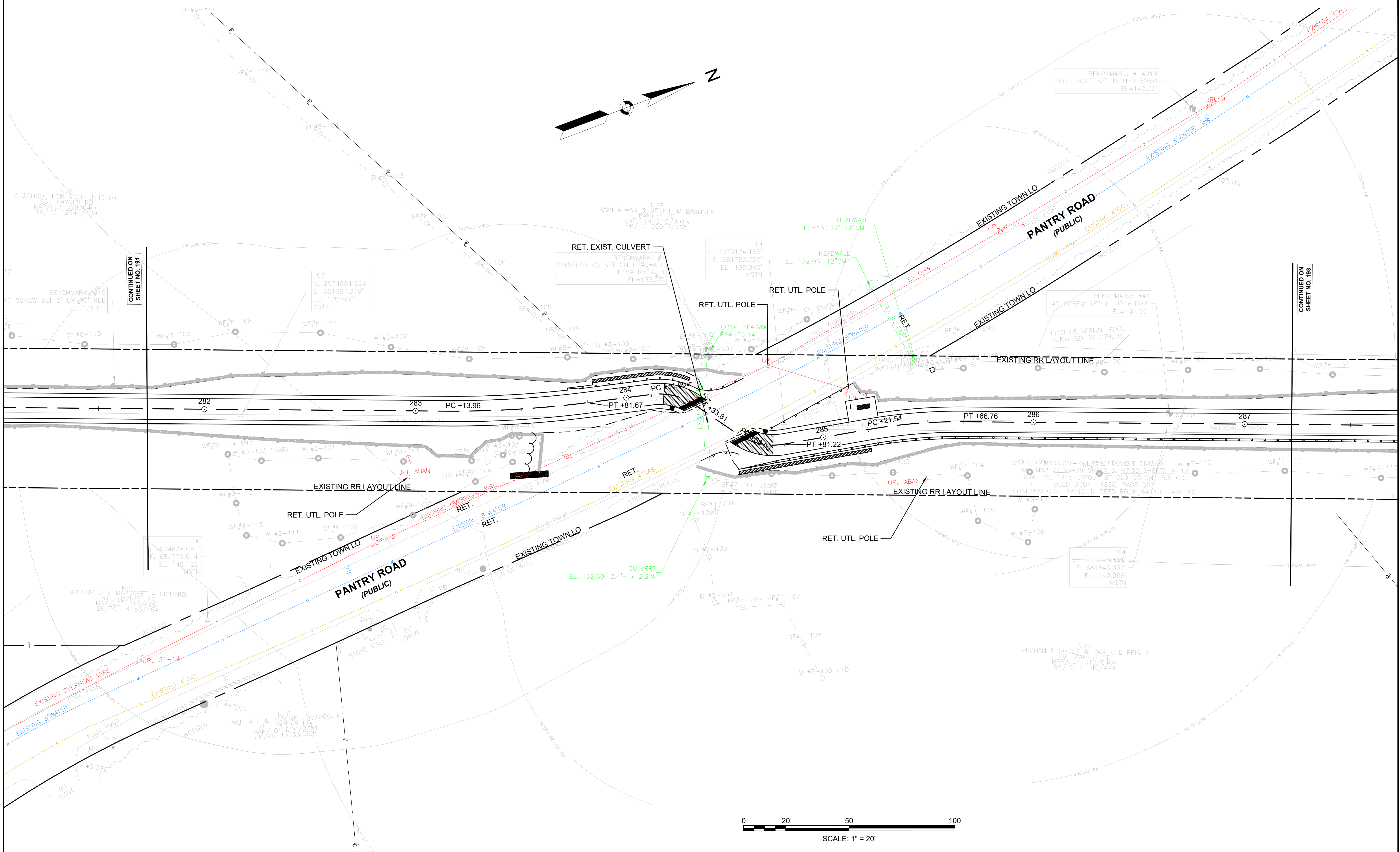
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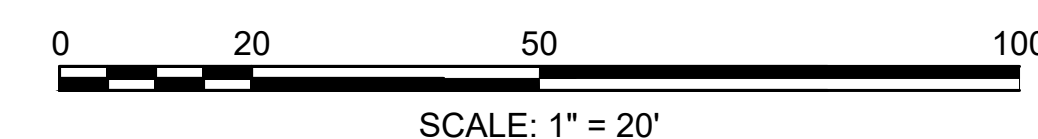






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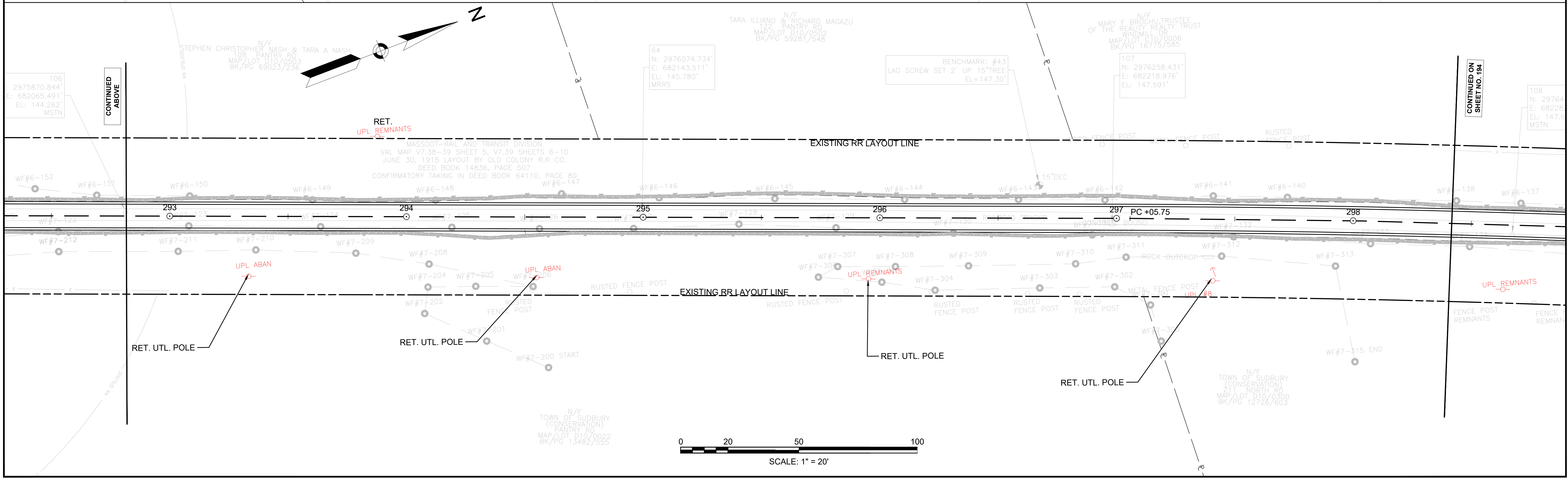
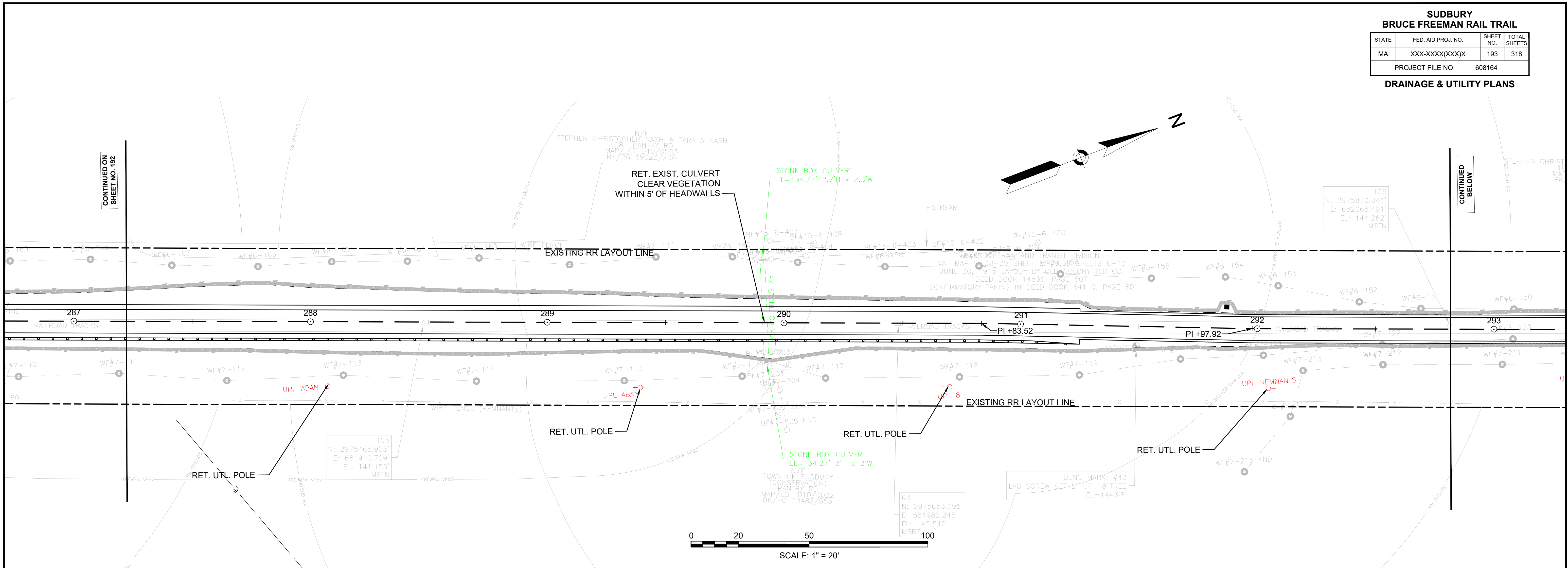
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BRUCE FREEMAN RAIL TRAIL**

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MA	XXX-XXX(XXX)X	193	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



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SHEET NO. 192

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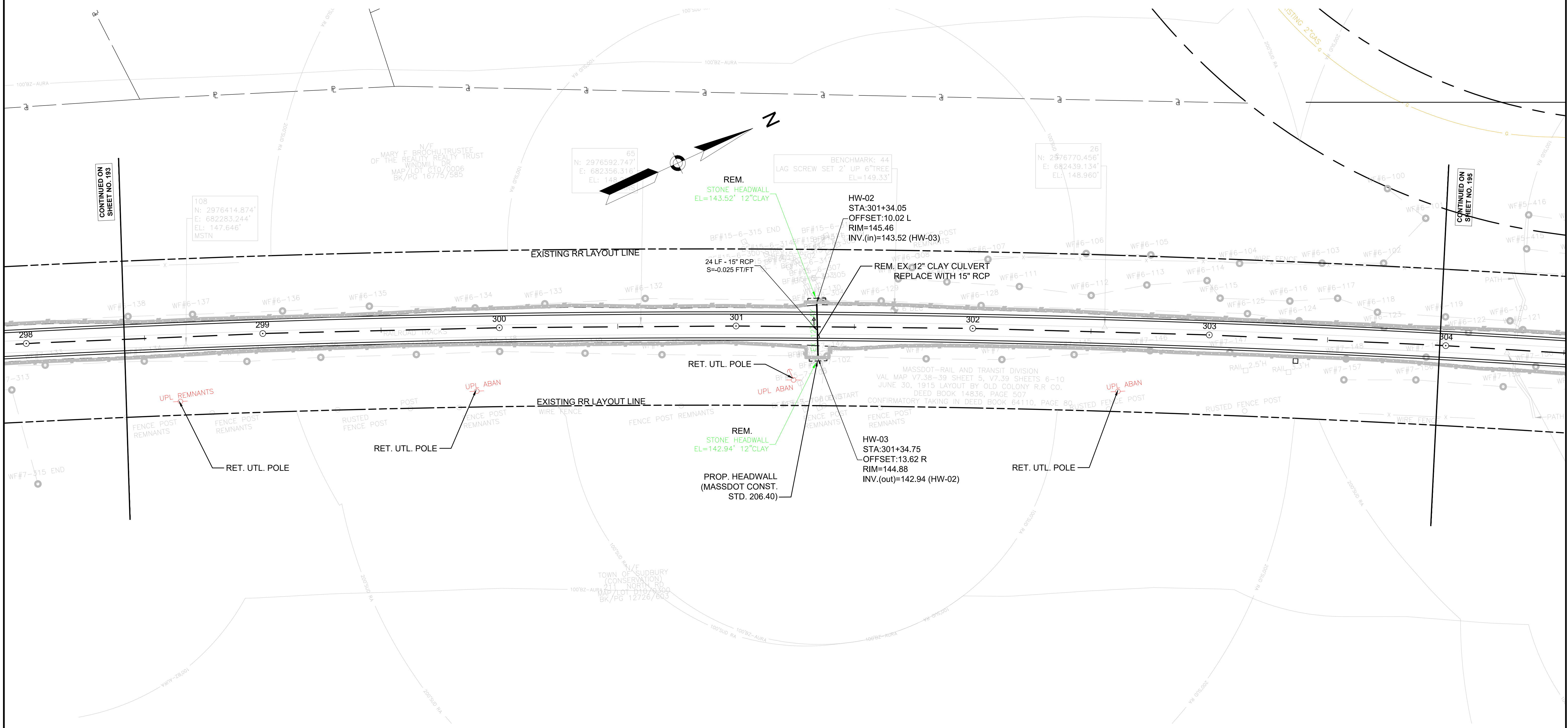
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BRUCE FREEMAN RAIL TRAIL**

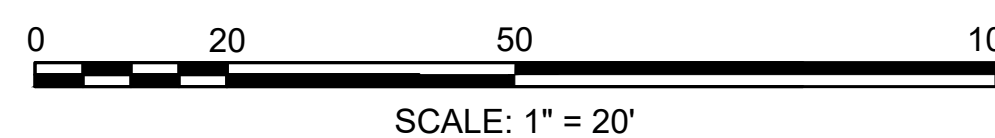
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MA	XXX-XXXX(XXX)X	194	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



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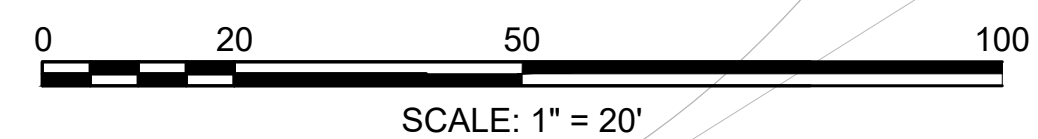
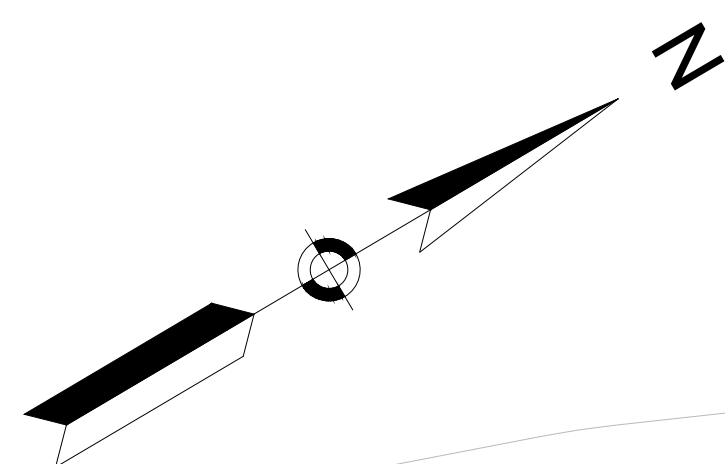
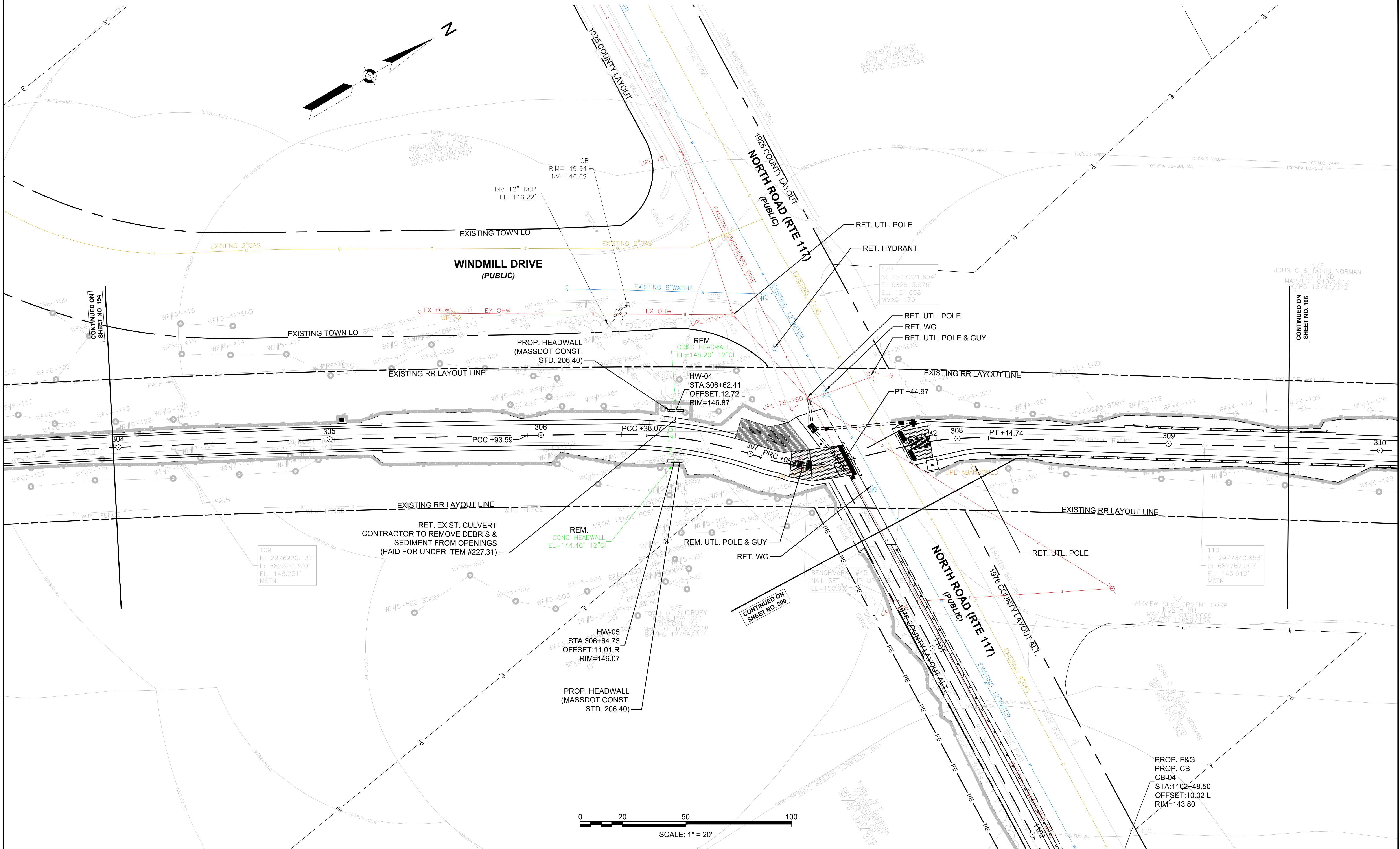
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BRUCE FREEMAN RAIL TRAIL

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MA	XXX-XXXX(XXX)X	195	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



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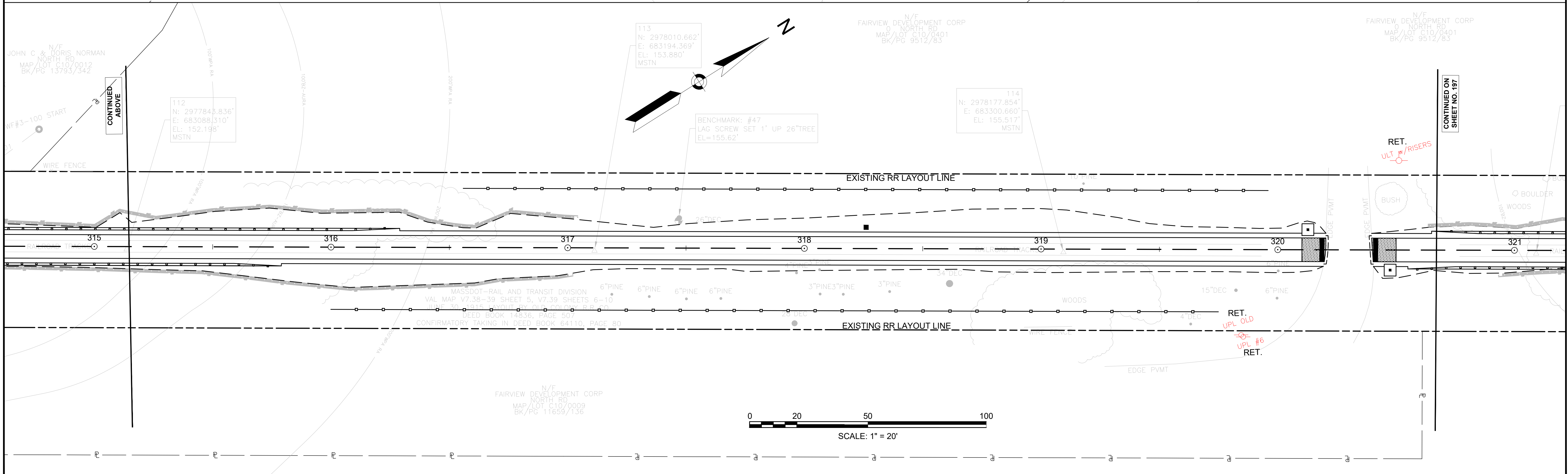
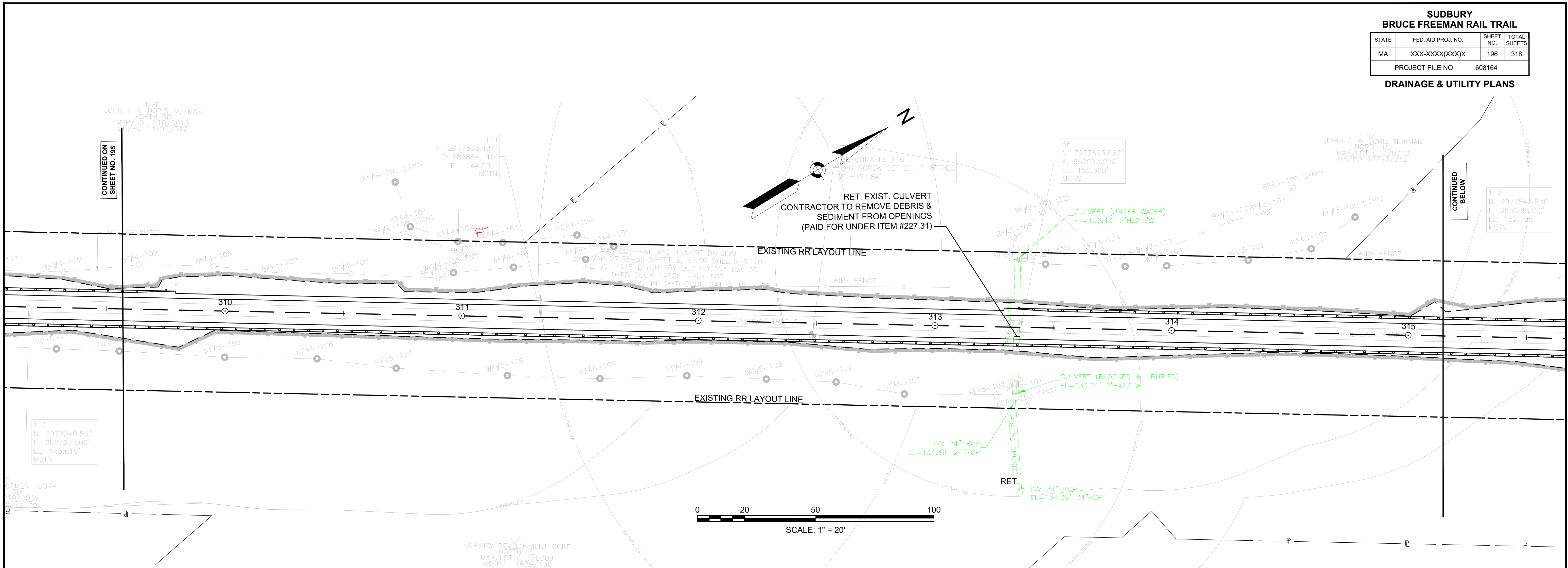
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**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

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MA	XXX-XXX(XXX)X	196	318
PROJECT FILE NO.		608164	

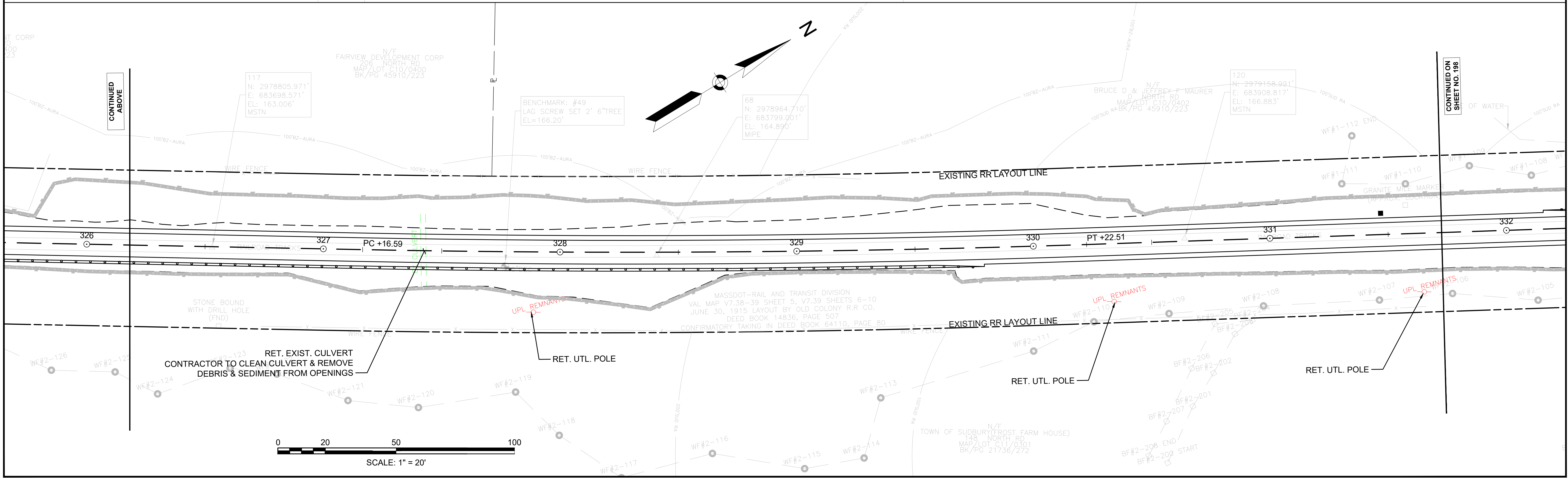
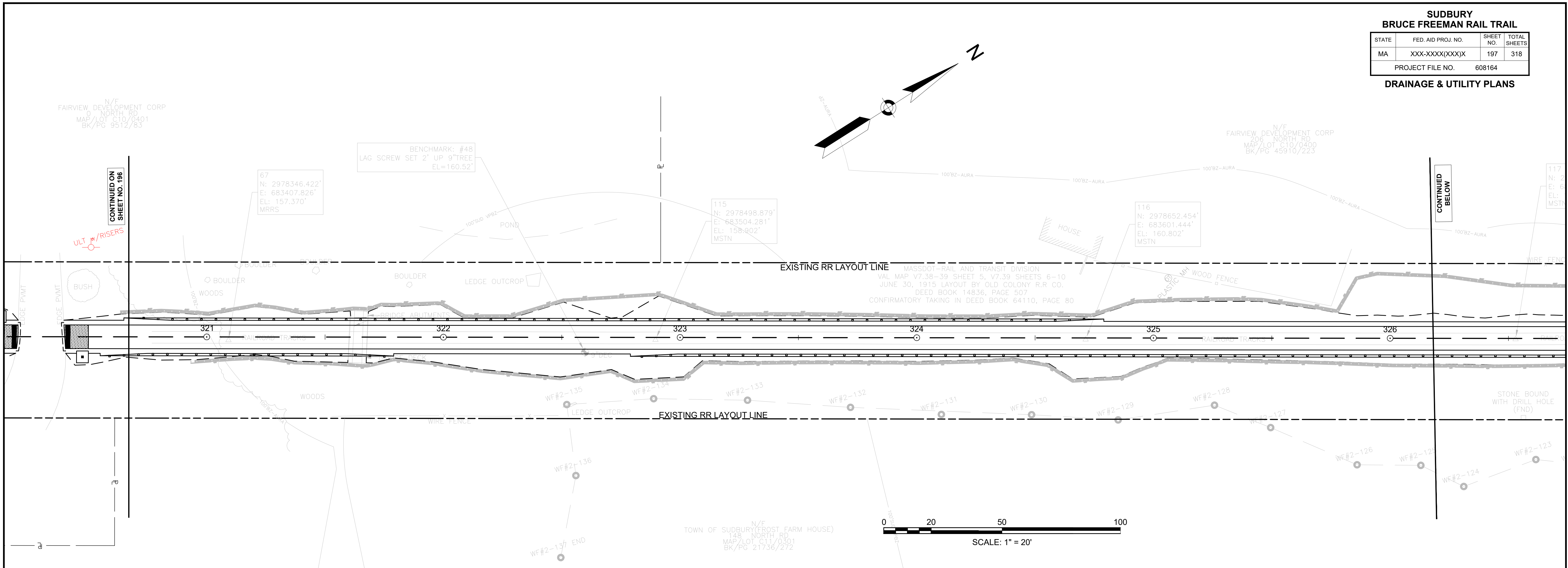
DRAINAGE & UTILITY PLANS



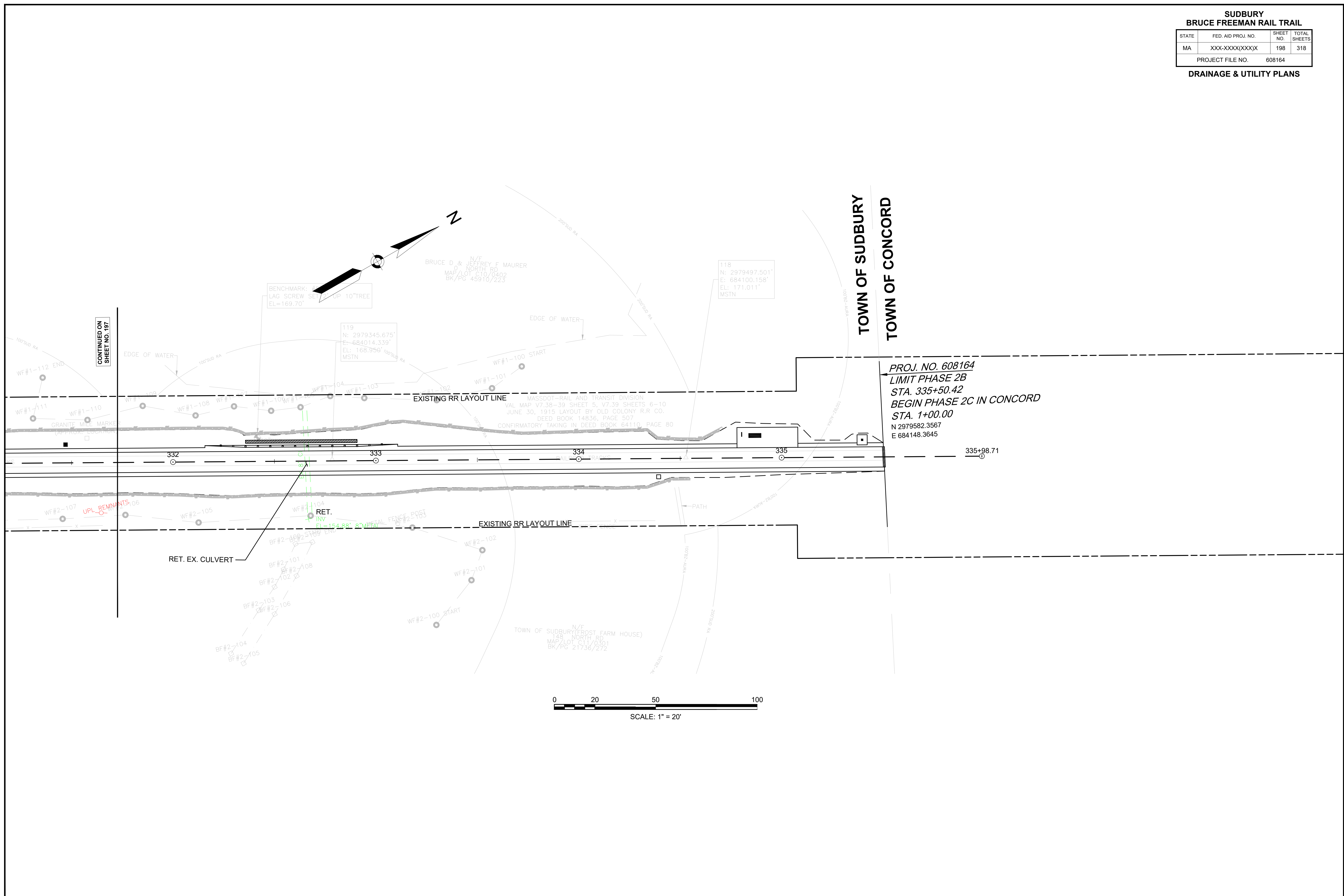
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BRUCE FREEMAN RAIL TRAIL**

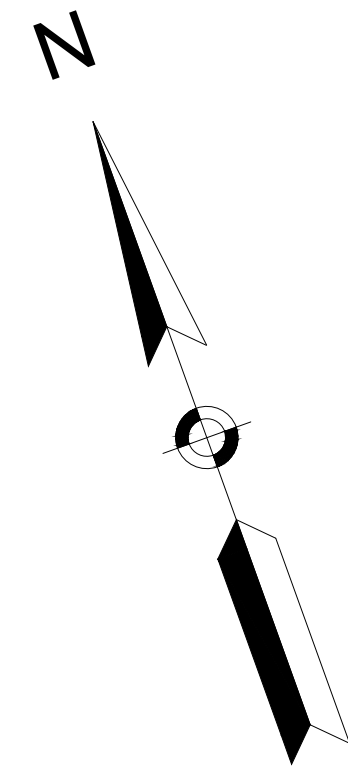
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	197	318
PROJECT FILE NO.		608164	

DRAINAGE & UTILITY PLANS



SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	198	318
PROJECT FILE NO.		608164	
DRAINAGE & UTILITY PLANS			





81
 N: 2965640.534'
 E: 679408.927'
 EL: 182.812'
 MSTN POL

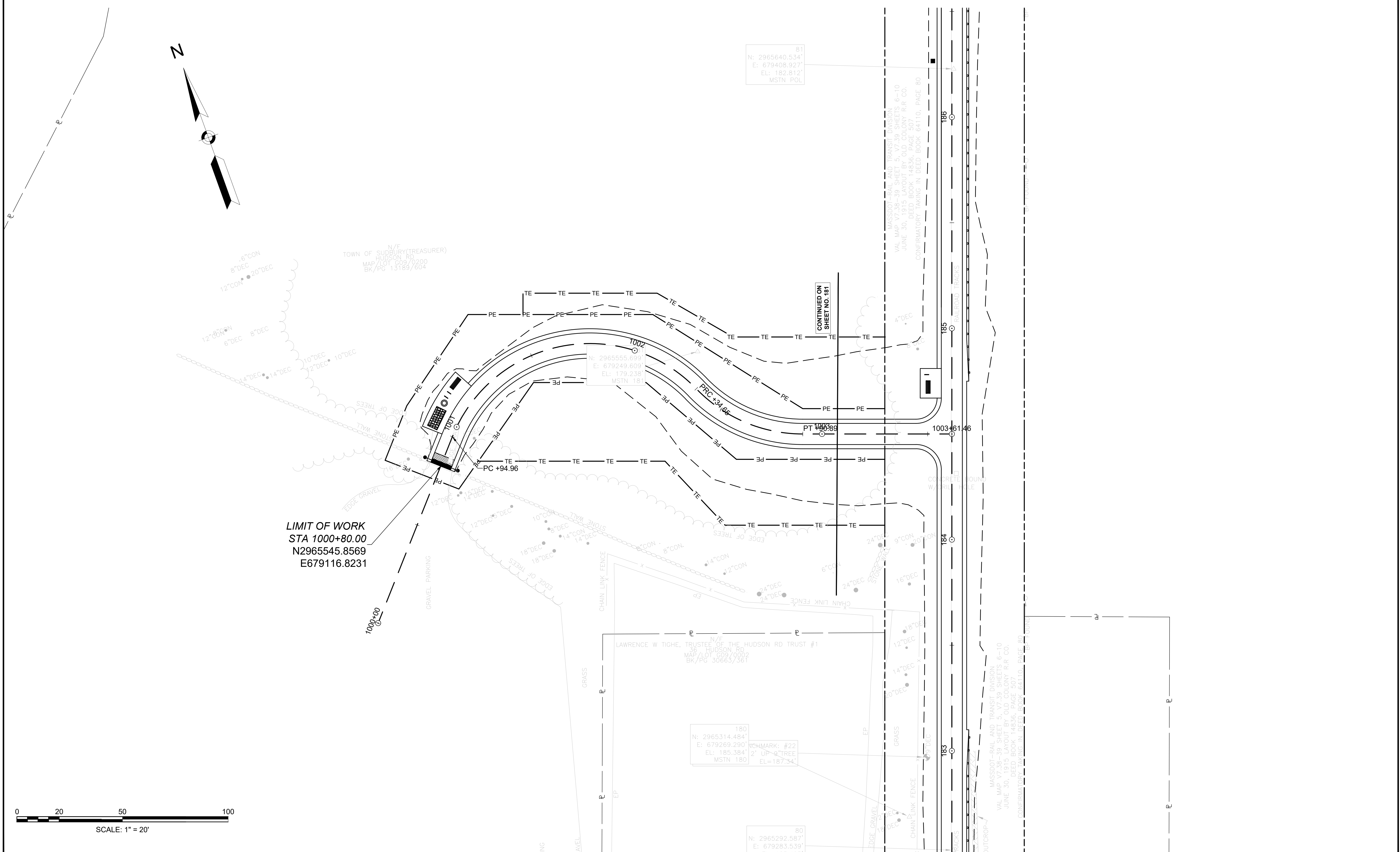
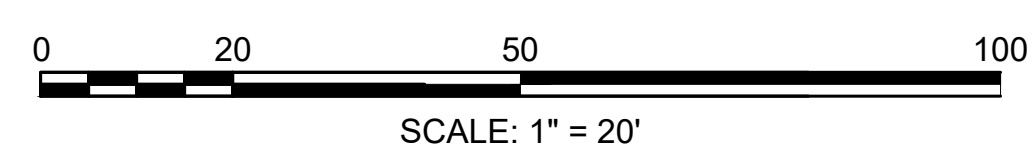
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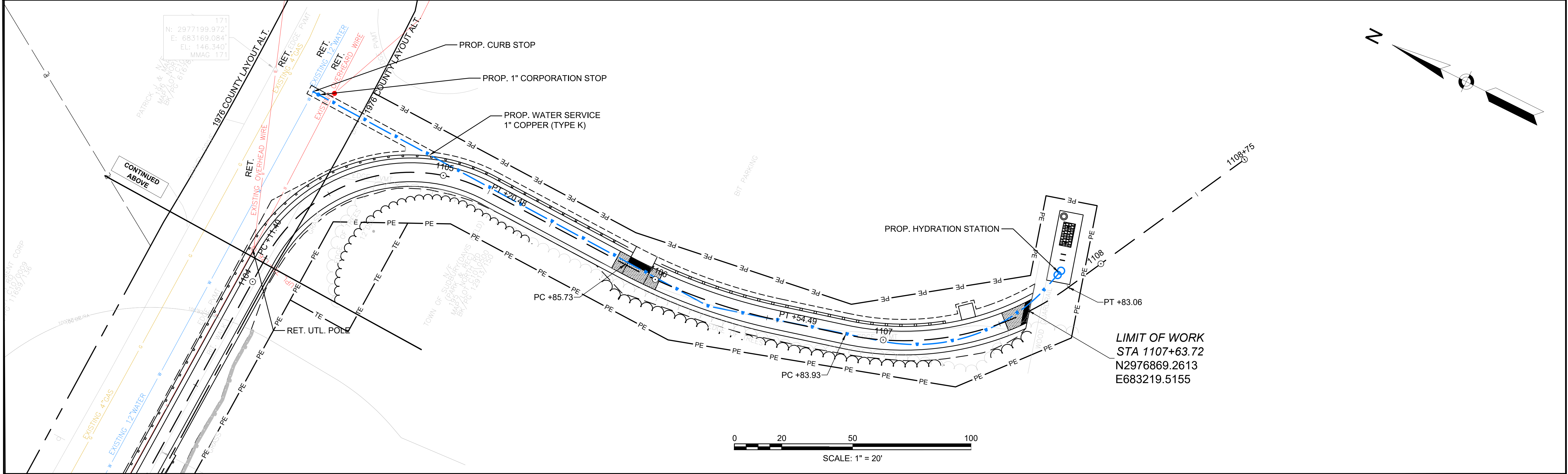
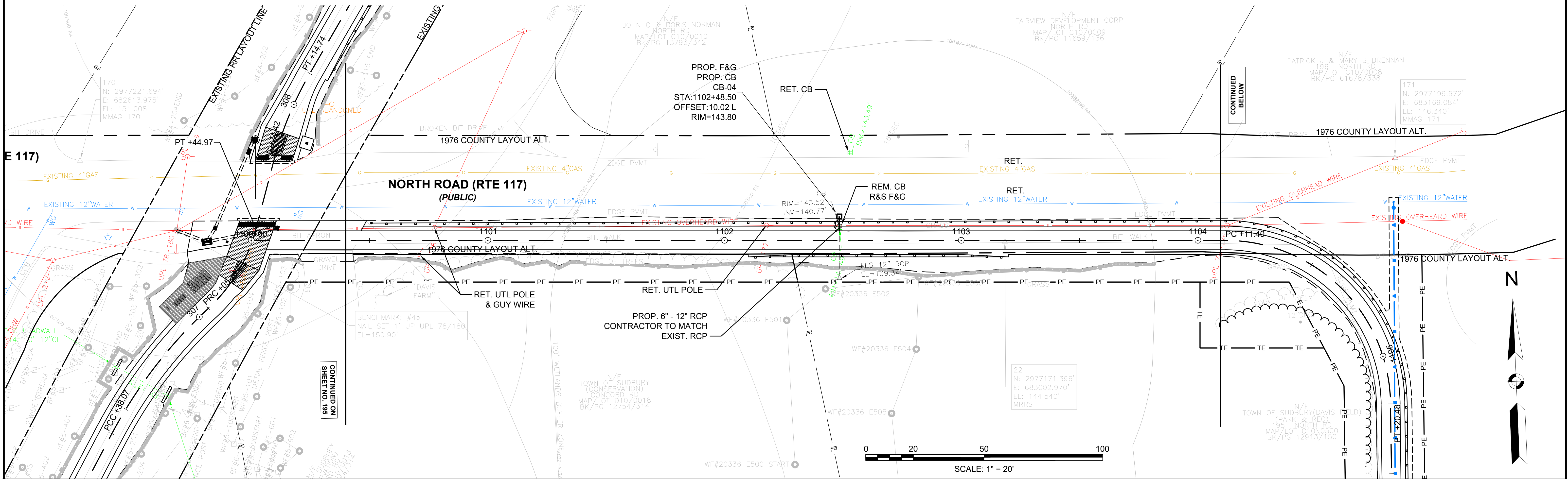
1002
 N: 2965555.699'
 E: 679249.609'
 EL: 179.238'
 MSTN 181

180
 N: 2965314.484'
 E: 679269.290'
 EL: 185.384'
 MSTN 180
 BENCHMARK: #22
 2" UP 9" TREE
 EL=187.34'

80
 N: 2965292.587'
 E: 679283.539'

LIMIT OF WORK
 STA 1000+80.00
 N2965545.8569
 E6791116.8231





WETLAND REPLICATION PLAN NOTES

GENERAL NOTES

1. THE CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ALSO PAY ALL FEES AND POST ALL BONDS ASSOCIATED WITH THE SAME, AND COORDINATE WITH THE ENGINEER AND ARCHITECT AS REQUIRED.
2. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE SAFETY AND ALL CONSTRUCTION MEANS AND METHODS.
3. LIMIT OF WORK SHALL BE EROSION CONTROL BARRIERS, LIMIT OF GRADING AND SITE PROPERTY LINES AND/OR AS INDICATED ON DRAWINGS.
4. ANY ALTERATION TO THESE DRAWINGS MADE IN THE FIELD DURING CONSTRUCTION SHALL BE RECORDED BY THE CONTRACTOR ON RECORD DOCUMENTS.
5. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO OWNER.
6. EXISTING TREES AND SHRUBS OUTSIDE THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON PRIOR APPROVAL OF THE OWNER.
7. FOR DRAWING LEGIBILITY, ALL EXISTING TOPOGRAPHIC FEATURES, EXISTING UTILITIES, PROPERTY BOUNDARIES, EASEMENTS, ETC. MAY NOT BE SHOWN ON ALL DRAWINGS. REFER TO ALL REFERENCED DRAWINGS AND OTHER DRAWINGS IN THIS SET FOR ADDITIONAL INFORMATION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL PERMIT CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING, SECURING AND COMPLIANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) CONSTRUCTION GENERAL PERMIT, AS ADMINISTERED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.

EROSION CONTROL AND SEDIMENTATION NOTES

1. CONTRACTOR SHALL MAINTAIN ANY EROSION CONTROL MEASURES DURING THE ENTIRE CONSTRUCTION PERIOD.
2. ANY SEDIMENT TRACKED ONTO THE PUBLIC RIGHT-OF-WAYS SHALL BE SWEEP AT THE END OF EACH WORKING DAY.
3. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFF SITE.
4. SITE ELEMENTS TO REMAIN MUST BE PROTECTED FOR DURATION OF PROJECT.
5. ADDITIONAL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE (E.G., PROFESSIONAL ENGINEER, WETLAND SCIENTIST, CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER).
6. THE WETLAND REPLICATION SITE WILL BE ACCESSED FROM THE BRUCE FREEMAN RAIL TRAIL. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADS.
7. EXTREME CARE SHALL BE EXERCISED SO AS TO PREVENT ANY UNSUITABLE MATERIAL FROM ENTERING WETLAND LOCATED OUTSIDE THE LIMIT OF WORK AND OFF PROPERTY.
8. ADDITIONAL EROSION CONTROLS SHALL BE LOCATED AS CONDITIONS WARRANT OR AS DIRECTED BY THE OWNER OR THEIR REPRESENTATIVE.

LAYOUT AND MATERIALS NOTES

1. ALL LINES AND DIMENSIONS ARE PARALLEL OR PERPENDICULAR TO THE LINES FROM WHICH THEY ARE MEASURED UNLESS OTHERWISE INDICATED.
2. CONTRACTOR SHALL REPORT SIGNIFICANT CONFLICTS TO THE OWNER AND THE ENGINEER FOR RESOLUTION.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN SITE PLAN DIMENSIONS AND BUILDING PLANS BEFORE PROCEEDING WITH ANY PORTION OF SITE WORK WHICH MAY BE AFFECTED SO THAT PROPER ADJUSTMENTS TO THE SITE LAYOUT CAN BE MADE IF NECESSARY.
4. PROTECT EXISTING PROPERTY MONUMENTS AND ABUTTING PROPERTIES DURING CONSTRUCTION ACTIVITIES.

GRADING, DRAINAGE AND UTILITY NOTES

1. UNDERGROUND UTILITIES WERE COMPILED FROM AVAILABLE RECORD PLANS OF UTILITY COMPANIES AND PUBLIC AGENCIES. ARE APPROXIMATE AND ASSUMED. BEFORE COMMENCING SITE WORK IN ANY AREA, CONTACT "DIG SAFE" AT 1-888-344-7233 AND THE OWNER TO ACCURATELY LOCATE UNDERGROUND UTILITIES. ANY DAMAGE TO EXISTING UTILITIES OR STRUCTURES SHALL BE THE CONTRACTOR'S RESPONSIBILITY. NO EXCAVATION SHALL BE DONE UNTIL UTILITY COMPANIES AND THE OWNER ARE PROPERLY NOTIFIED IN ADVANCE.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER PRIOR TO INSTALLATION OF ANY PORTION OF THE SITE WORK WHICH WOULD BE AFFECTED.
3. ALL WORK PERFORMED AND ALL MATERIALS FURNISHED SHALL CONFORM WITH THE LINES, GRADES AND OTHER SPECIFIC REQUIREMENTS OR SPECIFICATIONS FOR THE PROJECT AS SHOWN ON THE PLANS.
4. THE CONTRACTOR SHALL VERIFY EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES, AS REQUIRED. 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 OWNER AND ENGINEER FOR RESOLUTION.
5. THE CONTRACTOR SHALL REMOVE ALL EROSION CONTROL BARRIERS AFTER REVEGETATION OF DISTURBED AREAS AND AFTER APPROVAL OF THE CONSERVATION COMMISSION AND WETLAND SPECIALIST OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER.
6. PITCH EVENLY BETWEEN SPOT GRADES.

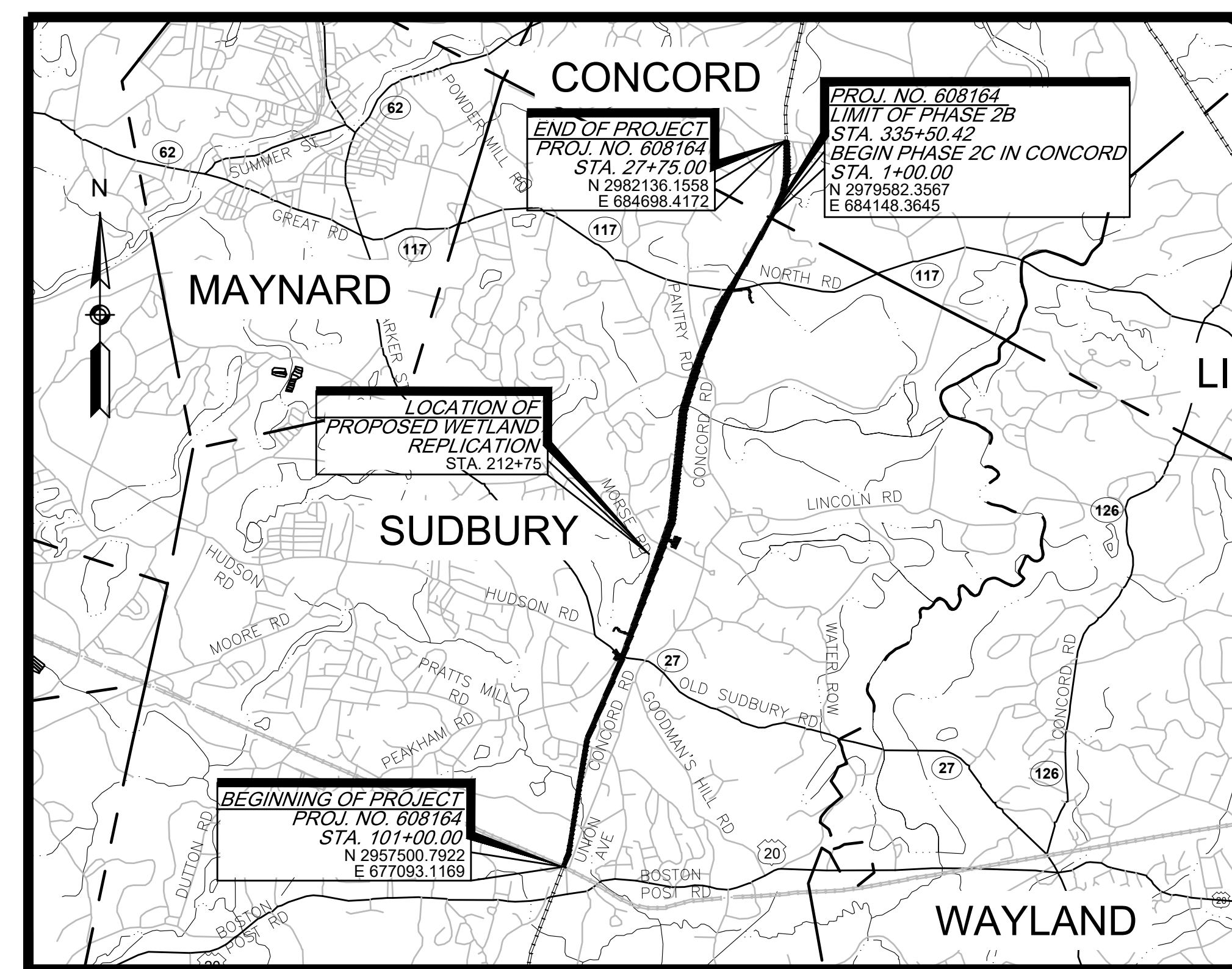
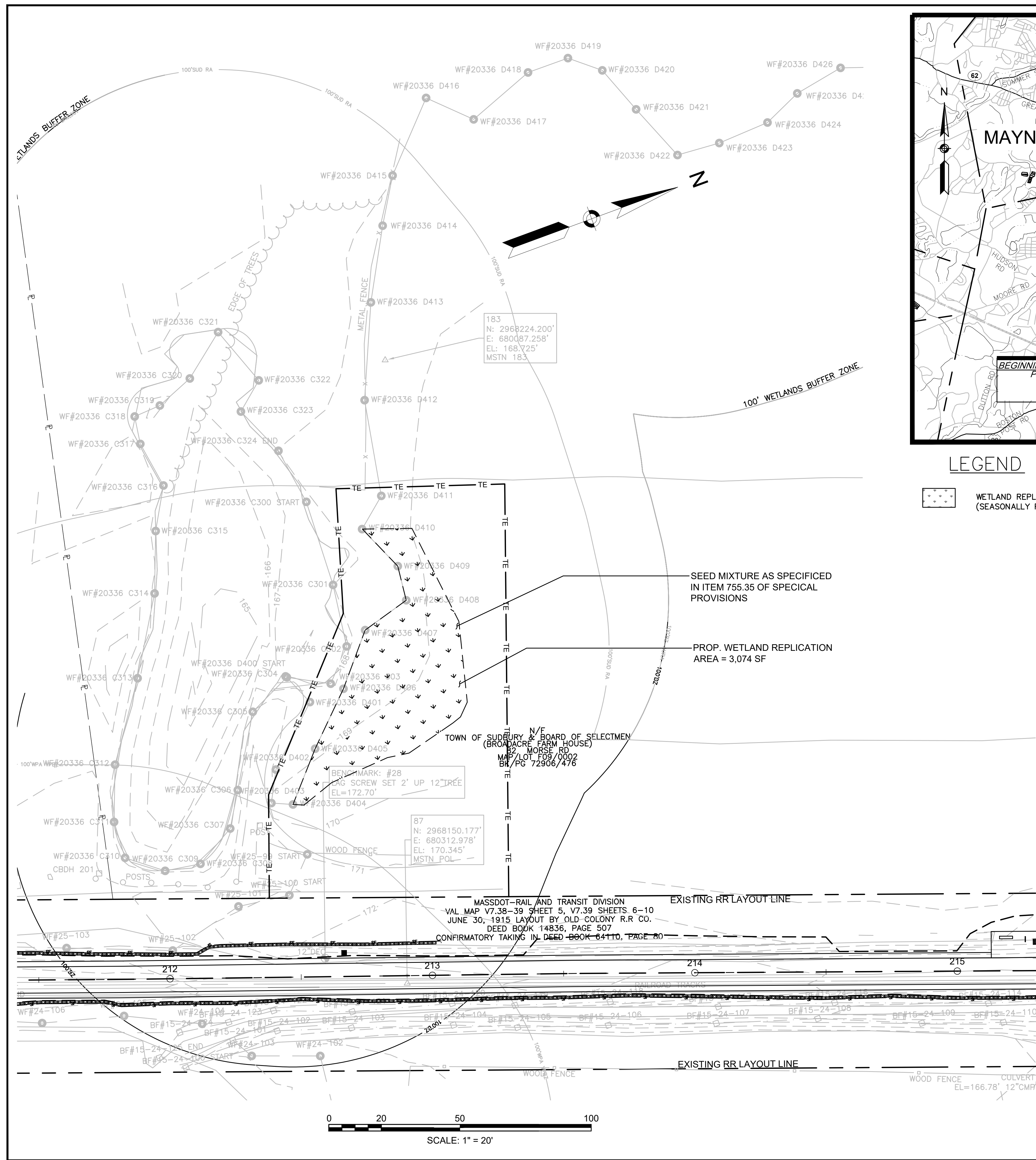
WETLAND CONSTRUCTION NOTES

1. A PRECONSTRUCTION MEETING SHALL BE HELD BEFORE INITIATING CONSTRUCTION. THE PRECONSTRUCTION MEETING SHALL BE ATTENDED BY THE DESIGNATED PROFESSIONAL WETLAND SCIENTIST, SITE ENGINEER, CONSTRUCTION GENERAL MANAGER, SITE CONTRACTOR, LANDSCAPE CONTRACTOR, AND ANY OTHER CONTRACTOR INVOLVED IN THE REPLICATION ACTIVITY.
2. WETLAND REPLICATION SHALL BE CONDUCTED IN ACCORDANCE WITH THESE DRAWINGS, SPECIAL PROVISIONS AND REQUIREMENTS OUTLINED IN THE ORDER OF CONDITIONS AS ISSUED BY THE TOWN OF SUDBURY CONSERVATION COMMISSION.
3. ALL EXISTING WETLAND DELINEATION WITHIN 100 FEET OF THE WORK AREA WILL BE RE-FLAGGED EVERY 25 FEET.
4. EROSION CONTROLS SHALL BE INSTALLED PER EROSION CONTROL PLAN, REPAIRED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD OF WETLAND MITIGATION AND UNTIL THE SITE IS FULLY STABILIZED BY VEGETATION (SEED MIX). EROSION CONTROLS SHALL THEN BE REMOVED FROM THE SITE.
5. A WETLAND SCIENTIST OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER SHALL BE ON SITE TO MONITOR PLANTING AND GRADING OF THE WETLAND REPLICATION AREA TO ENSURE COMPLIANCE WITH APPROVED PLANS.
6. INVASIVE NON-NATIVE PLANT SPECIES IN OR IMMEDIATELY ADJACENT TO REPLICATION AREA SHALL BE IDENTIFIED AND TAGGED FOR ERADICATION OR REMOVAL. REMOVED INVASIVE PLANT MATERIAL SHALL BE DISPOSED OF AT AN APPROVED OFF-SITE LOCATION.
7. HERBICIDE SELECTION AND TIMING FOR INVASIVE SPECIES CONTROL SHALL BE APPROVED BY A PROFESSIONAL WETLAND SCIENTIST OR OTHER QUALIFIED PROFESSIONAL.
8. HERBICIDE APPLICATION FOR INVASIVE SPECIES CONTROL SHALL BE PERFORMED BY A PROFESSIONAL CERTIFIED BY THE STATE OF MASSACHUSETTS. DOCUMENTATION OF CERTIFICATION SHALL BE SUBMITTED TO THE SITE CONSTRUCTION GENERAL MANAGER.
9. GRADING AND PLANTINGS WILL NOT BE CONDUCTED DURING PERIODS OF HIGH WATER. CONSTRUCTION OF THE REPLICATION AREA WILL CONTINUE UNINTERRUPTED TO AVOID EROSION AND THE SILTATION OF WETLANDS.
10. COMPACTION OF SOILS IN THE WETLAND REPLICATION AREA SHALL BE MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE BY THE USE OF LOW-GROUND PRESSURE MACHINERY.
11. SHOULD COMPACTION OCCUR, SOILS SHALL BE TILLED OR DISKED IN TWO DIRECTIONS TO RE-FRACTURE A MINIMUM OF TWELVE (12) INCHES BELOW FINISHED GRADE.
12. BURIED ORGANIC WETLAND SOILS ENCOUNTERED DURING EXCAVATION MAY BE LEFT IN PLACE. IF TEMPORARY STOCKPILING OF WETLAND SOIL IS NECESSARY, MATERIAL MUST BE COVERED TO PREVENT LEACHING, MOISTURE LOSS AND SEDIMENT TRANSPORT.
13. GRADING LINES DEPICTED ON THE PLAN ARE DRAWN SMOOTHLY. ACTUAL SURFACE GRADES ACROSS WETLAND 'FLOOR' SHALL REFLECT HUMMOCK AND HOLLOW TOPOGRAPHY OF NATURAL WETLANDS.
14. THE SUBGRADE OF WETLAND REPLACEMENT AREAS WILL BE GRADED A MINIMUM OF ONE FOOT BELOW THE ADJACENT WETLANDS. NO GRADING WILL BE PERMITTED WITHIN THE EXISTING WETLAND AREAS EXCEPT TO CUT OPENINGS IN BERMS TO ESTABLISH HYDRAULIC CONDUCTIVITY BETWEEN THE REPLACEMENT WETLAND AND THE WETLAND REPLICATION.
15. FINAL SUB-GRADES SHALL BE REVIEWED AND APPROVED BY A PROFESSIONAL WETLAND SCIENTIST OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER AFTER REVIEW OF SEASONAL, LOCAL HIGH GROUNDWATER MONITORING DATA AND FIELD CONDITIONS. MODIFICATIONS OF FINAL GRADES MAY BE MADE IN THE FIELD AS DIRECTED BY A PROFESSIONAL WETLAND SCIENTIST OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER.
16. A TWELVE-INCH LAYER OF NATURAL ORGANIC SOIL OR MIXTURE OF EQUAL PARTS OF GOOD QUALITY TOPSOIL AND CLEAN LEAF COMPOST WILL BE PLACED IN THE BOTTOM OF THE REPLACEMENT AREA. SOIL AND COMPOST SHOULD BE CERTIFIED FREE OF INVASIVE PLANT SEEDS OR OTHER ARTIFICIAL MATERIAL.
17. SIDE SLOPES OF NON-WETLAND (UPLAND) AREAS SHALL BE GRADED WITH A MINIMUM OF FOUR INCHES OF THE SOIL MIXTURE AS DESCRIBED ABOVE.
18. NO SOIL AMENDMENT OR FERTILIZER SHALL BE APPLIED OR ADDED UNLESS DIRECTED BY A PROFESSIONAL WETLAND SCIENTIST.
19. WHERE CALLED FOR, REPLICATION AREAS SHALL BE SEEDED IMMEDIATELY FOLLOWING PLACEMENT AND FINAL GRADING INCLUDING MICROTPOGRAPHY. SPRING SEEDING SHOULD OCCUR AFTER THE GROUND THAWS AND BEFORE JUNE 30. FALL SEEDING SHOULD OCCUR AFTER OCTOBER 15 AND BEFORE THE SOIL FREEZES.
20. ALL WETLAND AREAS SHALL BE SEEDED USING NEW ENGLAND WETMIX. SEE SPECIAL PROVISIONS FOR VENDORS. WETLAND SEEDING SHALL OCCUR AT A RATE OF ONE POUND (1 LB) PER TWO-THOUSAND FIVE-HUNDRED SQUARE FEET (2,500 SF).
21. UPLAND AREAS SHALL BE SEEDED USING NEW ENGLAND CONSERVATION/WILDLIFE MIX OR APPROVED EQUIVALENT. SEE SPECIAL PROVISIONS FOR VENDORS. WETLAND SEEDING SHALL OCCUR AT A RATE OF ONE POUND (1 LB) PER ONE-THOUSAND SEVEN-HUNDRED FIFTY SQUARE FEET (1,750 SF). THE AREA SHALL BE MULCHED WITH TWO INCHES OF CLEAN LEAF COMPOST OR STRAW.
22. SEED SHALL BE FRESH, RECLEANED SEED OF THE LATEST CROP. SEED SHALL BE DELIVERED TO THE SITE IN THE ORIGINAL CONTAINERS WHICH SHALL BEAR THE VENDORS' GUARANTEE OF ANALYSIS.
23. DEVIATIONS FROM THE PLANTING SCHEDULE AND/OR APPROVED PLANTING LIST MUST BE APPROVED IN ADVANCE BY A PROFESSIONAL WETLAND SCIENTIST OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER.
24. THE LANDSCAPE CONTRACTOR SHALL CLEAN UP AND REMOVE ANY DEBRIS FROM THE SITE CAUSED BY THE LANDSCAPE CONTRACTOR.
25. PLANT LISTS MAY BE ALTERED BASED ON FIELD CONDITIONS AS DIRECTED BY A PROFESSIONAL WETLAND SCIENTIST OR CERTIFIED ECOLOGICAL RESTORATION PRACTITIONER.
26. ALL PLANT MATERIALS SHALL CARRY A FULL GUARANTEE FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE TO INCLUDE PROMPT TREATMENT OR REMOVAL AND REPLACEMENT OF ANY PLANTS FOUND TO BE IN AN UNHEALTHY CONDITION BY THE LANDSCAPE ARCHITECT. ALL REPLACEMENTS SHALL BE OF THE SAME KINDS AND SIZE OF PLANTS SPECIFIED IN THE PLANT LIST.
27. WETLAND REPLICATION AREAS WILL BE INSPECTED ANNUALLY FOR THE FIRST TWO YEARS FOLLOWING PLANTING TO IDENTIFY INVASIVE SPECIES AND A REPORT DETAILING TO RELATIVE SUCCESS OF THE MITIGATION PLAN IN TERMS OF BOTH THE HEALTH AND SURVIVAL OF WETLAND PLANTINGS SHALL BE PREPARED.
28. DURING AND AFTER THE FIRST AND SECOND GROWING SEASON, THE SUCCESS OF THE VEGETATIVE GROWTH WILL BE REVIEWED AND EVALUATED. ADDITIONAL VEGETATION WILL BE PLANTED AS NECESSARY TO REPLACE STRESSED OR MISSING VEGETATION AND TO ACHIEVE THE 75% VEGETATIVE DENSITY SPECIFIED IN THE SPECIAL PROVISIONS.

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	204	318
PROJECT FILE NO.		608164	

WETLAND REPLICATION PLAN



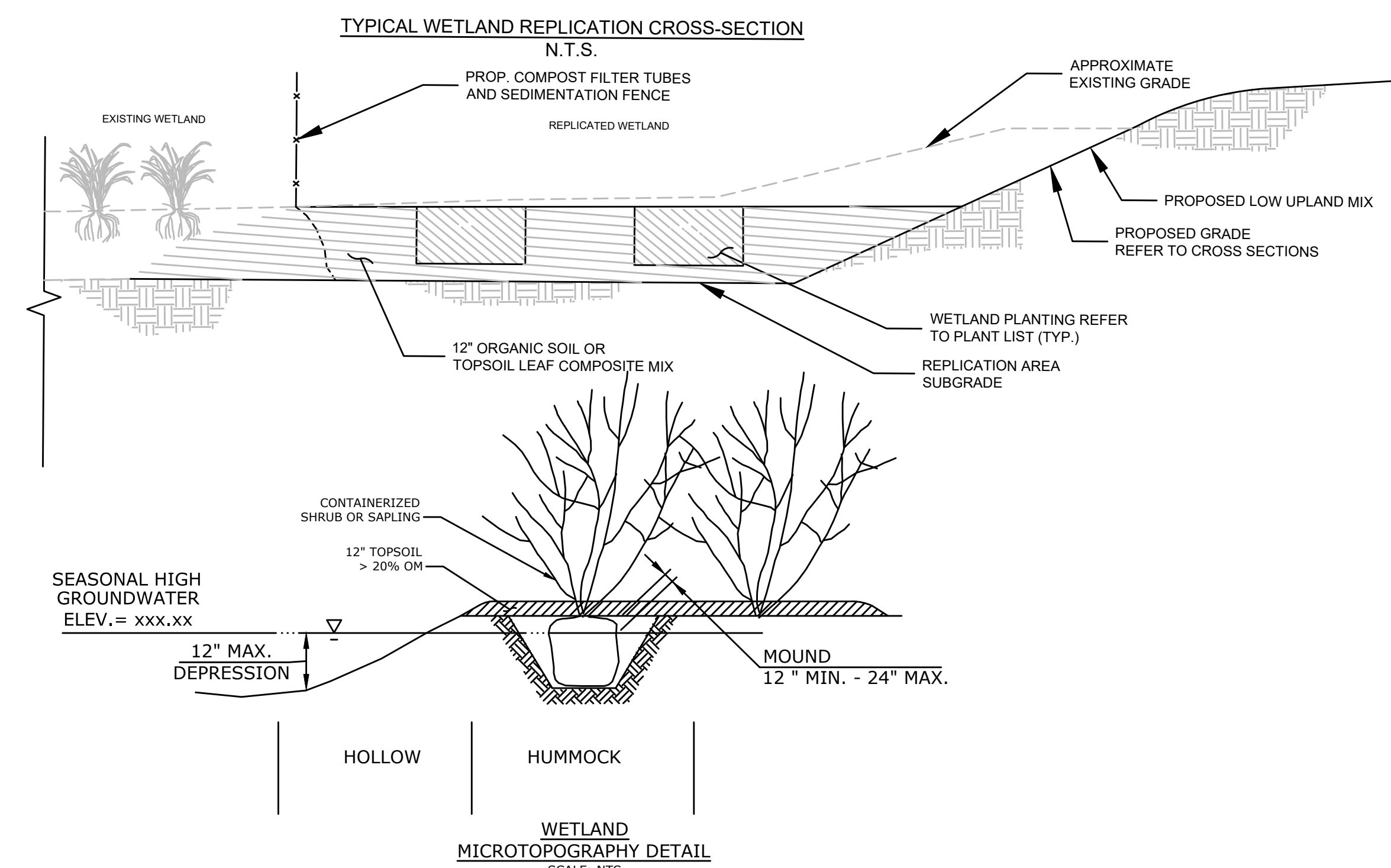
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BRUCE FREEMAN RAIL TRAIL**

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WETLAND REPLICATION PLAN

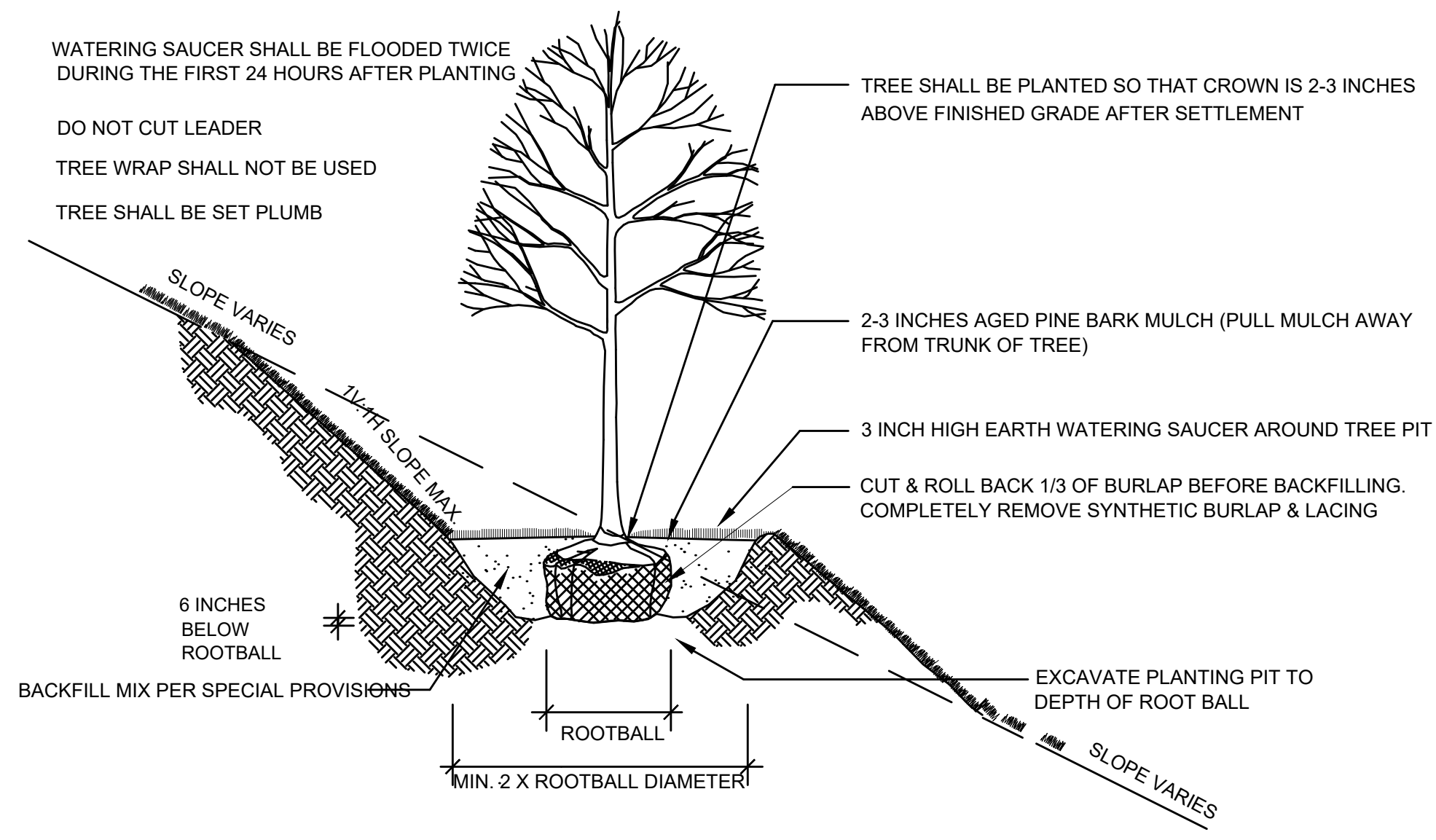
LEGEND

WETLAND REPLICATION AREA (SEASONALLY FLOODED)

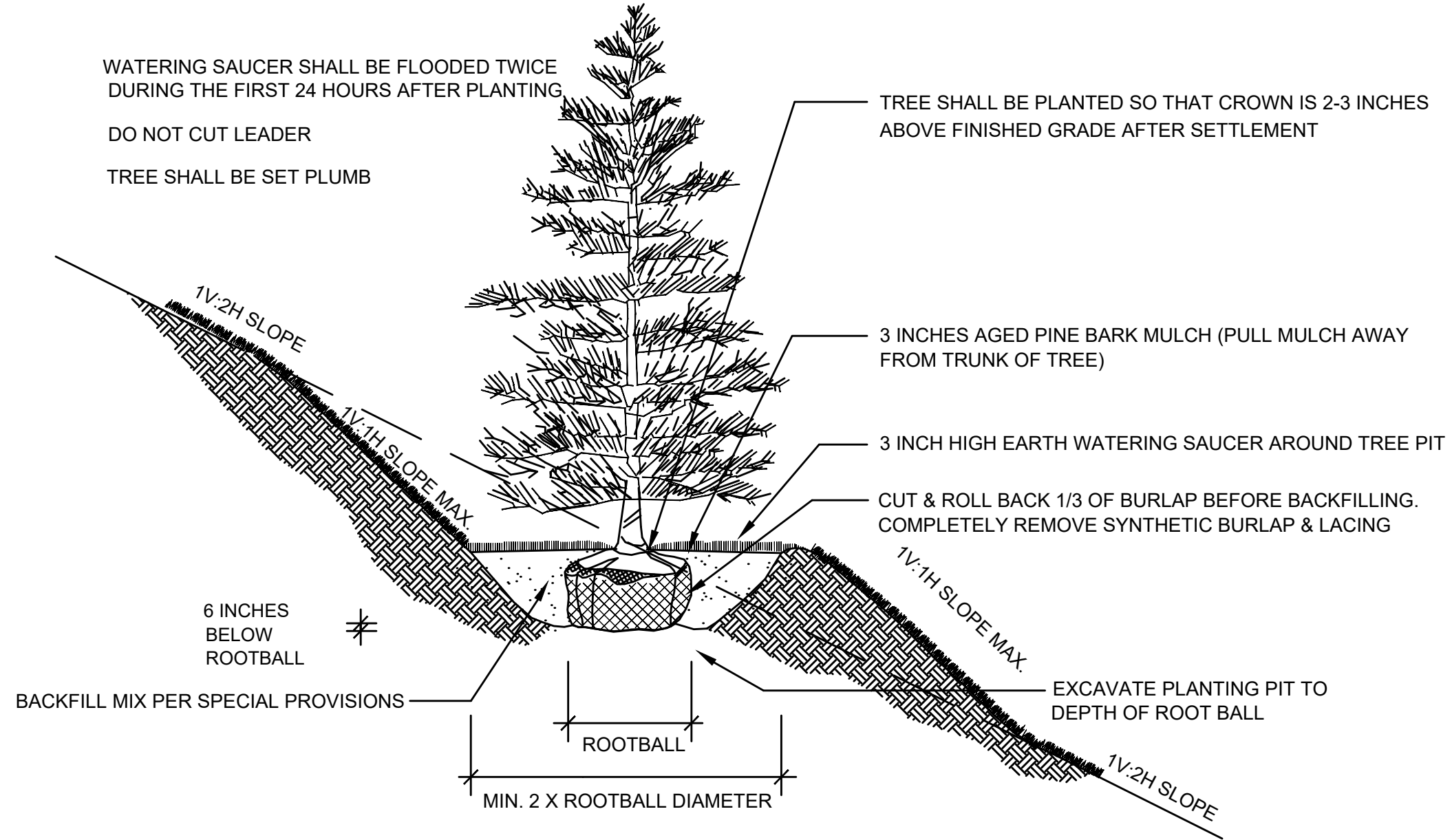


PLANT LIST

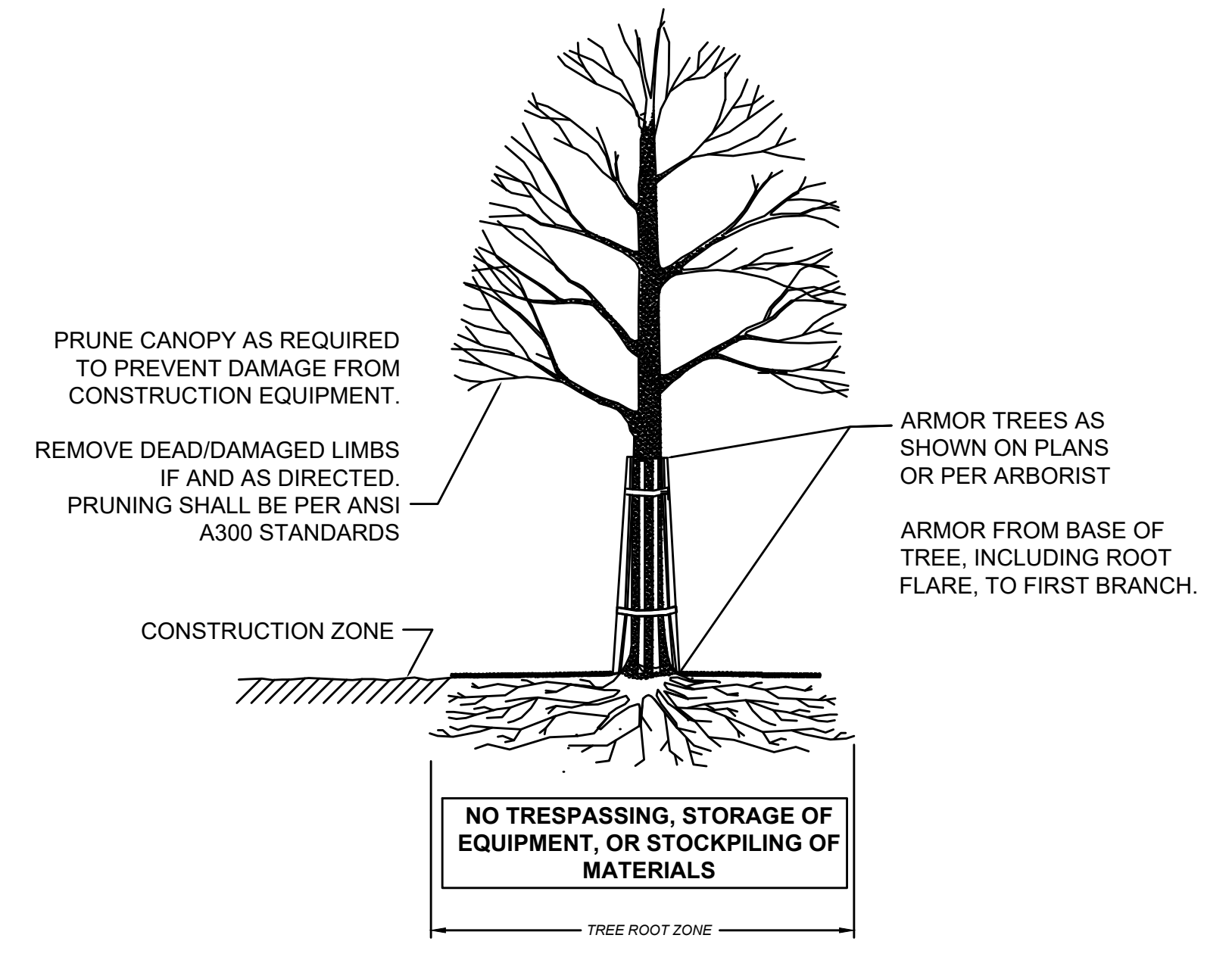
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TREES					
AR	11	ACER RUBRUM	RED MAPLE	4'-6' HT.	10' O.C.
BA	7	BETULA ALLEGHANIENSIS	YELLOW BIRCH	4'-6' HT.	10' O.C.
FP	4	FRAXINUS PENNSYLVANICA	GREEN ASH	4'-6' HT.	10' O.C.
UA	4	ULMUS RUBRA	SLIPPERY ELM	4'-6' HT.	10' O.C.
SHRUBS					
CR	4	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	2'-3' HT.	10' O.C. GROUPS OF 3
IV	7	ILEX VERTICILLATA	WINTERBERRY HOLLY	2'-3' HT.	10' O.C. GROUPS OF 3
LB	7	LINDERA BENZOIN	SPICEBUSH	2'-3' HT.	10' O.C. GROUPS OF 3
VC	5	VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	2'-3' HT.	10' O.C. GROUPS OF 3
VD	4	VIBURNUM DENTATUM	NORTHERN ARROWWOOD	2'-3' HT.	10' O.C. GROUPS OF 3
VL	4	VIBURNUM LENTAGO	NANNYBERRY	2'-3' HT.	10' O.C. GROUPS OF 3



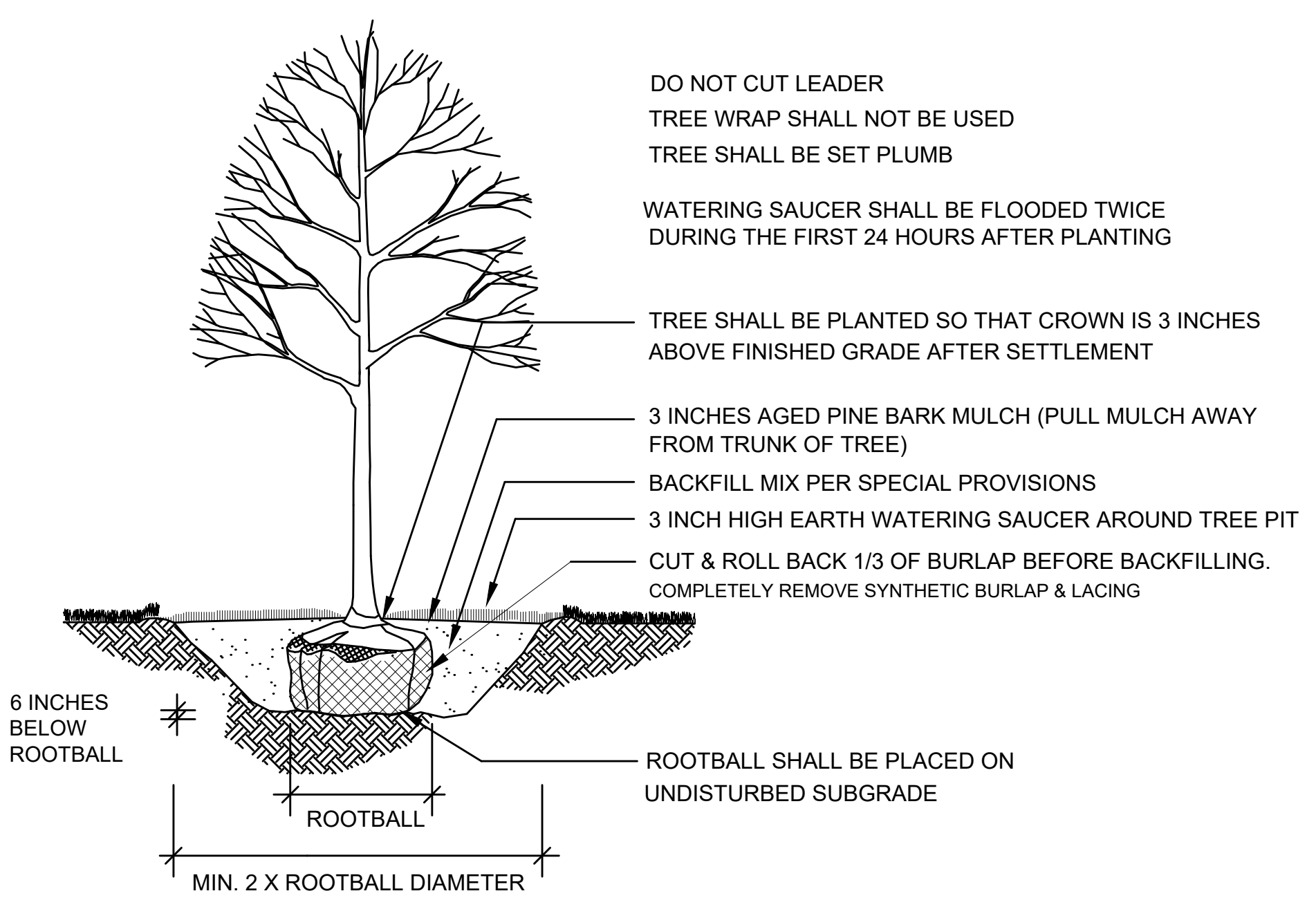
1 DECIDUOUS TREE PLANTING (SLOPE)
SCALE: N.T.S.



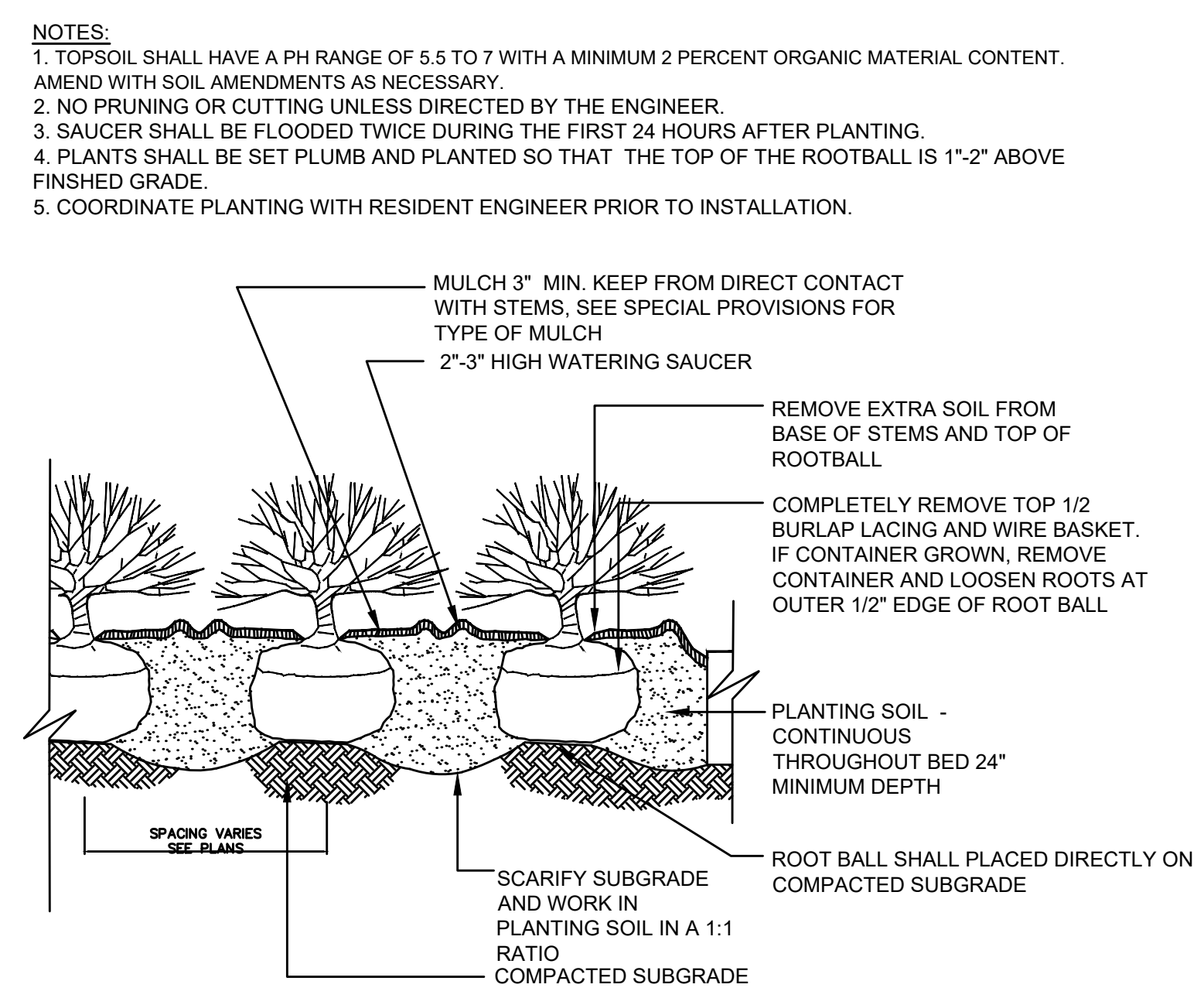
2 EVERGREEN TREE PLANTING (SLOPE)
SCALE: N.T.S.



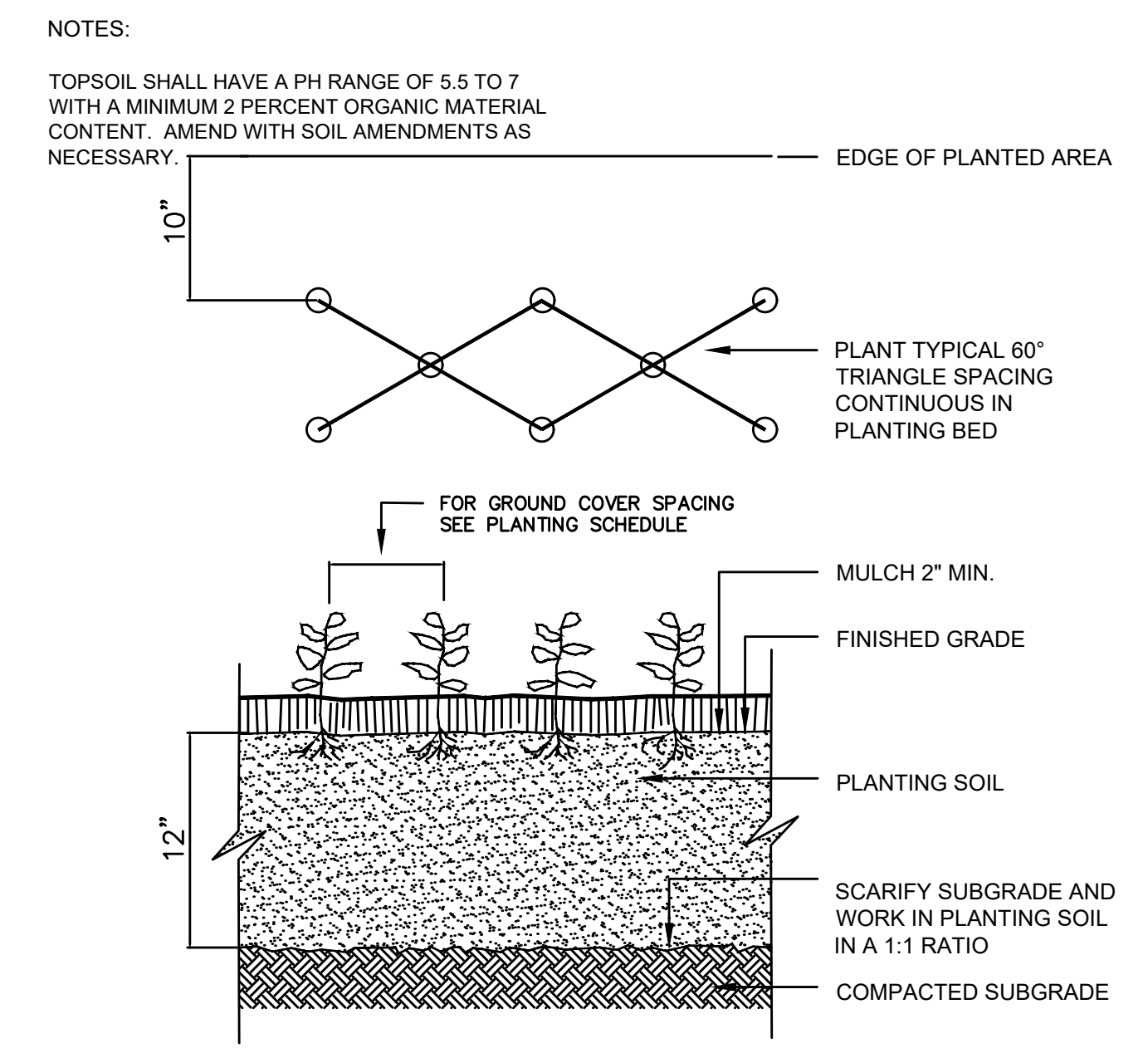
3 INDIVIDUAL TREE PROTECTION
SCALE: N.T.S.



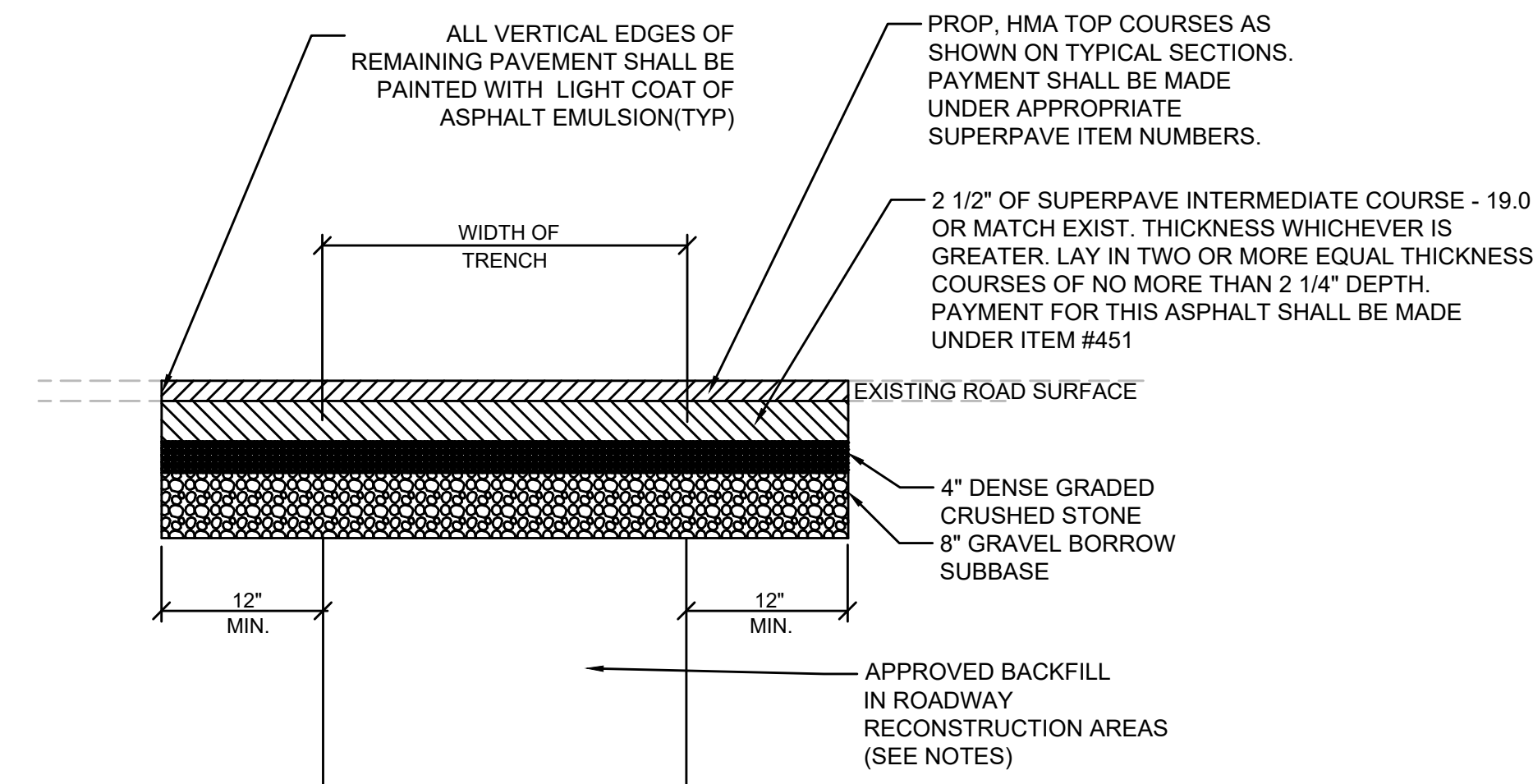
4 DECIDUOUS TREE PLANTING
SCALE: N.T.S.



5 SHRUB AND PERENNIAL PLANTING
SCALE: N.T.S.

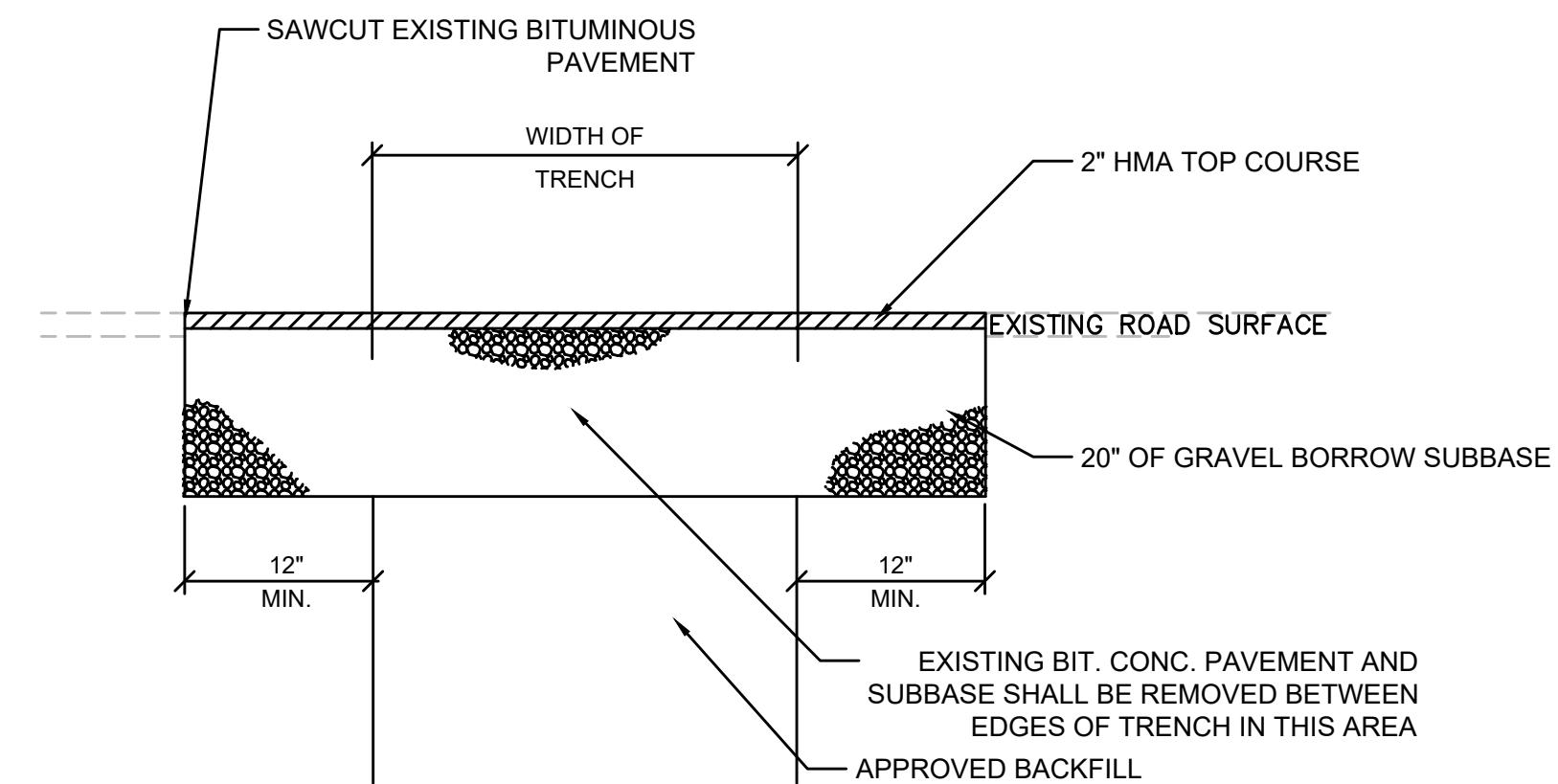


6 GROUNDCOVER PLANTING
SCALE: N.T.S.



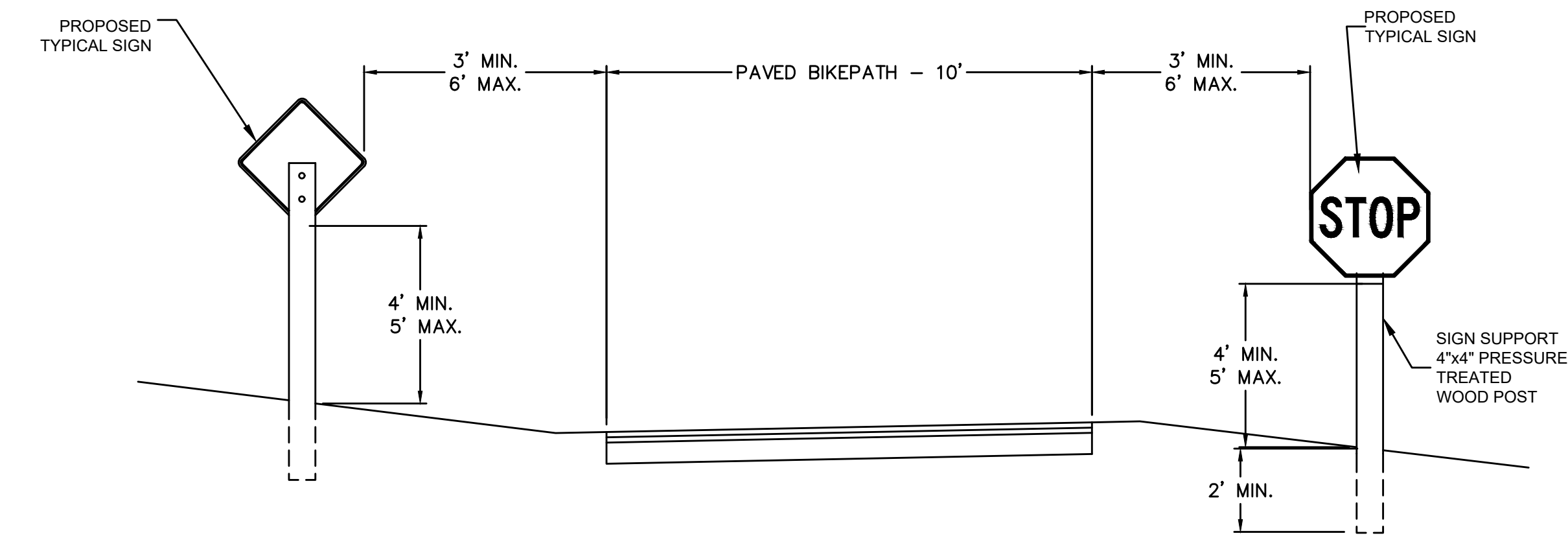
NOTES:
 OVERLAY AREAS: THE TRENCH SHALL BE REPAIRED TO THE TOP OF THE BASE COURSE. THE TOP COURSES SHALL BE PLACED WITH OVERLAY OF THE ROADWAY
 ROADWAY TRENCHING OUTSIDE OF FULL DEPTH AND OVERLAY: THE TRENCH SHALL BE REPAIRED WITH TOP COURSES INSTALLED WITH THE BASE COURSE.
 CONTROLLED DENSITY FILL MAY BE USED IN LIEU OF APPROVED BACKFILL IN PAVEMENT MILLING AND OVERLAY AREAS. **USE OF CONTROLLED DENSITY FILL TO BACKFILL TRENCHES SHALL BE APPROVED BY THE TOWN OF SUDBURY PRIOR TO PLACEMENT.**
 PERMANENT ASPHALT SHALL BE PAID FOR UNDER ITEM #451.

7 PERMANENT PAVEMENT TRENCH REPAIR IN ROADWAYS
 SCALE: N.T.S.



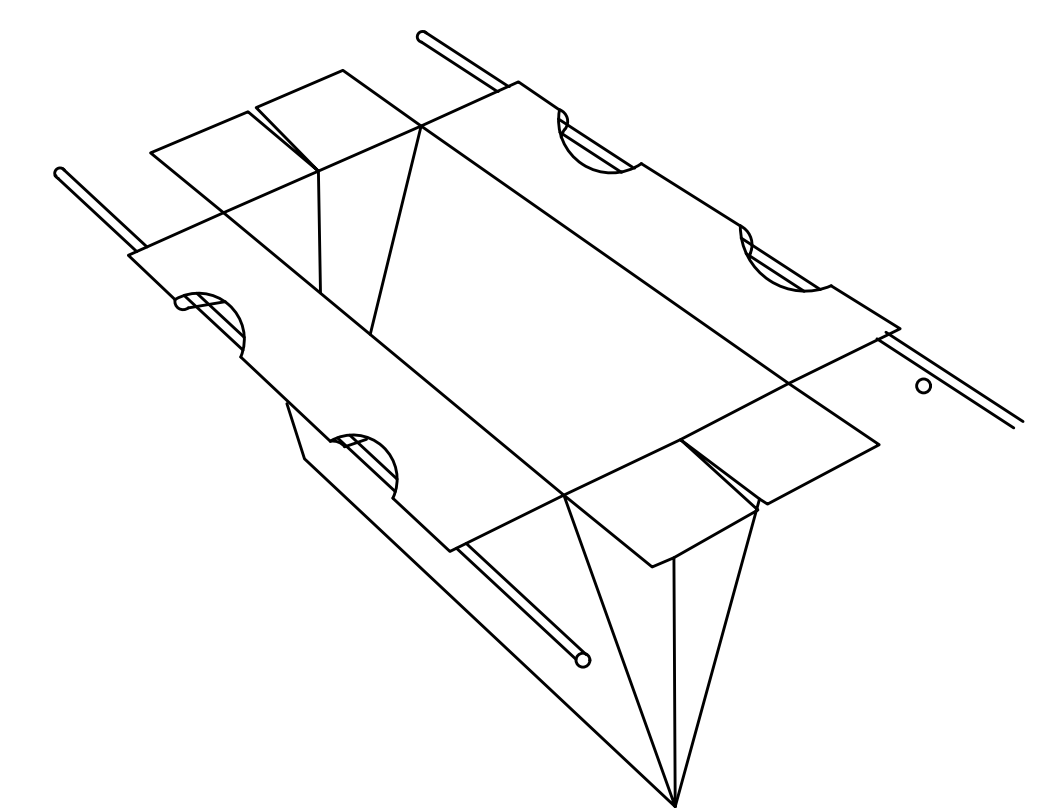
NOTES:
 THE TEMPORARY PAVEMENT TRENCH REPAIR SHALL BE USED DURING THE TIME BETWEEN COMPLETION OF THE UTILITY CONSTRUCTION AND CONSTRUCTION OF THE PROPOSED ROADWAY PAVEMENT STRUCTURE OR PERMANENT PAVEMENT TRENCH REPAIR.
 TEMPORARY ASPHALT SHALL BE PAID FOR UNDER ITEM #472

8 TEMPORARY PAVEMENT TRENCH REPAIR
 SCALE: N.T.S.



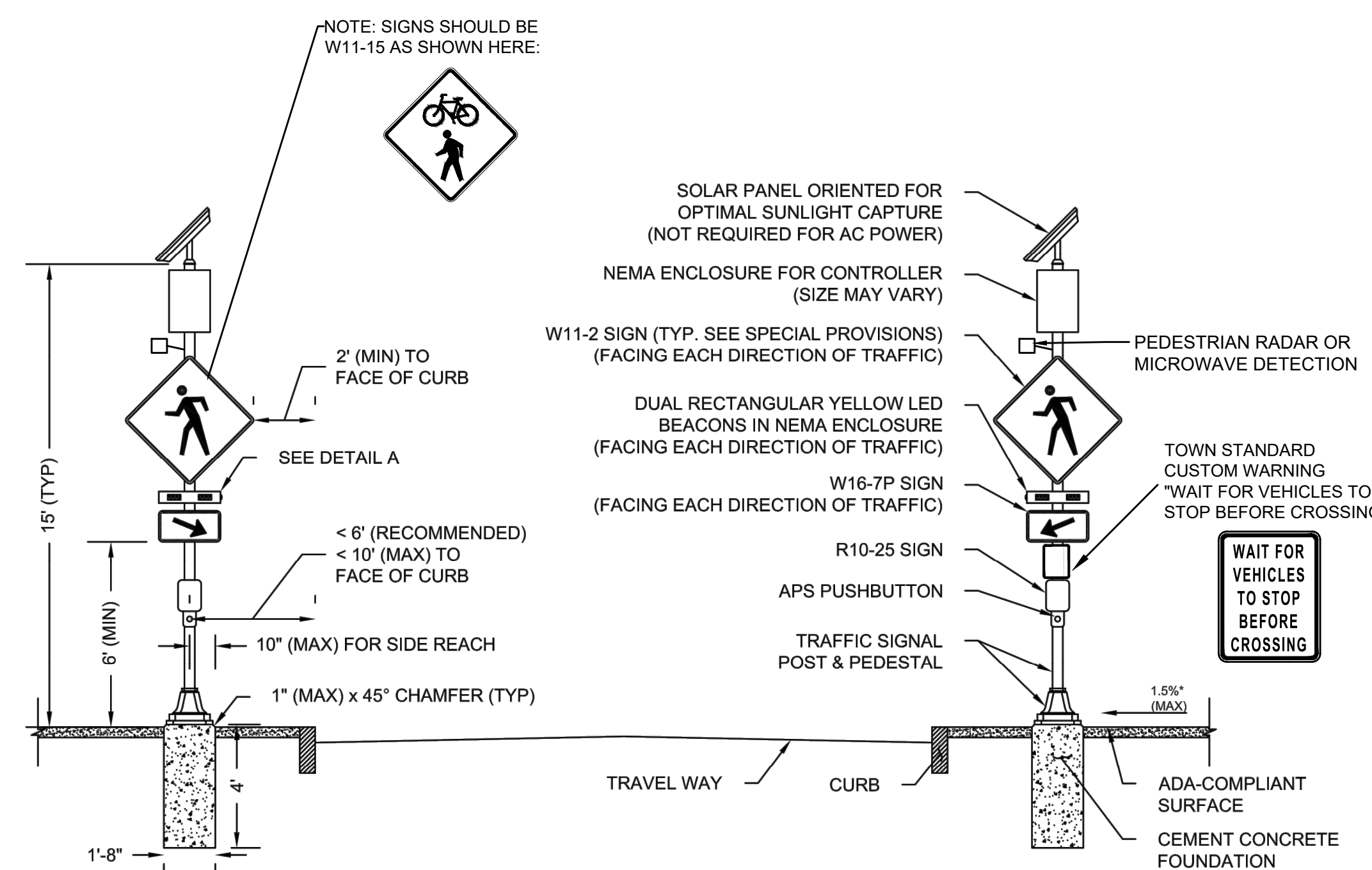
9 SHARED-USE PATH TYPICAL SIGN PLACEMENT
 SCALE: N.T.S.

NOTES:
 1. ALL HARDWARE SHALL BE GALVANIZED.
 2. WOOD POSTS SHALL BE PAID FOR UNDER ITEM 847.11".



NOTES:
 1. SIZED TO FIT ANY SIZE OR SHAPE CATCH BASIN.
 2. ALL SEAMS DOUBLE STITCHED.
 3. PERMEABILITY - REGULAR FLOW SILTSACK - 40 gal./min./sq. ft.
 HI - FLOW SILTSACK - 200 gal./min./sq. ft.

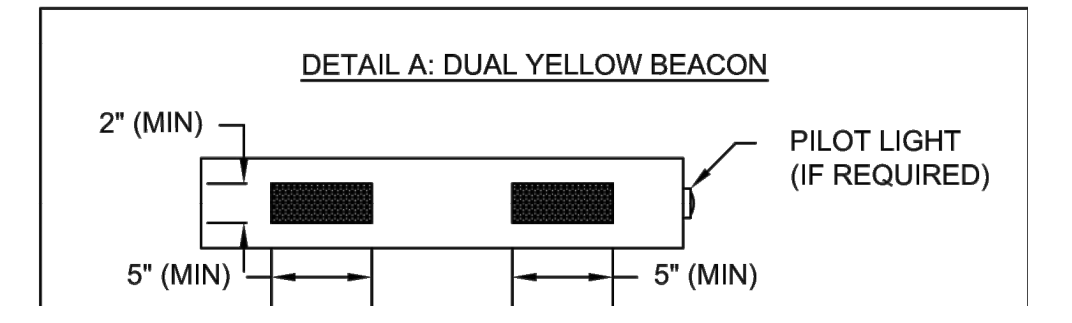
10 CATCH BASIN SILT SACK
 SCALE: N.T.S.



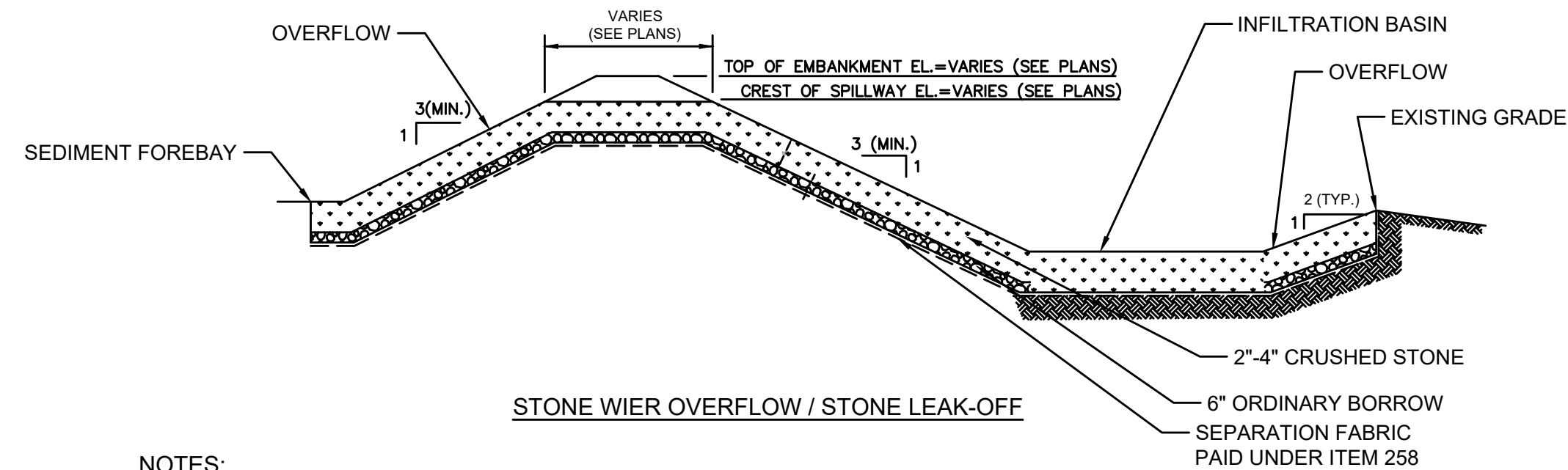
RRFB NOTES:
 1) PAYMENT FOR PRECAST FOUNDATION INCLUSIVE UNDER ITEM 824.221 & 824.222
 2) ALL POSTS, BRACKETS, AND HARDWARE SHALL BE FACTORY FEDERAL GREEN.

NOTES:
 1. CROSSWALK AND ADA-COMPLIANT RAMPS NOT SHOWN. SEE PLANS FOR LOCATIONS.
 2. REFER TO THE SPECIAL PROVISIONS FOR SIGN DIMENSIONS.
 3. ALL CONDUIT, PULL BOXES, SERVICE CONNECTIONS, AND EQUIPMENT GROUNDING REQUIRED FOR AC POWER IS NOT SHOWN IN THIS DETAIL AND SHALL BE PAID FOR SEPARATELY UNDER THEIR RESPECTIVE PAY ITEMS.
 4. ACCESS TO ALL PEDESTRIAN ACTUATED CONTROLS SHALL BE ADA/AAB COMPLIANT.
 5. *0.5% CONSTRUCTION TOLERANCE FOR CROSS-SLOPE.
 6. ALL RRFBS SHALL HAVE BOTH BUTTONS AND DETECTION INSTALLED.

MAJOR ITEMS LIST
 2 CEMENT CONCRETE FOUNDATIONS PER 812.30.1
 2 15' TRAFFIC SIGNAL POSTS & PEDESTALS
 2 APS PUSHBUTTON SYSTEMS
 4 DUAL RECTANGULAR YELLOW LED BEACONS IN NEMA ENCLOSURES
 2 R10-25 SIGNS
 4 W11-2 SIGNS
 2 W16-7PR SIGNS
 2 W16-7PL SIGNS
 2 SOLAR PANEL SYSTEMS (NOT REQUIRED FOR AC POWER)
 2 NEMA ENCLOSURES FOR ALL COMPONENTS NEEDED TO MEET FUNCTIONAL REQUIREMENTS PER SPECIAL PROVISIONS
 2 BATTERY SYSTEMS (NOT REQUIRED FOR AC POWER)
 2 TOWN STANDARD CUSTOM WARNING SIGNS PLUS ALL MOUNTING AND SUPPORTING HARDWARE AND WIRING NECESSARY TO COMPLETE A WORKING SYSTEM.
 2 PEDESTRIAN RADAR OR MICROWAVE DETECTION



11 RECTANGULAR RAPID FLASHING BEACON (RRFB)
 SCALE: N.T.S.

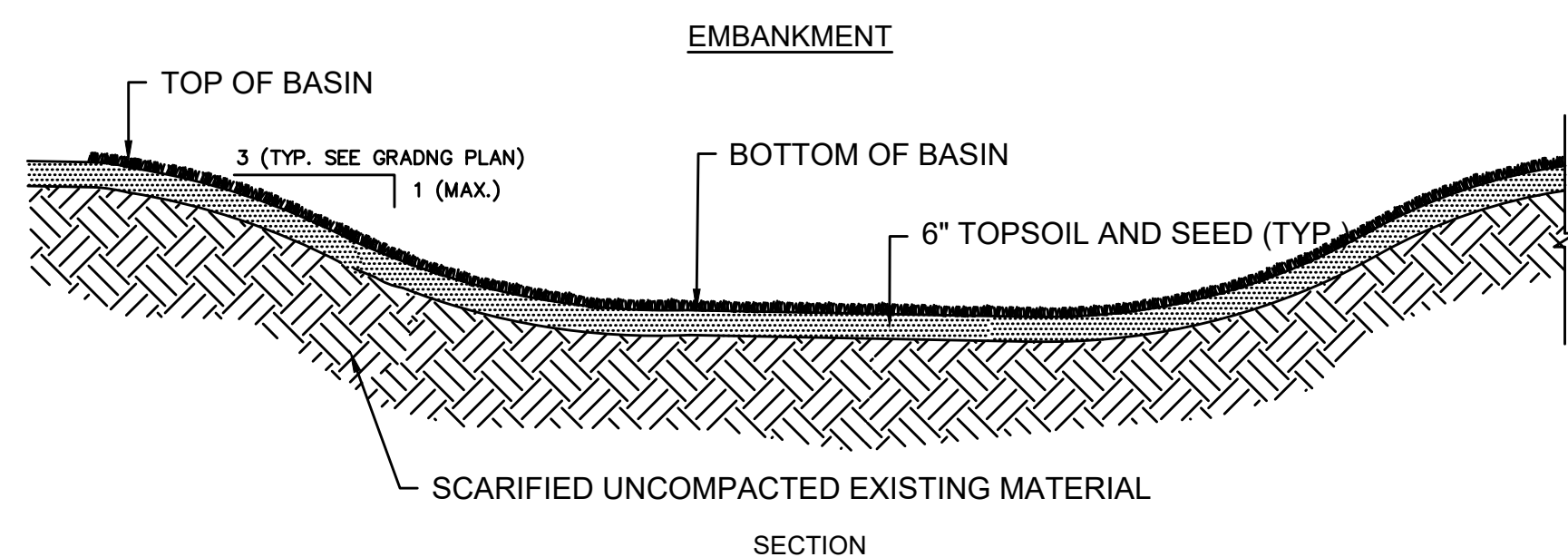


NOTES:

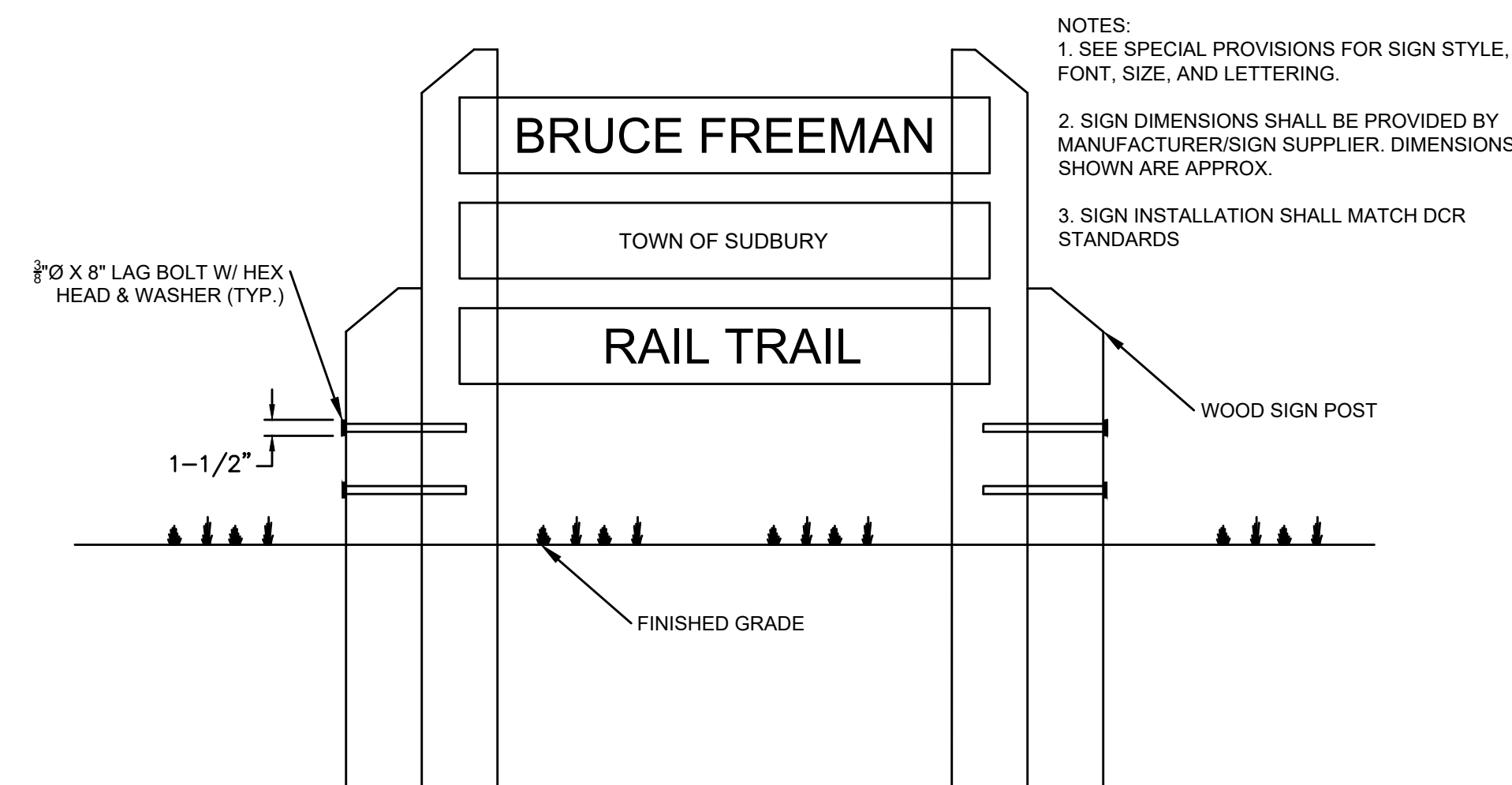
1. IMPERVIOUS MATERIAL FOR USE IN BASIN EMBANKMENT AREAS AND WHERE SHOWN ON THE PLANS SHALL BE COMPOSED OF CLAYS, SILTY CLAYS, OR CLAYEY SILTS. THE SOIL SHALL BE FREE OF RUBBISH, ICE, VEGETATIVE MATTER, LOAM, OR OTHER DEBRIS AND HAVE THE FOLLOWING GRADATION AS DEFINED BY A STANDARD SIEVE TEST (ASTM D422):

MIN. PERCENT PASSING (BY WT.)	SEIVE SIZE
100	3.5"
80-100	3/4"
40-90	No. 4
30-85	No. 40
25-75	No. 200

2. PERVIOUS BACKFILL MATERIAL FOR USE IN FILL AREAS ASSOCIATED WITH BASIN EMBANKMENTS SHALL BE COMPOSED OF ORDINARY BORROW MATERIAL (ITEM 150.) OR EXCAVATED MATERIAL FROM THE SITE DEEMED RE-USEABLE BY THE ENGINEER. SATISFACTORY ON-SITE MATERIAL SHALL HAVE SOIL CLASSIFICATION GROUPS OF GW, GP, GM, SW, SP, AND SM ACCORDING TO ASTM D 2487, OR A COMBINATION OF THESE GROUPS AND SHALL BE FREE OF ROCK OR GRAVEL LARGER THAN 3 INCHES (75 MM) IN ANY DIMENSION, DEBRIS, WASTE, FROZEN MATERIALS, VEGETATION, AND OTHER DELETERIOUS MATTER.

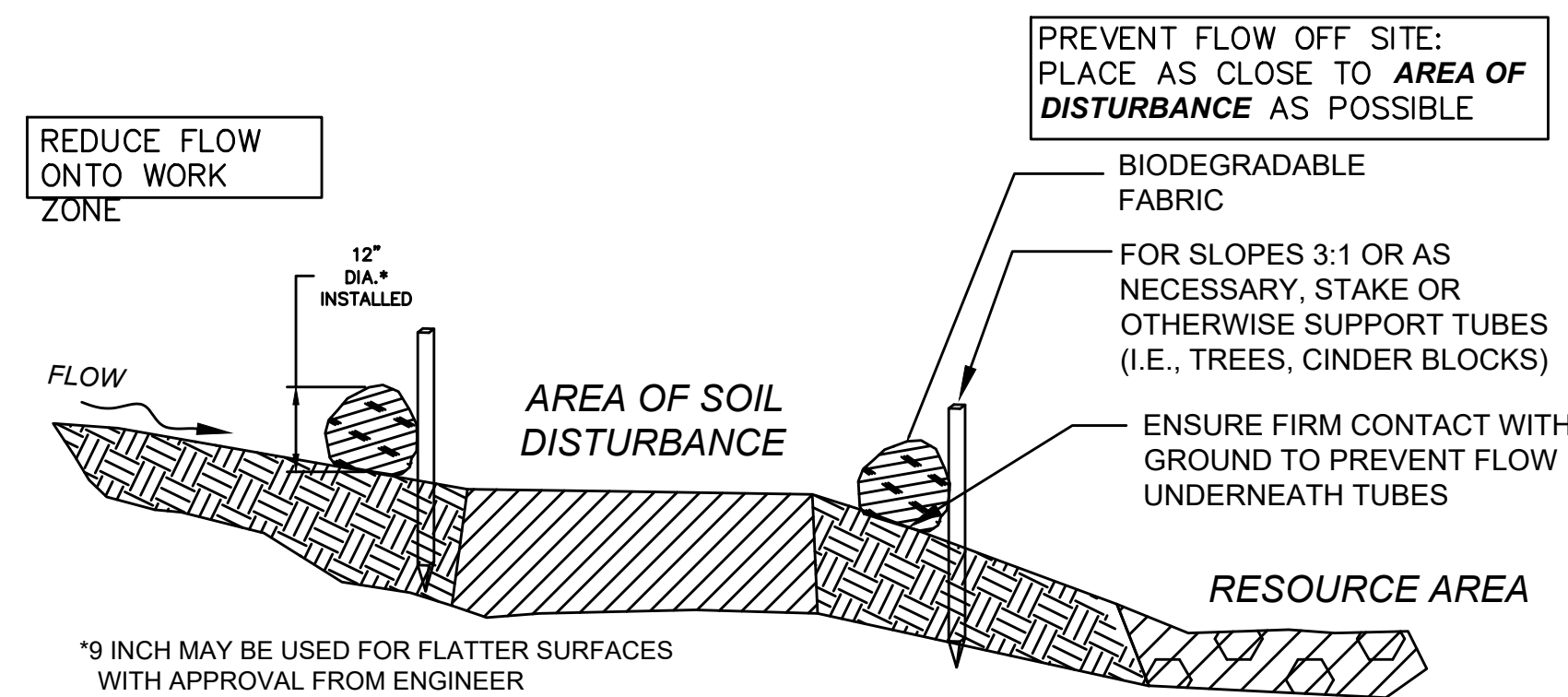


12 INFILTRATION BASIN
SCALE: N.T.S.



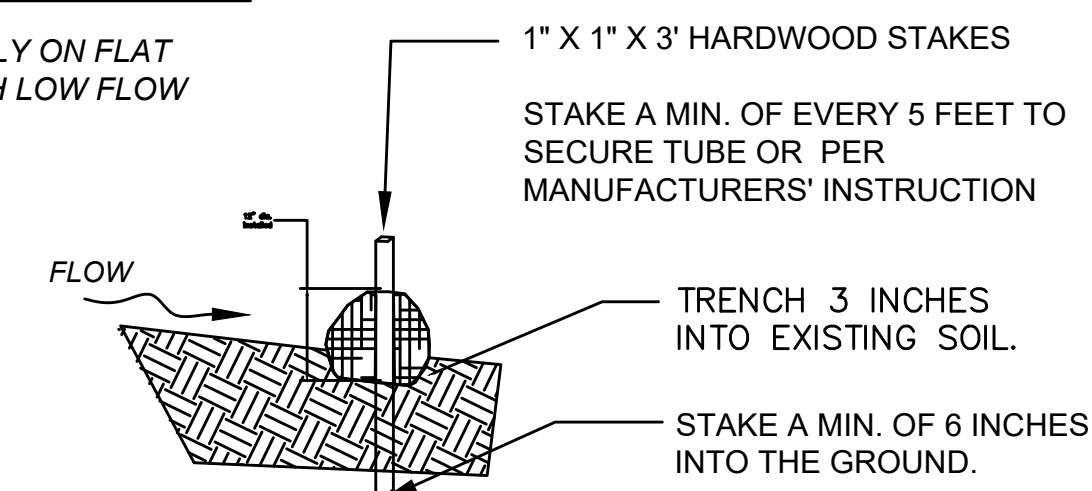
14 BRUCE FREEMAN RAIL TRAIL ENTRANCE SIGN
SCALE: N.T.S.

COMPOST FILTER TUBE

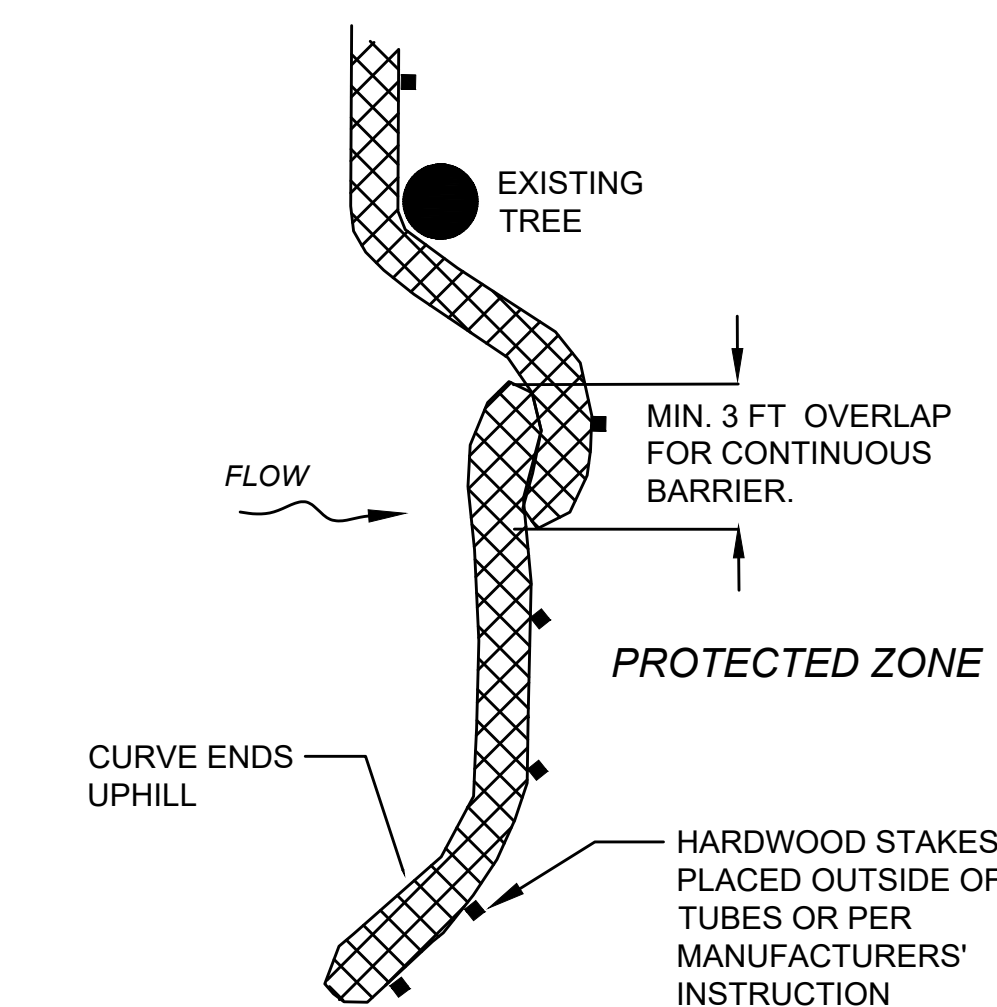


12 INCH STRAW WATTLE

TO BE USED ONLY ON FLAT SURFACES WITH LOW FLOW



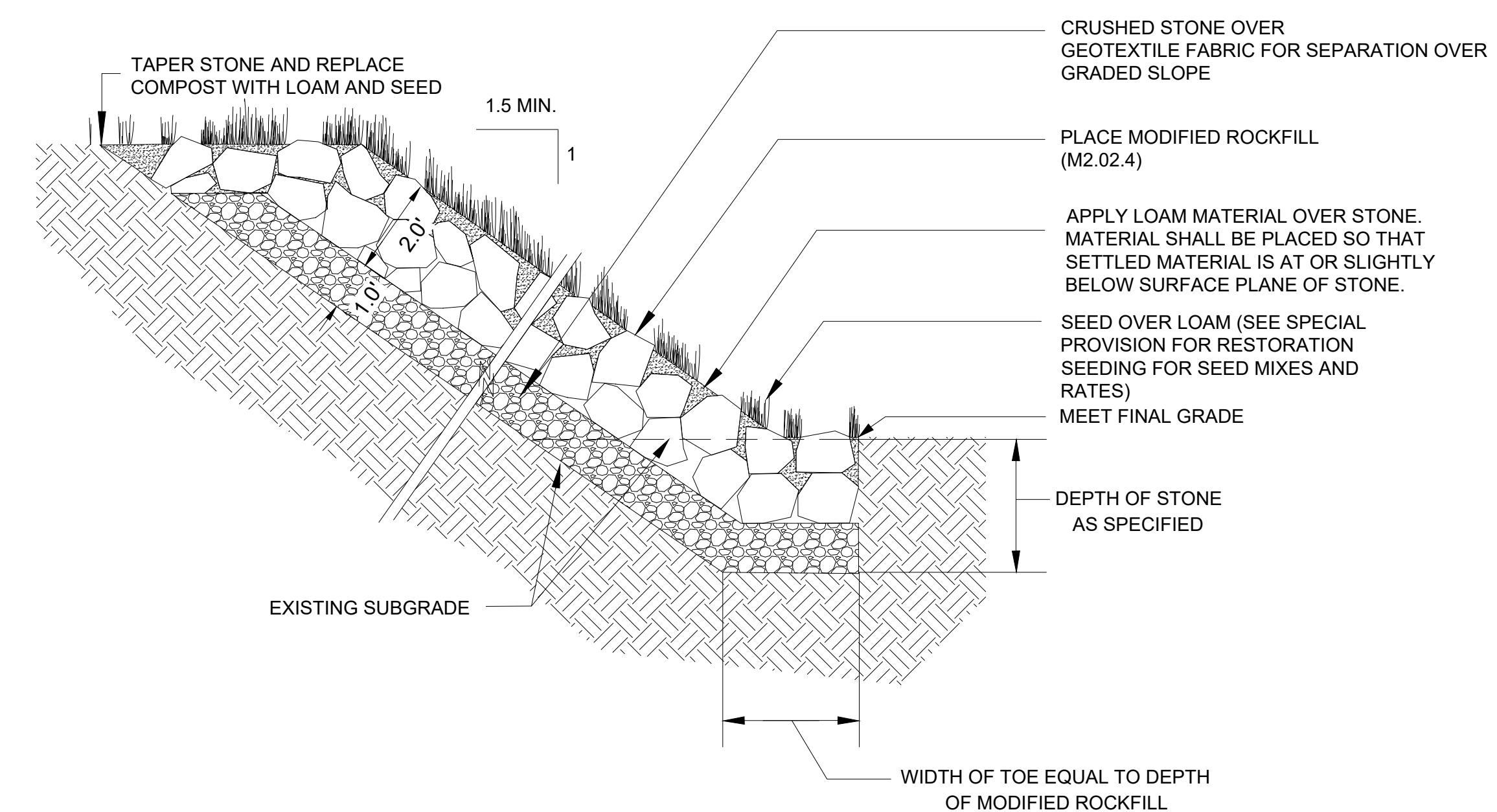
SECTION



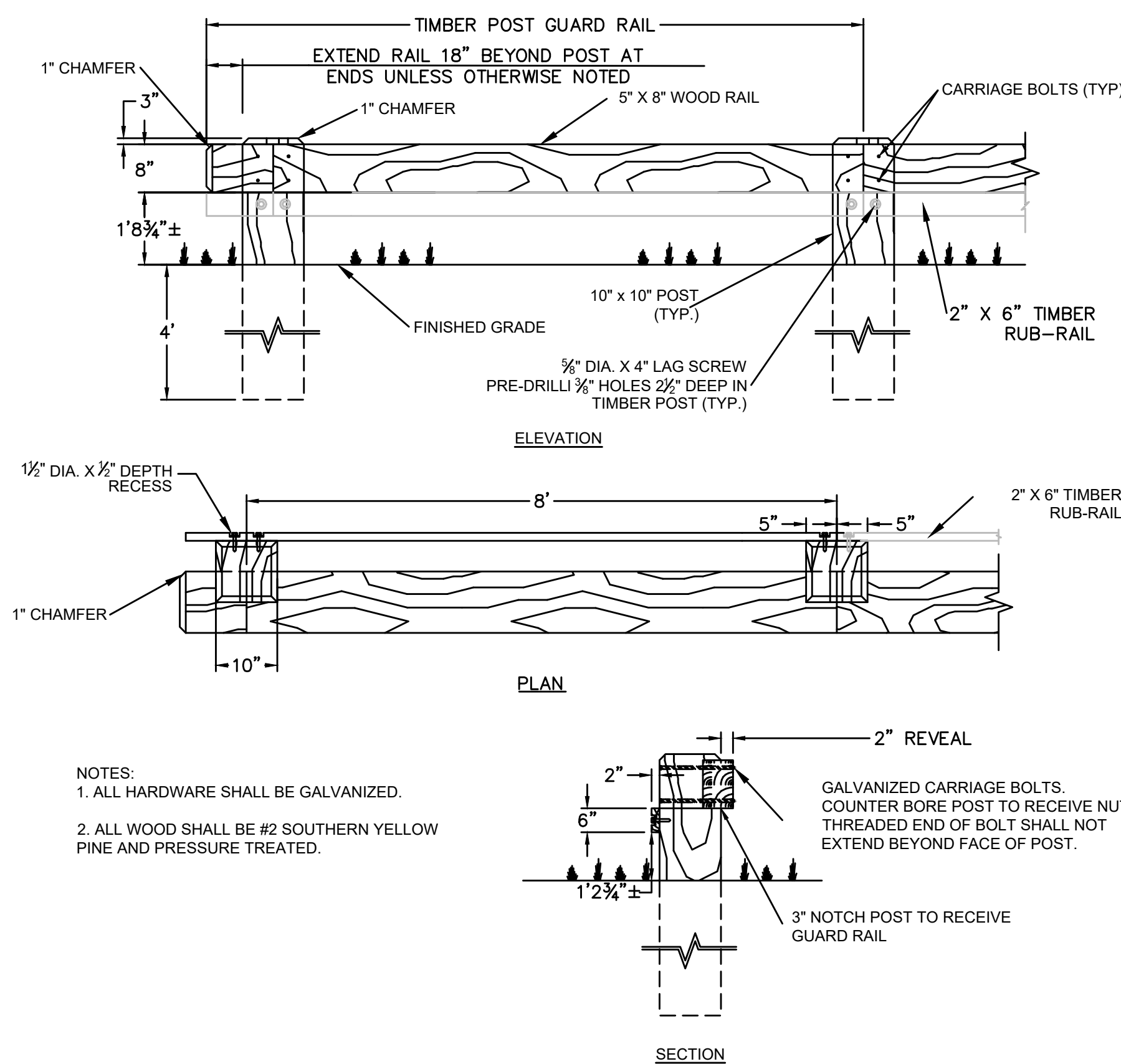
PLACE TUBE ALONG CONTOURS AND PERPENDICULAR TO FLOW.
ADJUST LOCATION AS REQUIRED FOR OPTIMUM EFFECTIVENESS. DO NOT INSTALL IN WATERWAYS.
PLACE STAKES AS NEEDED TO SECURE TUBES IN PLACE.

PLAN VIEW

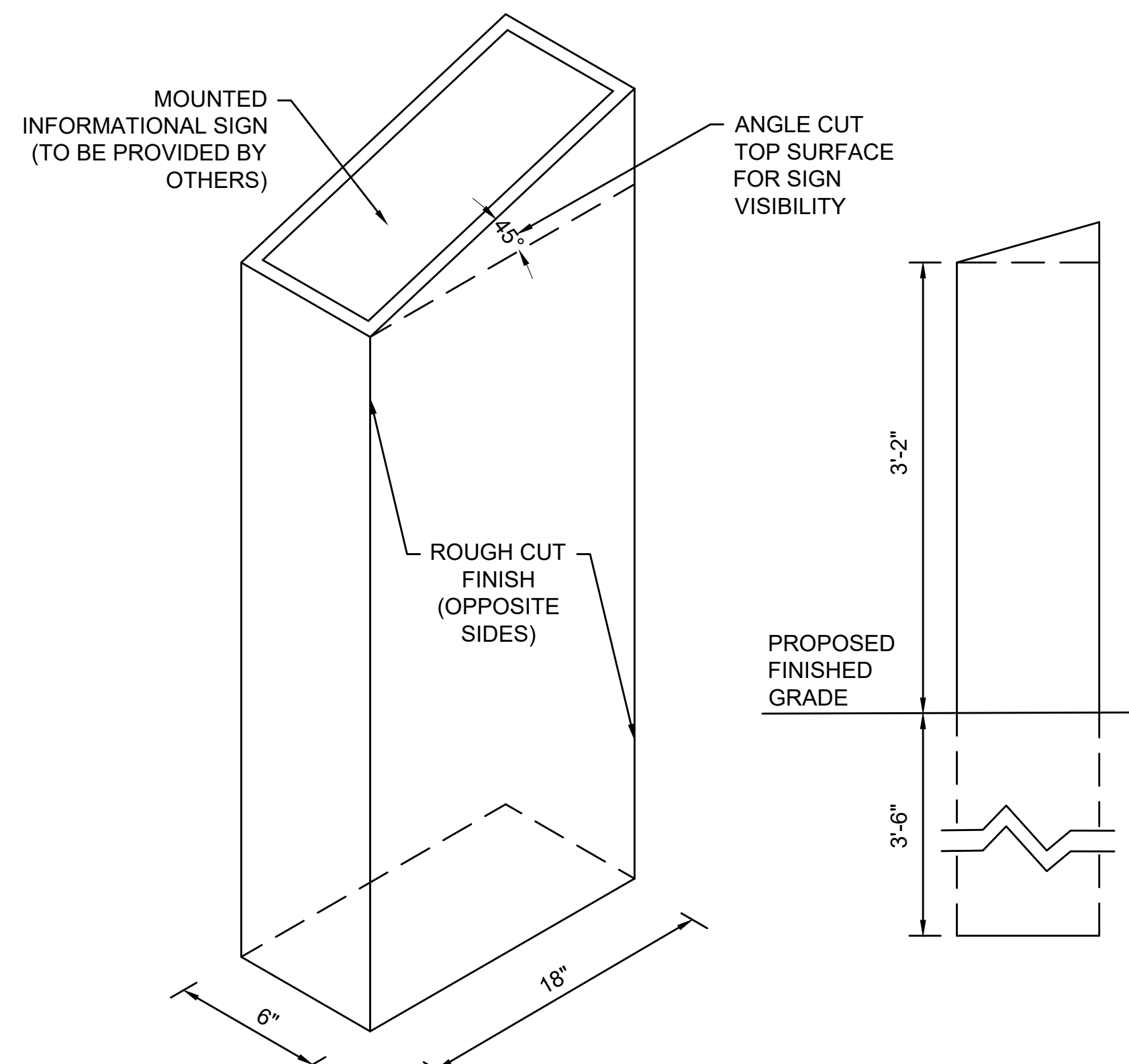
13 SEDIMENT BARRIERS – COMPOST FILTER TUBES
SCALE: N.T.S.



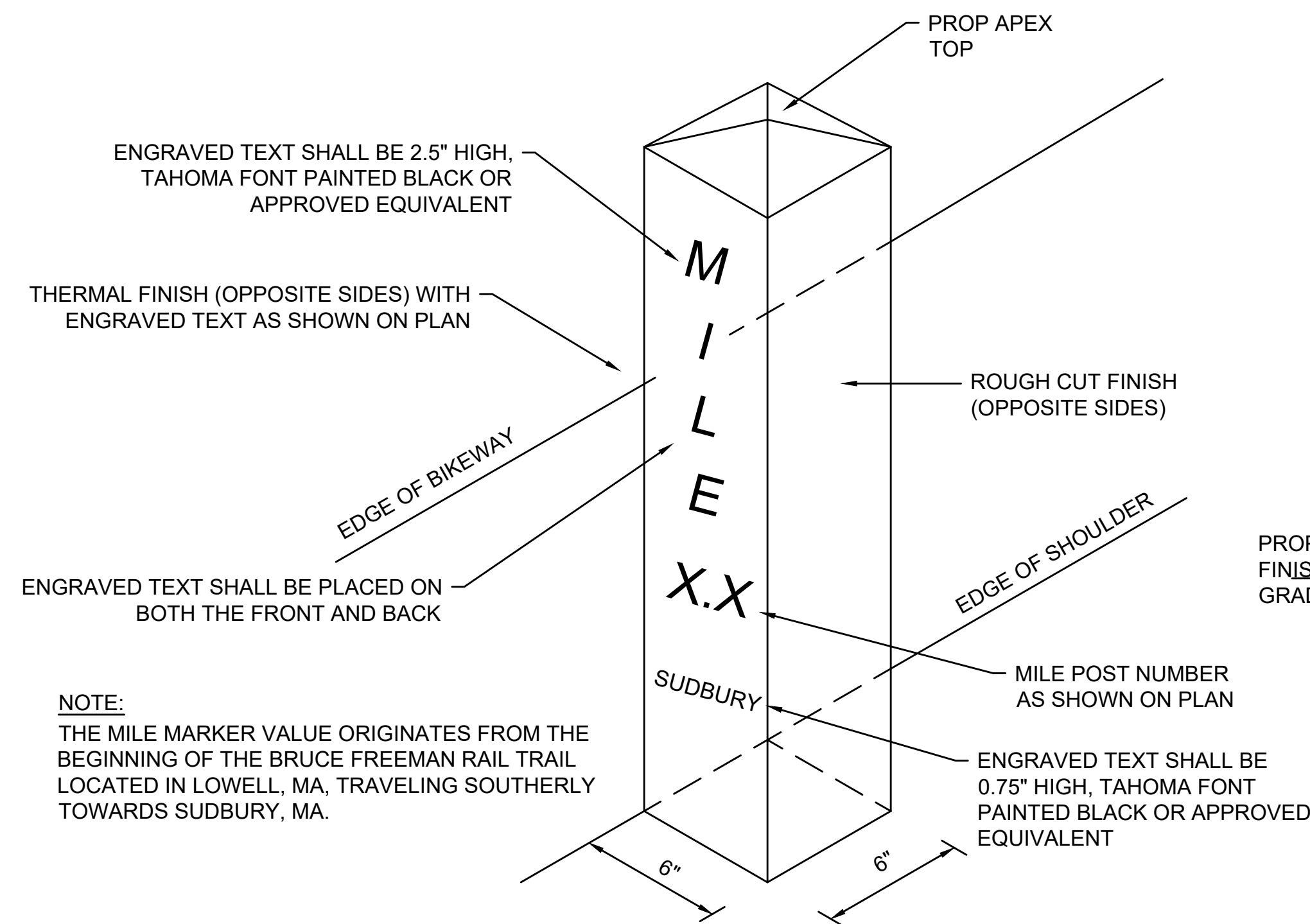
15 LOAM AND SEED OVER MODIFIED ROCKFILL
SCALE: N.T.S.



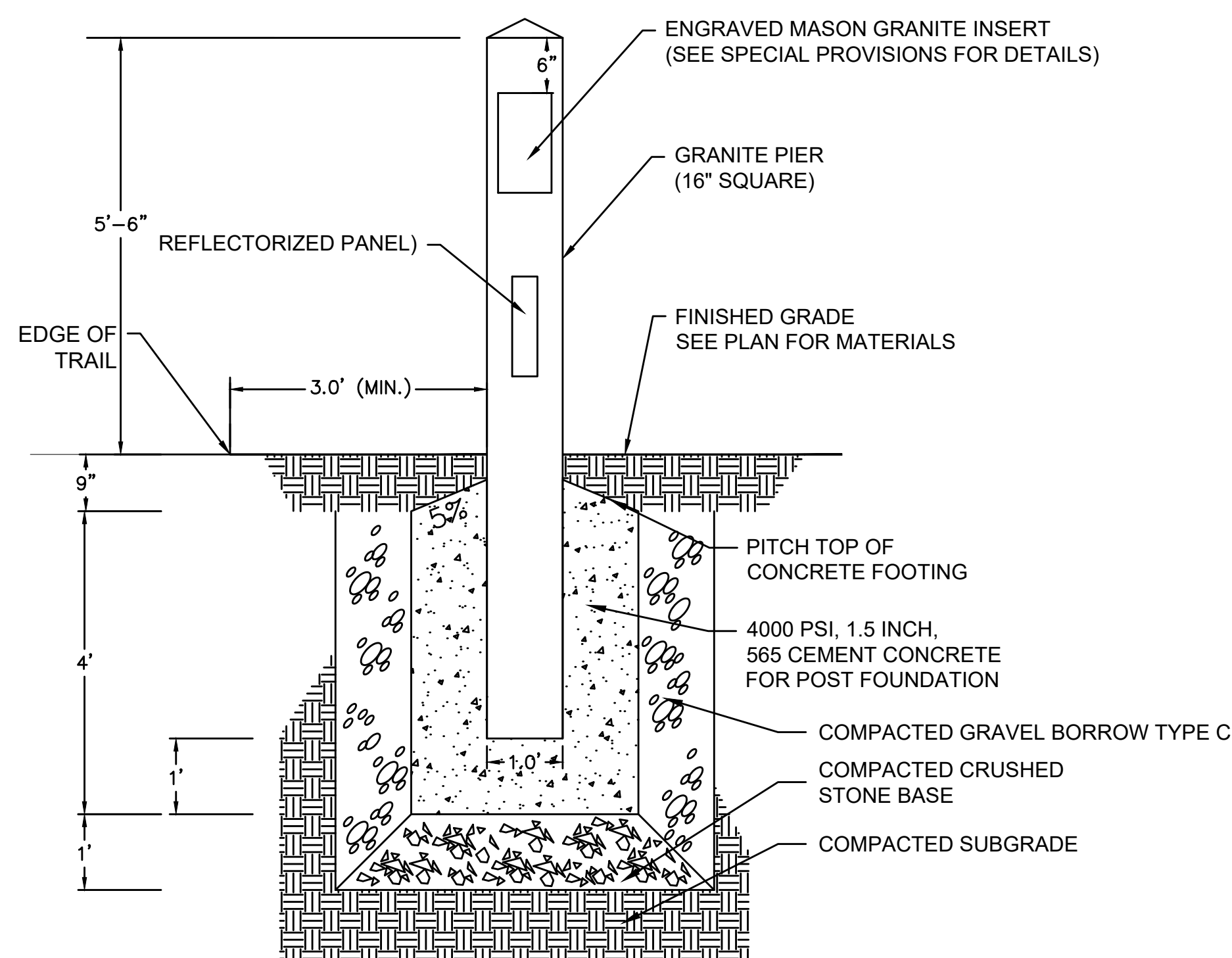
16 **TIMBER POST GUARDRAIL**
SCALE: N.T.S.



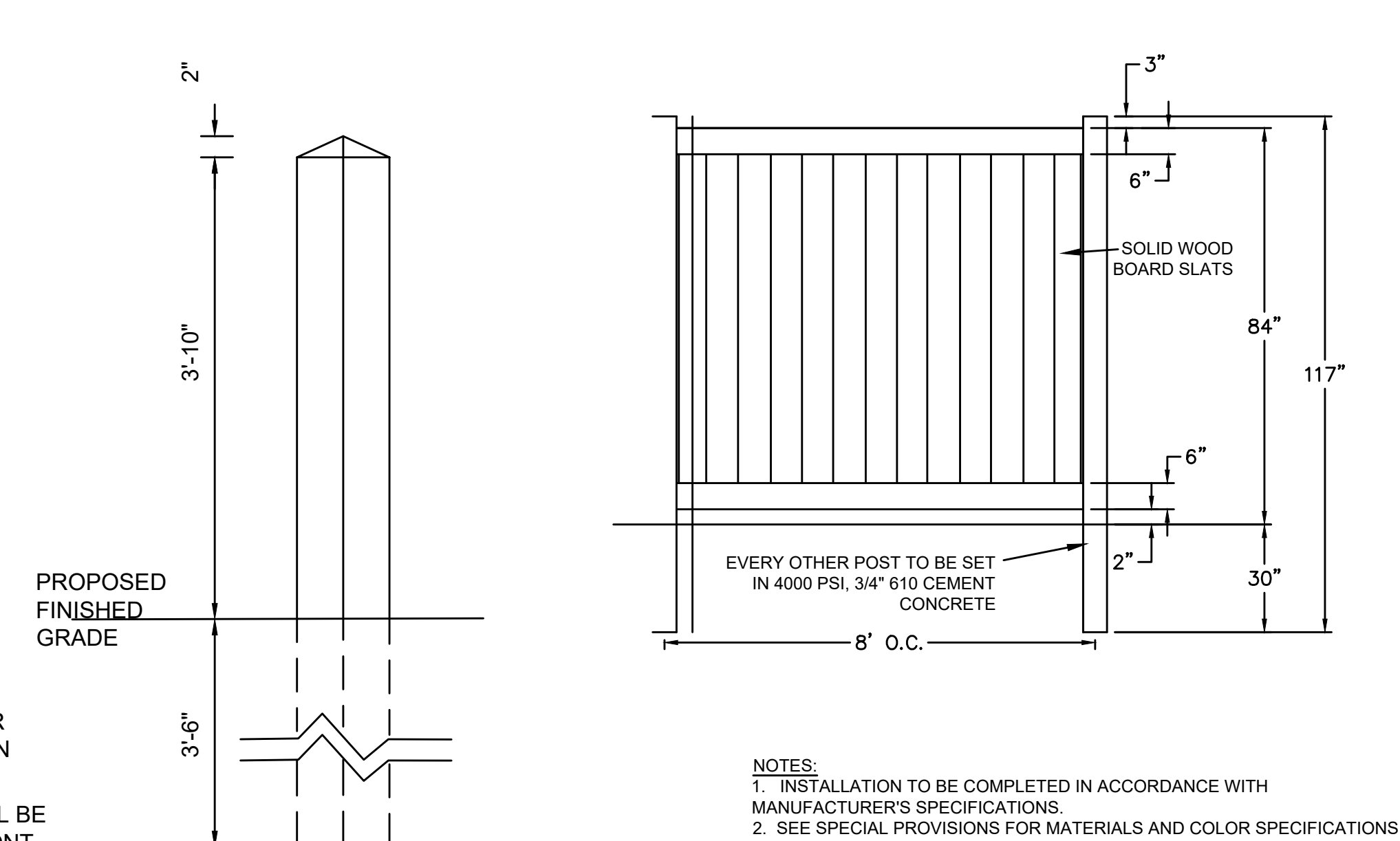
19 **GRANITE POST INTERPRETIVE SIGN**
SCALE: N.T.S.



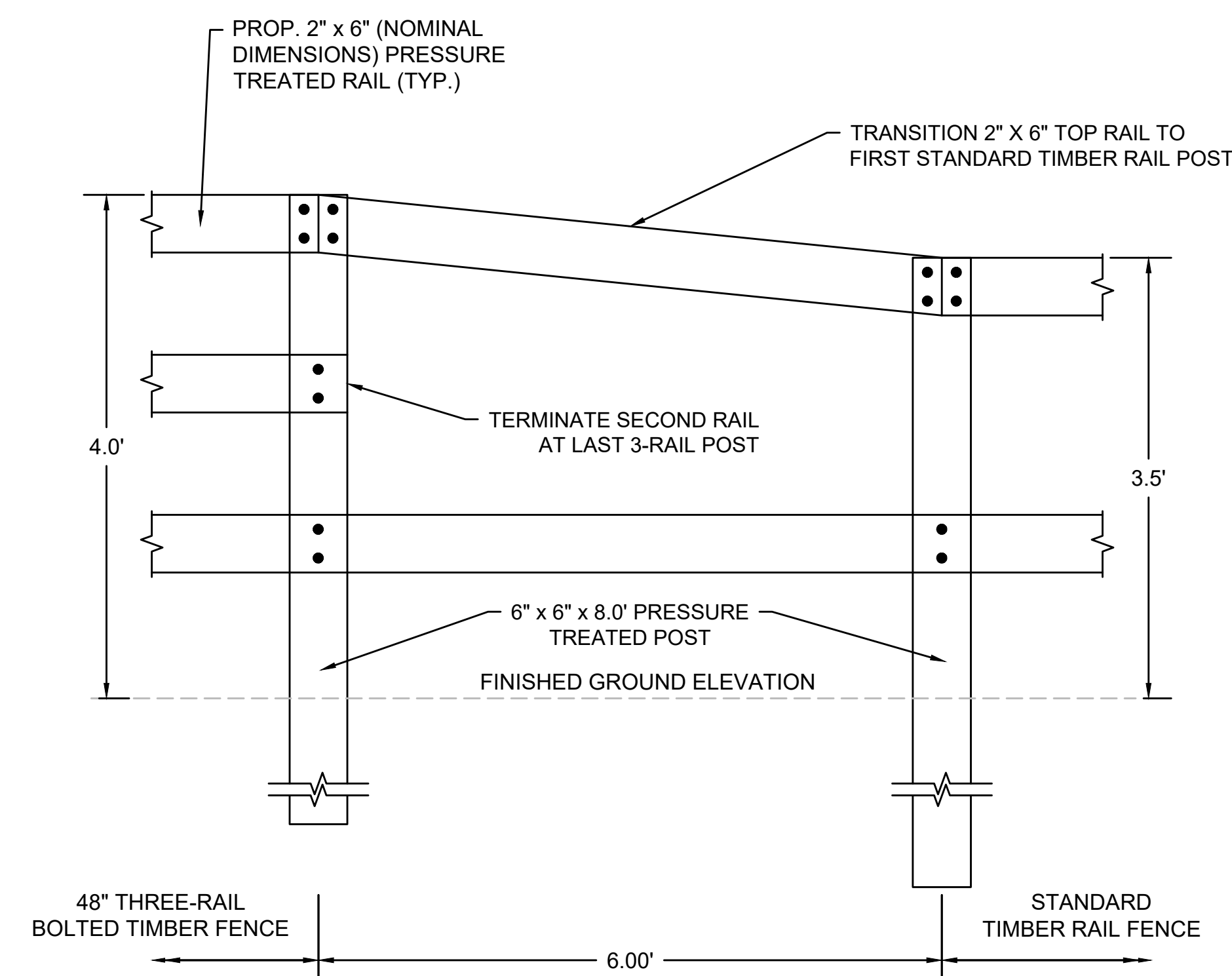
17 **GRANITE MILE MARKER**
SCALE: N.T.S.



20 **GRANITE BRUCE FREEMAN RAIL TRAIL PIER**
SCALE: N.T.S.



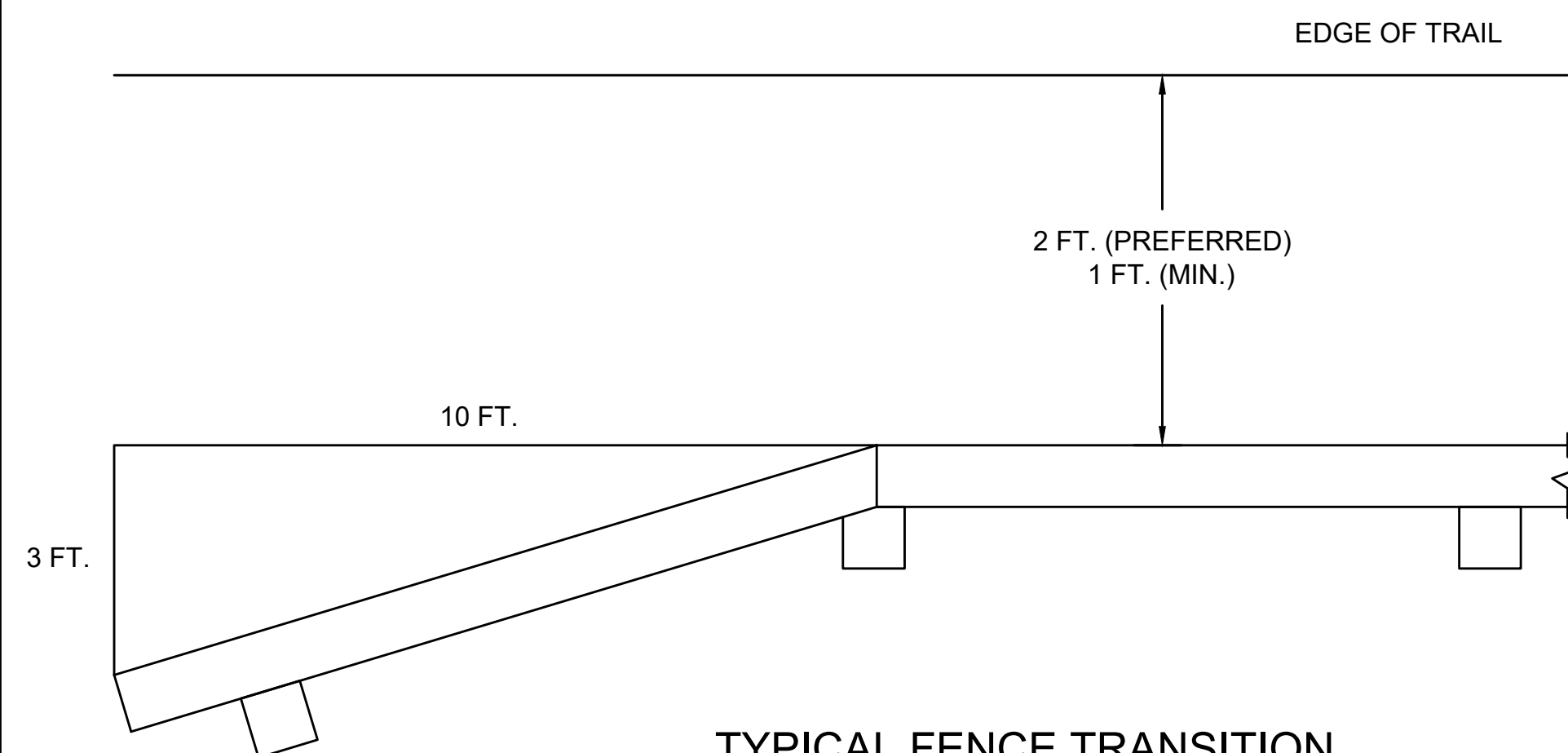
18 **STOCKADE FENCE**
SCALE: N.T.S.



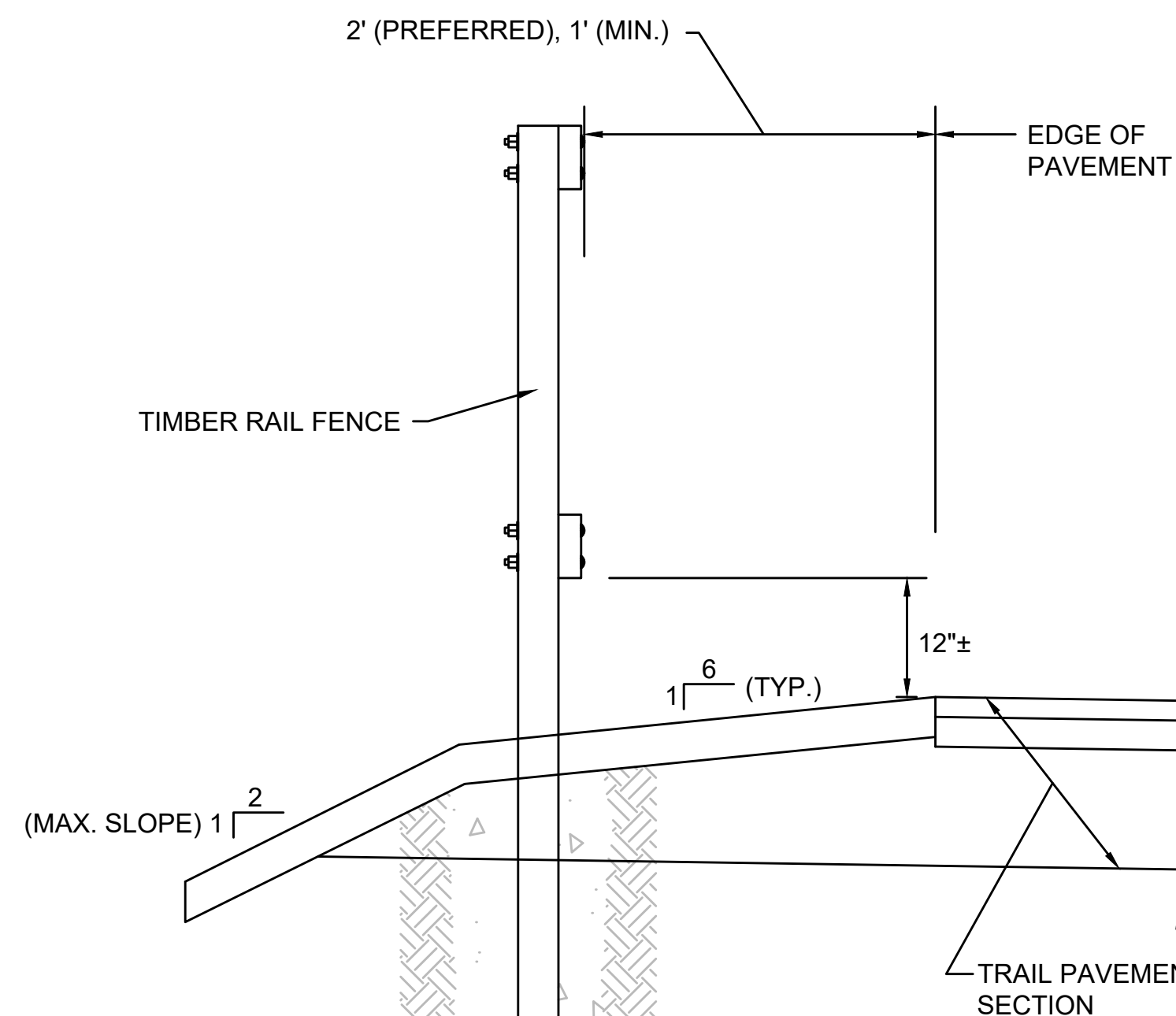
21 **48\"/>**

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	209	318
PROJECT FILE NO.		608164	

CONSTRUCTION DETAILS



**TYPICAL FENCE TRANSITION
AT FENCE APPROACHES**
N.T.S.

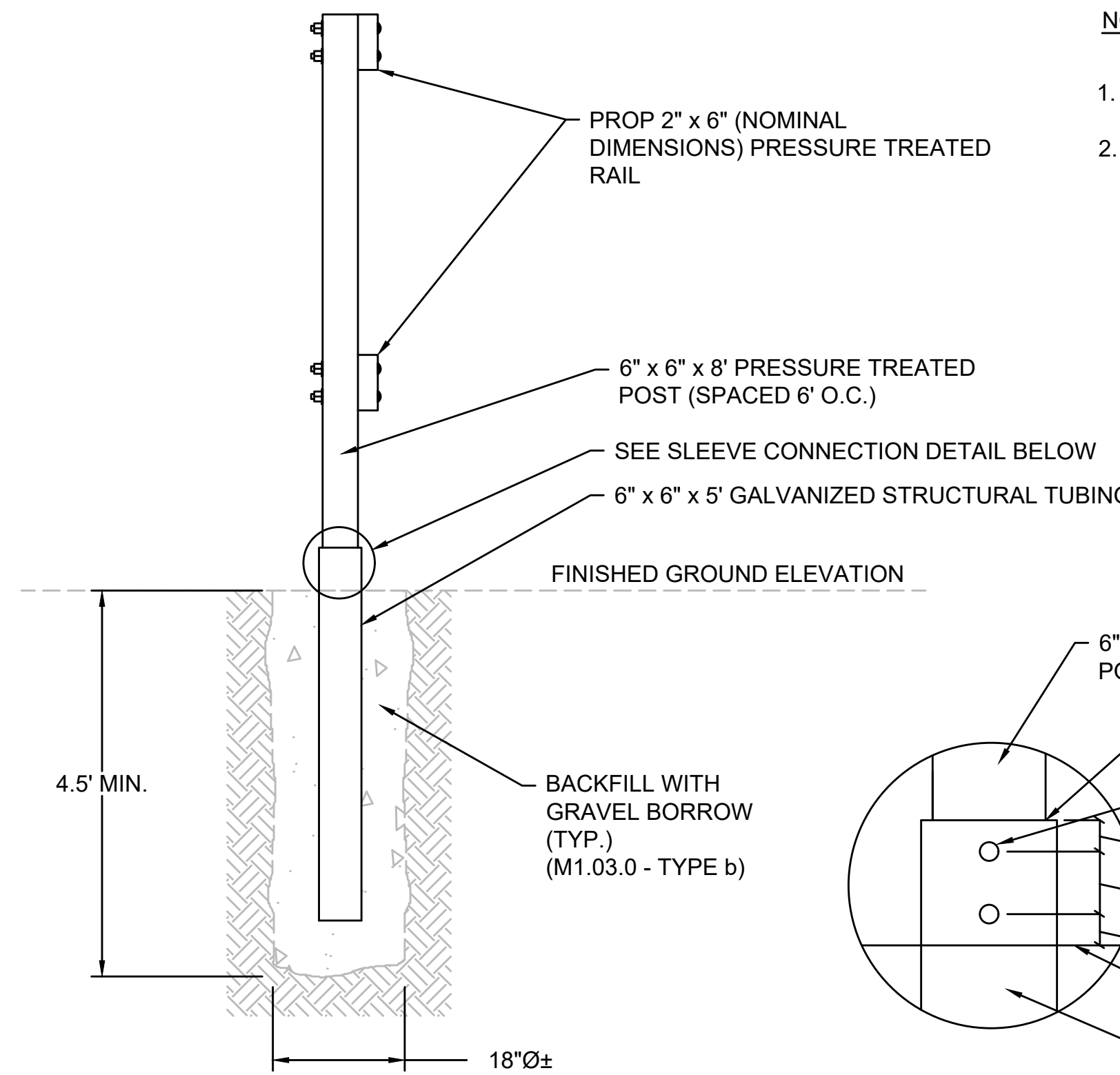


SECTION A-A

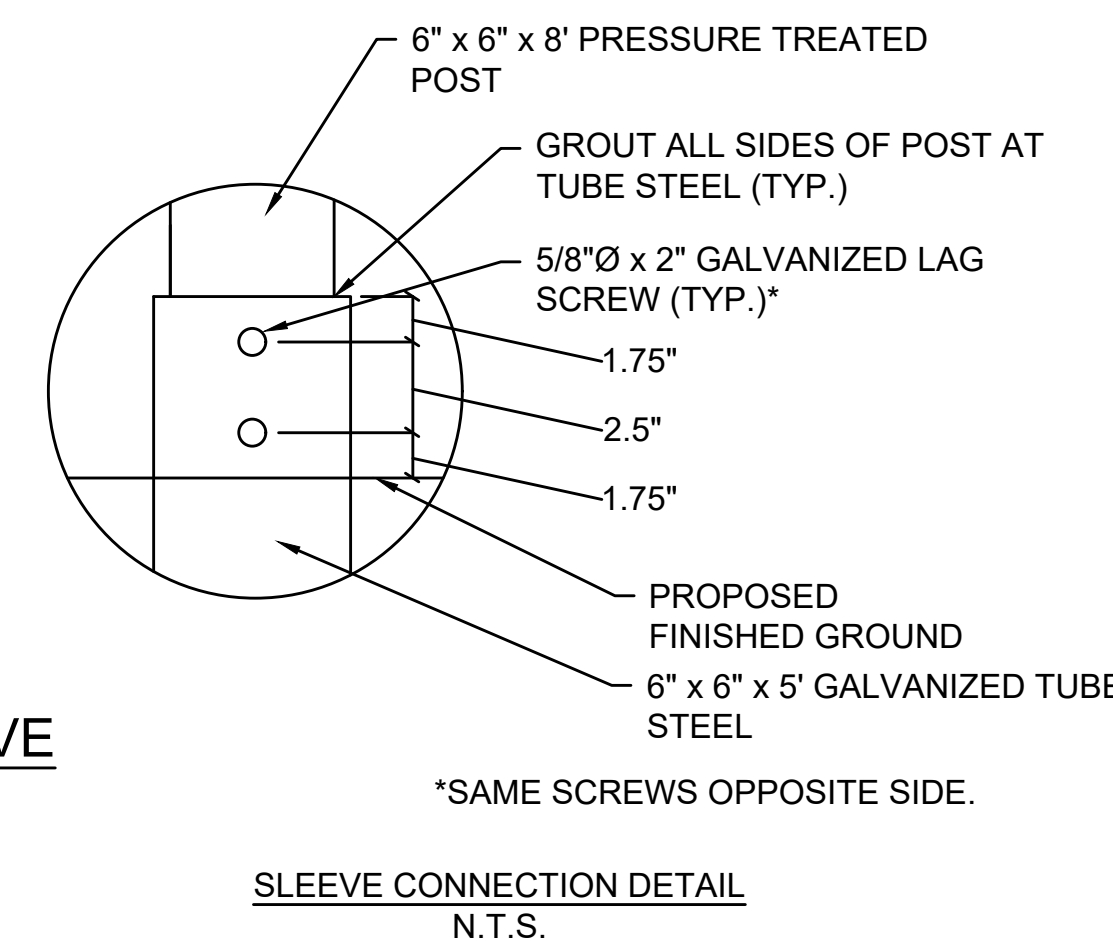
SUGGESTED TIMBER RAIL FENCE CONSTRUCTION SEQUENCE

1. AUGER OR DIG POST HOLE TO REQUIRED DIMENSIONS.
2. IF GROUND IS SATURATED, USE TUBE STEEL SLEEVE. SEE DETAIL ON THIS SHEET.
3. BACKFILL BOTTOM 6"± OF HOLE WITH GRAVEL AND COMPACT THOROUGHLY.
4. SET POST AND HOLD PLUMB DURING BACKFILLING.
5. BACKFILL WITH GRAVEL IN 12" LIFTS. COMPACT EACH LIFT THOROUGHLY.
6. CLAMP RAILS TO POSTS AND FIELD DRILL BOLT HOLES.
7. SET BOLTS, WASHERS AND NUTS.

22 **TIMBER FENCE (TWO-RAIL)**
SCALE: N.T.S.
SEE PLANS FOR LOCATIONS



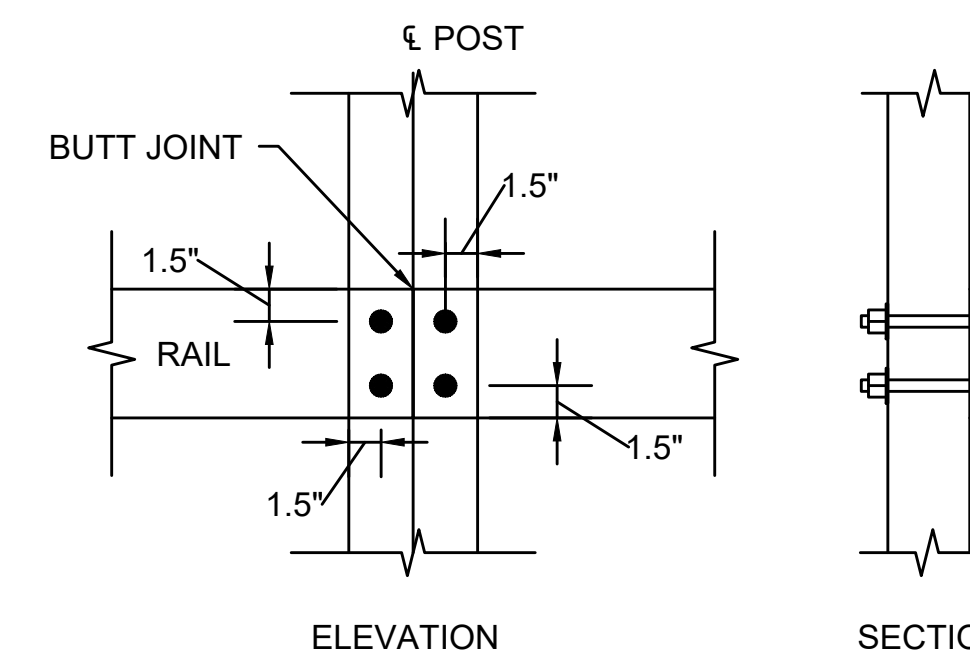
**TIMBER FENCE (TWO-RAIL) FENCE TUBE STEEL SLEEVE
(FOR USE IN SATURATED LOCATIONS AND
THROUGH WEST CONCORD CENTER)**
N.T.S.



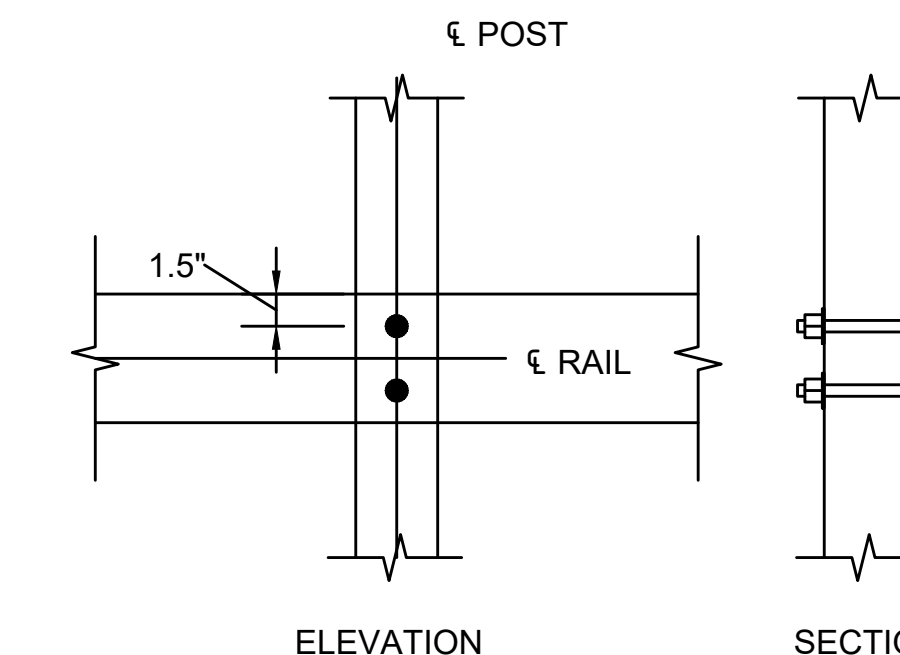
SLEEVE CONNECTION DETAIL
N.T.S.

NOTES:

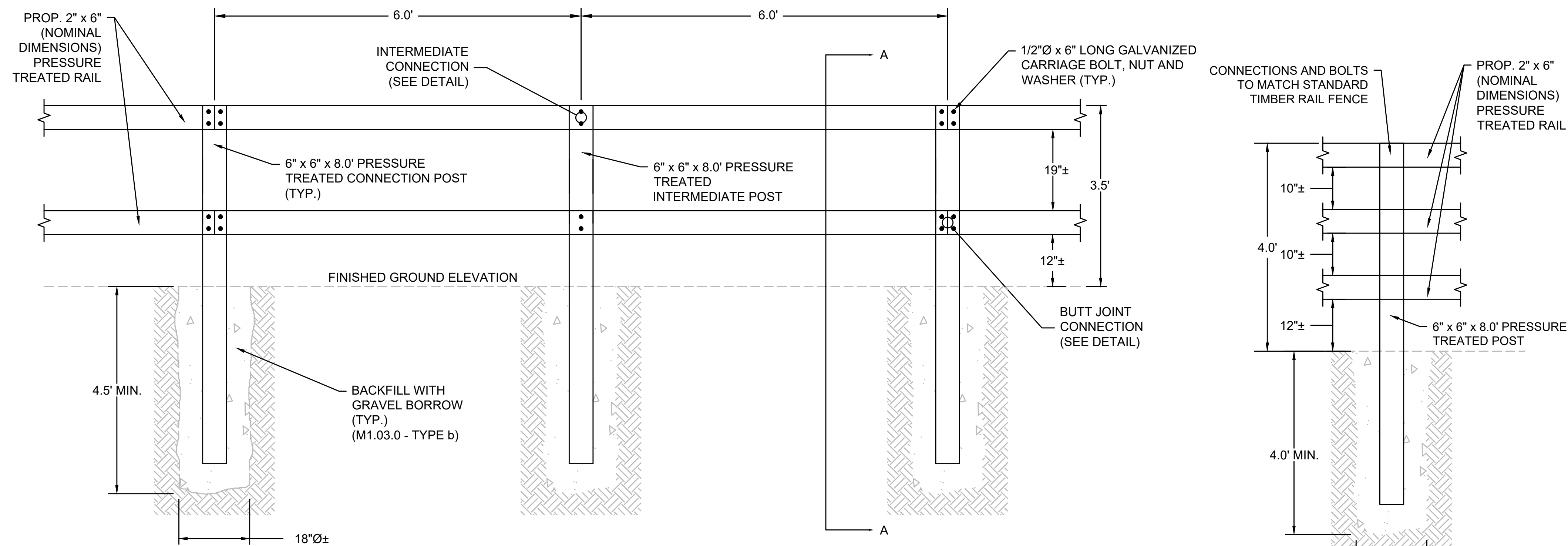
1. TIMBER PRESERVATIVES SHALL BE USED ON ALL WOOD TIMBER.
2. ALL CUT ENDS SHALL BE PAINTED WITH PRESERVATIVE IN THE FIELD PER MANUFACTURERS DIRECTION.



BUTT JOINT CONNECTION
N.T.S.



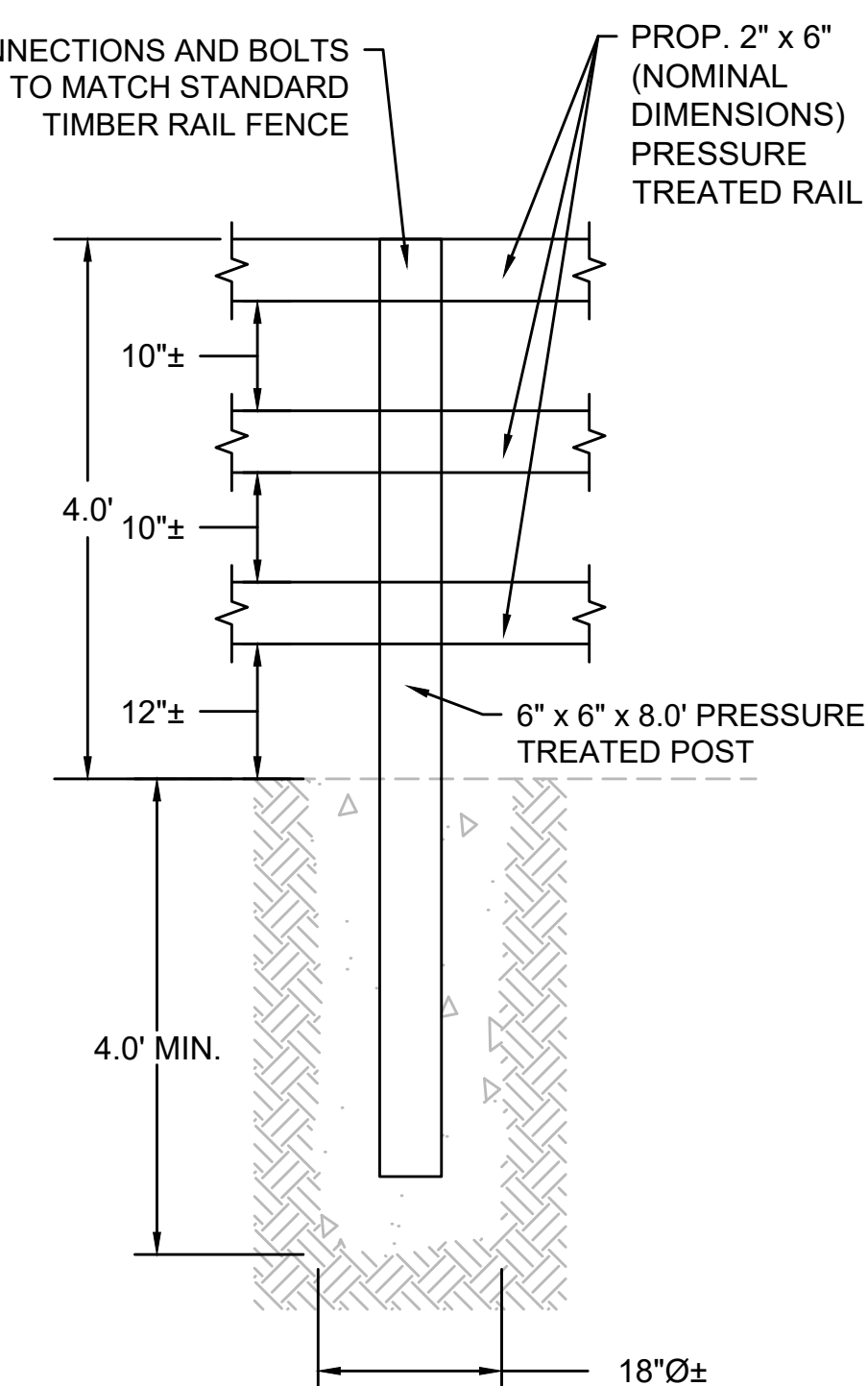
INTERMEDIATE CONNECTION
N.T.S.



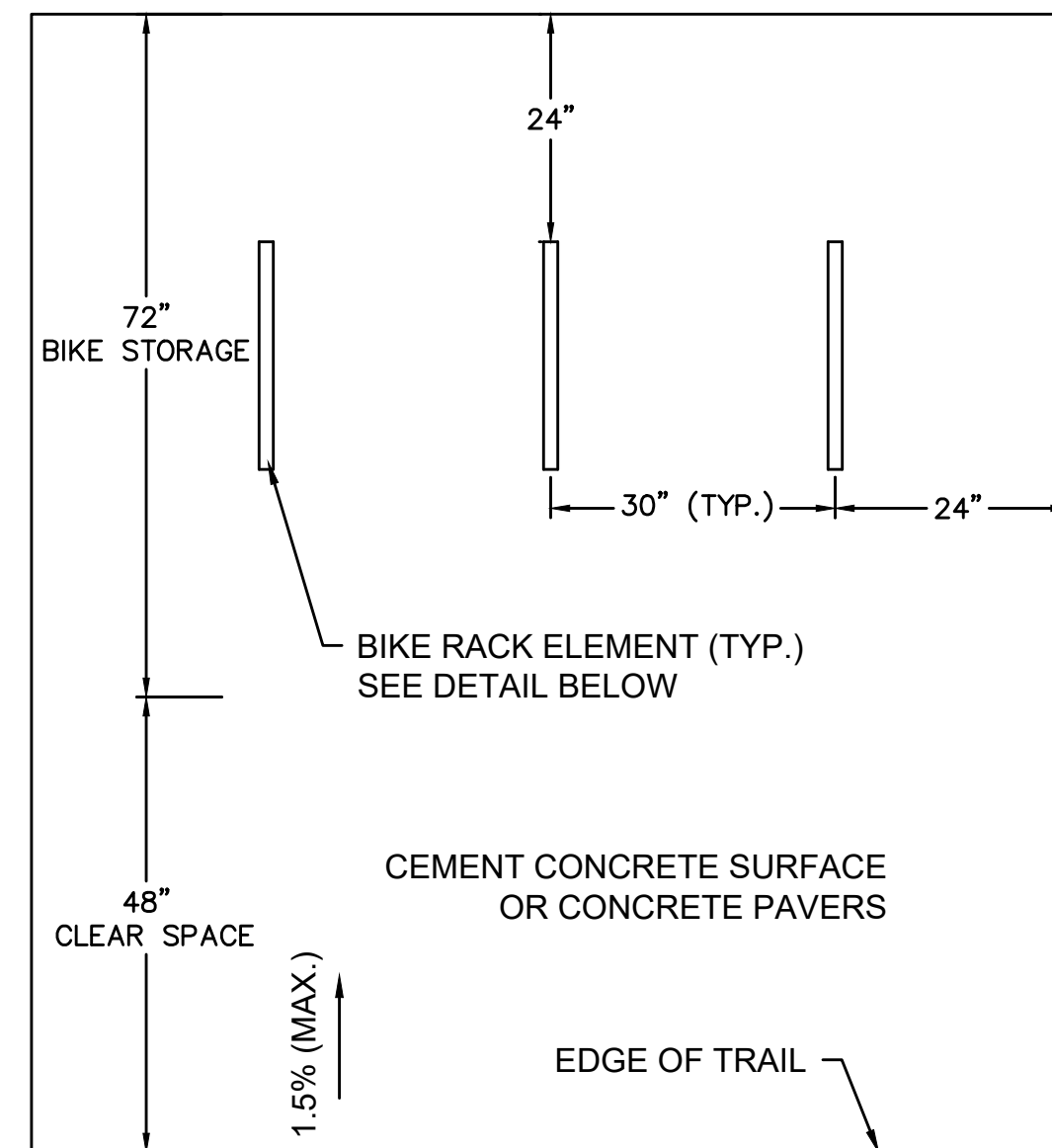
TIMBER FENCE (TWO RAIL) ELEVATION
N.T.S.

NOTES:

1. FOR RADII LESS THAN 165', USE CONNECTION POSTS SET AT 6.0' O.C. AND SHORTEN RAILS ACCORDINGLY.

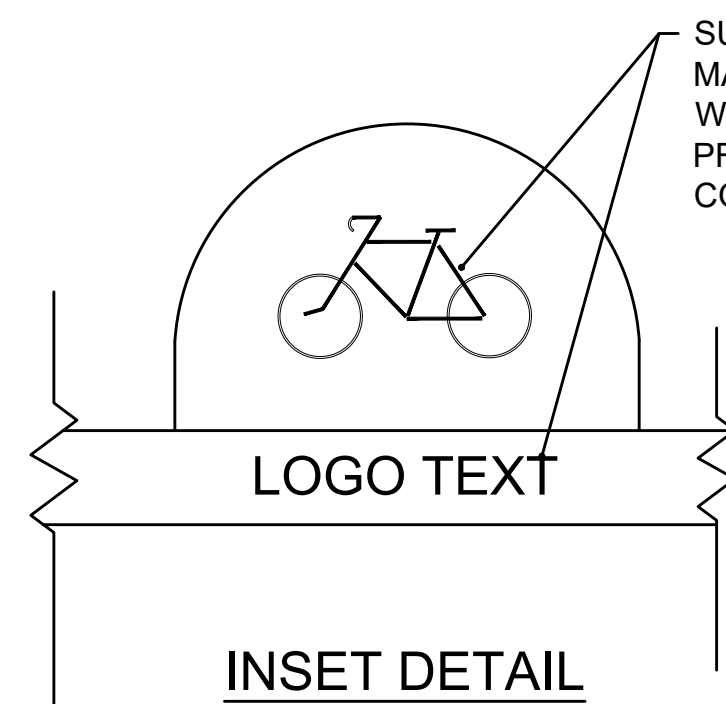


**48" THREE-RAIL BOLTED
TIMBER FENCE ELEVATION**
N.T.S.



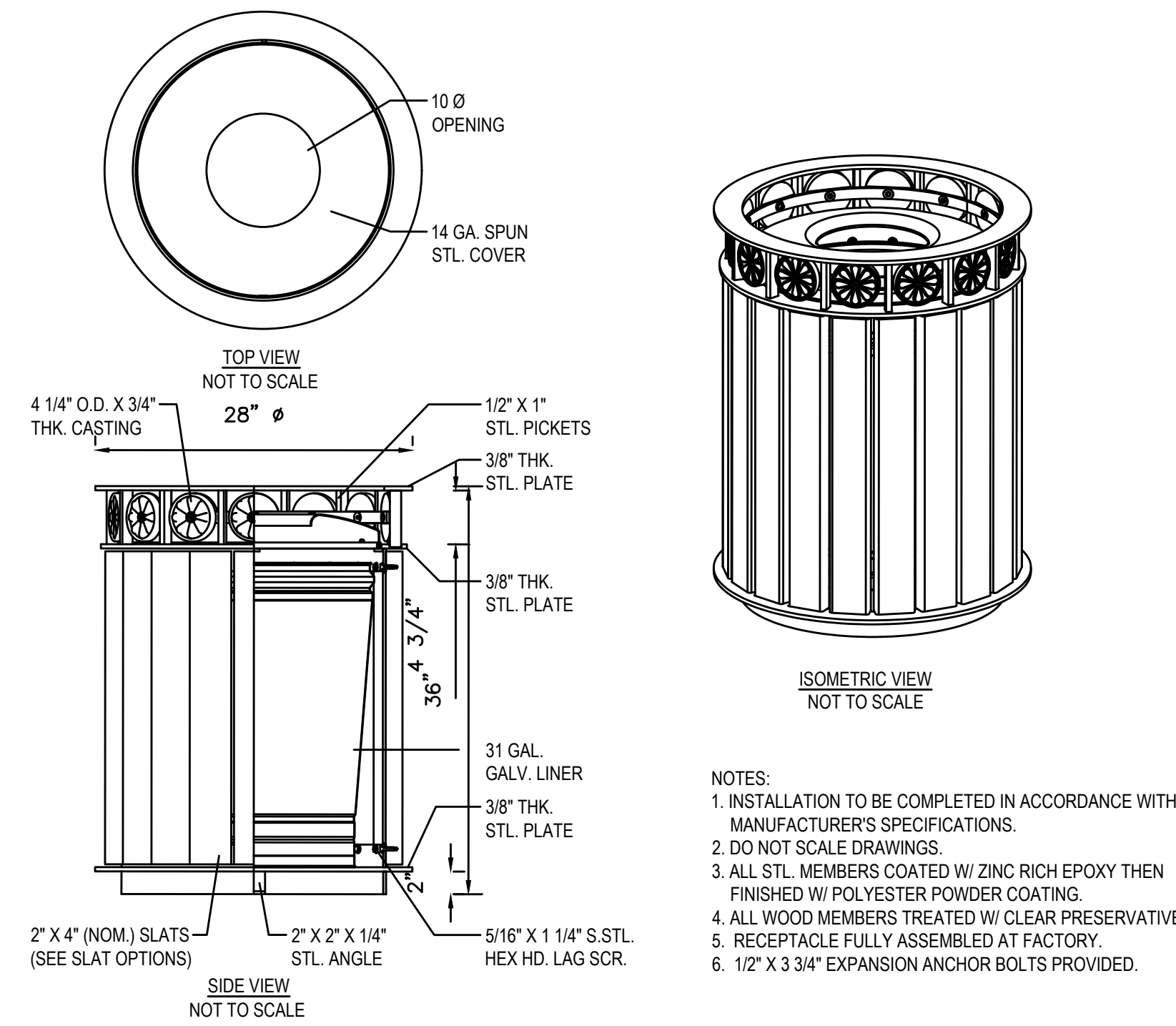
NOTES:
• SEE PLANS FOR QUANTITY OF BIKE RACK ELEMENTS

BICYCLE RACK PLACEMENT



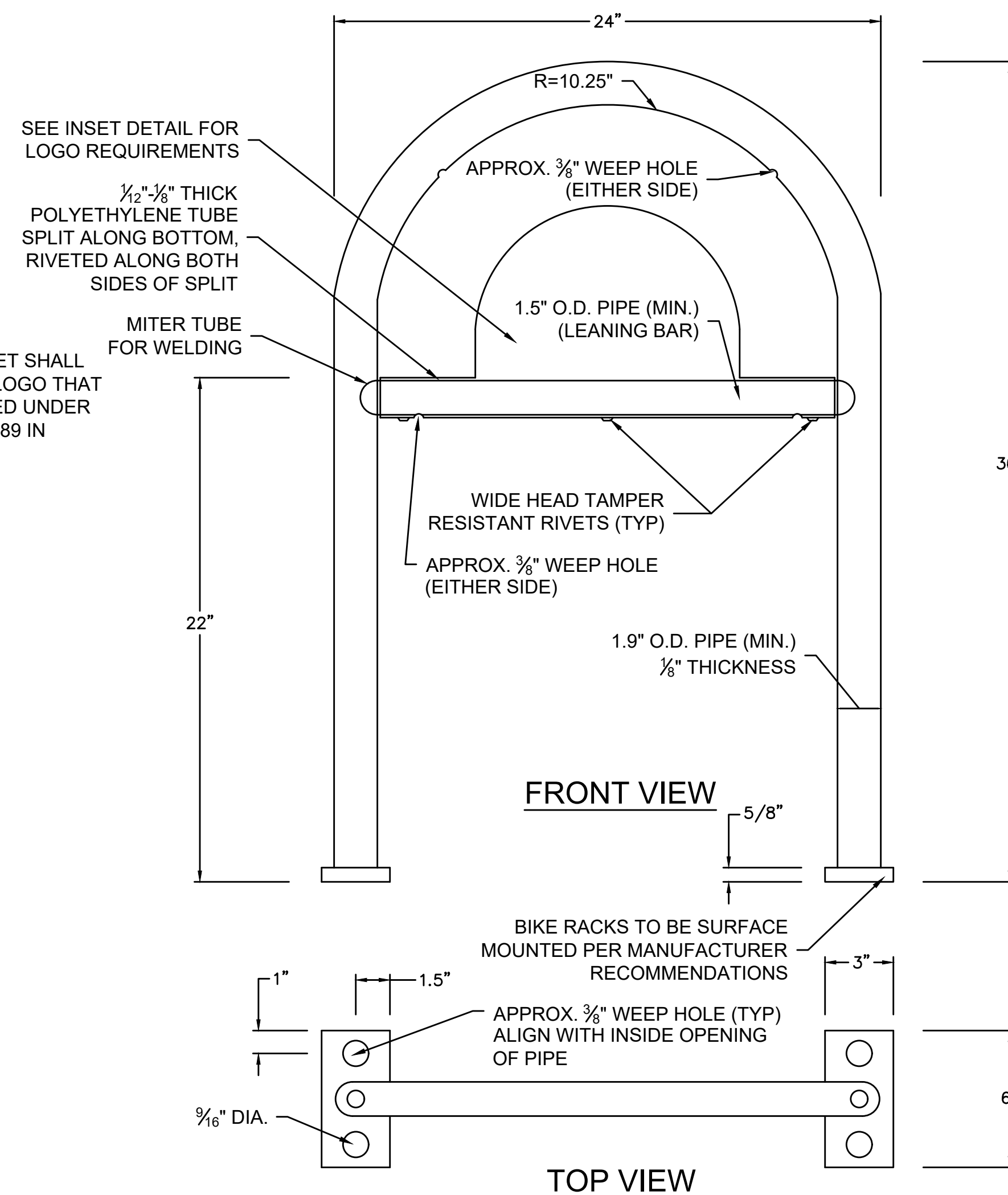
NOTES:
1. EACH BIKE RACK SHALL INCLUDE A LASER-CUT LOGO. LOGO DETAIL TO BE PROVIDED BY THE TOWN OF SUDBURY.
2. DIMENSIONS ARE APPROXIMATE AND WILL BE DETERMINED IN COORDINATION WITH THE MANUFACTURER. BIKE RACK ELEMENTS TO BE OF THE INVERTED "U".
3. EACH BIKE RACK SHALL ACCOMMODATE TWO BICYCLES.
4. ALL POSTS AND HARDWARE SHALL BE FACTORY COATED FEDERAL GREEN (SEE SPECIAL PROVISIONS)

25 BICYCLE RACK
SCALE: N.T.S.



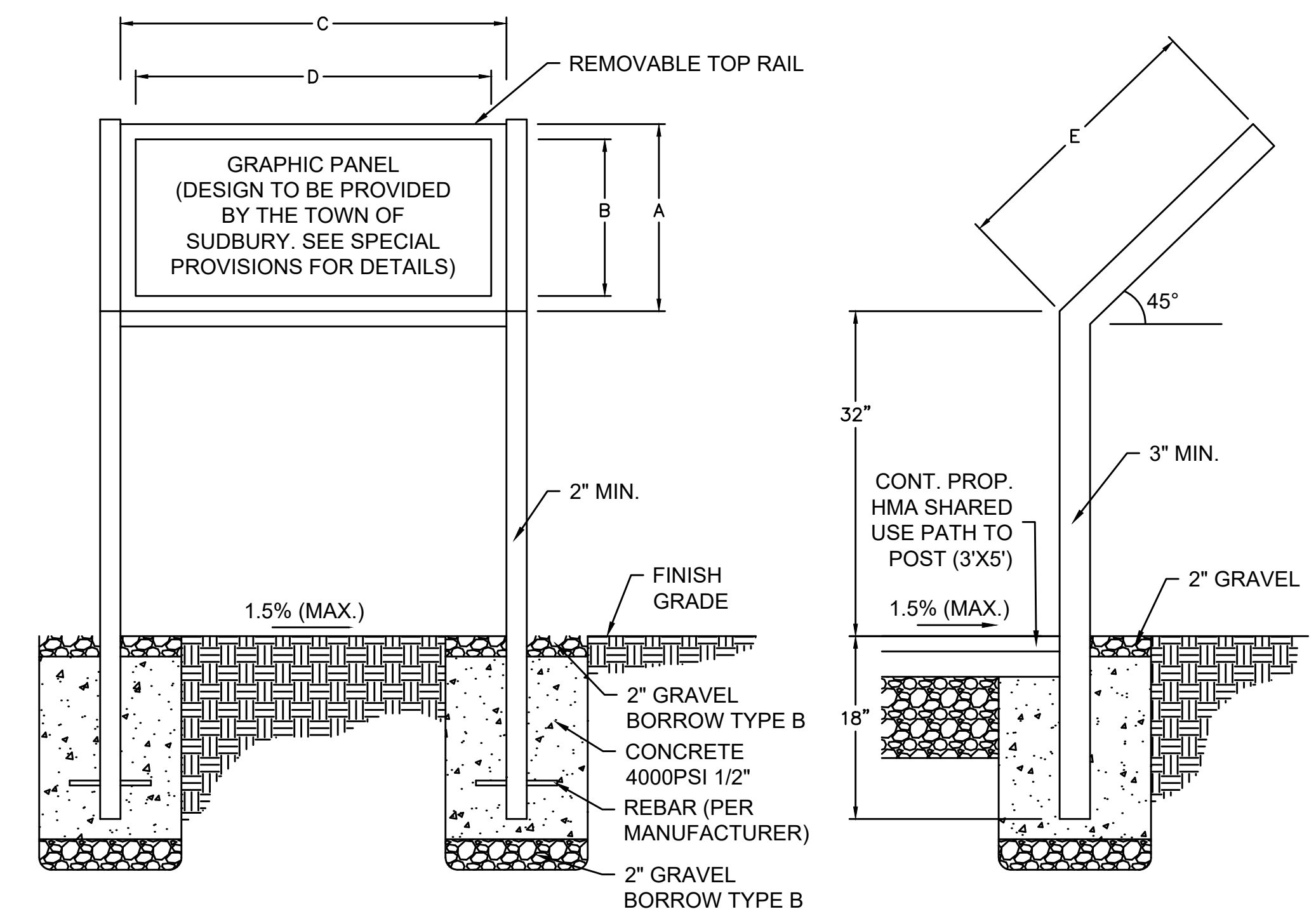
NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.
3. ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
4. ALL WOOD MEMBERS TREATED W/ CLEAR PRESERVATIVE.
5. RECEPTACLE FULLY ASSEMBLED AT FACTORY.
6. 1/2" X 3/4" EXPANSION ANCHOR BOLTS PROVIDED.

23 TRASH RECEPTACLE
SCALE: N.T.S.



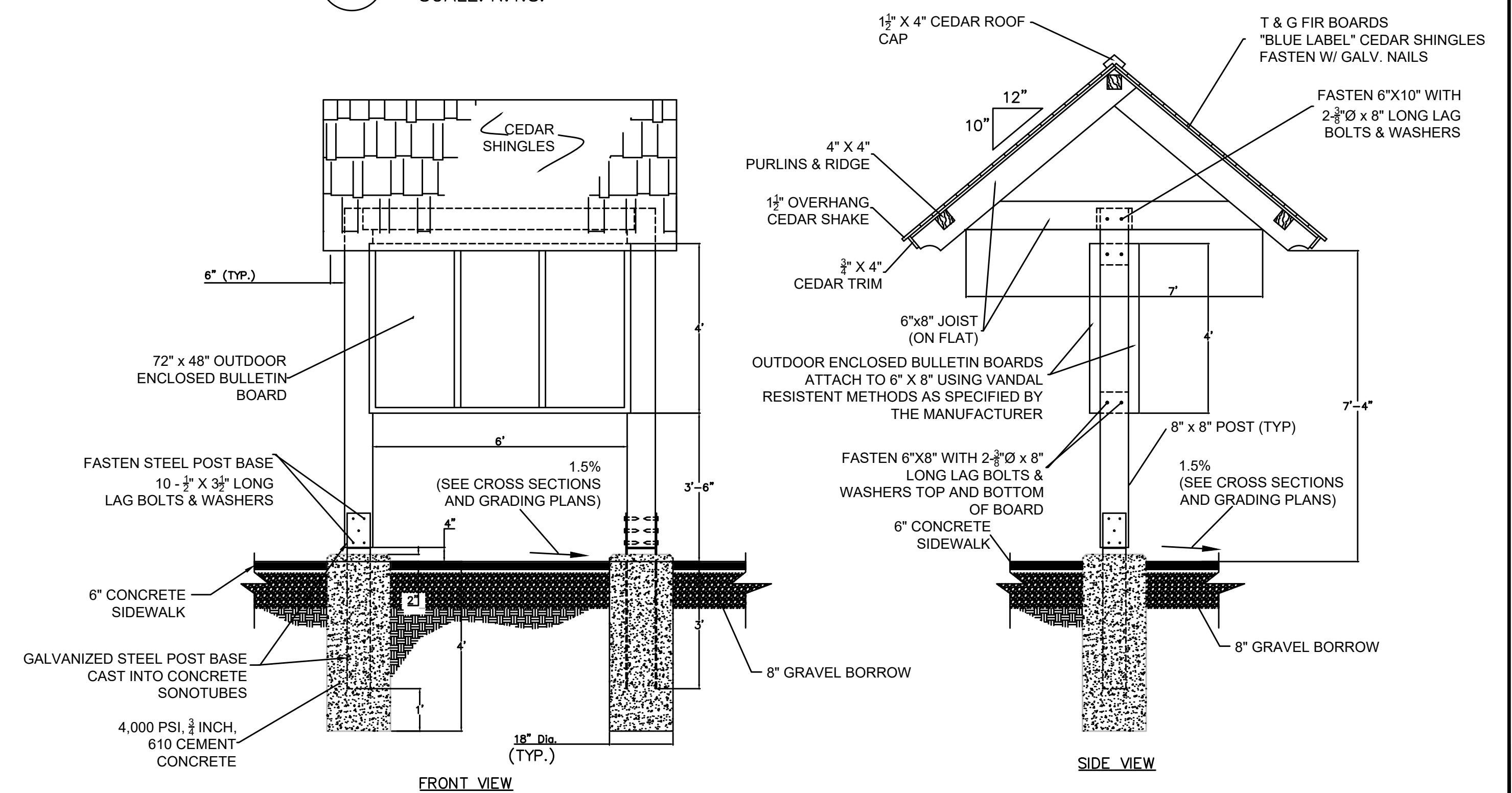
26 DISPLAY BOARD
SCALE: N.T.S.

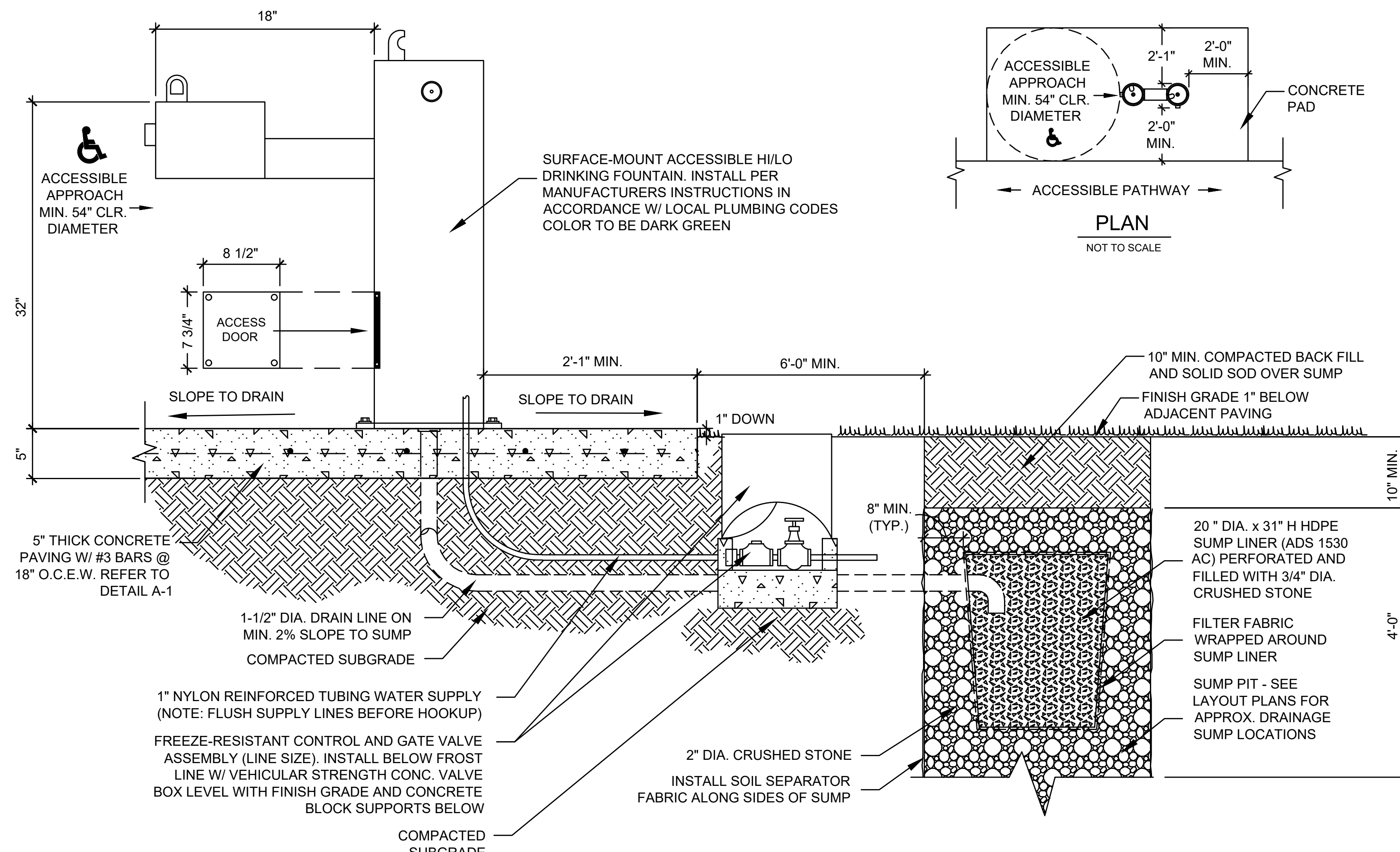
NOTE:
INTERPRETATIVE PANEL SHALL BE SQUARE METAL POSTS AND IS INTENDED TO MATCH THE MASSACHUSETTS DCR STANDARDS.



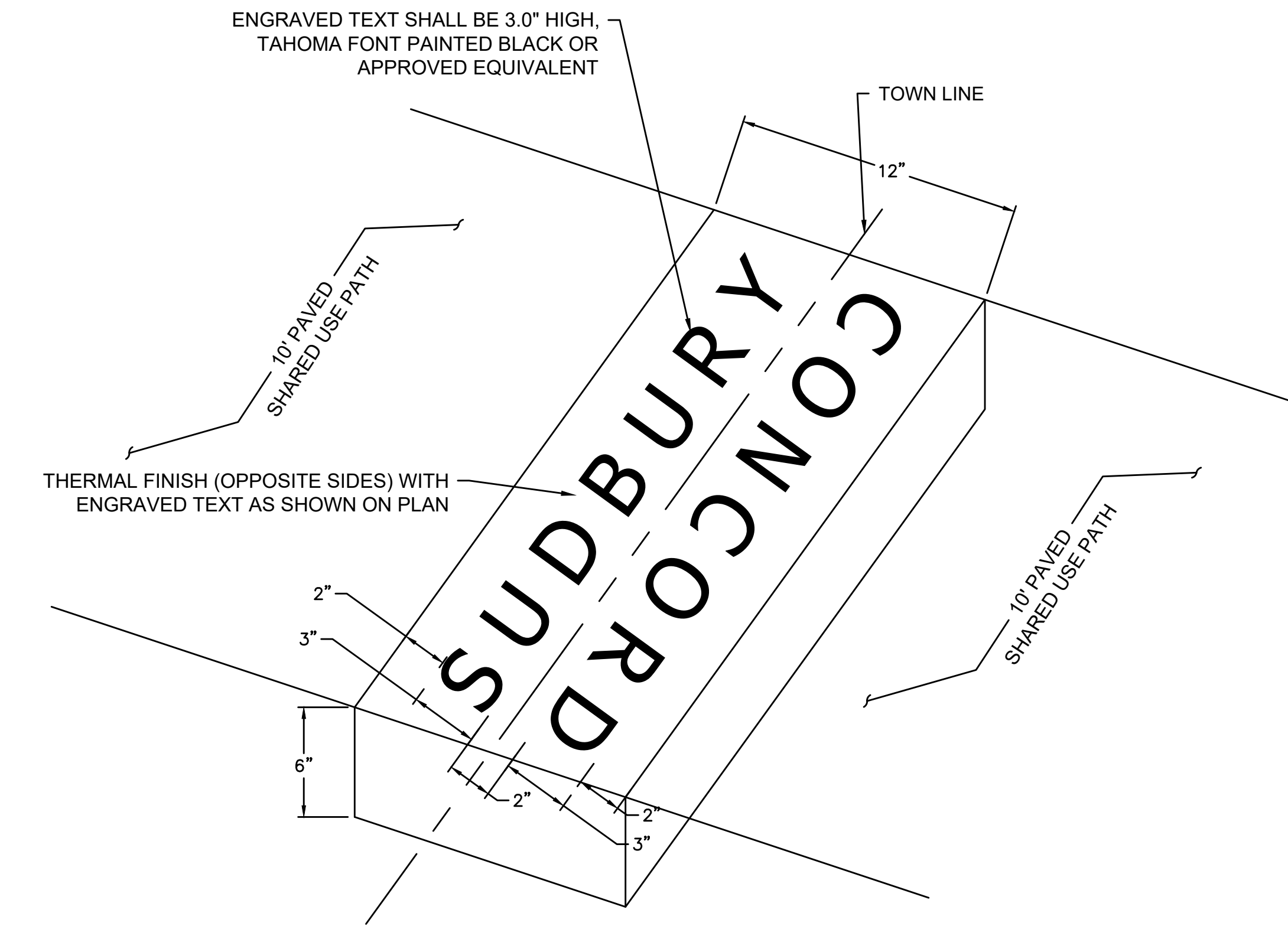
SIGN TYPE	DIMENSION TABLE				
	HEIGHT	WIDTH		DEPTH	
	A	B	C	D	E
26" x 38"	26"	23"	38"	35"	26.5"

24 INTERPRETATIVE SIGN
SCALE: N.T.S.

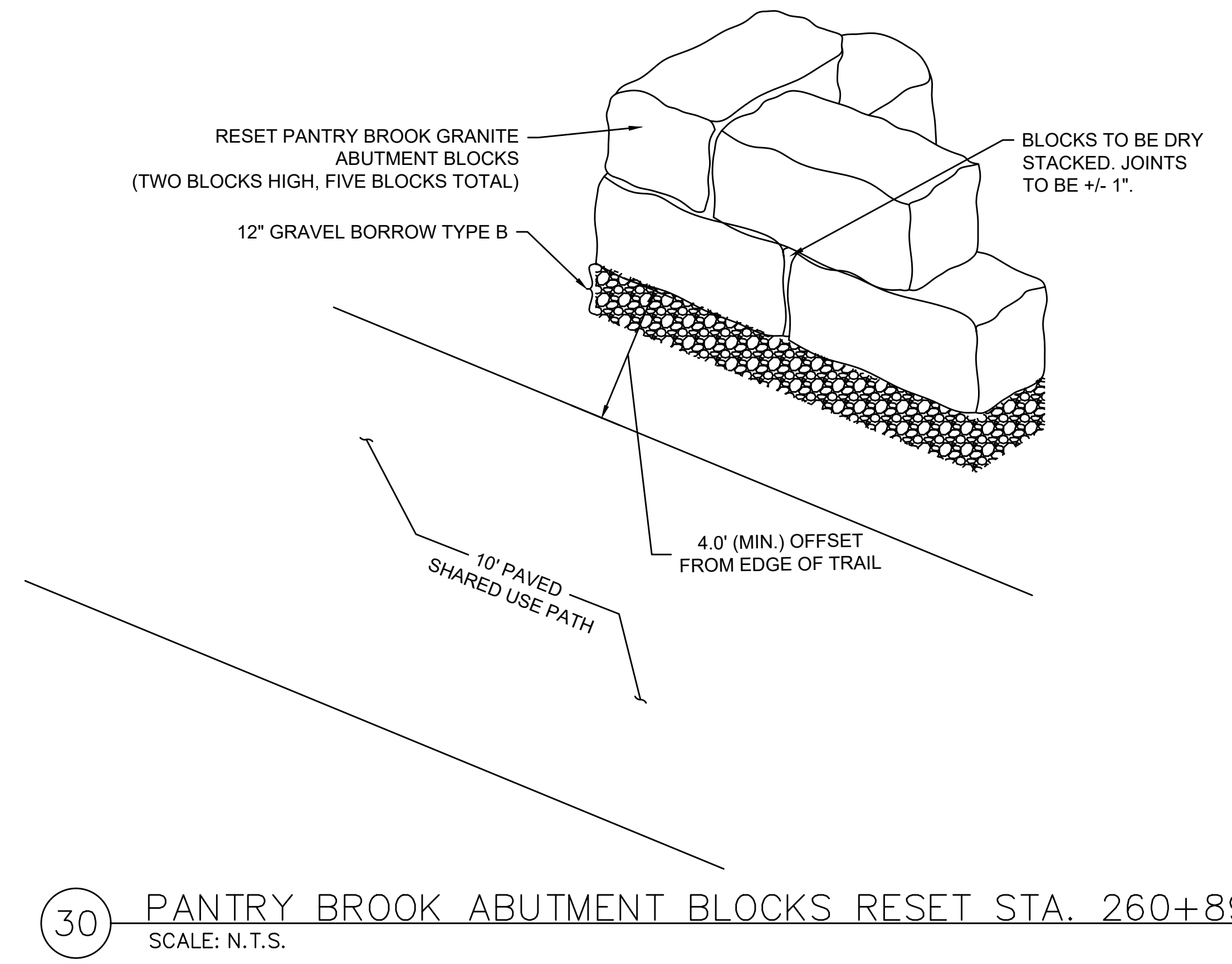
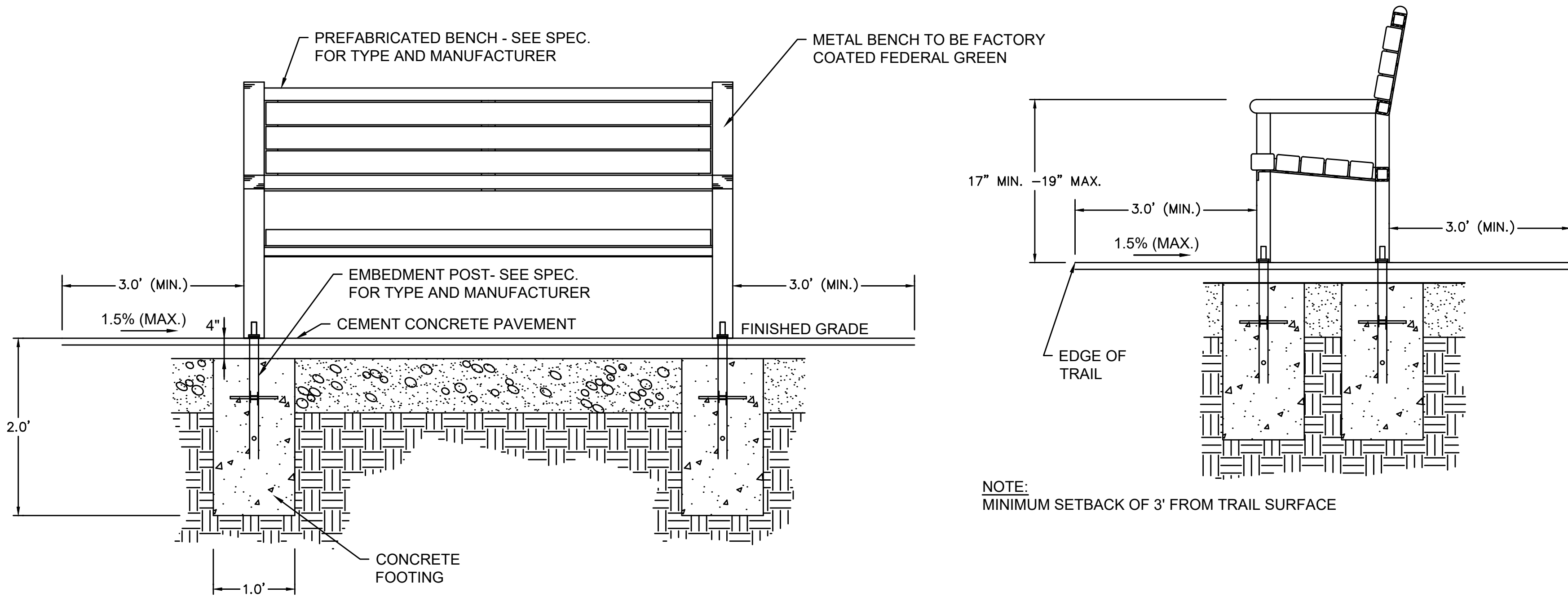




- GENERAL NOTES:**
1. DRINKING FOUNTAIN MUST BE INSTALLED ADJACENT TO AN ACCESSIBLE ROUTE.
 2. SPECIFIED DRINKING FOUNTAIN TO BE IN ACCORDANCE W/ MAAB ACCESSIBILITY STANDARDS.
 3. BASED ON PROJECT SPECIFICATIONS, MODEL MAY INCLUDE DOG BOWL AND/OR JUG FILLER. REFERENCE MANUFACTURER'S PRODUCT CATALOG FOR ACCESSORY ITEMS.



27 HYDRATATION STATION
SCALE: N.T.S.

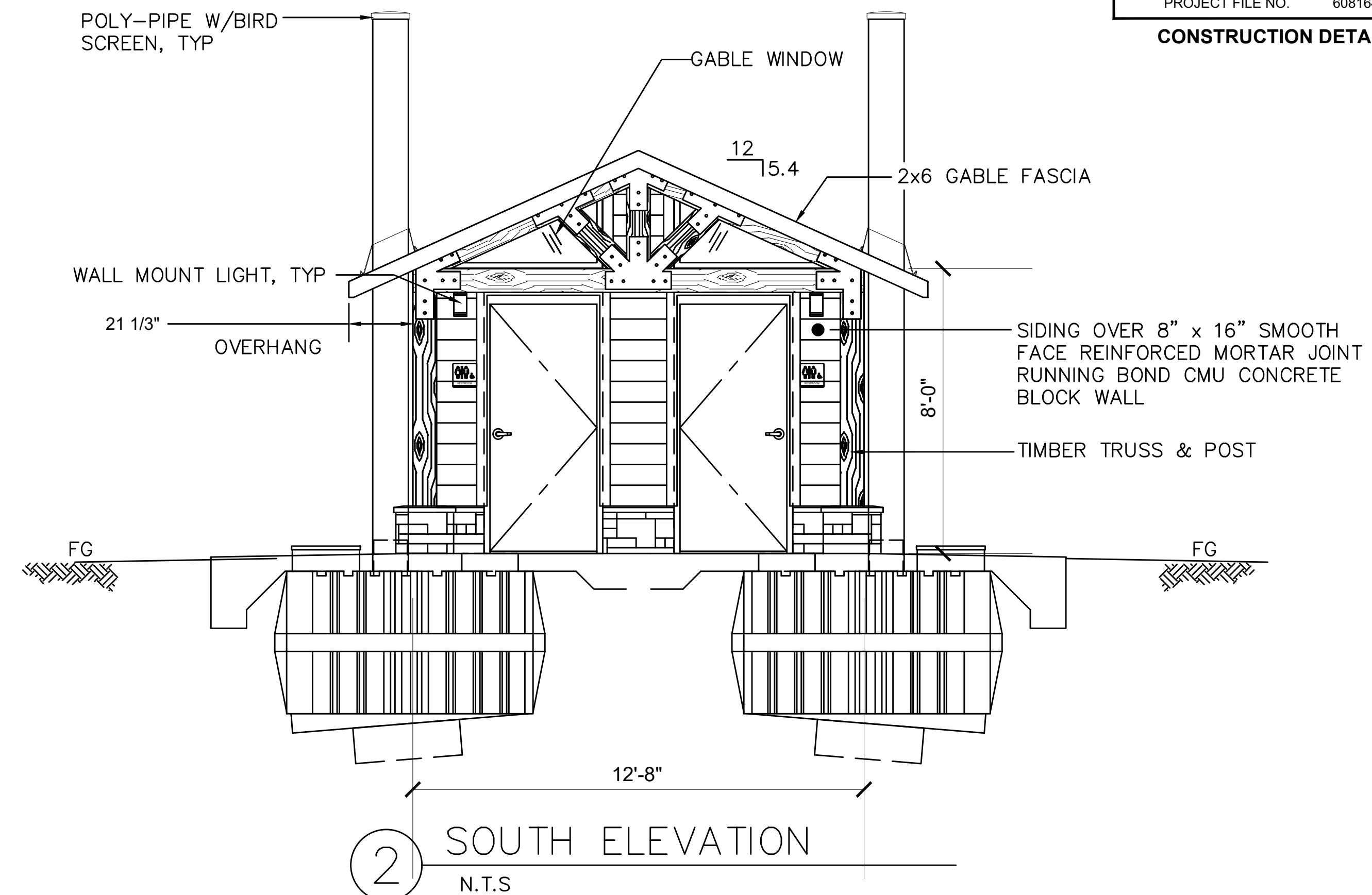
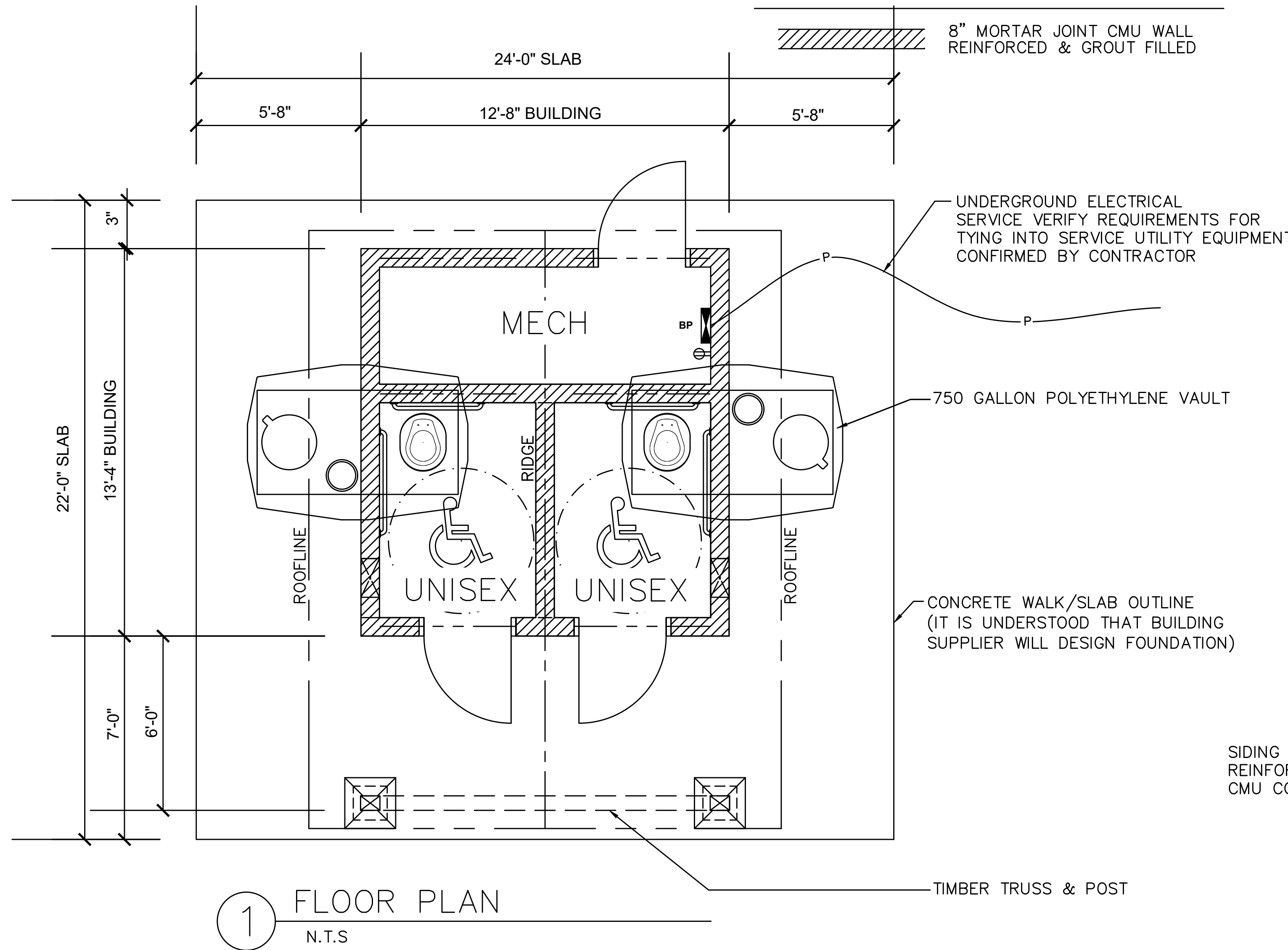


NOTE:
THESE PLAN VIEW AND ELEVATION DRAWINGS ARE A PRELIMINARY ARCHITECTURAL REPRESENTATION OF THE BUILDING. ALL DIMENSIONS, FEATURES AND COMPONENTS SHOWN ON THESE PRELIMINARY DRAWINGS MAY OR MAY NOT BE PART OF THE QUOTE.

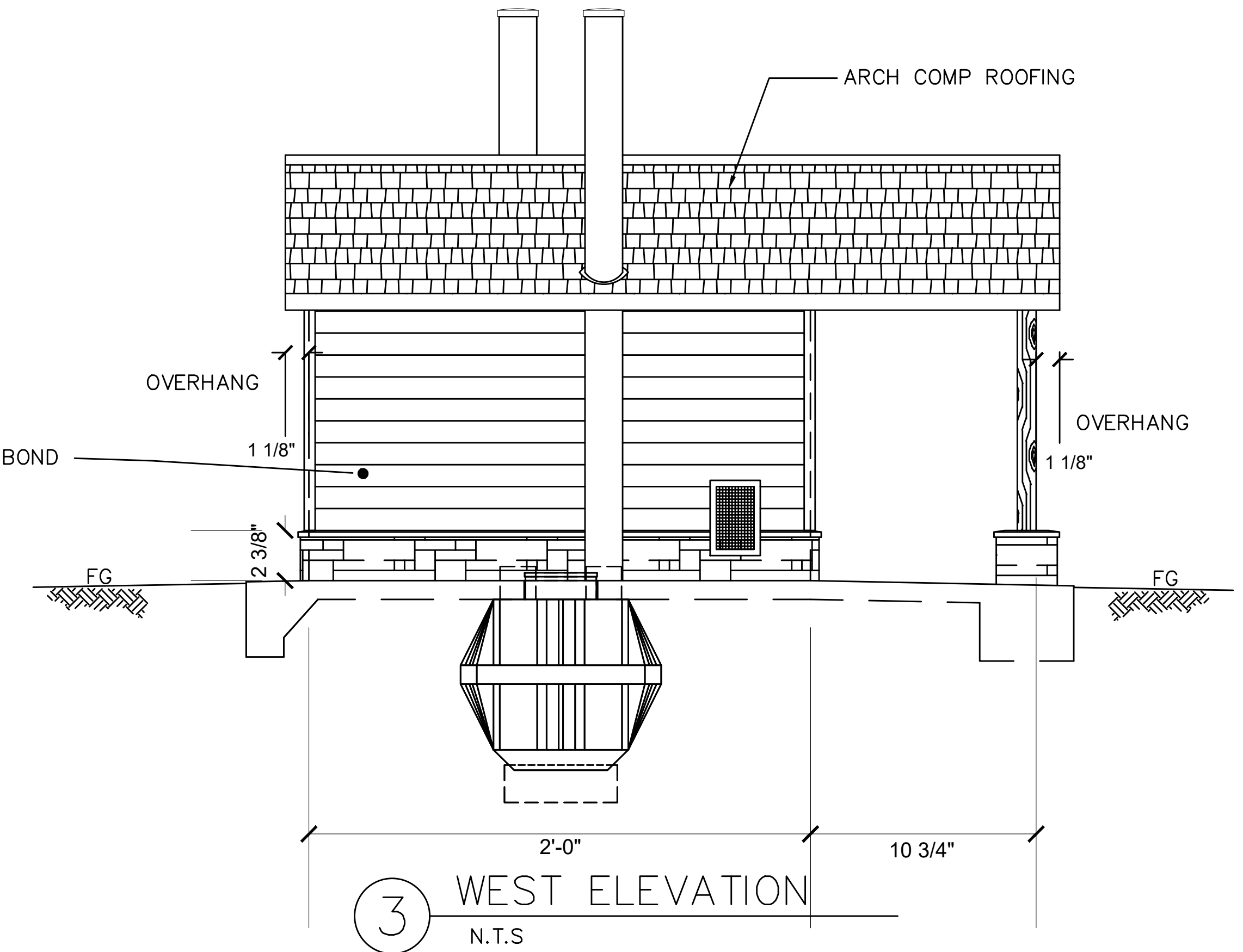
LEGEND		
SYMBOL	DESCRIPTION	AREA / QUANTITY
—	GABLE WINDOW	6
—	16" x 24" EXTERIOR WALL VENT LOCATED IN CMU WALL	2
—	EXTERIOR WALL LIGHTS	3
—	INTERIOR CEILING LIGHTS	3

WALL TYPE SCHEDULE

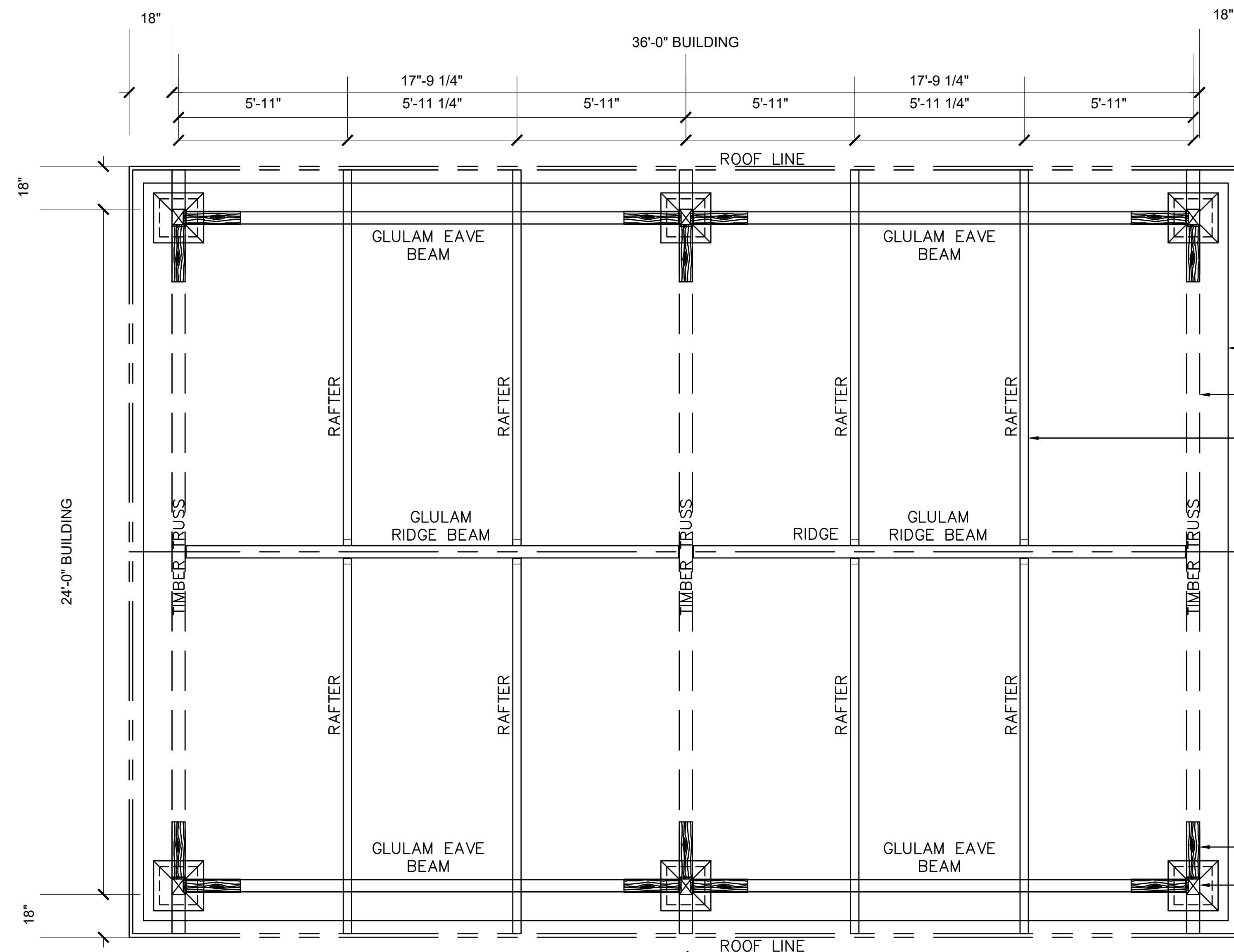
8" MORTAR JOINT CMU WALL REINFORCED & GROUT FILLED



SIDING OVER 8" x 16" SMOOTH FACE REINFORCED MORTAR JOINT RUNNING BOND CMU CONCRETE BLOCK WALL

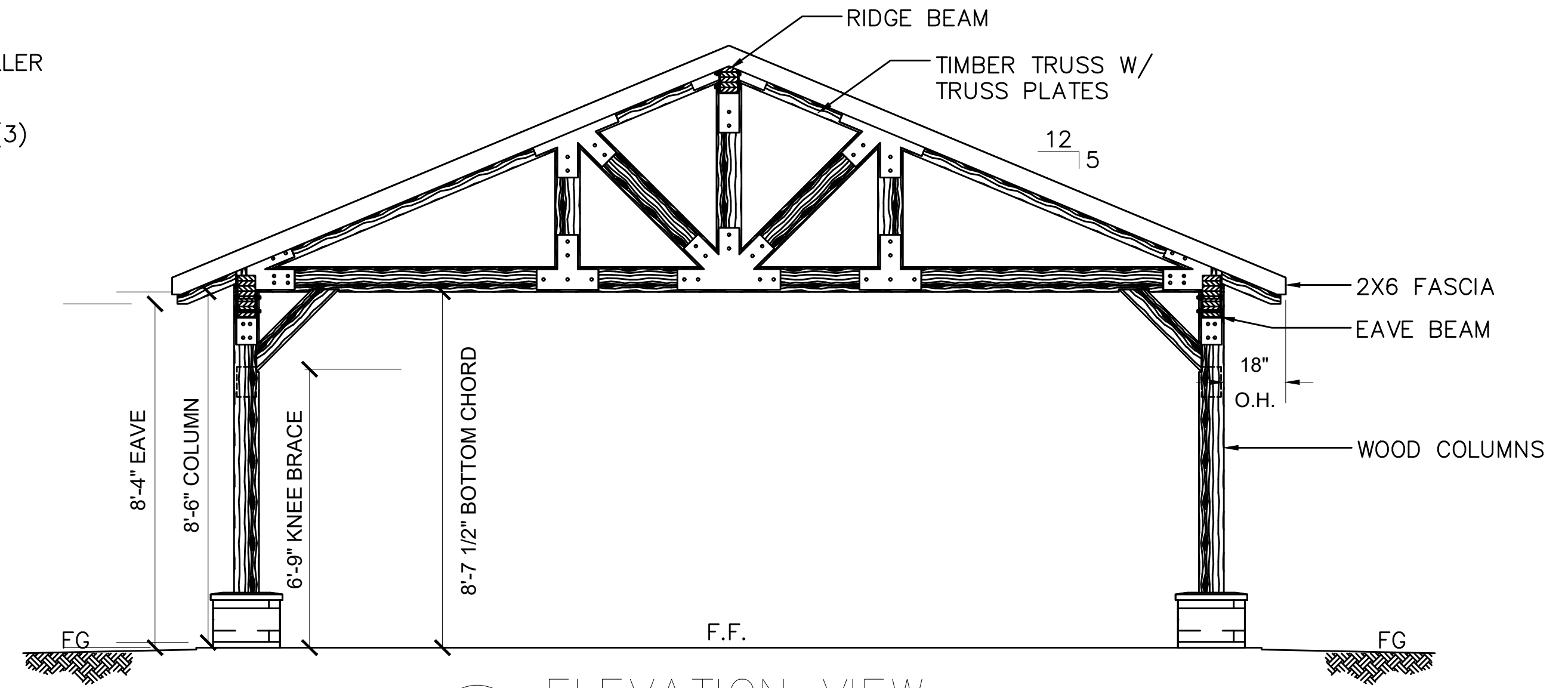


NOTE:
THESE PLAN VIEW AND ELEVATION DRAWINGS ARE A PRELIMINARY ARCHITECTURAL REPRESENTATION OF THE BUILDING. ALL DIMENSIONS, FEATURES AND COMPONENTS SHOWN ON THESE PRELIMINARY DRAWINGS SHALL BE APPROVED BY THE TOWN DURING CONSTRUCTION/SUBMISSION OF SHOP DRAWINGS.

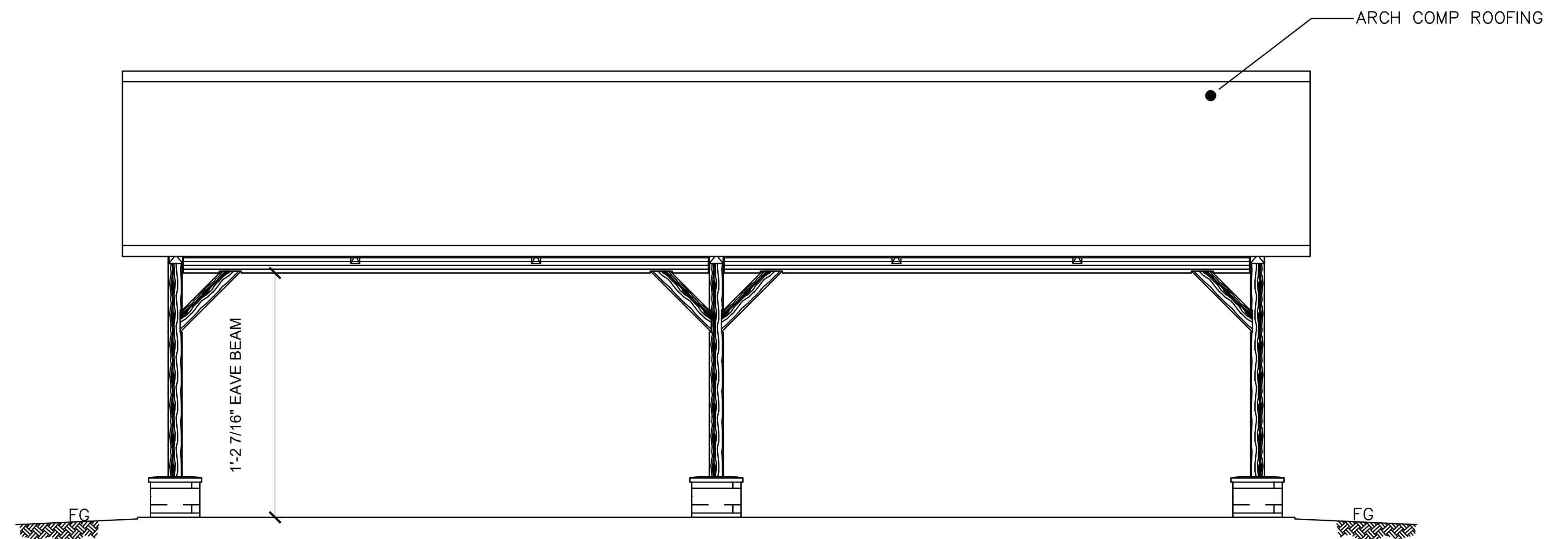


1 FLOOR PLAN
N.T.S.

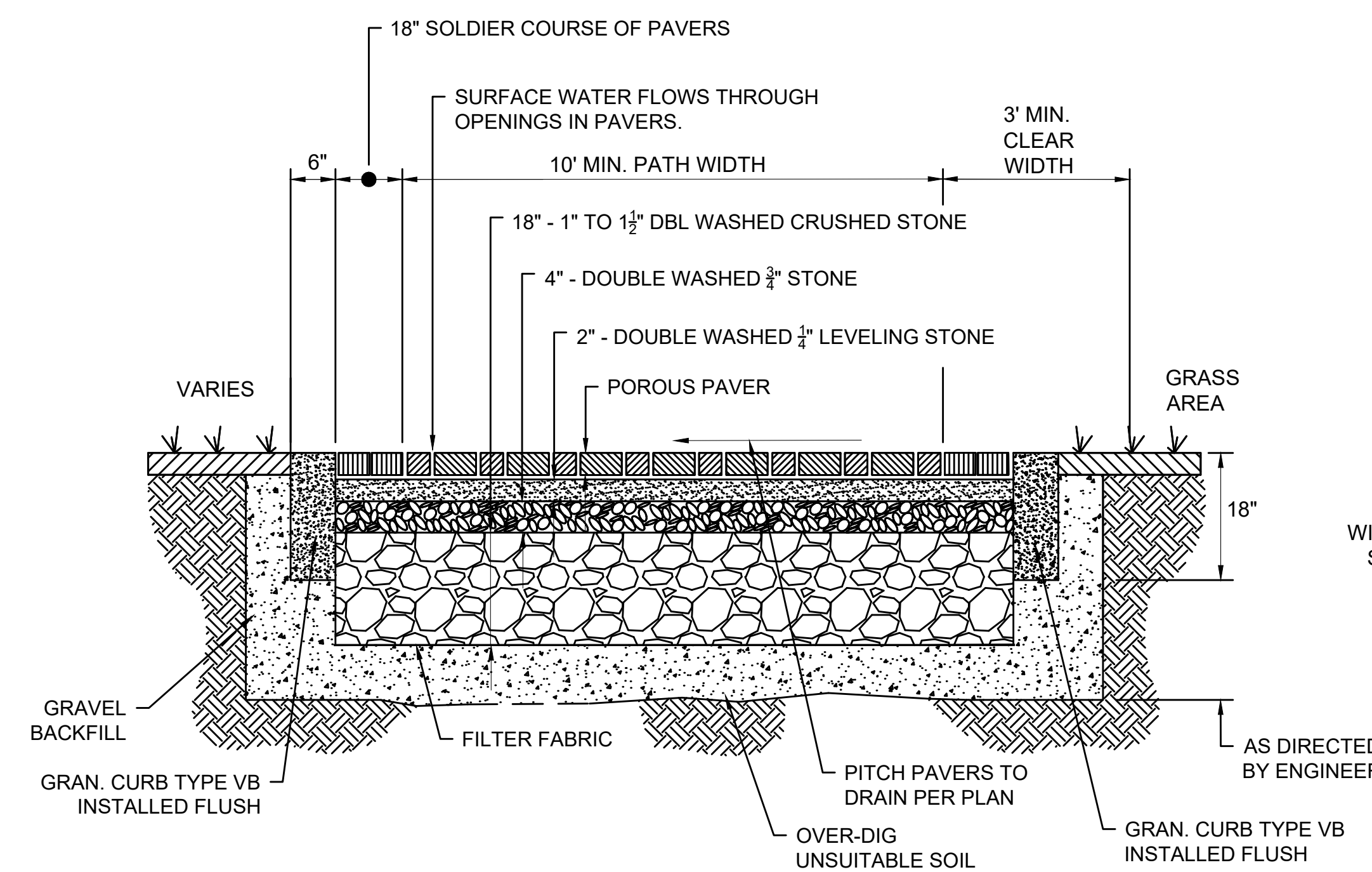
LEGEND		
SYMBOL	DESCRIPTION	AREA/QUANTITY
	WOOD TRUSS	3
	GLU-LAM BEAMS	6



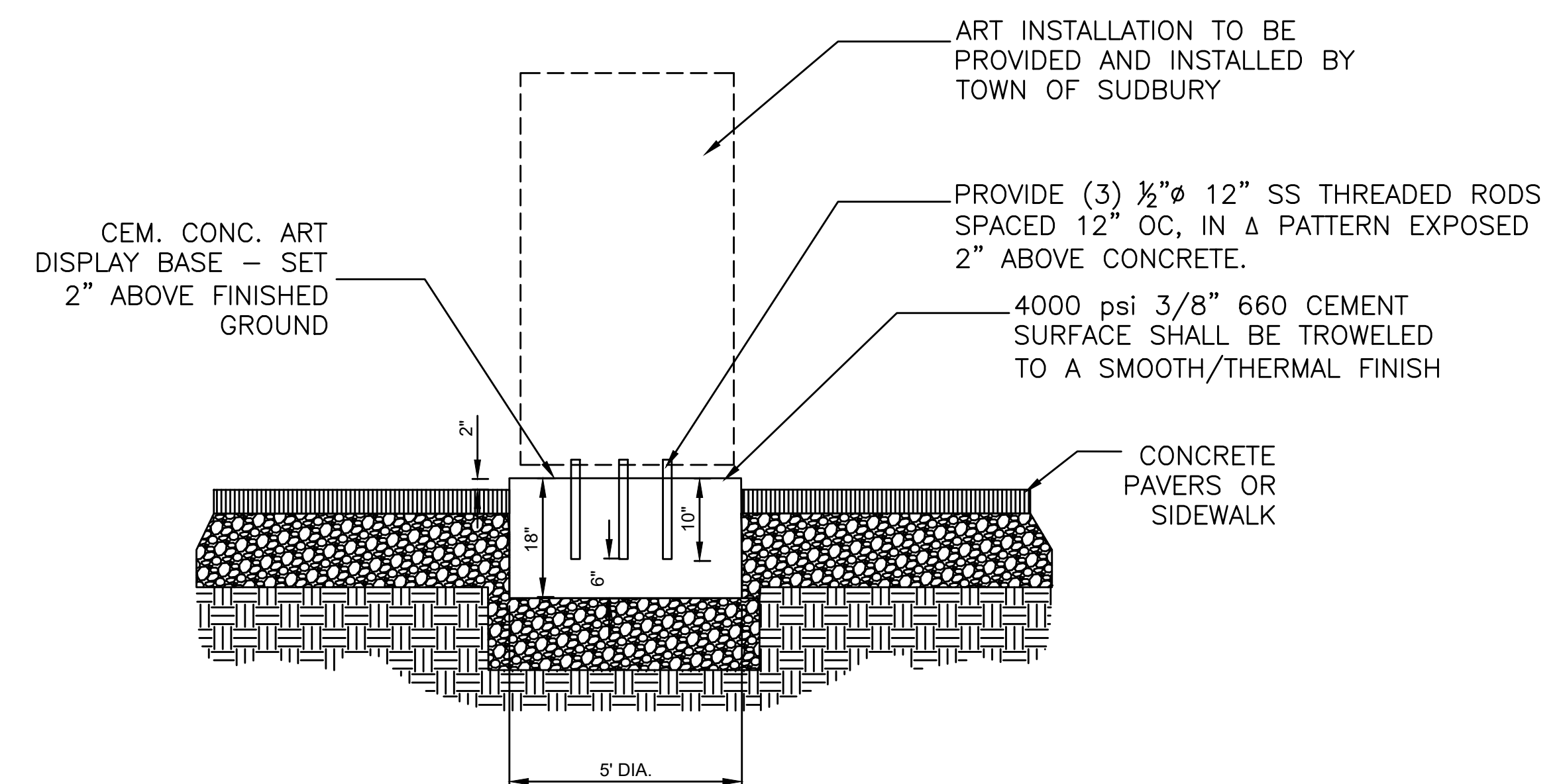
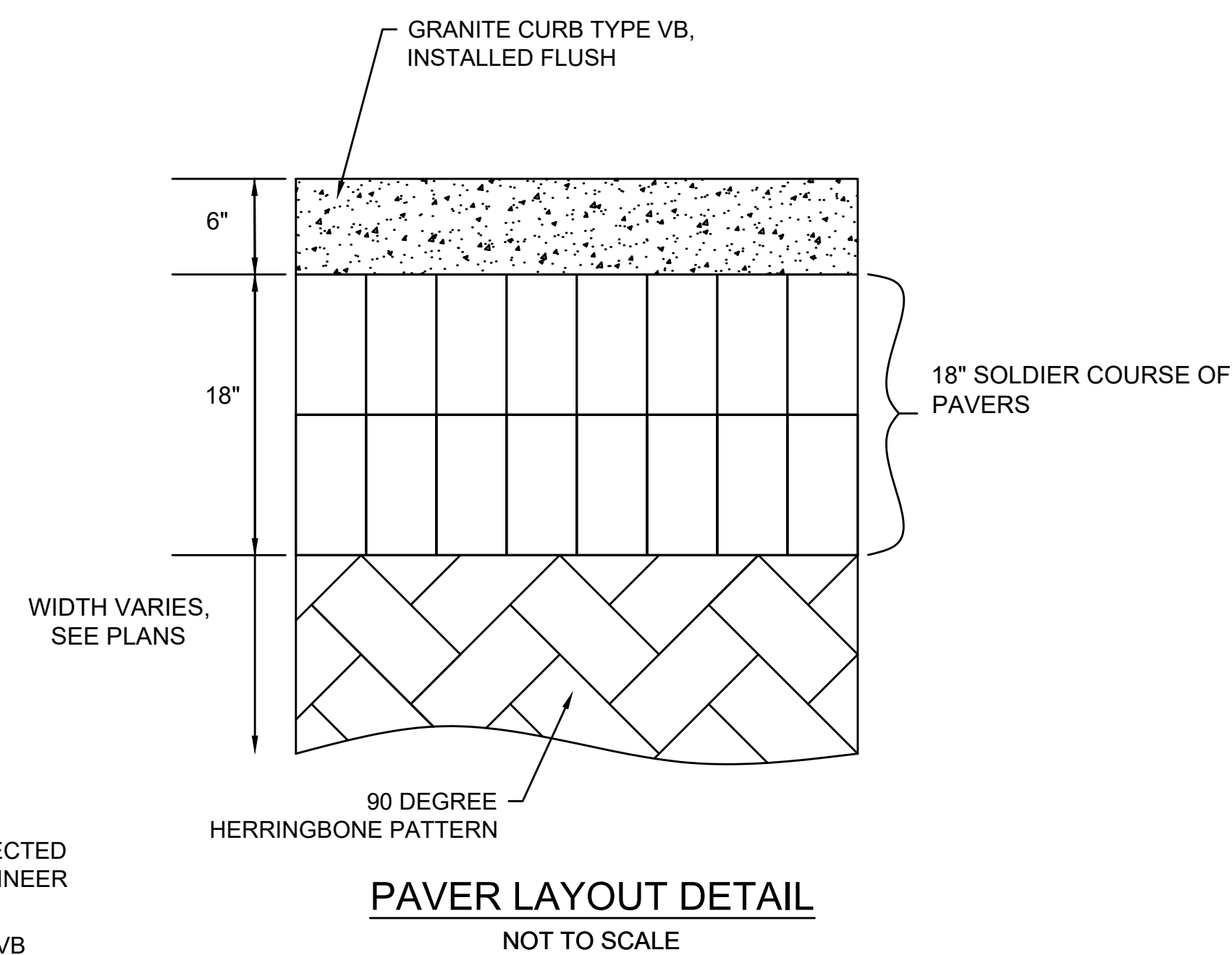
B ELEVATION VIEW
N.T.S.



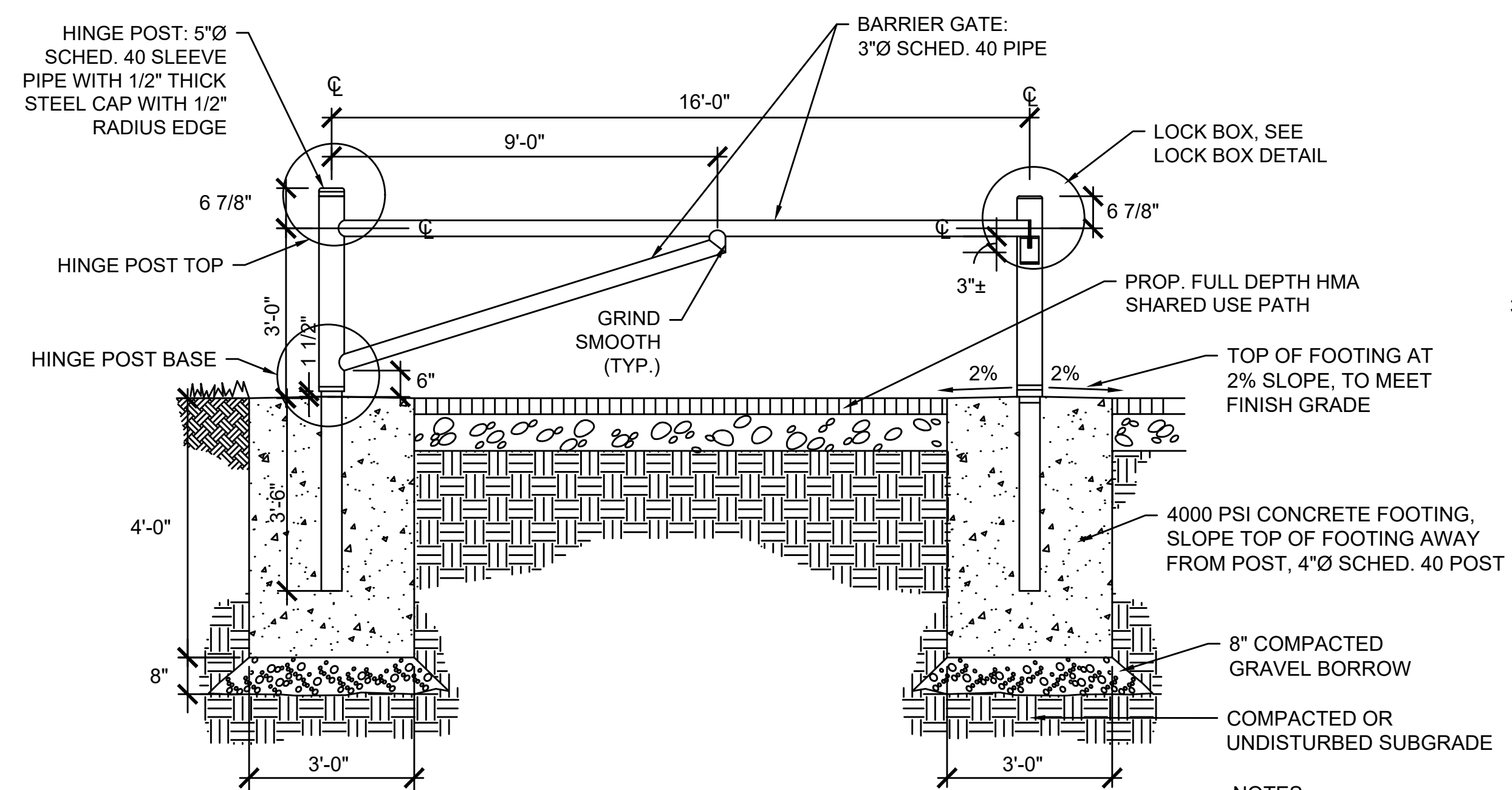
C ELEVATION VIEW
N.T.S.



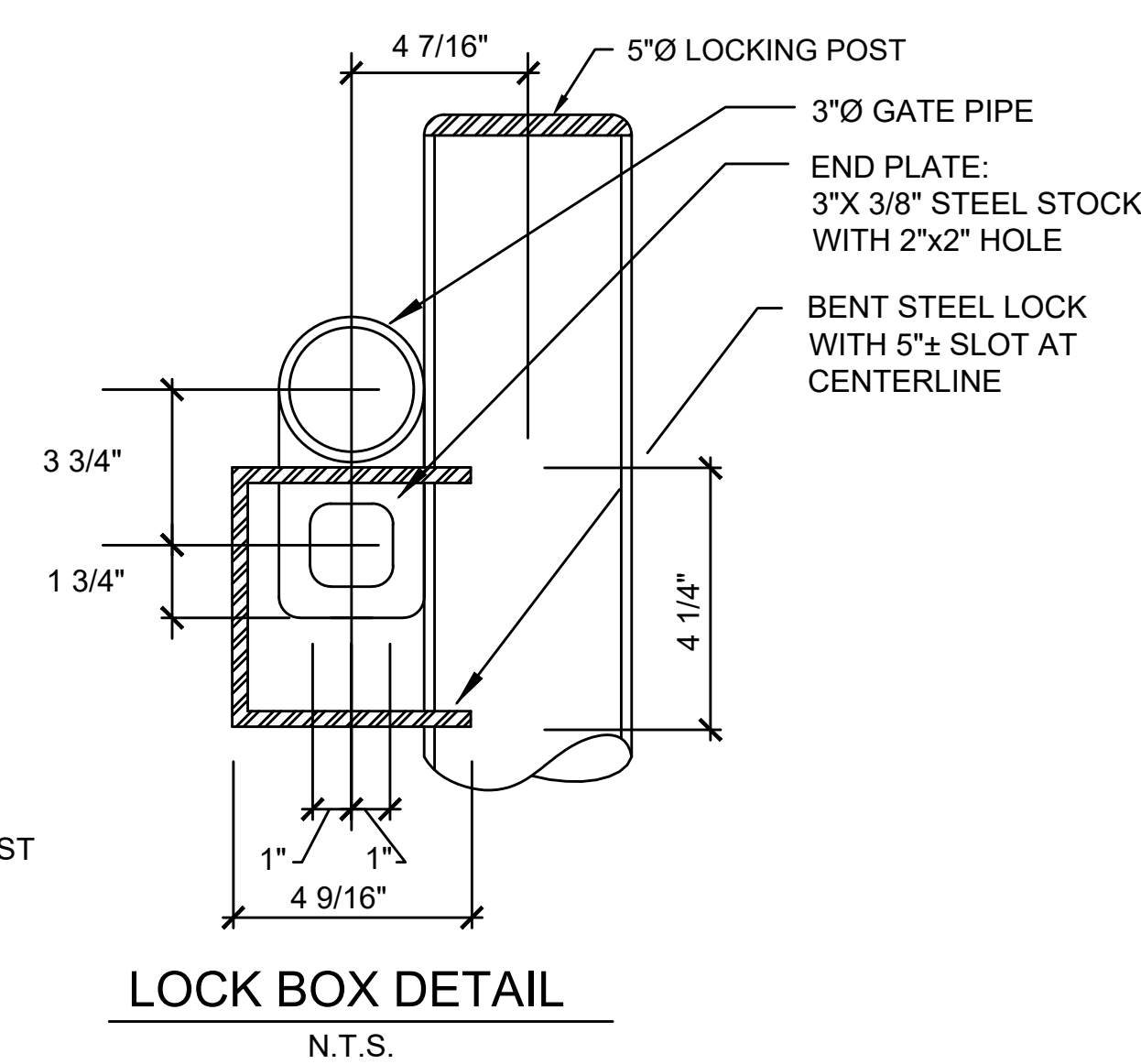
33 PERVIOUS PAVER TYPICAL SECTION
SCALE: N.T.S.



34 CONCRETE ART DISPLAY BASE
SCALE: N.T.S.



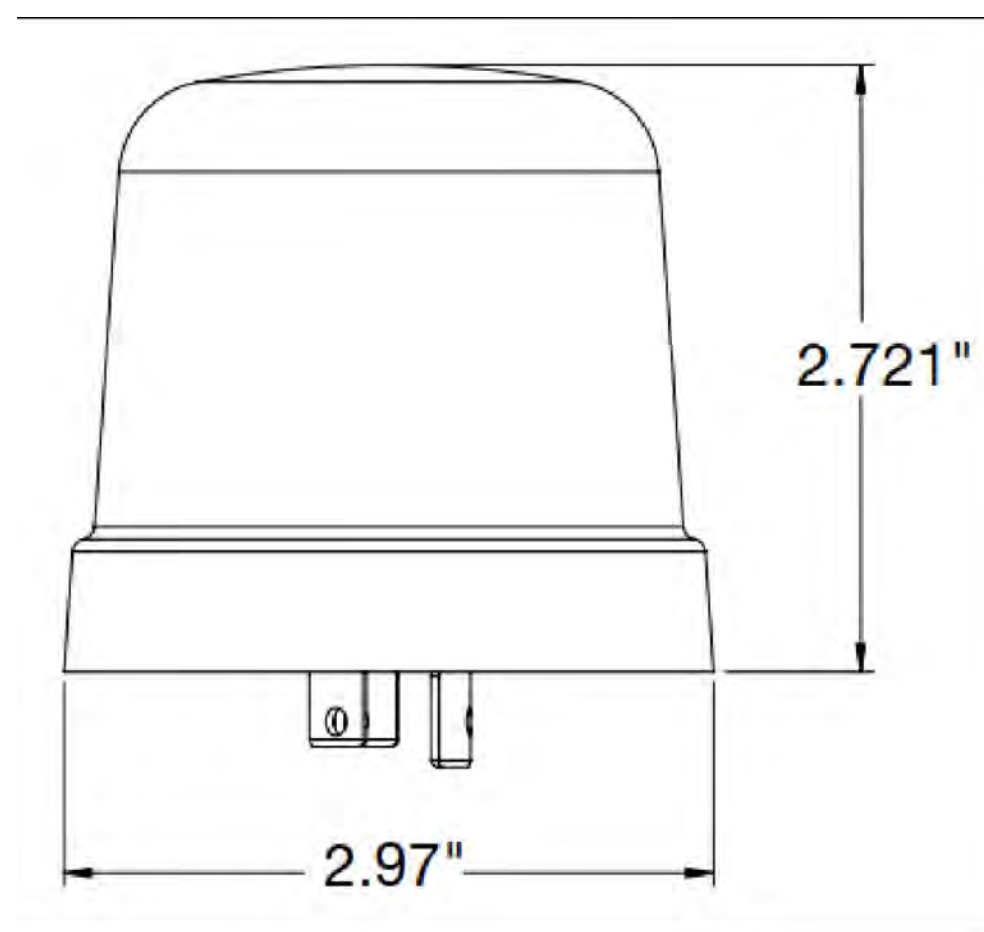
35 STEEL PIPE ACCESS GATE
SCALE: N.T.S.



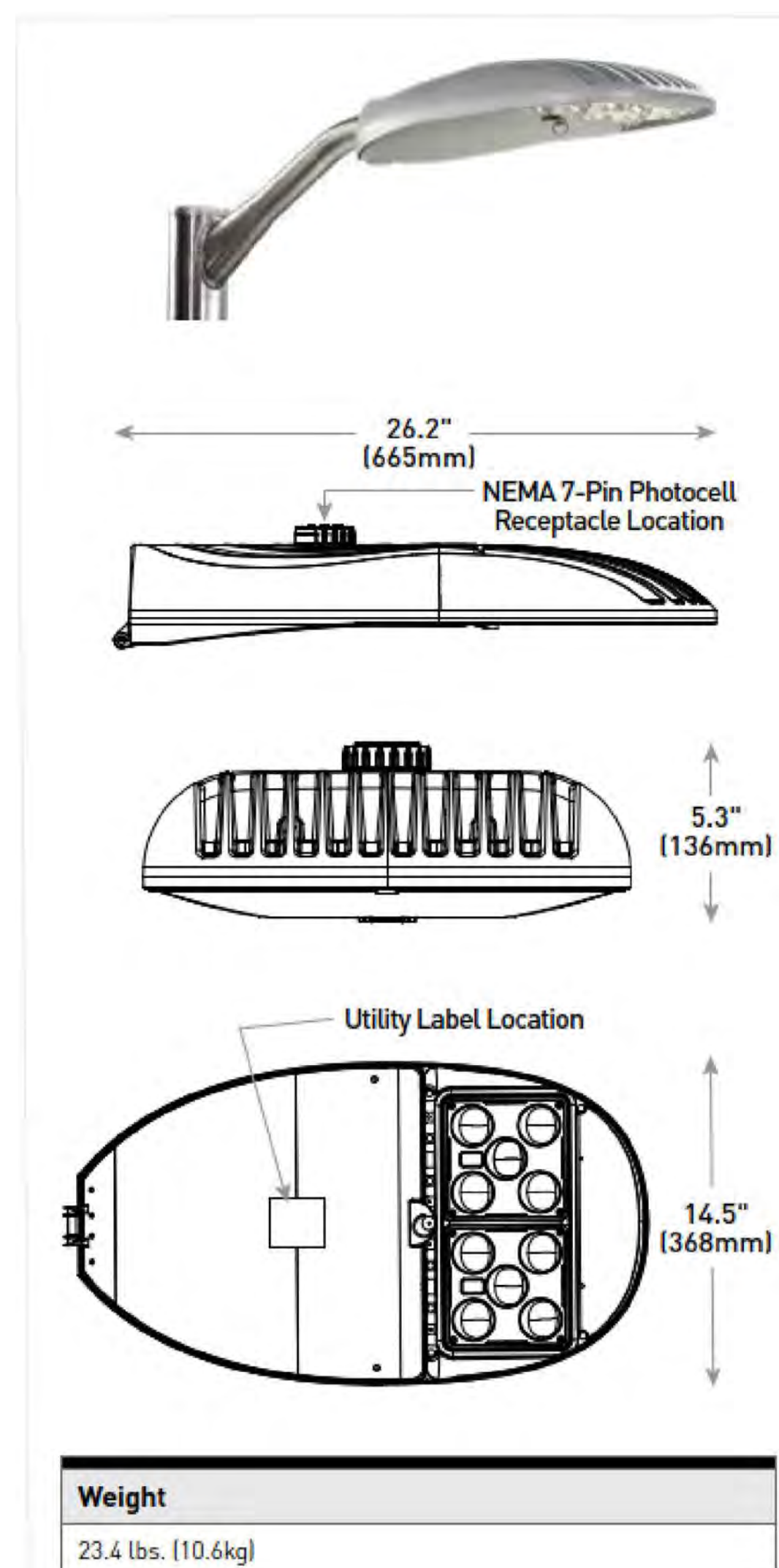
36 GRANITE COBBLESTONE PAVER SETTING BED
SCALE: N.T.S.

- NOTES:
1. ALL STEEL SHALL BE GALVANIZED INSIDE AND OUT.
 2. PROVIDE 1/2" Ø WEEP HOLES AT WELDED CONNECTIONS (3 PLACES).
 3. INSTALL BRASS BUSHINGS AFTER GALVANIZING.

**120-277 VOLT ELECTRIC PHOTO CONTROL
LOCKING TYPE MOUNTING**



LED STREET/AREA LUMINARE

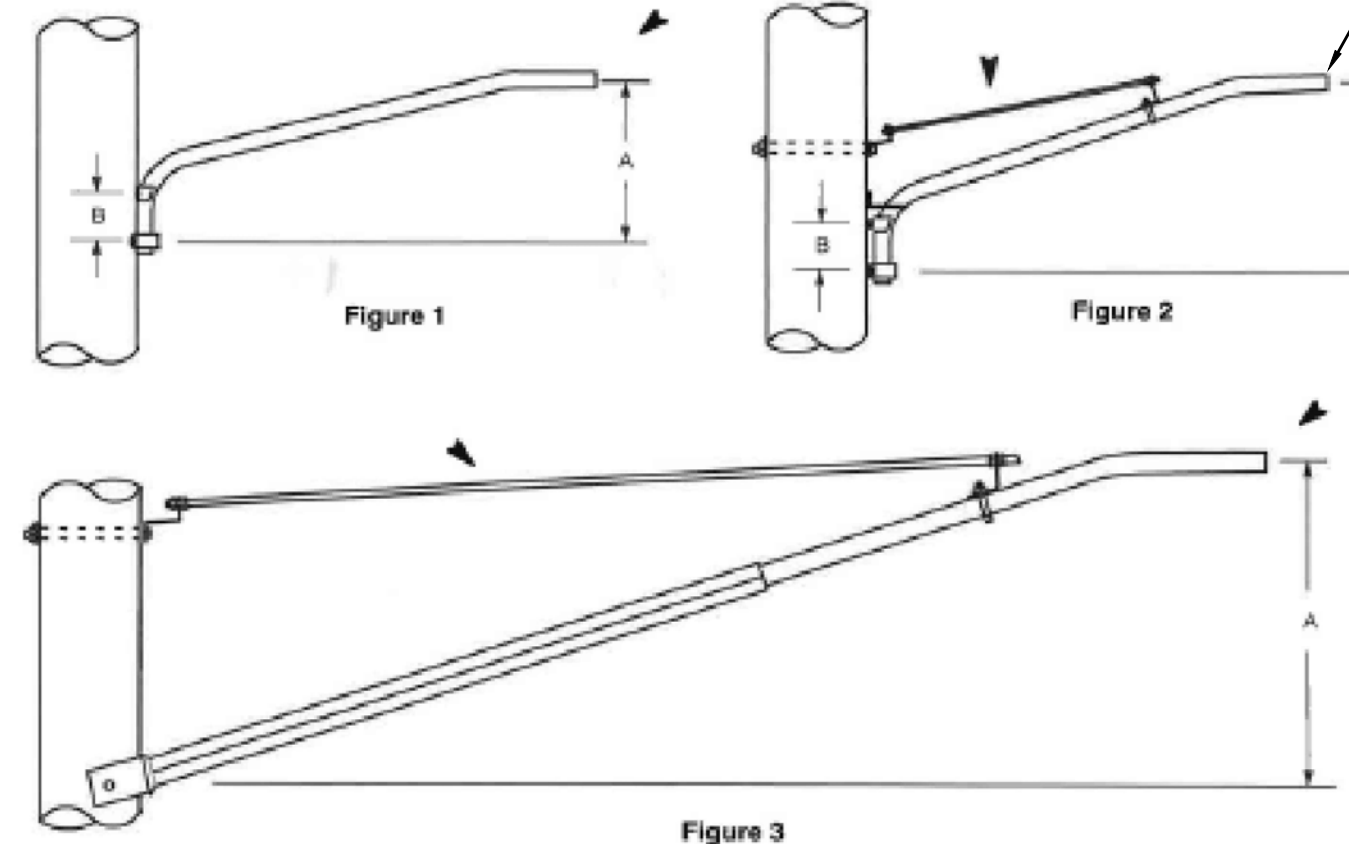


NOTES:

1. TO BE INSTALLED PER CITY STANDARD
2. HORIZONTAL TENSION MOUNTING
3. DIE CAST ALUMINUM HOUSING
4. INPUT VOLTAGE 120V - 277V
5. TO MEET ANSI C136.31-2001 AND 3G BRIDGE AND OVERPASS VIBRATION STANDARDS
6. TO DELIVER UP TO 23,800 LUMENS
7. WITH EFFICACY UP TO 139 LPW
8. CCT: 2700K, 3000K, 4000K, 5000K, 5700K

37 LED STREET/AREA LUMINARE (CITY STANDARD)
SCALE: N.T.S.

SEE SPECIAL PROVISIONS FOR CITY STANDARD LED FIXTURE

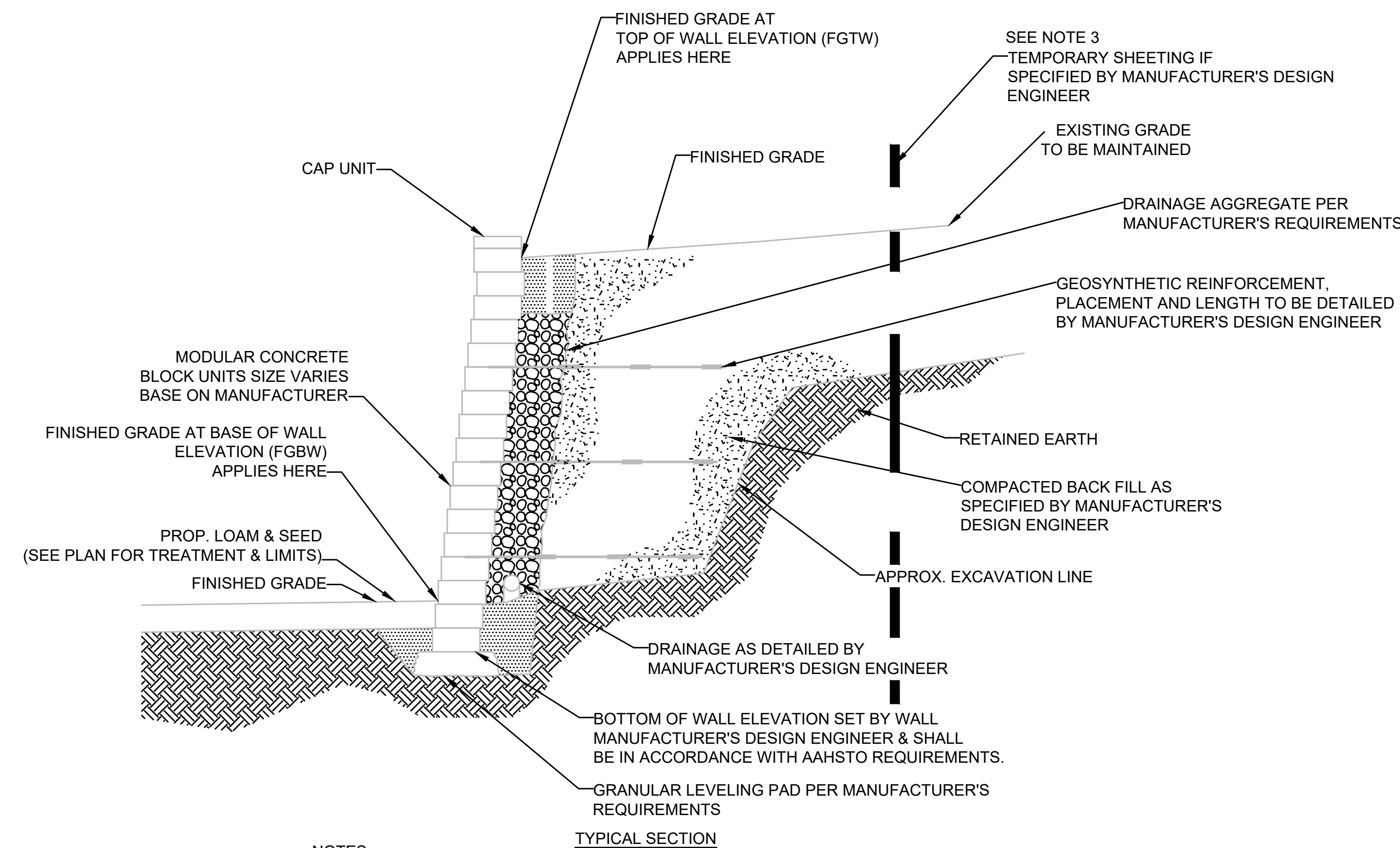


Bracket Size	Bracket Style Figure No.	Approximate Dimensions in Inches		Item Number	DTR 21.112 Pageback Variations
		A	B		
1 1/4" x 4"	1	18-19	11	511567	A thru C
1 1/4" x 6"	2	24-30	8-11	511568	D thru F
1 1/4" x 8"	2	18-31	8-13	511569	G thru I
1 1/4" x 10"	2	35-48	12-13	511570	J thru L
1 1/4" x 12"	3	40-43	—	511571	M thru O
1 1/4" x 16"	3	56-58	—	511572	P thru R
2" x 20"	3	67-73	—	511573	S thru U
2" x 8"	2	30	9	511496	V thru X

Notes
1. Dimensions shown do not necessarily apply to brackets purchased before 1967.
2. Variations shown depend on application.

AREA AND MUNICIPAL - GALVANIZED STEEL STREET LIGHT BRACKET FOR WOOD POLES
EVERSOURCE ENERGY DESIGN & APPLICATION STANDARD DTR 21.111 9

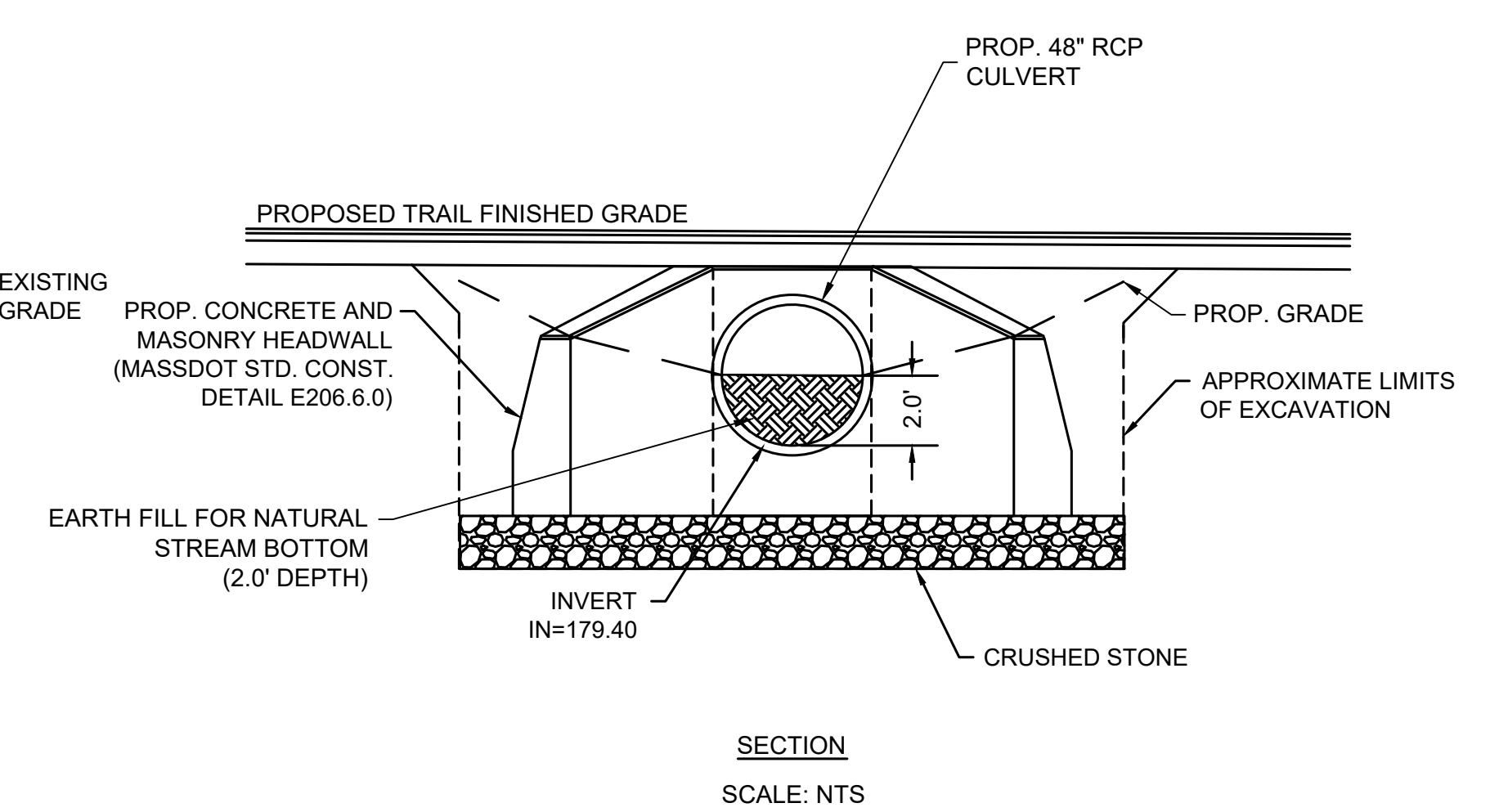
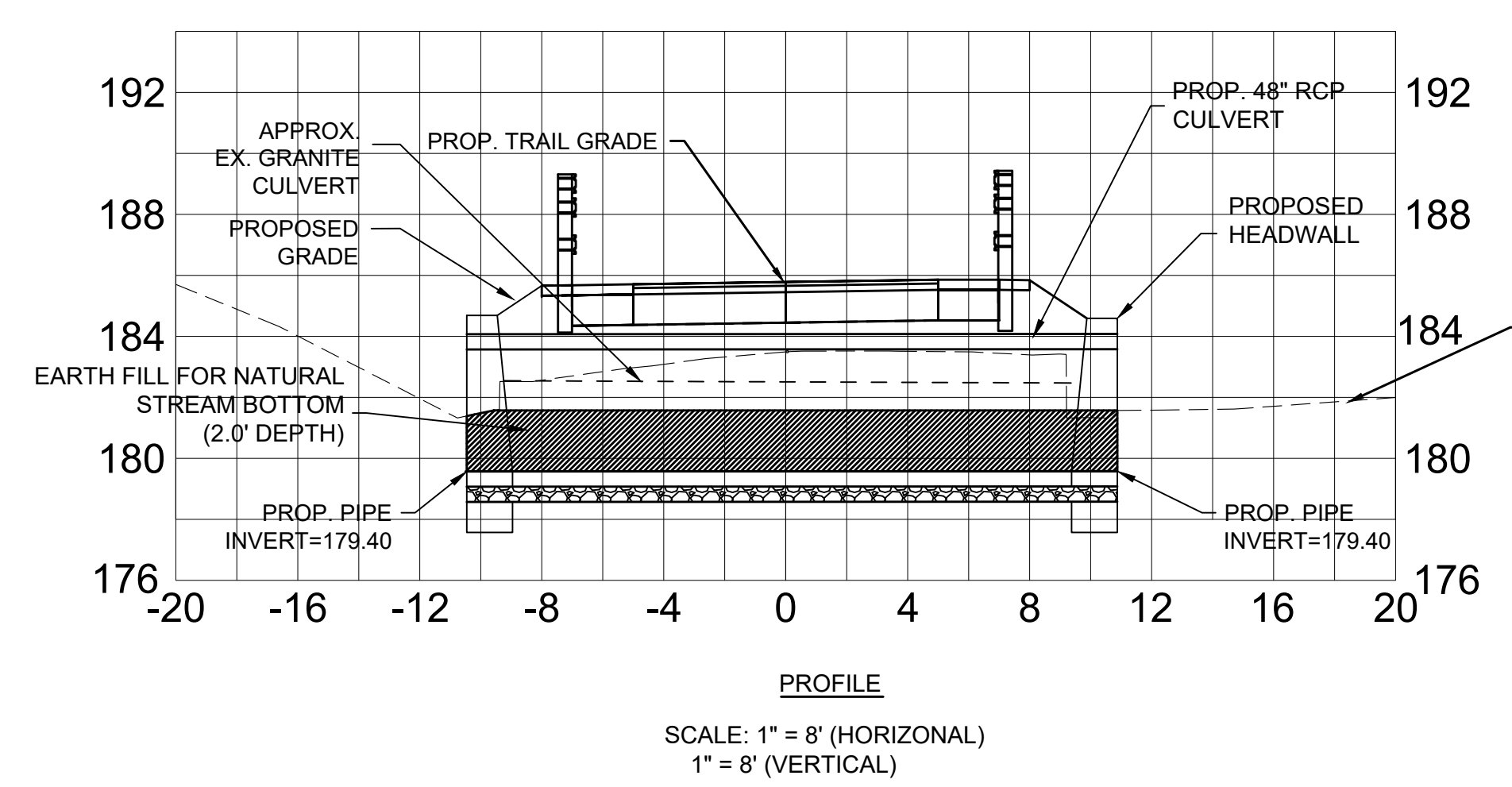
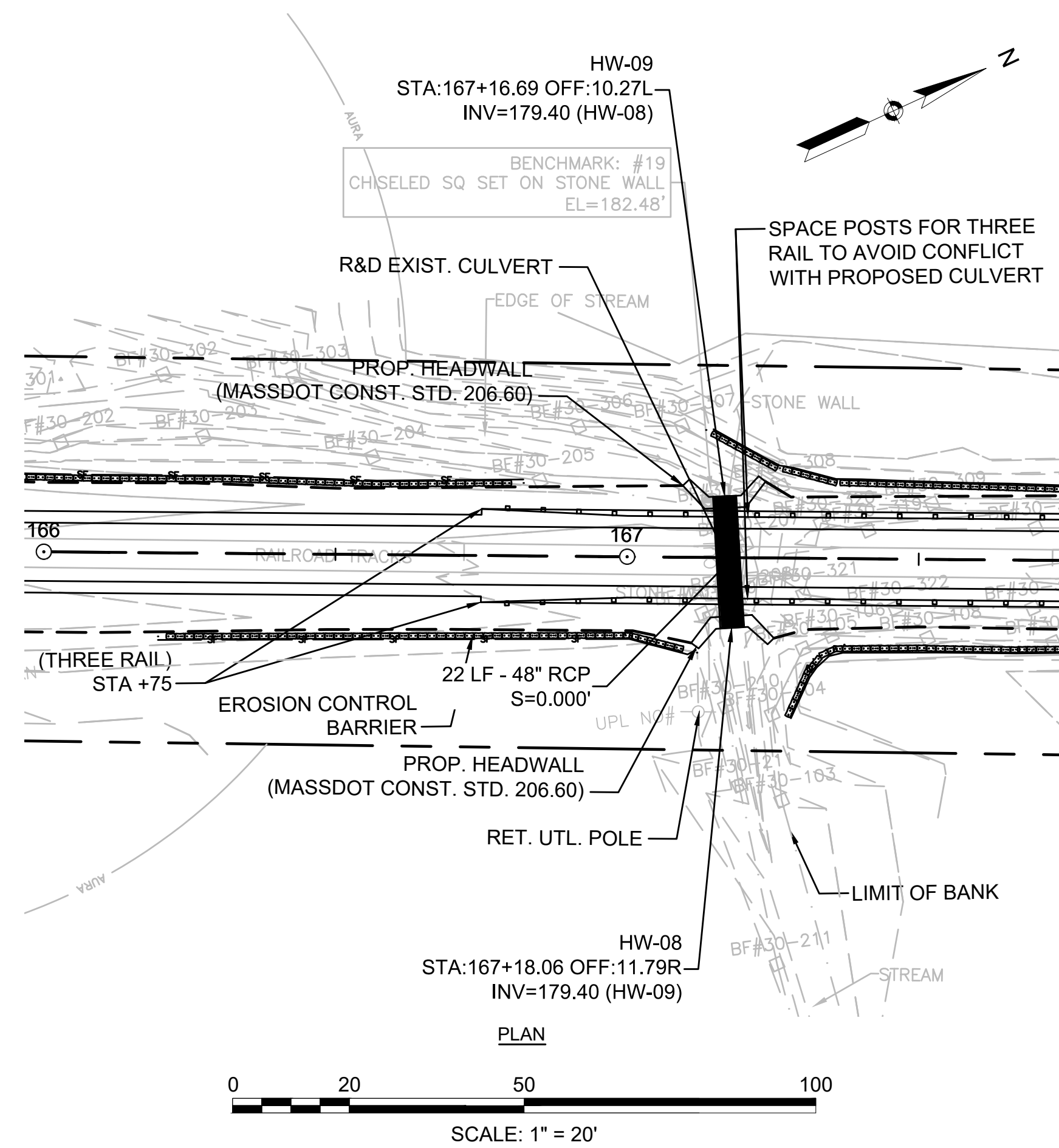
38 HIGHWAY LIGHTING FIXTURE ARM
SCALE: N.T.S.



NOTES

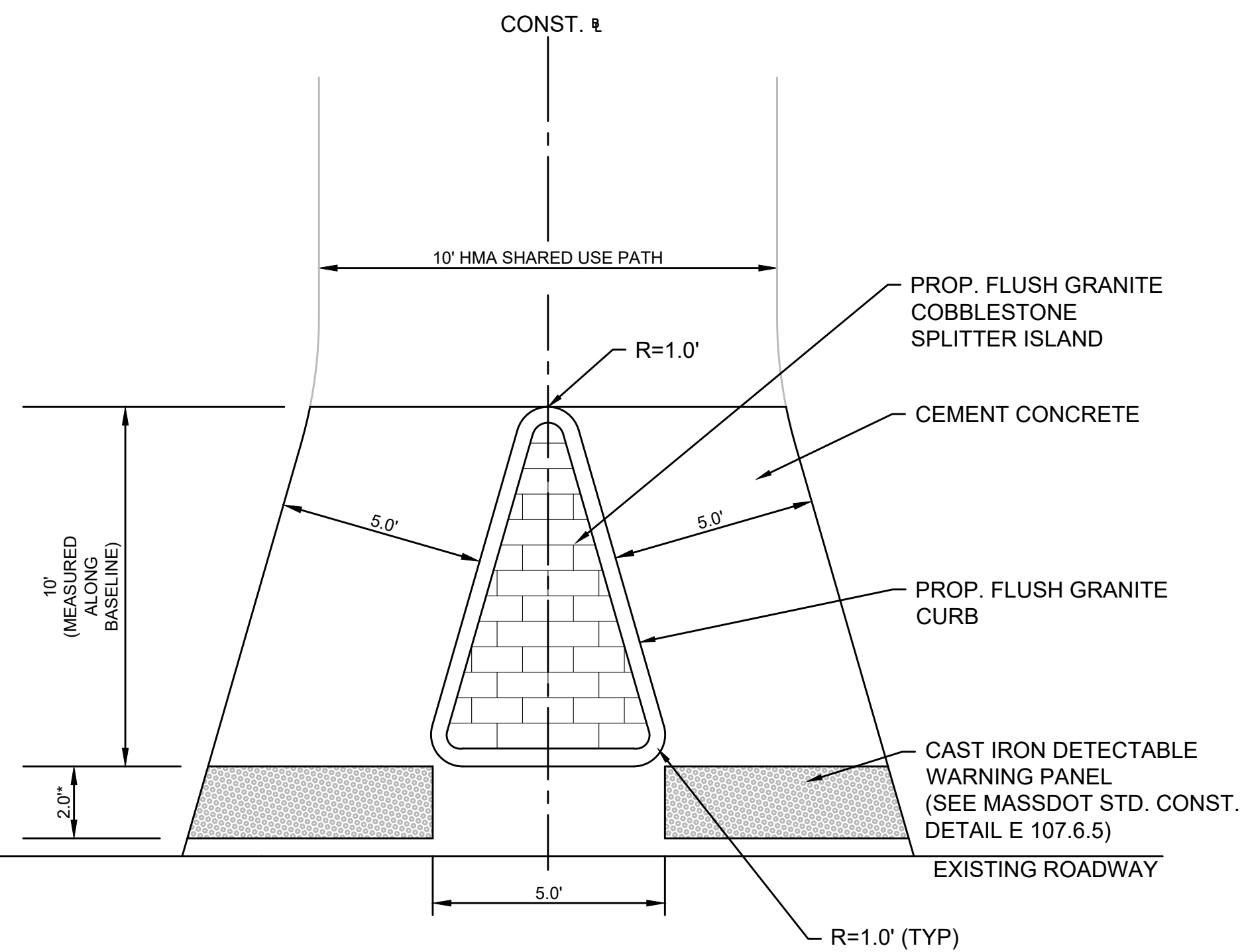
1. DETAILS AND NOTES HEREON ARE GENERIC AND ARE INTENDED TO GIVE A GENERAL DESCRIPTION OF THE WALL.
2. SEE GRADING PLANS FOR WALL ELEVATIONS.
3. DETAILED WALL CONSTRUCTION PLANS, STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE COMMONWEALTH OF MASSACHUSETTS, SHALL BE IN DESIGNED IN ACCORDANCE WITH AAHSTO LRFD BRIDGE DESIGN SPECIFICATIONS AND SUBMITTED TO AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
4. MANUFACTURER'S USE OF TEMPORARY SHEETING SHALL BE FOR CONTRACTOR CONVENIENCE ONLY. ANY TEMPORARY SHEETING USED SHALL BE PAID FOR AT THE EXPENSE OF THE CONTRACTOR.
5. SEE CONTRACT SPECIAL PROVISIONS FOR WALL FINISHES, COLOR, AND WALL FACE TREATMENTS
6. MECHANICALLY STABILIZED EARTH WALL WITH SEGMENTAL CONCRETE BLOCK FACING PATTERN TO BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL. EXCAVATION AND REPLACEMENT OF ANY UNSUITABLE MATERIALS BELOW THE LOW MODULAR BLOCK WALL LIMITS AS DIRECTED BY THE ENGINEER, WILL BE MEASURED AND PAID FOR AS DEFINED IN SECTIONS 120, 140, AND 150.

39 MECHANICALLY STABILIZED EARTH WALL
SCALE: N.T.S.

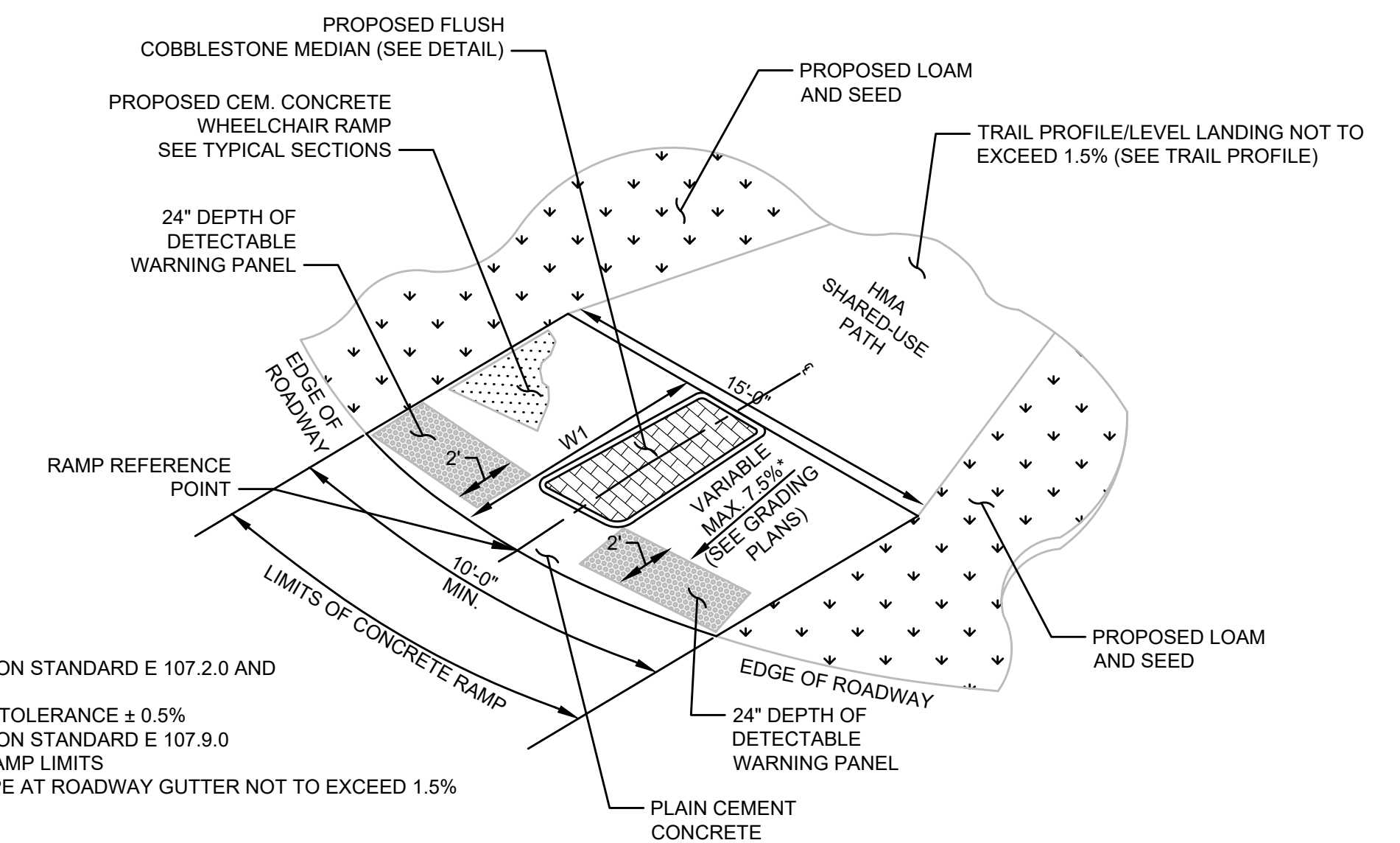


(40) CONCRETE CULVERT REPLACEMENT - STA 167+17
SCALE: AS NOTED

- NOTES:
- ALL RAMP ARE TO BE CONSTRUCTED WITH 6" THICKNESS OF CEMENT CONCRETE.
 - DETECTABLE WARNING PANELS SHALL BE MADE OF CAST IRON AND OTHERWISE CONFORM TO TOWN STANDARDS.



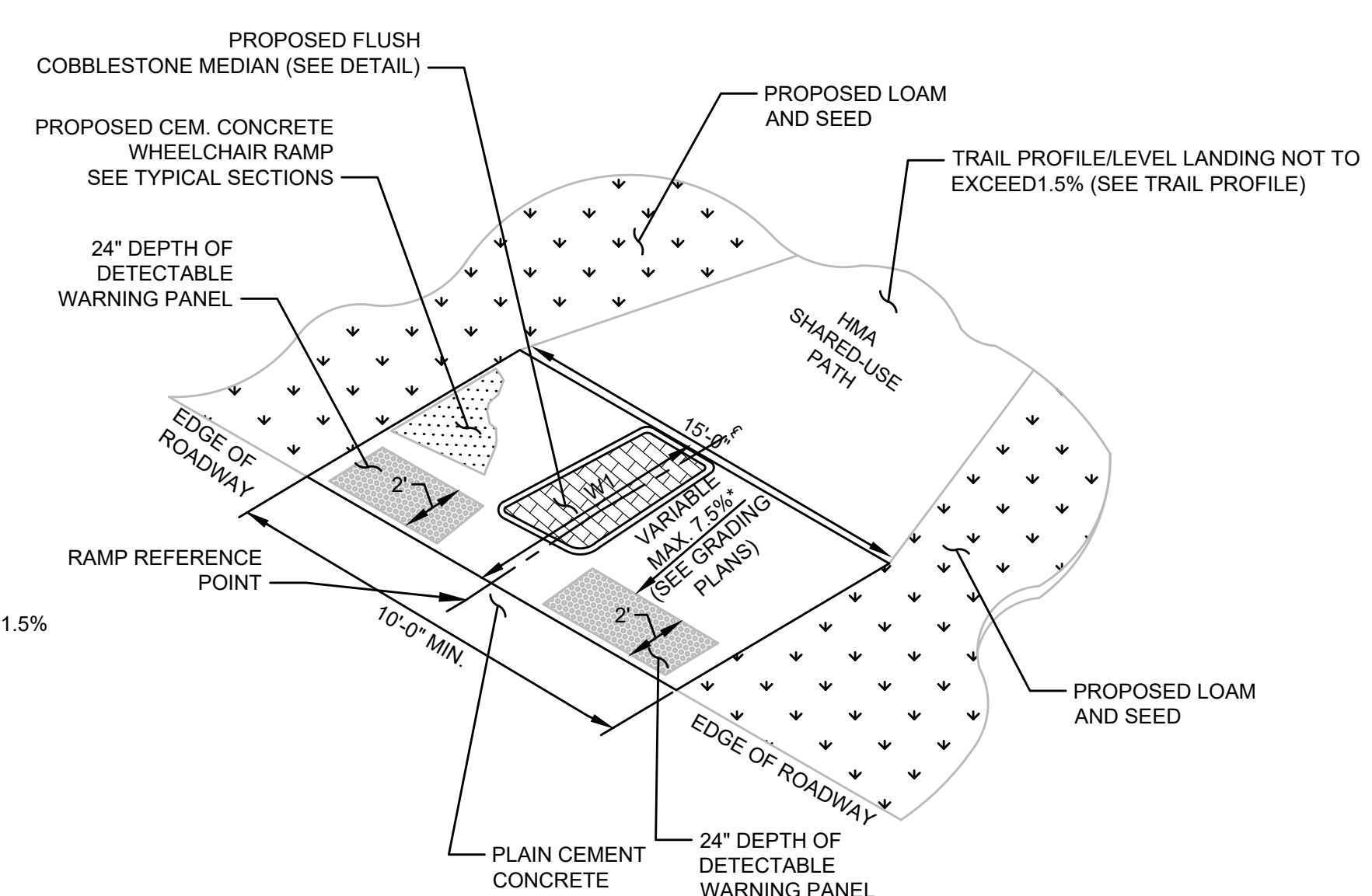
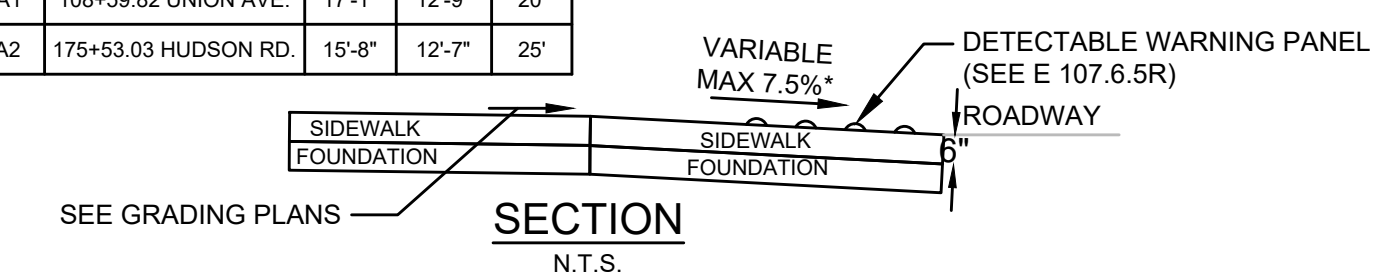
CEMENT CONCRETE RAIL TRAIL ENTRANCE WITH SPLITTER ISLAND
N.T.S.



- NOTES:
- SEE CONSTRUCTION STANDARD E 107.2.0 AND E 107.6.5
 - * CONSTRUCTION TOLERANCE ± 0.5%
 - SEE CONSTRUCTION STANDARD E 107.9.0
 - PC/PT OUTSIDE RAMP LIMITS
 - WCR CROSS SLOPE AT ROADWAY GUTTER NOT TO EXCEED 1.5%

**TYPE A SHARED USE PATH
ENTRANCE/EXIT RAMP ON CORNER RADIUS**
N.T.S.

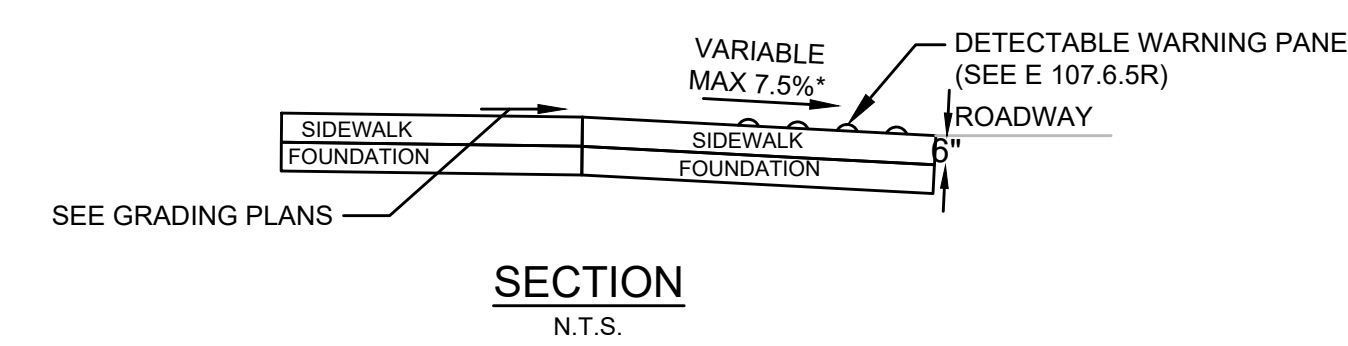
WCR#	RAMP REFERENCE POINT STATION/ ROADWAY	WIDTH OF RAMP (10'-0" MIN.)	LENGTH OF PRIMARY RAMP (W1)	CORNER RADIUS
A1	108+59.82 UNION AVE.	17'-1"	12'-9"	20'
A2	175+53.03 HUDSON RD.	15'-8"	12'-7"	25'



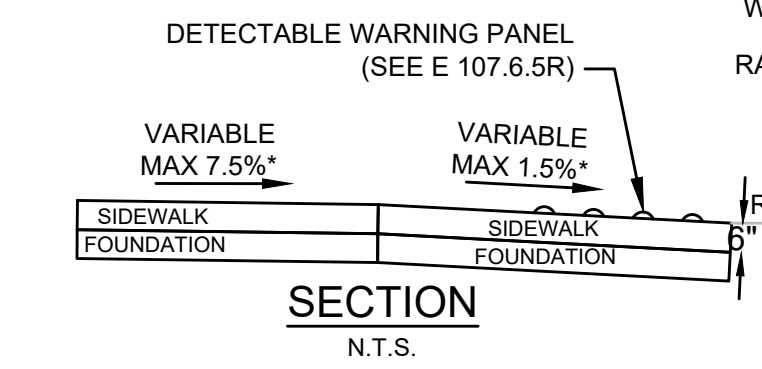
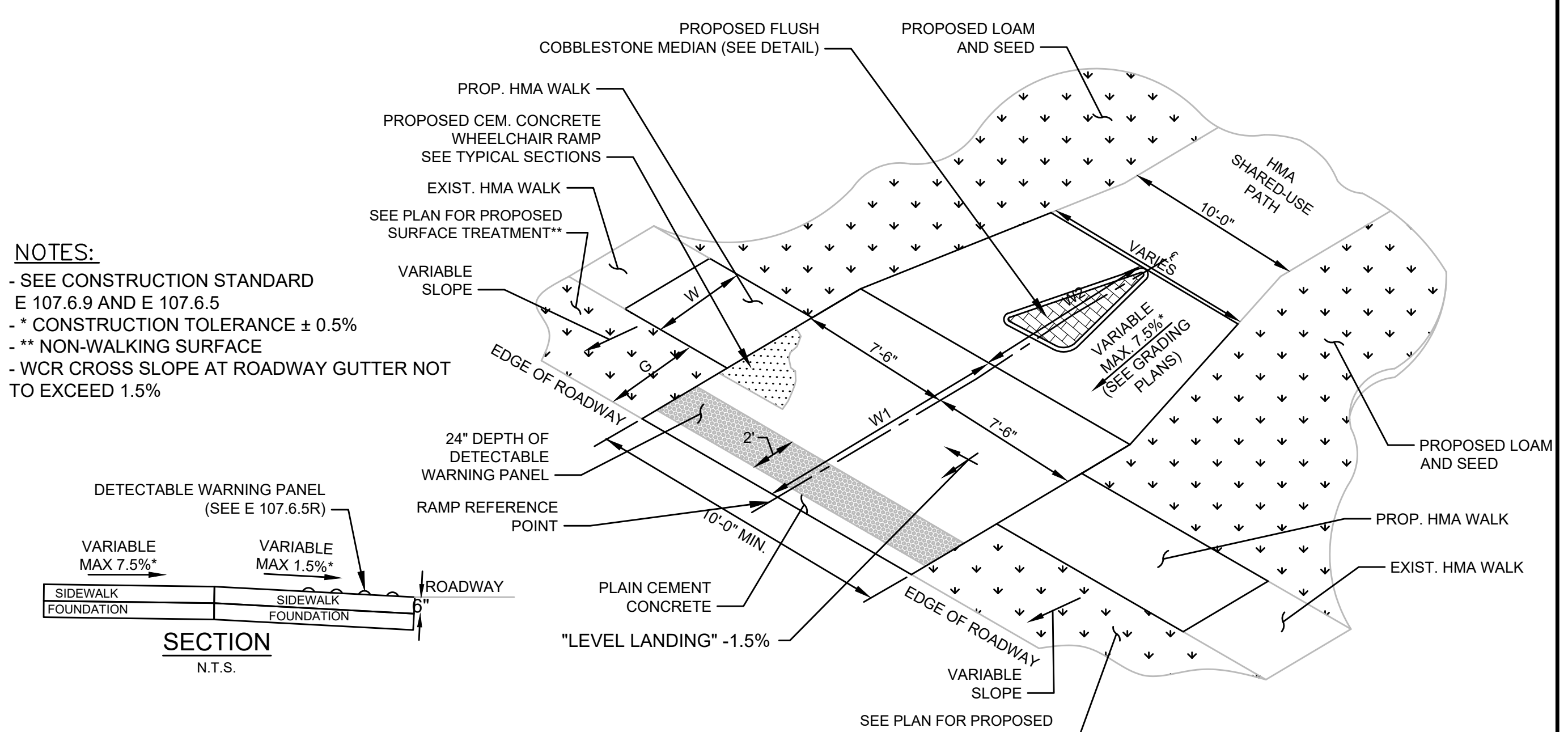
- NOTES:
- SEE CONSTRUCTION STANDARD E 107.2.0 AND E 107.6.5
 - * CONSTRUCTION TOLERANCE ± 0.5%
 - SEE CONSTRUCTION STANDARD E 107.9.0
 - PC/PT OUTSIDE RAMP LIMITS
 - WCR CROSS SLOPE AT ROADWAY GUTTER NOT TO EXCEED 1.5%

WCR#	RAMP REFERENCE POINT STATION/ ROADWAY	WIDTH OF RAMP (10'-0" MIN.)	LENGTH OF PRIMARY RAMP (W1)
B1	108+83.74 UNION AVE.	16'-5"	12'-7"
B2	115+96.13 CODJER LN.	15'-10"	12'-8"
B3	116+20.92 CODJER LN.	15'-1"	12'-7"
B4	142+82.00 OLD LANCASTER RD.	16'-2"	12'-7"
B5	215+94.04 MORSE RD.	16'-0"	12'-7"
B6	274+94.44 HAYNES RD.	15'-0"	12'-3"
B7	275+15.00 HAYNES RD.	15'-0"	12'-9"
B8	307+75.00 NORTH RD.	15'-7"	12'-7"

**TYPE B SHARED USE PATH
ENTRANCE/EXIT RAMP**
N.T.S.

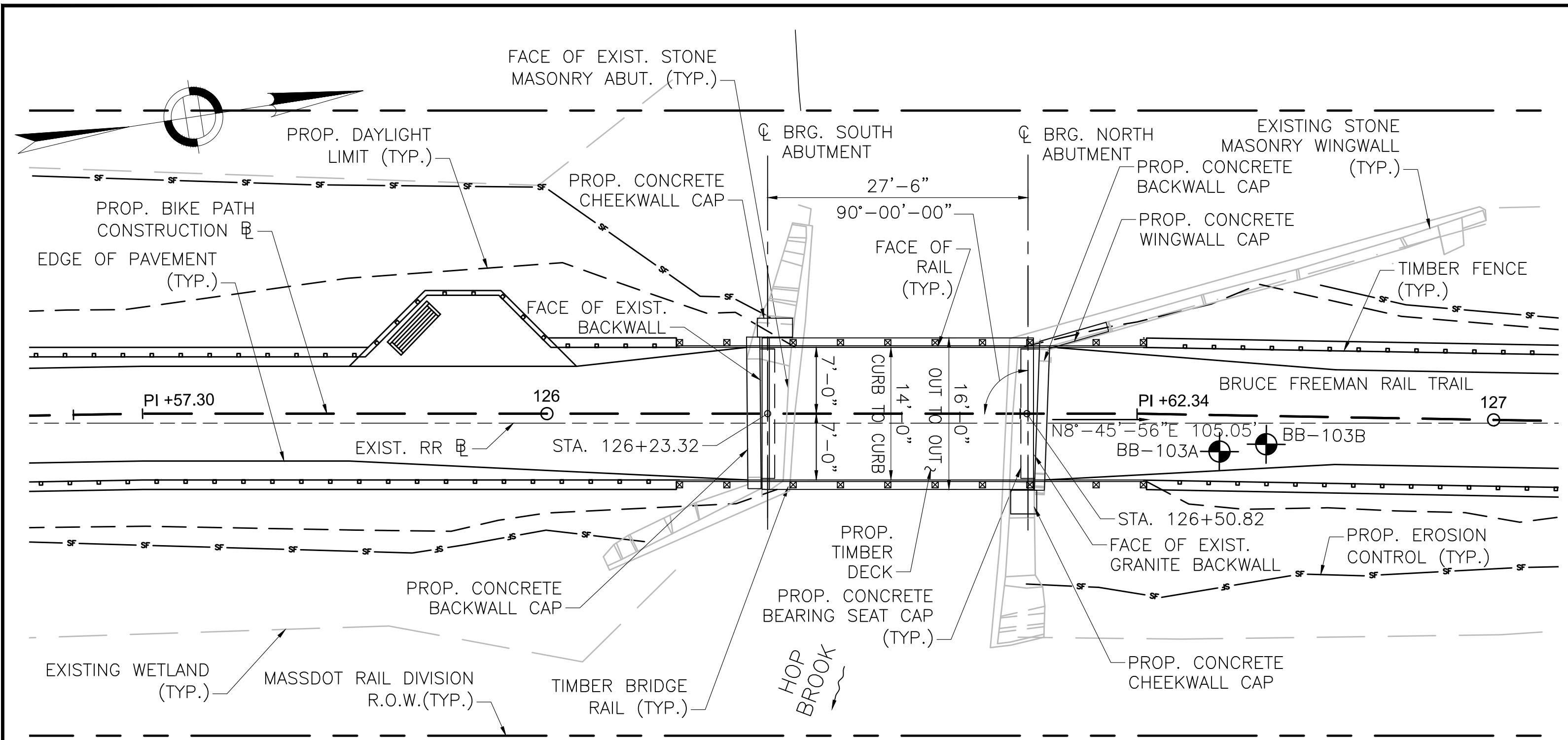


- NOTES:
- SEE CONSTRUCTION STANDARD E 107.6.9 AND E 107.6.5
 - * CONSTRUCTION TOLERANCE ± 0.5%
 - ** NON-WALKING SURFACE
 - WCR CROSS SLOPE AT ROADWAY GUTTER NOT TO EXCEED 1.5%

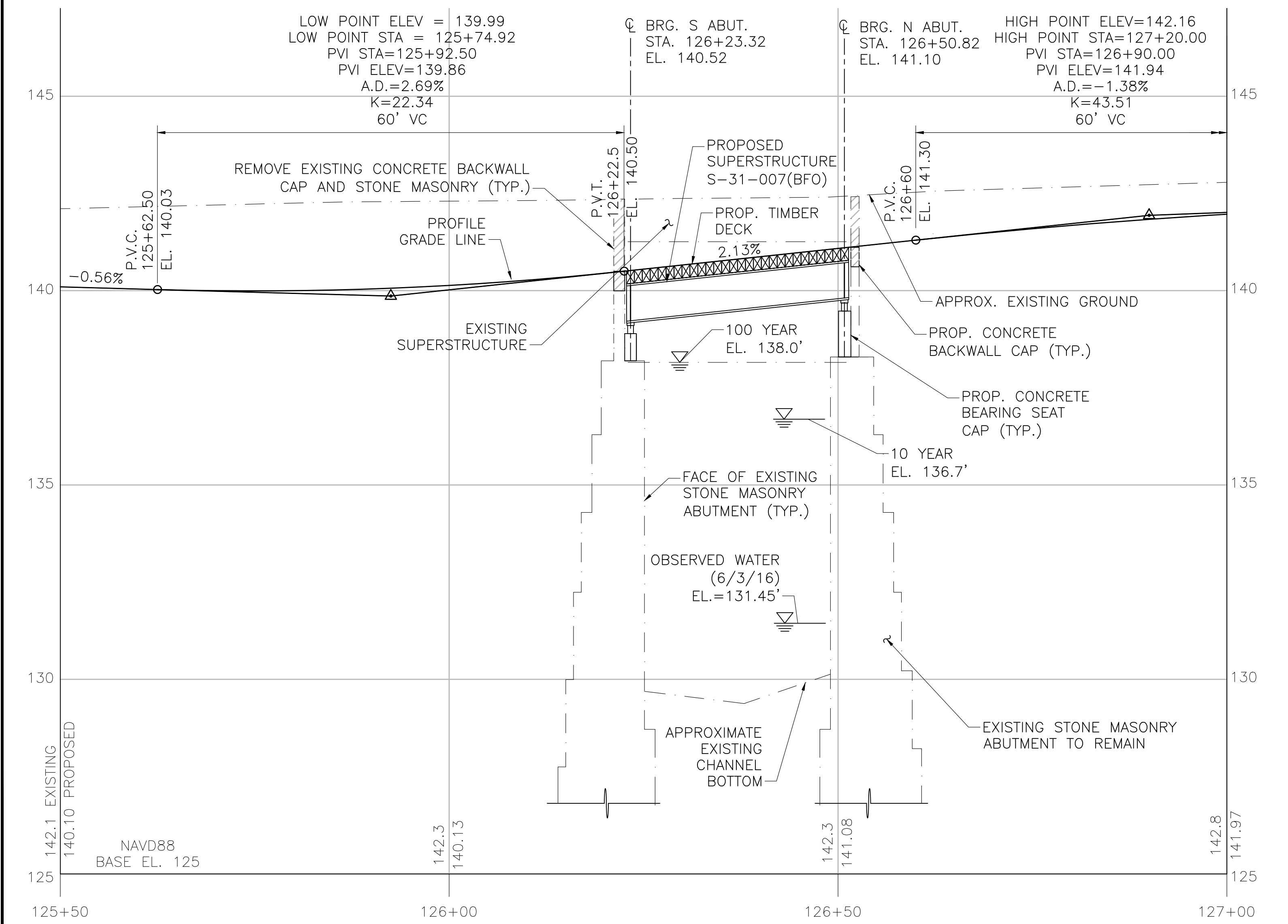


**TYPE C SHARED USE PATH
ENTRANCE/EXIT RAMP**
N.T.S.

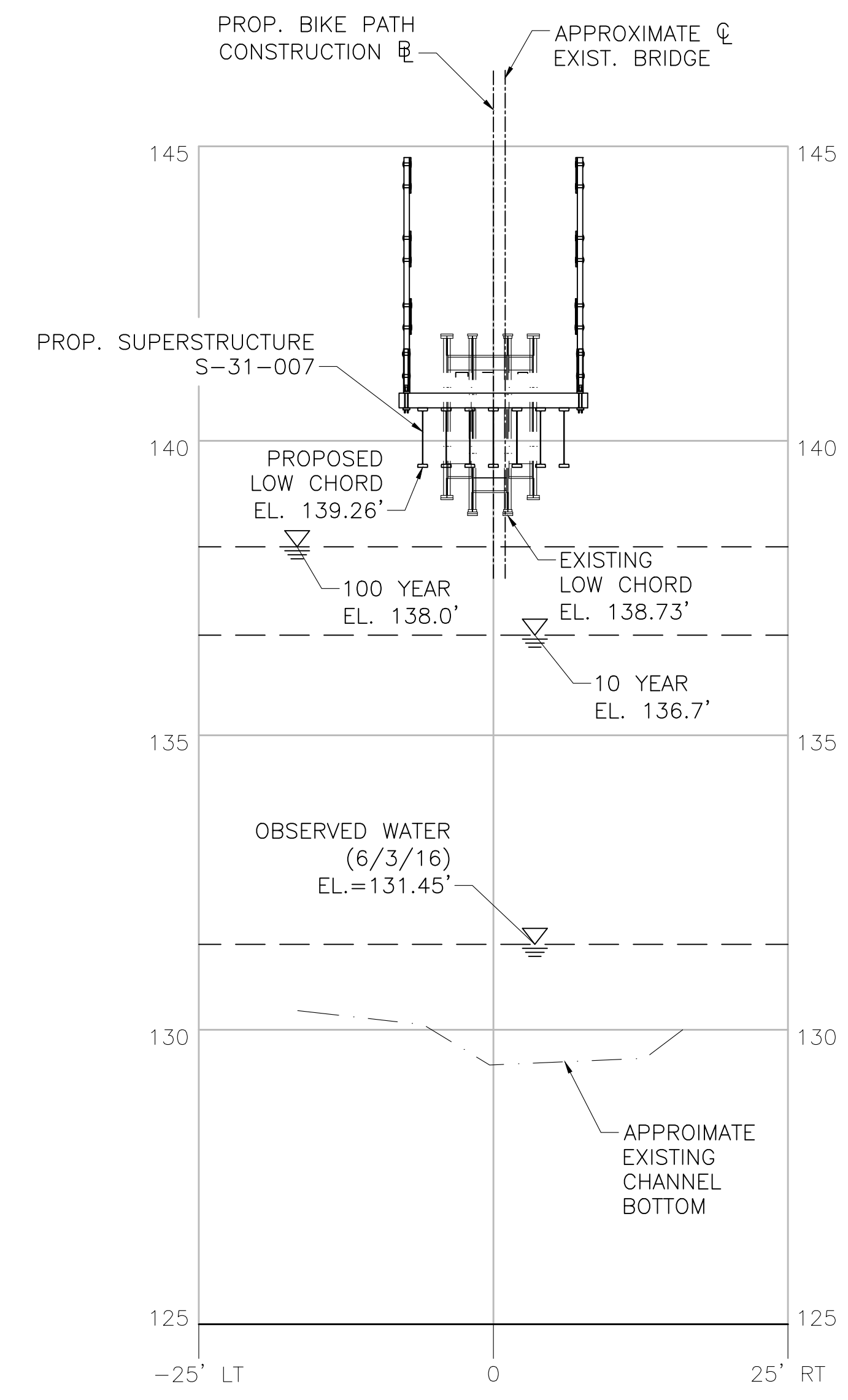
WCR#	RAMP REFERENCE POINT STATION/ ROADWAY	WIDTH OF SIDEWALK (W)	WIDTH OF BUFFER STRIP (S)	WIDTH OF RAMP (10'-0" MIN.)	LENGTH OF PRIMARY RAMP (W1)	LENGTH OF SECONDARY RAMP (W2)
C1	143+04.71 OLD LANCASTER RD.	4'-6"	4'-7"	15'-00"	11'-00"	10'-00"
C2	215+73.57 MORSE RD.	5'-0"	5'-6"	15'-11"	15'-6"	10'-00"
C3	307+48.47 NORTH RD.	8'-0"	4'-4"	15'-6"	19'-0"	10'-0"



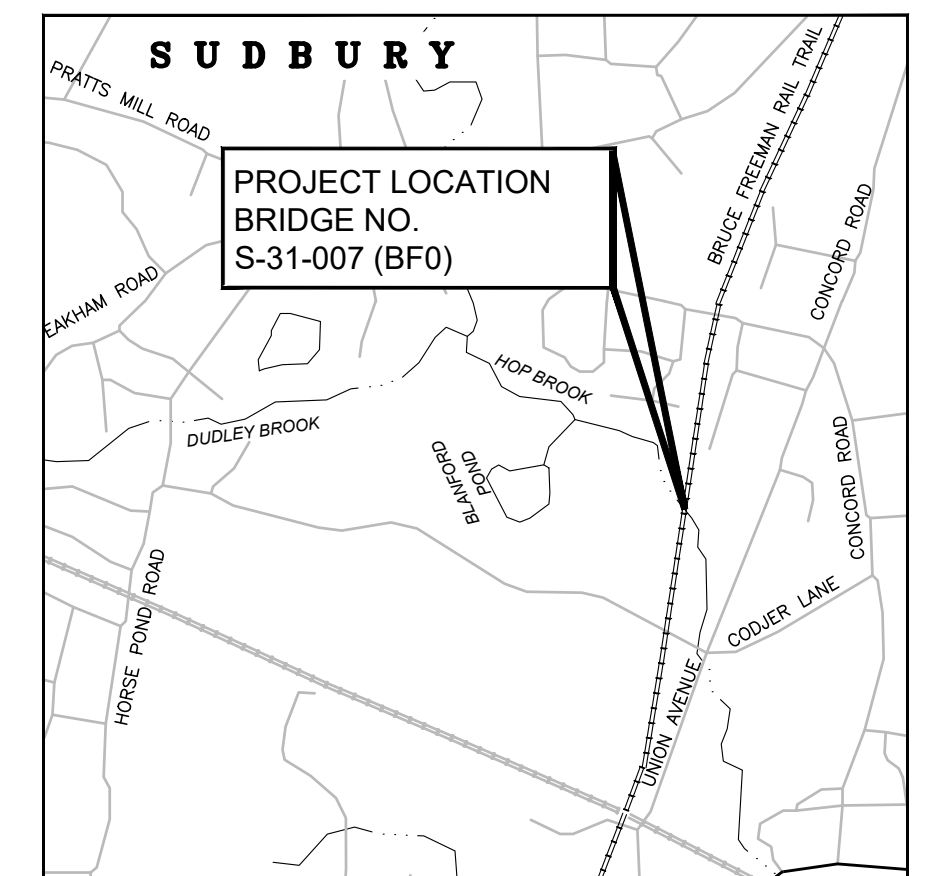
KEY PLAN
SCALE: 1" = 10'-0"



PROFILE ALONG BIKE PATH
HORIZONTAL SCALE: 1" = 10'-0"
VERTICAL SCALE: 1" = 2'-0"



PROFILE ALONG HOP BROOK
HORIZONTAL SCALE: 1" = 10'-0"
VERTICAL SCALE: 1" = 2'-0"



LOCUS PLAN
SCALE: 1" = 1200'

SUDBURY
BIKE PATH OVER HOP BROOK

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	221	318
PROJECT FILE NO.		608164	

KEY PLAN & PROFILE

ESTIMATED QUANTITIES:
(NOT GUARANTEED)

ITEM:	QUANTITY:	
DEMOLITION OF SUPERSTRUCTURE OF BRIDGE NO. S-31-007	1	LS
REINFORCED CONCRETE EXCAVATION	3	CY
BRIDGE EXCAVATION	5	CY
CLASS B ROCK EXCAVATION	5	CY
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	2	CY
STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	6	CY
MASONRY REPOINTING	65	SY
CONTROL OF WATER - STRUCTURE NO. S-31-007	1	LS
BRIDGE SUPERSTRUCTURE, BRIDGE NO. S-31-007	1	LS

INDEX

SHEET NO.	DESCRIPTION
1	KEY PLAN AND PROFILE
2	GENERAL NOTES
3	BORING LOGS
4	GENERAL PLAN AND ELEVATION
5	ABUTMENT REMOVAL PLANS AND ELEVATIONS
6	SOUTH ABUTMENT PLAN AND ELEVATION
7	NORTH ABUTMENT PLAN AND ELEVATION
8	SUBSTRUCTURE DETAILS
9	BEARING DETAILS
10	FRAMING PLAN AND STRUCTURAL STEEL DETAILS
11	DECK DETAILS AND TYPICAL SECTION
12	TIMBER BRIDGE RAIL DETAILS

P.E. STAMP SIGNATURE

FUSS & O'NEILL
1550 MAIN STREET, SUITE 400
SPRINGFIELD, MA 01103
413.452.0445
www.fando.com

MONTH DD, YYYY ISSUED FOR CONSTRUCTION

massDOT
Highway Division
PROPOSED SUPERSTRUCTURE REPLACEMENT
SUDBURY
PROPOSED BIKE PATH OVER HOP BROOK
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
10 PARK PLAZA BOSTON, MASS

TITLE: _____ CHIEF ENGINEER

608164_BRI(S-31-007)(FIRST SHEET).DWG Plotted on 12-May-2021 9:29 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

SUDBURY BIKE PATH OVER HOP BROOK			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	222	318
PROJECT FILE NO.		608164	

GENERAL NOTES

GENERAL NOTES:

DESIGN:

IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIM SPECIFICATIONS THROUGH 2021 FOR H-10 VEHICULAR AND 90 PSF PEDESTRIAN LOADINGS.

