To

Patrick Laux

Scott Ebel

From

Jerry Shadewald
Joe Gallamore

Date

January 15, 2013

Subject

41/441 Operational Needs Study
Considerations for the WIS 441 Design Project

HNTB Job Number

44386

Technical Memorandum

Introduction

The Wisconsin Department of Transportation (WisDOT) is currently conducting two projects in proximity to the US 41 interchange with US 10 and WIS 441 in Winnebago County. Both projects cover the same section of US 41 from CTH II to south of CTH BB, including the system interchange between US 41 and WIS 441.

The purpose of this technical memorandum is to identify and document design project items that may conflict with the planning study layout that with minor adjustments could match the layout resulting in potential cost savings, less impact to local businesses and less impact to the traveling public in future construction.

The first project is the US 10-US 41-STH 441 Interchange (Project ID 1517-07-00), a reconstruction of the US 10/WIS 441 system interchange with US 41. The design project seeks to expand capacity of WIS 441, reconstruct the first four services interchanges east of Little Lake Butte des Morts and improve the system interchange with US 41. The project is currently in the design phase and planned for construction during multiple years starting in 2014 through 2019.

The second project is the US 41/WIS 441 Operational Needs Study, a planning study of US 41 from the Breezewood interchange in Winnebago County, through Outagamie County, to just south of the CTH F interchange in Brown County. The planning study is being compiled for use by WisDOT staff to develop a program of short to long term improvements leading to a potential expansion of US 41 corridor from Neenah to De Pere. The concepts developed in the report are intended to provide a conservative footprint and cost estimate with a planning level understanding for subsequent environmental assessment and public review during a future National Environmental Policy Act (NEPA) study. The planning study

seeks to identify the potential layout, obstacles and costs to expand US 41 by one lane each direction through the majority of the corridor. The planning study is evaluating operational needs through year 2038.

Both projects require similar lane configurations along US 41 north of CTH II to south of CTH BB (See figure 1). The design project is adding new lanes adjacent to and tying into existing US 41 southbound and northbound pavement but is not addressing US 41 Interstate design standard requirements for the remaining existing pavements. Specifically, the design project is not addressing the median including the inside shoulder, since the project is not reconstructing them (Refer to Draft 60% plan Proposed Typical Sections in Attachment A). The existing median is 26-feet.

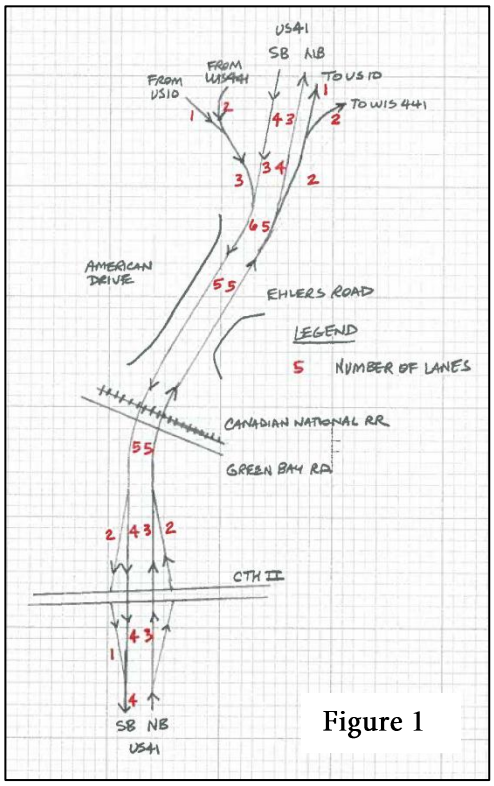


Figure 1

The planning study is using a wider median width of 36.5-feet, matching the US 41 Brown County Corridor reconstruction. The proposed section provides two 14-feet inside shoulders with single face median barrier which could be used as HOV lanes along US 41 if needed. Although the 14-foot shoulders exceed the minimum 12-foot inside shoulder requirement for Interstate design standards, this is not overly conservative to assume a median this wide at the planning stage. The US 41 mainline cross section in the northern 8-miles of US 41 Winnebago County reconstruction used a 12-foot shoulder with a median section of approximately 35-feet or slightly wider in most all cases indicating that a wider median has been used on both ends of this corridor.

When this segment of US 41 mainline is reconstructed at future date as part of the planning study, the wider proposed median will push the driving lanes further out (Refer to planning study proposed typical sections in Attachment B). The following items have been identified for consideration within the design project and are recommended for further evaluation as their implementation would have potential long term costs savings, less impact to local businesses, and less impact to the traveling public:

- Relocate American Drive further to the west
- Relocate retaining walls R-70-106 and R-70-112 further to the west
- Relocate retaining wall R-70-110 further to the east
- Relocate retaining walls R-70-113 and R-70-114 further to the west
- Widen bridge B-70-129 (US 41 Southbound over CTH II) to accommodate the planning section
- US 41 Southbound Exit Ramp improvements at CTH II ramp terminal and WB acceleration lane

Design Considerations

The following discusses each design project item recommended for further evaluation giving estimated base costs, costs for relocation to accommodate the proposed planning study typical section, total costs for both projects should the recommendation not be incorporated, as well as potential risks associated with relocation since the planning study project is only at a planning level of design.

Relocate American Drive further to the west
After initial review of the design plans, strip takings or temporary easements along American Drive are anticipated for tying in driveways and performing some minor improvements to parking lot areas from grading impacts. Existing parking lot pavement areas do encroach on the frontage road property and will have to be addressed with the design project. No acquisitions or relocations are anticipated for the work along American Drive. Complete street pedestrian and bicycle accommodations may be required based upon Trans 75 requirements. Base costs for American Drive reconstruction are $196.500.

Moving the American Drive frontage road further to the west makes additional room for the retaining walls R-70-106 and R-70-112 along the US 41 Southbound outside shoulder to incorporate the planning study cross section. By moving American Drive and accommodating the future section, further impacts to businesses or the traveling public along the frontage road could be minimized or avoided during the expansion project. Moving the roadway further to the west will require additional roadway reconstruction at the south and north ends and additional impacts to the parking lot area. An additional 600-foot of roadway is estimated at the south and an additional 150-foot of roadway is anticipated at the north end. The roadway section shown in Attachment A (Proposed Typical Sections) was used to calculate the added roadway costs. An additional 5-foot of parking lot impact was estimated for the additional parking lot costs. As shown in Attachment F, the additional costs to relocate American Drive now to accommodate the planning project section are estimated to cost $110,500, resulting in a total cost of $307,000.

If American Drive is constructed as shown in the design plans now, and then reconstructed in the future to accommodate the planning study cross section, the total costs would approach $503,500 for both projects combined, resulting in an additional $196,500 in construction costs. Some costs savings from reusing materials could be assumed but are not included within this total cost.

Relocate retaining walls R-70-106 and R-70-112 further to the west
Top of wall elevations were estimated using profile grade elevations on the draft 60% design plans and calculating proposed flow line elevations at the wall locations. Ground line elevations in front of the wall face were provided by the design team. Wall heights and resulting retaining wall square footages were calculated from the data. The base costs for constructing R-70-106 and R-70-112 are estimated at $558,000 and $111,000 respectively.

Relocating retaining walls R-70-106 and R-70-112 to incorporate the proposed study cross section will require the walls to move out an additional 5.25-foot and would minimize future retaining wall demolition and reconstruction costs (Refer to Attachment C – Typical Section Showing Impacts). At R-70-106, the US 41 mainline fill is higher than the adjacent American Drive frontage road. Additional

embankment fill will be required for the relocation but is considered within the retaining wall cost as structural fill. Also, the wall is anticipated to be slightly taller and longer due to 3:1 slopes along American Drive. At R-70-112, the American Drive frontage Road fill is higher than the US 41 mainline Southbound lanes. The retaining wall will have a fence along the top for freeway access control and the concrete barrier will be placed in front or made part of the retaining wall along US 41. Additional common excavation will be required to move the retaining wall R-70-112 further to the west otherwise no additional retaining wall costs for size differential is assumed. The additional cost (See Attachment F) to relocate retaining walls R-70-106 and R-70-112 are $131,000 and $3,000 (cost of further common excavation) respectively.

If retaining walls are constructed as shown in the design plans now, and then demolished and reconstructed in the future to accommodate the planning study cross section, the total costs would approach $1,355,000 and $260,000 respectively for R-70-106 and R-70-112, an increase of $666,000 and $146,000 respectively. In addition to higher construction costs, another disadvantage to reconstruction later would be impacts to the businesses along American Drive and to the traveling public using American Drive.

There are a couple of different risks to consider for relocating the retaining walls to accommodate the planning section in this area. The US 41 mainline currently has a substandard horizontal curve located near North Green Bay Road having a radius of 1763' and a minimum desired radius of 2050'. The planning study's expansion design concept drawing shows the alignment modified to meet the minimum desired radius. This shifts the US 41 mainline alignment over 10' to the east in addition to the required widening. The existing superelevation for this curve is 6.0% and the proposed superelevation of the new curve is also 6.0%. The proposed curve ends south of the American Drive retaining wall, but the superelevation transition will run along the retaining wall for some distance. The new curve or superelevation transition may require some reconstruction or rehabilitation of the retaining wall if placed in planning study's anticipated permanent configuration.

Relocate retaining wall R-70-110 further to the east

Wall heights and resulting area was determined similarly to other retaining walls above. Retaining wall R-70-110 is located along the outside shoulder of US 41 Northbound near the Conway Freight parking lot. The draft 60% design plans currently show the retaining wall a distance of 10-feet away from the property line. The base cost for constructing R-70-110 is estimated at $169,000.

Relocating retaining wall R-70-110 to incorporate the proposed study cross section will require the wall to move out an additional 5.25-foot and would minimize future retaining wall demolition and reconstruction costs (Refer to Attachment C – Typical Section Showing Impacts). Moving the retaining wall outward will move it to within approximately 4 to 5 feet from the property line. Additional embankment fill will be required for the relocation along with the wall being slightly taller and longer due to 3:1 slopes along US 41 Northbound. The additional cost to relocate the retaining wall R-70-110 is $84,000 (See Attachment F), totaling $253,000.

If the retaining wall is constructed as shown in the design plans now, and then demolished and reconstructed in the future to accommodate the planning study cross section, the total costs would approach $491,000, or $238,000 of additional costs.

This section is within a normal crown section but may be subject to vertical profile grade improvements for US 41 northbound mainline. A risk associated with constructing the retaining wall at the proposed location is that the future grades may not match well into the constructed retaining wall concrete barrier and flow line locations.

Relocate retaining walls R-70-113 and R-70-114 further to the west
Retaining walls R-70-113 and R-70-114 are located between the County II southbound on- and off-ramps and US 41. The draft 60% design plans show the retaining walls along US 41 Southbound lanes in line with the outside shoulder concrete barrier and tying into the required widening of bridge B-70-129. Wall heights and resulting areas were determined similarly to other retaining walls above. The base cost for constructing R-70-113 and R-70-114 are estimated at $32,000 and $285,000 respectively.

Relocating retaining walls R-70-113 and R-70-114 to incorporate the proposed study cross section will require the walls to move out an additional 5.25-foot and would minimize future retaining wall demolition and reconstruction costs (Refer to Attachment C – Typical Section Showing Impacts). Moving the retaining wall outward will make the retaining walls closer to the gore area of the ramps and should be evaluated further to determine if there are any impacts to the ramp lateral clearance requirements or if adjustments in grading could be made to minimize any added length to the retaining walls. Additional embankment fill will be required for the relocation but is considered within the retaining wall cost as structural fill. The additional cost to relocate retaining walls R-70-113 and R-70-114 are $14,000 and $75,000 respectively, totaling $46,000 and $360,000.

If retaining walls are constructed as shown in the design plans now, and then demolished and reconstructed in the future to accommodate the planning study cross section, the total costs would approach $88,000 and $705,000 respectively for R-70-113 and R-70-114 (See Attachment F), for an additional cost of $42,000 and $345,000 respectively.

There are a couple of different risks to consider for relocating the retaining walls to accommodate the planning section in this area. The future expansion project intends to improve any deficient vertical grades or superelevation along US 41. The curve just to the south of the CTH II interchange has a substandard superelevation of 3.0% rather than the required 3.4% using current design standards. The superelevation run-out transition length for this curve may impact the top of retaining wall elevations. This may require the barrier and top slab to be adjusted within the future expansion project if constructed to accommodate the planning study section now.

Widen bridge B-70-129 (US 41 Southbound over CTH II) to accommodate the planning section
At B-70-129, the US 41 Southbound structure over CTH II, the design project is proposing to use a 70-foot wide bridge clear distance. The existing bridge width is 56-feet requiring the bridge to be widened 14-feet. In addition to the 14-feet widening, the existing bridge deck will have to be removed to the

outside girder, which is an additional 3.25-feet for the cantilever, totaling 17.25 feet. With the new parapet (1.5-feet) included, the bridge will need to be widened 18.75-feet. The base cost for widening structure B-70-129 is estimated at $548,000.

The Planning Study assumes that B-70-129 will also be rehabilitated during the US 41 reconstruction project. The current bridge was built in 1994 and is anticipated to still have remaining life at the time the planning project is constructed. Traffic growth along CTH II prior to the design year of 2038 does not require any additional lanes. The CTH II section under the bridge has a wide terrace area, approximately 18-feet, that could accommodate any additional widening for bike lanes on the roadway with terrace sidewalks or combined pedestrian and bike facilities within the terrace areas. The bridge currently has a minimum vertical clearance of 16.75-feet and with the widening is anticipated to remain in excess of 16-feet as required for bridge rehabilitations (FDM 11-35 Attachment 1.9). To accommodate the new planning roadway section, or essentially the widening of the median since we will have the same number of through lanes, that results in an additional widening of 5.25-feet. By widening the bridge further outward during the current design project, additional widening costs for removing the deck back to the exterior girder could be avoided in the future. The additional cost required to widen bridge B-70-129 an additional 5.25-feet is $197,000 (See Attachment F) for a total of $745,000.

If the bridge is widened as shown in the design plans now, and then the deck removed to the outside girder and widened to accommodate the planning study cross section in the future, the total costs would approach $848,000, or an additional $103,000.

Similar risks to the retaining wall discussion above on how the substandard superelevation and new superelevation requirements may impact the top of retaining wall elevations, the superelevation run-out transition may impact the bridge deck top of slab elevations for the reconstruction project. This could be accommodated by a polymer overlay completed with the future reconstruction project bridge rehabilitation since the crown point would need correction anyways.

CTH II Interchange – Southbound Exit Ramp

The planning study developed four sets of short to intermediate-term alternatives for the CTH II interchange. Alternative 1 addresses existing safety and operational issues of the US 41 mainline within the interchange area. Alternative 2 addresses traffic operations at the ramp terminal intersections. Subsequent work identified local road improvements at the CTH II and Green Bay Road intersection that would benefit traffic operations of CTH II, but were deemed to be outside the jurisdiction of WisDOT. Alternatives 3 and 4 developed roundabout options for the CTH II intersections at the ramp terminals and Green Bay Road.

Alternative 2 was identified in the planning study as most cost-effectively meeting the needs of the interchange. This alternative includes the following improvements:

- Add second SBL at SB exit ramp terminal
- Add continuous WBR from Green Bay Road to NB ramp terminal

- Add second NB entrance ramp lane
- Additional improvements at CTH II and Green Bay Road intersection to be coordinated with locals

Table 1: Planning Study Recommended Improvements for CTH II Interchange

Improvement	Timeframe	Interaction with Design Project	Recommendation
2nd SBL at SB exit ramp and subsequent relocation of SBR	Approximately 2038	• SB exit ramp being designed as 2 lanes • Helps postpone need for 2nd EBL at NB ramp terminal, which would impact NB ramp design • Reduce queueing on SB exit ramp	Retiming signal can maintain acceptable operations for SB ramp terminal through 2038. Incorporate existing geometry at ramp terminal for current design effort.
Continuous WBR from Green Bay Rd to NB ramp	Prior to 2038	Minimal	No action
2nd NB entrance ramp lane	Prior to 2038	NB entrance ramp being designed as 2 lanes	Already incorporated
Green Bay Road intersection improvements	Prior to 2038	Minimal	No action

The HCM Signalized Intersection Capacity Analysis shown in Attachment D provides the SB ramp terminal intersection turning movement projections and associated level of service. As shown the SB approach has a level of service in the D or E range, depending upon the signal timings. Also note the NB ramp terminal level of service, which has movements at E and F. Further refinement of the proposed interchange design is required prior to making a determination of geometric needs.

Additional costs associated with adding the ramp to include a second southbound lane on the exit ramp and CTH II westbound acceleration lane including any signal modifications are anticipated to be less than $100,000. This cost is essentially the same if done with the design project or if completed with the future expansion project since it is moving the cost forward.

Additional US 41 Southbound Pavement Areas

If the retaining walls (R-70-106, 110, 112, 113 and 114) are constructed to accommodate the planning study cross section, the design project will require additional concrete pavement between the required lane addition and the newly placed retaining wall. This will be an added 5.25-foot of concrete pavement for the required length of Southbound and Northbound US 41. This is not required if the retaining walls are currently placed as shown. The base cost is $0 with the additional cost required at approximately

$172,000 (See Attachment F). These pavement costs would be considered throw away costs because the planning study expansion project would reconstruct this pavement area again in the future.

Other Considerations

Retaining Wall Staged Construction Methods
Staged construction methods were considered for relocated retaining walls to accommodate both the proposed flow line elevations and the future flow line elevations once vertical grade issues such as profile grade adjustments, different superelevation, or superelevation transitions are considered.
One staged method considered would construct a temporary cast-in-place concrete cap that would be removed and replaced by a permanent footing and parapet during the future project. This option would be constructed along with an outside concrete barrier adjacent to the proposed design project pavement. This option was not considered further due to some of the negatives associated with it. First, the outside shoulder concrete barrier would require a dual storm sewer system, one for draining the location at the current flow line and one for draining the location adjacent to the retaining wall location. Secondly, the temporary cap will need a fence along it since there is no barrier (or guard rail). These added costs will reduce the benefit of moving the retaining walls out. Maintenance issues and a temporary fence on the outside of temporary cap would also need to be considered prior to implementation.

Another method considered would be to construct the permanent retaining wall footing only, use an outside shoulder concrete barrier that would be removed with the existing pavement during the future project, and place the new parapet on the retaining wall during the future project. This option was not considered further for the same drainage and temporary fence reasons as above. The flow line needs to be located in a permanent location to avoid any further drainage or temporary fence costs.

Another method was considered which would construct the temporary retaining wall footing and parapet, but will require the footing and parapet to be removed and replaced during the future project to accommodate the new flow line grades based upon new profile grade, superelevation, etc. This would only apply to fill retaining wall sections along US 41 mainline, not R-70-112 which is a retaining wall in cut. The additional costs for demolition and reconstruction of the retaining wall footing and parapet cost approximately $676,000.

If the retaining wall footing was constructed to be permanent and used with a temporary parapet that would require removal and replacement during the future project to accommodate the new flow line grades based upon profile grade, superelevation, etc., the additional costs for demolition and reconstruction of the retaining wall parapet would reduce to approximately $286,000.

Bridge B-70-129 Substructure widening
In lieu of the complete bridge widening mentioned above, only the bridge substructure could be widened to accommodate the proposed study cross section and tie into the proposed retaining walls mentioned above. Bridge superstructure widening construction could occur during the future expansion project. Any superelevation transition or crown correction required due to shifting the US 41 SB mainline crown-

point location may impact the bridge but could be accounted for in a routine polymer overlay for bridge maintenance during the expansion project.

Potential complications that could arise with this option are the additional barrier transition that would be required to tie the temporary retaining wall parapet and bridge parapets together. The temporary retaining wall parapets mentioned above would need to remain on the retaining wall alignment, which is along the future project flow lines. Drainage will need to be worked out for these transition areas, specifically on the north side since the transition is not as big of an issue on the exiting side of the bridge. This option was not taken any further since it will cost an additional $103,000 to widen the bridge for the second time (the cost of replacing the cantilever area for the second widening) and it only cost $197,000 to widen to the future project during the design project.

Cost Summary

The table below summarizes how much the design project base cost will be for each considered item (See Cost Summary Table Column A). The total cost for reconstructing American Drive, constructing retaining walls R-70-106, 110, 112, 113, and 114 and widening B-70-129 is $1,899,500. To incorporate additional costs to accommodate the planning study cross section, an additional $886,500 will be required during the design project (See Cost Summary Table Column B). To implement the planning study items, the adjusted design project cost for these items would be $2,786,000 (See Cost Summary Table Column C), or approximately 47% more than the base costs. If the planning study items for are not implemented and the design project is constructed as currently shown and the planning study reconstructs these items as needed for the proposed section, the total project cost is $4,250,500 (See Cost Summary Table Column D). If the planning study items are implemented, there is a potential savings of $1,279,000 (See Cost Summary Table Column E).

Cost Summary Table					
Planning Study Item for Further Consideration	A Design Project Base Cost	B Additional Cost to incorporate Planning Study	C Adjusted Design Project Cost (A + B)	D Cost to Construct and Reconstruct	E Potential Savings (D-C)
American Drive Relocation	$196,500	$110,500	$307,000	$503,500	$196,500
Relocate Retaining Wall R-70-106	$558,000	$131,000	$689,000	$1,355,000	$666,000
Relocate Retaining Wall R-70-112	$111,000	$3,000	$114,000	$260,000	$146,000
Relocate Retaining Wall R-70-110	$169,000	$84,000	$253,000	$491,000	$238,000
Relocate Retaining Wall R-70-113	$32,000	$14,000	$46,000	$88,000	$42,000
Relocate Retaining Wall R-70-114	$285,000	$75,000	$360,000	$705,000	$345,000
Widen Bridge B-70-129	$548,000	$197,000	$745,000	$848,000	$103,000
CTH II Interchange Considerations	$0	$100,000	$100,000	$0	-$100,000
Additional US 41 Southbound Pavement Area	$0	$172,000	$172,000	$0	-$172,000
Retaining Wall Parapet Rehab	$0	$285,500	$285,500	$0	-285,500
Total	$1,899,500	$886,500	$2,786,000	$4,250,500	$1,179,000

All above costs shown are calculated in 2013 dollars and do not consider inflationary costs for future construction expenses.

Recommendations

The following planning study items are recommended for implementation:

- It is recommended to relocate American Drive to the west during the design project to allow the most flexibility for the future planning study reconstruction project.
- It is recommended to move retaining wall R-70-112 outward a minimum of 5.25-feet to accommodate the roadway planning section.
- Unless an adequate retaining wall temporary parapet detail can be determined through further structural evaluation to accommodate the future grade changes at the top or retaining wall flow line, then potential costs savings will not be realized and relocating retaining walls is not recommended.
- The structure B-70-129 should be widened similarly to what is decided for the adjacent retaining walls since they will be tied together at the bridge wing wall locations.
- For the CTH II Southbound ramp and CTH II acceleration improvements, it is not recommended to implement these improvements during the design project since traffic operations are not warranted until approximately the design year of 2038.

