CHAPTER 4

CONTEXT & SCOPING

STAGE 1

CHAPTER 4 PRELIMINARY

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INTRODUCTION

ROADWAY DESIGN GUIDELINES AND STANDARD DRAWINGS

Roadway Design Guidelines (RDG) and Standard Drawings have been created to ensure that there is consistency in TDOT projects across the state. The Roadway Design Guidelines and Standard Drawings indicate the current recognized design standards for new construction or reconstruction of existing highways and shall be utilized while giving due regard to topography, natural conditions, availability of road material, and prevailing traffic conditions.

Throughout these guidelines you will see the following terms used. To clarify the meanings intended in this guide, the following definitions apply:

- **Design Lead / Technical Lead** – Preconstruction Discipline Designer, or Consultant Discipline Designer
- **Project Manager** – assigned from Project Management division to lead Project team in delivery of project within defined scope, schedule, and budget.
- **Project Team** – Preconstruction Team consisting of a Discipline Manager, members of Roadway, Structure, Survey, Environmental, R.O.W., and Utilities (either TDOT staff or consulting staff), overseen by a Project Manager.
- **Concept Report** –Report developed by the Strategic Transportation Investments Division during Stage 0 of a project.

All forms mentioned throughout this chapter can be found on the Roadway Design -TDOT Documents webpage.

3 Phases of Project Development

1. Preliminary
2. Right-of-Way
3. Construction

4 Stages of Project Delivery Network

1. Context/Scoping
2. Footprint Established
3. Plan-in-Hand
4. PS&E

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SECTION 1 – GENERAL INFORMATION

4-100.00 LINE AND GRADE PLANS REFERENCES

For information on Line and Grade plans project information, plans production, survey information, estimates, field reviews, and public hearings, see Chapter One of the Roadway Design Guidelines and the Project Delivery Network.

4-100.01 DRAINAGE MANUAL

In order to assist the Designer performing drainage and hydrologic design, the Engineering Division has developed a Drainage Manual to provide a collection of applicable drainage criteria, policies, and examples. Designers shall use the Drainage Manual for all projects designed or constructed by TDOT. The manual includes the following chapters:

Chapter 1	Introduction
Chapter 2	General Drainage Policies and Practices
Chapter 3	Drainage Plan Requirements
Chapter 4	Hydrology
Chapter 5	Roadside Ditches and Streams
Chapter 6	Culverts
Chapter 7	Storm Drainage Systems
Chapter 8	Stormwater Storage Facilities
Chapter 9	Energy Dissipaters
Chapter 10	Erosion Prevention and Sediment Control
Chapter 11	Natural Stream Design

The TDOT Design Division Drainage Manual is available to download from the Roadway Design Standards website.

4-101.00 SURVEY AND DESIGN ORD VERSIONING GUIDANCE

Based on the frequency of Bentley ORD updates, coinciding TDOT ORD workspace updates, and the duration of TDOT project schedules, it will not be uncommon for a project to have design deliverable files on one ORD version and survey deliverable files on an earlier ORD version. While ORD provides an uplift process for moving older files to newer schemas, the changes in both the software and the workspace updates (to align with compatibility in the new software) may affect the integrity of the original survey. There is no guarantee that the uplifting process will not fundamentally change an aspect of the survey deliverable files. Therefore, **survey**

deliverable files that have been uplifted to a different ORD version are not considered the same survey deliverable files that were previously qualified and accepted via the QA/QC process. Uplifted survey deliverable files, post QA/QC process completion, would need to be resubmitted to complete the QA/QC process again.

4-101.01 SURVEY AND DESIGN ORD VERSIONING BEST PRACTICES

The survey deliverable files will be shared with design. Designers will use the latest version of ORD adopted by TDOT (with an accompanying TDOT workspace release) at the time of creating initial design deliverable files. All design deliverable files will be created on this same version of ORD and the same TDOT workspace release. The ORD software and TDOT workspace versions used on the design deliverable files will be documented in the Project Notebook. The designer will reference the survey respective Model.dgn, Aerial Model.dgn (where applicable), Terrain.dgn, Alignment.dgn, and Utility.dgn files into the design respective deliverables. Older ORD version files can always be used as references in newer ORD version files without uplifting and without changes to the said reference files.

SECTION 2 - INFORMATION REQUESTS

4-200.00 LINE AND GRADE FIELD REVIEW SUBMITTAL

Refer to PDN 1RD1 and the Roadway Design Guidelines Chapter 1-105.01 for more information regarding the Line and Grade package and what is included in the field review submittal.

4-200.01 TRAFFIC REPORT REQUEST

The typical cross-section used when designing a project is largely dependent on the anticipated traffic. It is critical that the traffic data is current to the projected letting year of the project. The Concept Report includes traffic data. Generally, the report is distributed when approved by divisional heads and when funding is available. However, there are times when funding or other circumstances delay the distribution of the Concept Report, and the traffic data in the report is not current. If traffic data is three years old upon receipt of the Concept Report, a Traffic Report Request shall be submitted. Also, if one of the following applies to a project, a Traffic Report Request shall be submitted:

1. Turning movement or crossroad design traffic year data is needed.
2. Survey is updated and area shows growth (building of apartment complex, shopping center, or industrial complex, etc. along corridor or on side road).
3. Information becomes available that denotes areas of growth outside the survey limits that could easily affect traffic within the project limits (building of apartment complex, shopping center, or industrial complex, etc.).

To establish a uniform and systematic method of obtaining desired traffic data for the construction year of projects, use the following procedure:

1. Designers shall complete a title sheet. If crossroad volumes and/or turning movements on certain intersecting streets or roads are needed, this shall be clearly indicated on the title sheet or on an additional sheet if necessary due to limited space on the title sheet.

2. Designers shall submit the title sheet in PDF format along with a completed copy of the Traffic Report Request, to the Special Project Office of the Strategic Transportation Investments Division at the email address shown on the form. Consultants shall submit the information to the appropriate Design Lead for submittal.

To expedite a pavement design from the Pavement Design Section, the following applicable notes shall be included under comments on the Traffic Report Request Form.

1. Furnish the 20xx-20xx ADL for pavement design on a (*number of lanes*) lane roadway.

2. Furnish the 20xx-20xx ADL for pavement design on a (*number of lanes*) lane roadway and the present ADT on all crossroads within the limits of the project.

3. Furnish the 20xx-20xx ADL for pavement design on a (*number of lanes*) lane roadway and the present ADT on all crossroads outside the limits of the project. (Specify locations)

NOTE:
ADL	(Average Daily Loading)
ADT	(Average Daily Traffic)
DHV	(Design Hourly Volume)
D	(Directional Distribution)
T	(Truck Percentage)

NOTE: For Bridge Replacement Projects, ADL are not required for ADTs of 1,000 or less and percentage trucks of 7 percent or less.

NOTE: ADTs and DHVs are not required for crossroads with ADTs of 1,000 or less.

4-200.02 PAVEMENT DESIGN RECOMMENDATIONS

The Materials and Test Division – Materials and Pavement Section shall furnish pavement designs on projects where concrete pavement or plant mix asphalt pavement is required. The Materials and Pavement Section does not provide pavement designs for metro-urban resurfacing projects and 100% state resurfacing projects.

For BRZE and BR-STP projects with an ADL (Average Daily Loading) of 150 or less, or an ADT (Average Daily Traffic) less than 1,000 and percent trucks less than seven, pavement sections shall be designed as in *Chapter 4-201.01, Pavement Design for Local Roads*.

When the Soils and Geology Report is received, the Designer shall forward the report to the pavement design email, TDOT.PavementDesign@tn.gov. This information is needed to analyze the needs of side roads, overlays, pavement alternates, and other pavement design features.

A preliminary pavement design is completed for the Functional Design phase. The Materials and Pavement Section reviews the recommendation upon receipt of the Plan-in-Hand Field Review plans and submits an updated pavement design, if applicable, to the Designer. If the traffic data is more than three years old or the recommendations are three years or older an updated Pavement Design Request shall be submitted. A copy of the email shall be placed in the project folder to document the resubmittal of a pavement design request.

4-200.03 SOILS AND GEOLOGY REPORT

On all new alignment, widening on existing alignment, and bridge projects, the Designer shall include the Materials and Tests Division – Geotechnical Engineering Section in the Line and Grade Field Review email. The Soils and Geology Report may include, but not limited to:

recommendations for slope design verification, embankment stabilization, earthwork shrink/swell characteristics for earthwork calculations, acid producing properties of earthwork, and subgrade evaluation (CBR) needed for pavement design.

If a Design Meeting is held and the comments resulted in a change in alignment, the Design Lead shall notify the Geotechnical Engineering Section immediately by email. Updated plan sheets and cross-section sheets are to be resubmitted to the Project Team.

All soils data shall be incorporated into the plans prior to distribution of the Functional Design Field Review plans. In the Line and Grade Field Review, the requested date for completion of the Soils and Geology report shall be determined based on the size of the project and the projected time the Designer would need to make adjustments to the plans based on changes in slope lines due to slope recommendations. If comments from the Functional Design Field Review deem additional soils information is needed, the Designer shall request an update. All soil comments shall be incorporated into the Functional Design plans to ensure sufficient R.O.W. is acquired to accommodate all slope requirements. If there are revisions to the plans after the Functional Design submittal, the Designer shall determine if the changes require re-evaluation by the Geotechnical Engineering Section, and if it does, the R.O.W. Revision shall be issued.

4-200.04 STRUCTURES GRADE APPROVAL

Structural grade analysis is needed for the vertical alignment of a proposed structure which may cross a waterway, railroad, or roadway. The Designer shall include the Structural Design and Hydraulics Sections on the Line and Grade Field Review email to request hydraulic and structural grade analysis and approval of the proposed vertical alignment. The Design Lead shall send the Structures Division all the material applicable to the project as specified in Sections 4.8, 4.11, 4.12, 4.13 of the TDOT Survey Manual.

4-200.05 RAILROAD CROSSING SAFETY REVIEW

A Railroad Crossing Safety Review is required for all projects at railroad crossings. Before Line and Grade plans are finalized, a collection of photographs of each impacted crossing within the zone of influence must be collected and submitted to the State Railroad Coordinator at HQRailroadCoordinator@tn.gov. The email subject line should be **Region X, County Name, Route Name, PIN nnnnnn-nn, Railroad Crossing Safety Review**. Ideally, the local district offices will be the ones collecting the photographs and submitting them to the design team. If the local district offices are not able to get the photographs, the design team must collect them at the site review. If the zone of influence needs defining, please contact the State Railroad Coordinator. TDOT Regional Geodetics will provide photos as required in *Figure 4-1, Railroad Safety Crossing Review Process*.

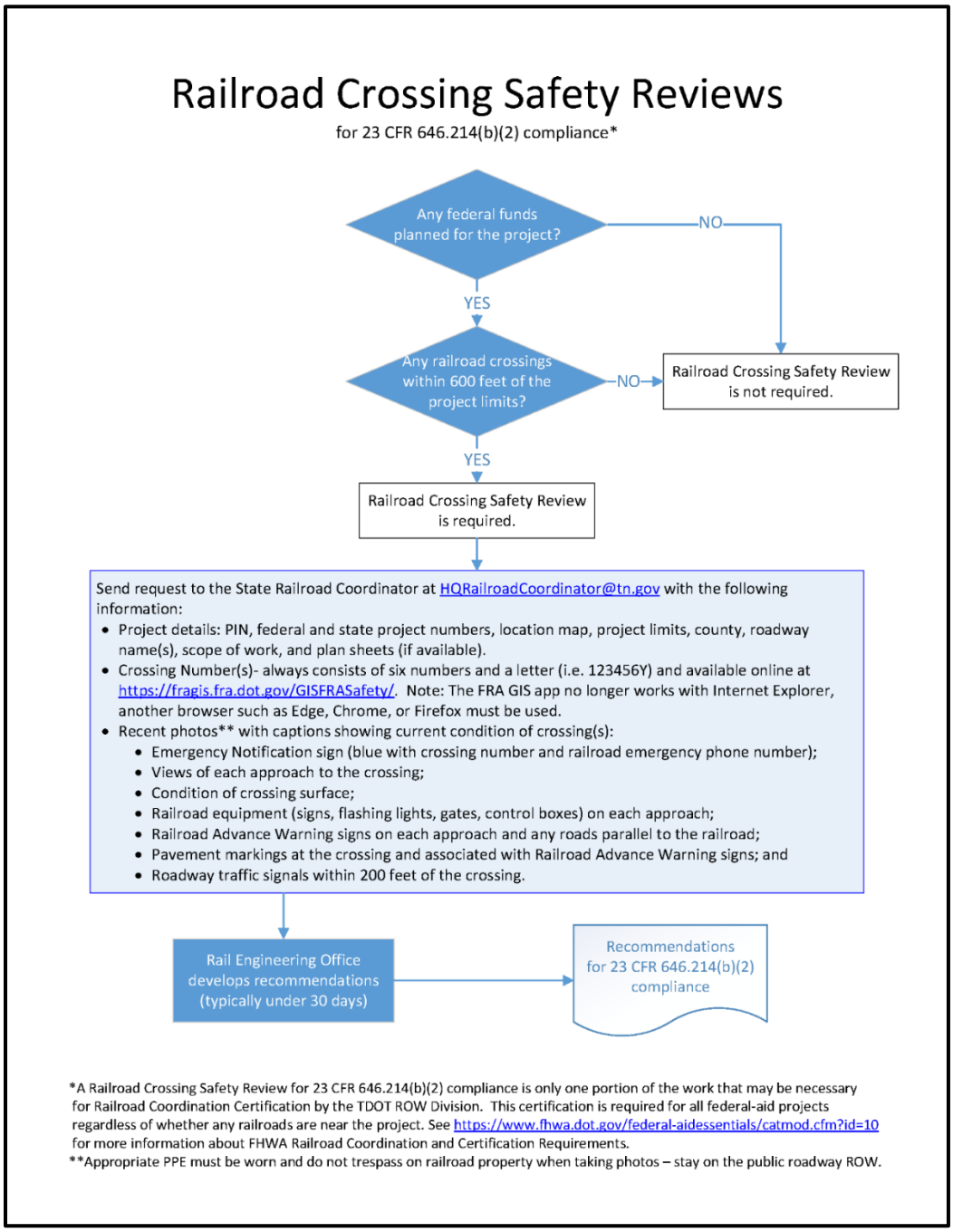

Figure 4-1
Railroad Safety Crossing Review Process

The Railroad Safety Crossing Review document shall have photographs for each crossing impacted by the project, within the zone of influence. These photos shall be arranged in a document with a short description of the perspective in which the photo was taken. The following is a list of crossing photos that are required as part of the Railroad Safety Crossing Review document:

- Emergency Notification sign with crossing number and railroad emergency contact information. This plaque will be on a pole or a railroad bungalow at the crossing.
- Views of each approach to the crossing
- Condition of the crossing surface
- Railroad equipment (signs, flashing lights, gates, control boxes) on each approach
- Railroad Advance Warning signs on each approach and any roads parallel to the railroad
- Pavement markings at the crossing and associated with Railroad Advance Warning signs
- Roadway traffic signals within 200 feet of the crossing
- NOTE: Safety should be considered at all times when around active railroad tracks and corridors. There should always be at least two (2) persons at the site when taking crossing photos. The first is to be watching for a train while the other takes the required photos. When taking photos up and down the track, it is not advisable to stand on the tracks. The photos can be taken offset from the tracks to ensure the photographer is as safe as possible.

Once the State Railroad Coordinator and the Multimodal Rail Safety Office concludes their review of the Line and Grade Package and Railroad Safety Crossing Review document, they will release their recommendations. The designer shall review the recommendations and implement them into the plans and the quantities of the project. Railroad crossing safety reviews are performed on resurfacing projects. However, Designers are not responsible for submitting the Railroad Safety Crossing Review document and plans for resurfacing projects.

If there are changes that result in the project being within 600 feet of a railroad, The Line and Grade Package will need to be resubmitted.

4-201.00 PAVEMENT DESIGN

The design of pavement structure takes into consideration many forms of input. Several of these are traffic loadings, soil characteristics (C.B.R. (California Bearing Ratio) tests from the Geotechnical Engineering Section), material availability, construction considerations, past performance, engineering judgement, quality control, and Departmental policy. Paving sections are analyzed for structural capacity and for life-cycle cost.

The Pavement Design Section shall review and approve all pavement designs for each phase of the project to ensure the proposed design is adequate for the specific project. The Pavement Design Section will review their original recommendation and submit the updated pavement design, if applicable, to the Designer two months prior to the schedule date of the Construction Field Review to ensure correct information is shown in the Construction Field Review plans.

If a Designer is asked to deviate from the pavement design at field reviews or by others in the Department, it shall be noted in the field review report or project file and then brought to the attention of the Pavement Design Section. If traffic data is three years or older, updated traffic

should be requested and the pavement design should be re-evaluated. **Under no circumstance is the pavement design to be altered without the written approval from the M&T Pavement Design Section.** After reviewing the requested change with the Designer, the Pavement Design Section will make the final decision on changes to be incorporated into the project plans relative to paving. Refer to PDN 2PV1 for more information regarding Pavement Design.

4-201.01 PAVEMENT DESIGN FOR LOCAL ROADS

Local Governments should use the following pavement design guidance for local roads. For projects with an Average Daily Load (ADL) of less than 150, or an Average Daily Traffic (ADT) less than 1,000 and percent trucks (T) less than seven, the pavement design can be obtained by using the County Soils Groupings, shown in *Table 4-1, County Soil Groupings*, and Tables 4-2 and *Table* 4-3.

ADL's shall not be provided when ADT's are less than 1,000 and T is less than seven percent. In this case, use Pavement Design No. IV for ADT less than or equal to 200 and Pavement Design No. I for ADT greater than 200 but less than or equal to 1,000.

Two examples are given as follows:

1.) The Designer has a project in Hamblen County. The ADL is 53. First, go to the *Table 4-1, County Soils Groupings* to obtain the Group No. which is 2. Then refer to *Table 4-2, Pavement Design Number* go to the column for Group 2 and down to the row containing 53 ADL. This determines that Pavement Design No. I shall be used. Refer to *Table 4-3, Pavement Design* to obtain the pavement design (1.25 inch "D" mix, 2.00 inch "B-M2", 3.00 inch "A" mix, and 8.00 inch mineral aggregate).

2.) The Designer has a project in Hamblen County. The ADT is 874 and the percentage of trucks is 5. No ADL is given because the ADT and T is low. As stated above, Pavement Design No. I shall be used. Refer to *Table 4-3, Pavement Design* to obtain the pavement design (1.25 inch "D" mix, 2.00 inch "B-M2", 3.00 inch "A" mix, and 8.00 inch mineral aggregate).

When the shoulders are 4 feet or less, the Designer shall determine during the Functional Design Field Review whether the shoulder shall be stone and double bituminous surface treatment or paved with 1.25 inches of 411 D-mix. When the existing road is crushed stone base only or base and double bituminous surface treatment, the roadway surface shall be replaced in kind. The proposed roadway pavement shall be a higher type or equal surface than that of the shoulders. When using ADT's for pavement design, use design year traffic.

Designers shall specify mineral aggregate, Item Number 303-01 Mineral Aggregate, Type A Base, Grading D, for projects located in Regions 1, 2, and 3. For Region 4 projects, Designers shall specify mineral aggregate, Item Number 303-02, Mineral Aggregate, Type B Base, Grading (Description) as the base stone layer.

English **Revised:**

COUNTY	GROUP	COUNTY	GROUP	COUNTY	GROUP
Anderson	2	Hamilton	3	Morgan	4
Bedford	3	Hancock	6	Obion	5
Benton	2	Hardeman	3	Overton	6
Bledsoe	6	Hardin	2	Perry	3
Blount	4	Hawkins	6	Pickett	5
Bradley	1	Haywood	4	Polk	5
Campbell	4	Henderson	3	Putnam	6
Cannon	4	Henry	3	Rhea	1
Carroll	4	Hickman	4	Roane	4
Carter	6	Houston	6	Robertson	4
Cheatham	3	Humphreys	5	Rutherford	6
Chester	4	Jackson	6	Scott	2
Claiborne	2	Jefferson	4	Sequatchie	3
Clay	6	Johnson	6	Sevier	1
Cocke	5	Knox	4	Shelby	5
Coffee	4	Lake	3	Smith	3
Crockett	4	Lauderdale	4	Stewart	5
Cumberland	5	Lawrence	5	Sullivan	4
Davidson	3	Lewis	4	Sumner	3
Decatur	3	Lincoln	3	Tipton	5
DeKalb	3	Loudon	6	Trousdale	4
Dickson	6	McMinn	3	Unicoi	6
Dyer	5	McNairy	4	Union	5
Fayette	5	Macon	4	Van Buren	5
Fentress	2	Madison	4	Warren	5
Franklin	4	Marion	3	Washington	4
Gibson	5	Marshall	4	Wayne	5
Giles	5	Maury	5	Weakley	4
Grainger	6	Meigs	3	White	4
Greene	5	Monroe	3	Williamson	3
Grundy	2	Montgomery	4	Wilson	2
Hamblen	2	Moore	3		

Table 4-1
County Soil Groupings

FLEX ADLs	COUNTY SOIL GROUP NUMBER					
	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6
1-19	I	I	III	III	III	IV
20 – 29	I	I	I	I	III	III
30 – 39	I	I	I	I	I	III
40 – 59	II	I	I	I	I	I
60 – 89	II	II	I	I	I	I
90 – 119	II	II	II	I	I	I
120 – 150	II	II	II	II	I	I

Table 4-2
Pavement Design Number

MIX TYPE	PAVEMENT DESIGN NUMBER			
	I	II	III	IV
"D"	1.25"	1.25"	1.25"	1.25"
"B-M2"	2.00"	2.00"	2.00"	2.00"
"A"	3.00"	3.00"	----	----
Mineral aggregate	8.00"	10.00"	12.00"	8.00"
Note: Remember to include Prime Coat should be included on concrete and rock surfaces and Tack Coat should be included on asphalt surfaces.				

Table 4-3
Pavement Design

4-201.02 PERFORMANCE GRADE ASPHALT ON PROJECTS

The type of performance grade asphalt used on all construction projects shall adhere to the following criteria:

Performance Grade PG64-22 Asphalt is to be used on all construction projects with current ADT less than 10,000. Performance Grade PG70-22 Asphalt is to be used on all construction projects with current ADT equal to or greater than 10,000, and on the NHS system, SR-15 (US-64), SR-5 (US-45W), SR-43 (US-45E), and SR-22 regardless of their traffic volume.

Performance Grade PG76-22 Asphalt is to be used on all interstate construction projects. It may also be used on state resurfacing and construction projects in cases of heavy truck traffic or severe rutting. However, in order to be used on these projects, prior approval by the Director of Materials and Tests must be given.

Performance Grade PG82-22 Asphalt is to be used on very select urban interstate projects with extremely high volumes. These projects shall always be designated by the Pavement Design Section.

SECTION 3 – ENVIRONMENTAL COORDINATION

4-300.00 ENVIRONMENTAL STUDY AREAS

The Environmental Division conducts studies for streams, wetlands, threatened and endangered species, air quality, noise, archaeology, hazardous material, permits, and historical preservation. The reports from these studies are used with other information to create the environmental documents required for the National Environmental Policy Act (NEPA). When a Concept Report is developed, Line and Grade Plans are developed based on the scope of project as defined in the document. The following are the boundaries of the study areas outside of the proposed R.O.W. limits:

Mainline

1. Study Area Extends a minimum of 300 feet before the project begins.
2. Study Area Extends a minimum of 300 feet after the project ends.
3. Width shall be a minimum of 50 feet beyond the proposed R.O.W. line.
4. If the project intent is to remain within the present R.O.W. with no proposed right-of-way or easements outside of the present R.O.W., the Environmental Study Area Boundary shall be the existing R.O.W. and shall be labeled as such.
5. Adjustments to the width shall be made as necessary based, on proposed concepts.

Side Roads

1. Study area extends a minimum of 150 feet past the proposed tie in point for the side road.
2. Width shall be a minimum of 50 feet beyond the proposed R.O.W. line.
3. If the project intent is to stay within the present R.O.W. with no proposed right-of-way or easements outside of the present R.O.W., the Environmental Study Area Boundary shall be the existing R.O.W. and shall be labeled as such.
4. Adjustments to the width shall be made as necessary, based on proposed concepts.

When changes occur to the Environmental Study Areas, as defined above for mainlines and side roads, a PDF of the Environmental Technical Studies Additional Area map shall be made and included in the R.O.W. or Letting revision. The PDF shall be made from a OpenRoads Designer file showing the additional areas as cross hatched. Including this map as part of the revision will aid the Environmental Division and Regional Environmental Technical Office in assessing what should be re-evaluated.

Figure 4-2, *Initial Environmental Technical Studies Area,* shows the original designated environmental study area as turned in for the Line and Grade Package. For this project, the study area is 300' before the beginning of the project and the project intent is to remain within existing R.O.W. There is not any improvement on the side road. Notice the R.O.W. is labeled as existing and proposed R.O.W.