MASSDOT BENCH MARK:

BM #5 CHISEL SQUARE FOUND
FEMA RM 6-1
ELEV. = 141.73'

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

SURVEY NOTEBOOKS:

SURVEY PERFORMED BY VANASSE HANGEN BRUSTLIN, INC FIELD NOTEBOOKS SHALL BE OBTAINED FROM FUSS AND O'NEILL, INC. SPRINGFIELD, MA.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE PRINTS (A3).

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE OF THE PROPOSED STRUCTURE, AS DIRECTED BY THE ENGINEER.

DIMENSIONS:

ALL DIMENSIONS SHOWN ON PLANS ARE FOR STRUCTURES AT 68' F, UNLESS OTHERWISE NOTED.

EXISTING CONSTRUCTION:

DIMENSIONS SHOWN ARE TAKEN FROM SURVEY, VARIOUS FIELD MEASUREMENTS, AND GEOTECHNICAL EXPLORATION AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE AND NOT ORDER ANY MATERIAL OR COMMENCE ANY FABRICATION UNTIL HE HAS MADE THE REQUIRED MEASUREMENTS ON THE ACTUAL STRUCTURE AND THE EXTENT OF THE PROPOSED WORK HAS BEEN APPROVED BY THE ENGINEER.

GEOTECHNICAL REPORT:

REFER TO GEOTECHNICAL REPORT DATED APRIL 24, 2020 BY JACOBS ENGINEERING GROUP, INC.

HYDRAULIC REPORT:

REFER TO HOP BROOK MEMORANDUM DATED APRIL 20, 2020 BY JACOBS ENGINEERING GROUP, INC.

TIMBER:

ALL STRUCTURAL TIMBER FOR DECKING SHALL BE MIXED SOUTHERN PINE GRADE 1 OR APPROVED EQUAL.

CONCRETE:

ALL CONCRETE SHALL BE 4,000 HP CONCRETE.

REINFORCEMENT:

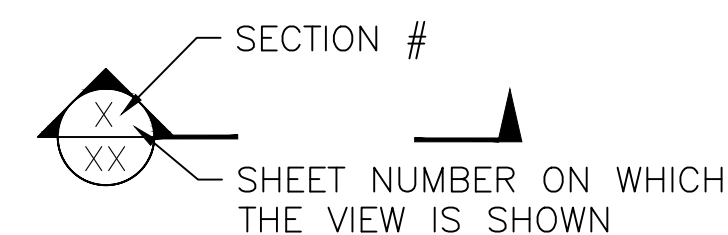
REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS	#6 BARS
1. NONE	16"	19"	23"
2. 12" OF CONCRETE BELOW BAR	20"	25"	30"
3. EPOXY COATED BARS, COVER < 3d _b , OR CLEAR SPACING < 6d _b	23"	29"	34"
4. COATED BARS, ALL OTHER CASES	18"	23"	27"
5. CONDITION 2. AND 3.	26"	32"	39"
6. CONDITION 2. AND 4.	24"	30"	36"

ALL OTHER BARS SHOULD BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

ALL REINFORCEMENT IN CONCRETE BACKWALL, BEARING SEAT, CHEEKWALL, AND WINGWALL CAPS SHALL BE EPOXY COATED.

SECTION MARK:



TRAFFIC DATA		
	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	N/A	
AVERAGE DAILY TRAFFIC -- PRESENT	N/A	
AVERAGE DAILY TRAFFIC -- DESIGN YEAR	N/A	
DESIGN HOURLY VOLUME	N/A	
DIRECTIONAL DISTRIBUTION	N/A	
TRUCK PERCENTAGE -- AVERAGE DAY	N/A	
TRUCK PERCENTAGE -- PEAK HOUR	N/A	
DESIGN SPEED	18 MPH	
DIRECTIONAL DESIGN HOURLY VOLUME	N/A	

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1,000
DESIGN SPECTRA	
As	0.11
SDs	0.23
SD1	0.09
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

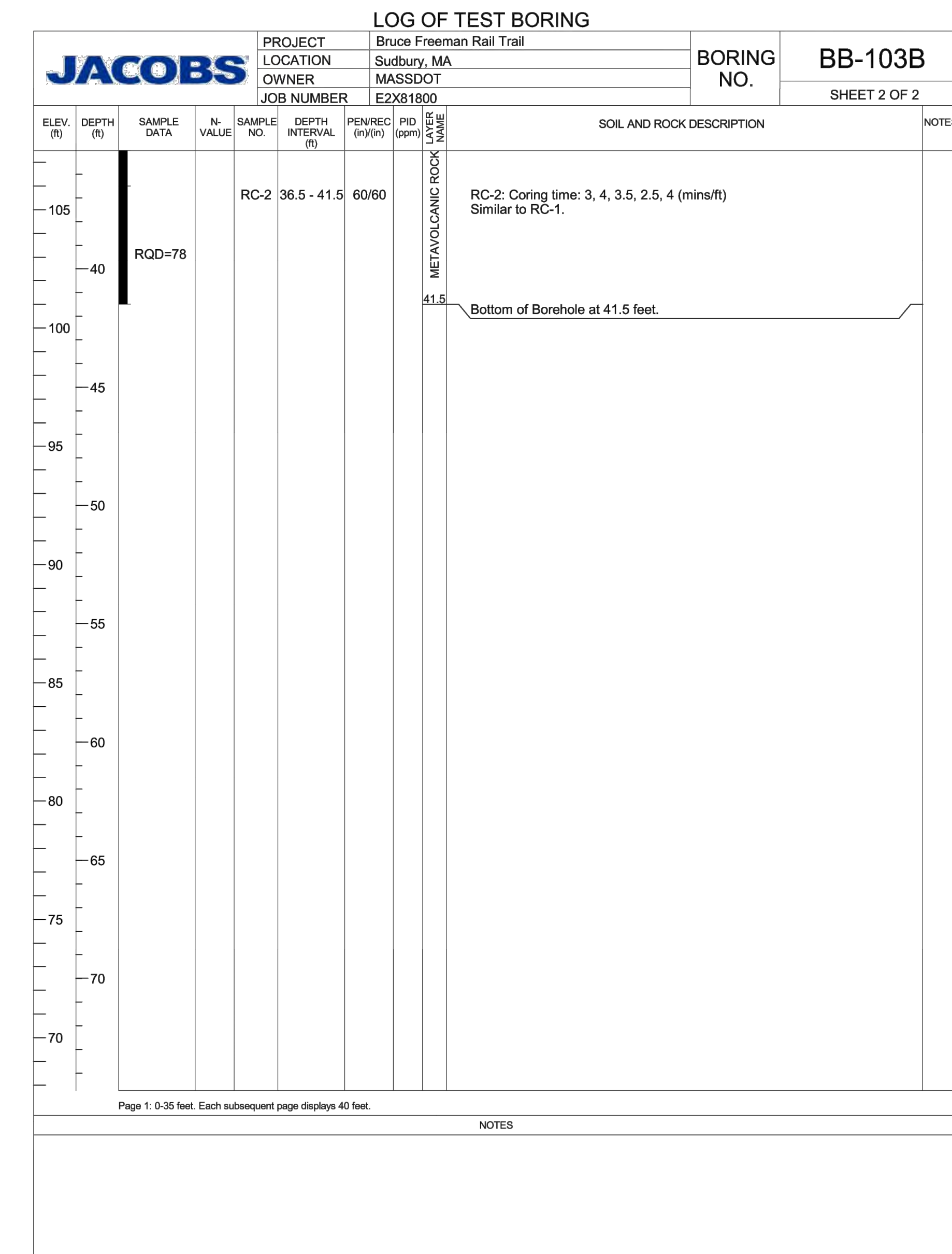
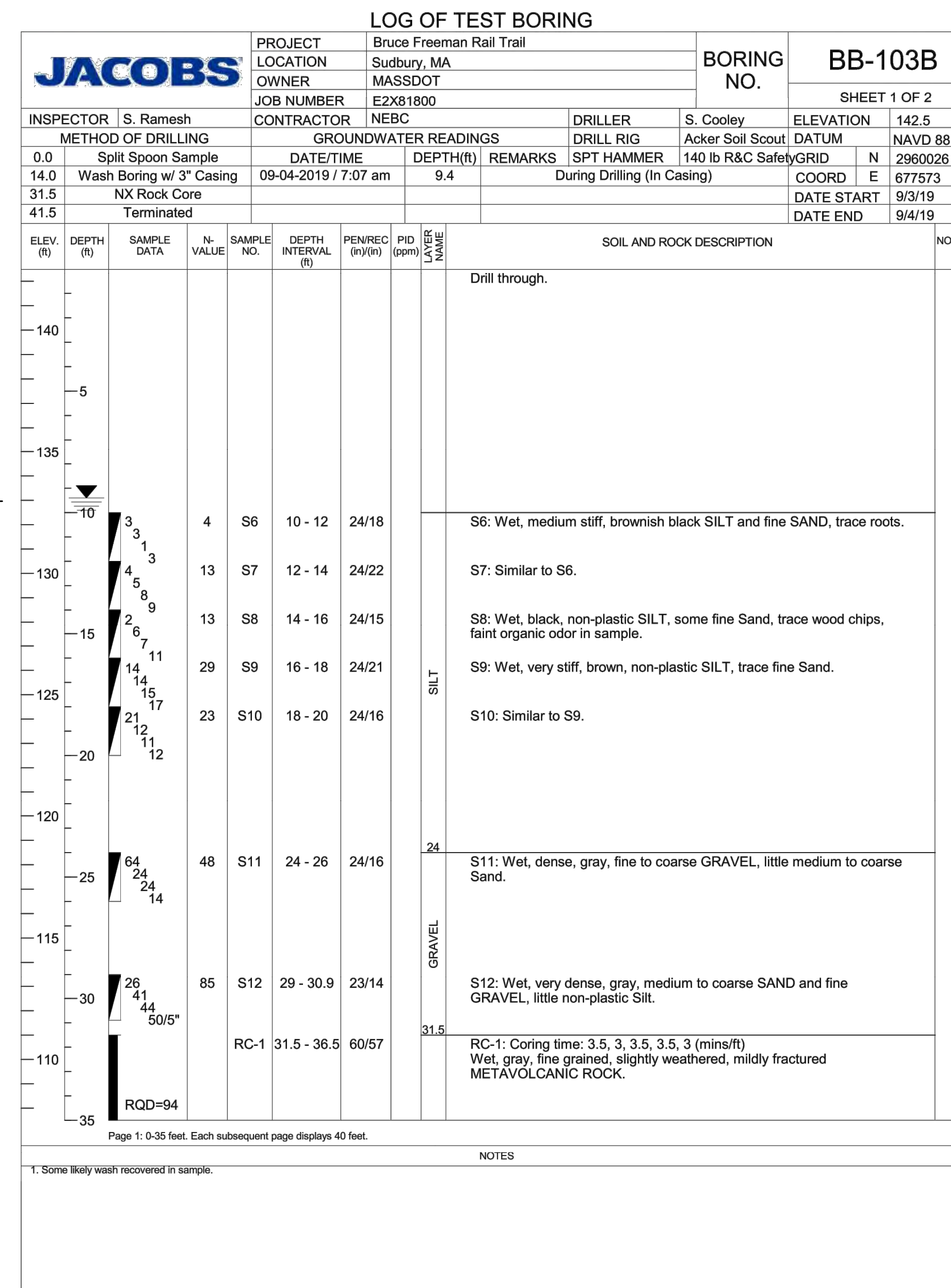
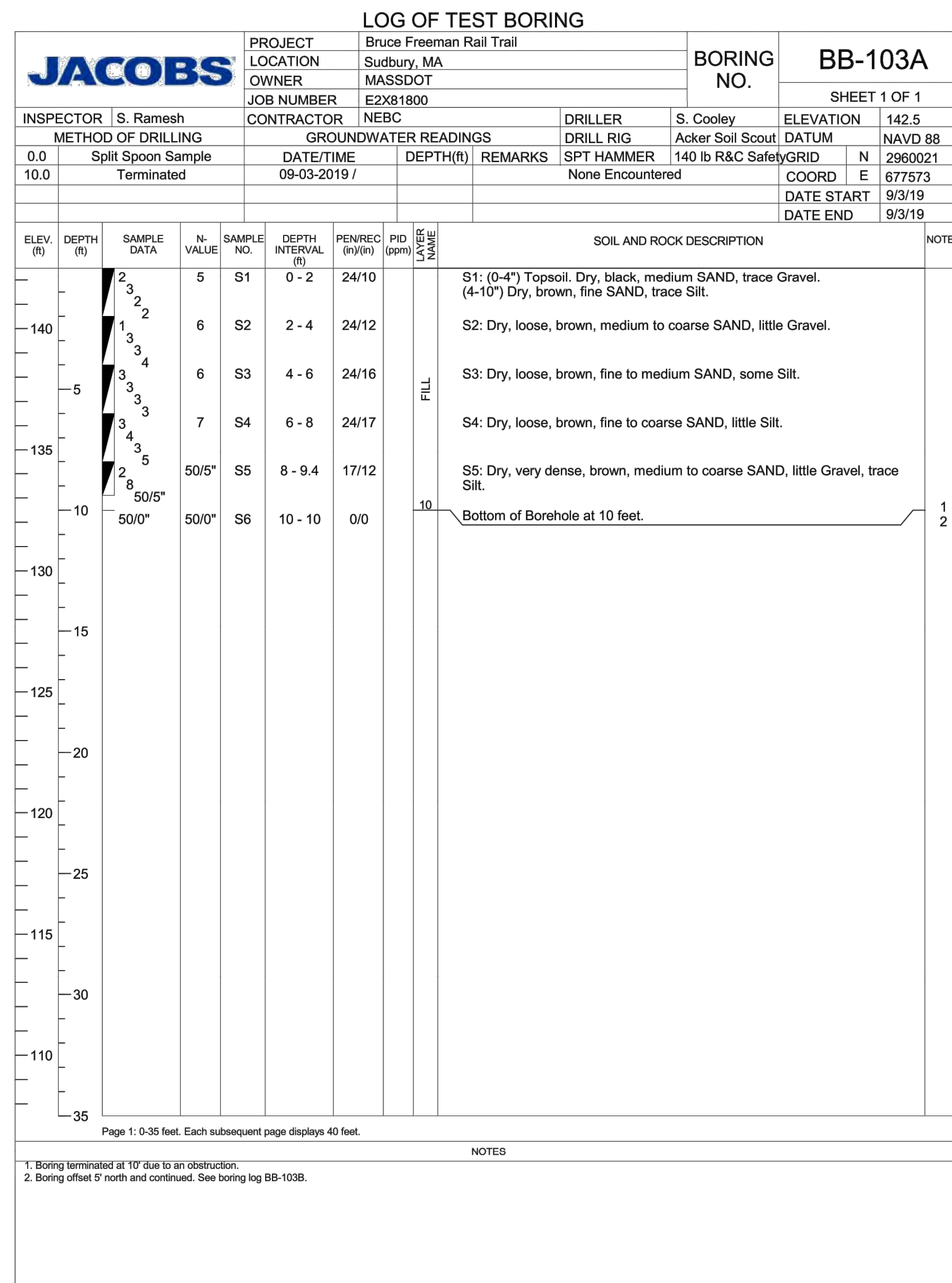
HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	14.7
DESIGN FLOOD DISCHARGE (C.F.S)	452
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S)	2.66
DESIGN FLOOD ELEVATION (FEET, NAVD)	136.7

BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S)	881
BASE FLOOD ELEVATION (FEET, NAVD)	138.2

DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	25
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	N/A
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	50
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	N/A
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A

FLOOD OF RECORD	
DISCHARGE (C.F.S.)	N/A
FREQUENCY (IF KNOWN, YEARS)	N/A
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	N/A
HISTORY OF ICE FLOES	N/A
EVIDENCE OF SCOUR AND EROSION	N/A

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	



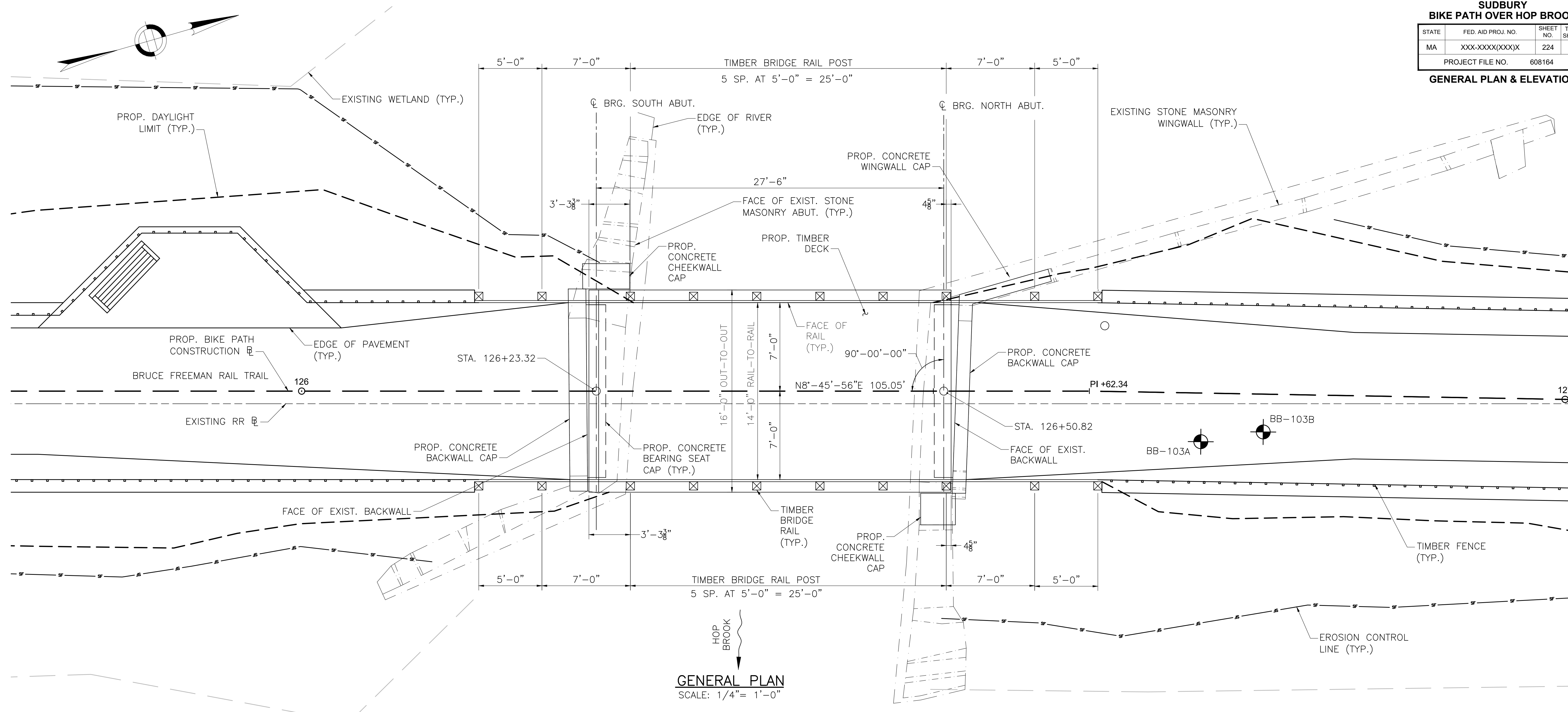
BORING NOTES:

- LOCATION OF BORINGS SHOWN ON THE PLANS THUS: BB-#
- BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
- WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
- FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 1/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
- BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHRUP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
- ALL BORINGS WERE MADE IN SEPTEMBER 2019.
- BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTOR, INC., P.O. BOX 165, DERRY, NH 03038.
- THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.

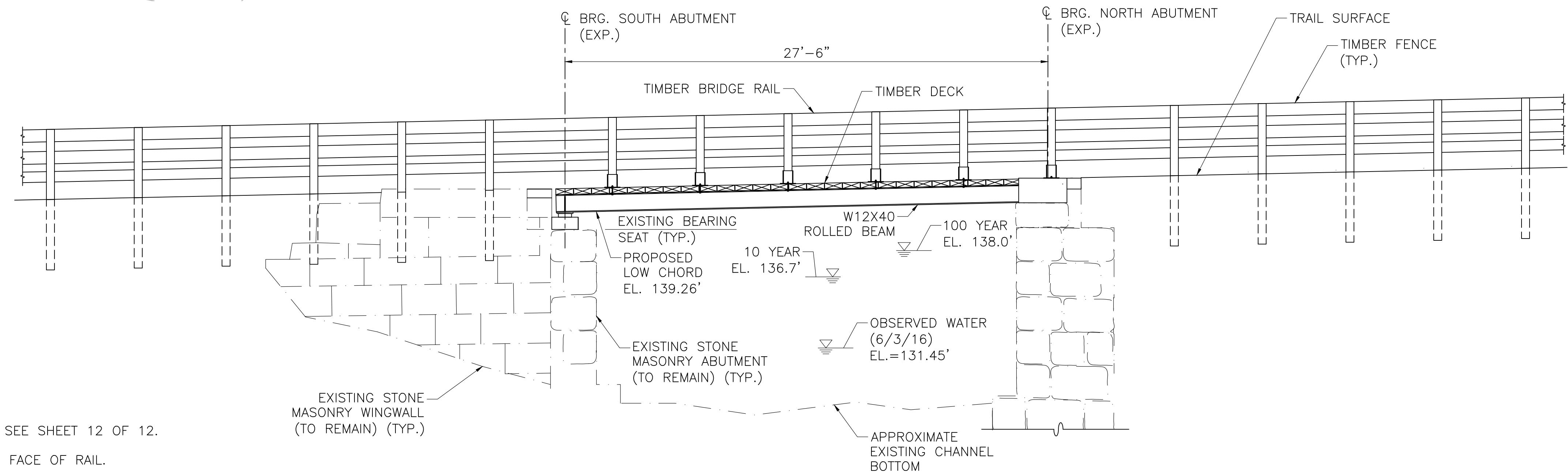
GROUNDWATER:

THE WATER LEVEL RECORDED IN THE TABLE ARE THOSE MEASURED ON THE DATES GIVEN AND DO NOT NECESSARILY REPRESENT GROUNDWATER LEVEL AT THE TIME OF CONSTRUCTION.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	



GENERAL PLAN
SCALE: 1/4" = 1'-0"



EAST BRIDGE ELEVATION
SCALE: 1/4" = 1'-0"

- NOTES:**
- FOR TIMBER BRIDGE RAIL DETAILS, SEE SHEET 12 OF 12.
 - RAIL POSTS ARE MEASURED ALONG FACE OF RAIL.

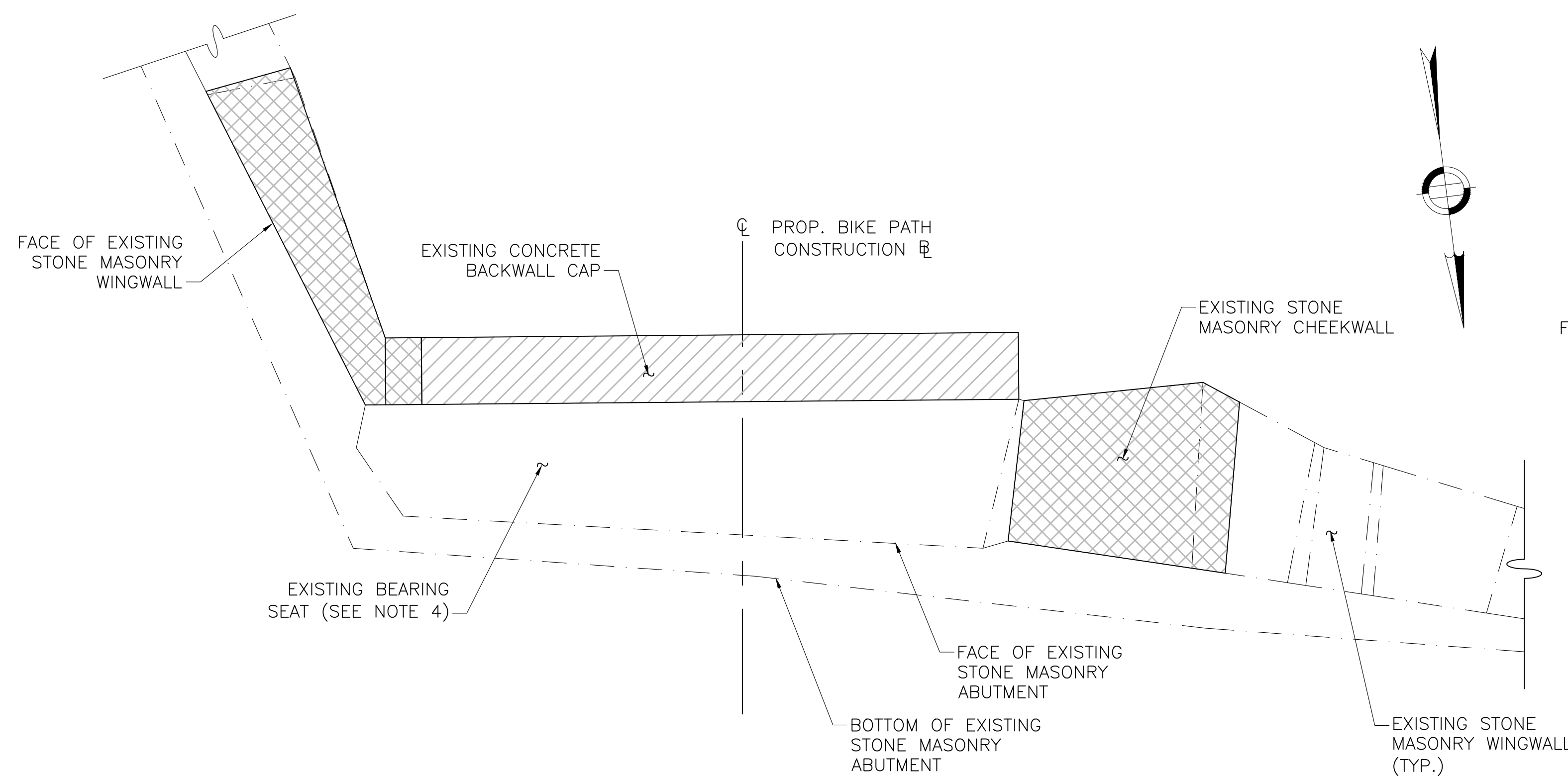
NOTE:
DECK END PLATE NOT SHOWN FOR CLARITY.
SEE SHEET 11 FOR PLATE DETAILS.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

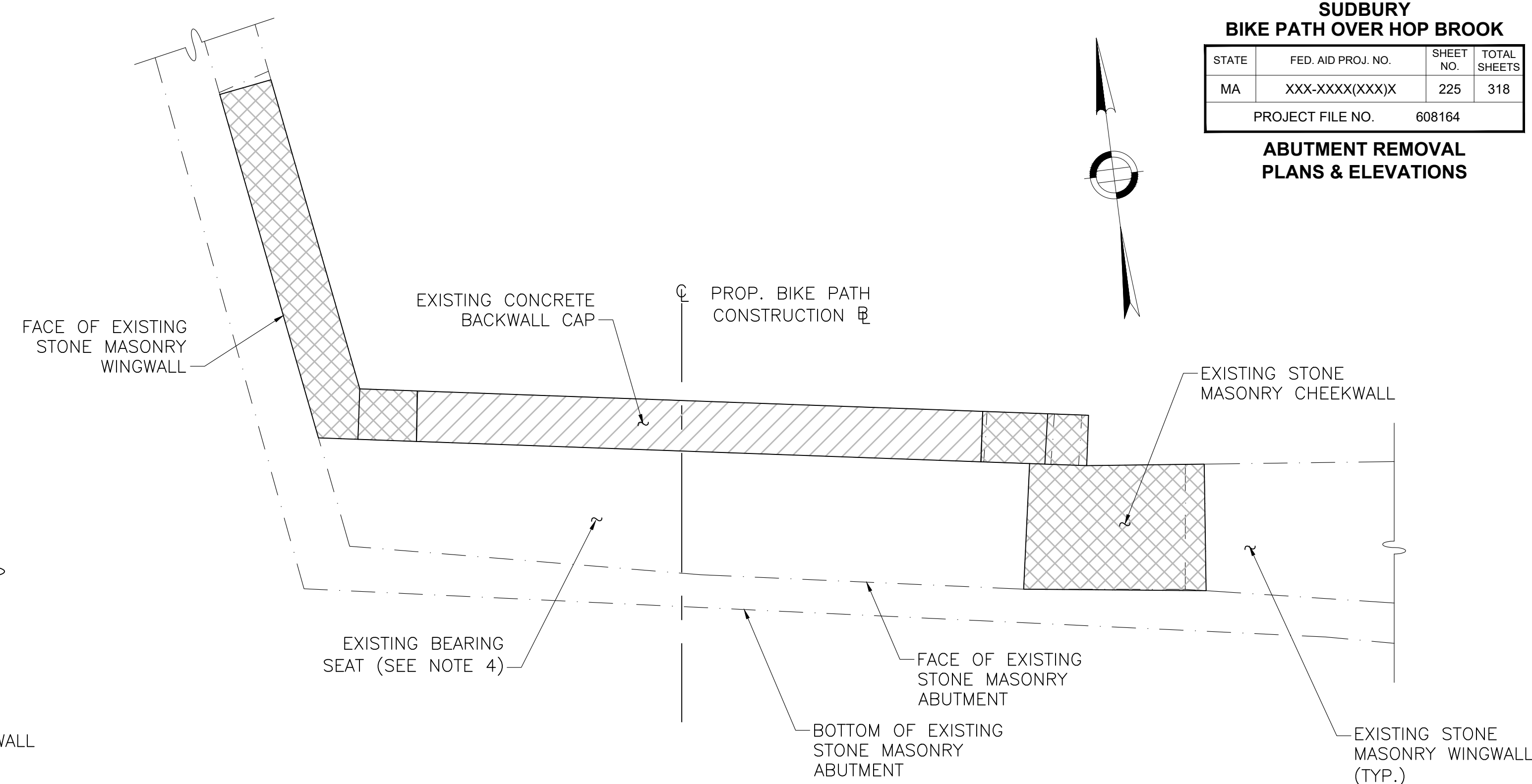
608164_BRF(S-31-007)GENPLAN.DWG Plotted on 12-May-2021 9:30 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

SUDBURY BIKE PATH OVER HOP BROOK			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	225	318
PROJECT FILE NO.		608164	

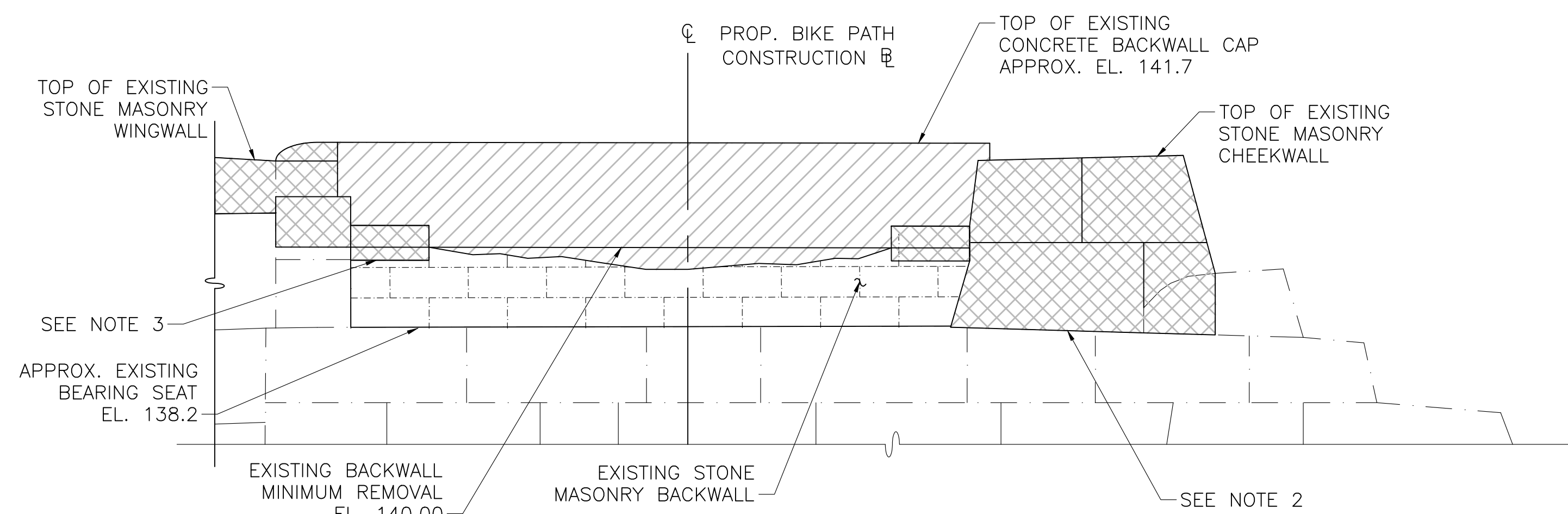
**ABUTMENT REMOVAL
PLANS & ELEVATIONS**



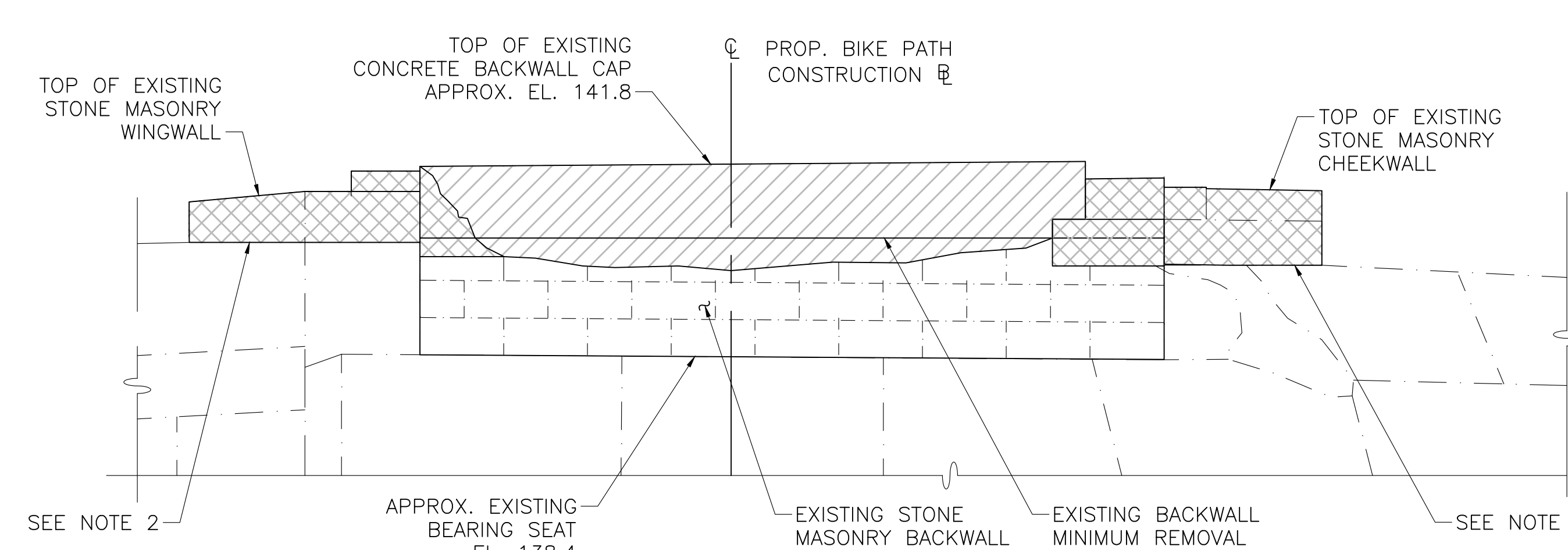
SOUTH ABUTMENT REMOVAL PLAN
SCALE: 1/2"=1'-0"



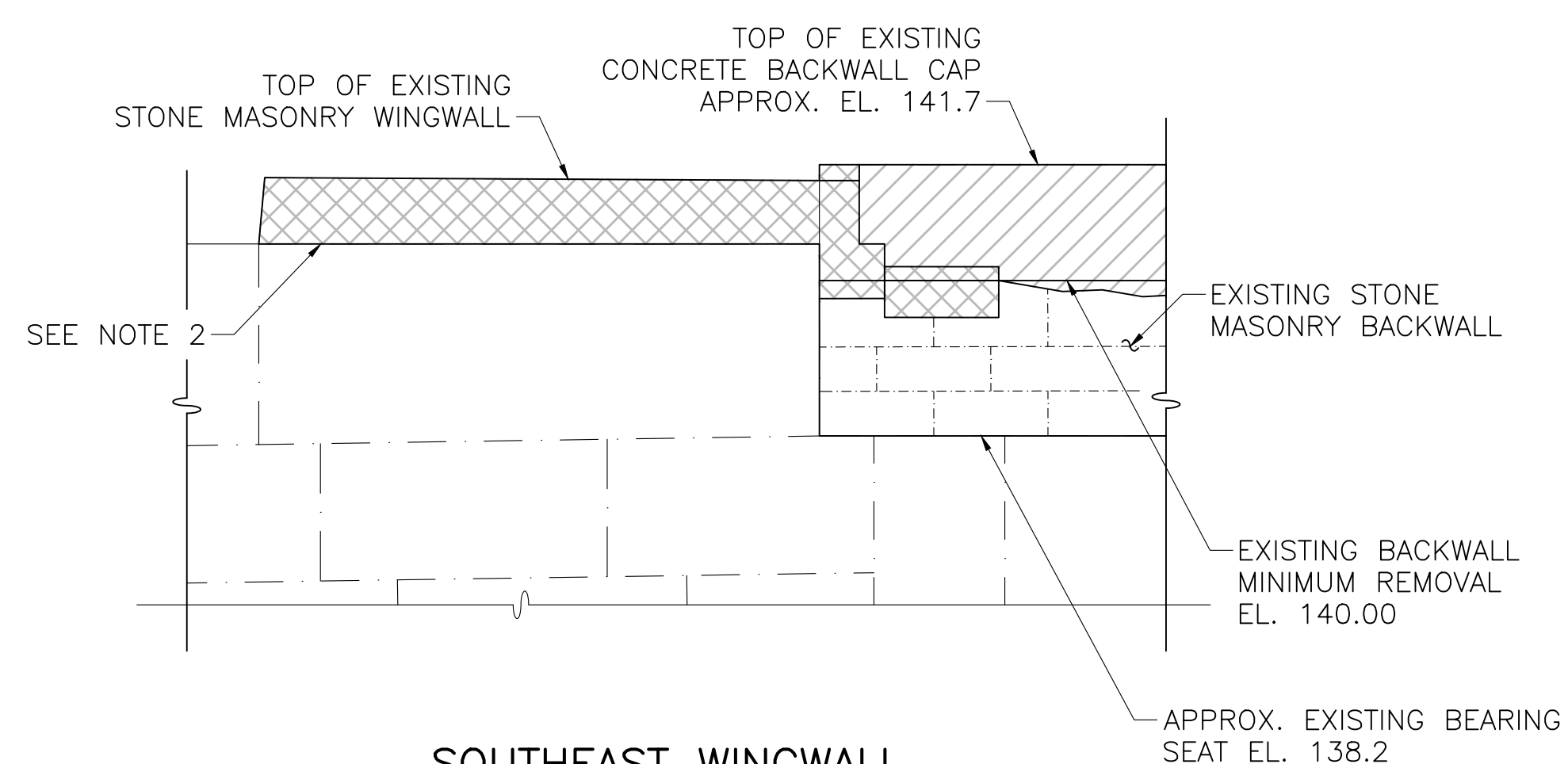
NORTH ABUTMENT REMOVAL PLAN
SCALE: 1/2"=1'-0"



SOUTH ABUTMENT AND SOUTHWEST WINGWALL REMOVAL ELEVATION
SCALE: 1/2"=1'-0"



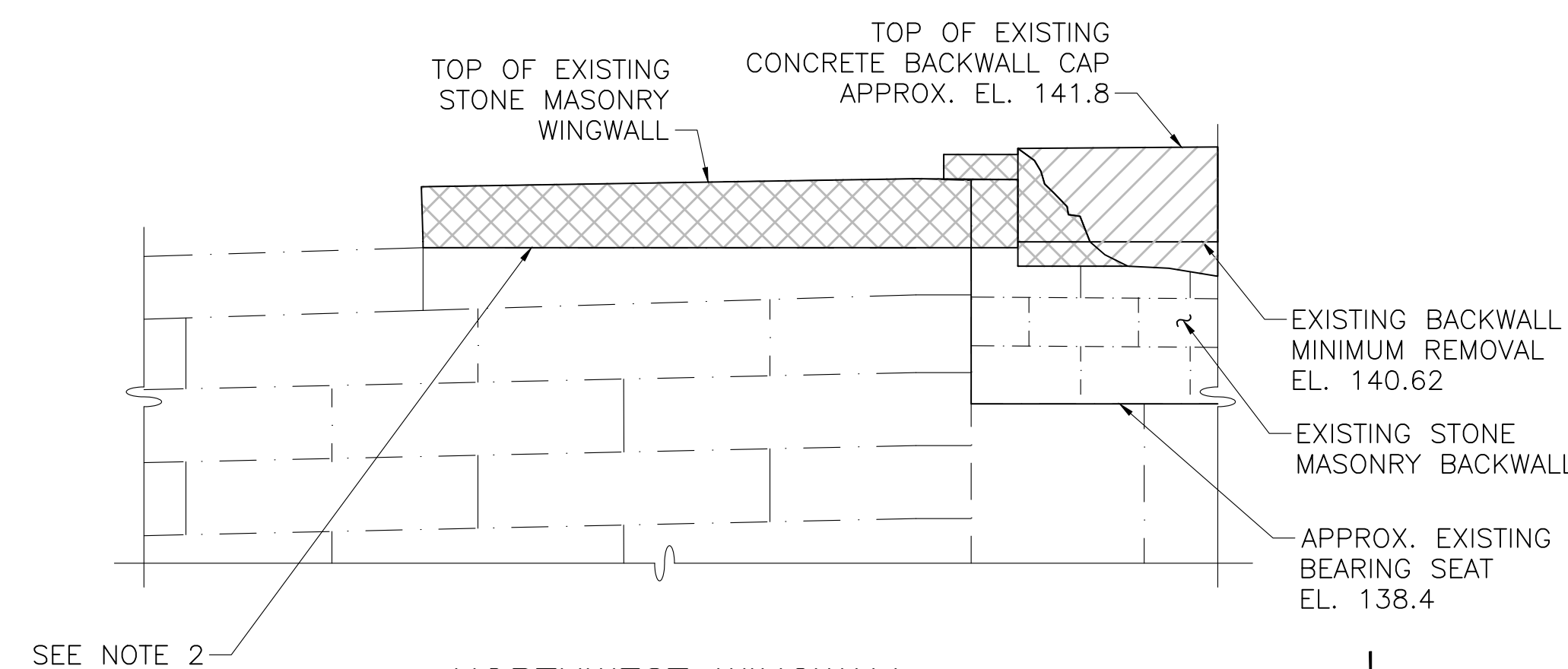
NORTH ABUTMENT AND NORTHEAST WINGWALL REMOVAL ELEVATION
SCALE: 1/2"=1'-0"



**SOUTHEAST WINGWALL
REMOVAL ELEVATION**
SCALE: 1/2"=1'-0"

EXISTING SUBSTRUCTURE REMOVAL NOTES:

1. BOTTOM OF EXISTING CONCRETE BACKWALL CAP VARIES. REMOVAL LIMITS SHALL EXTEND TO AT LEAST THE MINIMUM REMOVAL ELEVATION AS SHOWN ON THIS SHEET. FINAL REMOVAL LIMITS SHALL BE DETERMINED BY THE ENGINEER. PAYMENT FOR EXISTING CONCRETE BACKWALL REMOVAL SHALL BE INCLUDED IN ITEM 127.1, "REINFORCED CONCRETE EXCAVATION".
2. FINAL EXISTING STONE MASONRY CHEEKWALL AND WINGWALL REMOVAL LIMITS SHALL BE DETERMINED BY THE ENGINEER. PAYMENT FOR EXISTING STONE MASONRY REMOVAL, INCLUDING STONE MASONRY PORTIONS OF THE EXISTING ABUTMENT BACKWALLS, SHALL BE INCLUDED UNDER ITEM 144, "CLASS B ROCK EXCAVATION".
3. WHEN THE HORIZONTAL JOINT IN THE STONE FALLS BELOW THE MINIMUM REMOVAL ELEVATION, THE STONES OR PORTIONS OF STONES SHALL BE REMOVED BY MECHANICAL METHODS. WITH APPROVAL OF THE ENGINEER, THE ENTIRE STONE SHALL BE REMOVED AND REPLACED WITH 4,000 PSI, 3/4 INCH, 610 CEMENT CONCRETE IN LIEU OF MECHANICAL METHODS.
4. THE EXISTING ABUTMENT BEARING SEATS SHALL BE BLAST CLEANED OF EFFLORESCENCE AND DEBRIS AS DIRECTED BY THE ENGINEER. PAYMENT SHALL BE INCIDENTAL TO ITEM 995.



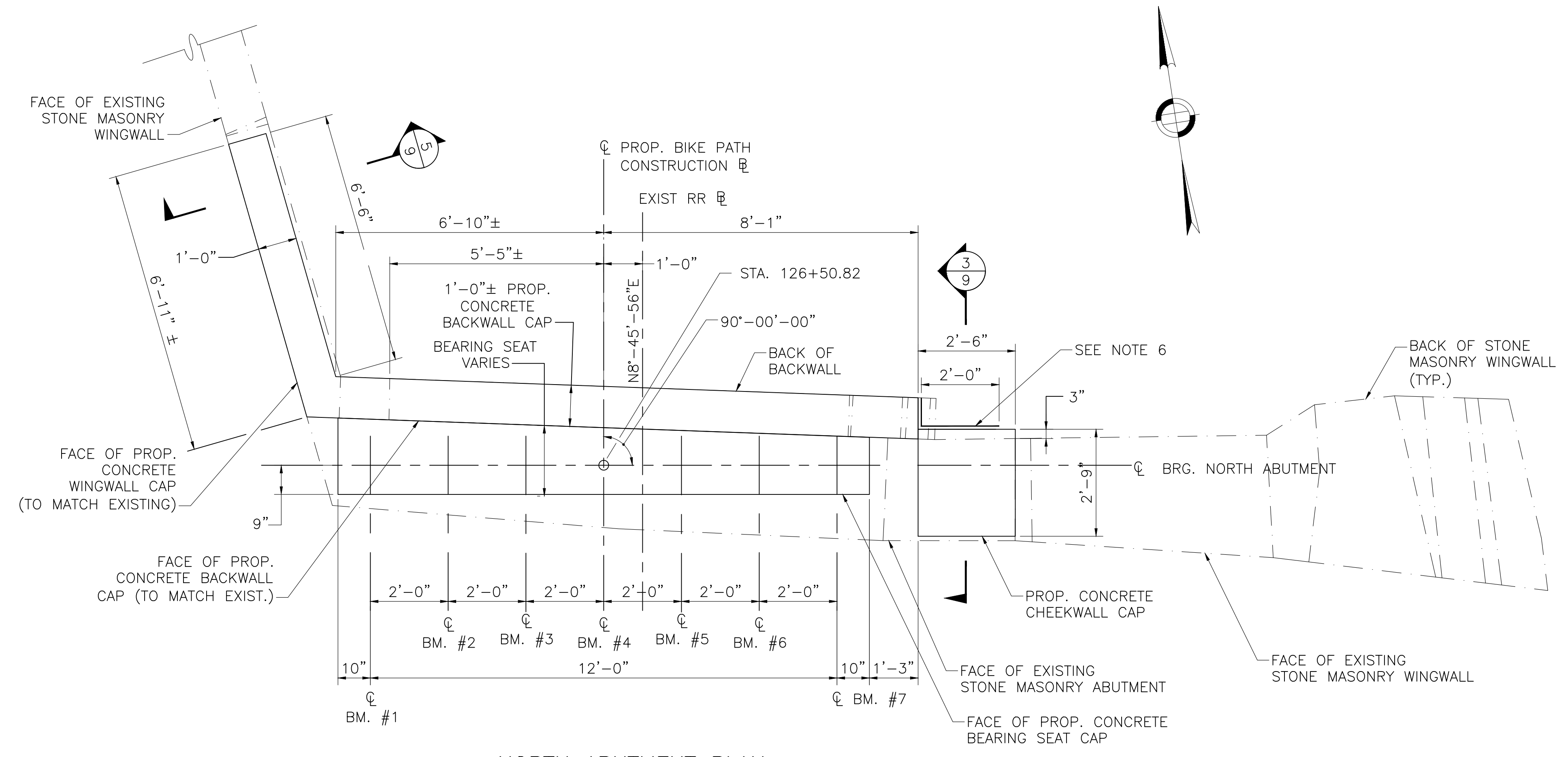
**NORTHWEST WINGWALL
REMOVAL ELEVATION**
SCALE: 1/2"=1'-0"

LEGEND

	CONCRETE REMOVAL LIMITS
	MASONRY REMOVAL LIMITS

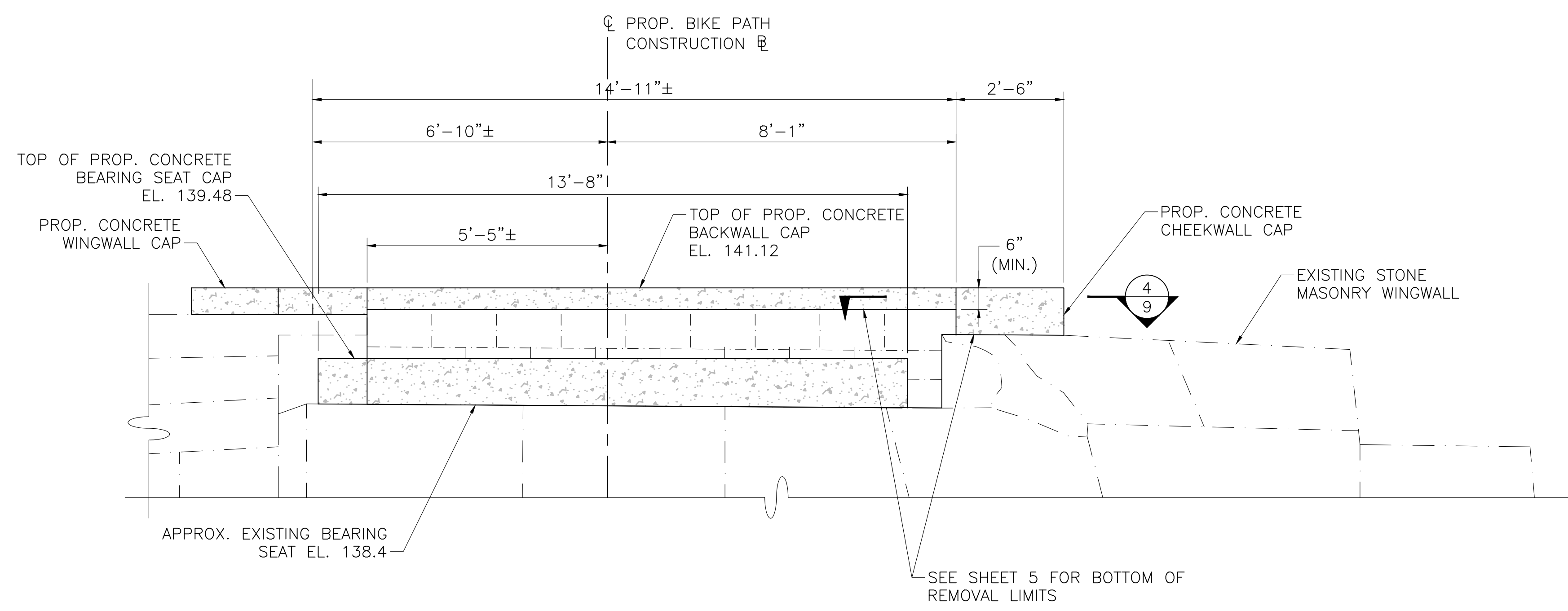
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

608164_BRG(S-31-007)REMOVAL.DWG Plotted on 12-May-2021 9:31 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

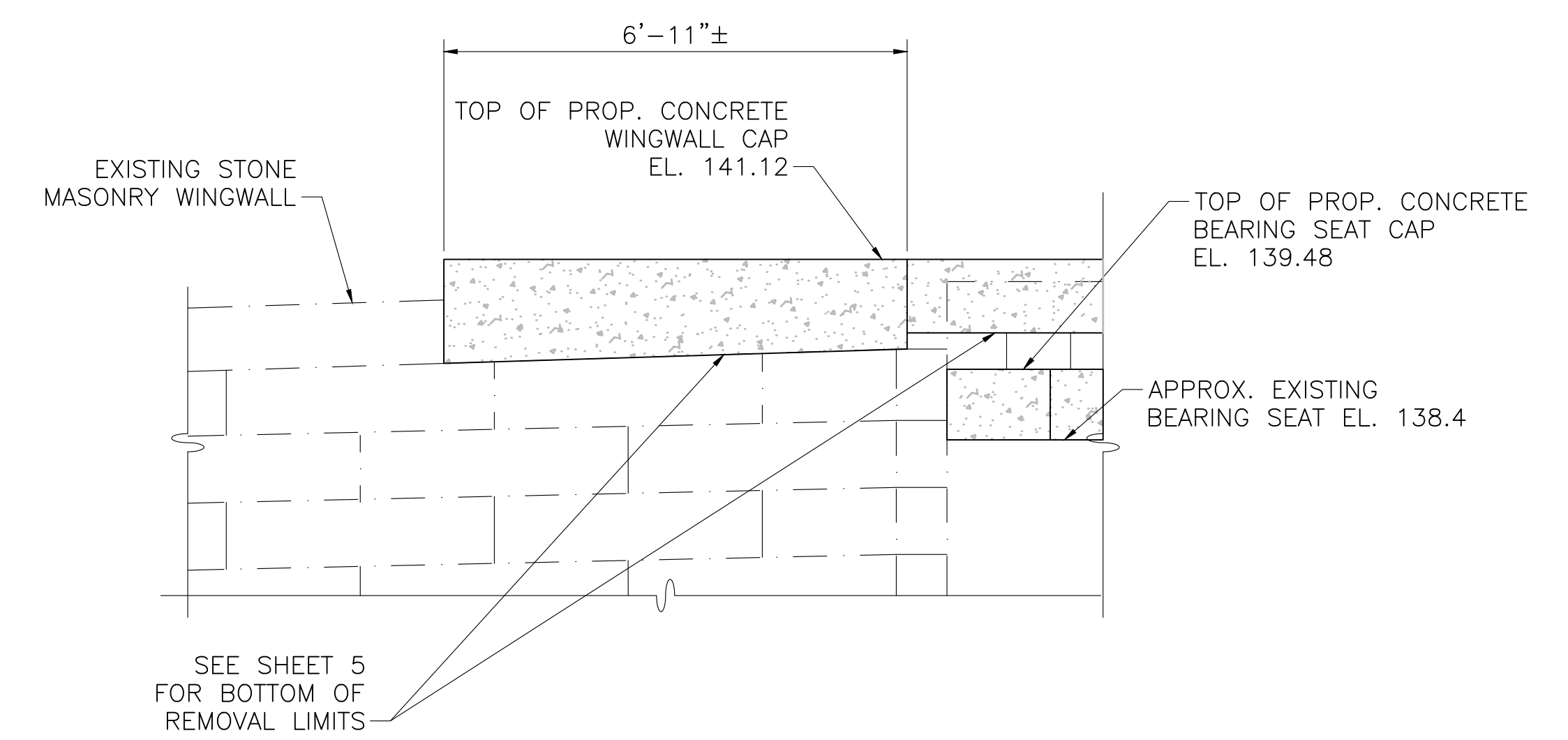


NORTH ABUTMENT PLAN
SCALE: $1/2" = 1'-0"$

- NOTES:**
1. BEARING SEAT ELEVATION IS GIVEN AT ϕ BEARING.
 2. BACKWALL ELEVATION IS GIVEN AT FACE OF BACKWALL.
 3. SEE SHEET 8 FOR EXISTING ABUTMENT REPAIR NOTES.
 4. SEE SHEET 8 FOR REINFORCING IN PROPOSED CHEEKWALL CAPS
 5. USE APPROVED NON-SHRINK GROUT WITH MINIMUM COMPRESSIVE STRENGTH $F'c$ OF 6,200 PSI.
 6. MEMBRANE WATERPROOFING AND $8"x16"x2"$, 4000 PSI, $3/4$ IN. 610 CEMENT CONCRETE BLOCKS LAID IN MORTAR OR OTHER WATERPROOFING PROTECTIVE COURSE, MIN 2" THICK AS SPECIFIED IN MHD STANDARD SPECIFICATIONS.
 7. SEE SHEET 6 FOR TYPICAL ABUTMENT SECTION.



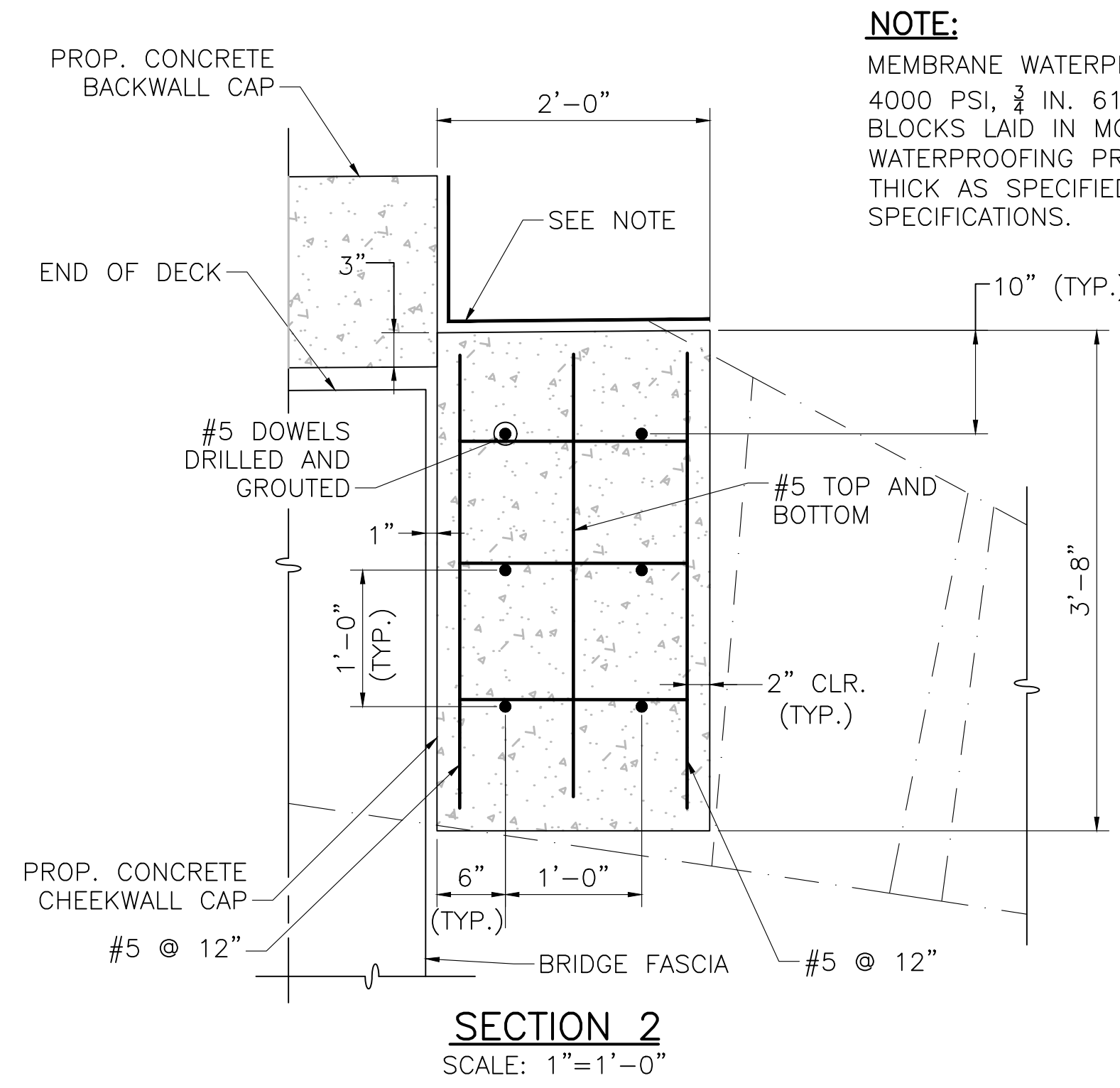
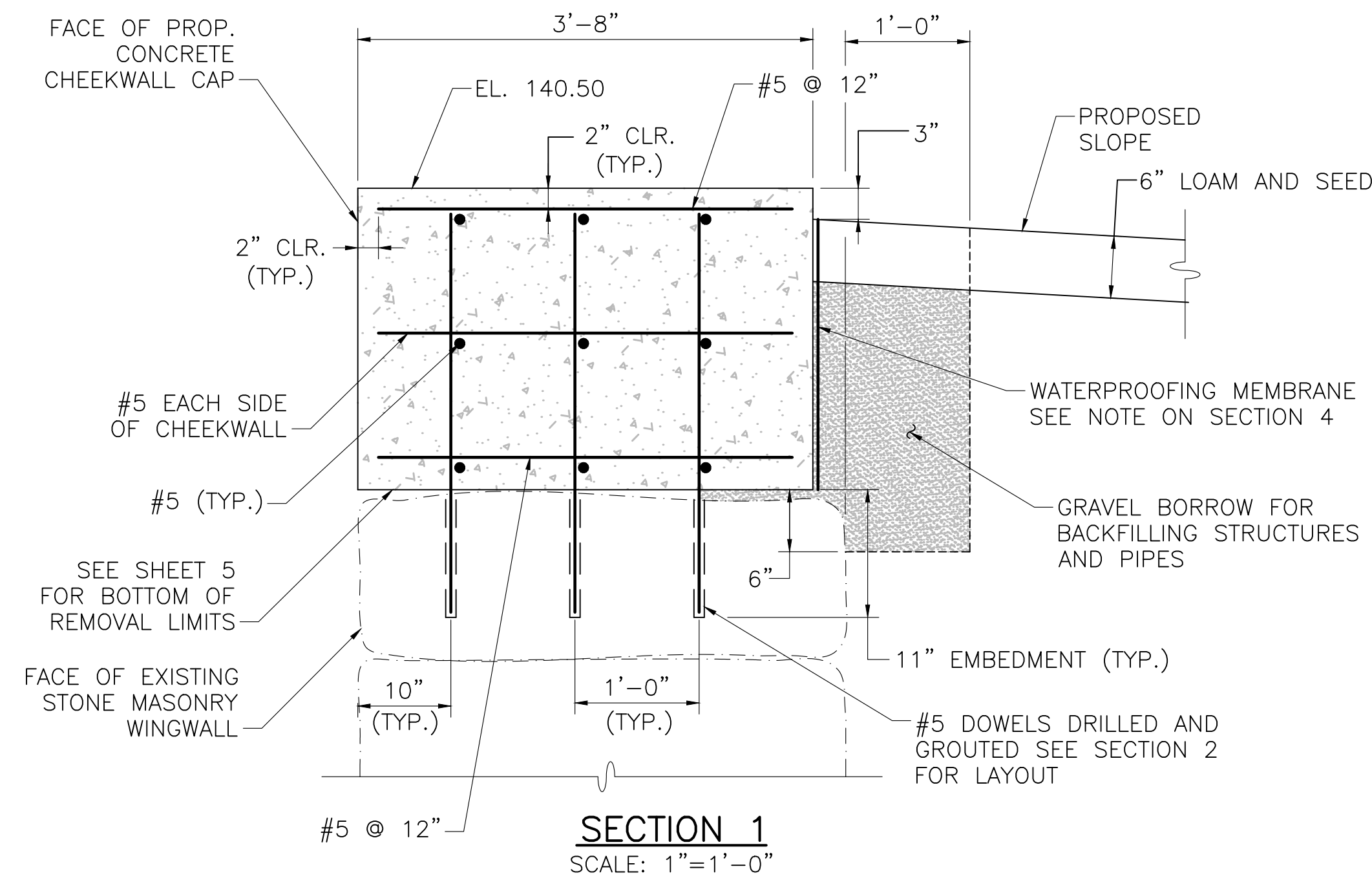
**NORTH ABUTMENT AND
NORTHEAST WINGWALL ELEVATION**
SCALE: $1/2" = 1'-0"$



NORTHWEST WINGWALL ELEVATION
SCALE: $1/2" = 1'-0"$

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

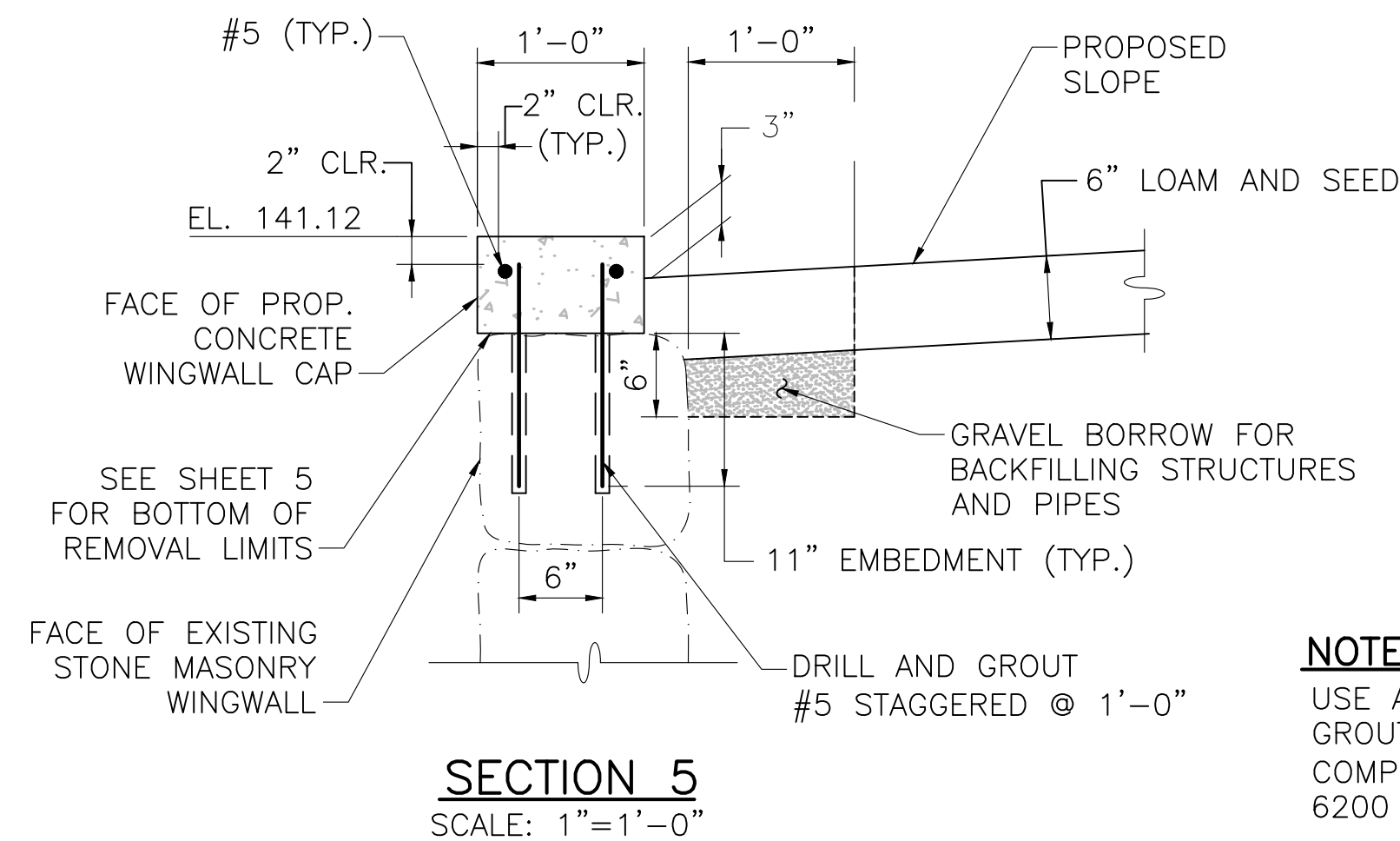
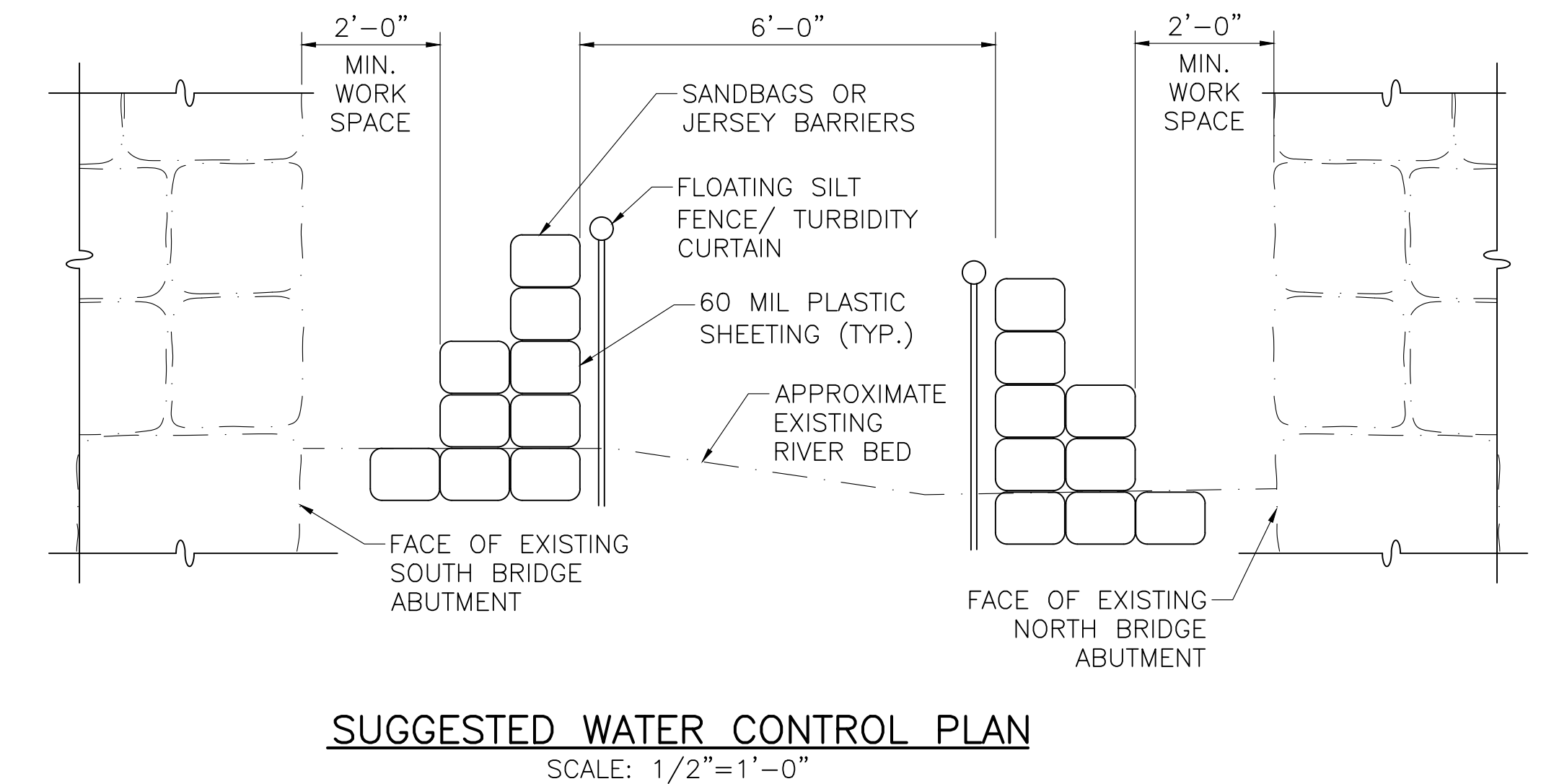
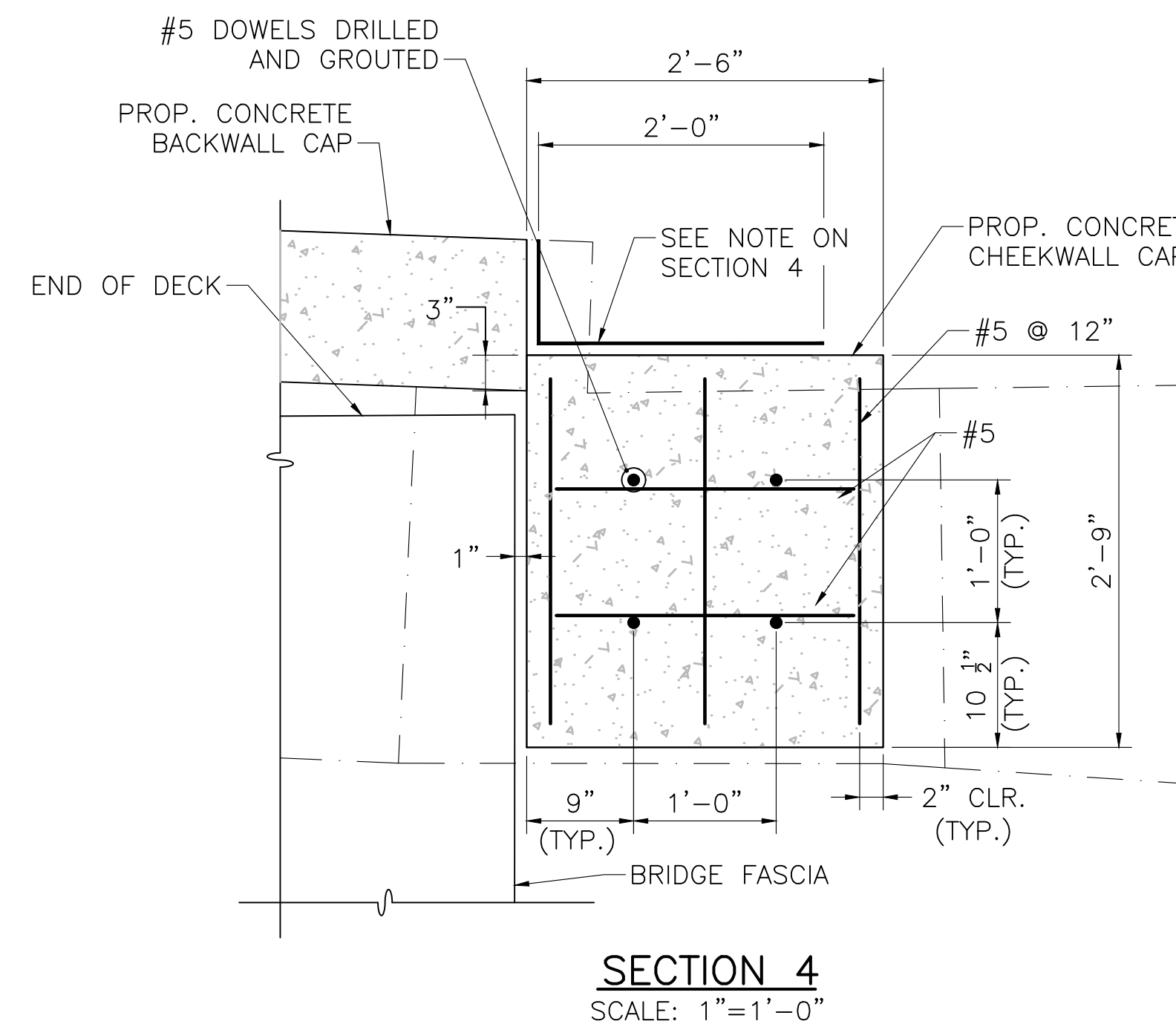
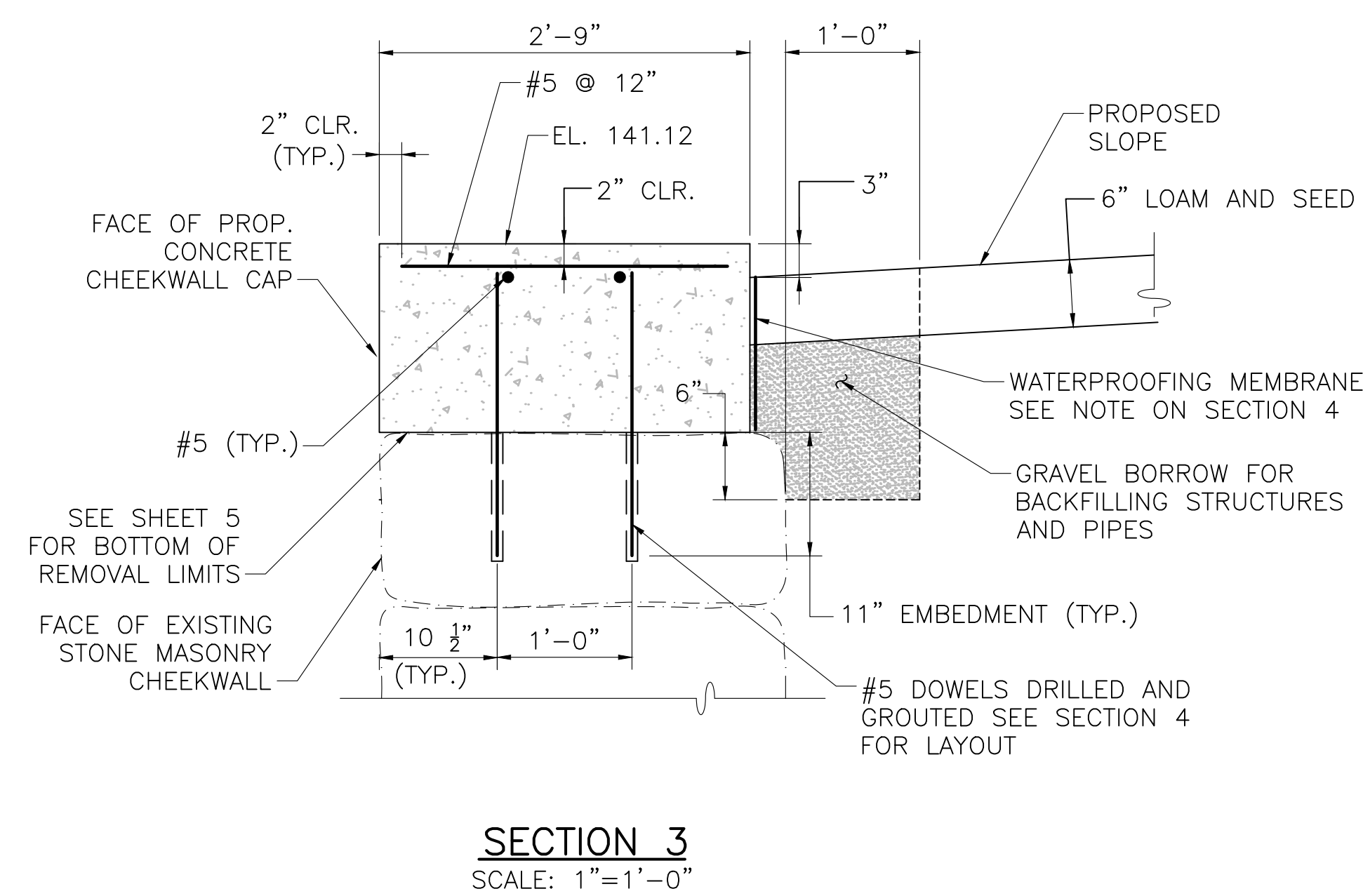
608164_BRES-31-007(NORTH ABUT) DWG Plotted on 12-May-2021 9:31 AM Xxxxx Structural Submittal (S) DD-Month-YYYY



NOTE:
MEMBRANE WATERPROOFING AND 8"x16"x2", 4000 PSI, 3/8 IN. 610 CEMENT CONCRETE BLOCKS LAID IN MORTAR OR OTHER WATERPROOFING PROTECTIVE COURSE, MIN 2" THICK AS SPECIFIED IN MHD STANDARD SPECIFICATIONS.

EXISTING ABUTMENT REPAIR NOTES:

1. THE NORTH EXISTING STONE MASONRY ABUTMENT HAS A MISSING STONE IN THE FACE. THE CONTRACTOR SHALL REBUILD ANY COLLAPSED PORTIONS OF THE EXISTING WALL ALONG THE LENGTH OF THE ABUTMENT AND WINGWALLS BELOW THE LIMITS OF REMOVAL. THE COST TO REBUILD THE WALL AS REQUIRED SHALL BE INCLUDED IN ITEM 690, "STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR".
2. REPOINTING OF THE EXISTING STONE MASONRY ABUTMENTS SHALL BE REQUIRED PRIOR TO SUPERSTRUCTURE WORK. THE CONFIGURATION OF THE EXISTING ABUTMENT STONE WALLS AND THE ELEVATION OF THE BOTTOM OF THE EXISTING ABUTMENTS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL ENSURE THE EXISTING ABUTMENT STONE WALLS ARE NOT UNDERMINED OR IN ANY WAY COMPROMISED DURING EXCAVATION OPERATIONS. THE COST TO REPOINT SHALL BE INCLUDED IN ITEM 690.91, "MASONRY REPOINTING".
3. ANY WATER CONTROL REQUIRED TO REMOVE, REPAIR, REBUILD, OR REPOINT THE EXISTING ABUTMENTS SHALL BE INCLUDED UNDER ITEM 991, "CONTROL OF WATER".



NOTE:
USE APPROVED NON-SHRINK GROUT WITH MINIMUM COMPRESSIVE STRENGTH F'c OF 6200 PSI.

NOTES:

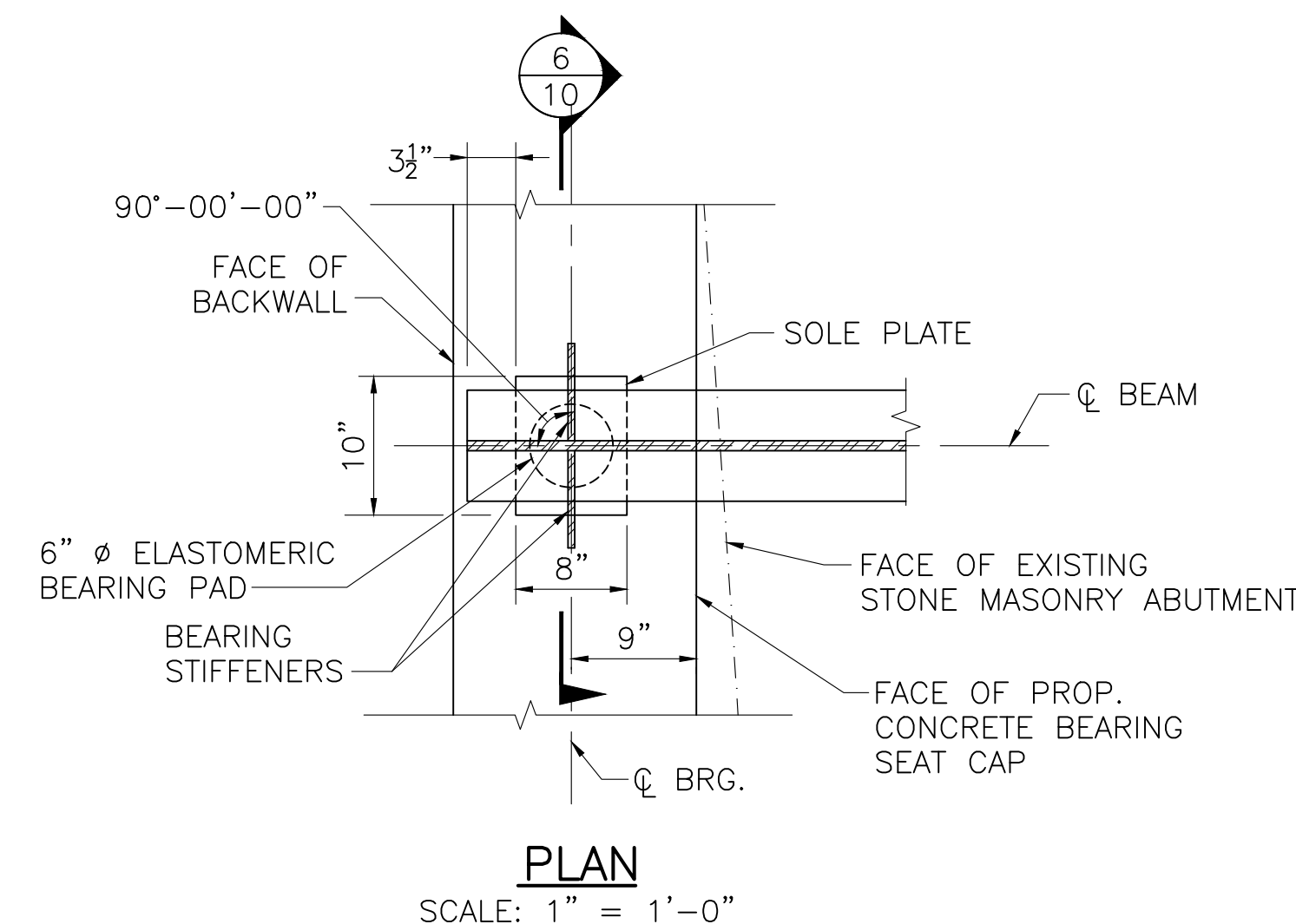
1. WORK IN THE WATER SHALL BE PERFORMED DURING LOW FLOW SEASON AND THE FLOW SHALL BE MAINTAINED THROUGH THE USE OF TEMPORARY WATER CONTROL.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING THE BARRIER TO HANDLE THE RIVER FLOW. THE BARRIER SHALL BE OF ADEQUATE SIZE TO DELIVER THE WATER AT THE DISCHARGE END TO THE RIVER WITHOUT DISTURBING THE EXISTING BANKS OR RIVERBED FLOW. THE BARRIER HEIGHT SHALL BE SIZED TO MAINTAIN THE 2-YEAR FLOOD.
3. IN THE EVENT OF HIGH FLOW RATES, THE CONTRACTOR SHALL BE RESPONSIBLE TO DEVELOP AND IMPLEMENT A REASONABLE MEANS NECESSARY TO HANDLE THE ADDITIONAL FLOWS TO PROTECT THE SURROUNDING AREA, AS APPROVED BY THE ENGINEER.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

**SUDBURY
BIKE PATH OVER HOP BROOK**

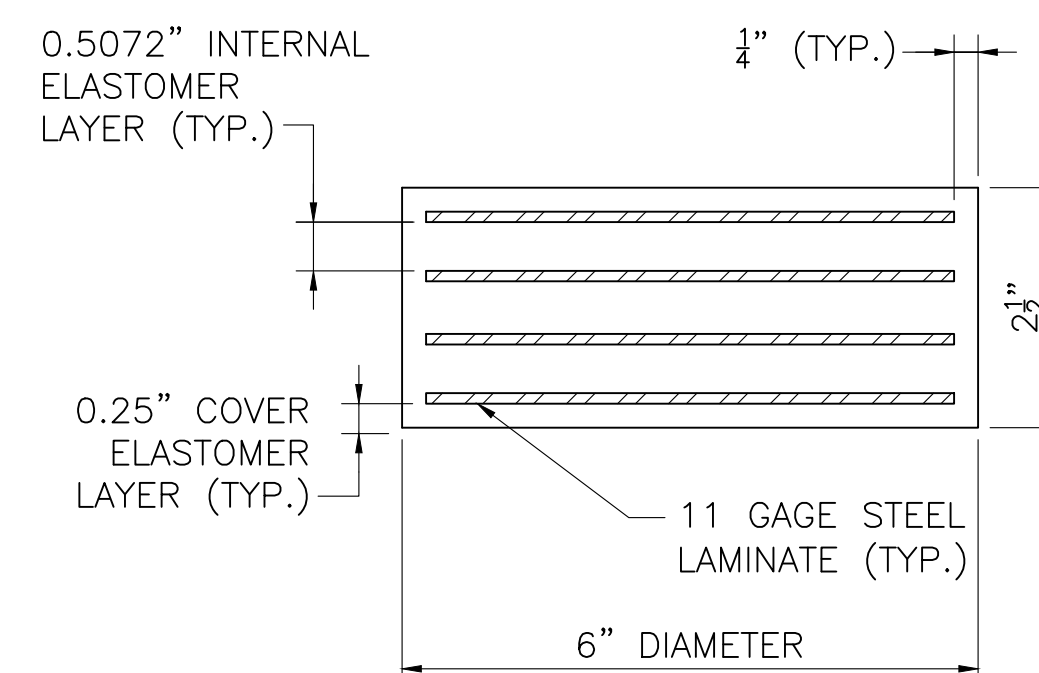
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	229	318
PROJECT FILE NO.		608164	

BEARING DETAILS



PLAN

SCALE: 1" = 1'-0"



NOTES:

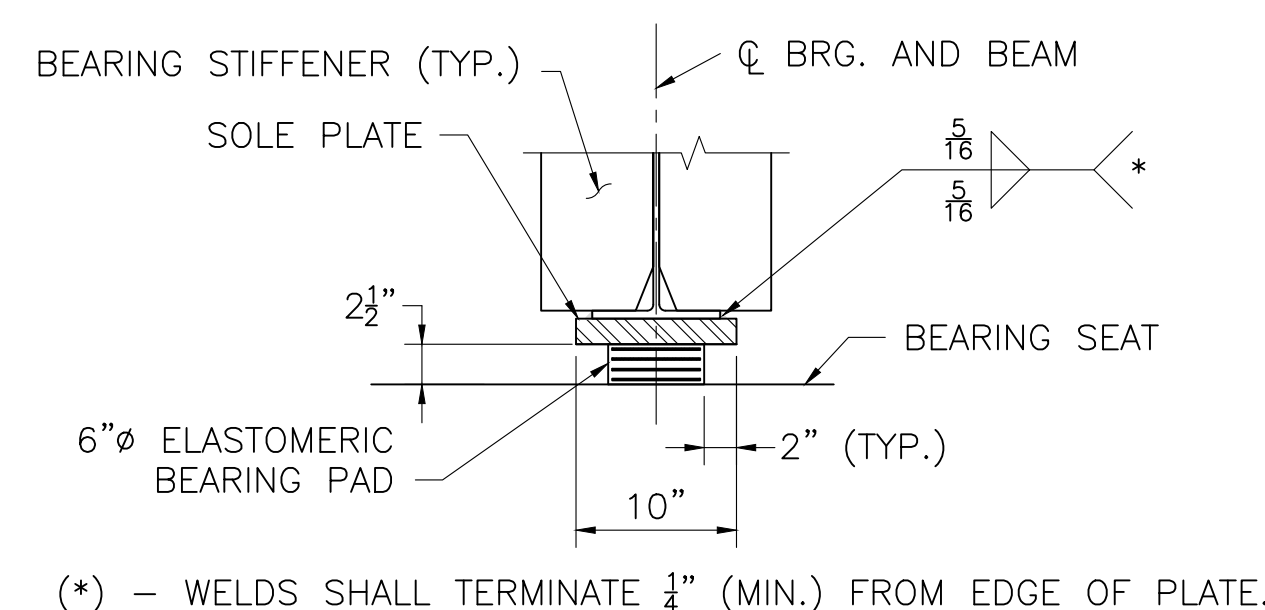
1. ELASTOMER SHALL HAVE A SHEAR MODULUS OF 0.160 KSI.
2. STEEL LAMINATES SHALL CONFORM TO ASTM A 1011 GRADE 36.
3. THE COMPRESSIVE DESIGN LOAD ON THE BEARING PAD IS 8 KIPS. THE COMPRESSIVE DESIGN STRESS IS THE RESULT OF DIVIDING THE COMPRESSIVE DESIGN LOAD BY THE AREA OF THE PAD AND IS EQUAL TO 0.28 KSI.
4. ELASTOMERIC BEARING PAD SHALL NOT BE VULCANIZED TO THE SOLE PLATE.
5. ELASTOMER SHALL HAVE A HARDNESS OF 60 DUROMETER.

ELASTOMERIC BEARING PAD

6" = 1'-0"

BEARING NOTES:

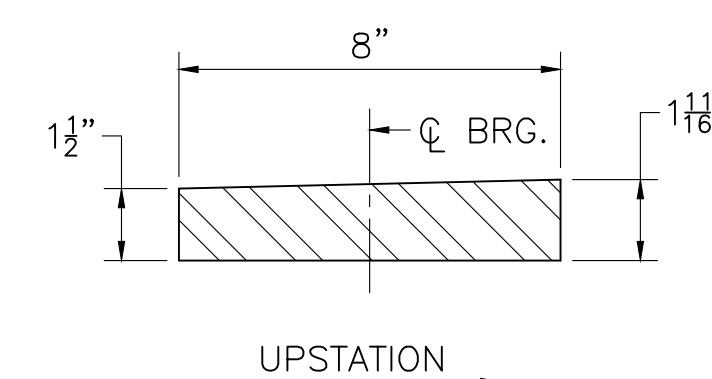
1. STEEL SOLE PLATES SHALL CONFORM TO AASHTO M 270 GRADE 36 AND SHALL BE HOT-DIP GALVANIZED.
2. CENTER THE ELASTOMERIC PAD UNDER THE SOLE PLATE DURING BEAM ERECTION.
3. BEAMS SHALL BE ERECTED WHEN THE AMBIENT TEMPERATURE IS BETWEEN 50 °F AND 77 °F. IF BEAMS ARE ERECTED AT OTHER AMBIENT TEMPERATURES, THEY WILL HAVE TO BE JACKED AND THE ELASTOMERIC BEARINGS RECENTERED WHEN THE TEMPERATURE RETURNS TO THAT RANGE.



SECTION 6

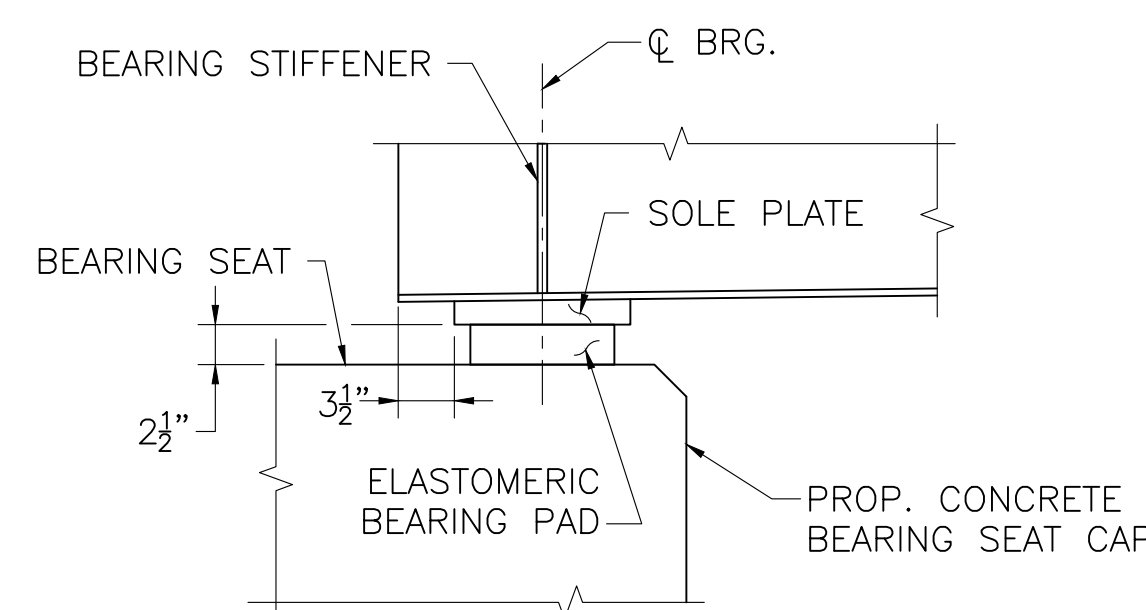
SCALE: 1" = 1'-0"

(*) - WELDS SHALL TERMINATE 1/4" (MIN.) FROM EDGE OF PLATE.



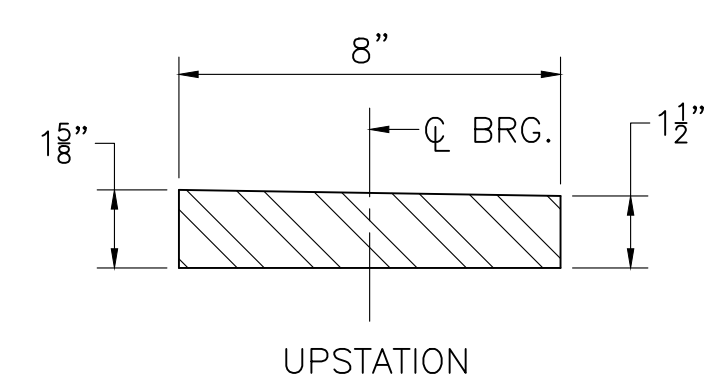
SOUTH ABUTMENT SOLE PLATE DETAIL

SCALE: 3" = 1'-0"



ELEVATION

SCALE: 1" = 1'-0"



NORTH ABUTMENT SOLE PLATE DETAIL

SCALE: 3" = 1'-0"

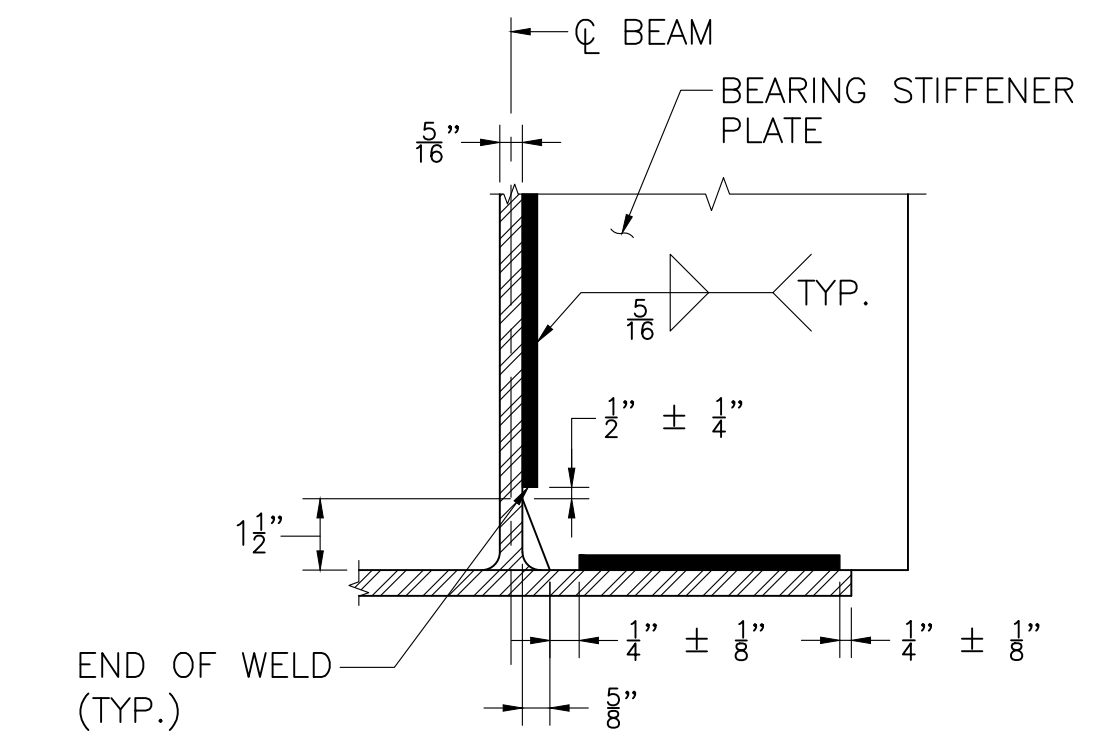
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

SUDBURY BIKE PATH OVER HOP BROOK			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	230	318
PROJECT FILE NO.		608164	

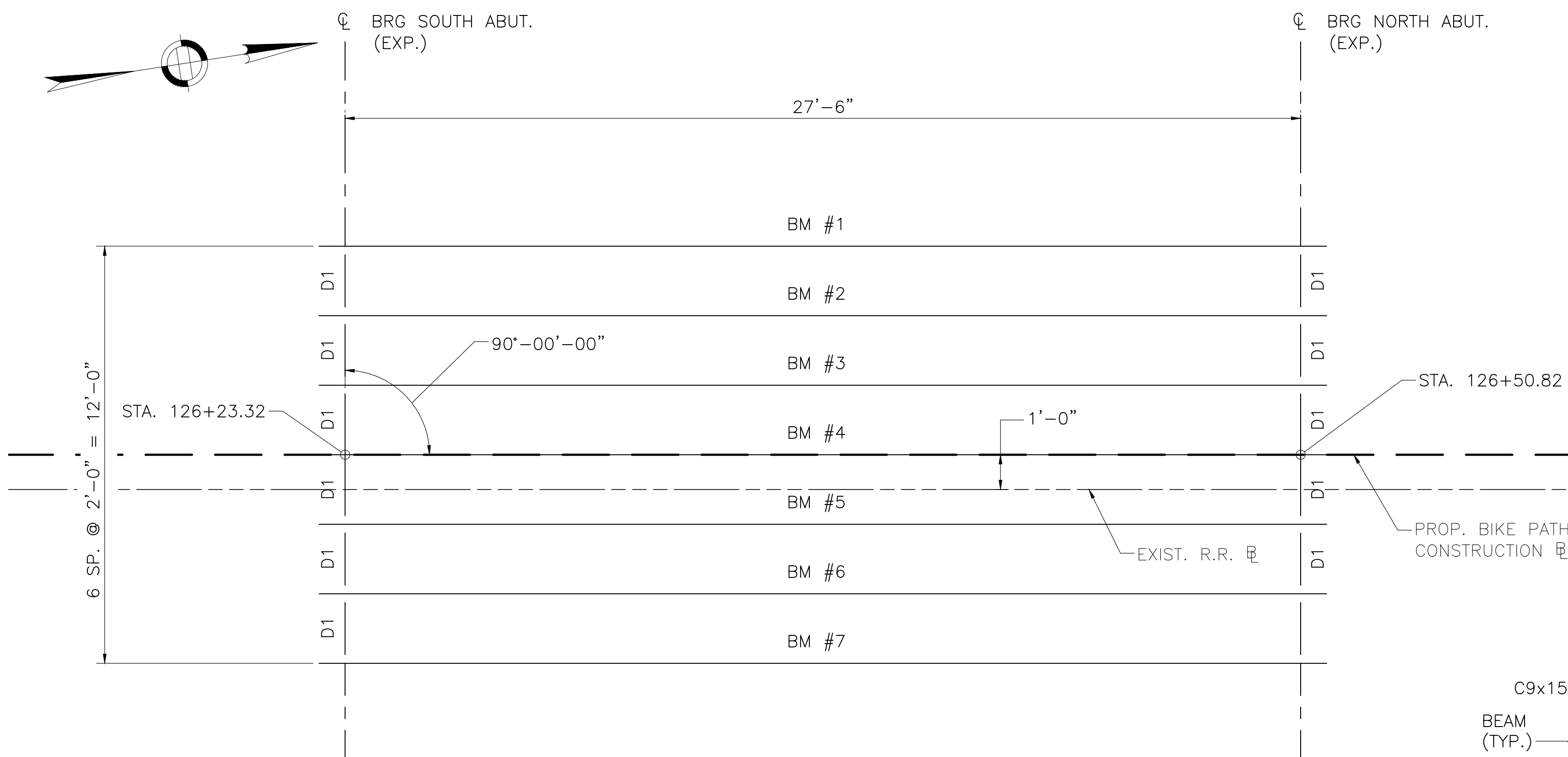
FRAMING PLAN & STRUCTURAL STEEL DETAILS

NOTES:

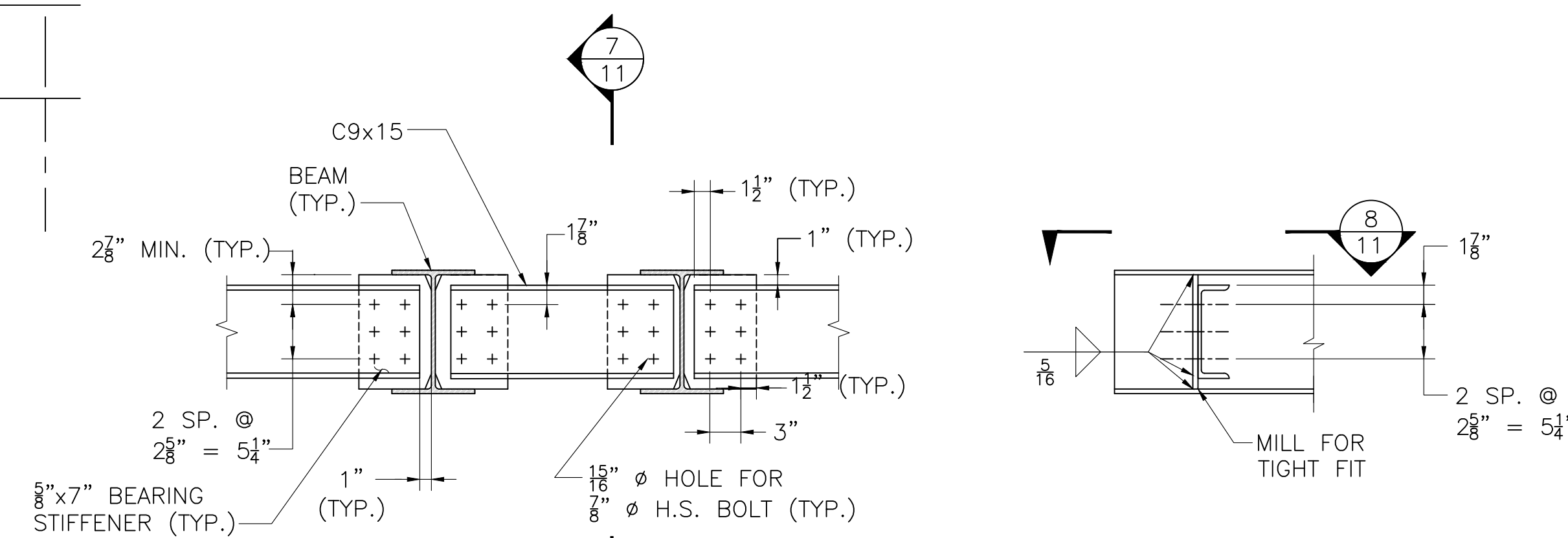
- D1 = C9x15 (TYPICAL DIAPHRAGM)
- THE MAIN LOAD CARRYING MEMBERS ARE BM #1 THROUGH BM #7. ALL BEAMS SHALL BE W12x40.
- ALL STEEL SHALL CONFORM TO AASHTO M270 GRADE 50 HOT-DIP GALVANIZED.
- ALL BEARING STIFFENERS SHALL BE PLUMB.
- ENDS OF BEAMS SHALL BE FABRICATED SO THAT UNDER FULL DEAD LOAD THE ENDS OF THE BEAMS WILL PLUMB.
- BEARING STIFFENER PLATES AT BOTTOM FLANGE SHALL BE MILLED FOR TIGHT FIT AND WELDED WITH $\frac{5}{16}$ " FILLET WELDS, BOTH SIDES OF PLATE.



CLIP DETAIL
NOT TO SCALE



FRAMING PLAN
SCALE: $\frac{3}{8}$ " = 1'-0"

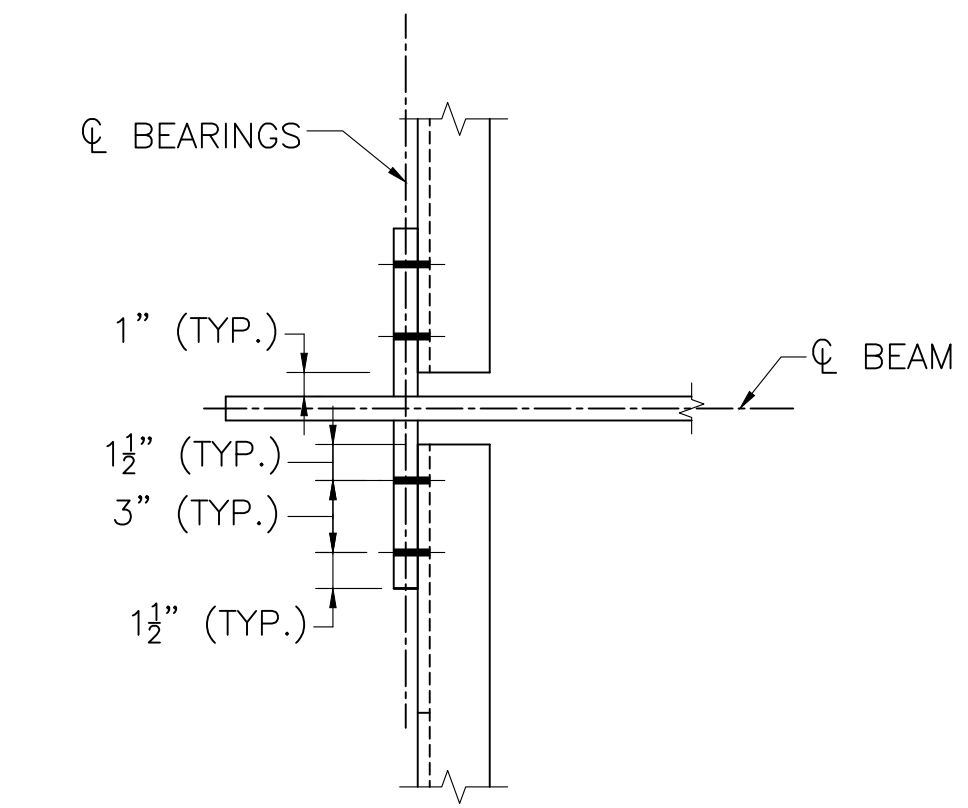


ELEVATION VIEW

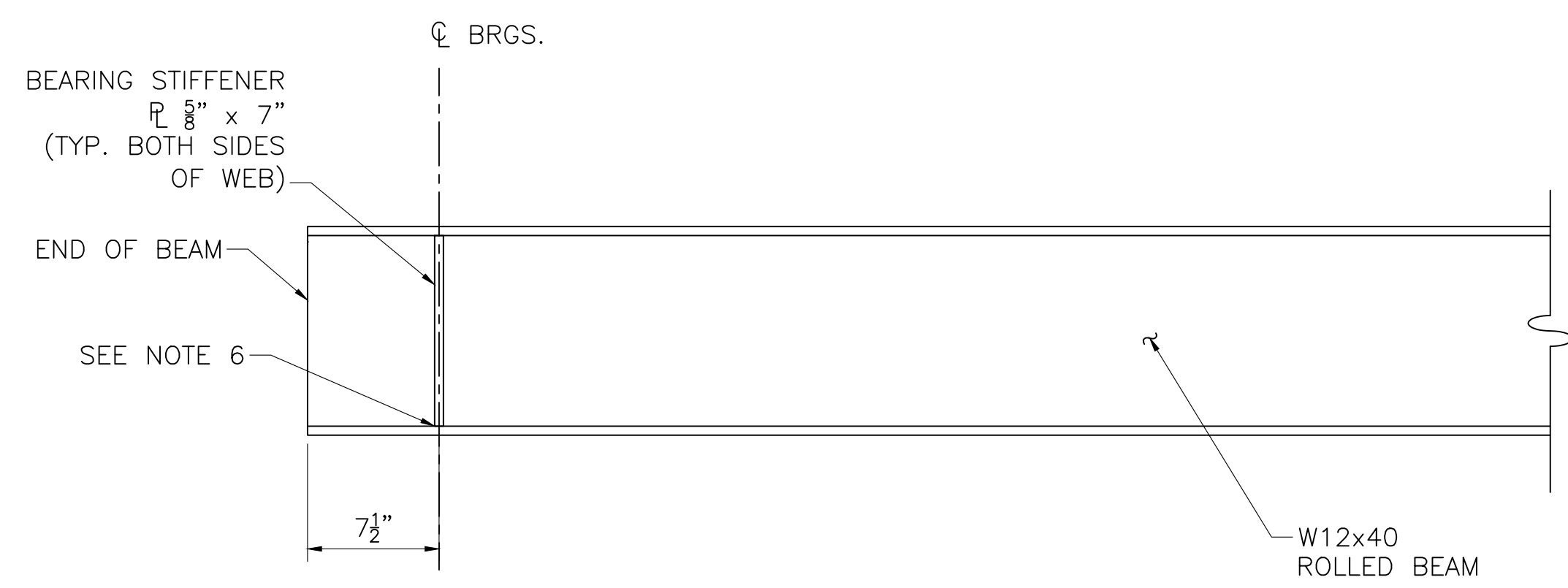
SECTION 7

NOTE:
SEE CLIP DETAIL ON THIS SHEET.

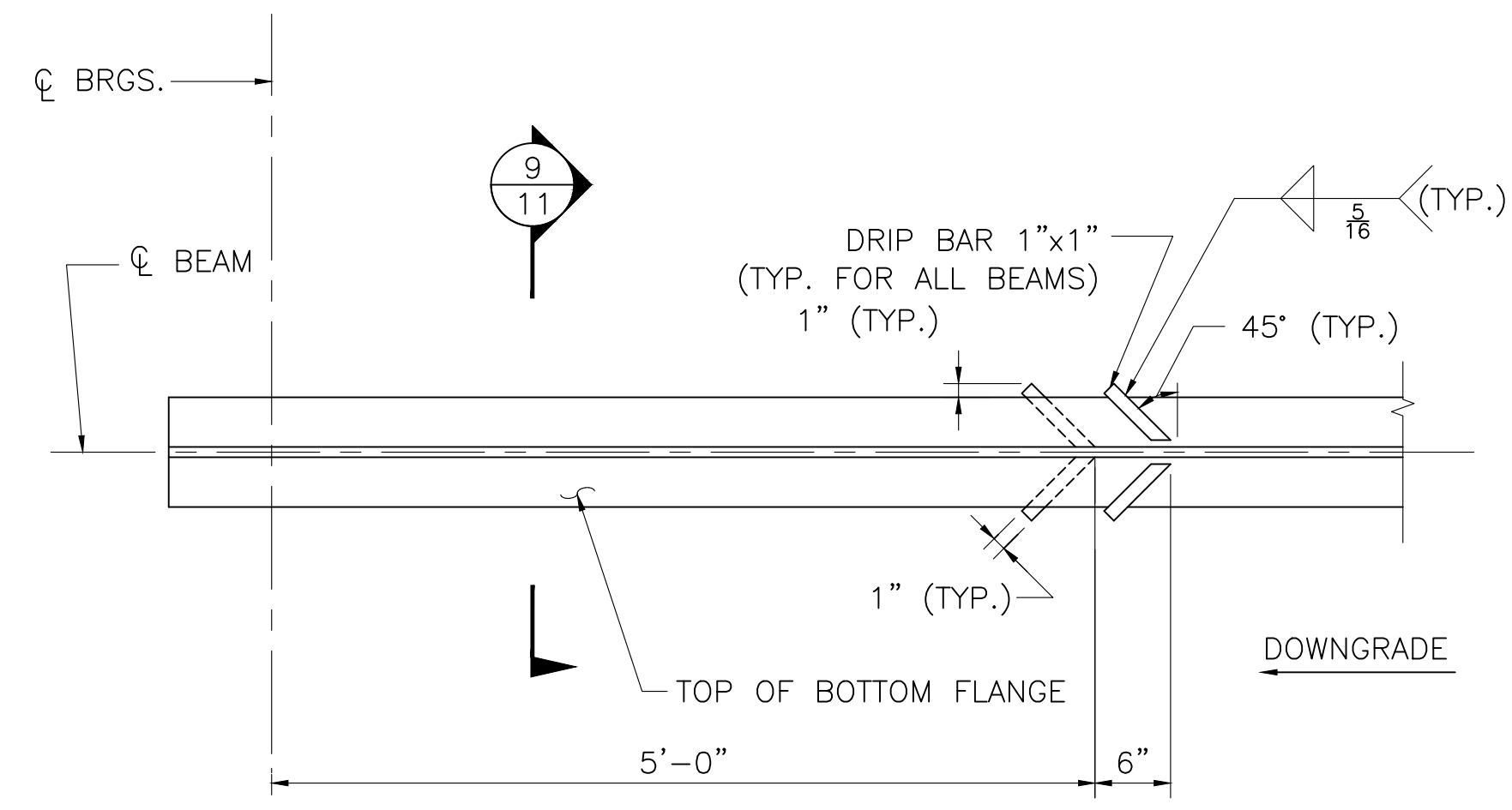
END DIAPHRAGM D1
SCALE: 1" = 1'-0"



SECTION 8
SCALE: $1\frac{1}{2}$ " = 1'-0"

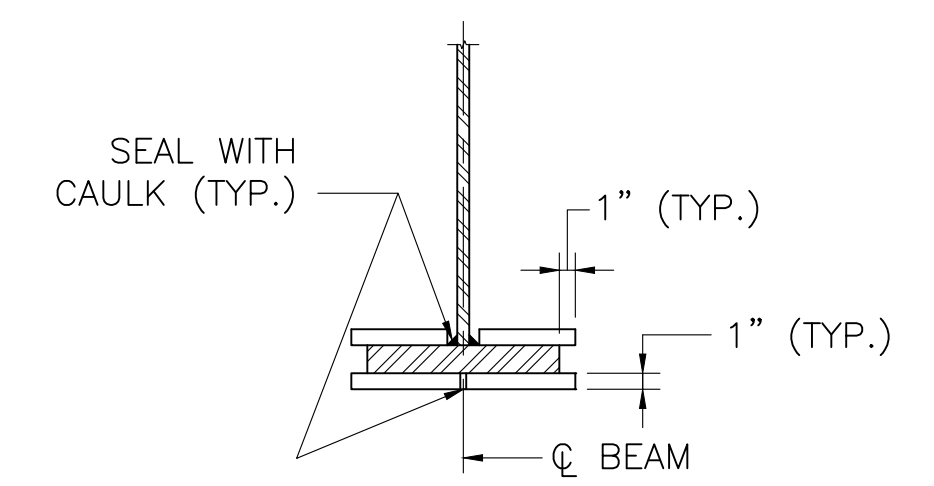


BEAM ELEVATION
SCALE: $1\frac{1}{2}$ " = 1'-0"



NOTE:
DRIP BARS SHALL BE LOCATED ON THE LOW END OF EACH SPAN FOR ALL BEAMS.

DRIP BAR DETAIL
SCALE: 1" = 1'-0"

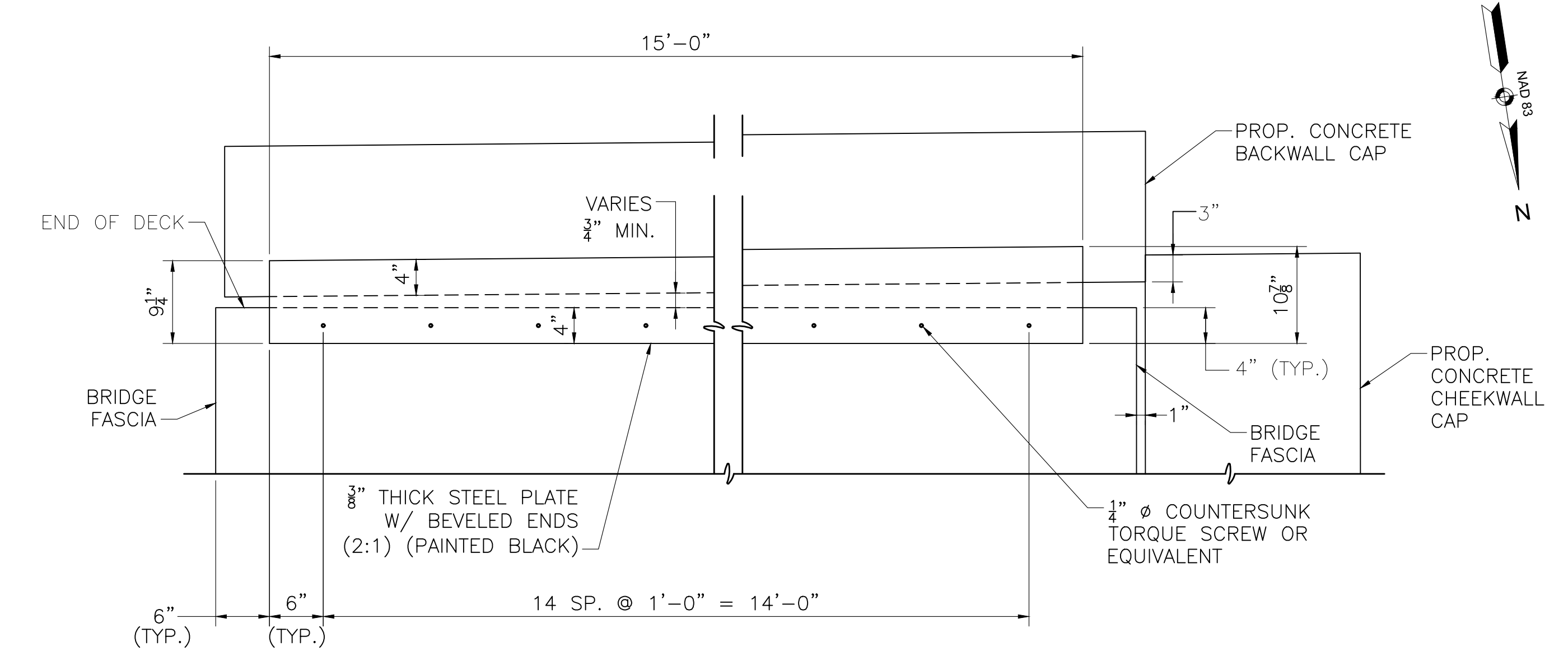
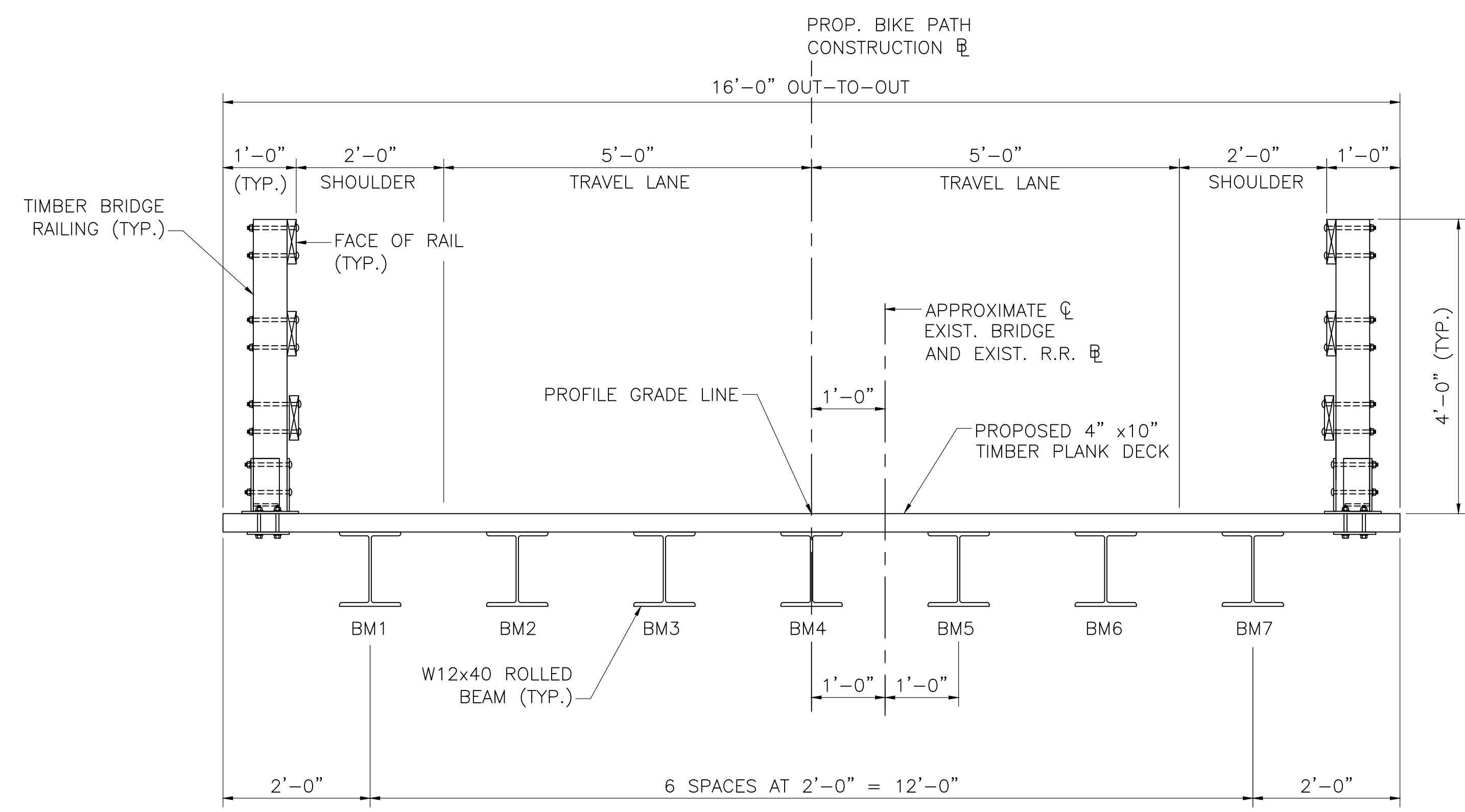


SECTION 9
SCALE: 1" = 1'-0"

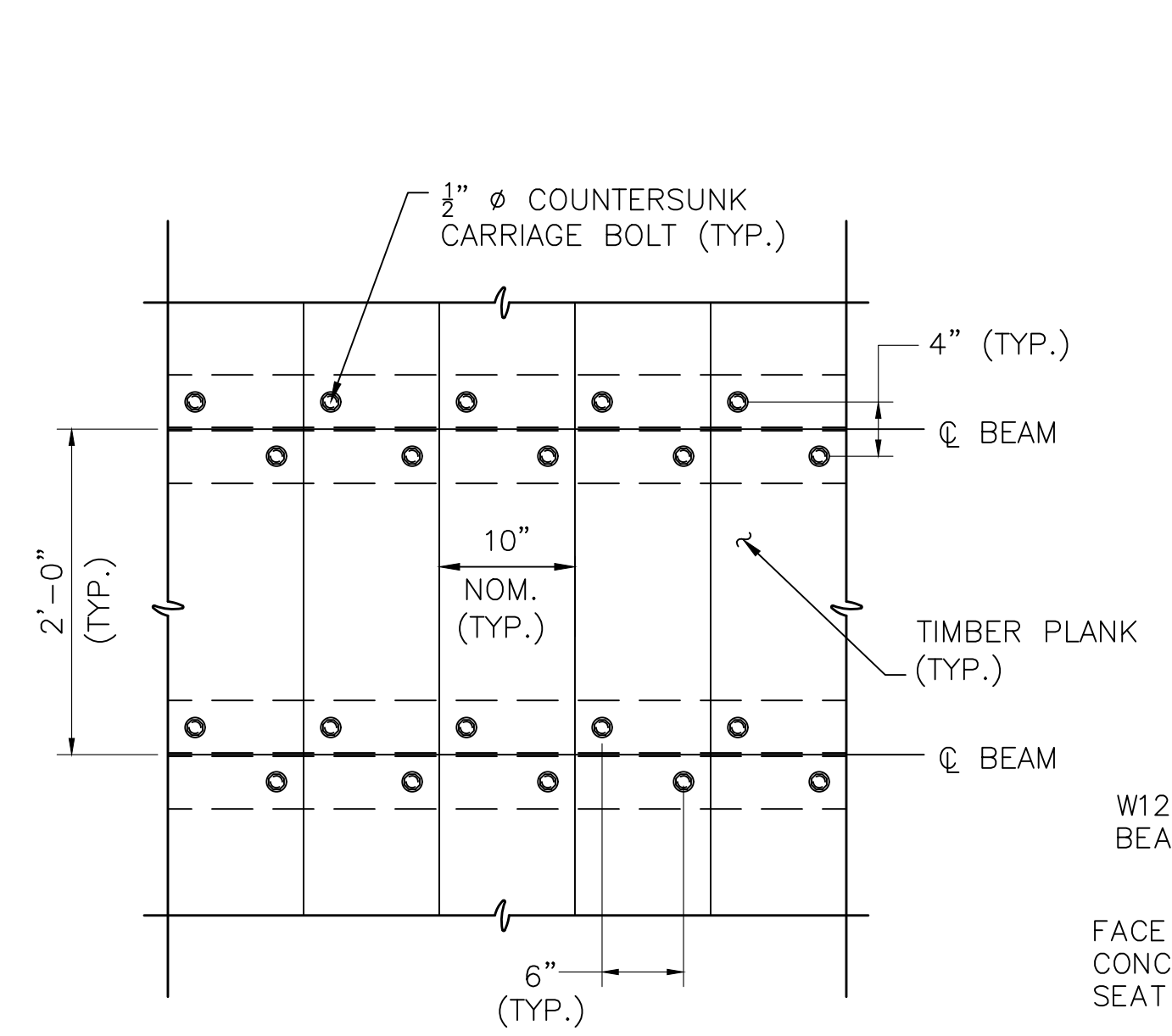
	CAMBER TABLE										
	SPAN NO. 1										
	S. ABUT.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	N. ABUT.
STEEL DL DEFLECTION	0.00	0.02	0.03	0.05	0.06	0.06	0.06	0.05	0.03	0.02	0.00
NONCOMP. DEFLECTION	0.00	0.03	0.05	0.06	0.07	0.07	0.07	0.06	0.05	0.03	0.00
ADDITIONAL CAMBER	0.00	0.07	0.14	0.21	0.28	0.34	0.28	0.21	0.14	0.07	0.00
TOTAL CAMBER	0.00	0.12	0.22	0.32	0.41	0.47	0.41	0.32	0.22	0.12	0.00

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

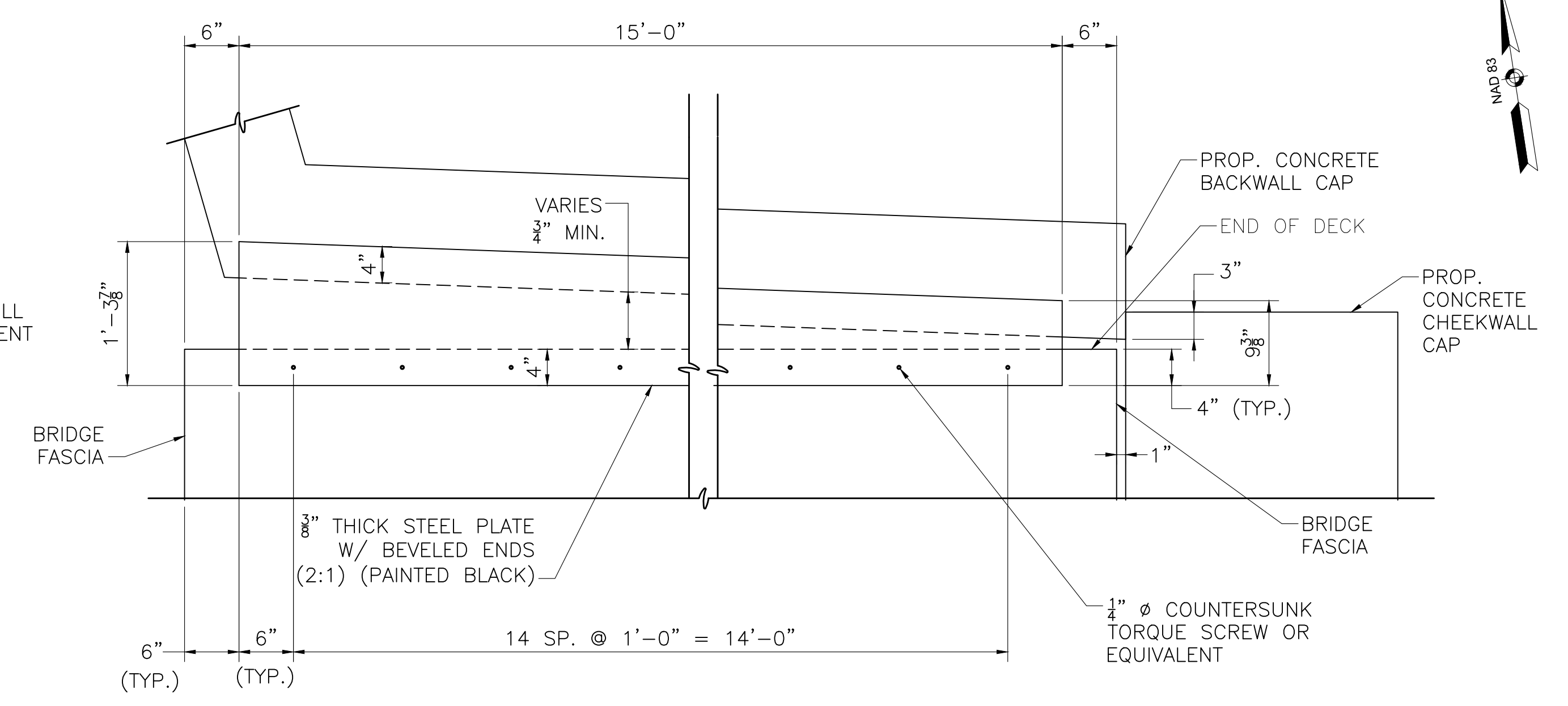
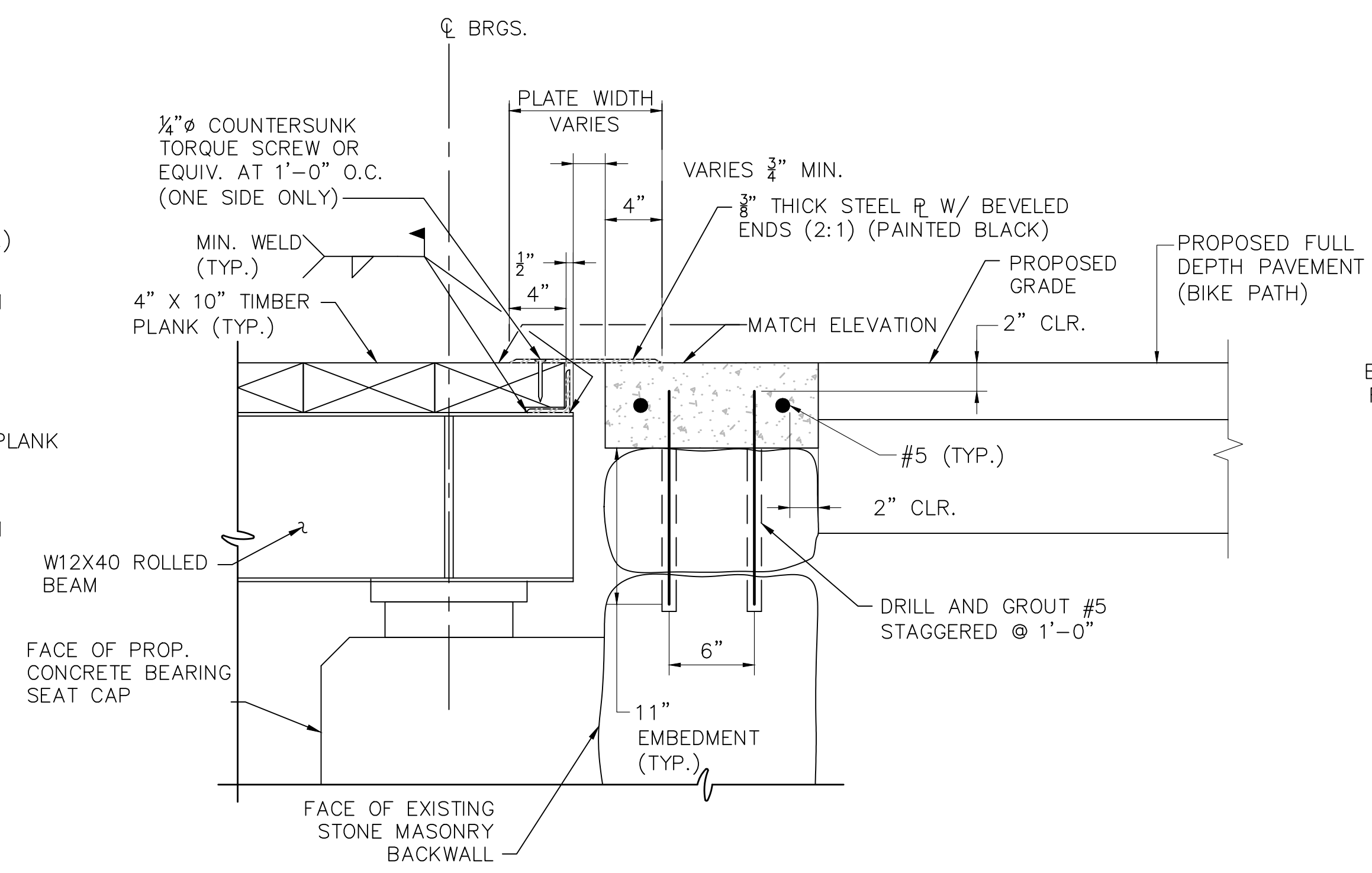
608164_BR1(S-31-007)FRAME.DWG Plotted on 12-May-2021 9:33 AM Xxxxx Structural Submitter (S) DD-Month-YYYY



NOTE:
BEAMS AND BEARING SEAT NOT SHOWN FOR CLARITY.



NOTE:
CONNECTION SHOULD BE CENTERED ON PLANKS AND BEAMS.

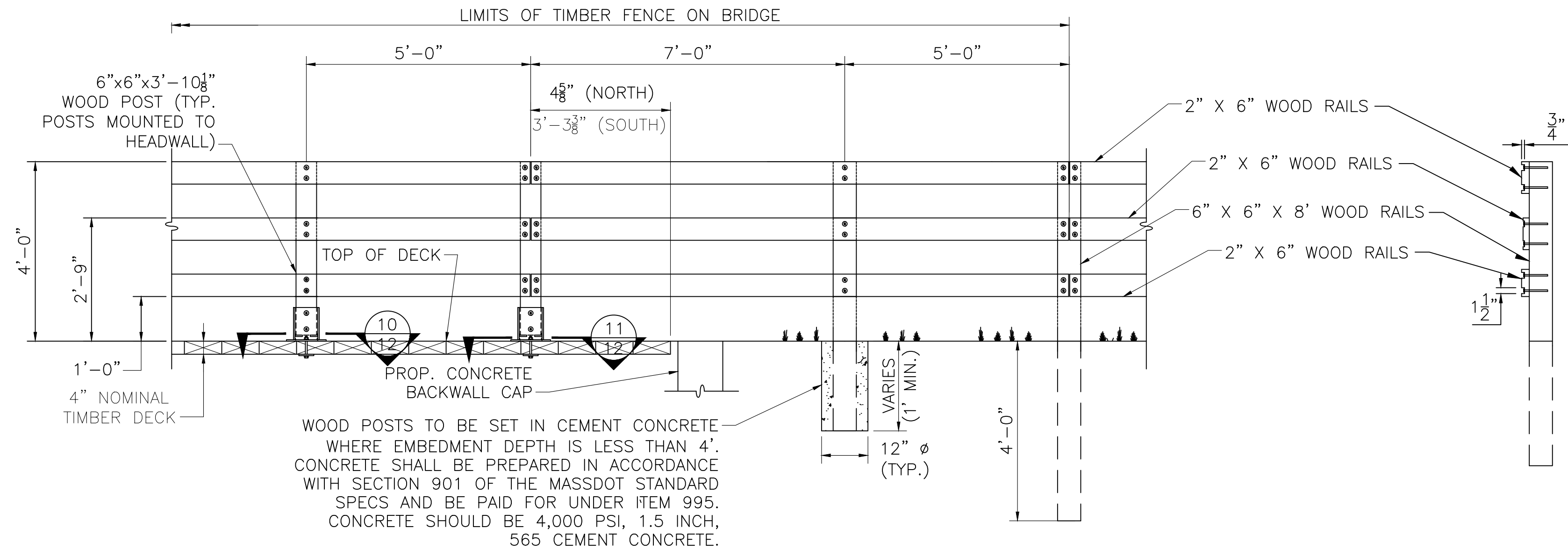


MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

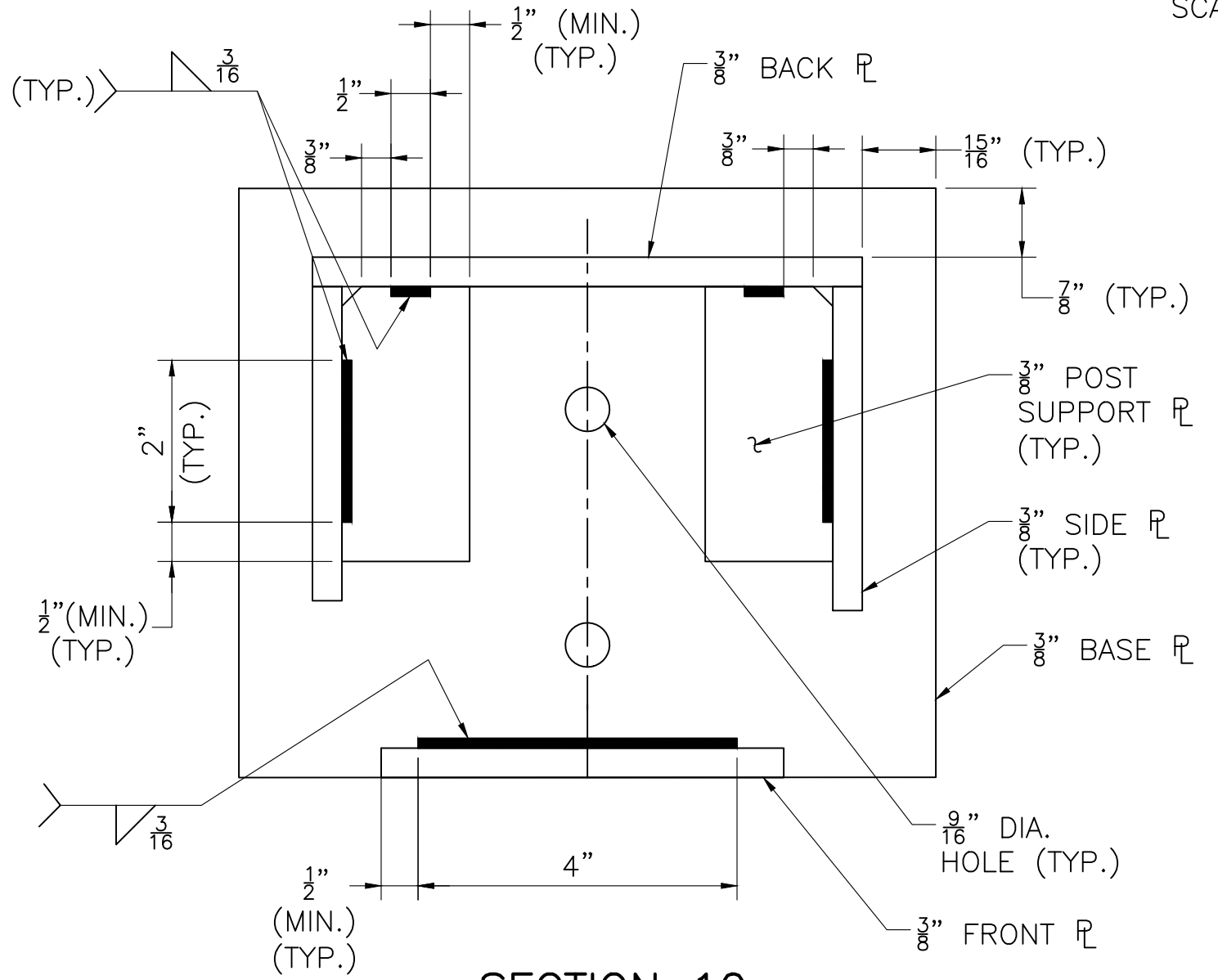
608164_BR13(S-31-007)DECK DETAILS.DWG Plotted on 12-May-2021 9:33 AM DD-Month-YYYY

RAILING NOTES:

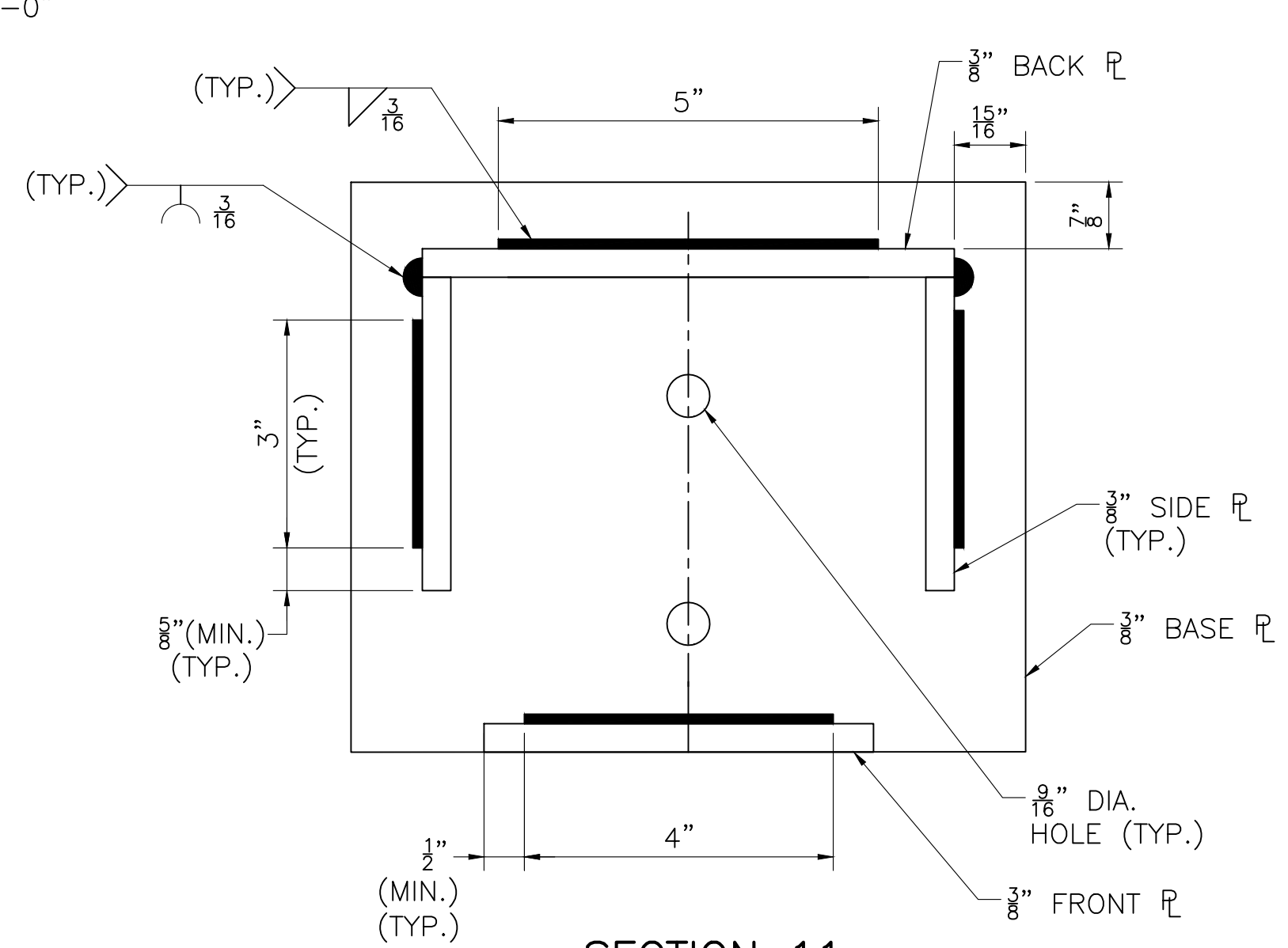
1. RAIL CONNECTION PLATES SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M270 GRADE 50.
2. ALL STEEL PLATES AND FASTENERS SHALL BE GALVANIZED.
3. THE NUT SECURING THE POST BASE PLATE TO THE TIMBER DECK SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL $\frac{1}{8}$ TURN AFTER STEEL IS IN PLACE.
4. CONNECTION BOLTS SHALL BE ASTM A325 TYPE 1.
5. ϕ RAIL POSTS SHALL NOT FALL WITHIN 2" OF EDGE OF PLANK. ADJUST RAIL SPACING TO BE NOT MORE THAN 5'-0" SPACING ON BRIDGE TO ACCOMMODATE 2" EDGE DISTANCE LIMIT. HOLD 7' SPACING BETWEEN LAST POST ON THE BRIDGE AND FIRST POST OFF THE BRIDGE.



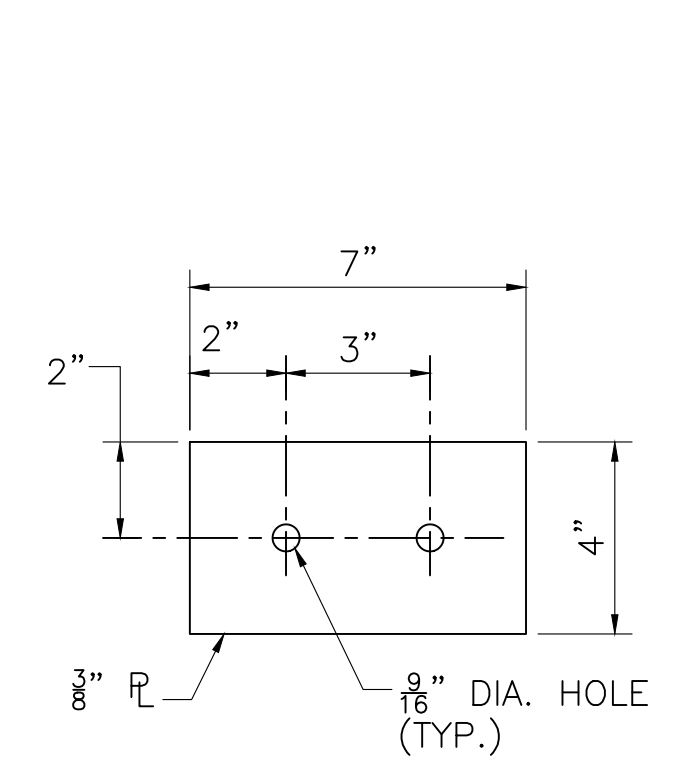
TIMBER BRIDGE RAIL ELEVATION
 SCALE: 1/2"=1'-0"



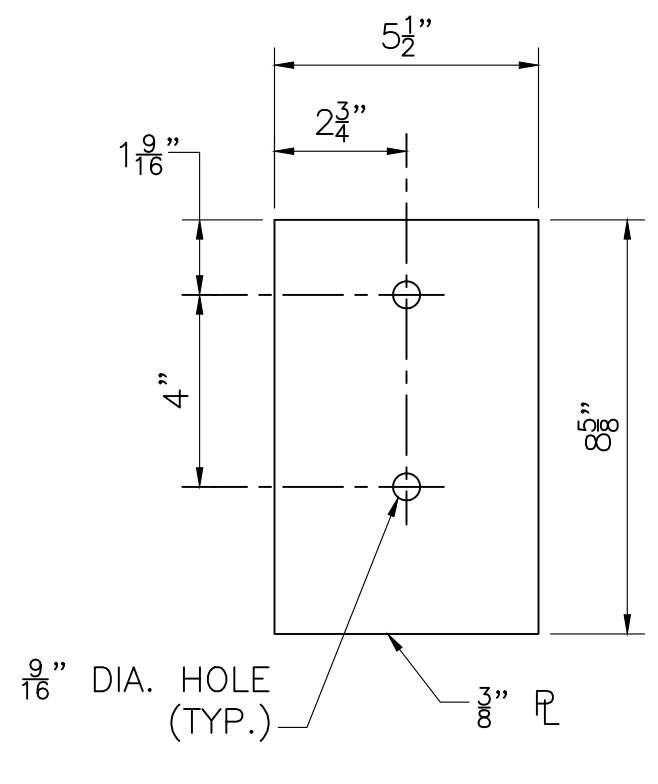
SECTION 10
 SCALE: 6"=1'-0"



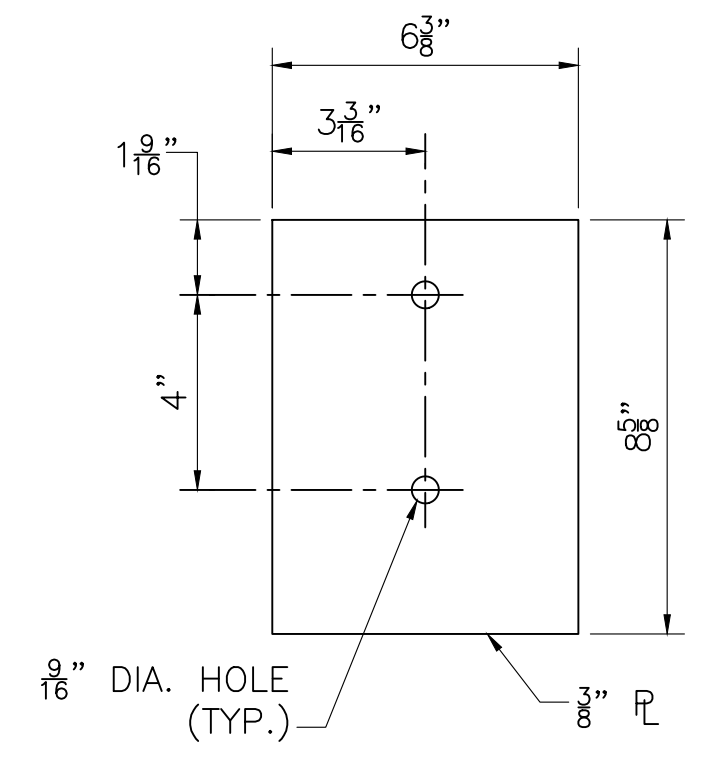
SECTION 11
 SCALE: 6"=1'-0"



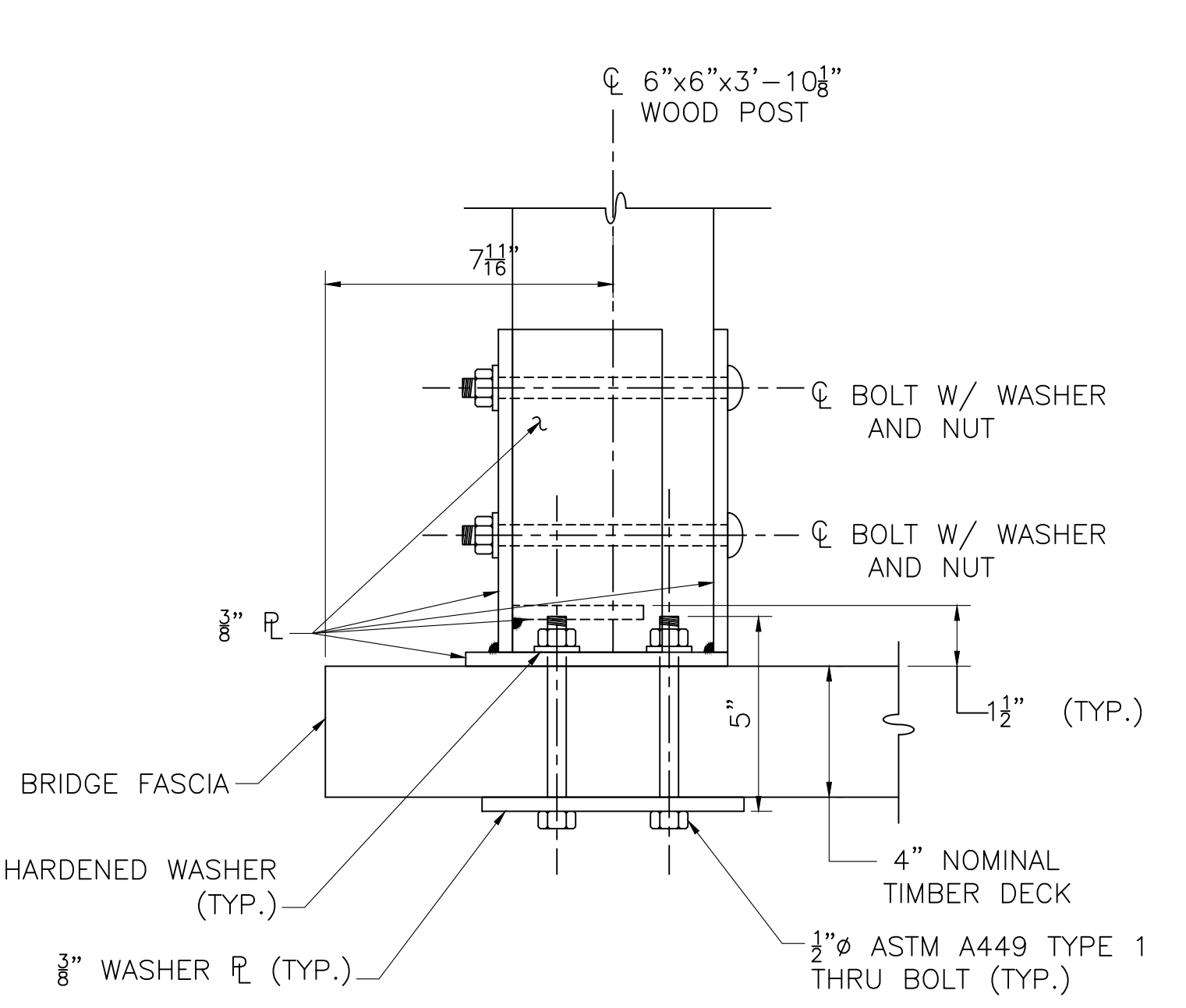
WASHER PLATE
 SCALE: 3"=1'-0"



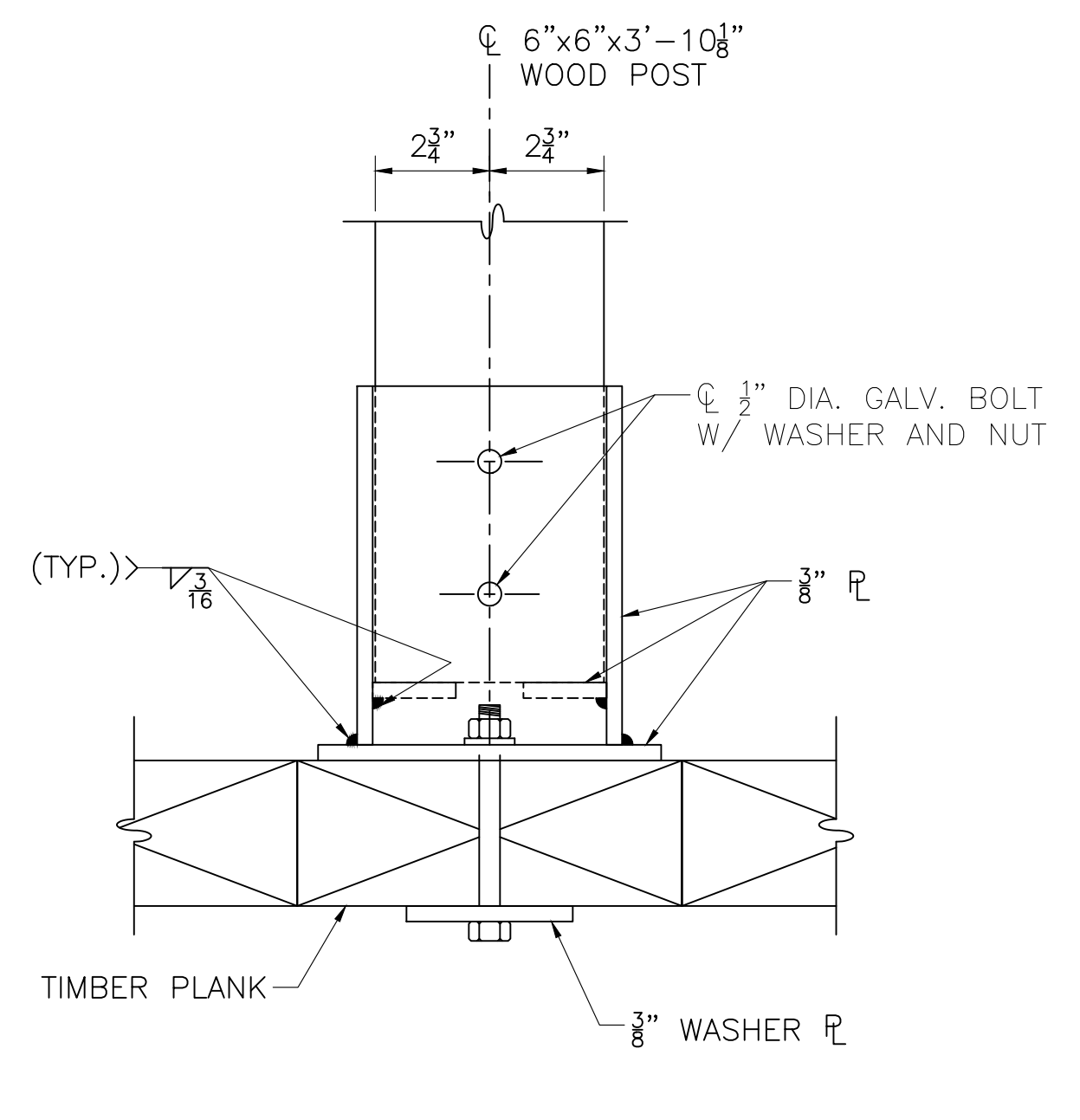
FRONT PLATE
 SCALE: 3"=1'-0"



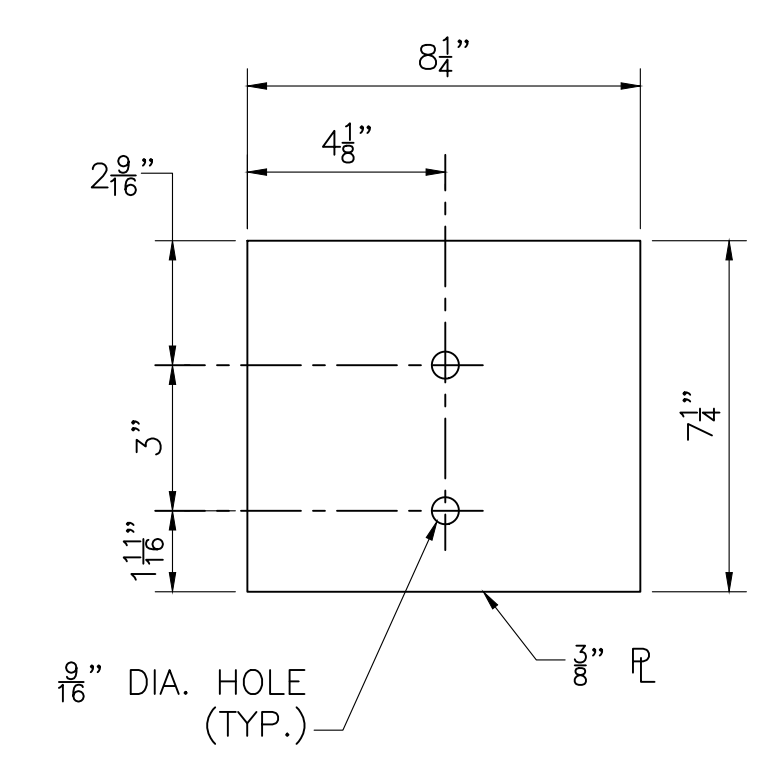
BACK PLATE
 SCALE: 3"=1'-0"



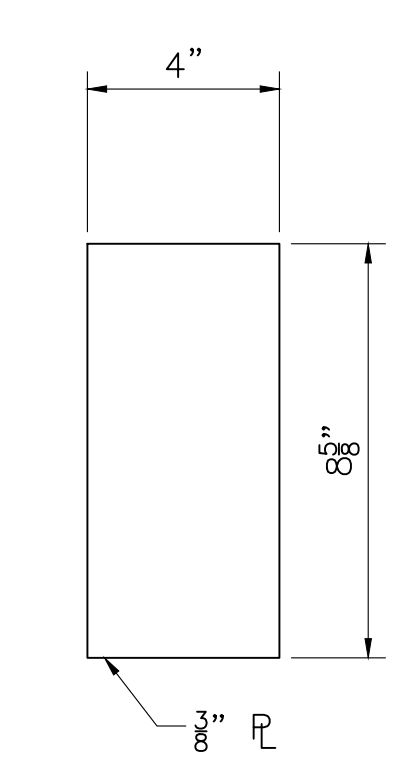
SIDE ELEVATION
 SCALE: 3"=1'-0"



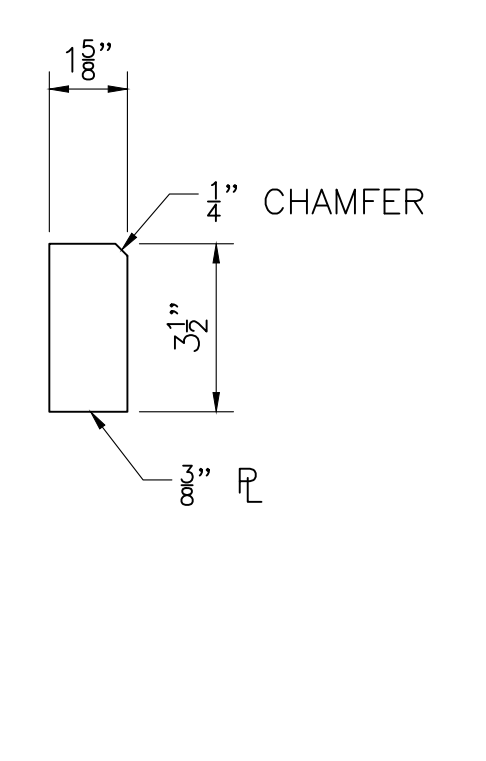
BACK ELEVATION
 SCALE: 3"=1'-0"



BASE PLATE
 SCALE: 3"=1'-0"



SIDE PLATE
 SCALE: 3"=1'-0"



POST SUPPORT PLATE
 SCALE: 3"=1'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

608164_BR1(S-31-007)RAIL.DWG Plotted on 12-May-2021 9:33 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

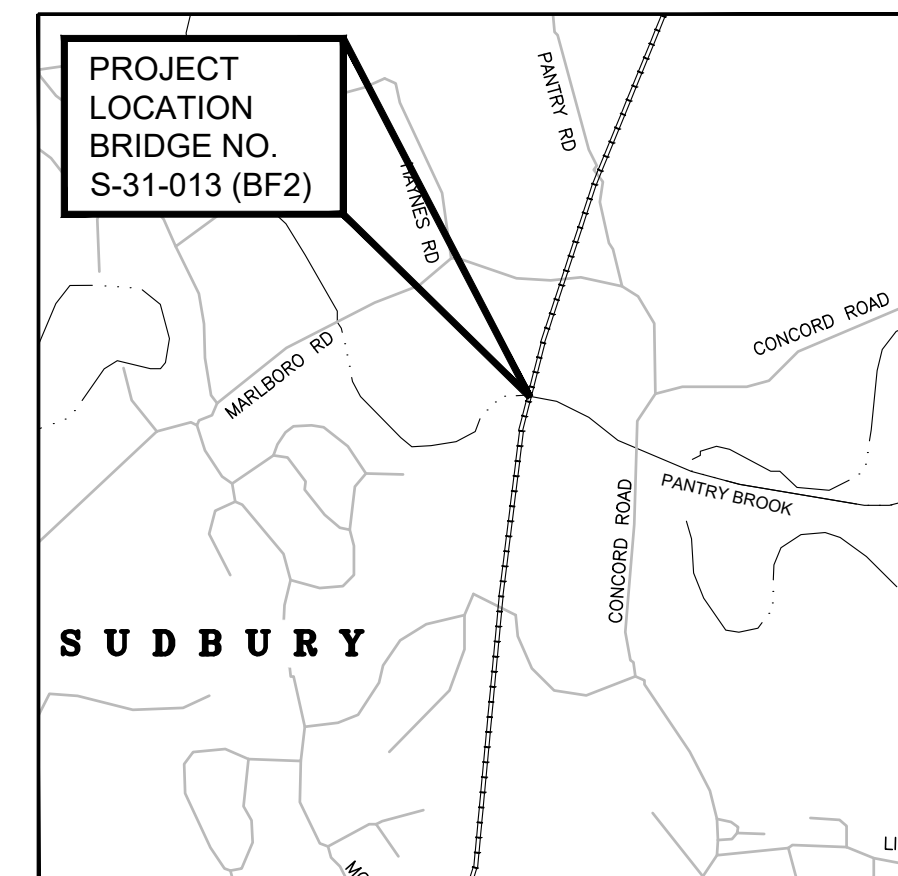
**SUDBURY
BIKE PATH OVER PANTRY BROOK**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	233	318
PROJECT FILE NO.		608164	

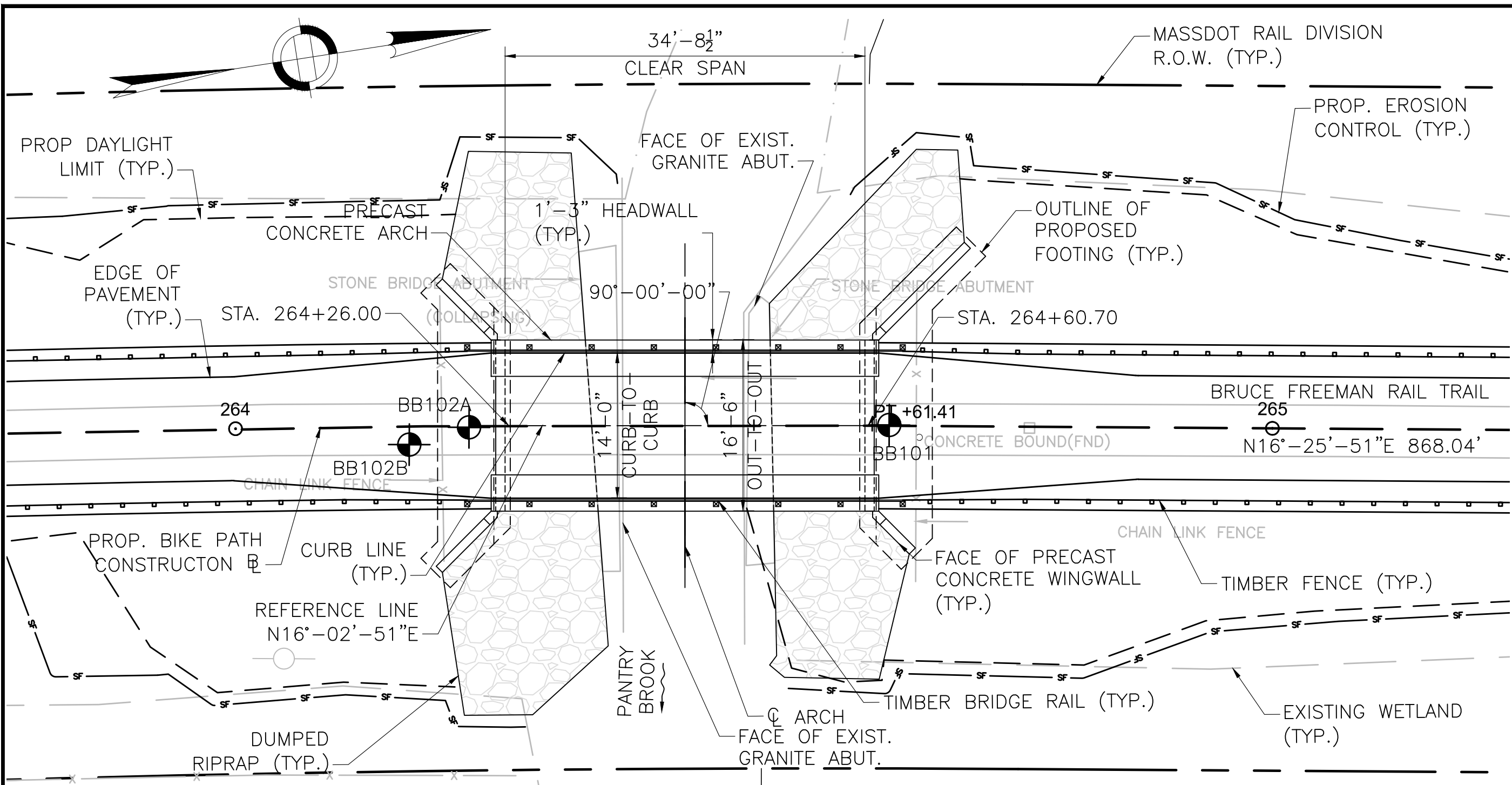
KEY PLAN & PROFILE

ESTIMATED QUANTITIES:
(NOT GUARANTEED)

ITEM:	QUANTITY:
DEMOLITION OF SUPERSTRUCTURE OF BRIDGE NO. S-31-013	1 LS
BRIDGE EXCAVATION	410 CY
CHANNEL EXCAVATION	235 CY
GRAVEL BORROW FOR BACKFILLING STRUCTURES AND PIPES	270 CY
CRUSHED STONE	85 TON
CRUSHED STONE FOR BRIDGE FOUNDATIONS	60 TON
CHAIN LINK FENCE REMOVED AND STACKED	55 FT
STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR	10 CY
MASONRY REPOINTING	10 SY
MASONRY REMOVED AND STOCKPILED	76 SY
GEOTEXTILE FABRIC FOR PERMANENT EROSION CONTROL	215 SY
MASONRY PARK BENCH REMOVED AND RESET	7 EA
DUMPED RIPRAP	205 TON
CONTROL OF WATER - STRUCTURE NO. S-31-013	1 LS
BRIDGE STRUCTURE, BRIDGE NO. S-31-013	1 LS



LOCUS PLAN
SCALE: 1" = 1200'



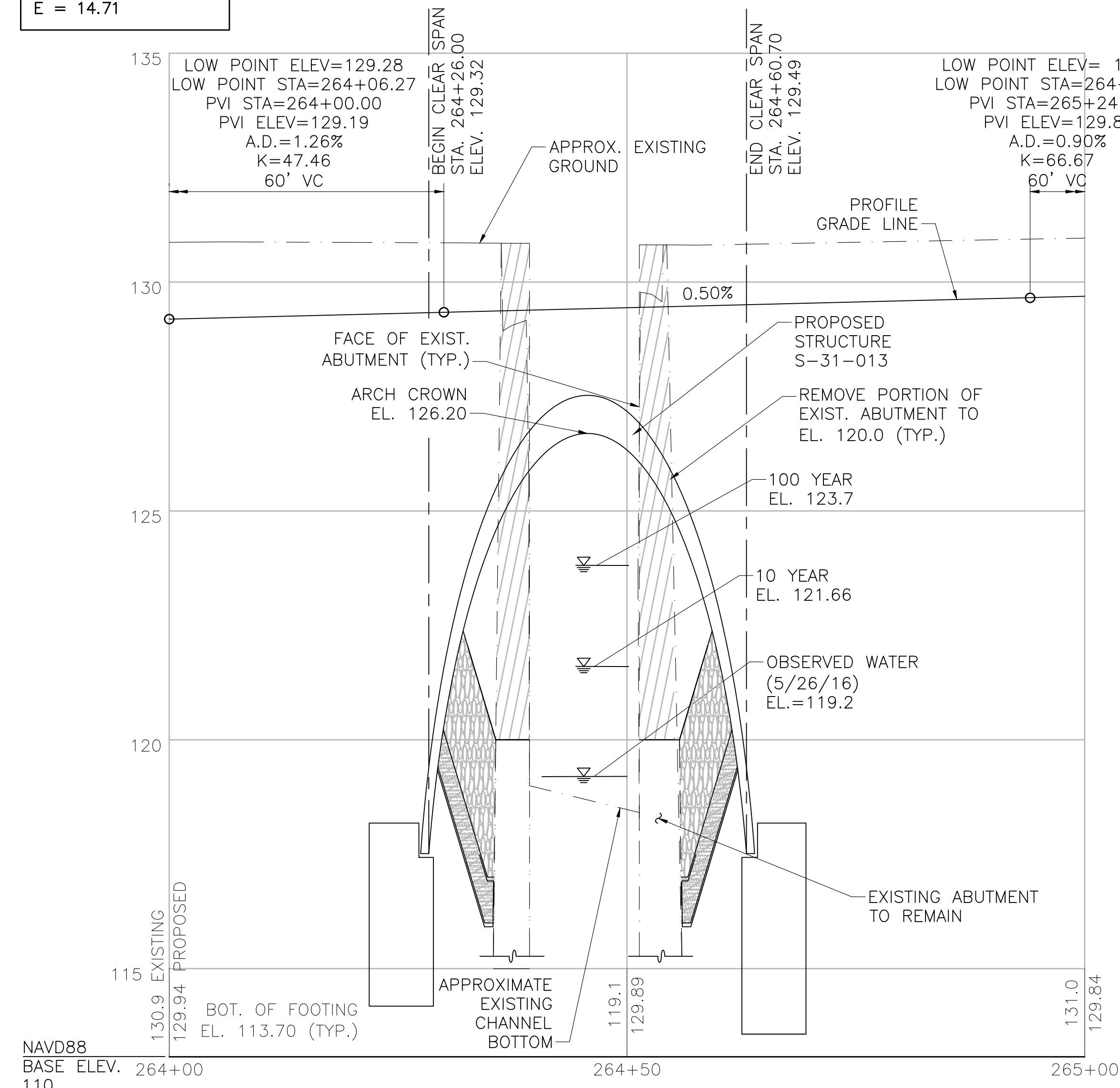
CURVE DATA

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Δ = 11°-56'-04.85"
R = 2700.00
T = 282.23
L = 562.41
E = 14.71

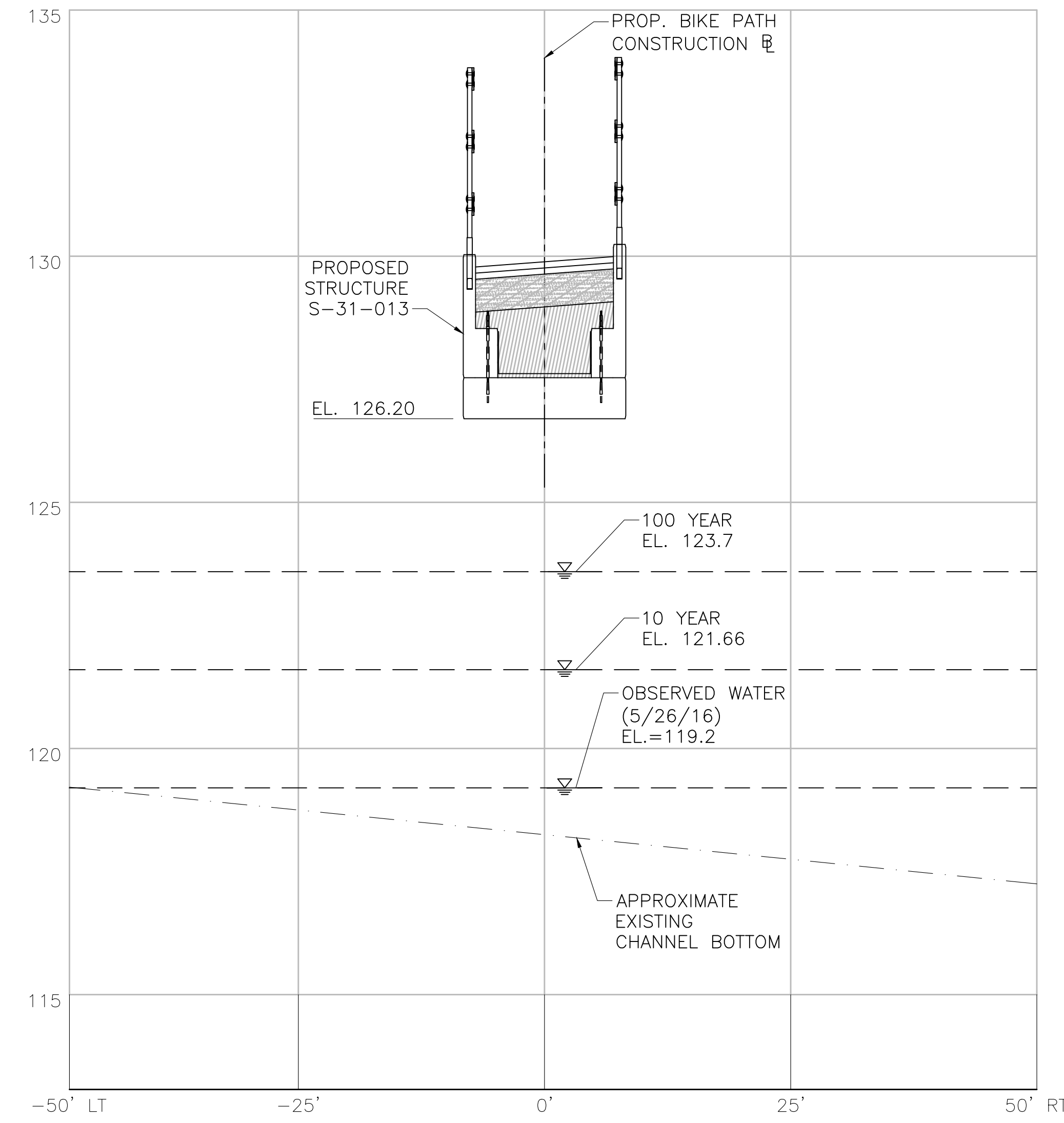
KEY PLAN
SCALE: 1" = 10'-0"

INDEX

SHEET NO.	DESCRIPTION
1	KEY PLAN AND PROFILE
2	GENERAL NOTES
3-4	BORING LOGS
5	GENERAL PLAN AND ELEVATION
6	EARTHWORK DETAILS
7	TYPICAL SECTIONS AND ELEVATIONS
8	FOUNDATION PLAN AND DETAILS
9	PRECAST ARCH DETAILS AND NOTES
10	TIMBER BRIDGE RAIL DETAILS



PROFILE ALONG BIKE PATH
HORIZONTAL SCALE: 1" = 10'-0"
VERTICAL SCALE: 1" = 2'-0"



PROFILE ALONG PANTRY BROOK
HORIZONTAL SCALE: 1" = 10'-0"
VERTICAL SCALE: 1" = 2'-0"

P.E. STAMP SIGNATURE

MONTH DD, YYYY ISSUED FOR CONSTRUCTION

**PROPOSED BRIDGE
SUDBURY
PROPOSED BIKEPATH
OVER PANTRY BROOK**

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

TITLE: _____ CHIEF ENGINEER

608164_BR(S-31-013)(FIRST SHEET).DWG Plotted on 12-May-2021 9:38 AM XXXXX Structural Submittal (S) DD-Month-YYYY

**SUDBURY
BIKE PATH OVER PANTRY BROOK**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	234	318
PROJECT FILE NO.		608164	

GENERAL NOTES

GENERAL NOTES:

DESIGN:

IN ACCORDANCE WITH THE 2020 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS WITH CURRENT INTERIM SPECIFICATIONS THROUGH 2021 FOR H-10 VEHICULAR AND 90 PSF PEDESTRIAN LOADINGS.

MASSDOT BENCH MARK:

BM #37 LAG SCREW SET 2' UP 7" PINE
ELEV. = 133.50'

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

SURVEY NOTEBOOKS:

SURVEY PERFORMED BY VANASSE HANGEN BRUSTLIN, INC. FIELD NOTEBOOKS SHALL BE OBTAINED FROM FUSS AND O'NEILL, INC., SPRINGFIELD, MA.

SCALES:

SCALES NOTED ON THE PLANS ARE NOT APPLICABLE TO REDUCED SIZE PRINTS. DIVIDE SCALES BY 2 FOR HALF-SIZE PRINTS (A3).

FOUNDATIONS:

FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH THE APPROVAL OF THE ENGINEER.

UNSUITABLE MATERIAL:

ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

EXISTING CONSTRUCTION:

DIMENSIONS SHOWN ARE TAKEN FROM SURVEY, VARIOUS FIELD MEASUREMENTS, AND GEOTECHNICAL EXPLORATION AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL DETERMINE AND ESTABLISH ALL DIMENSIONS AND DETAILS NECESSARY FOR COMPLETION OF ALL WORK BY FIELD MEASUREMENT AND SURVEY. THE CONTRACTOR SHALL BE RESPONSIBLE AND NOT ORDER ANY MATERIAL OR COMMENCE ANY FABRICATION UNTIL HE HAS MADE THE REQUIRED MEASUREMENTS ON THE ACTUAL STRUCTURE AND THE EXTENT OF THE PROPOSED WORK HAS BEEN APPROVED BY THE ENGINEER.

GEOTECHNICAL REPORT:

REFER TO GEOTECHNICAL REPORT DATED APRIL 24, 2020 BY JACOBS ENGINEERING GROUP, INC.

HYDRAULIC REPORT:

REFER TO HYDRAULIC REPORT DATED APRIL 24, 2020 BY JACOBS ENGINEERING GROUP, INC.

CONCRETE:

ALL CONCRETE SHALL BE 4,000 HP CONCRETE. ALL PRECAST CONCRETE SHALL BE 5,000 PSI, 3/4", 685 HP CEMENT CONCRETE

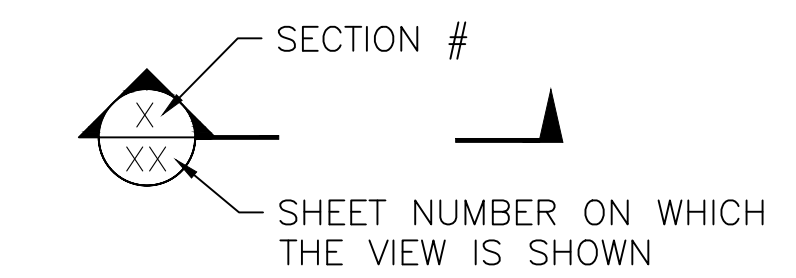
REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS	#6 BARS
1. NONE	16"	19"	23"
2. 12" OF CONCRETE BELOW BAR	20"	25"	30"
3. EPOXY COATED BARS, COVER < 3d _b , OR CLEAR SPACING < 6d _b	23"	29"	34"
4. COATED BARS, ALL OTHER CASES	18"	23"	27"
5. CONDITION 2. AND 3.	26"	32"	39"
6. CONDITION 2. AND 4.	24"	30"	36"

ALL OTHER BARS SHOULD BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

SECTION MARK:



TRAFFIC DATA		
	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	N/A	
AVERAGE DAILY TRAFFIC -- PRESENT	N/A	
AVERAGE DAILY TRAFFIC -- DESIGN YEAR	N/A	
DESIGN HOURLY VOLUME	N/A	
DIRECTIONAL DISTRIBUTION	N/A	
TRUCK PERCENTAGE -- AVERAGE DAY	N/A	
TRUCK PERCENTAGE -- PEAK HOUR	N/A	
DESIGN SPEED	18 MPH	
DIRECTIONAL DESIGN HOURLY VOLUME	N/A	

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1,000
DESIGN SPECTRA	
As	0.11
SDs	0.23
SD1	0.09
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	2.5
DESIGN FLOOD DISCHARGE (C.F.S)	155
DESIGN FLOOD FREQUENCY (YEARS)	10
DESIGN FLOOD VELOCITY (F.P.S)	2.88
DESIGN FLOOD ELEVATION (FEET, NAVD)	121.66

BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S)	240
BASE FLOOD ELEVATION (FEET, NAVD)	123.16

DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	25
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	0.6
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT RETURN FREQUENCY (YEARS)	50
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	0.7
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A

FLOOD OF RECORD	
DISCHARGE (C.F.S.)	N/A
FREQUENCY (IF KNOWN, YEARS)	N/A
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	N/A
HISTORY OF ICE FLOES	N/A
EVIDENCE OF SCOUR AND EROSION	YES

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

608164_BRF(S-31-013)NOTES.DWG Plotted on 12-May-2021 9:39 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

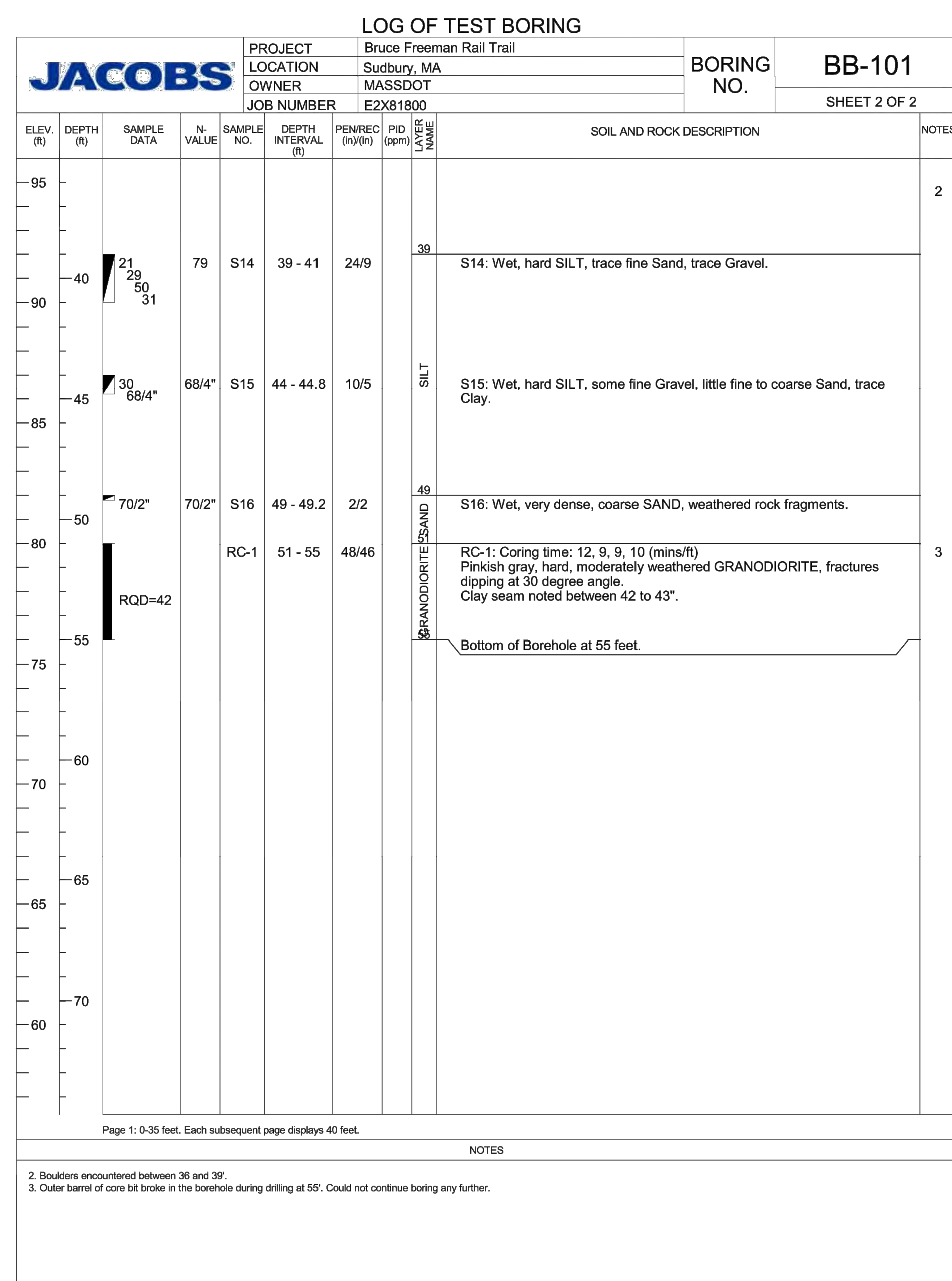
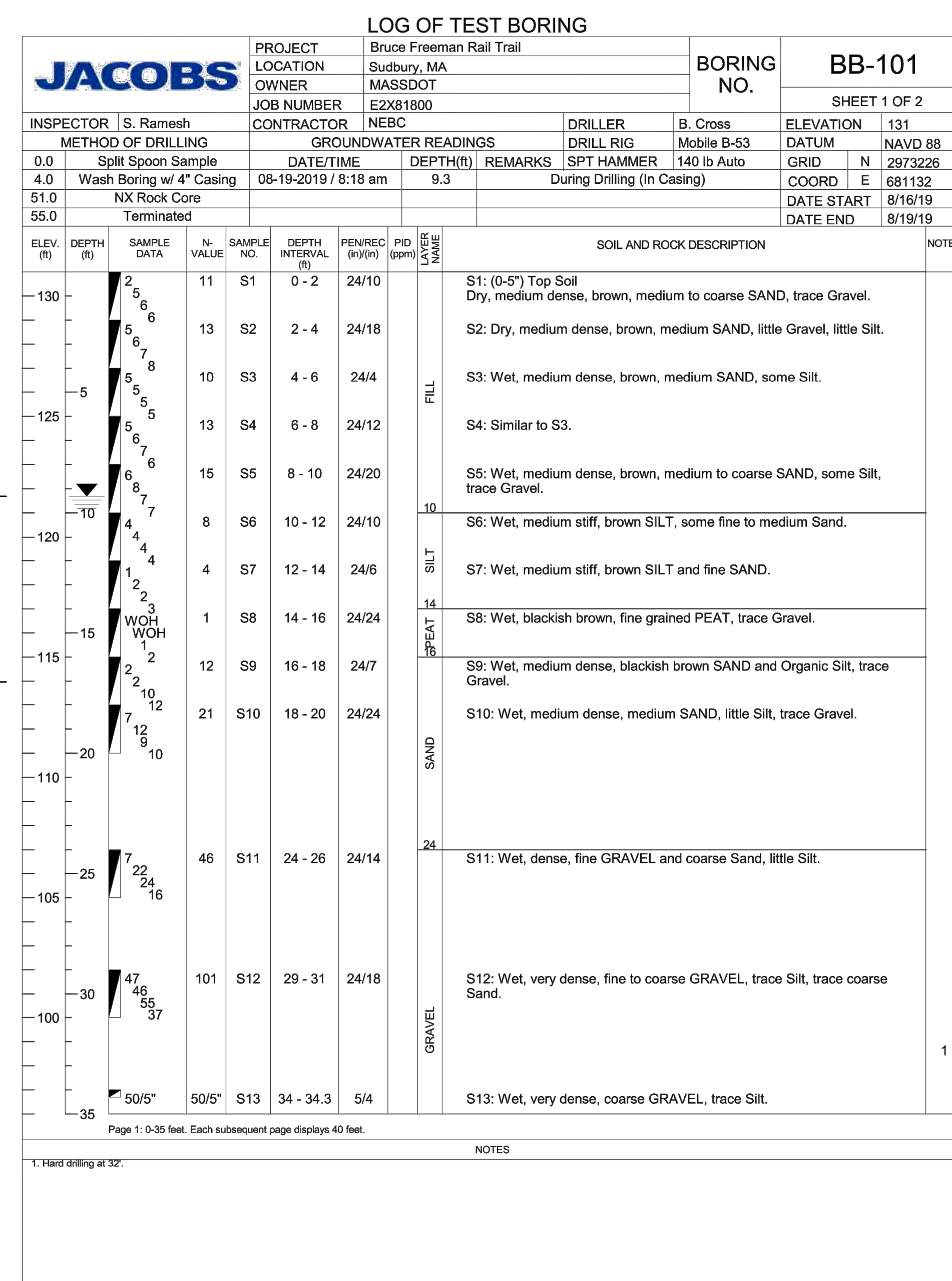
**SUDBURY
BIKE PATH OVER PANTRY BROOK**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	235	318
PROJECT FILE NO.		608164	

BORING LOGS

BORING NOTES:

1. LOCATION OF BORINGS SHOWN ON THE PLANS THUS: BB-#
2. BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
3. WATER LEVELS SHOWN ON THE BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
4. FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 1/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
5. BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTRACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
6. ALL BORINGS WERE MADE IN AUGUST 2019.
7. BORINGS WERE MADE BY NEW ENGLAND BORING CONTRACTOR, INC., P.O. BOX 165, DERRY, NH 03038.
8. THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.



GROUNDWATER:

THE WATER LEVELS RECORDED IN THE TABLE ARE THOSE MEASURED ON THE DATES GIVEN AND DO NOT NECESSARILY REPRESENT GROUNDWATER LEVEL AT THE TIME OF CONSTRUCTION.

▽ 121.7

BOT. OF FTG.
EL. 113.70

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
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608164_BRC-4(S-31-013)BORINGS.DWG Plotted on 12-May-2021 9:39 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

**SUDBURY
BIKE PATH OVER PANTRY BROOK**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	236	318
PROJECT FILE NO.		608164	

BORING LOGS

BORING NOTES:

SEE SHEET 3 FOR BORING NOTES.

LOG OF TEST BORING

JACOBS		PROJECT	Bruce Freeman Rail Trail	BORING NO.	BB-102A
		LOCATION	Sudbury, MA	SHEET 1 OF 1	
		OWNER	MASSDOT		
		JOB NUMBER	E2X81800		
INSPECTOR	S. Ramesh	CONTRACTOR	NEBC	DRILLER	B. Cross
METHOD OF DRILLING		GROUNDWATER READINGS		DRILL RIG	Mobile B-53
0.0	Split Spoon Sample	DATE/TIME		SPT HAMMER	140 lb Auto
4.0	Wash Boring w/ 4" Casing	08-20-2019 / 1:36 pm	11.5	REMARKS	Upon Completion (Casing pulled)
		GRID	N 2973187		
		COORD	E 681121		
		DATE START	8/20/19		
		DATE END	8/20/19		

ELEV. (ft)	DEPTH (ft)	SAMPLE DATA	N-VALUE	SAMPLE NO.	DEPTH INTERVAL (ft)	PEN/REC (in/ft)	PID (ppm)	LAYER NAME	SOIL AND ROCK DESCRIPTION	NOTES
130	2	4		10	0-2	24/17		FILL	S1: (0-12") Dry, black, medium SAND, trace Gravel, roots (topsoil). (12-17") Dry, brown, fine to medium SAND, trace Silt.	
125	5	4		11	2-4	24/15		FILL	S2: Dry, medium dense, brown, fine to medium SAND, little Silt, trace Gravel.	
120	8	4		6	4-6	24/9		FILL	S3: Wet, loose, brown, fine SAND, some Silt, trace Gravel.	
115	11	5		11	6-8	24/10		FILL	S4: Wet, medium dense, brown, fine SAND and SILT.	
110	12	5		12	8-10	24/5		FILL	S5: Wet, medium dense, fine to coarse SAND, some Silt, trace Gravel.	
105	15	6		4	10-12	24/4		PEAT	S6: Wet, medium stiff, brown, SILT, some fine to medium Sand, trace Clay, trace Gravel.	
100	18	7		5	12-14	24/23		PEAT	S7: Wet, blackish brown, fine grained PEAT.	
95	21	8		19	14-16	24/19		SAND	S8: Wet, medium dense, brownish gray, medium to coarse SAND, some Silt.	
90	24	11		41	16-18	24/15		SAND	S9: Wet, dense, brown, medium to coarse SAND, trace Silt, trace fine Gravel.	
85	27	12		29	18-20	24/19		SAND	S10: Wet, medium dense, grayish brown, medium to coarse SAND, little Silt.	
80	30	13		33	24-26	24/5		SILT	S11: Wet, hard, gray SILT, little fine Sand, little fine Gravel.	1
75	33	14							Bottom of Borehole at 26 feet.	2

Page 1: 0-35 feet. Each subsequent page displays 40 feet.

1. Boring terminated at 26' due to an obstruction.
2. Boring offset 6' south and continued. See boring log BB-102B.

LOG OF TEST BORING

JACOBS		PROJECT	Bruce Freeman Rail Trail	BORING NO.	BB-102B
		LOCATION	Sudbury, MA	SHEET 1 OF 2	
		OWNER	MASSDOT		
		JOB NUMBER	E2X81800		
INSPECTOR	S. Ramesh	CONTRACTOR	NEBC	DRILLER	B. Cross
METHOD OF DRILLING		GROUNDWATER READINGS		DRILL RIG	Mobile B-53
0.0	Wash Boring w/ 3" Casing	DATE/TIME		SPT HAMMER	140 lb Auto
30.0	Wash Boring w/ 4" Casing	08-21-2019 / 8:34 am	10.8	REMARKS	During Drilling (In Casing)
52.0	NX Rock Core	08-22-2019 / 9:02 am	11.9	REMARKS	During Drilling (In Casing)
62.8	Terminated	08-23-2019 / 9:06 am	11.8	REMARKS	During Drilling (In Casing)
		GRID	N 2973181		
		COORD	E 681121		
		DATE START	8/21/19		
		DATE END	8/23/19		

ELEV. (ft)	DEPTH (ft)	SAMPLE DATA	N-VALUE	SAMPLE NO.	DEPTH INTERVAL (ft)	PEN/REC (in/ft)	PID (ppm)	LAYER NAME	SOIL AND ROCK DESCRIPTION	NOTES
130									Drill through.	
125										
120										
115										
110										
105										
100										
95										
90										
85										
80										
75										
70										
65										
60										
55										
50										
45										
40										
35										
		55/4"		52	29.5 - 29.8	4/3			S12: Wet, very dense, gray, fine to coarse GRAVEL, trace coarse Sand.	
		24		52	34 - 36	24/10			S13: Wet, very dense, gray GRAVEL and SAND, little Silt.	

Page 1: 0-35 feet. Each subsequent page displays 40 feet.

LOG OF TEST BORING

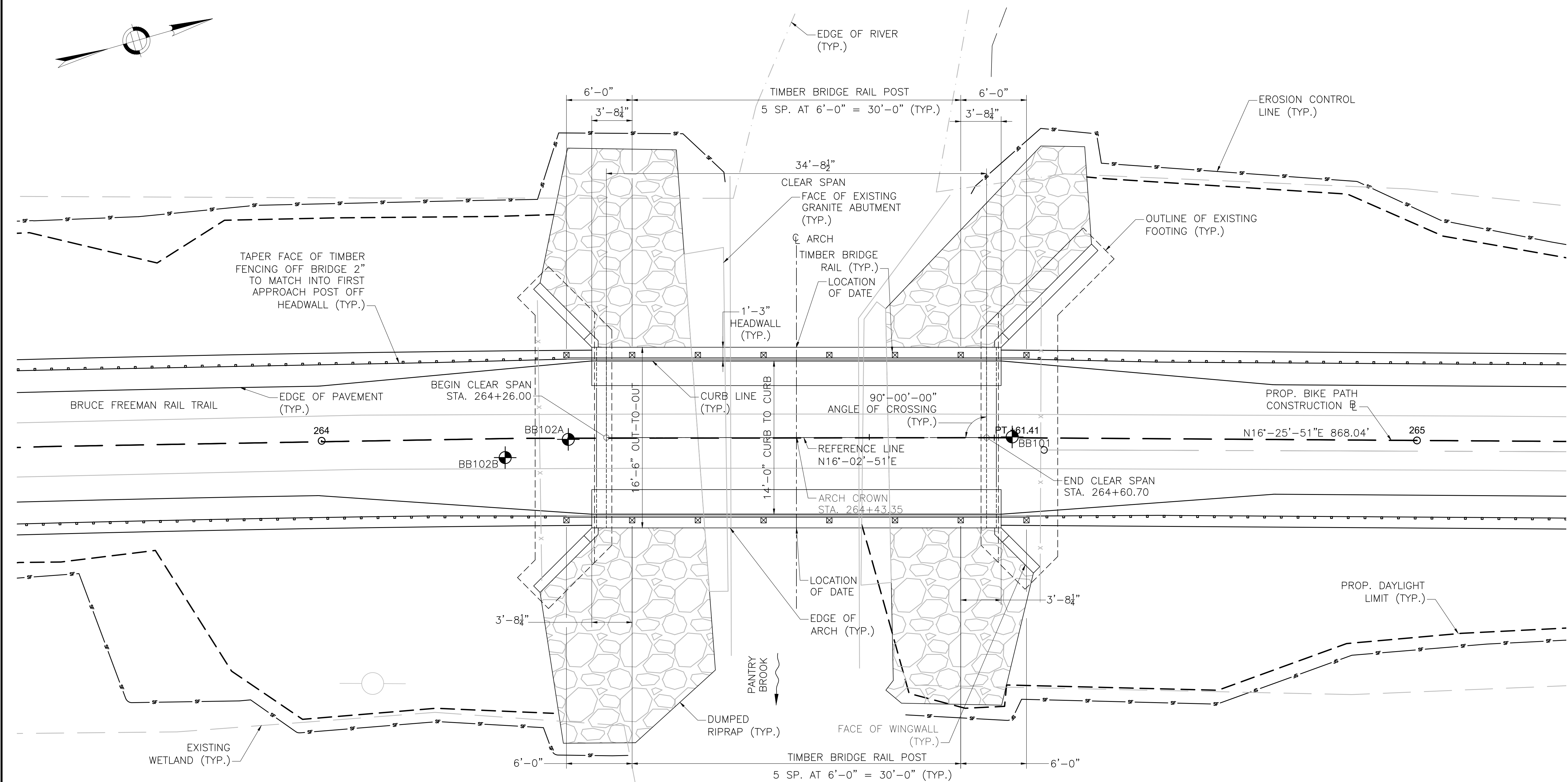
JACOBS		PROJECT	Bruce Freeman Rail Trail	BORING NO.	BB-102B
		LOCATION	Sudbury, MA	SHEET 2 OF 2	
		OWNER	MASSDOT		
		JOB NUMBER	E2X81800		
INSPECTOR	S. Ramesh	CONTRACTOR	NEBC	DRILLER	B. Cross
METHOD OF DRILLING		GROUNDWATER READINGS		DRILL RIG	Mobile B-53
0.0	Wash Boring w/ 3" Casing	DATE/TIME		SPT HAMMER	140 lb Auto
30.0	Wash Boring w/ 4" Casing	08-21-2019 / 8:34 am	10.8	REMARKS	During Drilling (In Casing)
52.0	NX Rock Core	08-22-2019 / 9:02 am	11.9	REMARKS	During Drilling (In Casing)
62.8	Terminated	08-23-2019 / 9:06 am	11.8	REMARKS	During Drilling (In Casing)
		GRID	N 2973181		
		COORD	E 681121		
		DATE START	8/21/19		
		DATE END	8/23/19		

ELEV. (ft)	DEPTH (ft)	SAMPLE DATA	N-VALUE	SAMPLE NO.	DEPTH INTERVAL (ft)	PEN/REC (in/ft)	PID (ppm)	LAYER NAME	SOIL AND ROCK DESCRIPTION	NOTES
95	31	21						GRAVEL	S14: Wet, very dense, gray, fine to coarse GRAVEL, little coarse Sand, trace Silt.	
90	30	53/4"	53/4"	S14	39 - 39.8	10/5		GRAVEL		
85	44	18		59	44 - 46	24/21		SILT	S15: Wet, hard, gray SILT, some Clay, trace fine Sand, trace Gravel.	
80	45	25						SILT		
75	50	37		82	49 - 50.8	22/22		SILT	S16: Wet, hard, gray SILT, some Clay, trace fine to coarse Sand, little Gravel.	
70	52	45						GRANODIORITE	RC-1: Coring time: 4.5, 5, 4.5, 11 (mins/ft) Wet, gray, pink grained, moderately to severely weathered, coarse grained GRANODIORITE.	
65	55	50/4"						GRANODIORITE	RC-2: Coring time: 6, 5, 3.5, 2.5, 2 (mins/ft) Similar to RC-1.	
60	60							GRANODIORITE	RC-3: Coring time: 2, 3.5 (mins/ft) Similar to RC-1.	
55	62.8							GRANODIORITE	Bottom of Borehole at 62.8 feet.	

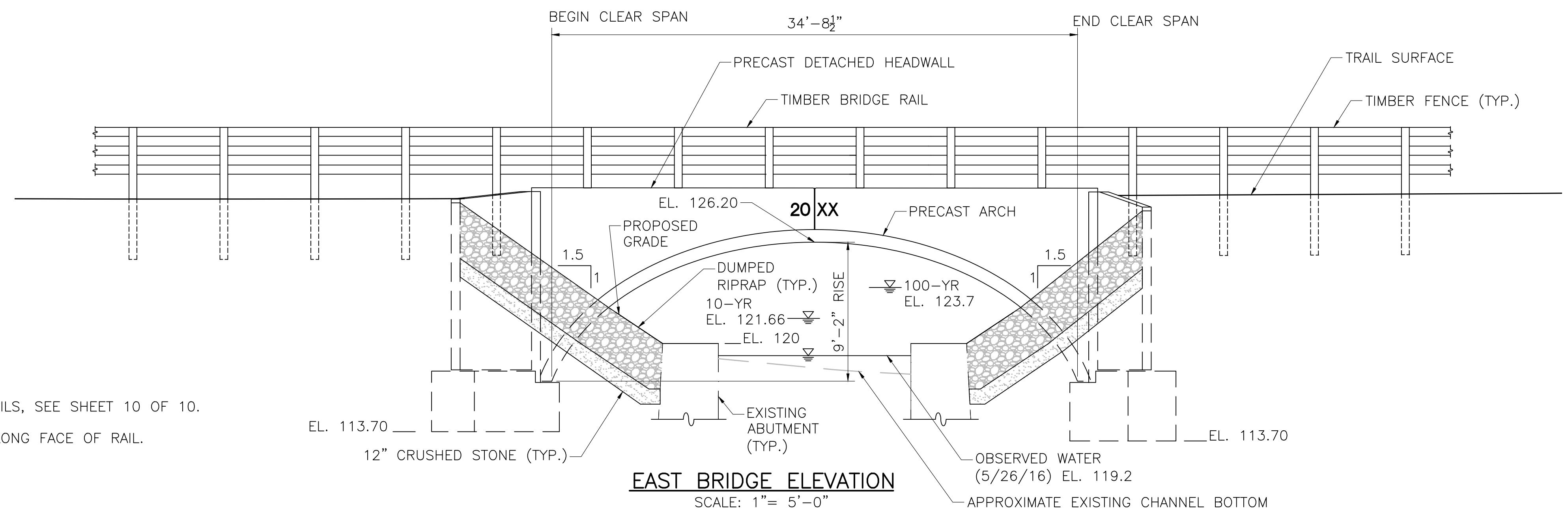
Page 1: 0-35 feet. Each subsequent page displays 40 feet.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
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608164_BRC-4(S-31-013)BORINGS.DWG Plotted on 12-May-2021 9:39 AM Xxxxx Structural Submittal (S)h DD-Month-YYYY



GENERAL PLAN
SCALE: 1" = 5'-0"



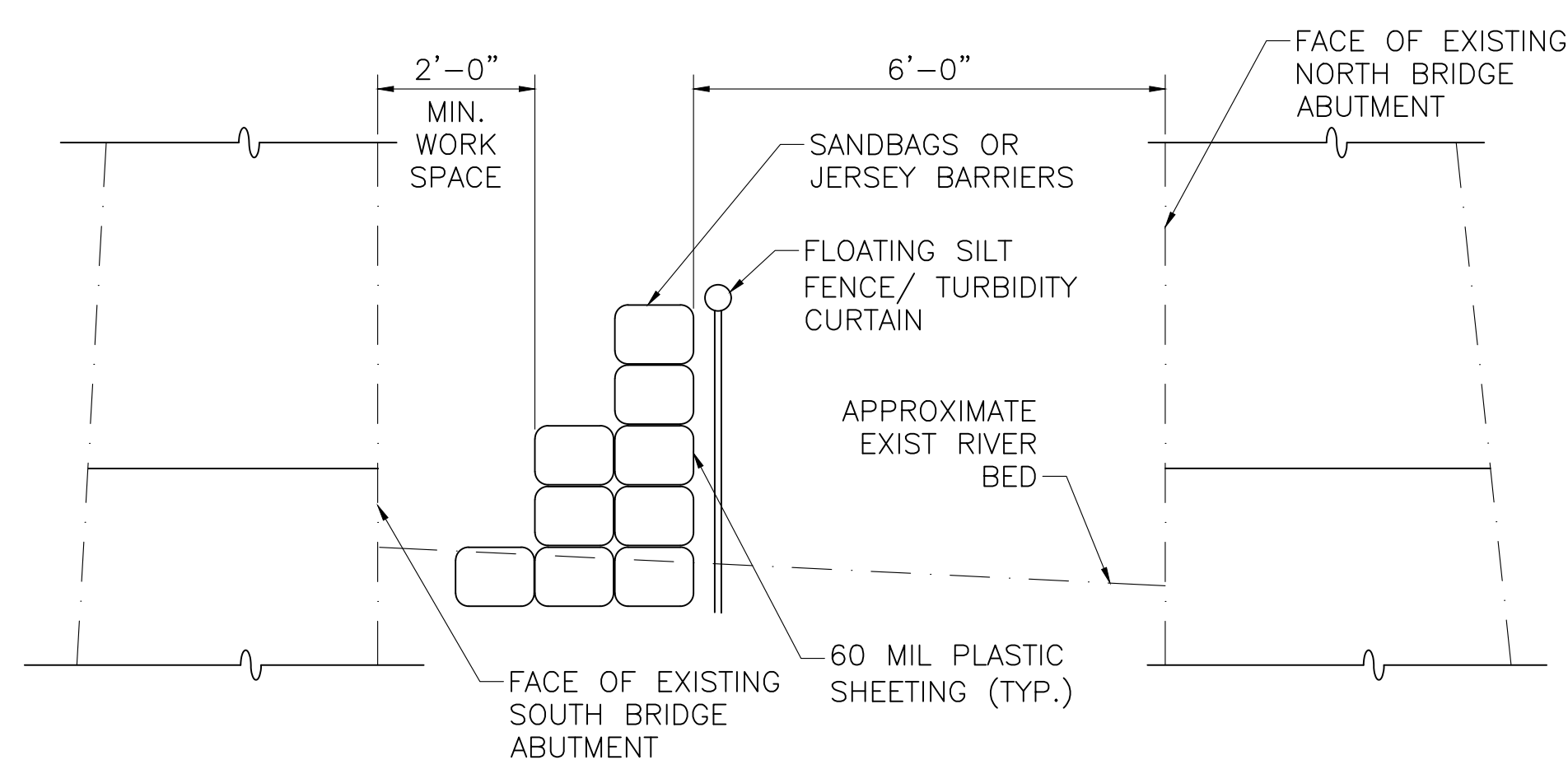
- NOTES:**
- FOR TIMBER BRIDGE RAIL DETAILS, SEE SHEET 10 OF 10.
 - RAIL POSTS ARE MEASURED ALONG FACE OF RAIL.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
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608164_BRF(S-31-013)GENPLAN.DWG Plotted on 12-May-2021 9:40 AM

EXISTING ABUTMENT REPAIR NOTES:

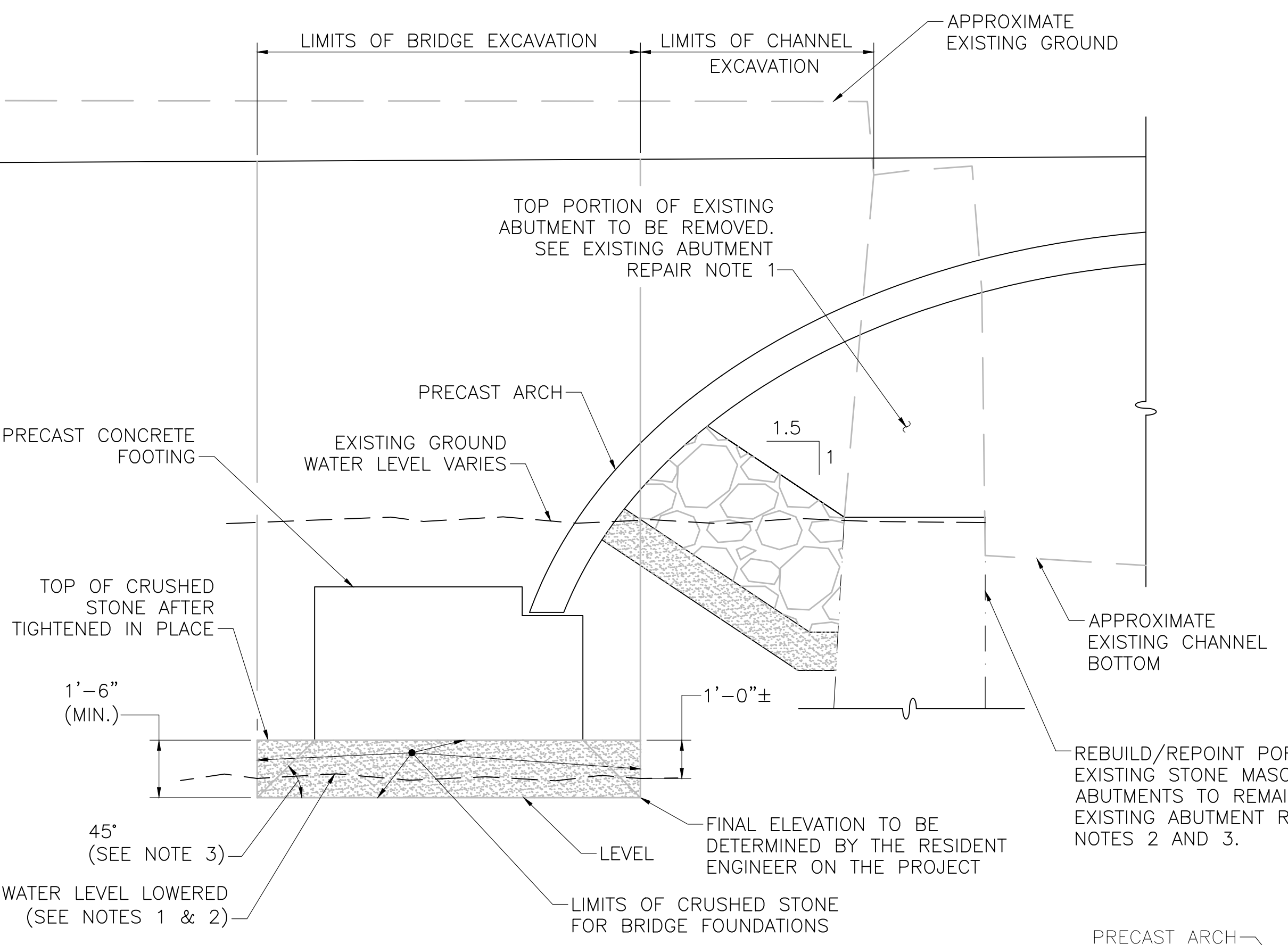
1. REMOVE TOPS OF EXISTING STONE MASONRY ABUTMENTS TO ELEVATION 120' OR TO THE NEAREST LONGITUDINAL STONE JOINT, PROVIDED THE JOINT LIES ABOVE THE RIVERBED OR AS DIRECTED BY THE ENGINEER. THE COST TO REMOVE THE EXISTING STONES SHALL BE INCLUDED IN ITEM 690.92, "MASONRY REMOVED AND STOCKPILED". SEVEN (7) OF THESE GRANITE BLOCKS SHALL BE SET ASIDE FOR RE-USE AS BENCHES AND HISTORIC DISPLAY ALONG THE TRAIL. REMOVAL AND RESETTING OF THESE 7 BLOCKS SHALL BE PAID FOR SEPARATELY UNDER ITEM 707.XX.
2. THE SOUTH EXISTING STONE MASONRY ABUTMENT HAS PARTIALLY COLLAPSED. THE CONTRACTOR SHALL REBUILD ANY COLLAPSED PORTIONS OF THE EXISTING WALL ALONG THE LENGTH OF THE ABUTMENT AND WINGWALLS BELOW THE LIMITS OF REMOVAL. THE COST TO REBUILD THE WALL AS REQUIRED SHALL BE INCLUDED IN ITEM 690, "STONE MASONRY WALL REMOVED AND REBUILT IN CEMENT MORTAR".
3. REPOINTING OF THE EXISTING STONE MASONRY ABUTMENTS SHALL BE REQUIRED AFTER THE TOP OF THE EXISTING ABUTMENTS HAVE BEEN REMOVED BUT PRIOR TO EXCAVATION OPERATIONS. THE CONFIGURATION OF THE EXISTING ABUTMENT STONE WALLS AND THE ELEVATION OF THE BOTTOM OF THE EXISTING ABUTMENTS SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL ENSURE THE EXISTING ABUTMENT STONE WALLS ARE NOT UNDERMINED OR IN ANY WAY COMPROMISED DURING EXCAVATION OPERATIONS. TEMPORARY SHORING OF THE EXISTING ABUTMENT WALLS MAY BE REQUIRED TO COMPLETE EXCAVATION OPERATIONS. THE COST TO REPOINT SHALL BE INCLUDED IN ITEM 690.91, "MASONRY REPOINTING".
4. ANY WATER CONTROL REQUIRED TO REMOVE, REPAIR, REBUILD, SHORE, OR REPOINT THE EXISTING ABUTMENTS SHALL BE INCLUDED UNDER ITEM 991, "CONTROL OF WATER".



SUGGESTED WATER CONTROL PLAN
SCALE: 1"=1'-0"

NOTES:

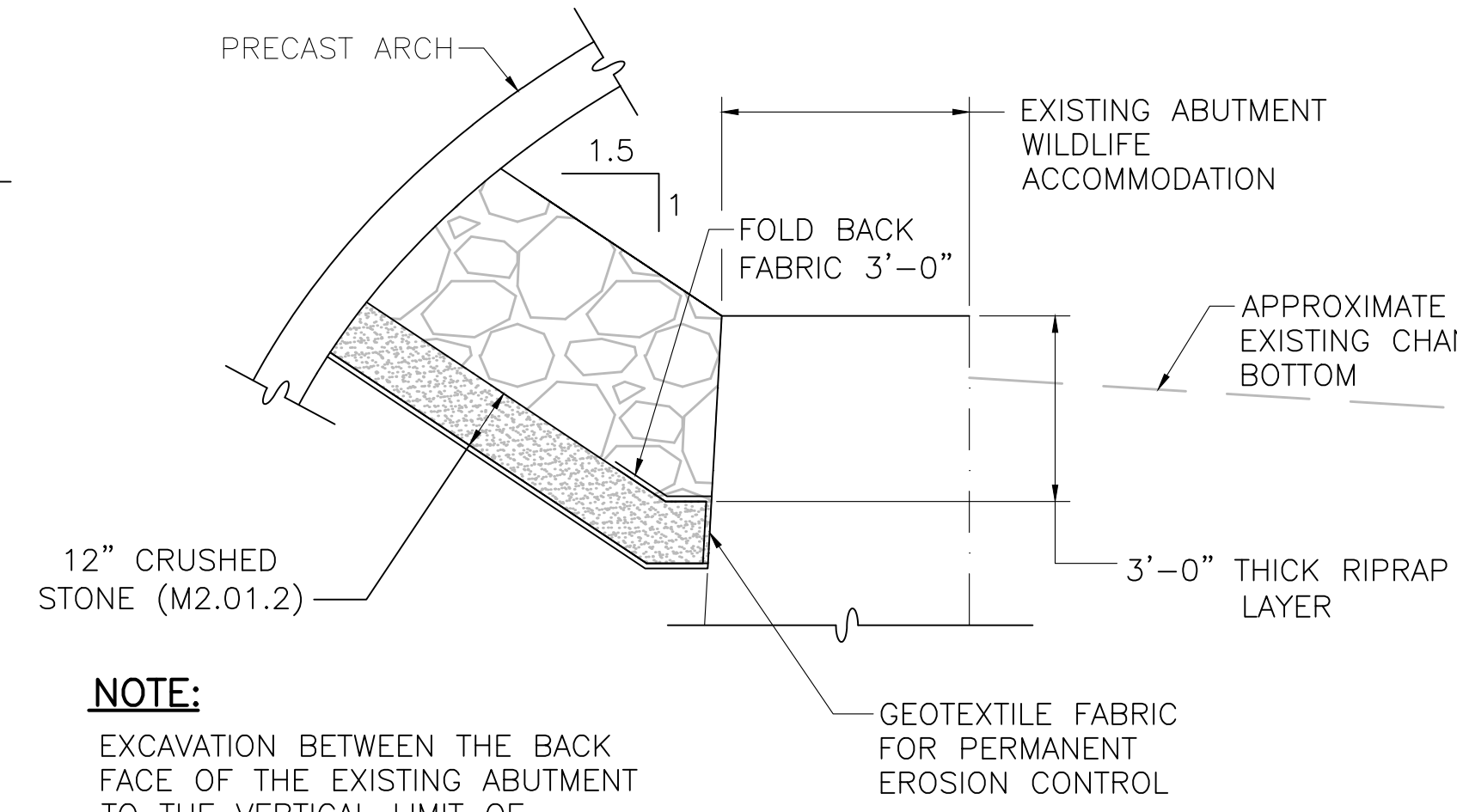
1. WORK IN THE WATER SHALL BE PERFORMED DURING LOW FLOW SEASON AND THE FLOW SHALL BE MAINTAINED THROUGH THE USE OF TEMPORARY WATER CONTROL.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING THE BARRIER TO HANDLE THE RIVER FLOW. THE BARRIER SHALL BE OF ADEQUATE SIZE TO DELIVER THE WATER AT THE DISCHARGE END TO THE RIVER WITHOUT DISTURBING THE EXISTING BANKS OR RIVERBED FLOW. THE BARRIER HEIGHT SHALL BE SIZED TO MAINTAIN THE 2-YEAR FLOOD.
3. IN THE EVENT OF HIGH FLOW RATES, THE CONTRACTOR SHALL BE RESPONSIBLE TO DEVELOP AND IMPLEMENT A REASONABLE MEANS NECESSARY TO HANDLE THE ADDITIONAL FLOWS TO PROTECT THE SURROUNDING AREA, AS APPROVED BY THE ENGINEER.



LIMITS OF CRUSHED STONE FOR BRIDGE FOUNDATIONS
SCALE: 3/8"=1'-0"

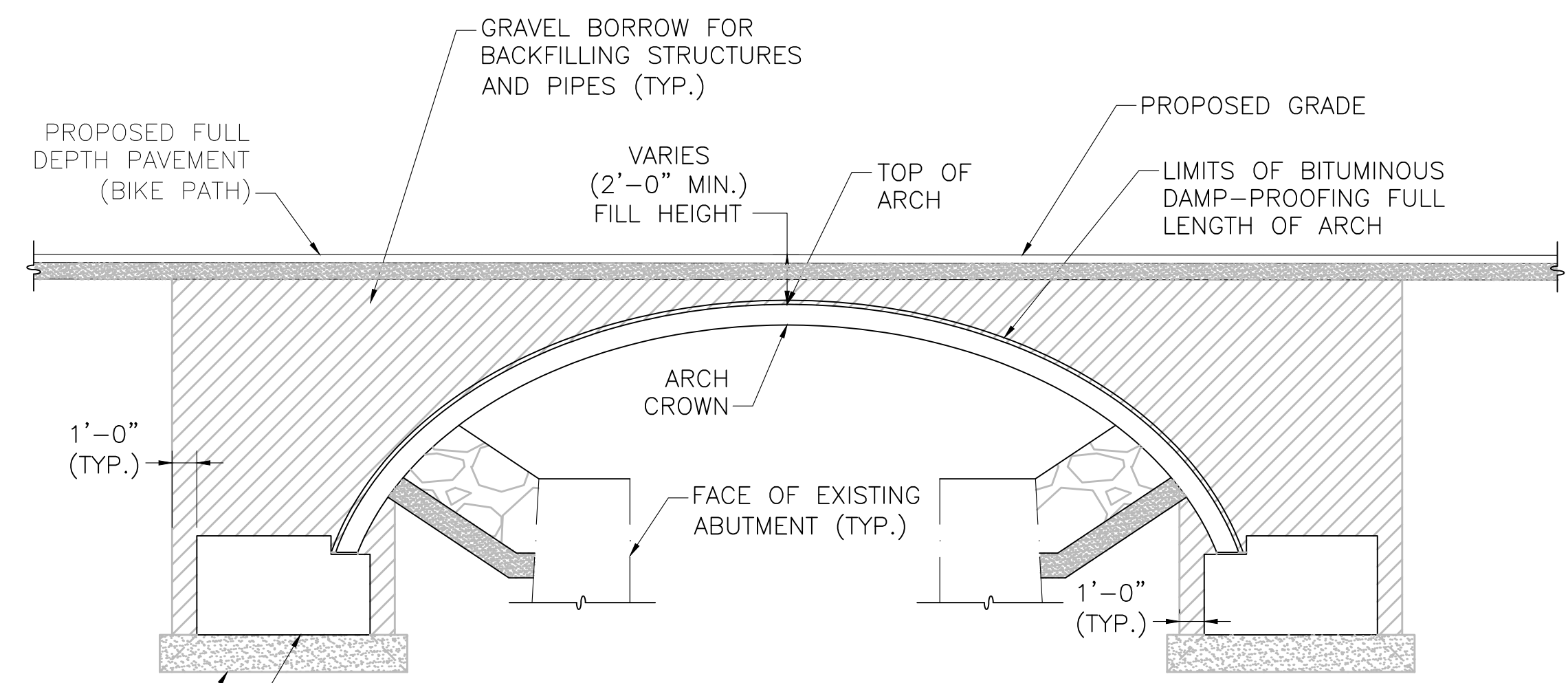
NOTES:

1. LOWER WATER LEVEL AS MUCH AS POSSIBLE WITHOUT DISTURBING THE GRANULAR SOIL (SIDES AND BOTTOM) AND TIGHTEN THE CRUSHED STONE IN PLACE (SEE STANDARD SPEC).
2. WATER CONTROL REQUIREMENTS:
 1. THE CONTRACTOR SHALL SUBMIT THE WATER CONTROL PLAN FOR APPROVAL PRIOR TO REMOVAL OF THE TOPS OF THE EXISTING ABUTMENTS AND WINGWALLS AND PLACEMENT OF THE PRECAST ARCH FOOTINGS.
 2. EXCAVATED FOOTING AREA SHALL CONTINUE TO BE DEWATERED UNTIL THE PRECAST CONCRETE FOOTINGS ARE FULLY INSTALLED.
 3. RIPRAP SHALL BE PLACED IN THE DRY AFTER DEWATERING ALL AREAS.
3. 45' FOR DEPTH 5'-0" OR LESS.
60' FOR DEPTH OVER 5'-0"

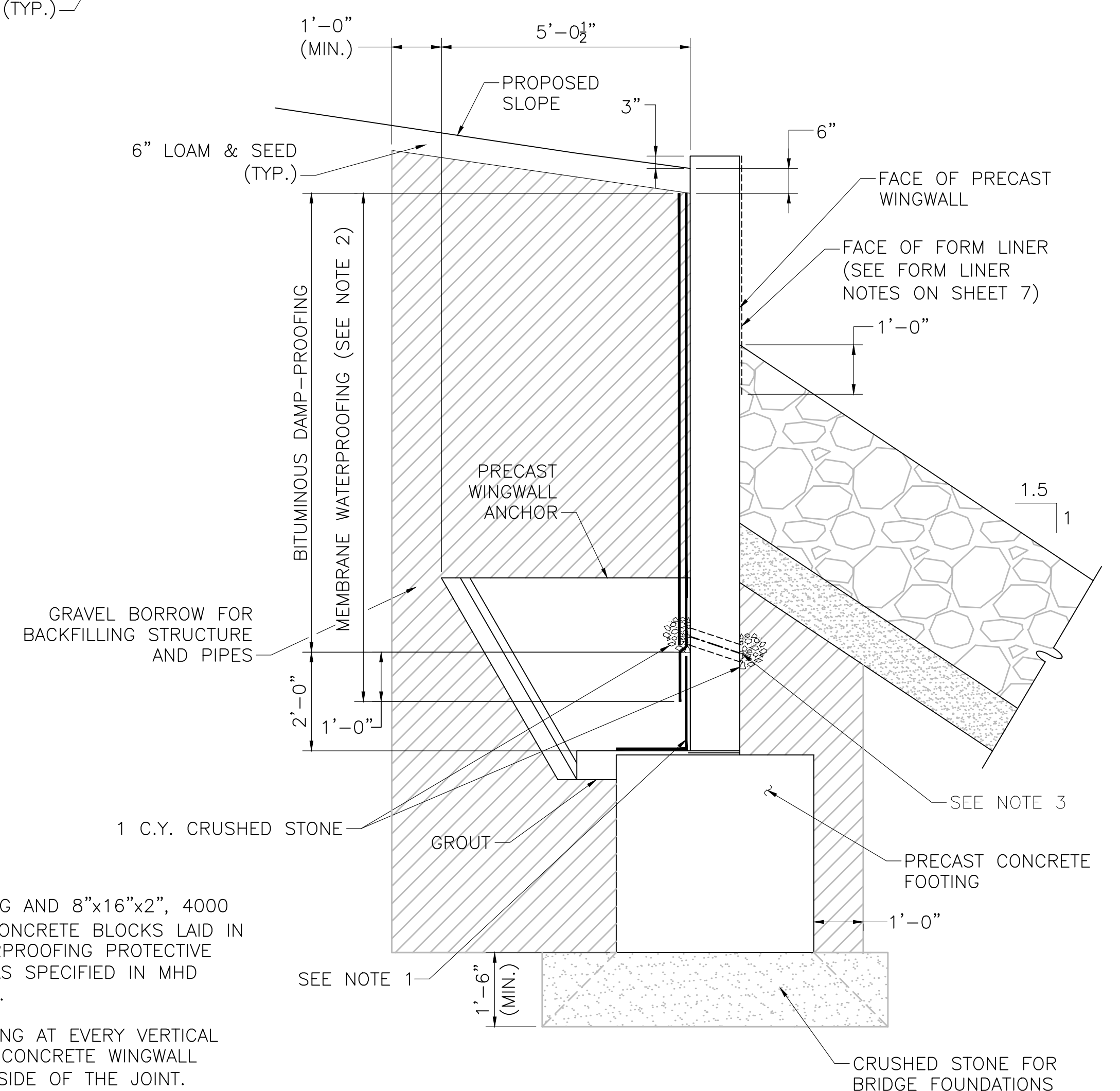


RIPRAP DETAIL
SCALE: 3/8"=1'-0"

NOTE:
EXCAVATION BETWEEN THE BACK FACE OF THE EXISTING ABUTMENT TO THE VERTICAL LIMIT OF EXCAVATION FOR CRUSHED STONE FOR BRIDGE FOUNDATIONS AND DOWN TO THE BOTTOM OF CRUSHED STONE (M2.01.2) SHALL BE PAID FOR UNDER ITEM 143, "CHANNEL EXCAVATION".



ARCH BACKFILL DETAIL
SCALE: 3/16"=1'-0"



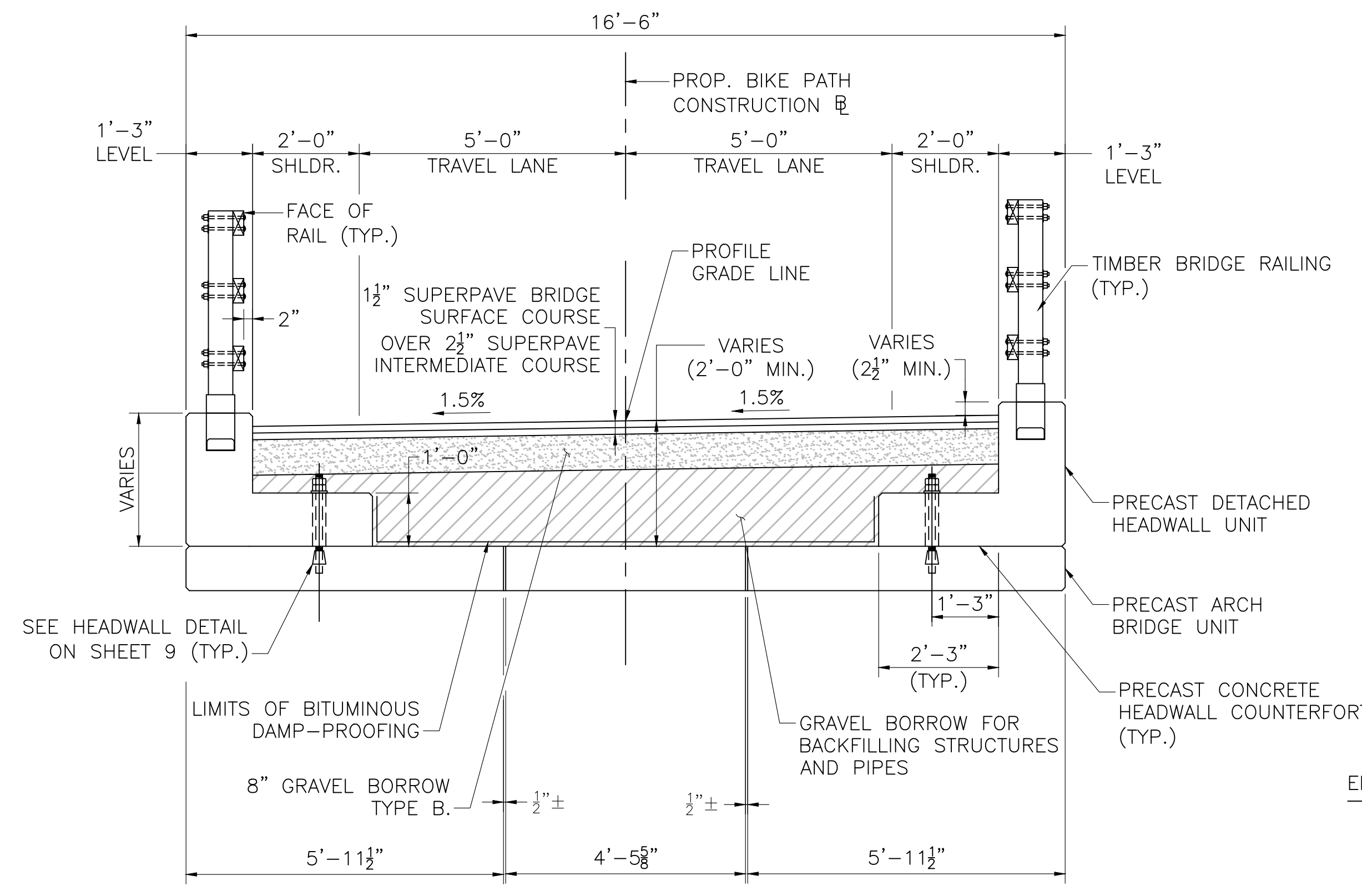
WINGWALL BACKFILL DETAIL
SCALE: 1/2"=1'-0"

NOTES:

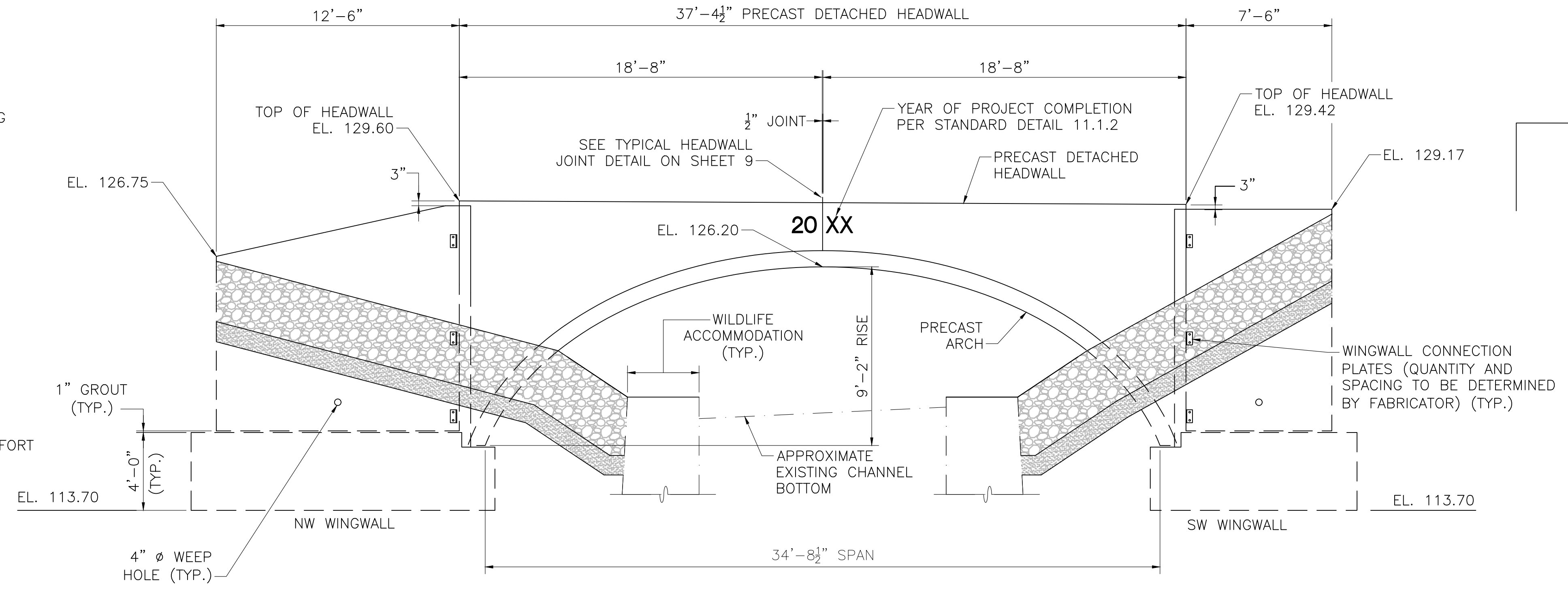
1. MEMBRANE WATERPROOFING AND 8"x16"x2", 4000 PSI, 3/4" IN. 610 CEMENT CONCRETE BLOCKS LAID IN MORTAR OR OTHER WATERPROOFING PROTECTIVE COURSE, MIN. 2" THICK AS SPECIFIED IN MHD STANDARD SPECIFICATIONS.
2. MEMBRANE WATERPROOFING AT EVERY VERTICAL JOINT BETWEEN PRECAST CONCRETE WINGWALL SECTIONS. 1'-0" EITHER SIDE OF THE JOINT.
3. 4" Ø WEEP HOLES 10'-0" O.C. (JUST ABOVE PROTECTIVE COURSE). PROVIDE 1 CUBIC YARD OF CRUSHED STONE AT EACH END OF WEEP HOLE.
4. SEE LIMITS OF CRUSHED STONE FOR BRIDGE FOUNDATIONS DETAIL FOR WINGWALL FOOTING REQUIREMENTS.
5. SEE RIPRAP DETAIL FOR RIPRAP AT FACE OF WINGWALL REQUIREMENTS.

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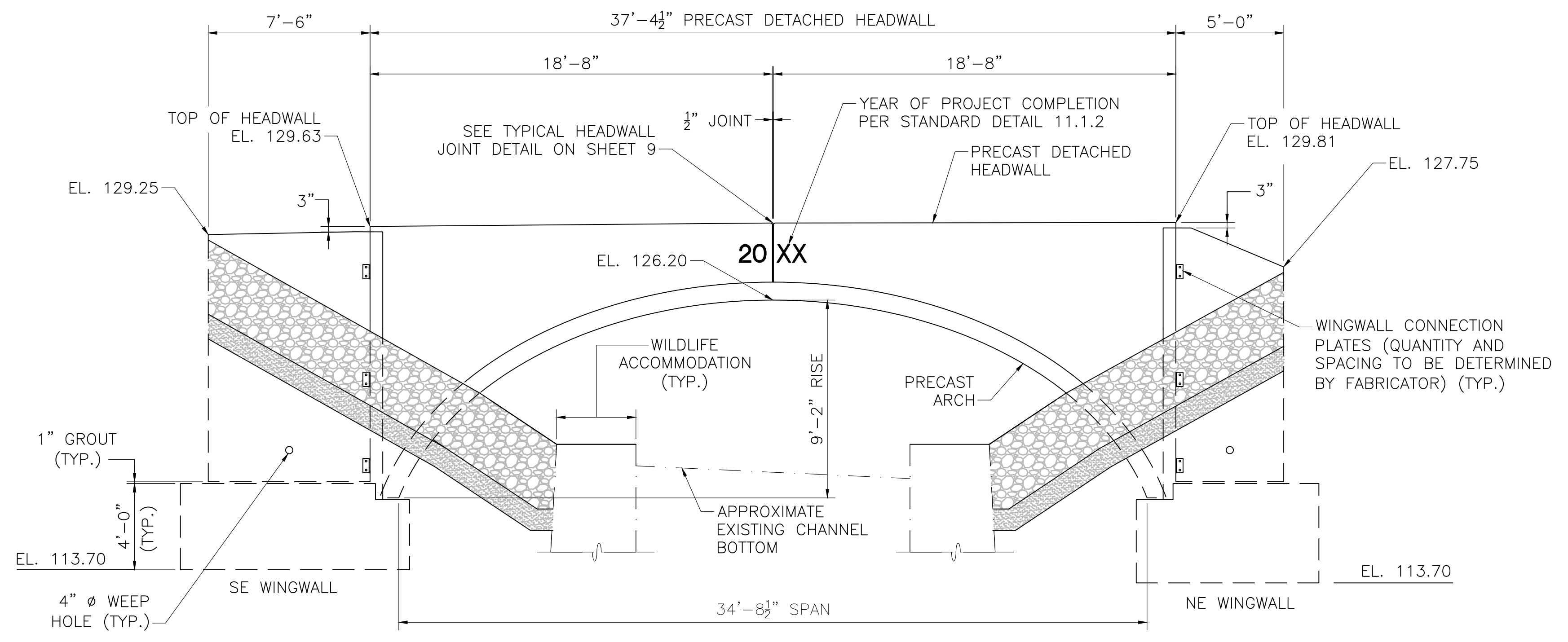
608164_BRF(S-31-013)EARTHWORKS.DWG Plotted on 12-May-2021 9:40 AM Xxxxx Structural Submittal (S) DD-Month-YYYY



TRANVERSE SECTION
SCALE: 1/2"=1'-0"



UPSTREAM ELEVATION
SCALE: 1/4"=1'-0"

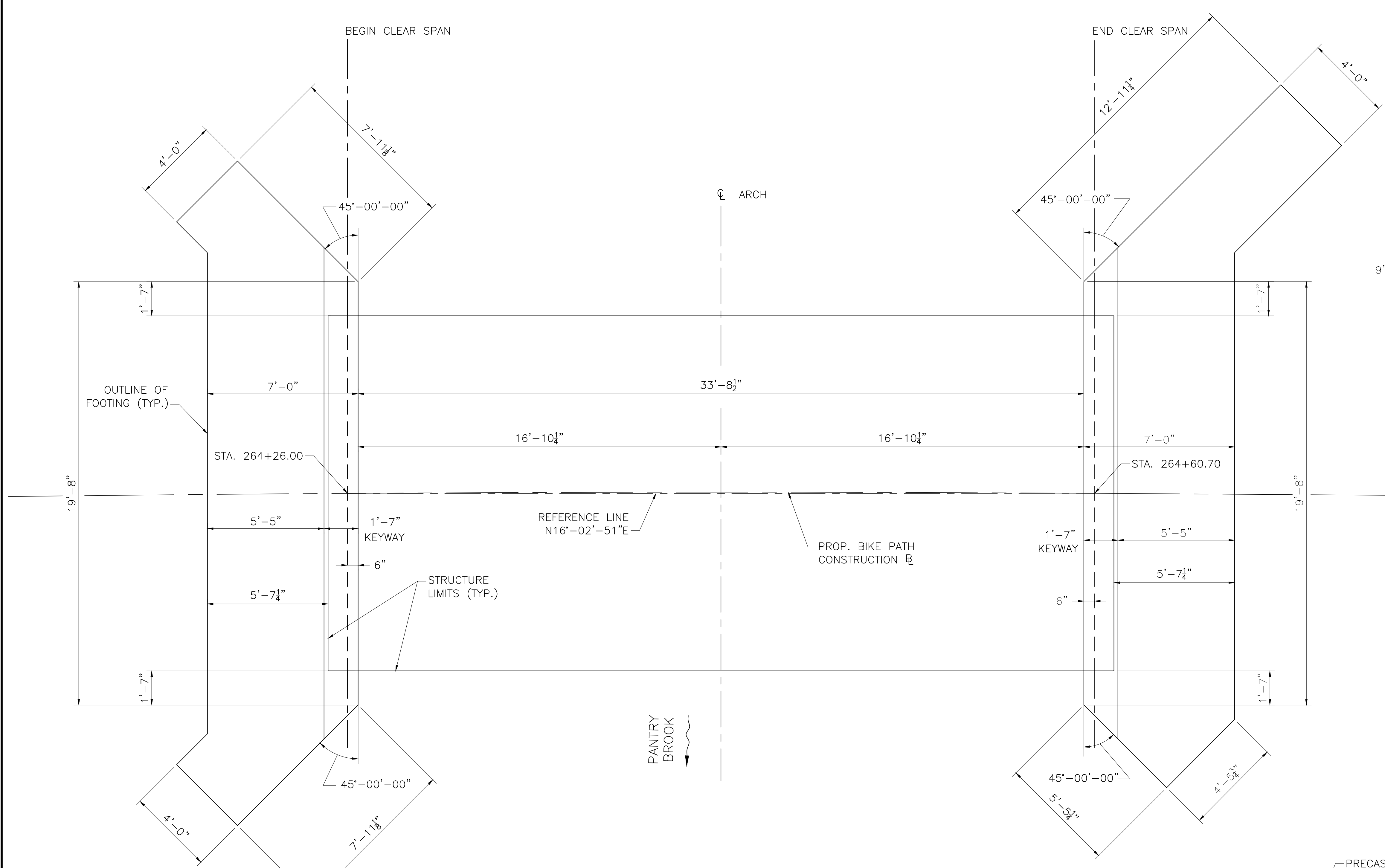


DOWNSTREAM ELEVATION
SCALE: 1/4"=1'-0"

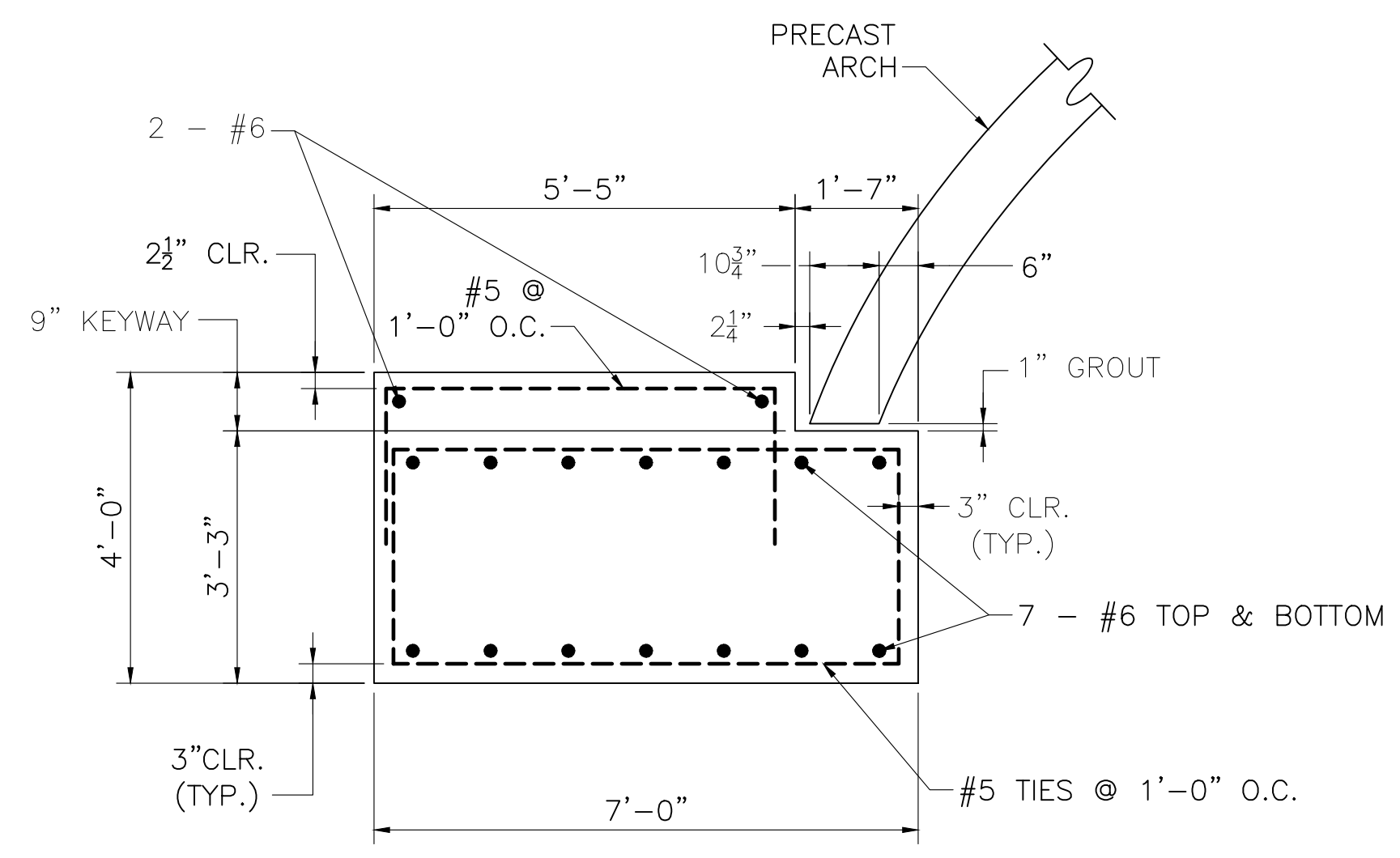
- WINGWALL AND HEADWALL FORM LINER NOTES:**
1. EXPOSED FACES OF HEADWALLS AND WINGWALLS SHALL HAVE A PATTERNED FORM LINER AND SHALL EXTEND A MINIMUM OF 1' BELOW THE PROPOSED GRADE AT THE FACE OF THE WALL.
 2. THE FORM LINER PATTERN AND STAIN SHALL SIMULATE THE APPEARANCE OF THE EXISTING MASONRY ABUTMENTS AND SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THE COST OF THE FORM LINER SHALL BE INCLUDED UNDER ITEM 995, "BRIDGE STRUCTURE BRIDGE NO. S-31-013." SEE SPECIAL PROVISION FOR ADDITIONAL INFORMATION.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

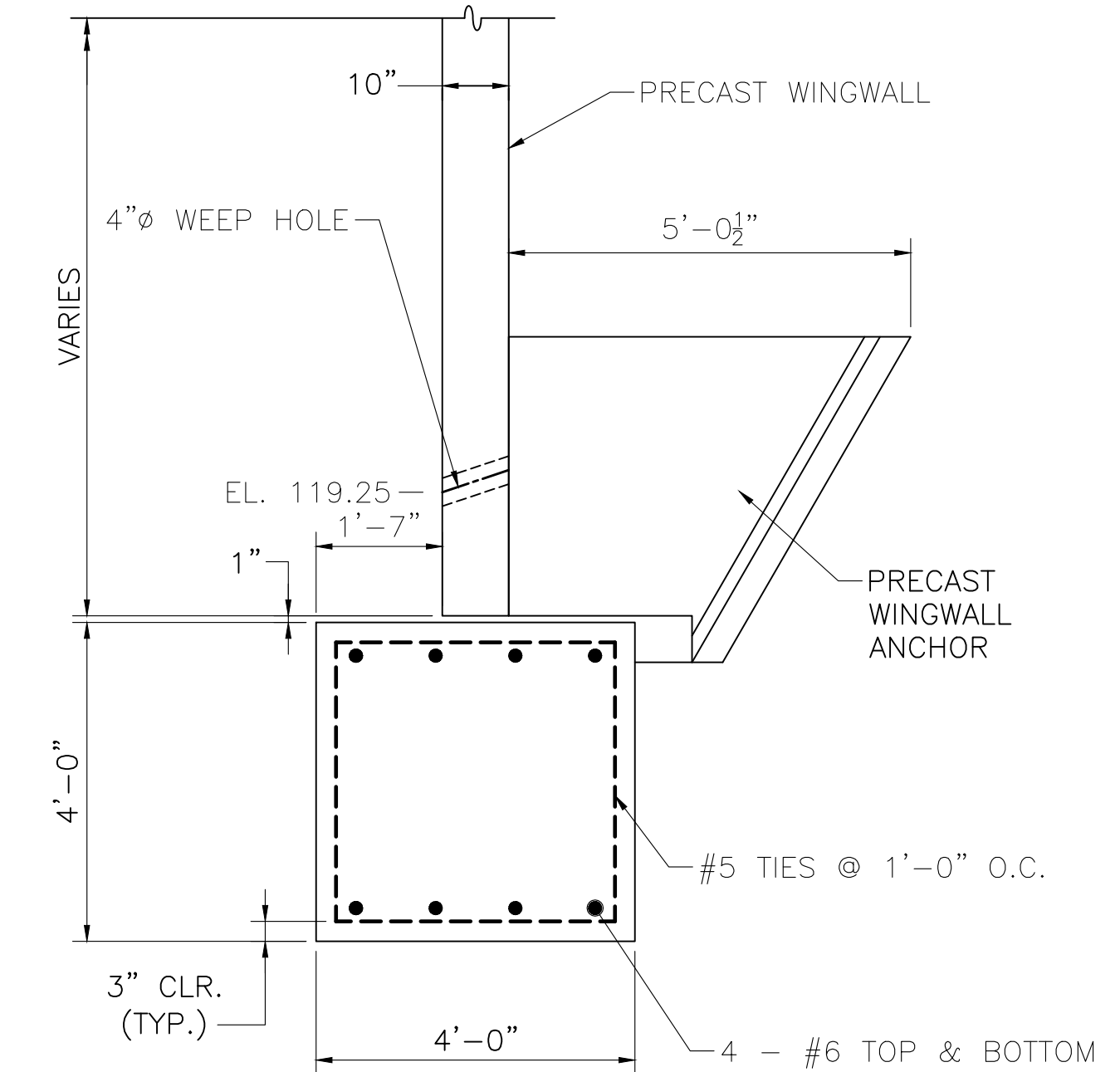
608164_BR7(S-31-013)DECK(SECT).DWG Plotted on 12-May-2021 9:40 AM Xxxxx Structural Submittal (S) DD-Month-YYYY



FOUNDATION PLAN
SCALE: 1/4"=1'-0"

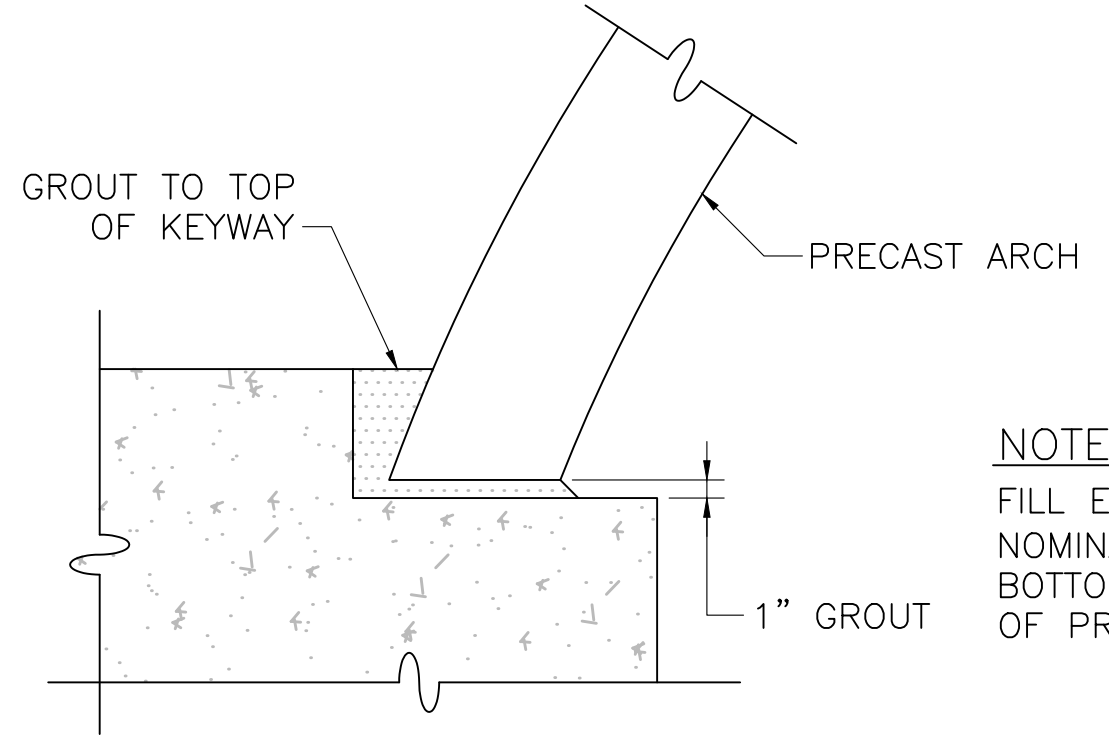


PRECAST FOOTING SECTION
SCALE: 1/2"=1'-0"



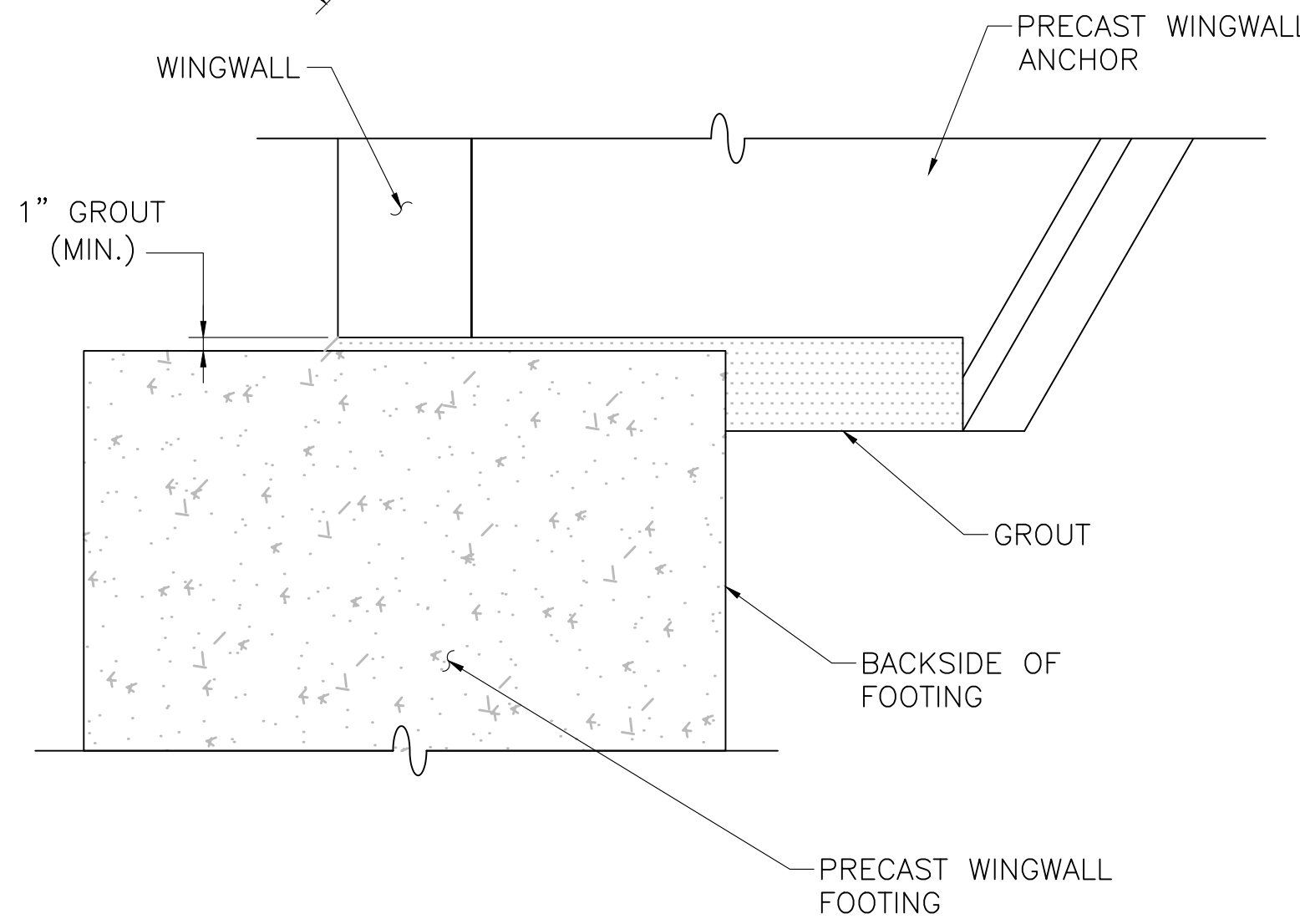
WINGWALL FOOTING SECTION
SCALE: 1/2"=1'-0"

- NOTES:**
- THE PRECAST CONCRETE STRIP FOOTING IS PER CONTRACTOR DESIGN. THEREFORE, THE FACTORED BEARING PRESSURE WILL BE DETERMINED BY THE CONTRACTOR. SLIDING AND OVERTURNING OF THE PRECAST STRIP FOOTING SHALL ALSO BE CHECKED IN THE CONTRACTOR'S DESIGN USING THE INFORMATION PROVIDED IN THE GEOTECHNICAL REPORT.
 - FACTORED BEARING RESISTANCE:
- | FOOTING WIDTH (FT) | ECCENTRICITY (FT) | FACTORED BEARING RESISTANCE (KSF) |
|--------------------|-------------------|-----------------------------------|
| 4 | 1.33 | 5.2 |
| 6 | 2.00 | 5.7 |
| 8 | 2.67 | 6.1 |
- FACTORED BEARING RESISTANCE IS THE PRODUCT OF THE NOMINAL BEARING RESISTANCE AND A RESISTANCE FACTOR OF 0.45.



ARCH TYPICAL KEY DETAIL
SCALE: 1"=1'-0"

NOTE:
FILL ENTIRE KEYWAY INCLUDING NOMINAL 1" VOID BETWEEN BOTTOM OF KEYWAY AND BOTTOM OF PRECAST ARCH LEG WITH GROUT.



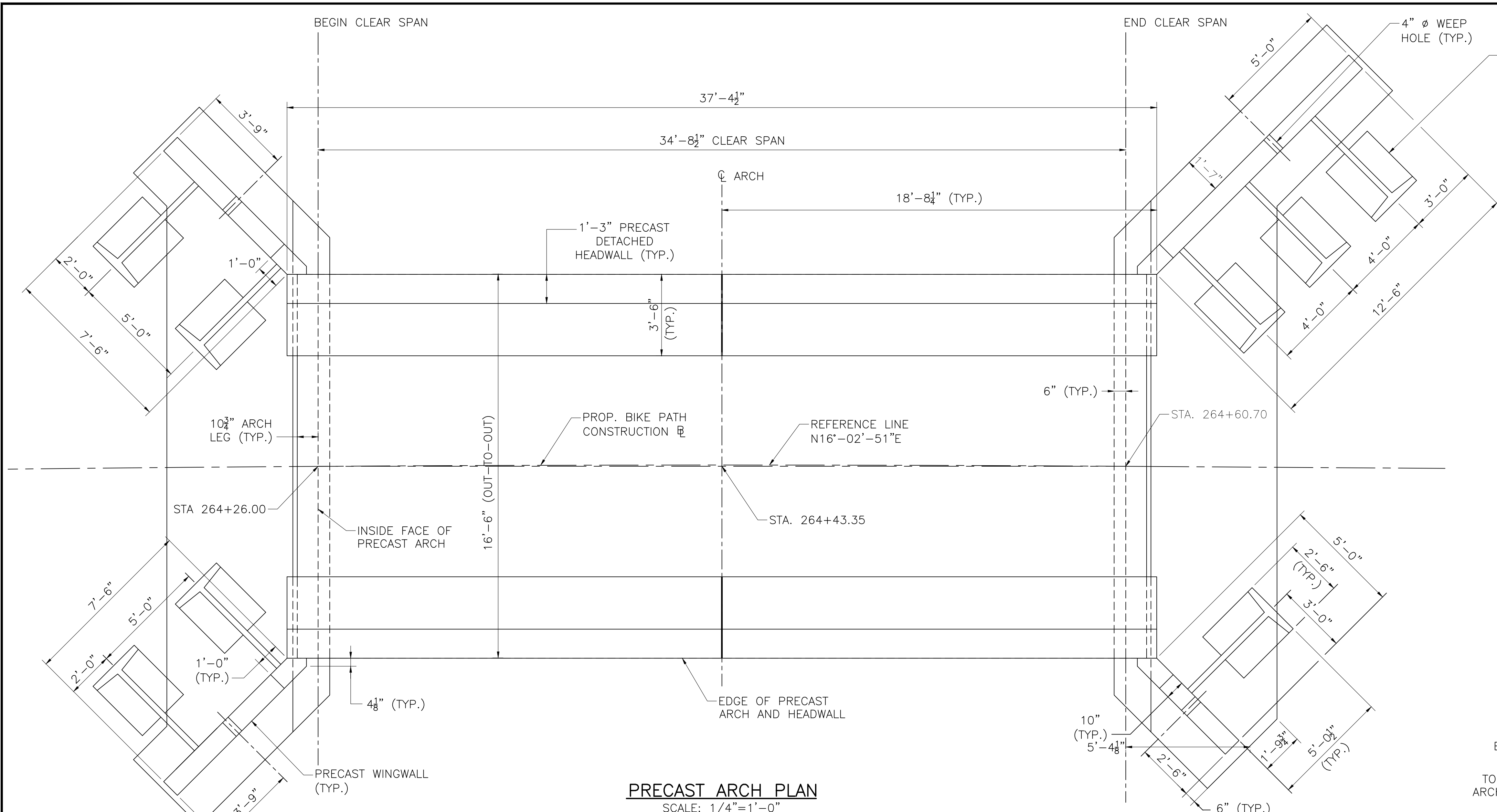
WINGWALL TYPICAL GROUT DETAIL
SCALE: 1"=1'-0"

- NOTES:**
- MINIMUM 1" NON-SHRINK GROUT CONFORMING TO M4.04.0 UNDER WINGWALL LEG AND ANCHOR STEM.
 - AREA BETWEEN WINGWALL FOOTING AND ANCHOR SHALL BE GROUTED SOLID BEFORE BACKFILL.

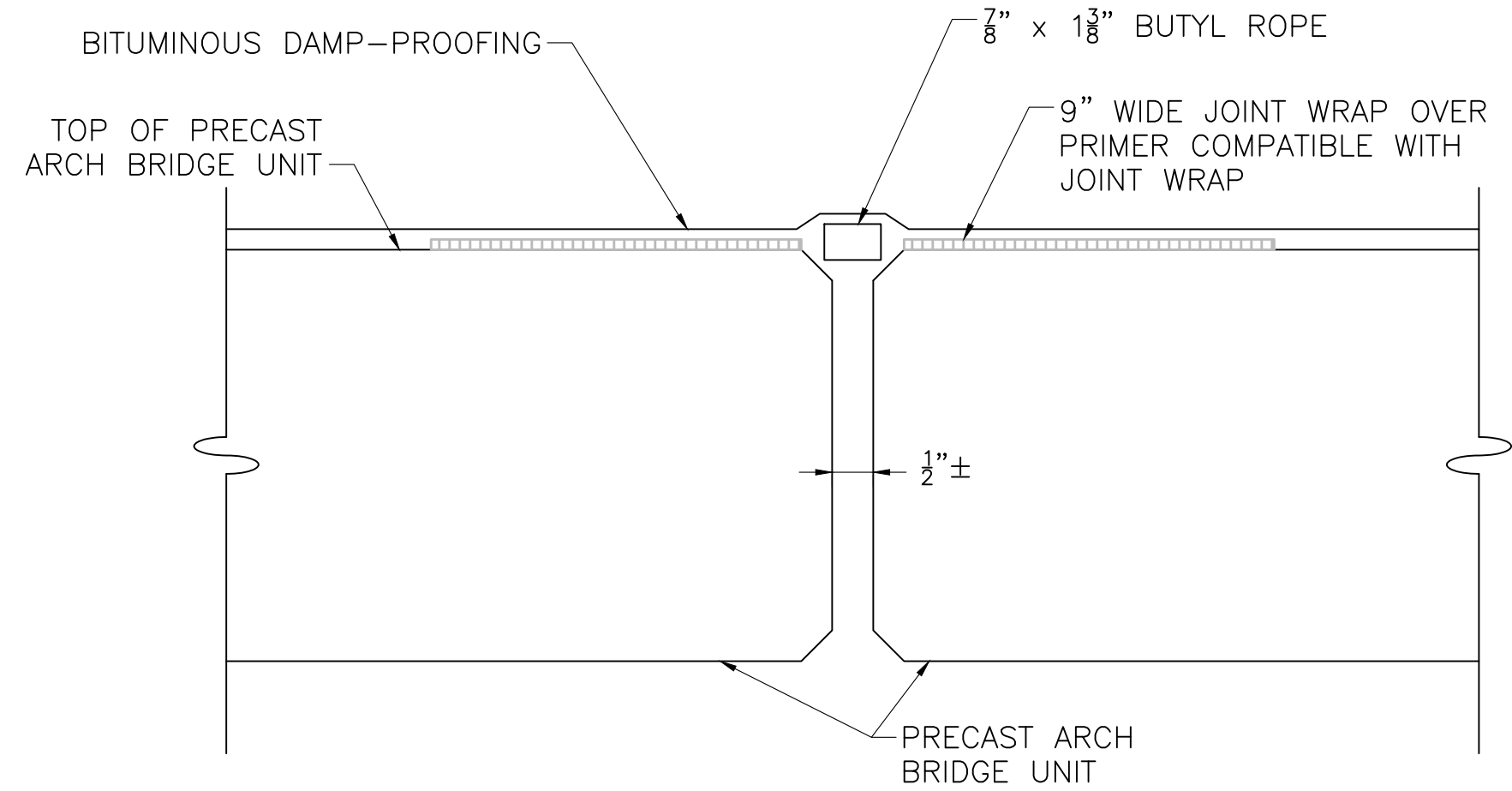
MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

608164_BRS(S-31-013)FOUNDATION.DWG Plotted on 12-May-2021 9:40 AM Xxxxx Structural Submittal (S) DD-Month-YYYY

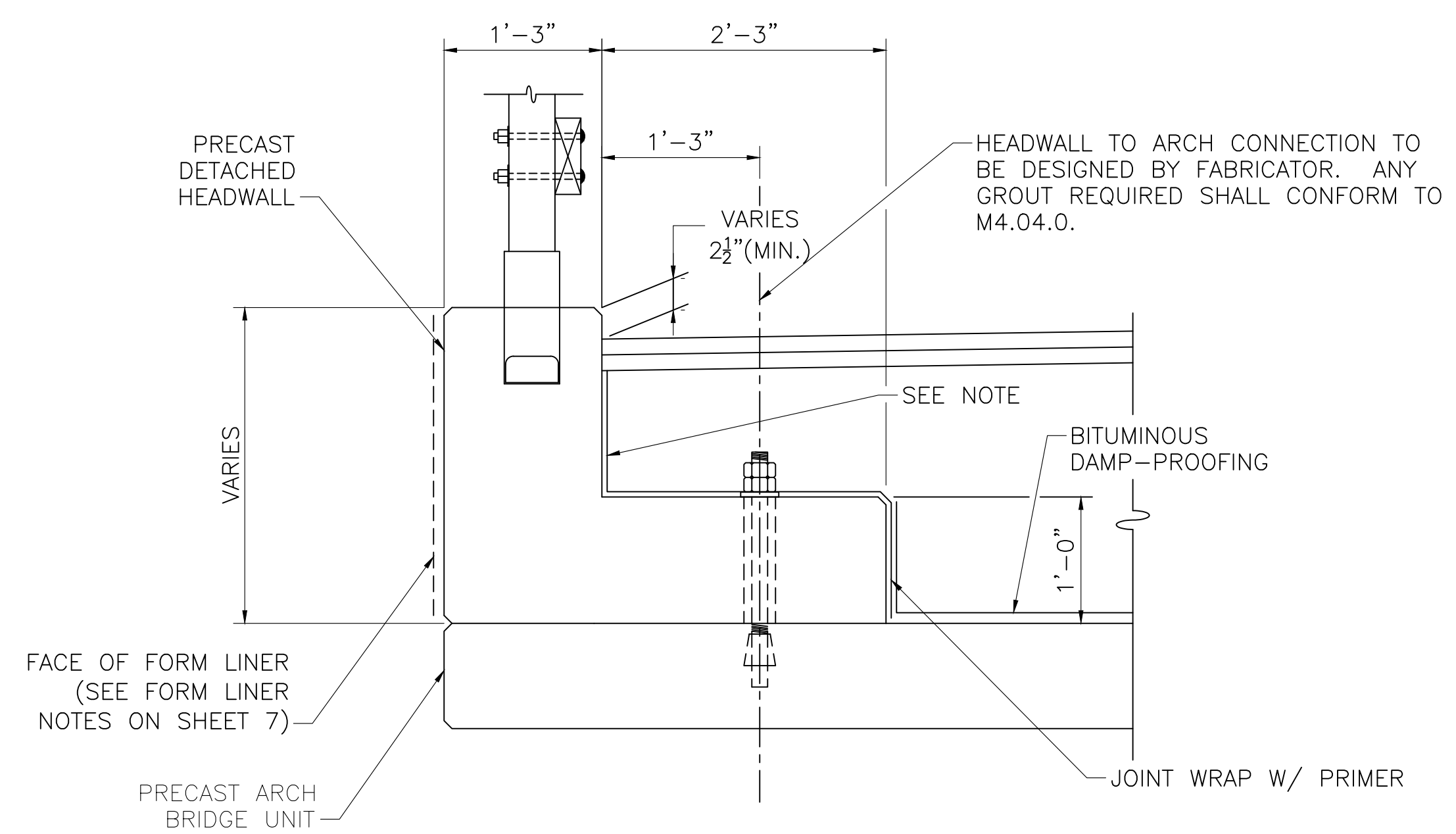
- PRECAST CONCRETE ELEMENT NOTES:**
1. THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS FOR THE ARCH BRIDGE ELEMENTS, INCLUDING THE HEADWALL CONNECTION TO THE ARCH AND THE ARCH FOOTINGS, IN ACCORDANCE WITH THE LATEST AASHTO LRFD DESIGN SPECIFICATIONS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION'S LRFD BRIDGE DESIGN MANUAL FOR H10 TRUCK LOADING AND PEDESTRIAN LOADING FOR APPROVAL OF THE ENGINEER. THE DESIGN COMPUTATIONS SHALL CONSIDER ALL LOADINGS AS APPROPRIATE DURING FABRICATION, SHIPMENT, ERECTION, CONSTRUCTION, AND AFTER COMPLETION OF CONSTRUCTION BASED ON THESE CONSTRUCTION DRAWINGS.
 2. THE ARCH DIMENSIONS PROVIDED ARE SHOWN TO ESTABLISH THE SIZE OF THE PROPOSED OPENING OF 141 SQUARE FEET. THE WIDTHS AND THICKNESSES OF EACH ARCH UNIT MAY VARY DEPENDING UPON THE MANUFACTURER'S SPECIFICATIONS. AN ARCH TYPE STRUCTURE SHALL BE REQUIRED. THE CONTRACTOR, AT NO ADDITIONAL COMPENSATION, HAS THE OPTION TO PROPOSE AN ALTERNATE ARCH DESIGN WITH THE SAME OR LARGER OPENING AREA.
 3. THE PRECAST FOOTING DESIGN DETAILED HEREIN WAS BASED ON THE GEOMETRY OF THE ARCH SHOWN. SEE FACTORED BEARING RESISTANCES BY SIZE ON SHEET 8. THE FABRICATOR SHALL PREPARE AND SUBMIT THE FINAL DESIGN OF THE FOOTING FOR APPROVAL.
 4. THE CONTRACTOR, AT NO ADDITIONAL COMPENSATION, HAS THE OPTION TO PROVIDE CAST-IN-PLACE CONCRETE FOOTINGS, AND SHALL PREPARE AND SUBMIT THE FINAL DESIGN OF THE CAST-IN-PLACE CONCRETE FOOTINGS.
 5. THE PRECAST ELEMENTS ARE TO BE PARALLEL AND ALIGNED WITH THE REFERENCE LINE AS SHOWN ON THESE CONSTRUCTION DRAWINGS.
 6. A MINIMUM OF 4 FEET COVER TO THE BOTTOM OF FOOTING SHALL BE PROVIDED.
 7. THE FABRICATOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF LIFT HOOKS FOR ALL PRECAST ELEMENTS. PLANS PROVIDING SPACING AND LOCATION OF LIFTING DEVICES AND HANDLING STRESS CALCULATIONS SHALL BE PROVIDED.
 8. SHOP DRAWINGS AND DESIGN CALCULATIONS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS.
 9. PRECAST CONCRETE ELEMENTS SHALL CONFORM TO THE APPLICABLE PARTS OF SECTION 901 OF THE SPECIFICATIONS.



PRECAST ARCH PLAN
 SCALE: 1/4"=1'-0"

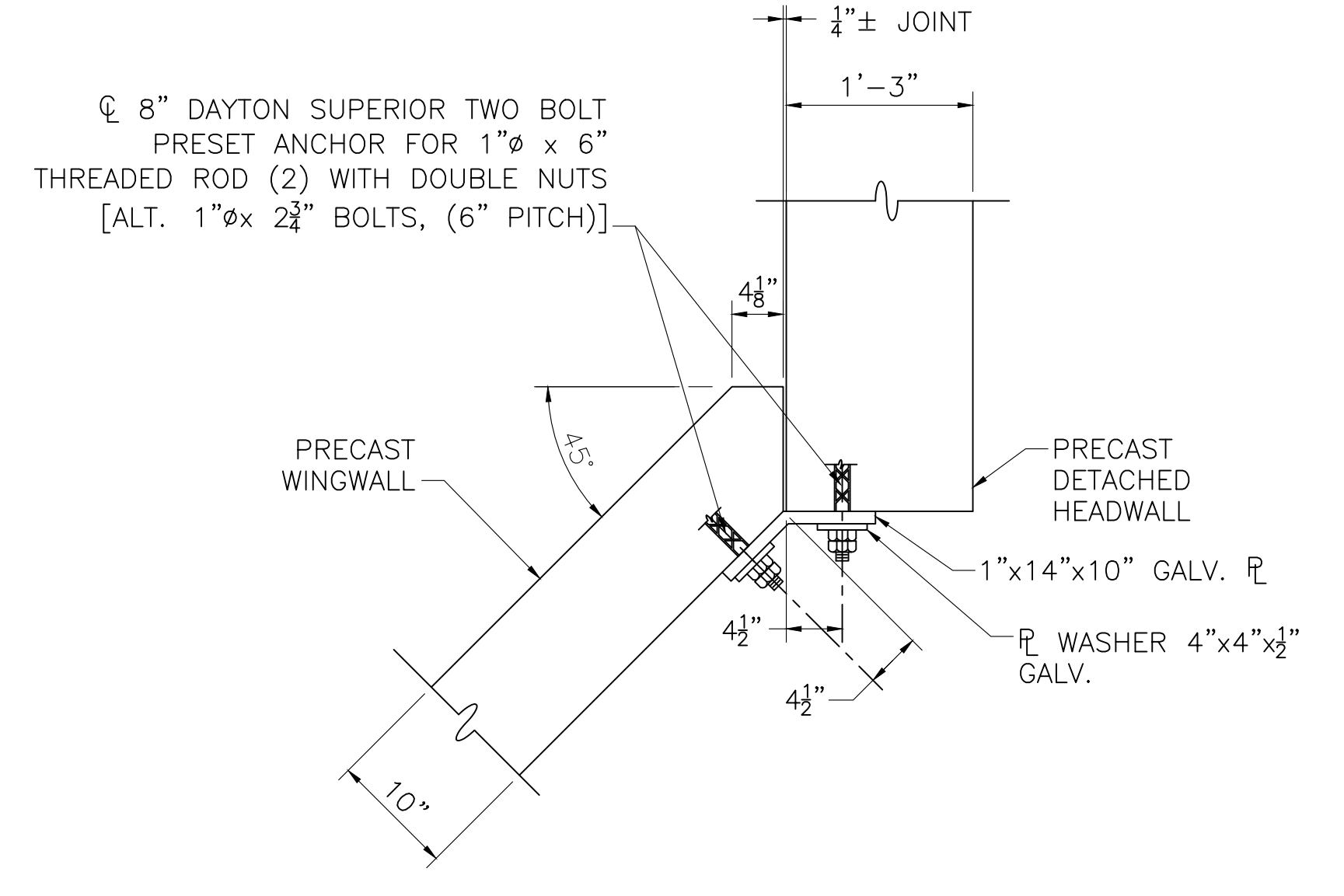


TYPICAL JOINT SEAL DETAIL
 SCALE: 3"=1'-0"

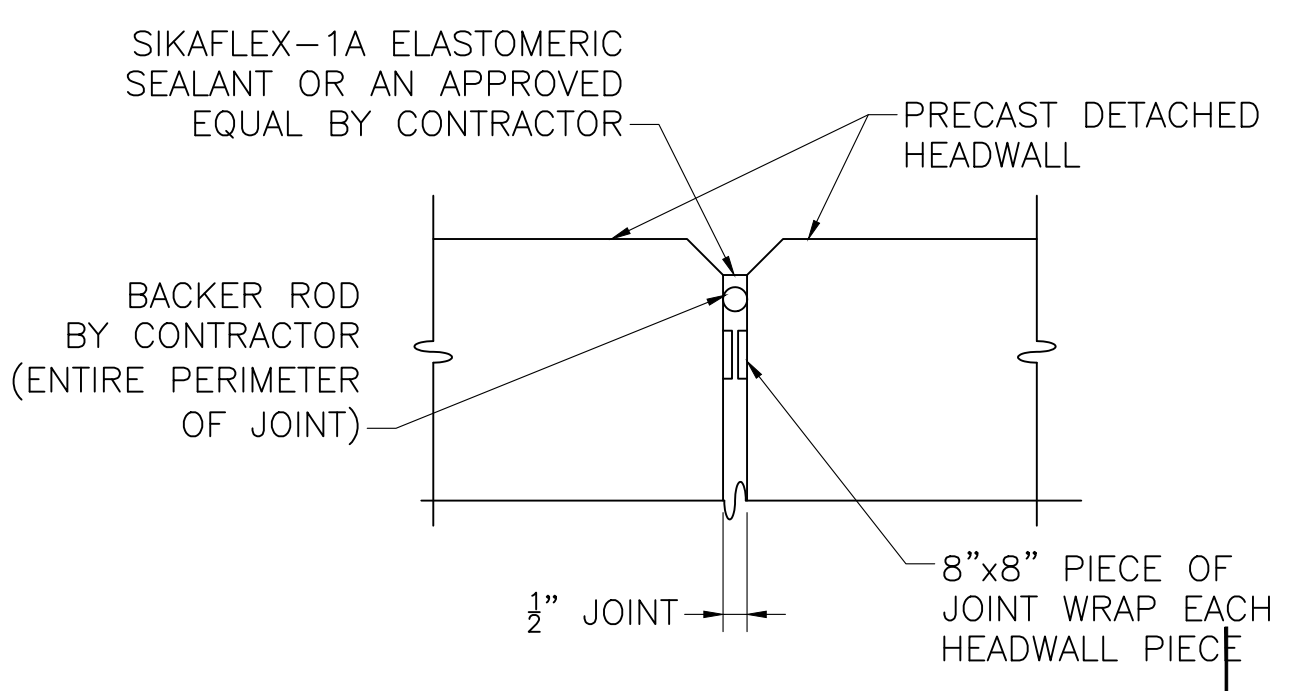


HEADWALL DETAIL
 SCALE: 1"=1'-0"

NOTE:
 MEMBRANE WATERPROOFING AND 8"x16"x2", 4000 PSI, 3/4" IN, 610 CEMENT CONCRETE BLOCKS LAID IN MORTAR OR OTHER WATERPROOFING PROTECTIVE COURSE, MIN. 2" THICK AS SPECIFIED IN MHD STANDARD SPECIFICATIONS.



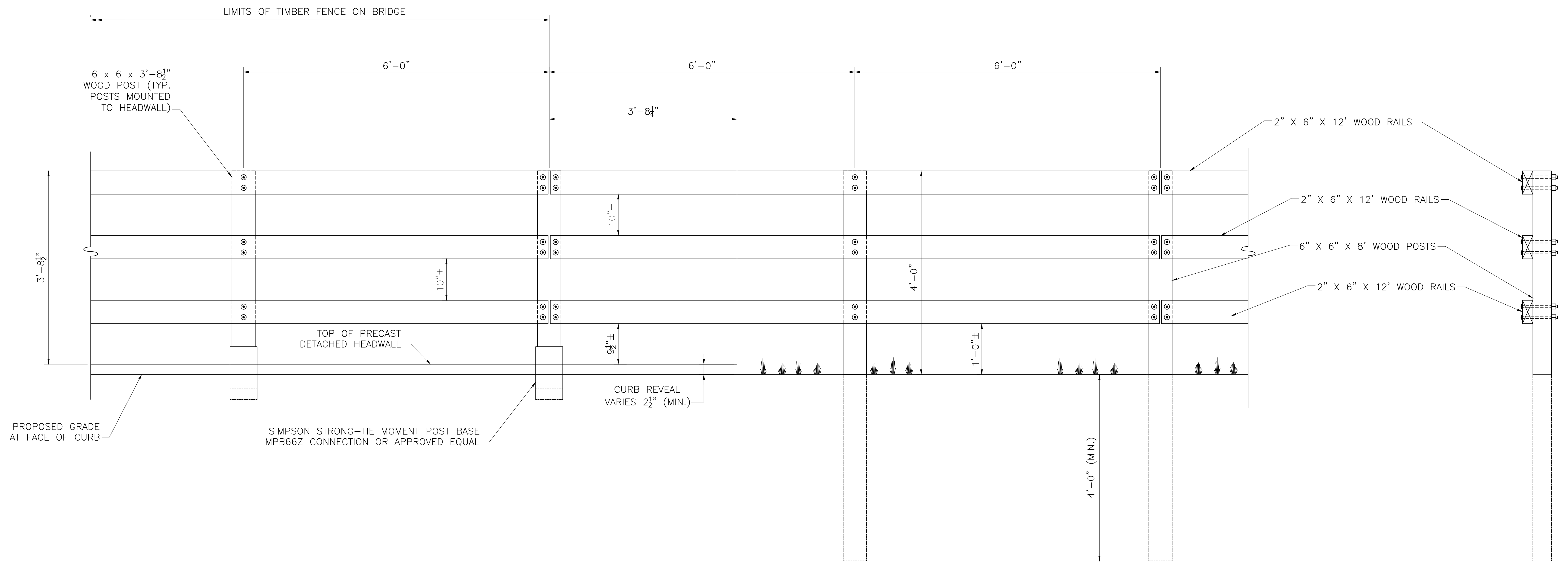
WINGWALL TO HEADWALL JOINT DETAIL
 SCALE: 1"=1'-0"



TYPICAL HEADWALL JOINT DETAIL
 SCALE: 1"=1'-0"

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

608164_BRF(S-31-013)PRECAST.DWG Plotted on 12-May-2021 9:40 AM Xxxxx Structural Submittal (S) DD-Month-YYYY



TIMBER BRIDGE RAIL ELEVATION
 SCALE: 1"=1'-0"

NOTE:
 SEE TIMBER FENCE DETAILS ON SHEET X FOR
 ADDITIONAL INFORMATION.

