STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Sandgate BO 1441(30)

TOWN HIGHWAY 9, (LINCOLN LANE), BRIDGE 27 OVER TERRY BROOK

January 10, 2014

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I. Site Information

The bridge is located in a rural area along TH 9 (Lincoln Lane) approximately 0.6 miles north of the junction with TH 2 (W Sandgate Road) and TH 9. Lincoln Lane is a dead end road leading to a couple residences. The existing conditions were gathered from a combination of a Site Visit, the Inspection Report, the Route Log and the existing Survey. See correspondence in the Appendix for more detailed information.

Roadway Classification	Rural Local Road (Class 3)
Bridge Type	Steel Beam with Timber Decking
Bridge Span	24 feet long
Year Built	1960
Ownership	Town of Sandgate

Need

Bridge 27 is the only access across the Terry Brook along TH 9 in this location. The following is a list of the deficiencies of Bridge 27 and TH 9 in this location.

1. The deck and superstructure are in serious condition with the bridge having an overall Federal Sufficiency Rating of 18.2. The timber decking is showing heavy decay. The beams are also showing signs of decay to such a degree that holes have developed in the webs of some beams.

2. The substructure is in poor condition. Displacement of the abutment has been observed.

3. The existing bridge and approach rail do not meet current Vermont state standards.

4. The existing bridge does not have adequate hydraulic capacity. Additionally, the existing bridge has obvious scour issues.

5. The existing horizontal and vertical alignments through the project location do not meet the current standard.

6. The lane and shoulder widths are too narrow for the traffic volume, design speed and roadway classification.

Traffic

A traffic study of this site was performed by the Vermont Agency of Transportation. The traffic volumes are projected for the years 2016 and 2036.

TRAFFIC DATA	2016	2036
ADT	15	15
DHV	10	10
ADTT	2	3
%T	1.1	1.4
%D	89	89

Design Criteria

The design standards for this bridge project are the Vermont State Standards, dated October 22, 1997. Minimum standards are based on an ADT of 15 and a design speed of 35 mph.

Design Criteria	Source	Existing Condition	Minimum Standard	Comment
Approach Lane and Shoulder Widths	VSS Table 6.3	7'/0' (14')	8'/0' (16')	Substandard
Bridge Lane and Shoulder Widths	VSS Table 6.3	7'/0' (14')	8'/0' (16')	Substandard
Clear Zone Distance	VSS Table 6.5		7' fill / 7' cut (1:3), 7' cut (1:4)	
Banking	VSS Section 6.12	Normal Crown	6% (max)	
Speed	VSS Section 6.2	35 mph (per town correspondence)	35 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-9b	R=100' (Southern approach) , R=50'(Bridge partially located on curve), R=800' (Northern Approach)	R_{min} = 340' @ 6%	Substandard
Vertical Grade	VSS Table 6.6	Bridge located in transition from (+)4.2968% grade to (-)1.0765% grade	10% (max) for rolling terrain	
K Values for Vertical Curves	VSS Table 6.1	Bridge located on crest (K = 12)	40 crest /50 sag	Substandard
Vertical Clearance Issues	VSS Section 6.7	None noted	14'-3" (min)	
Stopping Sight Distance	VSS Table 6.1	355'	225'	
Bicycle/Pedestrian Criteria	VSS Section 6.13		None Required	
Bridge Railing	Structures Manual Section 13	Heavy Duty Steel Beam Mounted to Steel Beams	TL-2	Substandard
Hydraulics	VTrans Hydraulics Section	Passes $Q_{2.33}$ storm event with 1.7' of freeboard (Approach road overtopped at Q_{10})	Pass Q_{25} storm event with 1.0' of freeboard	Substandard
Structural Capacity	SM, Ch. 3.4.1	Structurally Deficient	Design Live Load: HL-93	Substandard