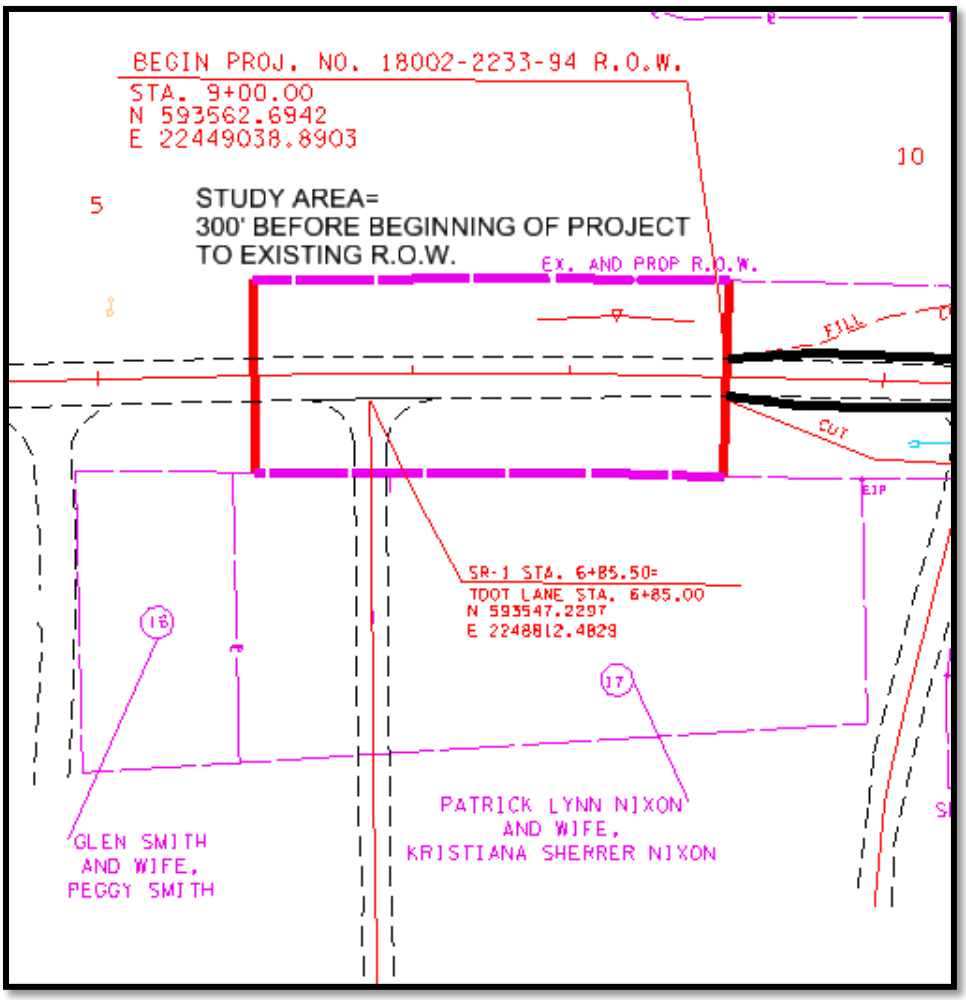

Figure 4-2
Initial Environmental Technical Studies Area

As the project developed, TDOT was contacted by the County. Since the original survey was completed, two (2) tracts were bought which will become the location of the county hospital off the side road TDOT Lane. The County requests that TDOT add a right turn lane on S.R. 1 to turn onto TDOT Lane. The right turn lane will drop at the intersection. The hospital also requested that TDOT add a left turn lane on TDOT Lane to turn onto S.R. 1. The request includes 200' of storage for each turn lane. The requests were approved by the Department and Traffic Design personnel requested that a flashing beacon should be added at the intersection to warn traffic that emergency vehicles would be in the area. These changes moved the beginning of the project

back 523.78', and the additional lanes and area needed for the poles for the flashing beacon require R.O.W. acquisition. These changes are outside the original Environmental Technical Study area. A R.O.W. revision shall be distributed that includes a PDF of an Environmental Technical Studies Additional Area map. See *Chapter 1-101, Project Scope and Changes in Scope* for the change in scope process.

Figure 4-3, *Environmental Technical Studies Additional Area Map,* illustrates the additional area (cross hatched) where the study is needed. The labeling for "new" and "original" on the Begin Project Limits and the labels for the 300' station prior to the beginning of project station are for illustrative purposes only. Also, name changes and pavement markings are adjusted to better illustrate the changes.

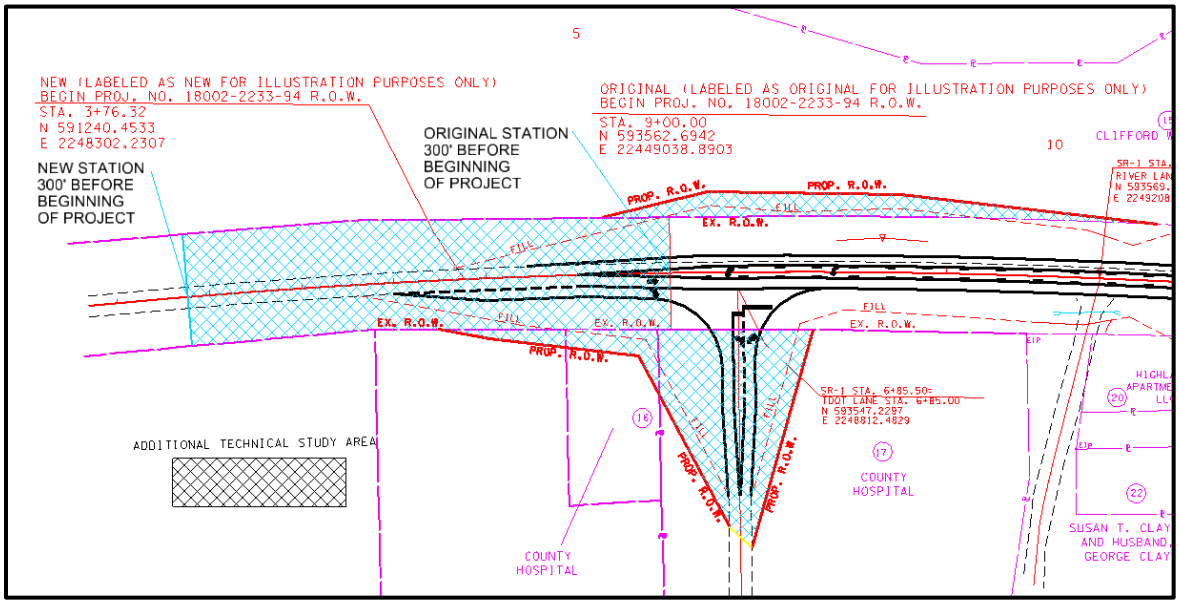

Figure 4-3
Environmental Technical Studies Additional Area Map

4-301.00 ENVIRONMENTAL IMPACTS AND MITIGATION

The following recommendations need to be followed in order to achieve an environmentally acceptable project as perceived by the United States Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), United States Fish and Wildlife Service (USFWS), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC).

Although the Designer shall take all precautions to not impact an existing environmental feature, it is often unavoidable and encroachment occurs on features such as wetlands, streams, or other aquatic resources. The TDOT Environmental Mitigation Office is responsible for providing compensatory mitigation to offset unavoidable stream and wetland impacts. The office provides the required mitigation through use of restoration, establishment, enhancement, and/or preservation.

When encroachment occurs, the Designer shall evaluate the area to determine if any adjustments can be made to eliminate or lessen the impact without causing safety and drainage concerns. Possible solutions would be alignment shifts, steeper slopes that are acceptable by the Geotechnical Engineering Section as stated in the Soils and Geology Report or adding guardrail. When any of these impacts occur, the Designer shall contact the Regional Environmental Technical Office and Environmental Division during Stage 1 of the project to discuss measures for possible mitigation that may have to occur. Discussions may include the possibility of new stream alignments which shall be shown on the Functional Design plans to ensure sufficient R.O.W. acquisition and/or construction easement is acquired. For additional information regarding stream mitigation, see *Chapter 4-404.00, Stream Mitigation Right-of-Way*.

4-301.01 WETLAND IMPACTS

The Regional Environmental Technical Office or Environmental Division shall identify wetland boundaries in the Ecology Report and will use surveying instruments to record the area as a shape file to deliver to the Designer. The shape file can be imported into ORD. If a shape file is not available or does not reference in the correct coordinate system in the ORD file, the Designer shall request a survey update for the boundaries of the wetland.

Wetland boundaries shall be shown by the appropriate level feature in ORD, as shown on Standard Drawing RD-L-1. The wetlands shall be numbered (WTL-1, WTL-2, etc.) as indicated in the Environmental Boundary Report or Concept Report and placed within the wetland boundary in ORD. See *Figure 4-4*, *Wetland Impact* for an example. The plans shall also indicate locations where stormwater outfall discharges are modified and locations where the wetland receiving flows are redirected.

The area (in square feet or acres) and volume (in cubic yards) (assume a depth of 1 foot if a depth is not provided.) of any wetlands impacted by the project or any R.O.W. taken for wetland replacement shall be indicated on the Present Layout sheet. Impacts or alterations to a wetland may require an Aquatic Resources Alteration Permit (ARAP). See Roadway Design Guidelines Chapter 5-304.00, *Environmental Permit Requirements*, for additional information on permit sketch requirements.

English **Revised:**

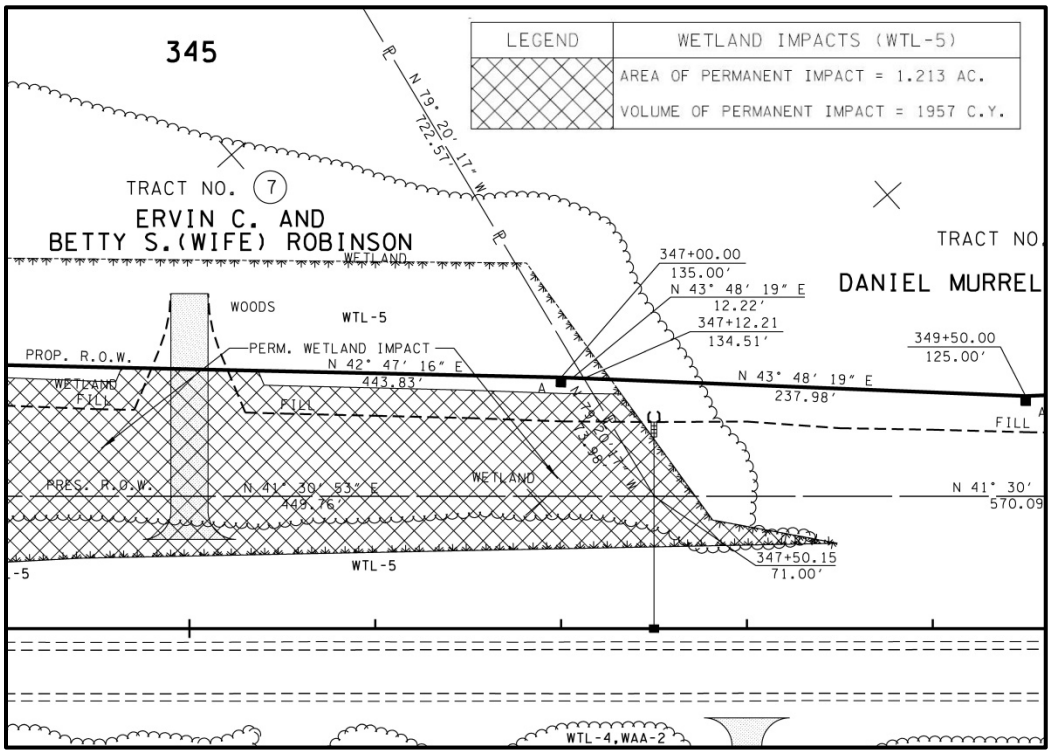

Figure 4-4
Wetland Impact

4-301.02 STREAM IMPACTS

As structures are proposed or changed on projects, the impacts to the environmental feature shall be considered. Early consideration for the type of structure and construction of the structure shall be considered, especially when there are restrictions in the water (such as piers) or time of year for construction in the water.

BOX/SLAB STRUCTURES

The following recommendations apply to box and slab impacts:

1. Any project which proposes long extensions of boxes and/or channel changes on streams (as indicated on the Environmental Boundaries Report) and/or wetlands involvement must be studied for alternate solutions; after which, a project coordination meeting between the involved TDOT Divisions, including the Regional Environmental Technical Offices must be held.

2. Where box and slab-type culverts and bridges are utilized, their length shall be held to a minimum. In the case of interchanges, intermittent boxes, rather than continuous boxes, are preferred.

3. Given the choice between long runs of boxes and channel changes, channel changes are generally preferred.

CHANNEL CHANGES

The following recommendations apply to channel impacts:

1. Concrete lined channels and rock lined (rip-rapped) channels are not acceptable for channel changes on blue-line streams.

2. In streams with enough flow to support aquatic life, a normal flow keyway within a channel change shall be considered if flood plain hydraulics dictates a channel larger than the natural channel is required. The normal flow keyway shall have approximately the same width (X) and height (Y) as the existing normal flow channel, as shown in *Figure 4-5, Channel Changes*.

3. Meanders must be included in channel changes on blue-line streams in order to maintain the natural stream length, sinuosity, and slope.

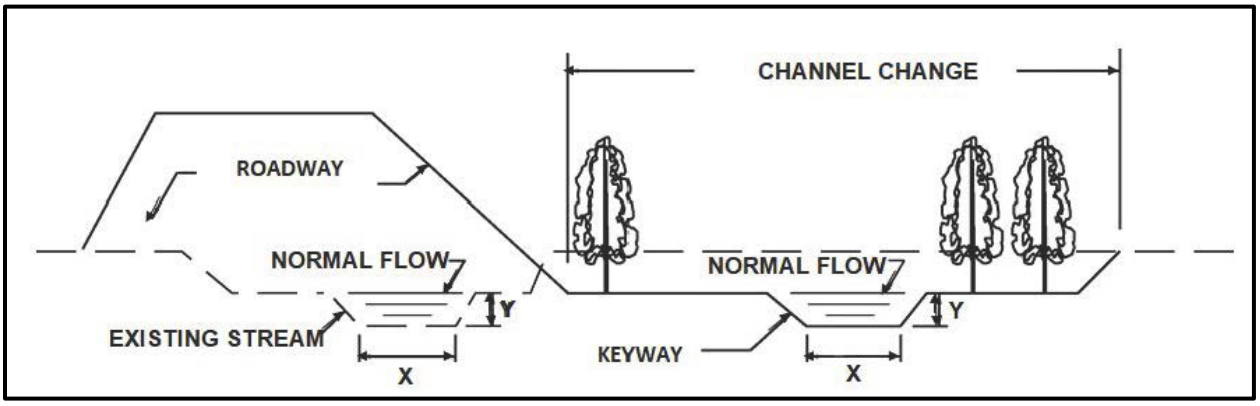

Figure 4-5 Channel Changes

For additional information on channel changes, see Drainage Manual, Chapter 5, *Section 5.05, Guidelines and Criteria for Stream Modifications*. For additional information on box and slab-type culvert and bridge lengths, see Drainage Manual, Chapter 6, *Section 6.04, Guidelines and Criteria*. For additional information on Natural Stream Design, see Chapter 11 of the Drainage Manual.

4-301.03 EMBEDDED PIPE CULVERTS

It is sometimes necessary to place a culvert bottom below a streambed. This is referred to as an embedded, sunken, or depressed culvert. Generally, when this is done, it is to eliminate the need to design specific hydraulic criteria for existing species of aquatic life. If an embedded pipe culvert is required, the Environmental Division or Regional Environmental Technical Office (R1.EnvTechOffice@tn.gov, R2.EnvTechOffice@tn.gov, R3.EnvTechOffice@tn.gov, R4.EnvTechOffice@tn.gov), shall notify the Designer of any stream with aquatic viability on the project in the Environmental

English **Revised:**

Boundaries Report. If Designers are instructed to embed a pipe culvert, the Designer shall follow the HEC 26 recommendations. The hydraulic capacity should be re-evaluated to ensure proper flow and capacity.

SECTION 4 – RIGHT-OF-WAY

4-400.00 RIGHT-OF-WAY (R.O.W.)

Once grade approval is received, both horizontal and vertical alignment are finalized, the R.O.W. process can begin. During the preliminary phase, the impacts to property owners can be identified and shown on the plans. At this point, the R.O.W. Division can start some of their Incidental activities. For additional information, refer to the TDOT R.O.W. Procedures Manual.

4-401.00 R.O.W. ACQUISITION TABLE

The R.O.W. Acquisition Table is provided by the Regional Survey in Excel format as part of the original survey documents for the project. The Excel file allows the Designer to insert measured areas into the table which in turn has pre-set formulas to calculate remaining areas, etc. If there are incorrect formulas, the acquisition tables need to be sent back to Regional Survey to revise. The Designer links the Excel file to a CADD file.

The R.O.W. Acquisition Table lists the property owners located on the project. Each property owner is assigned a tract number that **shall not** be altered or deleted. (See RDG Chapter *1-304.00, Tract Numbers on Plans*). The amount of land is shown as it appears in the CADD survey file with its location relevant to the centerline (left or right). The recorded deed documentation is obtained from a courthouse and shown in the table. The table shows the amount of existing land and the amount that is proposed to be acquired. There are formulas in the Excel file that calculate what remains of the original acreage.

Acquisition Areas and Easement Areas of 0.100 acre or more shall be shown in acres to 3 decimal places. Areas less than 0.100 acre shall be shown to the nearest square foot.

There are five columns for easements shown in the Excel Acquisition Table:

Column One: Permanent Drainage Easements
Column Two: Permanent Slope Easements
Column Three: Construction Easements
Column Four: Railroad - Permanent Highway Easements
Column Five: Railroad - Air Rights Easements

If the proposed centerline is changed during design, it shall be necessary to re-compute the areas left and right supplied with the survey and appearing in the TOTAL AREA columns of the table. The sum of all areas to be acquired and/or utilized as easements shall be totaled and shown at the bottom of the acquisition table. The survey file should be sent back to the Regional Survey Office for a file update.

If a tract is not affected by the project, the tract shall have a line placed through the name and number along with associated entries in the Excel file. There shall also be a line placed through the tract number in the CADD file.

The disturbed area is shown under the table. The total project area should be provided and will include all disturbed and undisturbed areas. Footnotes are added to describe where and/or why some of the easements are needed. For example, they may be used to designate areas to be used for erosion control. See *Figure 4-6*, *Example R.O.W. Acquisition and Disturbed Area Tables.*

4-402.00 DISTURBED AREA BLOCK

Designers shall show both the total project area (total R.O.W., easements and disturbed plus undisturbed areas) and the total disturbed project area below the R.O.W. Acquisition Table. The total disturbed area shall be updated, and the plans revised for any change in the amount of disturbance. Disturbed Area is defined in Chapter 10 of the *TDOT Drainage Manual* as the total area of the site to be cleared, graded, or excavated within the life of the project, and shall be calculated as the area within the slope lines plus a 15-foot wide strip adjacent to the slope lines. For urban areas, the disturbed area may be calculated as the area within the slope lines plus the width of the Construction Easement. The disturbed area shall include the area for the construction of driveways. The designer should verify enough R.O.W. is available for construction activities.

See *Figure 4-6, Example R.O.W. Acquisition and Disturbed Area Tables,* for an example of how to show disturbed area below the R.O.W. Acquisition Table. Designers should contact the Regional Environmental Technical Offices if additional clarification is needed.

R.O.W. ACQUISITION TABLE

TRACT NO.	PROPERTY OWNERS	COUNTY RECORDS				TOTAL AREA (ACRES)			AREA TO BE ACQUIRED (ACRES)			AREA REMAINING (ACRES)		EASEMENT (SQUARE FEET)				
		TAX MAP NO.	PARCEL NO.	DEED DOCUMENT REFERENCE		LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL	LEFT	RIGHT	PERM DRAINAGE	PERM SLOPE (1)	CONST (2, 3)	AIR RIGHTS	PERM HIGHWAY
				BOOK	PAGE													
1	BRADSHAW PROPERTIES, L.L.C.	136D	1.00	RB2194	47		1.866	1.866							1026 S.F.	2373 S.F.		
2	GALVIN PROPERTIES, L.L.C.	125		RB1083	187	6.523		6.523								1071 S.F.		
3	U.S.A., CORPS OF ENGINEERS			DB153	425											1102 S.F.		
4	U.S.A., CORPS OF ENGINEERS			DB153	425		14.185	14.185							2300 S.F.	0.775		
5	SUMMERLIN DEVELOPMENT, L.L.C.	125M	1.03	RB5753	510	7.873		7.873	0.187		0.187					0.116		
~~6~~	~~VINTAGE BAKERS CROSSINGS OWNER, L.L.C.~~	~~125M~~	~~1.01~~	~~RB5586~~	~~0~~	~~17.440~~		~~17.440~~										
~~6A~~	~~VINTAGE BAKERS CROSSINGS OWNER, L.L.C.~~	~~125M~~	~~1.11~~	~~RB5753~~	~~510~~	~~3.460~~		~~3.460~~										
~~7~~	~~BETTY HEE HOOPER~~	~~125M~~	~~4.00~~	~~RB2388~~	~~763~~	~~1.168~~		~~1.168~~										
	ACQUISITION TOTALS (ACRES)										0.187				3326 S.F.	0.995		

1) SLOPE EASEMETNS TO BE USED TO CONSTRUCT SLOPES FROM STA. 624+55.34 TO STA. 627+31.01
2) CONSTRUCTION EASEMENTS TO BE USED TO CONSTRUCT PRIVATE DRIVES AND TO BE USED AS WORK AREA FOR SLOPE CONSTRUCTION
3) TRACT 4 0.230 AC TO BE USED FOR PRIVATE DRIVES & SLOPE CONSTRUCTION AND 0.545 AC TO BE USED FOR OFFSET BASIN

DISTURBED AREA

IN BETWEEN SLOPE LINES	3.319	(AC)
15 FOOT WIDE STRIP (OUT SIDE SLOPE LINES)	1.110	(AC)
TOTAL DISTURBED AREA	4.915	(AC)
TOTAL PROJECT AREA	5.378	(AC)

Figure 4-6
Example R.O.W. Acquisition and Disturbed Area Tables

4-403.00 EASEMENTS

4-403.01 PERMANENT DRAINAGE EASEMENTS

Permanent Drainage Easements may be appropriate for channel changes and/or realignments or proposed ditches where no ditch existed before the proposed project. Permanent Drainage Easements shall be required for structures installed outside the proposed R.O.W. such as catch basins or cross drain pipes and headwalls that are needed to eliminate ponding. In these instances, it is not practical or economical to extend the proposed R.O.W. width to accommodate the structure. Any rip-rap or protection of these proposed structures shall also be included in the Permanent Drainage Easement. The Designer shall ensure that adequate drainage easement is obtained for placement of the structure, erosion protection, and maintenance of the structure.

The Permanent Drainage Easement shall extend from the R.O.W. and have precedence over other easements. Slope and Construction Easements shall not overlap Permanent Drainage Easements. A Permanent Drainage Easement should include stations/offsets and bearing/distances.

4-403.02 PERMANENT SLOPE EASEMENTS

Permanent Slope Easement is the area between the proposed R.O.W. and where the side slopes of the road meet the existing conditions. A Slope Easement is a permanent easement used to for the construction and maintenance of said slopes, but remains as a part of the property owner's R.O.W. The Permanent Slope Easement column in the R.O.W. Acquisition Table shall contain only that area outside the R.O.W. required to tie down the slopes.

4-403.03 CONSTRUCTION EASEMENTS

Construction Easement consists of the area between where the side slopes of the proposed road meet the existing ground and the width needed to construct the slope to that point (usually 10'). Construction Easement may also be used for building haul roads, improvements to a road that will be used as a detour on the project, area for construction behind a retaining wall, bridge, etc. It is also used in some drainage circumstances to provide a drainage ditch or channel improvement, such as widening or bank stabilization with rip-rap, for placement of sediment basins and other erosion prevention and sediment control devices during the construction phase, and staging/storing areas that will be used during construction for equipment, materials, etc.

Generally, a 10-foot Construction Easement is the width defined for working outside slope easements. This area must be shown on the appropriate plan sheets. The Construction Easement may be reduced or eliminated as necessary to avoid trees, buildings, etc. It may also be necessary to increase the easement width to allow for erosion control devices and areas that may be harder to construct such as steep slopes, rock slopes, rock catchments, etc.

English **Revised:**

An example of the three types of easements are shown in *Figure 4-7, Construction, Permanent Drainage, and Slope Easements in Plans.*

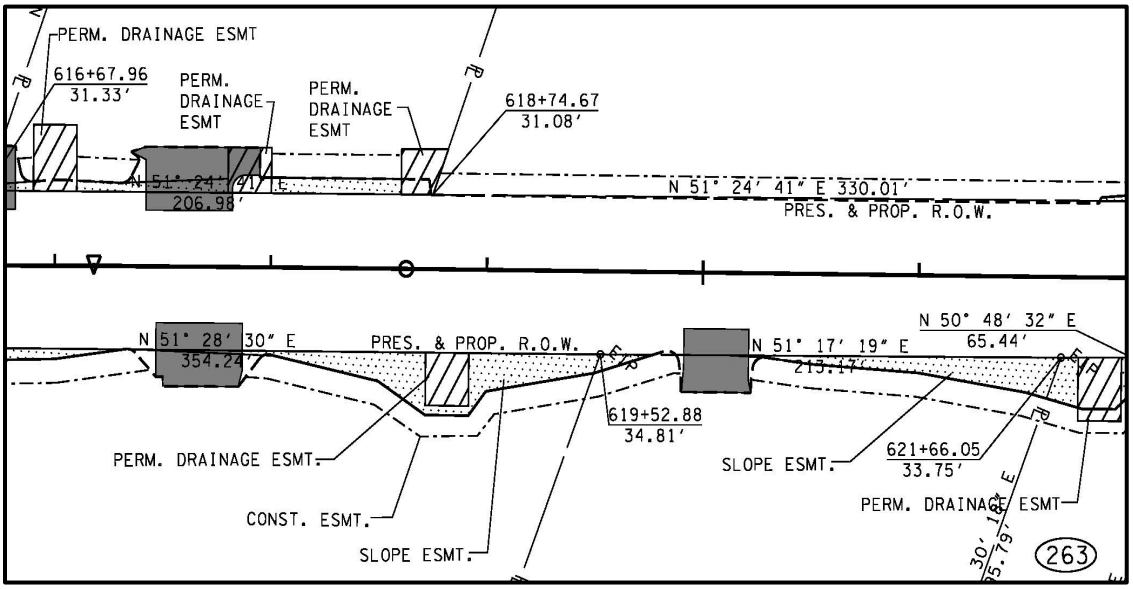

Figure 4-7
Construction, Permanent Drainage, and Slope Easements in Plans

4-403.04 RAILROAD EASEMENTS

PERMANENT AIR RIGHTS/AERIAL EASEMENT

When an overpassing structure impedes the Railroad's capacity to use their easements, rights, or property for Railroad purposes, the Department is required to compensate the Railroad for the encumbrance imposed on the Railroad. Air rights are a type of easement obtained by the Agency to compensate the Railroad for limiting the Railroad's use of their property or easement vertically or horizontally. Air rights are generally bounded by the abutments on either side of the Railroad Corridor and furthest dimensions of the superstructure – generally the parapet walls on either side of the structure. In some cases, the proposed structure does not span the Railroad R.O.W. but in all cases the Air Rights are limited to the dimensions of the superstructure. Air rights will never be acquired from the Railroad for at-grade crossings or crossing where the Railroad operates above a transportation facility, or crossing where the Railroad's ownership interest in its corridor is an easement for railroad purposes. See *Chapter 4-601.00 HQ Railroad Office Coordination* for more information on the types of easements needed for railroad projects.