MONTH DD, YYYY	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
USE ONLY PRINTS OF LATEST DATE	

608164_BR10(S-31-013)RAIL.DWG Plotted on 12-May-2021 9:40 AM Xxxxx Structural Submittal (S#) DD-Month-YYYY

SUDBURY
BRUCE FREEMAN RAIL TRAIL

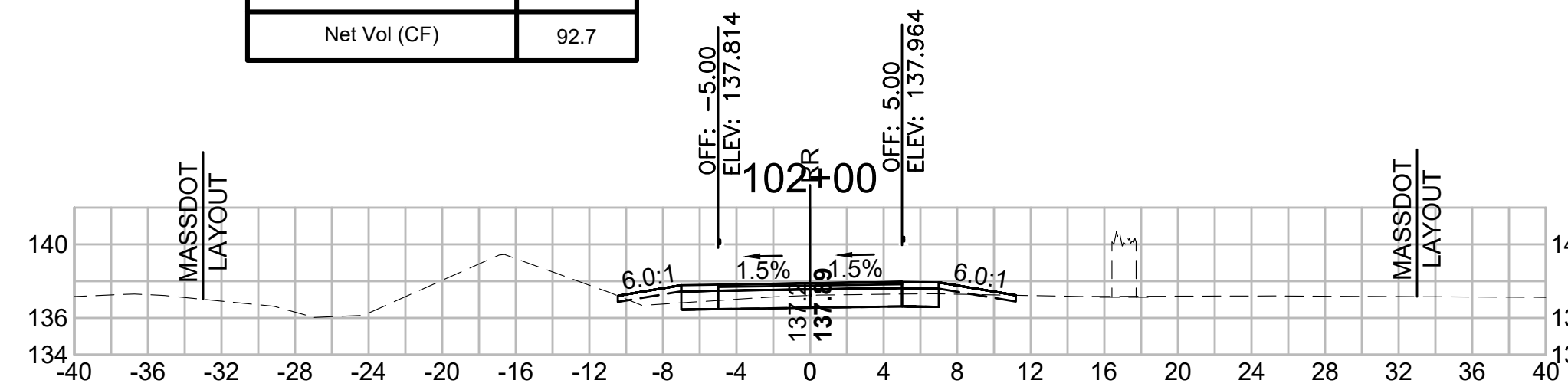
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	243	318

PROJECT FILE NO. 608164

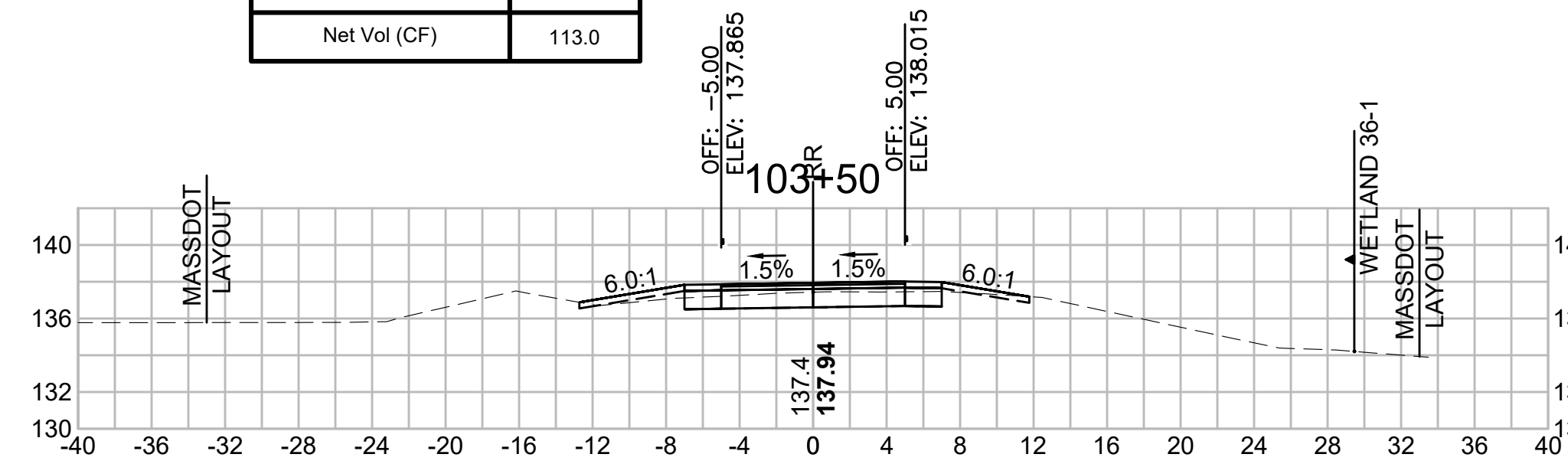
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

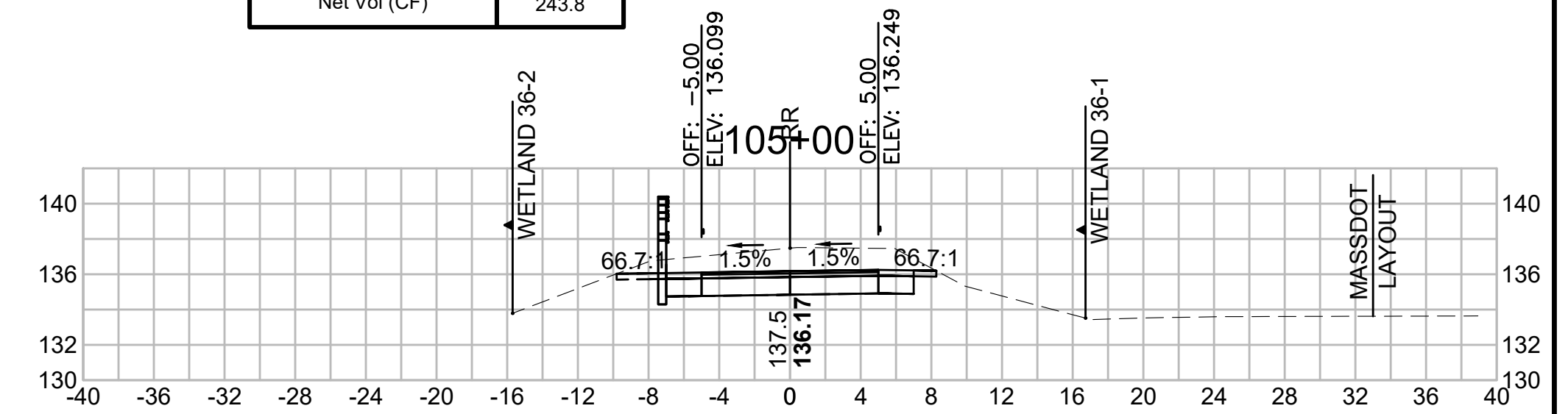
Total Volume at Station 102+00.00	
Cut Area (SF)	12.446
Fill Area (SF)	1.553
Cut Vol (CF)	35.195
Fill Vol (CF)	1.6
Cum Cut Vol (CF)	94.407
Cum Fill Vol (CF)	1.7
Net Vol (CF)	92.7



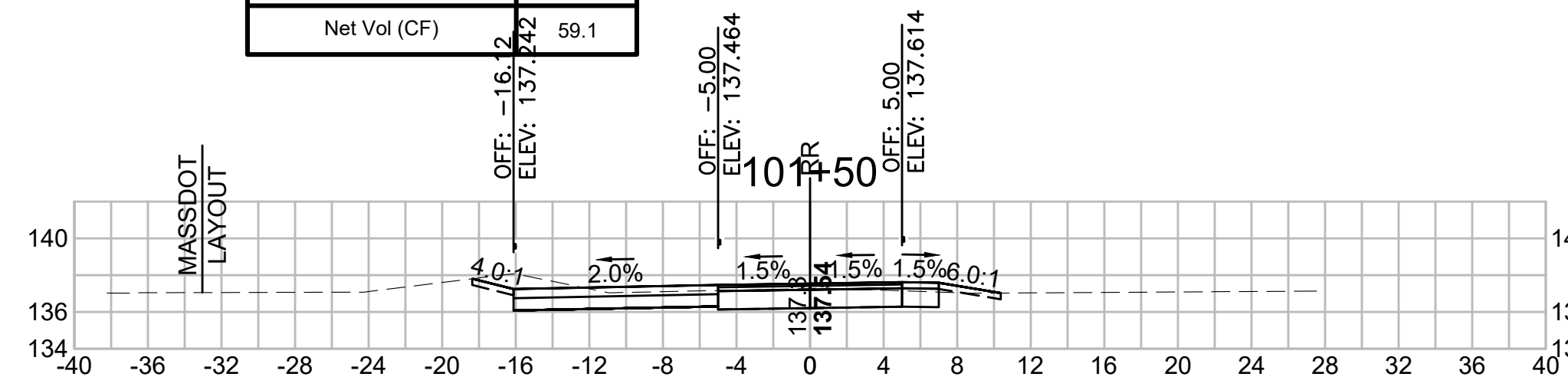
Total Volume at Station 103+50.00	
Cut Area (SF)	11.445
Fill Area (SF)	0.994
Cut Vol (CF)	13.330
Fill Vol (CF)	5.8
Cum Cut Vol (CF)	133.337
Cum Fill Vol (CF)	20.4
Net Vol (CF)	113.0



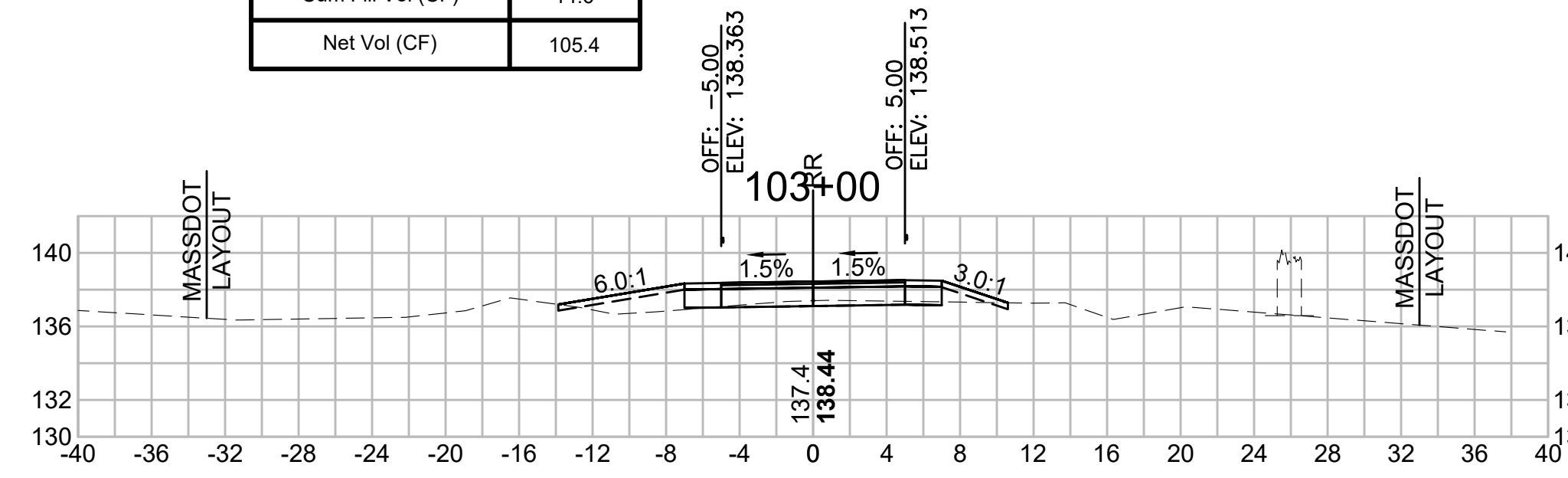
Total Volume at Station 105+00.00	
Cut Area (SF)	37.599
Fill Area (SF)	0.000
Cut Vol (CF)	64.961
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	266.702
Cum Fill Vol (CF)	22.9
Net Vol (CF)	243.8



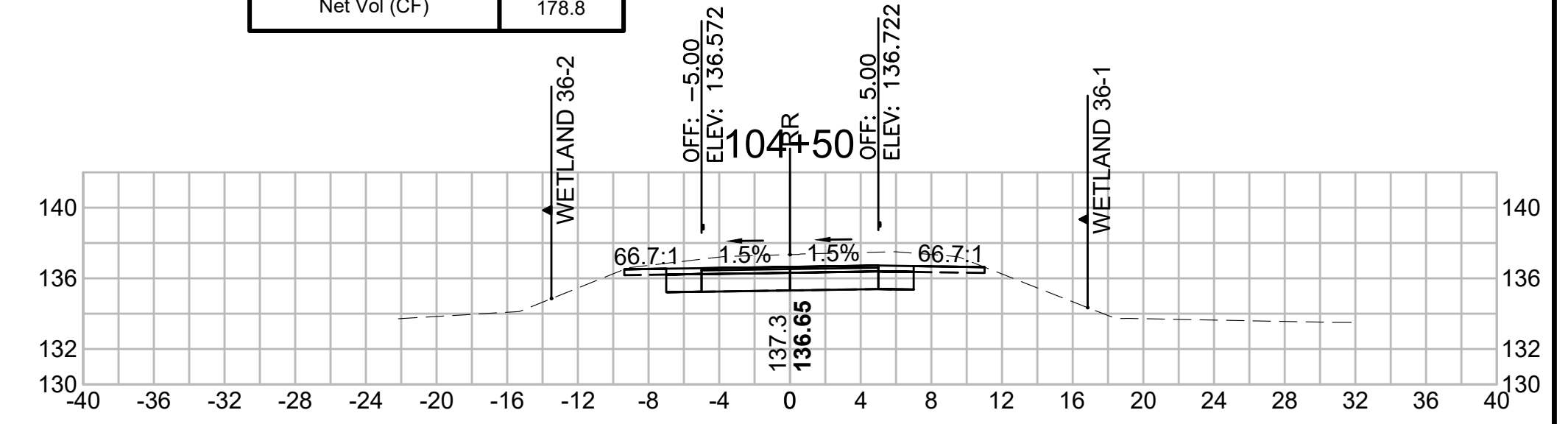
Total Volume at Station 101+50.00	
Cut Area (SF)	25.564
Fill Area (SF)	0.132
Cut Vol (CF)	41.442
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	59.213
Cum Fill Vol (CF)	0.1
Net Vol (CF)	59.1



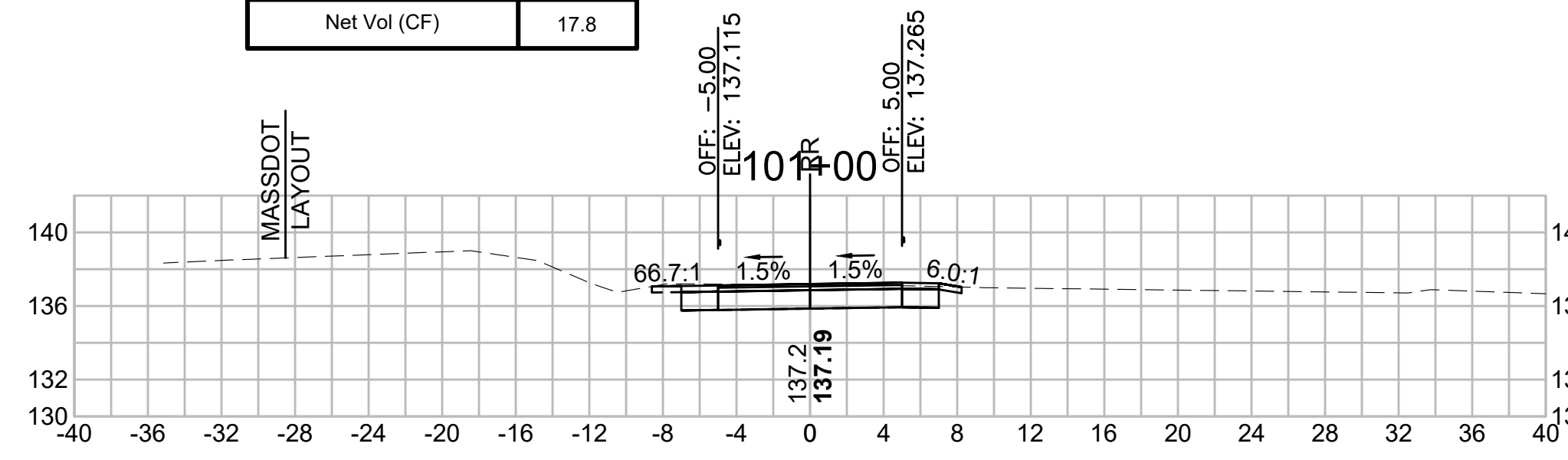
Total Volume at Station 103+00.00	
Cut Area (SF)	2.951
Fill Area (SF)	5.239
Cut Vol (CF)	8.405
Fill Vol (CF)	8.2
Cum Cut Vol (CF)	120.008
Cum Fill Vol (CF)	14.6
Net Vol (CF)	105.4



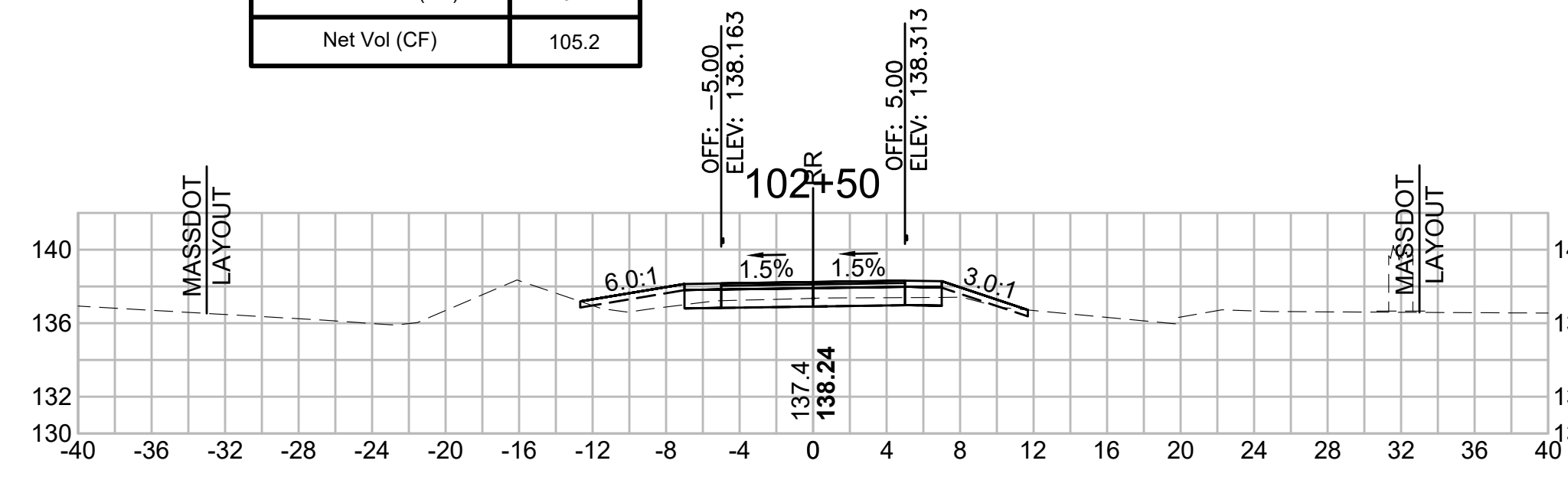
Total Volume at Station 104+50.00	
Cut Area (SF)	32.559
Fill Area (SF)	0.000
Cut Vol (CF)	43.978
Fill Vol (CF)	0.8
Cum Cut Vol (CF)	201.741
Cum Fill Vol (CF)	22.9
Net Vol (CF)	178.8



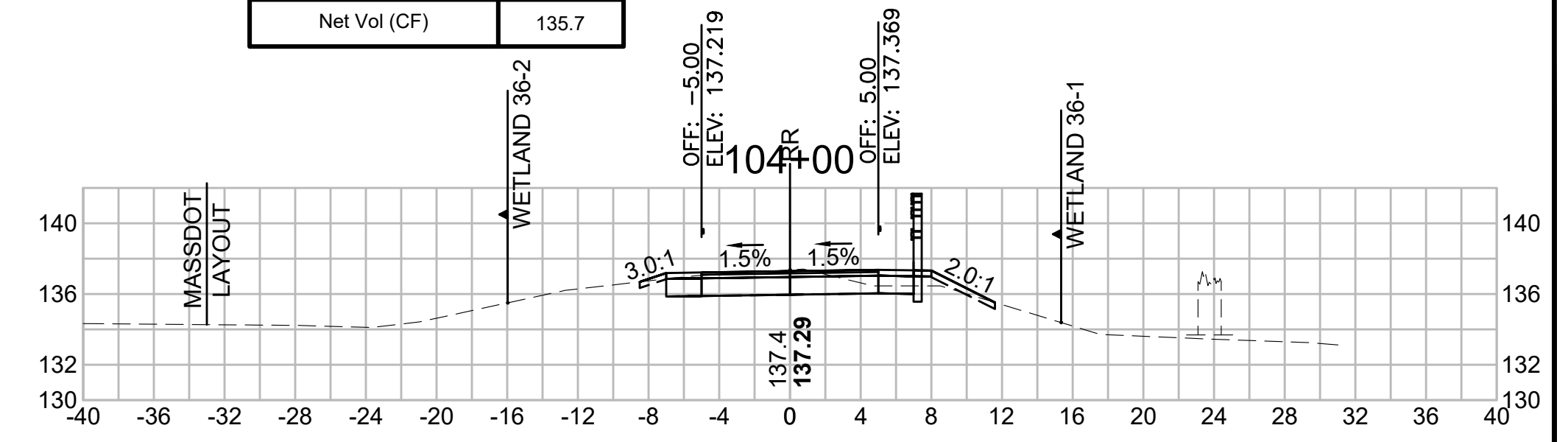
Total Volume at Station 101+00.00	
Cut Area (SF)	19.193
Fill Area (SF)	0.000
Cut Vol (CF)	17.772
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	17.771
Cum Fill Vol (CF)	0.0
Net Vol (CF)	17.8



Total Volume at Station 102+50.00	
Cut Area (SF)	6.126
Fill Area (SF)	3.571
Cut Vol (CF)	17.197
Fill Vol (CF)	4.7
Cum Cut Vol (CF)	111.604
Cum Fill Vol (CF)	6.4
Net Vol (CF)	105.2



Total Volume at Station 104+00.00	
Cut Area (SF)	14.937
Fill Area (SF)	0.878
Cut Vol (CF)	24.428
Fill Vol (CF)	1.7
Cum Cut Vol (CF)	157.764
Cum Fill Vol (CF)	22.1
Net Vol (CF)	135.7



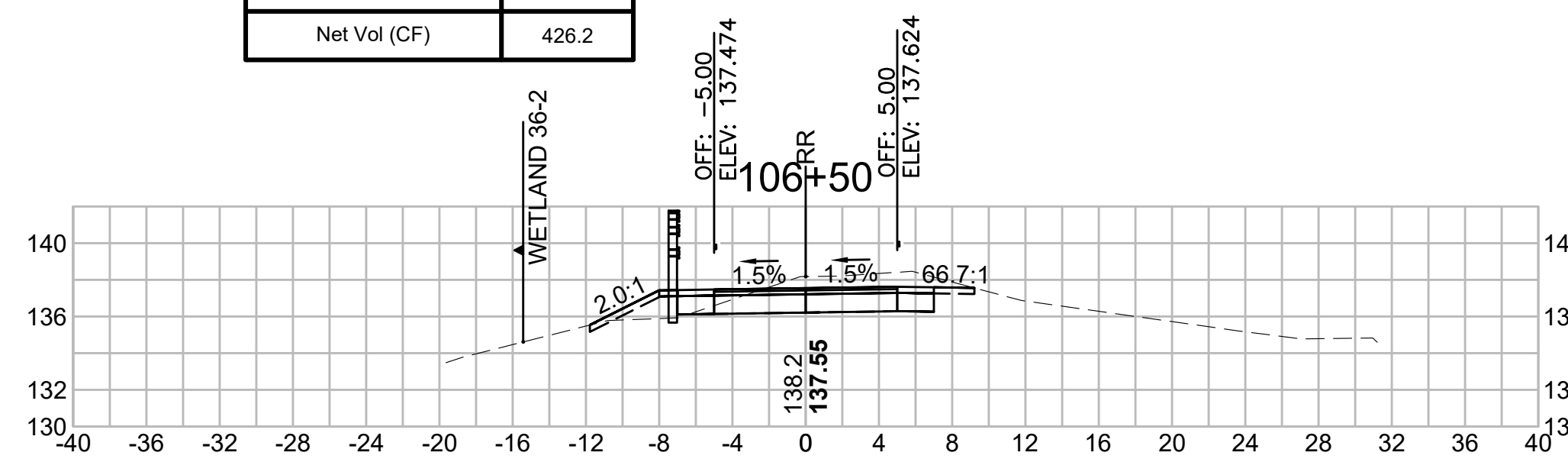
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	244	318

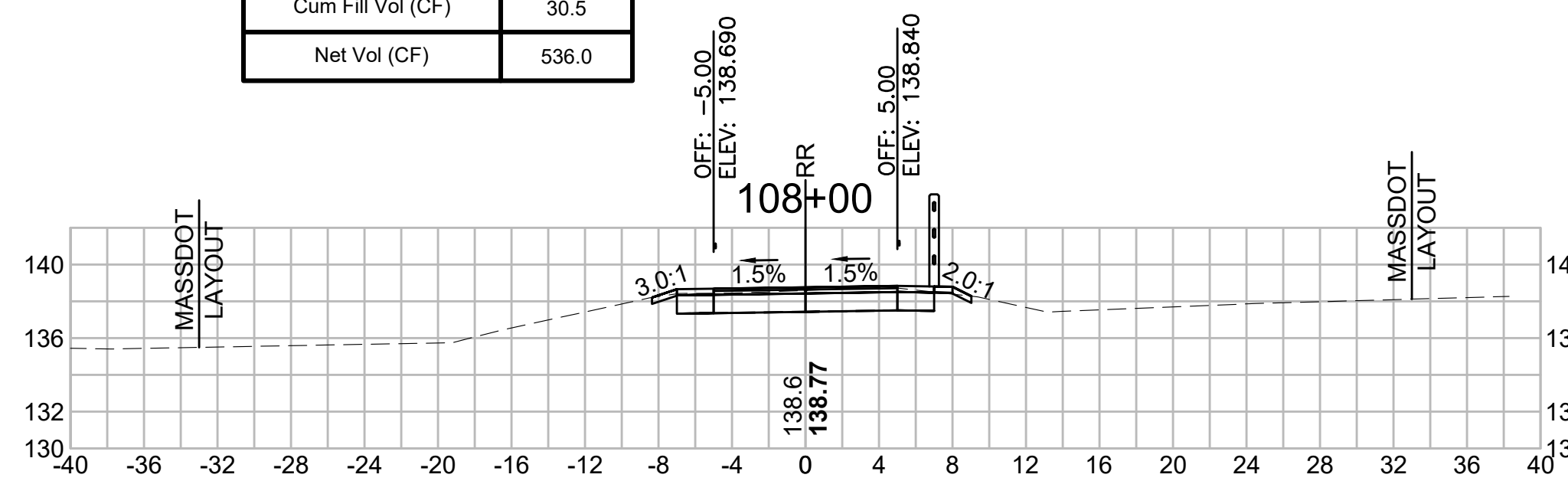
PROJECT FILE NO. 608164

CROSS SECTIONS

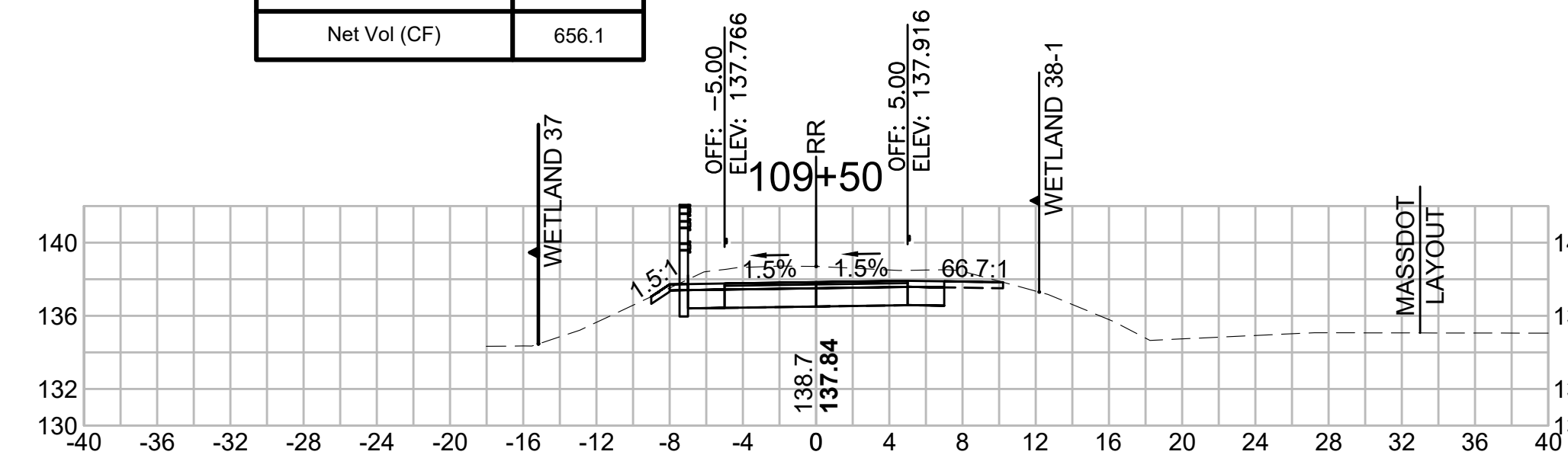
Total Volume at Station 106+50.00	
Cut Area (SF)	23.778
Fill Area (SF)	2.741
Cut Vol (CF)	50.848
Fill Vol (CF)	2.5
Cum Cut Vol (CF)	451.663
Cum Fill Vol (CF)	25.4
Net Vol (CF)	426.2



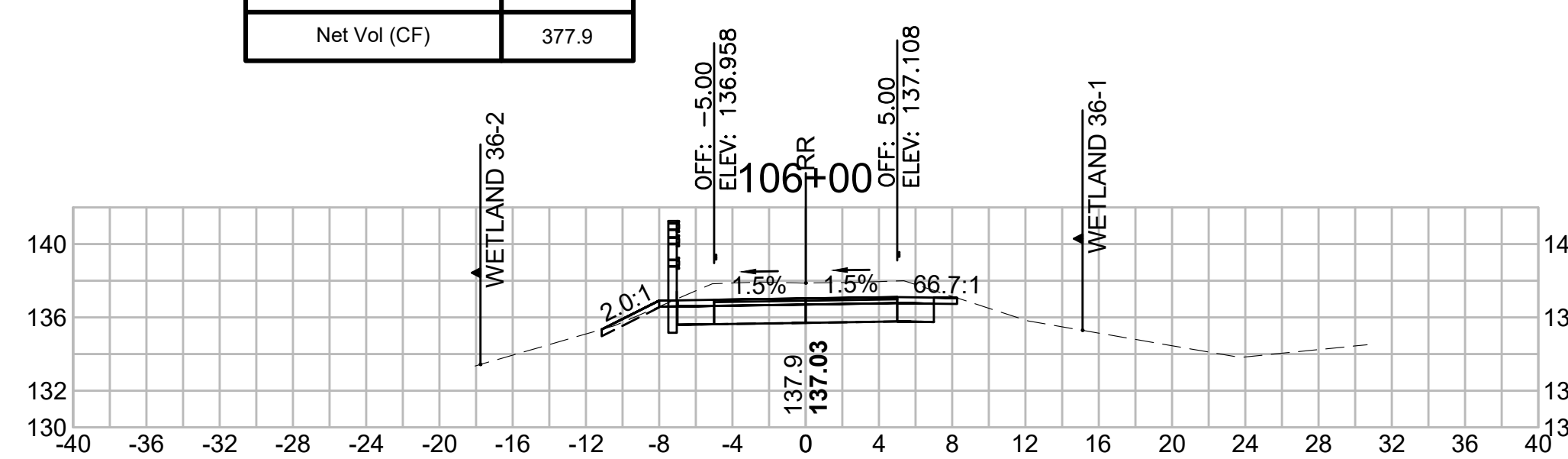
Total Volume at Station 108+00.00	
Cut Area (SF)	16.876
Fill Area (SF)	0.026
Cut Vol (CF)	34.794
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	566.483
Cum Fill Vol (CF)	30.5
Net Vol (CF)	536.0



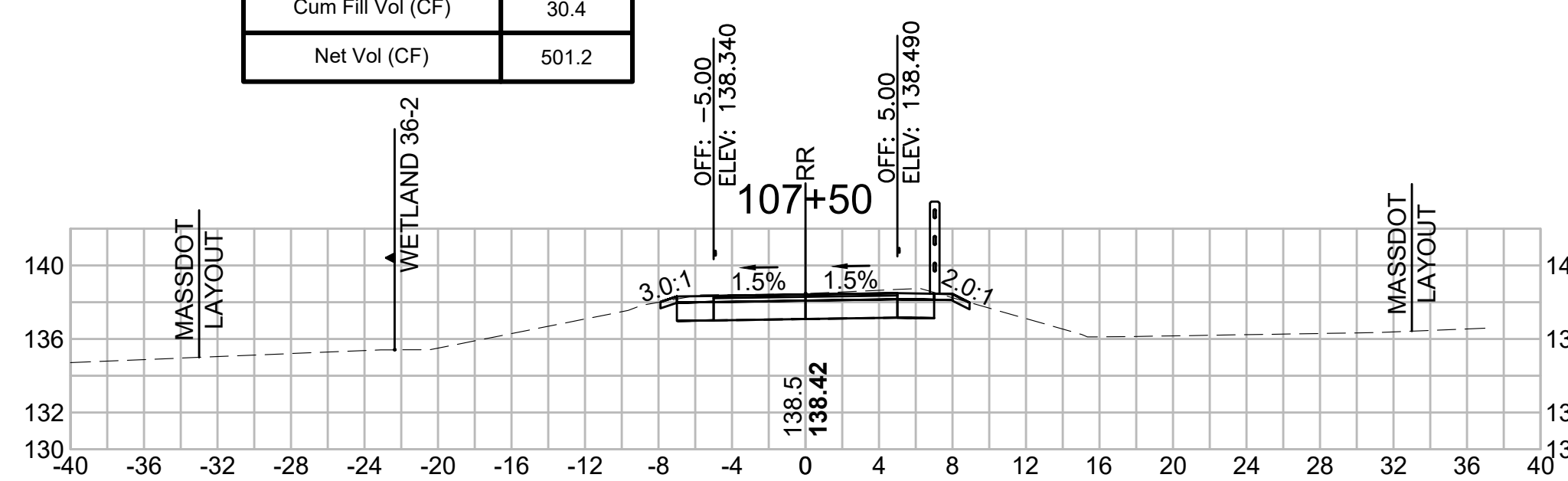
Total Volume at Station 109+50.00	
Cut Area (SF)	32.812
Fill Area (SF)	0.000
Cut Vol (CF)	47.278
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	687.192
Cum Fill Vol (CF)	31.0
Net Vol (CF)	656.1



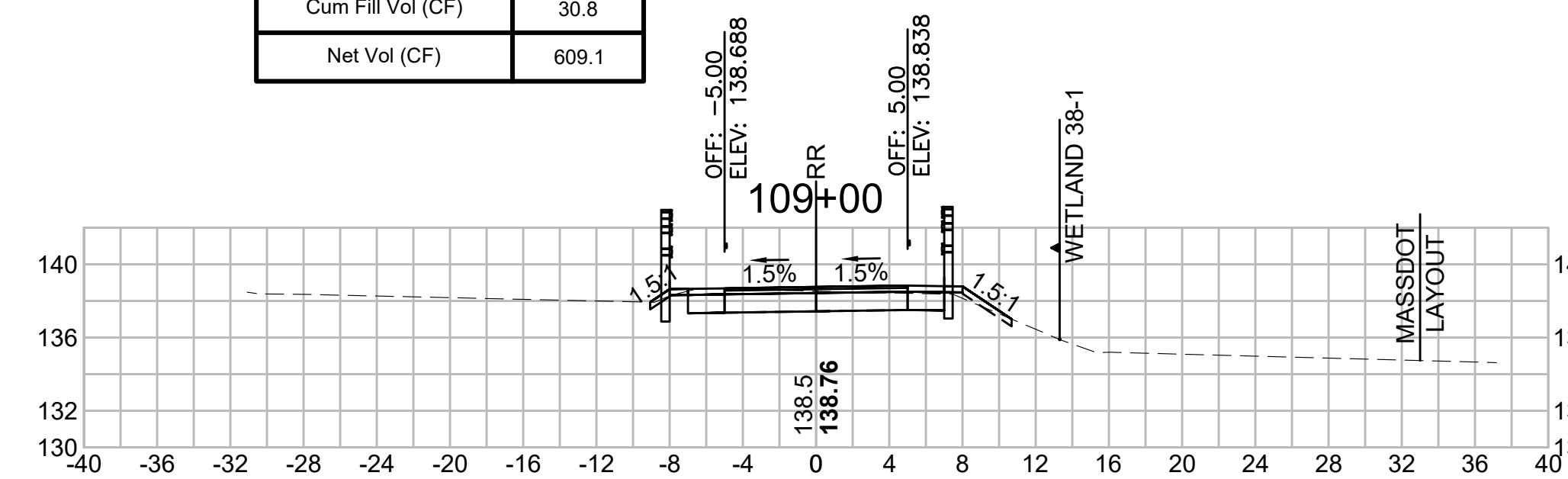
Total Volume at Station 106+00.00	
Cut Area (SF)	31.138
Fill Area (SF)	0.000
Cut Vol (CF)	64.066
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	400.816
Cum Fill Vol (CF)	22.9
Net Vol (CF)	377.9



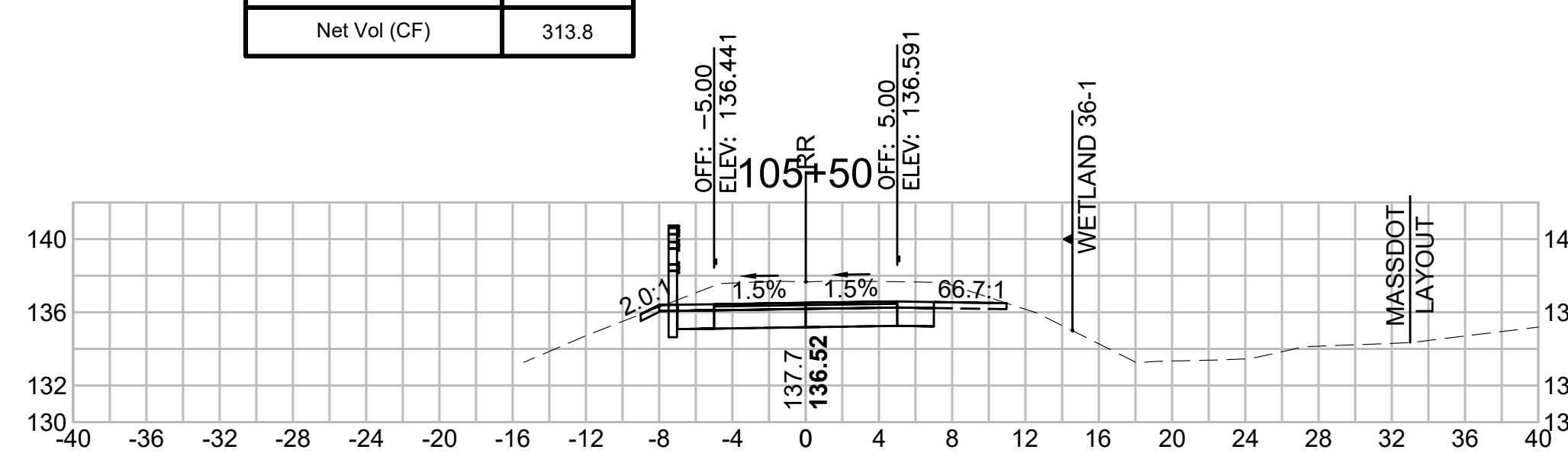
Total Volume at Station 107+50.00	
Cut Area (SF)	20.701
Fill Area (SF)	0.000
Cut Vol (CF)	38.589
Fill Vol (CF)	1.2
Cum Cut Vol (CF)	531.690
Cum Fill Vol (CF)	30.4
Net Vol (CF)	501.2



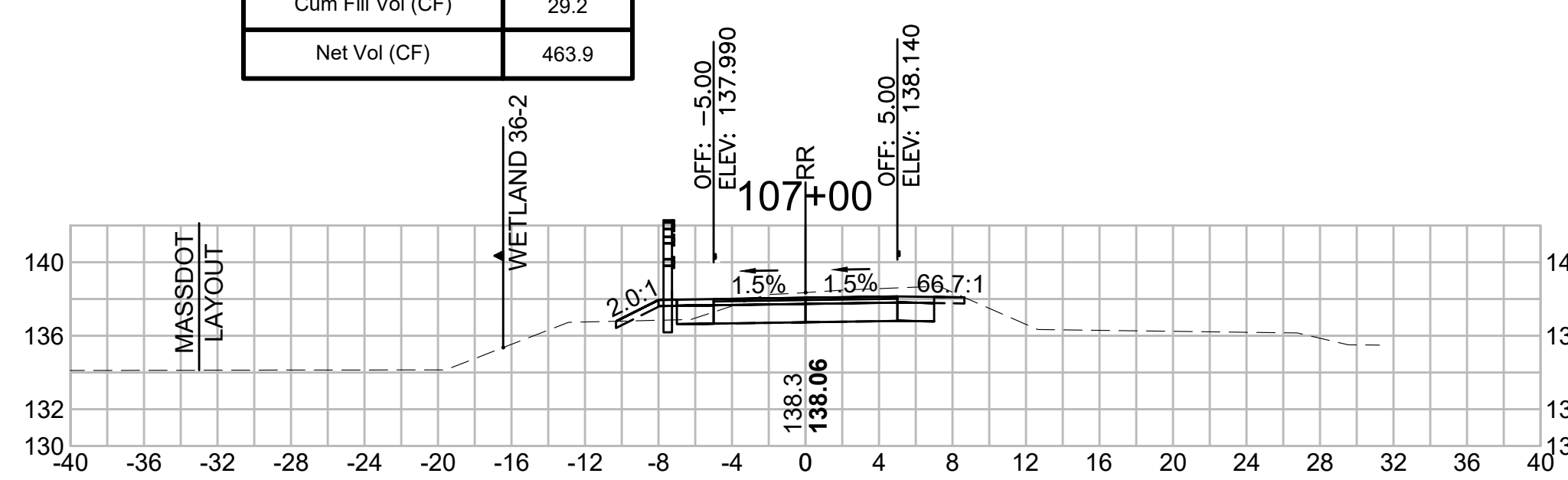
Total Volume at Station 109+00.00	
Cut Area (SF)	18.248
Fill Area (SF)	0.298
Cut Vol (CF)	37.351
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	639.914
Cum Fill Vol (CF)	30.8
Net Vol (CF)	609.1



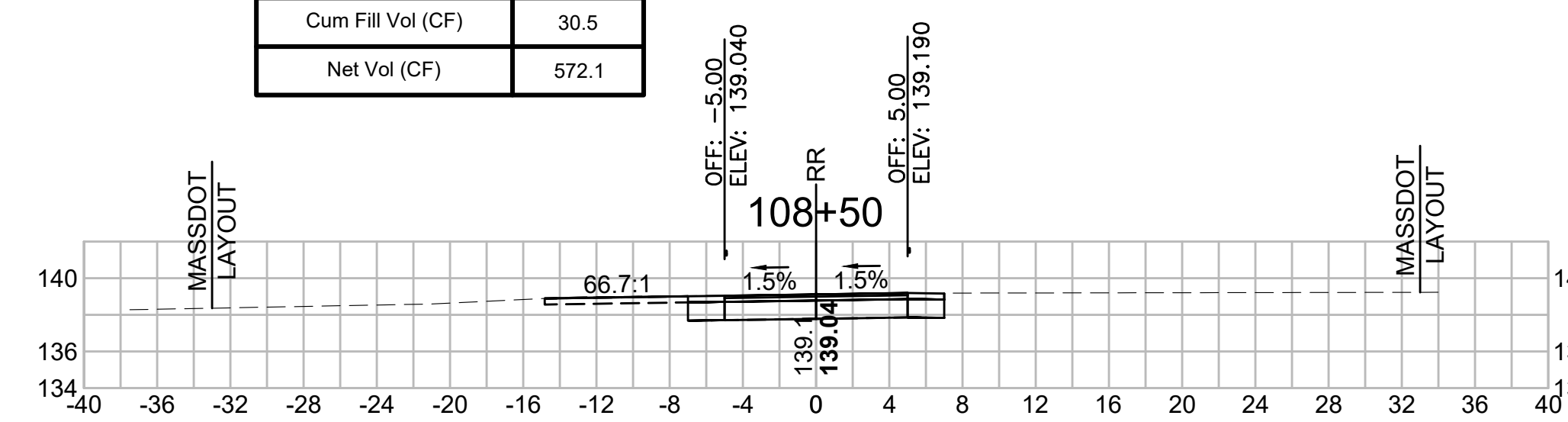
Total Volume at Station 105+50.00	
Cut Area (SF)	38.054
Fill Area (SF)	0.000
Cut Vol (CF)	70.049
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	336.750
Cum Fill Vol (CF)	22.9
Net Vol (CF)	313.8



Total Volume at Station 107+00.00	
Cut Area (SF)	20.975
Fill Area (SF)	1.333
Cut Vol (CF)	41.438
Fill Vol (CF)	3.8
Cum Cut Vol (CF)	493.101
Cum Fill Vol (CF)	29.2
Net Vol (CF)	463.9



Total Volume at Station 108+50.00	
Cut Area (SF)	22.091
Fill Area (SF)	0.000
Cut Vol (CF)	36.081
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	602.563
Cum Fill Vol (CF)	30.5
Net Vol (CF)	572.1



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	245	318

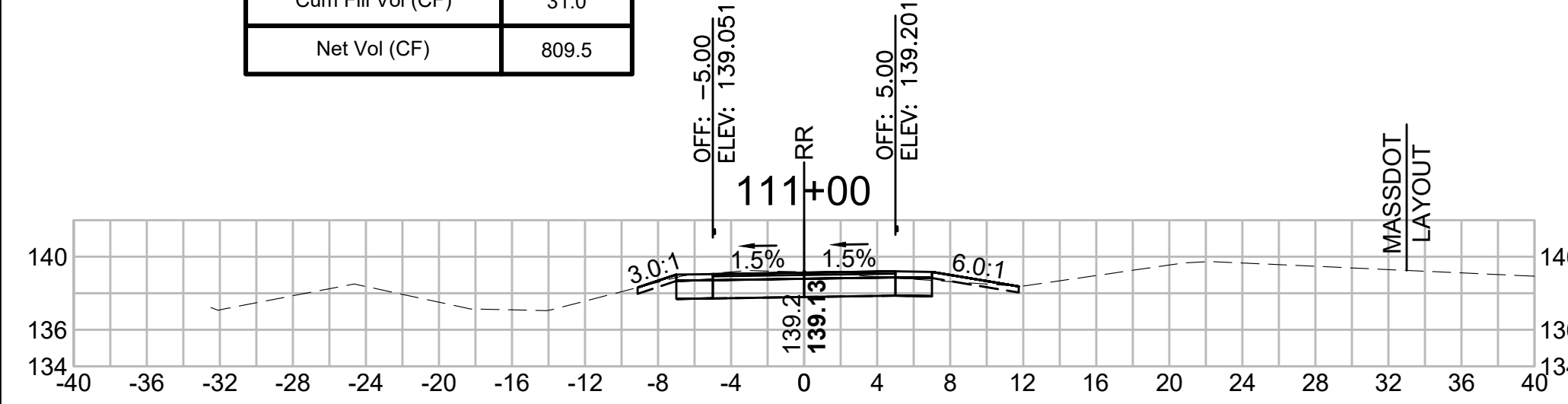
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

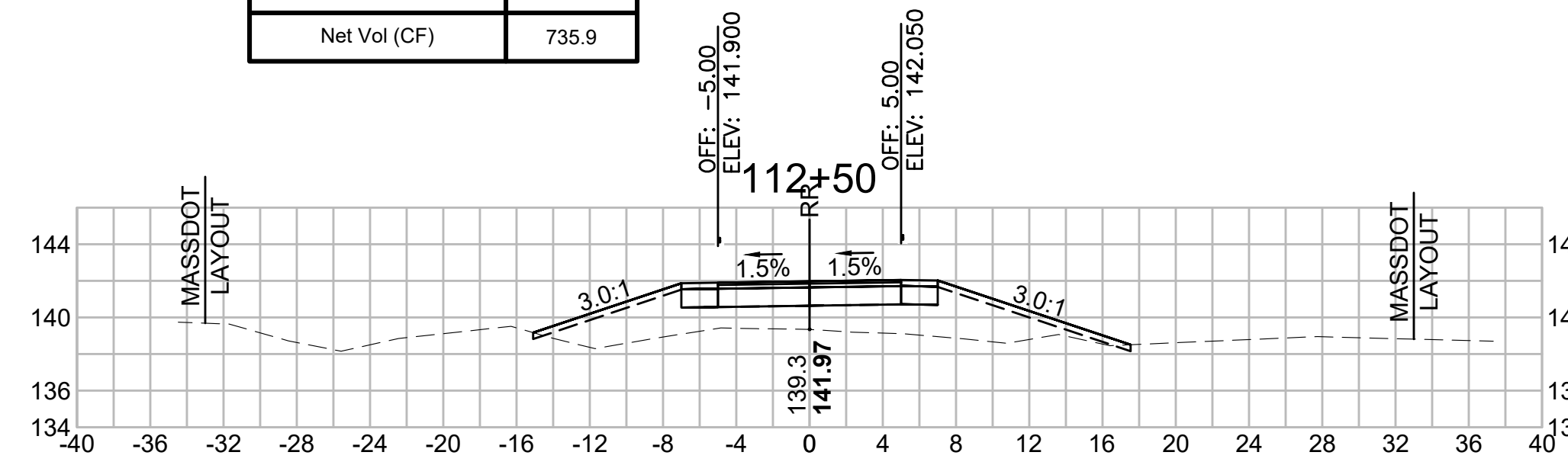
Total Volume at Station 111+00.00

Cut Area (SF)	18.236
Fill Area (SF)	0.000
Cut Vol (CF)	40.439
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	840.510
Cum Fill Vol (CF)	31.0
Net Vol (CF)	809.5



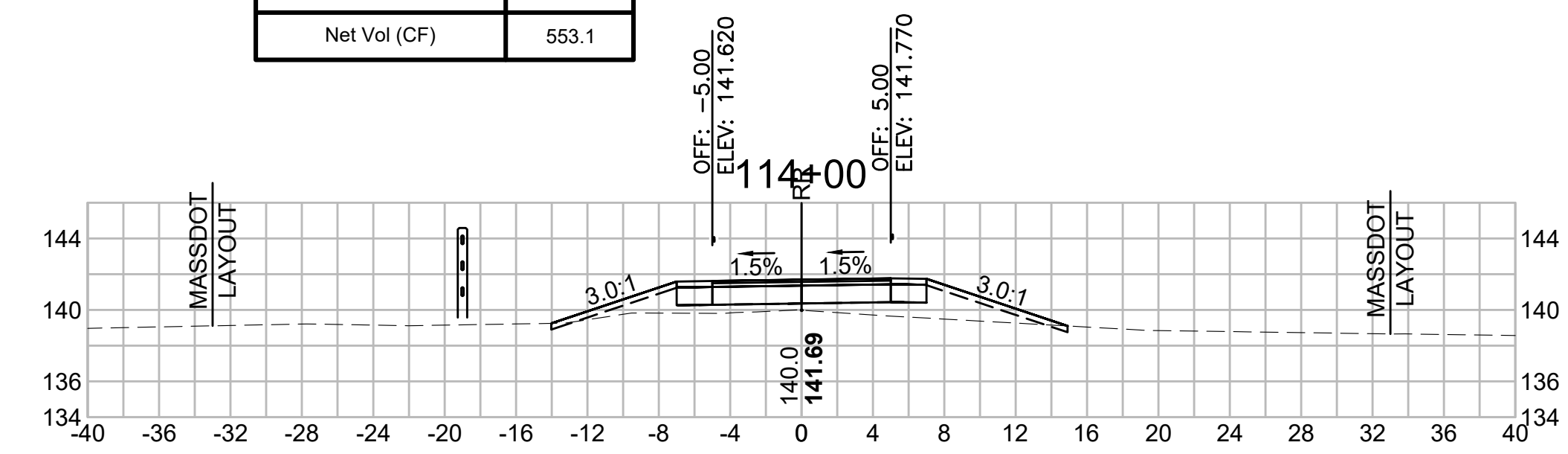
Total Volume at Station 112+50.00

Cut Area (SF)	0.261
Fill Area (SF)	43.694
Cut Vol (CF)	0.469
Fill Vol (CF)	63.5
Cum Cut Vol (CF)	866.904
Cum Fill Vol (CF)	131.0
Net Vol (CF)	735.9



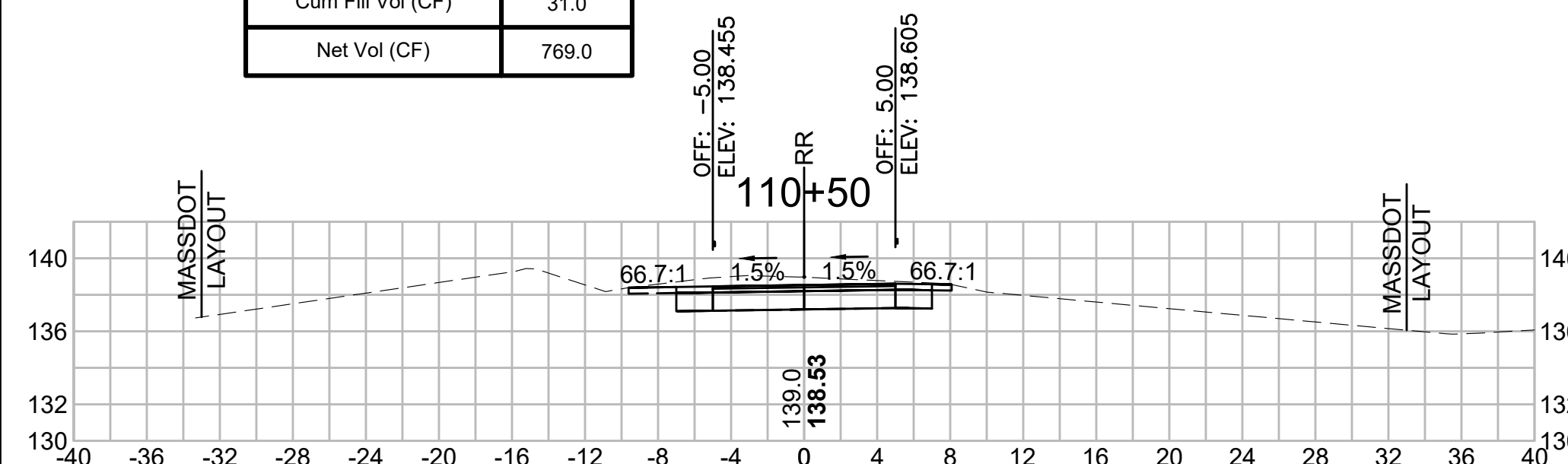
Total Volume at Station 114+00.00

Cut Area (SF)	0.425
Fill Area (SF)	17.156
Cut Vol (CF)	0.730
Fill Vol (CF)	38.5
Cum Cut Vol (CF)	868.832
Cum Fill Vol (CF)	315.7
Net Vol (CF)	553.1



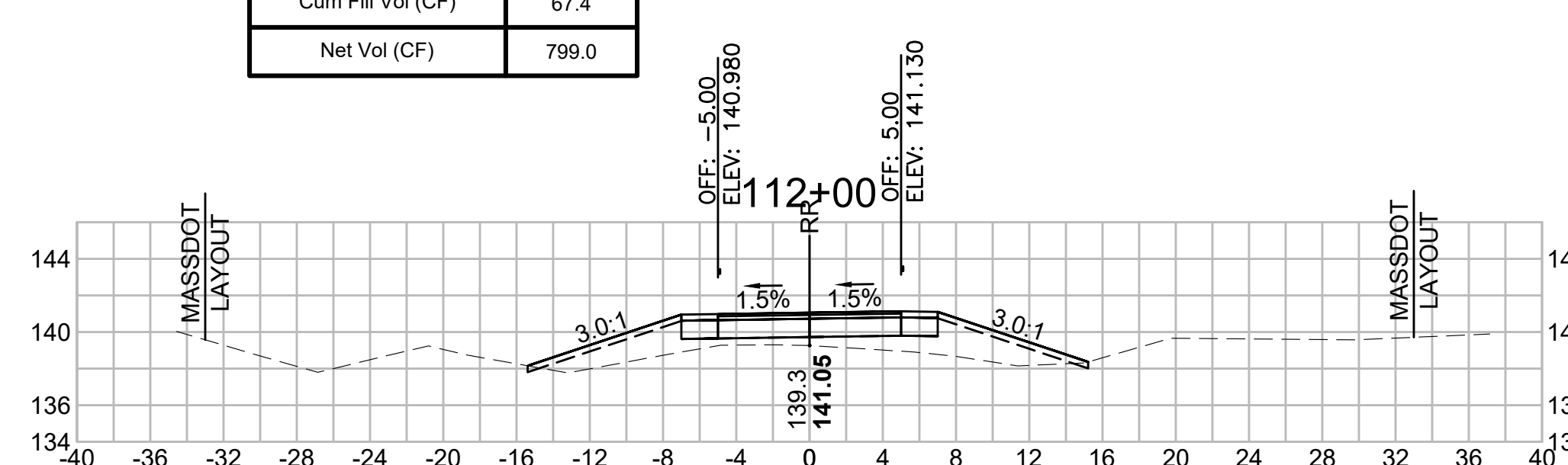
Total Volume at Station 110+50.00

Cut Area (SF)	25.438
Fill Area (SF)	0.000
Cut Vol (CF)	53.026
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	800.072
Cum Fill Vol (CF)	31.0
Net Vol (CF)	769.0



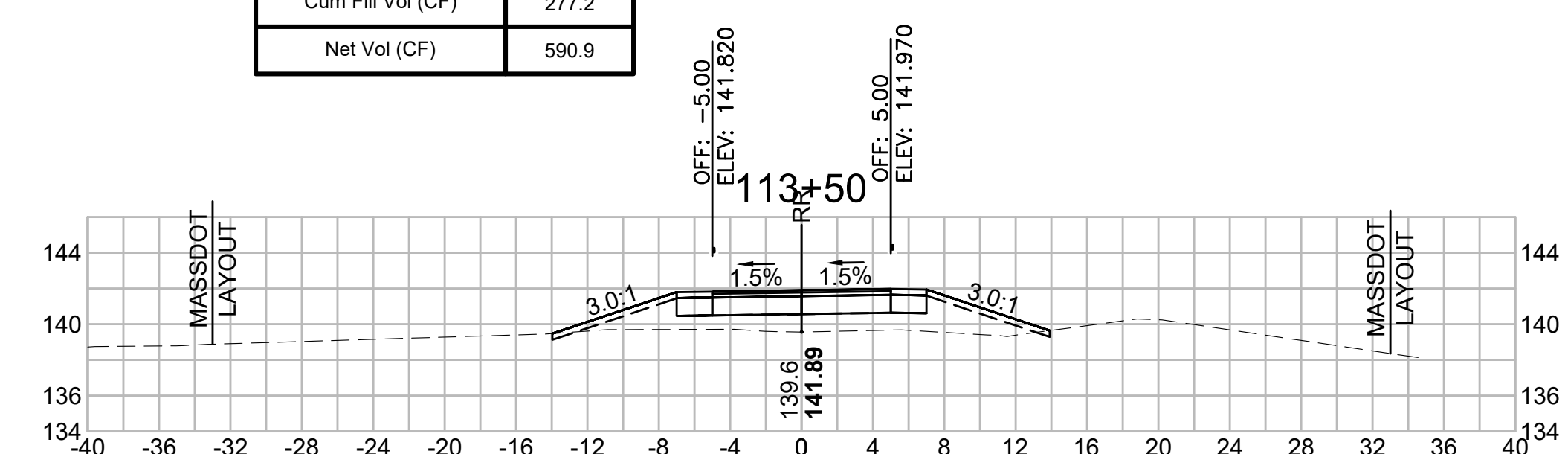
Total Volume at Station 112+00.00

Cut Area (SF)	0.246
Fill Area (SF)	24.924
Cut Vol (CF)	4.634
Fill Vol (CF)	29.7
Cum Cut Vol (CF)	866.435
Cum Fill Vol (CF)	67.4
Net Vol (CF)	799.0



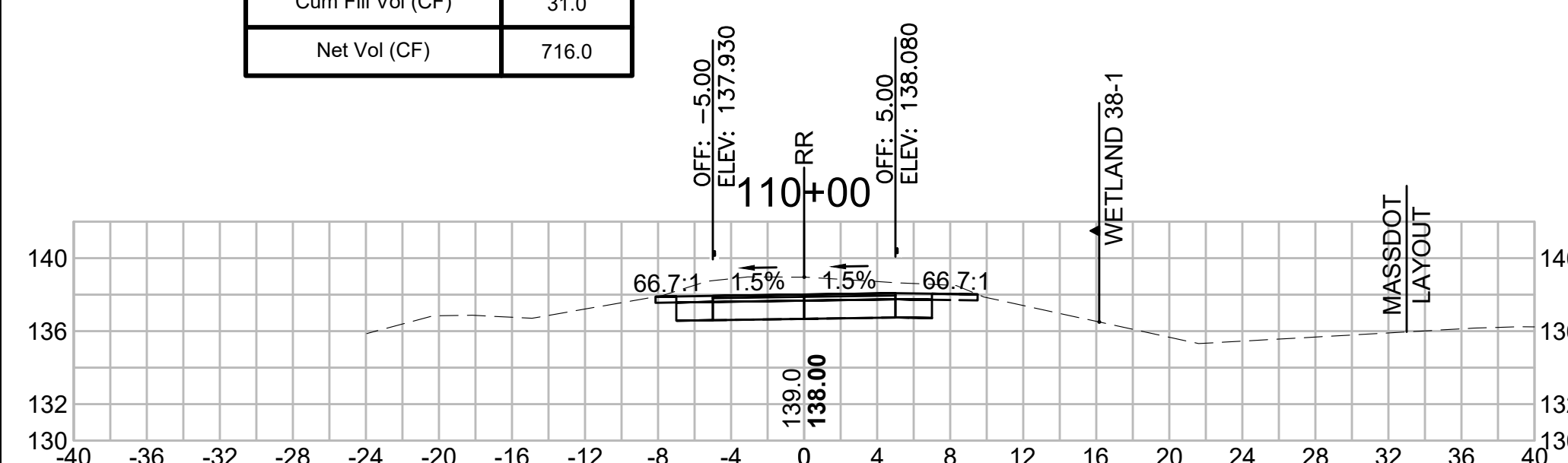
Total Volume at Station 113+50.00

Cut Area (SF)	0.363
Fill Area (SF)	24.397
Cut Vol (CF)	0.647
Fill Vol (CF)	64.2
Cum Cut Vol (CF)	868.103
Cum Fill Vol (CF)	277.2
Net Vol (CF)	590.9



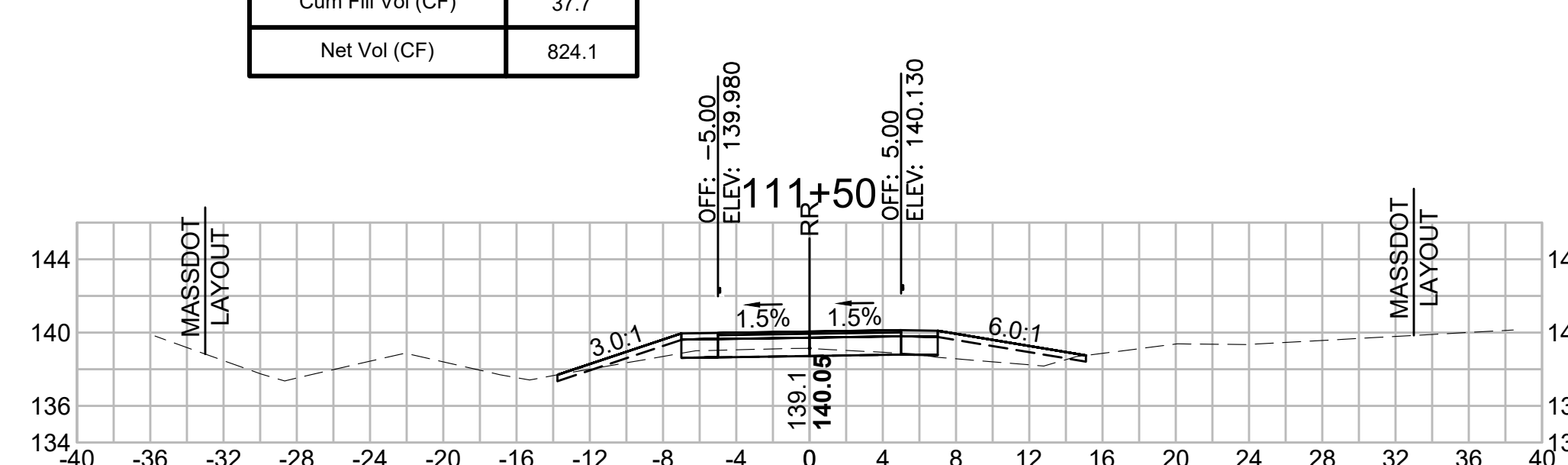
Total Volume at Station 110+00.00

Cut Area (SF)	31.830
Fill Area (SF)	0.000
Cut Vol (CF)	59.855
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	747.046
Cum Fill Vol (CF)	31.0
Net Vol (CF)	716.0



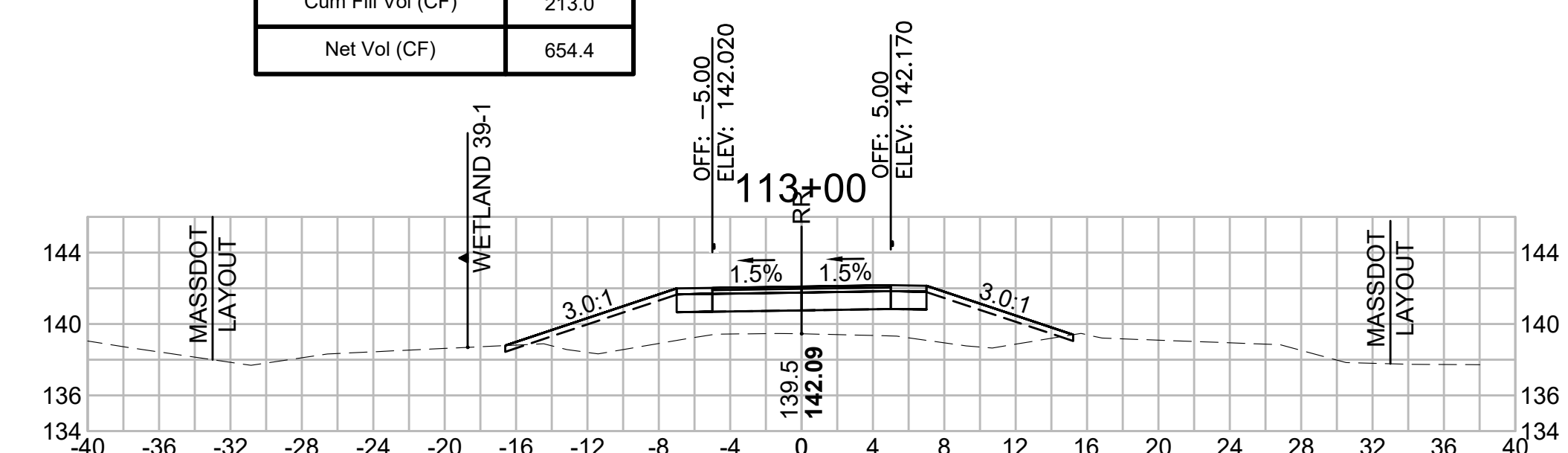
Total Volume at Station 111+50.00

Cut Area (SF)	4.759
Fill Area (SF)	7.194
Cut Vol (CF)	21.292
Fill Vol (CF)	6.7
Cum Cut Vol (CF)	861.802
Cum Fill Vol (CF)	37.7
Net Vol (CF)	824.1



Total Volume at Station 113+00.00

Cut Area (SF)	0.335
Fill Area (SF)	44.923
Cut Vol (CF)	0.552
Fill Vol (CF)	82.1
Cum Cut Vol (CF)	867.456
Cum Fill Vol (CF)	213.0
Net Vol (CF)	654.4



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	246	318

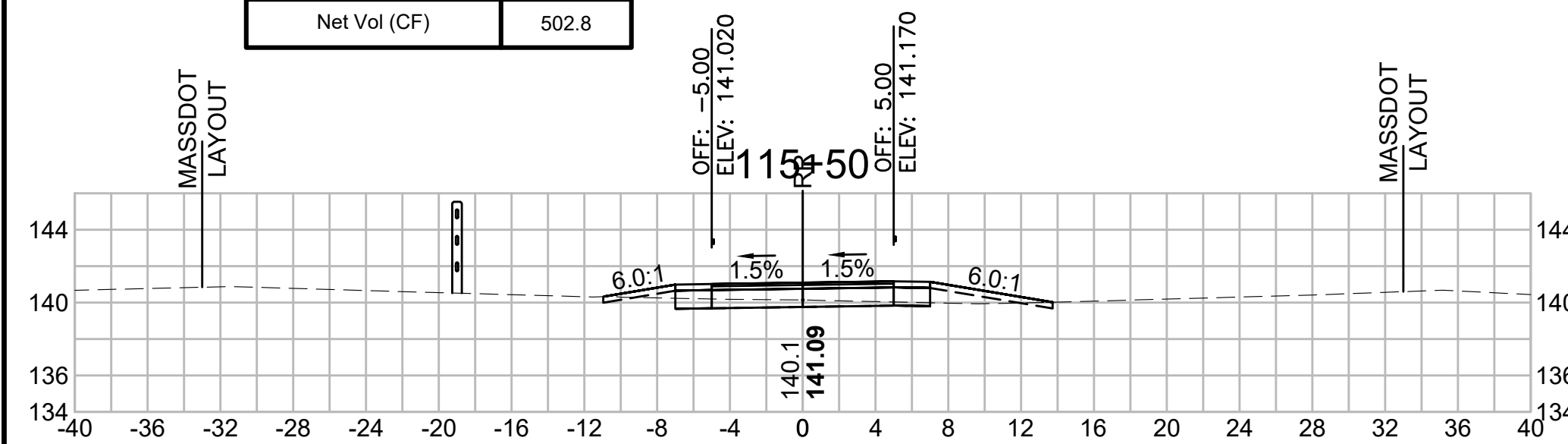
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

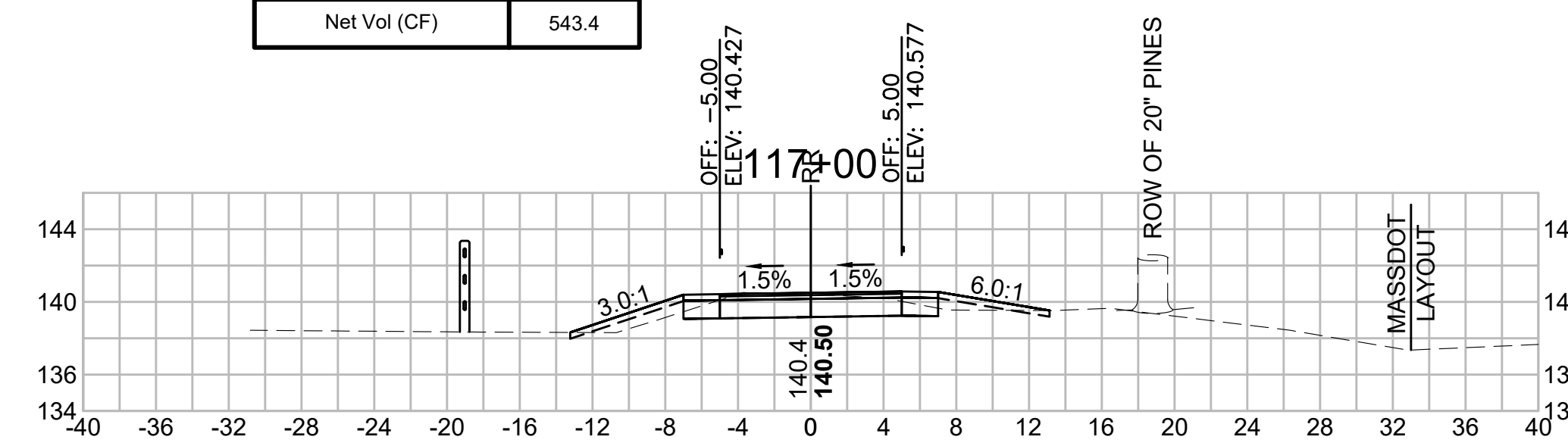
Total Volume at Station 115+50.00

Cut Area (SF)	5.798
Fill Area (SF)	2.583
Cut Vol (CF)	6.674
Fill Vol (CF)	8.8
Cum Cut Vol (CF)	877.856
Cum Fill Vol (CF)	375.1
Net Vol (CF)	502.8



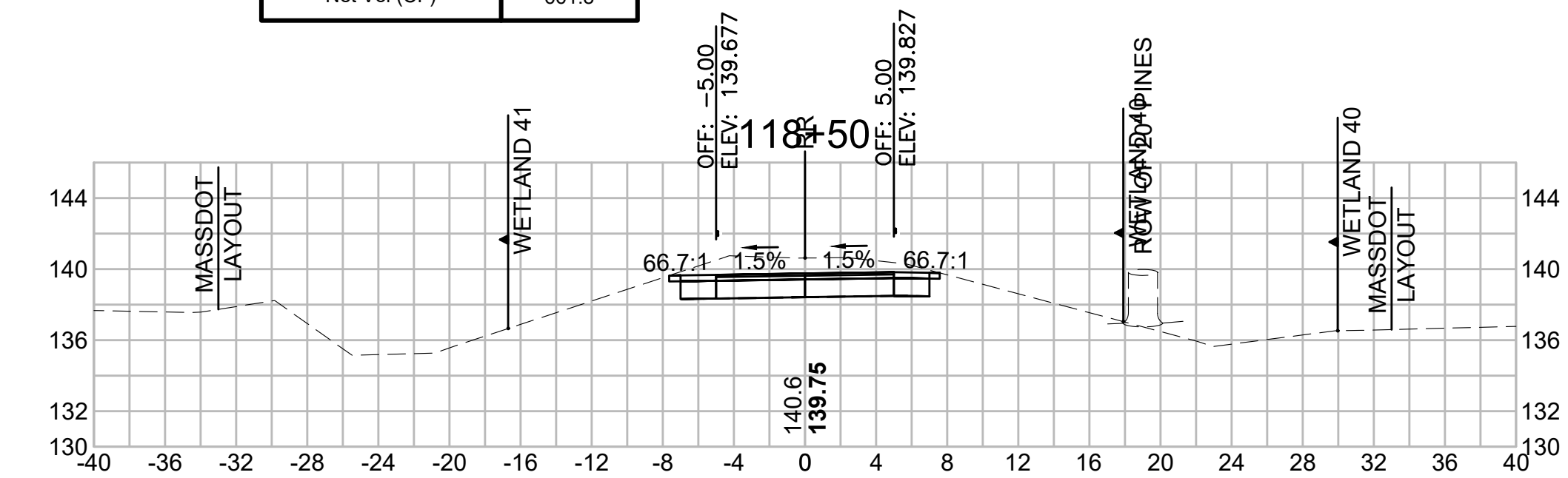
Total Volume at Station 117+00.00

Cut Area (SF)	14.901
Fill Area (SF)	3.704
Cut Vol (CF)	27.655
Fill Vol (CF)	3.7
Cum Cut Vol (CF)	924.738
Cum Fill Vol (CF)	381.3
Net Vol (CF)	543.4



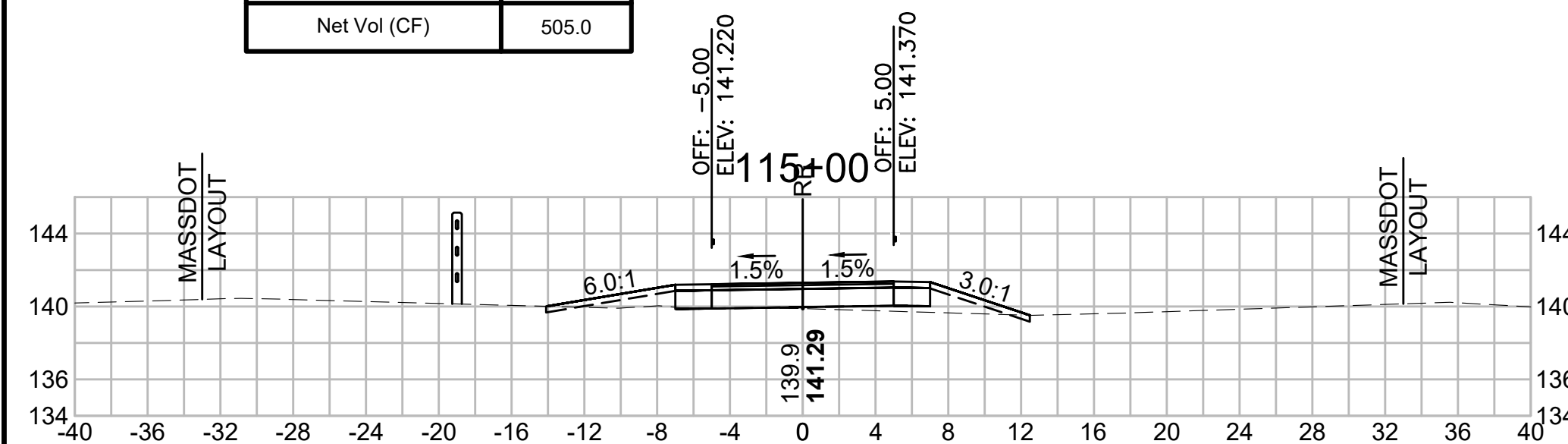
Total Volume at Station 118+50.00

Cut Area (SF)	29.627
Fill Area (SF)	0.000
Cut Vol (CF)	50.928
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1048.464
Cum Fill Vol (CF)	386.7
Net Vol (CF)	661.8



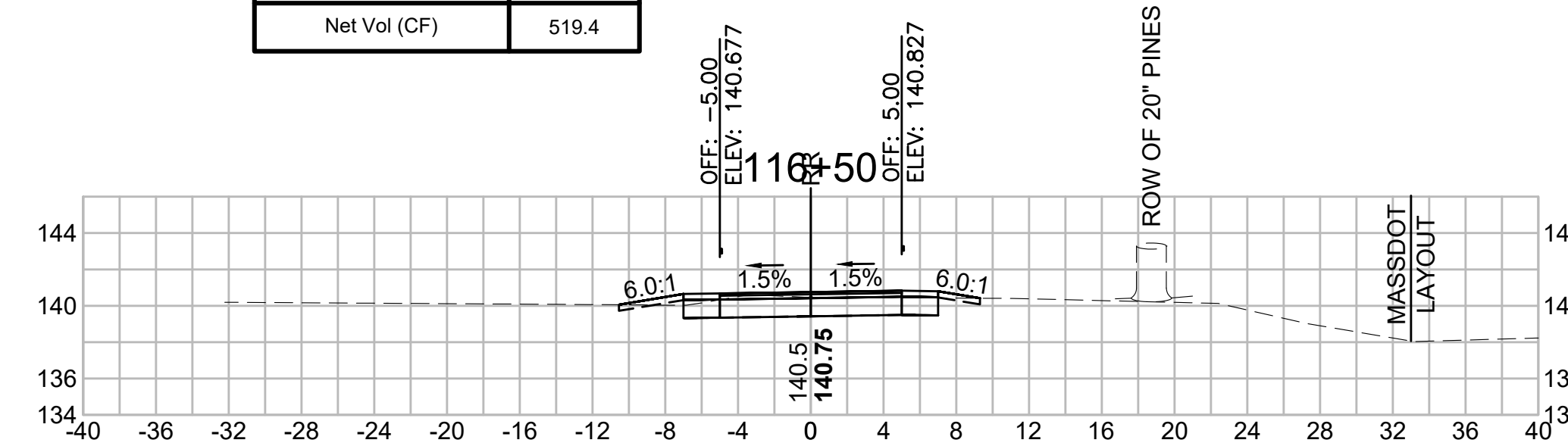
Total Volume at Station 115+00.00

Cut Area (SF)	1.409
Fill Area (SF)	6.957
Cut Vol (CF)	1.631
Fill Vol (CF)	20.5
Cum Cut Vol (CF)	871.182
Cum Fill Vol (CF)	366.2
Net Vol (CF)	505.0



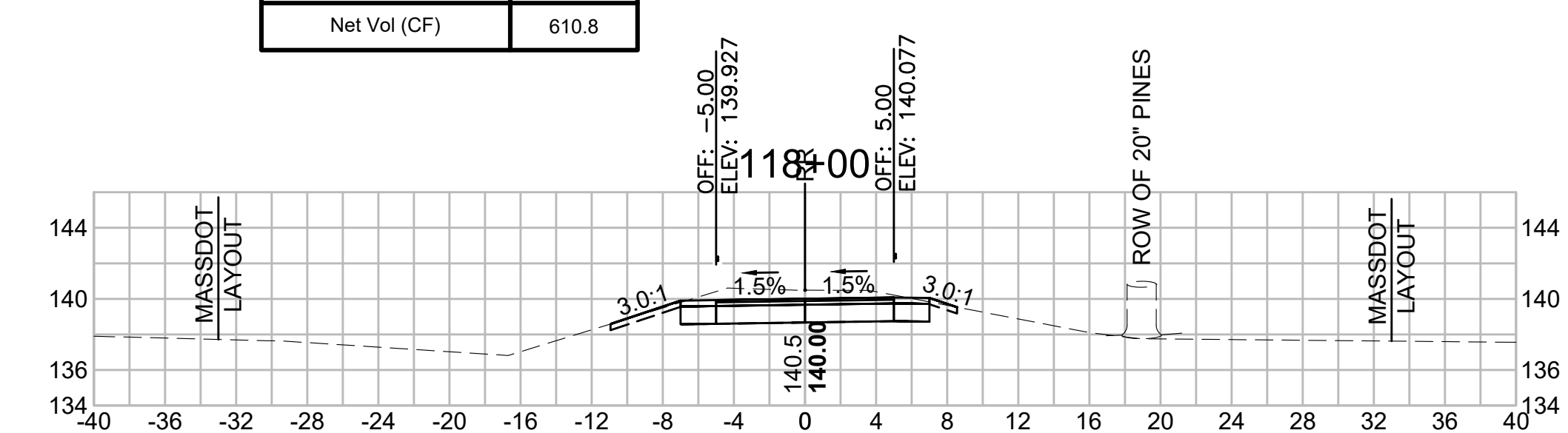
Total Volume at Station 116+50.00

Cut Area (SF)	14.966
Fill Area (SF)	0.240
Cut Vol (CF)	13.858
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	897.083
Cum Fill Vol (CF)	377.7
Net Vol (CF)	519.4



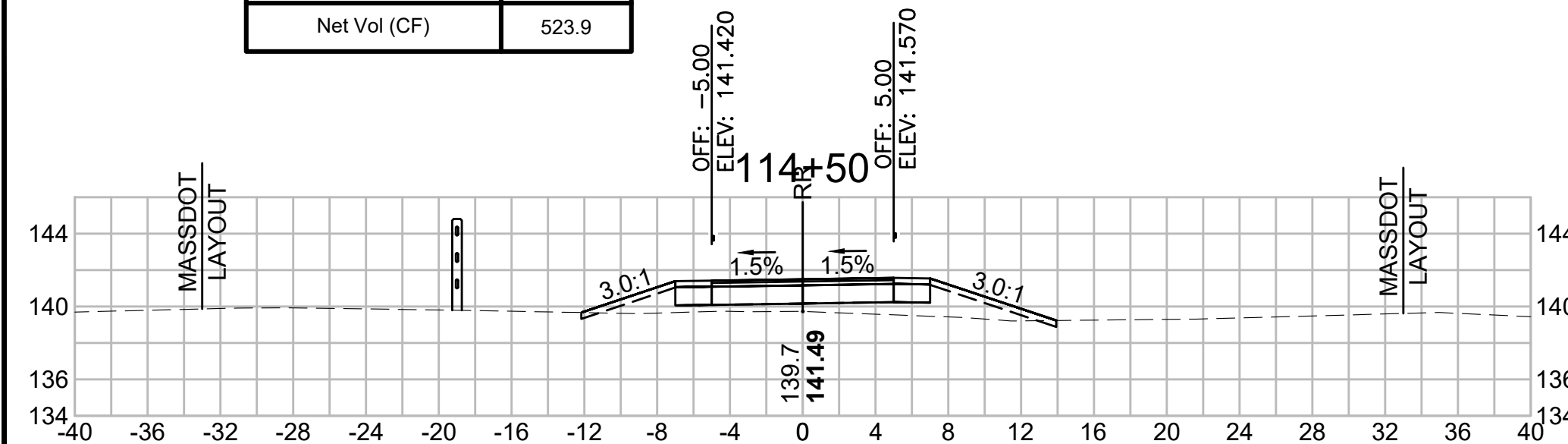
Total Volume at Station 118+00.00

Cut Area (SF)	25.374
Fill Area (SF)	0.000
Cut Vol (CF)	41.248
Fill Vol (CF)	1.0
Cum Cut Vol (CF)	997.536
Cum Fill Vol (CF)	386.7
Net Vol (CF)	610.8



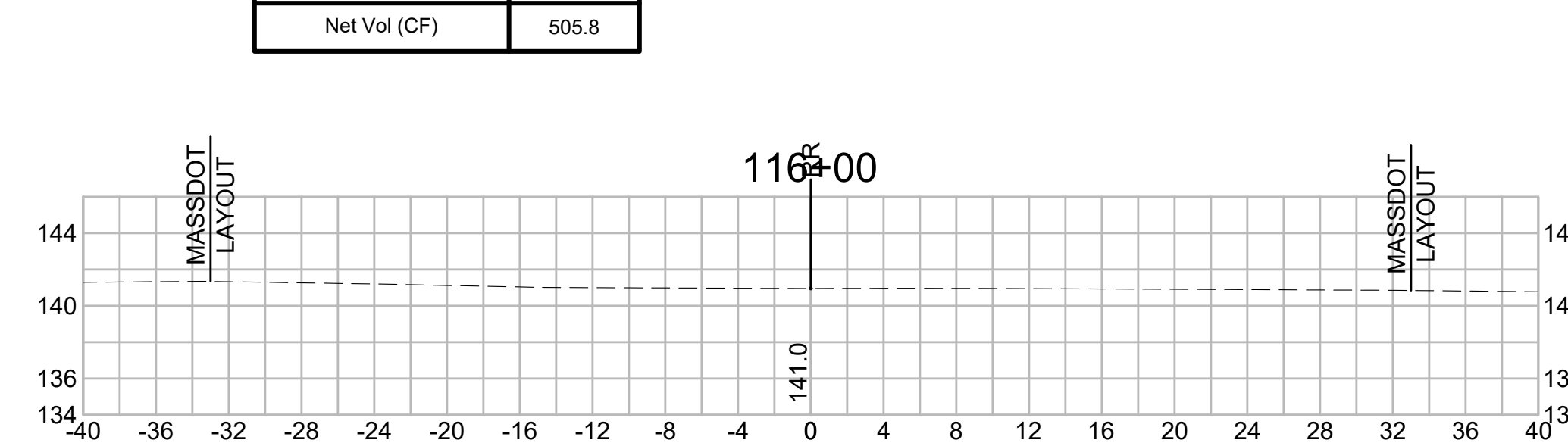
Total Volume at Station 114+50.00

Cut Area (SF)	0.352
Fill Area (SF)	15.229
Cut Vol (CF)	0.720
Fill Vol (CF)	30.0
Cum Cut Vol (CF)	869.552
Cum Fill Vol (CF)	345.7
Net Vol (CF)	523.9



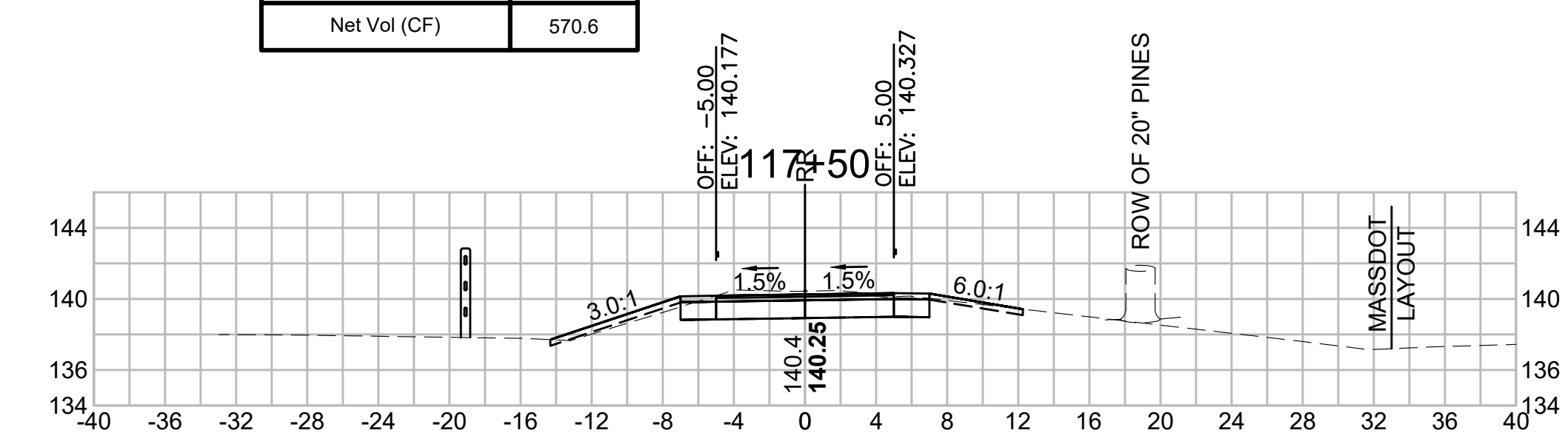
Total Volume at Station 116+00.00

Cut Area (SF)	0.000
Fill Area (SF)	0.000
Cut Vol (CF)	5.370
Fill Vol (CF)	2.4
Cum Cut Vol (CF)	883.225
Cum Fill Vol (CF)	377.4
Net Vol (CF)	505.8



Total Volume at Station 117+50.00

Cut Area (SF)	19.174
Fill Area (SF)	1.053
Cut Vol (CF)	31.551
Fill Vol (CF)	4.4
Cum Cut Vol (CF)	956.289
Cum Fill Vol (CF)	385.7
Net Vol (CF)	570.6



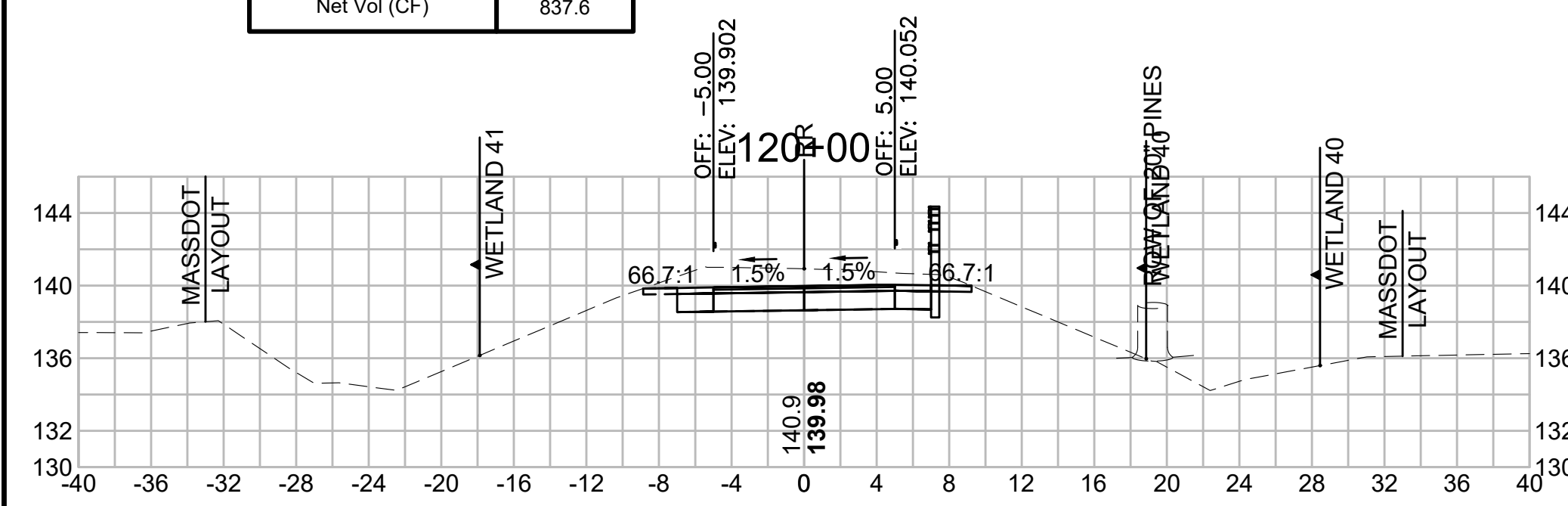
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	247	318

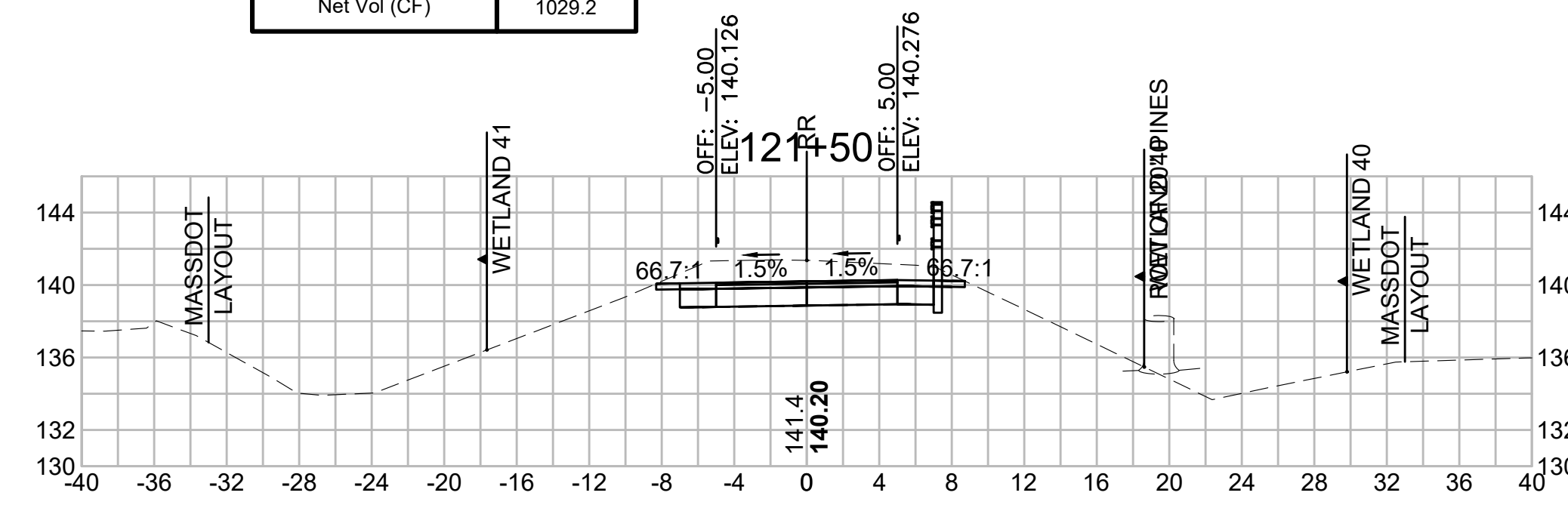
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

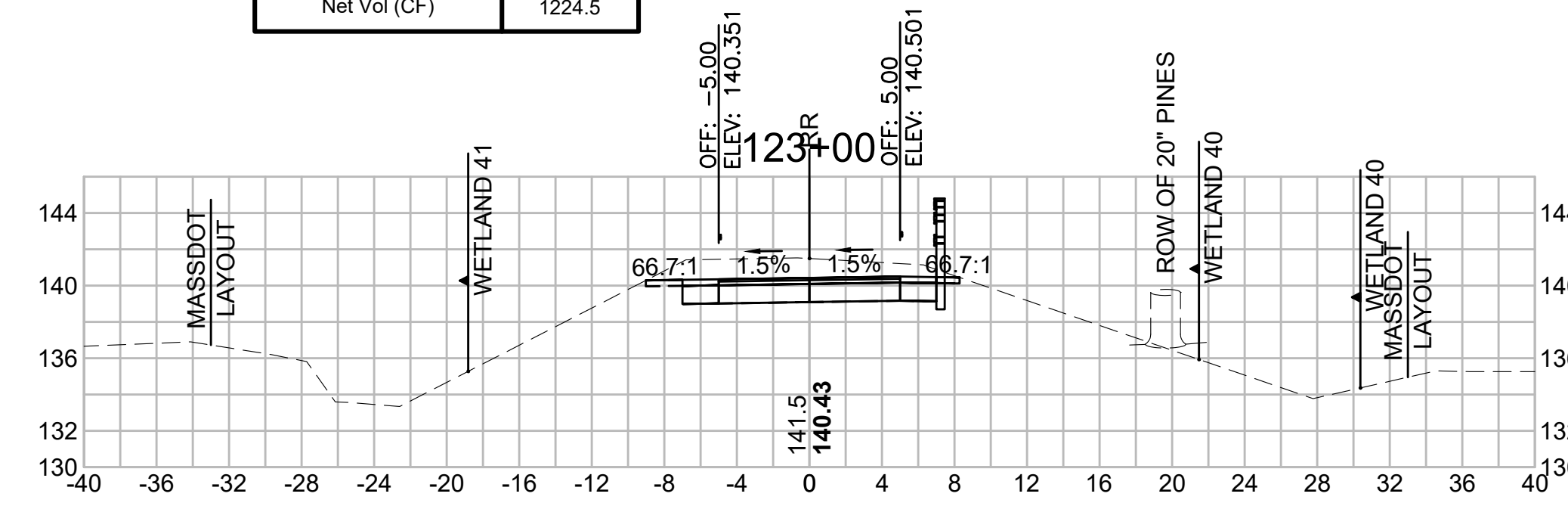
Total Volume at Station 120+00.00	
Cut Area (SF)	33.873
Fill Area (SF)	0.000
Cut Vol (CF)	61.831
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1224.261
Cum Fill Vol (CF)	386.7
Net Vol (CF)	837.6



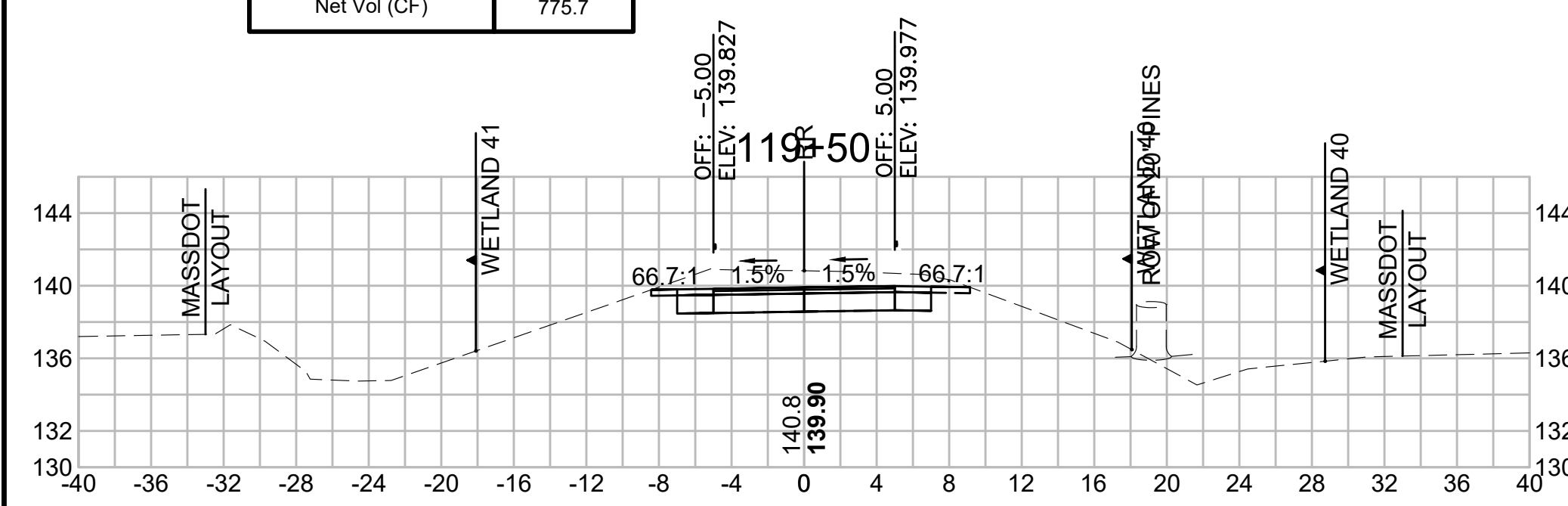
Total Volume at Station 121+50.00	
Cut Area (SF)	35.322
Fill Area (SF)	0.000
Cut Vol (CF)	65.507
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1415.918
Cum Fill Vol (CF)	386.7
Net Vol (CF)	1029.2



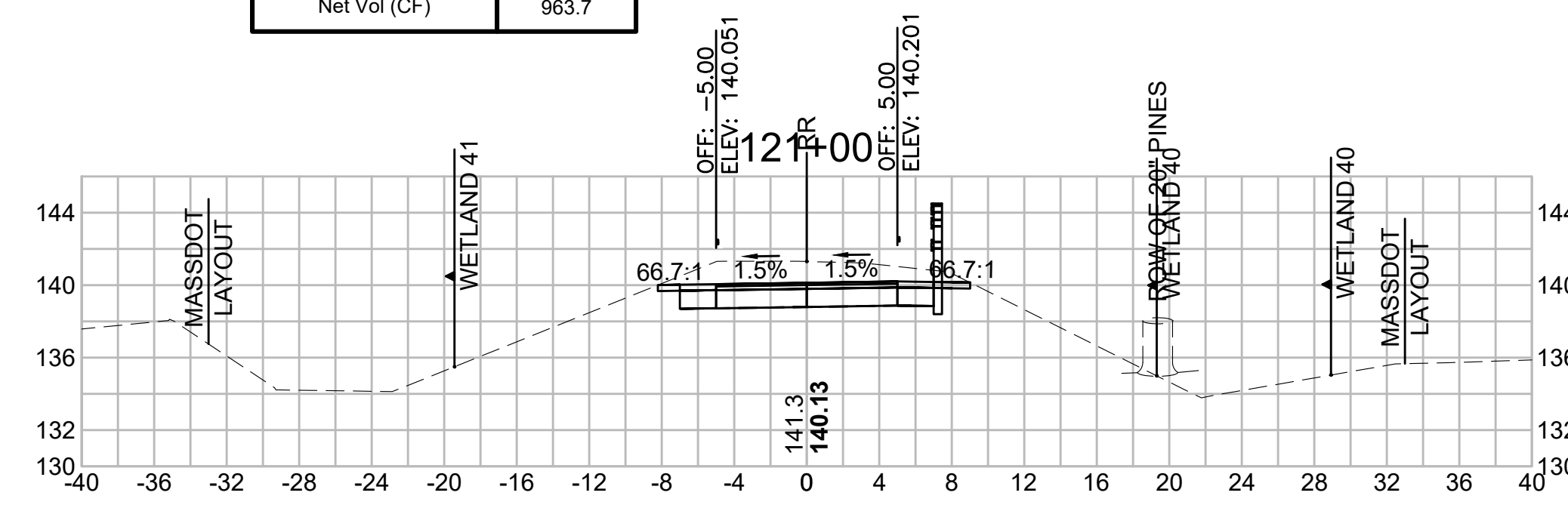
Total Volume at Station 123+00.00	
Cut Area (SF)	34.476
Fill Area (SF)	0.000
Cut Vol (CF)	64.981
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1611.251
Cum Fill Vol (CF)	386.7
Net Vol (CF)	1224.5



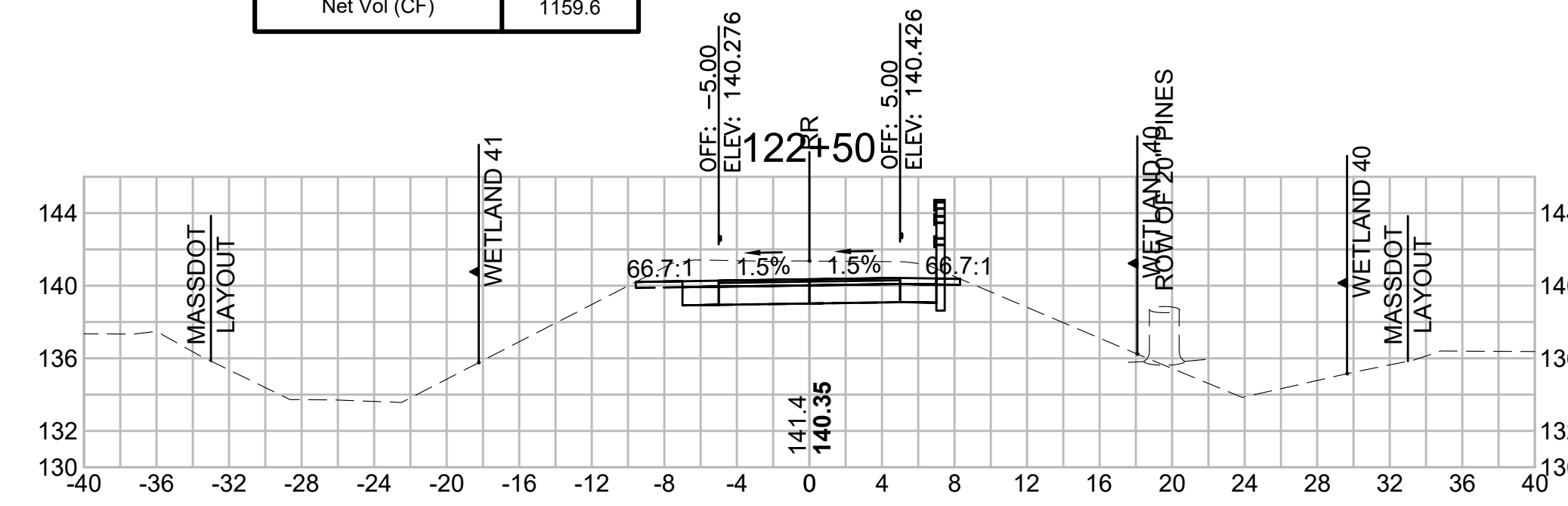
Total Volume at Station 119+50.00	
Cut Area (SF)	32.904
Fill Area (SF)	0.000
Cut Vol (CF)	58.501
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1162.430
Cum Fill Vol (CF)	386.7
Net Vol (CF)	775.7



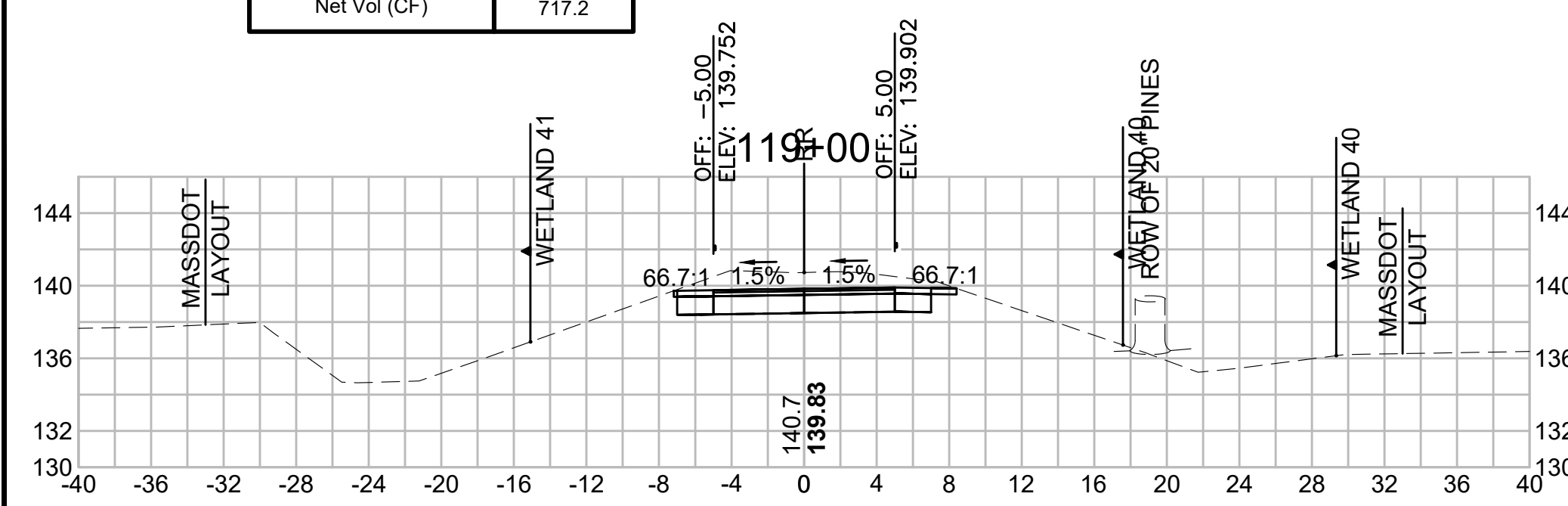
Total Volume at Station 121+00.00	
Cut Area (SF)	35.424
Fill Area (SF)	0.000
Cut Vol (CF)	63.795
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1350.412
Cum Fill Vol (CF)	386.7
Net Vol (CF)	963.7



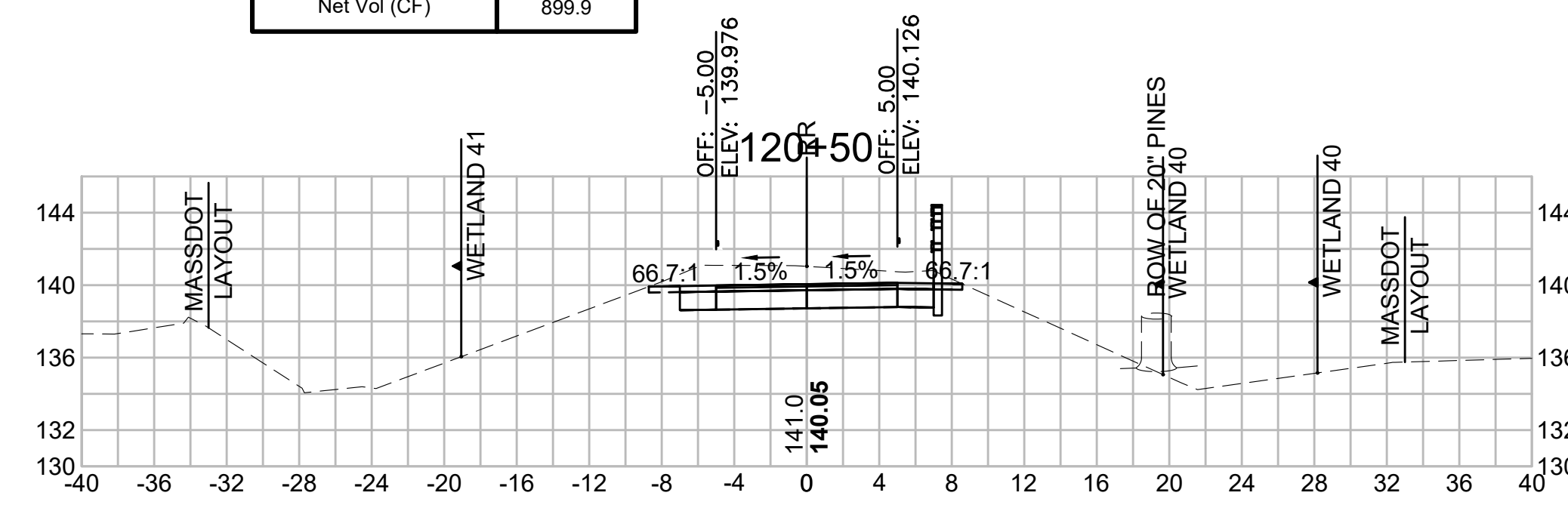
Total Volume at Station 122+50.00	
Cut Area (SF)	35.703
Fill Area (SF)	0.000
Cut Vol (CF)	65.353
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1546.271
Cum Fill Vol (CF)	386.7
Net Vol (CF)	1159.6



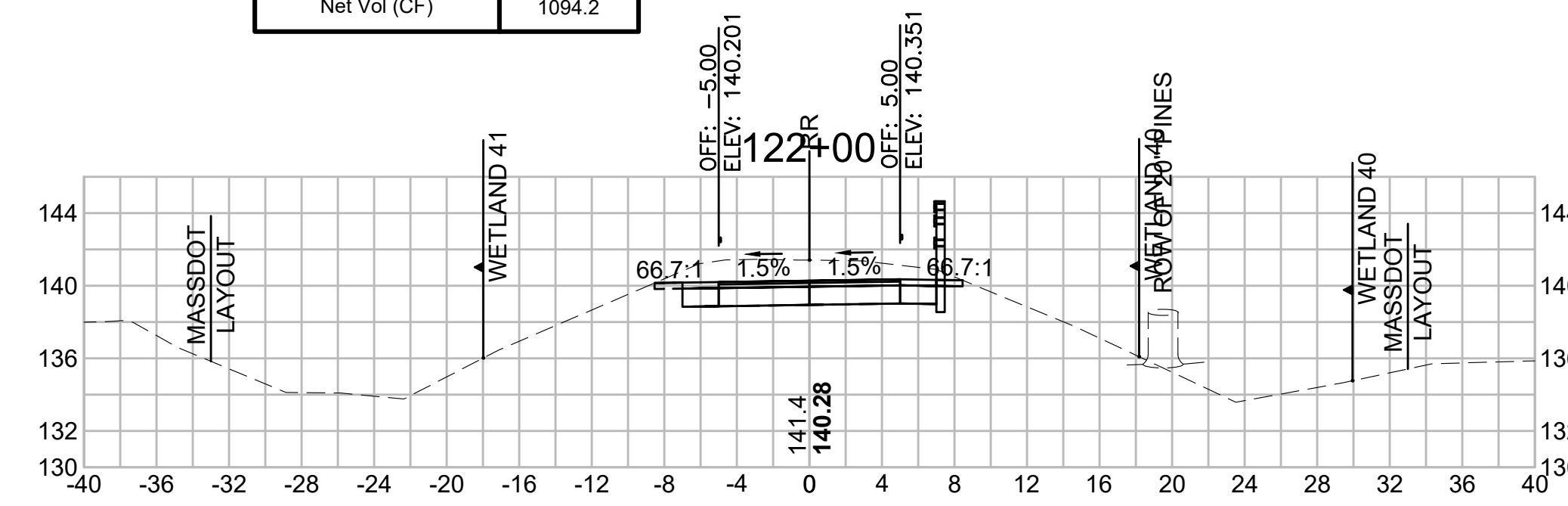
Total Volume at Station 119+00.00	
Cut Area (SF)	30.276
Fill Area (SF)	0.000
Cut Vol (CF)	55.467
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1103.930
Cum Fill Vol (CF)	386.7
Net Vol (CF)	717.2



Total Volume at Station 120+50.00	
Cut Area (SF)	33.473
Fill Area (SF)	0.000
Cut Vol (CF)	62.358
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1286.618
Cum Fill Vol (CF)	386.7
Net Vol (CF)	899.9



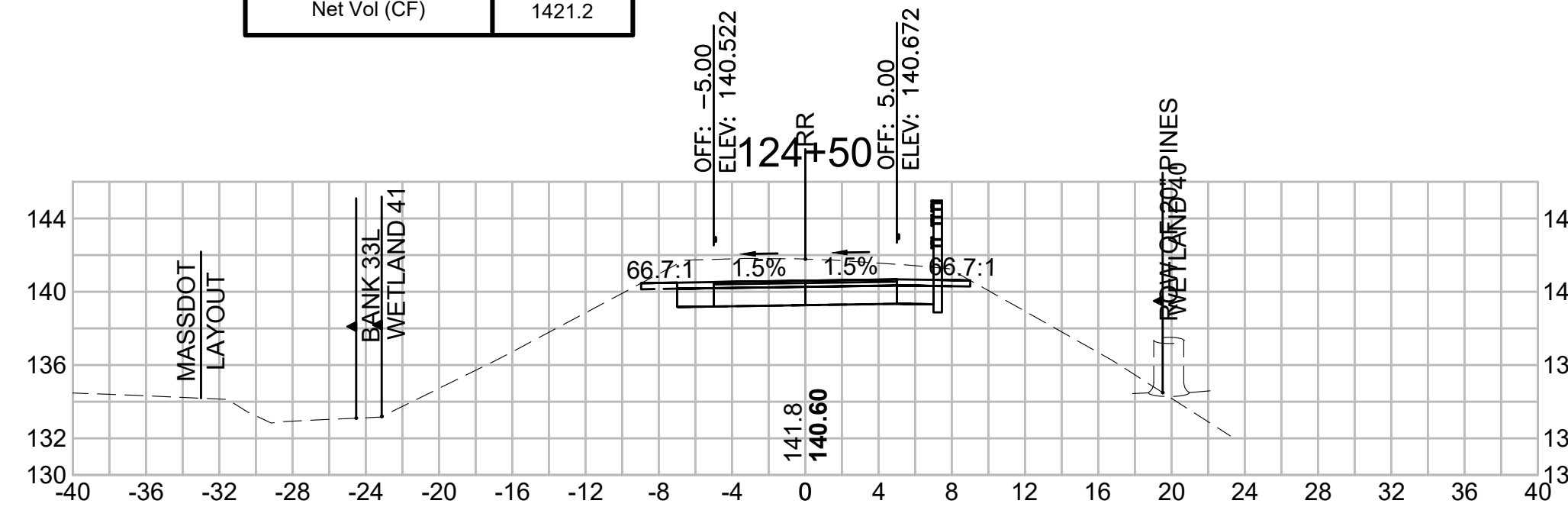
Total Volume at Station 122+00.00	
Cut Area (SF)	34.878
Fill Area (SF)	0.000
Cut Vol (CF)	65.001
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1480.919
Cum Fill Vol (CF)	386.7
Net Vol (CF)	1094.2



CROSS SECTIONS

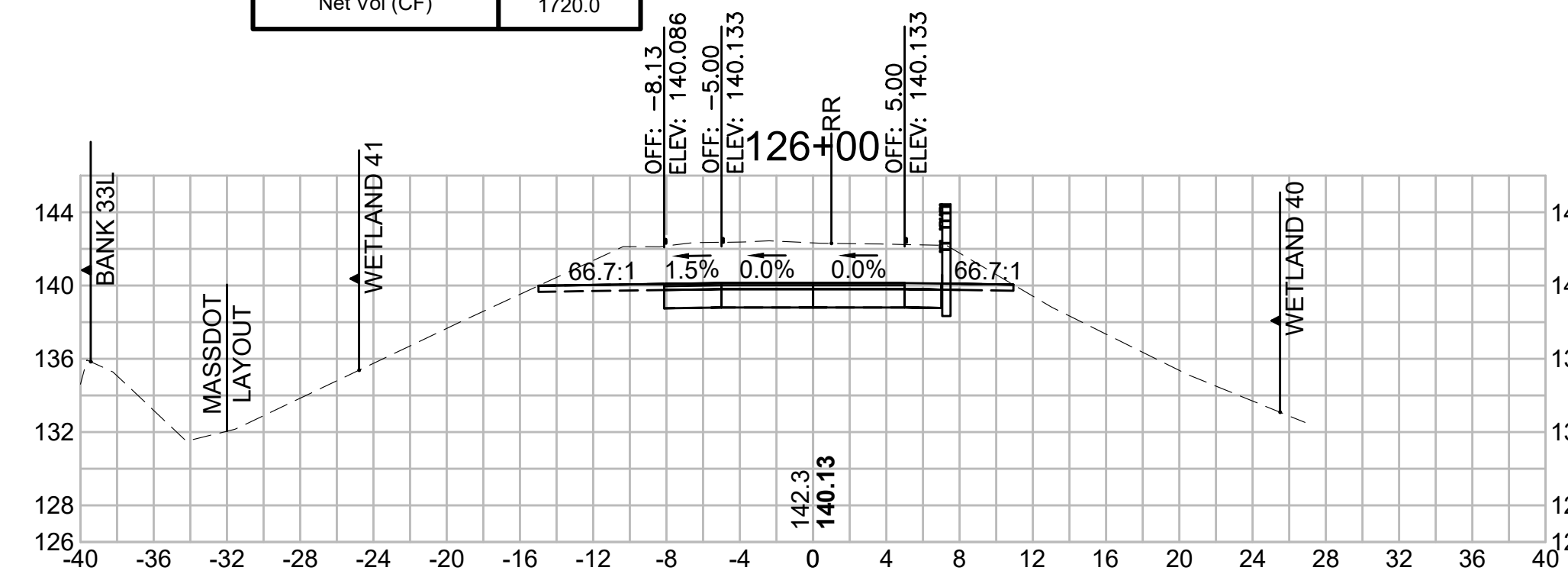
Total Volume at Station 124+50.00

Cut Area (SF)	37.198
Fill Area (SF)	1.922
Cut Vol (CF)	68.426
Fill Vol (CF)	1.8
Cum Cut Vol (CF)	1809.644
Cum Fill Vol (CF)	388.5
Net Vol (CF)	1421.2



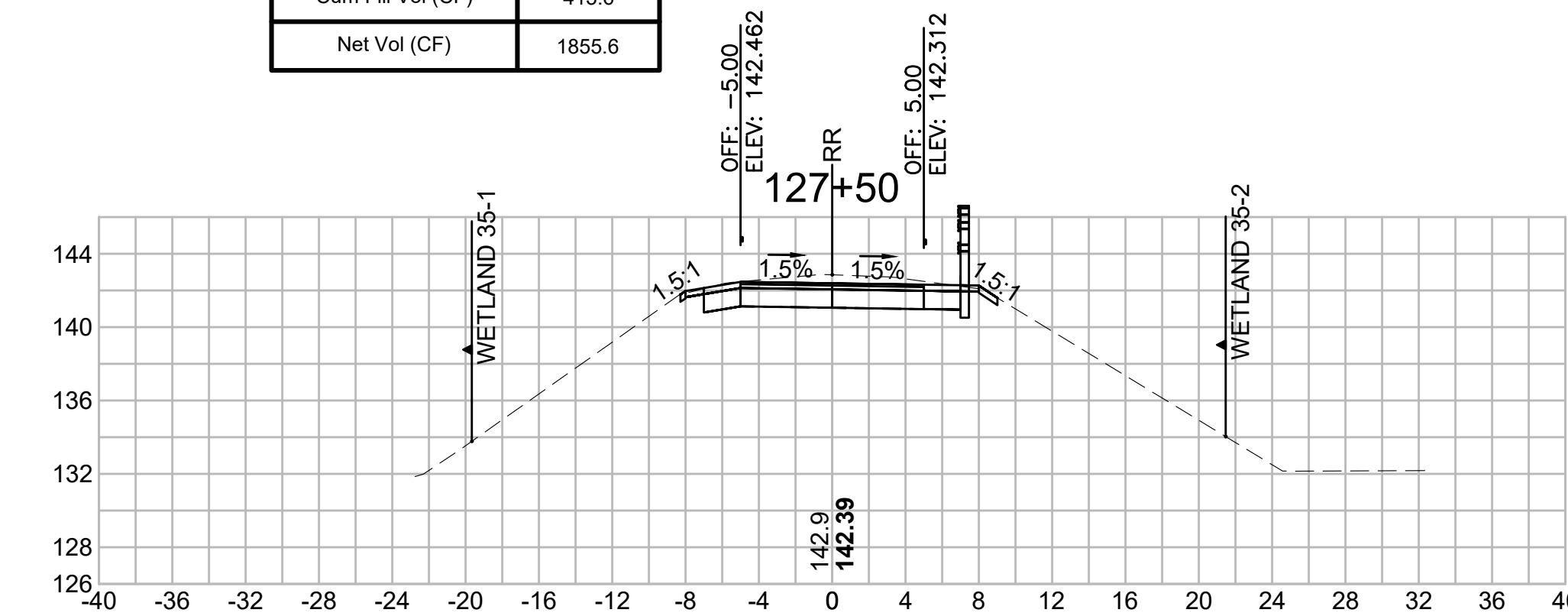
Total Volume at Station 126+00.00

Cut Area (SF)	59.168
Fill Area (SF)	0.058
Cut Vol (CF)	111.868
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	2110.659
Cum Fill Vol (CF)	390.7
Net Vol (CF)	1720.0



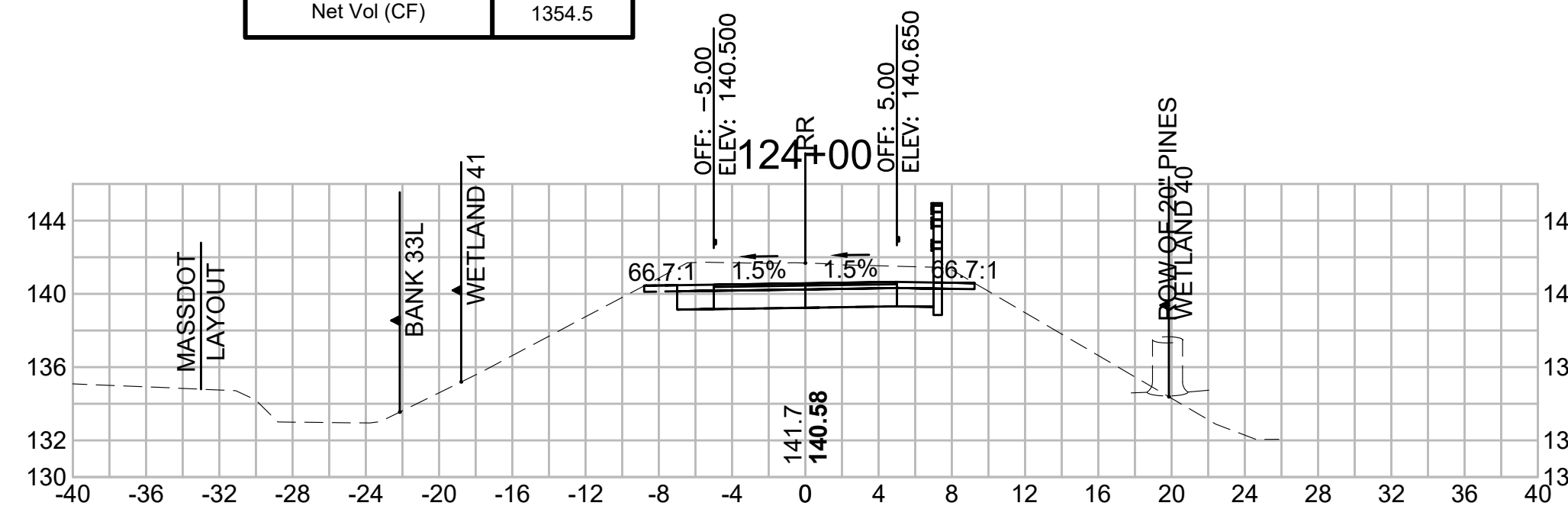
Total Volume at Station 127+50.00

Cut Area (SF)	22.655
Fill Area (SF)	0.000
Cut Vol (CF)	46.819
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2269.284
Cum Fill Vol (CF)	413.6
Net Vol (CF)	1855.6



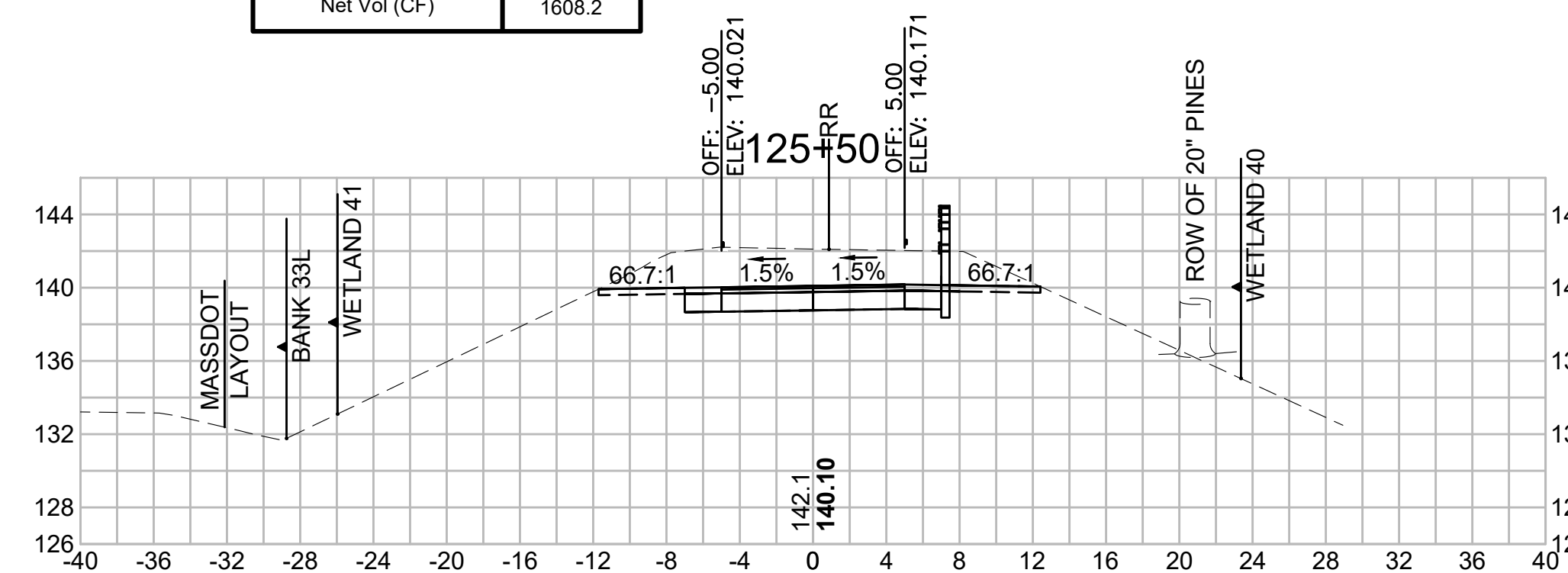
Total Volume at Station 124+00.00

Cut Area (SF)	36.702
Fill Area (SF)	0.000
Cut Vol (CF)	66.014
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1741.218
Cum Fill Vol (CF)	386.7
Net Vol (CF)	1354.5



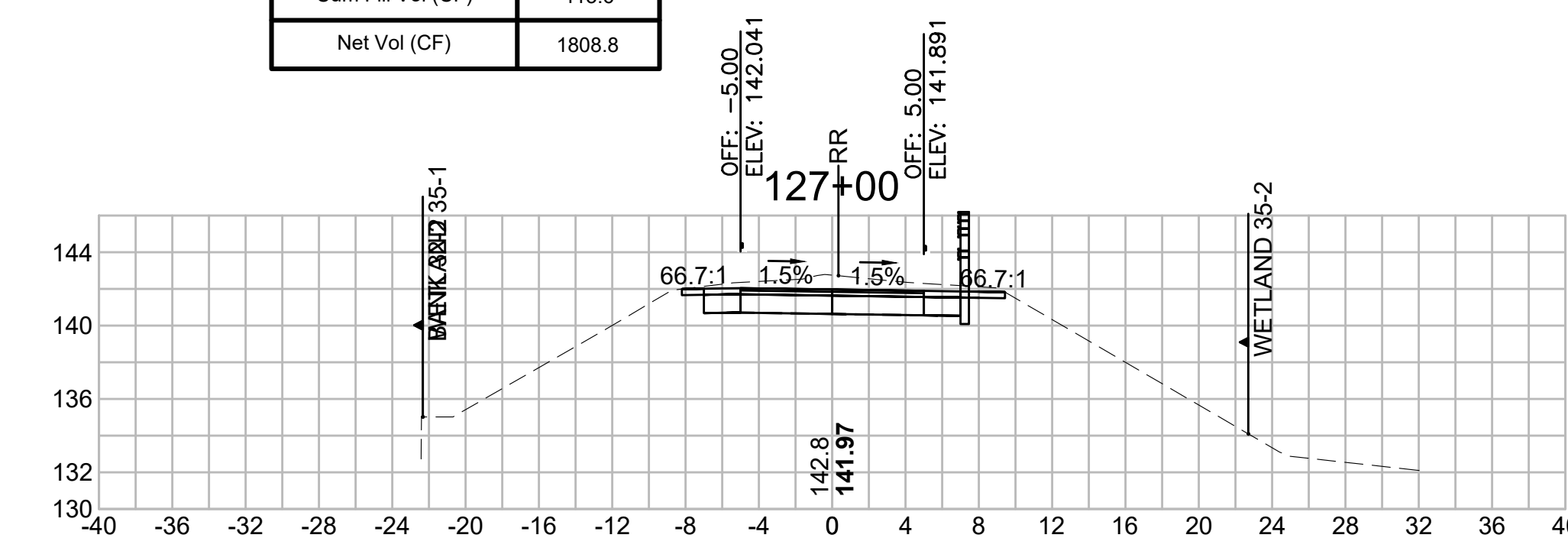
Total Volume at Station 125+50.00

Cut Area (SF)	61.649
Fill Area (SF)	0.014
Cut Vol (CF)	105.895
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	1998.791
Cum Fill Vol (CF)	390.6
Net Vol (CF)	1608.2



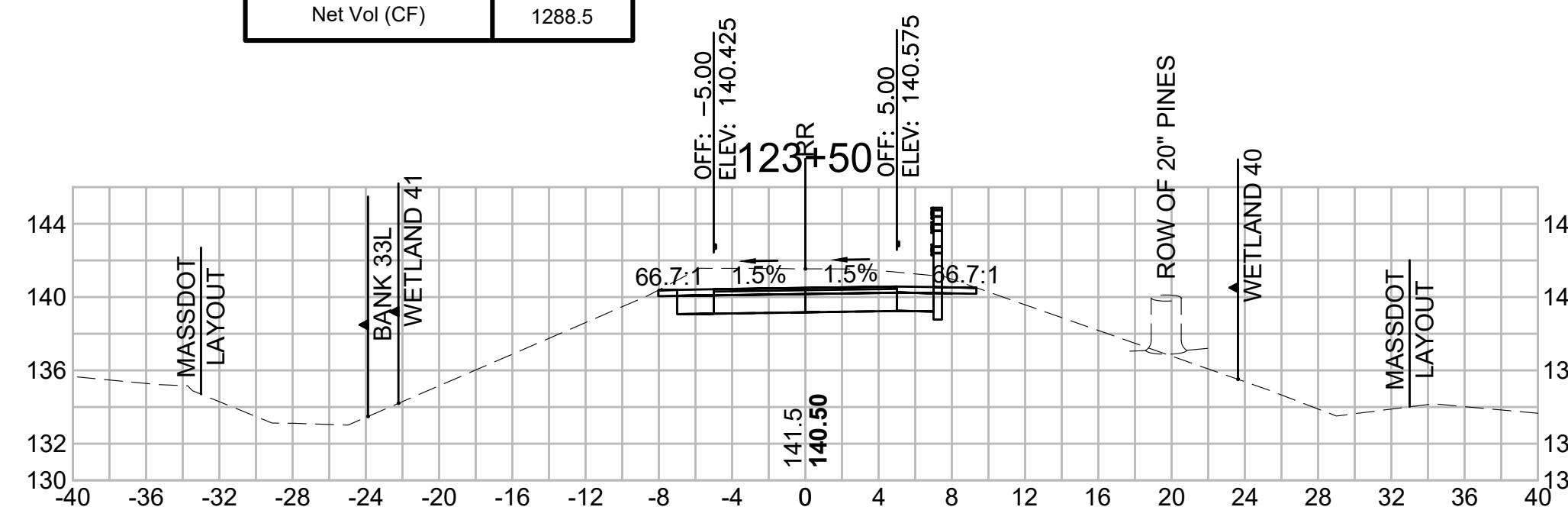
Total Volume at Station 127+00.00

Cut Area (SF)	27.909
Fill Area (SF)	0.000
Cut Vol (CF)	41.432
Fill Vol (CF)	11.5
Cum Cut Vol (CF)	2222.465
Cum Fill Vol (CF)	413.6
Net Vol (CF)	1808.8



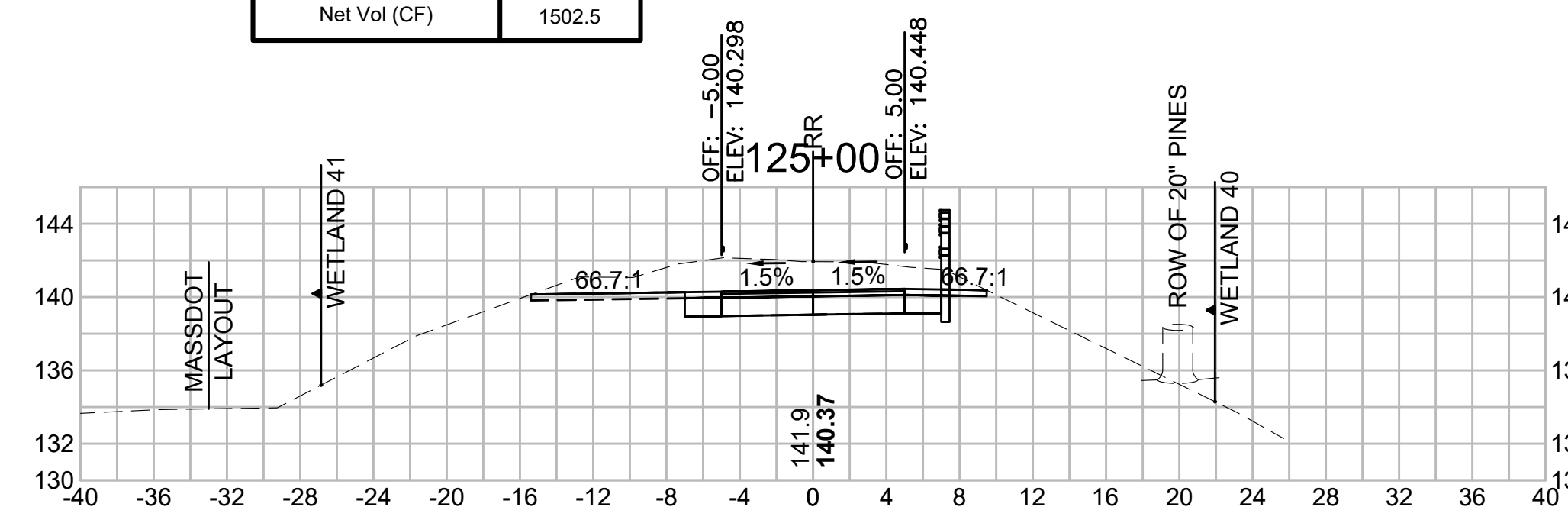
Total Volume at Station 123+50.00

Cut Area (SF)	34.593
Fill Area (SF)	0.000
Cut Vol (CF)	63.953
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	1675.204
Cum Fill Vol (CF)	386.7
Net Vol (CF)	1288.5



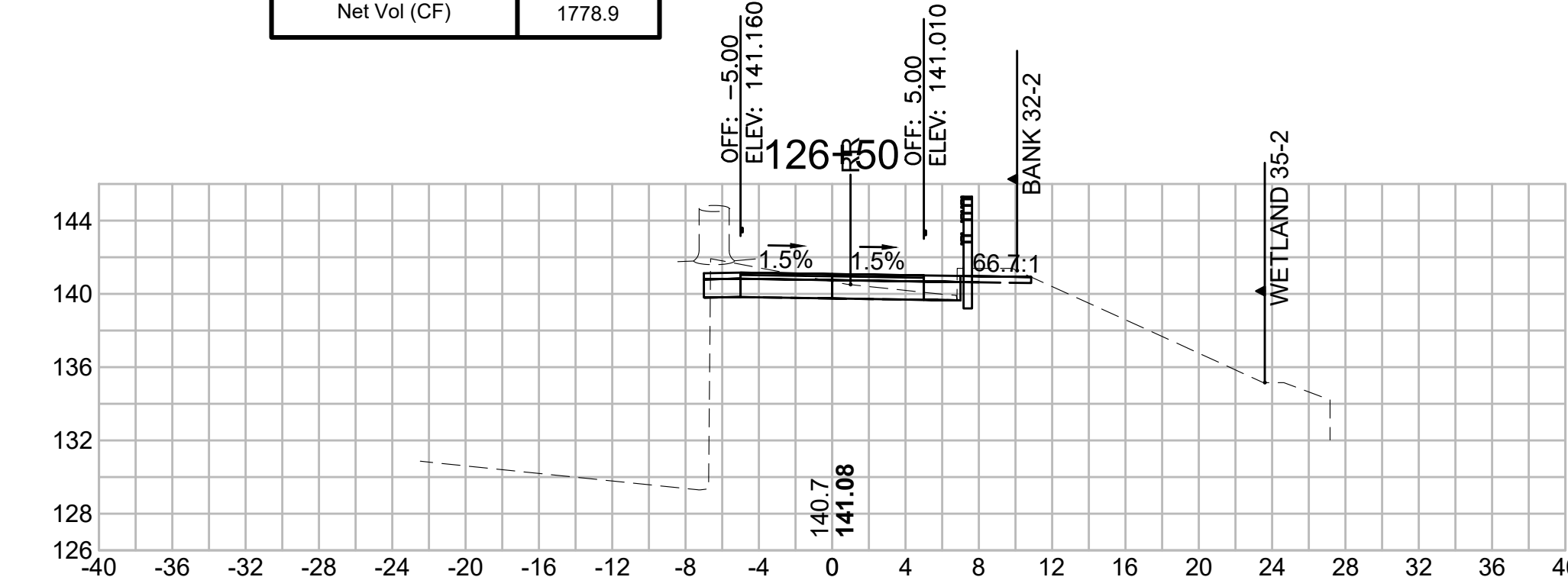
Total Volume at Station 125+00.00

Cut Area (SF)	52.717
Fill Area (SF)	0.172
Cut Vol (CF)	83.254
Fill Vol (CF)	1.9
Cum Cut Vol (CF)	1892.897
Cum Fill Vol (CF)	390.4
Net Vol (CF)	1502.5



Total Volume at Station 126+50.00

Cut Area (SF)	16.837
Fill Area (SF)	12.381
Cut Vol (CF)	70.376
Fill Vol (CF)	11.5
Cum Cut Vol (CF)	2181.034
Cum Fill Vol (CF)	402.2
Net Vol (CF)	1778.9



SUDBURY
BRUCE FREEMAN RAIL TRAIL

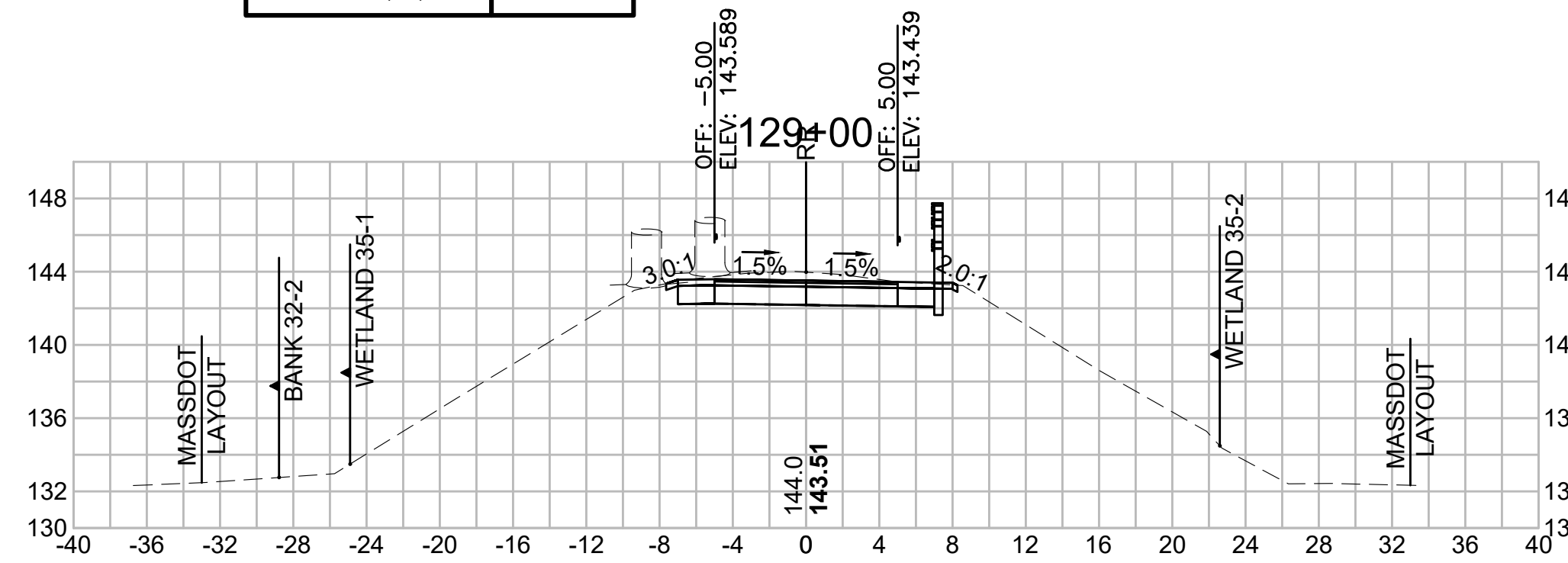
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	249	318

PROJECT FILE NO. 608164

CROSS SECTIONS

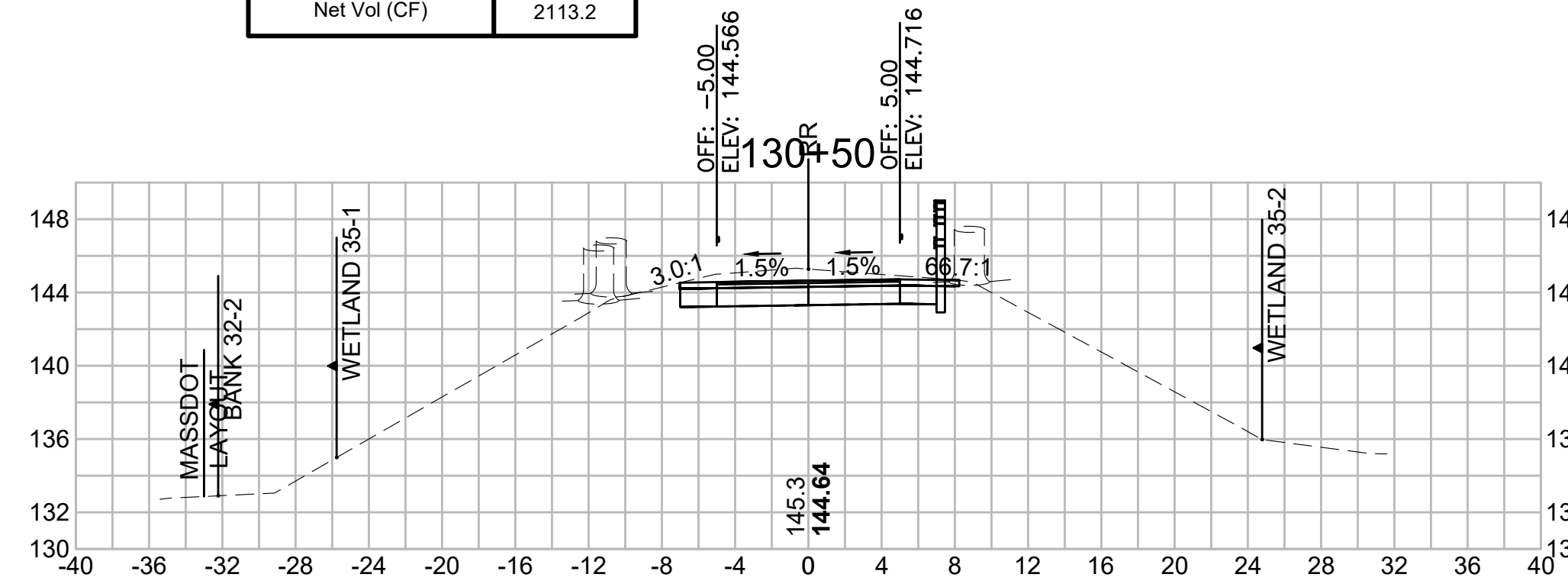
Total Volume at Station 129+00.00

Cut Area (SF)	22.380
Fill Area (SF)	0.000
Cut Vol (CF)	42.648
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2400.475
Cum Fill Vol (CF)	413.6
Net Vol (CF)	1986.8



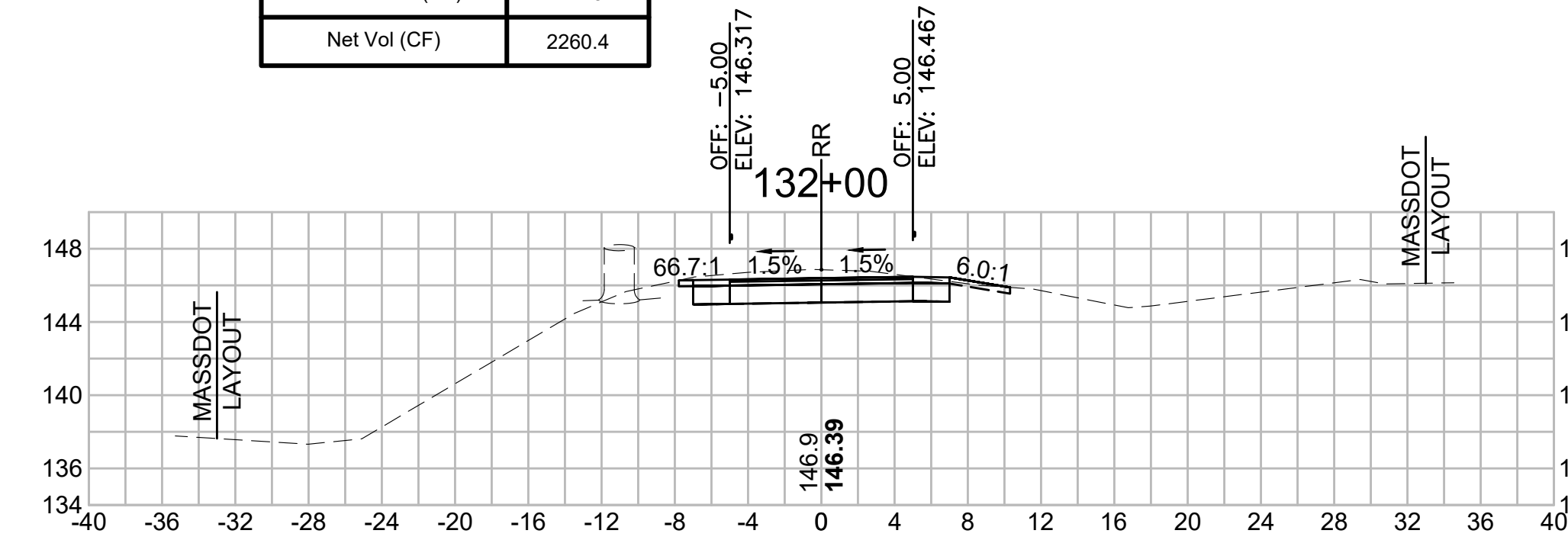
Total Volume at Station 130+50.00

Cut Area (SF)	24.889
Fill Area (SF)	0.000
Cut Vol (CF)	43.803
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	2527.523
Cum Fill Vol (CF)	414.3
Net Vol (CF)	2113.2



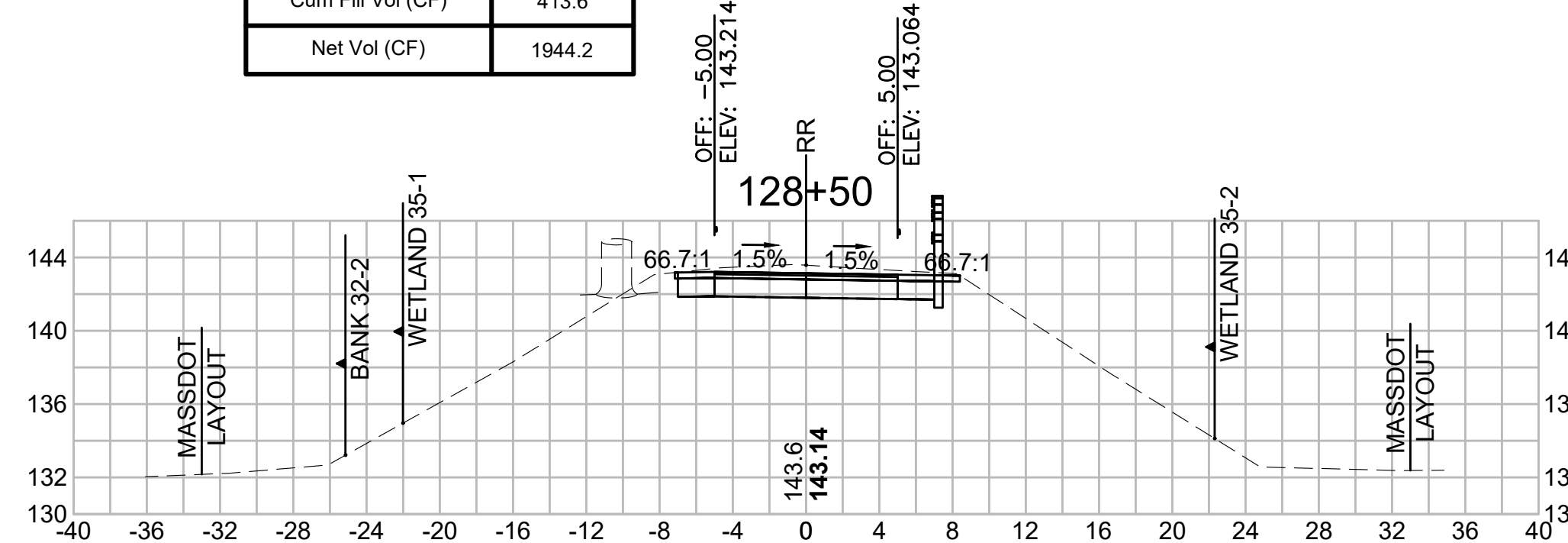
Total Volume at Station 132+00.00

Cut Area (SF)	23.474
Fill Area (SF)	0.000
Cut Vol (CF)	47.692
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2674.708
Cum Fill Vol (CF)	414.3
Net Vol (CF)	2260.4



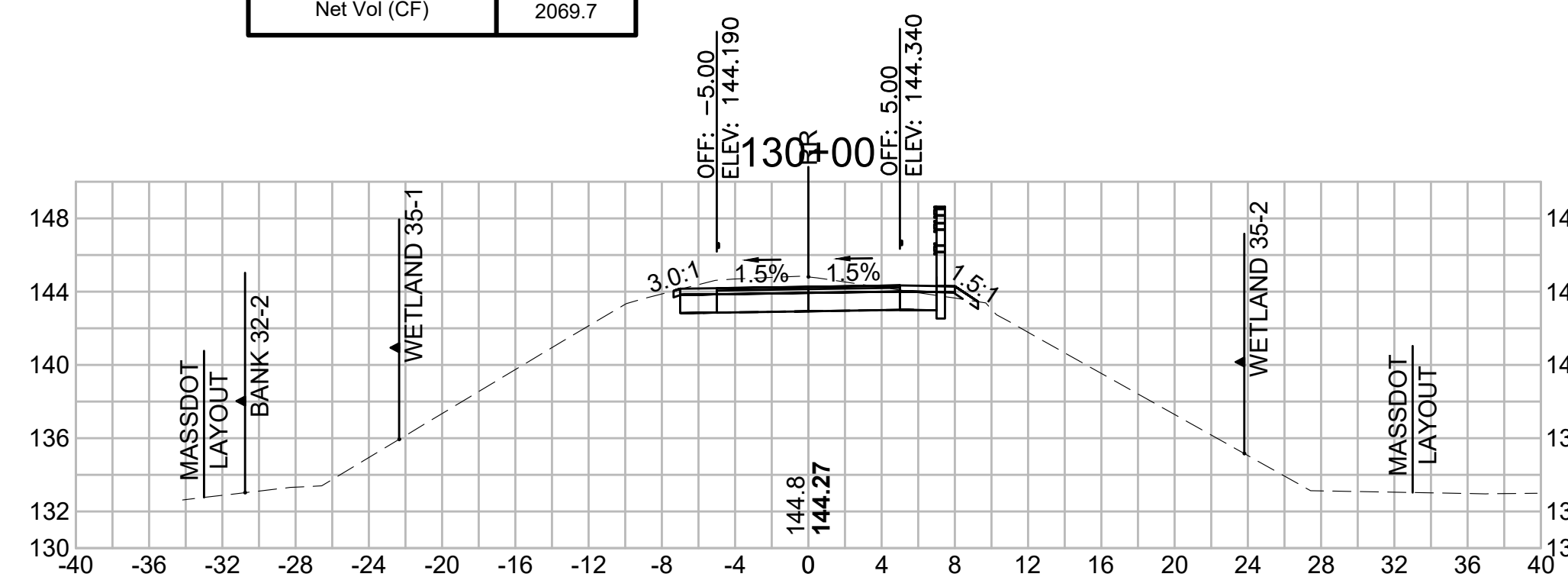
Total Volume at Station 128+50.00

Cut Area (SF)	23.679
Fill Area (SF)	0.000
Cut Vol (CF)	44.747
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2357.828
Cum Fill Vol (CF)	413.6
Net Vol (CF)	1944.2



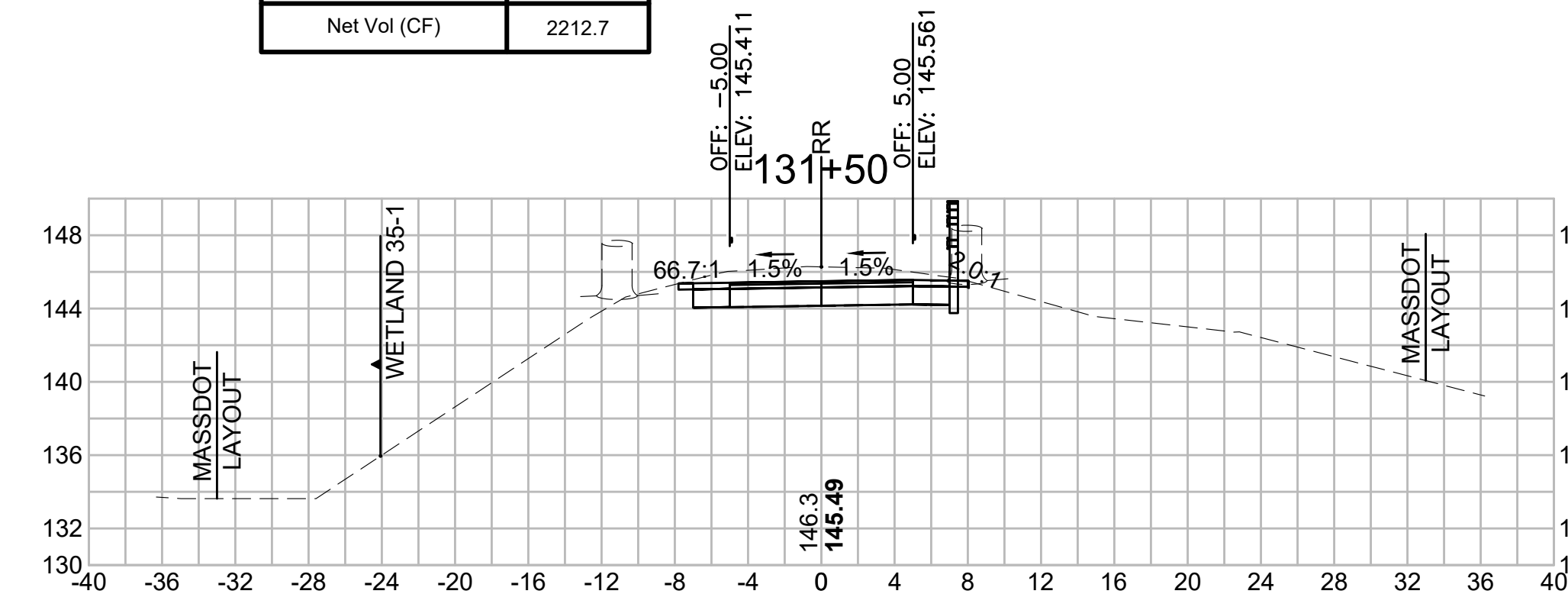
Total Volume at Station 130+00.00

Cut Area (SF)	22.418
Fill Area (SF)	0.307
Cut Vol (CF)	41.641
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	2483.721
Cum Fill Vol (CF)	414.0
Net Vol (CF)	2069.7



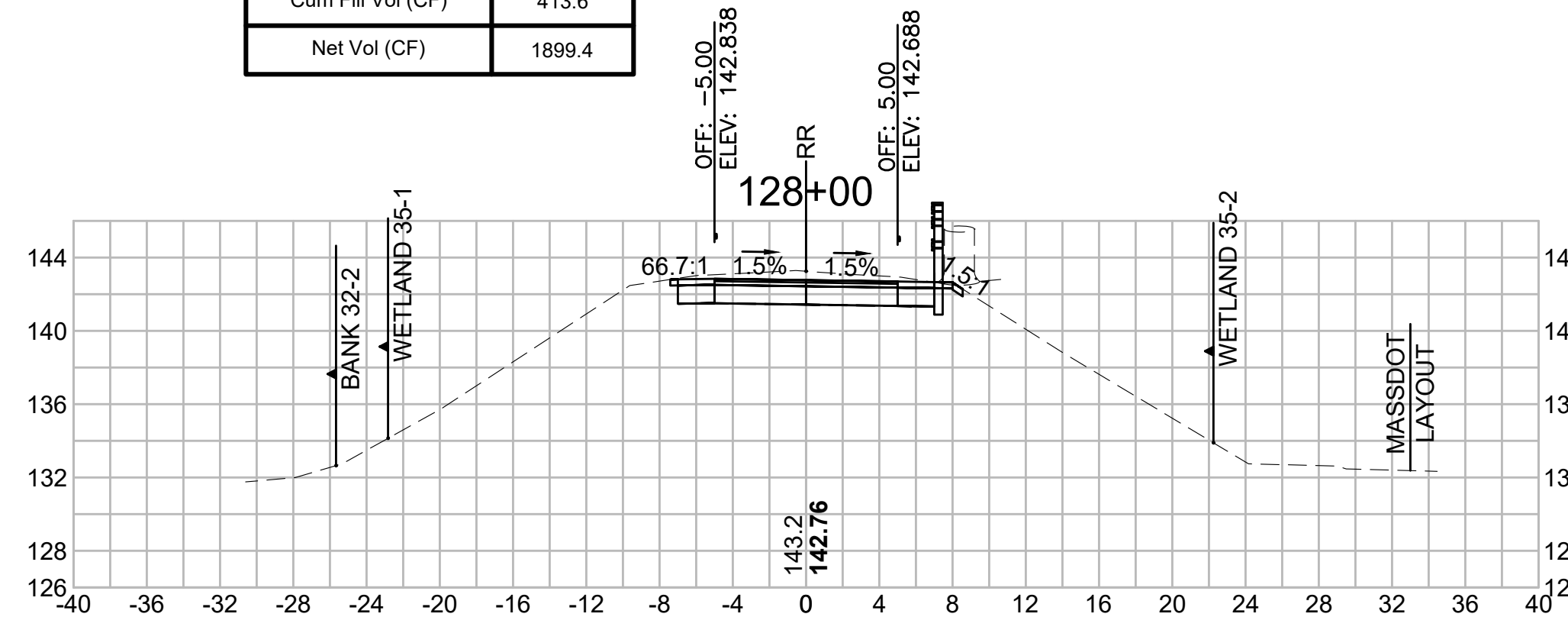
Total Volume at Station 131+50.00

Cut Area (SF)	28.033
Fill Area (SF)	0.000
Cut Vol (CF)	51.203
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2627.017
Cum Fill Vol (CF)	414.3
Net Vol (CF)	2212.7



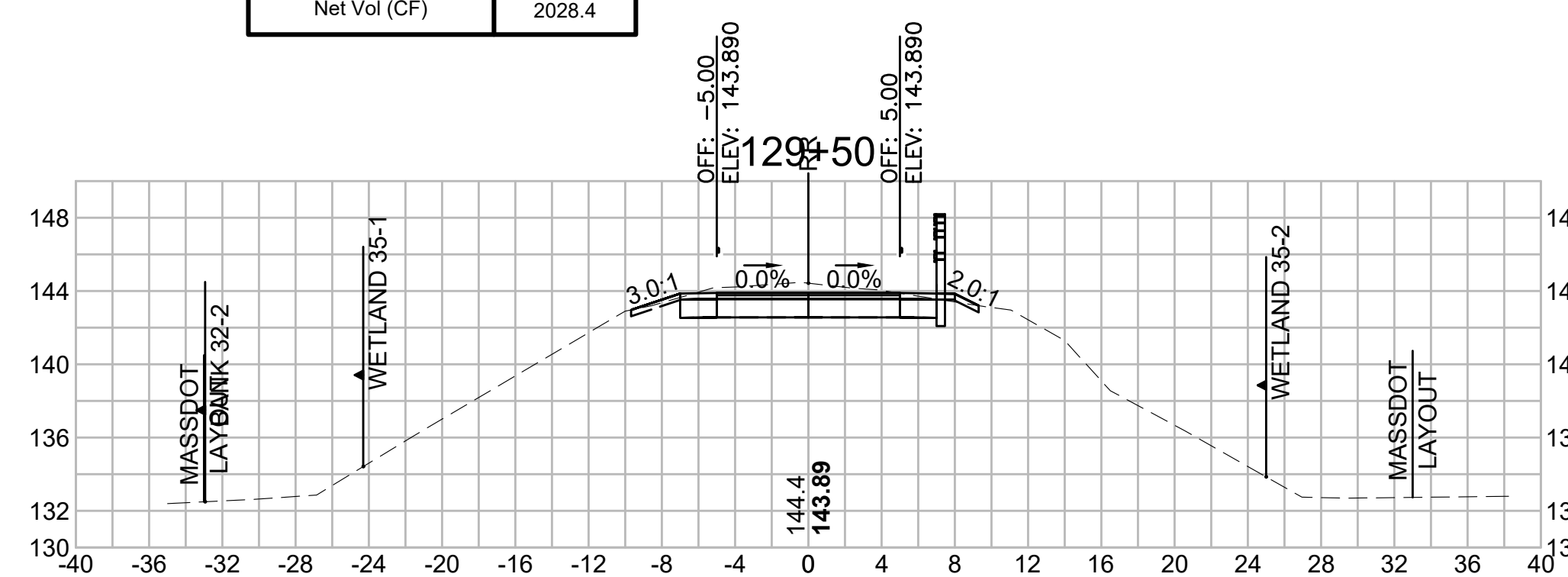
Total Volume at Station 128+00.00

Cut Area (SF)	24.647
Fill Area (SF)	0.000
Cut Vol (CF)	43.798
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2313.082
Cum Fill Vol (CF)	413.6
Net Vol (CF)	1899.4



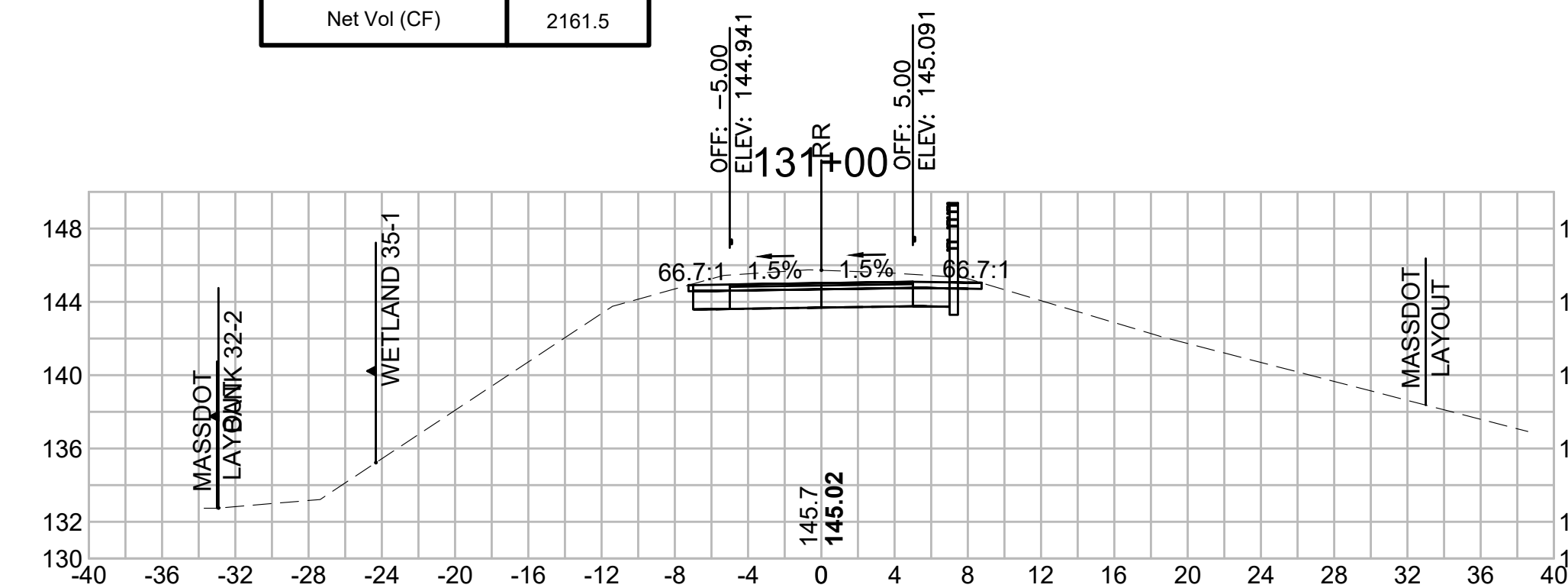
Total Volume at Station 129+50.00

Cut Area (SF)	22.554
Fill Area (SF)	0.046
Cut Vol (CF)	41.606
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2442.080
Cum Fill Vol (CF)	413.7
Net Vol (CF)	2028.4



Total Volume at Station 131+00.00

Cut Area (SF)	27.266
Fill Area (SF)	0.000
Cut Vol (CF)	48.292
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2575.814
Cum Fill Vol (CF)	414.3
Net Vol (CF)	2161.5



SUDBURY
BRUCE FREEMAN RAIL TRAIL

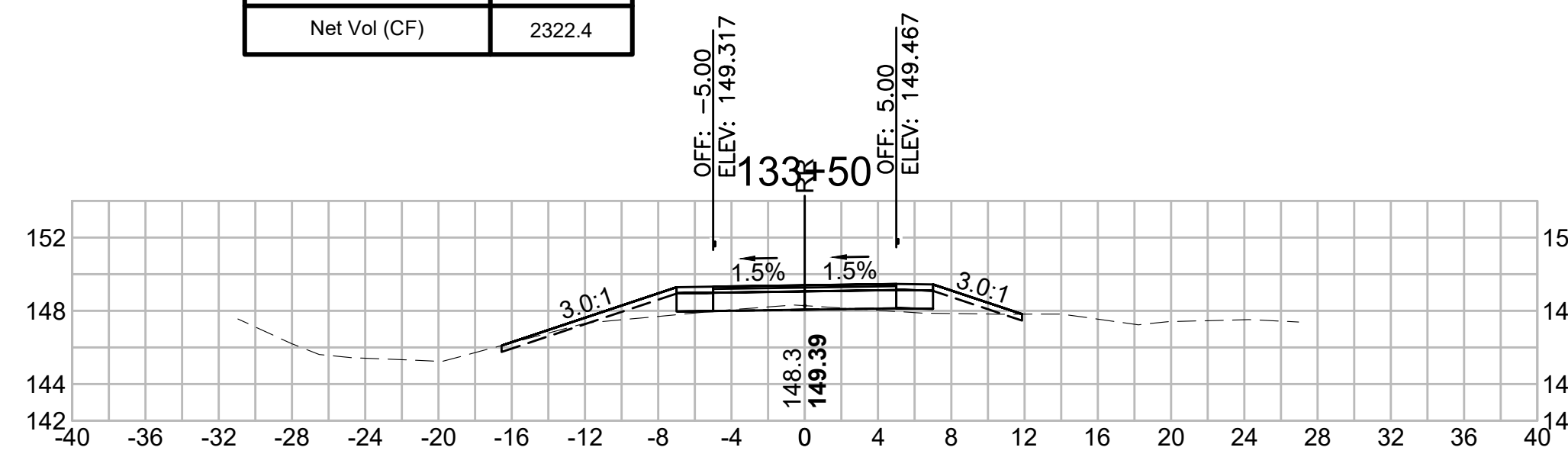
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	250	318

PROJECT FILE NO. 608164

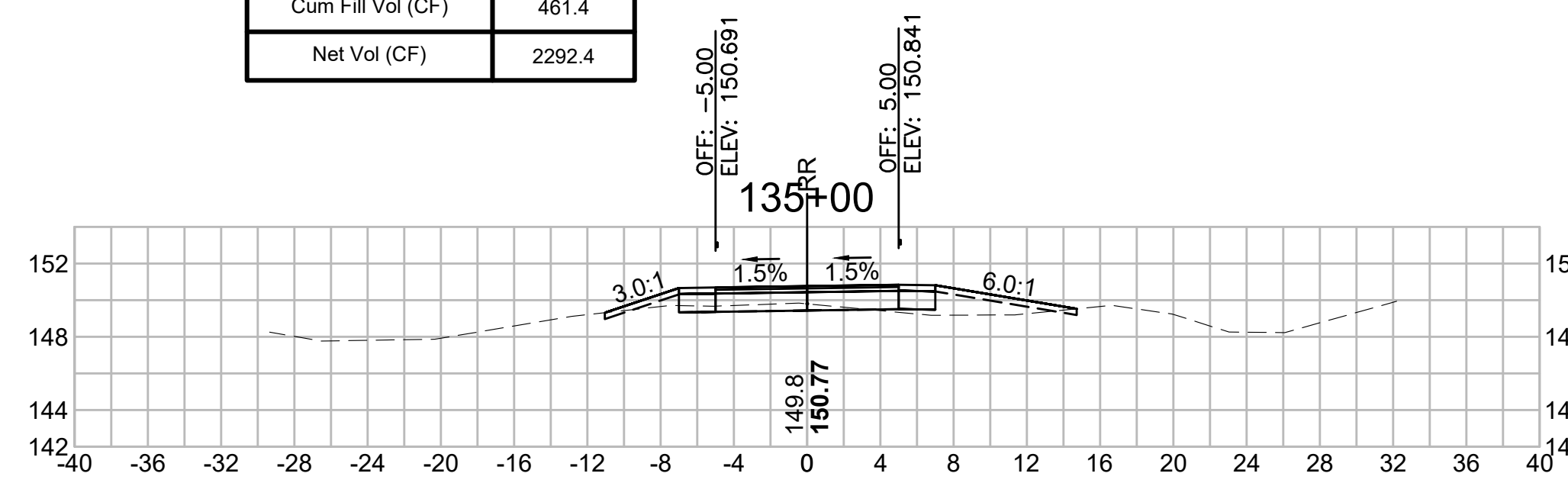
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

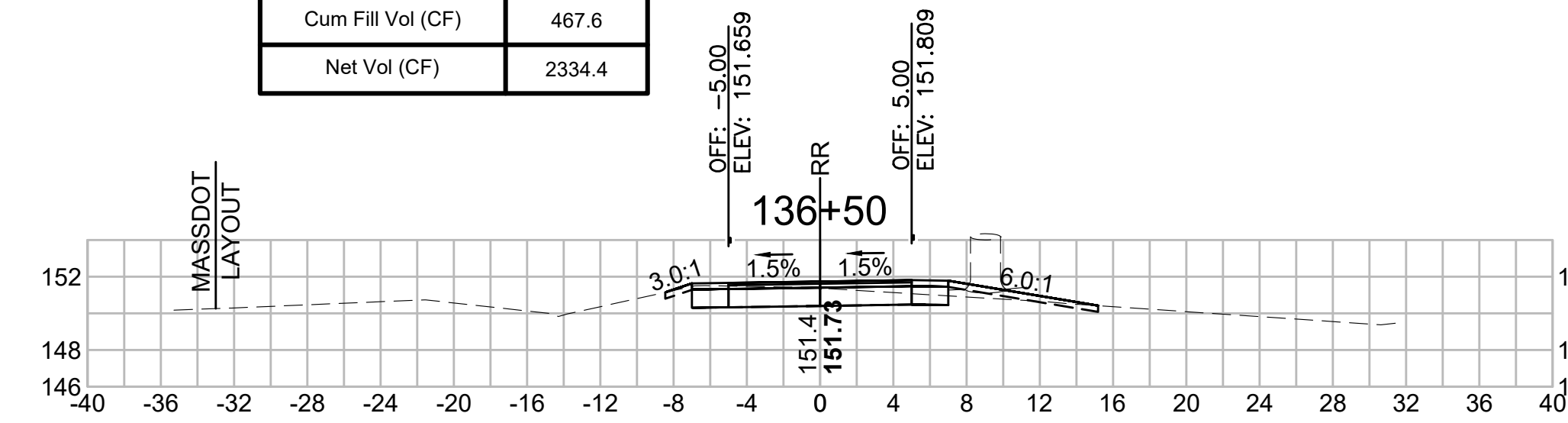
Total Volume at Station 133+50.00	
Cut Area (SF)	2.104
Fill Area (SF)	5.934
Cut Vol (CF)	10.399
Fill Vol (CF)	6.9
Cum Cut Vol (CF)	2745.316
Cum Fill Vol (CF)	423.0
Net Vol (CF)	2322.4



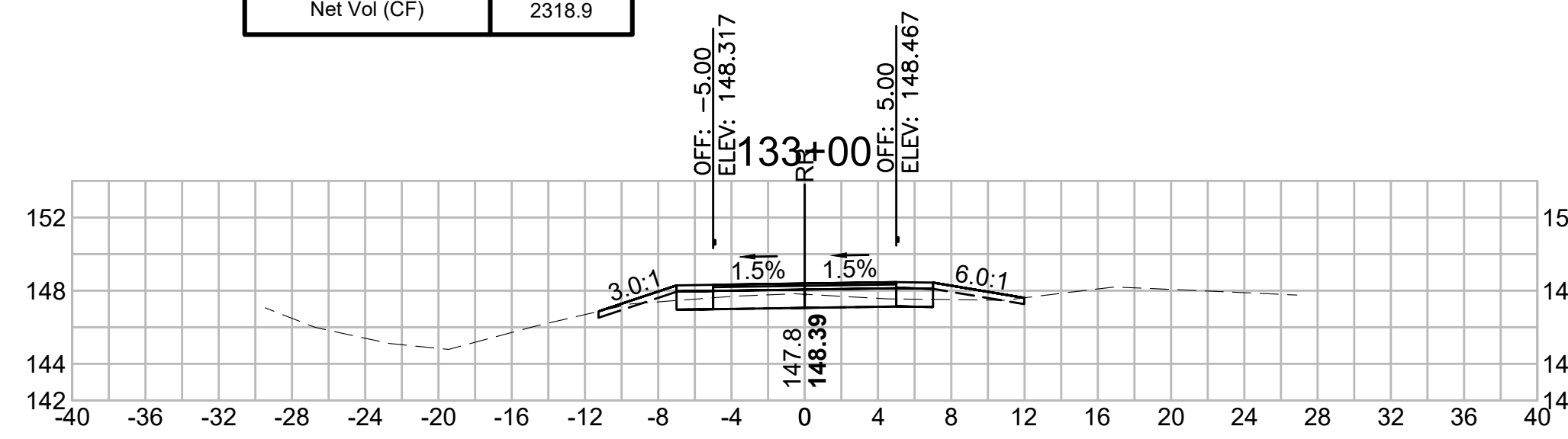
Total Volume at Station 135+00.00	
Cut Area (SF)	3.567
Fill Area (SF)	1.345
Cut Vol (CF)	4.610
Fill Vol (CF)	4.9
Cum Cut Vol (CF)	2753.845
Cum Fill Vol (CF)	461.4
Net Vol (CF)	2292.4



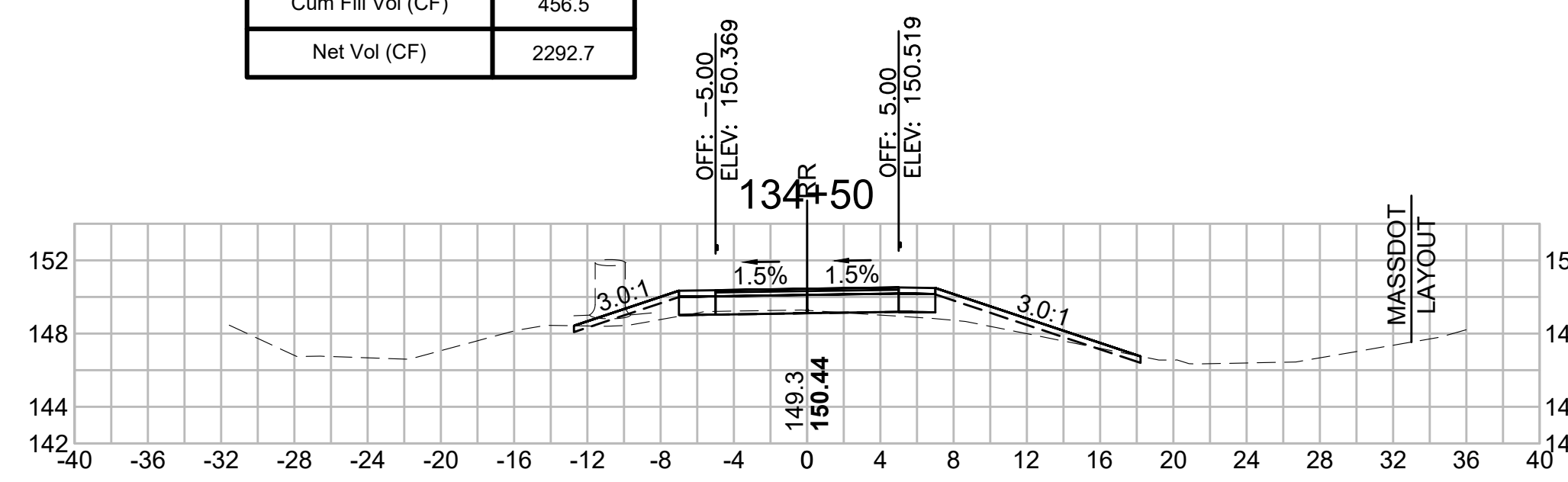
Total Volume at Station 136+50.00	
Cut Area (SF)	14.771
Fill Area (SF)	1.330
Cut Vol (CF)	22.076
Fill Vol (CF)	2.5
Cum Cut Vol (CF)	2801.990
Cum Fill Vol (CF)	467.6
Net Vol (CF)	2334.4



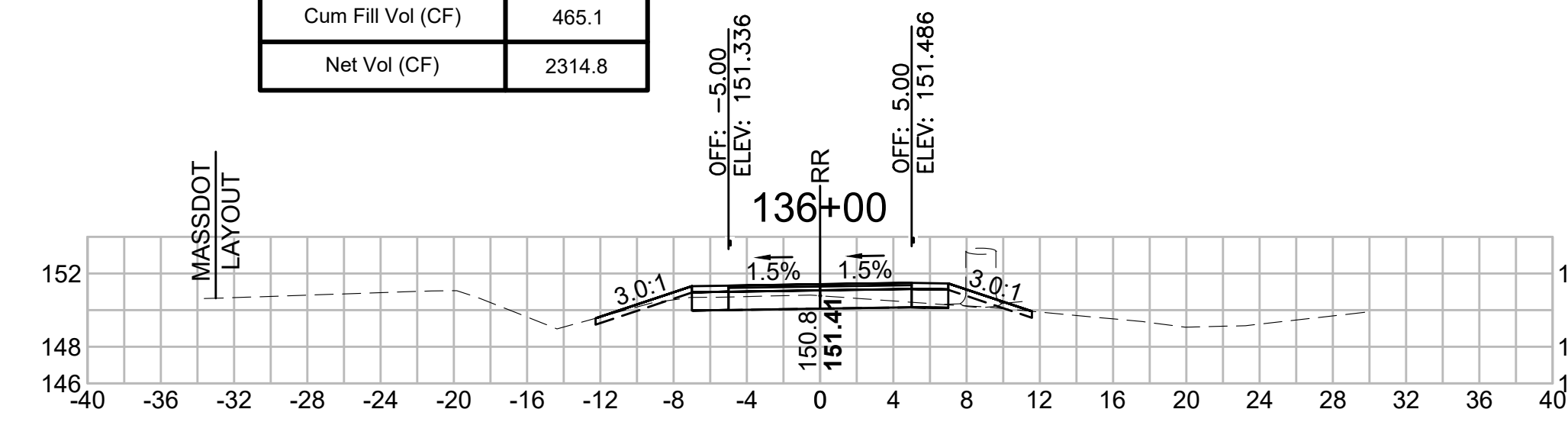
Total Volume at Station 133+00.00	
Cut Area (SF)	9.126
Fill Area (SF)	1.521
Cut Vol (CF)	23.463
Fill Vol (CF)	1.6
Cum Cut Vol (CF)	2734.918
Cum Fill Vol (CF)	416.1
Net Vol (CF)	2318.9



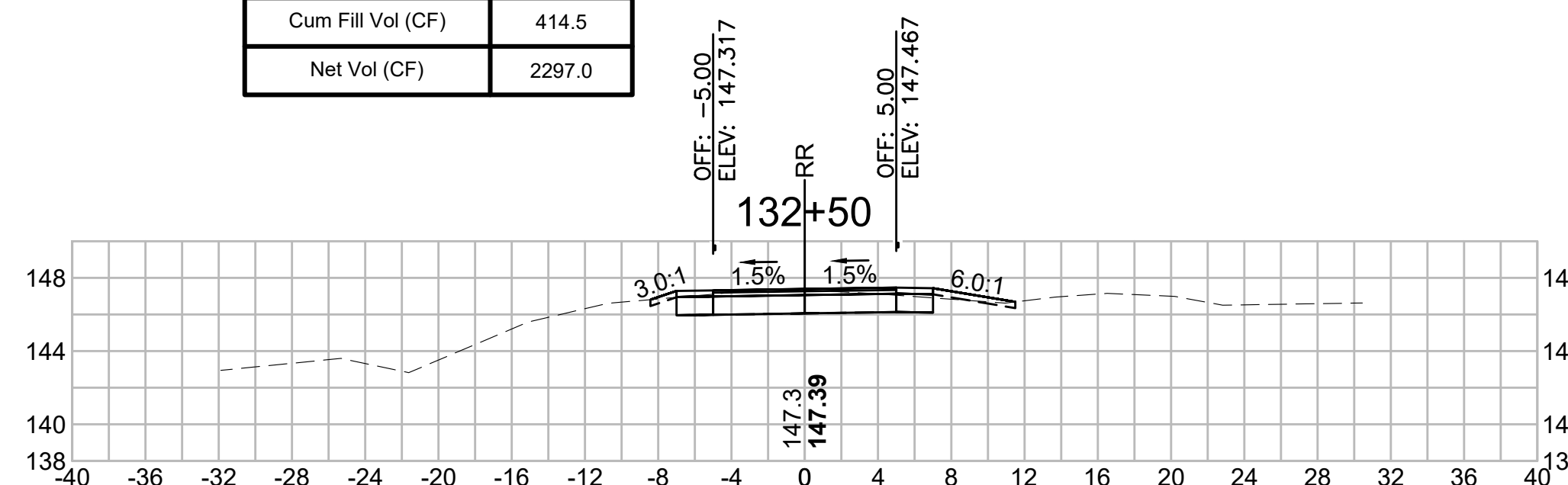
Total Volume at Station 134+50.00	
Cut Area (SF)	1.412
Fill Area (SF)	3.898
Cut Vol (CF)	1.639
Fill Vol (CF)	15.8
Cum Cut Vol (CF)	2749.235
Cum Fill Vol (CF)	456.5
Net Vol (CF)	2292.7



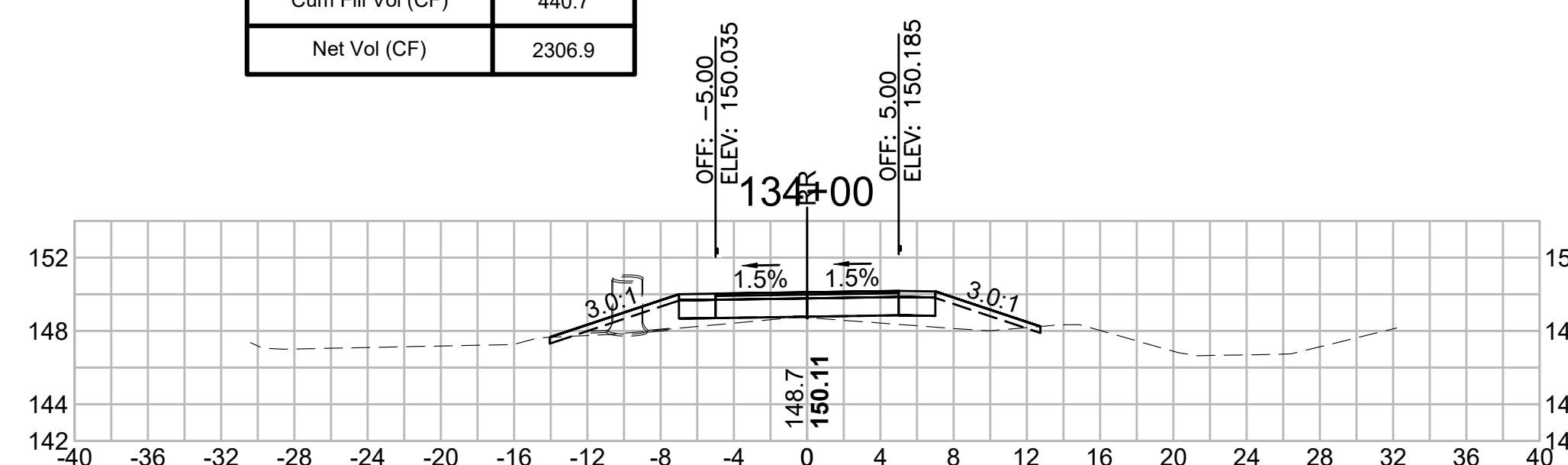
Total Volume at Station 136+00.00	
Cut Area (SF)	9.071
Fill Area (SF)	1.398
Cut Vol (CF)	15.584
Fill Vol (CF)	1.9
Cum Cut Vol (CF)	2779.915
Cum Fill Vol (CF)	465.1
Net Vol (CF)	2314.8



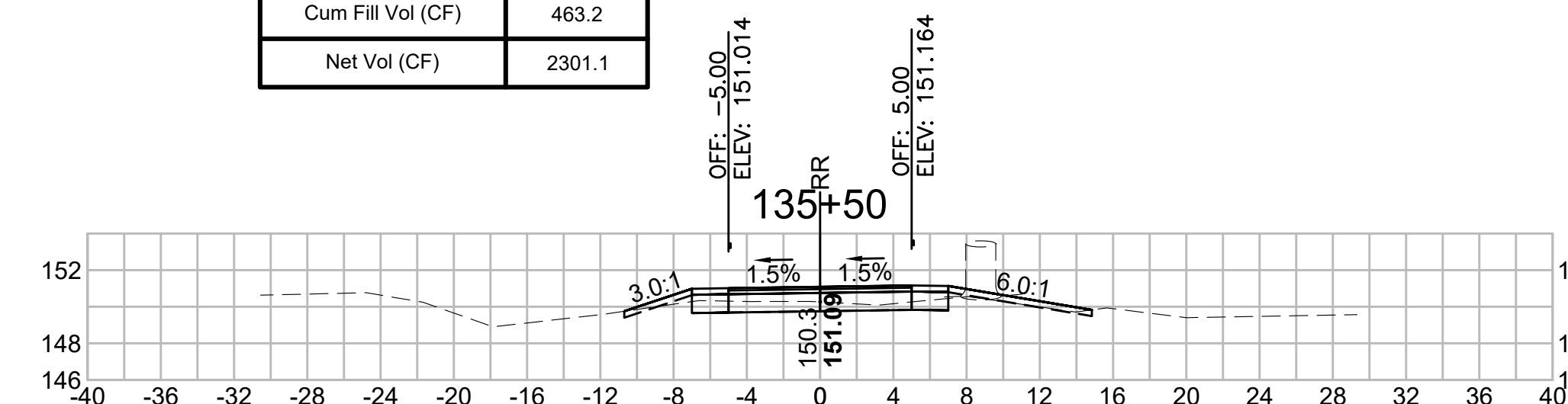
Total Volume at Station 132+50.00	
Cut Area (SF)	16.213
Fill Area (SF)	0.195
Cut Vol (CF)	36.748
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	2711.455
Cum Fill Vol (CF)	414.5
Net Vol (CF)	2297.0



Total Volume at Station 134+00.00	
Cut Area (SF)	0.358
Fill Area (SF)	13.218
Cut Vol (CF)	2.281
Fill Vol (CF)	17.7
Cum Cut Vol (CF)	2747.596
Cum Fill Vol (CF)	440.7
Net Vol (CF)	2306.9



Total Volume at Station 135+50.00	
Cut Area (SF)	7.759
Fill Area (SF)	0.630
Cut Vol (CF)	10.488
Fill Vol (CF)	1.8
Cum Cut Vol (CF)	2764.332
Cum Fill Vol (CF)	463.2
Net Vol (CF)	2301.1



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	251	318

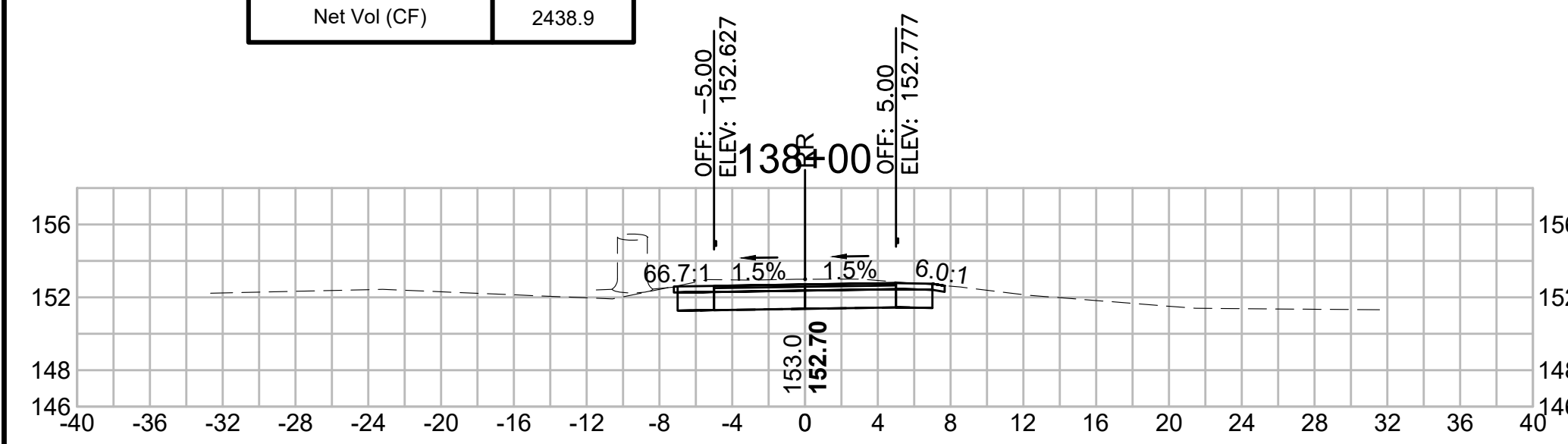
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

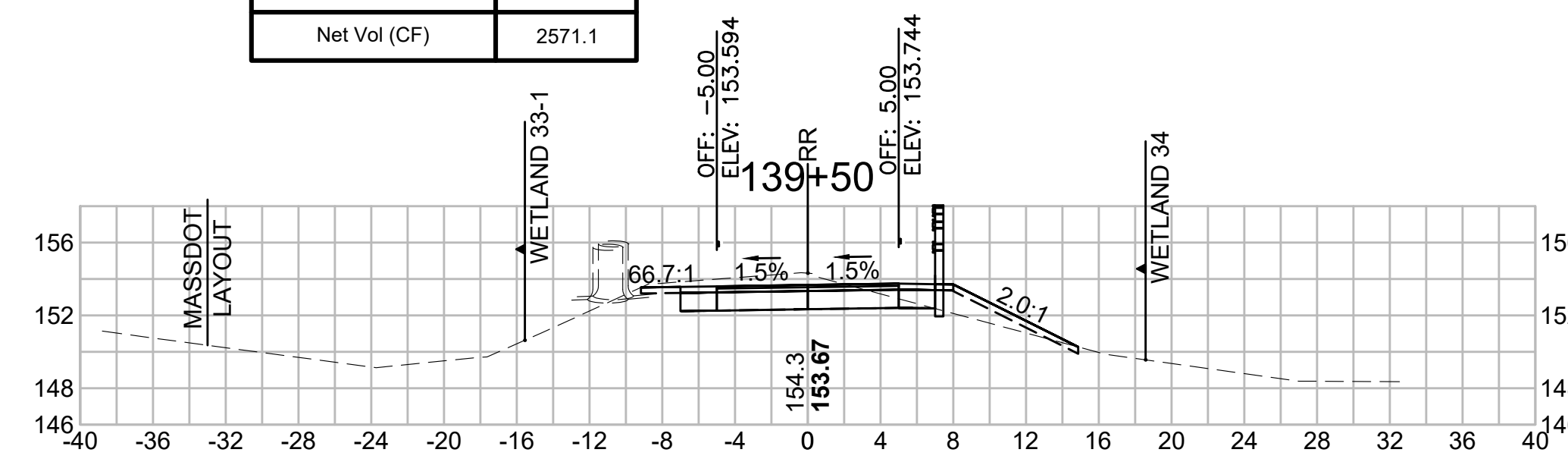
Total Volume at Station 138+00.00

Cut Area (SF)	22.037
Fill Area (SF)	0.000
Cut Vol (CF)	39.805
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2908.449
Cum Fill Vol (CF)	469.5
Net Vol (CF)	2438.9



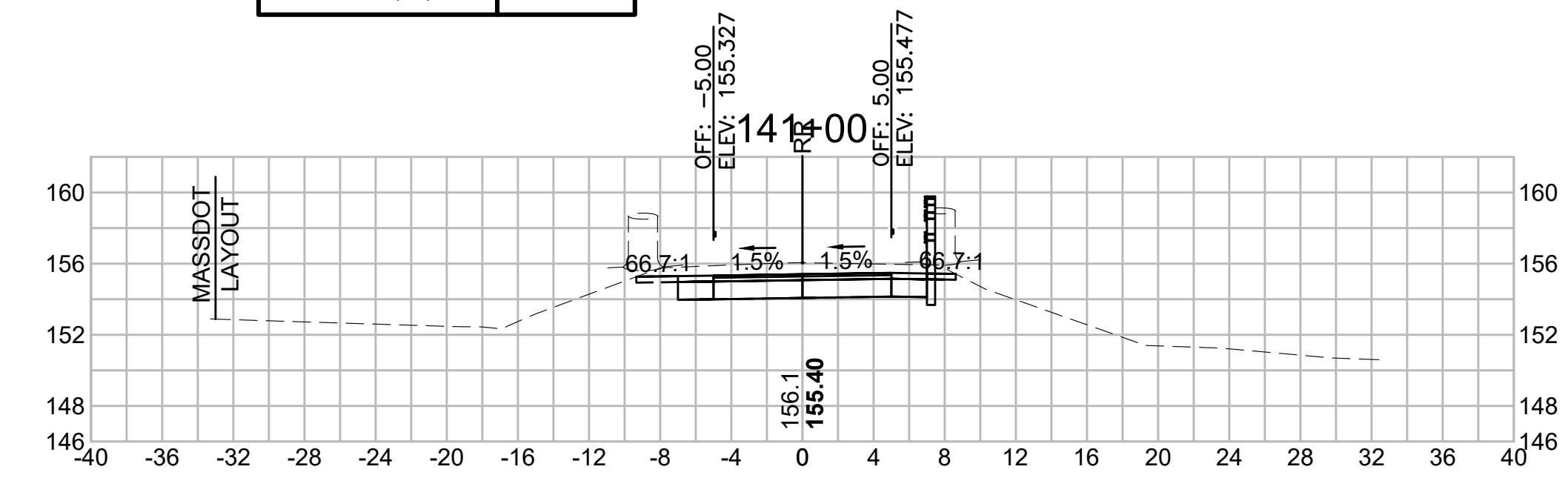
Total Volume at Station 139+50.00

Cut Area (SF)	20.757
Fill Area (SF)	4.368
Cut Vol (CF)	44.769
Fill Vol (CF)	4.0
Cum Cut Vol (CF)	3044.683
Cum Fill Vol (CF)	473.6
Net Vol (CF)	2571.1



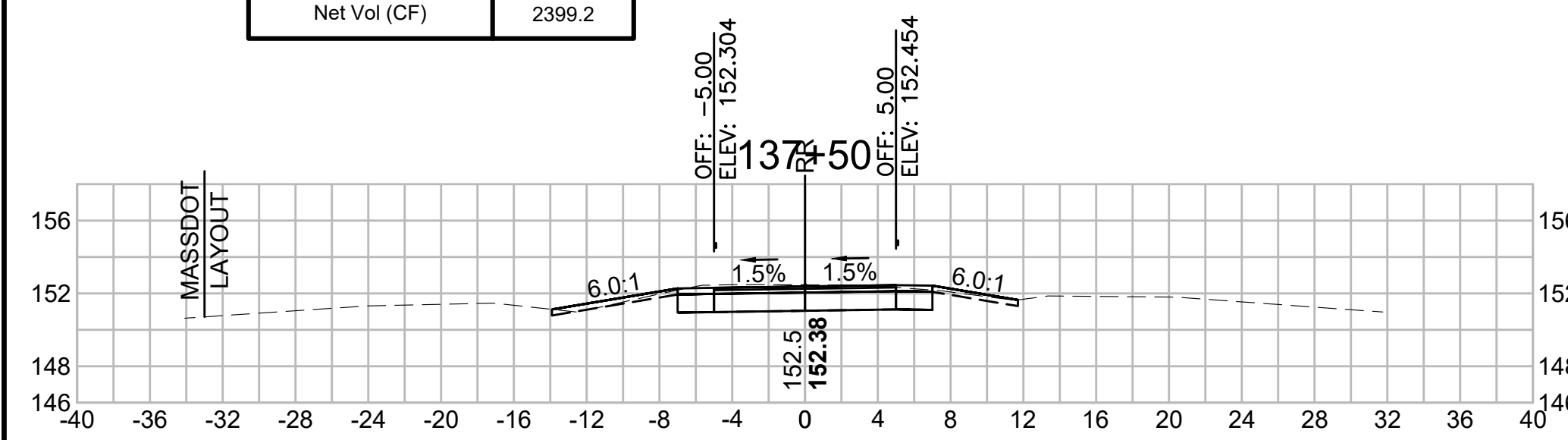
Total Volume at Station 141+00.00

Cut Area (SF)	29.263
Fill Area (SF)	0.000
Cut Vol (CF)	58.810
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	3209.736
Cum Fill Vol (CF)	478.9
Net Vol (CF)	2730.9



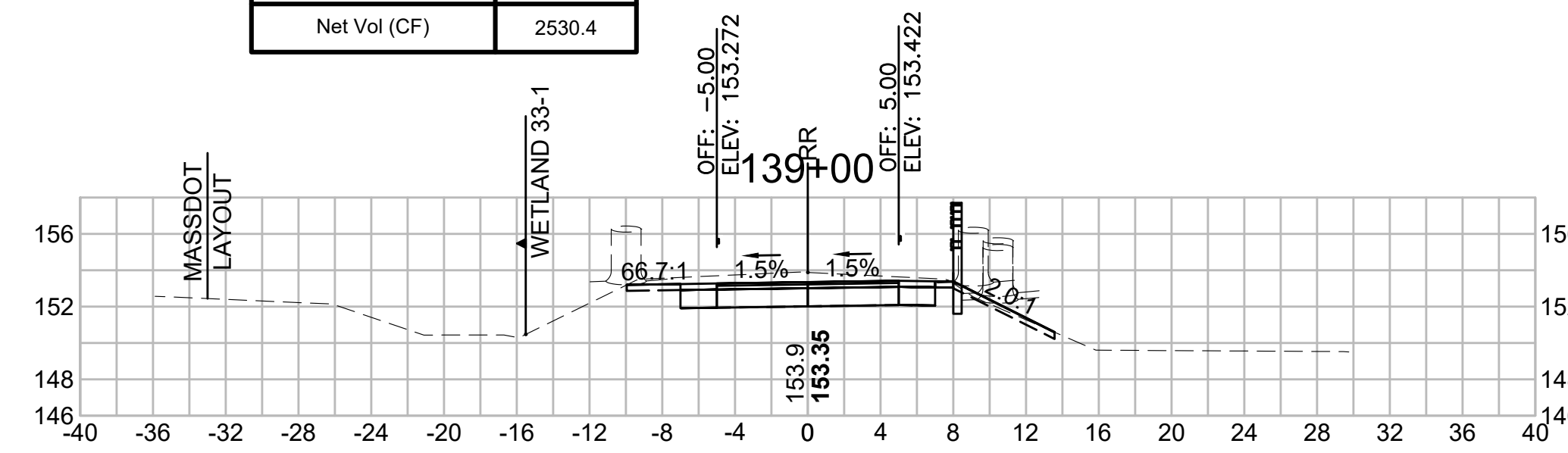
Total Volume at Station 137+50.00

Cut Area (SF)	20.952
Fill Area (SF)	0.033
Cut Vol (CF)	36.189
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	2868.644
Cum Fill Vol (CF)	469.5
Net Vol (CF)	2399.2



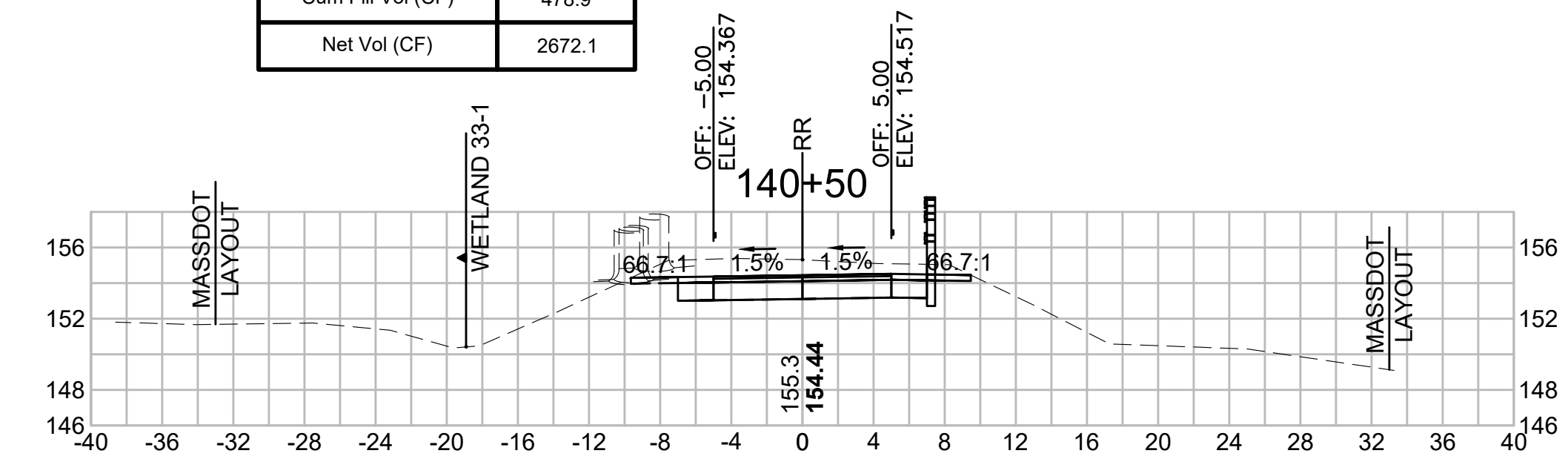
Total Volume at Station 139+00.00

Cut Area (SF)	27.593
Fill Area (SF)	0.000
Cut Vol (CF)	48.306
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2999.915
Cum Fill Vol (CF)	469.5
Net Vol (CF)	2530.4



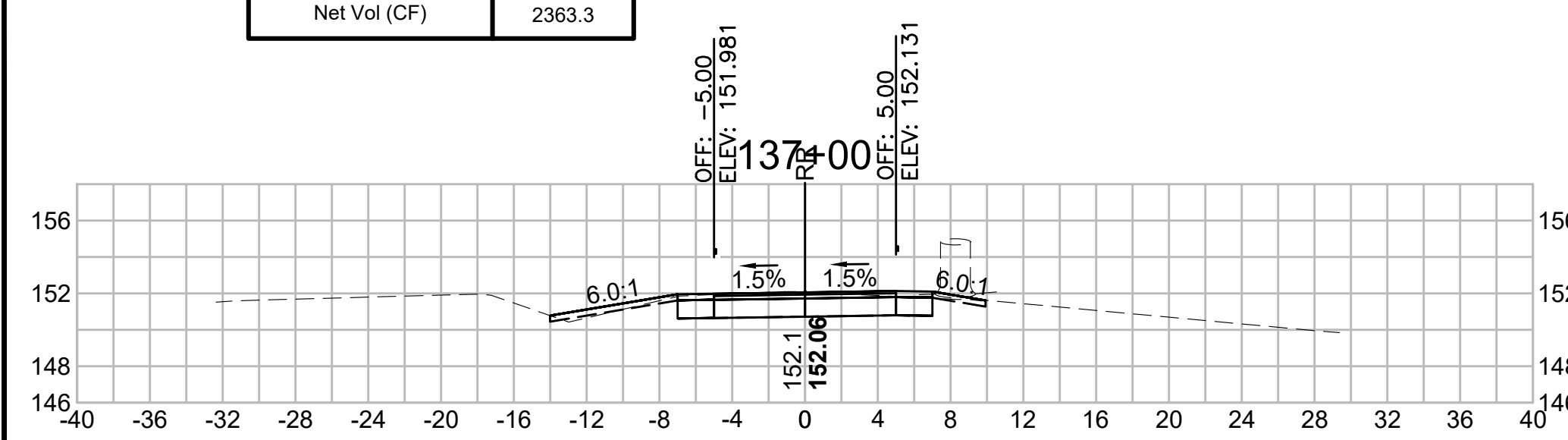
Total Volume at Station 140+50.00

Cut Area (SF)	34.252
Fill Area (SF)	0.000
Cut Vol (CF)	59.369
Fill Vol (CF)	0.6
Cum Cut Vol (CF)	3150.926
Cum Fill Vol (CF)	478.9
Net Vol (CF)	2672.1



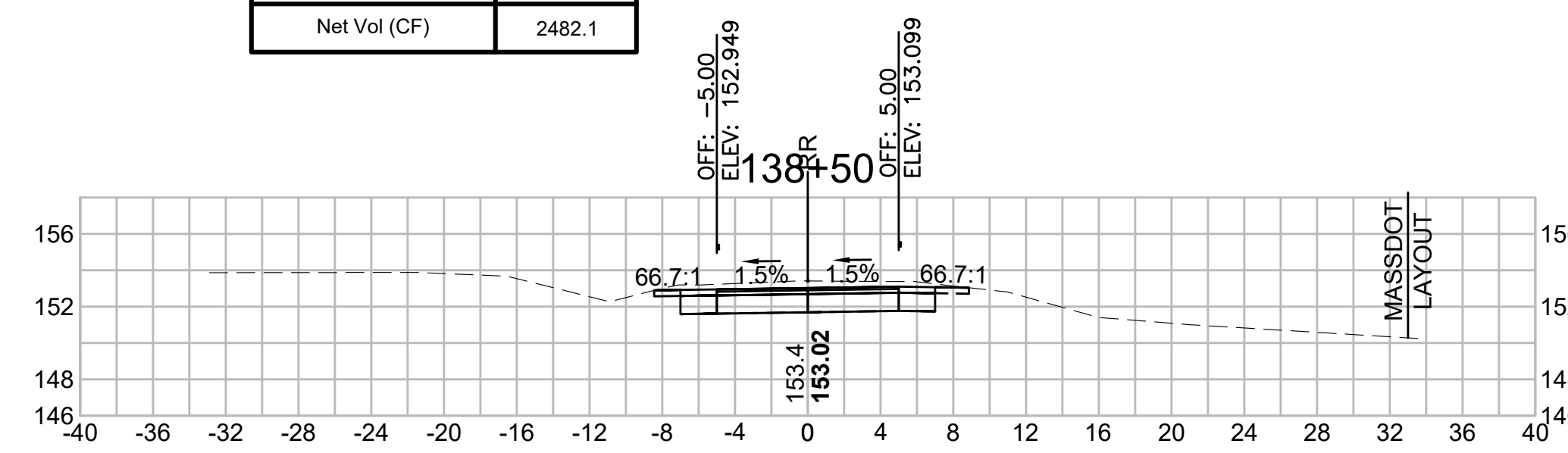
Total Volume at Station 137+00.00

Cut Area (SF)	18.132
Fill Area (SF)	0.314
Cut Vol (CF)	30.466
Fill Vol (CF)	1.5
Cum Cut Vol (CF)	2832.456
Cum Fill Vol (CF)	469.2
Net Vol (CF)	2363.3



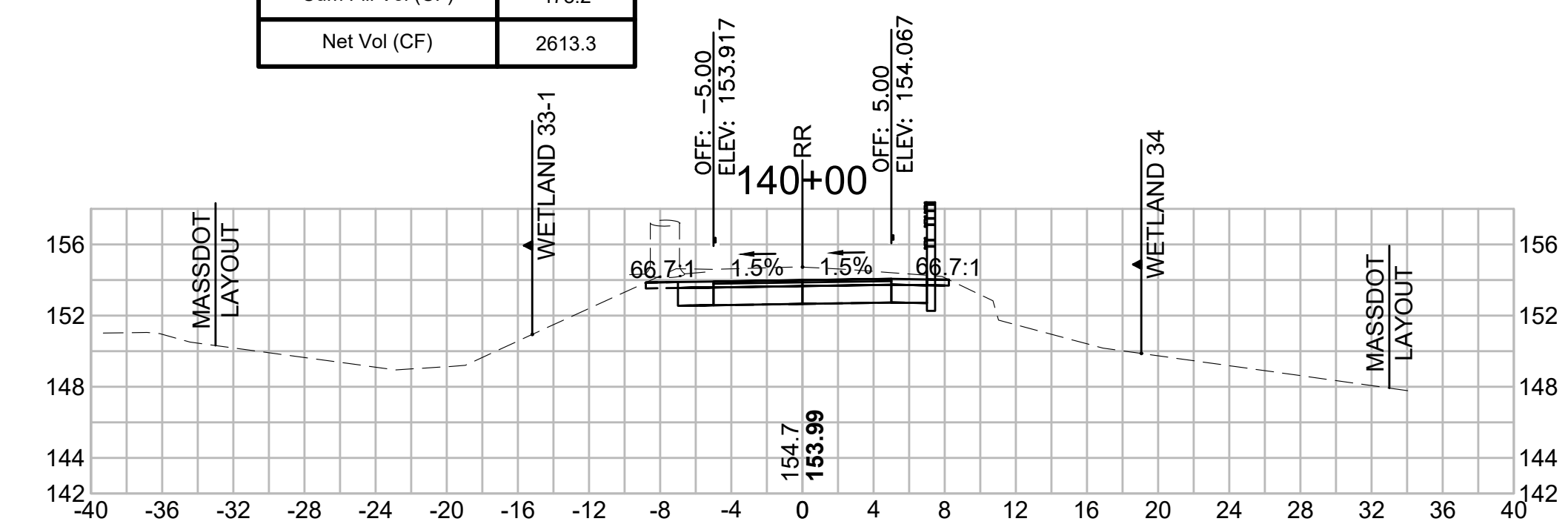
Total Volume at Station 138+50.00

Cut Area (SF)	24.577
Fill Area (SF)	0.000
Cut Vol (CF)	43.162
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	2951.610
Cum Fill Vol (CF)	469.5
Net Vol (CF)	2482.1



Total Volume at Station 140+00.00

Cut Area (SF)	29.866
Fill Area (SF)	0.685
Cut Vol (CF)	46.874
Fill Vol (CF)	4.7
Cum Cut Vol (CF)	3091.557
Cum Fill Vol (CF)	478.2
Net Vol (CF)	2613.3



SUDBURY
BRUCE FREEMAN RAIL TRAIL

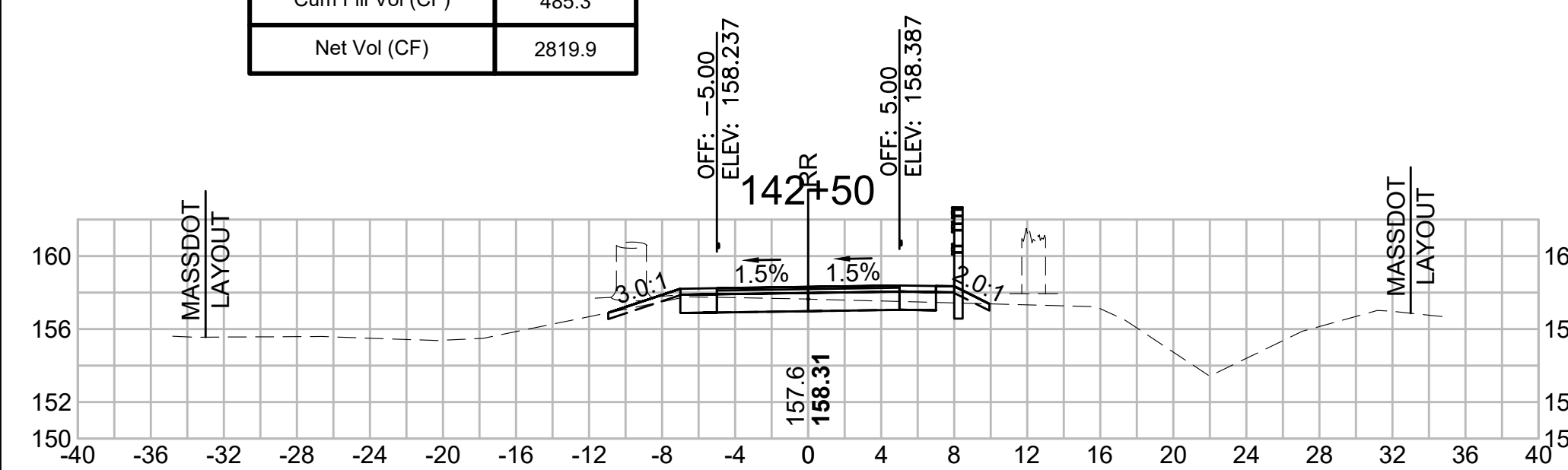
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	252	318

PROJECT FILE NO. 608164

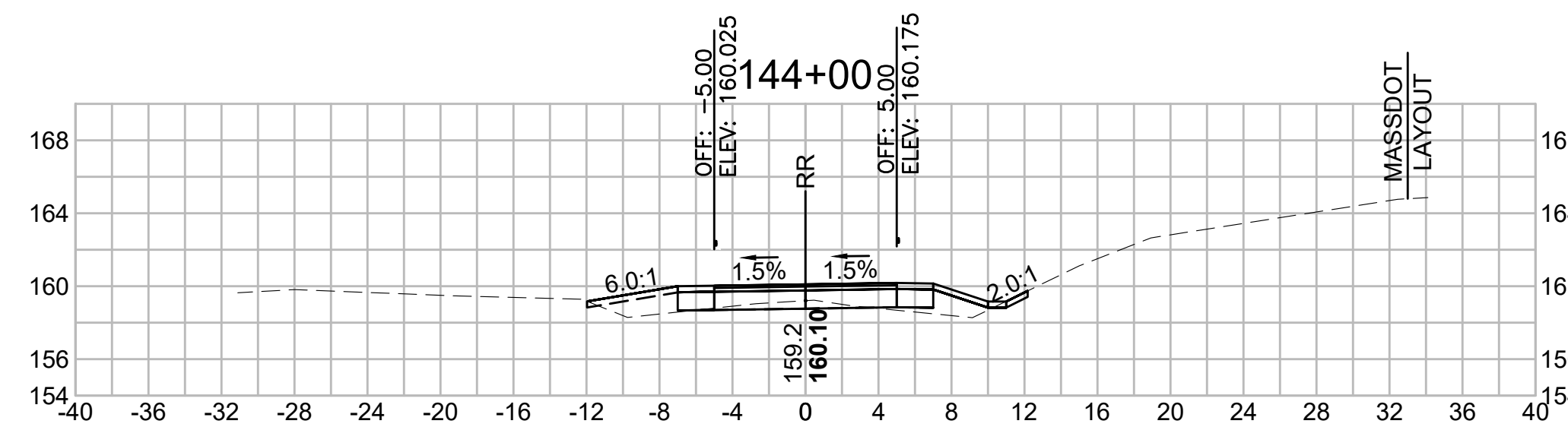
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

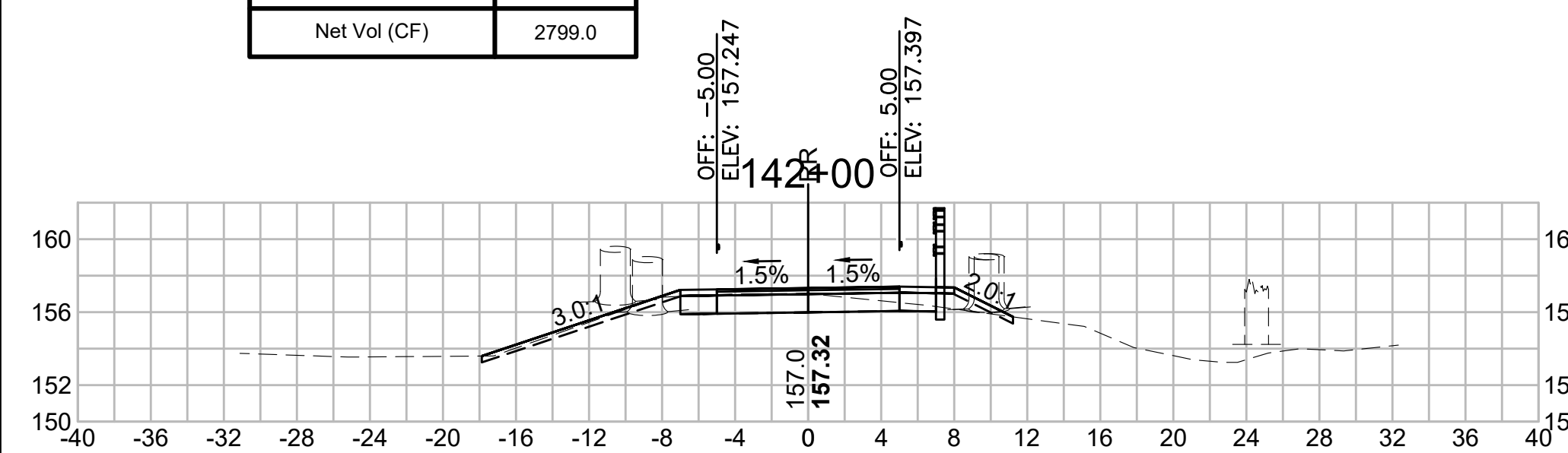
Total Volume at Station 142+50.00	
Cut Area (SF)	10.988
Fill Area (SF)	0.988
Cut Vol (CF)	23.427
Fill Vol (CF)	2.5
Cum Cut Vol (CF)	3305.223
Cum Fill Vol (CF)	485.3
Net Vol (CF)	2819.9



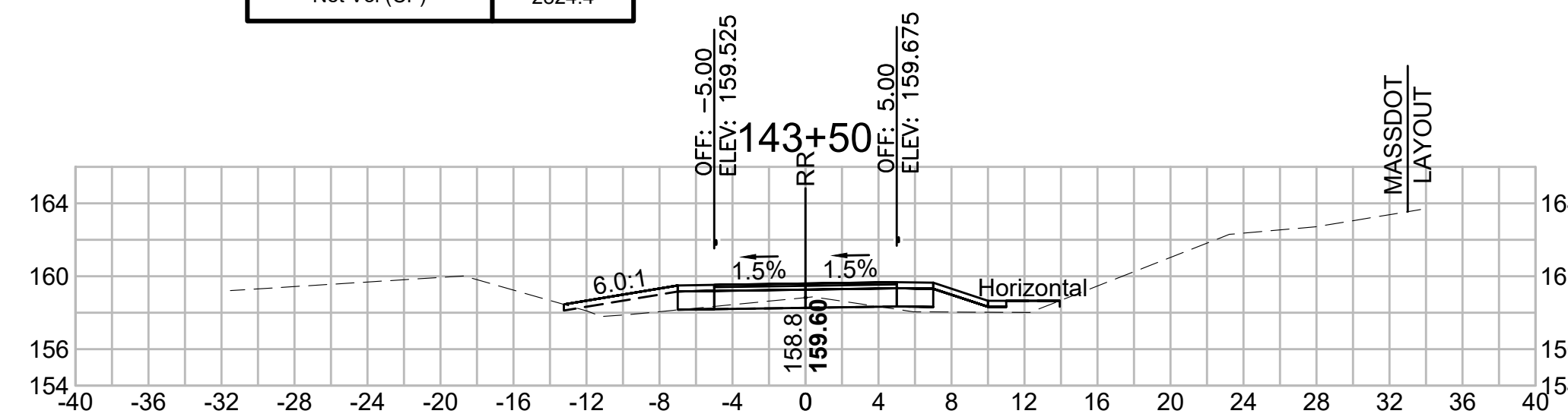
Total Volume at Station 144+00.00	
Cut Area (SF)	3.375
Fill Area (SF)	6.893
Cut Vol (CF)	6.235
Fill Vol (CF)	14.3
Cum Cut Vol (CF)	3324.741
Cum Fill Vol (CF)	508.5
Net Vol (CF)	2816.2



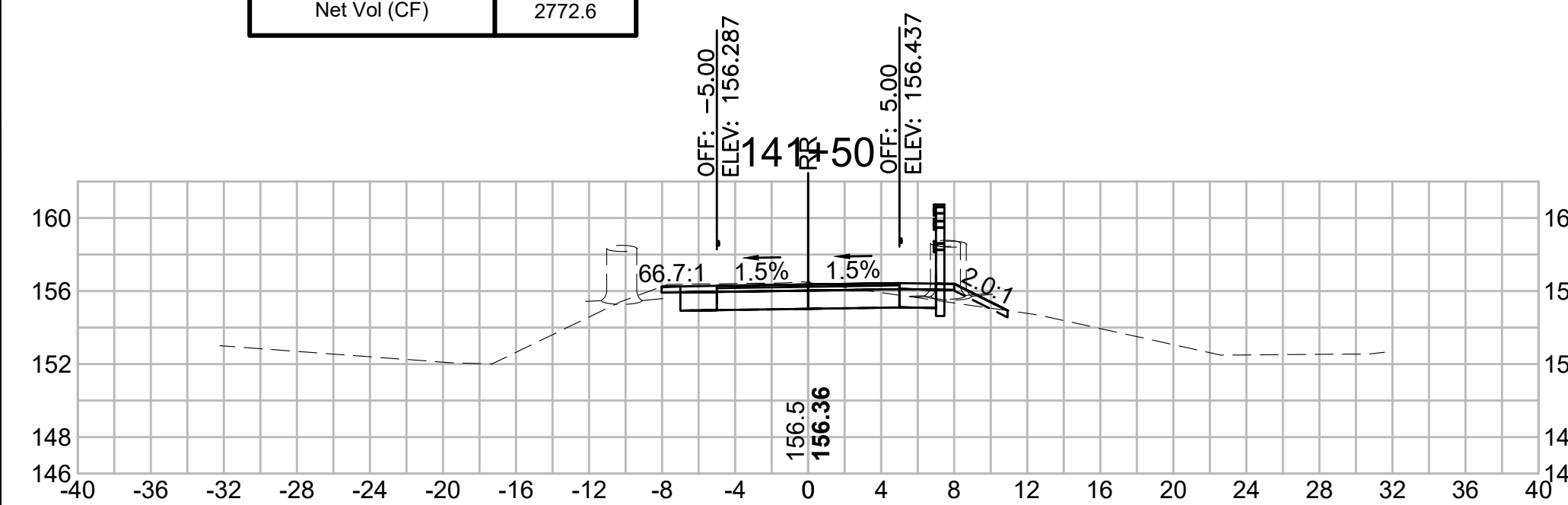
Total Volume at Station 142+00.00	
Cut Area (SF)	14.314
Fill Area (SF)	1.685
Cut Vol (CF)	29.110
Fill Vol (CF)	2.8
Cum Cut Vol (CF)	3281.796
Cum Fill Vol (CF)	482.8
Net Vol (CF)	2799.0



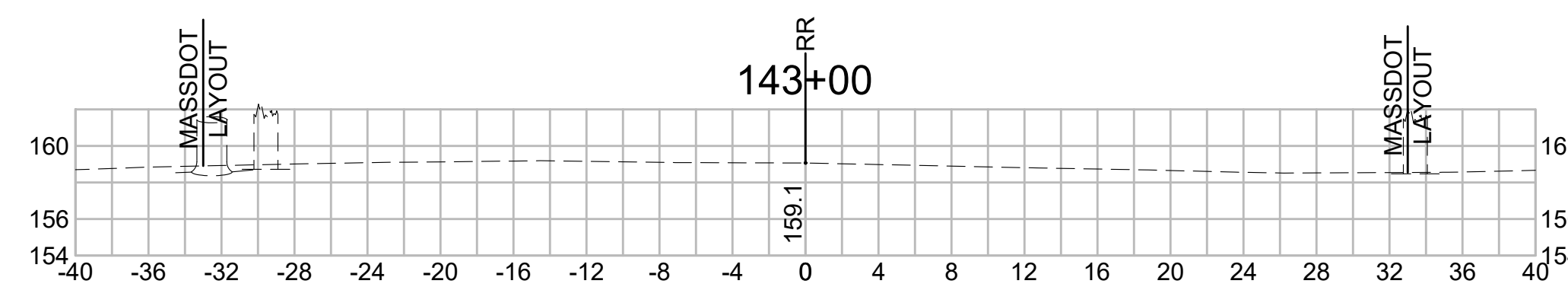
Total Volume at Station 143+50.00	
Cut Area (SF)	3.358
Fill Area (SF)	8.592
Cut Vol (CF)	3.110
Fill Vol (CF)	8.0
Cum Cut Vol (CF)	3318.506
Cum Fill Vol (CF)	494.2
Net Vol (CF)	2824.4



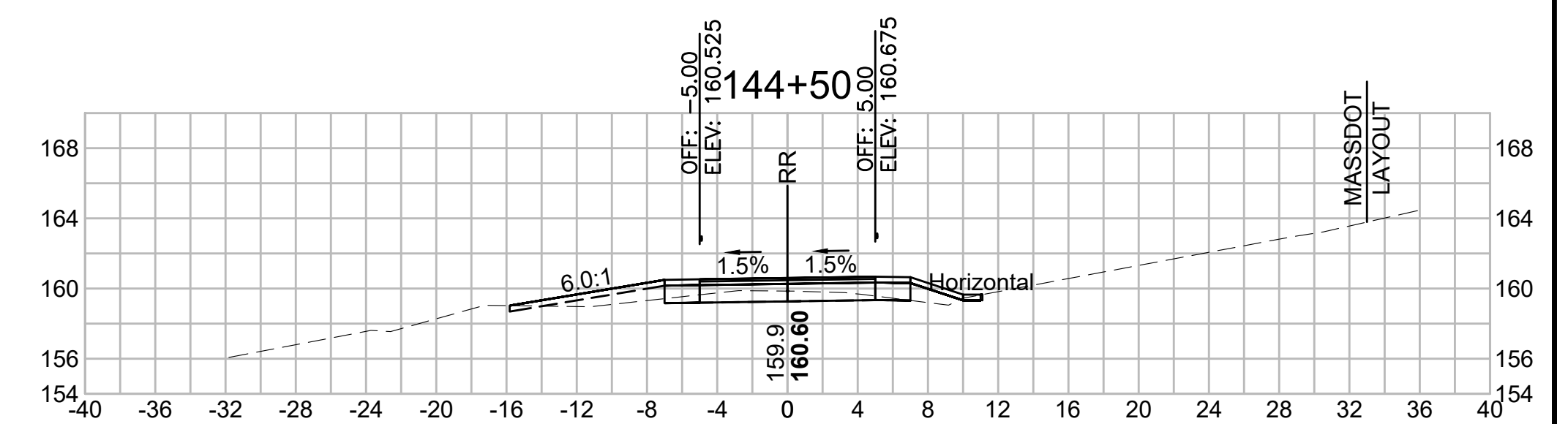
Total Volume at Station 141+50.00	
Cut Area (SF)	17.124
Fill Area (SF)	1.289
Cut Vol (CF)	42.951
Fill Vol (CF)	1.2
Cum Cut Vol (CF)	3252.687
Cum Fill Vol (CF)	480.1
Net Vol (CF)	2772.6



Total Volume at Station 143+00.00	
Cut Area (SF)	0.000
Fill Area (SF)	0.000
Cut Vol (CF)	10.174
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	3315.397
Cum Fill Vol (CF)	486.2
Net Vol (CF)	2829.2



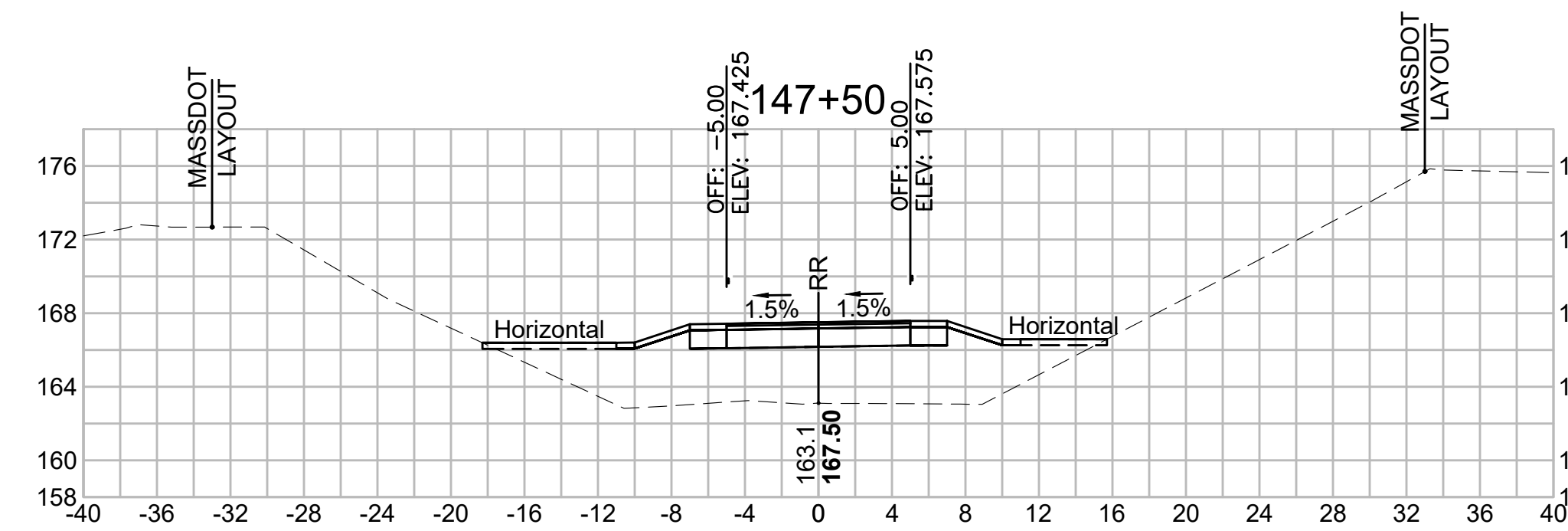
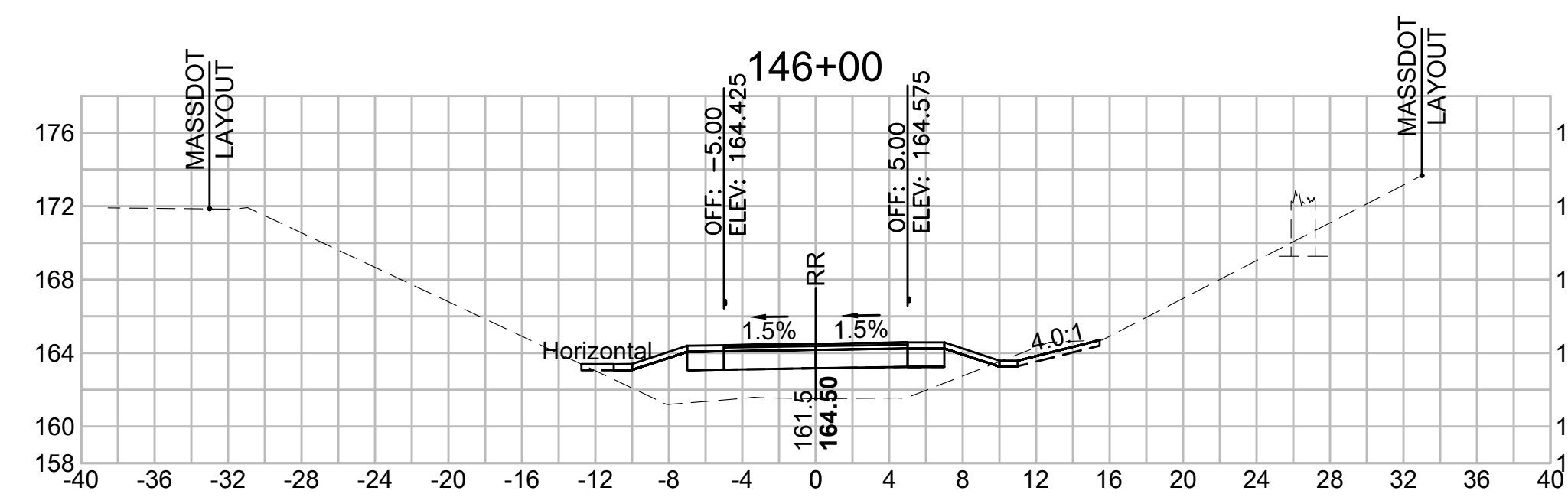
Total Volume at Station 144+50.00	
Cut Area (SF)	6.921
Fill Area (SF)	5.126
Cut Vol (CF)	9.534
Fill Vol (CF)	11.1
Cum Cut Vol (CF)	3334.275
Cum Fill Vol (CF)	519.6
Net Vol (CF)	2814.7



CROSS SECTIONS

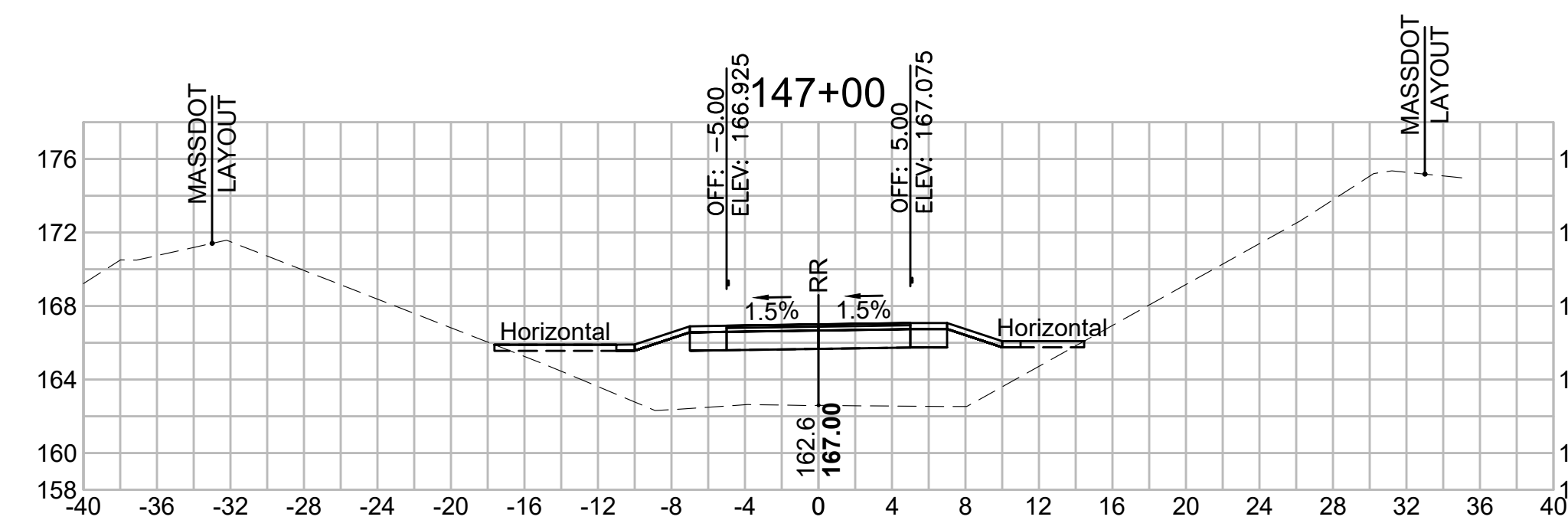
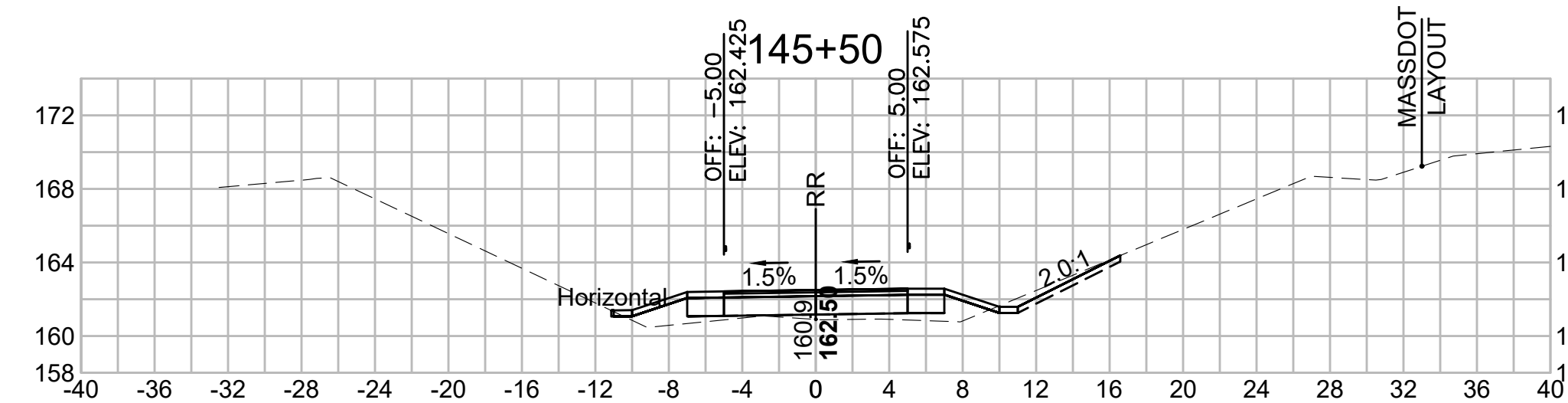
Total Volume at Station 146+00.00	
Cut Area (SF)	3.559
Fill Area (SF)	32.053
Cut Vol (CF)	7.0
Fill Vol (CF)	37.8
Cum Cut Vol (CF)	3364.3
Cum Fill Vol (CF)	579.4
Net Vol (CF)	2784.9

Total Volume at Station 147+50.00	
Cut Area (SF)	0.970
Fill Area (SF)	84.410
Cut Vol (CF)	1.1
Fill Vol (CF)	150.3
Cum Cut Vol (CF)	3369.4
Cum Fill Vol (CF)	961.5
Net Vol (CF)	2407.9



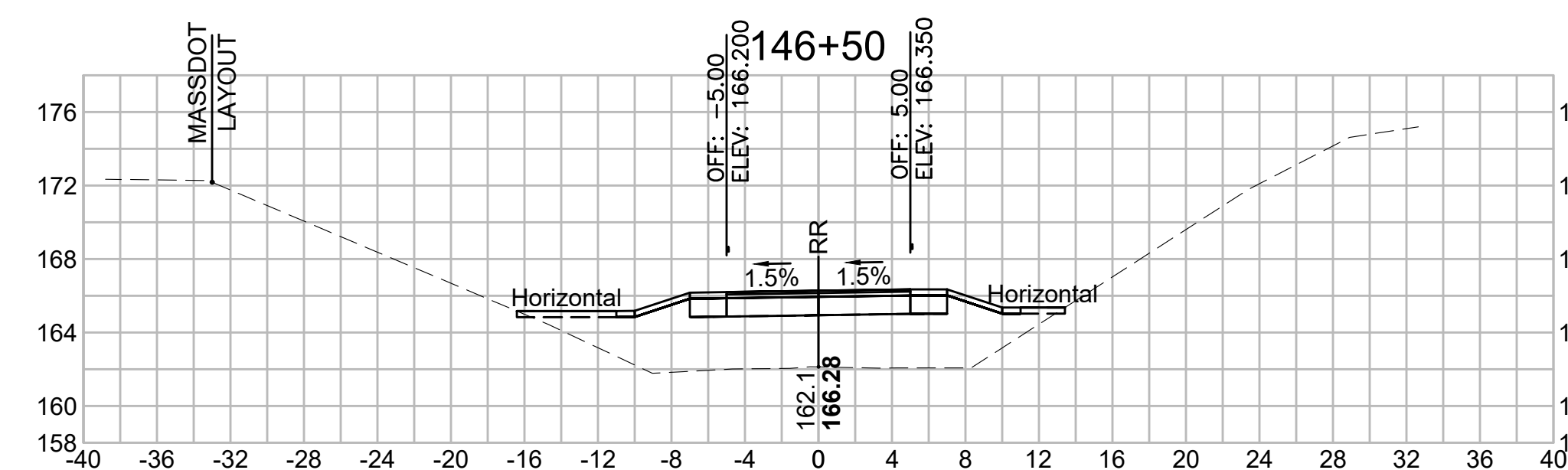
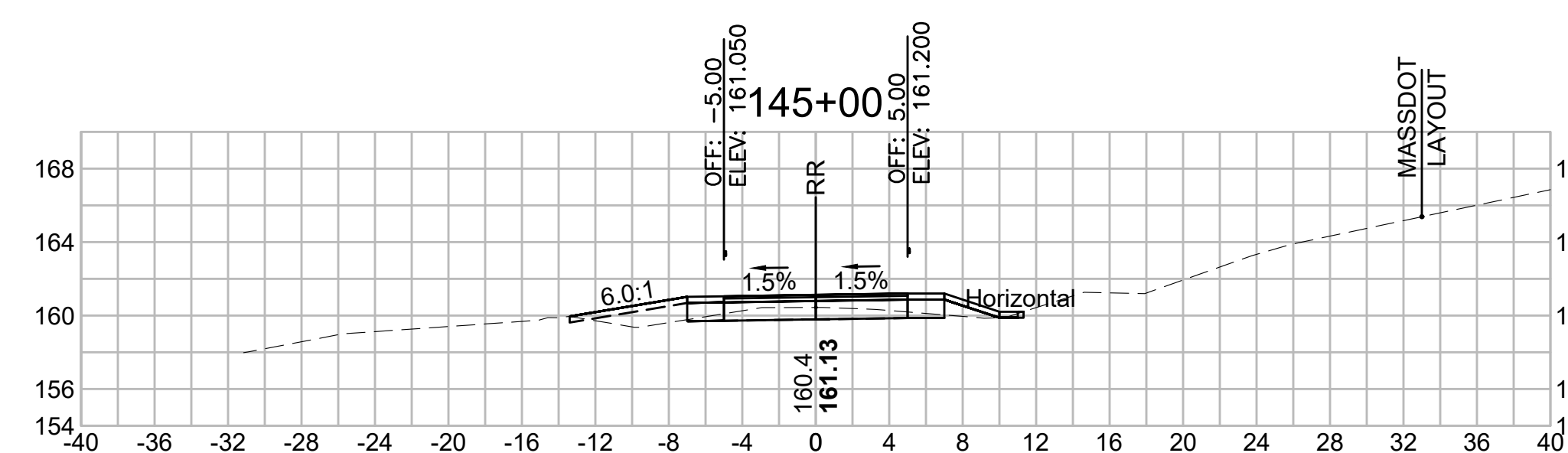
Total Volume at Station 145+50.00	
Cut Area (SF)	3.981
Fill Area (SF)	8.721
Cut Vol (CF)	10.2
Fill Vol (CF)	12.7
Cum Cut Vol (CF)	3357.3
Cum Fill Vol (CF)	541.7
Net Vol (CF)	2815.7

Total Volume at Station 147+00.00	
Cut Area (SF)	0.237
Fill Area (SF)	77.891
Cut Vol (CF)	0.4
Fill Vol (CF)	137.1
Cum Cut Vol (CF)	3368.2
Cum Fill Vol (CF)	811.2
Net Vol (CF)	2557.0



Total Volume at Station 145+00.00	
Cut Area (SF)	7.007
Fill Area (SF)	4.985
Cut Vol (CF)	12.9
Fill Vol (CF)	9.4
Cum Cut Vol (CF)	3347.2
Cum Fill Vol (CF)	529.0
Net Vol (CF)	2818.2

Total Volume at Station 146+50.00	
Cut Area (SF)	0.213
Fill Area (SF)	70.196
Cut Vol (CF)	3.5
Fill Vol (CF)	94.7
Cum Cut Vol (CF)	3367.8
Cum Fill Vol (CF)	674.1
Net Vol (CF)	2693.7



SUDBURY
BRUCE FREEMAN RAIL TRAIL

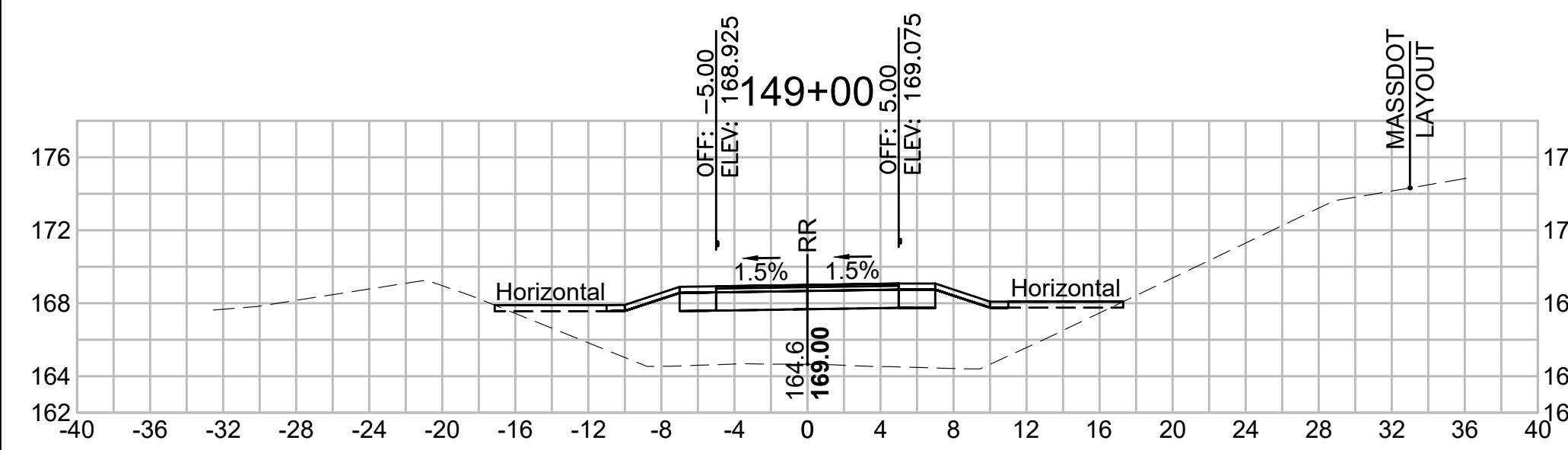
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	254	318

PROJECT FILE NO. 608164

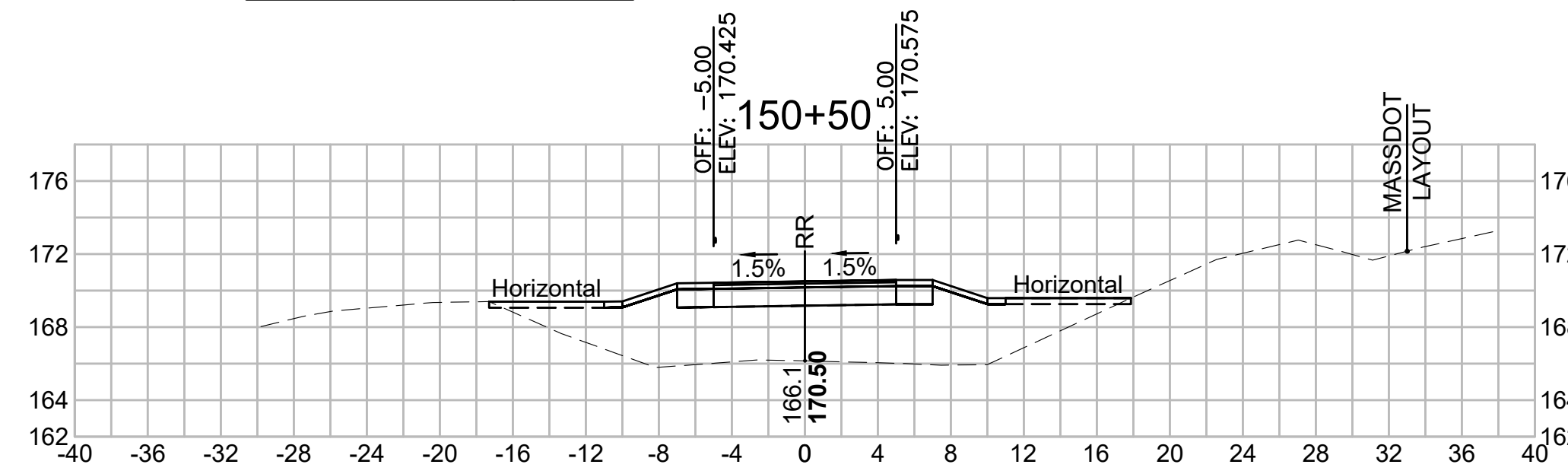
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

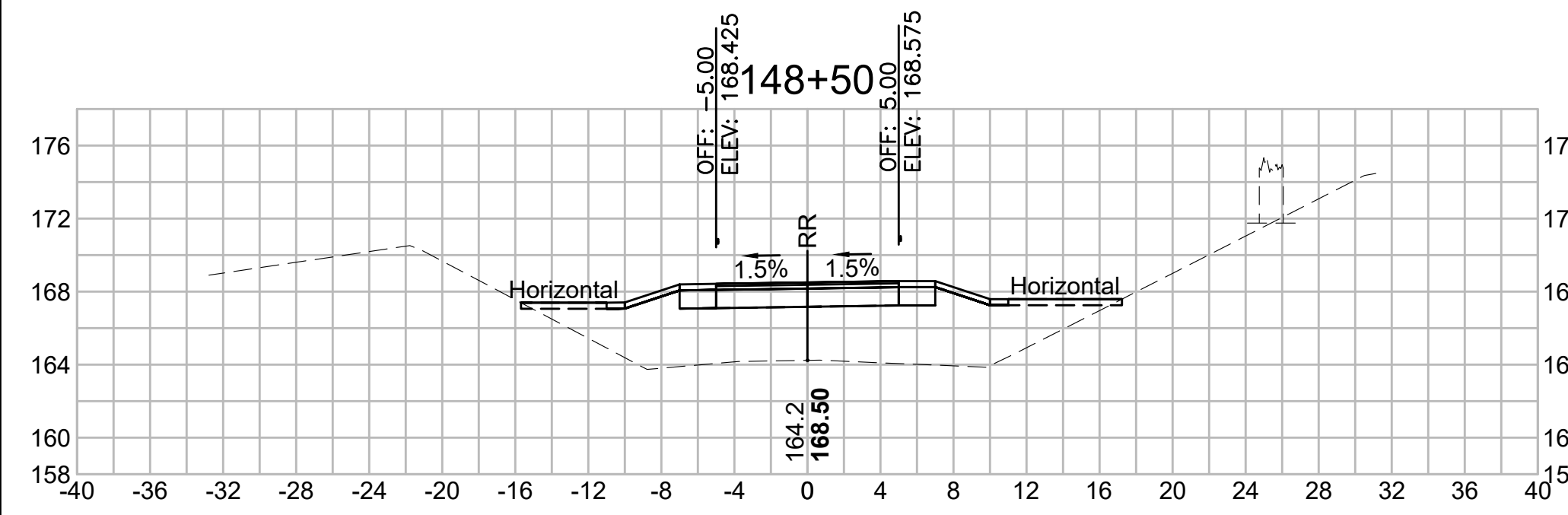
Total Volume at Station 149+00.00	
Cut Area (SF)	0.249
Fill Area (SF)	83.098
Cut Vol (CF)	0.4
Fill Vol (CF)	153.7
Cum Cut Vol (CF)	3371.2
Cum Fill Vol (CF)	1436.4
Net Vol (CF)	1934.9



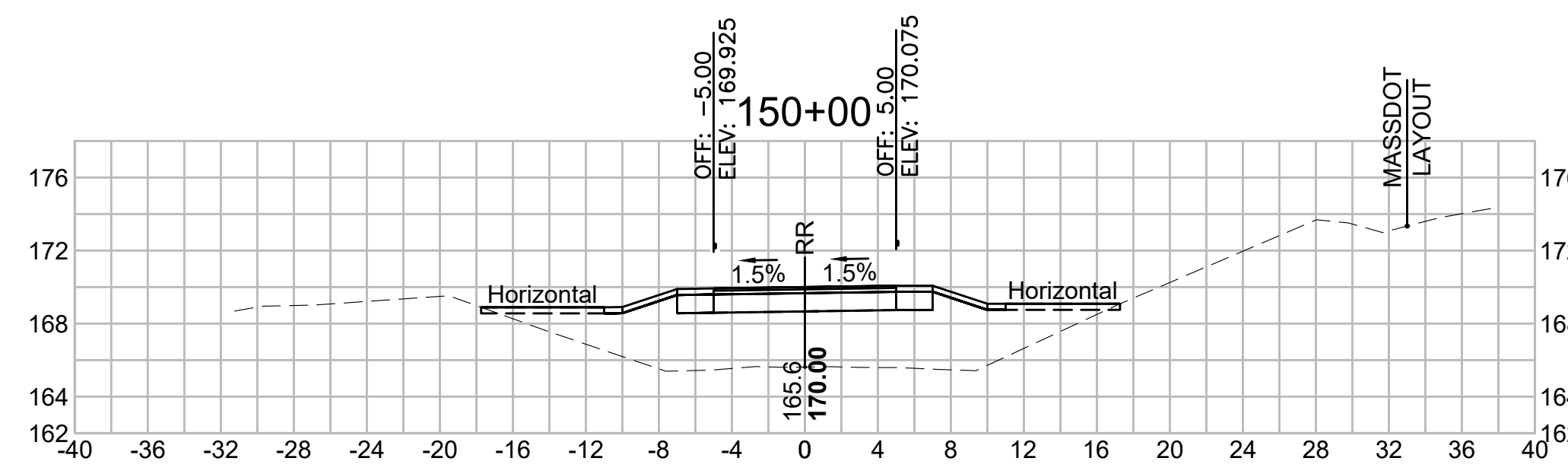
Total Volume at Station 150+50.00	
Cut Area (SF)	0.610
Fill Area (SF)	85.158
Cut Vol (CF)	0.8
Fill Vol (CF)	155.6
Cum Cut Vol (CF)	3373.1
Cum Fill Vol (CF)	1905.8
Net Vol (CF)	1467.3



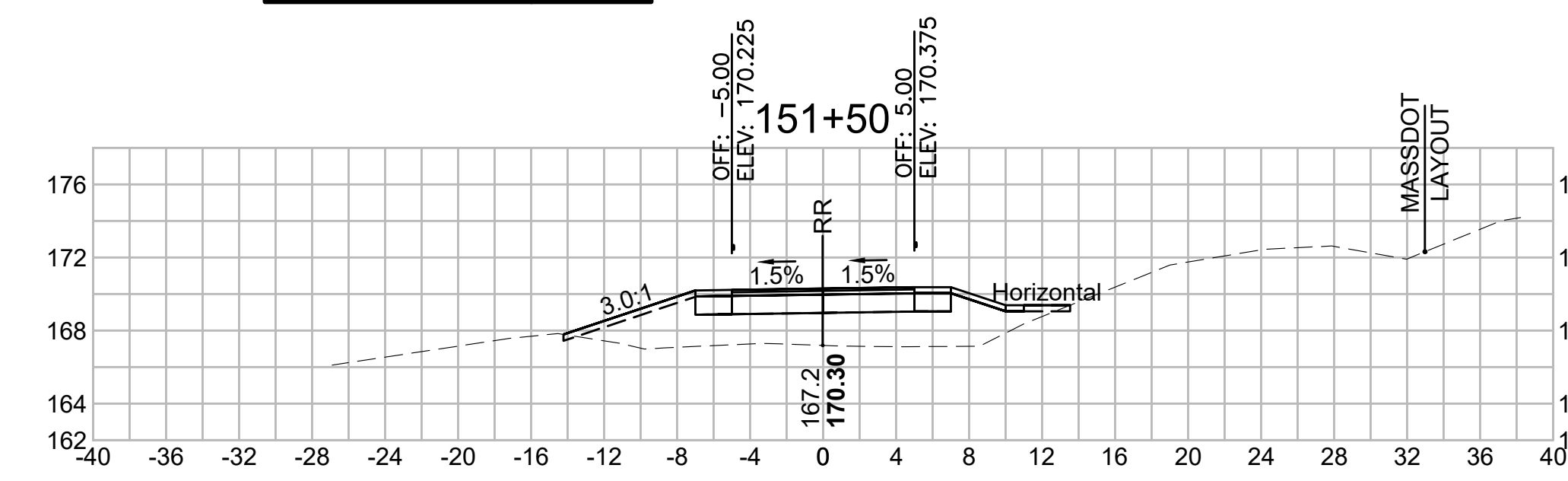
Total Volume at Station 148+50.00	
Cut Area (SF)	0.210
Fill Area (SF)	82.874
Cut Vol (CF)	0.4
Fill Vol (CF)	159.9
Cum Cut Vol (CF)	3370.8
Cum Fill Vol (CF)	1282.7
Net Vol (CF)	2088.1



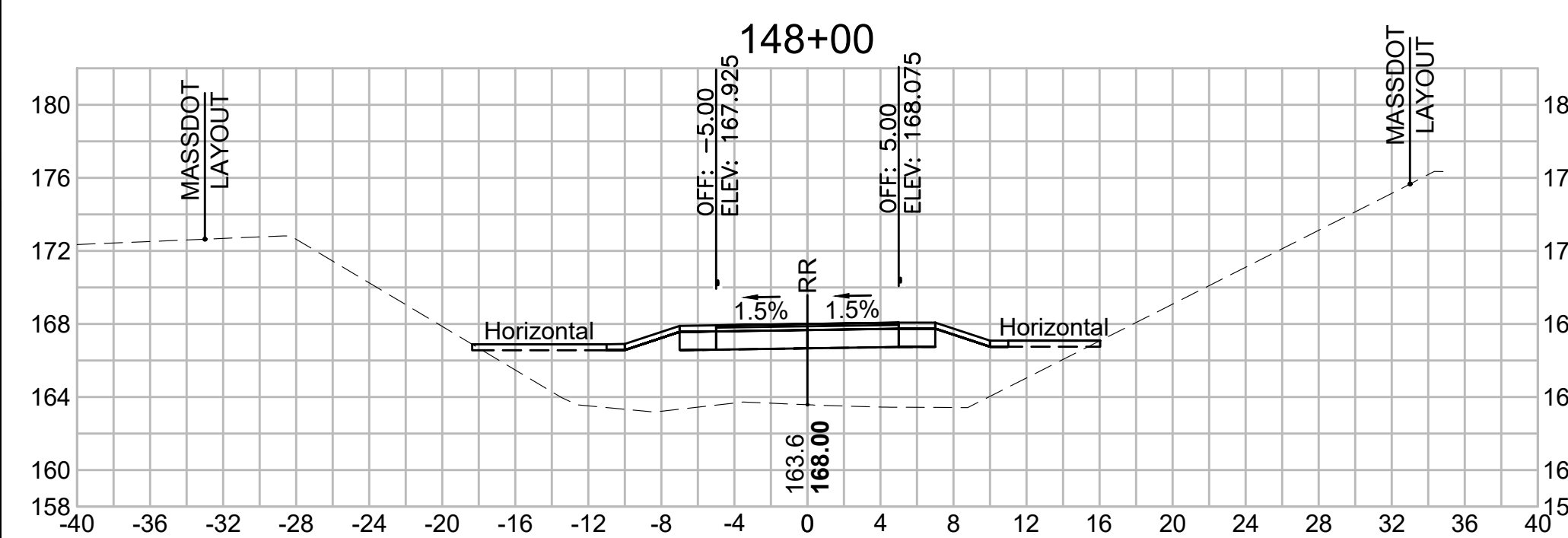
Total Volume at Station 150+00.00	
Cut Area (SF)	0.297
Fill Area (SF)	82.858
Cut Vol (CF)	0.5
Fill Vol (CF)	156.8
Cum Cut Vol (CF)	3372.3
Cum Fill Vol (CF)	1750.2
Net Vol (CF)	1622.0



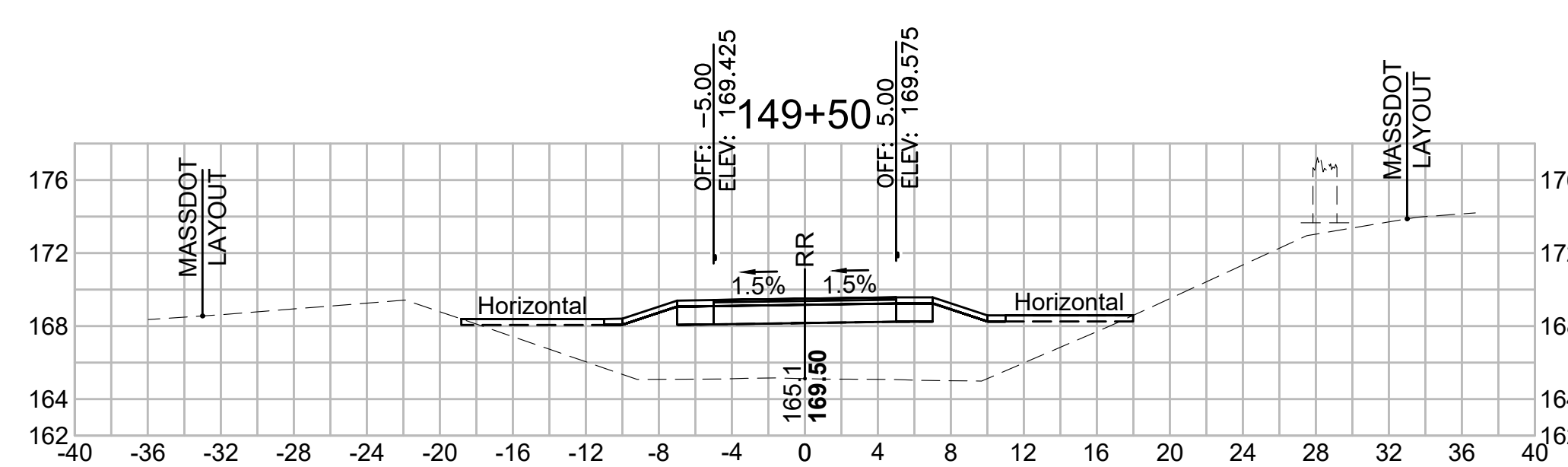
Total Volume at Station 151+50.00	
Cut Area (SF)	0.259
Fill Area (SF)	43.187
Cut Vol (CF)	0.6
Fill Vol (CF)	110.0
Cum Cut Vol (CF)	3374.7
Cum Fill Vol (CF)	2164.6
Net Vol (CF)	1210.1



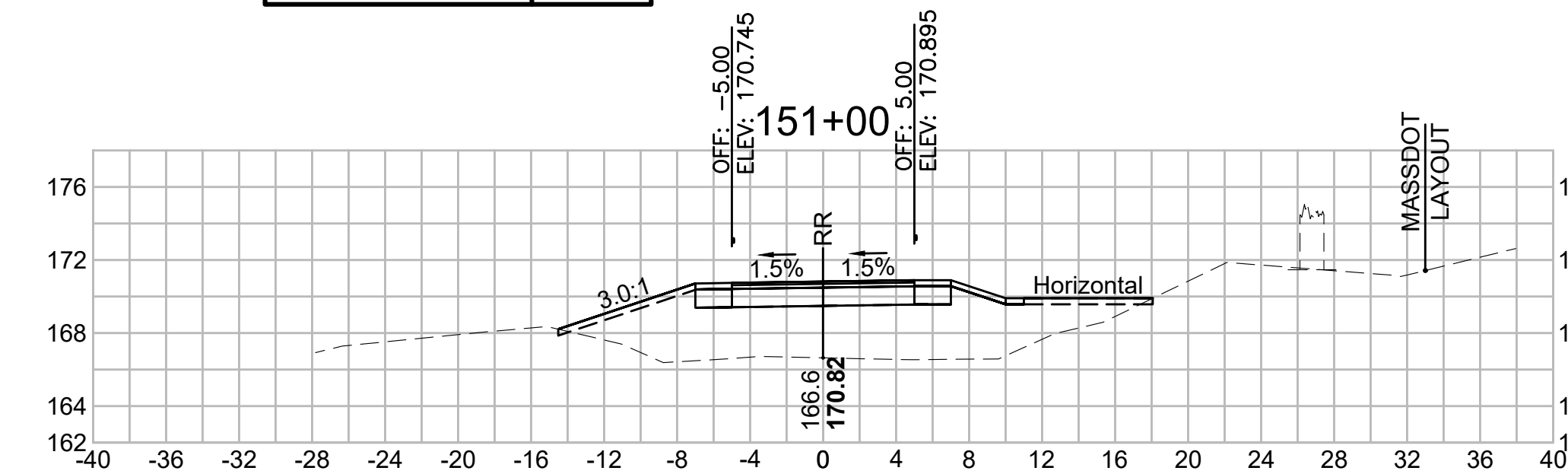
Total Volume at Station 148+00.00	
Cut Area (SF)	0.199
Fill Area (SF)	89.808
Cut Vol (CF)	1.1
Fill Vol (CF)	161.3
Cum Cut Vol (CF)	3370.4
Cum Fill Vol (CF)	1122.8
Net Vol (CF)	2247.6



Total Volume at Station 149+50.00	
Cut Area (SF)	0.280
Fill Area (SF)	86.502
Cut Vol (CF)	0.5
Fill Vol (CF)	157.0
Cum Cut Vol (CF)	3371.7
Cum Fill Vol (CF)	1593.4
Net Vol (CF)	1778.3



Total Volume at Station 151+00.00	
Cut Area (SF)	0.422
Fill Area (SF)	75.564
Cut Vol (CF)	1.0
Fill Vol (CF)	148.8
Cum Cut Vol (CF)	3374.1
Cum Fill Vol (CF)	2054.6
Net Vol (CF)	1319.4



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	255	318

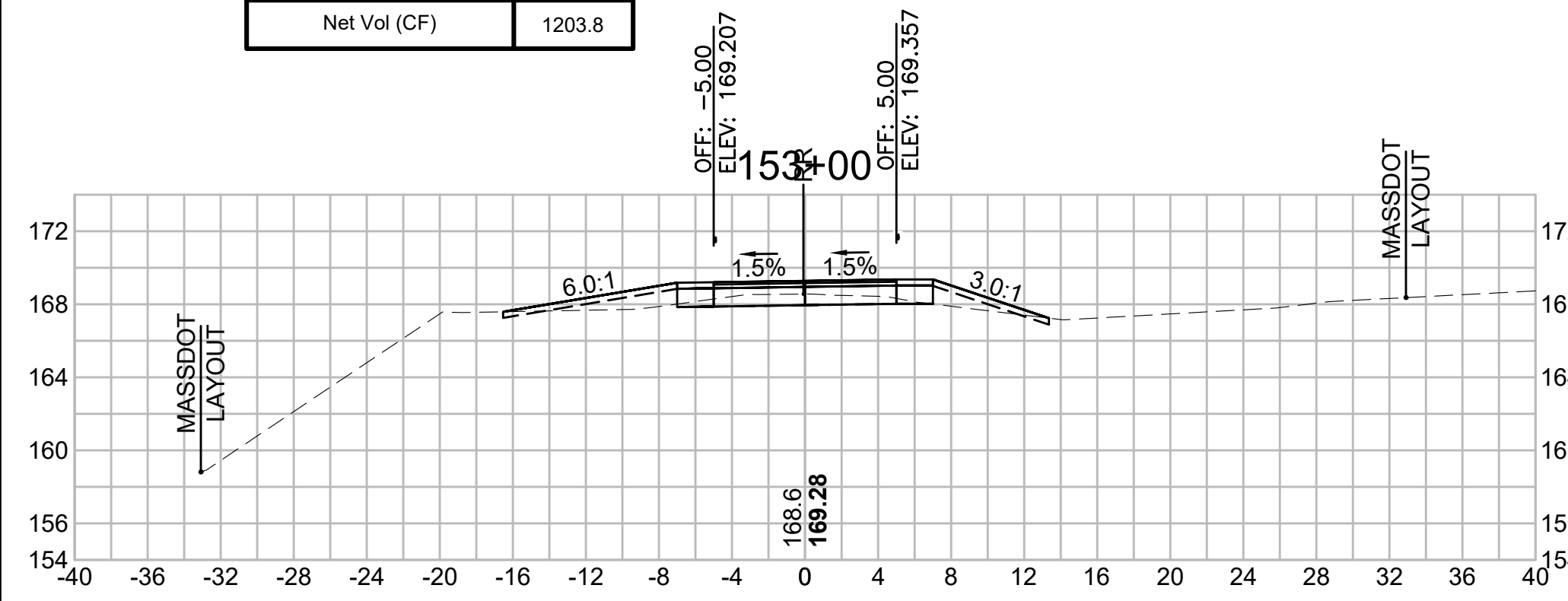
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

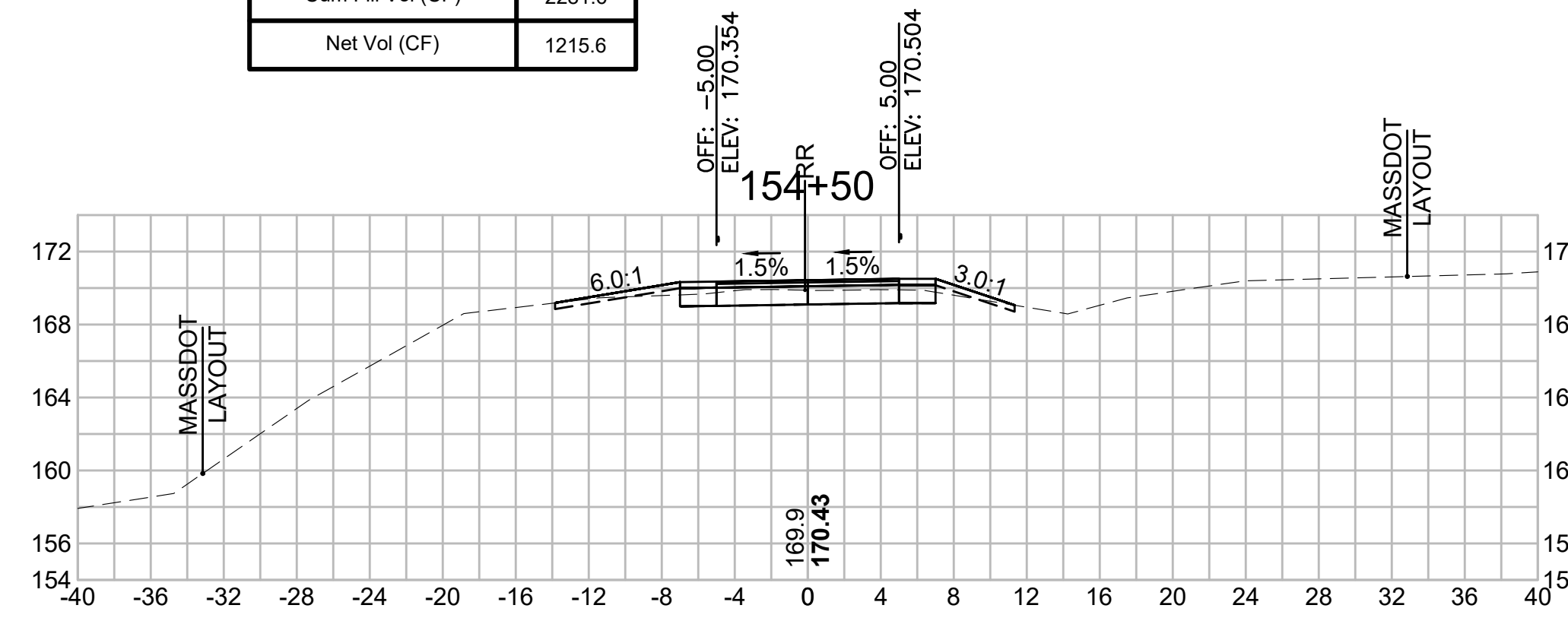
Total Volume at Station 153+00.00

Cut Area (SF)	9.364
Fill Area (SF)	5.972
Cut Vol (CF)	31.8
Fill Vol (CF)	8.6
Cum Cut Vol (CF)	3447.0
Cum Fill Vol (CF)	2243.2
Net Vol (CF)	1203.8



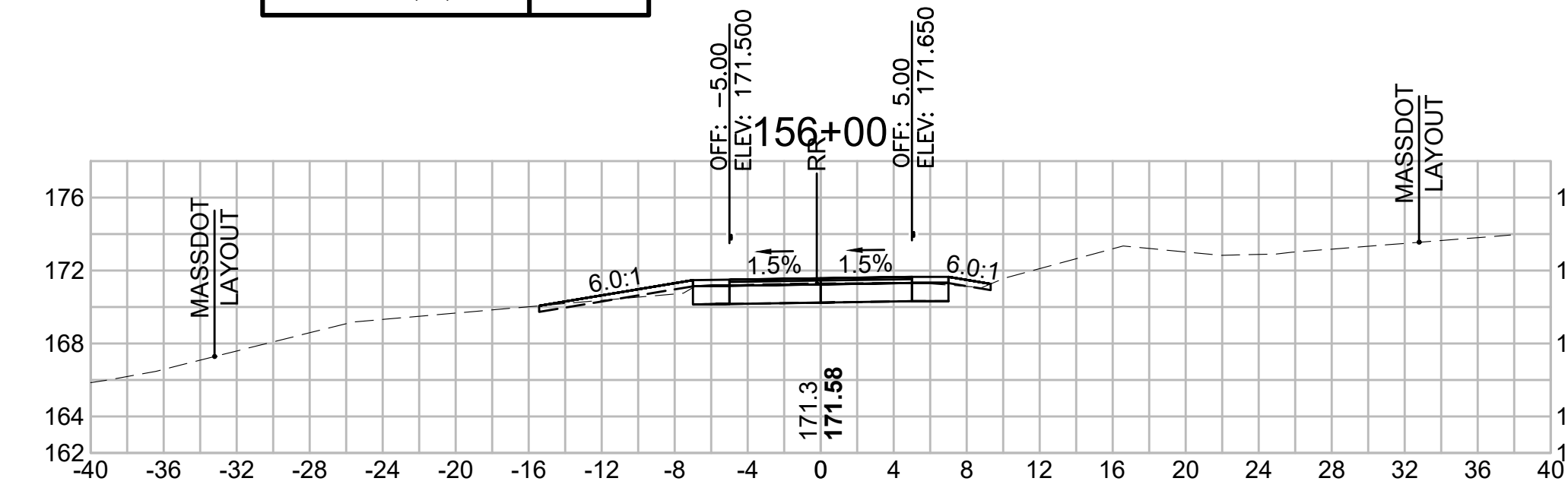
Total Volume at Station 154+50.00

Cut Area (SF)	13.458
Fill Area (SF)	1.023
Cut Vol (CF)	20.4
Fill Vol (CF)	8.1
Cum Cut Vol (CF)	3497.2
Cum Fill Vol (CF)	2281.6
Net Vol (CF)	1215.6



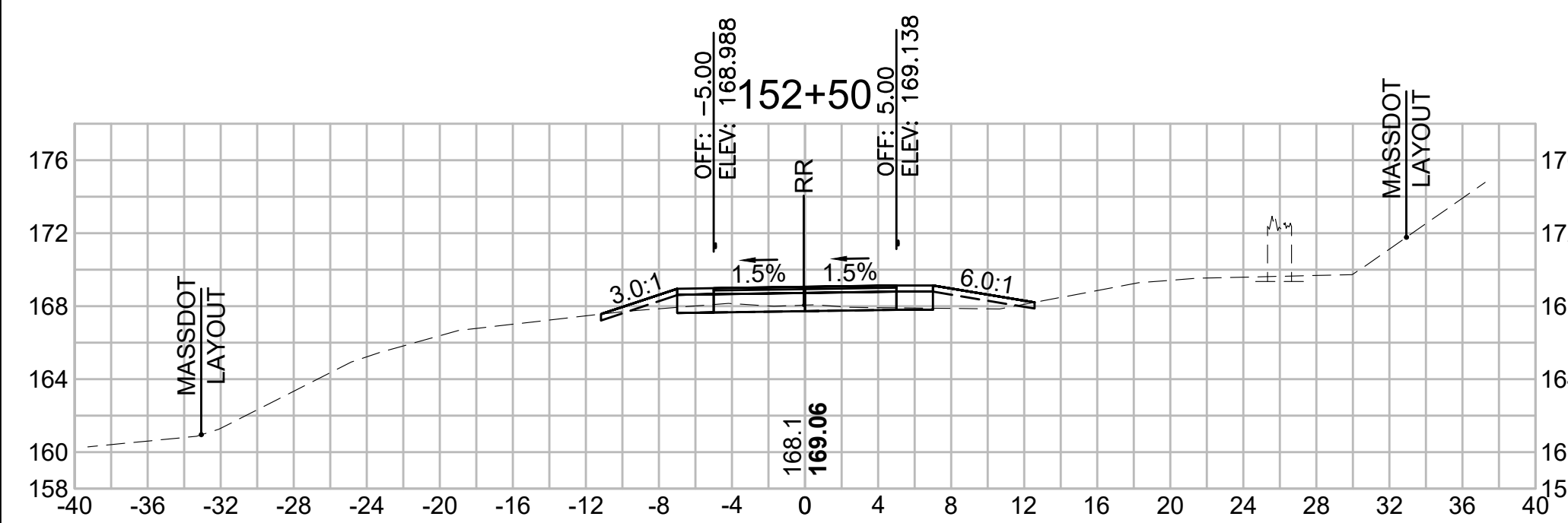
Total Volume at Station 156+00.00

Cut Area (SF)	16.208
Fill Area (SF)	0.703
Cut Vol (CF)	28.8
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	3574.5
Cum Fill Vol (CF)	2284.6
Net Vol (CF)	1289.9



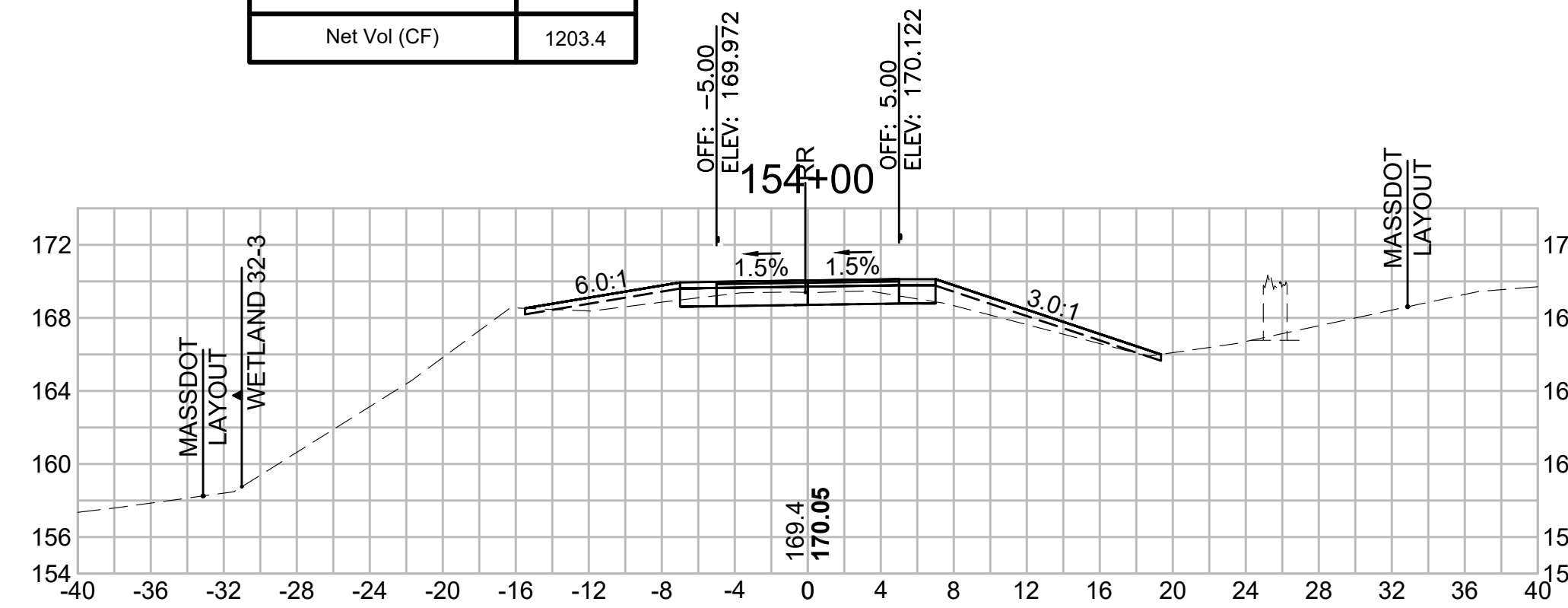
Total Volume at Station 152+50.00

Cut Area (SF)	24.926
Fill Area (SF)	3.337
Cut Vol (CF)	31.7
Fill Vol (CF)	16.5
Cum Cut Vol (CF)	3415.2
Cum Fill Vol (CF)	2234.6
Net Vol (CF)	1180.7



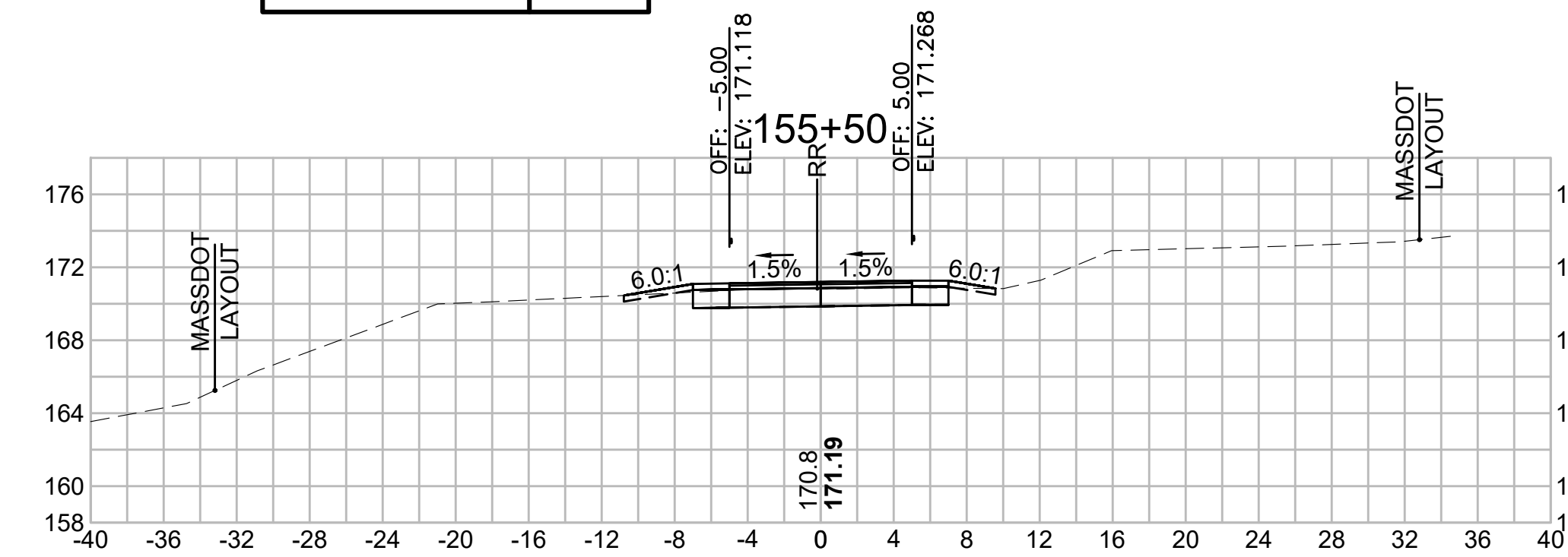
Total Volume at Station 154+00.00

Cut Area (SF)	8.578
Fill Area (SF)	7.745
Cut Vol (CF)	14.6
Fill Vol (CF)	16.0
Cum Cut Vol (CF)	3476.8
Cum Fill Vol (CF)	2273.5
Net Vol (CF)	1203.4



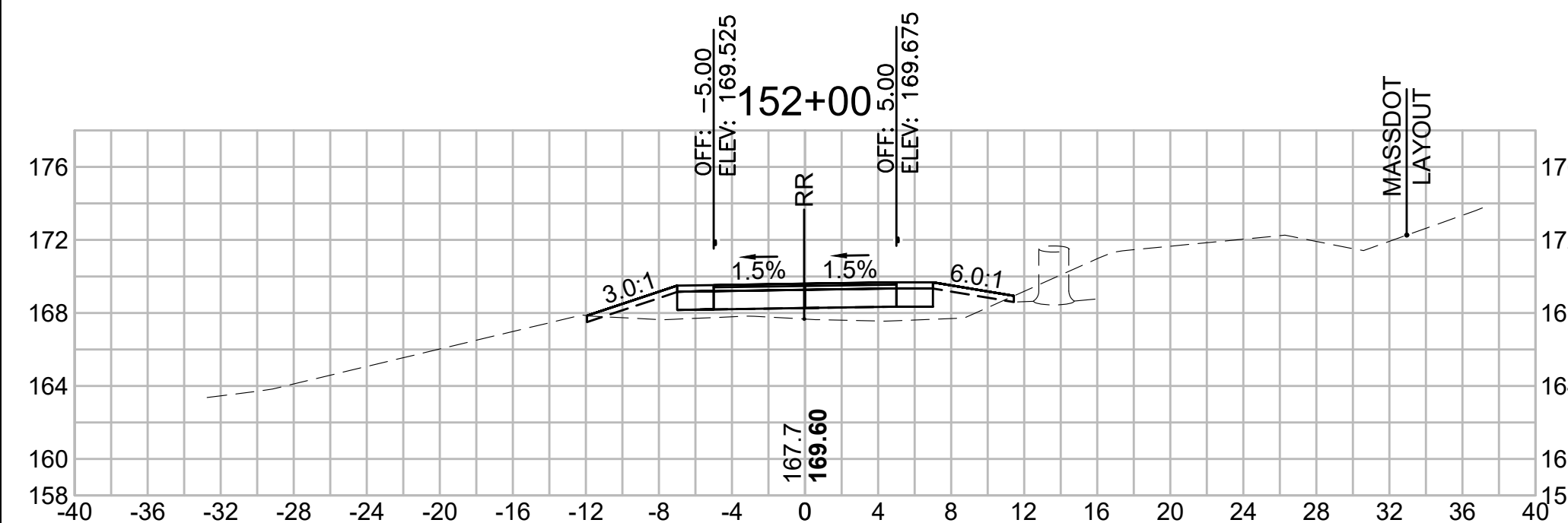
Total Volume at Station 155+50.00

Cut Area (SF)	14.892
Fill Area (SF)	0.070
Cut Vol (CF)	24.9
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	3545.7
Cum Fill Vol (CF)	2283.9
Net Vol (CF)	1261.8



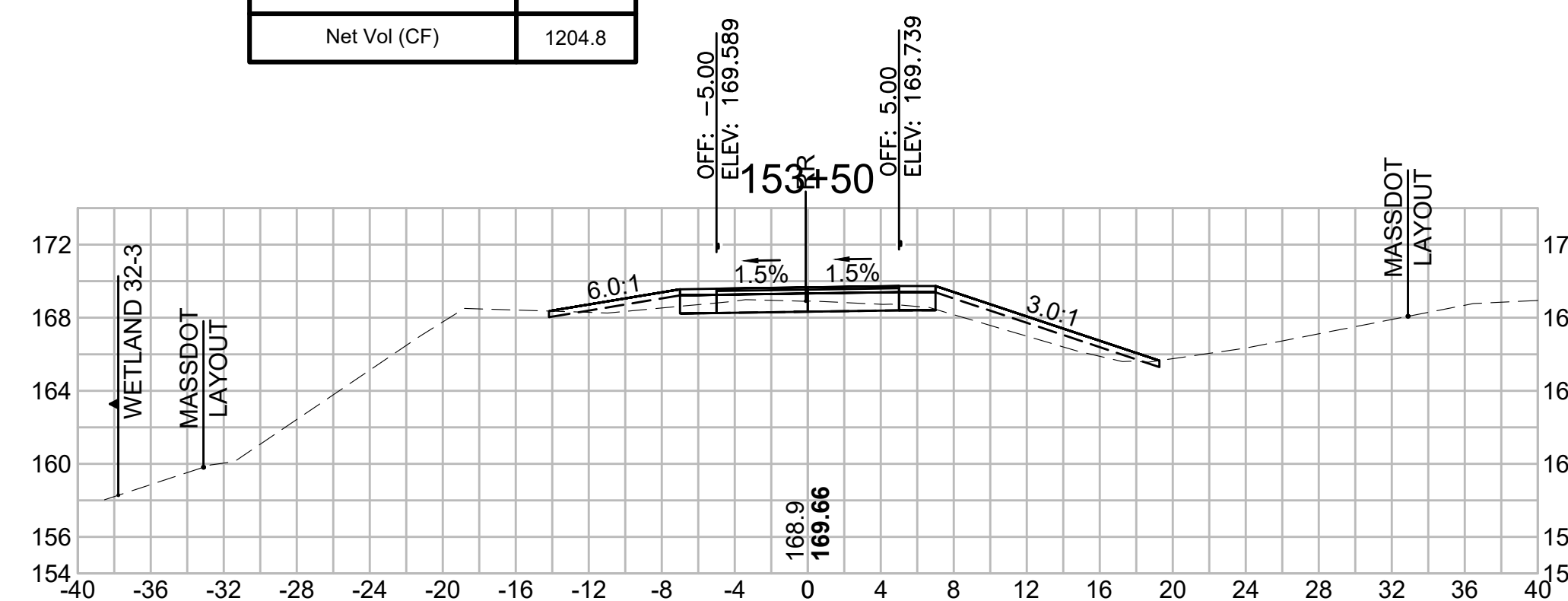
Total Volume at Station 152+00.00

Cut Area (SF)	9.300
Fill Area (SF)	14.530
Cut Vol (CF)	8.9
Fill Vol (CF)	53.4
Cum Cut Vol (CF)	3383.5
Cum Fill Vol (CF)	2218.0
Net Vol (CF)	1165.5



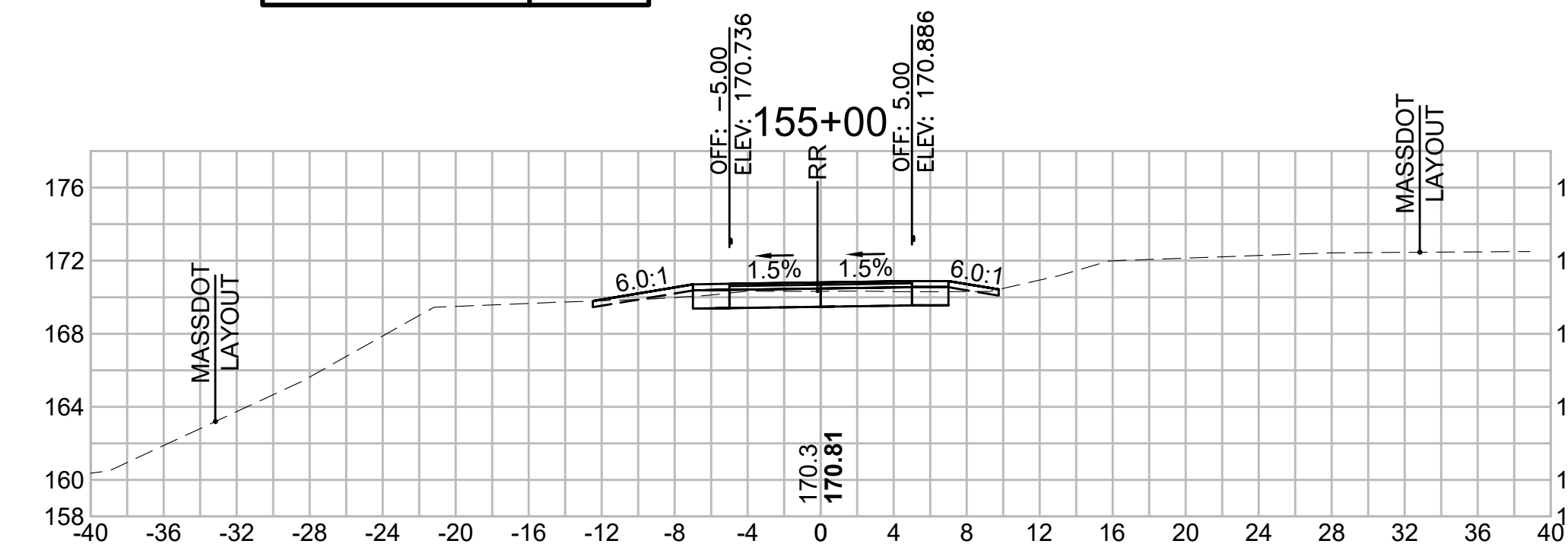
Total Volume at Station 153+50.00

Cut Area (SF)	7.150
Fill Area (SF)	9.504
Cut Vol (CF)	15.3
Fill Vol (CF)	14.3
Cum Cut Vol (CF)	3462.3
Cum Fill Vol (CF)	2257.5
Net Vol (CF)	1204.8



Total Volume at Station 155+00.00

Cut Area (SF)	11.993
Fill Area (SF)	0.670
Cut Vol (CF)	23.6
Fill Vol (CF)	1.6
Cum Cut Vol (CF)	3520.8
Cum Fill Vol (CF)	2283.2
Net Vol (CF)	1237.6



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	256	318

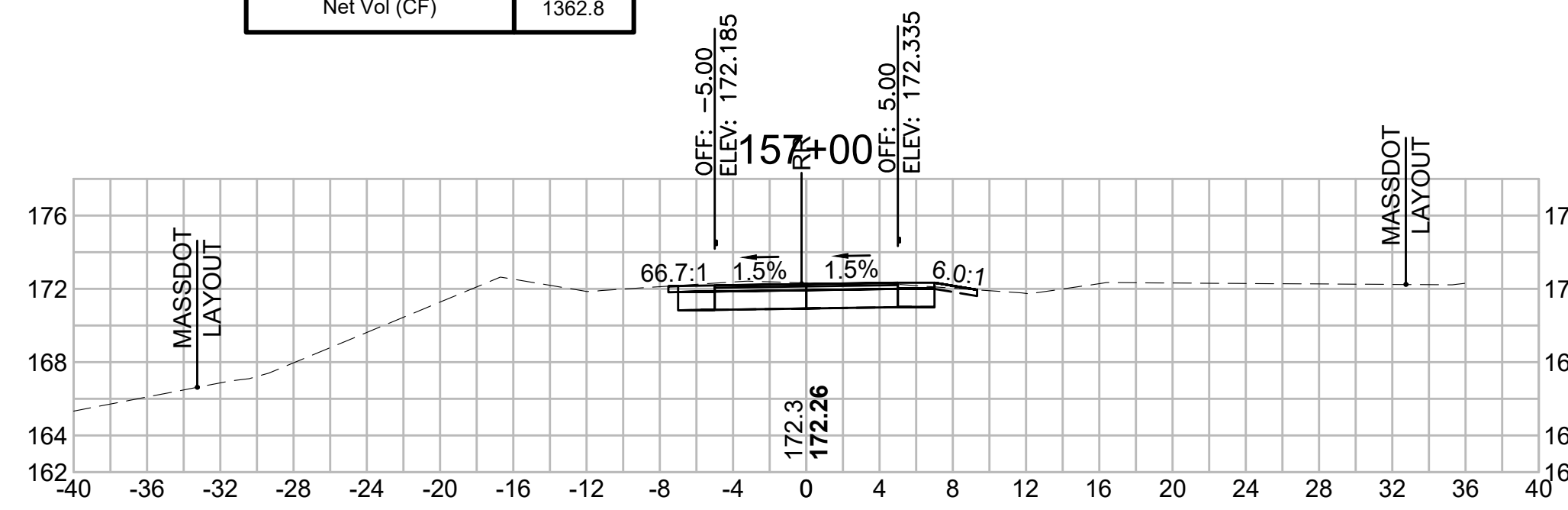
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

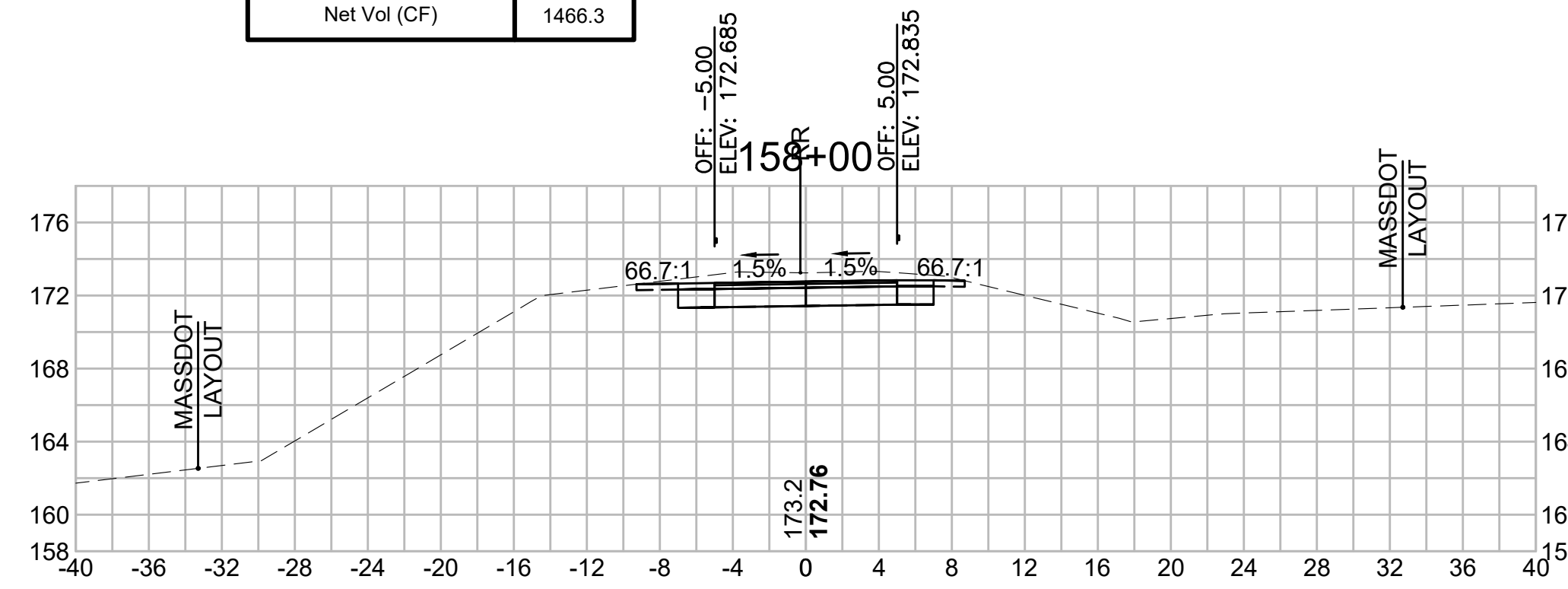
Total Volume at Station 157+00.00

Cut Area (SF)	24.992
Fill Area (SF)	0.000
Cut Vol (CF)	41.3
Fill Vol (CF)	0.5
Cum Cut Vol (CF)	3649.0
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1362.8



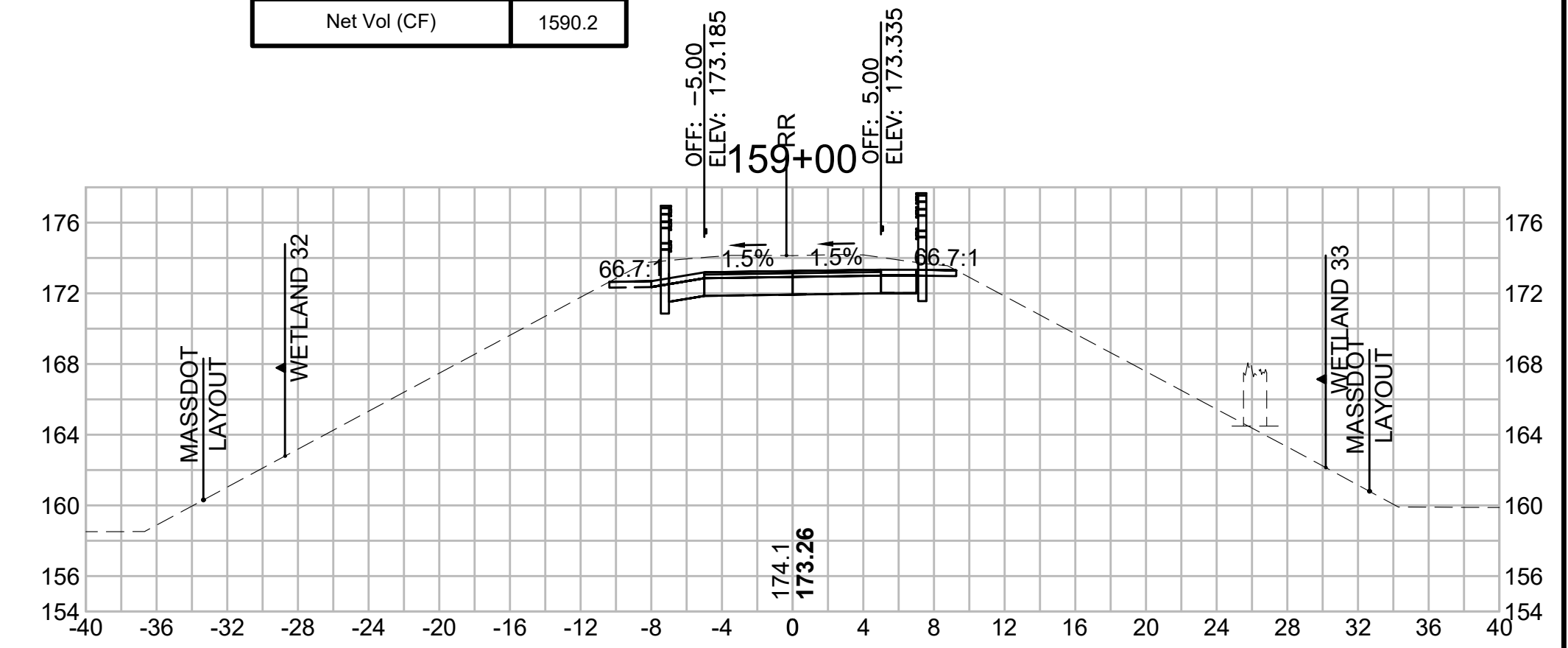
Total Volume at Station 158+00.00

Cut Area (SF)	28.031
Fill Area (SF)	0.000
Cut Vol (CF)	53.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	3752.5
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1466.3



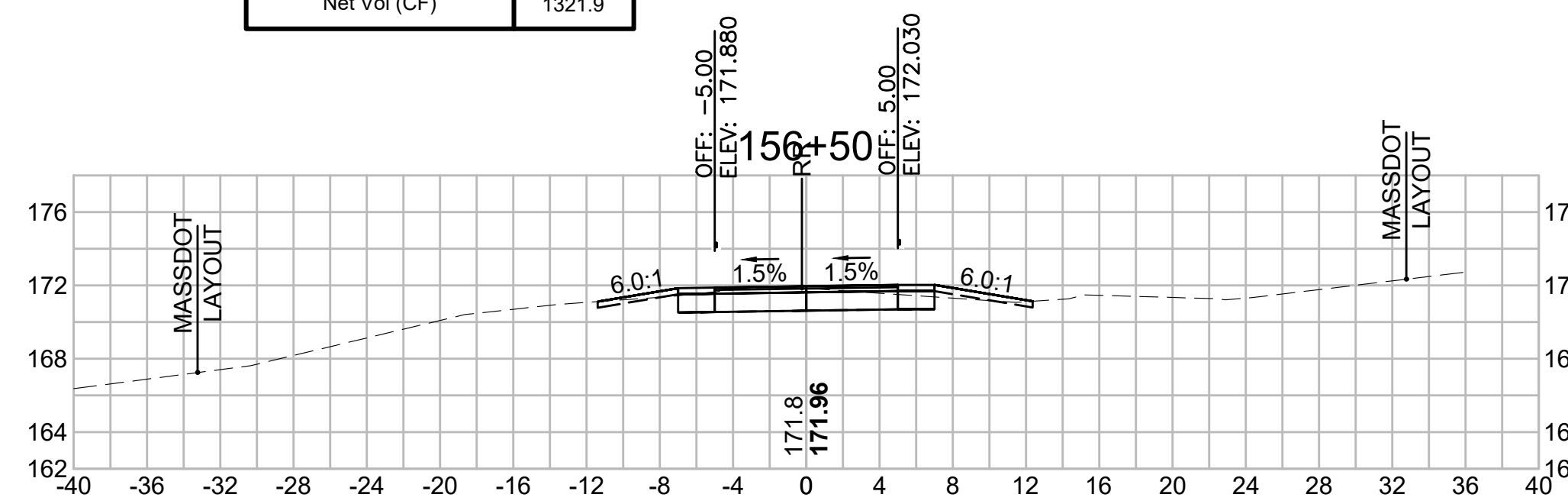
Total Volume at Station 159+00.00

Cut Area (SF)	35.419
Fill Area (SF)	0.000
Cut Vol (CF)	65.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	3876.4
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1590.2



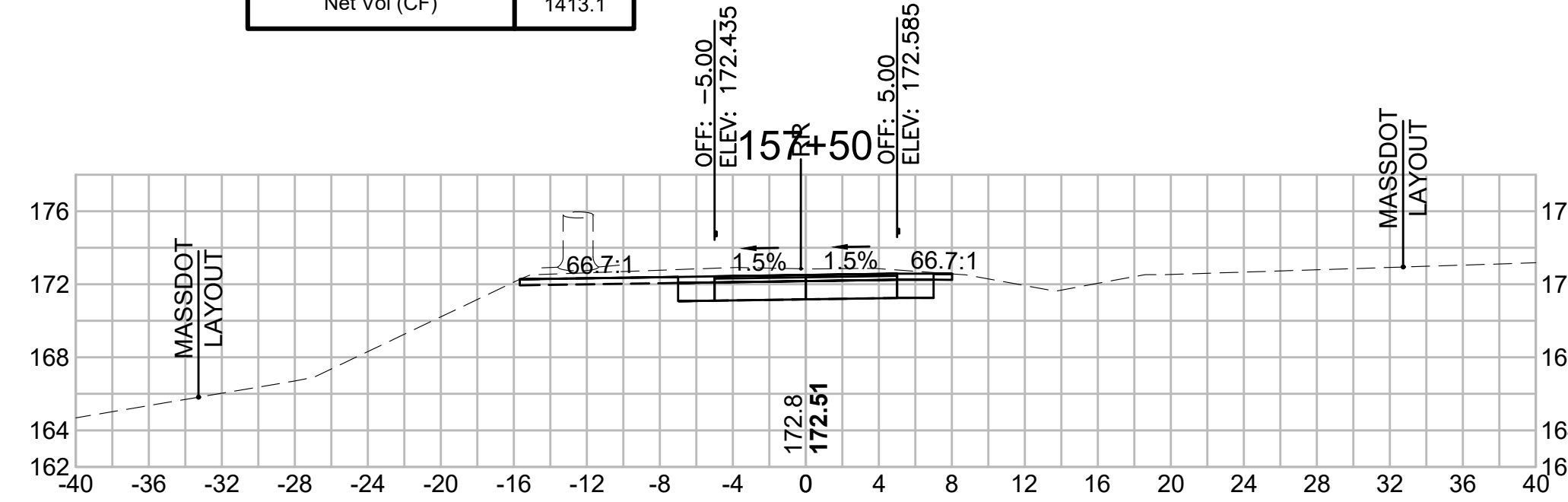
Total Volume at Station 156+50.00

Cut Area (SF)	19.620
Fill Area (SF)	0.543
Cut Vol (CF)	33.2
Fill Vol (CF)	1.2
Cum Cut Vol (CF)	3607.7
Cum Fill Vol (CF)	2285.7
Net Vol (CF)	1321.9



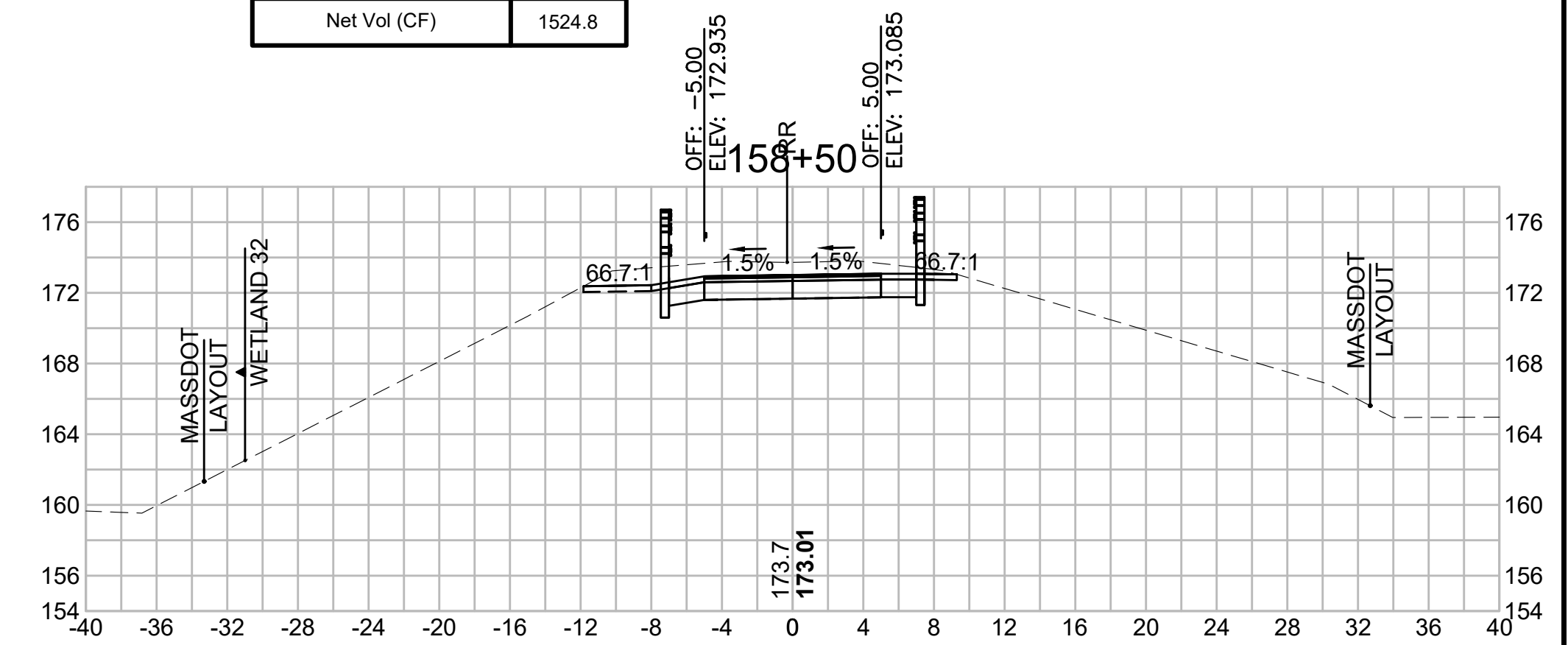
Total Volume at Station 157+50.00

Cut Area (SF)	29.380
Fill Area (SF)	0.000
Cut Vol (CF)	50.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	3699.3
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1413.1



Total Volume at Station 158+50.00

Cut Area (SF)	35.184
Fill Area (SF)	0.000
Cut Vol (CF)	58.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	3811.0
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1524.8



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	257	318

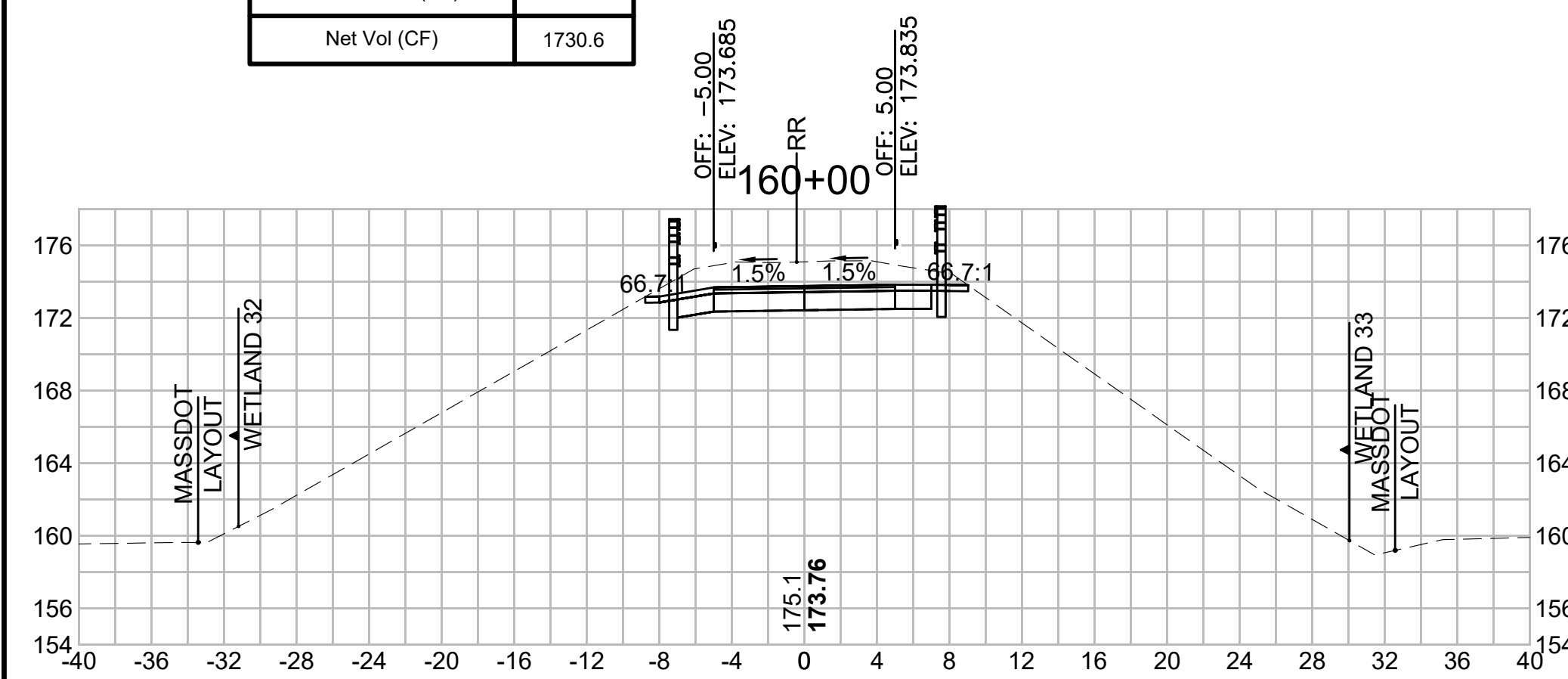
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

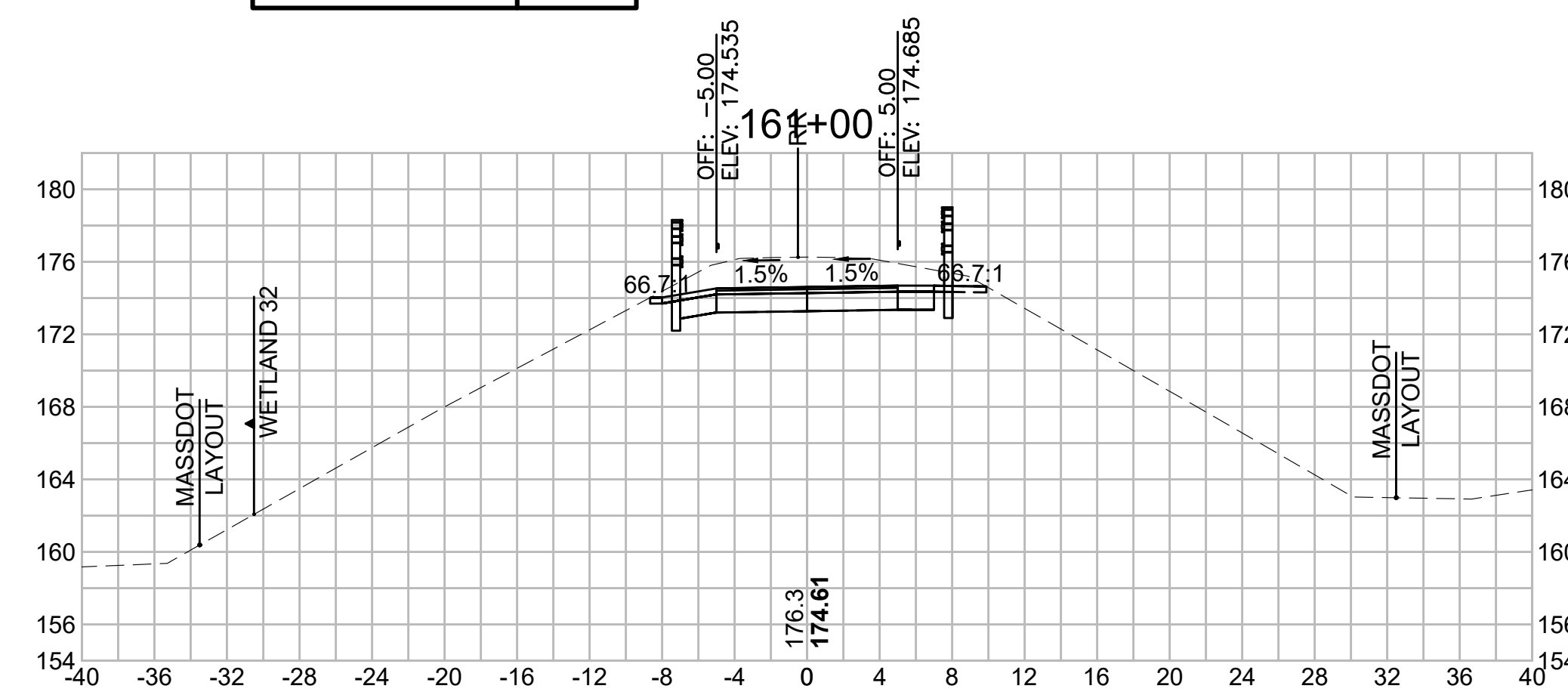
Total Volume at Station 160+00.00

Cut Area (SF)	39.083
Fill Area (SF)	0.000
Cut Vol (CF)	71.9
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	4016.8
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1730.6



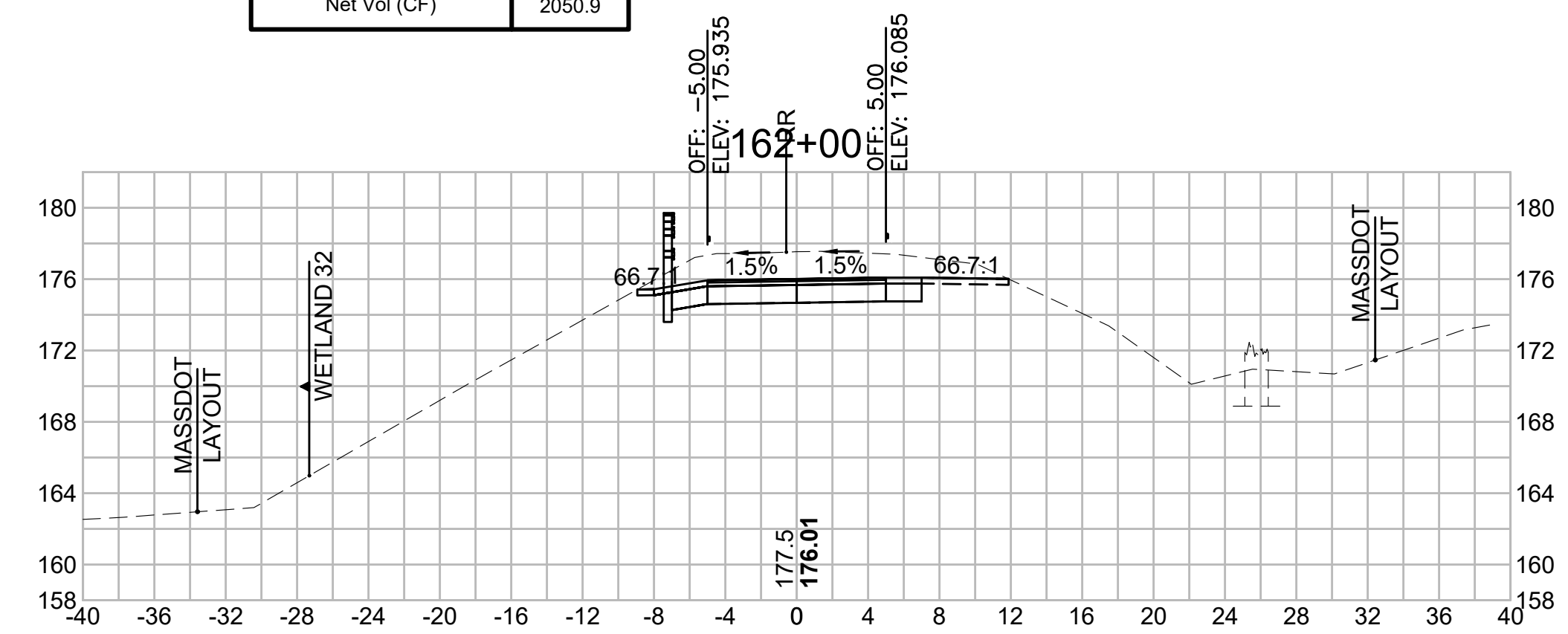
Total Volume at Station 161+00.00

Cut Area (SF)	42.276
Fill Area (SF)	0.000
Cut Vol (CF)	76.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	4166.5
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1880.3



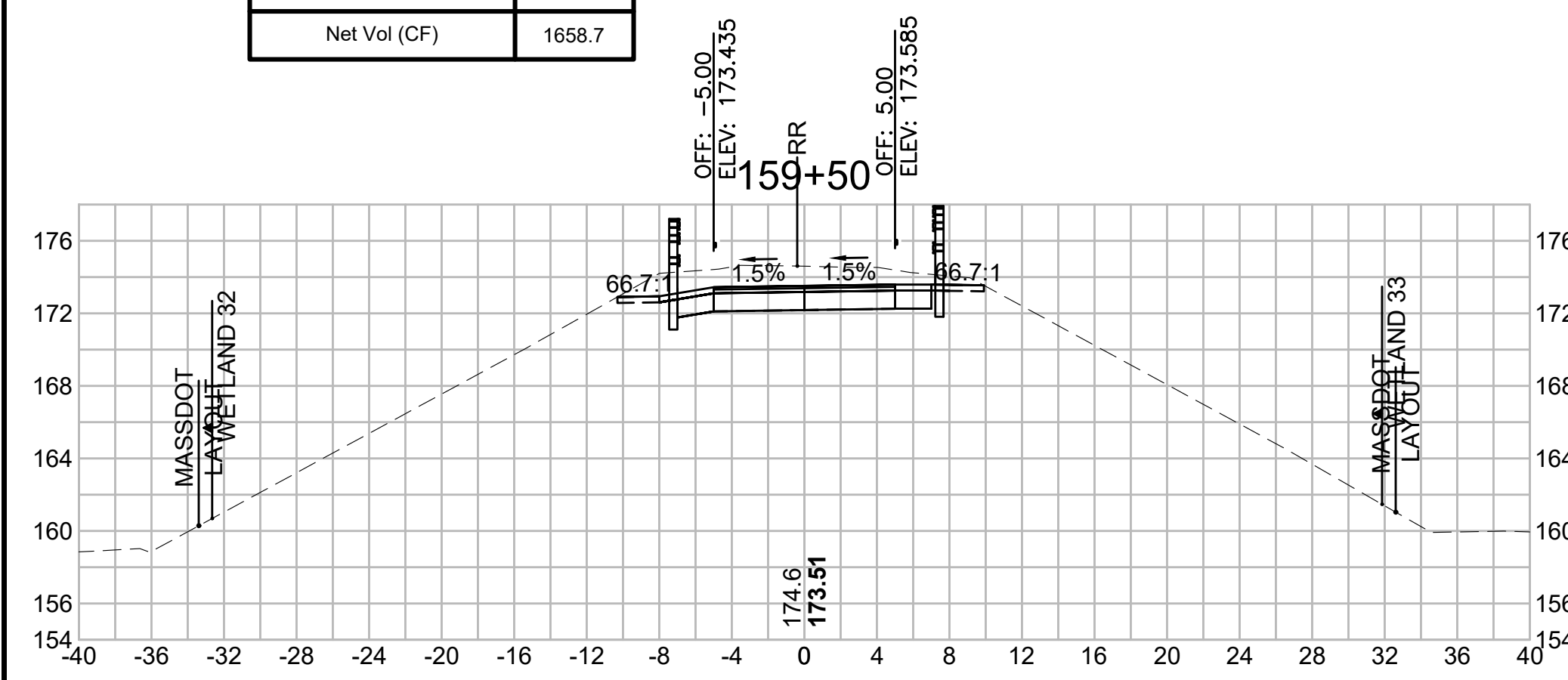
Total Volume at Station 162+00.00

Cut Area (SF)	46.382
Fill Area (SF)	0.000
Cut Vol (CF)	87.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	4337.2
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	2050.9



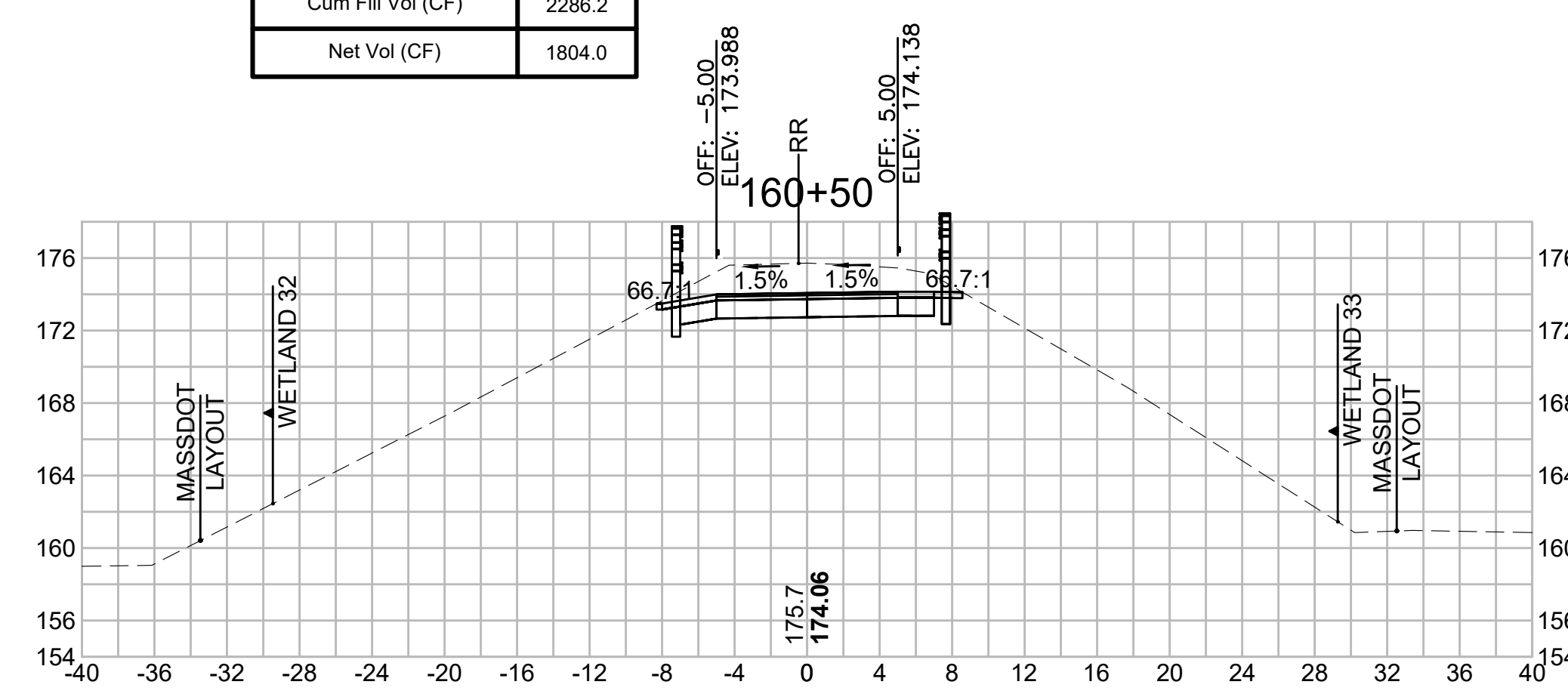
Total Volume at Station 159+50.00

Cut Area (SF)	38.578
Fill Area (SF)	0.000
Cut Vol (CF)	68.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	3944.9
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1658.7



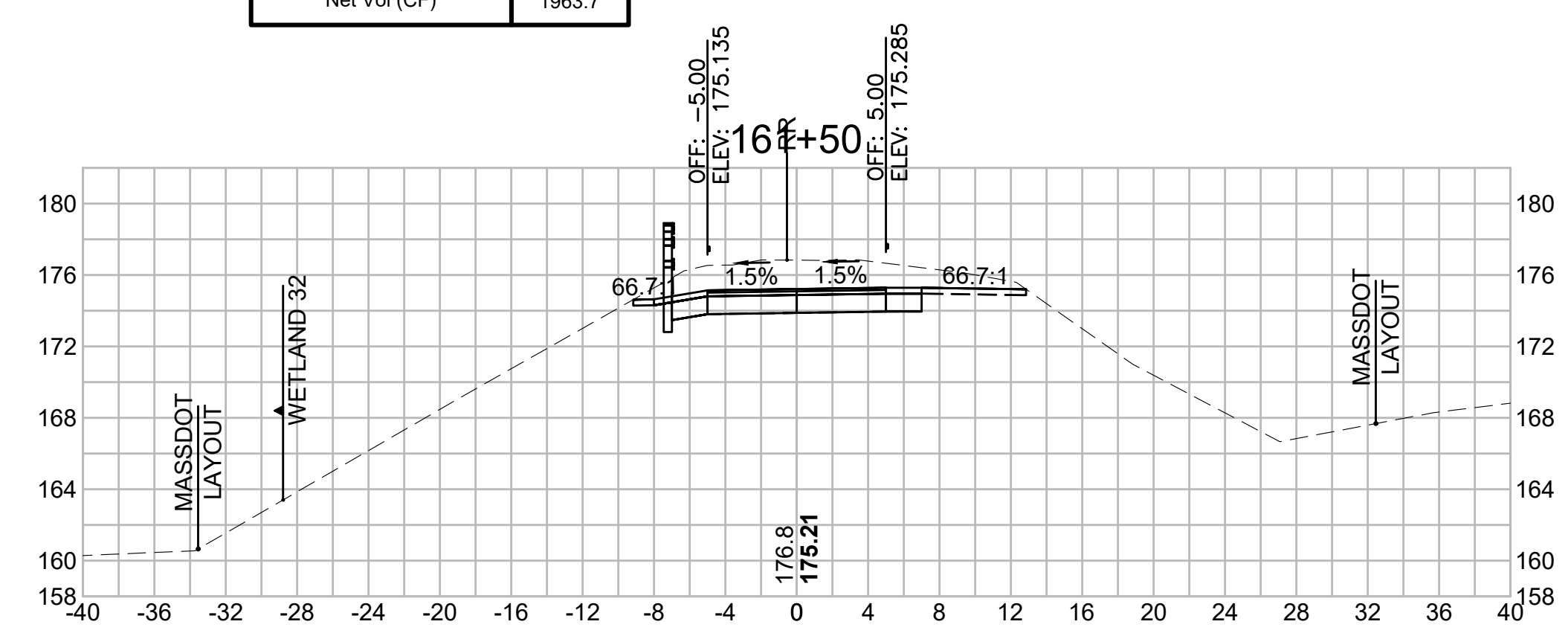
Total Volume at Station 160+50.00

Cut Area (SF)	40.182
Fill Area (SF)	0.000
Cut Vol (CF)	73.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	4090.2
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1804.0



Total Volume at Station 161+50.00

Cut Area (SF)	47.805
Fill Area (SF)	0.000
Cut Vol (CF)	83.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	4250.0
Cum Fill Vol (CF)	2286.2
Net Vol (CF)	1963.7



SUDBURY
BRUCE FREEMAN RAIL TRAIL

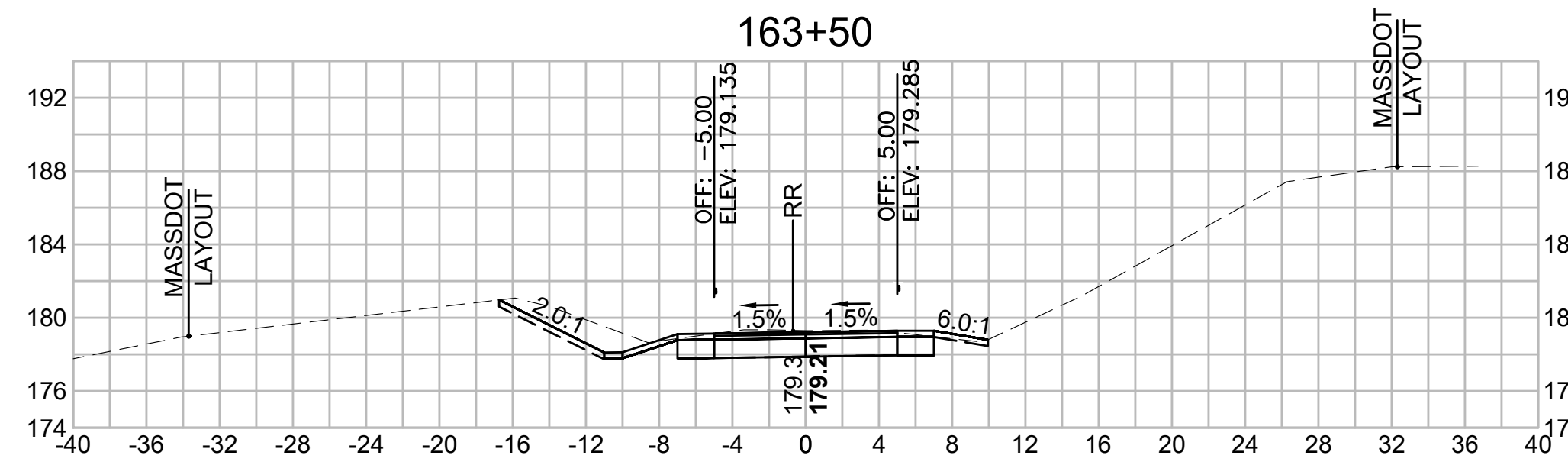
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	258	318

PROJECT FILE NO. 608164

CROSS SECTIONS

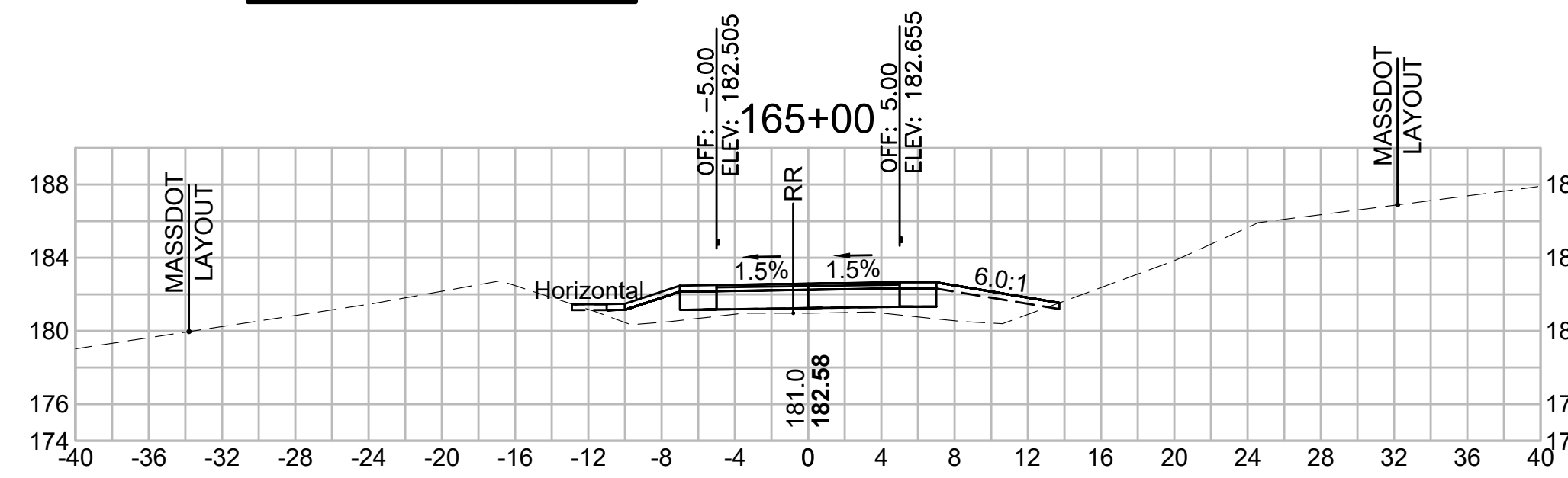
Total Volume at Station 163+50.00

Cut Area (SF)	31.079
Fill Area (SF)	0.000
Cut Vol (CF)	66.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	4556.3
Cum Fill Vol (CF)	2288.2
Net Vol (CF)	2268.1



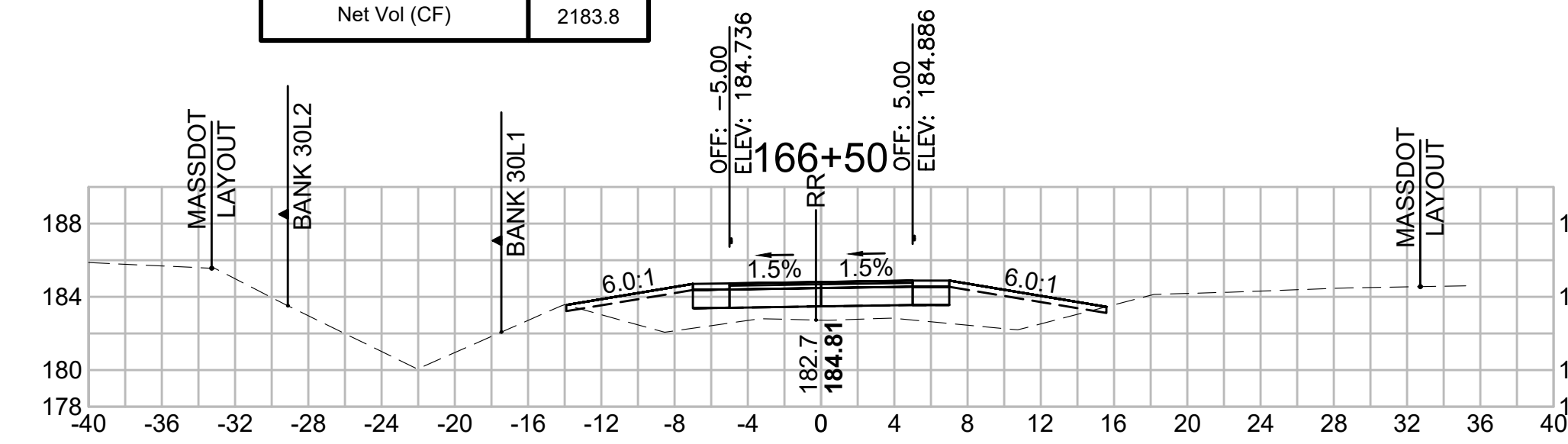
Total Volume at Station 165+00.00

Cut Area (SF)	0.823
Fill Area (SF)	16,241
Cut Vol (CF)	7.1
Fill Vol (CF)	20.1
Cum Cut Vol (CF)	4632.9
Cum Fill Vol (CF)	2316.8
Net Vol (CF)	2316.1



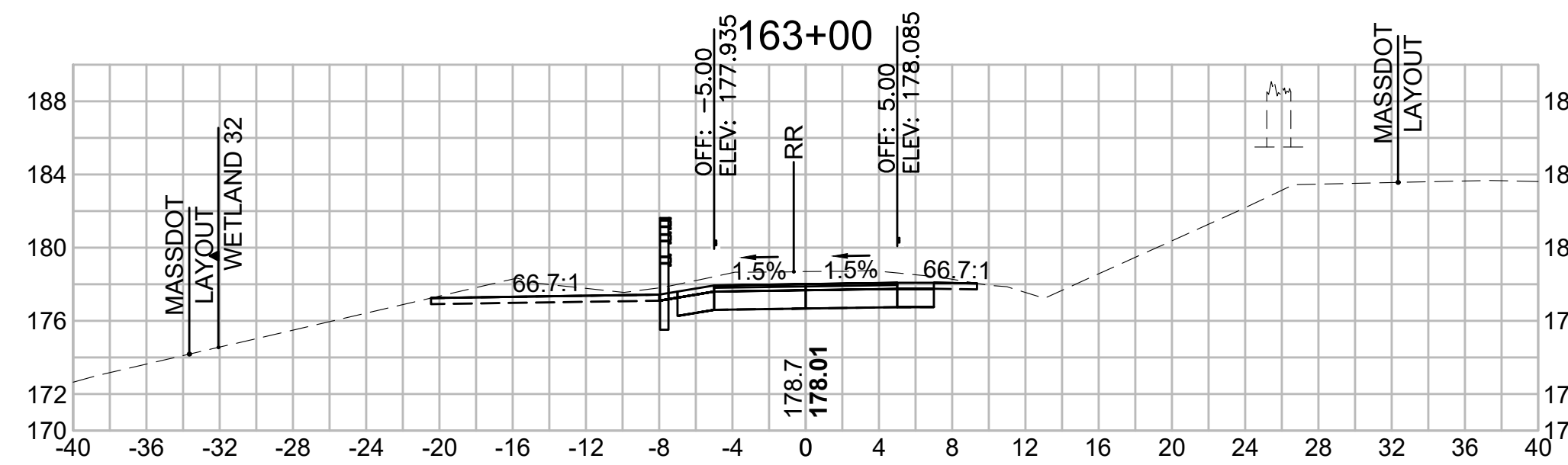
Total Volume at Station 166+50.00

Cut Area (SF)	2,401
Fill Area (SF)	29,348
Cut Vol (CF)	2.5
Fill Vol (CF)	52.2
Cum Cut Vol (CF)	4636.9
Cum Fill Vol (CF)	2453.1
Net Vol (CF)	2183.8



