



Town of Brewster Planning Board

2198 Main St., Brewster, MA 02631

brewplan@brewster-ma.gov

(508) 896-3701 x1133

PLANNING BOARD MEETING AGENDA

2198 Main Street

December 13, 2023 at 6:30 PM

Planning Board

Amanda Bebrin
Chair

Alexander
Wentworth
Vice Chair

Robert Michaels
Clerk

Charlotte Degen

Madalyn Hillis-
Dineen

Antone Freitas

Elizabeth Taylor

Town Planner
Jonathon Idman

Senior Department
Assistant
Lynn St. Cyr

This meeting will be conducted in person at the time and location identified above. This means that at least a quorum of the members of the public body will attend the meeting in person and members of the public are welcome to attend in person as well. **As a courtesy only, access to the meeting is also being provided via remote means in accordance with applicable law. Please note that while an option for remote attendance and/or participation is being provided as a courtesy to the public, the meeting/hearing will not be suspended or terminated if technological problems interrupt the virtual broadcast or affect remote attendance or participation, unless otherwise required by law.** Members of the public with particular interest in any specific item on this agenda, which includes an applicant and its representatives, should make plans for in-person vs. virtual attendance accordingly.

Members of the public who wish to access the meeting may do so in the following manner:

Phone: Call (312) 626 6799 or (301) 715-8592. Webinar ID: 841 0778 1002. Passcode: 612505.

To request to speak: Press *9 and wait to be recognized.

Zoom Webinar: <https://us02web.zoom.us/j/84107781002?pwd=VTFSV1ExaUNCL253NmNZV2lGdmo4dz09>
Passcode: 612505.

To request to speak: Tap Zoom "Raise Hand", then wait to be recognized.

When required by law or allowed by the Chair, persons wishing to provide public comment or otherwise participate in the meeting, may do so by accessing the meeting remotely, as noted above. Additionally, the meeting will be broadcast live, in real time, via **Live broadcast** (Brewster Government TV Channel 18), **Livestream** (livestream.brewster-ma.gov), or **Video recording** (tv.brewster-ma.gov).

The Planning Board packet can be found on the Calendar on the Town of Brewster website (www.brewster-ma.gov). Please note that the Planning Board may take official action, including votes, on any item on this agenda.

1. Call to Order.
2. Declaration of a Quorum.
3. Meeting Participation Statement.
4. Recording Statement. As required by the Open Meeting Law we are informing you that the Town will be video and audio taping as well as broadcasting this public meeting. In addition, if anyone else intends to either video or audio tape this meeting they are required to inform the Chair.
5. Public Announcements and Comment. Members of the public may address the Planning Board on matters not on the meeting's agenda for a maximum of 3-5 minutes at the Chair's discretion. The Planning Board will not reply to statements made or answer questions raised during public comment but may add items presented to a future agenda.
6. **Major Stormwater Management Permit, Case No. SWMP2023-43:**
Applicant/Owner: Town of Brewster has submitted a major stormwater permit application related to the Millstone Road Improvements Project, pursuant to Brewster Town Code Chapter 272 and its accompanying Regulations. The Planning Board will consider and potentially vote whether to approve the major stormwater permit, as well as any waivers from said Regulations deemed necessary and applicable.
7. **Major Stormwater Management Permit, Case No. SWMP2023-46:**
Applicant/Owner: David and Heidi Jenkins has submitted a major stormwater permit application for property located at 87 Timberlane Drive and shown on Tax Map 144, Parcel 11, pursuant to Brewster Town Code Chapter 272 and its accompanying Regulations. The Planning Board will consider and potentially vote whether to approve the major stormwater permit, as well as any waivers from said Regulations deemed necessary and applicable.



Planning Board

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**Senior Department
Assistant**
Lynn St. Cyr

8. Approval of Meeting Minutes: November 8, 2023.
9. Committee Reports.
10. For Your Information.
11. Matters Not Reasonably Anticipated by the Chair.
12. Next Meetings: January 10, 2024 and January 24, 2024.
13. Adjournment.

Date Posted:
12/06/23

Date Revised:

Received by Town Clerk:

'23 DEC 6 10:23AM
JL
BREWSTER/TOWN CLERK

MAJOR STORMWATER MANAGEMENT PERMIT
CASE NO. SWMP2023-43

APPLICANT/OWNER: TOWN OF BREWSTER
MILLSTONE ROAD IMPROVEMENTS PROJECT



Town of Brewster
Code Chapter 272
Stormwater Management Permit
Application Form

FOR TOWN OFFICIAL USE ONLY

TOWN CLERK RECEIVED:

BREWSTER TOWN CLERK
23 NOV 3 2:02 PM

SWM PERMIT NUMBER ASSIGNED:

SUMP 2023-43

1. Project Location:

Millstone Road

Street Address

Book 1291 Page 1139

Deed Reference

Assessors Map and Parcel(s)

2. Applicant:

Town of Brewster (c/o Griffin Ryder, DPW Director)

Name

2198 Main Street, Brewster, MA 02631

Legal Mailing Address

508.896.3701

Phone Number

gryder@brewster-ma.gov

Email Address

3. Property Owner (if different than Applicant):

Name

Legal Mailing Address

Phone Number

Email Address

4. Professional Representative:

Vanasse Hangen Brustlin, Inc. (c/o Steve Rhoads, Project Manager)

Name

101 Walnut Street, P.O. Box 9151, Watertown, MA 02472

Legal Mailing Address

617.924.1770

Phone Number

srhoads@vhb.com

Email Address

5. Type of Application (Check as applicable):

_____ **Minor Stormwater Permit-** Any combination or series of construction or land disturbance activities that, over a two-year period, will result in a net increase in impervious area of 500 sq.ft. to 2,500 sq.ft. and/or will result in land disturbances of 10,000 sq.ft. to 20,000 sq.ft.

X _____ **Major Stormwater Permit-** Any alteration, disturbance, development, or redevelopment that does not meet the eligibility criteria for a Minor Stormwater Permit.

_____ **SWM Permit Amendment-**
List existing Stormwater Management permit number/ type _____.

_____ **Stormwater Management Certificate of Compliance (SMCC) Request-**
List relevant Stormwater Management permit number _____.

6. Brief Project Description, including any waiver requests:

Please see the attached memorandum for the project description.

7. Signatures:

 _____ 11.01.2023
Applicant Date

_____ 11.01.2023
Property Owner (if different than Applicant) Date

 _____ 11.01.2023
Professional Representative (as applicable) Date

NOTES:

- Please refer to Appendix B of the Stormwater Management Regulations for detailed application submittal and supporting material requirements for Minor and Major Stormwater Management Permits, respectively.
- The application fee schedule is contained in Appendix C of the Regulations.
- Certain activities are exempt from review and permitting (See §272-6 of the Stormwater Management Bylaw).
- If the project is located, in whole or part, within an area subject to state or local wetlands protection law, the review and permitting authority is the Brewster Conservation Commission/ Conservation Department.
- No permit review shall occur nor shall review periods commence until the application is deemed complete.



Town of Brewster

2198 Main Street
Brewster, MA 02631-1898
Phone: (508) 896-3701
Fax: (508) 896-8089

Office of:
Department of Public Works

MEMORANDUM

TO: Brewster Planning Board
FROM: Griffin Ryder, Department of Public Works Director
RE: Millstone Road Major Stormwater Permit Submission
DATE: November 1, 2023

The Town of Brewster is proposing to improve Millstone Road from Route 6A to Route 137 (approx. 2.5 miles) (the "Project"). The Project will create a uniform cross section consisting of 11-foot wide lanes, 1.5-foot wide shoulders and a 5-foot wide sidewalk (separated with a grass strip where possible). Pursuant to the Town of Brewster Stormwater Management Regulations, Section 6.2.B(7) "Redevelopment," the project is an eligible redevelopment project as it is "exclusively limited to maintenance and improvement of existing roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, and repaving projects) shall improve existing conditions unless infeasible and are exempt from the requirements of Section 6.2.C(7)b." The Project is subject to and has been designed to meet this special standard governing roadway redevelopment projects.

The Project will incorporate significant stormwater infrastructure upgrades including the addition of 78 catch basins, 18 leaching pits and 145 leaching galleys as compared to the existing conditions. The stormwater system has been designed to meet the Mass Stormwater Handbook to the maximum extent practicable as a Redevelopment Project. The proposed stormwater system will provide for a significant improvement in stormwater collection and water quality treatment as compared to the existing conditions thereby meeting the redevelopment standard defined in the Town of Brewster Management Regulations.

The Project received a Massachusetts Environmental Policy Act Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form from the Executive office of Energy and Environmental Affairs on August 9, 2023. The Project received approval through an Order of Conditions from the Brewster Conservation Commission on October 23, 2023. The focus of the Conservation Commission filing was the small area of the Project within the 100' wetland resource buffer zone in the area proximal to 99 and 133 Millstone Road. The Project was designed to minimize impacts to the wetland resource area and its buffers. The Project

has also received conditional approval from MassDOT on an Access Permit that will allow for the construction of a crosswalk with push button rapid rectangular flashing beacons across Route 6A to connect to the existing sidewalk on the north side of Route 6A (which also abuts the town owned, former CCSC bay property).

The Project design was carefully selected using low impact development techniques to increase safety for all users of the roadway and sidewalk while limiting the increase of impervious area and corresponding impacts on the natural environment. Grass strips adjacent to the sidewalk have been incorporated into the design where there was available layout area and would not have permanent impacts on private property. Another design intent was to preserve healthy and mature existing trees to the maximum extent practicable. The grass strips will provide for vegetated filter pre-treatment prior to some level of further treatment, collection and infiltration via the catch basins. Further, a rain garden has been provided at the location opposite the Joe Long Road intersection on the west side of Millstone Road (see sheet 68 of the site plan set).¹ VHB will prepare a planting plan and details for the rain garden that will be part of a supplemental submission prior to the Planning Board meeting.

Also included in the Planning Board submission is a palette of replacement plant materials (trees and shrubs) that are proposed to be used throughout the Project footprint. These native and hearty plant selections were determined with the assistance of VHB's Landscape Architect, in consultation with the town's Tree Warden. These are the types of plant material that will be offered to property owners to replace the loss of vegetation on their properties, associated with the construction of the Project. The location of these plantings will be determined so as not to interfere with the function or safety of the roadway, and on a case-by-case basis in the field after discussions with the affected owners. Prior to commencement of work, a joint public hearing with the Tree Warden and the Planning Board will be required to review and approve the proposed tree removal associated with the Project, as Millstone Road is a locally designated scenic road. I anticipate a broader discussion regarding the proposed tree removal and potential mitigation as part of the hearing.

I look forward to meeting and discussing this item at the Planning Board's next available, regularly scheduled meeting, which I understand is December 13, 2023. I'm happy to coordinate site visits or provide additional information through Planning Staff in the meantime.

¹ Area was available on the west side of Millstone Road because the travelled way extends easterly outside of the road layout. It appears that the road was originally constructed and curved in this way to avoid the large "Spring Rock" glacial erratic at the location.



Memorandum

To: Town of Brewster
Department of Public Works
201 Run Hill Road
Brewster, MA 02631

Date: October 31, 2023

Project #: 14170.00

From: Luke Boucher, PE

Re: Stormwater Management Memorandum
Millstone Road Improvement Project

This Stormwater Management Memorandum has been prepared to show compliance with the Massachusetts Stormwater Management Standards to the maximum extent practicable, in accordance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), as well as with the Town of Brewster, MA Stormwater Management Bylaw (the local Stormwater Bylaw) and Stormwater Management Regulations (the local Stormwater Regulations)¹.

Project Description

The applicant, Town of Brewster, is proposing roadway improvements and new sidewalks for Millstone Road (the Project) from the intersection with Main Street (Route 6A) to the intersection with Long Pond Road (Route 137) in Brewster, MA (Figure 1). The Project also proposes approximately 50 leaching galley & basin systems along the roadway, as well as a rain garden, to treat stormwater runoff.

A portion of the Project Area is within the 100-foot buffer zone to an Isolated Vegetated Wetland, which is subject to the jurisdiction of the Massachusetts Wetland Protections Act and within the 50-foot No Disturb Zone, which is subject to the jurisdiction of the local wetland bylaw. Additionally, a portion of the Project Area is adjacent to a Natural Heritage Endangered Species Program Priority Habitat MassGIS polygon, and within Zone II wellhead protection areas, which is considered a critical area per 310 CMR 10.04. The Zone II wellhead protection areas are associated with the Brewster Water Department water supply wells.

Under the Massachusetts Stormwater Management Standards, the Project is considered a redevelopment project because it involves maintenance and improvement of an existing roadway, including widening less than a single lane, improving existing drainage systems and repaving. The Project has been designed to meet the Massachusetts Stormwater Management Standards to the maximum extent practicable and to improve upon existing conditions.

The Project also requires a Major Stormwater Permit for the proposed work per the local Stormwater Bylaw (Chapter 272 Stormwater Management), adopted November 15, 2021. Compliance with the local Stormwater Bylaw and local Stormwater Regulations, which went into effect on March 4, 2022, is documented later in this memorandum.

¹ Town of Brewster, 2022. *Town of Brewster Stormwater Management Regulations*. https://www.brewster-ma.gov/sites/g/files/vyhlf6286f/uploads/brewster_stormwater_management_regulations_022322.pdf

101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770



Site Description

Watershed

The Project Area lies within the Cape Cod watershed. The Cape Cod watershed is covered by a TMDL for pathogens.² The TMDL implementation plan for stormwater management recommends starting with non-structural best management practices (BMPs), and then using structural BMPs if the non-structural BMPs are not sufficient to address water quality. The TMDL implementation plan also references the six minimum control measures required under the MS4 permit.

The Project is not located in an area designated as an Outstanding Resource Water (ORW).³

Land Use

Land uses adjacent to the Project Area are primarily forest and residential.⁴ There are no known land uses with higher potential pollutant loads (LUHPPLs) in or with drainage areas directly tributary to the Project Area.

Land Cover

Land cover within the Project Area consists primarily of asphalt roadway. Existing pervious cover within the Project Area is predominantly grass adjacent to the roadway.

Utilities

Subsurface utilities along the Project Area include water and gas. Above-ground utilities include utility poles, overhead wires, signals, electrical structures, and hydrants.

Topography

The Project Area has multiple low points along its existing roadway alignment, ranging in elevation from approximately 44 to 121 (NAVD 88). Slopes along the project corridor range between 0.0% and 6.05%.

Soils

The Natural Resources Conservation Service (NRCS) soil survey⁵ has mapped the surface soils within the Project as predominantly Carver coarse sand (HSG A), Plymouth loamy coarse sand (HSG A), and Barnstable-Plymouth-Nantucket complex (HSG A). A map of existing NRCS Soil Survey in the Project Area is included in Appendix B.

Hazardous Materials

Based on VHB's preliminary screening of the MassDEP database, one (1) state-listed site with documented releases of oil and/or hazardous materials (OHM) is present within a 500-foot radius of the Project. This site does not have the potential to impact the Project based on proximity to the Project area and/or current regulatory status. Should OHM be encountered during project excavations that requires management or export, it must be handled under

² Massachusetts DEP. 2009. "Final Pathogen TMDL for the Cape Cod Watershed."

³ Massachusetts DEP, 2013. 314 CMR 4.00 Massachusetts Surface Water Quality Standards.

⁴ MassMapper Land Use 2005. <https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html>. Accessed August 2023.

⁵ Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey



appropriate regulatory submittal (such as a Utility Related Abatement Measure, Release Abatement Measure, or Immediate Response Action) and accompanied by appropriate documentation such as Material Shipping Records (MSRs), Bills of Lading (BOLs), or manifests.

No excavation associated with the proposed closed drainage and stormwater infrastructure is proposed within the limits of any open disposal site boundaries.

Existing Drainage Infrastructure and Structural Best Management Practices (BMPs)

The existing drainage infrastructure within the Project Area consists of a combination of country drainage and closed drainage (catch basins, leaching drainage structures, pipes). The cross slope of Millstone Road varies, with some sections crowned and some sloping to one side. The outer edges of Millstone Road are either uncurbed or feature bituminous berm with intermittently spaced catch basins that intercept flow that is unable to sheet off the roadway. The existing structural stormwater treatment BMPs within the Project Area include leaching basin systems.

Proposed Drainage Conditions

Land Cover

The Project proposes to increase impervious cover by approximately 3.3 acres. Proposed impervious cover will be comprised of asphalt roadway and sidewalks.

The Project proposes tree removal along Millstone Road to accommodate roadway widening and new sidewalks, which provide a safety improvement over existing conditions.

Structural BMPs

The Project proposes to install a rain garden and approximately 50 leaching galley & basin systems to supplement the proposed closed-drainage system consisting of catch basins, gutter inlets, and manholes. The majority of existing catch basins and drainage manholes will be retained or remodeled and incorporated into the proposed drainage system. In addition, the design includes a proposed rain garden located across from Joe Long Road.

Erosion and Sediment Control

An erosion and sedimentation control program will be implemented to minimize temporary impacts to wetland resource areas prior to and during the construction phase of the Project. The program incorporates BMPs specified in guidelines developed by the DEP⁶ and the U.S. Environmental Protection Agency (EPA)⁷.

Non-structural practices to be used during construction include permanent seeding and pavement sweeping. These practices will be initiated as soon as practicable during construction. Structural erosion and sedimentation controls include erosion control barriers and catch basin inlet protection.

⁶ DEP, 1997. *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers, and Municipal Officials.*

⁷ EPA, 2007. *Interim Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites.* Office of Water. Report EPA 833-R-060-04.



Massachusetts Department of Environmental Protection (MassDEP) – Massachusetts Stormwater Management Standards

Under the Massachusetts Stormwater Management Standards, the Project is considered a redevelopment project because it involves maintenance and improvement of an existing roadway, including widening less than a single lane, improving existing drainage systems and repaving. The Project has been designed to meet the Massachusetts Stormwater Management Standards to the maximum extent practicable, and to improve upon existing conditions.

Standard 1: No New Untreated Discharges or Erosion to Wetlands

The Project has been designed to comply with Standard 1.

The Project does not propose any discharge to wetlands or receiving waters. Under existing conditions, stormwater from the Project Area sheet flows off the roadway without pretreatment or flows into existing intermittent catch basins and leaching structures. The proposed drainage systems for the Project will reroute sheet flow into additional catch basins and provide treatment via a network of additional offline leaching basins and galleys. In addition, a rain garden has been incorporated into the design to provide additional treatment.

One isolated wetland resource area is located within the Project vicinity, east of station 211+50. Sheet flow from the roadway in this area will be directed to catch basins on both sides of the roadway, south and north of the wetland boundary, and conveyed through approximately 390 feet of 12" pipe trunkline to a leaching galley on the western side of the road for infiltration. The leaching galley system is located approximately 267 feet from the isolated wetland. No discharge to the isolated wetland resource area is proposed.

Standard 2: Peak Rate Attenuation

The Project has been designed to comply to the maximum extent practicable with Standard 2.

The Project proposes to increase impervious cover by approximately 3.3 acres. This increase in impervious area is to accommodate roadway widening and new sidewalks, which provide a safety improvement over existing conditions.



The Project is a redevelopment project. The new stormwater system will infiltrate all collected runoff and does not propose discharges to wetlands or receiving waters and calculations of peak rate discharges to receiving waters are not included.

Standard 3: Stormwater Recharge

The Project has been designed to comply with Standard 3.

Groundwater recharge of stormwater runoff is provided by leaching basins, leaching galleys, and a rain garden. The required water quality volume and proposed water quality volume are provided in Table 1.

Table 1: Required and Provided Groundwater Recharge Volumes

Proposed Impervious Area (HSG A) (acres)	Required Recharge Volume (cf)	Provided Recharge Volume (cf)
3.3	7,820	35,214

Supporting calculations for required and provided recharge volumes are included in Appendix C.

Standard 4: Water Quality

The Project has been designed to comply with Standard 4.

The Project Area, located within the Cape Cod Watershed, is covered by a Total Maximum Daily Load (TMDL) for pathogens. The TMDL does not reference stormwater as a significant source of pathogens to the waterbodies and does not require mitigation beyond the six minimum control measures (MCMs) as covered under the Town and MassDOT MS4 stormwater management programs.

Under existing conditions, stormwater from the Project Area sheet flows off of the roadway or directly into leaching catch basins without pretreatment or flows into existing catch basins and leaching structures interspersed throughout the roadway. The existing catch basins do not appear to be spaced adequately throughout the existing roadway to effectively capture runoff. The proposed drainage systems for the Project will reroute sheet flow into catch basins spaced appropriately and provide pretreatment via deep-sump catch basins and treatment via a network of 51 offline leaching basins (39 proposed and 12 existing to be



retained) and 145 leaching galleys. In addition, the proposed system includes a rain garden located across from Joe Long Road.

The Massachusetts Stormwater Standards require a TSS reduction of 80%. As indicated in the TSS Removal Calculation Worksheets included in Appendix C, the weighted average TSS load reduction across the Project Area is 80%, which complies with this requirement.

Computations and supporting information, including the Long-Term Pollution Prevention Plan, are provided in Appendix D. Table 2 below summarizes the required and provided Water Quality Volumes.

Table 2: Required and Provided Water Quality Volume

Proposed Impervious Area	Required Water Quality Volume (cf)	Provided Water Quality Volume (cf)
9.7	35,211	35,214

In addition to the treatment described above, vegetated grass strips have been incorporated into the design where feasible between the sidewalk and roadway. Runoff from the sidewalk areas will flow through these grass strips prior to entering the roadway. As these grass strips do not meet the requirements for vegetated filter strips or a qualifying pervious area (LID Credit No. 3) in the Massachusetts Stormwater Handbook, the Project cannot claim any water quality credit. The grass strips; however, will allow incidental infiltration and treatment of the sidewalk areas, resulting in improved water quality over a layout with sidewalks immediately adjacent to the roadway.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

There are no known land uses with higher potential pollutant loads (LUHPPLs) in or with drainage areas directly tributary to the Project Area. The Project complies with Standard 5.

Standard 6: Critical Areas

The Project is located within a Zone II, shown in Figure 2. The Project has been designed to comply with Standard 6 to the maximum extent practicable.

Runoff from the Project's proposed impervious cover will be treated by a subsurface leaching basin (80% TSS removal), a leaching galley (80% TSS removal), or a rain garden (90% TSS removal). Since this project is located within a critical area, 44% TSS removal must be



removed prior to discharge into the infiltration structure. Deep-sump catch basins provide 25% pretreatment to leaching basin and leaching galley systems, but due to limited right-of-way, proposing additional pretreatment is not practicable. A combination grass/gravel pretreatment system is proposed as pretreatment for the proposed rain garden, as specified in Volume 2, Chapter 2, page 25 of the Massachusetts Stormwater Handbook.

The project is located within a Zone II and within an area with infiltration rates greater than 2.4 inches/hour, both of which require that a 1" Water Quality Volume be treated. This Project complies with that requirement to the maximum extent practicable, as shown in Figure 2.

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the Maximum Extent Practicable

The Project is considered a redevelopment and has been designed to comply with the Massachusetts Stormwater Management Standards to the maximum extent practicable. The project complies with Standards 1, 3, 5, 8, 9, and 10. The Project complies with Standards 2, 4 and the pretreatment and structural BMP requirements of Standard 6 to the maximum extent practicable.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls

The Project will disturb approximately 9.7 acres of land and is therefore required to obtain coverage under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit. As required under this permit, a Stormwater Pollution Prevention Plan (SWPPP) will be developed and submitted by the contractor before land disturbance begins.

The project will include an erosion and sedimentation control program to minimize temporary impacts to wetland resource areas prior to and during the construction phase of the Project. Non-structural practices to be used during construction include permanent seeding and pavement sweeping. These practices will be initiated as soon as practicable during construction. Structural erosion and sedimentation controls include erosion control barriers and catch basin inlet protection.



Standard 9: Operation and Maintenance Plan

In compliance with Standard 9, a Post-Construction Stormwater Operation and Maintenance (O&M) Plan has been developed for the Project. The O&M Plan is included in Appendix D as part of the Long-Term Pollution Prevention Plan.

Standard 10: Prohibition of Illicit Discharges

The Project Area does not have any known illicit connections. Any illicit connections to sanitary sewer or storm drainage structures found in the project limit of work will be removed or incorporated into the project. The Town does not have any sanitary sewer infrastructure in this area. The Long-Term Pollution Prevention Plan, provided in Appendix D, includes measures to prevent illicit discharges.



Town of Brewster, MA Stormwater Management Bylaw and Stormwater Management Regulations – Major Stormwater Permit

As the project results in an increase in impervious area exceeding 2,500 square feet and a land disturbance exceeding 20,000 square feet, the project is required to obtain a Major Stormwater Permit from the Town of Brewster (Section 4 of the local Stormwater Regulations). The following section documents compliance with the Post-Construction Stormwater Management performance standards for Major Stormwater Permits, as listed in Section 6.2.B of the local Stormwater Regulations.

The local Stormwater Regulations include “redevelopment” provisions similar to those in the Massachusetts Stormwater Standards, requiring certain types of projects to comply with some stormwater quality and quantity requirements only to the maximum extent practicable. These “redevelopment” provisions recognize the physical constraints that limit the choice of BMP on certain projects, particularly those involving improvement of existing roads. These constraints derive from the linear configuration of the road, the limited area within the existing right-of-way, the structural and safety requirements attendant to good roadway design, and the long-term maintainability of the roadway drainage systems. As a result, there is often limited available space on existing roadway improvement projects to incorporate stormwater BMPs with adequate capacity to provide the stormwater treatment and peak rate attenuation necessary to fully comply with stormwater quality and quantity requirements.

Local Standard 1: Compliance with MassDEP and MS4 Requirements - Section 6.2.B(1)

See the previous section for documentation of compliance with the MassDEP Stormwater Standards. Per the response to Local Standard 7, the project is not subject to compliance with the MS4 requirements in Section 6.2.B(7)(b).

Local Standard 2: LID Planning and Design Strategies - Section 6.2.B(2)

The project team evaluated the project area for locations where the following LID practices could be incorporated into the design.

Protection and Restoration of Natural Resources

As designed, the Project does not have significant impact on any natural, cultural, recreational, historical, or other resource. The Project will not alter any wetland area regulated as a Water of the U.S. and is not subject to jurisdiction under Sections 401 and/or 404 of the



Memorandum

Clean Water Act. No permanent impacts to any vegetated wetlands are anticipated. The Project has been designed to avoid all direct impacts to wetland resource areas.

Minimizing Impervious Surfaces

The purpose of the project is to improve the exiting travel lanes and surface and provide accessible pedestrian accommodations along Millstone Road. The proposed alternative was selected to minimize increase in impervious area while still addressing insufficient shoulder width and lack of sidewalk, as these components currently provide inadequate safety accommodations for all users of the roadway, including motorists, pedestrians, bicyclists, and those who need accessible accommodations.

Grading to Direct Runoff onto Pervious Surfaces

One of the project goals was to maximize infiltration within the project area. As there is limited space within the relatively narrow project corridor, directing runoff off the roadway as surface flow would have resulted in untreated runoff being discharged onto private properties, some of which already experience periodic flooding. The project was able to incorporate this LID technique by directing roadway runoff to the proposed rain garden at Joe Long Road. In this location, a portion of the roadway will be uncurbed, allow surface flow into the rain garden, where it will infiltrate.

In locations where the roadway is elevated above the surrounding areas, runoff from the existing roadway has resulted in erosion and deterioration of the pavement edge. Curbing is proposed curb in these locations to eliminate the source of this erosion.

Vegetated grass strips have been incorporated into the design where space allows between the sidewalk and roadway. Runoff from the sidewalk areas will flow through these grass strips prior to entering the roadway. Consistent with the objectives of incorporating LID practices, these grass strips will allow incidental infiltration and treatment of the sidewalk areas, resulting in improved water quality over a layout with sidewalks immediately adjacent to the roadway.

Soil Decompaction and Amendments to Improve Infiltration Capacity

The proposed rain garden across from Joe Long Road will include an engineered soil layer specifically designed to improve infiltration within the BMP.



Local Standard 3: Stormwater BMPs Optimized for Phosphorus and Nitrogen Removal - Section 6.2.B(3)

Proposed treatment BMPs consist of leaching basins, leaching galleys, and an infiltrating rain garden, all of which utilize infiltration as the primary treatment mechanism. As stated in the Town's MS4 Permit, infiltration BMPs such as these are optimized for the removal of Phosphorus and Nitrogen. As a result, the Project has been designed to comply with Local Standard 3.

Local Standard 4: NOAA Plus Precipitation Depths - Section 6.2.B(4)

The Project proposes to increase impervious cover by approximately 3.3 acres. This increase in impervious area is to accommodate roadway widening and new sidewalks, which provide a safety improvement over existing conditions.

The new stormwater system will infiltrate all collected runoff and does not propose discharges to wetlands or receiving waters and therefore calculations of peak rate discharges to receiving waters are not included.

Local Standard 5: BMPs on Commercial or Industrial Land Use Areas - Section 6.2.B(5)

The project is a roadway improvement project, not located within properties with commercial or industrial uses. As a result, the Project complies with Local Standard 5.

Local Standard 6: New Development - Section 6.2.B(6)

The project is not considered New Development. As a result, the Project is not subject to the New Development performance standard under Section 6.2.B(6). See Local Standard 7 for additional information.

Local Standard 7: Redevelopment - Section 6.2.B(7)

Per Section 6.2.B(7)b of the local Stormwater Regulations, the Project is considered a redevelopment project because it exclusively limited to maintenance and improvement of existing roadways (including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects). As a result, the Project is required to improve upon existing conditions unless infeasible but is exempt from the MS4 treatment and storage requirements in Section 6.2.B(7)b of the local Stormwater Regulations.



Improvement Upon Existing Conditions

Under existing conditions, stormwater from the Project Area sheet flows off the roadway or directly into leaching catch basins without pretreatment or flows into existing catch basins and leaching structures interspersed throughout the roadway. The existing catch basins do not appear to be spaced adequately throughout the existing roadway to effectively capture runoff. The project proposes to increase the number of catch basins along the project corridor from 34 to 112. The addition of inlet structures and corrections to the roadway cross-slope will reduce ponding and gutter spread, both of which contribute to hydroplaning. As a result, the project will result in improved safety.

The proposed drainage systems for the Project will reroute sheet flow into catch basins spaced appropriately and provide pretreatment via deep-sump catch basins and treatment via a network of new offline leaching basins and galleys. In addition, the proposed system includes a rain garden across from Joe Long Road, which was the only location where incorporating a rain garden is feasible. Other locations along the roadway do not provide enough right-of-way or physical space when considering impacts to various residences frontage for the construction and maintenance of additional rain gardens.

Under existing conditions, 33 leaching basins exist along the project corridor. Under proposed conditions, the project corridor will contain 51 leaching basins (39 proposed and 12 existing to be retained), 145 leaching galleys, and rain garden, the project will result in 35,214 cubic feet of storage which will increase groundwater recharge and improve water quality. As indicated in Table 2 below, the proposed project will double the runoff depth that will be stored and treated through infiltration.

Table 3: Existing and Provided Treatment Depth

	Impervious Area (acres)	Provided BMP Volume (cf)	Treatment Depth (in)
Existing Conditions	6.4	10,857*	0.5
Proposed Conditions	9.7	35,214	1.0

* Assumes a storage volume of 329 cubic feet for each of the 33 existing leaching basins

Refer to Appendices E and F for plan markups depicting the existing and proposed stormwater infrastructure, respectively.



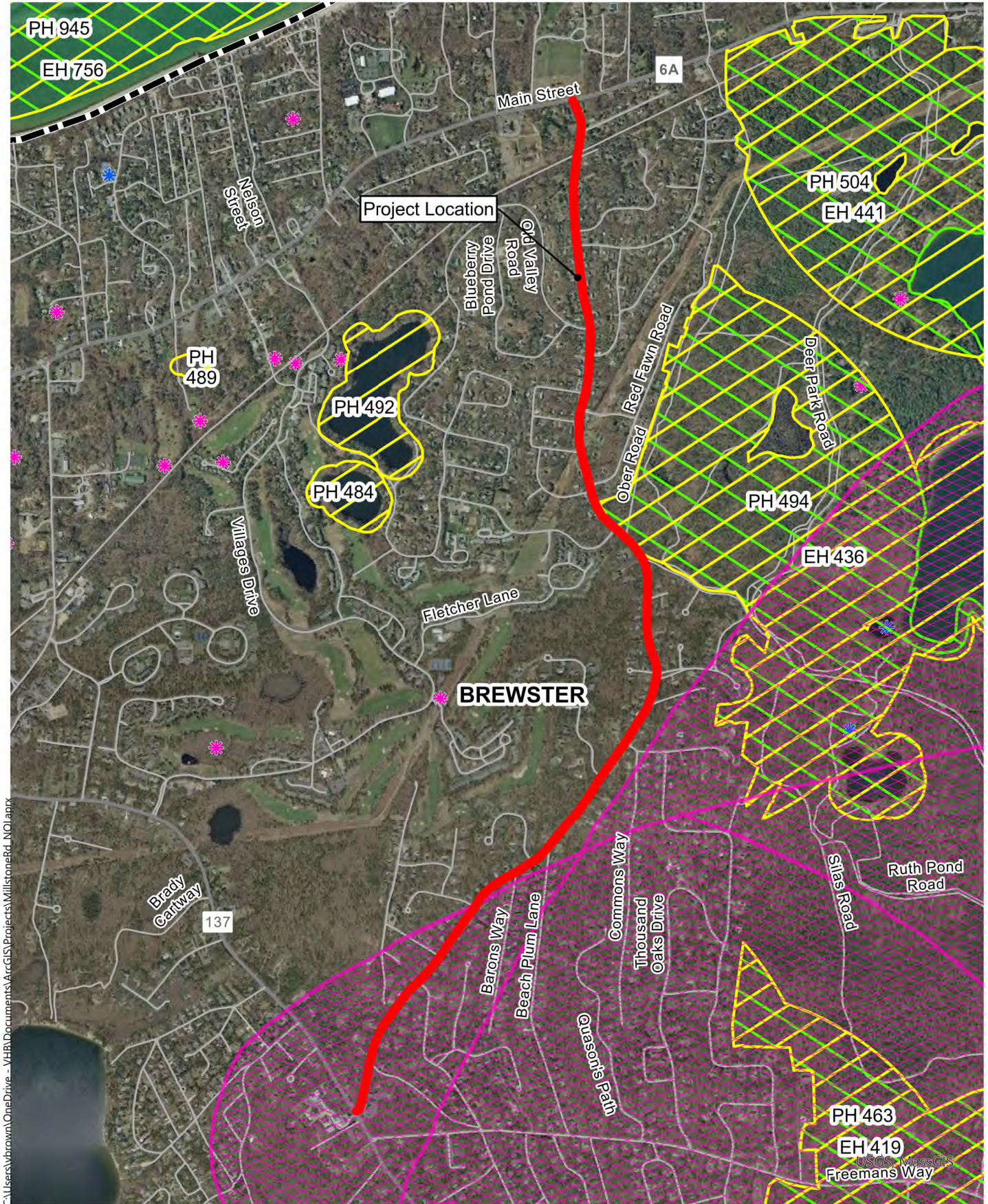
Memorandum

Figures: Figure 1 – USGS Locus
 Figure 2 – Environmental Constraints

Attachments: Appendix A – Stormwater Checklist
 Appendix B – Soils Data
 Appendix C – Stormwater Management Calculations
 Appendix D – Operation and Maintenance Plan and Long-Term Pollution Prevention Plan
 Appendix E – Existing Stormwater Infrastructure Markups
 Appendix F – Proposed Stormwater Infrastructure Markups



Figure 1 - USGS Locus Map
Source Info: USGS, MassGIS, VHB



C:\Users\vbrown\OneDrive - VHB\Documents\ArcGIS\Projects\MillstoneRd_NOL.aprx



Millstone Road Improvements Brewster, MA

- Zone II Wellhead Protection Area
- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

Figure 2 - Environmental Constraints Figure
Source Info: USGS, MassGIS, VHB



Memorandum

Attachment A

Stormwater Checklist



101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770



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.

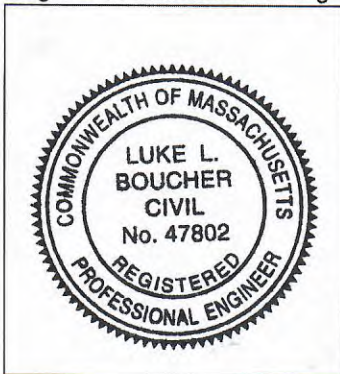
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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 Memorandum 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



 10-31-2023
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.



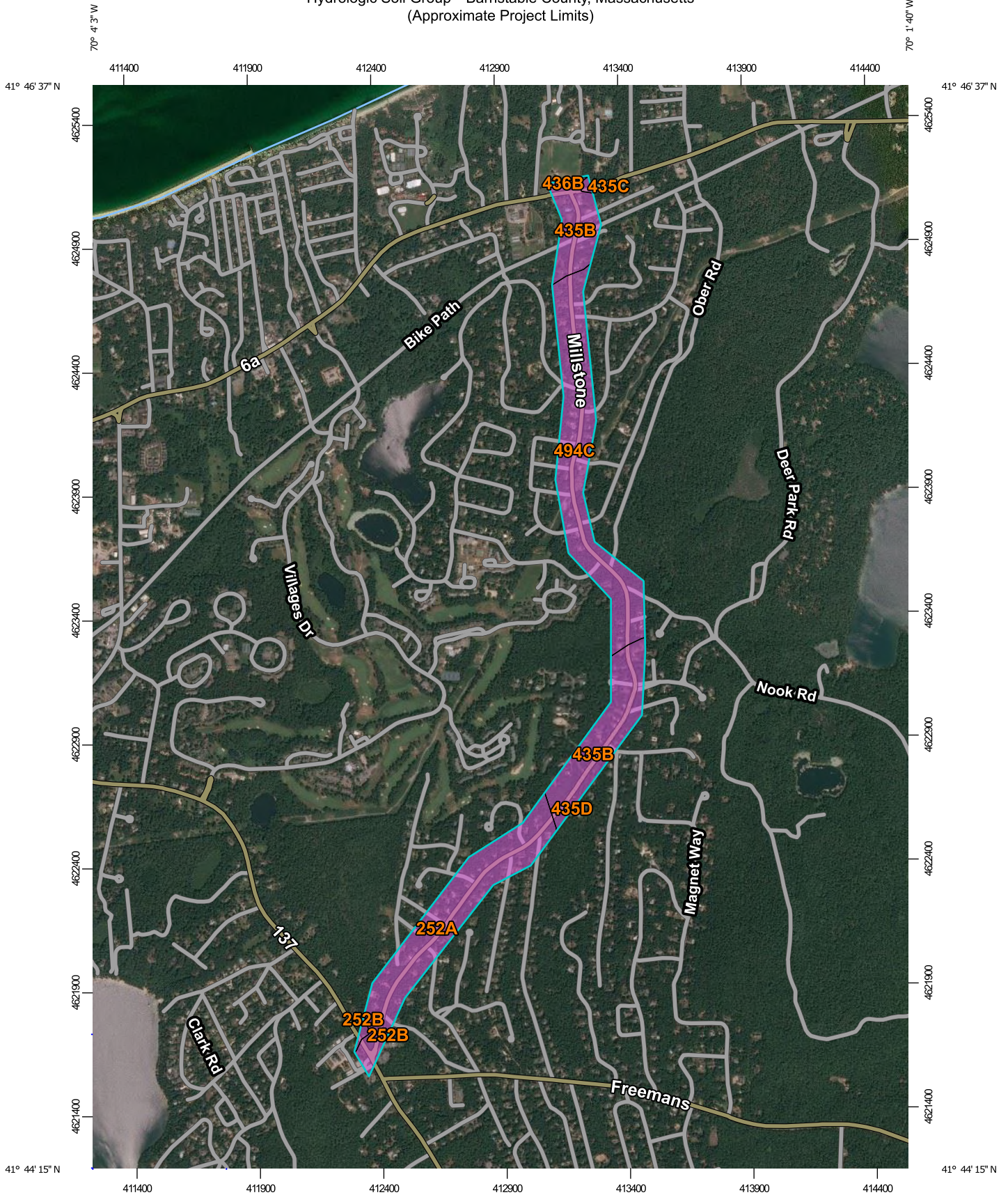
Memorandum

Attachment B

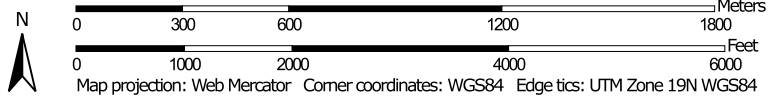
Soils Data



Hydrologic Soil Group—Barnstable County, Massachusetts
(Approximate Project Limits)



Map Scale: 1:21,300 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



Natural Resources
Conservation Service


Web Soil Survey
National Cooperative Soil Survey

11/2/2020
Page 1 of 4

Hydrologic Soil Group—Barnstable County, Massachusetts
(Approximate Project Limits)

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points




-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

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.

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: Barnstable County, Massachusetts
Survey Area Data: Version 17, 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 10, 2018—Nov 17, 2018

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
252A	Carver coarse sand, 0 to 3 percent slopes	A	43.9	32.8%
252B	Carver coarse sand, 3 to 8 percent slopes	A	0.7	0.5%
435B	Plymouth loamy coarse sand, 3 to 8 percent slopes	A	38.6	28.9%
435C	Plymouth loamy coarse sand, 8 to 15 percent slopes	A	0.6	0.5%
435D	Plymouth loamy coarse sand, 15 to 35 percent slopes	A	0.0	0.0%
436B	Plymouth loamy coarse sand, 3 to 8 percent slopes, very stony	A	0.8	0.6%
494C	Barnstable-Plymouth-Nantucket complex, rolling, very bouldery	A	49.0	36.6%
Totals for Area of Interest			133.7	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Memorandum

Attachment C

Stormwater Management Calculations



101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770



Project Name: Millstone Road Improvement

Proj. No.: 14170.00

Date: 10/31/2023

Project Location: Brewster, MA

Calculated by: LLB

Proposed Impervious Surface Summary

Increase in Impervious Areas by Hydrologic Soil Group (HSG) in acres

Subcatchment	HSG A	HSG B	HSG C	HSG D	Total Area
1	3.26				3.26
TOTAL	3.26	0.00	0.00	0.00	3.26

Required Recharge Volume (Cubic Feet)

HSG	Area (acres)	Recharge Depth ^a (in.)	Volume (c.f.)
A	3.3	0.60	7,100
B	0.0	0.35	0
C	0.0	0.25	0
D	0.0	0.10	0
TOTAL			7,100

Assumptions:

^a Massachusetts DEP Infiltration requirement: HSG A = 0.60 in; HSG B = 0.35 in; HSG C = 0.25 in; HSG D = 0.10 in.

Capture Area Adjustment

Required Recharge Volume	7,100 c.f.
Increase in Site Impervious Area	3.26 acres
Total Site Impervious Area Draining to Recharge Facilities	2.96 acres
Capture Area Adjustment Factor	1.10 -

Adjusted Required Recharge Volume: 7,820 c.f.



Water Quality Volume Calculations

Project Name: Millstone Road Improvements

Proj. No.: 14170.00

Project Location: Brewster, MA

Date: 10/31/2023

Calculated by: LLB

Total Impervious Area = **9.70** Acres

Required:

	Runoff Depth to be Treated (in.)	Required Volume (c.f.)	
Water Quality Volume	1	35,211	

Provided:

Type of Infiltration System	Storage Capacity (c.f.)	Quantity in Project	Total Storage Capacity (c.f.)
LB (Single)	329	13*	4,283
LB (Double)	1,011	7	7,080
LB (Triple)	1,113	5	5,564
LB (Triple)	1,403	3	4,208
LG (2)	201	4	804
LG (3)	274	9	2,466
LG (4)	353	15	5,293
LG (5)	432	10	4,318
Rain Garden	1,197	1	1,197
<u>Cumulative Volume Treated</u>		35,214	

* includes 12 existing leaching basins to remain



VHB, Inc.
 101 Walnut Street
 Post Office Box 9151
 Watertown, MA 02471
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TSS Removal Calculation Worksheet

Project Name: **Millstone Rd Improvements**
 Project Number: **14170.00**
 Location: **Brewster, MA**
 Discharge Point: **Various**
 Drainage Area(s): **Various**

Sheet: **1 of 3**
 Date: **27-Oct-2023**
 Computed by: **LLB**
 Checked by: _____

A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Rain Garden	90%	1.00	0.90	0.10
	0%	0.10	0.00	0.10
	0%	0.10	0.00	0.10
	0%	0.10	0.00	0.10
	0%	0.10	0.00	0.10

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.

** Equals remaining load from previous BMP (E)

**Treatment Train
 TSS Removal =**

90%



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TSS Removal Calculation Worksheet

Project Name: Millstone Rd Improvements
 Project Number: 14170.00
 Location: Brewster, MA
 Discharge Point: Various
 Drainage Area(s): Various

Sheet: 2 of 3
 Date: 17-Aug-2023
 Computed by: MEB
 Checked by: LLB

1. Pre-Treatment prior to Infiltration

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	25%	100%	25%	75%
	0%	75%	0%	75%
	0%	75%	0%	75%
Pre-Treatment TSS Removal =				25%

2. Total TSS Removal including Pretreatment 1.

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Leaching Catch Basin	80%	100%	80%	20%
	0%	20%	0%	20%
	0%	20%	0%	20%
	0%	20%	0%	20%
Treatment Train TSS Removal =				80%

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.

** Equals remaining load from previous BMP



101 Walnut Street
 Post Office Box 9151
 Watertown, MA 02471
 P 617.924.1770

TSS Removal Calculation Worksheet

Project Name: Millstone Rd Improvements
 Project Number: 14170.00
 Location: Brewster, MA
 Discharge Point: Various
 Drainage Area(s): Various

Sheet: 3 of 3
 Date: 17-Aug-2023
 Computed by: MEB
 Checked by: LLB

1. Pre-Treatment prior to Infiltration

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	25%	100%	25%	75%
	0%	75%	0%	75%
	0%	75%	0%	75%
Pre-Treatment TSS Removal =				25%

2. Total TSS Removal including Pretreatment 1.

BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (C*D)	Remaining Load (D-E)
Subsurface Infiltration Structure	80%	100%	80%	20%
	0%	20%	0%	20%
	0%	20%	0%	20%
	0%	20%	0%	20%
Treatment Train TSS Removal =				80%

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol. 1.

** Equals remaining load from previous BMP (E)



Memorandum

Attachment D

Operation and Maintenance/Long-Term Pollution Prevention Plan



101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770

**Millstone Road Improvement Project
Stormwater Management System**

**Operation and Maintenance Plan (O&M)
and
Long Term Pollution Prevention Plan (LTPPP)**

October 2023

This Stormwater Management System Operation and Maintenance (O&M) Plan provides for the inspection and maintenance of structural Best Management Practices (BMPs) and for measures to prevent pollution associated with the Millstone Road Improvement Project in the Town of Brewster.

This document has been prepared in accordance with the requirements of the Stormwater Regulations included in the Massachusetts Wetlands Protection Act Regulations (310 CMR 10).

Responsible Party

The Town of Brewster will be responsible for the maintenance of the roadway facilities and associated stormwater management features, in accordance with Town standards.

Questions or concerns regarding maintenance activities may also be addressed to Town of Brewster:

Town of Brewster
201 Run Hill Road
Brewster, MA 02631
Phone: (508) 896-3212

Maintenance Measures

The stormwater management system covered by this Operation and Maintenance Plan consists of the following components:

- Catch Basins
- Gutter Inlets
- Leaching Basins
- Leaching Galleys
- Rain Garden

Maintenance of these components will be conducted in accordance with Town of Brewster standard maintenance practices, as noted in the attached Operation and Maintenance table summarizing the pertinent inspection and maintenance activities.

If inspection indicates the need for major repairs of structural surfaces, the inspector should contact the Town of Brewster to initiate procedures to effect repairs in accordance with Town of Brewster standard construction practices.

Practices for Long Term Pollution Prevention

In general, long term pollution prevention and related maintenance activities will be conducted consistent with Town of Brewster's NPDES Stormwater MS4 Permit.

For the facilities covered by this Operation and Maintenance Plan, long term pollution prevention includes the following measures:

Routine Inspection and Maintenance of Stormwater BMPs

The Town of Brewster will conduct inspection and maintenance of the stormwater management practices in accordance with the information in Table 1.

Spill Prevention and Response

In the event of a release of oil or hazardous materials such as fuels, oils, or chemical materials onto the ground or other areas that could reasonably be expected to discharge to surface or groundwater, reportable quantities will immediately be reported to the applicable Federal, State, and local agencies as required by law. Reportable quantities of chemical, fuels, or oils are established under the Clean Water Act and enforced through DEP.

Applicable containment and cleanup procedures will be performed immediately. Impacted material collected during the response must be removed promptly and disposed of in accordance with Federal, State, and local requirements. A licensed emergency response contractor may be required to assist in cleanup of releases depending on the amount of the release and the ability of the responsible party to perform the required response.

Snow and Ice Management

Snow and Ice Management shall be conducted according to standard Town of Brewster standard practices. Stockpiling and disposal of snow or ice removed from highways and streets located outside of a Zone II that contains sodium chloride, chemically treated abrasives or other chemicals used for snow and ice removal is prohibited within Zones I and II of the Town's Groundwater Protection District in accordance with the Town of Brewster Water Quality Protection Bylaw.

Prohibition of Illicit Discharges

The DEP Stormwater Management Standards prohibit illicit discharges to the storm water management system. Illicit discharges are discharges that do not entirely consist of stormwater, except for certain specified non-stormwater discharges.

Discharges from the following activities are not considered illicit discharges:

firefighting	foundation drains
water line flushing	footing drains
landscape irrigation	individual resident car washing
uncontaminated groundwater	flows from riparian habitats and wetlands
potable water sources	dechlorinated water from swimming pools
water used to clean residential buildings without detergents	water used for street washing
	air conditioning condensation

There are no known or proposed illicit connections associated with this project. If a potential illicit discharge to the facilities covered by this plan is detected (e.g., dry weather flows at any pipe outlet, evidence of contamination of surface water discharge by non-stormwater sources), the Town of Brewster shall be notified for assistance in determining the nature and source of the discharge, and for resolution through the Town's IDDE program.