List of Attachments
Attachment A – USH 10-US 41-STH 441 Interchange Draft 60% Plans (Select Pages)
Attachment B – Planning Study Typical Section
Attachment C – Typical Section Showing Impacts
Attachment D –CTH II Interchange HCM Signalized Intersection Capacity Analysis
Attachment E – Conceptual Parapet and Footing Details
Attachment F – Cost Calculations

Attachment A

USH 10-US 41-STH 441 Interchange Draft 60% Plans (Select Pages)

PROJECT ID: 1517-07-04

COUNTY: WINNEBAGO

ORDER OF SHEETS

TOTAL SHEETS =

RETAINING WALLS
R-70-100
R-70-101
R-70-102
R-70-104
R-70-105
R-70-106
R-70-107
R-70-108
R-70-109
R-70-110
R-70-111
R-70-112
R-70-113
R-70-114
R-70-115
R-70-121

BRIDGES
B-70-61
B-70-129
B-70-131
B-70-132
B-70-134
B-70-157
B-70-400
B-70-401
B-70-402
B-40-403
B-70-405
B-70-406
B-70-407
B-70-409

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PLAN OF PROPOSED IMPROVEMENT

USH 10 - USH 10/STH 441

COUNTY CB - ONEIDA STREET

USH 10

WINNEBAGO COUNTY

SYSTEM INTERCHANGE

STATE PROJECT NUMBER
1517-07-04

STATE PROJECT	FEDERAL PROJECT	
	PROJECT	CONTRACT
1517-07-04		

POSSIBLE CONSTRUCTION ID'S

USH 10 MAINLINE (COLDSPRING RD - USH 41)
STATE PROJECT NUMBER **1517-07-71**

USH 41 INTERCHANGE PHASE 1
STATE PROJECT NUMBER **1517-07-72**

USH 41 INTERCHANGE PHASE 2
STATE PROJECT NUMBER **1517-07-73**

USH 41 MAINLINE PHASE 1
STATE PROJECT NUMBER **1517-07-74**

USH 41 MAINLINE PHASE 2
STATE PROJECT NUMBER **1517-07-75**

USH 10/STH 441 MAINLINE (LLBDM - STRUCTURE PHASE 1)
STATE PROJECT NUMBER **1517-07-78**

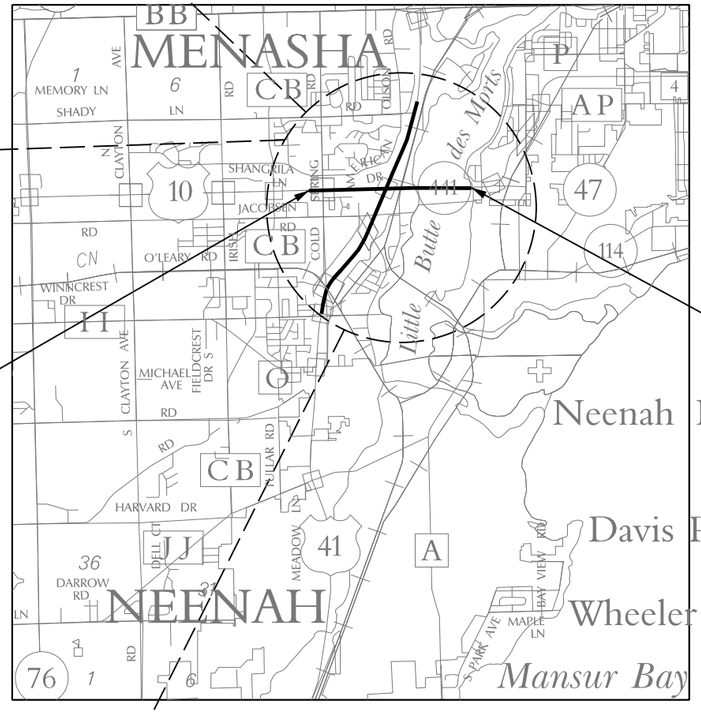
USH 10/STH 441 MAINLINE (LLBDM - STRUCTURE PHASE 2)
STATE PROJECT NUMBER **1517-07-79**

USH 41 INTCHG EARLY STEEL FAB
STATE PROJECT NUMBER **1517-07-80**

LLBDM EARLY STEEL FABRICATION
STATE PROJECT NUMBER **1517-07-81**

N

R-17-E



BEGIN PROJECT ID 1517-07-04
STA 104EB+00.00
X= 807211.064
Y= 546348.244

END PROJECT ID 1517-07-04
STA 181EB+11.45

T-20-N

BOX CULVERT
C-70-42
C-70-43
C-70-54

LAYOUT SCALE 0 0.75 MI.

TOTAL NET LENGTH OF CENTERLINE = 1.461 MI.

DESIGN DESIGNATION

A.A.D.T.	2015	=	67,900
A.A.D.T.	2035	=	87,300
D.H.V.		=	8,730
D.D.		=	58/42
T.		=	11.8%
DESIGN SPEED		=	70 MPH
ESALS		=	

CONVENTIONAL SYMBOLS

PLAN
- CORPORATE LIMITS
- PROPERTY LINE
- LOT LINE
- LIMITED HIGHWAY EASEMENT
- EXISTING RIGHT OF WAY
- PROPOSED OR NEW R/W LINE
- SLOPE INTERCEPT
- REFERENCE LINE
- EXISTING CULVERT
- PROPOSED CULVERT (Box or Pipe)
- COMBUSTIBLE FLUIDS (CAUTION)
- MARSH AREA
- WOODED OR SHRUB AREA

PROFILE
- GRADE LINE
- ORIGINAL GROUND
- MARSH OR ROCK PROFILE (To be noted as such) (ROCK)
- SPECIAL DITCH (LABEL)
- GRADE ELEVATION (95.36)
- CULVERT (Profile View)

UTILITIES
- ELECTRIC (E)
- FIBER OPTIC (FO)
- GAS (G)
- SANITARY SEWER (SAN)
- STORM SEWER (SS)
- TELEPHONE (T)
- WATER (W)
- UTILITY PEDESTAL
- POWER POLE
- TELEPHONE POLE

-COORDINATES ON THIS PLAN ARE REFERENCED TO THE WISCONSIN COUNTY COORDINATE SYSTEM (WCCS), WINNEBAGO COUNTY NAVD 83 (1991).
-ELEVATIONS SHOWN ON THIS PLAN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD 88 (1991).

DRAFT 60% PLAN
NOT FOR CONSTRUCTION
OR UTILITY RELOCATION
INTERNAL REVIEW
JANUARY 7, 2013

PLANS PREPARED BY

KAPUR & ASSOCIATES
CONSULTING ENGINEERS
414.751.7200

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PREPARED BY

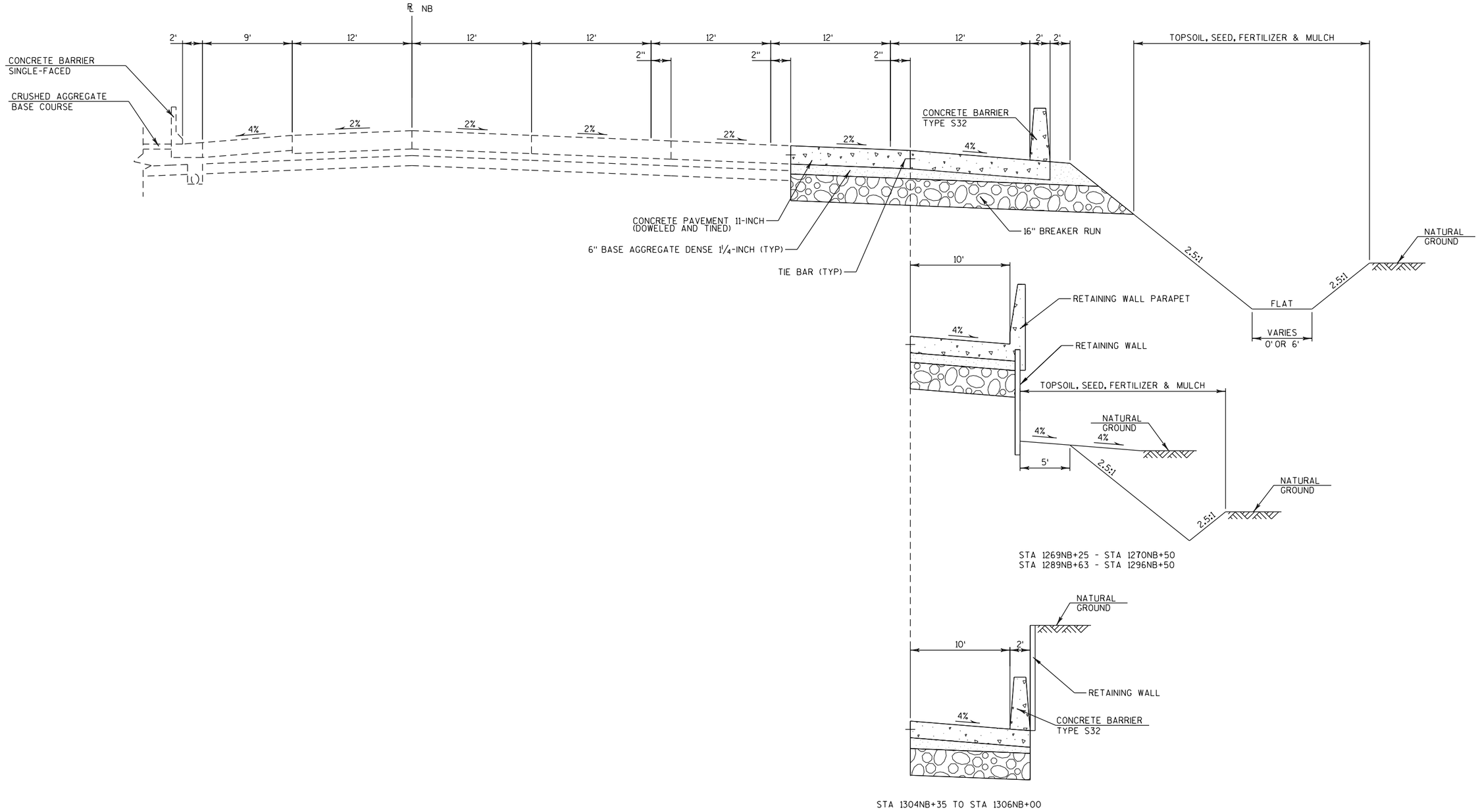
Surveyor	WISDOT
Designer	KAPUR & ASSOCIATES
Project Manager	SCOTT EBEL
Regional Examiner	
Regional Supervisor	
C.O. Examiner	

APPROVED FOR THE DEPARTMENT

DATE: _____ (Signature)

PRE_1

E

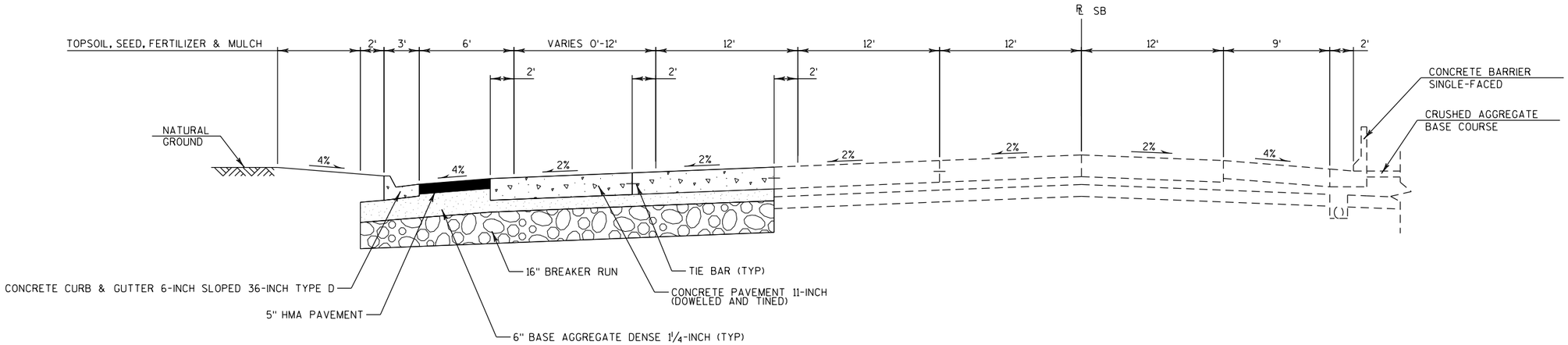


TYPICAL FINISHED SECTION

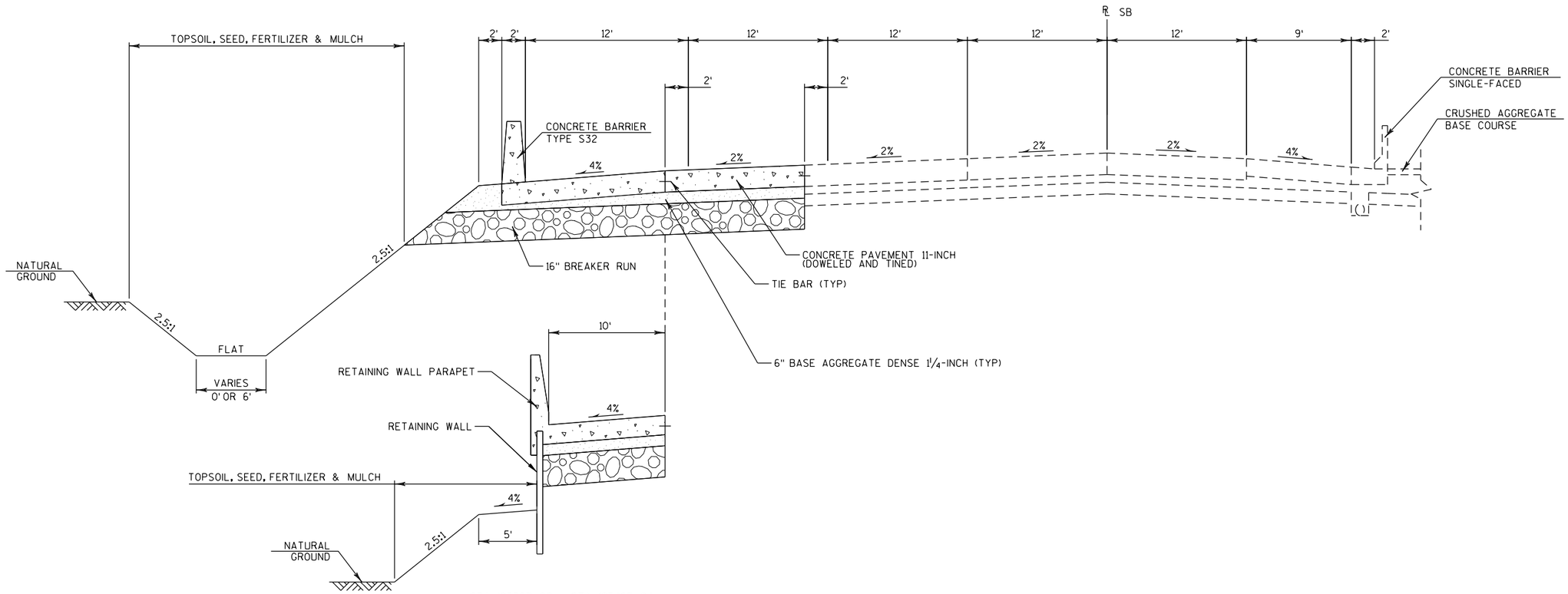
USH 41 NB

STA 1265NB+25 - STA 1306NB+00
STA 1342NB+88 - STA 1348NB+00

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET E



TYPICAL FINISHED SECTION
USH 41 SB
STA 1233SB+64 TO STA 1246SB+82

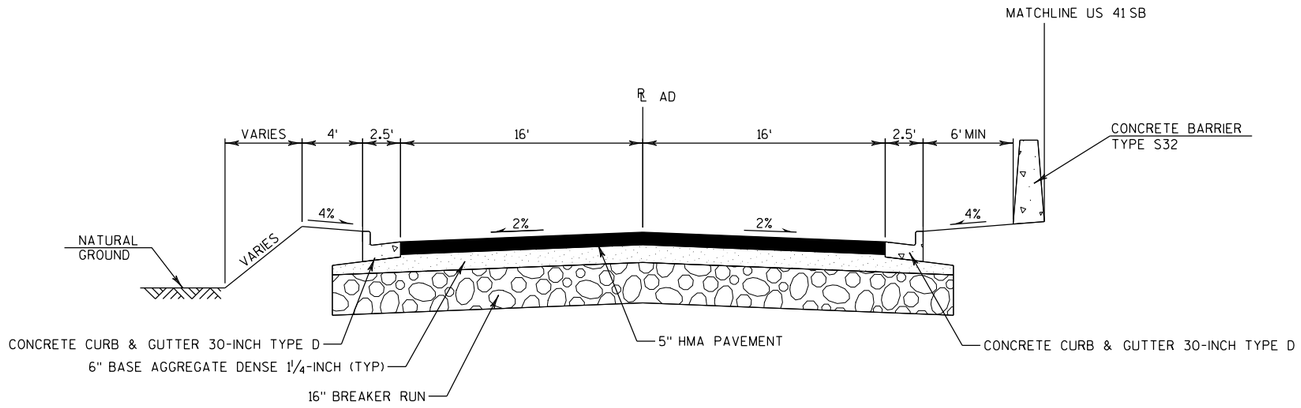


STA 1253SB+00 - STA 1254SB+04
STA 1256SB+16 - STA 1262SB+25

TYPICAL FINISHED SECTION
USH 41 SB
STA 1246SB+82 - STA 1254SB+04
STA 1256SB+16 - STA 1264SB+89

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET E

2



TYPICAL FINISHED SECTION

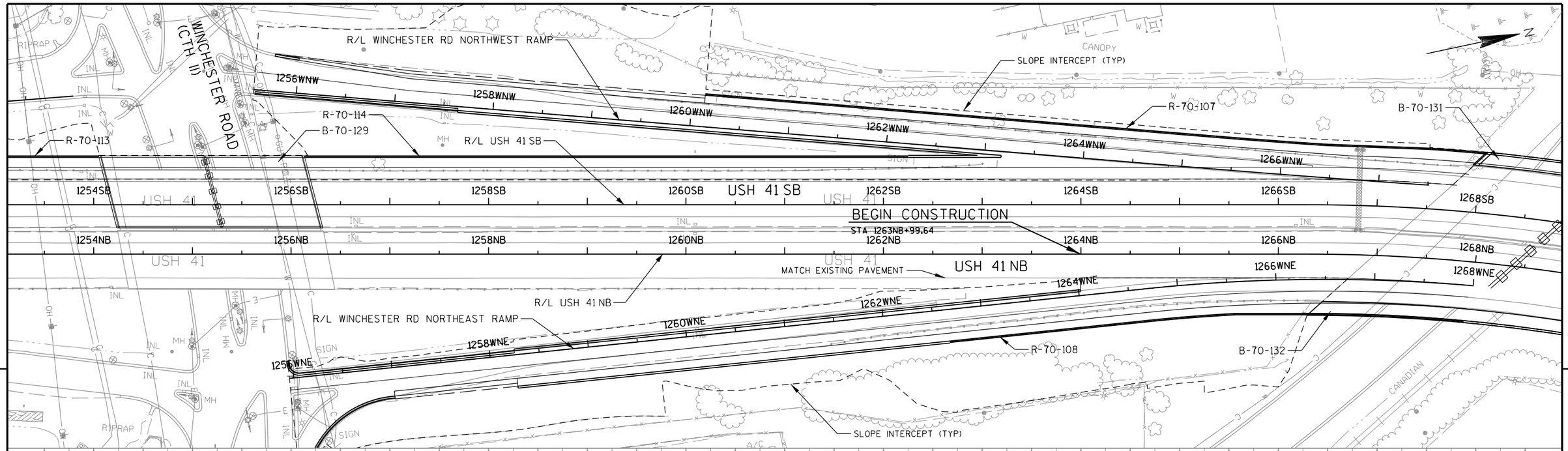
AMERICAN DRIVE

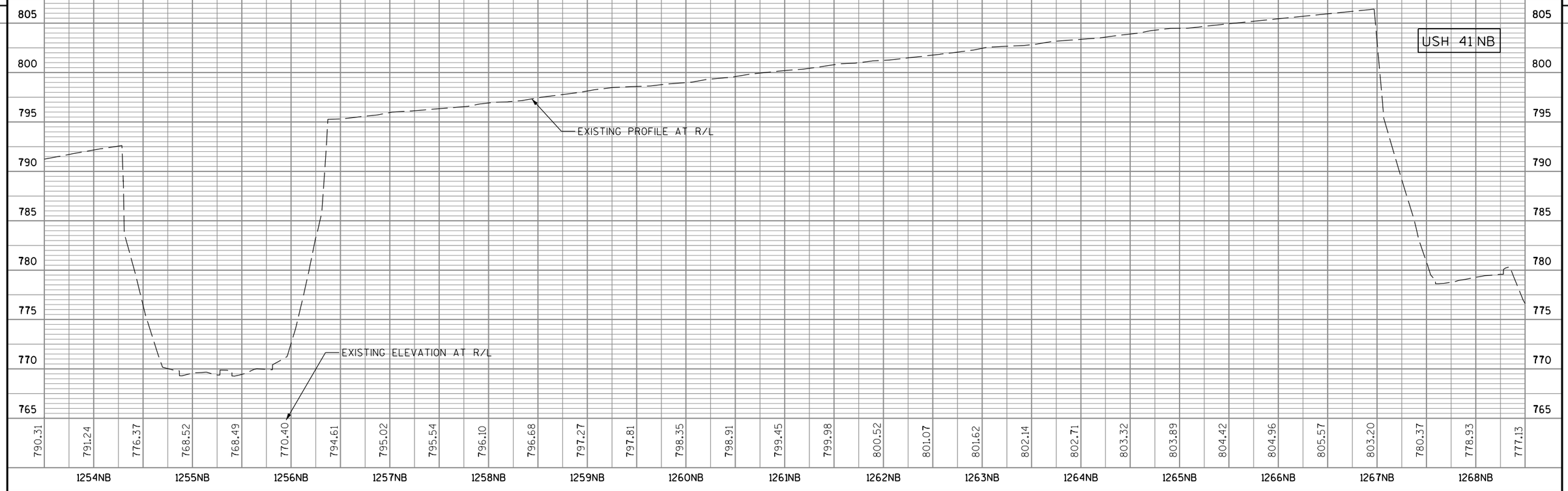
STA 53AD+95 - STA 66AD+00

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET E

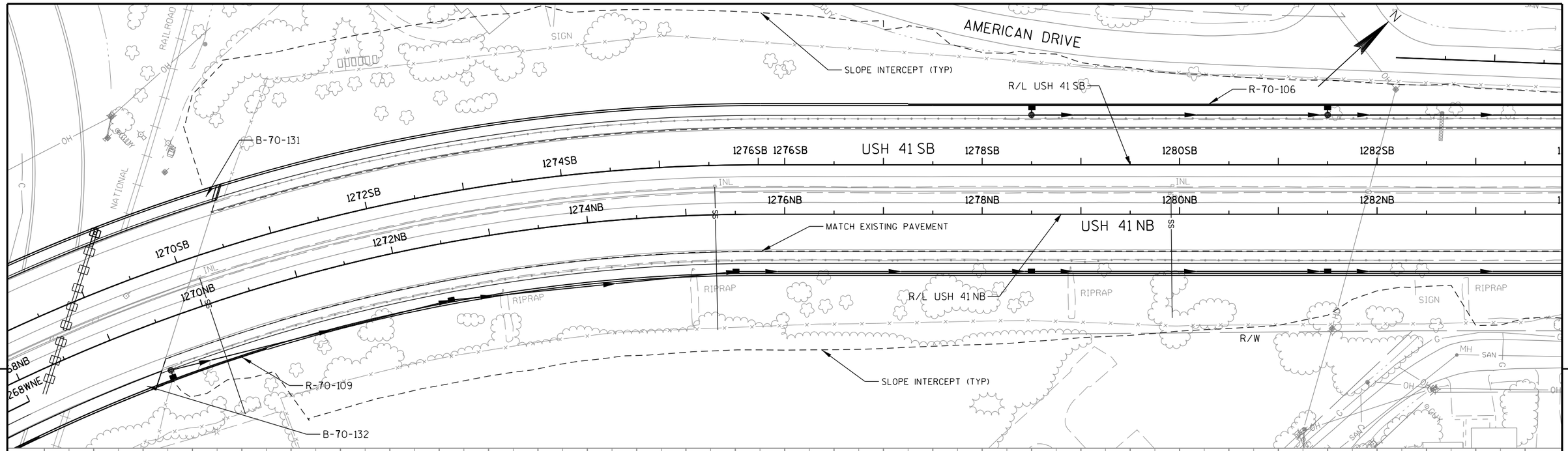
FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\020355_ts.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:10