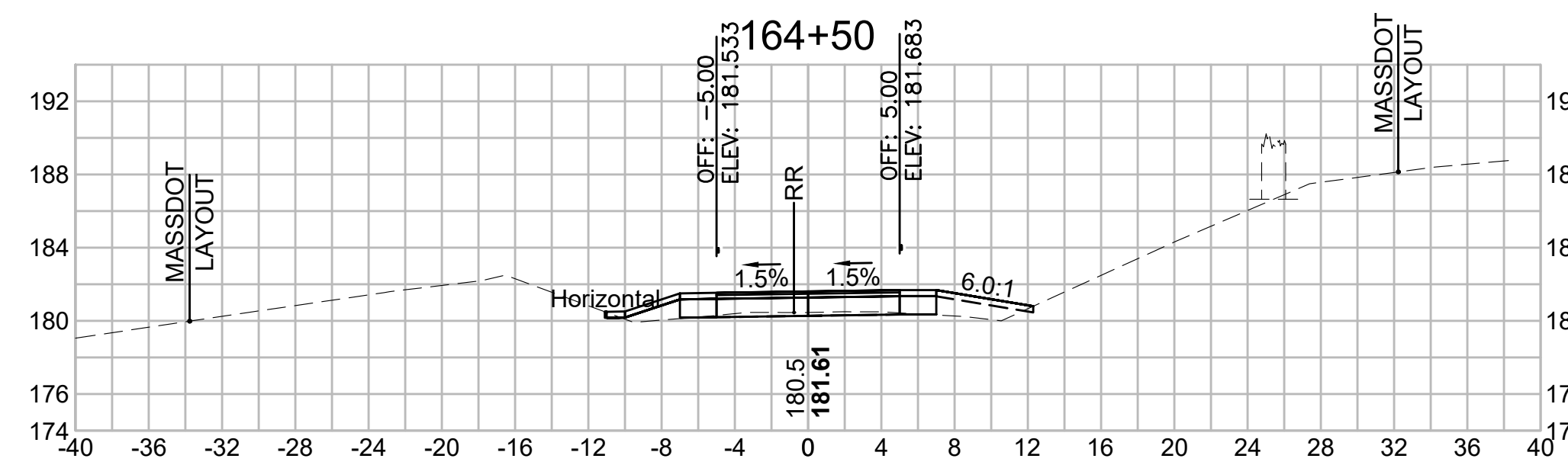
Total Volume at Station 163+00.00

Cut Area (SF)	40,741
Fill Area (SF)	0.000
Cut Vol (CF)	73.7
Fill Vol (CF)	1.0
Cum Cut Vol (CF)	4489.8
Cum Fill Vol (CF)	2288.2
Net Vol (CF)	2201.6



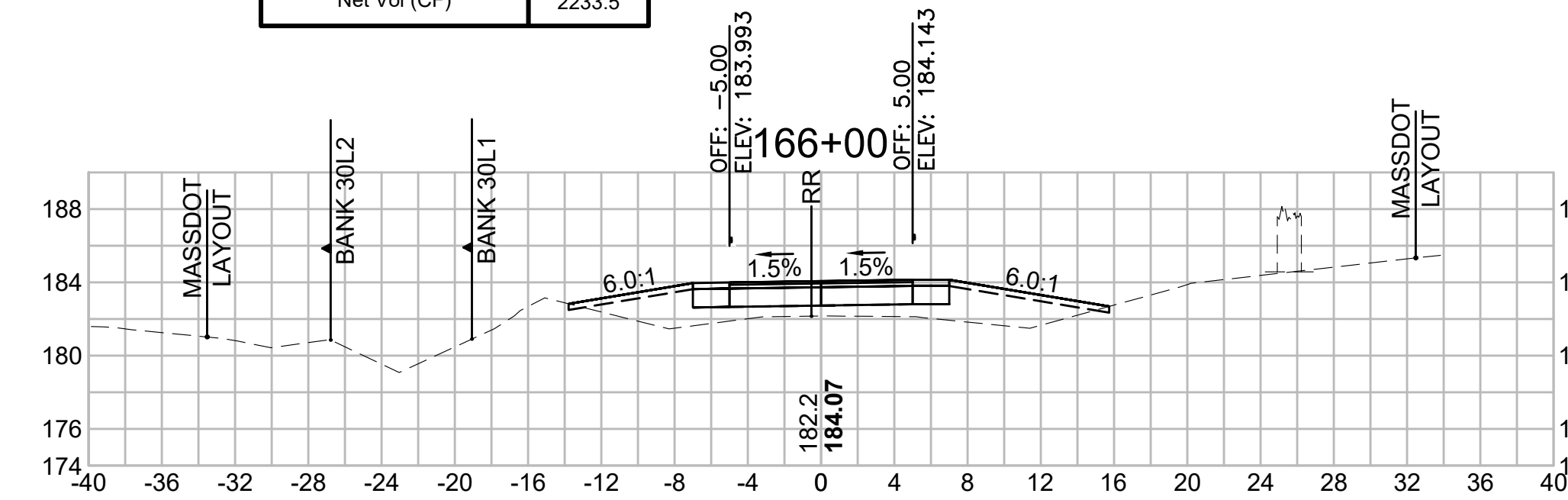
Total Volume at Station 164+50.00

Cut Area (SF)	6,792
Fill Area (SF)	5,512
Cut Vol (CF)	23.5
Fill Vol (CF)	6.8
Cum Cut Vol (CF)	4625.9
Cum Fill Vol (CF)	2296.6
Net Vol (CF)	2329.2



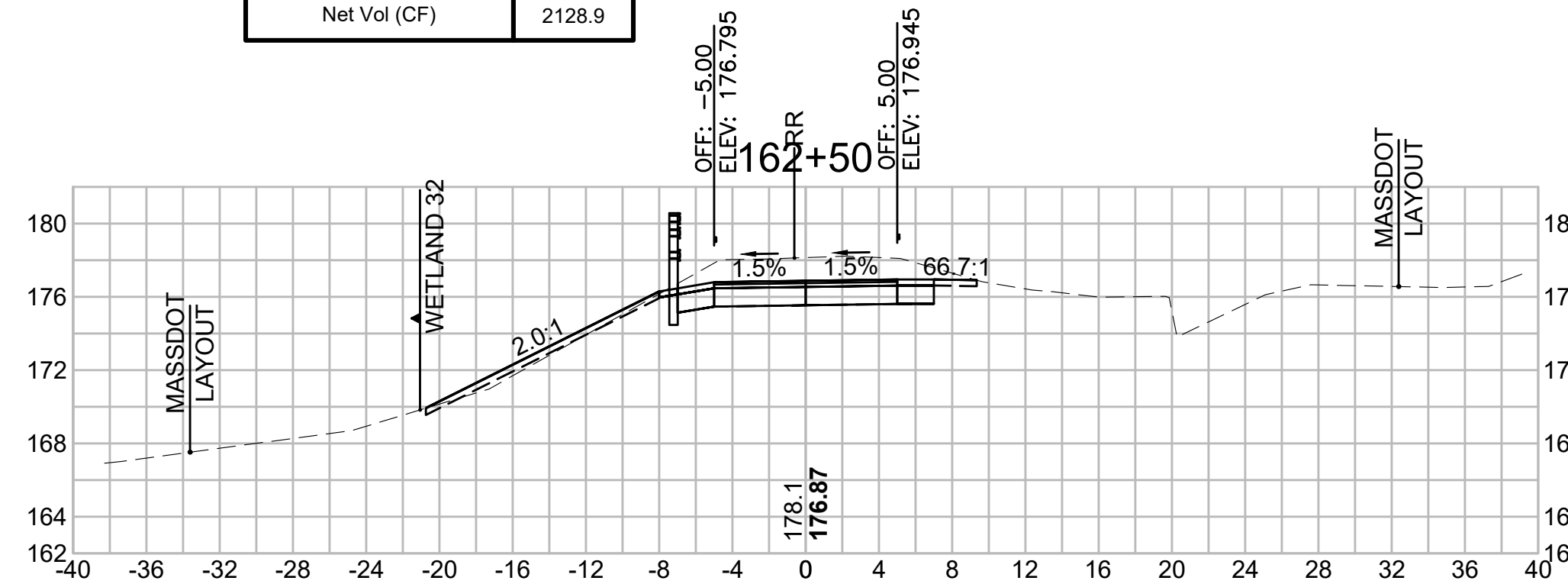
Total Volume at Station 166+00.00

Cut Area (SF)	0,263
Fill Area (SF)	26,994
Cut Vol (CF)	0.5
Fill Vol (CF)	47.0
Cum Cut Vol (CF)	4634.4
Cum Fill Vol (CF)	2400.9
Net Vol (CF)	2233.5



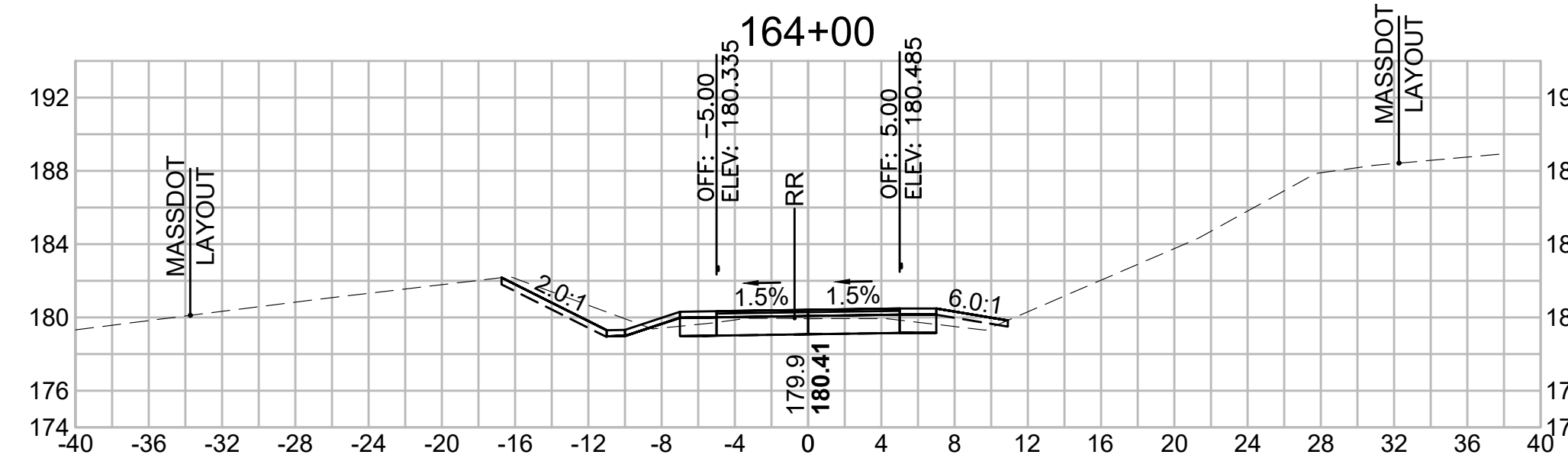
Total Volume at Station 162+50.00

Cut Area (SF)	38,865
Fill Area (SF)	1,063
Cut Vol (CF)	78.9
Fill Vol (CF)	1.0
Cum Cut Vol (CF)	4416.1
Cum Fill Vol (CF)	2287.2
Net Vol (CF)	2128.9



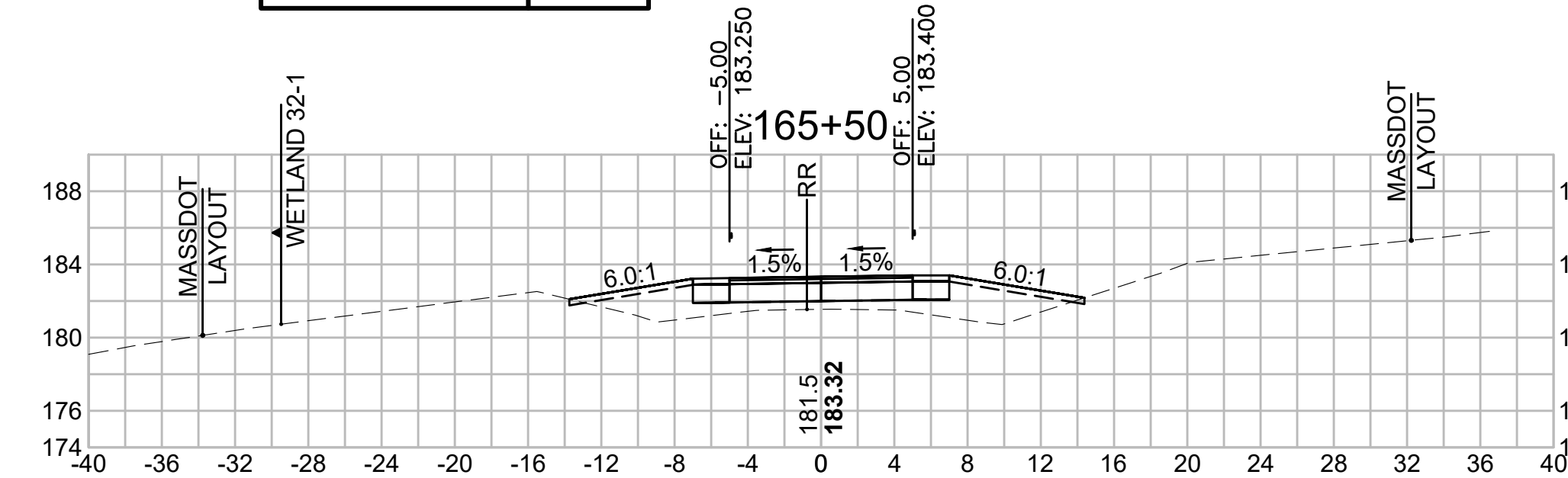
Total Volume at Station 164+00.00

Cut Area (SF)	18,630
Fill Area (SF)	1,805
Cut Vol (CF)	46.0
Fill Vol (CF)	1.7
Cum Cut Vol (CF)	4602.3
Cum Fill Vol (CF)	2289.9
Net Vol (CF)	2312.5



Total Volume at Station 165+50.00

Cut Area (SF)	0,254
Fill Area (SF)	23,819
Cut Vol (CF)	1.0
Fill Vol (CF)	37.1
Cum Cut Vol (CF)	4633.9
Cum Fill Vol (CF)	2353.9
Net Vol (CF)	2280.0



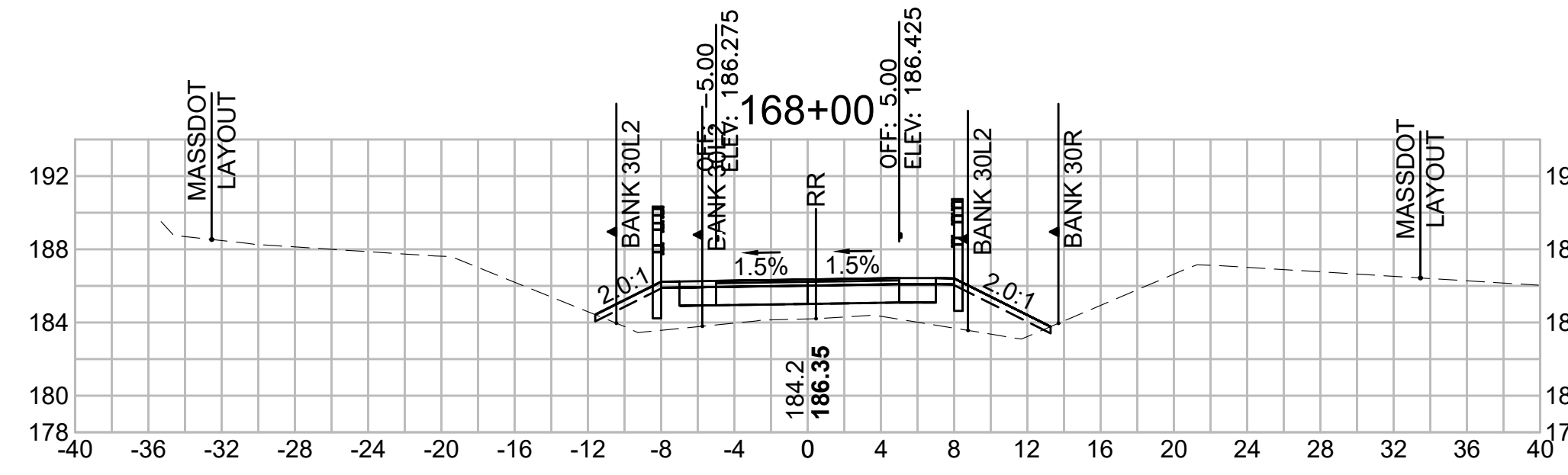
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	259	318
PROJECT FILE NO. 608164			

CROSS SECTIONS

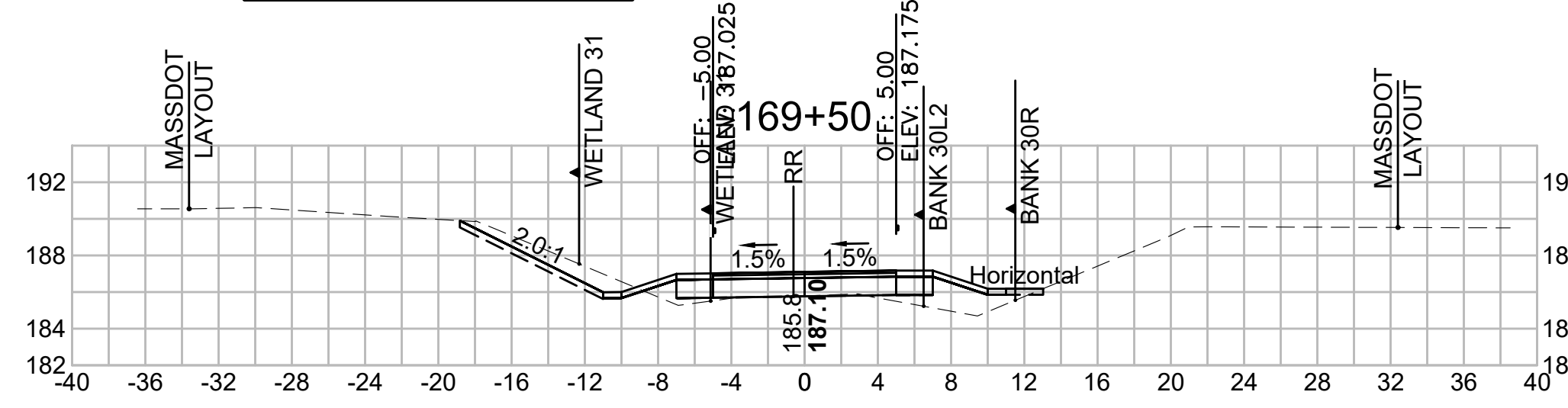
Total Volume at Station 168+00.00

Cut Area (SF)	1.753
Fill Area (SF)	28.680
Cut Vol (CF)	10.6
Fill Vol (CF)	58.8
Cum Cut Vol (CF)	4667.9
Cum Fill Vol (CF)	2624.2
Net Vol (CF)	2043.6



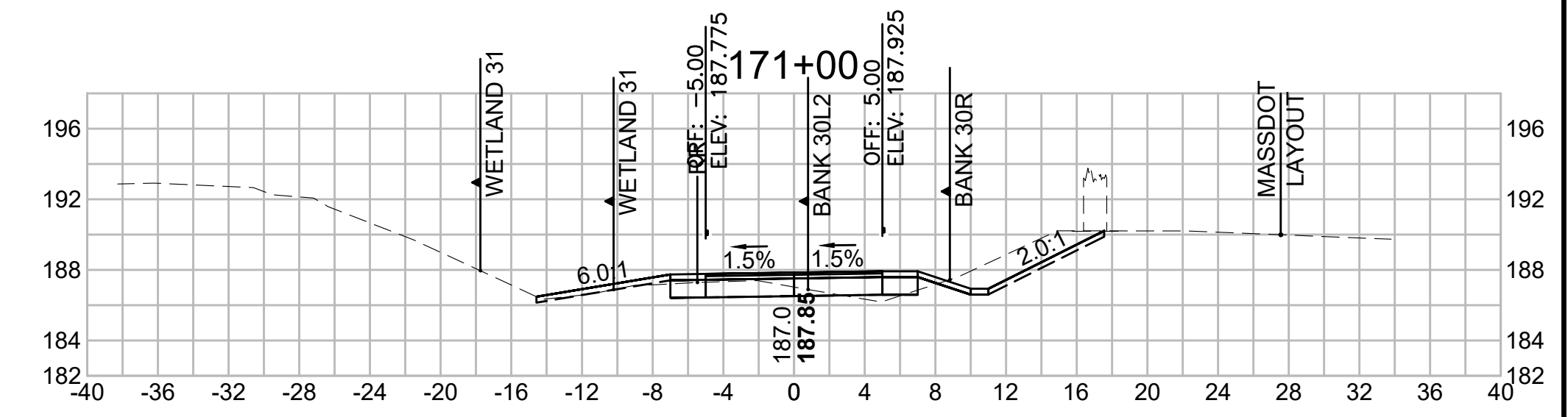
Total Volume at Station 169+50.00

Cut Area (SF)	10.732
Fill Area (SF)	8.648
Cut Vol (CF)	14.3
Fill Vol (CF)	22.6
Cum Cut Vol (CF)	4688.7
Cum Fill Vol (CF)	2745.2
Net Vol (CF)	1943.5



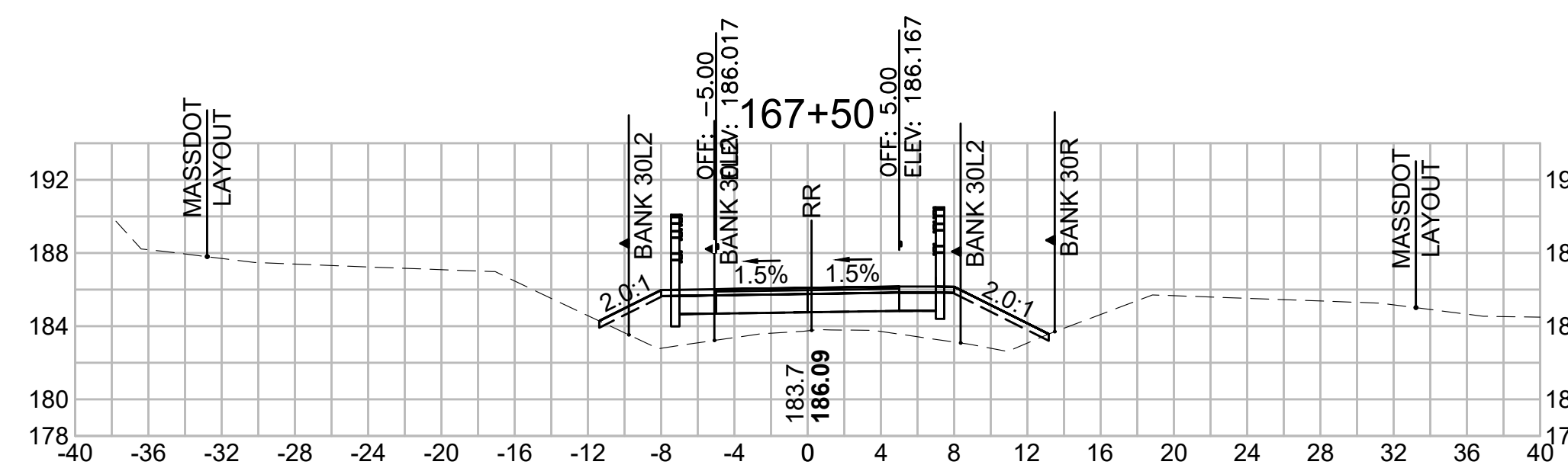
Total Volume at Station 171+00.00

Cut Area (SF)	19.179
Fill Area (SF)	1.323
Cut Vol (CF)	30.6
Fill Vol (CF)	6.6
Cum Cut Vol (CF)	4760.6
Cum Fill Vol (CF)	2781.9
Net Vol (CF)	1978.7



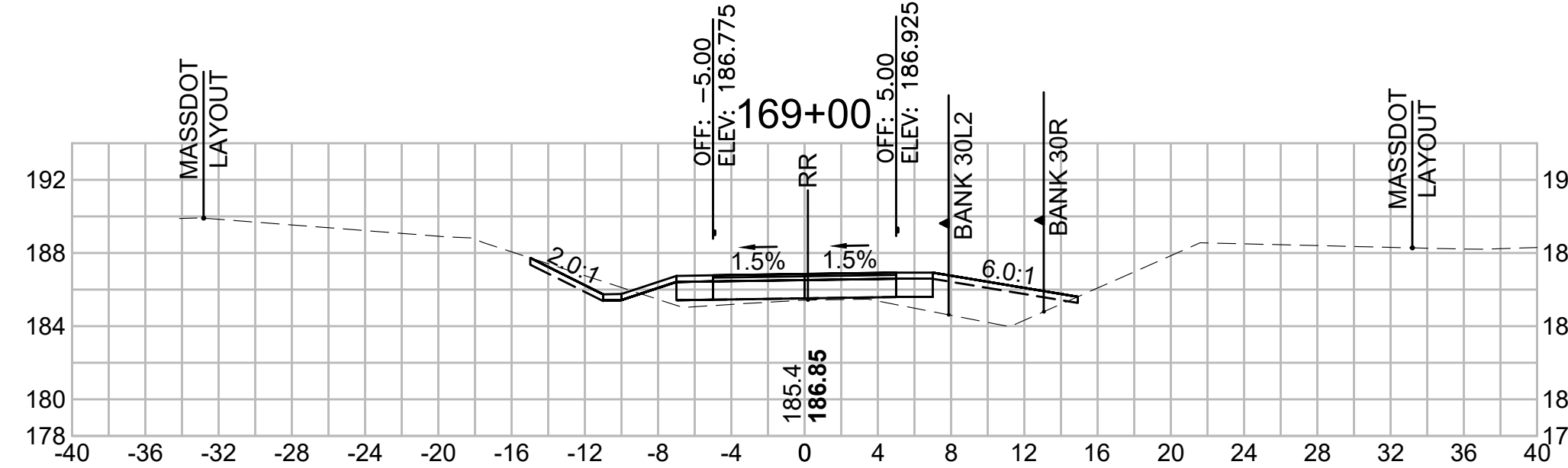
Total Volume at Station 167+50.00

Cut Area (SF)	9.708
Fill Area (SF)	34.842
Cut Vol (CF)	13.6
Fill Vol (CF)	58.7
Cum Cut Vol (CF)	4657.2
Cum Fill Vol (CF)	2565.4
Net Vol (CF)	2091.8



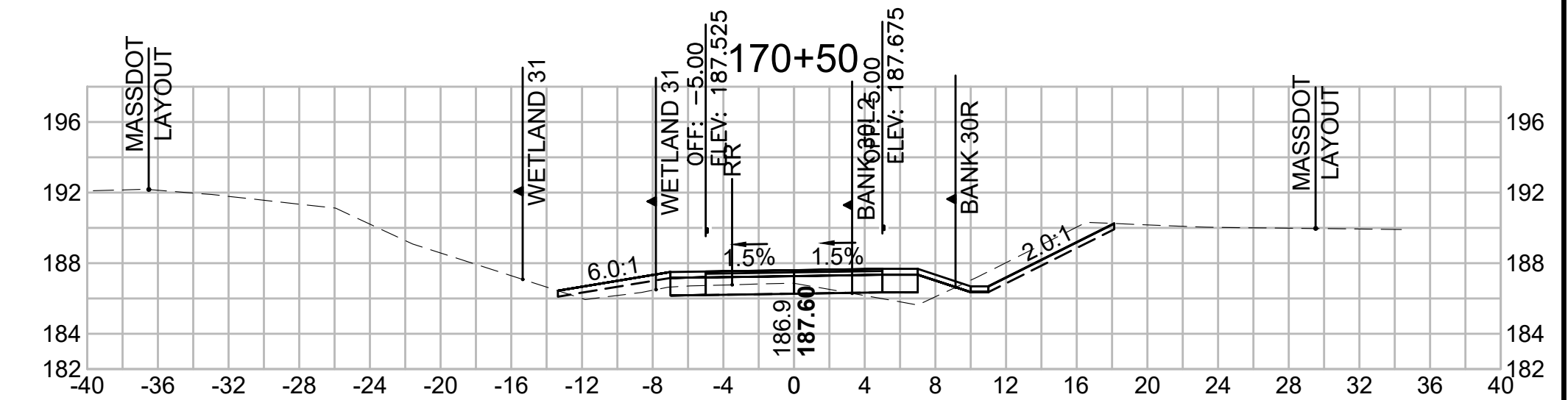
Total Volume at Station 169+00.00

Cut Area (SF)	4.696
Fill Area (SF)	15.803
Cut Vol (CF)	4.6
Fill Vol (CF)	43.2
Cum Cut Vol (CF)	4674.4
Cum Fill Vol (CF)	2722.5
Net Vol (CF)	1951.9



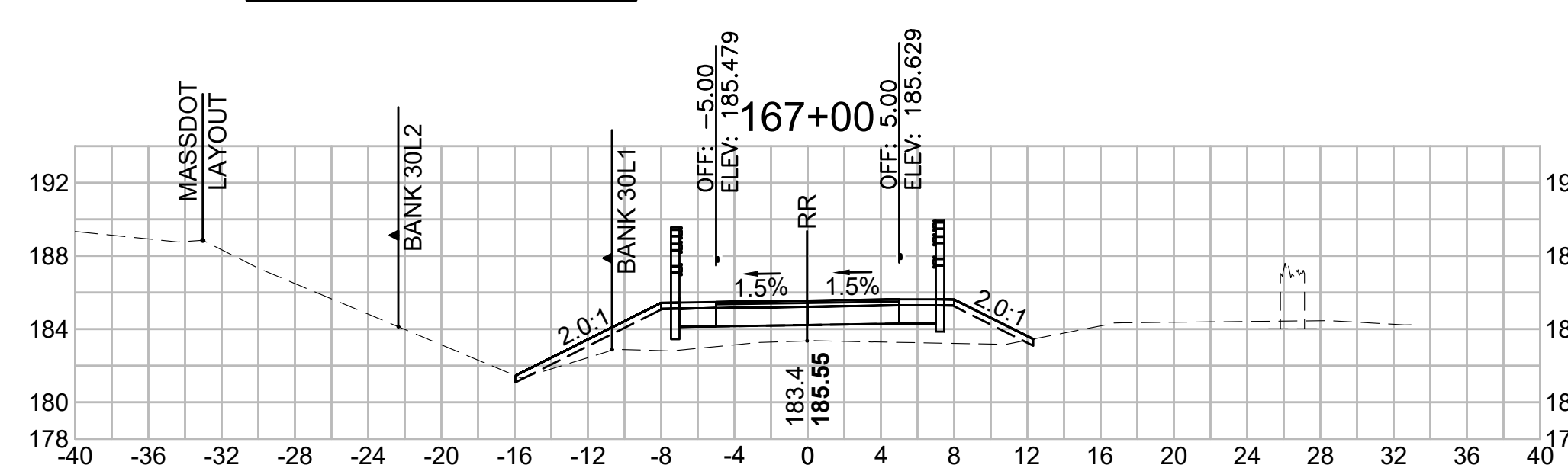
Total Volume at Station 170+50.00

Cut Area (SF)	13.832
Fill Area (SF)	5.840
Cut Vol (CF)	22.1
Fill Vol (CF)	13.8
Cum Cut Vol (CF)	4730.0
Cum Fill Vol (CF)	2775.3
Net Vol (CF)	1954.8



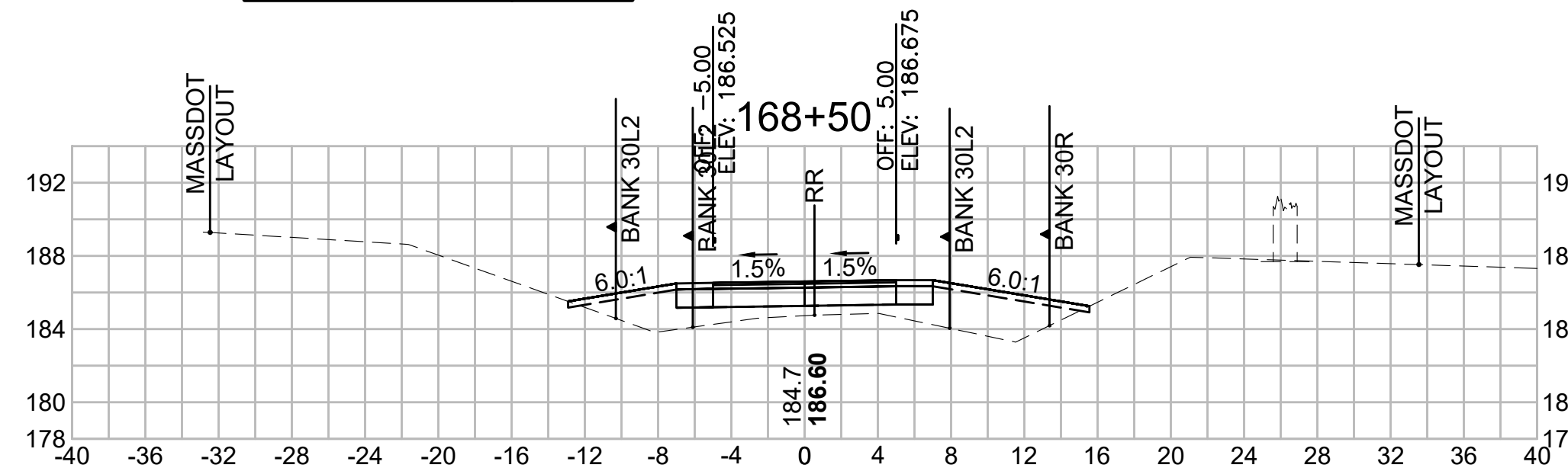
Total Volume at Station 167+00.00

Cut Area (SF)	4.951
Fill Area (SF)	28.554
Cut Vol (CF)	6.8
Fill Vol (CF)	53.6
Cum Cut Vol (CF)	4643.7
Cum Fill Vol (CF)	2506.7
Net Vol (CF)	2137.0



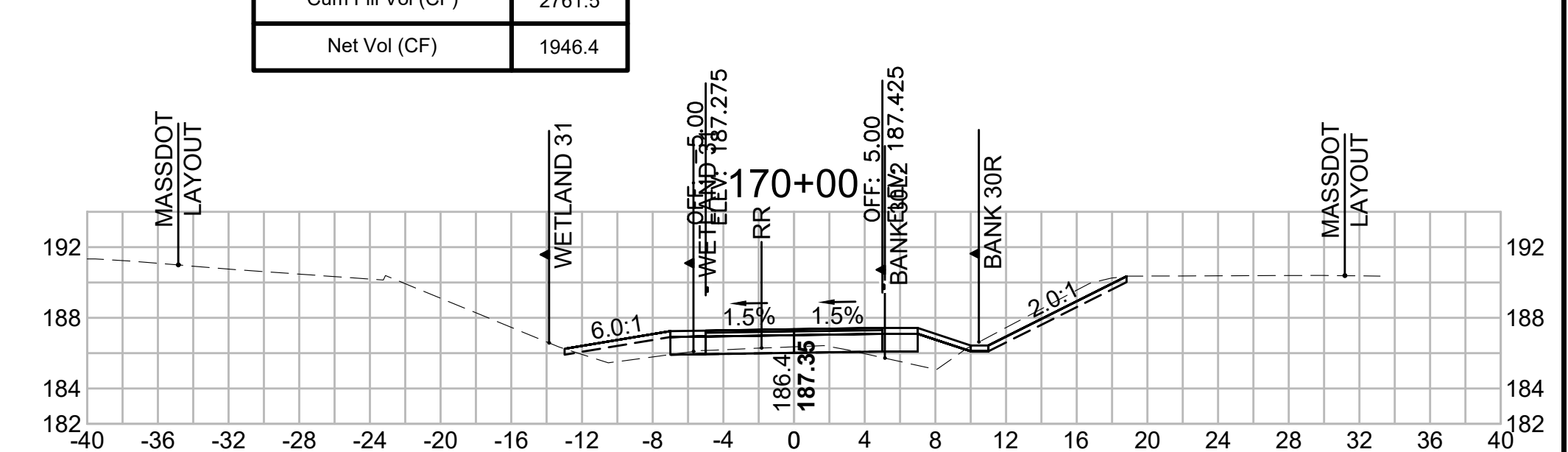
Total Volume at Station 168+50.00

Cut Area (SF)	0.290
Fill Area (SF)	30.838
Cut Vol (CF)	1.9
Fill Vol (CF)	55.1
Cum Cut Vol (CF)	4669.8
Cum Fill Vol (CF)	2679.3
Net Vol (CF)	1990.4



Total Volume at Station 170+00.00

Cut Area (SF)	10.063
Fill Area (SF)	9.015
Cut Vol (CF)	19.3
Fill Vol (CF)	16.4
Cum Cut Vol (CF)	4707.9
Cum Fill Vol (CF)	2761.5
Net Vol (CF)	1946.4



SUDBURY
BRUCE FREEMAN RAIL TRAIL

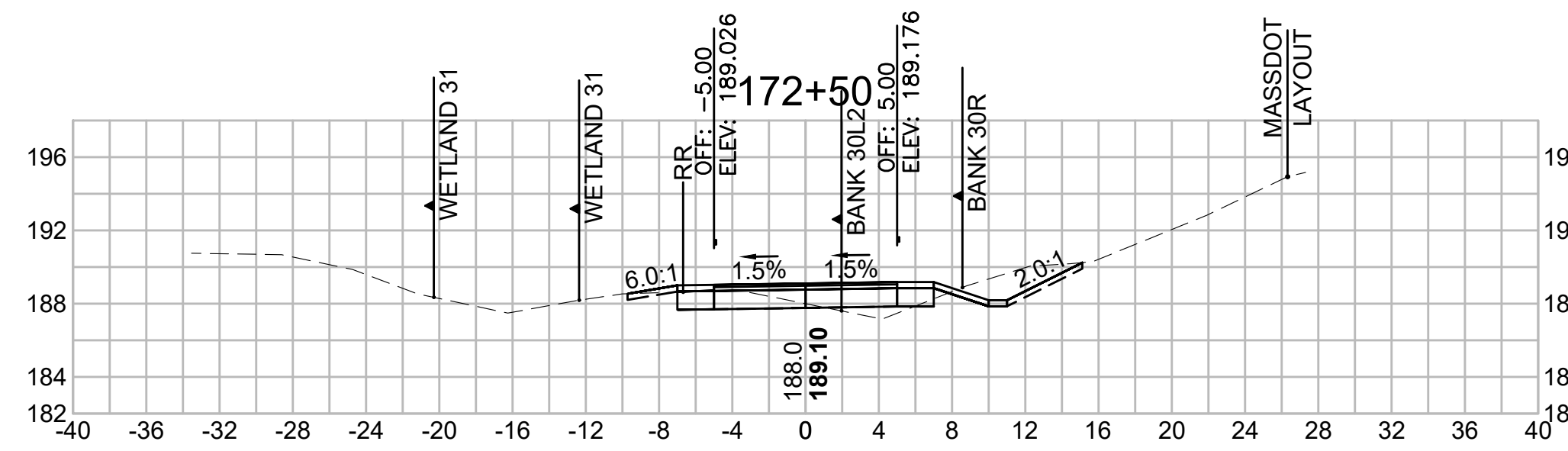
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	260	318

PROJECT FILE NO. 608164

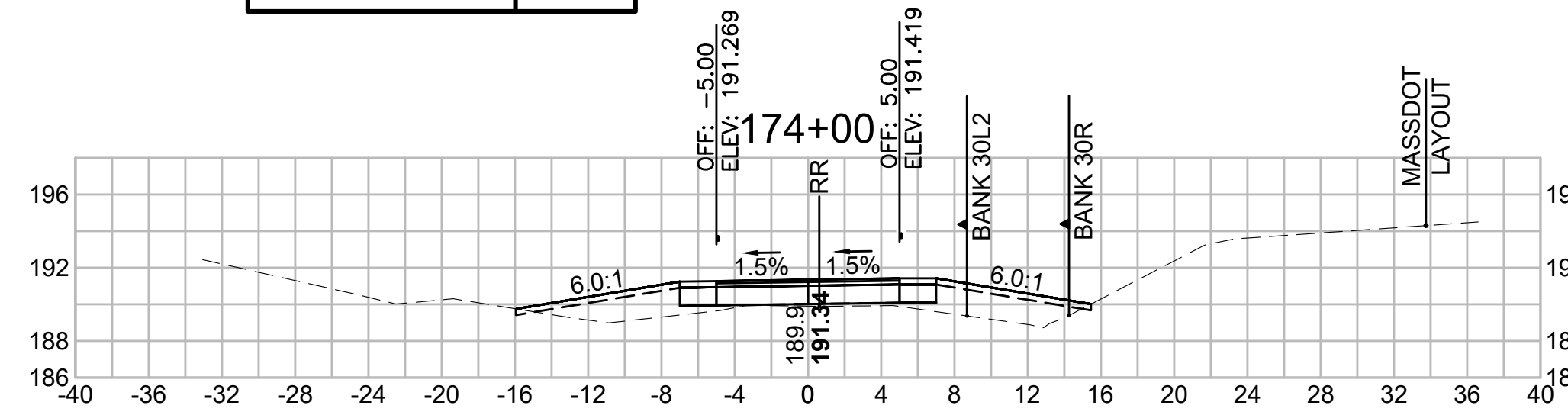
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

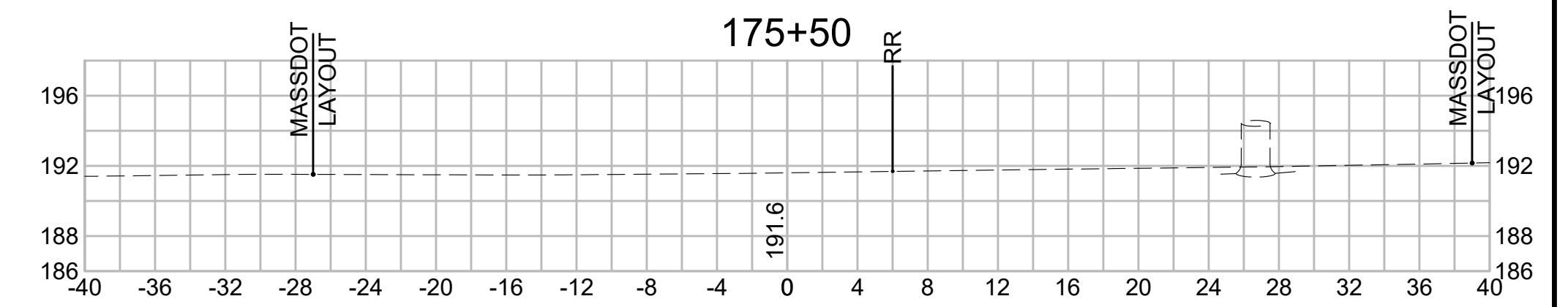
Total Volume at Station 172+50.00	
Cut Area (SF)	17.059
Fill Area (SF)	1.893
Cut Vol (CF)	35.3
Fill Vol (CF)	2.4
Cum Cut Vol (CF)	4875.8
Cum Fill Vol (CF)	2788.2
Net Vol (CF)	2087.6



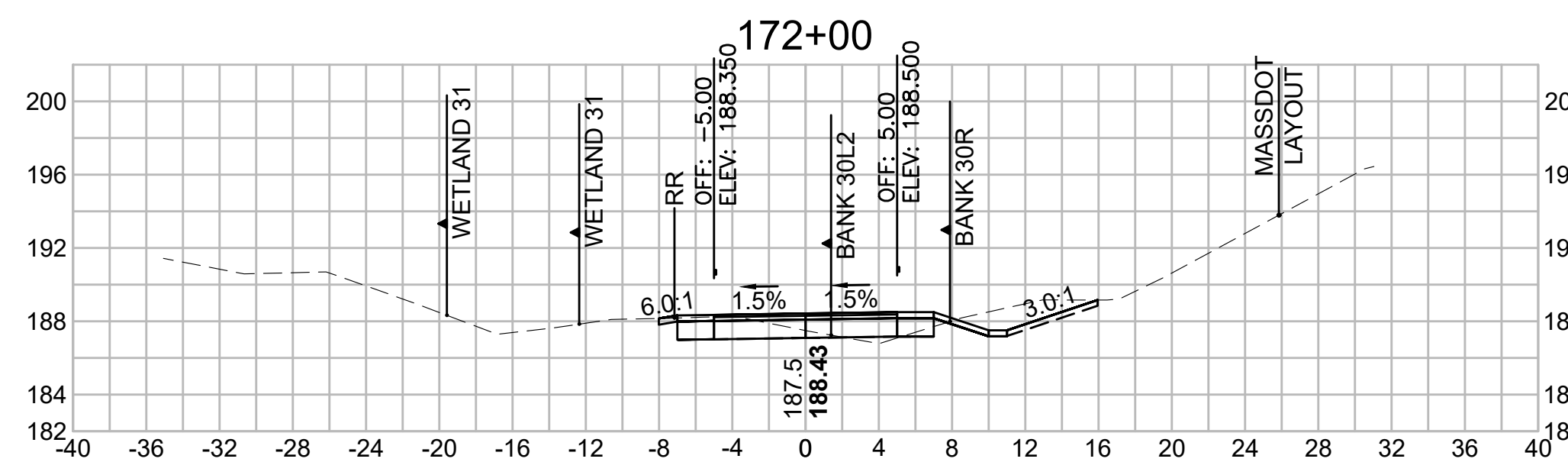
Total Volume at Station 174+00.00	
Cut Area (SF)	18.430
Fill Area (SF)	20.356
Cut Vol (CF)	22.4
Fill Vol (CF)	30.7
Cum Cut Vol (CF)	4934.2
Cum Fill Vol (CF)	2844.2
Net Vol (CF)	2090.0



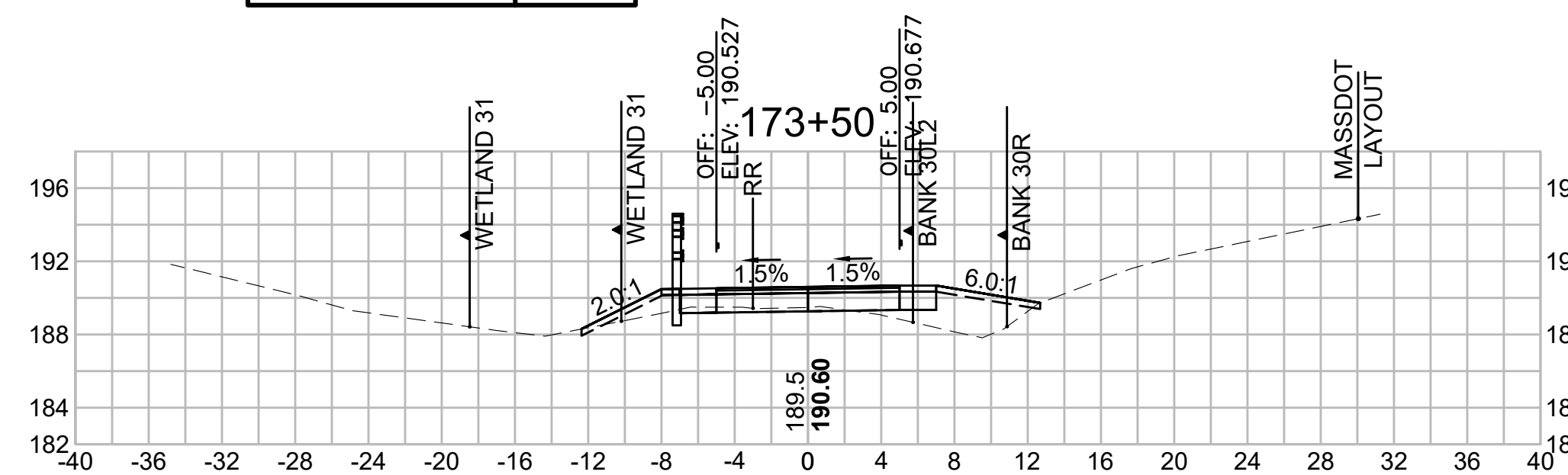
Total Volume at Station 175+50.00	
Cut Area (SF)	53.884
Fill Area (SF)	0.000
Cut Vol (CF)	97.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	5147.7
Cum Fill Vol (CF)	2869.4
Net Vol (CF)	2278.3



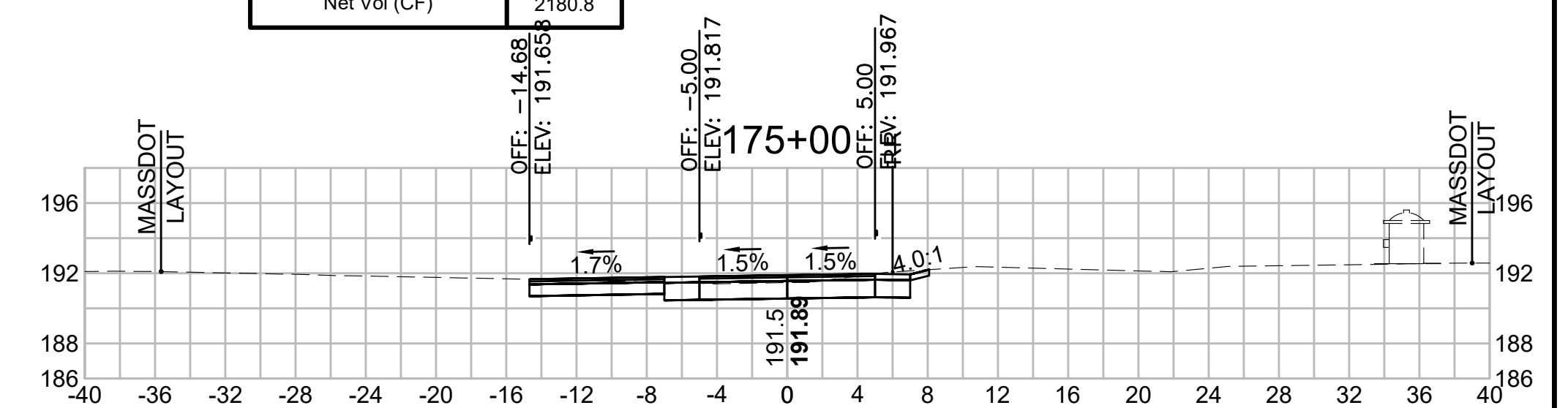
Total Volume at Station 172+00.00	
Cut Area (SF)	21.079
Fill Area (SF)	0.749
Cut Vol (CF)	40.8
Fill Vol (CF)	1.7
Cum Cut Vol (CF)	4840.5
Cum Fill Vol (CF)	2785.8
Net Vol (CF)	2054.7



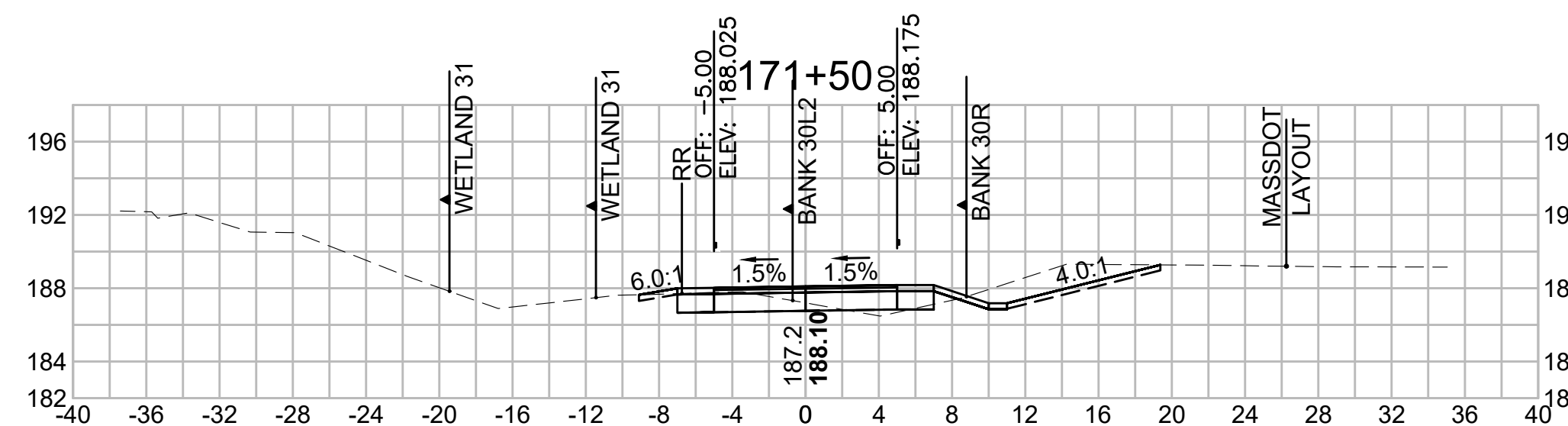
Total Volume at Station 173+50.00	
Cut Area (SF)	5.720
Fill Area (SF)	12.803
Cut Vol (CF)	12.8
Fill Vol (CF)	17.7
Cum Cut Vol (CF)	4911.8
Cum Fill Vol (CF)	2813.5
Net Vol (CF)	2098.4



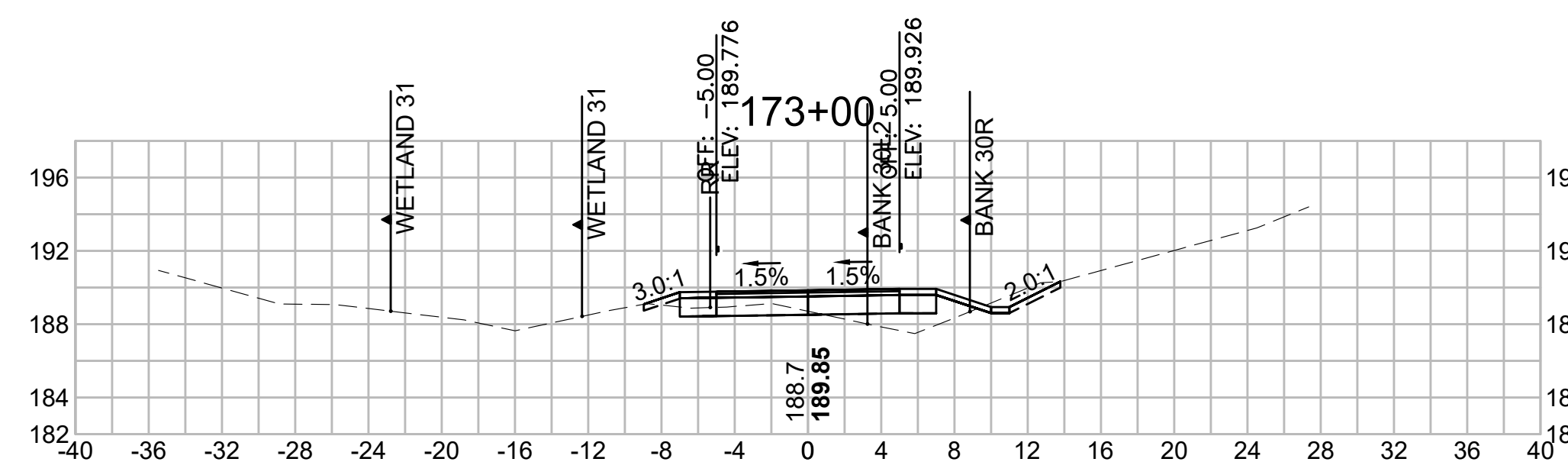
Total Volume at Station 175+00.00	
Cut Area (SF)	51.481
Fill Area (SF)	0.000
Cut Vol (CF)	73.3
Fill Vol (CF)	3.2
Cum Cut Vol (CF)	5050.1
Cum Fill Vol (CF)	2869.4
Net Vol (CF)	2180.8



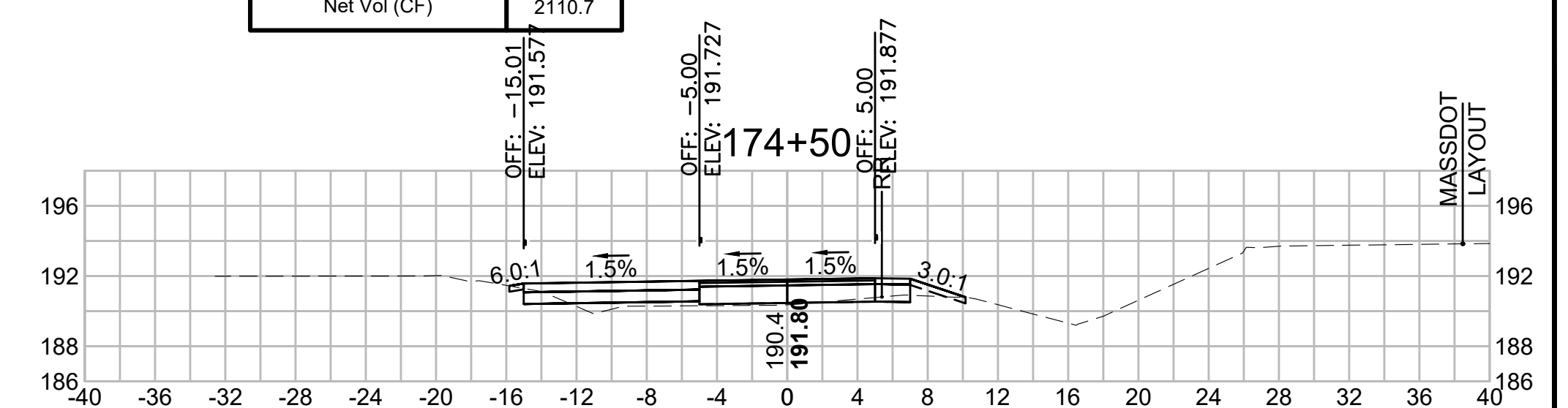
Total Volume at Station 171+50.00	
Cut Area (SF)	23.012
Fill Area (SF)	1.070
Cut Vol (CF)	39.1
Fill Vol (CF)	2.2
Cum Cut Vol (CF)	4799.7
Cum Fill Vol (CF)	2784.1
Net Vol (CF)	2015.6



Total Volume at Station 173+00.00	
Cut Area (SF)	8.068
Fill Area (SF)	6.275
Cut Vol (CF)	23.3
Fill Vol (CF)	7.6
Cum Cut Vol (CF)	4899.1
Cum Fill Vol (CF)	2795.8
Net Vol (CF)	2103.3



Total Volume at Station 174+50.00	
Cut Area (SF)	27.647
Fill Area (SF)	3.433
Cut Vol (CF)	42.7
Fill Vol (CF)	22.0
Cum Cut Vol (CF)	4976.9
Cum Fill Vol (CF)	2866.2
Net Vol (CF)	2110.7



SUDBURY
BRUCE FREEMAN RAIL TRAIL

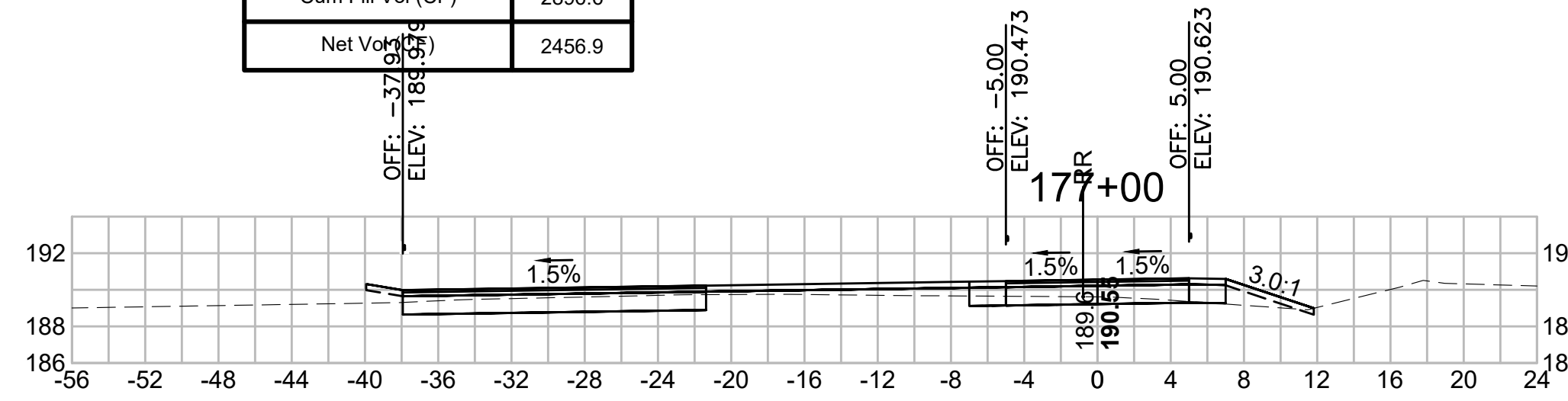
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	261	318

PROJECT FILE NO. 608164

CROSS SECTIONS

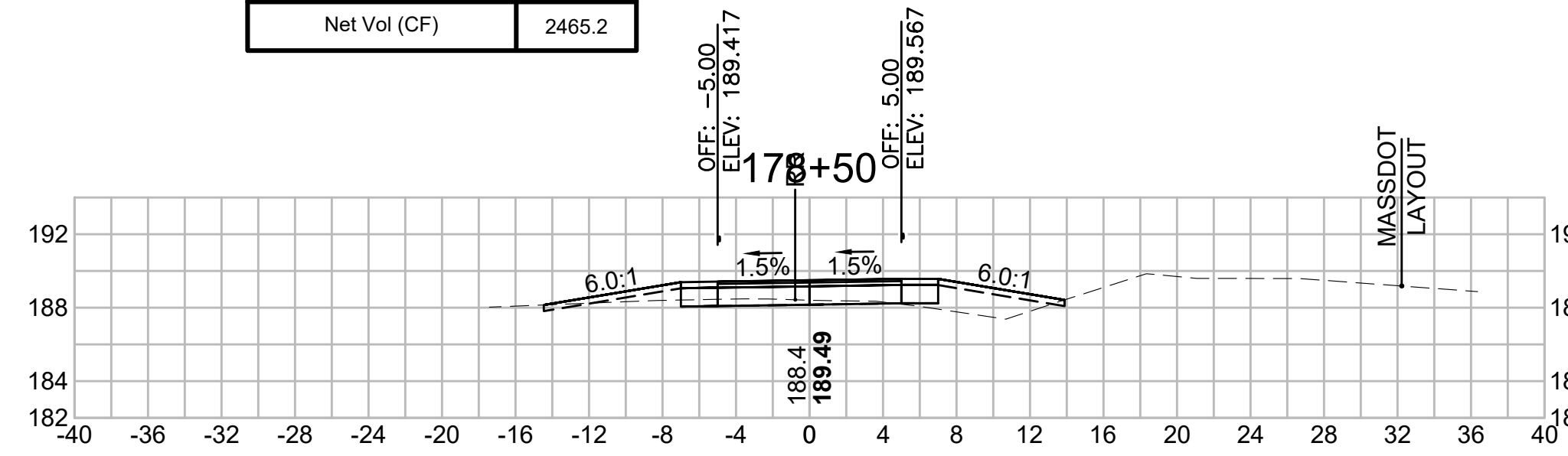
Total Volume at Station 177+00.00

Cut Area (SF)	17.842
Fill Area (SF)	11.279
Cut Vol (CF)	47.3
Fill Vol (CF)	15.6
Cum Cut Vol (CF)	5353.5
Cum Fill Vol (CF)	2896.6
Net Vol (CF)	2456.9



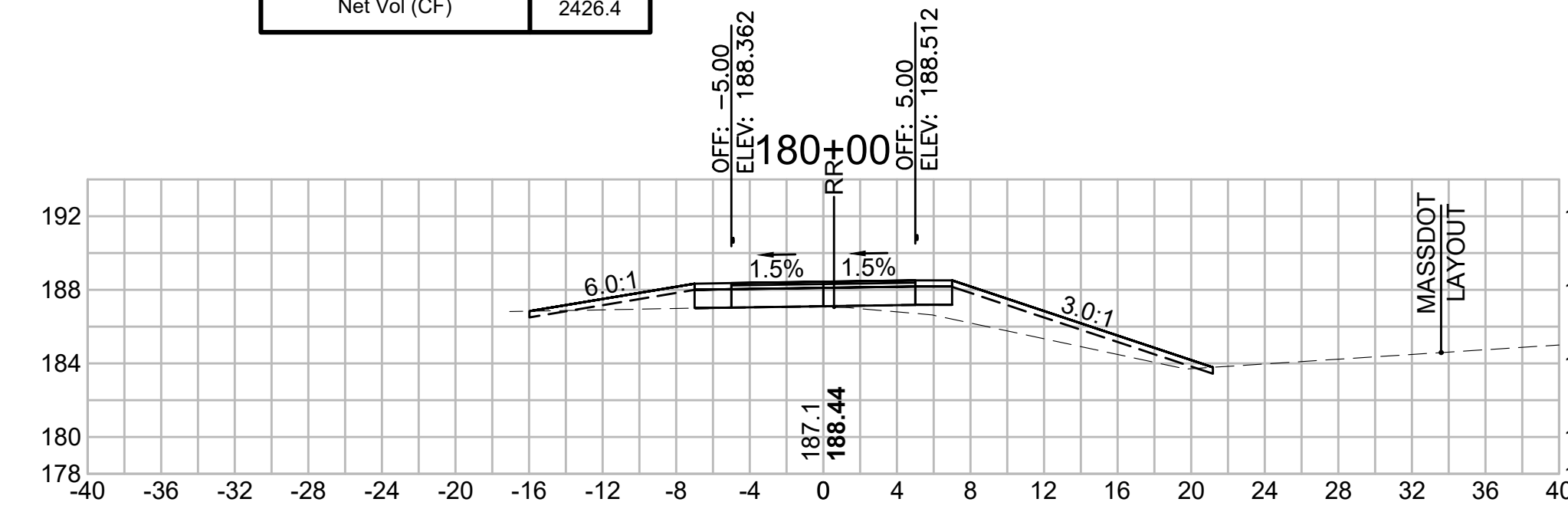
Total Volume at Station 178+50.00

Cut Area (SF)	4.589
Fill Area (SF)	8.137
Cut Vol (CF)	13.7
Fill Vol (CF)	13.2
Cum Cut Vol (CF)	5406.4
Cum Fill Vol (CF)	2941.3
Net Vol (CF)	2465.2



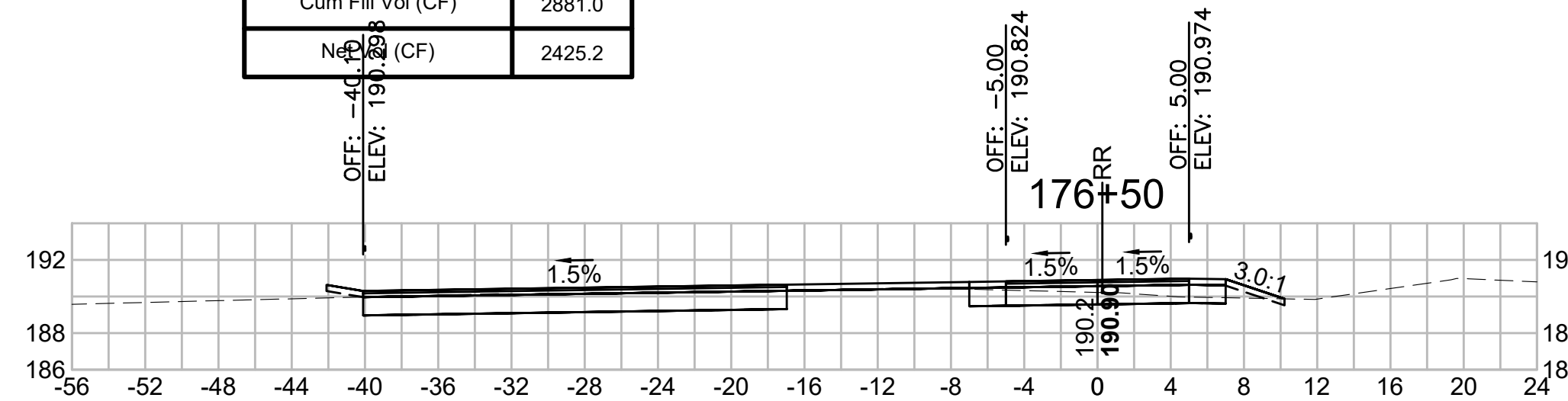
Total Volume at Station 180+00.00

Cut Area (SF)	0.645
Fill Area (SF)	18.383
Cut Vol (CF)	5.1
Fill Vol (CF)	24.3
Cum Cut Vol (CF)	5426.4
Cum Fill Vol (CF)	3000.0
Net Vol (CF)	2426.4



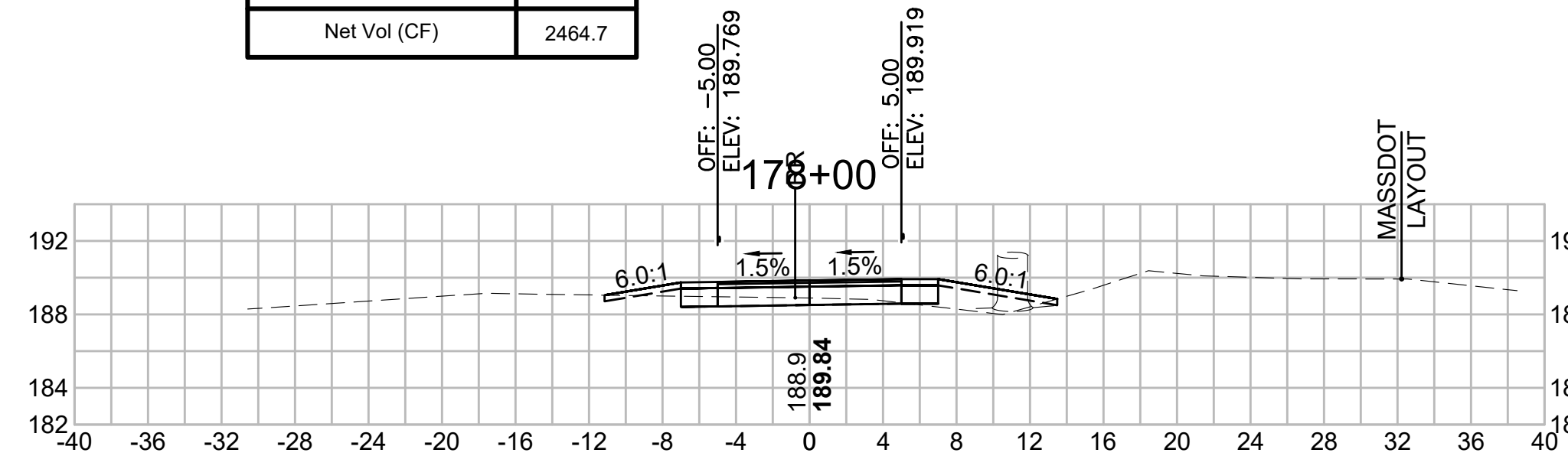
Total Volume at Station 176+50.00

Cut Area (SF)	33.198
Fill Area (SF)	5.555
Cut Vol (CF)	69.7
Fill Vol (CF)	8.4
Cum Cut Vol (CF)	5306.2
Cum Fill Vol (CF)	2881.0
Net Vol (CF)	2425.2



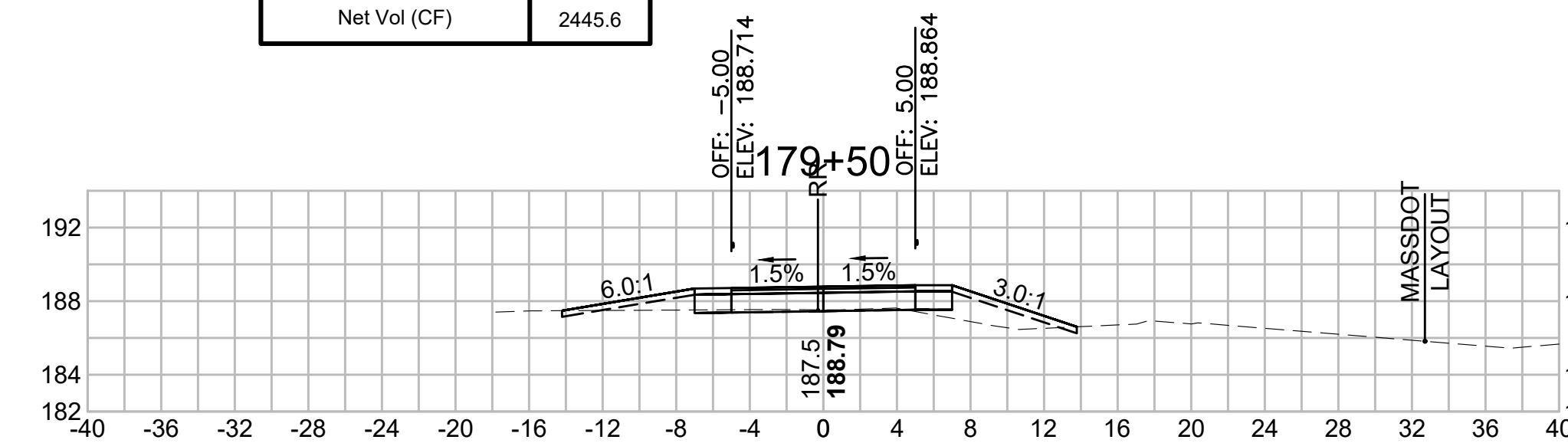
Total Volume at Station 178+00.00

Cut Area (SF)	10.165
Fill Area (SF)	6.125
Cut Vol (CF)	16.1
Fill Vol (CF)	13.4
Cum Cut Vol (CF)	5392.8
Cum Fill Vol (CF)	2928.1
Net Vol (CF)	2464.7



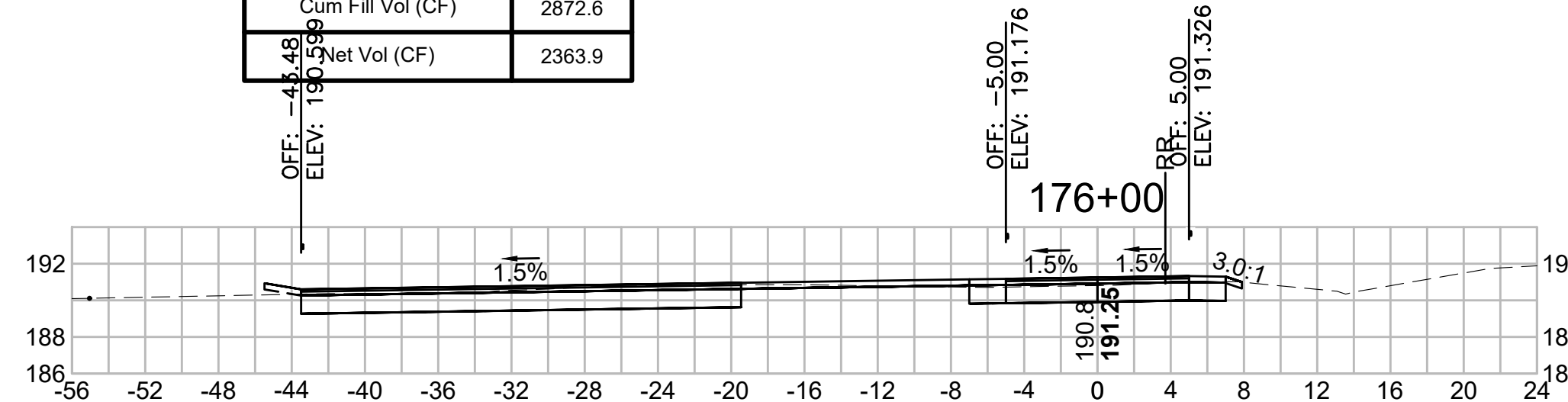
Total Volume at Station 179+50.00

Cut Area (SF)	4.862
Fill Area (SF)	7.855
Cut Vol (CF)	7.6
Fill Vol (CF)	17.1
Cum Cut Vol (CF)	5421.3
Cum Fill Vol (CF)	2975.7
Net Vol (CF)	2445.6



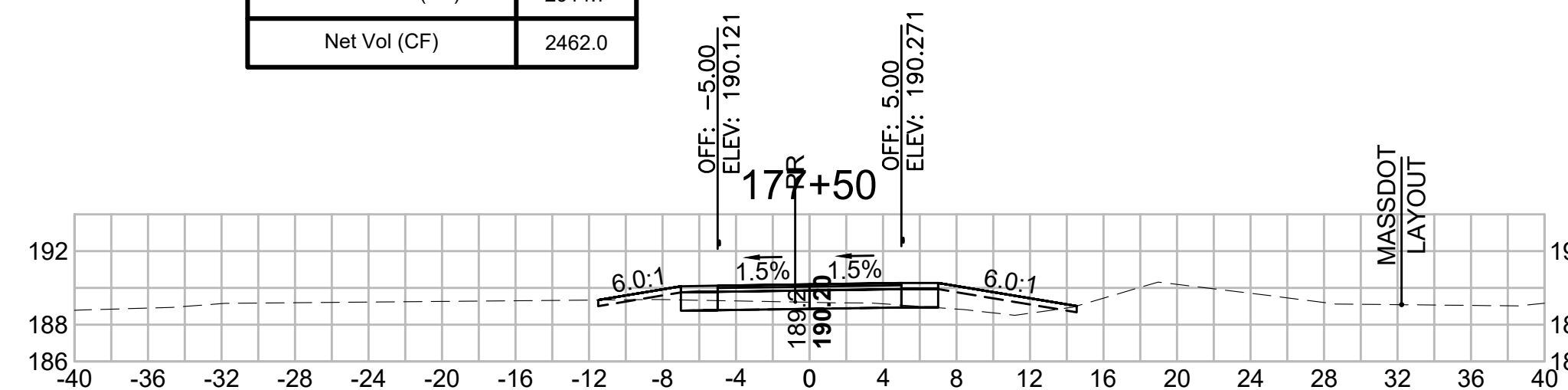
Total Volume at Station 176+00.00

Cut Area (SF)	42.074
Fill Area (SF)	3.492
Cut Vol (CF)	88.8
Fill Vol (CF)	3.2
Cum Cut Vol (CF)	5236.5
Cum Fill Vol (CF)	2872.6
Net Vol (CF)	2363.9



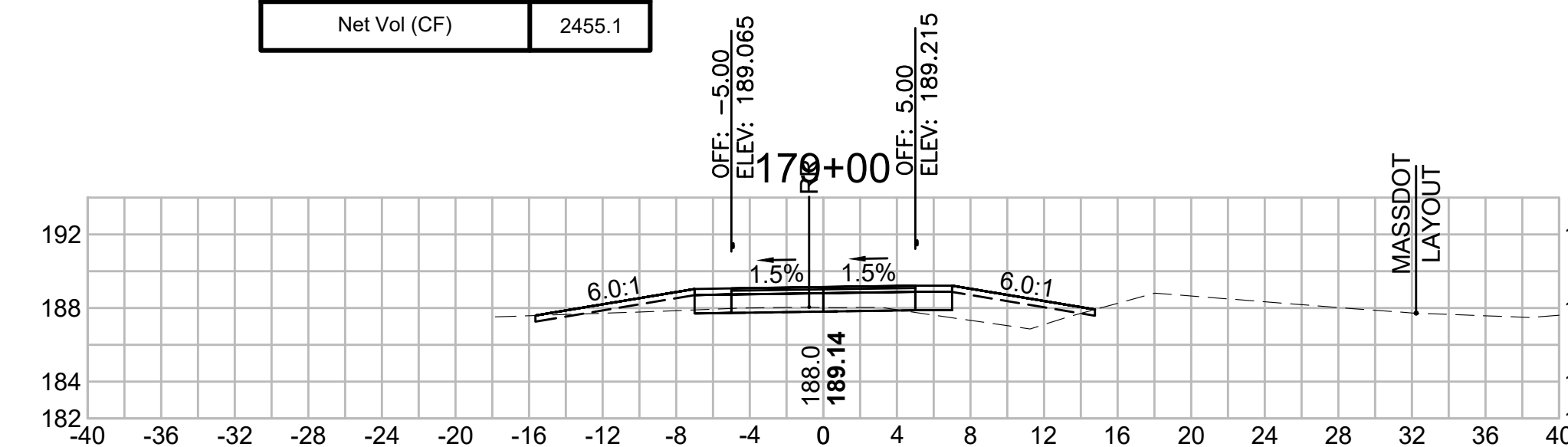
Total Volume at Station 177+50.00

Cut Area (SF)	7.197
Fill Area (SF)	8.297
Cut Vol (CF)	23.2
Fill Vol (CF)	18.1
Cum Cut Vol (CF)	5376.7
Cum Fill Vol (CF)	2914.7
Net Vol (CF)	2462.0



Total Volume at Station 179+00.00

Cut Area (SF)	3.318
Fill Area (SF)	10.592
Cut Vol (CF)	7.3
Fill Vol (CF)	17.3
Cum Cut Vol (CF)	5413.7
Cum Fill Vol (CF)	2958.6
Net Vol (CF)	2455.1



SUDBURY
BRUCE FREEMAN RAIL TRAIL

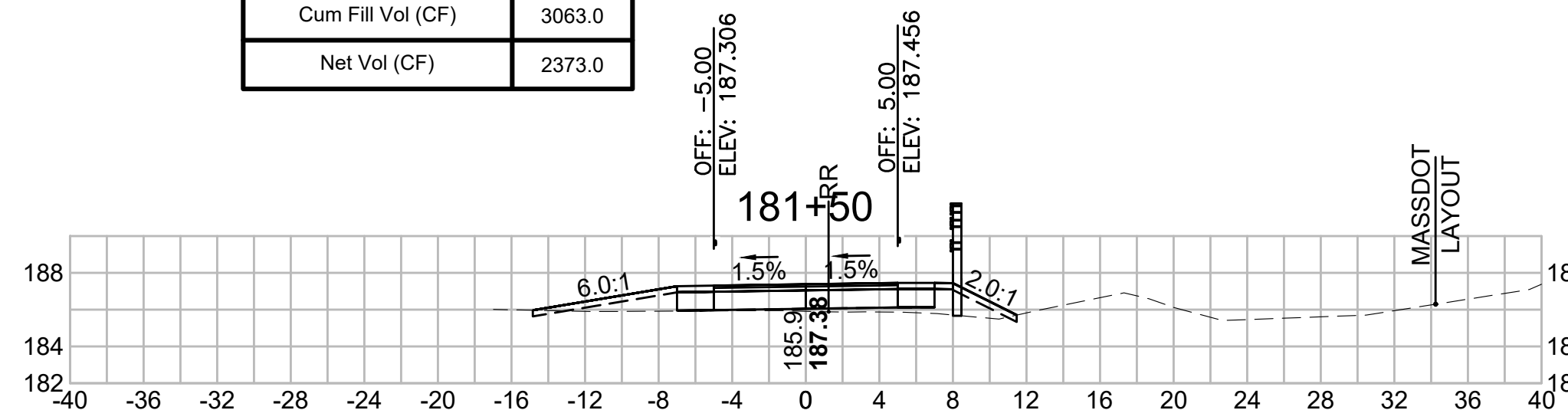
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	262	318

PROJECT FILE NO. 608164

CROSS SECTIONS

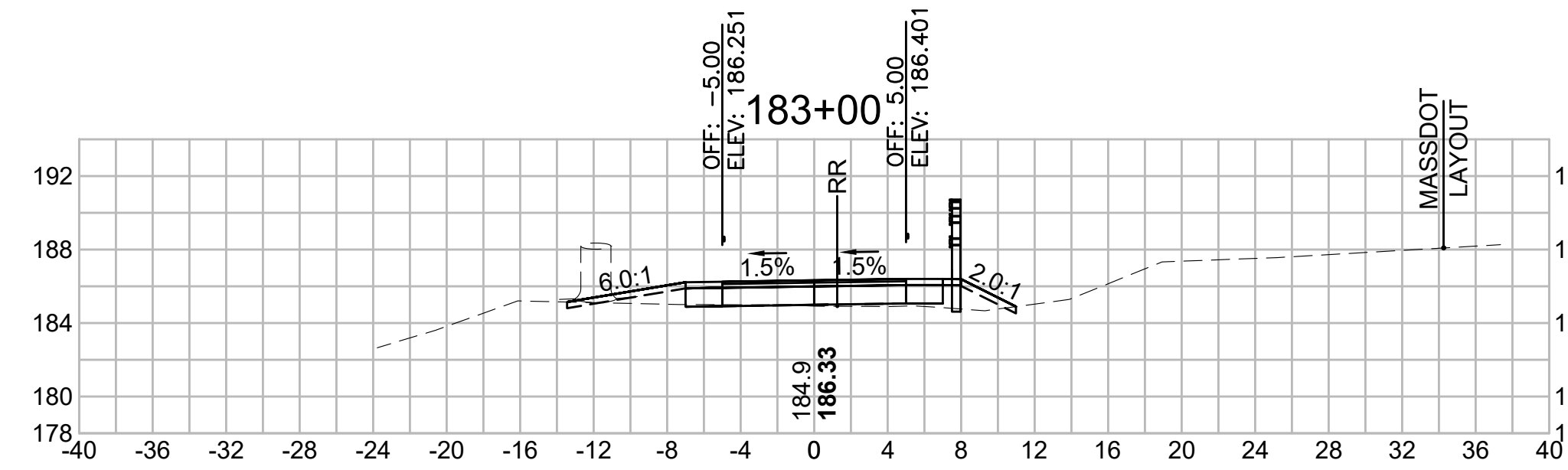
Total Volume at Station 181+50.00

Cut Area (SF)	1,346
Fill Area (SF)	8,786
Cut Vol (CF)	1.9
Fill Vol (CF)	19.4
Cum Cut Vol (CF)	5436.0
Cum Fill Vol (CF)	3063.0
Net Vol (CF)	2373.0



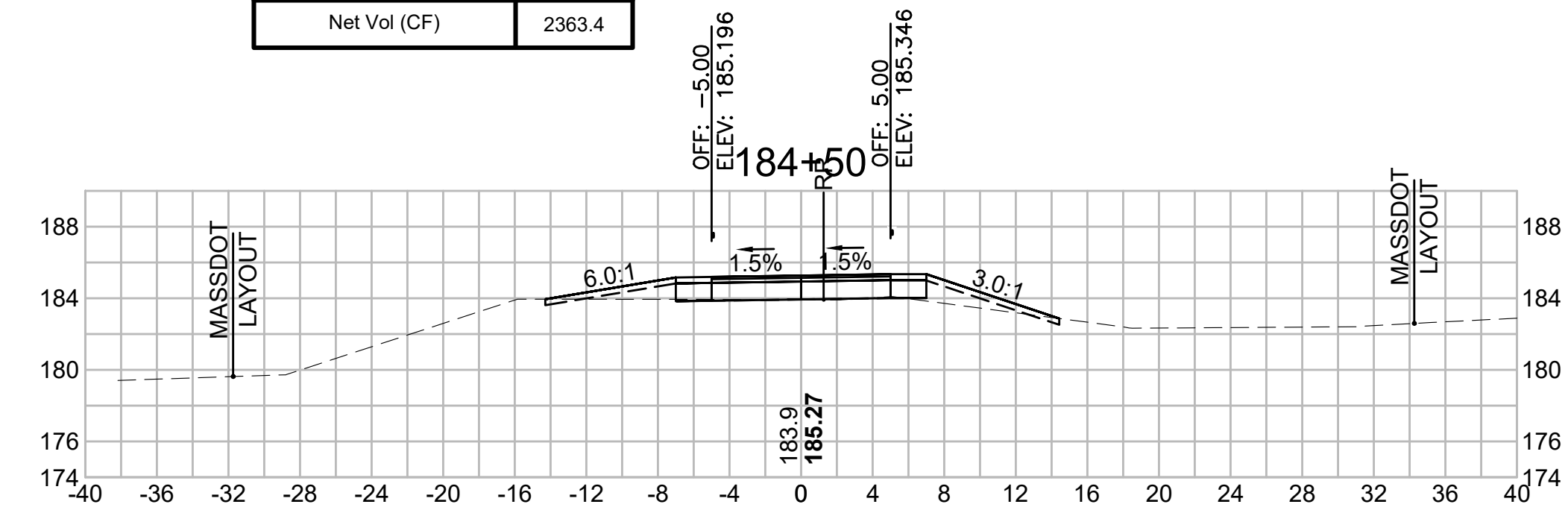
Total Volume at Station 183+00.00

Cut Area (SF)	2,529
Fill Area (SF)	5,951
Cut Vol (CF)	3.7
Fill Vol (CF)	10.5
Cum Cut Vol (CF)	5443.6
Cum Fill Vol (CF)	3098.9
Net Vol (CF)	2344.7



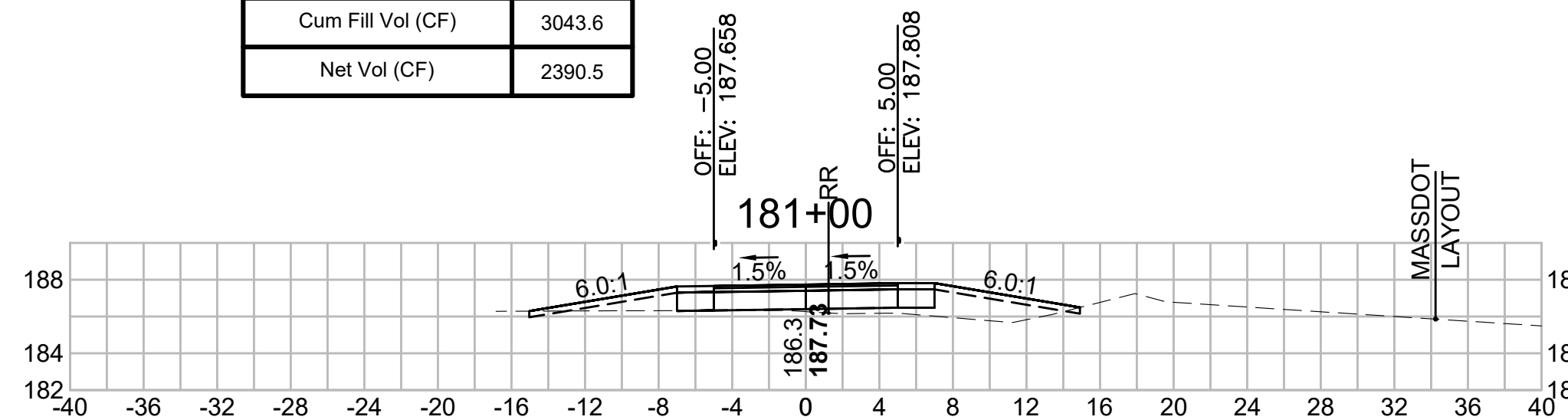
Total Volume at Station 184+50.00

Cut Area (SF)	6,232
Fill Area (SF)	6,019
Cut Vol (CF)	21.1
Fill Vol (CF)	11.5
Cum Cut Vol (CF)	5496.3
Cum Fill Vol (CF)	3132.9
Net Vol (CF)	2363.4



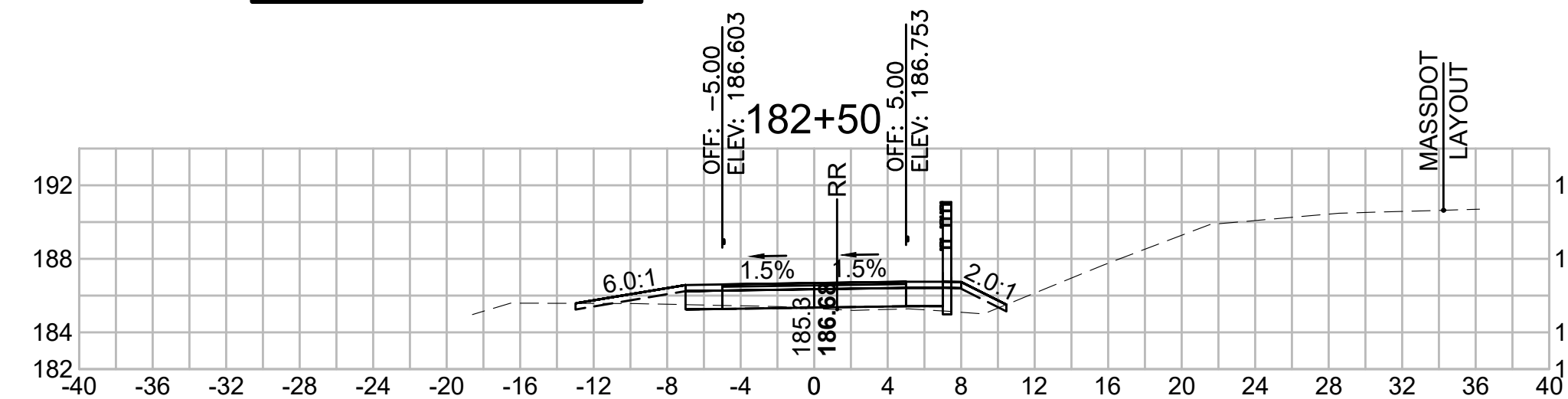
Total Volume at Station 181+00.00

Cut Area (SF)	0,695
Fill Area (SF)	12,165
Cut Vol (CF)	3.9
Fill Vol (CF)	18.9
Cum Cut Vol (CF)	5434.1
Cum Fill Vol (CF)	3043.6
Net Vol (CF)	2390.5



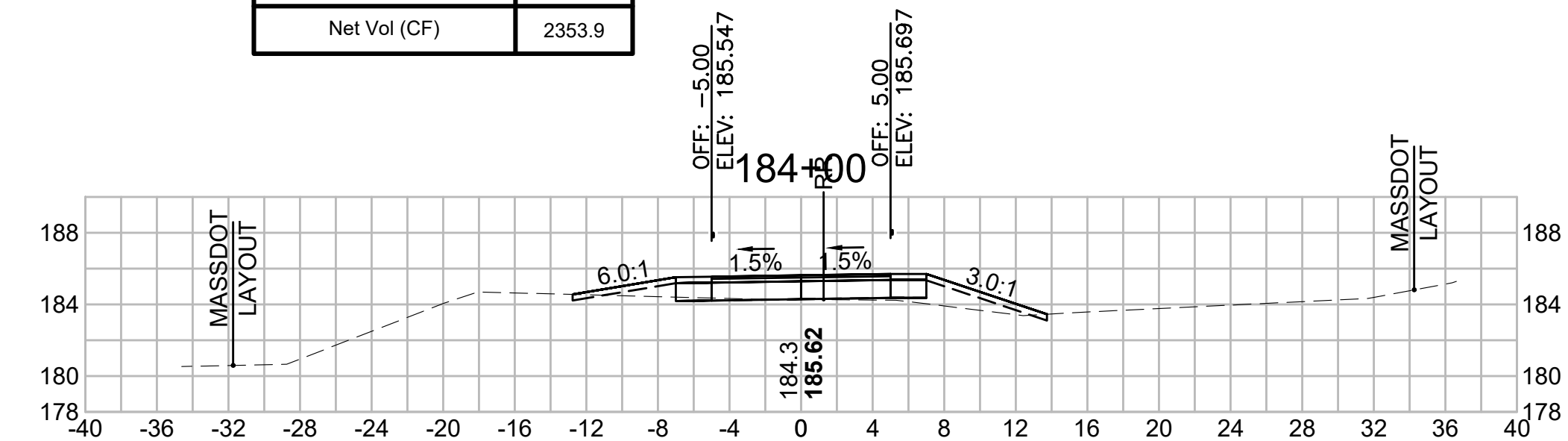
Total Volume at Station 182+50.00

Cut Area (SF)	1,419
Fill Area (SF)	5,417
Cut Vol (CF)	2.0
Fill Vol (CF)	11.1
Cum Cut Vol (CF)	5440.0
Cum Fill Vol (CF)	3088.4
Net Vol (CF)	2351.6



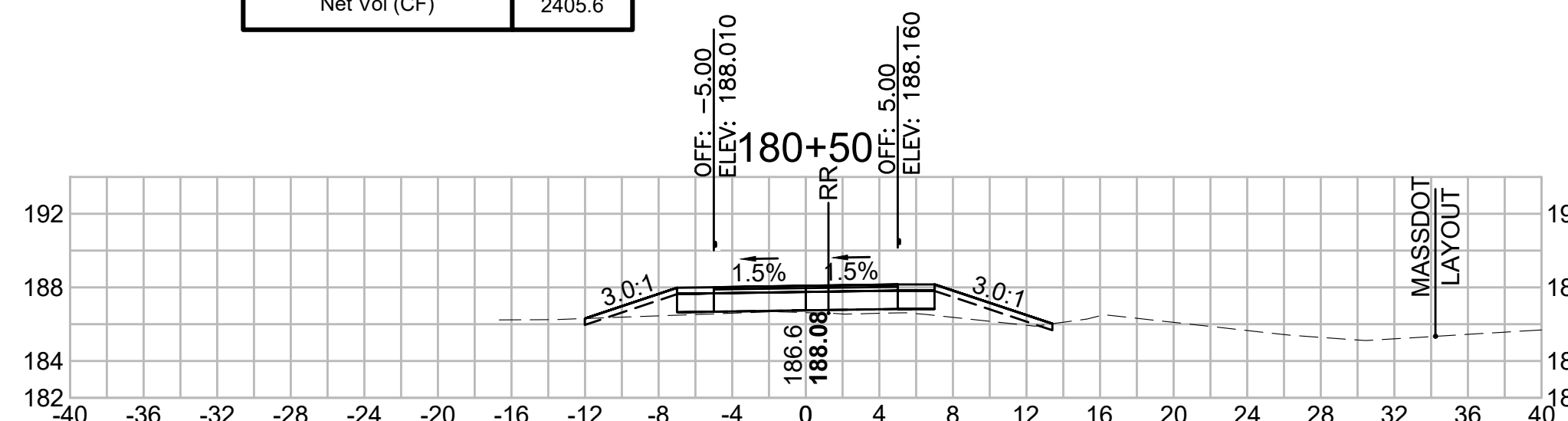
Total Volume at Station 184+00.00

Cut Area (SF)	16,514
Fill Area (SF)	6,420
Cut Vol (CF)	22.3
Fill Vol (CF)	11.5
Cum Cut Vol (CF)	5475.2
Cum Fill Vol (CF)	3121.4
Net Vol (CF)	2353.9



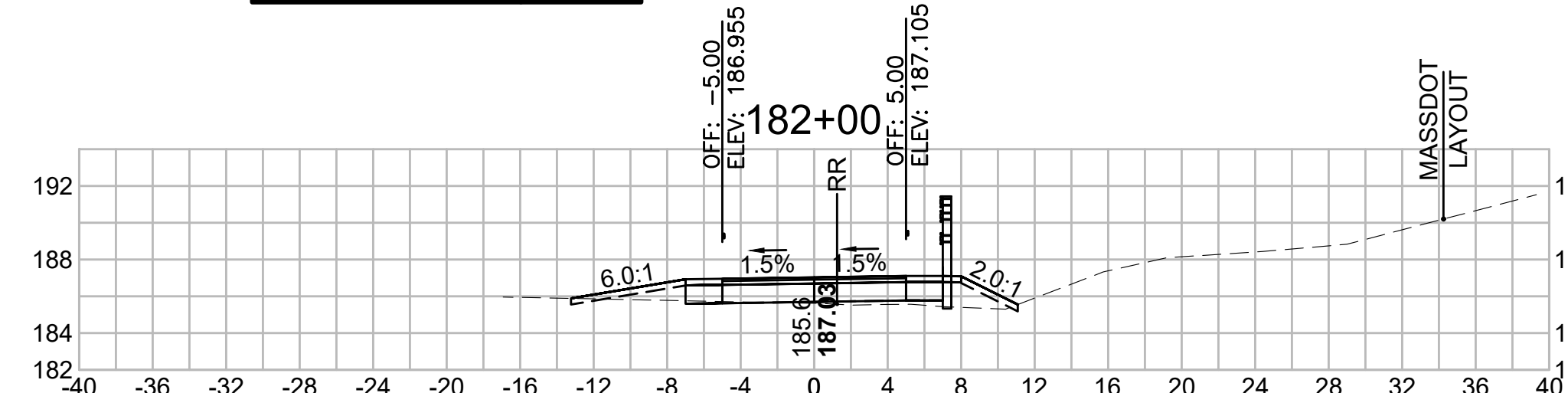
Total Volume at Station 180+50.00

Cut Area (SF)	3,507
Fill Area (SF)	8,297
Cut Vol (CF)	3.8
Fill Vol (CF)	24.7
Cum Cut Vol (CF)	5430.3
Cum Fill Vol (CF)	3024.7
Net Vol (CF)	2405.6



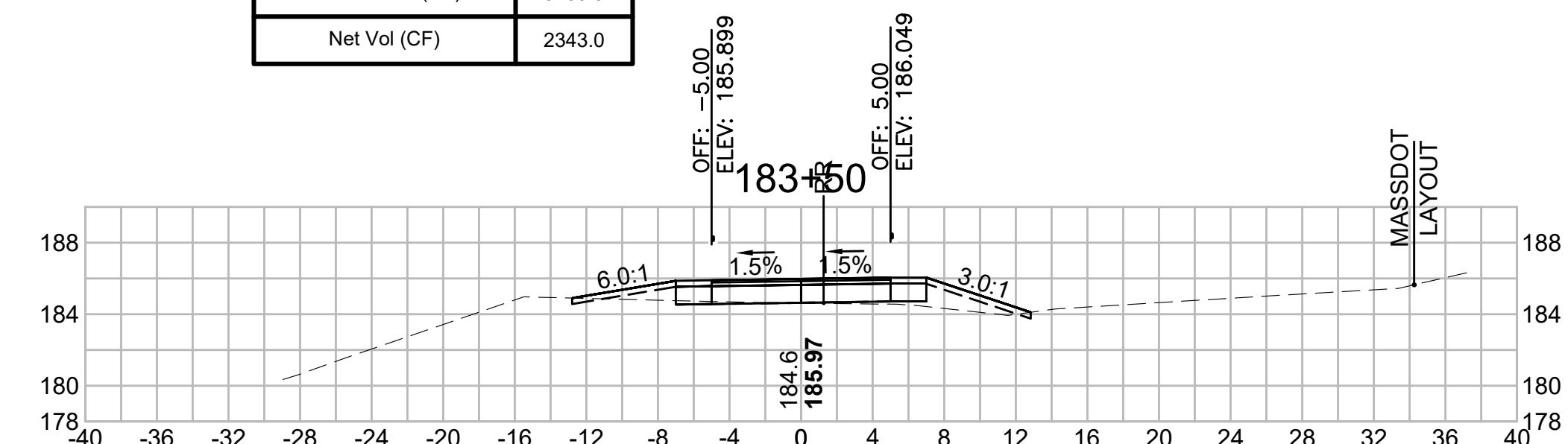
Total Volume at Station 182+00.00

Cut Area (SF)	0,744
Fill Area (SF)	6,586
Cut Vol (CF)	1.9
Fill Vol (CF)	14.2
Cum Cut Vol (CF)	5438.0
Cum Fill Vol (CF)	3077.3
Net Vol (CF)	2360.7



Total Volume at Station 183+50.00

Cut Area (SF)	7,540
Fill Area (SF)	5,949
Cut Vol (CF)	9.3
Fill Vol (CF)	11.0
Cum Cut Vol (CF)	5453.0
Cum Fill Vol (CF)	3109.9
Net Vol (CF)	2343.0



SUDBURY
BRUCE FREEMAN RAIL TRAIL

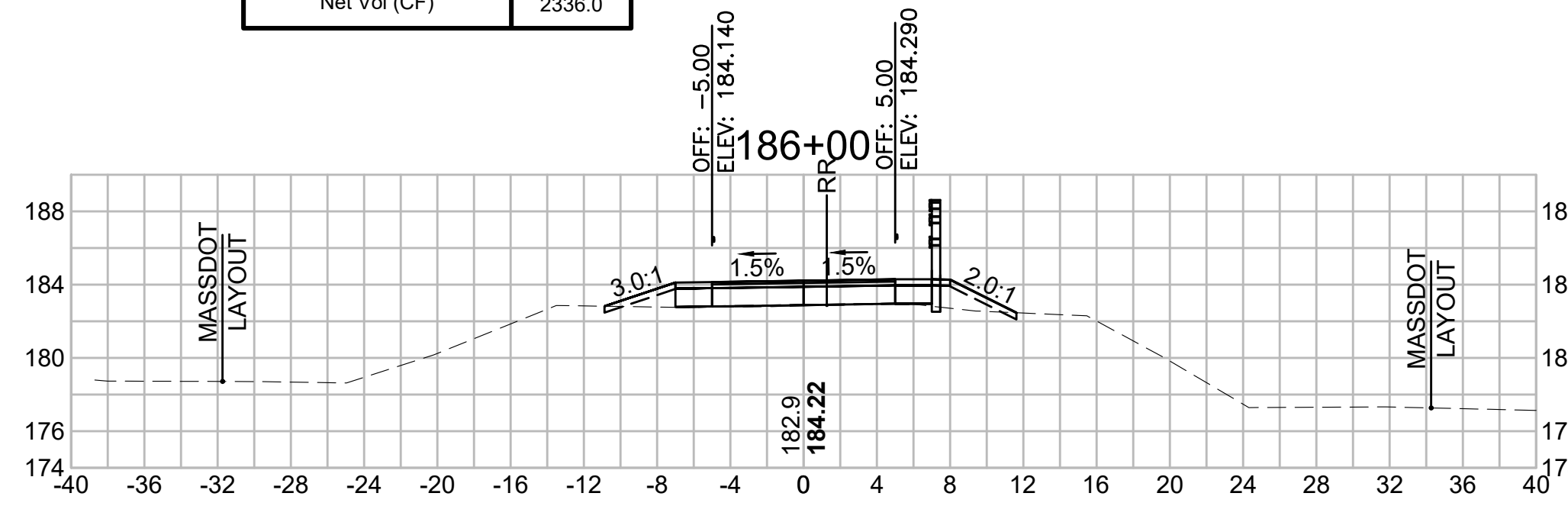
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	263	318

PROJECT FILE NO. 608164

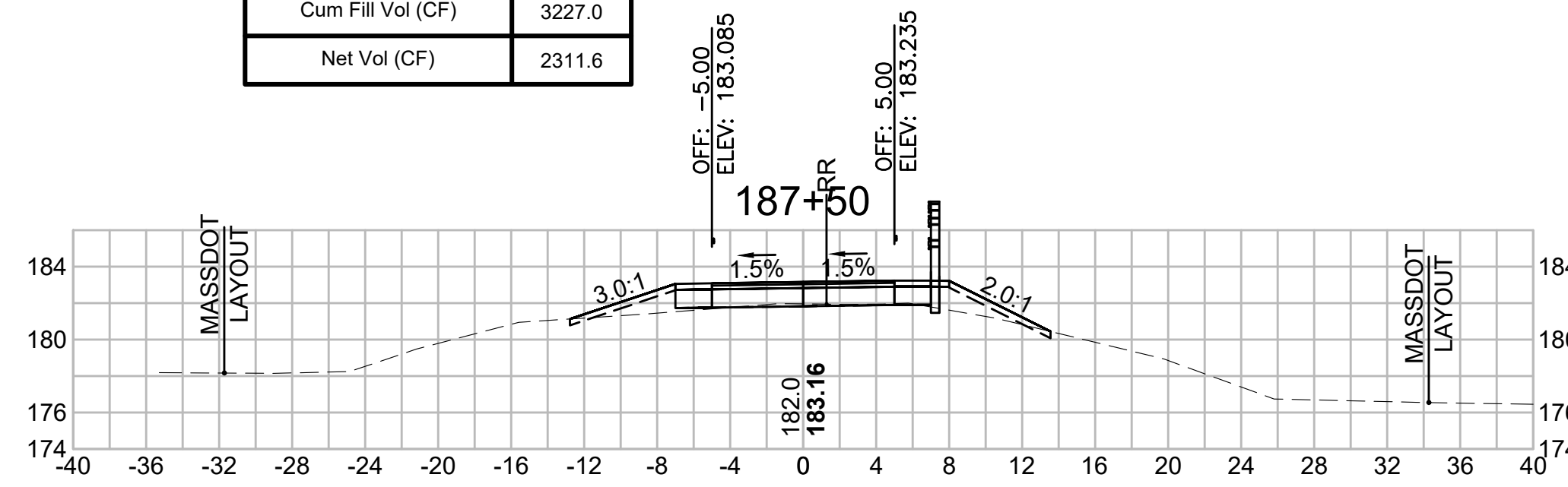
CROSS SECTIONS

608164_X\SEC\CROSS SECTION LAYOUTS.DWG 12-May-2021

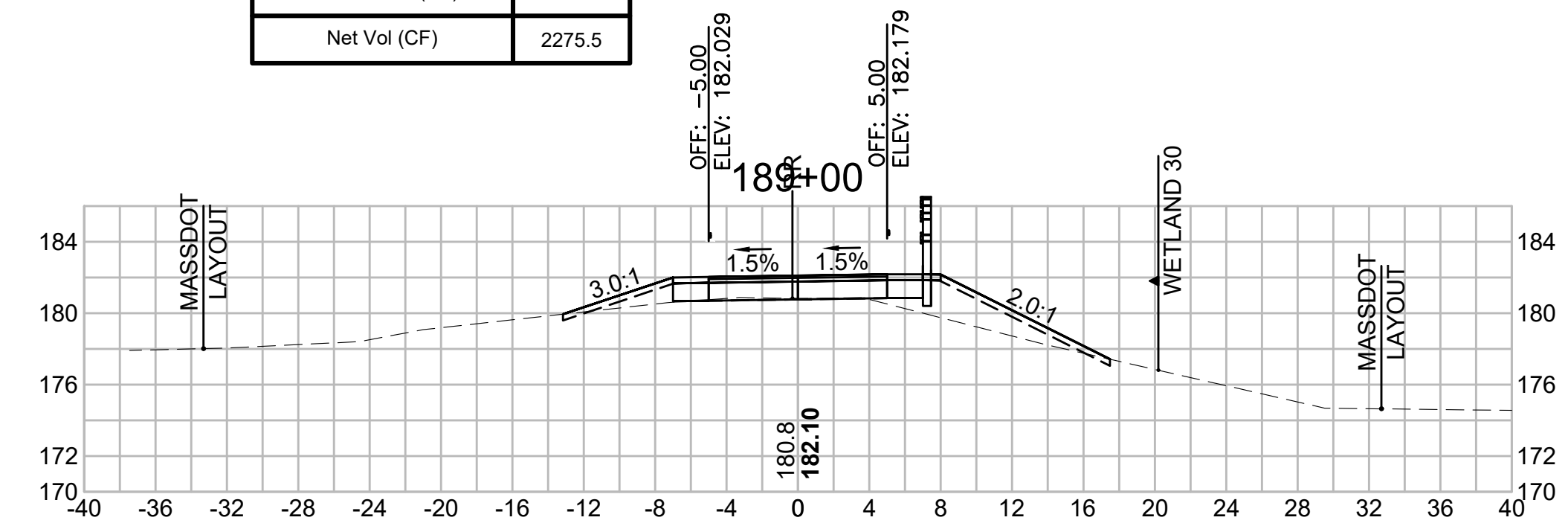
Total Volume at Station 186+00.00	
Cut Area (SF)	4.122
Fill Area (SF)	7.211
Cut Vol (CF)	9.9
Fill Vol (CF)	15.2
Cum Cut Vol (CF)	5525.1
Cum Fill Vol (CF)	3189.1
Net Vol (CF)	2336.0



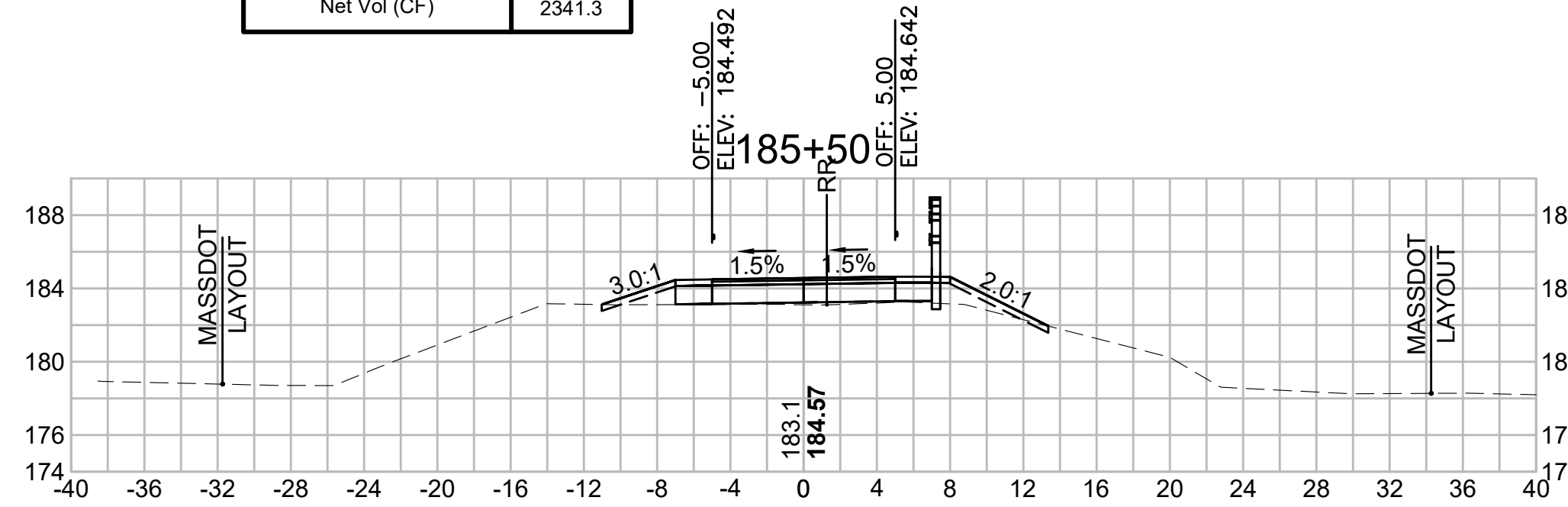
Total Volume at Station 187+50.00	
Cut Area (SF)	1.386
Fill Area (SF)	6.627
Cut Vol (CF)	3.6
Fill Vol (CF)	12.2
Cum Cut Vol (CF)	5538.5
Cum Fill Vol (CF)	3227.0
Net Vol (CF)	2311.6



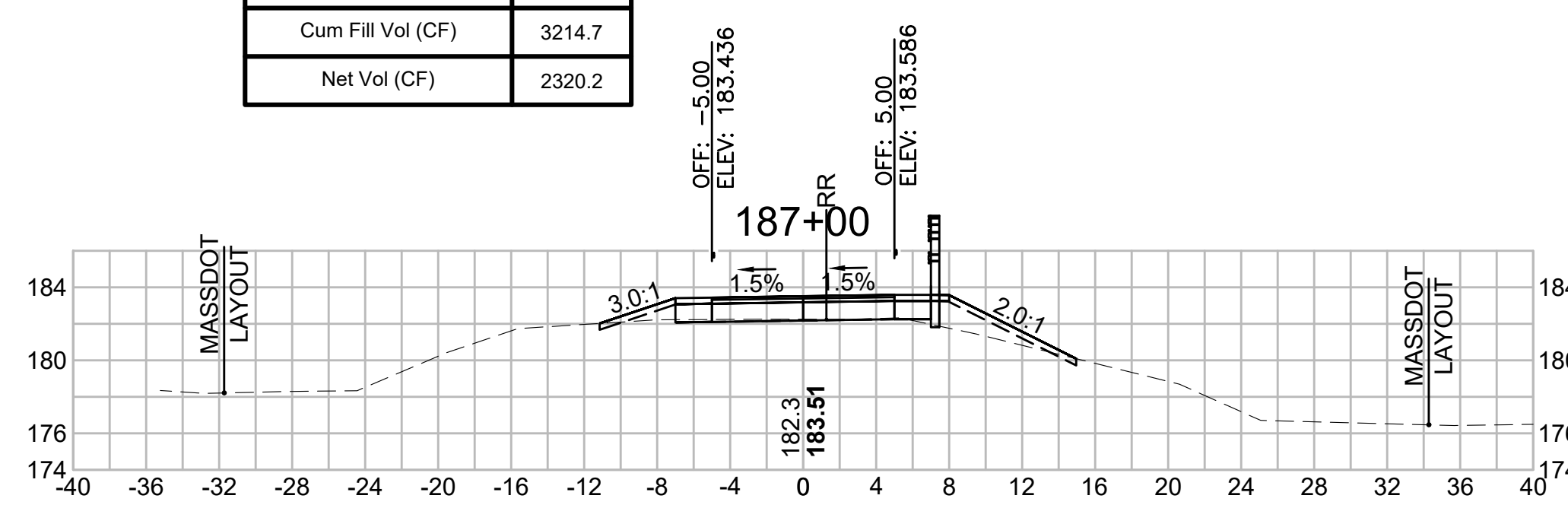
Total Volume at Station 189+00.00	
Cut Area (SF)	1.596
Fill Area (SF)	14.259
Cut Vol (CF)	2.9
Fill Vol (CF)	19.9
Cum Cut Vol (CF)	5546.8
Cum Fill Vol (CF)	3271.3
Net Vol (CF)	2275.5



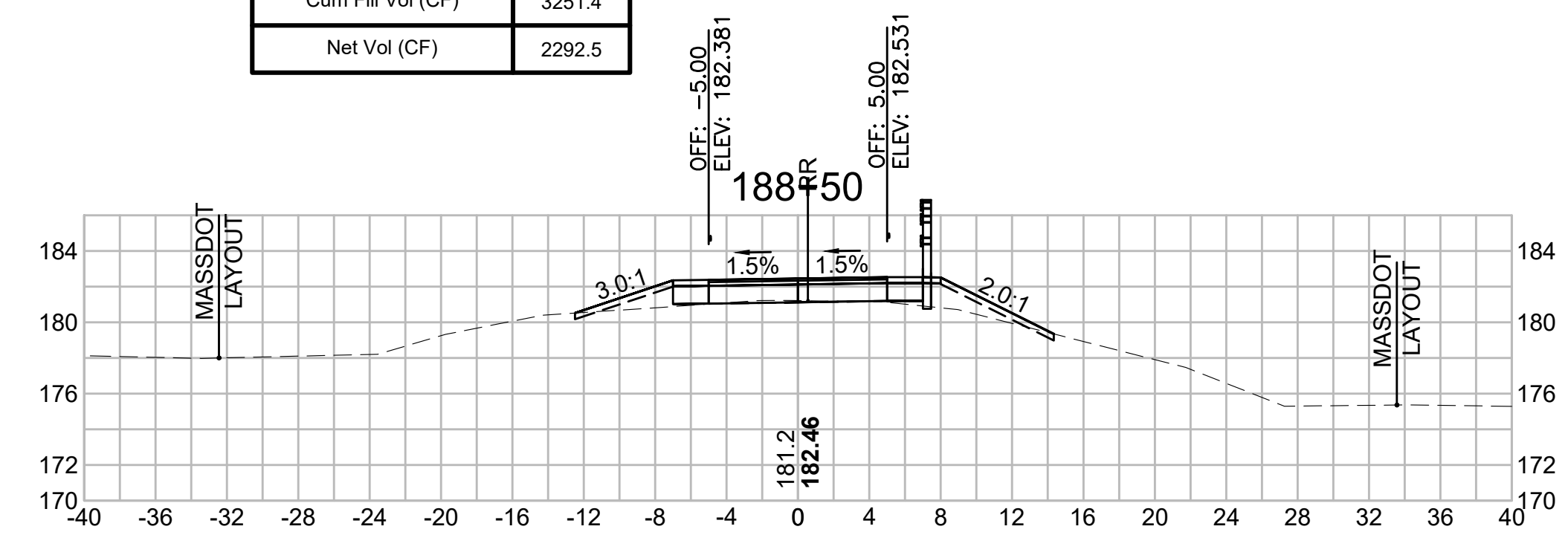
Total Volume at Station 185+50.00	
Cut Area (SF)	6.517
Fill Area (SF)	9.173
Cut Vol (CF)	9.6
Fill Vol (CF)	22.0
Cum Cut Vol (CF)	5515.2
Cum Fill Vol (CF)	3173.9
Net Vol (CF)	2341.3



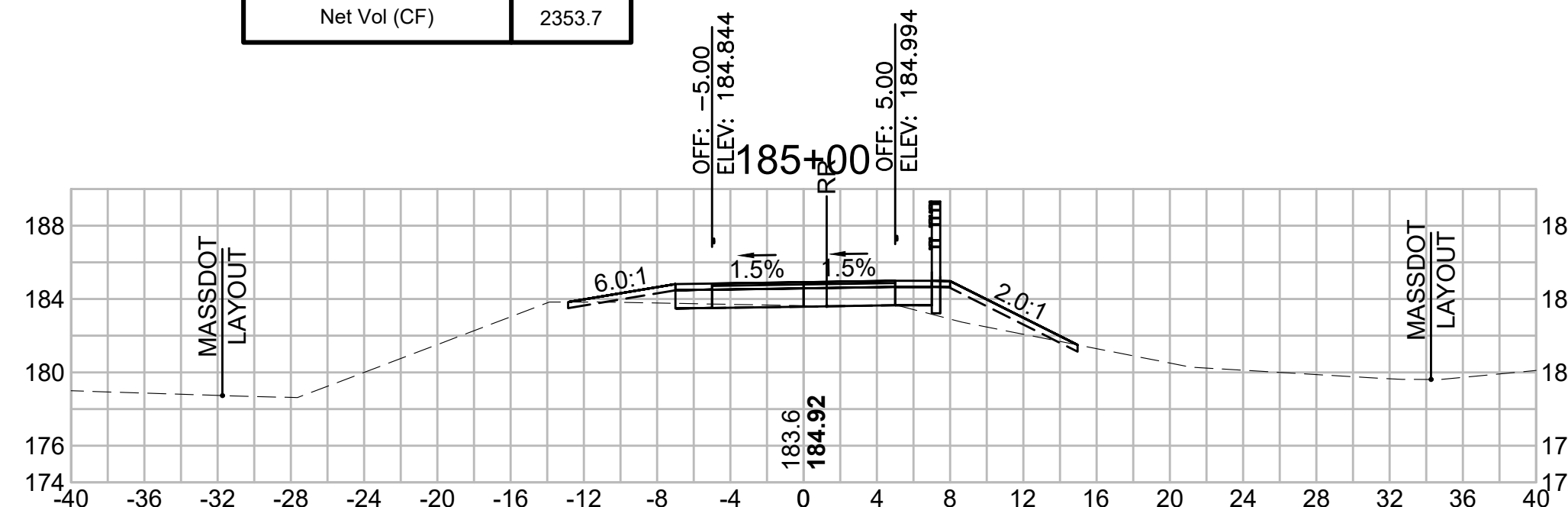
Total Volume at Station 187+00.00	
Cut Area (SF)	2.530
Fill Area (SF)	6.585
Cut Vol (CF)	4.2
Fill Vol (CF)	12.5
Cum Cut Vol (CF)	5534.9
Cum Fill Vol (CF)	3214.7
Net Vol (CF)	2320.2



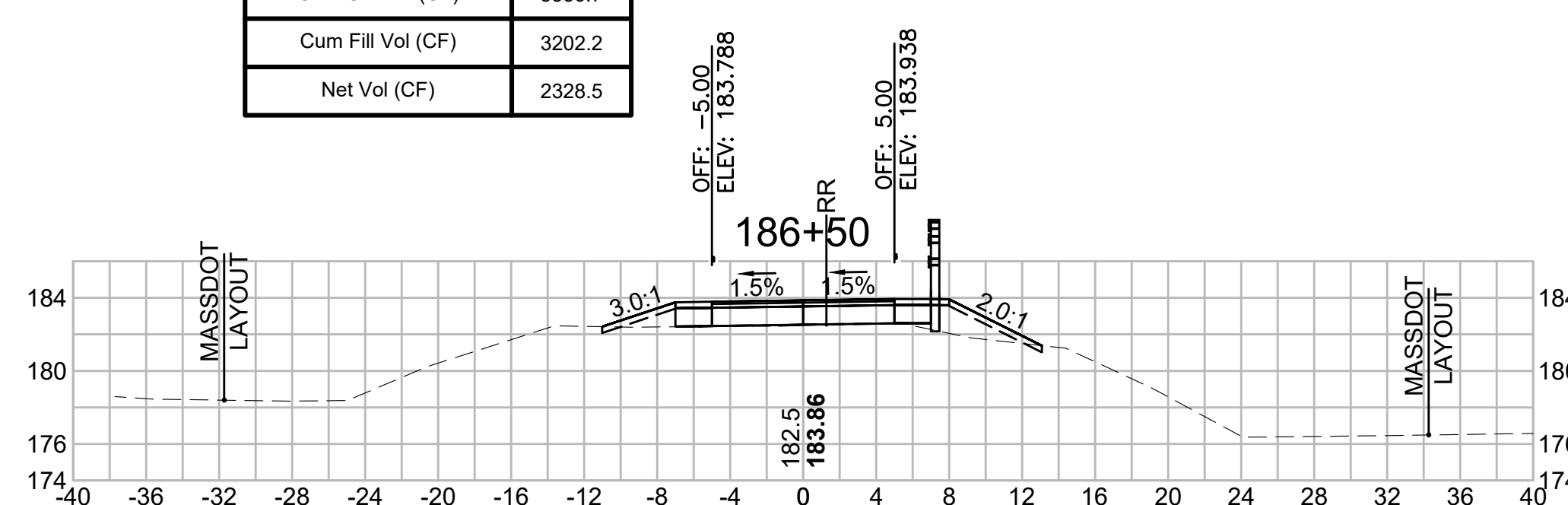
Total Volume at Station 188+50.00	
Cut Area (SF)	1.557
Fill Area (SF)	7.184
Cut Vol (CF)	2.8
Fill Vol (CF)	12.5
Cum Cut Vol (CF)	5543.9
Cum Fill Vol (CF)	3251.4
Net Vol (CF)	2292.5



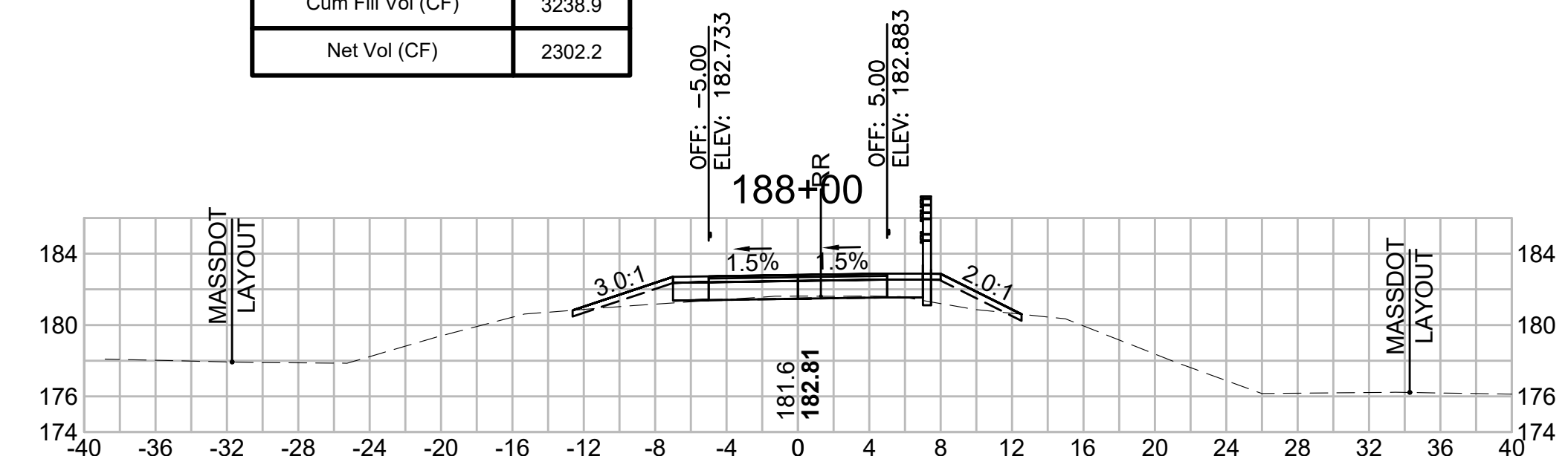
Total Volume at Station 185+00.00	
Cut Area (SF)	3.855
Fill Area (SF)	14.556
Cut Vol (CF)	9.3
Fill Vol (CF)	19.1
Cum Cut Vol (CF)	5505.6
Cum Fill Vol (CF)	3151.9
Net Vol (CF)	2353.7



Total Volume at Station 186+50.00	
Cut Area (SF)	1.968
Fill Area (SF)	6.945
Cut Vol (CF)	5.6
Fill Vol (CF)	13.1
Cum Cut Vol (CF)	5530.7
Cum Fill Vol (CF)	3202.2
Net Vol (CF)	2328.5

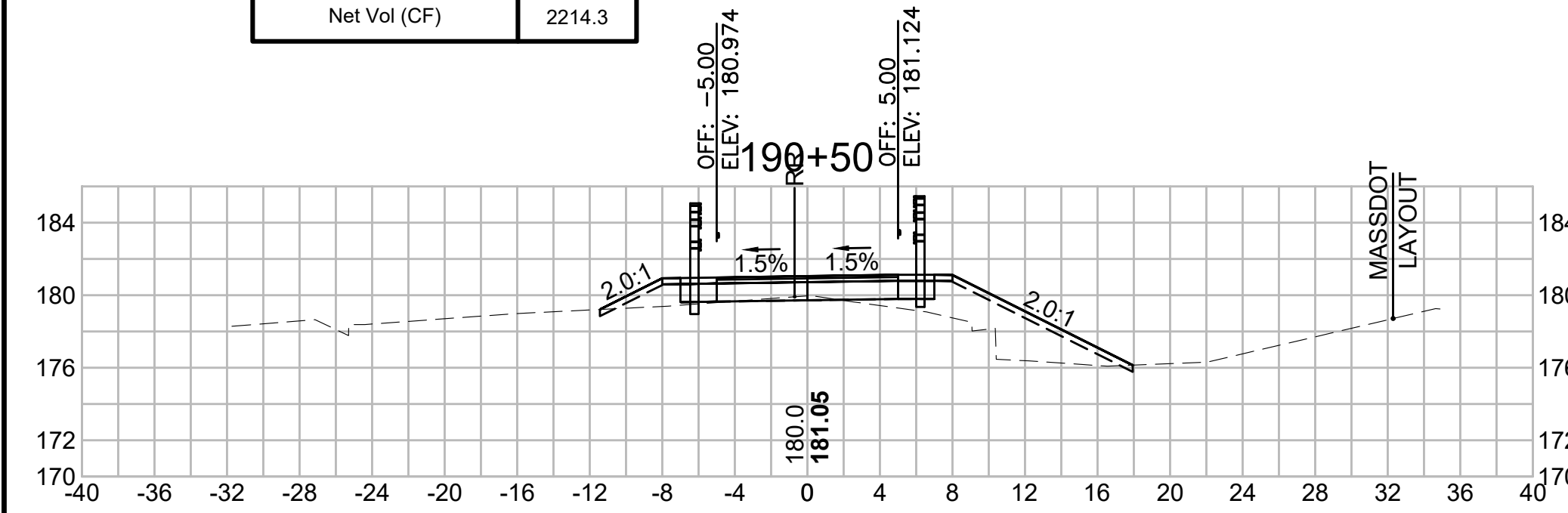


Total Volume at Station 188+00.00	
Cut Area (SF)	1.428
Fill Area (SF)	6.309
Cut Vol (CF)	2.6
Fill Vol (CF)	12.0
Cum Cut Vol (CF)	5541.1
Cum Fill Vol (CF)	3238.9
Net Vol (CF)	2302.2

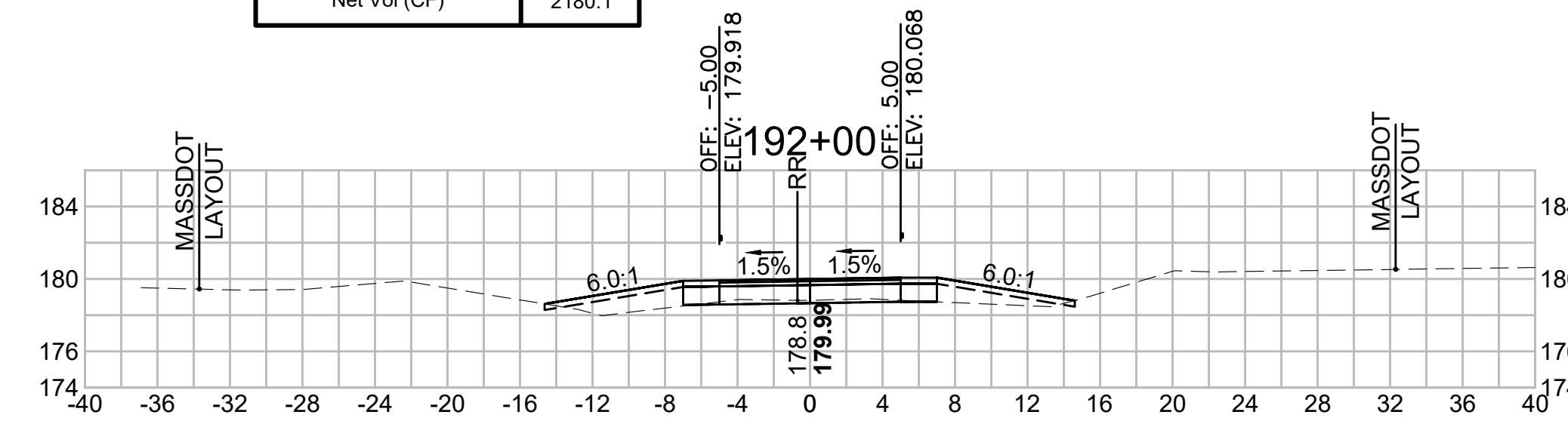


CROSS SECTIONS

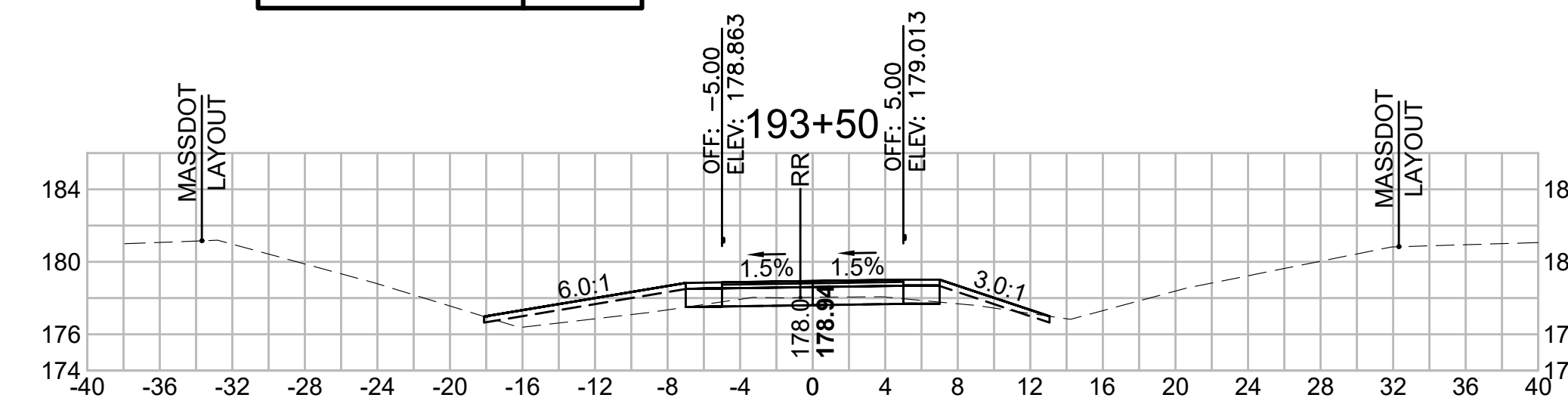
Total Volume at Station 190+50.00	
Cut Area (SF)	20.566
Fill Area (SF)	22.081
Cut Vol (CF)	20.2
Fill Vol (CF)	35.0
Cum Cut Vol (CF)	5573.6
Cum Fill Vol (CF)	3359.3
Net Vol (CF)	2214.3



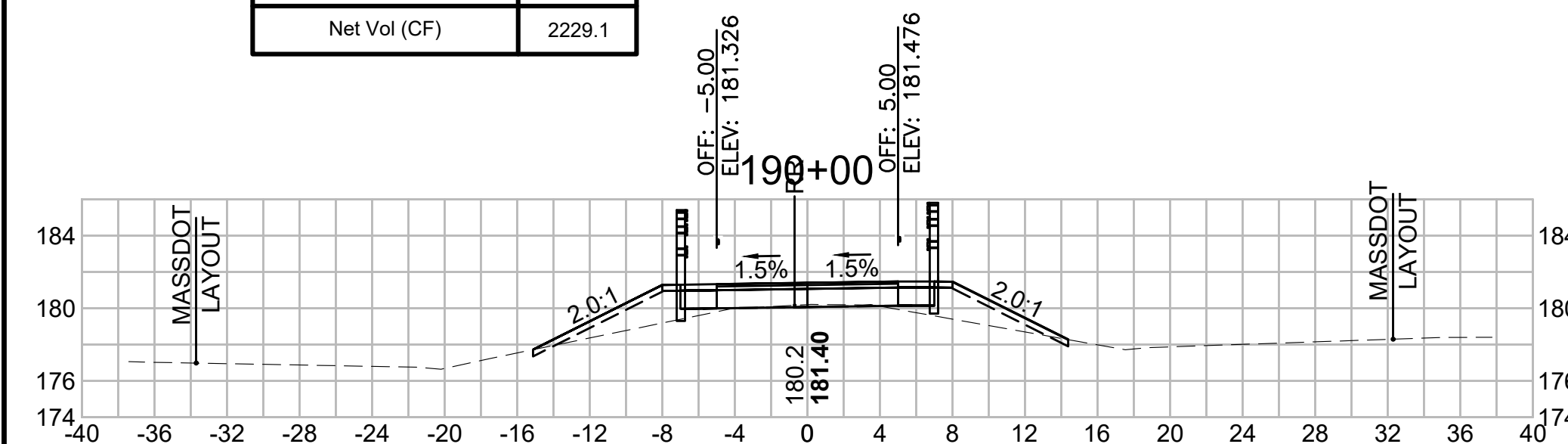
Total Volume at Station 192+00.00	
Cut Area (SF)	10.793
Fill Area (SF)	8.960
Cut Vol (CF)	17.1
Fill Vol (CF)	21.3
Cum Cut Vol (CF)	5624.8
Cum Fill Vol (CF)	3444.7
Net Vol (CF)	2180.1



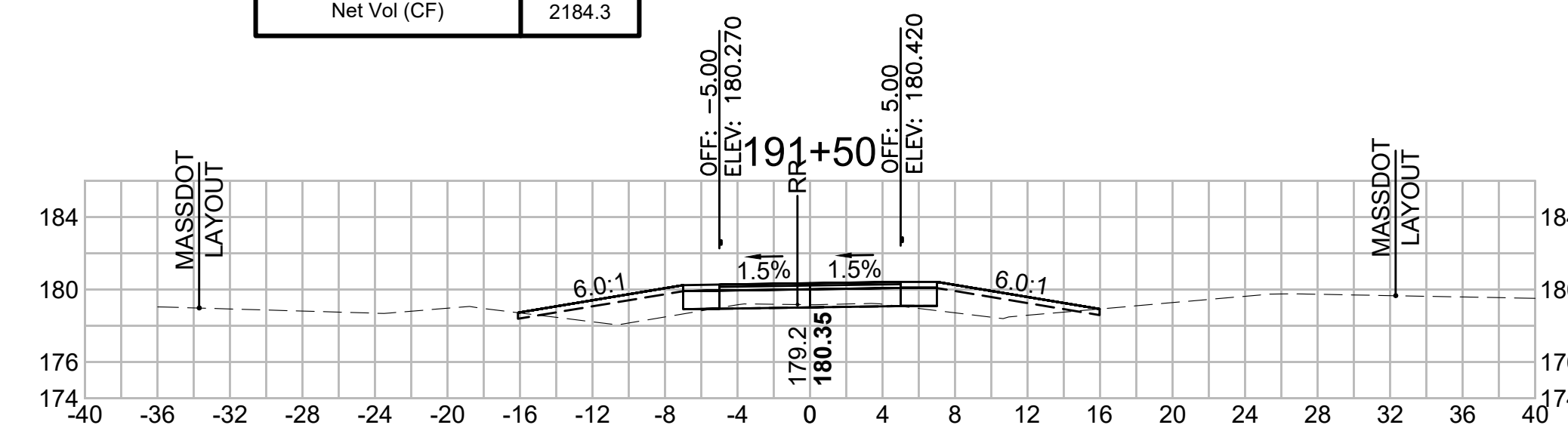
Total Volume at Station 193+50.00	
Cut Area (SF)	5.500
Fill Area (SF)	9.676
Cut Vol (CF)	8.4
Fill Vol (CF)	21.3
Cum Cut Vol (CF)	5661.8
Cum Fill Vol (CF)	3503.1
Net Vol (CF)	2158.7



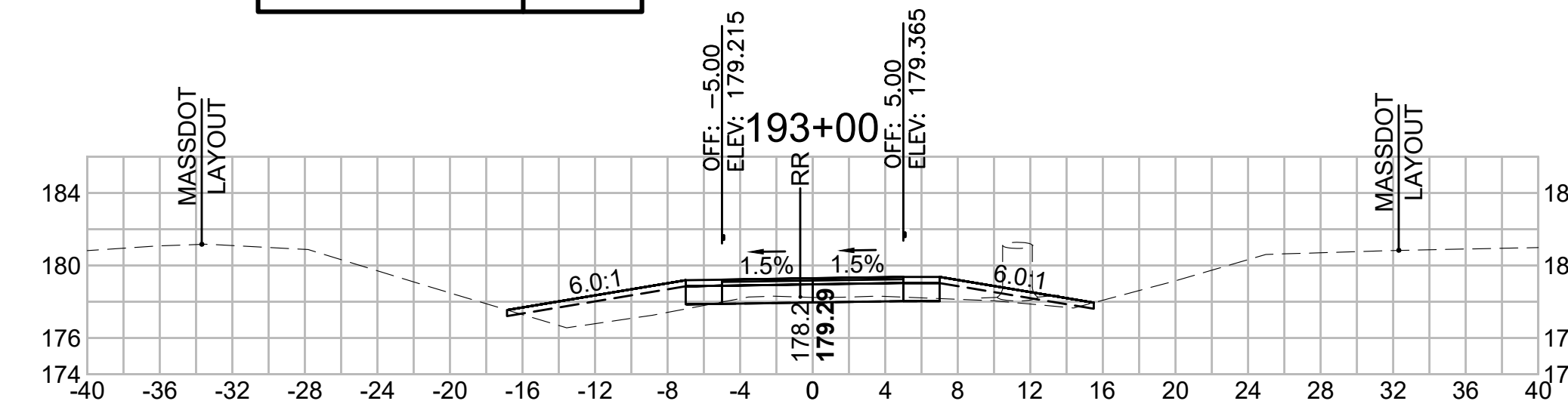
Total Volume at Station 190+00.00	
Cut Area (SF)	1.277
Fill Area (SF)	15.723
Cut Vol (CF)	3.1
Fill Vol (CF)	27.2
Cum Cut Vol (CF)	5553.4
Cum Fill Vol (CF)	3324.3
Net Vol (CF)	2229.1



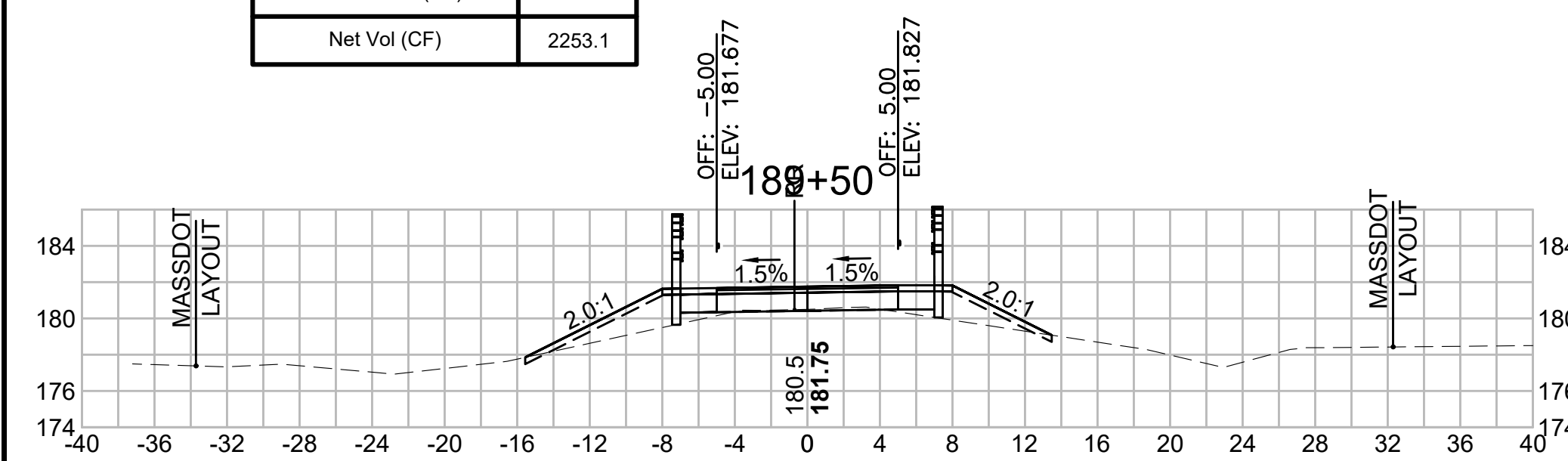
Total Volume at Station 191+50.00	
Cut Area (SF)	7.627
Fill Area (SF)	14.034
Cut Vol (CF)	11.1
Fill Vol (CF)	28.3
Cum Cut Vol (CF)	5607.8
Cum Fill Vol (CF)	3423.4
Net Vol (CF)	2184.3



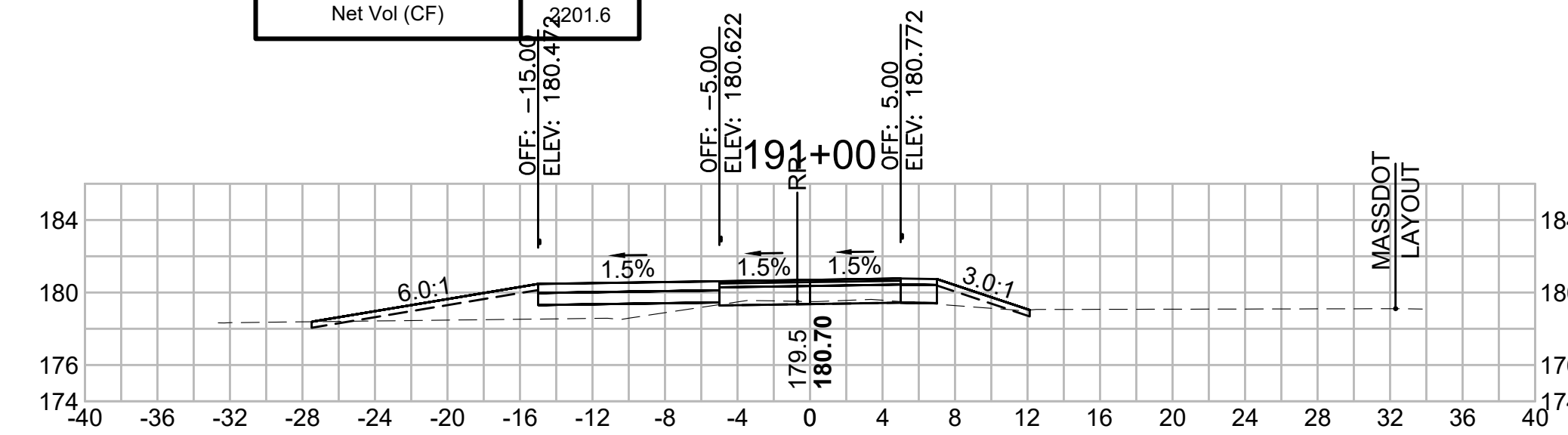
Total Volume at Station 193+00.00	
Cut Area (SF)	3.556
Fill Area (SF)	13.298
Cut Vol (CF)	10.9
Fill Vol (CF)	20.5
Cum Cut Vol (CF)	5653.4
Cum Fill Vol (CF)	3481.8
Net Vol (CF)	2171.6



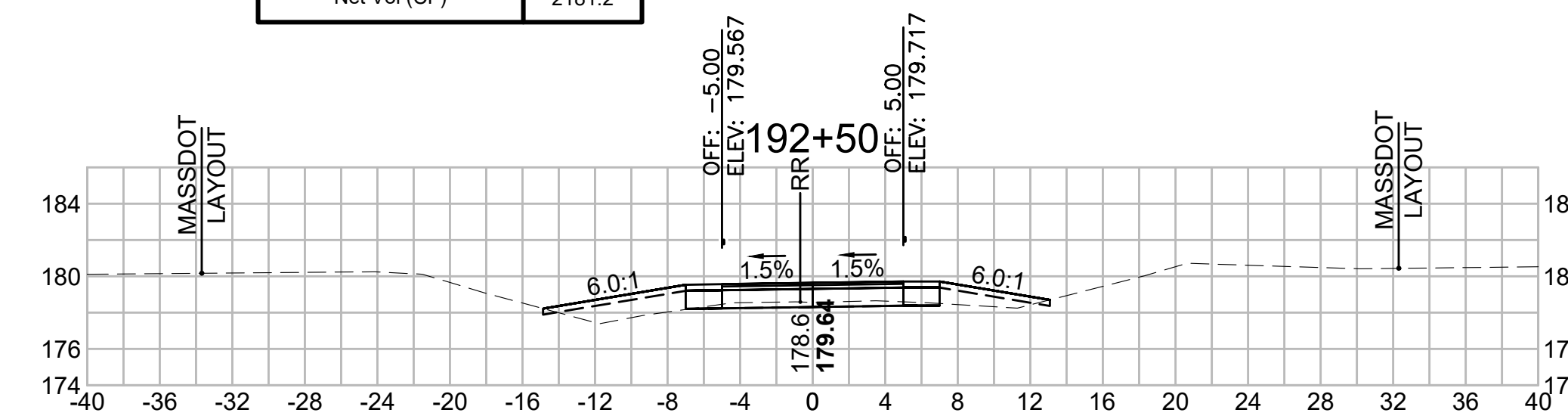
Total Volume at Station 189+50.00	
Cut Area (SF)	2.108
Fill Area (SF)	13.640
Cut Vol (CF)	3.4
Fill Vol (CF)	25.8
Cum Cut Vol (CF)	5550.2
Cum Fill Vol (CF)	3297.1
Net Vol (CF)	2253.1



Total Volume at Station 191+00.00	
Cut Area (SF)	4.366
Fill Area (SF)	16.576
Cut Vol (CF)	23.1
Fill Vol (CF)	35.8
Cum Cut Vol (CF)	5596.7
Cum Fill Vol (CF)	3395.1
Net Vol (CF)	2201.6



Total Volume at Station 192+50.00	
Cut Area (SF)	8.245
Fill Area (SF)	8.892
Cut Vol (CF)	17.6
Fill Vol (CF)	16.5
Cum Cut Vol (CF)	5642.5
Cum Fill Vol (CF)	3461.3
Net Vol (CF)	2181.2



SUDBURY
BRUCE FREEMAN RAIL TRAIL

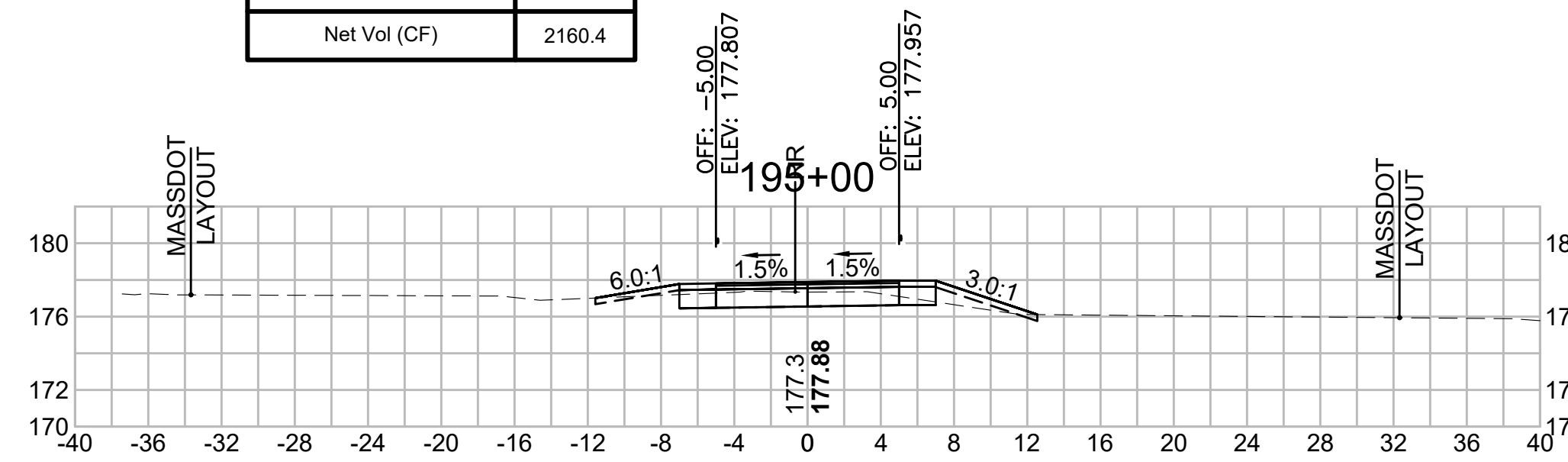
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	265	318

PROJECT FILE NO. 608164

CROSS SECTIONS

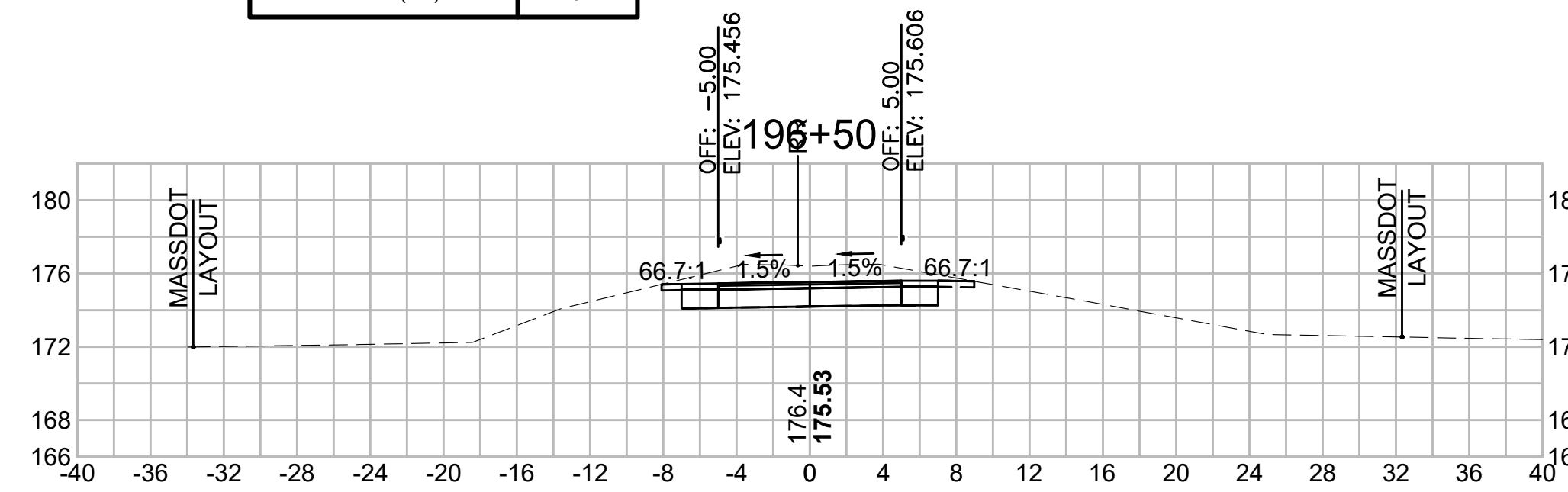
Total Volume at Station 195+00.00

Cut Area (SF)	15,040
Fill Area (SF)	2,012
Cut Vol (CF)	20.1
Fill Vol (CF)	11.4
Cum Cut Vol (CF)	5706.9
Cum Fill Vol (CF)	3546.5
Net Vol (CF)	2160.4



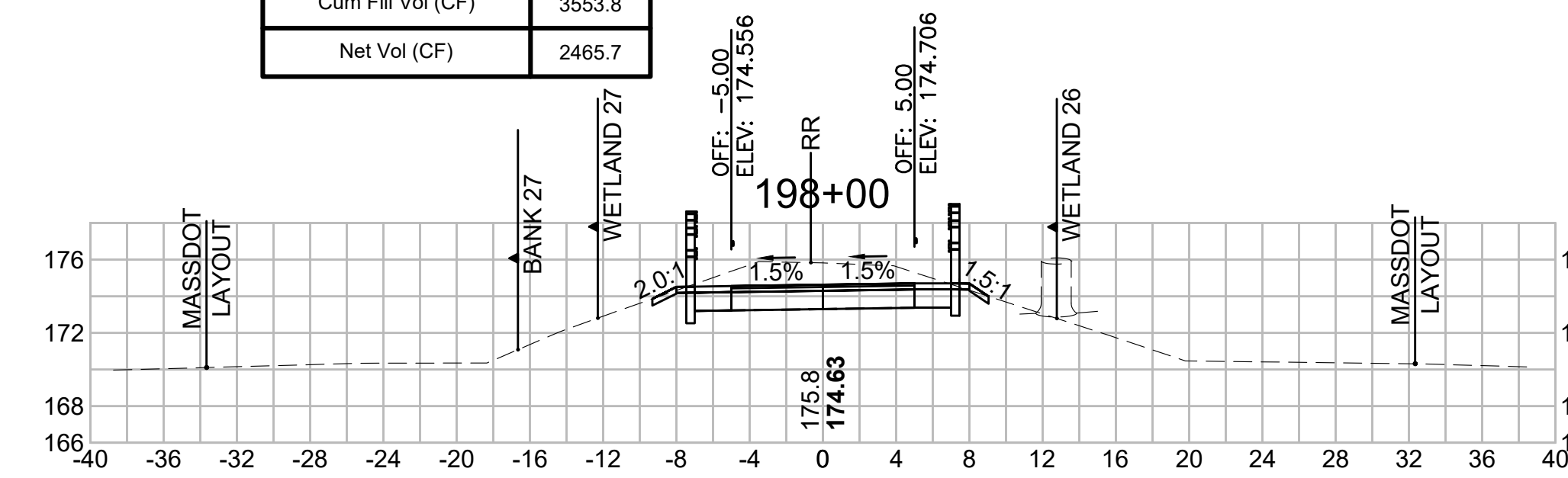
Total Volume at Station 196+50.00

Cut Area (SF)	35,196
Fill Area (SF)	0.000
Cut Vol (CF)	52.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	5814.9
Cum Fill Vol (CF)	3552.8
Net Vol (CF)	2262.1



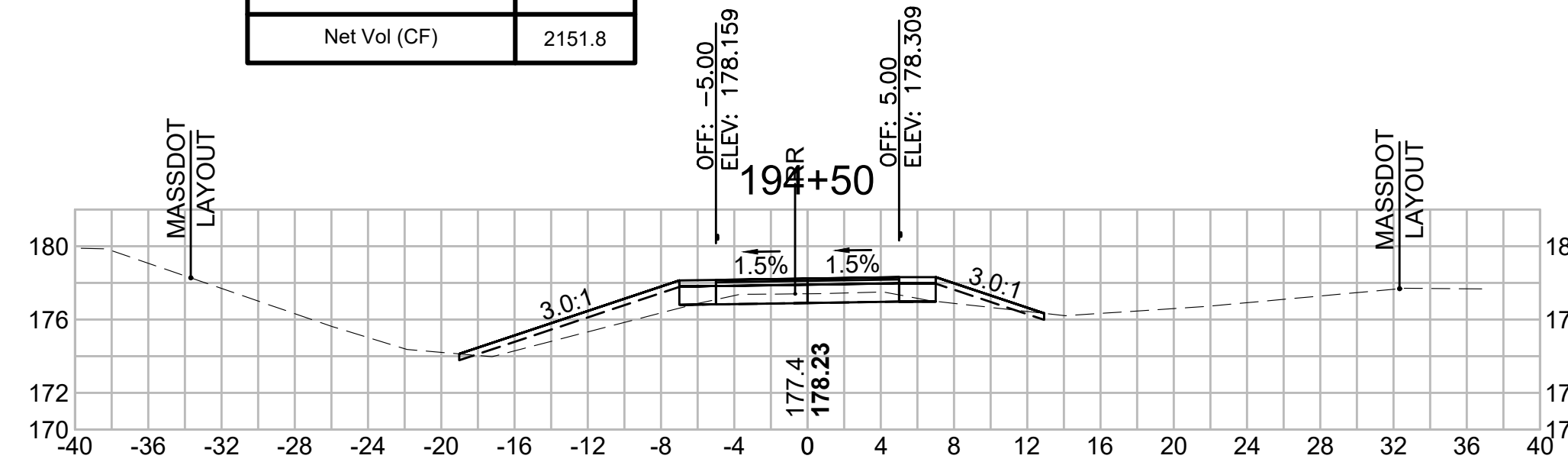
Total Volume at Station 198+00.00

Cut Area (SF)	34,547
Fill Area (SF)	1,124
Cut Vol (CF)	65.3
Fill Vol (CF)	1.1
Cum Cut Vol (CF)	6019.5
Cum Fill Vol (CF)	3553.8
Net Vol (CF)	2465.7



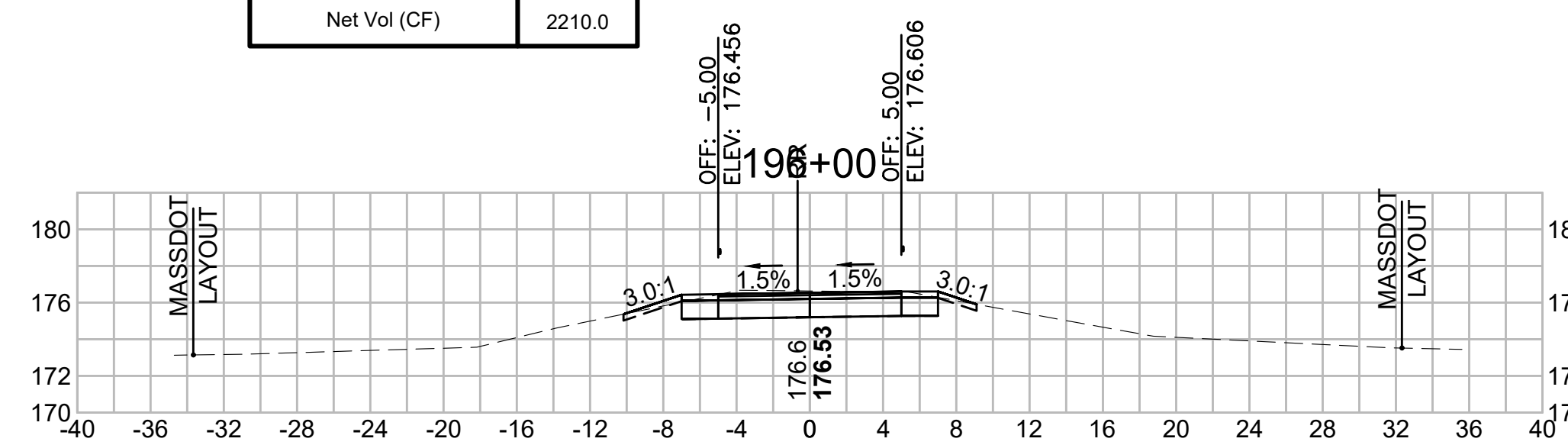
Total Volume at Station 194+50.00

Cut Area (SF)	6,663
Fill Area (SF)	10,352
Cut Vol (CF)	13.1
Fill Vol (CF)	16.3
Cum Cut Vol (CF)	5686.8
Cum Fill Vol (CF)	3535.1
Net Vol (CF)	2151.8



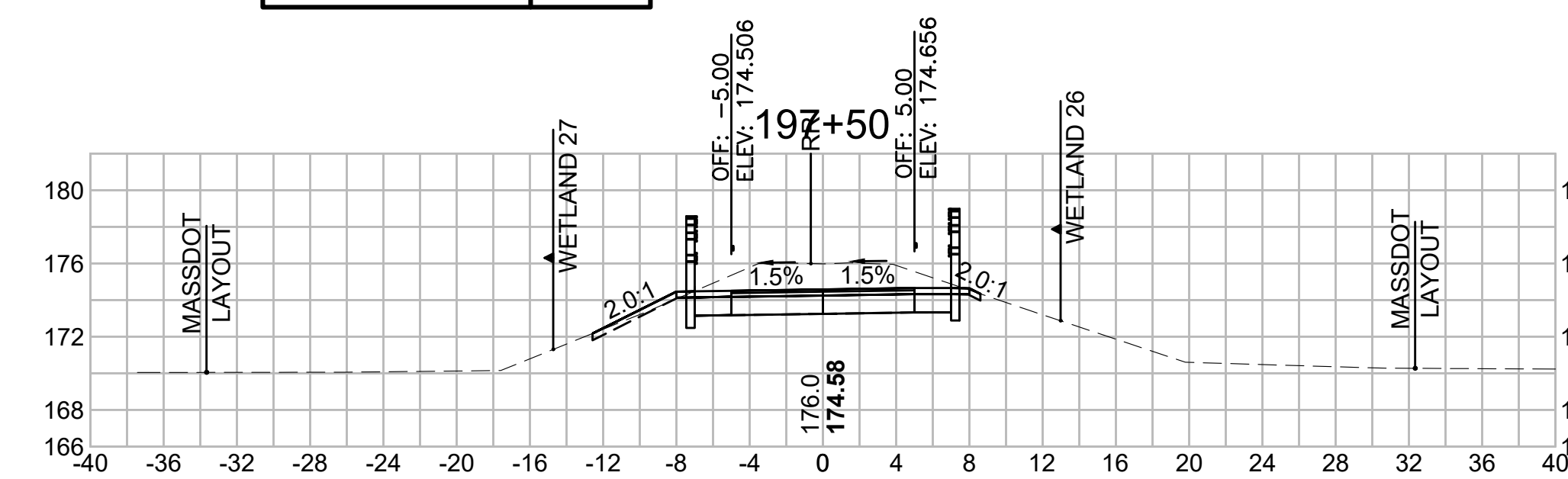
Total Volume at Station 196+00.00

Cut Area (SF)	21,122
Fill Area (SF)	0.012
Cut Vol (CF)	30.7
Fill Vol (CF)	2.2
Cum Cut Vol (CF)	5762.8
Cum Fill Vol (CF)	3552.8
Net Vol (CF)	2210.0



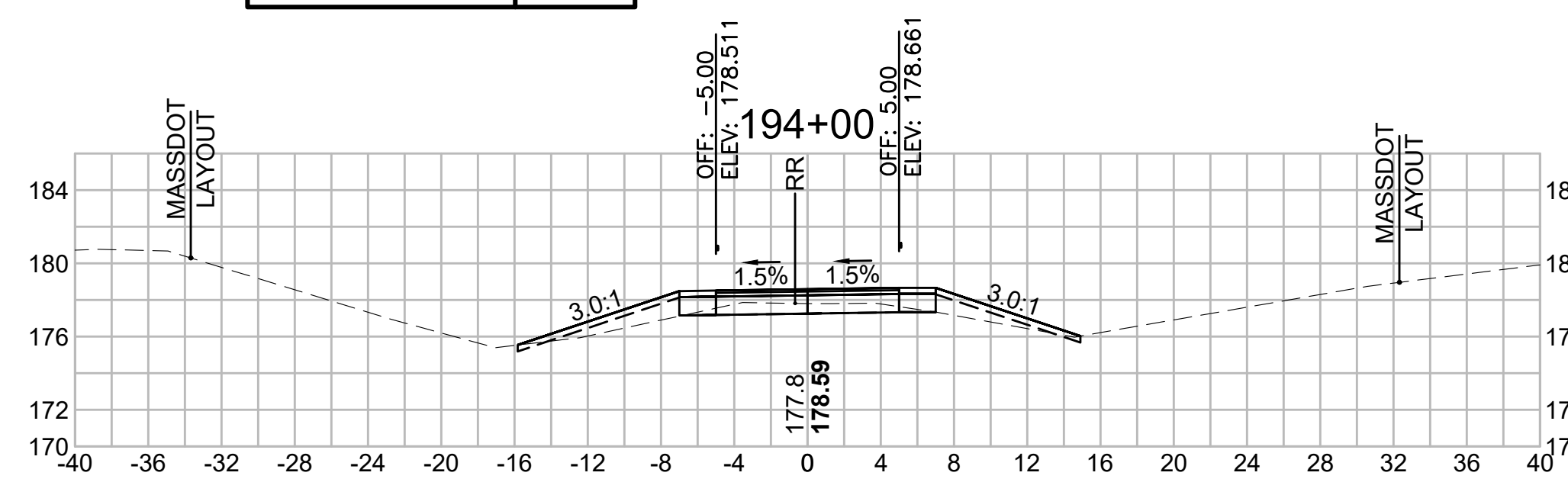
Total Volume at Station 197+50.00

Cut Area (SF)	36,005
Fill Area (SF)	0.012
Cut Vol (CF)	70.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	5954.2
Cum Fill Vol (CF)	3552.8
Net Vol (CF)	2401.4



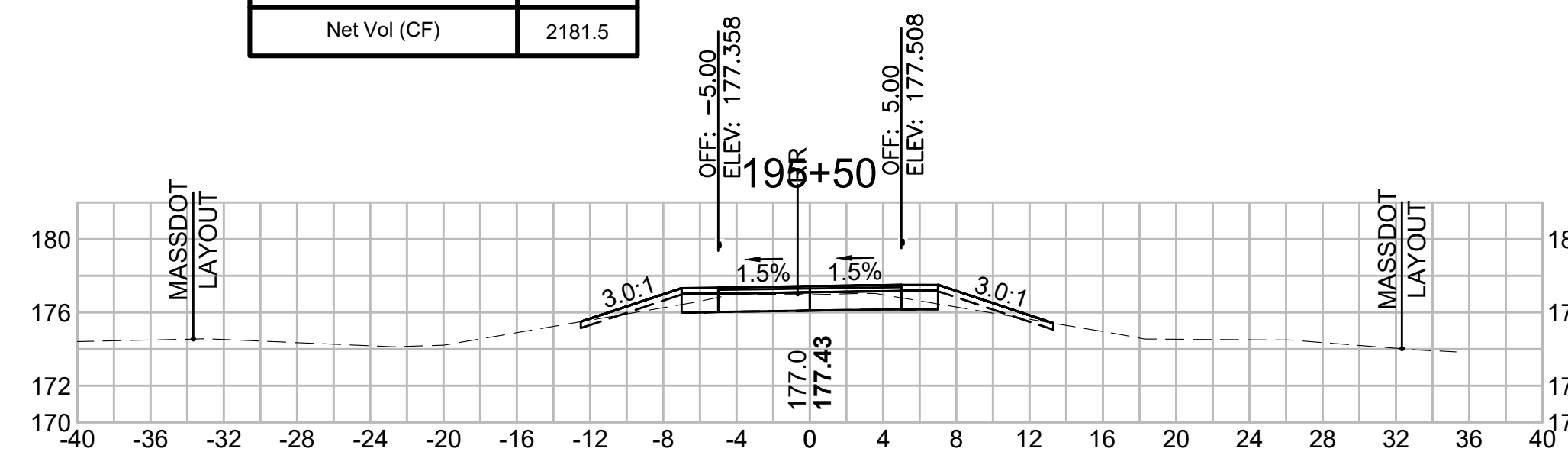
Total Volume at Station 194+00.00

Cut Area (SF)	7,450
Fill Area (SF)	7,251
Cut Vol (CF)	12.0
Fill Vol (CF)	15.7
Cum Cut Vol (CF)	5673.8
Cum Fill Vol (CF)	3518.8
Net Vol (CF)	2155.0



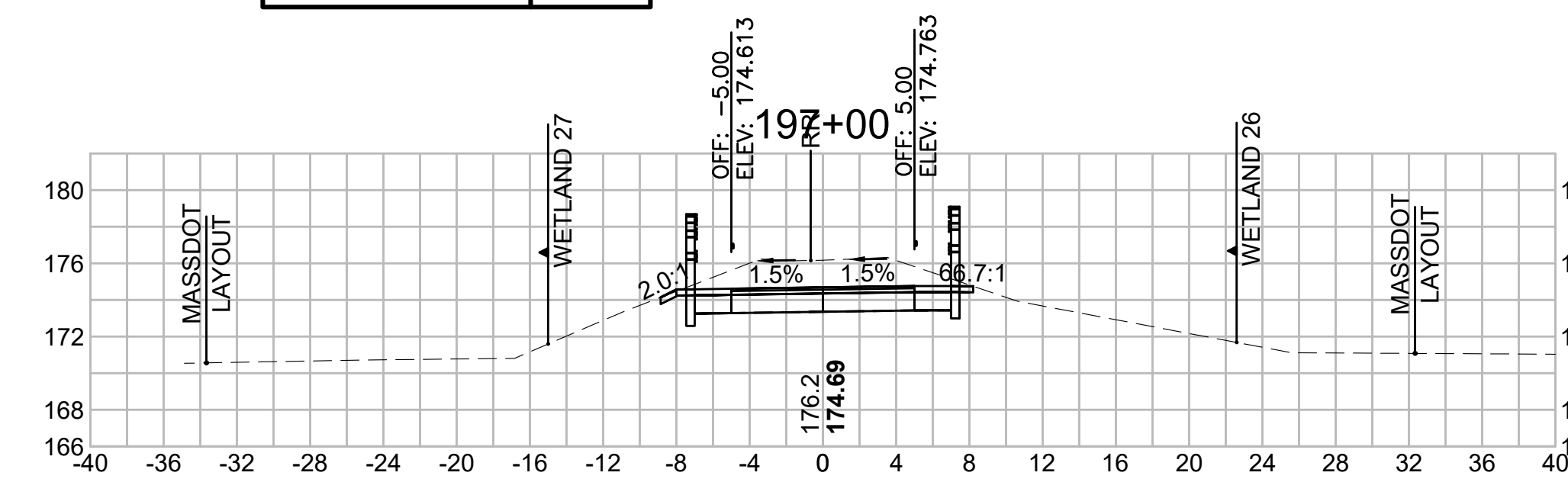
Total Volume at Station 195+50.00

Cut Area (SF)	12,077
Fill Area (SF)	2,372
Cut Vol (CF)	25.1
Fill Vol (CF)	4.1
Cum Cut Vol (CF)	5732.0
Cum Fill Vol (CF)	3550.6
Net Vol (CF)	2181.5



Total Volume at Station 197+00.00

Cut Area (SF)	39,622
Fill Area (SF)	0.001
Cut Vol (CF)	69.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	5884.2
Cum Fill Vol (CF)	3552.8
Net Vol (CF)	2331.4



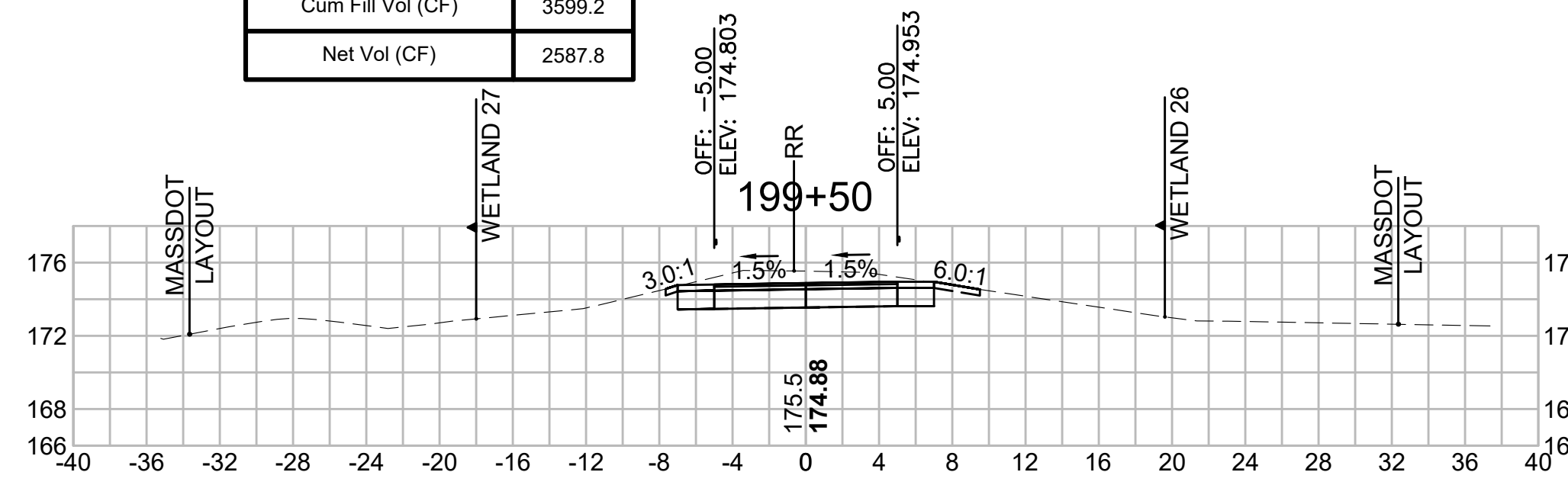
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	266	318

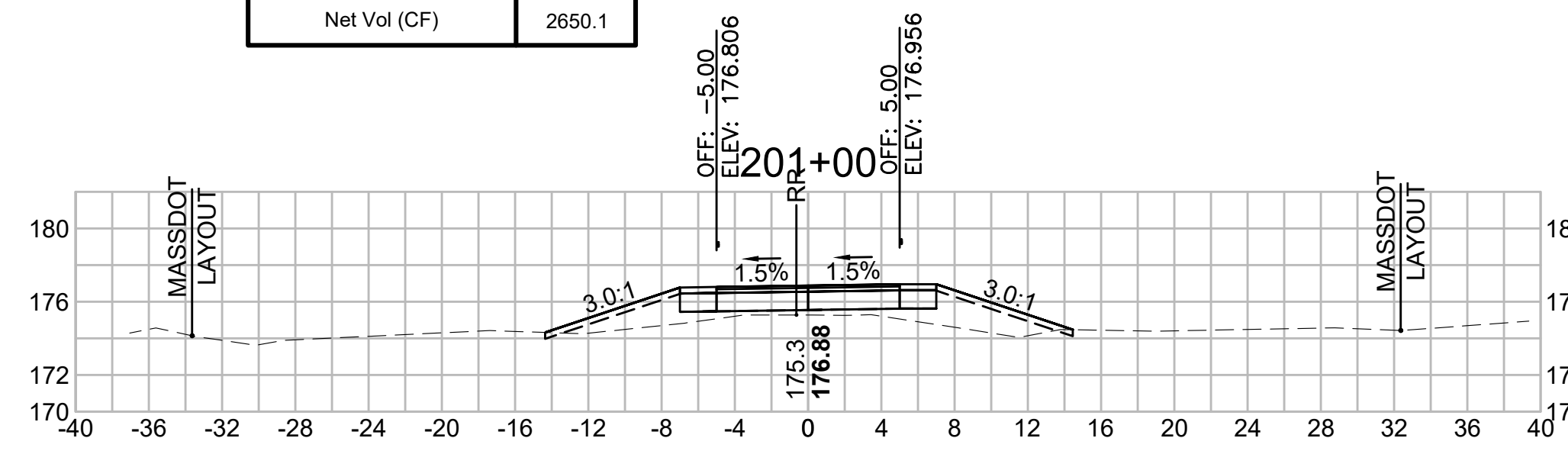
CROSS SECTIONS

12-May-2021
608164_X\$SEC(CROSS SECTION LAYOUTS).DWG

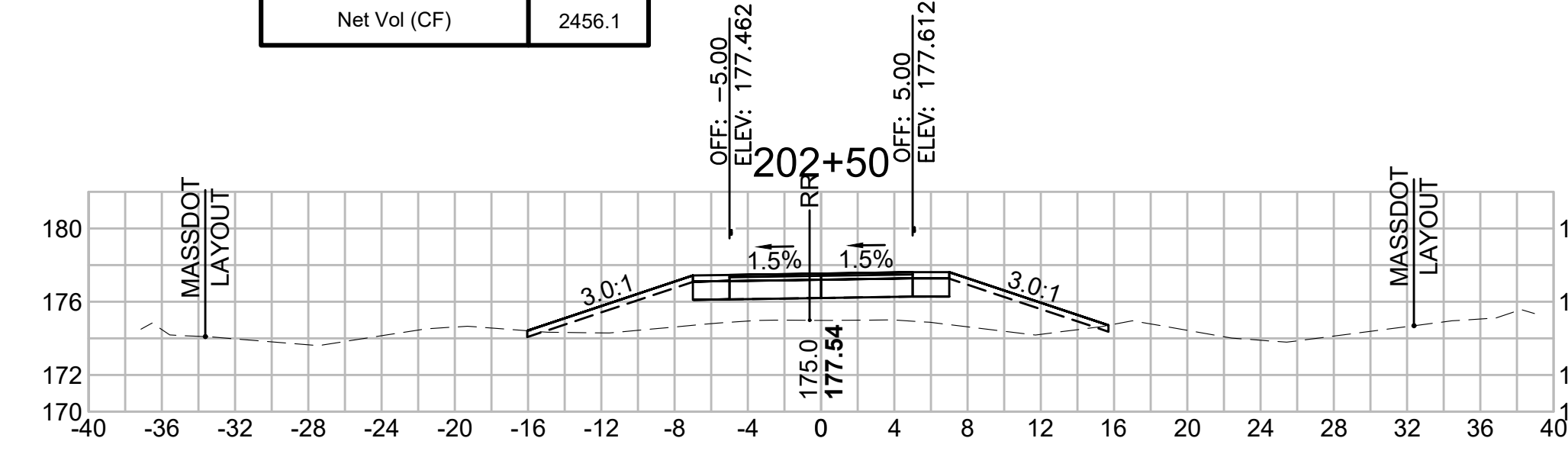
Total Volume at Station 199+50.00	
Cut Area (SF)	29.162
Fill Area (SF)	0.060
Cut Vol (CF)	53.1
Fill Vol (CF)	12.5
Cum Cut Vol (CF)	6187.0
Cum Fill Vol (CF)	3599.2
Net Vol (CF)	2587.8



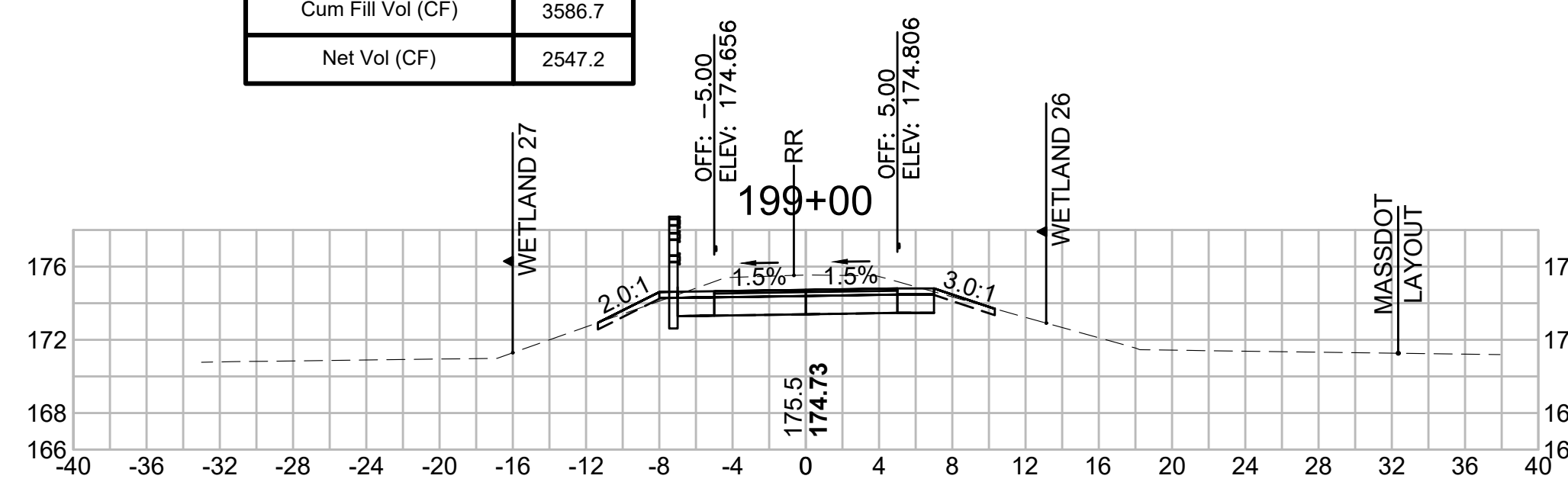
Total Volume at Station 201+00.00	
Cut Area (SF)	8.334
Fill Area (SF)	18.749
Cut Vol (CF)	19.3
Fill Vol (CF)	21.2
Cum Cut Vol (CF)	6278.1
Cum Fill Vol (CF)	3628.0
Net Vol (CF)	2650.1



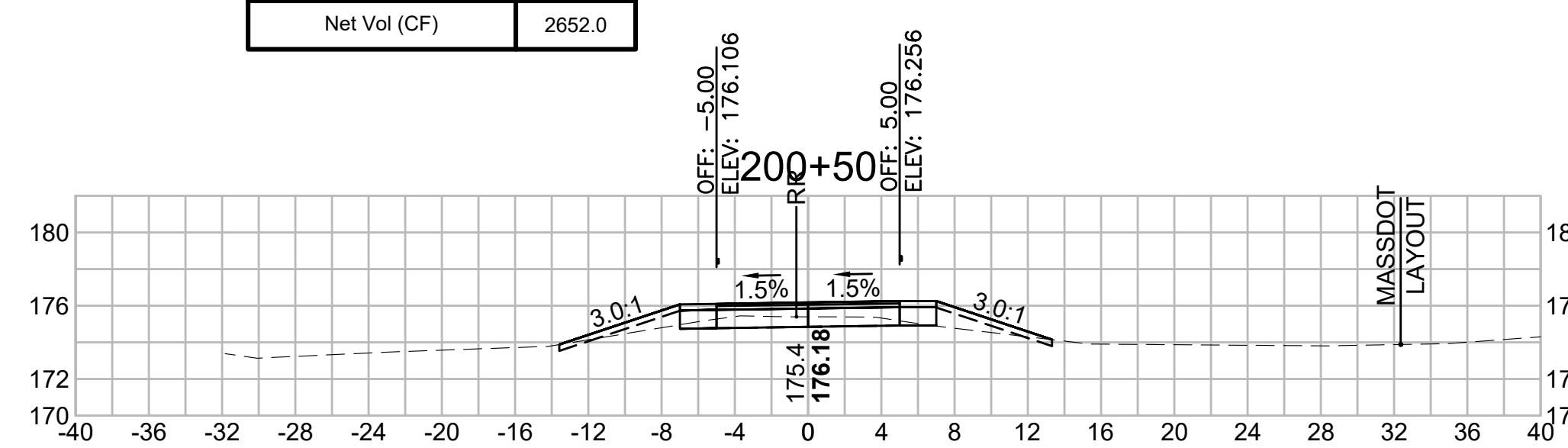
Total Volume at Station 202+50.00	
Cut Area (SF)	0.269
Fill Area (SF)	40.294
Cut Vol (CF)	0.6
Fill Vol (CF)	76.7
Cum Cut Vol (CF)	6291.0
Cum Fill Vol (CF)	3834.9
Net Vol (CF)	2456.1



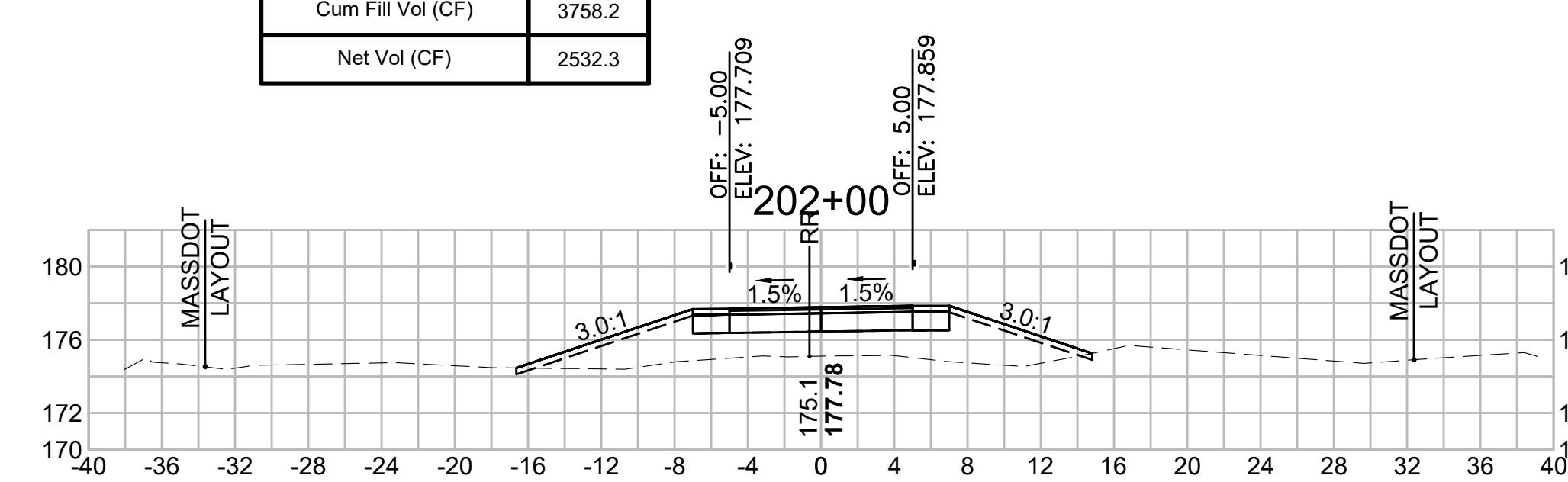
Total Volume at Station 199+00.00	
Cut Area (SF)	28.158
Fill Area (SF)	13.415
Cut Vol (CF)	54.2
Fill Vol (CF)	22.1
Cum Cut Vol (CF)	6133.9
Cum Fill Vol (CF)	3586.7
Net Vol (CF)	2547.2



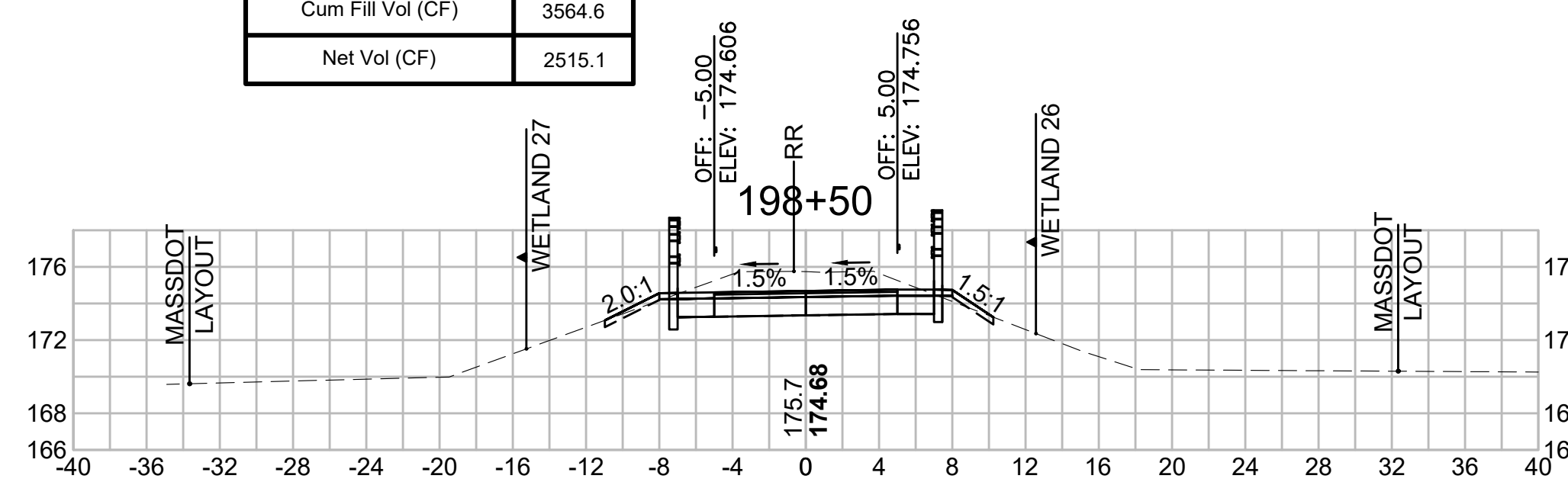
Total Volume at Station 200+50.00	
Cut Area (SF)	12.502
Fill Area (SF)	4.110
Cut Vol (CF)	28.2
Fill Vol (CF)	5.7
Cum Cut Vol (CF)	6258.9
Cum Fill Vol (CF)	3606.9
Net Vol (CF)	2652.0



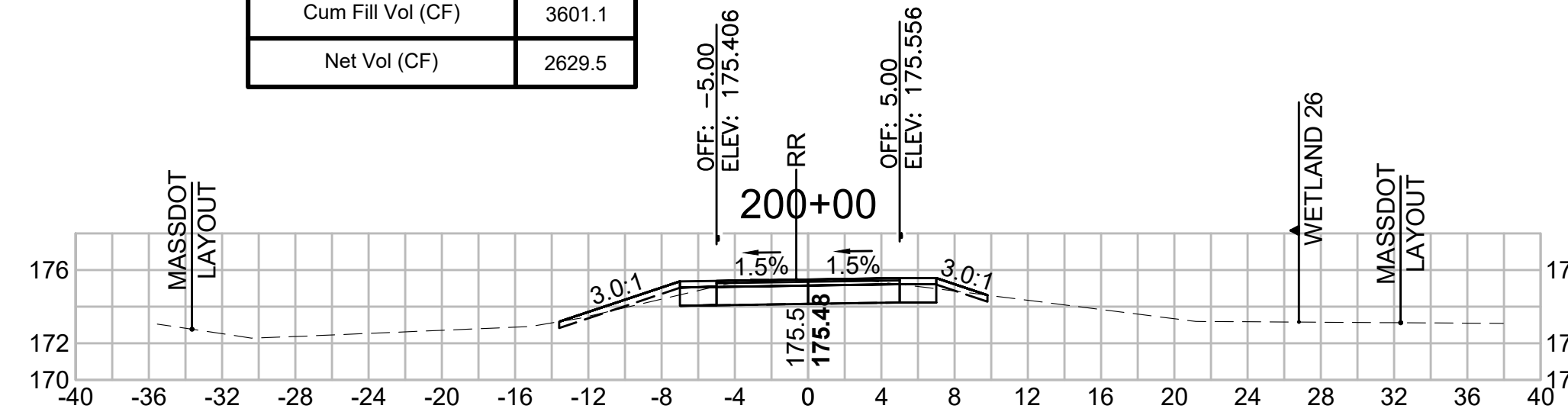
Total Volume at Station 202+00.00	
Cut Area (SF)	0.329
Fill Area (SF)	42.587
Cut Vol (CF)	2.4
Fill Vol (CF)	76.1
Cum Cut Vol (CF)	6290.4
Cum Fill Vol (CF)	3758.2
Net Vol (CF)	2532.3



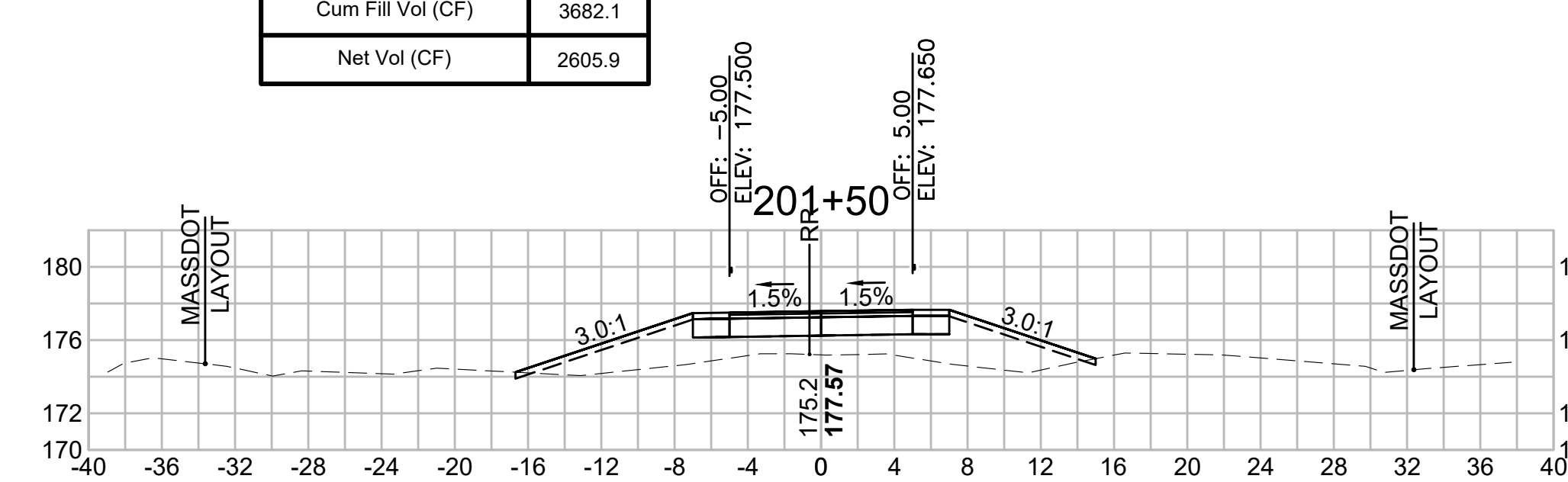
Total Volume at Station 198+50.00	
Cut Area (SF)	30.417
Fill Area (SF)	10.468
Cut Vol (CF)	60.2
Fill Vol (CF)	10.7
Cum Cut Vol (CF)	6079.7
Cum Fill Vol (CF)	3564.6
Net Vol (CF)	2515.1



Total Volume at Station 200+00.00	
Cut Area (SF)	17.962
Fill Area (SF)	2.080
Cut Vol (CF)	43.6
Fill Vol (CF)	2.0
Cum Cut Vol (CF)	6230.6
Cum Fill Vol (CF)	3601.1
Net Vol (CF)	2629.5



Total Volume at Station 201+50.00	
Cut Area (SF)	2.298
Fill Area (SF)	39.594
Cut Vol (CF)	9.8
Fill Vol (CF)	54.0
Cum Cut Vol (CF)	6288.0
Cum Fill Vol (CF)	3682.1
Net Vol (CF)	2605.9



SUDBURY
BRUCE FREEMAN RAIL TRAIL

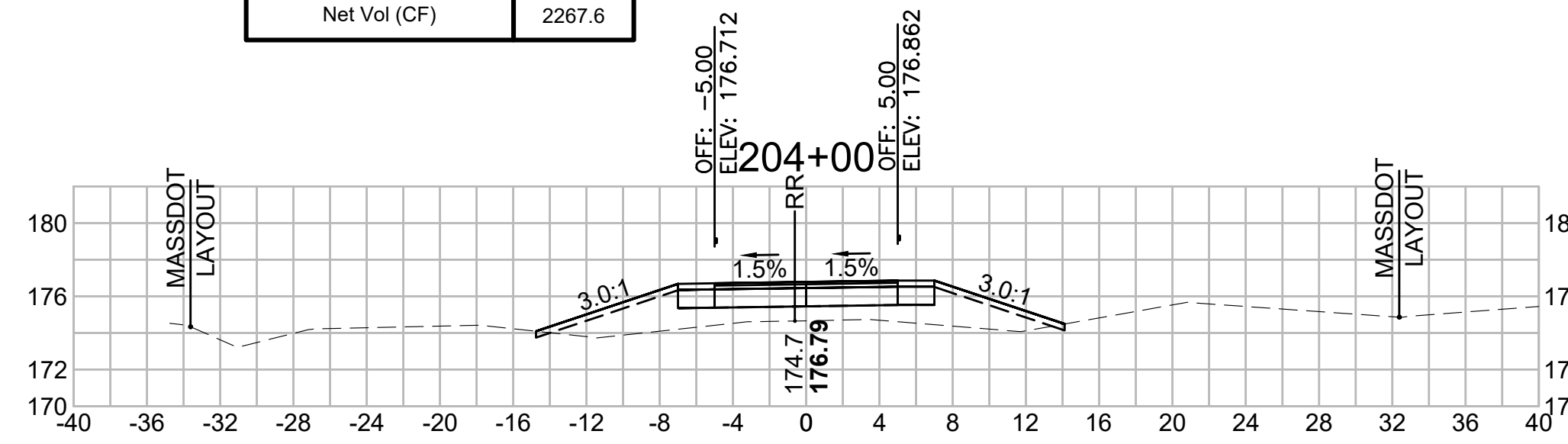
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	267	318

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

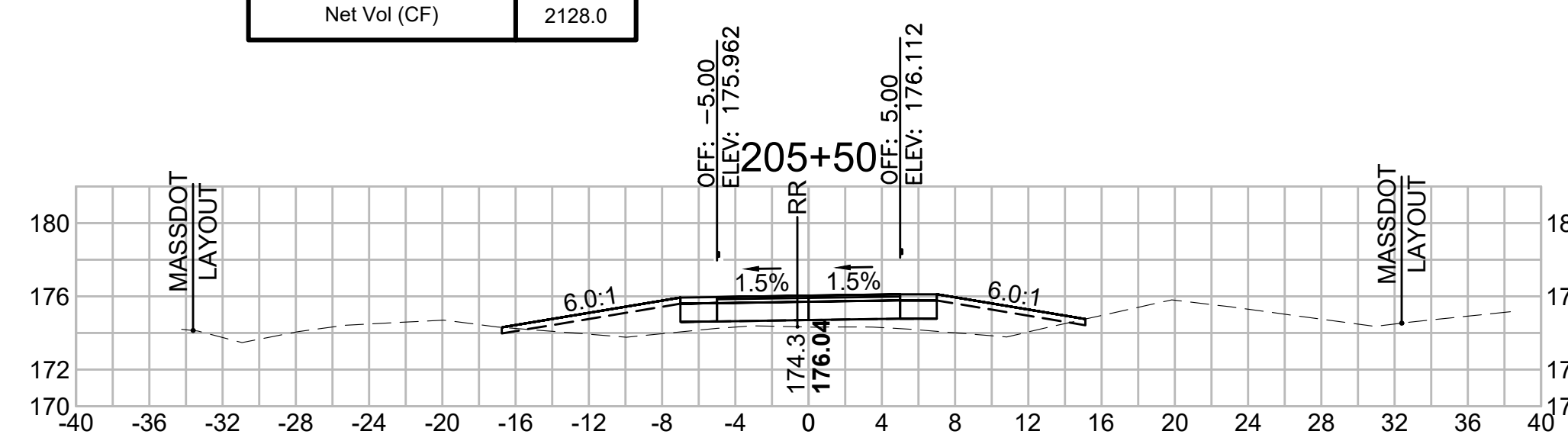
Total Volume at Station 204+00.00

Cut Area (SF)	1.111
Fill Area (SF)	28.525
Cut Vol (CF)	2.4
Fill Vol (CF)	56.9
Cum Cut Vol (CF)	6295.9
Cum Fill Vol (CF)	4028.3
Net Vol (CF)	2267.6



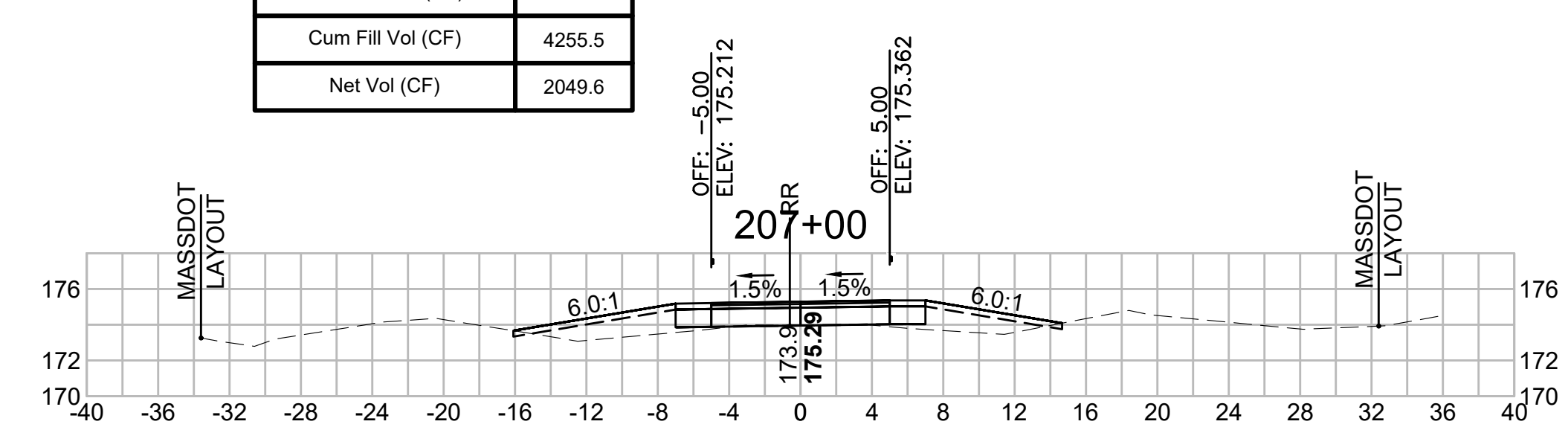
Total Volume at Station 205+50.00

Cut Area (SF)	0.375
Fill Area (SF)	21.945
Cut Vol (CF)	1.0
Fill Vol (CF)	42.2
Cum Cut Vol (CF)	6295.5
Cum Fill Vol (CF)	4171.5
Net Vol (CF)	2128.0



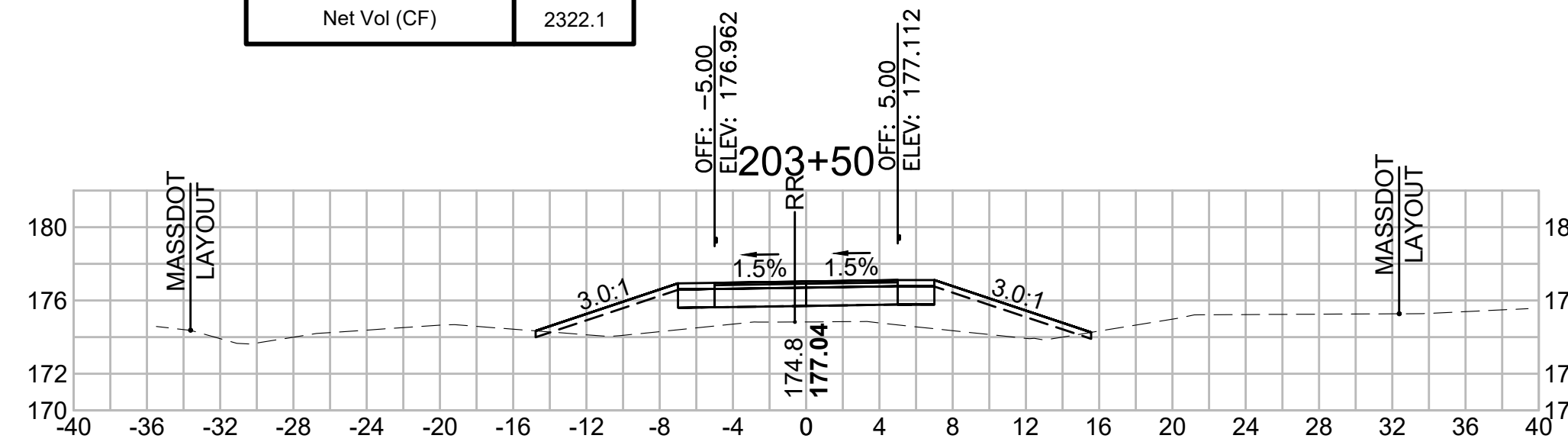
Total Volume at Station 207+00.00

Cut Area (SF)	0.486
Fill Area (SF)	13.756
Cut Vol (CF)	1.5
Fill Vol (CF)	24.4
Cum Cut Vol (CF)	6305.1
Cum Fill Vol (CF)	4255.5
Net Vol (CF)	2049.6



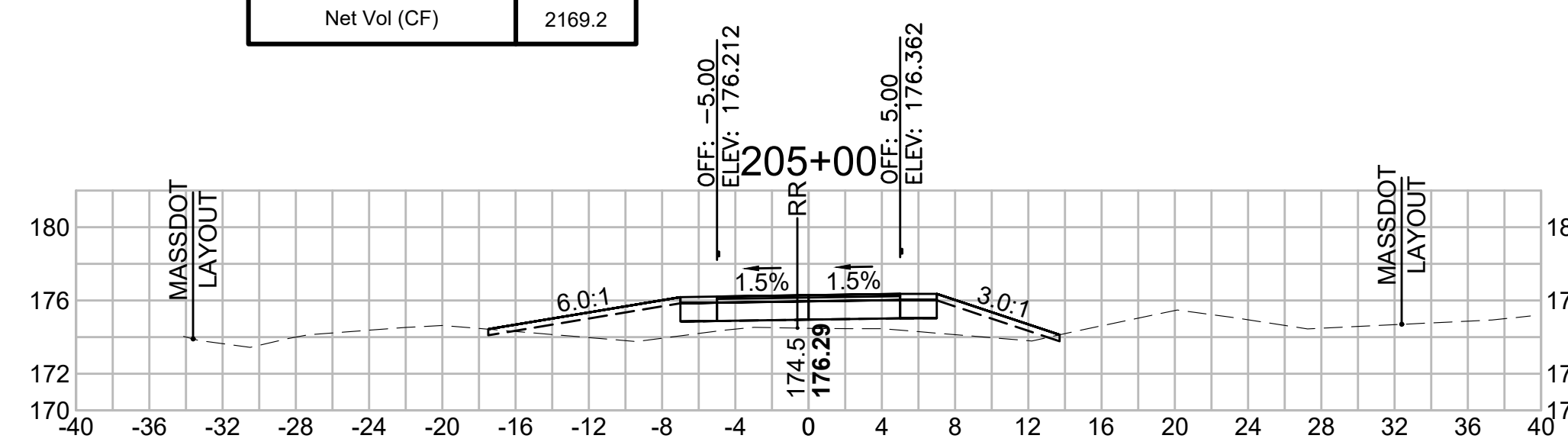
Total Volume at Station 203+50.00

Cut Area (SF)	1.477
Fill Area (SF)	32.895
Cut Vol (CF)	1.8
Fill Vol (CF)	64.8
Cum Cut Vol (CF)	6293.5
Cum Fill Vol (CF)	3971.4
Net Vol (CF)	2322.1



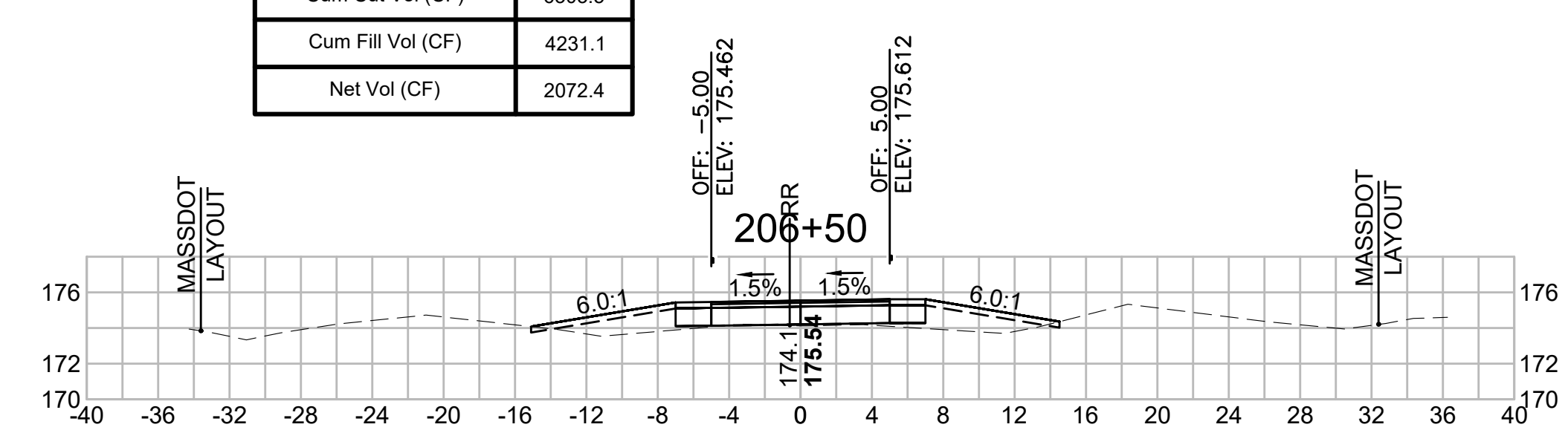
Total Volume at Station 205+00.00

Cut Area (SF)	0.741
Fill Area (SF)	23.656
Cut Vol (CF)	1.1
Fill Vol (CF)	48.2
Cum Cut Vol (CF)	6298.5
Cum Fill Vol (CF)	4129.3
Net Vol (CF)	2169.2



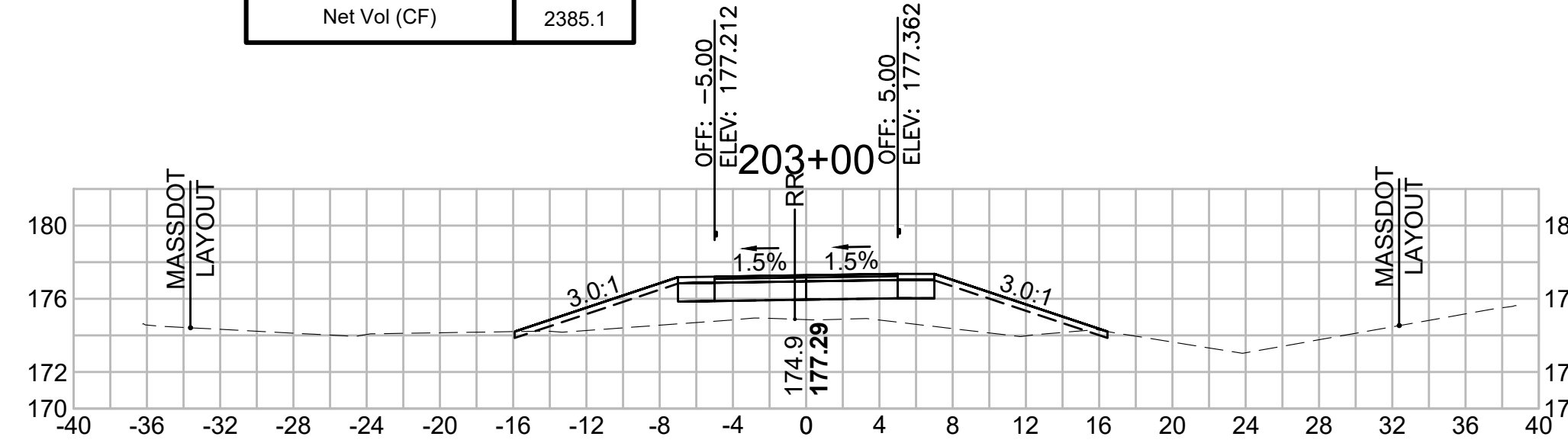
Total Volume at Station 206+50.00

Cut Area (SF)	1.181
Fill Area (SF)	12.544
Cut Vol (CF)	2.4
Fill Vol (CF)	25.4
Cum Cut Vol (CF)	6303.5
Cum Fill Vol (CF)	4231.1
Net Vol (CF)	2072.4



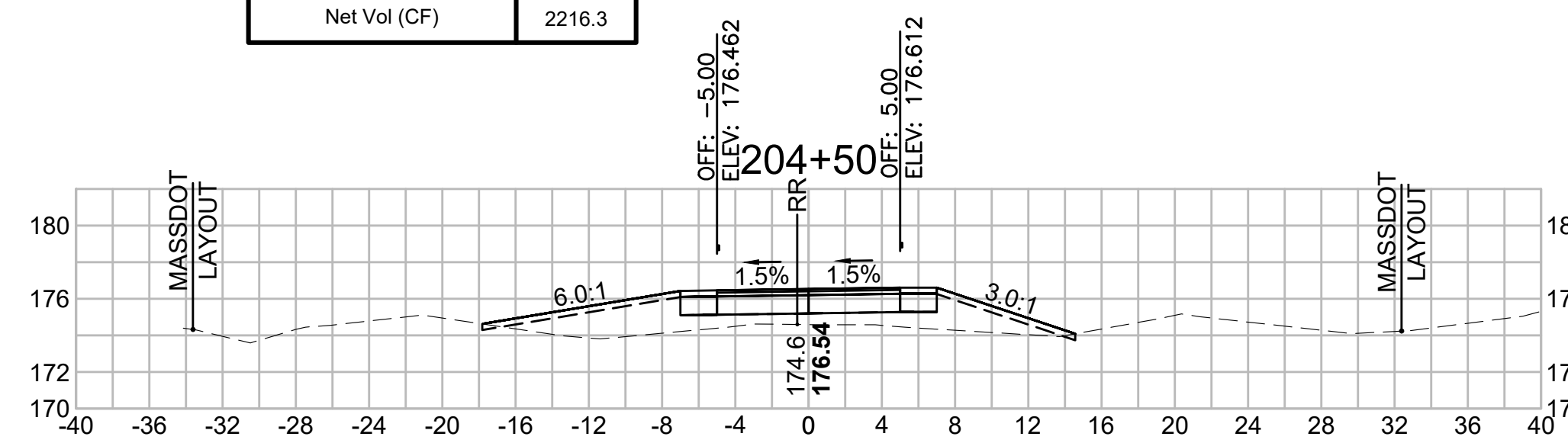
Total Volume at Station 203+00.00

Cut Area (SF)	0.502
Fill Area (SF)	37.130
Cut Vol (CF)	0.7
Fill Vol (CF)	71.7
Cum Cut Vol (CF)	6291.7
Cum Fill Vol (CF)	3906.6
Net Vol (CF)	2385.1



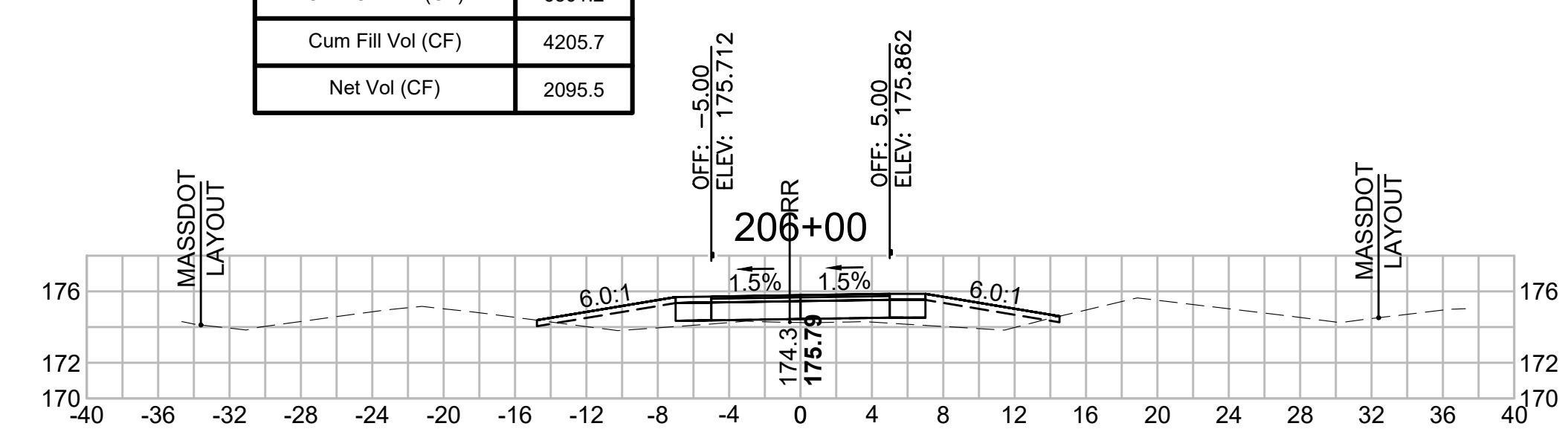
Total Volume at Station 204+50.00

Cut Area (SF)	0.471
Fill Area (SF)	28.449
Cut Vol (CF)	1.5
Fill Vol (CF)	52.8
Cum Cut Vol (CF)	6297.4
Cum Fill Vol (CF)	4081.1
Net Vol (CF)	2216.3



Total Volume at Station 206+00.00

Cut Area (SF)	1.387
Fill Area (SF)	14.930
Cut Vol (CF)	1.6
Fill Vol (CF)	34.1
Cum Cut Vol (CF)	6301.2
Cum Fill Vol (CF)	4205.7
Net Vol (CF)	2095.5



SUDBURY
BRUCE FREEMAN RAIL TRAIL

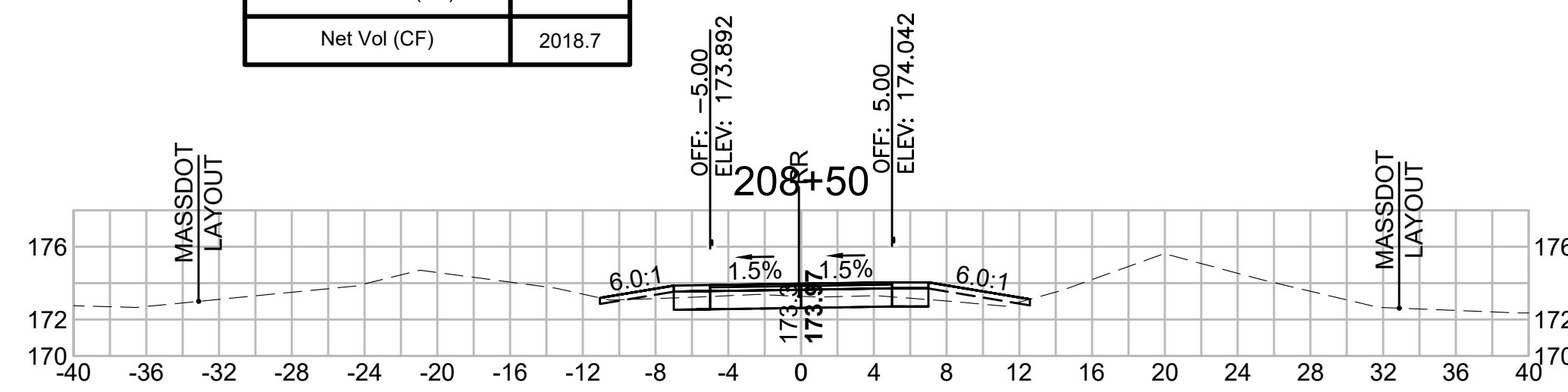
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	268	318

PROJECT FILE NO. 608164

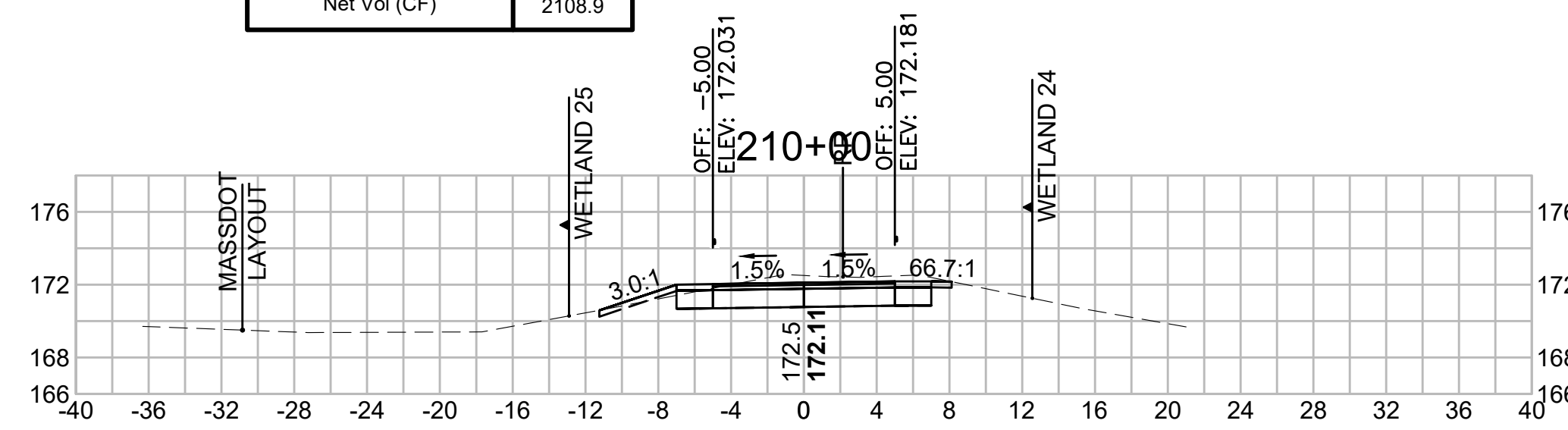
CROSS SECTIONS

608164_X\SEC\CROSS SECTION LAYOUTS.DWG 12-May-2021

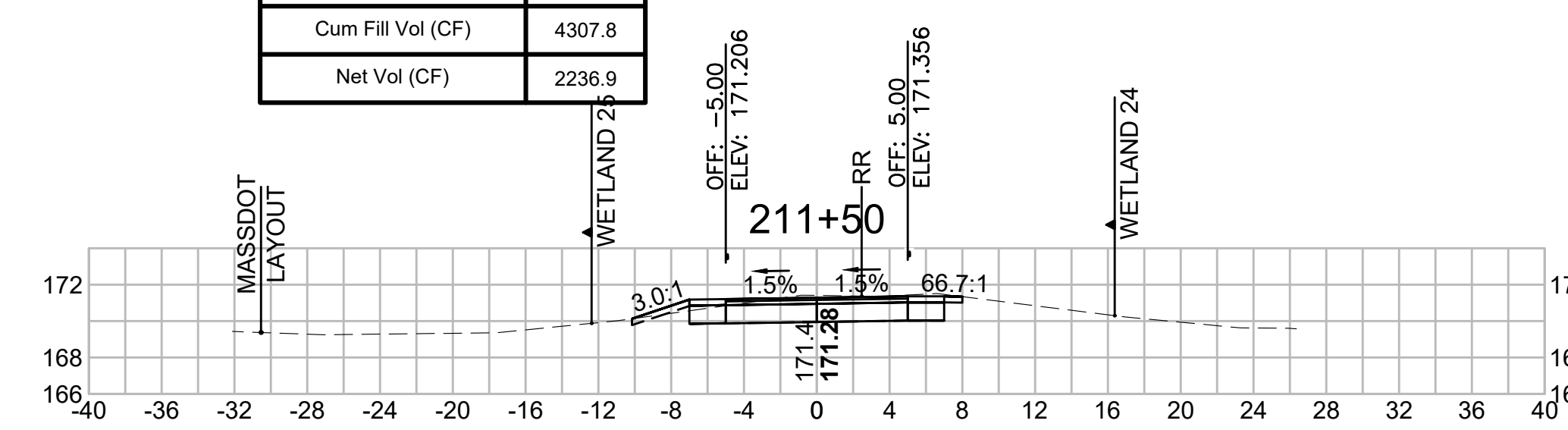
Total Volume at Station 208+50.00	
Cut Area (SF)	9.444
Fill Area (SF)	2.372
Cut Vol (CF)	12.0
Fill Vol (CF)	8.5
Cum Cut Vol (CF)	6322.5
Cum Fill Vol (CF)	4303.9
Net Vol (CF)	2018.7



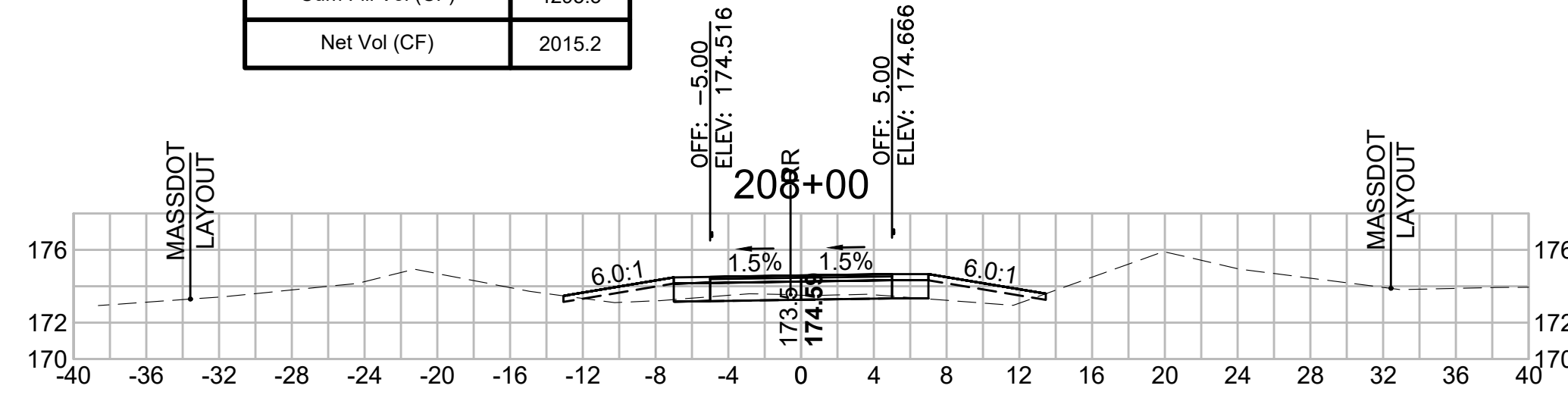
Total Volume at Station 210+00.00	
Cut Area (SF)	22.200
Fill Area (SF)	0.211
Cut Vol (CF)	39.3
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	6415.9
Cum Fill Vol (CF)	4307.0
Net Vol (CF)	2108.9



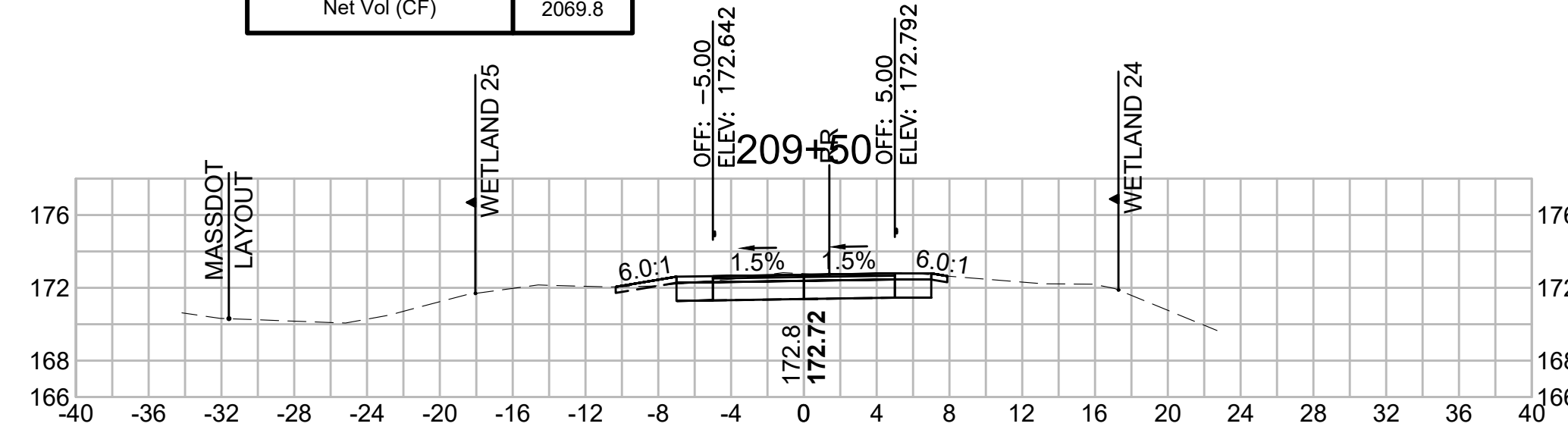
Total Volume at Station 211+50.00	
Cut Area (SF)	20.997
Fill Area (SF)	0.179
Cut Vol (CF)	41.2
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	6544.7
Cum Fill Vol (CF)	4307.8
Net Vol (CF)	2236.9



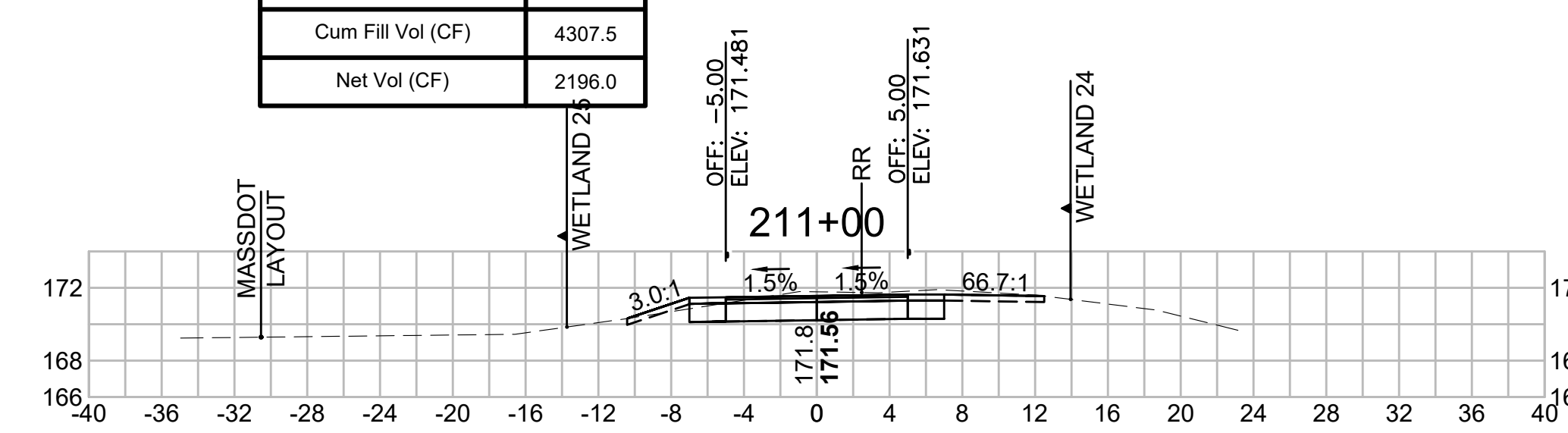
Total Volume at Station 208+00.00	
Cut Area (SF)	3.490
Fill Area (SF)	6.856
Cut Vol (CF)	4.1
Fill Vol (CF)	16.7
Cum Cut Vol (CF)	6310.5
Cum Fill Vol (CF)	4295.3
Net Vol (CF)	2015.2



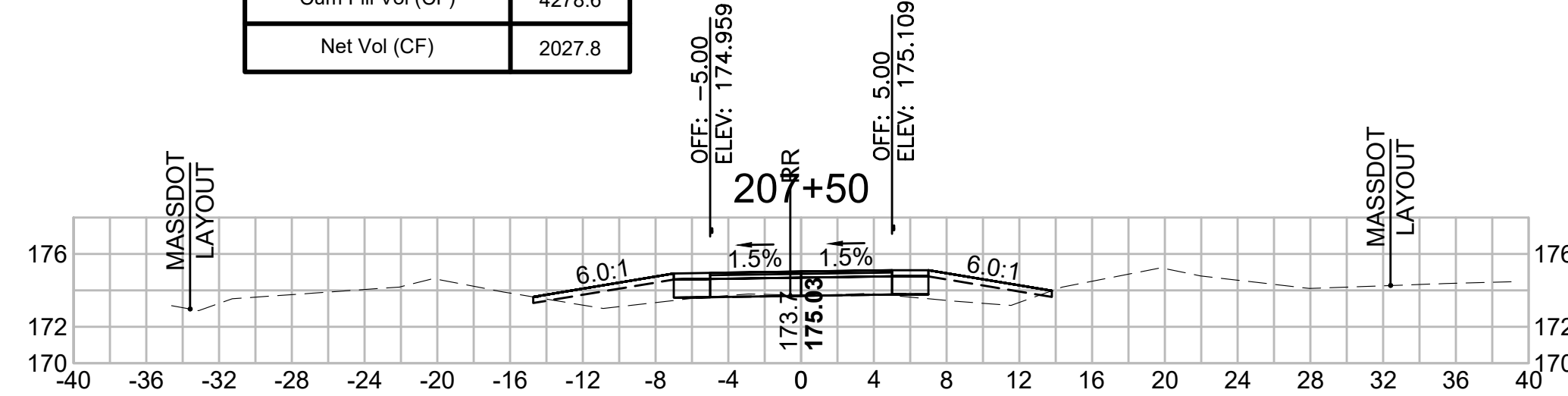
Total Volume at Station 209+50.00	
Cut Area (SF)	20.276
Fill Area (SF)	0.029
Cut Vol (CF)	32.1
Fill Vol (CF)	0.4
Cum Cut Vol (CF)	6376.6
Cum Fill Vol (CF)	4306.8
Net Vol (CF)	2069.8



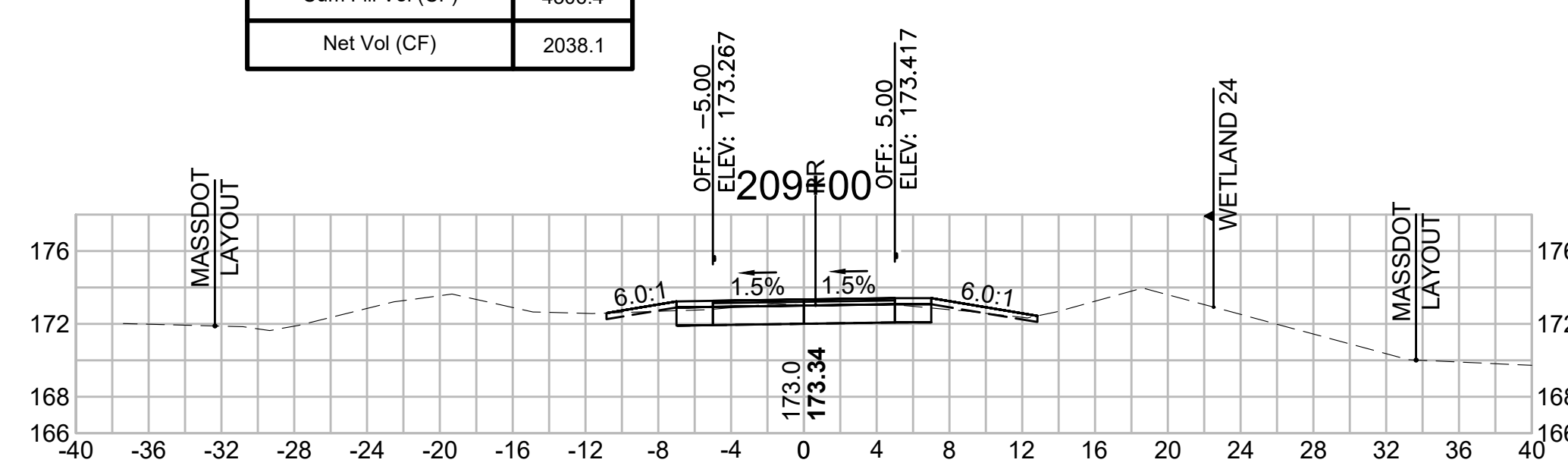
Total Volume at Station 211+00.00	
Cut Area (SF)	23.521
Fill Area (SF)	0.185
Cut Vol (CF)	44.4
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	6503.5
Cum Fill Vol (CF)	4307.5
Net Vol (CF)	2196.0



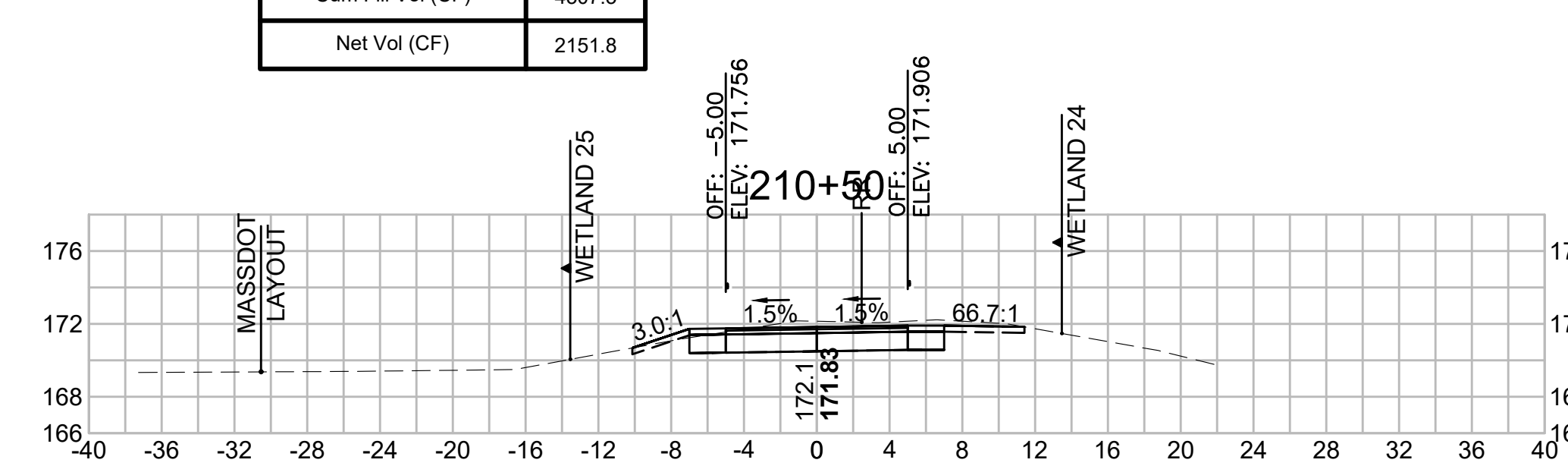
Total Volume at Station 207+50.00	
Cut Area (SF)	0.952
Fill Area (SF)	11.219
Cut Vol (CF)	1.3
Fill Vol (CF)	23.1
Cum Cut Vol (CF)	6306.4
Cum Fill Vol (CF)	4278.6
Net Vol (CF)	2027.8



Total Volume at Station 209+00.00	
Cut Area (SF)	14.341
Fill Area (SF)	0.396
Cut Vol (CF)	22.0
Fill Vol (CF)	2.6
Cum Cut Vol (CF)	6344.5
Cum Fill Vol (CF)	4306.4
Net Vol (CF)	2038.1



Total Volume at Station 210+50.00	
Cut Area (SF)	24.421
Fill Area (SF)	0.053
Cut Vol (CF)	43.2
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	6459.1
Cum Fill Vol (CF)	4307.3
Net Vol (CF)	2151.8



SUDBURY
BRUCE FREEMAN RAIL TRAIL

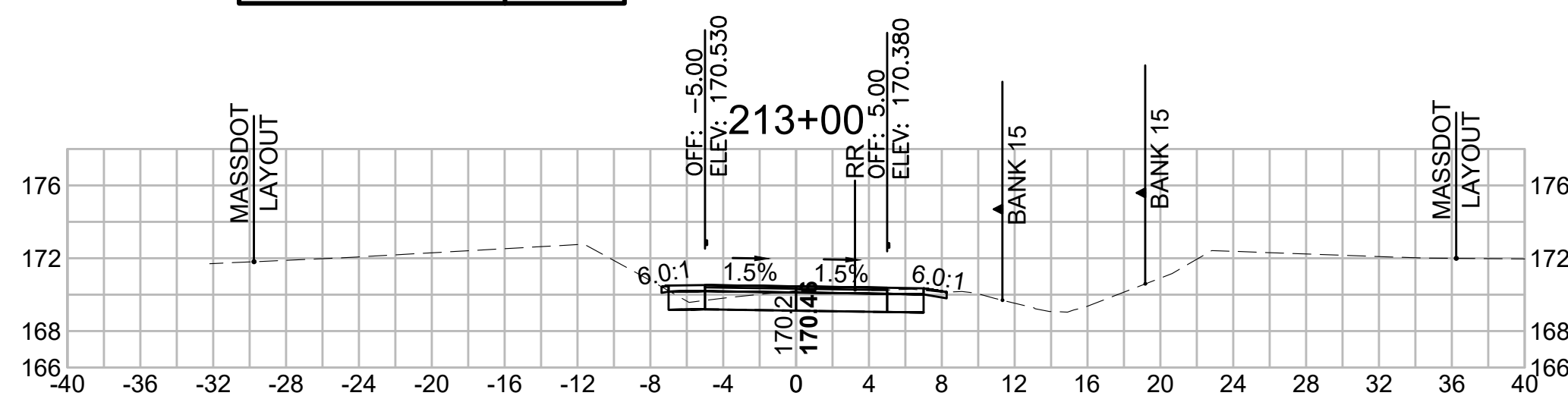
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	269	318

PROJECT FILE NO. 608164

CROSS SECTIONS

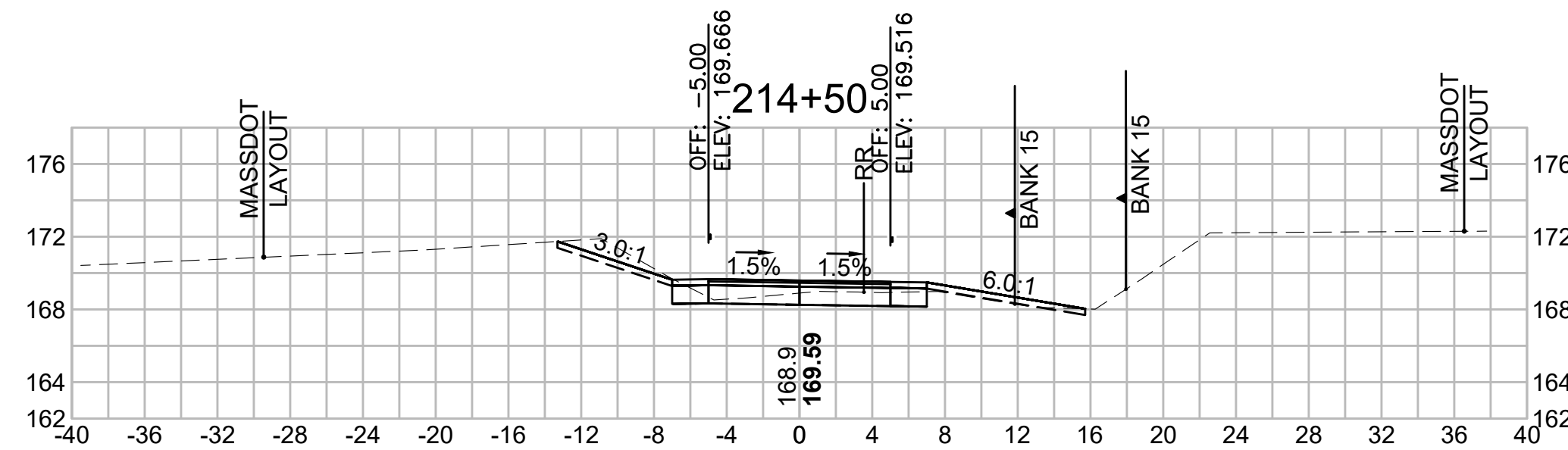
Total Volume at Station 213+00.00

Cut Area (SF)	20.996
Fill Area (SF)	0.000
Cut Vol (CF)	44.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	6673.8
Cum Fill Vol (CF)	4308.0
Net Vol (CF)	2365.8



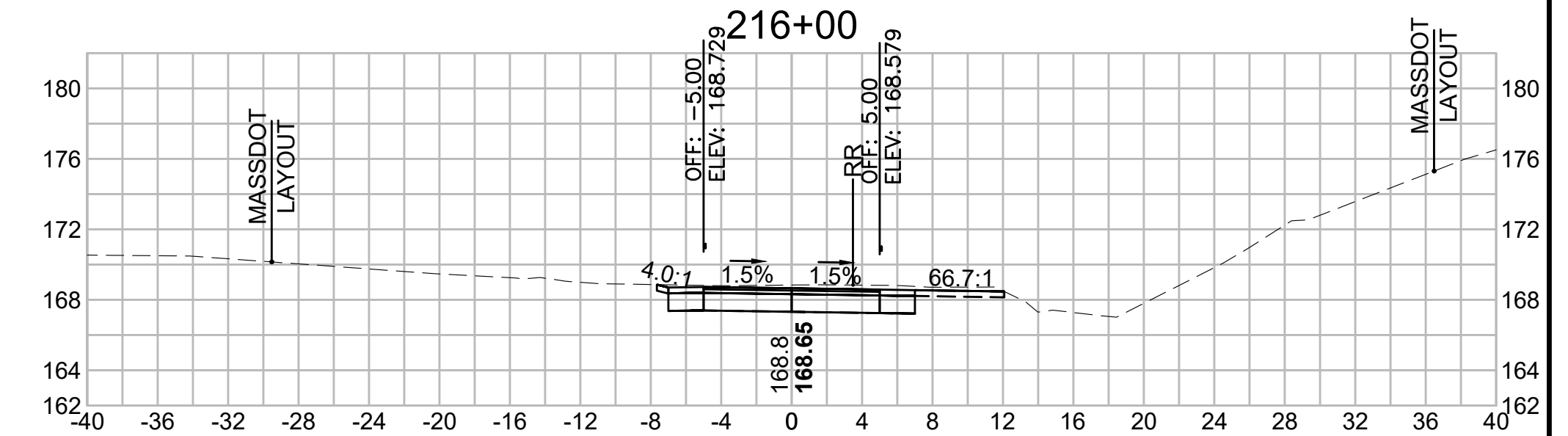
Total Volume at Station 214+50.00

Cut Area (SF)	14.820
Fill Area (SF)	0.356
Cut Vol (CF)	33.5
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	6784.2
Cum Fill Vol (CF)	4308.4
Net Vol (CF)	2475.9



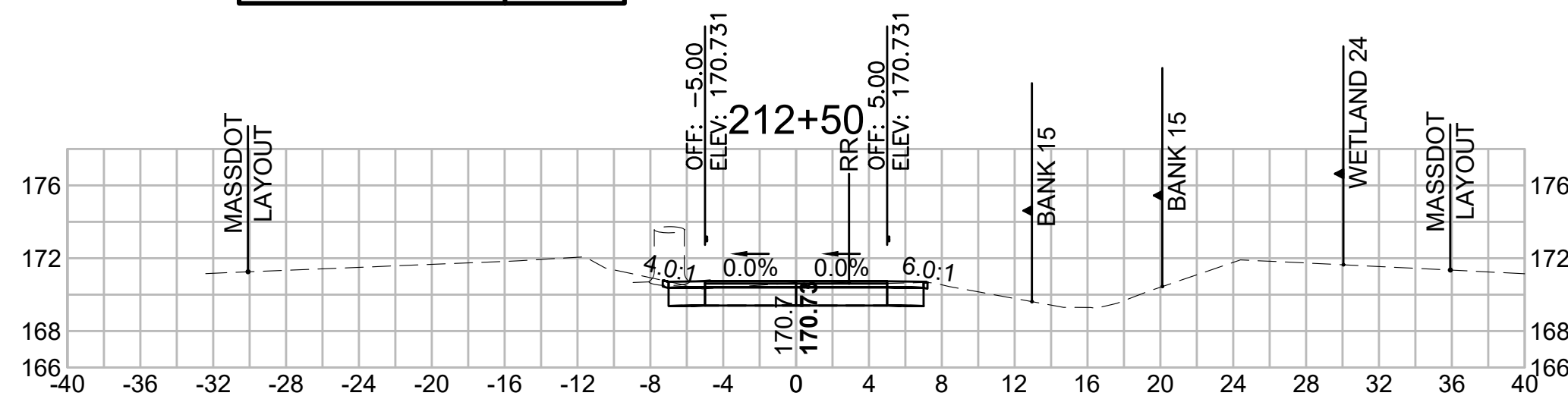
Total Volume at Station 216+00.00

Cut Area (SF)	27.469
Fill Area (SF)	0.000
Cut Vol (CF)	47.9
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	6897.7
Cum Fill Vol (CF)	4309.1
Net Vol (CF)	2588.5



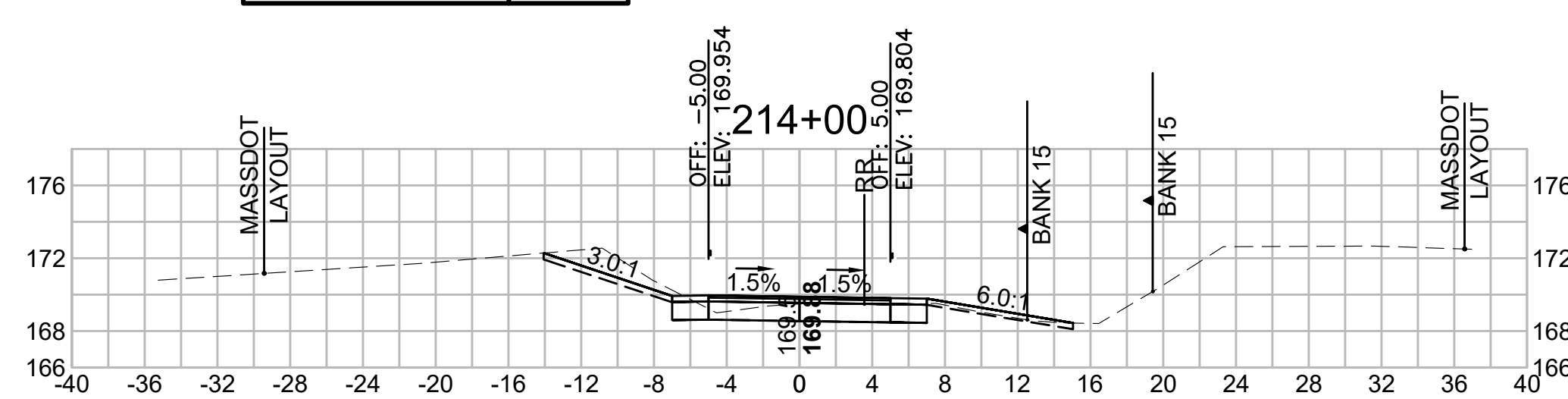
Total Volume at Station 212+50.00

Cut Area (SF)	26.497
Fill Area (SF)	0.000
Cut Vol (CF)	45.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	6629.8
Cum Fill Vol (CF)	4308.0
Net Vol (CF)	2321.8



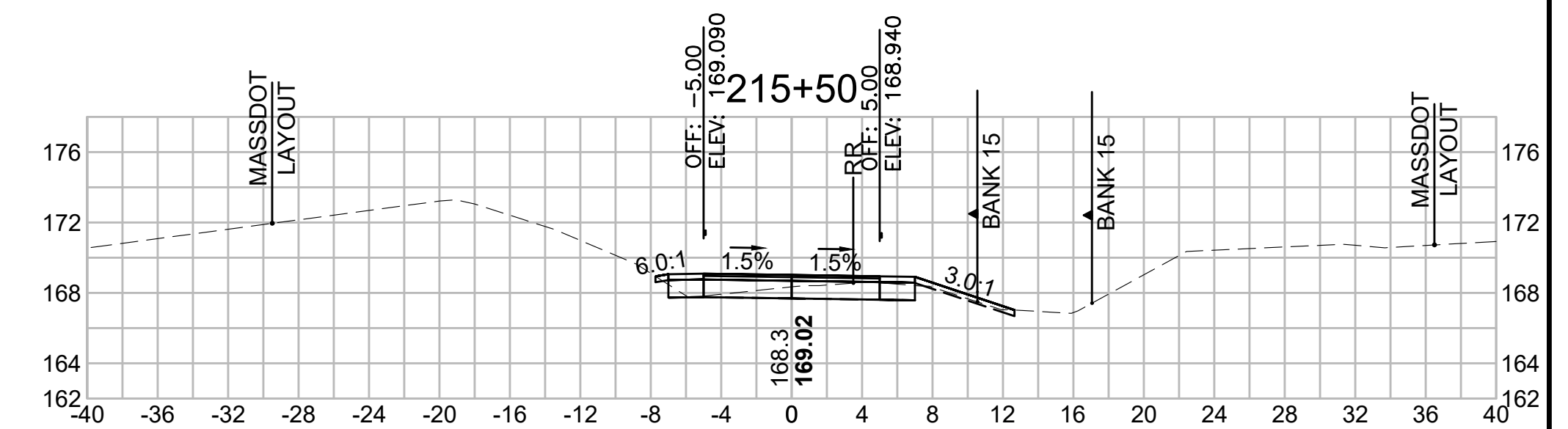
Total Volume at Station 214+00.00

Cut Area (SF)	21.365
Fill Area (SF)	0.000
Cut Vol (CF)	38.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	6750.7
Cum Fill Vol (CF)	4308.0
Net Vol (CF)	2442.7



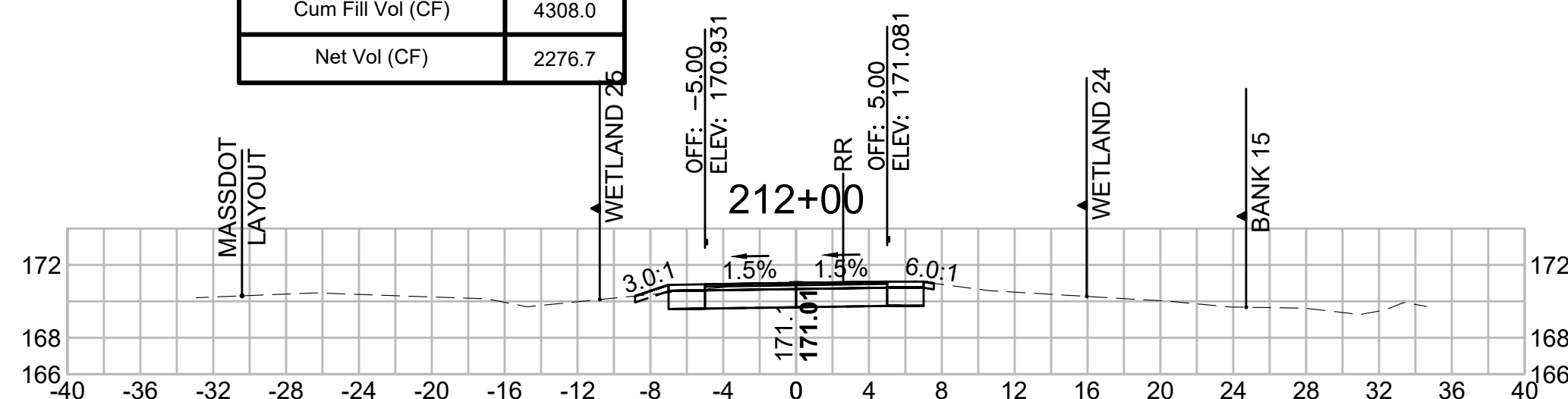
Total Volume at Station 215+50.00

Cut Area (SF)	24.227
Fill Area (SF)	0.083
Cut Vol (CF)	37.1
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	6849.8
Cum Fill Vol (CF)	4309.1
Net Vol (CF)	2540.7



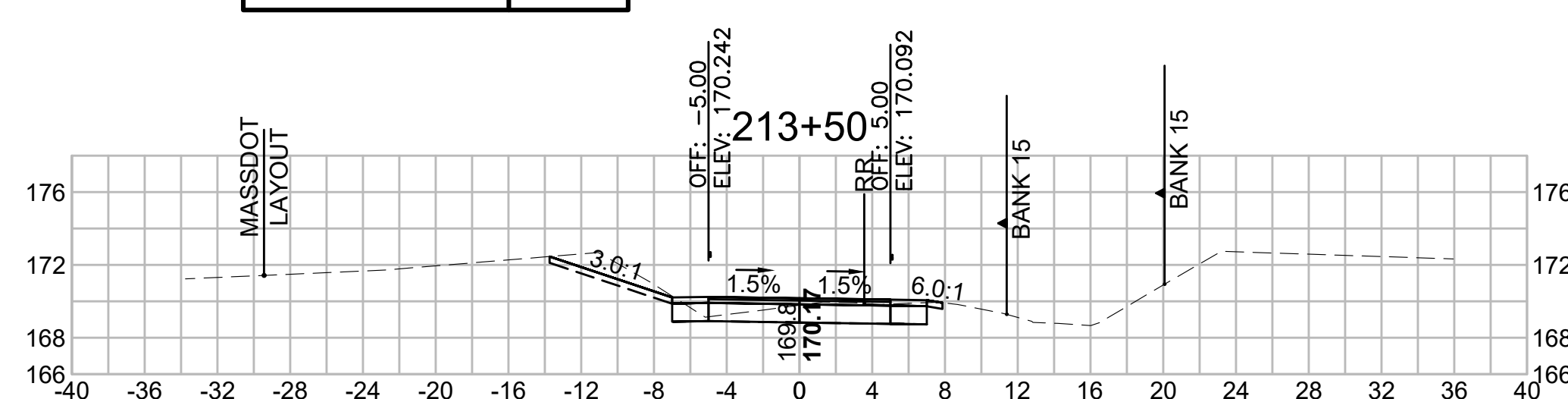
Total Volume at Station 212+00.00

Cut Area (SF)	22.231
Fill Area (SF)	0.014
Cut Vol (CF)	40.0
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	6584.7
Cum Fill Vol (CF)	4308.0
Net Vol (CF)	2276.7



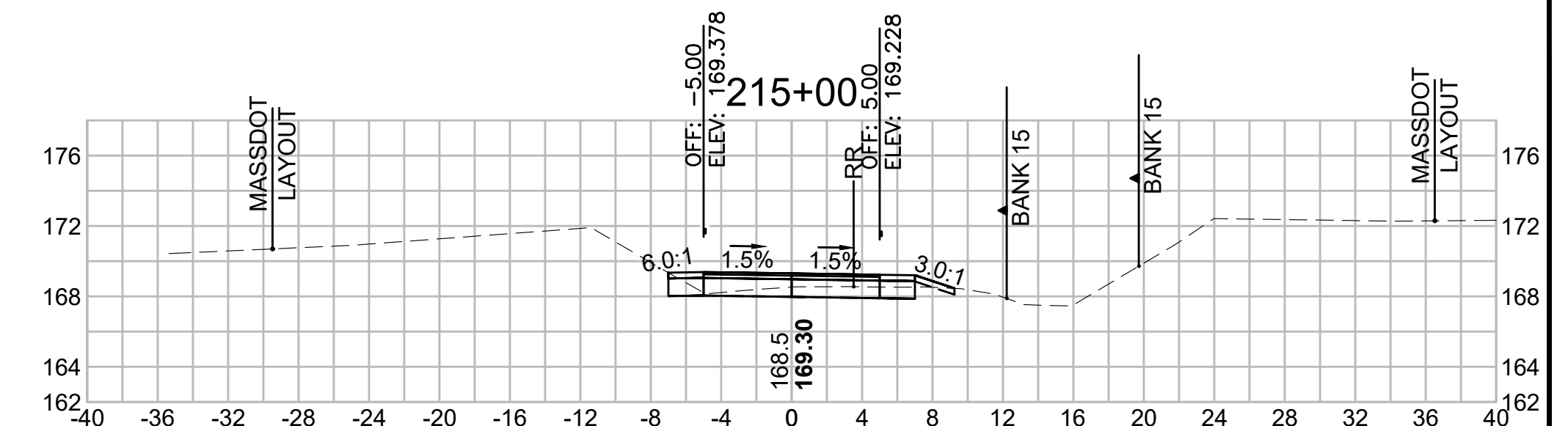
Total Volume at Station 213+50.00

Cut Area (SF)	20.362
Fill Area (SF)	0.000
Cut Vol (CF)	38.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	6712.1
Cum Fill Vol (CF)	4308.0
Net Vol (CF)	2404.1



Total Volume at Station 215+00.00

Cut Area (SF)	15.874
Fill Area (SF)	0.160
Cut Vol (CF)	28.4
Fill Vol (CF)	0.5
Cum Cut Vol (CF)	6812.7
Cum Fill Vol (CF)	4308.8
Net Vol (CF)	2503.8



SUDBURY
BRUCE FREEMAN RAIL TRAIL

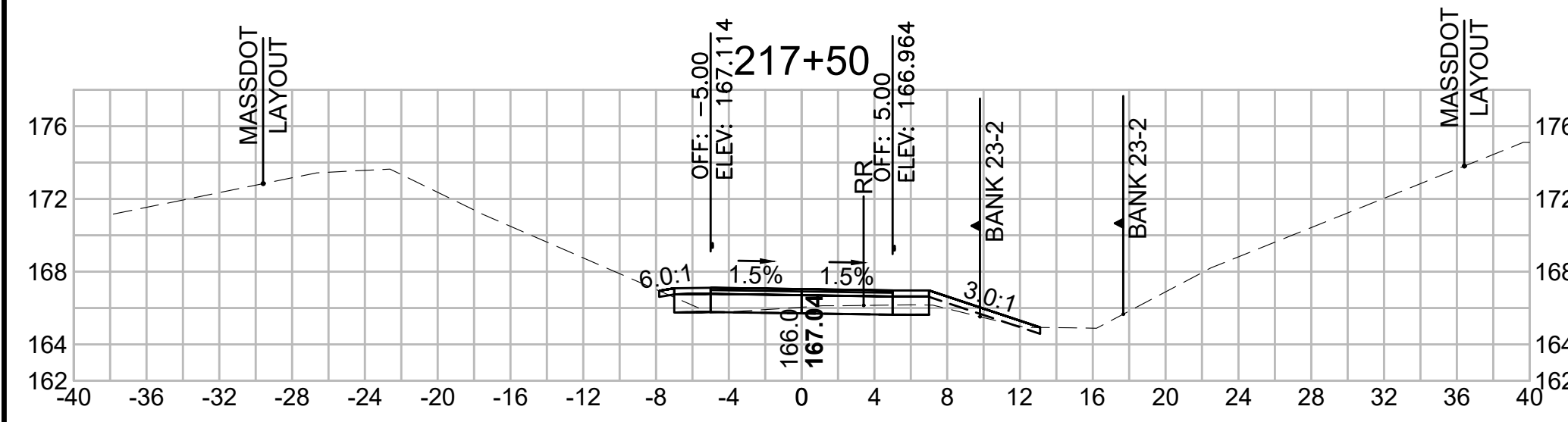
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	270	318

PROJECT FILE NO. 608164

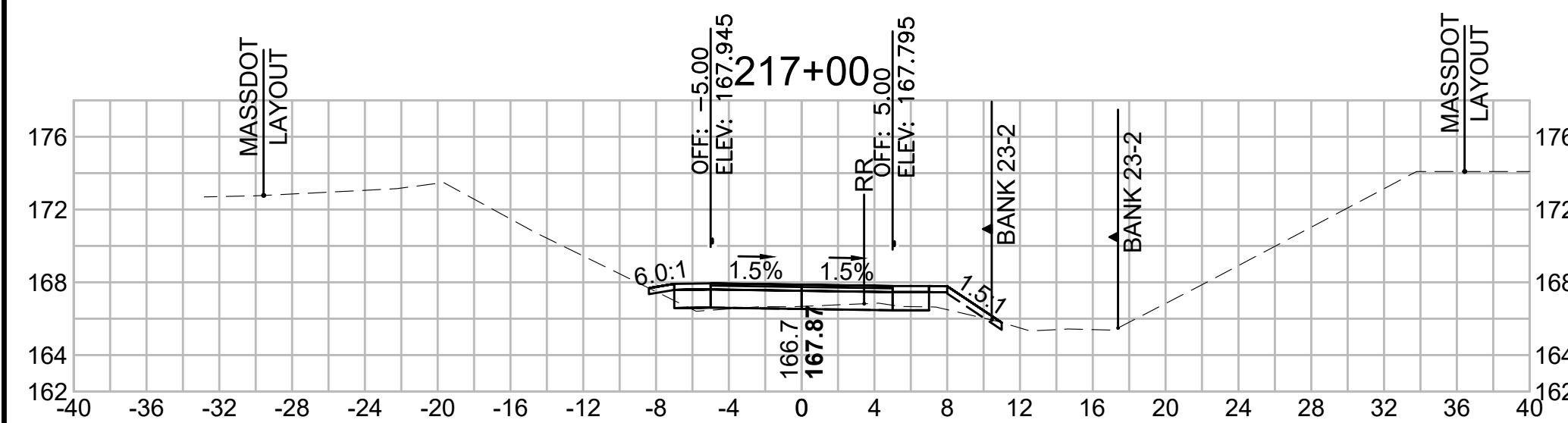
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

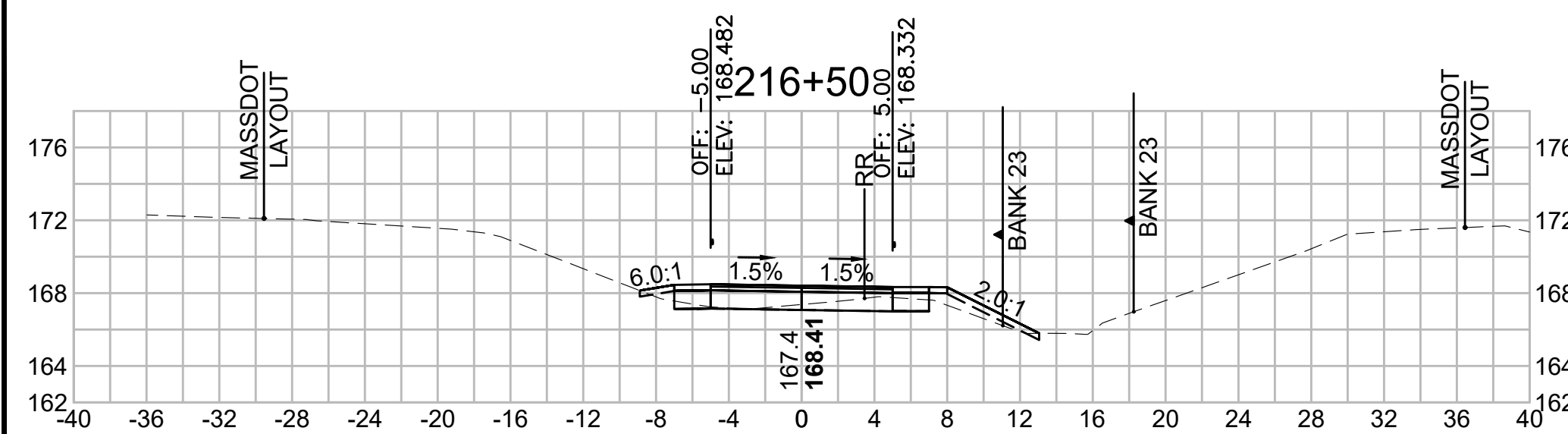
Total Volume at Station 217+50.00	
Cut Area (SF)	5.138
Fill Area (SF)	0.979
Cut Vol (CF)	7.8
Fill Vol (CF)	3.1
Cum Cut Vol (CF)	6944.8
Cum Fill Vol (CF)	4319.8
Net Vol (CF)	2625.0



Total Volume at Station 217+00.00	
Cut Area (SF)	3.273
Fill Area (SF)	2.324
Cut Vol (CF)	8.5
Fill Vol (CF)	4.9
Cum Cut Vol (CF)	6937.0
Cum Fill Vol (CF)	4316.7
Net Vol (CF)	2620.3



Total Volume at Station 216+50.00	
Cut Area (SF)	5.857
Fill Area (SF)	2.925
Cut Vol (CF)	30.9
Fill Vol (CF)	2.7
Cum Cut Vol (CF)	6928.5
Cum Fill Vol (CF)	4311.9
Net Vol (CF)	2616.7



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	271	318

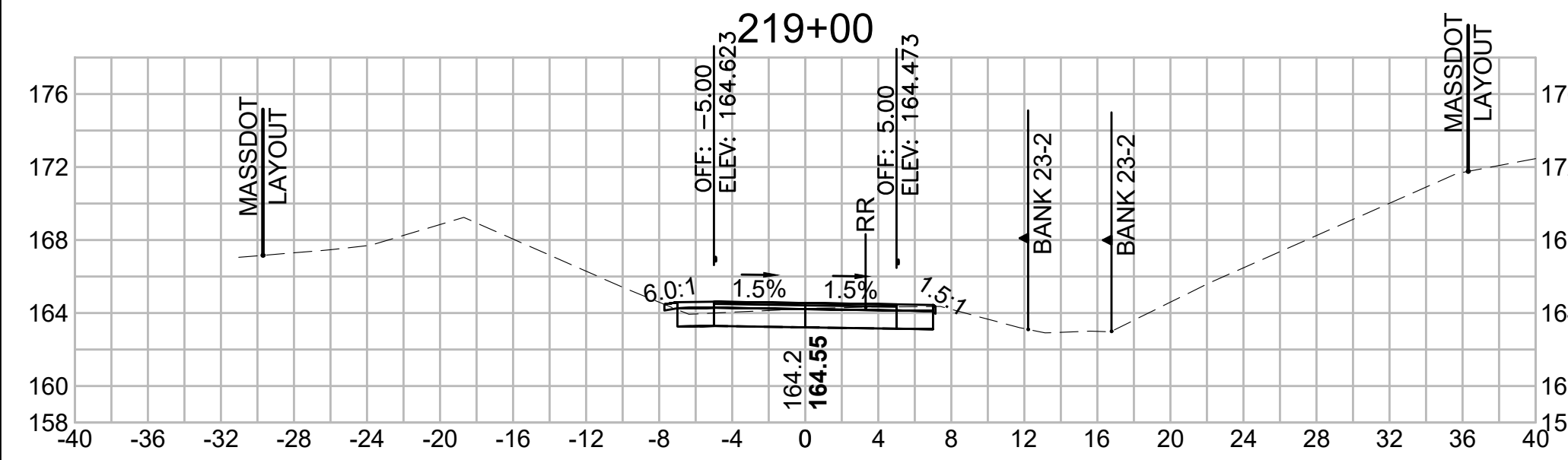
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

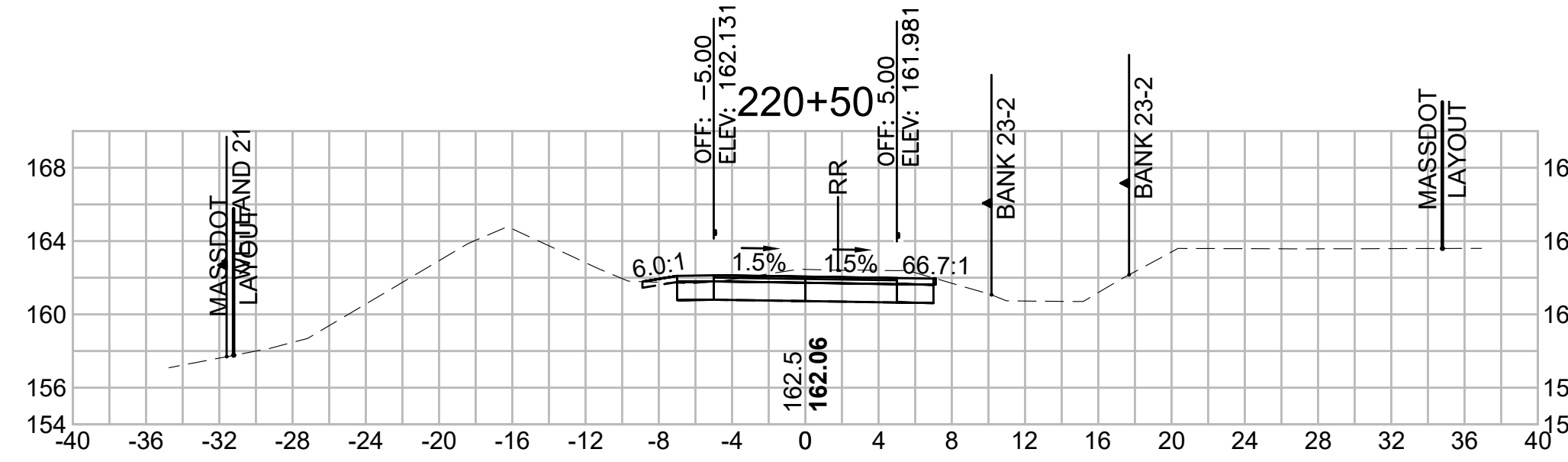
Total Volume at Station 219+00.00

Cut Area (SF)	13.950
Fill Area (SF)	0.005
Cut Vol (CF)	22.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	6990.9
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2692.4



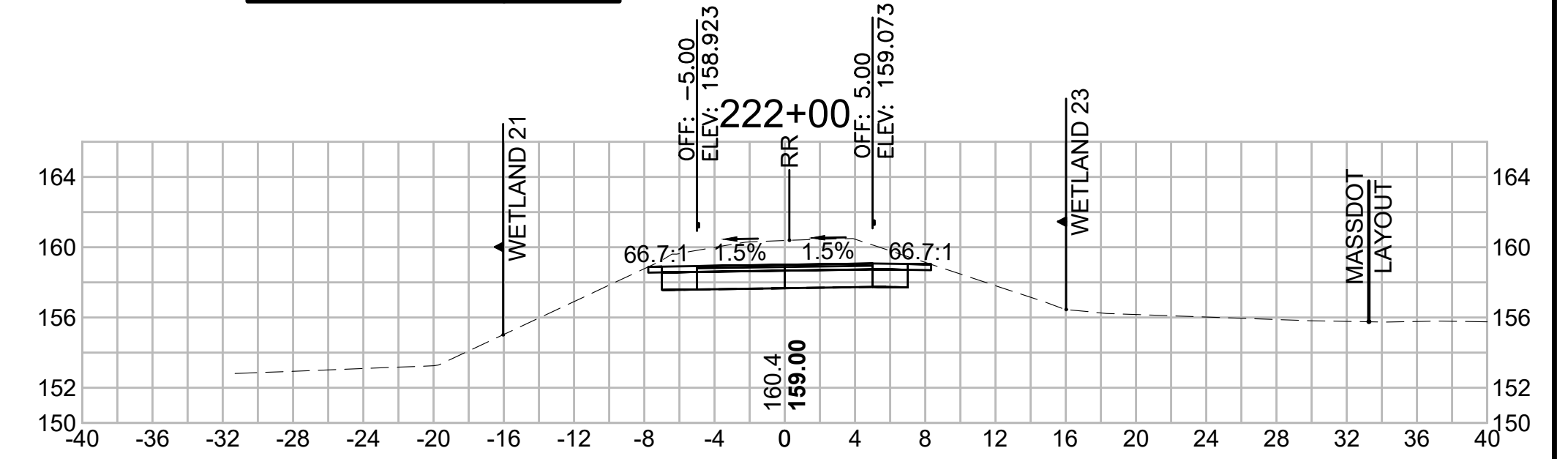
Total Volume at Station 220+50.00

Cut Area (SF)	20.886
Fill Area (SF)	0.009
Cut Vol (CF)	38.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7093.7
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2795.2



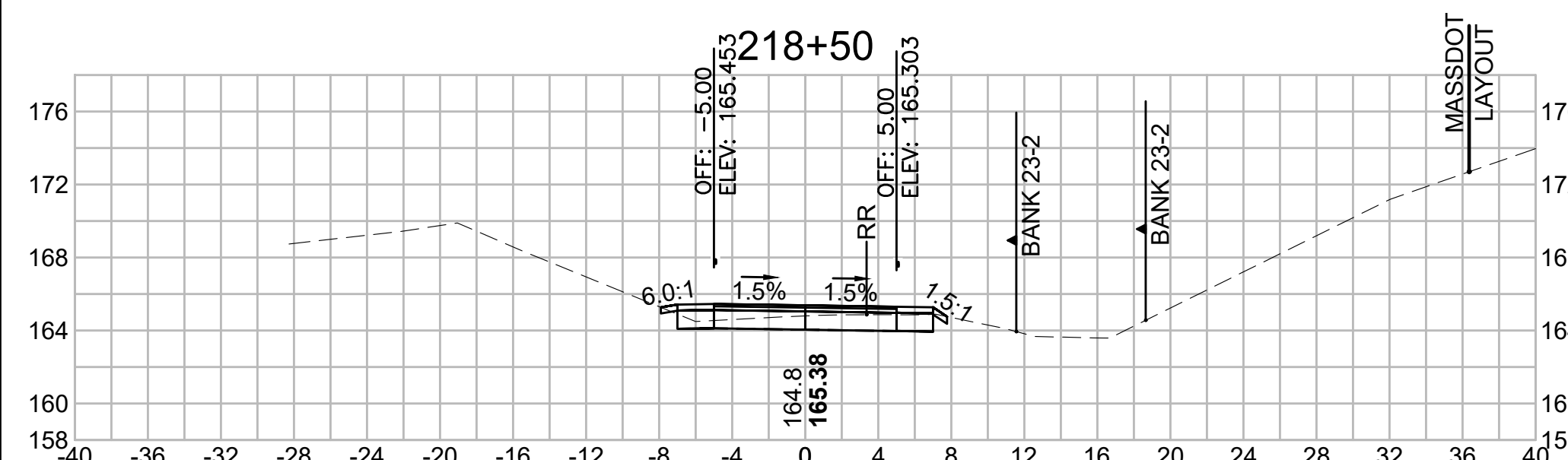
Total Volume at Station 222+00.00

Cut Area (SF)	36.279
Fill Area (SF)	0.043
Cut Vol (CF)	60.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7247.3
Cum Fill Vol (CF)	4298.6
Net Vol (CF)	2948.8



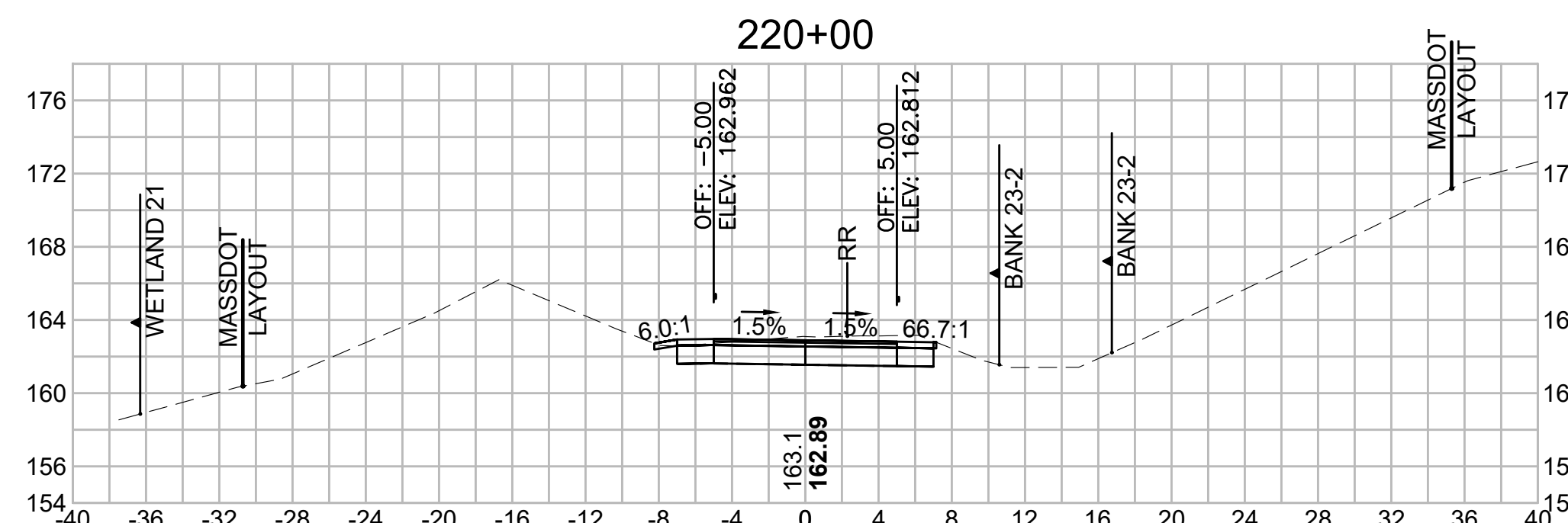
Total Volume at Station 218+50.00

Cut Area (SF)	10.300
Fill Area (SF)	0.030
Cut Vol (CF)	17.8
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	6968.4
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2670.0



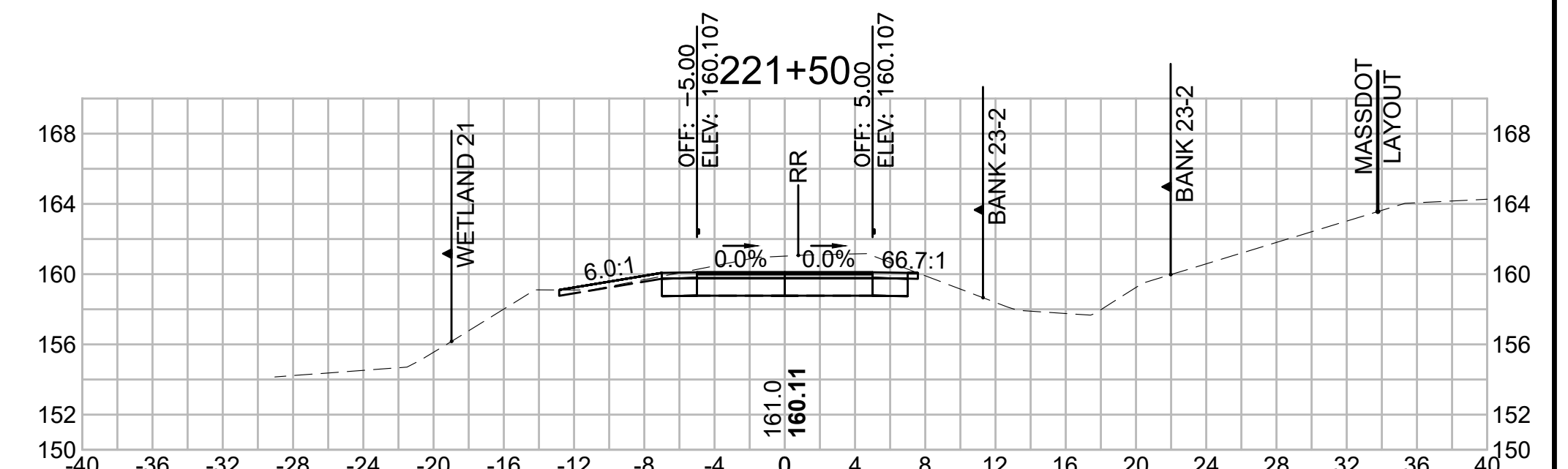
Total Volume at Station 220+00.00

Cut Area (SF)	20.136
Fill Area (SF)	0.001
Cut Vol (CF)	35.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7055.7
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2757.2



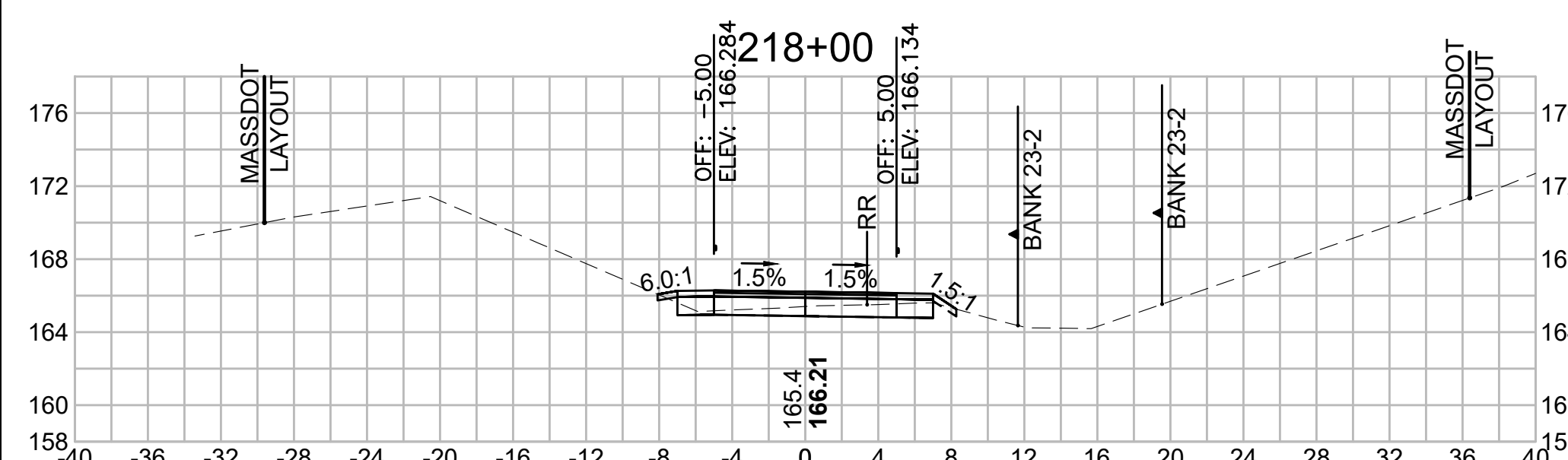
Total Volume at Station 221+50.00

Cut Area (SF)	28.856
Fill Area (SF)	0.000
Cut Vol (CF)	50.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7187.0
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2888.5



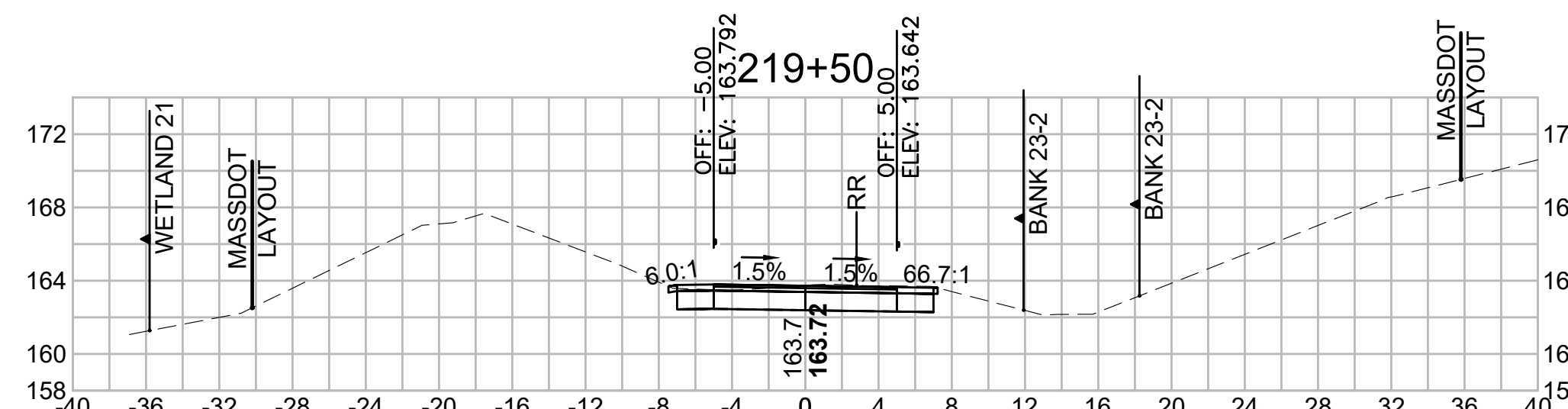
Total Volume at Station 218+00.00

Cut Area (SF)	8.908
Fill Area (SF)	0.096
Cut Vol (CF)	13.0
Fill Vol (CF)	1.0
Cum Cut Vol (CF)	6950.7
Cum Fill Vol (CF)	4298.3
Net Vol (CF)	2652.3



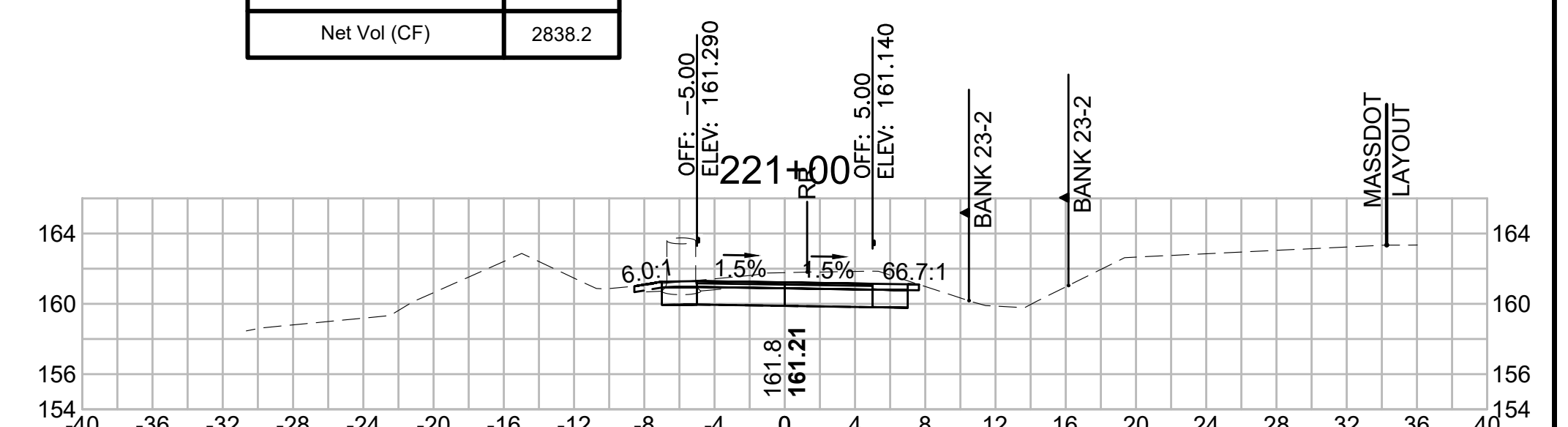
Total Volume at Station 219+50.00

Cut Area (SF)	17.969
Fill Area (SF)	0.000
Cut Vol (CF)	29.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7020.5
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2722.0



Total Volume at Station 221+00.00

Cut Area (SF)	25.513
Fill Area (SF)	0.000
Cut Vol (CF)	43.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7136.7
Cum Fill Vol (CF)	4298.5
Net Vol (CF)	2838.2



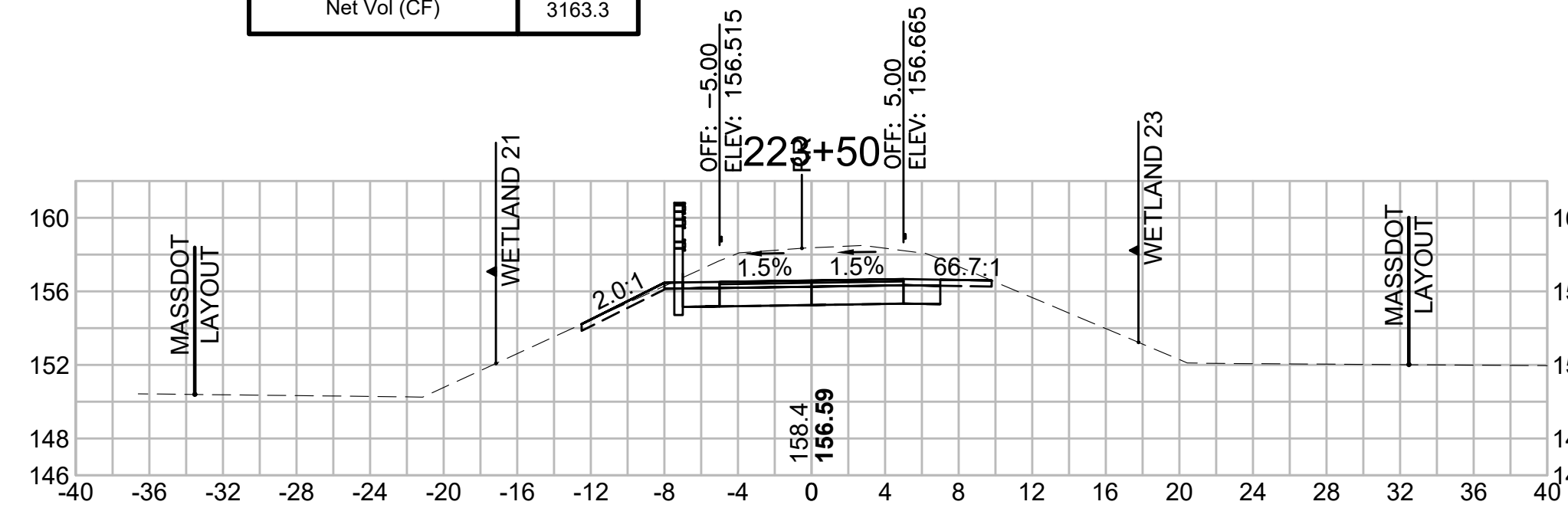
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	272	318

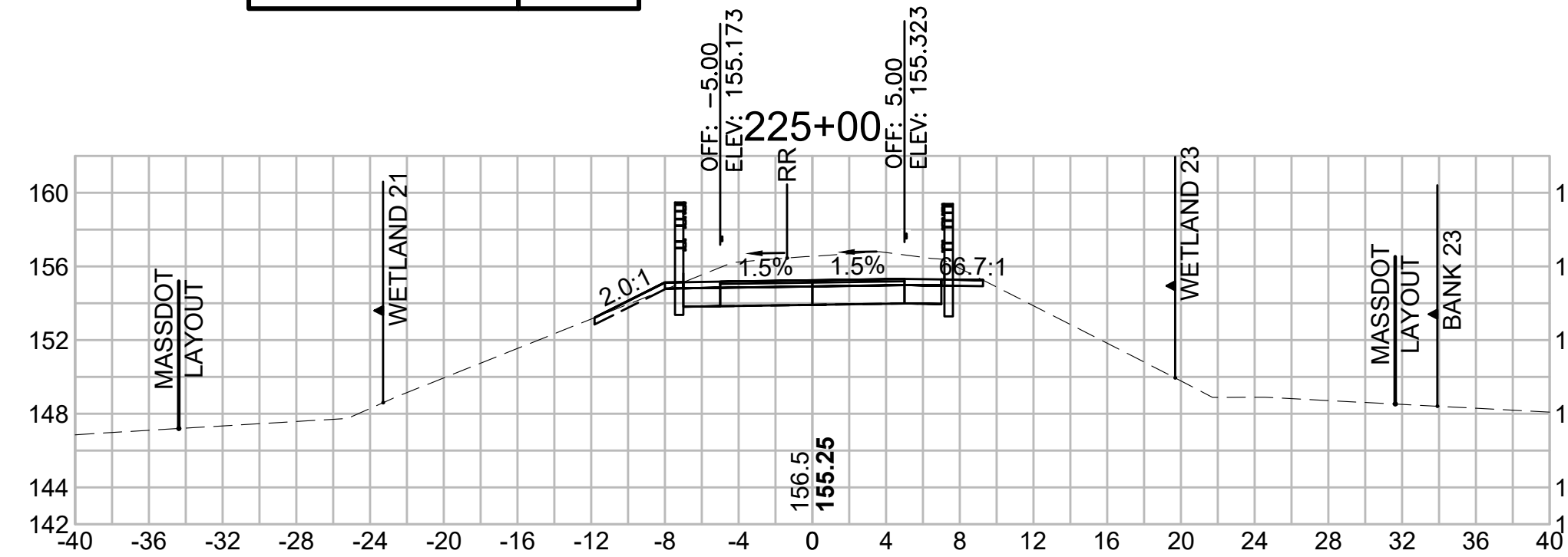
PROJECT FILE NO. 608164

CROSS SECTIONS

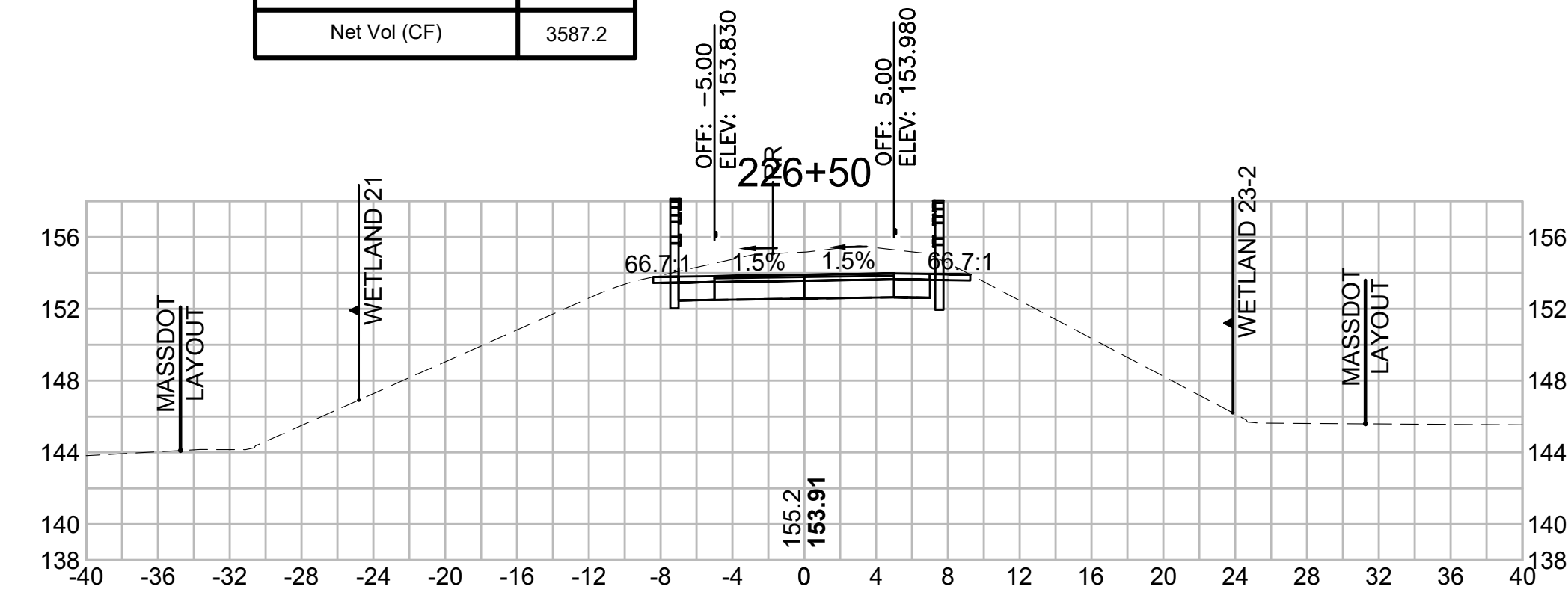
Total Volume at Station 223+50.00	
Cut Area (SF)	43.892
Fill Area (SF)	0.000
Cut Vol (CF)	76.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7462.3
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3163.3



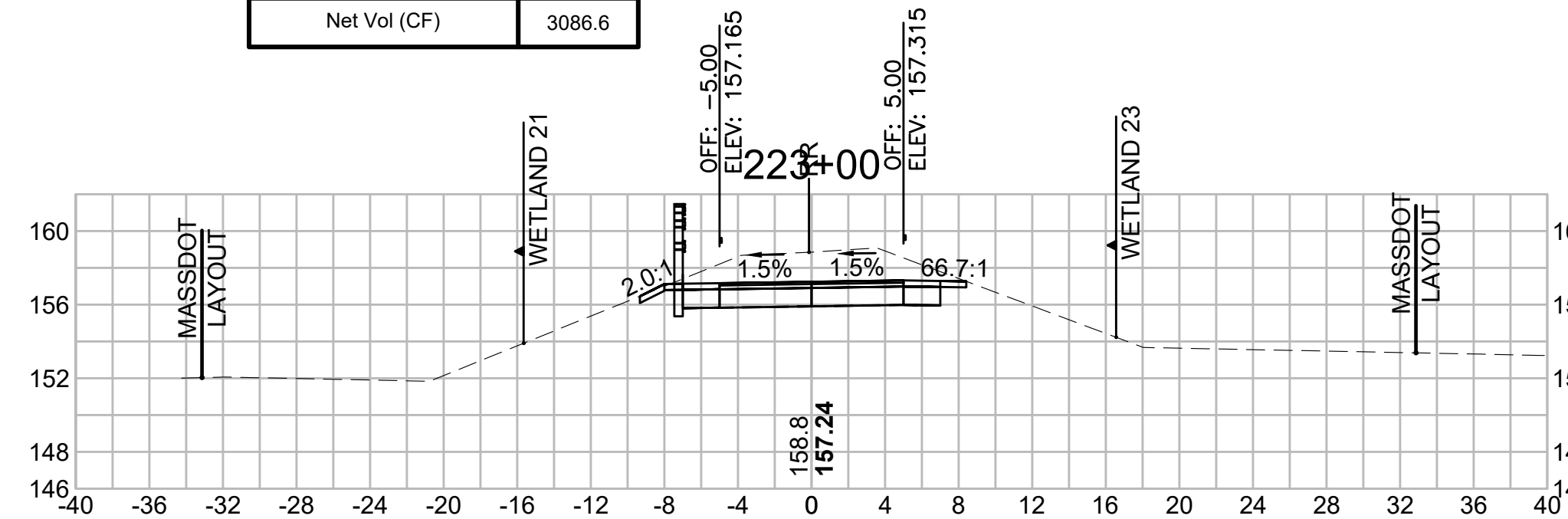
Total Volume at Station 225+00.00	
Cut Area (SF)	37.322
Fill Area (SF)	0.005
Cut Vol (CF)	69.9
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7677.6
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3378.5



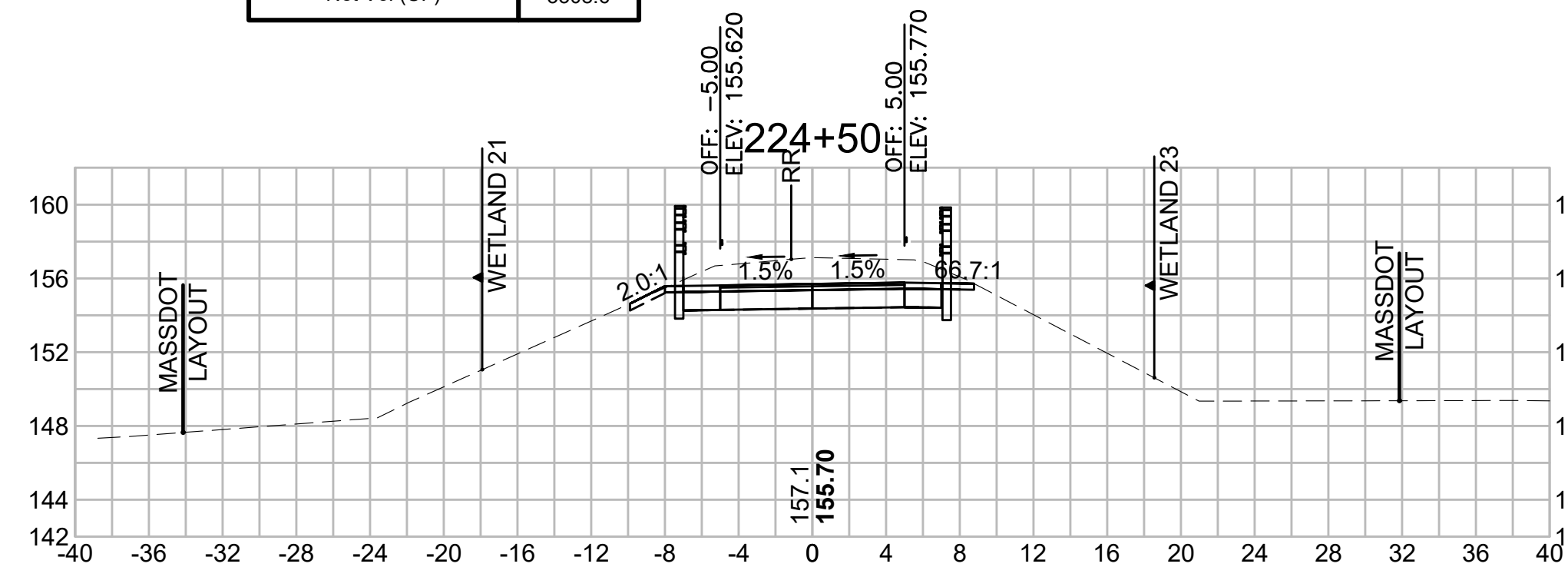
Total Volume at Station 226+50.00	
Cut Area (SF)	37.298
Fill Area (SF)	0.000
Cut Vol (CF)	68.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7886.3
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3587.2



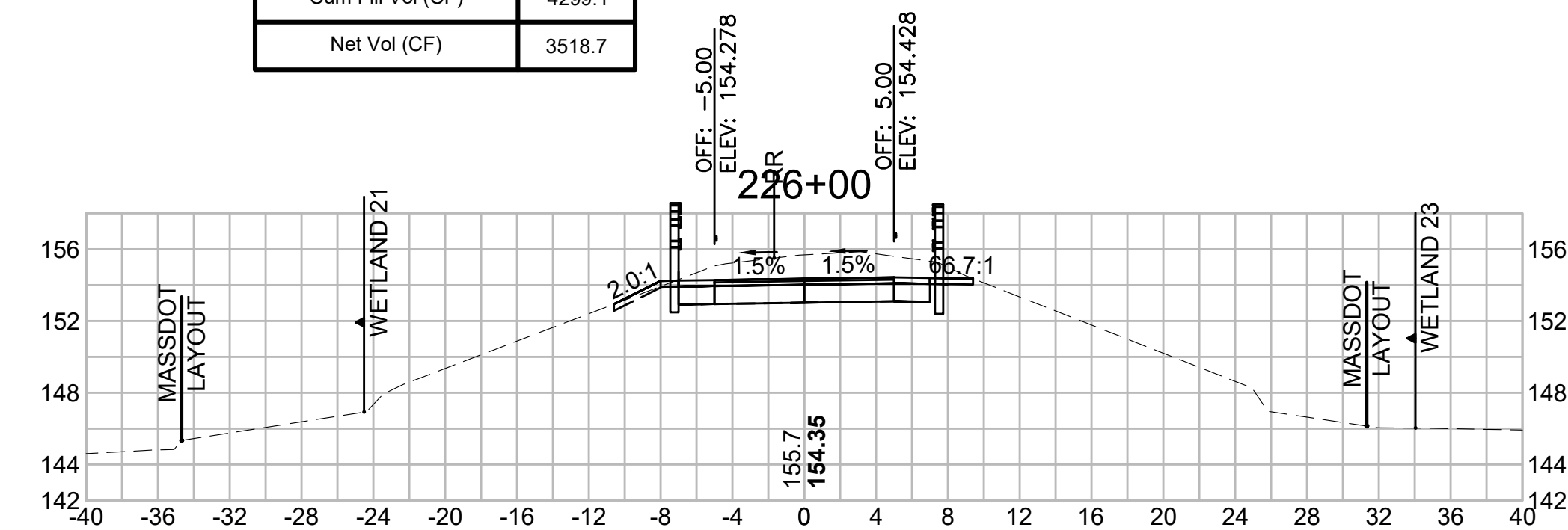
Total Volume at Station 223+00.00	
Cut Area (SF)	38.930
Fill Area (SF)	0.000
Cut Vol (CF)	70.4
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	7385.7
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3086.6



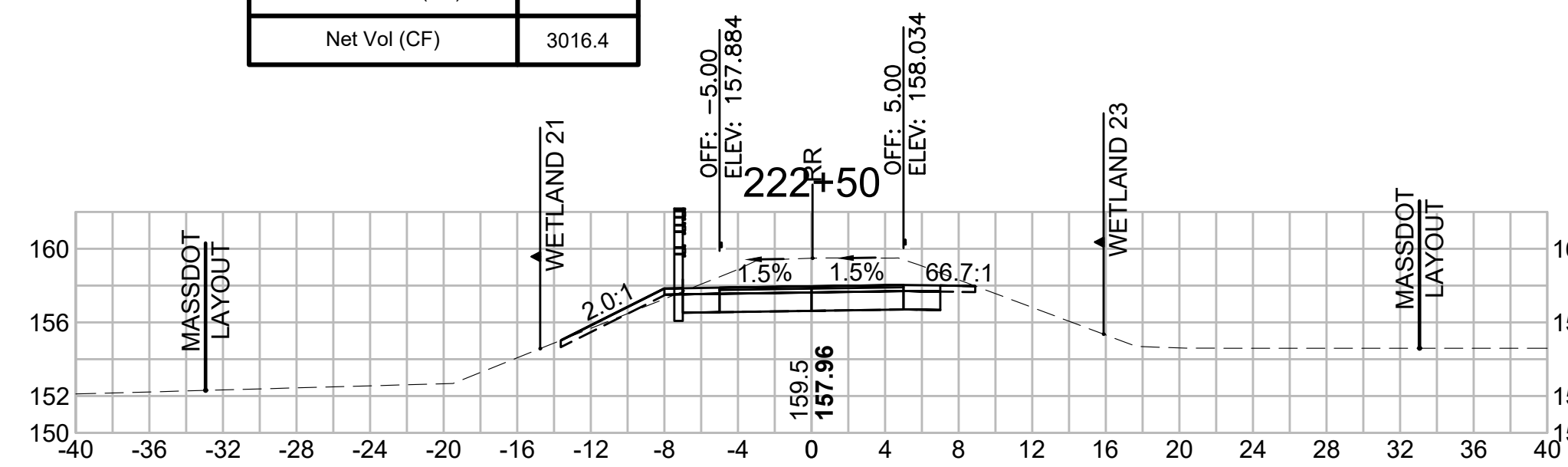
Total Volume at Station 224+50.00	
Cut Area (SF)	38.133
Fill Area (SF)	0.000
Cut Vol (CF)	70.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7607.7
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3308.6



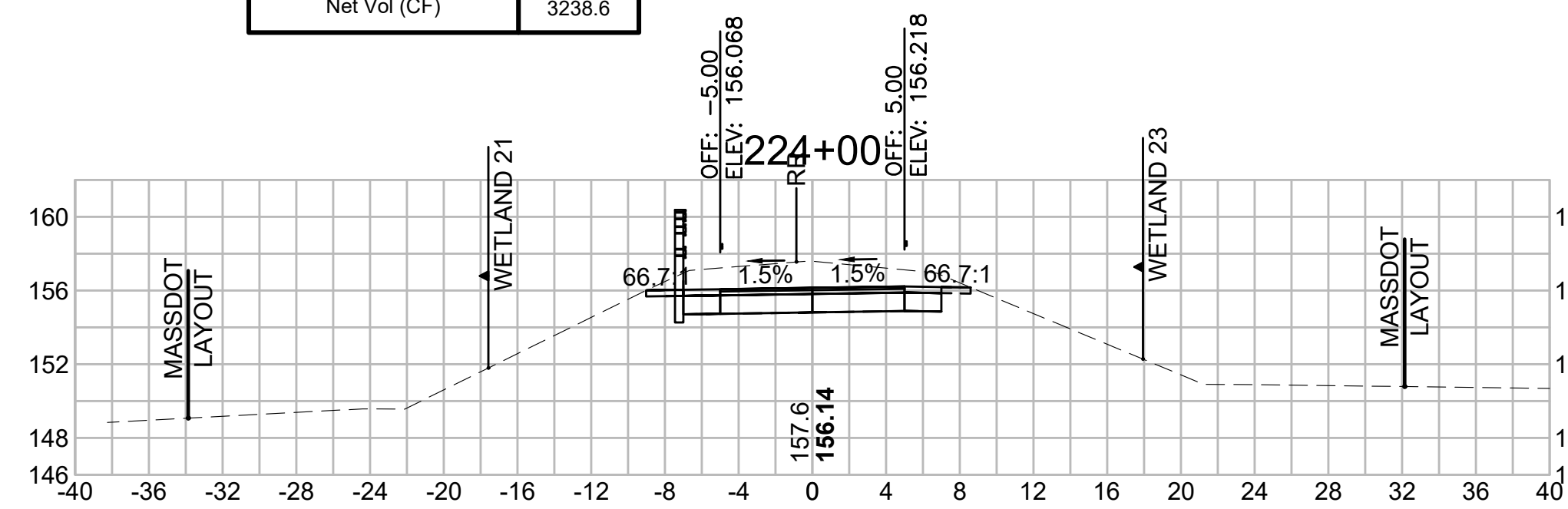
Total Volume at Station 226+00.00	
Cut Area (SF)	36.682
Fill Area (SF)	0.000
Cut Vol (CF)	69.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7817.8
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3518.7



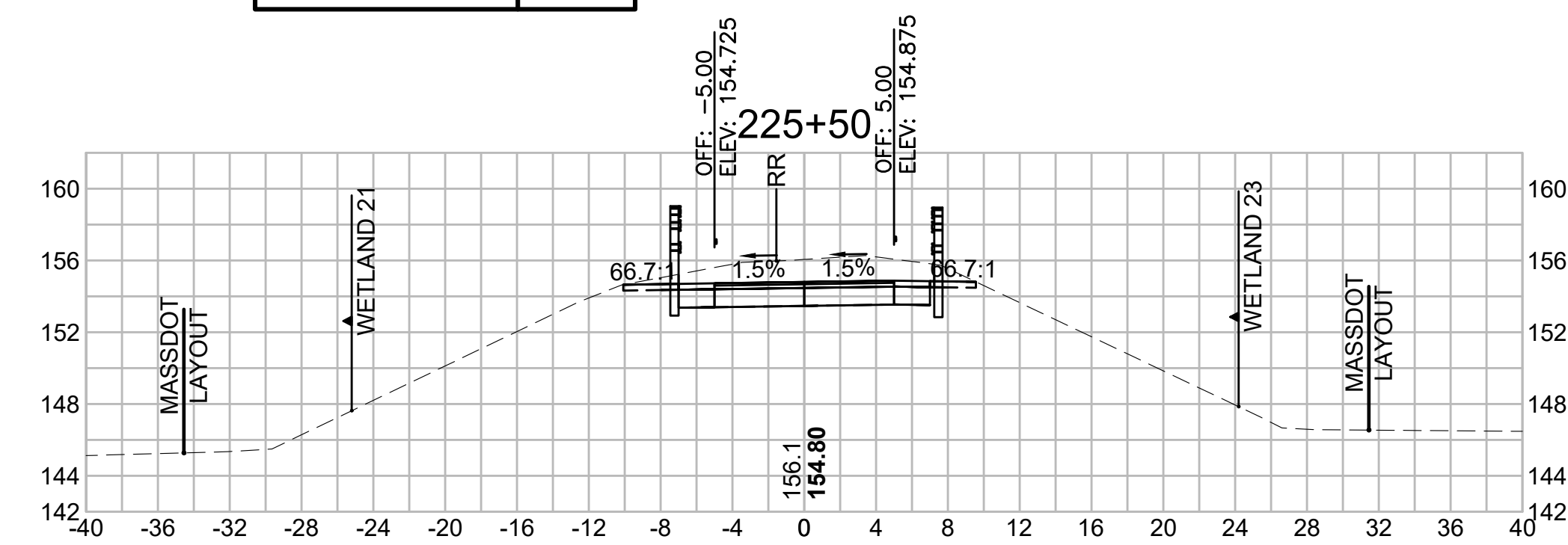
Total Volume at Station 222+50.00	
Cut Area (SF)	37.086
Fill Area (SF)	0.261
Cut Vol (CF)	67.9
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	7315.3
Cum Fill Vol (CF)	4298.8
Net Vol (CF)	3016.4



Total Volume at Station 224+00.00	
Cut Area (SF)	37.492
Fill Area (SF)	0.000
Cut Vol (CF)	75.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7537.7
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3238.6



Total Volume at Station 225+50.00	
Cut Area (SF)	38.695
Fill Area (SF)	0.000
Cut Vol (CF)	70.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7748.0
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3448.9



SUDBURY
BRUCE FREEMAN RAIL TRAIL

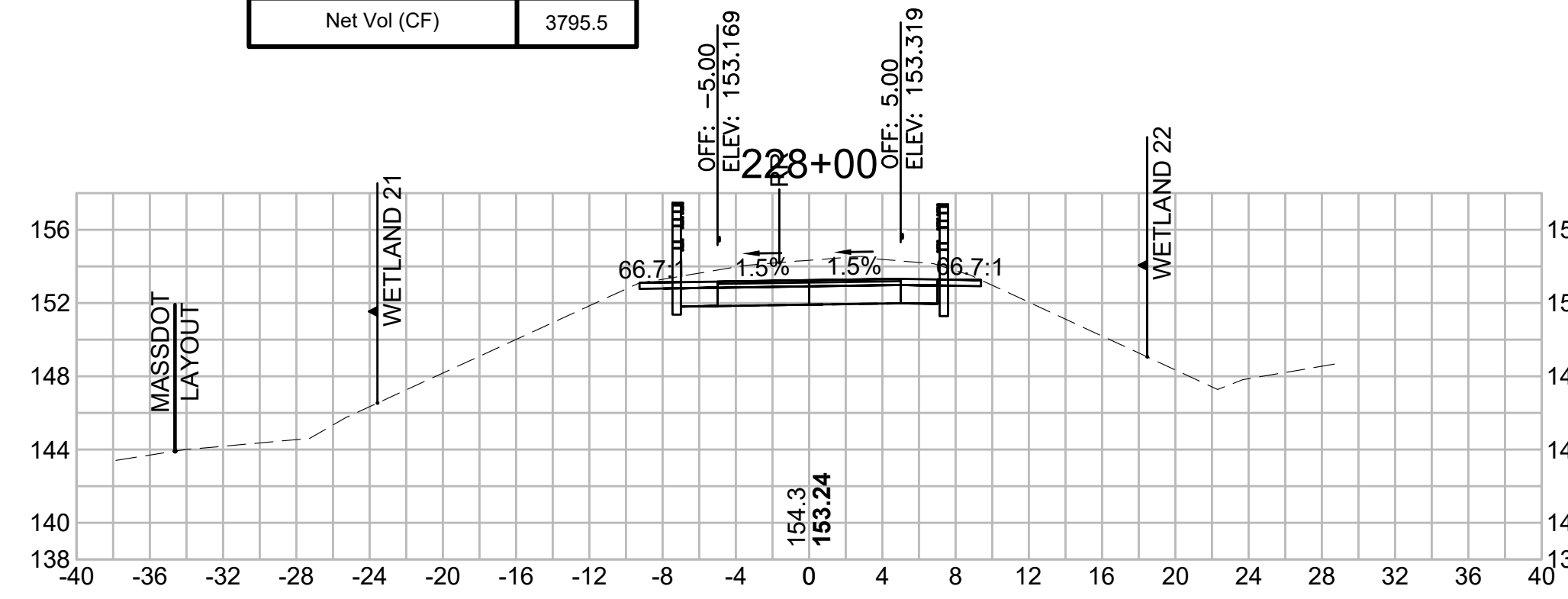
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	273	318