Table 1: Best Management Practices: Operation & Maintenance Measures

Best Management Practice	Sweep	Mow	Inspect	Clean	Repair
Street Sweeping	Annually	NA	NA	NA	NA
Catch Basins	NA	NA	Annually	ANI*	ANI
Gutter Inlets	NA	NA	Annually	ANI	ANI
Leaching Basins	NA	NA	Annually	ANI	ANI
Leaching Galleys	NA	NA	Annually	ANI	ANI
Rain Garden	NA	ANI	Annually	ANI	ANI

NA = Not Applicable

ANI = As needed based on inspection

* = Remove sediment when catch basin sump is 50% full



Memorandum

Attachment E

Existing Stormwater Infrastructure Markups



101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770

Millstone Road

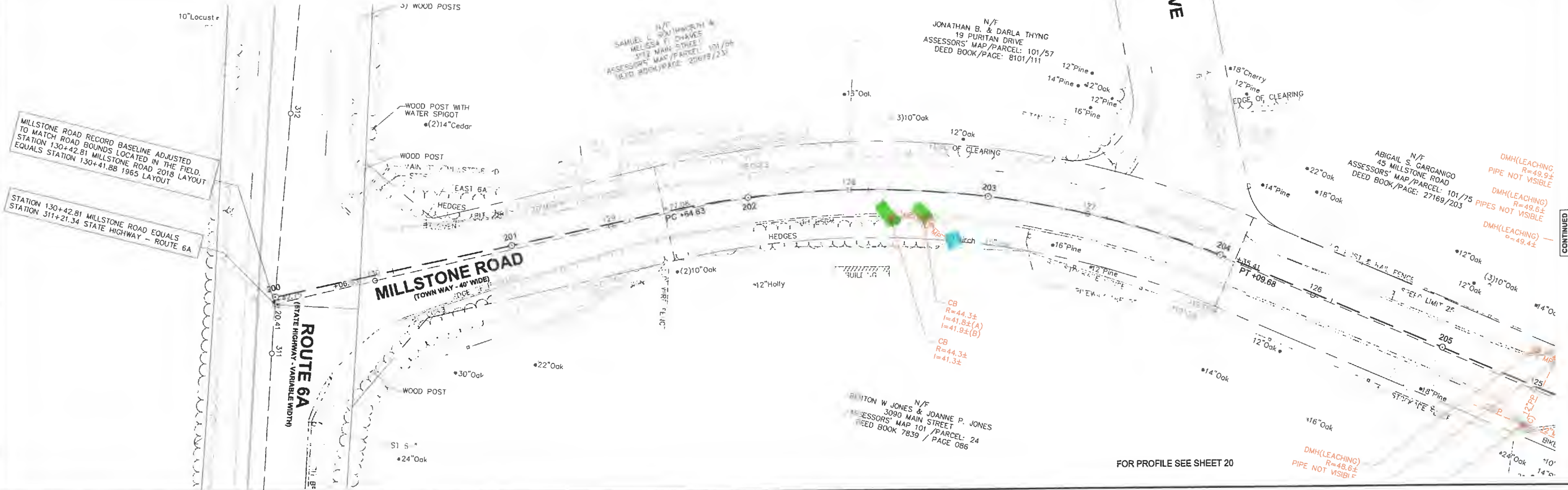
11/1/2023

Existing Conditions Drainage Infrastructure Review		
Sheet #	Catch Basins	Leach Pits
8	4	7
9	4	4
10	5	4
11	6	2
12	0	0
13	2	2
14	3	4
15	2	2
16	3	3
17	4	4
18	1	1
19	0	0

Total	34	33
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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 08 OF 123

AN DRIVE
(WAY - 40' WIDE)



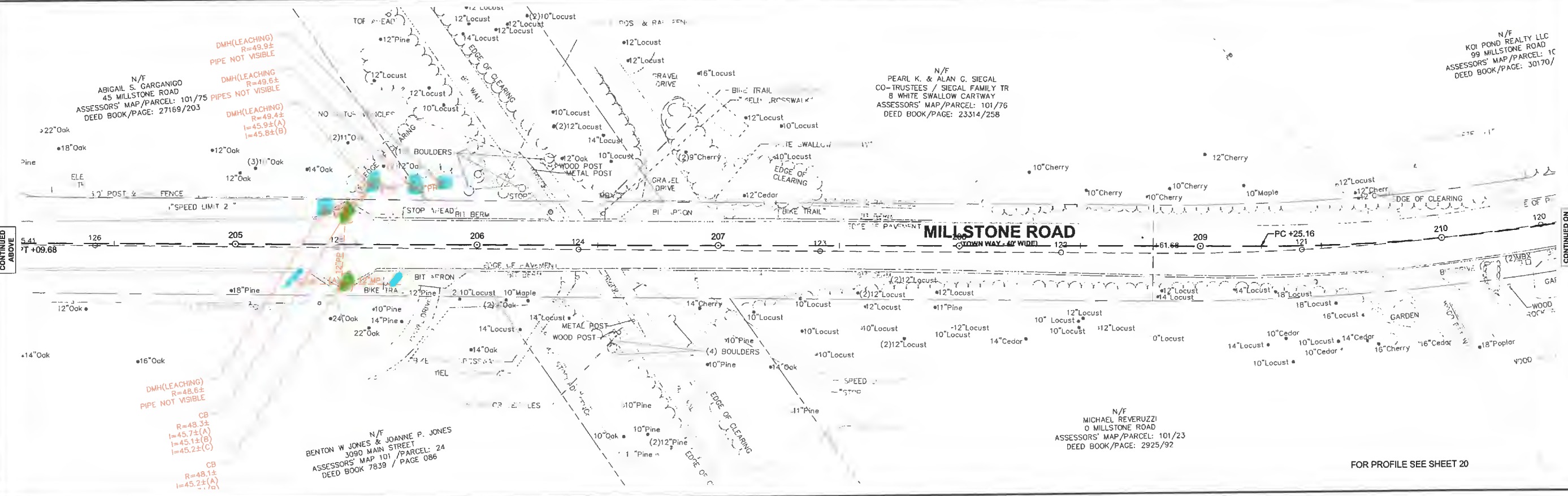
MILLSTONE ROAD RECORD BASELINE ADJUSTED TO MATCH ROAD BOUNDS LOCATED IN THE FIELD. STATION 130+42.81 MILLSTONE ROAD EQUALS STATION 130+41.88 1965 LAYOUT

STATION 130+42.81 MILLSTONE ROAD EQUALS STATION 311+21.34 STATE HIGHWAY - ROUTE 6A

ROUTE 6A
(STATE HIGHWAY - VARIABLE WIDTH)

MILLSTONE ROAD
(TOWN WAY - 40' WIDE)

FOR PROFILE SEE SHEET 20



DMH(LEACHING) R=49.9± PIPE NOT VISIBLE
DMH(LEACHING) R=49.6± PIPES NOT VISIBLE
DMH(LEACHING) R=49.4± I=45.9±(A) I=45.8±(B)

DMH(LEACHING) R=48.6± PIPE NOT VISIBLE
CB R=48.3± I=45.7±(A) I=45.1±(B) I=45.2±(C)
CB R=48.1± I=45.2±(A)

BENTON W JONES & JOANNE P. JONES
3090 MAIN STREET
ASSESSORS' MAP 101 / PARCEL: 24
DEED BOOK 7839 / PAGE 086

N/F MICHAEL REVERUZZI
0 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 101/23
DEED BOOK/PAGE: 2925/92

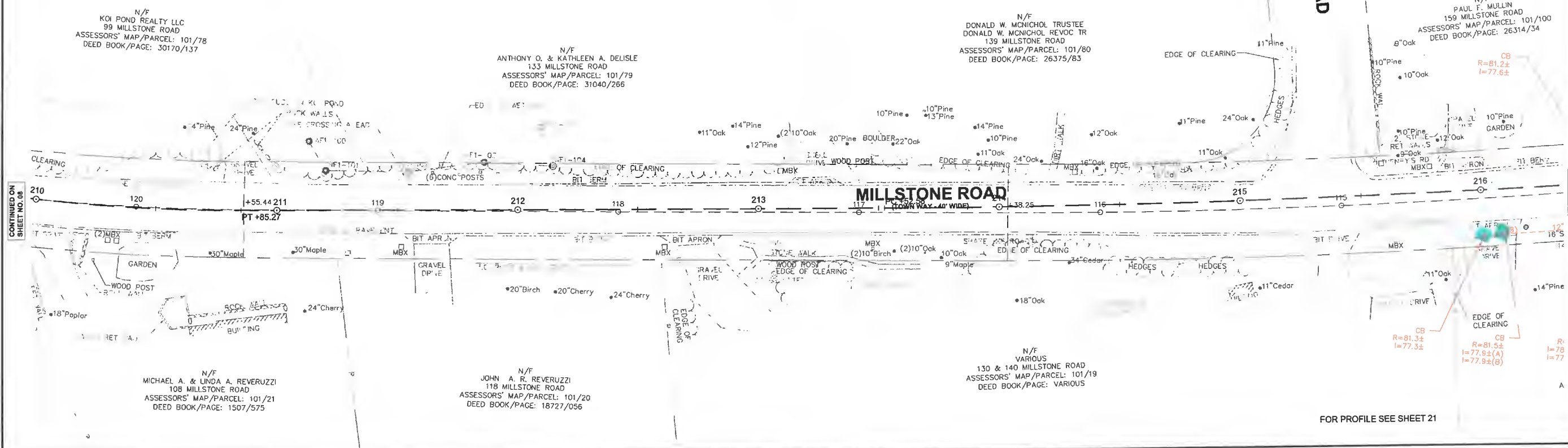
FOR PROFILE SEE SHEET 20

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**TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 09 OF 123**

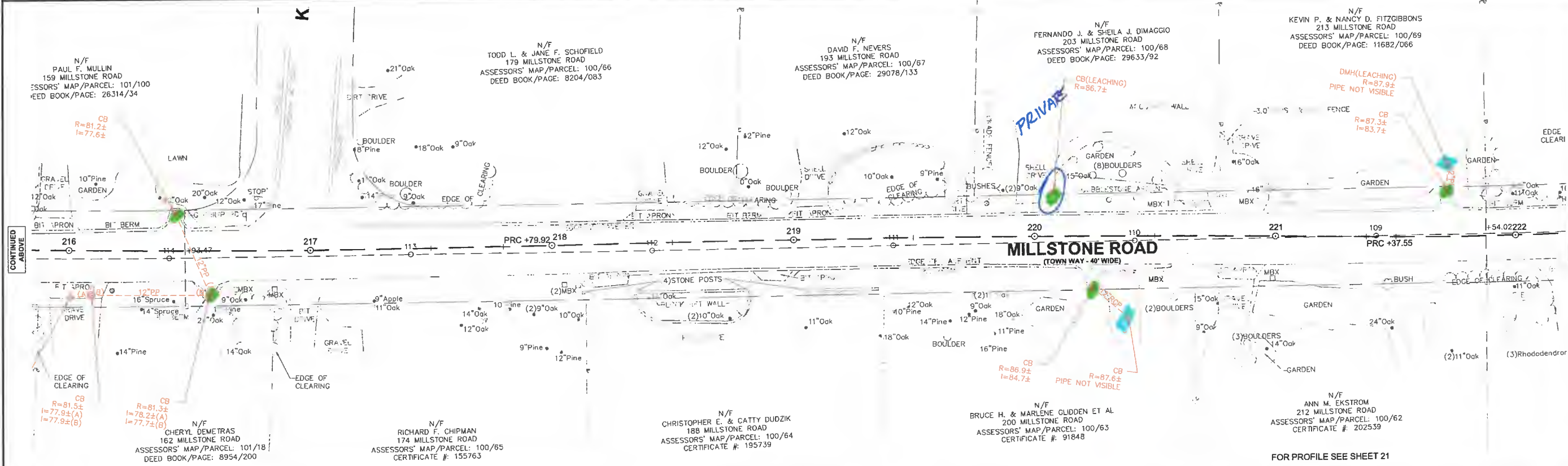
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SHEET NO. 08

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BELOW

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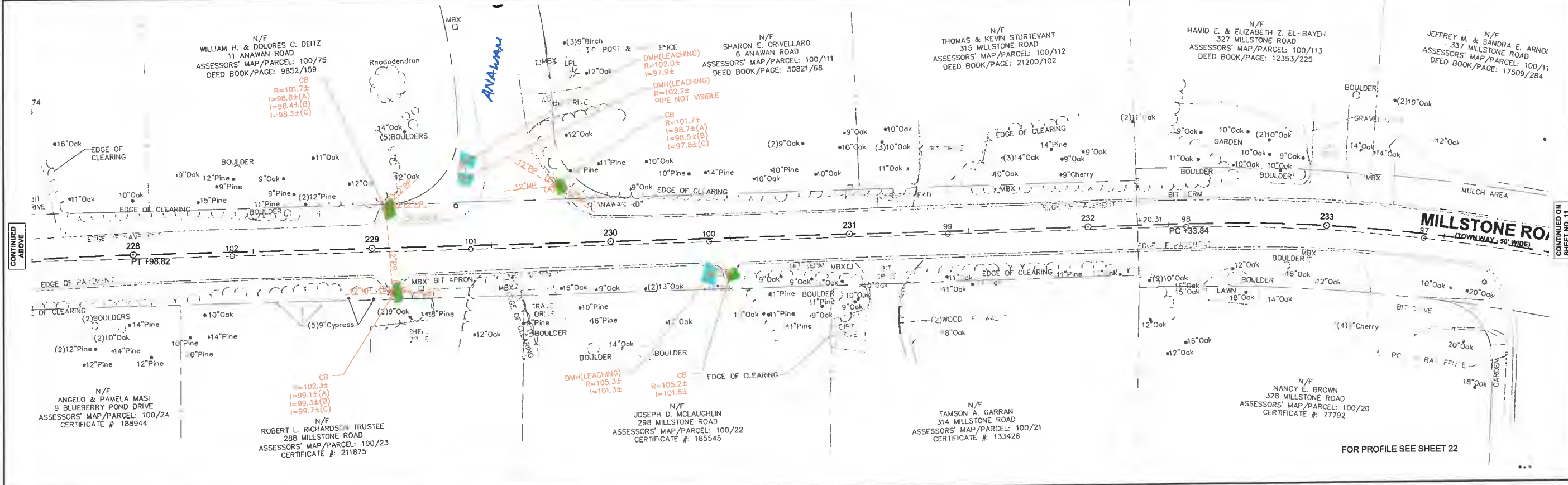
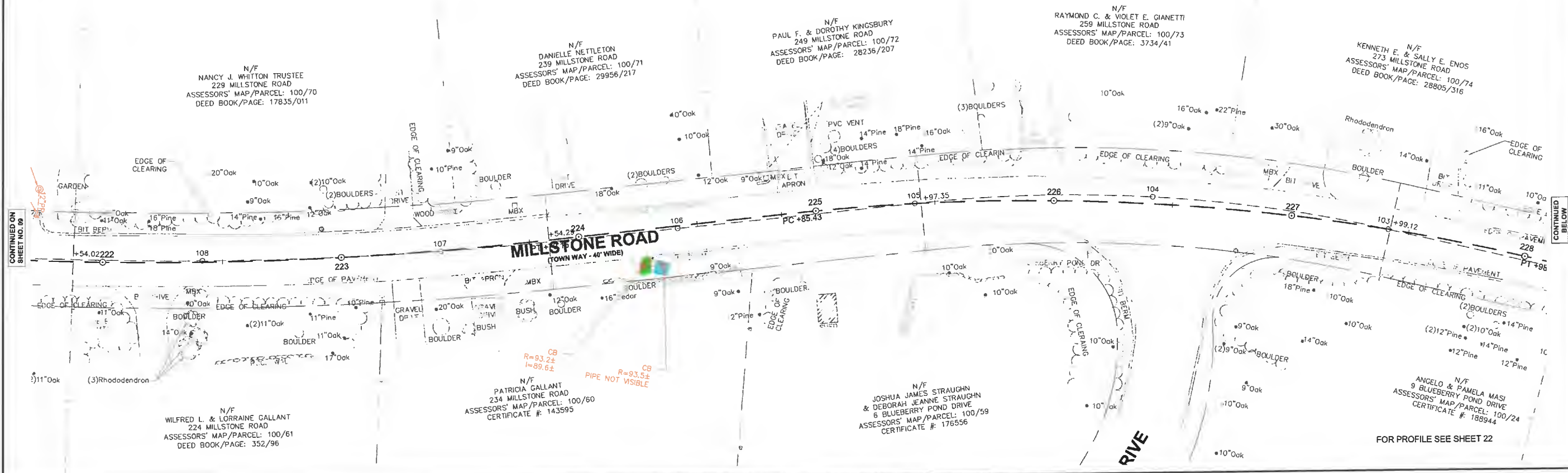


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SHEET NO. 10

FOR PROFILE SEE SHEET 21

TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 10 OF 123



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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 11 OF 123

N/F
MARY ELLEN & WILLIAM J. LEPPERT
389 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 99/60
DEED BOOK/PAGE: 28794/75
6"Cherry

N/F
ASSESSORS' MAP/PARCEL: 100/114
DEED BOOK/PAGE: 17509/284

N/F
MICHAEL D. BATTLES
369 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 100/136
DEED BOOK/PAGE: 21961/55

N/F
RAYMOND J. & HELEN T. TRAVERS
351 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 100/115
DEED BOOK/PAGE: 24405/254

N/F
WILLIAM H. & NATALIA M. DOUGHERTY
352 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 100/2
CERTIFICATE #: 138541

N/F
JOHN B. & ELAINE M. DAVENPORT
6 SANDPIPER LANE
ASSESSORS' MAP/PARCEL: 100/1
215501

N/F
PETER L. & JOYCE D. REGONINI
380 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 99/58
CERTIFICATE #: 116312

N/F
JOSEPH A. DENT TRUSTEE
21 RED FAWN ROAD
ASSESSORS' MAP/PARCEL: 99/62
DEED BOOK/PAGE: 29531/13

N/F
MICHAEL BOHANE REALTY TRUST
409 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 99/61
DEED BOOK/PAGE: 24422/78

N/F
MARY ELLEN & WILLIAM J. LEPPERT
389 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 99/60
DEED BOOK/PAGE: 28794/75

N/F
JOY C. JOHNSON TRUSTEE
398 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 99/57
CERTIFICATE #: 184952

N/F
BRIANA C. KANE
436 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 99/49
CERTIFICATE #: 199955

N/F
MARYALICE SISCO (LIFE ESTATE)
C/O ADAILTON F. & RACHEL C.
FIGUEROA
16 PILGRIMS WAY
ASSESSORS' MAP/PARCEL: 99/50
CERTIFICATE #: 212628

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SHEET NO. 10

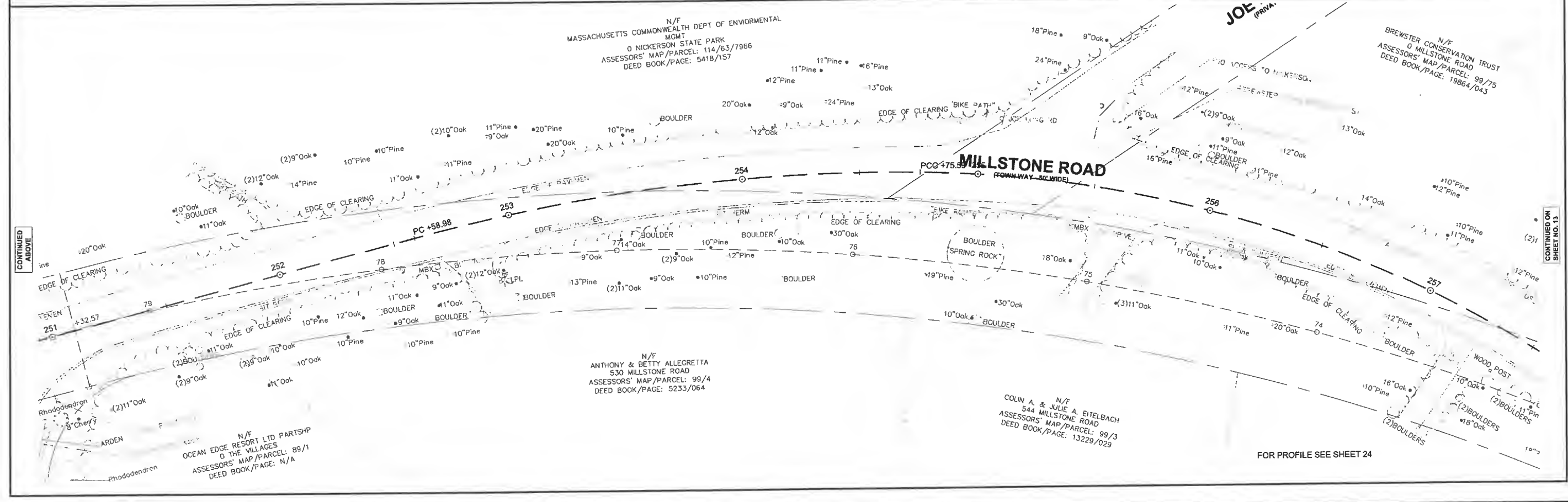
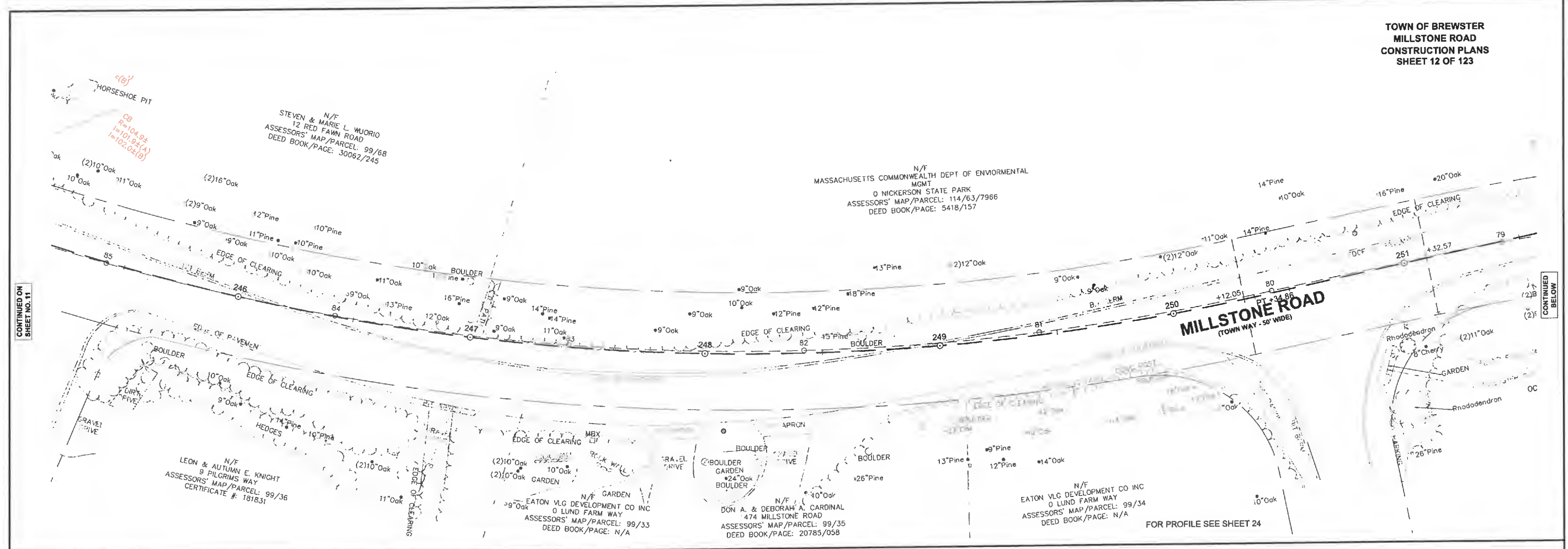
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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 12 OF 123

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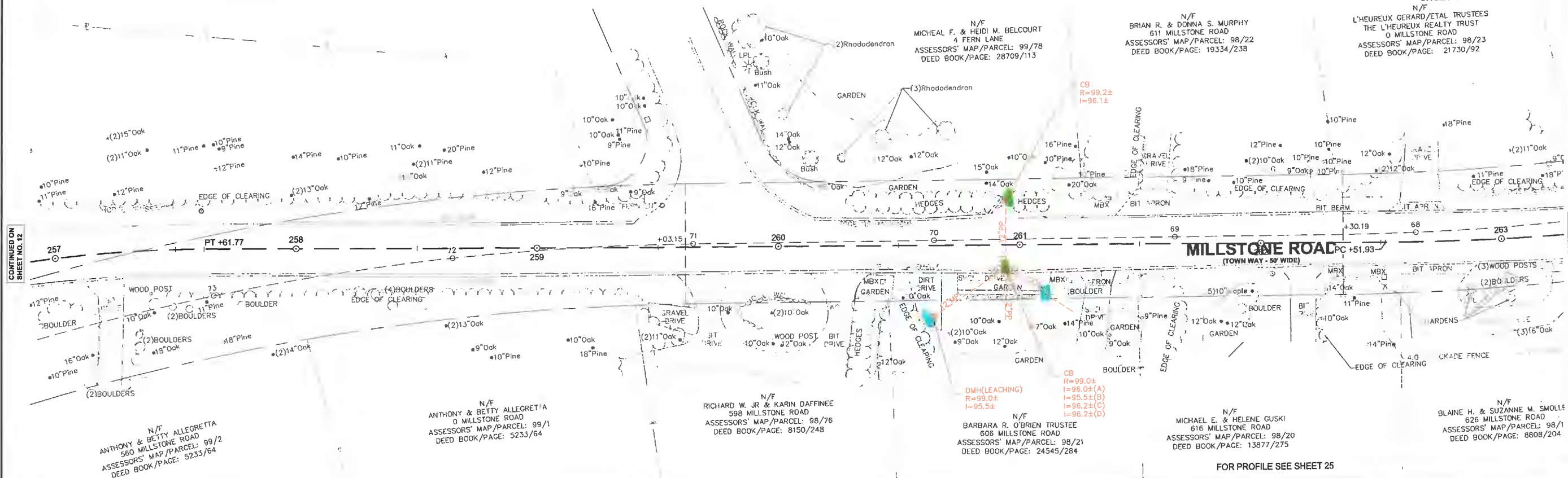
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SHEET NO. 13

**TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 13 OF 123**

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THE L'HEUREUX REALTY TRUST
0 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 98/23
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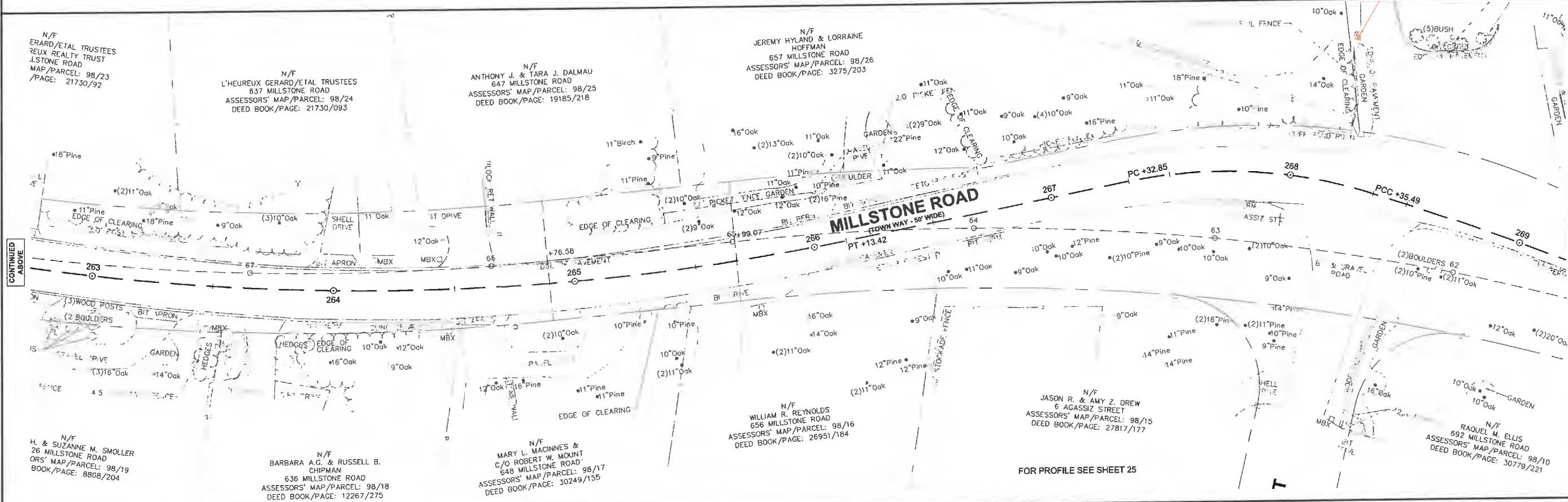
N/F
BRIAN R. & DONNA S. MURPHY
611 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 98/22
DEED BOOK/PAGE: 19334/238

N/F
MICHEAL F. & HEIDI M. BELCOURT
4 FERN LANE
ASSESSORS' MAP/PARCEL: 99/78
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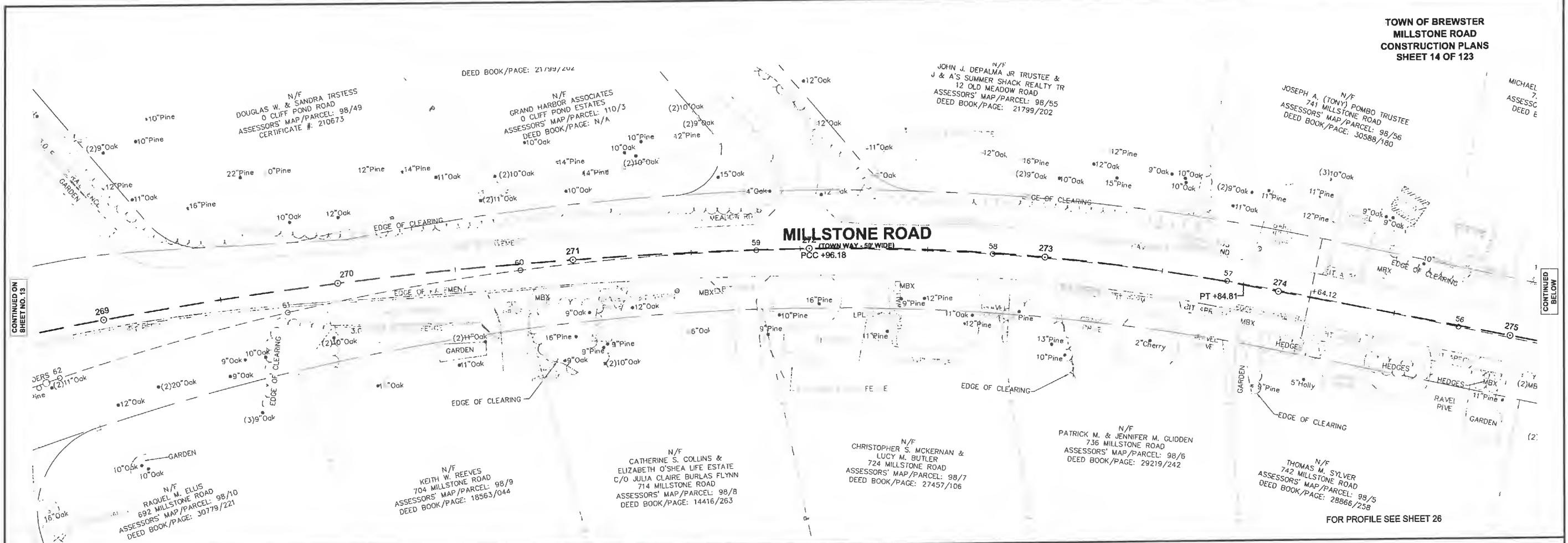


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ON
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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 14 OF 123

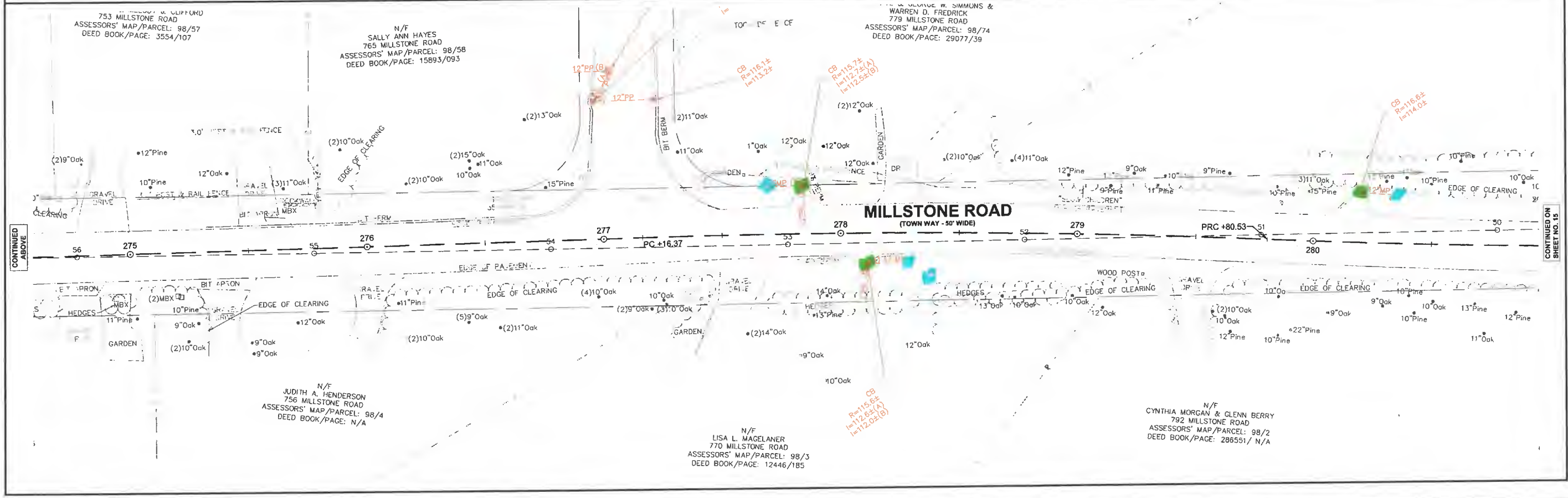
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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 15 OF 123

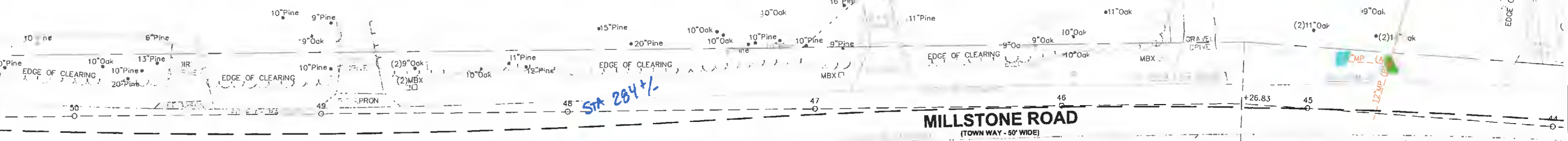
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N/F
AUDREY J. JENNINGS
825 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/24
DEED BOOK/PAGE: 22323/285

N/F
KENNETH W. THOMAS JR &
RACHELLE MARIE THOMAS
839 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/25
DEED BOOK/PAGE: 20219/118

N/F
JAMES M. REYNOLDS
855 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/26
DEED BOOK/PAGE: 9677/331

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I=115.44
I=112.94(B)



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N/F
CAPTAINS VILLAGE HOMEOWNERS ASSOCIATION
C/O ALAN GODFRED
25 CAPTAINS VILLAGE LANE
ASSESSORS' MAP/PARCEL: 98/1

N/F
DENNIS R. & SUSAN ANTI
CO-TRUSTEES
DENNIS R. ANTI REVOCABLE TRUST
25 CAPTAINS VILLAGE LANE
ASSESSORS' MAP/PARCEL: 98/1

N/F
MICHAEL T. & NENA TOBIN
836 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/23
DEED BOOK/PAGE: 27069/257

N/F
ANNE M. GILMORE
856 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/22
DEED BOOK/PAGE: 15922/014

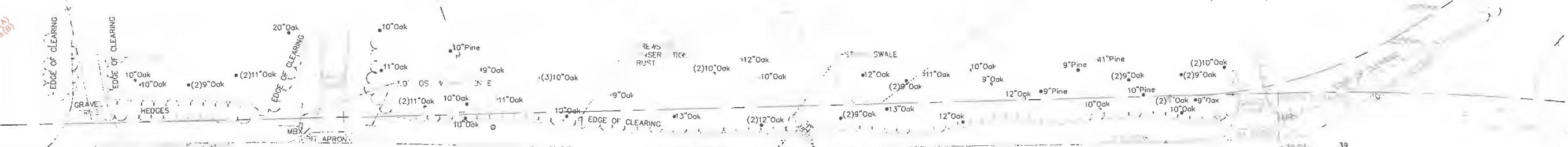
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N/F
MICHELLE M. YEUTTER
861 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/27
DEED BOOK/PAGE: 29400/80

N/F
BREWSTER CONSERVATION TRUST
0 MILLSTONE ROAD
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N/F
TOWN OF BREWSTER
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ASSESSORS' MAP/PARCEL: 97/29
DEED BOOK/PAGE: 5855/047

N/F
TRACY L. AVELLAR
917 MILLSTONE ROAD
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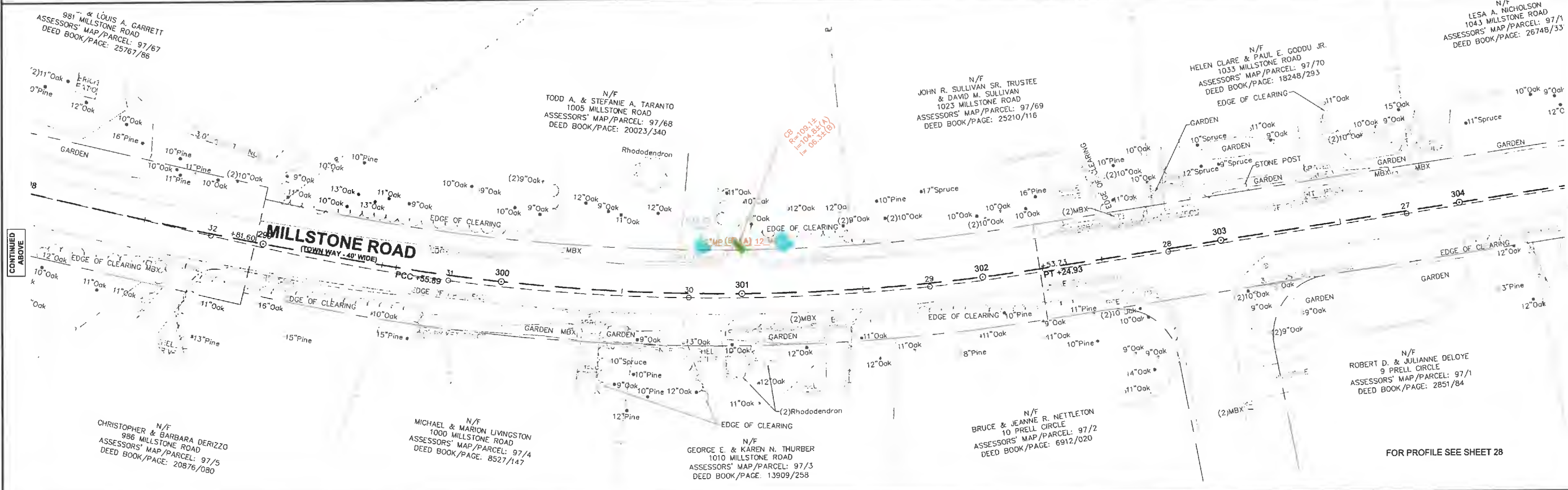
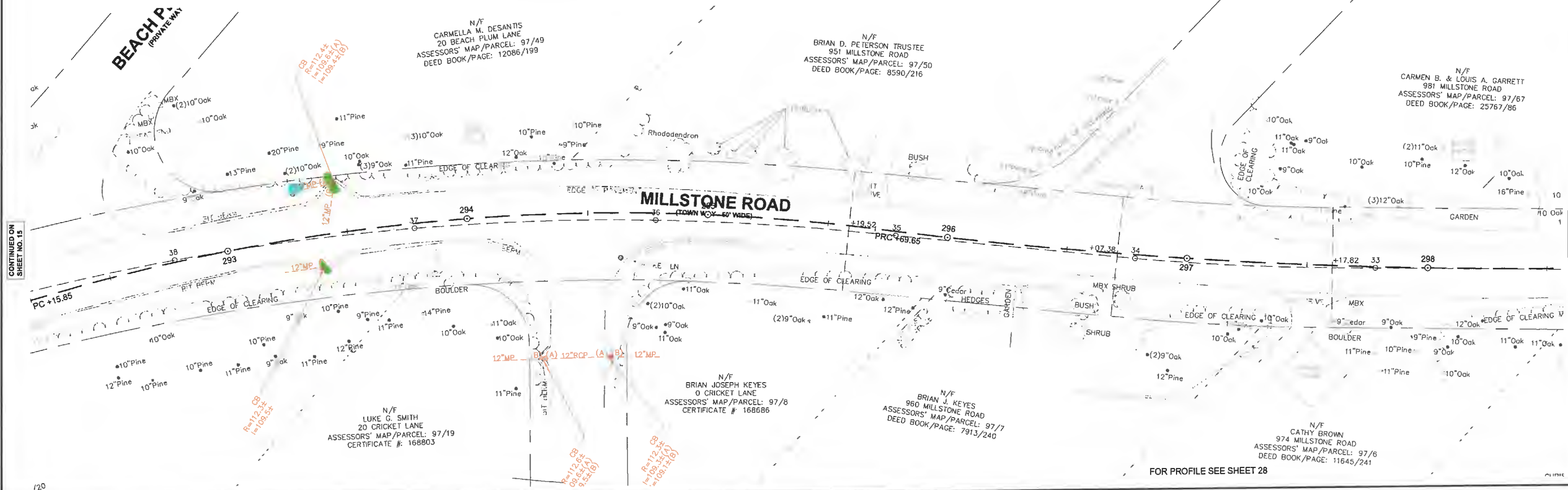
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0 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/21
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N/F
GAIL D. TILTON
912 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 97/20
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FOR PROFILE SEE SHEET 27

TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 16 OF 123

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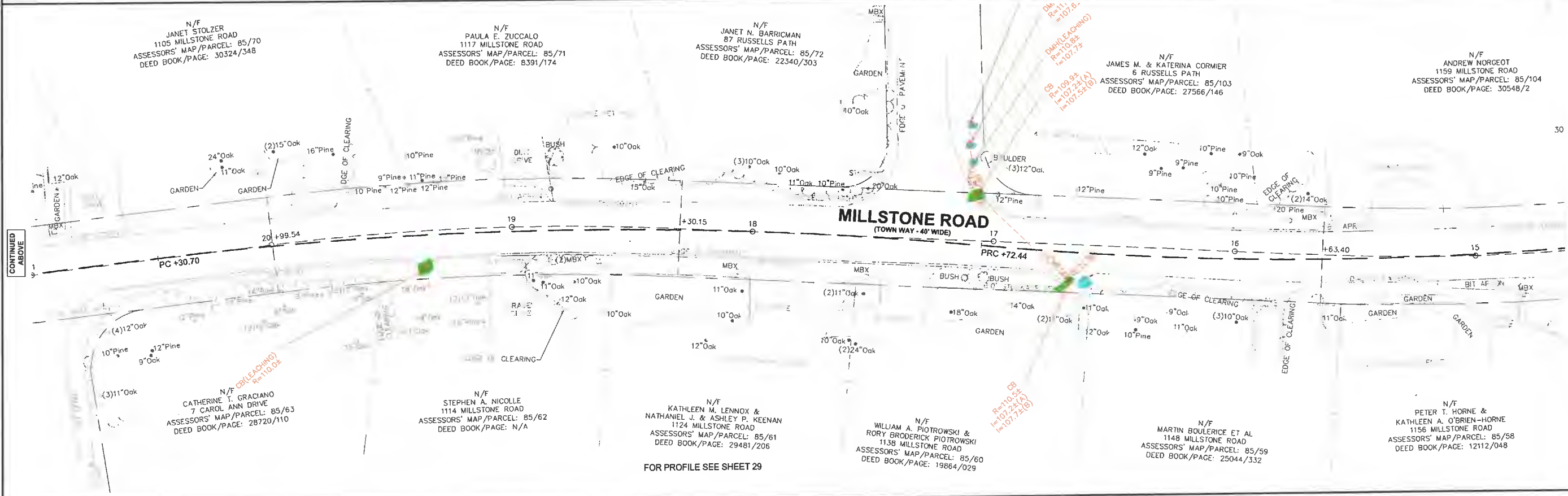
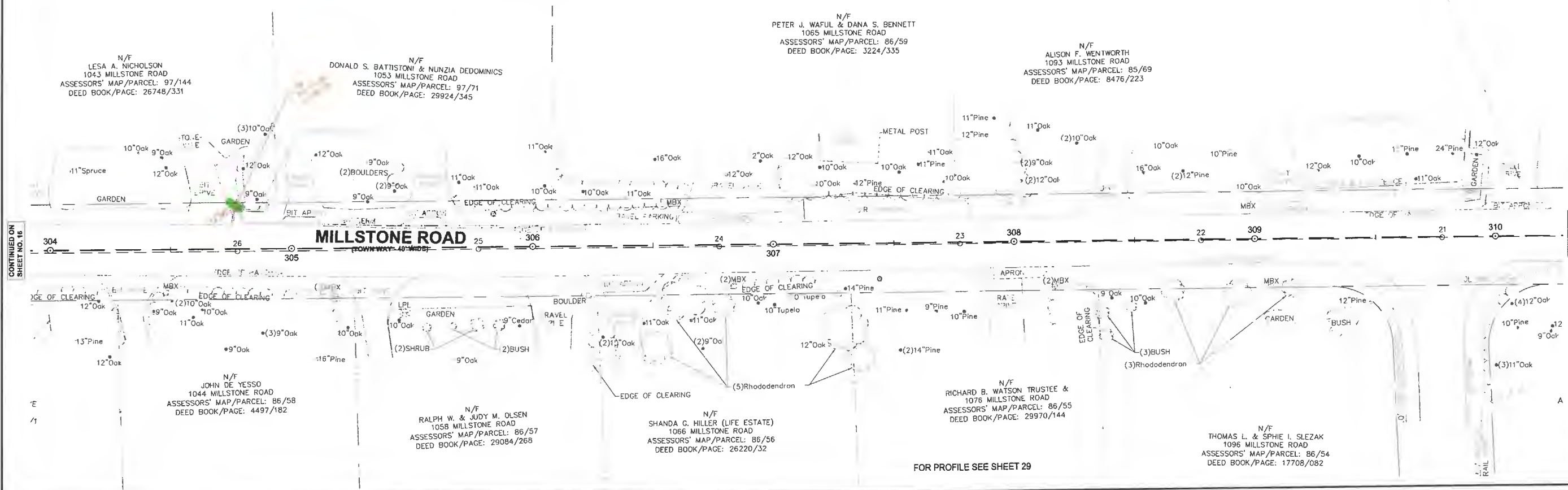
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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 17 OF 123

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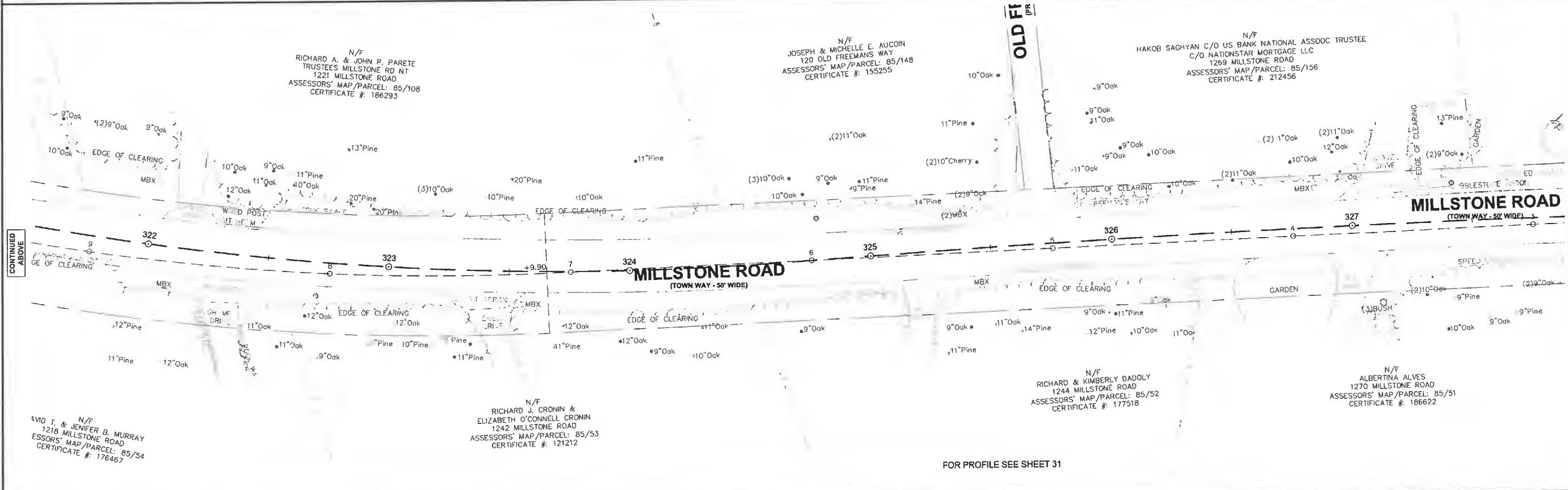
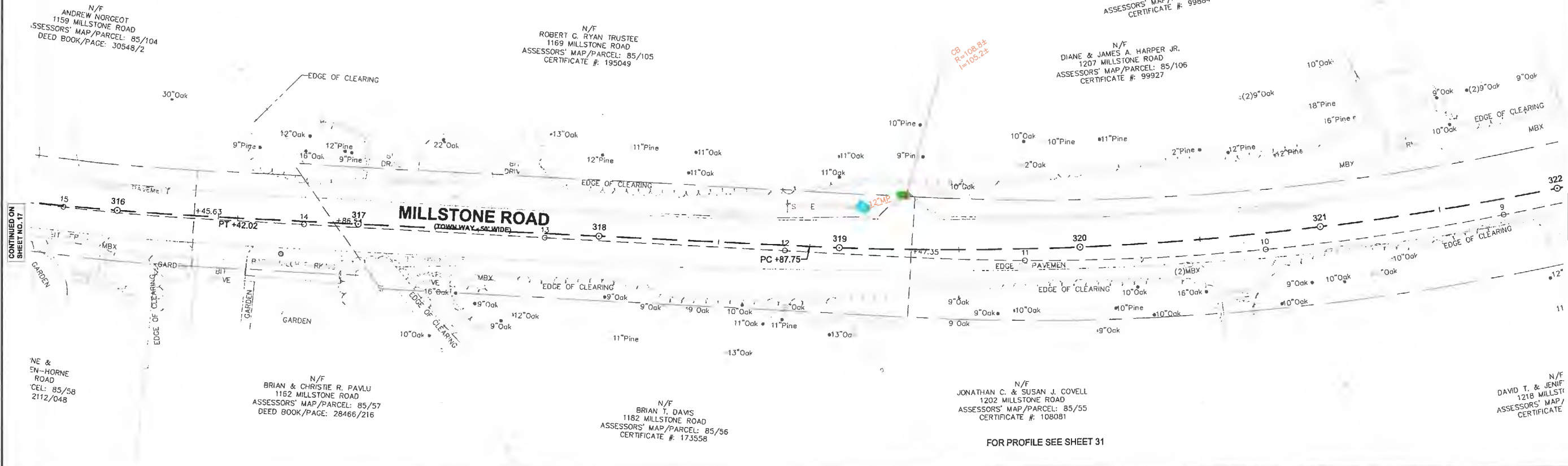
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TOWN OF BREWSTER
MILLSTONE ROAD
CONSTRUCTION PLANS
SHEET 18 OF 123

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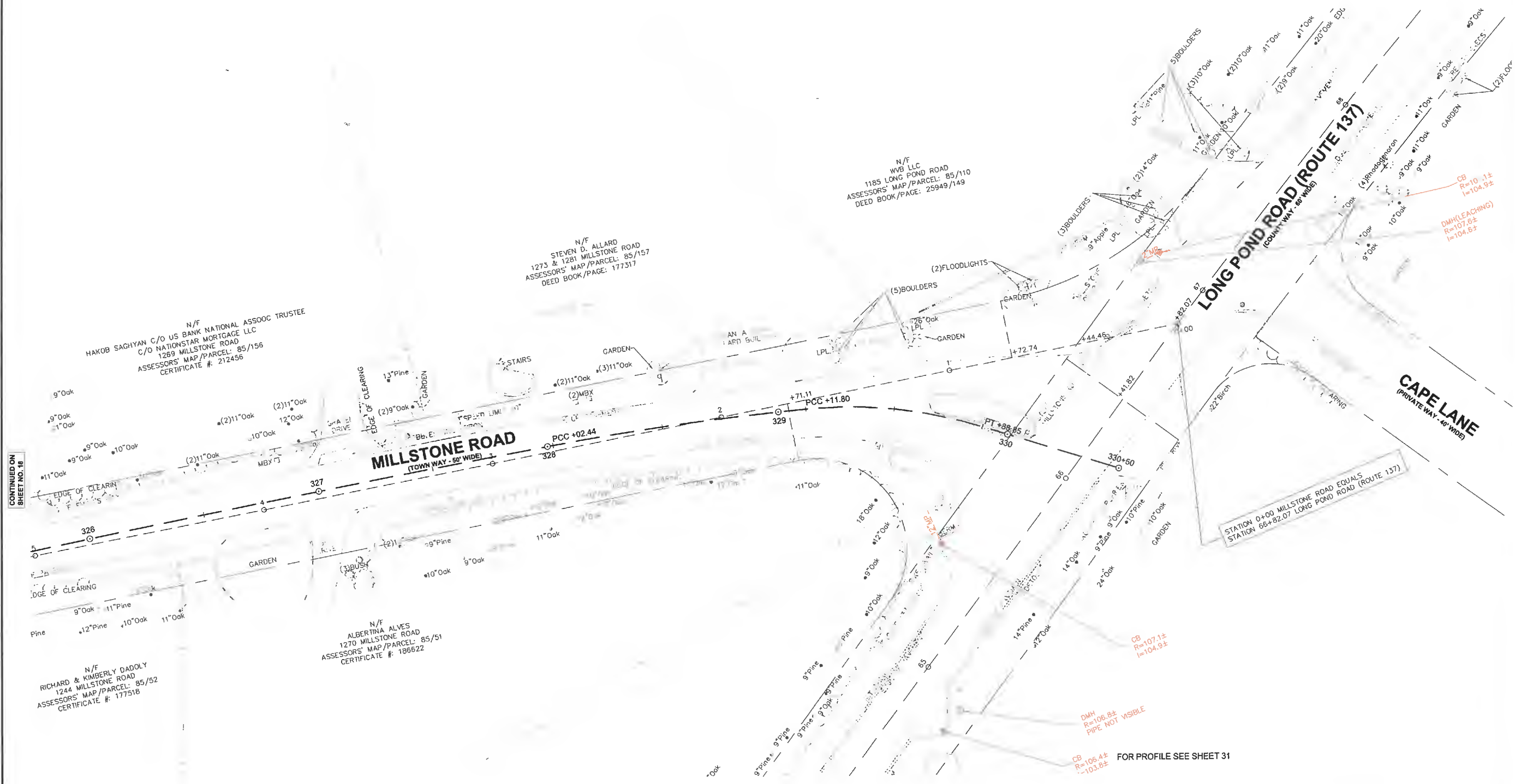


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Memorandum

Attachment F

Proposed Stormwater Infrastructure Markups



101 Walnut Street
PO Box 9151
Watertown, MA 02472-4026
P 617.924.1770

Millstone Road

11/1/2023

**Proposed Conditions Drainage
Infrastructure Review**

Sheet	CBs	LPs	Galleys
64	11	8	16
65	10	2	18
66	9	2	23
67	13	5	13
68	7	2	14
69	11	6	13
70	7	3	15
71	10	5	3
72	12	5	11
73	9	8	6
74	12	5	11
75	1	0	2

Total	112	51	145
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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
1	CB	200+49.6 13.5 LT	44.33		(2) 38.30	
2	LB	200+51.2 32.6 LT	42.46	(1) 38.00		



ROUTE 6A
(STATE HIGHWAY - VARIABLE WIDTH)

LIMIT OF WORK
STA 200+17.68
N 2745704.037
E 1053236.773

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
5	CB	202+53.7 5.9 RT	44.55	(7) 39.98	(10) 40.09	PROP FRAME & COVER
6	CB	202+53.6 11.5 RT	44.37		(10) 40.17	
7	EX CB	202+74.2 11.5 RT	44.53		(5) 40.37	REMODEL
8	LB	202+13.0 6.3 RT	45.05	(9) 39.51		
9	LB	202+29.4 6.6 RT	44.91	(10) 39.80	(8) 39.59	

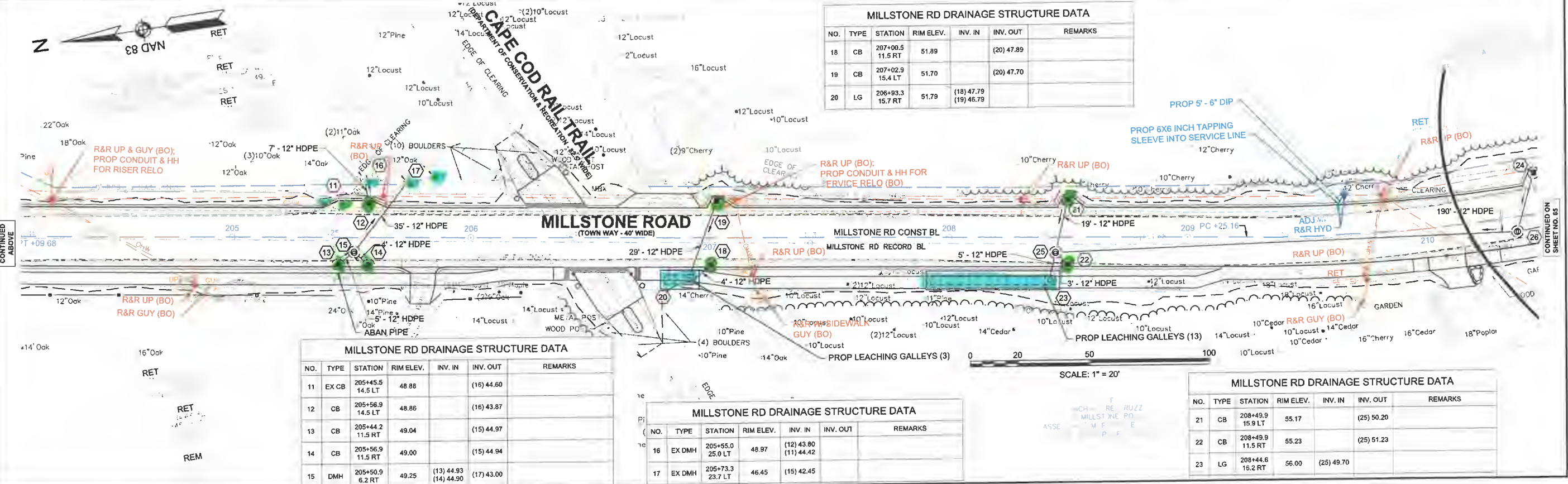
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
10	LB	202+45.5 6.3 RT	44.76	(5) 40.01 (6) 39.69	(9) 39.88	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
18	CB	207+00.5 11.5 RT	51.89		(20) 47.89	
19	CB	207+02.9 15.4 LT	51.70		(20) 47.70	
20	LG	206+93.3 15.7 RT	51.79	(18) 47.79 (19) 46.79		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
11	EX CB	205+45.5 14.5 LT	48.88		(16) 44.60	
12	CB	205+56.9 14.5 LT	48.86		(16) 43.87	
13	CB	205+44.2 11.5 RT	49.04		(15) 44.97	
14	CB	205+56.9 11.5 RT	49.00		(15) 44.94	
15	DMH	205+50.9 6.2 RT	49.25	(13) 44.93 (14) 44.90	(17) 43.00	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
16	EX DMH	205+55.0 25.0 LT	48.97		(12) 43.80 (11) 44.42	
17	EX DMH	205+73.3 23.7 LT	46.45		(15) 42.45	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
21	CB	208+49.9 15.9 LT	55.17		(25) 50.20	
22	CB	208+49.9 11.5 RT	55.23		(25) 51.23	
23	LG	208+44.8 15.2 RT	56.00	(25) 49.70		



SCALE: 1" = 20'

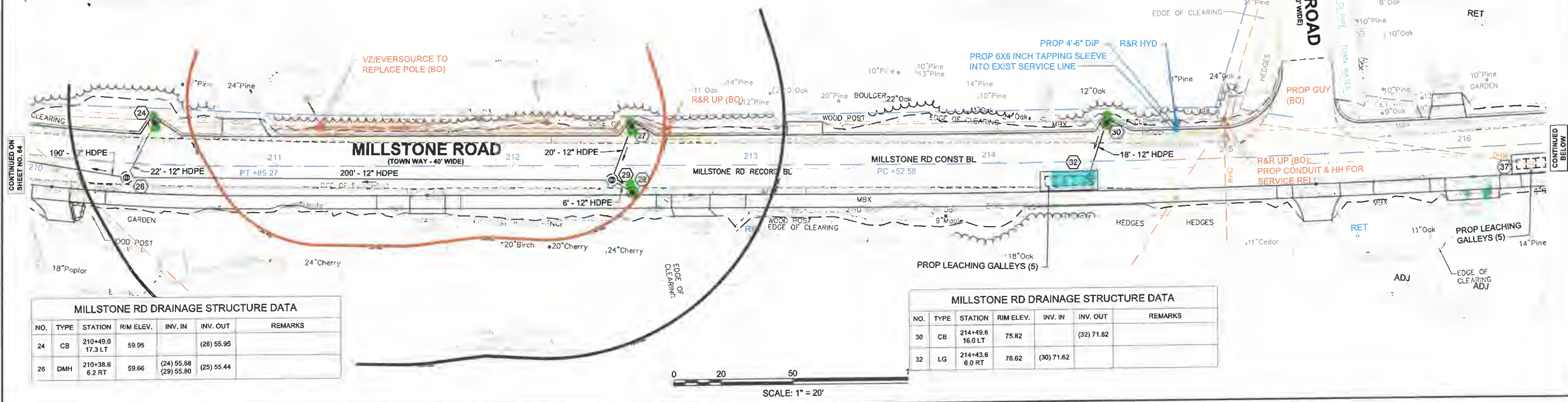
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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
27	CB	212+50.0 16.6 LT	65.36		(29) 61.36	
28	CB	212+50.3 11.5 RT	65.32		(28) 61.04	
29	DMH	212+41.7 6.1 RT	65.08	(28) 60.94 (27) 60.94	(28) 60.05	

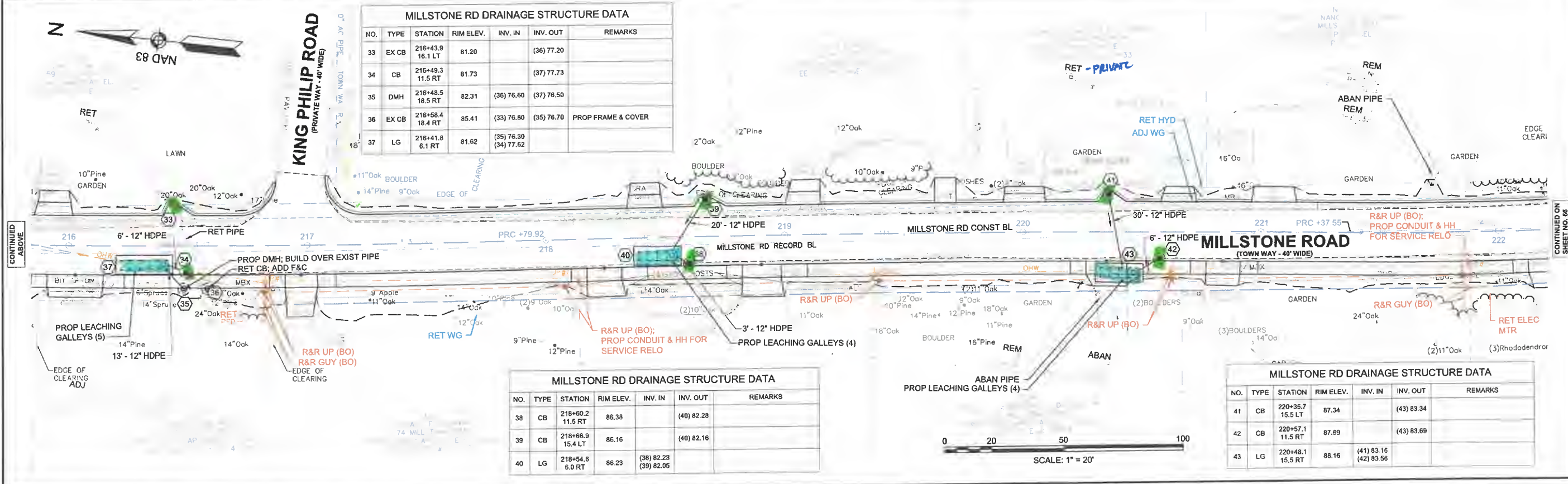


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
24	CB	210+49.0 17.3 LT	59.95		(26) 55.95	
26	DMH	210+38.8 6.2 RT	59.66	(24) 55.88 (29) 55.80	(25) 55.44	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
30	CB	214+49.6 16.0 LT	75.82		(32) 71.82	
32	LG	214+43.6 6.0 RT	76.62		(30) 71.62	

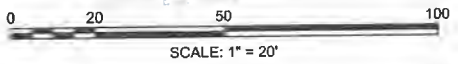


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
33	EX CB	216+43.9 16.1 LT	81.20		(36) 77.20	
34	CB	216+49.3 11.5 RT	81.73		(37) 77.73	
35	DMH	216+48.5 16.5 RT	82.31	(36) 76.60	(37) 76.50	
36	EX CB	216+58.4 18.4 RT	85.41	(33) 76.80	(35) 76.70	PROP FRAME & COVER
37	LG	216+41.8 6.1 RT	81.62		(35) 76.30 (34) 77.62	