Inspection Report Summary

2012 Inspection		2013 Inspection (Temporary Ratings)	
Deck Rating	3 Serious	Deck Rating	8 Very Good
Superstructure Rating	3 Serious	Superstructure Rating	5 Fair
Substructure Rating	4 Poor	Substructure Rating	6 Satisfactory
Channel Rating	5 Fair	Channel Rating	5 Fair

05/24/2013 - Special 12 month inspection: Improvements made since last inspection with repairs to abut. 1 and 2, added steel beam stringers, and a new hemlock 6x6 deck. Considered temporary measures until bridge is replaced, as the original steel stringers have progressive corrosion which will again, eventually effect load capacity. Bridge is posted for 16,000 lbs. ~ MJ

10/02/2012 - * Wood plank deck is quite poor with heavy decay. The steel beam superstructure is also poor with recent distress apparent since the last inspection just a few months ago, with beams 4 and 5 crushing. Abutment #1 also is poor with a large area of distress and displacement along the laid up stone from TS Irene. * Condition is such, that the bridge should now be closed to all traffic until completely replaced. ~ MJ/DK

4/17/2012 - Quality Control check. A full inspection will be performed this fall. Deck and superstructure have no significant further deterioration changes; though both are in poor condition and need complete upgrading. Tropical storm Irene caused erosion at the northwest corner and a partial failure of the laid up stone stem of abutment #1. A void roughly 3 feet in diameter formed with adjacent stone work are displaced just right of centerline. The damage is not a major concern at present but repairs in the interim are advisable and the abutment is certainly susceptible to further high-water effects. Since the bridge is overall in poor shape and the abutment is compromised, along with an opening which is not hydraulically adequate, we suggest the entire bridge be upgraded. ~ MJ

Hydraulics

This site does not meet current hydraulic minimum standards. The current road follows the brook from the south and turns to cross perpendicular to the brook. To meet hydraulic minimums the grade would have to be raised significantly through the approaches. Any adjustment to the grade would push the toe of slope into the brook through the raised section of the southern approach. Slope retention options through the affected area will greatly increase the cost of this project and the impact to the brook. Depending on the various options presented by the hydraulics section it may also be necessary to lengthen the bridge. This would move the abutments further into the substandard alignment and require using a curved superstructure. See the preliminary hydraulics report in the appendix.

Utilities

The existing utilities are shown on the Layout Sheet and are as follows:

<u>Municipal Utilities:</u>

- There are no municipal water or sewer facilities within this project area.

<u>Underground:</u>

- There are no buried utilities within the project area. FairPoint is the only provider in this area and they have stated that they have no buried plant within the project area. The Town of Sandgate has also indicated that there are no buried facilities thru this project area.

<u>Aerial:</u>

- There are aerial electric and telephone facilities which cross over Lincoln Lane (TH # 6) approximately 50 feet beyond the end of the existing bridge (see Layout Sheet). There is a potential conflict with an existing combo pole if the new bridge (or a temporary bridge) is constructed downstream from the existing bridge.

- These existing aerial facilities are owned by Green Mountain Power and FairPoint.

Right Of Way

There is an existing 3-rod Right-of-Way though the project area, as shown on the Layout sheet. Depending on which alternative is chosen, Right-of-Way may need to be acquired.

Resources

The resources present at this project are shown on the Existing Conditions Layout Sheet, and are as follows:

Biological:

Wetlands

There are no Wetlands within the project area.

Wildlife Habitat

The project corridor ranks as in the range of 5 on the wildlife habitat regional linkage analysis. This indicates that the area is of highest importance to wildlife movement. Traffic in this area is very limited so no improvements to terrestrial wildlife movement are recommended.

Terry Brook supports a variety of aquatic organisms including wild brook trout. The design of the new structure will need to accommodate aquatic organism passage (AOP) in accordance to the VT Fish and Wildlife AOP guidelines. As the design moves forward it would be beneficial to receive feedback from the fisheries biologist on the various alternatives.