PROJECT FILE NO. 608164

CROSS SECTIONS

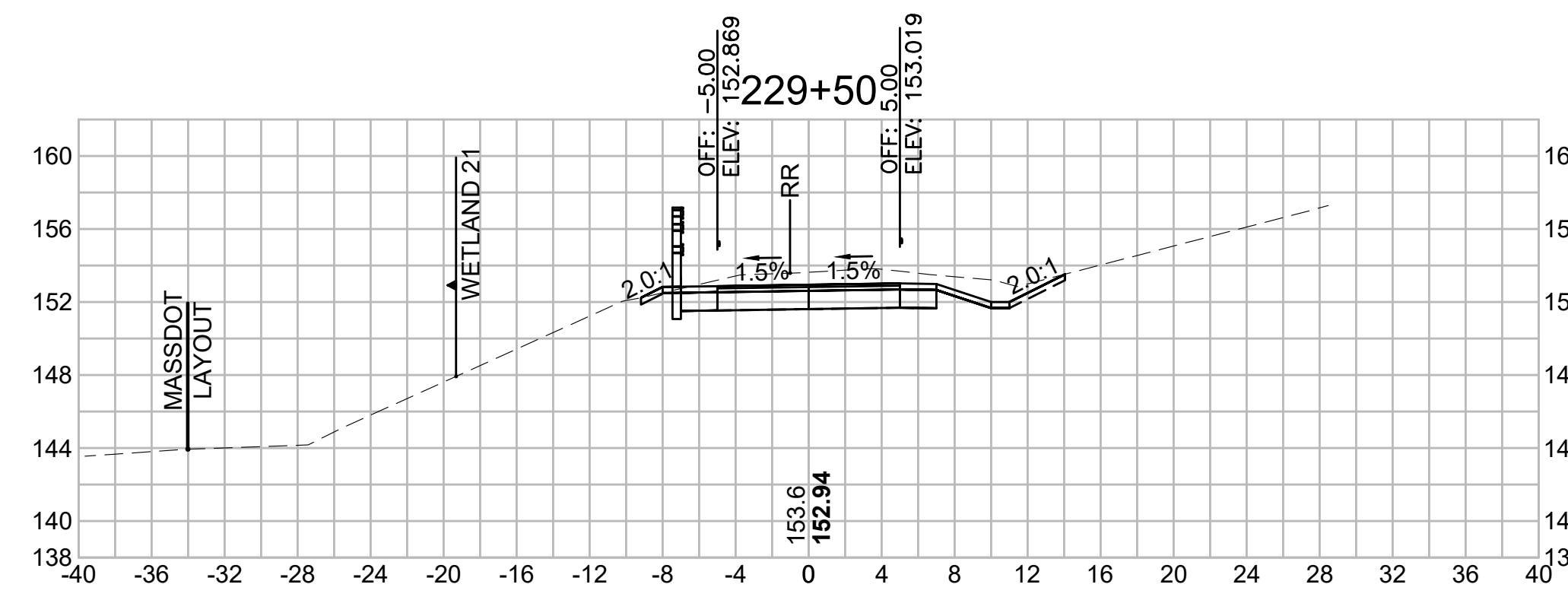
Total Volume at Station 228+00.00

Cut Area (SF)	34.618
Fill Area (SF)	0.000
Cut Vol (CF)	66.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8094.6
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3795.5



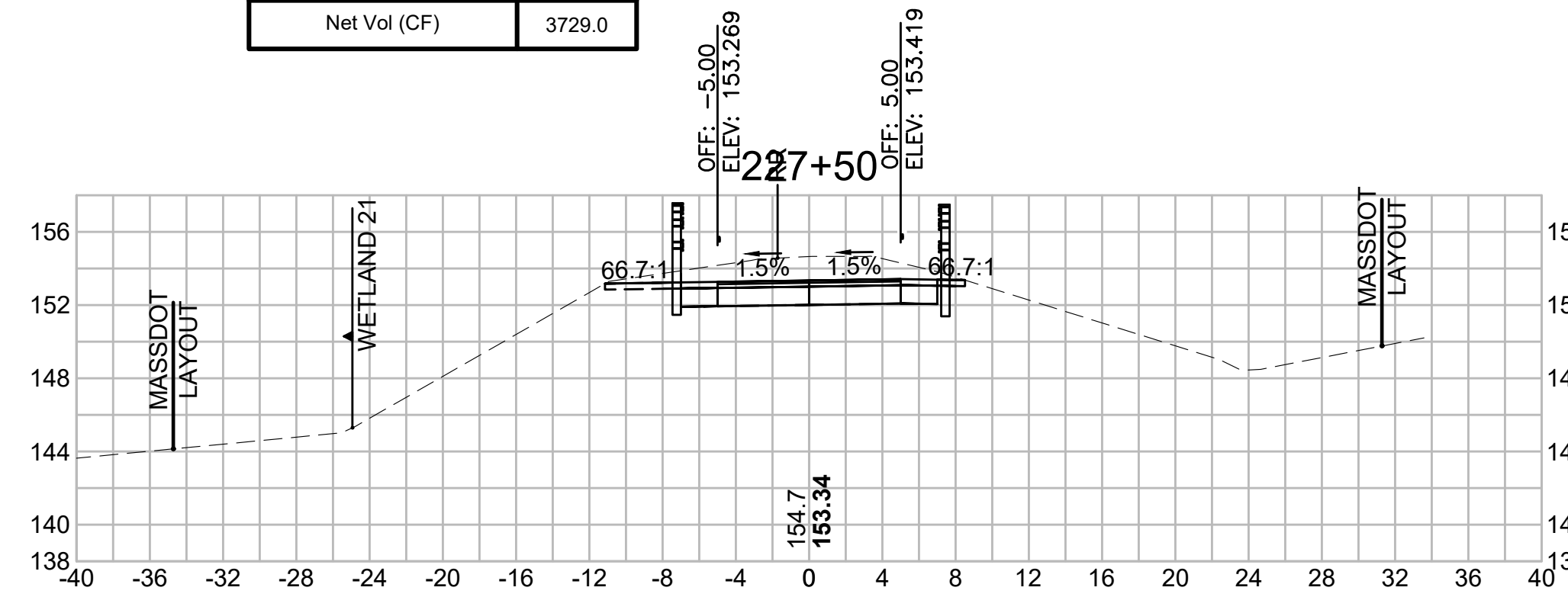
Total Volume at Station 229+50.00

Cut Area (SF)	34.762
Fill Area (SF)	0.000
Cut Vol (CF)	58.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8267.0
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3968.0



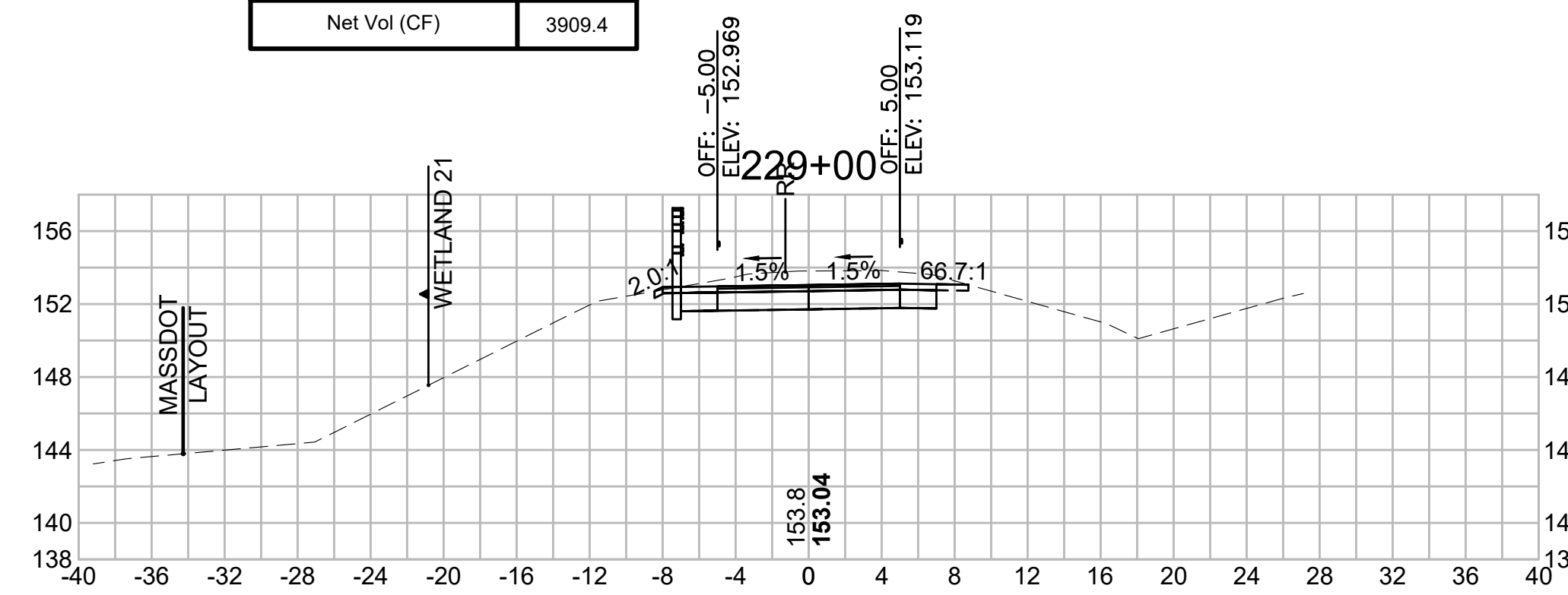
Total Volume at Station 227+50.00

Cut Area (SF)	37.191
Fill Area (SF)	0.000
Cut Vol (CF)	70.9
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8028.1
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3729.0



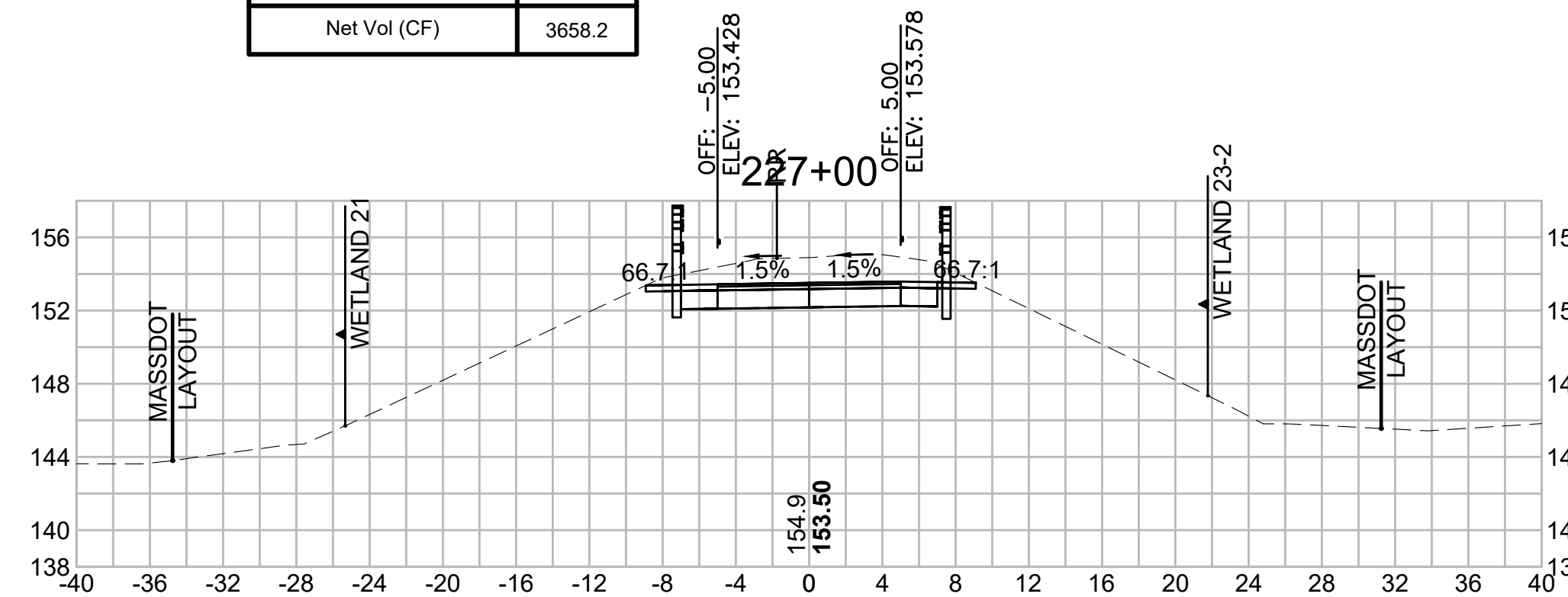
Total Volume at Station 229+00.00

Cut Area (SF)	28.437
Fill Area (SF)	0.000
Cut Vol (CF)	54.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8208.5
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3909.4



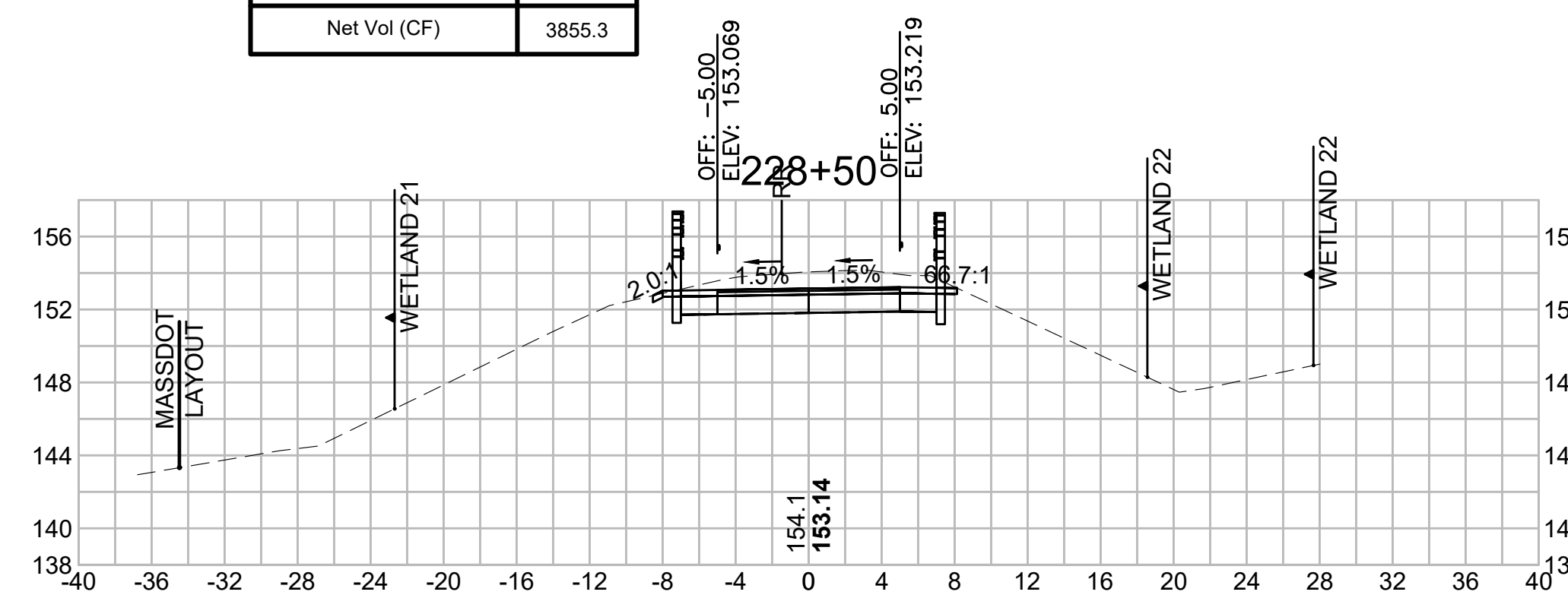
Total Volume at Station 227+00.00

Cut Area (SF)	39.361
Fill Area (SF)	0.000
Cut Vol (CF)	71.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	7957.2
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3658.2



Total Volume at Station 228+50.00

Cut Area (SF)	29.980
Fill Area (SF)	0.000
Cut Vol (CF)	59.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8154.4
Cum Fill Vol (CF)	4299.1
Net Vol (CF)	3855.3



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	274	318

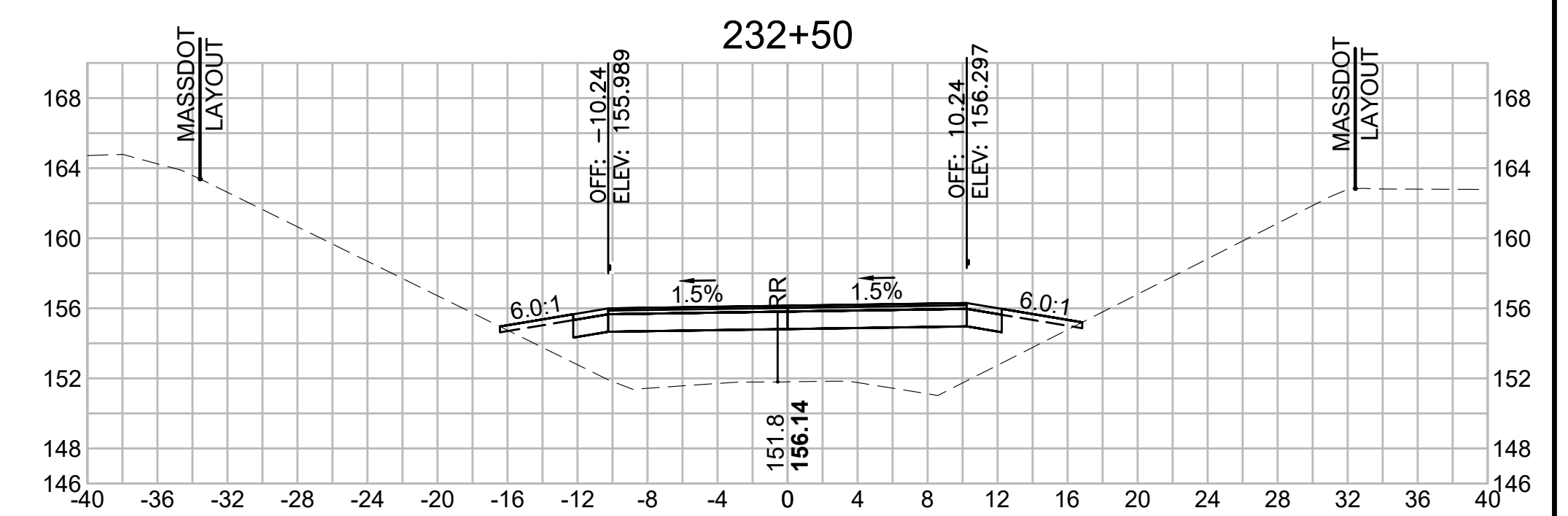
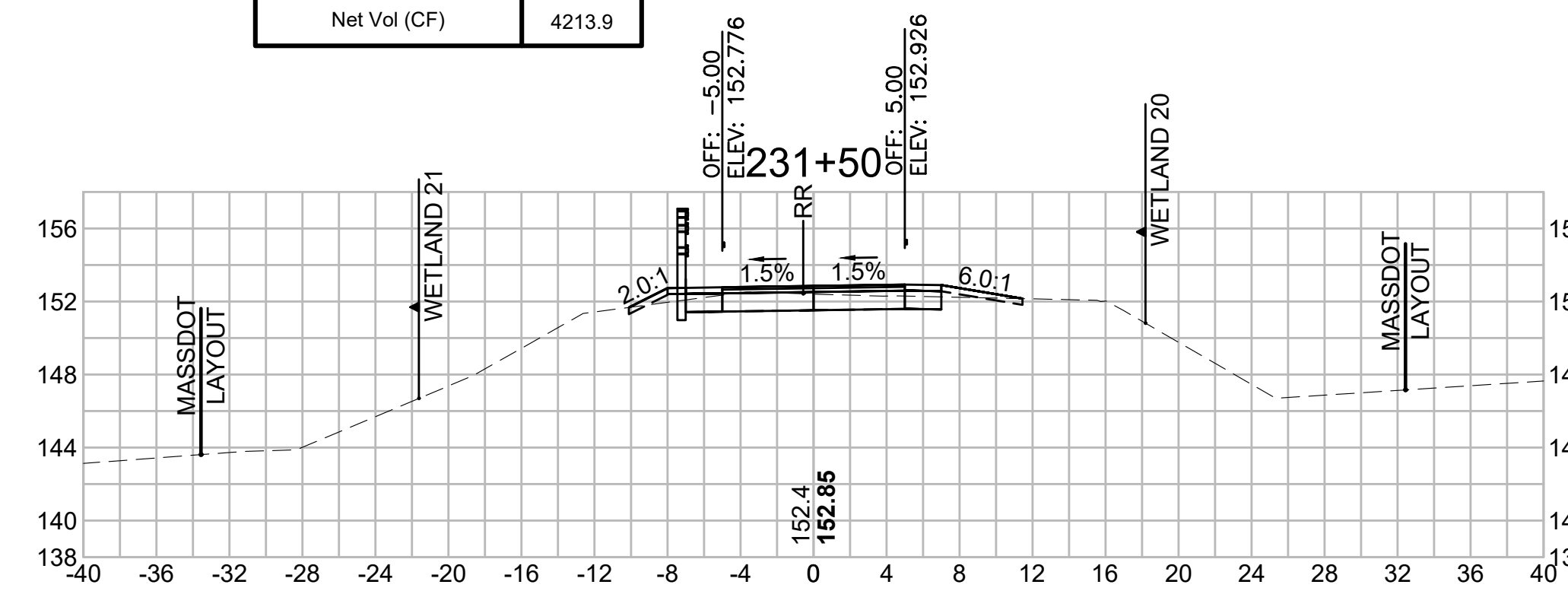
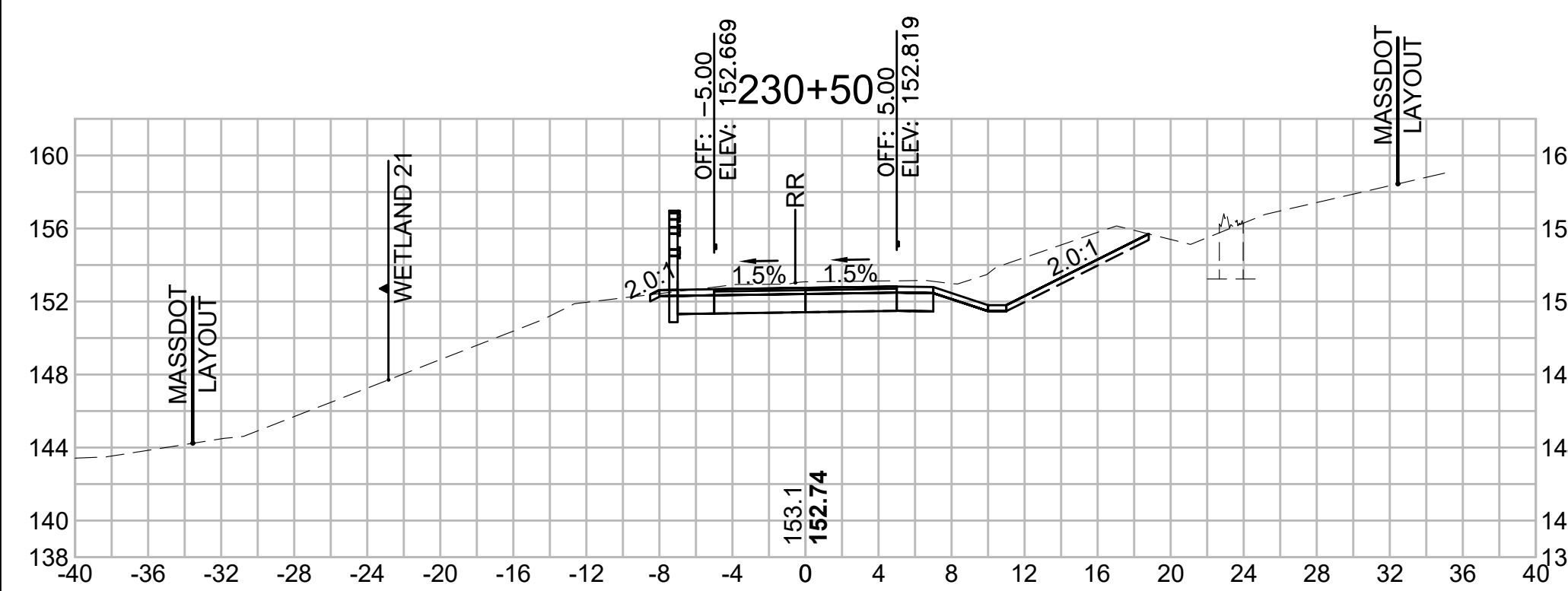
PROJECT FILE NO. 608164

CROSS SECTIONS

Total Volume at Station 230+50.00	
Cut Area (SF)	42.910
Fill Area (SF)	0.000
Cut Vol (CF)	79.0
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	8417.4
Cum Fill Vol (CF)	4299.5
Net Vol (CF)	4117.9

Total Volume at Station 231+50.00	
Cut Area (SF)	15.865
Fill Area (SF)	0.944
Cut Vol (CF)	35.9
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	8514.3
Cum Fill Vol (CF)	4300.4
Net Vol (CF)	4213.9

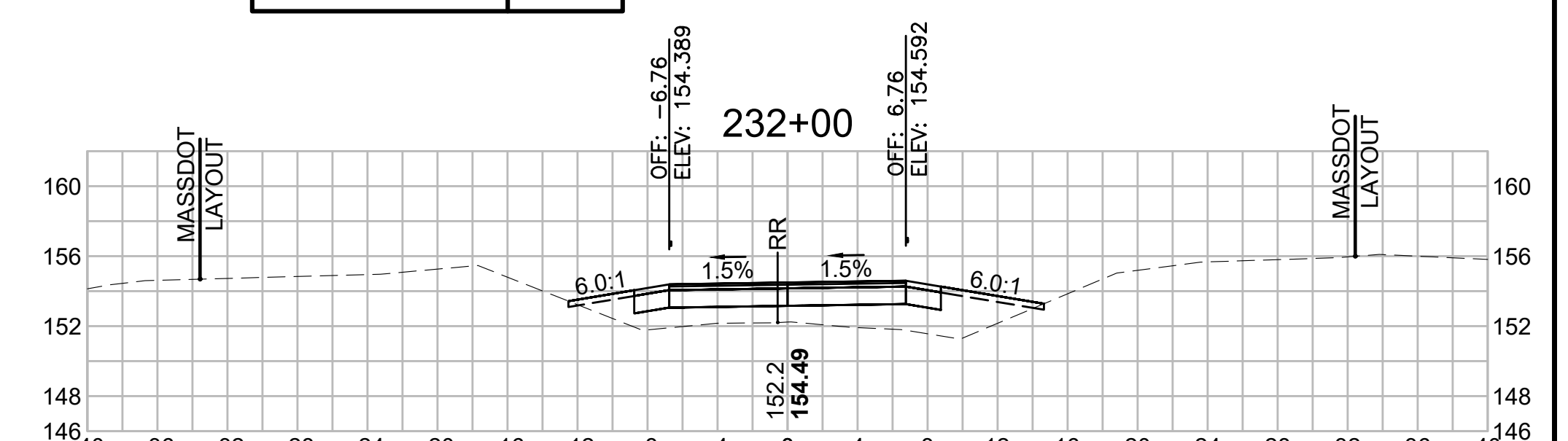
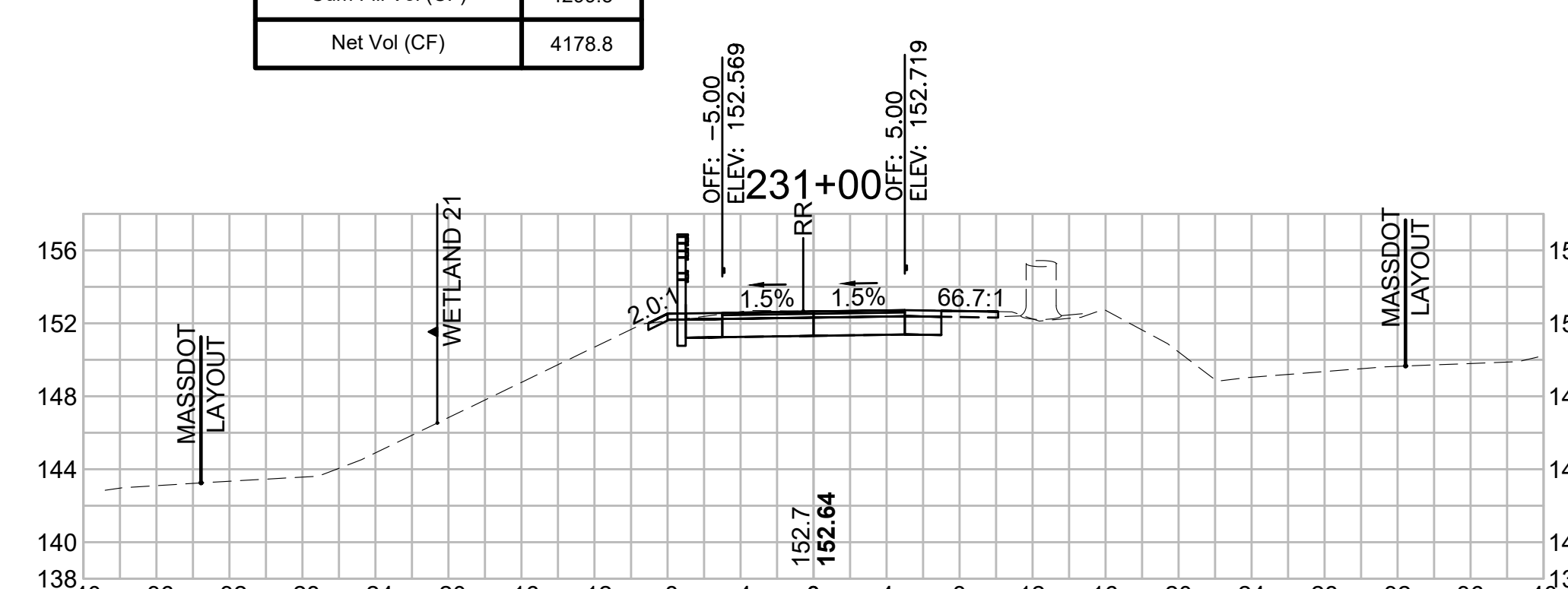
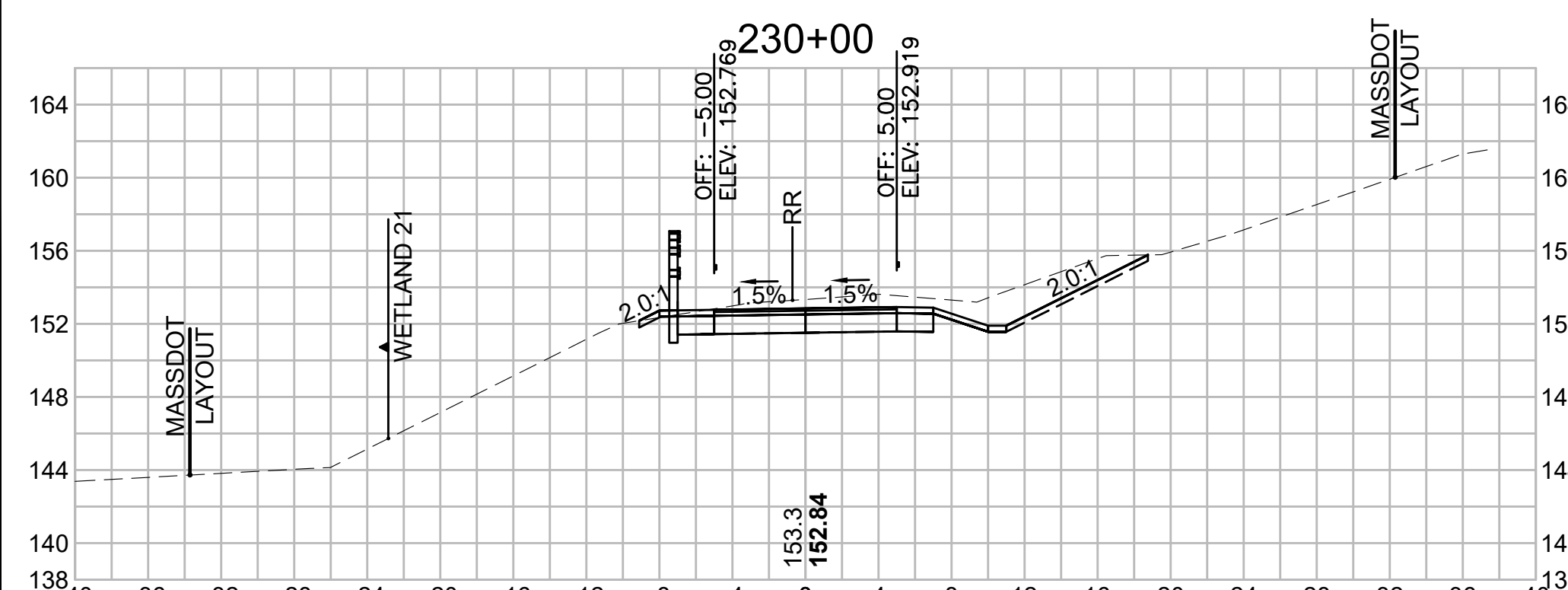
Total Volume at Station 232+50.00	
Cut Area (SF)	0.170
Fill Area (SF)	84.794
Cut Vol (CF)	1.8
Fill Vol (CF)	107.0
Cum Cut Vol (CF)	8532.5
Cum Fill Vol (CF)	4436.8
Net Vol (CF)	4095.7



Total Volume at Station 230+00.00	
Cut Area (SF)	42.357
Fill Area (SF)	0.240
Cut Vol (CF)	71.4
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	8338.4
Cum Fill Vol (CF)	4299.3
Net Vol (CF)	4039.1

Total Volume at Station 231+00.00	
Cut Area (SF)	22.956
Fill Area (SF)	0.022
Cut Vol (CF)	61.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8478.4
Cum Fill Vol (CF)	4299.5
Net Vol (CF)	4178.8

Total Volume at Station 232+00.00	
Cut Area (SF)	1.819
Fill Area (SF)	30.775
Cut Vol (CF)	16.4
Fill Vol (CF)	29.4
Cum Cut Vol (CF)	8530.7
Cum Fill Vol (CF)	4329.8
Net Vol (CF)	4200.9



SUDBURY
BRUCE FREEMAN RAIL TRAIL

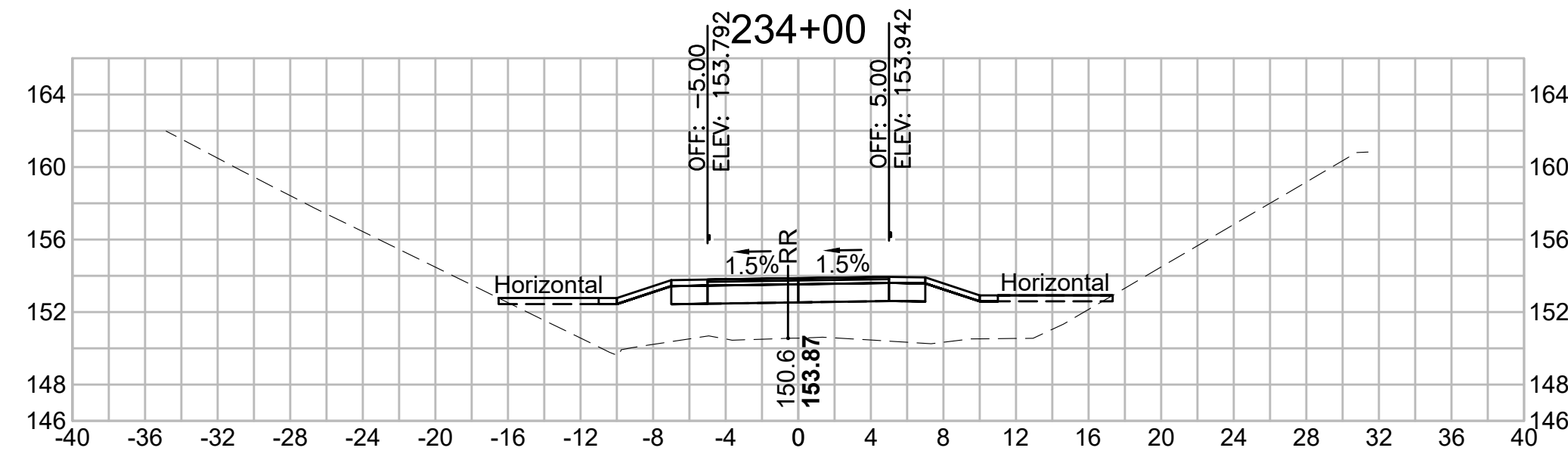
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	275	318

PROJECT FILE NO. 608164

CROSS SECTIONS

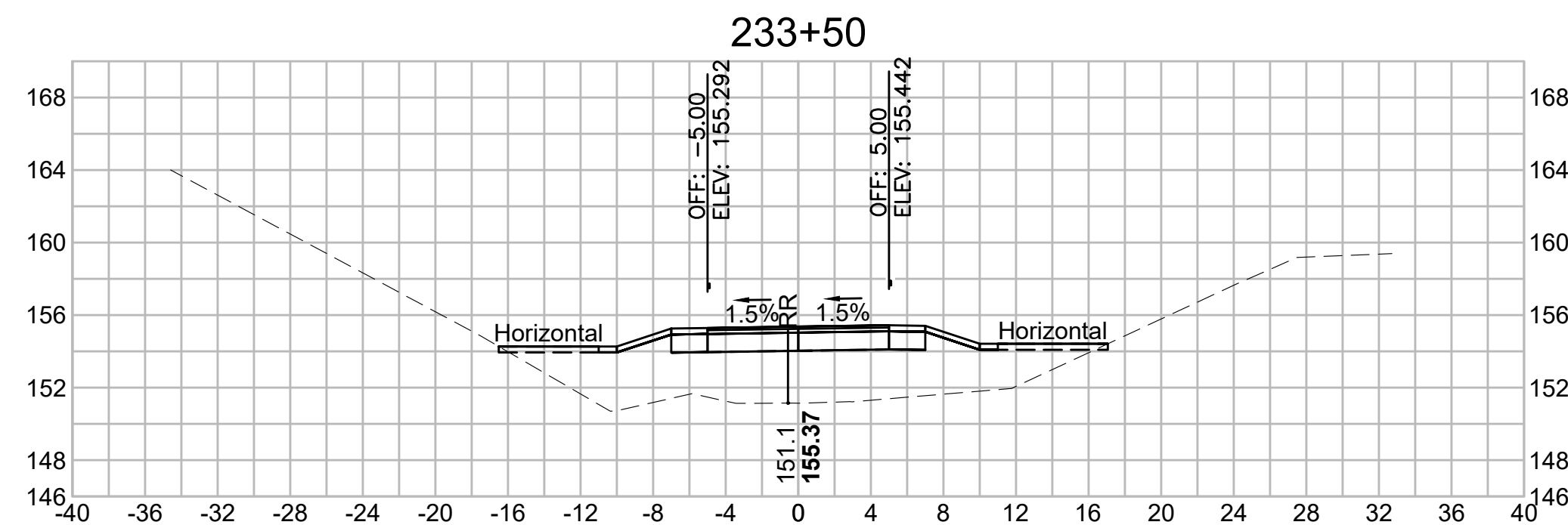
Total Volume at Station 234+00.00

Cut Area (SF)	0.204
Fill Area (SF)	63.421
Cut Vol (CF)	0.6
Fill Vol (CF)	129.1
Cum Cut Vol (CF)	8538.6
Cum Fill Vol (CF)	4905.1
Net Vol (CF)	3633.5



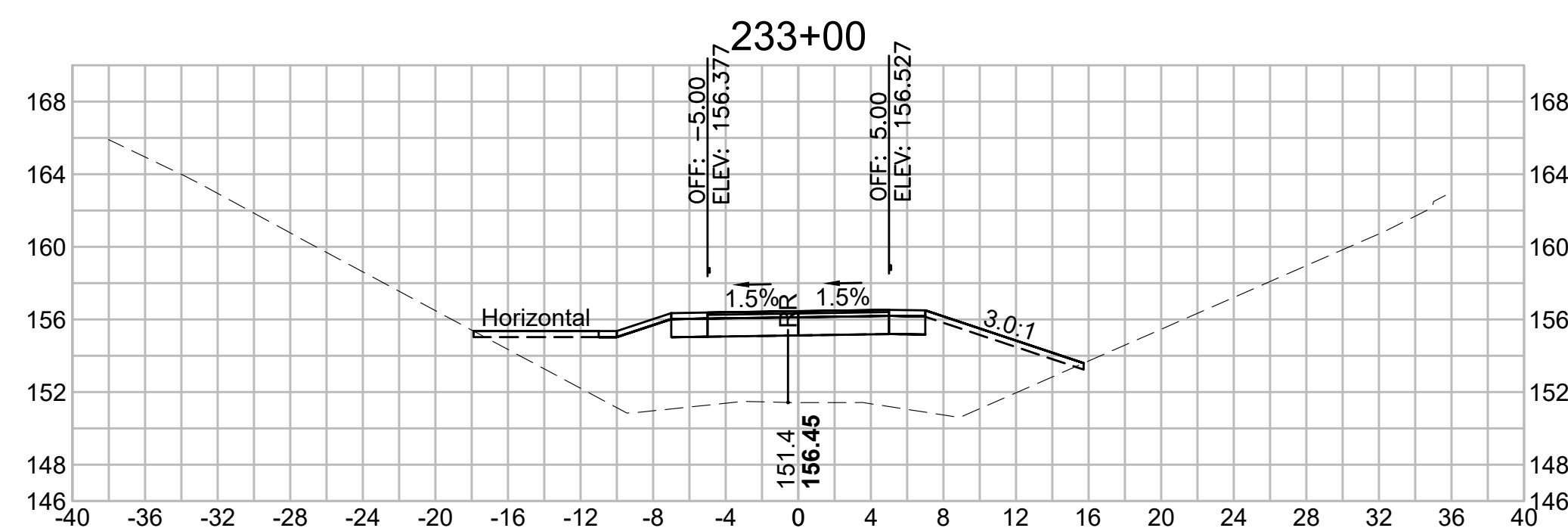
Total Volume at Station 233+50.00

Cut Area (SF)	0.426
Fill Area (SF)	76.015
Cut Vol (CF)	2.9
Fill Vol (CF)	165.5
Cum Cut Vol (CF)	8538.0
Cum Fill Vol (CF)	4776.0
Net Vol (CF)	3762.1



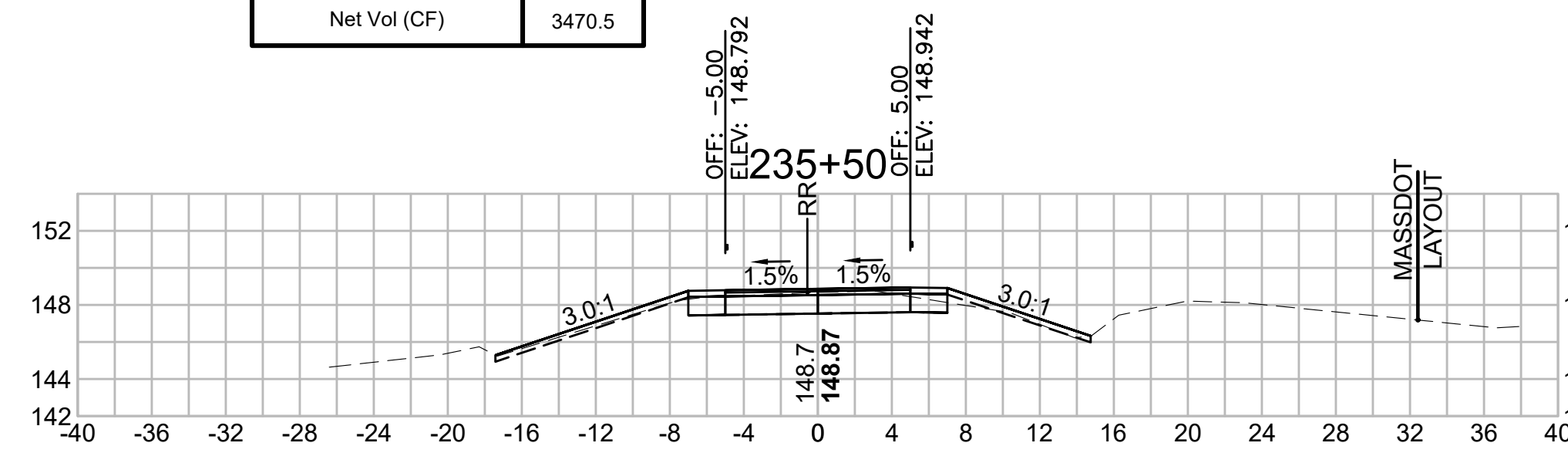
Total Volume at Station 233+00.00

Cut Area (SF)	2.657
Fill Area (SF)	102.732
Cut Vol (CF)	2.6
Fill Vol (CF)	173.6
Cum Cut Vol (CF)	8535.2
Cum Fill Vol (CF)	4610.5
Net Vol (CF)	3924.7



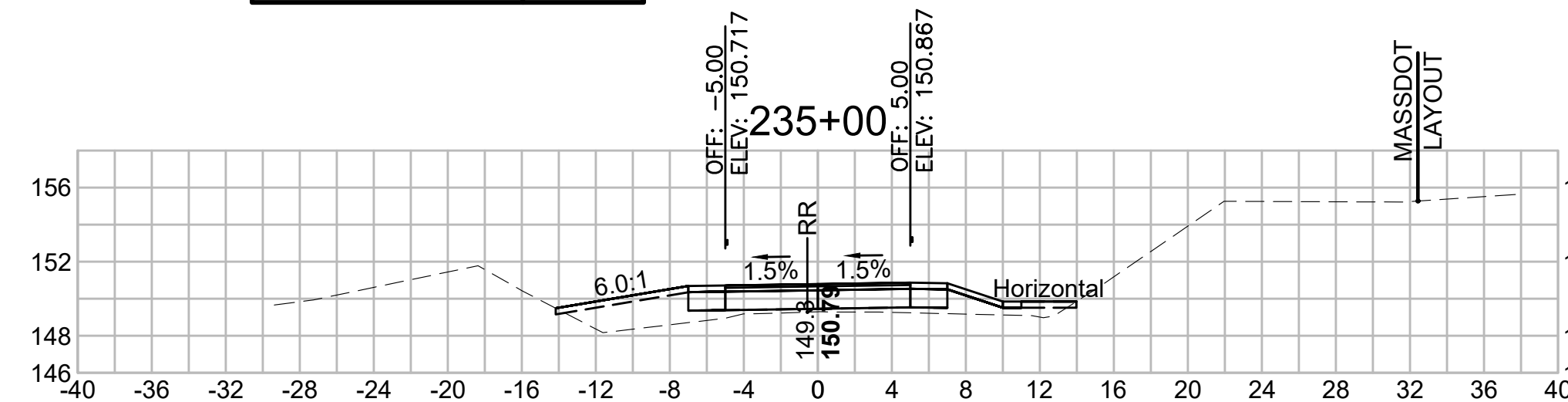
Total Volume at Station 235+50.00

Cut Area (SF)	16.187
Fill Area (SF)	0.584
Cut Vol (CF)	15.6
Fill Vol (CF)	15.7
Cum Cut Vol (CF)	8555.3
Cum Fill Vol (CF)	5084.8
Net Vol (CF)	3470.5



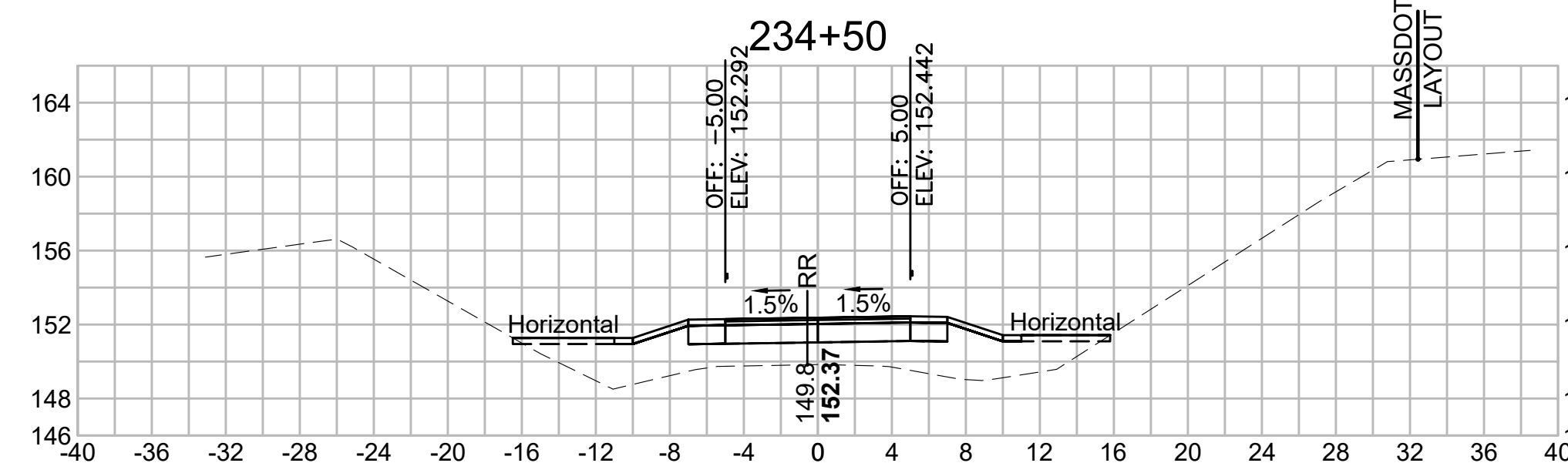
Total Volume at Station 235+00.00

Cut Area (SF)	0.665
Fill Area (SF)	16.342
Cut Vol (CF)	0.8
Fill Vol (CF)	60.2
Cum Cut Vol (CF)	8539.7
Cum Fill Vol (CF)	5069.1
Net Vol (CF)	3470.6



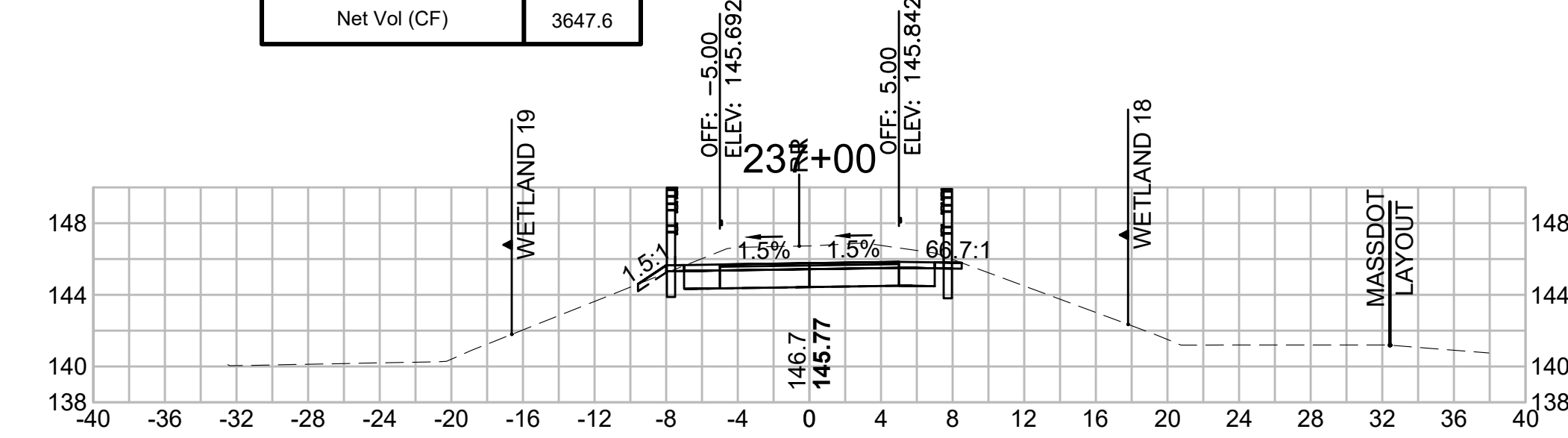
Total Volume at Station 234+50.00

Cut Area (SF)	0.181
Fill Area (SF)	48.716
Cut Vol (CF)	0.4
Fill Vol (CF)	103.8
Cum Cut Vol (CF)	8539.0
Cum Fill Vol (CF)	5008.9
Net Vol (CF)	3530.1



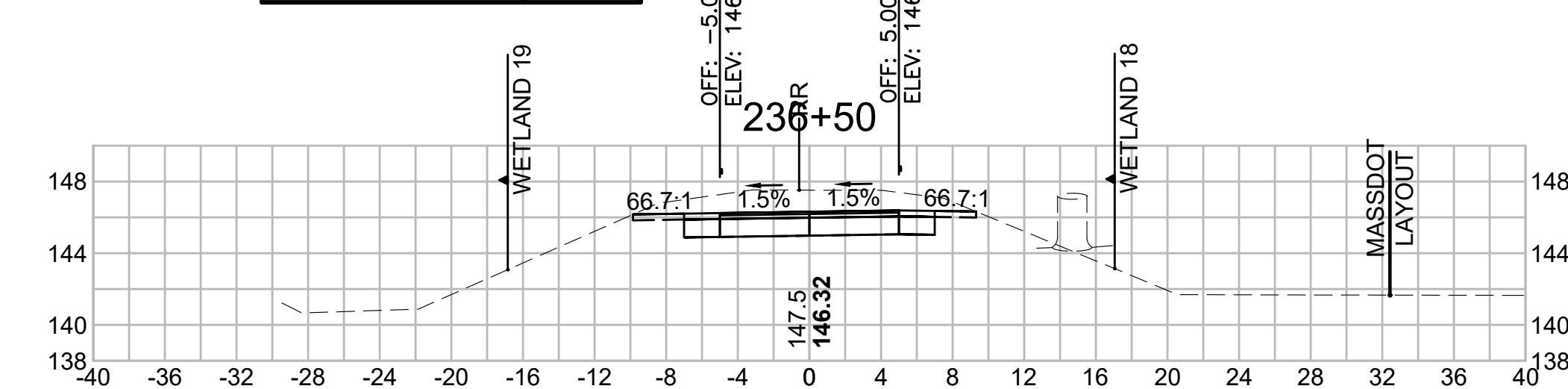
Total Volume at Station 237+00.00

Cut Area (SF)	31.543
Fill Area (SF)	0.012
Cut Vol (CF)	64.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8733.0
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	3647.6



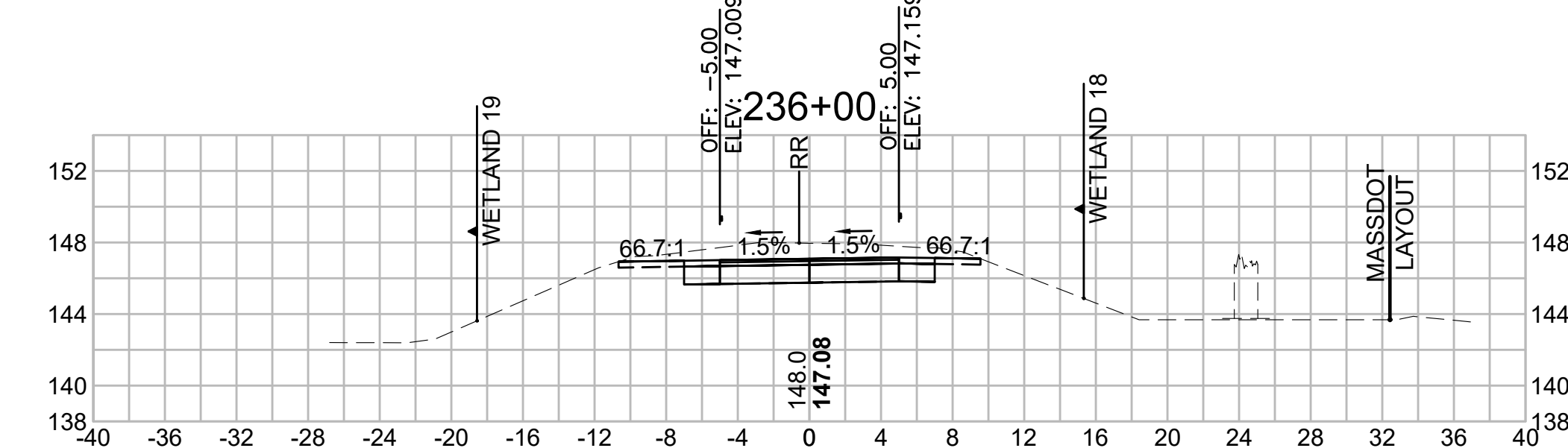
Total Volume at Station 236+50.00

Cut Area (SF)	38.158
Fill Area (SF)	0.000
Cut Vol (CF)	66.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8668.4
Cum Fill Vol (CF)	5085.3
Net Vol (CF)	3583.1



Total Volume at Station 236+00.00

Cut Area (SF)	33.891
Fill Area (SF)	0.000
Cut Vol (CF)	46.4
Fill Vol (CF)	0.5
Cum Cut Vol (CF)	8601.7
Cum Fill Vol (CF)	5085.3
Net Vol (CF)	3516.4

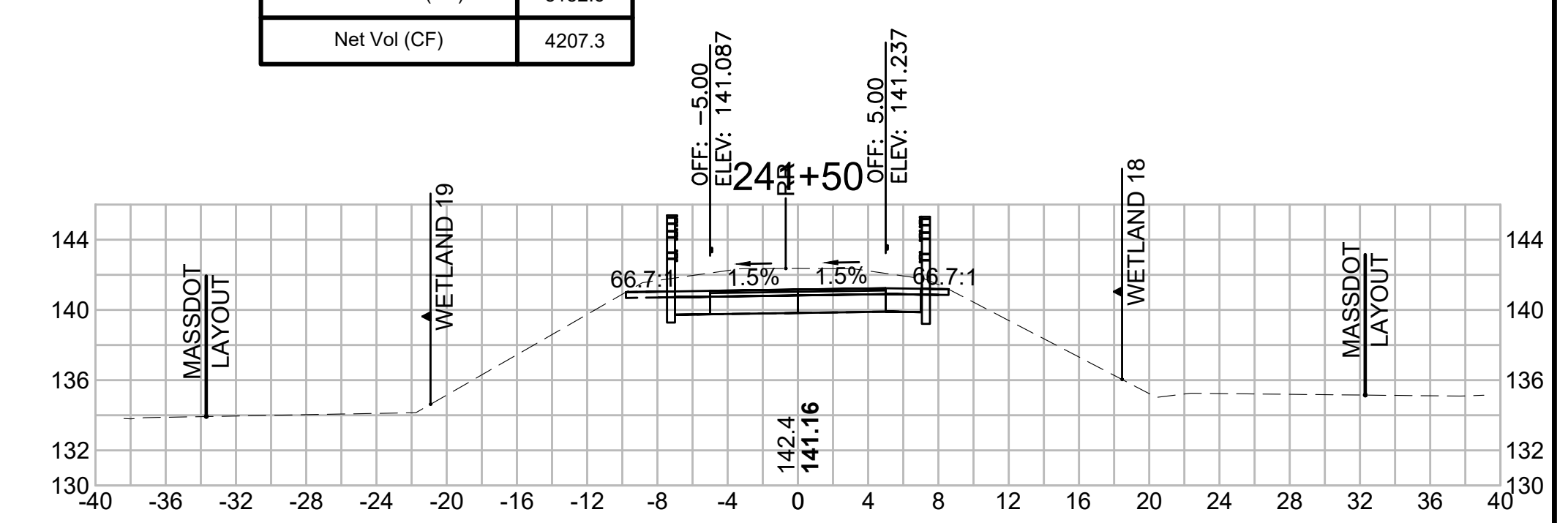
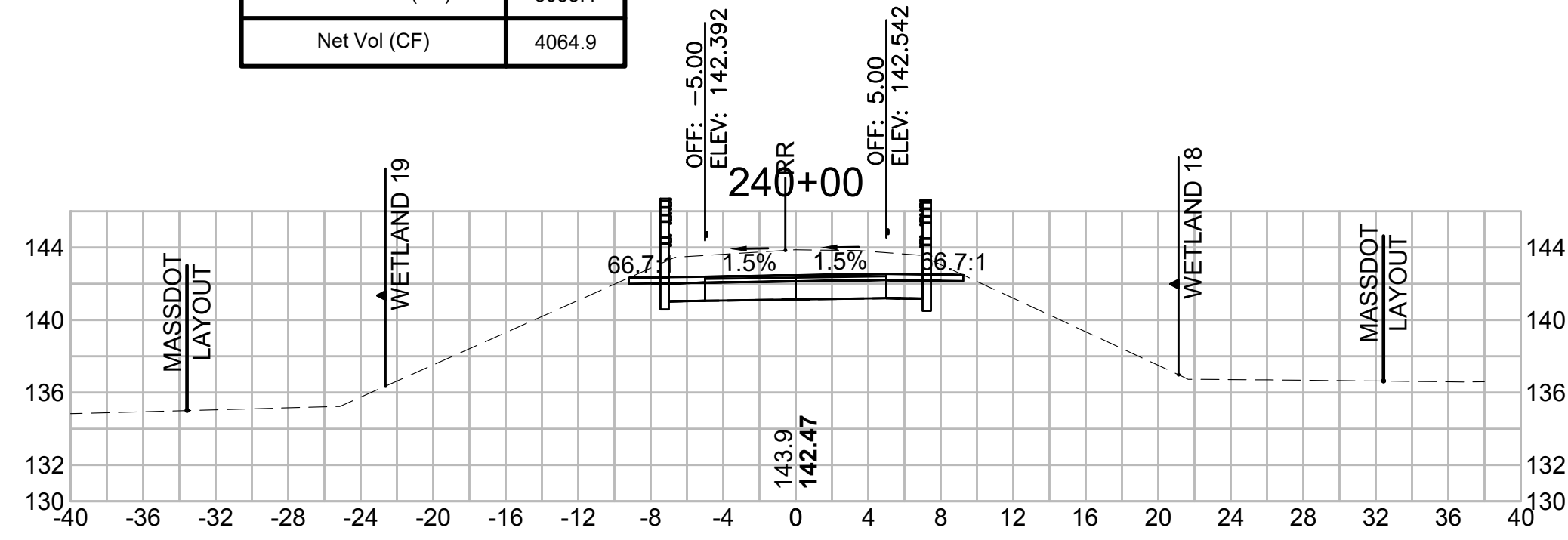
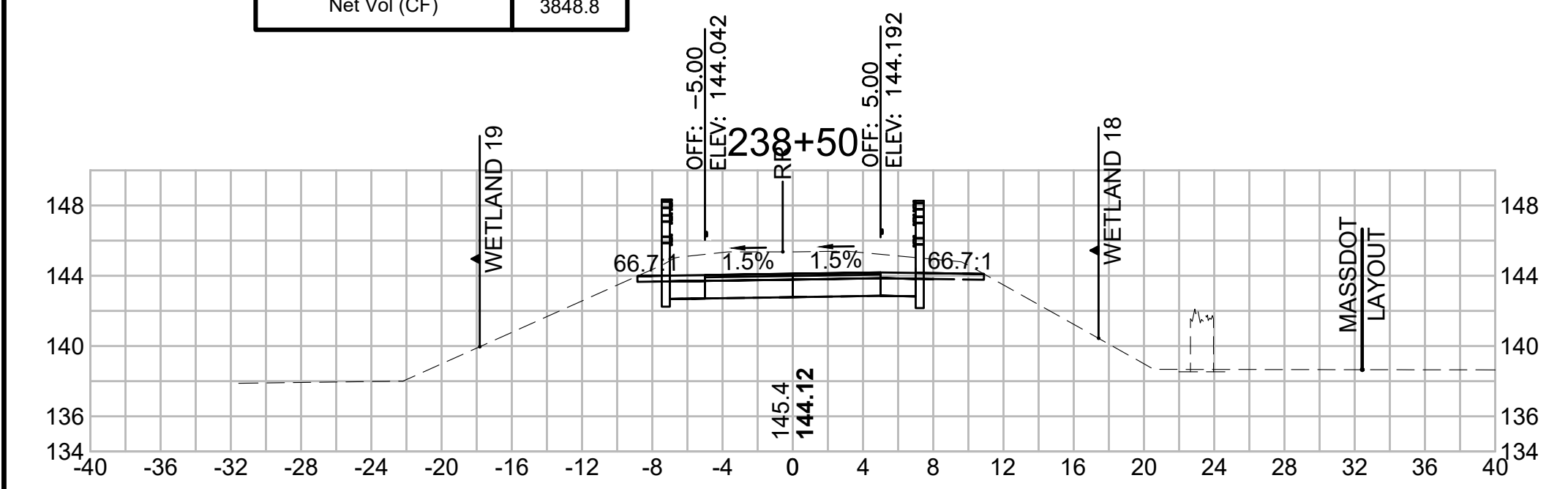


CROSS SECTIONS

Total Volume at Station 238+50.00	
Cut Area (SF)	40.123
Fill Area (SF)	0.000
Cut Vol (CF)	72.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8934.2
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	3848.8

Total Volume at Station 240+00.00	
Cut Area (SF)	39.826
Fill Area (SF)	0.000
Cut Vol (CF)	72.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	9150.2
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	4064.9

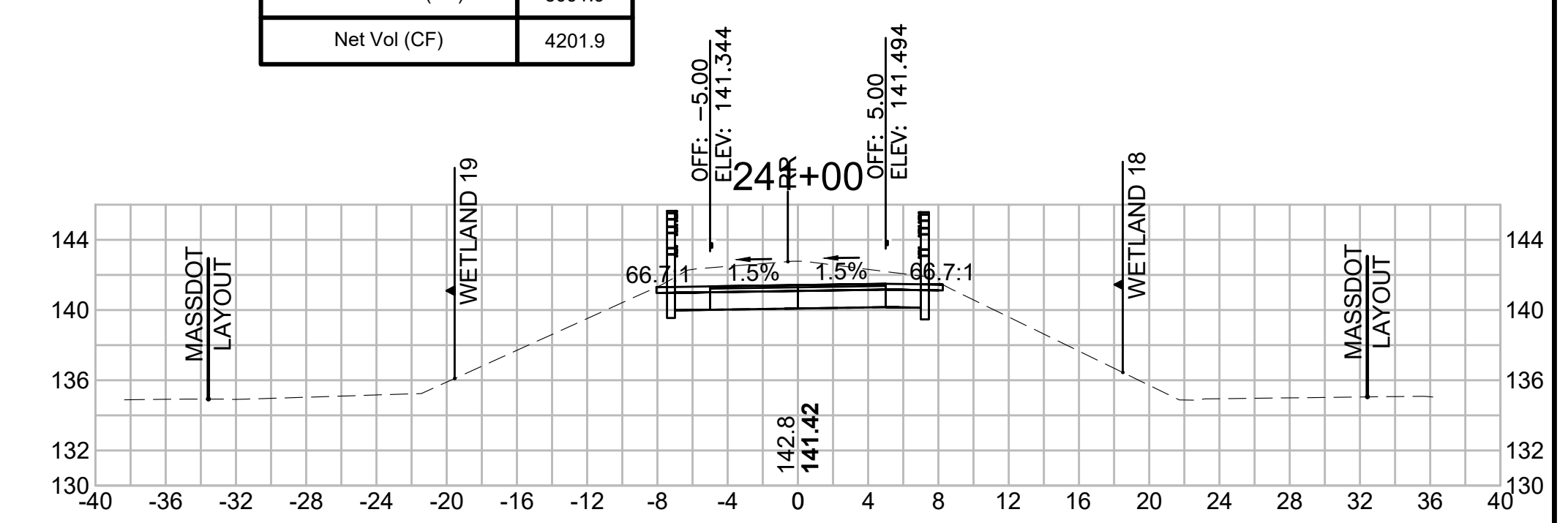
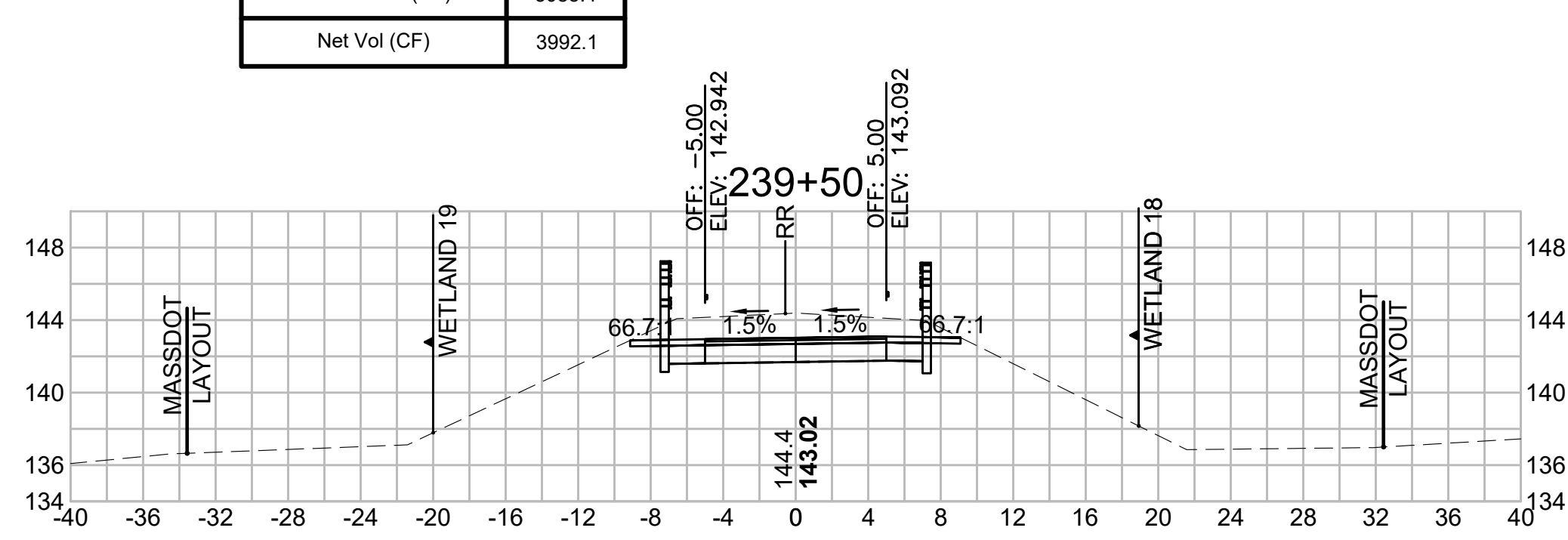
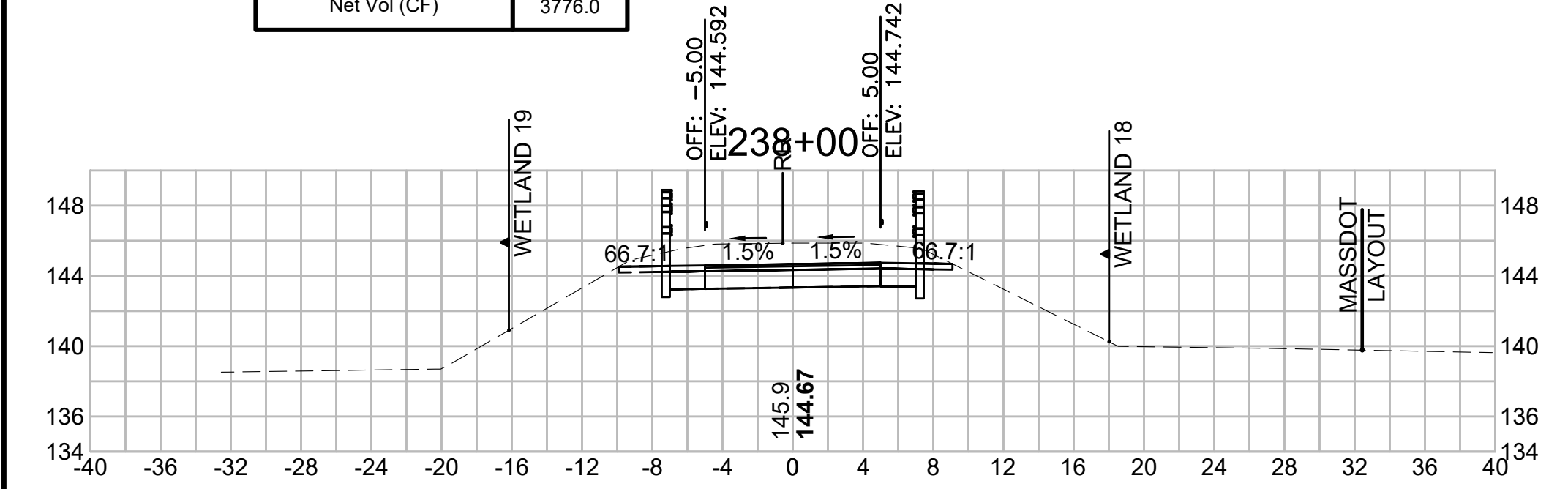
Total Volume at Station 241+50.00	
Cut Area (SF)	36.860
Fill Area (SF)	58.543
Cut Vol (CF)	66.2
Fill Vol (CF)	60.7
Cum Cut Vol (CF)	9359.9
Cum Fill Vol (CF)	5152.6
Net Vol (CF)	4207.3



Total Volume at Station 238+00.00	
Cut Area (SF)	38.481
Fill Area (SF)	0.000
Cut Vol (CF)	67.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8861.4
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	3776.0

Total Volume at Station 239+50.00	
Cut Area (SF)	38.714
Fill Area (SF)	0.000
Cut Vol (CF)	71.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	9077.5
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	3992.1

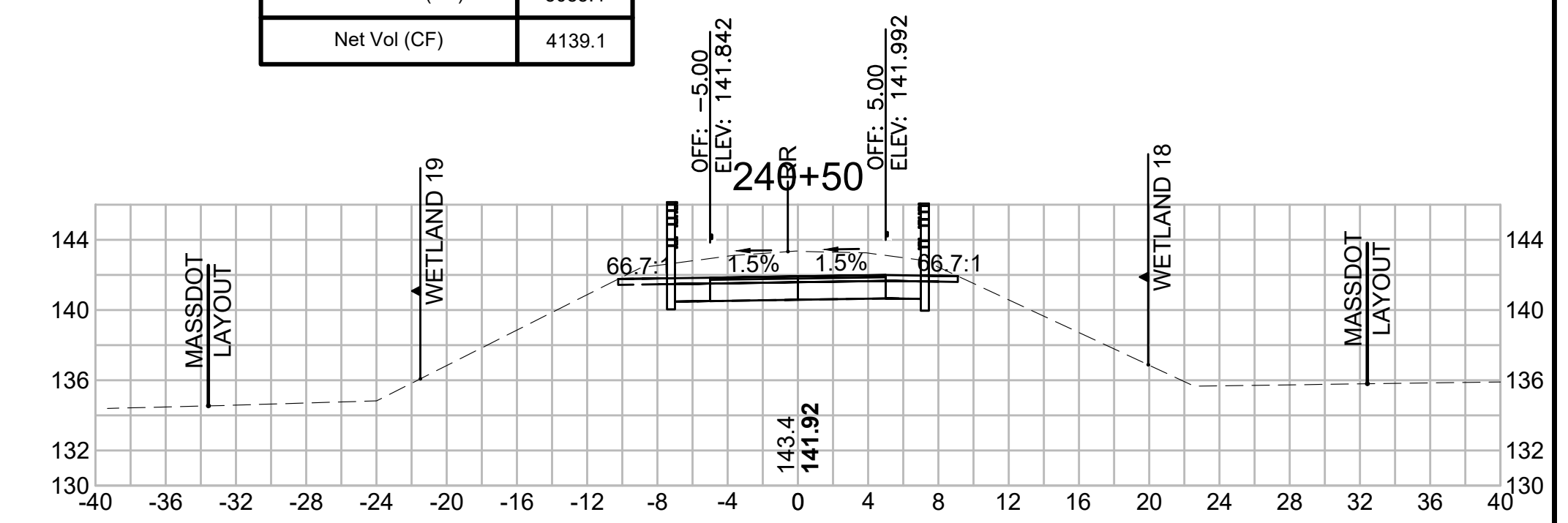
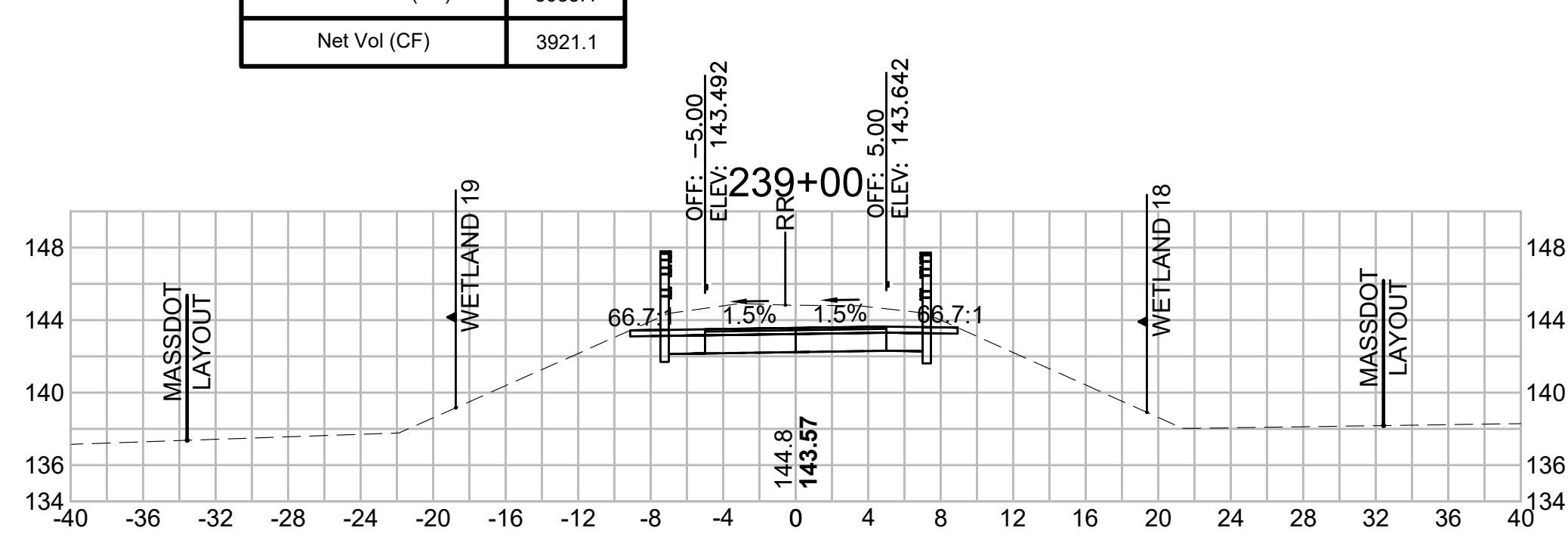
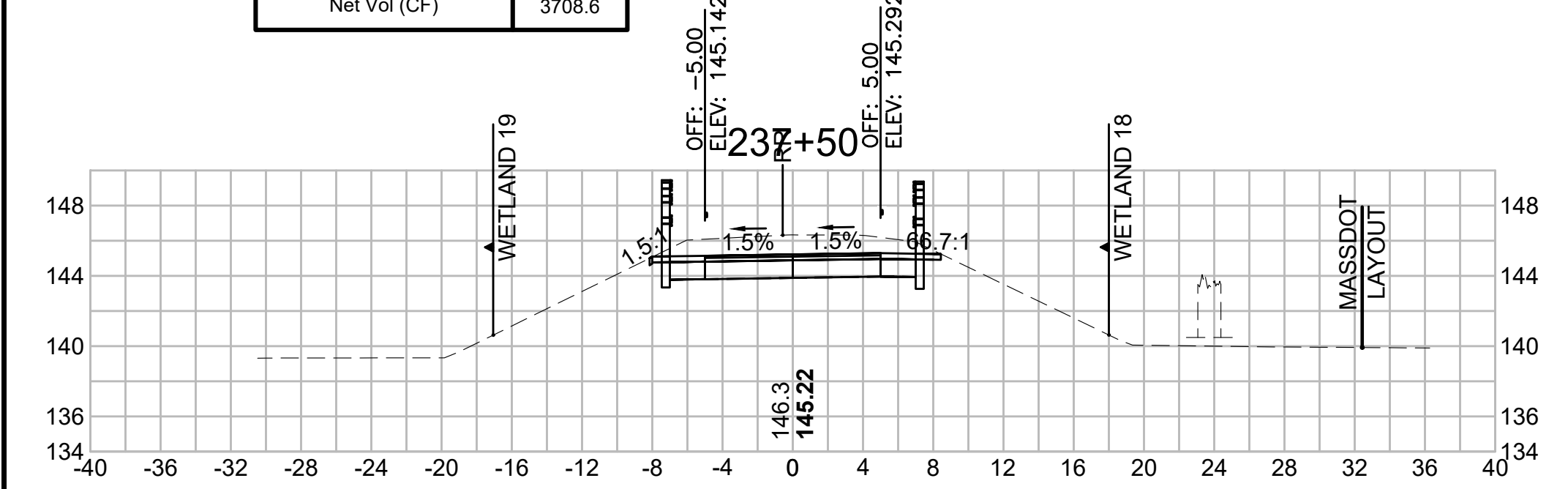
Total Volume at Station 241+00.00	
Cut Area (SF)	34.587
Fill Area (SF)	7.031
Cut Vol (CF)	69.4
Fill Vol (CF)	6.5
Cum Cut Vol (CF)	9293.8
Cum Fill Vol (CF)	5091.9
Net Vol (CF)	4201.9



Total Volume at Station 237+50.00	
Cut Area (SF)	34.340
Fill Area (SF)	0.000
Cut Vol (CF)	61.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	8794.0
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	3708.6

Total Volume at Station 239+00.00	
Cut Area (SF)	37.978
Fill Area (SF)	0.000
Cut Vol (CF)	72.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	9006.5
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	3921.1

Total Volume at Station 240+50.00	
Cut Area (SF)	40.318
Fill Area (SF)	0.000
Cut Vol (CF)	74.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	9224.4
Cum Fill Vol (CF)	5085.4
Net Vol (CF)	4139.1



SUDBURY
BRUCE FREEMAN RAIL TRAIL

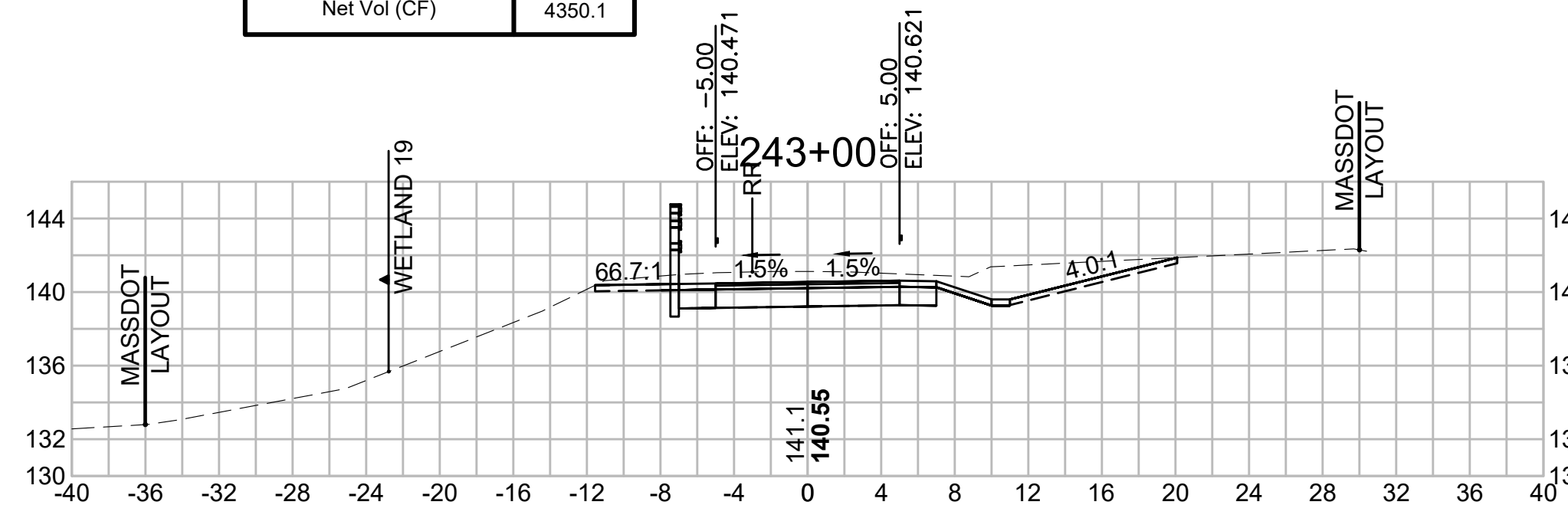
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	277	318

PROJECT FILE NO. 608164

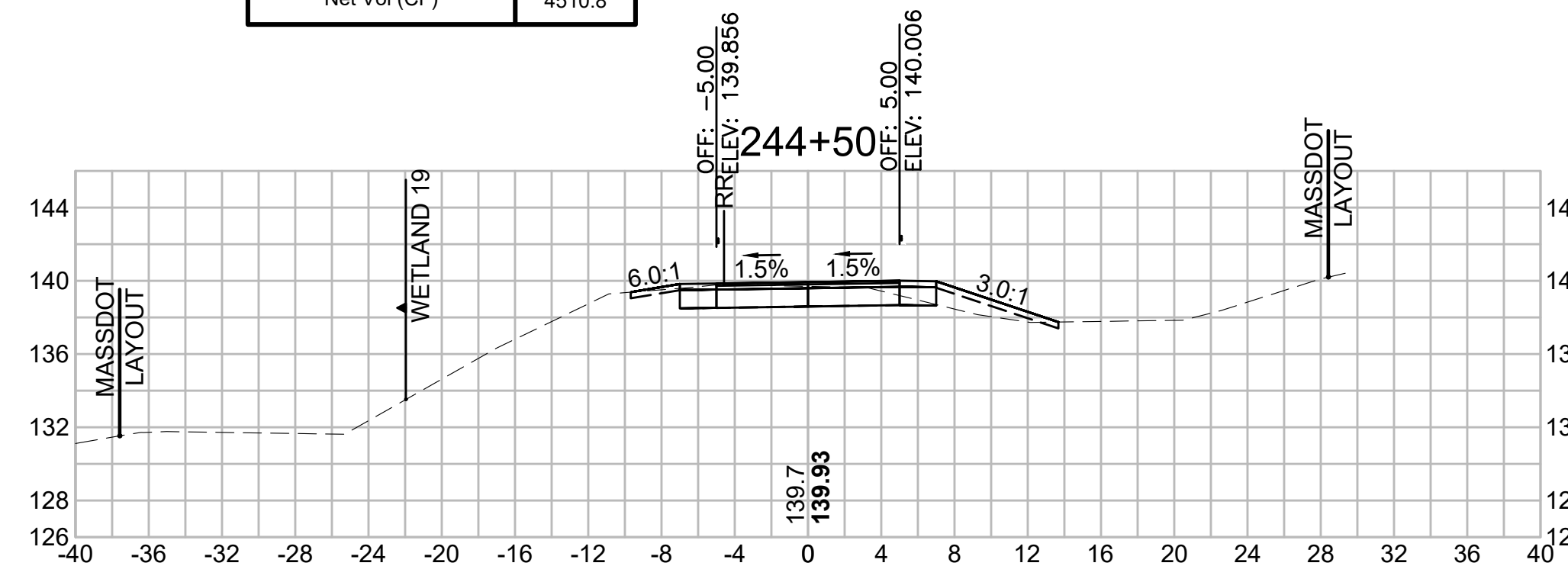
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

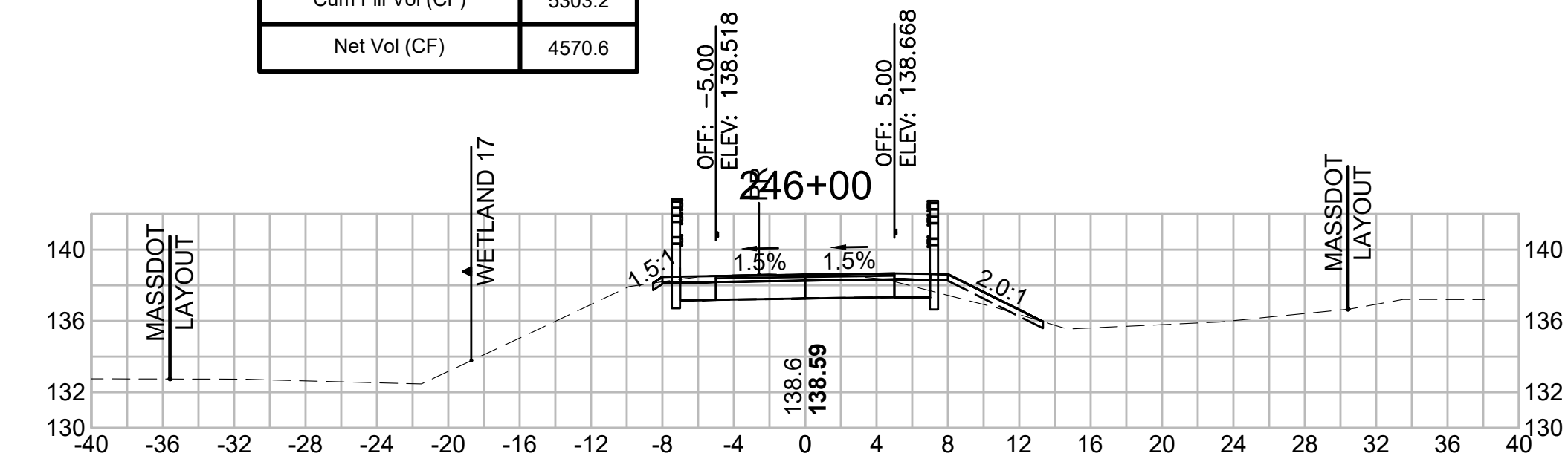
Total Volume at Station 243+00.00	
Cut Area (SF)	46.014
Fill Area (SF)	9.458
Cut Vol (CF)	95.3
Fill Vol (CF)	18.8
Cum Cut Vol (CF)	9617.2
Cum Fill Vol (CF)	5267.1
Net Vol (CF)	4350.1



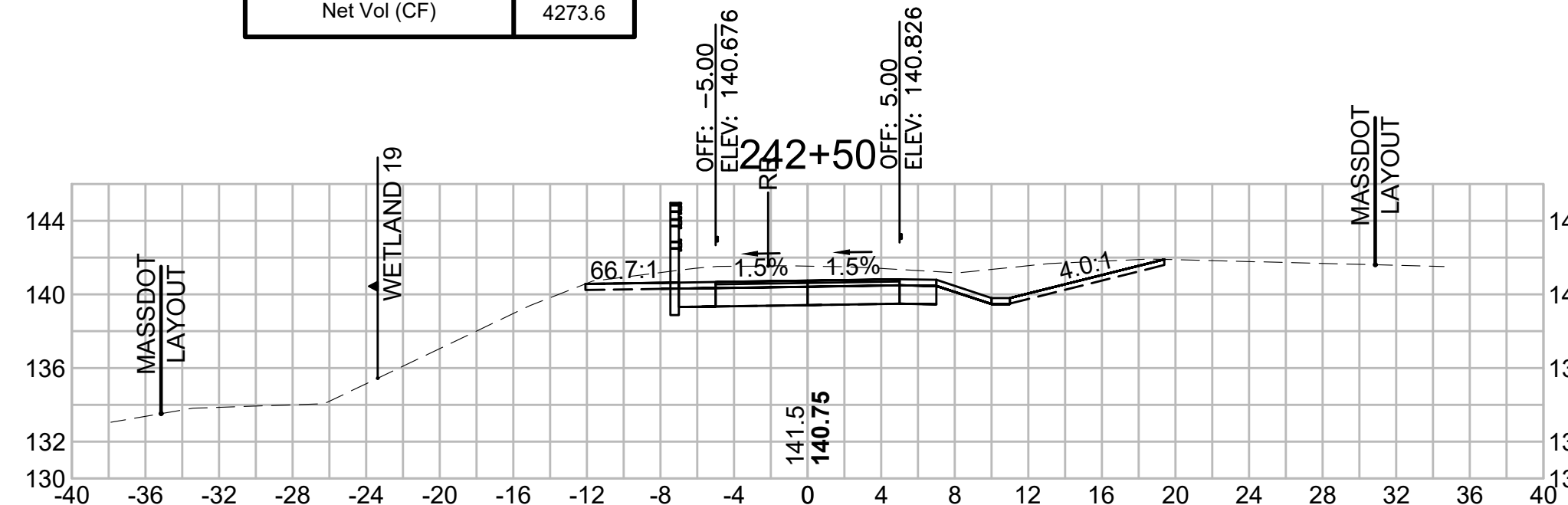
Total Volume at Station 244+50.00	
Cut Area (SF)	14.460
Fill Area (SF)	3.195
Cut Vol (CF)	32.6
Fill Vol (CF)	3.1
Cum Cut Vol (CF)	9789.8
Cum Fill Vol (CF)	5279.0
Net Vol (CF)	4510.8



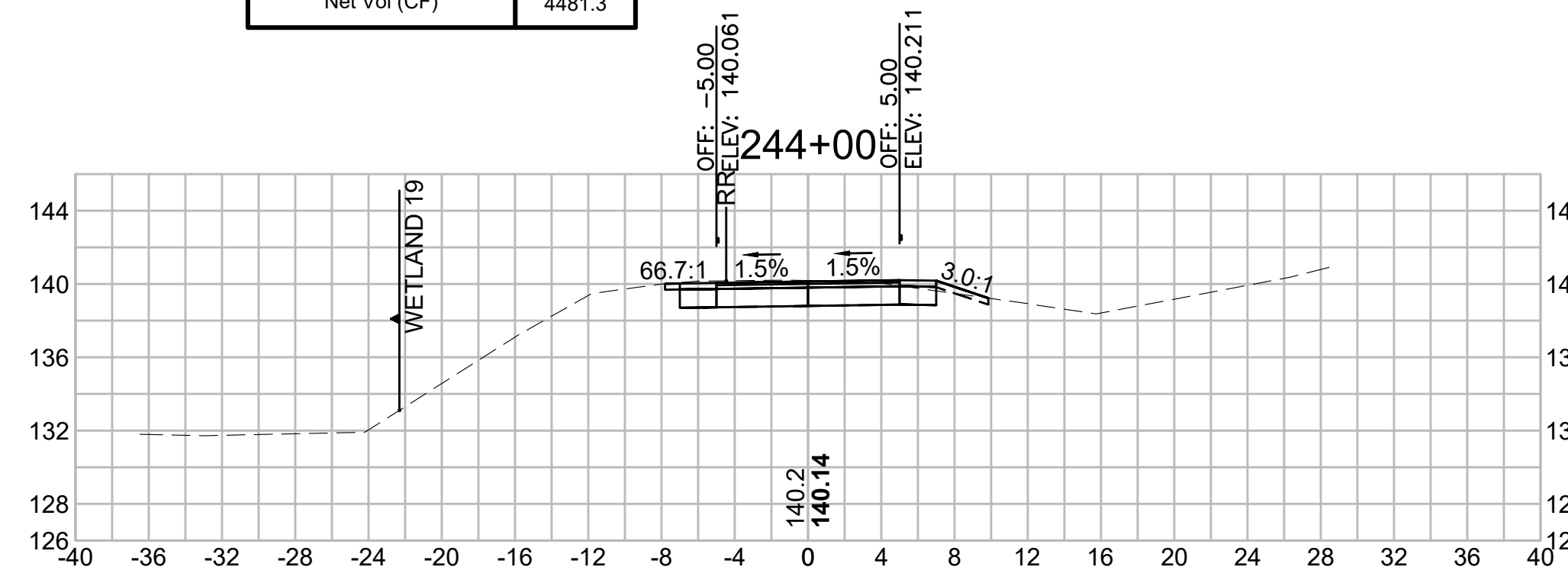
Total Volume at Station 246+00.00	
Cut Area (SF)	17.316
Fill Area (SF)	2.105
Cut Vol (CF)	27.3
Fill Vol (CF)	10.7
Cum Cut Vol (CF)	9873.8
Cum Fill Vol (CF)	5303.2
Net Vol (CF)	4570.6



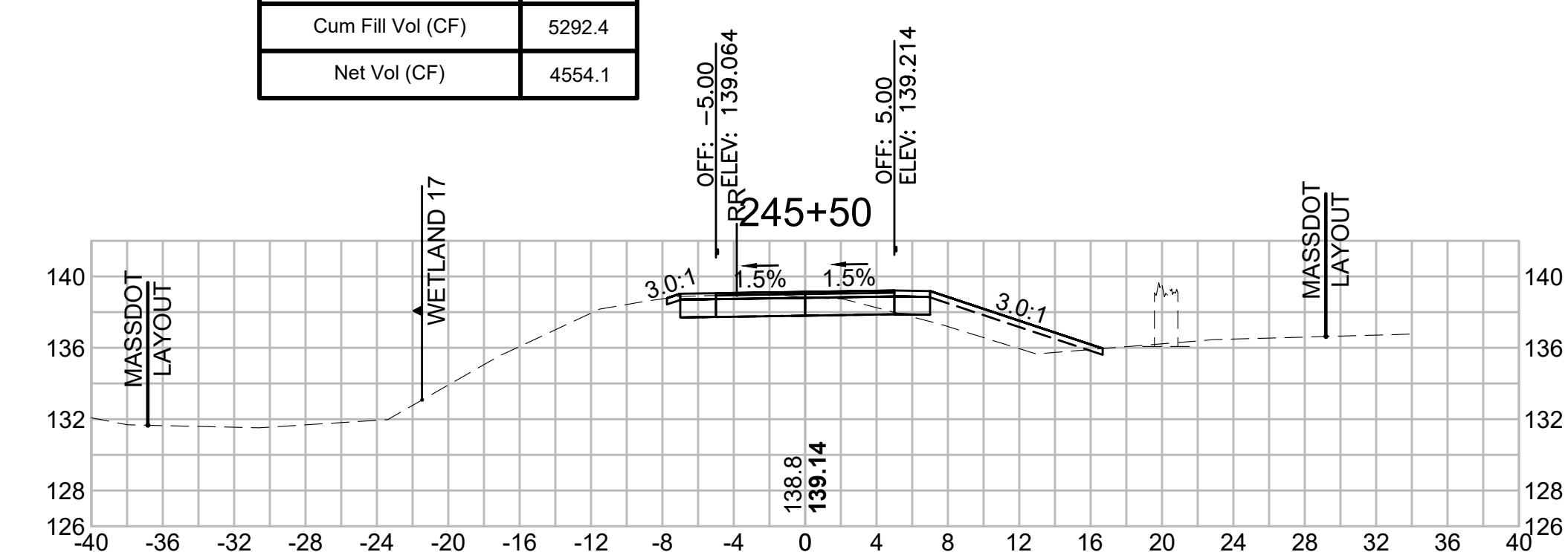
Total Volume at Station 242+50.00	
Cut Area (SF)	56.932
Fill Area (SF)	10.847
Cut Vol (CF)	90.3
Fill Vol (CF)	25.8
Cum Cut Vol (CF)	9521.9
Cum Fill Vol (CF)	5248.3
Net Vol (CF)	4273.6



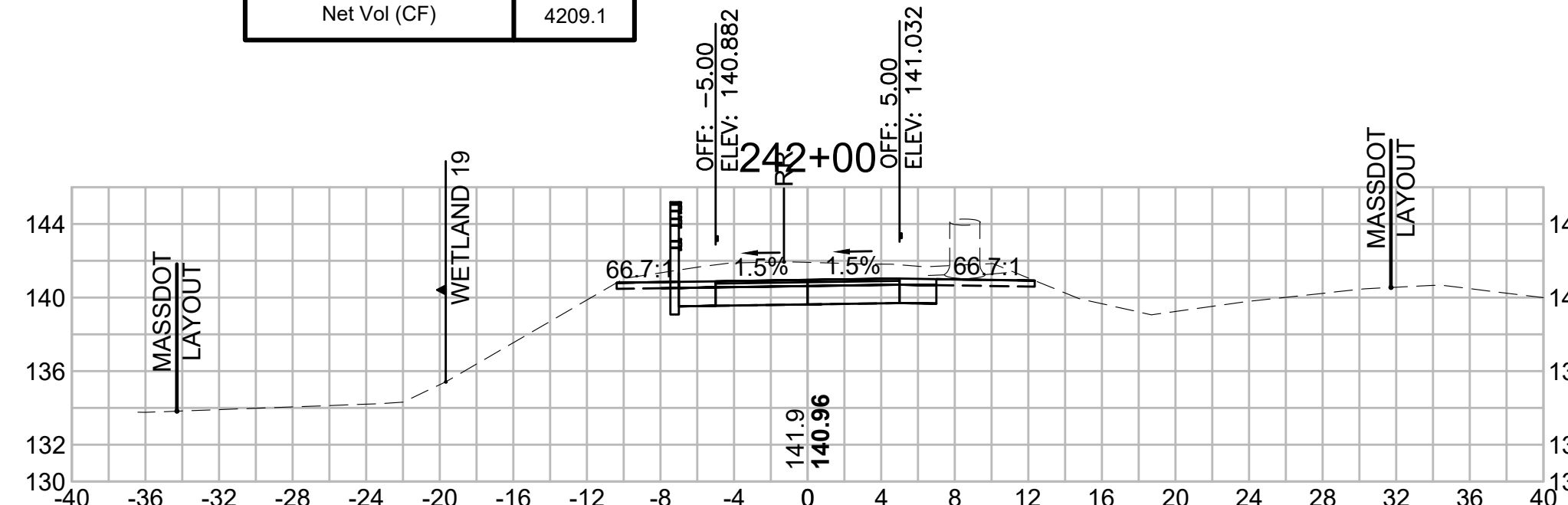
Total Volume at Station 244+00.00	
Cut Area (SF)	20.739
Fill Area (SF)	0.105
Cut Vol (CF)	58.3
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	9757.3
Cum Fill Vol (CF)	5276.0
Net Vol (CF)	4481.3



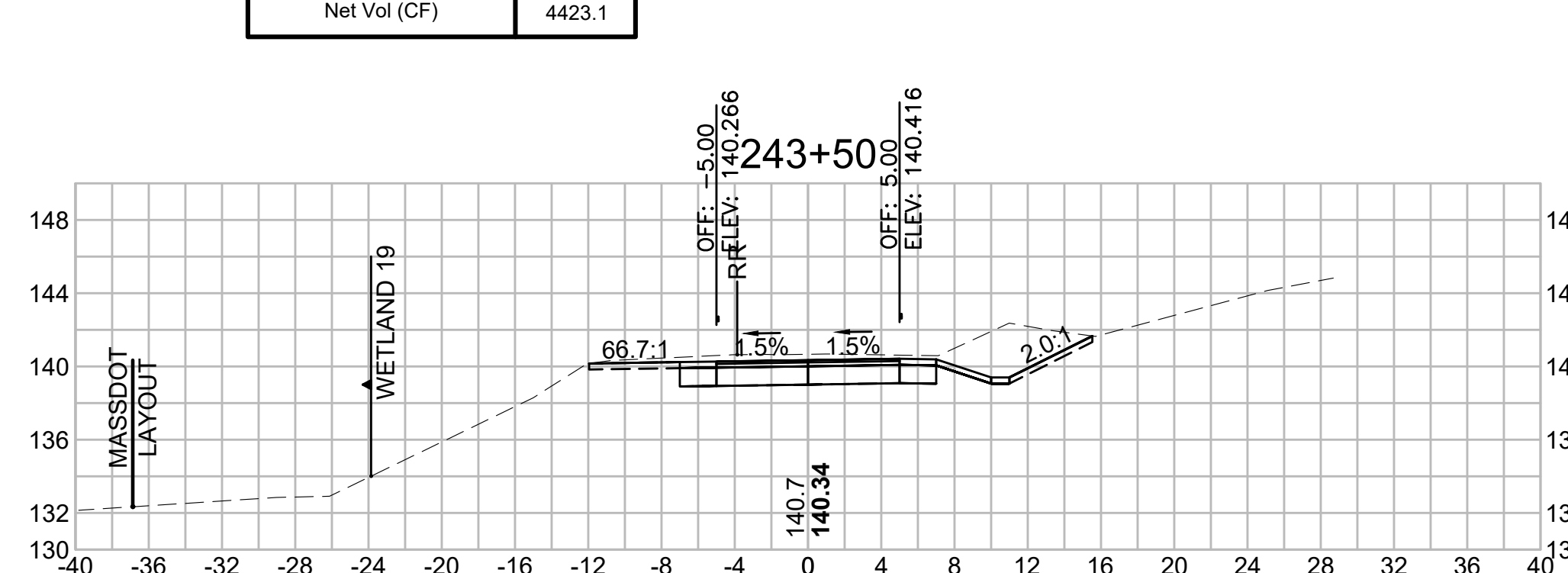
Total Volume at Station 245+00.00	
Cut Area (SF)	12.126
Fill Area (SF)	9.499
Cut Vol (CF)	27.3
Fill Vol (CF)	9.6
Cum Cut Vol (CF)	9846.5
Cum Fill Vol (CF)	5292.4
Net Vol (CF)	4554.1



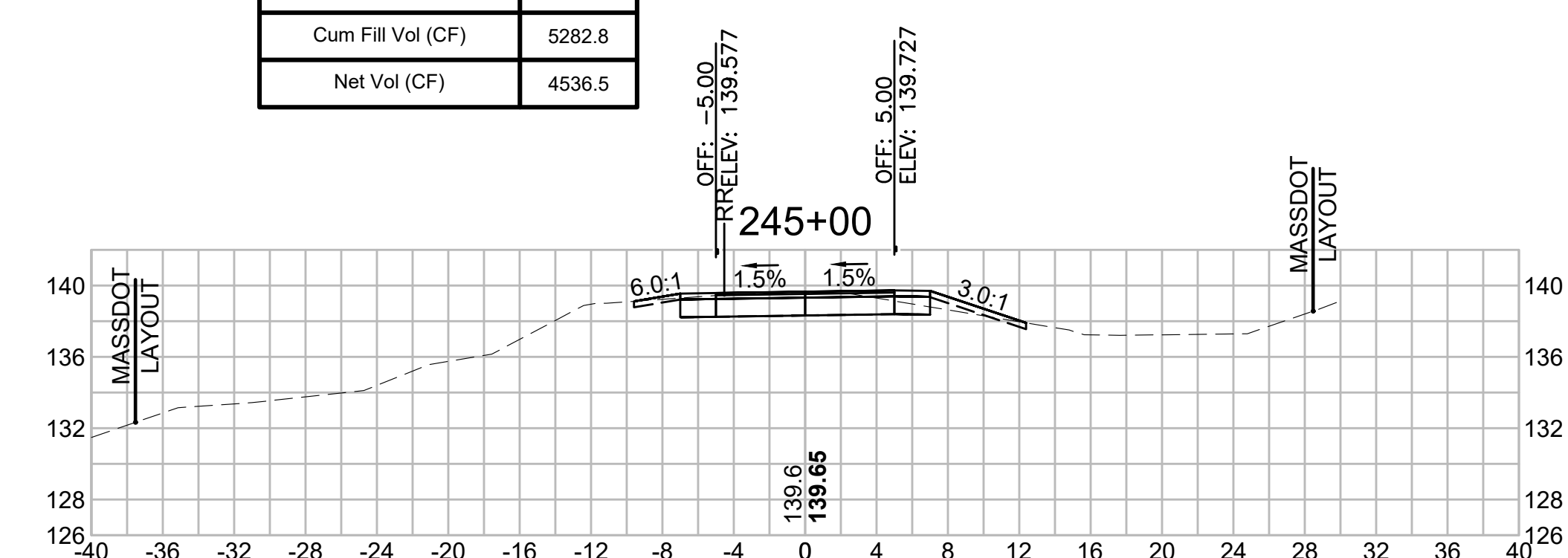
Total Volume at Station 242+00.00	
Cut Area (SF)	40.540
Fill Area (SF)	16.985
Cut Vol (CF)	71.7
Fill Vol (CF)	69.9
Cum Cut Vol (CF)	9431.6
Cum Fill Vol (CF)	5222.5
Net Vol (CF)	4209.1



Total Volume at Station 243+50.00	
Cut Area (SF)	42.264
Fill Area (SF)	0.003
Cut Vol (CF)	81.7
Fill Vol (CF)	8.8
Cum Cut Vol (CF)	9698.9
Cum Fill Vol (CF)	5275.9
Net Vol (CF)	4423.1



Total Volume at Station 245+00.00	
Cut Area (SF)	17.312
Fill Area (SF)	0.900
Cut Vol (CF)	29.4
Fill Vol (CF)	3.8
Cum Cut Vol (CF)	9819.3
Cum Fill Vol (CF)	5282.8
Net Vol (CF)	4536.5



SUDBURY
BRUCE FREEMAN RAIL TRAIL

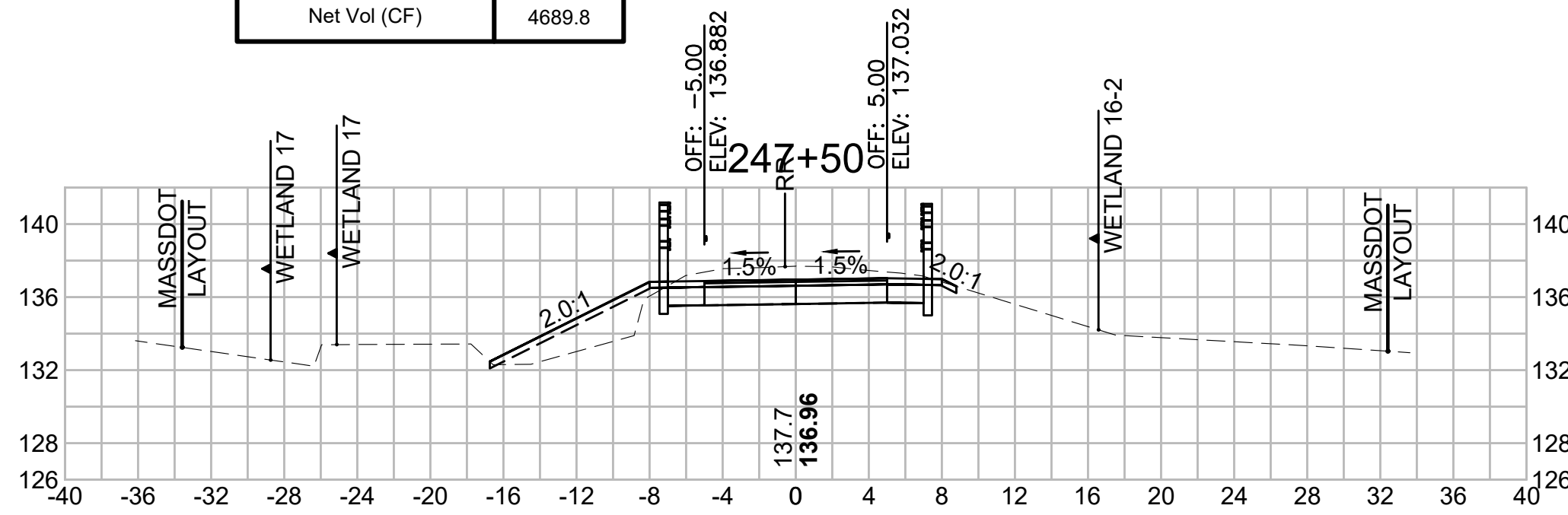
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	278	318

PROJECT FILE NO. 608164

CROSS SECTIONS

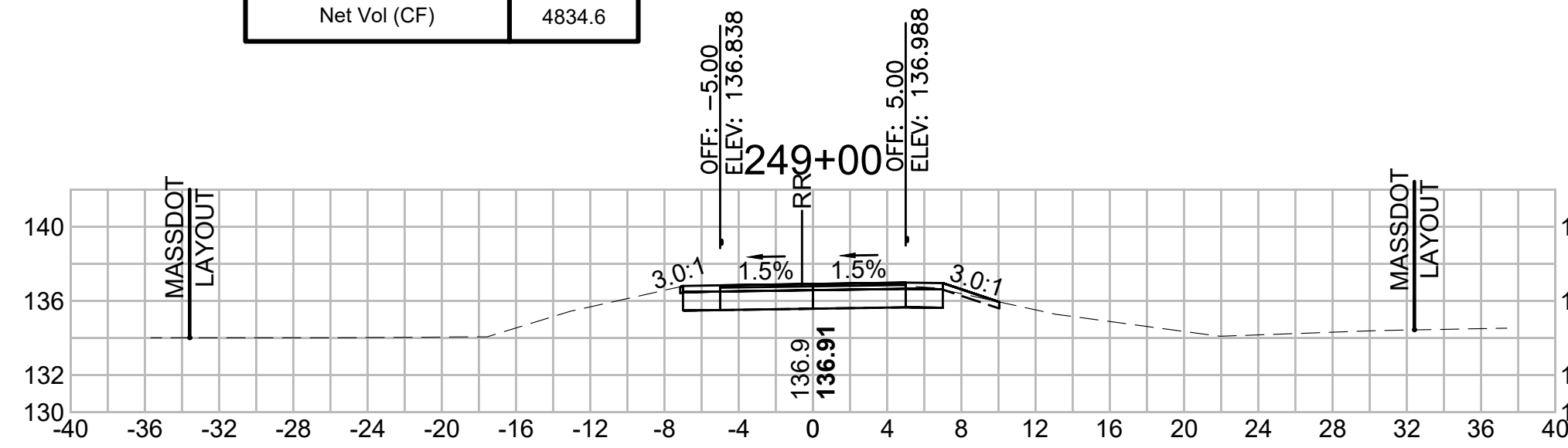
Total Volume at Station 247+50.00

Cut Area (SF)	28,081
Fill Area (SF)	10,437
Cut Vol (CF)	49.7
Fill Vol (CF)	9.7
Cum Cut Vol (CF)	10004.6
Cum Fill Vol (CF)	5314.8
Net Vol (CF)	4689.8



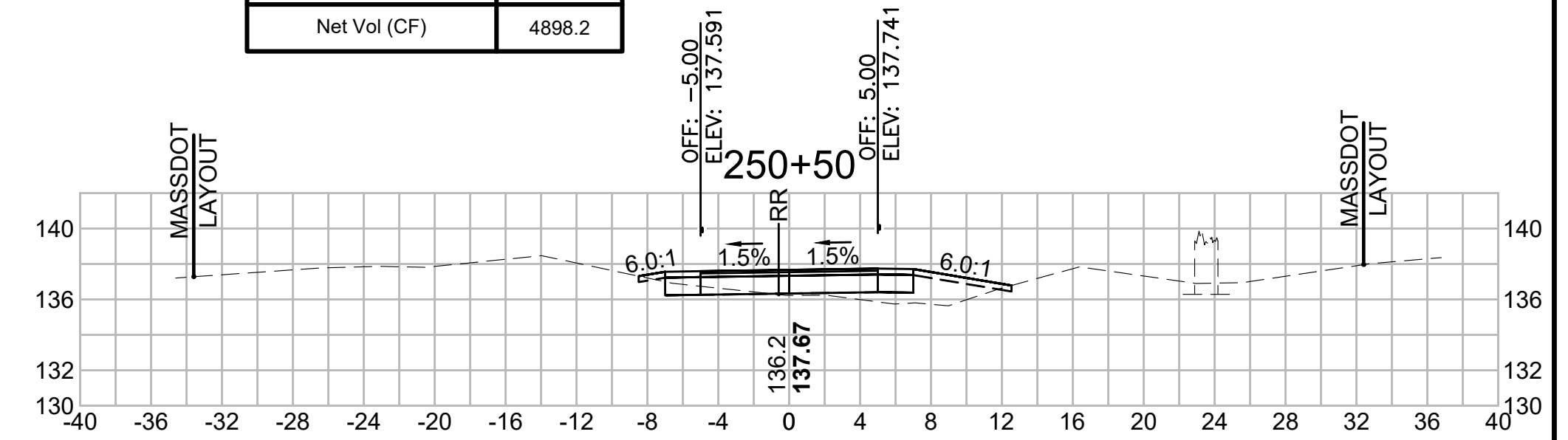
Total Volume at Station 249+00.00

Cut Area (SF)	19,014
Fill Area (SF)	0,000
Cut Vol (CF)	41.9
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	10159.1
Cum Fill Vol (CF)	5324.5
Net Vol (CF)	4834.6



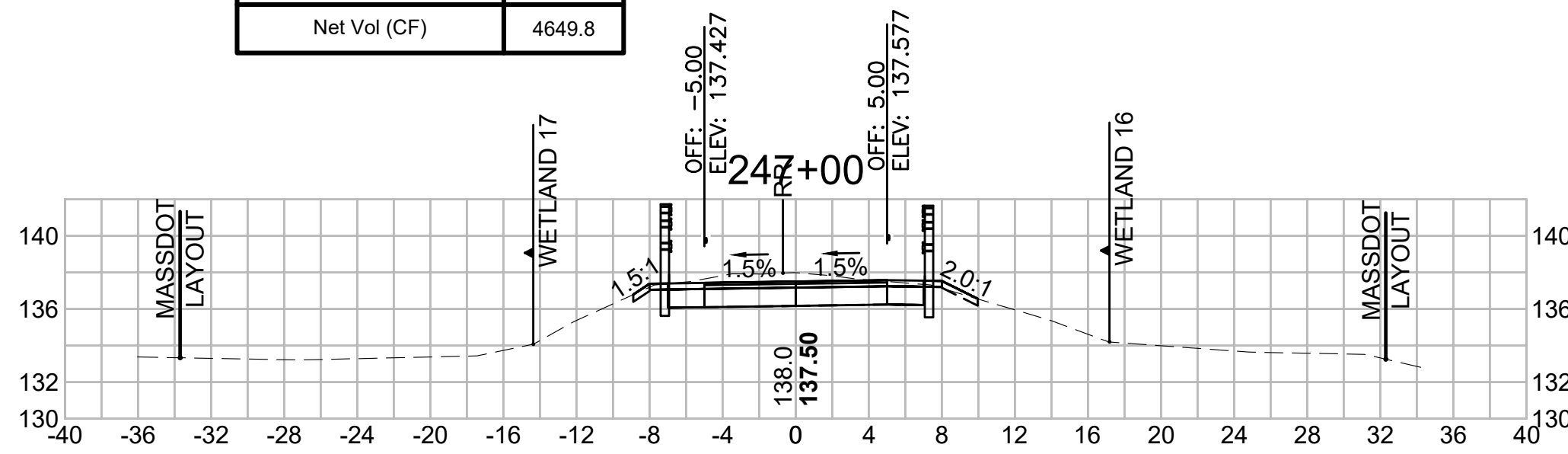
Total Volume at Station 250+50.00

Cut Area (SF)	18,871
Fill Area (SF)	7,482
Cut Vol (CF)	25.1
Fill Vol (CF)	8.6
Cum Cut Vol (CF)	10233.3
Cum Fill Vol (CF)	5335.1
Net Vol (CF)	4898.2



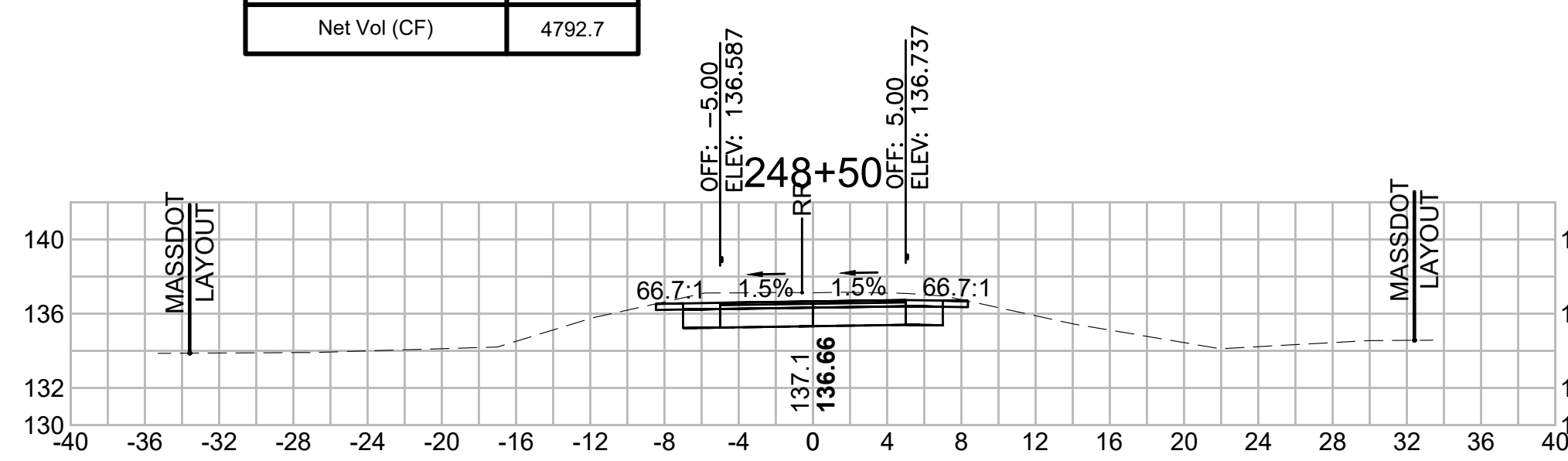
Total Volume at Station 247+00.00

Cut Area (SF)	25,565
Fill Area (SF)	0,011
Cut Vol (CF)	44.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	9955.0
Cum Fill Vol (CF)	5305.1
Net Vol (CF)	4649.8



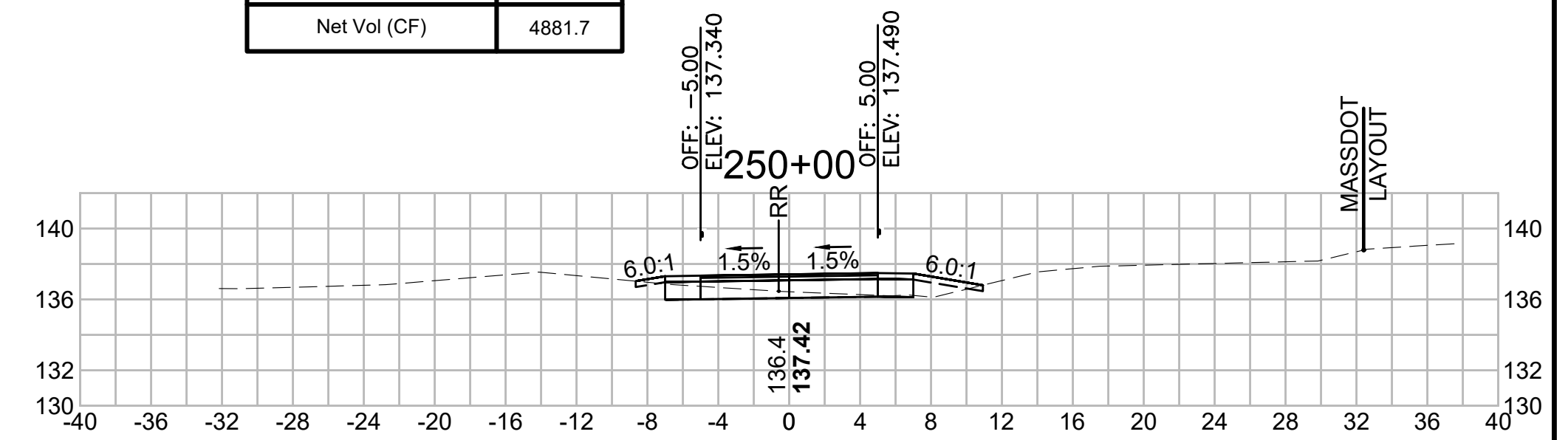
Total Volume at Station 248+50.00

Cut Area (SF)	26,248
Fill Area (SF)	0,000
Cut Vol (CF)	55.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	10117.2
Cum Fill Vol (CF)	5324.5
Net Vol (CF)	4792.7



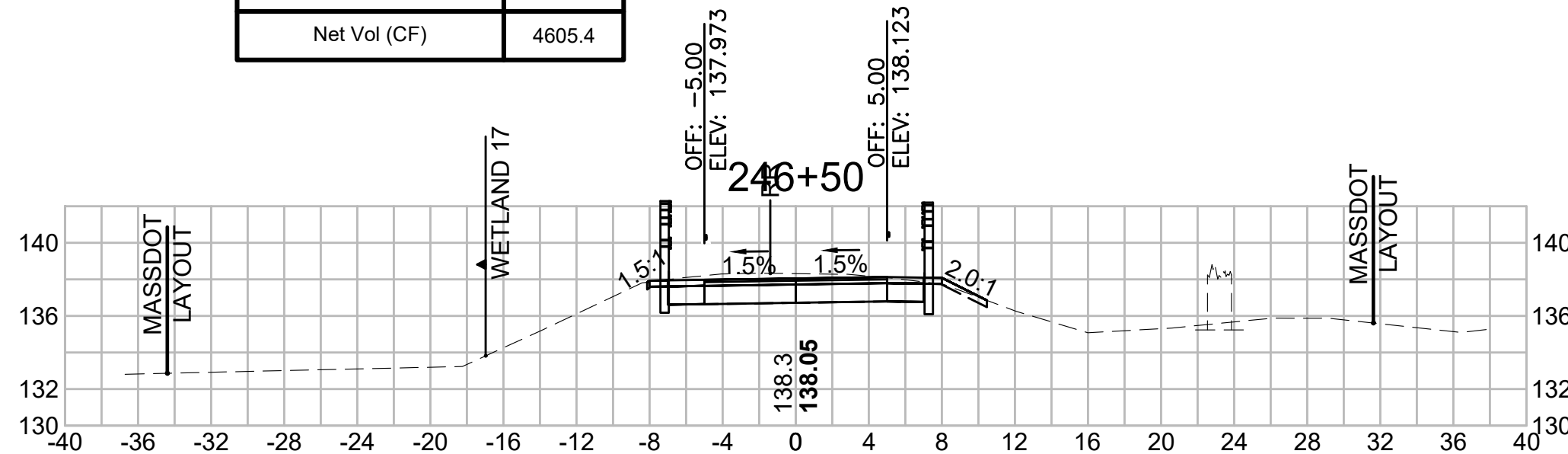
Total Volume at Station 250+00.00

Cut Area (SF)	8,194
Fill Area (SF)	1,778
Cut Vol (CF)	19.6
Fill Vol (CF)	1.8
Cum Cut Vol (CF)	10208.2
Cum Fill Vol (CF)	5326.5
Net Vol (CF)	4881.7



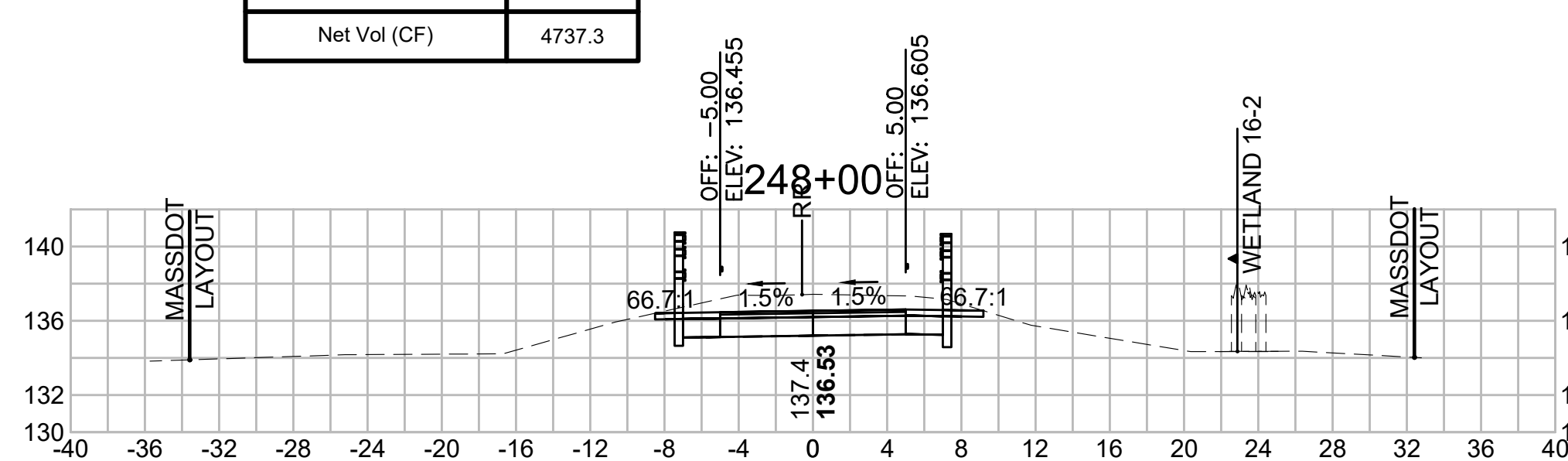
Total Volume at Station 246+50.00

Cut Area (SF)	22,390
Fill Area (SF)	0,001
Cut Vol (CF)	36.8
Fill Vol (CF)	1.9
Cum Cut Vol (CF)	9910.5
Cum Fill Vol (CF)	5305.1
Net Vol (CF)	4605.4



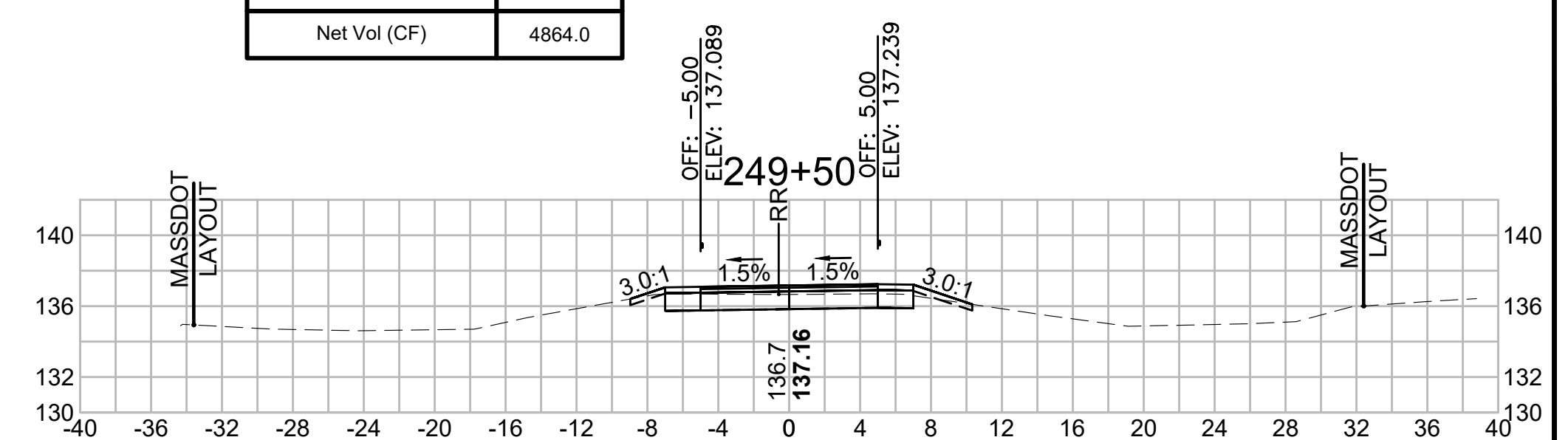
Total Volume at Station 248+00.00

Cut Area (SF)	33,601
Fill Area (SF)	0,000
Cut Vol (CF)	57.1
Fill Vol (CF)	9.7
Cum Cut Vol (CF)	10061.7
Cum Fill Vol (CF)	5324.5
Net Vol (CF)	4737.3



Total Volume at Station 249+50.00

Cut Area (SF)	12,926
Fill Area (SF)	0,194
Cut Vol (CF)	29.6
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	10188.6
Cum Fill Vol (CF)	5324.7
Net Vol (CF)	4864.0



SUDBURY
BRUCE FREEMAN RAIL TRAIL

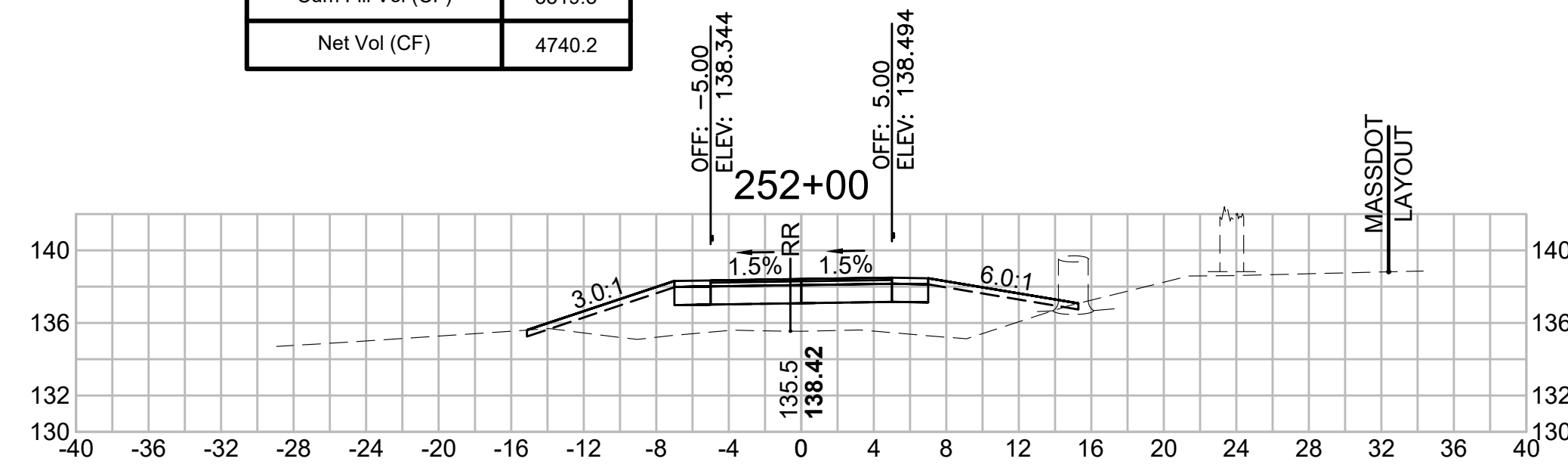
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	279	318

PROJECT FILE NO. 608164

CROSS SECTIONS

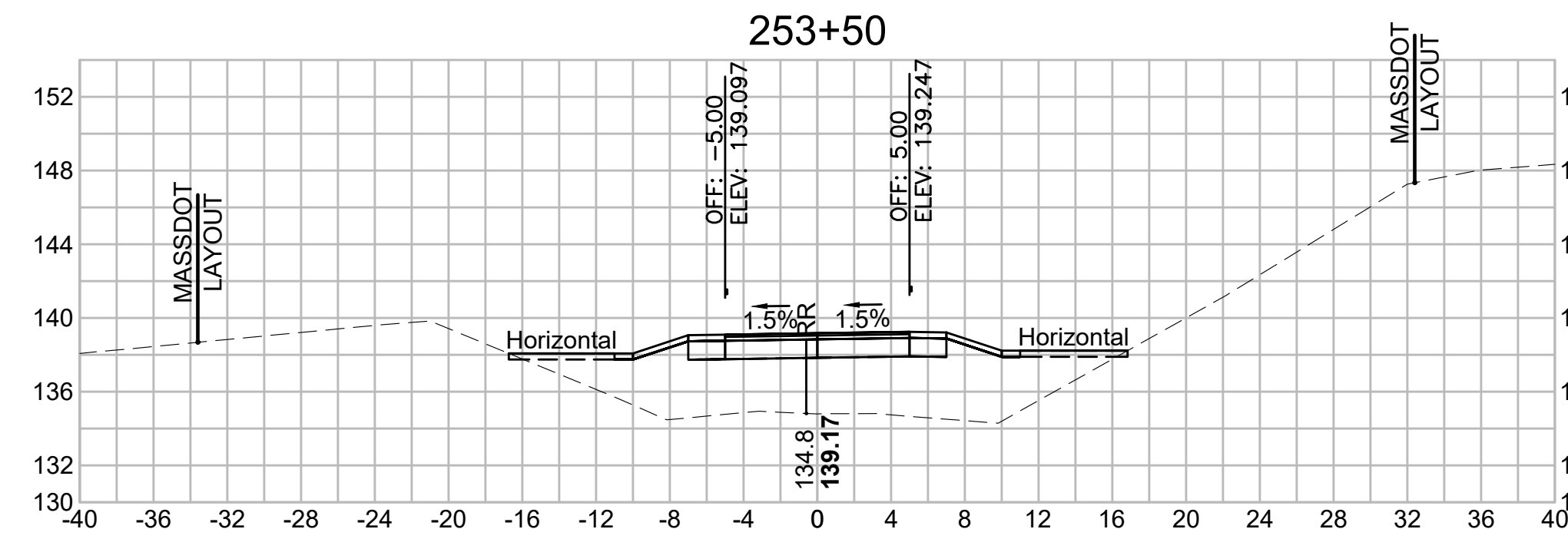
Total Volume at Station 252+00.00

Cut Area (SF)	0.630
Fill Area (SF)	45.112
Cut Vol (CF)	3.5
Fill Vol (CF)	76.7
Cum Cut Vol (CF)	10259.7
Cum Fill Vol (CF)	5519.5
Net Vol (CF)	4740.2



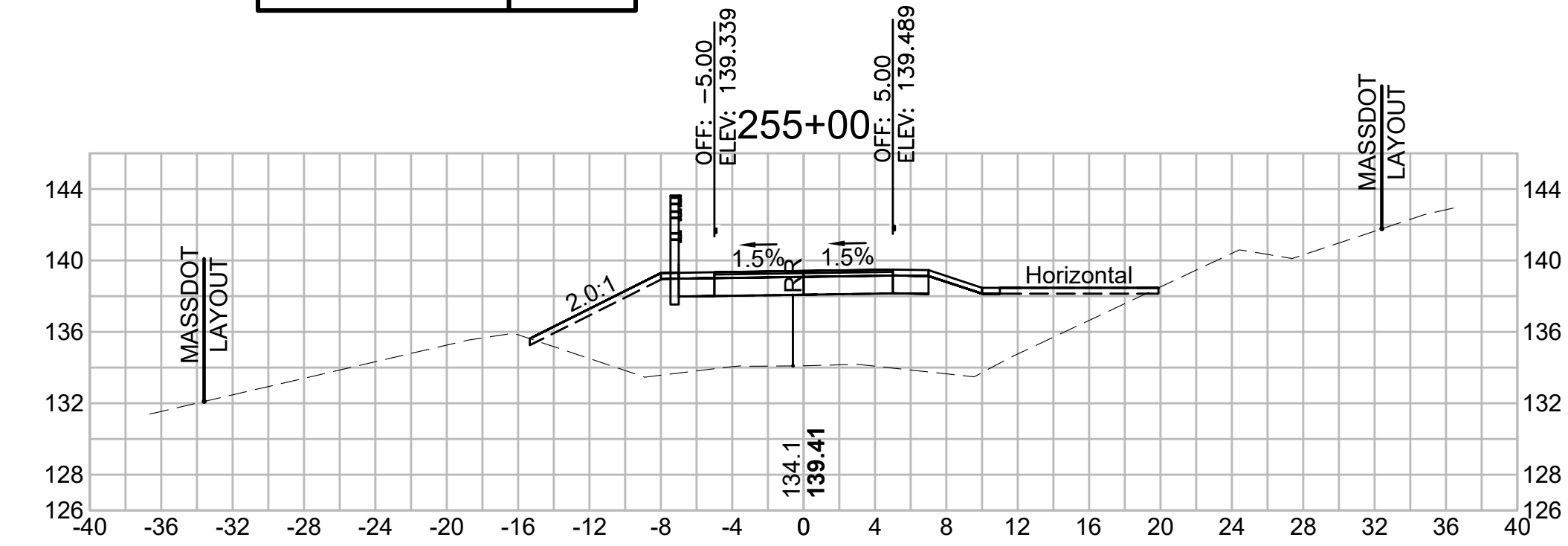
Total Volume at Station 253+50.00

Cut Area (SF)	0.229
Fill Area (SF)	83.655
Cut Vol (CF)	0.5
Fill Vol (CF)	144.9
Cum Cut Vol (CF)	10262.7
Cum Fill Vol (CF)	5874.3
Net Vol (CF)	4388.4



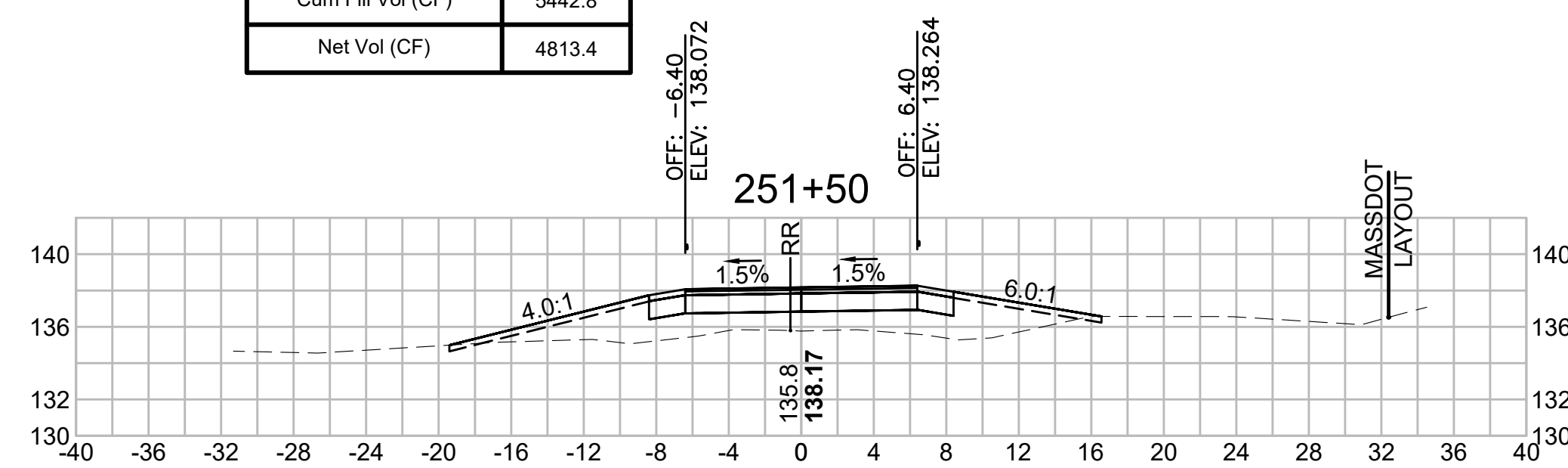
Total Volume at Station 255+00.00

Cut Area (SF)	0.198
Fill Area (SF)	116.778
Cut Vol (CF)	0.7
Fill Vol (CF)	215.6
Cum Cut Vol (CF)	10264.5
Cum Fill Vol (CF)	6464.1
Net Vol (CF)	3800.4



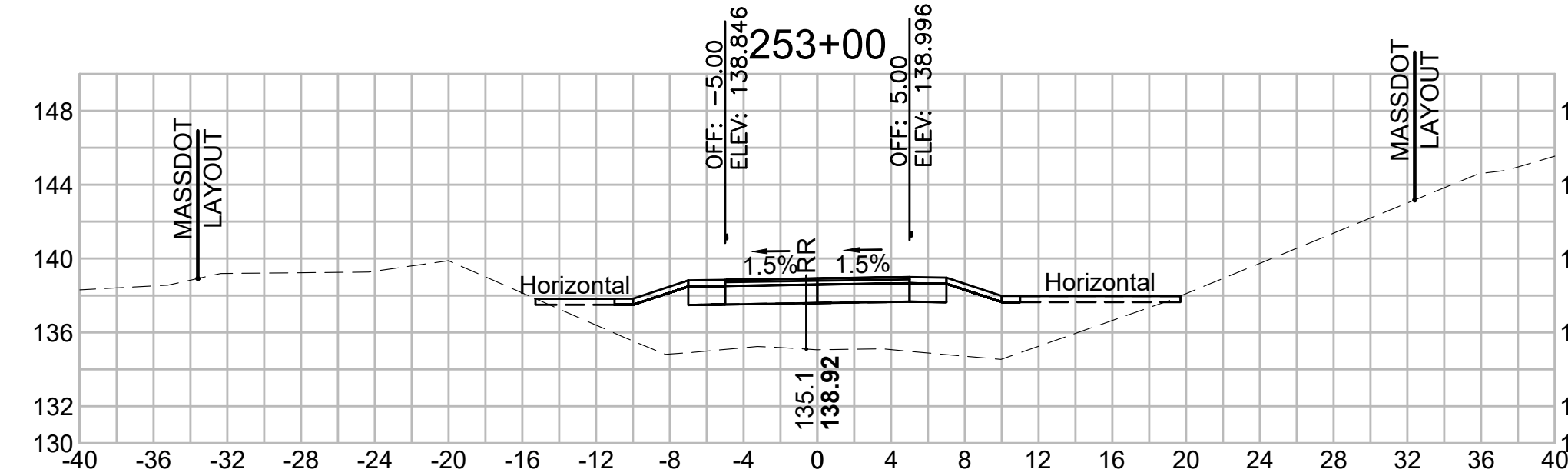
Total Volume at Station 251+50.00

Cut Area (SF)	3.142
Fill Area (SF)	37.729
Cut Vol (CF)	4.2
Fill Vol (CF)	67.9
Cum Cut Vol (CF)	10256.2
Cum Fill Vol (CF)	5442.8
Net Vol (CF)	4813.4



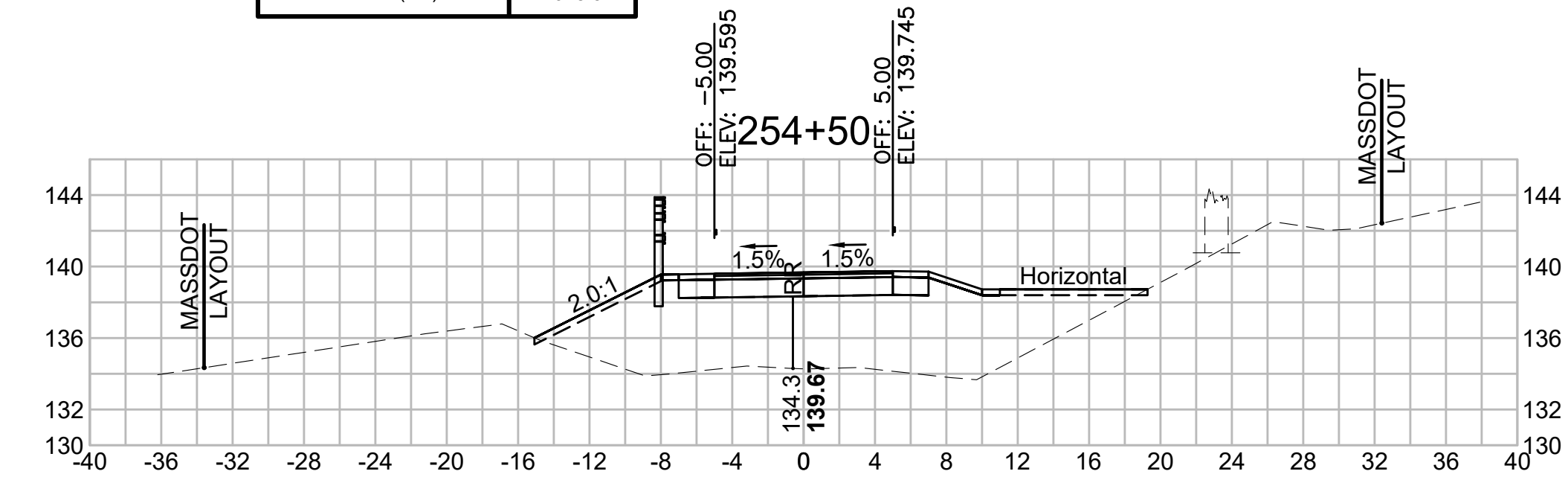
Total Volume at Station 253+00.00

Cut Area (SF)	0.259
Fill Area (SF)	72.794
Cut Vol (CF)	1.1
Fill Vol (CF)	117.8
Cum Cut Vol (CF)	10262.2
Cum Fill Vol (CF)	5729.4
Net Vol (CF)	4532.8



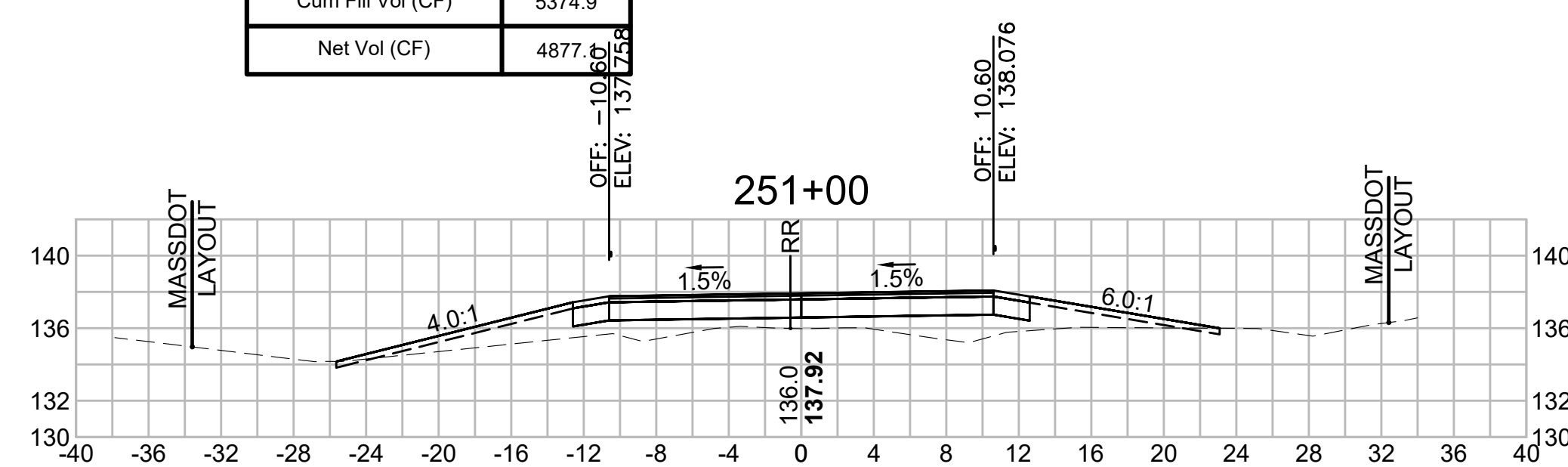
Total Volume at Station 254+50.00

Cut Area (SF)	0.534
Fill Area (SF)	116.084
Cut Vol (CF)	0.7
Fill Vol (CF)	202.1
Cum Cut Vol (CF)	10263.8
Cum Fill Vol (CF)	6248.5
Net Vol (CF)	4015.3



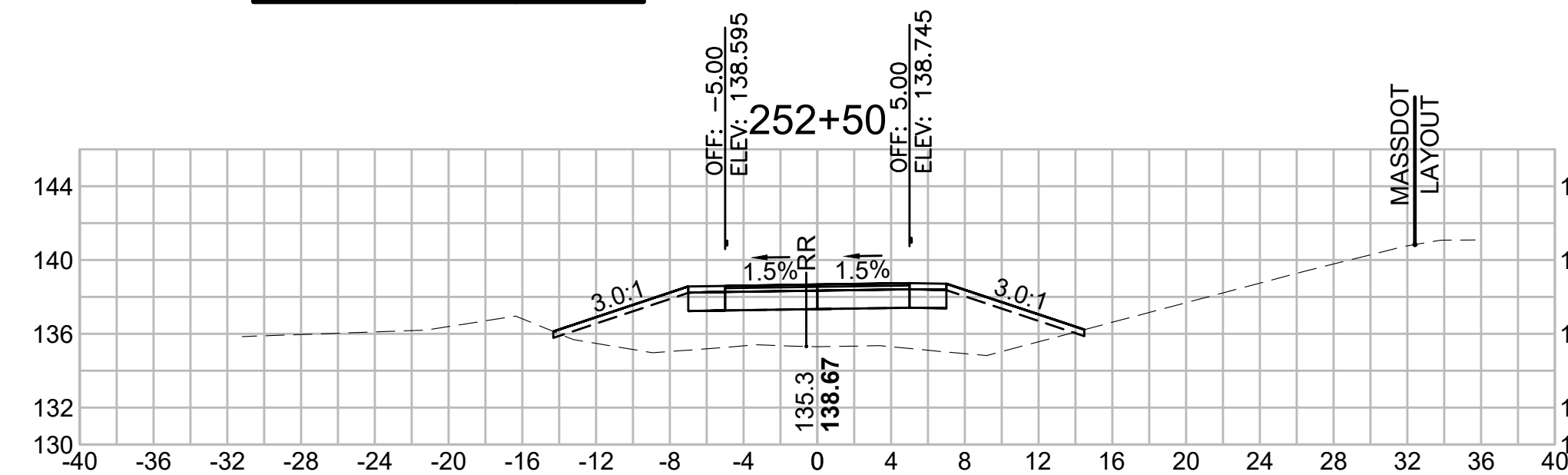
Total Volume at Station 251+00.00

Cut Area (SF)	1.399
Fill Area (SF)	35.563
Cut Vol (CF)	18.8
Fill Vol (CF)	39.9
Cum Cut Vol (CF)	10252.0
Cum Fill Vol (CF)	5374.9
Net Vol (CF)	4877.1



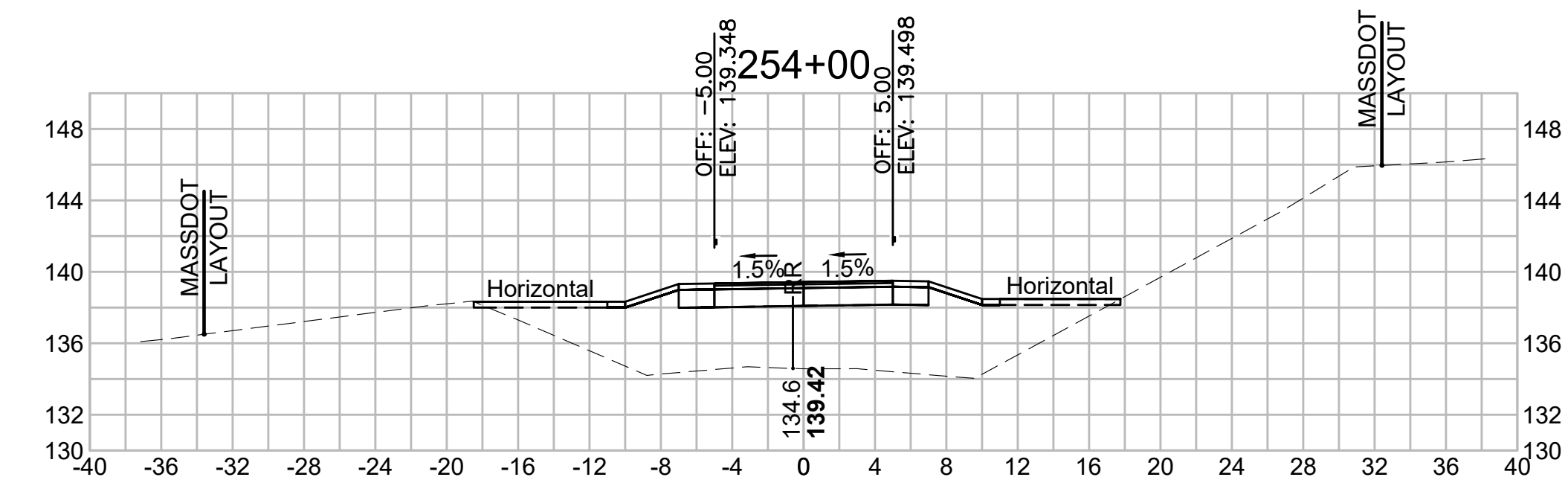
Total Volume at Station 252+50.00

Cut Area (SF)	0.898
Fill Area (SF)	54.414
Cut Vol (CF)	1.4
Fill Vol (CF)	92.2
Cum Cut Vol (CF)	10261.1
Cum Fill Vol (CF)	5611.6
Net Vol (CF)	4649.5



Total Volume at Station 254+00.00

Cut Area (SF)	0.232
Fill Area (SF)	102.202
Cut Vol (CF)	0.4
Fill Vol (CF)	172.1
Cum Cut Vol (CF)	10263.1
Cum Fill Vol (CF)	6046.4
Net Vol (CF)	4216.7



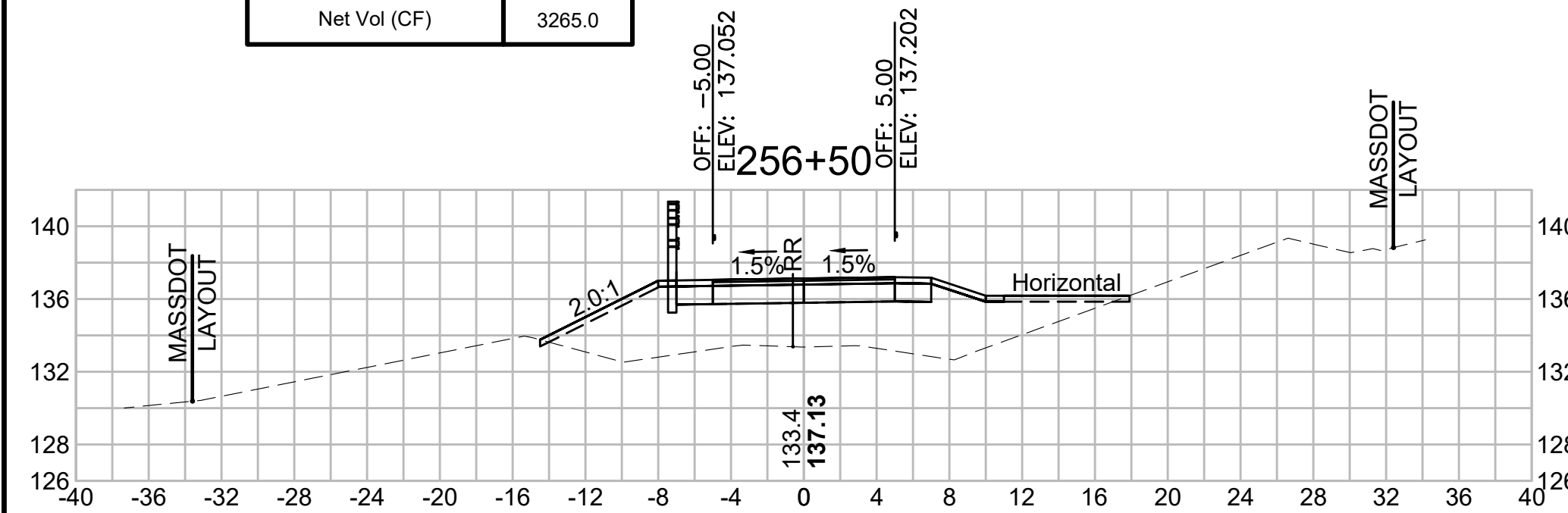
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	280	318

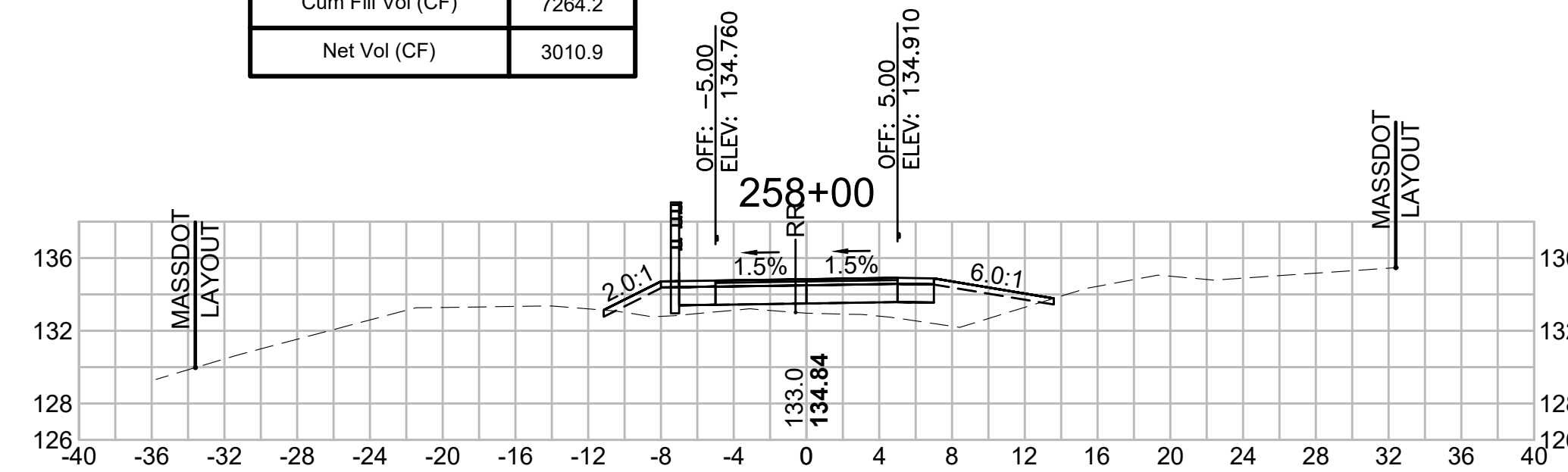
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

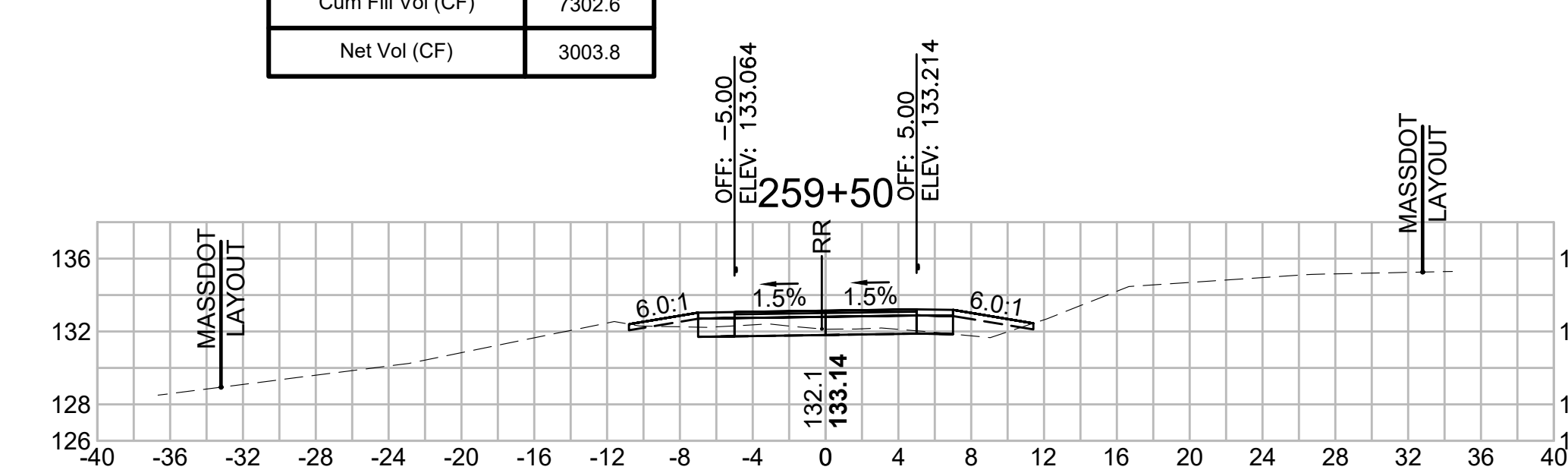
Total Volume at Station 256+50.00	
Cut Area (SF)	0.238
Fill Area (SF)	71.405
Cut Vol (CF)	0.5
Fill Vol (CF)	148.1
Cum Cut Vol (CF)	10265.7
Cum Fill Vol (CF)	7000.7
Net Vol (CF)	3265.0



Total Volume at Station 258+00.00	
Cut Area (SF)	6.276
Fill Area (SF)	19.509
Cut Vol (CF)	7.3
Fill Vol (CF)	60.3
Cum Cut Vol (CF)	10275.1
Cum Fill Vol (CF)	7264.2
Net Vol (CF)	3010.9



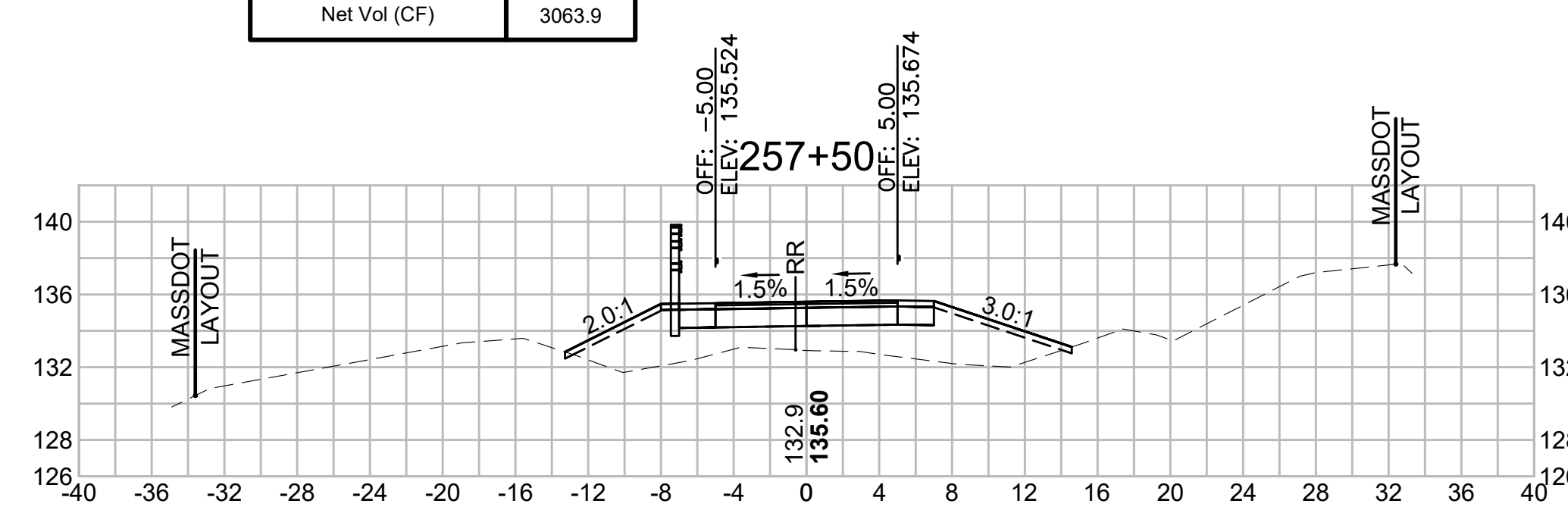
Total Volume at Station 259+50.00	
Cut Area (SF)	5.628
Fill Area (SF)	3.161
Cut Vol (CF)	12.0
Fill Vol (CF)	7.4
Cum Cut Vol (CF)	10306.4
Cum Fill Vol (CF)	7302.6
Net Vol (CF)	3003.8



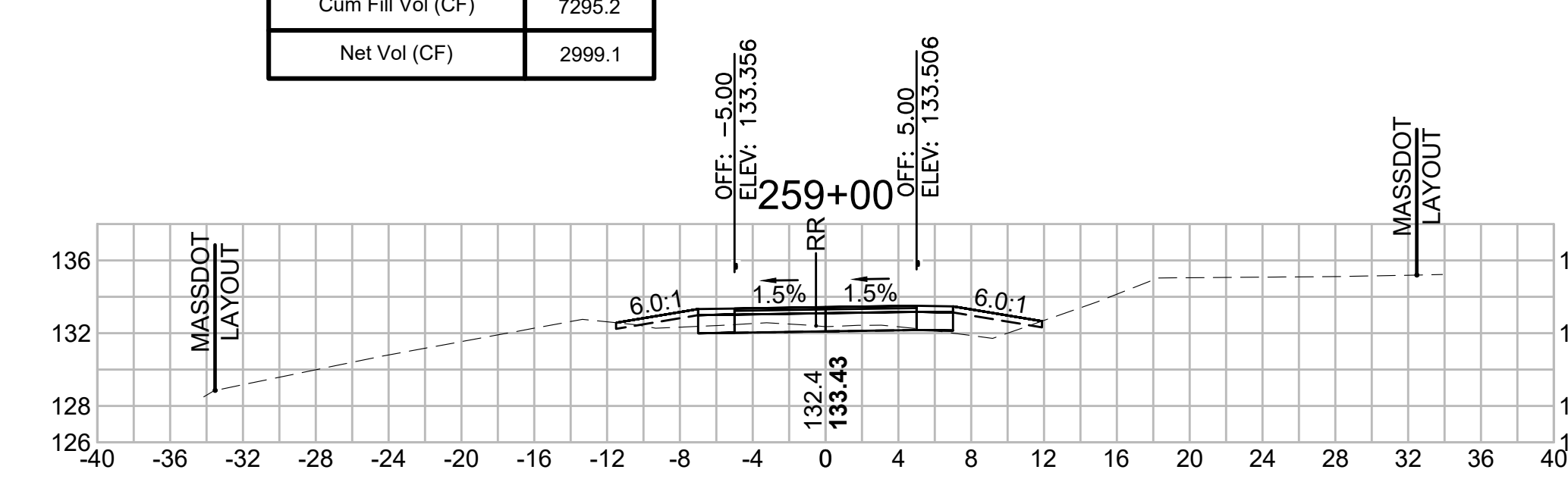
Total Volume at Station 256+00.00	
Cut Area (SF)	0.253
Fill Area (SF)	88.524
Cut Vol (CF)	0.4
Fill Vol (CF)	181.2
Cum Cut Vol (CF)	10265.3
Cum Fill Vol (CF)	6852.6
Net Vol (CF)	3412.7



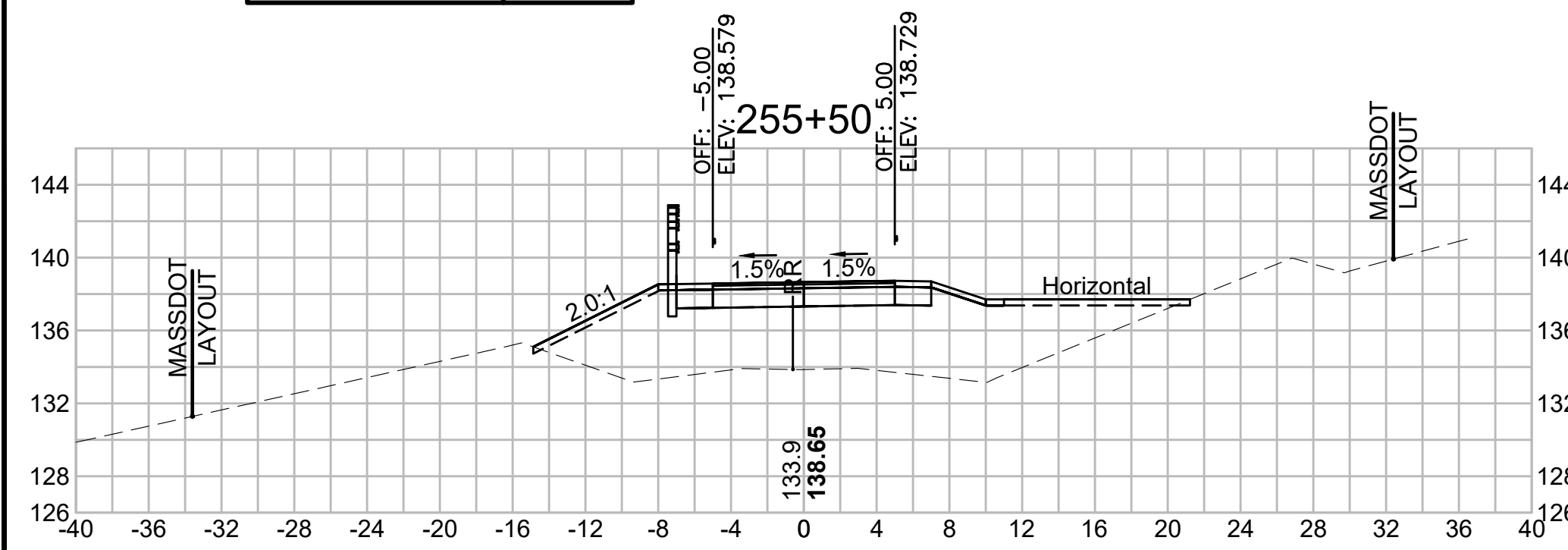
Total Volume at Station 257+50.00	
Cut Area (SF)	1.585
Fill Area (SF)	45.633
Cut Vol (CF)	1.7
Fill Vol (CF)	89.7
Cum Cut Vol (CF)	10267.9
Cum Fill Vol (CF)	7203.9
Net Vol (CF)	3063.9



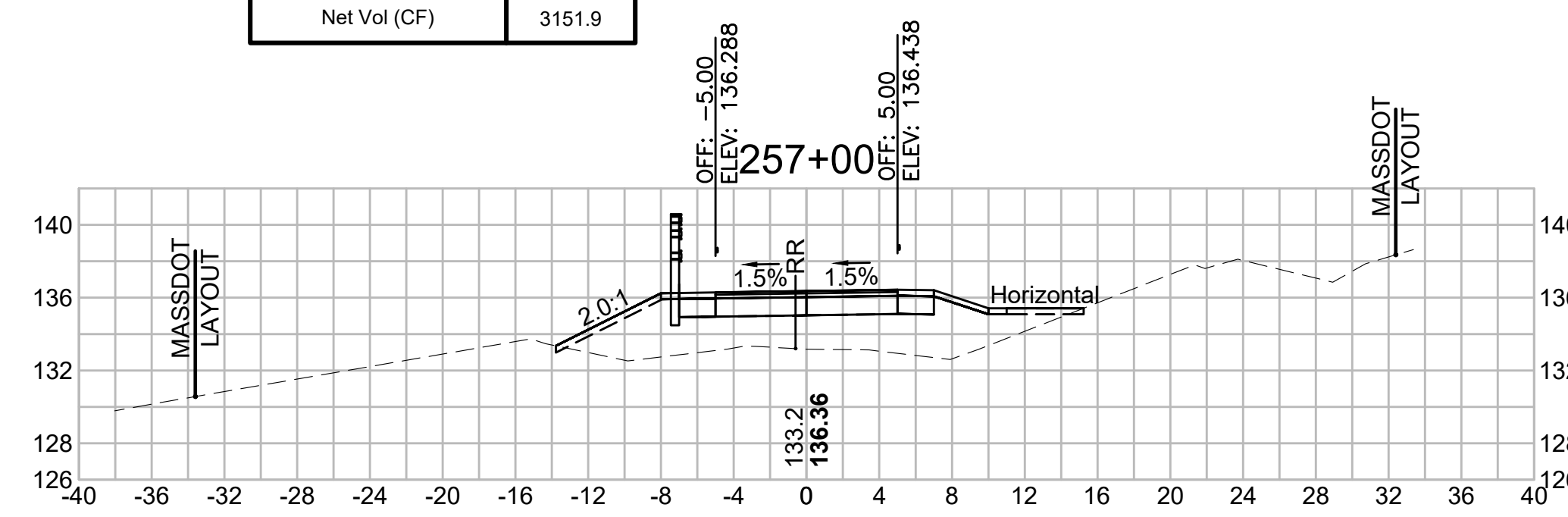
Total Volume at Station 259+00.00	
Cut Area (SF)	7.382
Fill Area (SF)	4.819
Cut Vol (CF)	10.1
Fill Vol (CF)	8.7
Cum Cut Vol (CF)	10294.3
Cum Fill Vol (CF)	7295.2
Net Vol (CF)	2999.1



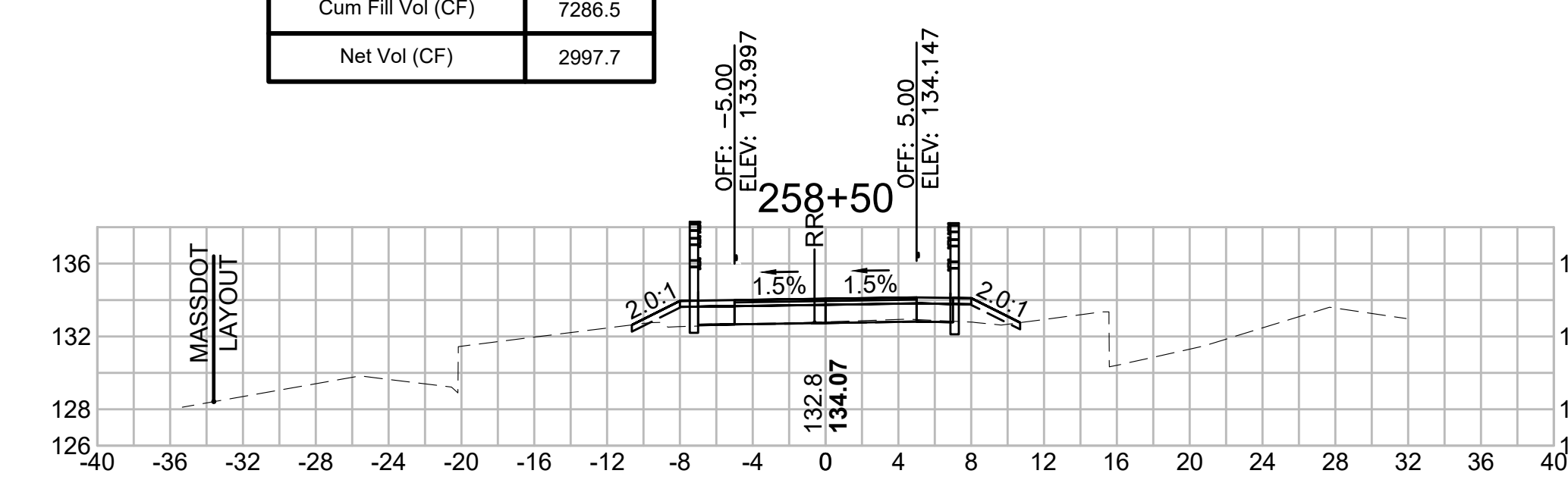
Total Volume at Station 255+50.00	
Cut Area (SF)	0.214
Fill Area (SF)	107.144
Cut Vol (CF)	0.4
Fill Vol (CF)	207.3
Cum Cut Vol (CF)	10264.9
Cum Fill Vol (CF)	6671.4
Net Vol (CF)	3593.4



Total Volume at Station 257+00.00	
Cut Area (SF)	0.235
Fill Area (SF)	51.223
Cut Vol (CF)	0.4
Fill Vol (CF)	113.5
Cum Cut Vol (CF)	10266.2
Cum Fill Vol (CF)	7114.2
Net Vol (CF)	3151.9



Total Volume at Station 258+50.00	
Cut Area (SF)	3.525
Fill Area (SF)	4.560
Cut Vol (CF)	9.1
Fill Vol (CF)	22.3
Cum Cut Vol (CF)	10284.2
Cum Fill Vol (CF)	7286.5
Net Vol (CF)	2997.7



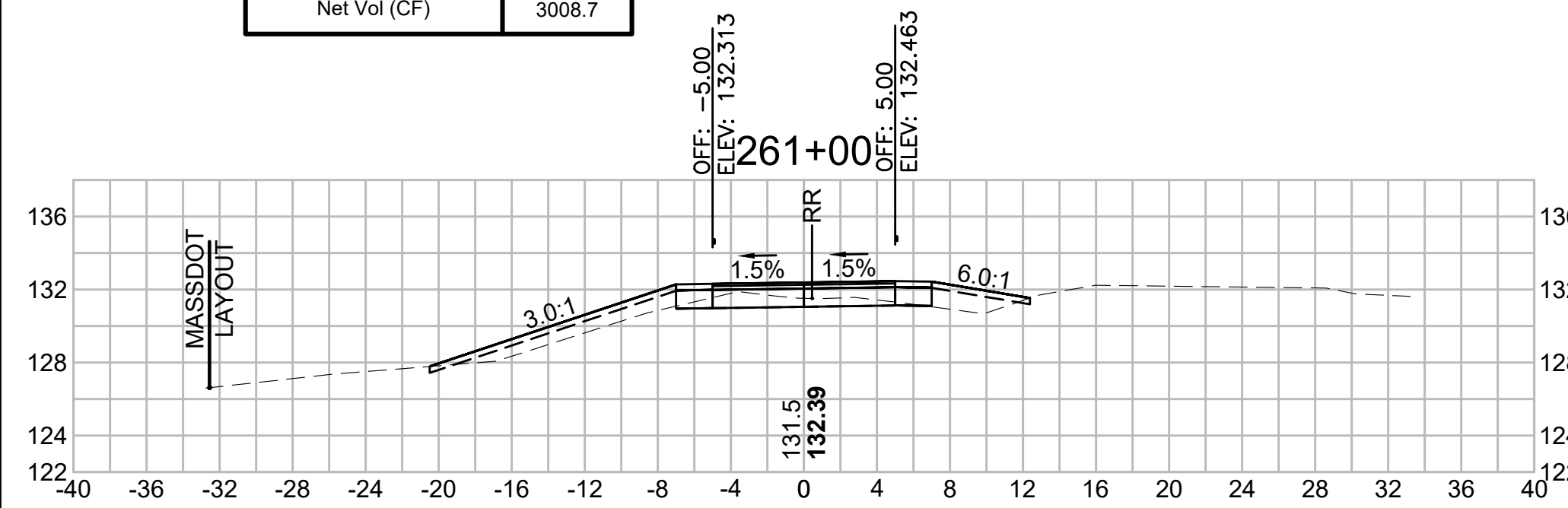
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	281	318

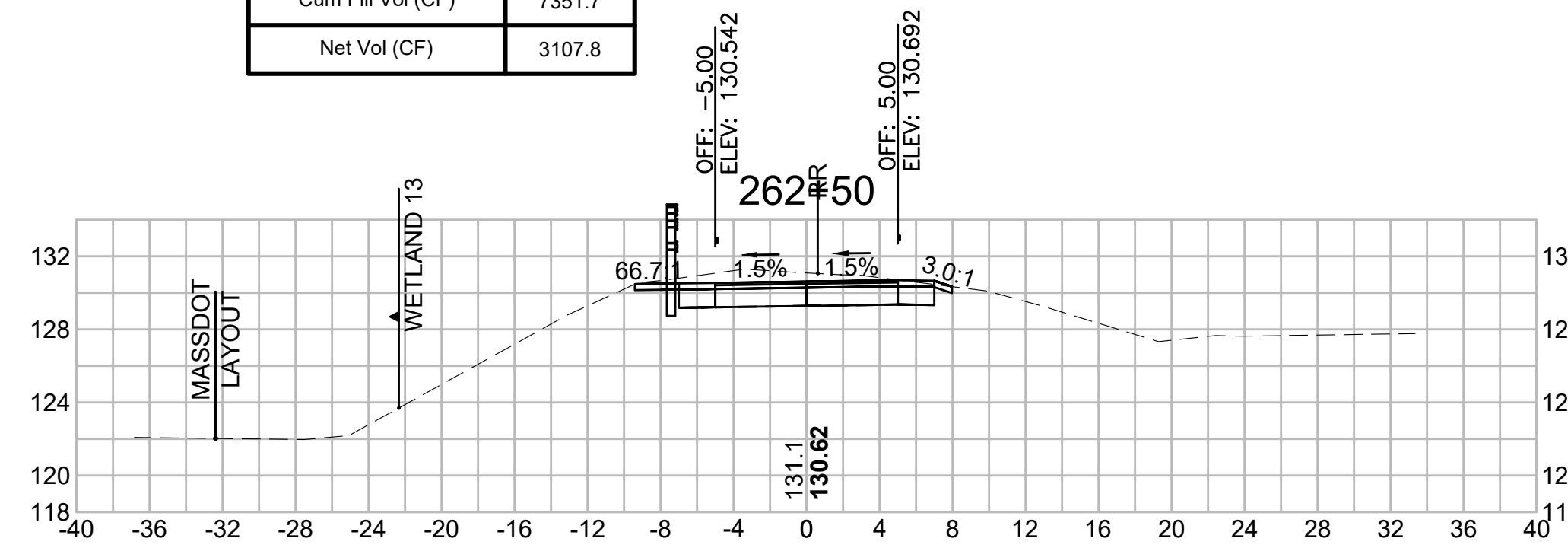
PROJECT FILE NO. 608164

CROSS SECTIONS

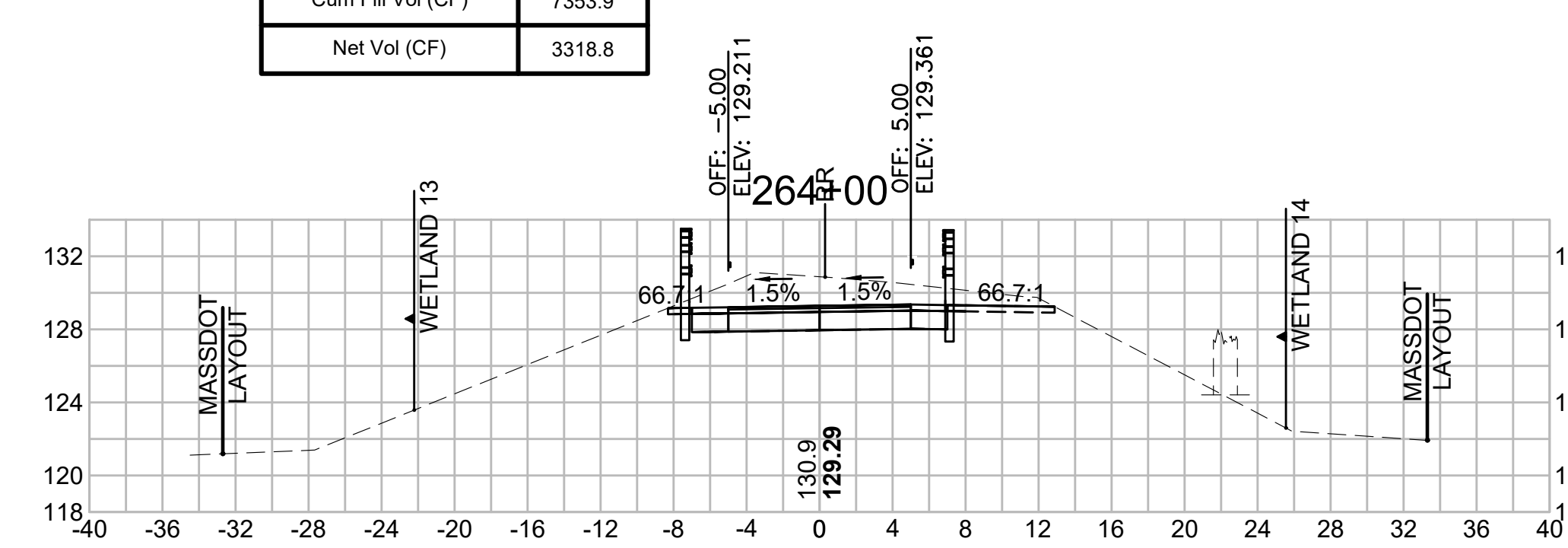
Total Volume at Station 261+00.00	
Cut Area (SF)	6.614
Fill Area (SF)	10.801
Cut Vol (CF)	11.9
Fill Vol (CF)	16.6
Cum Cut Vol (CF)	10343.4
Cum Fill Vol (CF)	7334.7
Net Vol (CF)	3008.7



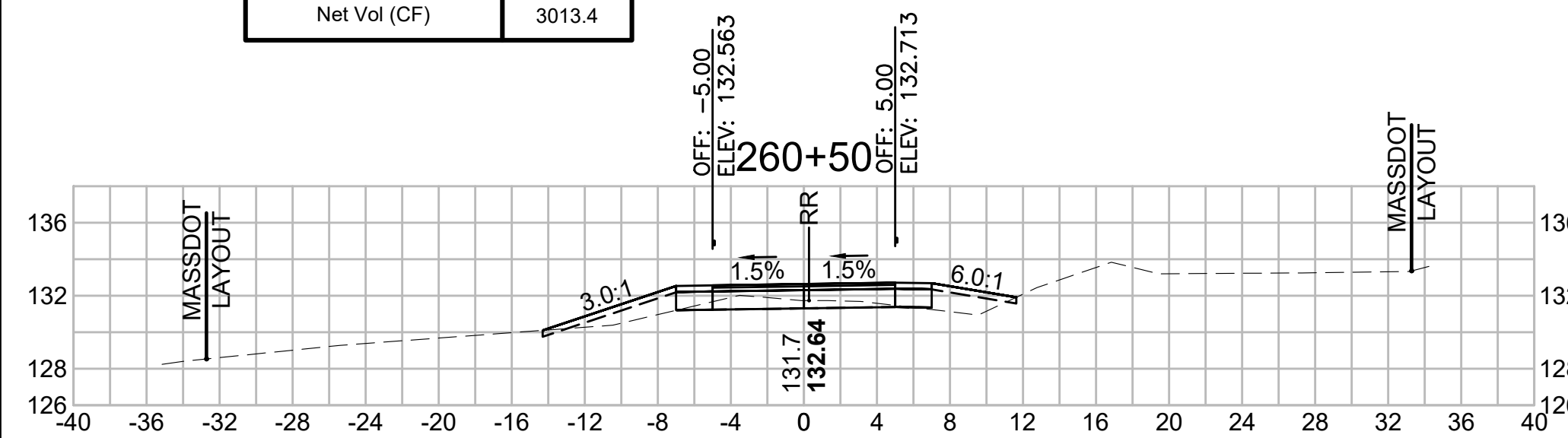
Total Volume at Station 262+50.00	
Cut Area (SF)	37.196
Fill Area (SF)	0.000
Cut Vol (CF)	60.5
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	10459.4
Cum Fill Vol (CF)	7351.7
Net Vol (CF)	3107.8



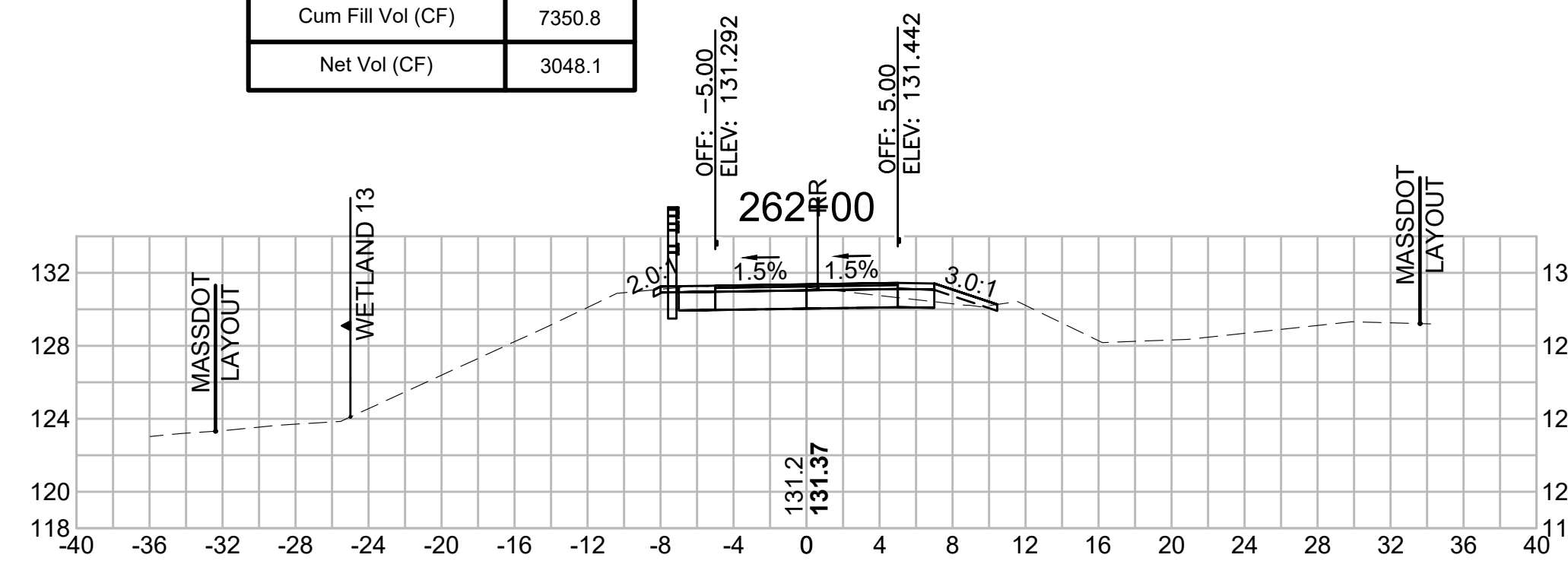
Total Volume at Station 264+00.00	
Cut Area (SF)	44.515
Fill Area (SF)	2.241
Cut Vol (CF)	77.6
Fill Vol (CF)	2.1
Cum Cut Vol (CF)	10672.7
Cum Fill Vol (CF)	7353.9
Net Vol (CF)	3318.8



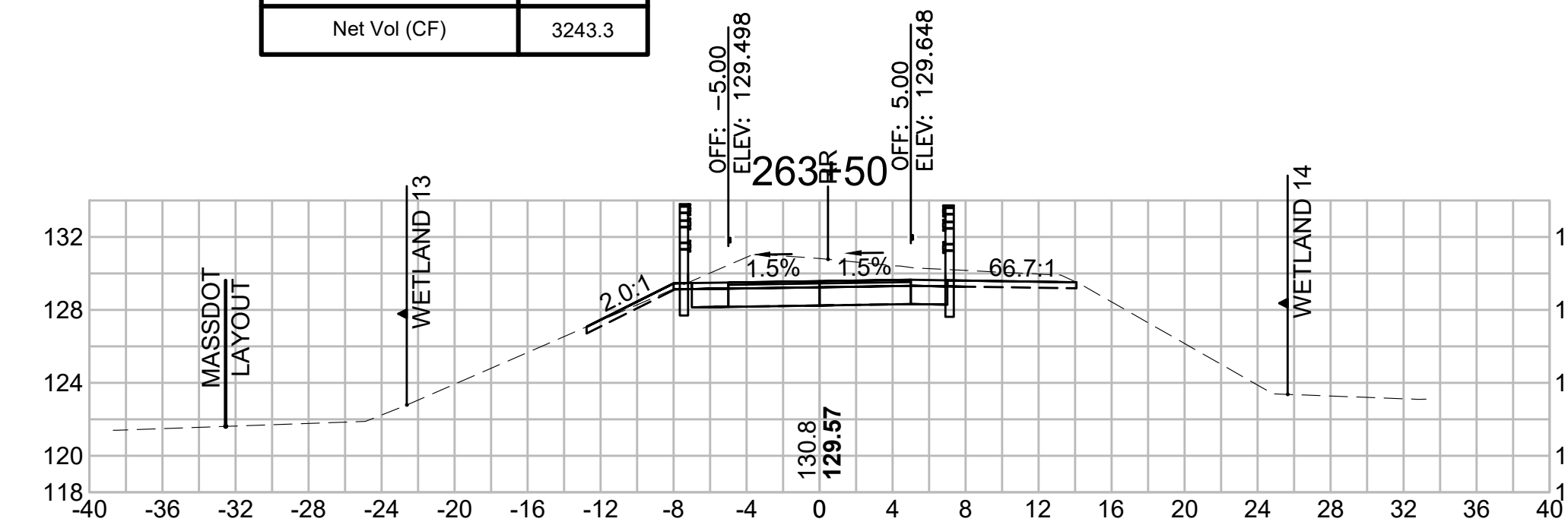
Total Volume at Station 260+50.00	
Cut Area (SF)	6.241
Fill Area (SF)	7.127
Cut Vol (CF)	12.8
Fill Vol (CF)	9.6
Cum Cut Vol (CF)	10331.5
Cum Fill Vol (CF)	7318.1
Net Vol (CF)	3013.4



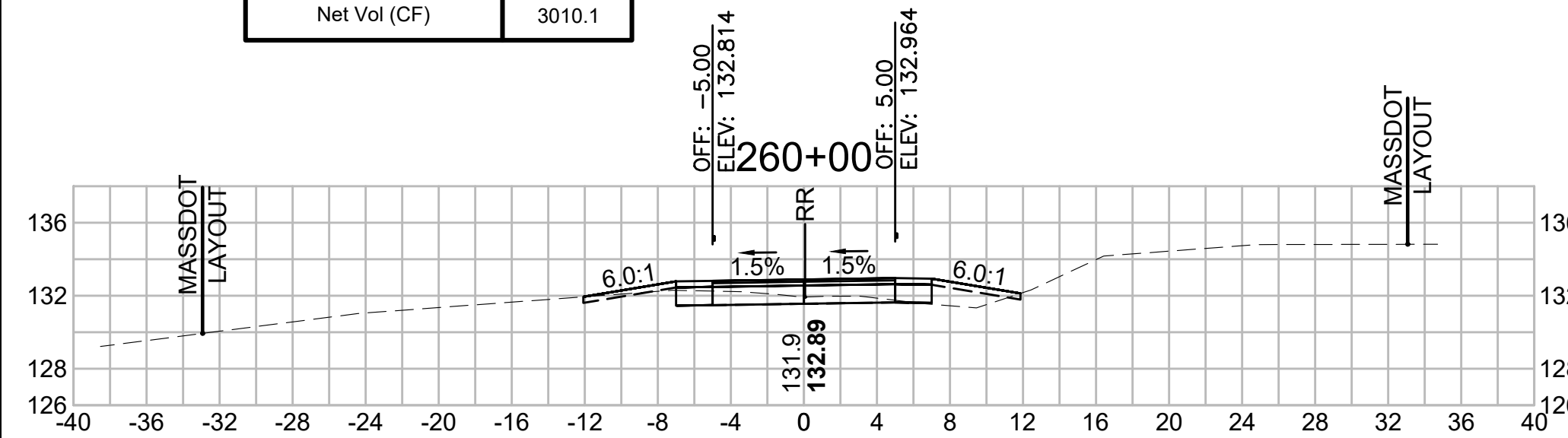
Total Volume at Station 262+00.00	
Cut Area (SF)	28.173
Fill Area (SF)	0.932
Cut Vol (CF)	37.7
Fill Vol (CF)	3.5
Cum Cut Vol (CF)	10398.9
Cum Fill Vol (CF)	7350.8
Net Vol (CF)	3048.1



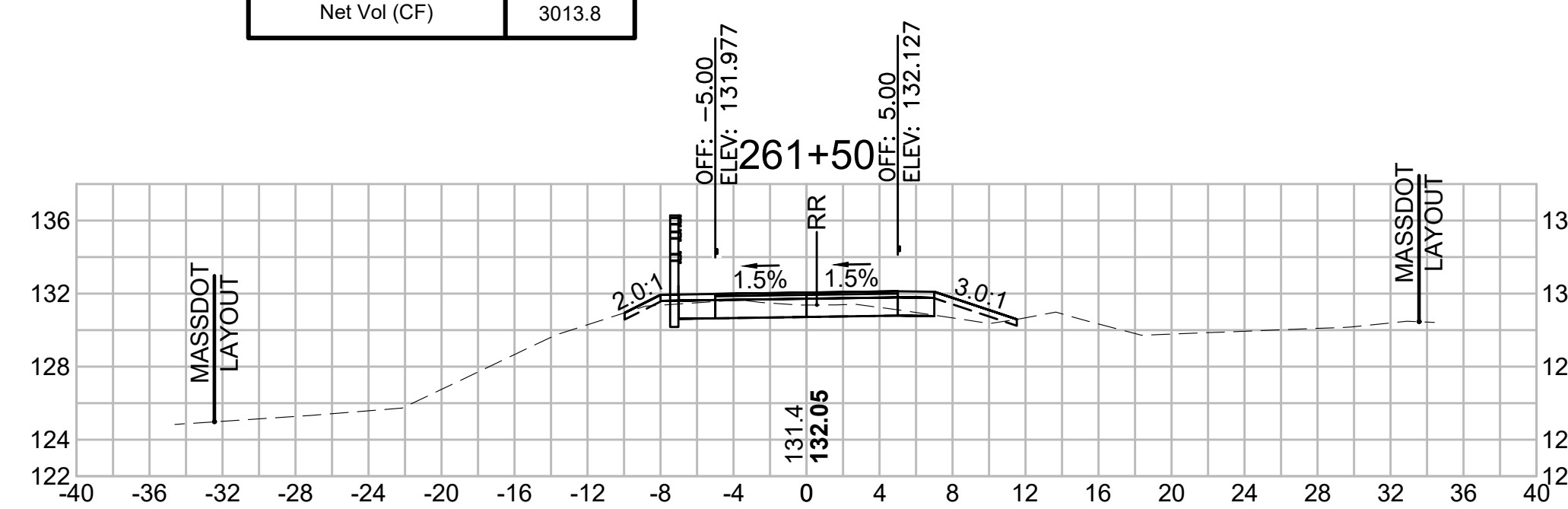
Total Volume at Station 263+50.00	
Cut Area (SF)	39.330
Fill Area (SF)	0.000
Cut Vol (CF)	68.8
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	10595.0
Cum Fill Vol (CF)	7351.8
Net Vol (CF)	3243.3



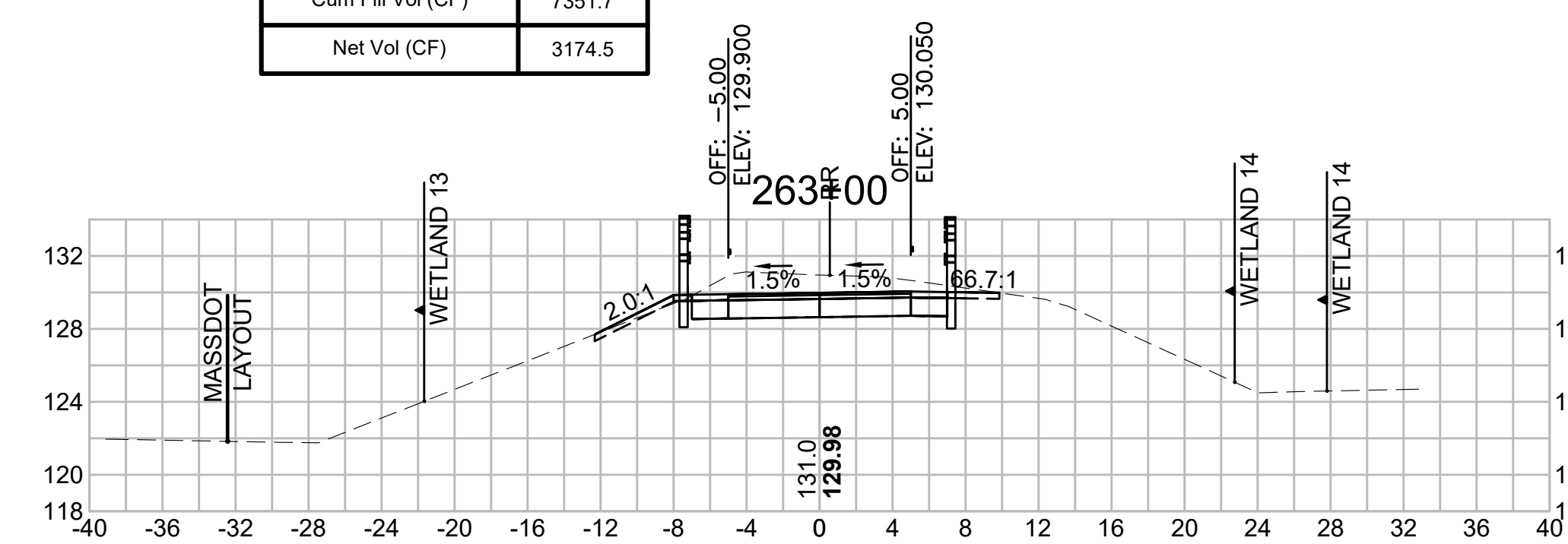
Total Volume at Station 260+00.00	
Cut Area (SF)	7.630
Fill Area (SF)	3.238
Cut Vol (CF)	12.3
Fill Vol (CF)	5.9
Cum Cut Vol (CF)	10318.6
Cum Fill Vol (CF)	7308.5
Net Vol (CF)	3010.1



Total Volume at Station 261+50.00	
Cut Area (SF)	12.596
Fill Area (SF)	2.817
Cut Vol (CF)	17.8
Fill Vol (CF)	12.6
Cum Cut Vol (CF)	10361.2
Cum Fill Vol (CF)	7347.3
Net Vol (CF)	3013.8



Total Volume at Station 263+00.00	
Cut Area (SF)	34.961
Fill Area (SF)	0.066
Cut Vol (CF)	66.8
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	10526.3
Cum Fill Vol (CF)	7351.7
Net Vol (CF)	3174.5



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	282	318

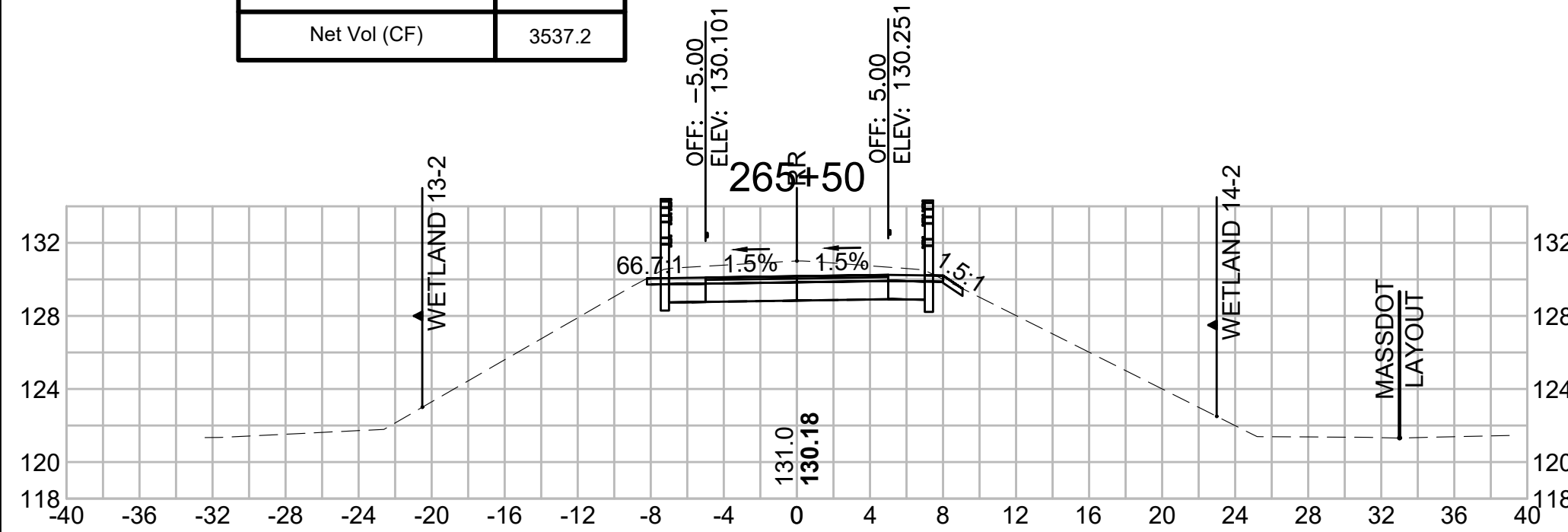
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

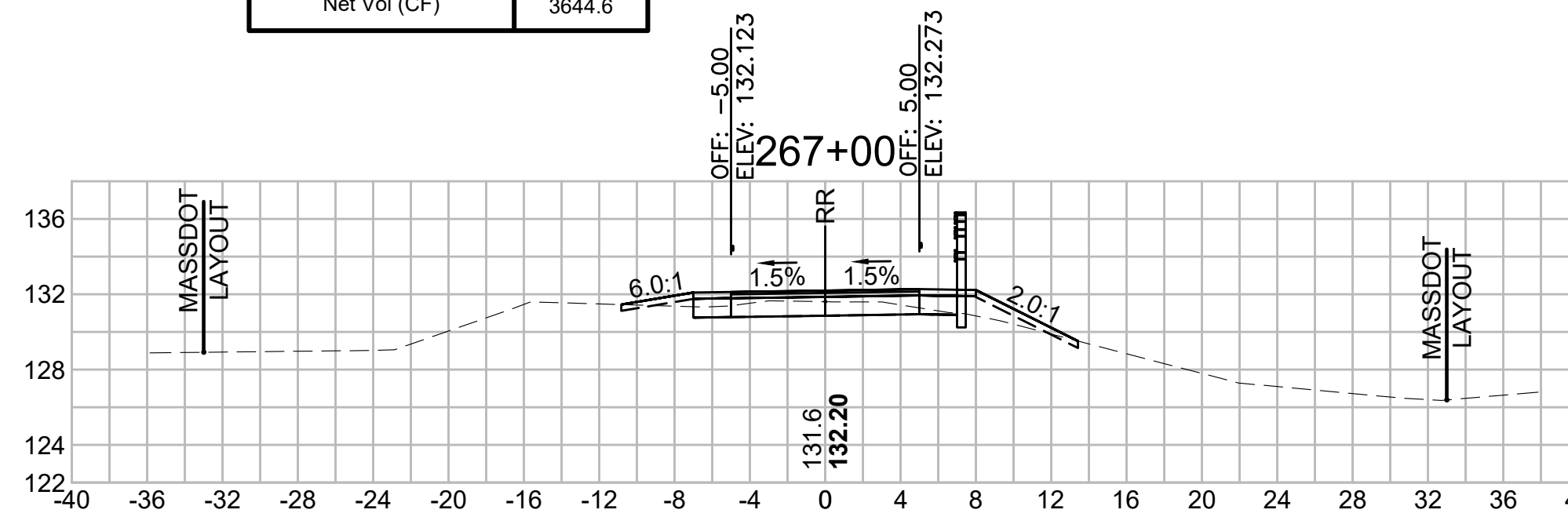
Total Volume at Station 265+50.00

Cut Area (SF)	28.952
Fill Area (SF)	0.000
Cut Vol (CF)	61.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	10894.5
Cum Fill Vol (CF)	7357.3
Net Vol (CF)	3537.2



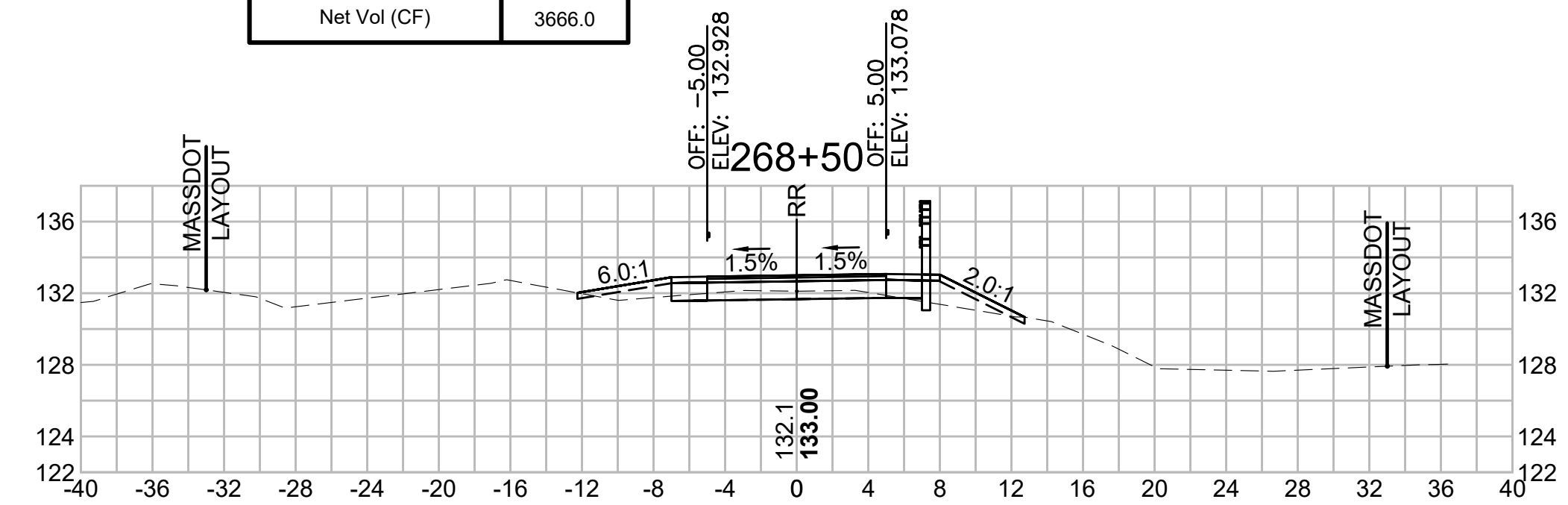
Total Volume at Station 267+00.00

Cut Area (SF)	9.549
Fill Area (SF)	3.254
Cut Vol (CF)	26.9
Fill Vol (CF)	4.9
Cum Cut Vol (CF)	11008.8
Cum Fill Vol (CF)	7364.2
Net Vol (CF)	3644.6



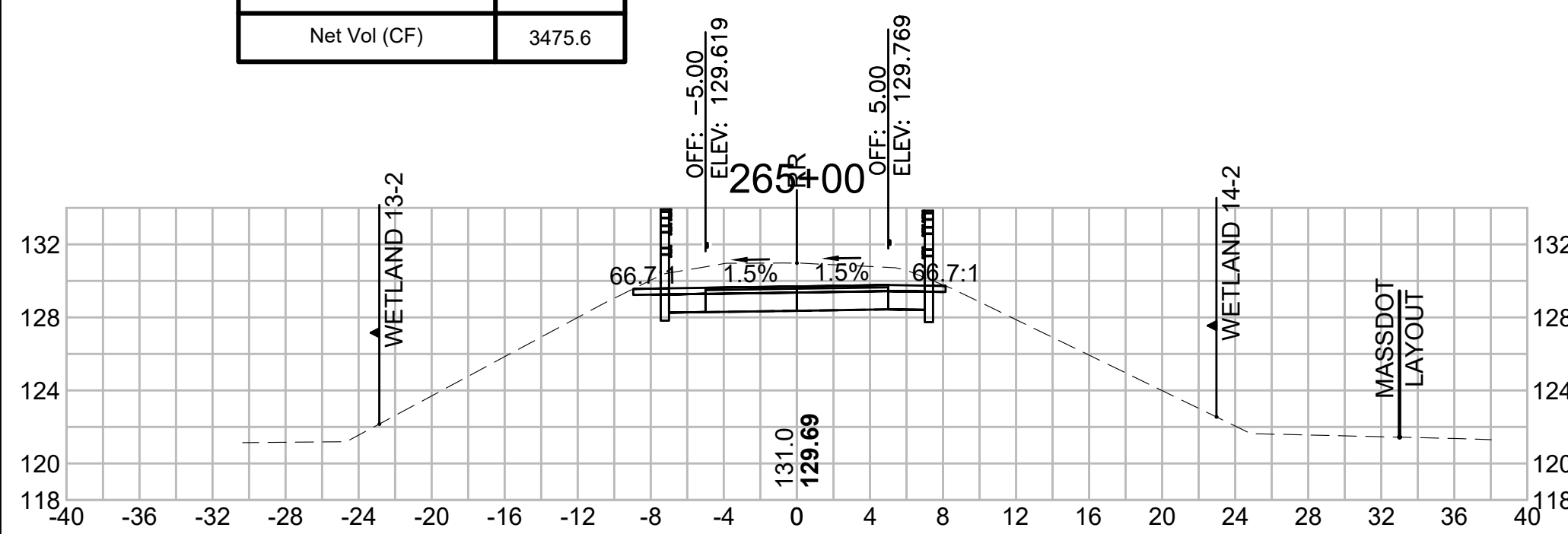
Total Volume at Station 268+50.00

Cut Area (SF)	5.393
Fill Area (SF)	5.881
Cut Vol (CF)	12.6
Fill Vol (CF)	8.7
Cum Cut Vol (CF)	11052.7
Cum Fill Vol (CF)	7386.6
Net Vol (CF)	3666.0



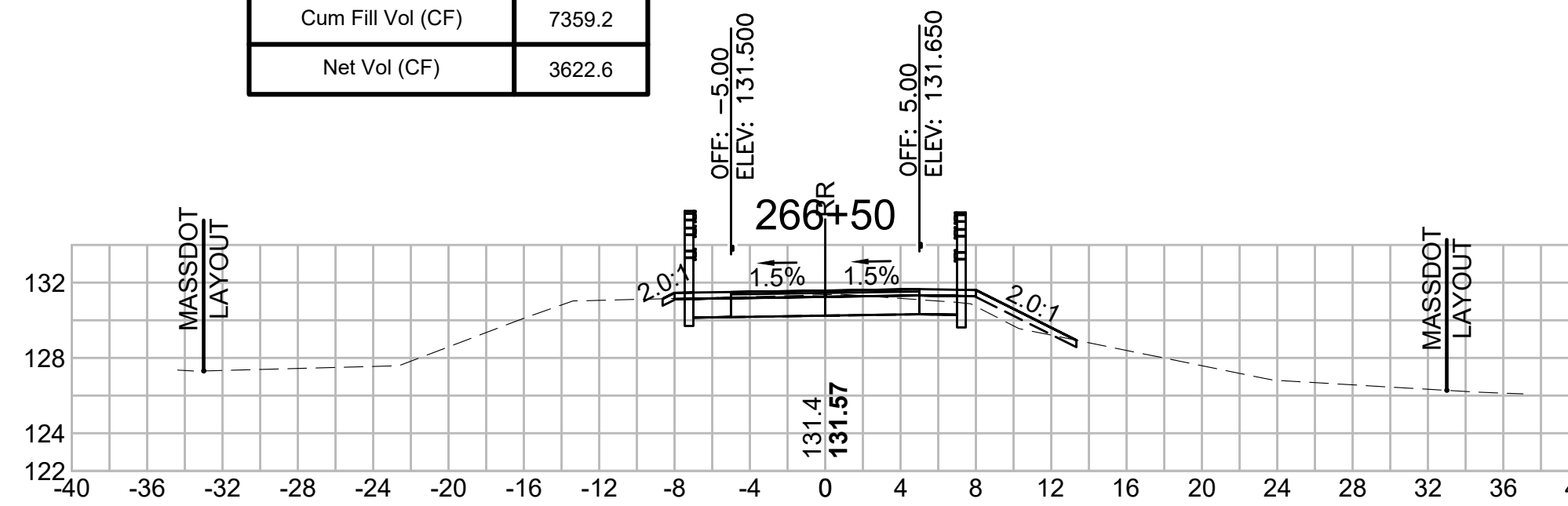
Total Volume at Station 265+00.00

Cut Area (SF)	37.581
Fill Area (SF)	0.000
Cut Vol (CF)	76.9
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	10832.9
Cum Fill Vol (CF)	7357.3
Net Vol (CF)	3475.6



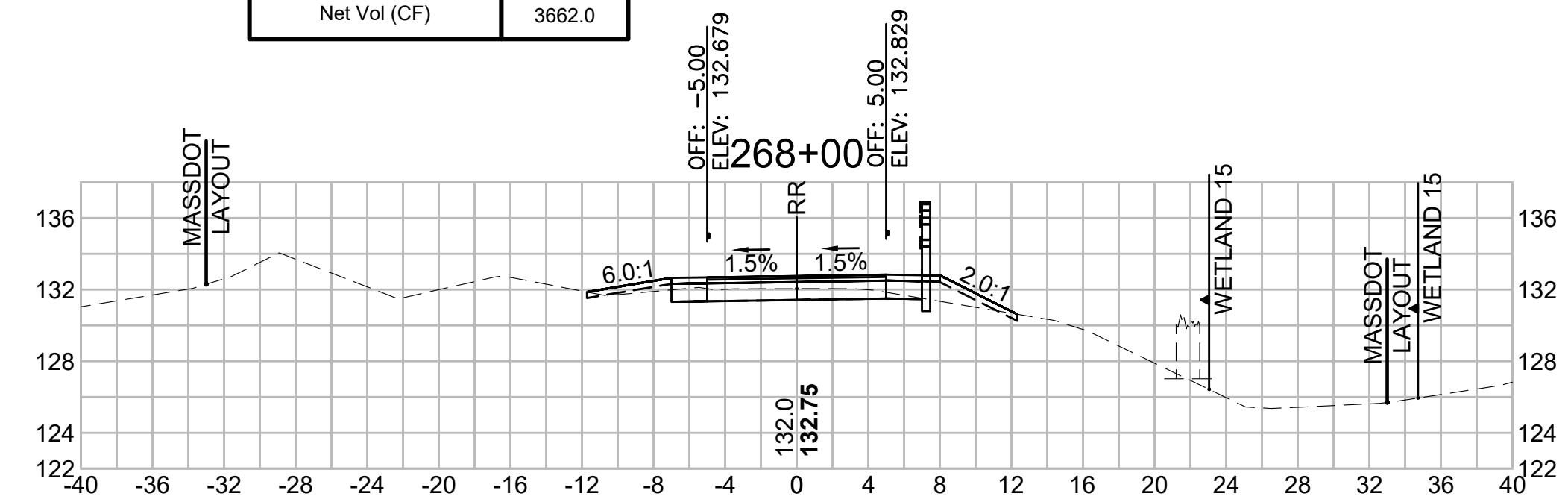
Total Volume at Station 266+50.00

Cut Area (SF)	19.498
Fill Area (SF)	2.079
Cut Vol (CF)	39.3
Fill Vol (CF)	1.9
Cum Cut Vol (CF)	10981.9
Cum Fill Vol (CF)	7359.2
Net Vol (CF)	3622.6



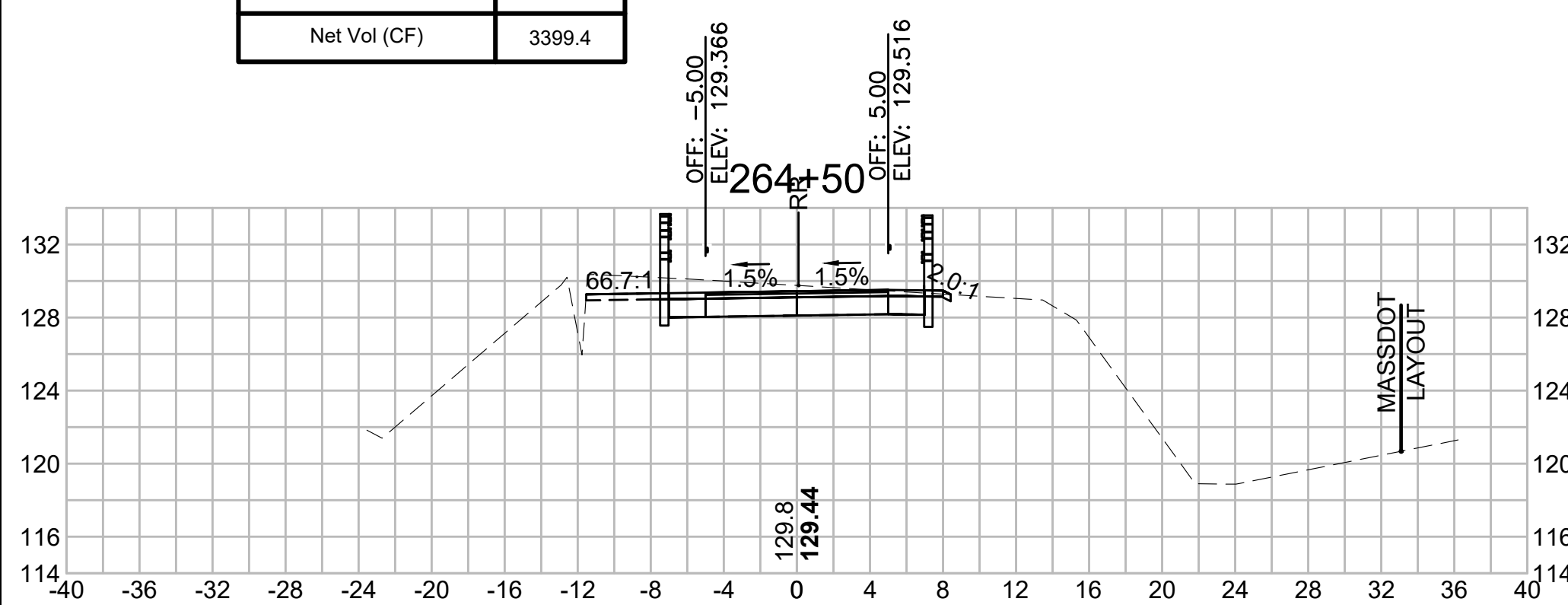
Total Volume at Station 268+00.00

Cut Area (SF)	8.250
Fill Area (SF)	3.461
Cut Vol (CF)	15.0
Fill Vol (CF)	7.0
Cum Cut Vol (CF)	11040.0
Cum Fill Vol (CF)	7378.0
Net Vol (CF)	3662.0



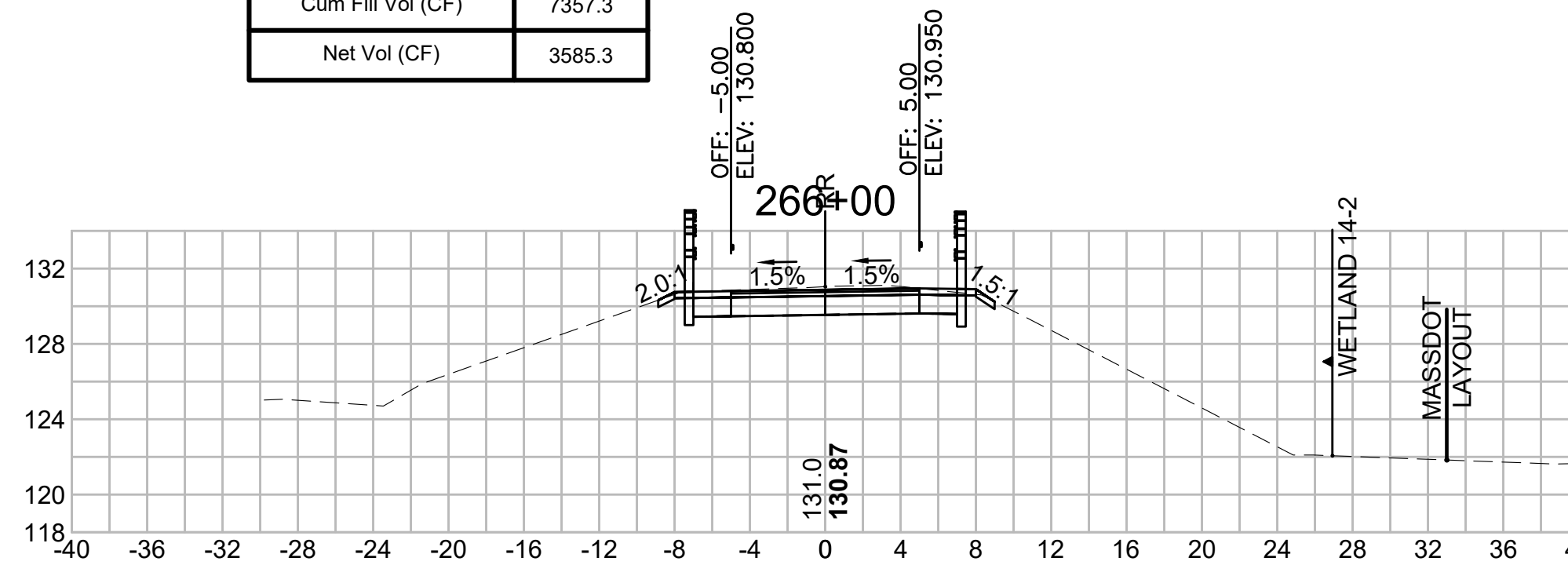
Total Volume at Station 264+50.00

Cut Area (SF)	45.493
Fill Area (SF)	0.745
Cut Vol (CF)	83.3
Fill Vol (CF)	2.8
Cum Cut Vol (CF)	10756.0
Cum Fill Vol (CF)	7356.6
Net Vol (CF)	3399.4



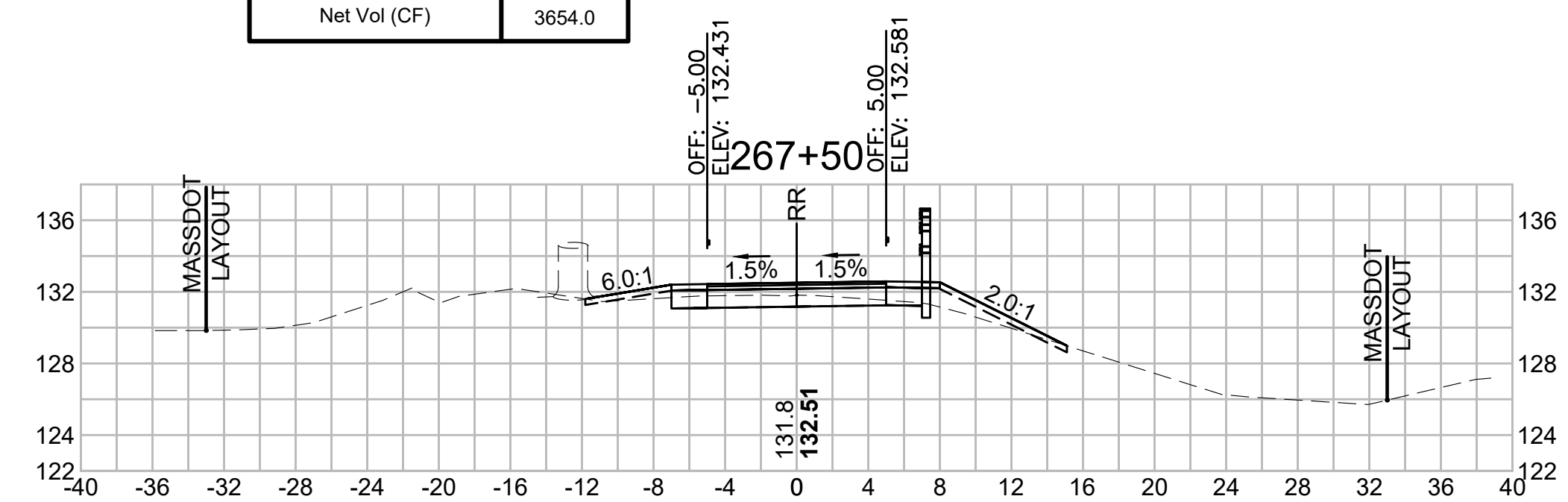
Total Volume at Station 266+00.00

Cut Area (SF)	22.934
Fill Area (SF)	0.000
Cut Vol (CF)	48.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	10942.6
Cum Fill Vol (CF)	7357.3
Net Vol (CF)	3585.3



Total Volume at Station 267+50.00

Cut Area (SF)	7.984
Fill Area (SF)	4.106
Cut Vol (CF)	16.2
Fill Vol (CF)	6.8
Cum Cut Vol (CF)	11025.0
Cum Fill Vol (CF)	7371.0
Net Vol (CF)	3654.0



SUDBURY
BRUCE FREEMAN RAIL TRAIL

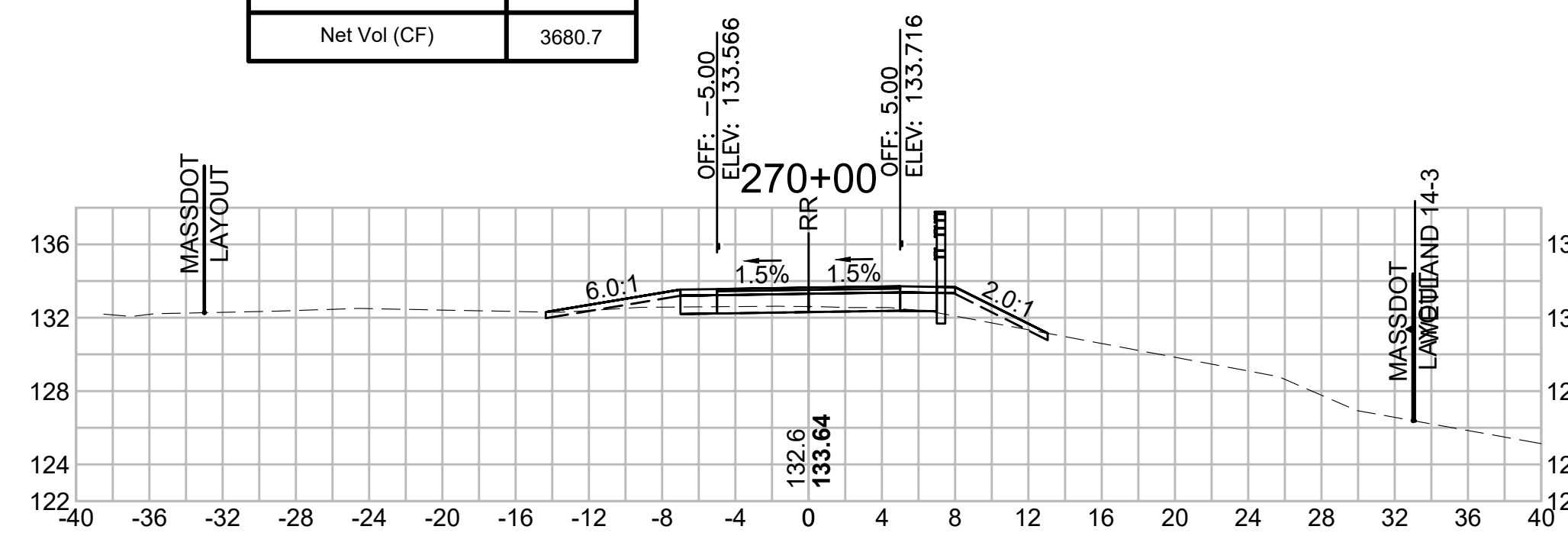
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	283	318

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

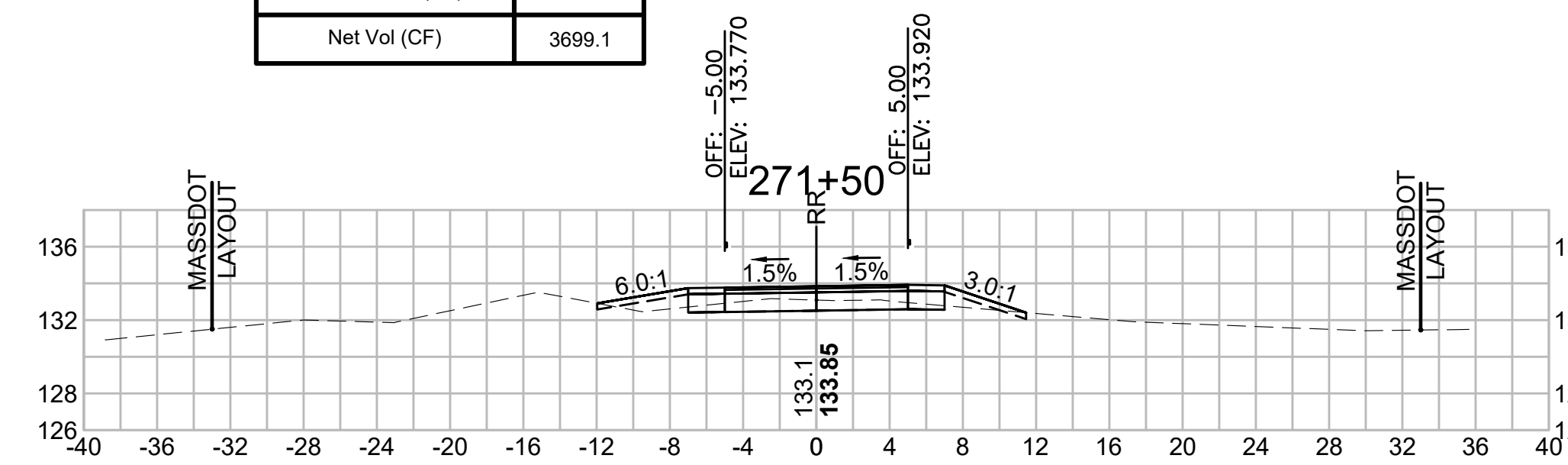
Total Volume at Station 270+00.00

Cut Area (SF)	13.731
Fill Area (SF)	4.831
Cut Vol (CF)	21.4
Fill Vol (CF)	12.3
Cum Cut Vol (CF)	11101.2
Cum Fill Vol (CF)	7420.5
Net Vol (CF)	3680.7



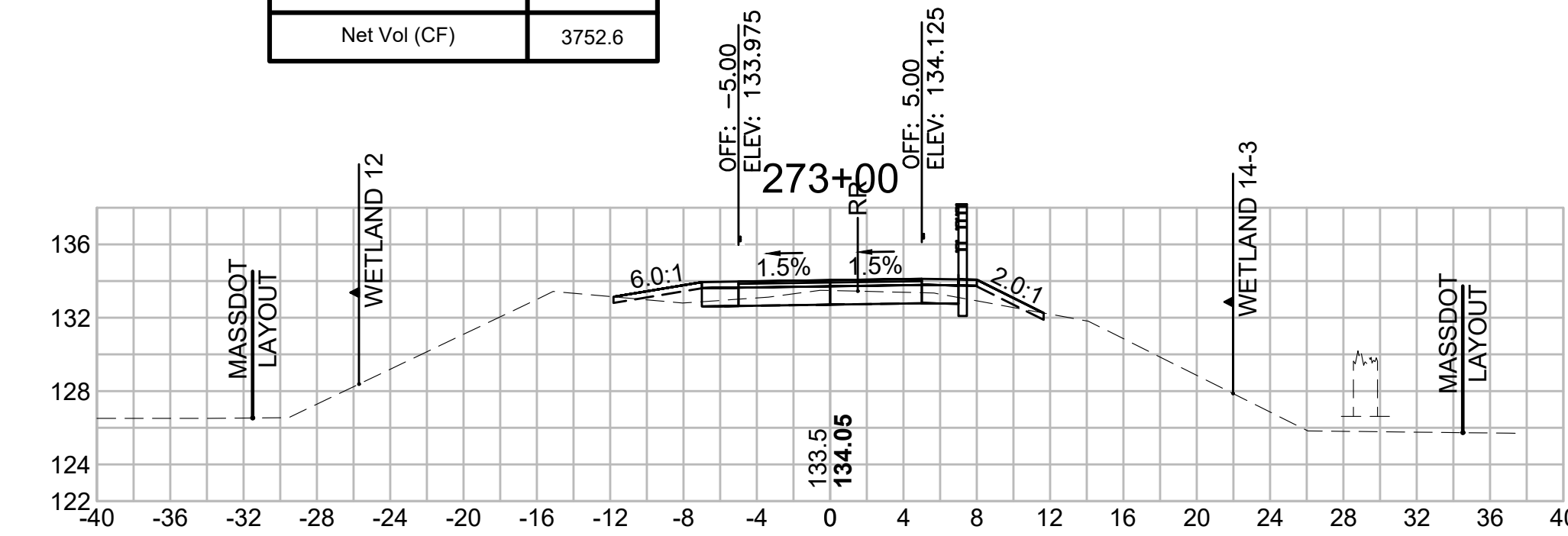
Total Volume at Station 271+50.00

Cut Area (SF)	15.888
Fill Area (SF)	3.101
Cut Vol (CF)	19.2
Fill Vol (CF)	10.0
Cum Cut Vol (CF)	11150.2
Cum Fill Vol (CF)	7451.1
Net Vol (CF)	3699.1



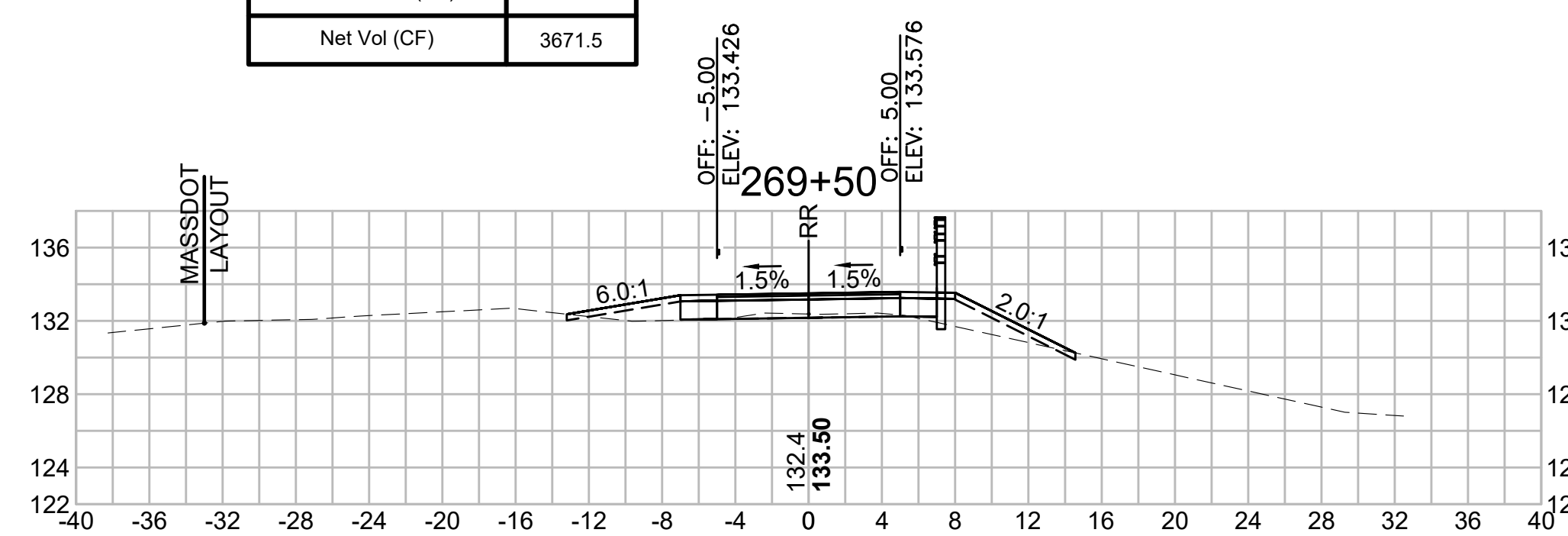
Total Volume at Station 273+00.00

Cut Area (SF)	8.276
Fill Area (SF)	3.215
Cut Vol (CF)	16.3
Fill Vol (CF)	8.6
Cum Cut Vol (CF)	11227.8
Cum Fill Vol (CF)	7475.2
Net Vol (CF)	3752.6



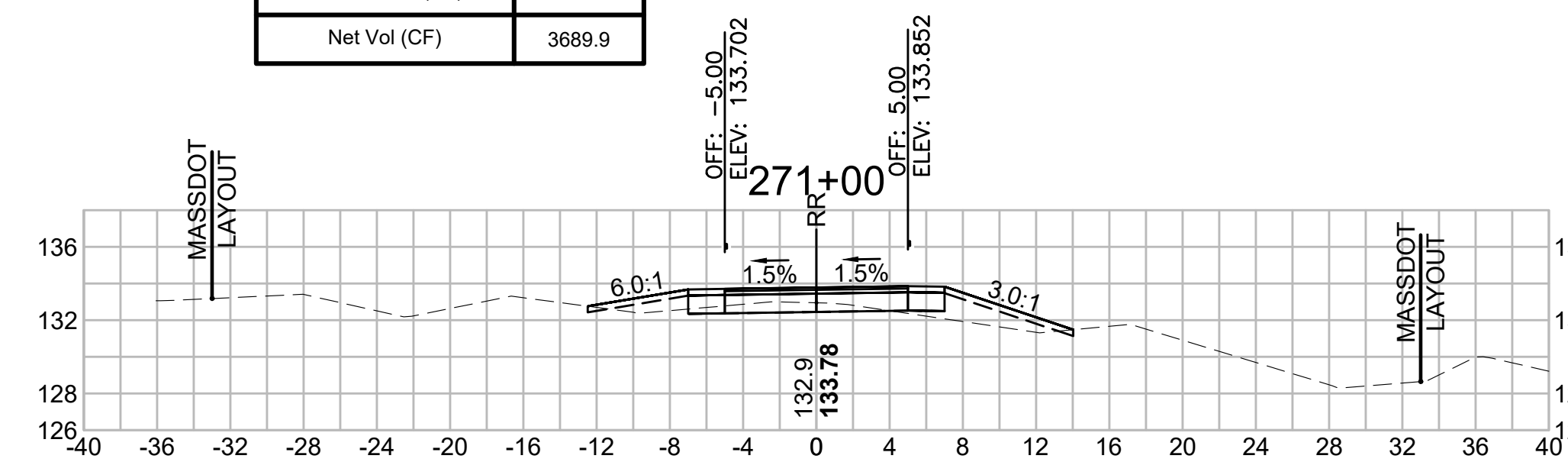
Total Volume at Station 269+50.00

Cut Area (SF)	9.431
Fill Area (SF)	8.445
Cut Vol (CF)	15.4
Fill Vol (CF)	12.0
Cum Cut Vol (CF)	11079.7
Cum Fill Vol (CF)	7408.2
Net Vol (CF)	3671.5



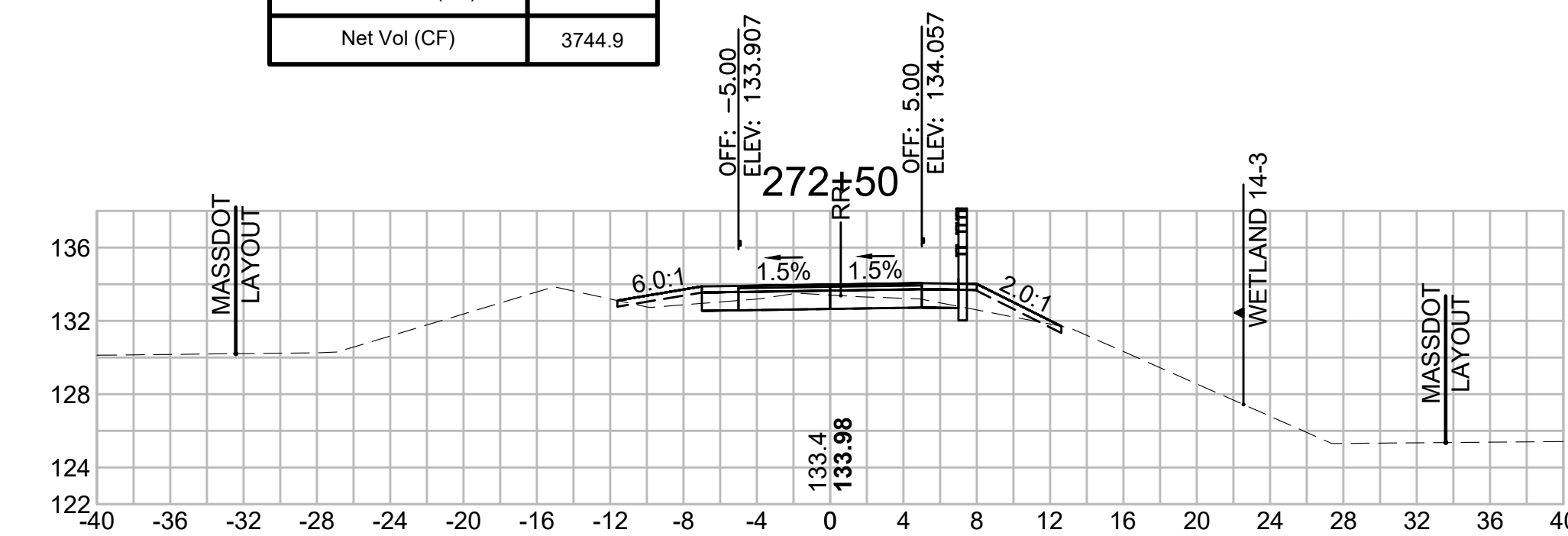
Total Volume at Station 271+00.00

Cut Area (SF)	4.887
Fill Area (SF)	7.726
Cut Vol (CF)	10.8
Fill Vol (CF)	11.6
Cum Cut Vol (CF)	11131.0
Cum Fill Vol (CF)	7441.1
Net Vol (CF)	3689.9



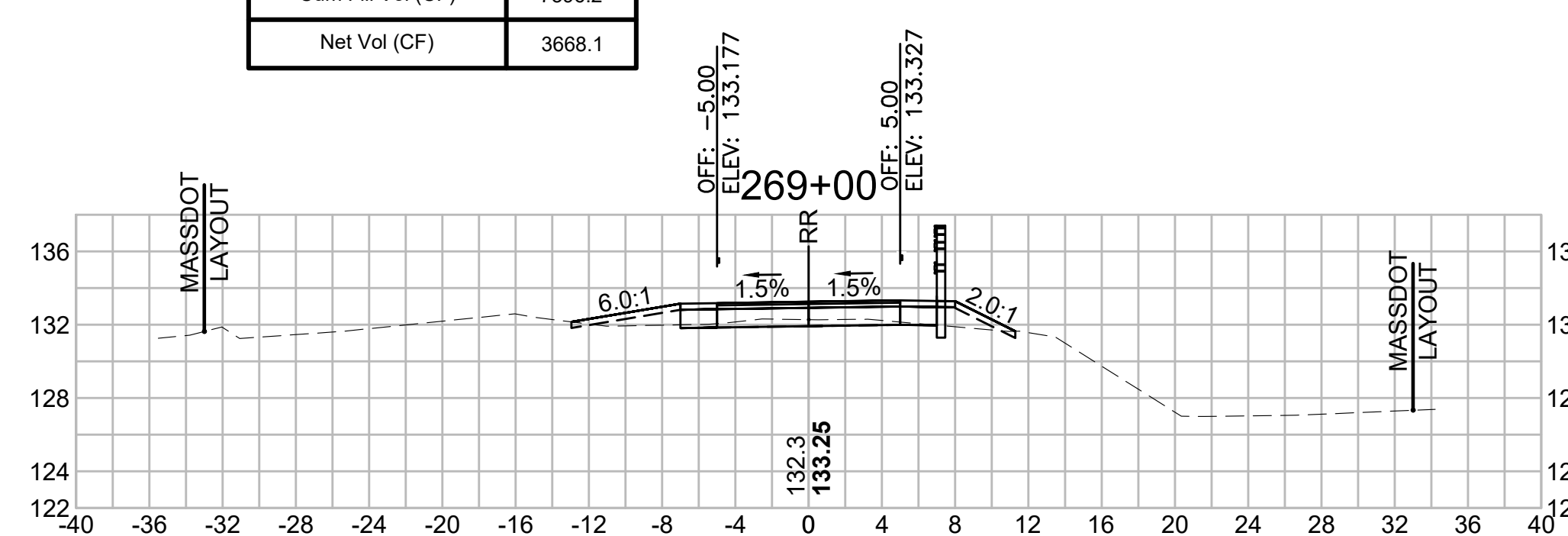
Total Volume at Station 272+50.00

Cut Area (SF)	9.303
Fill Area (SF)	6.077
Cut Vol (CF)	27.6
Fill Vol (CF)	9.1
Cum Cut Vol (CF)	11211.5
Cum Fill Vol (CF)	7466.6
Net Vol (CF)	3744.9



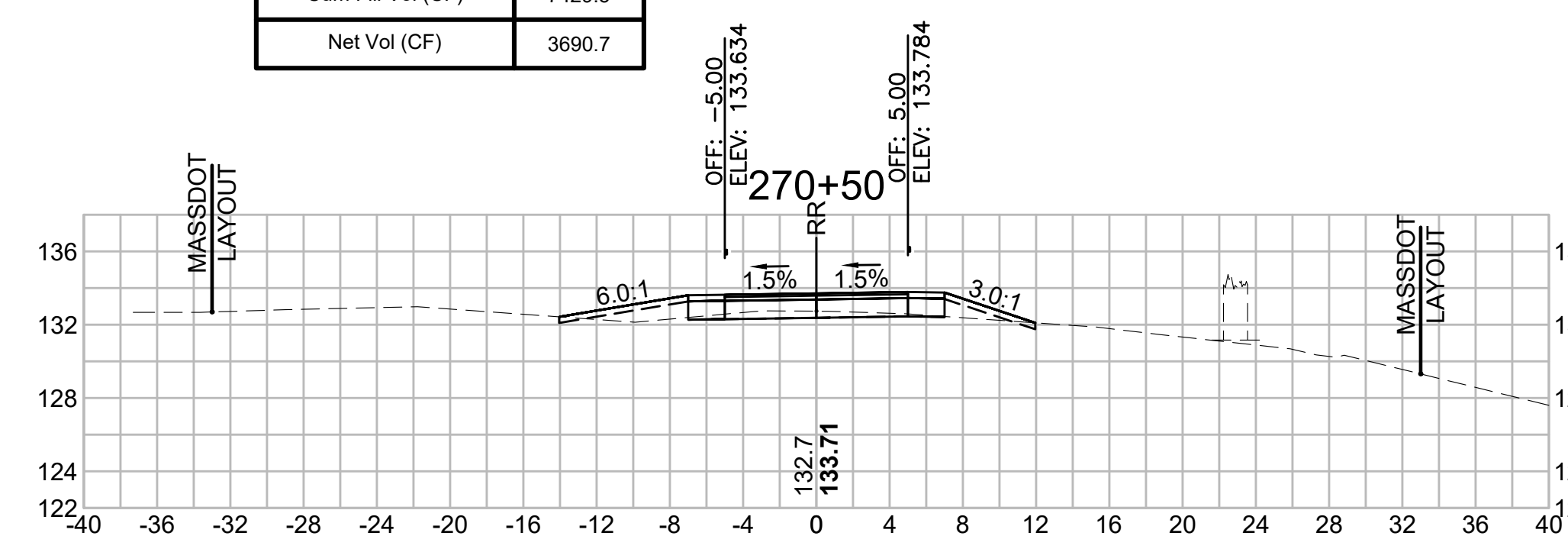
Total Volume at Station 269+00.00

Cut Area (SF)	7.207
Fill Area (SF)	4.489
Cut Vol (CF)	11.7
Fill Vol (CF)	9.6
Cum Cut Vol (CF)	11064.3
Cum Fill Vol (CF)	7396.2
Net Vol (CF)	3668.1



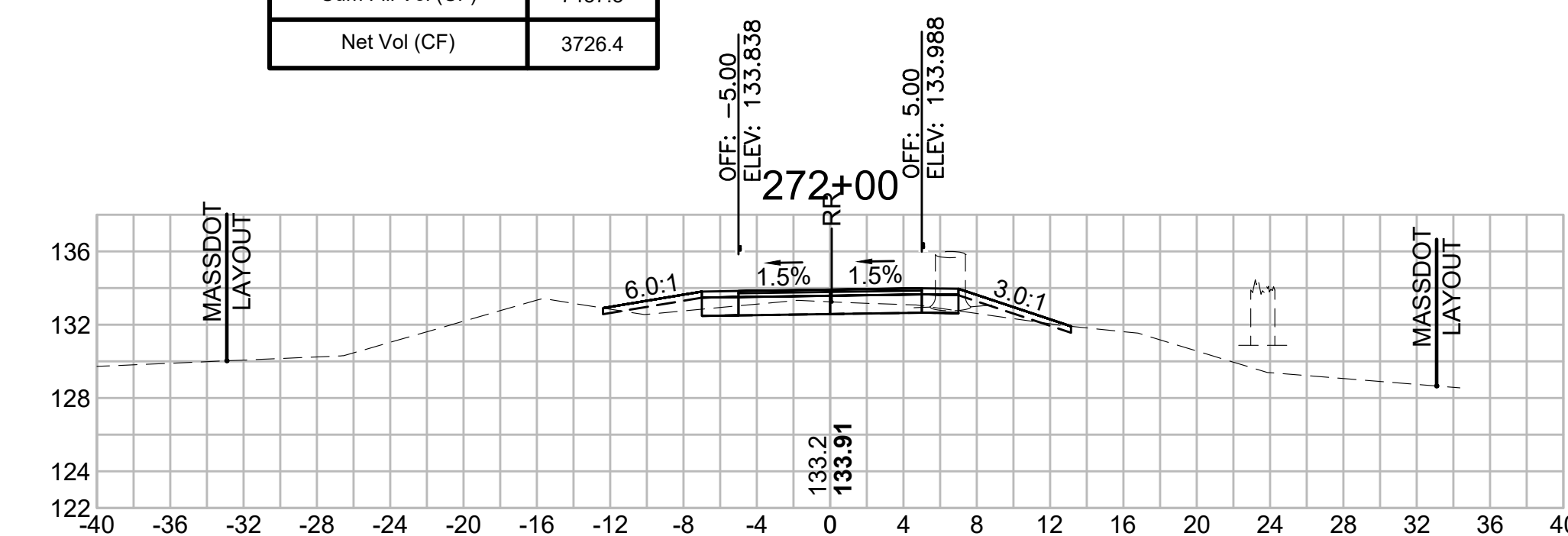
Total Volume at Station 270+50.00

Cut Area (SF)	6.768
Fill Area (SF)	4.837
Cut Vol (CF)	19.0
Fill Vol (CF)	9.0
Cum Cut Vol (CF)	11120.2
Cum Fill Vol (CF)	7429.5
Net Vol (CF)	3690.7



Total Volume at Station 272+00.00

Cut Area (SF)	20.499
Fill Area (SF)	3.749
Cut Vol (CF)	33.7
Fill Vol (CF)	6.3
Cum Cut Vol (CF)	11183.9
Cum Fill Vol (CF)	7457.5
Net Vol (CF)	3726.4

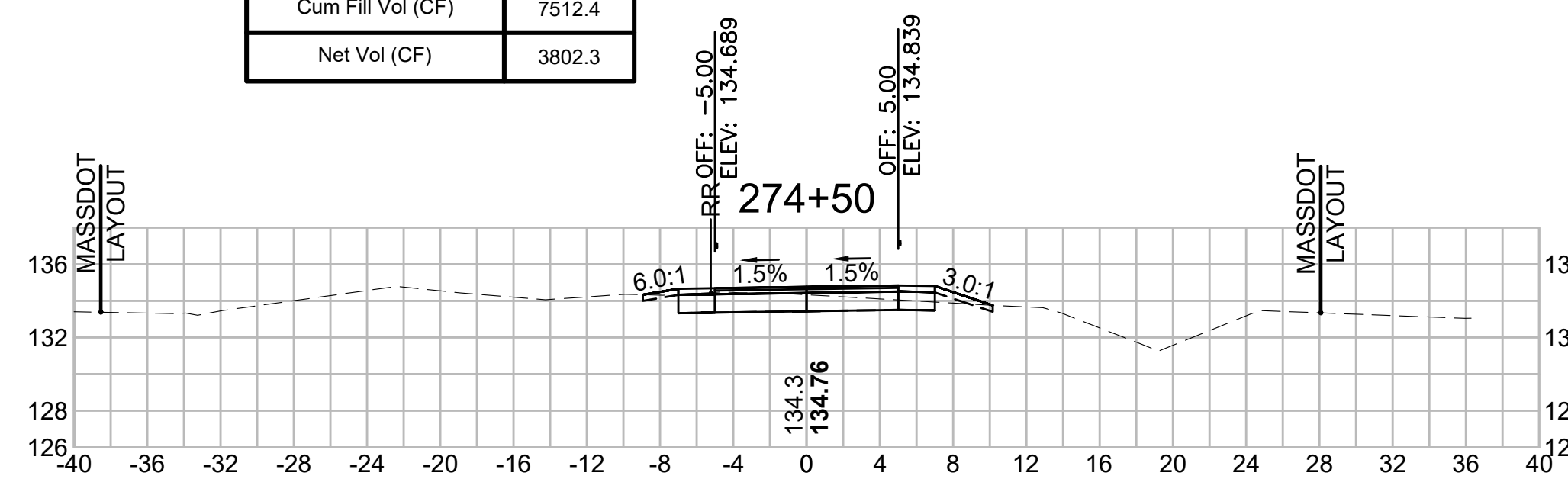


SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	284	318
PROJECT FILE NO. 608164			

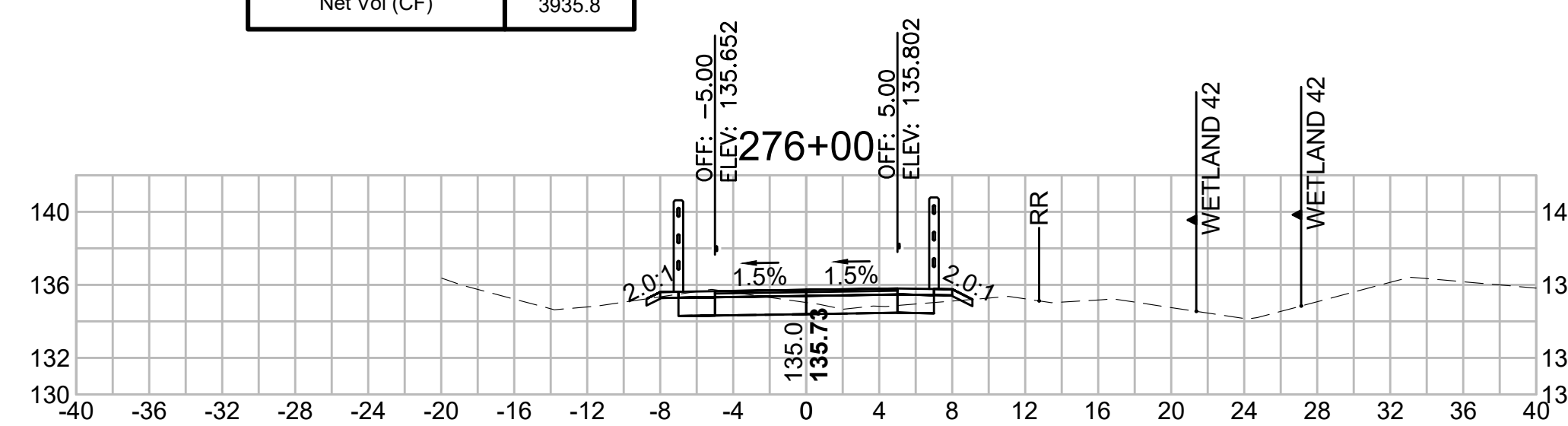
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

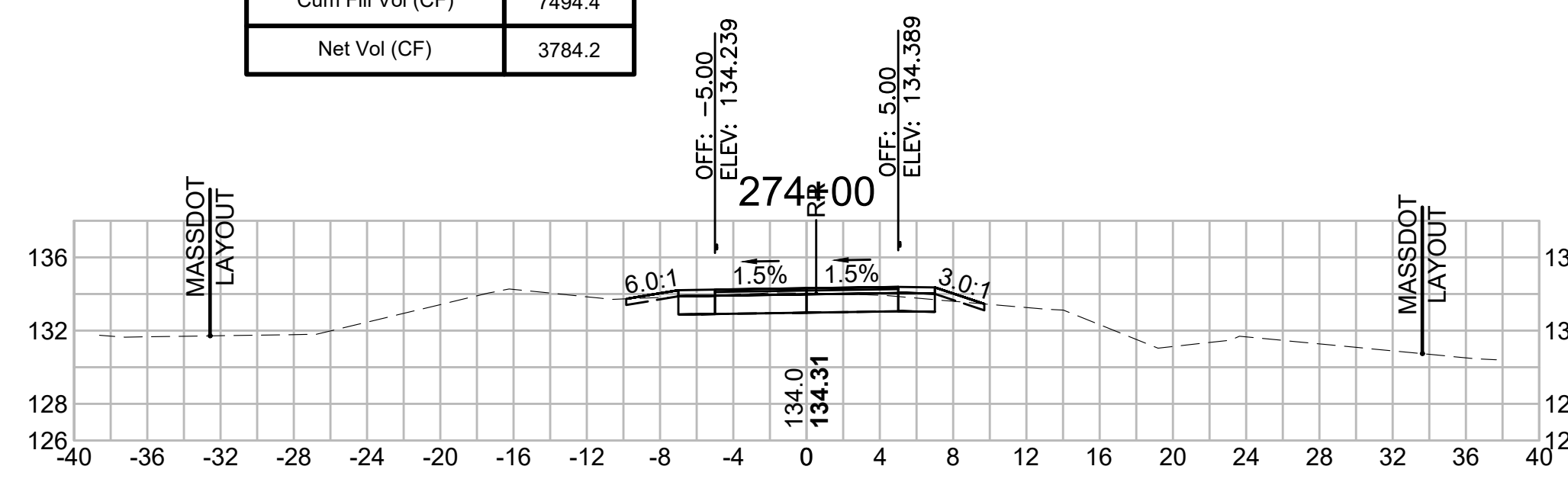
Total Volume at Station 274+50.00	
Cut Area (SF)	19.557
Fill Area (SF)	6.071
Cut Vol (CF)	36.1
Fill Vol (CF)	18.0
Cum Cut Vol (CF)	11314.7
Cum Fill Vol (CF)	7512.4
Net Vol (CF)	3802.3



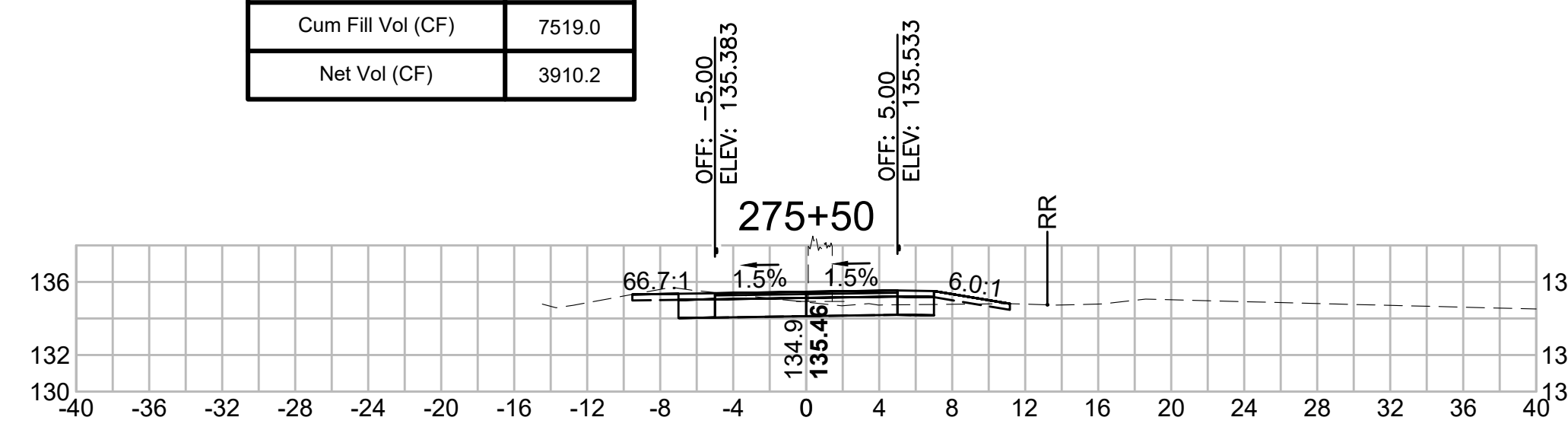
Total Volume at Station 276+00.00	
Cut Area (SF)	12.782
Fill Area (SF)	0.721
Cut Vol (CF)	27.2
Fill Vol (CF)	1.6
Cum Cut Vol (CF)	11456.3
Cum Fill Vol (CF)	7520.5
Net Vol (CF)	3935.8



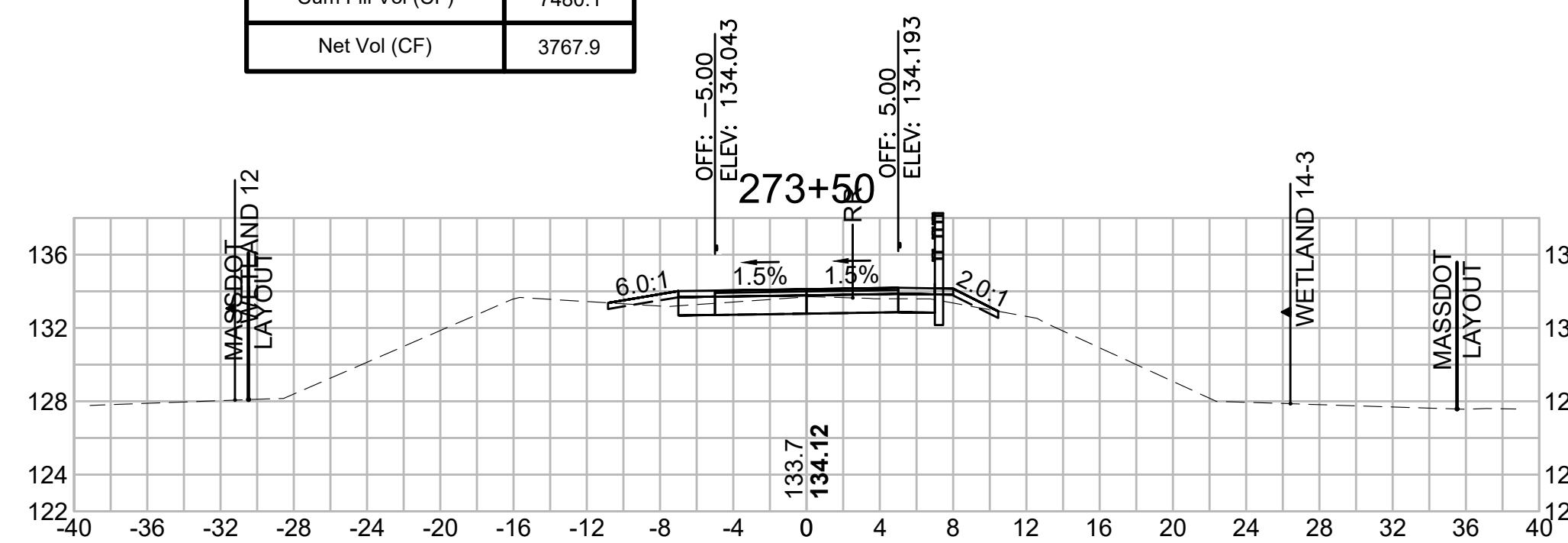
Total Volume at Station 274+00.00	
Cut Area (SF)	19.468
Fill Area (SF)	13.388
Cut Vol (CF)	30.6
Fill Vol (CF)	14.3
Cum Cut Vol (CF)	11278.6
Cum Fill Vol (CF)	7494.4
Net Vol (CF)	3784.2



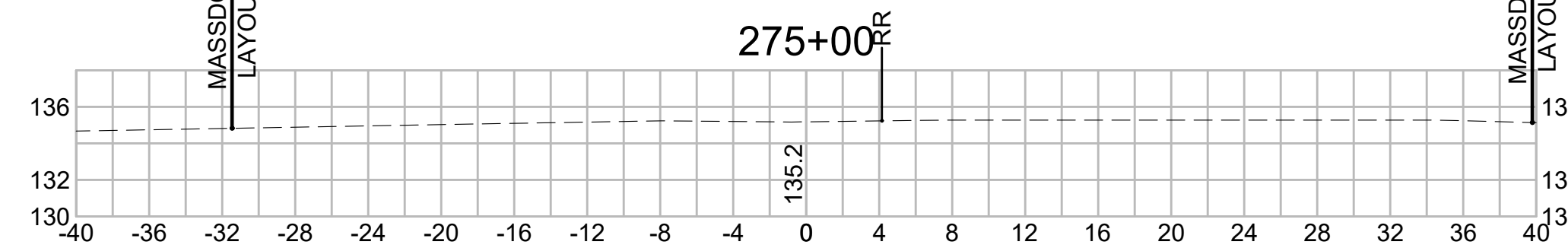
Total Volume at Station 275+50.00	
Cut Area (SF)	16.566
Fill Area (SF)	1.002
Cut Vol (CF)	55.8
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	11429.2
Cum Fill Vol (CF)	7519.0
Net Vol (CF)	3910.2



Total Volume at Station 273+50.00	
Cut Area (SF)	13.567
Fill Area (SF)	2.075
Cut Vol (CF)	20.2
Fill Vol (CF)	4.9
Cum Cut Vol (CF)	11248.0
Cum Fill Vol (CF)	7480.1
Net Vol (CF)	3767.9



Total Volume at Station 275+00.00	
Cut Area (SF)	43.743
Fill Area (SF)	0.000
Cut Vol (CF)	58.6
Fill Vol (CF)	5.6
Cum Cut Vol (CF)	11373.3
Cum Fill Vol (CF)	7518.0
Net Vol (CF)	3855.3



SUDBURY
BRUCE FREEMAN RAIL TRAIL

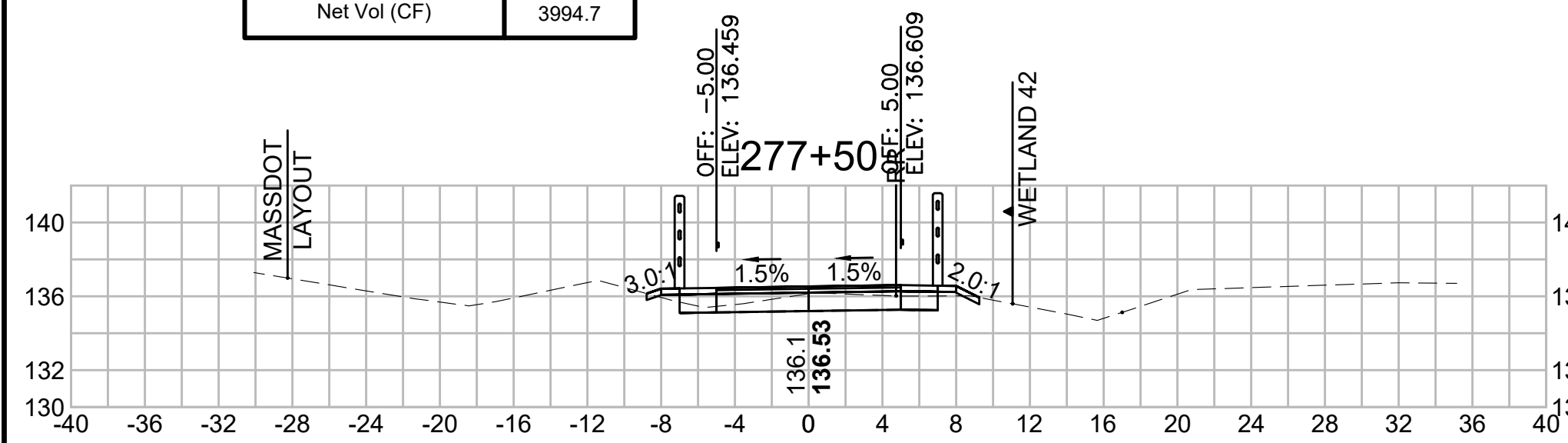
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	285	318

PROJECT FILE NO. 608164

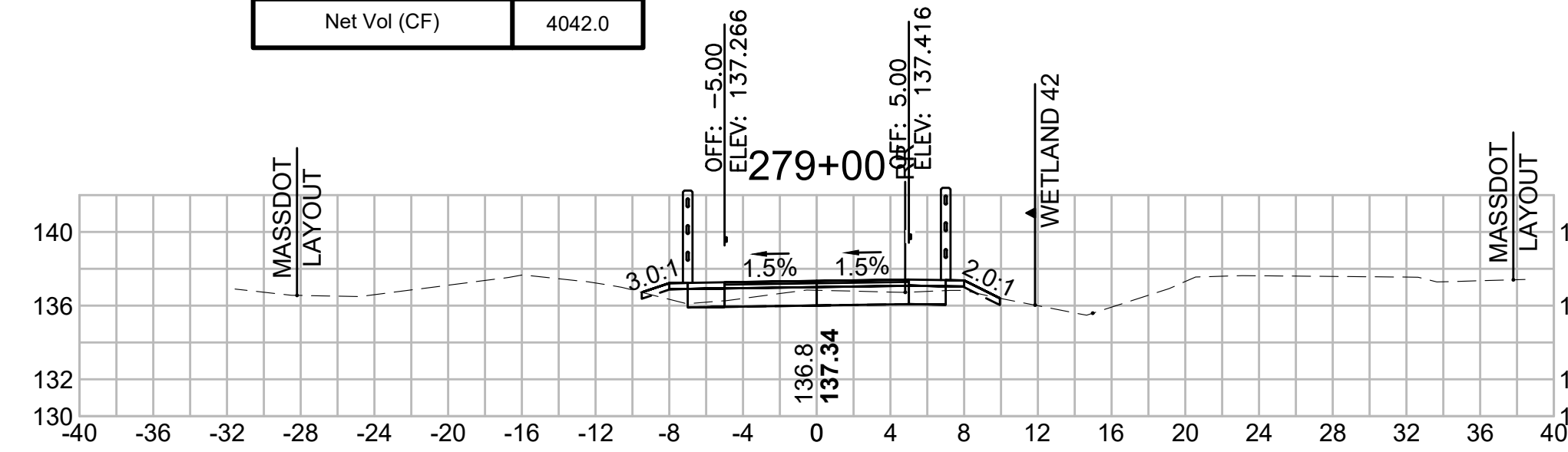
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

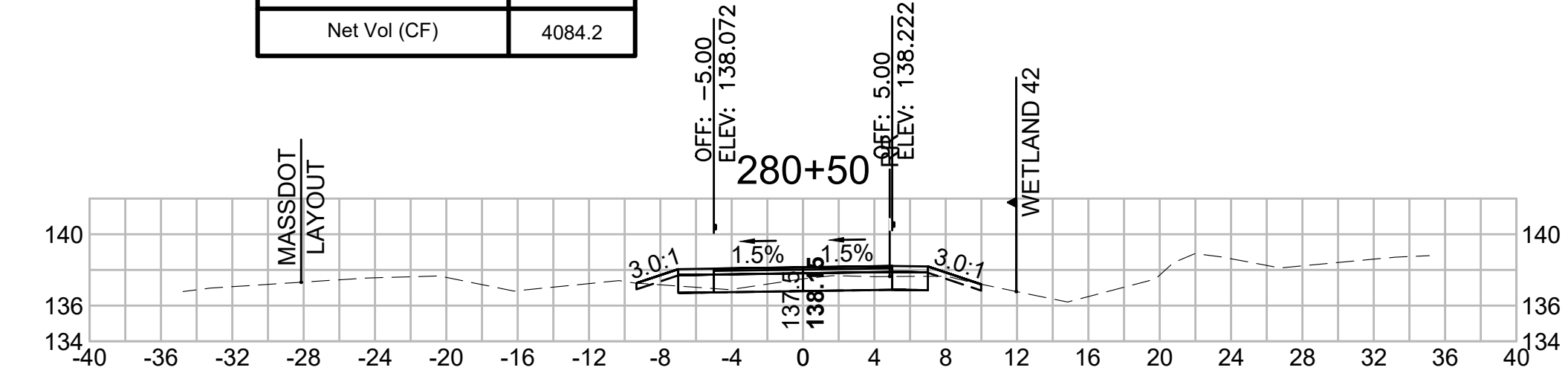
Total Volume at Station 277+50.00	
Cut Area (SF)	9,961
Fill Area (SF)	0,547
Cut Vol (CF)	15.8
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	11520.4
Cum Fill Vol (CF)	7525.7
Net Vol (CF)	3994.7



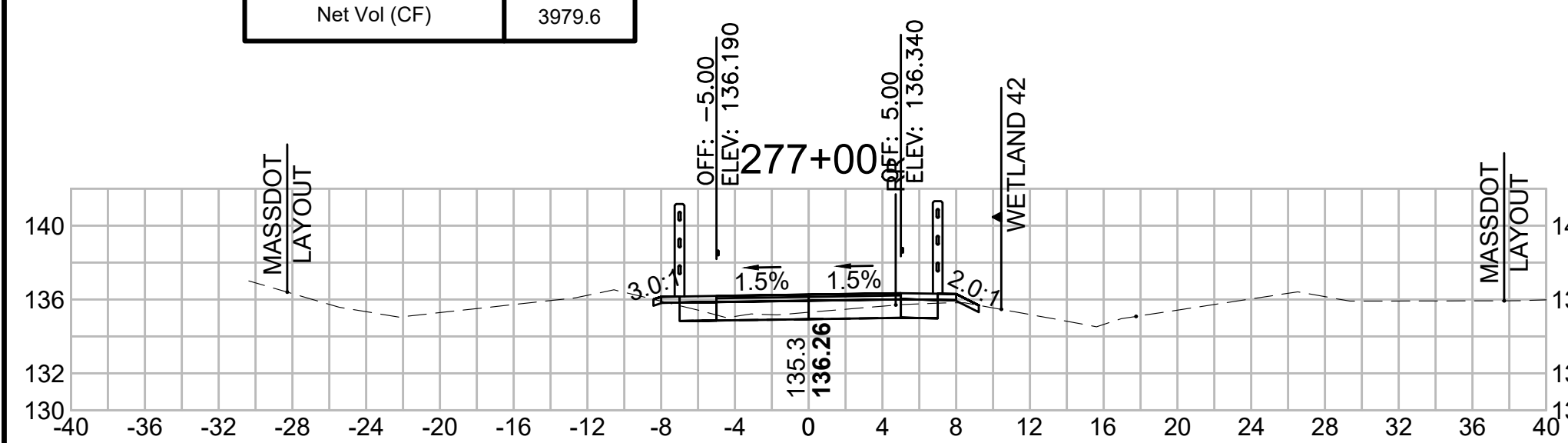
Total Volume at Station 279+00.00	
Cut Area (SF)	9,014
Fill Area (SF)	1,197
Cut Vol (CF)	17.2
Fill Vol (CF)	1.8
Cum Cut Vol (CF)	11572.5
Cum Fill Vol (CF)	7530.4
Net Vol (CF)	4042.0



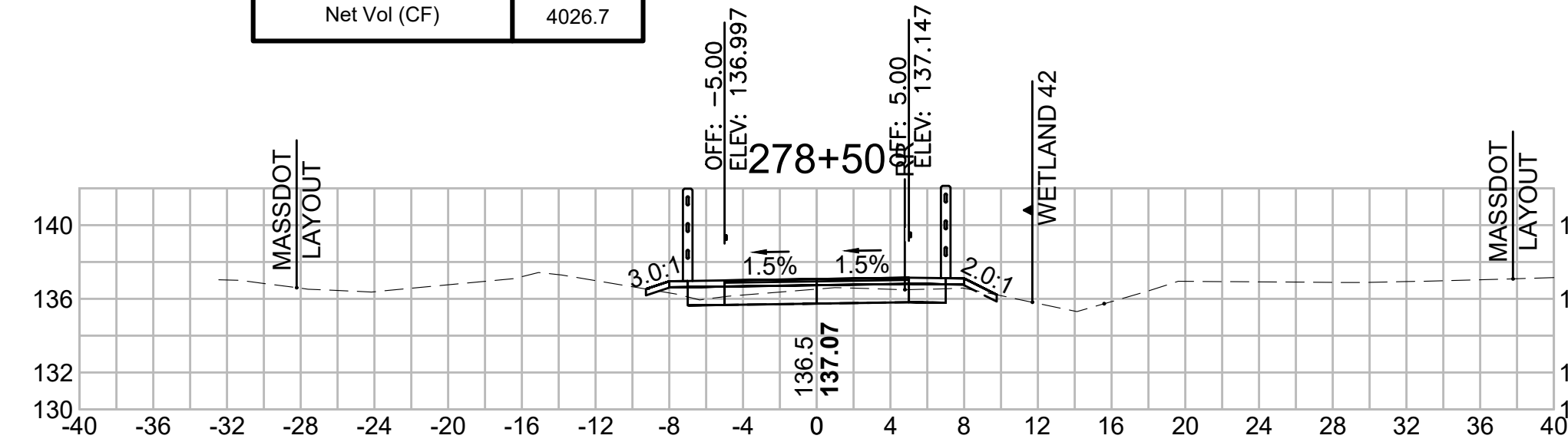
Total Volume at Station 280+50.00	
Cut Area (SF)	8,526
Fill Area (SF)	0,500
Cut Vol (CF)	15.8
Fill Vol (CF)	1.9
Cum Cut Vol (CF)	11621.4
Cum Fill Vol (CF)	7537.2
Net Vol (CF)	4084.2



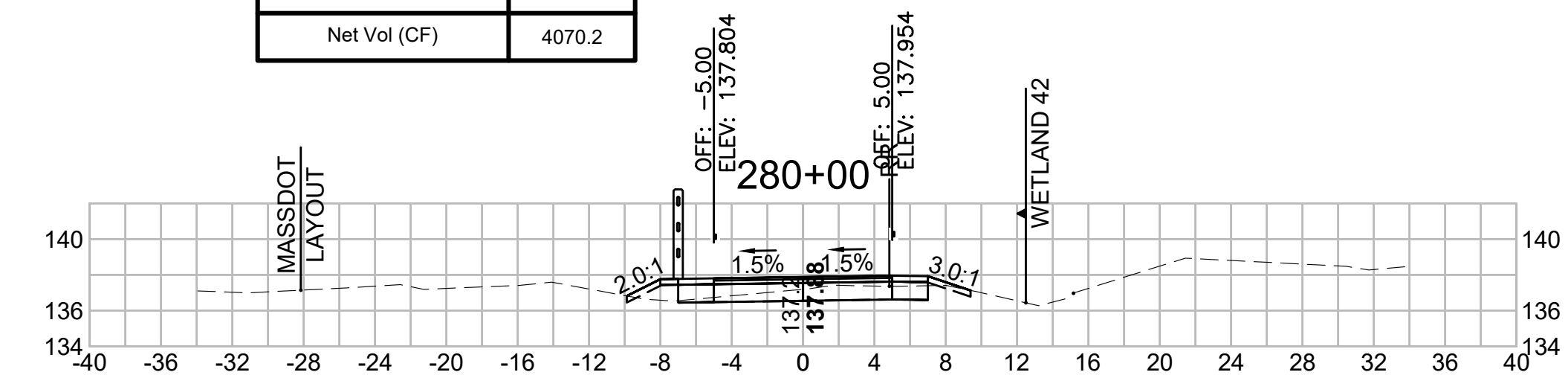
Total Volume at Station 277+00.00	
Cut Area (SF)	7,084
Fill Area (SF)	0,228
Cut Vol (CF)	15.9
Fill Vol (CF)	0.4
Cum Cut Vol (CF)	11504.6
Cum Fill Vol (CF)	7525.0
Net Vol (CF)	3979.6



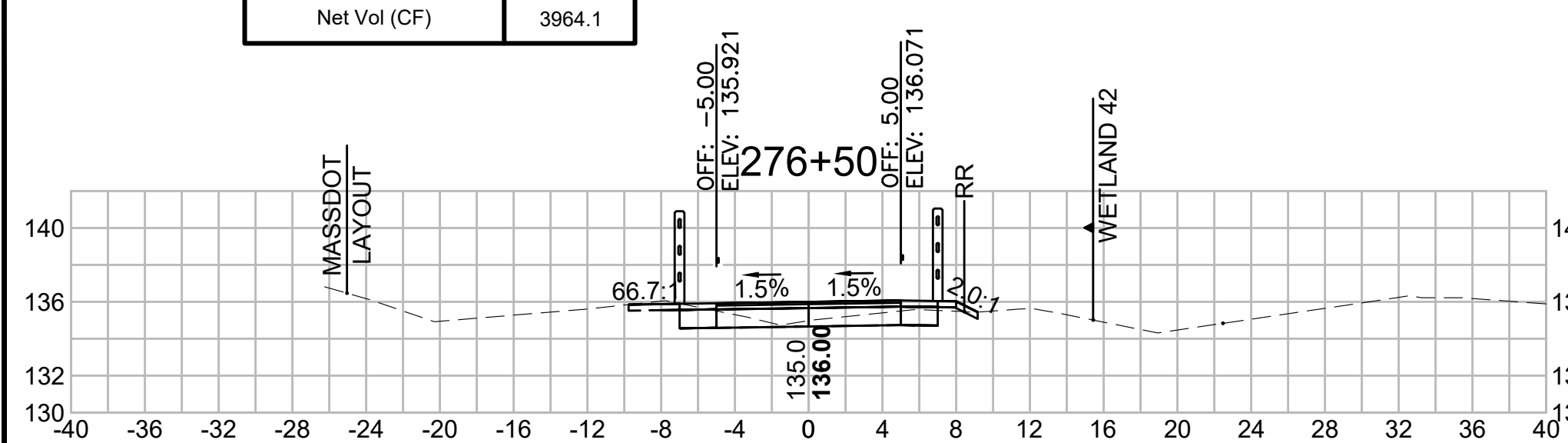
Total Volume at Station 278+50.00	
Cut Area (SF)	9,524
Fill Area (SF)	0,752
Cut Vol (CF)	17.3
Fill Vol (CF)	1.6
Cum Cut Vol (CF)	11555.3
Cum Fill Vol (CF)	7528.6
Net Vol (CF)	4026.7



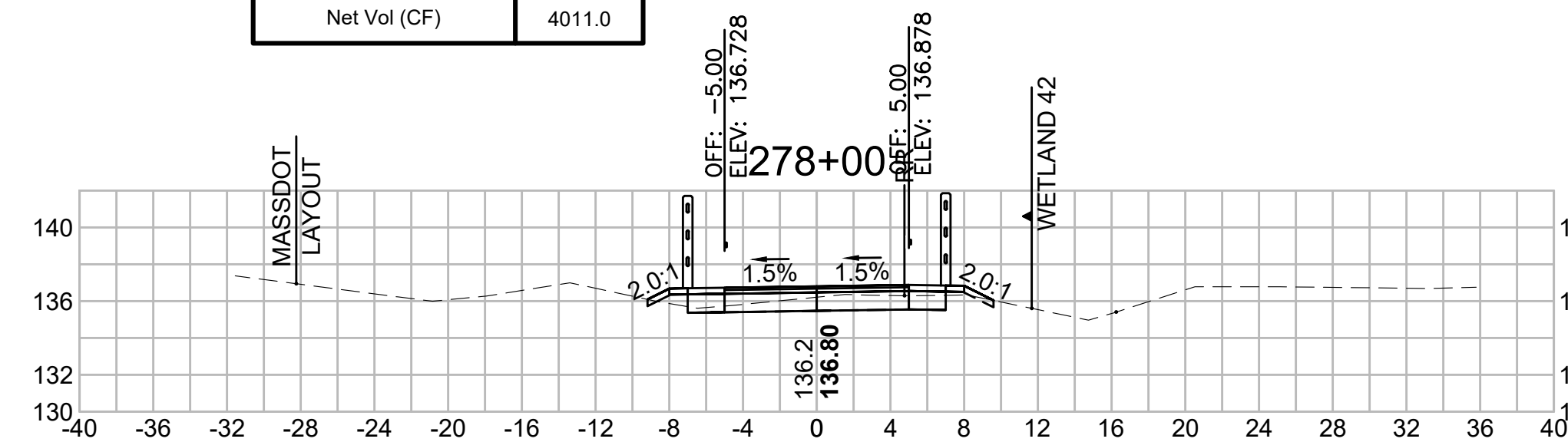
Total Volume at Station 280+00.00	
Cut Area (SF)	8,532
Fill Area (SF)	1,503
Cut Vol (CF)	16.3
Fill Vol (CF)	2.6
Cum Cut Vol (CF)	11605.6
Cum Fill Vol (CF)	7535.4
Net Vol (CF)	4070.2



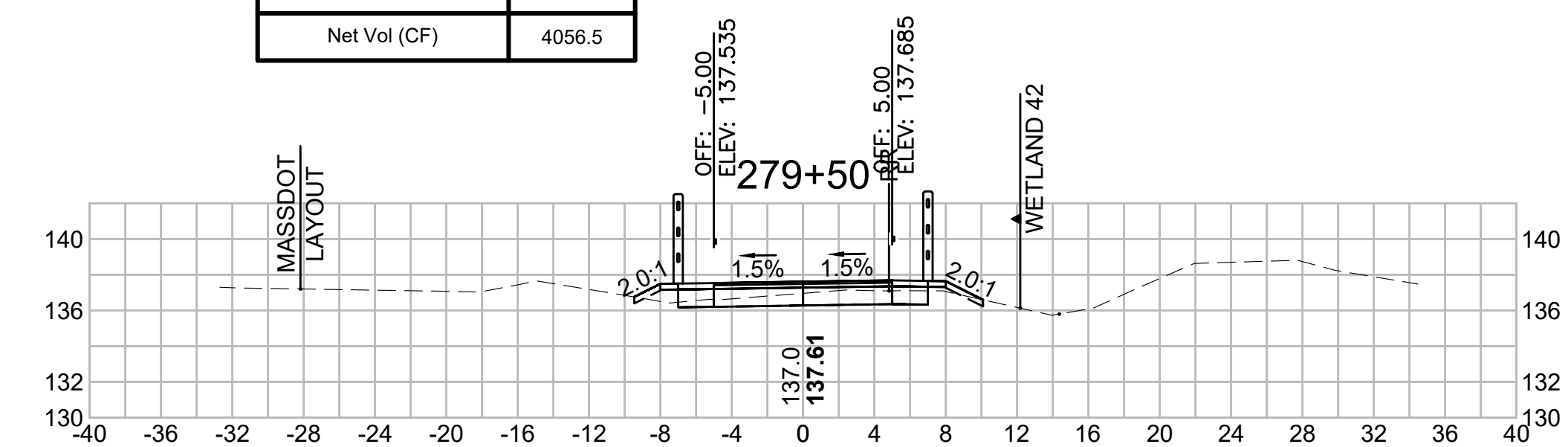
Total Volume at Station 276+50.00	
Cut Area (SF)	10,074
Fill Area (SF)	0,226
Cut Vol (CF)	21.2
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	11488.7
Cum Fill Vol (CF)	7524.6
Net Vol (CF)	3964.1



Total Volume at Station 278+00.00	
Cut Area (SF)	9,128
Fill Area (SF)	0,931
Cut Vol (CF)	17.7
Fill Vol (CF)	1.4
Cum Cut Vol (CF)	11538.1
Cum Fill Vol (CF)	7527.1
Net Vol (CF)	4011.0



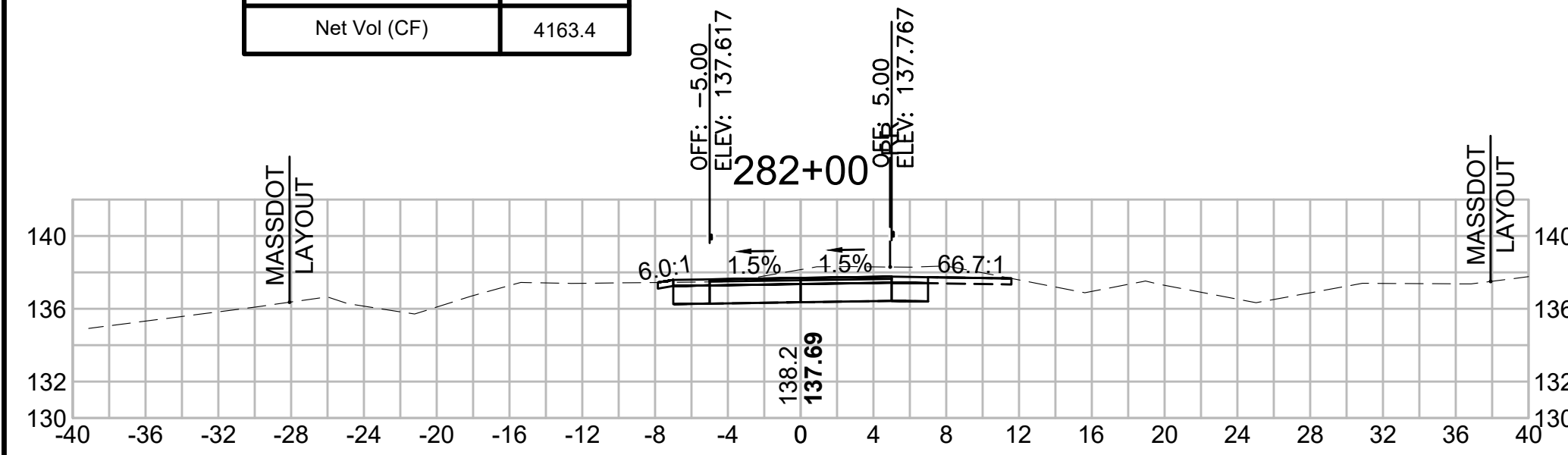
Total Volume at Station 279+50.00	
Cut Area (SF)	9,103
Fill Area (SF)	1,302
Cut Vol (CF)	16.8
Fill Vol (CF)	2.3
Cum Cut Vol (CF)	11589.3
Cum Fill Vol (CF)	7532.8
Net Vol (CF)	4056.5



CROSS SECTIONS

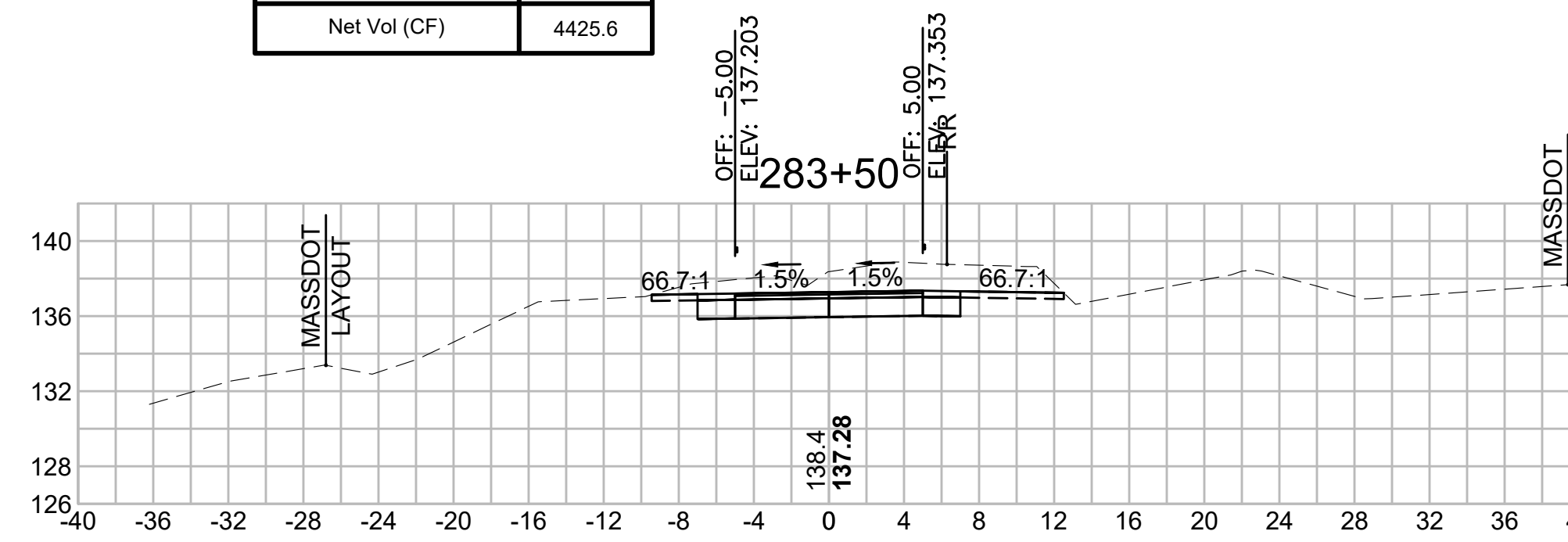
Total Volume at Station 282+00.00

Cut Area (SF)	28.258
Fill Area (SF)	0.000
Cut Vol (CF)	40.9
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	11701.9
Cum Fill Vol (CF)	7538.5
Net Vol (CF)	4163.4



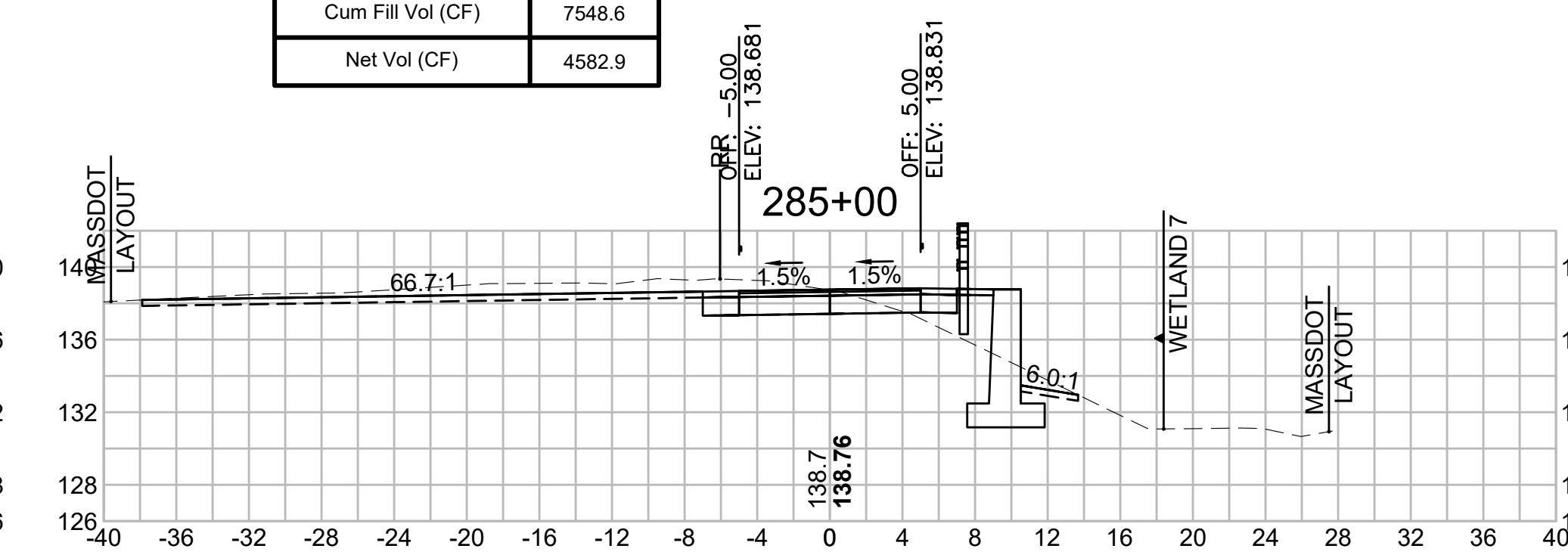
Total Volume at Station 283+50.00

Cut Area (SF)	59.185
Fill Area (SF)	0.222
Cut Vol (CF)	105.4
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	11964.3
Cum Fill Vol (CF)	7538.7
Net Vol (CF)	4425.6



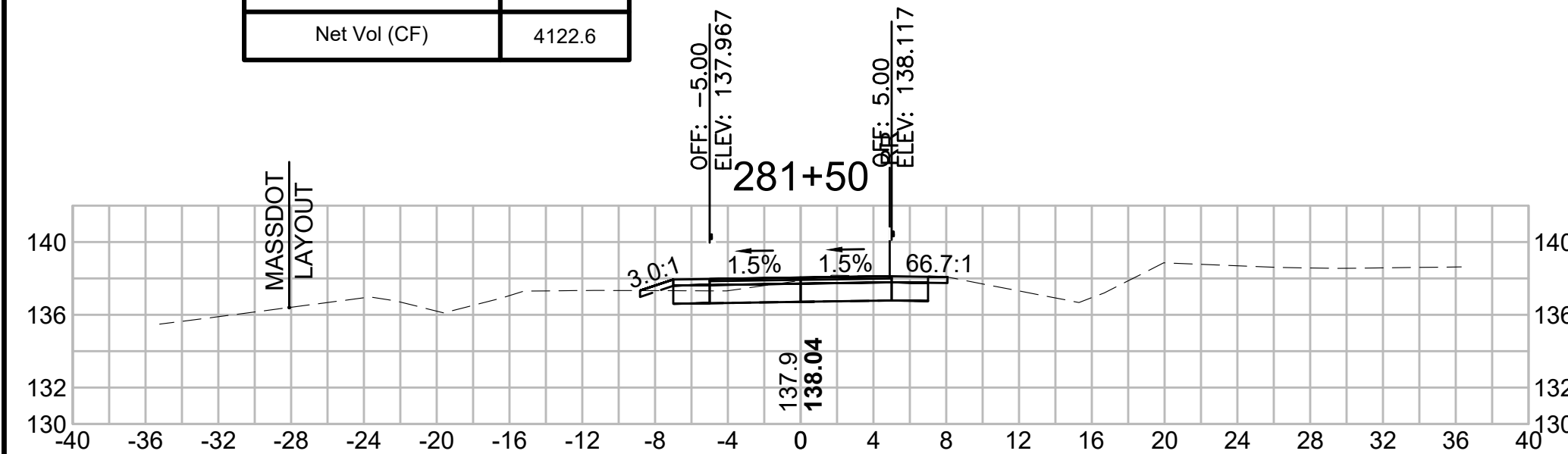
Total Volume at Station 285+00.00

Cut Area (SF)	56.229
Fill Area (SF)	5.536
Cut Vol (CF)	52.1
Fill Vol (CF)	5.1
Cum Cut Vol (CF)	12131.5
Cum Fill Vol (CF)	7548.6
Net Vol (CF)	4582.9



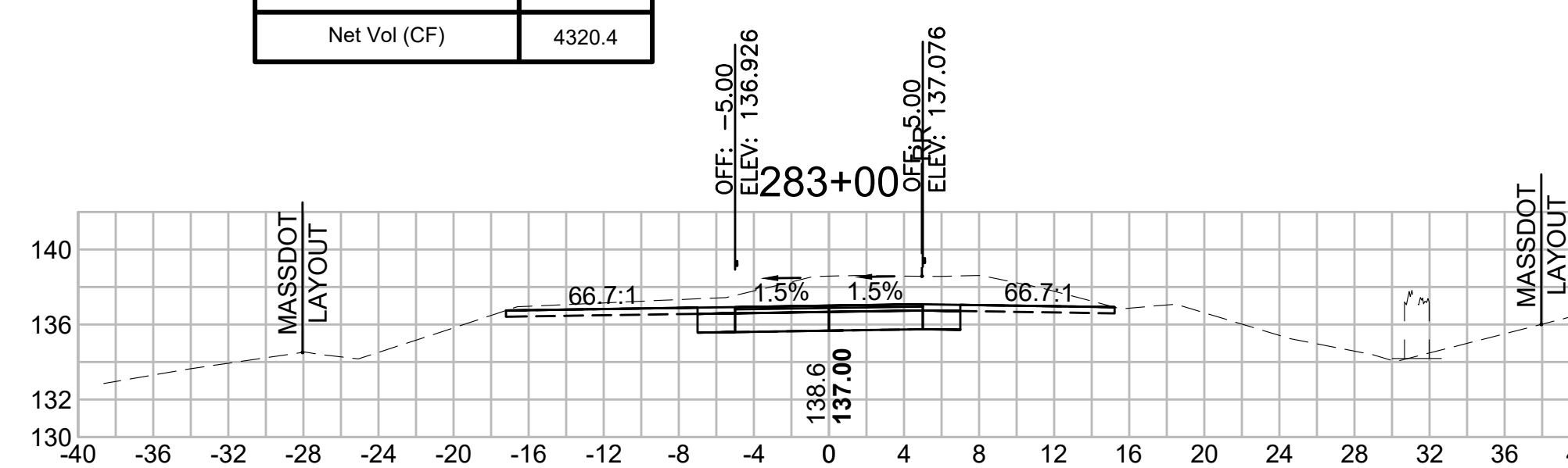
Total Volume at Station 281+50.00

Cut Area (SF)	15.927
Fill Area (SF)	0.106
Cut Vol (CF)	23.2
Fill Vol (CF)	0.4
Cum Cut Vol (CF)	11661.0
Cum Fill Vol (CF)	7538.4
Net Vol (CF)	4122.6



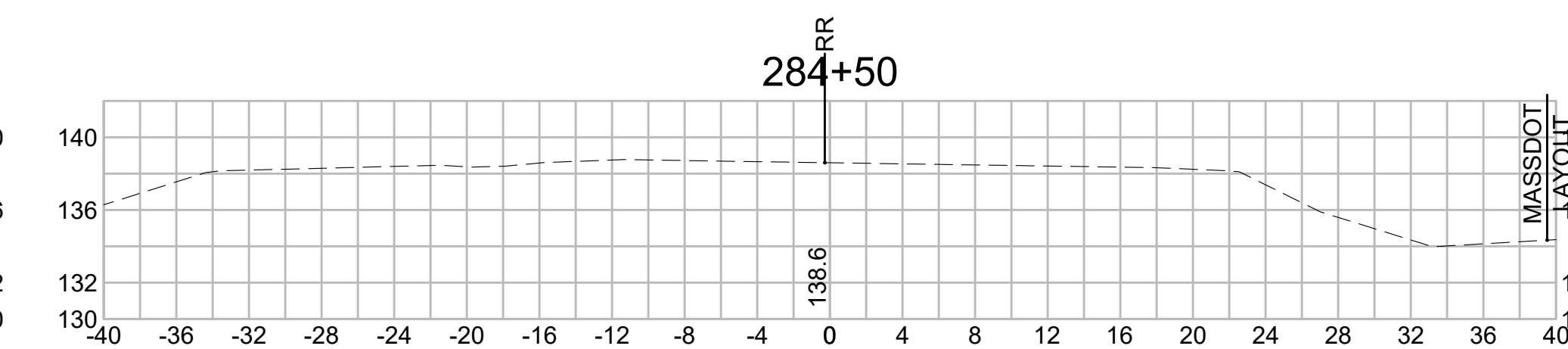
Total Volume at Station 283+00.00

Cut Area (SF)	54.652
Fill Area (SF)	0.000
Cut Vol (CF)	90.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	11858.9
Cum Fill Vol (CF)	7538.5
Net Vol (CF)	4320.4



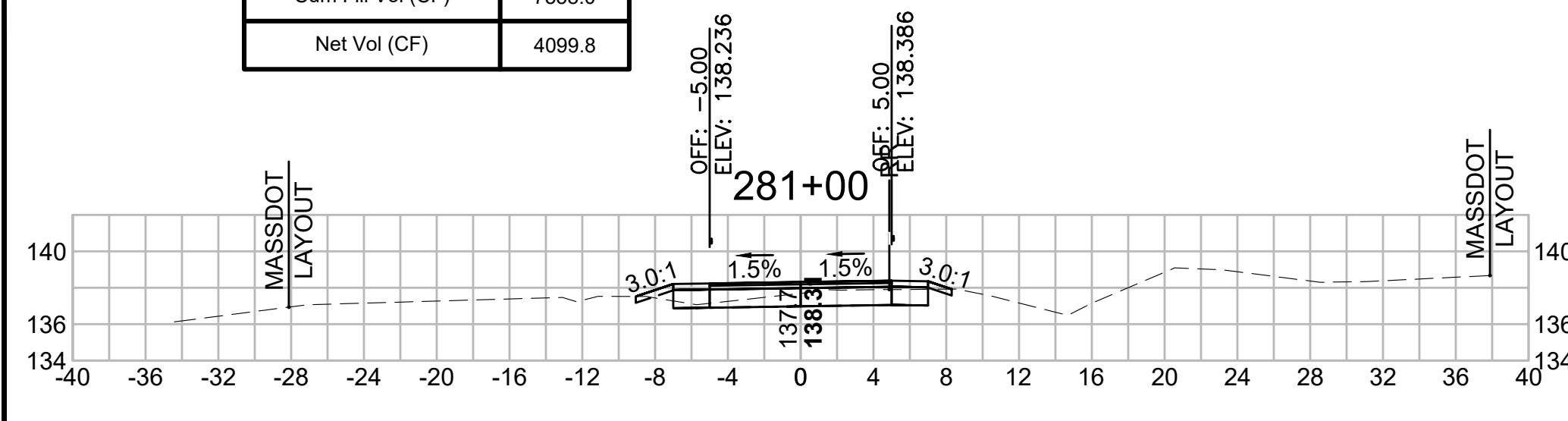
Total Volume at Station 284+50.00

Cut Area (SF)	0.000
Fill Area (SF)	0.000
Cut Vol (CF)	30.1
Fill Vol (CF)	2.3
Cum Cut Vol (CF)	12079.4
Cum Fill Vol (CF)	7543.5
Net Vol (CF)	4535.9



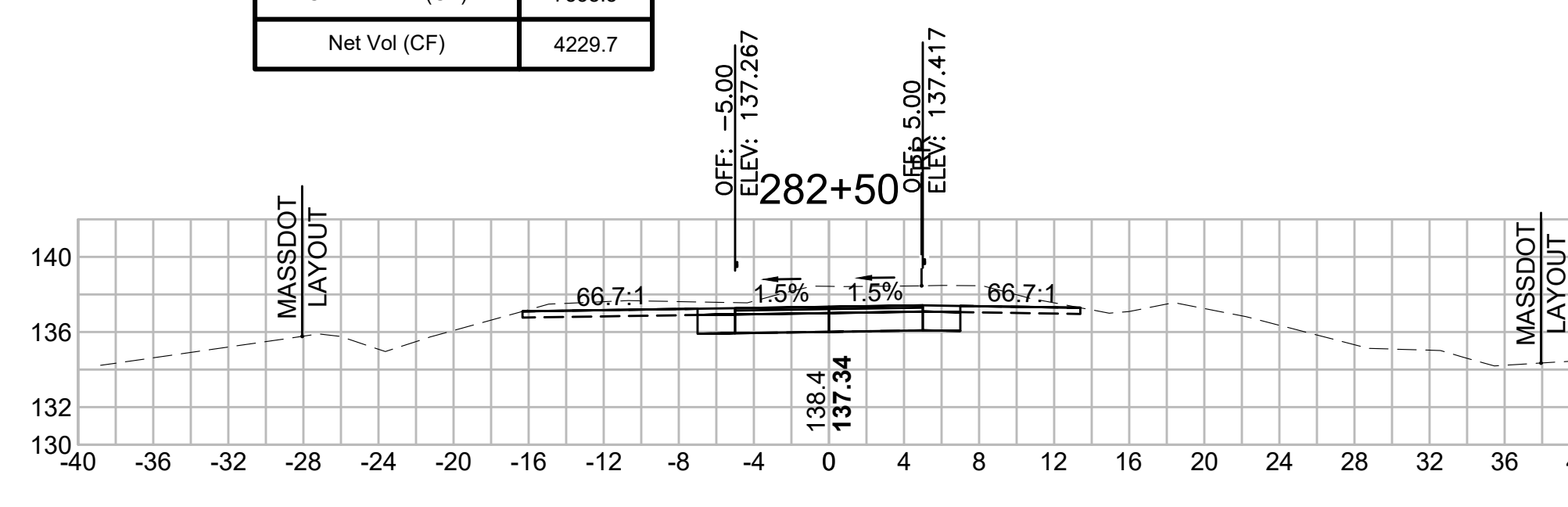
Total Volume at Station 281+00.00

Cut Area (SF)	9.182
Fill Area (SF)	0.352
Cut Vol (CF)	16.4
Fill Vol (CF)	0.8
Cum Cut Vol (CF)	11637.8
Cum Fill Vol (CF)	7538.0
Net Vol (CF)	4099.8



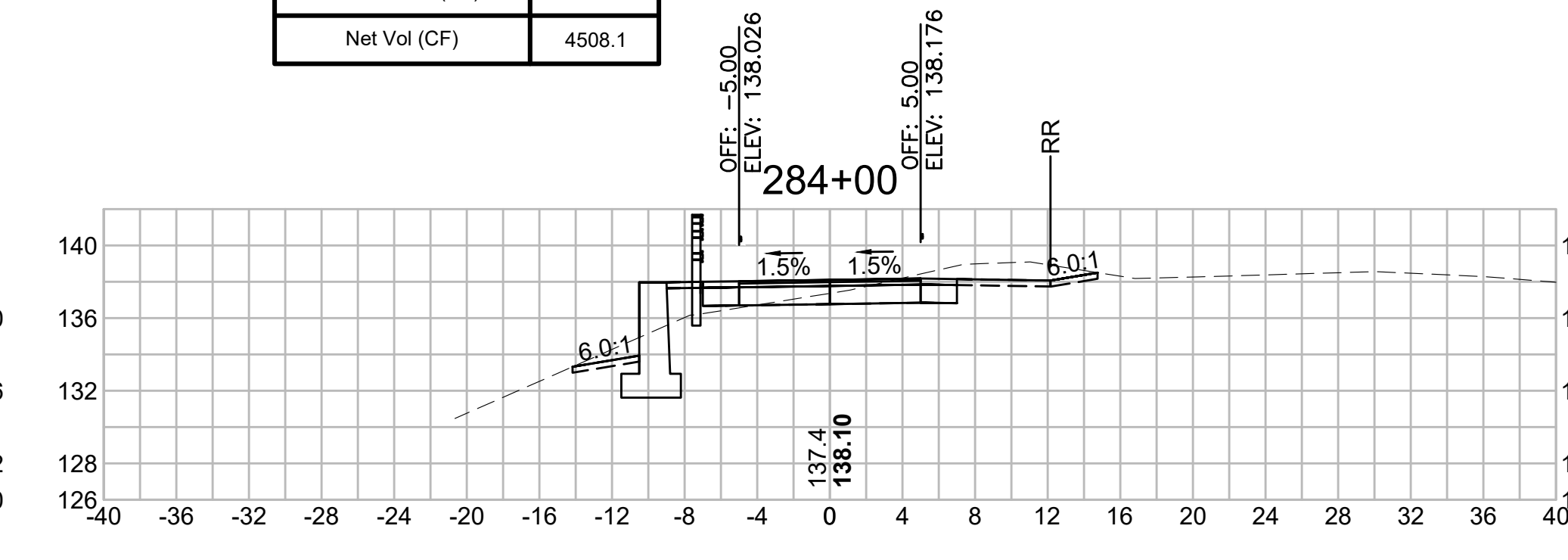
Total Volume at Station 282+50.00

Cut Area (SF)	43.320
Fill Area (SF)	0.000
Cut Vol (CF)	66.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	11768.2
Cum Fill Vol (CF)	7538.5
Net Vol (CF)	4229.7



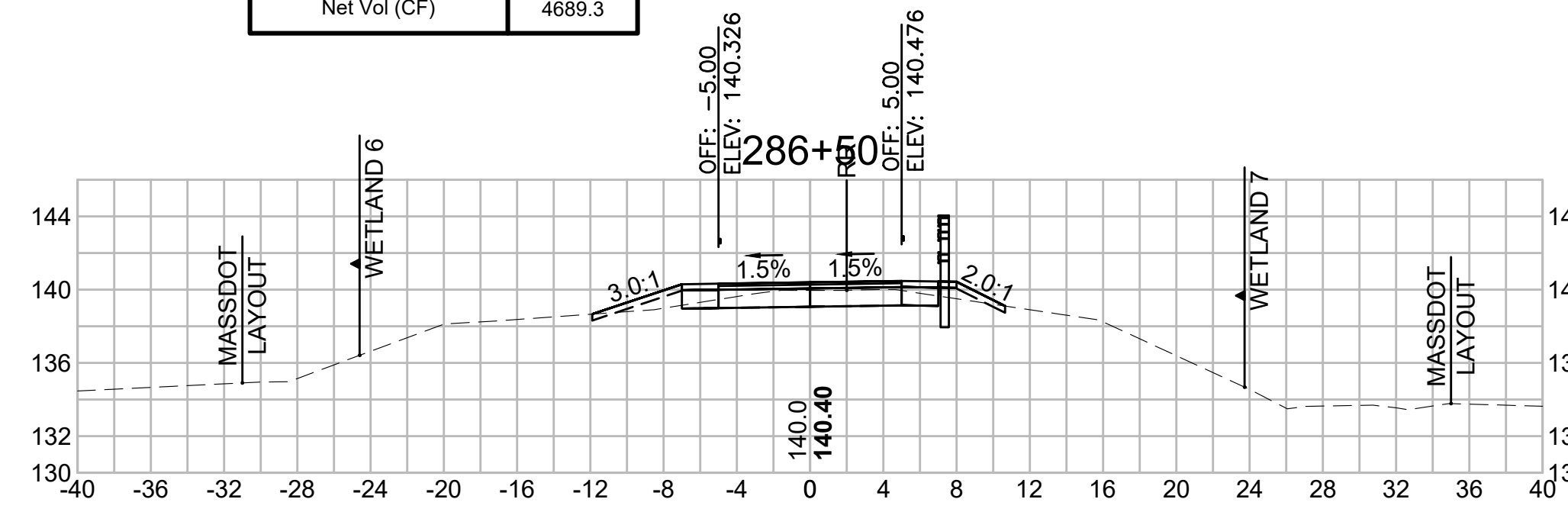
Total Volume at Station 284+00.00

Cut Area (SF)	32.535
Fill Area (SF)	2.450
Cut Vol (CF)	84.9
Fill Vol (CF)	2.5
Cum Cut Vol (CF)	12049.3
Cum Fill Vol (CF)	7541.2
Net Vol (CF)	4508.1

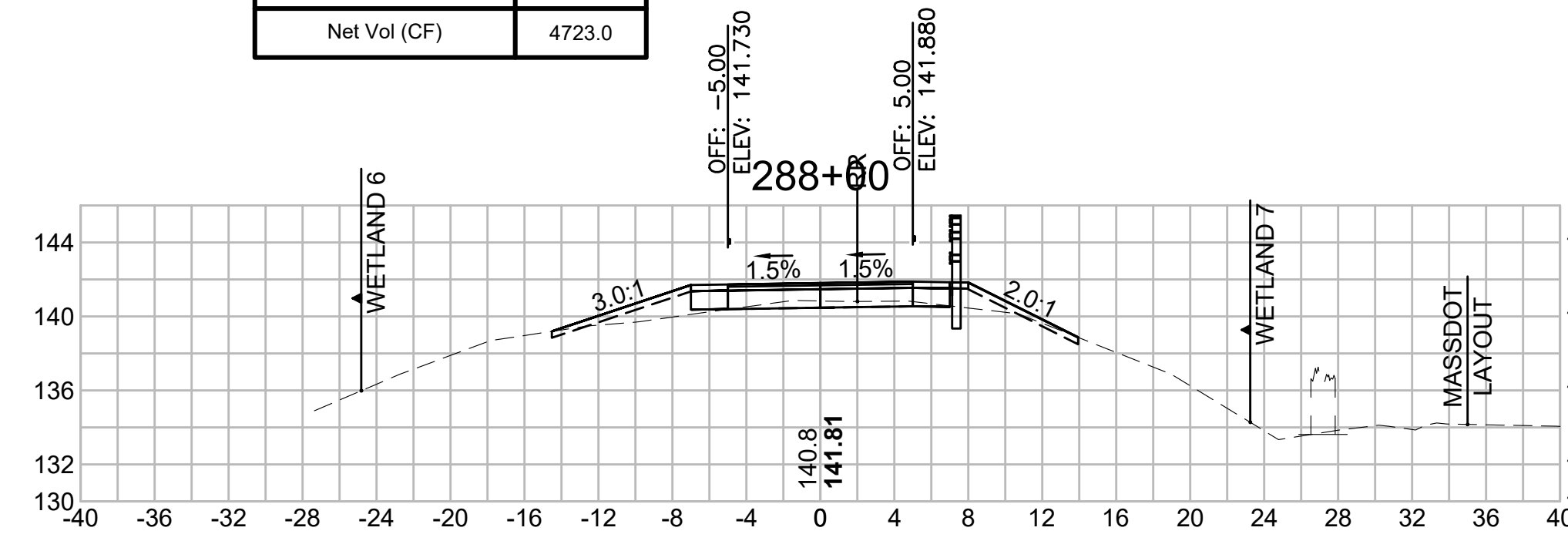


CROSS SECTIONS

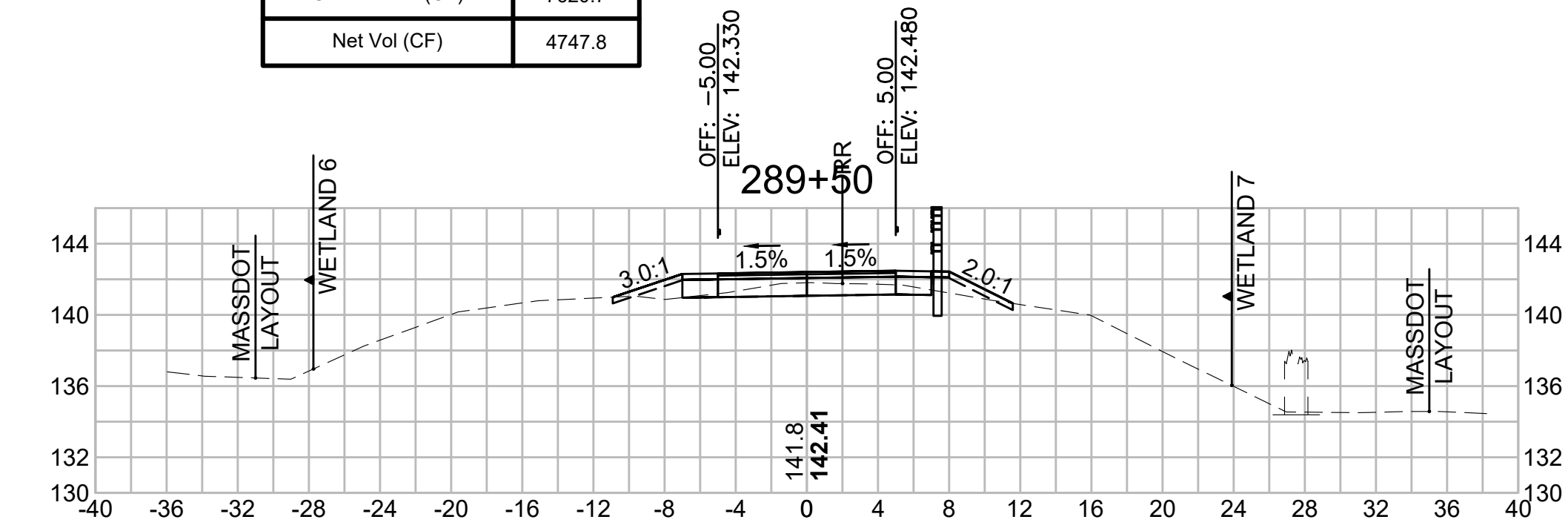
Total Volume at Station 286+50.00	
Cut Area (SF)	10.652
Fill Area (SF)	2.537
Cut Vol (CF)	22.5
Fill Vol (CF)	3.7
Cum Cut Vol (CF)	12254.0
Cum Fill Vol (CF)	7564.7
Net Vol (CF)	4689.3