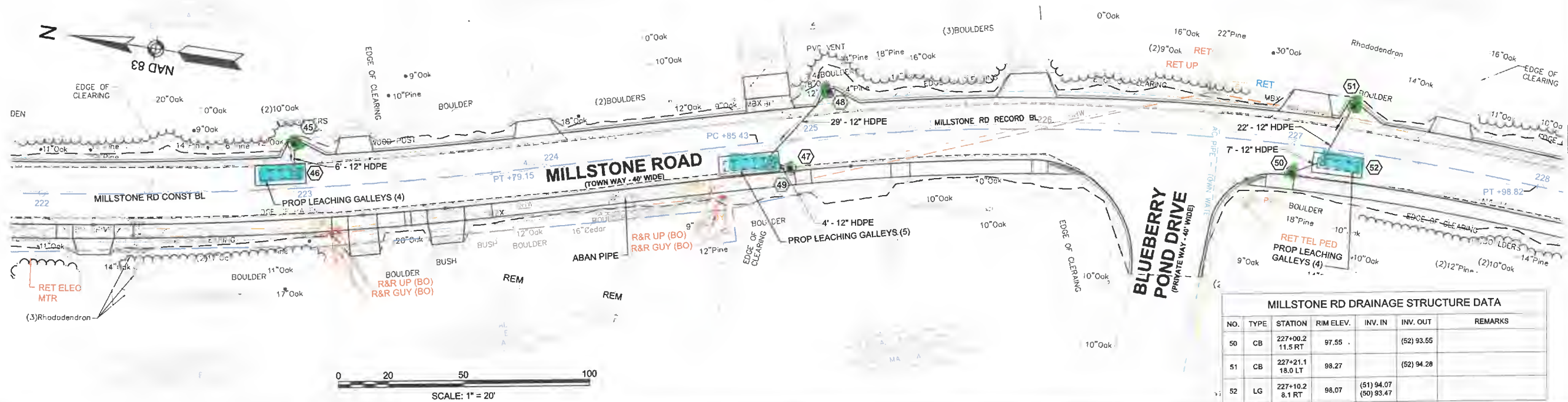
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
38	CB	218+60.2 11.5 RT	86.38		(40) 82.28	
39	CB	218+66.9 15.4 LT	86.16		(40) 82.16	
40	LG	218+54.5 6.0 RT	86.23	(38) 82.23 (39) 82.05		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
41	CB	220+35.7 15.5 LT	87.34		(43) 83.34	
42	CB	220+57.1 11.5 RT	87.69		(43) 83.69	
43	LG	220+48.1 15.5 RT	88.16	(41) 83.15 (42) 83.58		



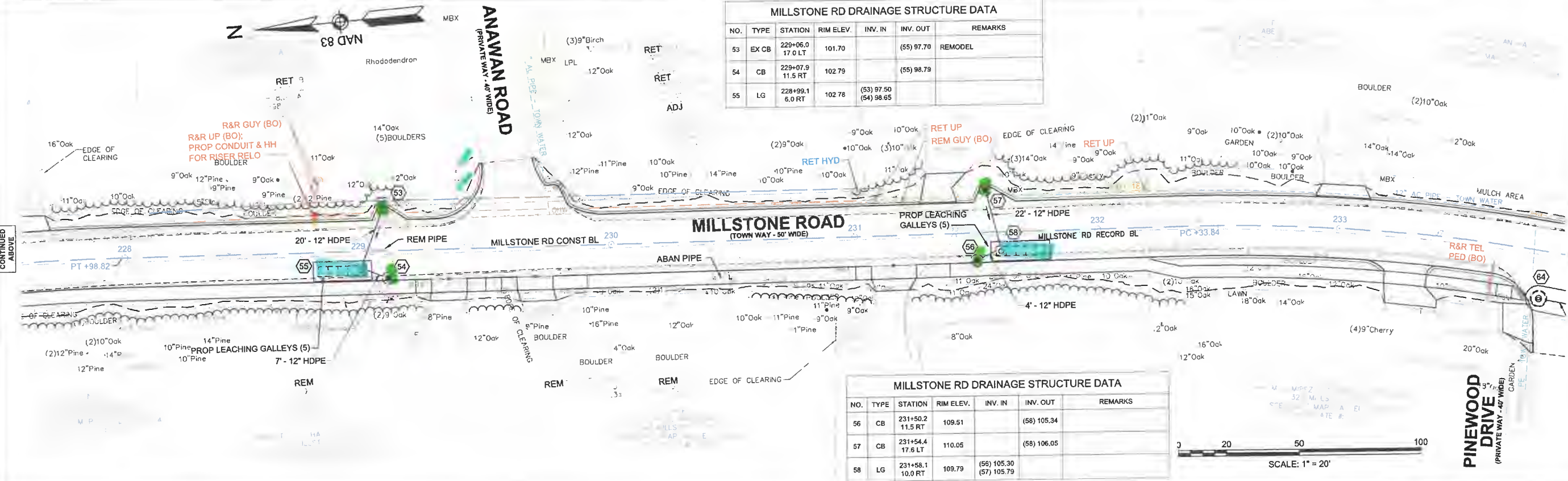
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
45	CB	223+00.8 17.6 LT	90.84		(46) 86.84	
48	LG	223+02.8 7.7 LT	106.74	(45) 86.76	(48)	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
47	CB	224+97.3 11.5 RT	94.10		(49) 90.10	
48	CB	225+15.2 18.0 LT	94.29		(49) 90.29	
49	LG	224+91.2 6.0 RT	94.16	(47) 90.06 (48) 89.86		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
50	CB	227+00.2 11.5 RT	97.55		(52) 93.55	
51	CB	227+21.1 18.0 LT	98.27		(52) 94.28	
52	LG	227+10.2 8.1 RT	98.07	(51) 94.07 (50) 93.47		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
53	EX CB	229+06.0 17.0 LT	101.70		(55) 97.70	REMODEL
54	CB	229+07.9 11.5 RT	102.79		(55) 98.79	
55	LG	228+99.1 6.0 RT	102.78	(53) 97.50 (54) 98.65		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
56	CB	231+50.2 11.5 RT	109.51		(58) 105.34	
57	CB	231+54.4 17.6 LT	110.05		(58) 106.05	
58	LG	231+58.1 10.0 RT	109.79	(56) 105.30 (57) 105.79		

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SHEET NO. 65

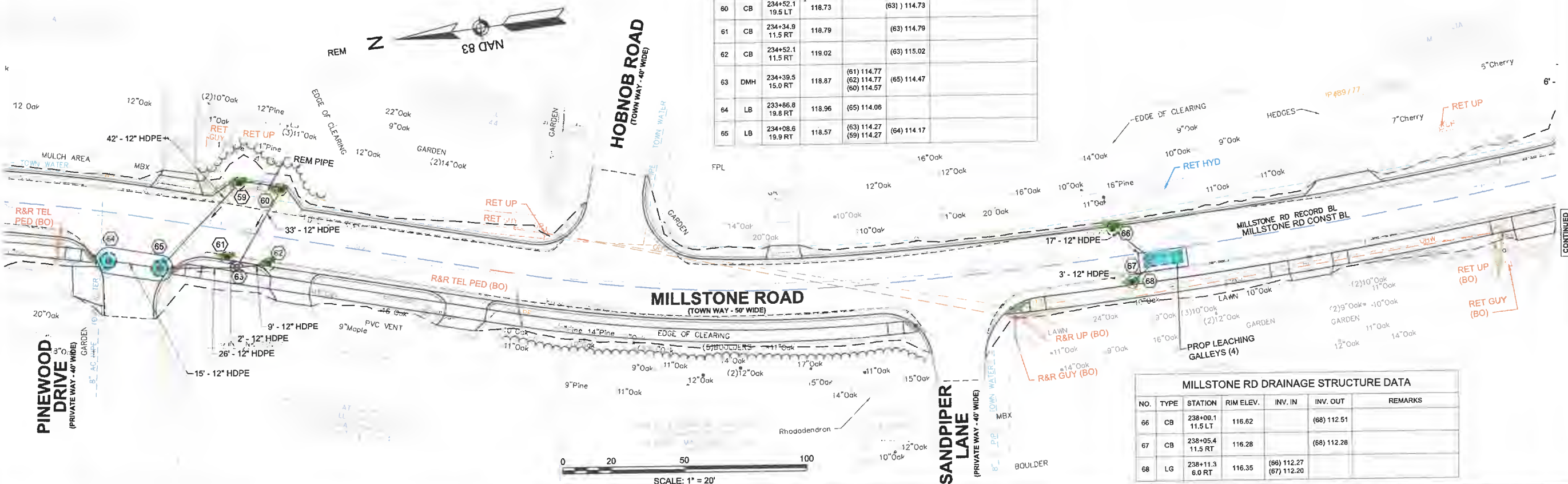
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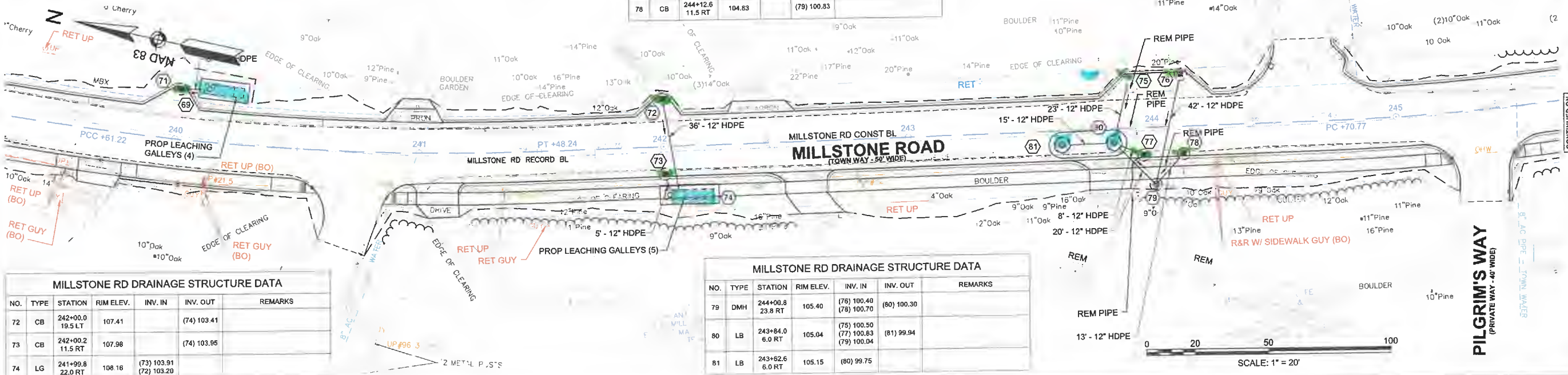
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
59	CB	234+34.9 19.5 LT	118.58		(65) 114.58	
60	CB	234+52.1 19.5 LT	118.73		(63) 114.73	
61	CB	234+34.9 11.5 RT	118.79		(63) 114.79	
62	CB	234+52.1 11.5 RT	119.02		(63) 115.02	
63	DMH	234+39.5 15.0 RT	118.87	(61) 114.77 (62) 114.77 (60) 114.57	(65) 114.47	
64	LB	233+86.8 19.8 RT	118.96		(65) 114.06	
65	LB	234+08.6 19.9 RT	118.57		(63) 114.27 (59) 114.27	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
66	CB	238+00.1 11.5 LT	116.62		(68) 112.51	
67	CB	238+05.4 11.5 RT	116.28		(68) 112.28	
68	LG	238+11.3 6.0 RT	116.35	(66) 112.27 (67) 112.20		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
69	CB	240+00.2 20.5 LT	112.86		(71) 108.86	
71	LG	240+09.9 19.7 LT	107.81	(69) 105.31		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
75	EX CB	243+91.2 21.2 LT	104.77		(80) 100.77	REMODEL
76	CB	244+12.3 21.2 LT	104.74		(79) 100.74	
77	CB	243+96.1 11.5 RT	104.88		(80) 100.88	
78	CB	244+12.6 11.5 RT	104.83		(79) 100.83	

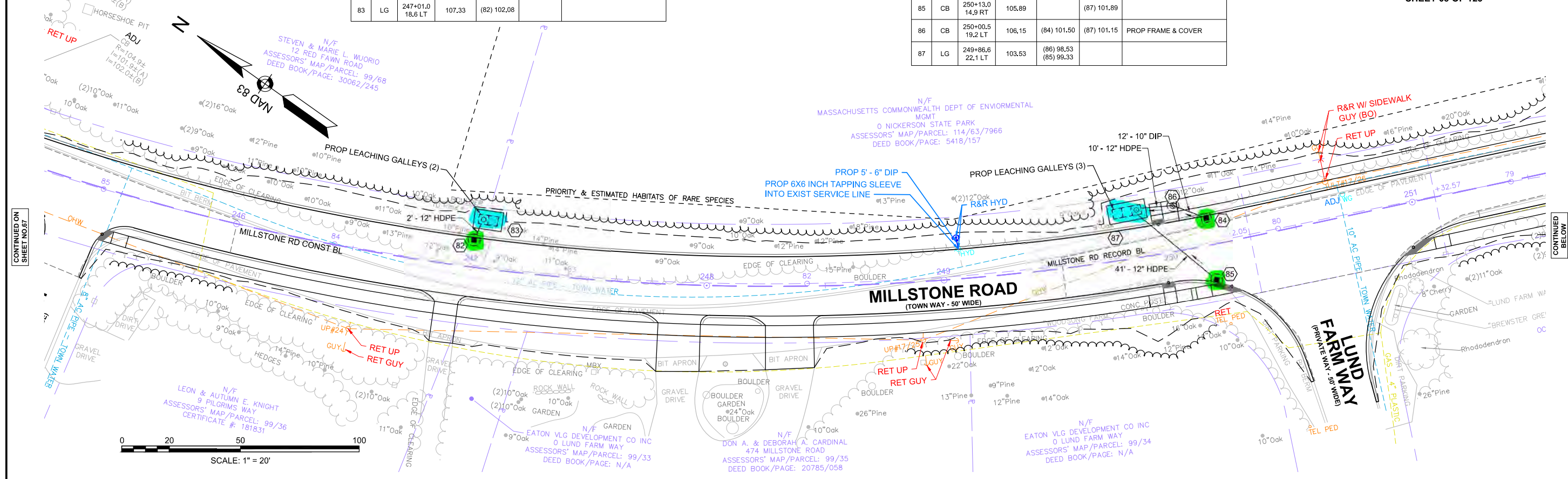


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
72	CB	242+00.0 19.5 LT	107.41		(74) 103.41	
73	CB	242+00.2 11.5 RT	107.98		(74) 103.98	
74	LG	241+99.8 22.0 RT	108.16	(73) 103.91 (72) 103.20		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
79	DMH	244+00.8 23.8 RT	105.40	(76) 100.40 (78) 100.70	(80) 100.30	
80	LB	243+84.0 6.0 RT	105.04	(75) 100.50 (77) 100.83 (79) 100.04	(81) 99.94	
81	LB	243+82.6 6.0 RT	105.15		(80) 99.75	

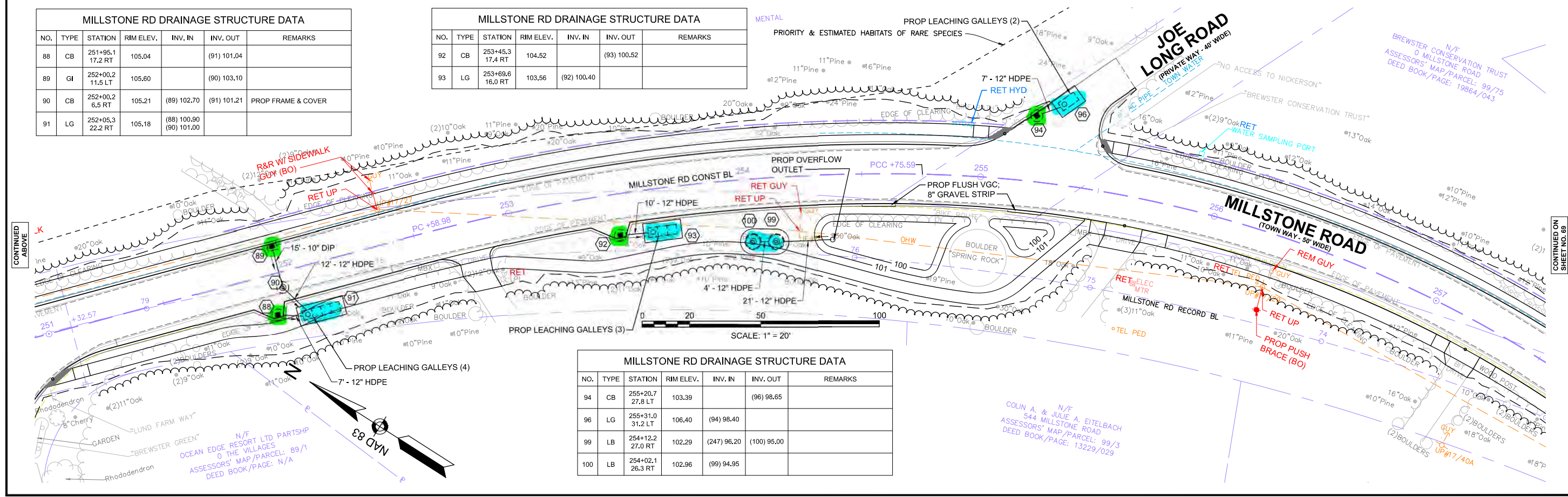
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
82	CB	247+00.2 11.5 LT	106.12		(83) 102.12	
83	LG	247+01.0 16.6 LT	107.33	(82)	102.08	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
84	GI	250+13.5 11.5 LT	106.05		(86) 102.05	
85	CB	250+13.0 14.9 RT	105.89		(87) 101.89	
86	CB	250+00.5 19.2 LT	106.15	(84)	101.50	PROP FRAME & COVER
87	LG	249+86.6 22.1 LT	103.53	(88)	98.53	(85) 99.33



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
88	CB	251+95.1 17.2 RT	105.04		(91) 101.04	
89	GI	252+00.2 11.5 LT	105.60		(90) 103.10	
90	CB	252+00.2 6.5 RT	105.21	(89)	102.70	PROP FRAME & COVER
91	LG	252+05.3 22.2 RT	105.18	(88)	100.90	(90) 101.00

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
92	CB	253+45.3 17.4 RT	104.52		(93) 100.52	
93	LG	253+69.6 16.0 RT	103.56	(92)	100.40	



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
94	CB	255+20.7 27.8 LT	103.39		(96) 98.65	
96	LG	255+31.0 31.2 LT	106.40	(94)	98.40	
99	LB	254+12.2 27.0 RT	102.29	(247)	96.20	(100) 95.00
100	LB	254+02.1 26.3 RT	102.96	(99)	94.95	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
102	GI	258+50.0 11.5 LT	103.83		(103) 98.64	
103	CB	258+50.0 4.7 LT	103.94	(102) 98.60	(105) 98.72	PROP FRAME & COVER
104	CB	258+50.0 16.3 RT	103.75		(105) 98.26	
105	LG	258+30.4 22.8 RT	102.43	(104) 98.20 (103) 98.43		

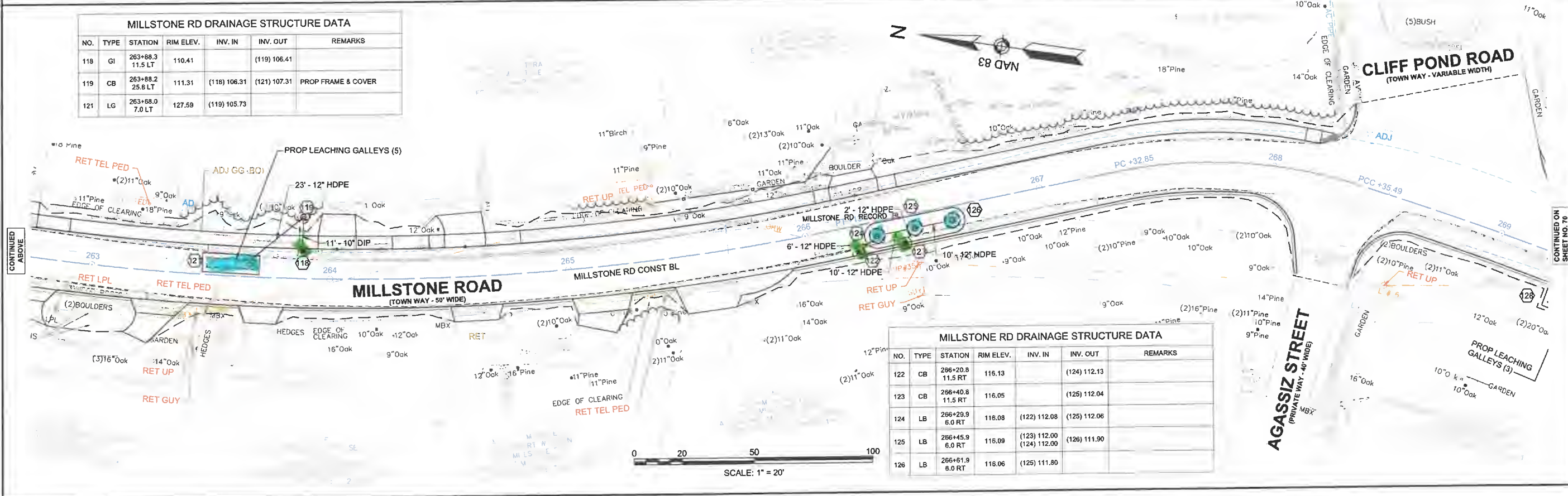
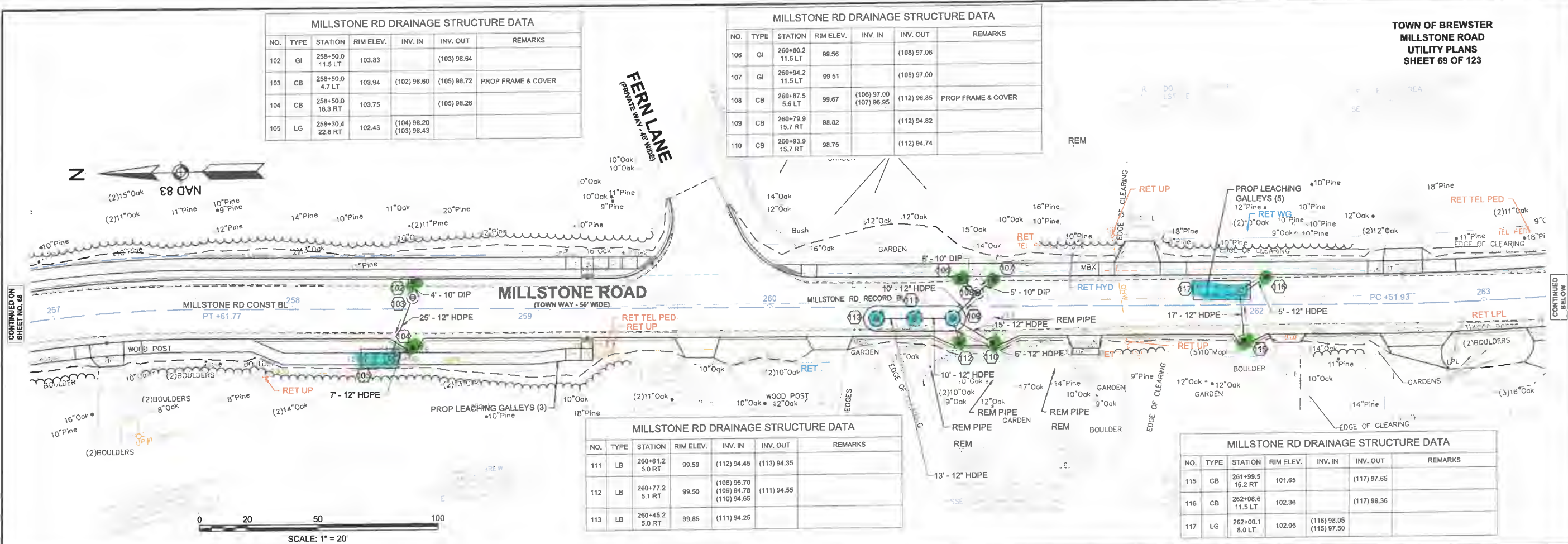
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
106	GI	260+80.2 11.5 LT	99.56		(108) 97.06	
107	GI	260+94.2 11.5 LT	99.51		(108) 97.00	
108	CB	260+87.5 5.6 LT	99.67	(106) 97.00 (107) 96.95	(112) 96.85	PROP FRAME & COVER
109	CB	260+79.9 15.7 RT	98.82		(112) 94.82	
110	CB	260+93.9 15.7 RT	98.75		(112) 94.74	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
111	LB	260+61.2 5.0 RT	99.59	(112) 94.45	(113) 94.35	
112	LB	260+77.2 5.1 RT	99.50	(108) 96.70 (109) 94.78 (110) 94.65	(111) 94.55	
113	LB	260+45.2 5.0 RT	99.85		(111) 94.25	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
115	CB	261+99.5 15.2 RT	101.65		(117) 97.65	
116	CB	262+08.6 11.5 LT	102.36		(117) 98.36	
117	LG	262+00.1 8.0 LT	102.05	(116) 98.05 (115) 97.50		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
118	GI	263+88.3 11.5 LT	110.41		(119) 106.41	
119	CB	263+88.2 25.8 LT	111.31	(118) 106.31	(121) 107.31	PROP FRAME & COVER
121	LG	263+88.0 7.0 LT	127.59	(119) 105.73		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
122	CB	266+20.8 11.5 RT	116.13		(124) 112.13	
123	CB	266+40.8 11.5 RT	116.05		(125) 112.04	
124	LB	266+29.9 6.0 RT	116.08	(122) 112.08	(125) 112.06	
125	LB	266+45.9 6.0 RT	116.09	(123) 112.09 (124) 112.00	(126) 111.90	
126	LB	266+61.9 6.0 RT	116.06		(125) 111.80	



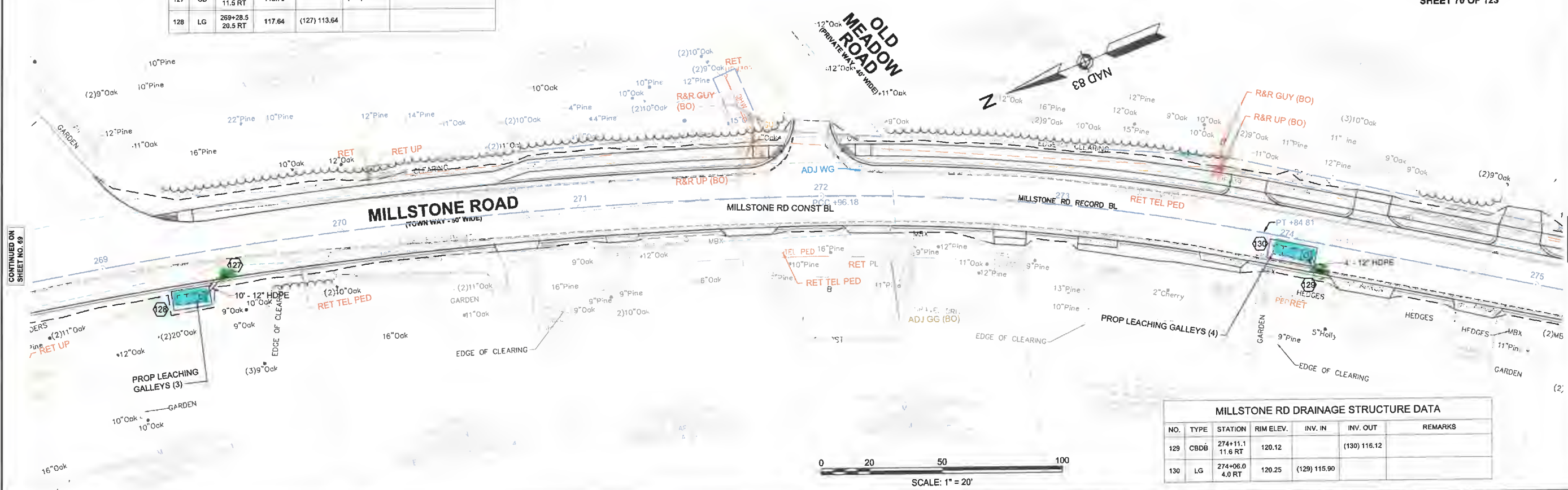
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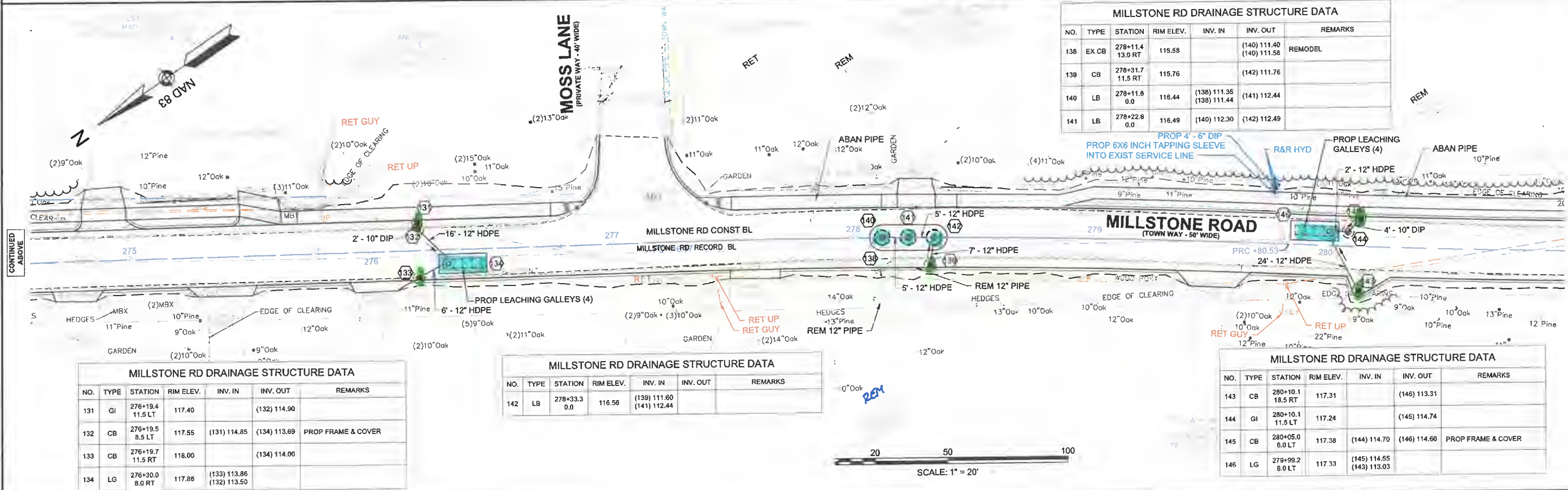
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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
127	CB	269+50.0 11.6 RT	118.70		(128) 113.80	
128	LG	269+28.5 20.5 RT	117.64	(127) 113.64		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
129	CBD	274+11.1 11.6 RT	120.12		(130) 116.12	
130	LG	274+06.0 4.0 RT	120.25	(129) 115.90		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
138	EX CB	278+11.4 13.0 RT	115.58		(140) 111.40 (140) 111.58	REMODEL
139	CB	278+31.7 11.5 RT	115.76		(142) 111.76	
140	LB	278+11.8 0.0	116.44	(138) 111.35 (138) 111.44	(141) 112.44	
141	LB	278+22.8 0.0	116.49	(140) 112.30	(142) 112.49	



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
131	GI	276+19.4 11.5 LT	117.40		(132) 114.90	
132	CB	276+19.5 8.5 LT	117.55	(131) 114.85	(134) 113.69	PROP FRAME & COVER
133	CB	276+19.7 11.5 RT	118.00		(134) 114.00	
134	LG	276+30.0 8.0 RT	117.88	(133) 113.86 (132) 113.50		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
142	LB	278+33.3 0.0	116.56	(139) 111.60 (141) 112.44		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
143	CB	280+10.1 18.5 RT	117.31		(148) 113.31	
144	GI	280+10.1 11.5 LT	117.24		(145) 114.74	
145	CB	280+05.0 8.0 LT	117.38	(144) 114.70	(146) 114.60	PROP FRAME & COVER
146	LG	279+99.2 8.0 LT	117.33	(145) 114.55 (143) 113.03		

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UTILITY PLANS
SHEET 71 OF 123

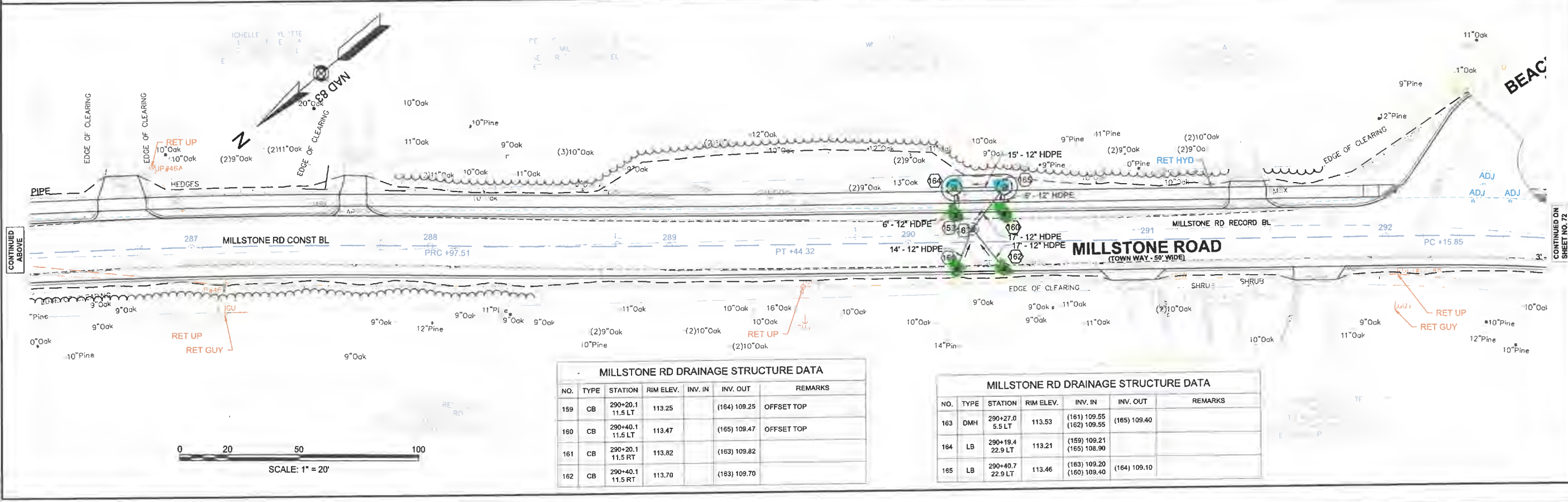
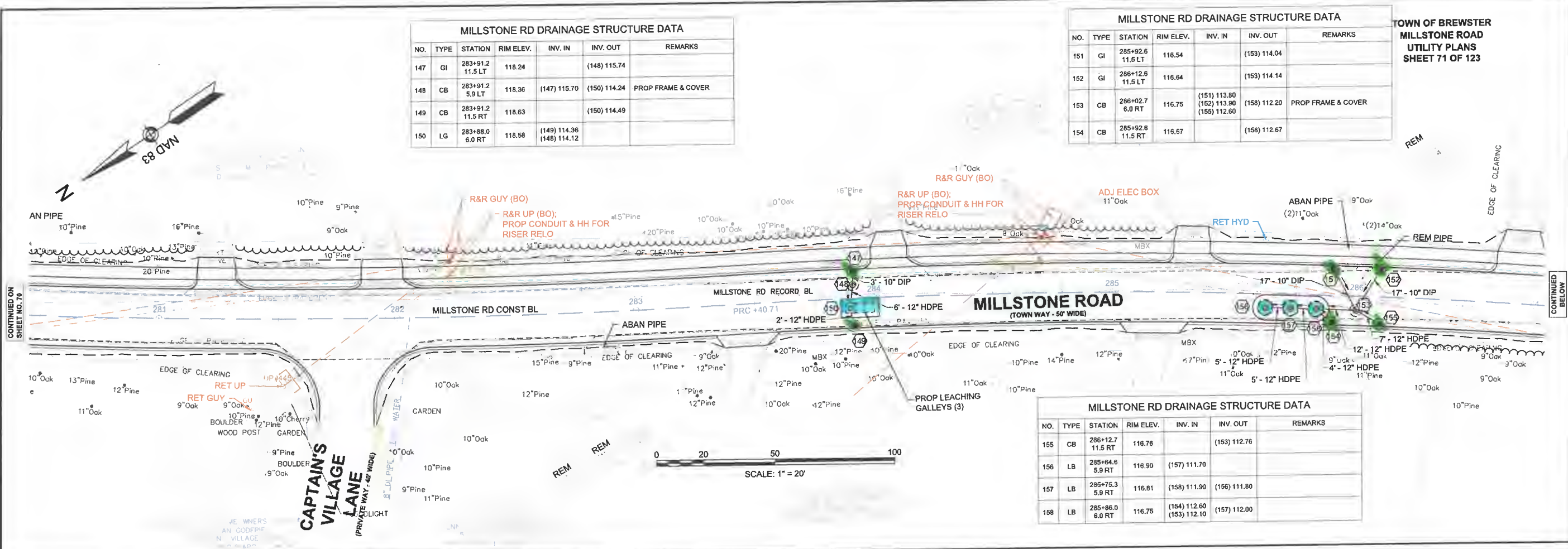
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
147	GI	283+91.2 11.5 LT	118.24		(148) 115.74	
148	CB	283+91.2 5.9 LT	118.36	(147) 115.70	(150) 114.24	PROP FRAME & COVER
149	CB	283+91.2 11.5 RT	118.63		(150) 114.49	
150	LG	283+88.0 6.0 RT	118.58	(149) 114.36 (148) 114.12		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
151	GI	285+92.6 11.5 LT	116.54		(153) 114.04	
152	GI	286+12.5 11.5 LT	116.64		(153) 114.14	
153	CB	286+02.7 6.0 RT	116.75	(151) 113.80 (152) 113.90 (155) 112.60	(158) 112.20	PROP FRAME & COVER
154	CB	285+92.6 11.5 RT	116.57		(158) 112.67	

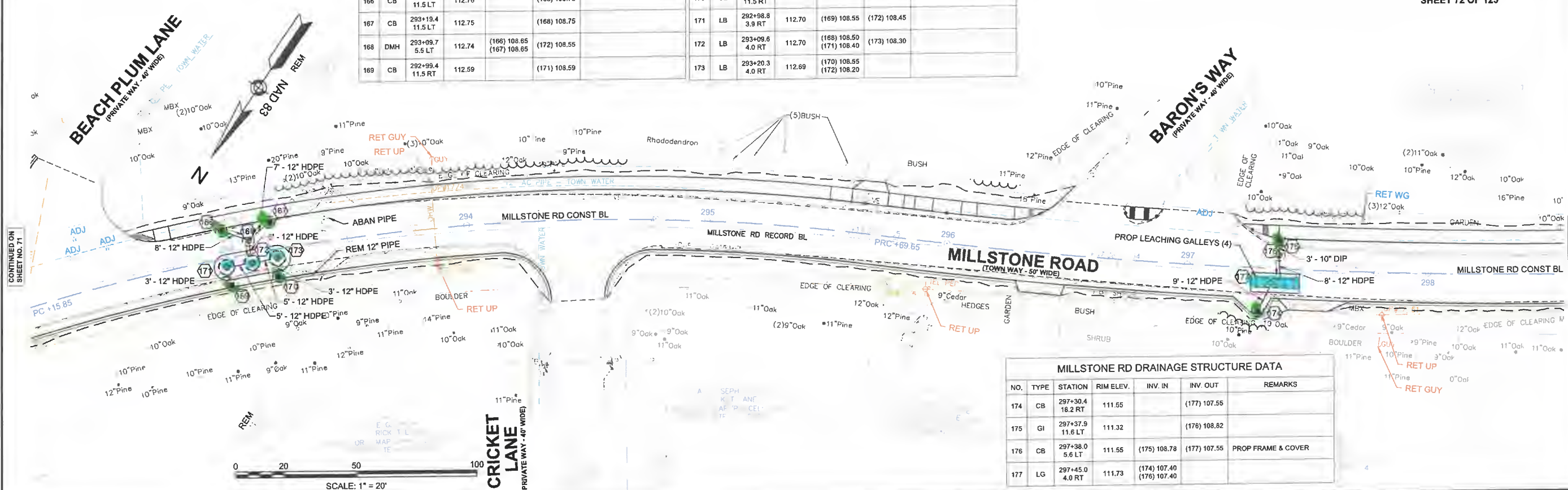
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
155	CB	286+12.7 11.5 RT	116.76		(153) 112.76	
156	LB	285+84.6 5.9 RT	116.90	(157) 111.70		
157	LB	285+75.3 5.9 RT	116.81	(158) 111.90	(156) 111.80	
158	LB	285+86.0 6.0 RT	116.75	(154) 112.60 (153) 112.10	(157) 112.00	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
159	CB	290+20.1 11.5 LT	113.25		(164) 109.25	OFFSET TOP
160	CB	290+40.1 11.5 LT	113.47		(165) 109.47	OFFSET TOP
161	CB	290+20.1 11.5 RT	113.82		(163) 109.82	
162	CB	290+40.1 11.5 RT	113.70		(163) 109.70	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
163	DMH	290+27.0 5.5 LT	113.53	(161) 109.55 (162) 109.55	(165) 109.40	
164	LB	290+19.4 22.9 LT	113.21	(159) 109.21 (165) 108.90		
165	LB	290+40.7 22.9 LT	113.46	(163) 109.20 (160) 109.40	(164) 109.10	



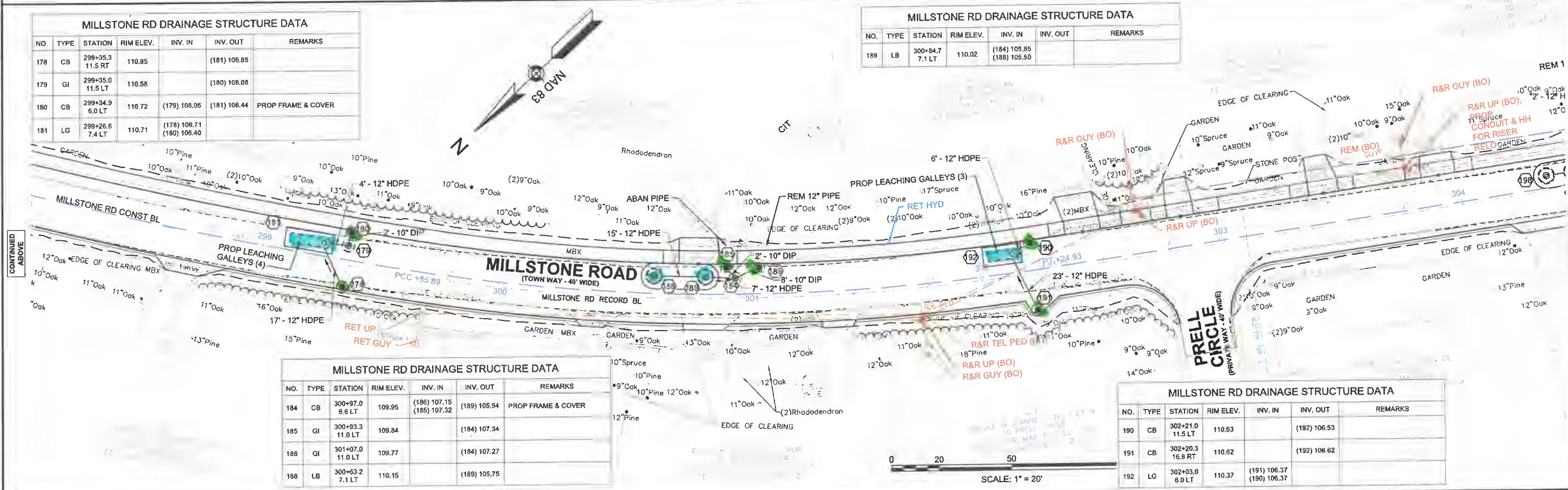
MILLSTONE RD DRAINAGE STRUCTURE DATA						MILLSTONE RD DRAINAGE STRUCTURE DATA							
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS	NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
166	CB	292+99.4 11.5 LT	112.76		(168) 108.76		170	CB	293+19.4 11.5 RT	112.57		(173) 108.57	
167	CB	293+19.4 11.5 LT	112.75		(168) 108.75		171	LB	292+98.8 3.9 RT	112.70	(169) 108.55	(172) 108.45	
168	DMH	293+09.7 5.5 LT	112.74	(166) 108.65 (167) 108.65	(172) 108.55		172	LB	293+09.6 4.0 RT	112.70	(168) 108.50 (171) 108.40	(173) 108.30	
169	CB	292+99.4 11.5 RT	112.59		(171) 108.59		173	LB	293+20.3 4.0 RT	112.69	(170) 108.55 (172) 108.20		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
174	CB	297+30.4 18.2 RT	111.65		(177) 107.55	
175	GI	297+37.9 11.6 LT	111.32		(176) 108.82	
176	CB	297+38.0 5.6 LT	111.55	(175) 108.78	(177) 107.55	PROP FRAME & COVER
177	LG	297+45.0 4.0 RT	111.73		(174) 107.40 (176) 107.40	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
178	CB	299+35.3 11.5 RT	110.85		(181) 106.85	
179	GI	299+35.0 11.5 LT	110.58		(180) 108.08	
180	CB	299+34.9 6.0 LT	110.72	(178) 108.05	(181) 106.44	PROP FRAME & COVER
181	LG	299+26.6 7.4 LT	110.71		(178) 106.71 (180) 106.40	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
189	LB	300+84.7 7.1 LT	110.02	(184) 105.85 (188) 105.50		

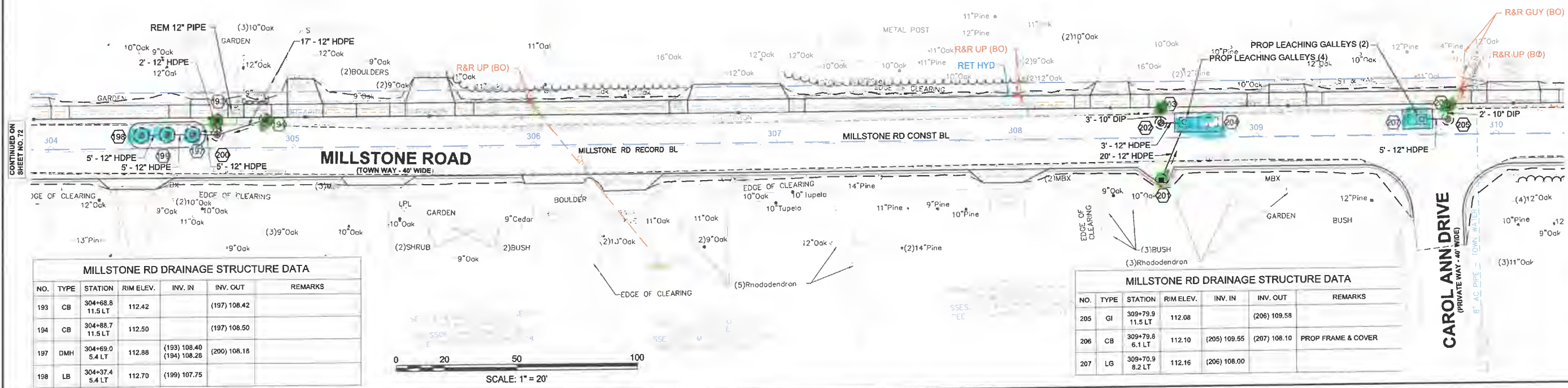


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
184	CB	300+97.0 6.6 LT	109.95	(186) 107.15 (185) 107.32	(189) 105.84	PROP FRAME & COVER
185	GI	300+93.3 11.0 LT	109.84		(184) 107.34	
186	GI	301+07.0 11.0 LT	109.77		(184) 107.27	
188	LB	300+63.2 7.1 LT	110.15		(189) 105.75	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
190	CB	302+21.0 11.5 LT	110.53		(192) 106.53	
191	CB	302+20.3 16.8 RT	110.62		(192) 106.62	
192	LG	302+03.0 6.0 LT	110.37	(191) 106.37 (190) 106.37		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
199	LB	304+48.1 5.5 LT	112.85	(200) 107.93	(198) 107.83	
200	LB	304+58.7 5.6 LT	112.84	(197) 108.10	(199) 108.00	

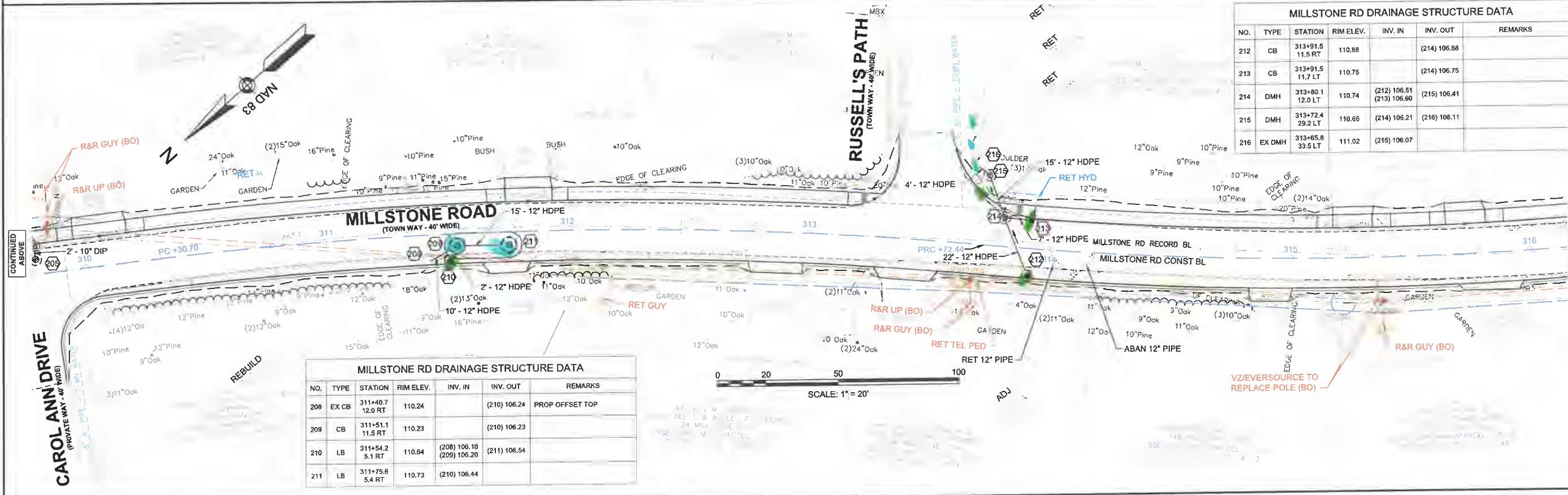
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
201	CB	308+60.6 17.8 RT	113.18		(204) 108.08	
202	GI	308+60.5 11.5 LT	112.92		(203) 110.42	
203	CB	308+60.6 5.9 LT	113.08	(202) 110.38	(204) 109.08	PROP FRAME & COVER
204	LG	308+68.3 4.1 LT	113.01	(201) 107.90 (203) 109.01		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
193	CB	304+88.8 11.5 LT	112.42		(197) 108.42	
194	CB	304+88.7 11.5 LT	112.50		(197) 108.50	
197	DMH	304+69.0 5.4 LT	112.88	(193) 108.40 (194) 108.28	(200) 108.18	
198	LB	304+37.4 5.4 LT	112.70	(199) 107.75		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
205	GI	309+79.9 11.5 LT	112.08		(206) 109.58	
206	CB	309+79.8 6.1 LT	112.10	(205) 109.55	(207) 108.10	PROP FRAME & COVER
207	LG	309+70.9 8.2 LT	112.16	(206) 108.00		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
212	CB	313+91.5 11.5 RT	110.88		(214) 106.88	
213	CB	313+91.5 11.7 LT	110.75		(214) 106.75	
214	DMH	313+80.1 12.0 LT	110.74	(212) 106.51 (213) 106.60	(215) 106.41	
215	DMH	313+72.4 29.2 LT	110.66	(214) 106.21	(216) 106.11	
216	EX DMH	313+65.8 33.5 LT	111.02	(215) 106.07		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
208	EX CB	311+40.7 12.0 RT	110.24		(210) 106.24	PROP OFFSET TOP
209	CB	311+51.1 11.5 RT	110.23		(210) 106.23	
210	LB	311+54.2 5.1 RT	110.84	(208) 106.10 (209) 106.20	(211) 106.54	
211	LB	311+75.6 5.4 RT	110.73	(210) 106.44		

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MILLSTONE ROAD
UTILITY PLANS
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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
221	CB	318+94.3 11.5 RT	109.45		(222) 105.45	
222	DMH	318+94.1 5.3 RT	109.50	(223) 105.30 (221) 105.42	(230) 105.50	
223	CB	319+14.3 11.5 RT	109.53		(222) 105.53	
224	GI	318+94.0 11.5 LT	109.43		(225) 105.43	
225	CB	318+94.2 6.3 LT	109.48	(226) 105.25 (224) 109.40	(230) 105.15	PROP FRAME & COVER

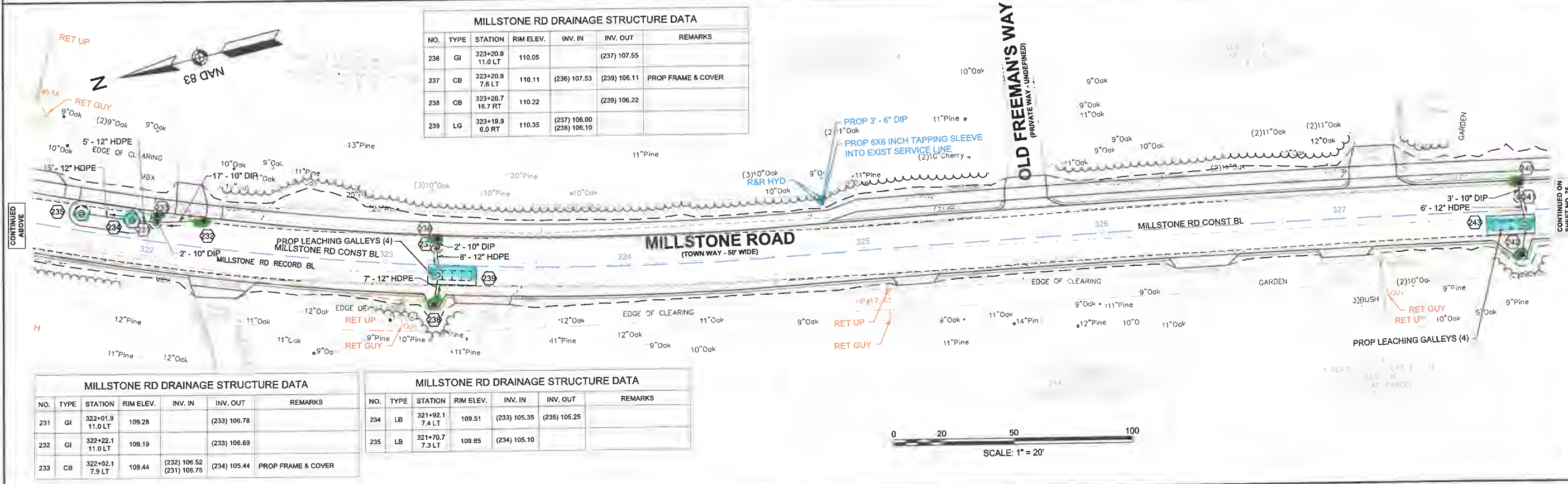
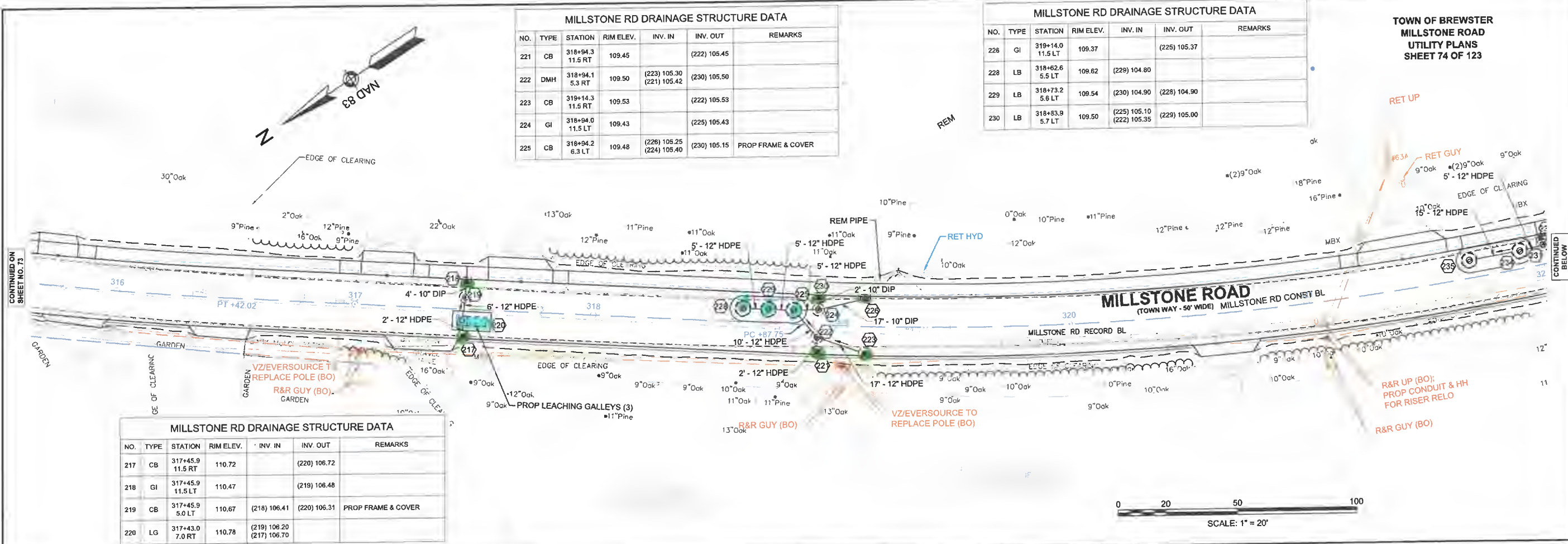
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
226	GI	318+14.0 11.5 LT	109.37		(225) 105.37	
228	LB	318+62.6 5.5 LT	109.62	(229) 104.80		
229	LB	318+73.2 5.8 LT	109.54	(230) 104.90	(228) 104.90	
230	LB	318+83.9 5.7 LT	109.50	(225) 105.10 (222) 105.35	(229) 105.00	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
217	CB	317+45.9 11.5 RT	110.72		(220) 106.72	
218	GI	317+45.9 11.5 LT	110.47		(219) 106.48	
219	CB	317+45.9 5.0 LT	110.67	(218) 106.41	(220) 106.31	PROP FRAME & COVER
220	LG	317+43.0 7.0 RT	110.78	(219) 106.20 (217) 106.70		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
236	GI	323+20.9 11.0 LT	110.05		(237) 107.55	
237	CB	323+20.9 7.6 LT	110.11	(236) 107.53	(239) 106.11	PROP FRAME & COVER
238	CB	323+20.7 16.7 RT	110.22		(239) 106.22	
239	LG	323+19.9 6.0 RT	110.35	(237) 106.00 (238) 106.10		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
231	GI	322+01.9 11.0 LT	109.28		(233) 106.78	
232	GI	322+22.1 11.0 LT	109.19		(233) 106.69	
233	CB	322+02.1 7.9 LT	109.44	(232) 106.52 (231) 106.75	(234) 105.44	PROP FRAME & COVER