Rare, Threatened and Endangered Species

There are no mapped rare, threatened or endangered species within the project area.

Agricultural

There are prime agricultural soils within the project area

Archaeological:

No Archaeological Resources have been identified at the site.

Historic:

There are no historic or 4f properties in the project area.

Hazardous Materials:

According to the Vermont Agency of Natural Resources (VANR) Vermont Hazardous Sites List, there are no known hazardous materials in the project area.

Stormwater:

There are no stormwater concerns for this project.

II. Maintenance of Traffic

The Vermont Agency of Transportation reviews each new project to determine suitability for the Accelerated Bridge Program, which focuses on faster delivery of construction plans, permitting, and Right of Way, as well as faster construction of projects in the field. One practice that will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the closure period with faster construction techniques and incentives to contractors to complete projects sooner. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of prefabricated elements in new bridges will also expedite construction schedules. This can apply to decks, superstructures, and substructures. Accelerated Construction should provide enhanced safety for the workers and the travelling public while maintaining project quality. The following options have been considered:

Temporary Bridge

The bridge is surrounded by wooded area both upstream and downstream and a number of trees would need to be cut down for a temporary bridge on either side. Initial investigations indicate that any temporary bridge should be located downstream of the existing structure. Due to the layout of the site, a temporary bridge would be difficult to place on the upstream side of the bridge and would require large impacts. Therefore, if a temporary bridge is chosen for traffic control, it should be placed on the inside of the curve, which is downstream of the existing bridge.

A one-way temporary bridge without traffic signals would be appropriate based on the daily traffic volumes. This would require temporary Right-of-Way acquisition. See the Temporary Bridge Layout Sheet in the appendix.

Advantages: Traffic flow would be maintained through the project corridor during construction.

Disadvantages: This option would require the acquisition of additional temporary rights. This option would have adverse impacts to the downstream area of the project, as a number of trees would have to be cleared for this temporary condition. Also, a downstream temporary bridge would require overhead utilities to be moved.

Use of the existing bridge during construction

This option is only plausible if a new bridge is built on a new alignment with an adequate separation distance from the new bridge for work to be completed.

Advantages: The existing bridge already exists eliminating the cost of installing a temporary bridge. Additionally, this option would maintain traffic along the corridor.

Disadvantages: This option would require the acquisition of additional permanent rights. This option would have adverse impacts to the downstream area of the bridge. Also, a downstream alignment would require overhead utilities to be moved.

Phased Construction

Phased construction is the maintenance of one way alternating traffic on the existing bridge while building one lane at a time of the proposed structure. This allows keeping the road open during construction, while having minimal impacts to historic resources and adjacent property owners. Based on traffic volumes at this site, it is reasonable to close one lane of traffic, and maintain one lane of alternating traffic, both ways, with no traffic signal.

The time required to develop a phased construction project is the same as that required to develop a project which is not phased. However, the time required to complete a phased construction project increases because some of the construction tasks have to be performed multiple times. This increase in the length of construction along with the inconvenience of working around traffic and the effort involved in coordinating the joints between the phases causes the construction costs for phased construction to be larger than construction which is not phased. Another negative aspect of phased construction is the decreased safety of the workers and vehicular traffic, which is caused by increasing the proximity and extending the duration that workers and moving vehicles are operating in the same confined space. Phased construction is usually considered when the benefits include reduced impacts to resources and decreased costs and development time by not requiring the purchase of additional ROW.

Due to the extremely low traffic volume on Bridge 27, many of the safety concerns involved with phased construction are not present. However, due to the horizontal constraints of the existing bridge, phasing traffic is not possible without shifting the alignment of the bridge, or widening the bridge beyond that required by the standards to allow traffic to be maintained on the new structure during the second phase of construction.

Advantages: Traffic flow can be maintained through the project corridor during construction.

Disadvantages: There are additional costs and time constraints for phasing the construction at this site, since some construction tasks will need to be performed twice.