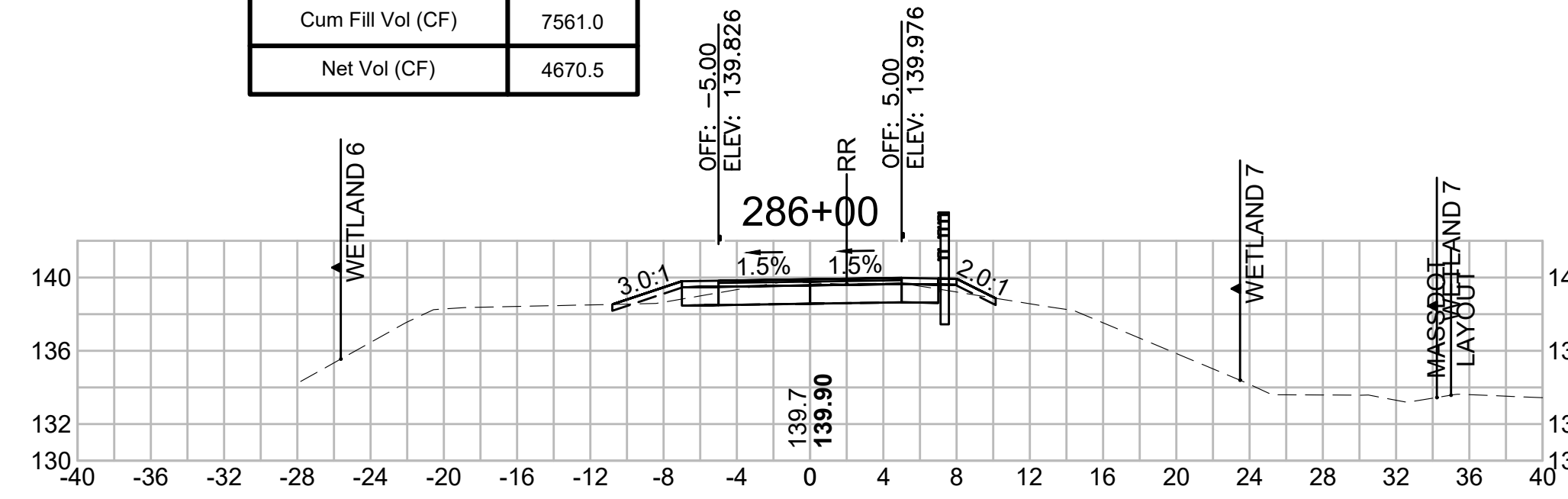
Total Volume at Station 288+00.00	
Cut Area (SF)	10.395
Fill Area (SF)	6.320
Cut Vol (CF)	22.4
Fill Vol (CF)	11.9
Cum Cut Vol (CF)	12314.2
Cum Fill Vol (CF)	7591.2
Net Vol (CF)	4723.0



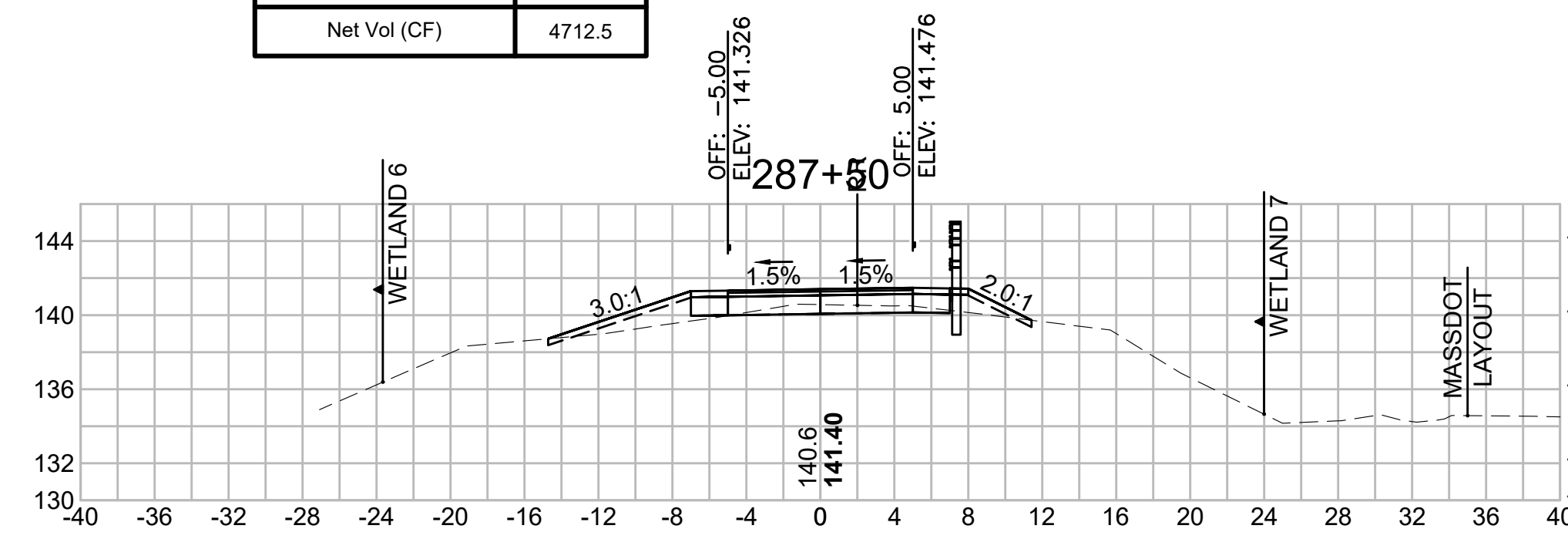
Total Volume at Station 289+50.00	
Cut Area (SF)	7.485
Fill Area (SF)	3.349
Cut Vol (CF)	12.2
Fill Vol (CF)	7.5
Cum Cut Vol (CF)	12368.5
Cum Fill Vol (CF)	7620.7
Net Vol (CF)	4747.8



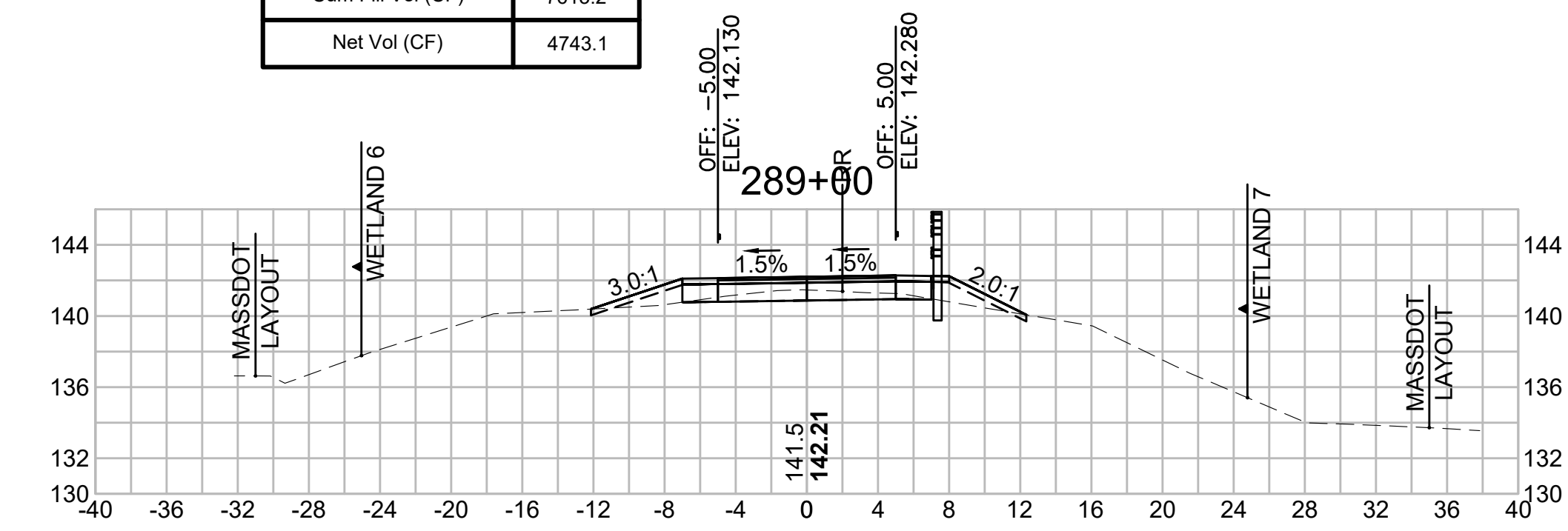
Total Volume at Station 286+00.00	
Cut Area (SF)	13.658
Fill Area (SF)	1.480
Cut Vol (CF)	30.3
Fill Vol (CF)	4.3
Cum Cut Vol (CF)	12231.5
Cum Fill Vol (CF)	7561.0
Net Vol (CF)	4670.5



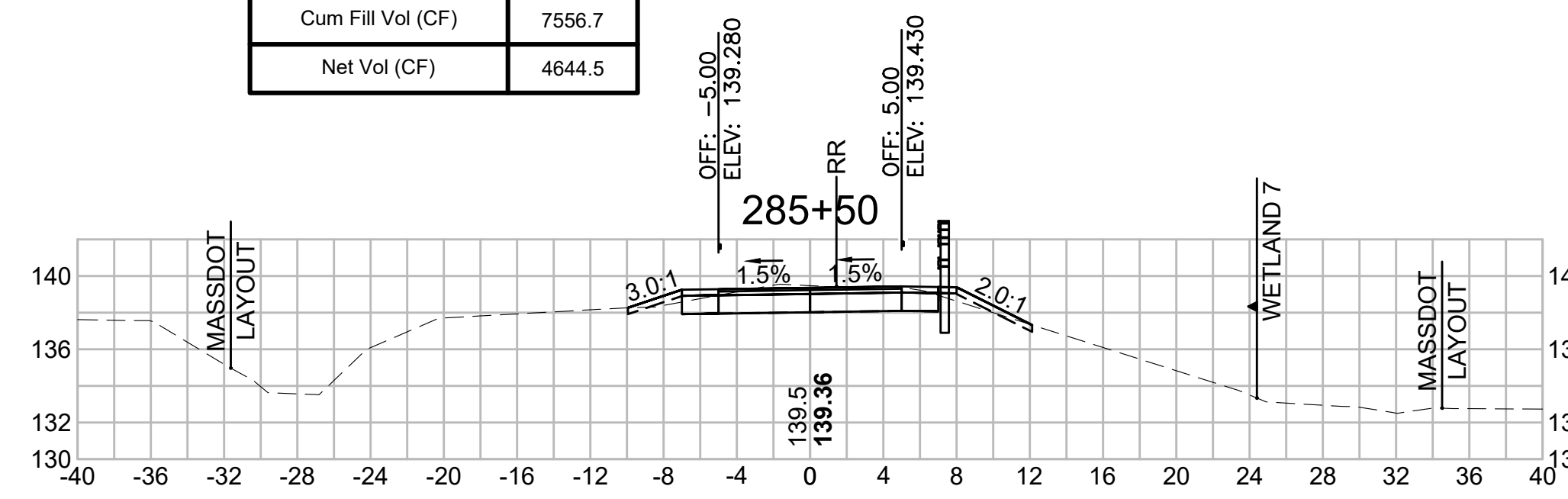
Total Volume at Station 287+50.00	
Cut Area (SF)	13.780
Fill Area (SF)	6.505
Cut Vol (CF)	20.4
Fill Vol (CF)	9.1
Cum Cut Vol (CF)	12291.8
Cum Fill Vol (CF)	7579.3
Net Vol (CF)	4712.5



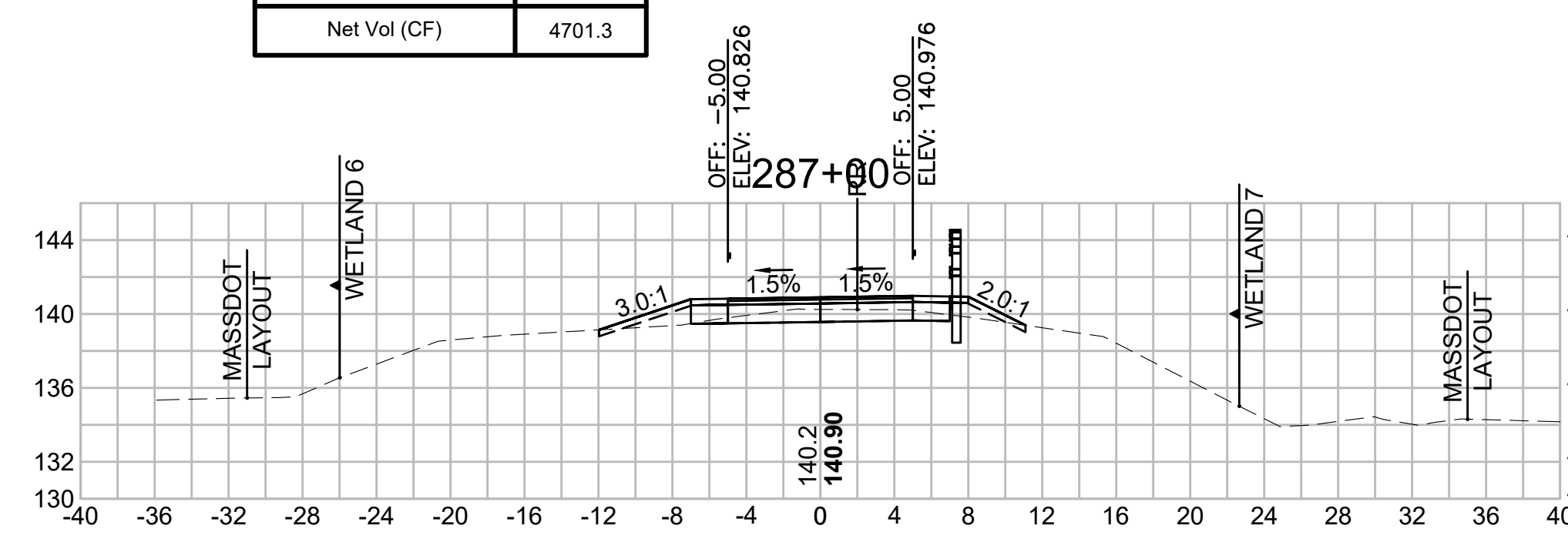
Total Volume at Station 289+00.00	
Cut Area (SF)	5.738
Fill Area (SF)	4.803
Cut Vol (CF)	18.9
Fill Vol (CF)	10.3
Cum Cut Vol (CF)	12356.3
Cum Fill Vol (CF)	7613.2
Net Vol (CF)	4743.1



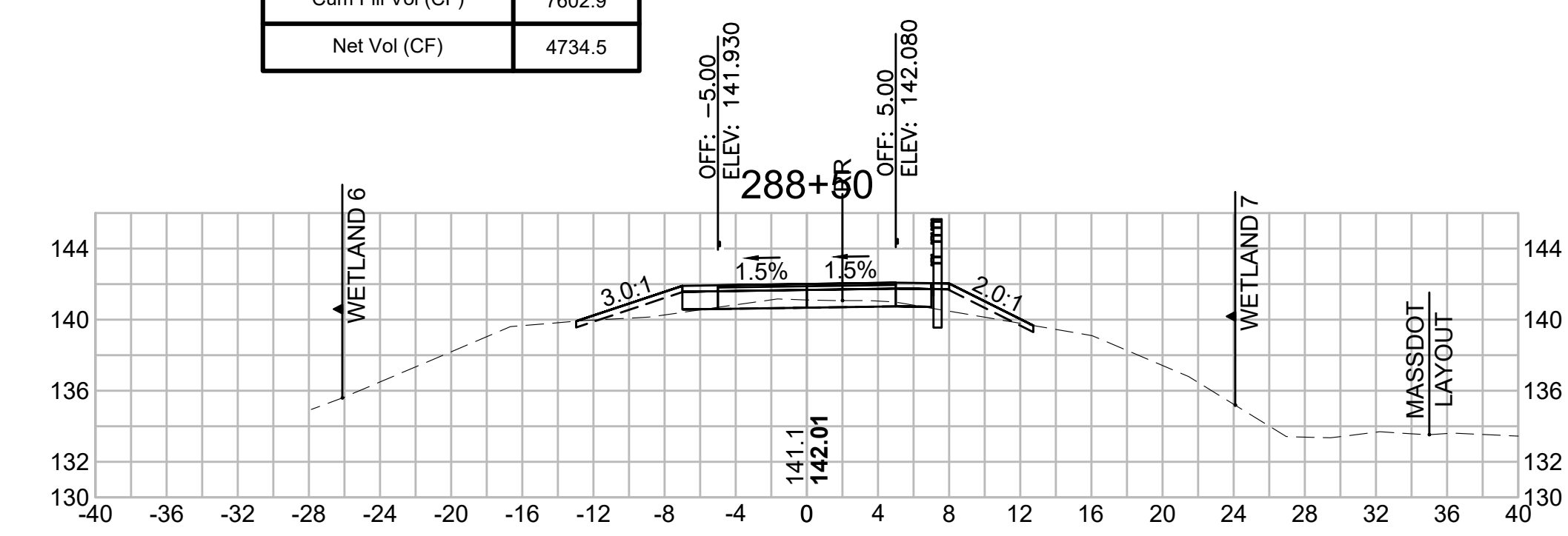
Total Volume at Station 285+50.00	
Cut Area (SF)	19.066
Fill Area (SF)	3.194
Cut Vol (CF)	69.7
Fill Vol (CF)	8.1
Cum Cut Vol (CF)	12201.2
Cum Fill Vol (CF)	7556.7
Net Vol (CF)	4644.5



Total Volume at Station 287+00.00	
Cut Area (SF)	8.206
Fill Area (SF)	3.343
Cut Vol (CF)	17.5
Fill Vol (CF)	5.4
Cum Cut Vol (CF)	12271.4
Cum Fill Vol (CF)	7570.2
Net Vol (CF)	4701.3



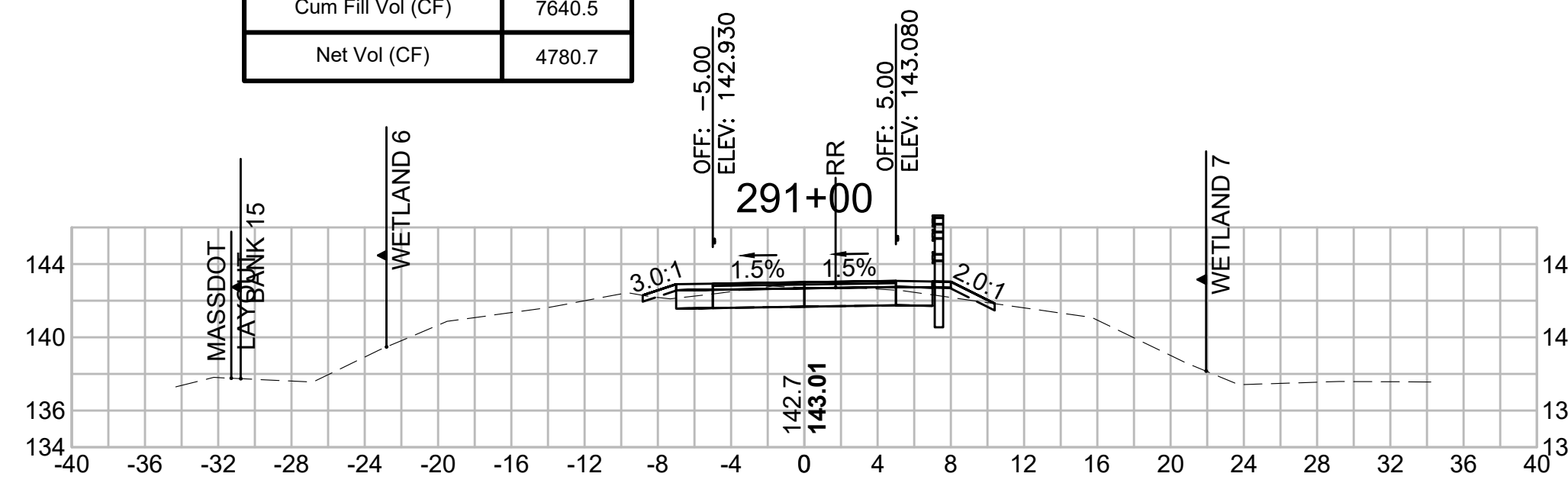
Total Volume at Station 288+50.00	
Cut Area (SF)	14.651
Fill Area (SF)	6.327
Cut Vol (CF)	23.2
Fill Vol (CF)	11.7
Cum Cut Vol (CF)	12337.4
Cum Fill Vol (CF)	7602.9
Net Vol (CF)	4734.5



CROSS SECTIONS

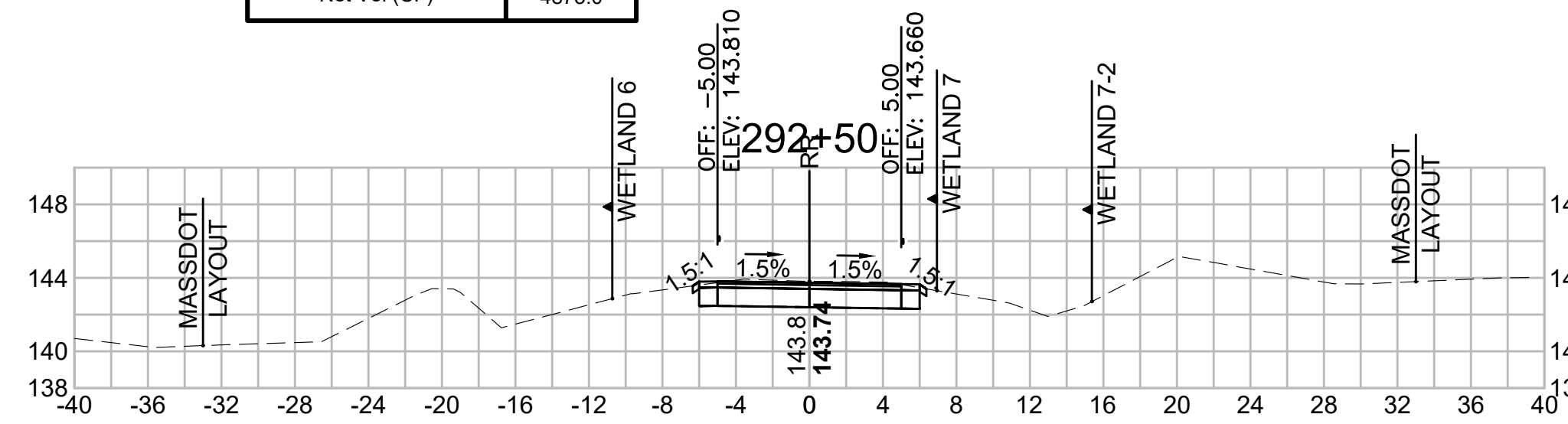
Total Volume at Station 291+00.00

Cut Area (SF)	13.191
Fill Area (SF)	1.057
Cut Vol (CF)	21.9
Fill Vol (CF)	2.3
Cum Cut Vol (CF)	12421.2
Cum Fill Vol (CF)	7640.5
Net Vol (CF)	4780.7



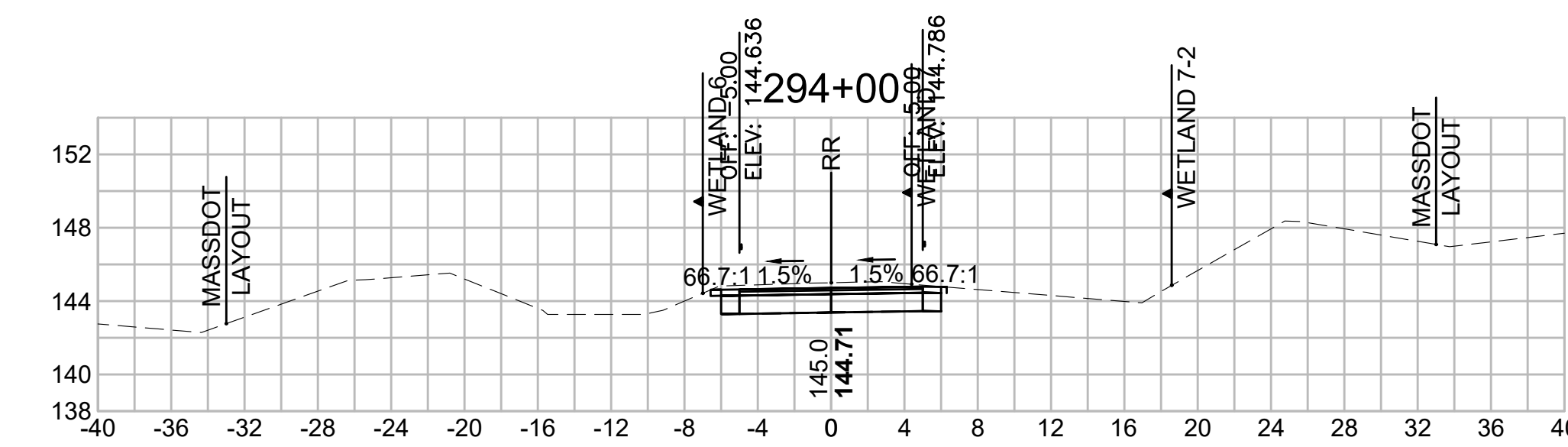
Total Volume at Station 292+50.00

Cut Area (SF)	17.578
Fill Area (SF)	0.237
Cut Vol (CF)	33.4
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	12514.9
Cum Fill Vol (CF)	7641.9
Net Vol (CF)	4873.0



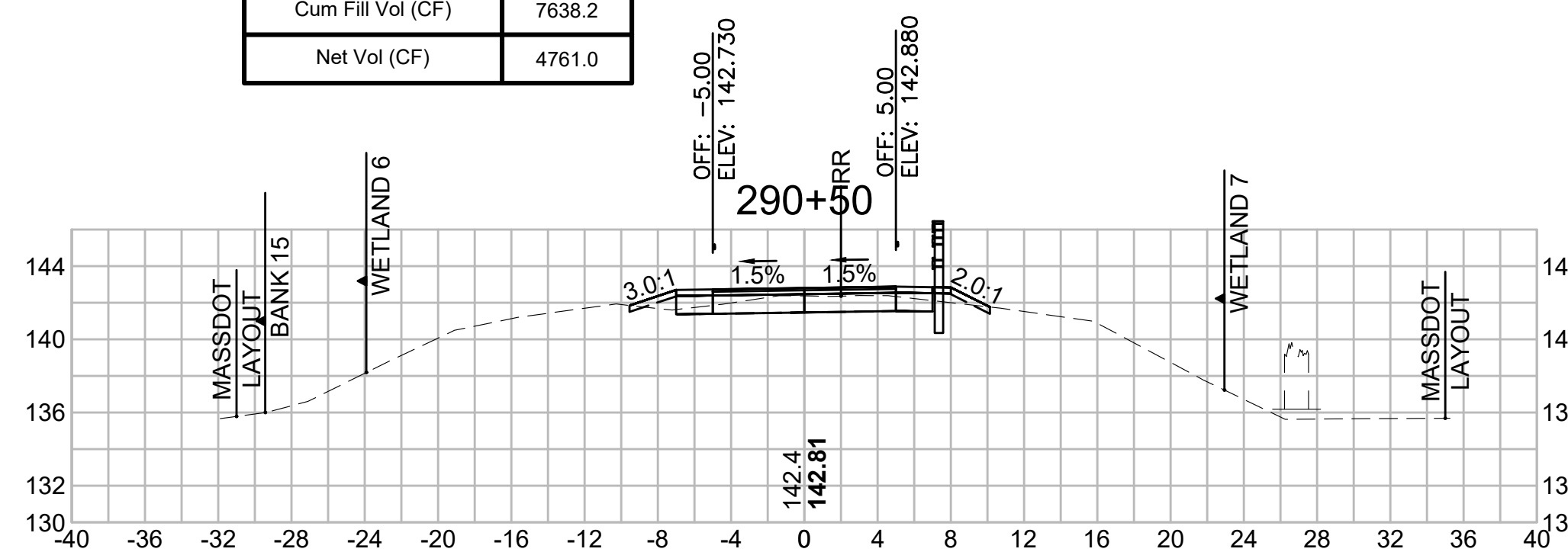
Total Volume at Station 294+00.00

Cut Area (SF)	18.901
Fill Area (SF)	0.000
Cut Vol (CF)	35.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12617.6
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	4975.4



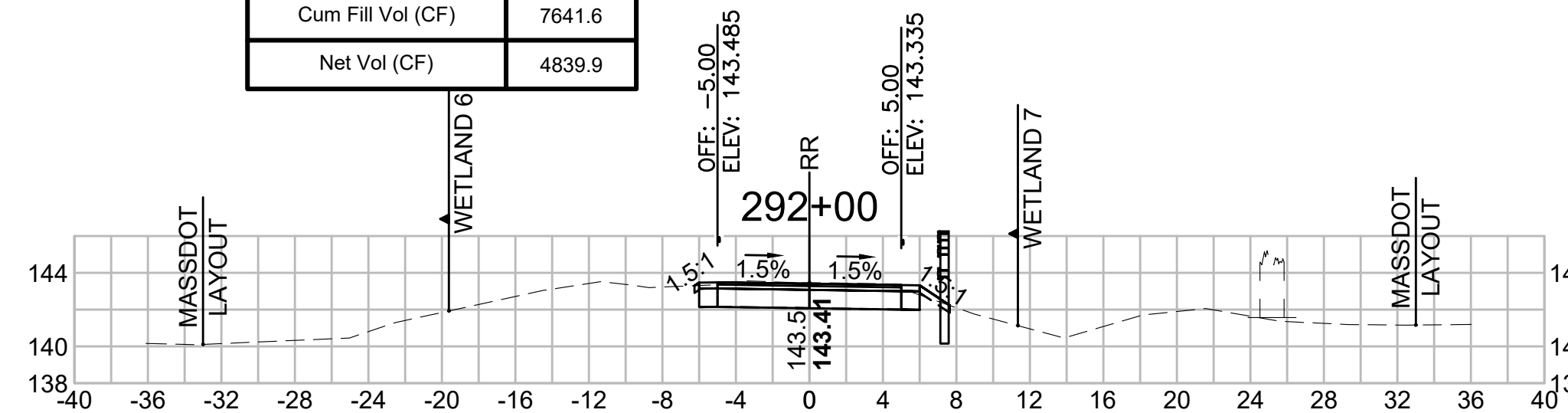
Total Volume at Station 290+50.00

Cut Area (SF)	10.501
Fill Area (SF)	1.398
Cut Vol (CF)	16.8
Fill Vol (CF)	7.9
Cum Cut Vol (CF)	12399.2
Cum Fill Vol (CF)	7638.2
Net Vol (CF)	4761.0



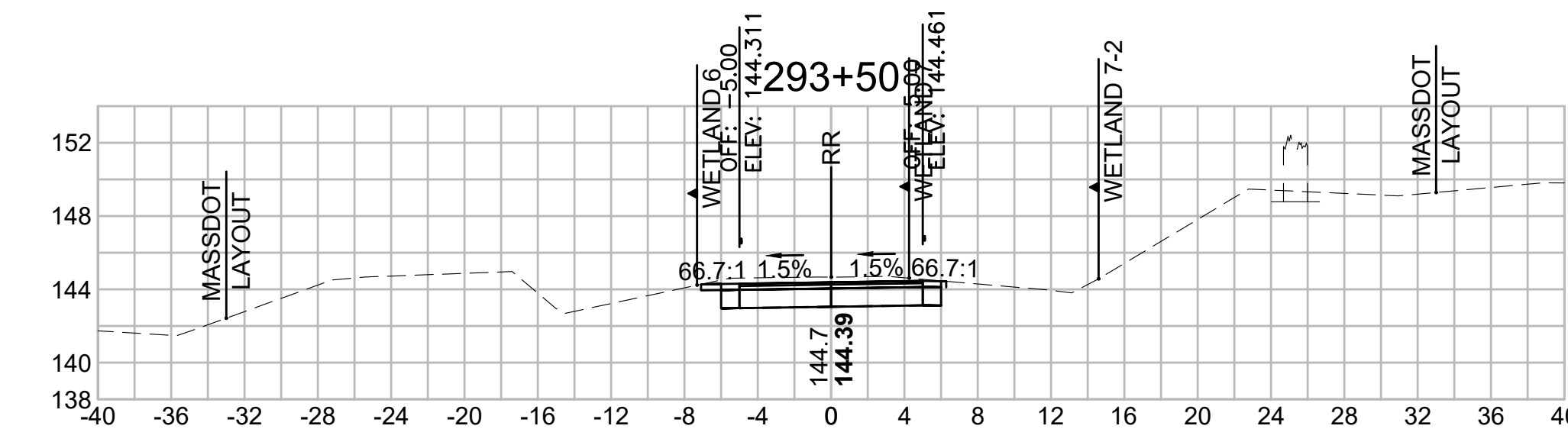
Total Volume at Station 292+00.00

Cut Area (SF)	18.450
Fill Area (SF)	0.117
Cut Vol (CF)	32.6
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	12481.6
Cum Fill Vol (CF)	7641.6
Net Vol (CF)	4839.9



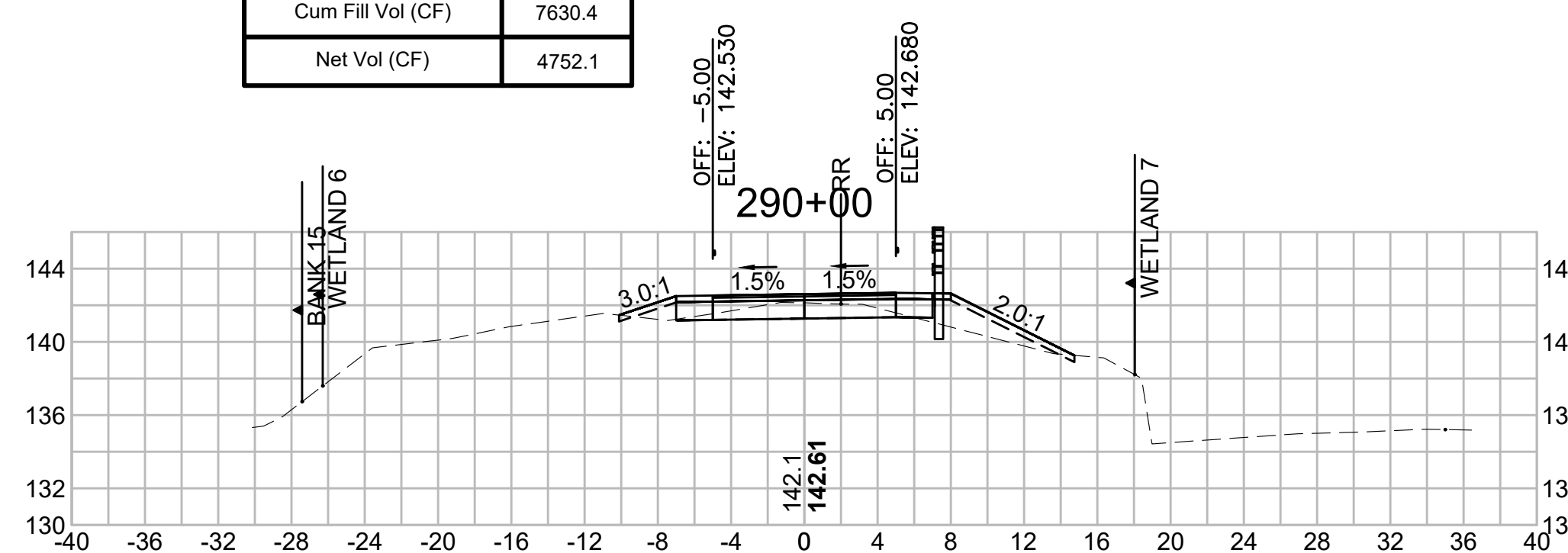
Total Volume at Station 293+50.00

Cut Area (SF)	19.180
Fill Area (SF)	0.000
Cut Vol (CF)	34.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12582.3
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	4940.2



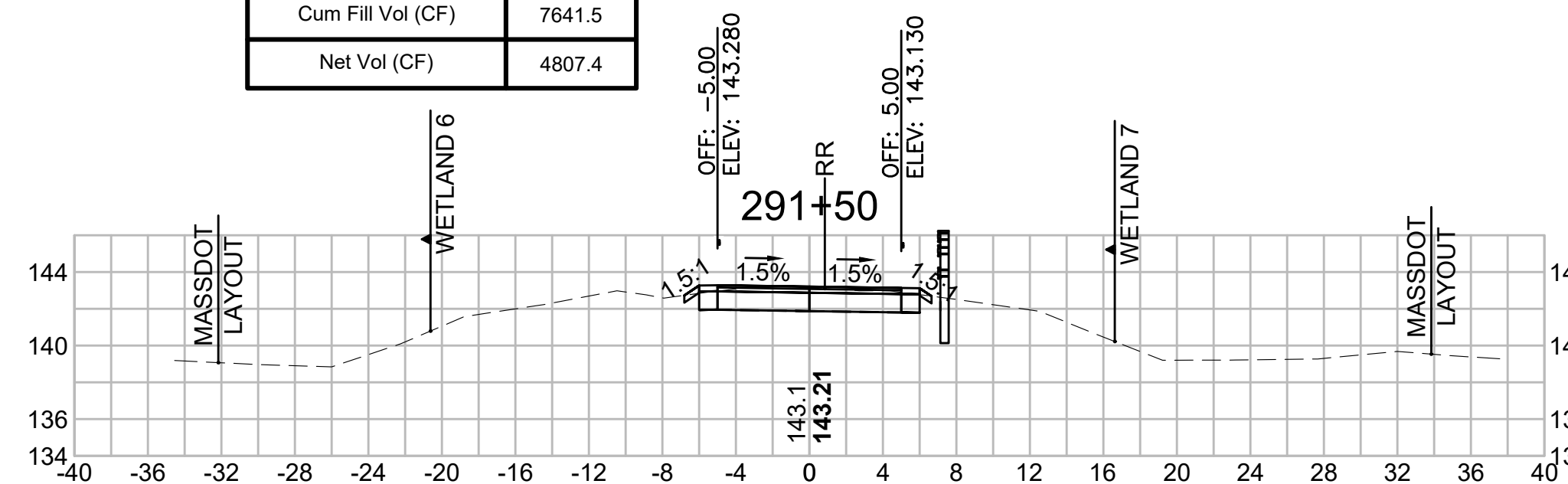
Total Volume at Station 290+00.00

Cut Area (SF)	7.605
Fill Area (SF)	7.084
Cut Vol (CF)	14.0
Fill Vol (CF)	9.7
Cum Cut Vol (CF)	12382.5
Cum Fill Vol (CF)	7630.4
Net Vol (CF)	4752.1



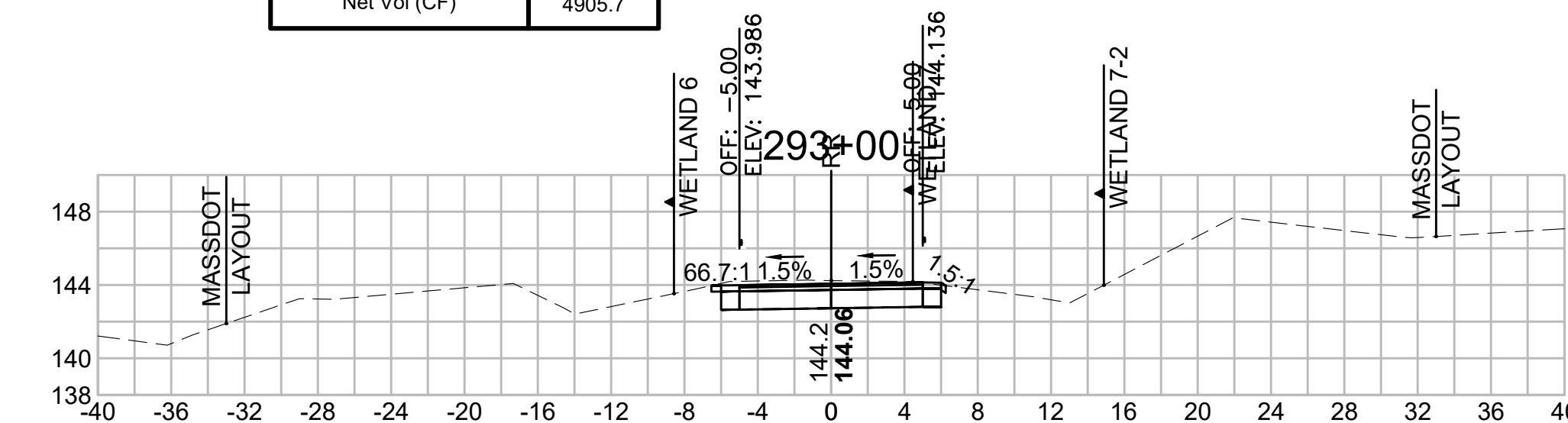
Total Volume at Station 291+50.00

Cut Area (SF)	16.789
Fill Area (SF)	0.009
Cut Vol (CF)	27.8
Fill Vol (CF)	1.0
Cum Cut Vol (CF)	12448.9
Cum Fill Vol (CF)	7641.5
Net Vol (CF)	4807.4



Total Volume at Station 293+00.00

Cut Area (SF)	18.034
Fill Area (SF)	0.000
Cut Vol (CF)	33.0
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	12547.9
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	4905.7



SUDBURY
BRUCE FREEMAN RAIL TRAIL

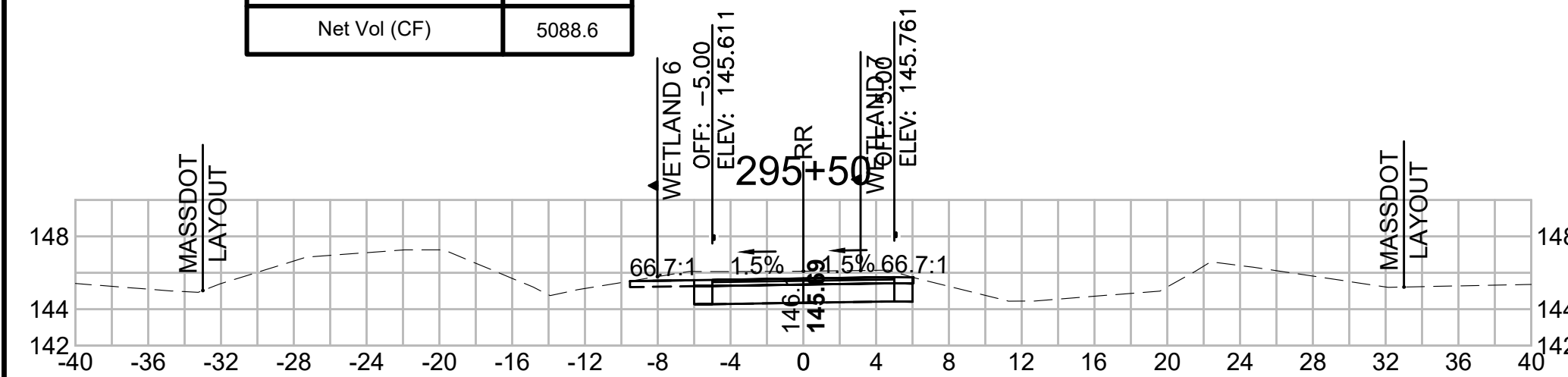
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	289	318

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

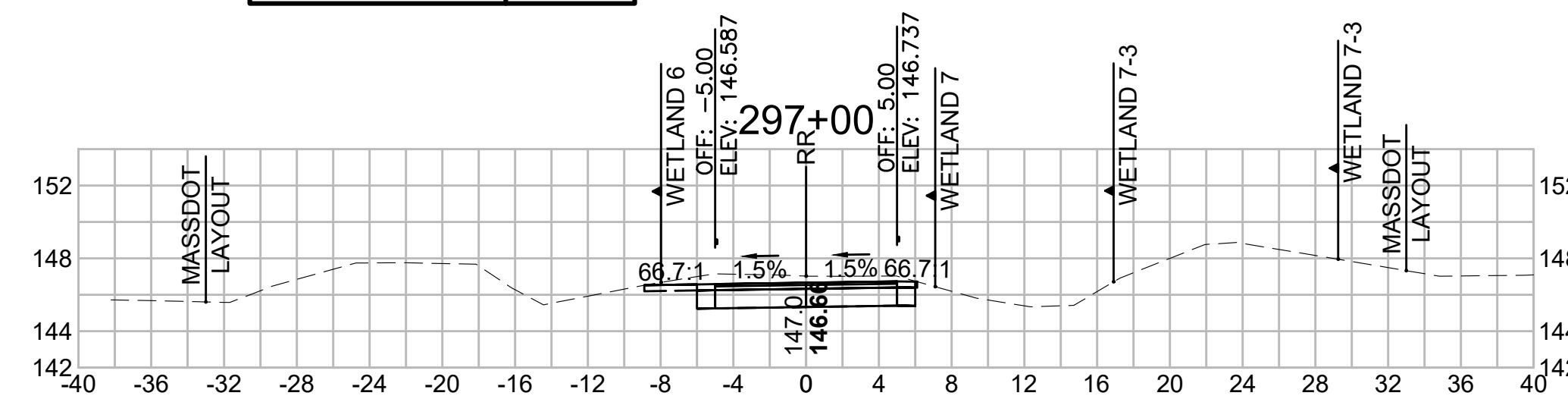
Total Volume at Station 295+50.00

Cut Area (SF)	21.623
Fill Area (SF)	0.000
Cut Vol (CF)	39.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12730.8
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5088.6



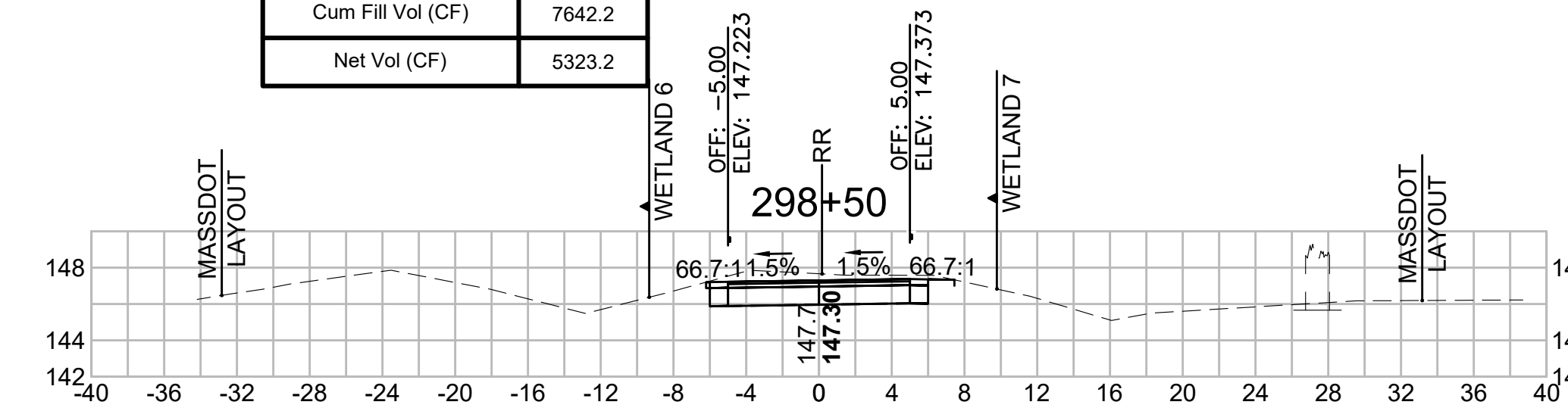
Total Volume at Station 297+00.00

Cut Area (SF)	21.291
Fill Area (SF)	0.000
Cut Vol (CF)	39.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12850.3
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5208.1



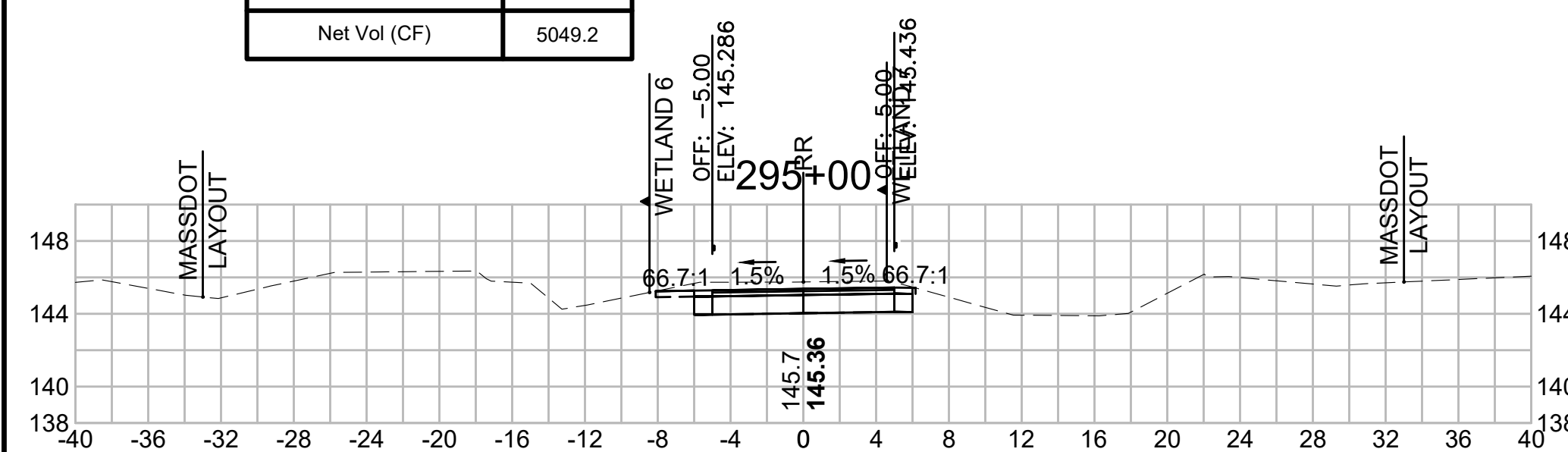
Total Volume at Station 298+50.00

Cut Area (SF)	20.486
Fill Area (SF)	0.000
Cut Vol (CF)	38.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12965.4
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5323.2



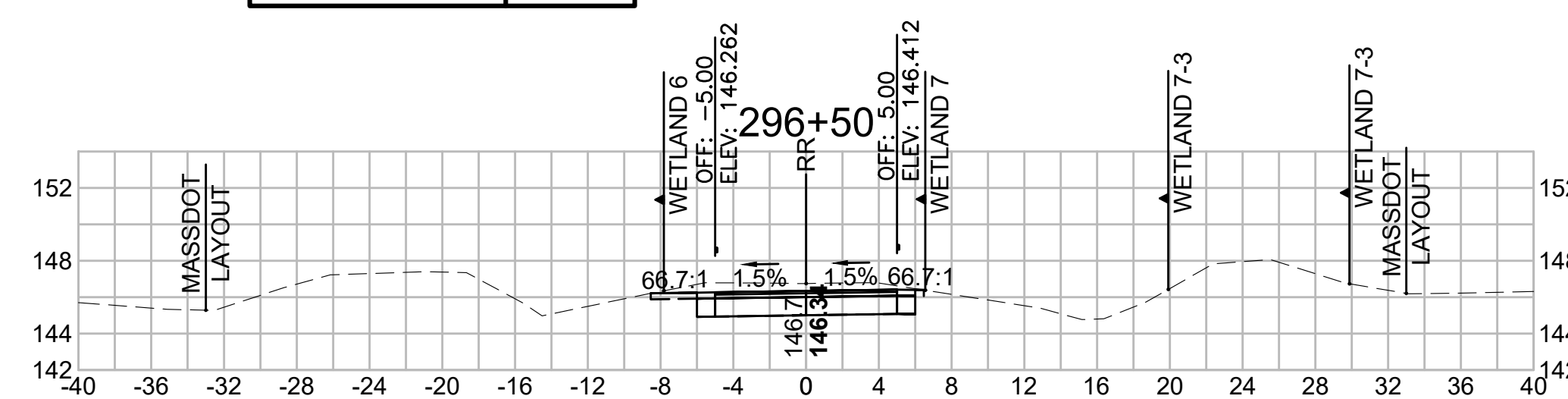
Total Volume at Station 295+00.00

Cut Area (SF)	20.951
Fill Area (SF)	0.000
Cut Vol (CF)	37.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12691.4
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5049.2



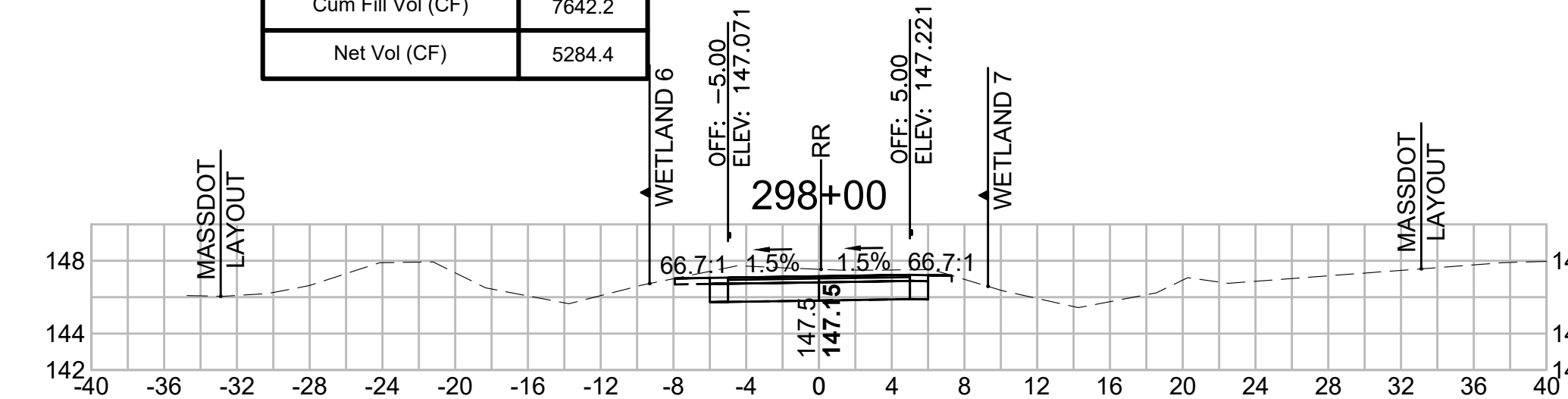
Total Volume at Station 296+50.00

Cut Area (SF)	21.515
Fill Area (SF)	0.000
Cut Vol (CF)	39.9
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12810.7
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5168.5



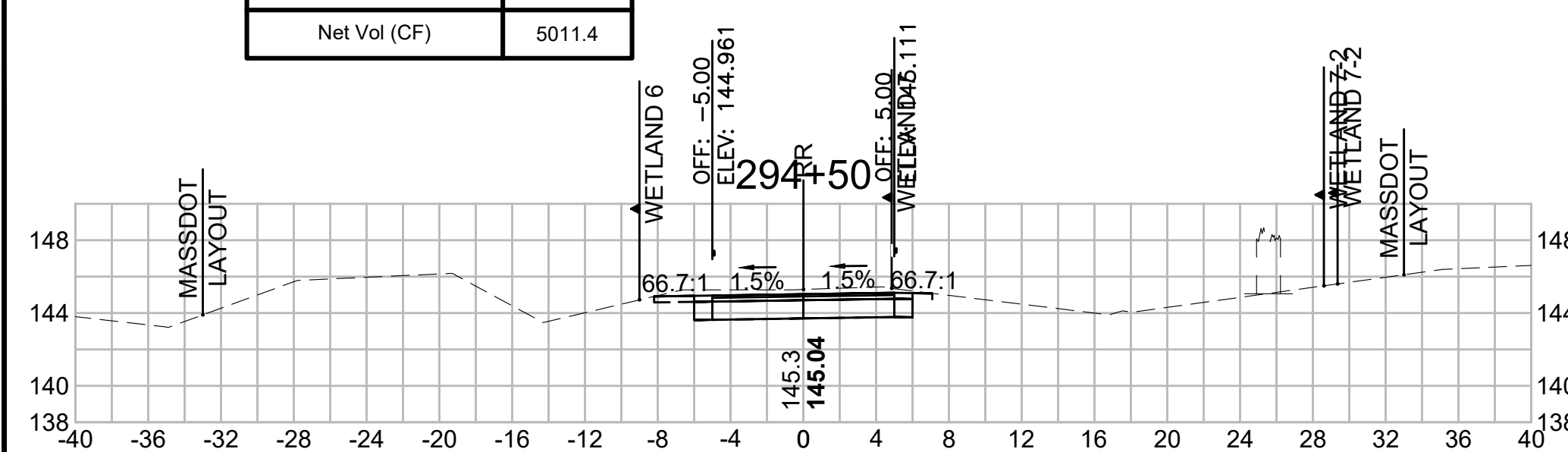
Total Volume at Station 298+00.00

Cut Area (SF)	21.465
Fill Area (SF)	0.000
Cut Vol (CF)	38.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12926.5
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5284.4



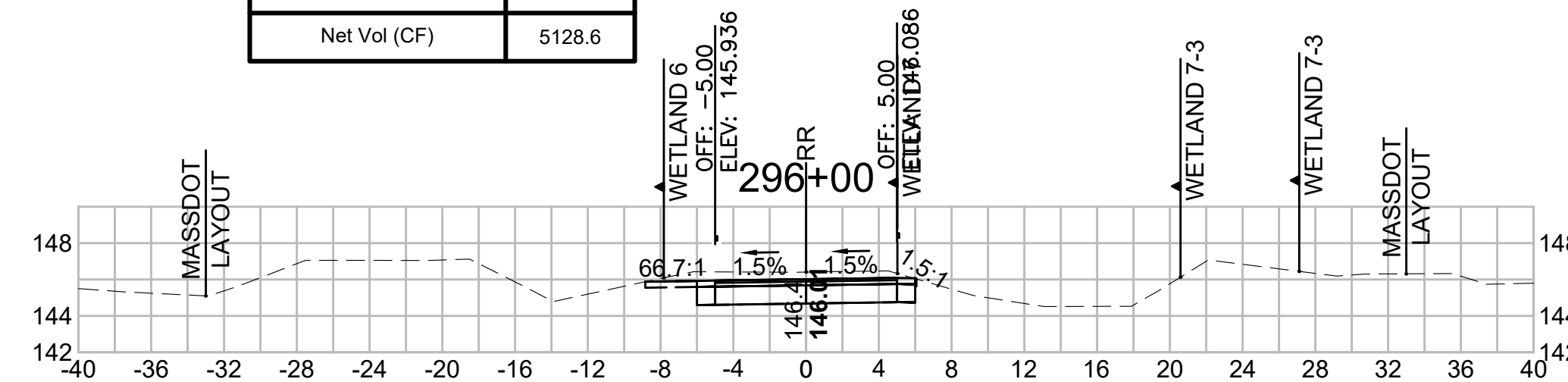
Total Volume at Station 294+50.00

Cut Area (SF)	19.901
Fill Area (SF)	0.000
Cut Vol (CF)	35.9
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12653.5
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5011.4



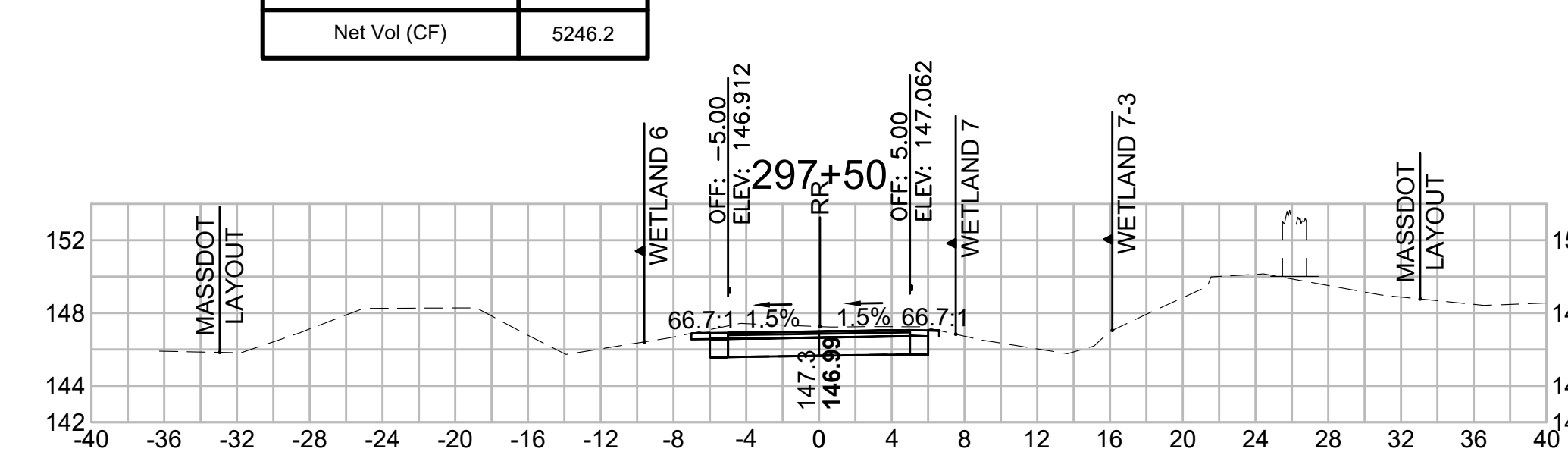
Total Volume at Station 296+00.00

Cut Area (SF)	21.562
Fill Area (SF)	0.000
Cut Vol (CF)	40.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12770.8
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5128.6



Total Volume at Station 297+50.00

Cut Area (SF)	19.792
Fill Area (SF)	0.000
Cut Vol (CF)	38.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	12888.3
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5246.2



SUDBURY
BRUCE FREEMAN RAIL TRAIL

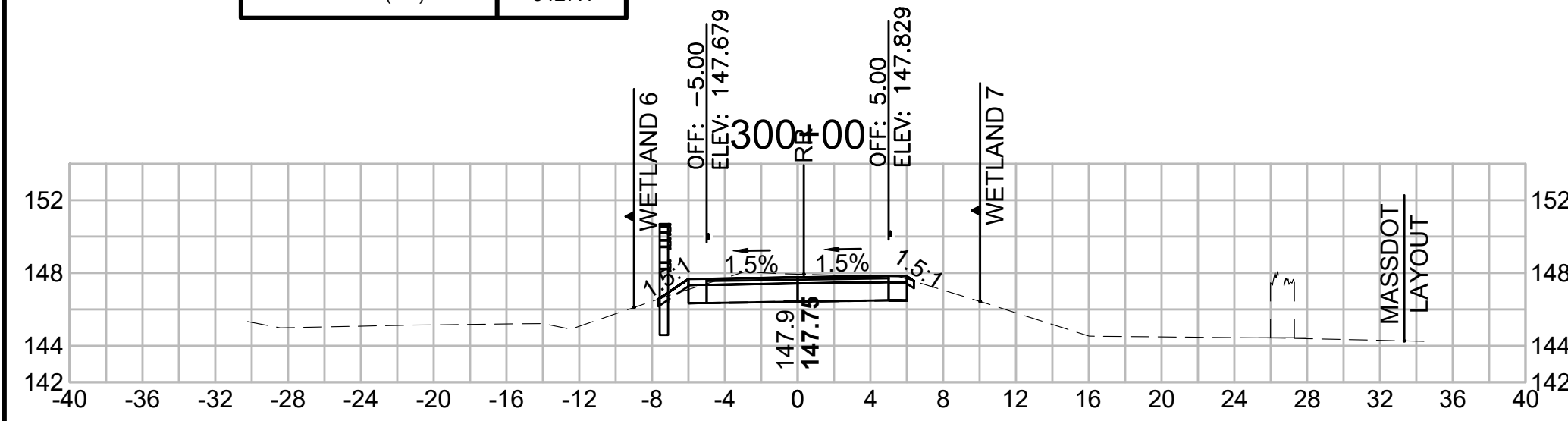
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	290	318

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

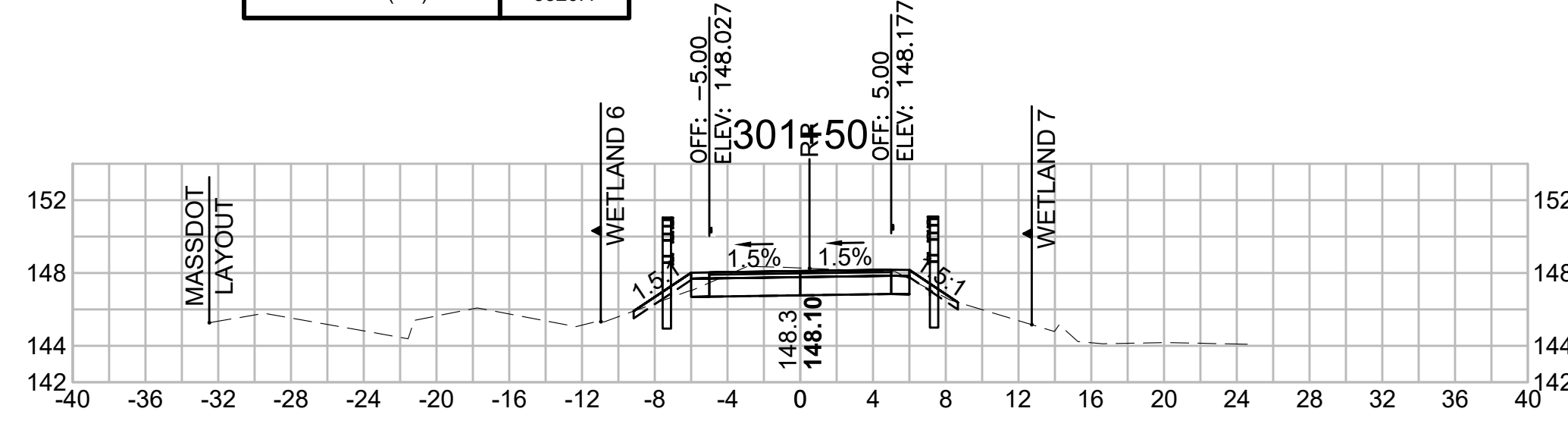
Total Volume at Station 300+00.00

Cut Area (SF)	17.154
Fill Area (SF)	0.043
Cut Vol (CF)	32.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	13069.3
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5427.1



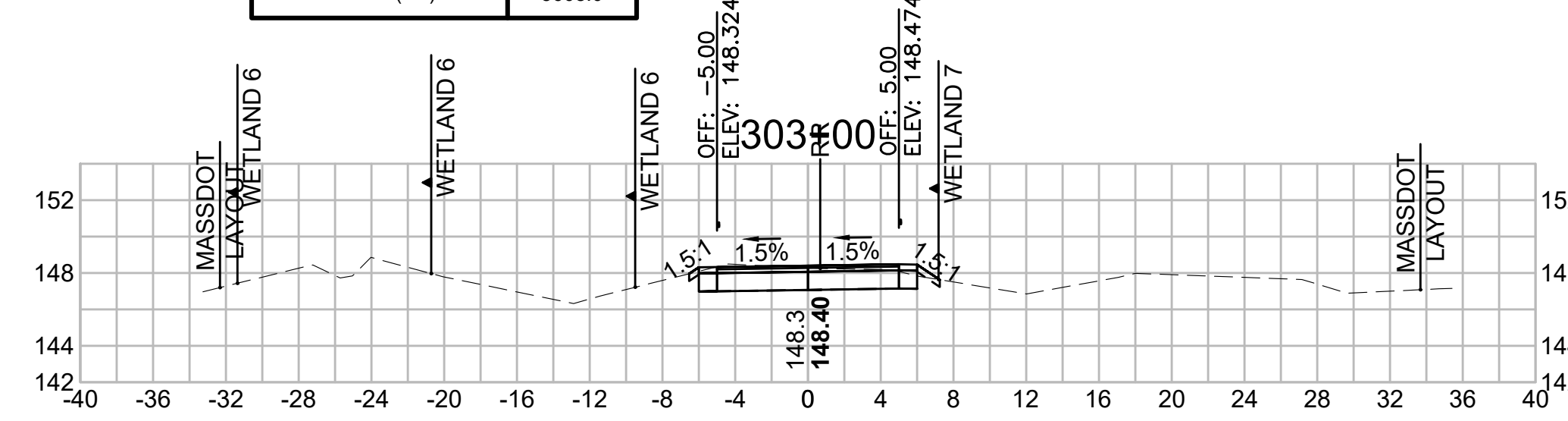
Total Volume at Station 301+50.00

Cut Area (SF)	16.144
Fill Area (SF)	0.556
Cut Vol (CF)	30.8
Fill Vol (CF)	0.6
Cum Cut Vol (CF)	13163.4
Cum Fill Vol (CF)	7643.0
Net Vol (CF)	5520.4



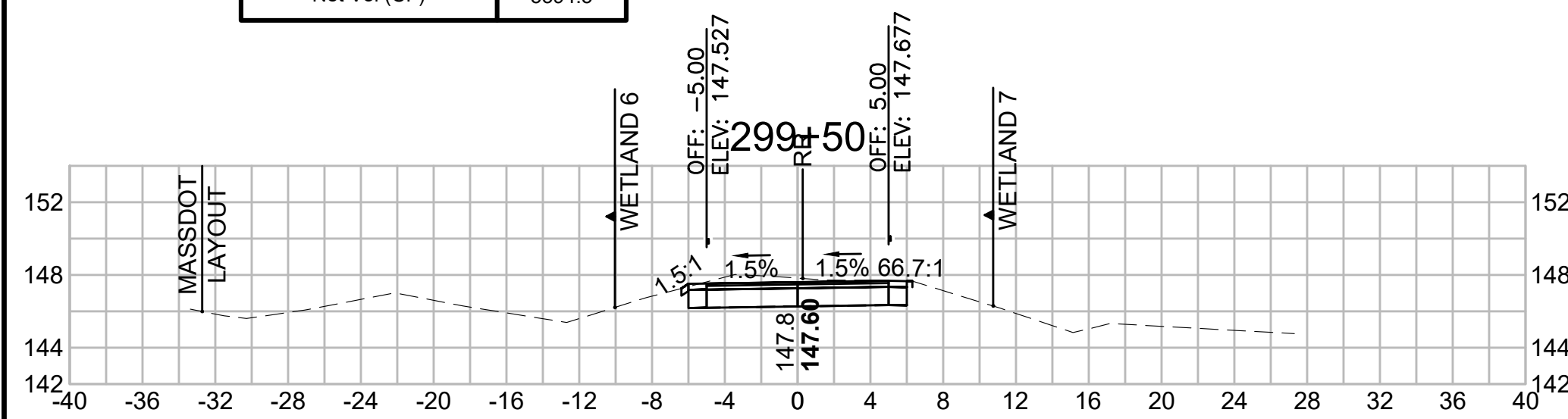
Total Volume at Station 303+00.00

Cut Area (SF)	14.693
Fill Area (SF)	0.053
Cut Vol (CF)	28.2
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	13251.7
Cum Fill Vol (CF)	7643.8
Net Vol (CF)	5608.0



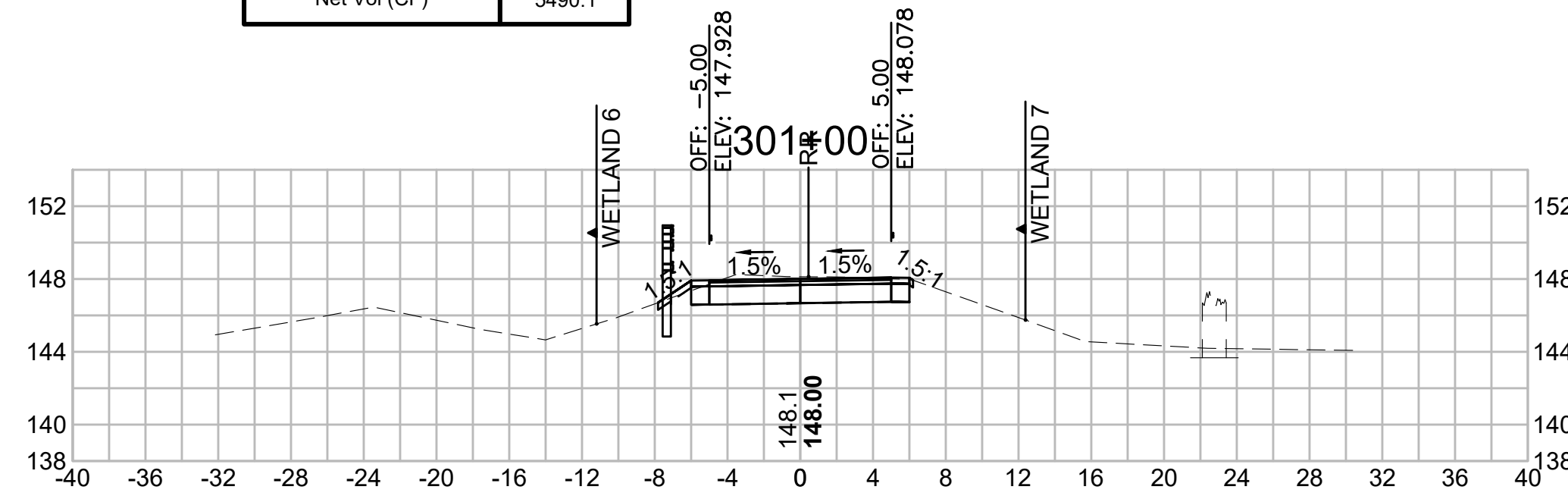
Total Volume at Station 299+50.00

Cut Area (SF)	18.190
Fill Area (SF)	0.000
Cut Vol (CF)	34.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	13036.6
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5394.5



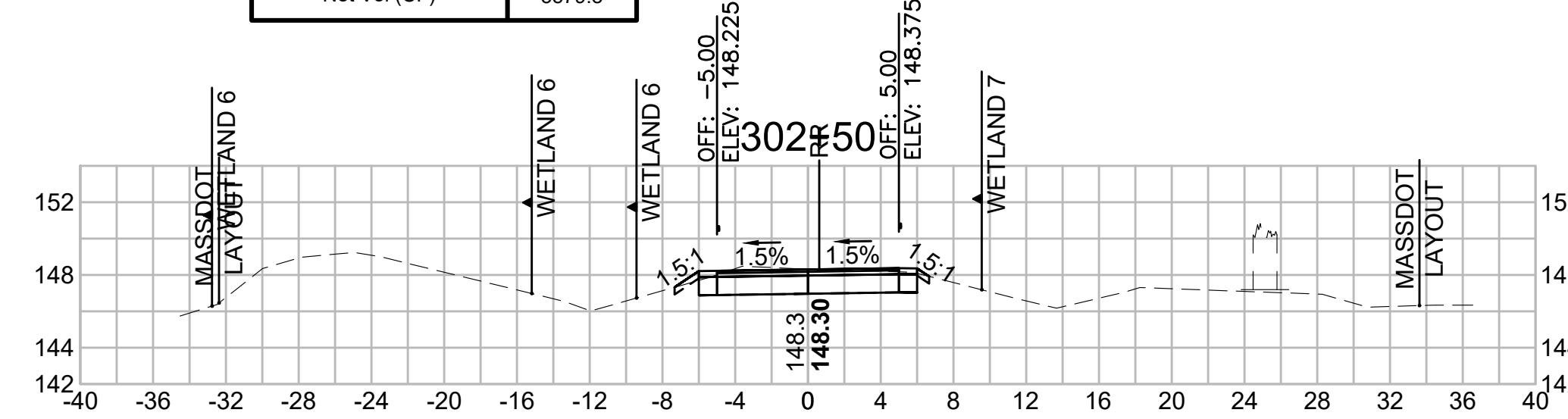
Total Volume at Station 301+00.00

Cut Area (SF)	17.105
Fill Area (SF)	0.042
Cut Vol (CF)	31.6
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	13132.6
Cum Fill Vol (CF)	7642.5
Net Vol (CF)	5490.1



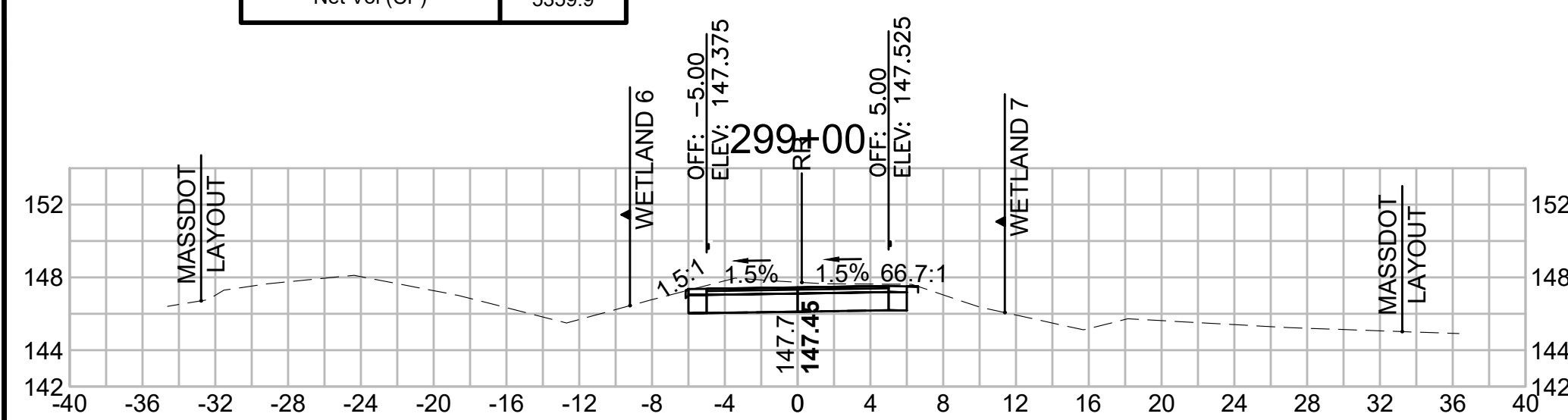
Total Volume at Station 302+50.00

Cut Area (SF)	15.798
Fill Area (SF)	0.017
Cut Vol (CF)	29.9
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	13223.5
Cum Fill Vol (CF)	7643.7
Net Vol (CF)	5579.8



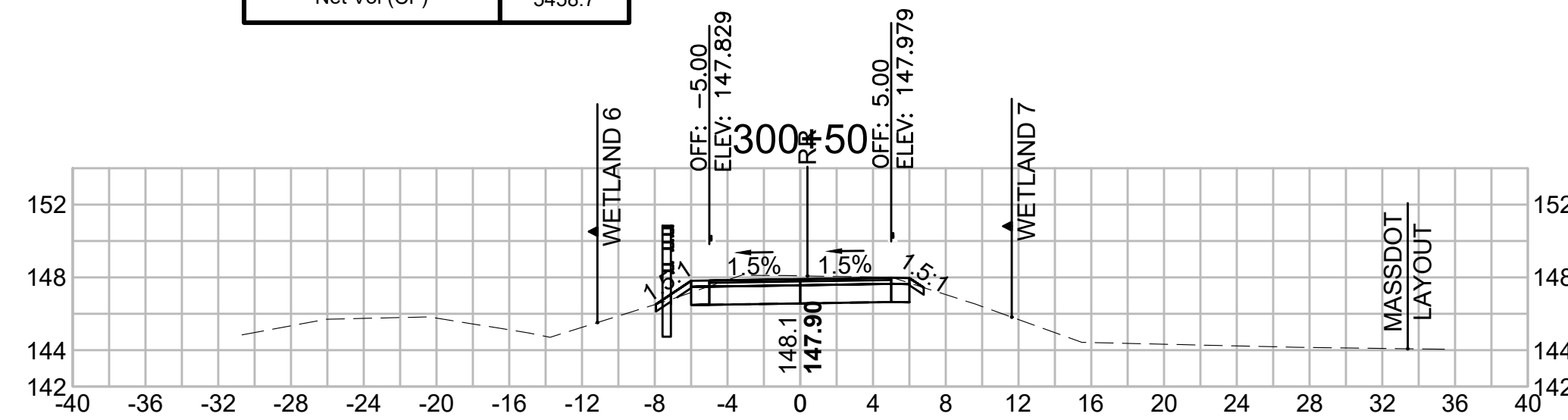
Total Volume at Station 299+00.00

Cut Area (SF)	19.134
Fill Area (SF)	0.000
Cut Vol (CF)	36.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	13002.1
Cum Fill Vol (CF)	7642.2
Net Vol (CF)	5359.9



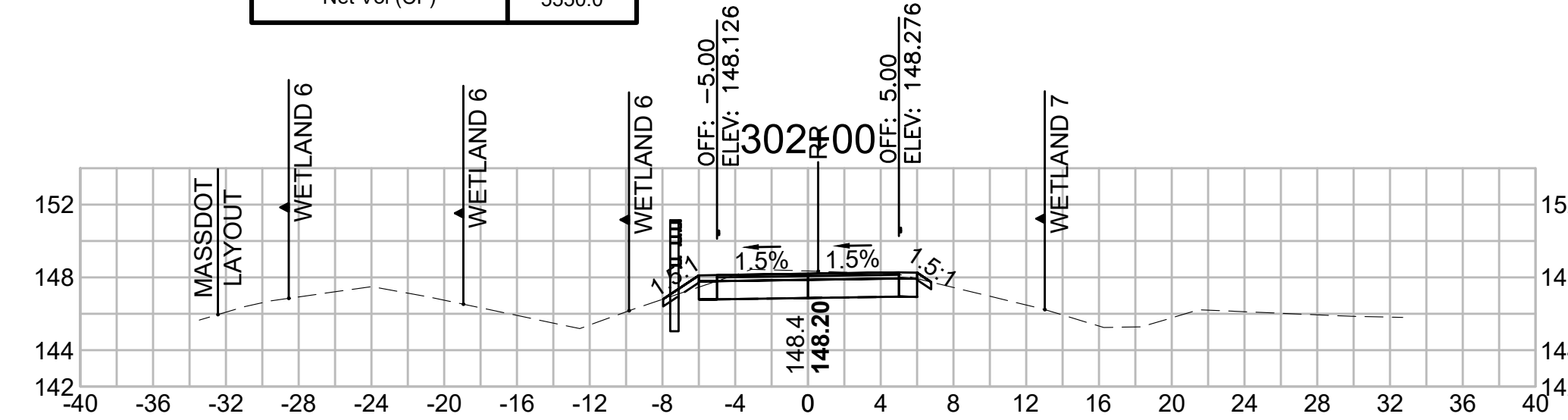
Total Volume at Station 300+50.00

Cut Area (SF)	17.029
Fill Area (SF)	0.093
Cut Vol (CF)	31.7
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	13101.0
Cum Fill Vol (CF)	7642.3
Net Vol (CF)	5458.7



Total Volume at Station 302+00.00

Cut Area (SF)	16.496
Fill Area (SF)	0.094
Cut Vol (CF)	30.2
Fill Vol (CF)	0.6
Cum Cut Vol (CF)	13193.6
Cum Fill Vol (CF)	7643.6
Net Vol (CF)	5550.0



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	291	318

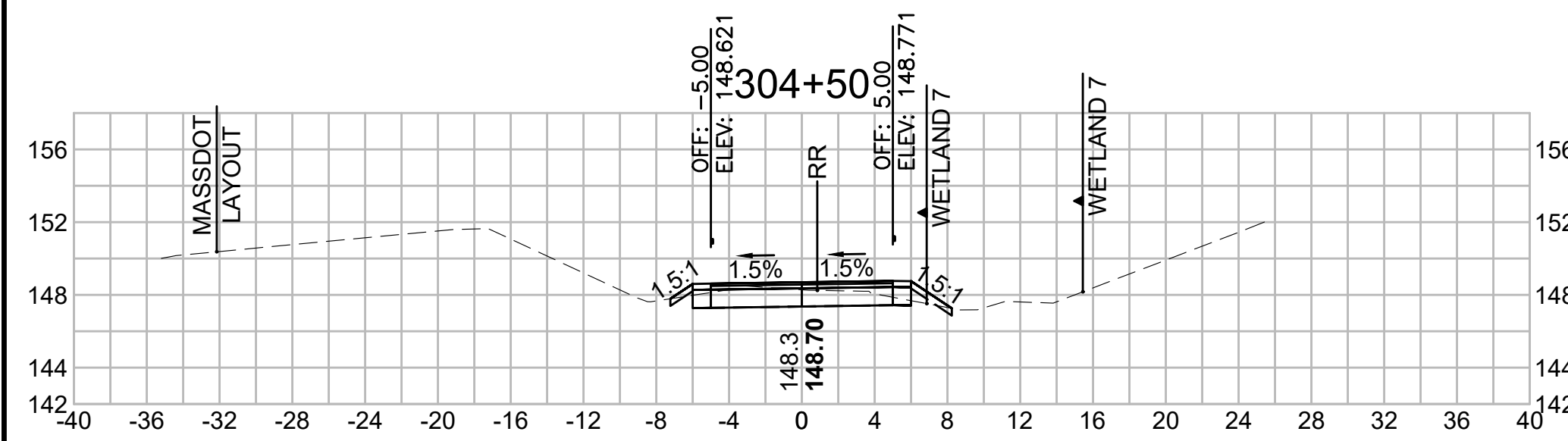
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

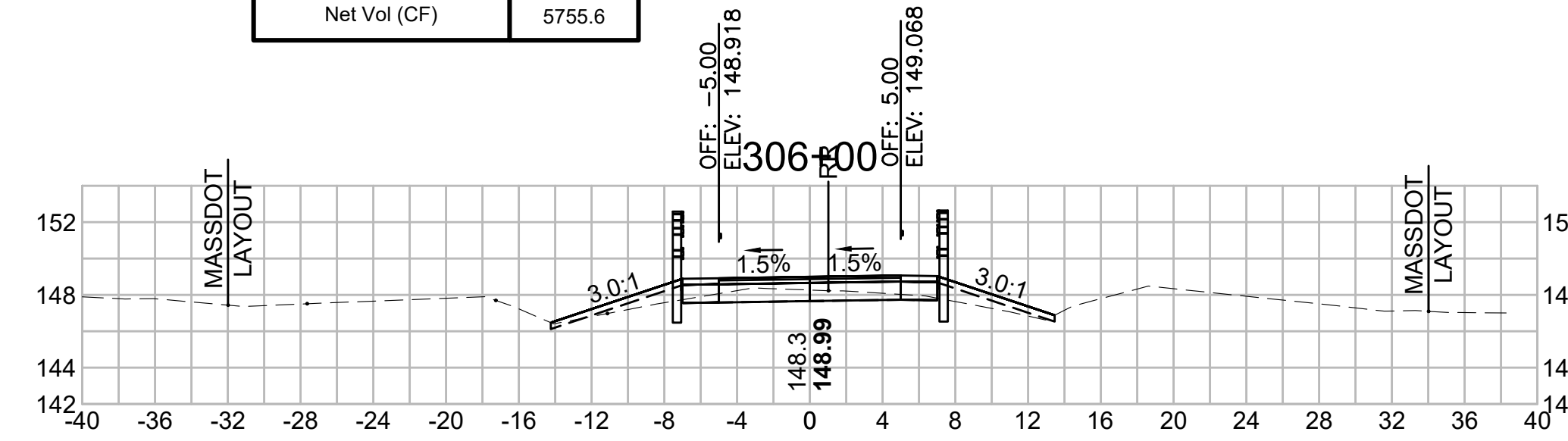
Total Volume at Station 304+50.00

Cut Area (SF)	12.586
Fill Area (SF)	0.527
Cut Vol (CF)	22.6
Fill Vol (CF)	0.5
Cum Cut Vol (CF)	13323.2
Cum Fill Vol (CF)	7644.5
Net Vol (CF)	5678.7



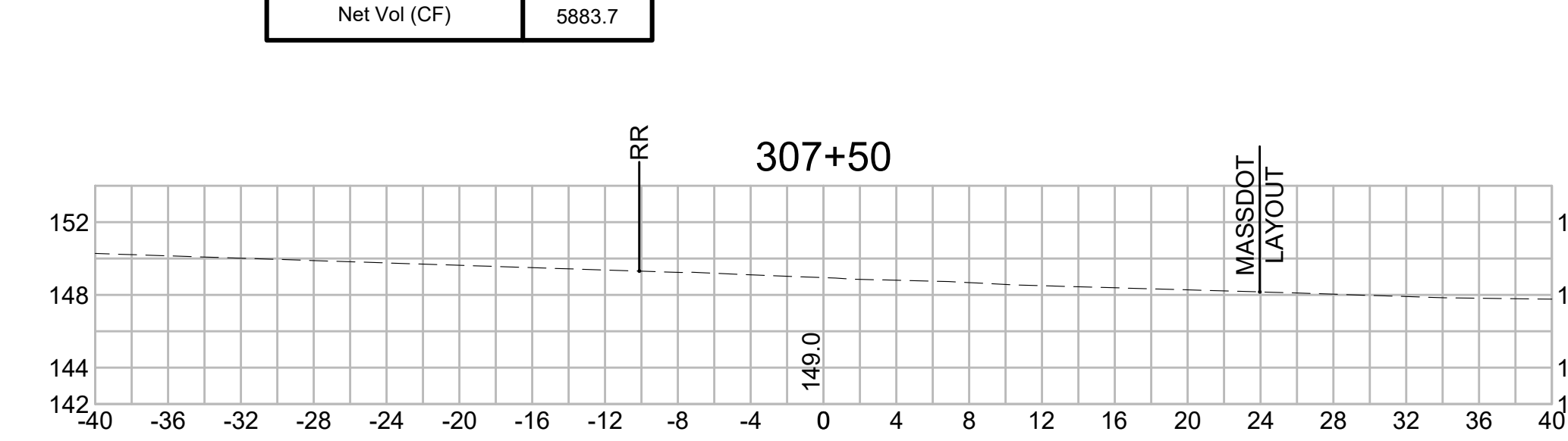
Total Volume at Station 306+00.00

Cut Area (SF)	14.361
Fill Area (SF)	4.761
Cut Vol (CF)	29.7
Fill Vol (CF)	8.9
Cum Cut Vol (CF)	13414.4
Cum Fill Vol (CF)	7658.8
Net Vol (CF)	5755.6



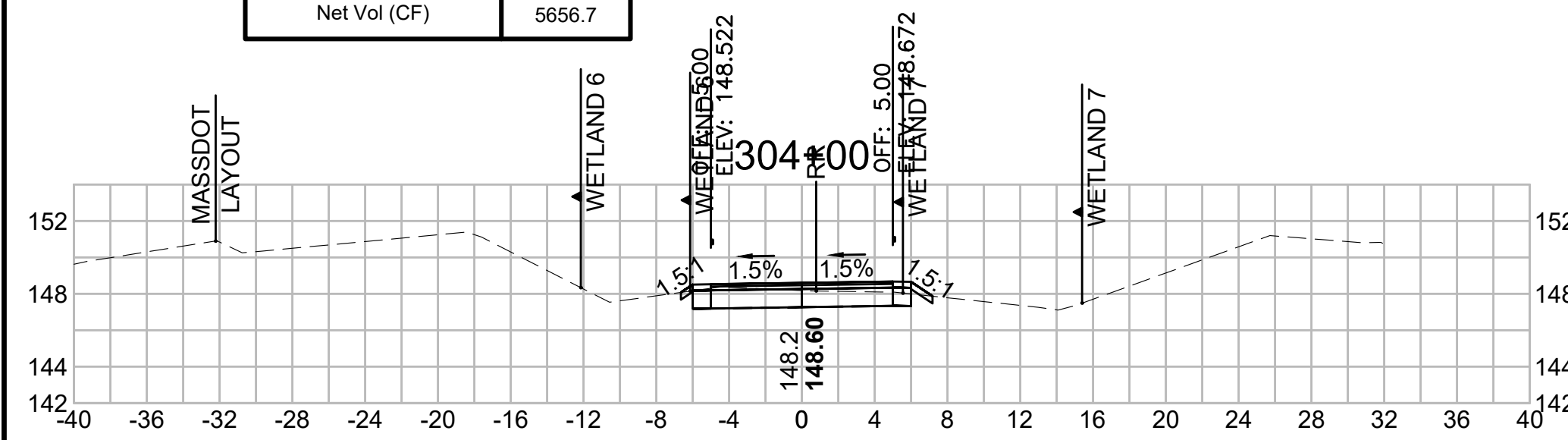
Total Volume at Station 307+50.00

Cut Area (SF)	80.230
Fill Area (SF)	0.000
Cut Vol (CF)	100.9
Fill Vol (CF)	12.2
Cum Cut Vol (CF)	13580.5
Cum Fill Vol (CF)	7696.8
Net Vol (CF)	5883.7



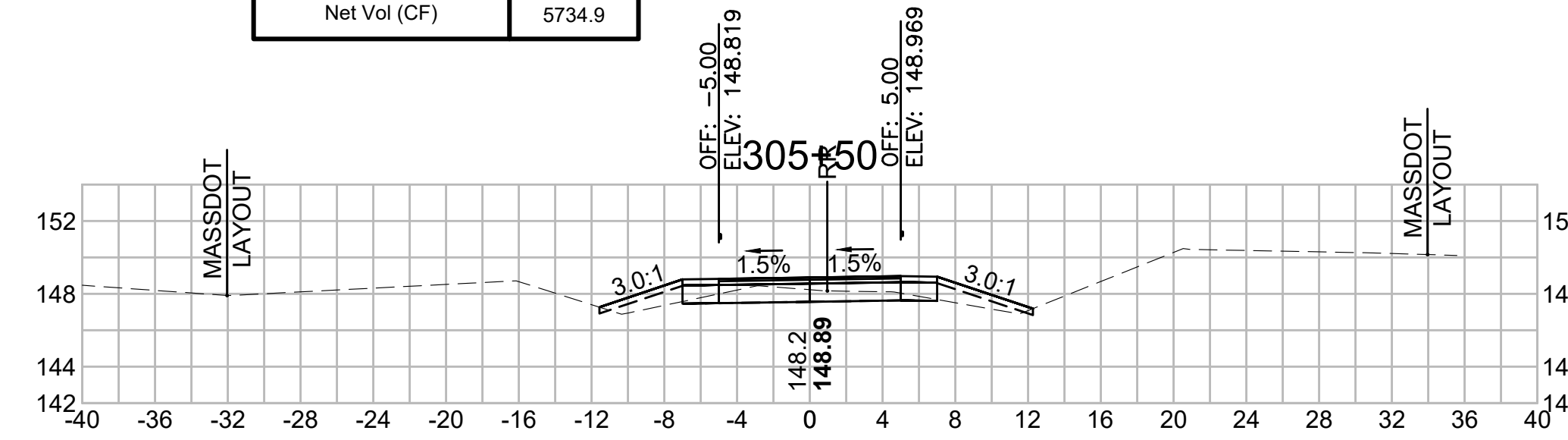
Total Volume at Station 304+00.00

Cut Area (SF)	11.791
Fill Area (SF)	0.064
Cut Vol (CF)	23.1
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	13300.6
Cum Fill Vol (CF)	7643.9
Net Vol (CF)	5656.7



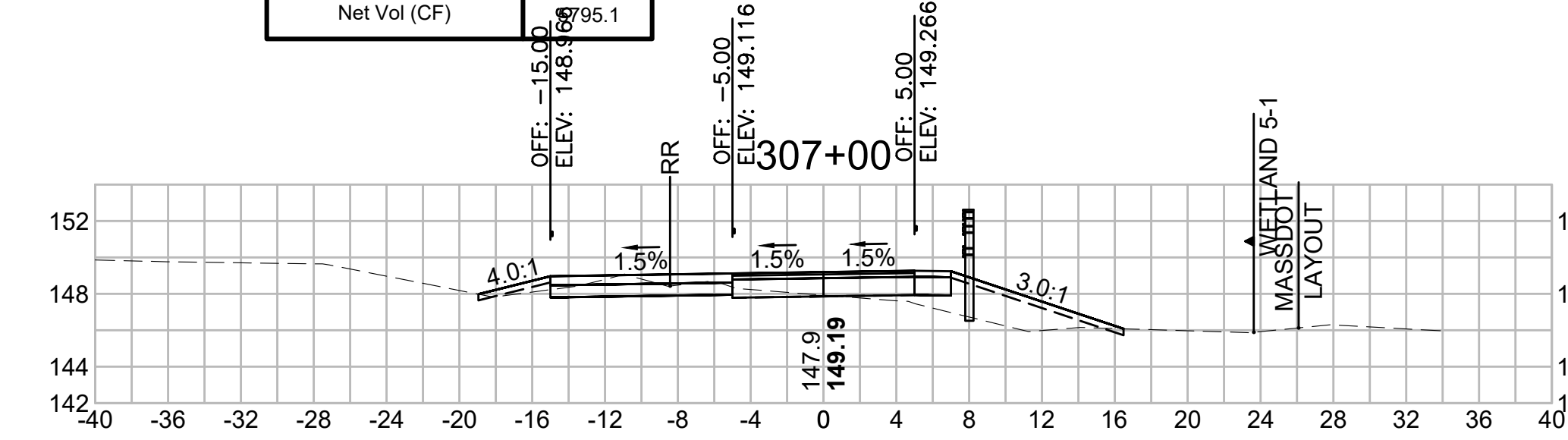
Total Volume at Station 305+50.00

Cut Area (SF)	17.675
Fill Area (SF)	4.848
Cut Vol (CF)	33.1
Fill Vol (CF)	4.7
Cum Cut Vol (CF)	13384.8
Cum Fill Vol (CF)	7649.9
Net Vol (CF)	5734.9



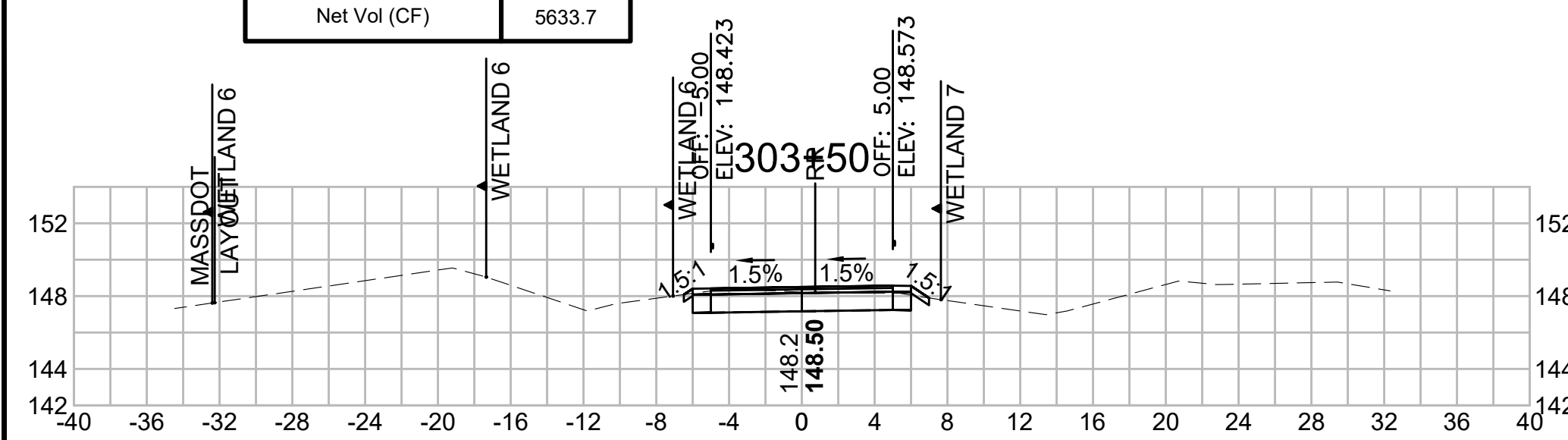
Total Volume at Station 307+00.00

Cut Area (SF)	28.724
Fill Area (SF)	13.211
Cut Vol (CF)	39.3
Fill Vol (CF)	16.8
Cum Cut Vol (CF)	13479.6
Cum Fill Vol (CF)	7684.6
Net Vol (CF)	5795.1



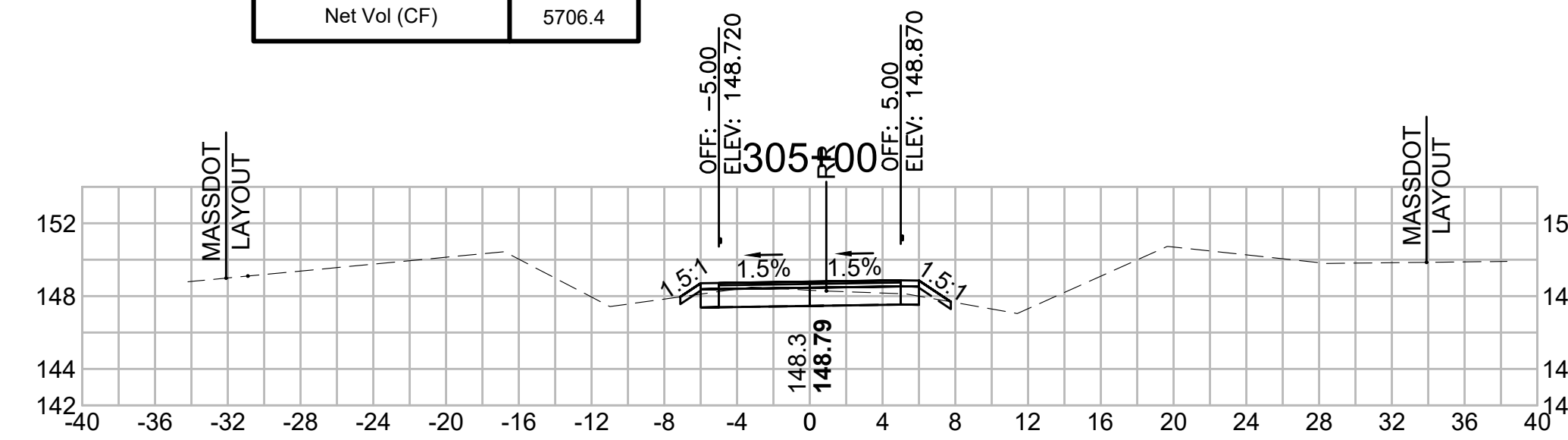
Total Volume at Station 303+50.00

Cut Area (SF)	13.145
Fill Area (SF)	0.011
Cut Vol (CF)	25.8
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	13277.5
Cum Fill Vol (CF)	7643.8
Net Vol (CF)	5633.7



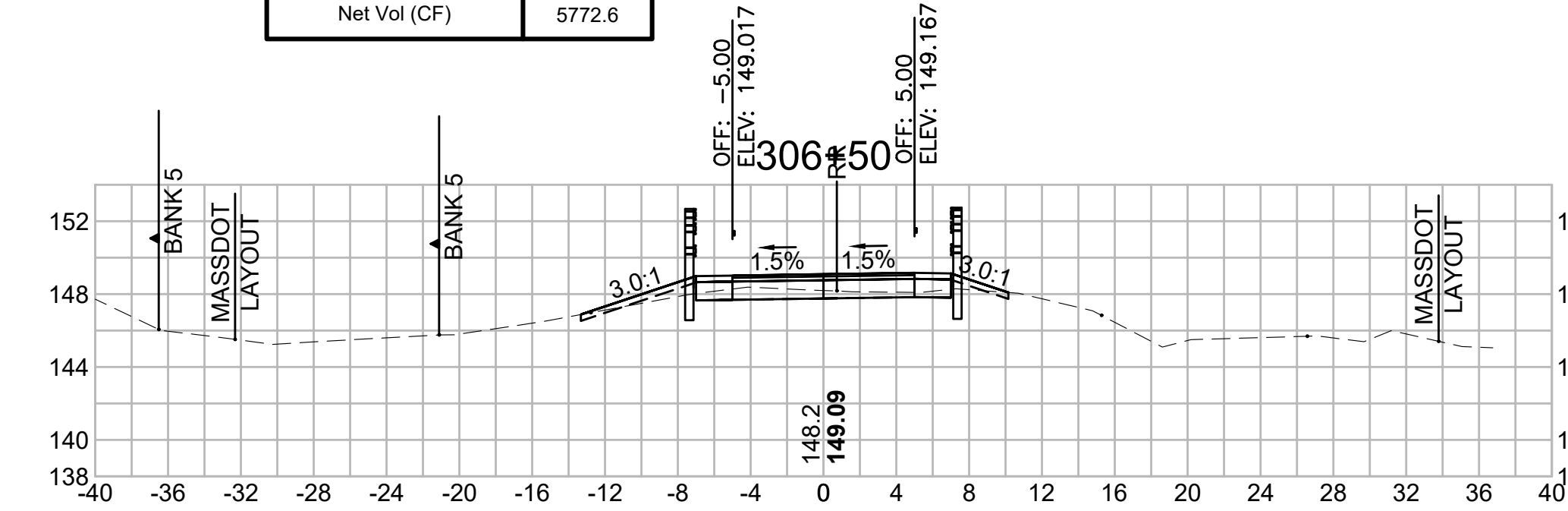
Total Volume at Station 305+00.00

Cut Area (SF)	18.122
Fill Area (SF)	0.254
Cut Vol (CF)	28.4
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	13351.6
Cum Fill Vol (CF)	7645.2
Net Vol (CF)	5706.4



Total Volume at Station 306+50.00

Cut Area (SF)	13.675
Fill Area (SF)	4.927
Cut Vol (CF)	26.0
Fill Vol (CF)	9.0
Cum Cut Vol (CF)	13440.4
Cum Fill Vol (CF)	7667.8
Net Vol (CF)	5772.6



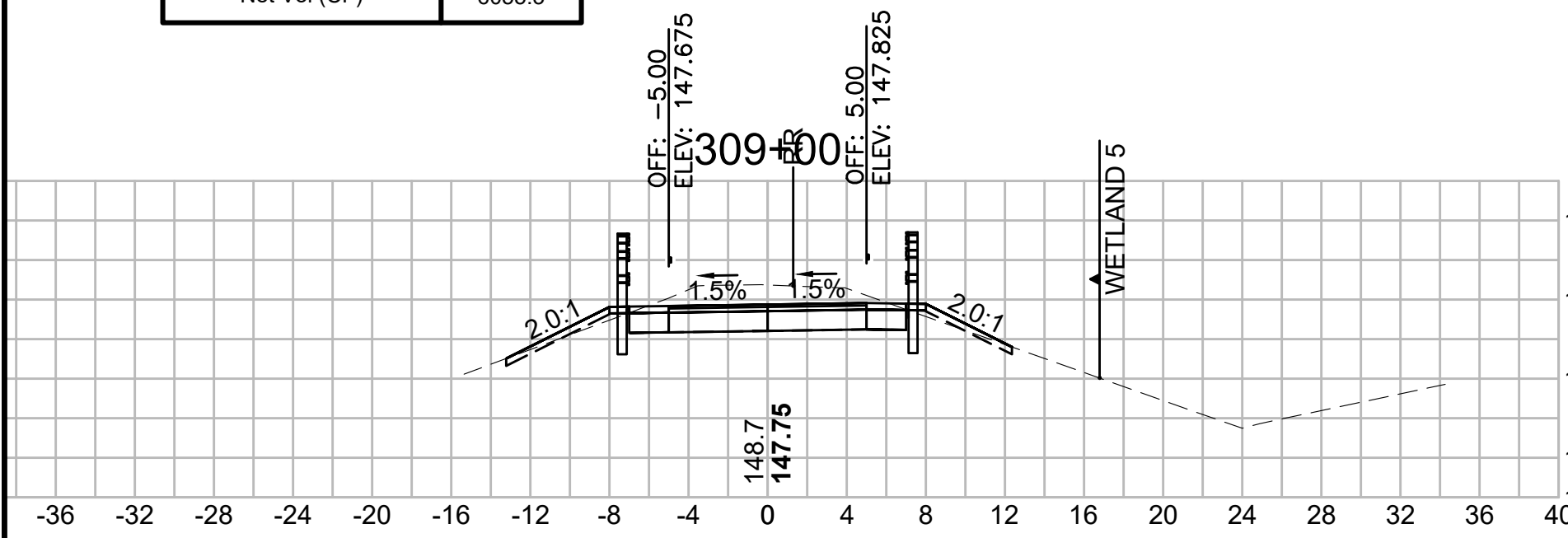
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	292	318

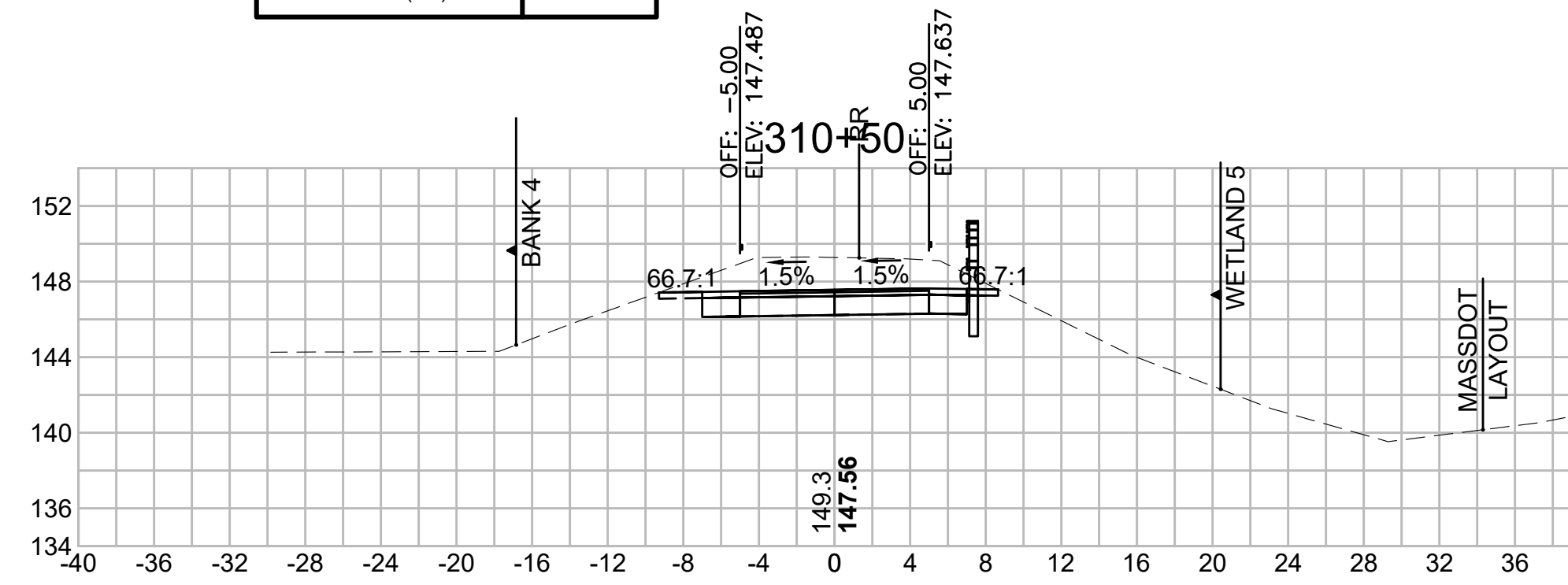
PROJECT FILE NO. 608164

CROSS SECTIONS

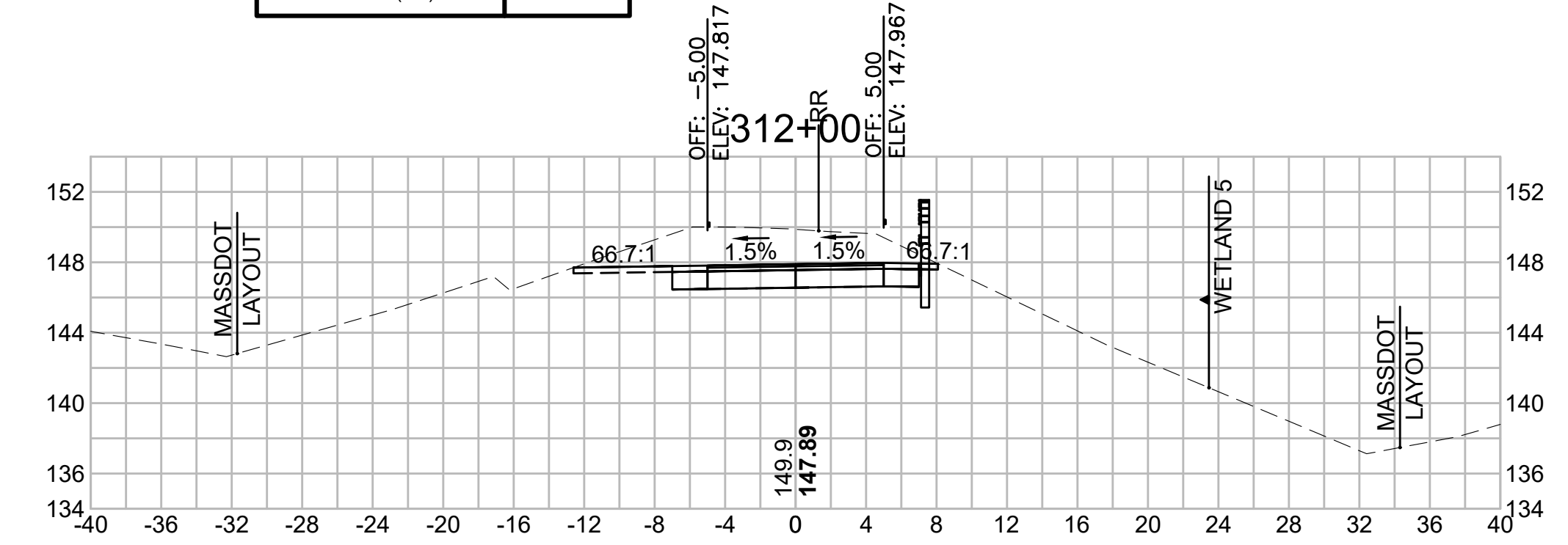
Total Volume at Station 309+00.00	
Cut Area (SF)	28.856
Fill Area (SF)	1.521
Cut Vol (CF)	50.8
Fill Vol (CF)	1.6
Cum Cut Vol (CF)	13761.9
Cum Fill Vol (CF)	7706.6
Net Vol (CF)	6055.3



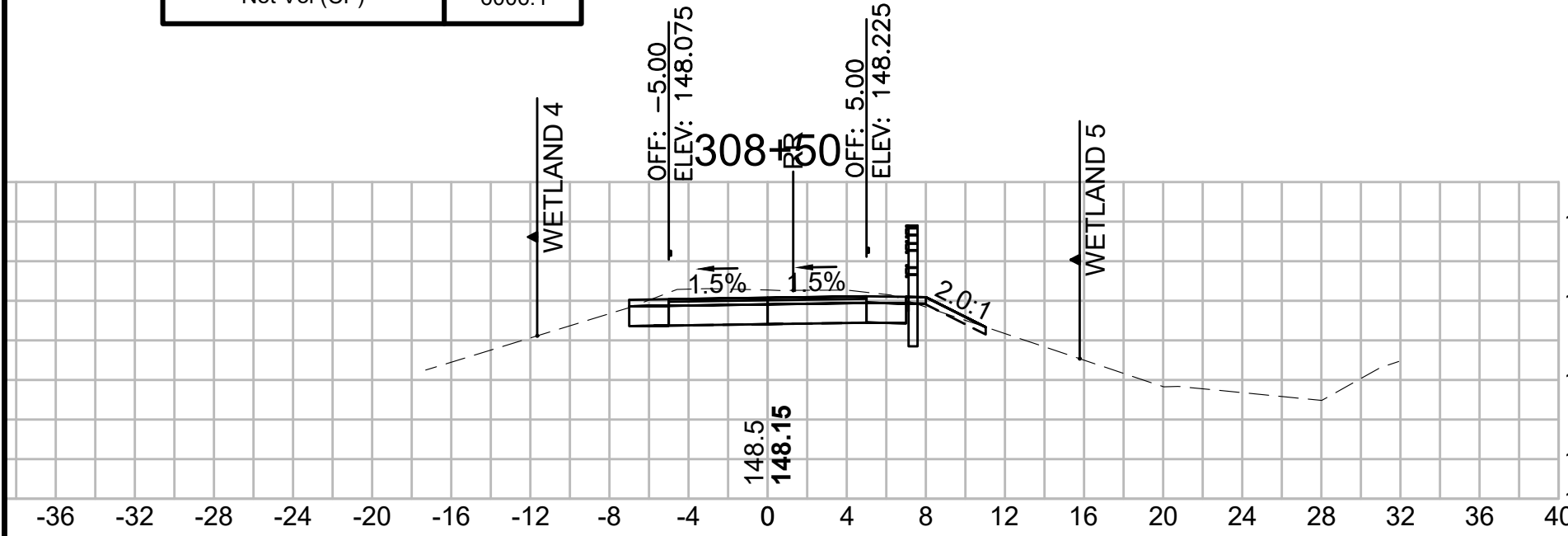
Total Volume at Station 310+50.00	
Cut Area (SF)	47.202
Fill Area (SF)	0.000
Cut Vol (CF)	87.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	13996.8
Cum Fill Vol (CF)	7718.5
Net Vol (CF)	6278.3



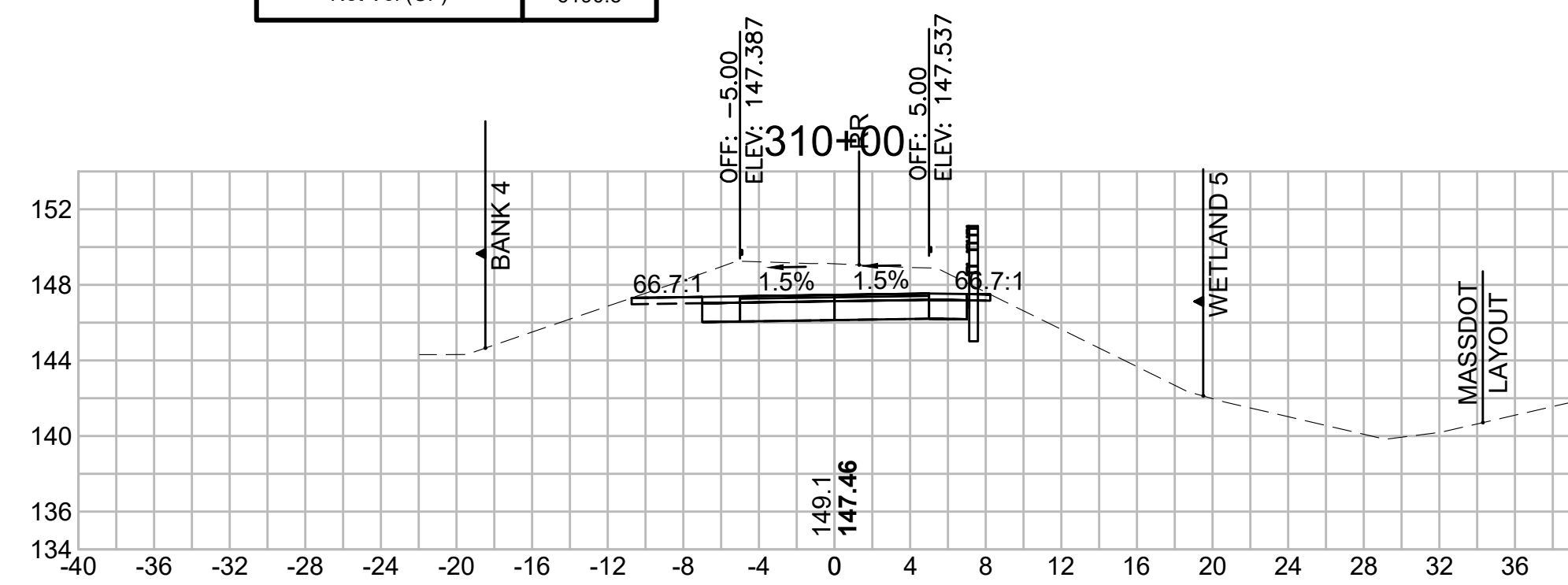
Total Volume at Station 312+00.00	
Cut Area (SF)	59.214
Fill Area (SF)	0.123
Cut Vol (CF)	118.2
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	14336.5
Cum Fill Vol (CF)	7718.9
Net Vol (CF)	6617.5



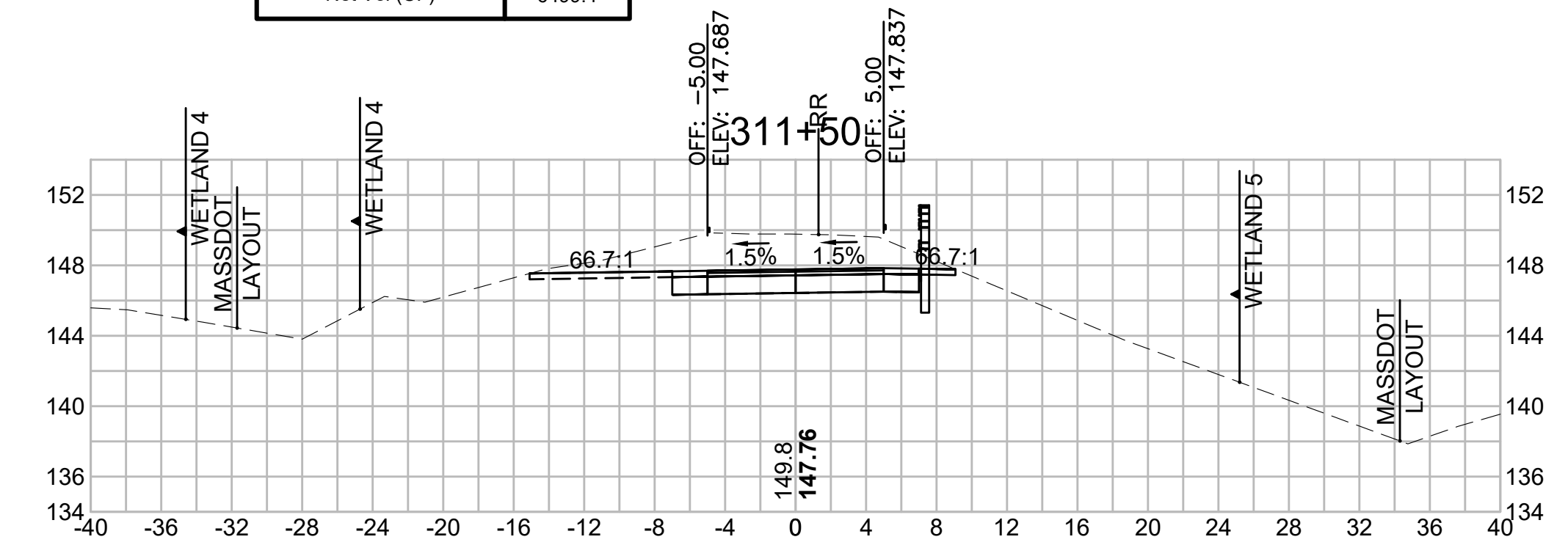
Total Volume at Station 308+50.00	
Cut Area (SF)	25.972
Fill Area (SF)	0.214
Cut Vol (CF)	40.2
Fill Vol (CF)	4.2
Cum Cut Vol (CF)	13711.1
Cum Fill Vol (CF)	7705.0
Net Vol (CF)	6006.1



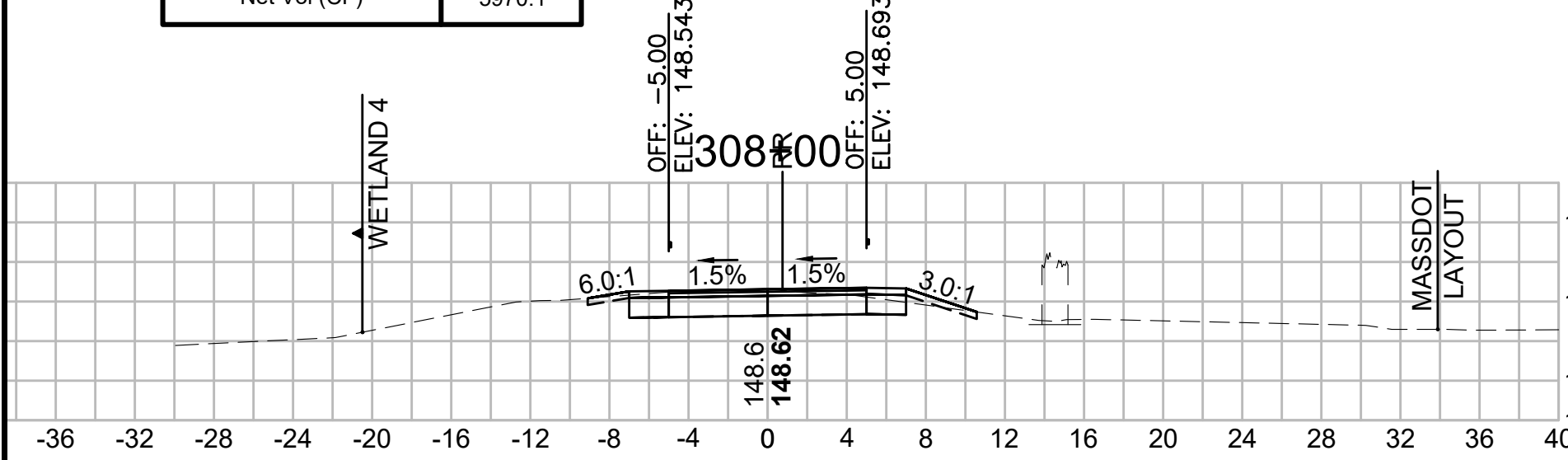
Total Volume at Station 310+00.00	
Cut Area (SF)	47.665
Fill Area (SF)	0.000
Cut Vol (CF)	82.3
Fill Vol (CF)	5.3
Cum Cut Vol (CF)	13909.0
Cum Fill Vol (CF)	7718.5
Net Vol (CF)	6190.5



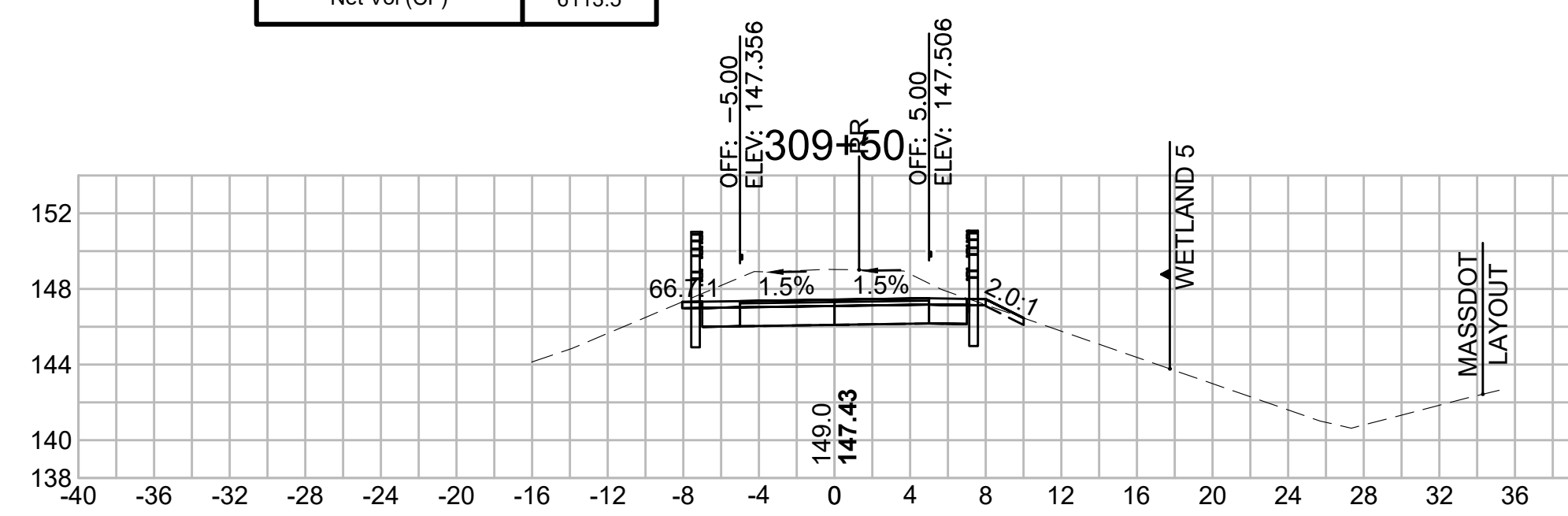
Total Volume at Station 311+50.00	
Cut Area (SF)	68.474
Fill Area (SF)	0.000
Cut Vol (CF)	120.6
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	14218.2
Cum Fill Vol (CF)	7718.8
Net Vol (CF)	6499.4



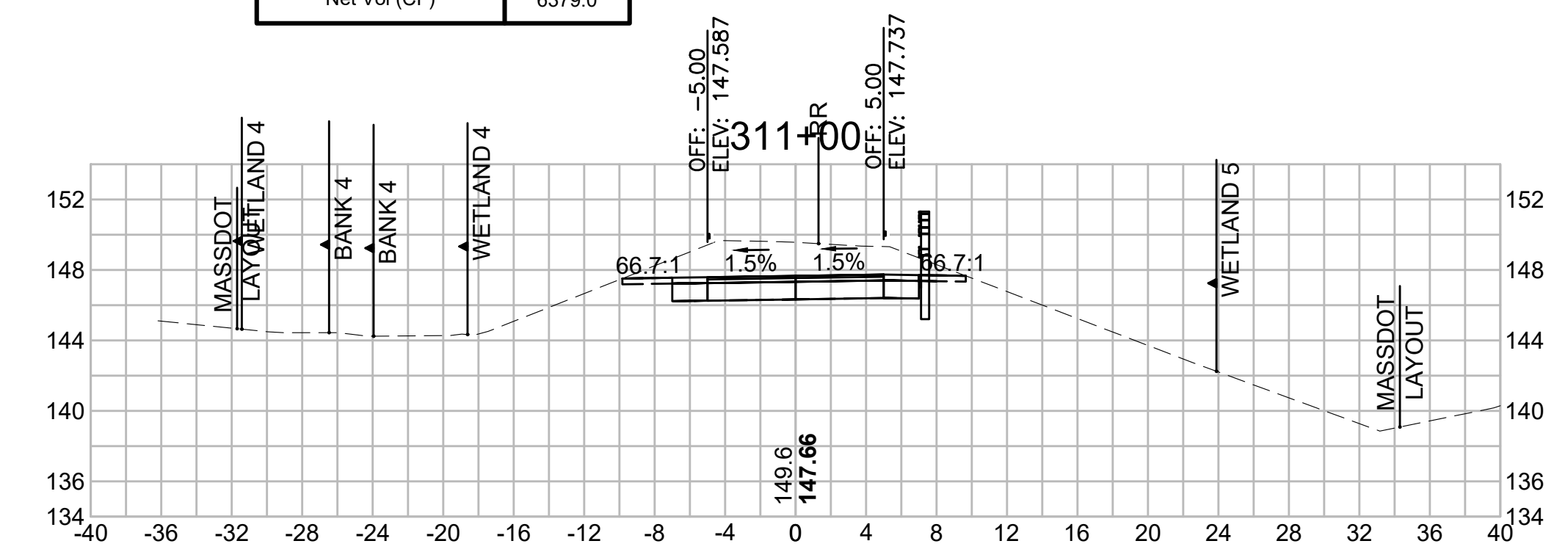
Total Volume at Station 308+00.00	
Cut Area (SF)	17.407
Fill Area (SF)	4.301
Cut Vol (CF)	90.4
Fill Vol (CF)	4.0
Cum Cut Vol (CF)	13670.9
Cum Fill Vol (CF)	7700.8
Net Vol (CF)	5970.1



Total Volume at Station 309+50.00	
Cut Area (SF)	41.186
Fill Area (SF)	5.677
Cut Vol (CF)	64.9
Fill Vol (CF)	6.7
Cum Cut Vol (CF)	13826.7
Cum Fill Vol (CF)	7713.2
Net Vol (CF)	6113.5



Total Volume at Station 311+00.00	
Cut Area (SF)	61.726
Fill Area (SF)	0.185
Cut Vol (CF)	100.9
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	14097.7
Cum Fill Vol (CF)	7718.7
Net Vol (CF)	6379.0



SUDBURY
BRUCE FREEMAN RAIL TRAIL

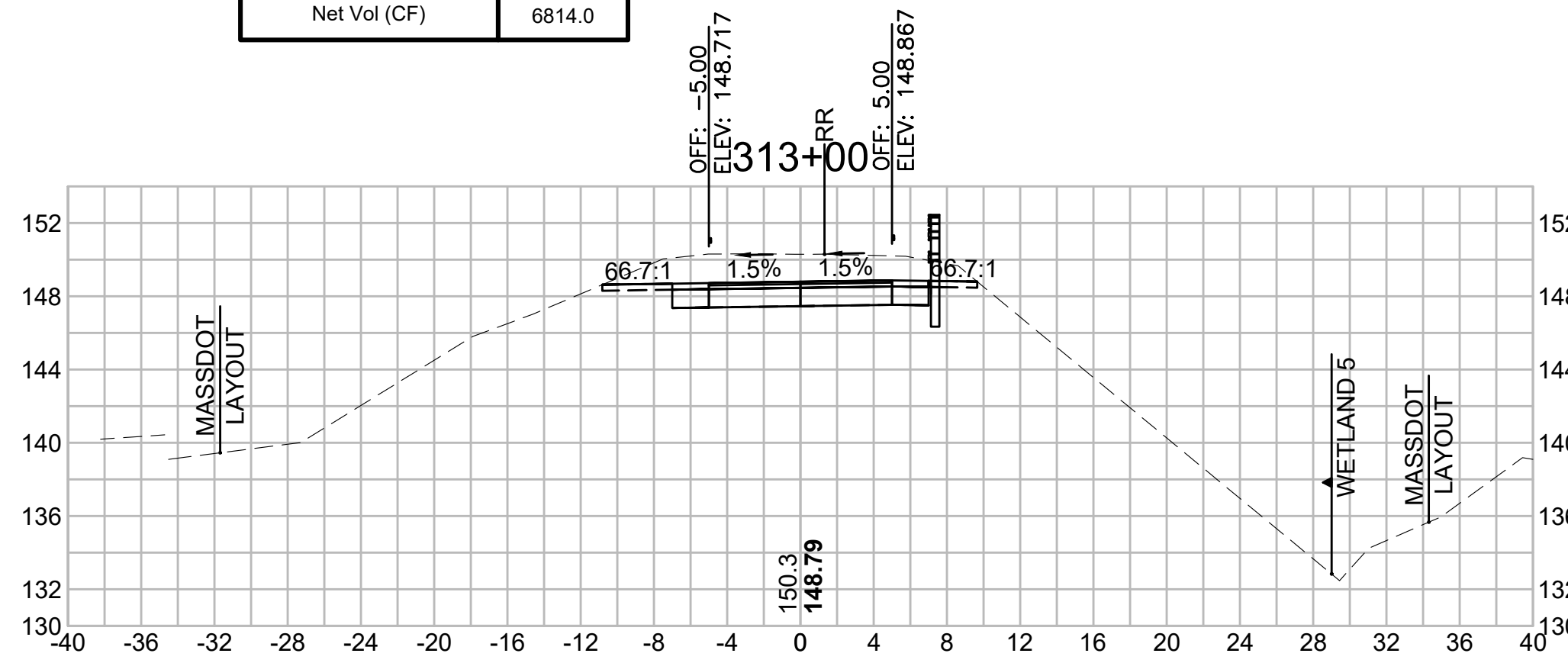
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	293	318

PROJECT FILE NO. 608164

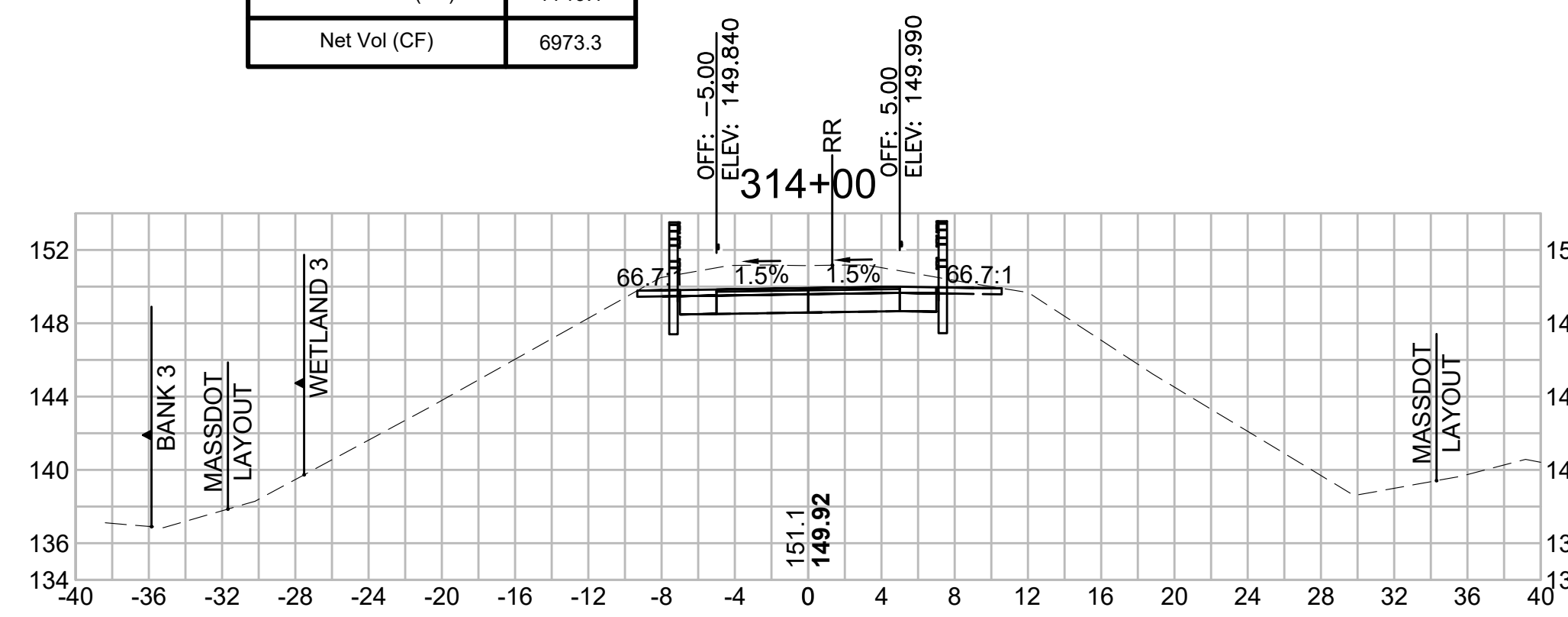
CROSS SECTIONS

608164_XSEC\CROSS SECTION LAYOUTS.DWG 12-May-2021

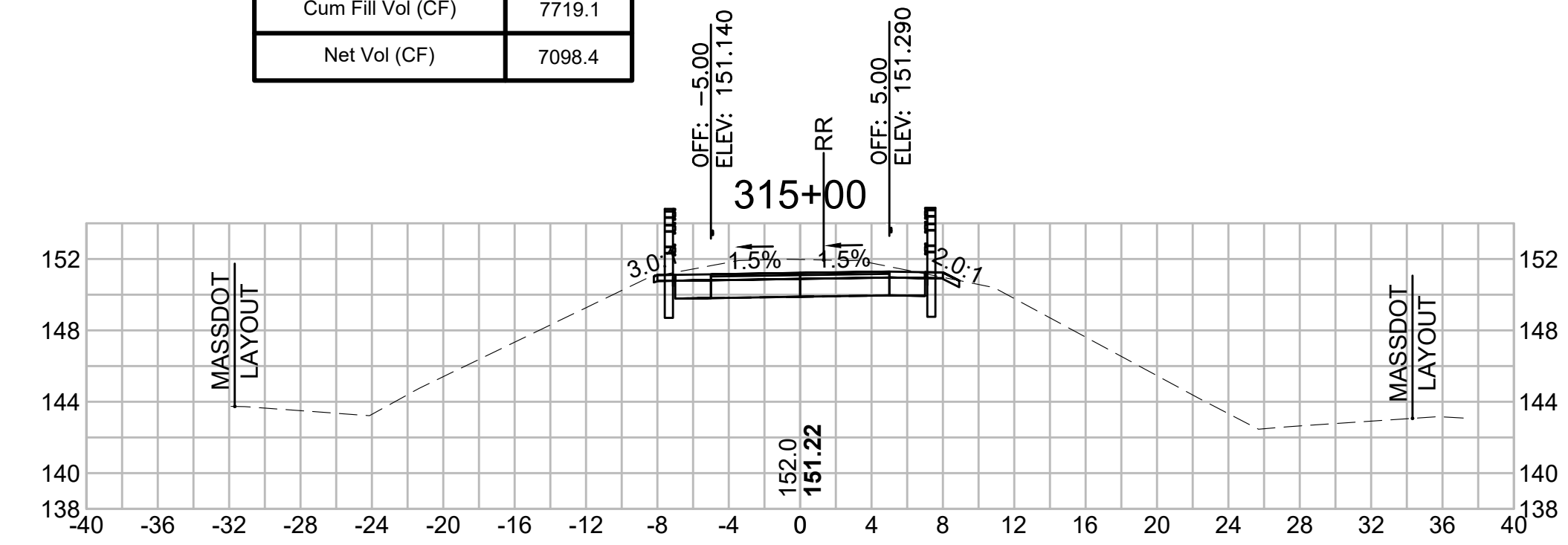
Total Volume at Station 313+00.00	
Cut Area (SF)	46.228
Fill Area (SF)	0.000
Cut Vol (CF)	92.3
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	14533.0
Cum Fill Vol (CF)	7719.1
Net Vol (CF)	6814.0



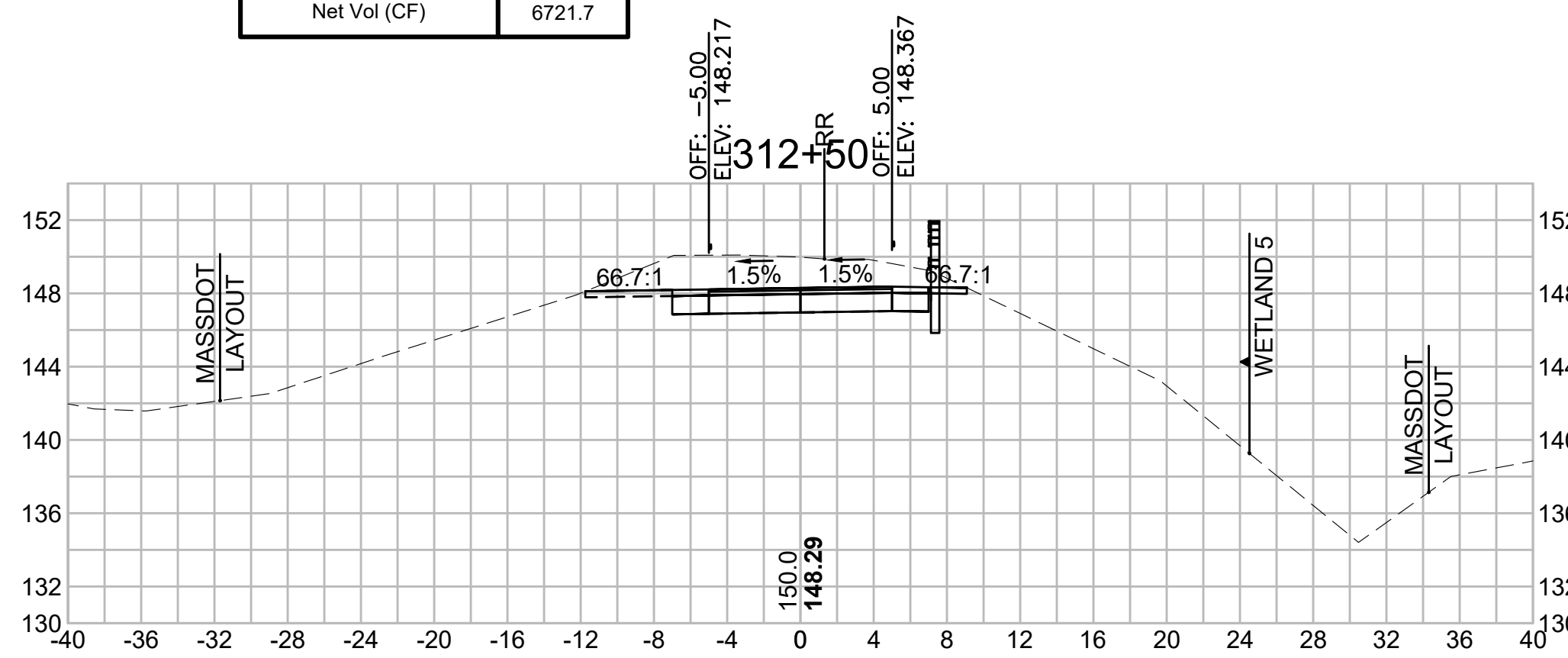
Total Volume at Station 314+00.00	
Cut Area (SF)	38.540
Fill Area (SF)	0.000
Cut Vol (CF)	76.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	14692.4
Cum Fill Vol (CF)	7719.1
Net Vol (CF)	6973.3



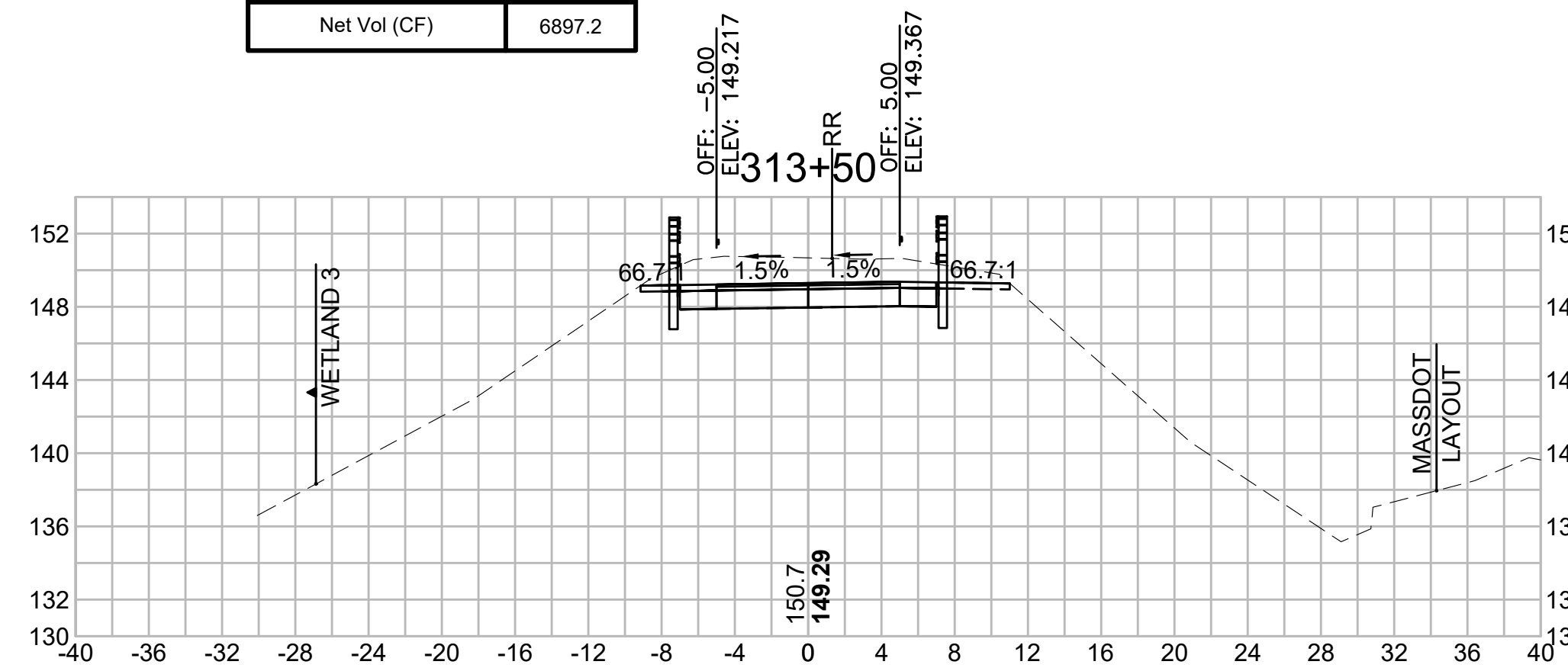
Total Volume at Station 315+00.00	
Cut Area (SF)	29.539
Fill Area (SF)	0.000
Cut Vol (CF)	58.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	14817.5
Cum Fill Vol (CF)	7719.1
Net Vol (CF)	7098.4



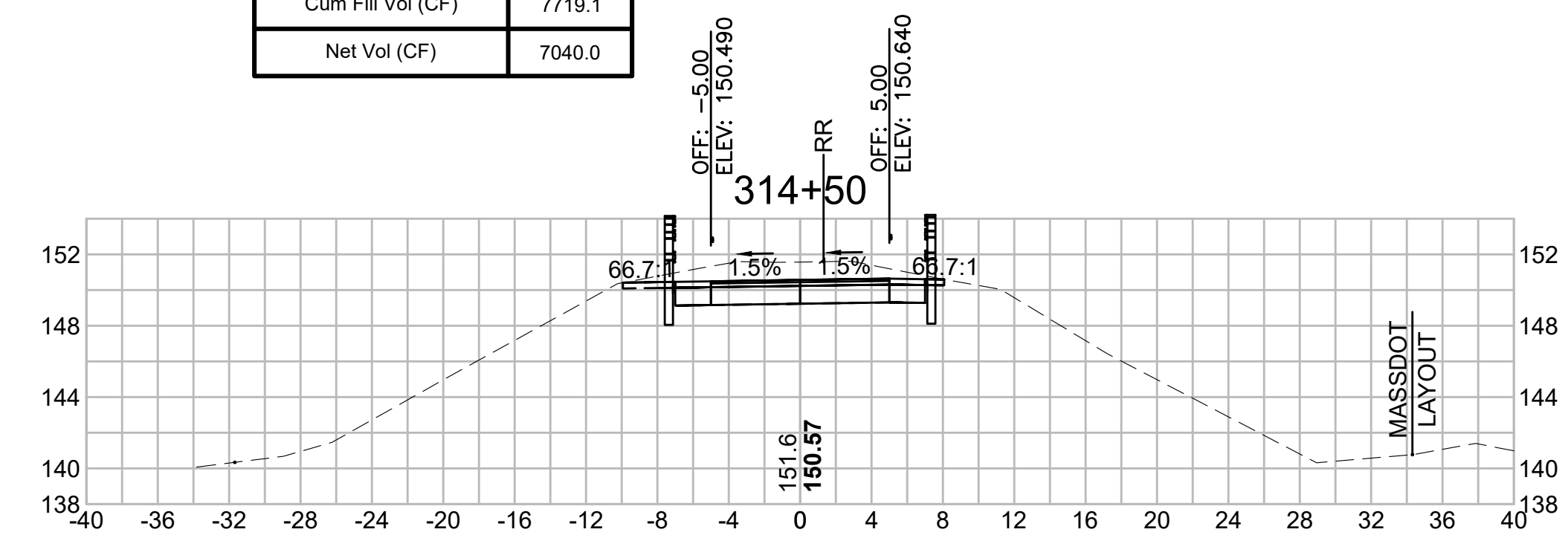
Total Volume at Station 312+50.00	
Cut Area (SF)	53.434
Fill Area (SF)	0.000
Cut Vol (CF)	104.3
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	14440.8
Cum Fill Vol (CF)	7719.1
Net Vol (CF)	6721.7



Total Volume at Station 313+50.00	
Cut Area (SF)	43.650
Fill Area (SF)	0.018
Cut Vol (CF)	83.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	14616.3
Cum Fill Vol (CF)	7719.1
Net Vol (CF)	6897.2



Total Volume at Station 314+50.00	
Cut Area (SF)	33.549
Fill Area (SF)	0.000
Cut Vol (CF)	66.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	14759.1
Cum Fill Vol (CF)	7719.1
Net Vol (CF)	7040.0



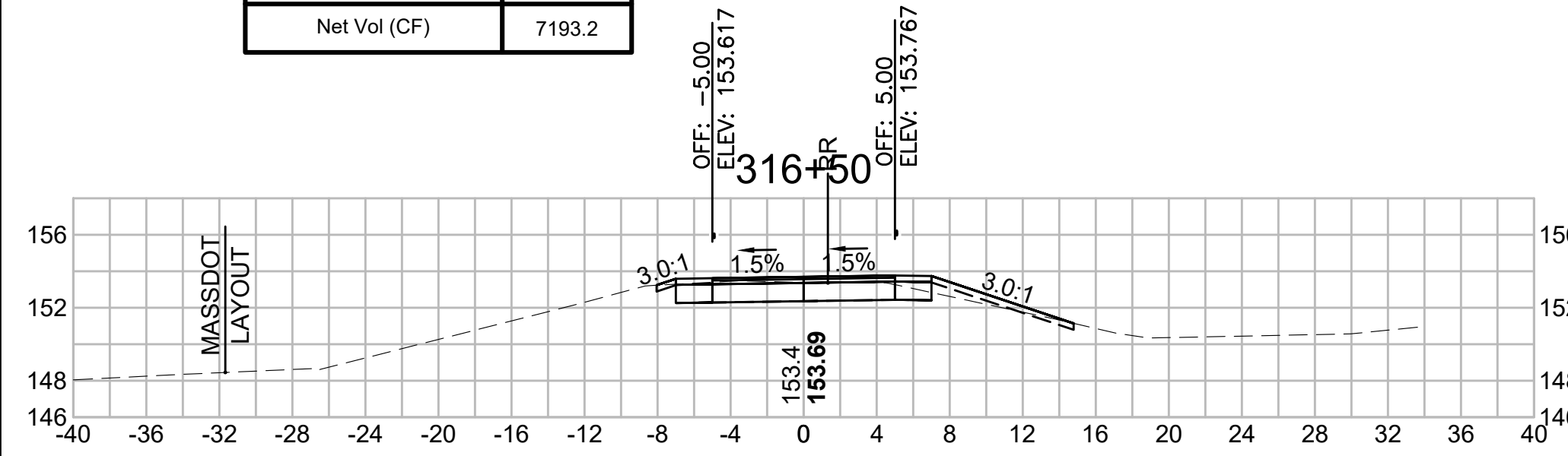
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	294	318

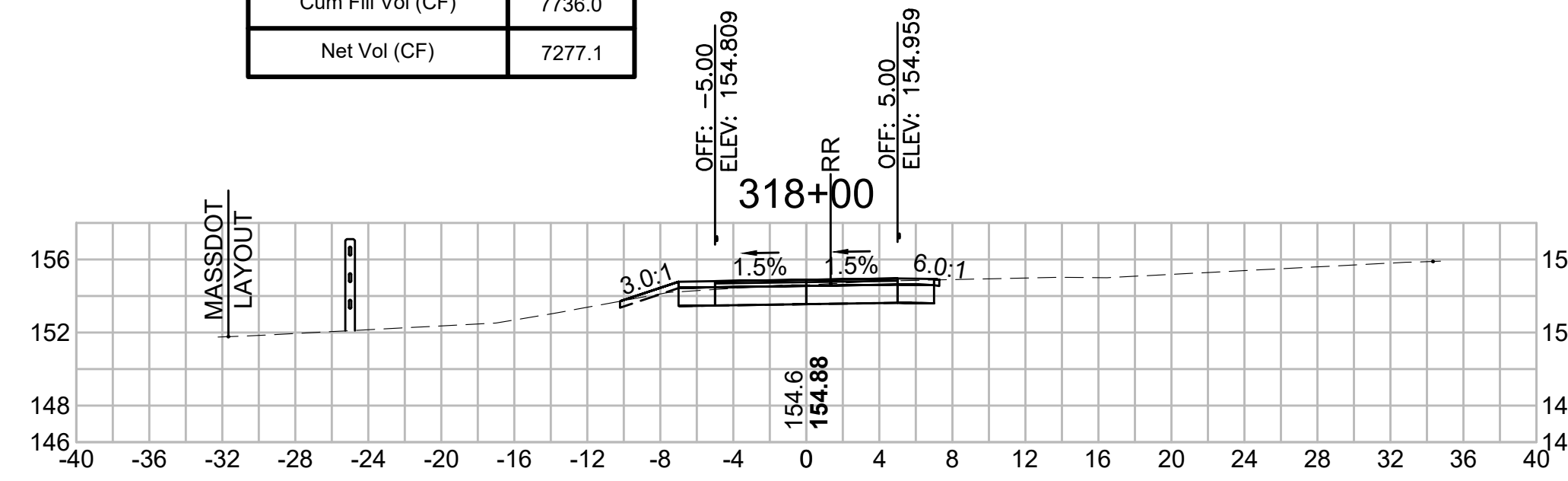
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

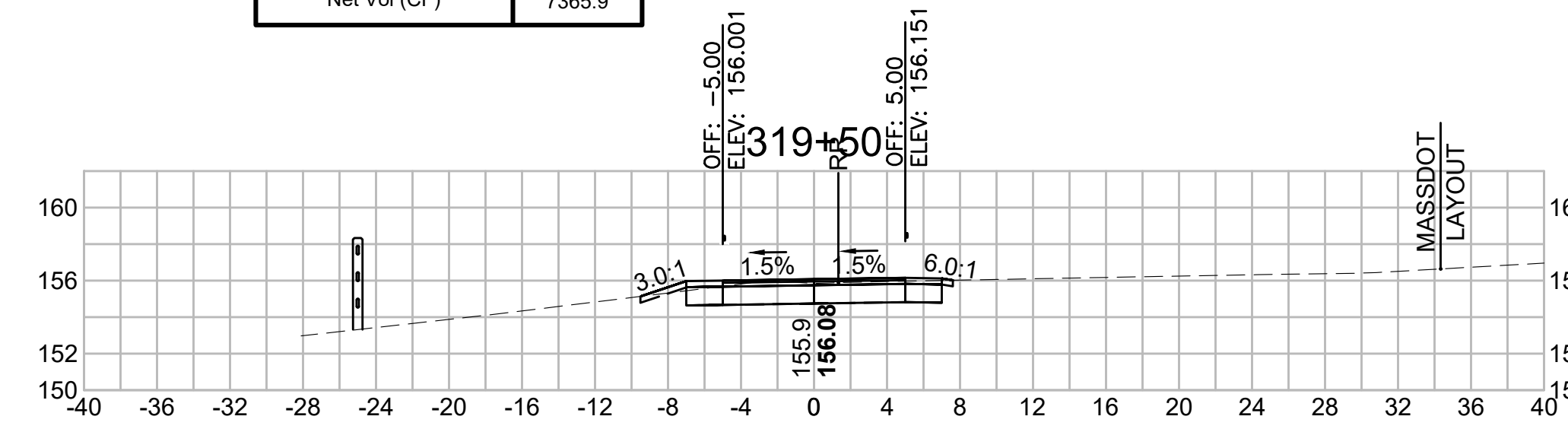
Total Volume at Station 316+50.00	
Cut Area (SF)	18.222
Fill Area (SF)	1.292
Cut Vol (CF)	30.0
Fill Vol (CF)	5.5
Cum Cut Vol (CF)	14926.7
Cum Fill Vol (CF)	7733.5
Net Vol (CF)	7193.2



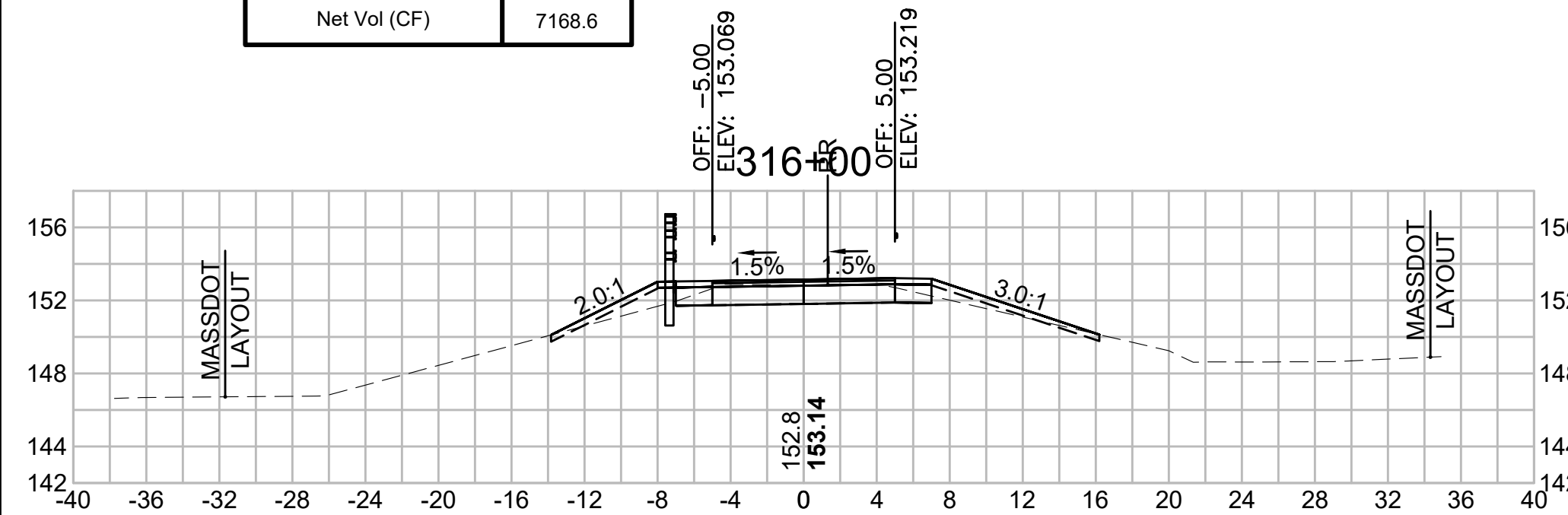
Total Volume at Station 318+00.00	
Cut Area (SF)	15.594
Fill Area (SF)	0.080
Cut Vol (CF)	28.5
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	15013.1
Cum Fill Vol (CF)	7736.0
Net Vol (CF)	7277.1



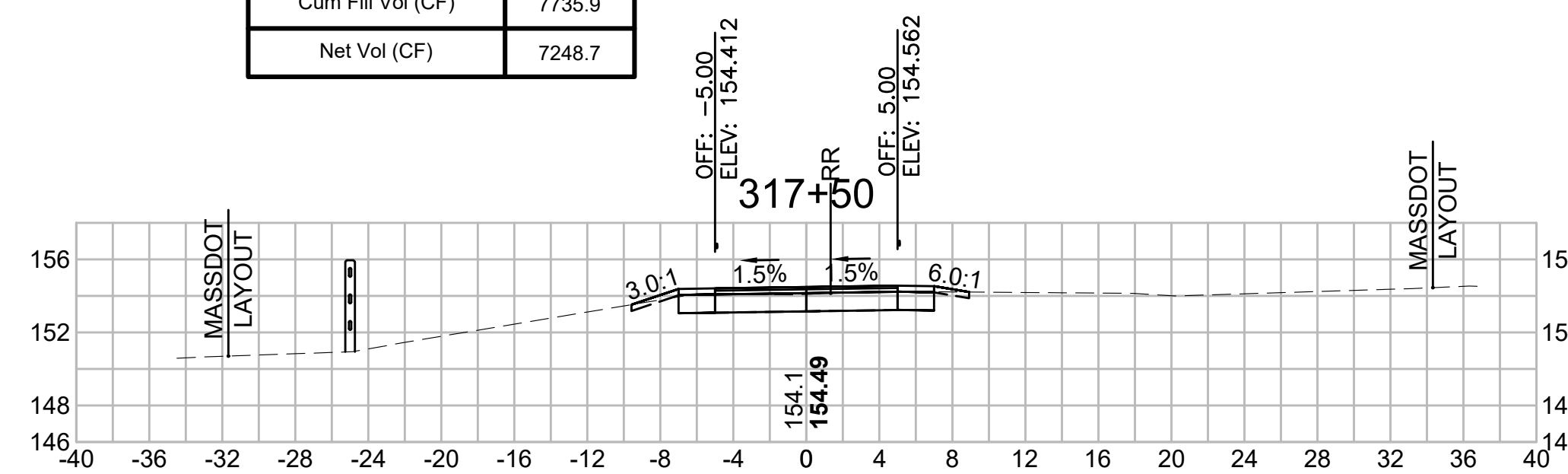
Total Volume at Station 319+50.00	
Cut Area (SF)	24.589
Fill Area (SF)	0.078
Cut Vol (CF)	36.6
Fill Vol (CF)	1.8
Cum Cut Vol (CF)	15107.2
Cum Fill Vol (CF)	7741.3
Net Vol (CF)	7365.9



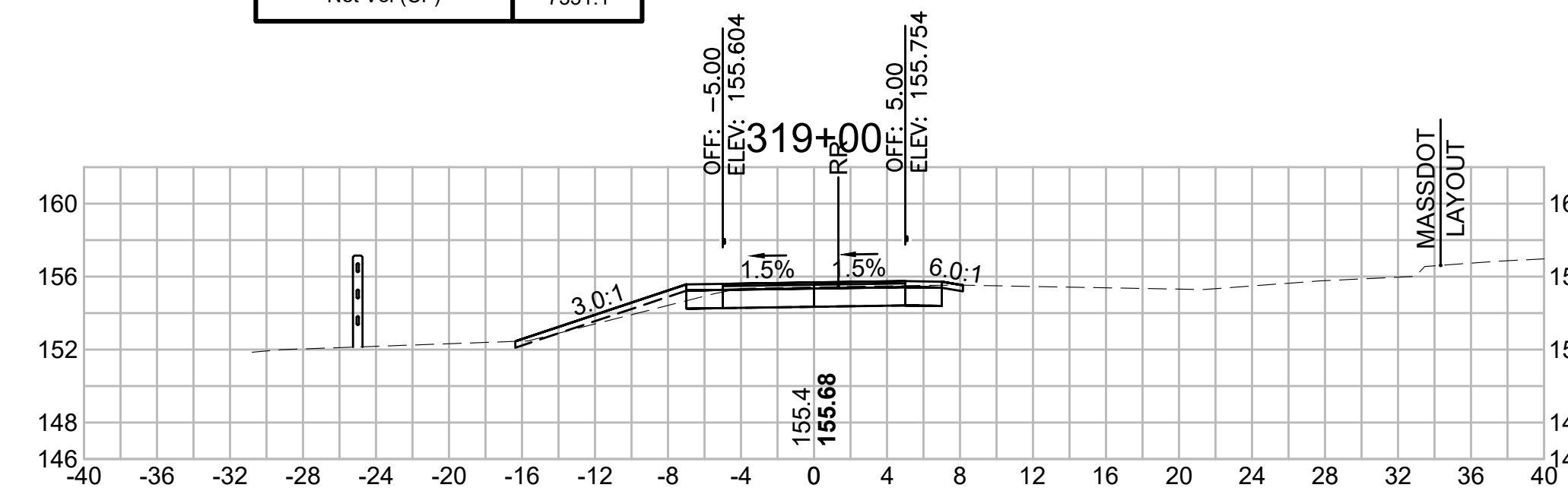
Total Volume at Station 316+00.00	
Cut Area (SF)	14.228
Fill Area (SF)	4.661
Cut Vol (CF)	32.5
Fill Vol (CF)	6.6
Cum Cut Vol (CF)	14896.6
Cum Fill Vol (CF)	7728.0
Net Vol (CF)	7168.6



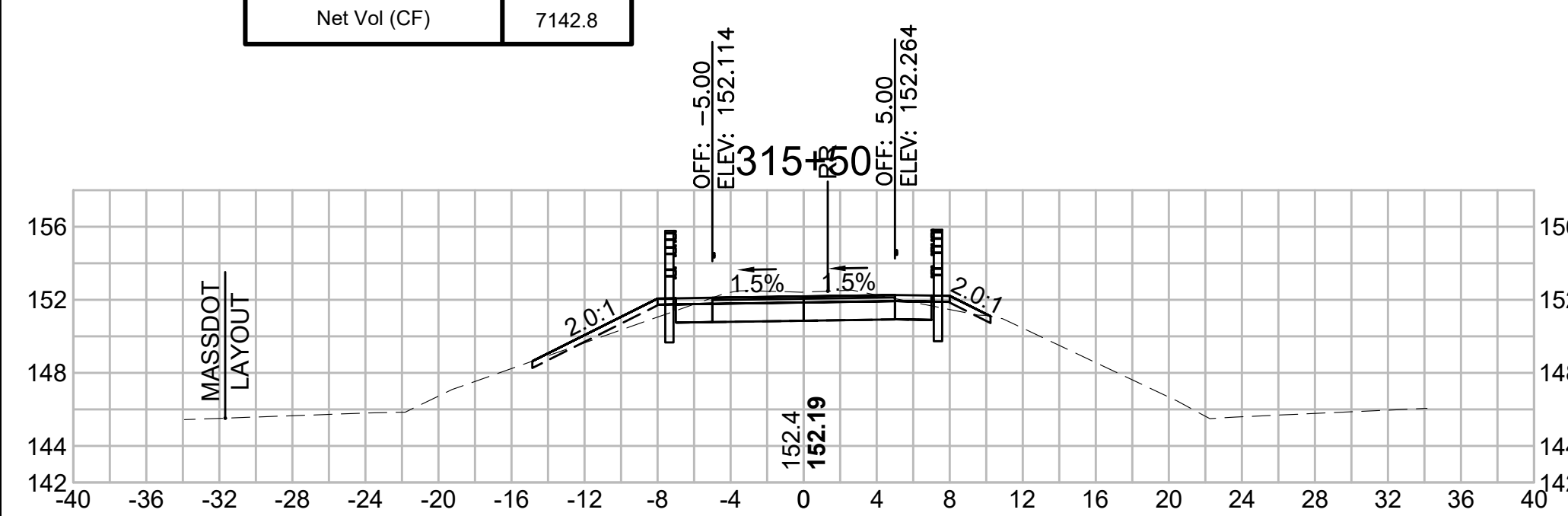
Total Volume at Station 317+50.00	
Cut Area (SF)	15.227
Fill Area (SF)	0.021
Cut Vol (CF)	27.6
Fill Vol (CF)	0.6
Cum Cut Vol (CF)	14984.6
Cum Fill Vol (CF)	7735.9
Net Vol (CF)	7248.7



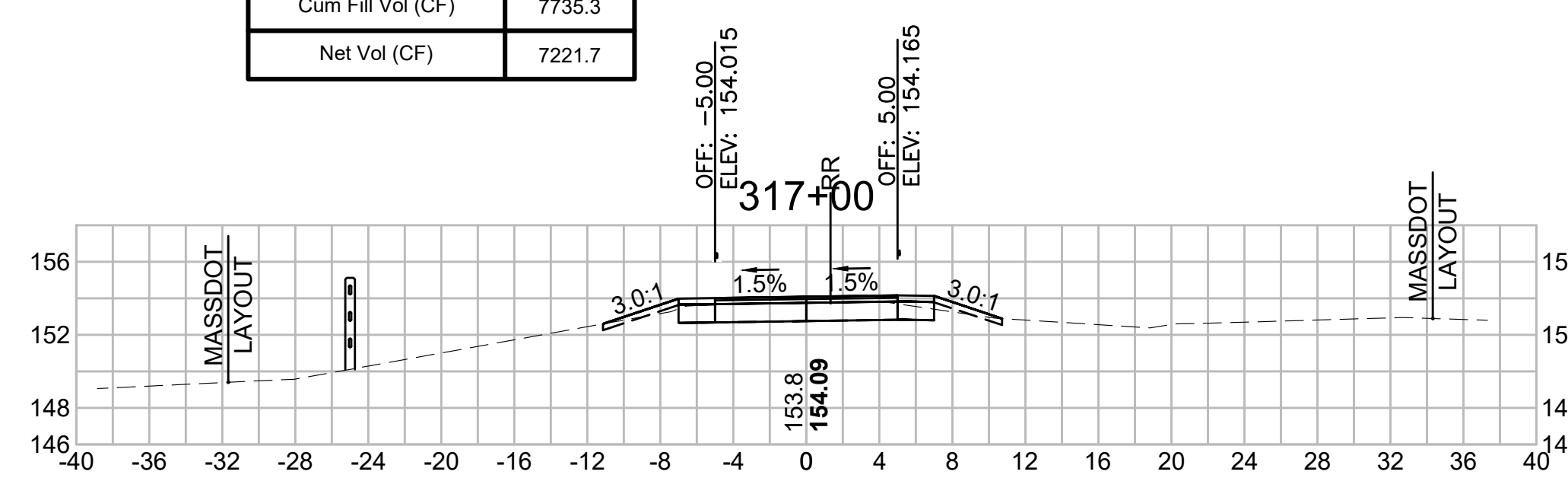
Total Volume at Station 319+00.00	
Cut Area (SF)	14.916
Fill Area (SF)	1.909
Cut Vol (CF)	28.4
Fill Vol (CF)	2.6
Cum Cut Vol (CF)	15070.6
Cum Fill Vol (CF)	7739.5
Net Vol (CF)	7331.1



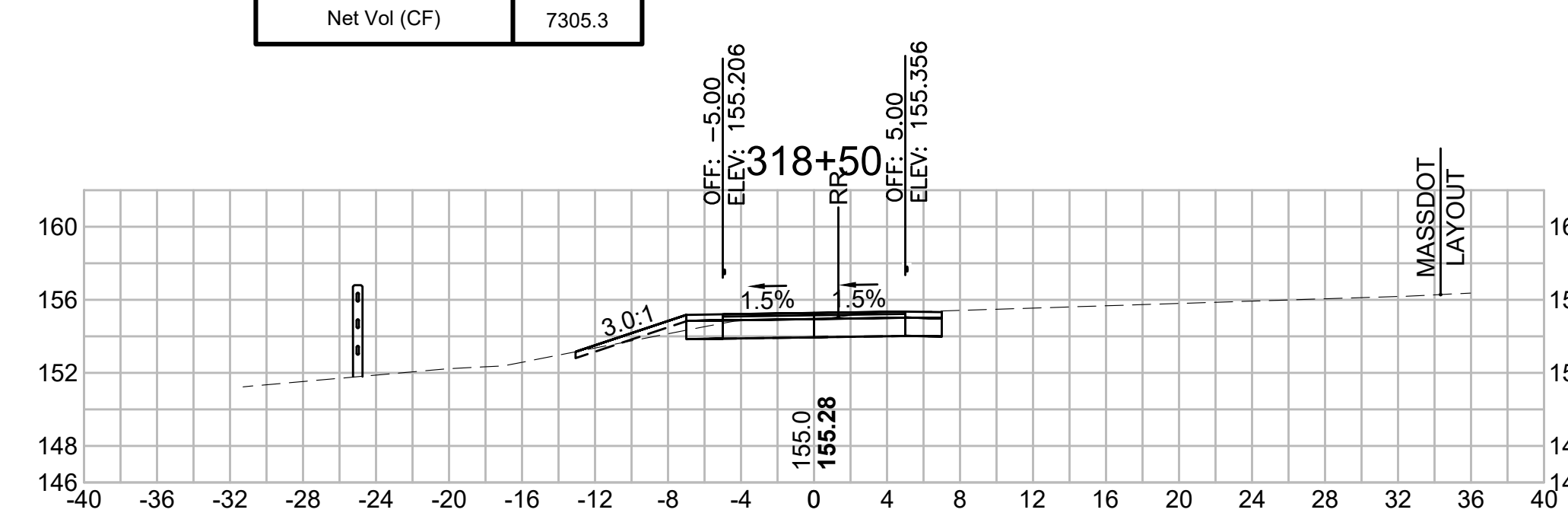
Total Volume at Station 315+50.00	
Cut Area (SF)	20.826
Fill Area (SF)	2.479
Cut Vol (CF)	46.6
Fill Vol (CF)	2.3
Cum Cut Vol (CF)	14864.2
Cum Fill Vol (CF)	7721.4
Net Vol (CF)	7142.8



Total Volume at Station 317+00.00	
Cut Area (SF)	14.546
Fill Area (SF)	0.634
Cut Vol (CF)	30.3
Fill Vol (CF)	1.8
Cum Cut Vol (CF)	14957.0
Cum Fill Vol (CF)	7735.3
Net Vol (CF)	7221.7



Total Volume at Station 318+50.00	
Cut Area (SF)	15.772
Fill Area (SF)	0.874
Cut Vol (CF)	29.0
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	15042.2
Cum Fill Vol (CF)	7736.9
Net Vol (CF)	7305.3



SUDBURY
BRUCE FREEMAN RAIL TRAIL

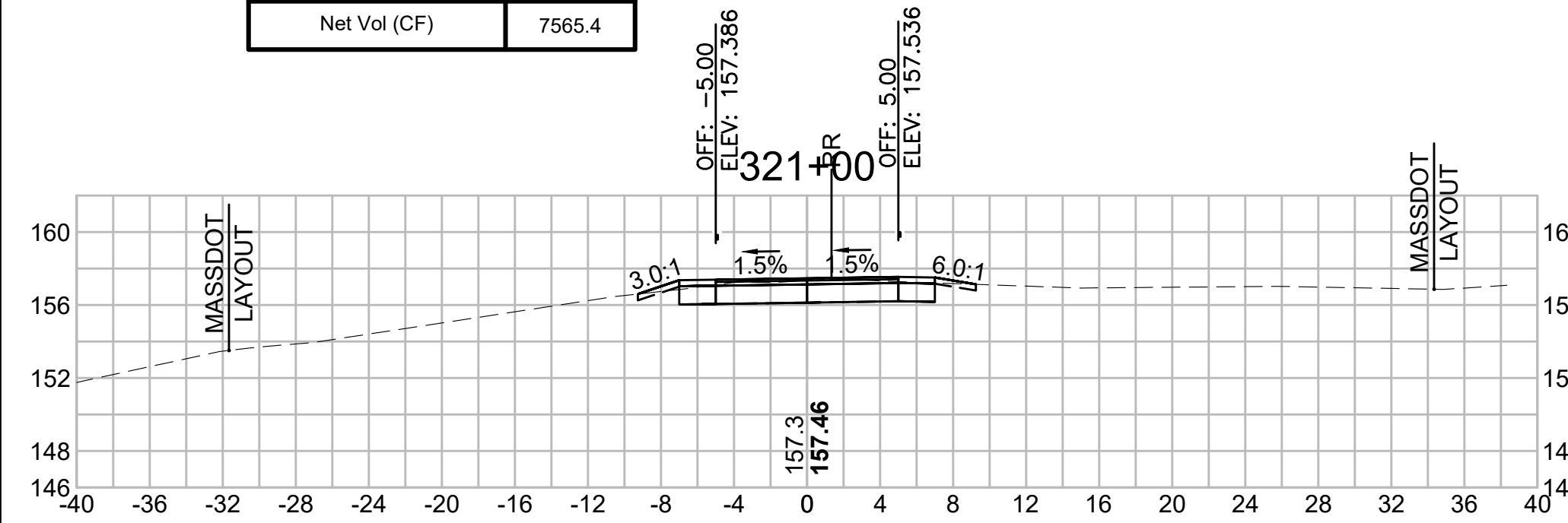
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	295	318

PROJECT FILE NO. 608164

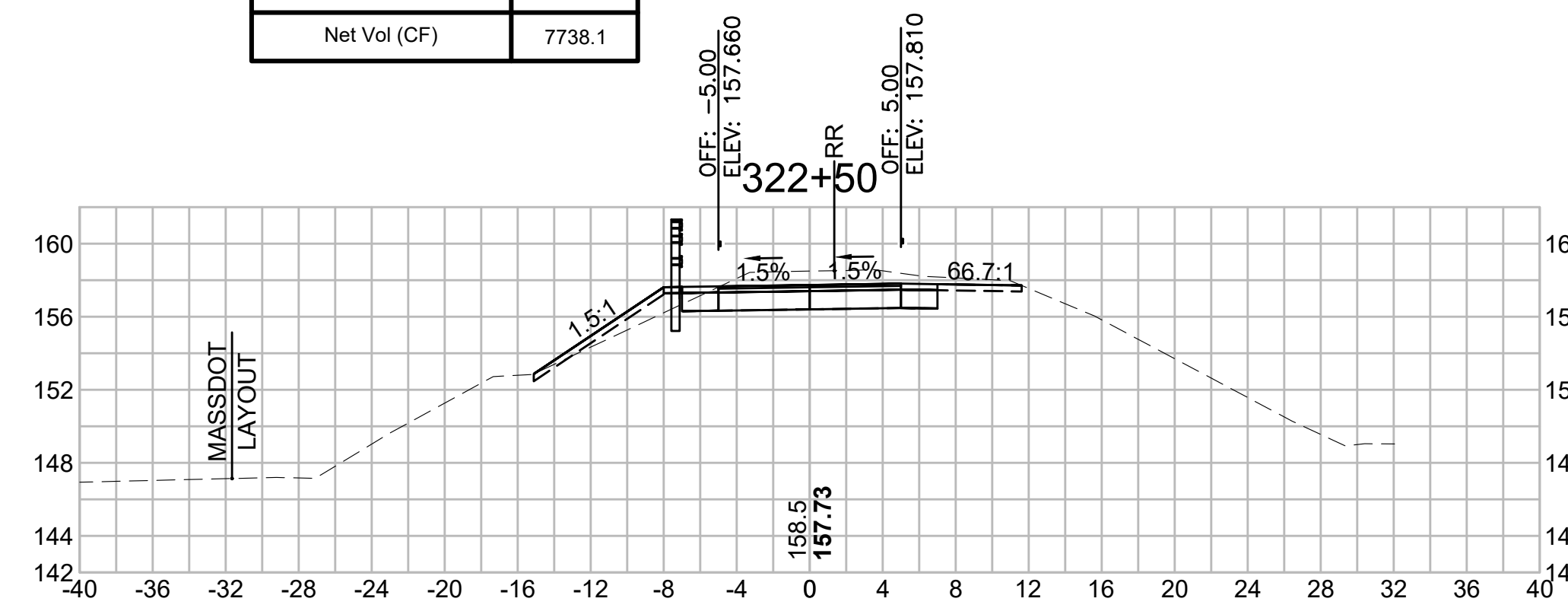
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

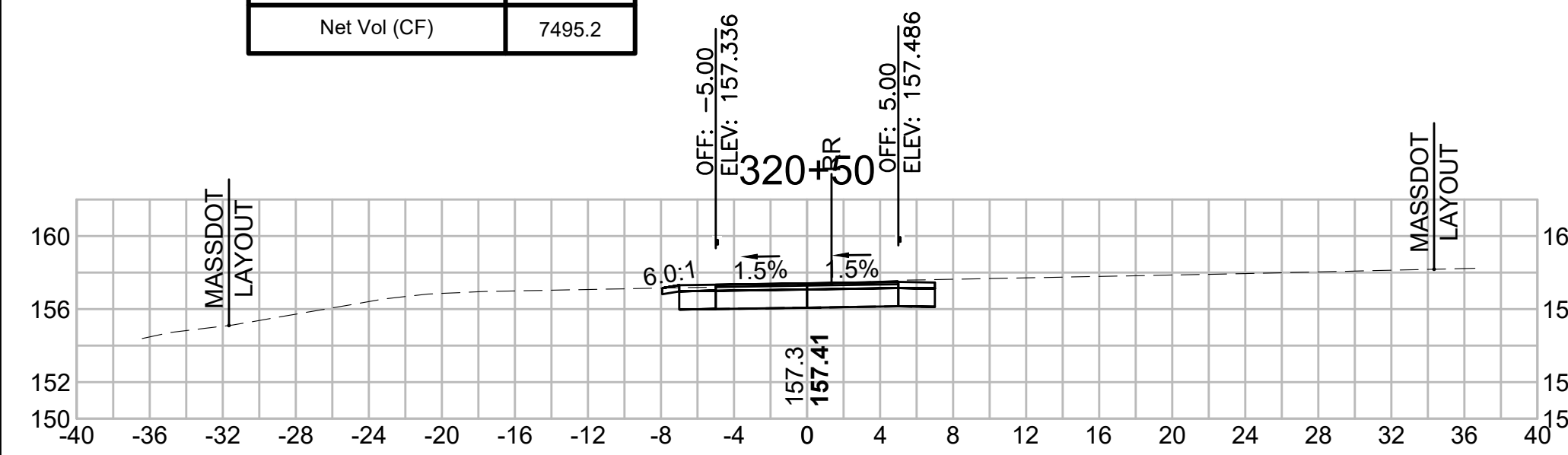
Total Volume at Station 321+00.00	
Cut Area (SF)	26.648
Fill Area (SF)	0.057
Cut Vol (CF)	70.3
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	15306.9
Cum Fill Vol (CF)	7741.4
Net Vol (CF)	7565.4



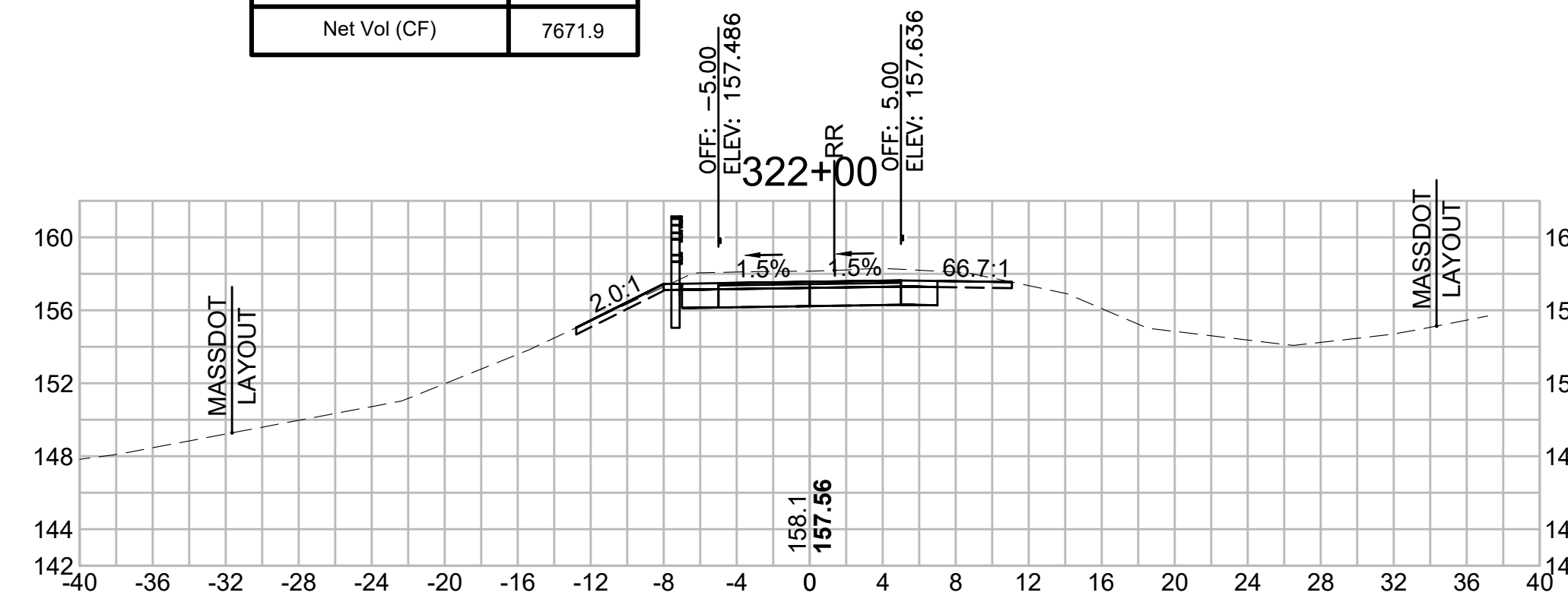
Total Volume at Station 322+50.00	
Cut Area (SF)	37.507
Fill Area (SF)	3.438
Cut Vol (CF)	71.9
Fill Vol (CF)	5.7
Cum Cut Vol (CF)	15491.1
Cum Fill Vol (CF)	7753.0
Net Vol (CF)	7738.1



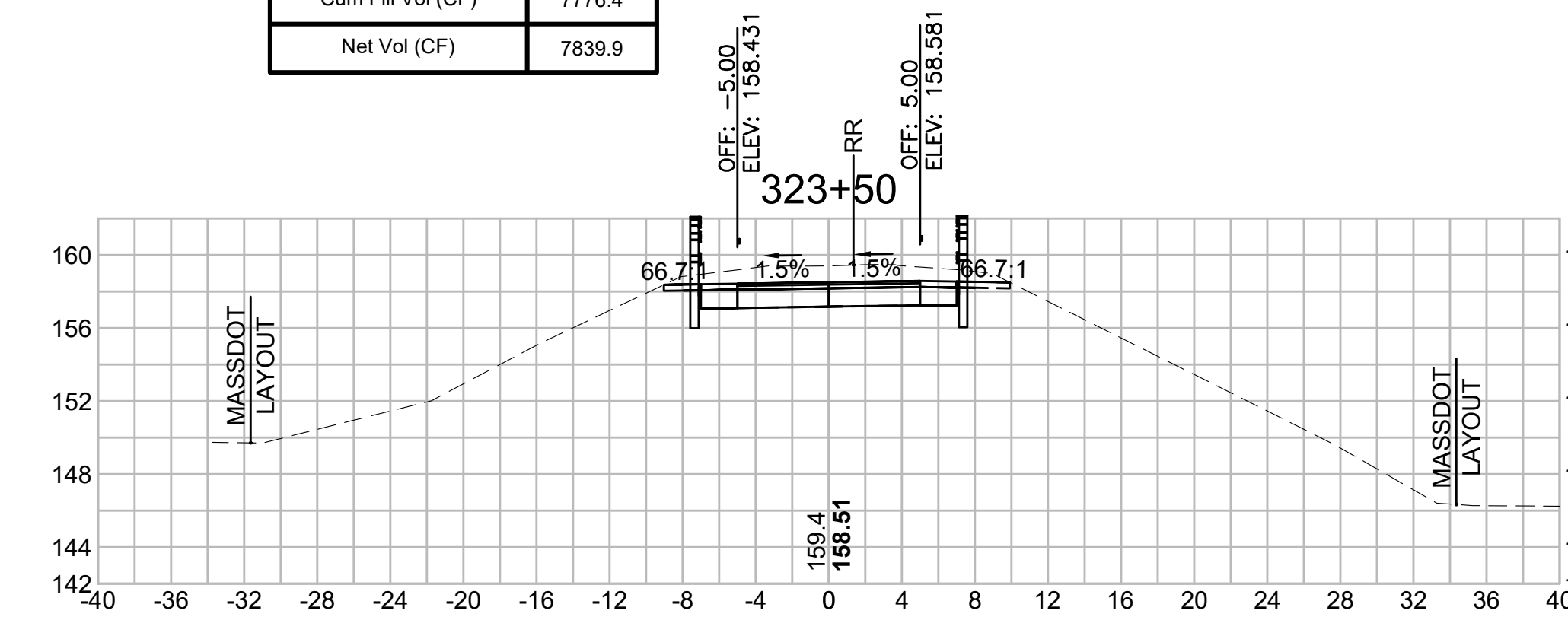
Total Volume at Station 320+50.00	
Cut Area (SF)	49.256
Fill Area (SF)	0.000
Cut Vol (CF)	76.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	15236.6
Cum Fill Vol (CF)	7741.4
Net Vol (CF)	7495.2



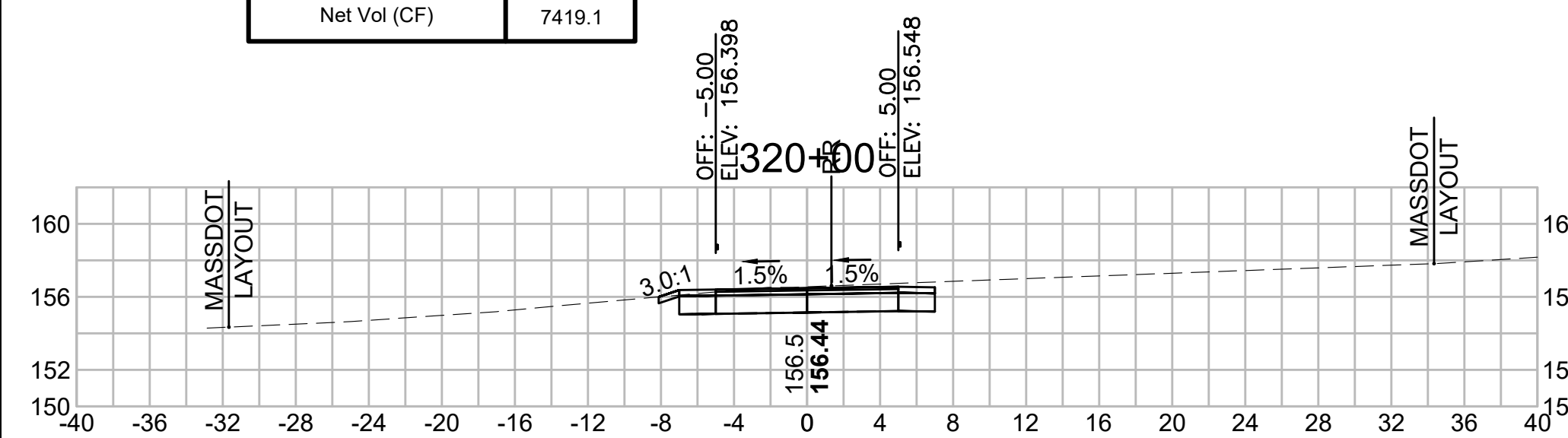
Total Volume at Station 322+00.00	
Cut Area (SF)	40.113
Fill Area (SF)	2.705
Cut Vol (CF)	62.4
Fill Vol (CF)	4.2
Cum Cut Vol (CF)	15419.2
Cum Fill Vol (CF)	7747.3
Net Vol (CF)	7671.9



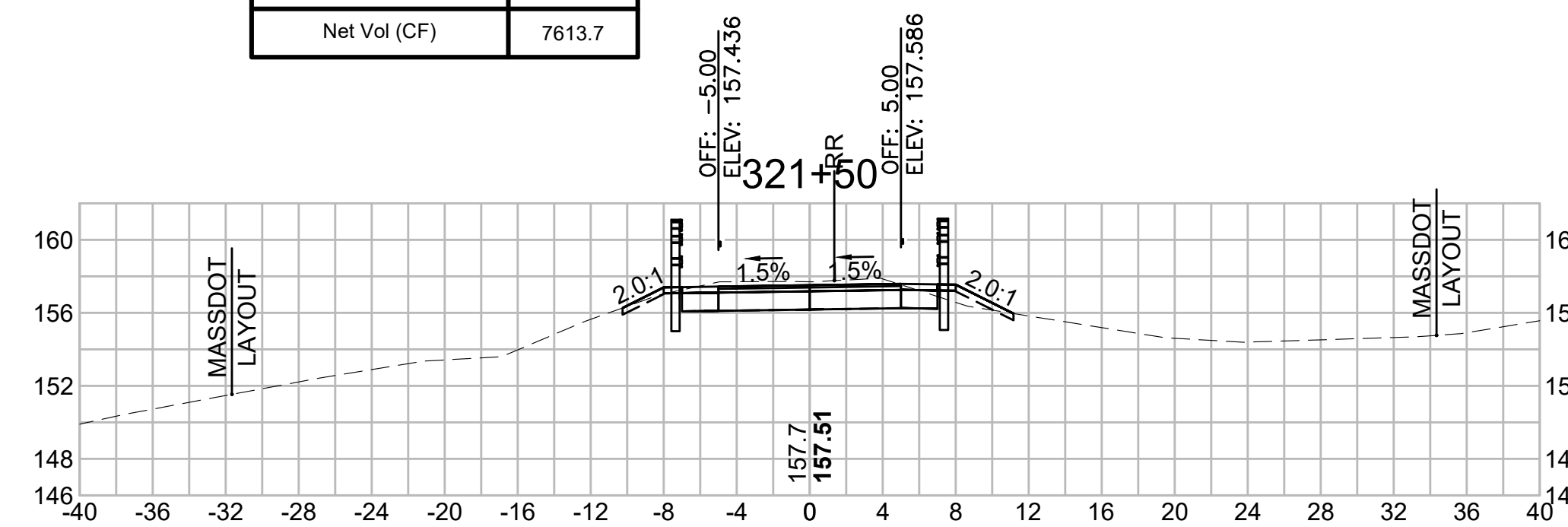
Total Volume at Station 323+50.00	
Cut Area (SF)	45.108
Fill Area (SF)	0.000
Cut Vol (CF)	66.2
Fill Vol (CF)	10.1
Cum Cut Vol (CF)	15616.3
Cum Fill Vol (CF)	7776.4
Net Vol (CF)	7839.9



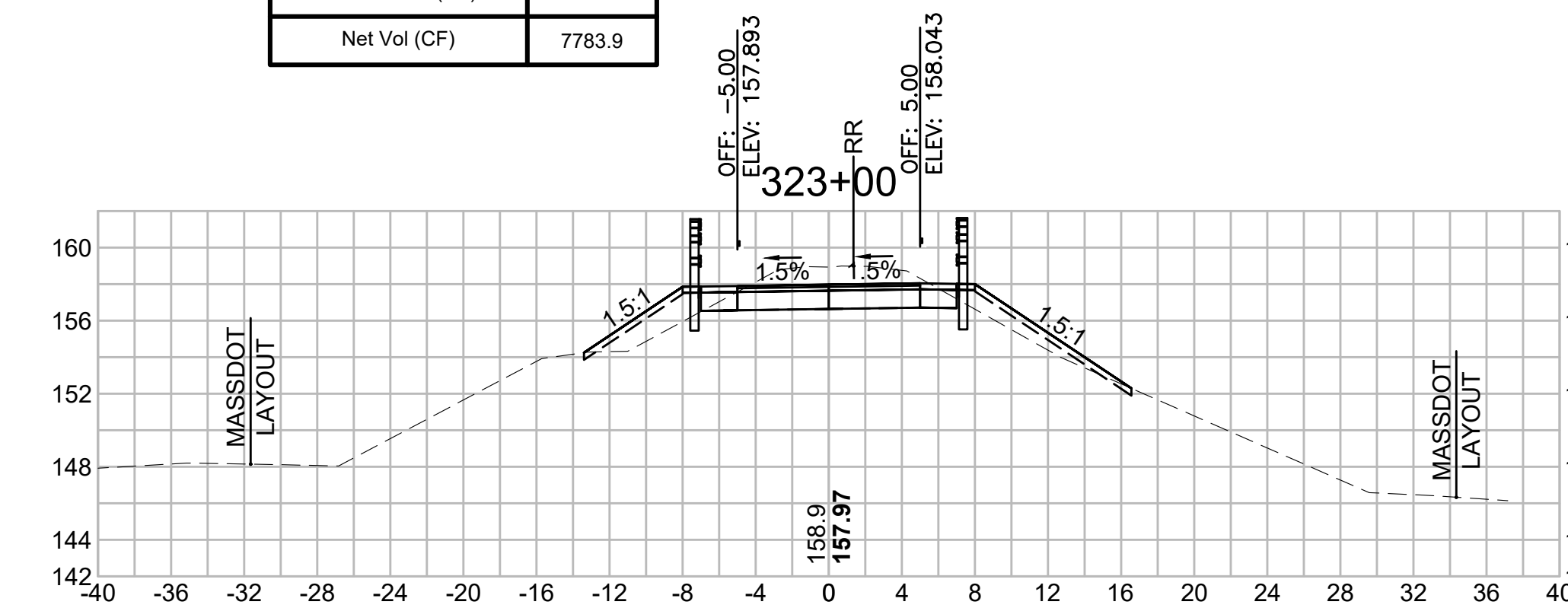
Total Volume at Station 320+00.00	
Cut Area (SF)	32.967
Fill Area (SF)	0.000
Cut Vol (CF)	53.3
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	15160.4
Cum Fill Vol (CF)	7741.4
Net Vol (CF)	7419.1



Total Volume at Station 321+50.00	
Cut Area (SF)	27.287
Fill Area (SF)	1.779
Cut Vol (CF)	49.9
Fill Vol (CF)	1.7
Cum Cut Vol (CF)	15356.8
Cum Fill Vol (CF)	7743.1
Net Vol (CF)	7613.7



Total Volume at Station 323+00.00	
Cut Area (SF)	26.338
Fill Area (SF)	10.961
Cut Vol (CF)	59.1
Fill Vol (CF)	13.3
Cum Cut Vol (CF)	15550.2
Cum Fill Vol (CF)	7766.3
Net Vol (CF)	7783.9



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	296	318

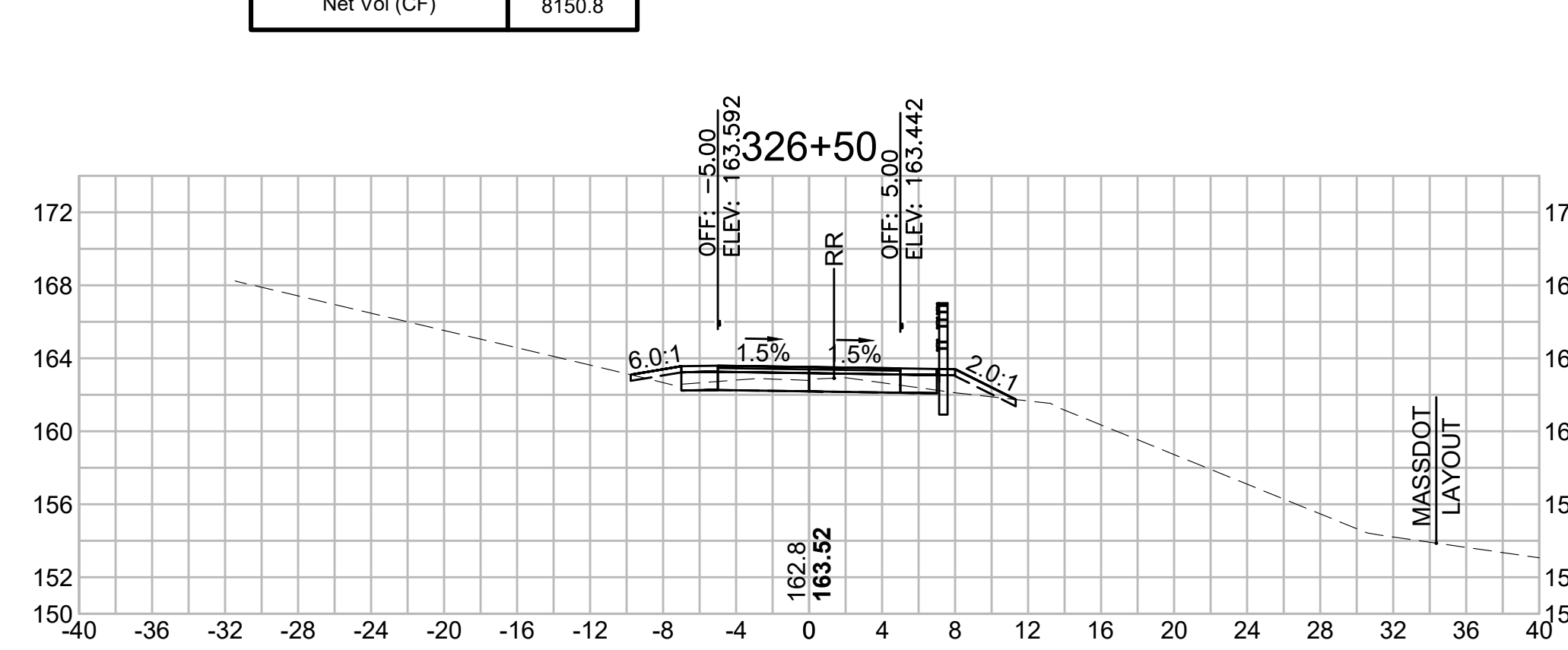
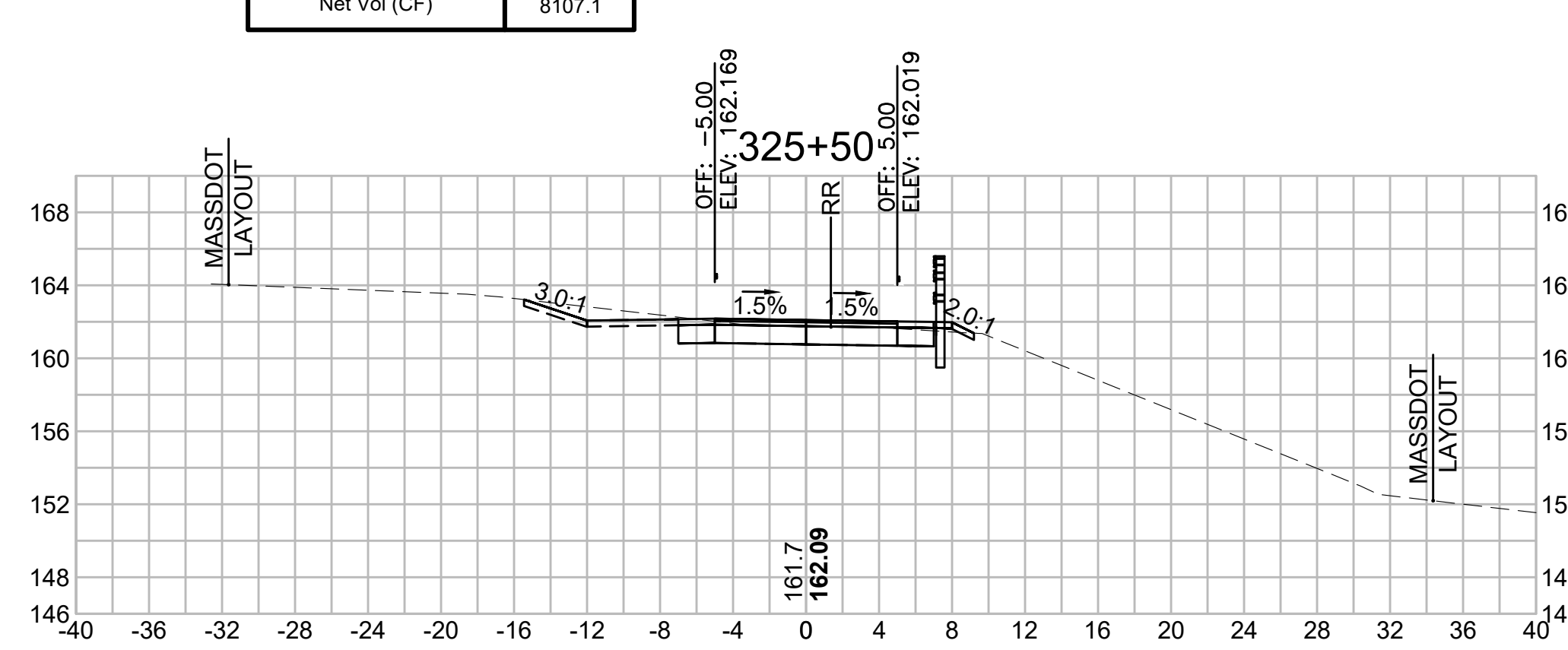
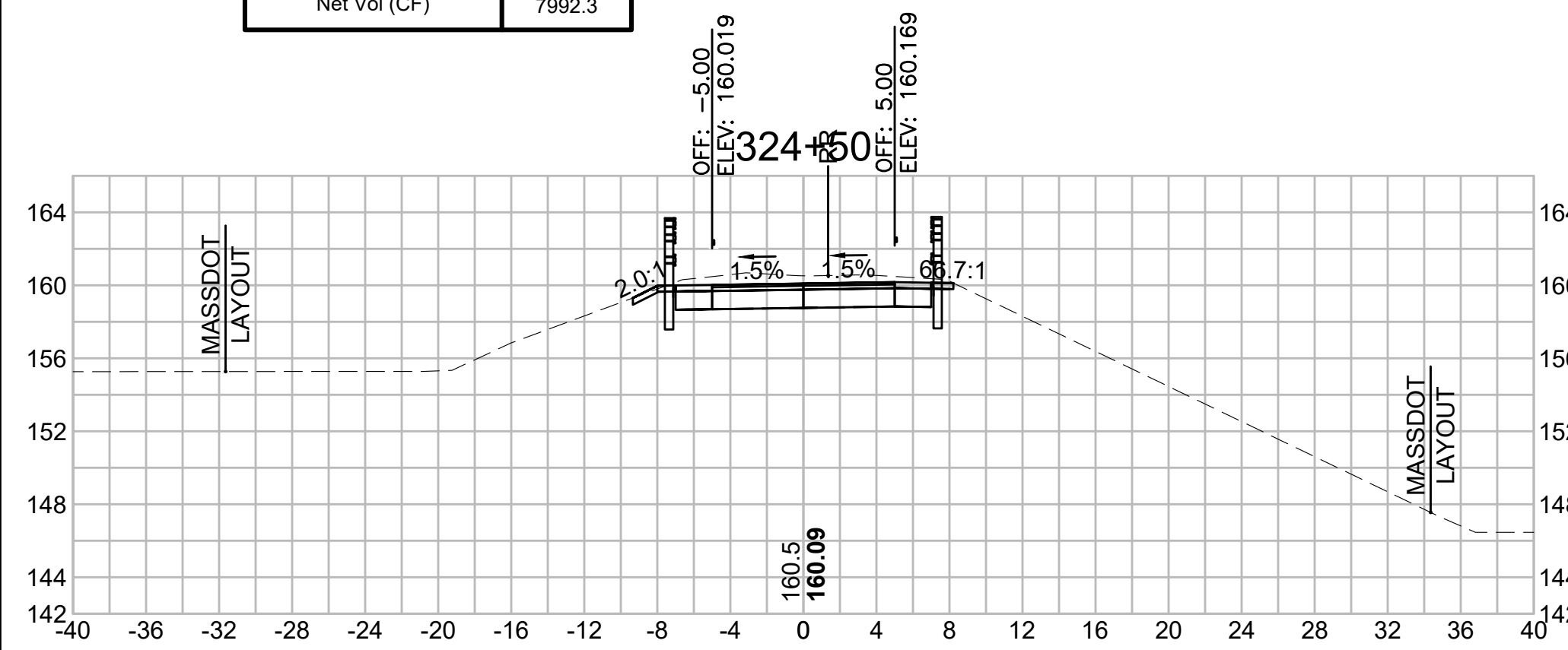
PROJECT FILE NO. 608164

CROSS SECTIONS

Total Volume at Station 324+50.00	
Cut Area (SF)	35.553
Fill Area (SF)	0.000
Cut Vol (CF)	71.8
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	15768.7
Cum Fill Vol (CF)	7776.4
Net Vol (CF)	7992.3

Total Volume at Station 325+50.00	
Cut Area (SF)	21.576
Fill Area (SF)	0.211
Cut Vol (CF)	51.3
Fill Vol (CF)	0.5
Cum Cut Vol (CF)	15884.3
Cum Fill Vol (CF)	7777.2
Net Vol (CF)	8107.1

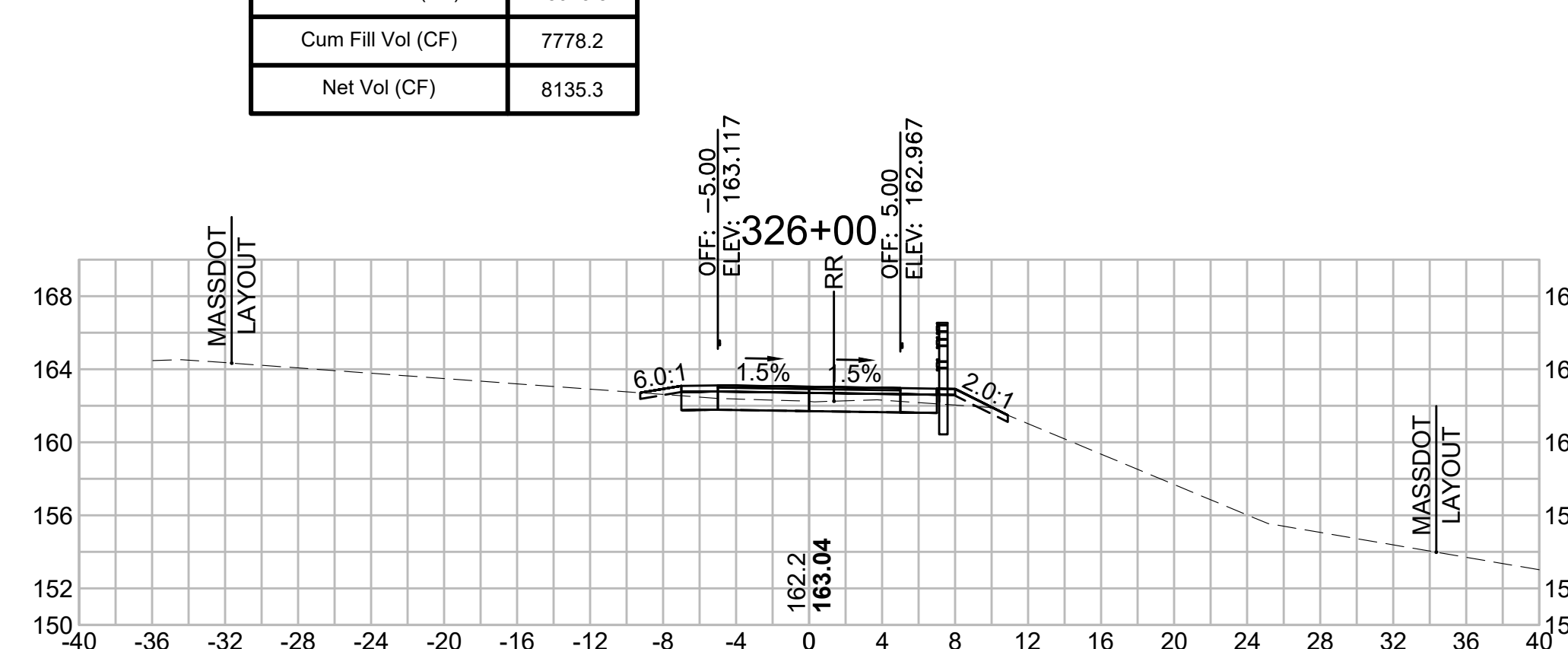
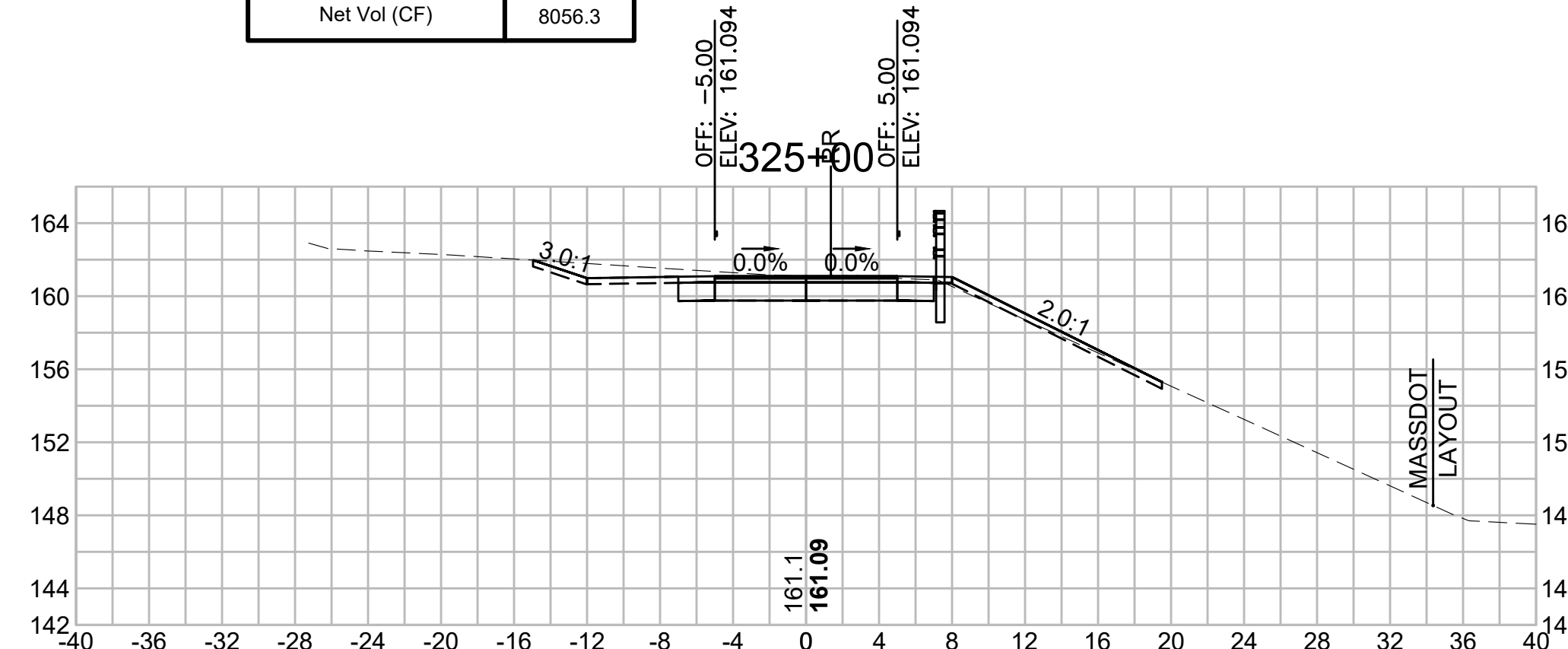
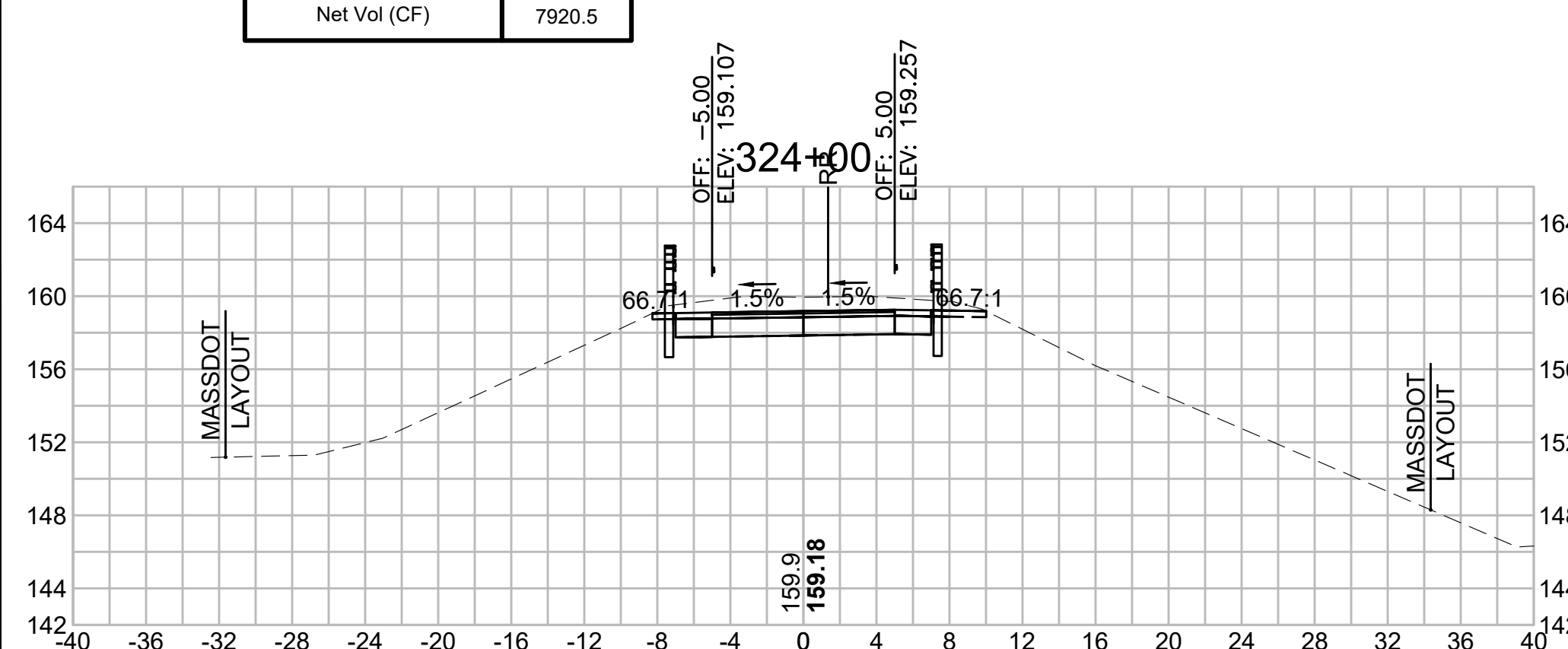
Total Volume at Station 326+50.00	
Cut Area (SF)	10.360
Fill Area (SF)	2.731
Cut Vol (CF)	18.9
Fill Vol (CF)	3.4
Cum Cut Vol (CF)	15932.4
Cum Fill Vol (CF)	7781.6
Net Vol (CF)	8150.8



Total Volume at Station 324+00.00	
Cut Area (SF)	41.953
Fill Area (SF)	0.000
Cut Vol (CF)	80.6
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	15697.0
Cum Fill Vol (CF)	7776.4
Net Vol (CF)	7920.5

Total Volume at Station 325+00.00	
Cut Area (SF)	33.827
Fill Area (SF)	0.286
Cut Vol (CF)	64.2
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	15833.0
Cum Fill Vol (CF)	7776.7
Net Vol (CF)	8056.3

Total Volume at Station 326+00.00	
Cut Area (SF)	10.046
Fill Area (SF)	0.925
Cut Vol (CF)	29.3
Fill Vol (CF)	1.1
Cum Cut Vol (CF)	15913.5
Cum Fill Vol (CF)	7778.2
Net Vol (CF)	8135.3



SUDBURY
BRUCE FREEMAN RAIL TRAIL

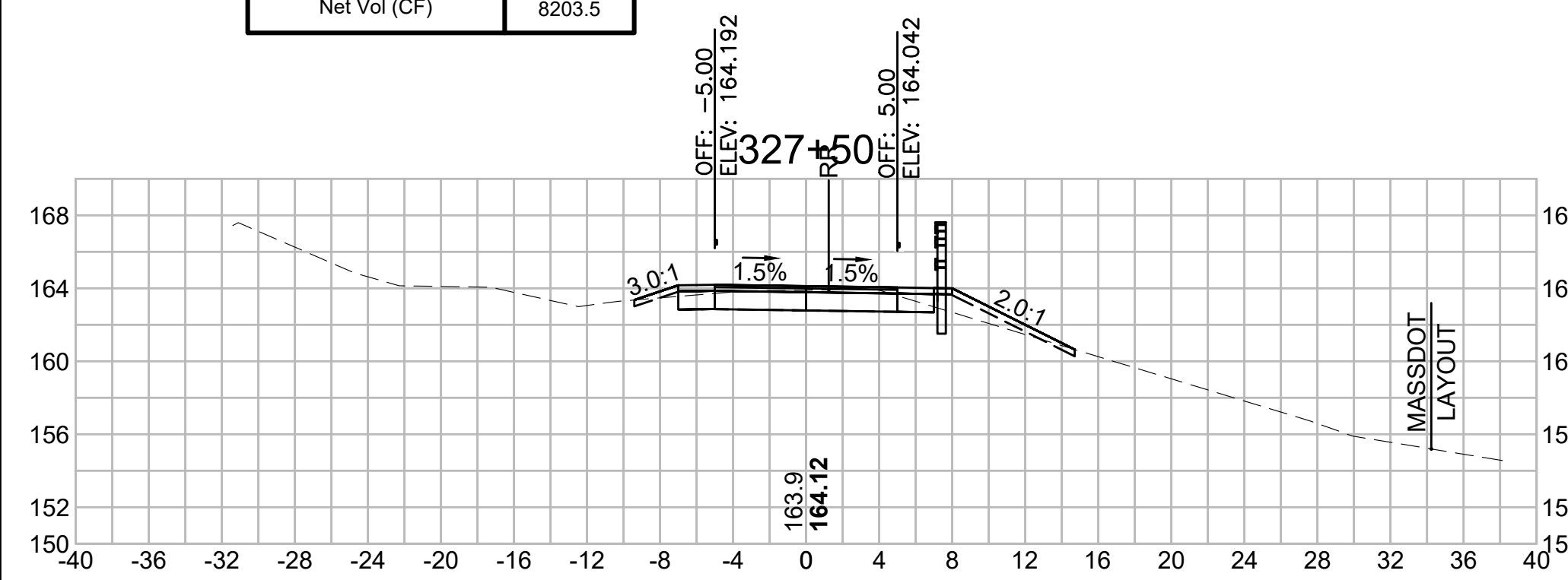
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	297	318

PROJECT FILE NO. 608164

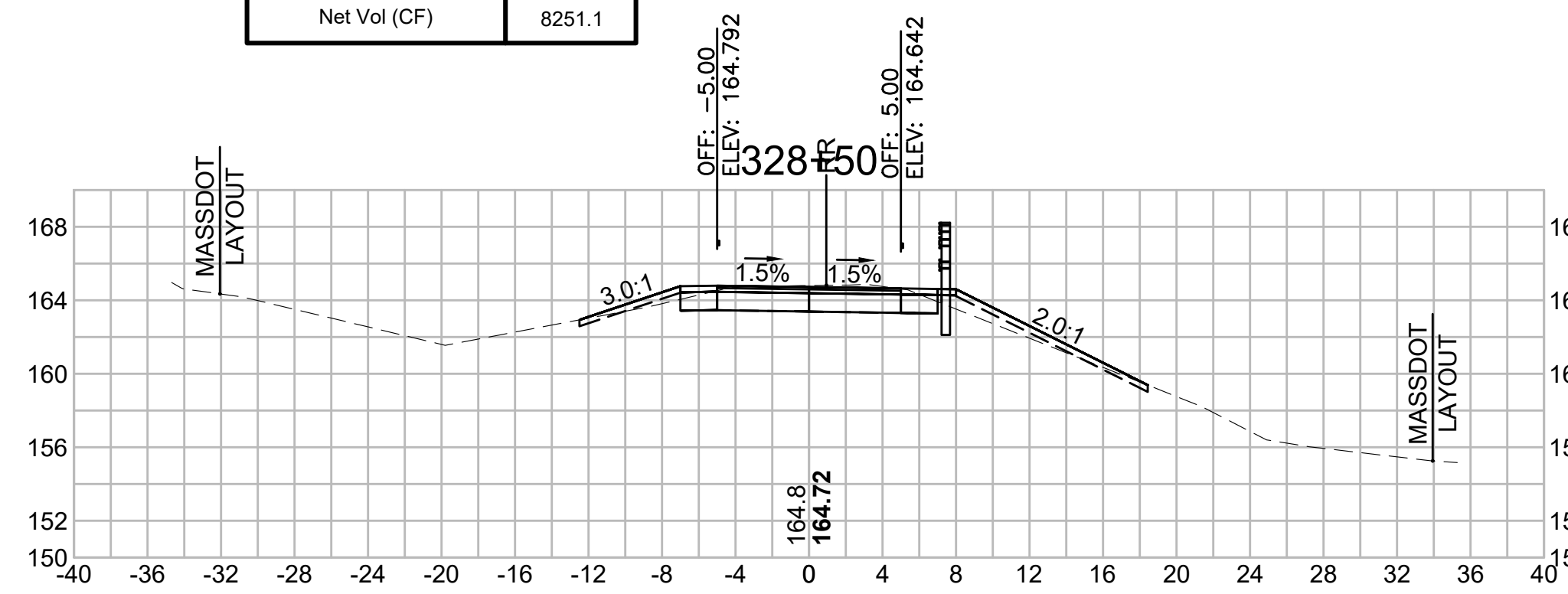
CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

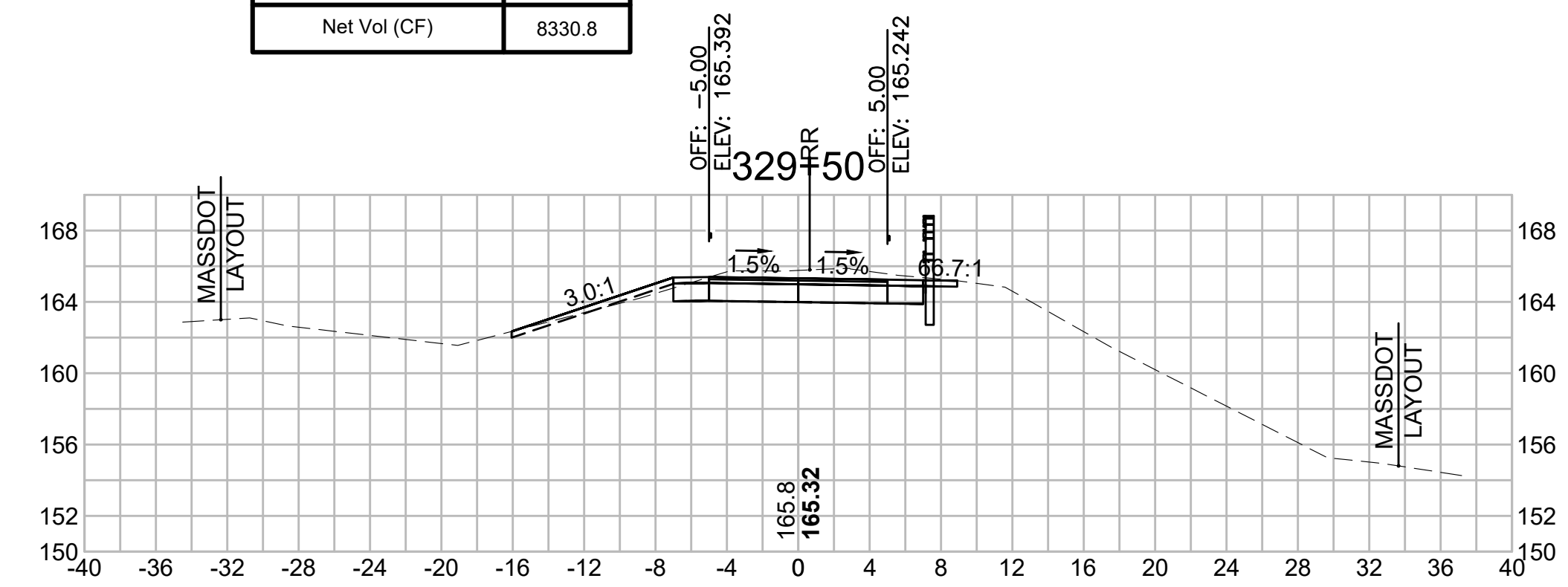
Total Volume at Station 327+50.00	
Cut Area (SF)	18.077
Fill Area (SF)	3.265
Cut Vol (CF)	33.9
Fill Vol (CF)	4.2
Cum Cut Vol (CF)	15993.0
Cum Fill Vol (CF)	7789.5
Net Vol (CF)	8203.5



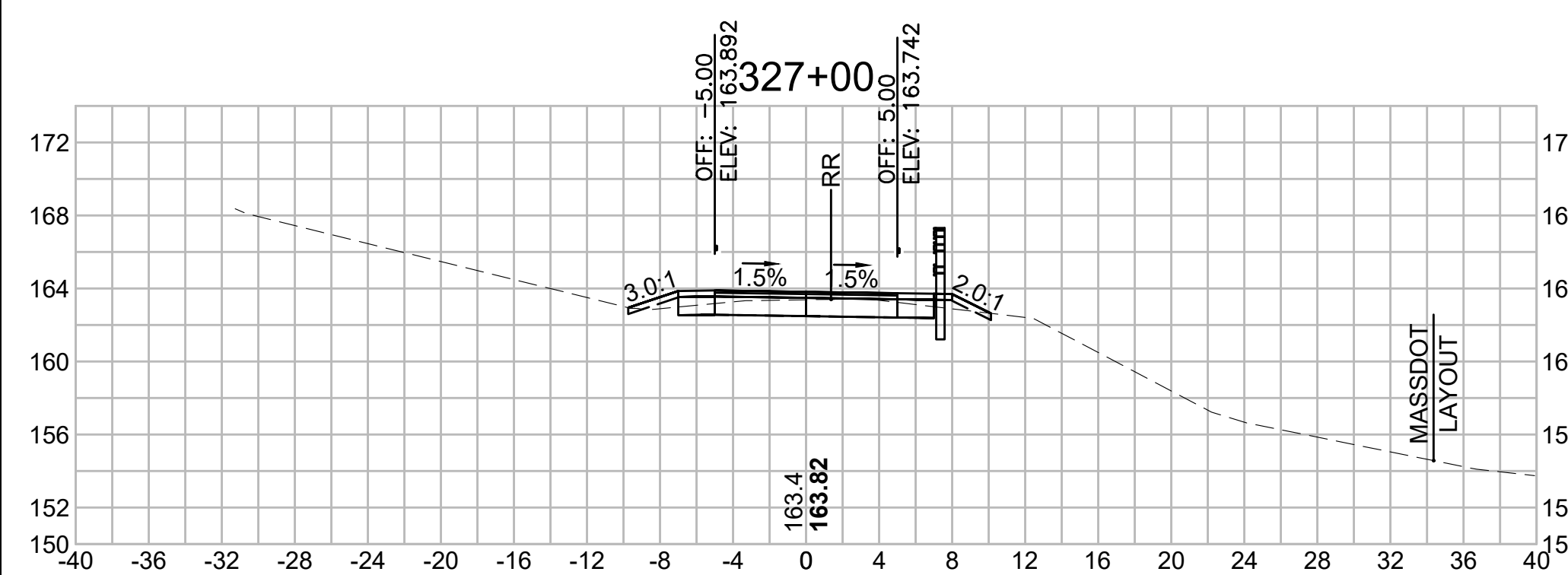
Total Volume at Station 328+50.00	
Cut Area (SF)	18.666
Fill Area (SF)	3.588
Cut Vol (CF)	33.0
Fill Vol (CF)	9.1
Cum Cut Vol (CF)	16058.5
Cum Fill Vol (CF)	7807.4
Net Vol (CF)	8251.1



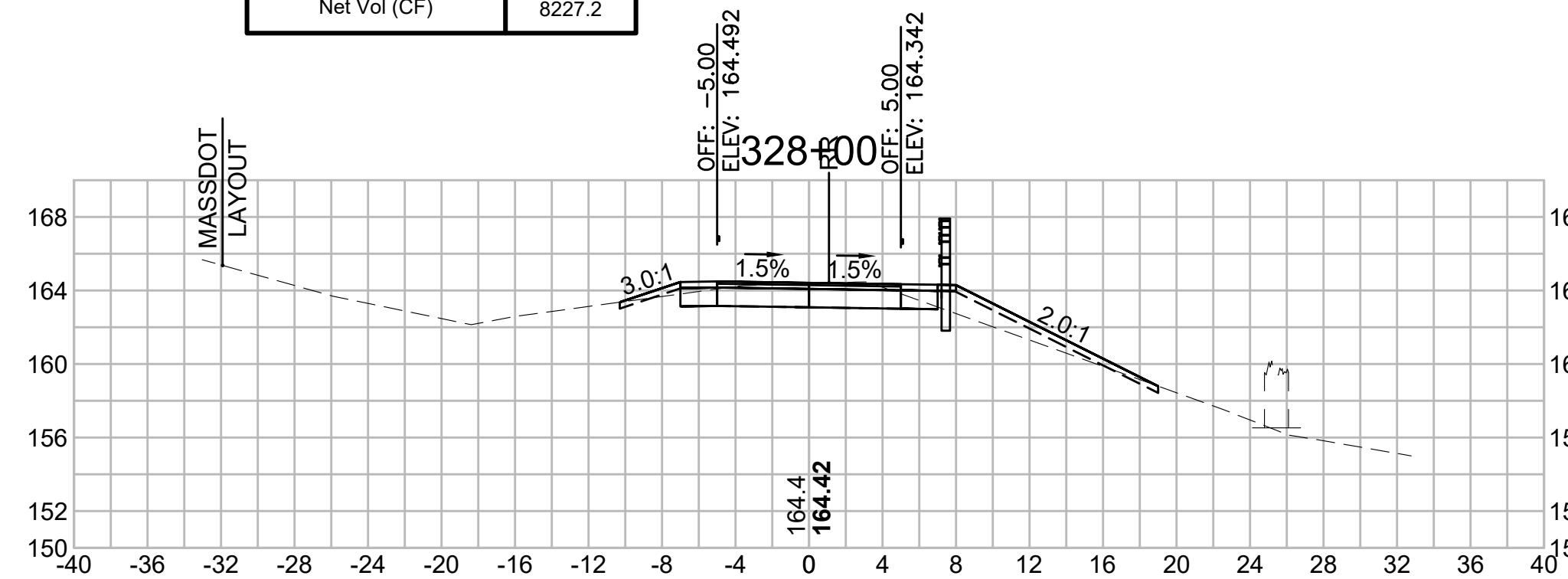
Total Volume at Station 329+50.00	
Cut Area (SF)	24.875
Fill Area (SF)	0.622
Cut Vol (CF)	44.8
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	16142.4
Cum Fill Vol (CF)	7811.6
Net Vol (CF)	8330.8



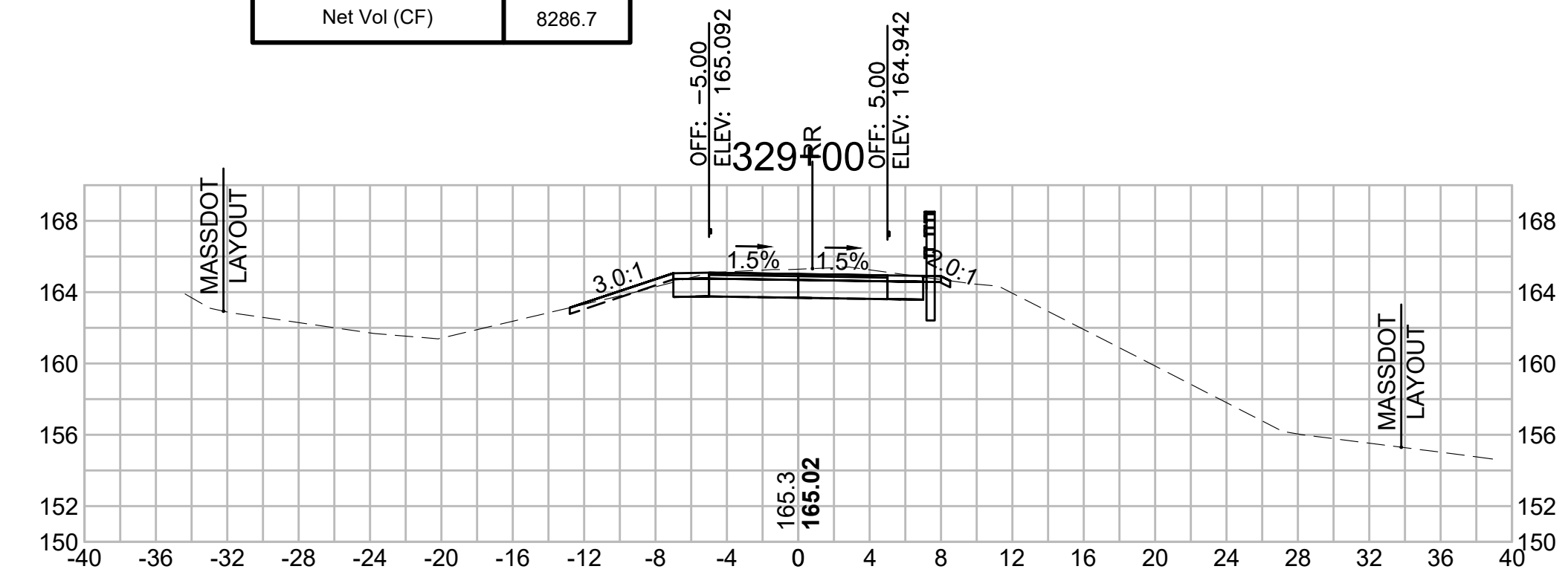
Total Volume at Station 327+00.00	
Cut Area (SF)	18.500
Fill Area (SF)	1.258
Cut Vol (CF)	26.7
Fill Vol (CF)	3.7
Cum Cut Vol (CF)	15959.2
Cum Fill Vol (CF)	7785.3
Net Vol (CF)	8173.9



Total Volume at Station 328+00.00	
Cut Area (SF)	16.999
Fill Area (SF)	6.252
Cut Vol (CF)	32.5
Fill Vol (CF)	8.8
Cum Cut Vol (CF)	16025.5
Cum Fill Vol (CF)	7798.3
Net Vol (CF)	8227.2



Total Volume at Station 329+00.00	
Cut Area (SF)	23.511
Fill Area (SF)	0.168
Cut Vol (CF)	39.1
Fill Vol (CF)	3.5
Cum Cut Vol (CF)	16097.6
Cum Fill Vol (CF)	7810.9
Net Vol (CF)	8286.7



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	298	318

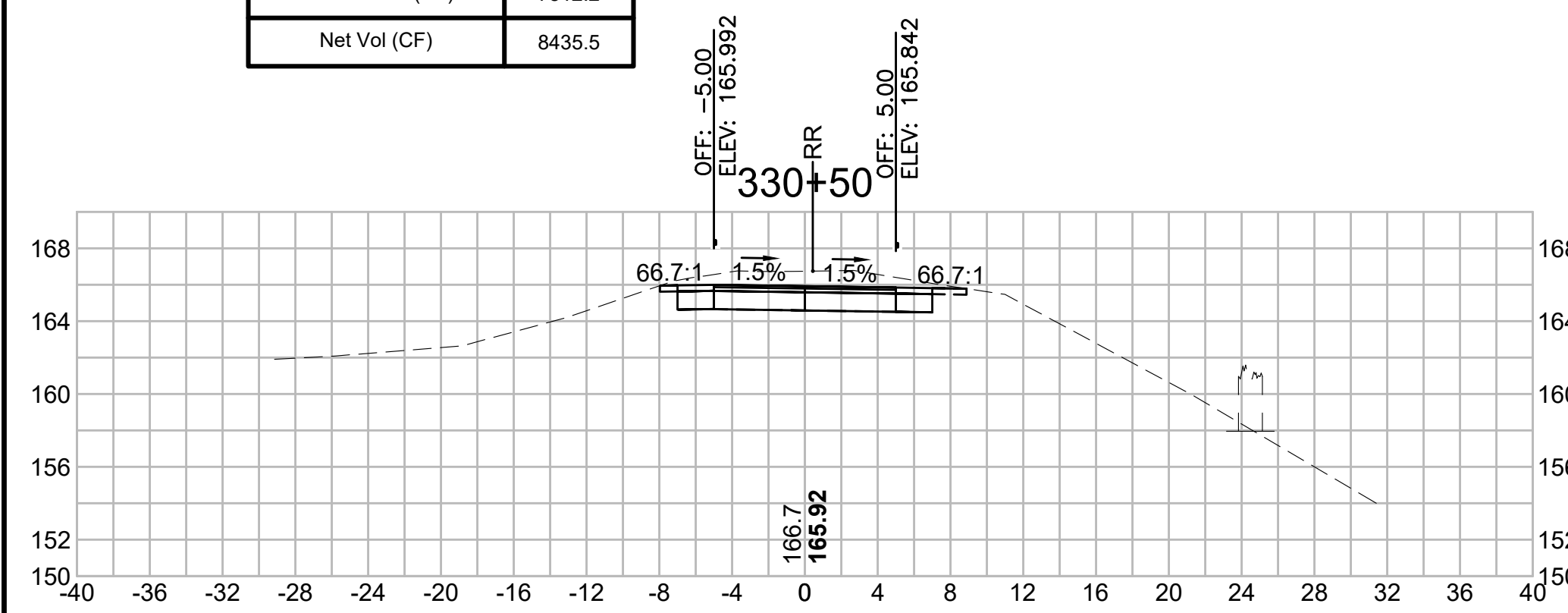
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

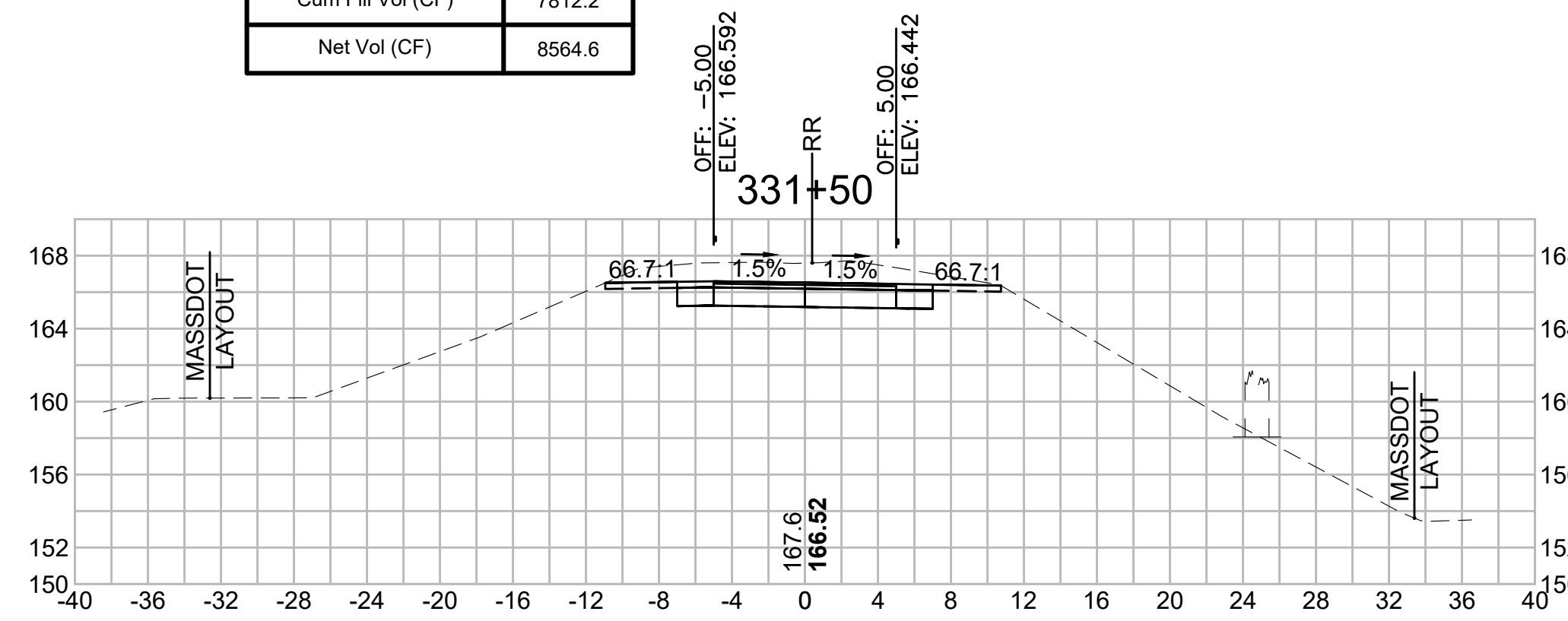
Total Volume at Station 330+50.00

Cut Area (SF)	31.474
Fill Area (SF)	0.000
Cut Vol (CF)	55.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16247.7
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8435.5



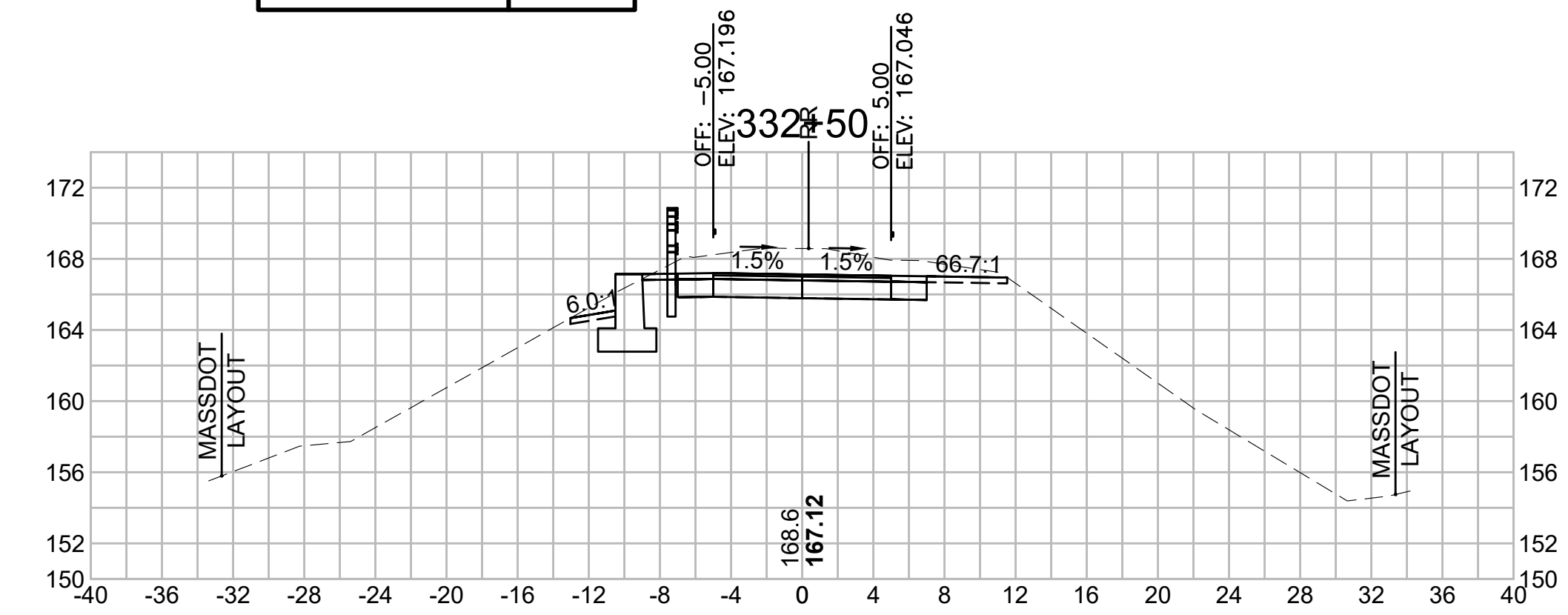
Total Volume at Station 331+50.00

Cut Area (SF)	39.244
Fill Area (SF)	0.000
Cut Vol (CF)	68.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16376.8
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8564.6



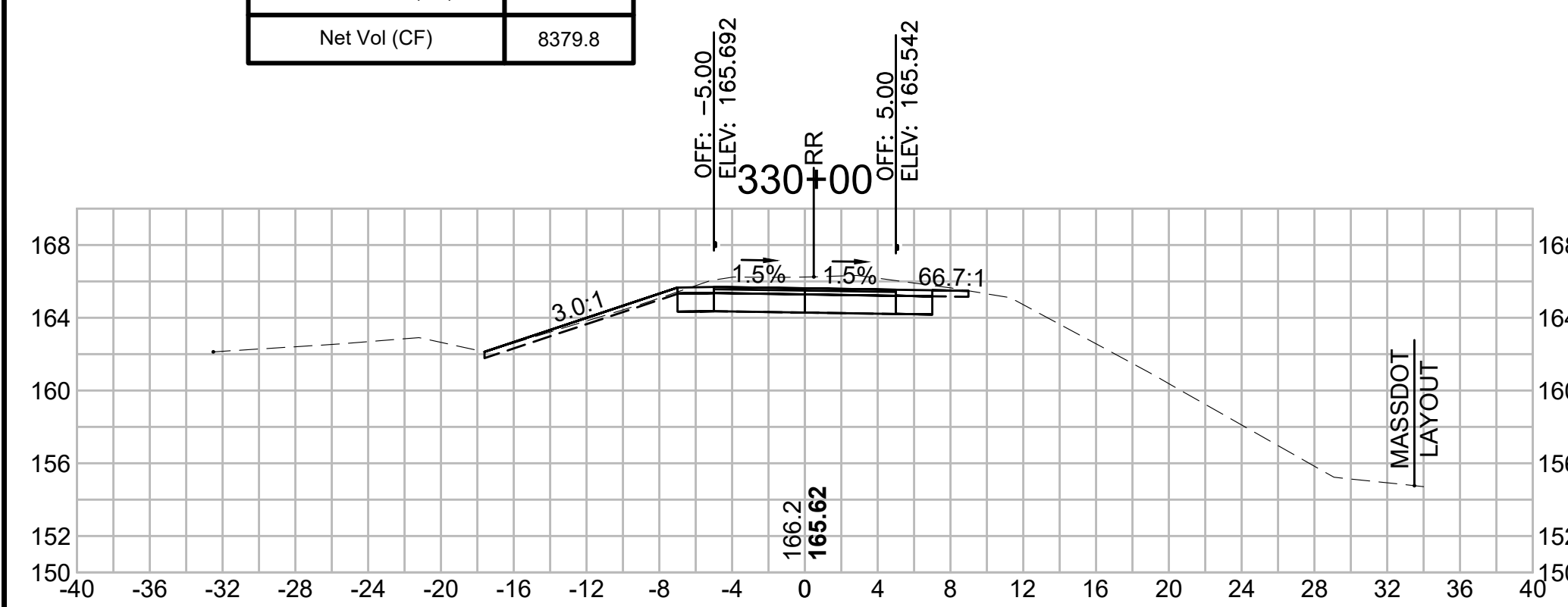
Total Volume at Station 332+50.00

Cut Area (SF)	53.006
Fill Area (SF)	0.008
Cut Vol (CF)	89.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16543.0
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8730.8



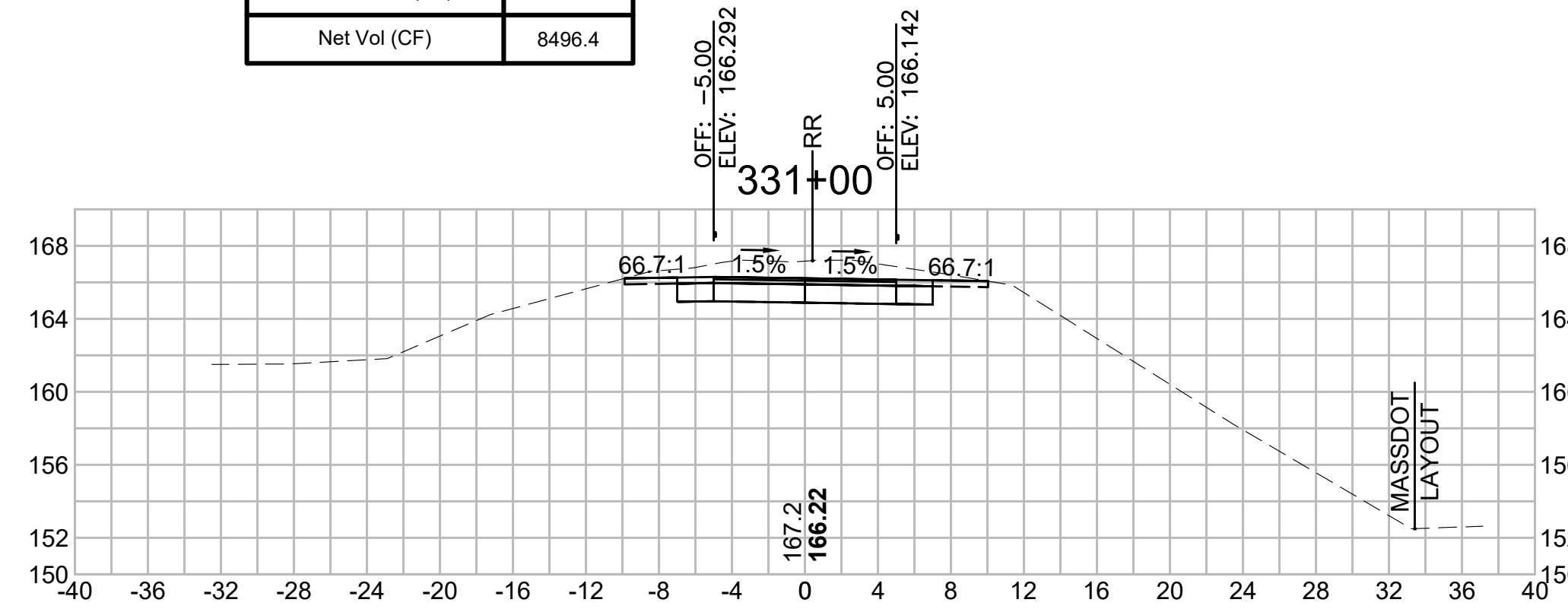
Total Volume at Station 330+00.00

Cut Area (SF)	28.671
Fill Area (SF)	0.000
Cut Vol (CF)	49.6
Fill Vol (CF)	0.6
Cum Cut Vol (CF)	16192.0
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8379.8



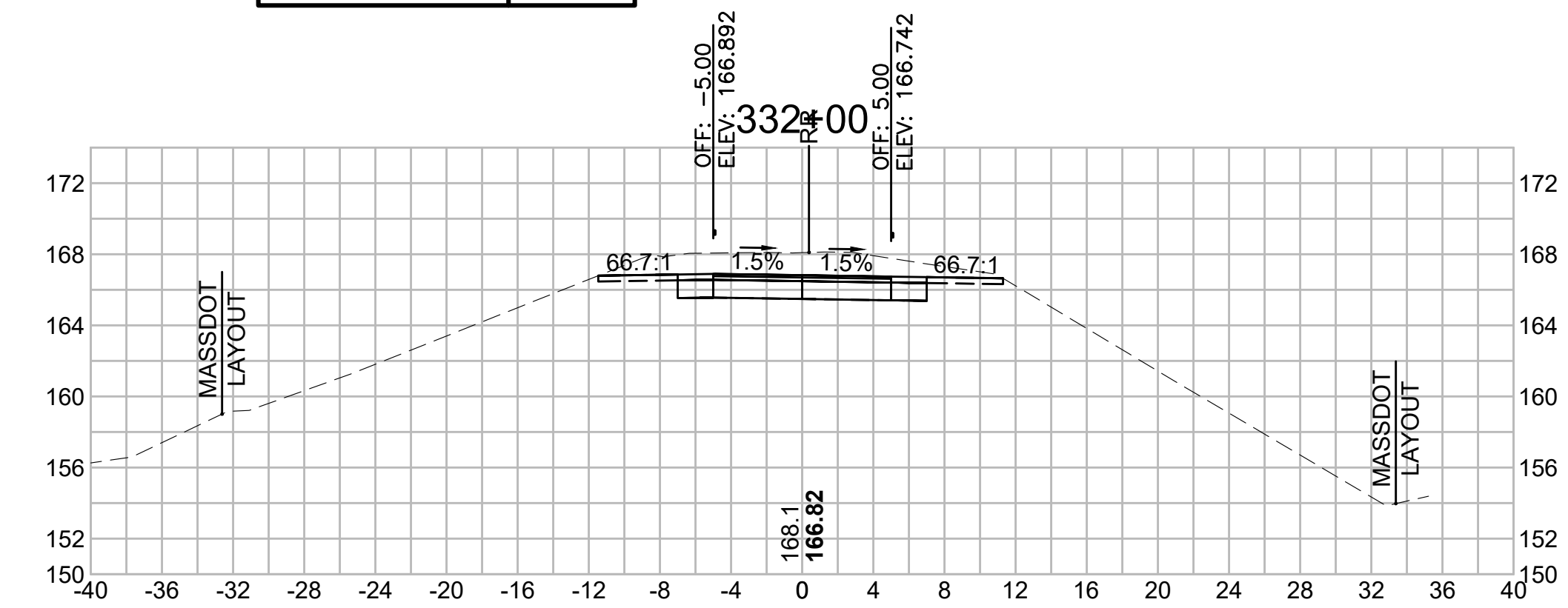
Total Volume at Station 331+00.00

Cut Area (SF)	34.386
Fill Area (SF)	0.000
Cut Vol (CF)	61.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16308.6
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8496.4



Total Volume at Station 332+00.00

Cut Area (SF)	43.619
Fill Area (SF)	0.000
Cut Vol (CF)	76.7
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16453.5
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8641.3



SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	299	318

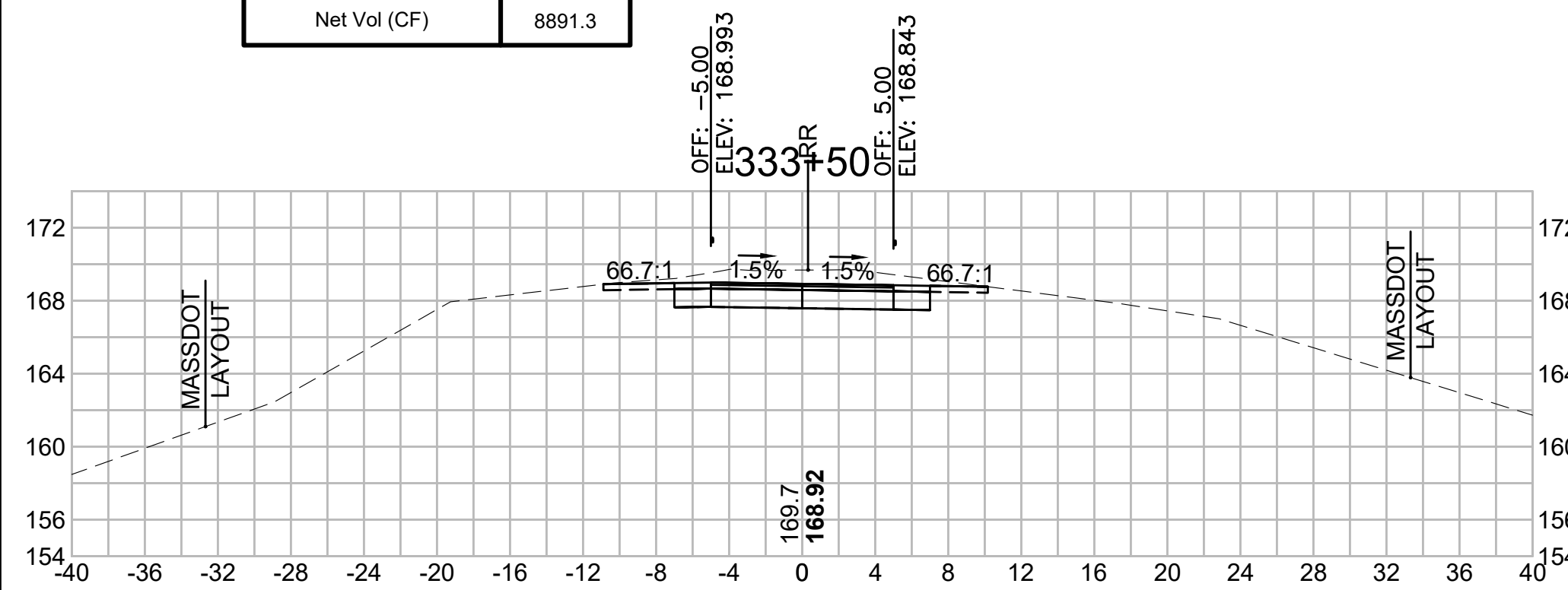
PROJECT FILE NO. 608164

CROSS SECTIONS

608164_XSEC(CROSS SECTION LAYOUTS).DWG 12-May-2021

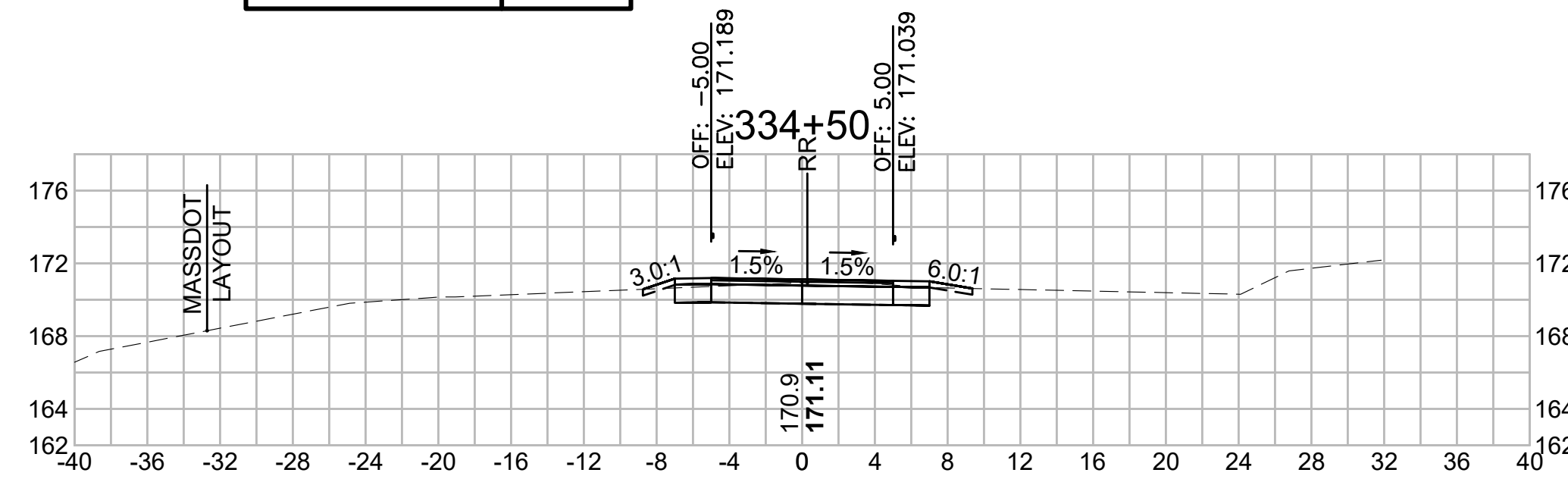
Total Volume at Station 333+50.00

Cut Area (SF)	31.997
Fill Area (SF)	0.000
Cut Vol (CF)	70.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16703.5
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8891.3



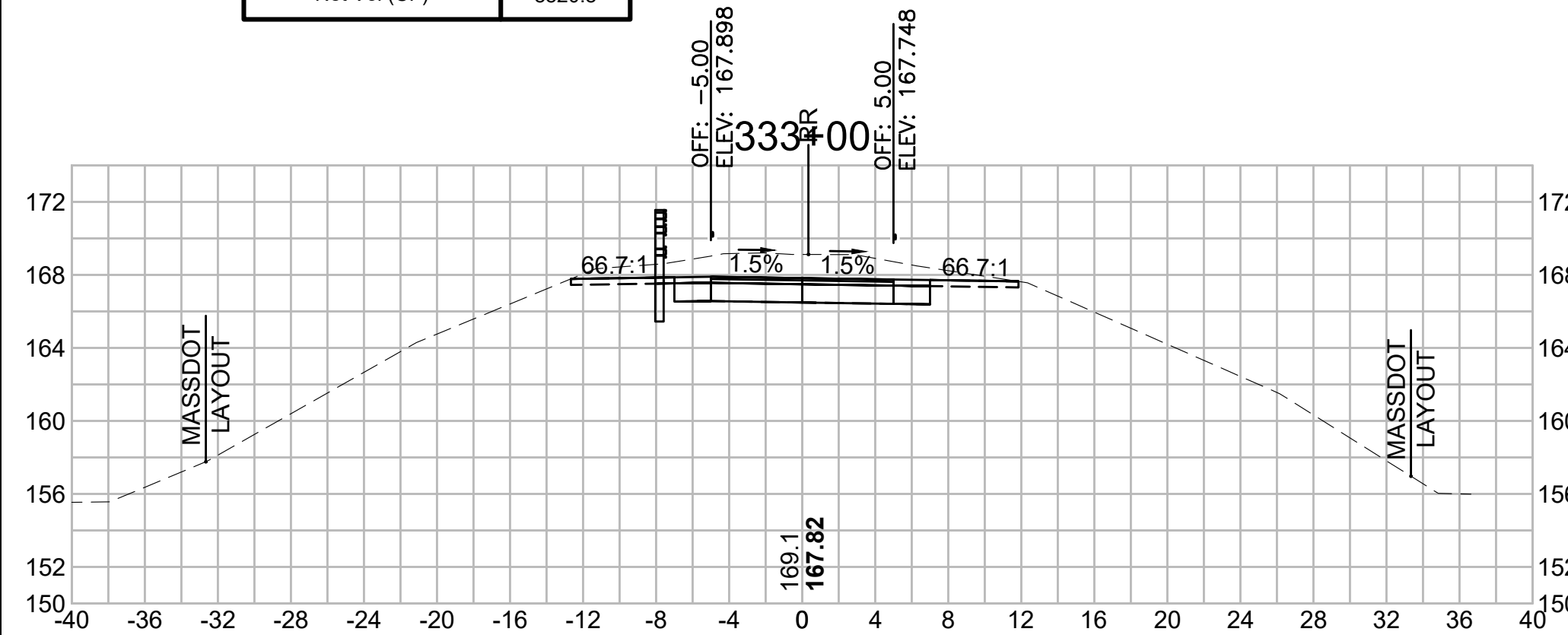
Total Volume at Station 334+50.00

Cut Area (SF)	18.660
Fill Area (SF)	0.046
Cut Vol (CF)	38.3
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	16792.5
Cum Fill Vol (CF)	7812.7
Net Vol (CF)	8979.8



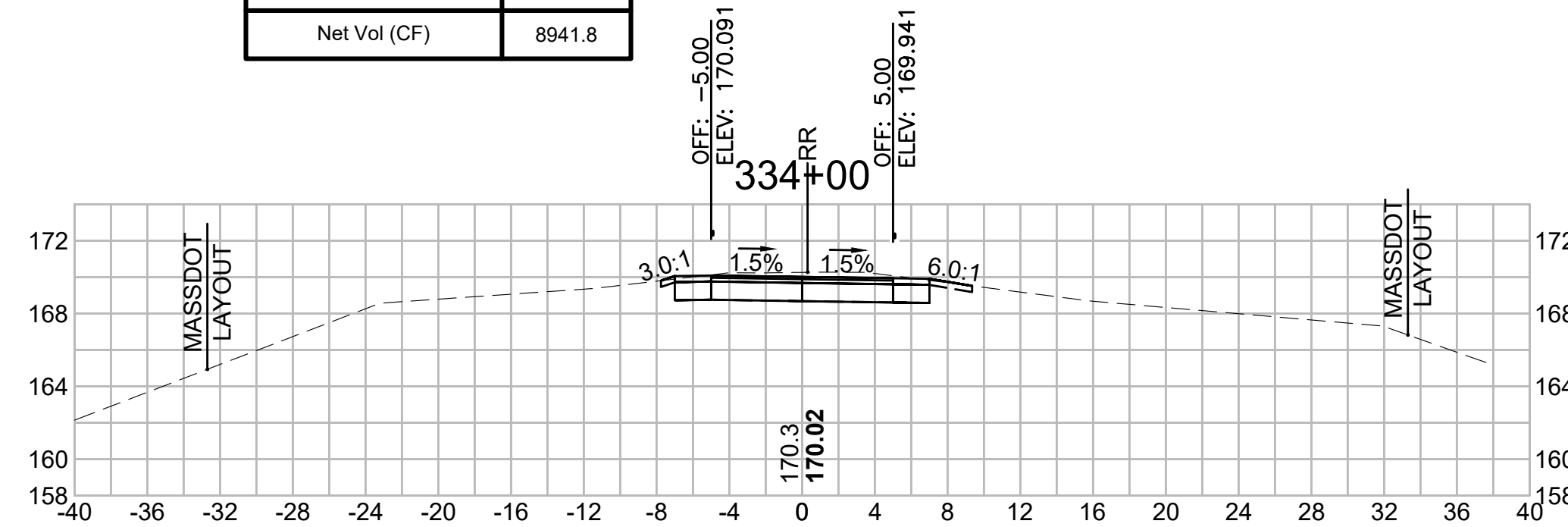
Total Volume at Station 333+00.00

Cut Area (SF)	44.181
Fill Area (SF)	0.000
Cut Vol (CF)	90.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	16633.0
Cum Fill Vol (CF)	7812.2
Net Vol (CF)	8820.8



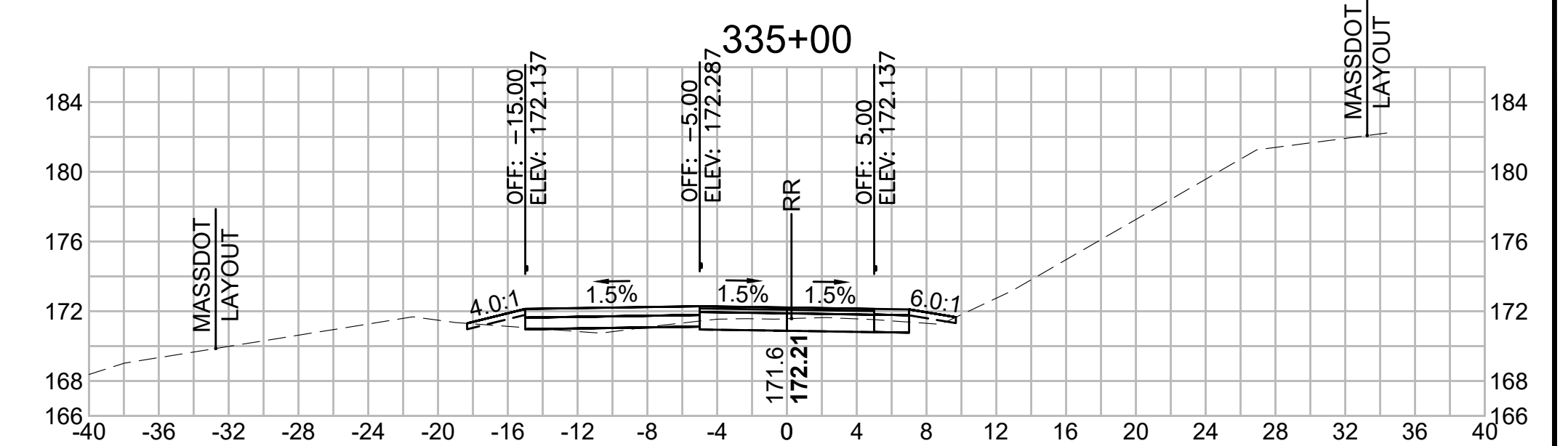
Total Volume at Station 334+00.00

Cut Area (SF)	22.718
Fill Area (SF)	0.248
Cut Vol (CF)	50.7
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	16754.2
Cum Fill Vol (CF)	7812.4
Net Vol (CF)	8941.8



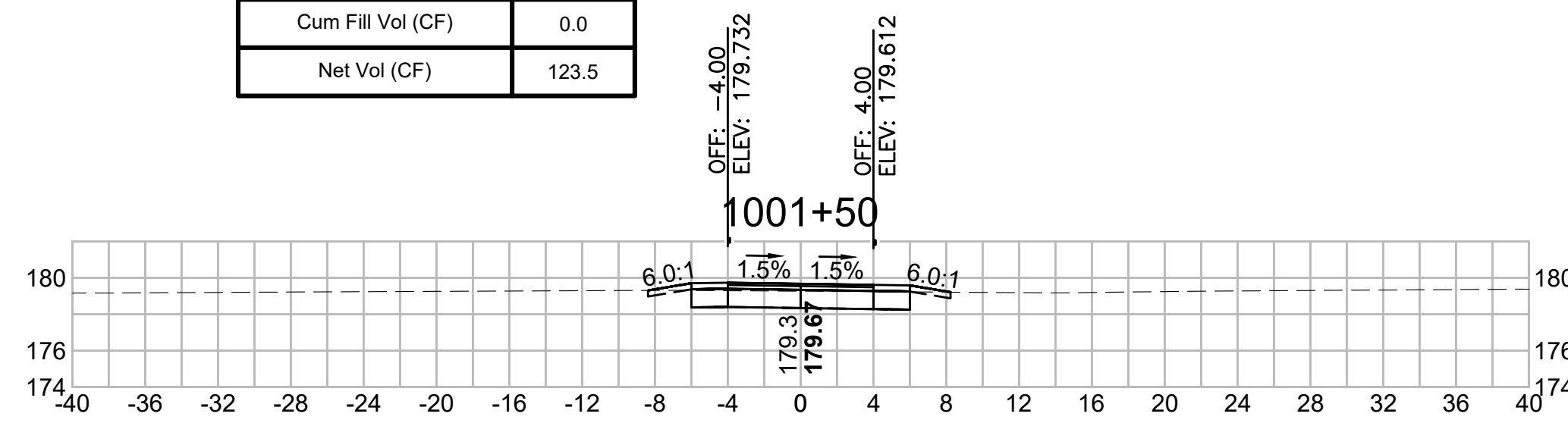
Total Volume at Station 335+00.00

Cut Area (SF)	9.103
Fill Area (SF)	2.279
Cut Vol (CF)	25.7
Fill Vol (CF)	2.2
Cum Cut Vol (CF)	16618.2
Cum Fill Vol (CF)	7814.9
Net Vol (CF)	9003.3



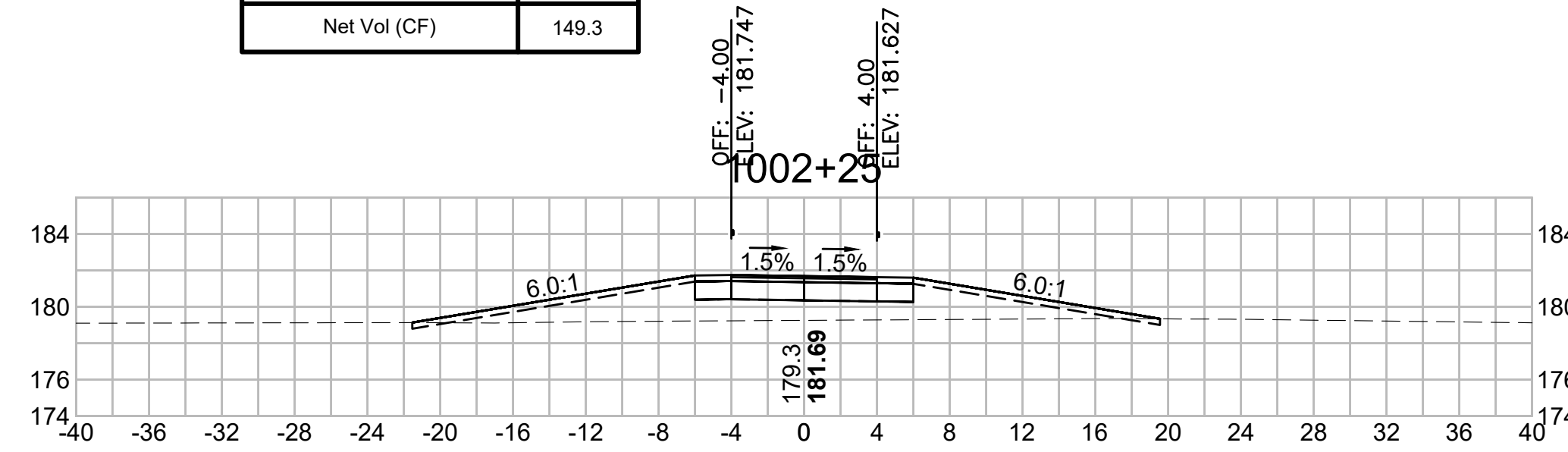
Total Volume at Station 1001+50.00

Cut Area (SF)	44.475
Fill Area (SF)	0.013
Cut Vol (CF)	52.4
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	123.5
Cum Fill Vol (CF)	0.0
Net Vol (CF)	123.5



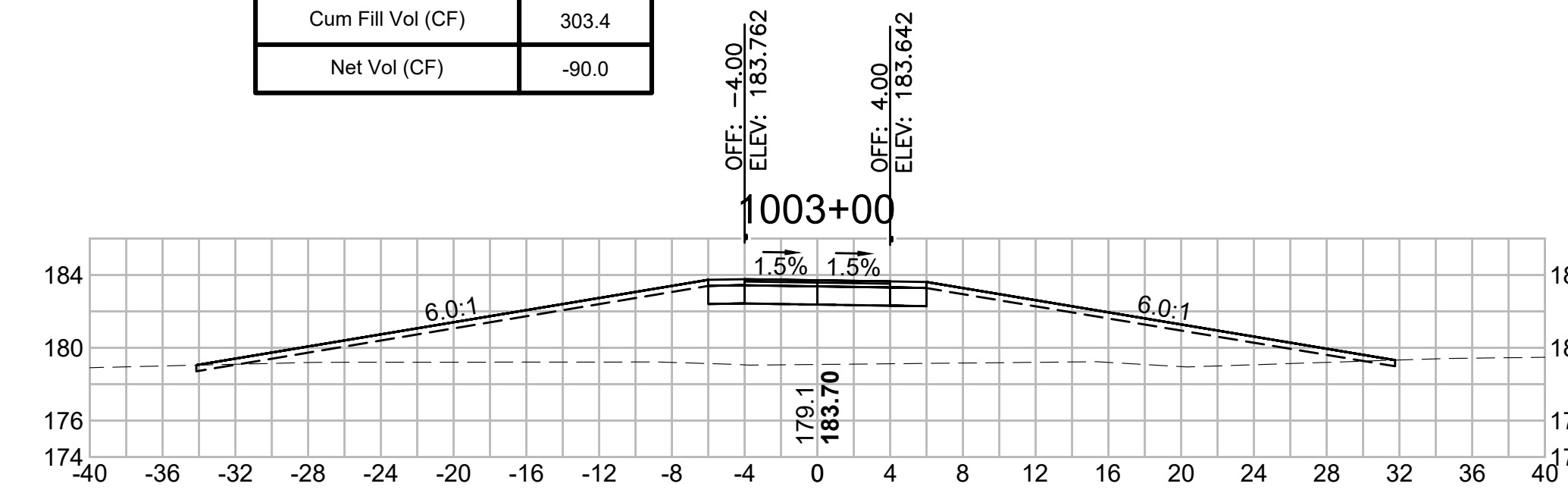
Total Volume at Station 1002+25.00

Cut Area (SF)	12.186
Fill Area (SF)	39.251
Cut Vol (CF)	12.8
Fill Vol (CF)	26.0
Cum Cut Vol (CF)	186.5
Cum Fill Vol (CF)	37.3
Net Vol (CF)	149.3



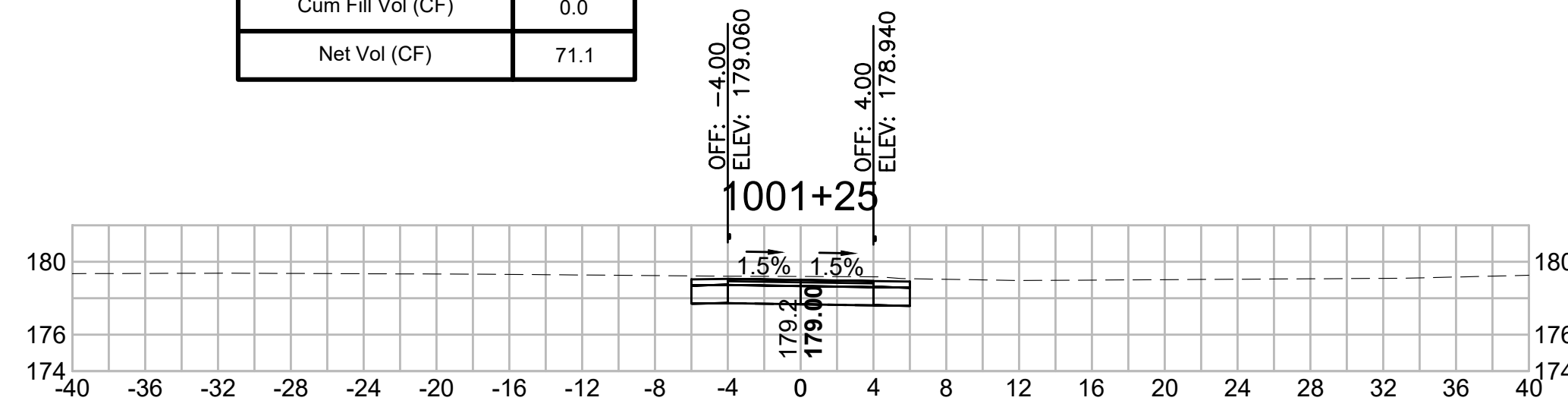
Total Volume at Station 1003+00.00

Cut Area (SF)	5.808
Fill Area (SF)	143.709
Cut Vol (CF)	7.4
Fill Vol (CF)	119.0
Cum Cut Vol (CF)	213.4
Cum Fill Vol (CF)	303.4
Net Vol (CF)	-90.0



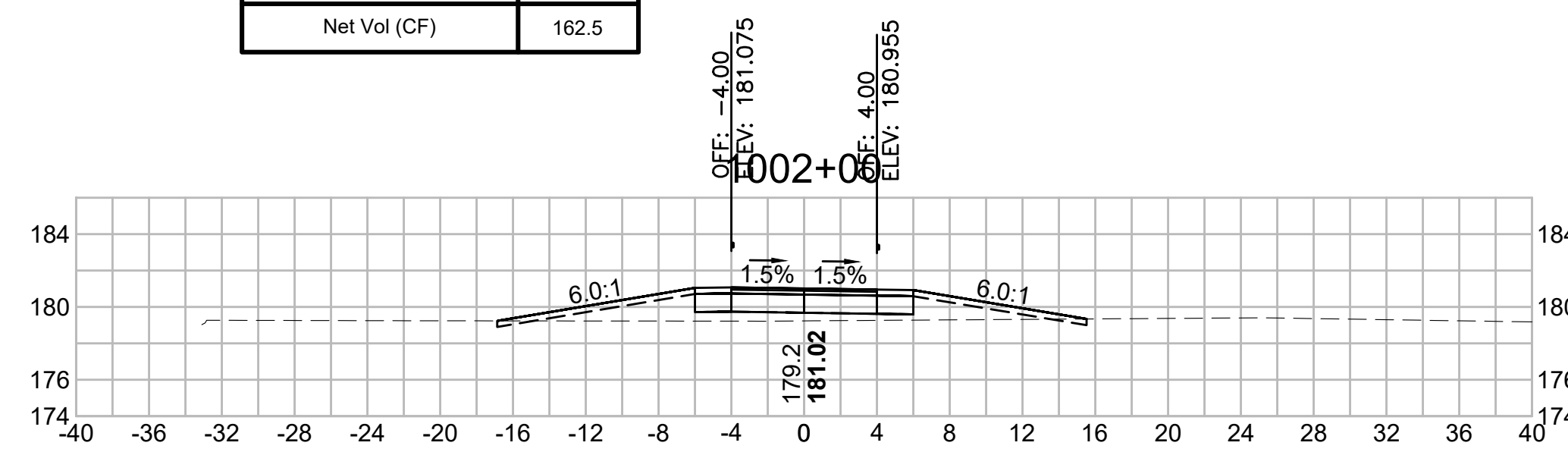
Total Volume at Station 1001+25.00

Cut Area (SF)	68.630
Fill Area (SF)	0.000
Cut Vol (CF)	71.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	71.1
Cum Fill Vol (CF)	0.0
Net Vol (CF)	71.1



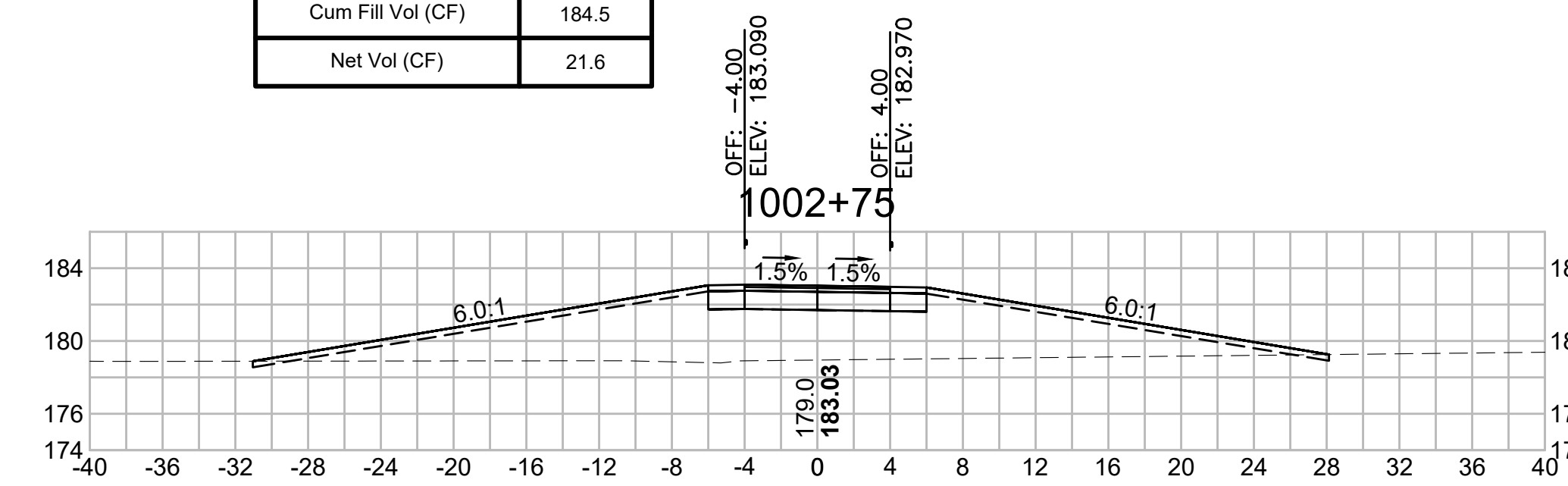
Total Volume at Station 1002+00.00

Cut Area (SF)	15.420
Fill Area (SF)	16.880
Cut Vol (CF)	18.4
Fill Vol (CF)	9.5
Cum Cut Vol (CF)	173.7
Cum Fill Vol (CF)	11.3
Net Vol (CF)	162.5



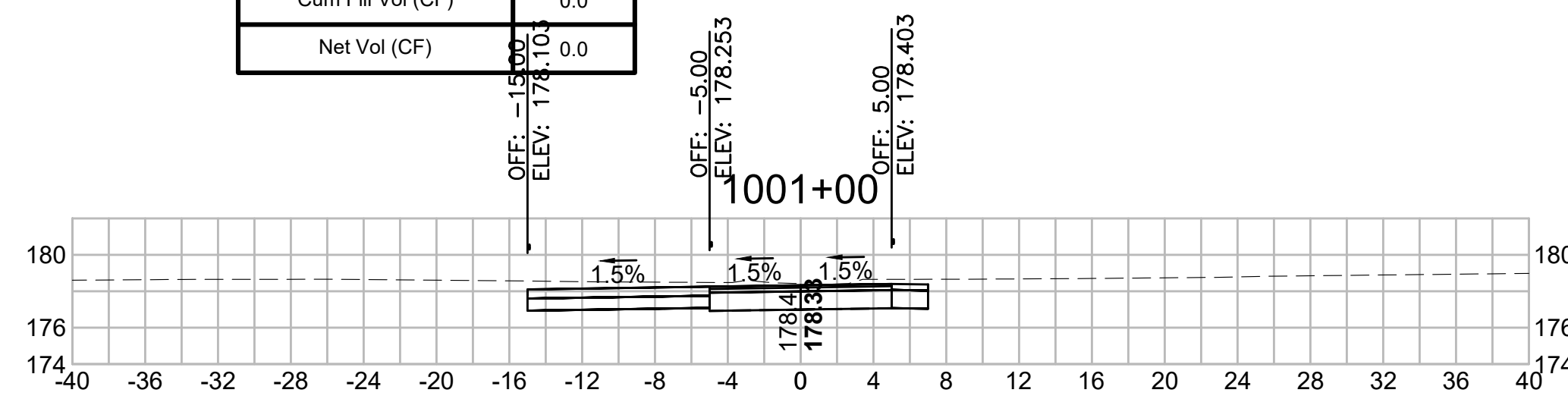
Total Volume at Station 1002+75.00

Cut Area (SF)	10.195
Fill Area (SF)	113.313
Cut Vol (CF)	9.3
Fill Vol (CF)	90.7
Cum Cut Vol (CF)	206.0
Cum Fill Vol (CF)	184.5
Net Vol (CF)	21.6



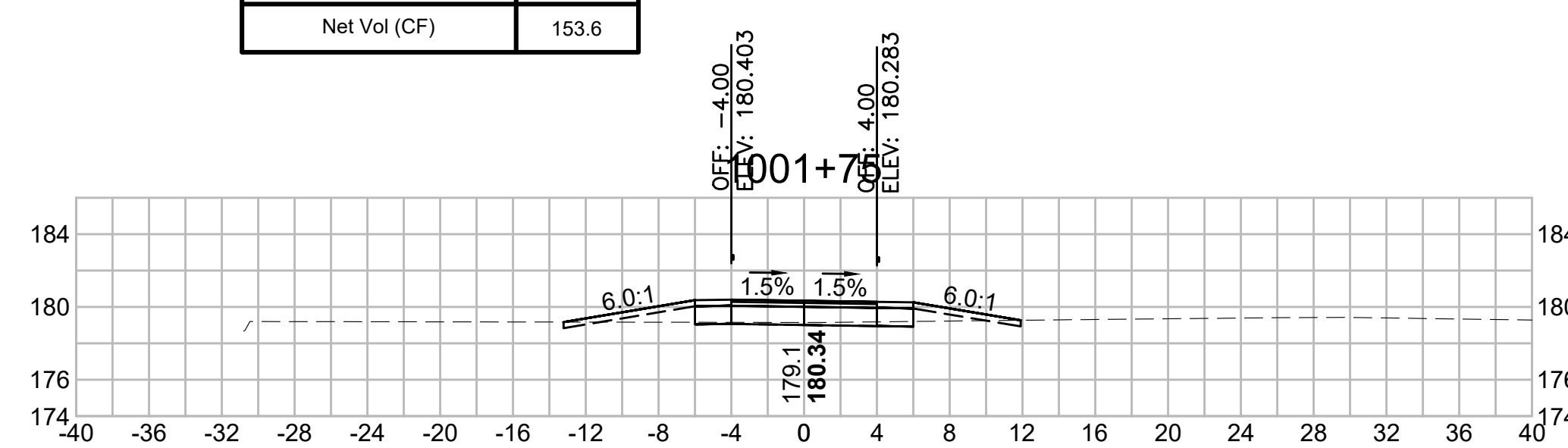
Total Volume at Station 1001+00.00

Cut Area (SF)	84.962
Fill Area (SF)	0.000
Cut Vol (CF)	0.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	0.0
Cum Fill Vol (CF)	0.0
Net Vol (CF)	0.0



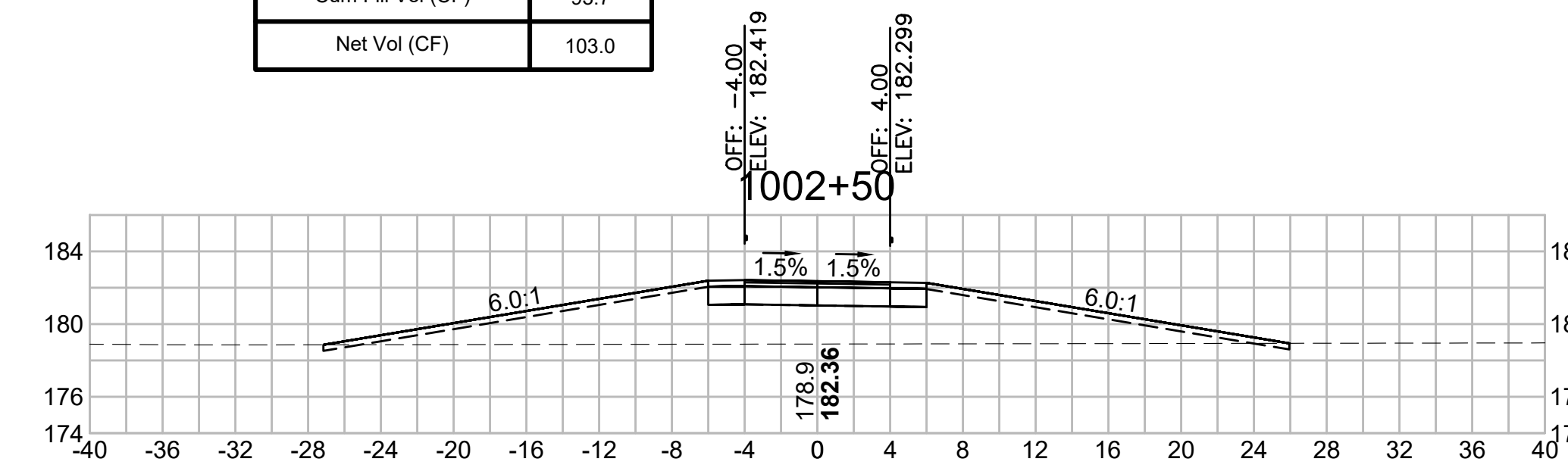
Total Volume at Station 1001+75.00

Cut Area (SF)	24.349
Fill Area (SF)	3.723
Cut Vol (CF)	31.9
Fill Vol (CF)	1.7
Cum Cut Vol (CF)	155.3
Cum Fill Vol (CF)	1.7
Net Vol (CF)	153.6



Total Volume at Station 1002+50.00

Cut Area (SF)	9.861
Fill Area (SF)	82.688
Cut Vol (CF)	10.2
Fill Vol (CF)	56.5
Cum Cut Vol (CF)	196.7
Cum Fill Vol (CF)	93.7
Net Vol (CF)	103.0



SUDBURY
BRUCE FREEMAN RAIL TRAIL

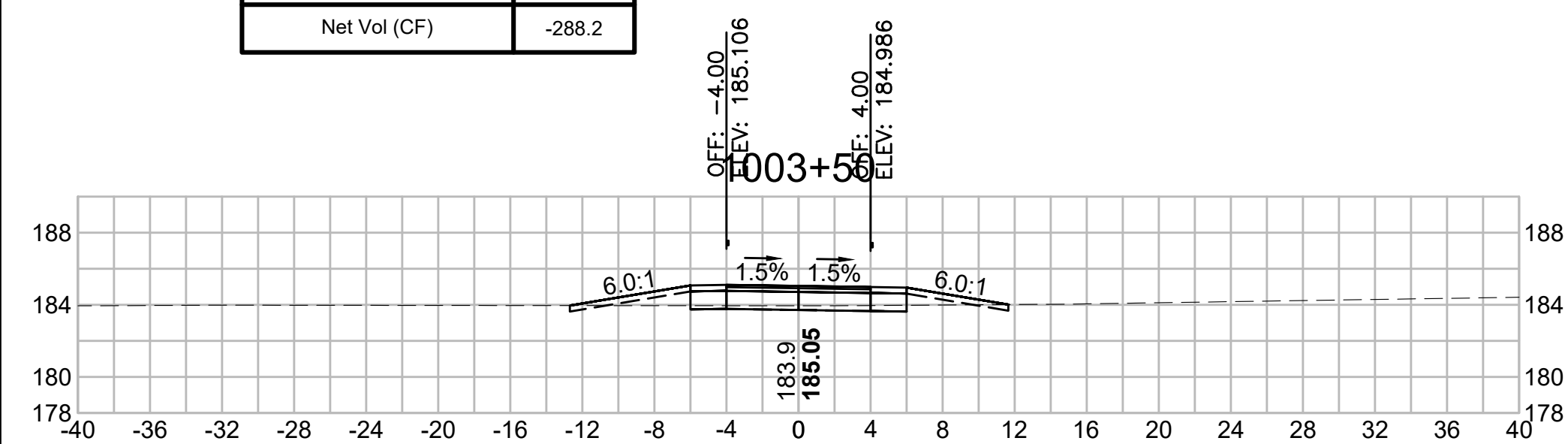
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	301	318
PROJECT FILE NO. 608164			

CROSS SECTIONS
PARKINSON'S LOT ACCESS PATH

608164_XSEC\CROSS SECTION LAYOUTS.DWG 12-May-2021

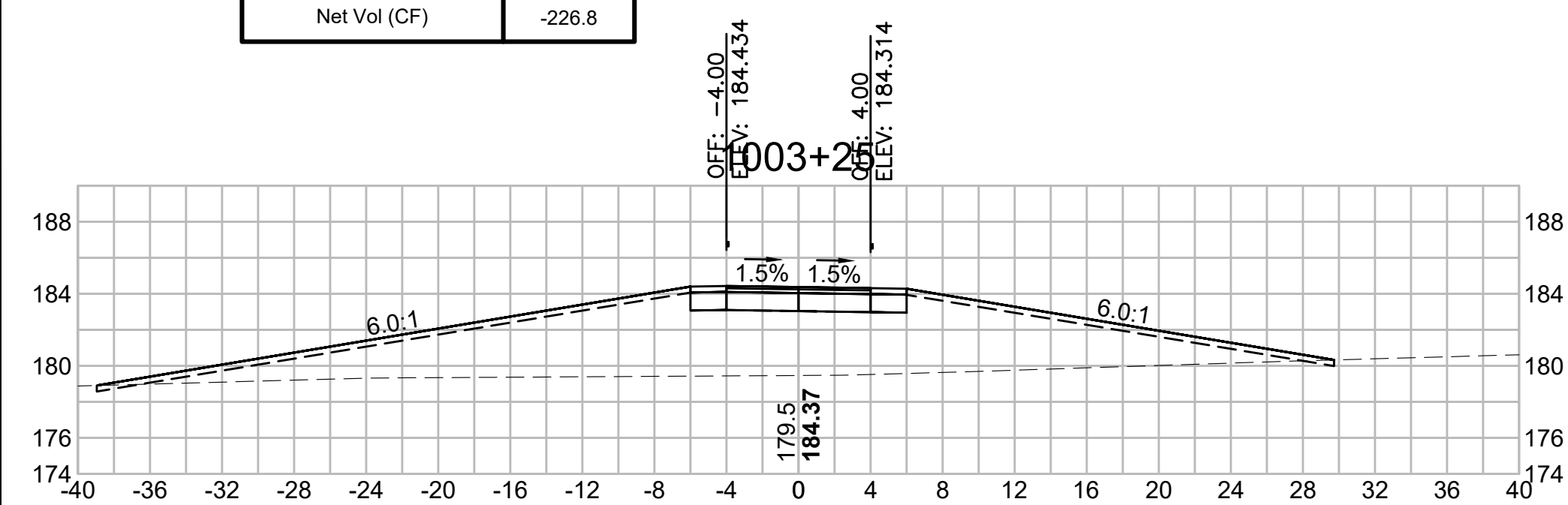
Total Volume at Station 1003+50.00

Cut Area (SF)	27,938
Fill Area (SF)	3,042
Cut Vol (CF)	13.7
Fill Vol (CF)	75.2
Cum Cut Vol (CF)	230.6
Cum Fill Vol (CF)	518.9
Net Vol (CF)	-288.2



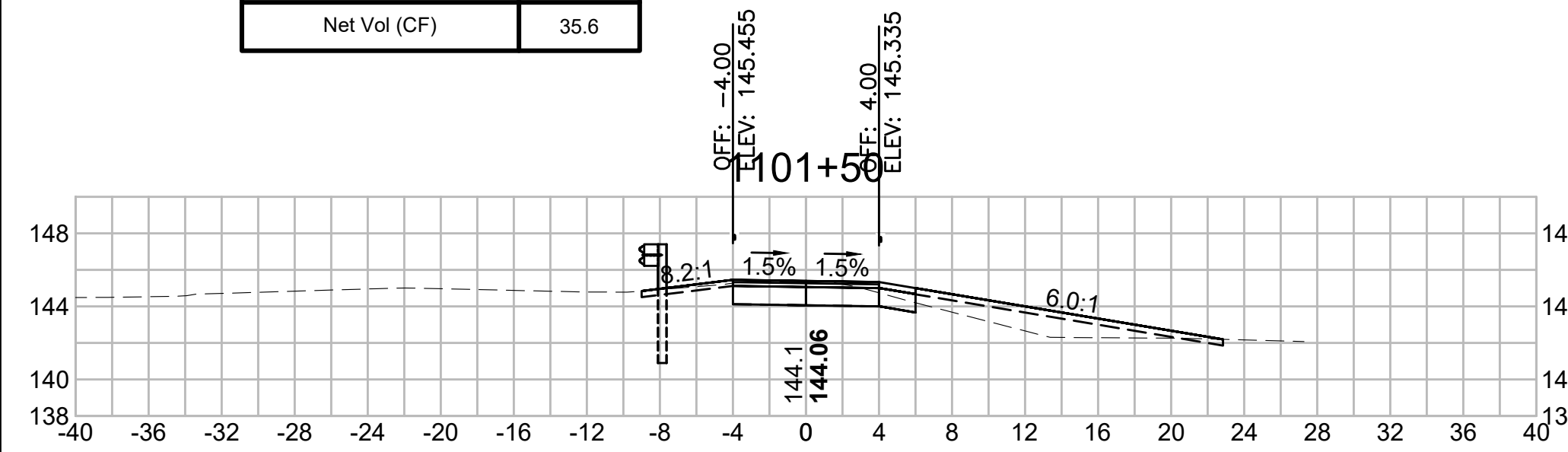
Total Volume at Station 1003+25.00

Cut Area (SF)	1,725
Fill Area (SF)	159,286
Cut Vol (CF)	3.5
Fill Vol (CF)	140.3
Cum Cut Vol (CF)	216.9
Cum Fill Vol (CF)	443.7
Net Vol (CF)	-226.8

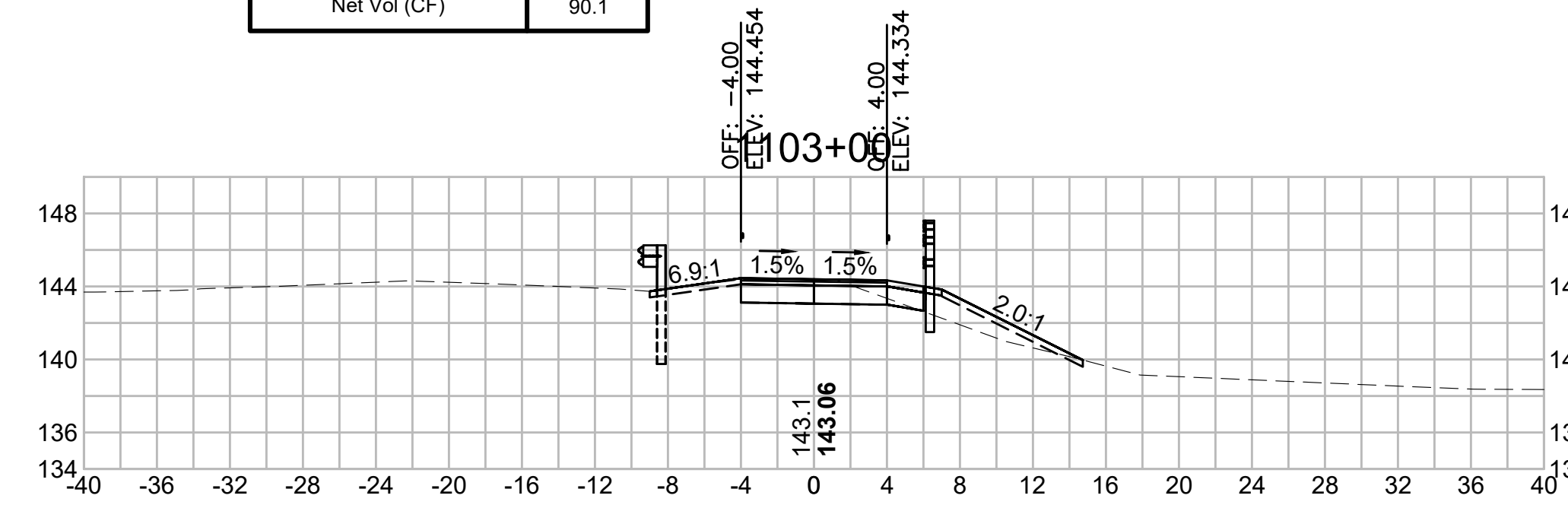


**CROSS SECTIONS
DAVIS FIELD ACCESS PATH**

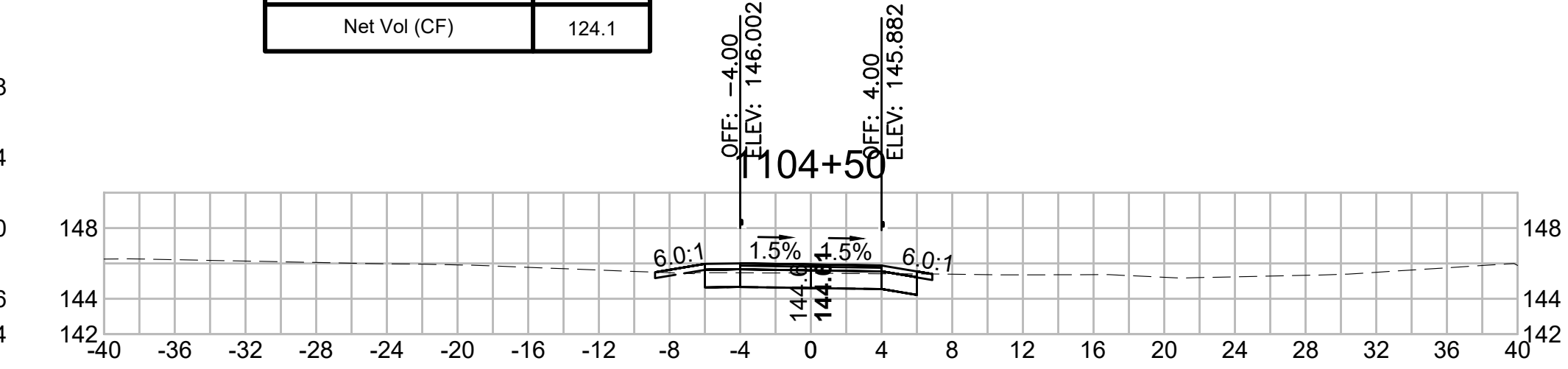
Total Volume at Station 1101+50.00	
Cut Area (SF)	12.344
Fill Area (SF)	9.860
Cut Vol (CF)	23.6
Fill Vol (CF)	9.1
Cum Cut Vol (CF)	45.0
Cum Fill Vol (CF)	9.5
Net Vol (CF)	35.6



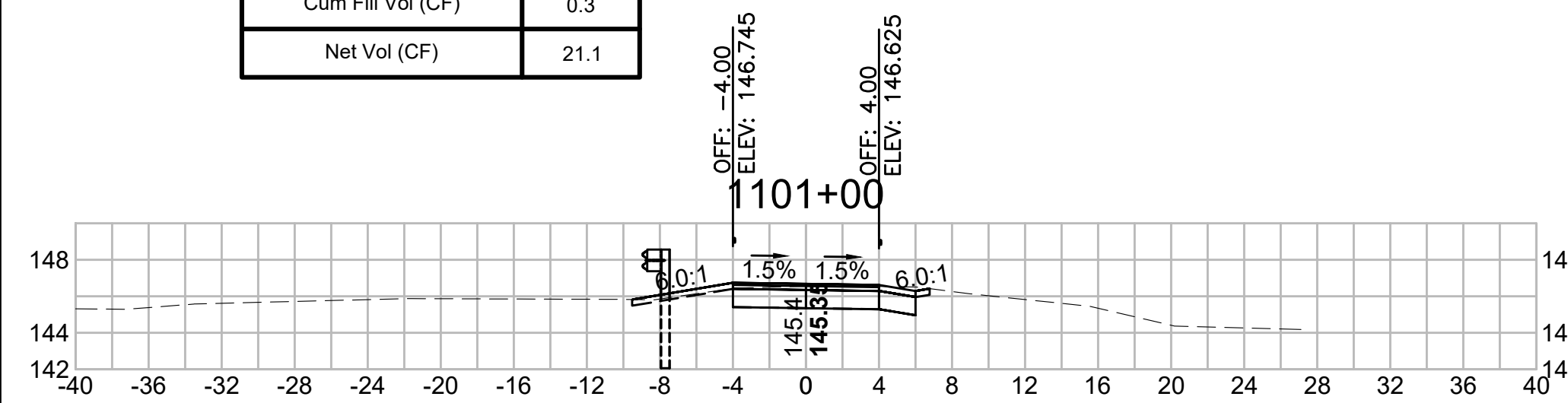
Total Volume at Station 1103+00.00	
Cut Area (SF)	11.283
Fill Area (SF)	5.526
Cut Vol (CF)	22.2
Fill Vol (CF)	7.1
Cum Cut Vol (CF)	124.4
Cum Fill Vol (CF)	34.4
Net Vol (CF)	90.1



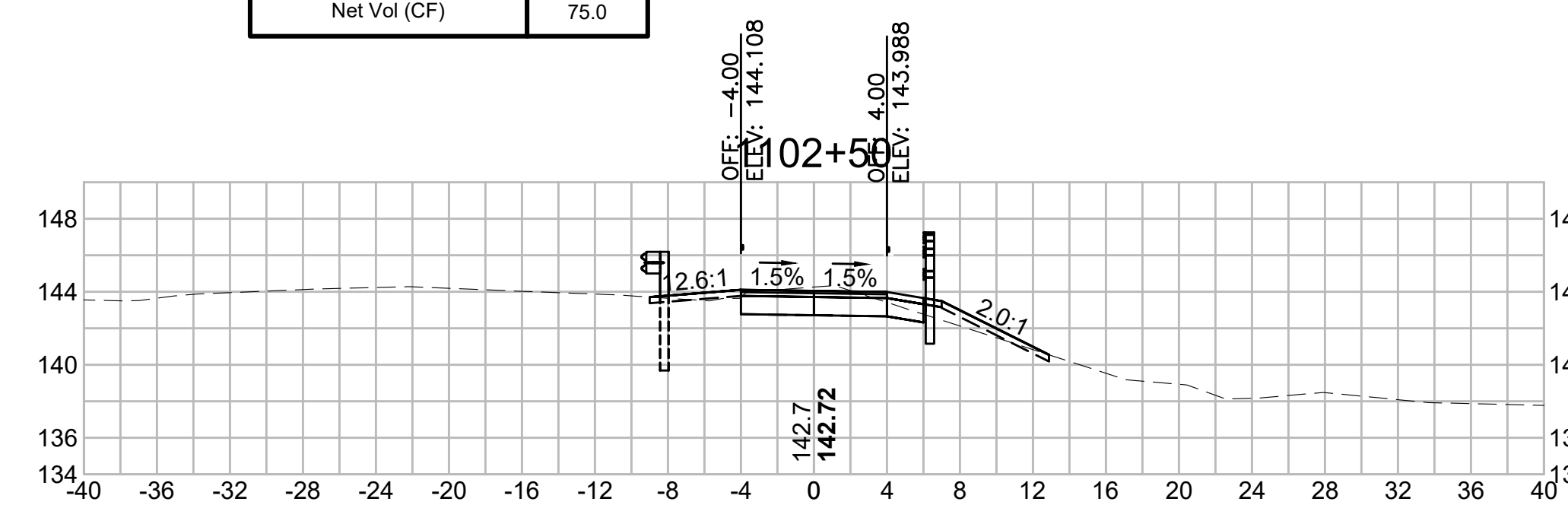
Total Volume at Station 1104+50.00	
Cut Area (SF)	10.903
Fill Area (SF)	0.099
Cut Vol (CF)	19.2
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	178.0
Cum Fill Vol (CF)	54.0
Net Vol (CF)	124.1



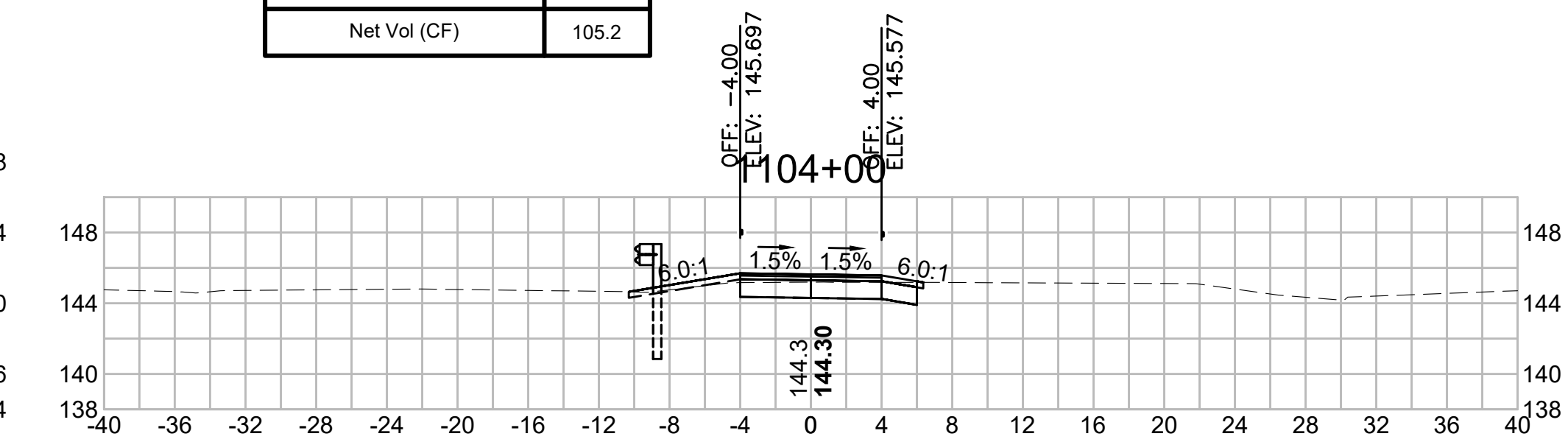
Total Volume at Station 1101+00.00	
Cut Area (SF)	13.171
Fill Area (SF)	0.000
Cut Vol (CF)	21.4
Fill Vol (CF)	0.3
Cum Cut Vol (CF)	21.4
Cum Fill Vol (CF)	0.3
Net Vol (CF)	21.1



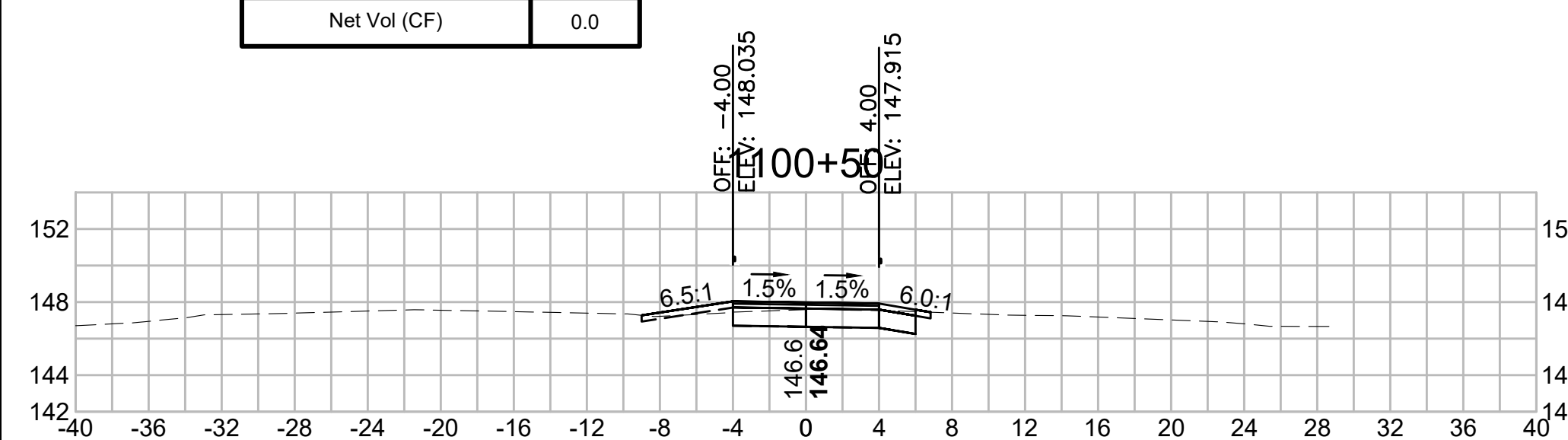
Total Volume at Station 1102+50.00	
Cut Area (SF)	12.683
Fill Area (SF)	2.123
Cut Vol (CF)	28.8
Fill Vol (CF)	5.3
Cum Cut Vol (CF)	102.2
Cum Fill Vol (CF)	27.3
Net Vol (CF)	75.0



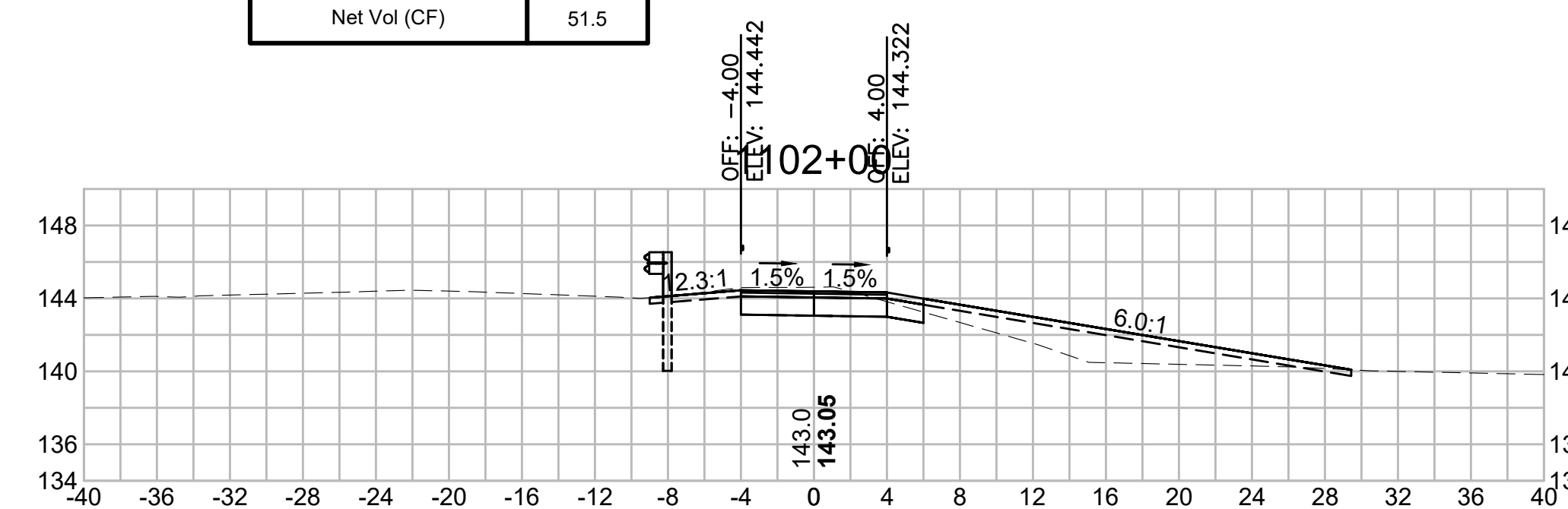
Total Volume at Station 1104+00.00	
Cut Area (SF)	9.816
Fill Area (SF)	0.185
Cut Vol (CF)	16.5
Fill Vol (CF)	7.2
Cum Cut Vol (CF)	158.9
Cum Fill Vol (CF)	53.7
Net Vol (CF)	105.2



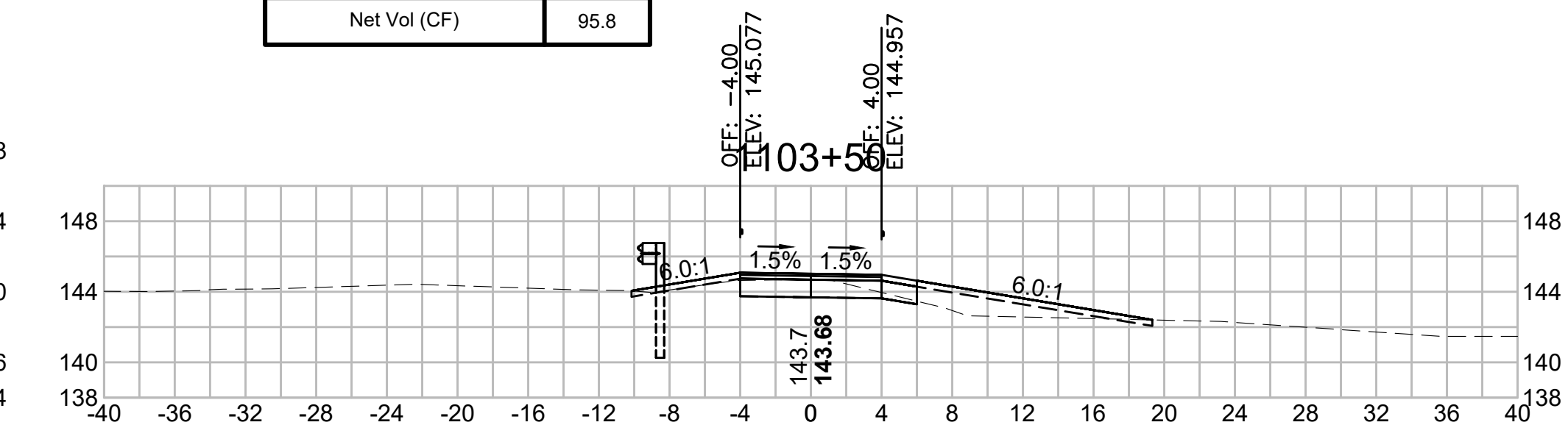
Total Volume at Station 1100+50.00	
Cut Area (SF)	9.964
Fill Area (SF)	0.368
Cut Vol (CF)	0.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	0.0
Cum Fill Vol (CF)	0.0
Net Vol (CF)	0.0



Total Volume at Station 1102+00.00	
Cut Area (SF)	18.374
Fill Area (SF)	3.620
Cut Vol (CF)	28.4
Fill Vol (CF)	12.5
Cum Cut Vol (CF)	73.5
Cum Fill Vol (CF)	22.0
Net Vol (CF)	51.5