WISDOT/CADDS SHEET 42

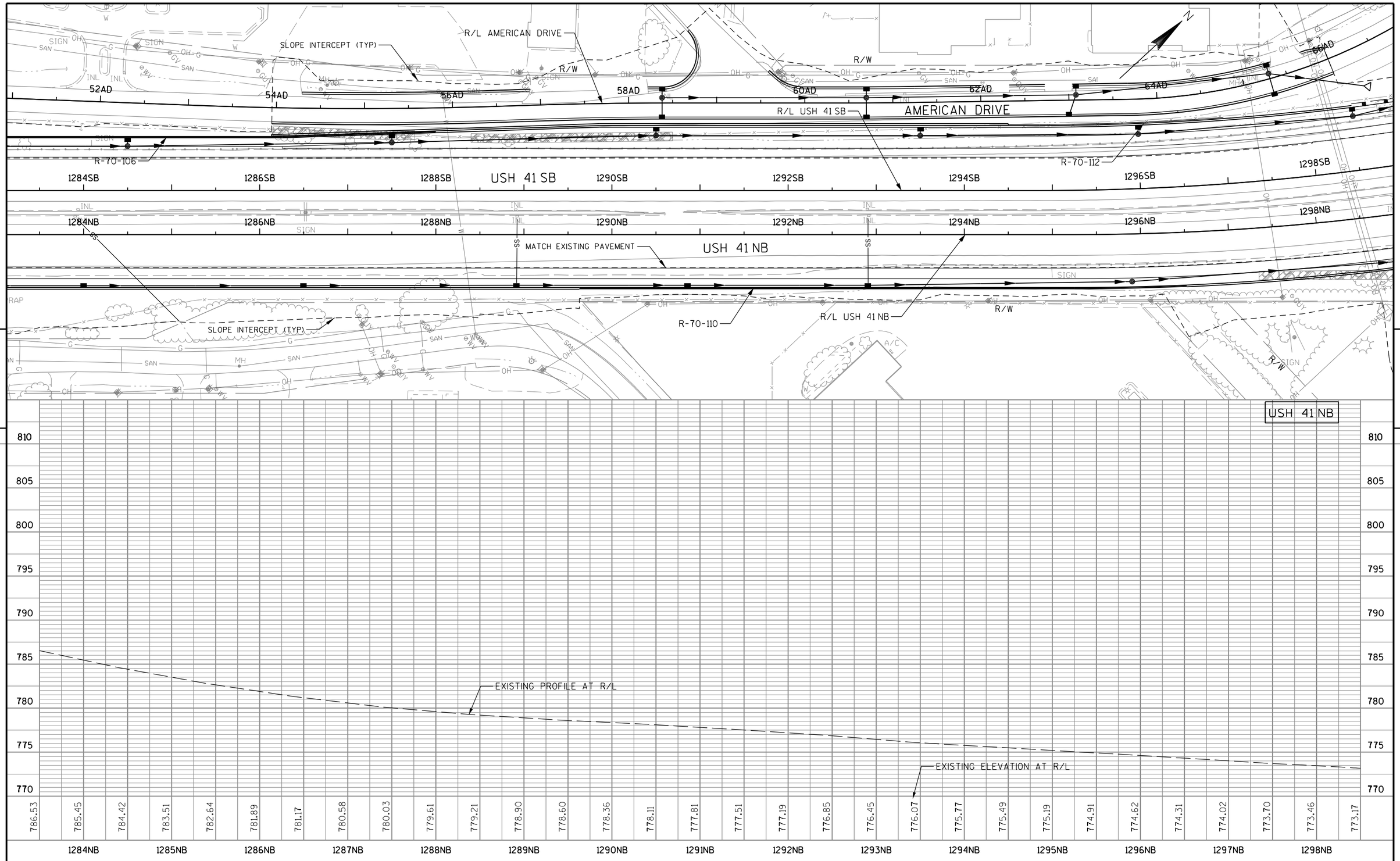




PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	PLAN & PROFILE: USH 41 NB	SHEET E



PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	PLAN & PROFILE: USH 41 NB	SHEET E



PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	PLAN & PROFILE: USH 41 NB	SHEET E

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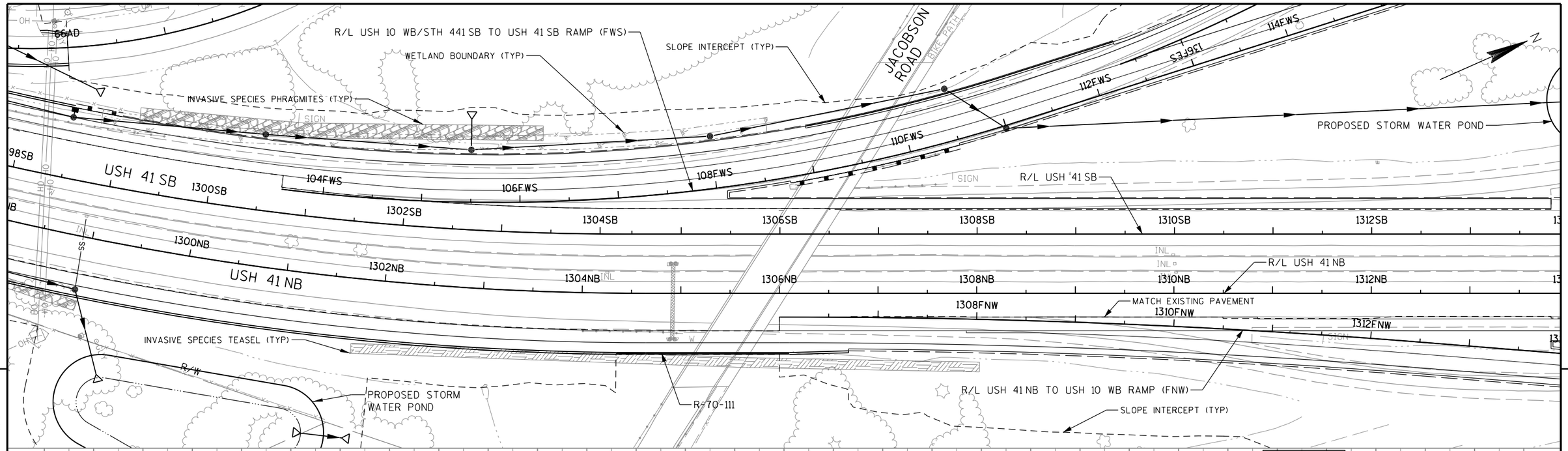
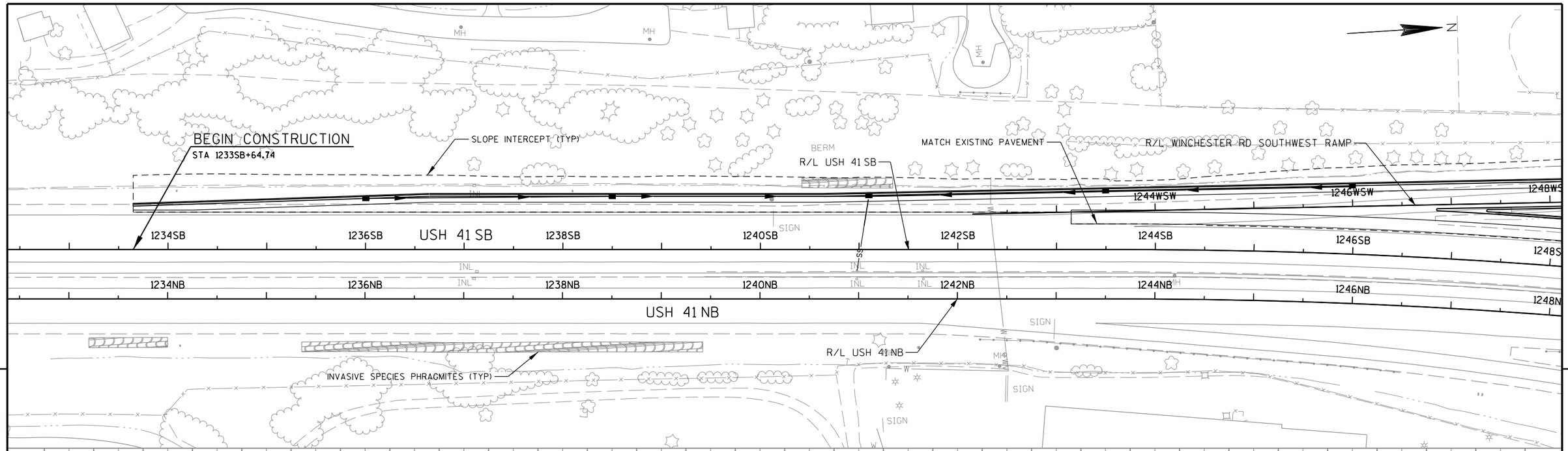
PRE_120

WISDOT/CADDS SHEET 45



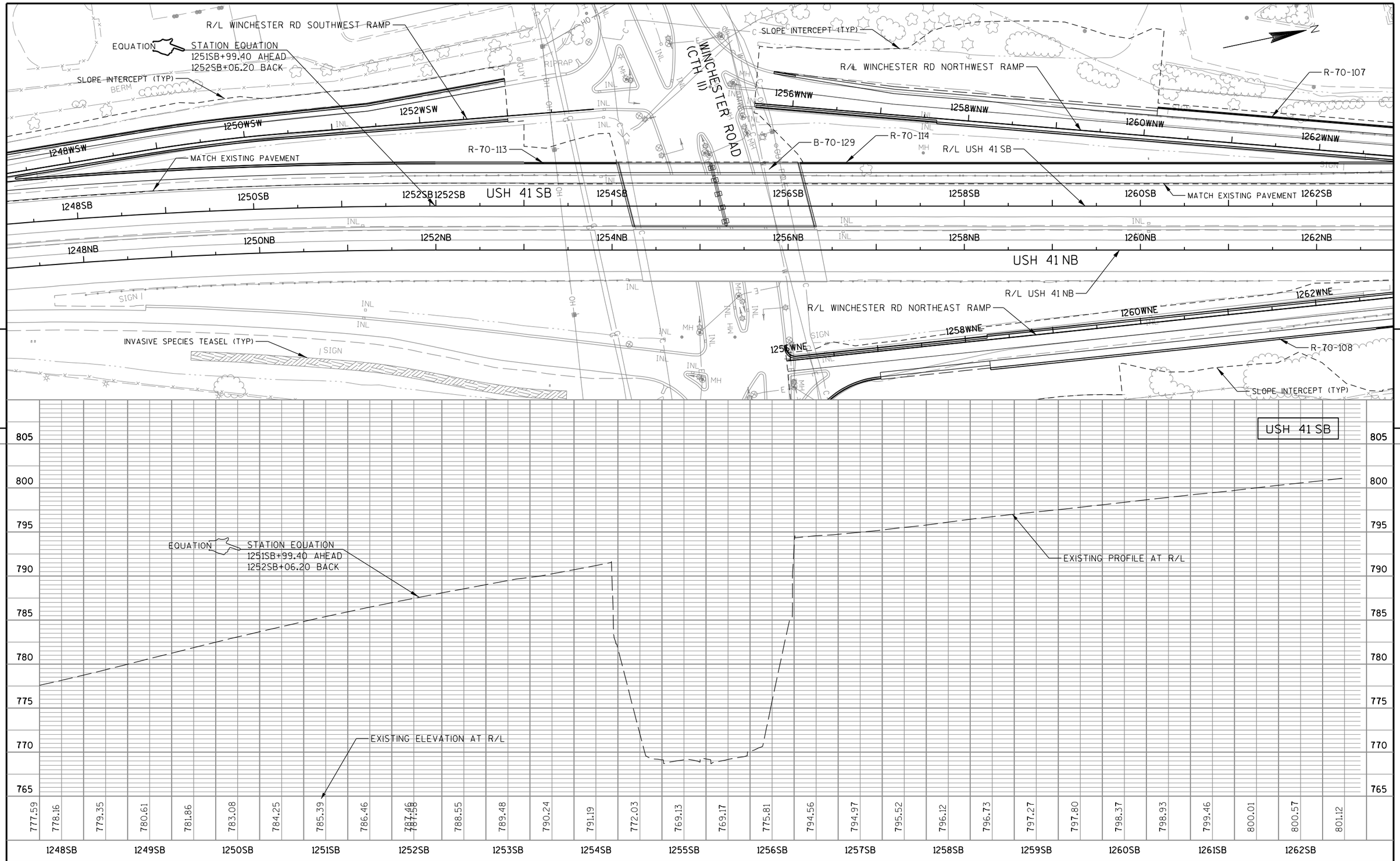
PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	PLAN & PROFILE: USH 41 NB	SHEET E



PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	PLAN & PROFILE: USH 41 SB	SHEET E

PRE_127

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\050131_pp.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:100

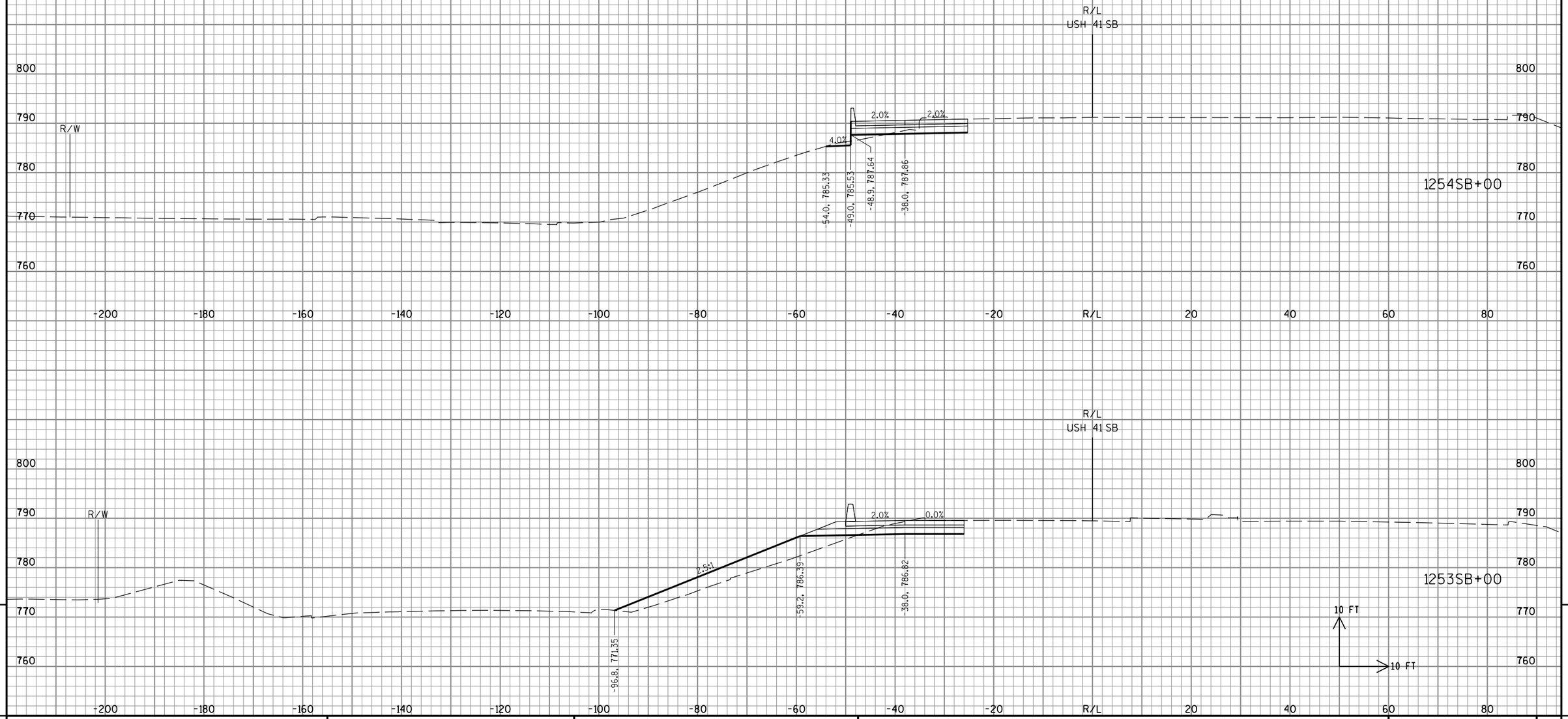


PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	PLAN & PROFILE: USH 41 SB	SHEET E

PRE_128

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\050132_pp.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:100

STRUCTURE B-70-129



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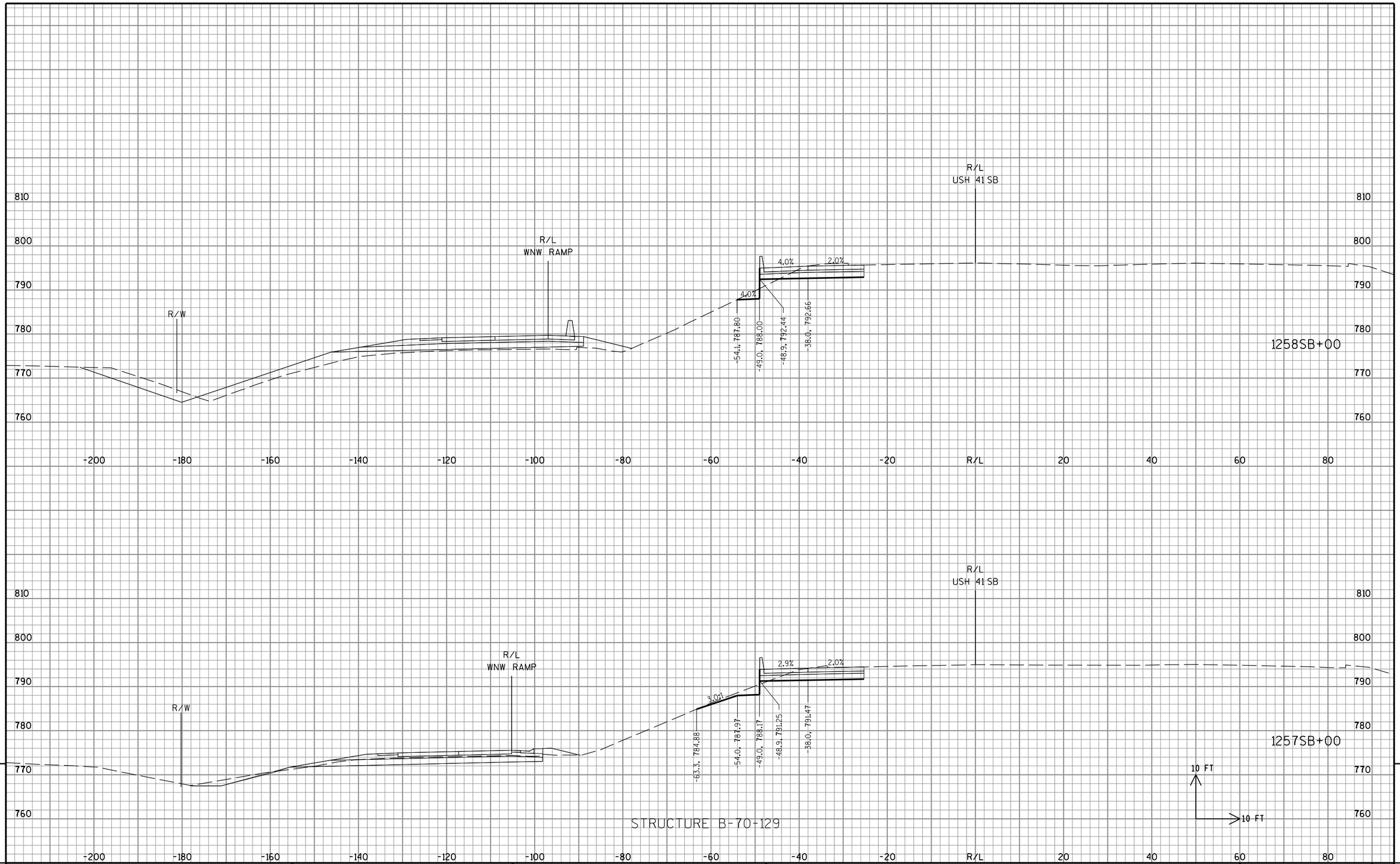
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: USH 41 SB	SHEET NO: PRE_268 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090225_41SB1_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20