PERMANENT HIGHWAY EASEMENTS

Permanent Highway Easements are obtained from the Railroad to include all properties the Railroad will no longer have rights to during and after construction of the project. Examples of Permeant Highway Easements are slope pavement and foundations for abutments, bents, and columns. The acquisition description should state that "the above-described property is hereby

conveyed as a permanent highway easement for the purpose of construction, maintenance, and operation of a highway facility. The title to the above-described land remains vested in the Grantor and may be used for any purpose, provided such use does not interfere with the State of Tennessee's use, construction, maintenance, or operation of the highway facility." Permanent Highway Easements can be used for both at-grade crossings and grade separated crossings.

Examples of these and other easements are shown in *Figure 4-8, Temporary Construction, Permanent Highway, and Air Rights Easements in Plans.*

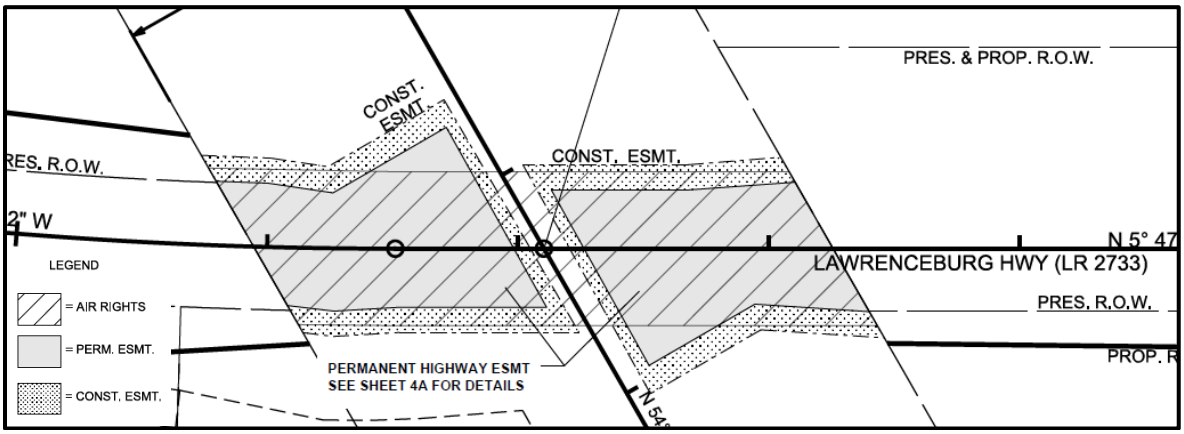

Figure 4-8
Temporary Construction, Permanent Highway, and Air Rights Easements in Plans

4-404.00 STREAM MITIGATION RIGHT-OF-WAY

Stream Mitigation Right-of-Way is land acquired for stream mitigation enhancements to help satisfy the Environmental Permitting requirements of roadway projects. Utilities cannot relocate into Proposed Stream Mitigation Right-of-Way and the requirement should be stated on both Present Layout sheets, Right-Of-Way Detail sheets, and in the Right-of-Way/Utility notes. If there are no feasible alternatives for existing utilities to relocate outside of the Proposed Stream Mitigation Right-of-Way, a solution will be determined on an individual basis.

4-404.01 OFF-SITE STREAM MITIGATION

Off-site stream mitigation is a stand-alone project that has a separate PIN and provides mitigation to one or more roadway projects. These projects will always have land use restrictions or conservation easements on them. In some rare cases, the off-site mitigation project might be directly adjacent to a roadway project it is offsetting. These projects are started with mitigation and once a NEPA document has been completed, the Regional Project Management Office holds a kick-off meeting to determine the schedule and next steps. The actual mitigation design is completed by an environmental consultant, but the designer will review and comment on the plans prior to field reviews.

4-404.02 ON-SITE STREAM MITIGATION

Most stream mitigation projects are on-site stream mitigation. This is where the Environmental Division determines a location within the project limits for a natural stream design and the environmental consultant completes a design to be incorporated into a roadway project. Trees and plantings included within the design cannot be cleared and the restriction must be incorporated into the plans.

4-405.00 PRELIMINARY R.O.W. ESTIMATE FROM LINE AND GRADE FIELD REVIEW PLANS

The Designer shall provide preliminary acquisition areas and all easement areas to the technical R.O.W. teams in Project Development (see *Distribution List* for email addresses) so that a preliminary R.O.W. estimate can be developed. Design Leads will be responsible for furnishing a copy of the R.O.W. Acquisition Excel File with acquisition areas, easement areas, and disturbed area after finalizing the Preliminary plans. R.O.W. Form 44A is for any estimates done prior to Functional Design Field Review.

Designers shall calculate preliminary areas using the following procedure:

1. Calculate acquisition and easement areas with the ORD's Measure Area tool using the Points or Flood methods. It is not necessary to store areas in the ORD file nor should time be spent defining shape elements in ORD for area calculations.

2. In the **R.O.W. Acquisition Excel File**, provided by Survey and includes owner and tract information, enter the calculated square foot areas on the "DES IN" worksheet.

3. Make a copy of the Excel file and rename it using the State Route Number, County, and PIN followed by the extension .xlsx. **Example: SR1Knox405132.00.xlsx**

4. Consultants shall provide the Excel file to the Design Lead. For projects developed in-house, the Designer should submit the Excel file to the email address listed below with a copy of the email being sent to the Design Lead and the Regional R.O.W. Manager.

5. Once the Line and Grade Field Review invitations are sent out, submit the Excel file via email as an attachment to Preliminary.acquistiontable@tn.gov. Subject line for email shall be Preliminary Areas-State Route #, County, PIN #/code. **Example: Preliminary Areas, SR 1, Knox County, PIN 405132.00.** A copy of the email shall be placed in the project folder to document the submittal of preliminary acquisition, easement areas, and disturbed area.

SECTION 5 – TRAFFIC DESIGN COORDINATION

The Designer shall include the Traffic Design groups in the Line and Grade Field Review email when requesting Signals, Lighting, Intelligent Transportation Systems (ITS), and/or Signs and Pavement Markings for a project. The ITS is also called TDOT SmartWay. The system uses live video cameras to monitor highways across the state and is monitored by TDOT personnel. The system also consists of live message boards which notify drivers of urgent traffic notices and provide safety messages to drivers.

Generally, the Concept Report will indicate if signals, lighting, ITS, and/or Signs and Pavement Markings are proposed on the project. However, in some instances, the report may have been distributed prior to significant land use changes within the project limits or there may be existing elements on a project that are not up to current TDOT standards. Distribution for the Line and Grade Field Review shall be sent to the Traffic Design Division for all projects except bridge projects located in remote locations with no indications of existing signals, nearby intersections, etc. If the Designer is unsure if any Traffic Design is needed, the Designer shall note in the email distribution that no signals, lighting, ITS, or signs and pavement markings were proposed in the Concept Report and a final determination review is requested by the Traffic Design Division. These studies shall be completed early in the plans production to ensure the Designer has pole locations and other items that may require additional R.O.W. acquisition and to avoid potential conflicts by utility companies when designing their plans.

The following steps shall be followed by TDOT and Consultant Designers in order to assist the Traffic Design Division in providing signalization, lighting, ITS, and/or signs and pavement marking designs in a timely manner, as well as to allow the Traffic Design Division to schedule workload.

4-500.00 TRAFFIC SIGNAL DESIGNS

The following steps are to be followed in order to assist the Traffic Design Division in providing signalization designs in a timely manner, as well as to allow the Traffic Design Division to schedule its work efficiently.

TDOT Designed Roadway Plans:

When the Concept Report indicates that signalization is required on a project, or if signalization is not included in the report, but there is suspicion that signals may be involved in a project, the Traffic Design Division – Signals and Lighting Section and the ITS section shall be notified by email, TDOT.TrafficOps.SNL-Reviews@tn.gov and TDOT.TrafficOps.ITS-Reviews@tn.gov, for the Line and Grade Field Review. Designers are reminded that all available design traffic data (including ADT's, DHV's, design speed, and traffic turning movements at all intersections) shall be included in the Line and Grade plans.

The Traffic Design Division – Signals and Lighting Section will respond to the Designer indicating where signalization is warranted, or if no signalization will be involved, give comments pertaining to geometric improvements that will provide better operations characteristics.

Consultant Designed Roadway Plans:

The Design Project Manager shall notify the Traffic Design Division – Signals and Lighting Section by email of the Line and Grade Field Review for projects which contain signalization. The Traffic Design Division – Signals and Lighting Section will provide comments for the Preliminary Field Review.

4-501.00 LIGHTING DESIGNS FOR ROADWAY PROJECTS

The following steps are to be followed in order to assist the Traffic Design Division in providing lighting designs in a timely manner, as well as to allow the Traffic Design Division to schedule its work efficiently.

TDOT Designed Roadway Plans:

When the Concept Report indicates that lighting is required on a project, the TDOT Designer shall furnish the Traffic Design Division – Signals and Lighting Section with a PDF of the preliminary plans and request a pole location layout. The PDF shall be furnished by the TDOT Designer at the Line and Grade Field Review of project development to ensure that the utility requirements will be shown on the plans for the Functional Design Field Review.

If there is no right-of-way acquisition required on the plans, but lighting is required, the TDOT Designer shall furnish the Traffic Design Division – Signals and Lighting Section with a PDF of the plans as soon as the Present and Proposed Layout sheets are drawn and request the light pole locations. This is to ensure that the utility requirements will be shown on the plans for Functional Design plans submittal.

The Designer shall notify the Traffic Design Division – Signals and Lighting Section by email of the Line and Grade Field Review submittal.

The proposed roadway lighting involves a design process which begins with a photometric layout after which the lighting design process can begin. Pole locations are dependent on the photometric layout and the complete roadway lighting design. Refer to Chapter 15 of the Traffic Design Manual for more information.

Consultant Designed Roadway Plans:

If a lighting design will be completed by the consultant, then the consultant designer will be responsible for providing the Traffic Design Division – Signals and Lighting Section with a PDF of the plans showing the light pole location layout. The Design Project Manager shall notify the Traffic Design Division – Signals and Lighting Section by email of the Line and Grade Field Review for projects which contain lighting. Traffic Design Division – Signals and Lighting Section will provide comments for the Line and Grade Field Review. **If a lighting design will not be completed by the consultant, then the in-house procedure shall be followed.**

4-502.00 INTELLIGENT TRAFFIC SYSTEM DESIGN

When the Concept Report indicates that ITS are required on a project or that elements may already be on the project, the TDOT Designer shall include the ITS Section of the Traffic Design Division when submitting the Line and Grade Field Review by emailing TDOT.TrafficDesign.ITS@tn.gov. **In addition to the Concept Report, for all projects that have signals and projects with roads classified as major arterials or higher, the ITS Section shall be emailed during the Line and Grade Stage.** This early notification will ensure that the ITS section reviews the plans for installation of fiber at signalized intersections or for installation parallel to major arterials. The requirements will be shown on the plans for the Functional Design Field Review.

4-503.00 SIGNS AND PAVEMENT MARKING DESIGN

TDOT Designed Roadway Plans:

When the Concept Report indicates that signs and/or pavement markings are required on a project, existing signs and/or pavement marking exists on the project, or if signs and/or pavement markings are not included in the report but there is suspicion that signals may be involved in a project, the Designer shall include the Signs and Pavement Marking Section of the Traffic Design Division (TDOT.TrafficDesign.SignsandMarking@tn.gov) with the Line and Grade Field Review. For all projects with signs and/or pavement markings, the Signs and Pavement Markings Section of the Traffic Design Division requests notification as well by email, TDOT.TrafficDesign.SignsandMarking@tn.gov. For bridge projects in remote locations with no indications of existing signs and/or pavement markings the Signs and Pavement Marking Section shall not be requested during PDN Stage 1.

Consultant Designed Roadway Plans:

If the project has roadway plans that are designed by a consultant who is also responsible for signs and pavement markings, email the Signs and Pavement Marking Section of the Traffic Design Division when submitting the Line and Grade Field Review. The Signs and Pavement Marking Section will review the plans and analysis and provide comments, if needed.

SECTION 6 – RAILROAD COORDINATION

4-601.00 HQ RAILROAD OFFICE COORDINATION

The State Railroad Coordinator is in the HQ Utility Office. This position is responsible for coordinating with any railroads on a project. It differs from the Multimodal Division Railroad program coordinator who generally has stand-alone Railroad Safety projects.

All railroad coordination and communication should be submitted through the State Railroad Coordinator to the railroad entities impacted by a State let project. Plans should be directed to the State Railroad Coordinator who will submit the plans and revised plans to the necessary railroad(s). When plan review comments are supplied by the railroad entity involved, the plan review comments will be submitted to the responsible Designer/Design Lead for the project.

During each project phase, an Excel file will accompany the plan review comments. Within the Excel file, under each plan review comment, there is a space titled: "*Agency Response*". In this section the Designer responds to how, if and where they have addressed the specific plan review comment. If the Designer disagrees with the request made by the plan review comment, the Designer may use the "Agency Response" area to state TDOT's position. Once all the plan review comments have been addressed, the completed Excel spreadsheet and the revised plans shall be submitted to the State Railroad Coordinator as a non-portfolio PDF set. The set will then be released to the railroad(s) involved.

Iterations of plan reviews will take place until the Railroad or their representative provides the following statement to the State Railroad Coordinator: *"(Railroad Entity) takes no further exceptions to the project plans."* When this statement is received by the State Railroad Coordinator, a request will be made of the Designer and the Point of Accountability for final plans. Once the final plans have been released to the Railroad(s), the coordination effort between the State Railroad Coordinator and the Designers is complete. If letting or construction revisions are made, the State Railroad Coordinator should be included in the revision notification email.

RAILROAD COORDINATION NOTES:

- By Agreement, the Railroad has thirty (30) days to review plans.
- A submission of revised plans without the completed Excel file will not be acknowledged as a submission by the Railroad. The completed Excel spreadsheet and the revised plans are both required.
- Revised sheets which only address the plan review comments are not permitted. Only full sets of plans will be transmitted by the State Railroad Coordinator to the Railroad.

4-602.00 SHOWING RAILROAD PROPERTIES ON PLANS

4-602.01 RAILROAD PROPERTY TYPES

Railroad property exists as corridors in the State of Tennessee by two means: easement or fee simple. Below is a short summary of the two cases. Inquiries regarding whether a Railroad's Right-of-Way is Easement or Fee Simple, should be sent to the State Railroad Coordinator at HQRailroadCoordinator@tn.gov.

Easement

Historically, the Government (Federal/State) condemned individual parcels of property in stretches of corridors in the name of the Government. The Government granted these corridors to individual railroad entities for railroad purposes. If the grantee railroad entity uses the corridors for railroad purposes, the railroads are granted certain rights to the Right-of-Way (R.O.W.) which facilitates the Railroad's needs. If the corridor is no longer used for railroad purposes, the Railroad must abandon the corridor at which time the Railroad Easement is relinquished and transferred to the current adjoining property owner up to the centerline of rail.

Fee Simple

Fee simple property is the highest order of ownership of property. This means the Railroad has acquired property from the individual parcel owners and paid for the acquisition which is accompanied by a deed of ownership. The Railroad has all rights to all fee simple properties they own and if a public project infringes on their rights, compensation must be made in accordance with the Uniform Act.

NOTE: If a fee simple corridor is discovered, the schedule for the project is increased by a minimum of nine months. Any modification will take an additional three to nine months. It is imperative that the information be presented correctly from the beginning.

4-602.02 RAILROAD ACQUISITION TYPES

Various easement types apply to Railroad acquisition. These include Permanent Highway Easement, Temporary Construction Easement, Permanent Air Rights/Aerial Easement, Permanent Slope Easement, and Permanent Drainage Easement. The following give a brief description of the type and methods often used in railroad acquisition. Permanent easement **CANNOT** overlap construction easement. Air Rights **CAN** overlap permanent easement and construction easement.

- **Permanent Highway Easement**
  - This would include all properties the Railroad has rights to prior to the project but will no longer have rights to during and after construction. Examples of

Permanent Easement are slope pavement and foundations of abutments, bents, and columns. No Permanent Easement can infringe on the Railroad's ability to use their current configuration of tracks (i.e., Permanent Easement cannot be atop the Railroad's tracks). See *Figure 4-9, Example of Permanent Highway Easement*.

- **NOTE:** When establishing the required square footage of Permanent Highway Easement, the required Permanent Highway Easement should extend one (1) foot beyond the furthest dimension of the proposed or actual footing. For example, if a footing is 4' x 4' or 16 square feet, the required permanent highway easement, which should be inserted within the Acquisition Table, will be 6' x 6' or 36 square feet. This note applies to abutment foundations and bent foundations which will permanently exist on the Railroad's Right-of-Way during and after construction. Slope pavements should be registered in the Acquisition Table by their actual dimensions. Slope pavements would include those constructed of concrete pavement, rip-rap, etc.

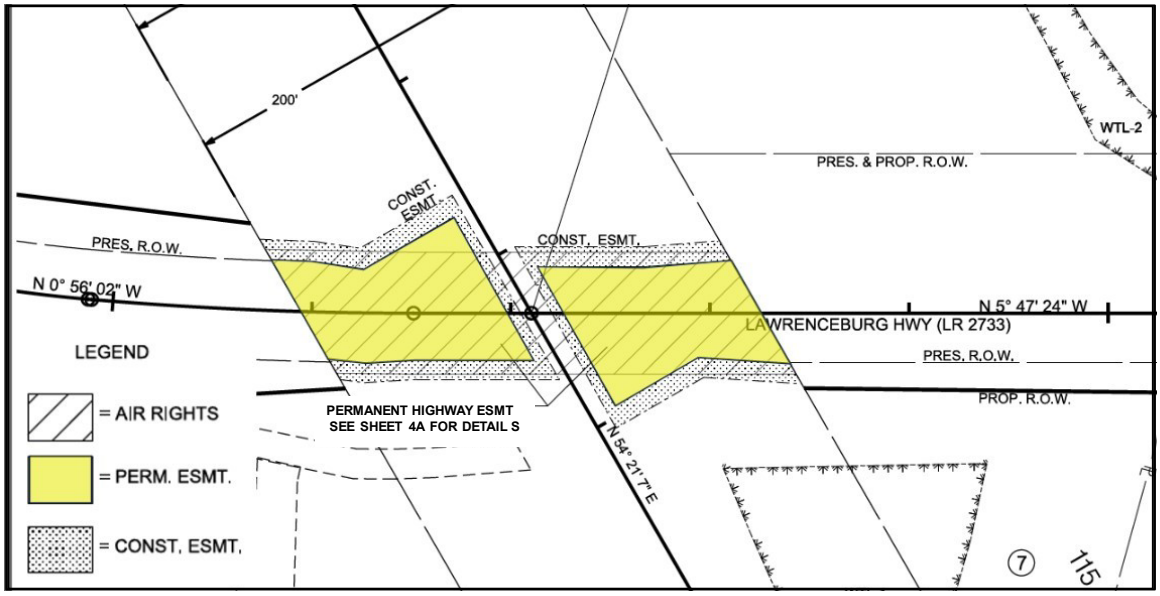

Figure 4-9
Example of Permanent Highway Easement

- **Temporary Construction Easement**

  - Any property necessary to construct the proposed project in which the Designer/contractor anticipates personnel or equipment on the Railroad's Right-of-Way during construction activities. A construction easement is generally obtained for haul roads, access roads, staging, or storage of materials for the proposed construction project. Once the project is complete and returned to its original condition, the original property owner assumes complete ownership, rights, and responsibility for maintenance.

- It is important to get adequate Temporary Construction Easement as there is a lengthy revision process if the corridor is Fee Simple. If necessary, consult with the Construction Division to ensure the initial amount of Temporary Construction Easement is enough to feasibly construct the project. See *Figure 4-10, Example of Temporary Construction Easement*.

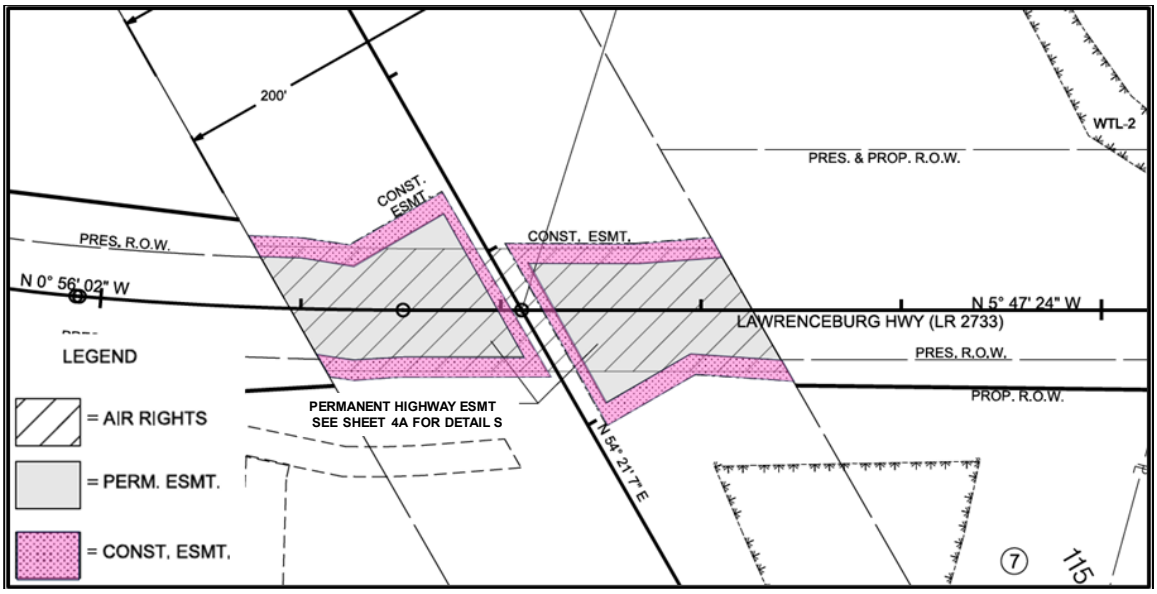

Figure 4-10
Example of Temporary Construction Easement

- **Permanent Air Rights/Aerial Easement**

  - This type of easement is reserved for future maintenance activities of the structure throughout its life. The required square footage is an envelope which includes the entire superstructure and an extended imaginary plan fifteen (15) feet beyond the furthest dimension of the superstructure into the Railroad's R.O.W. – in space. See *Figure 4-11, Example of Permanent Air Rights Easement*.

  - Air rights will never be acquired from the Railroad for an at-grade crossing.

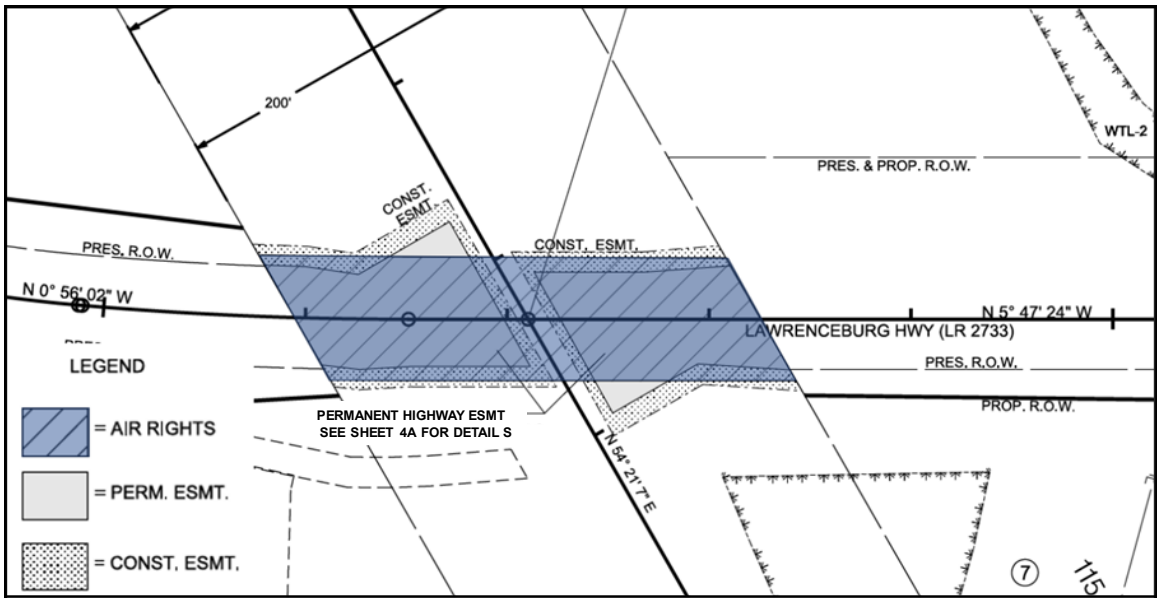

Figure 4-11
Example of Permanent Air Rights Easement

- **Permanent Slope Easement**

  - This type of easement is reserved for embankments which shall encroach onto the Railroad's property. These types of easements are rare, and if seen, will generally be on parallel encroachments. Often, the Railroad will request the Department to install a retaining wall to hold back the cut/fill materials from encroaching onto their right-of-way, however, in rare occasions, this type of easement will be used. The total square footage or acres shall be registered as the actual dimension on the Acquisition Table. See *Figure 4-12, Example of Permanent Slope Easement*.

  - Permanent Slope easements shall be reserved for earthen Slope Easements having to do with the embankments necessary to establish the vertical/horizontal alignments and cross-sections. All slope pavements (i.e., concrete pavement or rip-rap) shall be shown as Permanent Slope Easements.