Bridge Closure

The bridge is located on a dead end road; therefore, no detour route is available. At the discretion of the Town of Sandgate, the road may be closed during a portion of construction. This option would be the least expensive and have the least impacts to the surrounding wooded area. A temporary bridge would not have to be purchased, and the Right-of-Way process would be avoided. There are properties located on Lincoln Lane, and closing the road will have a disruption to residents' everyday life during the closure. The dates of the closure could be chosen by the property owners to minimize this disruption.

Depending on the type of bridge chosen, a road closure would vary from a long weekend closure to a month long closure. This is a dead end road providing access to only a few residences, so it does not have high traffic volumes. Thus, closing the bridge for a short duration would have minimal impacts to traffic. The Town would have to coordinate emergency services during the closure.

Advantages: This alternative would eliminate the need for a temporary bridge, which would significantly reduce the cost and time of construction. Additionally, this option would not require

Right-of-Way acquisition which would reduce the project development duration. This option would eliminate traffic through the project site providing the safest option for the contractor during the construction process. It would also allow the contractor to work in the road allowing for the most space to work in. This option would minimize the amount of temporary rights that would have to be acquired. This option likely be the cheapest and would decrease the towns contributions for the project by 50%.

Disadvantages: Traffic flow would not be maintained through the project corridor during construction.

III. Alternatives Discussion

The existing bridge is in a poor to serious condition. The horizontal alignment of the bridge approach is extremely poor. The bridge is located on the straight middle segment of an S-curve. The radius on one end is 50 feet, which is significantly substandard. Additionally, all flows beyond the $Q_{2.33}$ event, fail to pass through the existing structure.

No Action

This alternative is not recommended. The deck and superstructure are in serious condition and the substructure is in poor condition. All of these bridge elements will continue to deteriorate if no action is taken, so something will have to be done to improve this bridge in the near future. Although the bridge does not appear to be in imminent danger of collapse, it will eventually be posted for lower traffic loads. In the interest of safety to the traveling public, the No Action alternative is not recommended. No cost estimate has been provided for this alternative since there are no immediate costs.

Superstructure replacement

This Alternative would include removal of the existing wooded planks and steel girders, and replacement with a new precast superstructure founded on precast sleeper slabs. A precast superstructure with a relatively low profile, such as voided slabs, would be chosen in order to provide the maximum hydraulic opening possible. The existing granite block abutments would remain in place for soil retention, and precast slabs would be placed behind the abutments. The new superstructure would then sit on the slabs. This bridge would have a design life of 30 years.

The existing bridge width is substandard by 2 feet, and this type of superstructure replacement would rectify this. The new superstructure would have a width of 16 feet in order to meet geometric requirements as set forth in the Vermont State Standards. The substandard horizontal alignment would remain unchanged; however the vertical alignment could be adjusted to meet the current standard.

Advantages: This alternative would address the structural deficiencies of the existing bridge, with minimum upfront costs.

Disadvantages: The existing bridge is hydraulically inadequate and does not meet Bank Full Width requirements, which this option does not improve. The existing footings are scour

susceptible, and do not meet standards. Additionally, this option would only have a design life of approximately 30 years, at which point a new bridge would need to be constructed.

Maintenance of Traffic: The preferred option here would be a 3 day bridge closure.

Full Replacement with a Prefabricated 3-Sided Frame

This option would be a brand new 3-sided frame that addresses the current structural and hydraulic deficiencies of the existing bridge. The substandard horizontal curves would remain the same, but the other substandard geometric features would be brought up to standard.

a. Bridge Width

The current rail to rail width is 14 feet. This does not meet the minimum standard of 16 feet. Since a new 80+ year bridge is being proposed, the bridge geometry should meet the minimum standards. A 16 foot width bridge will be proposed.