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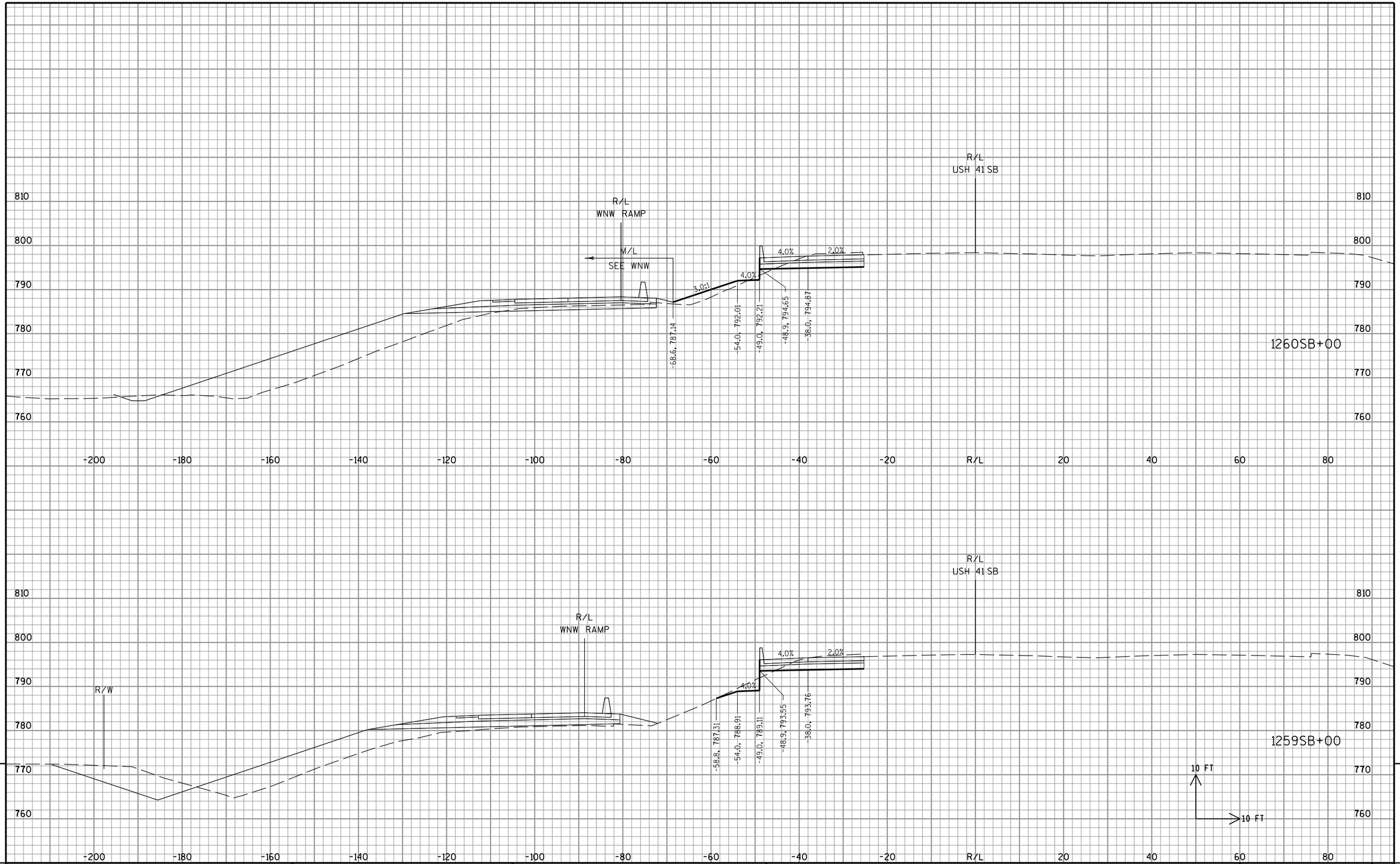
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: USH 41 SB	SHEET NO: PRE_269 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090225_41SB1_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20



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STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: USH 41 SB	SHEET NO: PRE_270 E

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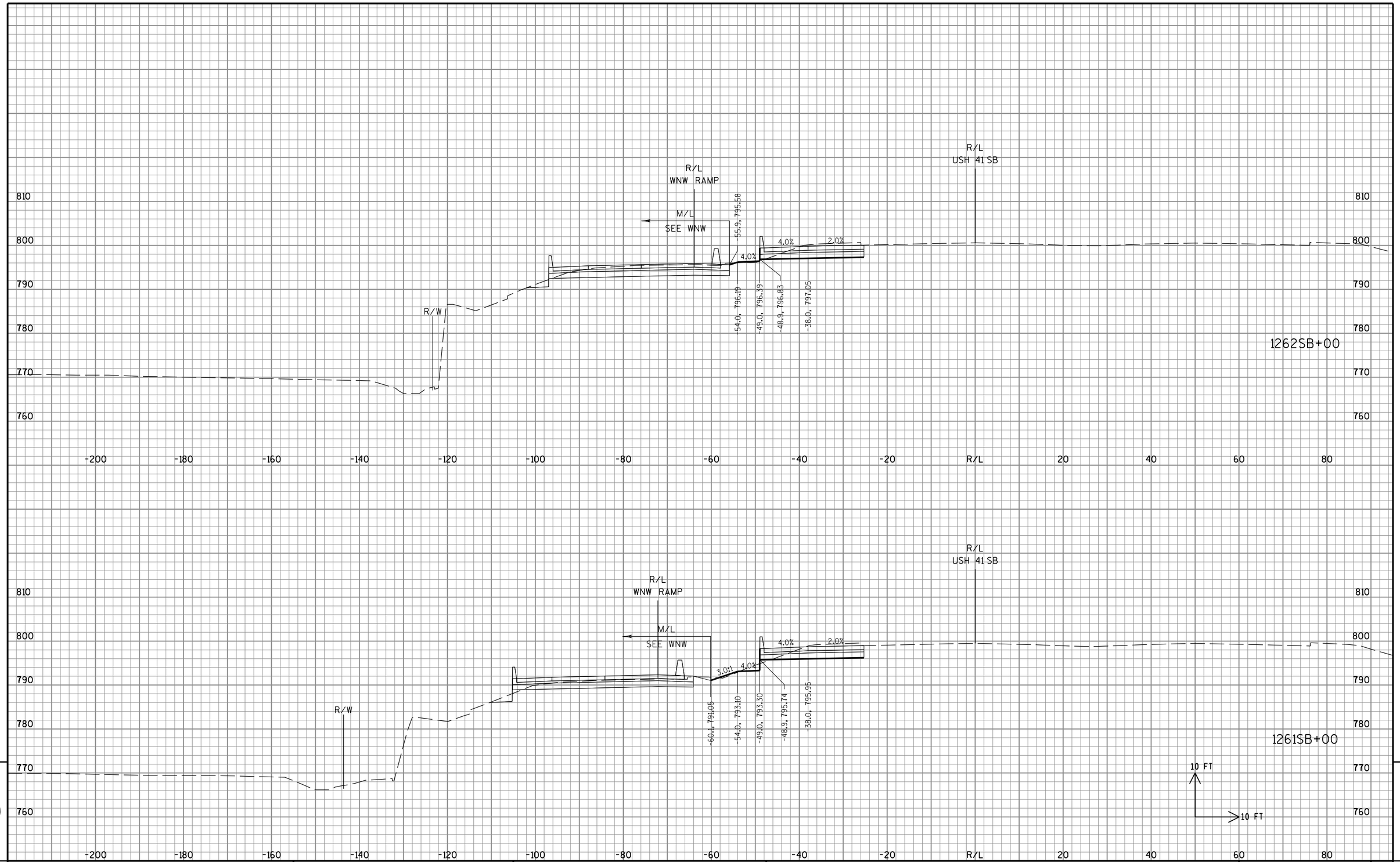

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STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: USH 41 SB	SHEET NO: PRE_271 E

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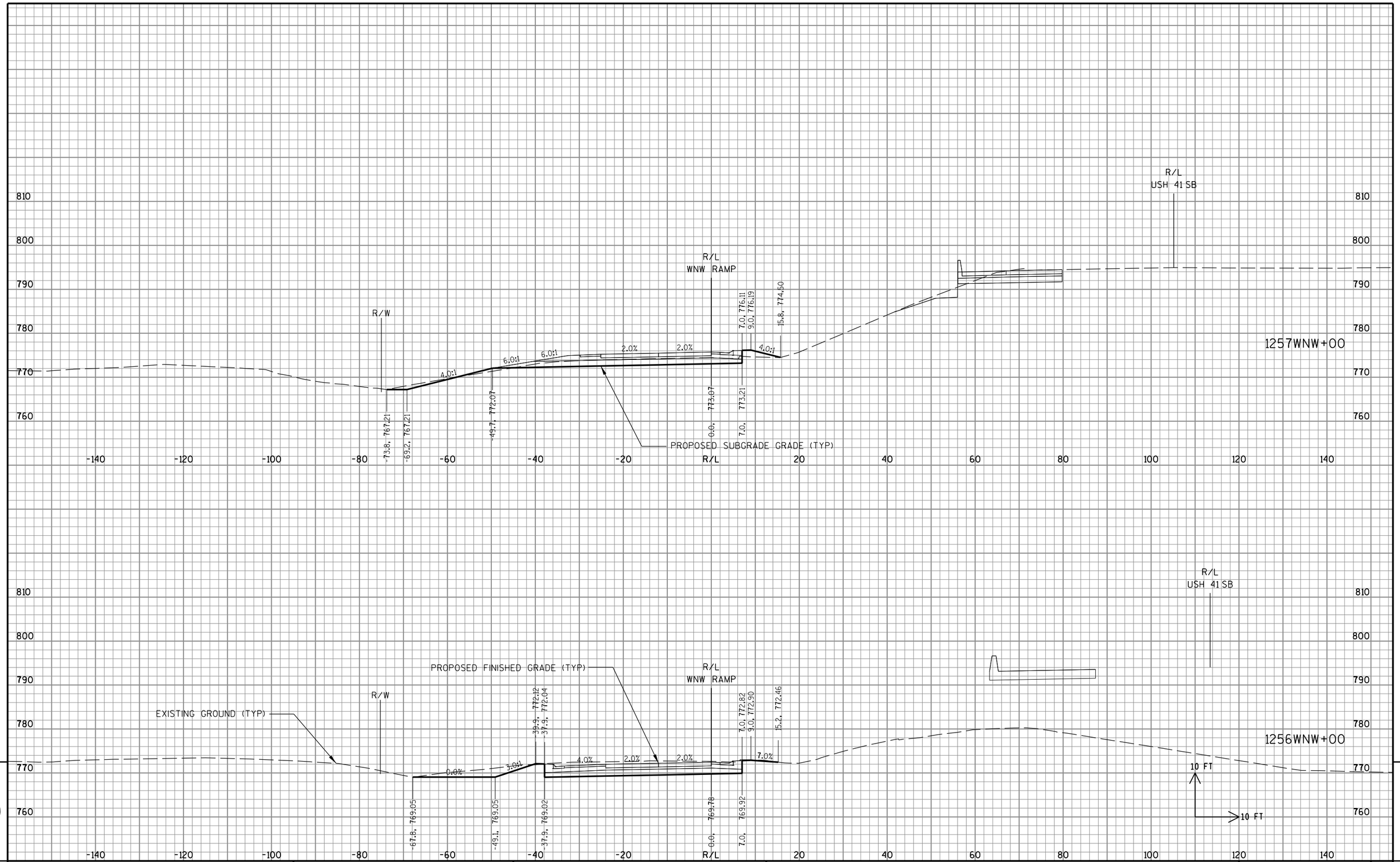

STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER NW RAMP	SHEET NO: PRE_430 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090302_WNW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

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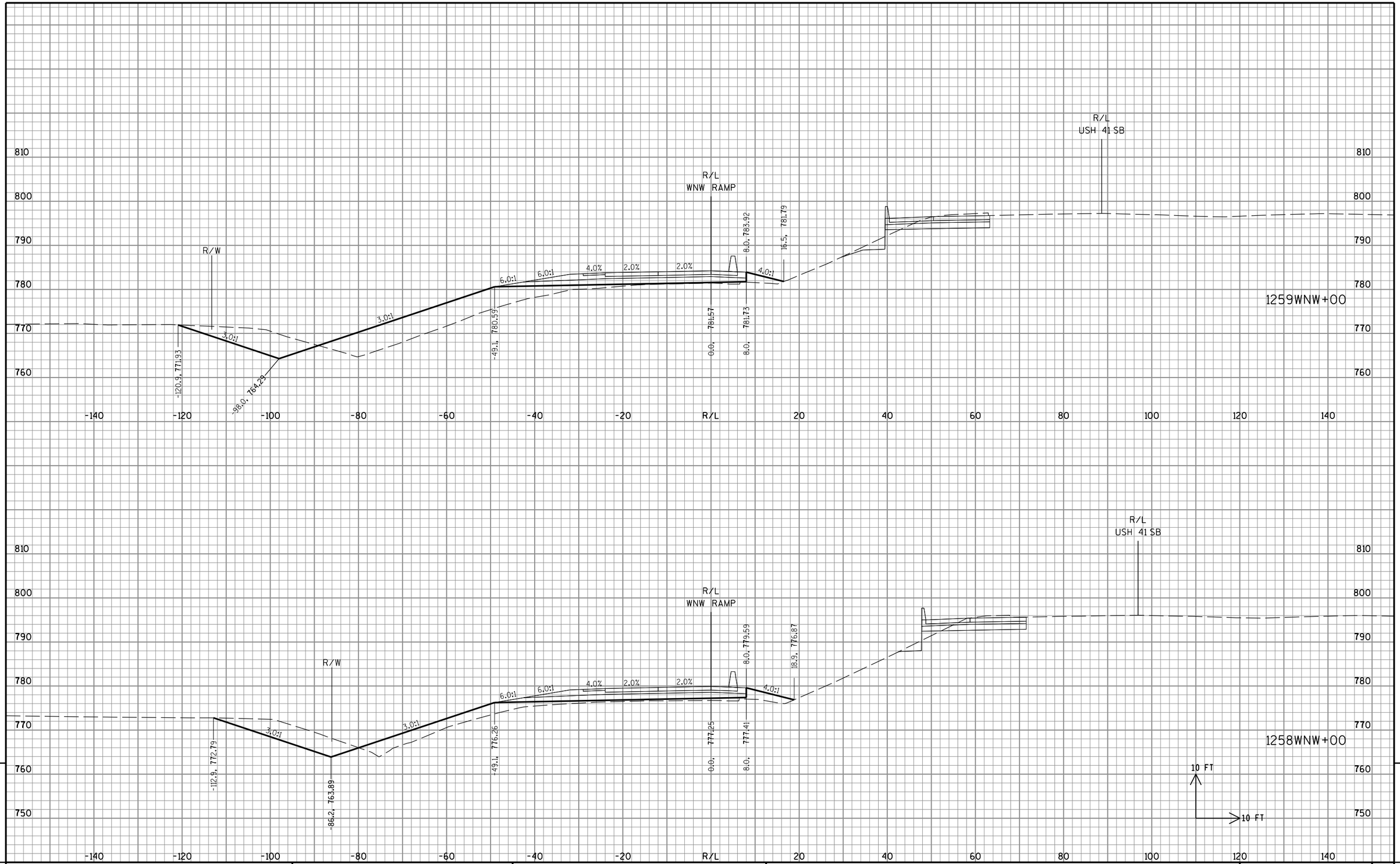

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STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER NW RAMP	SHEET NO: PRE_431 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090302_WNW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

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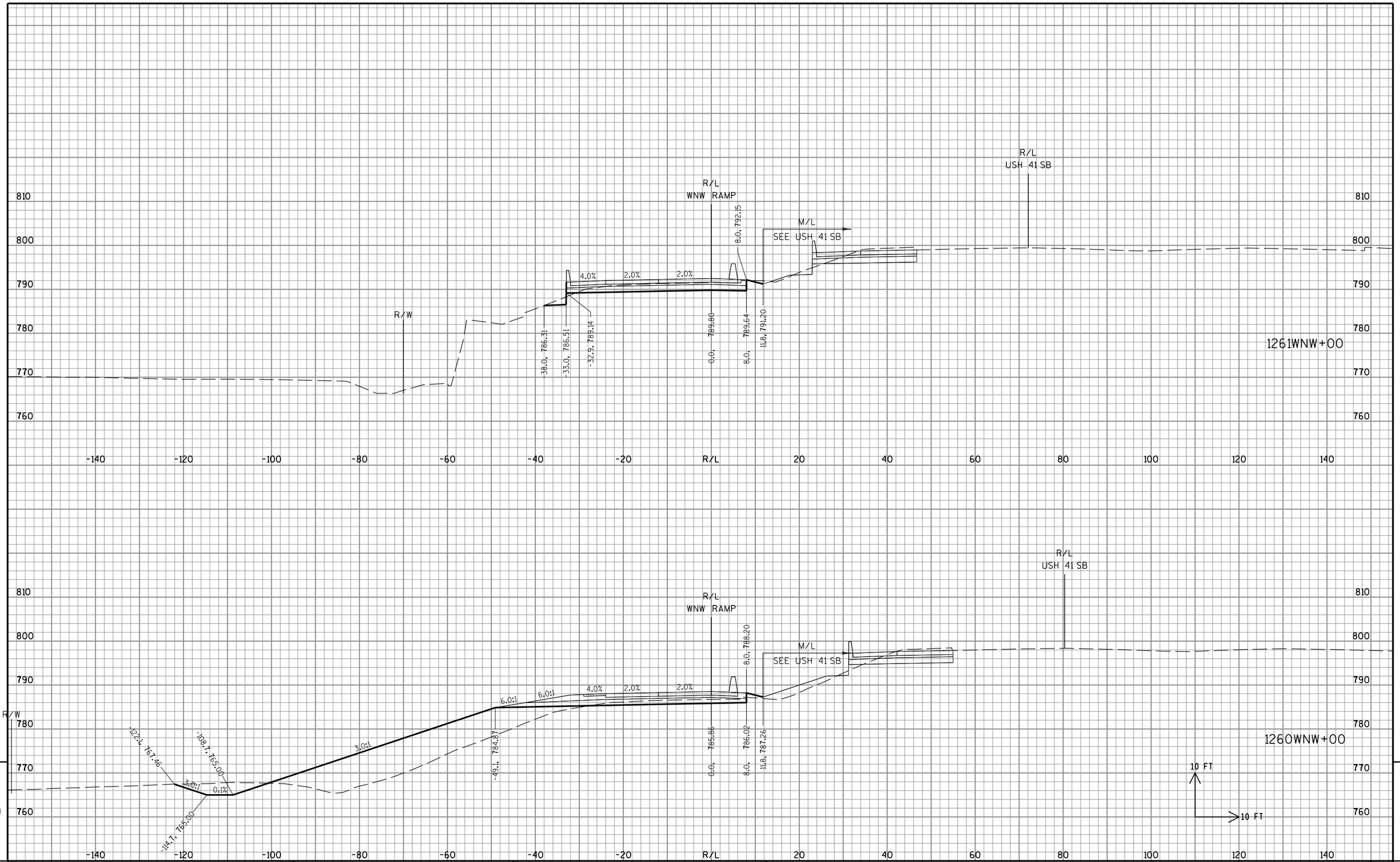
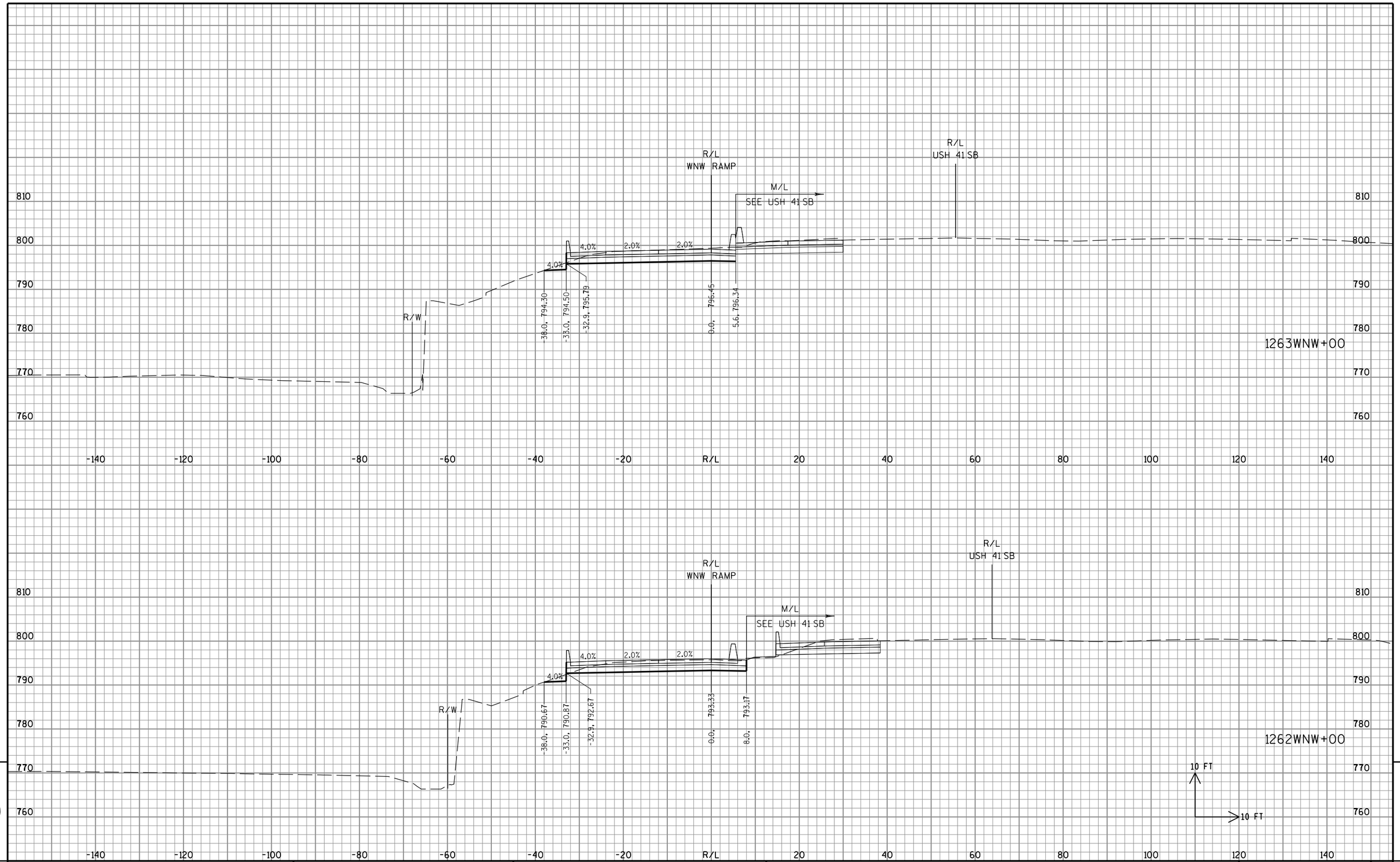


STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER NW RAMP	SHEET NO: PRE_432 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090302_WNW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20



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STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER NW RAMP	SHEET NO: PRE_433 E