English **Revised:**

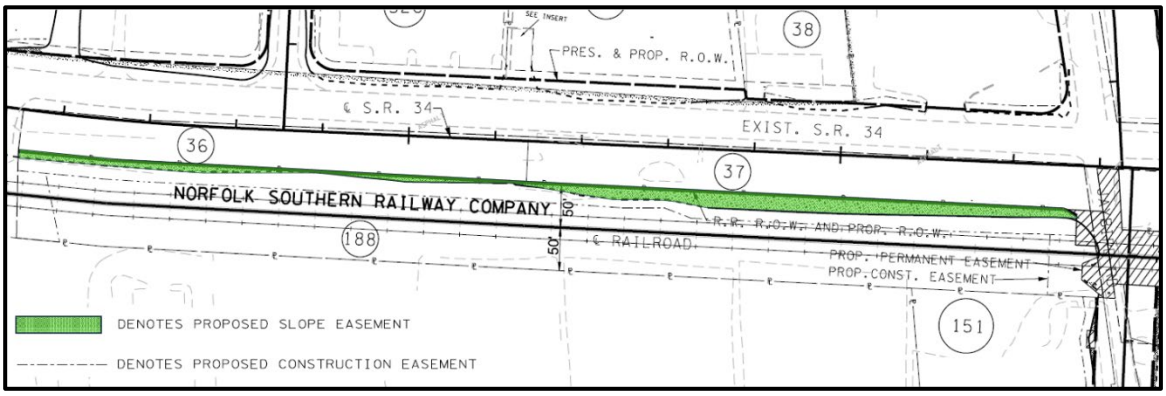

Figure 4-12
Example of Permanent Slope Easement

- **Permanent Drainage Easement**

  - This type of easement is also rare; however, it is utilized more often than a Permanent Slope Easement. Generally, the Railroad will request no additional water be released onto their corridor and request the additional water generated by the project be channeled away from the Railroad's corridor. In certain circumstances, this request is impossible to accommodate. In such a case, the necessary Permanent Drainage Easement shall be totaled as a square footage or acres and registered as the actual dimension on the Acquisition Table.

4-602.03 PROPERTY MAP REQUIREMENTS FOR RAILROADS

The property map for both Fee Simple and Easement property interests held by the Railroad will generally look the same. In addition to the items shown in the checklist, the Designer should add the following note to the Property Map for railroad corridors that are held as **Easement by the Railroad**. Refer to the following figures:

Figure 4-16, Grade Separated Easement Corridor Property Map
Figure 4-24 At-Grade Easement Corridor Property Map
Figure 4-34, Parallel Encroachment Easement Corridor Property Map
Figure 4-40, Norfolk Southern Property Map.

"The Agreement required for the Railroad crossing will be obtained by the R.O.W. Division's Utility Office Railroad Coordinator through negotiations and Special Provisions with the Railroad."

4-602.04 ACQUISTION TABLE REQUIREMENTS FOR RAILROAD FEE SIMPLE AND EASEMENT ACQUISITION TYPES

The Acquisition Table for both Fee Simple and Easement property interests held by the Railroad will generally look the same. The Acquisition Table, whether for Easement or Fee Simple railroad corridors, identifies properties impacted by the project and rights as easements. Refer to the following figures:

Figure 4-17, Grade Separated Easement Corridor R.O.W. Acquisition Table
Figure 4-25, At-Grade Easement Corridor R.O.W. Acquisition Table
Figure 4-35, Parallel Encroachment Easement Corridor R.O.W. Acquisition Table
Figure 4-41, Norfolk Southern R.O.W. Acquisition Table

Fee Simple and Easement Corridors

- All railroad entities impacted by a project will be identified along with their corresponding tract number(s) within the Acquisition Table.
- Each type of easement will be totaled as a square footage (or as acreage if the square footage number is greater than 0.1 acre) and inserted into the appropriate column.
- If the corridor is held in Fee Simple by the Railroad, there will be a Deed with a book and page reference. This information must be entered into the Acquisition Table. If the information is not provided by Geodetics, contact the State Railroad Coordinator at HQRailroadCoordinator@tn.gov for the required information.
- It is extremely rare that a Railroad entity will sell the underlying Fee of a Fee Simple Corridor to the State which is why we purchase easements from the Railroad. For this reason, the Total Area Acres, Area to be Acquired Acres, and the Area Remaining Acres columns of the Acquisition Table are very rarely filled out for a railroad tract. Instructions will be provided by the State Railroad Coordinator or the Special Acquisitions Agent at the Tennessee Department of Transportation (TDOT) Headquarters if these fields require inputs, otherwise they can be left blank.
- If not already inserted within the Acquisition Table, additional easement columns including: PERM. DRAINAGE (Permanent Drainage Easement), PERM. SLOPE (Permanent Slope Easement), CONST. (Temporary Construction Easement), PERM. (Permanent Easement), and AIR RIGHTS (Air Rights Easement) shall be inserted.

Acquisition Tables for Easement Corridors Only

Similar to the Fee Simple Acquisition Table, the Easement Acquisition Table will look exactly the same with the exception of two small additions:

- A double asterisk will be added to the left of the Railroad tract number(s).
- A footnote will be added to the bottom of the Acquisition Table referencing the double asterisk. The exact language to be inserted as a footnote will be provided by the State Railroad Coordinator.

4-602.05 PRESENT LAYOUT SHEET(S) REQUIREMENTS FOR RAILROADS

The Present Layout sheets for both Fee Simple and Easement property interests held by the Railroad will generally look the same. Additional information is shown in the checklists that should be added to the Present Layout sheets for Railroad involvement. Refer to the following figure:

Figure 4-18, Grade Separated Easement Corridor Present Layout
Figure 4-26, At-Grade Easement Corridor Present Layout
Figure 4-36, Parallel Encroachment Easement Corridor Present Layout
Figure 4-42, Norfolk Southern Present Layout

Whether a Railroad corridor is held in Fee Simple or Easement the Present Layout sheet(s) will look exactly alike with one simple difference:

FEE SIMPLE:

The Present Layout sheet(s) will be shown as described above and shall look similar to *Figure 4-8, Temporary Construction, Permanent Drainage, and Air Rights Easements in Plans*.

EASEMENT:

The Present Layout sheet(s) will be shown as described above and a boxed note will be placed on the sheet with the following statement:

"The Agreement required for the Railroad crossing will be obtained by the R.O.W. Division's Utility Office Railroad Coordinator through negotiations and Special Provisions with the Railroad."

4-602.06 RIGHT-OF-WAY DETAILS SHEET(S) and RAILROAD DETAILS SHEET(S)

Depending on the volume of information on the Right-of-Way Details sheet(s), the impacted railroad easements may need to be shown on multiple Right-of-Way Details sheets. Refer to the following figures for Easement Corridors:

Figure 4-19, Grade Separated Easement Corridor R.O.W. Details
Figure 4-27, At-Grade Easement Corridor R.O.W. Details (A)
Figure 4-28, At-Grade Easement Corridor R.O.W. Details (B)
Figure 4-37, Parallel Encroachment Easement Corridor R.O.W. Details
Figure 4-43, Norfolk Southern R.O.W. Details

The overall impacted railroad properties shall be shown in the Right-of-Way Details sheet(s) which would include: Permanent, Slope, Drainage, Air Rights, and Temporary Construction Easements. The Right-of-Way Details sheet(s) will include all the bearings/distances

and stations/offsets of the impacted easements. The Temporary Construction Easement and the Air Rights Easement shall be shown on one overlaid Right-of-Way detail.

4-602.07 PROPOSED LAYOUT SHEETS

The Proposed Layout Sheets for both Fee Simple and Easement property interests held by the Railroad will generally look the same. Additional information is shown in the checklists that should be added to the Proposed Layout sheets for railroad involvement. Refer to the following figures for additional information.

Figure 4-20, Grade Separated Easement Corridor Proposed Layout
Figure 4-29, At Grade Easement Corridor Proposed Layout
Figure 4-38, Parallel Encroachment Easement Corridor Proposed Layout
Figure 4-44, Norfolk Sothern Proposed Layout

4-602.08 PROPOSED PROFILE SHEETS

The Proposed Profile Sheets for both Fee Simple and Easement property interests held by the Railroad will generally look the same. Additional information is shown in the checklists that should be added to the Proposed Profile sheets for railroad involvement. Refer to the following figures for additional information.

Figure 4-21, Grade Separated Easement Corridor Profile
Figure 4-30, At Grade Easement Corridor Proposed Profile
Figure 4-39, Parallel Encroachment Easement Corridor Proposed Profile
Figure 4-45, Norfolk Sothern Proposed Profile

4-603.00 GRADE SEPARATED RAILROAD CROSSINGS

This section should only be referenced for crossing types which overpass or underpass the Railroad's corridor i.e., grade separated. All other crossing types are covered in subsequent sections of these guidelines. See *Figure 4-13, Example of Highway over Railroad* and *Figure 4-14, Example of Railroad over Highway*.

Figure 4-13
Example of Highway over Railroad

Figure 4-14
Example of Railroad over Highway

4-603.01 GENERAL DESIGN CRITERIA FOR GRADE SEPARATED CROSSINGS

- If designing under or over CSXT or Norfolk Southern Railway Company, use their published Public Projects Manual. If a copy of the Public Projects Manual is needed, please contact the State Railroad Coordinator for the latest version. For all other railroads, the publications of CSXT and Norfolk Southern Railway Company are a great rule of thumb to follow. If additional guidance is required, use the American Railway Engineering and Maintenance Association (AREMA) standards or contact the State Railroad Coordinator to determine if the railroad entity has some general standards.
- When possible, develop design plans concurrently with the structural plans.

- Starting with the Plan-in-Hand plans, indicate where modifications have been made to railroad plans.

4-603.02 PRELIMINARY PLANS FOR PROJECTS CONTAINING GRADE SEPARATED CROSSING(S)

In order to facilitate the Railroad's review of all future highway plans, including a highway-railroad grade separated crossing, the following information must be included on the preliminary plans, which are to be submitted to the State Railroad Coordinator as an info only set (non-portfolio PDF set) to be distributed to the Railroad(s) for comments and/or approval:

1. A minimum of five (5) railroad cross-sections shall be provided at the following locations:
   - The roadway grade at the proposed bridge
   - Both faces of the proposed bridge
   - Right-of-Way limits (minimum 100 ft.) from face of the proposed bridge (perpendicular to the railroad alignment)

   a. The proposed bridge toe of abutment fill slopes, existing railroad drainage structures and ditches, and roadside ditches should be shown on all applicable cross-sections.

   b. For any proposed structure (example: retaining wall, end wall), a cross-section view showing the location of such structures in relation to the location of the railroad centerline of track shall be shown.

   c. Cross-sections need to show any changes proposed during grading operations to the railroad embankment, drainage ditches, or sub-track structures.

   NOTE: If the distance between the subject cross sections exceeds fifty (50) feet, additional cross-sections are required to adequately depict conditions along the tracks. See *Figure 4-9, Example Cross Section Locations,* for cross-sections that are required to adequately depict conditions along the tracks.

2. Provide the Project Drainage Report with the Line and Grade Plans Field Review submission to the State Railroad Coordinator. An example can be found on the TDOT Engineering Production Support website.

   NOTE: The Railroad is concerned that no new water will be placed on their property as a result of the project and request proof to be provided by the State or their representative which confirms this as fact.

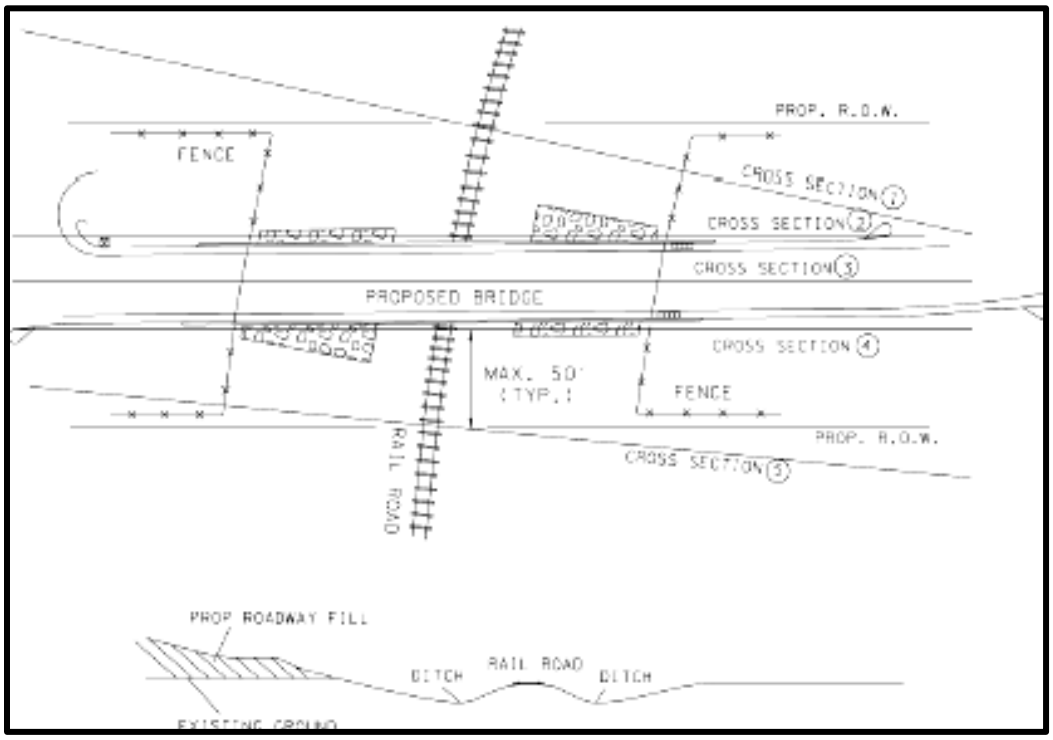

Figure 4-15
Example Cross Section Locations

3. The following information must be on the Line and Grade plans and carried through the subsequent phases of the project design,

   a. On the cover sheet, provide a call out with the Railroad Entity, the DOT crossing number, the type of crossing (Over/Under) and the railroad milepost for each crossing impacted by the project.
   b. Show the centerline of track on both the profile and plan views.
   c. Show and label the Railroad Right-of-Way as “ENTITY R.O.W.” on both the profile and plan views.
   d. Dimension the Railroad Right-of-Way from the centerline of track to the Right-of-Way limits and in total.
   e. Provide a call-out at the intersection of the centerline of rail and the centerline of the route/interstate that includes the DOT crossing number and the railroad milepost. If this information is needed, please contact the State Railroad Coordinator.
   f. Provide call-outs that include the minimum vertical clearance from the highest rail of the track(s) to the existing and new structures.
   g. Dimension the minimum horizontal clearance from the centerline of track(s) to any piers or bents on both sides of the track.
   h. On the plan views, dimension the minimum horizontal clearance from the centerline of track(s) to the proposed slope protection/pavement.

i. At skewed crossings, the plans must include a structure elevation view normal to the track.
j. Proposed distance from centerline of track(s) to toe of end slopes at their intersection with natural ground.
k. If end slopes are to be paved, indicate limits of paving.
l. Location of the railroad milepost on Railroad Right-of-Way.
m. Existing and proposed drainage structures.
n. Railroad station at highway-railroad intersection, or distance in feet from nearest railroad milepost.

In general, the information listed above is the minimum information needed by the Railroad to enable them to make a logical investigation of the proposed project. To furnish less information would only serve to delay the Railroad's approval of the plans.

See Chapter 4-602.03 through Chapter 4-602.07 and Figures 4-16 through 4-21 for how each sheet should look when a project contains a grade separated railroad crossing for both Fee Simple and Easement property type.

English **Revised:**

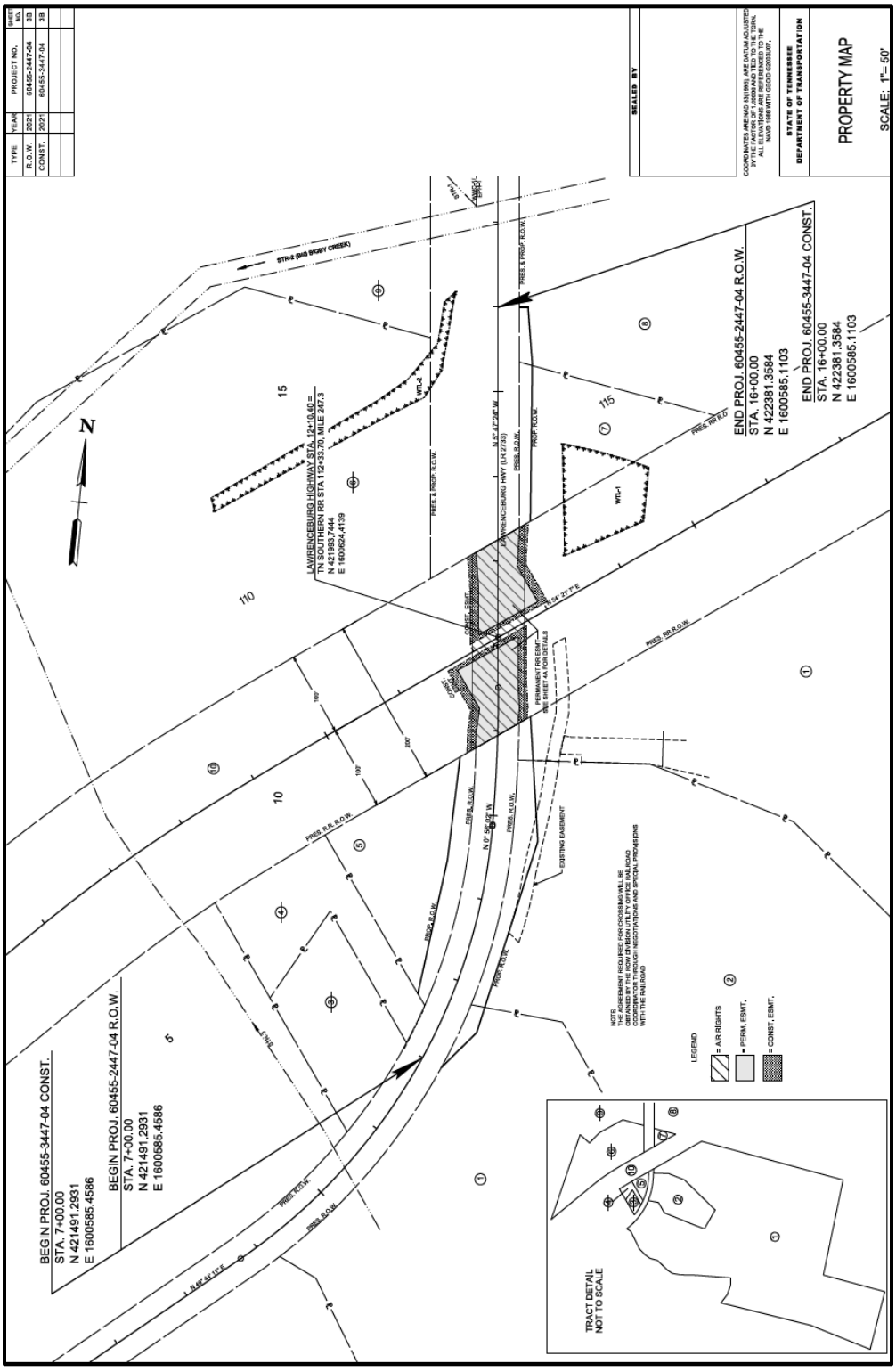

Figure 4-16
Grade Separated Easement Corridor Property Map

TYPE	YEAR	PROJECT NO.	SHEET NO.
R.O.W.	2021	60455-2447-04	3A
CONST.	2021	60455-3447-04	3A

R.O.W. ACQUISITION TABLE

TRACT NO.	PROPERTY OWNERS	COUNTY RECORDS				TOTAL AREA (ACRES)			AREA TO BE ACQUIRED (ACRES)			AREA REMAINING (ACRES)		EASEMENT (ACRES)				
		TAX MAP NO.	PARCEL NO.	DEED DOCUMENT REFERENCE BOOK	DEED DOCUMENT REFERENCE PAGE	LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL	LEFT	RIGHT	PERMANENT	SLOPE	CONSTRUCTION	AIR RIGHTS	PERM. RAILROAD
1	JOEL LEE KENNEDY ETUX, CATHY LINDSEY KENNEDY	171	59	R1673	701-703		67.920	67.920		1756 S.F.	1756 S.F.		67.880					
2	BRIAN ALTON LOVETT ETUX, MARY ELIZABETH KENNEDY	154	59	R1758	469		5.260	5.260		0.136	0.136		5.124					
3	SHERRILL STOKES C/O ROGER PATTERSON	154	61.01	R2096	659	0.480		0.480				0.480						
4	ROGER V. PATTERSON ETUX JENNIFER E C/O SHERRILL STOK	154	61	R2100	669	0.500		0.500				0.500						
5	JOSHUA BLAIR	154	60	R2625	1081-1082	0.630		0.630	0.146		0.146	0.484						
6	LARRY HORNER ETUX LORI K	154	64.01	R2493	216	0.230		0.230				0.230						
7	LARRY HORNER ETUX LORI K	154	64.01	R2493	216-219		0.520	0.520		2613 S.F.	2613 S.F.		0.460					
8	ANDREW MASSEY ETUX CASSIE	154	17.02	R2438	758		54.910	54.910		835 S.F.	835 S.F.		54.891					
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]				[illegible]						
10	CSX TRANSPORTATION INC. TAX DEPARTMENT															0.110	0.325	0.232

DISTURBED AREA

IN BETWEEN SLOPE LINES	1.090	(AC)
10 FOOT WIDE STRIP (OUT SIDE SLOPE LINES)	0.512	(AC)
TOTAL DISTURBED AREA	1.602	(AC)
TOTAL PROJECT AREA	1.729	(AC)