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
234	LB	321+92.1 7.4 LT	109.51	(233) 105.35	(235) 105.25	
235	LB	321+70.7 7.3 LT	109.85	(234) 105.10		



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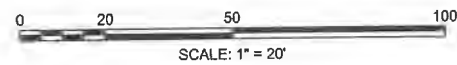
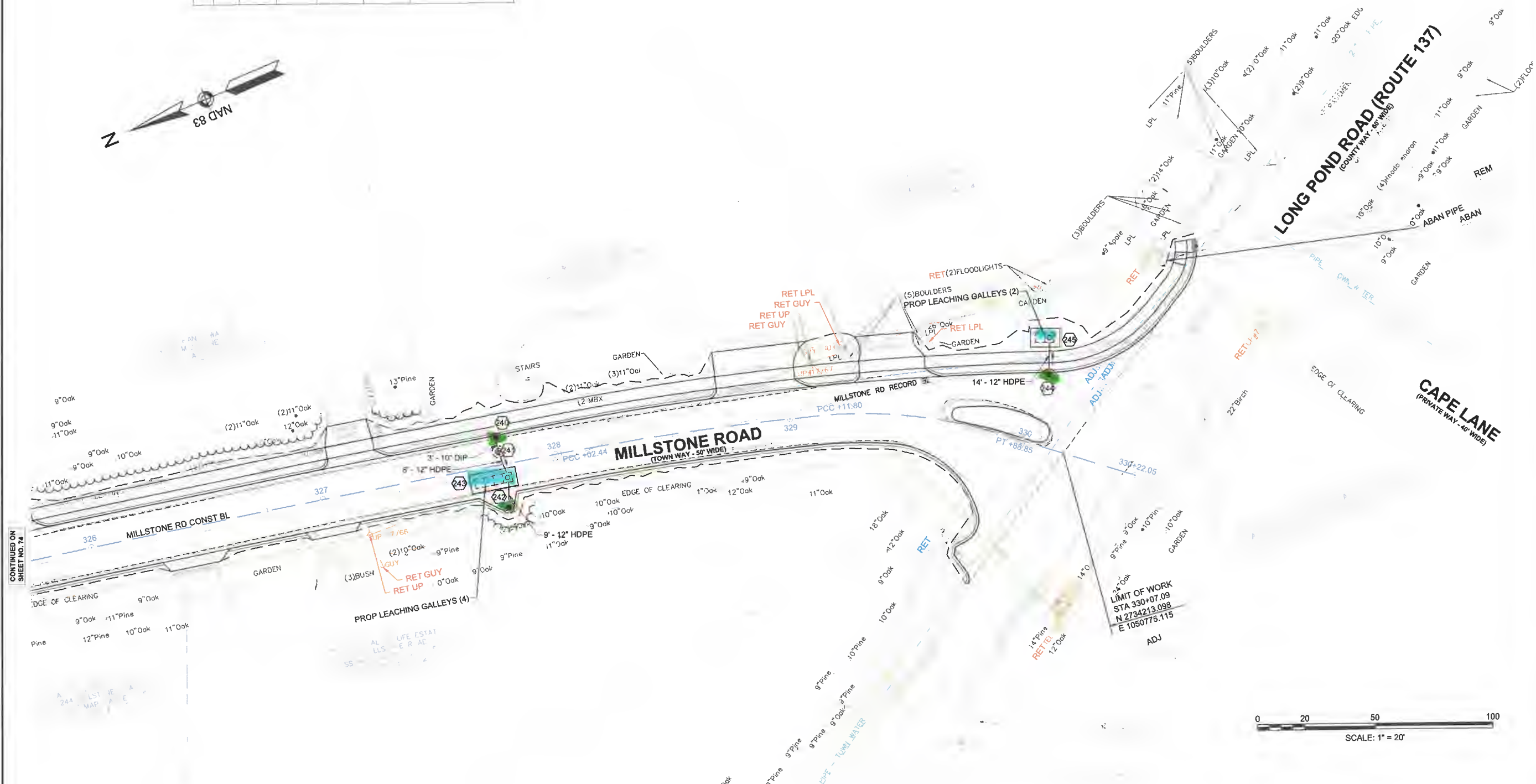
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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
240	GI	327+76.1 11.5 LT	110.90		(241) 108.40	
241	CB	327+76.1 5.5 LT	110.88	(240) 108.38	(243) 106.88	PROP FRAME & COVER
242	CB	327+76.1 18.7 RT	110.41		(243) 106.41	
243	LG	327+80.0 4.0 RT	111.00	(241) 106.80 (242) 106.30		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
244	CB	330+02.3 30.0 LT	109.06		(245) 102.10	
245	LG	329+99.2 47.5 LT	105.93	(244) 101.93		

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MILLSTONE ROAD
UTILITY PLANS
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TOWN OF BREWSTER PUBLIC WORKS DEPARTMENT

TOWN OF BREWSTER
MILLSTONE ROAD
TITLE SHEET & INDEX
SHEET 01 OF 123

PLAN AND PROFILE OF MILLSTONE ROAD

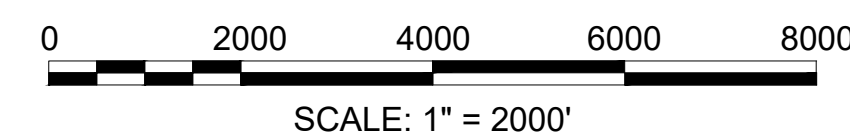
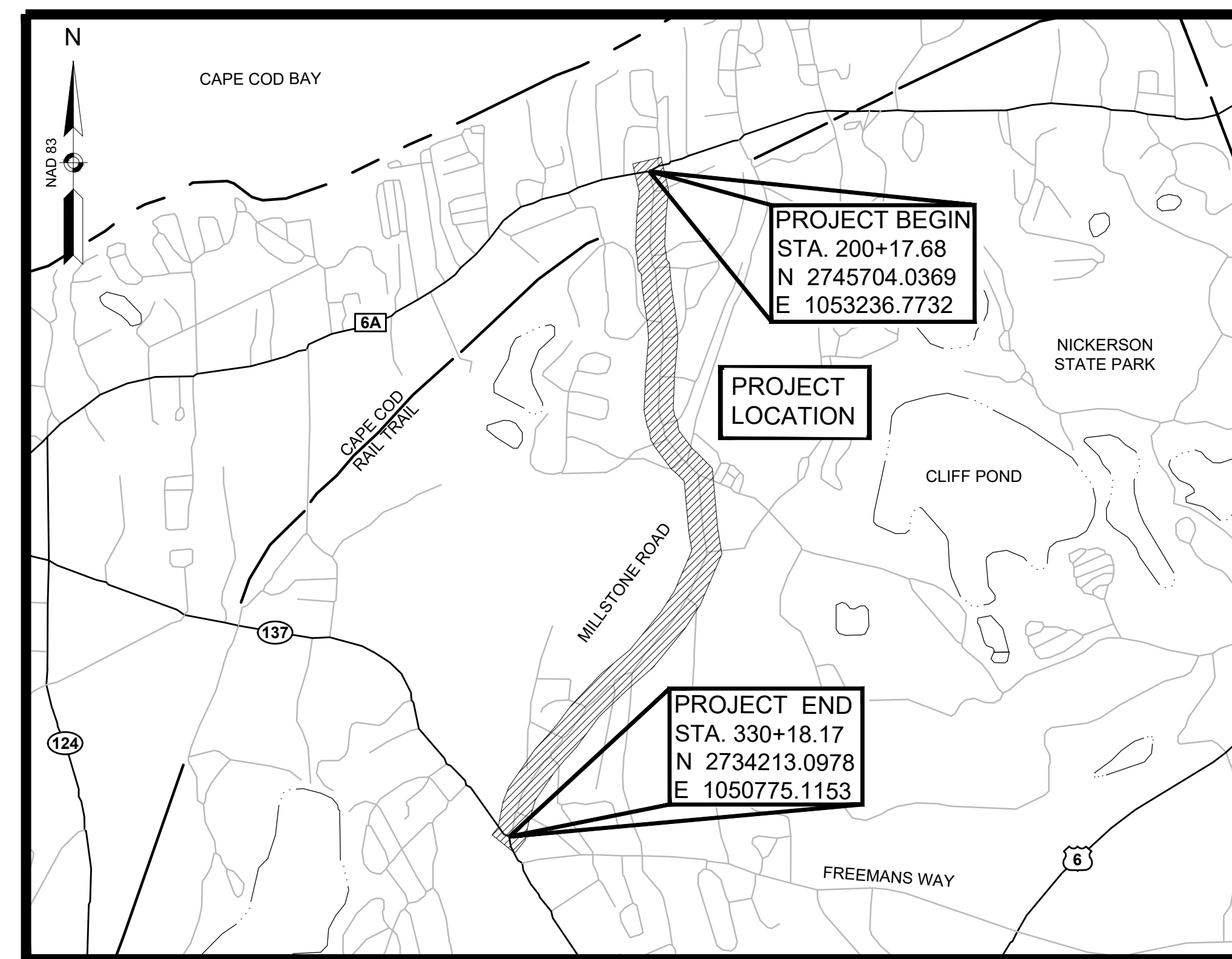
IN THE TOWN OF BREWSTER BARNSTABLE COUNTY

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

Abbreviated Stormwater Management
Permit Planset
(The highlighted sheets in the index below
are included in this set)

INDEX

SHEET NO.	DESCRIPTION
01	TITLE SHEET & INDEX
02	LEGEND
03	ABBREVIATIONS & GENERAL NOTES
04	KEY PLAN
05 - 06	TYPICAL SECTIONS
07	CONSTRUCTION BASELINE TABLES
08 - 19	CONSTRUCTION PLANS
20 - 31	PROFILES
32 - 43	ALIGNMENT & GRADING PLANS
44 - 55	TRAFFIC PLANS
56 - 57	TRAFFIC SIGN SUMMARY SHEET
58	TRAFFIC SIGNAL DETAILS
59 - 63	TEMPORARY TRAFFIC CONTROL PLANS
64 - 75	UTILITY PLANS
76	LANDSCAPE PLAN & DETAILS
77 - 82	CONSTRUCTION DETAILS
83 - 123	CROSS SECTIONS
APPENDICES	
APPENDIX A	EXISTING CONDITIONS DRAINAGE INFRASTRUCTURE INVENTORY
APPENDIX B	PROPOSED CONDITIONS DRAINAGE INFRASTRUCTURE INVENTORY




LENGTH OF PROJECT = 13,022 FEET = 2.466 MILES

100% DESIGN

DESIGN DESIGNATION (MILLSTONE ROAD)

DESIGN SPEED 35-40 MPH
FUNCTIONAL CLASSIFICATION MINOR ARTERIAL

DATE	DESCRIPTION	REV #

ENGINEER		DATE
		
Vanasse Hangen Brustlin, Inc. 101 Walnut St., PO Box 9151 Watertown, MA 02472 617.924.1770 FAX 617.924.2286		
DESIGNED BY MLD	APPROVED BY SHK	SHEET OF 01 123
DRAWN BY DJM	DTFG CHECKED BY SJR	WB CAD FILE NAME 14170.00_HD(COV) - 01
CHECKED BY SJR	DATE OCTOBER, 2022	JOB NO. 14170.00

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
		HAY BALES/SILT FENCE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

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

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	LEACHING BASIN
LG	LEACHING GALLEY
LPL	LIGHT POLE
MH	MANHOLE
MTR	METER
MW	MONITORING WELL
OHW	OVERHEAD WIRE
PEDESTAL	PEDESTAL
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
∠PT	ANGLE POINT
R	RADIUS OF CURVATURE
T	TANGENT DISTANCE OF CURVE
TAN	TANGENT
25.45	SPOT ELEVATION

PROFILE ABBREVIATIONS

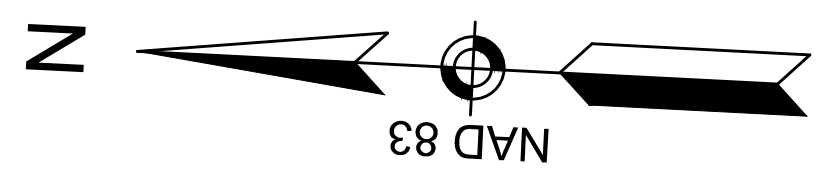
AD	ALGEBRAIC DIFFERENCE IN RATES OF GRADE
HSD	HORIZONTAL SIGHT DISTANCE
K	RATE OF VERTICAL CURVATURE
L	LENGTH OF CURVE
PVC	POINT OF VERTICAL CURVATURE
PVCC	POINT OF VERTICAL COMPOUND CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVRC	POINT OF VERTICAL REVERSE CURVATURE
PVT	POINT OF VERTICAL TANGENCY
SSD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

TRAFFIC & SIGNAL ABBREVIATIONS

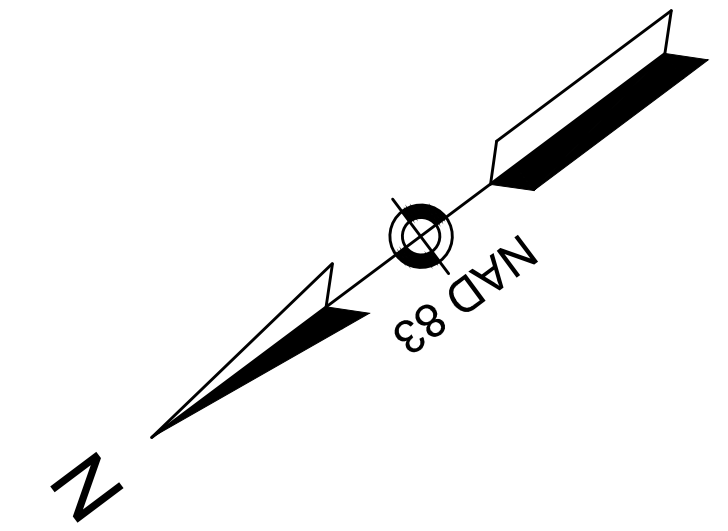
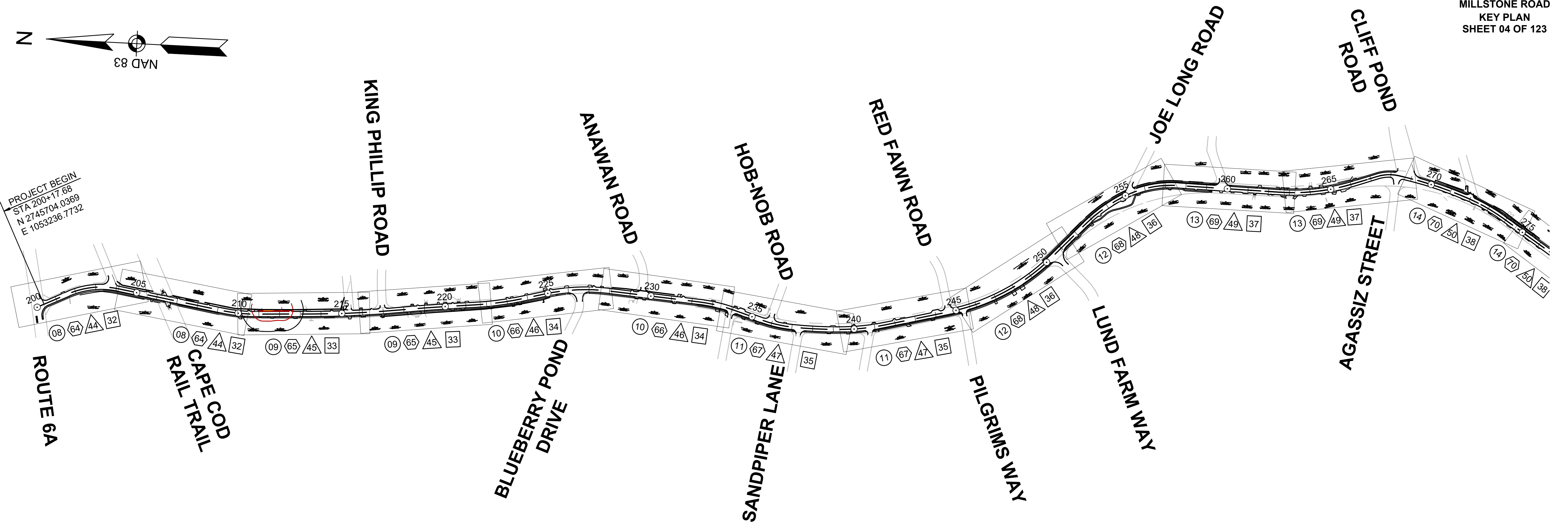
AADT	ANNUAL AVERAGE DAILY TRAFFIC
CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
COND	CONDUIT
CW	CROSS WALK
DW	STEADY DON'T WALK - PORTLAND ORANGE
DHV	DESIGN HOURLY VOLUME
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR AMBER
FYL	FLASHING AMBER LEFT ARROW
FYR	FLASHING AMBER RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
HH	HAND HOLE
OL	OVERLAP
PB	PULL BOX
PED	PEDESTRIAN
PTZ	PAN, TILE, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
SL	STOP LINE
T	TRUCK %
TS OR TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALK
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW

GENERAL NOTES:

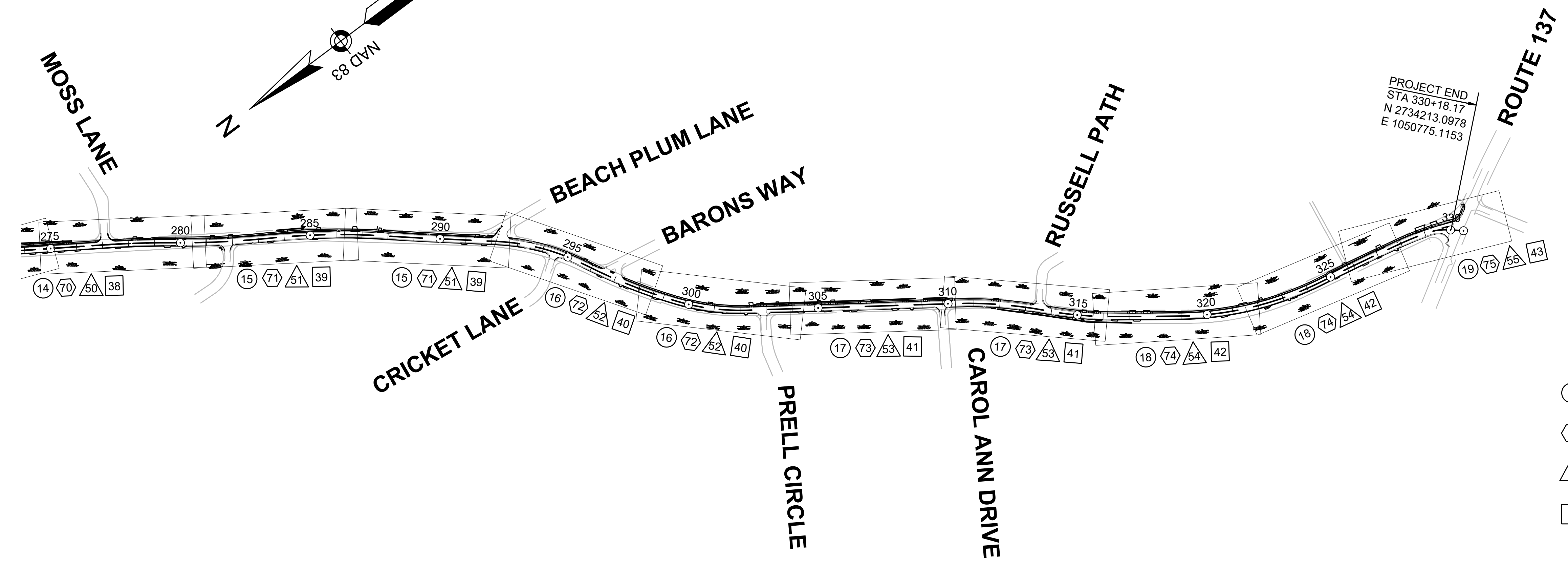
1. EXISTING CONDITIONS AND TOPOGRAPHICAL INFORMATION FROM AN ACTUAL FIELD SURVEY CONDUCTED BY J.M. O'REILLY IN JULY 2018.
2. THE HORIZONTAL CONTROL IS BASED ON THE MASSACHUSETTS MAINLAND STATE PLANE COORDINATE SYSTEM AND THE NATIONAL GEODETIC SURVEY (NAD83). ALL ELEVATION IS US FEET, REFERENCED TO THE NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).
3. THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND GRADES IN THE FIELD BEFORE COMMENCING WORK AND PROMPTLY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
4. 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.
5. 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.
6. THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH PROPOSED UTILITIES. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER.
7. 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.
8. 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.
9. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
10. EXISTING UTILITY POLES WILL BE RELOCATED BY OTHERS IF REQUIRED.
11. TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
12. 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.
13. 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).
14. JOINTS BETWEEN NEW ASPHALT CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
15. 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.
16. ALL EXISTING STATE, COUNTY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATIONS ARE NOT GUARANTEED.
17. 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.
18. DISPOSAL OF ALL SURPLUS MATERIAL SHALL BE AS APPROVED BY THE ENGINEER AND TOWN.
19. LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 0.01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE PLANS.
20. THE CONTRACTOR SHALL COORDINATE THE NEW LOCATION OF ALL PRIVATE MAILBOXES THAT ARE TO BE REMOVED AND RESET WITH THE PROPERTY OWNER.
21. ALL ABANDONED UNDERGROUND PIPE SHALL BE CAPPED WITH A MASONRY PLUG AS INDICATED AND ABANDONED IN PLACE UNLESS NOTED OTHERWISE.



PROJECT BEGIN
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E 1053236.7732

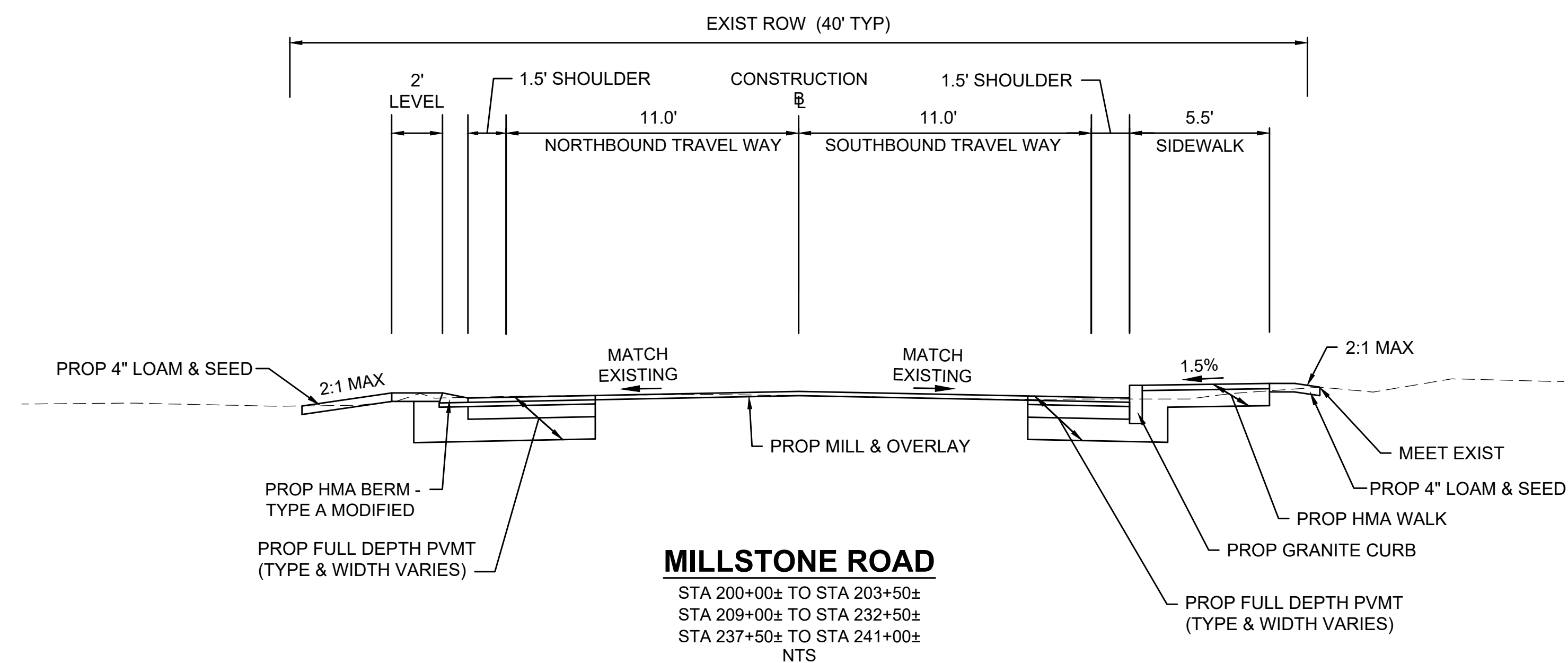
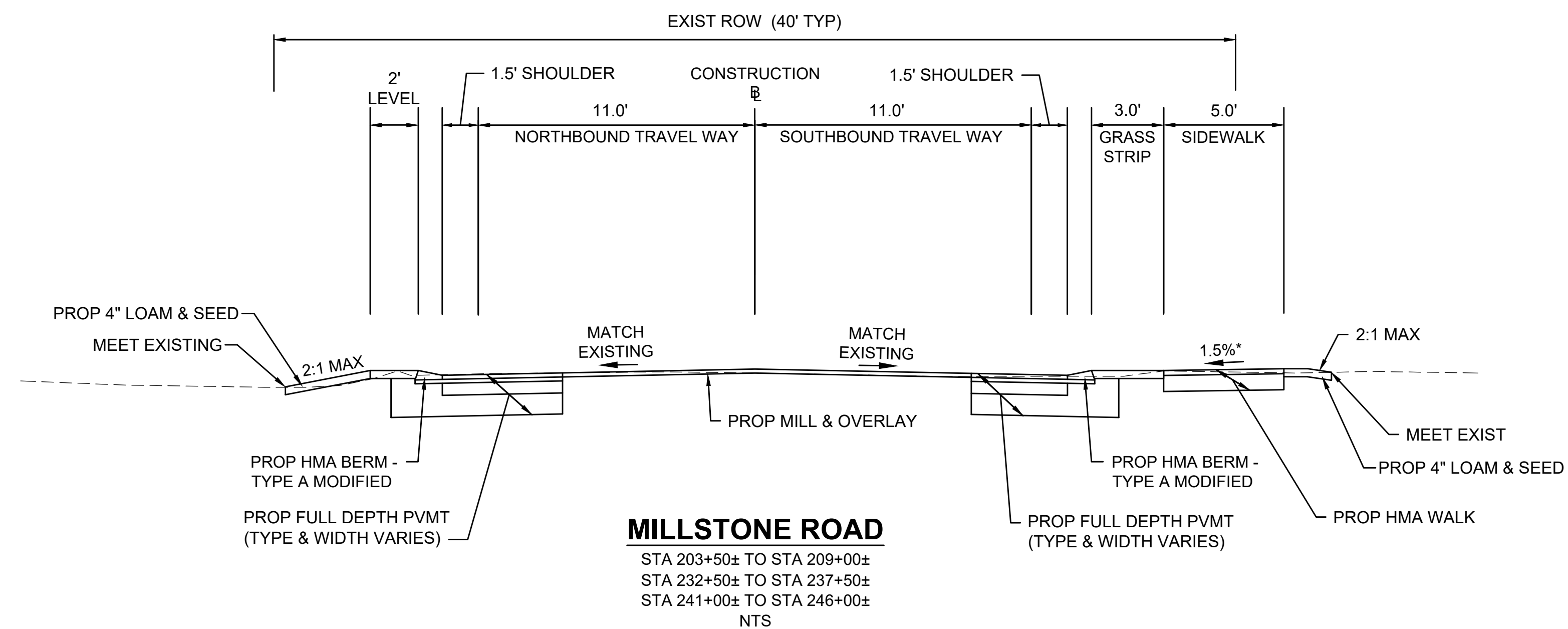
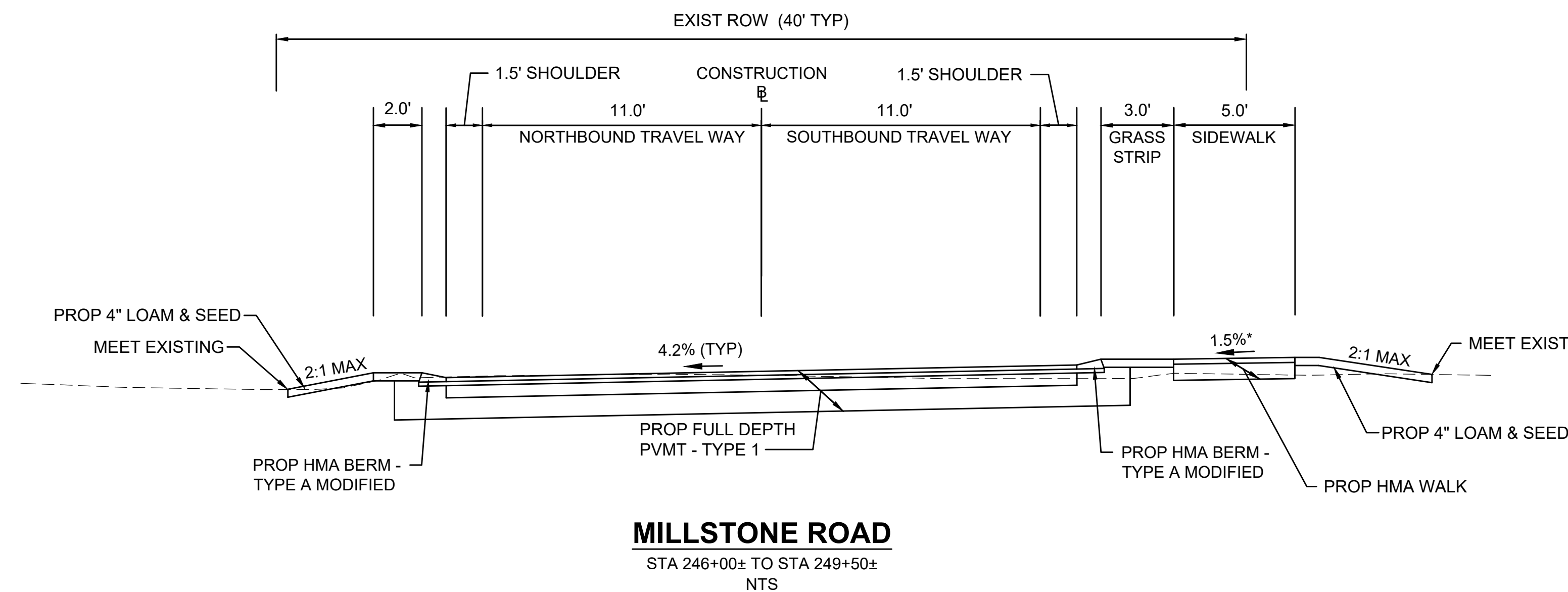


PROJECT END
STA 330+18.17
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LEGEND

- # CONSTRUCTION PLANS
- # UTILITY PLANS
- # TRAFFIC PLANS
- # ALIGNMENT & GRADING PLANS
- # SHEET NUMBER



PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT (TYPE 1)

SURFACE:	1 3/4"	SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
	1 3/4"	SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5)
BASE:	3.5"	SUPERPAVE BASE COURSE 25.0 (SBC-25.0)
SUBBASE:	4"	DENSE GRADED CRUSHED STONE OVER
	8"	GRAVEL BORROW, TYPE b

PROPOSED FULL DEPTH PAVEMENT (TYPE 2) - WIDTH LESS THAN 3 FEET

SURFACE:	1 3/4"	SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
	1 3/4"	SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5)
BASE:	6"	CEMENT CONCRETE BASE COURSE
SUBBASE:	4"	DENSE GRADED CRUSHED STONE OVER
	8"	GRAVEL BORROW, TYPE b

PROPOSED PAVEMENT MILLING AND OVERLAY

SURFACE:	1 3/4"	SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
	2 1/4"	SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5)
MILLING:	3"	PAVEMENT MICROMILLING

PROPOSED HOT MIX ASPHALT DRIVEWAY

SURFACE:	1 1/2"	SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER
	2"	SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5)
SUBBASE:	8"	GRAVEL BORROW, TYPE b

PROPOSED HOT MIX ASPHALT WALK

SURFACE:	1"	SUPERPAVE SURFACE COURSE 9.5 (SSC-9.5) OVER
	1 1/2"	SUPERPAVE INTERMEDIATE COURSE 12.5 (SIC-12.5)
SUBBASE:	8"	GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE WHEELCHAIR RAMP

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

PROPOSED SHELL DRIVEWAY

SURFACE:	4"	SHELLS
SUBBASE:	8"	GRAVEL BORROW, TYPE b

PROPOSED GRAVEL DRIVEWAY

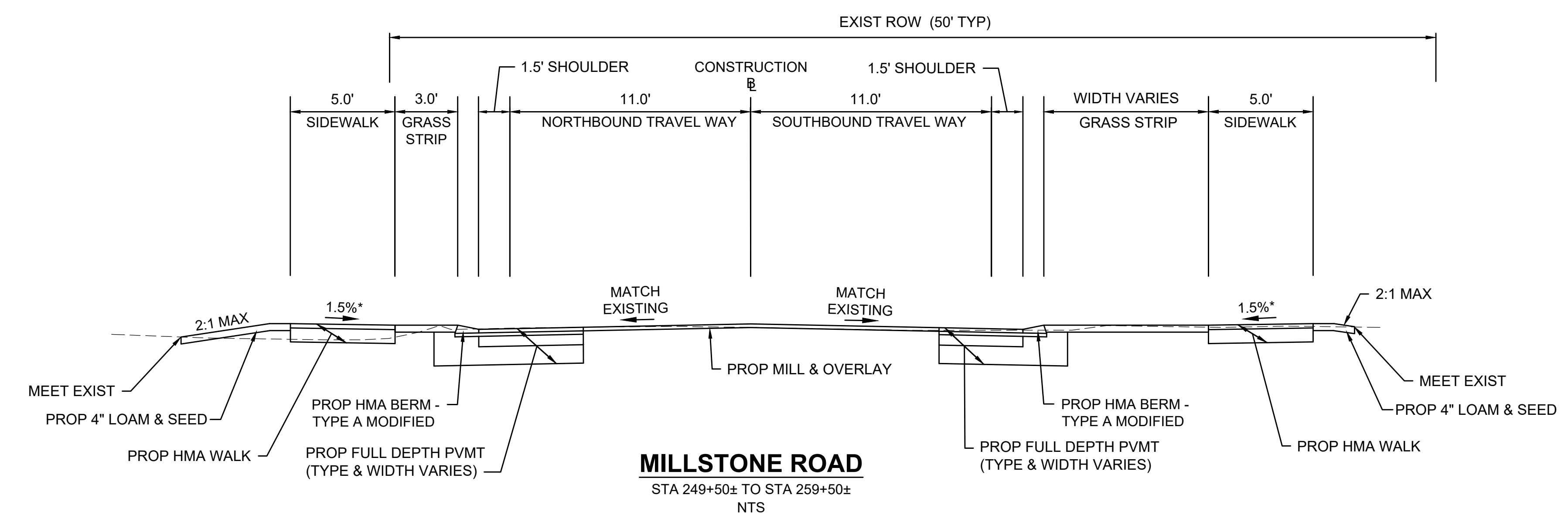
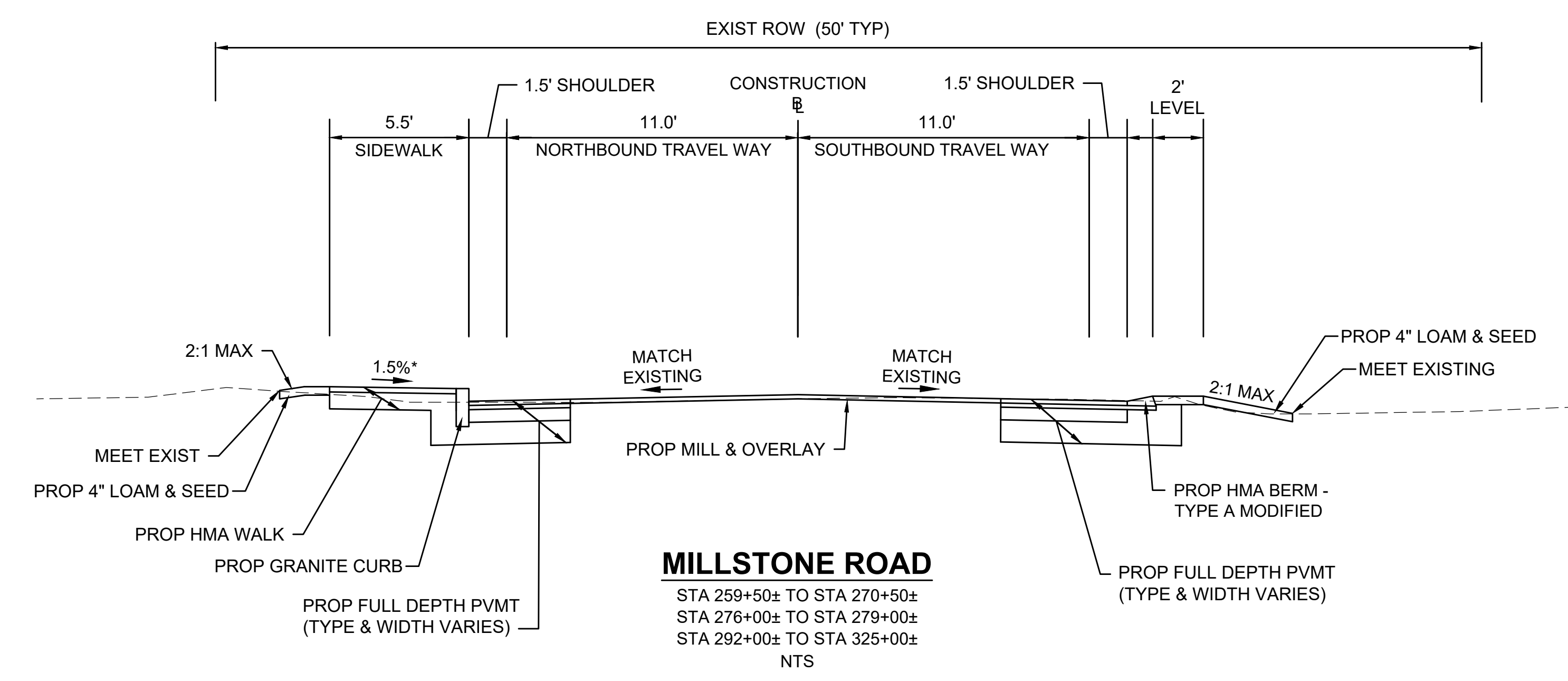
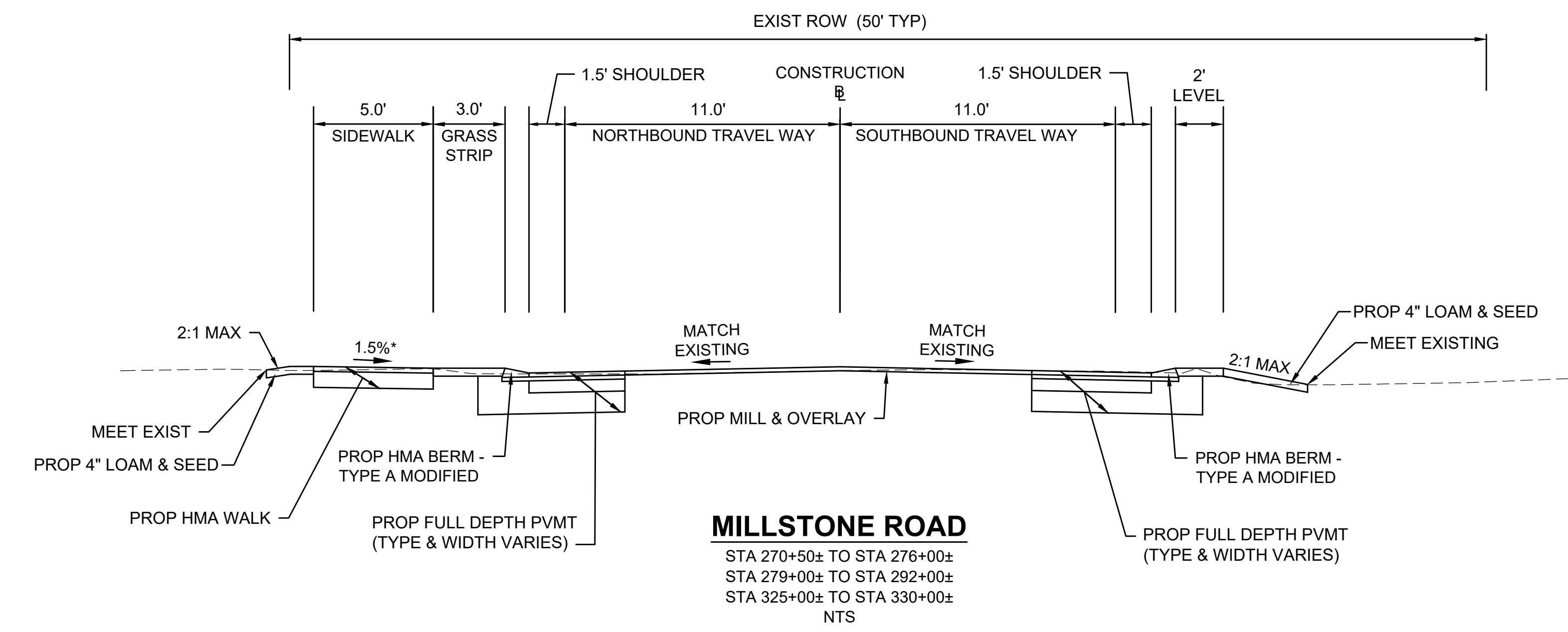
SURFACE:	8"	GRAVEL BORROW, TYPE b
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PROPOSED COBBLESTONE DRIVEWAY

SURFACE:	COBBLESTONES REMOVED AND RELAID, SET IN MORTAR	
SUBBASE:	8"	GRAVEL BORROW, TYPE b

GENERAL NOTES:

- ALL HOT MIX ASPHALT PAVEMENTS SHALL BE PER LATEST EDITION OF SECTION 450 HOT MIX ASPHALT AND SECTION M3 ASPHALTIC MATERIALS.
- ALL HMA FOR PATCHING, ASPHALT EMULSION FOR TACK COAT, AND HMA JOINT SEALANT SHALL BE APPLIED PER SECTION 450 AND M3.
- HMA JOINT SEALANT (ITEM 453.) SHALL BE APPLIED IN SURFACE COURSE AT ALL VERTICAL COLD JOINTS PRIOR TO HMA PAVING.
- ALL HOT MIX ASPHALT WALKS AND DRIVEWAYS SHALL BE ESTIMATED AND PAID FOR UNDER ITEM 702 OF STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
- SURFACE PAVING TO BE COMPLETED AT THE END OF THE PROJECT AND AS DIRECTED WHEN IT CAN BE PLACED IN ITS ENTIRETY.
- ALL FRAMES AND SERVICE BOXES SHALL BE ADJUSTED TO INTERMEDIATE COURSE AND ADJUSTED LEVEL WITH SURFACE COURSE PRIOR TO PAVING WITH HMA JOINT SEALANT.
- WHERE EXISTING CROSS SLOPE EXCEEDS 6% USE A LEVELING COURSE TO REDUCE SLOPE TO 6%.



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
1	CB	200+49.6 13.5 LT	44.33		(2) 38.30	
2	LB	200+51.2 32.6 LT	42.46	(1) 38.00		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
5	CB	202+53.7 5.9 RT	44.55	(7) 39.98	(10) 40.09	PROP FRAME & COVER
6	CB	202+53.6 11.5 RT	44.37		(10) 40.17	
7	EX CB	202+74.2 11.5 RT	44.53		(5) 40.37	REMODEL
8	LB	202+13.0 6.3 RT	45.05	(9) 39.51		
9	LB	202+29.4 6.6 RT	44.91	(10) 39.80	(8) 39.59	

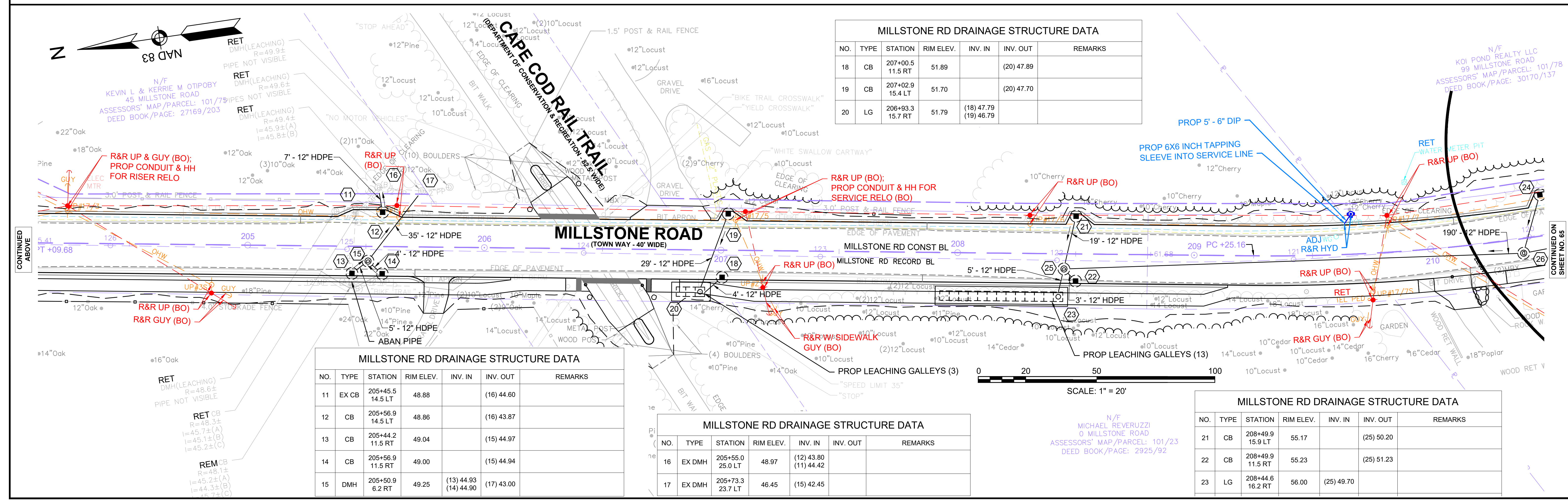
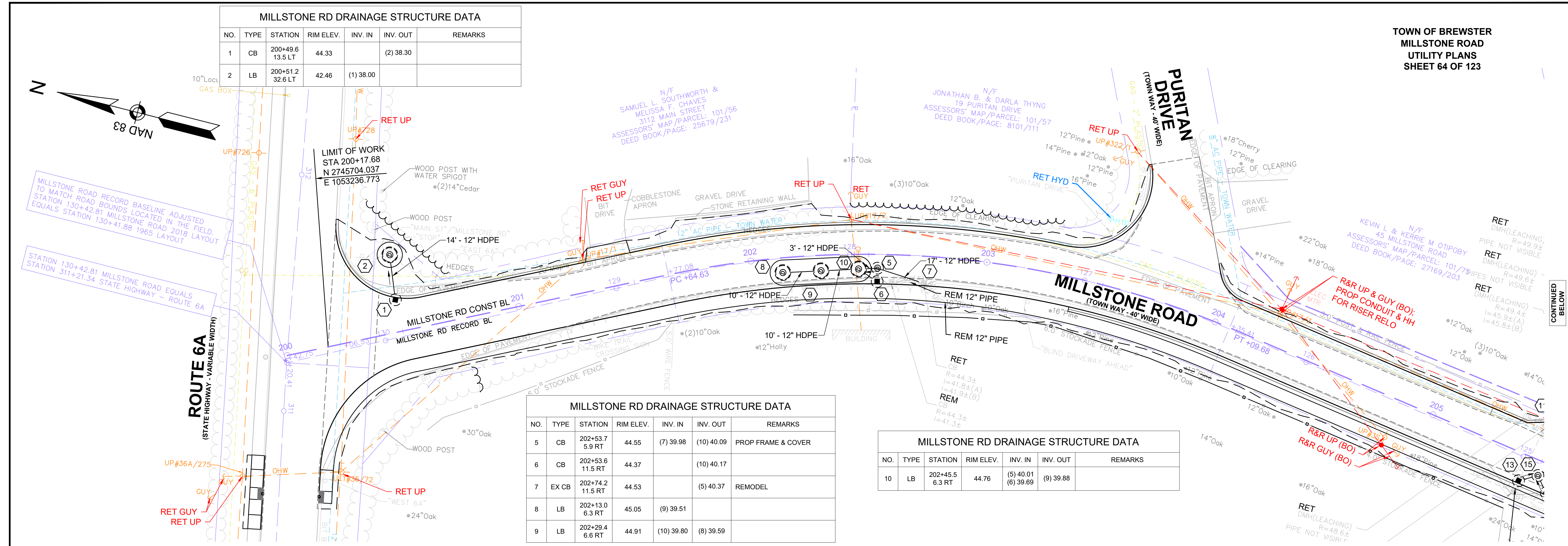
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
10	LB	202+45.5 6.3 RT	44.76	(5) 40.01 (6) 39.69	(9) 39.88	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
18	CB	207+00.5 11.5 RT	51.89		(20) 47.89	
19	CB	207+02.9 15.4 LT	51.70		(20) 47.70	
20	LG	206+93.3 15.7 RT	51.79	(18) 47.79 (19) 46.79		

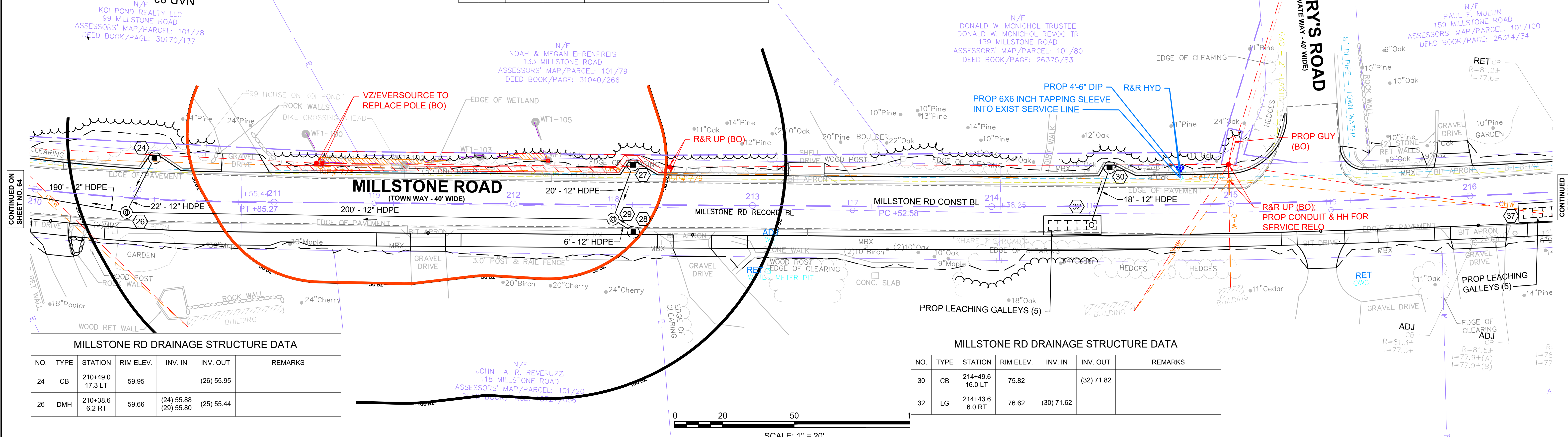
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
11	EX CB	205+45.5 14.5 LT	48.88		(16) 44.80	
12	CB	205+56.9 14.5 LT	48.86		(16) 43.87	
13	CB	205+44.2 11.5 RT	49.04		(15) 44.97	
14	CB	205+56.9 11.5 RT	49.00		(15) 44.94	
15	DMH	205+50.9 6.2 RT	49.25	(13) 44.93 (14) 44.90	(17) 43.00	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
16	EX DMH	205+55.0 25.0 LT	48.97	(12) 43.80 (11) 44.42		
17	EX DMH	205+73.3 23.7 LT	46.45	(15) 42.45		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
21	CB	208+49.9 15.9 LT	55.17		(25) 50.20	
22	CB	208+49.9 11.5 RT	55.23		(25) 51.23	
23	LG	208+44.6 16.2 RT	56.00	(25) 49.70		

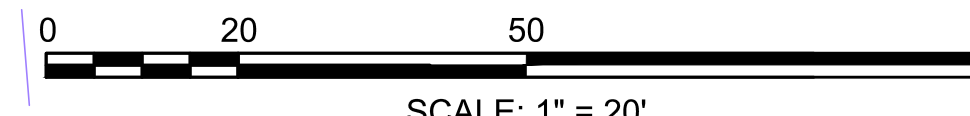


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
27	CB	212+50.0 16.6 LT	65.36		(29) 61.36	
28	CB	212+50.3 11.5 RT	65.32		(29) 61.04	
29	DMH	212+41.7 6.1 RT	65.08	(28) 60.94 (27) 60.94	(26) 60.05	

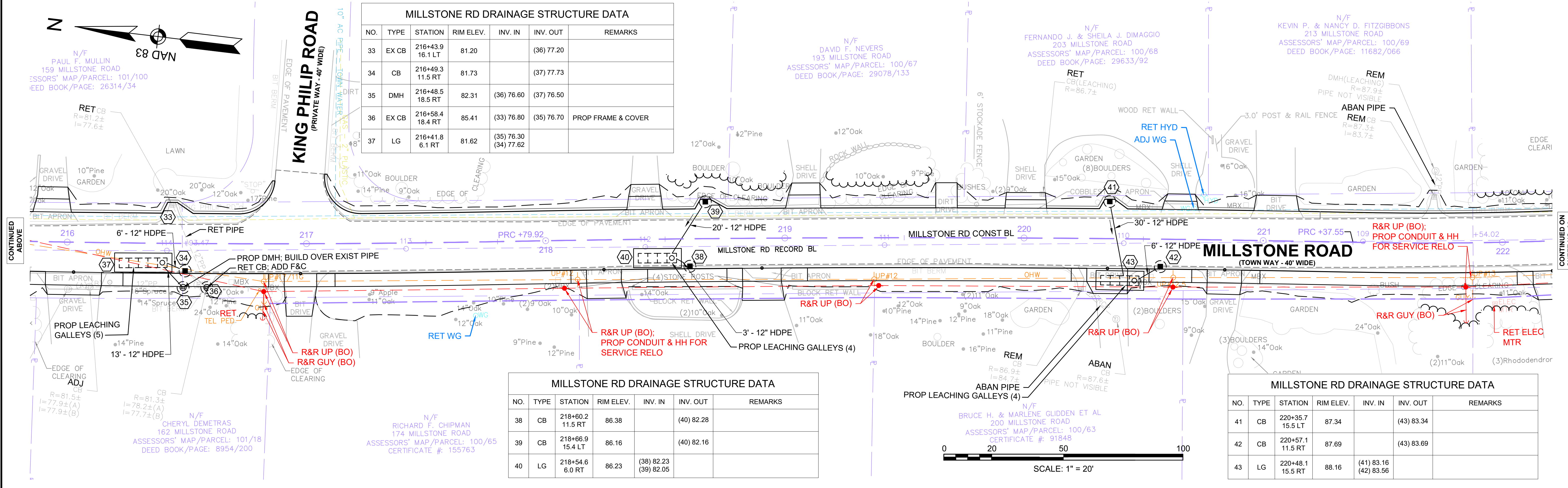
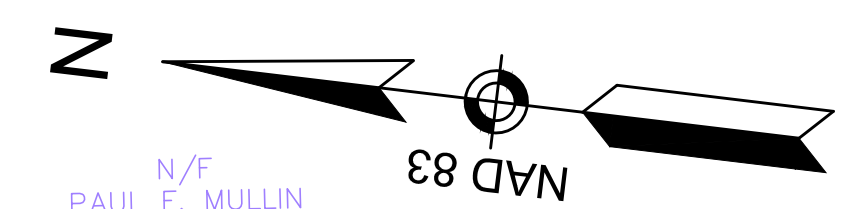


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
24	CB	210+49.0 17.3 LT	59.95		(26) 55.95	
26	DMH	210+38.6 6.2 RT	59.66	(24) 55.88 (29) 55.80	(25) 55.44	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
30	CB	214+49.6 16.0 LT	75.82		(32) 71.82	
32	LG	214+43.6 6.0 RT	76.62	(30) 71.62		

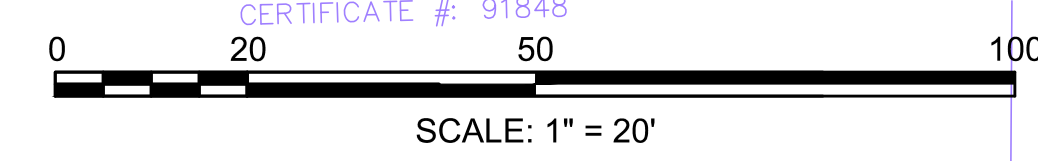


MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
33	EX CB	216+43.9 16.1 LT	81.20		(36) 77.20	
34	CB	216+49.3 11.5 RT	81.73		(37) 77.73	
35	DMH	216+48.5 18.5 RT	82.31	(36) 76.60 (37) 76.50		
36	EX CB	216+58.4 18.4 RT	85.41	(33) 76.80 (35) 76.70		PROP FRAME & COVER
37	LG	216+41.8 6.1 RT	81.62	(35) 76.30 (34) 77.62		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
38	CB	218+60.2 11.5 RT	86.38		(40) 82.28	
39	CB	218+66.9 15.4 LT	86.16		(40) 82.16	
40	LG	218+54.6 6.0 RT	86.23	(38) 82.23 (39) 82.05		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
41	CB	220+35.7 15.5 LT	87.34		(43) 83.34	
42	CB	220+57.1 11.5 RT	87.69		(43) 83.69	
43	LG	220+48.1 15.5 RT	88.16	(41) 83.16 (42) 83.56		