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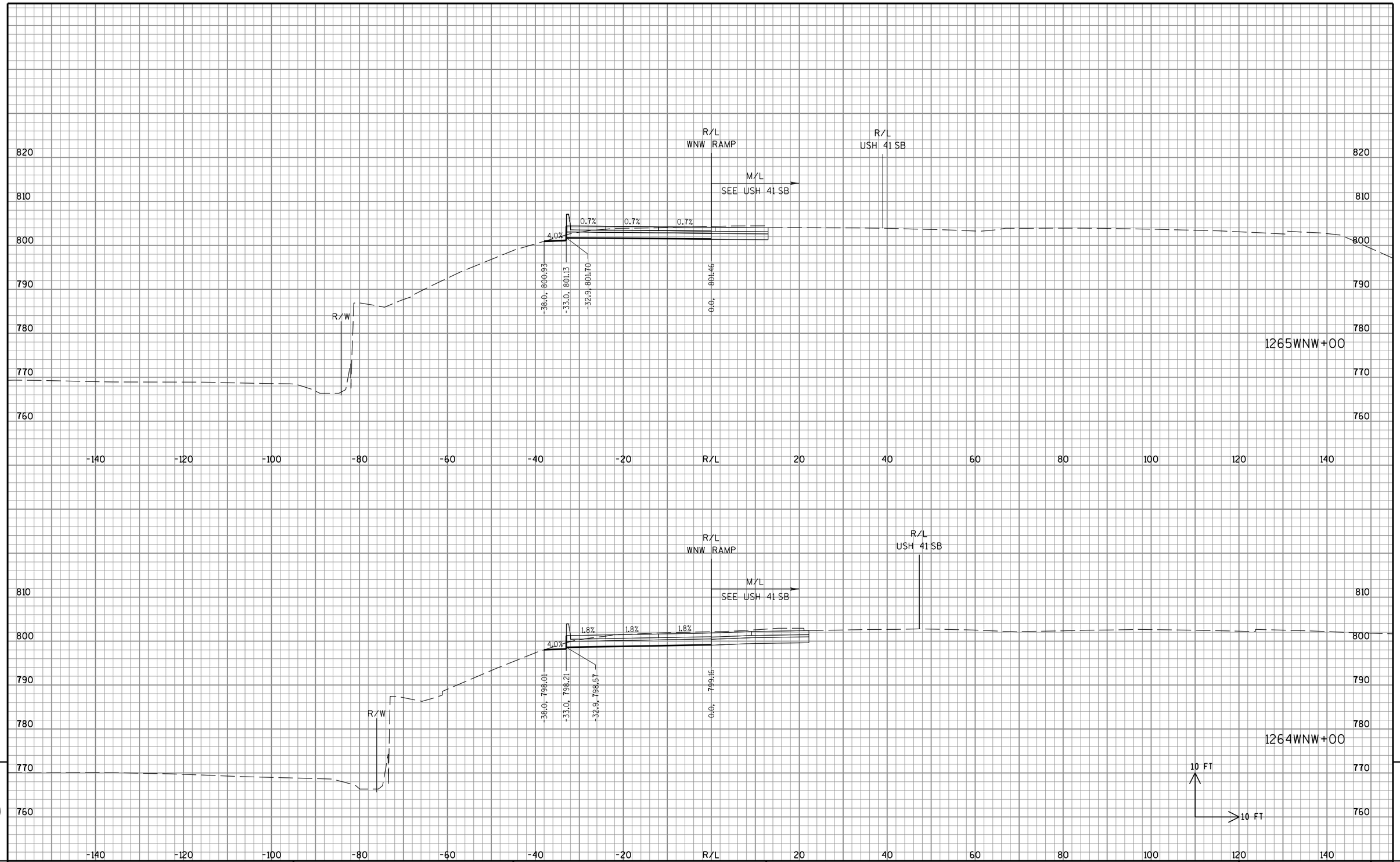

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STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER NW RAMP	SHEET NO: PRE_434 E

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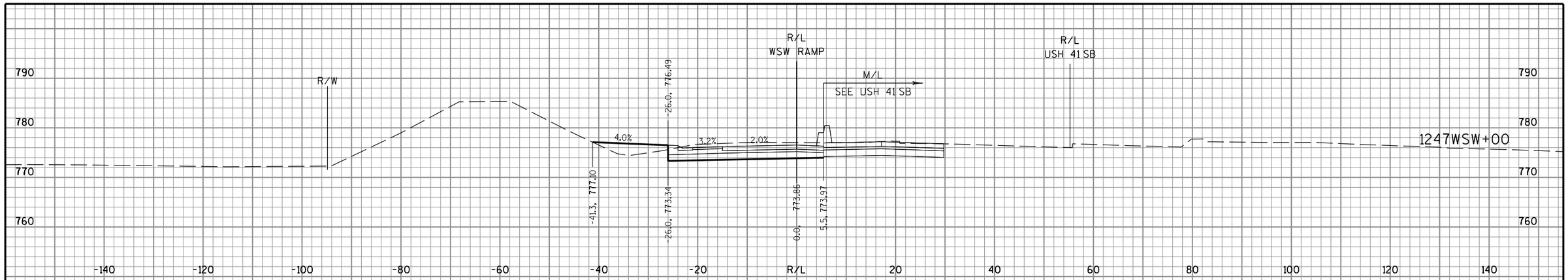

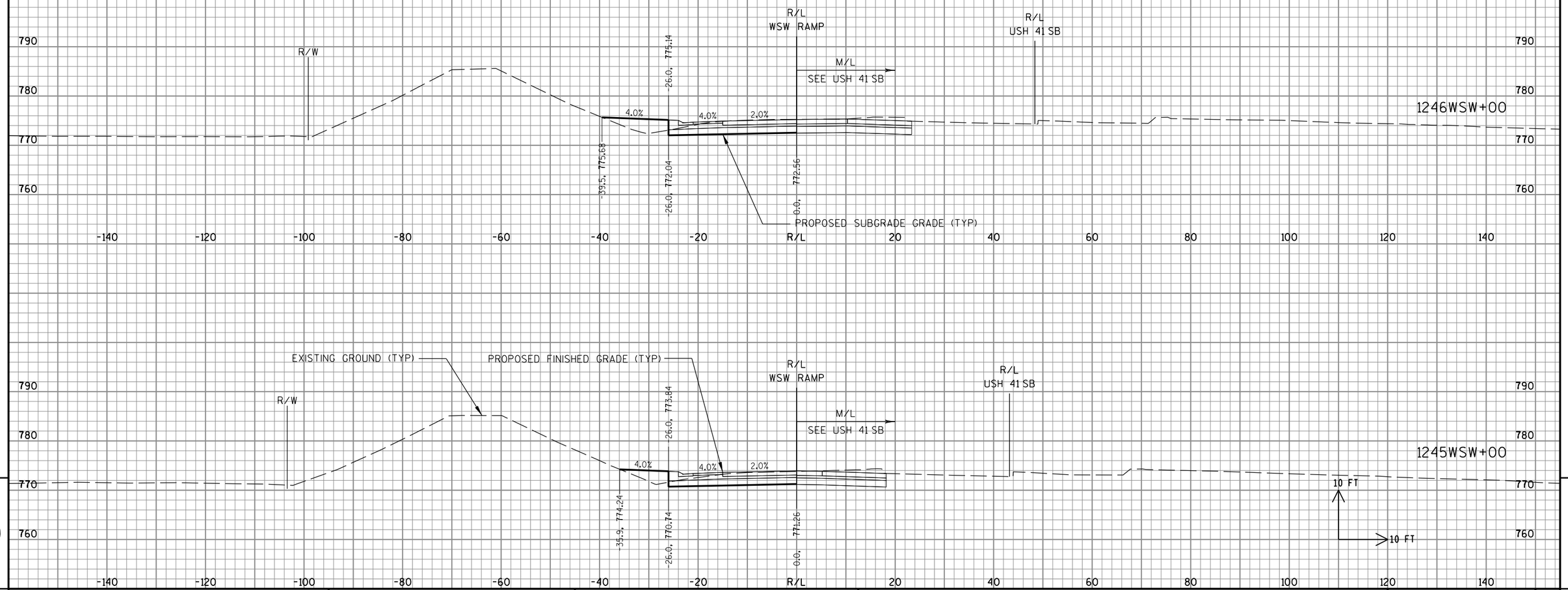

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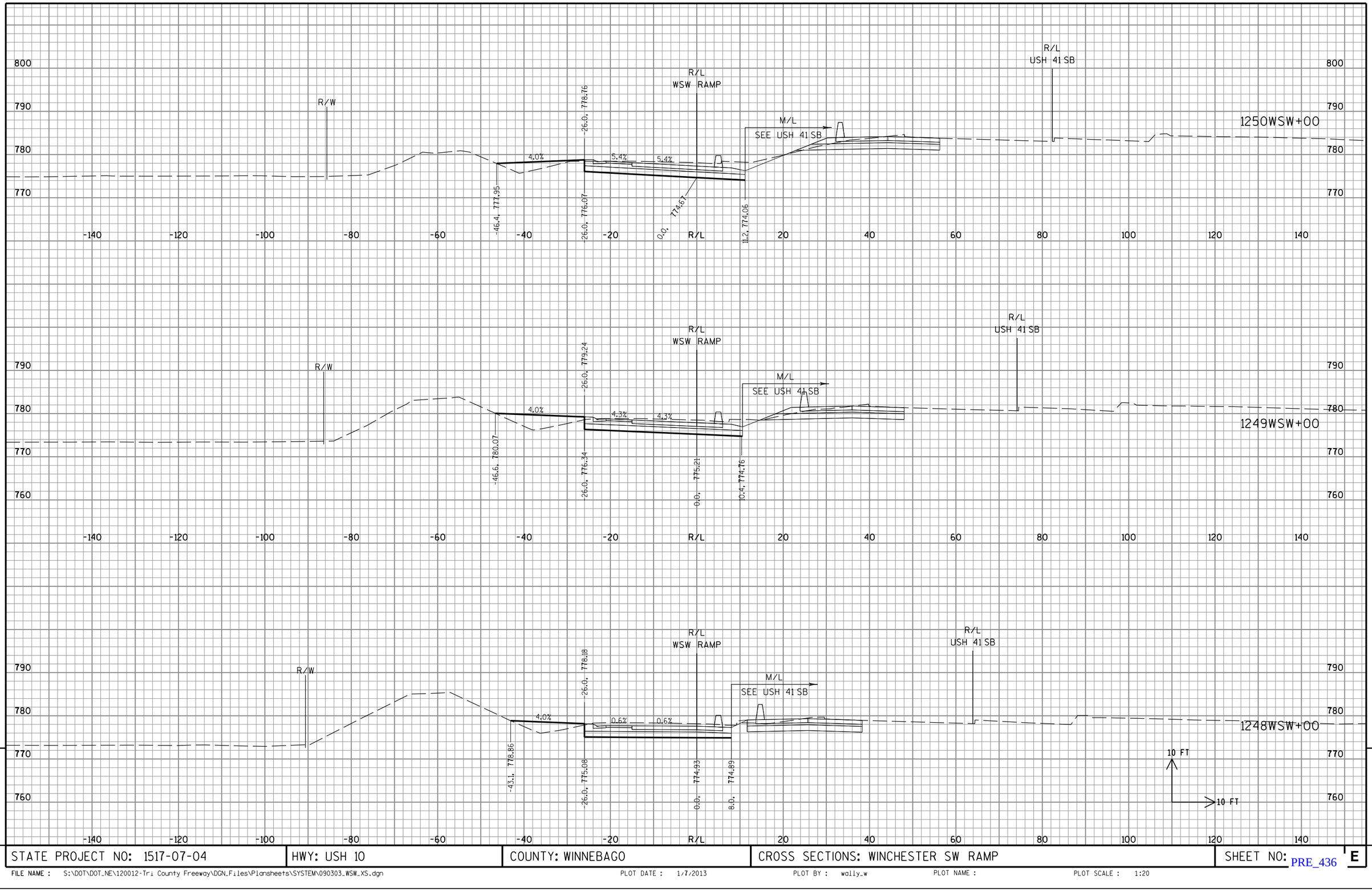
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER SW RAMP	SHEET NO: PRE_435 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090303_WSW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20



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STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER SW RAMP	SHEET NO: PRE_436 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090303_WSW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

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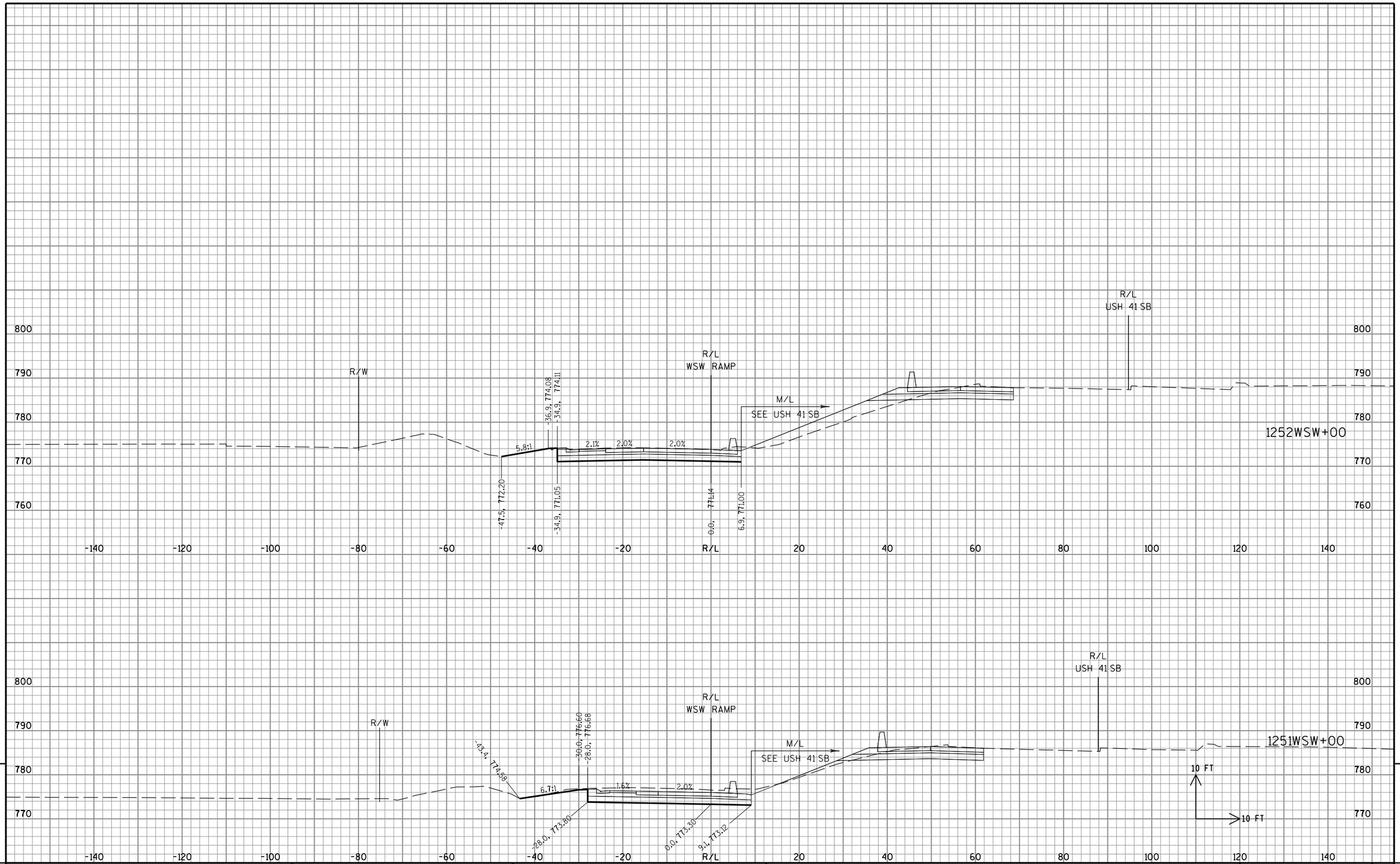

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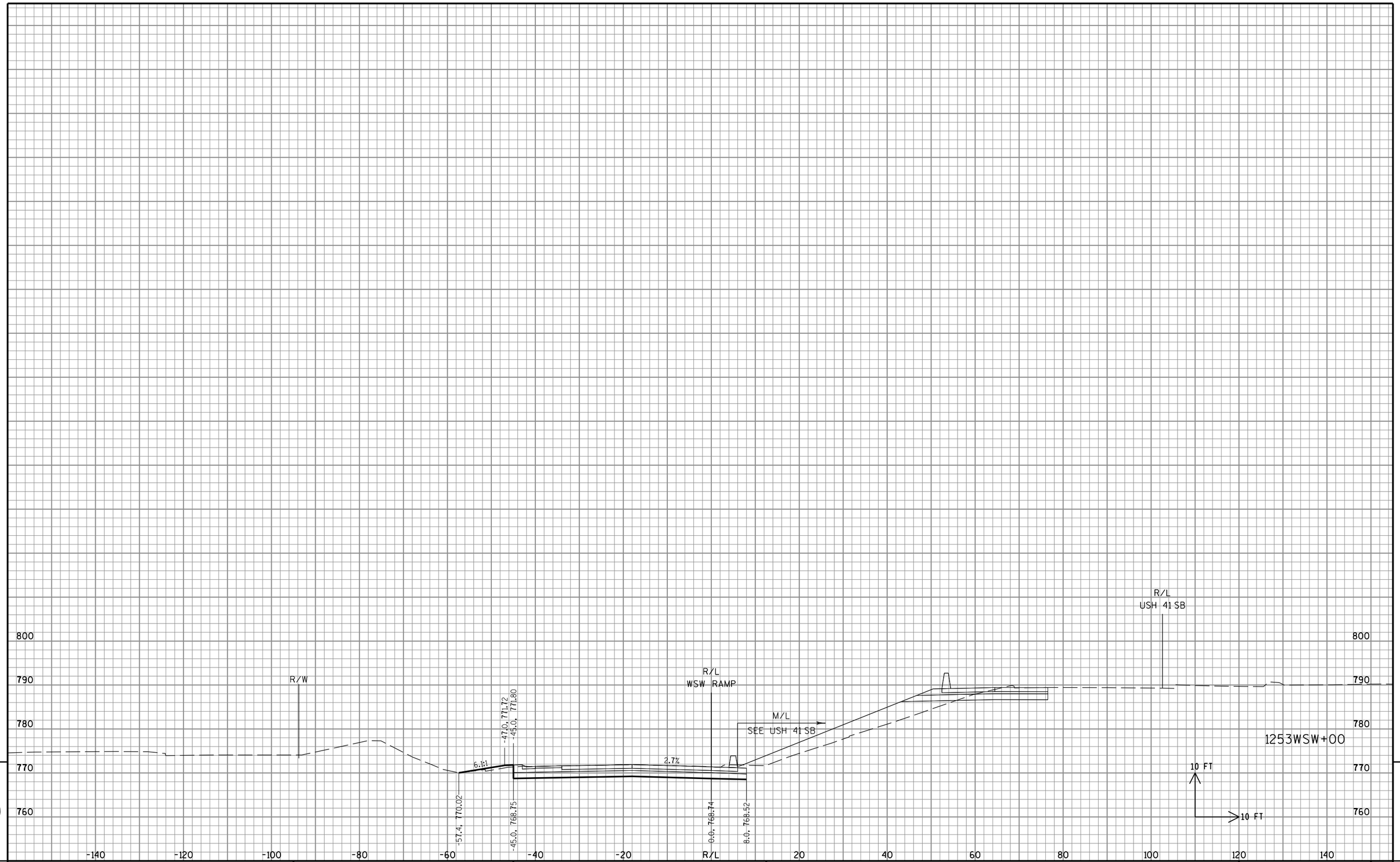
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER SW RAMP	SHEET NO: PRE_437 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090303_WSW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20



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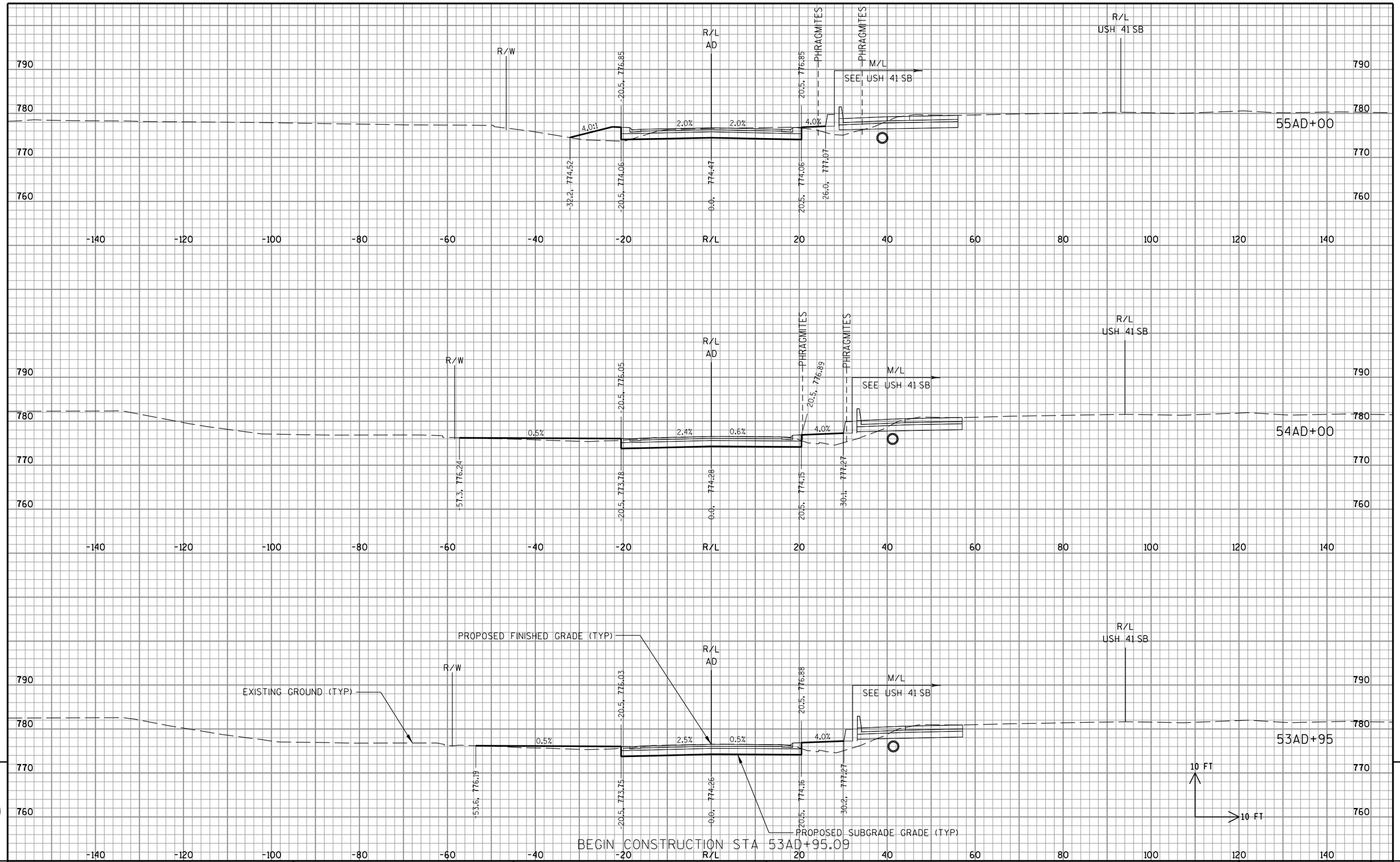
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: WINCHESTER SW RAMP	SHEET NO: E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090303_WSW_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