CONSTRUCTION FIELD REVIEW

SEALED BY

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

RIGHT-OF-WAY ACQUISITION TABLE & DISTURBED AREA

Figure 4-17
Grade Separated Easement Corridor R.O.W. Acquisition Table

English **Revised:**

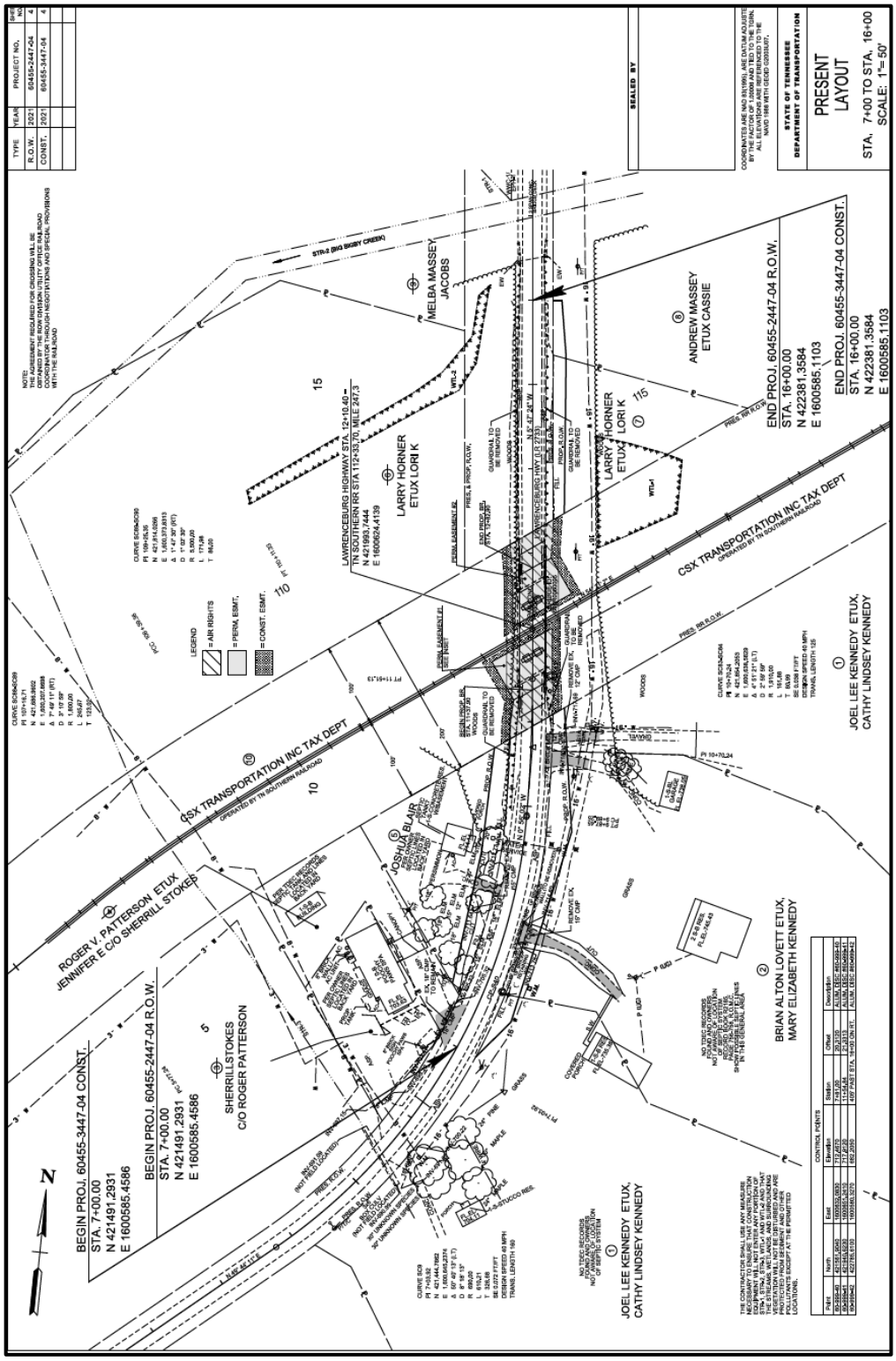

Figure 4-18
Grade Separated Easement Corridor Present Layout

English **Revised:**

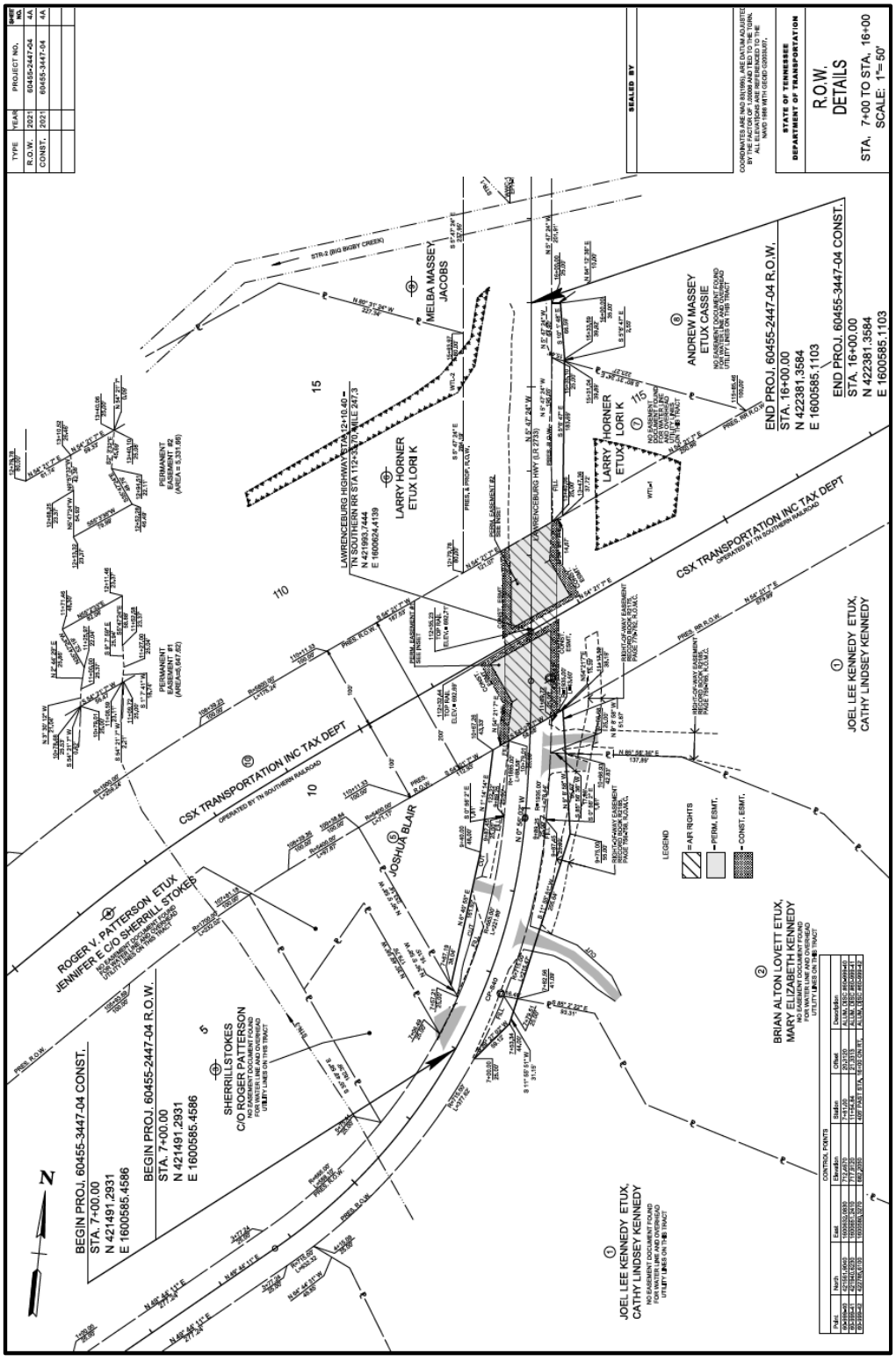

Figure 4-19
Grade Separated Easement Corridor R.O.W. Details

English **Revised:**

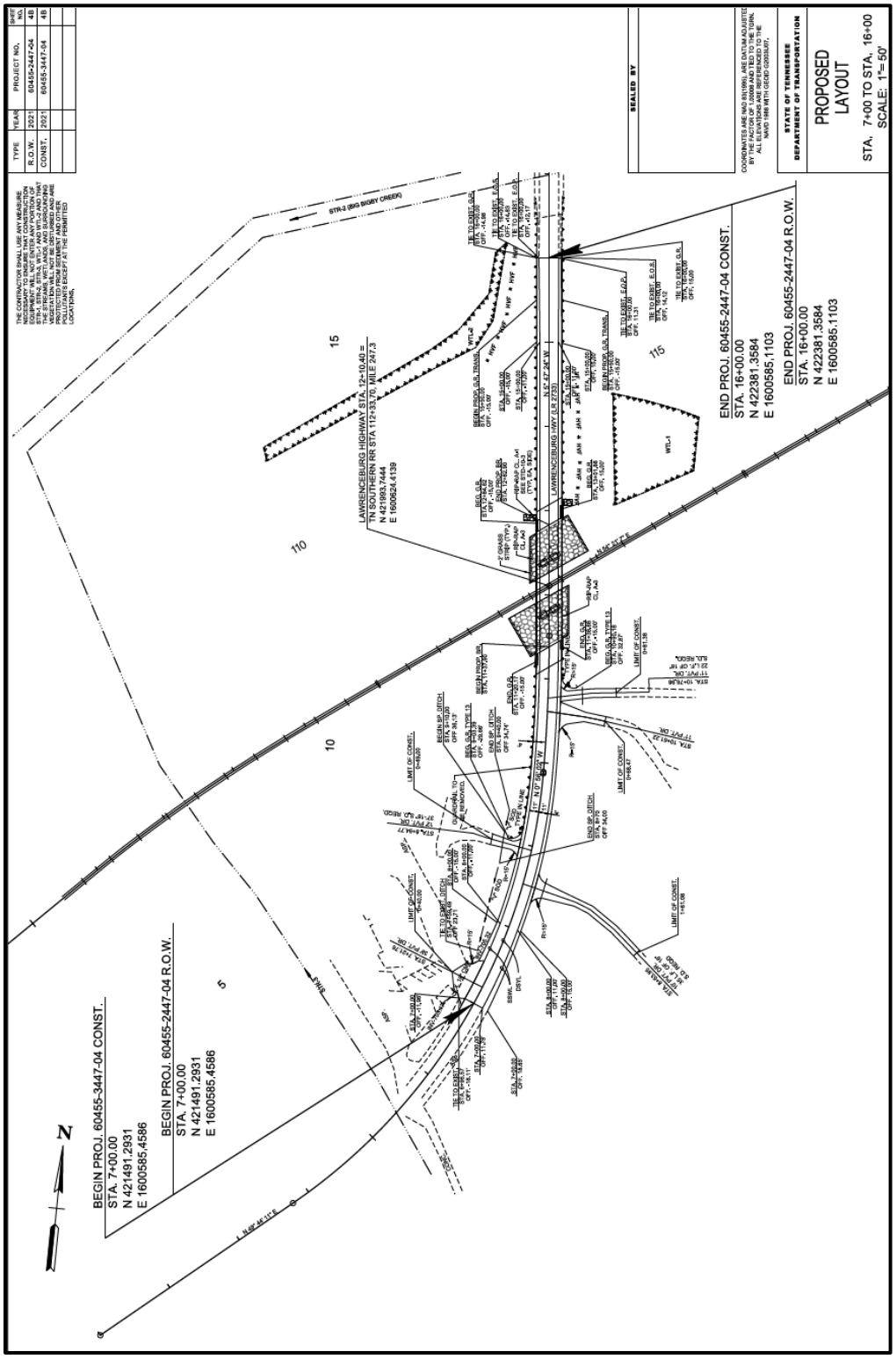

Figure 4-20
Grade Separated Easement Corridor Proposed Layout

English **Revised:**

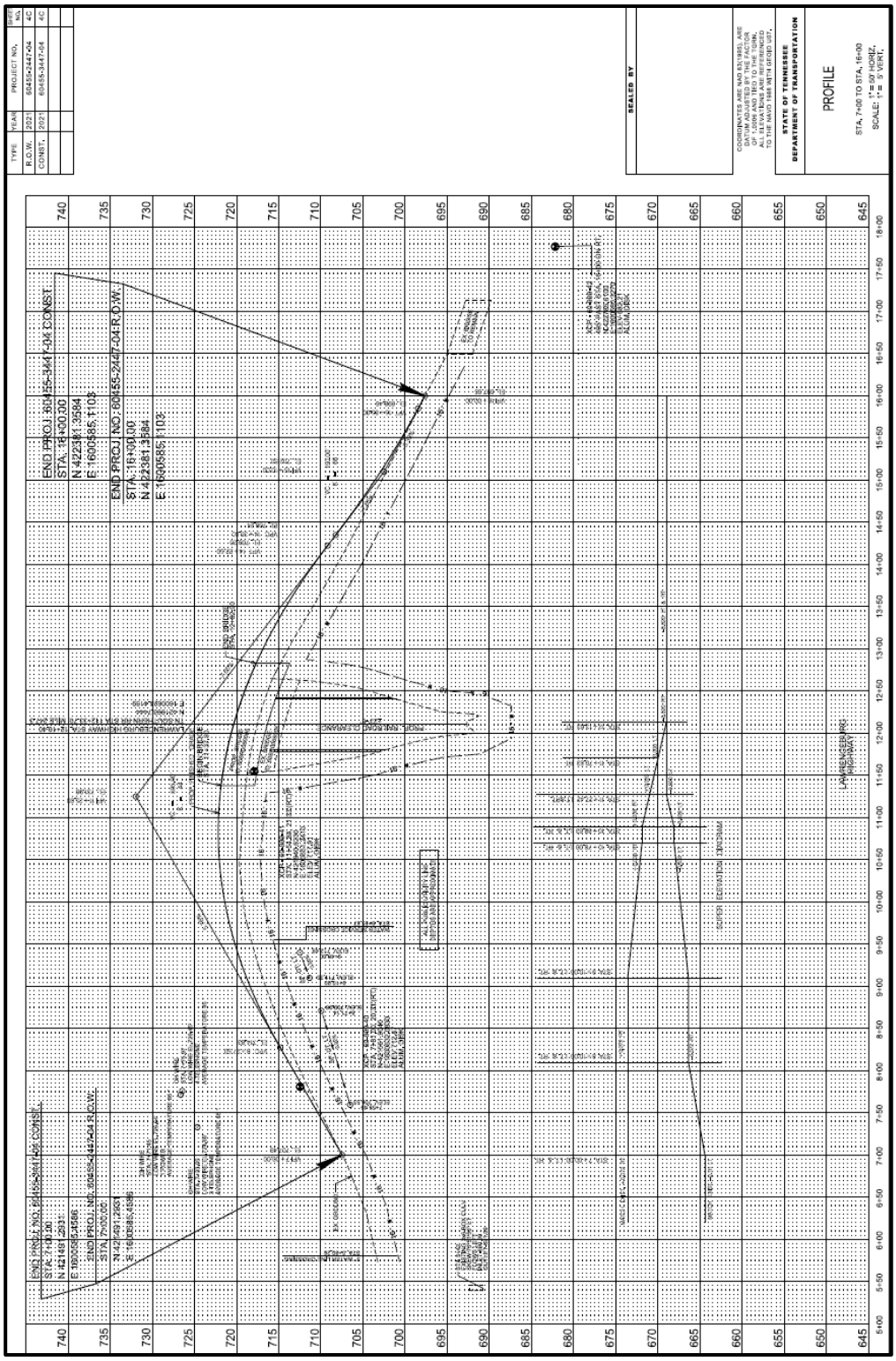

Figure 4-21
Grade Separated Easement Corridor Profile

4-604.00 AT-GRADE RAILROAD CROSSINGS

This section should only be referenced for at-grade crossings of the Railroad's corridor. All other crossing types are covered in previous or subsequent sections. See *Figure 4-22, Example of an At-Grade Railroad Crossing*.

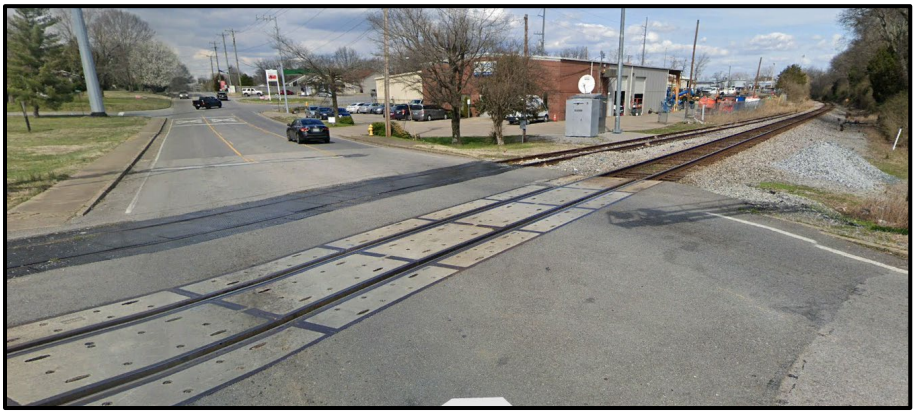

Figure 4-22
Example of an At-Grade Railroad Crossing

4-604.01 GENERAL DESIGN CRITERIA FOR AT-GRADE CROSSINGS

- If designing a crossing or designing up to or adjacent to a CSXT or Norfolk Southern Railway Company, use their published Public Projects Manual. If a copy of the Public Projects Manual is needed, please contact the State Railroad Coordinator for the latest version. For all other railroads, the publications of CSXT and Norfolk Southern Railway Company are a great rule of thumb to follow. If additional guidance is required, use the AREMA standards or contact the State Railroad Coordinator to determine if the railroad entity has some general standards.
- Starting with the Construction plans indicate where modifications have been made.
- At-grade crossing(s) can be impacted by a project in two manners:
    - The State Route or local road for which plans are being developed either directly intersects the railroad's corridor on the same plane or,
    - The railroad corridor runs parallel with the State Route or local street and one or more crossings are impacted by the zone of influence of the project.

4-604.02 PRELIMINARY PLANS FOR PROJECTS CONTAINING AT-GRADE CROSSING(S)

All Designers shall prepare plans for at-grade railroad crossings using the following design criteria where feasible:

Alignment: Ninety (90) degrees to the railroad desirable, seventy (70) degrees minimum, with good sight distance in both directions.

English **Revised:**

Grade: Profile adjustments to the at-grade railroad crossings should be avoided unless absolutely necessary per current design standards. Before designing profile modifications, the Designer should consult the State Railroad Coordinator to determine if the profile modification is necessary. The State Railroad Coordinator will consult with the TDOT Multimodal Rail Safety Office (TDOT.MultiModalAdmin@tn.gov) and the involved Railroad(s) to help make a determination as to whether or not the profile warrants adjustment. Once a determination has been made, the State Railroad Coordinator will inform the Designer.

If, in the rare occasion it is deemed necessary to change the profile of an at-grade crossing, use the following general guidelines:

Where crossings involve two (2) or more tracks, the top of rails for all tracks shall be brought to the same plane where practicable. The surface of the highway shall be in the same plane as the top of rails for a distance of two (2) feet outside of rails for either multiple or single-track crossings. The top of rail plane shall be connected with the grade line of the highway each way by vertical curves (if necessary) of such length as is required to provide riding conditions and sight distances normally applied to the highway under consideration. It is desirable that the surface of the roadway be not more than three (3) inches higher or six (6) inches lower than the top of the nearest rail at a point thirty (30) feet from the rail measured at right angles, thereto, unless track superelevation dictates otherwise. Desirable grades on the tangent immediately adjacent to the grade across the rails of the track shall be 5% or less but no steeper than 7%.

Curbs: Proposed roadway curbs and/or curb and gutter shall terminate no less than thirteen (13) feet from the centerline of the nearest tracks for at-grade railroad crossings.

The following information must be on the Line and Grade plans. See Figures 4-30 through 4-35.

a. On the Title sheet, provide a call out with the Railroad entity, the DOT crossing number, the type of crossing (at-grade), and the railroad milepost for each crossing impacted by the project.
b. Show the centerline of track(s) on both the profile and plan views.
c. Show and Label the Railroad Right-of-Way as “ENTITY R.O.W.” on both the profile and plan views.
d. Dimension the Railroad Right-of-Way from the centerline of track(s) to the Right-of-Way limits and in total.

e. Provide a call-out at the intersection of the centerline of track(s) and the centerline of the route that includes the DOT crossing number and the railroad milepost. If this information is needed, please contact the State Railroad Coordinator.
f. Location of the railroad milepost on Railroad Right-of-Way.
g. Existing and proposed drainage structures.
h. Railroad station at highway-railroad intersection, or distance in feet from nearest railroad milepost.

The roadway Right-of-Way lines will terminate at the railroad Right-of-Way as shown in *Figure 4-23, Method for Showing Right-of-Way at an At-Grade Railroad Crossing*.

Bearings and distances will be provided along both the Railroad Right-of-Way and the proposed roadway Right-of-Way lines. The distance to the nearest milepost will be shown at the intersection of the centerlines of the roadway and railroad.

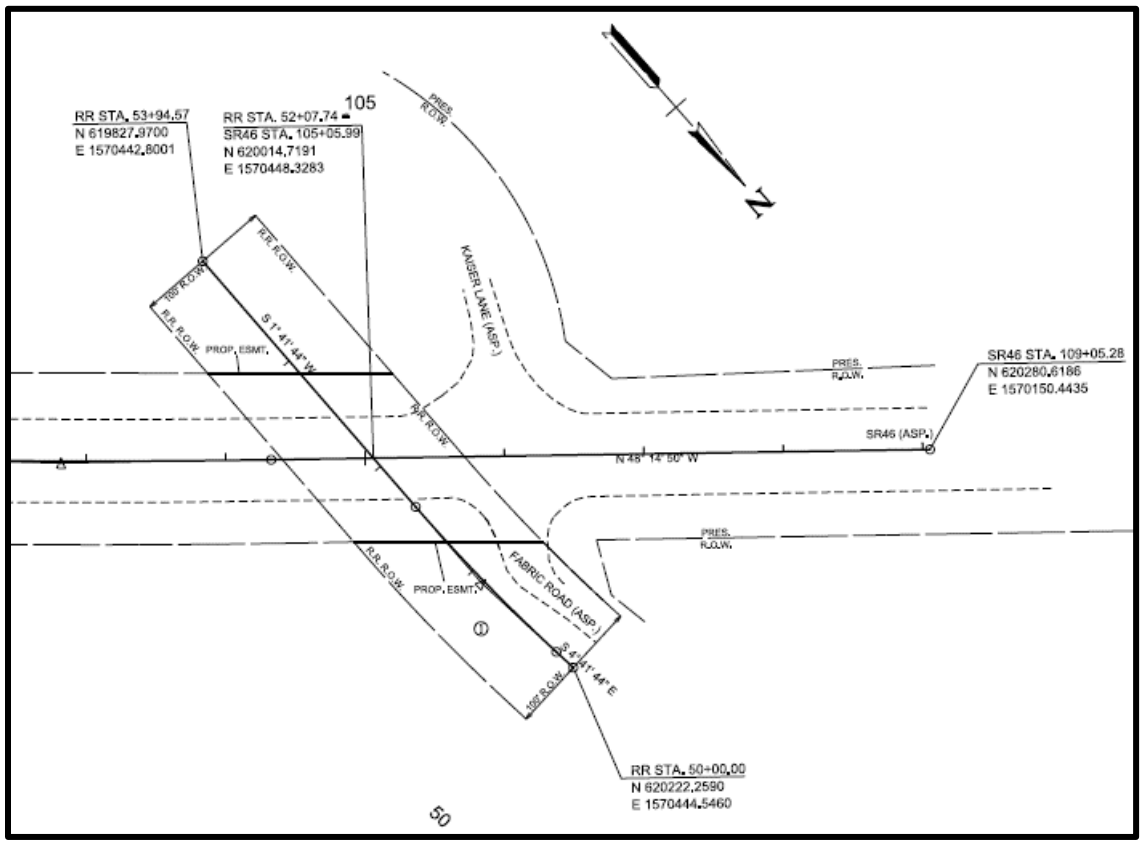

Figure 4-23
Method for Showing Right-of-Way at an At-Grade Railroad Crossing

See Chapter 4-602.03 through Chapter 4-602.07 and Figure 4-24 through 4-30 for how each sheet should look when a project contains an at grade railroad crossing for an Easement property type.