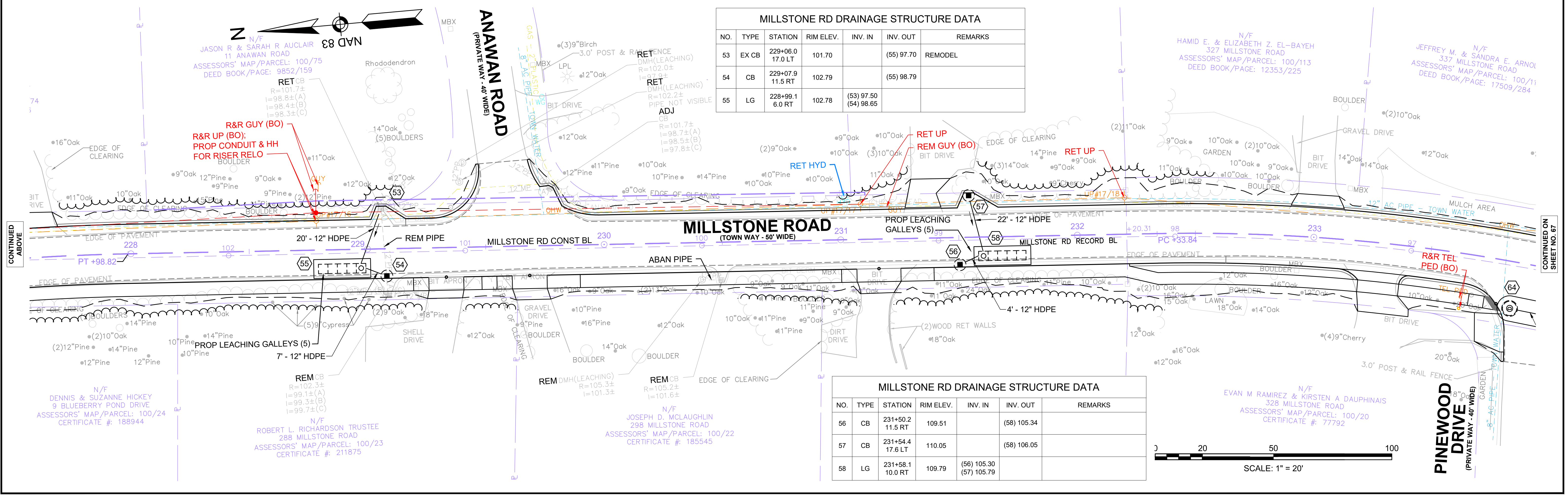
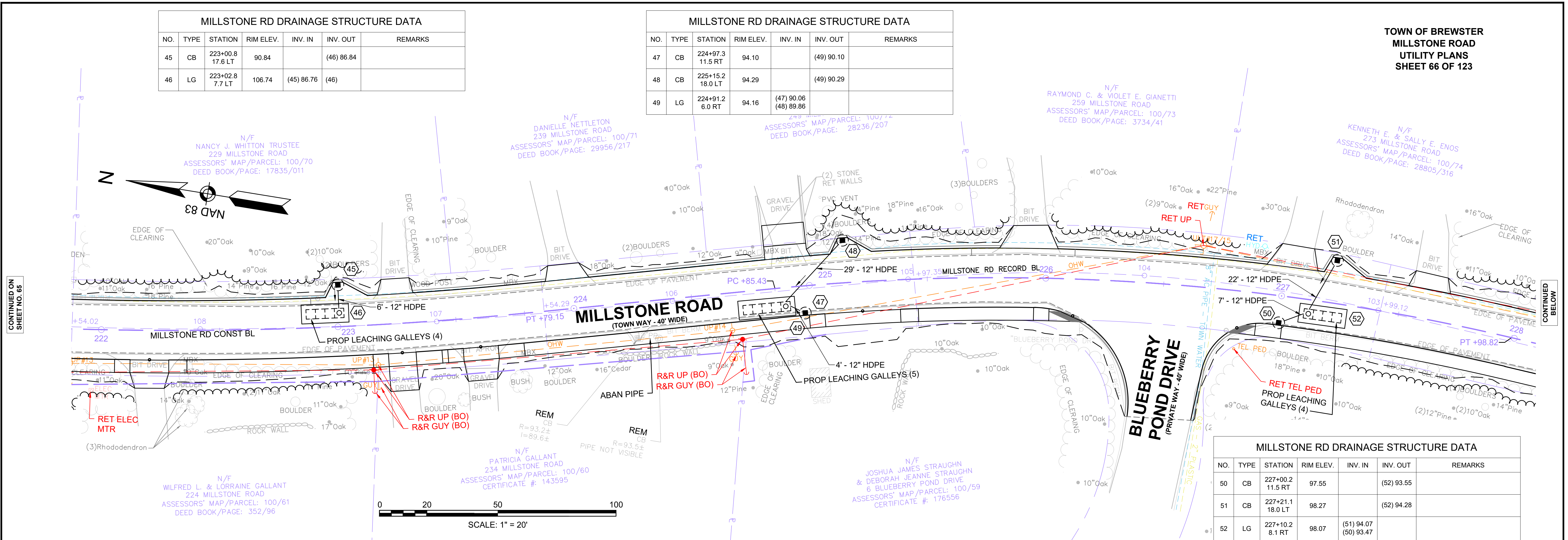
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
45	CB	223+00.8 17.6 LT	90.84		(46) 86.84	
46	LG	223+02.8 7.7 LT	106.74	(45) 86.76	(46)	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
47	CB	224+97.3 11.5 RT	94.10		(49) 90.10	
48	CB	225+15.2 18.0 LT	94.29		(49) 90.29	
49	LG	224+91.2 6.0 RT	94.16	(47) 90.06 (48) 89.86		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
50	CB	227+00.2 11.5 RT	97.55		(52) 93.55	
51	CB	227+21.1 18.0 LT	98.27		(52) 94.28	
52	LG	227+10.2 8.1 RT	98.07	(51) 94.07 (50) 93.47		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
53	EX CB	229+06.0 17.0 LT	101.70		(55) 97.70	REMODEL
54	CB	229+07.9 11.5 RT	102.79		(55) 98.79	
55	LG	228+99.1 6.0 RT	102.78	(53) 97.50 (54) 98.65		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
56	CB	231+50.2 11.5 RT	109.51		(58) 105.34	
57	CB	231+54.4 17.6 LT	110.05		(58) 106.05	
58	LG	231+58.1 10.0 RT	109.79	(56) 105.30 (57) 105.79		



CONTINUED ON
SHEET NO. 65

CONTINUED
SHEET NO. 67

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
59	CB	234+34.9 19.5 LT	118.58		(65) 114.58	
60	CB	234+52.1 19.5 LT	118.73		(63) 114.73	
61	CB	234+34.9 11.5 RT	118.79		(63) 114.79	
62	CB	234+52.1 11.5 RT	119.02		(63) 115.02	
63	DMH	234+39.5 15.0 RT	118.87	(61) 114.77 (62) 114.77 (60) 114.57	(65) 114.47	
64	LB	233+86.8 19.8 RT	118.96	(65) 114.06		
65	LB	234+08.6 19.9 RT	118.57	(63) 114.27 (59) 114.27	(64) 114.17	

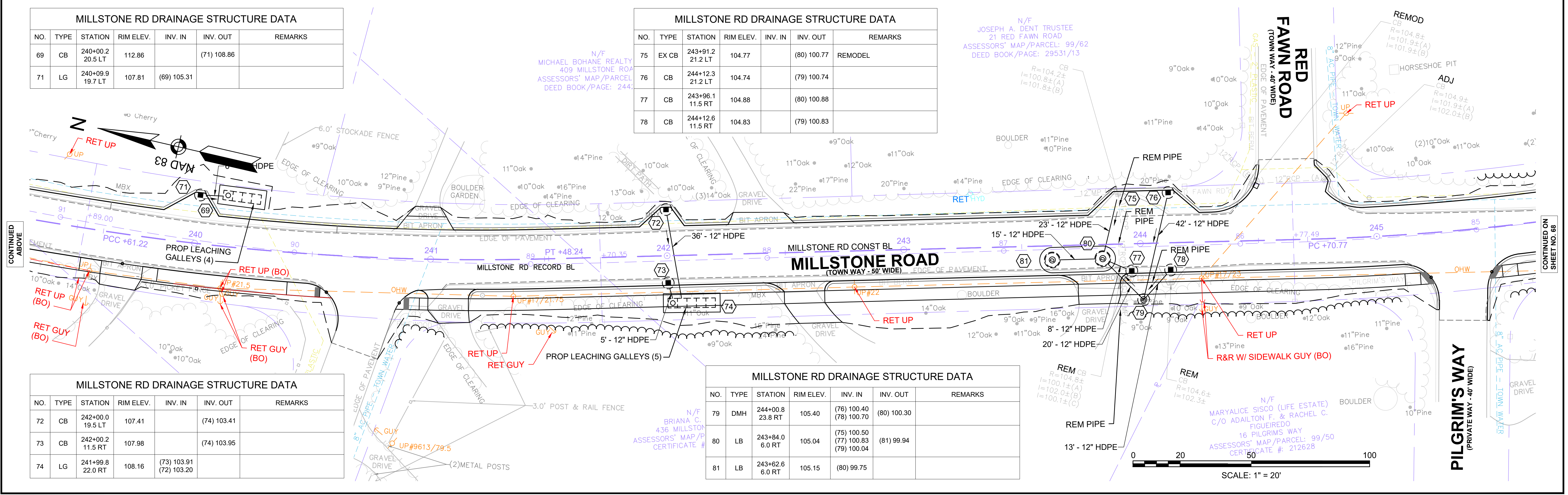
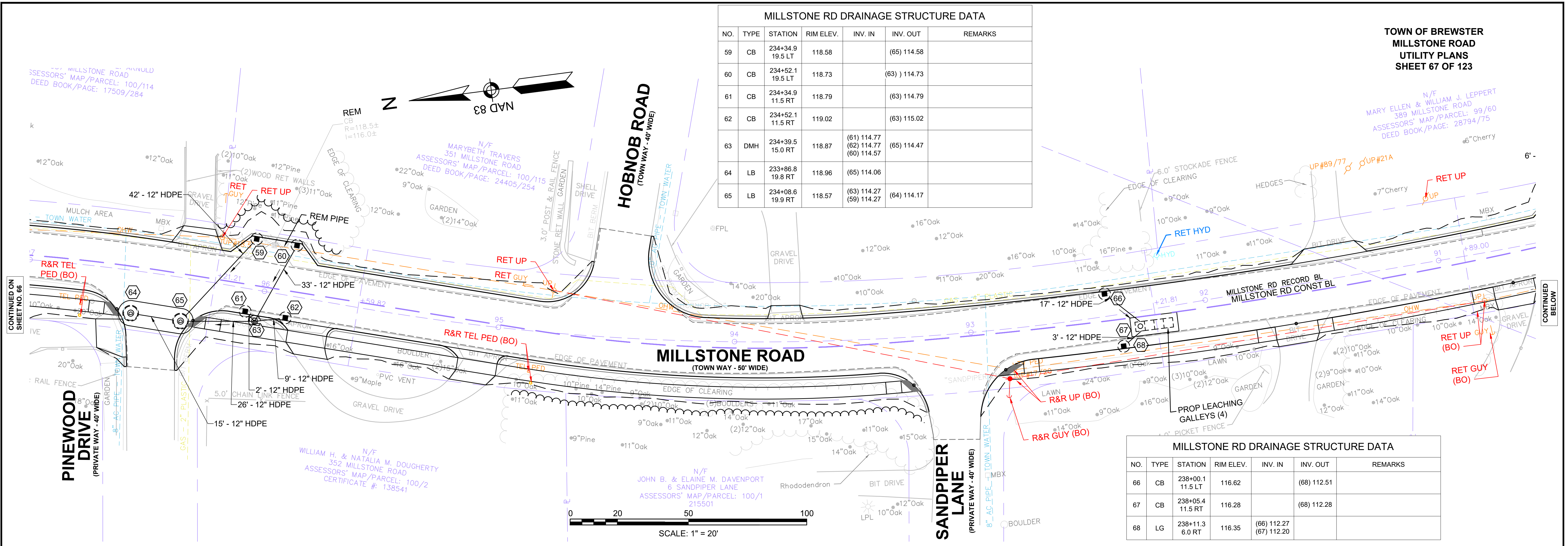
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NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
66	CB	238+00.1 11.5 LT	116.62		(68) 112.51	
67	CB	238+05.4 11.5 RT	116.28		(68) 112.28	
68	LG	238+11.3 6.0 RT	116.35	(68) 112.27 (67) 112.20		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
75	EX CB	243+91.2 21.2 LT	104.77		(80) 100.77	REMODEL
76	CB	244+12.3 21.2 LT	104.74		(79) 100.74	
77	CB	243+96.1 11.5 RT	104.88		(80) 100.88	
78	CB	244+12.6 11.5 RT	104.83		(79) 100.83	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
69	CB	240+00.2 20.5 LT	112.86		(71) 108.86	
71	LG	240+09.9 19.7 LT	107.81	(69) 105.31		

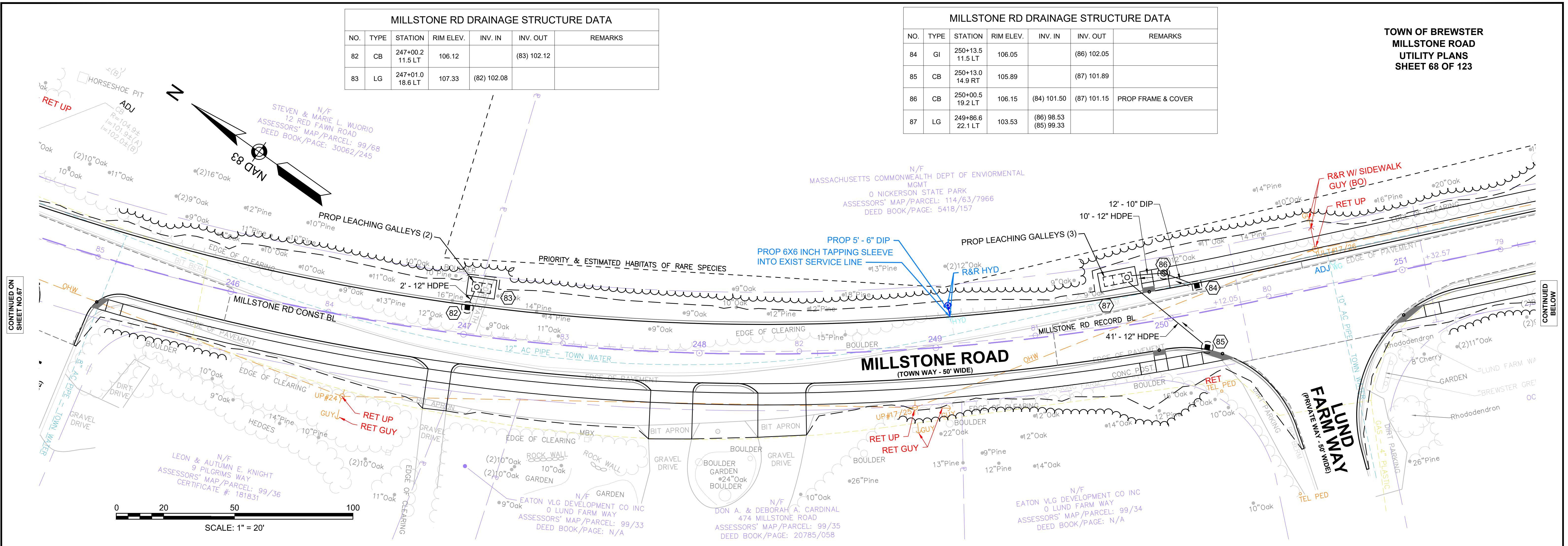
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
72	CB	242+00.0 19.5 LT	107.41		(74) 103.41	
73	CB	242+00.2 11.5 RT	107.98		(74) 103.95	
74	LG	241+99.8 22.0 RT	108.16	(73) 103.91 (72) 103.20		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
79	DMH	244+00.8 23.8 RT	105.40	(78) 100.40 (78) 100.70	(80) 100.30	
80	LB	243+84.0 6.0 RT	105.04	(75) 100.50 (77) 100.83 (79) 100.04	(81) 99.94	
81	LB	243+62.6 6.0 RT	105.15	(80) 99.75		



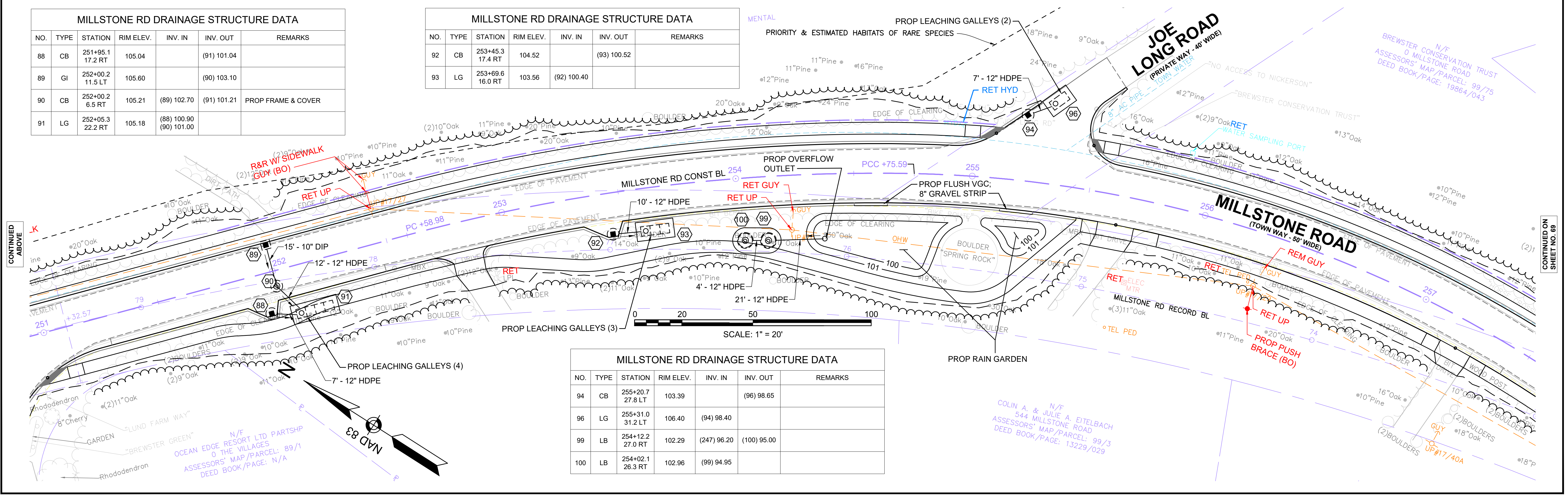
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NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
82	CB	247+00.2 11.5 LT	106.12		(83) 102.12	
83	LG	247+01.0 18.6 LT	107.33	(82)	102.08	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
84	GI	250+13.5 11.5 LT	106.05		(86) 102.05	
85	CB	250+13.0 14.9 RT	105.89		(87) 101.89	
86	CB	250+00.5 19.2 LT	106.15	(84) 101.50	(87) 101.15	PROP FRAME & COVER
87	LG	249+86.6 22.1 LT	103.53	(86) 98.53 (85) 99.33		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
88	CB	251+95.1 17.2 RT	105.04		(91) 101.04	
89	GI	252+00.2 11.5 LT	105.60		(90) 103.10	
90	CB	252+00.2 6.5 RT	105.21	(89) 102.70	(91) 101.21	PROP FRAME & COVER
91	LG	252+05.3 22.2 RT	105.18	(88) 100.90 (90) 101.00		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
92	CB	253+45.3 17.4 RT	104.52		(93) 100.52	
93	LG	253+69.6 16.0 RT	103.56	(92)	100.40	



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
94	CB	255+20.7 27.8 LT	103.39		(96) 98.65	
96	LG	255+31.0 31.2 LT	106.40	(94) 98.40		
99	LB	254+12.2 27.0 RT	102.29	(247) 96.20	(100) 95.00	
100	LB	254+02.1 26.3 RT	102.96	(99) 94.95		

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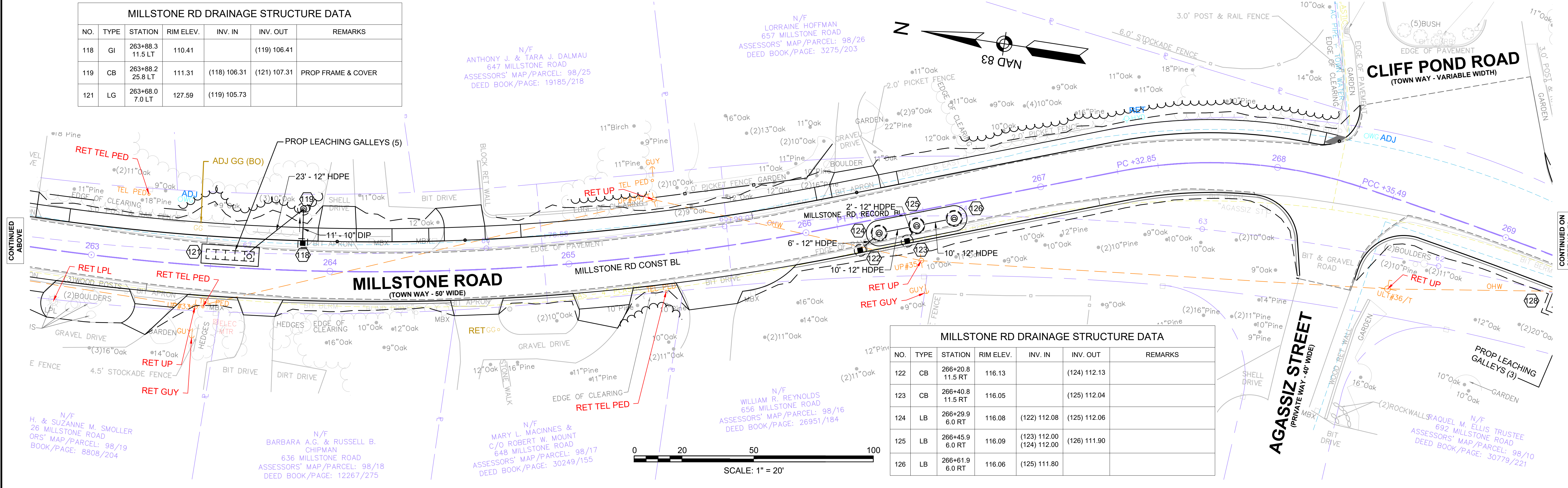
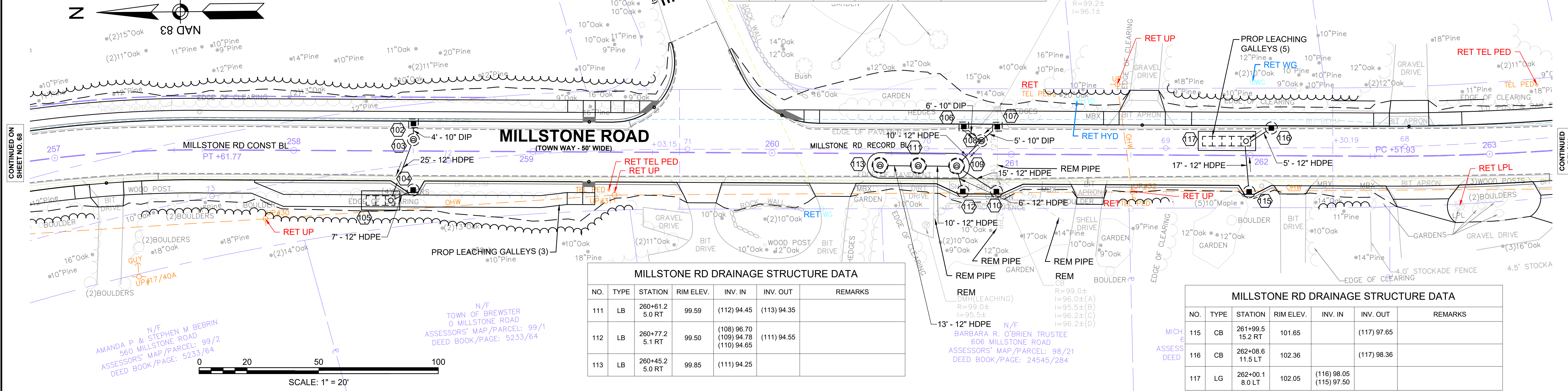
**TOWN OF BREWSTER
MILLSTONE ROAD
UTILITY PLANS
SHEET 69 OF 123**

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
102	GI	258+50.0 11.5 LT	103.83		(103) 98.84	
103	CB	258+50.0 4.7 LT	103.94	(102) 98.60	(105) 98.72	PROP FRAME & COVER
104	CB	258+50.0 16.3 RT	103.75		(105) 98.26	
105	LG	258+30.4 22.8 RT	102.43	(104) 98.20 (103) 98.43		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
106	GI	260+80.2 11.5 LT	99.56		(108) 97.06	
107	GI	260+94.2 11.5 LT	99.51		(108) 97.00	
108	CB	260+87.5 5.6 LT	99.67	(106) 97.00 (107) 96.95	(112) 96.85	PROP FRAME & COVER
109	CB	260+79.9 15.7 RT	98.82		(112) 94.82	
110	CB	260+93.9 15.7 RT	98.75		(112) 94.74	

N/F
BRIAN R. & DONNA S. MURPHY
611 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 98/22
DEED BOOK/PAGE: 19334/238

N/F
L'HEUREUX GERARD/ETAL TRUSTEES
THE L'HEUREUX REALTY TRUST
0 MILLSTONE ROAD
ASSESSORS' MAP/PARCEL: 98/23
DEED BOOK/PAGE: 21730/92



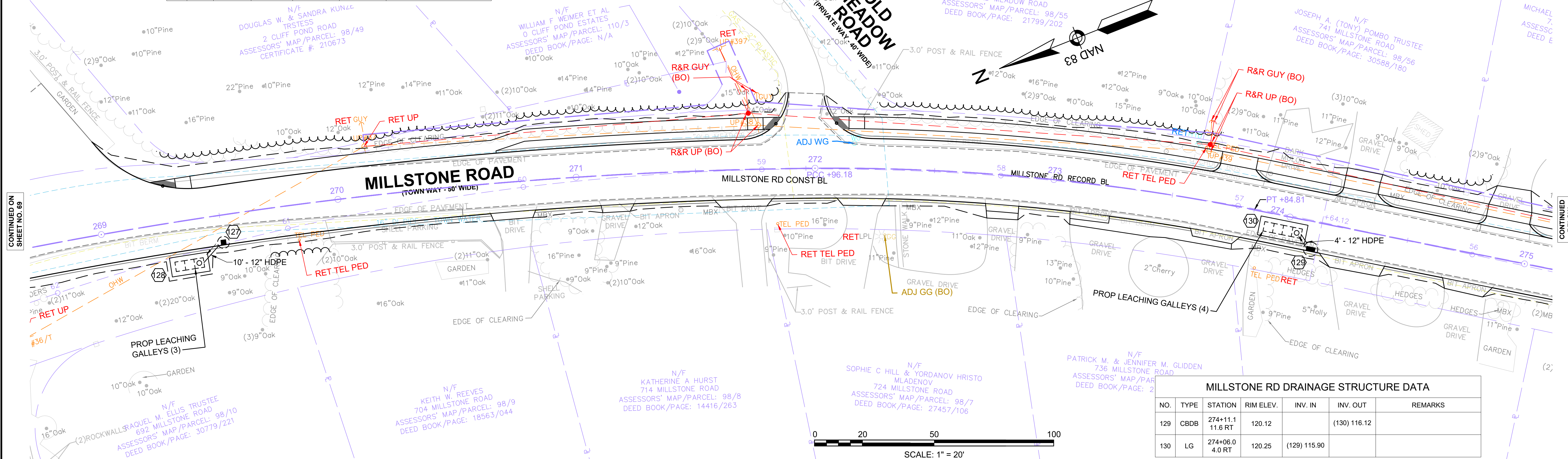
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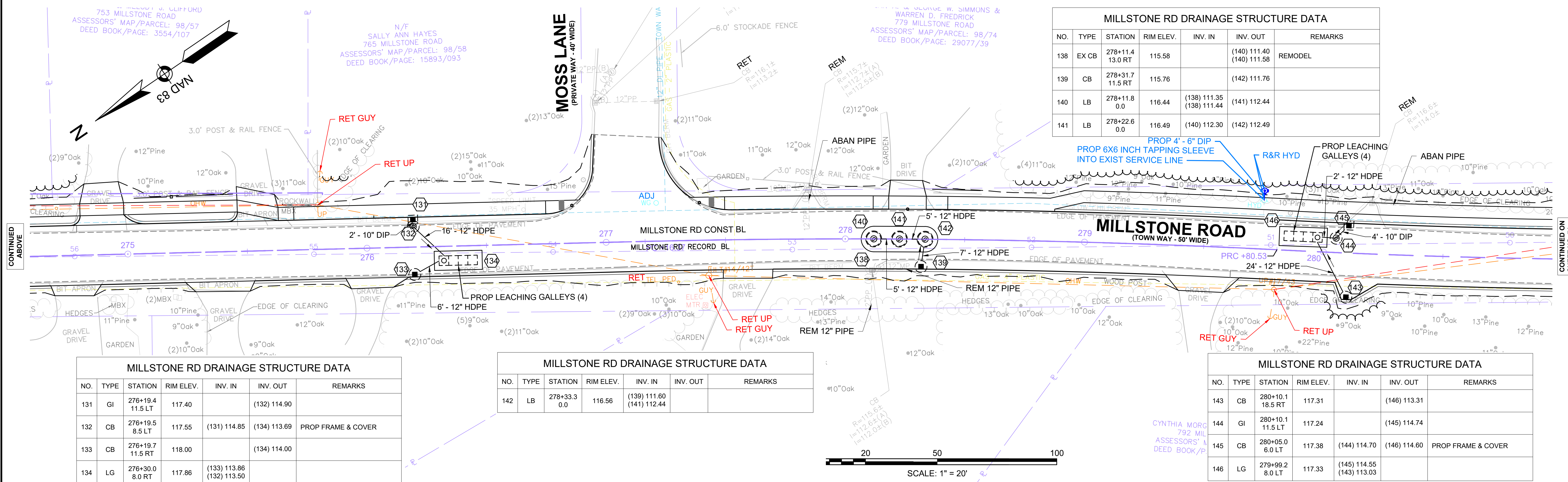
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SHEET NO. 70

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
127	CB	269+50.0 11.5 RT	118.70		(128) 113.80	
128	LG	269+28.5 20.5 RT	117.64	(127) 113.64		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
129	CBDB	274+11.1 11.6 RT	120.12		(130) 116.12	
130	LG	274+06.0 4.0 RT	120.25	(129) 115.90		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
131	GI	276+19.4 11.5 LT	117.40		(132) 114.90	
132	CB	276+19.5 8.5 LT	117.55	(131) 114.85	(134) 113.69	PROP FRAME & COVER
133	CB	276+19.7 11.5 RT	118.00		(134) 114.00	
134	LG	276+30.0 8.0 RT	117.86	(133) 113.86 (132) 113.50		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
142	LB	278+33.3 0.0	116.56	(139) 111.60 (141) 112.44		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
138	EX CB	278+11.4 13.0 RT	115.58		(140) 111.40 (140) 111.58	REMODEL
139	CB	278+31.7 11.5 RT	115.76		(142) 111.76	
140	LB	278+11.8 0.0	116.44	(138) 111.35 (138) 111.44	(141) 112.44	
141	LB	278+22.6 0.0	116.49	(140) 112.30	(142) 112.49	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
143	CB	280+10.1 18.5 RT	117.31		(146) 113.31	
144	GI	280+10.1 11.5 LT	117.24		(145) 114.74	
145	CB	280+05.0 6.0 LT	117.38	(144) 114.70	(146) 114.60	PROP FRAME & COVER
146	LG	279+99.2 8.0 LT	117.33	(145) 114.55 (143) 113.03		

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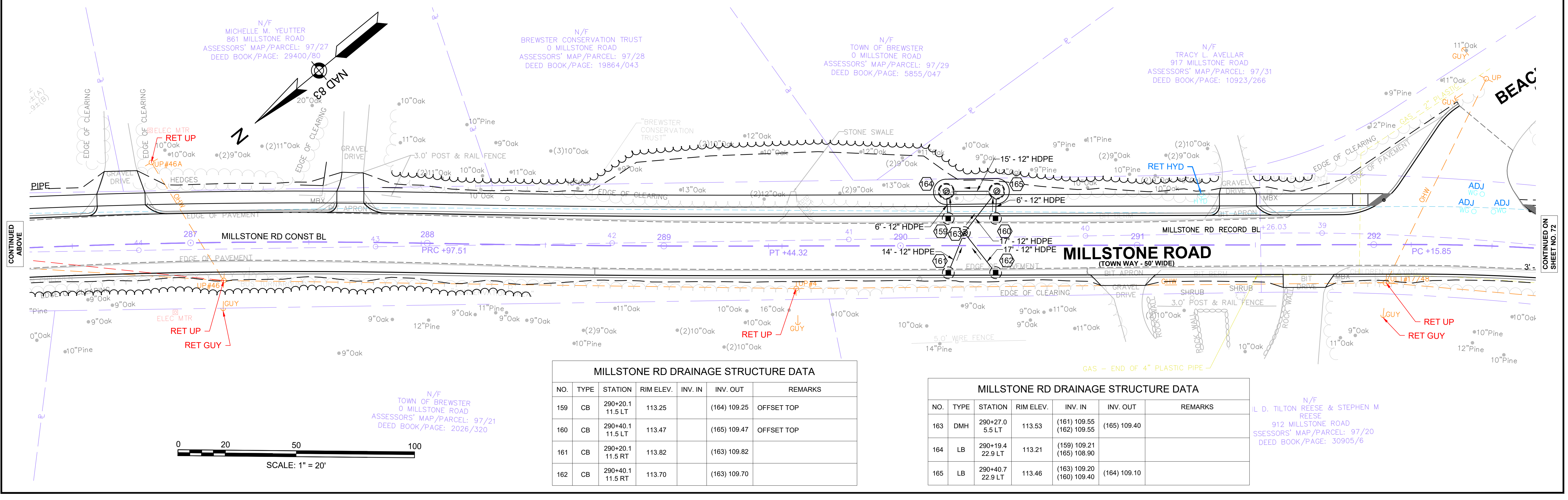
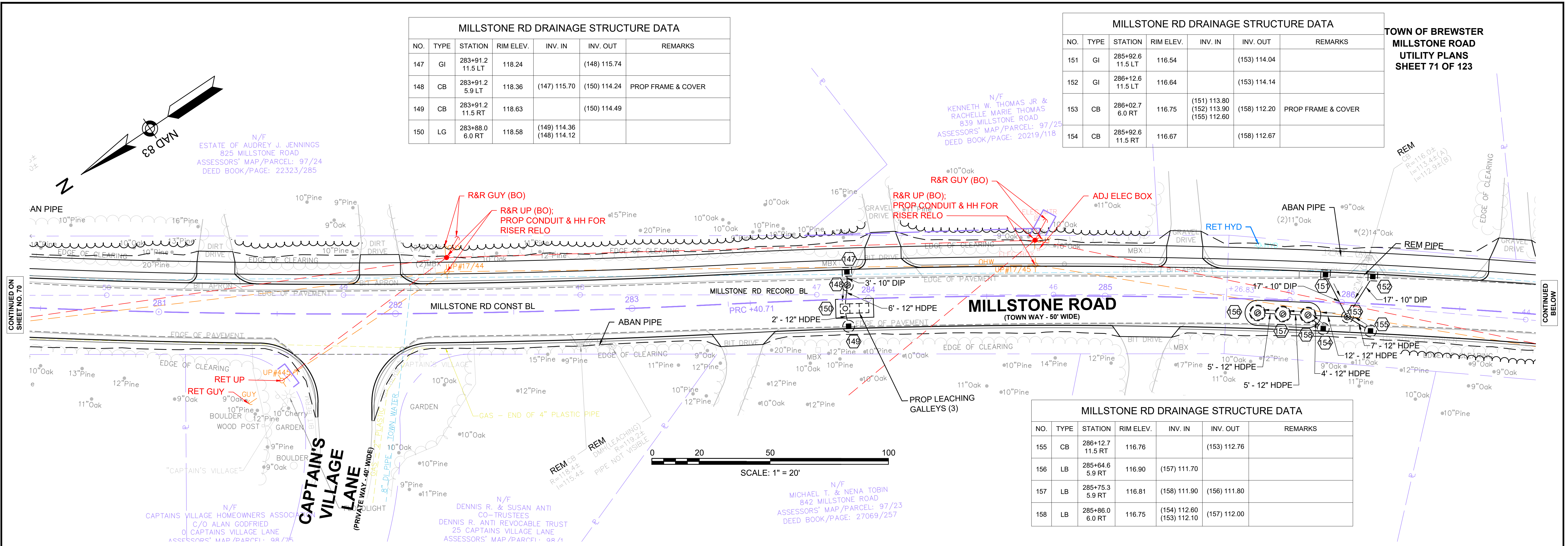
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NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
147	GI	283+91.2 11.5 LT	118.24		(148) 115.74	
148	CB	283+91.2 5.9 LT	118.36	(147) 115.70	(150) 114.24	PROP FRAME & COVER
149	CB	283+91.2 11.5 RT	118.63		(150) 114.49	
150	LG	283+88.0 6.0 RT	118.58	(149) 114.36 (148) 114.12		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
151	GI	285+92.6 11.5 LT	116.54		(153) 114.04	
152	GI	286+12.6 11.5 LT	116.64		(153) 114.14	
153	CB	286+02.7 6.0 RT	116.75	(151) 113.80 (152) 113.90 (155) 112.60	(158) 112.20	PROP FRAME & COVER
154	CB	285+92.6 11.5 RT	116.67		(158) 112.67	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
155	CB	286+12.7 11.5 RT	116.76		(153) 112.76	
156	LB	285+64.6 5.9 RT	116.90	(157) 111.70		
157	LB	285+75.3 5.9 RT	116.81	(158) 111.90	(156) 111.80	
158	LB	285+86.0 6.0 RT	116.75	(154) 112.60 (153) 112.10	(157) 112.00	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
159	CB	290+20.1 11.5 LT	113.25		(164) 109.25	OFFSET TOP
160	CB	290+40.1 11.5 LT	113.47		(165) 109.47	OFFSET TOP
161	CB	290+20.1 11.5 RT	113.82		(163) 109.82	
162	CB	290+40.1 11.5 RT	113.70		(163) 109.70	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
163	DMH	290+27.0 5.5 LT	113.53	(161) 109.55 (162) 109.55	(165) 109.40	
164	LB	290+19.4 22.9 LT	113.21	(159) 109.21 (165) 108.90		
165	LB	290+40.7 22.9 LT	113.46	(163) 109.20 (160) 109.40	(164) 109.10	



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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
166	CB	292+99.4 11.5 LT	112.76		(168) 108.76	
167	CB	293+19.4 11.5 LT	112.75		(168) 108.75	
168	DMH	293+09.7 5.5 LT	112.74	(166) 108.65 (167) 108.65	(172) 108.55	
169	CB	292+99.4 11.5 RT	112.59		(171) 108.59	

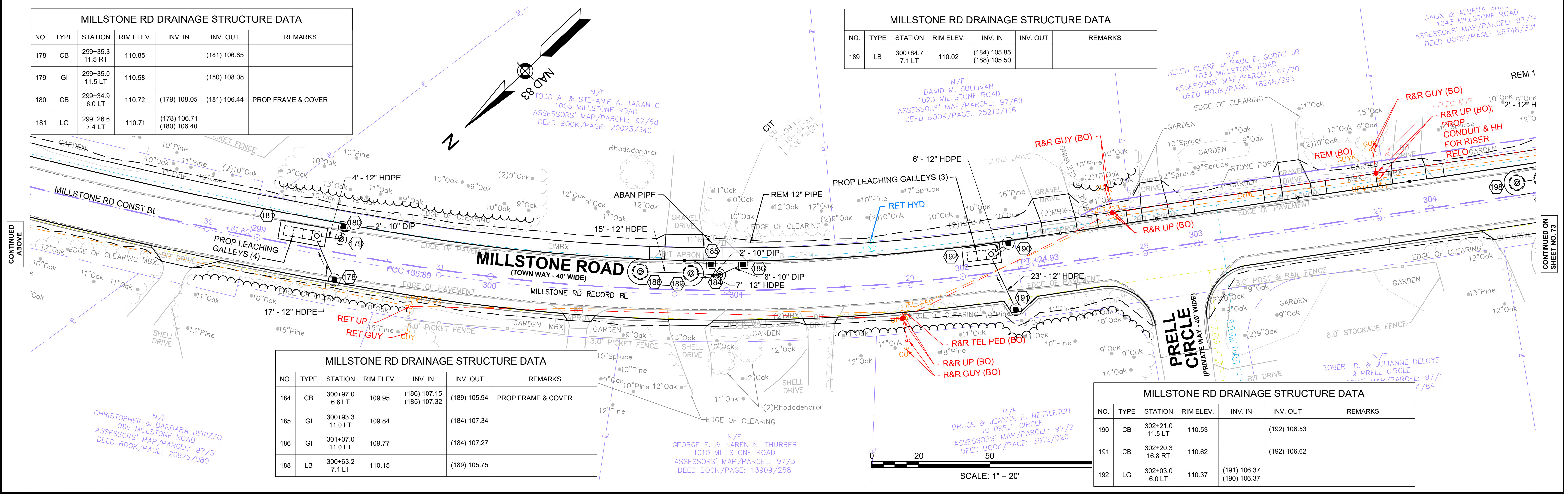
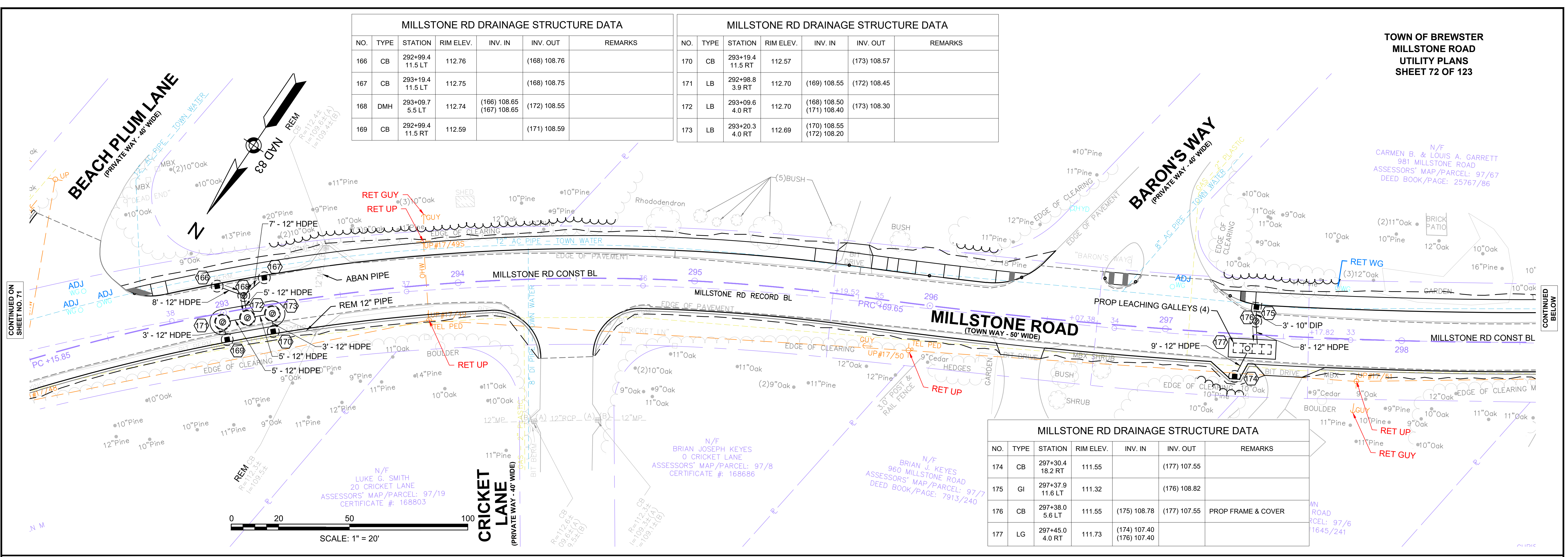
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
170	CB	293+19.4 11.5 RT	112.57		(173) 108.57	
171	LB	292+98.8 3.9 RT	112.70	(169) 108.55	(172) 108.45	
172	LB	293+09.6 4.0 RT	112.70	(168) 108.50 (171) 108.40	(173) 108.30	
173	LB	293+20.3 4.0 RT	112.69		(170) 108.55 (172) 108.20	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
174	CB	297+30.4 18.2 RT	111.55		(177) 107.55	
175	GI	297+37.9 11.6 LT	111.32		(176) 108.82	
176	CB	297+38.0 5.6 LT	111.55	(175) 108.78	(177) 107.55	PROP FRAME & COVER
177	LG	297+45.0 4.0 RT	111.73	(174) 107.40 (176) 107.40		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
189	LB	300+84.7 7.1 LT	110.02	(184) 105.85 (188) 105.50		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
178	CB	299+35.3 11.5 RT	110.85		(181) 106.85	
179	GI	299+35.0 11.5 LT	110.58		(180) 108.08	
180	CB	299+34.9 6.0 LT	110.72	(179) 108.05	(181) 106.44	PROP FRAME & COVER
181	LG	299+26.6 7.4 LT	110.71	(178) 106.71 (180) 106.40		
184	CB	300+97.0 6.6 LT	109.95	(186) 107.15 (185) 107.32	(189) 105.94	PROP FRAME & COVER
185	GI	300+93.3 11.0 LT	109.84		(184) 107.34	
186	GI	301+07.0 11.0 LT	109.77		(184) 107.27	
188	LB	300+63.2 7.1 LT	110.15		(189) 105.75	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
190	CB	302+21.0 11.5 LT	110.53		(192) 106.53	
191	CB	302+20.3 16.8 RT	110.62		(192) 106.62	
192	LG	302+03.0 6.0 LT	110.37	(191) 106.37 (190) 106.37		



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SHEET NO. 71

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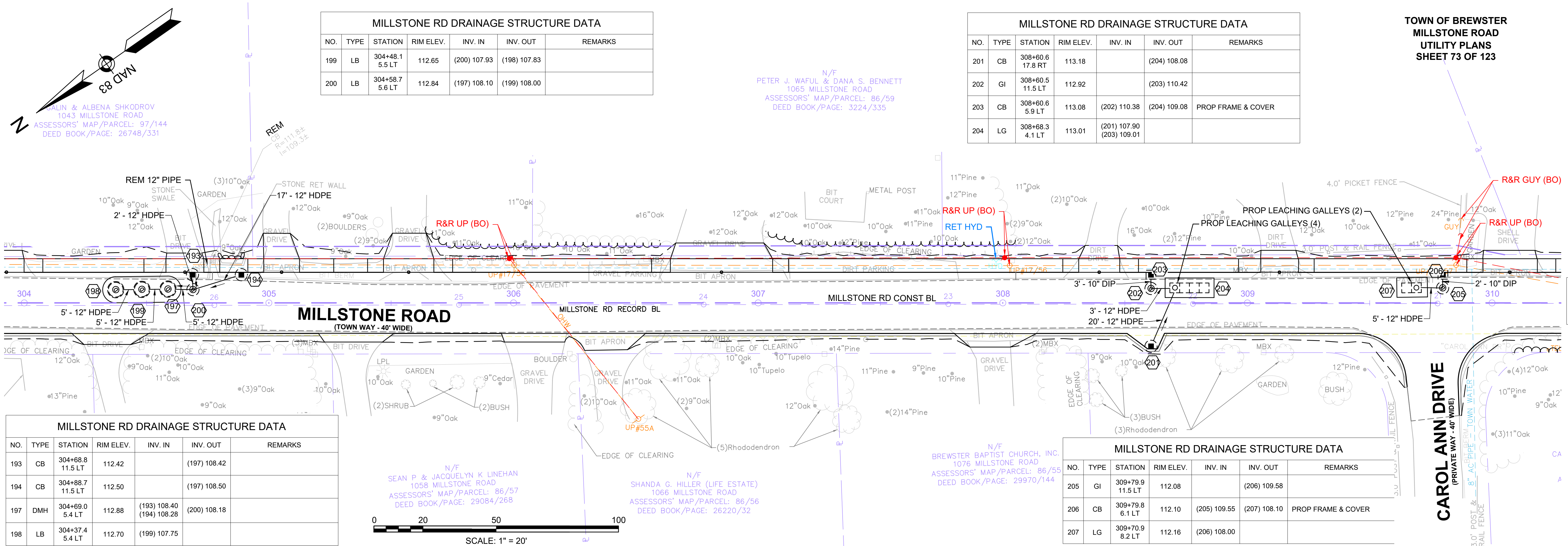
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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
199	LB	304+48.1 5.5 LT	112.65	(200) 107.93	(198) 107.83	
200	LB	304+58.7 5.6 LT	112.84	(197) 108.10	(199) 108.00	

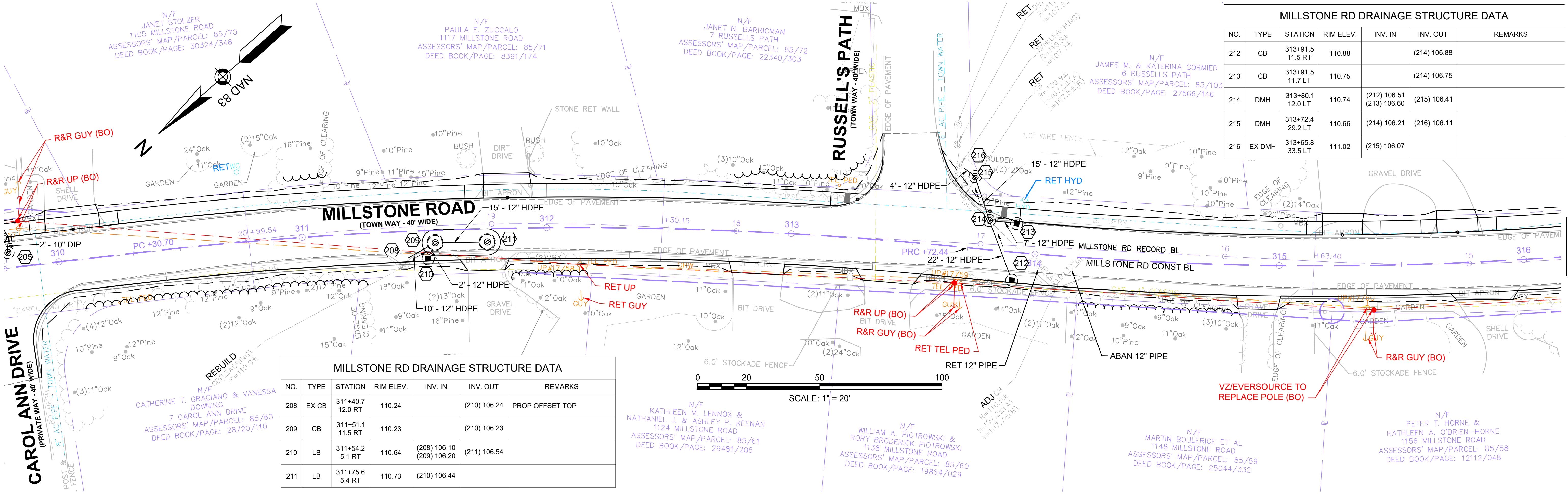
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
201	CB	308+60.6 17.8 RT	113.18		(204) 108.08	
202	GI	308+60.5 11.5 LT	112.92		(203) 110.42	
203	CB	308+60.6 5.9 LT	113.08	(202) 110.38	(204) 109.08	PROP FRAME & COVER
204	LG	308+68.3 4.1 LT	113.01	(201) 107.90	(203) 109.01	



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
193	CB	304+68.8 11.5 LT	112.42		(197) 108.42	
194	CB	304+88.7 11.5 LT	112.50		(197) 108.50	
197	DMH	304+69.0 5.4 LT	112.88	(193) 108.40 (194) 108.28	(200) 108.18	
198	LB	304+37.4 5.4 LT	112.70	(199) 107.75		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
205	GI	309+79.9 11.5 LT	112.08		(206) 109.58	
206	CB	309+79.8 6.1 LT	112.10	(205) 109.55	(207) 108.10	PROP FRAME & COVER
207	LG	309+70.9 8.2 LT	112.16	(206) 108.00		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
212	CB	313+91.5 11.5 RT	110.88		(214) 106.88	
213	CB	313+91.5 11.7 LT	110.75		(214) 106.75	
214	DMH	313+80.1 12.0 LT	110.74	(212) 106.51 (213) 106.60	(215) 106.41	
215	DMH	313+72.4 29.2 LT	110.66	(214) 106.21	(216) 106.11	
216	EX DMH	313+65.8 33.5 LT	111.02	(215) 106.07		



MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
208	EX CB	311+40.7 12.0 RT	110.24		(210) 106.24	PROP OFFSET TOP
209	CB	311+51.1 11.5 RT	110.23		(210) 106.23	
210	LB	311+54.2 5.1 RT	110.64	(208) 106.10 (209) 106.20	(211) 106.54	
211	LB	311+75.6 5.4 RT	110.73	(210) 106.44		

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MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
221	CB	318+94.2 11.5 RT	109.45		(222) 105.45	
222	DMH	318+94.1 5.3 RT	109.50	(223) 105.30 (221) 105.42	(230) 105.50	
223	CB	319+14.3 11.5 RT	109.53		(222) 105.53	
224	GI	318+94.0 11.5 LT	109.43		(225) 105.43	
225	CB	318+94.2 6.3 LT	109.48	(226) 105.25 (224) 105.40	(230) 105.15	PROP FRAME & COVER

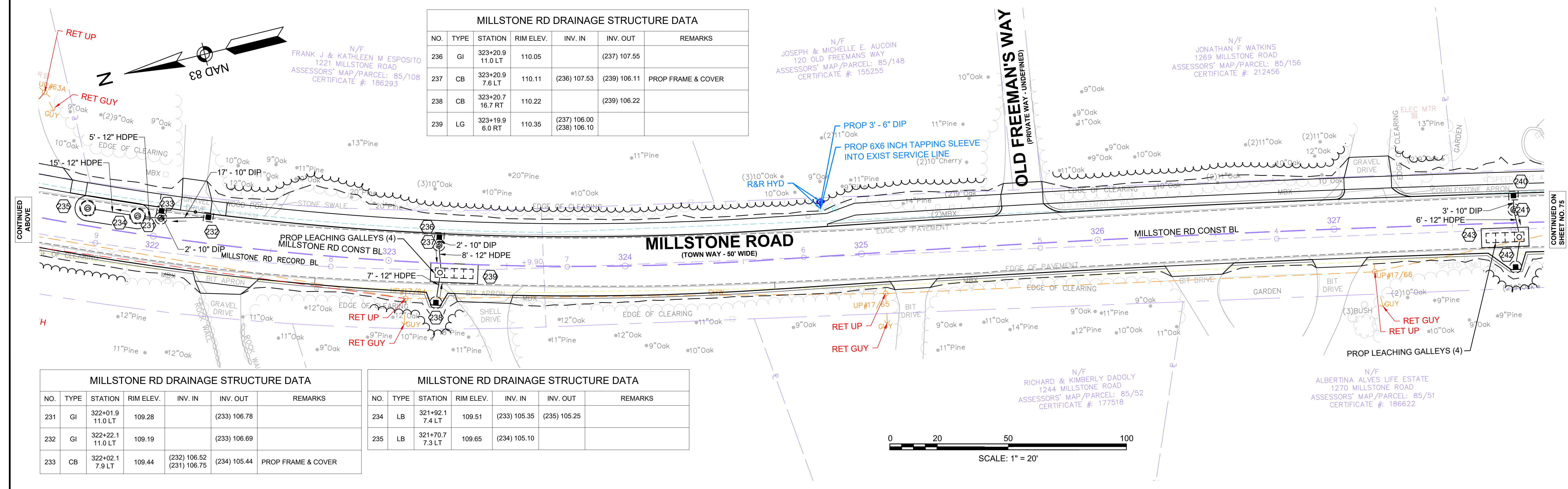
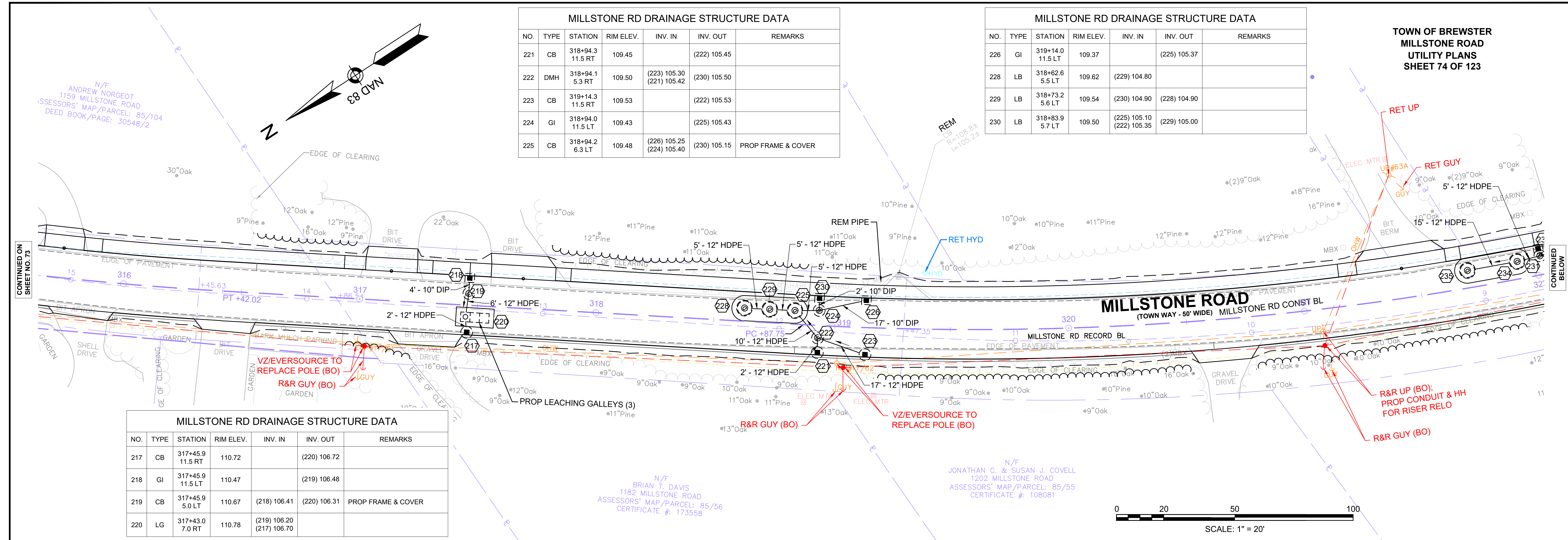
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
226	GI	319+14.0 11.5 LT	109.37		(225) 105.37	
228	LB	318+62.6 5.5 LT	109.62	(229) 104.80		
229	LB	318+73.2 5.6 LT	109.54	(230) 104.90 (228) 104.90		
230	LB	318+83.9 5.7 LT	109.50	(225) 105.10 (222) 105.35	(229) 105.00	