b. Bridge Length and Skew

The existing bridge has a clear span of 18.5 feet between abutment faces, and a skew of approximately 10 degrees. One of the options presented by the Hydraulics section is to lengthen the clear span to 25.3 feet to match bank full width, raise the low beam to meet the design storm event, while providing vertical face abutments. A 28 foot span frame with a skew of 25 degrees will be chosen. This configuration will provide the minimum recommended clear span of 25.3 feet and match the natural skew of the channel.

c. Superstructure/Substructure Type

The most economical solution for a possible 26' span length bridge is a precast arch or 3-sided frame. There is no need to match into upstream and downstream channel banks, or to extend the length of the superstructure in order to provide stone fill. Hydraulics has recommended a 25.3 foot clear span with vertical abutments and no stone fill as one of the hydraulically adequate options[1].

There is no visible bedrock in the vicinity of the project, and available subsurface information indicates that shallow bedrock is not likely to be encountered. As such, spread footings placed six feet below the stream bottom, are appropriate at this site. Any rapid construction alternative should have sufficient subsurface information to verify the in-situ conditions.

d. Maintenance of Traffic

The preferred method of traffic control for this option is either a bridge closure or a temporary bridge. By closing the bridge during a portion of construction, the local share of funds would be reduced by 50%.

[1] Option 2 in the Preliminary Hydraulics Report, dated August 16th, 2013 specifies vertical abutments with no stone fill. The report can be found in the Appendix.

Advantages: This alternative would be a new structure with an estimated life span of 80 years. The increased bridge width would meet Vermont State Standards. This option would also meet hydraulic standards. Right-of-Way acquisition would not be required if a bridge closure is chosen as the preferred method of traffic control.

Disadvantages: The substandard horizontal curve off the bridge would remain.

Integral Abutment Bridge On Existing Alignment

This option would involve constructing a new bridge on the existing alignment.

This option would provide a brand new bridge that addresses the current structural deficiencies of the existing bridge. Additionally, the new bridge would meet current geometric standards in regards to width and vertical curve requirements. However, the substandard horizontal geometry of the approaches would remain the same for this alternative.

The various considerations under this option include: the bridge width and length, skew, superstructure type and substructure type.

a. Bridge Width

The current rail to rail width is 14 feet. This does not meet the minimum standard of 16 feet. Since a new 80+ year bridge is being proposed, the bridge geometry should meet the minimum standards. A 16 foot width bridge will be proposed.

b. Bridge Length and Skew

In order to keep the majority of the bridge off of a horizontal curve, the new bridge would have a span of 30 feet. The existing bridge has a clear span of 18.5 feet between abutment faces and a 9° skew. This does not match the existing channel. The 30 foot span bridge is in accordance with hydraulics recommendation of a minimum 25 foot clear span between abutment faces. The bridge will have parallel abutments at a 10° skew measured from abutment two in order to match the natural skew of the channel.

c. Superstructure Type

A superstructure type with a shallow profile should be chosen for this option, to provide for a larger hydraulic capacity. A prefabricated structure will be the preferred choice, due to decreased construction time. The possible bridge types for this span length are steel and composite concrete deck and voided slab concrete beams. The superstructure depth is critical for meeting hydraulic standards.

d. Substructure Type

There is no visible bedrock in the location of the project. Available information on nearby water wells indicates that the site may be comprised of gravelly fine sandy loam. Borings should be taken at the project site, to determine if the subsurface is conducive for an integral abutment at this location. This type of substructure would provide the best scour protection. If it is determined that driving piles will be difficult, then the substructure should be reinforced concrete

abutments on spread footings. Any rapid construction alternative should have sufficient subsurface information to verify the in-situ conditions.

e. Maintenance of Traffic

A temporary bridge or bridge closure would be the most appropriate measures for traffic control at this site.

Advantages: This alternative would be a new structure with an estimated life span of 80 years. The increased bridge width would meet Vermont State Standards. This option would also meet hydraulic standards. Right-of-Way acquisition would not be required if a bridge closure is chosen as the preferred method of traffic control.