Total Volume at Station 1103+50.00	
Cut Area (SF)	8.037
Fill Area (SF)	7.586
Cut Vol (CF)	17.9
Fill Vol (CF)	12.1
Cum Cut Vol (CF)	142.3
Cum Fill Vol (CF)	46.5
Net Vol (CF)	95.8



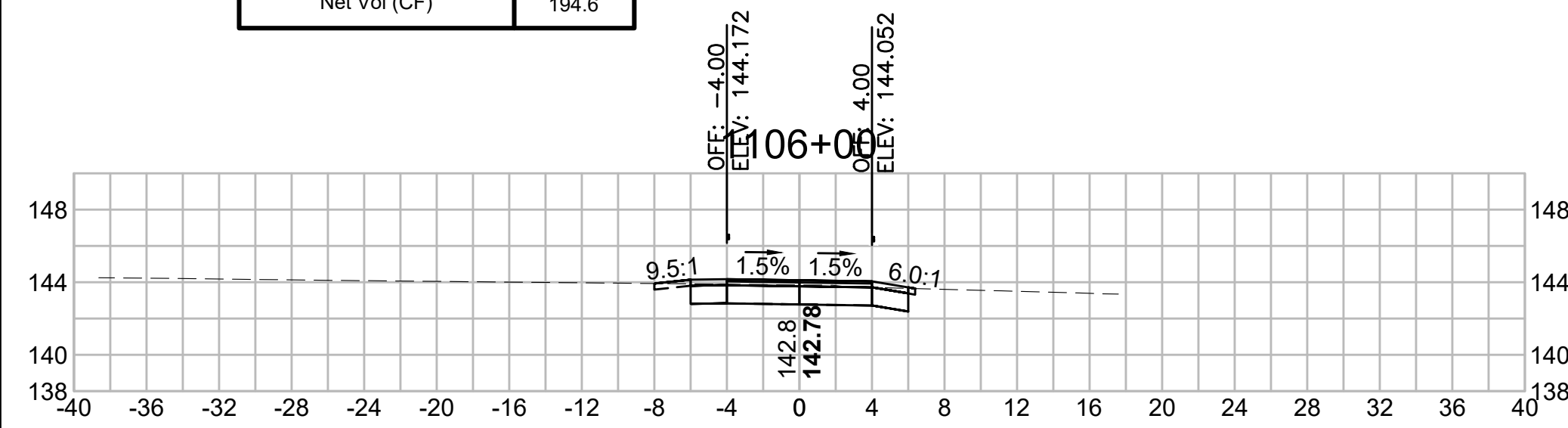
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	303	318

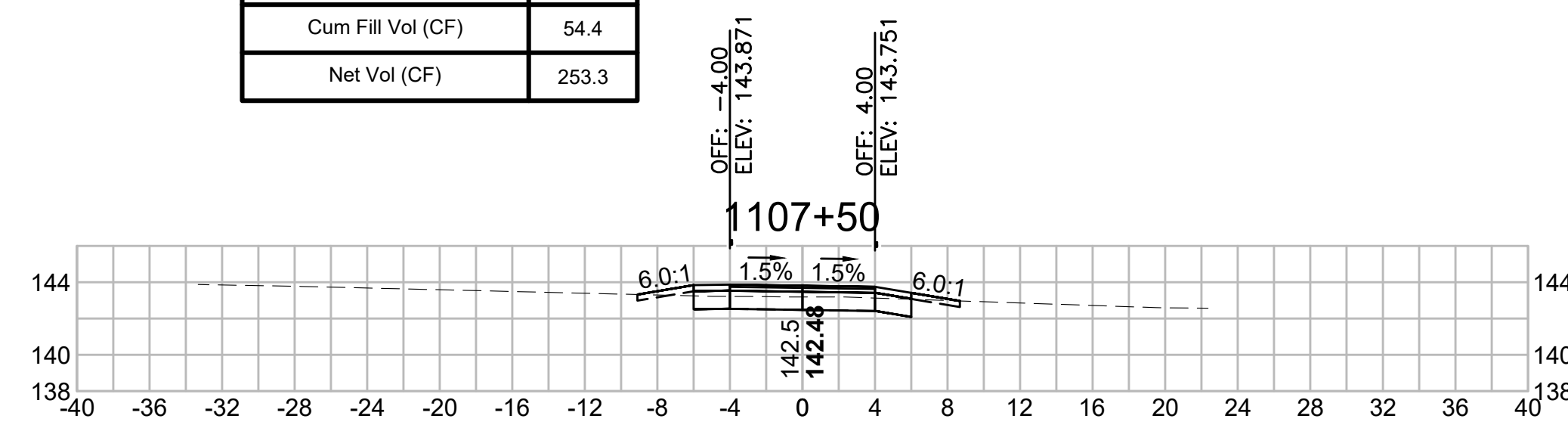
CROSS SECTIONS
DAVIS FIELD ACCESS PATH

PROJECT FILE NO. 608164

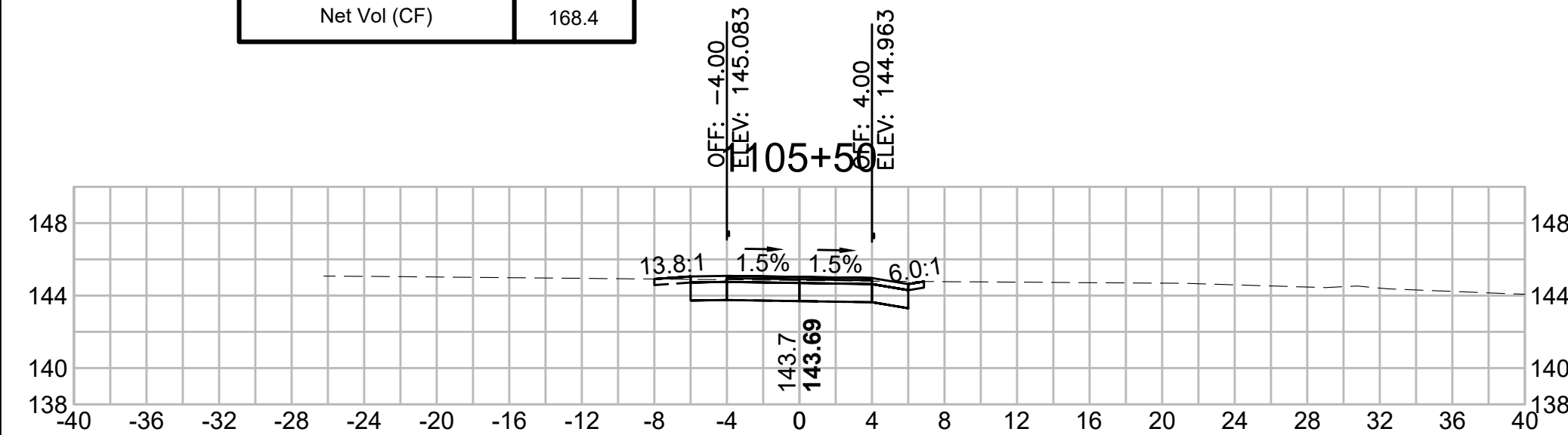
Total Volume at Station 1106+00.00	
Cut Area (SF)	13.425
Fill Area (SF)	0.000
Cut Vol (CF)	26.2
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	248.7
Cum Fill Vol (CF)	54.1
Net Vol (CF)	194.6



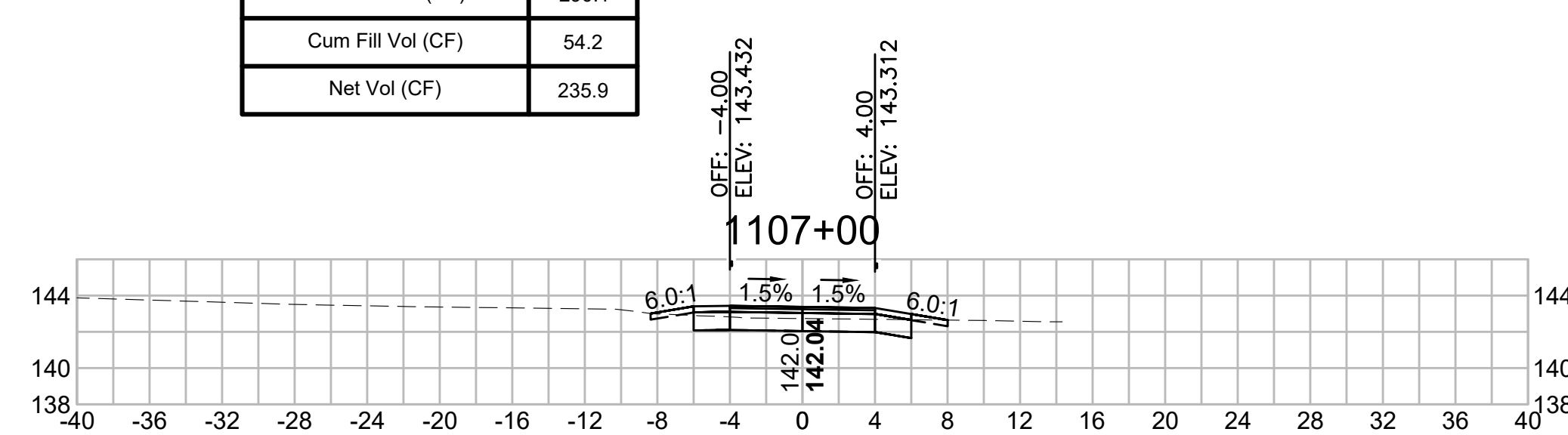
Total Volume at Station 1107+50.00	
Cut Area (SF)	9.520
Fill Area (SF)	0.169
Cut Vol (CF)	17.6
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	307.6
Cum Fill Vol (CF)	54.4
Net Vol (CF)	253.3



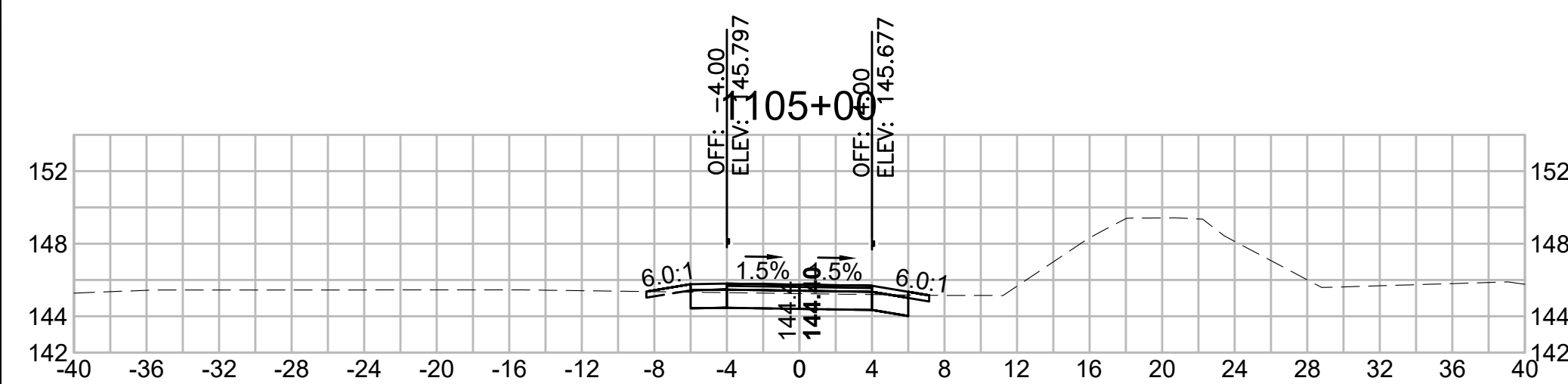
Total Volume at Station 1105+50.00	
Cut Area (SF)	14.923
Fill Area (SF)	0.000
Cut Vol (CF)	24.1
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	222.5
Cum Fill Vol (CF)	54.1
Net Vol (CF)	168.4



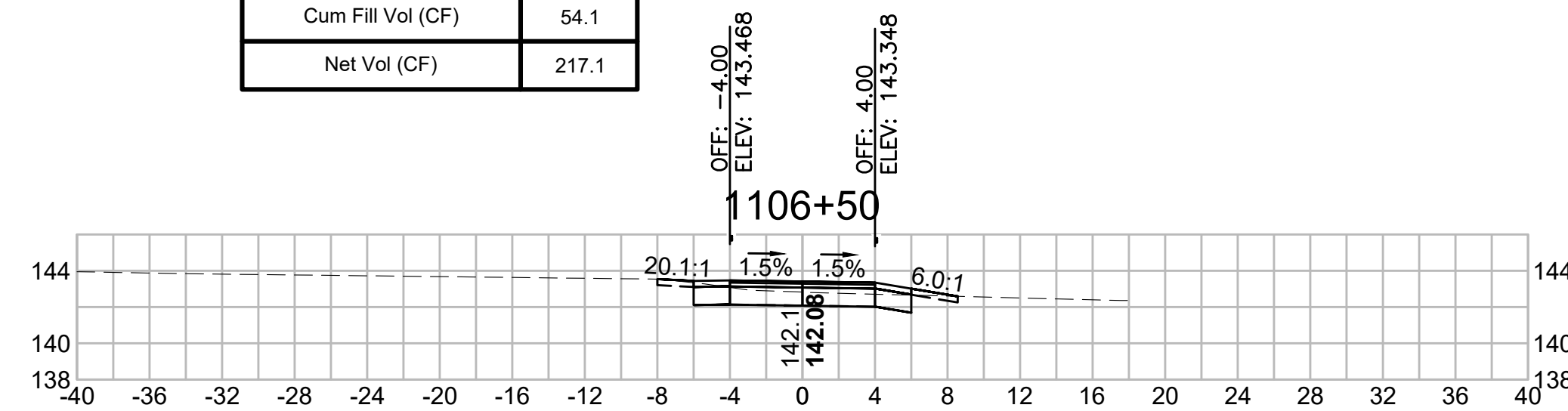
Total Volume at Station 1107+00.00	
Cut Area (SF)	9.448
Fill Area (SF)	0.063
Cut Vol (CF)	18.8
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	290.1
Cum Fill Vol (CF)	54.2
Net Vol (CF)	235.9



Total Volume at Station 1105+00.00	
Cut Area (SF)	11.073
Fill Area (SF)	0.028
Cut Vol (CF)	20.3
Fill Vol (CF)	0.1
Cum Cut Vol (CF)	198.4
Cum Fill Vol (CF)	54.1
Net Vol (CF)	144.3



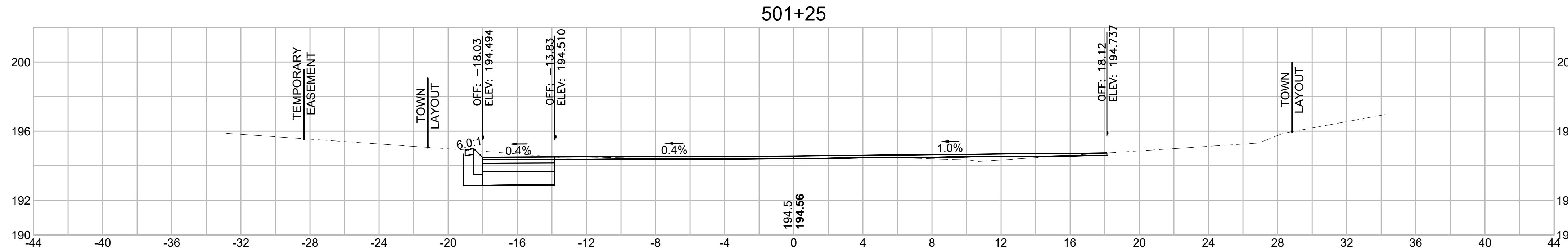
Total Volume at Station 1106+50.00	
Cut Area (SF)	10.901
Fill Area (SF)	0.002
Cut Vol (CF)	22.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	271.2
Cum Fill Vol (CF)	54.1
Net Vol (CF)	217.1



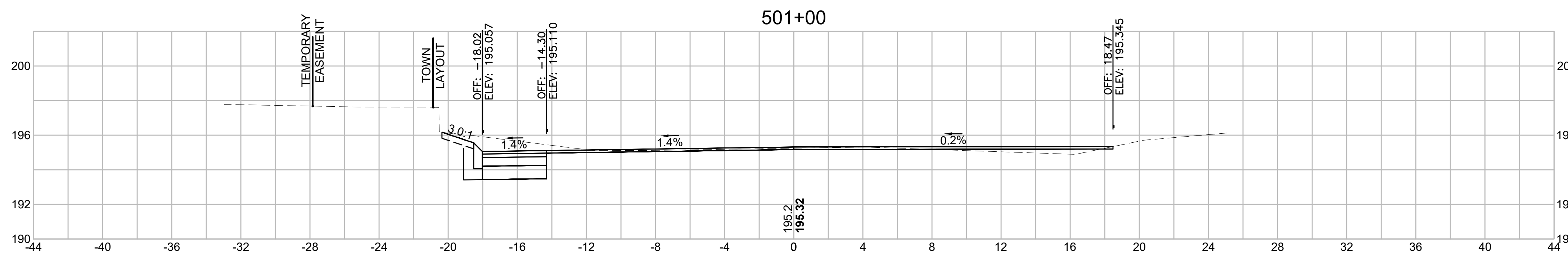
SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	304	318

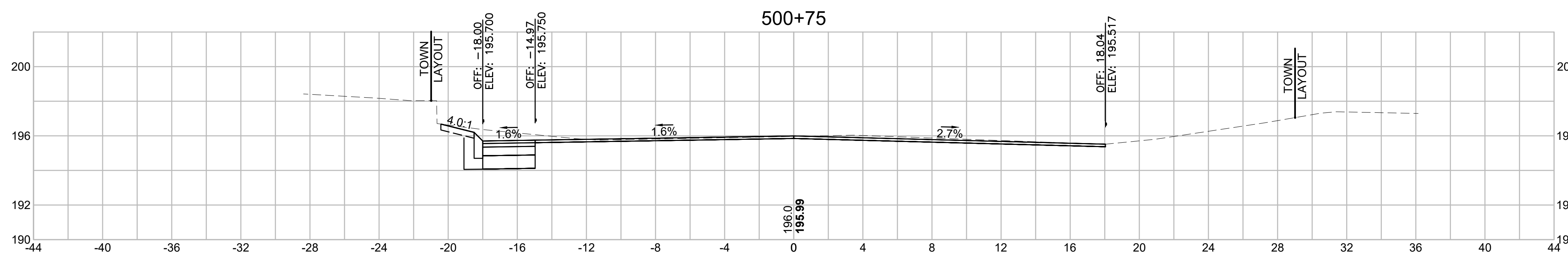
CROSS SECTIONS
HUDSON ROAD



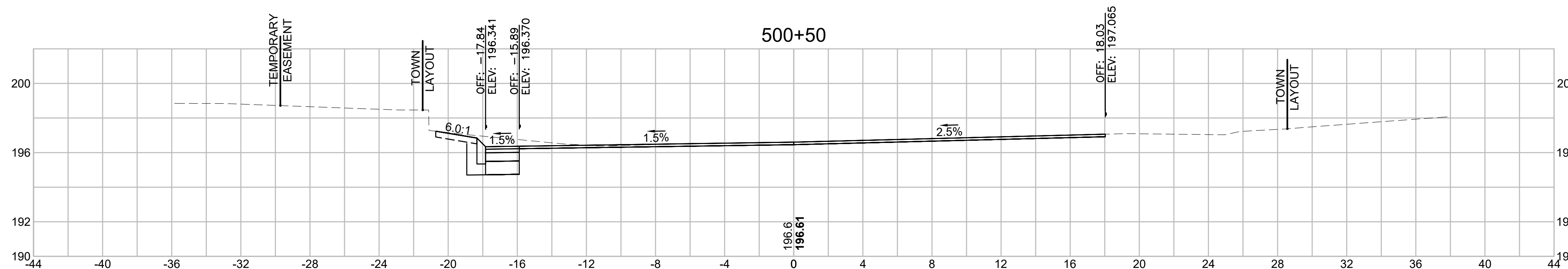
Total Volume at Station 501+25.00	
Cut Area (SF)	19.339
Fill Area (SF)	1.373
Cut Vol (CF)	18.8
Fill Vol (CF)	1.3
Cum Cut Vol (CF)	43.3
Cum Fill Vol (CF)	2.0
Net Vol (CF)	41.3



Total Volume at Station 501+00.00	
Cut Area (SF)	21.351
Fill Area (SF)	1.499
Cut Vol (CF)	15.0
Fill Vol (CF)	0.7
Cum Cut Vol (CF)	24.4
Cum Fill Vol (CF)	0.7
Net Vol (CF)	23.7



Total Volume at Station 500+75.00	
Cut Area (SF)	11.018
Fill Area (SF)	0.000
Cut Vol (CF)	9.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	9.5
Cum Fill Vol (CF)	0.0
Net Vol (CF)	9.5



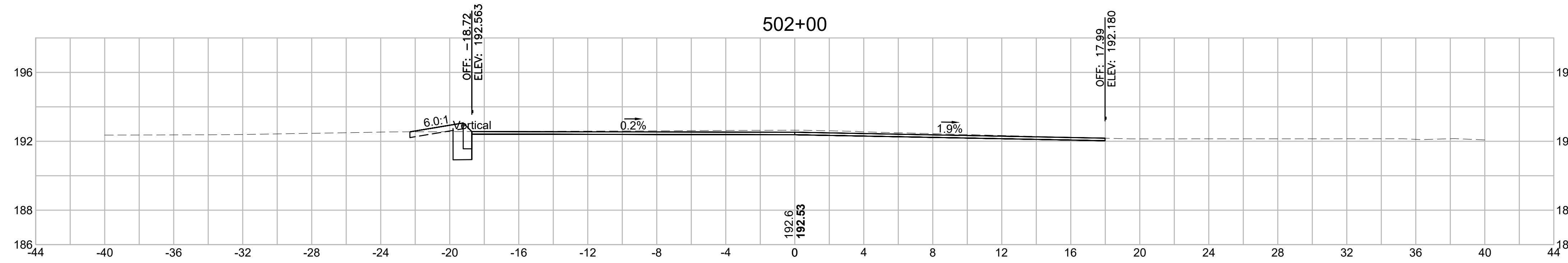
Total Volume at Station 500+50.00	
Cut Area (SF)	9.404
Fill Area (SF)	0.000
Cut Vol (CF)	0.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	0.0
Cum Fill Vol (CF)	0.0
Net Vol (CF)	0.0

SUDBURY
BRUCE FREEMAN RAIL TRAIL

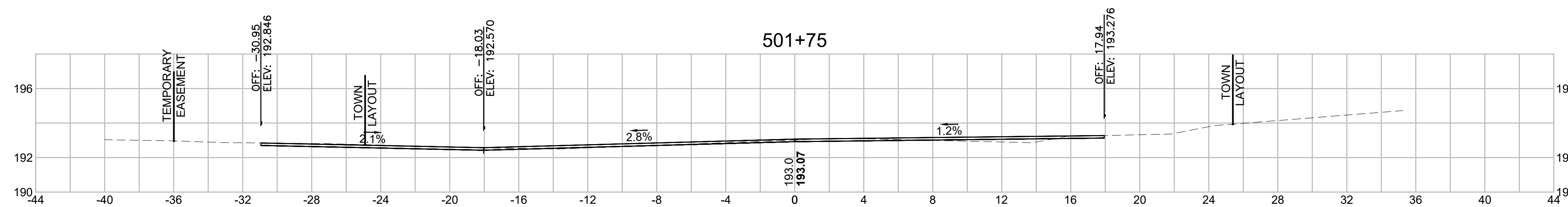
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	305	318

CROSS SECTIONS
HUDSON ROAD

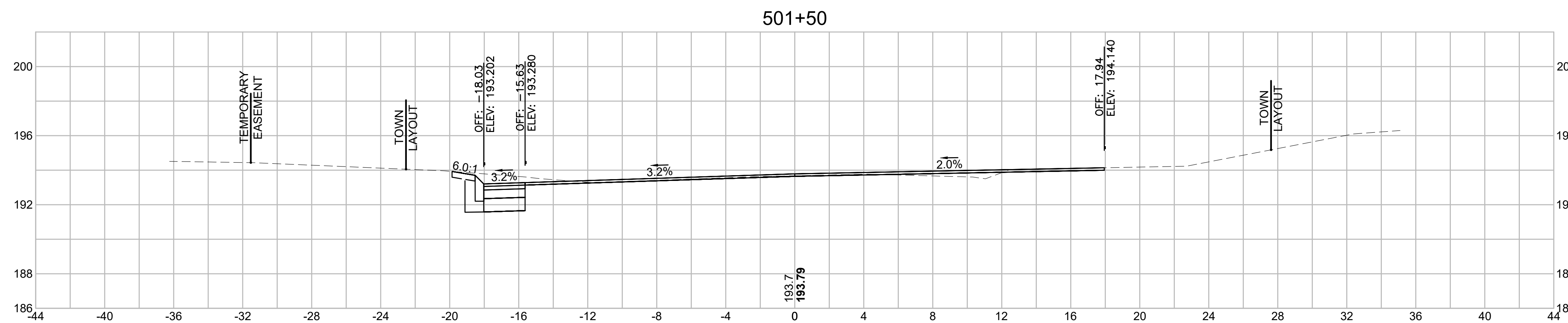
PROJECT FILE NO. 608164



Total Volume at Station 502+00.00	
Cut Area (SF)	22.126
Fill Area (SF)	0.086
Cut Vol (CF)	11.4
Fill Vol (CF)	0.9
Cum Cut Vol (CF)	85.2
Cum Fill Vol (CF)	5.4
Net Vol (CF)	79.8



Total Volume at Station 501+75.00	
Cut Area (SF)	2.528
Fill Area (SF)	1.892
Cut Vol (CF)	11.4
Fill Vol (CF)	1.4
Cum Cut Vol (CF)	73.8
Cum Fill Vol (CF)	4.5
Net Vol (CF)	69.3



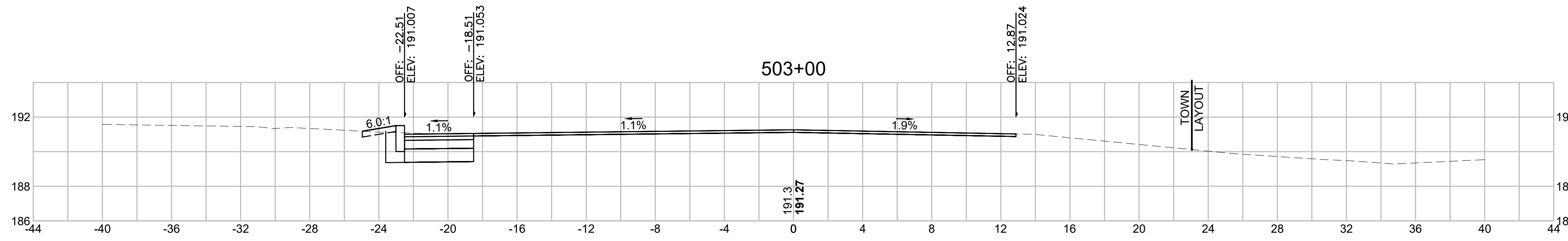
Total Volume at Station 501+50.00	
Cut Area (SF)	22.022
Fill Area (SF)	1.027
Cut Vol (CF)	19.1
Fill Vol (CF)	1.1
Cum Cut Vol (CF)	62.4
Cum Fill Vol (CF)	3.1
Net Vol (CF)	59.3

SUDBURY
BRUCE FREEMAN RAIL TRAIL

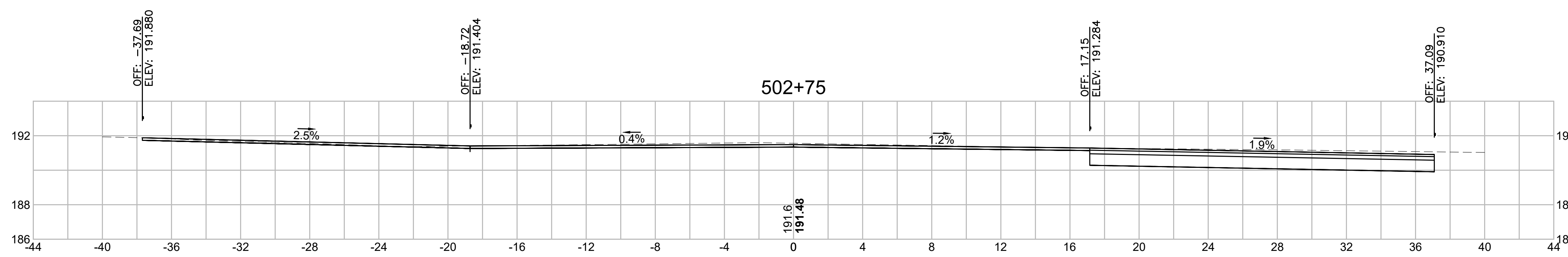
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	306	318

CROSS SECTIONS
HUDSON ROAD

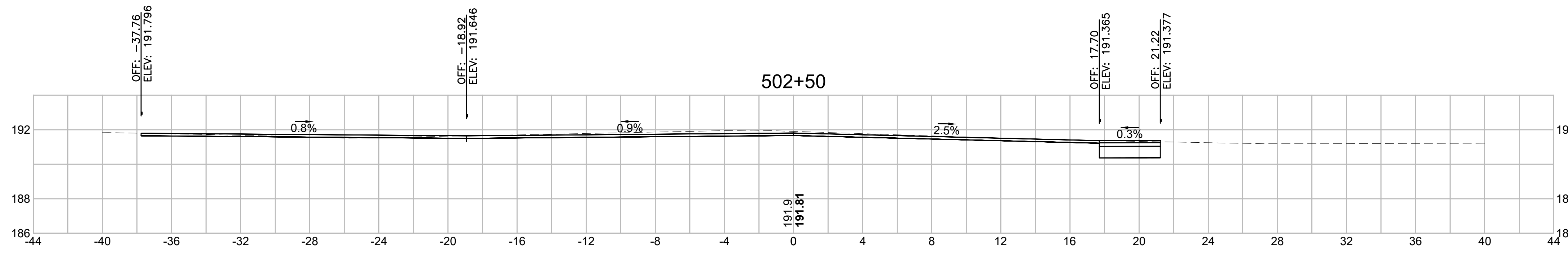
PROJECT FILE NO. 608164



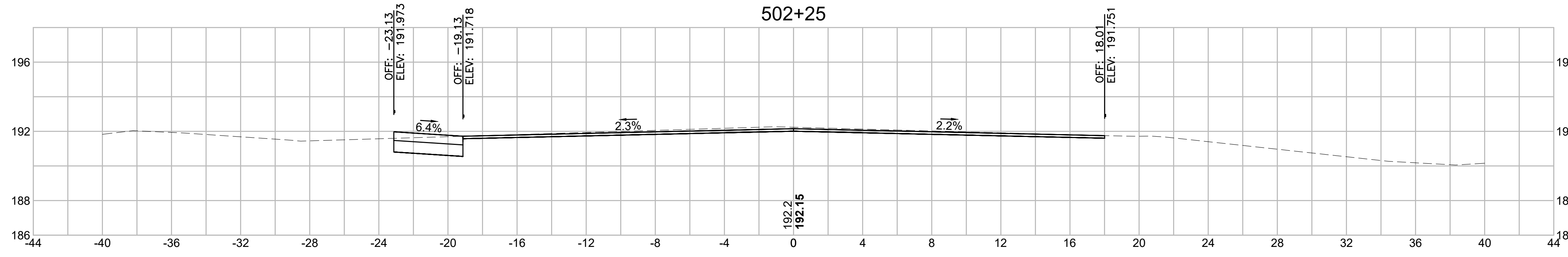
Total Volume at Station 503+00.00	
Cut Area (SF)	29.184
Fill Area (SF)	5.560
Cut Vol (CF)	29.8
Fill Vol (CF)	2.8
Cum Cut Vol (CF)	175.3
Cum Fill Vol (CF)	8.8
Net Vol (CF)	166.4



Total Volume at Station 502+75.00	
Cut Area (SF)	35.160
Fill Area (SF)	0.535
Cut Vol (CF)	26.6
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	145.5
Cum Fill Vol (CF)	6.0
Net Vol (CF)	139.5

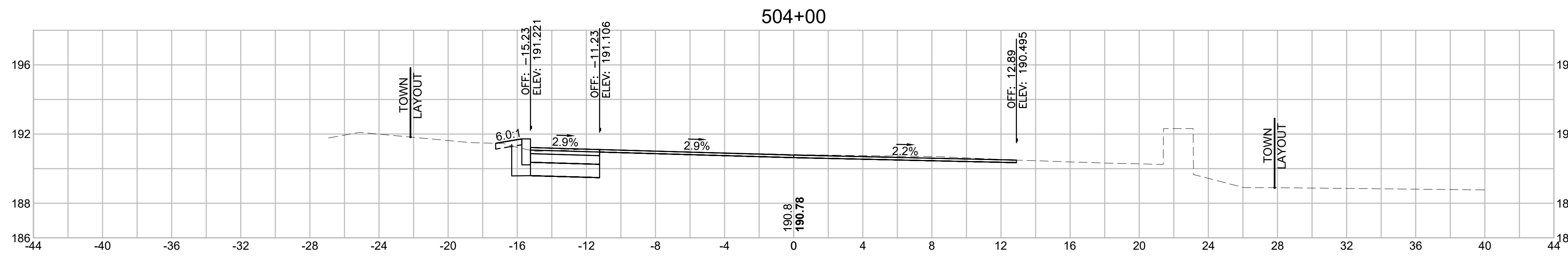


Total Volume at Station 502+50.00	
Cut Area (SF)	22.276
Fill Area (SF)	0.000
Cut Vol (CF)	16.9
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	118.9
Cum Fill Vol (CF)	5.8
Net Vol (CF)	113.1

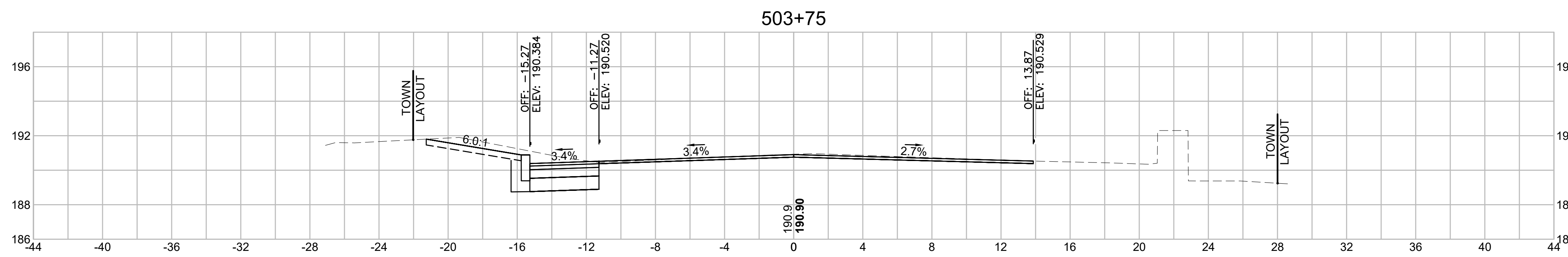


Total Volume at Station 502+25.00	
Cut Area (SF)	14.164
Fill Area (SF)	0.336
Cut Vol (CF)	16.8
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	102.0
Cum Fill Vol (CF)	5.6
Net Vol (CF)	96.4

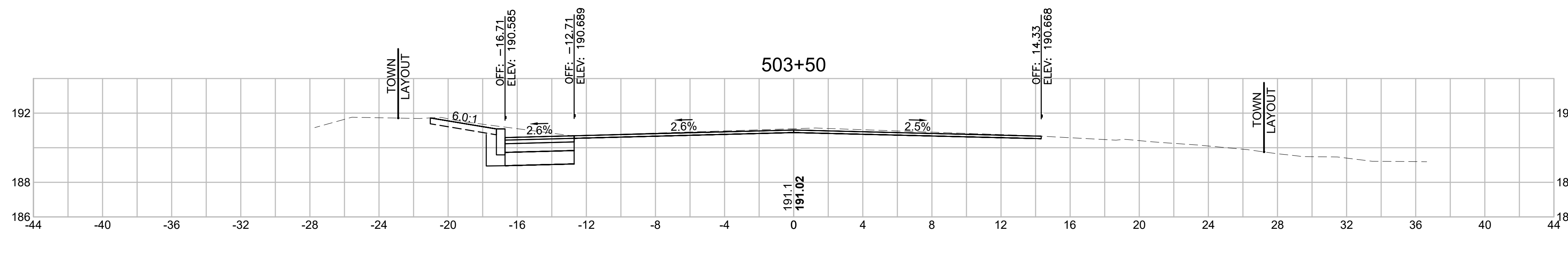
CROSS SECTIONS
HUDSON ROAD



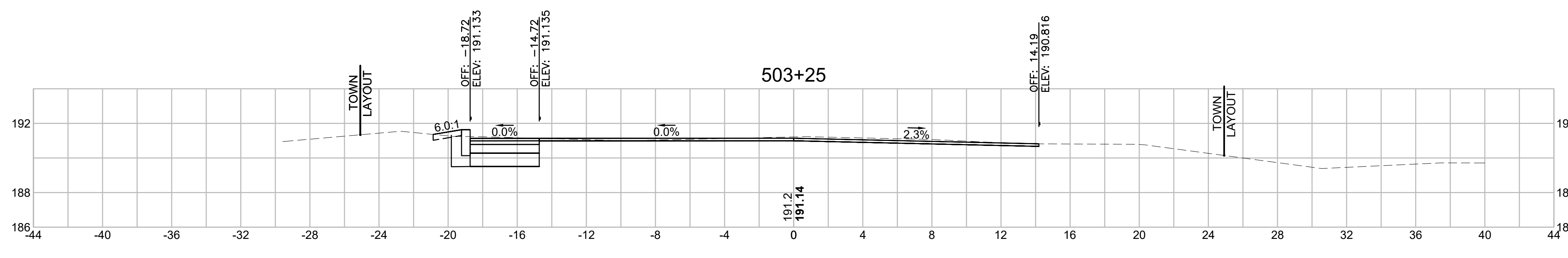
Total Volume at Station 504+00.00	
Cut Area (SF)	9.026
Fill Area (SF)	0.055
Cut Vol (CF)	16.0
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	239.4
Cum Fill Vol (CF)	13.8
Net Vol (CF)	225.6



Total Volume at Station 503+75.00	
Cut Area (SF)	25.454
Fill Area (SF)	0.000
Cut Vol (CF)	17.7
Fill Vol (CF)	0.2
Cum Cut Vol (CF)	223.4
Cum Fill Vol (CF)	13.8
Net Vol (CF)	209.6



Total Volume at Station 503+50.00	
Cut Area (SF)	12.869
Fill Area (SF)	0.405
Cut Vol (CF)	11.4
Fill Vol (CF)	1.2
Cum Cut Vol (CF)	205.7
Cum Fill Vol (CF)	13.6
Net Vol (CF)	192.1

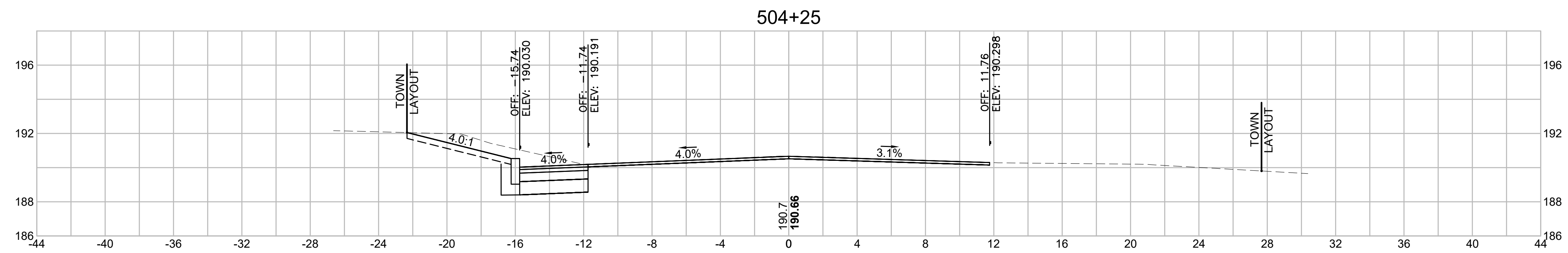


Total Volume at Station 503+25.00	
Cut Area (SF)	11.807
Fill Area (SF)	2.169
Cut Vol (CF)	19.0
Fill Vol (CF)	3.6
Cum Cut Vol (CF)	194.2
Cum Fill Vol (CF)	12.4
Net Vol (CF)	181.8

SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	308	318

PROJECT FILE NO. 608164
CROSS SECTIONS
HUDSON ROAD



Total Volume at Station 504+25.00	
Cut Area (SF)	15.866
Fill Area (SF)	0.000
Cut Vol (CF)	11.5
Fill Vol (CF)	0.0
Cum Cut Vol (CF)	250.9
Cum Fill Vol (CF)	13.8
Net Vol (CF)	237.1

Attachment 6

Circulation List to Agencies

ENF Distribution List for MassDOT Project #608164

Agency	Email Address	Address	Submission Type
Massachusetts Environmental Policy Act (MEPA) Office	MEPA@mass.gov	MEPA Office 100 Cambridge Street, Suite 900 Boston, MA 02144	Electronic
Department of Environmental Protection, Boston Office	helena.boccardo@mass.gov	Commissioner's Office One Winter Street Boston, MA 02108	Electronic
Department of Environmental Protection	john.d.viola@mass.gov	DEP/Northeast Regional Office Attn: MEPA Coordinator 205B Lowell Street Wilmington, MA 01887	Electronic
Massachusetts Department of Transportation	MassDOTPPDU@dot.state.ma.us	Public/Private Development Unit 10 Park Plaza, Suite #4150 Boston, MA 02116	Electronic
Applicable MassDOT District Office	jeffrey.r.gomes@dot.state.ma.us	District #3 Attn: MEPA Coordinator 499 Plantation Parkway Worcester, MA 01605	Electronic
Massachusetts Historical Commission	N/A	The MA Archives Building 220 Morrissey Boulevard Boston, MA 02125	Hard Copy
Boston Region Metropolitan Planning Organization	ctps@ctps.org	State Transportation Building 10 Park Plaza, Suite 2150 Boston, MA 02116-3968	Electronic
Town of Sudbury, Select Board	selectboard@sudbury.ma.us	Flynn Building 278 Old Sudbury Road Sudbury, MA 01776	Electronic
Town of Sudbury, Planning Board	planningboard@sudbury.ma.us	Flynn Building 278 Old Sudbury Road Sudbury, MA 01776	Electronic
Town of Sudbury, Conservation Commission	concom@sudbury.ma.us	Department of Public Works Building 275 Old Lancaster Road Sudbury, MA 01776	Electronic
Town of Sudbury, Board of Health	health@sudbury.ma.us	Department of Public Works Building 275 Old Lancaster Road Sudbury, MA 01776	Electronic

Agency	Email Address	Address	Submission Type
Department of Agricultural Resources	barbara.hopson@mass.gov	Department of Agricultural Resources Attn: MEPA Coordinator 138 Memorial Avenue, Suite 42 West Springfield, MA 01089	Electronic
Natural Heritage and Endangered Species Program	melany.cheeseman@mass.gov emily.holt@mass.gov	Natural Heritage and Endangered Species Program Division of Fisheries & Wildlife 1 Rabbit Hill Road Westborough, MA 01581	Electronic
DCR	andy.backman@mass.gov	DCR Attn: MEPA Coordinator 251 Causeway St. Suite 600 Boston MA 02114	Electronic
MBTA	MEPAcoordinator@mbta.com	Massachusetts Bay Transit Authority Attn: MEPA Coordinator 10 Park Plaza, 6 th Fl. Boston, MA 02116-3966	Electronic
Coastal Zone Community	N/A	N/A	N/A
DPH (Toxicology)	N/A	N/A	N/A
Gas Emissions Policy or Energy Facilities Sting Board	N/A	N/A	N/A
MWRA	N/A	N/A	N/A

N/A: Not Applicable to this Project

Attachment 7

List of Municipal and Federal Permits and Review

1. Notice of Intent (NOI)/Order of Conditions: File number TBD upon filing
2. U.S.A.C.O.E. Pre-Construction Notification (PCN) for General Permit
3. Determination of Applicability for Chapter 91 Waterways License
4. Massachusetts Bay Transportation Authority (MBTA) Access Permit
5. Federal Highway Administration FHWA Categorical Exclusion Review

Attachment 8

RMAT Report

RMAT Climate Resilience Design Standards Tool Project Report

608164_Sudbury Bruce Freeman Rail Trail

Date Created: 11/8/2021 10:37:28 AM

Created By: Nlapointe

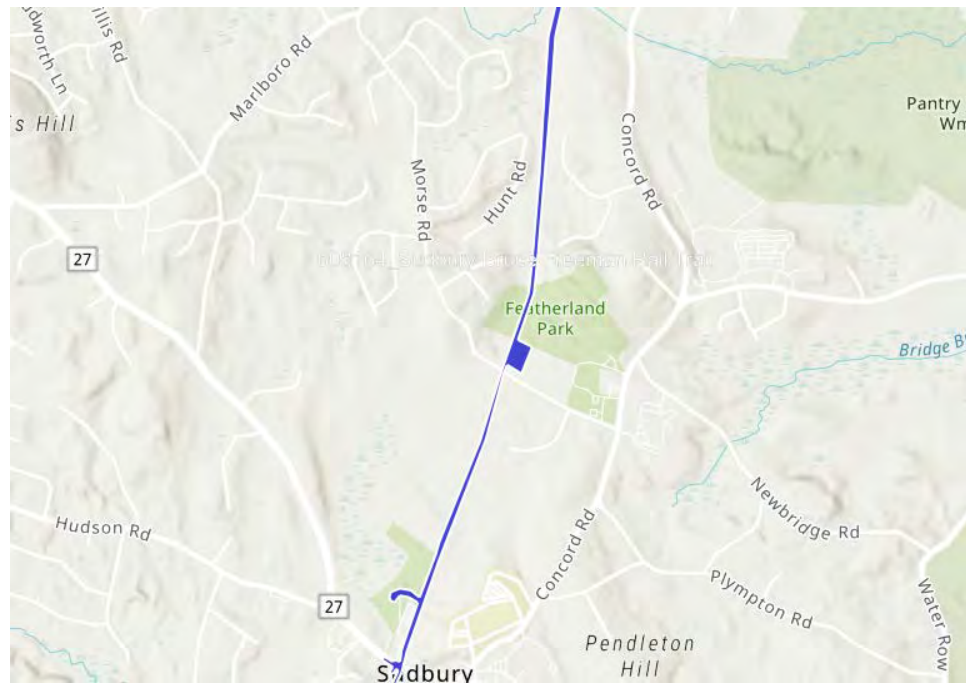
Project Summary

[Link to Project](#)

Estimated Construction Cost: \$12700000.00

Useful Life: 2050 - 2059

Ecosystem Benefits	Scores
Project Score	High
Exposure	Scores
Sea Level Rise/Storm Surge	Not Exposed
Extreme Precipitation - Urban Flooding	Moderate Exposure
Extreme Precipitation - Riverine Flooding	High Exposure
Extreme Heat	High Exposure



Asset Summary

Number of Assets: 1

Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Bruce Freeman Rail Trail	Low Risk	Moderate Risk	High Risk	High Risk

Project Outputs

	Target Planning Horizon	Intermediate Planning Horizon	Percentile	Return Period	Tier
Sea Level Rise/Storm Surge Bruce Freeman Rail Trail					
Extreme Precipitation Bruce Freeman Rail Trail	2050			10-yr (10%)	Tier 2
Extreme Heat Bruce Freeman Rail Trail	2050		50th		Tier 2

Scoring Rationale - Exposure

Sea Level Rise/Storm Surge

This project received a "Not Exposed" because of the following:

- Not located within the predicted mean high water shoreline by 2030
- No historic coastal flooding at project site
- Not located within the Massachusetts Coastal Flood Risk Model

Extreme Precipitation - Urban Flooding

This project received a "Moderate Exposure" because of the following:

- Increased impervious area
- No historic flooding at project site
- Minor projected increase in rainfall within project's useful life

Extreme Precipitation - Riverine Flooding

This project received a "High Exposure" because of the following:

- Exposed to riverine flooding within the project's useful life
- No historic riverine flooding at project site

Extreme Heat

This project received a "High Exposure" because of the following:

- 30+ days increase in days over 90 deg. F within project's useful life
- Increased impervious area
- Tree removal

Scoring Rationale - Asset Risk Scoring

Asset - Bruce Freeman Rail Trail

Primary asset criticality factors influencing risk ratings for this asset:

- Asset can be inaccessible/inoperable more than a week after natural hazard event without consequences
- Less than 100,000 people would be directly affected by the loss/inoperability of the asset
- Inoperability of the asset would be expected to cause a loss of confidence in government agency
- Cost to replace is between \$10 million and \$30 million
- Impact on natural resources can be mitigated naturally with the inoperability of the asset

Project Design Standards Output

Asset: Bruce Freeman Rail Trail

Infrastructure

Sea Level Rise/Storm Surge

Low Risk

Applicable Design Criteria

Tidal Benchmarks: No
Stillwater Elevation: No
Design Flood Elevation (DFE): No
Wave Heights: No
Duration of Flooding: No
Design Flood Velocity: No
Wave Forces: No
Scour or Erosion: No

Extreme Precipitation

Moderate Risk

Target Planning Horizon: 2050
Return Period: 10-yr (10%)

Applicable Design Criteria

Tiered Methodology: Tier 2 ([Link](#))
Total Precipitation Depth for 24-hour Design Storms: Yes
Peak Intensity for 24-hour Design Storms: Yes
Riverine Peak Discharge: Yes
Riverine Peak Flood Elevation: Yes
Duration of Flooding for Design Storm: Yes
Flood Pathways: Yes

Extreme Heat

High Risk

Target Planning Horizon: 2050
Percentile: 50th Percentile

Applicable Design Criteria

Tiered Methodology: Tier 2 ([Link](#))

Annual/Summer/Winter Average Temperature: Yes
Heat Index: Yes
Days Per Year With Max Temperature > 95°F: Yes
Days Per Year With Max Temperature > 90°F: Yes
Days Per Year With Max Temperature < 32°F: Yes
Number of Heat Waves Per Year: Yes
Average Heat Wave Duration (Days): Yes
Cooling Degree Days (Base = 65°F): No
Heating Degree Days (Base = 65°F): No
Growing Degree Days: No

Project Inputs

Core Project Information

Name:	608164_Sudbury Bruce Freeman Rail Trail
Given the expected useful life of the project, through what year do you estimate the project to last (i.e. before a major reconstruction/renovation)?	2050 - 2059
Location of Project:	Sudbury
Estimated Capital Cost:	\$12,700,000
Entity Submitting Project:	Massachusetts Department of Transportation / Department of Transportation
Is this project being submitted as part of a state grant application?	No
Which grant program?	
Is climate resiliency a core objective of this project?	Yes
Is this project being submitted as part of the state capital planning process?	Yes
Is this project being submitted as part of a regulatory review process?	Yes
Brief Project Description:	Project is subject to MEPA ENF filing

Project Ecosystem Benefits

Provides flood protection through green infrastructure or nature-based solutions	Yes
Provides storm damage mitigation	No
Provides groundwater recharge	Yes
Protects public water supply	No
Filters stormwater	Yes
Improves water quality	Yes
Promotes decarbonization	No
Enables carbon sequestration	No
Provides oxygen production	Yes
Improves air quality	Yes
Prevents pollution	Yes
Remediates existing sources of pollution	Yes
Protects fisheries, wildlife, and plant habitat	Yes
Protects land containing shellfish	No
Provides pollination	Yes
Provides recreation	Yes
Provides cultural resources/education	Yes

Project Climate Exposure

Does the project site have a history of coastal flooding?	No
Does the project site have a history of flooding during extreme precipitation events (unrelated to water/sewer damages)?	No
Does the project site have a history of riverine flooding?	No
Does the project result in a net increase in impervious area of the site?	Yes
Are existing trees being removed as part of the proposed project?	Yes

Project Assets

Asset: Bruce Freeman Rail Trail
 Asset Type: Transportation
 Asset Sub-Type: Pedestrian ways and bikeways
 Construction Type: New Construction
 Construction Year: 2022
 Useful Life: 30

Identify the length of time the asset can be inaccessible/inoperable without significant consequences.

Infrastructure may be inaccessible/inoperable more than a week after natural hazard event without consequences.

Identify the geographic area directly affected by permanent loss or significant inoperability of the infrastructure.

Impacts would be limited to local area and/or municipality

Identify the population directly served that would be affected by the permanent loss or significant inoperability of the infrastructure.

Less than 100,000 people

Identify if the infrastructure is located within an environmental justice community or provides services to vulnerable populations.

The infrastructure is not located in an environmental justice community and does not provide services to vulnerable populations

Will the infrastructure reduce the risk of flooding?

No

If the infrastructure became inoperable for longer than acceptable in Question 1, how, if at all, would it be expected to impact people's health and safety?

Inoperability of the infrastructure would not be expected to result in injuries

If there are hazardous materials in your infrastructure, what are the extents of impacts related to spills/releases of these materials?

There are no hazardous materials in the infrastructure

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts on other facilities, assets, and/or infrastructure?

Minor – Inoperability will not likely affect other facilities, assets, or buildings

If the infrastructure was damaged beyond repair, how much would it approximately cost to replace?

Between \$10 million and \$30 million

Does the infrastructure function as an evacuation route during emergencies? This question only applies to roadway projects.

No

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the environmental impacts related to natural resources?

Impact on natural resources can be mitigated naturally

If the infrastructure became inoperable for longer than acceptable in Question 1, what are the impacts to government services (i.e. the infrastructure is not able to serve or operate its intended users or function)?

Loss of infrastructure is not expected to reduce the ability to maintain government services

What are the impacts to loss of confidence in government resulting from loss of infrastructure functionality (i.e. the infrastructure asset is not able to serve or operate its intended users or function)?




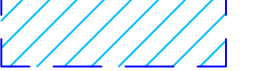



Loss of confidence in government agency

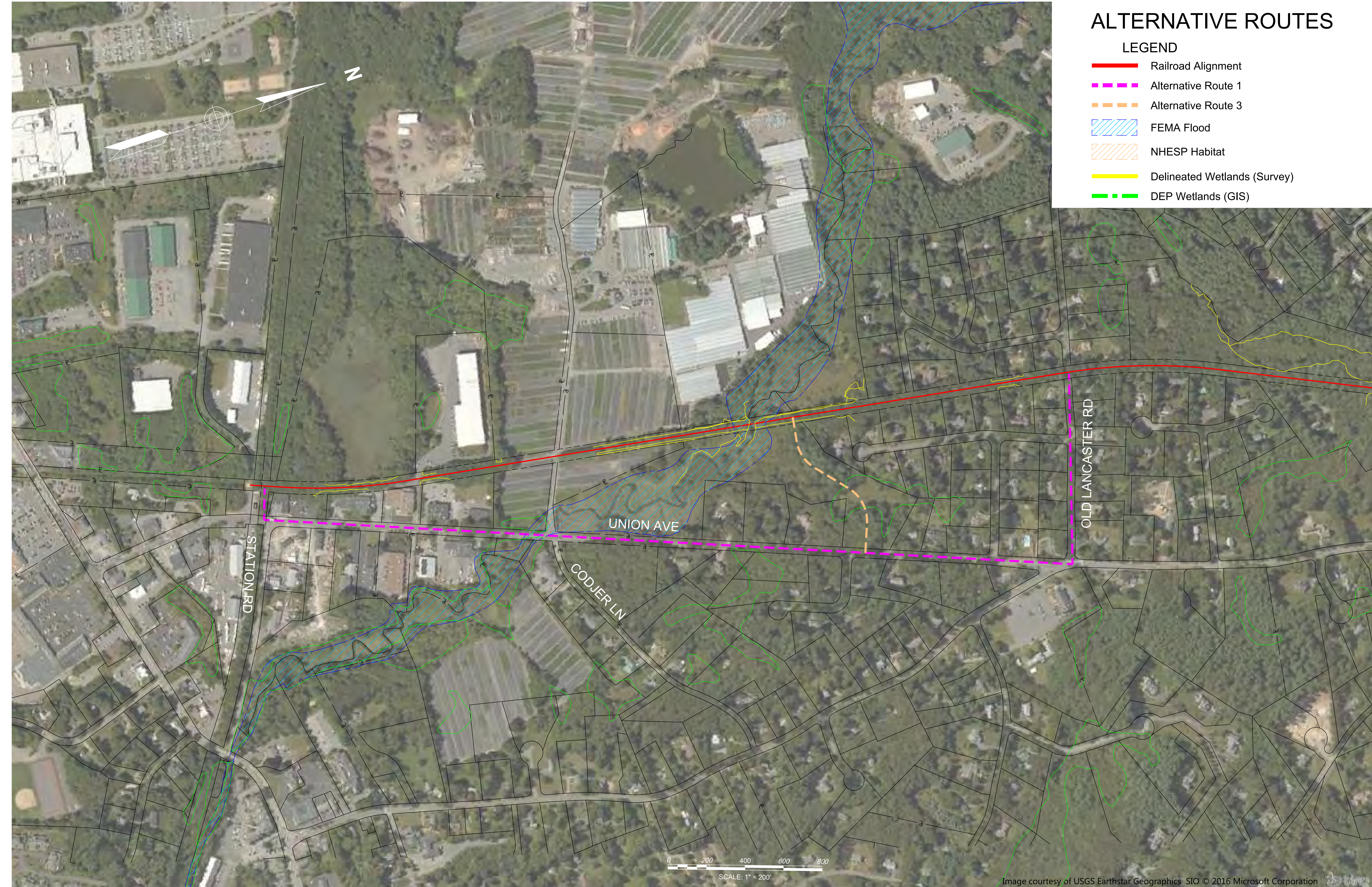
Attachment 9

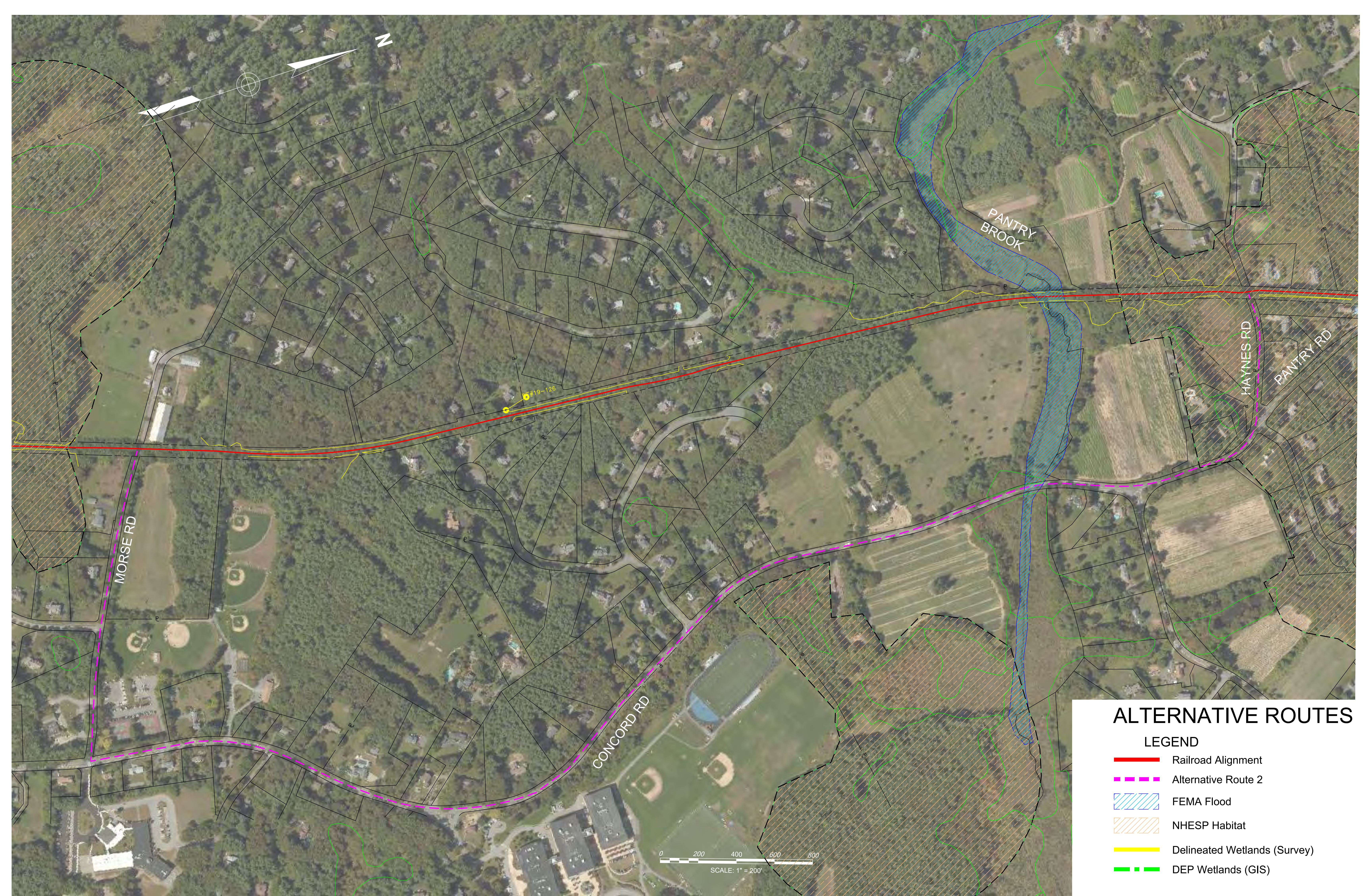
Alternatives Analysis Documentation

ALTERNATIVE ROUTES

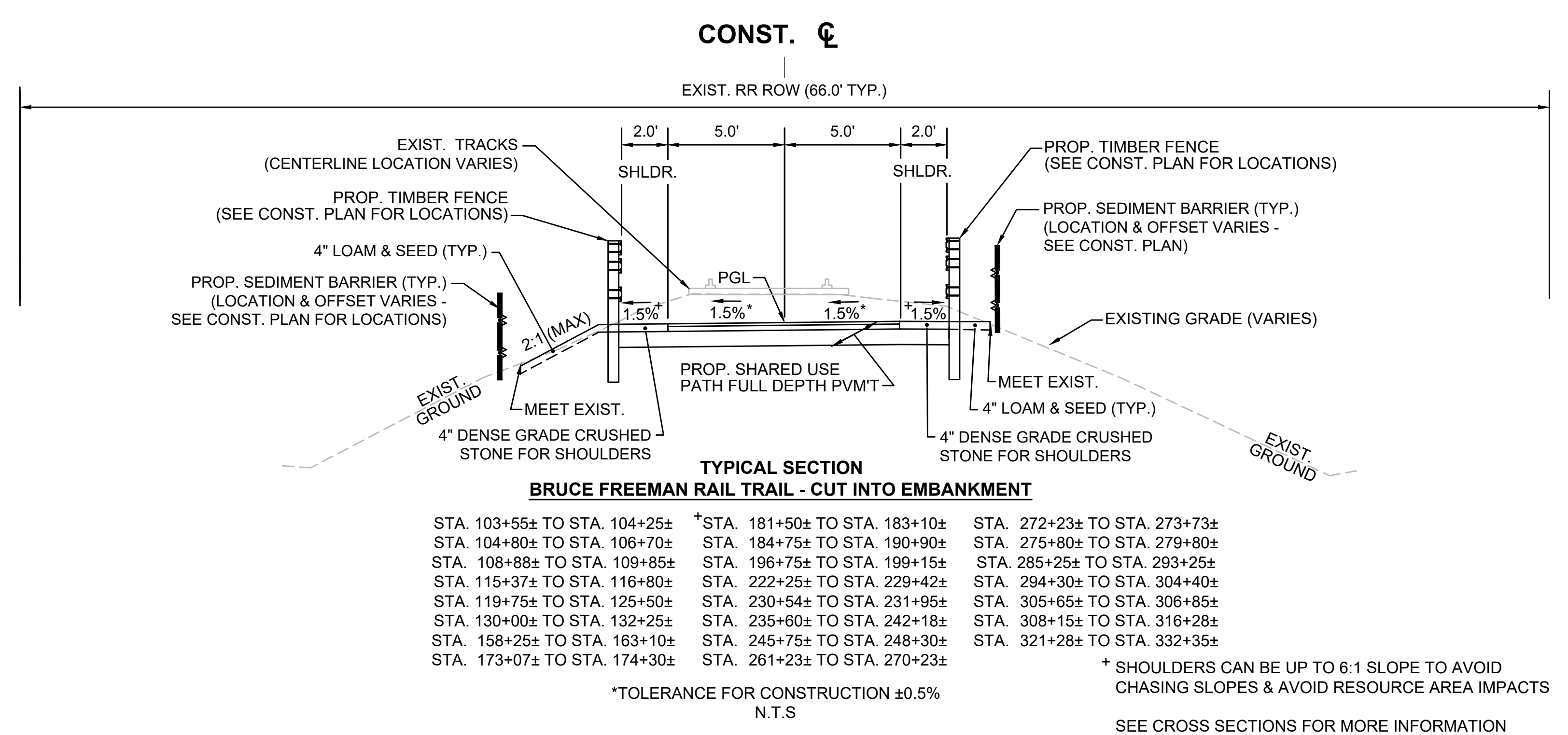
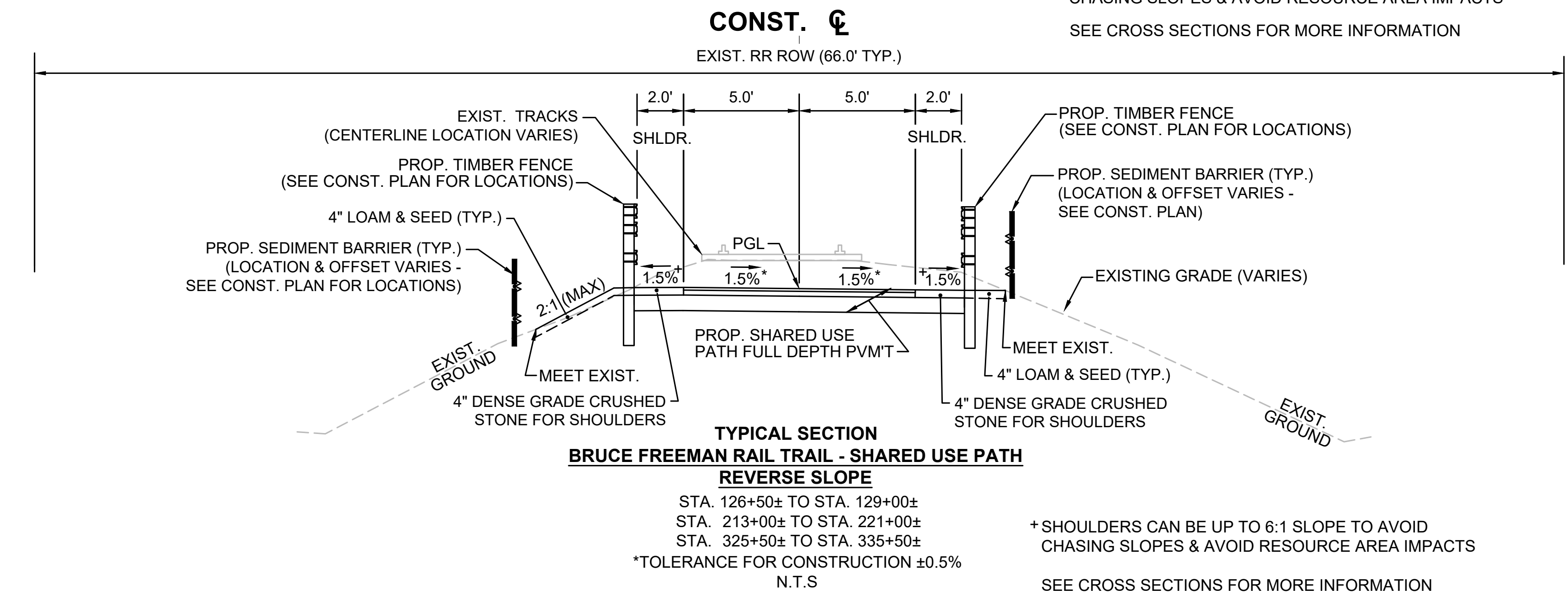
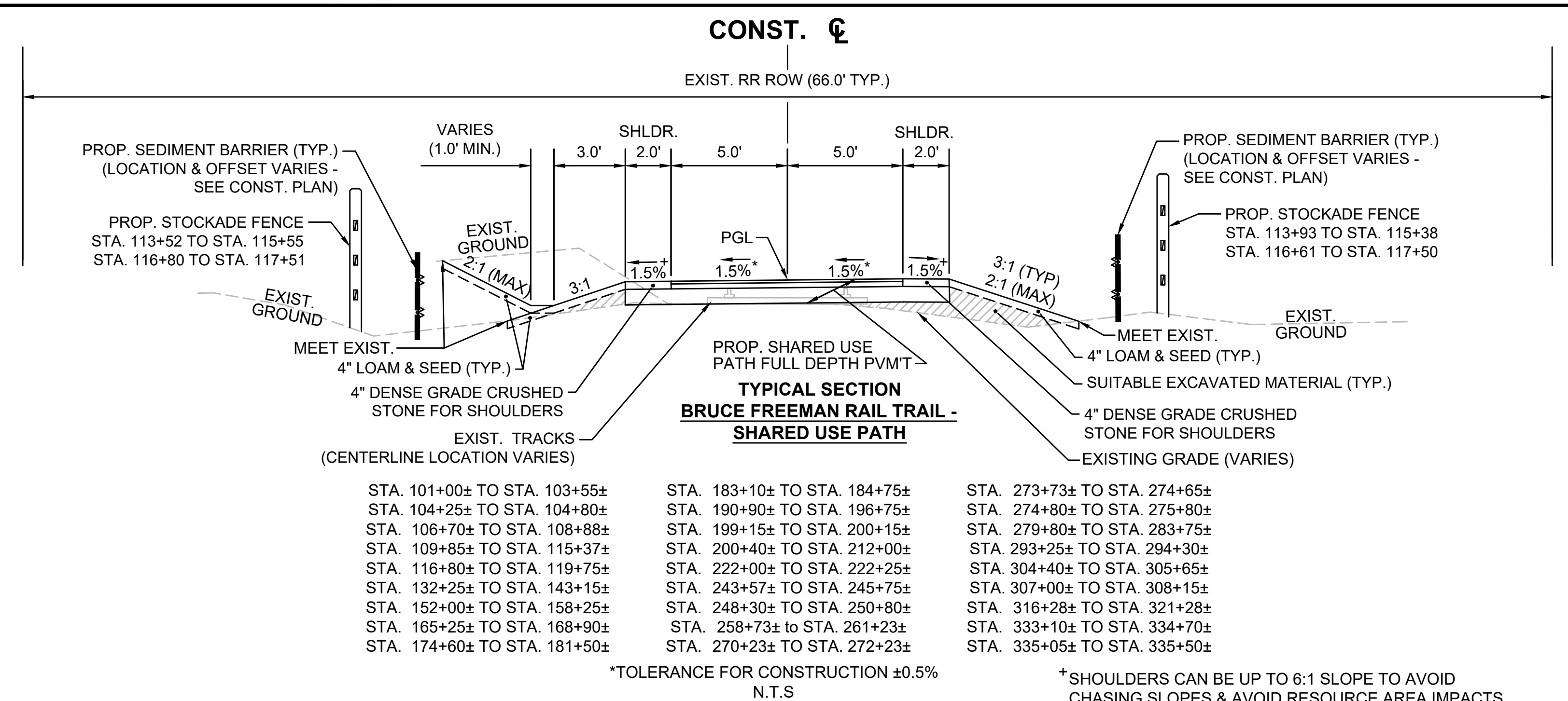
LEGEND

-  Railroad Alignment
-  Alternative Route 1
-  Alternative Route 3
-  FEMA Flood
-  NHESP Habitat
-  Delineated Wetlands (Survey)
-  DEP Wetlands (GIS)





SUBBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	9	318
PROJECT FILE NO. 608164			



PAVEMENT NOTES:

- PROPOSED SHARED-USE PATH**
SURFACE: 1-1/2" SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5)
INTERMEDIATE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0)
SUBBASE: 4" TO 8" GRAVEL BORROW, TYPE b (FOR LEVELING) OVER RESHAPED EXISTING RAILROAD BALLAST
- PROPOSED PARKING LOT FULL DEPTH PAVEMENT**
SURFACE: 1-1/2" SUPERPAVE SURFACE COURSE (SSC-12.5-P) - OVER
BASE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE (19.0) - OVER
FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED FULL DEPTH CONSTRUCTION (LESS THAN 4.00' WIDE) - PEAKHAM ROAD & HUDSON ROAD**
SURFACE: 1-3/4" SUPERPAVE SURFACE COURSE (12.5 POLYMER) - OVER
INTERMEDIATE: 2-1/2" SUPERPAVE INTERMEDIATE COURSE (19.0) - OVER
BASE: 6" CEMENT CONCRETE BASE COURSE 4000psi, 610, 3/4" OVER
SUBBASE: 8" GRAVEL BORROW, TYPE b.
- PROPOSED PAVEMENT MILLING & OVERLAY - PEAKHAM ROAD & HUDSON ROAD**
1-3/4" PAVEMENT MILLING
1-3/4" SUPERPAVE SURFACE COURSE (SSC - 12.5 - P)
- PROPOSED HOT MIX ASPHALT SIDEWALK & DRIVEWAY**
SURFACE: 1-1/2" SUPERPAVE SURFACE COURSE (9.5) - OVER
2-1/2" SUPERPAVE INTERMEDIATE COURSE (12.5)
FOUNDATION: 8" GRAVEL BORROW, TYPE b
- PROPOSED CEMENT CONCRETE WALK, REST AREA & WHEELCHAIR RAMP**
SURFACE: 4" CEMENT CONCRETE AIR ENTRAINED 4000 PSI, 3/4", 610
SUBBASE: 8" GRAVEL BORROW, TYPE b

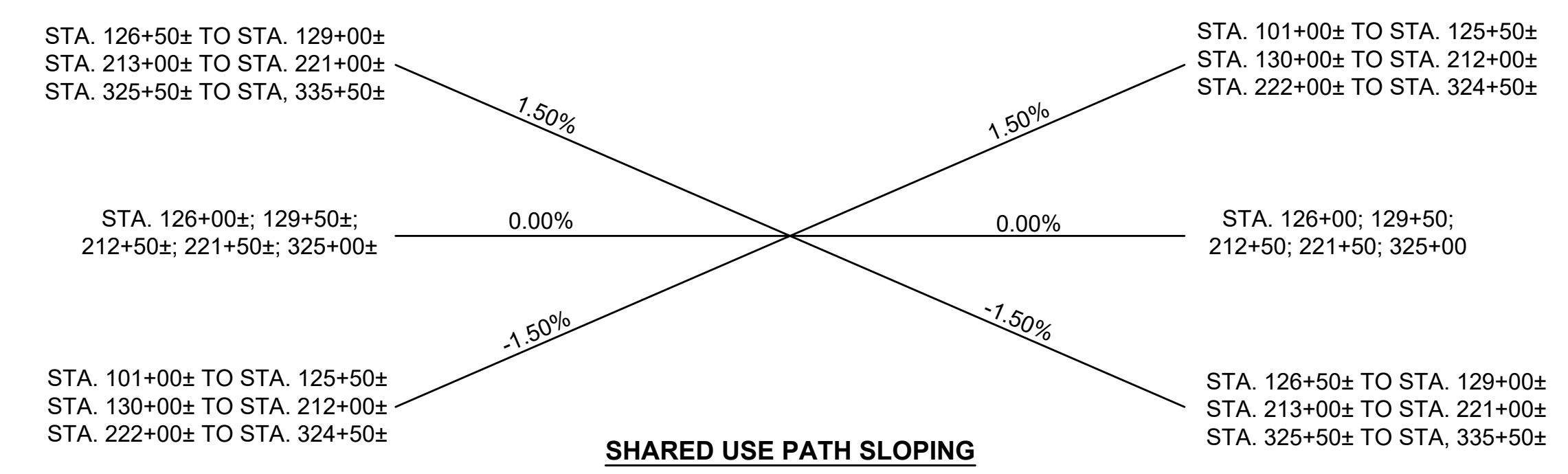
NOTES: EXIST. GRAVEL/BALLAST SUBGROUND MATERIAL DETERMINED BY THE ENGINEER TO BE SUITABLE SHALL REMAIN. THE DEPTH OF THE GRAVEL BORROW WILL BE AS REQUIRED BASED ON THE PROPOSED SUB-BASE ELEVATIONS.

AFTER REMOVAL OF STEEL RAILS AND WOOD TIMBER, ROUGH GRADE AND COMPACT SUBGROUND AREA. THEN PLACE AND COMPACT GRAVEL BORROW SUB-BASE MATERIAL IN MULTIPLE LIFTS.

ASPHALT EMULSION FOR TACK COAT AND HMA JOINT SEALANT SHALL BE APPLIED PER SECTION 450 QA OF THE SPECIAL PROVISIONS.

HMA FOR PATCHING SHALL BE USED FOR ALL PERMANENT, PARTIAL, AND FULL DEPTH PAVEMENT REPAIRS OF UNSOUND PAVEMENT PER SECTION 450 IN AREAS OUTSIDE OF PROP. OSED FULL DEPTH RECLAMATION OR RECONSTRUCTION ROADWAY AREAS.

HMA FOR MISCELLANEOUS WORK SHALL BE USED FOR ALL TEMPORARY CONSTRUCTION, TAPER RAMPS, CURB CUT RAMPS, TEMPORARY TRENCH REPAIR, ETC.



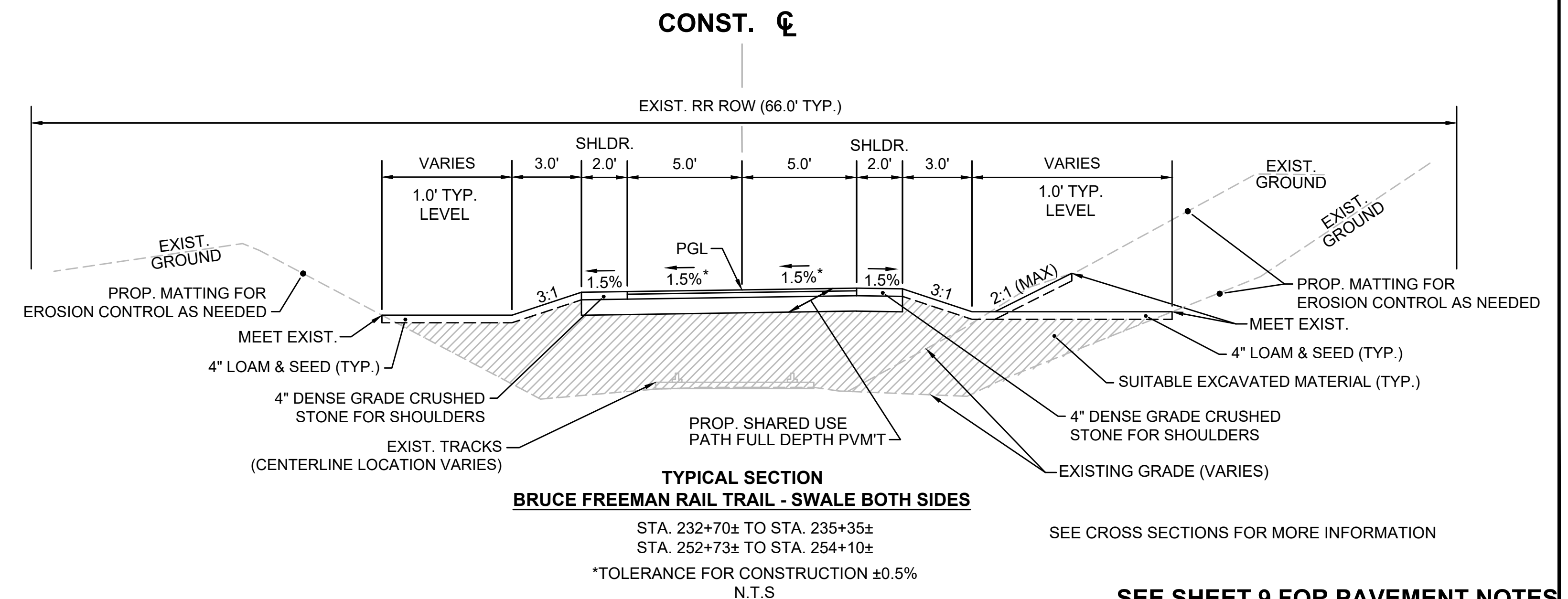
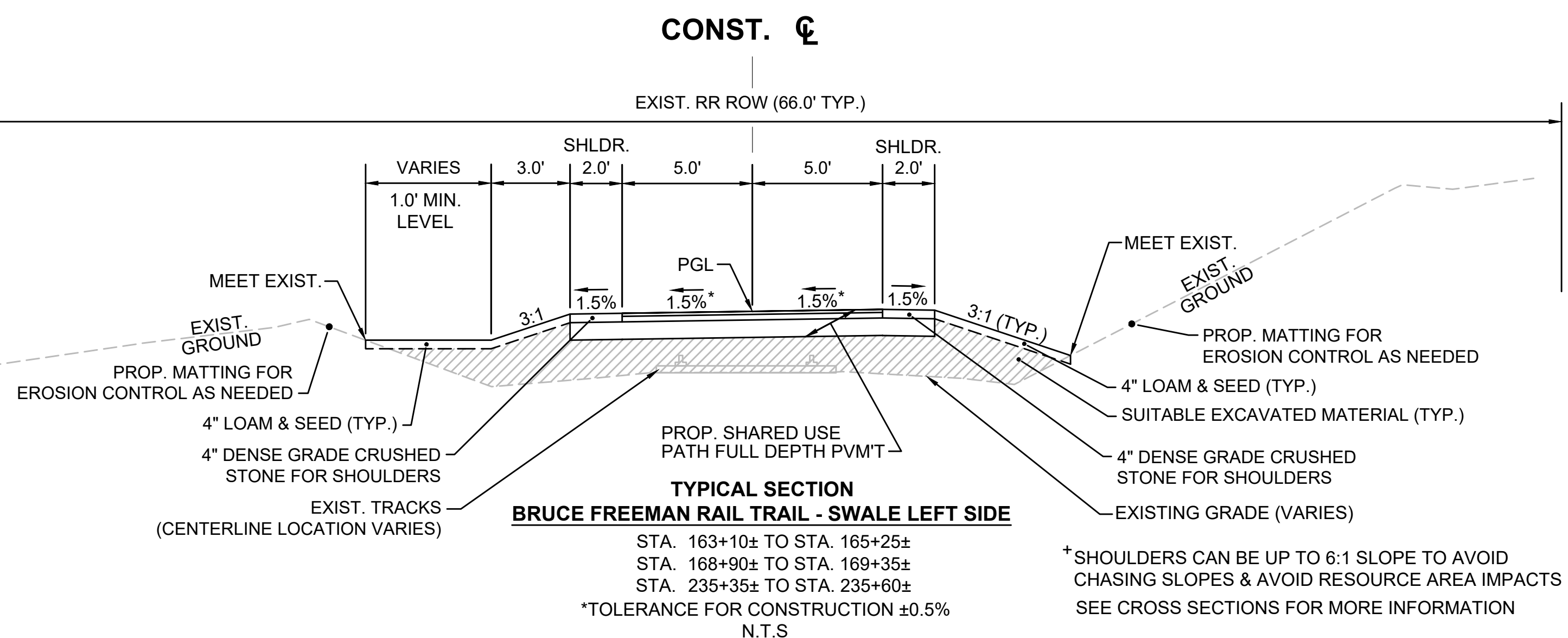
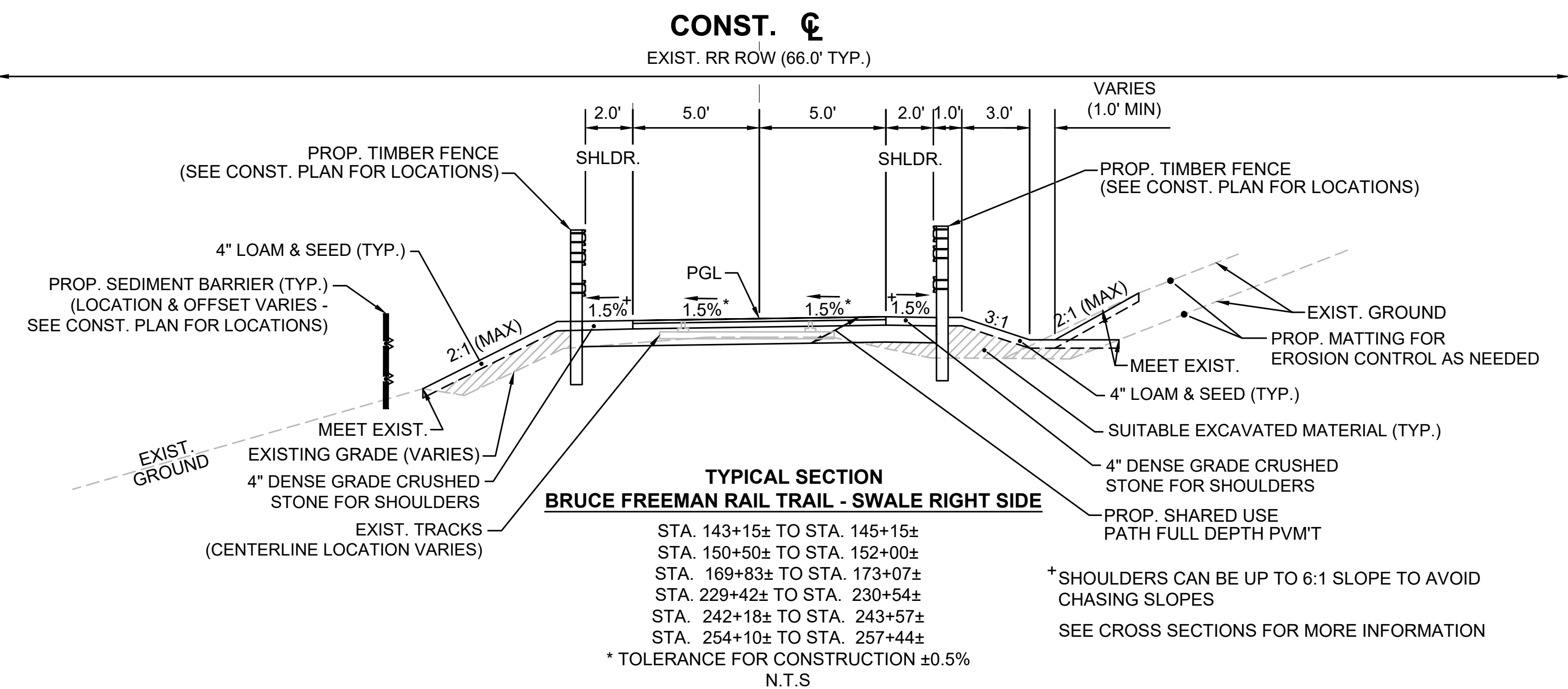
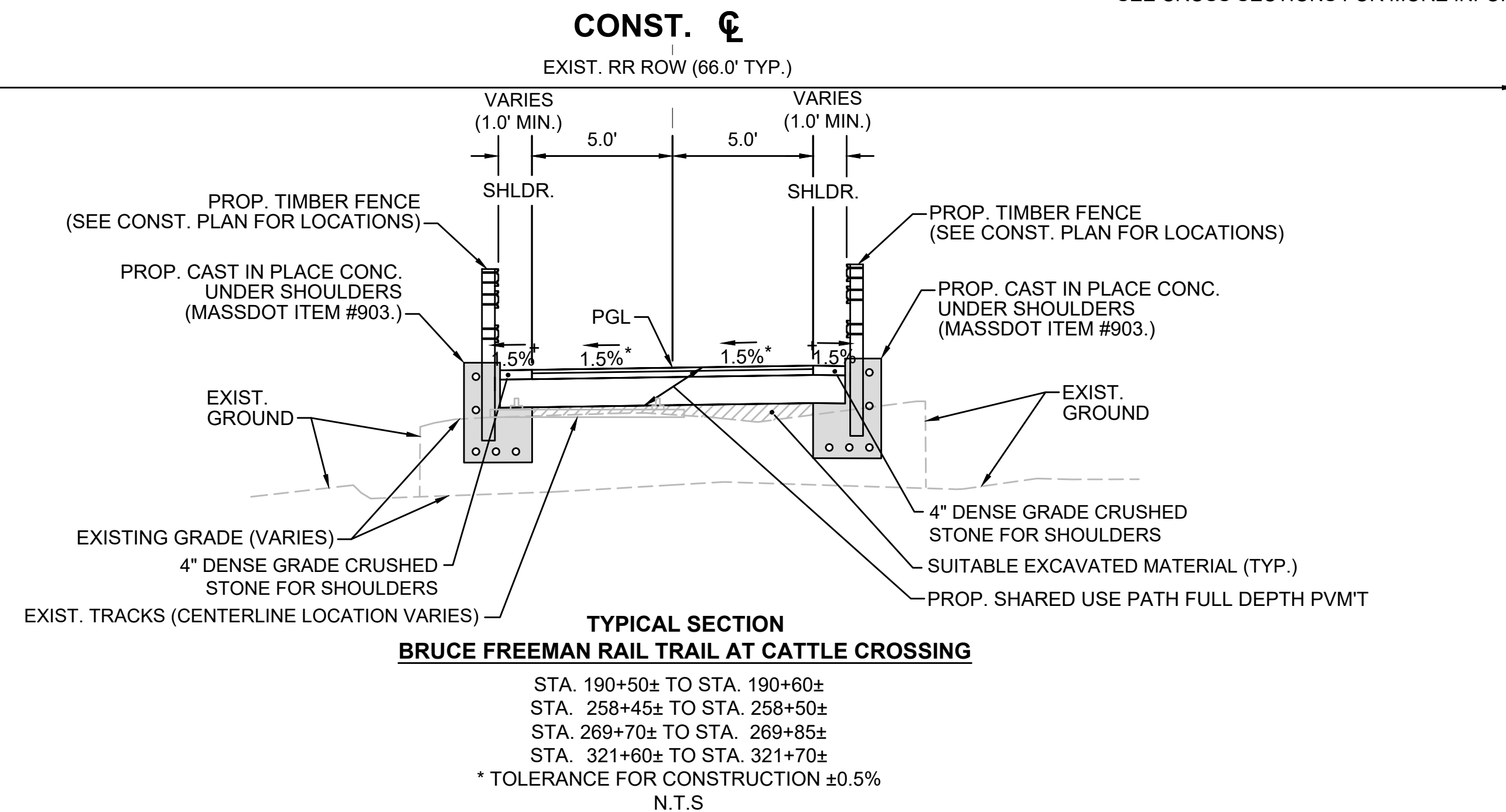
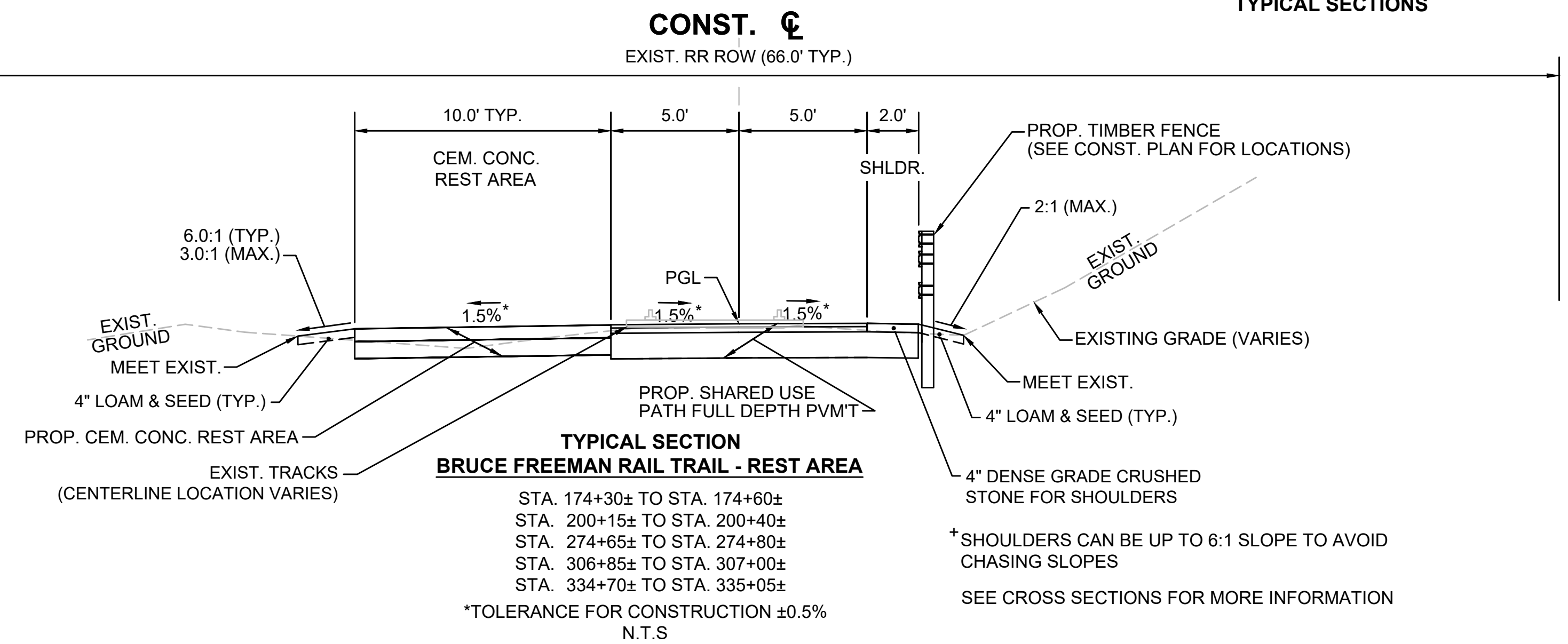
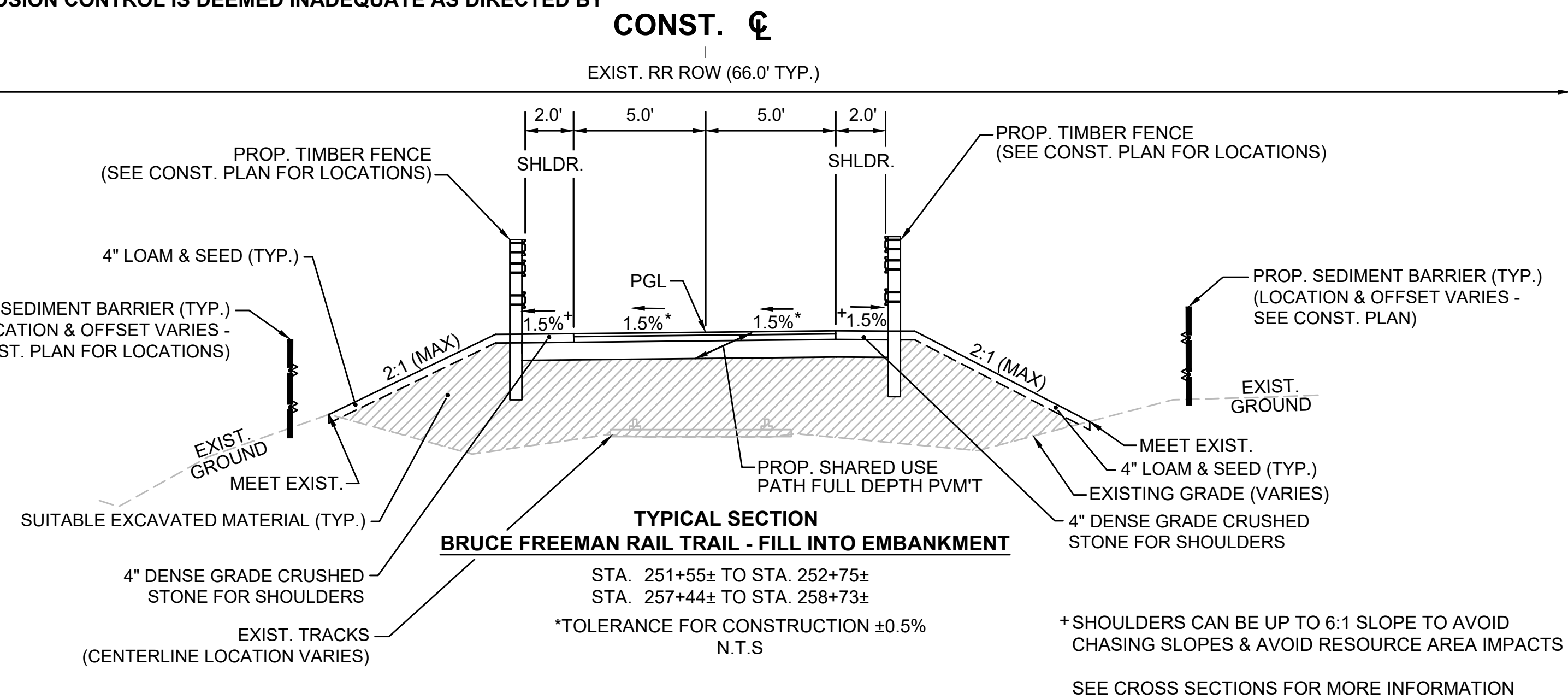
SHARED USE PATH SLOPING

NOTE:
 1. THE SECTIONS OF PROPOSED ROADWAY NOT COVERED IN THE RANGE OF STATIONS ASSOCIATED WITH THE TYPICAL SECTIONS ARE EITHER IN TRANSITION OR ARE LOCATED AT INTERSECTIONS AND THEREFOR HAVE NOT BEEN SHOWN. REFER TO CROSS SECTION SHEETS FOR MORE DETAILS.

NOTES:

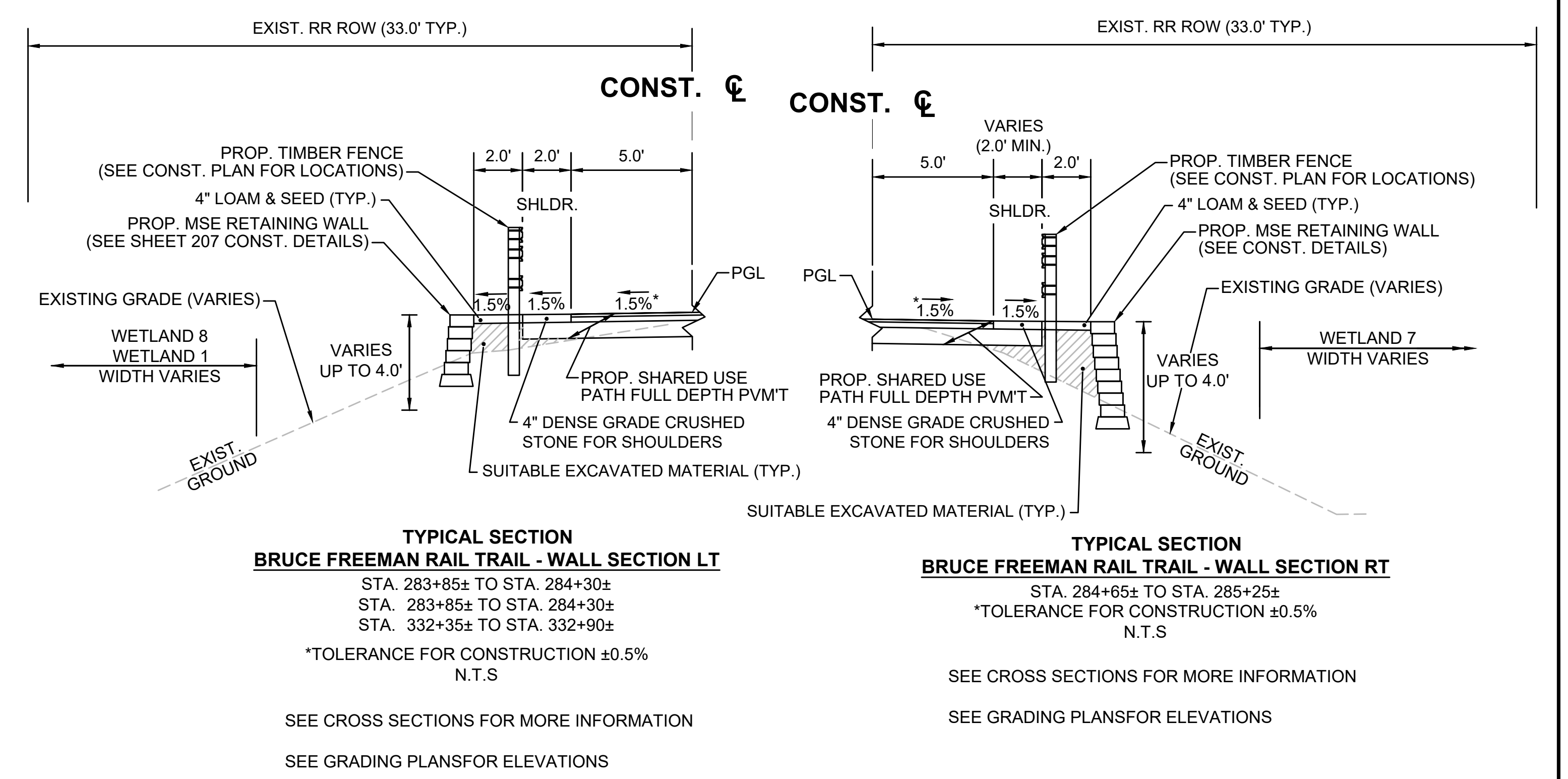
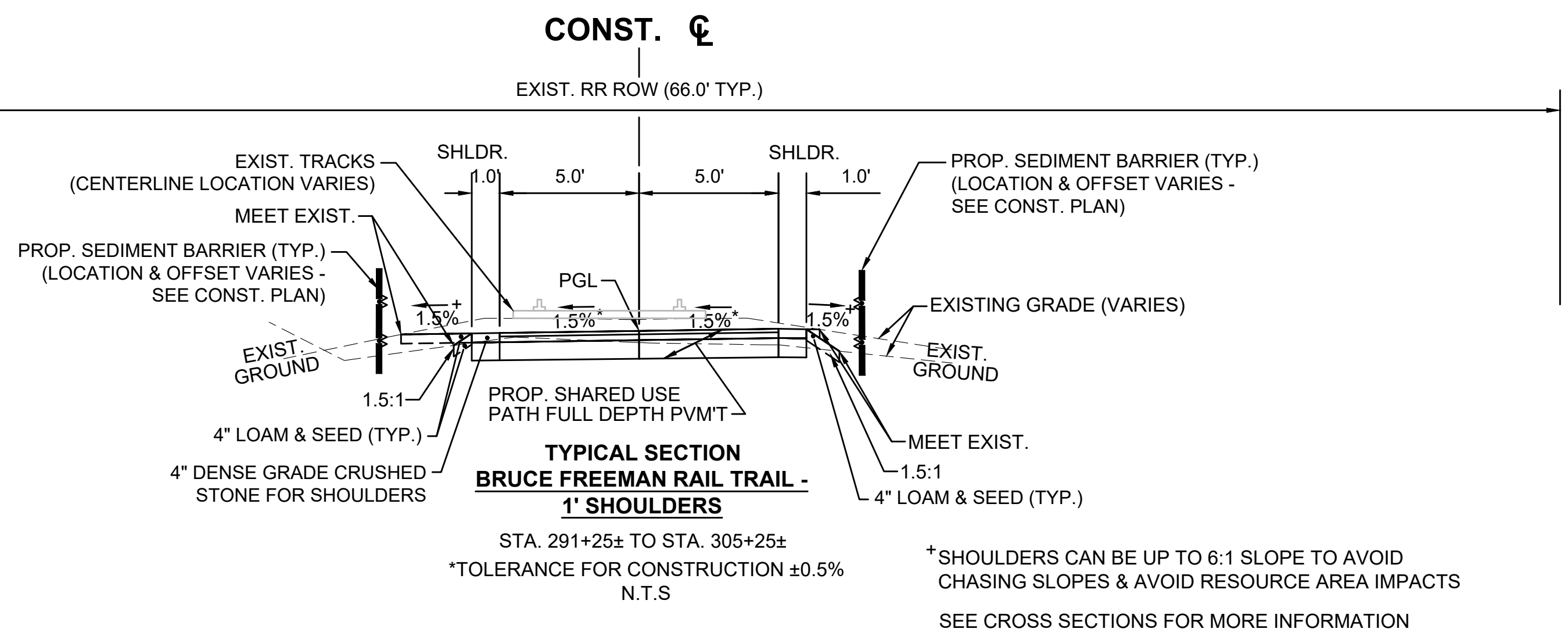
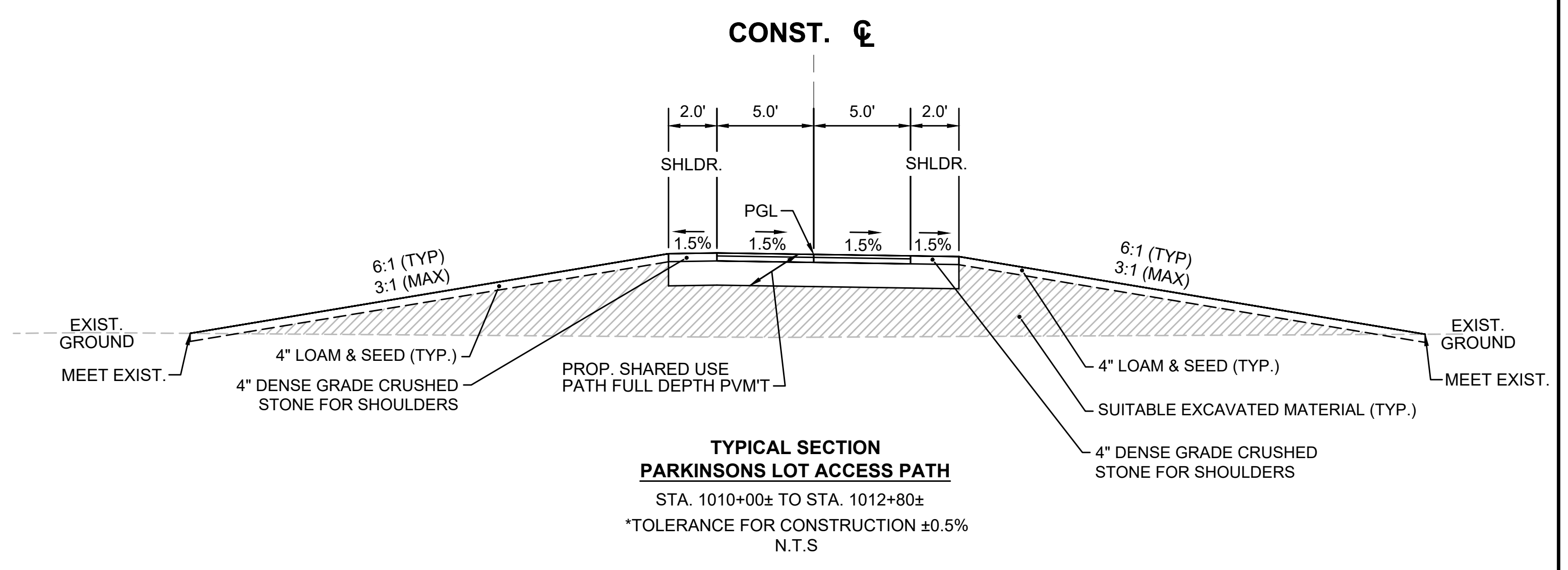
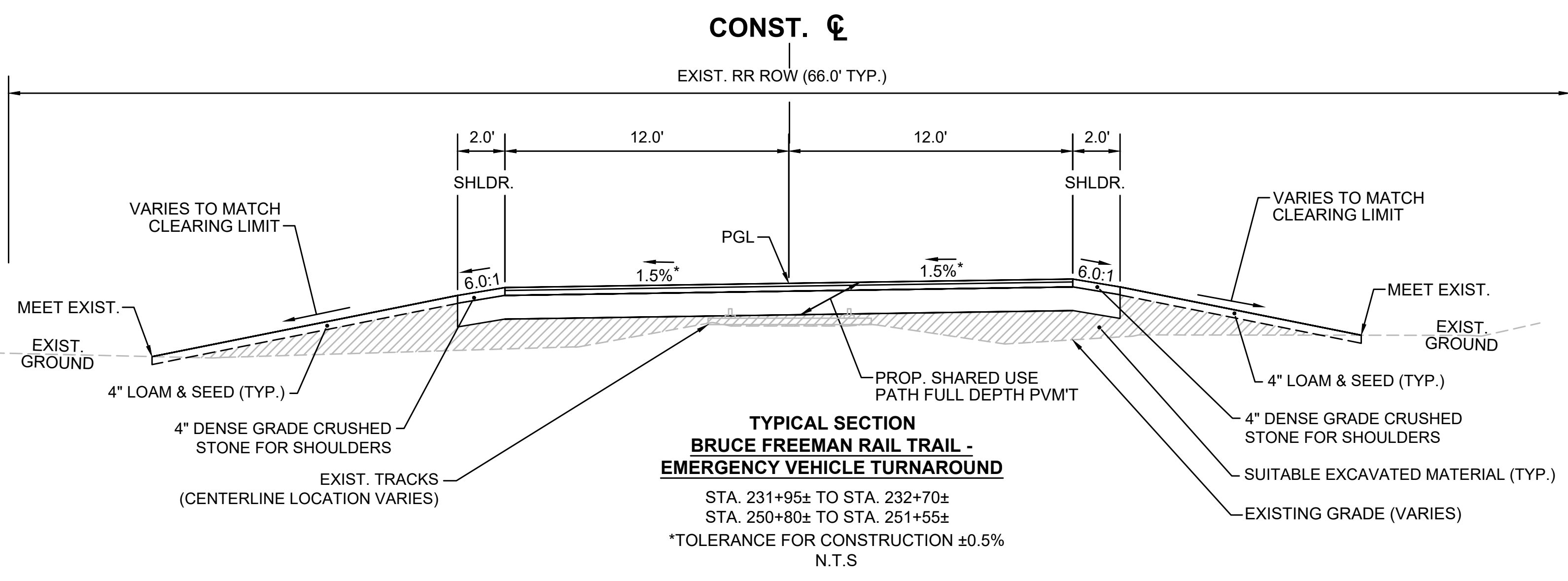
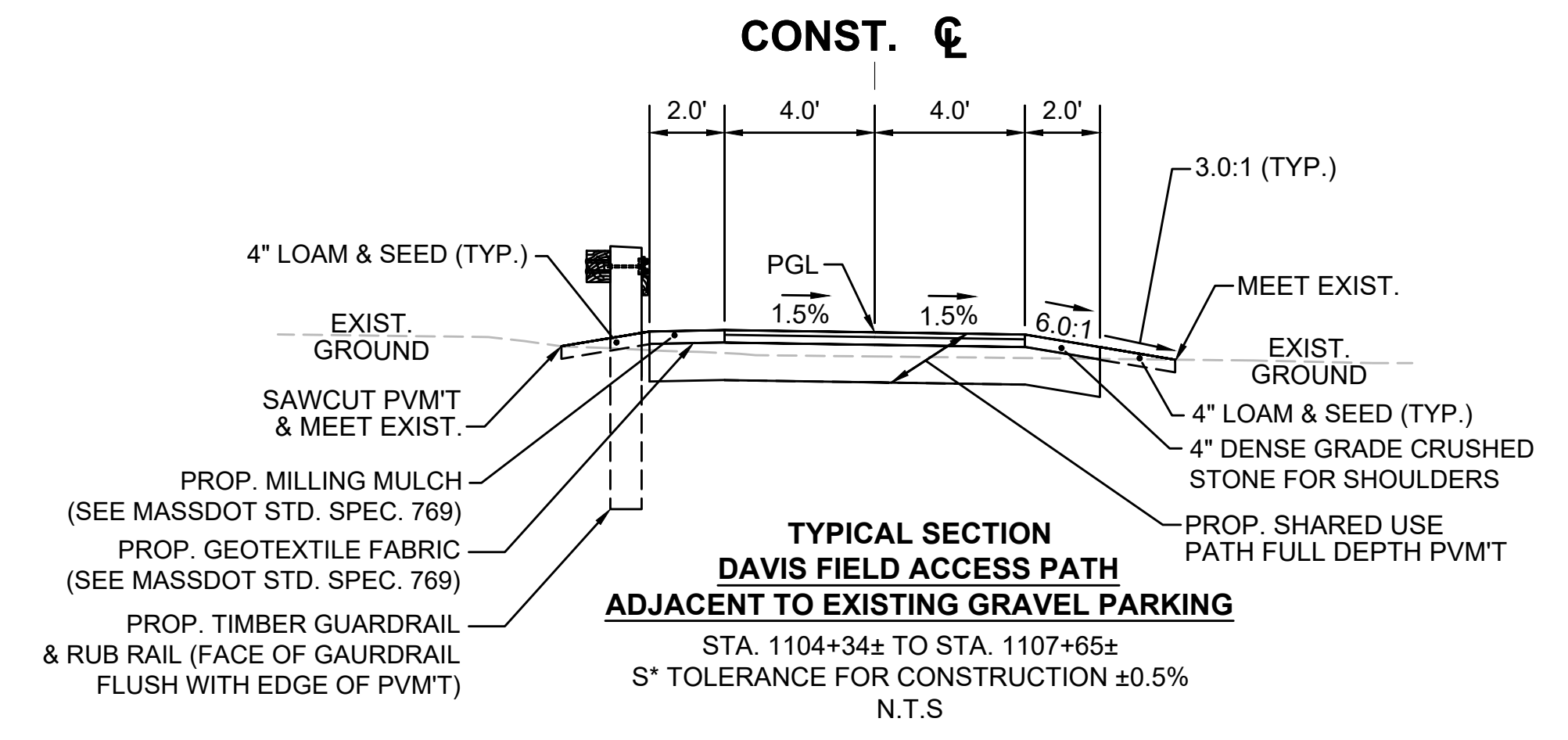
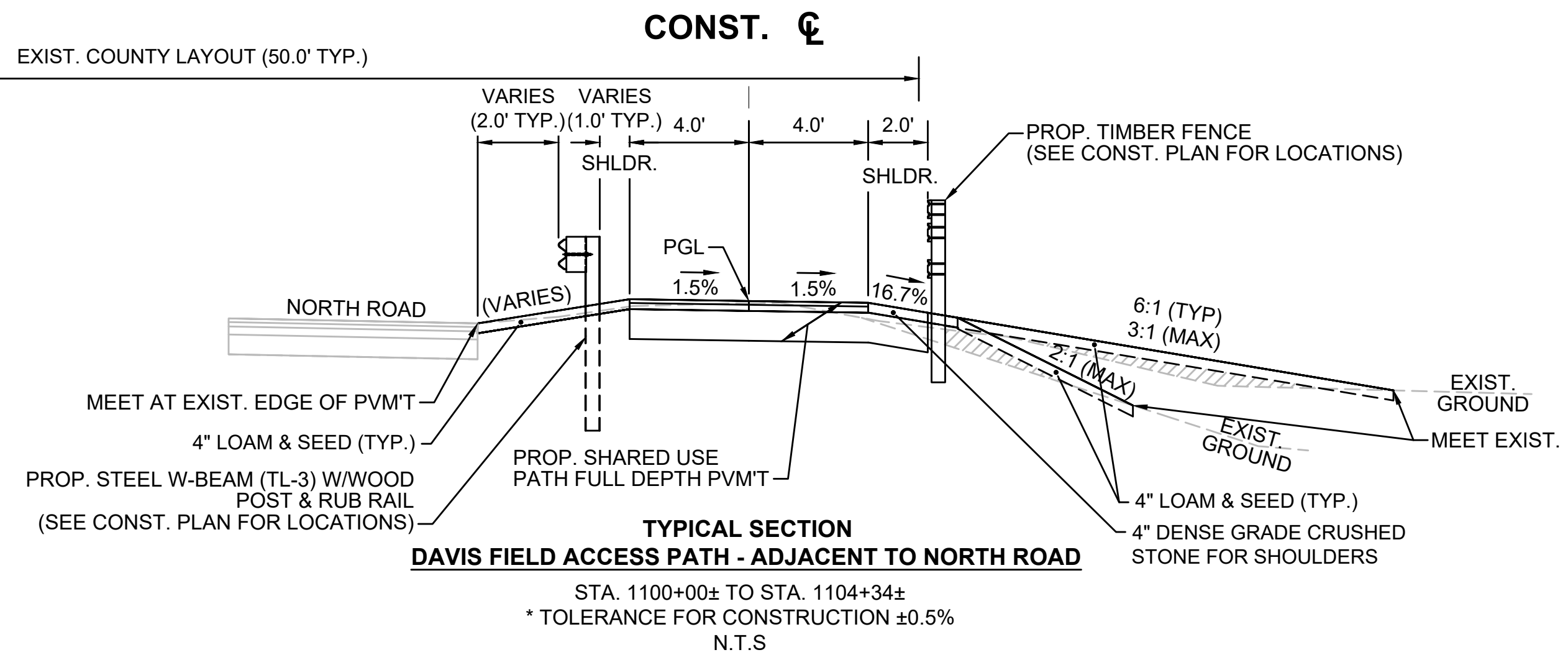
- MATTING FOR EROSION CONTROL SHALL BE INSTALLED ON EXISTING SIDE SLOPES THAT ARE 2:1 OR STEEPER THAT ARE NOT WITHIN JUTE MESH WATERWAY AREAS.
- MODIFIED ROCK FILL SHALL BE USED AS NEEDED ON ANY CUT OR FILL SLOPES STEEPER THAN 2:1 WHERE POOR SOIL CONDITIONS EXIST AND MATTING FOR EROSION CONTROL IS DEEMED INADEQUATE AS DIRECTED BY THE ENGINEER.

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXX(XXX)X	10	318
PROJECT FILE NO.		608164	
TYPICAL SECTIONS			



SEE SHEET 9 FOR PAVEMENT NOTES

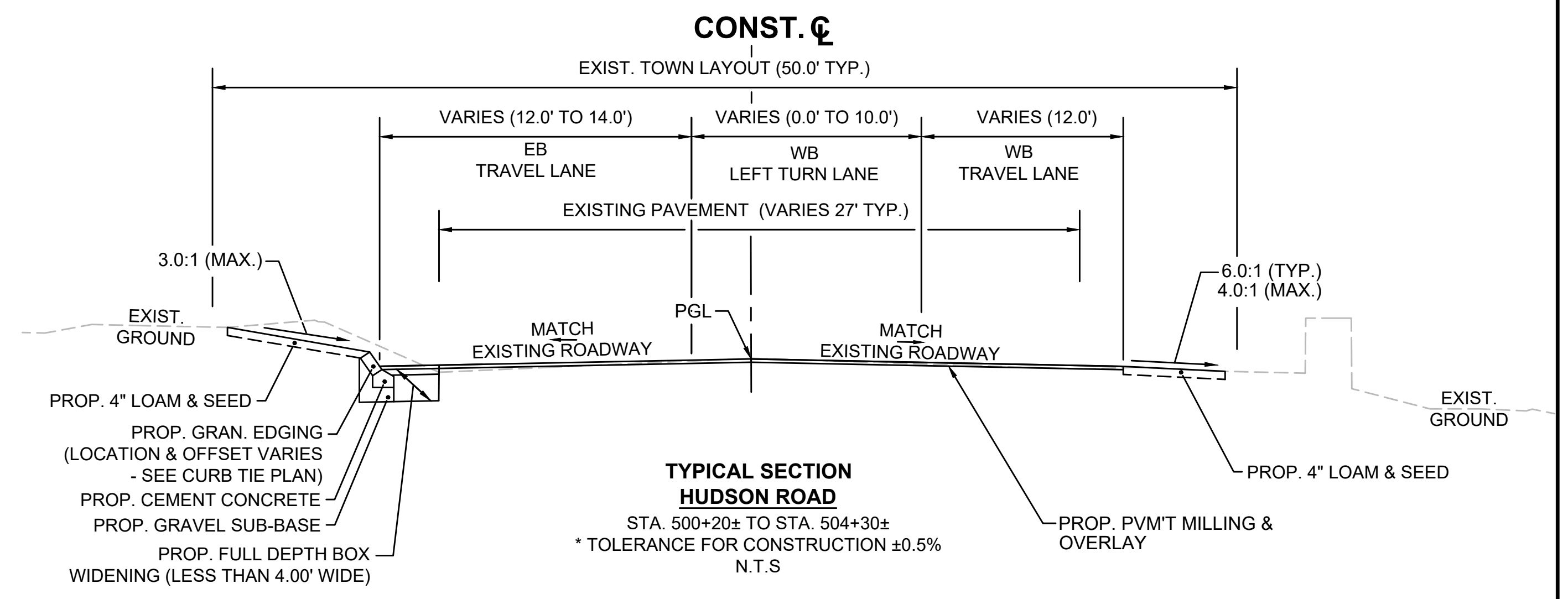
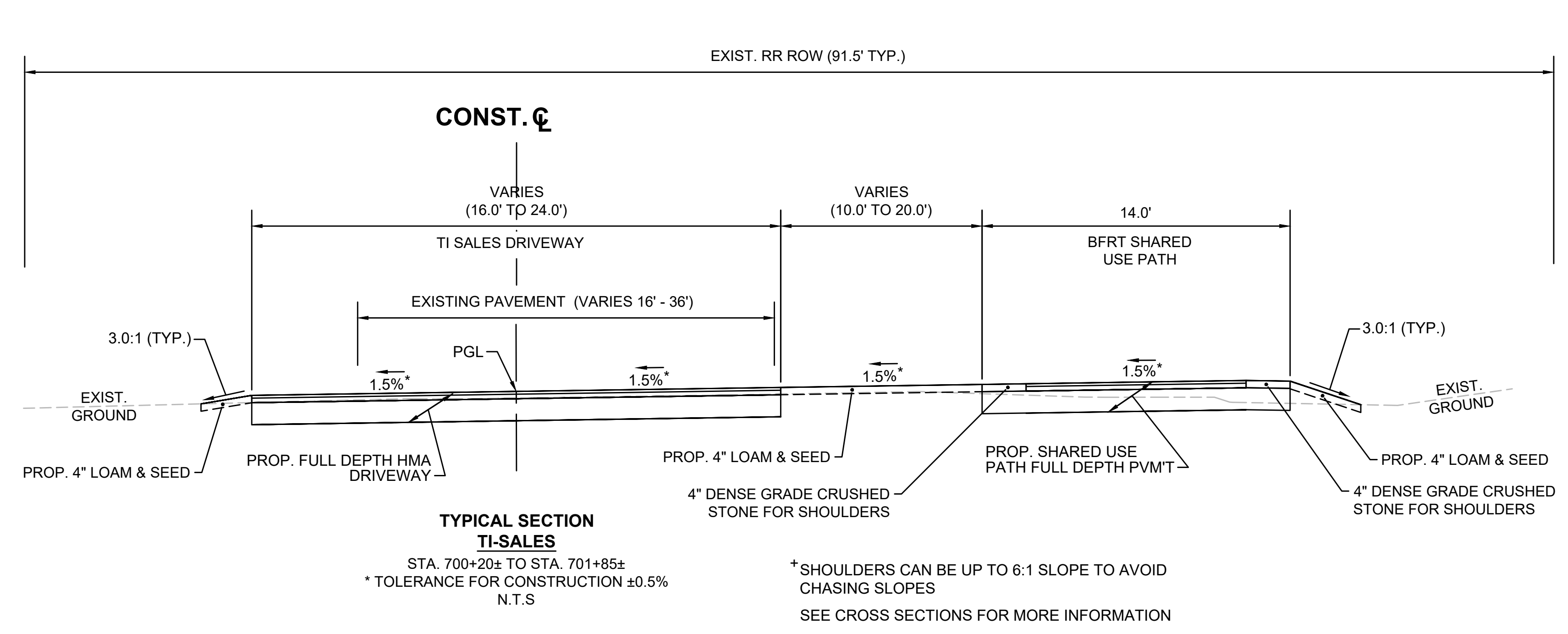
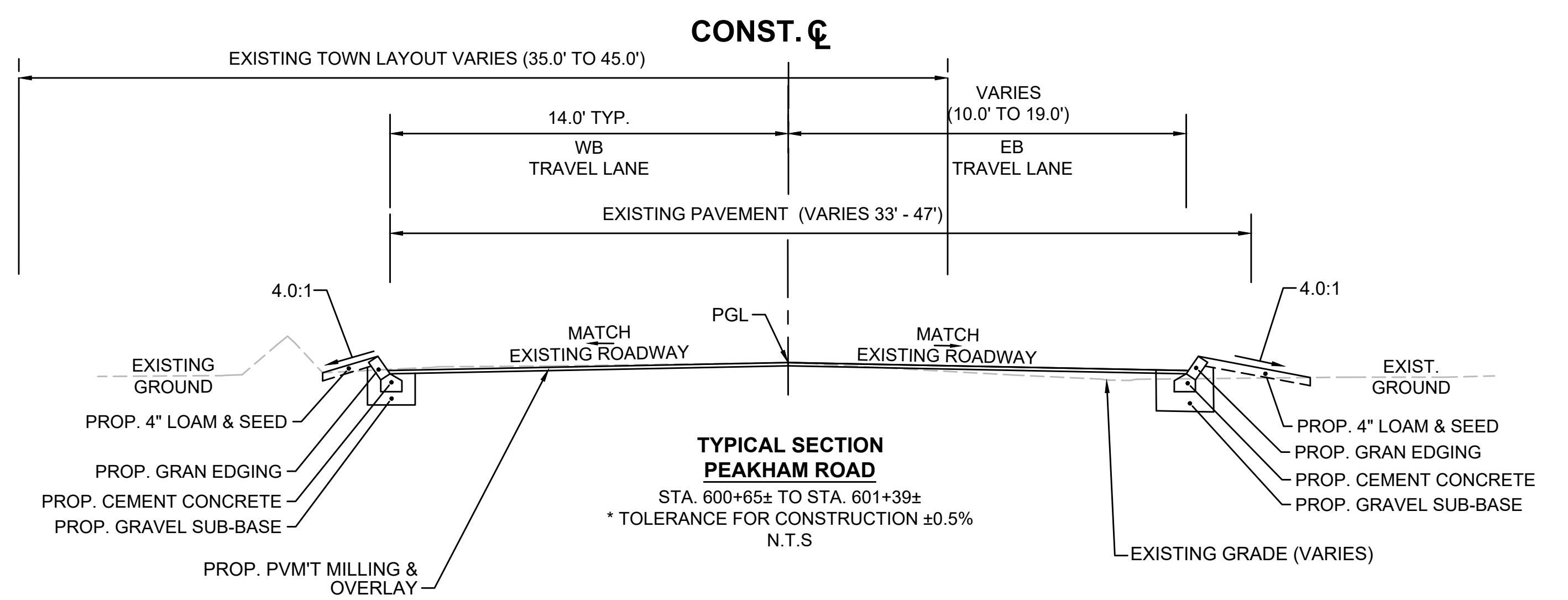
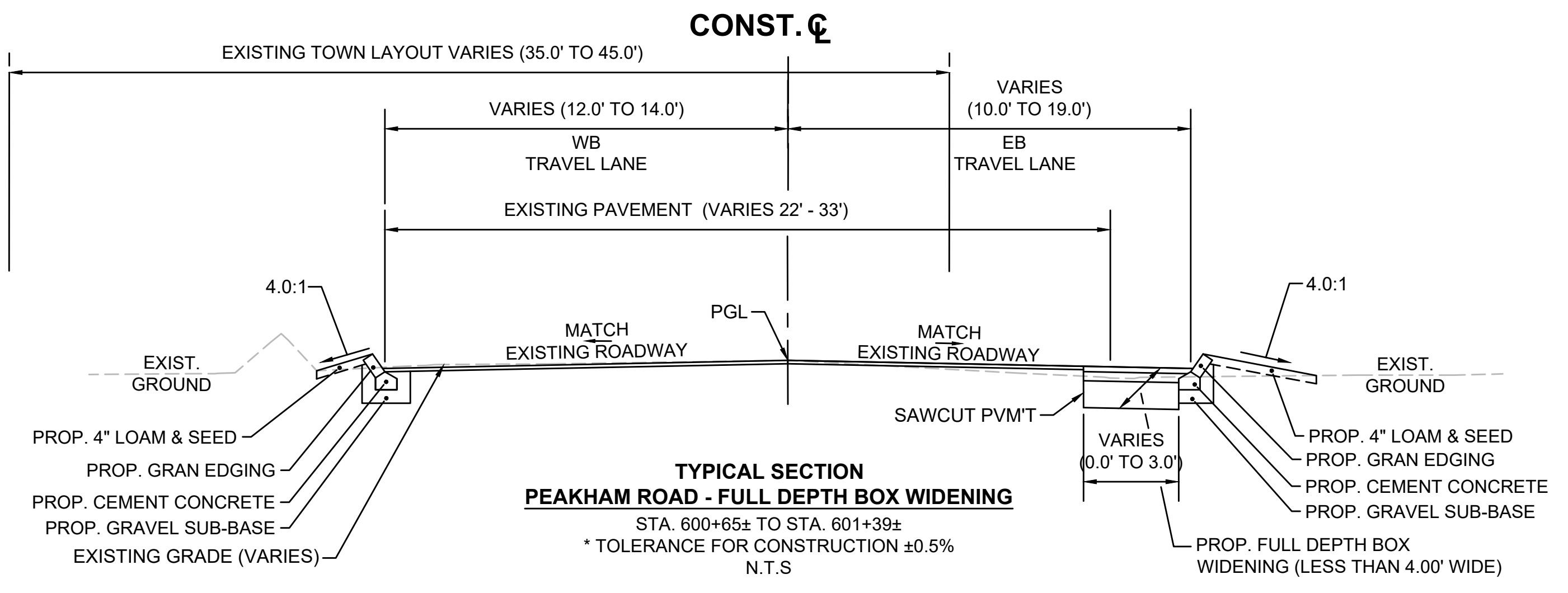
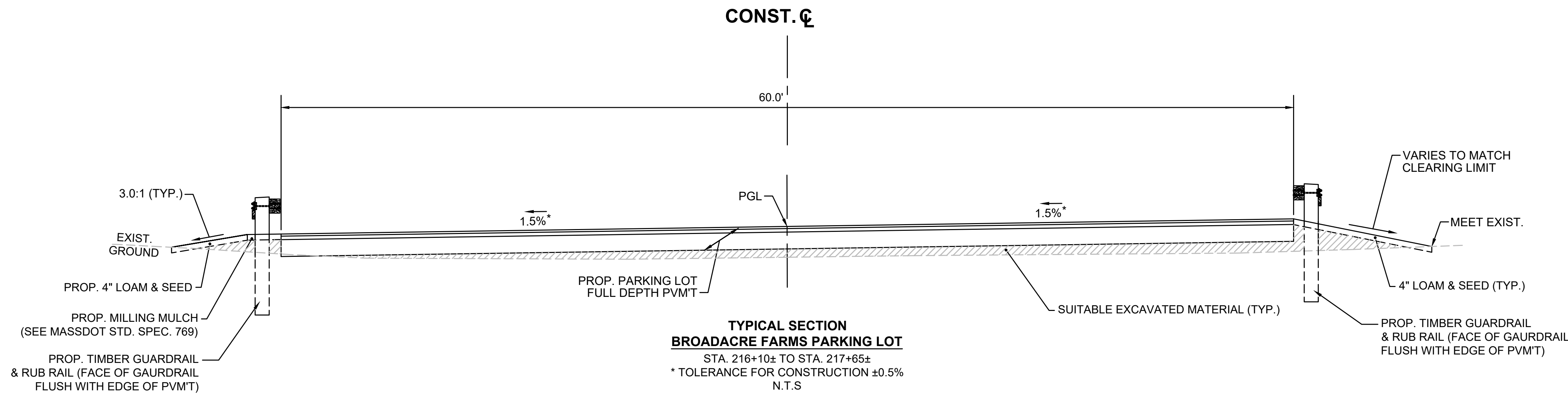
SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	11	318
PROJECT FILE NO.		608164	
TYPICAL SECTIONS			



SEE SHEET 9 FOR PAVEMENT NOTES

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXX-XXXX(XXX)X	12	318
PROJECT FILE NO.		608164	

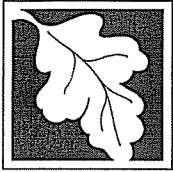
TYPICAL SECTIONS



SEE SHEET 9 FOR PAVEMENT NOTES

Attachment 10

Amended ORAD



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Provided by MassDEP:
301-1193
MassDEP File Number

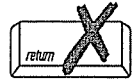
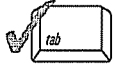
eDEP Transaction Number
Sudbury
City/Town

**WPA Form 4B – Order of Resource Area
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

From: Sudbury
1. Conservation Commission

2. This Issuance is for (check one):

- a. Order of Resource Area Delineation
- b. Amended Order of Resource Area Delineation

3. Applicant:

Sudbury Town Planning & Community Dev. b. Last Name
Dept. _____
Town of Sudbury
c. Organization
278 Old Sudbury Rd.
d. Mailing Address
Sudbury MA 01776
e. City/Town f. State g. Zip Code

4. Property Owner (if different from applicant):

Executive Office of Transportation and Construction b. Last Name
Commonwealth of MA
c. Organization
10 Park Plaza, Ssuite 3170
d. Mailing Address
Boston MA 02116
e. City/Town f. State g. Zip Code

5. Project Location:

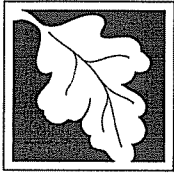
Railroad ROW Sudbury 01776
a. Street Address b. City/Town c. Zip Code

d. Assessors Map/Plat Number e. Parcel/Lot Number
Latitude and Longitude 42d39m065s -71d41m162s
(in degrees, minutes, seconds): f. Latitude g. Longitude

6. Dates: July 26, 2016
a. Date ANRAD filed b. Date Public Hearing Closed c. Date of Issuance

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Proposed Bike Path May 19, 2016
a. Title b. Date
c. Title d. Date



**WPA Form 4B – Order of Resource Area
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

301-1193
MassDEP File Number

eDEP Transaction Number

Sudbury
City/Town

B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable):

a. **Accurate:** The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

- 1. Bordering Vegetated Wetlands
- 2. Other resource area(s), specifically:

a. bank

subject to receipt of a dated revised plan of the version received by email on Oct. 24, 2016

b. **Modified:** The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

- 1. Bordering Vegetated Wetlands
- 2. Other resource area(s), specifically:

a.

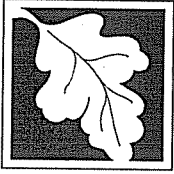
c. **Inaccurate:** The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

- 1. Bordering Vegetated Wetlands
- 2. Other resource area(s), specifically:

Perennial stream including mean annual high water; vernal pools (including, but not limited to vernal pools protected under the Sudbury Wetlands Bylaw only)

3. The boundaries were determined to be inaccurate because:

Drought conditions and low groundwater during 2016 did not permit the identification of these resource areas.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

301-1193
MassDEP File Number

eDEP Transaction Number

Sudbury
City/Town

C. Findings

This Order of Resource Area Delineation determines that the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

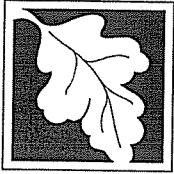
This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see <http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html>).

D. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order of Resource Area Delineation will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

**WPA Form 4B – Order of Resource Area
Delineation**

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

301-1193
MassDEP File Number

eDEP Transaction Number

Sudbury
City/Town

E. Signatures

Nov. 14, 2016
Date of Issuance

Please indicate the number of members who will sign this form.

6
1. Number of Signers

[Signature]
Signature of Conservation Commission Member

[Signature] (Armstrong)
Signature of Conservation Commission Member

[Signature] Charles Russo
Signature of Conservation Commission Member

[Signature]
Signature of Conservation Commission Member

[Signature] BRUCE PORTER
Signature of Conservation Commission Member

[Signature]
Signature of Conservation Commission Member

[Signature] MARK SGOVER
Signature of Conservation Commission Member

This Order is valid for three years from the date of issuance.

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on _____ unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. By hand delivery on
Nov. 14, 2016
a. Date

3. By certified mail, return receipt requested on _____
a. Date



**NOTICE OF PUBLIC HEARING
SUDBURY CONSERVATION COMMISSION
Virtual Meeting 6:30 PM**

The Sudbury Conservation Commission will hold a public hearing to review an Amendment to the Order of Resource Area Delineation filing (DEP #301-1193) to clarify jurisdictional wetland resource areas subject to the Wetlands Protection Act versus the Sudbury Wetland Administration Bylaw, to classify streams as intermittent or perennial, and to enter into the record the status of vernal pools along the MassDOT Right of Way in Sudbury, MA. MassDOT Highway Division, applicant. The hearing will be held on Monday, June 29, 2020 at 6:30 pm, via remote participation through Zoom. The link to join this Zoom meeting (<https://us02web.zoom.us/j/98803339162>) as well as copies of the application, may be reviewed on the Conservation Commission web page at: <https://sudbury.ma.us/conservationcommission/meeting/conservation-commission-meeting-monday-june-29-2020/>. Please contact the Conservation Office with any questions at 978-440-5470.

SUDBURY CONSERVATION COMMISSION
June 15, 2020



Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, Secretary & CEO
Jonathan L. Gulliver, Highway Administrator



June 15, 2020

Sudbury Conservation Commission
Department of Public Works
275 Old Lancaster Road
Sudbury, MA 01776

**Subject: ORAD Amendment Request, Bruce Freeman Rail Trail, Sudbury, MA
DEP File No. 301-1193**

Dear Commissioners:

Massachusetts Department of Transportation, Highway Division (MassDOT) submits this Amendment Request for the Order of Resource area Delineation (ORAD) issued by the Sudbury Conservation Commission (DEP File No. 301-1193) to the Town of Sudbury for the Bruce Freeman Rail Trail (BFRT) right-of-way property. The ORAD was recently extended by the Commission for an additional three years and is scheduled to expire in October 2022.

State and local wetland resource areas were approved by the Sudbury Conservation Commission through an ORAD dated November 2016. The ORAD was granted to the applicant, the Town of Sudbury, with permission from the property owner, Massachusetts Department of Transportation (MassDOT), to advance the design of the BFRT. However, the ORAD (and the submitted Abbreviated Notice of Resource Area Delineation (ANRAD) plans themselves) did not distinguish between Sudbury Wetland Administration Bylaw (Bylaw) jurisdictional wetlands and Massachusetts Wetlands Protection Act (WPA) jurisdictional wetlands. Furthermore, due to drought conditions at the time of ANRAD review, the Commission did not accept the classification of intermittent versus perennial streams as presented in the ANRAD application. The referenced ORAD was issued under both the Bylaw and WPA because at the time of filing the Applicant was the Town of Sudbury and not MassDOT. State agencies such as MassDOT are not ordinarily subject to local bylaws. MassDOT is seeking to make these distinctions as defined under the WPA in order to proceed with the permitting phase of the BFRT in an accurate manner and ensure compliance with WPA regulatory performance standards.

MassDOT reviewed the existing conditions plans of the proposed BFRT in Sudbury, MA to confirm the presence (or lack thereof) of Bordering Vegetated Wetlands (BVW), and classify the intermittent and perennial streams, as such terms are defined under the WPA. The results are discussed below.

Ten Park Plaza, Suite 4160, Boston, MA 02116

Tel: 857-368-4636, TTY: 857-368-0655

www.mass.gov/massdot

Subsequent to the ORAD being issued in 2016, additional detailed field investigations of potential vernal pools were conducted by VHB in 2017 and Stantec in 2018 in accordance with MA Natural Heritage and Endangered Species program (NHESP) guidance. MassDOT would like to enter these results into the record and identify those two pools (or portions thereof) that are within the right of way as certifiable vernal pools in accordance with NHESP Guidance.

Isolated Vegetated Wetlands

ANRAD plans were compared with publicly available wetlands information on MassGIS such as MassDEP wetlands, hydrological connection data layers, along with USGS maps, and identified nine distinct wetland flag series to review in the field based on whether they appeared isolated in the landscape or if there was a lack of mapped hydrological connection to another resource area. One additional wetland, WF-36 series, was identified as isolated on the plans and presumed to be correct. On April 1 and May 8, 2020, wetland scientists conducted a field inspection of these identified areas to confirm if the delineated vegetated wetlands are bordering wetlands under the WPA or isolated wetlands only under the Bylaw. Based on the results of the field inspection, MassDOT identified seven (7) vegetated wetland areas that are clearly isolated. See Figure 1 in Attachment A.

The identified freshwater wetland flag series listed in Table 1 should not be considered BVWs under the WPA because they are isolated in the landscape and do not border on a surface water body as required under 310 CMR 10.55. Nor should these flag series be considered Isolated Land Subject to Flooding under the WPA as they do not meet the volume and depth requirements under 310 CMR 10.57.

Waterways

Based on the plan assessment, review of USGS map information, and USGS StreamStats™ analysis, four perennial streams within the BFRT right of way were identified. The remaining bank flag series are to be considered intermittent. Finally, portions of one bank series do not meet the state WPA definition of a stream. See Table 1 and the summary below for further information.

Pursuant to 310 CMR 10.58(2)(a)1c, “a stream shown as intermittent or not shown on the current USGS map or more recent map provided by the Department, that has a watershed size less than one square mile, is intermittent unless the stream has a watershed size of at least ½ (0.50) square mile and has a predicted flow rate greater than or equal to 0.01 cubic feet per second at the 99% flow duration using the USGS Stream Stats method.”

Hop Brook (BF32 & BF33), Pantry Brook (PS1), a tributary to Pantry Brook (BF12), and a tributary to Cold Brook (BF3) are all USGS-mapped perennial and thus have associated 200-foot Riverfront Area under the WPA. Using the USGS Stream Stats program, the remaining streams mapped as intermittent or flagged in the field as identified in the plans were evaluated (see Attachment B). Because none of these streams are mapped as perennial by USGS, and all have watershed sizes of less than ½ square

mile as indicated by the Stream Stats program, none are considered perennial under the WPA regulations. Thus, none of these intermittent streams have associated Riverfront Area.

Portions of bank flag series BF-30 are up gradient of any other resource area according to the 2016 ANRAD existing condition plans (Sheets 17 and 18). This condition was field verified and determined that there was not a freshwater wetland (bordering or otherwise) or surface water body up gradient of these sections. These portions include flags BF 30-106 through BF 30-126, BF 30-132 through BF 30-139, and BF 30-333 through BF 30-321 (one continuous section on the east side of the trail), and flags BF 30-302 through BF 30-320 (one continuous section on west side of trail). While this stream may be considered jurisdictional under the Bylaw, in our opinion it would not be a regulated resource area under the WPA, as these portions do not meet the definition of a stream¹.

Perennial and intermittent streams have been categorized in Table 1 on the next page according to the WPA definitions.

Vernal Pools

The attached reports (Attachment C) have identified three additional certifiable vernal pools: PVP 4, PVP 11 and PVP 12a. Of these, only PVP 4 (associated with WF 6) and PVP 11 (associated with WF 24) appear to be within the BFRT ROW. It is important to note that while several of the IVWs identified in Table 1 were surveyed, no vernal pool species were found within these wetlands according to the survey results.

¹ According to 310 CMR 10.04, a "Stream means a body of running water, including brooks and creeks, which moves in a definite channel in the ground due to a hydraulic gradient, and which flows within, into or out of an Area Subject to Protection under M.G.L. c. 131, § 40. A portion of a stream may flow through a culvert or beneath a bridge. Such a body of running water which does not flow throughout the year (i.e., which is intermittent) is a stream except for that portion **upgradient of all bogs, swamps, wet meadows and marshes.**" [emphasis added]

Table 1 – Summary of Recommended Resource Area Classification under the WPA

FLAG SERIES	PLAN SHEET	CLASSIFICATION/STREAM TYPE UNDER WPA	APPROXIMATE AREA (IVW)	COMMENTS
BF36	2	Intermittent		
BF33	8	Perennial		Hop Brook
BF32	7, 8, 16	Perennial		Hop Brook
BF27	24	Intermittent		
BF26	24	Intermittent		
BF15-24	26, 28, 29	Intermittent		
BF23	27	Intermittent		
BF30*	17, 18	Intermittent <i>Flags BF 30-100 to 105, 30-200-212, 30-300 to 308, 300-13, 30-320 and 30-321 only</i>		Unnamed tributary to Hop Brook
BF21	29, 30, 31	Intermittent		
BF19	33	Intermittent		
BF 18	33	Intermittent		
BF17	33, 34	Intermittent		Not shown on USGS stream stats
BF16	34	Intermittent		
PS1	35, 36, 37	Perennial		Pantry Brook
BF15-6	47	Intermittent		
BF12	38, 39, 40	Perennial		Unnamed tributary to Pantry Brook
BF8	42, 43, 44, 48	Intermittent		Cold Brook
BF6	42, 43, 44, 48	Intermittent		Cold Brook
BF7	45	Intermittent		Not shown on USGS streamstats
BF5	48	Intermittent		
BF3	51, 52	Perennial		Unnamed tributary to Cold Brook
BF2	54, 55	Intermittent		
WF38	3	Isolated/Non-jurisdictional	1,550 sf	Included in VP survey (PVP ID 16)
WF36	22	Isolated/Non-jurisdictional	3,315 sf	Included in VP survey (PVP ID 15)
WF34	10	Isolated/Non-jurisdictional	~ 3,200 sf	Included in VP survey (PVP ID 14)
WF33	10	Isolated/Non-jurisdictional	1,200 sf	Not included in VP survey
WF31	18	Isolated/Non-jurisdictional	3,250 sf	Not included in VP survey
WF20	31	Isolated/Non-jurisdictional	~1,000 sf	Included in VP survey (PVP ID 10)
WF15	38	Isolated/Non-jurisdictional	850 sf	Not included in VP survey

ORAD Amendment Request Details

MassDOT requests that the Sudbury Conservation Commission revise the jurisdictional status of the previously approved wetland resource area delineation boundary to clarify status under the WPA and issue an amended ORAD to reflect any agreed upon jurisdictional changes under the WPA. Specifically, MassDOT is seeking to specify the Isolated Vegetated Wetlands as listed in Table 1 as non-jurisdictional under the WPA. Furthermore, the classification of intermittent and perennial should be documented in accordance with WPA regulations at 10.58 2(a)1 in the ORAD, as well as classification of the portions of flag series BF30 that do not meet the WPA definition of a stream. MassDOT is also seeking to enter the vernal pool survey results into the record as described.

MassDOT also requests that the ORAD be transferred to MassDOT from the Town of Sudbury to MassDOT as they are the property owner. The proposed activities to construct the BFRT would be analyzed in a separate Notice of Intent prepared by MassDOT as the Applicant under the WPA.

This Request was prepared in accordance with the Massachusetts Wetland Protection Act (MGL c.131 s.40) and implementing Regulations (310 CMR 10.00). This Amendment Request is being submitted for the Commission's review at the next available public hearing on June 29, 2020. If the Commission would like to conduct a site walk prior to that date or has any questions regarding this request, please do not hesitate to contact me at Timothy.Dexter@state.ma.us.

Sincerely,



Tim Dexter
Fish & Wildlife Supervisor
MassDOT Highway Division

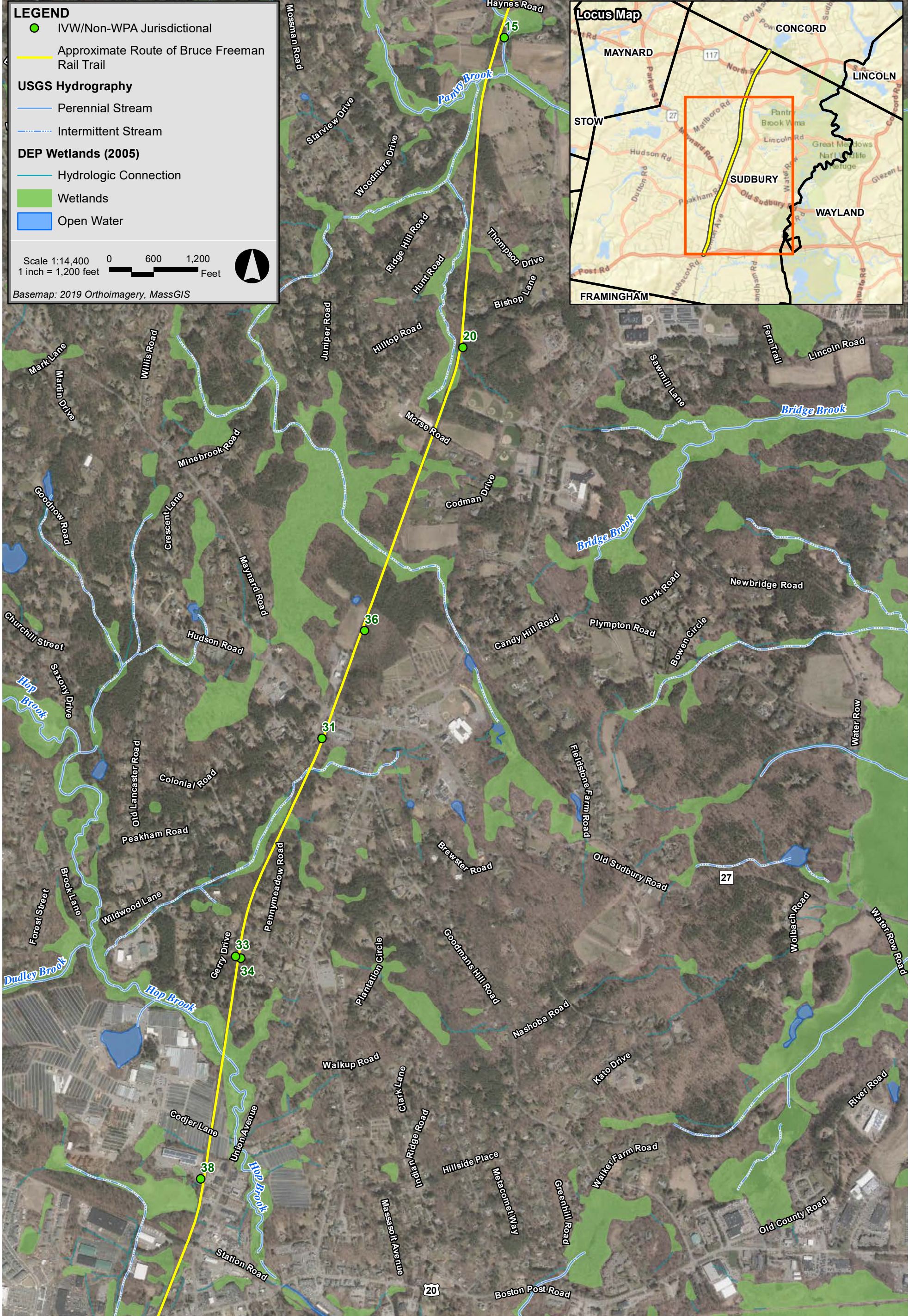
cc: DEP NERO

Attachments

- Attachment A – Figures
- Attachment B – Stream Stats results
- Attachment C – Vernal Pool Surveys

Attachment A - Figure 1

Isolated Vegetated Wetland Locations



Bruce Freeman Rail Trail Sudbury, Massachusetts

Attachment B

USGS Stream Stats Results

StreamStats Report

Region ID: MA

Workspace ID: MA20200514184801479000

Clicked Point (Latitude, Longitude): 42.41684, -71.40201

Time: 2020-05-14 14:48:17 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.000463	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	1.56	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.000463	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	1.56	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
-----------	-------	------

Low-Flow Statistics Citations

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.3.11

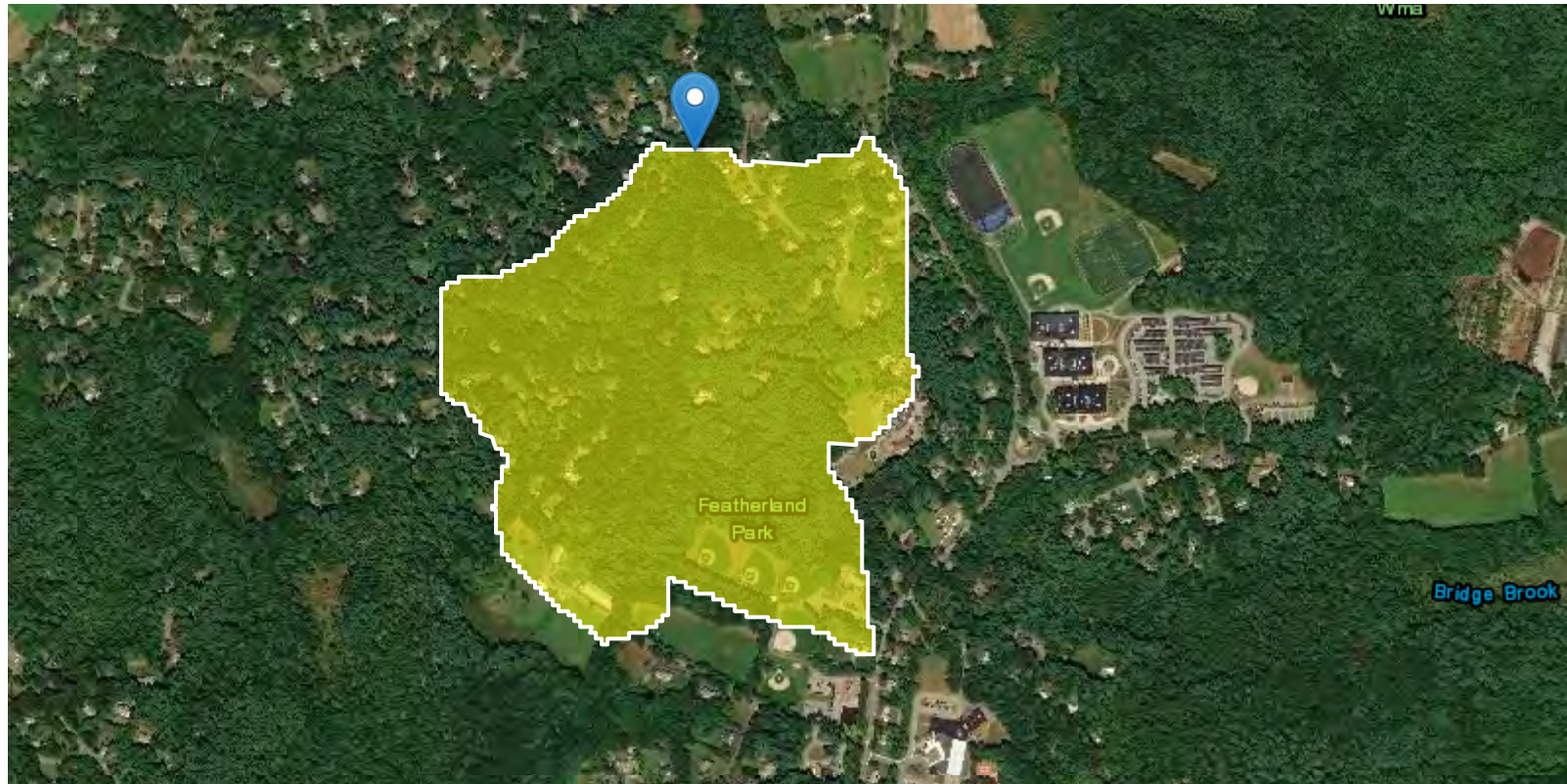
StreamStats Report

Region ID: MA

Workspace ID: MA20200514191833515000

Clicked Point (Latitude, Longitude): 42.40107, -71.40860

Time: 2020-05-14 15:18:49 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.22	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	4.488	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.23	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.22	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	4.488	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.23	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0182	ft ³ /s
7 Day 10 Year Low Flow	0.00796	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.3.11

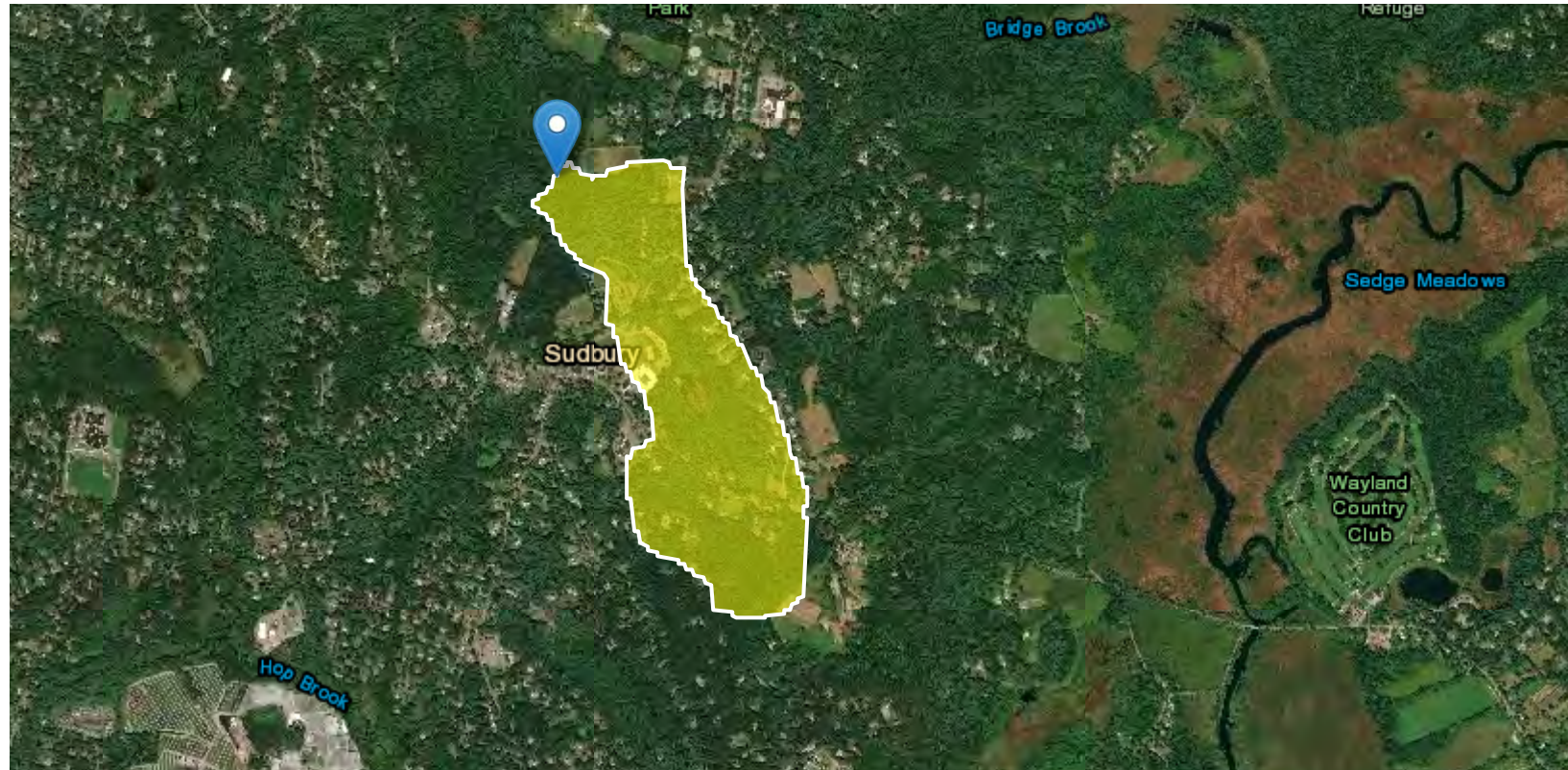
StreamStats Report

Region ID: MA

Workspace ID: MA20200514195811116000

Clicked Point (Latitude, Longitude): 42.38901, -71.41281

Time: 2020-05-14 15:58:28 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.31	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	3.67	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.0607	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.31	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	3.67	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.0607	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors
 One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0137	ft ³ /s
7 Day 10 Year Low Flow	0.00458	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

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Application Version: 4.3.11

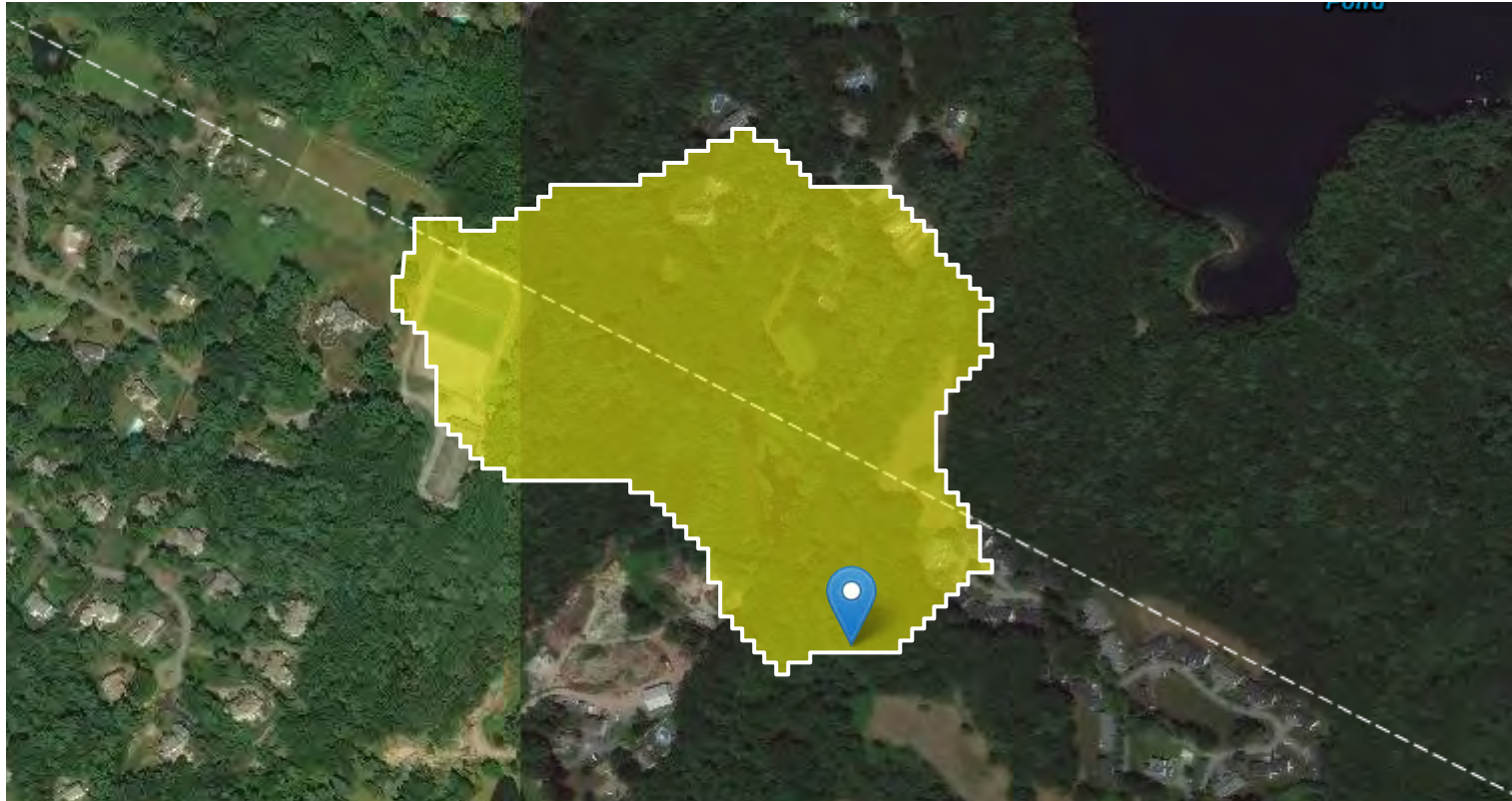
StreamStats Report

Region ID: MA

Workspace ID: MA20200514183759447000

Clicked Point (Latitude, Longitude): 42.42248, -71.39637

Time: 2020-05-14 14:38:15 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0599	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.973	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.0938	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0599	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.973	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.0938	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00236	ft ³ /s
7 Day 10 Year Low Flow	0.00075	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

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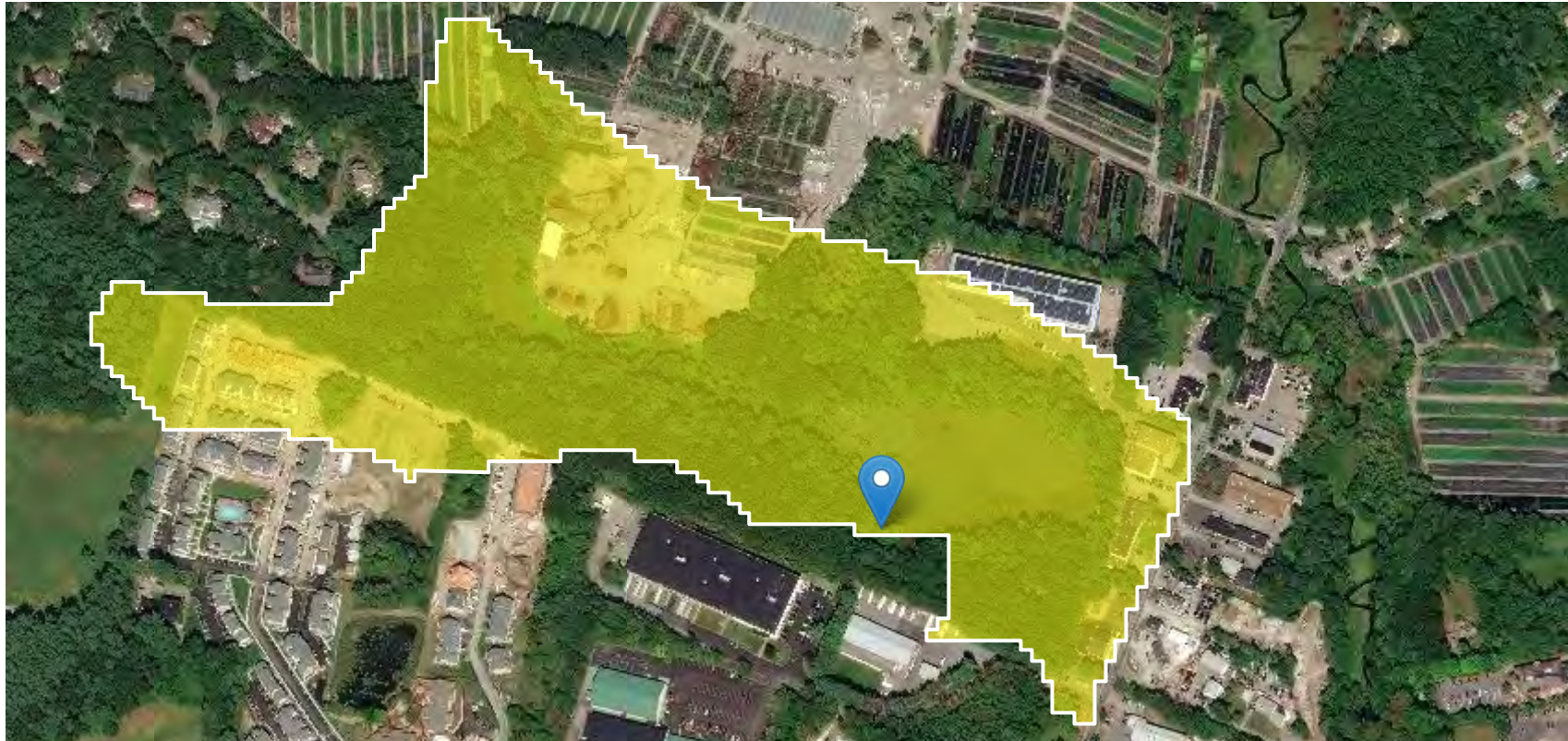
StreamStats Report

Region ID: MA

Workspace ID: MA20200514200930136000

Clicked Point (Latitude, Longitude): 42.36455, -71.42467

Time: 2020-05-14 16:09:46 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.1	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	0.27	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.41	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.1	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	0.27	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.41	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00504	ft ³ /s
7 Day 10 Year Low Flow	0.00125	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

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Application Version: 4.3.11

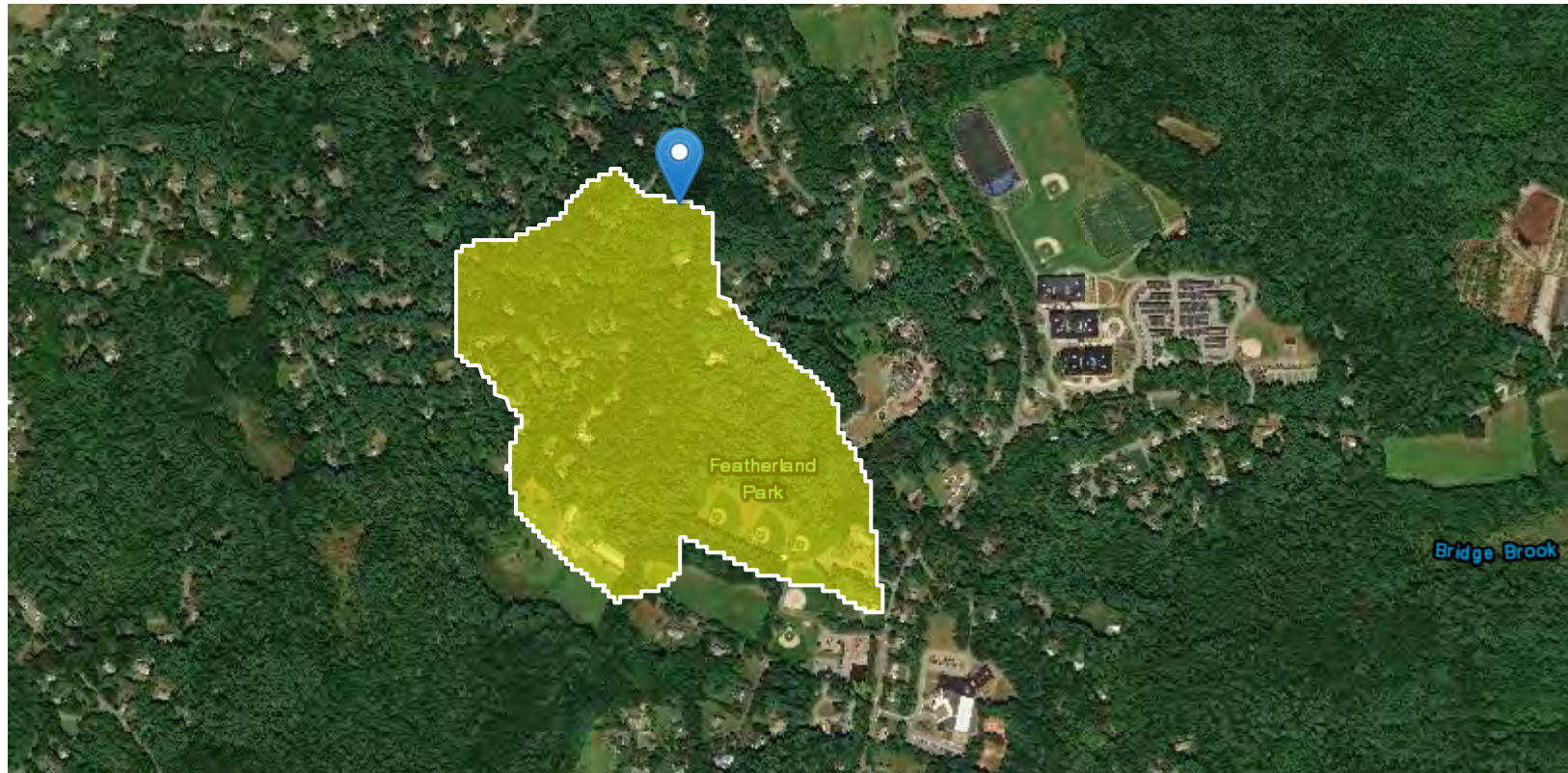
StreamStats Report

Region ID: MA

Workspace ID: MA20200514192159770000

Clicked Point (Latitude, Longitude): 42.39961, -71.40918

Time: 2020-05-14 15:22:16 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.15	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	4.861	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.18	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.15	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	4.861	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.18	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0105	ft ³ /s
7 Day 10 Year Low Flow	0.00436	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

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Application Version: 4.3.11

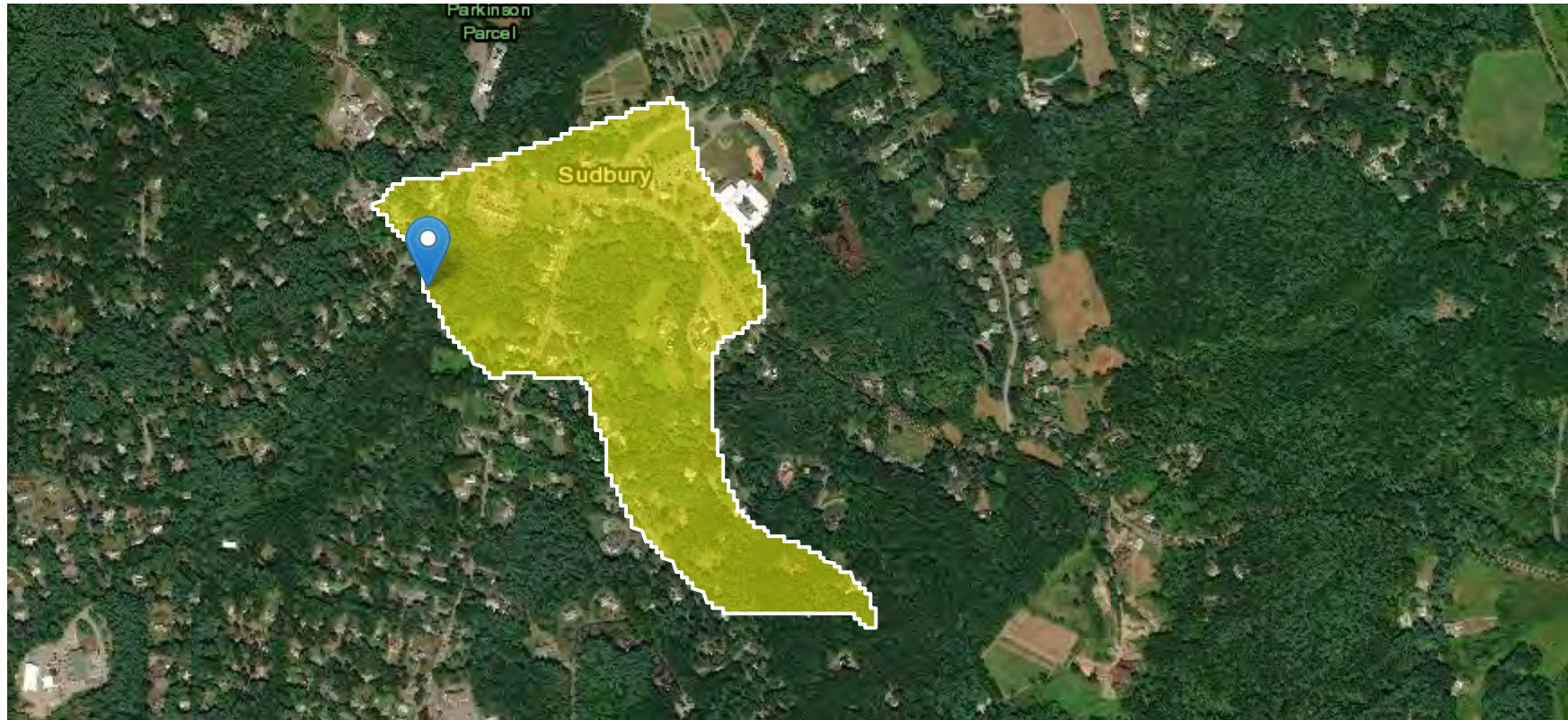
StreamStats Report

Region ID: MA

Workspace ID: MA20200514200455222000

Clicked Point (Latitude, Longitude): 42.38092, -71.41651

Time: 2020-05-14 16:05:11 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.16	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.589	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.000877	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.16	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.589	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.000877	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00395	ft ³ /s
7 Day 10 Year Low Flow	0.00102	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

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Application Version: 4.3.11

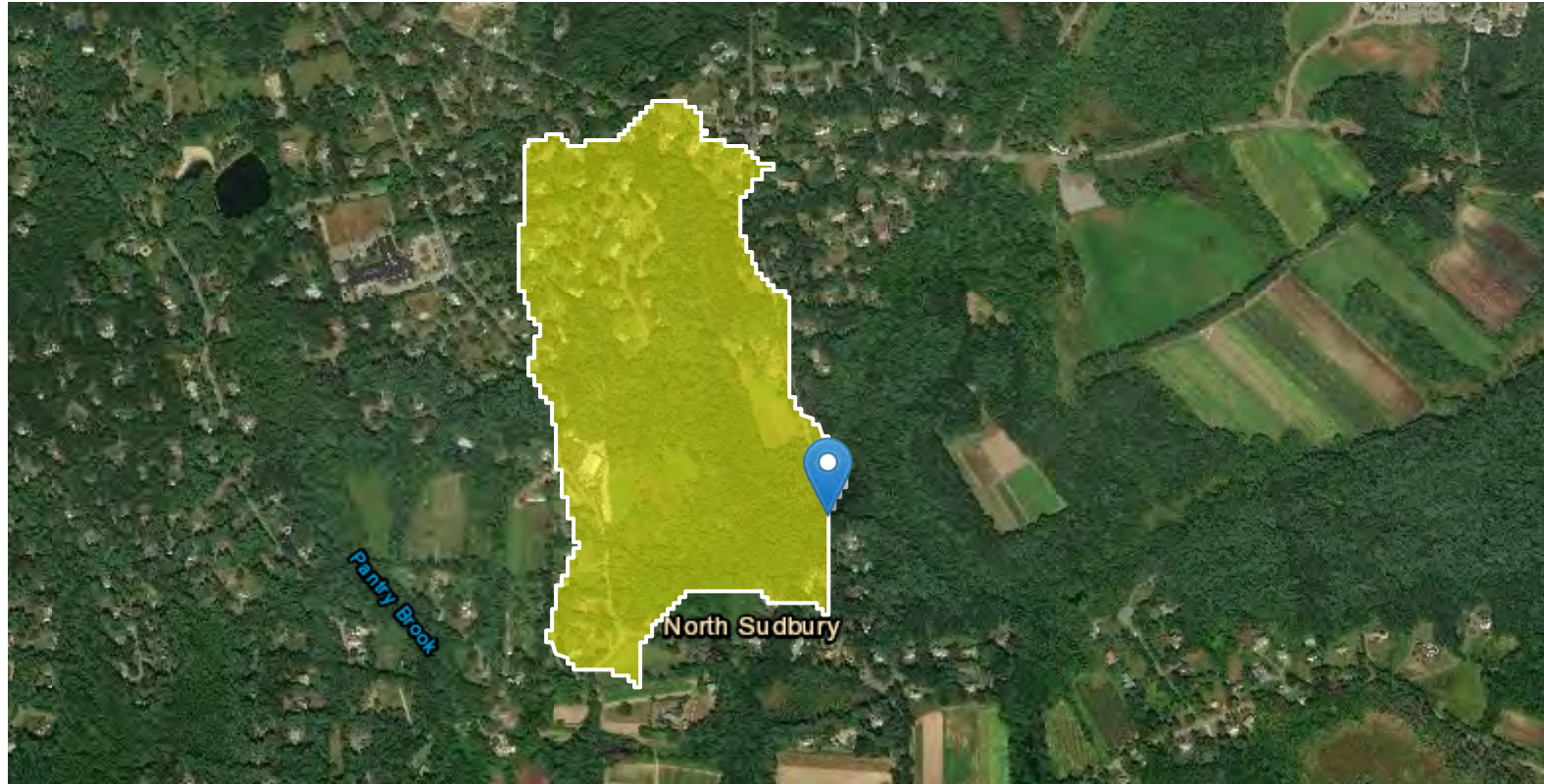
StreamStats Report

Region ID: MA

Workspace ID: MA20200514190649965000

Clicked Point (Latitude, Longitude): 42.41173, -71.40523

Time: 2020-05-14 15:07:05 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.16	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	1.946	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.35	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.16	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	1.946	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.35	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Disclaimers^[Statewide Low Flow WRIR00 4135]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0132	ft ³ /s
7 Day 10 Year Low Flow	0.00514	ft ³ /s

Low-Flow Statistics Citations

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (<http://pubs.usgs.gov/wri/wri004135/>)

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Application Version: 4.3.11

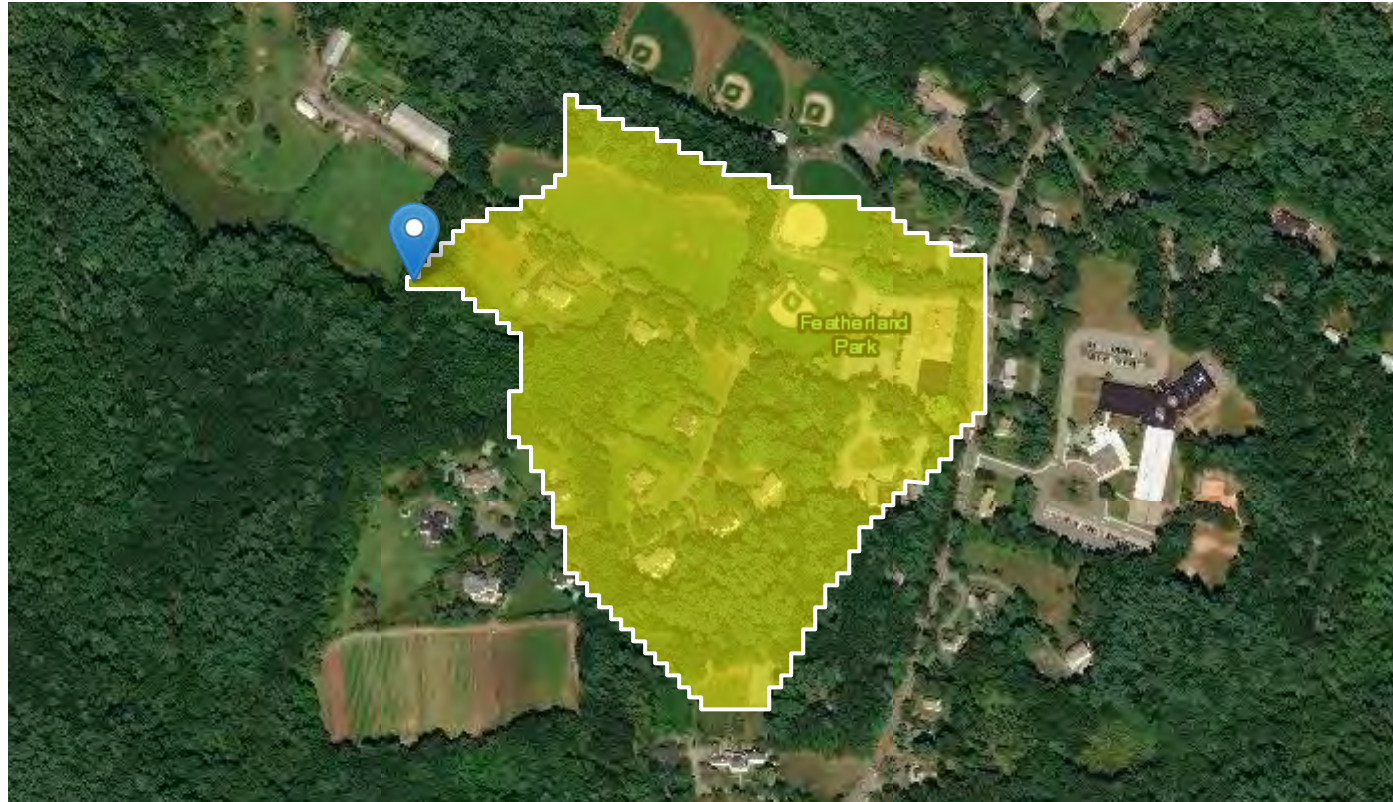
StreamStats Report

Region ID: MA

Workspace ID: MA20200514194929069000

Clicked Point (Latitude, Longitude): 42.39274, -71.41078

Time: 2020-05-14 15:49:46 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0587	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	1.79	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0587	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	1.79	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
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Low-Flow Statistics Citations

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Application Version: 4.3.11

StreamStats Report

Region ID: MA

Workspace ID: MA20200514192955671000

Clicked Point (Latitude, Longitude): 42.39373, -71.41025

Time: 2020-05-14 15:30:12 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
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Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.000154	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM		percent
DRFTPERSTR	Area of stratified drift per unit of stream length	-100000	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters^[Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.000154	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM		percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	-100000	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Flow Report^[Statewide Low Flow WRIR00 4135]

Statistic	Value	Unit
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Low-Flow Statistics Citations

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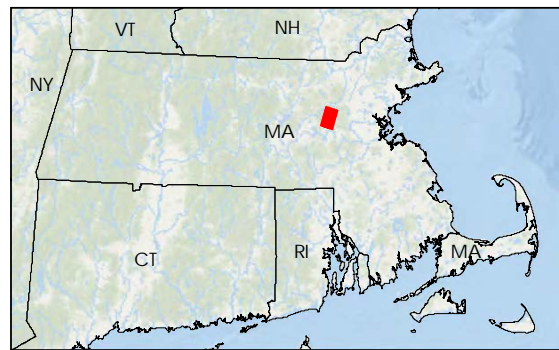
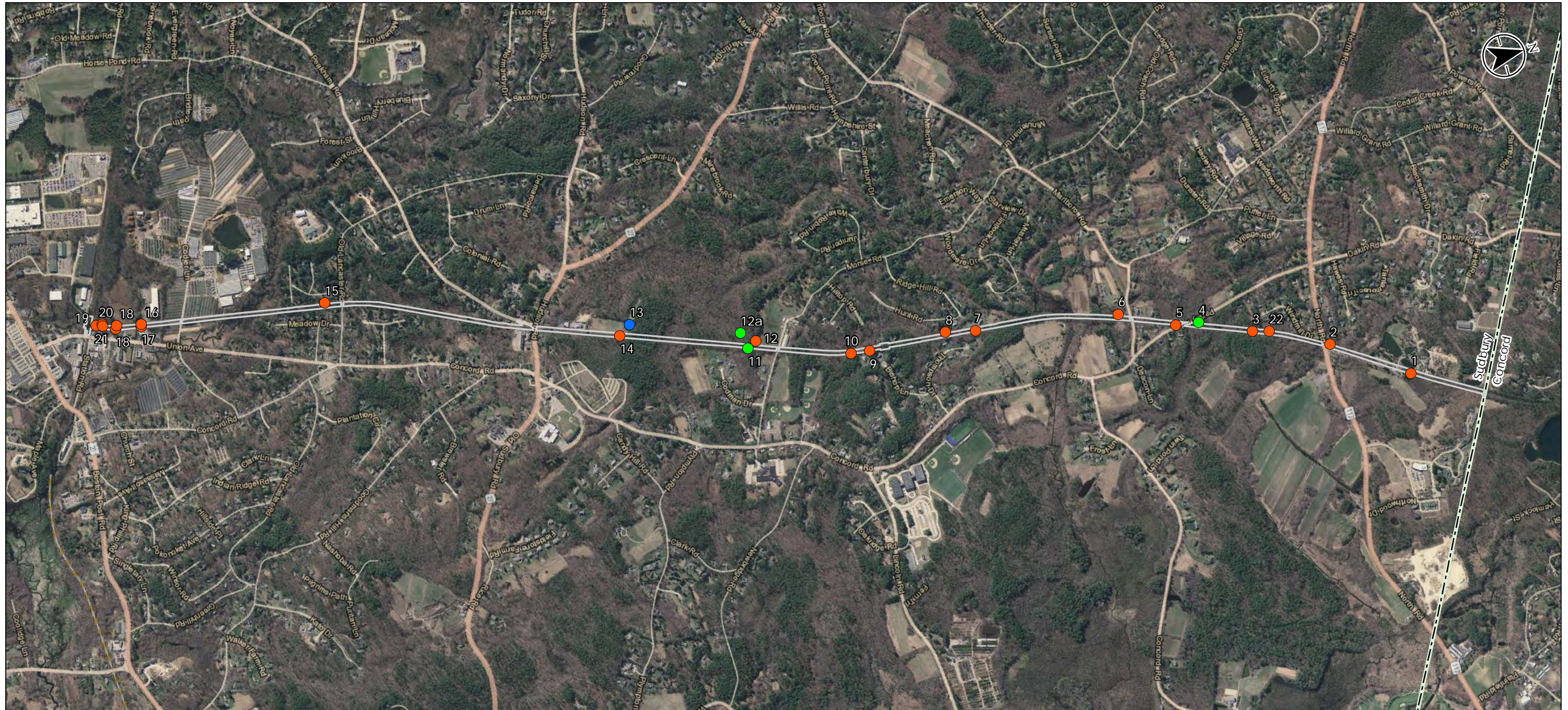
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Application Version: 4.3.11

Attachment C

Vernal Pool Investigations
Prepared by VHB and Stantec



- Legend**
- Vernal Pool Location
 - NHESP Certified Vernal Pool
 - Eligible to be Certified by NHESP
 - Not Eligible to be Certified by NHESP
 - Town Boundary
 - Sudbury Rail Trail

- Data Sources**
1. Vernal pools 1 - 19 were digitized from the Existing Conditions Survey Plan At Proposed Rail Trail in Sudbury Mass., prepared by Atlantic Engineering and Survey Consultants Inc., dated June 30, 2008.
 2. Potential Vernal Pools 12a, 20 - 22 were located by Stantec on 4/17/2018 and 4/18/2018.
 3. Sudbury Rail Trail provided by MassGIS Sudbury parcel data layer.

0 1,000 2,000 Feet
1:20,000 (At original document size of 11x17)



Project Location: Sudbury, Massachusetts
179410498
Prepared by GC on 2018-05-01
Reviewed by DN on 2018-05-01

Client/Project: Sudbury Rail Trail

Figure No.: 1
Title: 2018 Potential Vernal Pool Survey

- Notes**
1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001
 2. Orthoimagery: MassGIS 2013-2014 USGS Color Orthoimagery

Table 1. Vernal Pool Survey Results: 2015, 2017 & 2018: Bruce Freeman Rail Trail, Sudbury, Massachusetts

2015	VHB		2017	VHB		2018	Stantec	
	Water Depth (in)	Findings		Volume (>200 cubic ft.)	Findings		Water Depth (in)	Findings
PVP 1	<1	No VP species found.	PVP 1	Yes	No VP species found.	PVP 1	2	No VP species found.
PVP 2	24-48	No VP species found.	PVP 2	Yes	No VP species found.	PVP 2	25	No VP species found.
PVP 3	2-3	No VP species found.	PVP 3	Yes	No VP species found.	PVP 3	8	No VP species found.
PVP 4	6-15	1 wood frog egg mass and 2 spotted salamander egg masses	PVP 4	Yes	12 wood frog egg masses, 100+ wood frog tadpoles, and 1 dead adult wood frog	PVP 4	12	Appx. 20 wood frog egg masses.
PVP 5	2-12	No VP species found. 1 predacious diving beetle observed.	PVP 5	No	No VP species found.	PVP 5	20	No VP species found.
PVP 6	2-6	No VP species found. Direct outlet to adjacent stream	PVP 6	Yes	No VP species found.	PVP 6	12	No VP species found. Pooled area in stream floodplain and fish observed.
PVP 7	6-8	No VP species found. Limited opportunity for egg mass attachment.	PVP 7	No	No VP species found.	PVP 7	11	No VP species found.
PVP 8	2-3	No VP species found. Water was flowing through area instead of ponding due to topography.	PVP 8	Yes	No VP species found. 1 adult green frog found.	PVP 8	0	No VP species found. Stream floodplain with no discernable pool boundary or pooled area.
SVP 9 ¹	2-5	No VP species found.	SVP 9 ¹	Yes	No VP species found.	SVP 9 ¹	24	2 dead salamanders; lead phase of eastern red-backed salamander (NHESP confirmed species identification).
PVP 10	0	No VP species found. Area was dry at time of inspection.	PVP 10	No	No VP species found.	PVP 10	0	No VP species found; area dry at time of inspection.
PVP 11	10-12	8 spotted salamander egg masses. Appx. 5 small (4in) fish swimming near some of the egg masses.	PVP 11	Yes	1 dead adult wood frog.	PVP 11	11	20 mole salamander spermatophores.
PVP 12	12-24	No VP species found. Limited opportunity for egg mass attachment.	PVP 12	Yes	No VP species found. Limited opportunity for egg mass attachment (2015 results).	PVP 12	>12	Farm pond beyond fence noted in 2015 and 2017. Expected to be permanent wetland.
						PVP 12a ^{2, 4}	10	9 wood frog egg masses.
CVP 13 ³	5-24	15+ spotted salamander egg masses, 15+ blue spotted salamander egg masses, 10+ wood frog egg masses found.	CVP 13 ³	Yes	15+ spotted salamander egg masses, 15+ blue spotted salamander egg masses, 15+ fairy shrimp.	CVP 13 ³	>36	52 spotted salamander egg masses, 73 blue-spotted salamander egg masses, 72 wood frog egg masses, and fairy shrimp.
PVP 14	4-6	No VP species found.	PVP 14	Yes	1 dead adult blue spotted salamander found. No other VP species found.	PVP 14		No VP species found.
PVP 15	4-18	1 wood frog egg mass found. No other signs of VP species.	PVP 15	No	No VP species found. No water present at time of inspection.	PVP 15	18	No VP species found.
PVP 16	2-10	No VP species found (10 wood frog egg masses found on 4/22/15).	PVP 16	Yes	No VP species found.	PVP 16		No VP species found.
PVP 17	0-6	No VP species found. Oil sheen present throughout isolated wetland.	PVP 17	No	No VP species found.	PVP 17	24	1 wood frog egg mass.
PVP 18	0-12	No VP species found.	PVP 18	Yes	No VP species found.	PVP 18	32	Intermittent spring peeper calls.
PVP 19	0	No VP species found. Area was dry at time of inspection.	PVP 19	Yes	No VP species found.	PVP 19	16	No VP species found.
						PVP 20 ⁴	6	1 adult gray treefrog.
						PVP 21 ⁴	16	No VP species found.
						PVP 22 ⁴	8	No VP species found.

Bold text were identified as eligible for NHESP certification.

Notes: ¹ Previously identified as Subdbury Vernal Pool.

² Potential Vernal Pool surveyed in 2018 and located south of the PVP 12 surveyed in 2015 and 2017.

³ Previously Certified by NHESP.

⁴ New Potential Vernal Pool identified in 2018.



**General Wildlife Habitat
Assessment Report**

Bruce Freeman Rail Trail
Sudbury, Massachusetts

Wildlife Habitat Assessment Relative to
the 25% Design Submittal dated
November 2016

April 8, 2020

Prepared for:

Massachusetts Department of
Transportation

Prepared by:

Stantec Consulting Services Inc.

April 8, 2020

Table of Contents

1.0	INTRODUCTION	1
2.0	METHODOLOGY	1
2.1	EXISTING DATA REVIEW	1
2.1.1	25% Design Submittal and Preliminary Resource Area Impacts.....	2
2.2	FIELD ASSESSMENT.....	2
3.0	RESULTS	4
3.1	EXISTING DATA REVIEW	4
3.2	FIELD ASSESSMENT RESULTS.....	7
3.2.1	Wildlife Observations	8
4.0	EVALUATION OF ADVERSE EFFECT	10
5.0	ADDITIONAL DESIGN CONSIDERATIONS AND RECOMMENDATIONS	11
6.0	REFERENCES	12

LIST OF TABLES

Table 1. Existing Natural Resource Data Review, Bruce Freeman Rail Trail, Sudbury, Massachusetts	5
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LIST OF FIGURES

- Figure 1 Project Location Map
- Figure 2a Natural Resources Data Review National Heritage Resources
- Figure 2b Natural Resources Data Review MassDEP Resources and FEMA National Flood Hazard
- Figure 2c Natural Resources Data Review Open Space

LIST OF APPENDICES

APPENDIX A	25% DESIGN SUBMITTAL	A.1
APPENDIX B	PRELIMINARY IMPACT TABLES	B.1



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

1.0 INTRODUCTION

On behalf of the Massachusetts Department of Transportation (MassDOT), Stantec Consulting Services Inc. (Stantec) performed a general wildlife habitat assessment for the proposed Bruce Freeman Rail Trail (BFRT; Project) located in Sudbury, Massachusetts, between the driveway to Chiswick Park off Union Avenue north to the Concord town line. The approximately 4.6-mile-long trail is proposed along the former Lowell Secondary Track of the Old Colony Rail Road that operated between Lowell and Framingham, Massachusetts (Figure 1). The right of way (ROW) is presently owned by MassDOT. In light of recent efforts in neighboring towns to rehabilitate the former railroad ROW as a rail trail, the Town of Sudbury (Town) is considering rehabilitation of the ROW in Sudbury to interconnect with trails in adjacent towns (Fay, Spofford, and Thorndike 2006).

The wildlife habitat assessment described herein considered the proposed impacts per 25% Design Submittal dated November 16, 2017, to wetland resource areas subject to the Massachusetts Wetlands Protection Act regulations (310 CMR; WPA) and relative to the guidance of the 2006 *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands* (Guidance)¹ developed by the Massachusetts Department of Environmental Protection (MassDEP). Stantec Certified Wildlife Biologists (CWB), Daniel Nein and Rodney Kelshaw, performed the wildlife habitat assessment following review and approval of professional qualifications by the Sudbury Conservation Commission.

The assessment included a desktop review of publicly available natural resource data, including Massachusetts Geographic Information Systems (MassGIS), prior to the field survey and a wildlife habitat field assessment conducted October 1–2, 2018. MassDOT Environmental Services staff participated in the field assessment on October 1, 2018.

2.0 METHODOLOGY

Methodology is described below for the data review and field survey associated with the general wildlife habitat assessment at the Project.

2.1 EXISTING DATA REVIEW

Stantec reviewed publicly available natural resource data from MassGIS to evaluate the potential presence or absence of resources and to identify specific areas of potential unique ecological value to target during the field assessment. The MassGIS data review included federal and state wetlands and waterways, open space, aerial photography, Areas of Critical Environmental Concern, Federal Emergency Management Agency (FEMA) flood zones, Coldwater Fisheries Resources, Massachusetts Natural Heritage and Endangered Species data, University of Massachusetts (UMass), and surface and wellhead drinking water supplies. The UMass Conservation Assessment and Prioritization System (CAPS) data for the Town was also reviewed. This wildlife habitat assessment also considered the results

¹ MassDEP. 2006 *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands* is available at: <http://umasscaps.org/pdf/wldhab.pdf>.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

of the previous wildlife habitat assessment performed by Call of the Wild Consulting in 2009 (Call of the Wild 2009) and vernal pool surveys performed by Stantec and other consultants between 2015 and 2018 (Stantec 2018), the results of which are summarized herein.

2.1.1 25% Design Submittal and Preliminary Resource Area Impacts

The existing data review also considered the 25% Design Submittal prepared by Vanasse Hangen Brustlin, Inc. (VHB) dated November 17, 2016 (Appendix A), and the associated wetland resource area impact tables for floodplain, Bordering Vegetated Wetland (BVW), and Bank dated September 25, 2017 (Appendix B).

2.2 FIELD ASSESSMENT

Following the completion of the existing data review, Stantec CWBs performed the field assessment along the full length of the proposed BFRT in Sudbury to evaluate general wildlife habitat and potential for Project adverse effect relative to the Guidance. The Guidance was referenced to determine each wetland resource area to assess, followed by a determination of the impact being above or below the “significance” threshold to identify the appropriate field data form (i.e., Guidance’s Appendix A or B). The results of field form for each wetland resource area were used to assess whether or not the Project will adversely affect wildlife habitat.

Based on the preliminary wetland resource area impact calculations prepared by VHB (Appendix B) and our interpretation of the Guidance, Appendix A of the Guidance was used as the field data form when evaluating wetland resource areas where impact was proposed based on the 25% Design Submittal. Appendix A provides a simplified evaluation of small-scale alterations to ensure protection for certain “important habitat features” and identify projects that warrant detailed wildlife habitat evaluations (i.e., Appendix B of the Guidance). Appendix A also was deemed applicable based on the localized nature of proposed impacts based on the 25% Design Submittal. The following is a summary of the proposed wetland resource area impacts that triggered Appendix A of the Guidance.

- The Project proposes 4,681 square feet (sf; 3,670 sf temporary/1,011 sf permanent) of impact to BVW. Appendix A applies when impacts are below 5,000 sf to BVW.
- The Project proposes 1,752 linear ft (lf; 1705 lf temporary/47 lf permanent) of impact to Bank. Appendix A applies when impacts are above 50 lf to Bank.
- The Project proposes to fill approximately 3 cubic yards and cut approximately 73 cubic yards of floodplain/Bordering Land Subject to Flooding. The proposed impacts do not trigger Appendix A, but localized Bank habitat can be important to wildlife, so the wildlife habitat assessment evaluated where impact is proposed to this resource.
- Impacts to Previously Developed Riverfront Areas does not require a wildlife habitat assessment per the Guidance; however, Riverfront can be important to wildlife, so the wildlife habitat assessment considered these areas associated with Hop Brook, the unnamed tributary to Hop Brook, and Pantry Brook.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

Stantec assessed the ROW for the following important habitat features outlined in Appendix A of the Guidance:

- Habitat for state-listed species
- Sphagnum hummocks and pools suitable as nesting habitat for four-toed salamanders
- Trees with large cavities (>18" diameter at entrance)
- Existing beaver, mink, or otter dens
- Areas within 100 feet of existing beaver, mink or otter dens
- Existing nest trees for birds that traditionally reuse nests (bald eagle, osprey, great blue heron)
- Land containing freshwater mussel beds
- Wetland and waterbodies known to contain open water in winter that may serve as waterfowl winter habitat
- Turtle nesting areas
- Vertical sandy banks (bank swallows, rough-winged swallows or kingfishers)

In addition to the above habitat features, the Guidance identifies the following habitat characteristics to evaluate when not commonly encountered in the surrounding area:

- stream bed riffle zones,
- springs,
- gravel stream bottoms (trout and salmon nesting substrate,
- plunge pools (deep holes) in rivers or streams, and;
- medium to large, flat rock substrates in streams.

The activities identified in Appendix A of the Guidance, if proposed within resources areas, that would trigger a detailed wildlife habitat evaluation include:

- Activities located in mapped "Habitat of Potential Regional or Statewide Importance"
- Activities affecting certified or documented vernal pool habitat, including habitat within 100 feet of a certified or documented vernal pool when within another jurisdictional resource area
- Activities in Bank, Land Under Water, Bordering Land Subject to Flooding (presumed significant) where alterations are more than twice the size of thresholds
- Activities affecting vegetated wetlands >5000 sf occurring in source areas other than Bordering Vegetated Wetland
- Activities affecting the sole connector between habitats >50 acres in size



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

- Installation of structures that prevent animal movement
- Activities for the purpose of bank stabilization using hard structure solutions that significantly affect ability of stream channel to shift and meander, or disrupt continuity in cover that would inhibit animal passage, and
- Dredging (>5,000 sf)

The evaluation not only considered Appendix A of the Guidance but additional evidence of wildlife use and potential wildlife habitat not identified on Appendix A and general design recommendations that would avoid, minimize, and mitigate impacts, where deemed applicable, to general wildlife habitat interests protected under the WPA.

3.0 RESULTS

The results of the existing data review and field assessment at the Project are presented below.

3.1 EXISTING DATA REVIEW

The BFRT is proposed along an existing ROW in a suburb of Greater Boston where adjacent primary land uses include residential, commercial / industrial, and open space available for conservation and recreation. Several of these larger open space parcels are owned by the Town and occur near the northern extent of the Project. Commercial / industrial uses primarily occur in the southern extent of the ROW, located south of Codjer Lane and near the Hudson Road (Route 27) and North Road (Route 117) road crossings. The ROW crosses several perennial or intermittent waterways, including Hop Brook and Pantry Brook. We understand the determination of whether a stream is perennial or not may be ongoing and is being performed by others. Wetland areas are present in lower lying areas along the ROW, some of which are associated with riparian areas.

Table 1 below summarizes the natural resource desktop data review and identifies resources within, or immediately adjacent to, the ROW. It is noteworthy that unique ecological communities and high value wildlife habitat requiring regulatory review are not present within or proximal to the Project; these include:

- Critical Habitat for federally listed species,
- Priority or Estimated Habitat for state-listed species or BioMap2 Critical Natural Landscape, or
- Area of Critical Environmental Concern.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

Table 1. Existing Natural Resource Data Review, Bruce Freeman Rail Trail, Sudbury, Massachusetts

Resource Type Within or Immediately Adjacent* to Project	Yes	No
NHESP BioMap2 Core Habitat Core Habitat 1920 (mapped for Species of Conservation Concern)	X	
NHESP Critical Natural Landscape		X
NHESP Priority/Estimated Habitat for state listed species		X
NHESP Potential Vernal Pool (8 PVPs) PVPs 24213, 24206, 24192, 24191, 24159, 24158, 24157, 24155	X	
NHESP Certified Vernal Pool CVP 1428 between Route 27 & Morse Road CVP 2504 between Route 27 & Old Lancaster Road	X	
NHESP Natural Community		X
Area of Critical Environmental Concern		X
Critical Habitat for federally listed species		X
UMass CAPS Habitat of Potential Regional or Statewide Significance	X	
MassWildlife Coldwater Fisheries Resource Hop Brook Unnamed Tributary to Hop Brook	X	
Protected Open Space	X	
MassDEP wetlands	X	
Bicycle Trails	X	
Surface Water Protection Area (Zone A, B, or C)		X
Zone II Wellhead Protection Area	X	
Interim Wellhead Protection Area		X
FEMA National Flood Hazard Area	X	

Notes:

Data is derived from MassGIS with the exception of CAPS data from UMass and Critical Habitat data from USFWS.

* For the purposes of the data review, immediately adjacent is considered as present within 500 feet of the Project ROW.

BioMap2 Core Habitat² (for Species of Conservation Concern) as mapped by the NHESP occurs between Hudson Road (Route 27) and Morse Road (Figure 2a). The Project is not mapped as BioMap2 Critical Natural Landscape, which can overlap with BioMap2 Core Habitat. BioMap2 is intended as a strategic conservation planning tool designed by the by the Massachusetts Department of Fish and Game and Massachusetts Nature Conservancy in 2010 to guide strategic biodiversity conservation to focus land protection and stewardship on areas most critical for ensuring long-term persistence of rare and native species and their habitats, exemplary natural communities, and a diversity of ecosystems and includes

² BioMap2 Core Habitat consists of 1,242,000 acres that are critical for the long-term persistence of rare species and other Species of Conservation Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth. It includes habitats of rare, vulnerable or uncommon species; Priority Natural Communities; high quality wetland, vernal pool, aquatic, and coastal habitats; and intact forest ecosystems.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

the habitats and species of conservation concern identified in the State Wildlife Action Plan. When the NHESP updated Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife mapping in 2017 for the 14th Edition of the Natural Heritage Atlas, which are regulatory maps used for review under Massachusetts Endangered Species Act (MESA and WPA, respectively), the Project was not mapped within or proximal to either habitat. It is possible that the BioMap2 Core Habitat from 2010 overlapping the Project was due to the inclusion of NHESP Priority Habitat mapping that predated the 14th Edition of the Natural Heritage Atlas.

Two generally small areas, which are adjacent to but not within the Project, have been modeled by the UMass Conservation and Assessment Prioritization System (CAPS)³ and are mapped as Habitat of Potential Regional or Statewide Importance⁴. The first is the existing CVP noted above and surrounding forest immediately west of the ROW between Hudson Road and Morse Road, and second is small open water wetland/PVP and shoreline area immediately west of the ROW near the Sudbury-Concord town line (Figure 2a). When areas modeled by CAPS occur within jurisdiction of the WPA, they are subject to the Guidance.

Hop Brook and an unnamed tributary to Hop Brook are designated as Coldwater Fisheries Resources by Massachusetts Division of Fisheries and Wildlife (MassWildlife) (Figure 2b). Wellhead Protection Areas, Zone IIs, occur at the northern and southern extents of the ROW (Figure 2b). The nearest Surface Water Protection Areas associated with Cambridge Reservoir and surrounding waterbodies of the Charles River Watershed are located in the adjacent towns of Lincoln, Weston, and Waltham. FEMA Floodzones can be generally associated with low-lying areas at waterway crossings and wetlands.

There are two National Wildlife Refuges (NWR) (2,480 acres), one state Wildlife Management Area (WMA, 411 acres), two State Forests (~1,630 acres), one municipal state forest (289 acres) and multiple other open space parcels located within 5 miles of the Project. The boundaries of the Pantry Brook State Park WMA and Great Meadows NWR are located approximately 1,100 feet and 2,100 feet east of the ROW, respectively (Figure 2c). The boundary of the Marlborough-Sudbury State Forest, Callahan State Forest, Memorial Forest, and Assabet River NWR are located approximately 2 miles west or southwest of the ROW. Non-federal or state protected open space within a mile of the ROW includes Mineway Brook Corridor, Brues Woods, Gray Reservation, and Emmons Conservation Restriction (Figure 2c). Using data publicly available through MassGIS, greater than 30% and more than 25,000 acres of the land area within a 5-mile buffer of the ROW is currently protected open space.

Mapped vernal pool habitat (Potential or Certified Vernal Pools, PVP and CVP, respectively) are present in low density and scattered along and generally proximal to the ROW. At a landscape scale, vernal pools are more common in other parts of Sudbury and nearby towns. Several PVPs are generally present in the northern extent of the ROW and two CVPs have been identified in the southern extent of the ROW (Figure 2a). Under WPA, vernal pool habitat protection includes the vernal pool and the 100-foot zone around the vernal pool when located within a wetland resource area.

³ CAPS is an ecosystem-based (coarse-filter) approach for assessing the ecological integrity of lands and waters and subsequently identifying and prioritizing land for habitat and biodiversity conservation.

⁴ Areas representing the 40% of the landscape with the highest potential wildlife habitat value as measured by CAPS, and applicable to the MassDEP Guidance when within the jurisdiction of WPA.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

The ROW is mapped as a Bicycle Trail, which is a MassGIS data layer representing trails where bicycles are a permitted use and corridors with conversion potential. The mapping in Sudbury connects with the Bicycle Trail mapping in adjacent towns of Concord and Framingham. The Massachusetts Department of Conservation and Recreation created this data layer for the purpose of regional planning and mapping.

Call of the Wild Consulting performed a wildlife habitat assessment between 2007 and 2008 in response to the Town's request for a comprehensive four-season wildlife habitat assessment (Call of the Wild 2009). Wildlife habitat assessment results, evidence of species use, and recommendations were provided in 2009.

3.2 FIELD ASSESSMENT RESULTS

A two-day field survey was conducted on October 1–2, 2018 to evaluate general wildlife habitat conditions, wildlife use, and direct observations of wildlife species within and near delineated wetland resource areas within the ROW that may be adversely affected by the Project. MassDOT Environmental Services staff participated in the field assessment on October 1, 2018. Stantec's wildlife habitat assessment was subsequent to the wetland delineation conducted by VHB in 2015-2016 that supported development of the 25% Project Design Submittal. This evaluation is based on the 25% Project Design Submittal and proposed impacts at this early stage should continue to be evaluated as the Project design advances in an effort to further avoid and minimize the possibility of adverse effect to not only general wildlife habitat, but the other interests protected under the WPA.

As noted in Section 3.1, the ROW traverses a suburban setting with adjacent areas of protected open space, past/current agricultural use, and commercial/industrial businesses. Representative and dominant ecological communities which were observed adjacent to the ROW included variants of the Mixed Oak Forest/Woodland, White Pine-Oak Forest, and Red Maple Swamp as described in the *Classification of Natural Communities of Massachusetts* (Swain 2016). These communities are widespread and considered common and secure in Massachusetts. The encroachment of commercial and residential land uses within the ROW has occurred over time. The ROW is approximately 65 feet wide for most of its length and is predominantly a wooded corridor passing through multiple wetland areas, including vegetated wetlands, perennial/intermittent streams, and associated floodplain. Wetland areas are previously disturbed or presumed to be an artifact or, at a minimum, influenced hydrologically by the original ROW construction. The vegetated wetlands where temporary or permanent impacts are proposed generally occur at the toe of slope or near the edge of the rail bed. A further description of the wetland resource areas can be found in the VHB wetland report.

Within the ROW, the existing railbed (i.e., the earthen area containing the tracks and ties), is of variable width as a result of adjacent cut and fill slopes among other variables. The track, wooden ties, and ballast are visible along the ground surface over much of the ROW. A buildup of a shallow duff and/or soil layer over areas of ballast has occurred over time, allowing the colonization of some rooted native species; however, the dominant species are predominately invasive plant species within the ROW. It can be inferred that the initial construction of the rail bed involved the use of off-site and on-site fill material, which may have created depressions or lower lying areas and additionally caused soil compaction.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

Portions of the ROW less frequented by pedestrian foot traffic in the northern section are heavily overgrown with dense shrubbery and vines. Overall, invasive species are common throughout, including: glossy buckthorn (*Frangula alnus*), Oriental bittersweet (*Celastrus orbiculatus*), and honeysuckle (*Lonicera spp.*), with occasional occurrences of winged euonymus (*Euonymus alatus*) and Japanese barberry (*Berberis thunbergii*), and with common reed (*Phragmites australis*) frequent in wetland resource areas.

3.2.1 Wildlife Observations

The mosaic of the wooded corridor interfacing with seasonal and permanent wetlands and small waterways represents habitat for a variety of wildlife species and their uses (e.g., foraging, breeding, shelter, nesting), including representative and regionally common species expected for a suburban or urban area. However, less common or rare species are also documented from nearby state WMAs and NWFs and possibly other open space or protected areas noted in section 3.1. For example, Blanding's turtle (*Emydoidea blandingii*), state-listed and candidate for federal listing, and spotted turtle (*Clemmys guttata*), previously state-listed, are known inhabitants at Great Meadows NWF. The closest NHESP documented occurrence of a state-listed rare species to the Project is blue-spotted salamander (*Ambystoma laterale*) observed at the previously certified CVP 1428 located just beyond 100 feet west of station 336+00, which is further described below in the Vernal Pool Survey section as CVP #13. Direct observations of wildlife species presence within the ROW primarily included common or generalist species typical of a suburban and forested landscape such as the conditions present at the Project and those in areas of eastern Massachusetts and the region. No state-listed or federally listed species were observed within the ROW during the assessment.

Mammals

Evidence of the wildlife species at the Project in part included mammals such as white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), and red squirrel (*Tamiasciurus hudsonicus*). Open portions of the ROW provide ease of travel for mammalian species, while overgrown areas provide cover or shelter in addition to functioning as a potential travel corridor.

Evidence of prior beaver (*Castor canadensis*) activity (>5 years) within the ROW was noted in three areas and included stumps of hardwood species with evidence of beaver chew near the existing Hop Brook crossing. Inactive heavily deteriorated bank dens in the embankment close to the toe of slope at stations 264+00 near Pantry Brook and 477+00 near the open wetland modeled by CAPS were likely historically used by beaver or possibly river otter (*Lontra canadensis*). Within the ROW, including areas of proposed wetland impact, there were no observations of evidence of recent or current use by beaver, American mink (*Neovison vison*), or river otter. Riparian and open water habitat that would be considered suitable to support these species is limited at the Project, with the most likely exception of Hop Brook and Pantry Brook.

The presence of small mammal populations and additional larger mammals such as grey fox (*Urocyon cinereoargenteus*), raccoon, and other species using the ROW and adjacent areas, as reported by the Call of the Wild 2009, is anticipated given available suitable habitat to support these species.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

A potential bat roost tree was identified near station 171+30 where an impact is proposed within a wetland resource area; however, potential roost trees were observed beyond the ROW and broader potential bat roost habitat, including mature trees, is expected to be common on the landscape. The spread of White Nose Syndrome has detrimentally impacted bat populations in the northeast United States.

Birds

Representative avian species such as red-tailed hawk (*Buteo jamaicensis*), American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), turkey (*Meleagris gallopavo*), black-capped chickadee (*Penthestes atricapillus*), gray catbird (*Dumetella carolinensis*), nuthatches (*Sitta* sp.), and several woodpeckers (*Picoides* sp.) were also observed at the Project. A pair of mallard ducks (*Anas platyrhynchos*) were observed in the open water wetland near the Sudbury/Concord town line. This area was modeled by CAPS and represents a small open water habitat for waterfowl and other bird species that is anticipated to freeze annually during winter months, unlike other larger open water habitats less likely to freeze in nearby WMAs and NWFs. Additional avian species anticipated to use the ROW and adjacent landscape include neotropical migrants and resident species typical of suburban forested and partially fragmented landscapes. The ROW provides an open corridor for avian travel and foraging, while overgrown areas provide increased cover, shelter, and nesting habitat, although these habitats are primarily located outside of jurisdictional areas. These types of habitats are not limited to the ROW and are expected to be abundant in the surrounding landscape.

Fisheries and Mussels

Hop Brook and an unnamed tributary to Hop Brook are designated as Coldwater Fisheries Resources by MassWildlife. Attributes of Coldwater Fisheries Resources include high water quality, natural flow regimes, cold water temperatures (less than 68°F), largely intact riparian area, and watershed connectivity. Hop Brook, the unnamed tributary to Hop Brook and additional potential perennial and intermittent streams were evaluated for the presence of fisheries and mussel habitat, including the habitat features and considerations identified in Appendix A.

The in-stream conditions at the existing Hop Brook crossing and nearby unnamed tributary to Hop Brook indicate a perennial condition with a sand and sparse gravel streambed with moderate shoreline and submerged aquatic vegetation. Habitat conditions are anticipated to support coldwater species where the ROW crosses these waterways. Species such as brook trout (*Salvelinus fontinalis*), dace (*Rhinichthys* spp.), and white suckers (*Catostomus commersonii*) may be present in small densities and are examples of species that would need to be documented to designate the waterway as a Coldwater Fisheries Resource by MassWildlife.

In-stream conditions at the Pantry Brook crossing include a higher percentage of muck/organic material in the substrate. Water quality is not expected to be as high in this area compared to Hop Brook and high water quality is needed to support coldwater species; however, habitat could support some warmwater species.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

Conditions at and near each perennial waterway crossing did not appear suitable (e.g., substrate, depth) for mussel beds, nor was there evidence of the predation of mussels, such as empty shells, which is also an indication of species presence.

There is the potential for mussel beds, and plunge pools and gravel dominated substrates suitable for fish spawning to be present further up or downstream of the areas assessed for the Project. The designation of Coldwater Fisheries Resources for waterways at the Project indicates suitable conditions are present for coldwater fish species, which might also be suitable for some mussel species.

Vernal Pool Species

A vernal pool survey at the Project was conducted by Stantec in April 2018 (Stantec 2018) and evaluated eligibility under the NHESP 2009 *Guidelines for the Certification of Vernal Pool Habitat* and the Sudbury Wetlands Administration Bylaw Regulations (Bylaw) revised September 25, 2017. The results of the 2018 survey identified three vernal pools eligible for NHESP certification (PVP 4, PVP 11, and PVP 12a). CVP 13⁵ continues to meet NHESP certification requirements, and PVP 9⁶, PVP 17, and PVP 20 may meet criteria as a vernal pool under the Town's Bylaw. Amphibian species observed during the spring survey included: wood frog (*Lithobates sylvaticus*), spotted salamander (*Ambystoma maculatum*), red-backed salamander (*Plethodon cinereus*), gray treefrog (*Hyla versicolor*), blue-spotted salamander (CVP 13; NHESP CVP# 1428), and spring peeper (*Pseudacris crucifer*).

There was no evidence of turtle nesting (i.e., shell fragments or nests excavated by mammals) or measurable areas of suitable turtle nesting habitat with the ROW or immediate vicinity observed during the 2018 vernal pool survey or wildlife habitat assessment.

4.0 EVALUATION OF ADVERSE EFFECT

The results of the data review and the results of the field survey were used to assess whether or not the Project will result in an adverse effect to wildlife habitat subject to the WPA. None of the important habitat features or other thresholds identified in Appendix A of the MassDEP guidance were observed within or proximal to wetland resource areas where temporary or permanent Project impacts are proposed. Additionally, no other high value habitats or species particularly sensitive to the construction of a rail trail were observed. The trail is not expected to be a barrier to wildlife usage patterns near the Project or at the landscape level, as most species would shift habitat usage patterns, as needed, to carry out their life cycles during construction and post-construction. Therefore, potential habitat impact within jurisdiction of the WPA is generally localized, temporary, occurring previously disturbed area, and would occur to habitat that is not considered critical; or limiting at the Project or the local landscape. As a result, no adverse effect to wildlife habitat within wetland resource areas is anticipated based on the 25% Design

⁵ Obligate vernal pools species observed in 2018 included fairy shrimp (*Eubrachipus* spp.) and blue-spotted salamander (*Ambystoma laterale*) egg masses.

⁶ The NHESP confirmed Stantec's 2018 identification of two dead salamanders as the lead phase for eastern red-backed salamander.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

Submittal. As the Project design develops further, recommendations are provided below for consideration in consultation with the Sudbury Conservation Commission and other resource agencies, as appropriate.

5.0 ADDITIONAL DESIGN CONSIDERATIONS AND RECOMMENDATIONS

The following additional recommendations relative to the protection of wildlife habitat should be considered as Project planning and design continues.

1. Locate the Project limit of disturbance within existing ROW to the greatest extent practical, including staging areas, construction access, parking, and scenic vistas.
2. Avoid or minimize tree clearing where possible. For example, the forested habitat surrounding high value or productive vernal pools (e.g., certified or certifiable by NHESP), particularly the 100-foot zone surrounding the boundary of the pool breeding habitat.
3. Implement Best Management Practices (BMPs) to avoid/minimize potential impacts to wetland resources areas that support wildlife habitat. For example, avoidance and minimization of erosion and sedimentation into wetland resource areas, use of clean heavy machinery at Project to limit/avoid introduction of invasive non-native plant species, avoidance of machinery refueling in buffer zones, and general housekeeping (including final site cleanup).
4. Establish a robust erosion and sedimentation control program per MassDEP Erosion and Sedimentation Control Guidelines and guidance from the Sudbury Conservation Commission, including monitoring and timely maintenance throughout construction due to the proximity of limits of work near some wetland resource areas.
5. Use plantings and seed from native plant species during restoration of disturbed areas. The selection of species for plantings should consider enhancing or replacing wildlife habitat use (e.g., fruiting shrubs, pollinator habitat, evergreen species for cover, etc.).
6. Incorporate minimum Massachusetts Stream Crossing Standards at perennial waterway crossings to the maximum extent practical. Consider these standards in additional areas that may provide high value wildlife habitat (e.g., intermittent stream). In the case of Hop Brook, the reuse/rehabilitation of the existing bridge to span the brook is being considered for the design.
7. Consider maintaining or creating wildlife crossing passage at strategic locations underneath the trail (e.g., existing cattle crossing used by wildlife, new crossing where amphibians migrate from the forest to high value vernal pools close to the ROW).
8. If scenic vistas or additional parking are proposed, cite these in areas that avoid and minimize the potential impact to wildlife habitat and wildlife behavior.
9. Monitoring of Priority and Estimated Habitat mapping by the NHESP for the potential presence of state-listed species near or at the Project as environmental permitting continues.
10. Avoid or minimize installation of physical barriers that would create impassable conditions across the trail for some smaller wildlife species.



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

11. Consider leash and waste clean-up rules for pets at the Project.
12. Strategically girdling trees (e.g., cottonwood) that are located a safe distance from the ROW (to avoid creating hazard tree to humans). This management practice would increase the number of standing dead trees that could offer natural cavities and crevices for wildlife (e.g., roosting bats, nesting birds and waterfowl, small mammal dens).
13. Beneficially reuse trees and brush cleared during on-site site preparation to create new or enhance existing brush piles near the ROW to serve as wildlife habitat (e.g., refugia for small mammals, amphibians, and reptiles; and nesting habitat for songbirds).
14. Avoid and minimize effects of temporary construction and permanent lighting to the maximum extent practical to minimize the potential for the disruption of wildlife behavior. If permanent lighting is proposed, use full cutoff lens to direct lighting downward toward the trail surface to avoid and minimize the secondary effect to adjacent wildlife habitat.
15. Consider strategically locating signage along the trail (e.g., trail heads or parking areas) to educate trail users about wildlife and wetland ecology.

6.0 REFERENCES

- Call of The Wild Consulting. 2009. Comprehensive Four-Season Wildlife Habitat Evaluation Phase II Bruce Freeman Rail Trail Project. Prepared for Sudbury Conservation Commission.
- Fay, Spofford, & Thorndike, 2006. Bruce Freeman Rail Trail Environmental & Engineering Assessment. Prepared for Town of Sudbury, Massachusetts.
- Massachusetts Office of Geographic Information. Massachusetts Online Viewer (Oliver). Available at http://maps.massgis.state.ma.us/map_ol/oliver.php.
- Stantec Consulting Services Inc. (Stantec). 2018. Bruce Freeman Rail Trail Vernal Pool Survey. Prepared for Massachusetts Department of Transportation. Dated May 14, 2018.
- Swain, P. 2016. Classification of the Natural Communities of Massachusetts. Version 2.0. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, Massachusetts.

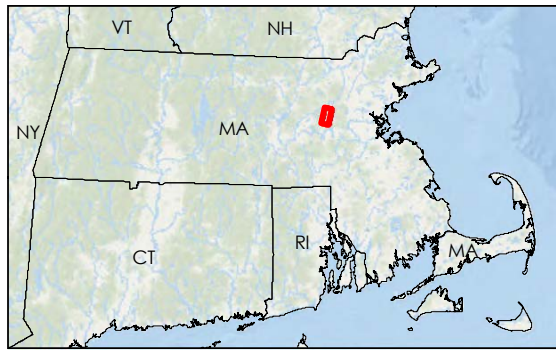




April 8, 2020

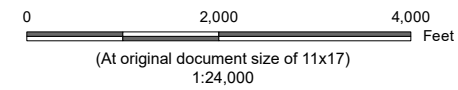
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Legend
 Bruce Freeman Rail Trail
 Town Boundary



Project Location
Sudbury, Massachusetts

Prepared by REM on 2019-02-20
IR Review by DGN on 2019-02-21

Client/Project
MassDOT
Bruce Freeman Rail Trail
Sudbury, MA

179410498

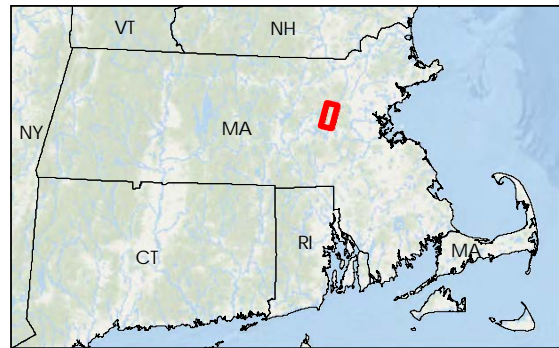
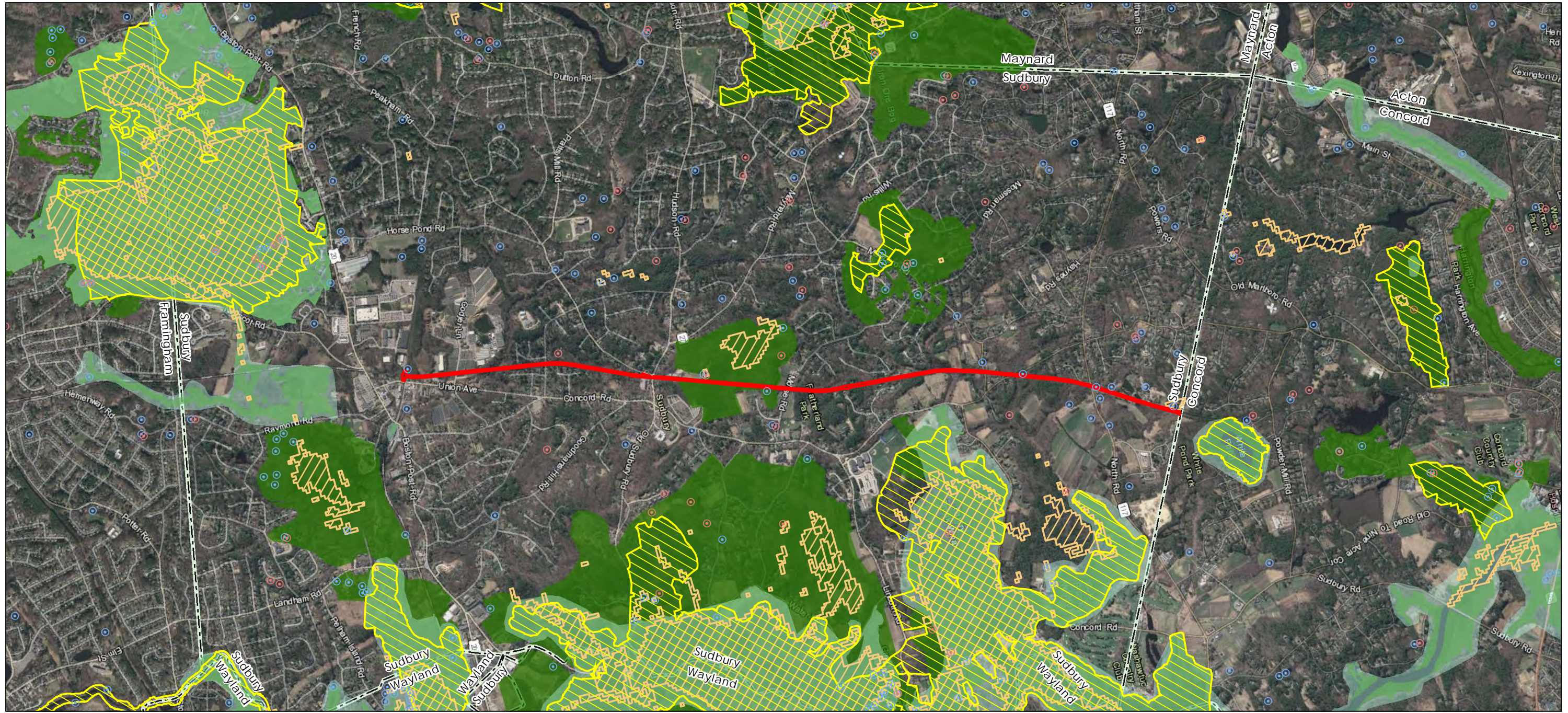
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Title

Project Location Map

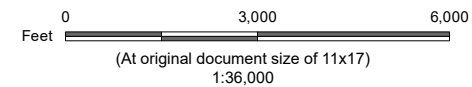
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 Revised: 2019-04-17 By: rmack



- Legend**
- ▭ Bruce Freeman Rail Trail
 - NHESP Potential Vernal Pools
 - NHESP Certified Vernal Pools
 - NHESP Priority Habitats of Rare Species (August 2017)
 - UMass CAPS Habitat of Potential Statewide or Regional Importance
 - BioMap2 Core Habitat
 - BioMap2 Critical Natural Landscape
 - Town Boundary

Notes

1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001
2. Data Sources: Administrative boundaries, NHESP data, and BioMap2 habitat and landscape data provided by Bureau of Geographic Information (MassGIS). CAPS habitat data provided by UMass. Bruce Freeman Rail Trail provided by MassGIS Sudbury parcel data layer.
3. Background: Orthoimagery; MassGIS 2013-2014 USGS Color Orthoimagery



Project Location
Sudbury, Massachusetts

Prepared by REM on 2019-02-20
IR Review by DGN on 2019-02-21

Client/Project
MassDOT
Bruce Freeman Rail Trail
Sudbury, MA

179410498

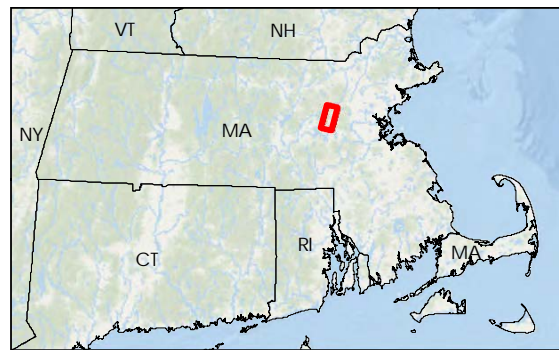
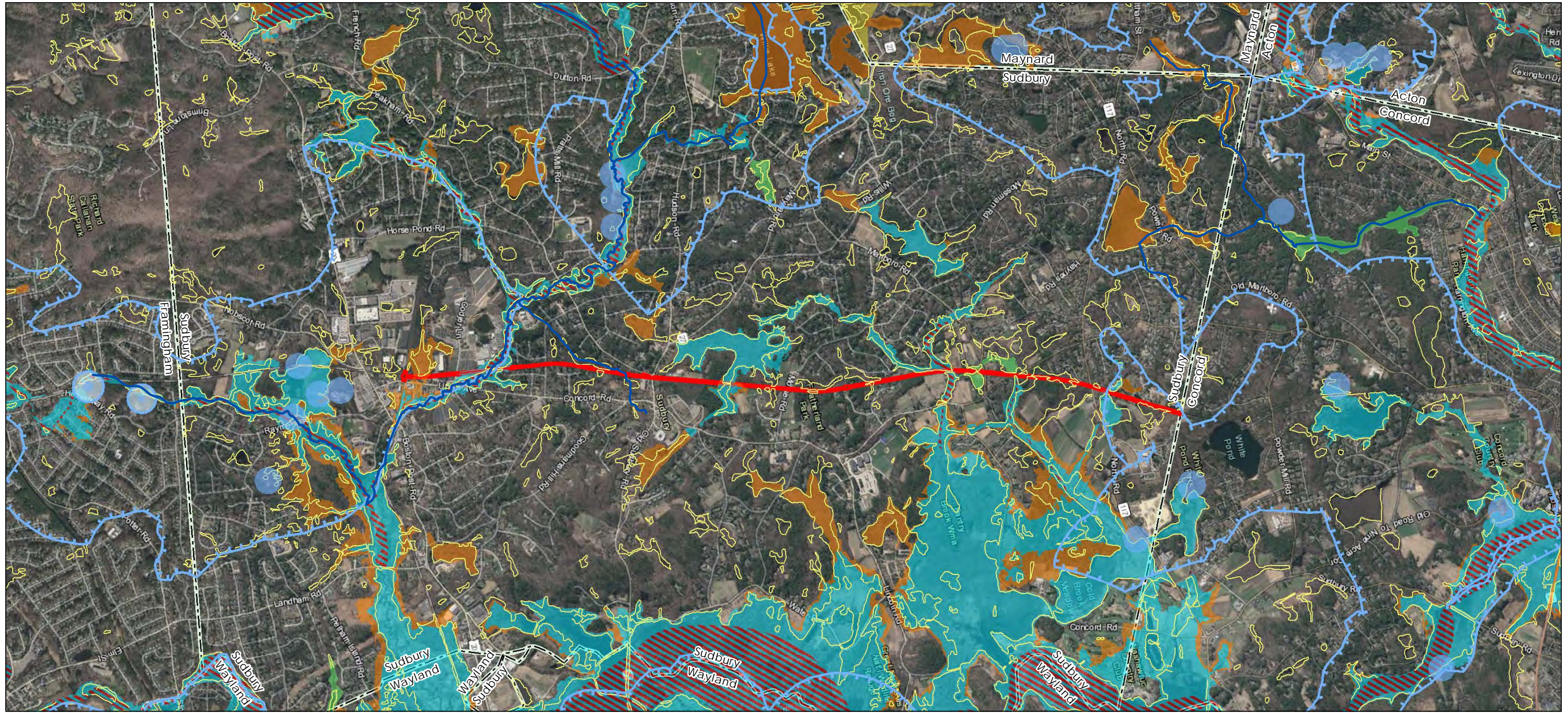
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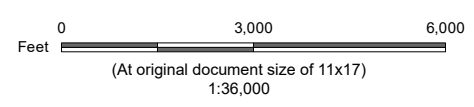
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**Natural Resources Data Review
National Heritage Resources**

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- Legend**
- █ Bruce Freeman Rail Trail
 - █ Apparent Wetland Limit (DEP)
 - █ DFW Coldwater Fisheries Resources
 - FEMA National Flood Hazard Layer**
 - █ A: 1% Annual Chance of Flooding, no BFE
 - █ AE: 1% Annual Chance of Flooding, with BFE
 - █ AE: Regulatory Floodway
 - █ D: Possible But Undetermined Hazard
 - █ X: 0.2% Annual Chance of Flooding
- Surface Water Protection Areas**
 - █ Zone A
 - █ Zone B
 - █ Zone C
 - Wellhead Protection Area**
 - █ IWPA
 - █ Zone Is
 - █ Zone IIs
 - █ Town Boundary



Project Location: Sudbury, Massachusetts
 Prepared by REM on 2019-02-20
 IR Review by DGN on 2019-02-21

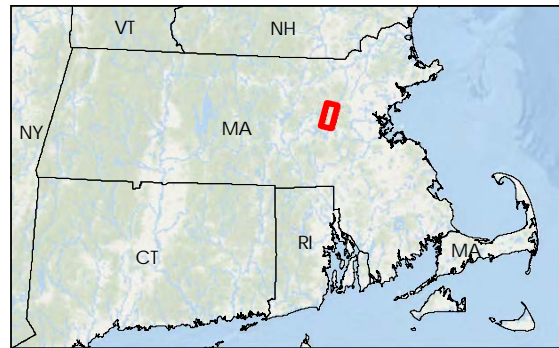
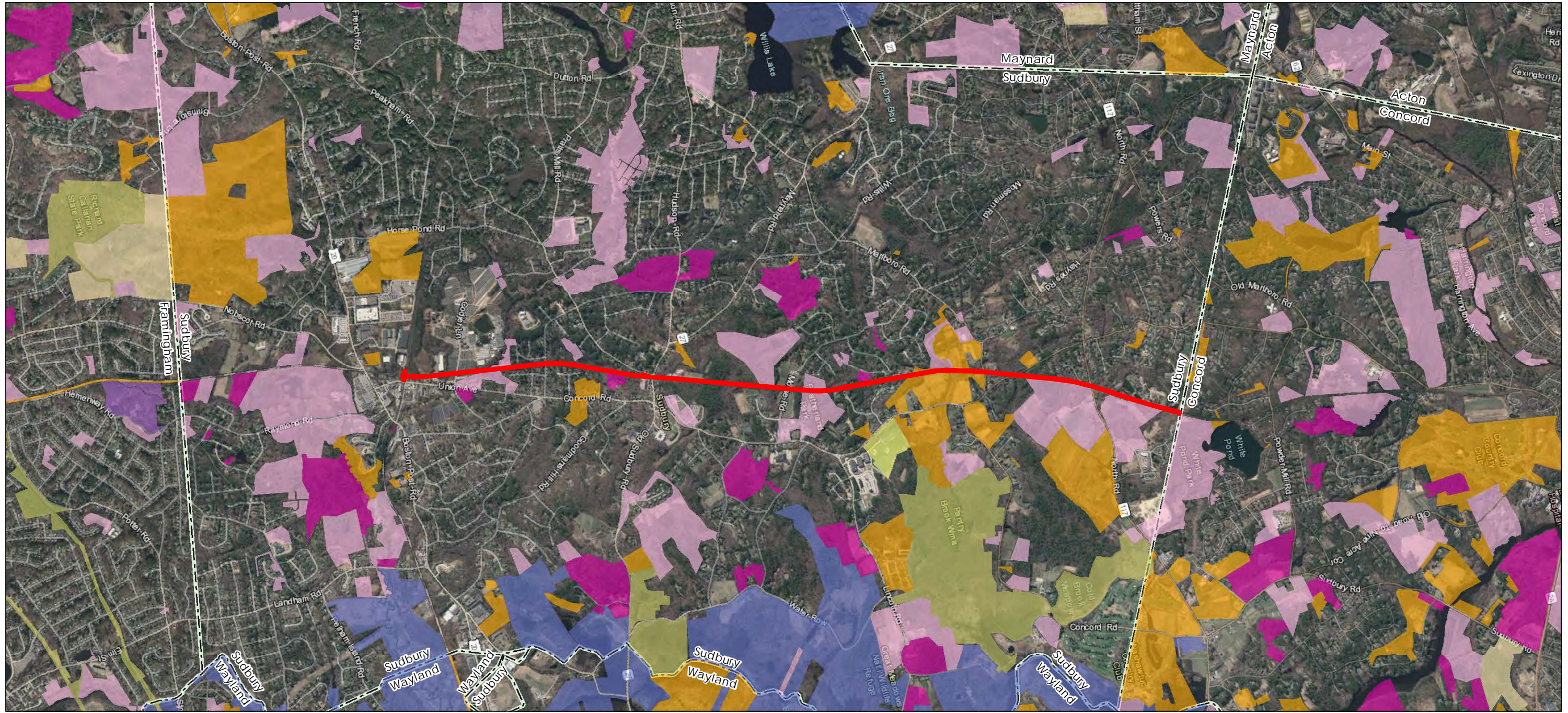
Client/Project: MassDOT
 Bruce Freeman Rail Trail
 Sudbury, MA
 179410498

Figure No.: **2b**

**Natural Resources Data Review
 MassDEP Resources and FEMA National
 Flood Hazard**

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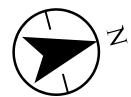
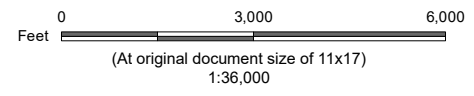
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- Legend**
- Bruce Freeman Rail Trail
 - Town Boundary
 - Protected and Recreational OpenSpace**
 - Conservation Organization
 - Federal
 - Land Trust
 - Municipal
 - Other
 - Private
 - Private Non-Profit
 - State

Notes

1. Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001
2. Data Sources: Protected and recreational open space and administrative boundaries provided by Bureau of Geographic Information (MassGIS). Bruce Freeman Rail Trail provided by MassGIS Sudbury parcel data layer.
3. Background: Orthoimagery: MassGIS 2013-2014 USGS Color Orthoimagery



Project Location
Sudbury, Massachusetts

Prepared by REM on 2019-02-20
IR Review by DGN on 2019-02-21

Client/Project
MassDOT
Bruce Freeman Rail Trail
Sudbury, MA

179410498

Figure No.

2c

Title
**Natural Resources Data Review
Open Space**

GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

April 8, 2020

APPENDICES



GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

Appendix A 25% Design Submittal
April 8, 2020

Appendix A 25% DESIGN SUBMITTAL



MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

PLAN AND PROFILE OF BRUCE FREEMAN RAIL TRAIL

IN THE CITY/TOWN OF
SUDBURY
MIDDLESEX COUNTY

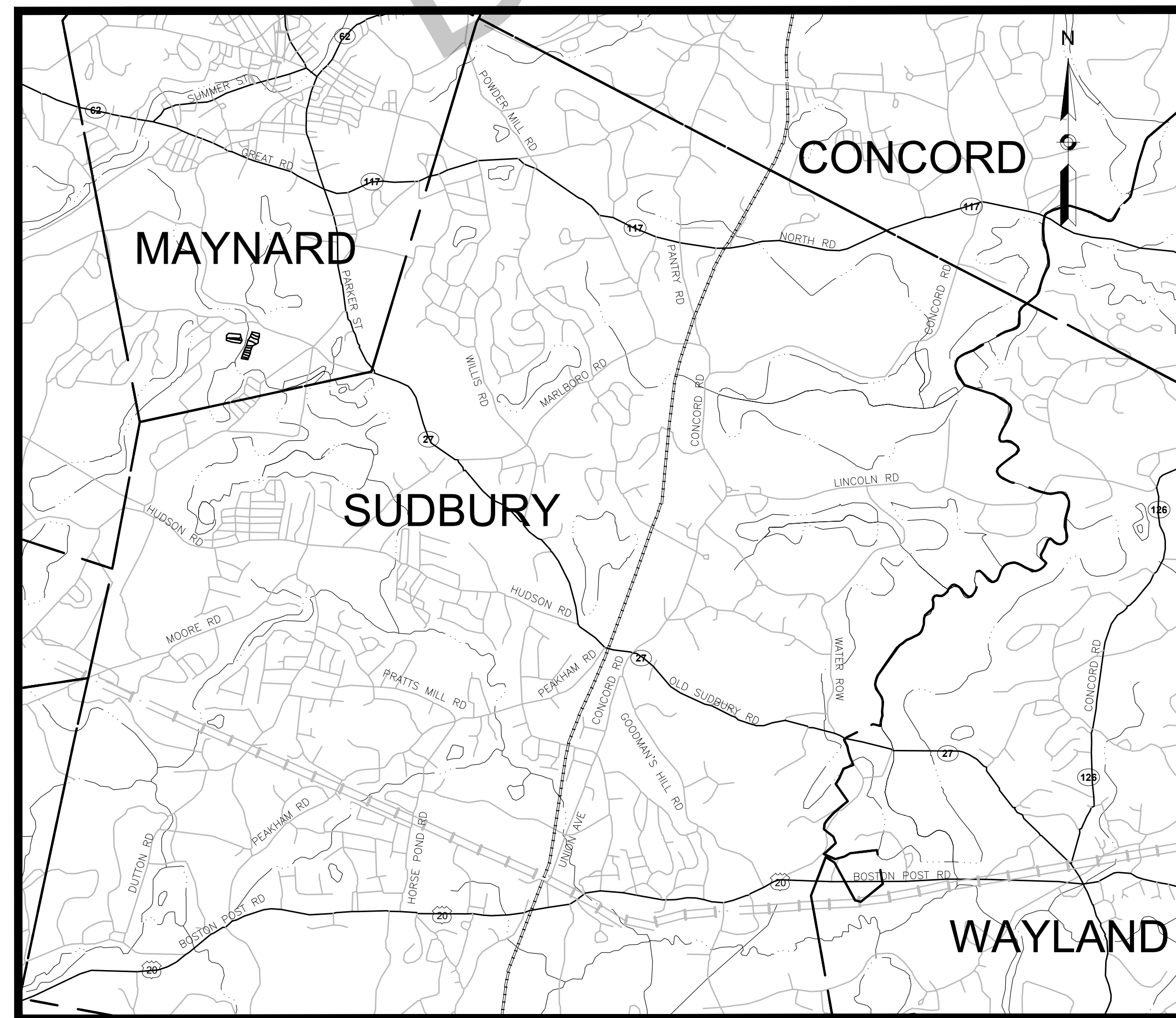
FEDERAL AID PROJECT NO.

25% SUBMITTAL

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	01	XX
PROJECT FILE NO.		608164	
TITLE SHEET & INDEX			

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE 2014 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

INDEX	
SHEET NO.	DESCRIPTION
01	TITLE SHEET & INDEX
02	GENERAL NOTES
03	LEGEND & ABBREVIATIONS
X-X	KEY PLAN
X-X	TYPICAL SECTIONS
05-31	CONSTRUCTION PLANS
34-54	PROFILES
X-X	TRAFFIC SIGN & PAVEMENT MARKINGS
X	TRAFFIC SIGN SUMMARY SHEET
X-X	TEMPORARY TRAFFIC CONTROL PLANS
X-X	CONSTRUCTION DETAILS
X-X	CROSS SECTIONS




LENGTH OF PROJECT = XXX.XX FEET = X.XXX MILES

DESIGN DESIGNATION (STREET/RTE # OR NAME)

DESIGN SPEED	XX MPH
ADT (YYYY)	X,XXX
ADT (YYYY)	X,XXX
K	X%
D	XX%
T (PEAK HOUR)	X.X%
T (AVERAGE DAY)	X.X%
DHV	XXX
DDHV	XXX
FUNCTIONAL CLASSIFICATION	XXXXXXXXXX

Preliminary Design
DRAFT
November 17, 2016

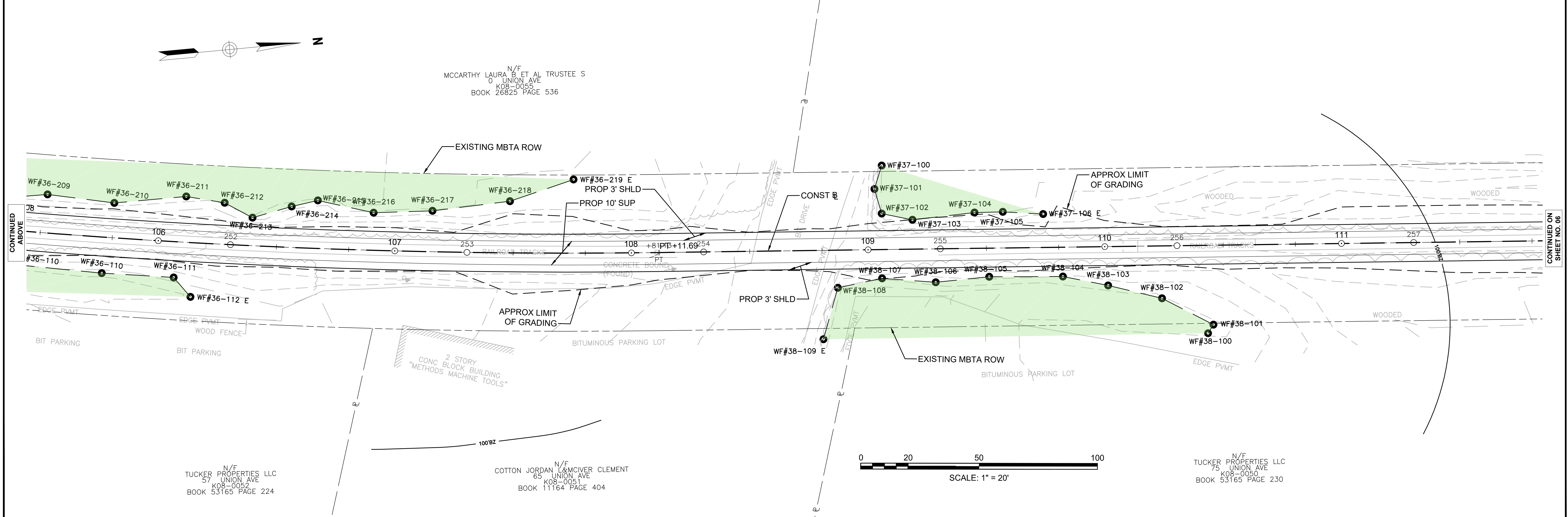
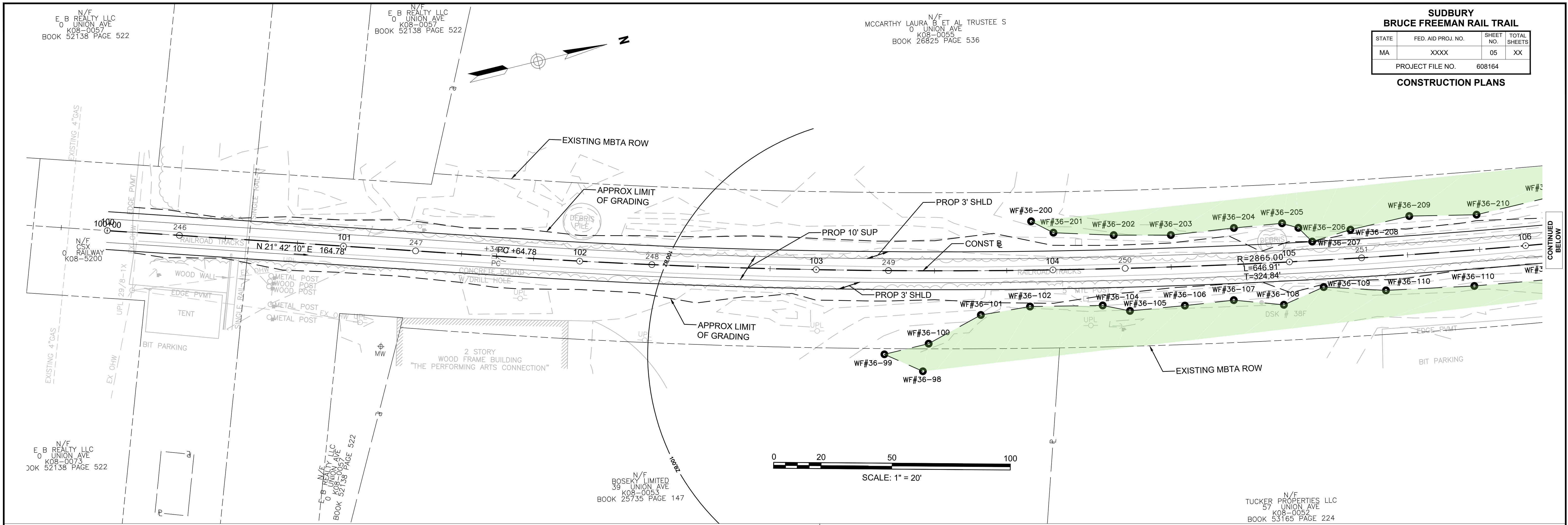
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	RECOMMENDED FOR APPROVAL _____ CHIEF ENGINEER DATE
APPROVED _____ HIGHWAY ADMINISTRATOR DATE	

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

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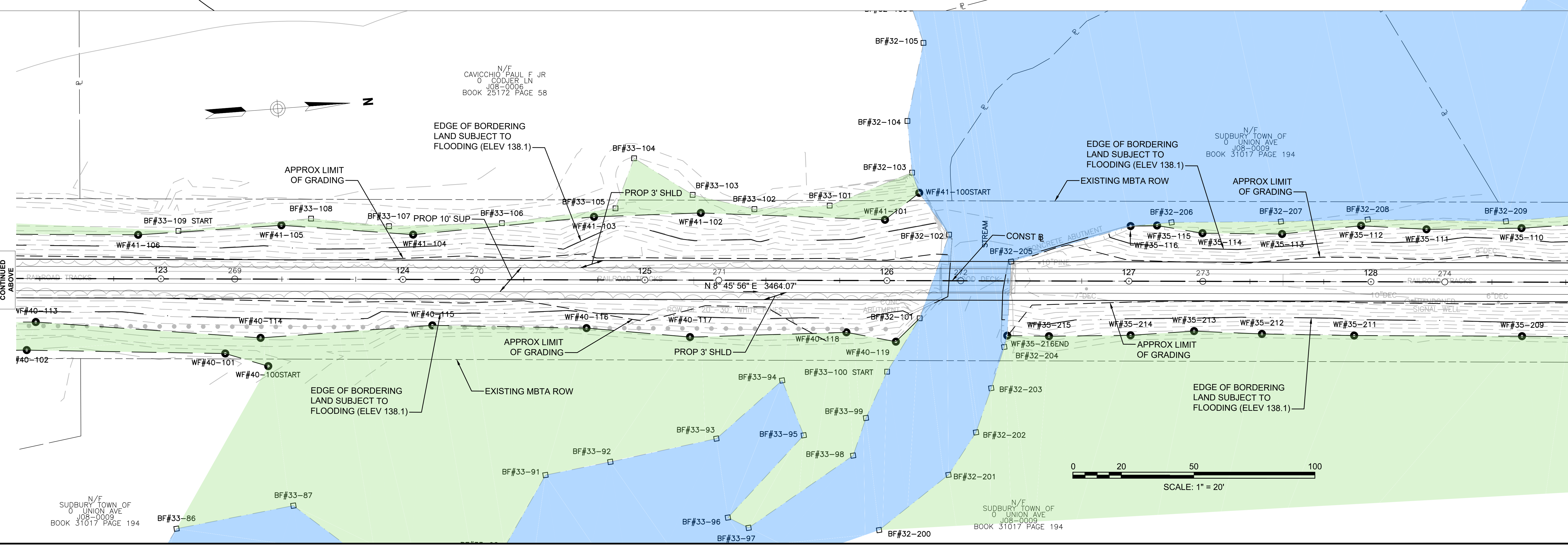
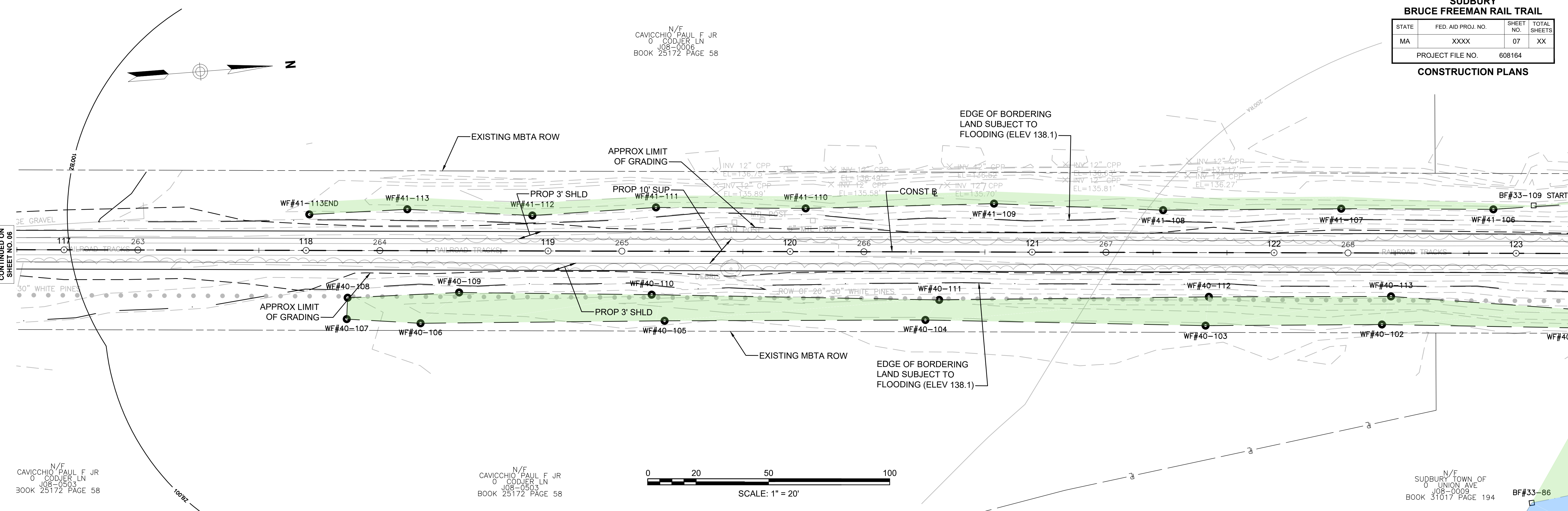
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ON
SHEET NO. 08

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BOOK 25172 PAGE 58

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BOOK 25172 PAGE 58

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JOB-0009
BOOK 31017 PAGE 194

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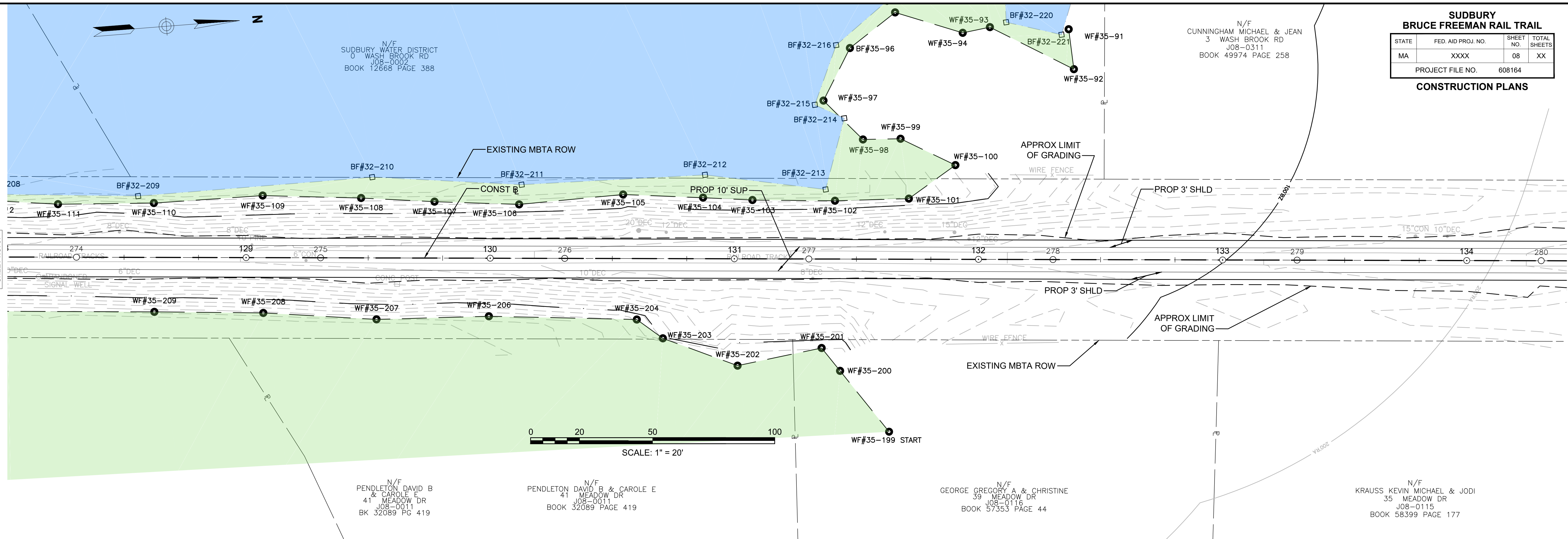
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BK 32089 PG 419

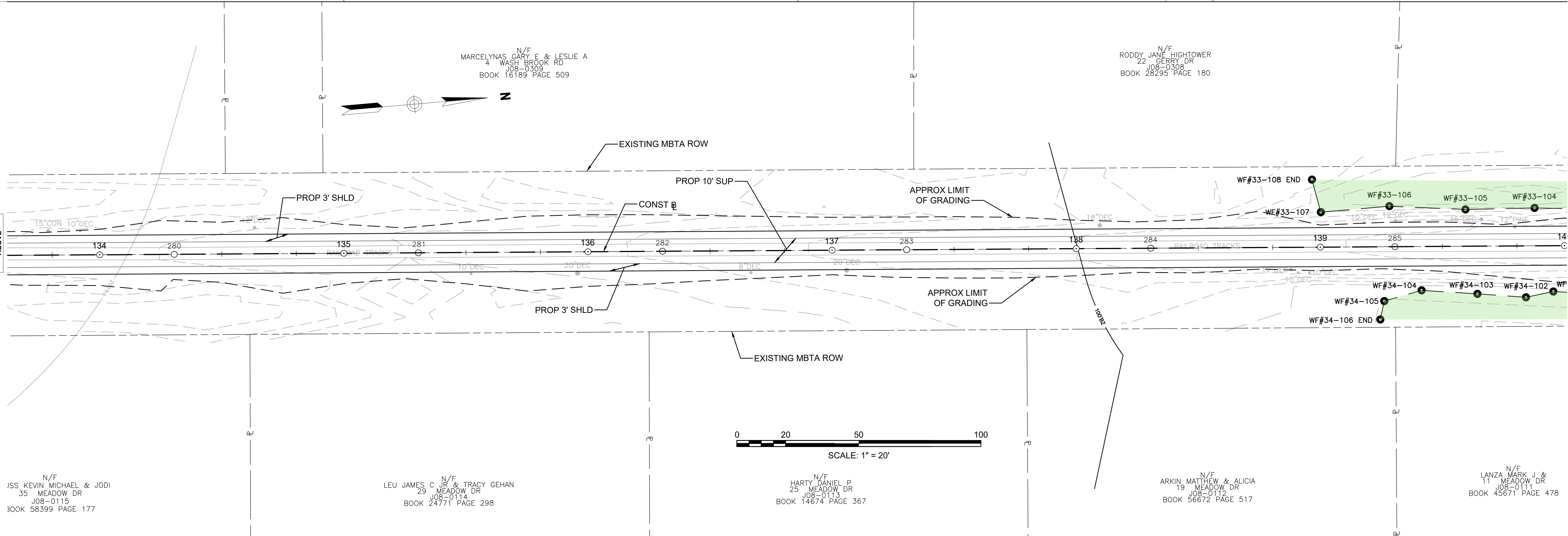
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BOOK 32089 PAGE 419

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JOB-0116
BOOK 57353 PAGE 44

N/F
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35 MEADOW DR
JOB-0115
BOOK 58399 PAGE 177

N/F
MARCELYNAS GARY E & LESLIE A
4 WASH BROOK RD
JOB-0309
BOOK 16189 PAGE 509

N/F
RODDY JANE HIGHTOWER
22 GERRY DR
JOB-0308
BOOK 28295 PAGE 180



N/F
JSS KEVIN MICHAEL & JODI
35 MEADOW DR
JOB-0115
300K 58399 PAGE 177

N/F
LEU JAMES C JR & TRACY GEHAN
29 MEADOW DR
JOB-0114
BOOK 24771 PAGE 298

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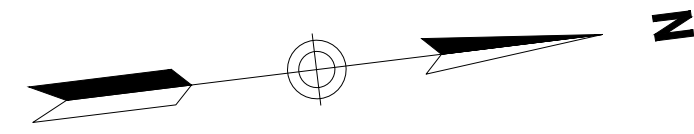
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 14 GERRY DR
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 JONES CHERYL
 233 OLD LANCASTER RD
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 BOOK 33438 PAGE 39

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 CHO CHONG M & WAI-WAI
 236 OLD LANCASTER RD
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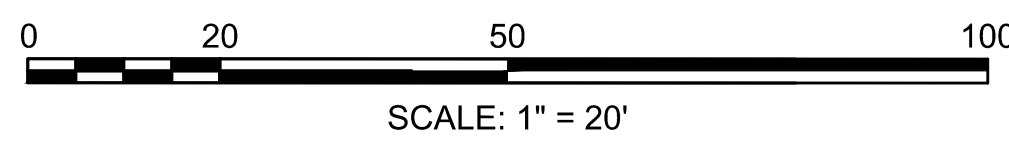
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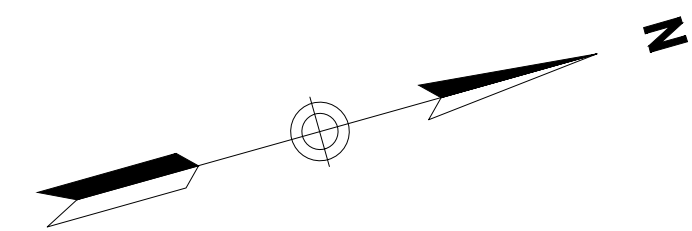
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 BOOK 35851 PAGE 169

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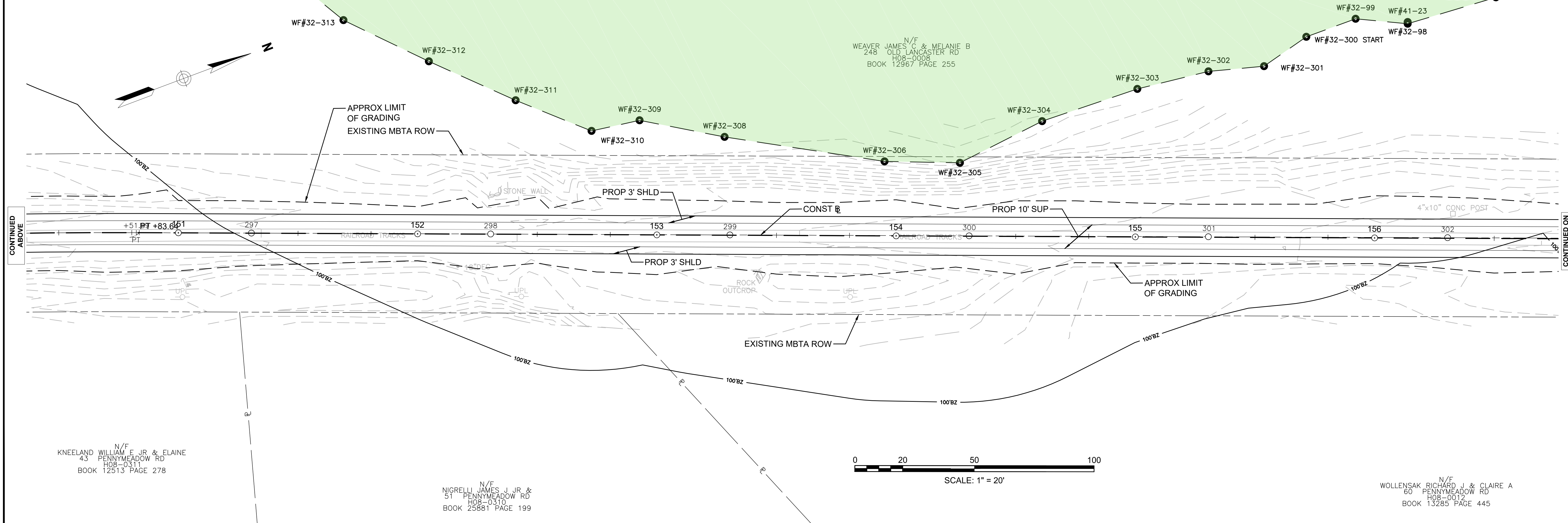
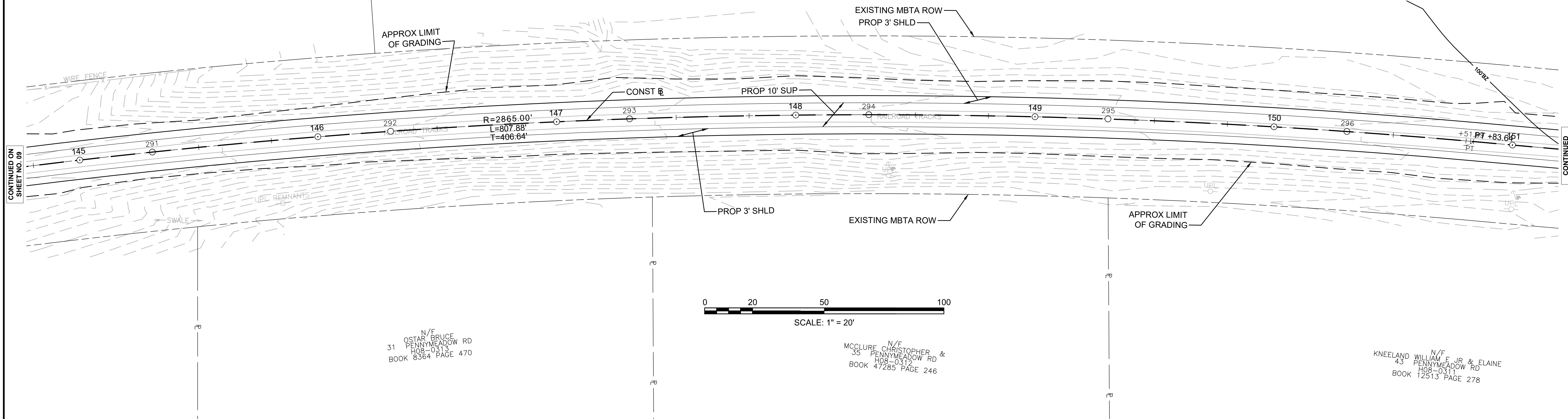
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**SUDBURY
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PROJECT FILE NO. 608164

CONSTRUCTION PLANS



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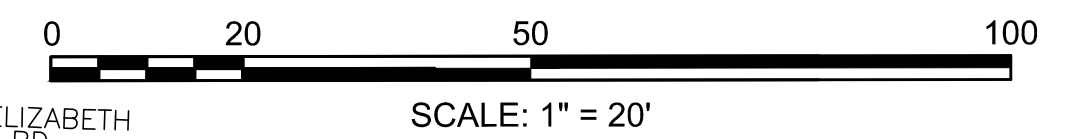
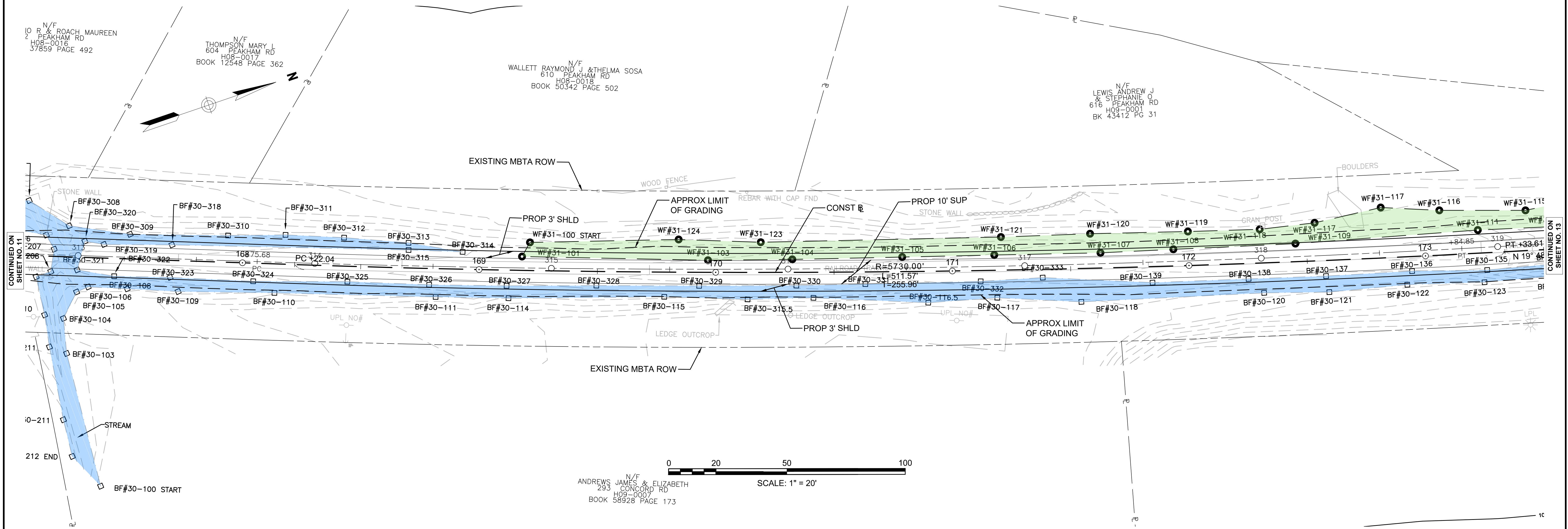
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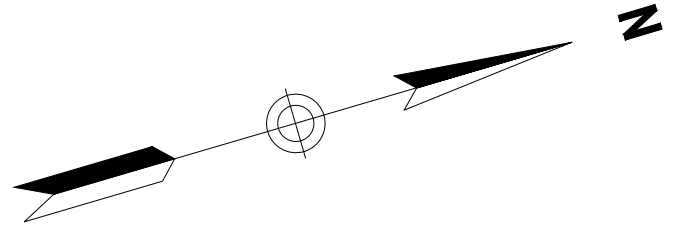
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 & STEPHANIE O
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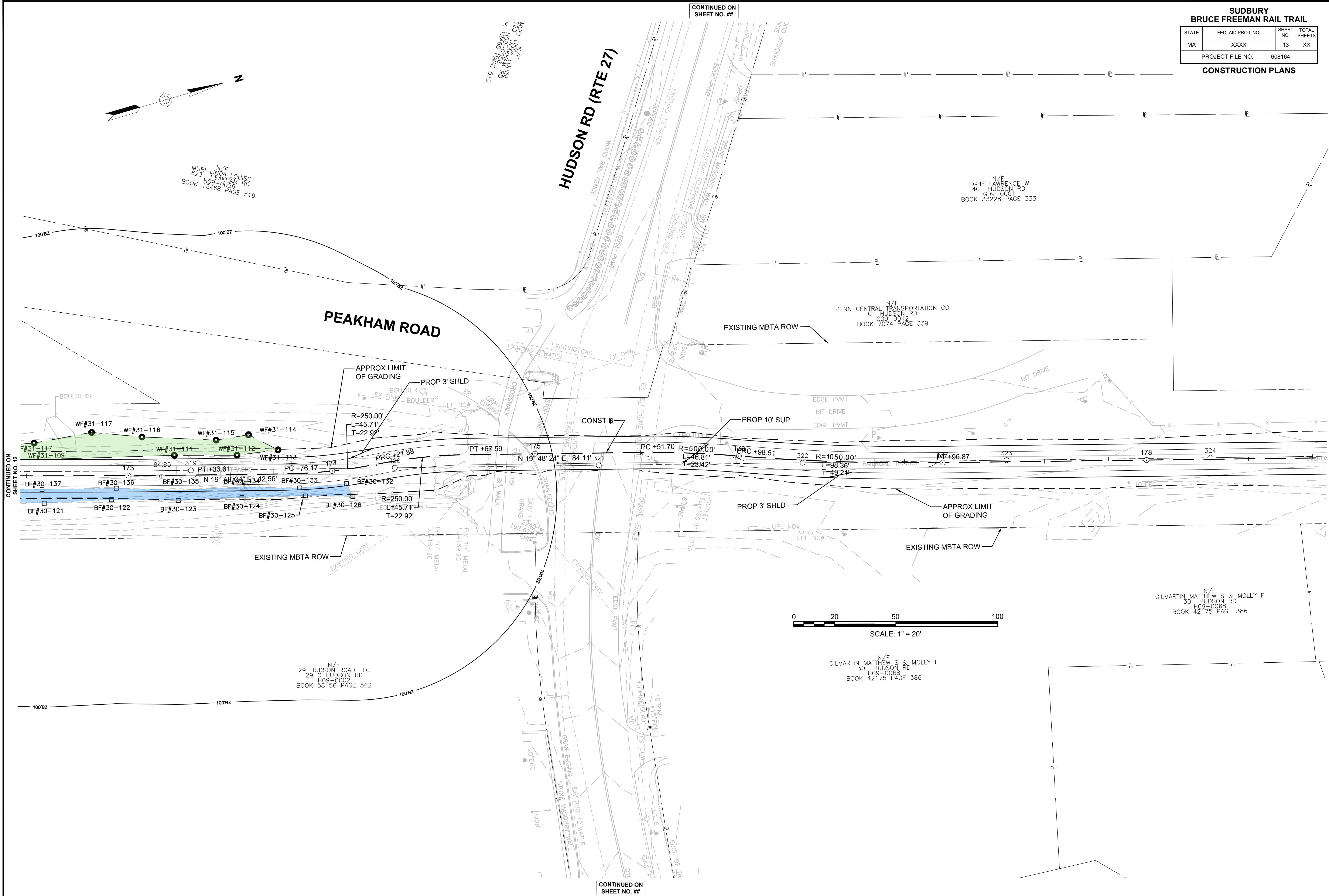
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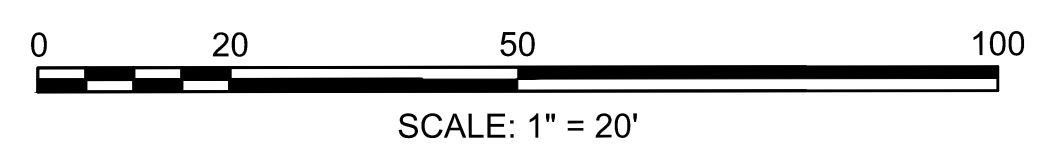
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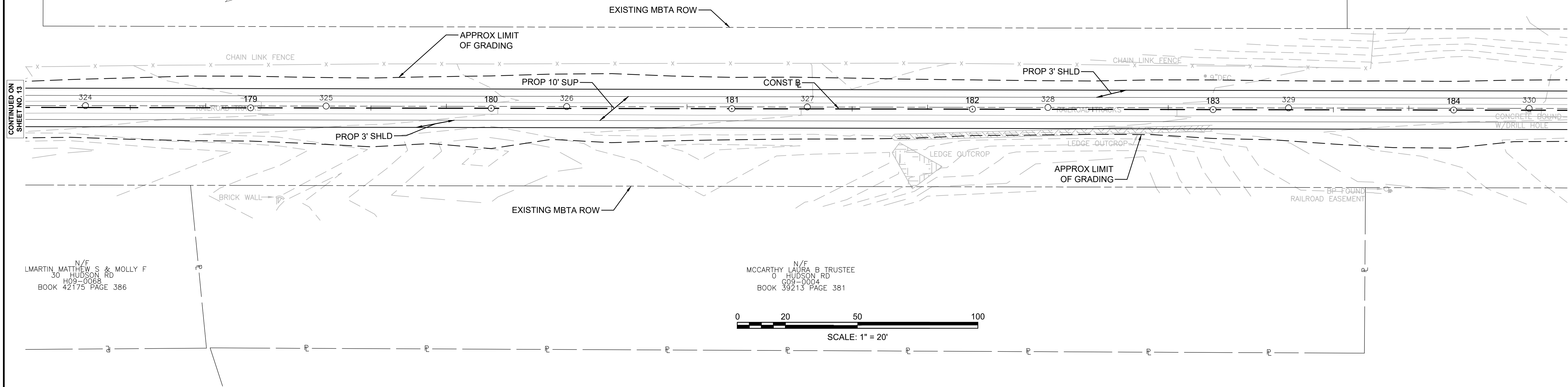
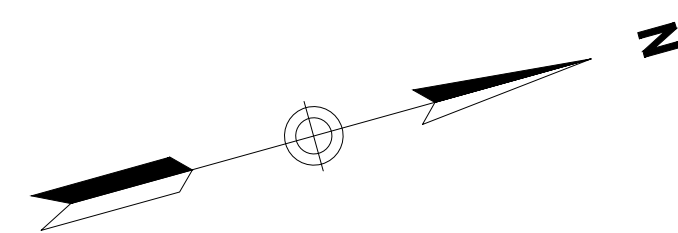
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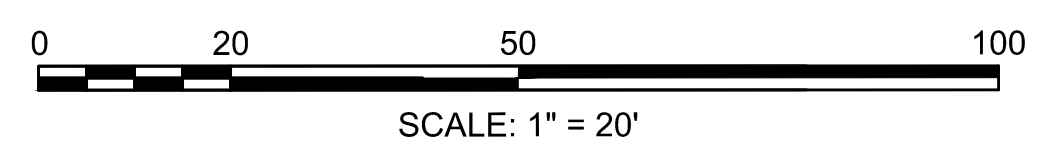
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CONSTRUCTION PLANS

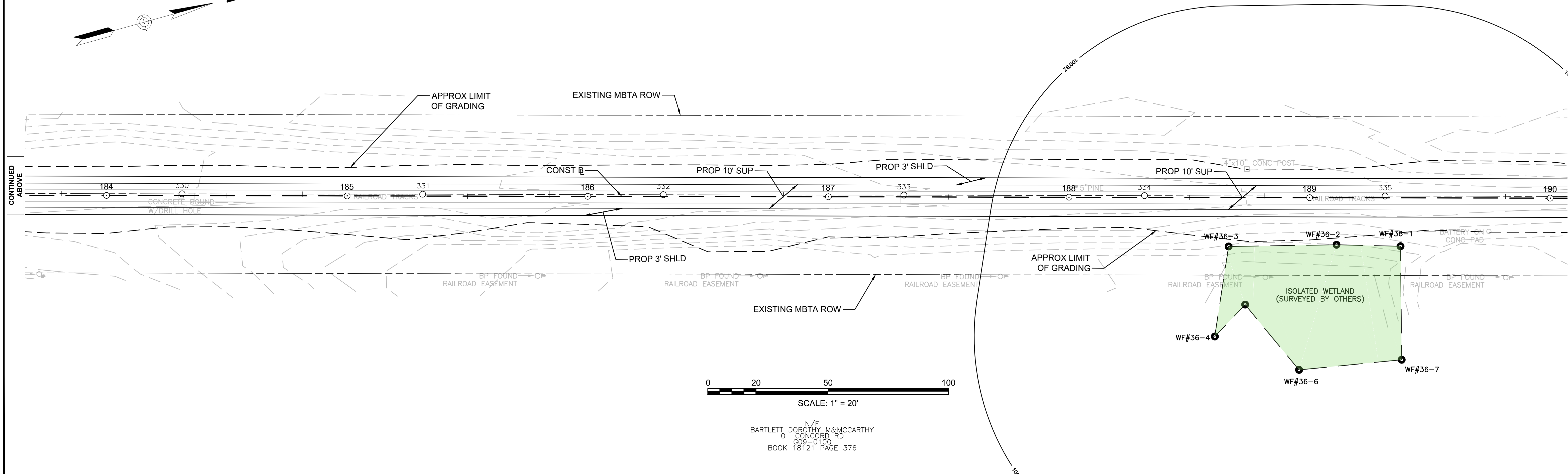
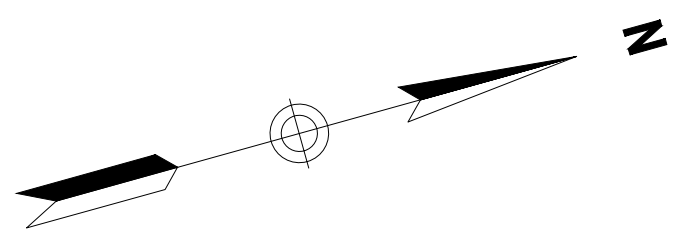


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BOOK 39213 PAGE 381



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BOOK 13189 PAGE 604



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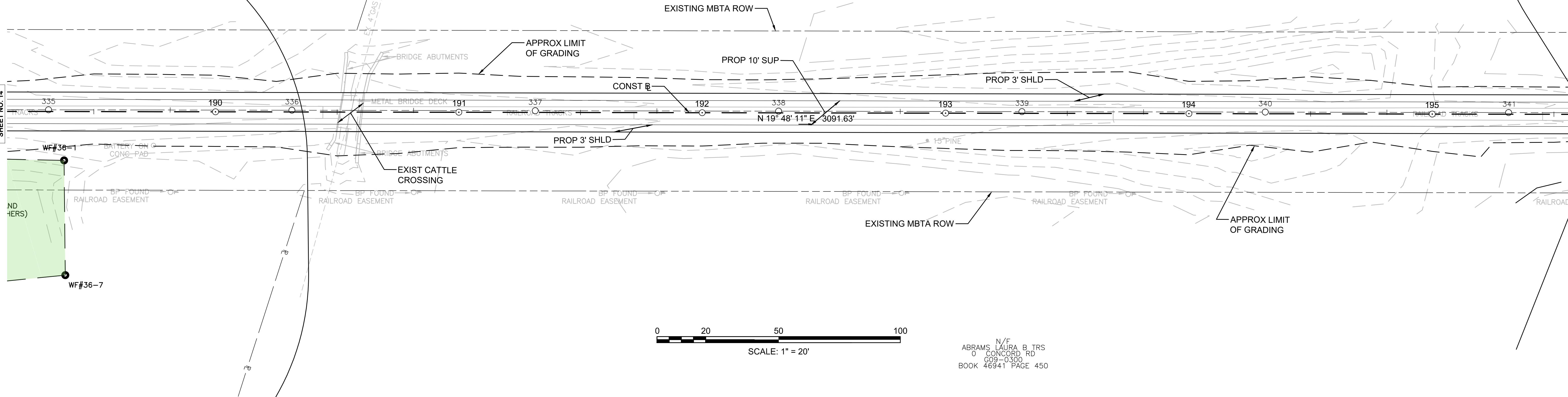
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BOOK 24441 PAGE 588

SUDBURY BRUCE FREEMAN RAIL TRAIL			
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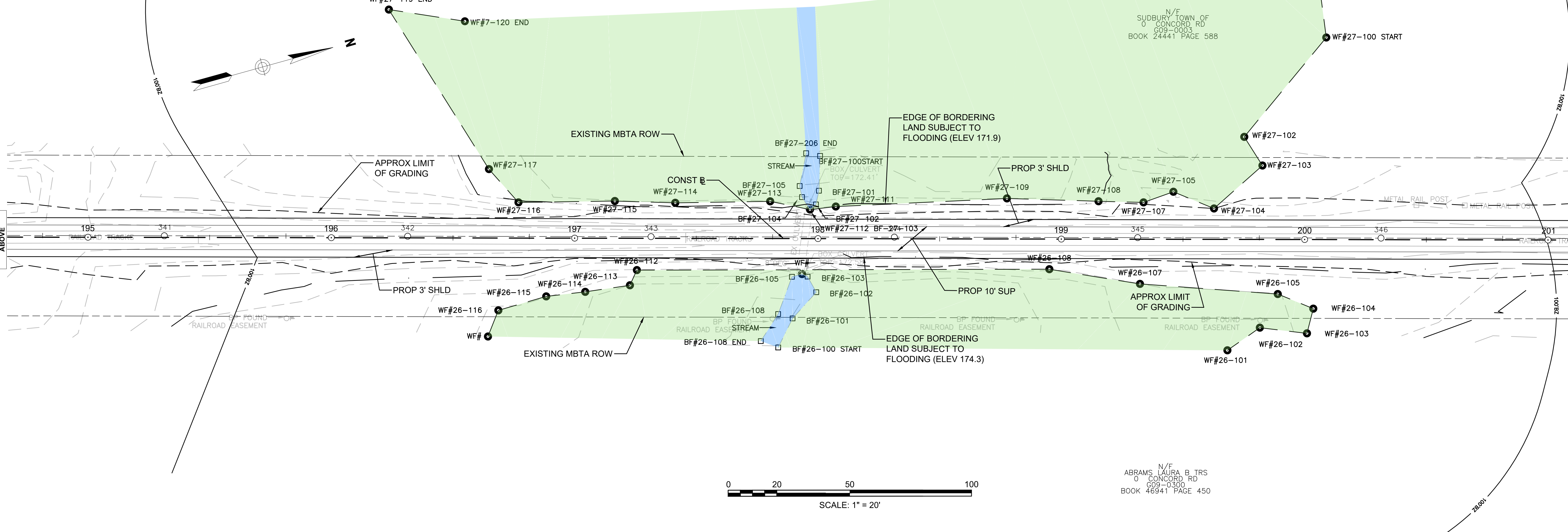
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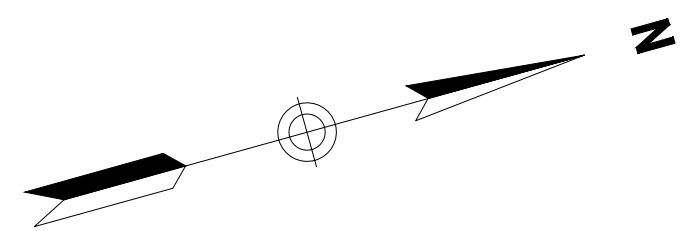


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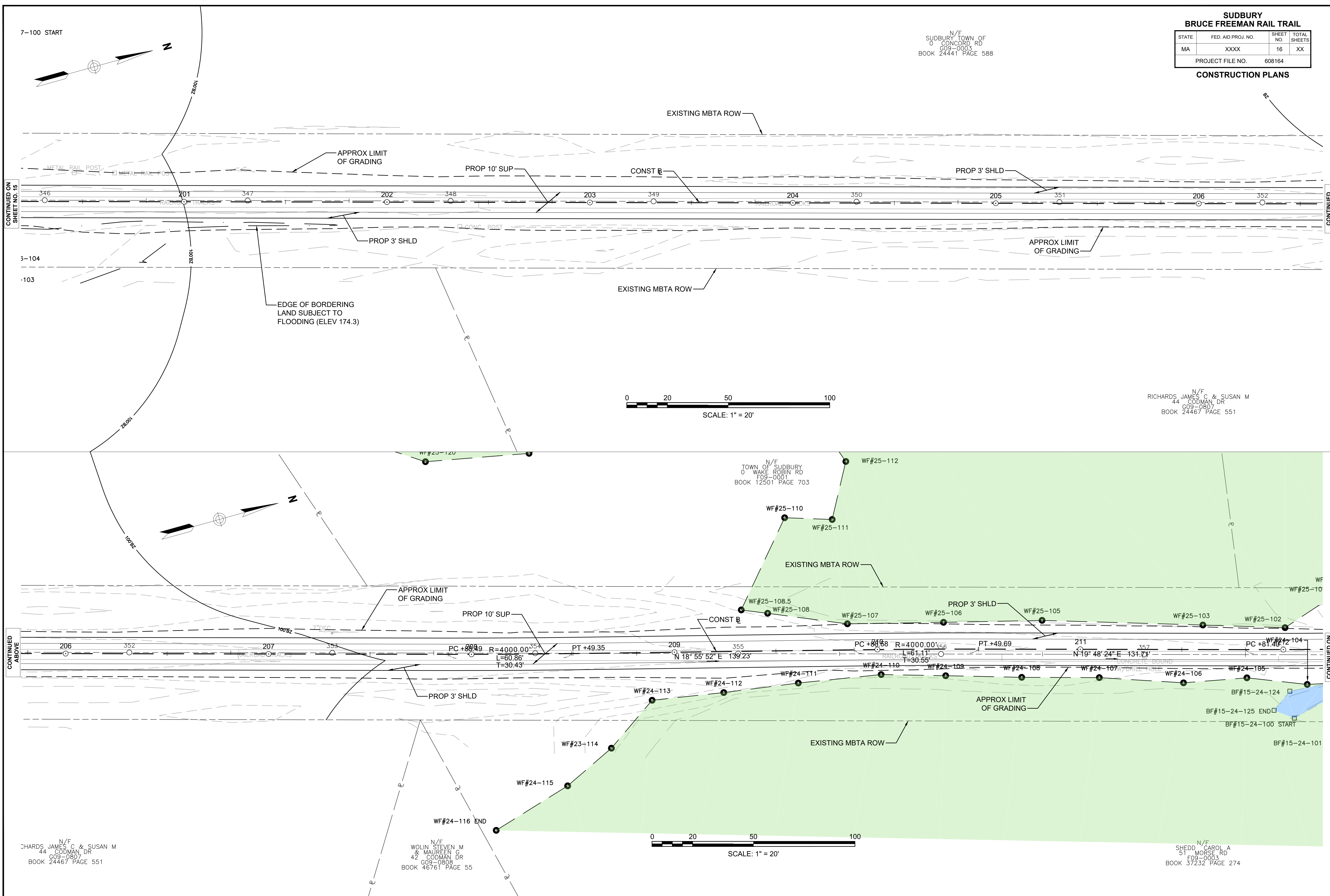
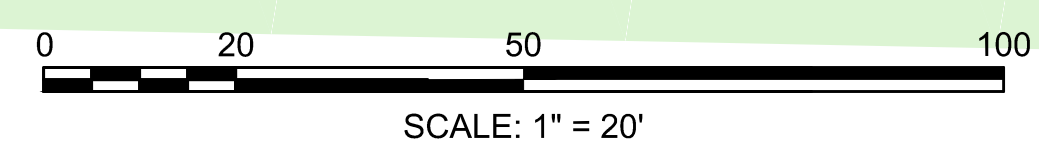
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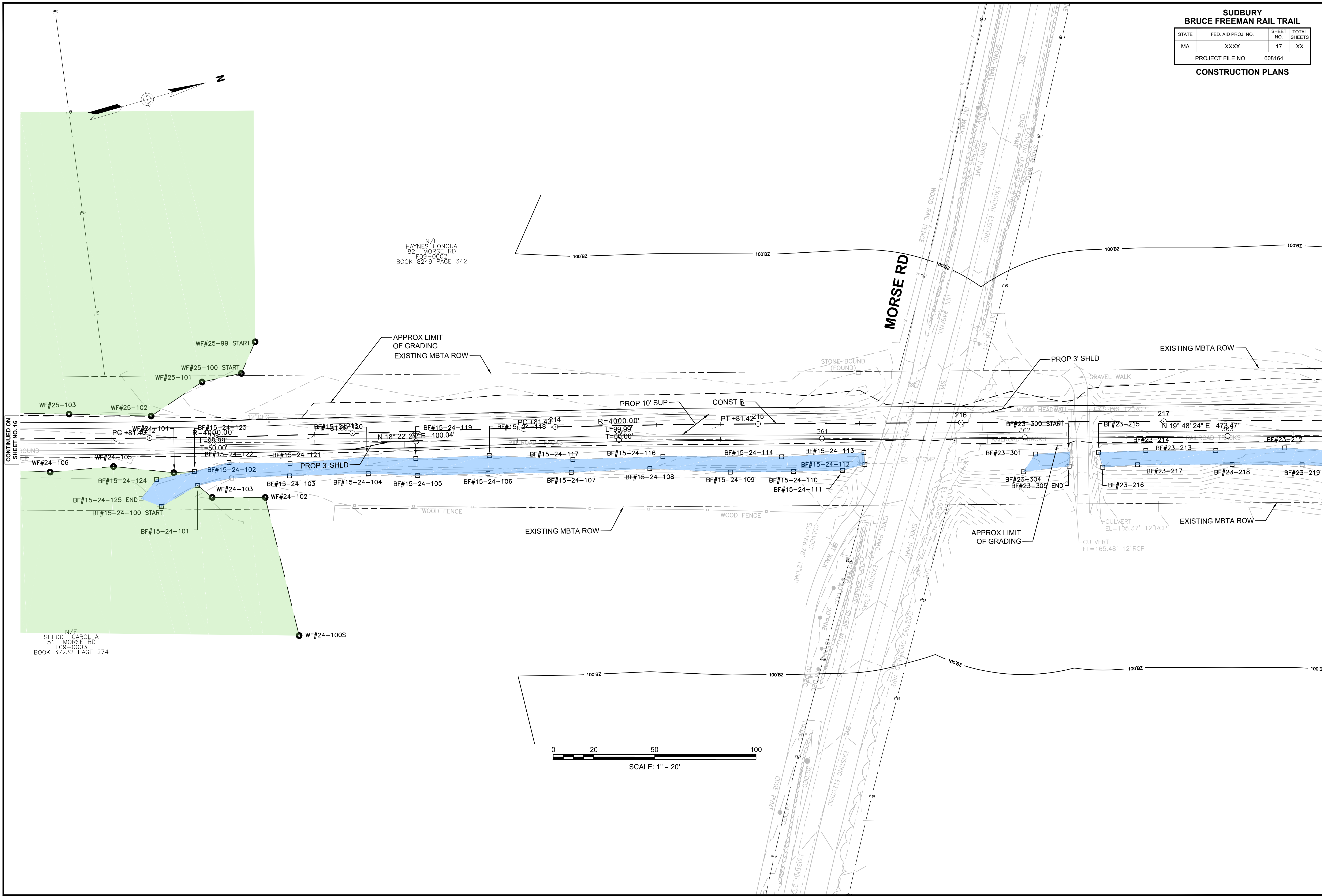
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RICHARDS JAMES C & SUSAN M
44 CODMAN DR
099-0807
BOOK 24467 PAGE 551

N/F
WOLIN STEVEN M
& MAUREEN G
42 CODMAN DR
099-0808
BOOK 46761 PAGE 55

N/F
SHEDD CAROL A
51 MORSE RD
099-0003
BOOK 37232 PAGE 274

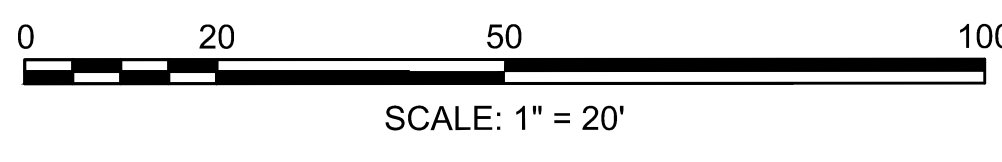


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 82 MORSE RD
 F09-0002
 BOOK 8249 PAGE 342

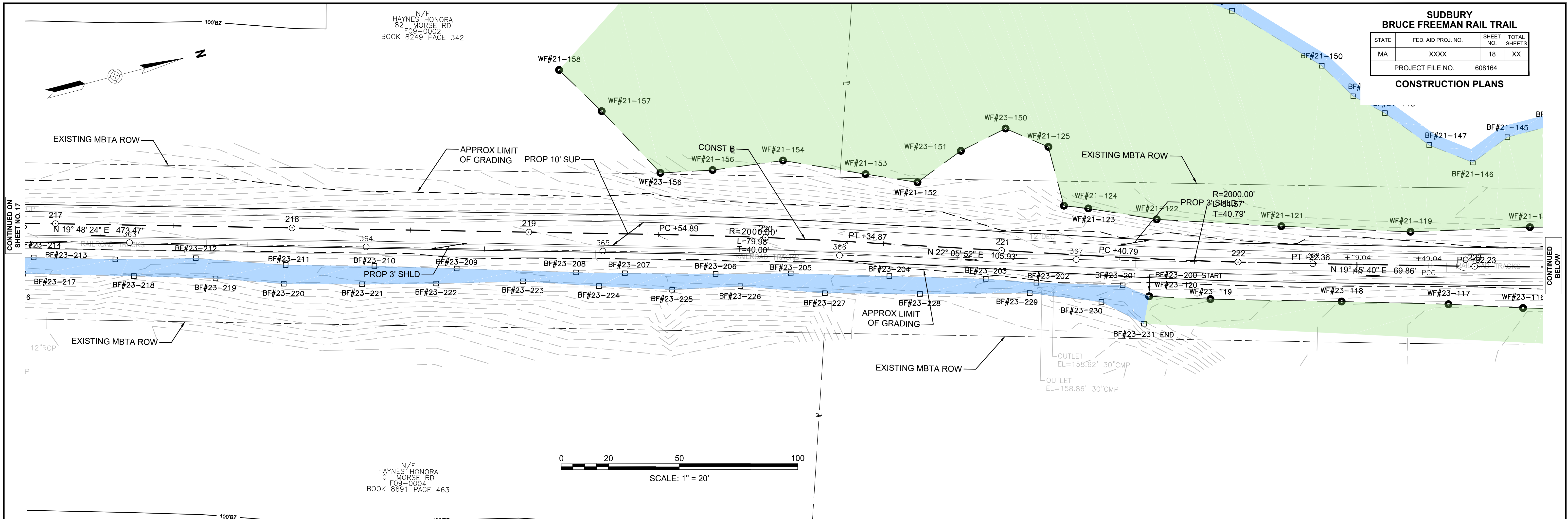
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 SHEDD CAROL A
 51 MORSE RD
 F09-0003
 BOOK 37232 PAGE 274

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	18	XX

PROJECT FILE NO. 608164

CONSTRUCTION PLANS



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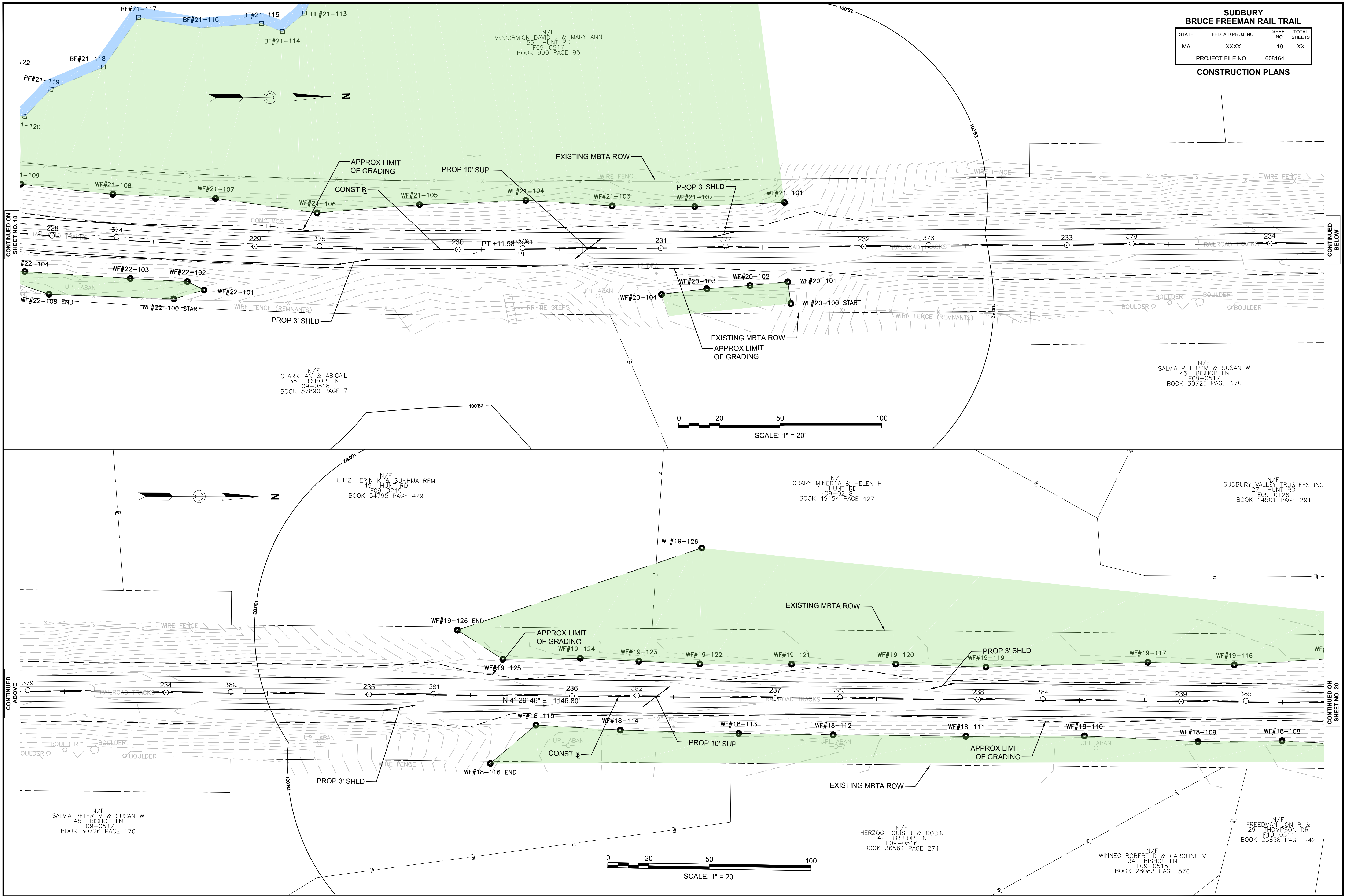
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**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	19	XX

PROJECT FILE NO. 608164
CONSTRUCTION PLANS



CONTINUED ON SHEET NO. 18

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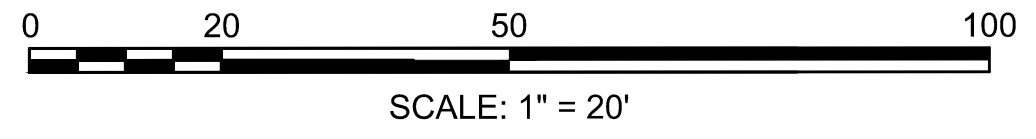
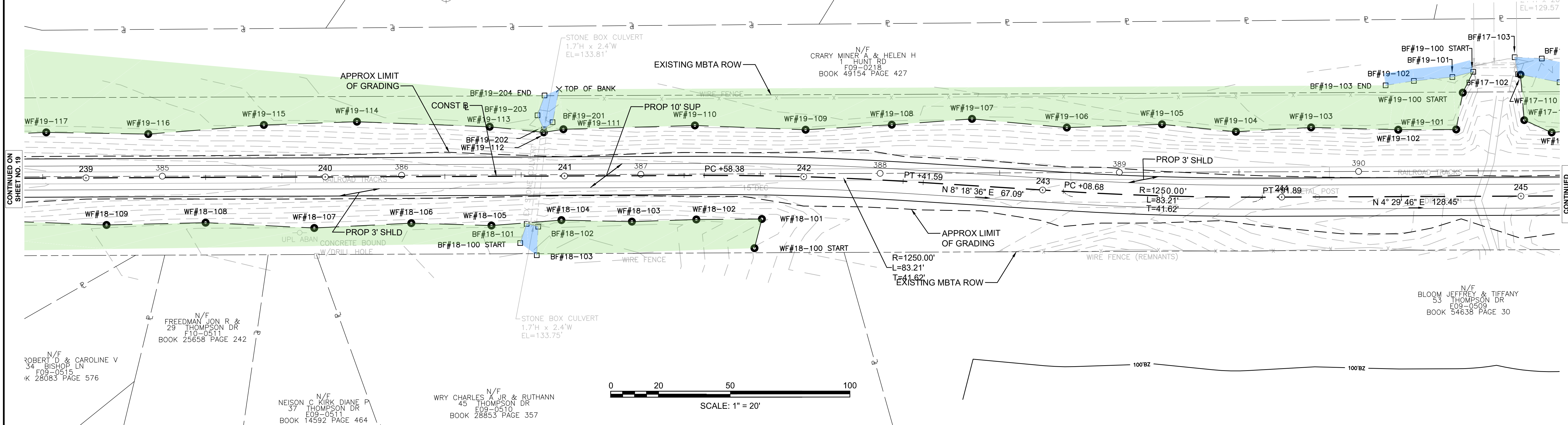
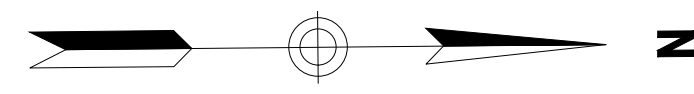
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27 HUNT RD
E09-0126
BOOK 14501 PAGE 291

N/F
STEINER KENNETH &
19 HUNT RD
E09-0127
BOOK 18899 PAGE 359

N/F
SCHOW JOAN M
11 HUNT RD
E09-0128
BOOK 12241 PAGE 378

SUDBURY BRUCE FREEMAN RAIL TRAIL			
STATE	FED AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	20	XX
PROJECT FILE NO.		608164	
CONSTRUCTION PLANS			



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SHEET NO. 19

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29 THOMPSON DR
E10-0511
BOOK 26658 PAGE 242

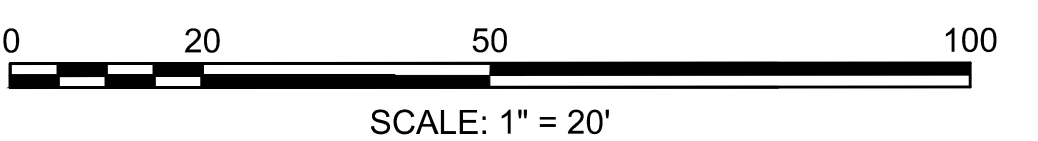
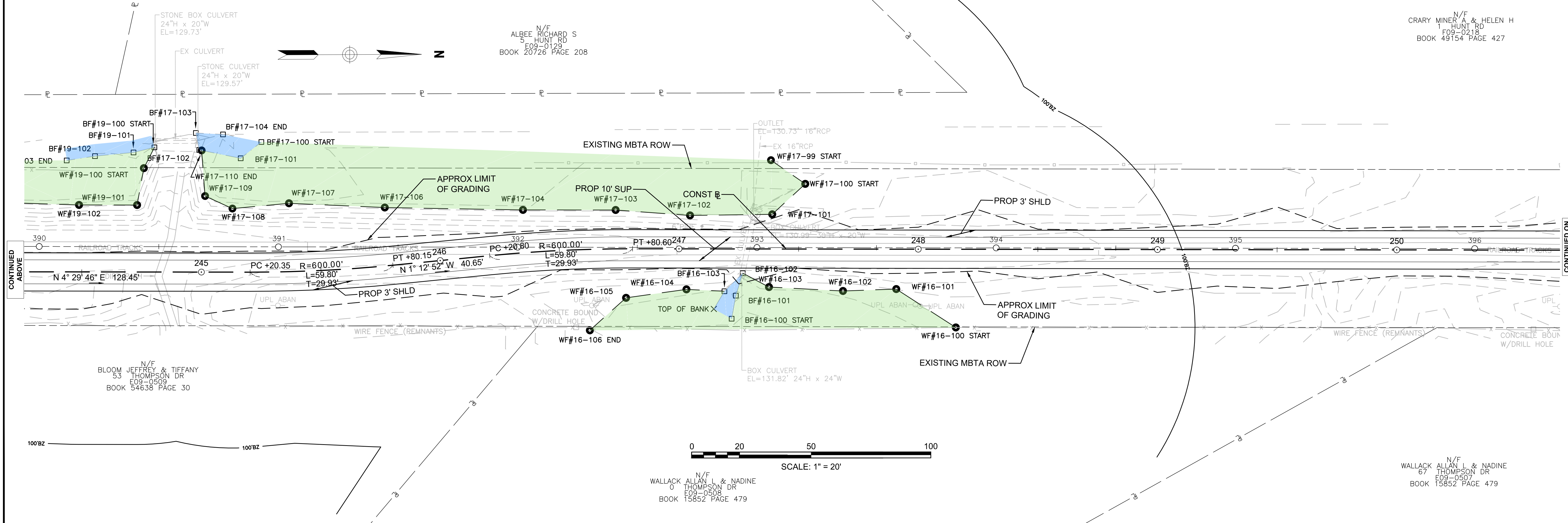
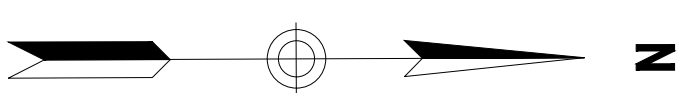
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ROBERT D & CAROLINE V
34 BISHOP LN
E09-0515
BK 28083 PAGE 576

N/F
NEISON C KIRK DIANE P
37 THOMPSON DR
E09-0510
BOOK 14592 PAGE 464

N/F
WRY CHARLES JR & RUTHANN
45 THOMPSON DR
E09-0510
BOOK 28853 PAGE 357

N/F
ALBEE RICHARD S
5 HUNT RD
E09-0129
BOOK 20726 PAGE 208

N/F
CRARY MINER A & HELEN H
1 HUNT RD
E09-0218
BOOK 49154 PAGE 427



CONTINUED
ABOVE

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ON
SHEET NO. 21

N/F
BLOOM JEFFREY & TIFFANY
53 THOMPSON DR
E09-0509
BOOK 54638 PAGE 30

N/F
WALLACK ALLAN L & NADINE
67 THOMPSON DR
E09-0508
BOOK 15852 PAGE 479

N/F
WALLACK ALLAN L & NADINE
67 THOMPSON DR
E09-0507
BOOK 15852 PAGE 479

N/F
CRARY MINER A & HELEN H
1 HUNT RD
F09-0218
BOOK 49154 PAGE 427

N/F
CRARY MINER A & HELEN H
1 HUNT RD
F09-0218
BOOK 49154 PAGE 427

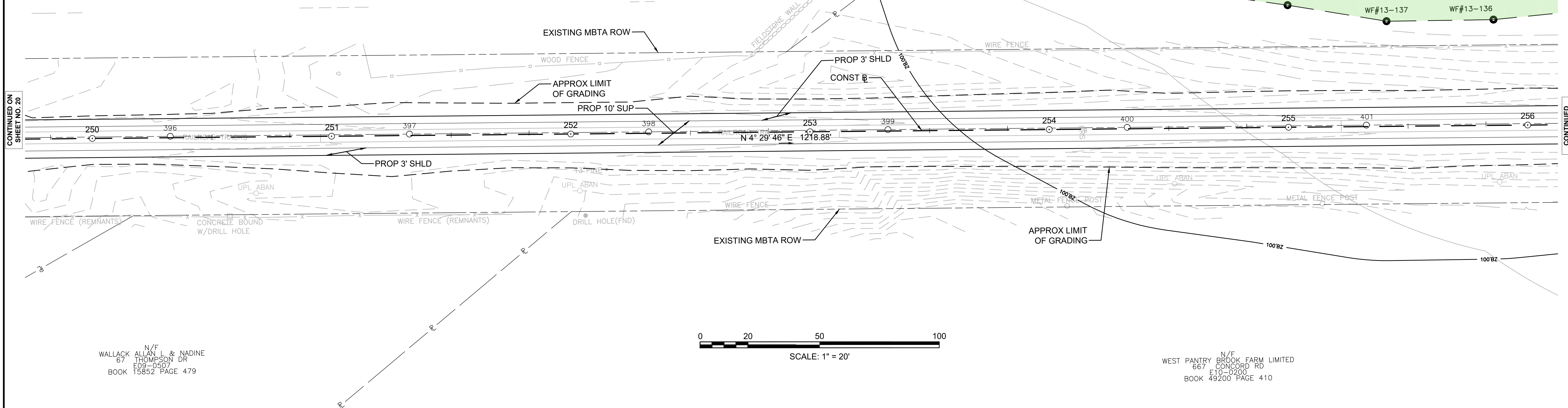
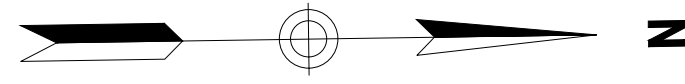
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WEST PANTRY BROOK FARM LIMITED
667 CONCORD RD
E10-0200
BOOK 49200 PAGE 410

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	21	XX

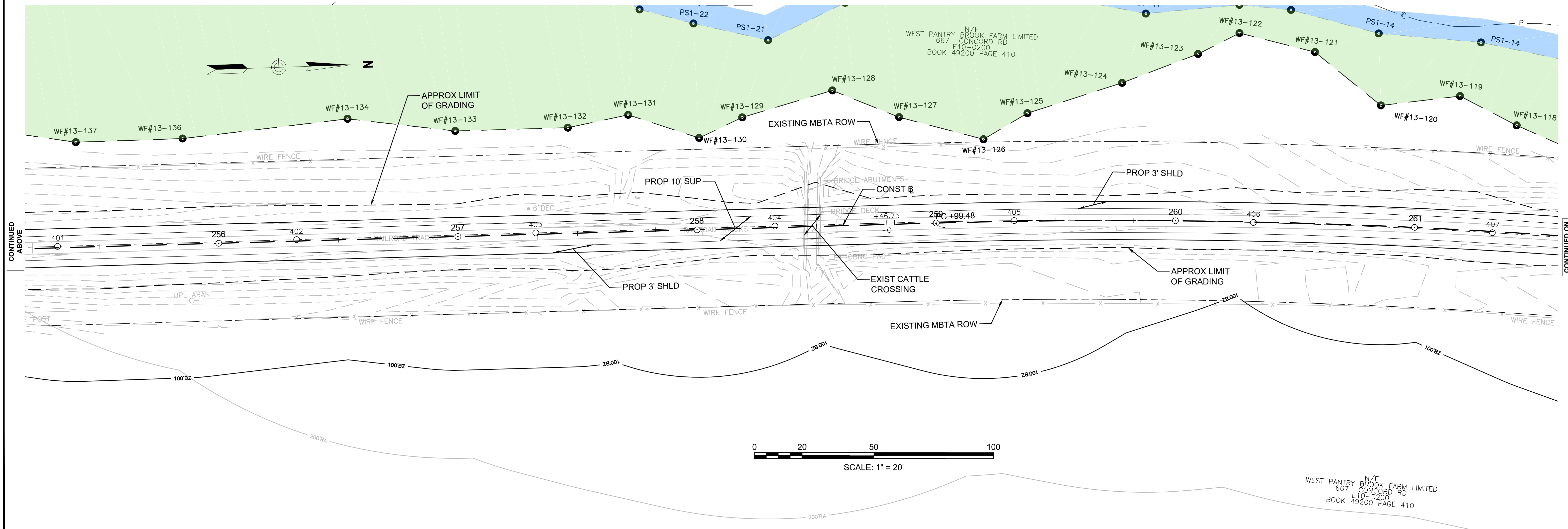
PROJECT FILE NO. 608164

CONSTRUCTION PLANS



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WALLACK ALLAN L & NADINE
67 THOMPSON DR
E09-0507
BOOK 15852 PAGE 479

N/F
WEST PANTRY BROOK FARM LIMITED
667 CONCORD RD
E10-0200
BOOK 49200 PAGE 410



N/F
WEST PANTRY BROOK FARM LIMITED
667 CONCORD RD
E10-0200
BOOK 49200 PAGE 410

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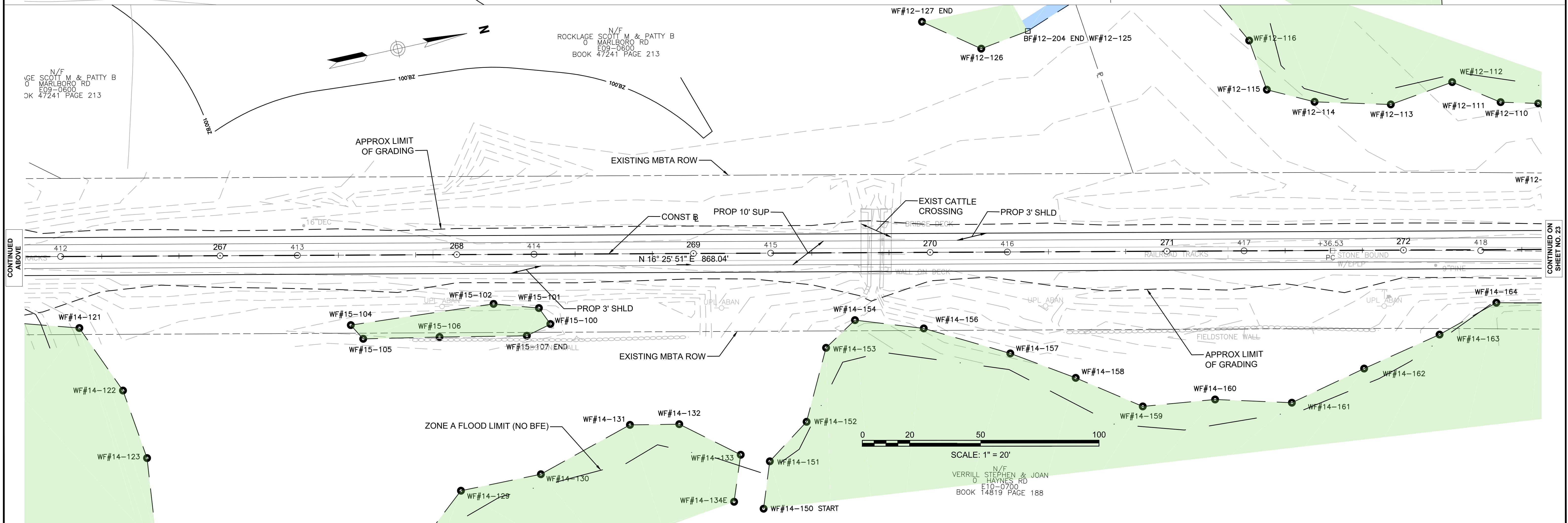
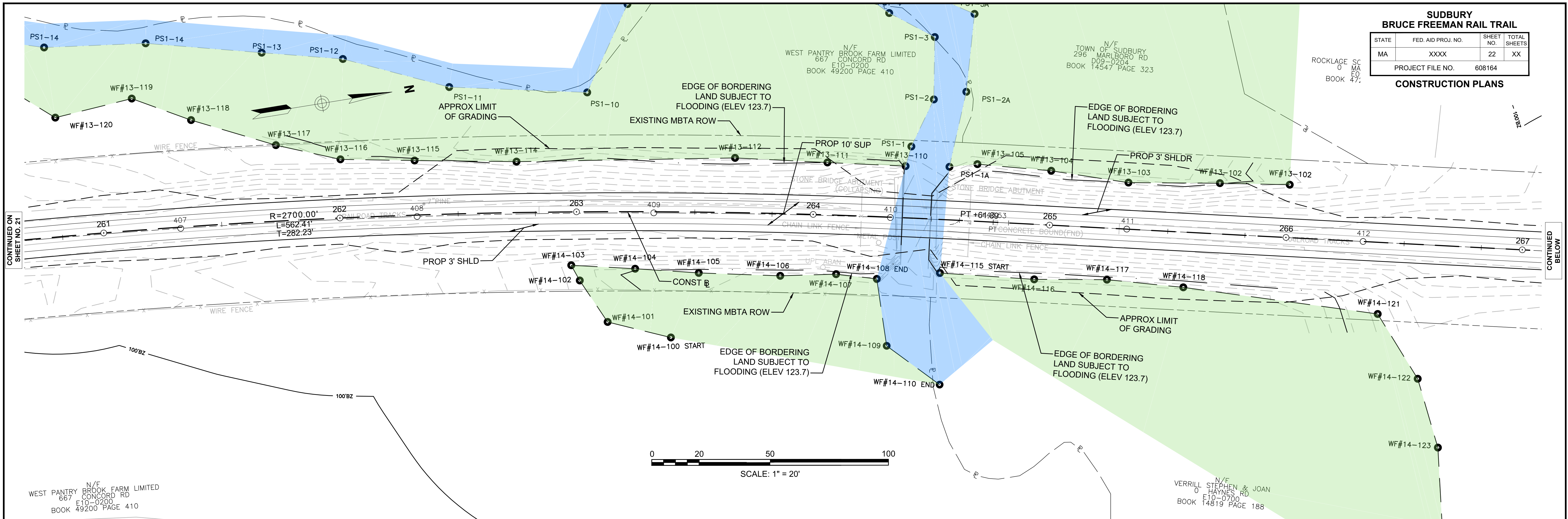
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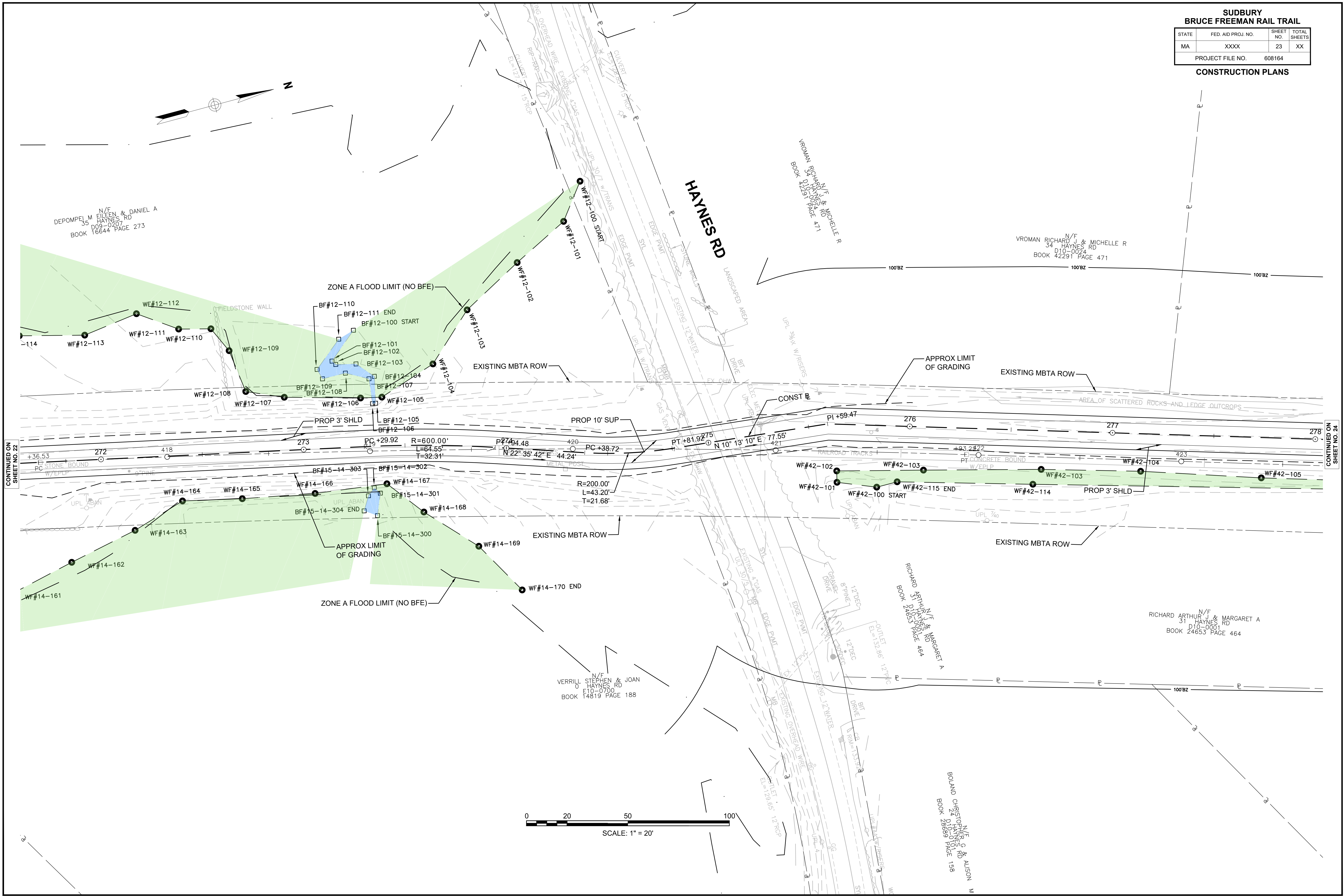
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BRUCE FREEMAN RAIL TRAIL**

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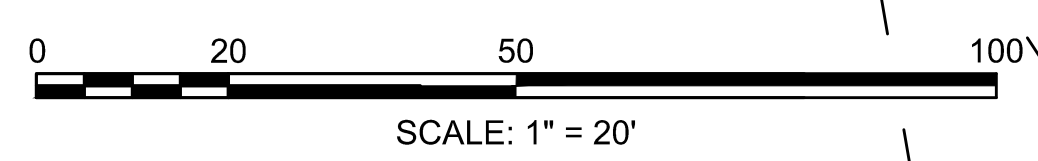
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CONSTRUCTION PLANS





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SHEET NO. 24



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31 HAYNES RD
SUDBURY MA 01801
BOOK 28689 PAGE 158

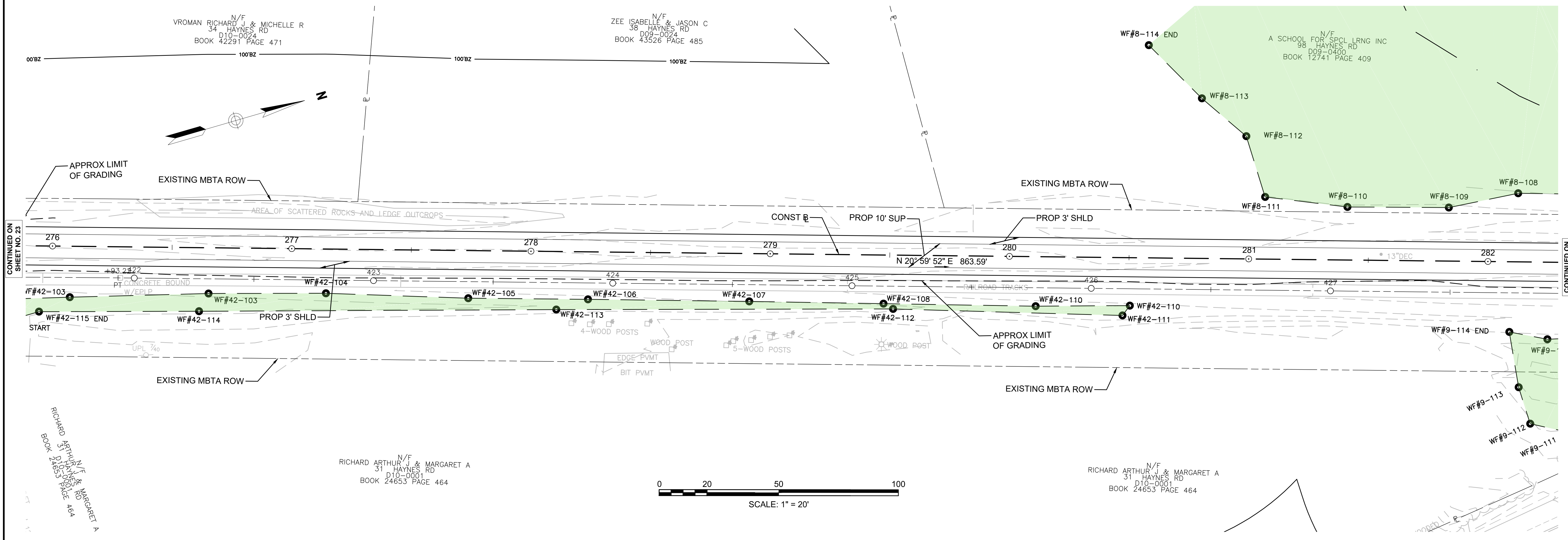
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RICHARD S & MARGARET A
28653 HAYNES RD
SUDBURY MA 01801
BOOK 28653 PAGE 464

N/F
VERRILL STEPHEN & JOAN
0 HAYNES RD
SUDBURY MA 01801
BOOK 14819 PAGE 188

N/F
RICHARD ARTHUR J & MARGARET A
31 HAYNES RD
SUDBURY MA 01801
BOOK 24653 PAGE 464

N/F
VROMAN RICHARD J & MICHELLE R
34 HAYNES RD
SUDBURY MA 01801
BOOK 42291 PAGE 471

N/F
DEPOMPEL M EILEEN & DANIEL A
35 HAYNES RD
SUDBURY MA 01801
BOOK 16644 PAGE 273



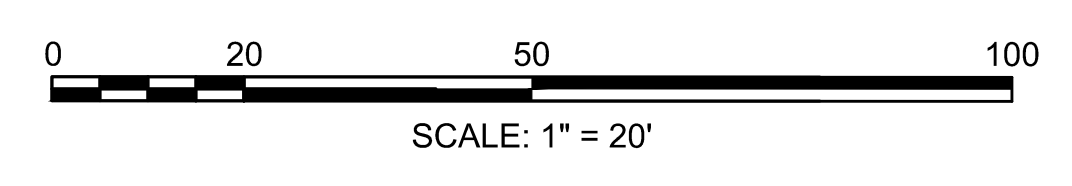
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 31 HAYNES RD
 D10-0001
 BOOK 24653 PAGE 464

RICHARD ARTHUR J & MARGARET A
 31 HAYNES RD
 D10-0001
 BOOK 24653 PAGE 464

RICHARD ARTHUR J & MARGARET A
 31 HAYNES RD
 D10-0001
 BOOK 24653 PAGE 464



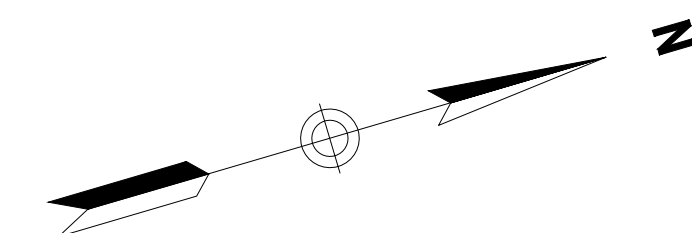
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 EAST GEORGE H JR &
 PANTRY RD
 D10-0013
 BOOK 19927 PAGE 213

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 EAST GEORGE H JR &
 PANTRY RD
 D10-0013
 BOOK 19927 PAGE 213

N/E
 SCHOOL FOR SPCL LRNG INC
 98 HAYNES RD
 D03-0400
 BOOK 12741 PAGE 409

N/E
 LYMAN LYNDEN & KRISTIN E
 76 PANTRY RD
 D10-0400
 BOOK 26054 PAGE 548

N/E
 LYMAN LYNDEN & KRISTIN E
 76 PANTRY RD
 D10-0400
 BOOK 26054 PAGE 548



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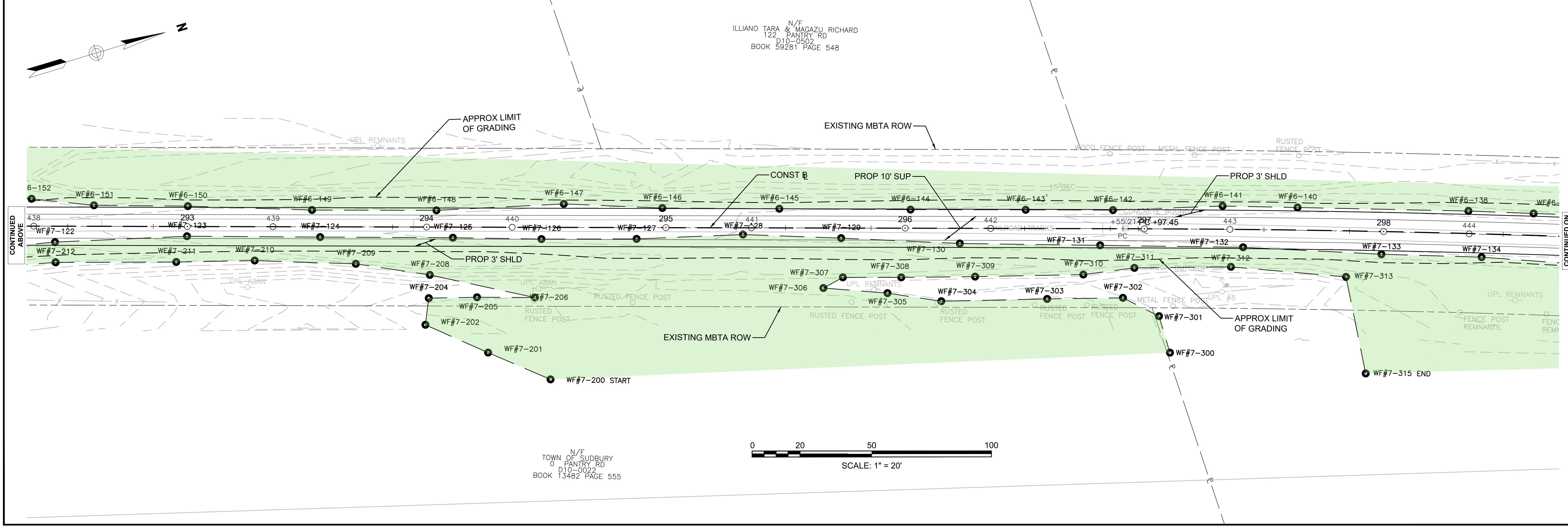
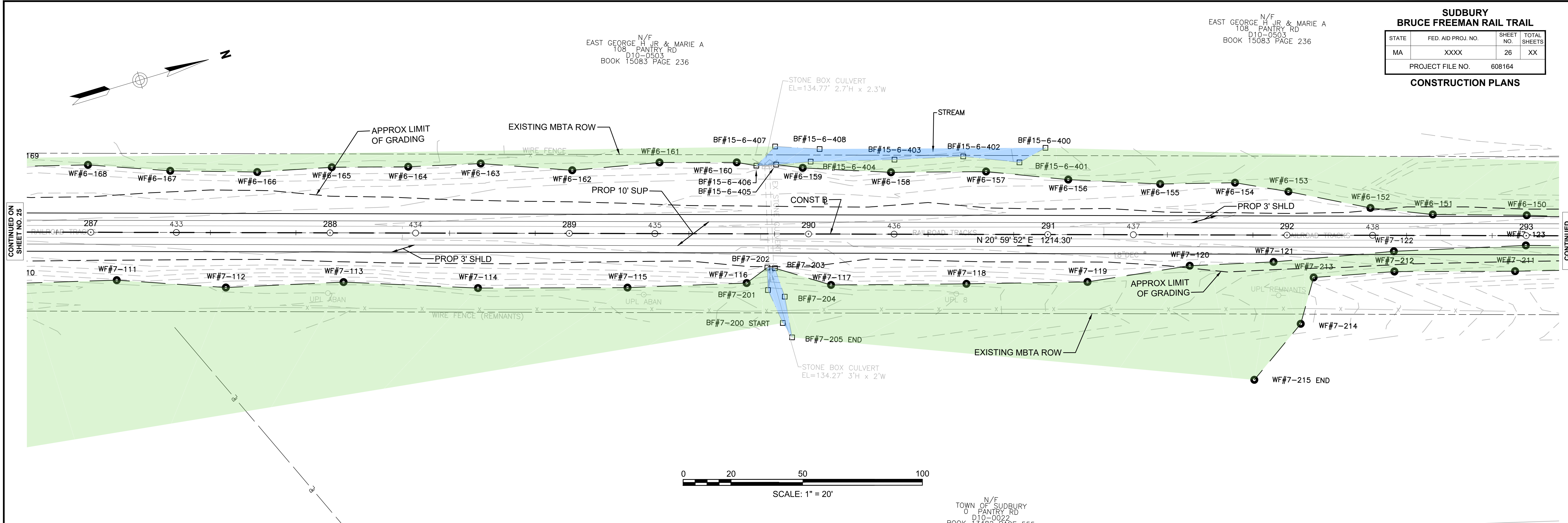
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EAST GEORGE H JR & MARIE A
108 PANTRY RD
D10-0503
BOOK 15083 PAGE 236

**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	26	XX
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS

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608164_HDGEN.DWG



N/F
EAST GEORGE H JR & MARIE A
108 PANTRY RD
D10-0503
BOOK 15083 PAGE 236

N/F
ILLIANO TARA & MAGAZU RICHARD
122 PANTRY RD
D10-0502
BOOK 59281 PAGE 548

N/F
TOWN OF SUDBURY
0 PANTRY RD
D10-0022
BOOK 13482 PAGE 555

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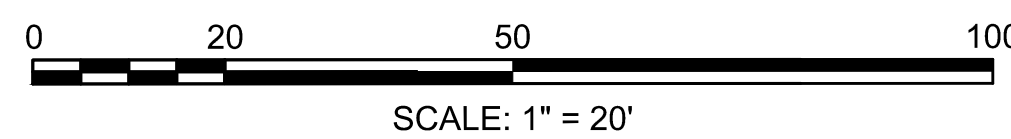
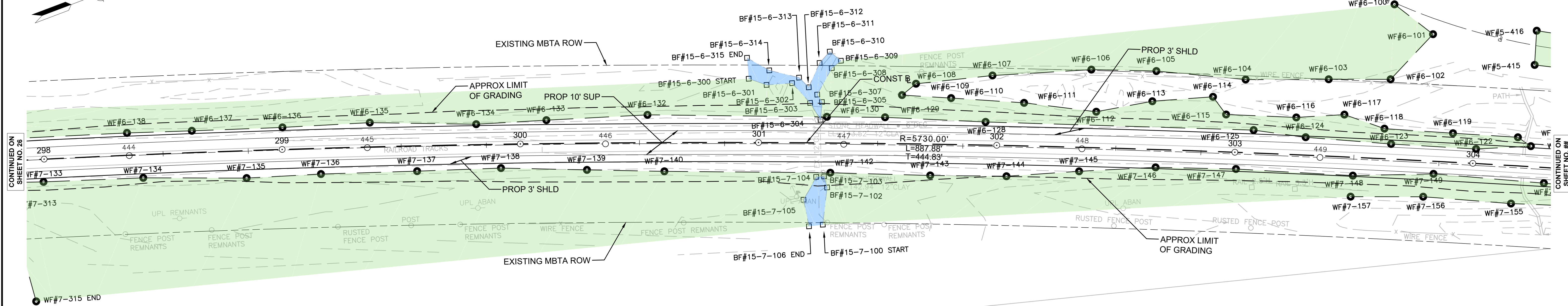
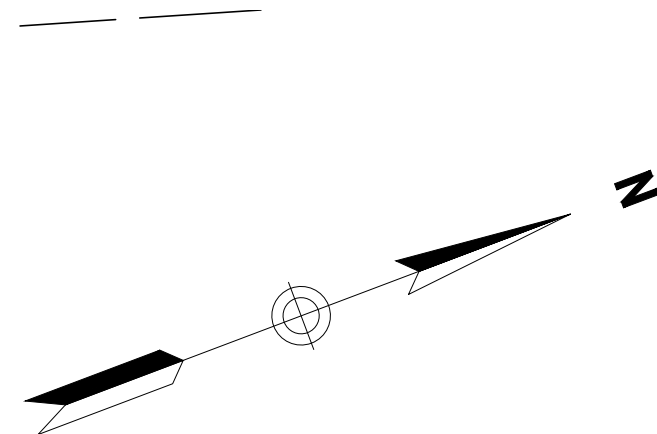
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**SUDBURY
BRUCE FREEMAN RAIL TRAIL**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	27	XX
PROJECT FILE NO.		608164	

CONSTRUCTION PLANS

N/E
BROCHU MARY F TRUSTEE
0 WINDMILL DR
C19-0006
BOOK 16775 PAGE 585



N/E
TOWN OF SUDBURY
211 NORTH RD
D10-0300
BOOK 12726 PAGE 603

SUDBURY
BRUCE FREEMAN RAIL TRAIL

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	XXXX	28	XX

PROJECT FILE NO. 608164

CONSTRUCTION PLANS

NORMAN JOHN C & DORIS
NORTH RD
C10-0013
BOOK 13793 PAGE 342

CONTINUED ON SHEET NO. ##

POPE BROTHERS
70 WINDMILL DR
BOOK 58283 PAGE 2-41

GRANT N/E CORNER
225 NORTH RD
C10-0014
BOOK 12344 PAGE 611

TOWN OF SUDBURY
CONCORD RD
D10-0018
BOOK 12754 PAGE 314

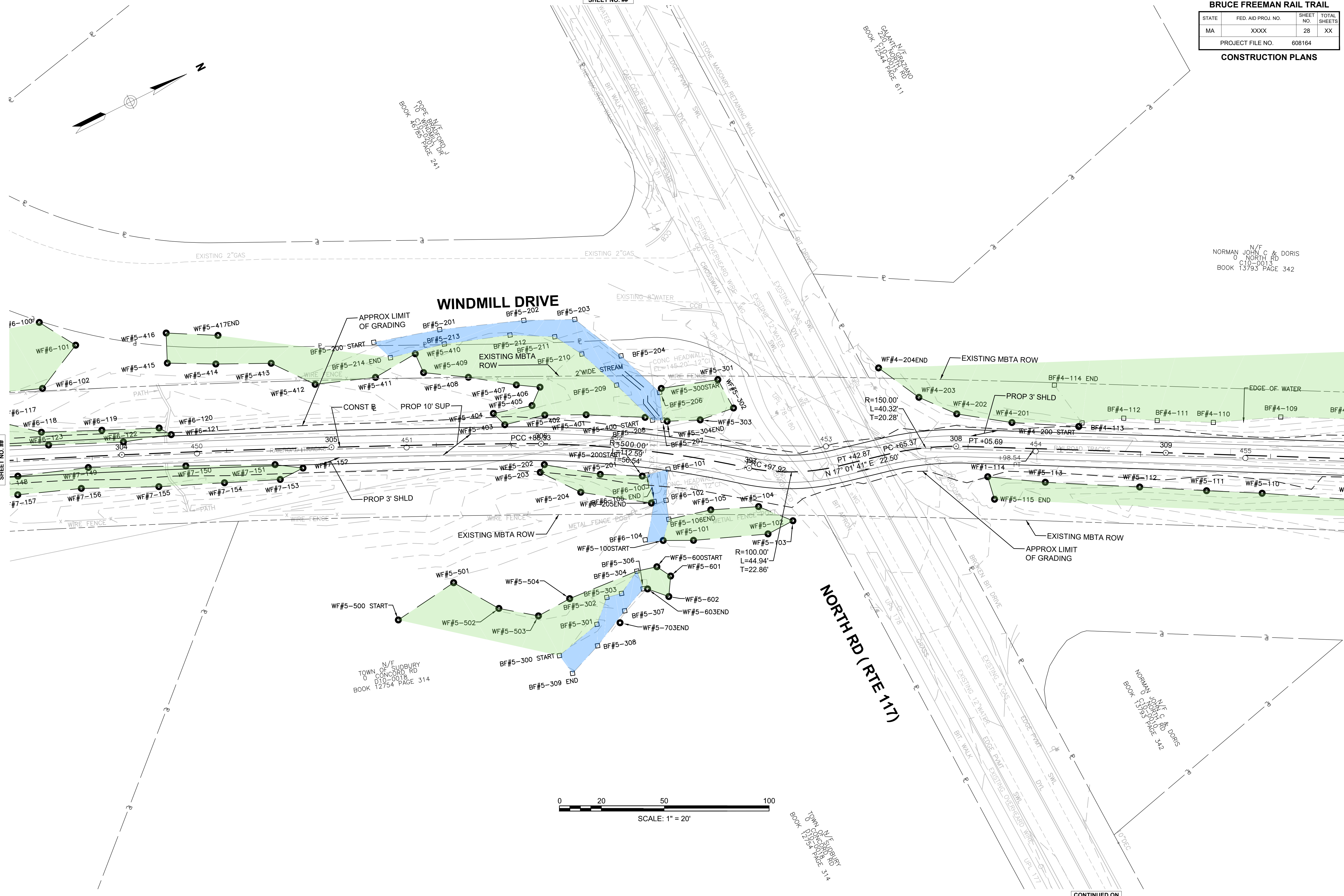
TOWN OF SUDBURY
CONCORD RD
D10-0018
BOOK 12754 PAGE 314

NORMAN JOHN C & DORIS
NORTH RD
C10-0013
BOOK 13793 PAGE 342

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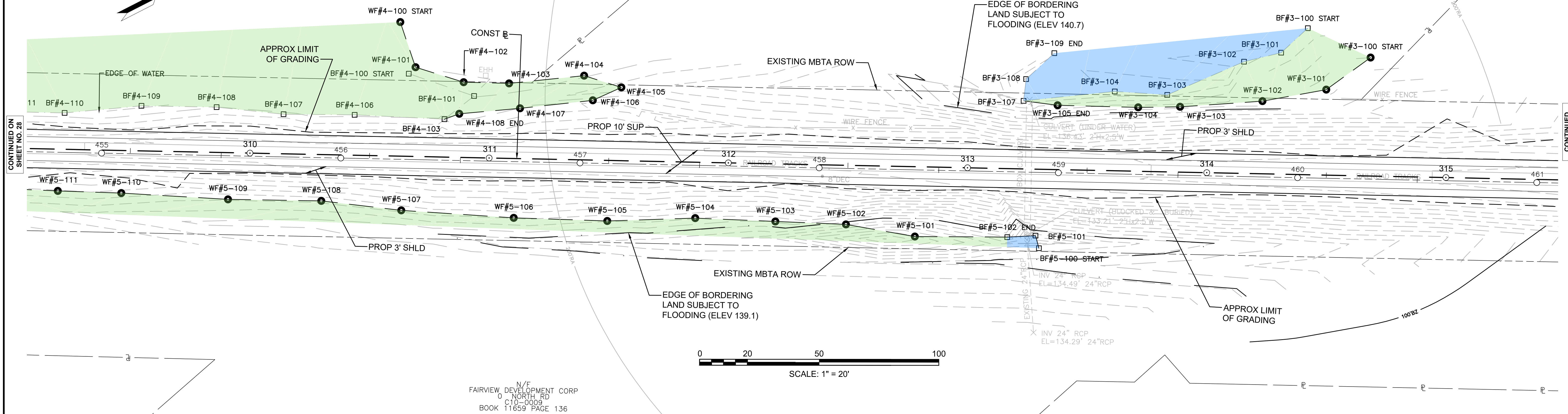
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0 NORTH RD
C10-0013
BOOK 13793 PAGE 342

NORMAN JOHNSON
0 NORTH RD
C10-0013
BOOK 13793 PAGE 342

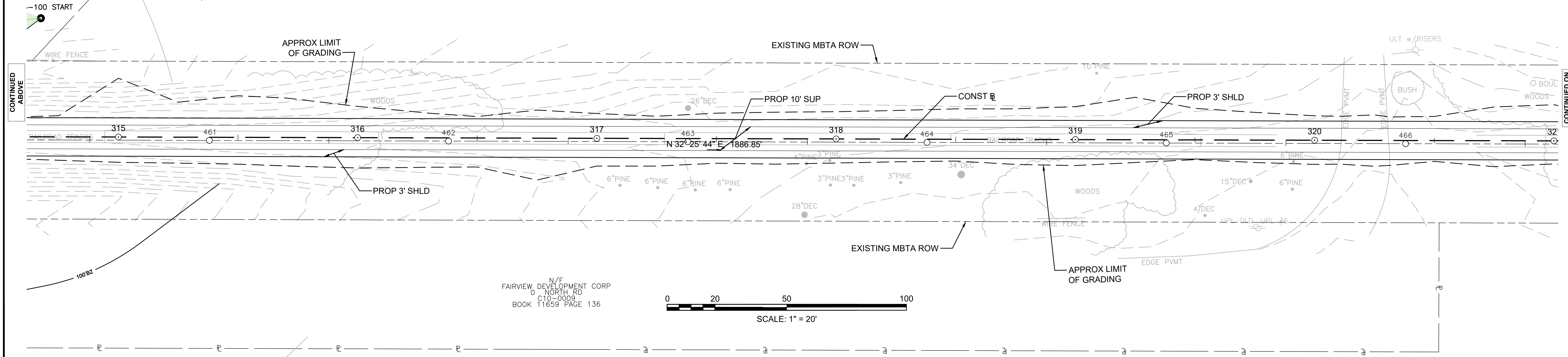


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FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0009
BOOK 11659 PAGE 136

N/F
FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0401
BOOK 9512 PAGE 83

N/F
JOHN C & DORIS
0 NORTH RD
C10-0012
BOOK 13793 PAGE 342

N/F
FAIRVIEW DEVELOPMENT CORP
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C10-0401
BOOK 9512 PAGE 83



N/F
FAIRVIEW DEVELOPMENT CORP
0 NORTH RD
C10-0009
BOOK 11659 PAGE 136

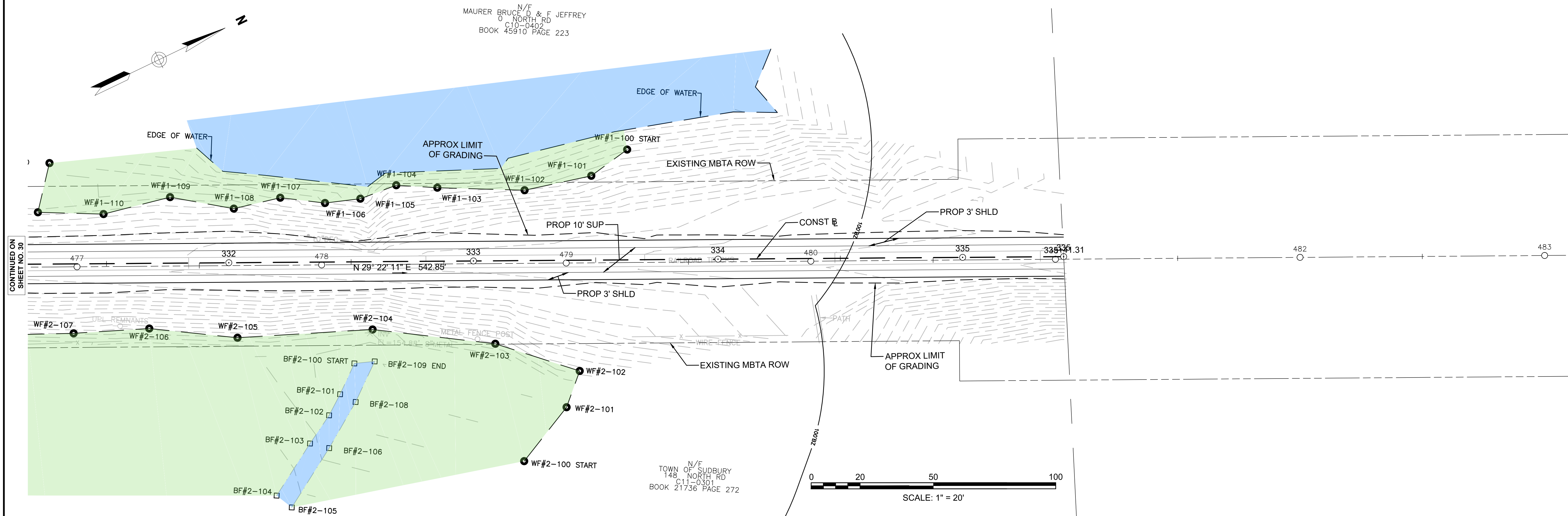
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0 NORTH RD
C10-0012
BOOK 13793 PAGE 342

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SHEET NO. 28

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ON
SHEET NO. 30



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SHEET NO. 30

GENERAL WILDLIFE HABITAT ASSESSMENT REPORT

Appendix B Preliminary Impact Tables

April 8, 2020

Appendix B PRELIMINARY IMPACT TABLES



SUMMARY QUANTITY SHEET

FROM EARTHWORKS SHEETS:

<u>Elevation</u>	<u>Fill FLP (CY)</u>	<u>Cutting FLP (CY)</u>
173.3'-174.3'	2.93	72.77
172.3'-173.3'	0.09	0.00

TOTALS: **3.02** **CY** **72.77** **CY**

Sections with Floodplain

Sta 116+00 to Sta 132+00	No Impacts
Sta 195+00 to 201+50	Impacts
Sta 263+50 to Sta 266+00	No Impacts
Sta 311+00 to 314+50	No Impacts

EARTHWORK QUANTITY SHEET

FILL FLOOD PLAIN

Station	Length (ft)	Fill Area (sf) 173.3'-174.3'	Avg Fill Area (sf)	Fill Vol (cy)	Fill Area (sf) 172.3'-173.3'	Avg Fill Area (sf)	Fill Vol (cy)	
195+00		0.00			0.00			
195+50	50	0.00	0.0	0.00	0.00	0.0	0.00	
196+00	50	0.00	0.0	0.00	0.00	0.0	0.00	
196+50	50	0.00	0.0	0.00	0.00	0.0	0.00	
197+00	50	0.00	0.0	0.00	0.00	0.0	0.00	
197+50	50	0.00	0.0	0.00	0.00	0.0	0.00	
198+00	50	0.23	0.1	0.21	0.00	0.0	0.00	
198+50	50	0.11	0.2	0.31	0.00	0.0	0.00	
199+00	50	0.06	0.1	0.16	0.00	0.0	0.00	
199+50	50	0.00	0.0	0.06	0.00	0.0	0.00	
200+00	50	1.08	0.5	1.00	0.05	0.0	0.05	
200+50	50	0.02	0.6	1.02	0.00	0.0	0.05	
201+00	50	0.00	0.0	0.02	0.00	0.0	0.00	
201+50	50	0.16	0.1	0.15	0.00	0.0	0.00	
TOTAL:				2.93	TOTAL: 0.09			

Calculated by: MAD
 Checked by: JCR 6/17

EARTHWORK QUANTITY SHEET

CUT FLOOD PLAIN

Station	Length (ft)	Cut Area (sf) 173.3'-174.3'	Avg Cut Area (sf)	Cut Vol (cy)	Cut Area (sf) 172.3'-173.3'	Avg Cut Area (sf)	Cut Vol (cy)		
195+00		0.00			0.00				
195+50	50	0.00	0.0	0.00	0.00	0.0	0.00		
196+00	50	0.00	0.0	0.00	0.00	0.0	0.00		
196+50	50	0.00	0.0	0.00	0.00	0.0	0.00		
197+00	50	5.99	3.0	5.55	0.00	0.0	0.00		
197+50	50	7.52	6.8	12.51	0.00	0.0	0.00		
198+00	50	7.62	7.6	14.02	0.00	0.0	0.00		
198+50	50	6.76	7.2	13.31	0.00	0.0	0.00		
199+00	50	6.44	6.6	12.22	0.00	0.0	0.00		
199+50	50	4.36	5.4	10.00	0.00	0.0	0.00		
200+00	50	0.00	2.2	4.04	0.00	0.0	0.00		
200+50	50	0.36	0.2	0.33	0.00	0.0	0.00		
201+00	50	0.19	0.3	0.51	0.00	0.0	0.00		
201+50	50	0.11	0.2	0.28	0.00	0.0	0.00		
TOTAL:				72.77	TOTAL:				0.00

Calculated by: MAD
 Checked by: JCR 6/17

Bordering Vegetated Wetland (BVW) Impacts

Wetland Flag Number	Wetland Impact Type		Station
	Temporary (sq. ft.)	Permanent (sq. ft.)	
1			
2			
3			
4	7	0	Sta 307+80 to 311+65 LT
5	28	1	Sta 305+40 to 312+90 RT
6	708	93	Sta 285+70 to 304+35 LT
7	2490	910	Sta 284+60 to 304+95 RT
8			
9	6	0	Sta 282+15 to 283+50 RT
10			
11			
12			
13			
14			
15			
16	11	4	Sta 246+65 to 248+20 RT
17			
18			
19			
20			
21			
22			
23			
24	1	0	Sta 208+25 to 212+15 RT
25	9	0	Sta 207+00 to 212+50 LT
26	6	0	Sta 196+70 to 200+00 RT
27			Sta 196+25 to 200+00 LT
28			
29			
30			
31	332	0	Sta 169+25 to 172+50 LT
32			
33			Sta 140 LT - Potential Vernal Pool
33A			Sta 160 RT
34			
35			
36	5	0	Sta 103+25 to 107+75 LT & RT
36			Sta 188+75 to 189+40 RT (SURVEYED BY OTHERS)
37			Potential Vernal Pool
38	3	0	
39			

Bordering Vegetated Wetland (BVW) Impacts

Wetland Flag Number	Wetland Impact Type		Station
	Temporary (sq. ft.)	Permanent (sq. ft.)	
40			
41			
42	64	3	Sta 275+70 to 280+55 RT
PROJECT	3670	1011	4,681

Bank Impacts

Bank Flag Number	Bank Impact Type				Station
	Temporary (ln. ft.)	Temporary (sq. ft.)	Permanent (ln. ft.)	Permanent (sq. ft.)	
1					
2					
3					
4					
5					
6	6	15	10	10	Sta 306+60 to 306+70 RT
7					
8					
9					
10					
11					
12					
13					Pantry Brook
14					Pantry Brook
15 - 6	3	1	0	0	Sta 301+10 to 301+40 LT
15 - 24	13	6	0	0	Sta 212+00 to 215+55 RT
16	5	7	8	4	Sta 247+20 to 247+30 RT
17					
18					
19					
20					
21					
22					
23	298	376	0	0	Sta 216+30 to 221+60 RT
24					
25					
26					
27					
28					
29					
30	1,380	4,180	29	64	Sta 167 to 174
31					
32					
33					Sta 140 LT - Potential Vernal Pool
33A					Sta 160 RT
34					
35					
36					
37					Potential Vernal Pool
38					
39					

Bank Impacts

Bank Flag Number	Bank Impact Type				Station
	Temporary (ln. ft.)	Temporary (sq. ft.)	Permanent (ln. ft.)	Permanent (sq. ft.)	
40					
41					
42					
PROJECT	1705	4585	47	78	

To: Jodie Kablack – Town of Sudbury

Date: May 22, 2015



Project #: 12984.00

From: Meghan Selby,
Environmental Scientist

Re: Vernal Pool Investigation

Memorandum

This memorandum describes the results of a field investigation that was conducted along the proposed Bruce Freeman Rail Trail (BFRT) corridor on April 24, 2015. The investigation included verifying the presence or absence of egg masses or individuals of obligate vernal pool species within certified and potential vernal pools along the BFRT corridor (Figure 1).