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
217	CB	317+45.9 11.5 RT	110.72		(220) 106.72	
218	GI	317+45.9 11.5 LT	110.47		(219) 106.48	
219	CB	317+45.9 5.0 LT	110.67	(218) 106.41 (220) 106.31		PROP FRAME & COVER
220	LG	317+43.0 7.0 RT	110.78	(219) 106.20 (217) 106.70		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
236	GI	323+20.9 11.0 LT	110.05		(237) 107.55	
237	CB	323+20.9 7.6 LT	110.11	(236) 107.53 (239) 106.11		PROP FRAME & COVER
238	CB	323+20.7 16.7 RT	110.22		(239) 106.22	
239	LG	323+19.9 6.0 RT	110.35	(237) 106.00 (238) 106.10		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
231	GI	322+01.9 11.0 LT	109.28		(233) 106.78	
232	GI	322+22.1 11.0 LT	109.19		(233) 106.69	
233	CB	322+02.1 7.9 LT	109.44	(232) 106.52 (231) 106.75	(234) 105.44	PROP FRAME & COVER

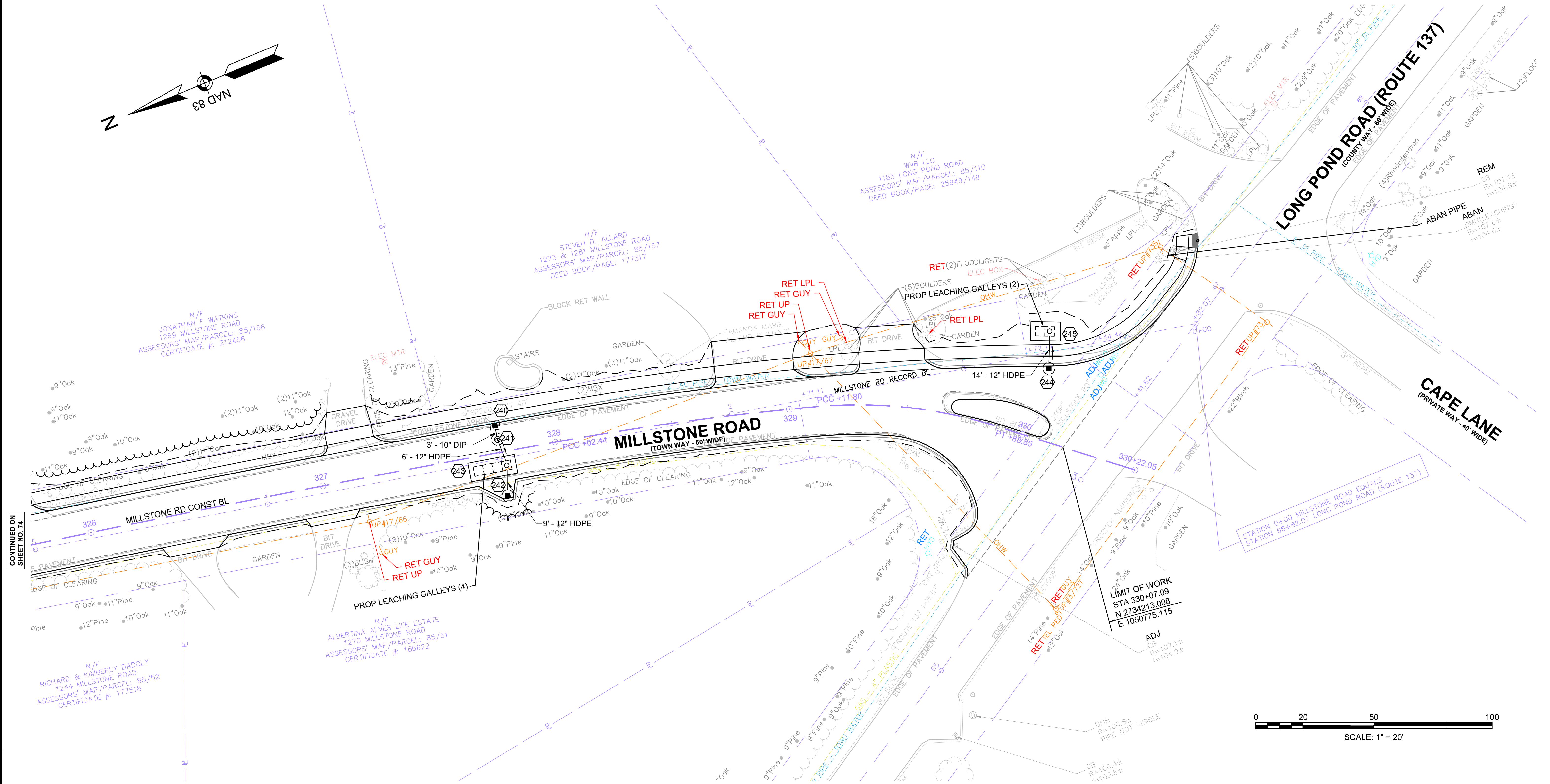
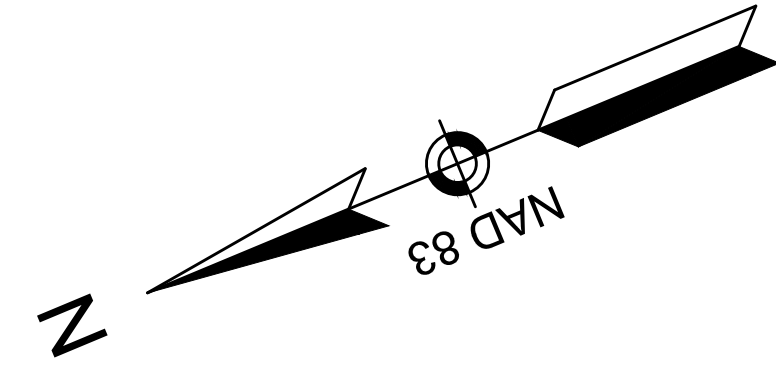
MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
234	LB	321+92.1 7.4 LT	109.51	(233) 105.35 (235) 105.25		
235	LB	321+70.7 7.3 LT	109.65	(234) 105.10		



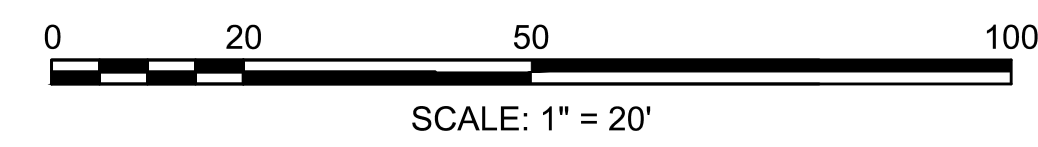
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NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
240	GI	327+76.1 11.5 LT	110.90		(241) 108.40	
241	CB	327+76.1 5.5 LT	110.88	(240) 108.38	(243) 106.88	PROP FRAME & COVER
242	CB	327+76.1 18.7 RT	110.41		(243) 106.41	
243	LG	327+80.0 4.0 RT	111.00	(241) 106.80 (242) 106.30		

MILLSTONE RD DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
244	CB	330+02.3 30.0 LT	109.06		(245) 102.10	
245	LG	329+99.2 47.5 LT	105.93	(244) 101.93		

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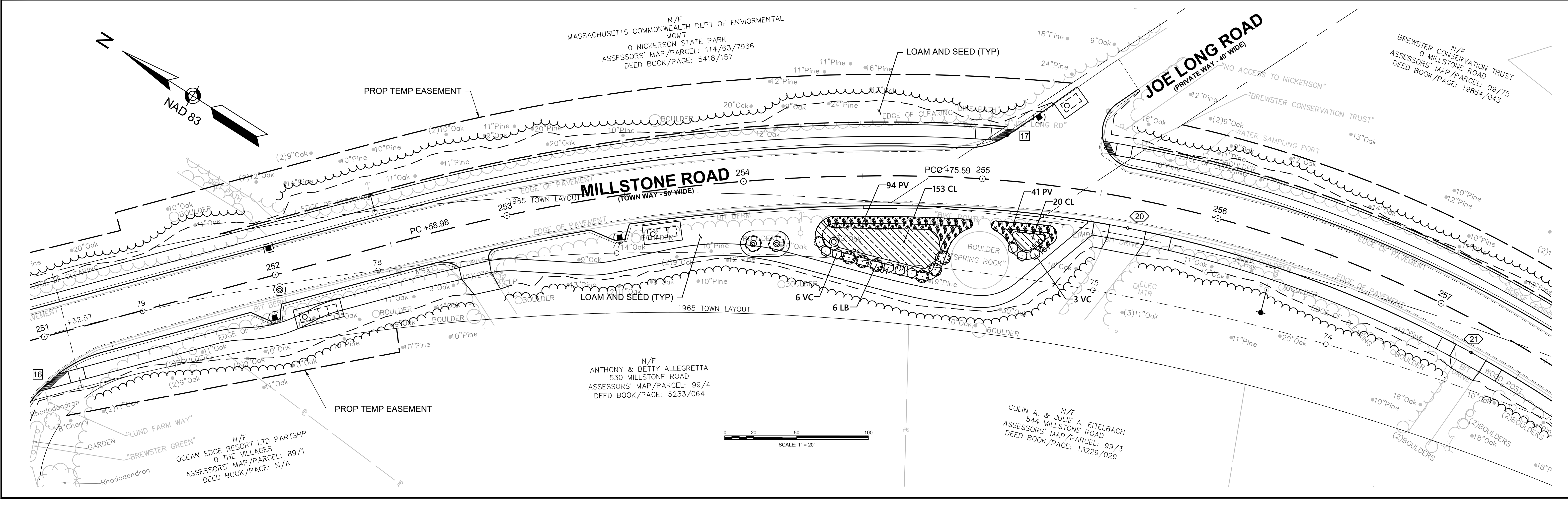
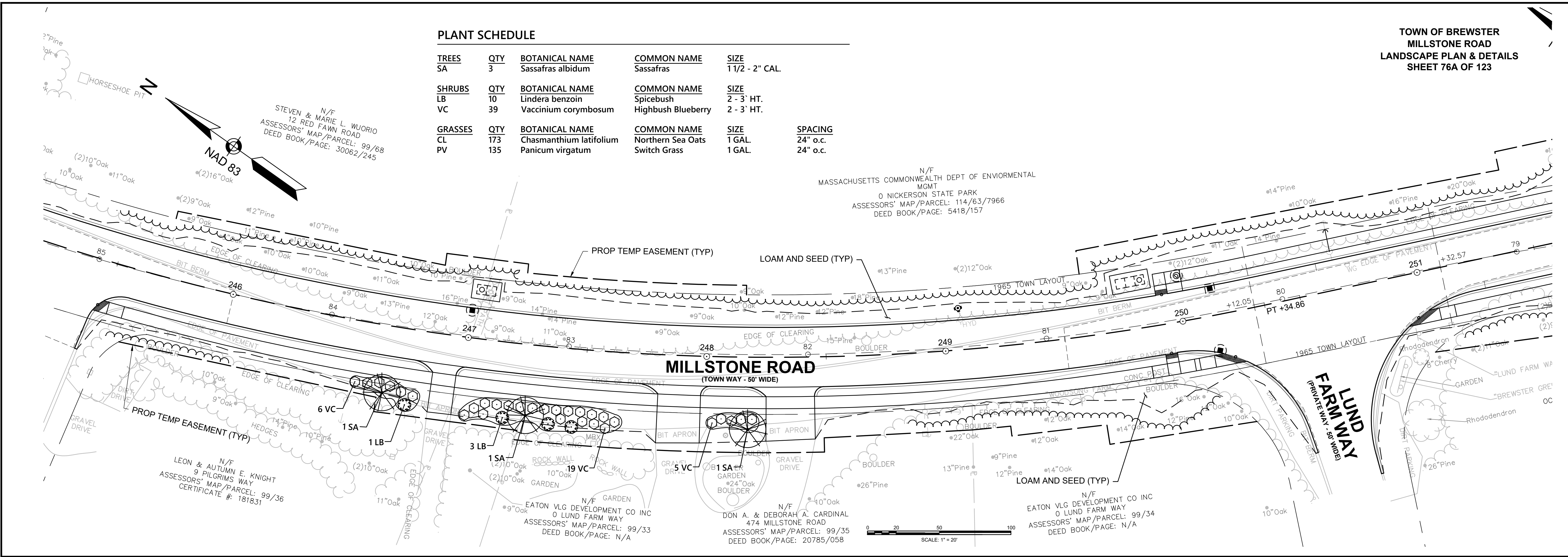


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SHEET NO. 74



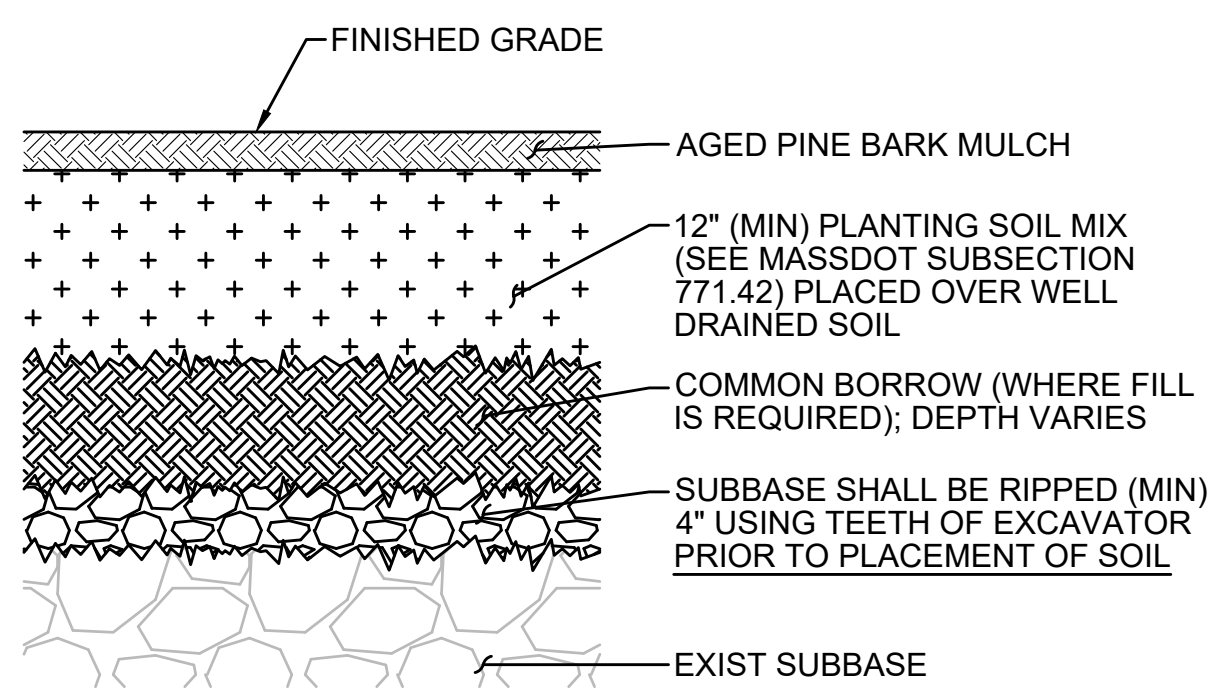
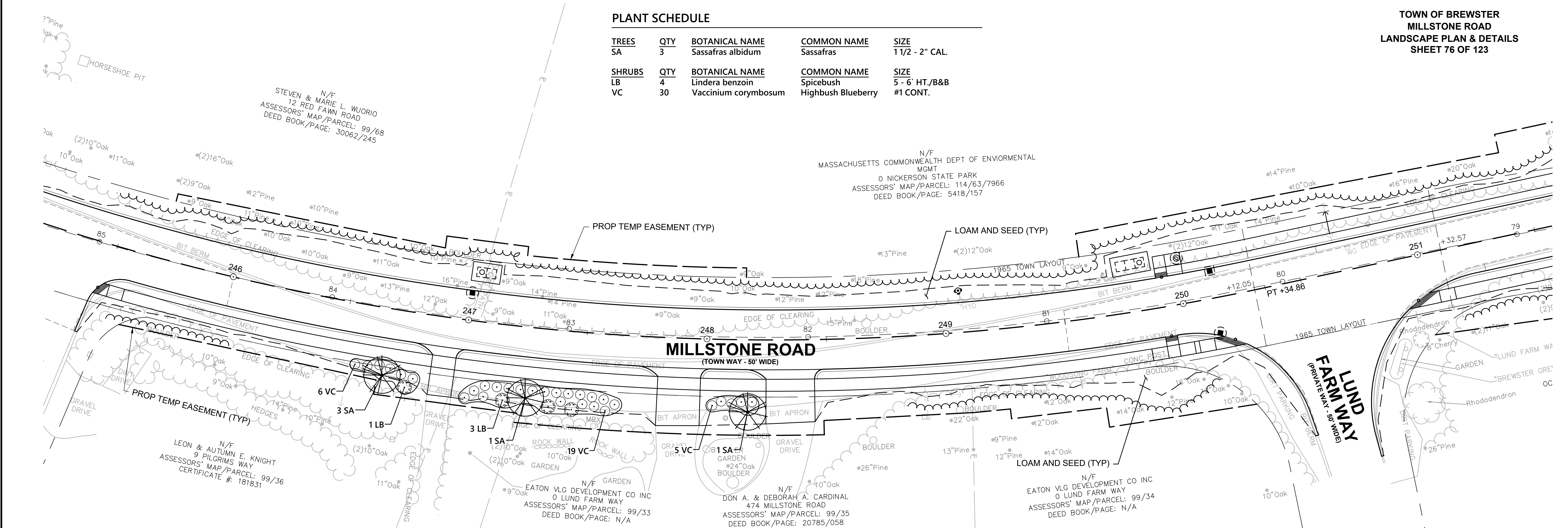
PLANT SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
SA	3	Sassafras albidum	Sassafras	1 1/2 - 2" CAL.	
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
LB	10	Lindera benzoin	Spicebush	2 - 3' HT.	
VC	39	Vaccinium corymbosum	Highbush Blueberry	2 - 3' HT.	
GRASSES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
CL	173	Chasmanthium latifolium	Northern Sea Oats	1 GAL.	24" o.c.
PV	135	Panicum virgatum	Switch Grass	1 GAL.	24" o.c.



PLANT SCHEDULE

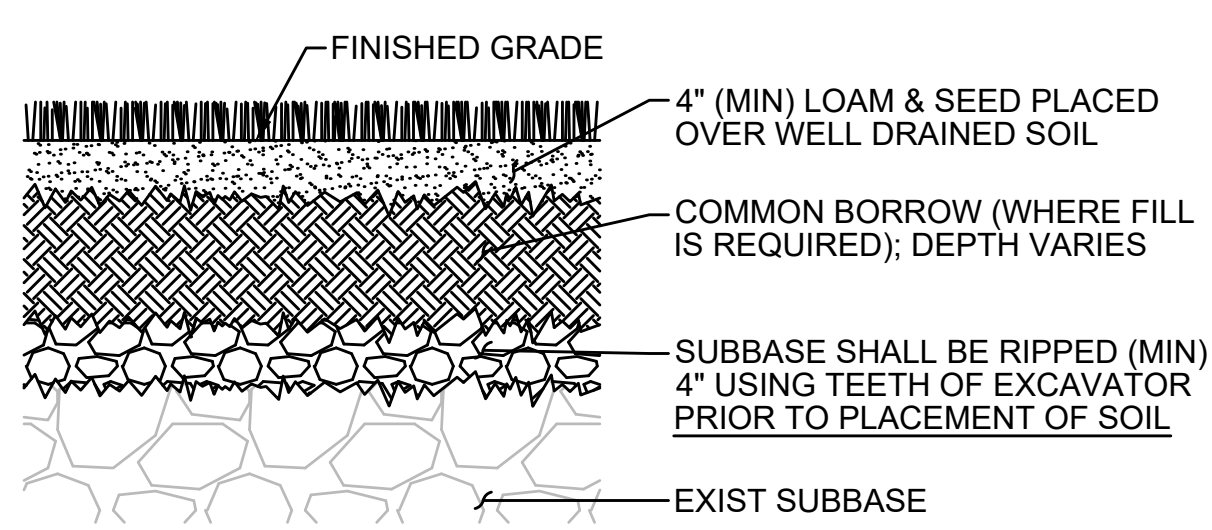
TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE
SA	3	Sassafras albidum	Sassafras	1 1/2 - 2" CAL.
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE
LB	4	Lindera benzoin	Spicebush	5 - 6' HT./B&B
VC	30	Vaccinium corymbosum	Highbush Blueberry	#1 CONT.



NOTE
ALL EXISTING ASPHALT SHALL BE STRIPPED AND REMOVED PROPT TO TILLING. ASPHALT SHALL NOT BE MIXED WITH THE SUBBASE.

PLANTING BED IN FORMER PAVED AREAS

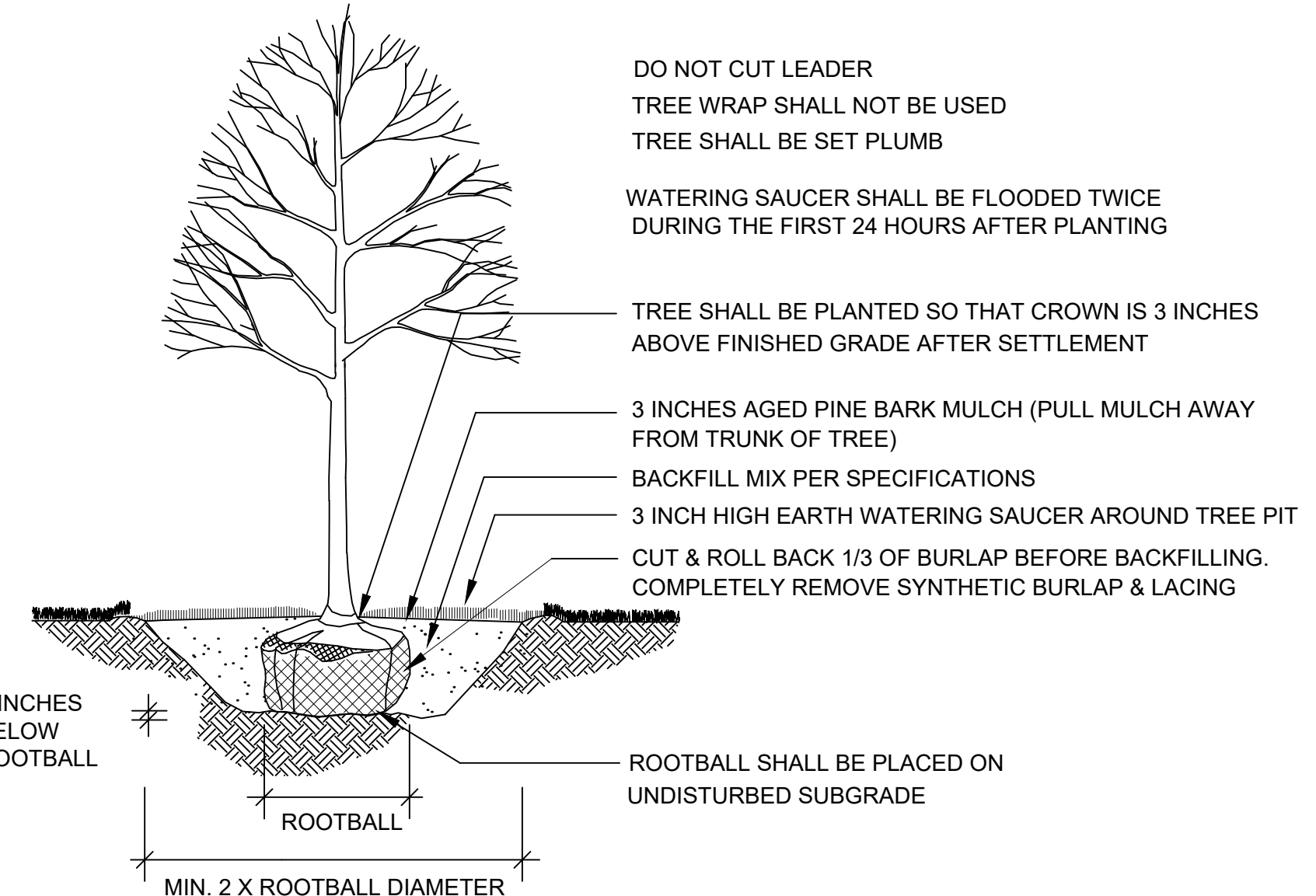
SCALE: NTS



NOTE
ALL EXISTING ASPHALT SHALL BE STRIPPED AND REMOVED PRIOR TO TILLING. ASPHALT SHALL NOT BE MIXED WITH THE SUBBASE.

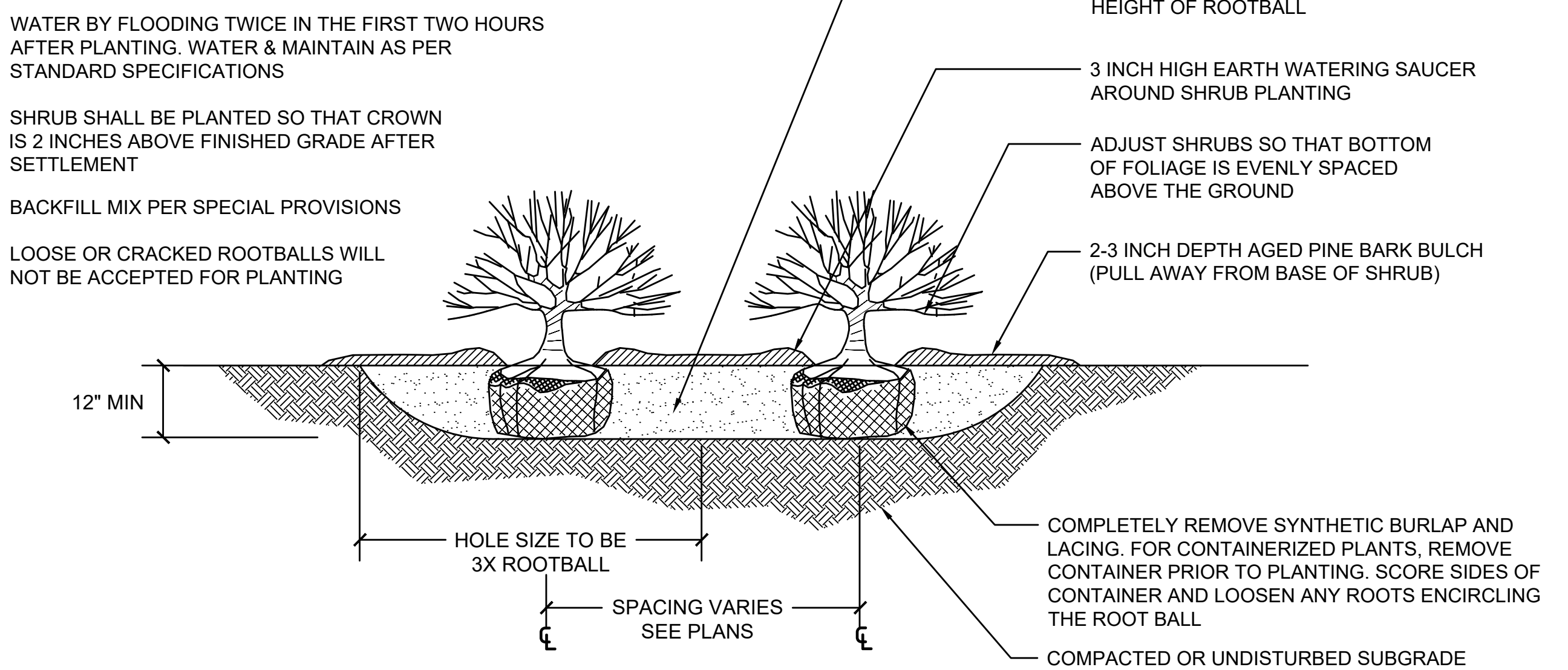
LAWN IN FORMER PAVED AREAS

SCALE: NTS



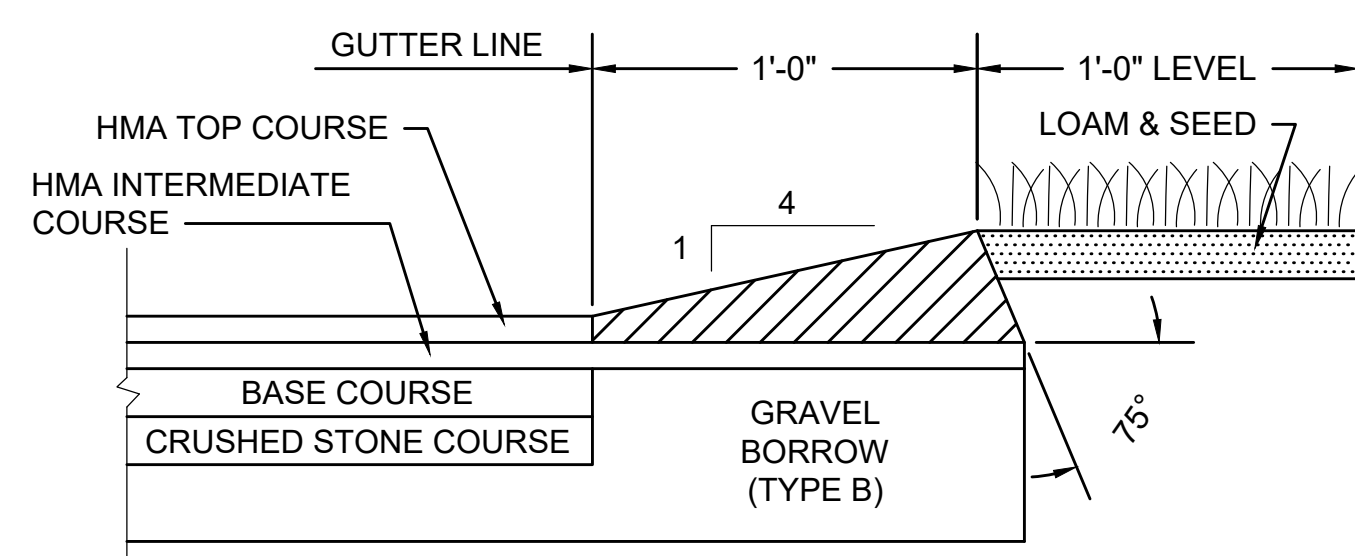
DECIDUOUS TREE PLANTING

NOT TO SCALE



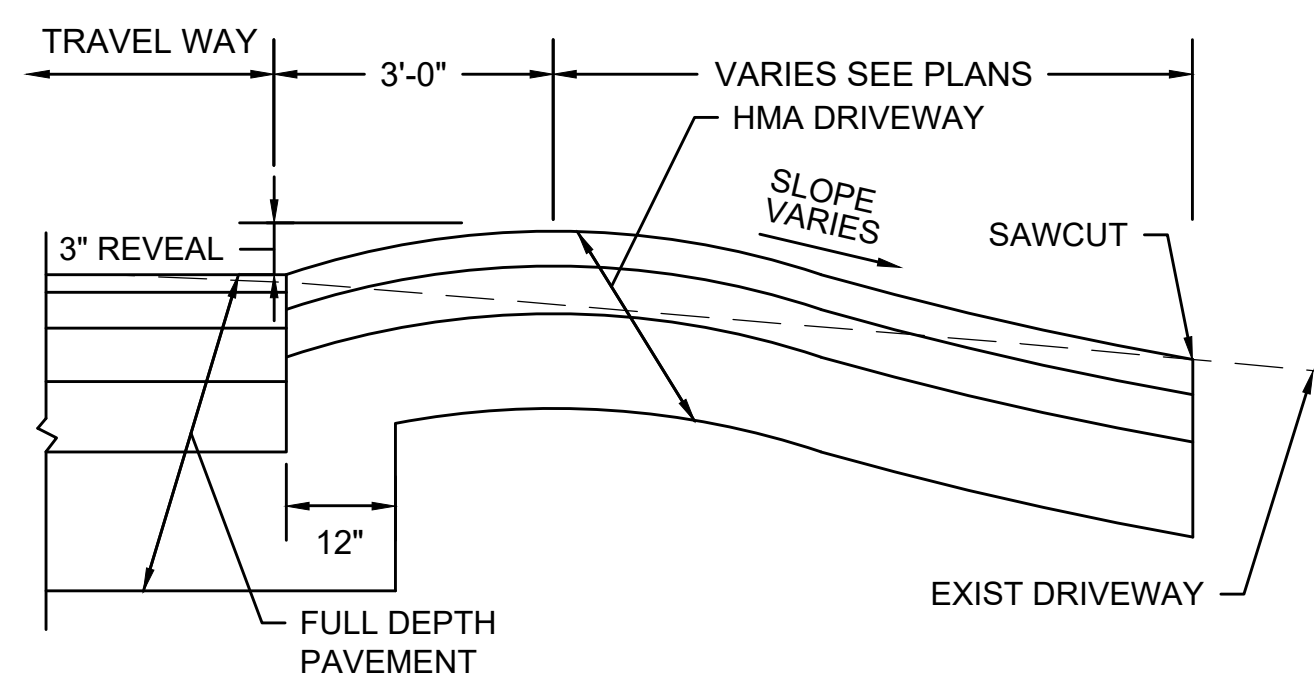
SHRUB PLANTING

SCALE: N.T.S.



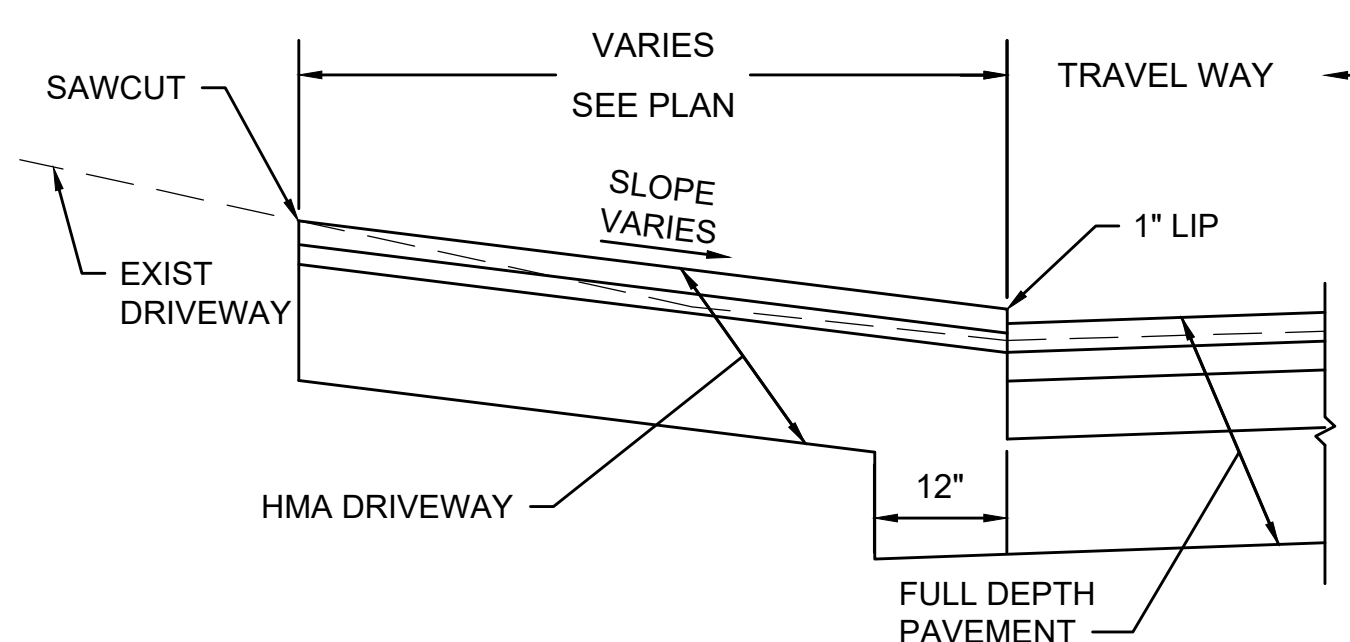
**HMA BERM TYPE A-MODIFIED
(USED WITH FULL DEPTH PAVEMENT)**

SCALE: N.T.S.



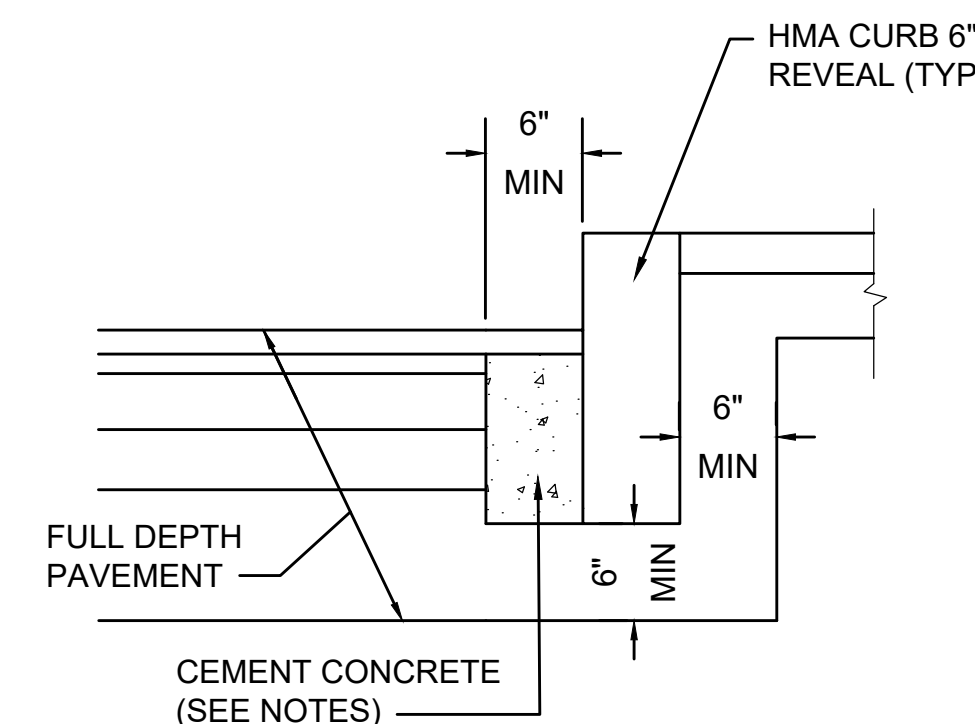
HMA DRIVEWAY

SCALE: N.T.S.



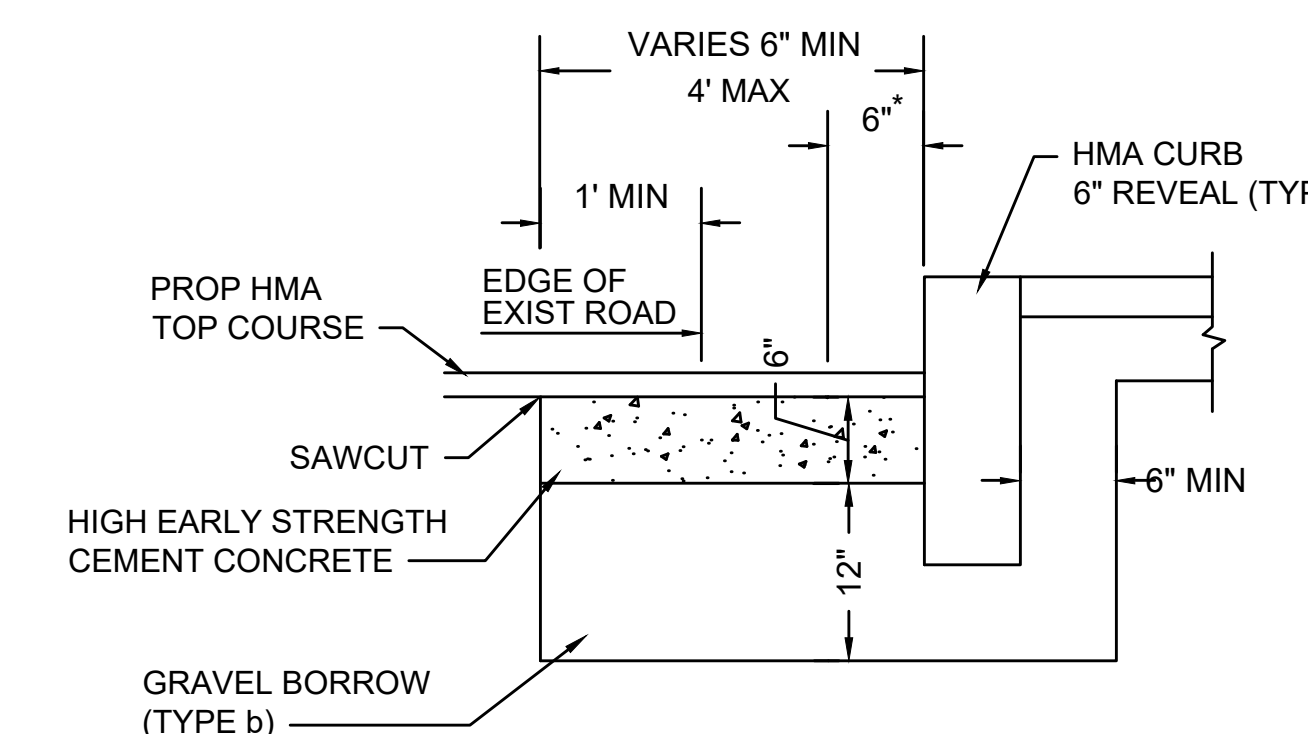
HMA DRIVEWAY

SCALE: N.T.S.



NOTES:

1. TO BE PLACED IF CURB IS INSTALLED AFTER HOT MIX ASPHALT
2. CONCRETE SHALL BE INCLUDED IN PRICE BID FOR HMA CURB
3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED. ALL TEST REQUIREMENTS ARE WAIVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.



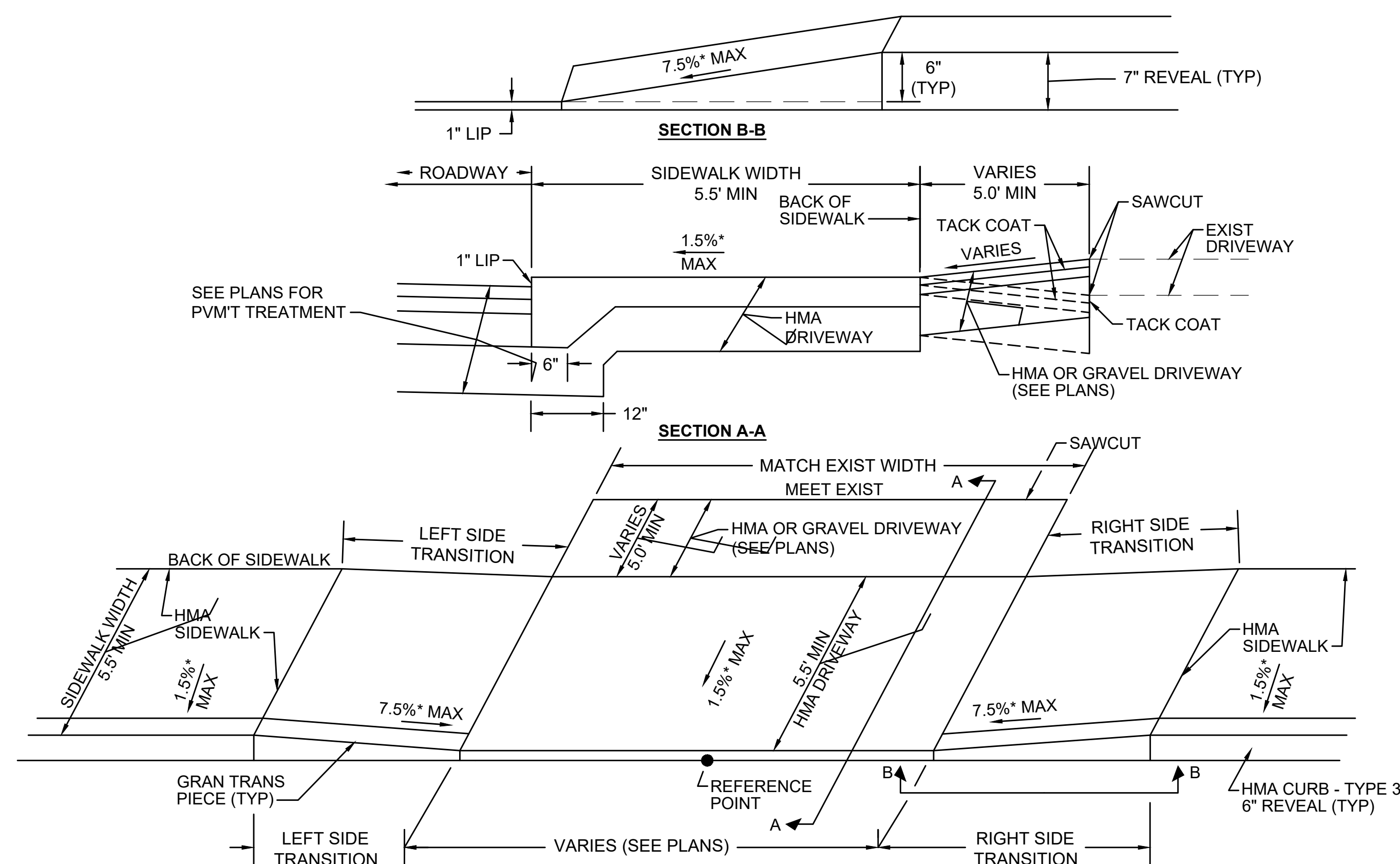
* 6" OF HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE SHALL BE INCLUDED IN PRICE BID FOR HMA CURB.

HMA CURB IN FULL DEPTH PAVEMENT - TYPE 1

SCALE: N.T.S.

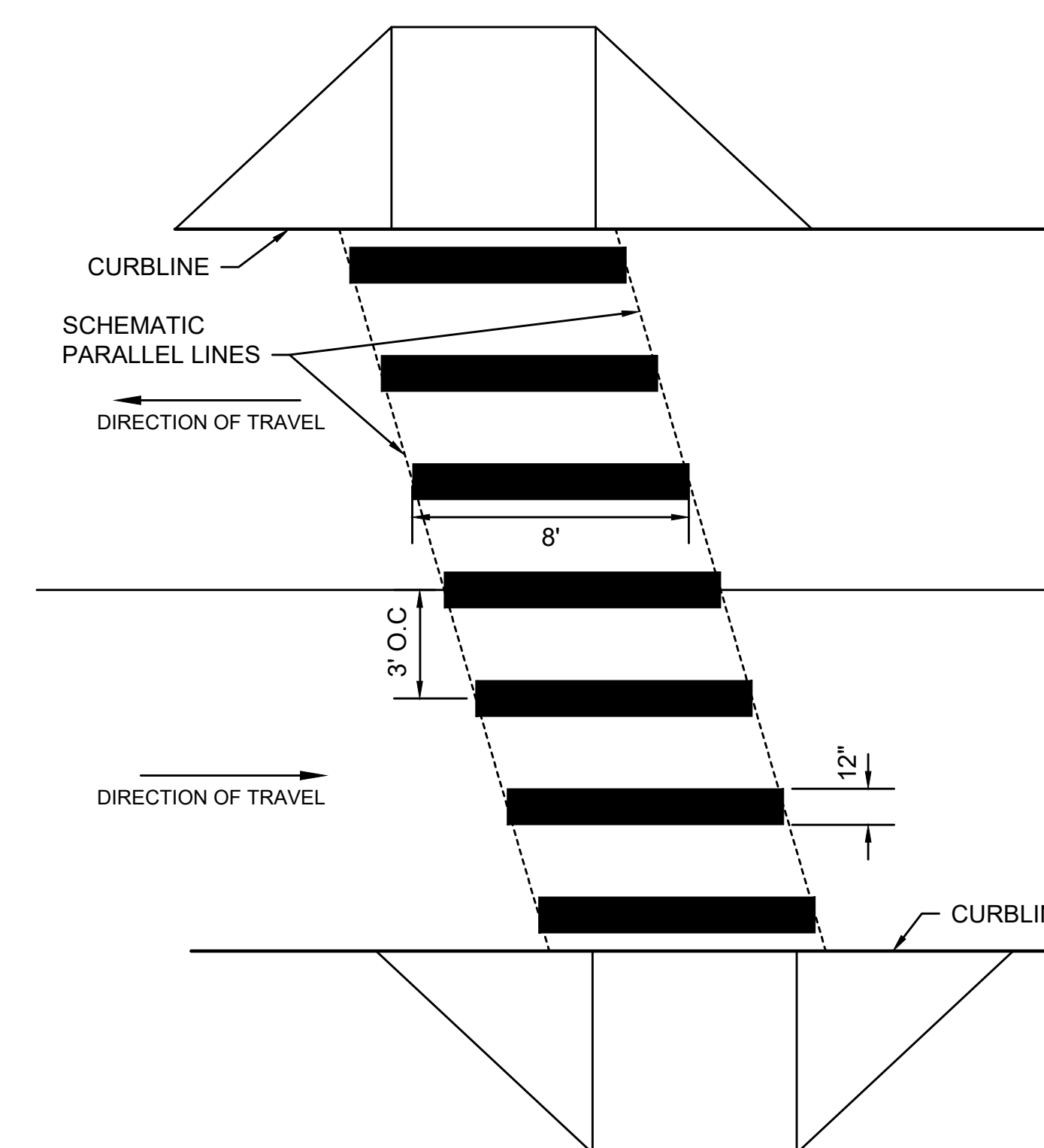
HMA CURB IN FULL DEPTH PAVEMENT - TYPE 2

SCALE: N.T.S.



HMA DRIVEWAY WITH HMA SIDEWALK

SCALE: N.T.S.



NOTES:

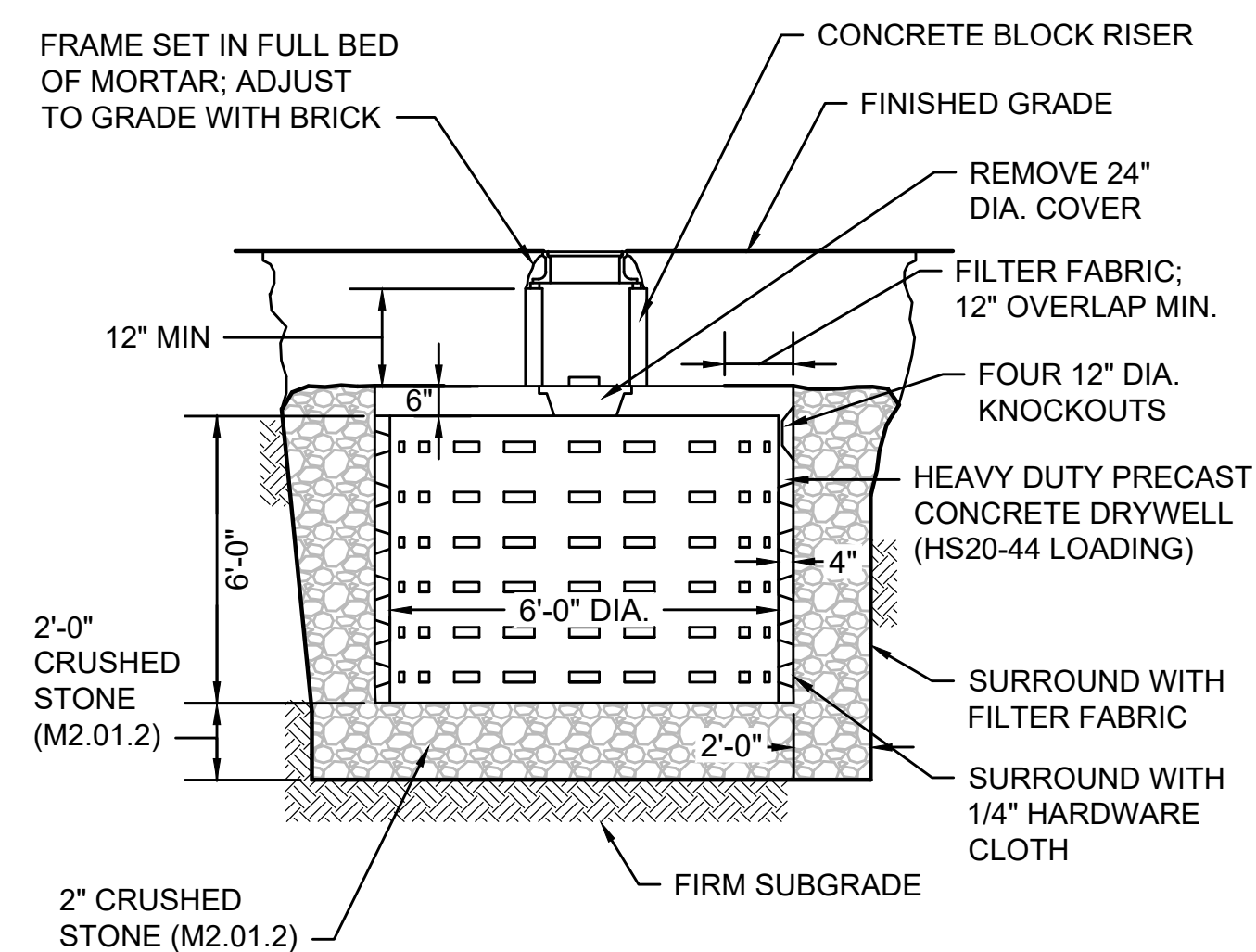
1. ALL EXISTING CROSSWALK MARKINGS SHALL BE FULLY ERADICATED BY APPROVED METHOD PRIOR TO THE APPLICATION OF PROPOSED MARKINGS.
2. ALL 12" THERMOPLASTIC LINES SHALL BE APPLIED IN ONE APPLICATION, NO COMBINATION OF LINES (TWO - 6" LINES) WILL BE ACCEPTED.
3. LAYOUT OF CROSSWALKS SHALL BE ORIENTATED IN THE DIRECTION OF TRAVEL AND LOCATED OUTSIDE OF THE WHEEL PATH OF VEHICLES. LAYOUT SHALL BE APPROVED BY BREWSTER DPW PRIOR TO APPLICATION OF THERMOPLASTIC.
4. ALL CROSSWALKS INSTALLED SHALL CONFORM TO THE RELEVANT PROVISIONS OF THE MASSACHUSETTS HIGHWAY DEPARTMENT "STANDARD SPECIFICATION FOR HIGHWAY AND BRIDGES" DATED 2022, SECTION 860 FOR REFLECTORIZED LINE (THERMO-PLASTIC) & MATERIAL M7.01.03, LATEST REVISIONS.

CONTINENTAL-STYLE CROSSWALK - 12" WIDE LINES

SCALE: N.T.S.

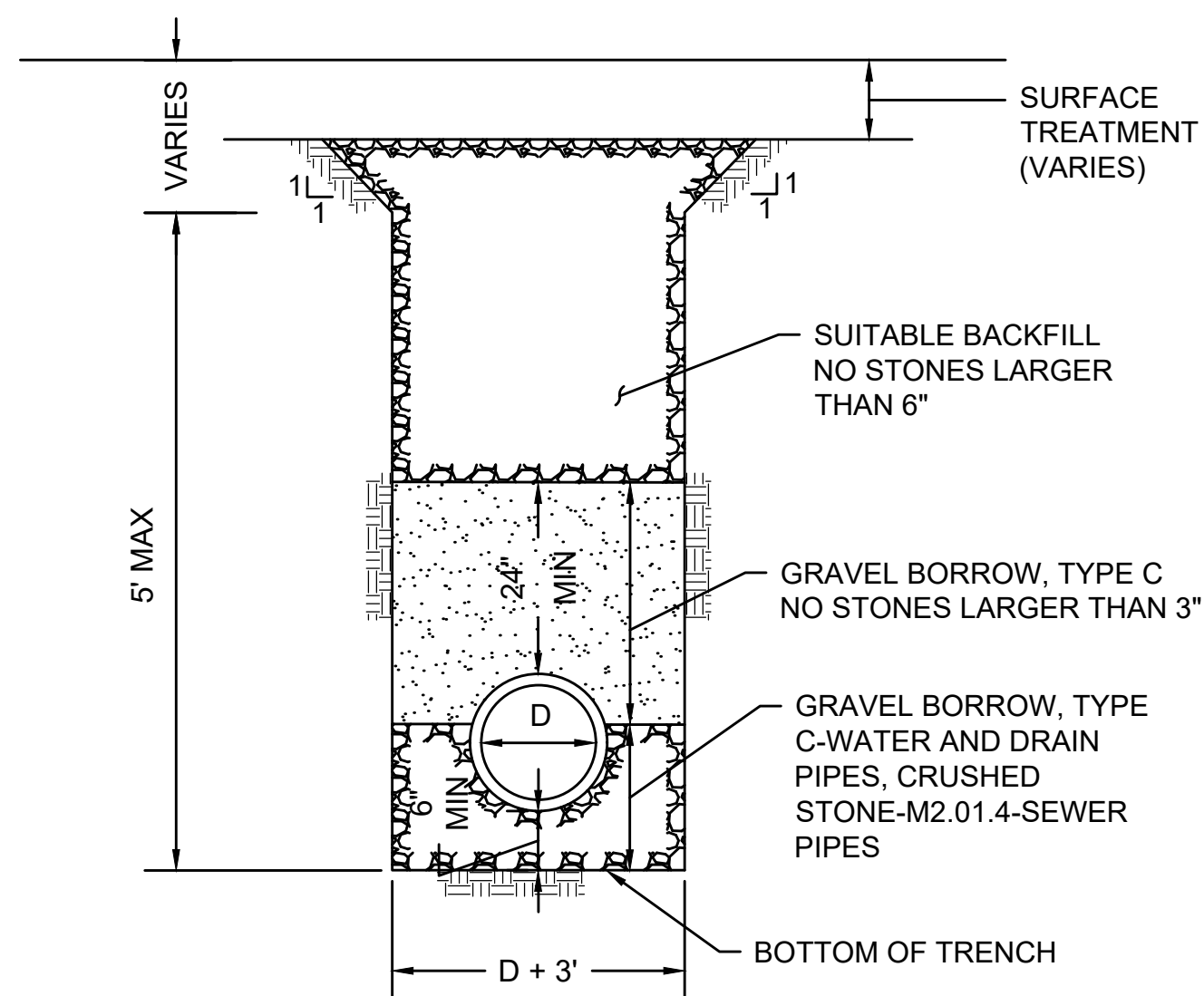
DWG: PM-27

DATE: MAY 2017



6' DIAMETER LEACHING BASIN

SCALE: N.T.S.