Disadvantages: This alternative would create a tight working environment for workers during the construction process. This alternative will require the removal of existing vegetation along the brook to accommodate a temporary bridge.

Integral Abutment Bridge Off Existing Alignment

This option would involve constructing a new bridge on a new alignment located downstream from the existing bridge.

This option would provide a brand new bridge that addresses the current structural deficiencies of the existing bridge. Additionally, the new bridge would meet current geometric standards in regards to width and vertical curve requirements, as well as the horizontal geometry requirements.

The various considerations under this option include: the bridge width and length, skew, superstructure type and substructure type.

a. Alignment

Placing a new structure on a new alignment provides the opportunity to remove three substandard horizontal curves with one curve that meets current standards. This option would extend the project length by several hundred feet, require the purchase of permanent easements and have significant impact to the local vegetation.

b. Bridge Width

The current rail to rail width is 14 feet. This does not meet the minimum standard of 16 feet. Since a new 80+ year bridge is being proposed, the bridge geometry should meet the minimum standards. A 16 foot bridge width will be proposed.

c. Bridge Length and Skew

The existing bridge is 24 feet long and with a 9° skew. This does not match the existing channel. The preferred substructure type is an integral abutment. Based on the layout procedures for integral abutments, and the sight constraints, the appropriate span for this location would be 80 feet with no skew. It is not possible to skew the bridge in order to achieve a shorter span due to a stream that merges into Terry Brook and the abutment location.

d. Superstructure Type

A precast structure will be the preferred choice, due to decreased construction time. The possible 80' span length bridge types that are most commonly used in Vermont, are steel and composite concrete deck and concrete NEXT beams. The superstructure depth is critical for meeting hydraulic standards, so the shallowest type beam should be chosen for this alternative.

e. Substructure Type

There is no visible bedrock in the location of the project. Available information on nearby water wells indicates that the site may be comprised of gravelly fine sandy loam. Borings should be taken at the project site, to determine if the subsurface is conducive for an integral abutment at this location. This type of substructure would provide the best scour. If it is determined that driving piles will be difficult, then the substructure should be reinforced concrete abutments on spread footings. Any rapid construction alternative should have sufficient subsurface information to verify the in-situ conditions.

f. Maintenance of Traffic

Using the existing bridge through the construction process would be the recommended traffic maintenance option at this site.

Advantages: This alternative would maintain traffic through the construction process and be the least expensive option as the bridge wouldn't be closed until after the new bridge was finished.

Disadvantages: This alternative would create a tight working environment for workers during the construction process. The existing bridge may not be able to support the loads associated with moving construction equipment across the brook to the northern abutment.

IV. Alternatives Summary

Based on the existing site conditions, bridge condition, and recommendations from hydraulics, there are several viable alternatives:

Alternative 1: Superstructure Replacement with a Weekend Bridge Closure
Alternative 2a: Full Replacement with a 3-Sided Frame and Bridge Closure
Alternative 2b: Full Replacement with a 3-Sided Frame and Traffic Maintained on a Temporary Bridge
Alternative 3a: Full Replacement On-Alignment with an Integral Abutment and a Bridge Closure
Alternative 3b: Full Replacement On-Alignment with an Integral Abutment with Traffic Maintained on a Temporary Bridge
Alternative 4: Full Replacement Off-Alignment with an Integral Abutment with Traffic Maintained on Existing Bridge