English **Revised:**

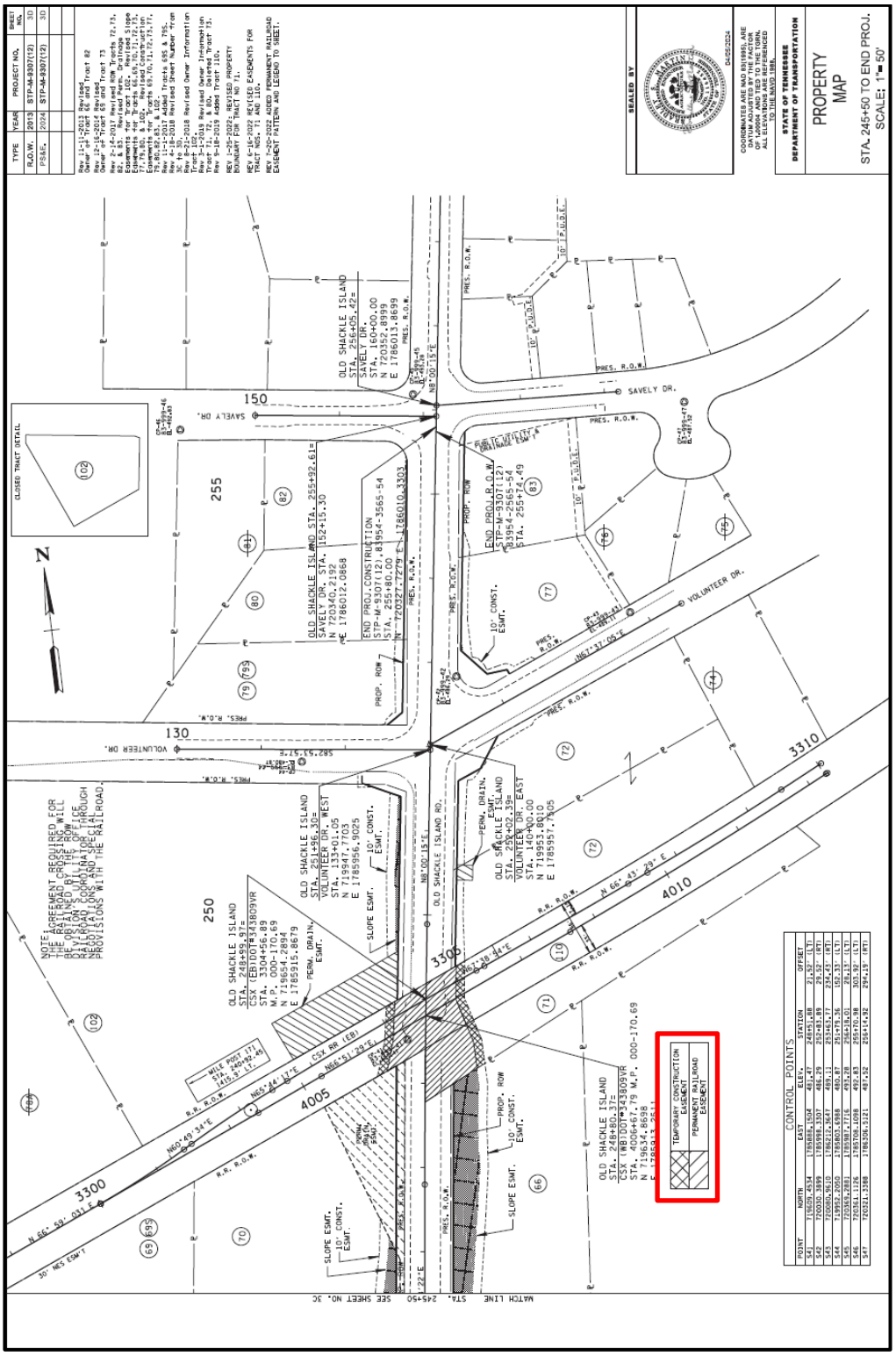

Figure 4-24
At-Grade Easement Corridor Property Map

English **Revised:**

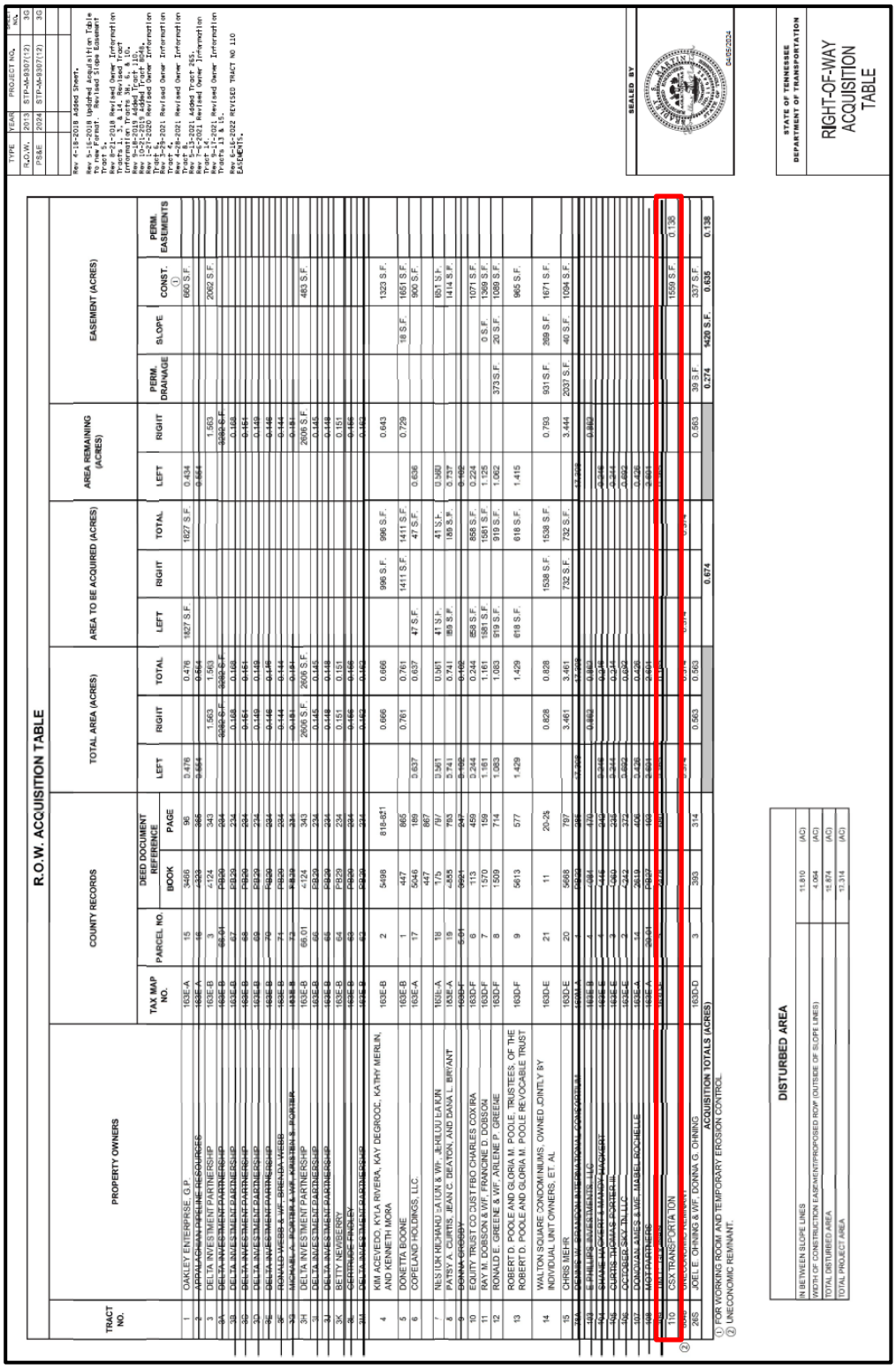

Figure 4-25
At-Grade Easement Corridor R.O.W. Acquisition Table

English **Revised:**

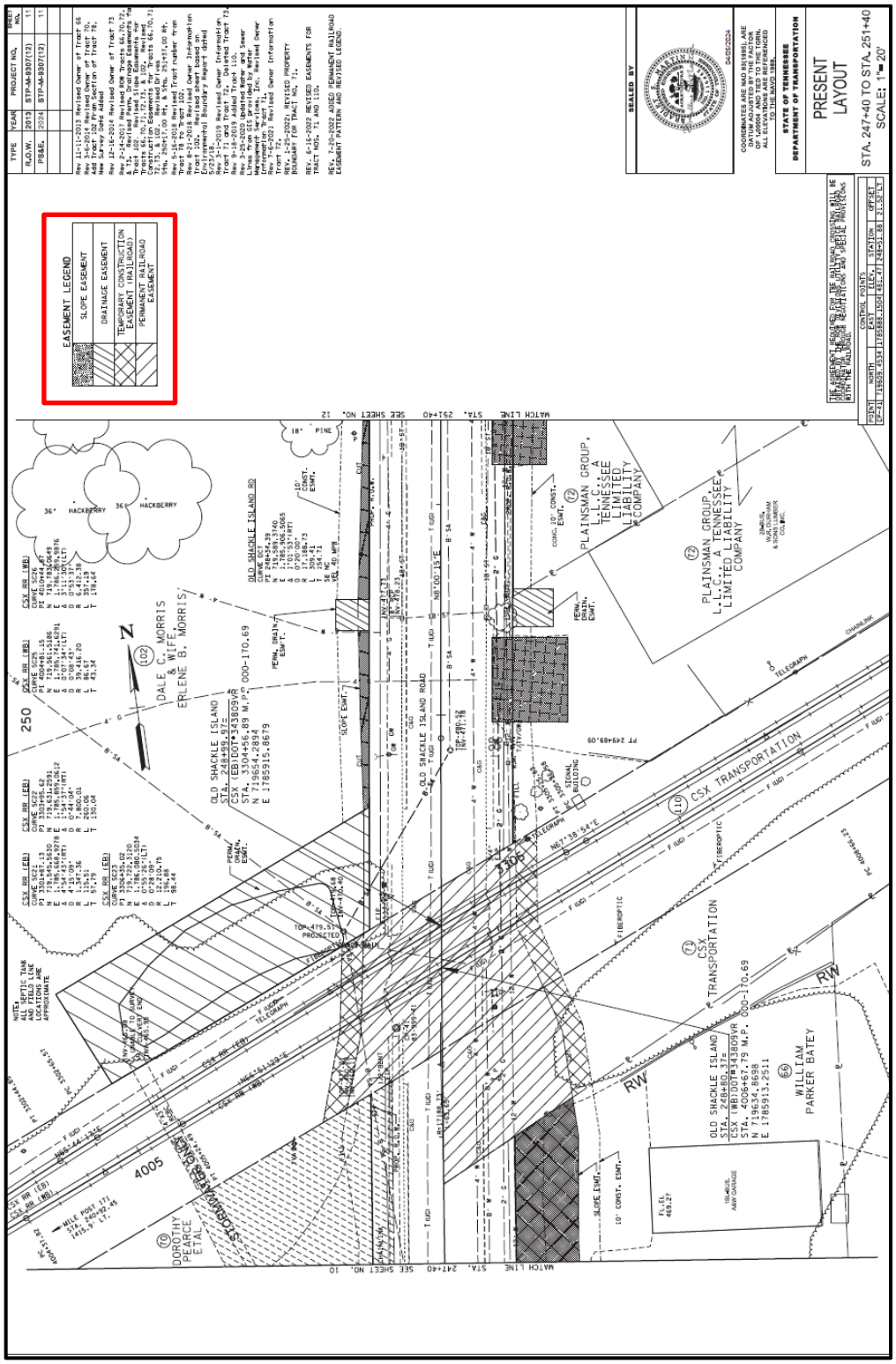

Figure 4-26
At-Grade Easement Corridor Present Layout

English **Revised:**

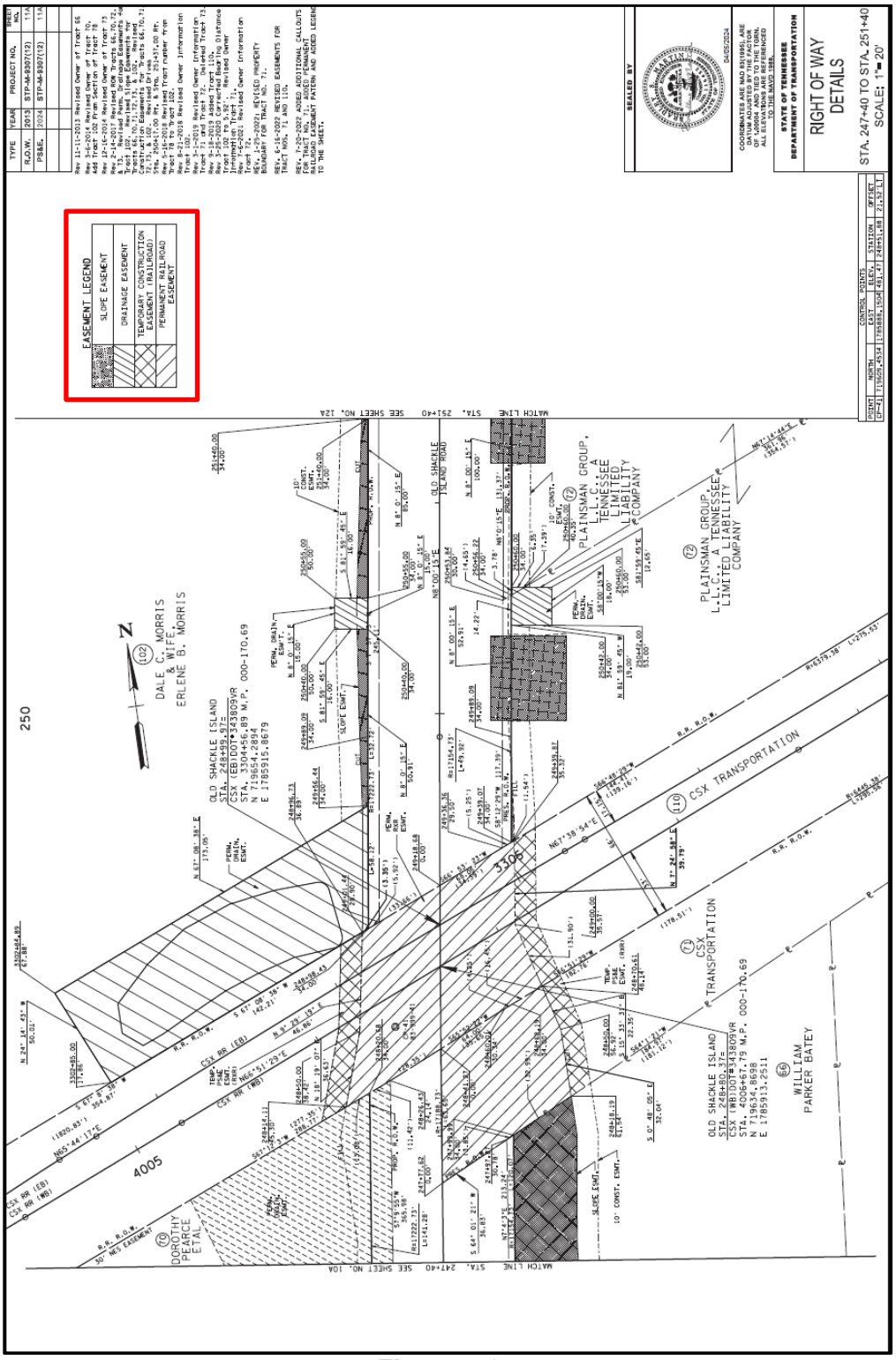

Figure 4-27
At-Grade Easement Corridor R.O.W. Details (A)

English **Revised:**

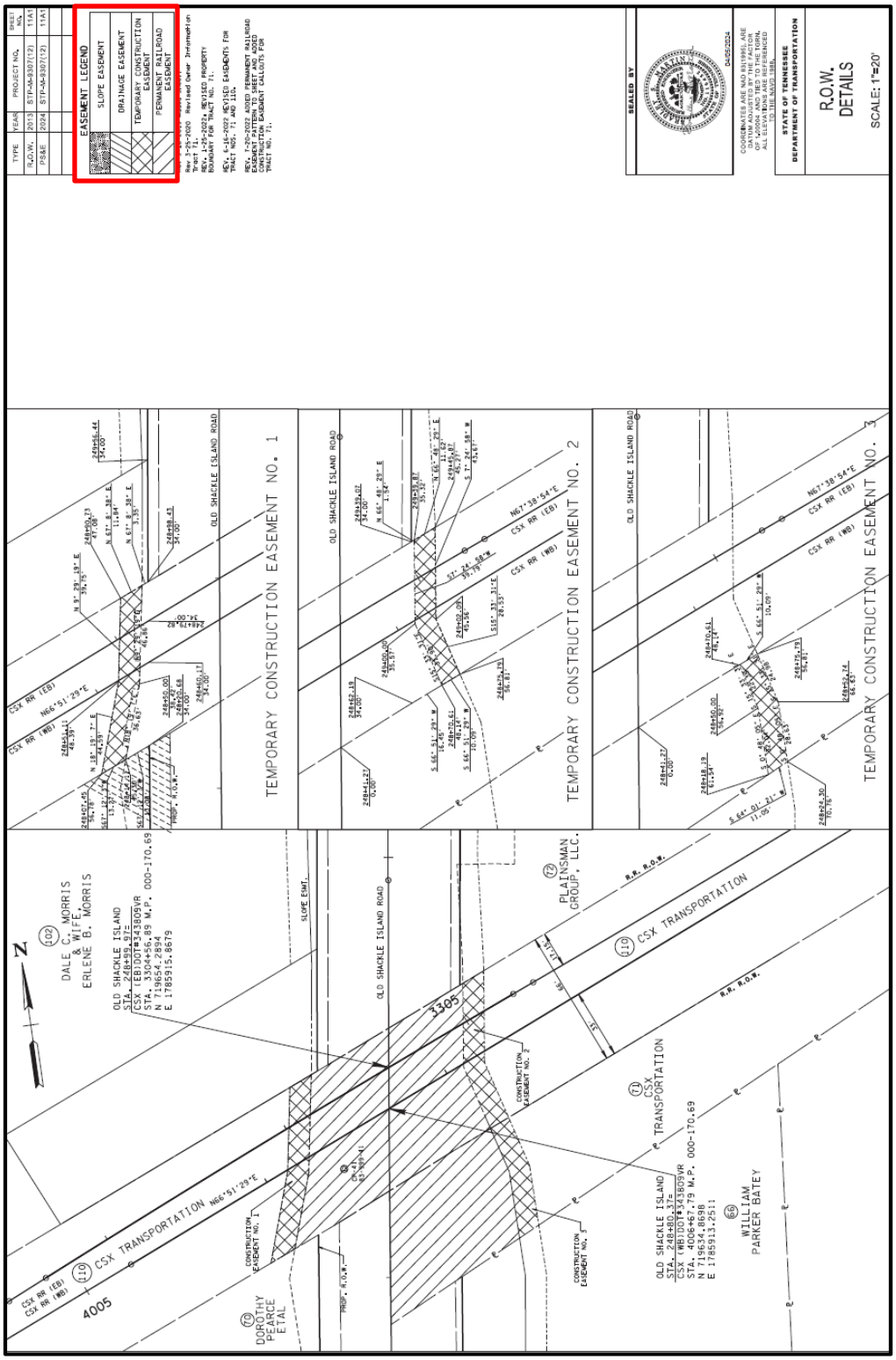

Figure 4-28
At-Grade Easement Corridor R.O.W. Details (B)

English **Revised:**

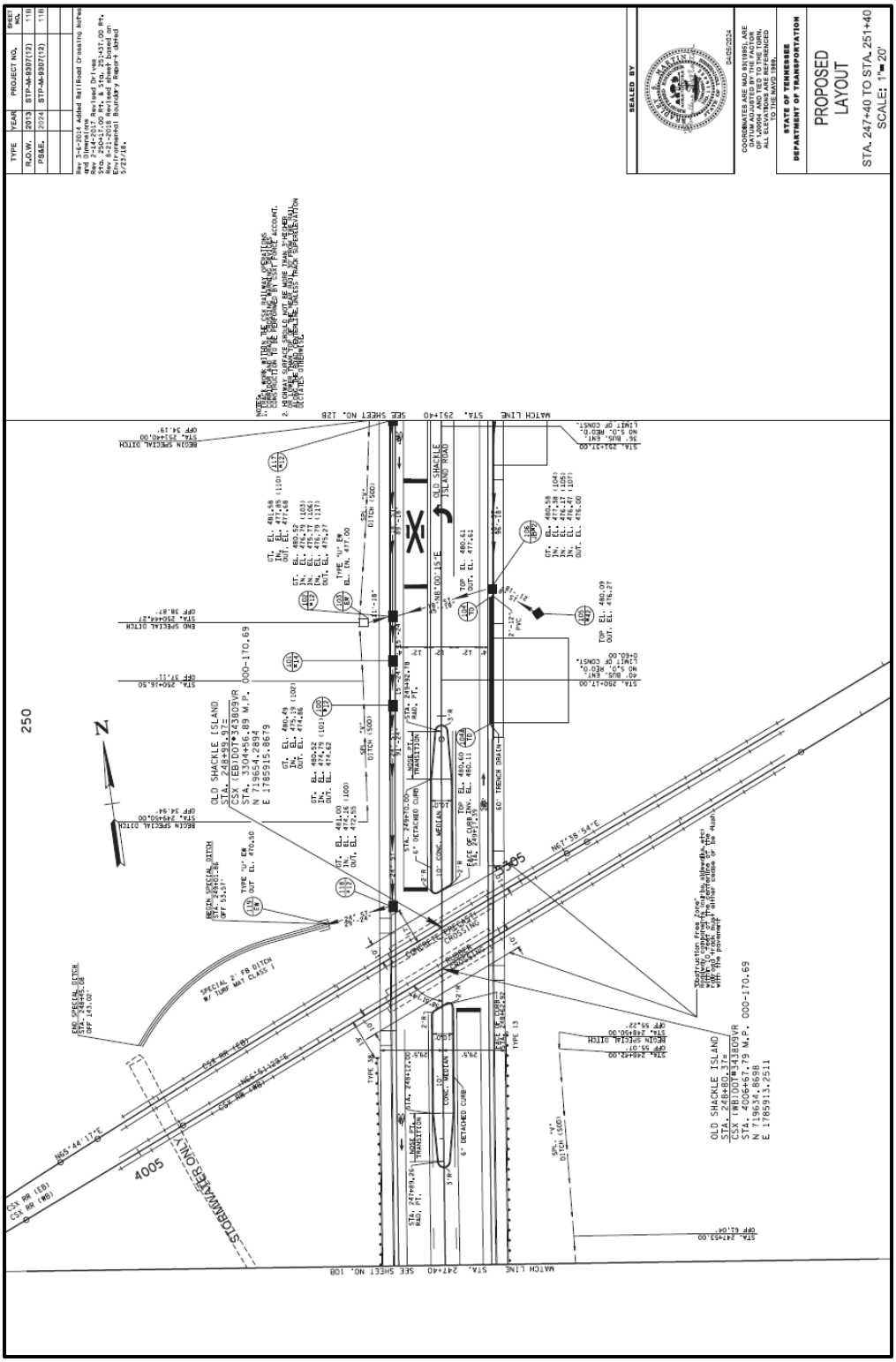

Figure 4-29
At-Grade Easement Corridor Proposed Layout

English **Revised:**

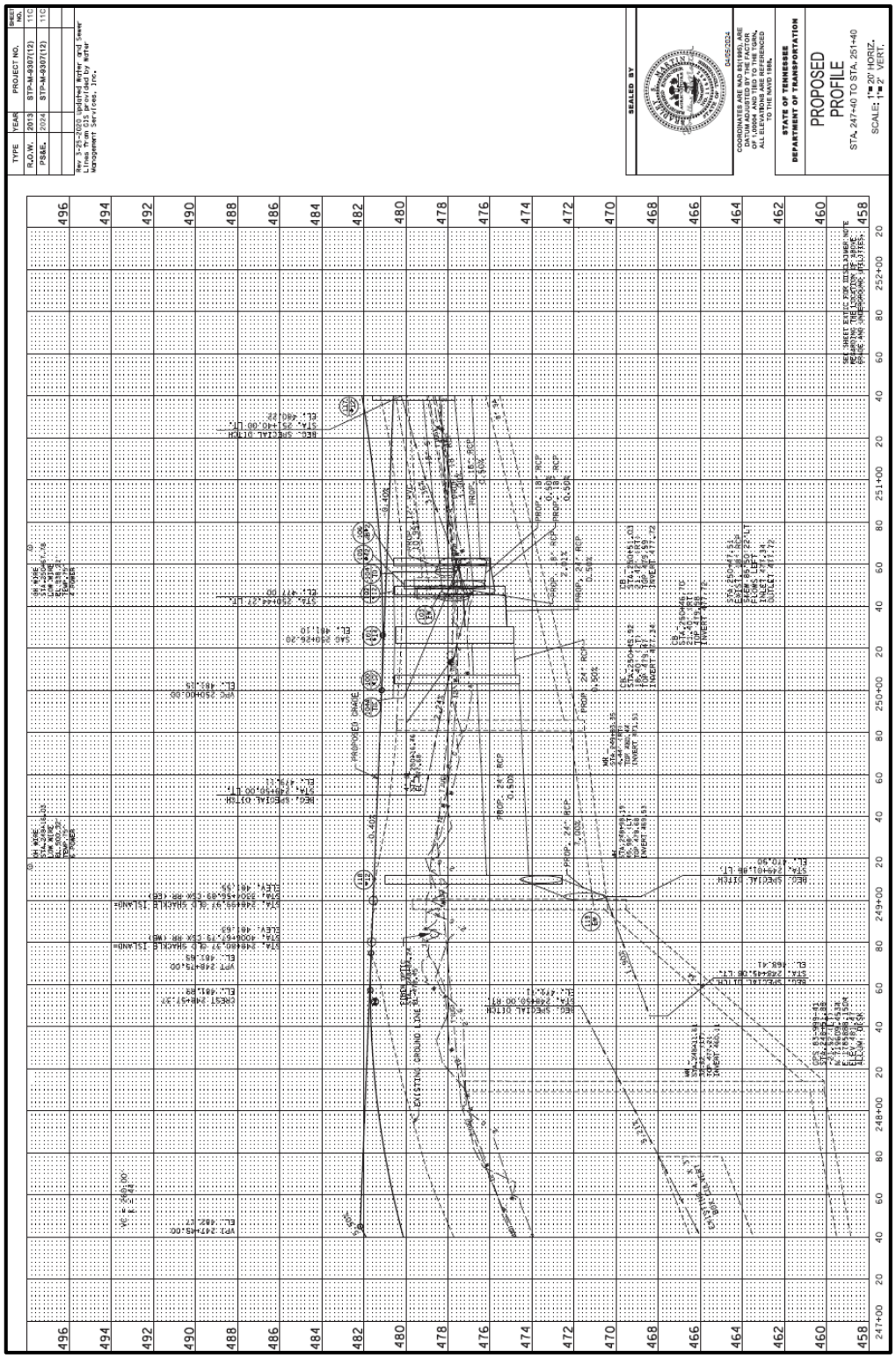

Figure 4-30
At-Grade Easement Corridor Proposed Profile

4-605.00 PARALLEL ENCROACHMENT OF RAILROAD RIGHT-OF-WAY

This section should only be referenced for parallel encroachments of the Railroad's Right-of-Way. This is when the State Route or Interstate runs parallel with the Railroad's corridor for a distance and construction limits encroach on the Railroad Right-of-Way. All other crossing types are covered in previous sections of these guidelines. See *Figure 4-31, Example of Parallel Encroachment*.

Figure 4-31
Example of Parallel Encroachment

4-605.01 GENERAL DESIGN CRITERIA FOR PARALLEL ENCROACHMENT PROJECTS

- If designing for a project which runs parallel with CSXT or Norfolk Southern Railway Company, use their published Public Projects Manual. If a copy of the Public Projects Manual is needed, please contact the State Railroad Coordinator for the latest version. For all other Railroads, the publications of CSXT and Norfolk Southern Railway Company are a great rule of thumb to follow. If additional guidance is required, use the AREMA standards or contact the State Railroad Coordinator to determine if the Railroad entity has some general standards.
- Starting with the Construction plans, use revision markers to indicate where modifications have been made.
- At-grade crossing(s) can be impacted by this project type in the following manner:
    - The proposed project runs parallel with the State Route or local street and one or more crossings are impacted by the zone of influence of the project.

4-605.02 PRELIMINARY PLANS FOR PROJECTS CONTAINING PARALLEL ENCROACHMENT

English **Revised:**

Refer to Figure 4-32, Encroachment is Parallel to the Railroad when the proposed roadway runs parallel to the railroad corridor and construction limits encroach on the railroad Right-of-Way. When constructing a roadway parallel to a track roadbed, if work is required inside the Railroad Right-of-Way, the preferred construction limit (toe of slope) shall be no closer than fifty (50) feet from the centerline of the nearest track.

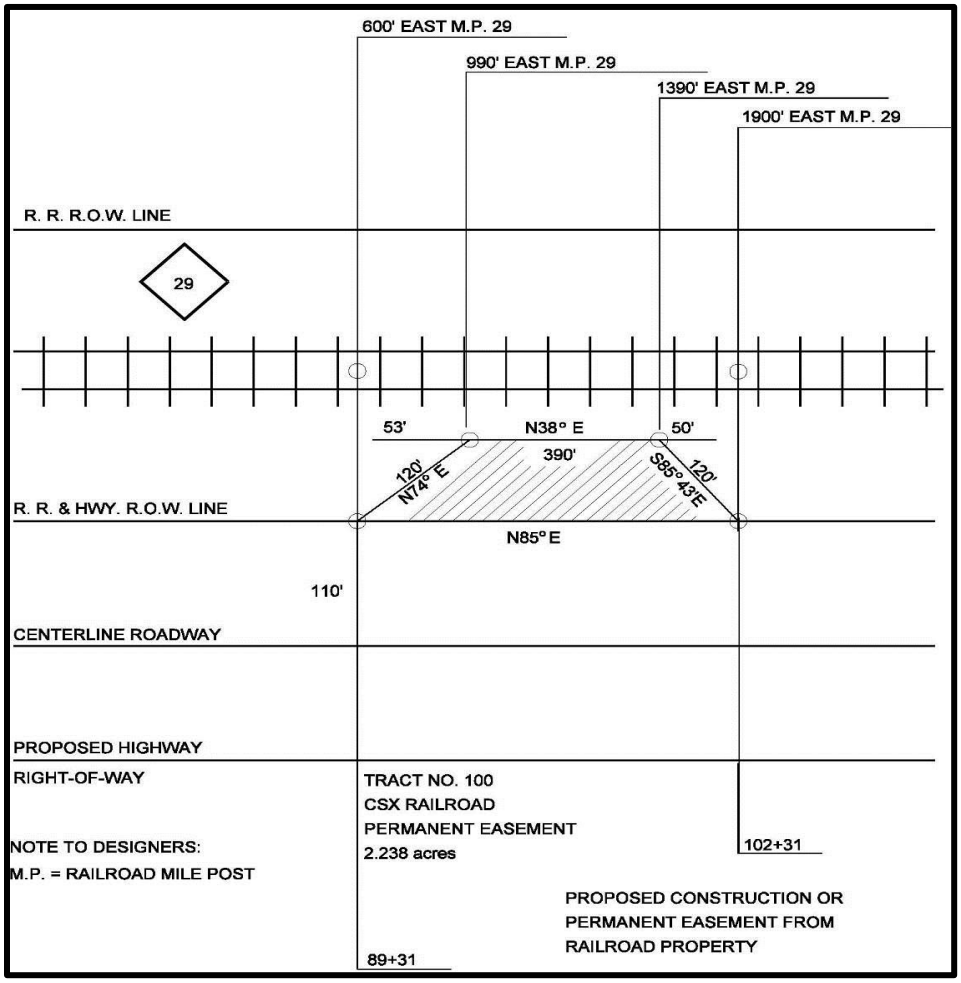

Figure 4-32
Encroachment is Parallel to the Railroad

If it is necessary to encroach nearer than the fifty (50) feet described above, a set of Preliminary plans, including cross-sections, showing how the proposed work ties to the existing railroad roadbed, are to be sent to the State Railroad Coordinator for review, comment, and submittal to the railroad. An example for Designers working inside Railroad Right-of-Way is shown in *Figure 4-33, Minimum Requirement for Railroad Typical Roadbed Section*.