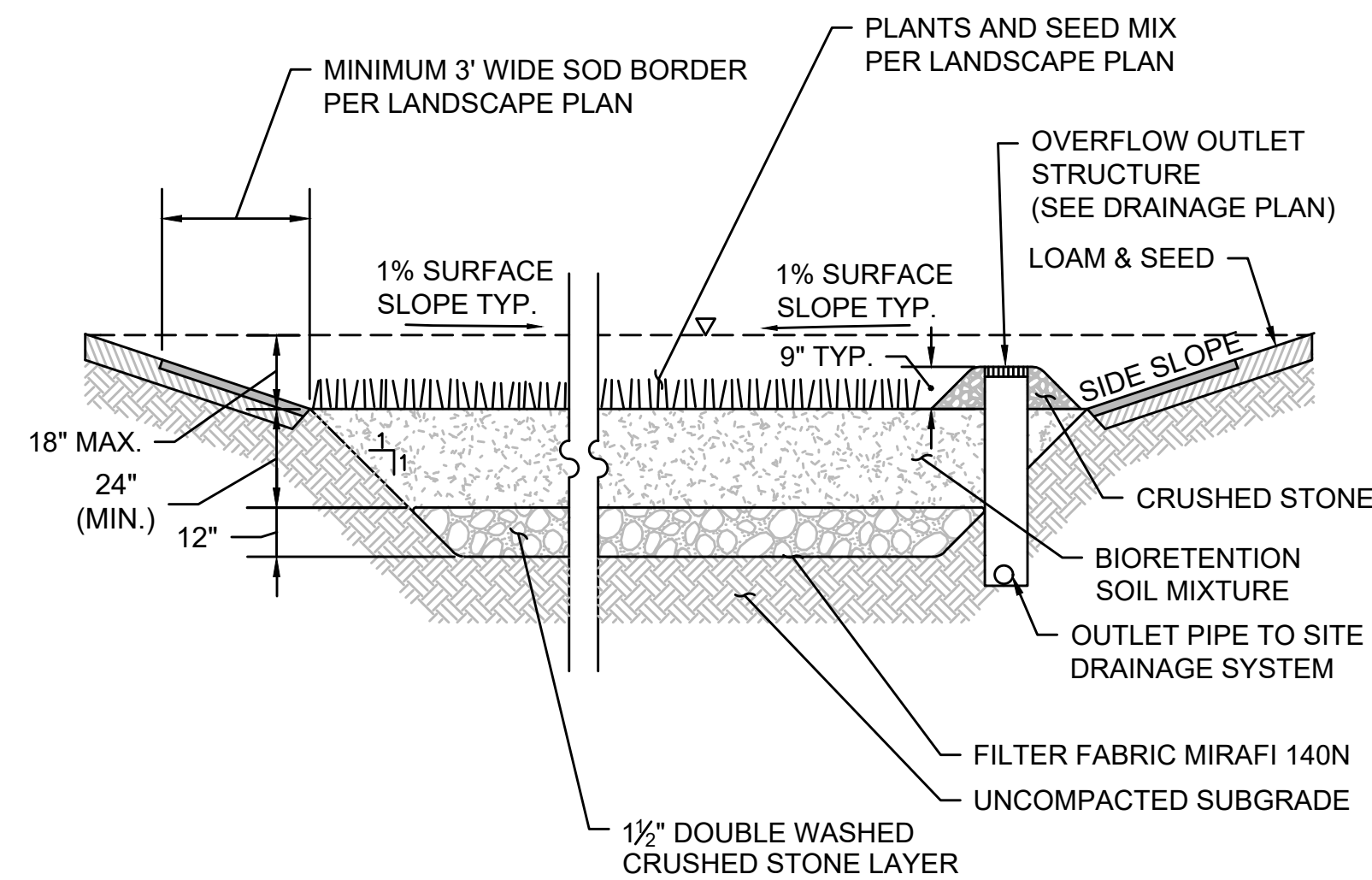


TRENCH DETAIL

SCALE: N.T.S.

DWG: TRENCH-05

DATE: AUGUST 2018



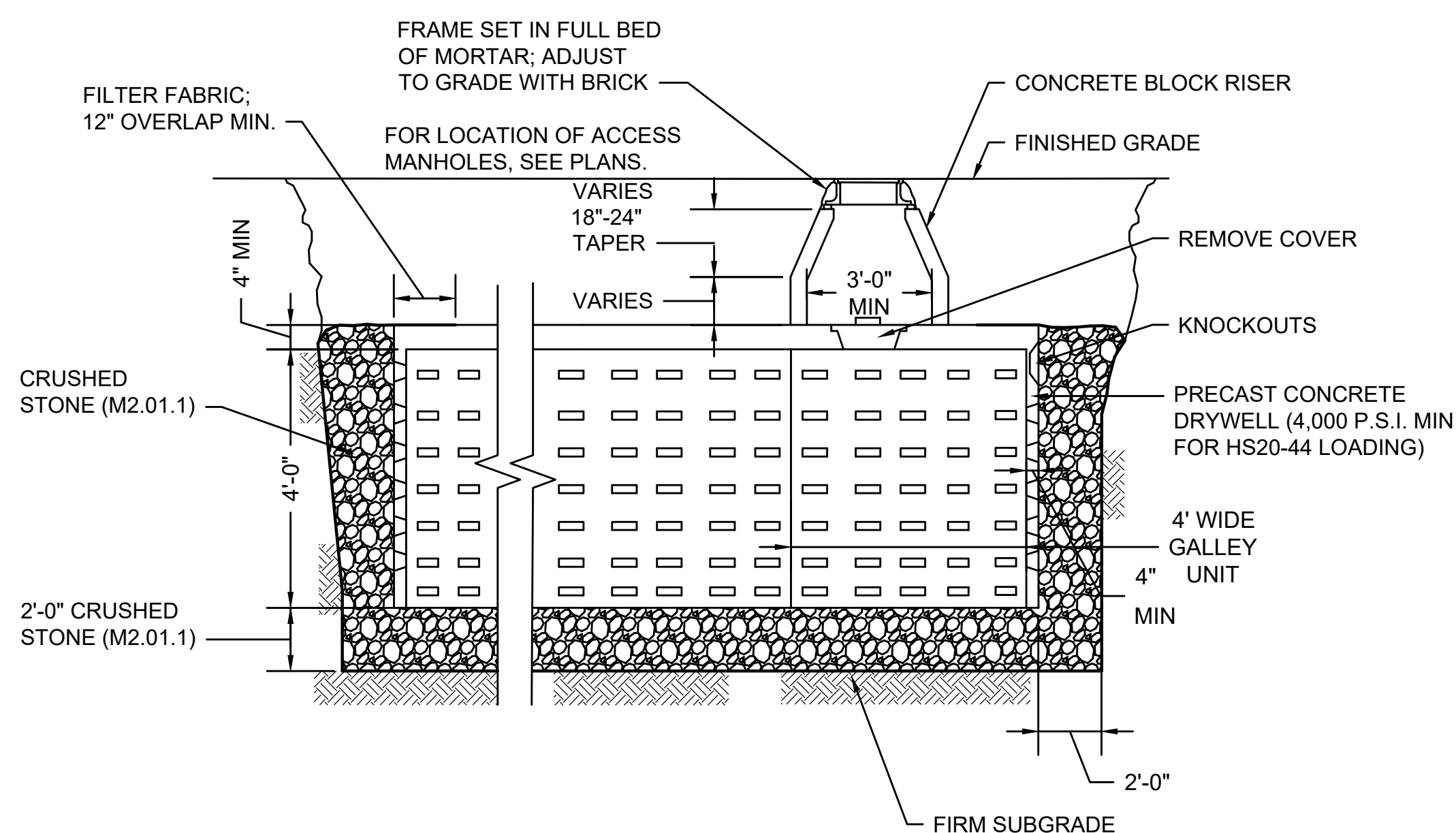
NOTES

- SIDE SLOPES SHALL BE 3:1 MAX. 2% MIN.

BIORETENTION BASIN (RAIN GARDEN)

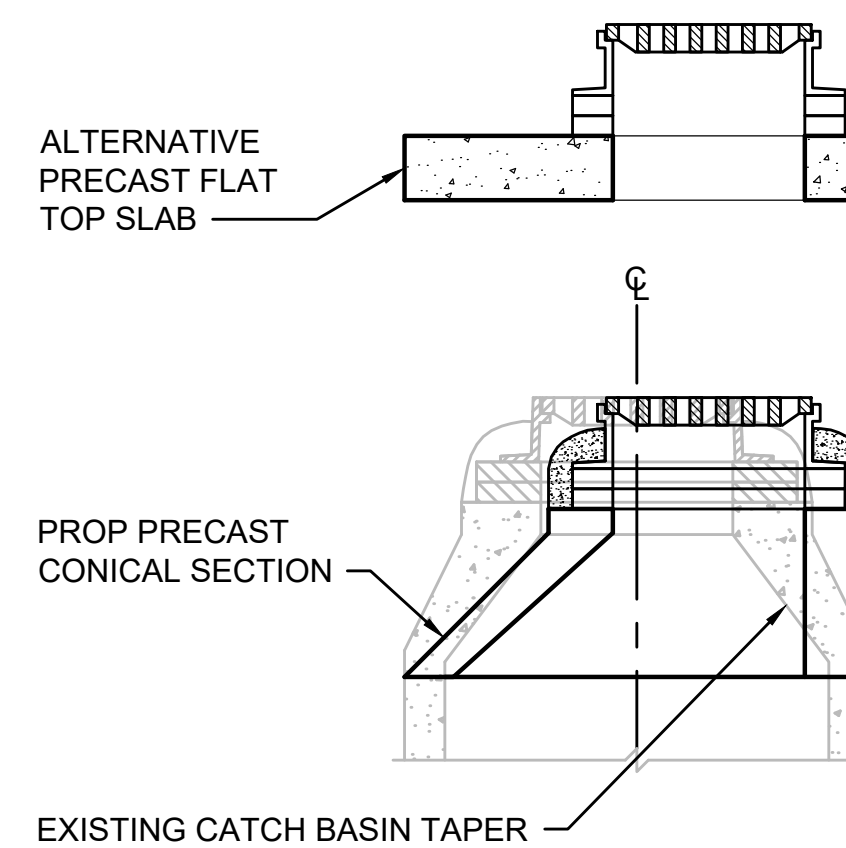
SCALE: N.T.S.

DATE: MARCH 2020



LEACHING GALLEY

SCALE: N.T.S.

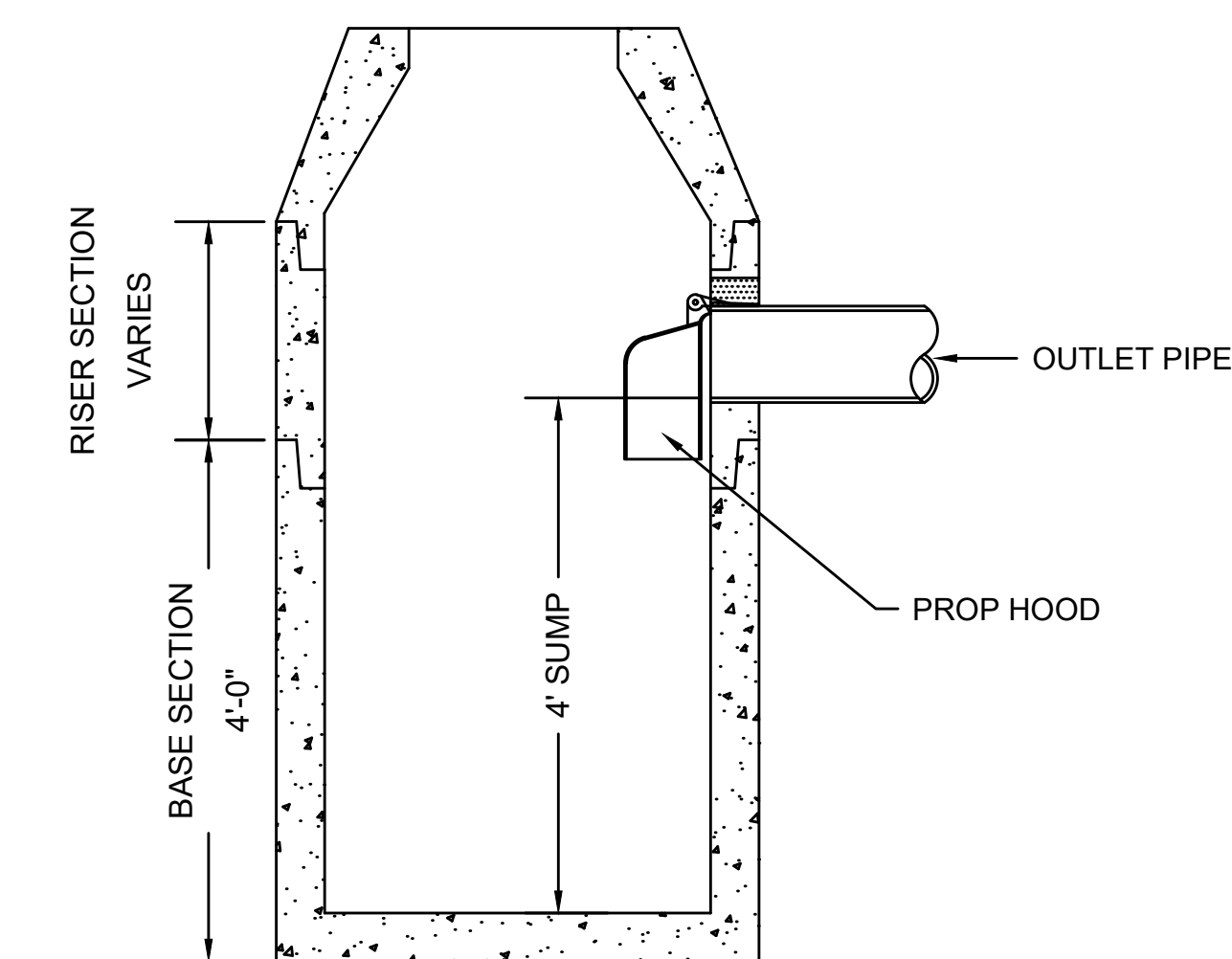


CB TREATMENT NOTES

- BASED ON ACTUAL FIELD CONDITIONS; THE CONTRACTOR SHALL DETERMINE WHICH STYLE OF TOP SECTION SHOULD BE USED.
- CATCH BASIN FRAME AND GRATE SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM).

CATCH BASIN REMODELED

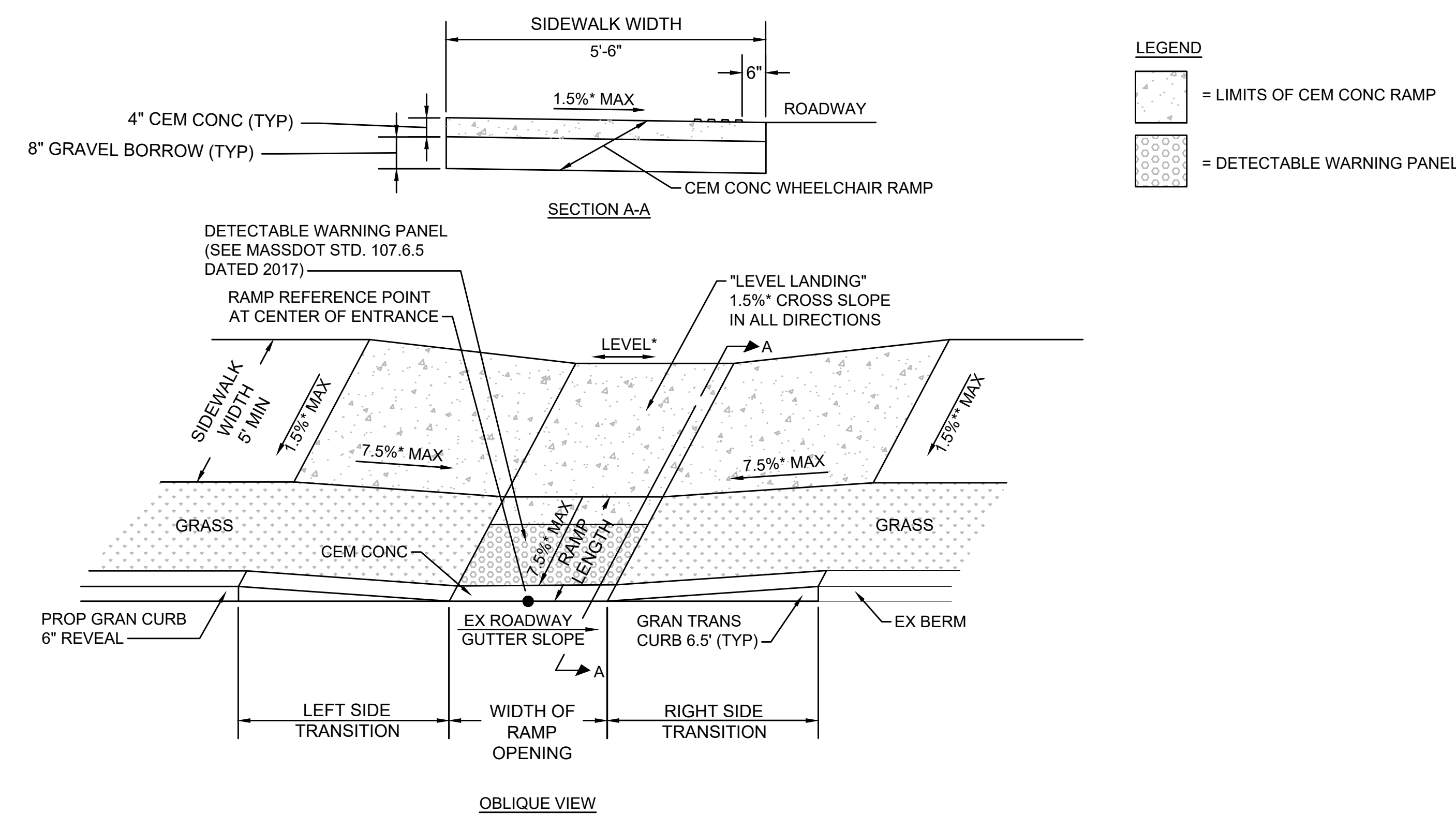
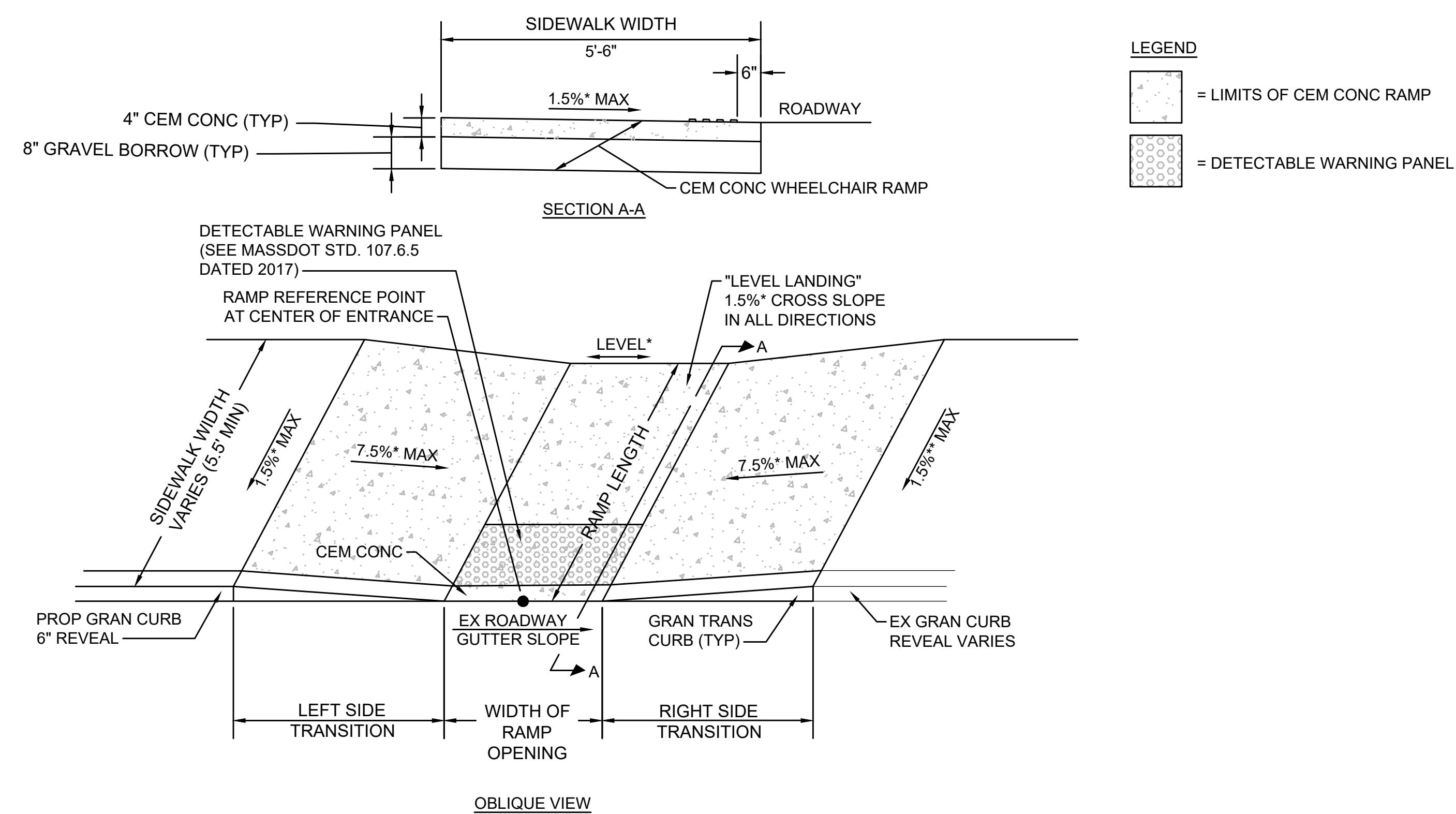
SCALE: N.T.S.



NOTE:
ALL CATCH BASINS SHALL CONFORM TO MASSDOT CONSTRUCTION STANDARD 201.4.0 EXCEPT FOR 4' SUMP DEPTH AS SHOWN.

DEEP SUMP CATCH BASIN

SCALE: N.T.S.



WHEELCHAIR RAMP - LESS THAN 6.50' WIDTH

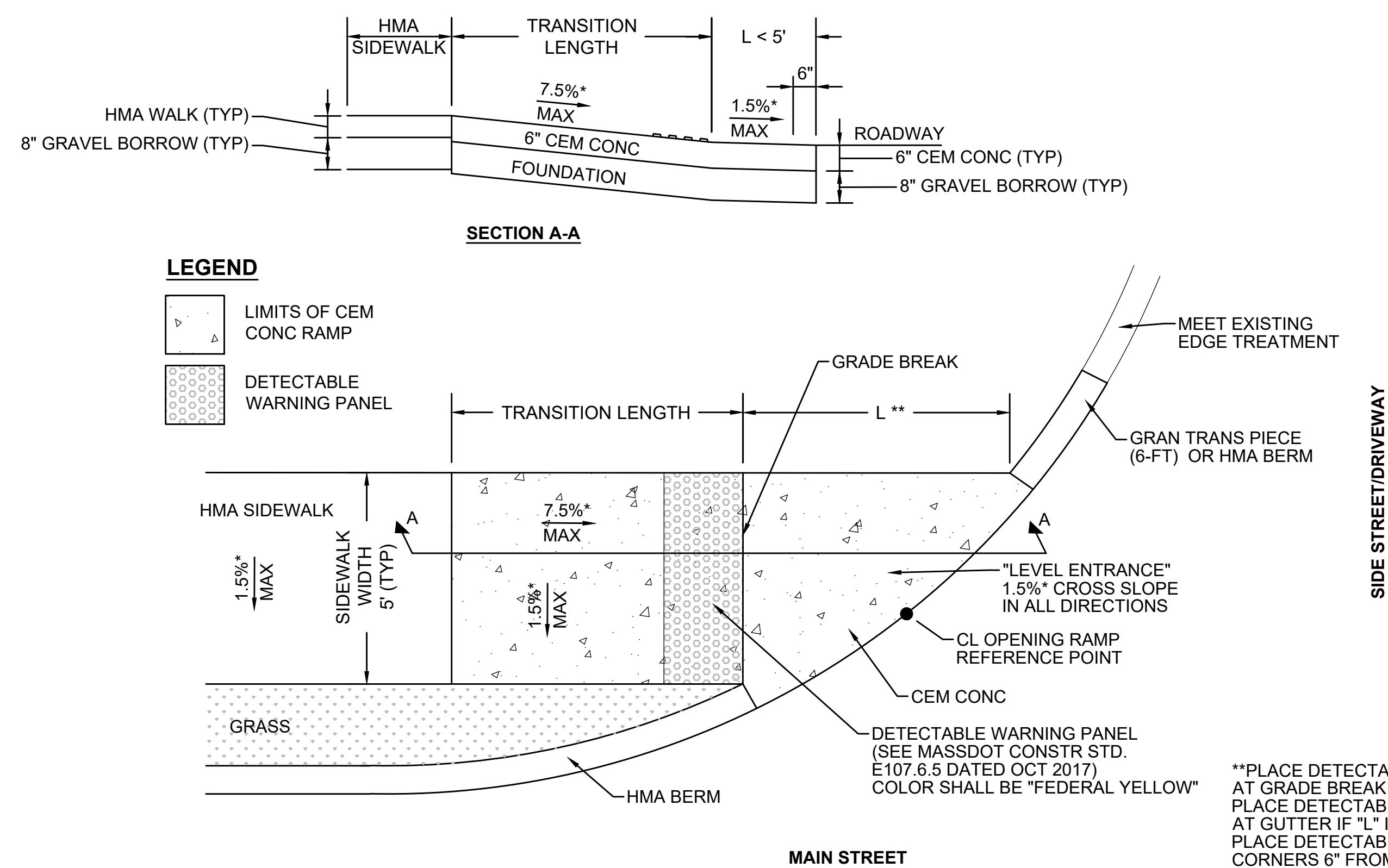
SCALE: N.T.S.

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF POINT)	SIDEWALK WIDTH	RAMP WIDTH	RAMP LENGTH	OPENING ELEV	LEFT SIDE			RIGHT SIDE		
						ROADWAY GUTTER	REVEAL	TRANS	ROADWAY GUTTER	REVEAL	TRANS
1	STA 311+35.46, 6.9 RT ALGN - ROUTE 6A RECORD BASELINE	5.4'-5.5'	5'-0"	5'-5"	44.24	-1.23%	6"	6.5'	0.65%	6"	7.67'
2	STA 311+35.36, 17.0 LT ALGN - ROUTE 6A RECORD BASELINE	5'-6"	5'-0"	5'-6"	44.25	1.67%	6"	9.0'	-1.54%	6"	6.5'

WHEELCHAIR RAMP - LESS THAN 6.50' WIDTH WITH GRASS STRIP

SCALE: N.T.S.

WHEELCHAIR RAMP DATA											
NO.	LOCATION (REF POINT)	SIDEWALK WIDTH	RAMP WIDTH	RAMP LENGTH	OPENING ELEV	LEFT SIDE			RIGHT SIDE		
						ROADWAY GUTTER	REVEAL	TRANS	ROADWAY GUTTER	REVEAL	TRANS
35	STA 67+10.46, 20.45 LT ALGN - LONG POND ROAD RECORD BASELINE	5'-0"	6'-0"	4'-0"	107.38	3.43%	2"	6.5'	N/A	N/A	N/A
36	STA 249+92.96, 12.5 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	5'-0"	4'-0"	106.01	N/A	N/A	N/A	0.31%	2"	6.5'
37	STA 249+92.96, 12.5 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	5'-0"	4'-0"	106.23	-1.85%	2"	6.5'	2.77%	2"	6.5'
38	STA 259+23.46, 12.5 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	5'-0"	4'-0"	102.62	-0.15%	2"	6.5'	-3.04%	2"	6.5'
39	STA 259+23.46, 12.5 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	5'-0"	4'-0"	102.59	N/A	N/A	N/A	0.15%	2"	6.5'

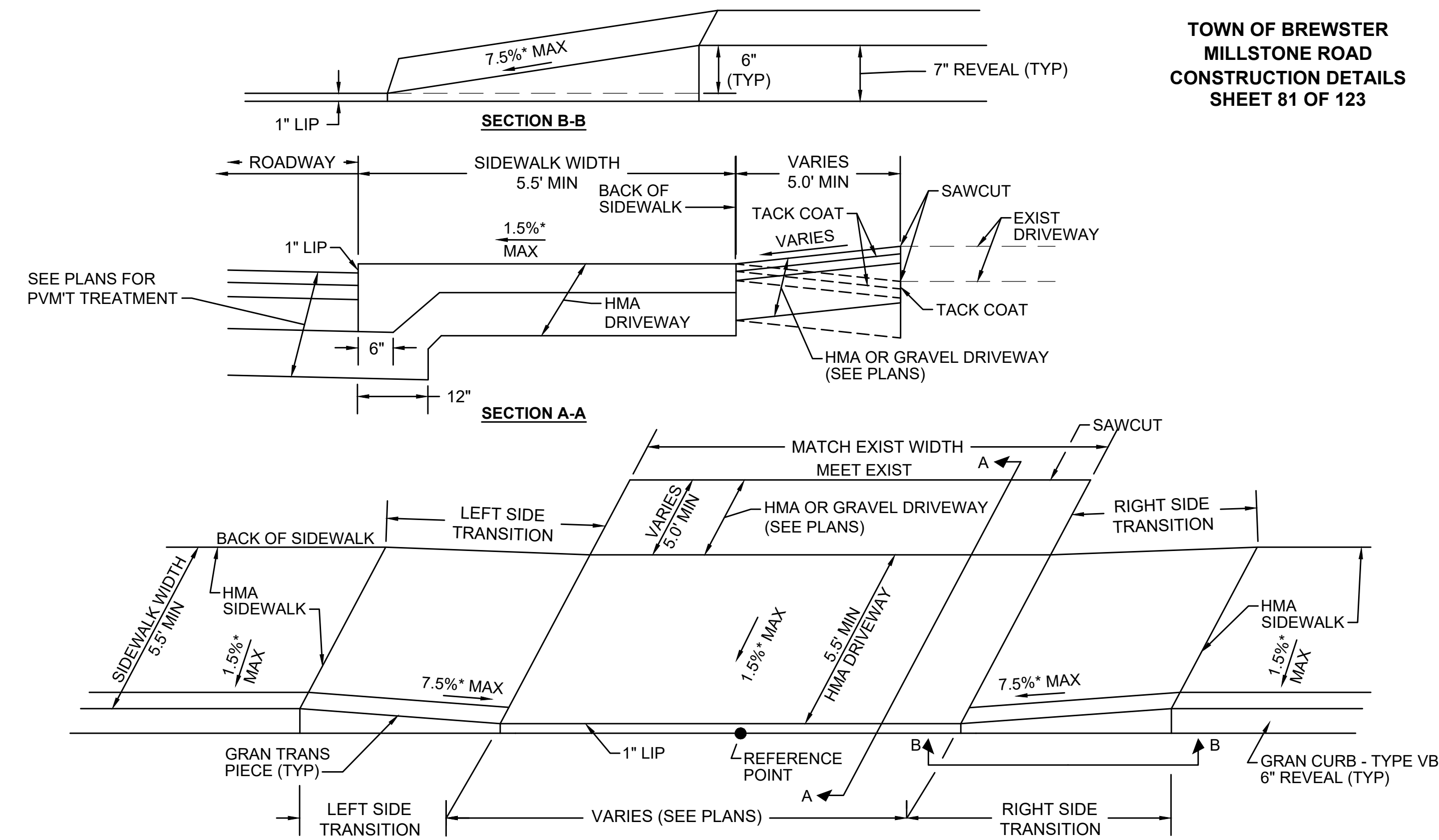


*TOLERANCE FOR CONSTRUCTION ±0.5%

ONE DIRECTIONAL WHEELCHAIR RAMP WITH GRASS STRIP

SCALE: NTS

WHEELCHAIR RAMP DATA							
NO.	LOCATION (REF POINT)	SIDEWALK WIDTH	TRANS LENGTH	"L"	OPENING ELEV	ROADWAY GUTTER	REVEAL
7	STA 233+80.62, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	7.52'	118.92'	8.61%	2"
8	STA 234+13.74, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	7.45'	118.55'	1.69%	2"
9	STA 237+16.16, 18.6 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	7.37'	117.86'	-0.15%	2"
12	STA 240+87.35, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	3.52'	111.31'	-4.77%	6"
13	STA 245+21.57, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	5.97'	105.28'	2.77%	2"
14	STA 245+46.88, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	5.97'	106.03'	1.38%	2"
15	STA 250+18.63, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	12.90'	105.75'	1.85%	2"
16	STA 250+96.58, 18.8 RT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	13.87'	105.30'	0.92%	2"
17	STA 255+08.66, 18.8 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	10.07'	102.52'	1.85%	2"
18	STA 255+48.74, 18.8 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	5.95'	102.57'	1.69%	2"
19	STA 259+50.59, 18.8 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	8.66'	101.94'	3.03%	2"
23	STA 271+83.95, 18.8 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	7.42'	120.62'	2.77%	2"
24	STA 272+08.91, 18.8 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	7.39'	121.59'	-1.23%	2"
27	STA 292+04.23, 19.0 LT ALGN - MILLSTONE RD CONST BASELINE	5'-0"	6'-6"	7.59'	113.43'	0.31%	2"

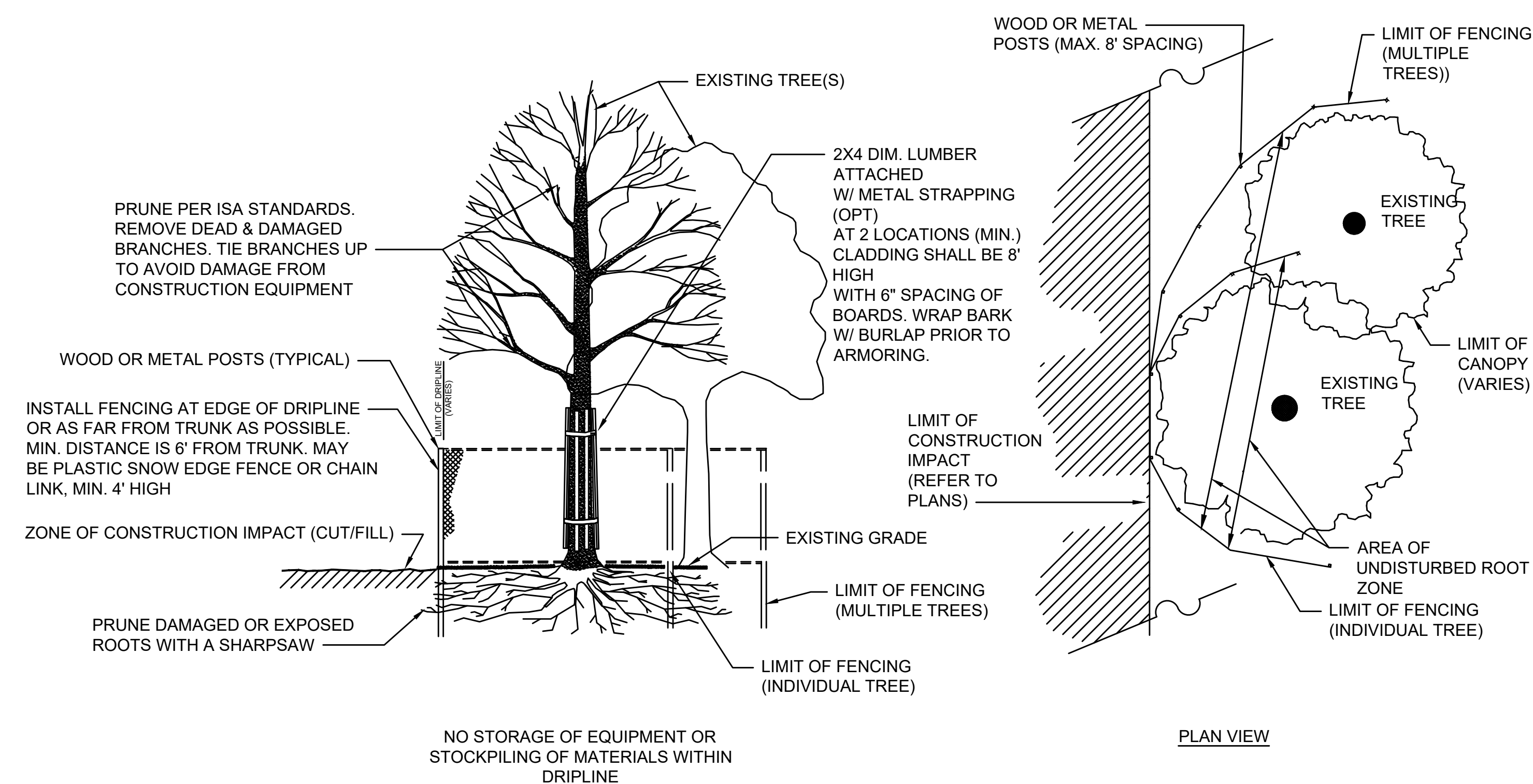


HMA DRIVEWAY WITH HMA SIDEWALK

SCALE: NTS

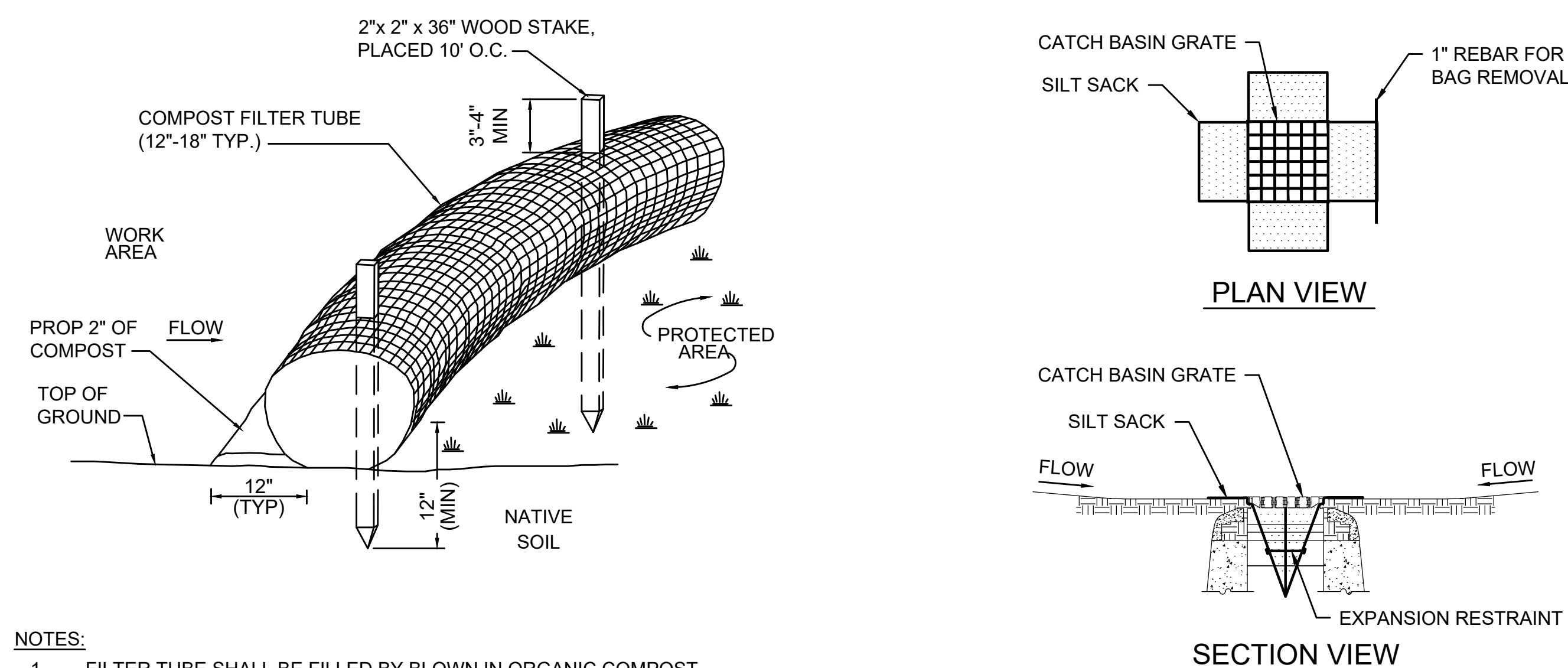
DRIVEWAY DATA					
NO.	LOCATION (REF POINT)	ROADWAY GUTTER	OPENING ELEV	LEFT SIDE	RIGHT SIDE
				TRANS	TRANS
1	STA 210+07.82, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	1.45%	59.04	15'-0"	6'-6"
2	STA 211+64.43, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	2.97%	62.03	6'-6"	14'-0"
3	STA 212+75.00, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	5.97%	66.53	15'-0"	6'-6"
4	STA 215+37.14, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	2.57%	80.42	14'-0"	6'-6"
5	STA 216+02.83, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.55%	81.44	9'-0"	6'-6"
6	STA 216+97.46, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	1.37%	82.09	7'-8"	6'-6"
7	STA 218+24.15, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	3.57%	85.35	11'-0"	6'-6"
8	STA 218+90.29, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.94%	86.94	11'-0"	6'-6"
9	STA 220+34.89, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.42%	87.58	9'-0"	6'-6"
10	STA 220+84.01, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.50%	87.94	7'-8"	6'-6"
11	STA 222+20.41, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	1.73%	89.34	7'-8"	6'-6"
12	STA 223+26.45, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	2.86%	92.22	11'-0"	6'-6"
13	STA 223+59.38, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	1.97%	93.05	11'-0"	6'-6"
14	STA 225+21.82, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.24%	94.21	7'-8"	6'-6"
15	STA 229+33.04, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.91%	102.88	7'-8"	6'-6"

16	STA 229+98.28, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	1.09%	103.70	14'-0"	6'-6"
17	STA 231+15.89, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	4.51%	107.97	14'-0"	6'-6"
18	STA 238+78.40, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	-1.29%	115.48	6'-6"	7'-8"
19	STA 238+78.40, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	-1.85%	114.63	6'-6"	9'-0"
20	STA 255+63.66, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	2.43%	101.450	11'-0"	6'-6"
21	STA 257+20.71, 12.5' RT ALGN - MILLSTONE RD CONST BASELINE	0.73%	105.39	7'-8"	6'-6"
22	STA 261+54.66, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	2.48%	100.81	6'-6"	11'-0"
23	STA 262+66.36, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	3.92%	104.61	6'-6"	14'-0"
24	STA 264+02.82, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	5.16%	111.09	6'-6"	15'-0"
25	STA 264+56.93, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	4.54%	113.61	6'-6"	15'-0"
26	STA 266+23.98, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.02%	115.76	6'-6"	7'-8"
27	STA 278+25.89, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	0.30%	116.99	6'-6"	9'-0"
28	STA 295+63.96, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-1.71%	112.51	9'-0"	6'-6"
29	STA 298+98.21, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.47%	112.21	7'-8"	6'-6"
30	STA 300+81.84, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.90%	109.93	6'-6"	7'-8"
31	STA 302+43.46, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	2.16%	110.90	6'-6"	9'-0"
32	STA 302+84.44, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	3.91%	112.08	6'-6"	11'-0"
33	STA 303+44.79, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.48%	113.23	7'-8"	6'-6"
34	STA 303+92.72, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.60%	112.73	6'-6"	7'-8"
35	STA 304+65.68, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	0.11%	112.34	9'-0"	6'-6"
36	STA 305+05.21, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	1.33%	112.89	6'-6"	14'-0"
37	STA 305+57.15, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	1.30%	113.39	6'-6"	7'-8"
38	STA 306+85.02, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.68%	113.70	7'-8"	6'-6"
39	STA 308+39.42, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-1.06%	113.09	6'-6"	7'-8"
40	STA 309+13.09, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.85%	112.51	9'-0"	6'-6"
41	STA 310+07.28, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.76%	111.93	6'-6"	7'-8"
42	STA 311+84.19, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.02%	111.30	7'-8"	6'-6"
43	STA 315+25.93, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	0.36%	111.84	6'-6"	7'-8"
44	STA 315+73.46, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	0.03%	111.93	6'-6"	7'-8"
45	STA 317+12.70, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-1.17%	110.79	9'-0"	6'-6"
46	STA 317+68.53, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.44%	110.30	9'-0"	6'-6"
47	STA 321+43.06, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-1.33%	109.73	7'-8"	6'-6"
48	STA 322+16.30, -12.5' LT ALGN - MILLSTONE RD CONST BASELINE	-0.09%	109.16	9'-0"	6'-6"



TREE PROTECTION OF EXISTING TREE(S)

SCALE: N.T.S.



NOTES:

1. FILTER TUBE SHALL BE FILLED BY BLOWN IN ORGANIC COMPOST AND PLACED AS ILLUSTRATED ON THE PROJECT PLANS.
2. COMPOST FILTER TUBES SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIRED OR REPLACED AS NEEDED.
3. AT COMPLETION OF PROJECT, COMPOST FILTER TUBES SHALL BE CUT OPEN AND COMPOST MATERIAL SHALL BE DISPERSED ON SITE, AS DETERMINED BY THE ENGINEER.
4. THE EMPTY FILTER TUBE FABRIC SHALL BE COLLECTED AND DISPOSED OF PROPERLY.

SEDIMENTATION FENCE

SCALE: N.T.S.

NOTES:

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

INLET PROTECTION - SILT SACK IN CATCH BASIN

SCALE: N.T.S.



WHITE PINE

Pinus strobus

Mature Height:

50-80 ft.

Mature Width:

20-40 ft.

General Habit:

Tall and wide

Pyramidal

Tends to lose lower branches as it ages

Maintenance

Low

PREFERRED CONDITONS

Sun: Full sun, 6+ hrs a day
Soils: High organic content, loam, sand
PH: Acidic
Spacing Req: 24-60'
USDA Hardiness Zones: 3a-8a

INSTALLED PRICING:

5-6' HT : \$400 /ea



EASTERN RED CEDAR

Juniperus Virginiana

Mature Height:

30-40 ft.

Mature Width:

10-20 ft.

General Habit:

Fastigate

Conical

Dense

Maintenance

Low

PREFERRED CONDITONS

Sun: Partial shade to full sun
Soils: Dry to moist and well drained
PH: Acidic - neutral
Spacing Req: 12-24'
USDA Hardiness Zones: 2a-9a

INSTALLED PRICING:

5-6' HT : \$500 /ea

Vulnerable to deer



COMMON SASSAFRAS

Sassafras albidum

Mature Height:

30-60 ft.

Mature Width:

25-40 ft.

General Habit:

Rounded

Irregular

Multistem

Maintenance

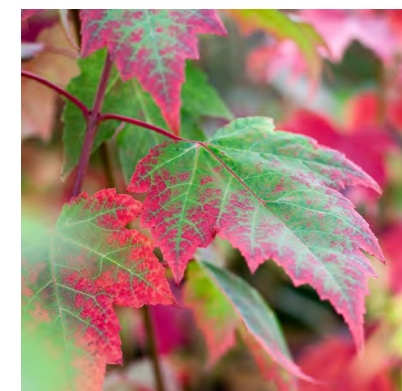
Pruning to maintain shape

PREFERRED CONDITONS

Sun: Partial shade to full sun
Soils: Well drained, sandy
PH: Acidic
Spacing Req: 24-60'
USDA Hardiness Zones: 4a-9a

INSTALLED PRICING:

1.5"-2." : \$700 /ea



RED MAPLE

Acer rubrum

Mature Height:

40-80 ft.

Mature Width:

30-50 ft.

General Habit:

Oval

Pyramidal

Maintenance

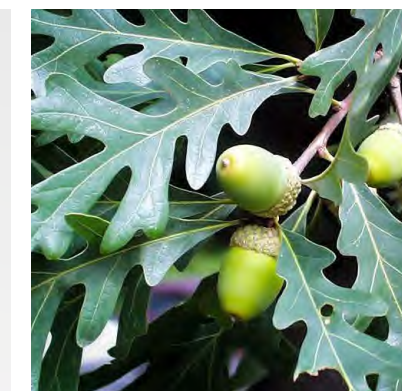
Low

PREFERRED CONDITONS

Sun: Partial shade to full sun
Soils: Moist and well drained
PH: Slightly Acidic
Spacing Req: +40'
USDA Hardiness Zones: 2b-9b

INSTALLED PRICING:

1.5"-2." : \$700 /ea



WHITE OAK

Quercus alba

Mature Height:

50-120 ft.

Mature Width:

50-80 ft.

General Habit:

Pyramidal

Rounded

Spreading

Maintenance

Acorns

PREFERRED CONDITONS

Sun: Partial shade to full sun
Soils: Coarse, deep, moist, well-drained
PH: Acidic - neutral
Spacing Req: +60'
USDA Hardiness Zones: 4a-9a

INSTALLED PRICING:

1.5"-2." : \$800 /ea



TULIP TREE

Liriodendron tulipifera

Mature Height:

50-120 ft.

Mature Width:

30-60 ft.

General Habit:

Oval

Pyramidal

Rounded

Maintenance

Low

PREFERRED CONDITONS

Sun: Partial shade to full sun
Soils: Moist and well drained
PH: Acidic - neutral
Spacing Req: 12-24'
USDA Hardiness Zones: 4a-9a

INSTALLED PRICING:

1.5"-2." : \$700 /ea

Cape Cod Native Shrubs



BEACH PLUM

Prunus maritima

Mature Height:

3-6 ft.

Mature Width:

3-6 ft.

General Habit:

Spreading

Dense

INSTALLED PRICING:

4-5' B&B:

\$350 /ea

PREFERRED CONDITONS

Sun: Full sun

Soils: Well drained, sandy
USDA Hardiness Zones: 3-7



SMOOTH SUMAC

Rhus glabra

Mature Height:

9-15 ft.

Mature Width:

9-15 ft.

General Habit:

Multistemmed

Spreading



INSTALLED PRICING:

#3 Pot :

\$100 /ea

PREFERRED CONDITONS

Sun: Partial shade to full sun

Soils: Well drained, rocky
USDA Hardiness Zones: 3a-9a



FRAGRANT SUMAC

Rhus aromatica

Mature Height:

2-6 ft.

Mature Width:

6-10 ft.

General Habit:

Creeping

Dense



INSTALLED PRICING:

3-4' B&B:

\$300 /ea

PREFERRED CONDITONS

Sun: Partial shade to full sun

Soils: Well drained, moist
USDA Hardiness Zones: 3a-9a



COMMON WITCHHAZEL

Hamamelis virginiana

Mature Height:

10-20 ft.

Mature Width:

10-20 ft.

General Habit:

Multistemmed



WINTERBERRY

Ilex verticillata

Mature Height:

3-15 ft.

Mature Width:

3-12 ft.

General Habit:

Rounded

Dense

INSTALLED PRICING:

#3 Pot :

\$100 /ea

PREFERRED CONDITONS

Sun: Shade to Full sun

Soils: Well drained, moist
USDA Hardiness Zones: 3a-9a



BLACK CHOKEBERRY

Aronia melanocarpa

Mature Height:

3-6 ft.

Mature Width:

3-6 ft.

General Habit:

Shrubby



INSTALLED PRICING:

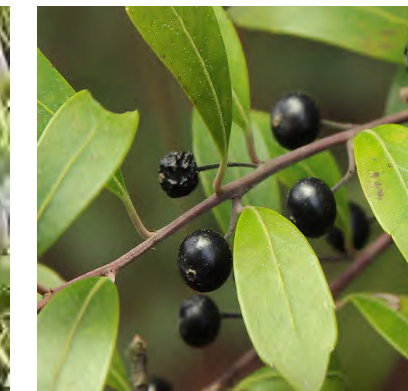
#3 Pot :

\$250 /ea

PREFERRED CONDITONS

Sun: Partial shade to full sun

Soils: Moist, Sandy
USDA Hardiness Zones: 4a-11a



INKBERRY

Ilex glabra

Mature Height:

5-10 ft.

Mature Width:

5-8 ft.

General Habit:

Round

Dense



INSTALLED PRICING:

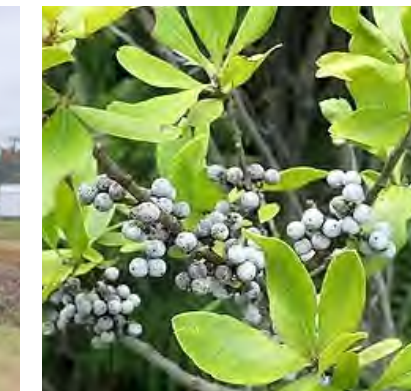
3-4' B&B:

\$300 /ea

PREFERRED CONDITONS

Sun: Partial shade to full sun

Soils: Highly adaptable
USDA Hardiness Zones: 3a-7a



NORTHERN BAYBERRY

Myrica pensylvanica

Mature Height:

5-10 ft.

Mature Width:

5-10 ft.

General Habit:

Dense



SHADBUSH

Amelanchier canadensis

Mature Height:

10-20 ft.

Mature Width:

10-20 ft.

General Habit:

Multistemmed

INSTALLED PRICING:

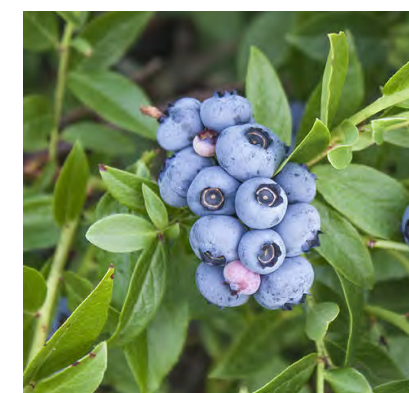
3-4' B&B:

\$200 /ea

PREFERRED CONDITONS

Sun: Shade to Full sun

Soils: Highly adaptable
USDA Hardiness Zones: 4b-9a



HIGHBUSH BLUEBERRY

Vaccinium corymbosum

Mature Height:

3-12 ft.

Mature Width:

3-10 ft.

General Habit:

Shrubby



INSTALLED PRICING:

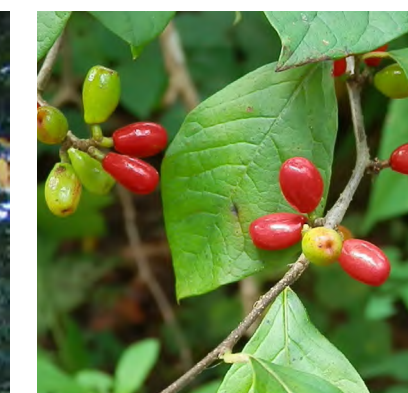
5-6' B&B:

\$350 /ea

PREFERRED CONDITONS

Sun: Partial shade to full sun

Soils: Highly adaptable
USDA Hardiness Zones: 5a-9a



SPICEBUSH

Lindera benzoin

Mature Height:

8-15 ft.

Mature Width:

6-15 ft.

General Habit:

Multistemmed

Shrubby



INSTALLED PRICING:

3-4' B&B:

\$250 /ea

PREFERRED CONDITONS

Sun: Partial shade to full sun

Soils: Moist, well drained
USDA Hardiness Zones: 3a-7a



ARROWWOOD VIBURNUM

Viburnum Dentatum

Mature Height:

5-10 ft.

Mature Width:

6-10 ft.

General Habit:

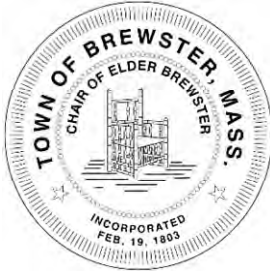
Clumping

Rounded

MAJOR STORMWATER MANAGEMENT PERMIT
CASE NO. SWMP2023-46

APPLICANT/OWNER: DAVID & HIEDI JENKINS

PROPERTY: 87 TIMBERLANE DRIVE



Town of Brewster

2198 Main Street
Brewster, MA 02631-1898
Phone: (508) 896-3701 x. 1133

Office of:
Planning Board
Planning Dept.

STAFF REPORT

TO: Planning Board
FROM: Town Planner
RE: Major Stormwater Permit SWMP23-46
87 Timberlane Drive (Map 144, Parcel 11)
Owner/ Applicant: David & Heidi Jenkins
c/o John M. O'Reilly, P.E., J.M. O'Reilly & Associates
DATE: November 28, 2023

Recommendation

The stormwater permit application meets the applicable performance standards and submission requirements set out in the town's Stormwater Management Regulations for issuance and approval of a Major Stormwater Permit.

Approval should be granted subject to the continuing obligations set out in said Regulations, including Sections 5.7, 5.8, 5.9 (Certificates of Compliance), 6.1B (Construction practices), Section 7.2 (Inspections), 8.3 (Recording of stormwater permit and O&M plan) and 8.5 therein.

The Board may want to consider/ impose the following special conditions of approval: use of the new building is limited to accessory residential; and any use or storage of hazardous materials in the building is limited to Household Amounts (as defined in the Zoning Bylaw); and a stone driveway apron shall be installed and maintained during construction.

Major Stormwater Management Permit

The underlying project is the addition of an accessory/ utility building on a large, 5.4+ acre residential property. The project triggers a Major Stormwater Permit according to Chapter 272 of the Brewster Code (Stormwater Management Bylaw) and Section 4 of the Bylaw's supporting regulations, as the project involves net new impervious surface of 2500 sq ft or greater, albeit slightly. Major Stormwater Permits are subject to review at a public meeting, including for any waivers requested. No waivers have been requested or identified as necessary. No portion of the project is located in a special flood hazard area or wetland resource areas. Because the project is not subject to wetlands jurisdiction, the Planning Board is the stormwater permitting authority.

The applicant states that the proposed use of the new building will be as accessory to the existing single family dwelling use on the property. The underlying property zoning is residential. The property is also located in the Zone II/ DCPC overlay. On this basis, the applicant will need to submit site-wide nitrogen loading calculations for the project with its building permit application, limited to a site concentration of 5ppm or lower. Further, storage of hazardous materials is limited to household quantities.

The Applicant has provided the required application materials for a Major Stormwater Permit as set out in Appendix B of the Stormwater Management Regulations, including a stamped site & drainage plan and Stormwater Management Report, including TSS Report and HydroCad analysis of pre- and post-development conditions, all dated 11/16/23.

The Applicant has provided construction-period BMPs consistent with the performance standards for Major Stormwater Permits set out in Section 6.1B of the Stormwater Management Regulations. The site plan contains the specific details of the proposed erosion and sedimentation controls.