PRE_438



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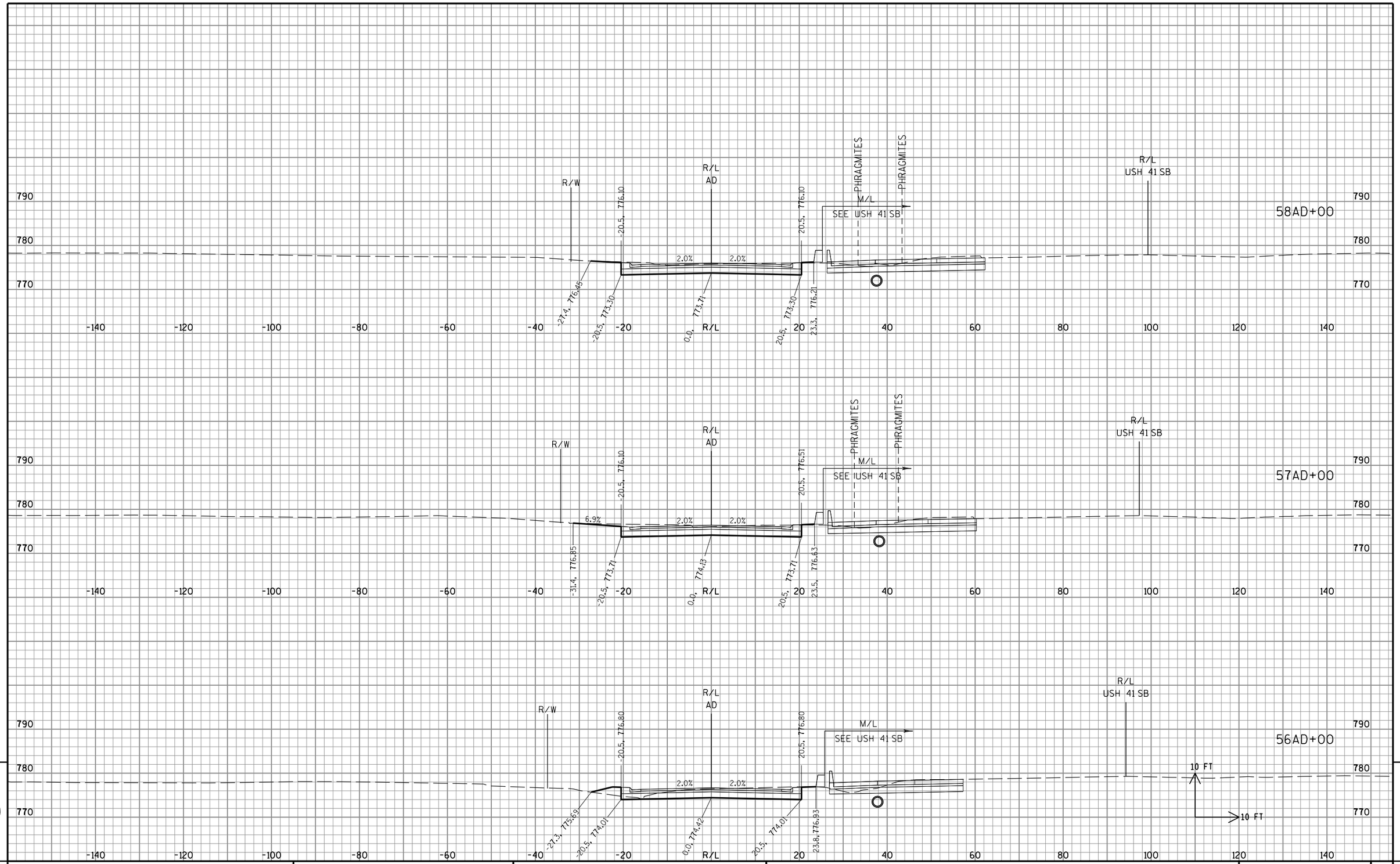
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: AMERICAN DRIVE	SHEET NO: E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090311_AMERICAN_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

PRE_439



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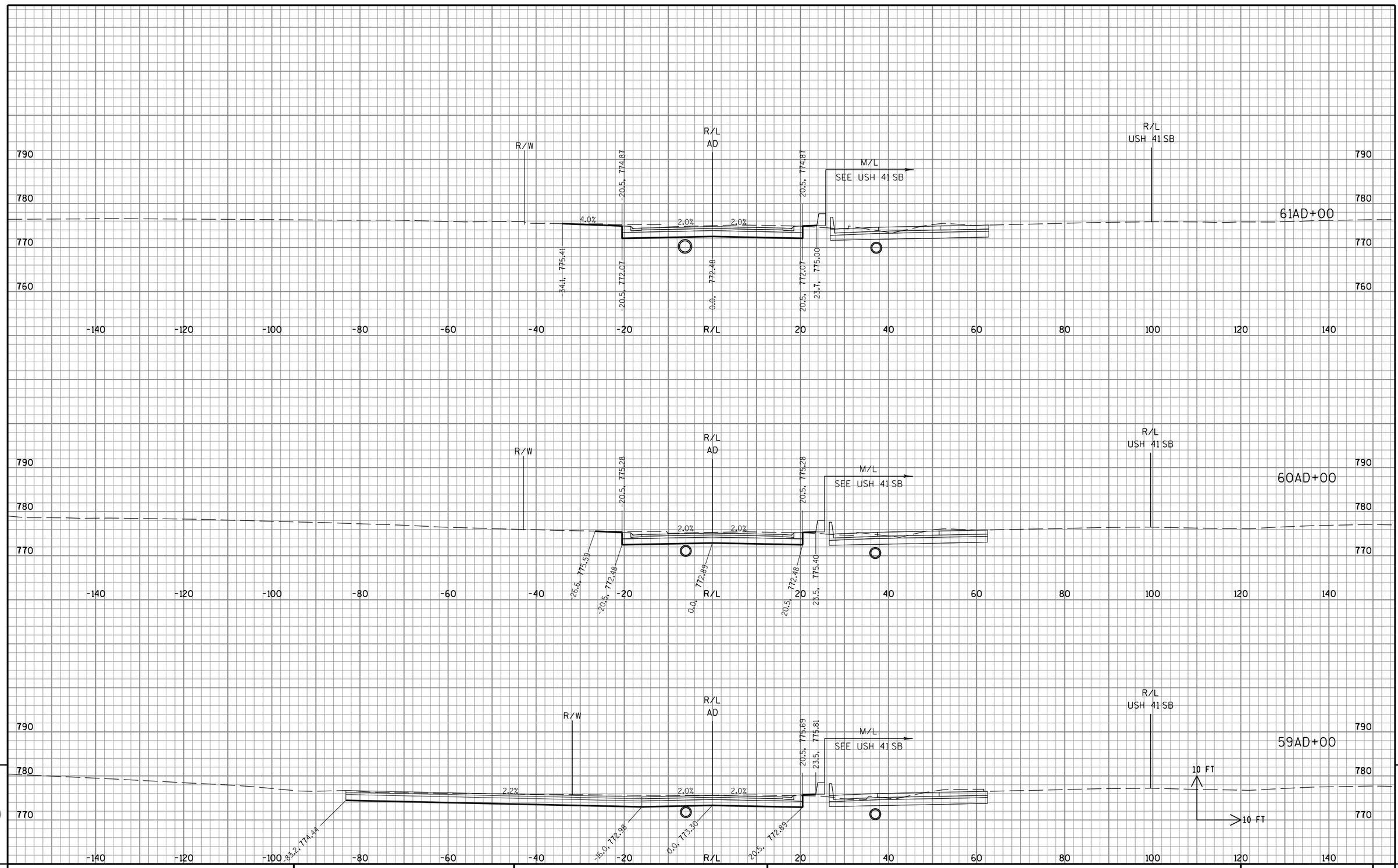
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: AMERICAN DRIVE	SHEET NO: PRE_440 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090311_AMERICAN_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20



STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: AMERICAN DRIVE	SHEET NO: E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090311_AMERICAN_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

PRE_441

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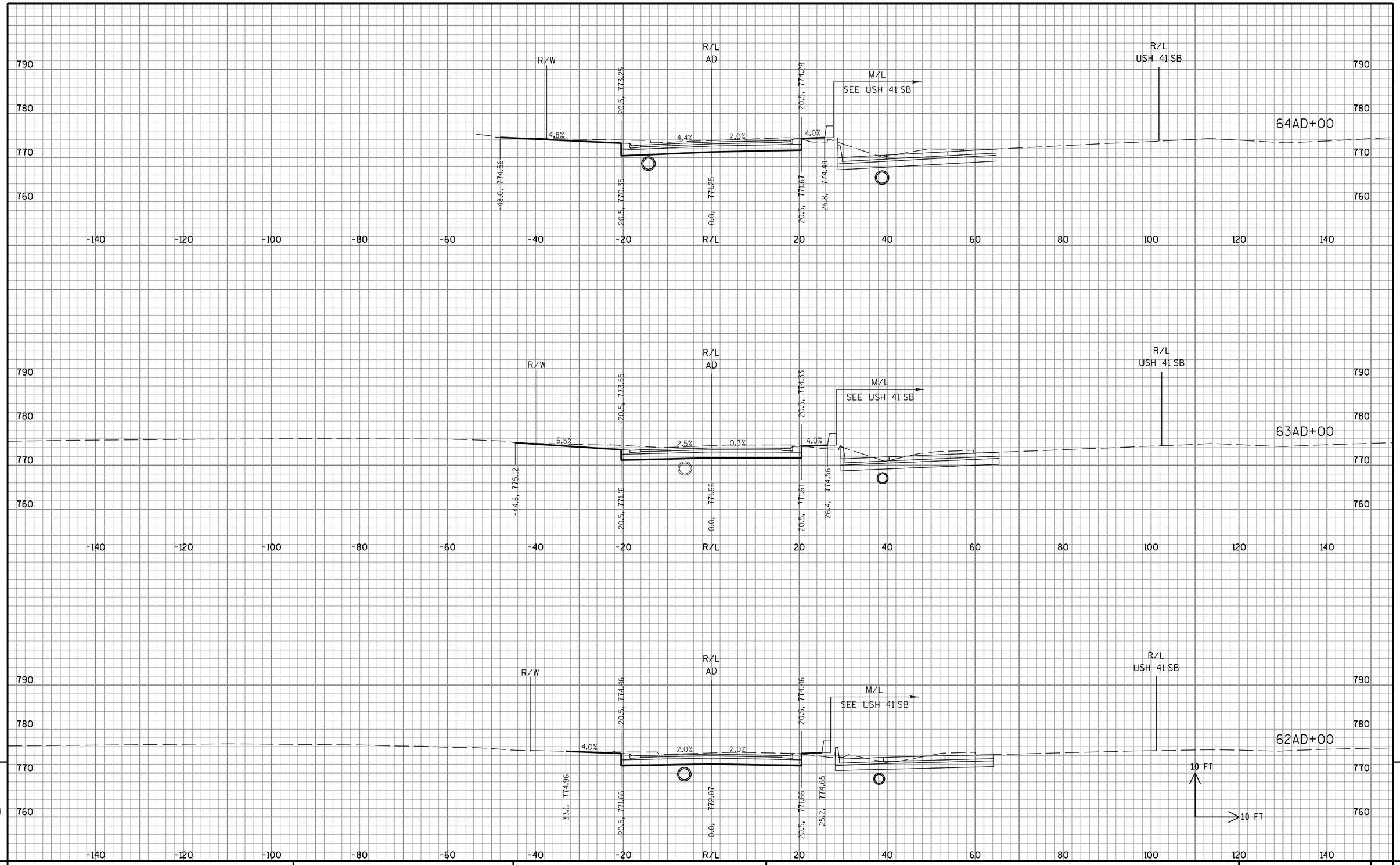

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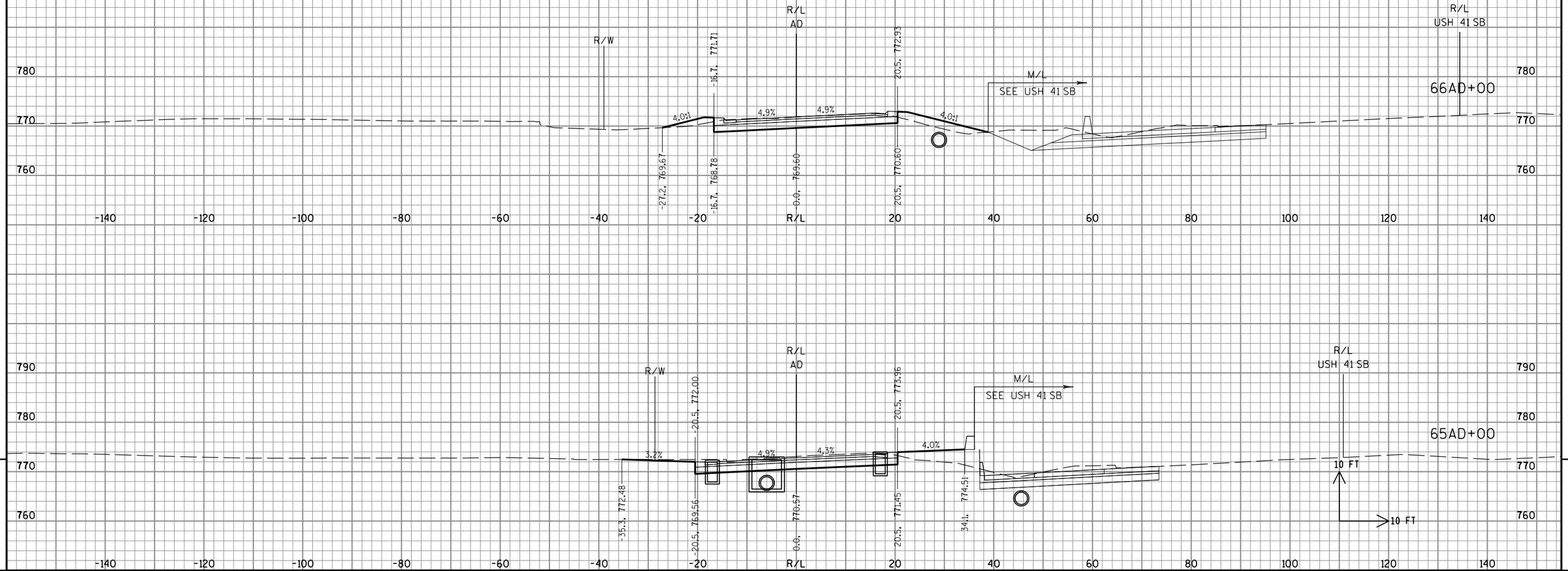
STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: AMERICAN DRIVE	SHEET NO: E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090311_AMERICAN_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

PRE_442

END CONSTRUCTION STA 66AD+00.00



STATE PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	CROSS SECTIONS: AMERICAN DRIVE	SHEET NO: PRE_443 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\090311_AMERICAN_XS.dgn PLOT DATE : 1/7/2013 PLOT BY : wally_w PLOT NAME : PLOT SCALE : 1:20

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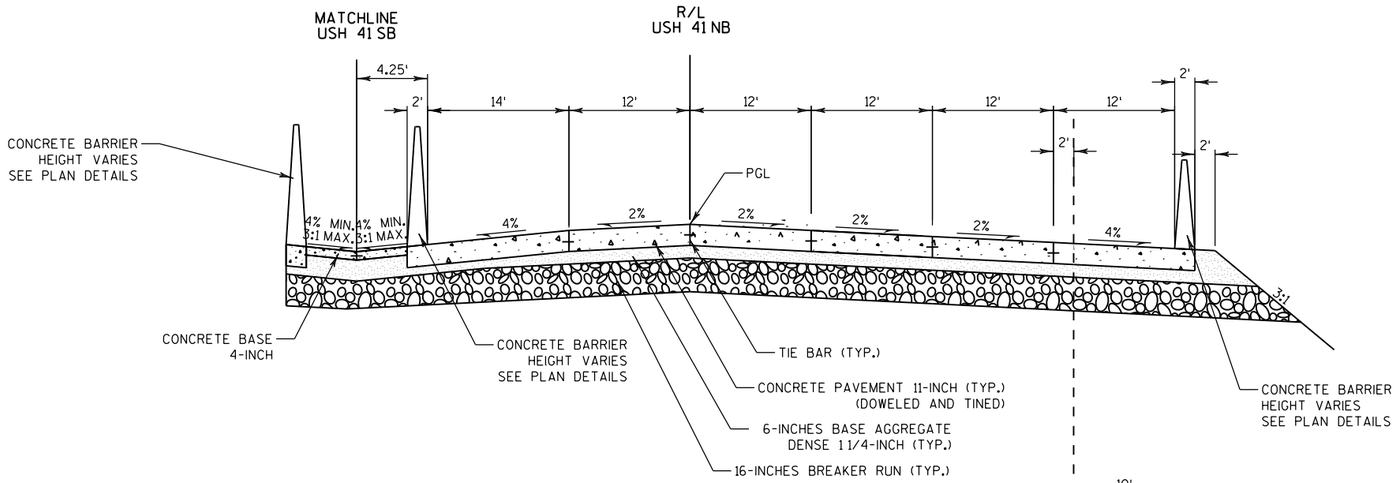
Attachment B

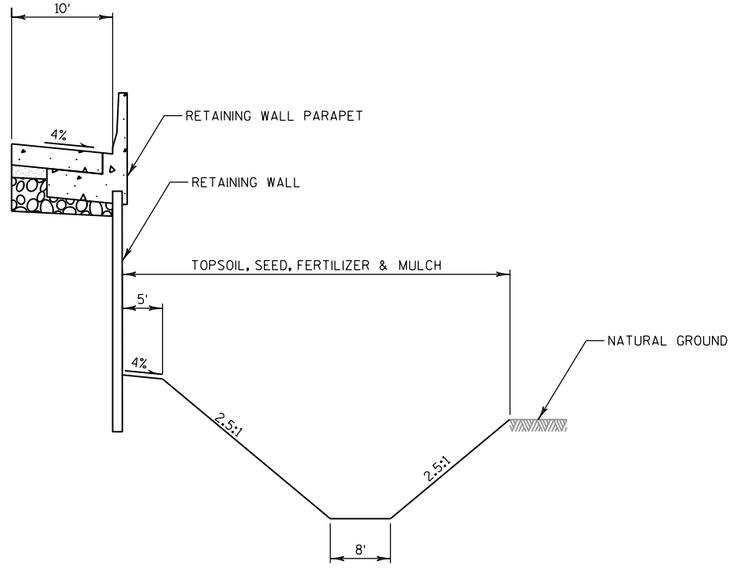
Planning Study Typical Section

2

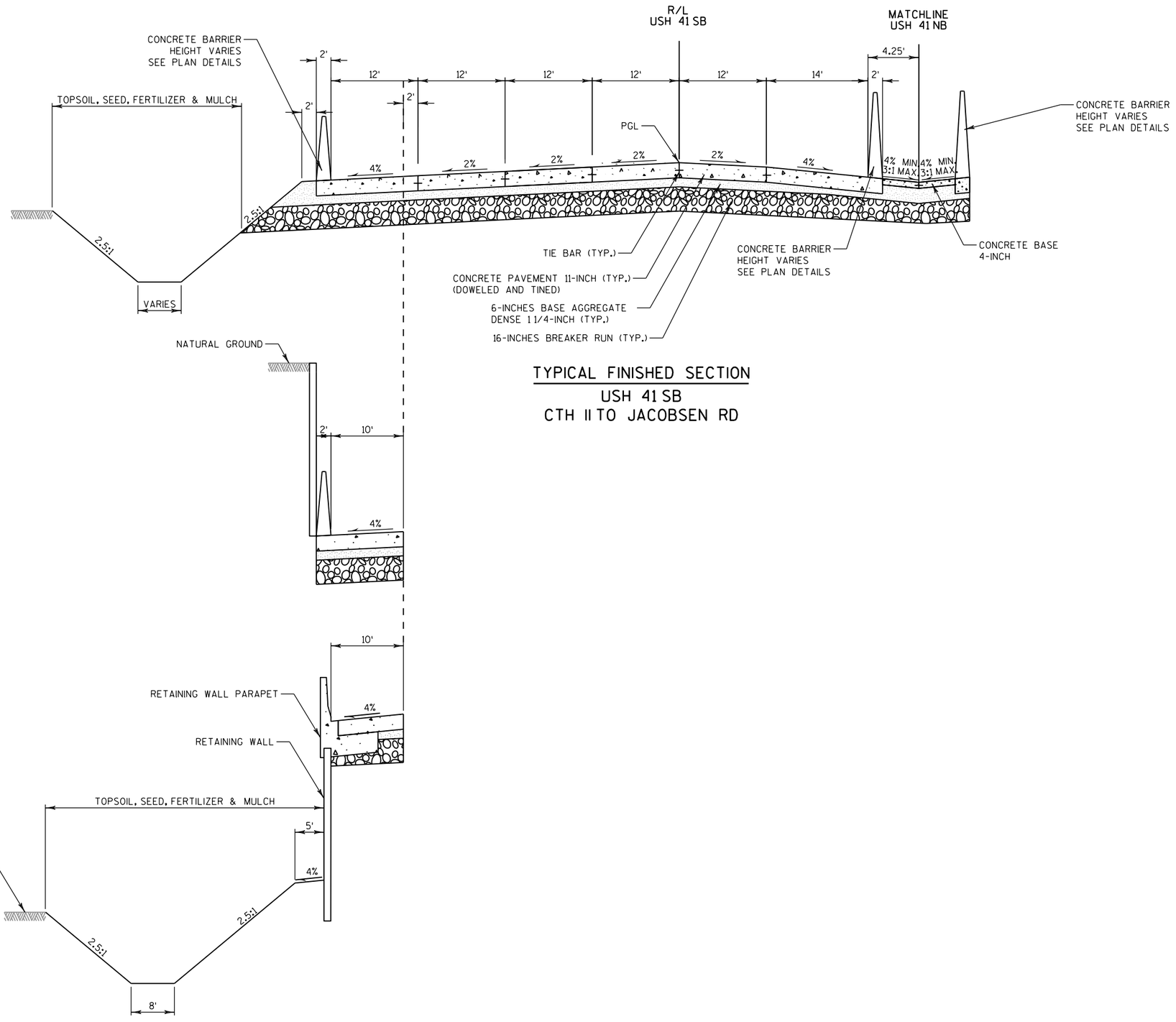


TYPICAL FINISHED SECTION

USH 41 NB
CTH II TO JACOBSEN RD



PROJECT NO: 1517-75-71	HWY: USH 41	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET	E



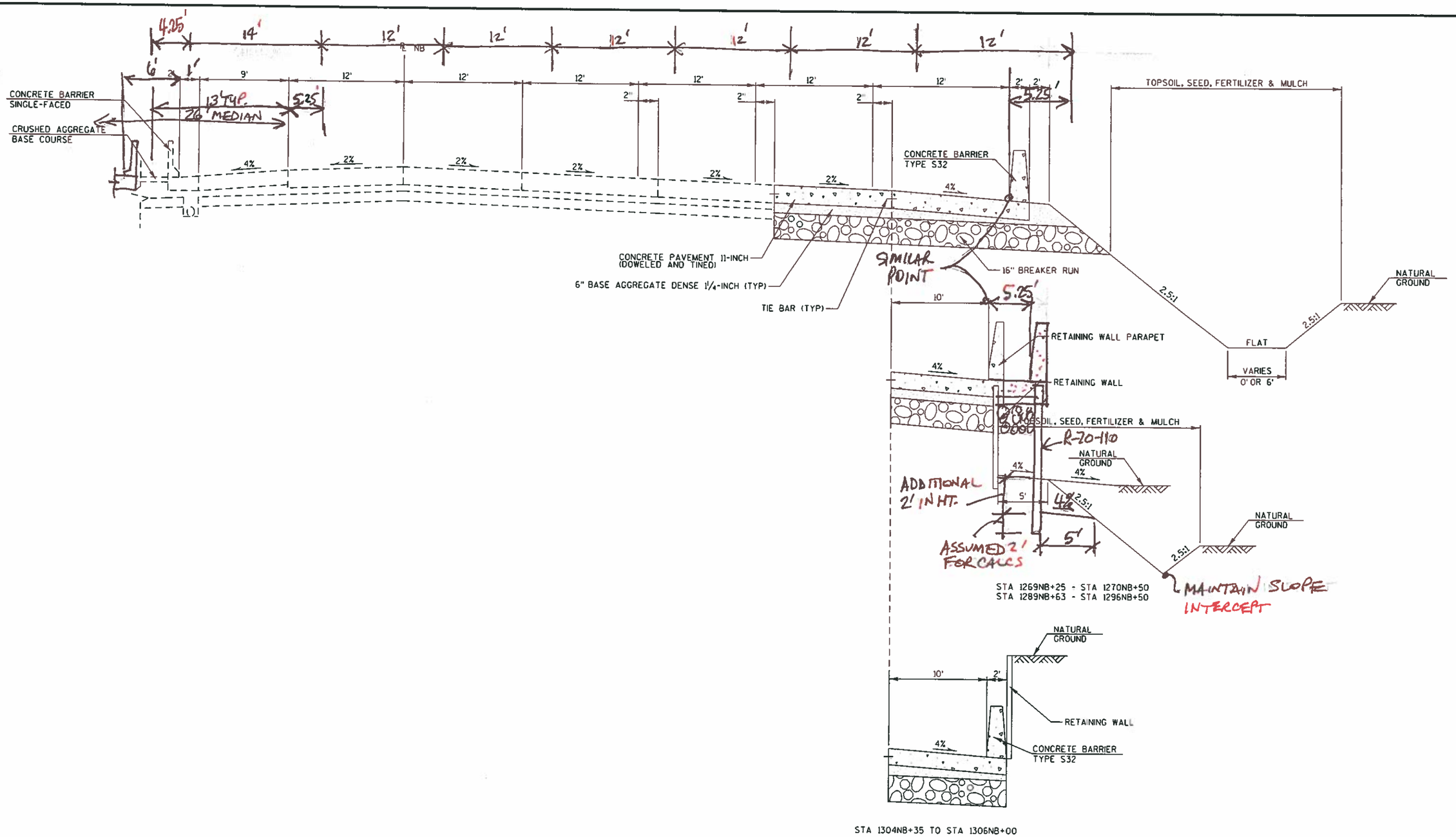
TYPICAL FINISHED SECTION
USH 41 SB
CTH II TO JACOBSEN RD

PROJECT NO: 1517-75-71	HWY: USH 41	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET	E