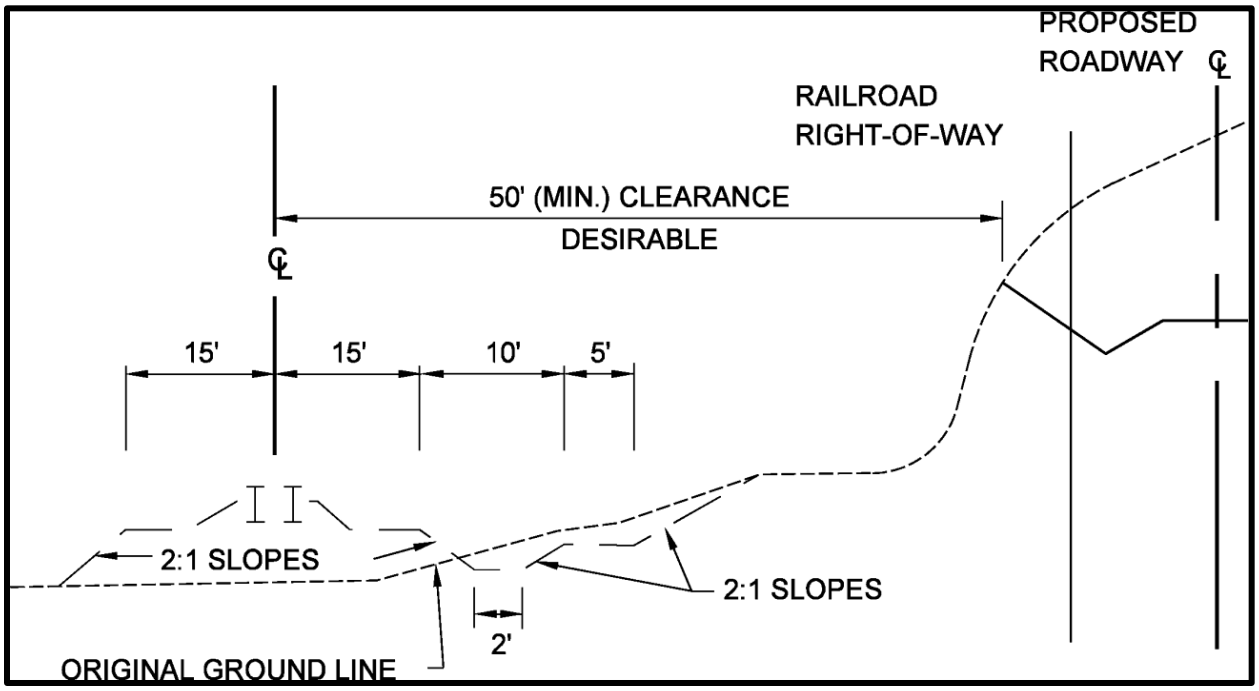

Figure 4-33
Minimum Requirement for Railroad Typical Roadbed Section

See Chapter 4-602.03 through Chapter 4-602.07 and Figure 4-34 through Figure 4-39 for how each sheet should look when a project contains a Parallel Encroachment of a Railroad for an Easement property type.

English **Revised:**

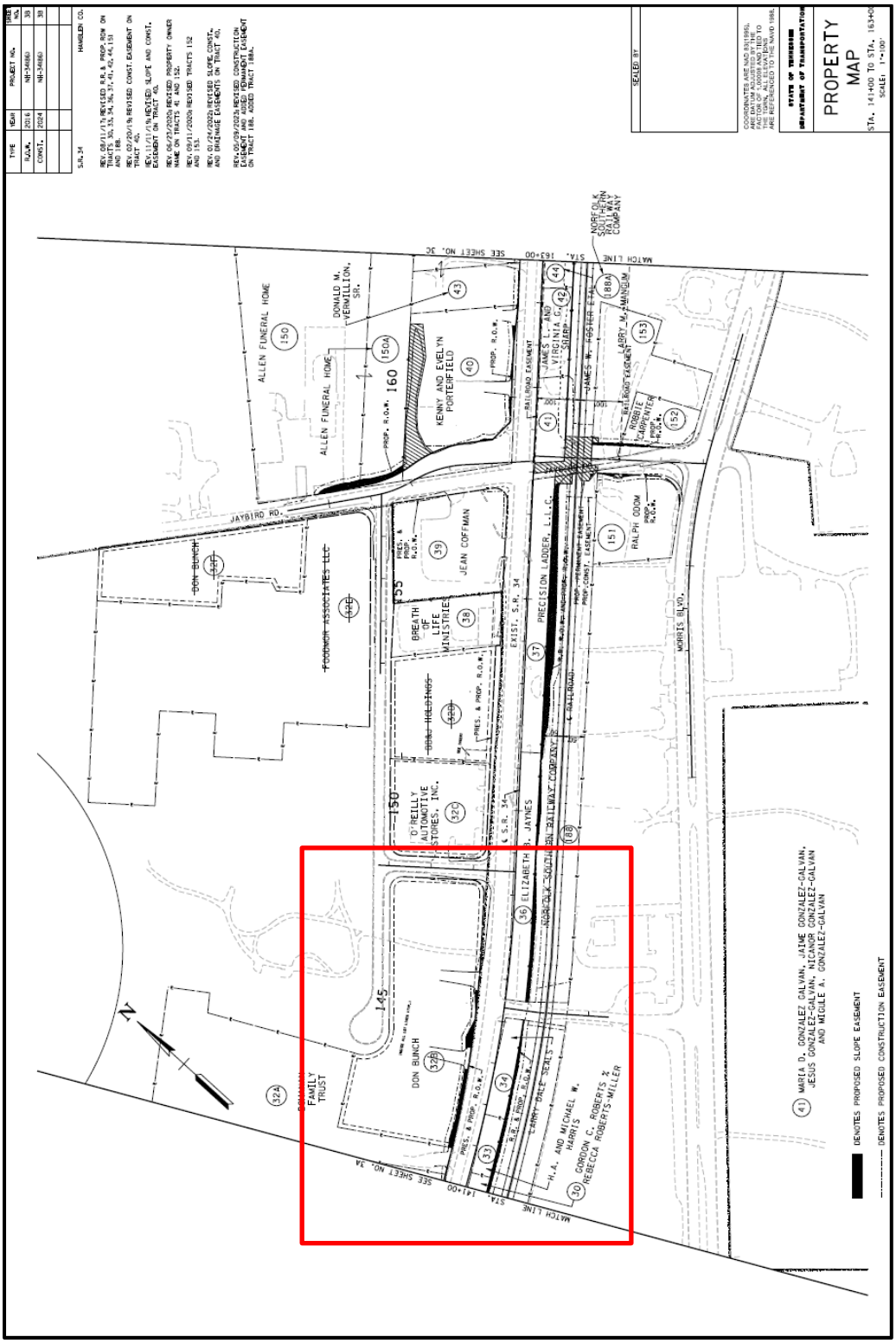

Figure 4-34
Parallel Encroachment Easement Corridor Property Map

English **Revised:**

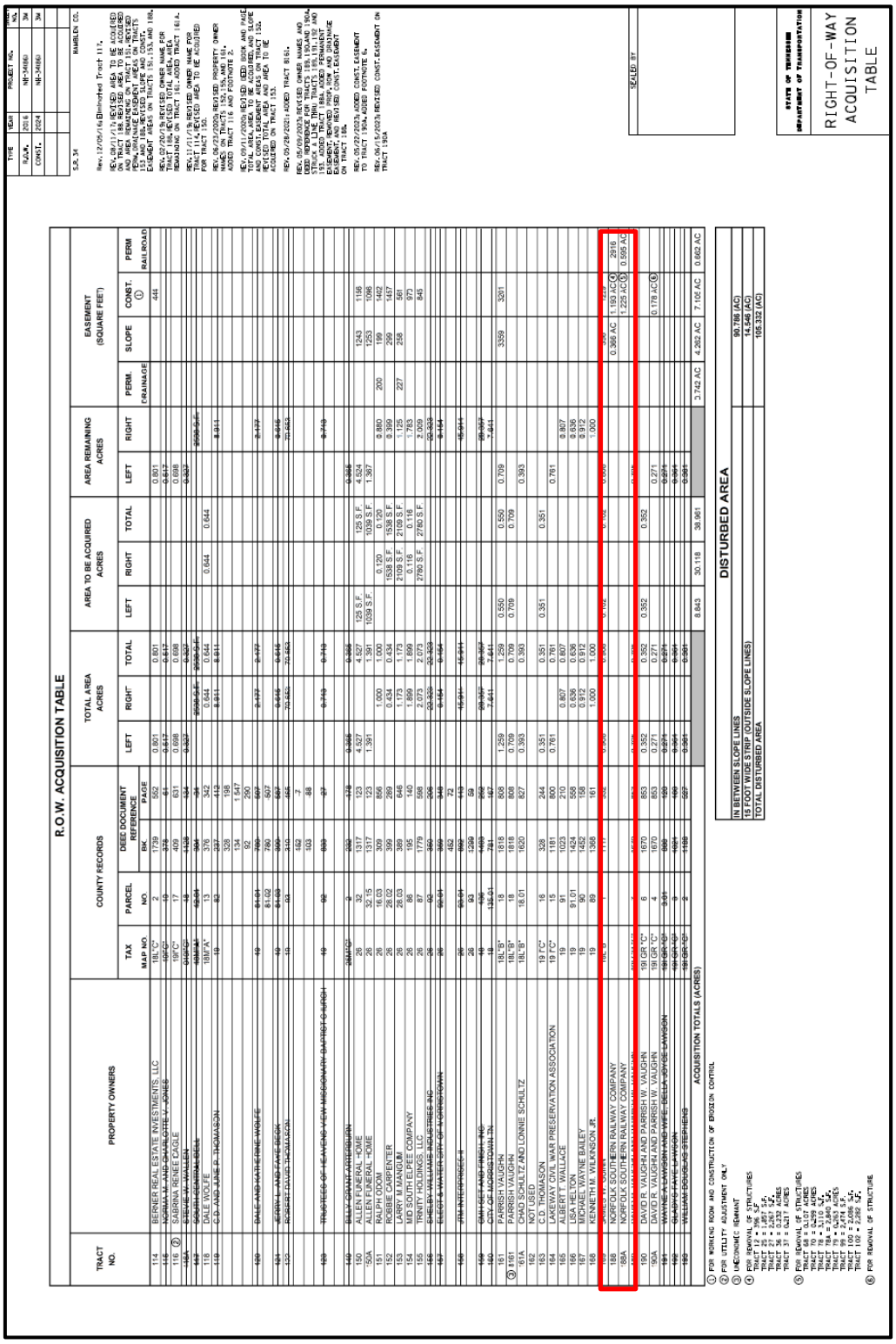

Figure 4-35
Parallel Encroachment Easement Corridor R.O.W. Acquisition Table

English **Revised:**

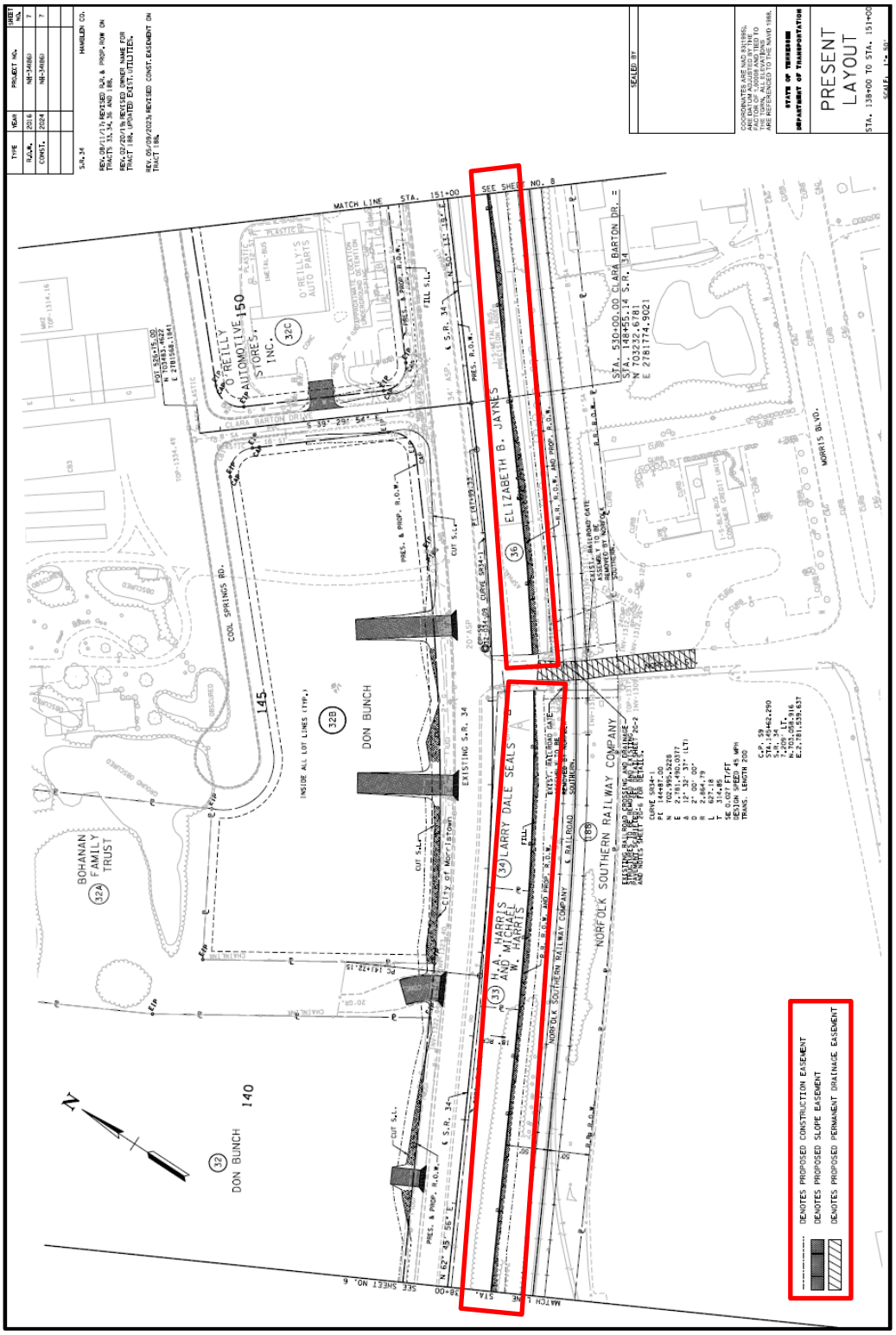

Figure 4-36
Parallel Encroachment Easement Corridor Present Layout

English **Revised:**

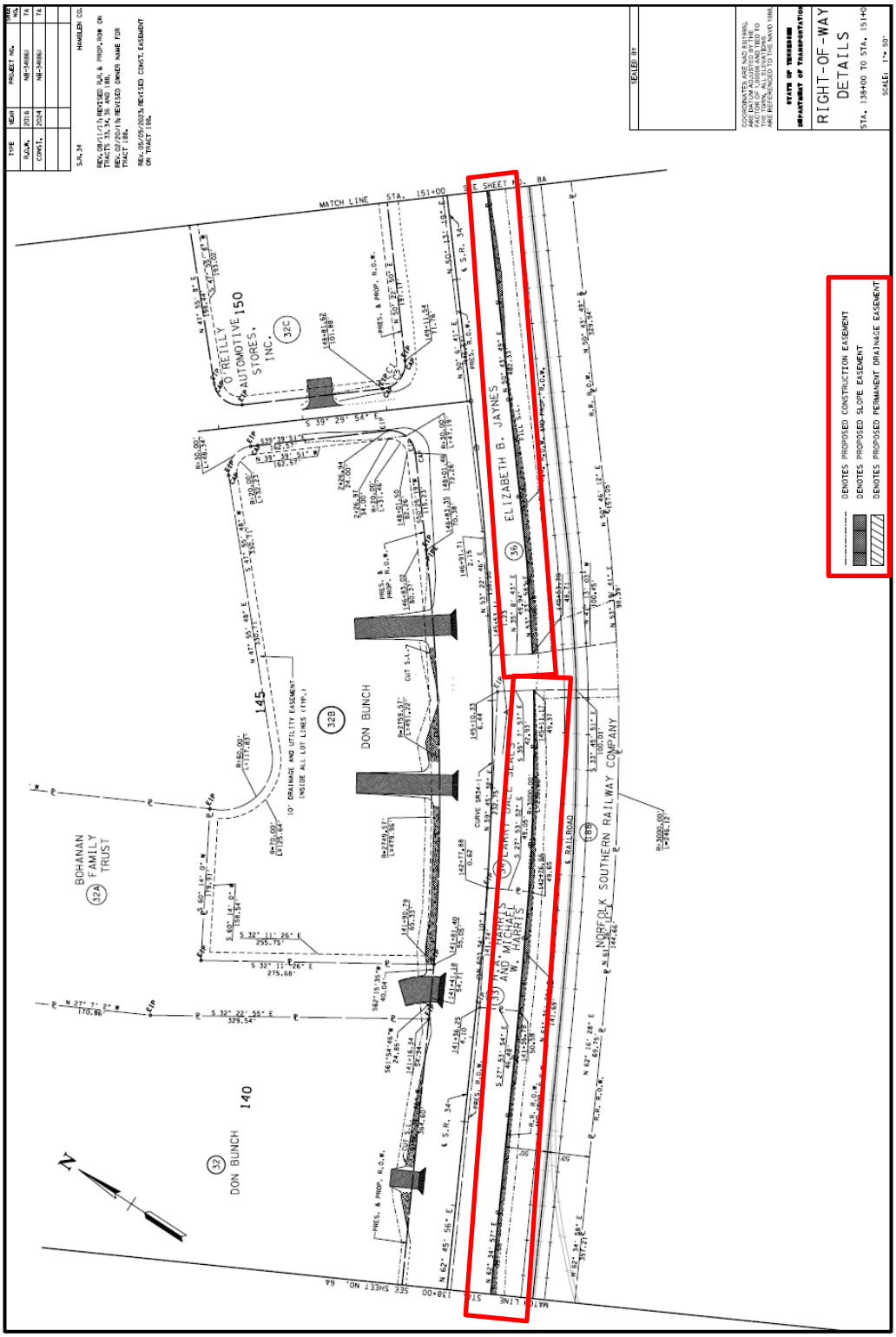

Figure 4-37
Parallel Encroachment Easement Corridor R.O.W. Details

English **Revised:**

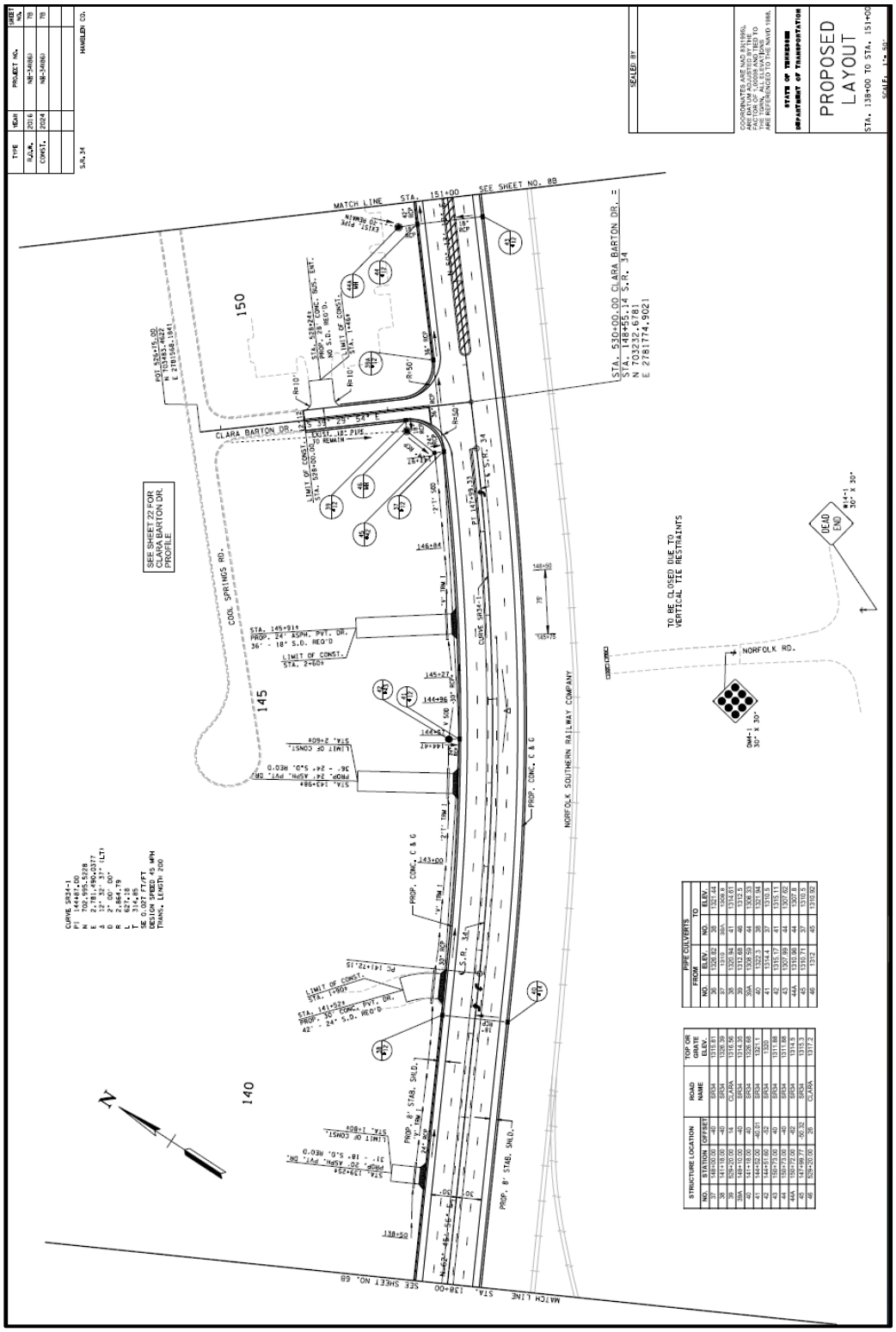

Figure 4-38
Parallel Encroachment Easement Corridor Proposed Layout

English **Revised:**

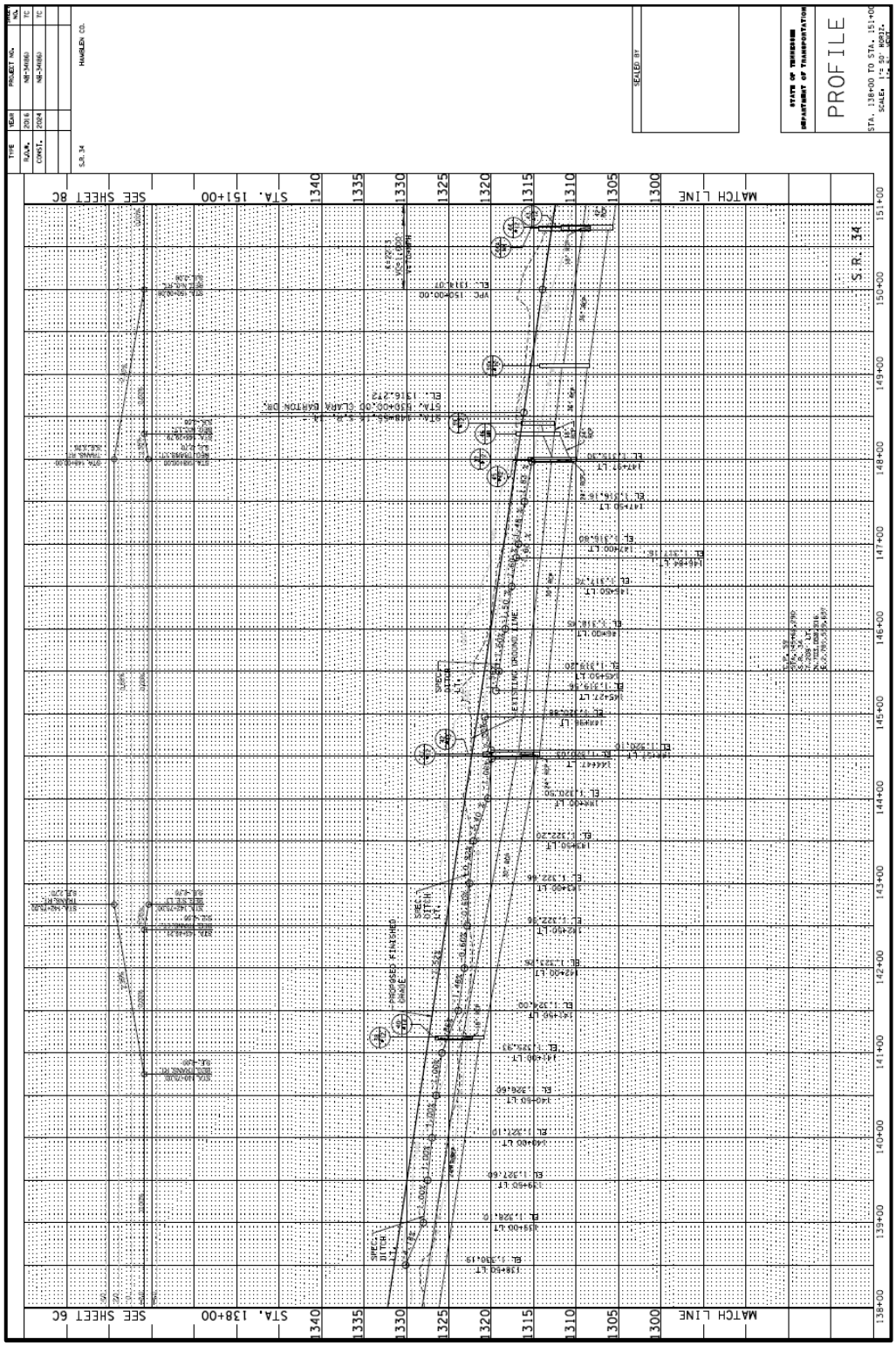

Figure 4-39
Parallel Encroachment Easement Corridor Proposed Profile

4-606.00 SPECIAL CASES

4-606.01 NORFOLK SOUTHERN RAILWAY COMPANY

REAL ESTATE ENGINEERING PLAT AND LEGAL DESCRIPTION REQUIREMENT

The Applicant must submit the following documents to **Norfolk Southern Railway Company**, or its appropriate subsidiary for review and approval:

1. The survey plat drawing must be presented in a recordable PDF format (Proper size, statements, medium, etc.) for the county in which the survey is conducted. The document must be sufficient for use as a conveyance document.
    a) The final survey plat submitted must contain a signed Surveyor's stamp. The surveyor's name, address and telephone number shall be printed on the plat along with the legal description in a legible manner.
    b) The surveyor must also submit a survey plat in digital format (AutoCAD or MicroStation convertible file). The CAD drawing must be translated and rotated according to the appropriate State Plane Coordinate Zone. Units of the CAD file shall be US Survey Feet. All adjoining property lines must be included on the CAD file.
2. A legal description must be submitted in PDF format and Microsoft Office Word format unless extenuating circumstances prevent the usage of that Word processing program for production of the legal description. The legal description may be used within a legal document or as referenced material. The legal description must indicate a distance to the nearest railroad mile post and the direction of increasing railroad mile posts where appropriate. The "**Point of Beginning**" must be identified with the appropriate State Plane Coordinates in the legal description were permitted by the local government agency.
3. A PDF document containing the appropriate State Plane Coordinates each of the Permanent Highway Easement area corners numbered beginning with the number 1 at the "**Point of Beginning**" must be submitted.
4. Note on the plat the appropriate State Plane Coordinate for the "**Point of Beginning**" of each parcel, as well as an opposing corner, or NGS Monument with bearing and distance to **POB.**

Requirements for Survey Plat and Legal Description are as follows:

- The survey plat and legal description must be presented in a form and manner that the local government agency will accept for filing. Knowledge of what is acceptable is the sole responsibility of the surveyor.
- The required accuracy for the survey shall meet or exceed an error of the most restrictive and/or appropriate of the following requirements and must be shown on the survey plat:
    - Closure of 1:10,000 for all urban property and rural property valued at or greater than $1,000.00 per acre.
    - Closure of 1:5,000 for rural property valued at less than $1,000 per acre.