The post-construction stormwater management system is consistent with the Major Stormwater Permit performance standards for new construction set out in Section 6.2B of the Stormwater Management Regulations, addressing BMPs and management for both stormwater quantity and quality:

- The system meets the applicable standards in the Massachusetts Stormwater Handbook for new development.
- The entirety of the post-construction stormwater management system is Low Impact Development (LID)- type: the use of existing natural site depressions and a stone perimeter foundation trench conveyed by gutters and downspouts. Also, consistent with LID, the applicant proposes to relocate pine saplings in the new building footprint to other areas of the property.
- NOAA Plus precipitation values were used in the HydroCad analysis.
- The stormwater system will not increase off-site flooding and does not increase peak run-off rates over existing conditions including for the 100 yr. storm.
- The system will recharge all run-off from the development on-site and preserve the existing recharge volume/ capacity on-site.
- In addition to the MA handbook stormwater standards, the system meets the TSS and Total Phosphorus treatment requirements set out in the Brewster Stormwater Management Regulations through water quality volume/ holding capacity of the natural depression infiltration facilities. There is also some associated Nitrogen treatment assumed with system performance.
- The system treats the ‘first flush’ (first inch) of run-off.
- The Applicant has provided a corresponding Operations and Maintenance Plan, which adequately addresses the long-term maintenance of the post-construction BMPs.
- The Applicant’s soil tests on the property, and NRCS mapping (Carver coarse), have revealed well-draining soils typical of Cape Cod.
- Test pits suggest that there is significant separation between stormwater infiltration facilities and the groundwater table.
- There is no formal pretreatment provided, which is generally required in Zone II area, especially where a metal roof is proposed (the application does not state whether the proposed building roof is metal). However, given the circumstances, even if a metal roof is proposed, it does not appear that pre-treatment would or should be necessary: 1) there is significant separation to groundwater; 2) the use is residential; 3) the property is large; 4) LID-type facilities are proposed including nature-based treatment/ infiltration; 5) the overland travel prior to collection, treatment and infiltration in the existing natural basins is analogous to a vegetated filter strip; 6) the stormwater management approach meets overall treatment requirements; and 7) there are no wetlands resources applicable to the project. To the extent a waiver is deemed necessary by the Board, the applicant meets the standards for a waiver under Section 5.10 of the Brewster Stormwater Management Regulations from the pre-treatment requirements of MA Stormwater Handbook Standard 4.



Town of Brewster
Code Chapter 272
Stormwater Management Permit
Application Form

FOR TOWN OFFICIAL USE ONLY
TOWN CLERK RECEIVED:
23 NOV 20 3:03 PM
BREWSTER TOWN CLERK
SWM PERMIT NUMBER ASSIGNED:
SUMP 203-44

1. Project Location:

87 Timberlane Drive, Brewster
Street Address

Map 144, Parcel 11
Assessors Map and Parcel(s)

Deed Book 6266, Page 257
Deed Reference

2. Applicant:

David & Heidi Jenkins
Name

P.O. Box 978 South Orleans MA 02662
Legal Mailing Address

508-737-9678
Phone Number

hjenkins978@gmail.com
Email Address

3. Property Owner (if different than Applicant):

Same
Name

Legal Mailing Address

Phone Number

Email Address

4. Professional Representative:

J.M. O'Reilly & Associates, Inc. John O'Reilly, P.E.
Name

1573 Main Street (Mailing: P.O. Box 1773), Brewster, MA 02631
Legal Mailing Address

508-896-6601
Phone Number

joreill@moreillassoc.com
Email Address

5. Type of Application (Check as applicable):

Minor Stormwater Permit- Any combination or series of construction or land disturbance activities that, over a two-year period, will result in a net increase in impervious area of 500 sq.ft. to 2,500 sq.ft. and/or will result in land disturbances of 10,000 sq.ft. to 20,000 sq.ft.

Major Stormwater Permit- Any alteration, disturbance, development, or redevelopment that does not meet the eligibility criteria for a Minor Stormwater Permit.

SWM Permit Amendment-
List existing Stormwater Management permit number/ type _____.

Stormwater Management Certificate of Compliance (SMCC) Request-
List relevant Stormwater Management permit number _____.

6. Brief Project Description, including any waiver requests:

Project proposes to construct a storage / barn building. The building area is about 2,520 sf in size and triggers the major SW permit. The stormwater will be handled by a perimeter drain along with the surrounding low points to the east of the building. Refer to Plans and Stormwater Report.

7. Signatures:

Applicant David J. Fredi Jenkins Date 11/20/23

Property Owner (if different than Applicant) _____ Date _____

Professional Representative (as applicable) [Signature] Date 11-20-2023

NOTES:

- Please refer to Appendix B of the Stormwater Management Regulations for detailed application submittal and supporting material requirements for Minor and Major Stormwater Management Permits, respectively.
- The application fee schedule is contained in Appendix C of the Regulations.
- Certain activities are exempt from review and permitting (See §272-6 of the Stormwater Management Bylaw).
- If the project is located, in whole or part, within an area subject to state or local wetlands protection law, the review and permitting authority is the Brewster Conservation Commission/ Conservation Department.
- No permit review shall occur nor shall review periods commence until the application is deemed complete.



J.M. O'REILLY & ASSOCIATES, INC.

PROFESSIONAL ENGINEERING, LAND SURVEYING & ENVIRONMENTAL SERVICES

Site Development • Property Line • Subdivision • Sanitary • Land Court • Environmental Permitting

STORMWATER MANAGEMENT REPORT AND OPERATIONS & MAINTENANCE MANUAL

David & Heidi Jenkins
87 TIMBERLANE DRIVE, BREWSTER, MA
ASSESSORS MAP 144, PARCEL 11

NOVEMBER 16, 2023

PREPARED FOR:

David & Heidi Jenkins
P.O. Box 978
S. Orleans, MA 02662

PREPARED BY:

J.M. O'REILLY & ASSOCIATES, INC.
1573 MAIN STREET
P.O. BOX 1773
BREWSTER, MA 02631
508-896-6601

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1. Property Description and Information
2. Stormwater Management System Description
3. Pre Versus Post peak Discharge Rates; volumes requirements & Nutrient Treatment
4. Massachusetts Stormwater Handbook Performance Standards
5. Owner and Responsible Party
6. Schedule of Inspection and Maintenance of System
7. Long Term Lawn Care & Pollution Prevention Plan
8. Emergency Spill Cleanup Plan
9. ATTACHMENTS
 - A – TSS Removal Calculation Sheets (Roof and Driveway)
 - B – Routing Diagram from HydroCAD Report with Pre versus Post Discharge
 - C – Site Plan with Watershed Plan

Property Description:

- Lot Area: 235,475 sf+/- (5.41 ACRES)
- Parcel Improvements: The site is developed with a single family dwelling, driveway and utilities.
- Wetlands: There are no wetlands associated with this project or parcel.
- Soils: Soil testing on the parcel for the sewage system design reflects a fine to medium grain sand.
- Groundwater: The groundwater is anticipated at elevation 24+/-, as reflected in the groundwater maps within the Brewster Health Department. Groundwater is anticipated to be about 46 feet below the large low point, east of the proposed building.
- Zone II: The parcel is located within a Zone II Groundwater Recharge area.
- Topography: The topography is rolling and provides for multiple watersheds within the parcel and three watersheds for the proposed building. As noted on the Site Plan the highest elevation is about 103, with a lowest elevation of 70, east of proposed building.
- Site Conditions: The existing lot is currently improved with a single family home with a paved driveway. The parcel is well wooded with the existing natural low points, east of the existing dwelling. The low areas are currently taking a majority of stormwater runoff from the existing driveway. The intention is to continue utilizing the native landscape and topography with a perimeter leaching trench for the roof runoff, to accommodate the stormwater from the project site.

Stormwater Management System Description:

The proposed post-development stormwater management plan consists of one (1) stormwater system which has been designed to collect, deliver and discharge the stormwater from the roof area into the ground via a perimeter leaching trench. The disturbed areas on the north, east and south of the proposed building are going to be graded to direct the stormwater into the low areas, east of the proposed building. The evaluation of the low point was limited to the volume available for the anticipated discharge of stormwater based on a 100 year storm event. The attached HydroCAD calculations provide the anticipated pre-peak discharge versus post-peak discharge analysis for the project.

The intent of the stormwater controls is the collection of the entire roofed area of the building, the gravel aprons and the disturbed areas because of the construction via gutters, downspouts and leaching trench along with grading of the disturbed areas and gravel aprons towards the low points. The proposal does not specifically provide pre-treatment prior to discharge to the low points, we feel the utilization of the natural vegetated low points as the best option for the additional stormwater associated with the disturbed areas and gravel aprons.

The leaching facility for the roof is designed for the 100-year storm event, so there is no additional stormwater being generated to the low points because of the roof area. The grading to the west of the

building continues to run off the property into a low point (EL=86.9). The incorporation of the perimeter leach trench for the 100 year storm is to address the mitigation of additional stormwater running to the west and off property. The remaining slope, west of the parcel, will continue to slope west toward the low point, as currently exists. The Application are planning to transplant the existing vegetation (specifically the scrub pine saplings) within the building footprint to along the property line.

Like a previous application, this application utilizes the natural vegetated low points as a Bioretention Basin for the surface runoff from the north, east and south of the proposed building. The TSS removal, with the Bioretention Areas, would be 90%, when you consider the overland runoff a ‘vegetated strip’.

The nitrogen and phosphorous reduction can be considered to be about 70% when you apply the reduction rate of a Bio-retention basin is between 30% to 90% and the infiltration trench (Existing Sand Layers) under the basin (low point) is between 40% and 70%.

As shown in the HydroCAD report, the Watersheds (low points east of building) provide the storage capacity for the 100 year storm with no additional volume being discharged from the low points to off property. The table below provides a comparison of the site-wide Pre- to Post-Development peak discharge rate for each storm event.

Storm Event	Pre-Development Peak Discharge Rate, cubic feet per second (ft ³ /sec)	Post-Development Peak Discharge Rate, cubic feet per second (ft ³ /sec)
Watersheds (East of Building)	0	0

Erosion Control Plan - Temporary Siltation Barrier & Silt Socks:

The proposal calls for a row of straw wattles along the western property line to mitigate any off-site disturbance or washout. The plan view reflects the anticipated areas of disturbance. For the remaining areas of disturbance, the applicants will implement the wattles, as necessary, to mitigate washout and scour.

Operation and maintenance plan is included herewith to address the long-term maintenance of the stormwater systems.

Massachusetts Stormwater Management Design Standards:

The following is a description of how the proposed project meets the Massachusetts Stormwater Handbook design standards.

Standard 1: No new untreated discharges:

This standard is met since there are no new untreated stormwater discharges proposed. See Standards 4-6 calculations.

Standard 2: Maintain Pre-development peak discharge rate:

This standard has been met. Refer to the Table above.

Groundwater Recharge:

This standard is met. The proposed stormwater management system (Leach Trench and the Natural Low Point) is sized so that the total recharge volume provided exceeds the minimum groundwater recharge volume specified in the handbook and the proposed stormwater recharge galleys will drawdown within 72 hours of a storm event. In accordance with the MA Stormwater Manual, the required recharge volume factor (F) required across the impervious area (A) is 0.6 inches per hour for hydraulic soil group A soils. Fine Sand (Rawls Rate: 8.27 inches per hour) has been used in the sizing of the stormwater recharge galleys. Refer to the HydroCAD Stormwater Modeling Report in Appendix. The required recharge volume is calculated based on the total pavement and roof areas on site.

- Required Recharge Volume $R_v = F \times A = (0.6 \text{ in})(1 \text{ ft}/12 \text{ in})(2,520 \text{ sf} + 2,500 \text{ sf}) = 251 \text{ cf}$ (Roof & Driveway)
- Recharge Storage Provided (Subsurface leaching facilities for roof and Swale) = +100,000 cf >> 251 cf.
- The drawdown for the subsurface leaching facilities for the driveway/parking system and roof runoff is < 1 hour < 72 hour maximum allowance.

Standard 4: Water Quality:

The TSS standard appears to be met when utilizing the natural low point for stormwater. TSS removal calculation tables for driveway and altered portions included in the Appendix A.

The Nitrogen and Phosphorus reductions are estimated based on the pre-treatment of the vegetated strip, the Bio-retention nature of the natural low point and the sandy material which lays beneath the natural low point. Our office estimates an approximate reduction of 70% in both nitrogen and phosphorus when applying the removal percentages of a Bio-retention area (natural low point) and the dry sandy soils beneath the low point. The lowest reduction rates of a Bio-retention area and the sand soils (infiltration area) is about 70% (40% for Bio-retention & 30% for infiltration).

In accordance with the MA Stormwater Manual, the required water quality depth (Dwq) across the impervious area (A) is 1.0 inches per hour in areas containing soils with rapid infiltration rate greater than 2.4 in/hr. The required water quality volume is based on the total pavement area on site.

- Required Water Quality Volume $V_{wq} = Dwq \times A = (1.0 \text{ in})(1 \text{ ft}/12 \text{ in})(2,500 \text{ sf gravel areas}) = 208 \text{ cf}$
- Water Quality Storage Provided (natural low point / swale) = +100,000 cf >> 208 cf.

Standard 5: Land uses with higher potential pollutant loads:

This standard has been met. The proposed use is a residential building.

Standard 6: Stormwater discharges within Zone II or Interim Wellhead protection area of a public water supply and stormwater discharges near or to any critical area.

This standard has been met. The 1-inch Required Water Quality Volume for discharges within a Groundwater Protection area has been met, see Standard 4 calculations. The existing low points provide the necessary storage volumes (+100,000 cf)

Standard 7: Redevelopment:

This standard is met. The project addresses the increased hardscape and roof area and the potential stormwater water runoff. No direct discharges are proposed. The pre versus post construction volumes are addressed when utilizing the natural low point for stormwater control.

Standard 8: Construction Erosion Control Plan:

The project is subject to the proposed erosion control plan as outlined on the plan. Straw wattles shall be implemented as required to mitigate erosion of soil.

Standard 9: Long Term Operation and Maintenance Plan:

A long-term O&M plan has been submitted with this report. The property owners will operate and maintain the stormwater systems.

Standard 10: Illicit Discharges:

This standard is met since there are no illicit discharges at this site and no illicit discharges proposed.

Owner and Responsible Party

The owner and responsible party for Stormwater Pollution Control at 87 Timberlane Drive, Brewster, MA

Owner & Operator:

David & Heidi Jenkins

P.O. Box 978

South Orleans, MA 02662

508-737-9678

Hjenkin978@gamil.com

Schedule of Inspection and Maintenance of Stormwater Management Systems

1. Gutters and downspouts shall be cleaned twice a year.
2. Gravel areas shall be kept clean and free of trash and debris.

Estimate of annual operation and maintenance budget for common areas = \$ 500.00

Long Term Lawn Care & Pollution Prevention Plan

Description of Pollutant Sources:

- Light vehicle traffic – residential development
- Lawn care products

Source Control Best Management Practices

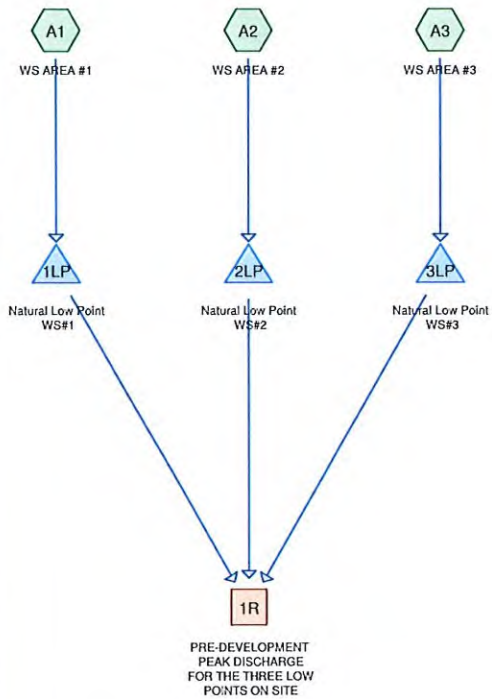
- There shall be no storage of items or materials which will be subject to the weather.
- Good housekeeping measures shall be implemented throughout the site to keep the driveways clean of debris.
- Regularly cleaning the gravel areas to remove debris and any other potential stormwater pollutants.
- The use of winter de-icing sand and salt materials shall be minimized to the maximum extent practicable.
- Winter de-icing sand and salt materials shall be stored indoors.
- Snow storage shall not be within the swales.
- Immediately clean up any spillage on gravel areas and dispose of wastes properly.

Emergency Spill Cleanup Plan

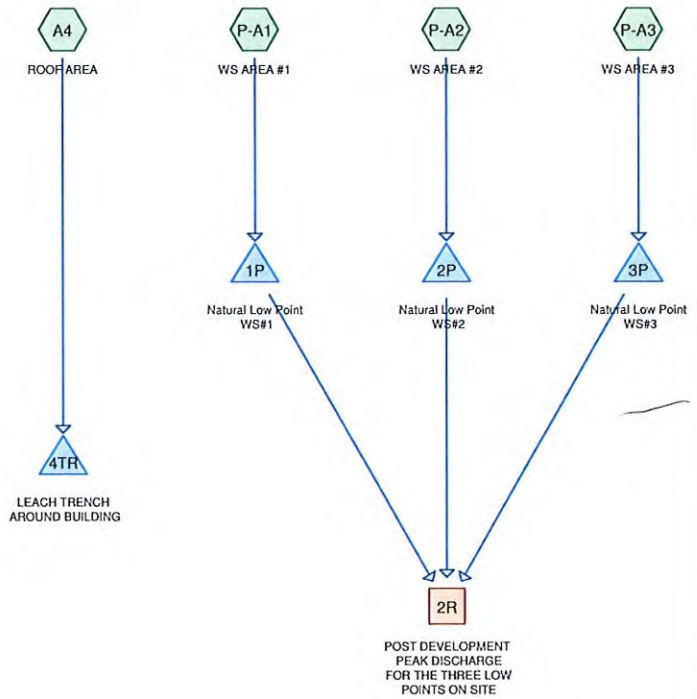
1. The owner of the facility shall have a designated person with overall responsibility for spill response cleanup.
2. In the event of a spill the following shall be notified:

A. Brewster Fire Department	(508) 896-1708
(for a gasoline or hazardous material spill)	911
B. Massachusetts D.E.P. Emergency Response	(800) 304-1133
C. Brewster Health Department	(508) 896-3701 ext. 1120
3. Cleanup of spills shall begin immediately.

**PRE-CONSTRUCTION
- WATERSHEDS**



**POST-CONSTRUCTION
WATERSHEDS**



Routing Diagram for 9579.JENKINS-STORAGE BUILDING - 87 TIMBERLINE
 Prepared by J M O'Reilly & Associates Inc, Printed 11/16/2023
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9579.JENKINS-STORAGE BUILDING - 87 TIMBERLINE

Prepared by J M O'Reilly & Associates Inc

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Printed 11/16/2023

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.115	96	Gravel surface, HSG A (P-A1, P-A2)
0.180	98	Paved parking, HSG A (A2, A3, P-A2, P-A3)
0.159	98	Roofs, HSG A (A3, A4, P-A1, P-A3)
5.408	30	Woods, Good, HSG A (A1, A2, A3, P-A1, P-A2, P-A3)
5.863	35	TOTAL AREA

9579.JENKINS-STORAGE BUILDING - 87 TIMBERLINE

Prepared by J M O'Reilly & Associates Inc

Printed 11/16/2023

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Page 3

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.115	0.000	0.000	0.000	0.000	0.115	Gravel surface	P-A1, P-A2
0.180	0.000	0.000	0.000	0.000	0.180	Paved parking	A2, A3, P-A2, P-A3
0.159	0.000	0.000	0.000	0.000	0.159	Roofs	A3, A4, P-A1, P-A3
5.408	0.000	0.000	0.000	0.000	5.408	Woods, Good	A1, A2, A3, P-A1, P-A2, P-A3
5.863	0.000	0.000	0.000	0.000	5.863	TOTAL AREA	

Time span=0.00-25.00 hrs, dt=0.01 hrs, 2501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Reach 1R: PRE-DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2R: POST DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

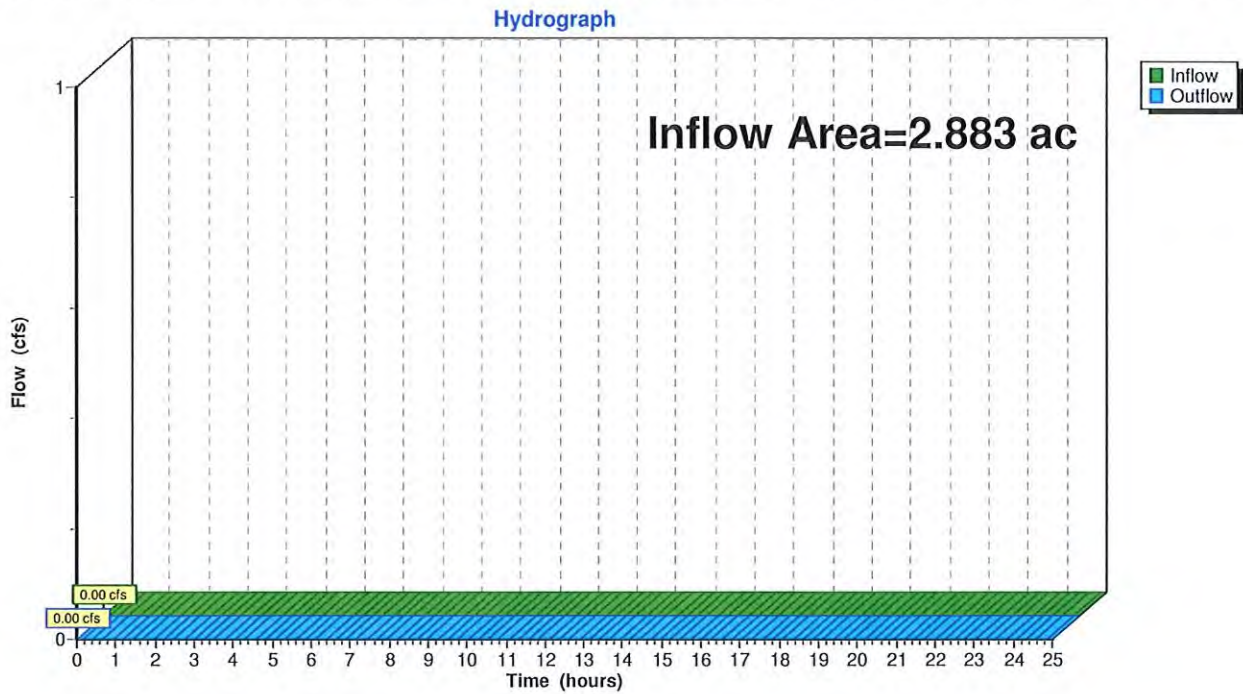
Summary for Reach 1R: PRE-DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW POINTS ON SITE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.883 ac, 3.89% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 1R: PRE-DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW POINTS ON SITE



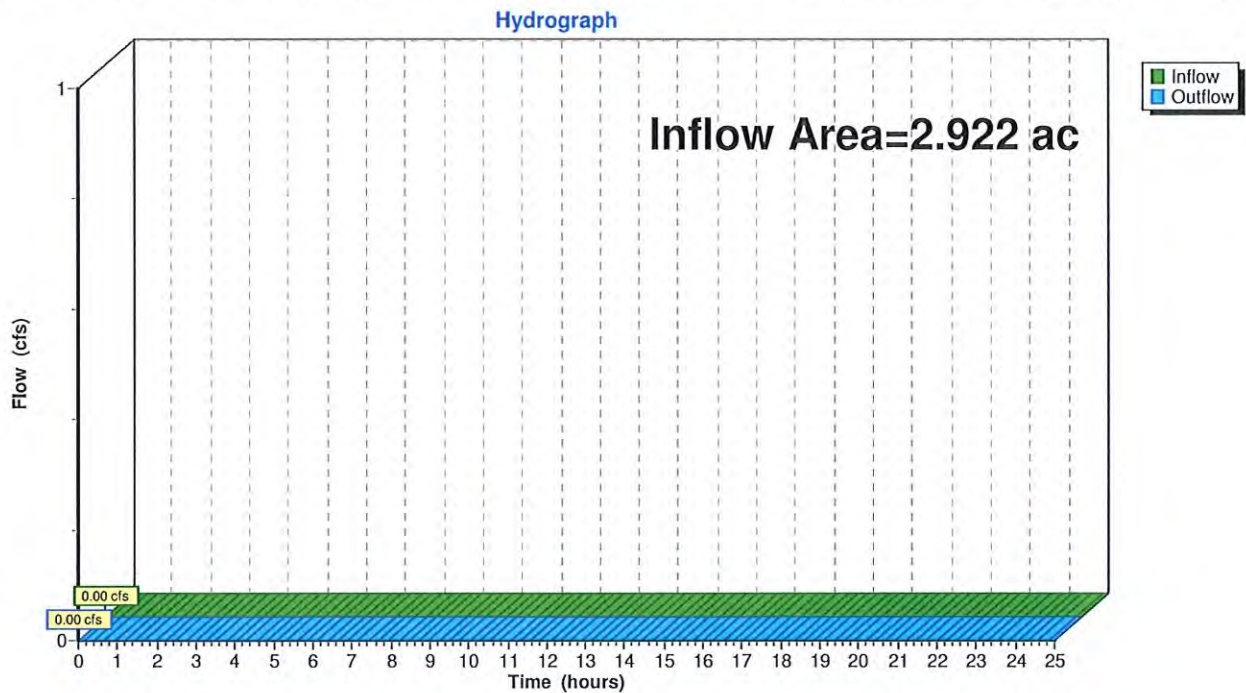
Summary for Reach 2R: POST DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW POINTS ON SITE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.922 ac, 5.81% Impervious, Inflow Depth = 0.00" for 100-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Reach 2R: POST DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW POINTS ON SITE



Summary for Pond 2LP: Natural Low Point WS#2

Inflow Area = 1.861 ac, 2.81% Impervious, Inflow Depth = 0.71" for 100-Year event
 Inflow = 0.57 cfs @ 12.32 hrs, Volume= 0.110 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routed to Reach 1R : PRE-DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW POINTS ON SITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs
 Peak Elev= 73.72' @ 24.34 hrs Surf.Area= 3,875 sf Storage= 4,786 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	72.00'	44,069 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
72.00	1,815	155.0	0	0	1,815
74.00	4,282	238.0	5,923	5,923	4,440
76.00	6,970	303.0	11,143	17,067	7,290
78.00	10,080	364.0	16,955	34,021	10,596
80.00	1,330	417.7	10,048	44,069	14,027

Device	Routing	Invert	Outlet Devices	
#1	Primary	79.90'	10.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=72.00' TW=0.00' (Dynamic Tailwater)
 ↳ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

9579.JENKINS-STORAGE BUILDING - 87 TIMBERLIN Type III 24-hr 100-Year Rainfall=8.50"

Prepared by J M O'Reilly & Associates Inc

Printed 11/20/2023

HydroCAD® 10.20-2g s/n 08678 © 2022 HydroCAD Software Solutions LLC

Summary for Pond 3LP: Natural Low Point WS#3

Inflow Area = 0.634 ac, 9.42% Impervious, Inflow Depth = 1.08" for 100-Year event
 Inflow = 0.45 cfs @ 12.13 hrs, Volume= 0.057 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routed to Reach 1R : PRE-DEVELOPMENT PEAK DISCHARGE FOR THE THREE LOW POINTS ON SITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-25.00 hrs, dt= 0.01 hrs

Peak Elev= 46.37' @ 24.34 hrs Surf.Area= 781 sf Storage= 2,475 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	43.01'	66,029 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
43.01	695	97.0	0	0	695
82.00	1,998	161.0	50,315	50,315	5,894
84.00	3,455	212.0	5,387	55,702	7,453
86.00	5,215	261.0	8,610	64,312	9,357
86.30	6,245	288.0	1,717	66,029	10,539

Device	Routing	Invert	Outlet Devices
#1	Primary	83.20'	10.0' Long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=43.01' TW=0.00' (Dynamic Tailwater)

↑1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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: 87 TIMBERLANE DRIVE, BREWSTER

	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 =

90%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: 87 TIMBERLAND - JENKINS
 Prepared By: JM OREILLY
 Date: 11/16/2023

*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

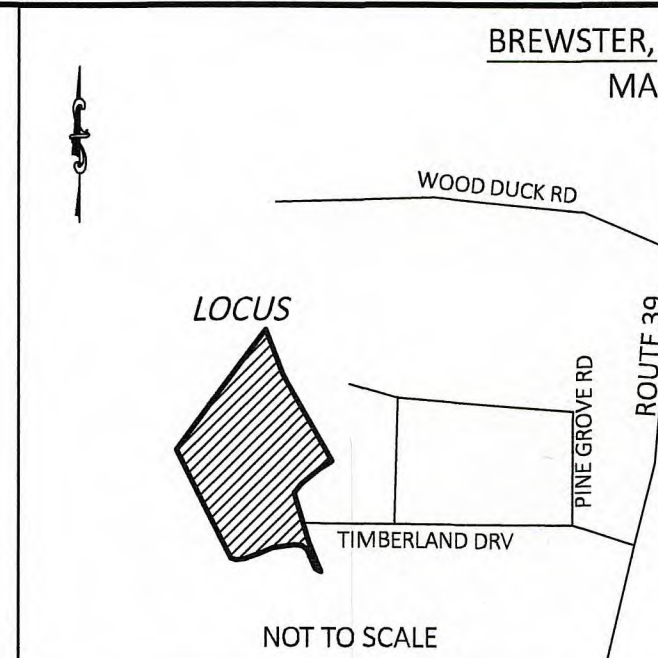
STORMWATER FACILITY NOTES:

- GENERAL:**
- 1.) CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING, LOCATING AND PROTECTING ALL ABOVE AND BELOW GROUND UTILITIES PRIOR TO AND DURING CONSTRUCTION. CONTRACTOR SHALL CONTACT DIG-SAFE, ON-TARGET LOCATING, WATER DEPARTMENT AND ALL OTHER NECESSARY UTILITY COMPANIES FOR THE MARKING OR ALL PUBLIC AND PRIVATE UTILITIES.
 - 2.) ALL WORKMANSHIP PROVIDED SHALL BE IN CONFORMANCE WITH THE TOWN OF BREWSTER D.P.W. SPECIFICATIONS AND REQUIREMENTS.
 - 3.) ALL COMPONENTS SHALL BE SUBJECT TO WHEEL LOADS, UNLESS SPECIFICALLY IDENTIFIED ON THE PLAN DETAILS.
 - 4.) ANY MODIFICATIONS AND/OR DEVIATIONS FROM THE PLANS SHALL BE REVIEWED AND APPROVED BY THE PROJECT ENGINEER AND/OR THE TOWN.

- LIMIT OF WORK LINE:**
- 5.) THE LIMIT OF WORK LINE SHALL BE AS SHOWN ON THE PLAN VIEW. CONTRACTOR SHALL INSTALL 9-INCH DIA. STRAW WATTLES ALONG WORK LIMIT ALONG THE WESTERN PORTION OF THE WORK LIMIT TO MITIGATE OFF SITE EROSION POTENTIAL.

- NATURAL LOW POINTS:**
- 6.) THE NATURAL LOW POINT IS WOODED, NO ALTERATIONS ARE PROPOSED WITHIN EXISTING LOW POINTS.
 - 7.) THE EXISTING LOW POINTS ARE LARGE ENOUGH TO CONTAIN ALL RUNOFF GENERATED BY THE STORAGE BUILDING.

- LANDSCAPE:**
- 9.) THE DISTURBED AREAS FOR THE BUILDING SHALL BE LOAMED AND SEEDED WITH A GRASS SEED FOR DROUGHT TOLERANT APPLICATIONS. THE AREA AFTER SEEDED SHALL BE ALLOWED TO NATURALIZE.

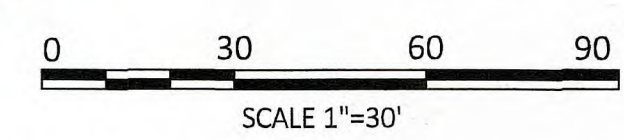
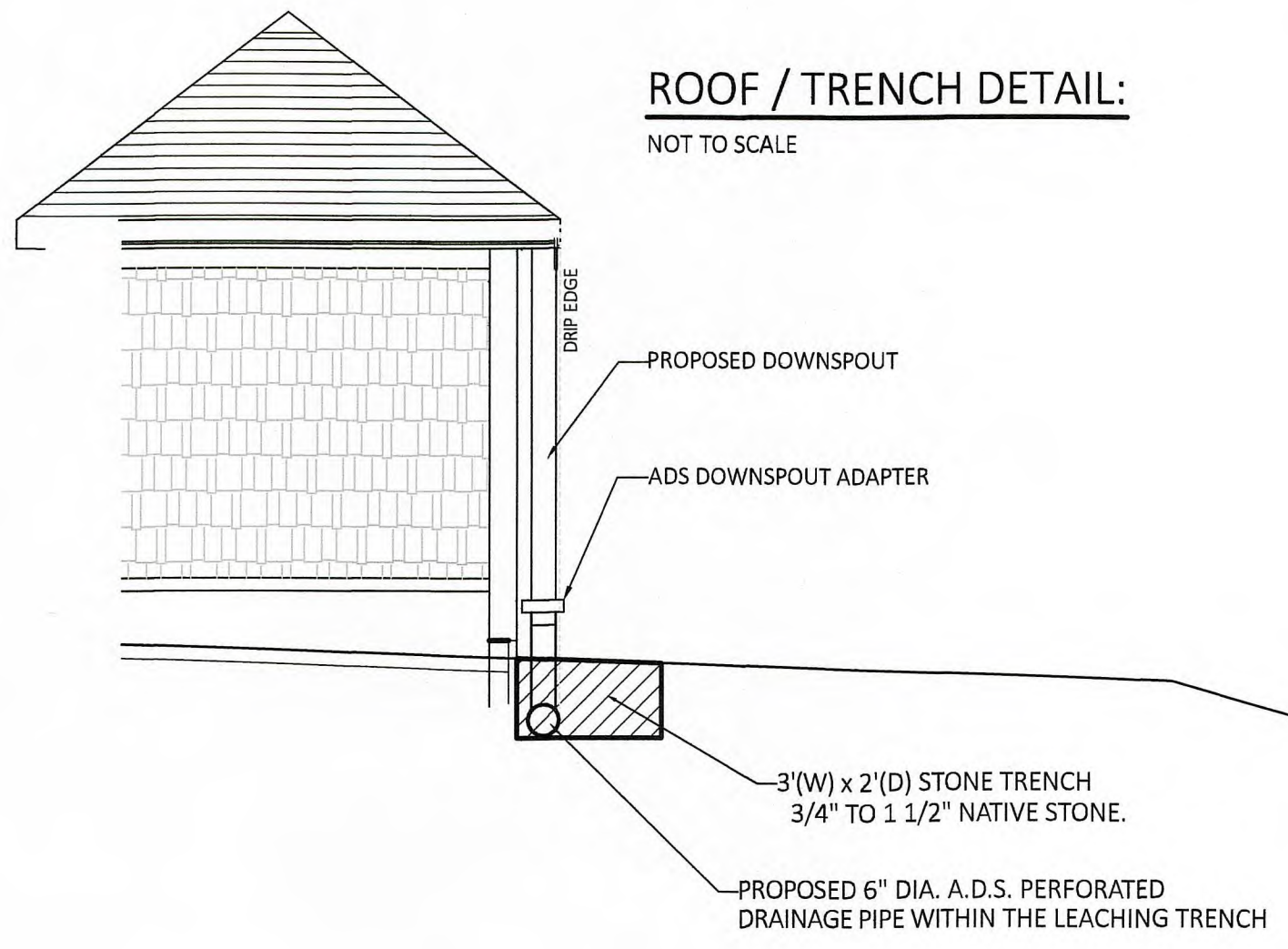
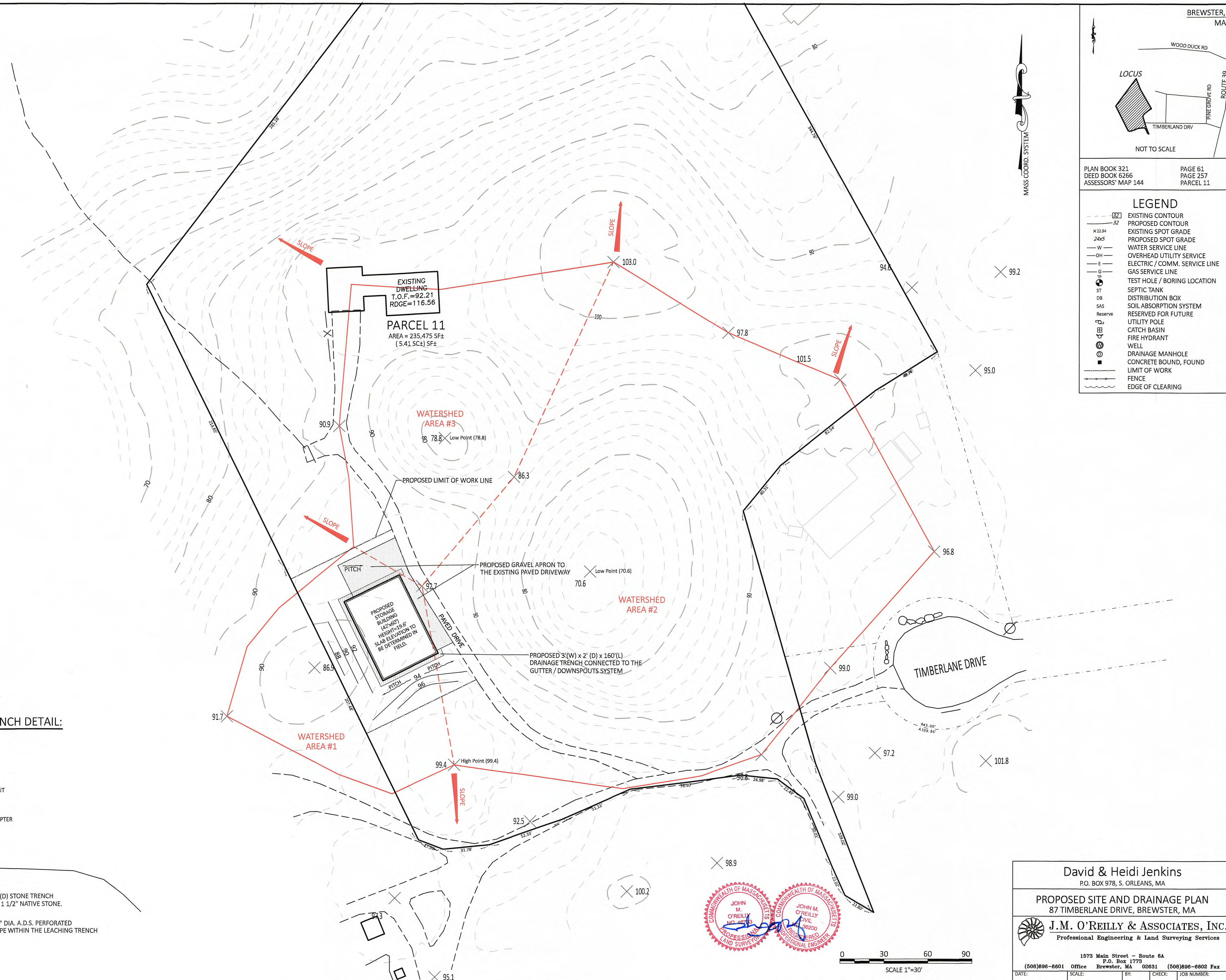


PLAN BOOK 321
DEED BOOK 6266
ASSESSORS' MAP 144

PAGE 61
PAGE 257
PARCEL 11

LEGEND

	EXISTING CONTOUR
	PROPOSED CONTOUR
	EXISTING SPOT GRADE
	PROPOSED SPOT GRADE
	WATER SERVICE LINE
	OVERHEAD UTILITY SERVICE
	ELECTRIC / COMM. SERVICE LINE
	GAS SERVICE LINE
	TEST HOLE / BORING LOCATION
	SEPTIC TANK
	DISTRIBUTION BOX
	SOIL ABSORPTION SYSTEM
	RESERVED FOR FUTURE
	UTILITY POLE
	CATCH BASIN
	FIRE HYDRANT
	WELL
	DRAINAGE MANHOLE
	CONCRETE BOUND, FOUND
	LIMIT OF WORK
	FENCE
	EDGE OF CLEARING



David & Heidi Jenkins
P.O. BOX 978, S. ORLEANS, MA

PROPOSED SITE AND DRAINAGE PLAN
87 TIMBERLANE DRIVE, BREWSTER, MA

J.M. O'REILLY & ASSOCIATES, INC.
Professional Engineering & Land Surveying Services

1573 Main Street - Route 6A
P.O. Box 1779
Brewster, MA 02631 (508)696-6802 Fax

(508)696-6601

DATE: 11-16-23	SCALE: As Noted	BY: JMO/gb	CHECK: JMO	JOB NUMBER: JMO-9579
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G:\AA\JOBS\JENKINS 9579\DWG\9579 SITE PLAN FOR STORAGE BUILDING-STORM WATER.DWG

**APPROVAL OF MEETING MINUTES DATED
NOVEMBER 8, 2023**



Brewster Planning Board
2198 Main Street
Brewster, MA 02631-1898
(508) 896-3701 x1133
brewplan@brewster-ma.gov

Approved:
Vote:

MEETING MINUTES
Wednesday, November 8, 2023 at 6:30 pm
Brewster Town Office Building

Chair Amanda Bebrin convened a meeting of the Planning Board at 6:30 pm with the following members participating: Tony Freitas, Rob Michaels, Elizabeth Taylor, and Alex Wentworth. Charlotte Degen and Madalyn Hillis-Dineen were not present. Also participating: Jon Idman, Town Planner, and Lynn St. Cyr, Senior Department Assistant. Bebrin declared that a quorum of the Planning Board was present. The Meeting Participation Statement and Recording Statement were read.

6:32 PM PUBLIC ANNOUNCEMENTS AND COMMENT

None.

6:32 PM PUBLIC HEARING

Proposed Modification, Special Use Permit and Site Plan Approval Decision #2017-11 MOD1: Applicant: Ocean Edge Resort LLC. Owner: Brewster Properties, Inc. Property: 30-44 Villages Drive as shown on Tax Map 89, Parcel 23. The Applicant seeks to modify special use permit and site plan approval decision #2017-11, which authorized the construction and operation of seasonal workforce housing units as an accommodations use for employees of Ocean Edge Resort. Specifically, the Applicant seeks modification of condition #2 of the decision, which limited the term of the approval to five (5) years, to remove any term limitation of the approval and make it permanent.

Documents:

- 09/27/17 Special Use Permit & Site Plan Approval Decision #2017-11 with site plan
- 09/26/23 Modification Application
- 10/17/23 Email from Tim Pellegrin, Brewster resident
- 10/31/23 Memo from Jon Idman, Town Planner with 2018 compliance review documents and 10/23/23 Health Department comments
- 11/07/23 Letter from Janice Fox, Regional Account Manager at intrax Work Travel
- 11/08/23 Photos of Ocean Edge workforce housing

Attorney Michael Ford, John O'Reilly P.E., P.L.S. of JM O'Reilly & Associates, Inc., and Thomas Devane, Project Director of Ocean Edge Resort LLC were present on behalf of the Applicant Ocean Edge Resort LLC.

Motion by Wentworth to Open the Public Hearing on Proposed Modification, Special Use Permit and Site Plan Approval Decision #2017-11 MOD1. Second by Michaels. Vote: 5-0-0.

Ford stated that the Applicant was seeking modification of condition #2 from the 2017 special permit which limited the special permit to five years unless extended by the Planning Board via the public hearing process. There were several other conditions of the special permit including one that required the Applicant to return to the Planning Board after one year for a review of all permit conditions. Ford stated that the one-year review showed that the conditions were being met satisfactorily. After the review, the Applicant has continued operating in accordance with the conditions. The Applicant has reached out to town staff in various departments including Police, Fire, Building, and Health as well as the neighbors and has not heard of any ongoing problems. Ford stated that there are 42 bedrooms /84 beds that have been used exclusively for Ocean Edge employees as transient workforce housing. Ford asked that the Planning Board extend the special permit as it would any other special permit without a time limitation so Ocean Edge can rely on this housing

for its employees as it moves forward to plan accordingly. Ford noted that the Applicant has reviewed the memorandum from the Town Planner which indicates that there are no active non-compliance issues.

Devane addressed condition #10 of the special permit related to maintenance of landscaped areas. He stated that eight pine trees were planted behind the fence along the west side of the property and all eight have died. This was not noticed by the Applicant until a few months ago when speaking with a neighbor of the property. He spoke to a tree expert and the pines will need to be replaced. The Applicant would like to be allowed to replant the eight trees in the spring. Devane would like to speak to an arborist to determine if pines are the best trees to plant in that area. He would like to plant trees that will survive and provide sufficient buffering. Devane discussed use of the property and stated that employees without cars were given priority. The Applicant tries to limit the number of vehicles on the property. Shuttle service and bicycles are provided to employees.

Idman stated that Condition #2 limiting the special permit to five years was included due to the novelty of the use. Additionally, there was a review after one year. Idman stated that there have been a number of times that staff and the Planning Board have discussed this project and it has been recognized that Ocean Edge has met its obligations. Typically, the Planning Board grants special permits in perpetuity and the permit runs with the land. The Planning Department solicited comments from other town departments and became aware of a few issues, not land use related and not unique to this property. The issues were addressed quickly with an eye towards preventing reoccurrence. From a staff perspective, there is no issue with allowing the special permit to continue and all other conditions remain in effect. If there were other issues, there would be recourse such as enforcement by police and/or the zoning enforcement agent.

Michaels read comments received from the Health Department into the record.

Taylor stated that she was glad to see that this project has succeeded and she hoped that other companies would do the same to help with employee housing. Michaels stated that the project appears to be very well managed and he sees no reason why it would not continue to be well managed. Wentworth is encouraged to see a company providing workforce housing. Wentworth was hesitant when the project first began because he is nearby and he was concerned with noise and traffic. Wentworth said that if anything, he's seen a decrease in motor scooters between the Villages and mansion. Freitas agreed with other members and stated the site looks great and is well managed.

Janine Getek-Orr, 39 Thad Ellis Road, asked when the housing was first occupied and Devane stated that it was in Spring 2018. It has been occupied per the special permit since that time including during the COVID pandemic. There were less than 84 occupants during COVID. Getek-Orr stated that the abutters are concerned because the past five years have not been normal economic business years on Cape Cod. She does not support a permanent special permit at this time and would like to see a review in another five years. Devane responded that the project has been in full operation for six years.

Tom Suffriti, 59 Thad Ellis Road, asked if any of the conditions related to operation were proposed to be changed in addition to the request to change Condition #2 related to the length of the special permit. Bebrin responded that the Applicant was before the Planning Board with a request to modify Condition #2 only and all other conditions remain in effect.

Evelyn Salvadore, owner of 43, 45, 49, and 51 Thad Ellis Road, expressed concern that the continued use could be allowed without another review in five years. She asked why the project was referred to as a motel. Idman responded that the project falls under the definition of a motel in the Brewster Zoning Bylaw. Salvadore asked if the broad definition would allow for use as a motel in the future. Idman responded that the use is circumscribed by the permit and the permittee is bound by the terms and conditions of the permit. Salvadore asked what the process would entail if the permittee wanted to change the use and Bebrin stated that they would have to come back to the Planning Board. Ford stated that a public hearing with abutter notification would be needed for a change of use. Salvadore asked if the

permit would allow for 40+ motel units to be built. Ford responded that that could not be done under the terms of the current permit as motel has been specifically defined as the workforce housing currently being operated. If the permittee wished to operate a motel, they would need to come back to the Planning Board for a public hearing. Bebrin noted that there is no category in the use table for workforce housing, so motel is most likely the closest category for seasonal housing. Again, she stated that the permittee would need to return to the Planning Board for a public hearing if they wished to depart from any of the terms of the special permit.

Ken Benson, 38 Thad Ellis Road, asked whether the buildings meet the requirements to be permanent buildings as they were initially proposed as temporary buildings. Devane responded that the units are modular homes that meet building code requirements. He also stated that they plan to use these units as long as possible. Benson asked what recourse abutters have if things are not going well. Idman responded that as a practical matter residents could reach out to Devane. If that is not sufficient, abutters could reach out to the Building Commissioner who enforces zoning for the town.

Joan Orr, 39 Thad Ellis Road, stated that alcohol is prohibited at the site and marijuana should be prohibited as well. She also stated that all utilities to the site are supposed to be turned off from December 1 – March 31 but during the past year there were lights on during this time. She also thinks the quiet hours should be change to 9 pm – 8 am. Orr offered to advise on the replanting of pines.

Freitas asked Devane to address the comment about lights at the site. Devane stated that the units are winterized but some lights are left on for security and in case the site needs to be accessed by the emergency personnel. All lights are down casting. Michaels inquired about lighting and noted that lights are not allowed on the rear of the units near the northwestern western sides of the site. Devane stated that there are doors with security lighting on the north and west buildings, but the doors are on the side of the buildings not the rear. Ford stated that the Applicant believes they are in compliance with the special permit requirements.

Janine Getek-Orr suggested that the special permit be extended for another five years and at that time the Planning Board could consider making it permanent.

Idman asked Taylor for suggestions on the replanting of the pine trees that have died. Taylor suggested white pine, arborvitae or Leyland cypress as these species grow quickly. She stated that trees not only act as a visual buffer but a sound attenuator. Idman suggested a condition that the Applicant replant with an appropriate evergreen species.

Evelyn Salvadore stated that the neighbors as direct abutters would be more comfortable if the special permit was extended for five years as a lot can happen in five years. Ford responded that the conditions placed on this special permit were extraordinary. The Applicant returned for a status review after one year and is back after five years for an additional review. The Applicant believes they have met all conditions of the special permit and request the time limit be removed and the special permit be permanent like a typical special permit.

Motion by Taylor to Close the Public Hearing on Proposed Modification, Special Use Permit and Site Plan Approval Decision #2017-11 MOD1. Second by Michaels. Vote: 5-0-0.

Freitas stated that the Applicant has been monitored by the town and neighbors and they've shown to be good stewards the special permit. Since there is recourse for any problems that may occur with neighbors and since the Applicant would need to return to the Planning Board for any changes to the special permit, he does not see any reason to put a time limitation on the permit. Wentworth asked if the Applicant was aware of the issues raised with hours of operation and lighting. Ford responded that the Applicant was not aware until they were mentioned at the hearing. Idman suggested modifying condition #10 with a requirement that the Applicant provide a planting plan to staff to review and approve prior to replanting.

Motion by Wentworth to Modify Condition #2 of the Decision to read “The Special Permit shall run with the property.” and that pursuant to Condition #10 the Applicant will provide a planting plan to staff for review and approval, and the Applicant will implement the plan on Proposed Modification, Special Use Permit and Site Plan Approval Decision #2017-11 MOD1. Second by Michaels. There was discussion by the Planning Board regarding enforcement mechanisms for the special permit and the need for workforce housing. **Vote: 5-0-0.**

7:12 PM PUBLIC MEETING

Discussion with Department of Public Works Director Griffin Ryder regarding stormwater management permitting.

Griffin Ryder, Director of Public Works, discussed his experience with stormwater review and design. Ryder has extensive experience with the Massachusetts Stormwater Handbook. Michaels asked Ryder how Massachusetts compares to other states in stormwater management. Ryder responded that Virginia was one of the first states to focus on stormwater management, but Massachusetts was quick to follow. He believed Massachusetts began reviewing phosphorous issues with the Charles River about 15-20 years. Ryder noted that for a long time Massachusetts relied on its Wetlands Protection Act for stormwater control.

Ryder reviewed Brewster’s Long Pond landing project and stormwater report with the Planning Board. He walked the Planning Board through the different sections of a stormwater report and described what a report should include and what the Planning Board should focus on. He stated that the report should provide a description of existing and proposed conditions, drainage areas, rain events, and stormwater modelling. Ryder stated that during his time doing stormwater work he has never peer reviewed a single-family home. The focus is typically on larger developments such as grocery stores and modelling is done to capture the impacts of the development. Idman stated that tonight’s meeting was a first step toward reviewing stormwater. The next step would be a public forum to hear feedback from the public on the stormwater bylaw and regulations and then a review by the Select Board and Planning Board to discuss policy and any changes. A discussion on quantitative versus qualitative requirements should be considered. Bebrin stated that there was an understanding when the Planning Board drafted the stormwater management bylaw that it would need to be reviewed and reconsideration would be given to areas such as thresholds. Freitas voiced concern with the impact the bylaw has on housing. He stated that the requirements are extensive for residential properties and expressed concern about the costs. Ryder stated that quantitative analysis is best used for high impact development whereas a qualitative approach is best used with smaller, low impact projects. He further stated that Brewster’s zoning for single-family homes encourages low impact development. Michaels stated that high infiltration can mean things are not getting filtered as well as they should be. Ryder stated that rapid infiltration is less likely on Cape Cod with groundwater 15+ feet away and sand acting as a filter. Michaels noted that Brewster’s pre-treatment requirements are more stringent than the state’s requirements. Ryder stated that the primary BMP is infiltration.

Ryder reviewed important components to be considered in stormwater management including drainage delineation and topography, land use within the drainage area including coverage and underlying soil types, rainfall, and time of concentration. These components combined create a hydrograph. HydroCAD is a calculator of hydrographs. There was discussion on the time of concentration component and Ryder stated that the existing and proposed time of concentration should be close and should not increase from existing to proposed. Quantitative versus qualitative approaches to stormwater management were discussed again. Idman stated that using quantitative standards from the Massachusetts Stormwater Handbook and applying them to residential development could result in over mitigating for stormwater. Ryder stated that for single-family homes a qualitative approach provides better analysis. Idman stated that the MA Stormwater Handbook was intended for wetlands settings and larger developments.

Taylor stated that after storms there are large puddles on town roads. She asked how the puddling could be resolved. Idman discussed the MS4 program and work to identify impaired catch basins. Ryder stated that puddling occurs because we focus on infiltration and systems are not designed for overflow. Ryder also discussed storm events and how catch basements have limited capacity to accept all stormwater. Ryder stated that the DPW is working on identifying locations where infrastructure is needed and where infrastructure is not working properly. Due to budget restraints, the DPW is not able to address all problem areas.

Ryder reviewed the stormwater management standards from the Massachusetts Stormwater Management Handbook including: 1) No new stormwater conveyances may discharge untreated stormwater. 2) Peak rate attenuation. 3) Eliminate or minimize loss of annual recharge to groundwater. 4) TSS treatment train. Ryder noted that some of the requirements of this standard should not be applied to a single-family home. 5) Source control and pollution prevention for land uses with higher potential pollution loads. Ryder noted that this standard does not apply often to Brewster as Brewster does not have these types of projects. 6) Source control and pollution prevention for discharges in Zone II areas. 7) Redevelopment projects are required to meet standards to the maximum extent practicable. 8) Construction related impact plans. 9) Long term operation and maintenance plans. Michaels asked if the town does inspections to determine compliance with the operation and maintenance plan. Idman stated that the operation and maintenance plan must be recorded against the property. Enforcement by the town would take place if there was an issue such as evidence of surface water. 10) Illicit discharges are prohibited. Ryder noted that Brewster does not see a lot of illicit discharges because the town does not have sewers. Ryder stated that there are 14 various discharge locations throughout Brewster including Cape Cod Bay and the Consodine Ditch. Wentworth noted that several of the stormwater management permit applications reviewed by the Planning Board have included single-family homes with pools. There town's illicit discharge bylaw regulates discharging of swimming pools.

Ryder also stated that a stormwater report should include analysis of soil types and drainage maps which are useful to compare to the HydroCAD report. Ryder noted that for redevelopment projects it is important to fully treat any addition. Micahels asked Ryder what the Planning Board should consider in reviewing a stormwater report and Ryder responded that he would double check that the rainfall events make sense and match to NOAA and a review of the size of pre and post development areas is important. There was discussion on velocity and how it impacts time of concentration. The Planning Board discussed BMPs and Wentworth stated that swales wouldn't really do much on a level lot. Ryder stated that they could be used to provide a lower area for collection or a bioretention area could be used. Idman stated that the quantitative approach does not always give you everything you need intuitively to review a project. He stated that the slope and topography of the site were important factors. Ryder stated that slopes and velocities are considered through BMPs in the MA Stormwater Handbook. He gave an example of a project taking place at the Freeman Fields where the field itself is a vegetated swale and will be used as a BMP. Michaels asked if the Planning Board could suggest specific BMPs to those applying for stormwater management permits. Idman stated that given the Stormwater Regulations, it was best that the Planning Board did not try to direct Applicants to specific BMPs that may require requests for waiver. Bebrin noted that Applicants could make requests for waivers to the Planning Board. Michaels stated that he felt some of the stormwater requirements, specifically HydroCAD requirements, may be overkill for single-family dwellings depending on slope and topography of the lot.

There was discussion on maintenance of catch basins throughout the town. Ryder noted that the town has a catch basin cleaning program for basins on private roads. The program happens in the Fall and residents on private roads can sign up to have their catch basins cleaned for a fee. The DPW cleans the catch basins on town roads.

Ryder discussed Operation and Maintenance Plans and the importance of the plan including a schedule for inspection and cleaning of catch basins. Idman stated that in residential settings not as much pre-treatment is needed and TSS removal can be handled after the fact.

The Planning Board thanked Ryder for his time and look forward to further discussions with him on stormwater management.

8:31 PM APPROVAL OF MEETING MINUTES

Approval of Meeting Minutes: October 25, 2023.

The Board reviewed the October 25, 2023 meeting minutes. **Motion by Michaels to Approve October 25, 2023 Meeting Minutes. Second by Wentworth. Vote: 5-0-0.**

8:31 PM COMMITTEE REPORTS

Wentworth stated that the Vision Planning Committee (VPC) is continuing its work on public outreach on the Local Comprehensive Plan (LCP). Wentworth reminded everyone of Fall Town Meeting which will be taking place on Monday, November 13th. He thanked the VPC members for all their work on the LCP and specifically recognized Sharon Tennstedt and town staff as well.

8:32 PM FOR YOUR INFORMATION

None.

8:32 PM MATTERS NOT REASONABLY ANTICIPATED BY THE CHAIR

None.

Motion by Wentworth to Adjourn. Second by Michaels. Vote: 5-0-0. The meeting adjourned at 8:33 PM.

Next Planning Board Meeting Date: December 13, 2023.

Respectfully submitted,

Lynn St. Cyr, Senior Department Assistant, Planning

DRAFT