FILE NAME : J:\44386\t1\Short Term Solutions\Amendment #5\TYICAL SECTIONS2.dgn PLOT DATE : 1/15/2013 PLOT BY : nbennett PLOT NAME : $FILE$ PLOT SCALE : 15:1

Attachment C

Typical Section Showing Impacts



TYPICAL FINISHED SECTION
USH 41 NB

STA 1265NB+25 - STA 1306NB+00
STA 1342NB+88 - STA 1348NB+00

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET PRE_26 E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\020304_ts.dgn
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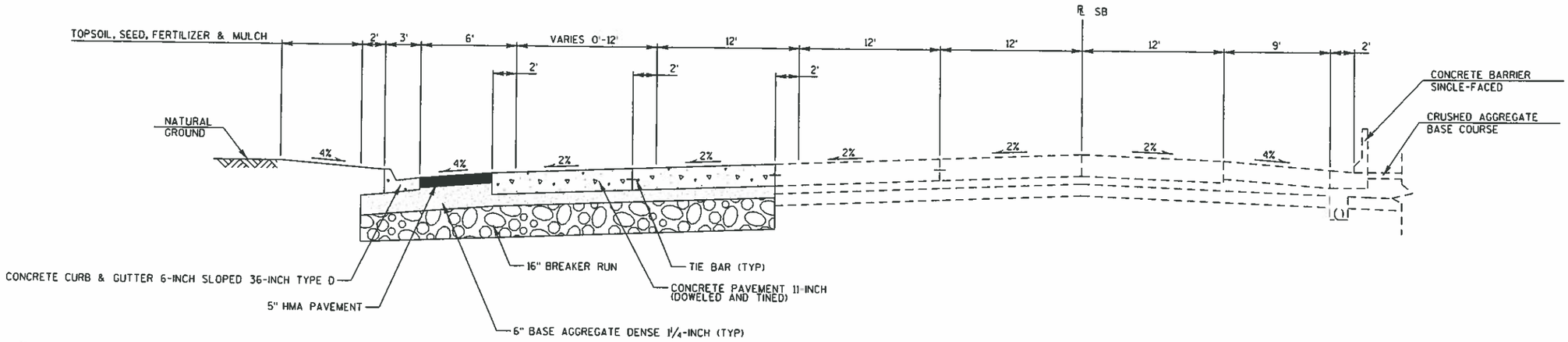
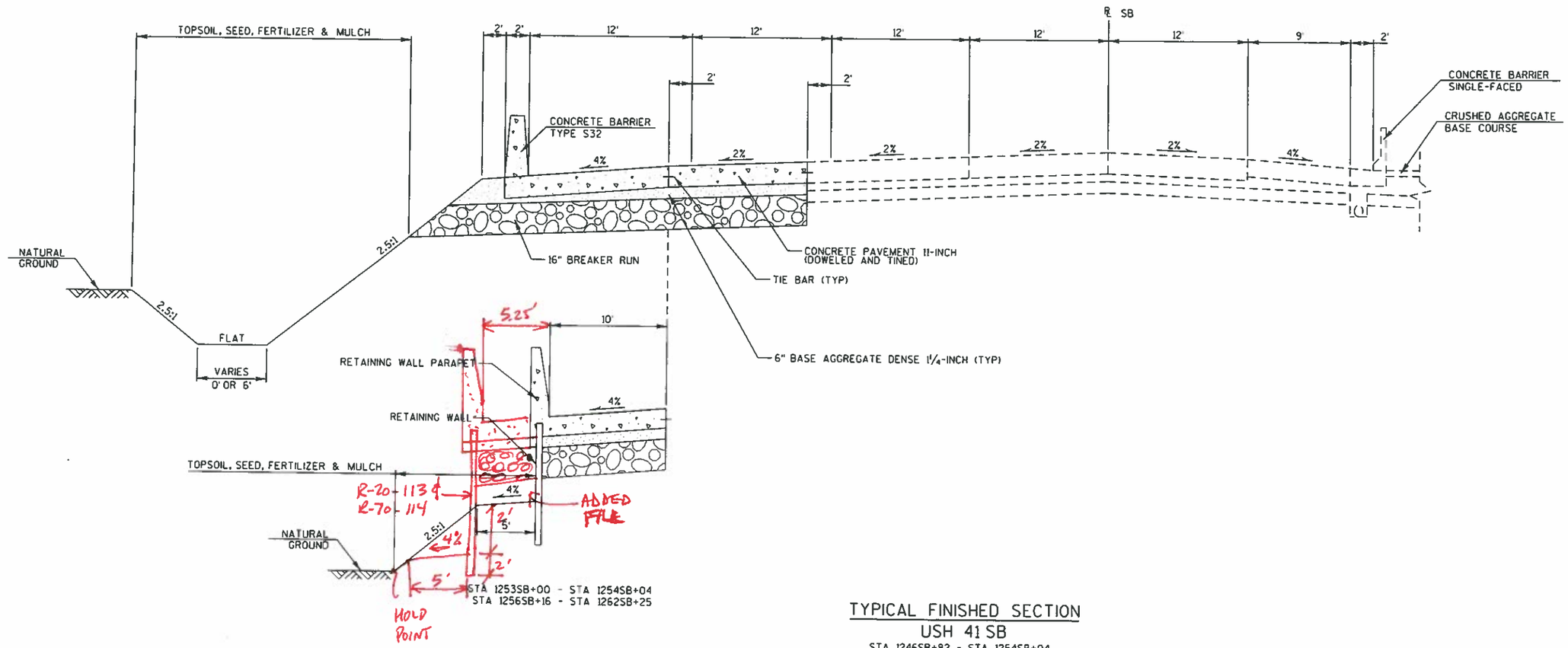


TYPICAL FINISHED SECTION
USH 41 SB
STA 1233SB+64 TO STA 1246SB+82



TYPICAL FINISHED SECTION
USH 41 SB
STA 1246SB+82 - STA 1254SB+04
STA 1256SB+16 - STA 1264SB+89

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET PRE_30 E

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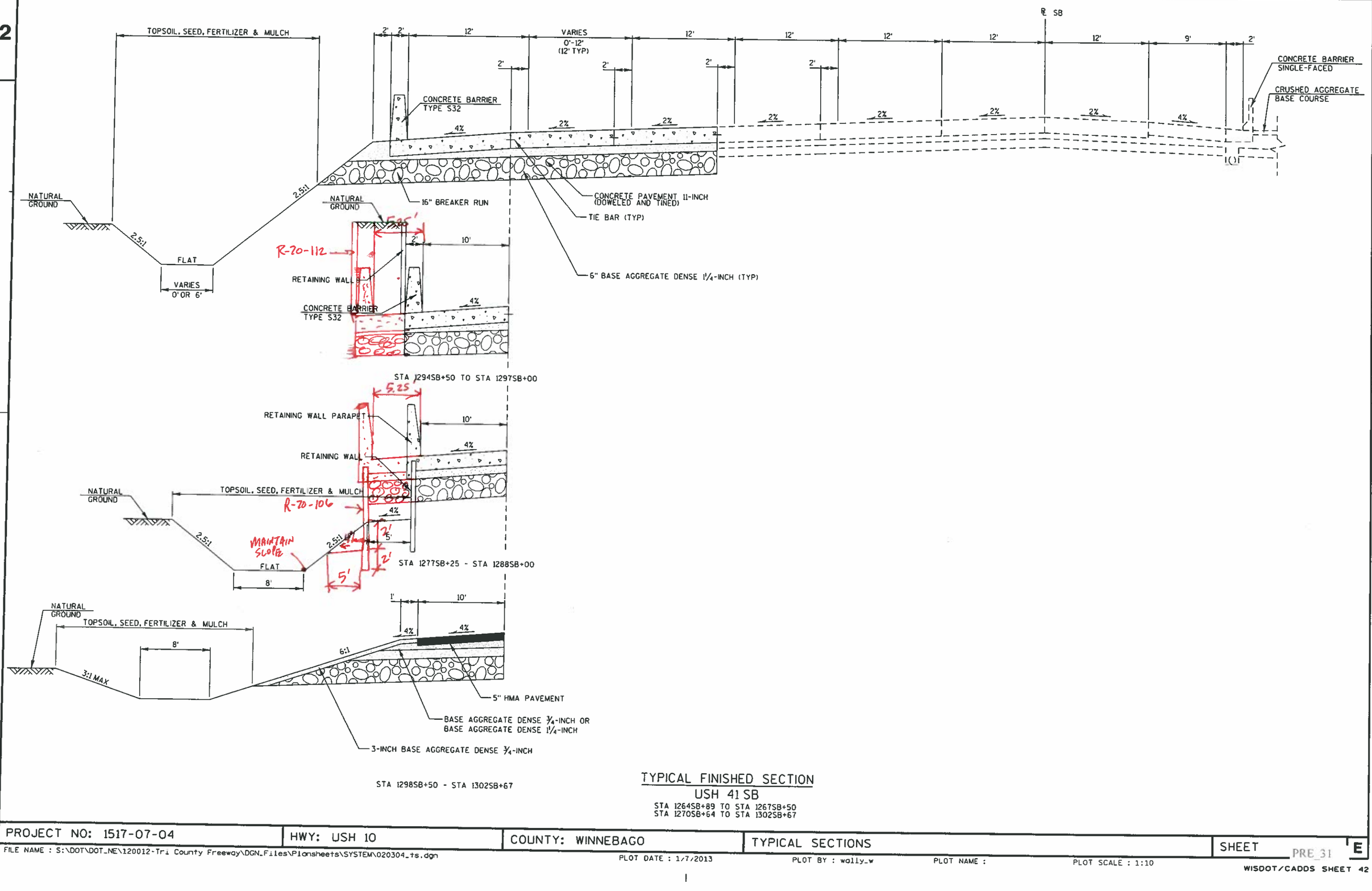
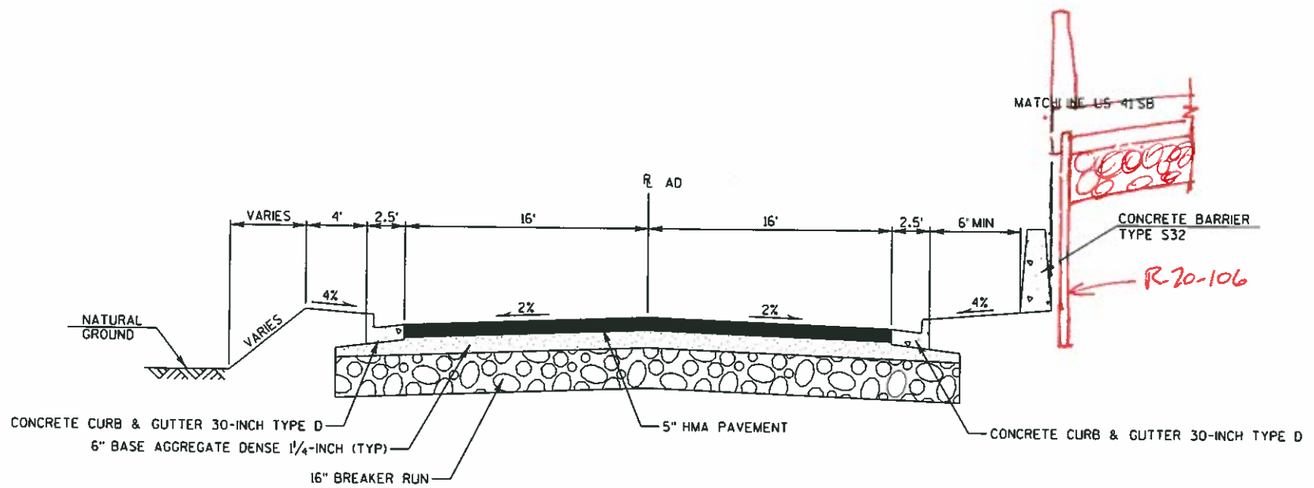
PLOT DATE : 1/7/2013 PLOT BY : wolly_w PLOT NAME : PLOT SCALE : 1:10



TYPICAL FINISHED SECTION
USH 41 SB
STA 1264SB+89 TO STA 1267SB+50
STA 1270SB+64 TO STA 1302SB+67

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET E

2



TYPICAL FINISHED SECTION

AMERICAN DRIVE

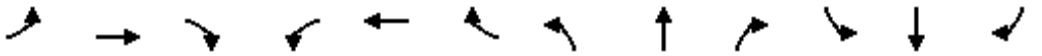
STA 53AD+95 - STA 66AD+00

PROJECT NO: 1517-07-04	HWY: USH 10	COUNTY: WINNEBAGO	TYPICAL SECTIONS	SHEET E

FILE NAME : S:\DOT\DOT_NE\120012-Tri County Freeway\DGN_Files\Plansheets\SYSTEM\020355_ts.dgn
PLOT DATE : 1/7/2013
PLOT BY : wally_w
PLOT NAME :
PLOT SCALE : 1:10
WISDOT/CADDS SHEET 42

Attachment D

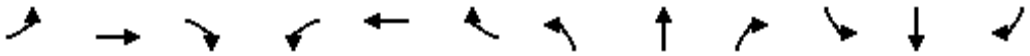
CTH II Interchange HCM Signalized Intersection Capacity Analysis



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	567	215	117	439	0	0	0	0	555	0	395
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3539	1583	1656	3312						1752	1568
Flt Permitted		1.00	1.00	0.25	1.00						0.95	1.00
Satd. Flow (perm)		3539	1583	436	3312						1752	1568
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	659	250	136	510	0	0	0	0	645	0	459
RTOR Reduction (vph)	0	0	197	0	0	0	0	0	0	0	0	174
Lane Group Flow (vph)	0	659	53	136	510	0	0	0	0	0	645	285
Heavy Vehicles (%)	2%	2%	2%	9%	9%	9%	1%	1%	1%	3%	3%	3%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	Perm
Protected Phases		16		5 8	5 8 16						6	
Permitted Phases			16	16						6		6
Actuated Green, G (s)		15.0	15.0	33.0	38.0						30.0	30.0
Effective Green, g (s)		17.0	17.0	30.0	34.0						32.0	32.0
Actuated g/C Ratio		0.21	0.21	0.38	0.42						0.40	0.40
Clearance Time (s)		6.0	6.0								6.0	6.0
Vehicle Extension (s)		3.0	3.0								3.0	3.0
Lane Grp Cap (vph)		752	336	377	1407						700	627
v/s Ratio Prot		c0.19		0.06	c0.15							
v/s Ratio Perm			0.03	0.07							0.37	0.18
v/c Ratio		0.88	0.16	0.36	0.36						0.92	0.45
Uniform Delay, d1		30.5	25.7	17.9	15.6						22.8	17.6
Progression Factor		1.00	1.00	0.77	0.26						1.00	1.00
Incremental Delay, d2		11.2	0.2	0.5	0.1						19.5	2.4
Delay (s)		41.7	25.9	14.3	4.1						42.3	20.0
Level of Service		D	C	B	A						D	B
Approach Delay (s)		37.3			6.3			0.0			33.0	
Approach LOS		D			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

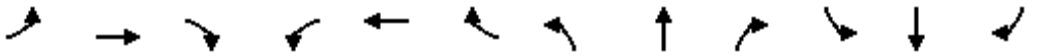
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	344	778	0	0	338	449	218	0	230	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	2.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	1736	3471			3252	1455		1556	1392			
Flt Permitted	0.37	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	673	3471			3252	1455		1556	1392			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	414	937	0	0	407	541	263	0	277	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	181	0	0	0
Lane Group Flow (vph)	414	937	0	0	407	541	0	263	96	0	0	0
Heavy Vehicles (%)	4%	4%	4%	11%	11%	11%	16%	16%	16%	1%	1%	1%
Turn Type	D.P+P	NA			NA	Free	Perm	NA	Perm			
Protected Phases	4 12	2 4 12			2			1				
Permitted Phases	2					Free	1		1			
Actuated Green, G (s)	37.0	43.0			15.0	80.0		25.0	25.0			
Effective Green, g (s)	39.0	42.0			17.0	80.0		27.0	27.0			
Actuated g/C Ratio	0.49	0.52			0.21	1.00		0.34	0.34			
Clearance Time (s)					6.0			6.0	6.0			
Vehicle Extension (s)					3.0			3.0	3.0			
Lane Grp Cap (vph)	633	1822			691	1455		525	469			
v/s Ratio Prot	c0.19	c0.27			0.13							
v/s Ratio Perm	c0.13					0.37		0.17	0.07			
v/c Ratio	0.65	0.51			0.59	0.37		0.50	0.20			
Uniform Delay, d1	18.2	12.4			28.4	0.0		21.1	18.9			
Progression Factor	0.85	1.03			0.70	1.00		1.00	1.00			
Incremental Delay, d2	1.2	0.1			1.1	0.6		3.4	1.0			
Delay (s)	16.6	12.8			20.9	0.6		24.5	19.8			
Level of Service	B	B			C	A		C	B			
Approach Delay (s)		14.0			9.4			22.1			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

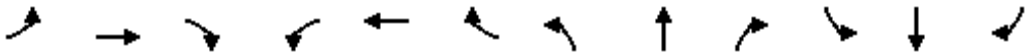
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	596	370	170	654	0	0	0	0	409	0	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3539	1583	1656	3312						1752	1568
Flt Permitted		1.00	1.00	0.19	1.00						0.95	1.00
Satd. Flow (perm)		3539	1583	332	3312						1752	1568
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	693	430	198	760	0	0	0	0	476	0	501
RTOR Reduction (vph)	0	0	312	0	0	0	0	0	0	0	0	198
Lane Group Flow (vph)	0	693	118	198	760	0	0	0	0	0	476	303
Heavy Vehicles (%)	2%	2%	2%	9%	9%	9%	1%	1%	1%	3%	3%	3%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	Perm
Protected Phases		16		5 8	5 8 16						6	
Permitted Phases			16	16						6		6
Actuated Green, G (s)		20.0	20.0	43.0	48.0						20.0	20.0
Effective Green, g (s)		22.0	22.0	40.0	44.0						22.0	22.0
Actuated g/C Ratio		0.28	0.28	0.50	0.55						0.28	0.28
Clearance Time (s)		6.0	6.0								6.0	6.0
Vehicle Extension (s)		3.0	3.0								3.0	3.0
Lane Grp Cap (vph)		973	435	480	1821						481	431
v/s Ratio Prot		c0.20		0.10	c0.23							
v/s Ratio Perm			0.07	0.11							0.27	0.19
v/c Ratio		0.71	0.27	0.41	0.42						0.99	0.70
Uniform Delay, d1		26.1	22.7	12.4	10.5						28.9	26.1
Progression Factor		1.00	1.00	1.05	0.03						1.00	1.00
Incremental Delay, d2		2.5	0.3	0.2	0.1						38.6	9.3
Delay (s)		28.6	23.1	13.2	0.4						67.4	35.3
Level of Service		C	C	B	A						E	D
Approach Delay (s)		26.5			3.0			0.0			51.0	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

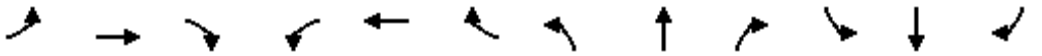
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	638	367	0	0	435	1078	389	0	230	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	2.0		4.0	4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00	1.00			
Frt	1.00	1.00			1.00	0.85		1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (prot)	1736	3471			3252	1455		1556	1392			
Flt Permitted	0.25	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	457	3471			3252	1455		1556	1392			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	769	442	0	0	524	1299	469	0	277	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	201	0	0	0
Lane Group Flow (vph)	769	442	0	0	524	1299	0	469	76	0	0	0
Heavy Vehicles (%)	4%	4%	4%	11%	11%	11%	16%	16%	16%	1%	1%	1%
Turn Type	D.P+P	NA			NA	Free	Perm	NA	Perm			
Protected Phases	4 12	2 4 12			2			1				
Permitted Phases	2					Free	1		1			
Actuated Green, G (s)	42.0	48.0			15.0	80.0		20.0	20.0			
Effective Green, g (s)	44.0	47.0			17.0	80.0		22.0	22.0			
Actuated g/C Ratio	0.55	0.59			0.21	1.00		0.28	0.28			
Clearance Time (s)					6.0			6.0	6.0			
Vehicle Extension (s)					3.0			3.0	3.0			
Lane Grp Cap (vph)	699	2039			691	1455		427	382			
v/s Ratio Prot	c0.39	0.13			0.16							
v/s Ratio Perm	0.22					c0.89		0.30	0.05			
v/c Ratio	1.10	0.22			0.76	0.89		1.10	0.20			
Uniform Delay, d1	21.4	7.8			29.6	0.0		29.0	22.2			
Progression Factor	0.79	1.09			0.88	1.00		1.00	1.00			
Incremental Delay, d2	57.8	0.0			4.7	8.5		72.9	1.2			
Delay (s)	74.7	8.5			30.7	8.5		101.9	23.4			
Level of Service	E	A			C	A		F	C			
Approach Delay (s)		50.5			14.9			72.7			0.0	
Approach LOS		D			B			E			A	