  - ALTA-ACSM Allowable Positional Tolerance for Land Title Surveys of 0.07 feet per point.
  - Or minimum state requirements for surveys to be used in the conveyance of property.
- The surveyor will obtain copies of tax maps and deeds for property to be acquired and all adjacent properties. Adjoining property owners shall be identified by name and deed reference. All adjoining property lines are to be delineated on the survey plat.
- Norfolk Southern Railway Company, or its subsidiaries, will decide whether to attach the surveyor's plat and description to the deed.
- Monuments shall not be placed on the subject parcel until the survey plat is approved by the Norfolk Southern Real Estate Engineering Department. When monuments are laced they will be placed at the corners and changes in curves (PC & PT including PCC, TS, SC, CS and ST points where applicable).
- All monuments placed along the boundary of operating Right-of-Way, property owned by Norfolk Southern and/or subsidiaries shall bear an aluminum cap, provided by Norfolk Southern Real Estate Engineering Department. Said caps shall be stamped with a provided unique identifier, along with the RLS # of the supervising surveyor. A report including point ID, Northing, Easting, and Elevation shall be submitted. Caps are designed for use with 5/8-inch rebar.
- The survey must establish railroad valuation stationing where appropriate. This stationing must be delineated on the plat. The stationing will be established using the ties marked on the valuation map provided by the Real Estate Department. A bridge abutment or other fixed object or landmark where the location is reliable and has an established railroad valuation station shown on a valuation map may also be used to establish railroad stationing.
- The survey plat shall state what monuments (culverts, headwalls, etc.) were used to establish the railroad stationing.
- The surveyor should check with NS Real Estate Engineering to ensure that the correct owning Company (Norfolk Southern Railway Company, Alabama Great Southern Railway Company, Cincinnati Southern Railway Company, Central of Georgia Railroad Company, etc.) is shown on the survey plat.

See Figure 4-40 through Figure 4-45 for more information on what the plans should look like with a Norfolk Southern Railroad.

English **Revised:**

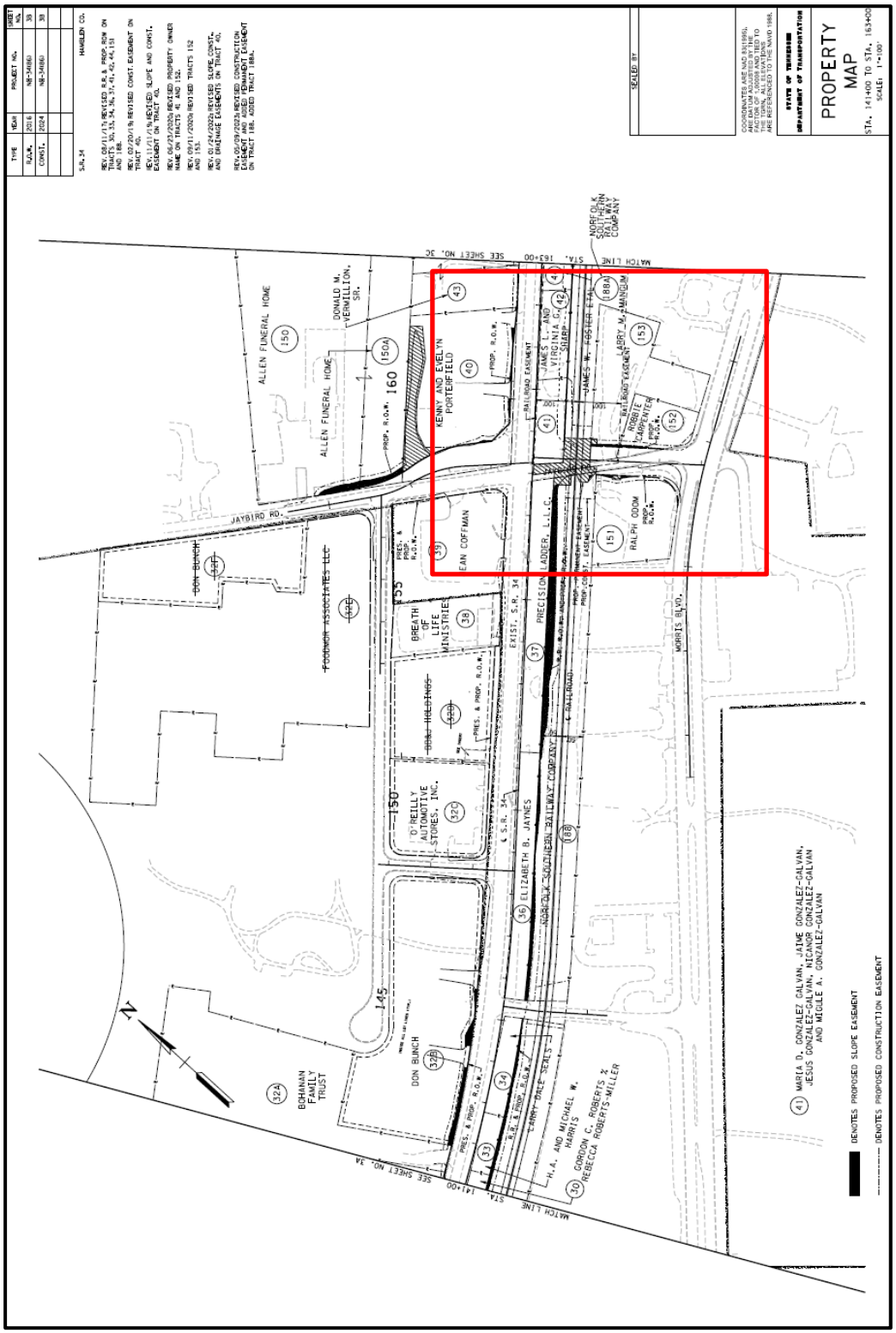

Figure 4-40
Norfolk Southern Property Map

English **Revised:**

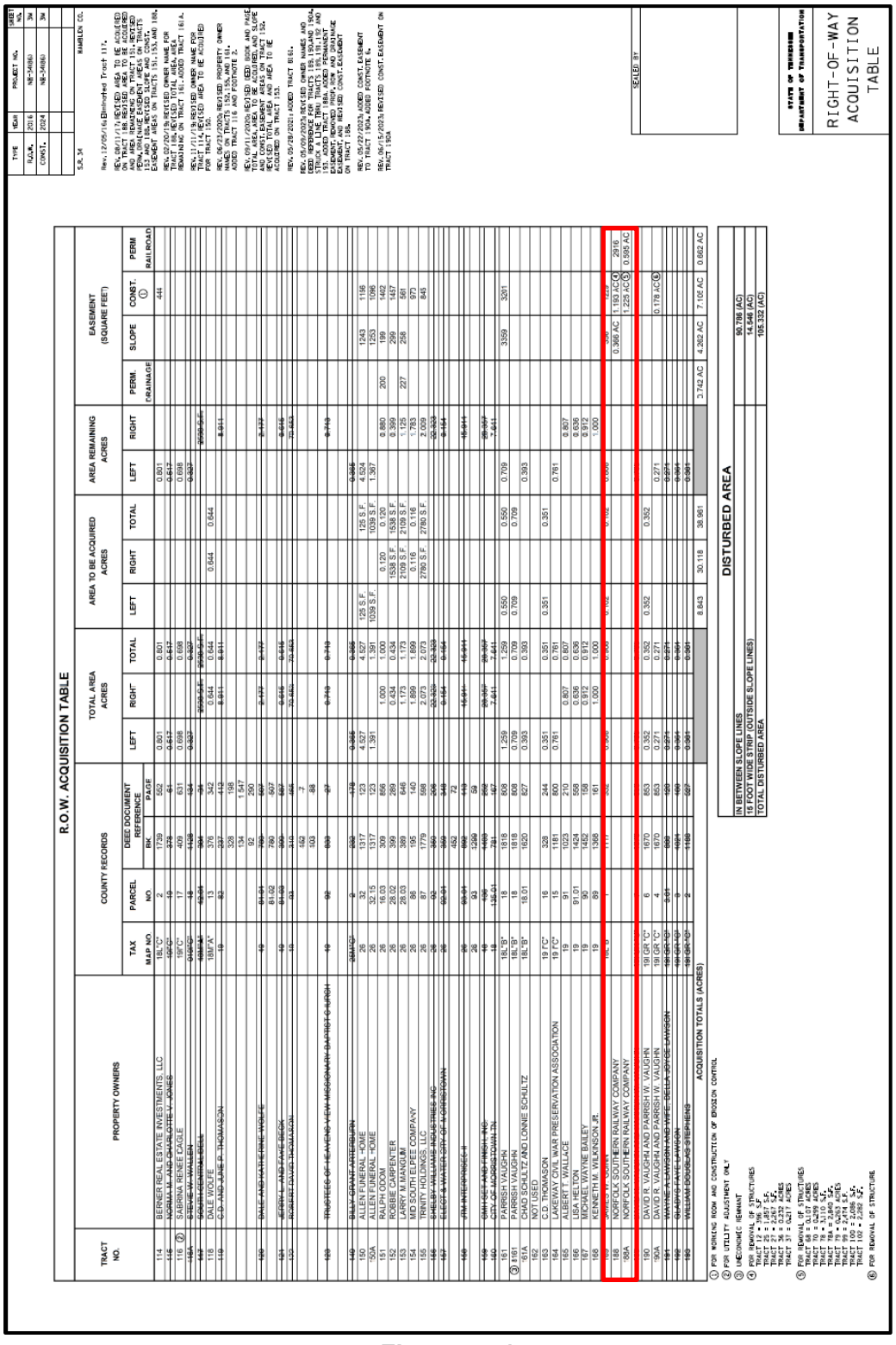

Figure 4-41
Norfolk Southern R.O.W. Acquisition Table

English **Revised:**

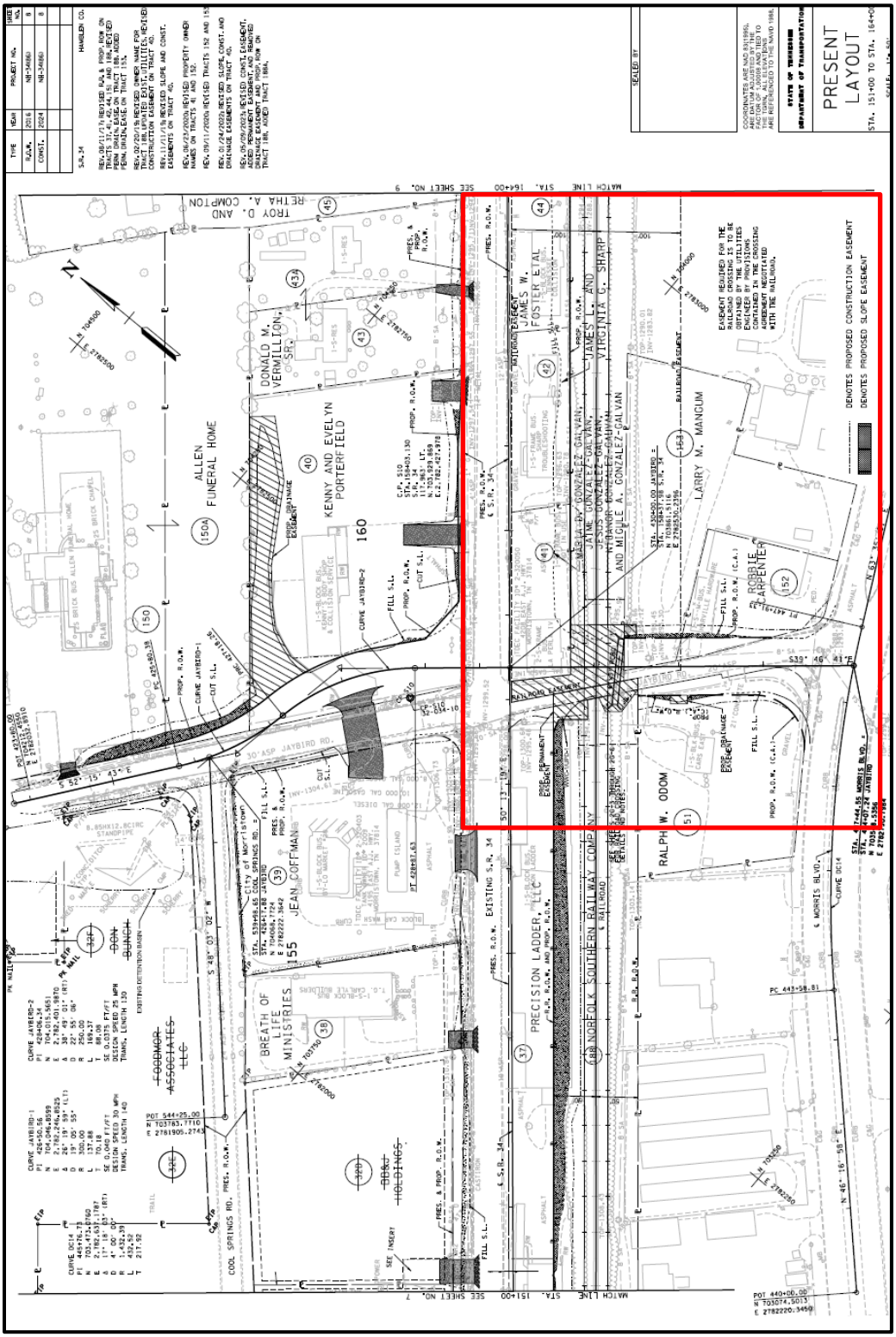

Figure 4-42
Norfolk Southern Present Layout

English **Revised:**

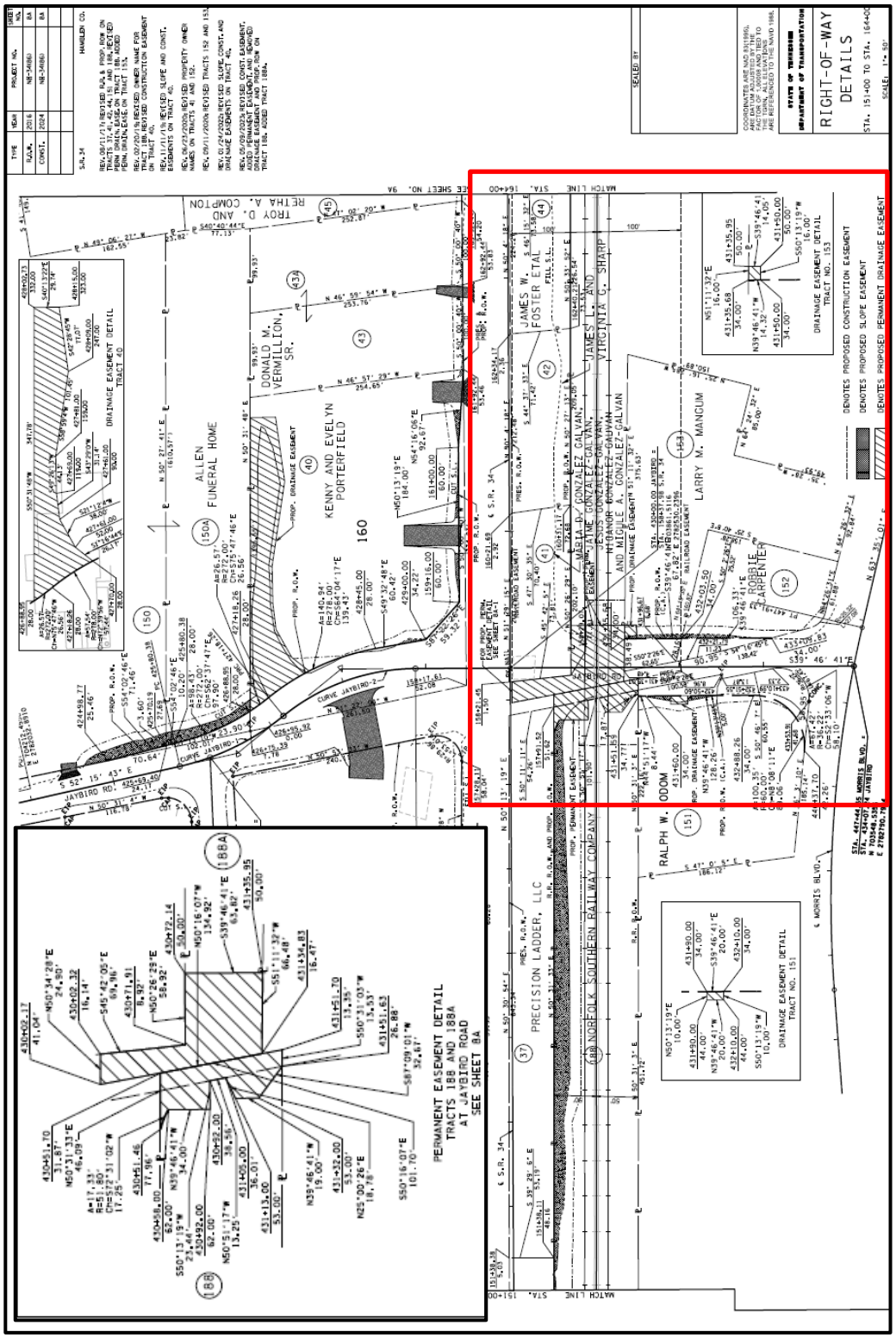

Figure 4-43
Norfolk Southern R.O.W. Details

English **Revised:**

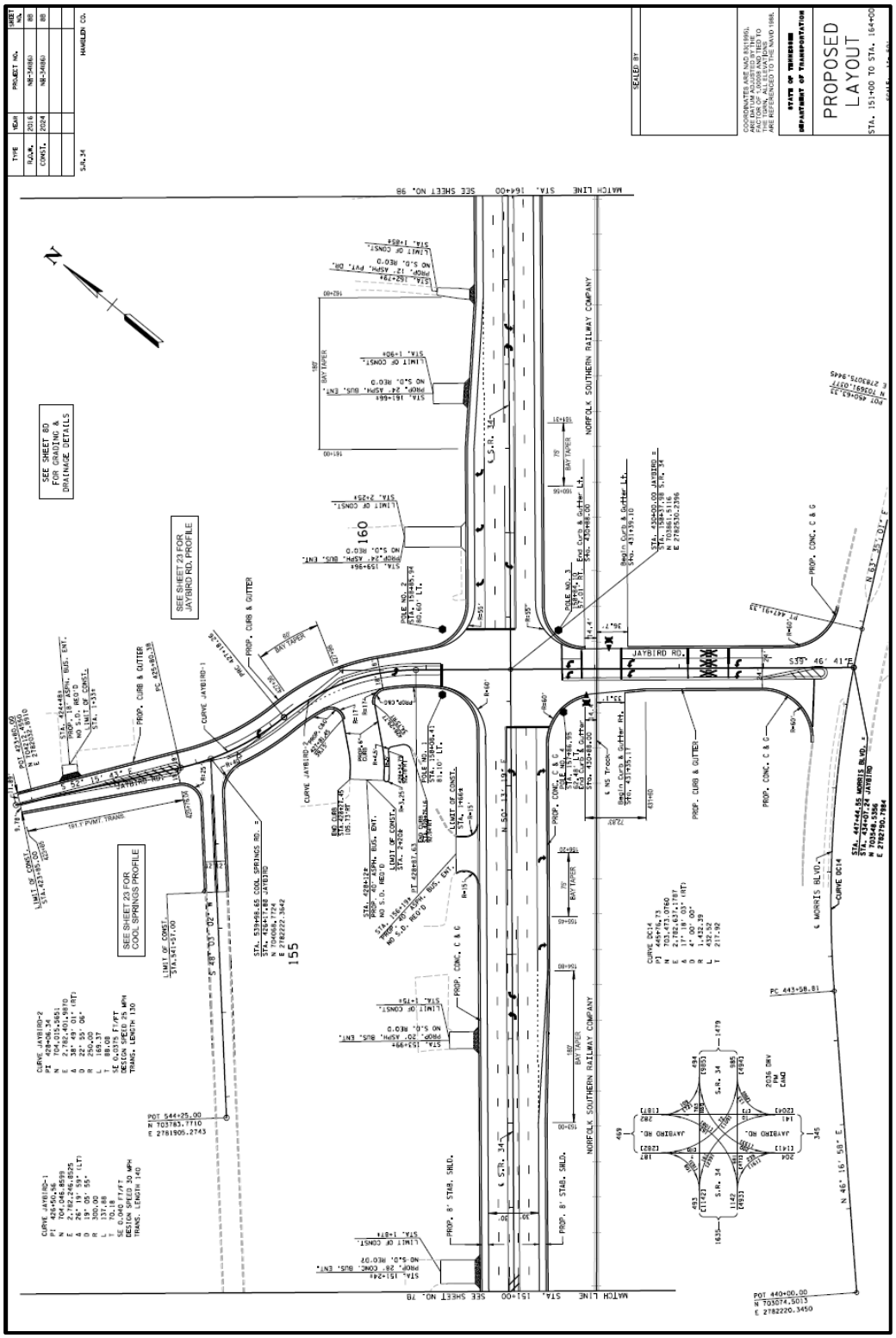

Figure 4-44
Norfolk Southern Proposed Layout

English **Revised:**

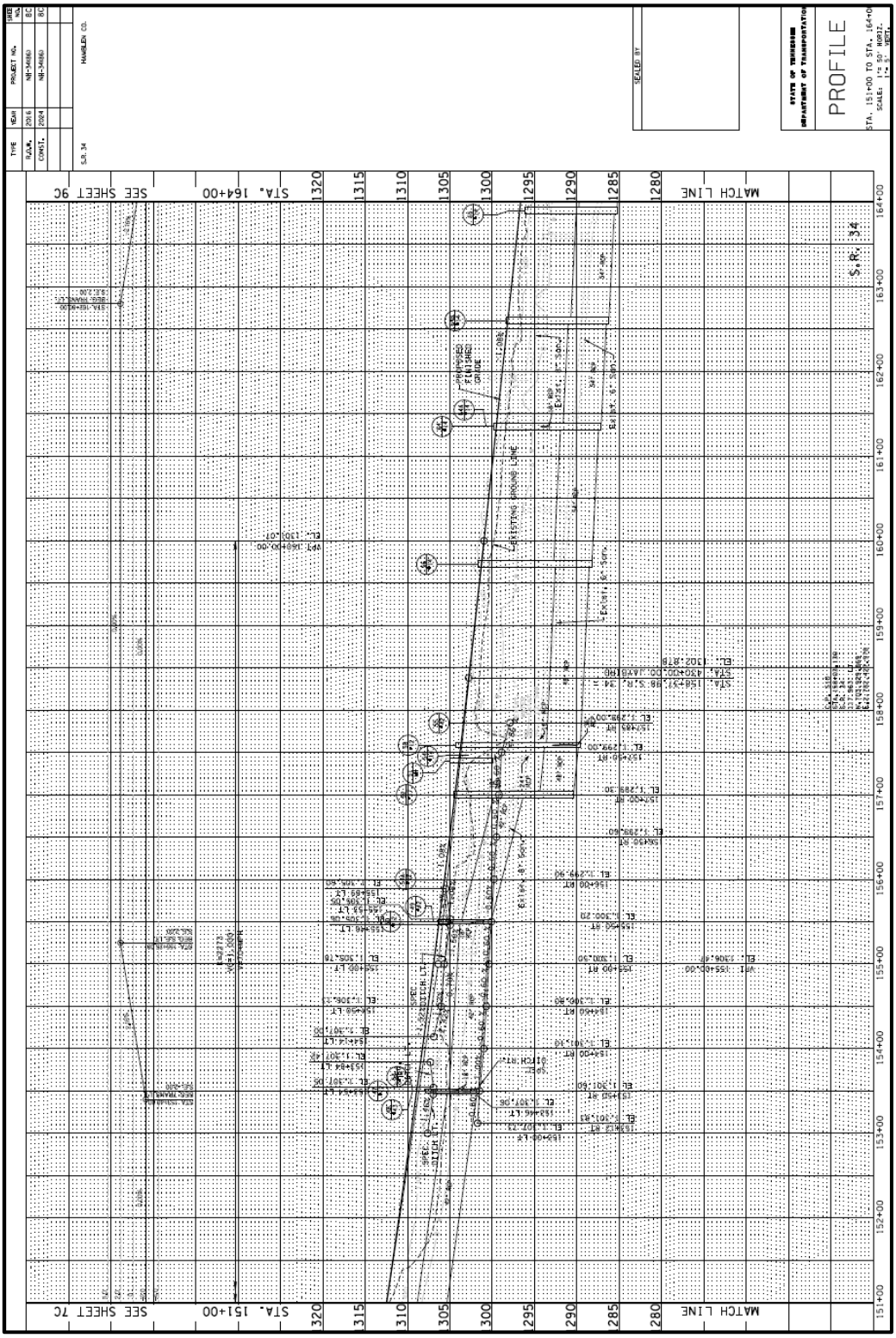

Figure 4-45
Norfolk Southern Proposed Profile

4-606.02 ILLINOIS CENTRAL RAILROAD

REAL ESTATE ENGINEERING PLAT AND LEGAL DESCRIPTION REQUIREMENT

See *Chapter 4-606.01 Norfolk Southern Railway Company*. The process for Illinois Central Railroad shall be the same as for Norfolk Southern Railway Company.