The *Existing Conditions Survey Plan at Proposed Rail Trail in Sudbury, Mass.*, prepared by Atlantic Engineering & Survey Consultants Inc., dated June 30, 2008, was used as the base for the vernal pool investigation (Attachment A). The plan set identified a single certified vernal pool (CVP), numerous potential vernal pools (PVPs), a single Sudbury vernal pool (SVP), and isolated wetlands. In addition to the previously identified areas the field team walked the corridor looking for any additional areas that had vernal pool characteristics. The following lists of vernal pool criteria were used as the basis for documenting areas along the corridor.

The results of the investigation are summarized in Table 1 and described in further detail the following sections.

Vernal Pool Criteria

The March 2009 *Guidelines for the Certification of Vernal Pool Habitat* (Guidelines) defines the Vernal Pool Certification Criteria based on biological and physical evidence.

Biological criteria include:

- Obligate species (wood frog (*Lithobates sylvaticus*), spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*A. laterale*), Jefferson salamander (*A. jeffersonianum*), and marbled salamander (*A. opacum*)
 - Wood frog chorusing
 - At least 5 pairs of mated wood frogs
 - At least 5 egg masses of either wood frogs or spotted salamanders
 - One egg mass of state-listed blue-spotted or Jefferson salamander
 - Mating adult salamanders
 - Salamander spermatophores
 - Salamander or wood frog larvae
 - Fairy shrimp (*Anostraca: Eubranchipus*)
- Facultative species (spring peeper, gray treefrog, American toad, Folwer's toad) – at least two species must be present.
 - Adult chorusing
 - At least 5 mated pairs
 - Any number of egg masses

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- Tadpoles

Physical criteria include evidence that there is a pool with no permanently flowing outlet (no culvert or stream). The Guidelines defines Vernal Pool Boundary as:

- A distinct and clear topographic break at the edge of a pool or
- The maximum observed or recorded extent of flooding, as evidenced by:
 - Leaf staining or other indicators of hydrology, or
 - The mean annual high water mark as observed in March through early April.

The *Sudbury Wetlands Administration Bylaw Regulations* (Revised August 11, 2014) further defines a vernal pool as:

any confined basin or depression not occurring in existing lawns, gardens, landscaped areas, or driveways which, at least in most years, holds water for a minimum of two continuous months during the spring and/or summer, contains at least 200 cubic feet of water at some time during most years, is free of adult predatory fish populations, and provides essential breeding and rearing habitat functions for amphibian, reptile, or other vernal pool community species.

Results

Results from the investigation are summarized in the following table and described in greater detail in the following section.

Table 1. Vernal Pool Investigation Results Summary

ID	Between Stations	Water Depth (in)	Findings
PVP 1	468.00-468.50	<1	No VP species found.
PVP 2	453.00-457.00	24-48	No VP species found.
PVP 3	440.50-441.50	2-3	No VP species found.
PVP 4*	431.50-435.00	6-15	1 wood frog egg mass and 2 spotted salamander egg masses.
PVP 5*	427.50-429.25	2-12	No VP species found. 1 predacious diving beetle observed.
PVP 6*	418.00-419.00	2-6	No VP species found. Direct outlet to adjacent stream.
PVP 7	393.50-395.50	6-8	No VP species found. Limited opportunity for egg mass attachment.
PVP 8	389.00-390.50	2-3	No VP species found. Water was flowing through area instead of ponding due to topography.
SVP 9	376.50-377.50	2-5	No VP species found.
PVP 10	373.00-374.50	0	No VP species found. Area was dry at time of inspection.

ID	Between Stations	Water Depth (in)	Findings
PVP 11*	384.50-385.50	10-12	8 spotted salamander egg masses. Approx. 5 small (~4in) fish swimming near some of the egg masses.
PVP 12*	354.50-356.00	12-24	No VP species found. Limited opportunity for egg mass attachment.
CVP 13*	336.00-337.00	5-24	15+ blue spotted salamander, 15+ spotted salamander, and 10+ wood frog egg masses found.
PVP 14*	334.00-335.00	4-6	No VP species found.
PVP 15	284.50-286.50	4-18	1 wood frog egg mass found. No other signs of VP species.
PVP 16	254.50-255.50	2-10	No VP species found. (~10 wood frog egg masses found on 4/22/15)
PVP 17	254.50-256.00	0-6	No VP species found. Oil sheen present throughout isolated wetland.
PVP 18	249.00-254.00	0-12	No VP species found.
PVP 19	247.00-248.00	0	No VP species found. Area was dry at time of inspection.

*Areas within mapped priority and estimated habitat as provided by NHESP.

Based on the findings of the April 2015 survey of potential vernal pools along the proposed Bruce Freeman Rail Trail in Sudbury, only Potential Vernal Pools 4, 11, 15, and 16 are eligible for certification as Vernal Pools with the Natural Heritage and Endangered Species Program. Vernal Pool 13 is already certified and was confirmed with by our findings. Although a single wood frog egg mass was observed within Potential Vernal Pool 15, it would not meet NHESP certification requirements.

The following are photographs from the field investigation of each of the pools, and additional site specific notes.

Potential Vernal Pool Area 1 – Between Stations 468.00 and 468.50.



PVP 1 was within a larger wetland complex. The area does not appear to hold enough water long enough for VP species utilization. Water levels were less than 1 inch. No VP species were observed.

Potential Vernal Pool Area 2 – Between Stations 453.00 and 457.00.



PVP 2 is part of a larger wetland complex. Water levels were to a depth of approximately 2 feet along the outer edge and up to 4 feet within the center of the pool. Despite the abundance of suitable egg laying locations (over hanging branches) no VP species or evidence of species was observed during the investigation.

Potential Vernal Pool Area 3 – Between Stations 440.50 and 441.50.

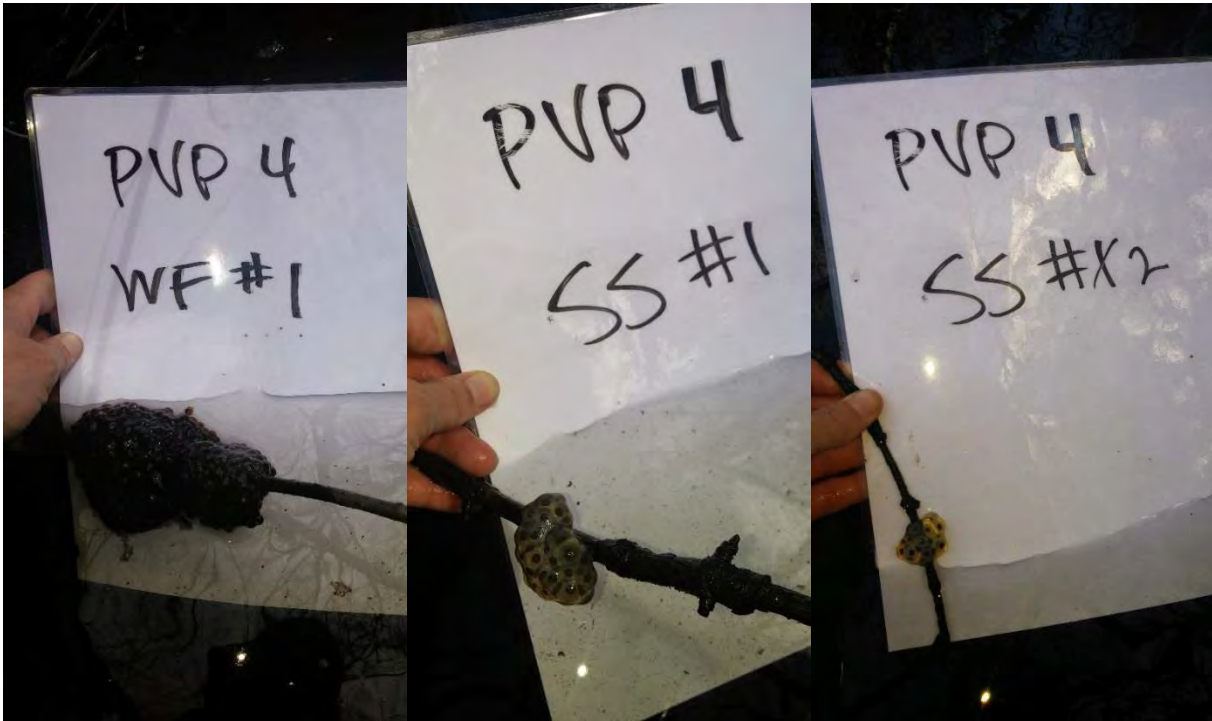


PVP 3 is a shallow and narrow depression that runs parallel to the rail bed. Water depths were 2-3 inches and no VP species were observed.

Potential Vernal Pool Area 4 – Between Stations 431.50 and 435.00.



PVP 4 is to the east of Pantry Road and on the western limit of the BFRT corridor. The pool had standing water ranging from 6 to 15 inches. High levels of iron were observed within the pool. Numerous branches were positioned along the edge of the pool, creating good egg mass attachment opportunities.



One wood frog and two spotted salamander egg masses were found within PVP 4. This area is within Priority Habitat of Rare Species (PH 617) and Estimated Habitat of Rare Wildlife (EH 543).

Potential Vernal Pool Area 5 – Between Stations 427.50 and 429.25.



PVP 5 is a narrow depression with shallow pockets of water along the fringes and up to 12 inches in the center. No VP species were observed within the pool. Clumps of algae were observed on some branches and within the deeper sections of the water. This area is within Priority Habitat of Rare Species (PH 617) and Estimated Habitat of Rare Wildlife (EH 543).

Potential Vernal Pool Area 6 – Between Stations 418.00 and 419.00.



PVP 6 is a shallow depression adjacent to a stream. Standing water within the depression ranged from 2 to 6 inches. No VP species were observed. This area is within Priority Habitat of Rare Species (PH 617) and Estimated Habitat of Rare Wildlife (EH 543).



Water within the PVP 6 area was actively draining into the adjacent stream at the time of the inspection.

Potential Vernal Pool Area 7 – Between Stations 393.50 and 395.50.



PVP 7 is a shallow depression with standing water ranging from 6 to 8 inches. The depression was approximately 10 feet at its widest point. No VP species were observed.

Potential Vernal Pool Area 8 – Between Stations 389.00 and 390.50.



PVP 8 is a shallow secondary channel adjacent to a well-defined stream. No VP species were observed.



PVP 8 had flowing water ranging from 2 to 3 inches deep before the confluence with the main stream channel.

Sudbury Vernal Pool 9 – Between Stations 376.50 and 377.50.



SVP 9 had approximately 2 to 5 inches of standing water. No permanent outlet was present. No VP species were observed.

Potential Vernal Pool Area 10 – Between Stations 373.00 and 374.50.



PVP 10 is a channel like depression that runs along rail bed's the toe of slope. The area was dry at the time of inspection. Based on topography within this area it is unlikely that water ponds up for the requisite period of time for VP species to utilization. No VP species were found.

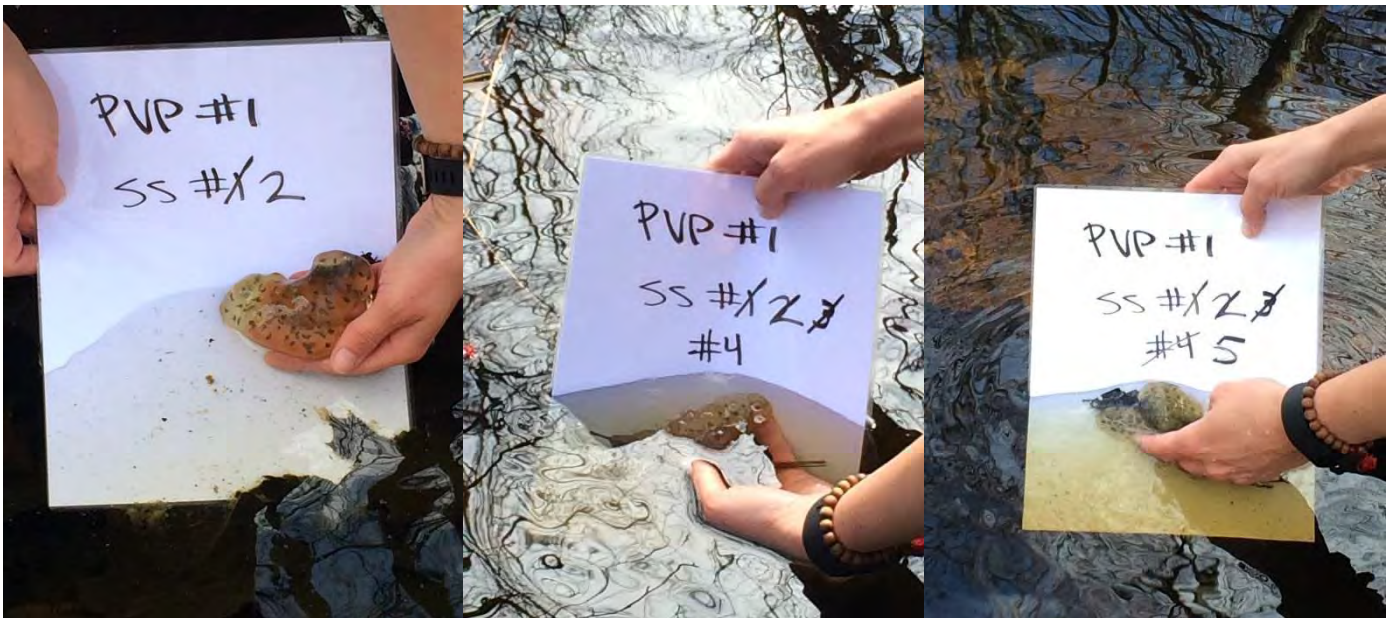
Potential Vernal Pool Area 11 – Between Stations 384.50 and 385.50.



PVP 11 is part of a larger wetland complex. The southern extent of the complex (as pictured above) had standing water between 10 and 12 inches.



The northern extent of the wetland complex (PVP 11) transitions into a wide channel and to the northeast a pond. Small fish approximately 4 inches in length were primarily observed within the larger channel area and a few were found swimming within a few feet of the spotted salamander egg masses.



Eight spotted salamander egg masses were observed within PVP 11. These were localized within the southern extent of the wetland complex. This area is within Priority Habitat of Rare Species (PH 528) and Estimated Habitat of Rare Wildlife (EH 437).

Potential Vernal Pool Area 12 – Between Stations 354.50 and 356.00

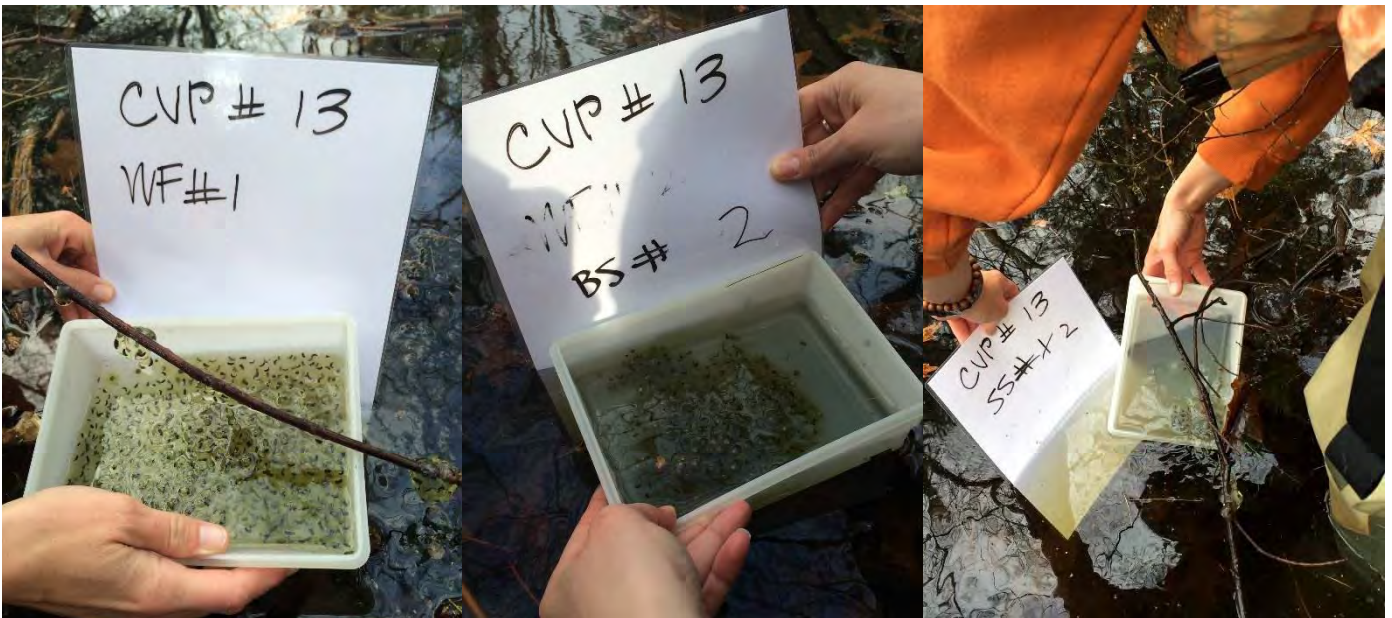


PVP 12 is on the western side of the BFRT corridor, across from PVP 11. PVP 12 is a farm pond that has the potential to hold water through most of the year. Water depths were approximately 1 to 2 feet. There were little to no branches within the outer fringe of the pond along the eastern limit (within the ROW easement). No VP species were found. This area is within Priority Habitat of Rare Species (PH 528) and Estimated Habitat of Rare Wildlife (EH 437).

Certified Vernal Pool 13 – Between Stations 336.00 and 337.00.



CVP 13 is approximately 80 by 100 feet and had up to approximately 2 feet of standing water at the time of the inspection. This area is within Priority Habitat of Rare Species (PH 528) and Estimated Habitat of Rare Wildlife (EH 437).



Wood frog (10+), spotted salamander (15+), and blue-spotted salamander (15+) egg masses were found throughout the pool. A number of individual and clusters of 2-5 eggs were also found throughout and on the bottom of the pool.

Potential Vernal Pool Area 14 – Between Stations 334.00 and 335.00.



PVP 14 was holding approximately 4 to 6 inches of standing water at the time of inspection. This area is within Priority Habitat of Rare Species (PH 528) and Estimated Habitat of Rare Wildlife (EH 437). No VP species were found.

Potential Vernal Pool Area 15 – Between Stations 284.50 and 286.50.



PVP 15 is a narrow depression that is coincident with the rail bed's toe of slope. The center of the depression was holding approximately 18 inches of water at the time of inspection. One wood frog egg mass was found. No other VP species were observed.

Potential Vernal Pool Area 16 – Between Stations 254.50 and 255.50.



PVP 16 is within a constructed detention basin. At the time of inspection standing water reached depths of 10 inches in the southern extent and the basin was dry in the northern extent. No VP species were observed. An oil sheen was present on the surface of the water and small piles of snow and associated debris were present. During a flagging event on April 15, 2015 staff heard wood frog chorusing and noted multiple wood frog egg masses within the center of the pool.

Potential Vernal Pool Area 17 – Between Stations 254.50 and 256.00.



PVP 17 is an isolated wetland. The depression was holding up to 6 inches of water in the center. An oil sheen was present within the pool and no VP species were observed.

Potential Vernal Pool Area 18 – Between Stations 249.00 and 254.00.

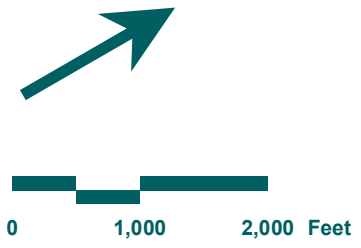
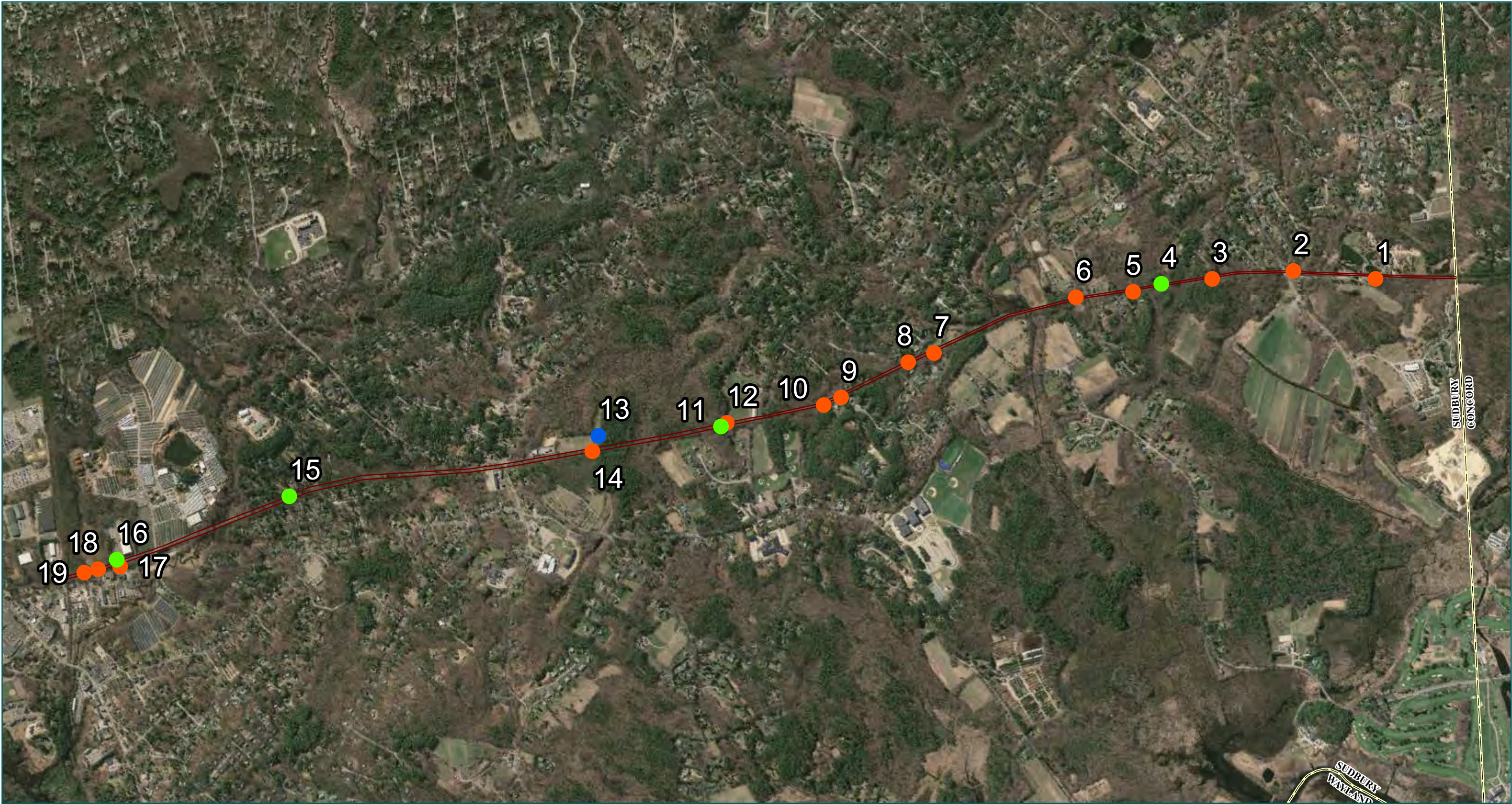


PVP area 18 is part of a large cattail marsh wetland complex with a stream channel flowing through the center. The stream is carried under the rail road bed through a culvert and connects to a wetland on the eastern side of the alignment. The investigation was limited to the railroad easement and no VP species were found.

Potential Vernal Pool Area 19 – Between Stations 247.00 and 248.00



PVP 19 is an isolated wetland located to the west of the rail alignment. The area was dry at the time of the inspection and no VP species were found.



- Legend**
- Certified Vernal Pool
 - Eligible to be Certified
 - Non-Eligible to be Certified
 - ▭ Bruce Freeman Rail Trail Corridor

Figure 1 – Site Location Map
Bruce Freeman Rail Trail
Sudbury, Massachusetts

SUDBURY BRUCE FREEMAN RAIL TRAIL EXISTING CONDITIONS BASE SURVEY

SITE NOTES

- TOPOGRAPHY, PROPERTY LINE INFORMATION AND SITE FEATURES WERE OBTAINED FROM AN ON THE GROUND SURVEY BY ATLANTIC ENGINEERING PERFORMED BETWEEN MARCH AND JUNE OF 2008.
- THE LOCATIONS OF ALL EXISTING UTILITIES ARE TAKEN FROM EXISTING AVAILABLE INFORMATION AND SHOULD BE CONSIDERED APPROXIMATE. THERE MAY BE EXISTING LINES OTHER THAN THOSE SHOWN HEREON. THE CONTRACTOR SHALL BE REQUIRED TO CONTACT THE PROPER UTILITY COMPANIES AND DIG-SAFE PRIOR TO BEGINNING ANY CONSTRUCTION ON THE SITE. OUR FIRM DOES NOT WARRANT WARRANT OR GUARANTEE THE LOCATION OF ANY UTILITIES SHOWN HEREON.
- ALL ELEVATIONS REFER TO NORTH AMERICAN VERTICAL DATUM (NAD83) OF 1983. FROM NGVD OF 1929 USING "VERTCON" FROM THE NGS/NOAA.GOV WEB SITE.
- WETLANDS FLAGS DEMARCATING WETLAND RESOURCE AREAS WERE DELINEATED MARCH THROUGH MAY OF 2008 BY:
WETLANDS & LAND MANAGEMENT, INC.
DANVERS, MASSACHUSETTS
- PER THE COMMONWEALTH OF MASSACHUSETTS REPORTABLE HAZARDOUS RELEASE LOOKUP WEB SITE THERE ARE NO OPEN SITES WITHIN 100 FEET OF THE LOCUS.

RIGHT OF WAY ABUTTERS

ParcelID	Owner	ParcelID	Owner
C10-0005	KING THOMAS M & REBECCA L	F09-0002	HAYNES HONORA
C10-0009	FAIRVIEW DEVELOPMENT CORP	F09-0003	SHEDD MATTHEW D & CAROL A
C10-0010	NORMAN JOHN C & DORIS	F09-0004	HAYNES HONORA
C10-0011	FAIRVIEW DEVELOPMENT CORP	F09-0006	TOWN OF SUDBURY
C10-0012	NORMAN JOHN C & DORIS	F09-0218	CRARY MINER A & HELEN H
C10-0013	NORMAN JOHN C & DORIS	F09-0219	SIMONSEN JORN & MIA
C10-0400	FAIRVIEW DEVELOPMENT CORP	F09-0415	WONG JEAN E & ARTHUR P
C10-0401	FAIRVIEW DEVELOPMENT CORP	F09-0515	WINNEG ROBERT D & CAROLINE V
C10-0402	MAURER BRUCE D & F JEFFREY	F09-0516	HERZOG LOUIS J & ROBIN
C11-0301	TOWN OF SUDBURY	F09-0517	SALVIA PETER M & SUSAN W
C11-0301-A-02	CLEARY MARGARET	F09-0518	MUELLER KATHRYN E &
C11-0301-A-04	DUARTE PATRICIA	F10-0511	FREEDMAN JON R &
C11-0301-A-06	WILSON LUCIE	F10-0512	MCDERMOTT ROBERT F
C11-0301-A-08	LEVINE MILDRED & GRUNEBaum LIN	F10-0514	LINNEG ROBERT D & CAROLINE V
C11-0301-A-10	CERULO MARGARET	G09-0002	TIGHE LAWRENCE W TRS THE HUDSO
C11-0301-A-12	SANTIAGO GLORIA R	G09-0003	HOWE JANET R REVOCABLE TRUST
C11-0301-A-14	GASTAN LUDMILLA	G09-0004	MCCARTHY LAURA B TRUSTEE
C11-0301-A-16	MCGRAW WILLIAM T & MARGERY E	G09-0012	PENN CENTRAL TRANSPORTATION CO
C11-0301-A-18	GODFREY BRENDA	G09-0100	BARTLETT DOROTHY M&MCCARTHY
C11-0301-A-20	JAMES ELETTRAUD U	G09-0200	TOWN OF SUDBURY
C11-0301-A-22	BAHLKOW ADOLF & BARBARA	G09-0300	ABRAMS LAURA B TRS
C11-0301-A-24	LEWIS NANCY	G09-0807	RICHARDS JAMES C & SUSAN M
C11-0301-A-26	SPIRO CARMIN J & JACQUELINE	G09-0808	WOL IN STEVEN M & MAUREEN G
C11-0301-A-28	ARONSON THERESA	H08-0008	WEAVER JAMES C & MELANIE B
C11-0301-A-30	FARRELL MARGUERITE	H08-0011	CHO CHONG M & WAI-WAI
C11-0301-A-32	AUFDERHAAR JUDITH	H08-0012	WOLLENSAK RICHARD J & CLAIRE A
C11-0301-A-33	PERKINS VIRGINIA	H08-0015	ENSLEY MICHAEL T & LAURIE A
C11-0301-A-34	KREYNES SAMUIL & PENKINA INNA	H08-0016	ALTERIO DINO R & ROACH MAUREEN
C11-0301-A-35	FRAZER VIRGINIA R &	H08-0017	THOMPSON MARY L
C11-0301-A-36	JANJANIAN MARY & ELEANOR	H08-0018	WALLET RAYMOND J & THELMA SOSA
C11-0301-A-37	FRAIZE JOHN & ELLEN	H08-0019	GOLS - CAVALLARO JENNI
C11-0301-A-39	INGERSOLL ROBERT & EUZABETH	H08-0020	DIMAURO MIRIAM
C11-0301-A-41	FREYDIN YEVGENIA	H08-0021	BOND JOHN T & MARY A
C11-0301-A-42	GALLIGAN FRANCES TRUSTEE	H08-0045	BORG CARL G & MARIAN A
C11-0301-A-43	SAWYN RUTH	H08-0301	NEWTON ALAN L & THERESA W
C11-0301-A-44	BARNEY ANNA MAE	H08-0310	NIGRELLI JAMES J JR &
C11-0301-A-45	POCH GAIL B & NANCY F	H08-0311	KNEELAND WILLIAM E JR & ELAINE
C11-0301-A-46	GARDNER MARIE S TRS.	H08-0312	MCCLURE CHRISTOPHER &
C11-0301-A-47	REZNIK MARK & HELEN	H08-0313	OSTAR BRUCE & SHPRESA
C11-0301-A-48	SULLIVAN LOUISE M	H09-0001	LEWIS ANDREW J & STEPHANIE O
C11-0301-A-49	JACKSON SUSAN	H09-0002	SOMERSET SUDBURY LLC
C11-0301-A-50	HERZOG ANITA	H09-0007	SHILTS REED L & DAWN R
C11-0301-A-51	NELSON MURIEL	H09-0012	SUDBURY VALLEY TRUSTEES INC
C11-0301-A-52	MANN ESTHER & WALDMAN STUART	H09-0068	GILMARTIN MATTHEW S & MOLLY F
C11-0301-A-53	DIPALMA JAMES J & JANE M	J08-0004	CODJER LANE LLC
C11-0301-A-54	GRUMAN LEONID N & ZINAIDA	J08-0006	CAVICCHIO PAUL F JR
C11-0301-A-55	CHIDO FRANK & LAURA	J08-0009	SUDBURY TOWN OF
C11-0301-A-56	DELUCA IRIS F TRS	J08-0011	PENDLETON DAVID B & CAROLE E
C11-0301-A-57	ANDERSON EUNICE GAY &	J08-0101	KREBS W MICHAEL & BARBARA P
C11-0301-A-58	SHAER PETER &	J08-0111	LANZA MARK J &
C11-0301-A-59	MAGEE JOVANNA F TRS	J08-0112	MURPHY GREG C & JENNIFER B
C11-0301-A-60	KURAS CATHERINE M	J08-0113	HARTY DANIEL P
C11-0301-A-61	MCNEIL MARCIA	J08-0114	LEU JAMES C JR & TRACY GEHAN
C11-0301-A-63	GOLFMAN MARGARITA M & YOSEF	J08-0115	ROBINS D JOAN
D10-0001	RICHARD ARTHUR J & MARGARET A	J08-0116	SHAW JOHN J & ANN C
D10-0013	EAST GEORGE H JR &	J08-0301	JONES CHERYL
D10-0018	TOWN OF SUDBURY	J08-0307	DAVIES ADRIAN G & MELINDA J
D10-0024	VROMAN RICHARD J & MICHELLE R	J08-0308	RODDY JANE HIGHTOWER
D10-0207	EN GERMAN JEFFREY M	J08-0309	MARCELYNAS GARY E & LESLIE A
D10-0300	TOWN OF SUDBURY	J08-0311	CUNNINGHAM MICHAEL & JEAN
D10-0400	LYMAN LYNDEN & KRISTIN E	J08-0501	CAVICCHIO PAUL F JR
D10-0502	CERASUOLO DOMENIC & JOAN M	J08-0502	CAVICCHIO PAUL F JR
D10-0503	EAST GEORGE H JR & MARIE A	J08-0503	CAVICCHIO PAUL F JR
E09-0507	WALLACK ALLAN L & NADINE	K08-0050	TUCKER EDWARD L & SANDRA A TR
E09-0508	WALLACK ALLAN L & NADINE	K08-0051	COTTON JORDAN L&MCIVER CLEMENT
E09-0509	GLOVSKY CHARLES S & EILEEN G	K08-0052	TUCKER SANDRA A
E09-0510	WRY CHARLES A JR & RUTHANN	K08-0053	BOSEKY LIMITED
E09-0511	NEISON C KIRK DIANE P	K08-0055	MCCARTHY LAURA B ET AL TRUSTEE
E09-0600	ROCKLAGE SCOTT M & PATTY B	K08-0057	PASQUARELLO THEODOR
E10-0700	VERRILL STEPHEN & JOAN	K08-0087	MOIVER CLEMENT L TR
F09-0001	TOWN OF SUDBURY		

PROPERTY LINE NOTES

- THE BOUNDARY LINES OF THE RAILROAD RIGHT OF WAY ARE DETERMINED FROM THE 1915 VALUATION PLANS FOR THE OLD COLONY RAILROAD COMPANY AND FROM CENTERLINE MONUMENTS FOUND ON THE GROUND. WHERE THE RIGHT OF WAY IS INDICATED TO BE WIDER THAN 66 FEET THE LOCATION OF THE BOUNDARIES ARE DETERMINED FROM ADJACENT DEEDS AND PLANS OF RECORD.
- THE LOCATIONS OF PROPERTY LINES OF OWNERS ABUTTING THE RAILROAD WERE DETERMINED FROM AVAILABLE DEEDS AND PLANS OF RECORD AND SHOULD BE CONSIDERED APPROXIMATE. NO BOUNDARY LINE DETERMINATIONS OF LANDS ABUTTING THE RAILROAD RIGHT OF WAY WERE PERFORMED AS PART OF THIS SURVEY.
- THE LOCATIONS OF STREET LINES CROSSING THE RAILROAD WERE DETERMINED FROM AVAILABLE DEEDS AND PLANS OF RECORD AND SHOULD BE CONSIDERED APPROXIMATE. NO BOUNDARY LINE DETERMINATIONS OF THESE STREET RIGHTS OF WAY WERE PERFORMED AS PART OF THIS SURVEY.

BENCHMARK NO:	DESCRIPTION	NAD88 ELEV.	NGVD ELEV.
1	RM 2-3	133.07	133.85
2	10060	139.94	140.77
3	10061	173.58	174.36
4	38G (7448)	168.65	169.43
5	RM 6-1	141.73	142.51

MONUMENT DESCRIPTIONS

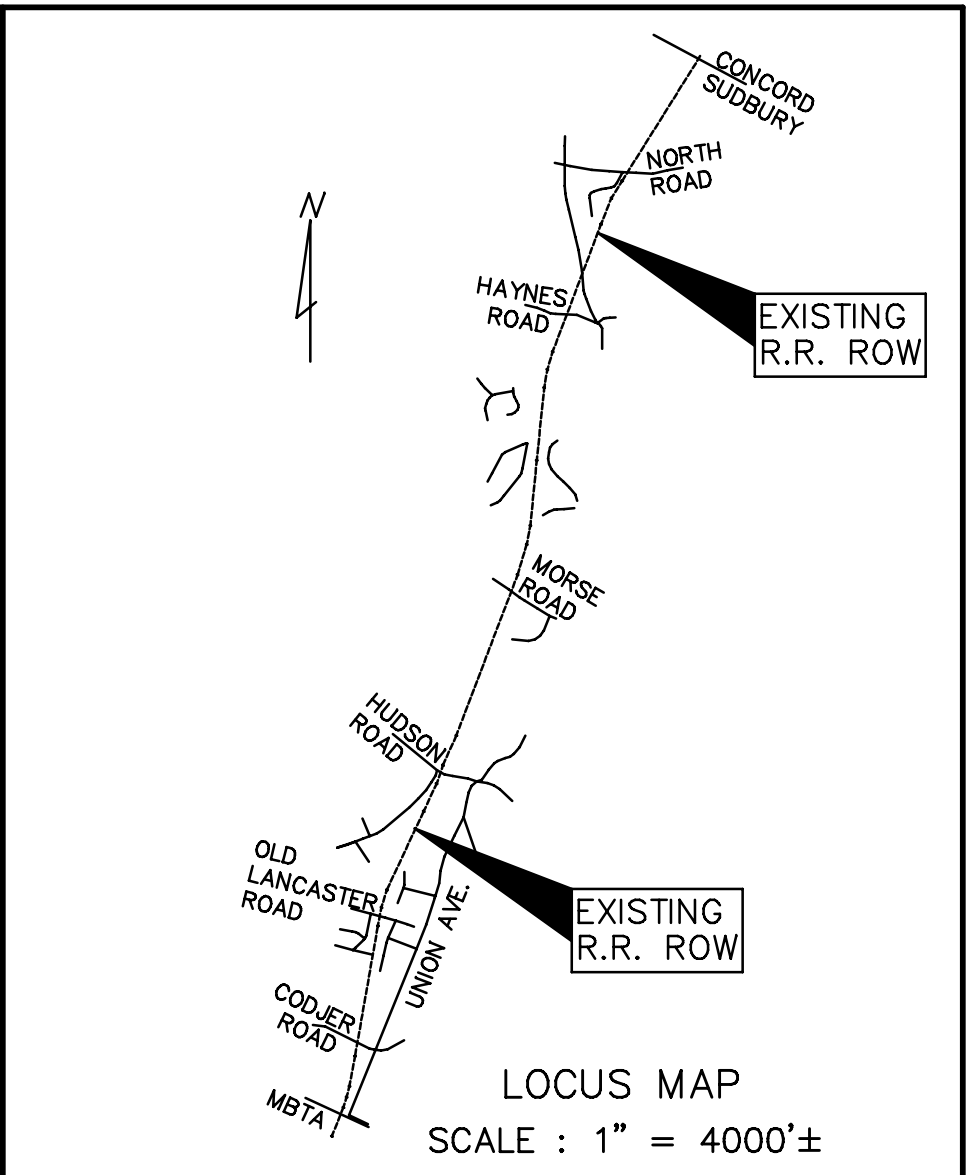
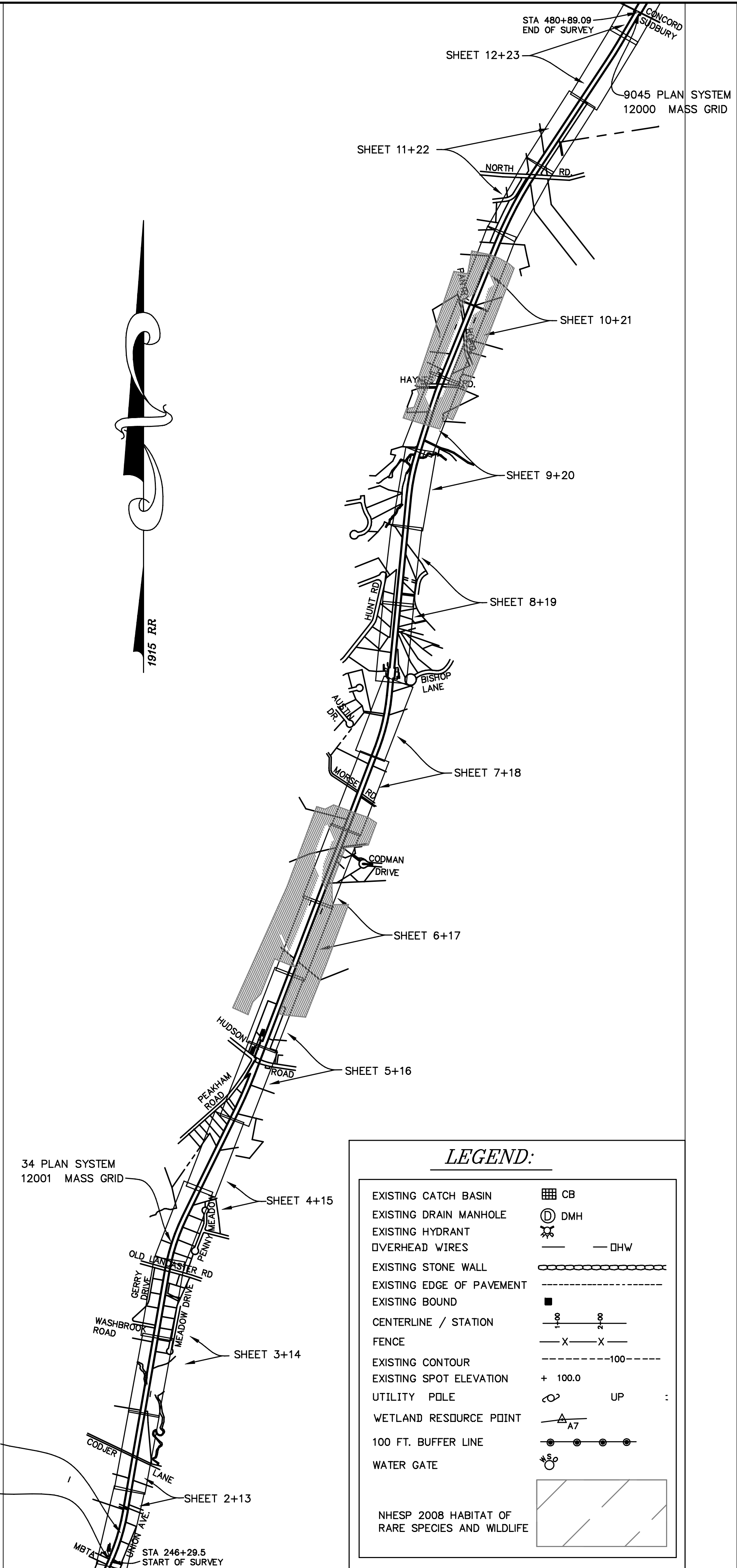
- RM 2-3 CHISELED SQUARE ON NORTHERLY CORNER OF WEST HEADWALL OF BOX CULVERT UNDER PANTRY ROAD/RAILROAD
- 10060 (STA 364) CHISELED SQUARE ON MILE POST 18
- 10061 (STA 365) CHISELED SQUARE ON BOULDER
- RM 6-1 CHISELED SQUARE IN SOUTHEAST CORNER OF SOUTH ABUTMENT OF RAILROAD BRIDGE OVER HOP BROOK
- 38G MAGNETIC DISK IN CONCRETE MONUMENT
- 38F MAGNETIC DISK IN CONCRETE MONUMENT

Point numbers and Coordinates on Plan System

Point	Northing	Easting	Description
9045	29364.49	13493.99	STA 480+89.09
34	11909.36	6888.17	MON 38G
14	7793.77	6172.94	MON 38F
9001	7397.92	6008.08	STA 246+29.5

Point numbers and Coordinates on Mass Grid System

Point	Northing	Easting	Description
12000	518901.93	627845.26	STA 480+89.09
12001	501324.34	621572.57	CONTROL 38G
12002	497195.89	620935.73	CONTROL 38F
12003	496796.98	620778.42	STA 246+29.5



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SURVEY NOTES

PORTIONS OF THE BANK OF HOP BROOK AND PANTRY BROOK COULD NOT BE ESTABLISHED ON TOWN LAND AS THE AREA WAS UNDER WATER AT THE TIME OF THE RESOURCE DELINEATION.

THE CONTOUR INTERVAL ON THE PLAN IS 1 FOOT. SOME CONTOURS ARE NOT LABELLED DUE TO THE SCALE OF THE PLAN AND THE STEEPNESS OF THE GROUND SLOPE.

TREES NOTATED AS "TREE GREATER THAN 8" (TYP) REPRESENT THE FIELD LOCATED TREE NEAREST TO THE EXISTING RAIL LINES.

DRAWING FILE: RAILTRAILfinal2-gps2
ATLANTIC JOB NO. A0801-02

I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION AND THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF IT CONFORMS WITH TECHNICAL, ETHICAL AND PROCEDURAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.

JOHN B. PAULSON
No. 31725
REGISTERED PROFESSIONAL LAND SURVEYOR

JUNE 30, 2008
Date

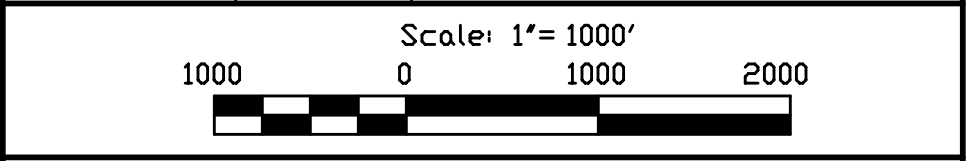
ENGINEER:
ATLANTIC ENGINEERING & SURVEY CONSULTANTS INC.
97 TENNEY STREET - SUITE 5 - GEORGETOWN, MA 01833
PHONE: 978-352-7870 FAX: 978-352-9940

EXISTING CONDITIONS SURVEY PLAN AT PROPOSED RAIL TRAIL IN SUDBURY, MASS.

PREPARED FOR: TOWN OF SUDBURY
275 OLD LANCASTER ROAD
SUDBURY, MA 01776

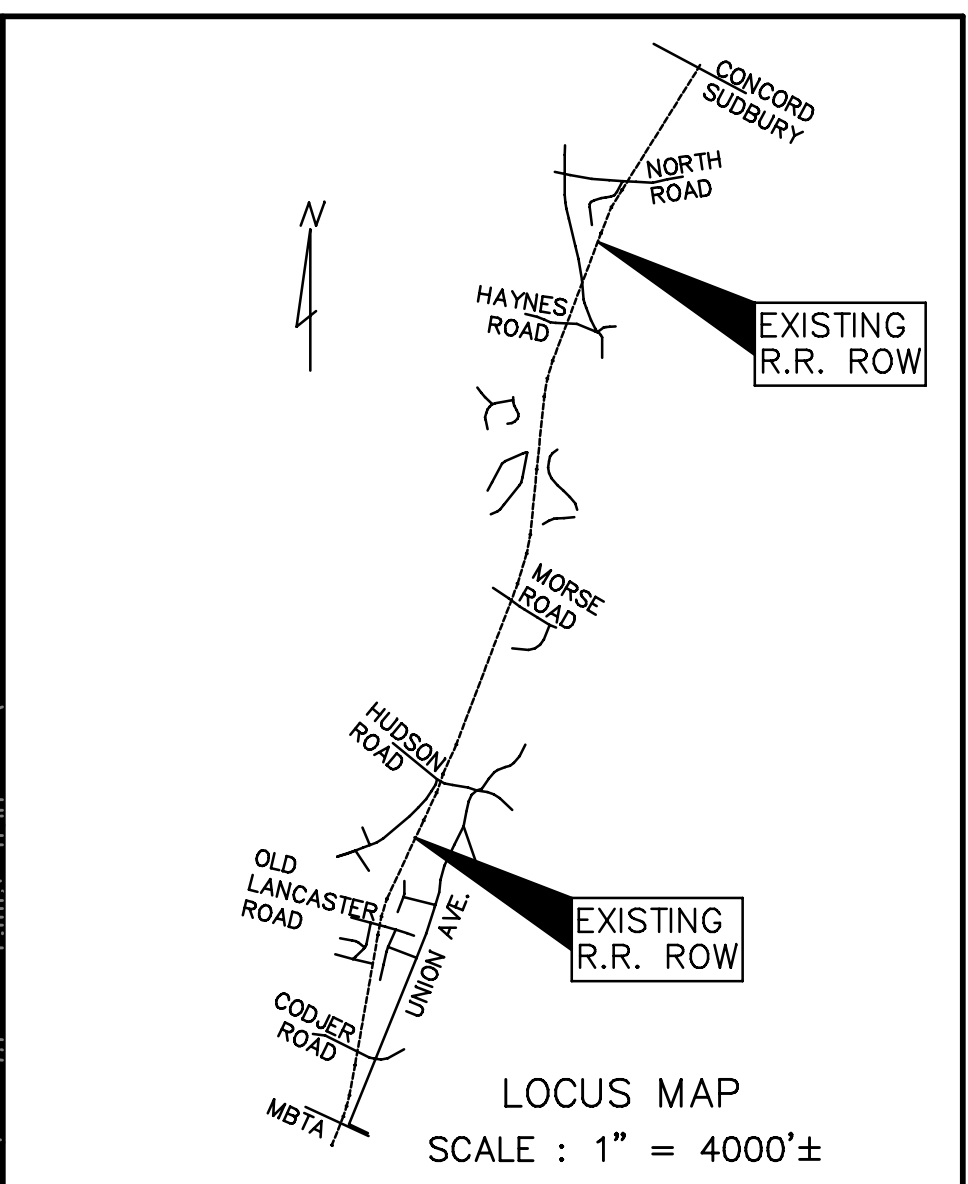
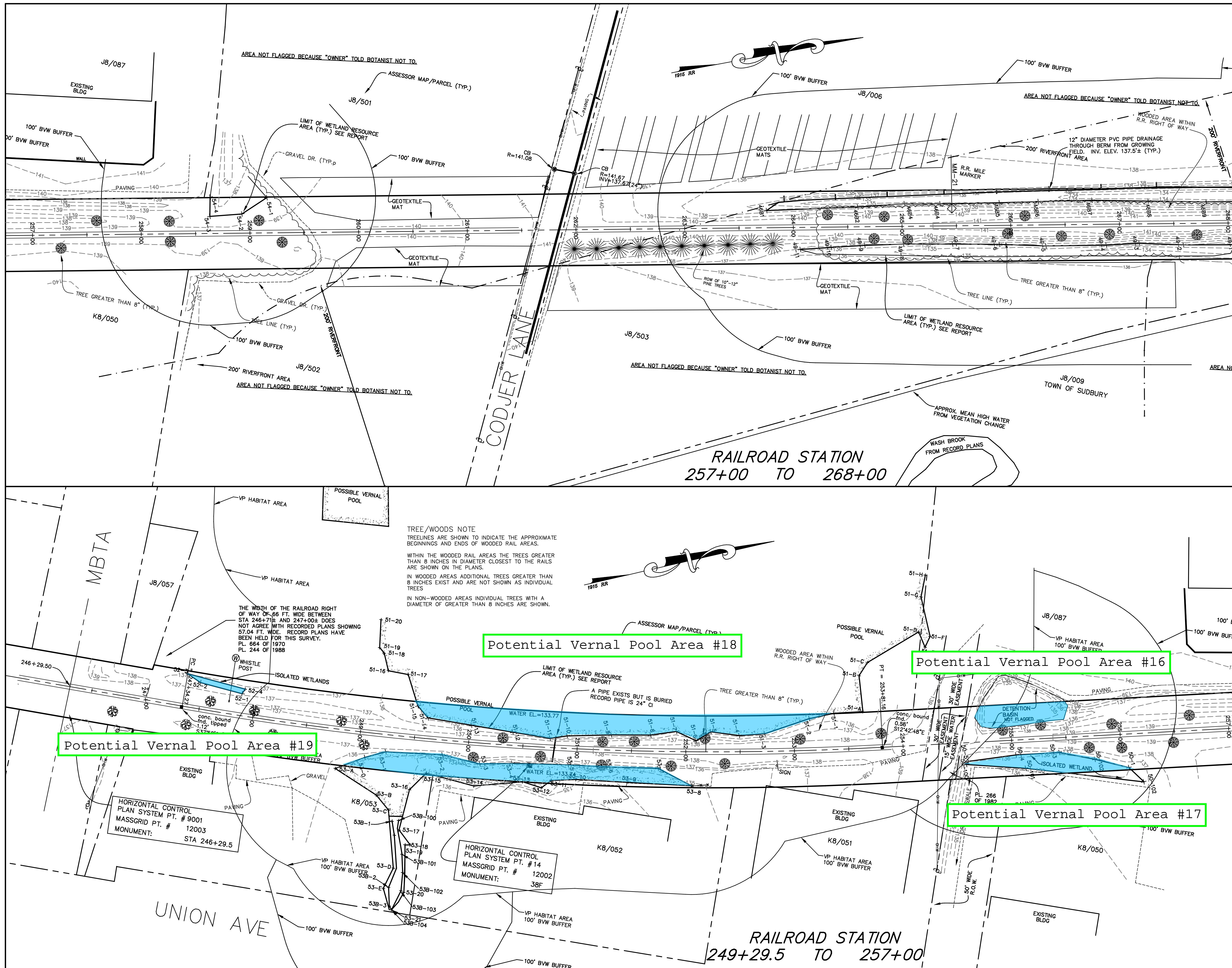
DATE: JUNE 30, 2008 (1ST SUBMISSION)

Submission #	date	description
2	7/23/2008	Site Plan with TDPD
3	3/18/2009	REVISIONS
4	7/28/2009	PROFILE



LEGEND:

- EXISTING CATCH BASIN: CB
- EXISTING DRAIN MANHOLE: DMH
- EXISTING HYDRANT: DHW
- OVERHEAD WIRES: OHW
- EXISTING STONE WALL: [Symbol]
- EXISTING EDGE OF PAVEMENT: [Symbol]
- EXISTING BOUND: [Symbol]
- CENTERLINE / STATION: [Symbol]
- FENCE: [Symbol]
- EXISTING CONTOUR: [Symbol]
- EXISTING SPOT ELEVATION: + 100.0
- UTILITY POLE: UP
- WETLAND RESOURCE POINT: [Symbol]
- 100 FT. BUFFER LINE: [Symbol]
- WATER GATE: [Symbol]
- NHESP 2008 HABITAT OF RARE SPECIES AND WILDLIFE: [Symbol]



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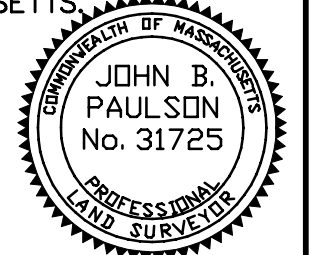
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TREES NOTATED AS "TREE GREATER THAN 8" (TYP)" REPRESENT THE FIELD LOCATED TREE NEAREST TO THE EXISTING RAIL LINES.

DRAWING FILE: RAILTRAILfinal2-gps2
 ATLANTIC JOB NO. A0801-02

I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION AND THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF IT CONFORMS WITH TECHNICAL, ETHICAL AND PROCEDURAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.



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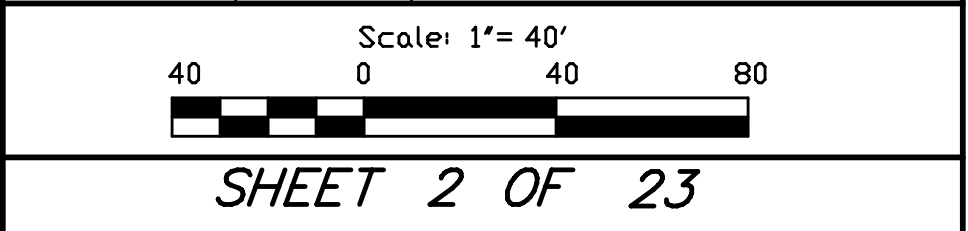
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 SUDBURY, MA 01776

DATE: JUNE 30, 2008 (1ST SUBMISSION)

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Potential Vernal Pool Area #18

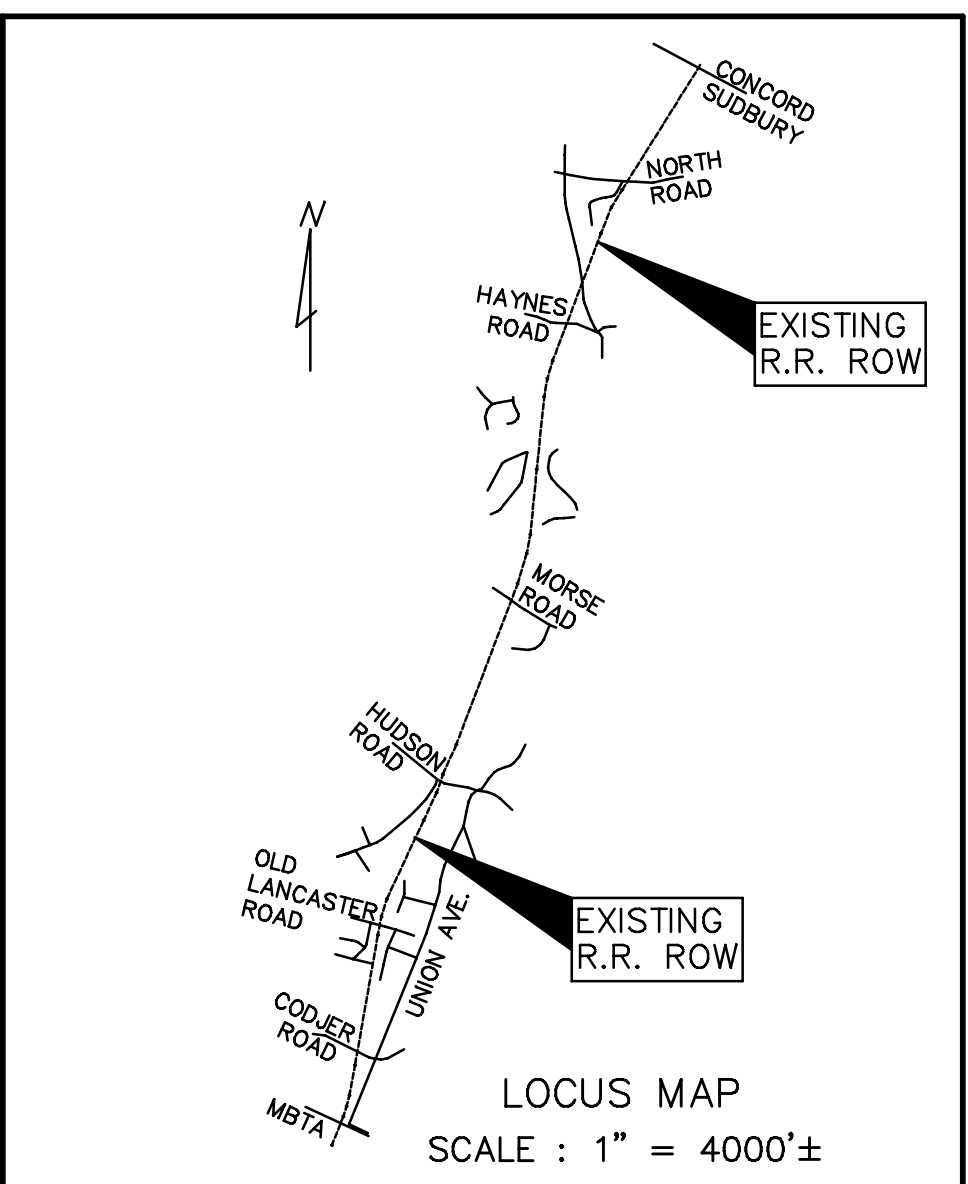
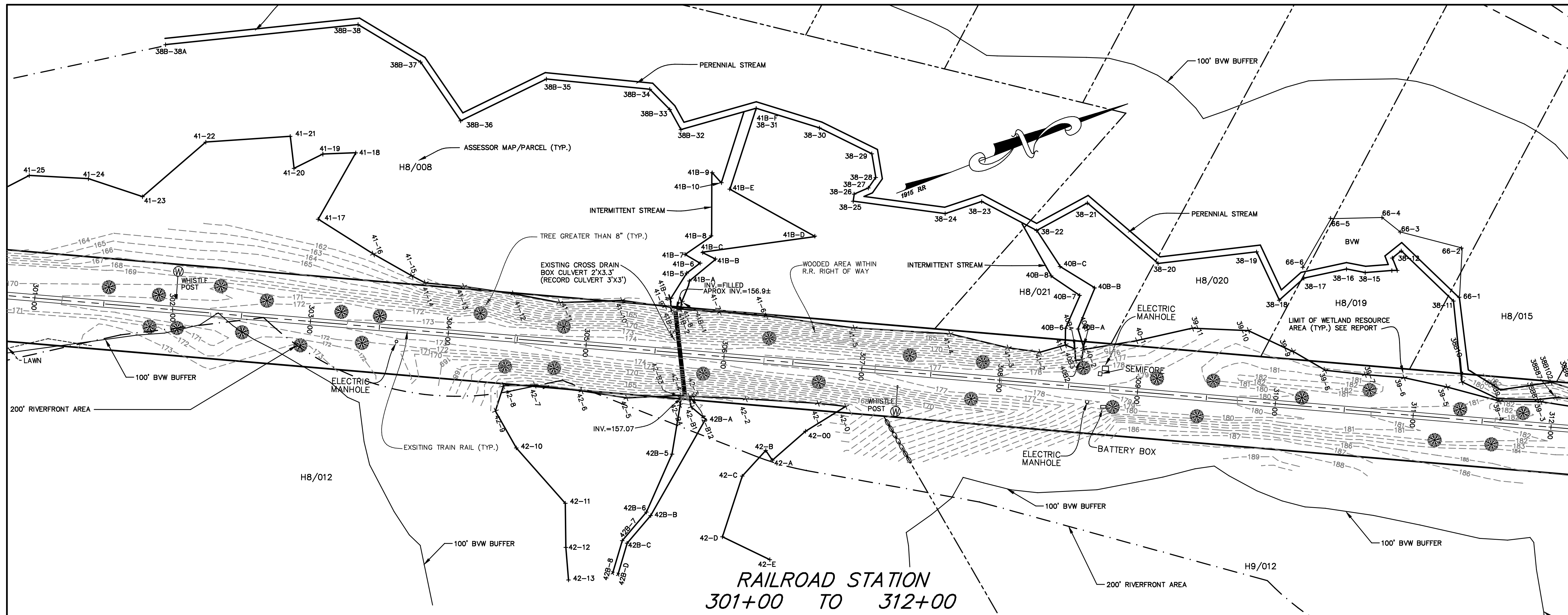
Potential Vernal Pool Area #16

Potential Vernal Pool Area #19

Potential Vernal Pool Area #17

HORIZONTAL CONTROL PLAN SYSTEM PT. # 9001
 MASSGRID PT. # 12003
 MONUMENT:
 STA 246+29.5

HORIZONTAL CONTROL PLAN SYSTEM PT. # 14
 MASSGRID PT. # 12002
 MONUMENT:
 38F



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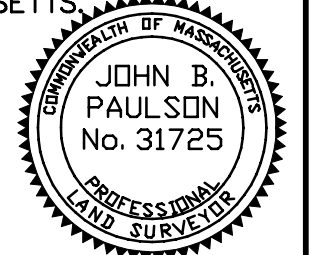
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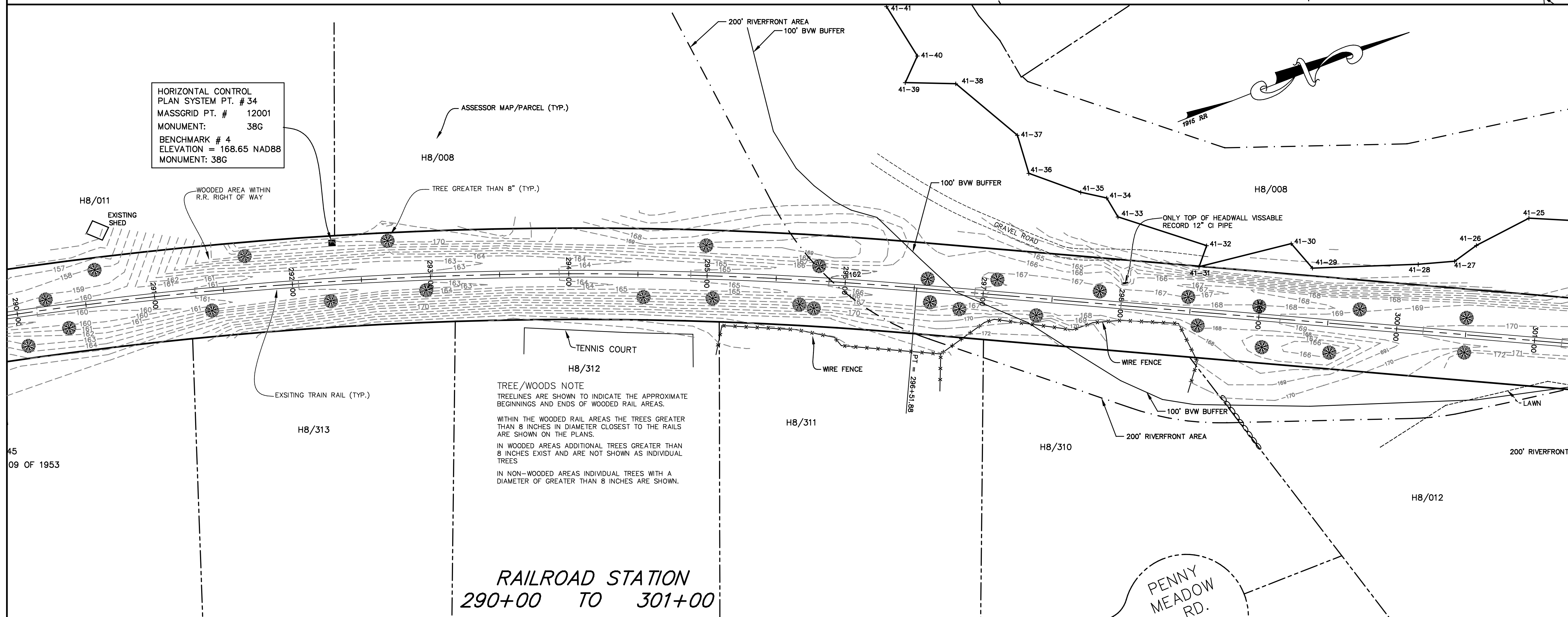
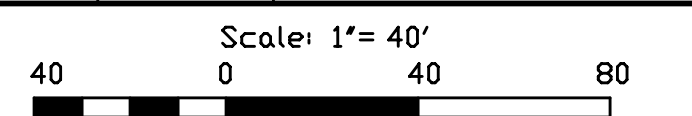
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**EXISTING CONDITIONS
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 IN
 SUDBURY, MASS.**

PREPARED FOR: TOWN OF SUDBURY
 275 OLD LANCASTER ROAD
 SUDBURY, MA 01776

DATE: JUNE 30, 2008 (1ST SUBMISSION)

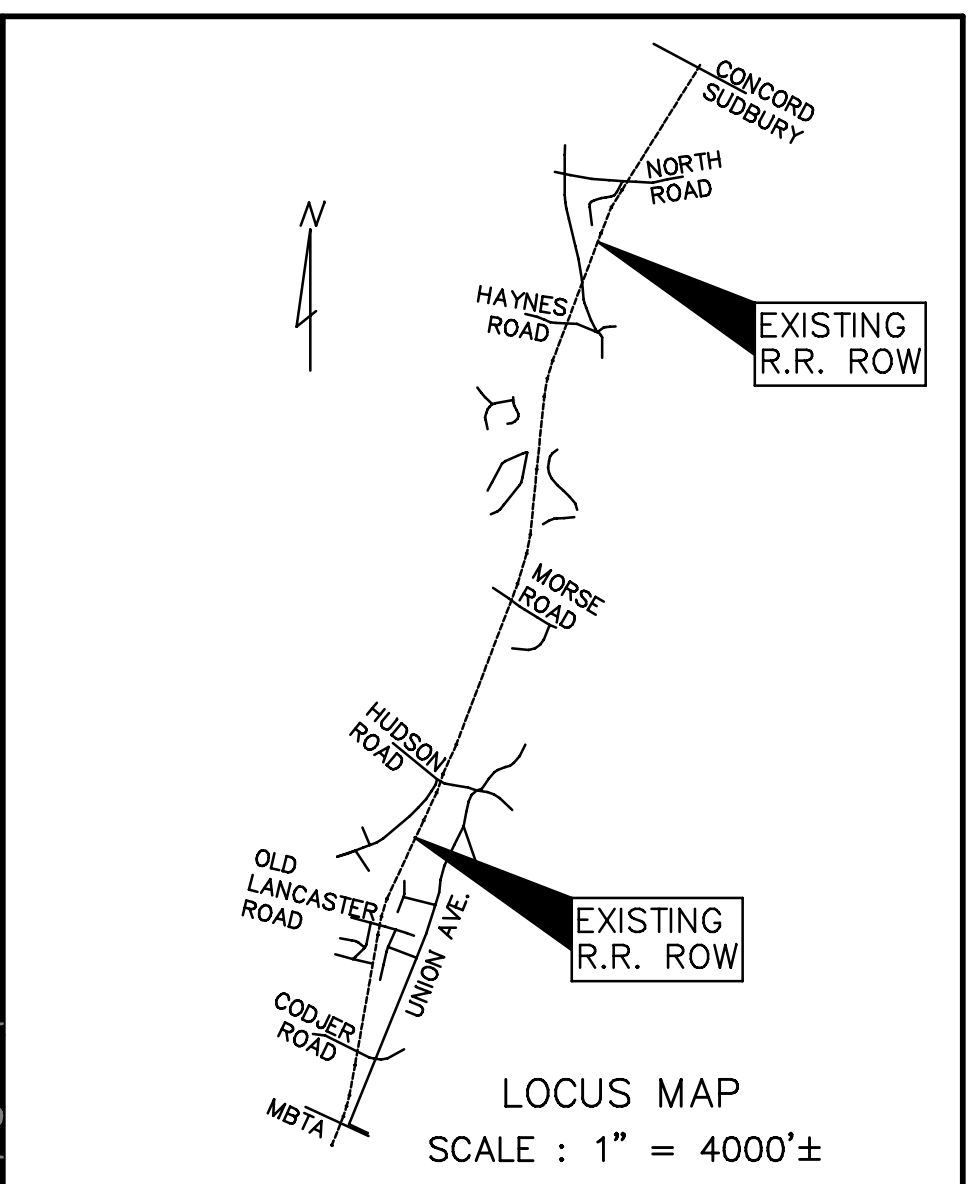
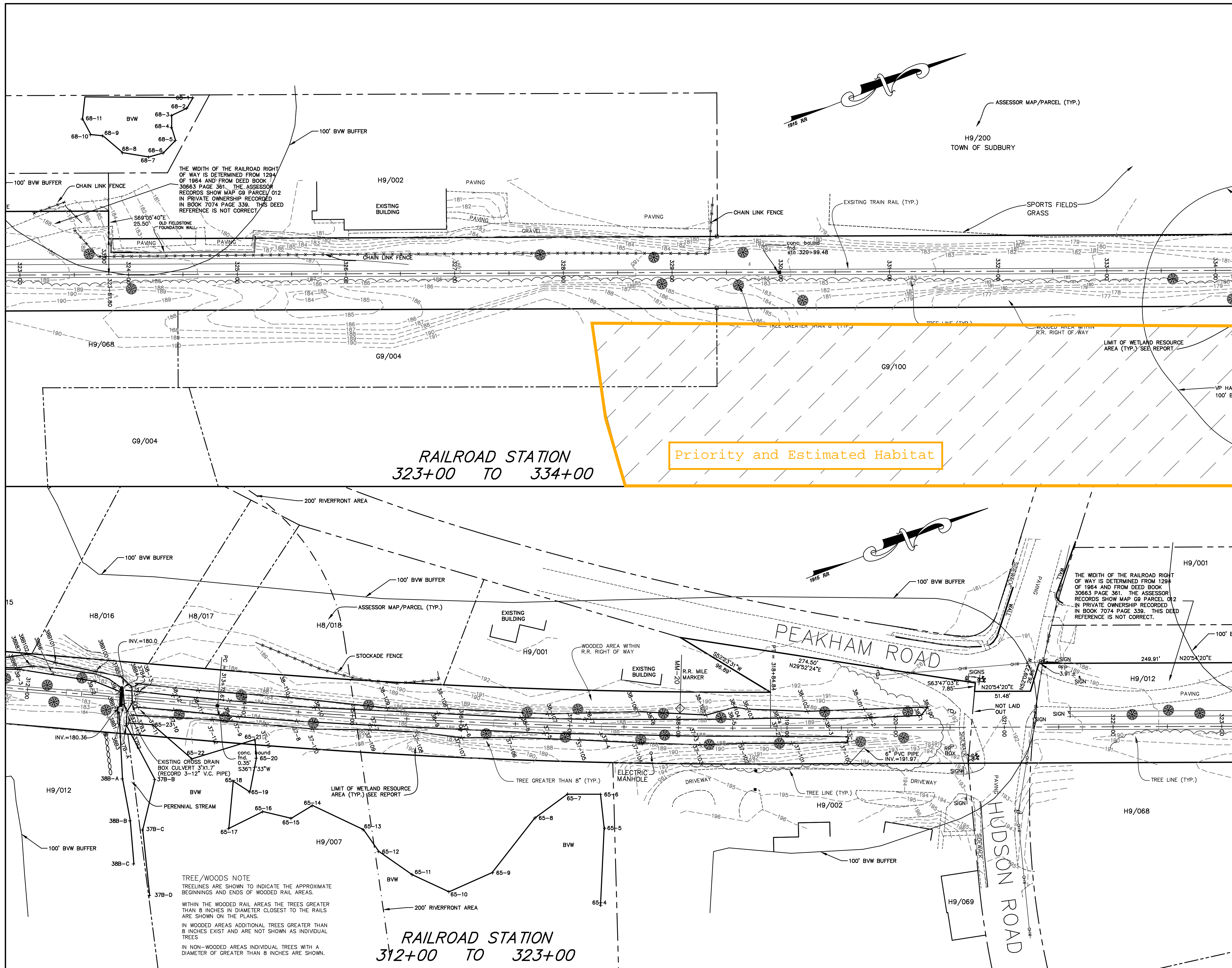
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4	7/28/2009	PROFILE



HORIZONTAL CONTROL
 PLAN SYSTEM PT. # 34
 MASSGRID PT. # 12001
 MONUMENT: 38G
 BENCHMARK # 4
 ELEVATION = 168.65 NAD88
 MONUMENT: 38G

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**RAILROAD STATION
 290+00 TO 301+00**



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JOHN B. PAULSON
 No. 31725
 REGISTERED PROFESSIONAL LAND SURVEYOR

JUNE 30, 2008
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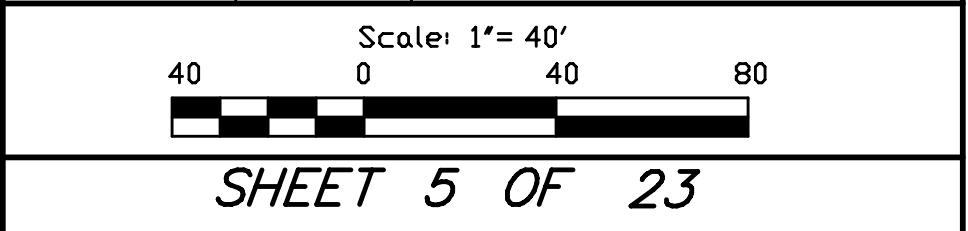
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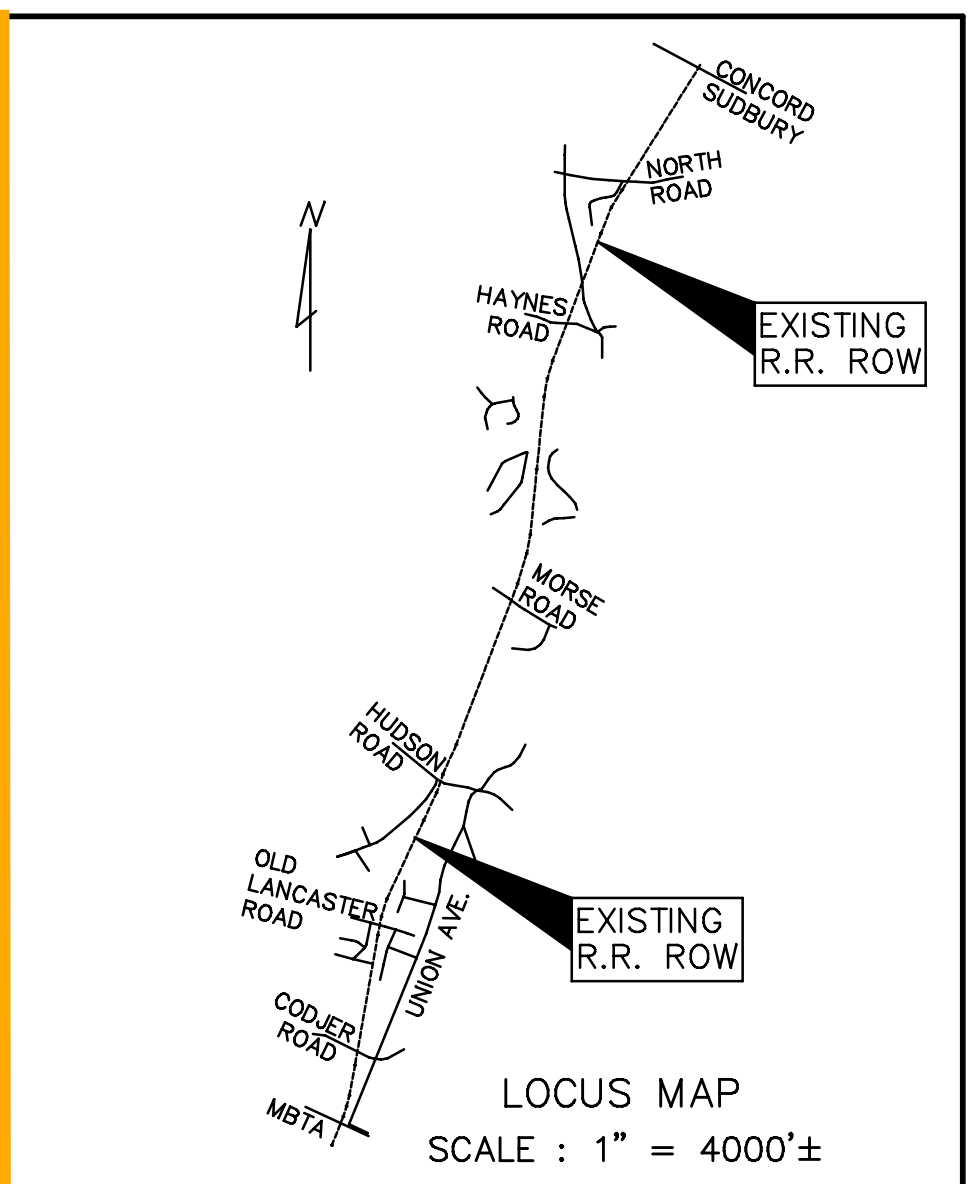
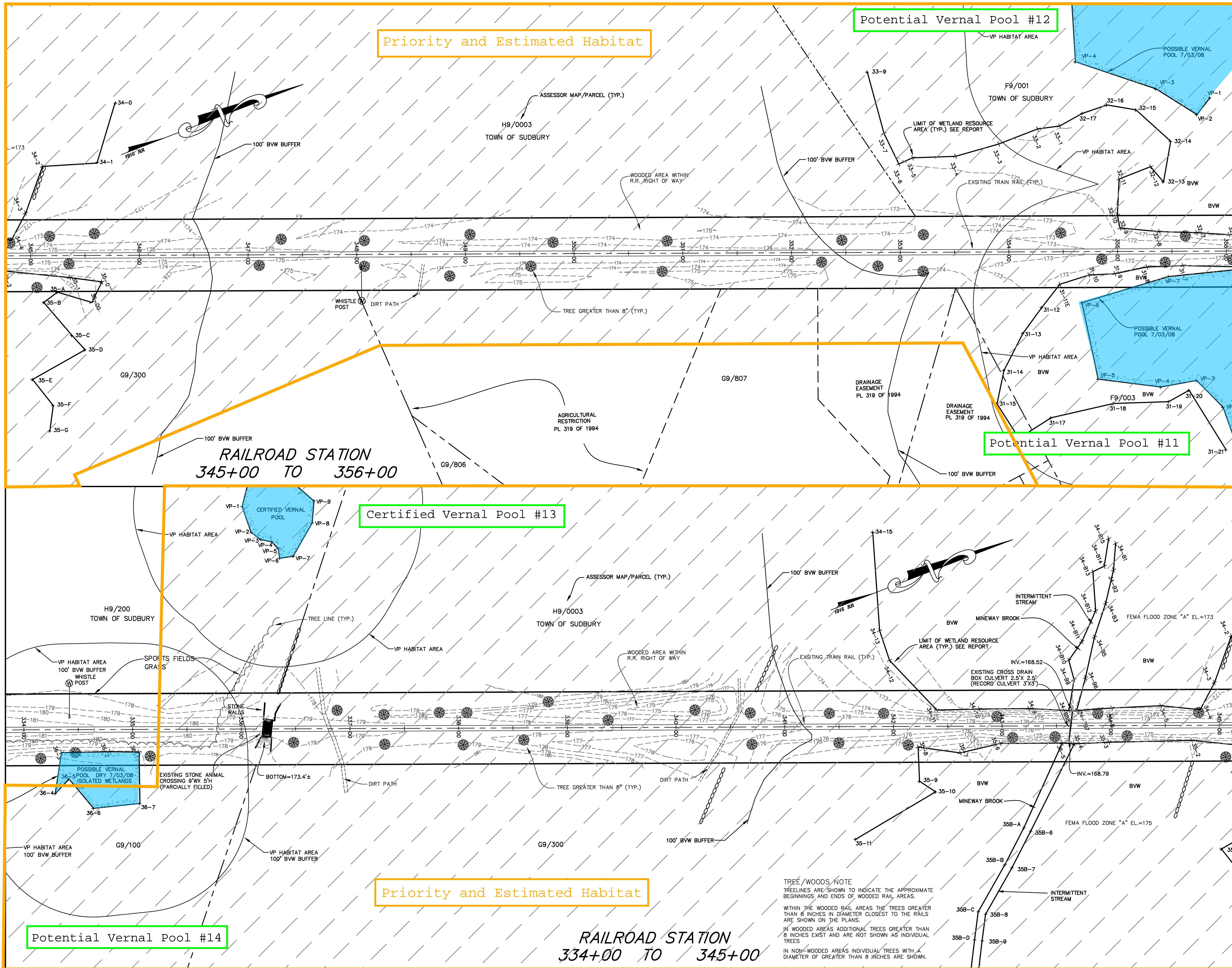
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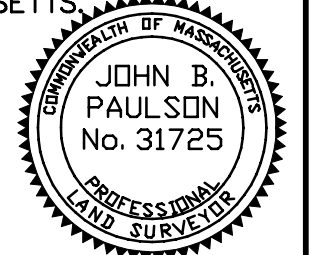
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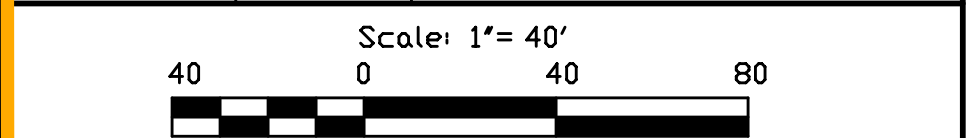
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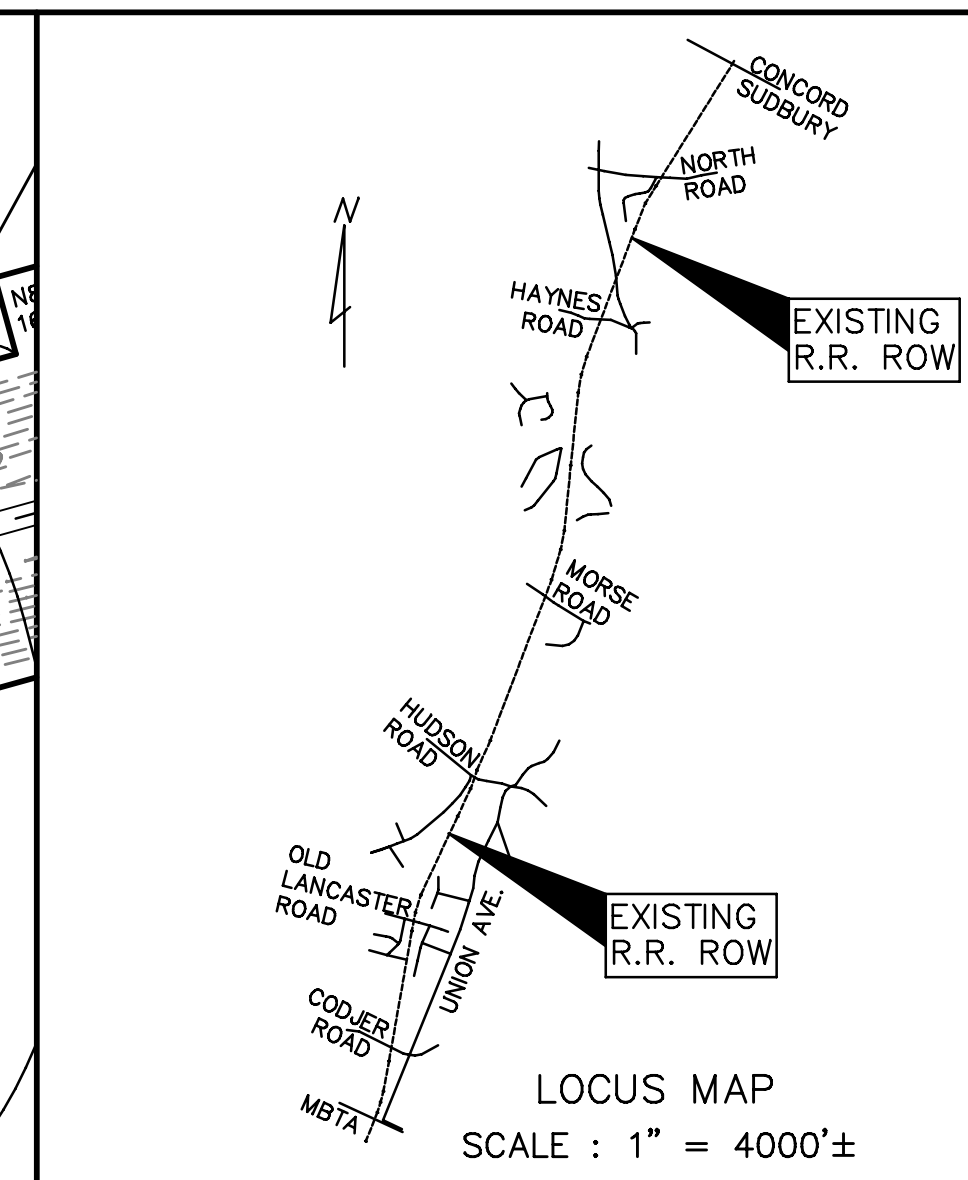
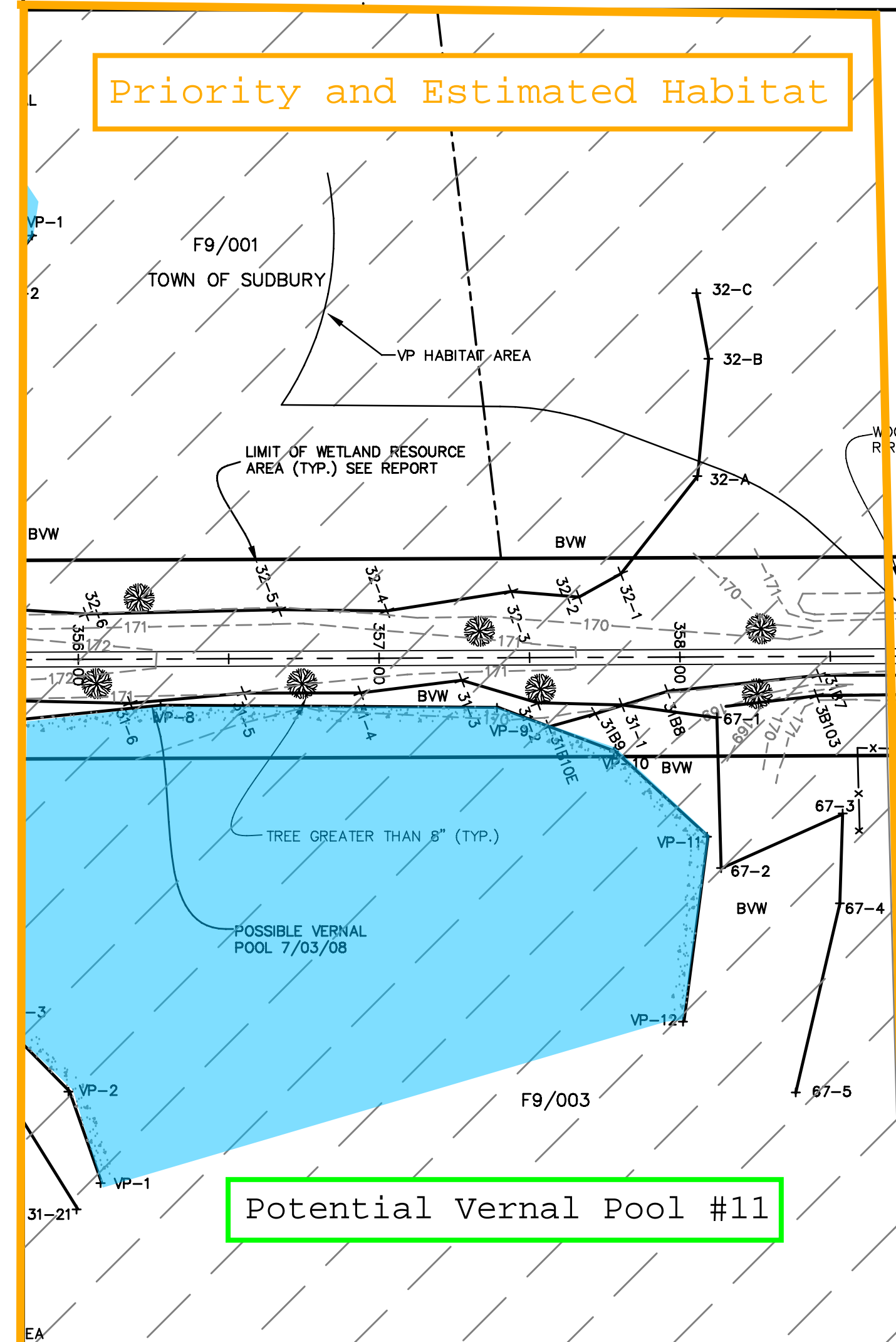
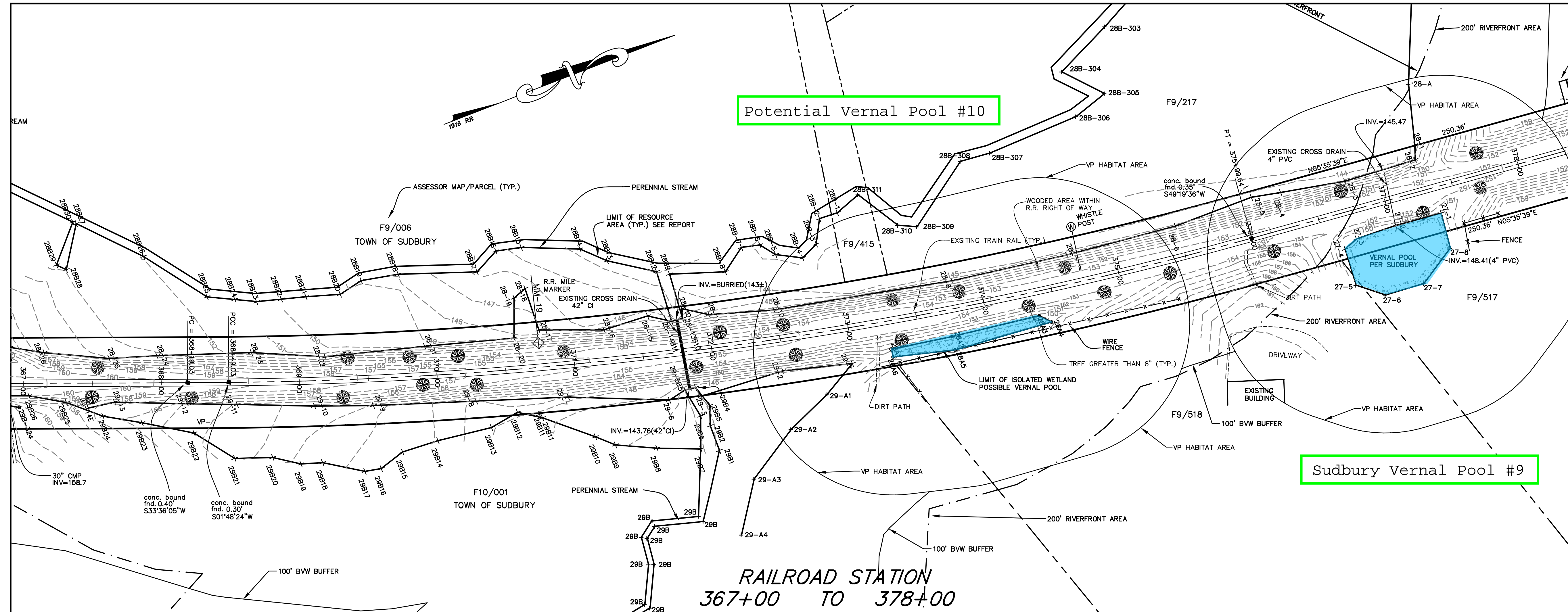
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JOHN B. PAULSON
 No. 31725
 REGISTERED PROFESSIONAL LAND SURVEYOR

JUNE 30, 2008
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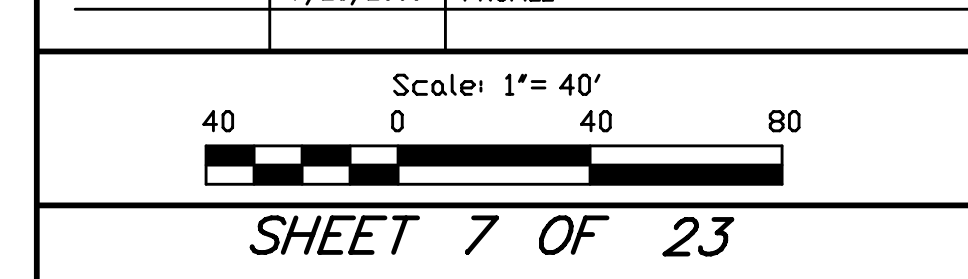
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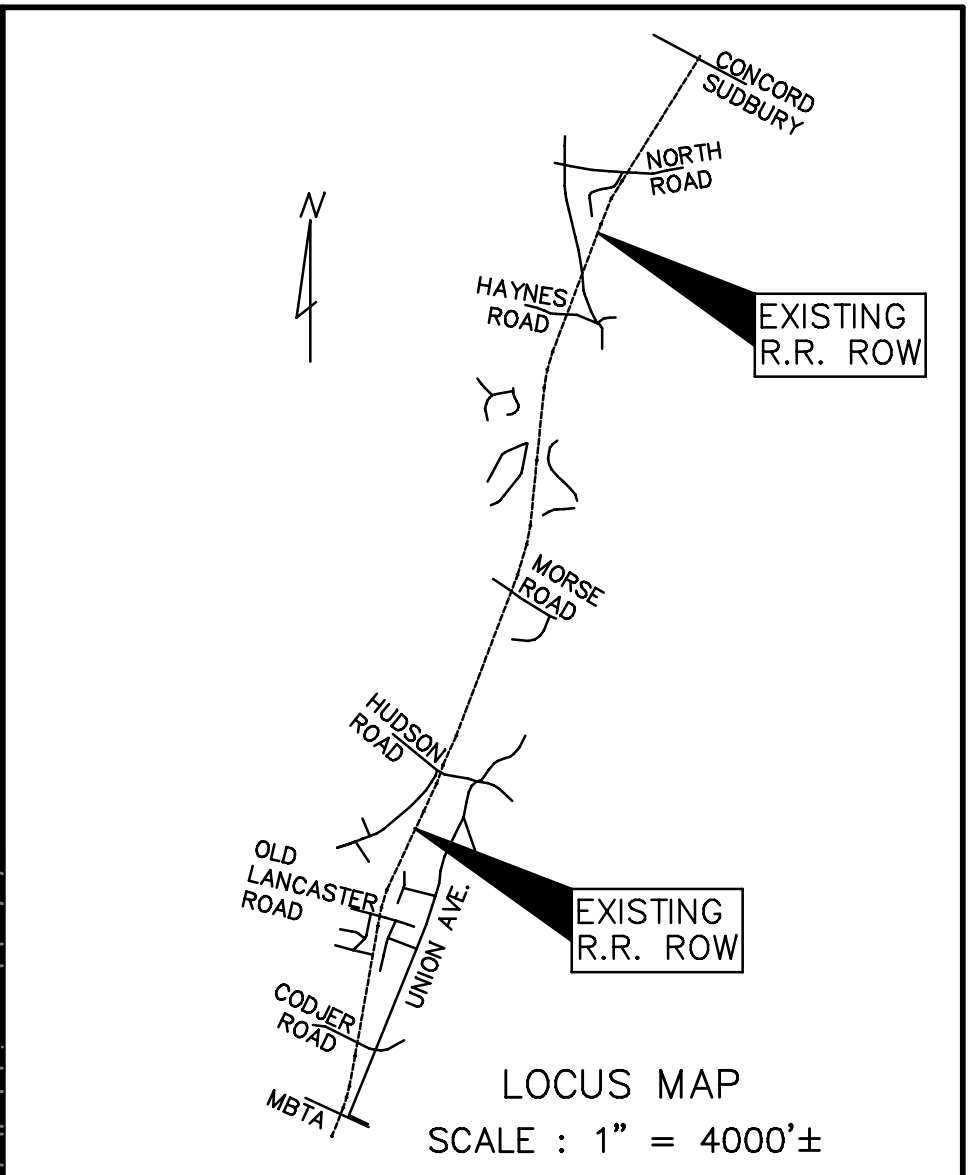
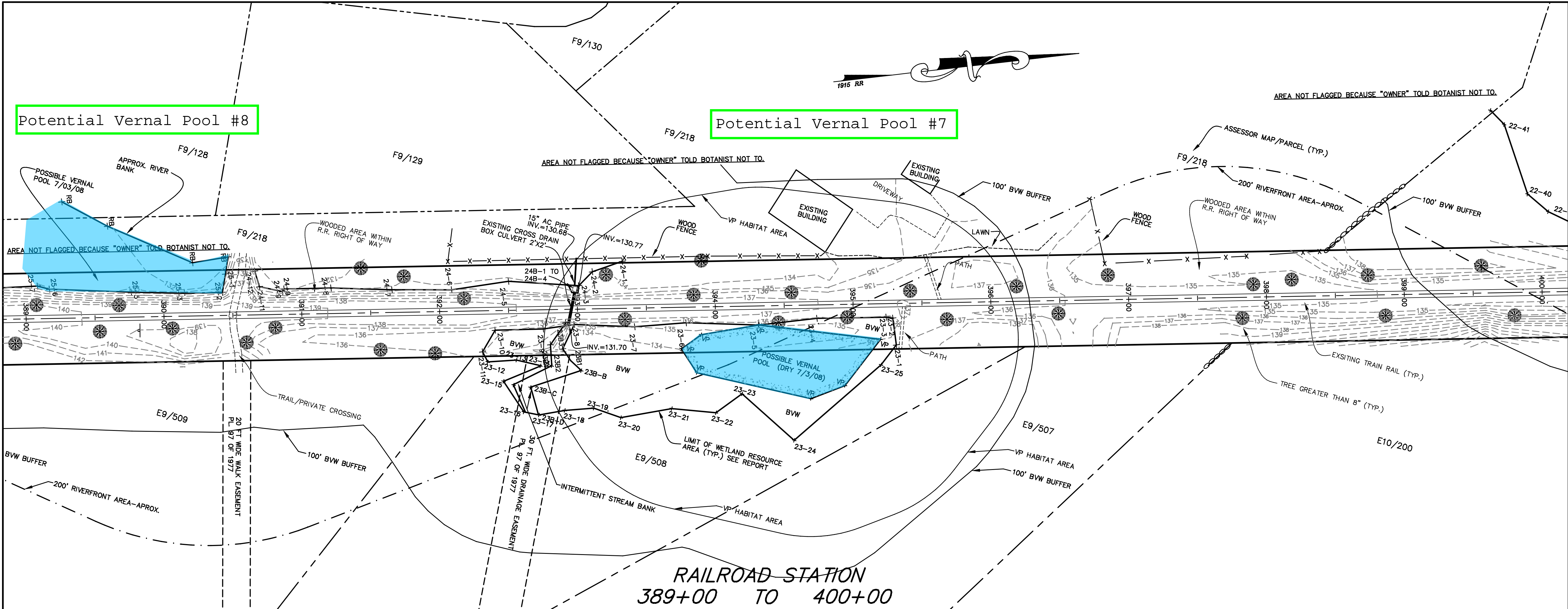
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**RAILROAD STATION
 356+00 TO 367+00**



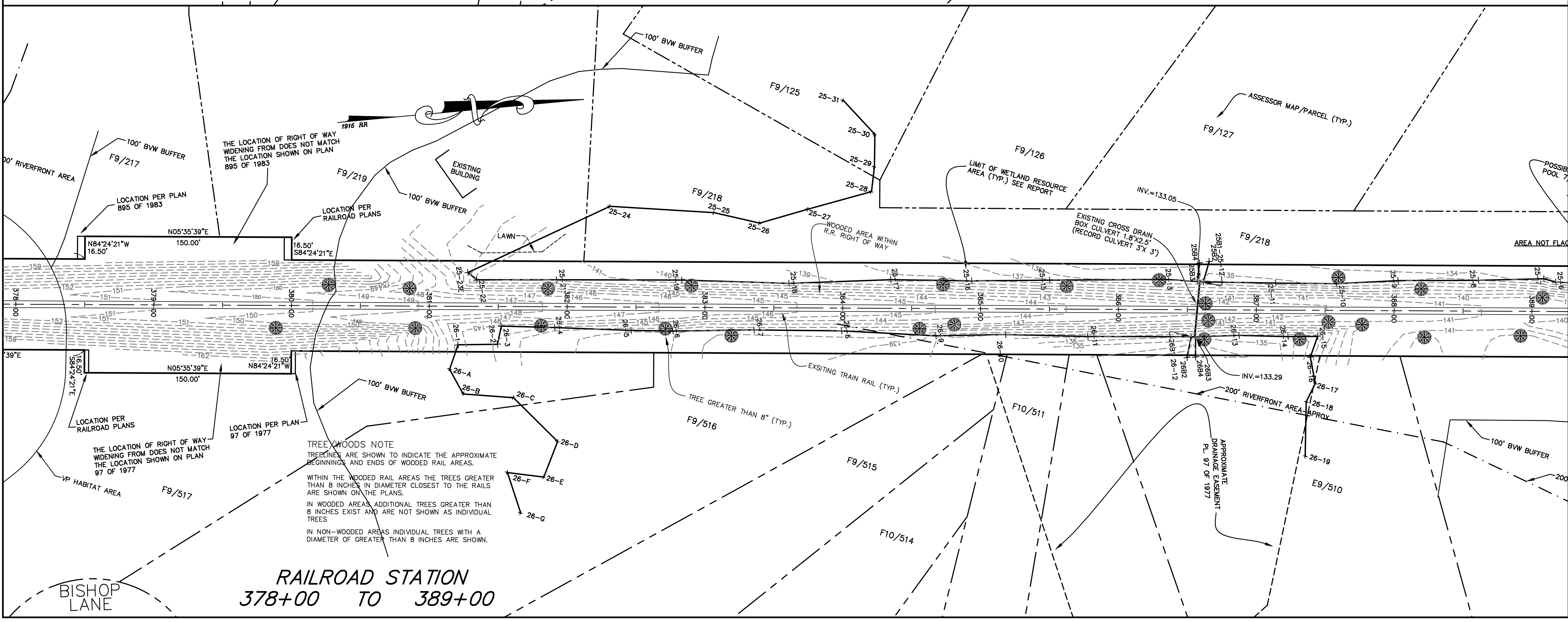
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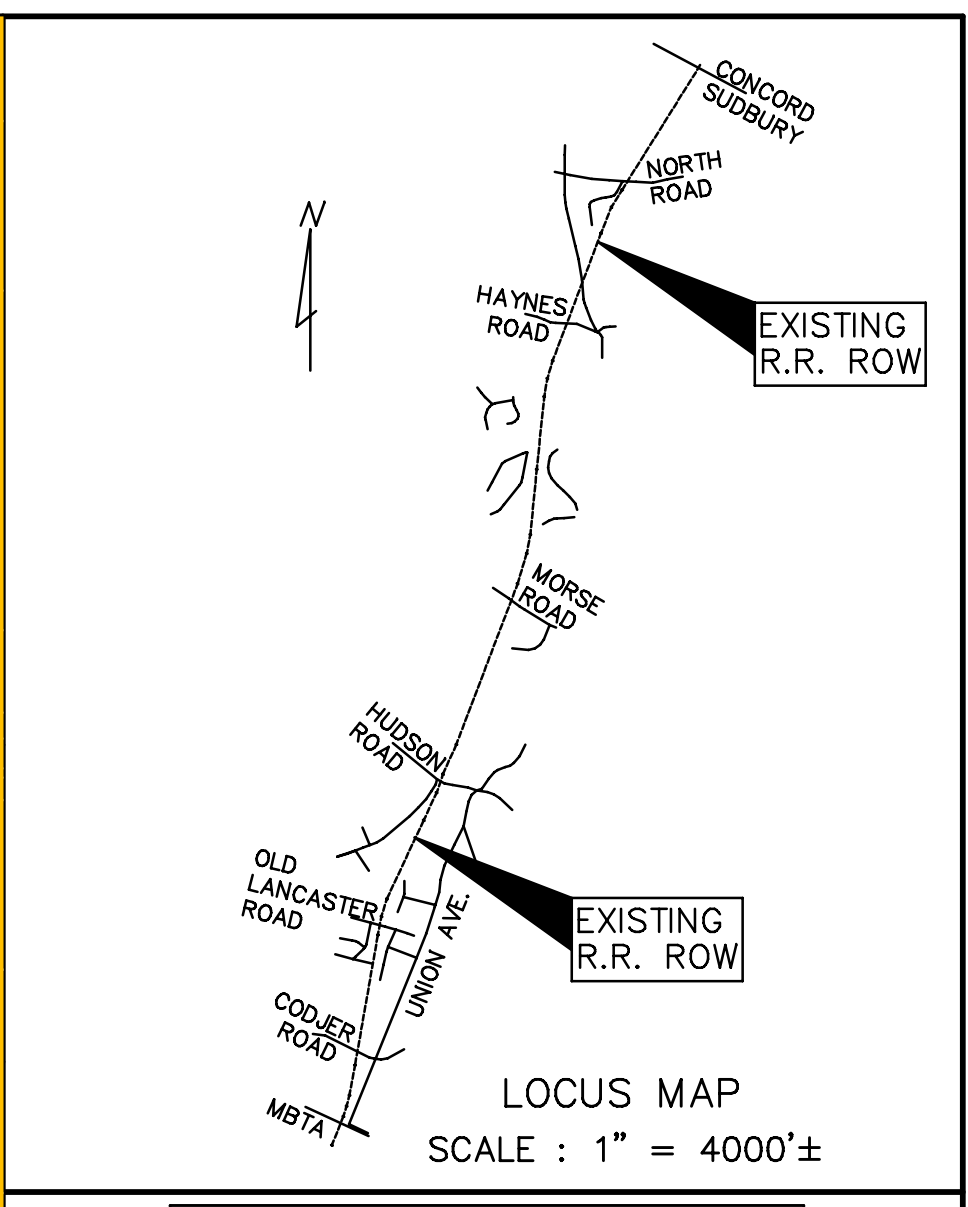
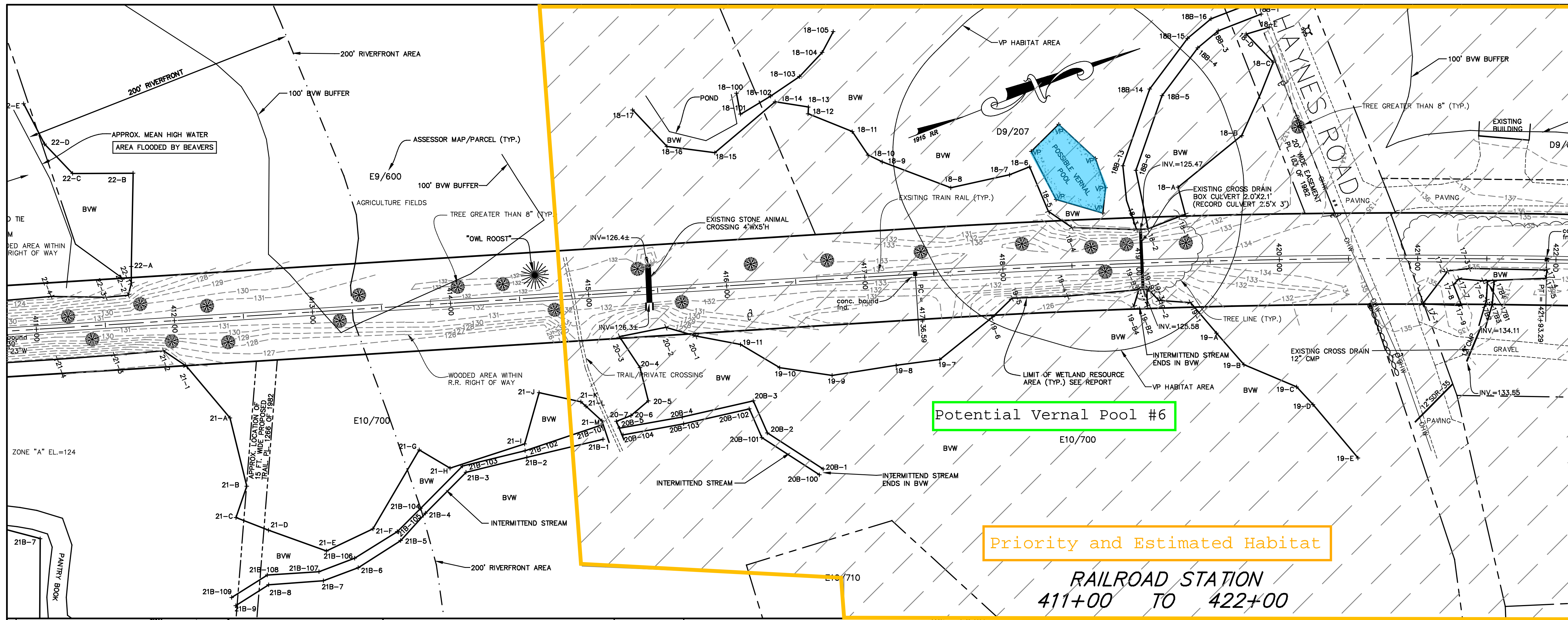
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Scale: 1" = 40'
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SHEET 8 OF 23



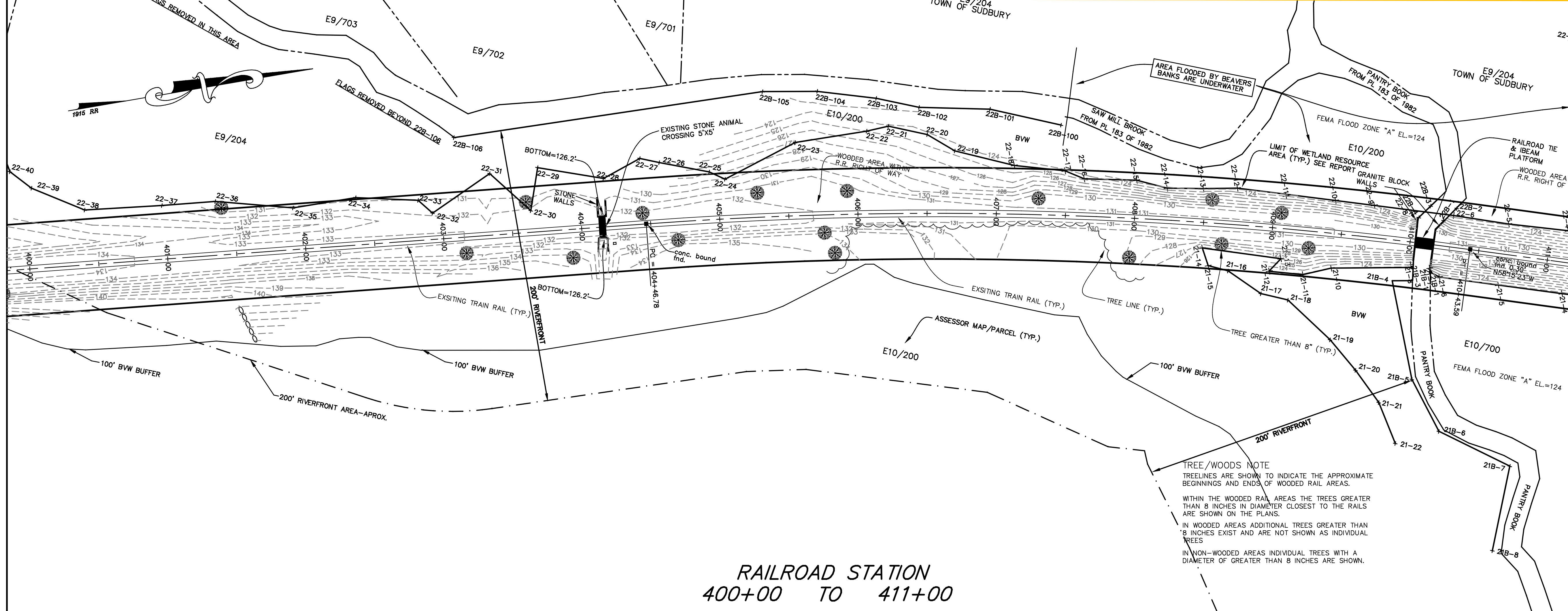
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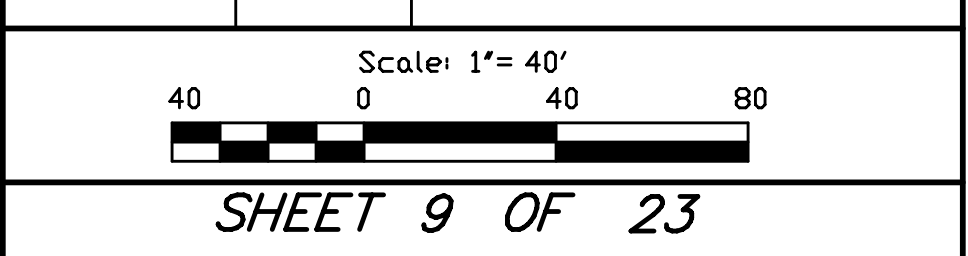
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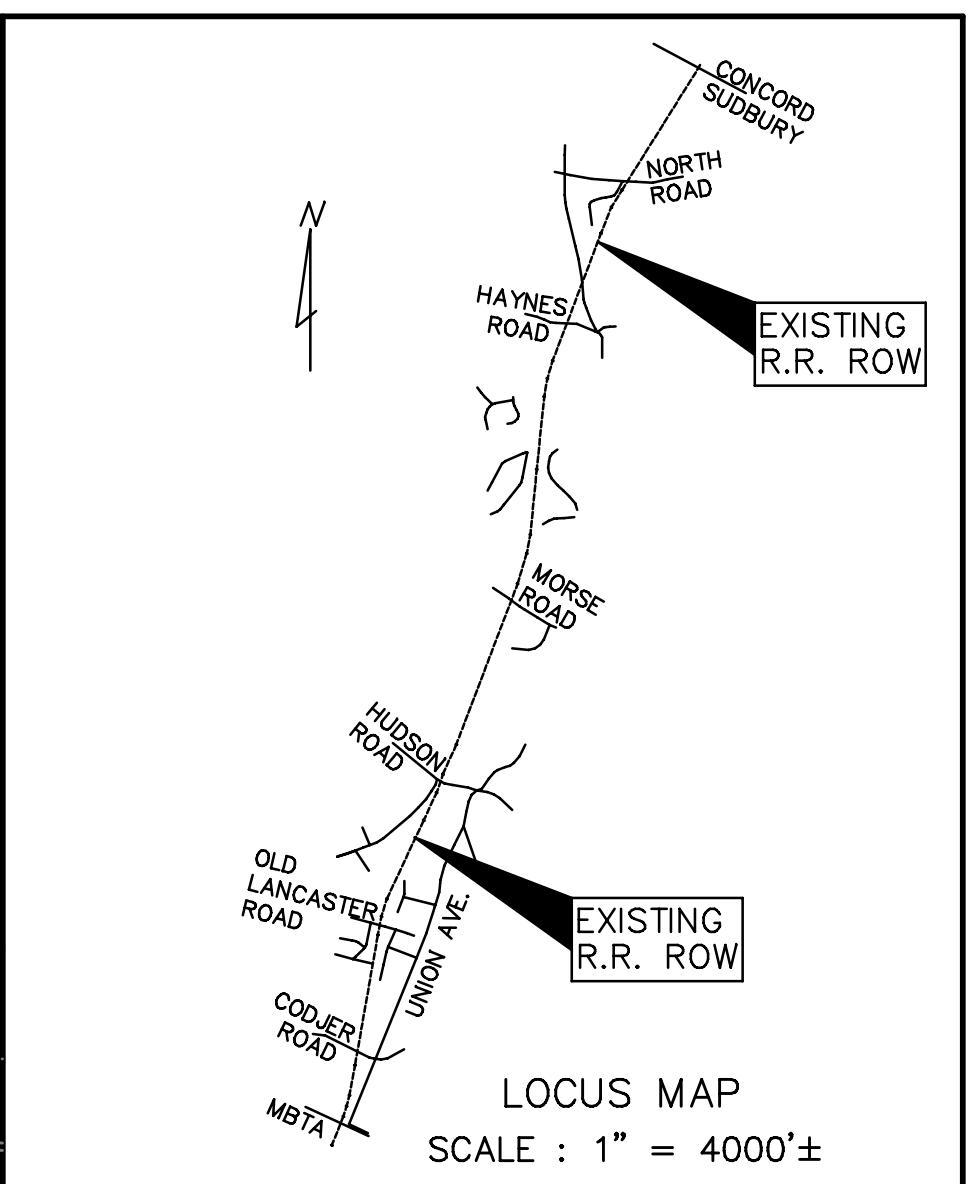
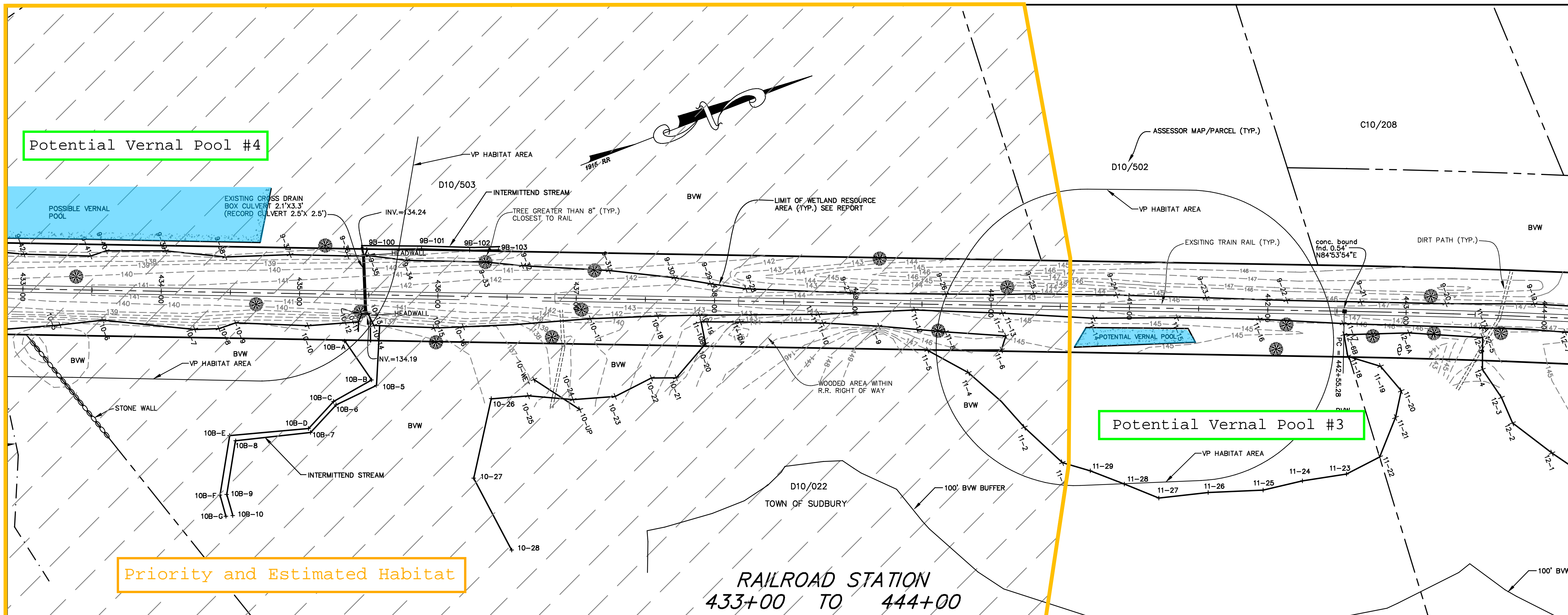
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RAILROAD STATION
 400+00 TO 411+00

RAILROAD STATION
 411+00 TO 422+00



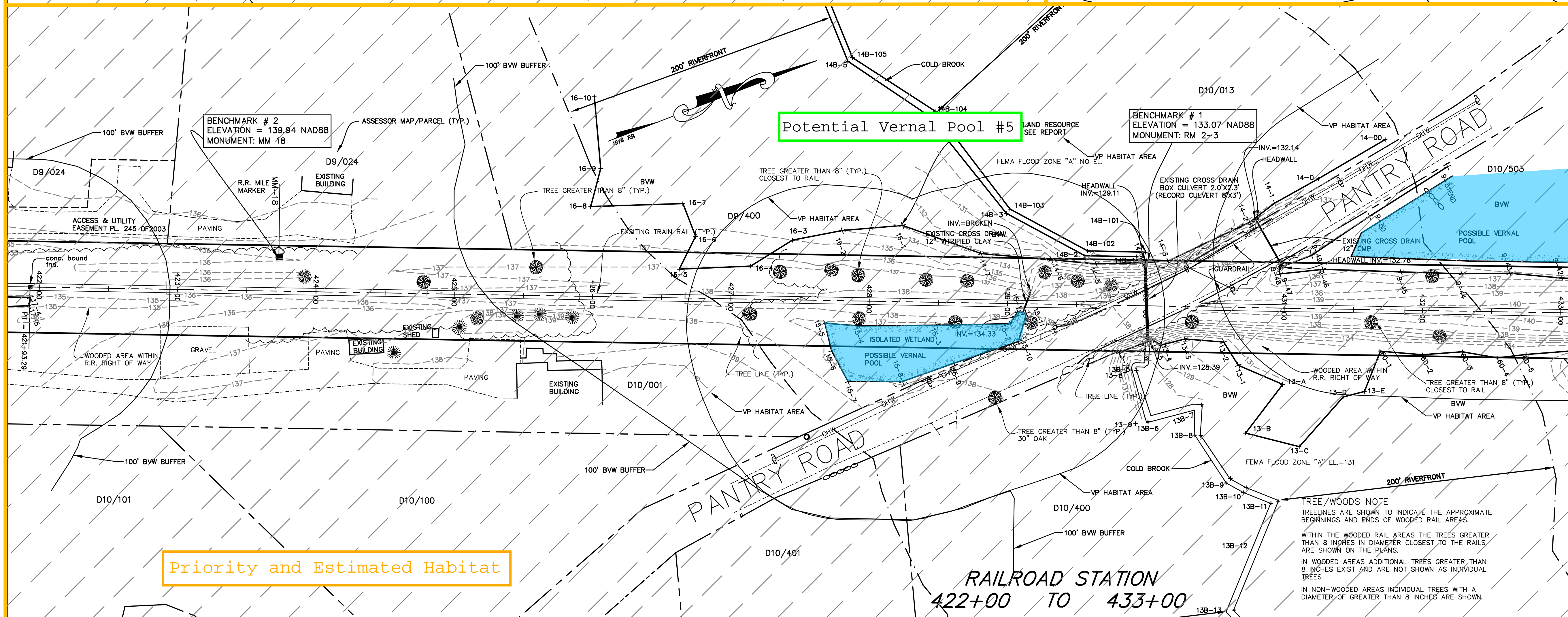
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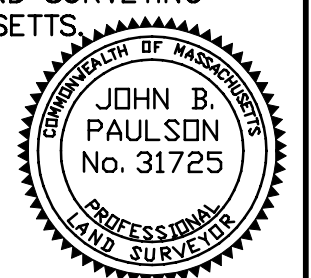


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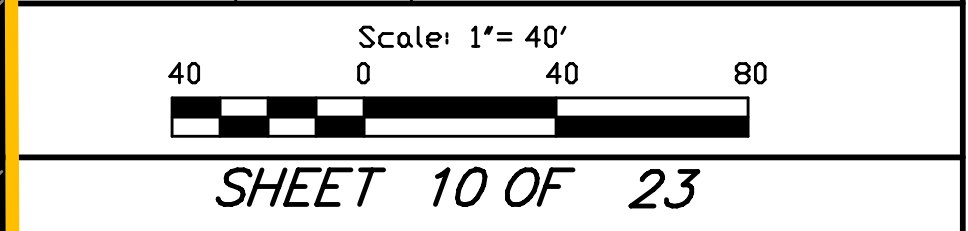


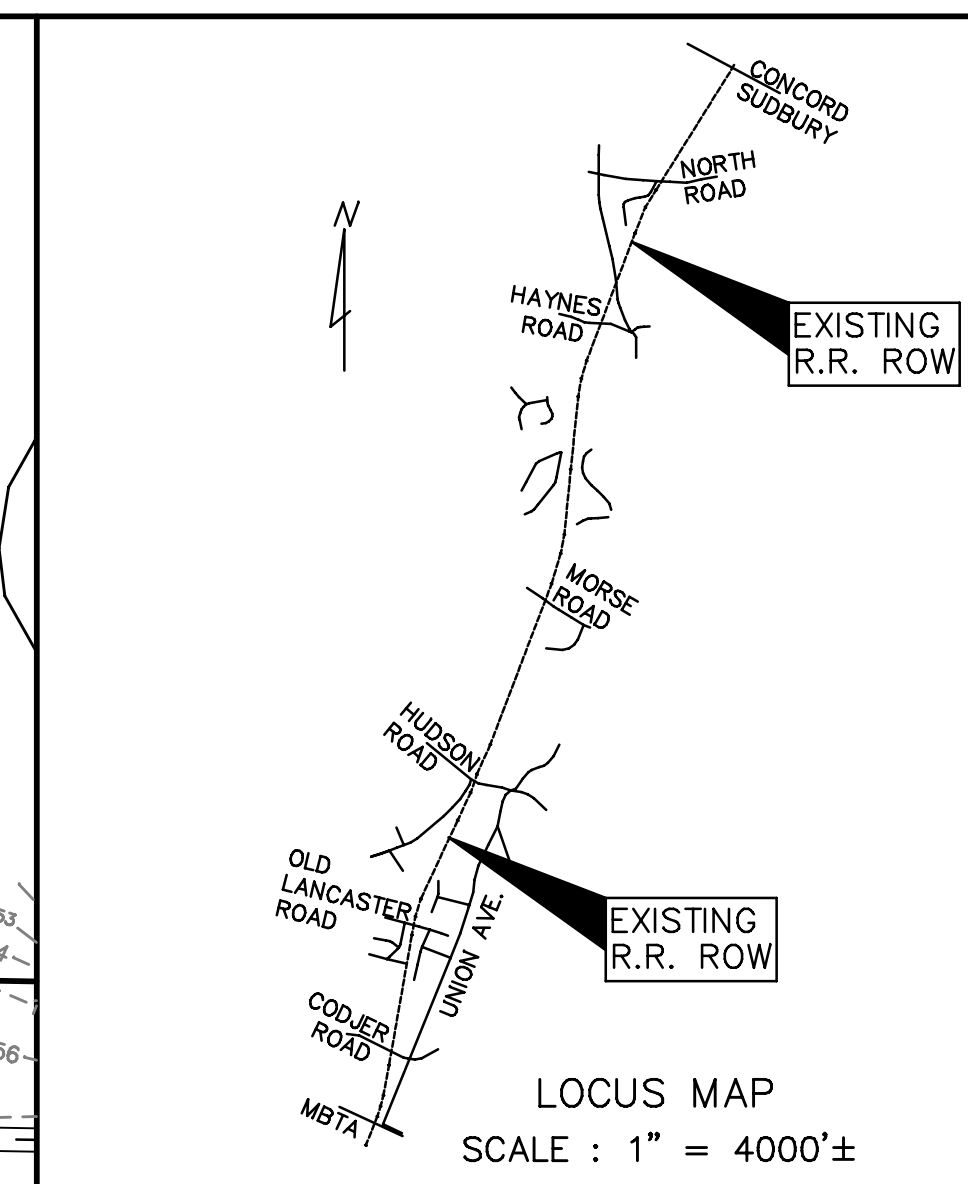
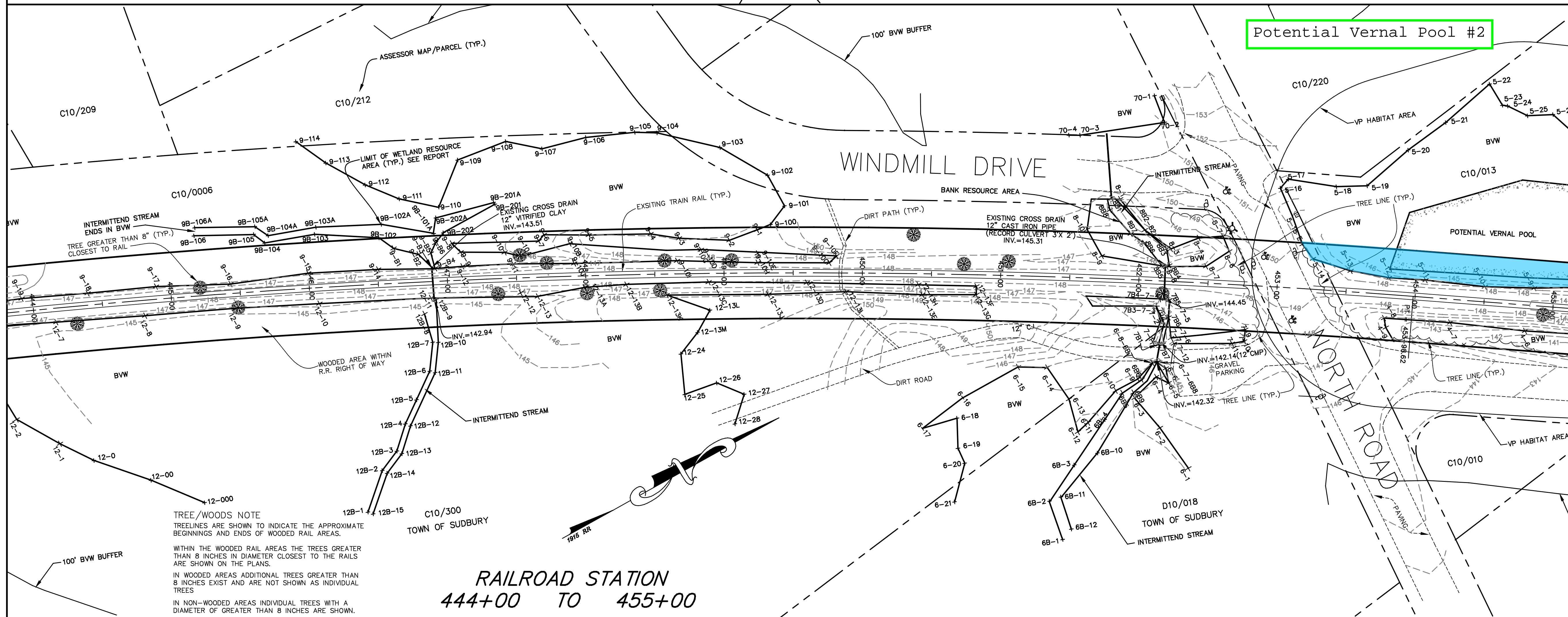
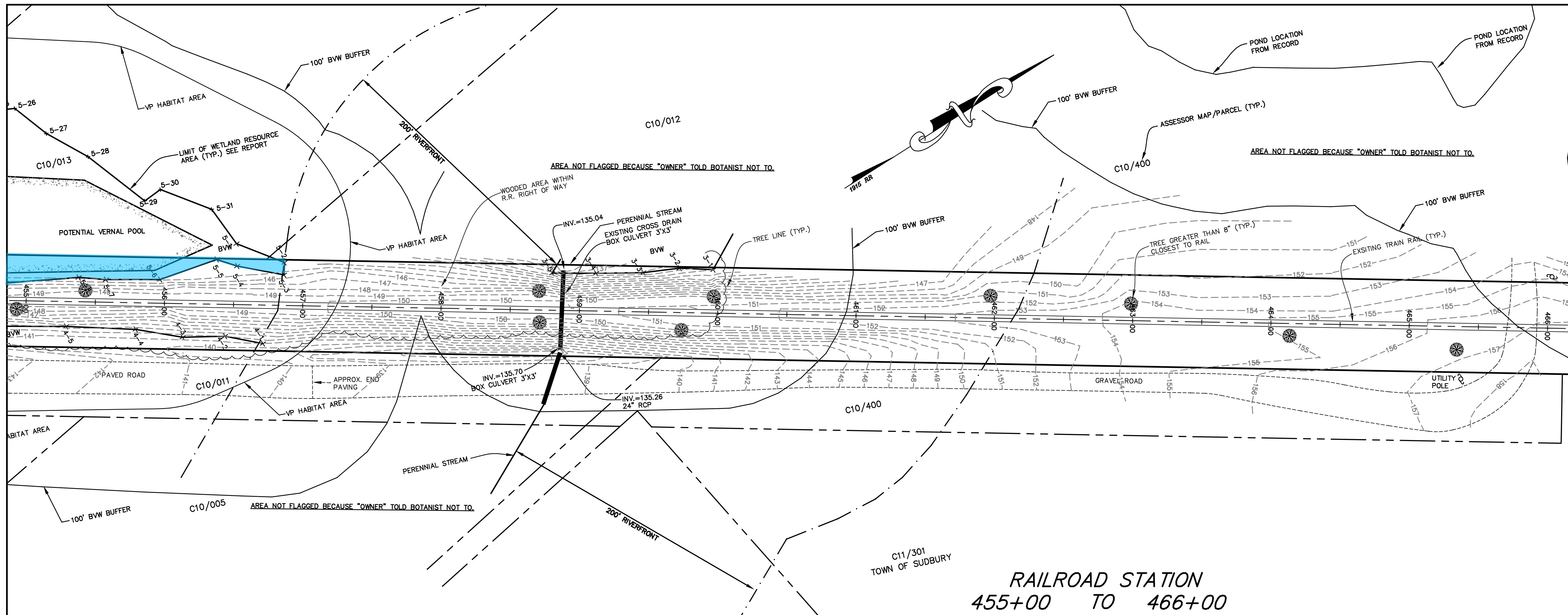
EXISTING CONDITIONS SURVEY PLAN AT PROPOSED RAIL TRAIL IN SUDBURY, MASS.

PREPARED FOR: TOWN OF SUDBURY
 275 OLD LANCASTER ROAD
 SUDBURY, MA 01776

DATE: JUNE 30, 2008 (1ST SUBMISSION)

Submission #	date	description
2	7/23/2008	Site Plan with TDPD
3	3/18/2009	REVISIONS
4	7/28/2009	PROFILE





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SURVEY NOTES

PORTIONS OF THE BANK OF HOP BROOK AND PANTRY BROOK COULD NOT BE ESTABLISHED ON TOWN LAND AS THE AREA WAS UNDER WATER AT THE TIME OF THE RESOURCE DELINEATION.

THE CONTOUR INTERVAL ON THE PLAN IS 1 FOOT. SOME CONTOURS ARE NOT LABELLED DUE TO THE SCALE OF THE PLAN AND THE STEEPNESS OF THE GROUND SLOPE.

TREES NOTATED AS "TREE GREATER THAN 8" (TYP)" REPRESENT THE FIELD LOCATED TREE NEAREST TO THE EXISTING RAIL LINES.

DRAWING FILE: RAILTRAILfinal2-gps2
 ATLANTIC JOB NO. A0801-02

I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION AND THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF IT CONFORMS WITH TECHNICAL, ETHICAL AND PROCEDURAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.

JOHN B. PAULSON
 No. 31725
 REGISTERED PROFESSIONAL LAND SURVEYOR

JUNE 30, 2008
 Date

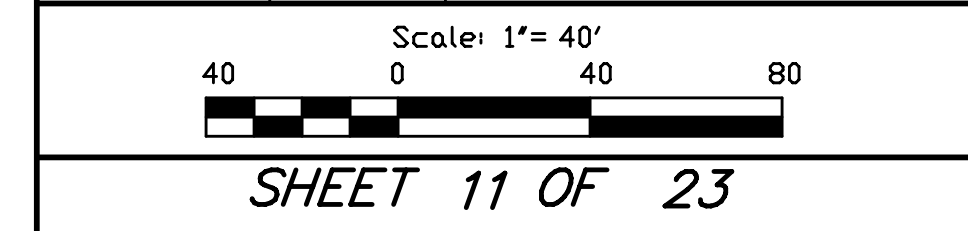
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 PHONE: 978-352-7870 FAX: 978-352-9940

EXISTING CONDITIONS SURVEY PLAN AT PROPOSED RAIL TRAIL IN SUDBURY, MASS.

PREPARED FOR: TOWN OF SUDBURY
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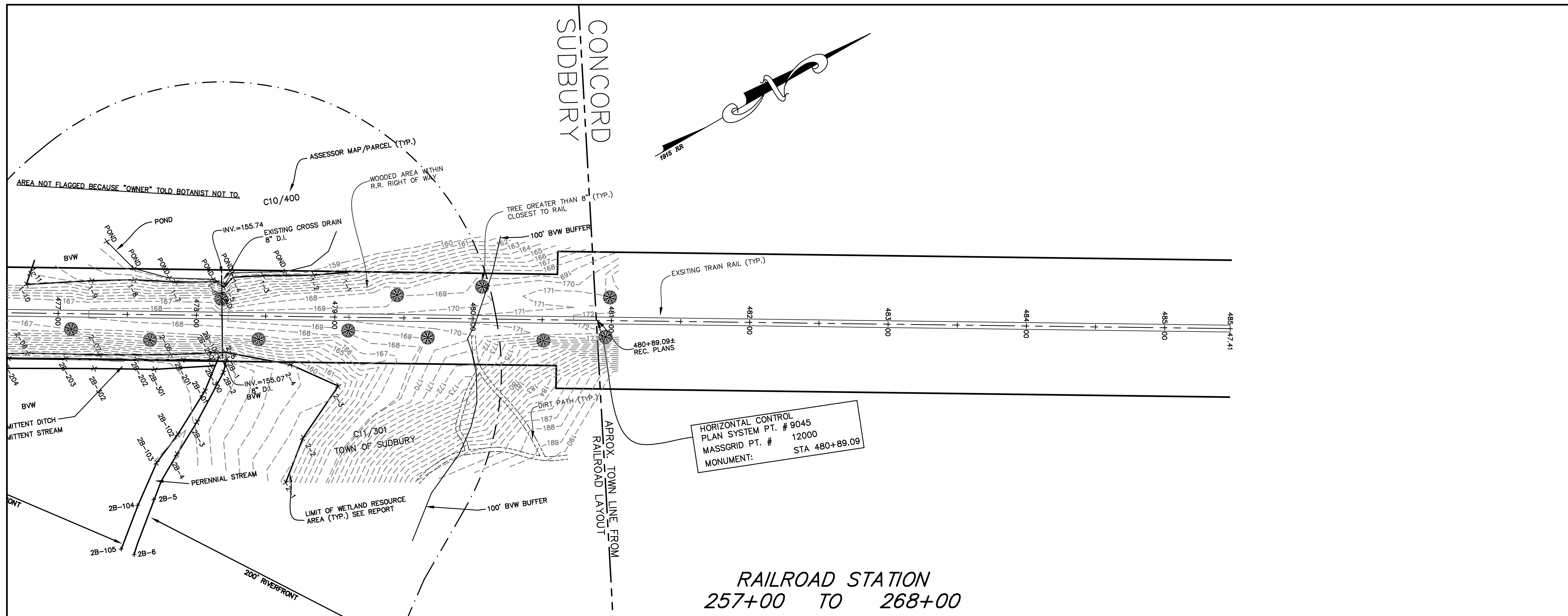


TREE/WOODS NOTE
 TREELINES ARE SHOWN TO INDICATE THE APPROXIMATE BEGINNINGS AND ENDS OF WOODED RAIL AREAS.

WITHIN THE WOODED RAIL AREAS THE TREES GREATER THAN 8 INCHES IN DIAMETER CLOSEST TO THE RAILS ARE SHOWN ON THE PLANS.

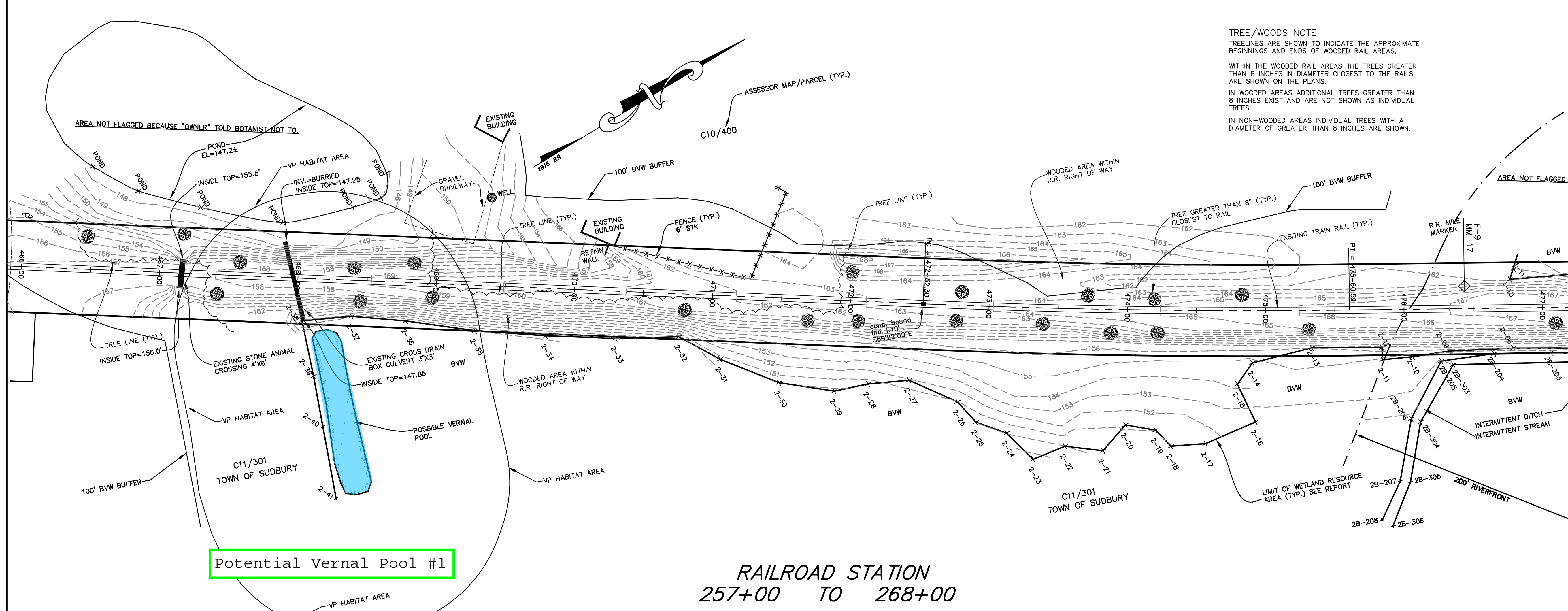
IN WOODED AREAS ADDITIONAL TREES GREATER THAN 8 INCHES EXIST AND ARE NOT SHOWN AS INDIVIDUAL TREES.

IN NON-WOODED AREAS INDIVIDUAL TREES WITH A DIAMETER OF GREATER THAN 8 INCHES ARE SHOWN.



RAILROAD STATION
257+00 TO 268+00

HORIZONTAL CONTROL
PLAN SYSTEM PT. # 9045
MASSGRID PT. # 12000
MONUMENT: STA 480+89.09



RAILROAD STATION
257+00 TO 268+00

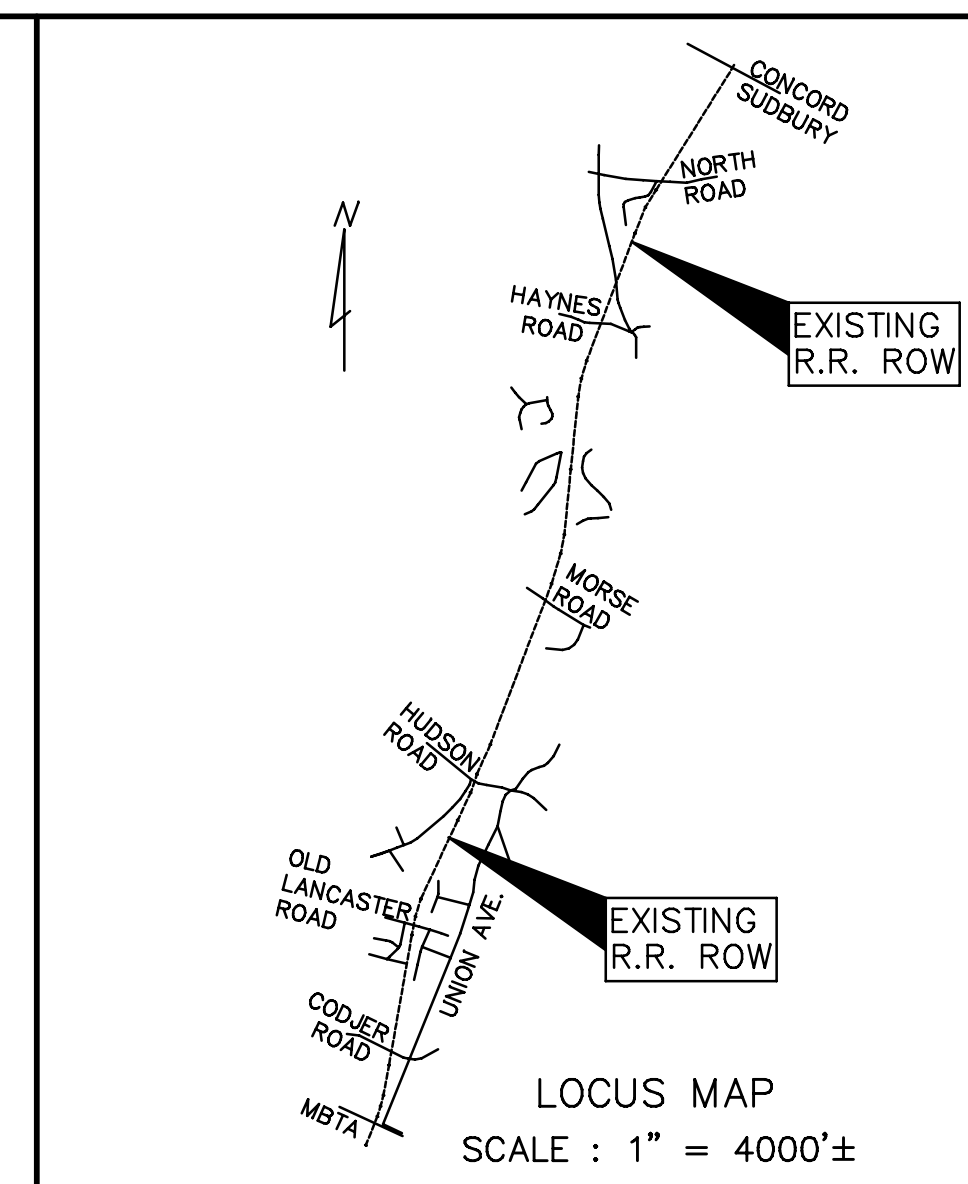
Potential Vernal Pool #1

TREE/WOODS NOTE
TREELINES ARE SHOWN TO INDICATE THE APPROXIMATE BEGINNINGS AND ENDS OF WOODED RAIL AREAS.

WITHIN THE WOODED RAIL AREAS THE TREES GREATER THAN 8 INCHES IN DIAMETER CLOSEST TO THE RAILS ARE SHOWN ON THE PLANS.

IN WOODED AREAS ADDITIONAL TREES GREATER THAN 8 INCHES EXIST AND ARE NOT SHOWN AS INDIVIDUAL TREES.

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SURVEY NOTES

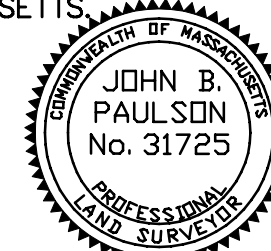
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TREES NOTATED AS "TREE GREATER THAN 8\"/>

DRAWING FILE: RAILTRAILfinal2-gps2
ATLANTIC JOB NO. A0801-02

I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION AND THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF IT CONFORMS WITH TECHNICAL, ETHICAL AND PROCEDURAL STANDARDS FOR THE PRACTICE OF LAND SURVEYING IN THE COMMONWEALTH OF MASSACHUSETTS.



JUNE 30, 2008
Date

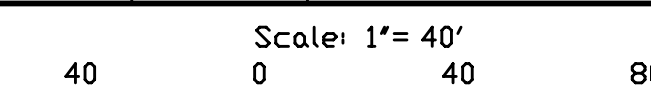
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PHONE: 978-352-7870 FAX: 978-352-9940

**EXISTING CONDITIONS
SURVEY PLAN
AT
PROPOSED RAIL TRAIL
IN
SUDBURY, MASS.**

PREPARED FOR: TOWN OF SUDBURY
275 OLD LANCASTER ROAD
SUDBURY, MA 01776

DATE: JUNE 30, 2008 (1ST SUBMISSION)

Submission #	date	description
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Attachment 11

Impact Summary Tables

Bruce Freeman Rail Trail 100% Design Resource Area Impacts Summary Table						
Fuss & O'Neill	11/12/2021					
WPA resource Area Impacts Project Wide		Perm	Temp	Total Impact	Total Resource Area in Project Locus	
Bank		149	336	485	5,802	LF
0-100ft Riverfront Area		42,317	25,387	67,704	173,375	SF
100-200ft Riverfront Area		23,540	18,382	41,922	111,576	SF
Riverfront Area		65,857	43,769	109,626	284,951	SF
Land Under Water		474	1,347	1,821	19,919	SF
Vernal Pools (WPA Certified or WPA Eligible)		-	-	-		SF
Vernal Pools (100' Buffer) (Certified or Eligible)		14,545	7,531	22,076	66,163	SF
Bordering Vegetative Wetlands		1,190	1,520	2,710	185,887	SF
Bordering Land Subject to Flooding (BLSF) 100-year FEMA Flood Plain		1,946	-	1,946	78,754	SF
100ft Buffer Zone		254,639	172,631	427,270	1,122,312	SF
Impacts to (LUW+ BVW)		1,664	2,867	4,531		SF
		0.04	0.07	0.10		AC

Bank Impacts (WPA Jurisdiction)

					Permanant	Temporary	Total Disturbed	Replaced			
Work Activity	Plan Station	Left/Right of Stationing (LT/RT)	East/West of Trail	Name of River/Stream	Length (Ft.)	Length (Ft.)	Length (Ft.)	Length (Ft.)	Impact Desc.	Resource Desc.	Flag Series
Bridge Renovation	126+26	LT/RT	Under Trail	Hop Brook		49	49	49	Abutment Work Area/Water Control	Perennial Stream (River)	BF#32-100 series
Bridge Renovation	126+50	LT/RT	Under Trail	Hop Brook		84	84	84	Abutment Work Area/Water Control	Perennial Stream (River)	BF#32-200
Culvert Renovation	166+89	LT	West			5		5	Work Area for Replacement of Collapsed Culvert (South Bank)	Intermittent Stream	BF#30-205 to 206
Culvert Renovation	167+14	RT	East			3		3	Work Area for Replacement of Collapsed Culvert (North Bank)	Intermittent Stream	BF#30-209 to 210
Culvert Renovation	167+24	LT	West			8		8	Work Area for Replacement of Collapsed Culvert (North Bank)	Intermittent Stream	BF#30-308
Culvert Renovation	167+19	LT/RT	Under Trail		53				Replacement of Collapsed Culvert (South bank)	Intermittent Stream	BF#30-205 to 210
Culvert Renovation	167+31	LT/RT	Under Trail		48				Replacement of Collapsed Culvert (North bank)	Intermittent Stream	BF#30-105,321,319, 308
BFRT Shared-Use Path	216+34 to 216+52	RT	East		19			19	Embankment Grading, Loam & Seed	Intermittent Stream	BF#23-301 to 300
BFRT Shared-Use Path	216+68 to 216+84	RT	East			17		17	Embankment Grading	Intermittent Stream	BF#23-216 to 217
BFRT Shared-Use Path	216+69 to 216+99	RT	East			29		29	Embankment Grading	Intermittent Stream	BF#23-214 to 215
Culvert Renovation	216+68	RT	East		6				Headwall Replacement	Intermittent Stream	BF#23-215
Bridge Renovation	264+30	RT	Under Trail	Pantry Brook	12			12	Dumped Rip Rap (South east bank)	Perennial Stream (River)	PS1-1 series
Bridge Renovation	264+37	LT/RT	Under Trail	Pantry Brook		52		52	Abutment Work Area/Water Control (South Bank)	Perennial Stream (River)	PS1-1 series
Bridge Renovation	264+52	RT	Under Trail	Pantry Brook	5			5	Dumped Rip Rap (North East bank)	Perennial Stream (River)	PS1-1A series
Bridge Renovation	264+56	LT/RT	Under Trail	Pantry Brook		56		56	Abutment Work Area/Water Control (North Bank)	Perennial Stream (River)	PS1-1A series

Culvert Renovation	301+33	LT	West			6	6	6	Erosion control & work area to replace headwall	Intermittent Stream	BF#15-6 series
Culvert Renovation	306+64	LT	West			15	15	15	Erosion control & work area to replace headwall	Intermittent Stream	BF#15-6 series
Culvert Renovation	306+65	RT	East			9	9	9	Erosion control & work area to replace headwall	Intermittent Stream	BF#15-6 series
Culvert Renovation	306+71	RT	East			3	3	3	Erosion control & work area to replace headwall	Intermittent Stream	BF#15-6 series
Culvert Renovation	306+72	RT	East		6				Embankment Grading, Loam & Seed	Intermittent Stream	BF#15-6 series
Total:					149	336	485	336			

Riverfront Area Impacts (WPA Jurisdiction)

			0ft-100ft Permanent	0ft-100ft Temporary	0ft-100ft Total Disturbed Area	100ft-200ft Permanent	100ft-200ft Temporary	100ft-200ft Total Disturbed Area	Total Permanent	Total Temporary	Total Disturbed Area	Work Activity	Desc.
Left/Right of Stationing (L/T/RT)	East/West of Trail	Name of River	Area (SF)	Area (SF)	Area (SF)	Area (SF)	Area (SF)		Area (SF)	Area (SF)	Area (SF)		
121+35 to 134+13	Both	BF-32-100 & BF-32-200, BF-33 series, Hop Brook	14,420	5,850	20,270	4,964	2,832	7,796	19,384	8,682	28,066	BFRT Shared-Use Path	Perm: Paved Path & Crushed Gravel; Temp: Loam & Native Seed, Erosion Control
125+94 to 126+99	Both	BF-32-100 & BF-32-200, BF-33 series, Hop Brook	0	441	441	0	0	0	0	441	441	Bridge Renovation	Clean & repair existing bridge abutments
157+91 to 164+89	Both	BF-32-100 & BF-32-200 series, Hop Brook	6,265	2,943	9,208	4,312	2,275	6,587	10,577	5,218	15,795	BFRT Shared-Use Path	Perm: Paved Path & Crushed Gravel; Temp: Loam & Native Seed
254+79 to 266+53	Both	PS-1 series, Pantry Brook	11,492	11,210	22,702	5,299	6,361	11,660	16,791	17,571	34,362	BFRT Shared-Use Path	Perm: Paved Path & Crushed Gravel; Temp: Loam & Native Seed
264+19 to 264+70	Both	PS-1 series, Pantry Brook	1,412	179	1,591	0	0	0	1,412	179	1,591	Bridge Renovation	New bridge superstructure, duped riprap, modified rock fill
268+64 to 275+39	Both	BF-12 series, Unamed Tributary to Pantry Brook	4,139	2,718	6,857	5,728	4,233	9,961	9,867	6,951	16,818	BFRT Shared-Use Path	Perm: Paved Path & Crushed Gravel; Temp: Loam & Native Seed
311+33 to 316+40	Both	BF-3 series, unamed tributary to Cold Brook	4,589	2,046	6,635	3,237	2,681	5,918	7,826	4,727	12,553	BFRT Shared-Use Path	Perm: Paved Path & Crushed Gravel; Temp: Loam & Native Seed
Total			42,317	25,387	67,704	23,540	18,382	41,922	65,857	43,769	109,626		

Land Under Water Impacts (WPA Jurisdiction)

Work Activity	Plan Station	Left/Right of Stationing (LT/RT)	East/West of Trail	Name of River/Stream	Permanant Area (SF)	Temporary Area (SF)	Total Disturbed Area (SF)	Impact Desc.	Resource Desc.	Flag Series
Bridge Renovation	126+30	LT/RT	Under Trail	Hop Brook		179	179	Abutment Work Area, Water Control	Perennial Stream (River)	BF#32-100 Series
Bridge Renovation	126+52	LT/RT	Under Trail	Hop Brook		347	347	Abutment Work Area, Water Control	Perennial Stream (River)	BF#32-200 Series
Culvert Renovation	167+18 to 167+33	LT/RT	Under Trail		351		351	Repair Culvert	Intermittent Stream	BF#30-105, 308, 320, 321, BF#30-206-210
Culvert Renovation	166+91 to 167+14	LT	West		43		43	Repair Culvert	Intermittent Stream	BF#30-205-206
Culvert Renovation	167+14	RT	East		10		10	Repair Culvert	Intermittent Stream	BF#30-208-209
Culvert Renovation	167+17	RT	East			54	54	Work Area for culvert repair, returned to natural stream bed	Intermittent Stream	BF#30-208-209
Culvert Renovation	167+17	LT	West			88	88	Work Area for culvert repair, returned to natural stream bed	Intermittent Stream	BF#30-205-206
BFRT Shared-Use Path	216+35 to 216+52	RT	East		25		25	Embankment Grading	Intermittent Stream	BF#23-300 to 301
BFRT Shared-Use Path	216+35 to 216+52	RT	East			18	18	Erosion Control	Intermittent Stream	BF#23-300 to 301
Culvert Renovation	216+50	RT	East		16		16	Headwall Replacement	Intermittent Stream	BF#23-300 to 305
Culvert Renovation	216+65	RT	East		9		9	Headwall Replacement	Intermittent Stream	BF#23-215 to 216
Culvert Renovation	216+67 to 216+98	RT	East			109	109	Embankment Grading, loam & seed, returned to natural condition	Intermittent Stream	BF#23-214 to 217
Bridge Renovation	264+39	LT/RT	Under Trail	Pantry Brook		254	254	Bridge Abutment Work Area/Water Control	Perennial Stream (River)	PS1-1 Series
Bridge Renovation	264+55	LT/RT	Under Trail	Pantry Brook		231	231	Bridge Abutment Work Area/Water Control	Perennial Stream (River)	PS1-1A Series
Culvert Renovation	301+33	LT	West			4	4	Erosion Control & Work Area	Intermittent Stream	BF#15-6-304, BF#15-6-130
Culvert Renovation	301+33	RT	East			12	12	Erosion Control & Work Area	Intermittent Stream	BF#15-7-100 Series
Culvert Renovation	306+61	LT	West			29	29	Erosion Control & Work Area	Intermittent Stream	BF#5-206 to 209

Culvert Renovation	306+60	LT	West		8		8	Replace Headwall	Intermittent Stream	BF#5-207 to 208
Culvert Renovation	306+60	RT	East		8		8	Replace Headwall	Intermittent Stream	BF#6-100 to 101
Culvert Renovation	306+61	RT	East			22	22	Erosion Control & Work Area	Intermittent Stream	BF#6-102 to 105
Culvert Renovation	306+70	RT	East		4		4	Embankment Grading	Intermittent Stream	BF#6-101 to 102
Total:					474	1,347	1,821			

Vernal Pool Impacts (WPA Jurisdiction)

					VP Permanent	VP Temporary	VP 100ft Buffer Zone Permanent	VP 100ft Buffer Temporary	Total Disturbed	Within Resouce Area	Work Activity	Impact Desc.
Station	Left/Right of Stationing (LT/RT)	East/West of Trail	Name (VP Number)	Eligibility Status in ORAD	Area (SF)	Area (SF)	Area (SF)	Area (SF)	Area (SF)			
208+18	LT/RT	BOTH	11	Eligible	0	0	7,051	2,973	10,024	WF#24 Series (BVW)	BFRT Shared-Use Path	Perm. Paved Path, Temp. Crushed Gravel, Loam & Seed
285+11	LT/RT	BOTH	4	Eligible	0	0	7,494	4,558	12,052	WF#6-100 Series (BVW)	BFRT Shared-Use Path	Perm. Paved Path, Temp. Crushed Gravel, Loam & Seed
Total:					0	0	14,545	7,531	22,076			

BVW Impacts (WPA Jurisdiction)

					Permanant	Temporary	Total Disturbed	Replaced	Impact Disc.	Flag Series
Work Activity	Plan Station	Left/Right of Stationing (LT/RT)	East/West of Trail	Name (WF Number)	Area (SF)	Area (SF)	Area (SF)	Area (SF)		
BFRT Shared-Use Path	105+10	LT				14	14	14	Erosion Control	WF#36-200 series
BFRT Shared-Use Path	105+10	LT			5		5	0	Embankment Grading, Loam & Seed	WF#36-200 series
Bridge Renovation	126+08	RT				47	47	47	Abutment Work Area/Water Control	WF#40-100 series
Bridge Renovation	263+94 to 264+28	RT		Pantry Brook		42	42	42	Erosion Control	WF#14-100 series
Bridge Renovation	264+23	RT		Pantry Brook	10		10	0	Dumped Rip Rap	WF#14-100 series
Bridge Renovation	264+34	LT		Pantry Brook		35	35	35	Abutment Work Area/Water Control	WF#13-100 series
Bridge Renovation	264+61	LT		Pantry Brook		31	31	31	Abutment Work Area/Water Control	WF#13-100 series
Bridge Renovation	264+21 to 264+32	LT		Pantry Brook	47		47	0	Dumped Rip Rap	WF#13-100 series
Bridge Renovation	264+19 to 264+37	LT		Pantry Brook		29	29	29	Erosion Control	WF#13-100 series
Bridge Renovation	264+67	LT		Pantry Brook	15		15	0	Dumped Rip Rap	WF#13-100 series
Bridge Renovation	264+60 to 264+95	LT		Pantry Brook		39	39	39	Erosion Control	WF#13-100 series
Bridge Renovation	264+57	RT		Pantry Brook	13		13	0	Dumped Rip Rap	WF#14-100 series
Bridge Renovation	264+30 to 264+84	RT		Pantry Brook		36	36	36	Erosion Control	WF#14-100 series
BFRT Shared-Use Path	293+18 to 294+15	LT				88	88	88	Erosion Control	WF#6-100 series
BFRT Shared-Use Path	292+44 to 297+14	RT				503	503	503	Erosion Control	WF#7-100 series
BFRT Shared-Use Path	292+55 to 296+26	RT			725		725	0	HMA Pavement, Gravel Shoulder, Loam & Seed	WF#7-100 series
BFRT Shared-Use Path	294+84 to 297+24	LT				272	272	272	Erosion Control	WF#6-100 series
BFRT Shared-Use Path	295+08 to 297+08	LT			190		190	0	Embankment Grading, Loam & Seed	WF#6-100 series
BFRT Shared-Use Path	296+55 to 296+76	RT			2		2	0	Embankment Grading, Loam & Seed	WF#7-100 series
BFRT Shared-Use Path	297+24 to 297+78	RT				8	8	8	Embankment Grading, Loam & Seed	WF#7-100 series
BFRT Shared-Use Path	301+30	LT				9	9	9	Erosion Control & Work Area for Headwall Replacement	WF#6-100 series
BFRT Shared-Use Path	301+38	LT				12	12	12	Erosion Control & Work Area for Headwall Replacement	WF#6-100 series

BFRT Shared-Use Path	301+34	RT				12	12	12	Erosion Control & Work Area for Headwall Replacement	WF#7-100 series
BFRT Shared-Use Path	302+96 to 303+14	RT			2		2	0	Embankment Grading, Loam & Seed	WF#7-100 series
BFRT Shared-Use Path	302+69 to 304+91	RT				214	214	214	Erosion Control	WF#7-100 series
BFRT Shared-Use Path	303+70 to 304+84	RT			155		155	0	Gravel Shoulder, Embankment Grading Loam & Seed	WF#7-100 series
BFRT Shared-Use Path	303+66 to 304+20	LT			26		26	0	Embankment Grading, Loam & Seed	WF#6-100 series
BFRT Shared-Use Path	303+39 to 304+29	LT				91	91	91	Erosion Control	WF#6-100 series
Culvert Renovation	306+55	LT				13	13	13	Erosion Control & Work Area	WF#5-400 series
Culvert Renovation	306+56	LT				25	25	25	Erosion Control & Work Area	WF#5-300 series
	Total:				1,190	1,520	2,710	1,520		

**100ft Buffer Zone Impacts
(WPA Jurisdiction)**

Work Activity	Plan Station	Left/Right of Stationing (L/R)	East/West of Trail	Name (WF Number)	Permanent Area (SF)	Temporary Area (SF)	Total Disturbed Area (SF)	Impact Desc.
BFRT Shared-Use Path	102+37 to 108+61	LT/RT	Both	WF-36	9,155	6,078	15,233	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	108+86 to 110+87	LT/RT	Both	WF-37	2,929	1,510	4,439	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	111+90 to 114+23	LT/RT	Both	WF-39	3,168	3,794	6,962	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed
BFRT Shared-Use Path	117+00 to 126+20	LT/RT	Both	WF-35, WF-40, WF-41, BF-32	14,136	6,783	20,919	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Bridge Renovation	126+20 to 126+53	LT/RT	Both	BF-32 (Hop Brook)	0	441	441	Cleaning & Repairing Existing Bridge abutment
BFRT Shared-Use Path	126+53 to 133+14	LT/RT	Both	WF-35, BF-32	10,176	3,716	13,892	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	151+00 to 164+20	LT/RT	Both	WF-32	18,699	14,352	33,051	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	164+48 to 168+32	LT/RT	Both	BF-30	5,407	4,472	9,879	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	195+56 to 201+00	LT/RT	Both	WF-26, WF-27	8,125	4,577	12,702	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed
BFRT Shared-Use Path	206+91 to 215+75	LT/RT	Both	WF-24, WF-25, BF 15-24	11,911	7,586	19,497	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Wetland Replication Area	212+46 to 213+15	LT	West	WF#20336 D405	0	3,074	3,074	Wetland Replication Area
BFRT Shared-Use Path	215+99 to 232+63	LT/RT	Both	WF-24, WF-25, BF 15-24, BF-23, WF-21, WF-23	26,322	17,744	44,066	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
New Parking Area	215+85 to 219+32	RT	East	BF-23 Series	0	12,916	12,916	Temp: Earthen Detention Basins
New Parking Area	215+64 to 217+70	RT	East	BF-23 Series	9,177	0	9,177	Perm: Paved Parking Area and connecting path to Trail, Rip Rap
BFRT Shared-Use Path	234+45 to 249+12	LT/RT	Both	Wf-19, WF-18, WF-17, WF-16	22,296	14,589	36,885	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	253+50 to 264+24	LT/RT	Both	WF-14, WF-13, WF-12	14,434	13,137	27,571	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Bridge Renovation	264+24 to 264+62	LT/RT	Both	WF14, WF13	1,412	179	1,591	New bridge superstructure, duped riprap, modified rock fill behind existing bridge abutment

BFRT Shared-Use Path	264+62 to 274+93	LT/RT	Both	WF-12, WF-13, WF14	14,897	8,469	23,366	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	275+15 to 284+41	LT/RT	Both	WF-42, WF-9, WF-8	14,094	7,857	21,951	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	284+54 to 307+50	LT/RT	Both	WF-6, WF-7, WF-5	30,440	14,284	44,724	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
BFRT Shared-Use Path	307+71 to 315+79	LT/RT	Both	WF-5, WF-4, WF-3	12,248	6,576	18,824	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Shared-use path connection	320+97 to 335+17	LT/RT	Both	WF-2, WF-1	21,227	17,818	39,045	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Shared-use path connection	1100+29 to 1101+32	LT/RT	Both	WF-5-103, WF-5-115	1,299	472	1,771	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Shared-use path connection	1101+34 to 1103+79	LT/RT	Both	WF#20336	3,087	2,207	5,294	Perm. Paved Path & Crushed Gravel. Temp. Loam & Native Seed, Erosion Control
Total:					254,639	172,631	427,270	

**Bordering Land Subject to Flooding
(100-year FEMA Flood Plain) Impact Areas**

Work Activity	BLSF Location & Station	Impact Area Station	Permanent Impact (square feet)	Temporary Impact ¹ (square feet)	Total Impact (square feet)	Impact Desc.
BFRT Shared-Use Path	Hop Brook STA 116+00 to 133+30 (East & West of trail) Base Flood Elevation 138.0'	STA 117+18 to 117+97 (West side of trail)	325		325	Grading from trail shoulder to existing ground w/ loam & native seed fill
		Subtotal	325		325	
	Mineway Brook STA 195+00 to 202+00 (West of trail) Base Flood Elevation 171.9'	-	-		-	No impacts
BFRT Shared-Use Path	Mineway Brook STA 195+00 to 202+00 (East of trail) Base Flood Elevation 174.3'	STA 197+81 to 198+72 (East side of trail)	148		148	Grading from trail shoulder to existing ground w/ loam & native seed fill
BFRT Shared-Use Path		STA 198+86 to 199+07 (East side of trail)	21		21	Grading from trail shoulder to existing ground w/ loam & native seed fill
BFRT Shared-Use Path		STA 199+56 to 199+77 (East side of trail)	60		60	Grading from trail shoulder to existing ground w/ loam & native seed fill
BFRT Shared-Use Path		STA 200+48 to 201+68 (East side of trail)	240		240	Grading from trail shoulder to existing ground w/ loam & native seed fill
		Subtotal	469		469	
Bridge Renovation	Pantry Brook STA 261+00 to STA 267+00 (East & West of trail) Base Flood Elevation 123.7'	264+00 to 264+37 (South abutment west side of trail)	195		195	Cut and regrade embankment behind existing abutment with loam & native seed, placement of modified rock fill and riprap
Bridge Renovation		264+00 to 264+37 (South abutment east side of trail)	215		215	Cut and regrade embankment behind existing abutment with loam & native seed, placement of modified rock fill and riprap
Bridge Renovation		264+50 to 265+00 (North abutment west side of trail)	264		264	Cut and regrade embankment behind existing abutment with loam & native seed, placement of modified rock fill and riprap
Bridge Renovation		264+50 to 265+00 (North abutment east side of trail)	212		212	Cut and regrade embankment behind existing abutment with loam & native seed, placement of modified rock fill and riprap
Bridge Renovation		264+28 to 264+37 (underneath proposed bridge span, south abutment)	130		130	Reduction in height of existing abutment walls, Cut and regrade embankments behind existing abutments, placement of modified rock fill and riprap
Bridge Renovation		264+49 to 264+58 (underneath proposed bridge span, North abutment)	136		136	Reduction in height of existing abutment walls, Cut and regrade embankments behind existing abutments, placement of modified rock fill and riprap
		Subtotal	1,152		1,152	
	Zone A BLSF STA 272+60 to 273+65 (west side of trail) STA 272+10 to 273+50 (east side of trail) STA 283+50 to 284+50 (west side of trail) STA 284+55 to 285+95 (east side of trail)	-	-	-	-	No impacts
	Tributary A to Cold Brook STA 310+50 to 314+50 (east side of trail) Base Flood Elevation 139.1'	-	-	-	-	No impacts
	Tributary A to Cold Brook	-	-	-	-	No impacts
		Total	1,946		1,946	

Bordering Land Subject to Flooding
(100-year FEMA Flood Plain) Impact Volumes

Work Activity	BLSF Location & Station	Elevation (ft)	Fill	Cut	Net (+Fill/-Cut)	Impact Desc.
BFRT Shared-Use Path	Hop Brook STA 117+118 to 117+97 (West side of trail)	138'-137'	0.63	0	0.63	Grading from trail shoulder to existing ground w/ loam & native seed fill
		Subtotal	0.63	0	0.63	
BFRT Shared-Use Path	Mineway Brook STA 197+81 to 198+72 (East side of trail)	174.3'-173.3'	1.21	0	1.21	Grading from trail shoulder to existing ground w/ loam & native seed fill
BFRT Shared-Use Path	STA 198+86 to STA 199+07	174.3'-173.3'	0.17	0	0.17	Grading from trail shoulder to existing ground w/ loam & native seed fill
BFRT Shared-Use Path	STA 199+56 to 199+77 (East side of trail)	174.3'-173.3'	0.16	0	0.16	Grading from trail shoulder to existing ground w/ loam & native seed fill
BFRT Shared-Use Path	STA 200+48 to 201+68 (East side of trail)	174.3'-173.3'	0.83	0	0.83	Grading from trail shoulder to existing ground w/ loam & native seed fill
		Subtotal	2.37	0	2.37	
Bridge Renovation	Pantry Brook 264+00 to 264+37 (South bridge abutment, east and west sides)	123.7'-122.7' 122.7'-121.7' 121.7'-120.7' 120.7'-119.7'	0 0 0 0	-8.08 -9.30 -6.53 -2.31	-8.08 -9.30 -6.53 -2.31	Reduction in height of existing abutment walls, Cut and regrade embankments behind existing abutments, placement of modified rock fill and riprap
Bridge Renovation	264+50 to 265+00 (North bridge abutment, east and west sides)	123.7'-122.7' 122.7'-121.7' 121.7'-120.7' 120.7'-119.7'	0 0 0 0	-10.56 -9.84 -7.26 -2.37	-10.56 -9.84 -7.26 -2.37	Reduction in height of existing abutment walls, Cut and regrade embankments behind existing abutments, placement of modified rock fill and riprap
Bridge Renovation	264+49 to 265+00 (underneath proposed bridge span)	123.7'-122.7' 122.7'-121.7' 121.7'-120.7' 120.7'-119.7'	0 0 0 0	-6.41 -6.84 -5.65 -3.20	-6.41 -6.84 -5.65 -3.20	Reduction in height of existing abutment walls, Cut and regrade embankments behind existing abutments, placement of modified rock fill and riprap
		Subtotal	0	-78.4	-78.4	
		Total	3.0	-78.4	-75.4	

Attachment 12

Broadacres Farm Parking Area Stormwater Report

Stormwater Management Report
Broadacres Farm Parking Lot
(Part of the Bruce Freeman Rail Trail Project)

Owner
Town of Sudbury
322 Concord Road
Sudbury, MA 01776

May 7, 2021



1550 Main Street, Suite 400
Springfield, MA 01089

Table of Contents

Stormwater Management Report Broadacres Farm Parking Lot

1	Executive Summary	1
2	Project Description.....	1
2.1	Existing Conditions.....	1
2.2	Proposed Conditions	1
3	Hydrologic Analysis	2
3.1	Existing Watershed Summary.....	2
3.2	Proposed Watershed Summary	2
3.3	Hydrologic Analysis Results	3
4	Soil Erosion and Sedimentation Control.....	3
5	Construction Sequence.....	3
6	Massachusetts Stormwater Handbook Standards.....	4
7	Summary	5



Table of Contents

Stormwater Management Report Broadacres Farm Parking Lot

Tables		Page
1	Peak Discharge Summary	3
Figures		End of Report
1	Site Location Map	
2	Existing Watershed Map	
3	Proposed Watershed Map	
Appendices		End of Report
A	Plans (bound separately)	
B	NRCS Web Soil Mapping	
C	Test Pit Information - Schofield Brothers, LLC	
D	Pre-Development Hydrological Analysis	
E	Post-Development Hydrological Analysis	
F	Stormwater Management Checklist	
G	Water Quality Treatment Calculations	
H	TSS Removal Calculations	
I	Groundwater Recharge Calculations & 72 Hour Drawdown	
J	Construction Operation and Maintenance Plan	
K	Long Term Operation and Maintenance Plan	

1 Executive Summary

The Town of Sudbury is proposing to construct a parking lot on Town-owned property off of Morse Road and adjacent to the proposed Bruce Freeman Rail Trail in Sudbury, Massachusetts. The project includes a new parking lot containing 32 parking spaces, approximately 9,770 square feet in size, with a walkway connection to the west to provide connectivity to the new trail. A pavilion, restrooms, and other amenities will be located to the east of the new parking area.

The proposed stormwater basins were designed in accordance with the guidelines of the Massachusetts Stormwater Handbook (Stormwater Handbook). Existing and proposed hydrologic conditions for the developed area were evaluated to ensure stormwater peak discharges are maintained or reduced as a result of the proposed development for the 2-, 10-, 25-, and 100-year storm events. Maintenance or reduction in stormwater peak discharges was achieved through the utilization of two proposed stormwater bioretention basins with pretreatment forebays.

2 Project Description

2.1 Existing Conditions

The project site is located off Morse Road, in Sudbury, Massachusetts, as shown on *Figure 1*, Site Location Map. The proposed parking lot improvements are part of a 9.5 acre site owned by the Town of Sudbury. The existing site is undeveloped and mostly grass and wooded.

Existing grades allow stormwater to sheet flow to a swale adjacent to the former railroad right-of-way to the west of the site. The existing site does not contain any stormwater management systems. Existing conditions information is included with the plans located in *Appendix A*.

Soil types at the site consist of Windsor Loamy Sands, which are hydrologic soil group (HSG) type A soils with high permeability. Soil mapping generated from the Natural Resources Conservation Service (NRCS) website is provided in *Appendix B*. Soil boring and test pits were completed at the site as part of an overall soil investigation by Schofield Brothers, LLC in 2018. Based on the test pits conducted in the area of the proposed parking lot, groundwater elevations are estimated at elevation 170 feet. Test pit information has been included in *Appendix C*.

2.2 Proposed Conditions

The proposed development includes the construction of a new parking lot to contain 32 parking spaces, approximately 9,770 square feet in size, with a walkway connection to the west to provide connectivity to the new trail. A pavilion, restrooms, and other amenities will be located to the east of the new parking area. Proposed conditions are depicted on the plans located in *Appendix A*.

On-site stormwater management systems have been designed to maintain existing stormwater flow patterns and meet the requirements of the stormwater management standards (Standards) outlined in the Stormwater Handbook. The systems have been designed to maintain or reduce peak flows between pre-

and post-development conditions. Post-construction stormwater runoff from the new parking area will be directed to two (2) bioretention basins with forebay pre-treatment areas along the west side of the proposed parking lot which will ultimately discharge to the existing drainage swales along the railroad right-of-way.

The proposed bioretention basins provide storage greater than that required of the Massachusetts Stormwater Handbook. Water quality volume calculations are included in *Appendix G*. Total Suspended Solids (TSS) removal provided by the bioretention basins with pretreatment forebays is 90%. TSS Removal calculations are provided in *Appendix H*. Groundwater recharge is also provided by the proposed basins and calculations indicate that both of the proposed bioretention basins areas will drawdown in approximately 10 hours. Groundwater recharge and drawdown calculations are provided in *Appendix I*.

3 Hydrologic Analysis

Peak flows for existing and proposed conditions were determined using the Natural Resources Conservation Service (NRCS) Technical Release 20 and Technical Release 55 (TR-55) hydrologic methods. The hydrologic analyses for existing and proposed conditions were completed using a computer software program, HydroCAD version 10.00-20, to determine peak runoff flow rates and total runoff volumes for each of the watersheds. Runoff curve numbers were developed based on a combination of land cover use and existing site soil types acquired from the NRCS website. Time of concentration runs were developed based on the methods in the NRCS TR55 manual.

Peak flows for the 2-, 10-, 25-, and 100-year frequency storm events were determined by using a 24-hour type III storm, standard for the New England area. Rainfall depths were obtained from published rainfall information in the Town of Sudbury Stormwater Regulations.

3.1 Existing Watershed Summary

Stormwater from the site is generally conveyed by sheet flow and shallow concentrated flow to the design point described above. Two (2) subcatchment areas have been established for the pre-development, existing conditions, and watershed modeling. *Figure 2* illustrates existing conditions, pre-development watershed areas, and time of concentration (Tc) paths. A schematic watershed diagram showing discharge point and the breakdown of the ground cover characteristics for each watershed area can be found in the pre-development hydrological analysis provided in *Appendix D*.

3.2 Proposed Watershed Summary

The proposed development has been designed to maintain overall existing drainage patterns directing post-construction stormwater runoff to two (2) bioretention basins with pretreatment forebays located to the west of the proposed parking lot which then discharge to the existing drainage swales within the railroad right-of-way. Two (2) subcatchment areas have been established for the post-development, proposed conditions, watershed modeling. *Figure 3* illustrates proposed conditions, post-development watershed areas, and Tc paths. A schematic watershed diagram showing discharge points and a

breakdown of the ground cover characteristics for each watershed area can be found in the post-development hydrological analysis provided in *Appendix E*.

3.3 Hydrologic Analysis Results

Proposed Best Management Practices (BMPs) have been designed to approximately maintain peak flows for the site from pre to post-development conditions. A summary of the pre- and post-development peak flows at the site for the 2-year, 10-year, 25-year, 50-year, and 100-year storm events are summarized in *Table 1* below.

Table 1
Peak Discharge Summary

Design Year Storm Event	Existing Peak Flows (cfs)	Proposed Peak Flows (cfs)	Change in Peak Flows (cfs)
2-year (3.2")	0.01	0.00	-0.01
10-year (4.8")	0.07	0.02	-0.05
25-year (6.0")	0.28	0.09	-0.19
100-year (8.6")	1.21	1.21	0.00

4 Soil Erosion and Sedimentation Control

Soil erosion and sedimentation control plans, including construction phasing, construction details and notes are provide on the plans located in *Appendix A*. Soil erosion and sedimentation control details and procedures are consistent with the “Massachusetts Erosion and Sediment Control Guideline for Urban and Suburban Areas,” and with state, local, and federal requirements.

Erosion and sedimentation controls used on the site during construction will include construction entrances pads, silt fence, straw bales, and water for dust control. Additional erosion and sediment controls will be utilized as required. Silt fence and straw bales will be placed down-gradient of disturbed areas and up-gradient of resource areas. A construction entrance will be installed at the entrance of the site at Morse Road. Water will be applied to exposed soils to provide dust control as needed.

Prior to the start of construction the Contractor will be required to obtain coverage under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and prepare a formal Stormwater Pollution Prevention Plan (SWPPP), further specifying the details of construction phasing, limits of soil disturbance, erosion and sediment controls and other stabilization measures, stockpile locations, construction waste management procedures, and hazardous materials storage procedures during construction activities.

5 Construction Sequence

The Contractor will be responsible for finalizing the proposed construction sequencing for construction of the project, however construction sequencing shall generally be as follows:

1. Install erosion & sedimentation control measures.

2. Clear and grub project area.
3. Construct stormwater bioretention basins and rough grade site.
4. Install base materials for parking lot and building pads.
5. Install asphalt paving and construction buildings.
6. Loam and seed disturbed areas.
7. Clean site and remove any accumulated sediment from stormwater basins.
8. Remove erosion & sedimentation controls upon site stabilization.

6 Massachusetts Stormwater Handbook Standards

The following is a description of how the proposed project conforms to the Standards outlined in the Stormwater Handbook. The Stormwater Management Checklist is included in *Appendix F*.

LID Measures

Standard 1: No Untreated Discharge or Erosion to Wetlands

Perimeter erosion controls will be installed during construction to protect resource areas from sedimentation until construction is completed and the site is stabilized.

There are no new untreated conveyances proposed. Proposed conveyances have been designed to ensure no erosion will occur to existing resource areas. Post-construction stormwater flows and water quality will be managed by two (2) new bioretention basins which ultimately discharge into the existing drainage swales along the railroad right-of-way, mimicking existing drainage patterns at the site.

Standard 2: Peak Rate Attenuation

Post-development discharge rates will be maintained or reduced in post-development conditions. Stormwater Hydrologic Analyses have been provided in *Appendix D* and *Appendix E* and a summary of pre- versus post-development peak discharge rates have been provided in *Table 1* under Section 3.3. Mitigation of post-development peak runoff flows are achieved through stormwater storage provided by the two (2) proposed bioretention basins.

Standard 3: Stormwater Recharge

Due to relatively high groundwater elevations at the site, the proposed design has not accounted for on-site groundwater recharge, although given the presence of HSG type A soils within the project area, it is presumed that some groundwater recharge takes place in both existing and post-construction conditions.

Each of the bioretention basins have been designed to drawdown within 72 hours. Calculations for groundwater recharge and 72 hour drawdown can be found in *Appendix I*.

Standard 4: Water Quality

Water quality treatment and removal of suspended solids will be provided by the new bioretention basins with pretreatment forebays and during overland flow to the existing swales and within the existing swales. Water quality volume calculations are included in *Appendix G*. TSS Removal calculations are included in *Appendix H*.

Standard 5: Land Uses with Higher Potential Pollutant Loads

This project does not include areas which would be classified as having higher potential pollutant loading as the proposed parking area will have low intensity use and as the trail is anticipated to see 275 users per day.

Standard 6: Critical Areas

This project does not contain any critical areas as defined by the Massachusetts Stormwater Handbook.

Standard 7: Redevelopment

The proposed project is not considered a redevelopment project per the Stormwater Handbook.

Standard 8: Construction Period Controls

It is anticipated that there will be no proposed pollution created during the construction of the proposed development. General erosion and sedimentation controls will be implemented and maintained in accordance with local, state, and federal requirements until construction is complete and disturbed areas have been stabilized.

Prior to the start of construction the Contractor will be required to obtain coverage under the NPDES Construction General Permit and prepare a formal Stormwater Pollution Prevention Plan (SWPPP), further specifying the details of construction phasing, limits of soil disturbance, erosion and sediment controls and other stabilization measures, stockpile locations, construction waste management procedures, and hazardous materials storage procedures during construction activities.

Standard 9: Operation and Maintenance Plan

A suggested Construction Operation and Maintenance (O&M) Plan has been developed for the development of the site and is included in *Appendix J*. The contractor shall be responsible for construction operation and maintenance of the site.

A suggested Long Term O&M Plan, which includes recommended maintenance activities and schedule of maintenance as outlined within the Stormwater Handbook, is included in *Appendix K*. The owner will be responsible for long term operation and maintenance of the site.

Standard 10: Illicit Discharge to Drainage System

The project does not include any proposed illicit discharges to Stormwater Management Systems as defined in the Stormwater Handbook.

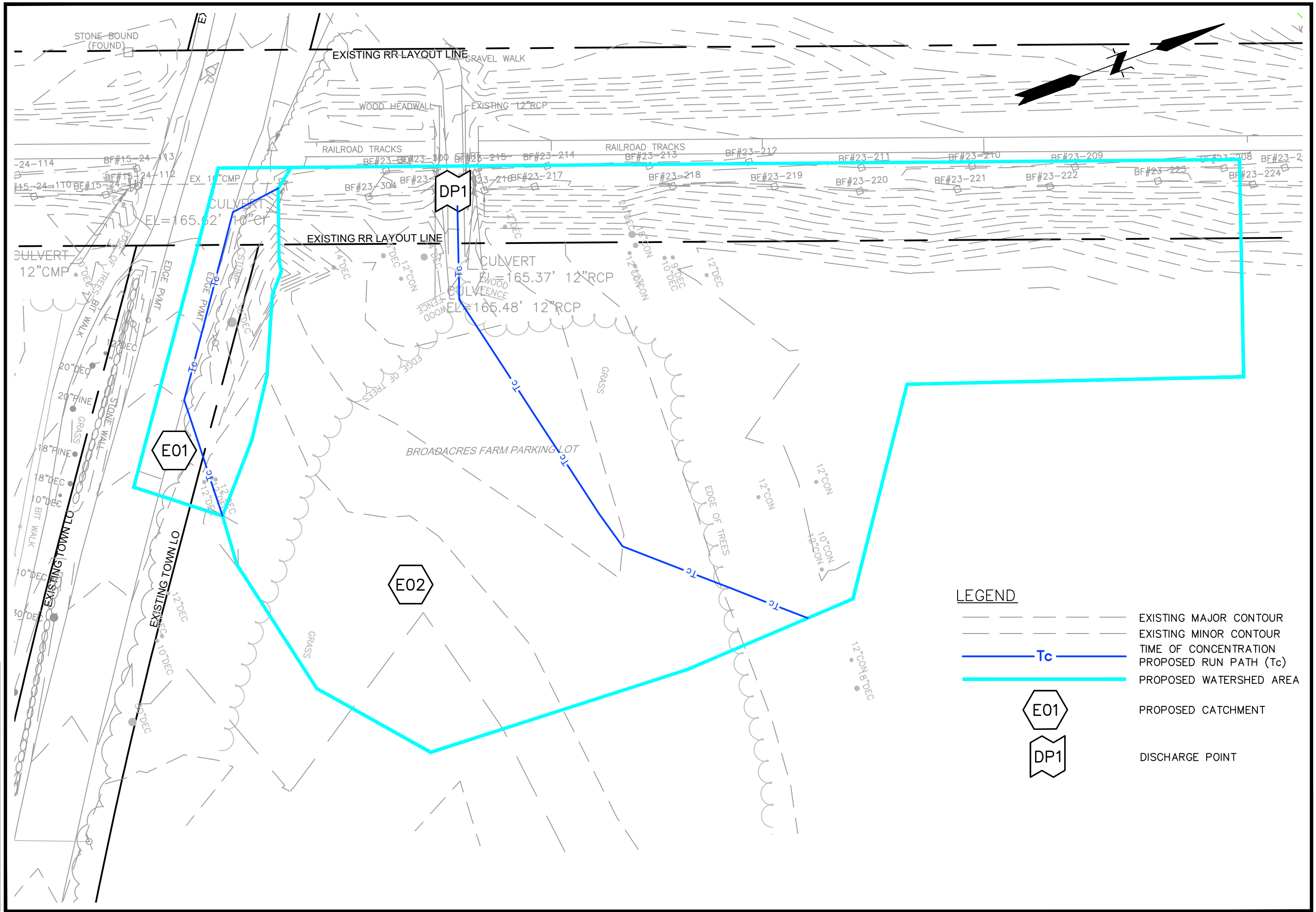
7 Summary

This Stormwater Management Report demonstrates the proposed stormwater management system for proposed parking lot improvements at the Broadacres Farm site, have been designed to mitigate or reduce post-construction stormwater flows from the site and meet the requirements of the Massachusetts Stormwater Standards.

Figures



File Path: J:\DWG\20200785A10\608164\DWG\Environmental\Plans\608164_STRM_CALC_S_MTC.dwg Layout: FIG.3_EXC_Plot.dwg Thu, May 06, 2021 - 12:32 PM User: mtrumbly
 PLOTTER: AUTOCAD PDF (SMALLEST FILE) PC3 CTB File: FO STB
 LAYER STATE:



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- TIME OF CONCENTRATION PROPOSED RUN PATH (Tc)
- PROPOSED WATERSHED AREA
- PROPOSED CATCHMENT
- DISCHARGE POINT

SCALE:	HORIZ.: 1" = 30'
	VERT.: 1" = 15'
DATUM:	HORIZ.: NAD 1983
	VERT.: NAVD 1988
	GRAPHIC SCALE

FUSS & O'NEILL
 1550 MAIN STREET, SUITE 400
 SPRINGFIELD, MA 01103
 413.452.0445
 www.fandoo.com



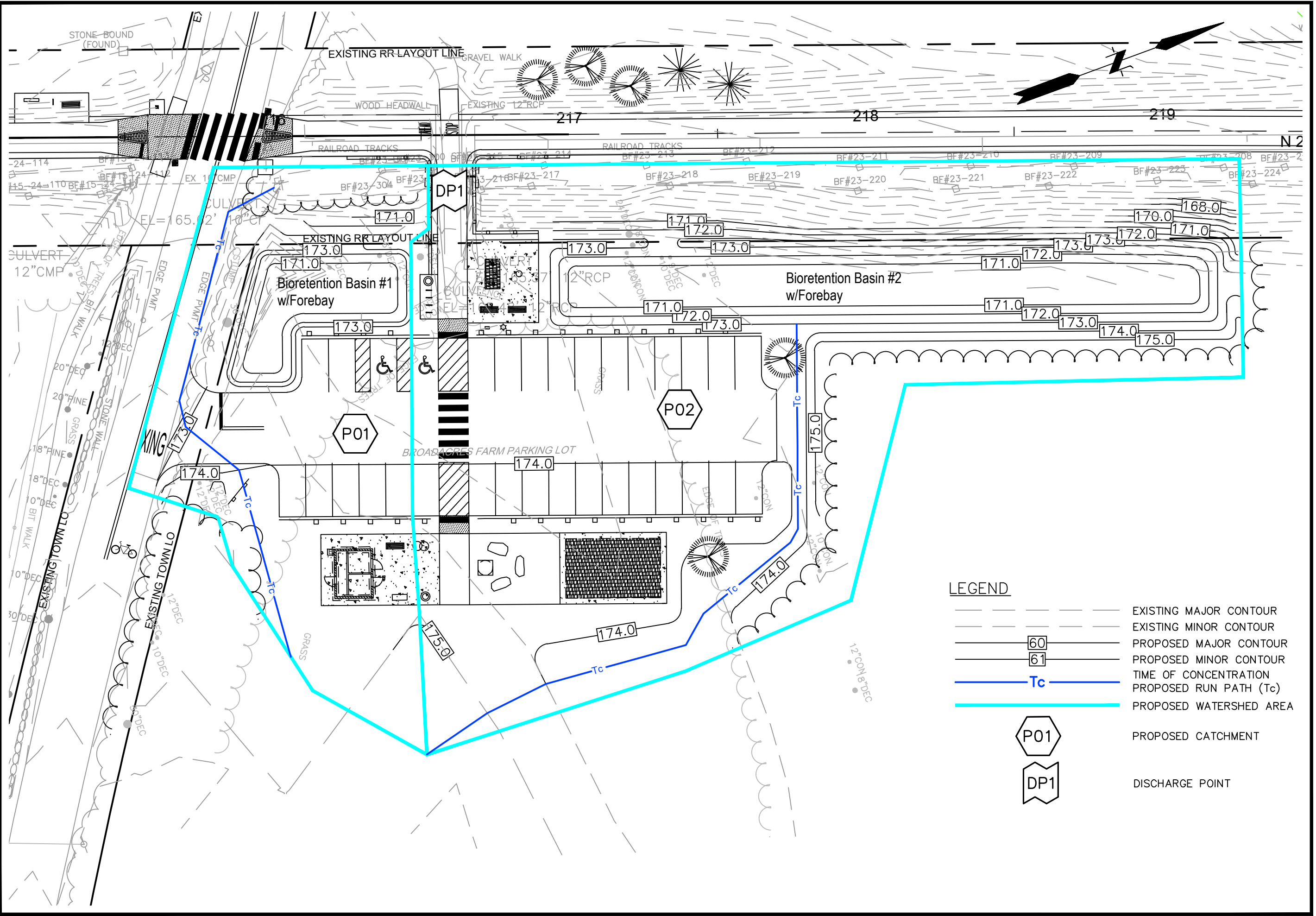
TOWN OF SUDBURY
 MASSACHUSETTS

EXISTING WATERSHED MAPPING
 BROADACRES FARM PARKING LOT
 (PART OF BRUCE FREEMAN RAIL TRAIL PROJECT)

PROJ. No.: 20200785.A10
 DATE: 05/06/2021

FIG. 2

File Path: J:\DWG\2020\785A10\608164\DWG\Environmental\Plans\608164_STRM_CALC_S_MTC.dwg Layout: FIG_3_PROJ_Plotter: Thu, May 06, 2021 - 12:39 PM User: ntrrombley
 MS VIEW: LAYER STATE: Plotter: AUTOCAD PDF (SMALLEST FILE).PC3 CTB File: FO.STB



LEGEND

- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- TIME OF CONCENTRATION
- PROPOSED RUN PATH (Tc)
- PROPOSED WATERSHED AREA
- PROPOSED CATCHMENT
- DISCHARGE POINT

SCALE: HORIZ: 1" = 30'
VERT: 1" = 15'
DATUM: HORIZ: NAD 1983
VERT: NAVD 1988
GRAPHIC SCALE

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TOWN OF SUDBURY
 PROPOSED WATERSHED MAPPING
 BROADACRES FARM PARKING LOT
 (PART OF BRUCE FREEMAN RAIL TRAIL PROJECT)
 MASSACHUSETTS
 SUDBURY

PROJ. No.: 20200785.A10
 DATE: 05/06/2021

FIG. 3

Appendix A

Plans (bound separately)



Appendix B

NRCS Web Soil Mapping





United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Middlesex County, Massachusetts



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Middlesex County, Massachusetts.....	13
255A—Windsor loamy sand, 0 to 3 percent slopes.....	13
255B—Windsor loamy sand, 3 to 8 percent slopes.....	14
654—Udorthents, loamy.....	15
References	17

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

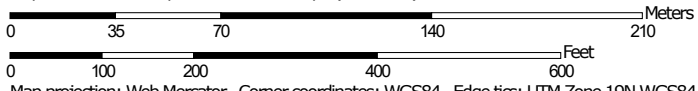
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:2,510 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
 Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 28, 2019—Aug 15, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
255A	Windsor loamy sand, 0 to 3 percent slopes	8.0	60.7%
255B	Windsor loamy sand, 3 to 8 percent slopes	4.6	35.3%
654	Udorthents, loamy	0.5	4.0%
Totals for Area of Interest		13.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

Custom Soil Resource Report

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

255A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg

Elevation: 0 to 990 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains

Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, tal
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Deltas, outwash plains, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

255B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Outwash plains, dunes, outwash terraces, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand

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Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent

Landform: Outwash plains, eskers, kames, deltas

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise

Down-slope shape: Convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent

Landform: Outwash plains, terraces, deltas

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

654—Udorthents, loamy

Map Unit Setting

National map unit symbol: vr1l

Elevation: 0 to 3,000 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 45 to 50 degrees F

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Frost-free period: 110 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Depth to restrictive feature: More than 80 inches

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Minor Components

Udorthents, sandy

Percent of map unit: 10 percent

Hydric soil rating: No

Udorthents, wet substratum

Percent of map unit: 5 percent

Hydric soil rating: Yes

Urban land

Percent of map unit: 5 percent

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

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United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix C

Test Pit Information (Schofield Brothers LLC)



Location Address or Lot No. Broadacre Farm – Morse Road, Sudbury, MA 01776

On-site Witnessed Review

Deep Hole Number 18-01 Date: 3/23/2018 Time: A.M. Weather 40°, overcast

Location (identify on site plan) see attached sketch

Land Use Farm Land Slope (%) 0-3 Surface Stones None

Vegetation Grass

Landform Outwash Plain

Position on landscape (sketch on the back)

Distances from:

Open Water Body see sketch Feet Drainageway see sketch Feet

Possible Wet Area see sketch Feet Property Line see sketch Feet

Drinking Water Well see sketch Feet Other _____

DEEP OBSERVATION HOLE LOG					
Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
0 – 10"	A	Fine Sandy Loam	10 YR 3/2	None Observed	Massive-Friable
10 – 19"	B _w	Fine Sandy Loam	10 YR 5/6	None Observed	Massive-Friable
19 – 104"	C	Sand (Fine)	2.5 Y 5/2	>5% @ 43"	Loose-Single Grained

Parent Material (geologic) Loose Sandy Glaciofluvial Deposits Depth to Bedrock: None Observed (Cave-ins)

Depth to Groundwater: _____ Standing Water in the Hole: @ 104" Weeping from Pit Face: @ 75"

Estimated Seasonal High Ground Water: @ 43" based on soil morphology

TP Elevation @ ~ 173.5ft
 GW Elevation @ ~ 170 ft





SOIL TEST LOCATION PLAN

BROADACRES FARM - MORSE ROAD
 SUDBURY, MASSACHUSETTS 01776
 PARCEL ID: F09-0002
 ASSESSORS: (SHOWN AS PARCEL 1.A. & 1.B. ON THIS PLAN)
 (PARCEL ID: F09-0004)
 (SHOWN AS PARCEL 2 ON THIS PLAN)

PREPARED FOR:
TOWN OF SUDBURY CONSERVATION COMMISSION

275 OLD LANCASTER ROAD
 SUDBURY, MASSACHUSETTS 01776

SCHOFIELD BROTHERS LLC
 ENGINEERING ♦ SURVEYING ♦ PLANNING ♦ GIS
 1071 WORCESTER ROAD
 FRAMINGHAM, MA 01701
 508-879-0030
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(C:\corken\jobs\25291\Correspondence\To_Client\2018-05-11 (To_Sudbury)\25291-Soil Test Hole Location Plan.dwg

NO.	APP	DATE	DESCRIPTION

DATE: **MAY 11, 2018**

SCALE: **1" = 80'**

DRAFTED: **JAL** CHECKED: **BEC** APPROVED:

SOIL TEST HOLE LOCATION PLAN: OVERALL LAYOUT

SHEET: **1 OF 2**
 PROJECT NO.: **25291**

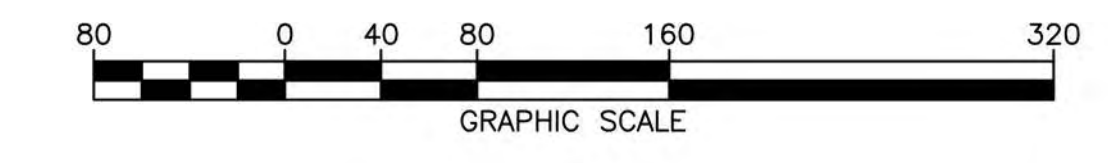
ST-1

NOTES

1. PROPERTY LINE INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE FROM MASS GIS.
2. SOIL BOUNDARY LINES SHOWN ON THIS PLAN ARE FROM WEB SOIL SURVEY (NRCS).
3. PARCEL IDENTIFICATION CORRESPONDS TO A SKETCH PROVIDED BY THE SUDBURY CONSERVATION COMMISSION TO SCHOFIELD BROTHERS ON 2/13/18.
4. THE SOIL TEST HOLE LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND WERE OBTAINED FROM AN ON-THE-GROUND-SURVEY USING RTK GPS OBSERVATIONS BY SCHOFIELD BROTHERS ON 4/20/18.

LEGEND

- DEEP TEST HOLE
- PERCOLATION TEST HOLE



Appendix D

Pre-Development Hydrological Analysis



20200785A10_EX01

Prepared by Fuss & O'Neill

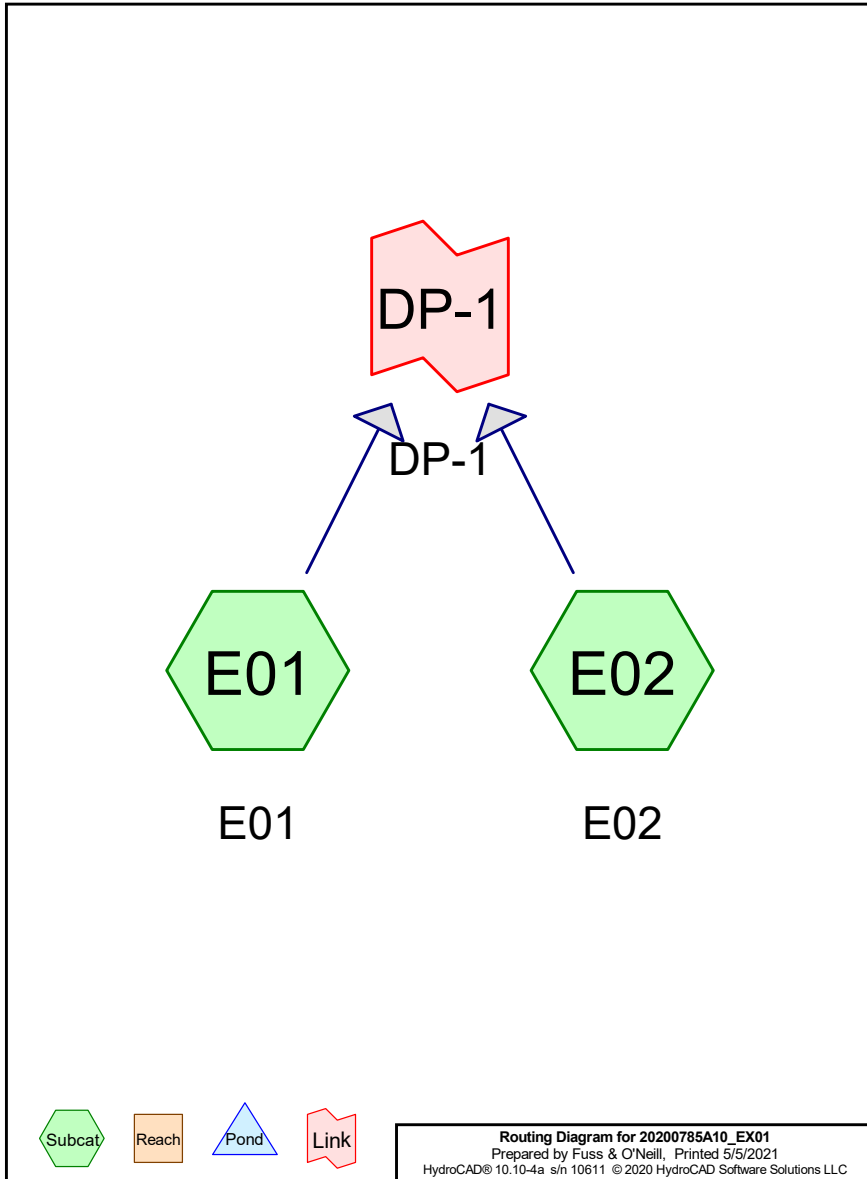
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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.20	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.80	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.00	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.60	2



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Page 3

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
17,820	49	50-75% Grass cover, Fair, HSG A (E01, E02)
147	96	Gravel surface, HSG A (E02)
1,004	98	Paved parking, HSG A (E01)
30,433	36	Woods, Fair, HSG A (E01, E02)
49,404	42	TOTAL AREA

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Page 4

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
49,404	HSG A	E01, E02
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
49,404		TOTAL AREA

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Page 5

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatd Number:
17,820	0	0	0	0	17,820	50-75% Grass cover, Fair	
147	0	0	0	0	147	Gravel surface	
1,004	0	0	0	0	1,004	Paved parking	
30,433	0	0	0	0	30,433	Woods, Fair	
49,404	0	0	0	0	49,404	TOTAL AREA	

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Type III 24-hr 2-Year Rainfall=3.20"

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Page 6

Time span=0.00-80.00 hrs, dt=0.05 hrs, 1601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E01: E01

Runoff Area=3,515 sf 28.56% Impervious Runoff Depth=0.28"
Flow Length=125' Tc=7.0 min CN=56 Runoff=0.01 cfs 82 cf

Subcatchment E02: E02

Runoff Area=45,889 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=222' Tc=19.7 min CN=41 Runoff=0.00 cfs 27 cf

Link DP-1: DP-1

Inflow=0.01 cfs 109 cf
Primary=0.01 cfs 109 cf

Total Runoff Area = 49,404 sf Runoff Volume = 109 cf Average Runoff Depth = 0.03"
97.97% Pervious = 48,400 sf 2.03% Impervious = 1,004 sf

Summary for Subcatchment E01: E01

Runoff = 0.01 cfs @ 12.32 hrs, Volume= 82 cf, Depth= 0.28"

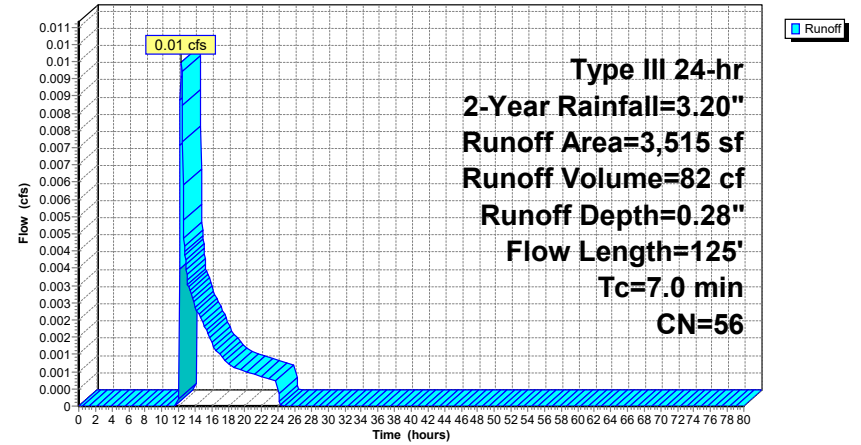
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
571	49	50-75% Grass cover, Fair, HSG A
1,004	98	Paved parking, HSG A
1,940	36	Woods, Fair, HSG A
3,515	56	Weighted Average
2,511		71.44% Pervious Area
1,004		28.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	33	0.0670	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	8	0.1250	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.8	59	0.0169	1.16		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.0	8	0.1250	7.18		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1760	2.94		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	125	Total			

Subcatchment E01: E01

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.80"

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Page 11

Time span=0.00-80.00 hrs, dt=0.05 hrs, 1601 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E01: E01Runoff Area=3,515 sf 28.56% Impervious Runoff Depth=0.94"
Flow Length=125' Tc=7.0 min CN=56 Runoff=0.07 cfs 275 cf**Subcatchment E02: E02**Runoff Area=45,889 sf 0.00% Impervious Runoff Depth=0.23"
Flow Length=222' Tc=19.7 min CN=41 Runoff=0.05 cfs 866 cf**Link DP-1: DP-1**

Inflow=0.07 cfs 1,141 cf

Primary=0.07 cfs 1,141 cf

Total Runoff Area = 49,404 sf Runoff Volume = 1,141 cf Average Runoff Depth = 0.28"
97.97% Pervious = 48,400 sf 2.03% Impervious = 1,004 sf**20200785A10_EX01**

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Type III 24-hr 10-Year Rainfall=4.80"

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Page 12

Summary for Subcatchment E01: E01

Runoff = 0.07 cfs @ 12.12 hrs, Volume= 275 cf, Depth= 0.94"

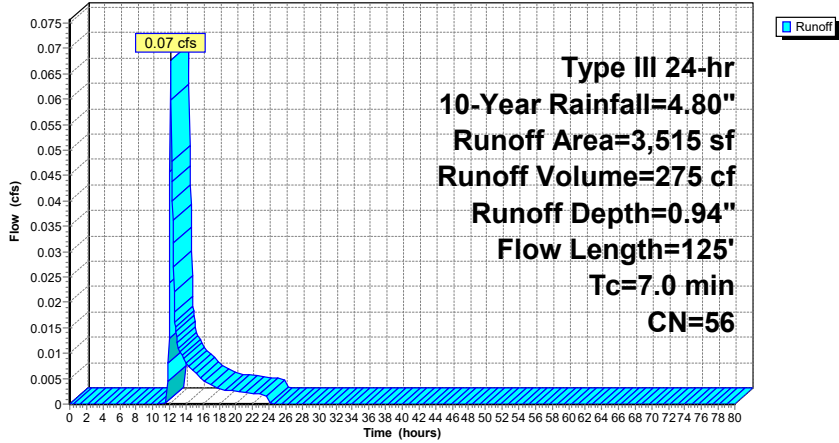
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
571	49	50-75% Grass cover, Fair, HSG A
1,004	98	Paved parking, HSG A
1,940	36	Woods, Fair, HSG A
3,515	56	Weighted Average
2,511		71.44% Pervious Area
1,004		28.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	33	0.0670	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	8	0.1250	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.8	59	0.0169	1.16		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.0	8	0.1250	7.18		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1760	2.94		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	125	Total			

Subcatchment E01: E01

Hydrograph



Summary for Subcatchment E02: E02

Runoff = 0.05 cfs @ 12.66 hrs, Volume= 866 cf, Depth= 0.23"

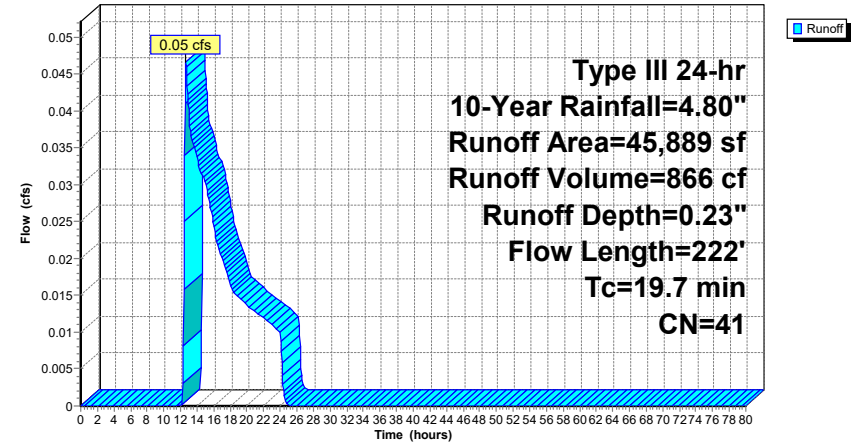
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
17,249	49	50-75% Grass cover, Fair, HSG A
28,493	36	Woods, Fair, HSG A
147	96	Gravel surface, HSG A
45,889	41	Weighted Average
45,889		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	49	0.0196	0.07		Sheet Flow, Sheet Woods: Light underbrush n= 0.400 P2= 3.20"
5.5	51	0.0224	0.16		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.20"
1.7	88	0.0160	0.89		Shallow Concentrated Flow, Shallow 1 Short Grass Pasture Kv= 7.0 fps
0.3	34	0.1324	1.82		Shallow Concentrated Flow, Shallow 2 Woodland Kv= 5.0 fps
19.7	222	Total			

Subcatchment E02: E02

Hydrograph



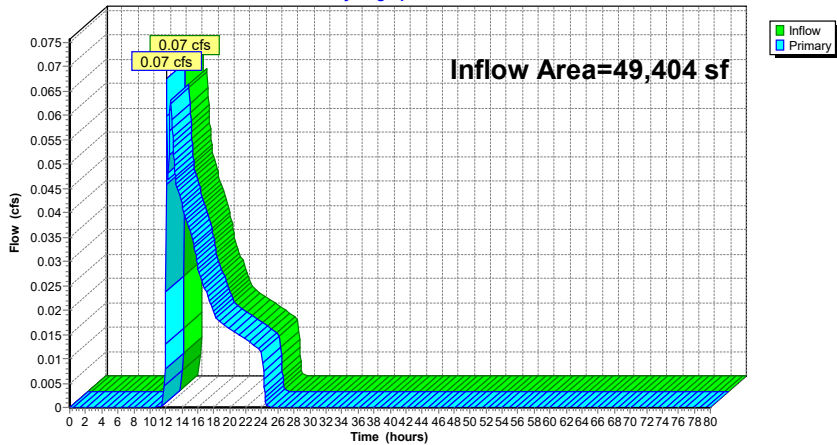
Summary for Link DP-1: DP-1

Inflow Area = 49,404 sf, 2.03% Impervious, Inflow Depth = 0.28" for 10-Year event
 Inflow = 0.07 cfs @ 12.12 hrs, Volume= 1,141 cf
 Primary = 0.07 cfs @ 12.12 hrs, Volume= 1,141 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

Hydrograph



Time span=0.00-80.00 hrs, dt=0.05 hrs, 1601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E01: E01

Runoff Area=3,515 sf 28.56% Impervious Runoff Depth=1.60"
 Flow Length=125' Tc=7.0 min CN=56 Runoff=0.13 cfs 468 cf

Subcatchment E02: E02

Runoff Area=45,889 sf 0.00% Impervious Runoff Depth=0.56"
 Flow Length=222' Tc=19.7 min CN=41 Runoff=0.23 cfs 2,128 cf

Link DP-1: DP-1

Inflow=0.28 cfs 2,596 cf
 Primary=0.28 cfs 2,596 cf

Total Runoff Area = 49,404 sf Runoff Volume = 2,596 cf Average Runoff Depth = 0.63"
97.97% Pervious = 48,400 sf 2.03% Impervious = 1,004 sf

Summary for Subcatchment E01: E01

Runoff = 0.13 cfs @ 12.12 hrs, Volume= 468 cf, Depth= 1.60"

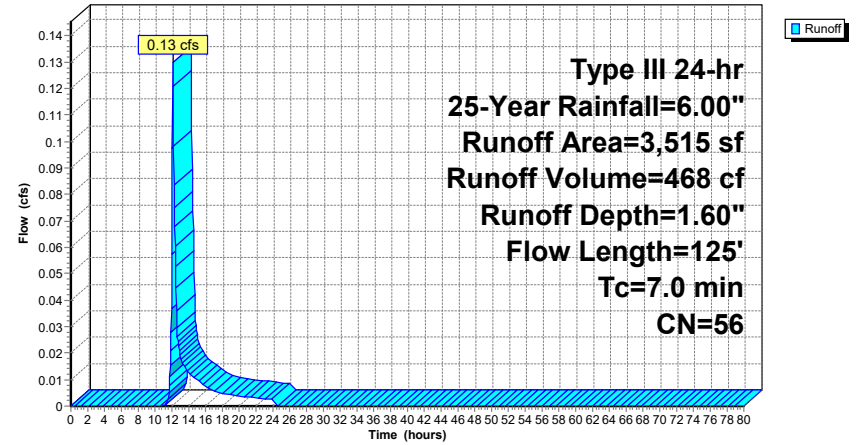
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
571	49	50-75% Grass cover, Fair, HSG A
1,004	98	Paved parking, HSG A
1,940	36	Woods, Fair, HSG A
3,515	56	Weighted Average
2,511		71.44% Pervious Area
1,004		28.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	33	0.0670	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	8	0.1250	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.8	59	0.0169	1.16		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.0	8	0.1250	7.18		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1760	2.94		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	125	Total			

Subcatchment E01: E01

Hydrograph



Summary for Subcatchment E02: E02

Runoff = 0.23 cfs @ 12.50 hrs, Volume= 2,128 cf, Depth= 0.56"

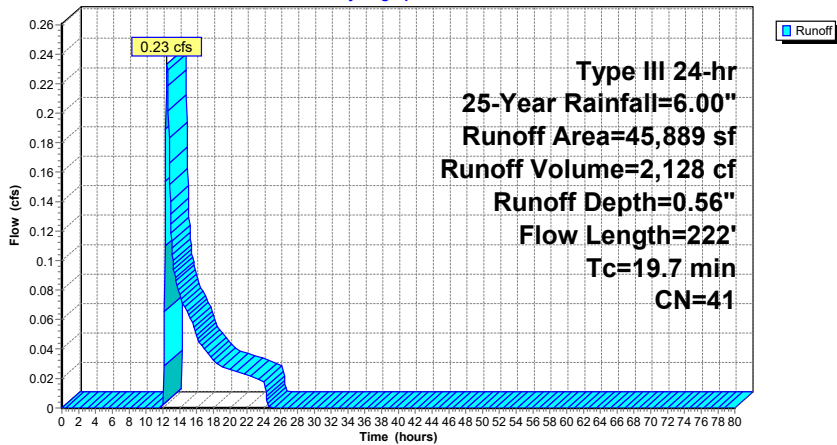
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
17,249	49	50-75% Grass cover, Fair, HSG A
28,493	36	Woods, Fair, HSG A
147	96	Gravel surface, HSG A
45,889	41	Weighted Average
45,889		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	49	0.0196	0.07		Sheet Flow, Sheet Woods: Light underbrush n= 0.400 P2= 3.20"
5.5	51	0.0224	0.16		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.20"
1.7	88	0.0160	0.89		Shallow Concentrated Flow, Shallow 1 Short Grass Pasture Kv= 7.0 fps
0.3	34	0.1324	1.82		Shallow Concentrated Flow, Shallow 2 Woodland Kv= 5.0 fps
19.7	222	Total			

Subcatchment E02: E02

Hydrograph



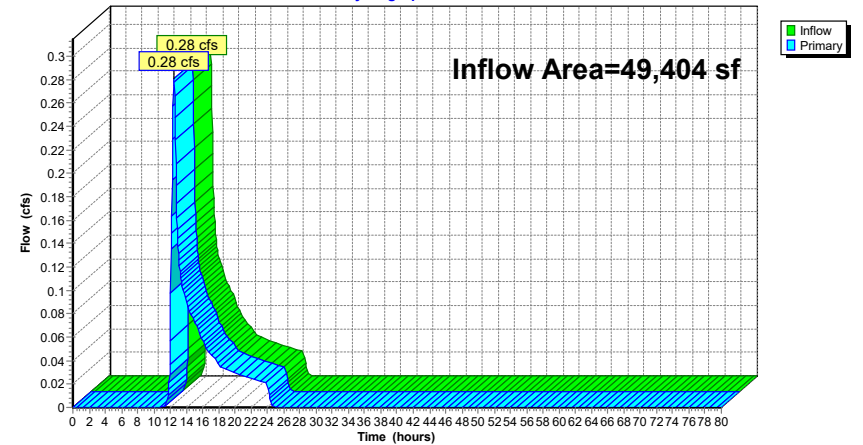
Summary for Link DP-1: DP-1

Inflow Area = 49,404 sf, 2.03% Impervious, Inflow Depth = 0.63" for 25-Year event
Inflow = 0.28 cfs @ 12.46 hrs, Volume= 2,596 cf
Primary = 0.28 cfs @ 12.46 hrs, Volume= 2,596 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.60"

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Page 21

Time span=0.00-80.00 hrs, dt=0.05 hrs, 1601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E01: E01

Runoff Area=3,515 sf 28.56% Impervious Runoff Depth=3.32"
 Flow Length=125' Tc=7.0 min CN=56 Runoff=0.29 cfs 972 cf

Subcatchment E02: E02

Runoff Area=45,889 sf 0.00% Impervious Runoff Depth=1.63"
 Flow Length=222' Tc=19.7 min CN=41 Runoff=1.06 cfs 6,225 cf

Link DP-1: DP-1

Inflow=1.21 cfs 7,197 cf
 Primary=1.21 cfs 7,197 cf

Total Runoff Area = 49,404 sf Runoff Volume = 7,197 cf Average Runoff Depth = 1.75"
97.97% Pervious = 48,400 sf 2.03% Impervious = 1,004 sf

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Type III 24-hr 100-Year Rainfall=8.60"

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Page 22

Summary for Subcatchment E01: E01

Runoff = 0.29 cfs @ 12.11 hrs, Volume= 972 cf, Depth= 3.32"

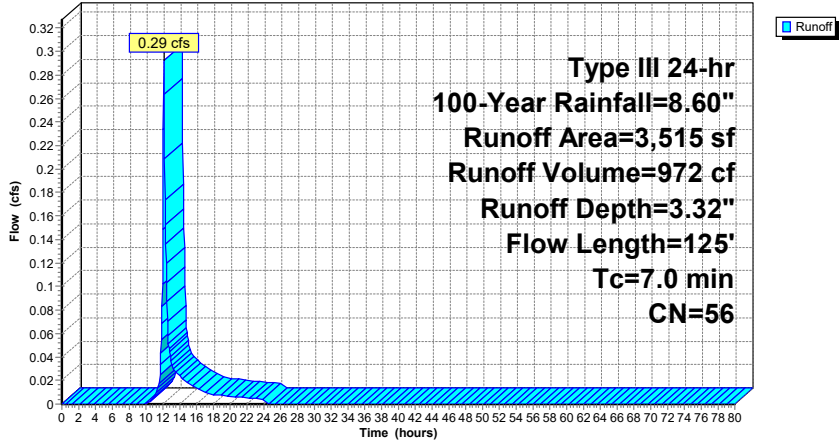
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
571	49	50-75% Grass cover, Fair, HSG A
1,004	98	Paved parking, HSG A
1,940	36	Woods, Fair, HSG A
3,515	56	Weighted Average
2,511		71.44% Pervious Area
1,004		28.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	33	0.0670	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.20"
0.6	8	0.1250	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.8	59	0.0169	1.16		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.0	8	0.1250	7.18		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1760	2.94		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.0	125	Total			

Subcatchment E01: E01

Hydrograph



Summary for Subcatchment E02: E02

Runoff = 1.06 cfs @ 12.34 hrs, Volume= 6,225 cf, Depth= 1.63"

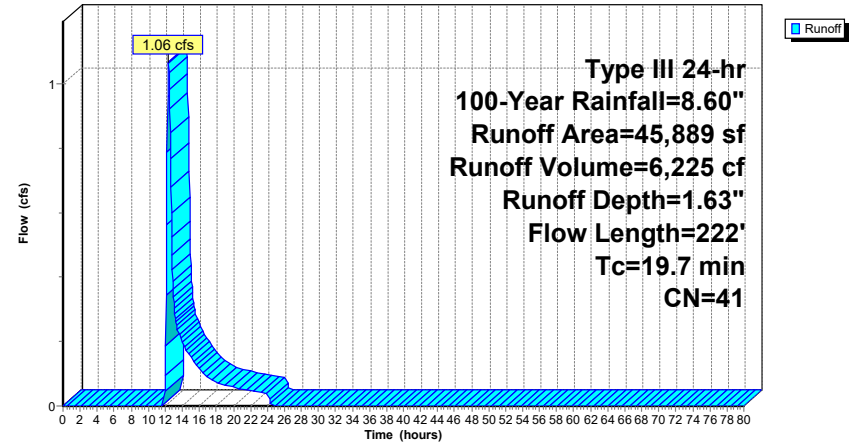
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
17,249	49	50-75% Grass cover, Fair, HSG A
28,493	36	Woods, Fair, HSG A
147	96	Gravel surface, HSG A
45,889	41	Weighted Average
45,889		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	49	0.0196	0.07		Sheet Flow, Sheet Woods: Light underbrush n= 0.400 P2= 3.20"
5.5	51	0.0224	0.16		Sheet Flow, Sheet Grass: Short n= 0.150 P2= 3.20"
1.7	88	0.0160	0.89		Shallow Concentrated Flow, Shallow 1 Short Grass Pasture Kv= 7.0 fps
0.3	34	0.1324	1.82		Shallow Concentrated Flow, Shallow 2 Woodland Kv= 5.0 fps
19.7	222	Total			

Subcatchment E02: E02

Hydrograph



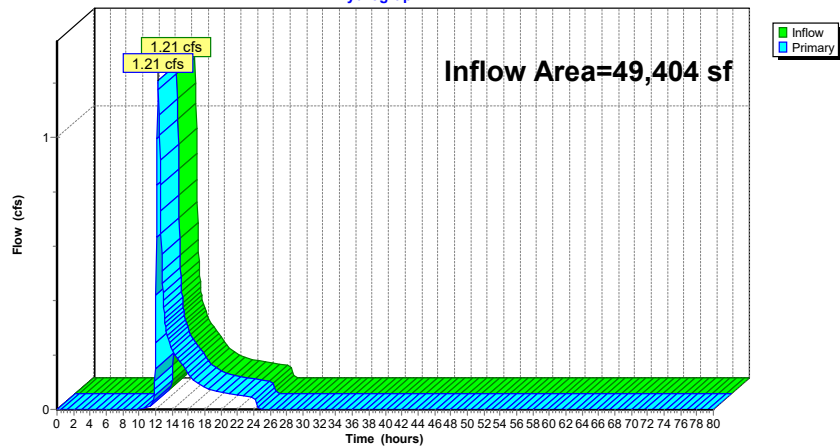
Summary for Link DP-1: DP-1

Inflow Area = 49,404 sf, 2.03% Impervious, Inflow Depth = 1.75" for 100-Year event
Inflow = 1.21 cfs @ 12.32 hrs, Volume= 7,197 cf
Primary = 1.21 cfs @ 12.32 hrs, Volume= 7,197 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-80.00 hrs, dt= 0.05 hrs

Link DP-1: DP-1

Hydrograph



Appendix E

Post-Development Hydrological Analysis



20200785A10_PROP01

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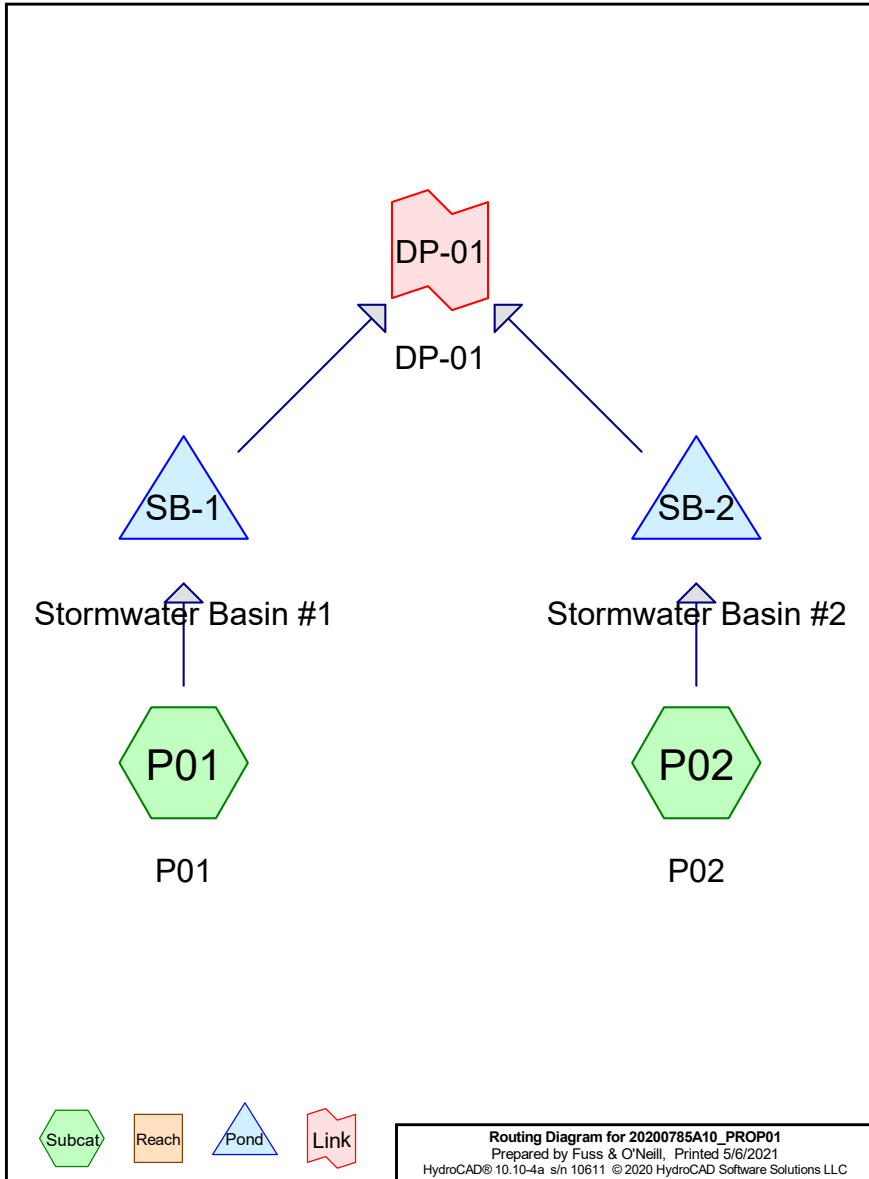
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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.20	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.80	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.00	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.60	2



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Page 3

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
16,059	49	50-75% Grass cover, Fair, HSG A (P01, P02)
16,134	98	Paved parking, HSG A (P01, P02)
5,821	98	Water Surface, 0% imp, HSG A (P02)
1,849	98	Water Surface, HSG A (P01)
9,541	36	Woods, Fair, HSG A (P01, P02)
49,404	70	TOTAL AREA

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Page 4

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
49,404	HSG A	P01, P02
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
49,404		TOTAL AREA

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Page 5

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatd Number:
16,059	0	0	0	0	16,059	50-75% Grass cover, Fair	
16,134	0	0	0	0	16,134	Paved parking	
1,849	0	0	0	0	1,849	Water Surface	
5,821	0	0	0	0	5,821	Water Surface, 0% imp	
9,541	0	0	0	0	9,541	Woods, Fair	
49,404	0	0	0	0	49,404	TOTAL AREA	

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Type III 24-hr 2-Year Rainfall=3.20"

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Page 6

Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: P01

Runoff Area=13,249 sf 53.56% Impervious Runoff Depth=0.98"
 Flow Length=180' Tc=10.9 min CN=73 Runoff=0.28 cfs 1,085 cf

Subcatchment P02: P02

Runoff Area=36,155 sf 30.11% Impervious Runoff Depth=0.78"
 Flow Length=220' Tc=15.4 min CN=69 Runoff=0.49 cfs 2,349 cf

Pond SB-1: Stormwater Basin #1

Peak Elev=171.87' Storage=1,085 cf Inflow=0.28 cfs 1,085 cf
 Outflow=0.00 cfs 0 cf

Pond SB-2: Stormwater Basin #2

Peak Elev=171.59' Storage=2,349 cf Inflow=0.49 cfs 2,349 cf
 Outflow=0.00 cfs 0 cf

Link DP-01: DP-01

Inflow=0.00 cfs 0 cf
 Primary=0.00 cfs 0 cf

Total Runoff Area = 49,404 sf Runoff Volume = 3,434 cf Average Runoff Depth = 0.83"
63.60% Pervious = 31,421 sf 36.40% Impervious = 17,983 sf

Summary for Subcatchment P01: P01

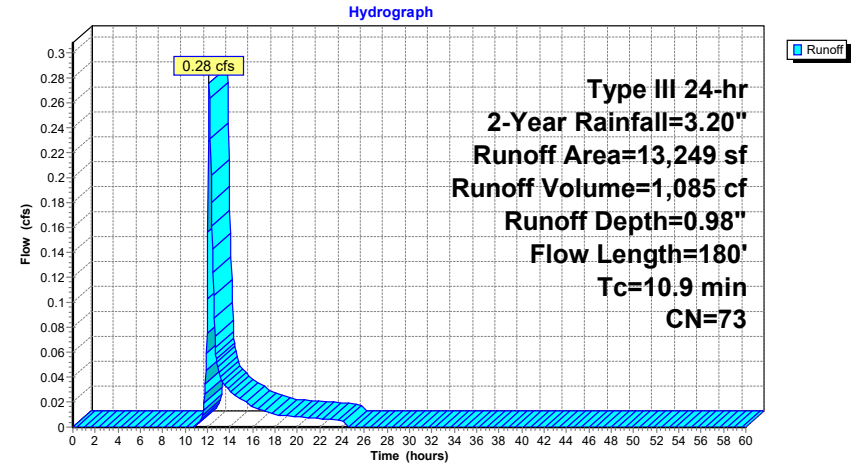
Runoff = 0.28 cfs @ 12.17 hrs, Volume= 1,085 cf, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
4,298	49	50-75% Grass cover, Fair, HSG A
5,247	98	Paved parking, HSG A
1,855	36	Woods, Fair, HSG A
1,849	98	Water Surface, HSG A
13,249	73	Weighted Average
6,153		46.44% Pervious Area
7,096		53.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	65	0.0077	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0570	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.3	63	0.0400	4.06		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1900	3.05		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.9	180	Total			

Subcatchment P01: P01



Summary for Subcatchment P02: P02

Runoff = 0.49 cfs @ 12.25 hrs, Volume= 2,349 cf, Depth= 0.78"

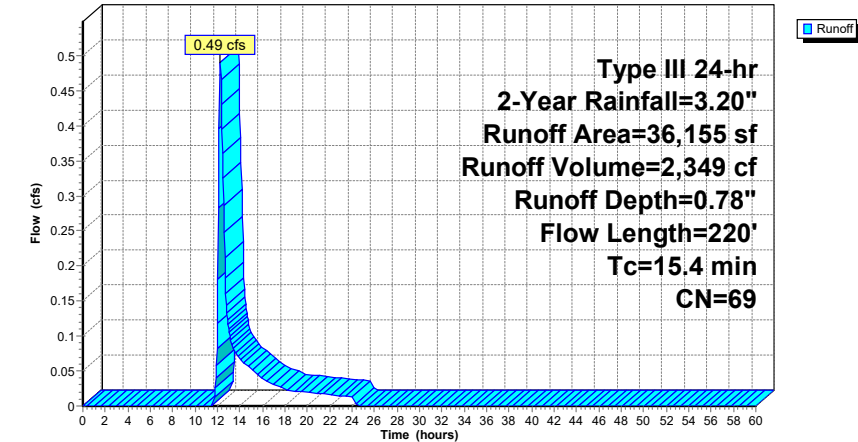
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
11,761	49	50-75% Grass cover, Fair, HSG A
7,686	36	Woods, Fair, HSG A
10,887	98	Paved parking, HSG A
5,821	98	Water Surface, 0% imp, HSG A
36,155	69	Weighted Average
25,268		69.89% Pervious Area
10,887		30.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0125	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.6	120	0.0063	0.56		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.4	220	Total			

Subcatchment P02: P02

Hydrograph



Summary for Pond SB-1: Stormwater Basin #1

Inflow Area = 13,249 sf, 53.56% Impervious, Inflow Depth = 0.98" for 2-Year event
Inflow = 0.28 cfs @ 12.17 hrs, Volume= 1,085 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 171.87' @ 24.65 hrs Surf.Area= 1,479 sf Storage= 1,085 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	2,975 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

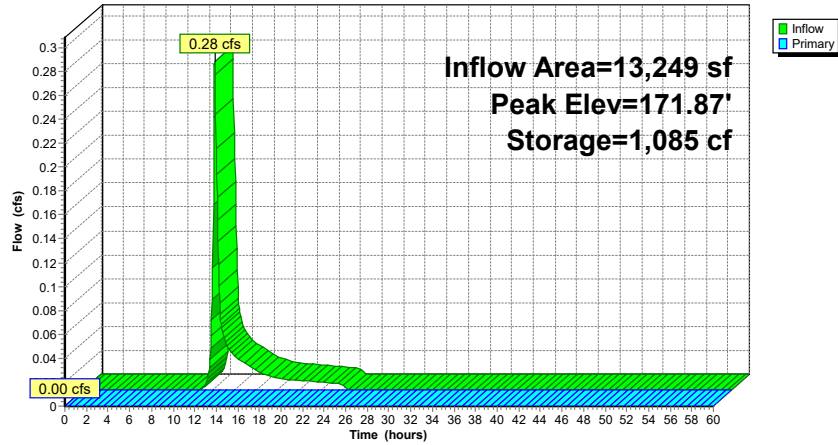
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	1,004	0	0
172.00	1,548	1,276	1,276
173.00	1,849	1,699	2,975

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=171.00' (Free Discharge)
↑=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SB-1: Stormwater Basin #1

Hydrograph



Summary for Pond SB-2: Stormwater Basin #2

Inflow Area = 36,155 sf, 30.11% Impervious, Inflow Depth = 0.78" for 2-Year event
 Inflow = 0.49 cfs @ 12.25 hrs, Volume= 2,349 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Peak Elev= 171.59' @ 24.95 hrs Surf.Area= 4,439 sf Storage= 2,349 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	10,274 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

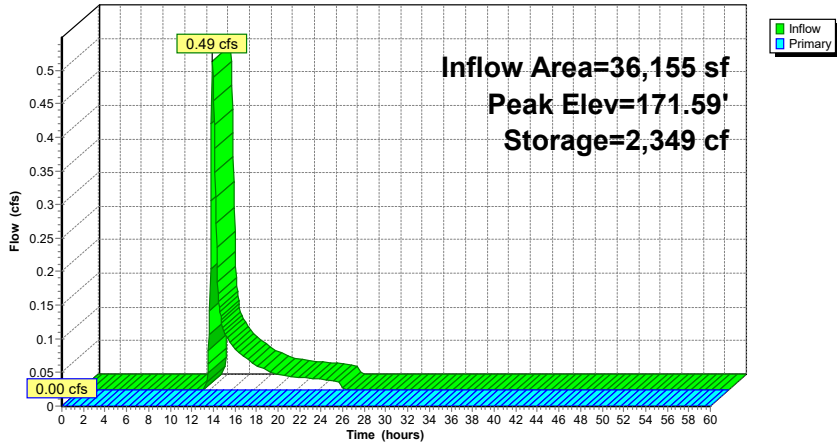
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	3,462	0	0
172.00	5,106	4,284	4,284
173.00	6,873	5,990	10,274

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=171.00' (Free Discharge)
 ↑=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SB-2: Stormwater Basin #2

Hydrograph



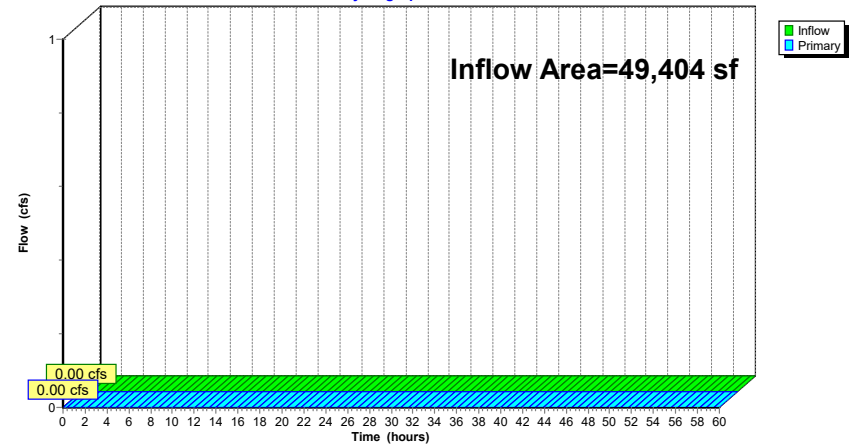
Summary for Link DP-01: DP-01

Inflow Area = 49,404 sf, 36.40% Impervious, Inflow Depth = 0.00" for 2-Year event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs

Link DP-01: DP-01

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.80"

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Page 15

Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: P01Runoff Area=13,249 sf 53.56% Impervious Runoff Depth=2.12"
Flow Length=180' Tc=10.9 min CN=73 Runoff=0.63 cfs 2,346 cf**Subcatchment P02: P02**Runoff Area=36,155 sf 30.11% Impervious Runoff Depth=1.81"
Flow Length=220' Tc=15.4 min CN=69 Runoff=1.27 cfs 5,463 cf**Pond SB-1: Stormwater Basin #1**Peak Elev=172.50' Storage=2,095 cf Inflow=0.63 cfs 2,346 cf
Outflow=0.02 cfs 258 cf**Pond SB-2: Stormwater Basin #2**Peak Elev=172.22' Storage=5,463 cf Inflow=1.27 cfs 5,463 cf
Outflow=0.00 cfs 0 cf**Link DP-01: DP-01**

Inflow=0.02 cfs 258 cf

Primary=0.02 cfs 258 cf

Total Runoff Area = 49,404 sf Runoff Volume = 7,809 cf Average Runoff Depth = 1.90"
63.60% Pervious = 31,421 sf 36.40% Impervious = 17,983 sf**20200785A10_PROP01**

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Type III 24-hr 10-Year Rainfall=4.80"

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Page 16

Summary for Subcatchment P01: P01

Runoff = 0.63 cfs @ 12.16 hrs, Volume= 2,346 cf, Depth= 2.12"

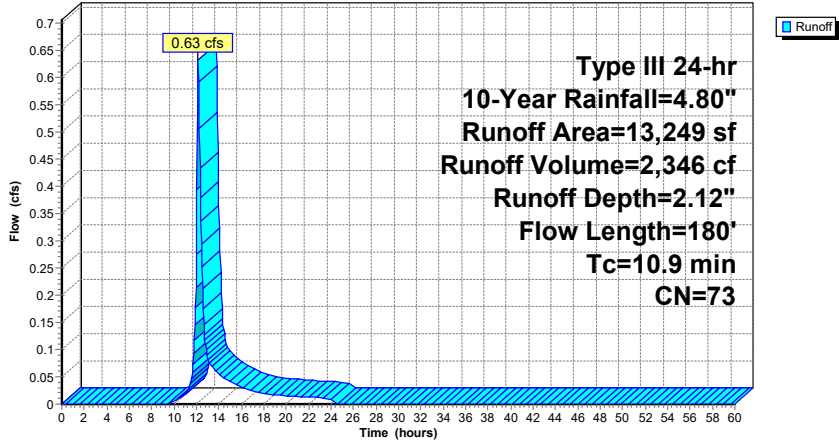
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
4,298	49	50-75% Grass cover, Fair, HSG A
5,247	98	Paved parking, HSG A
1,855	36	Woods, Fair, HSG A
1,849	98	Water Surface, HSG A
13,249	73	Weighted Average
6,153		46.44% Pervious Area
7,096		53.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	65	0.0077	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0570	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.3	63	0.0400	4.06		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1900	3.05		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.9	180	Total			

Subcatchment P01: P01

Hydrograph



Summary for Subcatchment P02: P02

Runoff = 1.27 cfs @ 12.22 hrs, Volume= 5,463 cf, Depth= 1.81"

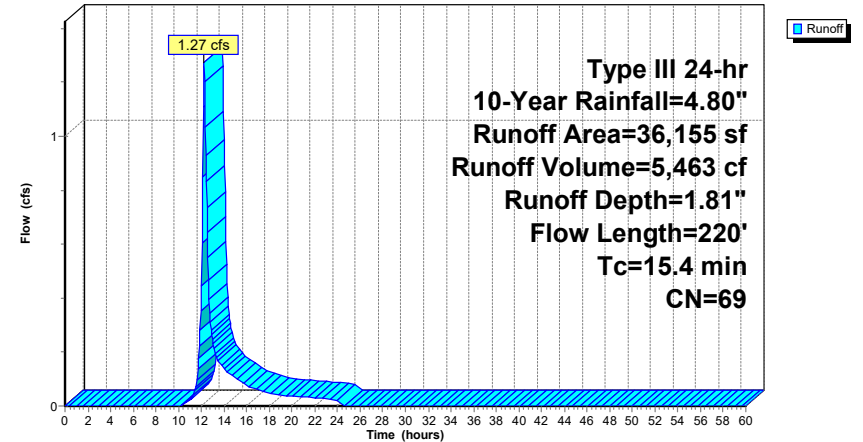
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
11,761	49	50-75% Grass cover, Fair, HSG A
7,686	36	Woods, Fair, HSG A
10,887	98	Paved parking, HSG A
5,821	98	Water Surface, 0% imp, HSG A
36,155	69	Weighted Average
25,268		69.89% Pervious Area
10,887		30.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0125	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.6	120	0.0063	0.56		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.4	220	Total			

Subcatchment P02: P02

Hydrograph



Summary for Pond SB-1: Stormwater Basin #1

Inflow Area = 13,249 sf, 53.56% Impervious, Inflow Depth = 2.12" for 10-Year event
 Inflow = 0.63 cfs @ 12.16 hrs, Volume= 2,346 cf
 Outflow = 0.02 cfs @ 19.29 hrs, Volume= 258 cf, Atten= 97%, Lag= 427.8 min
 Primary = 0.02 cfs @ 19.29 hrs, Volume= 258 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Peak Elev= 172.50' @ 19.29 hrs Surf.Area= 1,700 sf Storage= 2,095 cf

Plug-Flow detention time= 590.1 min calculated for 258 cf (11% of inflow)
 Center-of-Mass det. time= 432.8 min (1,279.4 - 846.6)

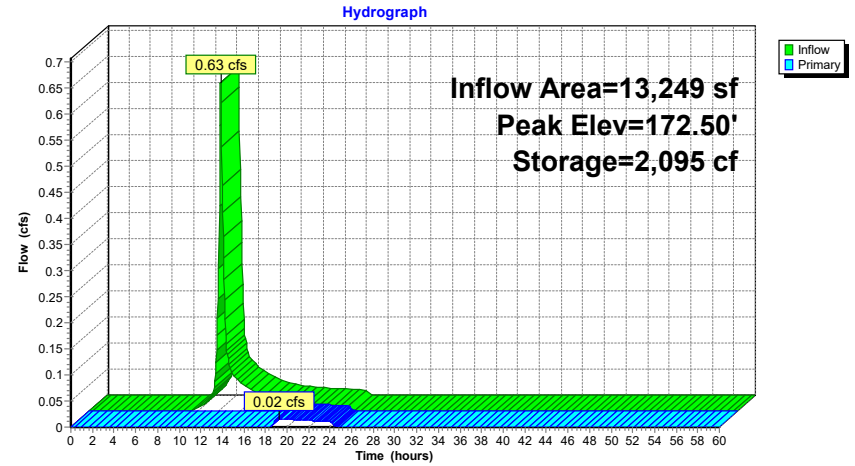
Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	2,975 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	1,004	0	0
172.00	1,548	1,276	1,276
173.00	1,849	1,699	2,975

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.01 cfs @ 19.29 hrs HW=172.50' (Free Discharge)
 1=Broad-Crested Rectangular Weir (Weir Controls 0.01 cfs @ 0.17 fps)

Pond SB-1: Stormwater Basin #1



Summary for Pond SB-2: Stormwater Basin #2

Inflow Area = 36,155 sf, 30.11% Impervious, Inflow Depth = 1.81" for 10-Year event
 Inflow = 1.27 cfs @ 12.22 hrs, Volume= 5,463 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Peak Elev= 172.22' @ 24.95 hrs Surf.Area= 5,499 sf Storage= 5,463 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	10,274 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

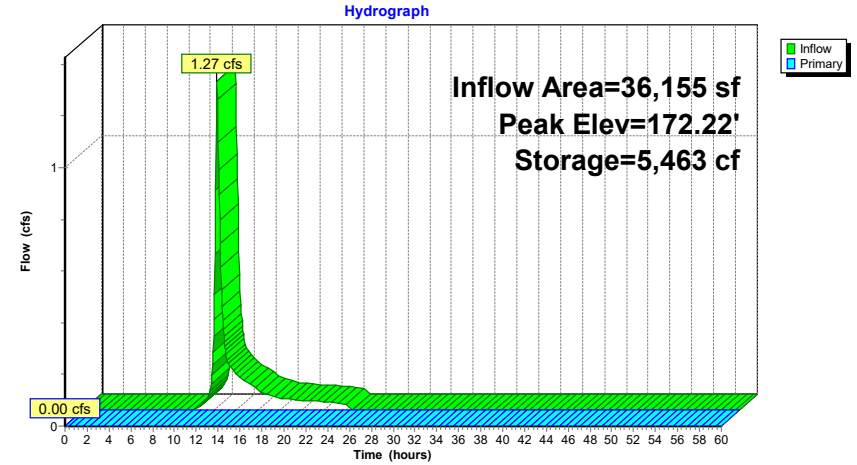
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	3,462	0	0
172.00	5,106	4,284	4,284
173.00	6,873	5,990	10,274

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=171.00' (Free Discharge)

↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SB-2: Stormwater Basin #2



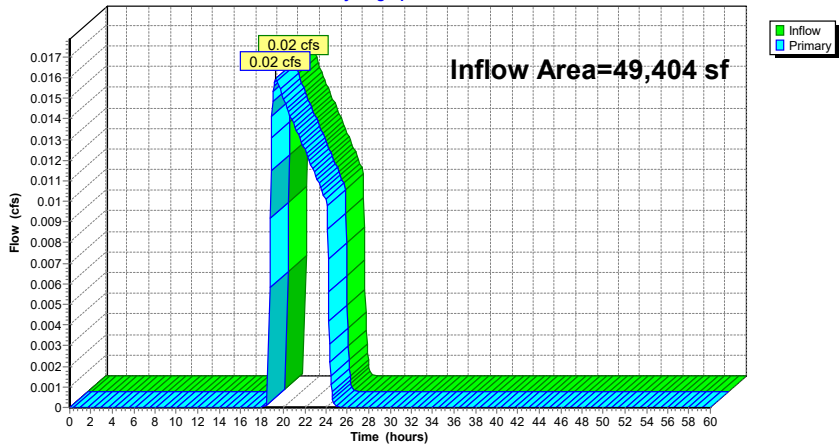
Summary for Link DP-01: DP-01

Inflow Area = 49,404 sf, 36.40% Impervious, Inflow Depth = 0.06" for 10-Year event
 Inflow = 0.02 cfs @ 19.29 hrs, Volume= 258 cf
 Primary = 0.02 cfs @ 19.29 hrs, Volume= 258 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs

Link DP-01: DP-01

Hydrograph



Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: P01

Runoff Area=13,249 sf 53.56% Impervious Runoff Depth=3.09"
 Flow Length=180' Tc=10.9 min CN=73 Runoff=0.93 cfs 3,410 cf

Subcatchment P02: P02

Runoff Area=36,155 sf 30.11% Impervious Runoff Depth=2.71"
 Flow Length=220' Tc=15.4 min CN=69 Runoff=1.95 cfs 8,173 cf

Pond SB-1: Stormwater Basin #1

Peak Elev=172.52' Storage=2,128 cf Inflow=0.93 cfs 3,410 cf
 Outflow=0.09 cfs 1,322 cf

Pond SB-2: Stormwater Basin #2

Peak Elev=172.51' Storage=7,146 cf Inflow=1.95 cfs 8,173 cf
 Outflow=0.06 cfs 1,115 cf

Link DP-01: DP-01

Inflow=0.09 cfs 2,437 cf
 Primary=0.09 cfs 2,437 cf

Total Runoff Area = 49,404 sf Runoff Volume = 11,583 cf Average Runoff Depth = 2.81"
63.60% Pervious = 31,421 sf 36.40% Impervious = 17,983 sf

Summary for Subcatchment P01: P01

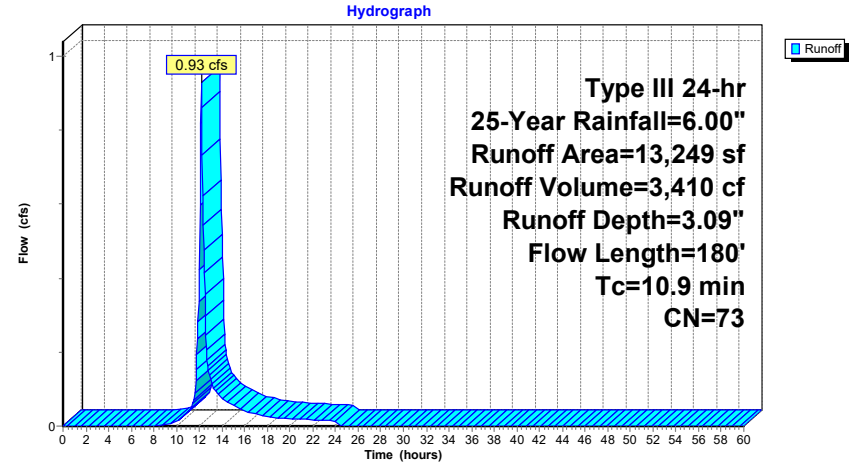
Runoff = 0.93 cfs @ 12.16 hrs, Volume= 3,410 cf, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
4,298	49	50-75% Grass cover, Fair, HSG A
5,247	98	Paved parking, HSG A
1,855	36	Woods, Fair, HSG A
1,849	98	Water Surface, HSG A
13,249	73	Weighted Average
6,153		46.44% Pervious Area
7,096		53.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	65	0.0077	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0570	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.3	63	0.0400	4.06		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1900	3.05		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.9	180	Total			

Subcatchment P01: P01



Summary for Subcatchment P02: P02

Runoff = 1.95 cfs @ 12.22 hrs, Volume= 8,173 cf, Depth= 2.71"

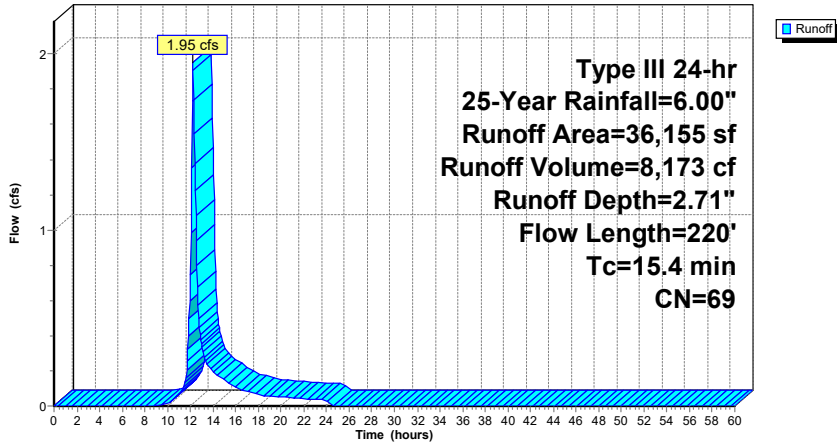
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.00"

Area (sf)	CN	Description
11,761	49	50-75% Grass cover, Fair, HSG A
7,686	36	Woods, Fair, HSG A
10,887	98	Paved parking, HSG A
5,821	98	Water Surface, 0% imp, HSG A
36,155	69	Weighted Average
25,268		69.89% Pervious Area
10,887		30.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0125	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.6	120	0.0063	0.56		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.4	220	Total			

Subcatchment P02: P02

Hydrograph



Summary for Pond SB-1: Stormwater Basin #1

Inflow Area = 13,249 sf, 53.56% Impervious, Inflow Depth = 3.09" for 25-Year event
Inflow = 0.93 cfs @ 12.16 hrs, Volume= 3,410 cf
Outflow = 0.09 cfs @ 13.51 hrs, Volume= 1,322 cf, Atten= 90%, Lag= 81.3 min
Primary = 0.09 cfs @ 13.51 hrs, Volume= 1,322 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 172.52' @ 13.51 hrs Surf.Area= 1,706 sf Storage= 2,128 cf

Plug-Flow detention time= 304.3 min calculated for 1,321 cf (39% of inflow)
Center-of-Mass det. time= 179.8 min (1,015.5 - 835.7)

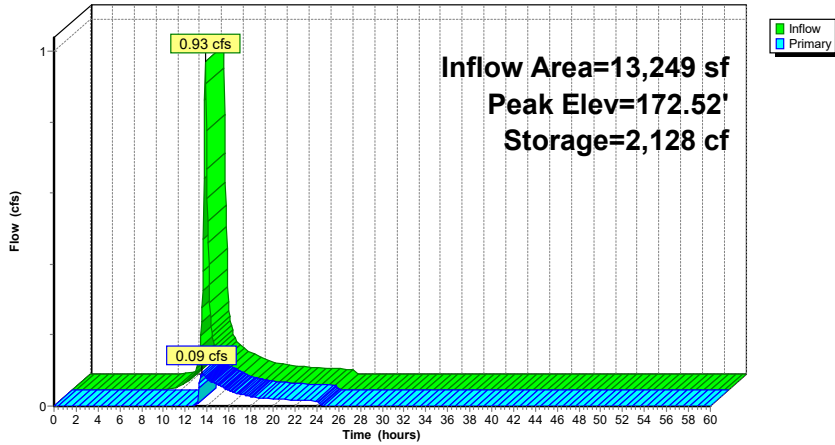
Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	2,975 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	1,004	0	0
172.00	1,548	1,276	1,276
173.00	1,849	1,699	2,975

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.09 cfs @ 13.51 hrs HW=172.52' (Free Discharge)
↑=Broad-Crested Rectangular Weir (Weir Controls 0.09 cfs @ 0.37 fps)

Pond SB-1: Stormwater Basin #1

Hydrograph



Summary for Pond SB-2: Stormwater Basin #2

Inflow Area = 36,155 sf, 30.11% Impervious, Inflow Depth = 2.71" for 25-Year event
 Inflow = 1.95 cfs @ 12.22 hrs, Volume= 8,173 cf
 Outflow = 0.06 cfs @ 19.18 hrs, Volume= 1,115 cf, Atten= 97%, Lag= 417.9 min
 Primary = 0.06 cfs @ 19.18 hrs, Volume= 1,115 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Peak Elev= 172.51' @ 19.18 hrs Surf.Area= 6,015 sf Storage= 7,146 cf

Plug-Flow detention time= 568.4 min calculated for 1,114 cf (14% of inflow)
 Center-of-Mass det. time= 416.0 min (1,265.4 - 849.3)

Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	10,274 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

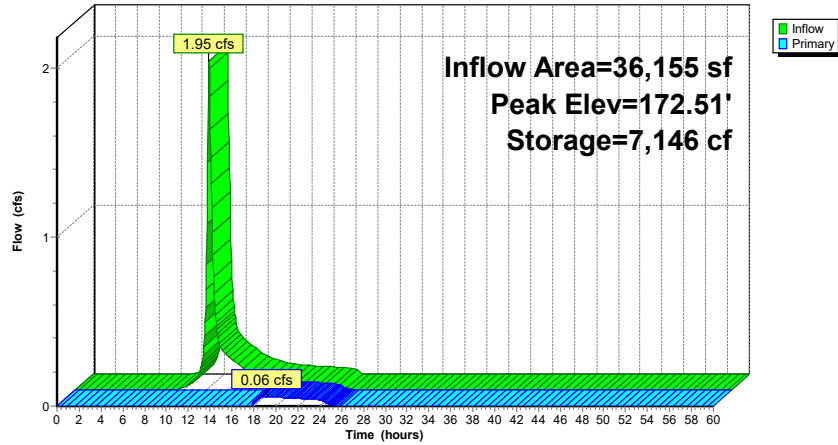
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	3,462	0	0
172.00	5,106	4,284	4,284
173.00	6,873	5,990	10,274

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.05 cfs @ 19.18 hrs HW=172.51' (Free Discharge)
 ↑=Broad-Crested Rectangular Weir (Weir Controls 0.05 cfs @ 0.33 fps)

Pond SB-2: Stormwater Basin #2

Hydrograph



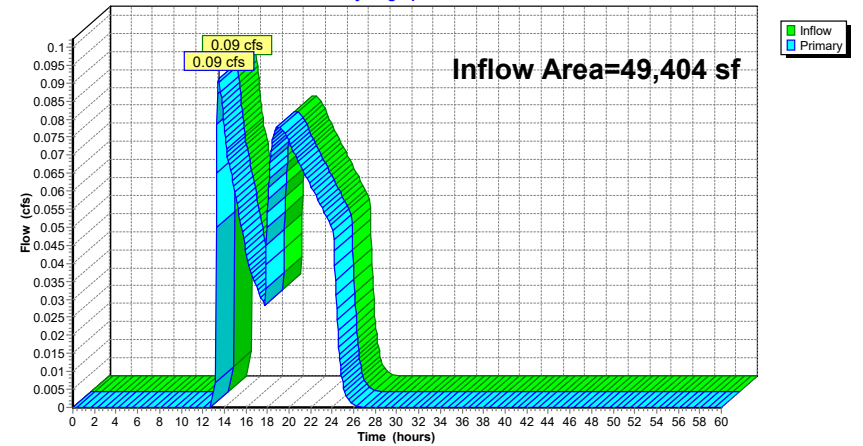
Summary for Link DP-01: DP-01

Inflow Area = 49,404 sf, 36.40% Impervious, Inflow Depth = 0.59" for 25-Year event
 Inflow = 0.09 cfs @ 13.51 hrs, Volume= 2,437 cf
 Primary = 0.09 cfs @ 13.51 hrs, Volume= 2,437 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs

Link DP-01: DP-01

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.60"

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Page 33

Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: P01Runoff Area=13,249 sf 53.56% Impervious Runoff Depth=5.35"
Flow Length=180' Tc=10.9 min CN=73 Runoff=1.60 cfs 5,901 cf**Subcatchment P02: P02**Runoff Area=36,155 sf 30.11% Impervious Runoff Depth=4.86"
Flow Length=220' Tc=15.4 min CN=69 Runoff=3.53 cfs 14,655 cf**Pond SB-1: Stormwater Basin #1**Peak Elev=172.63' Storage=2,305 cf Inflow=1.60 cfs 5,901 cf
Outflow=1.10 cfs 3,814 cf**Pond SB-2: Stormwater Basin #2**Peak Elev=172.60' Storage=7,680 cf Inflow=3.53 cfs 14,655 cf
Outflow=0.88 cfs 7,597 cf**Link DP-01: DP-01**

Inflow=1.21 cfs 11,411 cf

Primary=1.21 cfs 11,411 cf

Total Runoff Area = 49,404 sf Runoff Volume = 20,556 cf Average Runoff Depth = 4.99"
63.60% Pervious = 31,421 sf 36.40% Impervious = 17,983 sf**20200785A10_PROP01**

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Type III 24-hr 100-Year Rainfall=8.60"

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Page 34

Summary for Subcatchment P01: P01

Runoff = 1.60 cfs @ 12.15 hrs, Volume= 5,901 cf, Depth= 5.35"

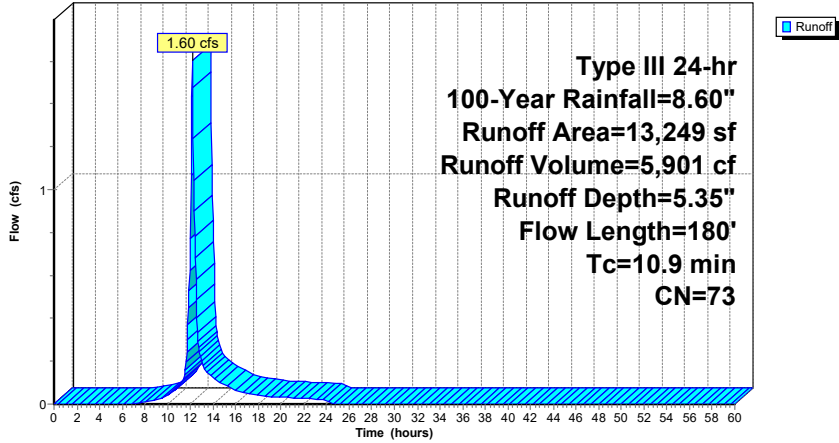
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
4,298	49	50-75% Grass cover, Fair, HSG A
5,247	98	Paved parking, HSG A
1,855	36	Woods, Fair, HSG A
1,849	98	Water Surface, HSG A
13,249	73	Weighted Average
6,153		46.44% Pervious Area
7,096		53.56% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	65	0.0077	0.11		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
0.3	35	0.0570	1.70		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.20"
0.3	63	0.0400	4.06		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	17	0.1900	3.05		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.9	180	Total			

Subcatchment P01: P01

Hydrograph



Summary for Subcatchment P02: P02

Runoff = 3.53 cfs @ 12.21 hrs, Volume= 14,655 cf, Depth= 4.86"

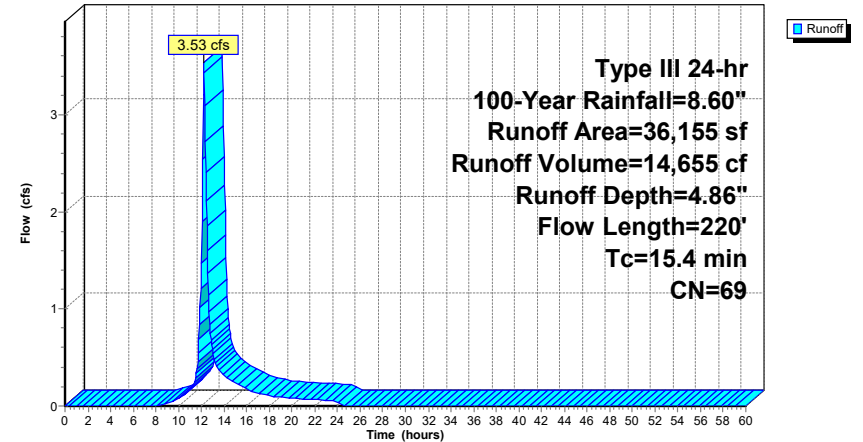
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.60"

Area (sf)	CN	Description
11,761	49	50-75% Grass cover, Fair, HSG A
7,686	36	Woods, Fair, HSG A
10,887	98	Paved parking, HSG A
5,821	98	Water Surface, 0% imp, HSG A
36,155	69	Weighted Average
25,268		69.89% Pervious Area
10,887		30.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0125	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
3.6	120	0.0063	0.56		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
15.4	220	Total			

Subcatchment P02: P02

Hydrograph



Summary for Pond SB-1: Stormwater Basin #1

Inflow Area = 13,249 sf, 53.56% Impervious, Inflow Depth = 5.35" for 100-Year event
 Inflow = 1.60 cfs @ 12.15 hrs, Volume= 5,901 cf
 Outflow = 1.10 cfs @ 12.31 hrs, Volume= 3,814 cf, Atten= 31%, Lag= 9.2 min
 Primary = 1.10 cfs @ 12.31 hrs, Volume= 3,814 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Peak Elev= 172.63' @ 12.31 hrs Surf.Area= 1,737 sf Storage= 2,305 cf

Plug-Flow detention time= 176.8 min calculated for 3,814 cf (65% of inflow)
 Center-of-Mass det. time= 75.4 min (895.4 - 820.0)

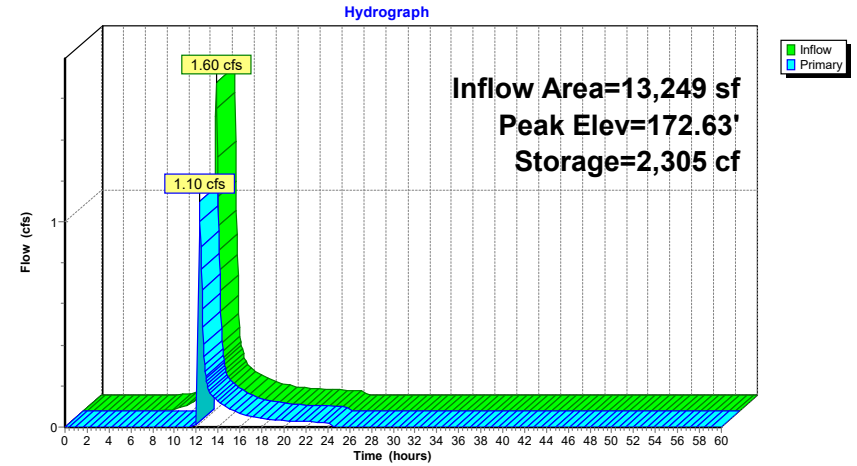
Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	2,975 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	1,004	0	0
172.00	1,548	1,276	1,276
173.00	1,849	1,699	2,975

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=1.08 cfs @ 12.31 hrs HW=172.63' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 1.08 cfs @ 0.86 fps)

Pond SB-1: Stormwater Basin #1



Summary for Pond SB-2: Stormwater Basin #2

Inflow Area = 36,155 sf, 30.11% Impervious, Inflow Depth = 4.86" for 100-Year event
 Inflow = 3.53 cfs @ 12.21 hrs, Volume= 14,655 cf
 Outflow = 0.88 cfs @ 12.74 hrs, Volume= 7,597 cf, Atten= 75%, Lag= 31.5 min
 Primary = 0.88 cfs @ 12.74 hrs, Volume= 7,597 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Peak Elev= 172.60' @ 12.74 hrs Surf.Area= 6,170 sf Storage= 7,680 cf

Plug-Flow detention time= 242.1 min calculated for 7,597 cf (52% of inflow)
 Center-of-Mass det. time= 127.1 min (959.5 - 832.4)

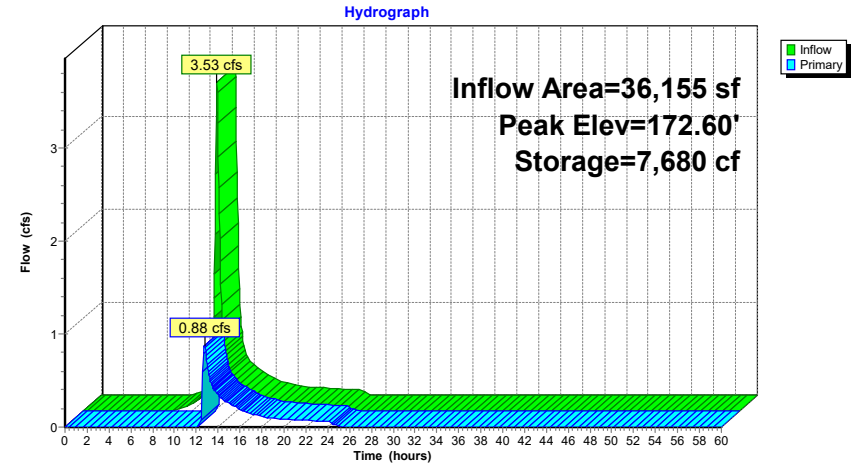
Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	10,274 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.00	3,462	0	0
172.00	5,106	4,284	4,284
173.00	6,873	5,990	10,274

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	10.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.88 cfs @ 12.74 hrs HW=172.60' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 0.88 cfs @ 0.86 fps)

Pond SB-2: Stormwater Basin #2



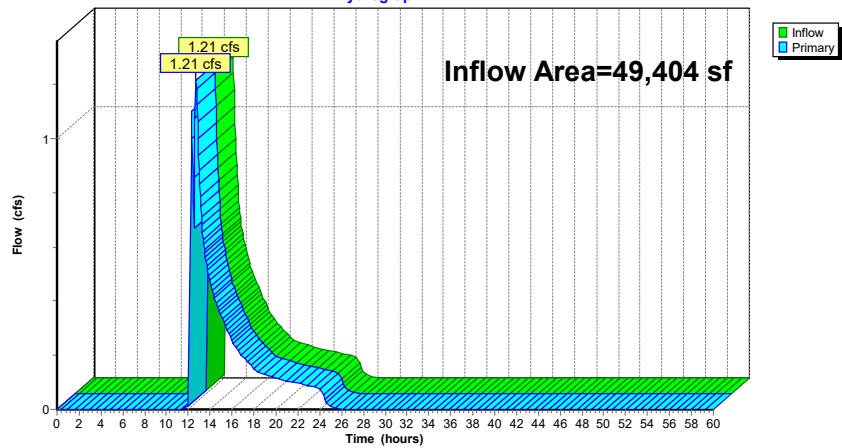
Summary for Link DP-01: DP-01

Inflow Area = 49,404 sf, 36.40% Impervious, Inflow Depth = 2.77" for 100-Year event
Inflow = 1.21 cfs @ 12.70 hrs, Volume= 11,411 cf
Primary = 1.21 cfs @ 12.70 hrs, Volume= 11,411 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs

Link DP-01: DP-01

Hydrograph



Appendix F

Stormwater Management Checklist





Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.¹ This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8²
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

¹ The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

² For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
 - Credit 1
 - Credit 2
 - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): _____

Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic Field¹
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
 - Site is comprised solely of C and D soils and/or bedrock at the land surface
 - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
 - Solid Waste Landfill pursuant to 310 CMR 19.000
 - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
 - Provisions for storing materials and waste products inside or under cover;
 - Vehicle washing controls;
 - Requirements for routine inspections and maintenance of stormwater BMPs;
 - Spill prevention and response plans;
 - Provisions for maintenance of lawns, gardens, and other landscaped areas;
 - Requirements for storage and use of fertilizers, herbicides, and pesticides;
 - Pet waste management provisions;
 - Provisions for operation and management of septic systems;
 - Provisions for solid waste management;
 - Snow disposal and plowing plans relative to Wetland Resource Areas;
 - Winter Road Salt and/or Sand Use and Storage restrictions;
 - Street sweeping schedules;
 - Provisions for prevention of illicit discharges to the stormwater management system;
 - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
 - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
 - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
 - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
 - is within the Zone II or Interim Wellhead Protection Area
 - is near or to other critical areas
 - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
 - involves runoff from land uses with higher potential pollutant loads.
 - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
 - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
 - The ½" or 1" Water Quality Volume or
 - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
 - Limited Project
 - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
 - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
 - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
 - Bike Path and/or Foot Path
 - Redevelopment Project
 - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
 - Construction Period Operation and Maintenance Plan;
 - Names of Persons or Entity Responsible for Plan Compliance;
 - Construction Period Pollution Prevention Measures;
 - Erosion and Sedimentation Control Plan Drawings;
 - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
 - Vegetation Planning;
 - Site Development Plan;
 - Construction Sequencing Plan;
 - Sequencing of Erosion and Sedimentation Controls;
 - Operation and Maintenance of Erosion and Sedimentation Controls;
 - Inspection Schedule;
 - Maintenance Schedule;
 - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance tasks;
 - Plan showing the location of all stormwater BMPs maintenance access areas;
 - Description and delineation of public safety features;
 - Estimated operation and maintenance budget; and
 - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
 - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
 - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

Appendix G

Water Quality Treatment Calculations





Project: Broadacres Farm Parking Lot
Sudbury, MA

Date: 5/7/21

REQUIRED WATER QUALITY VOLUME (V_{wq})

$$V_{wq} = (Dwq/12 \text{ inches/foot}) * (\text{Impervious Area})$$

$$Dwq = 0.5$$

Stormwater Basin #1

Impervious Area Contributing=

7,096 SF

*REQUIRED V_{wq}=	296 CF
---------------------------------------	---------------

PROVIDED WQV STORAGE=	2,086 CF
------------------------------	-----------------

Stormwater Basin #1

Impervious Area Contributing=

10,887 SF

*REQUIRED V_{wq}=	454 CF
---------------------------------------	---------------

PROVIDED WQV STORAGE=	7,058 CF
------------------------------	-----------------

Appendix H

TSS Removal Calculations



INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Bioretention Area	0.90	1.00	0.90	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
 1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Bioretention Area	0.90	1.00	0.90	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10
		0.00	0.10	0.00	0.10

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
 1. From MassDEP Stormwater Handbook Vol. 1

Appendix I

Groundwater Recharge Calculations & 72 Hour Drawdown





BIORETENTION BASIN #1

REQUIRED RECHARGE VOLUME

$$Rv = F * IMPERVIOUS AREA$$

$$F = 0.6 \text{ INCH Soil A}$$

Contributing to Infiltration Basin #1

Receives Stormwater From Catch P8D, P15, P17A & P17B

Total Impervious= 7,096 SF

Impervious Soil A= 7,096 SF

$$\text{Infiltration Basin \#1 Rv} = 355 \text{ CF}$$

Stormwater Infiltration Basin #1 Design

$$\text{Provided Storage Volume} = 2,086 \text{ CF} > 355 \text{ CF}$$

(Per HydroCAD, at lowest outlet el. 172.5)

72 HOUR DRAWDOWN

$$\text{Time drawdown} = \frac{Rv}{(K)(\text{Bottom Area})}$$

$$\begin{aligned} Rv &= \text{storage volume of basin}^* \\ \text{Soil a K} &= 2.41 \text{ inch/hour} \end{aligned}$$

Bottom Area of System=	1,004 SF	(at elevation 171)
System Storage=	2,086 CF	storage volume per HyrdoCAD
T drawdown=	10 hours	< 72 hours



BIORETENTION BASIN #2

REQUIRED RECHARGE VOLUME

$$Rv = F * IMPERVIOUS AREA$$

F= 0.6 INCH Soil A

Contributing to Infiltration Basin #1

Receives Stormwater From Catch P8D, P15, P17A & P17B

Total Impervious= 10,887 SF

Impervious Soil A= 10,887 SF

Infiltration Basin #1 Rv= 544 CF

Stormwater Infiltration Basin #1 Design

Provided Storage Volume= 7,058 CF > 544 CF

(Per HydroCAD, at lowest outlet el. 172.5)

72 HOUR DRAWDOWN

$$\text{Time drawdown} = \frac{Rv}{(K)(\text{Bottom Area})}$$

Rv= storage volume of basin*
Soil A K= 2.41 inch/hour

Bottom Area of System=	3,462 SF	(at elevation 171)
System Storage=	7,058 CF	storage volume per HyrdoCAD
T drawdown=	10 hours	< 72 hours

Appendix J

Construction Operation and Maintenance Plan



MEMORANDUM

TO: Town of Sudbury

FROM: Fuss & O'Neill, Inc.

DATE: May 7, 2021

RE: Construction Operation and Maintenance Plan
Broadacres Farm Parking Lot
Sudbury, MA

This suggested Construction Operation and Maintenance Plan (O&M) is for the construction of the Broadacres Farm Parking Lot located off Morse Road in Sudbury, Massachusetts. This O&M Plan has been prepared in accordance with the Massachusetts Stormwater Handbook.

Property Owner: Town of Sudbury
322 Concord Road
Sudbury, MA 01776

Responsible Party: Site Contractor

The contractor shall be responsible for the operation and maintenance of the site during construction. Construction includes construction of a new parking lot to access the rail trail and related site amenities. A suggested operation and maintenance activities plan and proposed schedule for during construction are as follows:

1. No earthwork activities shall commence until erosion and sedimentation control measures are installed. Erosion and sedimentation controls shall be installed as shown on the drawings.
2. Areas left exposed to erosion for more than seven days shall be rough graded and temporarily stabilized. Areas disturbed but inactive for more than thirty days shall be temporarily seeded.
3. Erosion and sedimentation controls shall be maintained until successful establishment of ground cover.
4. No staging of materials or lay down areas shall be located within the resource areas.
5. Paved areas shall be kept free of sediment and shall be cleaned periodically as required by construction activities.
6. Temporary soil stockpiles shall be located within areas consisting of formerly paved or developed surfaces and will be moved as necessary to accommodate ongoing work.

7. Sediment stockpiles shall have a side slope of no greater than 2:1. Stockpiles shall be rough graded or maintain a roughened surface to prevent erosion. Stockpiles that are not to be used within 7 days shall be seeded after formation of stockpile as to prevent erosion. Compost filter tube barrier and silt fence shall be installed around stockpile area approximately 10 feet from toe of slope.
8. The contractor is responsible to inspect and repair erosion and sedimentation control measures as required to prevent damage or sedimentation.
9. Upon completion of construction and establishment of permanent ground cover, remove and dispose of temporary erosion control measures. Clean sediment and debris from temporary measures and from permanent stormwater management systems.

Inspections shall be completed a minimum of every seven (7) calendar days and within 24 hours of the end of a storm event of 0.25 inches or greater. Attached is an example Construction Inspection and Maintenance Report Form.

CONSTRUCTION INSPECTION AND MAINTENANCE REPORT FORM

Broadacres Farm Parking Lot Sudbury, MA

To be completed every 7 calendar days and within 24 hours of the end of a storm event of 0.25 inches or greater

Inspector: _____ Date: _____

Inspector's Title and Qualifications: _____

Summary of Previous 7-day Rainfall:

Date	Friday Date	Saturday Date	Sunday Date	Monday Date	Tuesday Date	Wednesday Date	Thursday Date
Total Daily Rainfall (in.)							

Stabilization Measures:

Area	Disturbed (Yes/No)	Stabilized (Yes/No)	Stabilized With	Condition
Paved Parking Lot and Access Driveway				
Bioretention Basin #1				
Bioretention Basin #1				
Adjacent Areas within Work Site				

Bioretention Basin #1

Depth of Infiltration Basin	Condition of Side Slopes	Evidence of Overtopping of Embankments	Condition of Outfall

Bioretention Basin #1

Depth of Infiltration Basin	Condition of Side Slopes	Evidence of Overtopping of Embankments	Condition of Outfall

CONSTRUCTION INSPECTION AND MAINTENANCE REPORT FORM

**Broadacres Farm Parking Lot
Sudbury, MA**

Construction Site & Adjacent Areas:

General condition: _____

Maintenance Required for Silt Fence: _____

Is sediment being tracked on to road? _____

Maintenance required? _____

Changes Required to the Pollution Prevention Plan:

Reasons for Changes:

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____ Date: _____

Appendix K

Long Term Operation and Maintenance Plan



MEMORANDUM

TO: Town of Sudbury

FROM: Fuss & O'Neill, Inc.

DATE: May 7, 2021

RE: Long Term Operation and Maintenance Plan
Broadacres Farm Parking Lot
Sudbury, MA

This Long Term Operation and Maintenance Plan (O&M) is for the long term operation of the Broadacres Farm Parking Lot located off Morse Road in Sudbury, Massachusetts. This Long Term O&M Plan has been prepared in accordance with the Massachusetts Stormwater Handbook.

Property Owner and Responsible Party:

Town of Sudbury
322 Concord Road
Sudbury, MA 01776

It will be the responsibility of the Owner to comply with this Long Term Operation and Maintenance Plan. The owner is responsible for all financing, maintenance and emergency repairs. Should the property or any portion of the property be transferred to another owner, that new owner will be notified of the presence of this Long Term Operation and Maintenance Plan and be held responsible for the implementation of this plan and financing as it pertains to their property.

Operation and Maintenance Plan

The post construction operation and maintenance plan outlined hereafter provides recommendations for periodic inspection and maintenance activities for the stormwater management system. This Long-Term Operation and Maintenance Plan will ensure that the stormwater management system functions as designed throughout the life of the system.

- Paved surfaces will be swept twice annually, April and October, to remove sand and debris.
- Sediment forebays shall be inspected monthly. This will include checking for signs of riling and gullyng. Also this will include checking for the accumulation of sediments and pollutants. Sediment forebays shall be cleaned at least four time per year and when sediment depth is between 3 to 6 inches. When mowing grasses, keep the grass height no greater than six inches.
- Bioretention basins shall be inspected after every major storm event for the first three months and a minimum twice a year thereafter. Basin shall be inspected for, but not limited to, evidence of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, condition of riprap, and sediment accumulation and the health of the turf.

Upper-stage, side slopes, embankments, and emergency spillways shall be mowed at least twice a year. Trash and debris shall be removed at least twice a year and accumulated sediment shall be removed at least twice a year from the basin.

Snow Removal and Storage

Snow removal and storage shall be performed when needed as follows:

- Snow shall be plowed to snow storage areas located off the perimeter of the parking lots and loading area. No snow shall be stored within the infiltration basins.
- De-icing chemicals may only be used on pedestrian surfaces. All other paved surfaces may have sand applied.
- Excess snow shall be removed from site or stockpiled only within the paved areas on the site.

Location and Access of Stormwater Management System

All components of the stormwater management system are located within project site area. Access to the site will be provided via Morse Road.

Records of Maintenance and Repair Activities

The responsible parties shall keep records of installation, maintenance and repairs of the stormwater management facilities. These records shall be retained for the most recent five years on site and be provided to the Conservation Commission annually and upon request. An example Operation and Maintenance Log Form is attached.

Attachments:

O&M Log Form

Operation and Maintenance Log Form

Project/Location: Broadacres Farm Parking Lot, Sudbury, MA

“As Built” Plans Available? _____

Date/Time: _____

Days since Previous Rainfall and Rainfall Amount: _____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Parking Lot and Paved Areas			
<ul style="list-style-type: none"> • Evidence of erosion 			
Action to be Taken:			
Date to be Completed by:			
2. Sediment Forebays			
<ul style="list-style-type: none"> • Forebay is free of debris, litter and waste. 			
<ul style="list-style-type: none"> • Grass height is between 3 and 6 inches. 			
<ul style="list-style-type: none"> • Depth of sediments is less than half of the basin. 			
Action to be Taken:			
Date to be Completed by:			
3. Bioretention Basins			
<ul style="list-style-type: none"> • Vegetation coverage adequate 			
<ul style="list-style-type: none"> • Undesirable vegetative growth 			
<ul style="list-style-type: none"> • Undesirable woody vegetation 			
<ul style="list-style-type: none"> • Mowing performed as necessary 			
<ul style="list-style-type: none"> • Embankment in good repair 			
<ul style="list-style-type: none"> • No evidence of erosion 			
<ul style="list-style-type: none"> • Standing water or wet spots 			
<ul style="list-style-type: none"> • Sediment and/or trash accumulation 			
<ul style="list-style-type: none"> • Other (specify) 			
Action to be Taken:			
Date to be Completed by:			

Source: Adapted from Watershed Management Institute, Inc. 1997. *Operation, Maintenance, and Management of Stormwater Management Systems*. In cooperation with U.S. Environmental Protection Agency, Office of Water. Washington, D.C.