Intersection Summary			
HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

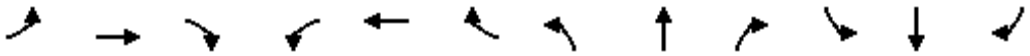
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	596	370	170	654	0	0	0	0	409	0	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	1.00	1.00	0.95						1.00	1.00
Frt		1.00	0.85	1.00	1.00						1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (prot)		3539	1583	1656	3312						1752	1568
Flt Permitted		1.00	1.00	0.20	1.00						0.95	1.00
Satd. Flow (perm)		3539	1583	354	3312						1752	1568
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	693	430	198	760	0	0	0	0	476	0	501
RTOR Reduction (vph)	0	0	306	0	0	0	0	0	0	0	0	188
Lane Group Flow (vph)	0	693	124	198	760	0	0	0	0	0	476	313
Heavy Vehicles (%)	2%	2%	2%	9%	9%	9%	1%	1%	1%	3%	3%	3%
Turn Type		NA	Perm	D.P+P	NA					Perm	NA	Perm
Protected Phases		16		5 8	5 8 16						6	
Permitted Phases			16	16						6		6
Actuated Green, G (s)		21.0	21.0	40.0	45.0						23.0	23.0
Effective Green, g (s)		23.0	23.0	37.0	41.0						25.0	25.0
Actuated g/C Ratio		0.29	0.29	0.46	0.51						0.31	0.31
Clearance Time (s)		6.0	6.0								6.0	6.0
Vehicle Extension (s)		3.0	3.0								3.0	3.0
Lane Grp Cap (vph)		1017	455	407	1697						547	490
v/s Ratio Prot		c0.20		c0.09	c0.23							
v/s Ratio Perm			0.08	0.13							0.27	0.20
v/c Ratio		0.68	0.27	0.49	0.45						0.87	0.64
Uniform Delay, d1		25.3	22.0	14.1	12.3						26.0	23.6
Progression Factor		1.00	1.00	0.95	0.20						1.00	1.00
Incremental Delay, d2		1.9	0.3	0.7	0.1						17.1	6.3
Delay (s)		27.2	22.4	14.1	2.6						43.0	29.9
Level of Service		C	C	B	A						D	C
Approach Delay (s)		25.3			5.0			0.0			36.3	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	638	367	0	0	435	1078	389	0	230	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	2.0	4.0	4.0	4.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	0.95	0.95	1.00			
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)	1736	3471			3252	1455	1478	1478	1392			
Flt Permitted	0.25	1.00			1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)	457	3471			3252	1455	1478	1478	1392			
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	769	442	0	0	524	1299	469	0	277	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	204	0	0	0
Lane Group Flow (vph)	769	442	0	0	524	1299	234	235	73	0	0	0
Heavy Vehicles (%)	4%	4%	4%	11%	11%	11%	16%	16%	16%	1%	1%	1%
Turn Type	D.P+P	NA			NA	Free	Perm	NA	Perm			
Protected Phases	4 12	2 4 12			2			1				
Permitted Phases	2					Free	1		1			
Actuated Green, G (s)	43.0	49.0			15.0	80.0	19.0	19.0	19.0			
Effective Green, g (s)	45.0	48.0			17.0	80.0	21.0	21.0	21.0			
Actuated g/C Ratio	0.56	0.60			0.21	1.00	0.26	0.26	0.26			
Clearance Time (s)					6.0		6.0	6.0	6.0			
Vehicle Extension (s)					3.0		3.0	3.0	3.0			
Lane Grp Cap (vph)	720	2082			691	1455	387	387	365			
v/s Ratio Prot	c0.39	0.13			0.16							
v/s Ratio Perm	0.21					c0.89	0.16	0.16	0.05			
v/c Ratio	1.07	0.21			0.76	0.89	0.60	0.61	0.20			
Uniform Delay, d1	21.0	7.3			29.6	0.0	25.9	25.9	23.0			
Progression Factor	0.81	1.09			0.89	1.00	1.00	1.00	1.00			
Incremental Delay, d2	47.4	0.0			4.7	8.5	6.8	6.9	1.2			
Delay (s)	64.4	8.0			31.0	8.5	32.7	32.8	24.2			
Level of Service	E	A			C	A	C	C	C			
Approach Delay (s)		43.9			15.0			29.6			0.0	
Approach LOS		D			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Attachment E

Conceptual Parapet and Footing Details

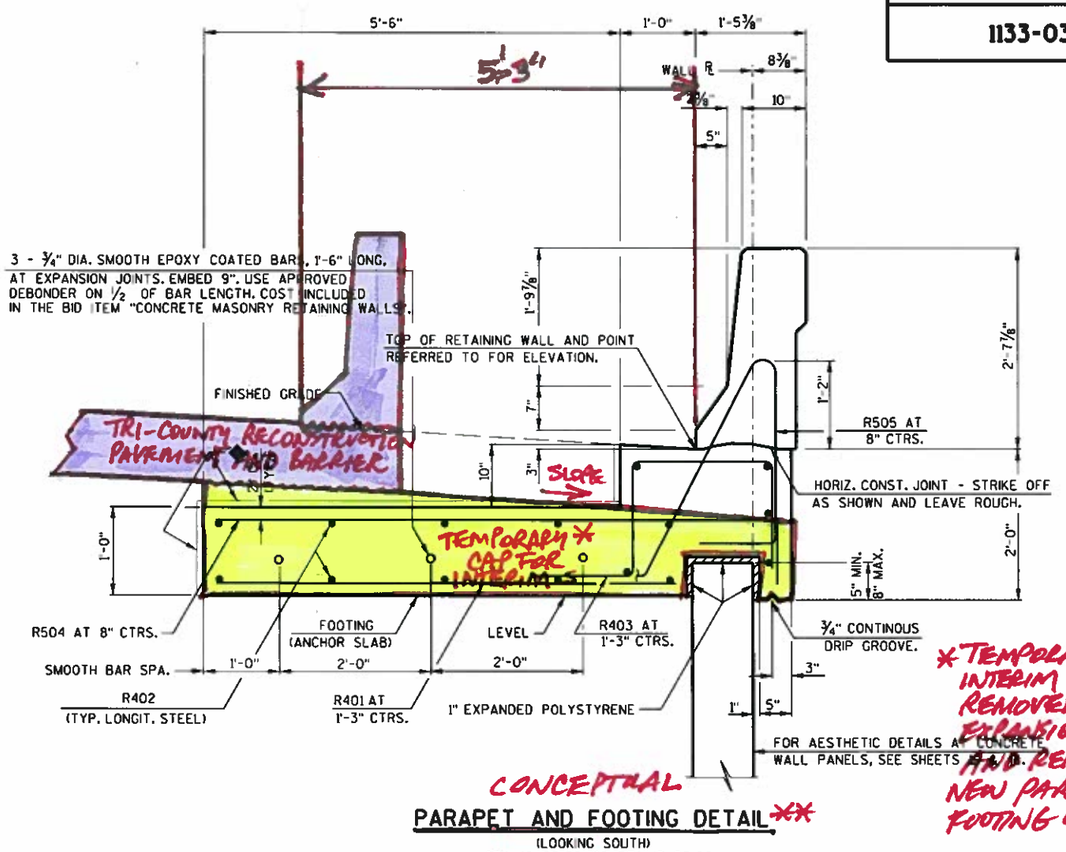
STATE PROJECT NUMBER

1133-03-73

NOTES: FOR PARAPET REINFORCEMENT DETAILS, SEE SHEET 13.
LAP R402 BARS 2'-4" MIN.
PLACE LONGITUDINAL BARS CONCENTRIC TO RAMP ℄ IN CURVED PORTION.

LEGEND

◆ 18" RUBBERIZED MEMBRANE WATERPROOFING - SEAL ALL HORIZONTAL & VERTICAL JOINTS IN FOOTING.



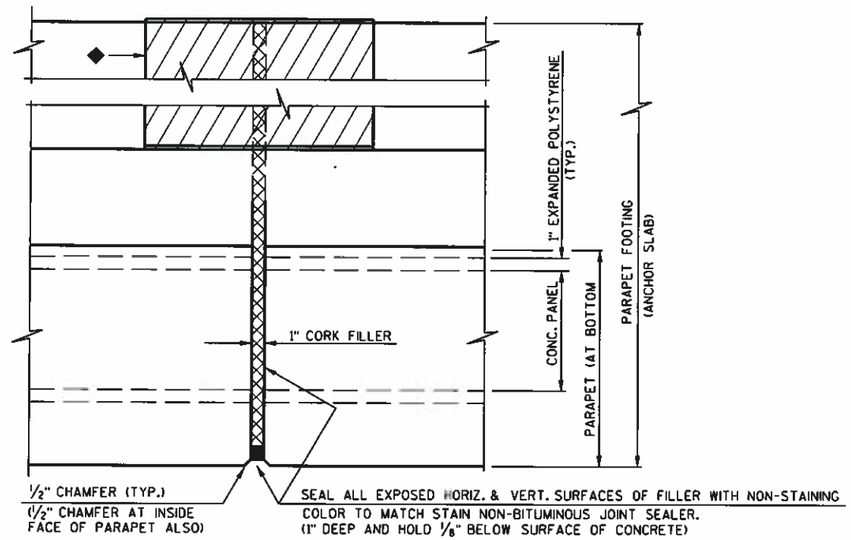
CONCEPTUAL

PARAPET AND FOOTING DETAIL **

(LOOKING SOUTH)
STA. 10+00.00 TO STA. 17+50.00

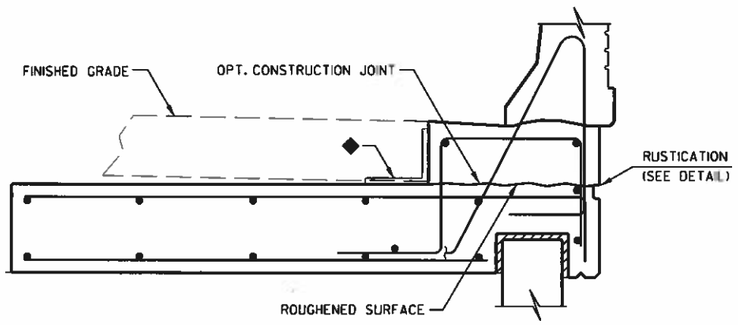
** FURTHUR PREL. & FINAL DESIGN REQUIRED

* TEMPORARY CAP FOR INTERIM WILL BE REMOVED IN FUTURE EXPANSION PROJECT & REPLACED WITH NEW PARAPET AND FOOTING DETAIL.



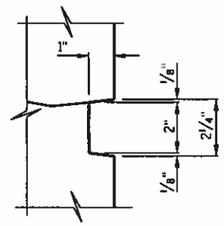
CONCRETE PARAPET/FOOTING EXPANSION JOINT DETAIL

EXPANSION JOINTS TO BE SPACED AT A MINIMUM OF 20' AND A MAXIMUM OF 30'±.
LOCATE EXPANSION JOINTS OVER WALL JOINTS. DO NOT RUN BAR STEEL THRU JOINT.



ALT. SECTION THRU PARAPET AND ANCHOR SLAB

COST OF RUBBERIZED MEMBRANE WATERPROOFING AT ALT. JOINT IS INCIDENTAL TO OTHER BID ITEMS.
THE ALT. JOINT MAY BE USED BY THE CONTRACTOR WITH THE CONCURRENCE OF THE ENGINEER.



RUSTICATION DETAIL

NO.	DATE	REVISION	BY

Plans Prepared By
ROMENESKO ENGINEERING, INC.

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN SECTION

STRUCTURE R-5-61

DRAWN BY TAW | PLANS CK'D. TR

SECTION & DETAILS

SHEET 12 OF 16
2359

8

8

FILE NAME : P:\152 DSH 41 1133-03-02 DRS\structures\R-5-61\12 wall section v8_r-5-61.dgn
PLOT DATE : 4/2/2012

Attachment F

Cost Calculations

Calculations for	BASE COSTS FOR COMPARISONS	Job No. 44386	Sheet No. 1
Made by JDG		Date	
Checked by		Date	
Backchecked by		Date	

HNTB

ROUGH SQUARE FOOTAGES WERE PULLED FROM CROSS SECTIONS TO DETERMINE WALL AREAS.

R-70-113

AREA	UNIT COST	COST
530	$60/SF	$31,800

R-70-114

AREA	UNIT COST	COST
4747	$60/SF	$284,820

R-70-110

AREA	UNIT COST	COST
2820	$60/SF	$169,200

R-70-106

AREA	UNIT COST	COST
9304	$60/SF	$558,240

SUBTOTAL RET. WALLS = $1,044,060

R-70-112

1852 $60/SF $111,120

R-70-112 IS HOLDING BACK AMERICAN DRIVE FILL FROM US 41 SB MAINLINE. NO COST DIFFERENCE BETWEEN THE TRI-COUNTY PROJECT AND PLANNING PROJECT IS ANTICIPATED.

B-70-129

AREA	UNIT COST	COST
(208.60) x (18.75) = 3911.25	$140/SF	$547,600

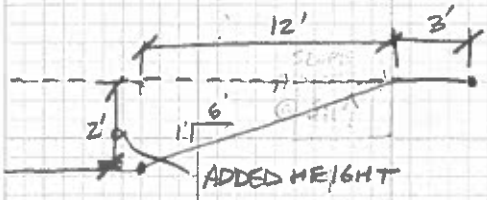
SUBTOTAL TOTAL = $547,600

Calculations for ADDITIONAL COSTS	Job No. 44386	Sheet No. 2
Made by JDG	Date	
Checked by	Date	
Backchecked by	Date	

HNTB

RETAINING WALL(S) ADJUSTMENTS

SLOPE IN FRONT OF WALL IS 2:5:1 AS SHOWN ON TYPICAL SECTION FROM DRAFT 60% PLANS. IF THE ROADWAY IS MOVED OUTWARD 5.25', THEN THE WALL WILL BE 5.25/2.5' FOR APPROXIMATELY 2' TALLER.



IF SLOPE ALONG WALL NEAR BARRIER IS ASSUMED AT 6:1, THEN THE ADDED DISTANCE IS DETERMINED TO BE AN ADDITIONAL 12'. ASSUMED 15' AS CONSERVATIVE.

ADDED WALL AREA WILL BE 2 x OLD WALL LENGTH + 30 SF

ITEM	WALL	OLD LENGTH	NEW LENGTH	AREA ADDED	UNIT COST	COST
(1A)	R-70-113	104'	119'	238 SF	$60/SF	$14,280
(1A)	R-70-114	609'	624'	1248 SF	$60/SF	$74,880
-	R-70-112	NO COST DIFFERENCE				N/A
(3A)	R-70-106	1075'	1090'	2180 SF	$60/SF	$130,800
(4A)	R-70-110	687'	702'	1404 SF	$60/SF	$84,240
			2535'			$304,200

~30% MORE WALL COST

ADDITIONAL PAVEMENTS

ADDITIONAL PAVEMENT REQUIRED BETWEEN DESIGN PAVEMENT AND 5.25' OFFSET FROM PLANNING STUDY (INCLUDES B.A.D. AND BREAKER.

SB. FULL BEGIN STA 1252+50
FULL END STA 1298+50
SUBTOTAL LENGTH 4600 LF
70:1 TRANSITION 7 x 5.5 = 385 ~ 400 LF
LESS BRIDGE LENGTH ~ 200 FT
TOTAL LENGTH 4800 LF

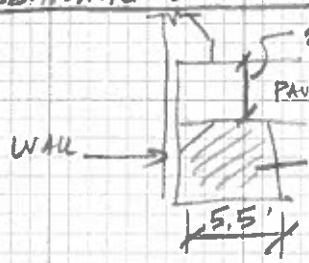
AREA = 5.25' x 4800' = 25,200 SF

COST = 25,200 SF / 9 x $50/SY = $140,000

NB IS SIMILAR, BUT ONLY R-70-110 plus transitions, SAY 1100 LF.
AREA = 5.25 x 1100 = 5775 SF / 9 x 50 = $32,000
TOTAL $172K

CONSIDER AS PART OF RETAINING WALL STRUCTURAL FILL COSTS ~ INCLUDED IN COSTS ABOVE.

ADDITIONAL EARTHWORK FILL



Calculations for	ADDITIONAL COSTS	Job No.	44386	Sheet No.	3
Made by		Date			
Checked by		Date			
Backchecked by		Date			

HNTB

B-70-129 ADDITIONAL WIDTH

WIDTH = 5.25' + 1.5' = 6.75'
(2 PARAPET)

LENGTH = 208.60'

AREA = (208.60')(6.75') = 1408.05 SF

COST = 1408.05 SF ($140/SF) = $197,200

~30% MORE BRIDGE COST

AMERICAN DRIVE ADJUSTMENTS

ADJUSTING AMERICAN DRIVE TO THE WEST AWAY FROM US 41 SB TO ACCOUNT FOR PLANNING STUDY CROSS SECTION WILL RESULT IN APPROXIMATELY 600 FT ROADWAY AND 150 FT NORTH FURTHER THAN ORIGINAL LAYOUT IN ~~DRAFT~~ 60% PLANS.

USE $15/LF FOR C&G

USE $32/SY FOR HMA PAVEMENT / B.A.D. / $ AND BREAKER

ITEM	LF / AREA	UNIT COST	COST
SOUTH C&G	1200 LF	$15/LF	$18,000
SOUTH PAVT	32(600)/9 = 2133 SY	$32/SY	$68,300
NORTH C&G	150 LF	$15/LF	$1,800
NORTH PAVT	32(150)/9 = 533 SY	$32/SY	$ 17,100
PARKING LOT	300(5)/9 = 167 SY	$32/SY	$ 5,300
TOTAL		(CONS.	$ 110,500

Calculations for TEMPORARY OPTION SAVINGS	No. 44386	Sheet No. 4
Made by JDG	Date	
Checked by	Date	
Backchecked by	Date	

HNTB

B-70-129 SUBSTRUCTURE WIDENING ONLY

WIDENING COST IS $140/SF

DECK COST IS $60/SF (SAVINGS)

1 ADDITIONAL LINE OF 54" GIRDER ~ 200' @ $180/LF OR $36,000 SAVINGS

SAVINGS: $60/SF × 1408.05 SF (SEE PREVIOUS) = $84,500

TOTAL SAVINGS – $120,500

IF RETAINING WALLS ARE PLACED IN CORRECT LOCATIONS TO ACCOMMODATE THE FUTURE EXPANSION SECTION AND A TEMPORARY CAP WAS IMPLEMENTED, THE ADDITIONAL PAVEMENT COSTS WOULD BE SAVED (SEE NOTE BELOW)

TOTAL SAVINGS –$152,800

TEMPORARY CAP AND BARRIER COSTS ARE INCLUDED IN $60/SF RETAINING WALL COSTS - THEREFORE OFFSET

NOTE: WHAT IF THE RETAINING WALLS AND BRIDGE WHERE BUILT IN LOCATION THAT WILL ACCOMMODATE THE PLANNING STUDY CROSS SECTION BUT WILL ELIMINATE POTENTIAL COMPLICATIONS WITH SUPERELEVATION, VERTICAL GRADE ADJUSTMENTS, CROSS SLOPE CORRECTIONS, ETC.? REFER TO ATTACHED RETAINING WALL DETAILS (EXAMPLE FROM 41/29) FOR CONCEPTUAL TEMPORARY CAP DETAIL.

PARTIAL

Calculations for PLANNING STUDY COSTS	Job No. 44386	Sheet No. 5
Made by	Date	
Checked by	Date	
Backchecked by	Date	

HNTB

ADDITIONAL COSTS DURING FUTURE EXPANSION PROJECT WILL BE TO REMOVE EXISTING TEMPORARY CAP/BARRIER AND TO RE-POUR THE PARAPET AND FOOTING

REMOVE TEMP. CAP & BARRIER

TEMP. CAP: $20/SY × (8' × 2535') = $95,000
BARRIER: $20/LF × 2535' = $50,700
95,800

NEW FOOTING AND PARAPET

FOOTING: AREA – (8'×1') + (2.5'×1') = 10.5SF
LENGTH – 2535 LF (SEE ABOVE)
VOLUME – 26,618CF / 27CF/CY = 986CY
COST – $460/CY × 986CY = $453,600

PARAPET: COST – $50/LF × 2535 LF = $126,800
580,400

TOTAL COSTS $1,676,200

IF TEMPORARY CAP CAN BE MADE PERMANENT (SEE ALTERNATE DETAIL ON ATTACHED 41/29 RET. WALL EX.) THEN THE COST COULD BE REDUCED TO BARRIER REMOVAL AND NEW PARAPET AND SECOND POUR COSTS.

BARRIER REMOVAL $50,700
PARAPET $126,800
SECOND POUR (2.5'×1')(2535')/27 ($460/CY) $108,000
TOTAL $285,500

Calculations for	A: SUMMARY	Job No.	44386	Sheet No.	6
Made by	JDG	Date			
Checked by		Date			
Backchecked by		Date			

HNTB

(1) TOTAL COSTS TO MOVE RETAINING WALLS OUTWARD TO EXPANSION FOOTPRINT & WIDEN B-70-129, PROVIDE ADDITIONAL PAVEMENTS WITH EARTHWORK FILL, AND ADJUST AMERICAN DRIVE:

ITEM	COSTS
RETAINING WALLS	$ 304,200
ADDITIONAL PAVEMENTS	$ 152,800
ADDITIONAL EARTHWORK FILL	$ 8,300
B-70-129 WIDENING	$ 197,200
AMERICAN DRIVE ADJUSTMENTS	$ 110,500
TOTAL	$773,000

(2) IF ONLY BRIDGE SUBSTRUCTURE IS WIDENED AND TEMPORARY CAP IS IMPLEMENTED, THE FOLLOWING SAVINGS WILL BE REALIZED

ITEM	SAVINGS
B-70-129 SUPERSTRUCTURE	- $120,500
ADDITIONAL PAVEMENTS	- $152,800
TOTAL	- 273,300

STUDY COSTS ⇒ NET COST [(1) - (2)] $500,300

(3) COSTS TO FUTURE EXPANSION PROJECTS TO IMPLEMENT (1) & (2) ABOVE

ITEM	COSTS
REMOVE TEMP CAP & BARRIER	$147,000
NEW FOOTING AND PARAPET	$580,400
TOTAL	$ 727,400

IF THE TEMPORARY CAP IS PERMANENT, COSTS GO DOWN TO $269,100 FOR BARRIER REMOVAL, SECOND POUR W/ PARAPET.

Calculations for	FULL PLANNING STUDY COSTS	Job No.	44386	Sheet No.	7
Made by		Date			
Checked by		Date			
Backchecked by		Date			

HNTB

IF THE PLANNING STUDY HAS TO CONSTRUCT THE RETAINING WALLS FROM SCRATCH.

BASE COSTS	$1,044,000
ADDITIONAL HEIGHT FOR NEW LOCATIONS	$304,200
EARTHWORK	$8,300
TOTAL	$1,356,500

REMOVAL OF RETAINING WALLS

WALL	LF	UNIT COST	COST
R-70-113	104'	$100/LF	$10,400
R-70-114	609'		$60,900
R-70-112	350'		$35,000
R-70-106	1075'		$107,500
R-70-110	687'		$68,700
TOTAL	2885'		$288,500

TOTAL COSTS $1,645,000

IF THE PLANNING STUDY HAS TO RECONSTRUCT AMERICAN DRIVE IF NOT IN CORRECT LOCATION

ITEM	LF/AREA	UNIT COST	COST
C&G	1950(2) = 3900LF	$15/LF	$58,500
PAVEMENT	$\frac{(32)(1950)}{9}$ = 6933SY	$32/SY	$221,900
PARKING LOT	$\frac{300(25)}{9}$ = 833SY	$32/SY	$26,600
TOTAL			$307,000