V. Cost Matrix[2]

Sandgate BO 1441(30)		Do Nothing	Alt 1	Alt 2		Alt 3		Alt 4
			Superstructure Replacement	3-Sided Frame		Integral Abutment Existing Alignment		Integral Abutment Off Alignment
			Bridge Closure	a. Bridge Closure	b. Temporary Bridge	a. Bridge Closure	b. Temporary Bridge	Existing Bridge
COST	Bridge Cost	$0	$199,800	$350,000	$350,000	$514,000	$514,000	$918,800
	Removal of Structure	$0	$30,000	$40,000	$40,000	$40,000	$40,000	$40,000
	Roadway	$0	$53,400	$79,000	$79,000	$91,200	$91,130	$129,100
	Maintenance of Traffic	$0	$14,000	$15,000	$70,000	$15,000	$70,000	$19,000
	Construction Costs	$0	$297,200	$484,000	$539,000	$660,200	$715,130	$1,106,900
	Construction Engineering + Contingencies	$0	$89,160	$145,200	$161,700	$198,060	$214,539	$332,070
	Total Construction Costs w CEC	**$0**	**$386,360**	**$629,200**	**$700,700**	**$858,260**	**$929,669**	**$1,438,970**
	Preliminary Engineering[3]	**$0**	**$104,020**	**$169,400**	**$188,650**	**$198,060**	**$214,539**	**$276,725**
	Right of Way	**$0**	**$0**	**$0**	**$50,000**	**$0**	**$50,000**	**$50,000**
	Total Project Costs	$0	$490,380	$798,600	$939,350	$1,056,320	$1,194,208	$1,765,700
TOWN SHARE			$12,260 (2.5%)	$39,930 (5%)	$93,935 (10%)	$52,820 (5%)	$119,420 (10%)	$176,570 (10%)
SCHEDULING	Project Development Duration[4]		2 years	2 years	4 years	2 years	4 years	4 years
	Construction Duration		3 months	6 months	18 months	6 months	18 months	9 months
	Closure Duration (If Applicable)		3 days	3 weeks	N/A	4 weeks	N/A	N/A
ENGINEERING	Typical Section - Roadway (feet)	14’	16'	16'	16’	16'	16'	16'
	Typical Section - Bridge (feet)	0’-7’-7’-0’	0’-8-8-0’	0’-8-8-0’	0’-8-8-0’	0’-8-8-0’	0’-8-8-0’	0’-8-8-0’
	Geometric Design Criteria	Substandard	Substandard Horizontal	Substandard Horizontal	Substandard Horizontal	Substandard Horizontal	Substandard Horizontal	Meets Criteria
	Traffic Safety	No Change	Improved	Improved	Improved	Improved	Improved	Improved
	Alignment Change	No Change	No	No	No	No	No	Yes
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulic Performance	No Change	Substandard	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria	Meets Criteria
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Utility	No Change	Relocation	Relocation	Relocation	Relocation	Relocation	Relocation
OTHER	ROW Acquisition	No	No	No	Yes	No	Yes	Yes
	Road Closure	No	Yes	Yes	No	Yes	No	No
	Design Life	<10 years	30 years	80 years	80 years	80 years	80 years	80 years

[2] Costs are estimates only, used for comparison purposes.
[3] Preliminary Engineering costs are estimated starting from the end of the Project Definition Phase.
[4] Project Development Durations are staring from the end of the Project Definition Phase.

VI. Conclusion

We recommend **Alternative 2b**; to replace the existing structure on alignment with a 3-Sided Prefabricated Frame with traffic maintained on a temporary bridge.

Structure:
The annualized cost for a 3-sided box has the least expensive annual cost. For this option, hydraulics will be brought up to standard. Additionally, the substandard vertical alignment will be modified. The substandard horizontal curves off the bridge will remain substandard for this alternative. Bringing the horizontal alignment up to standard would create a very large project, and is not context sensitive for this low volume, town highway bridge.

The proposed structure is a 28 foot span 3-sided prefabricated concrete frame. The frame should be founded on footings six feet below the stream bed to protect for scour.

Traffic Control:
The recommended method of traffic control is a temporary bridge. Lincoln Lane is a dead end road, and there is no detour available. The daily traffic volume for this site is 12 vehicles per day, which is considered low. However, a bridge closure would last approximately 3 weeks. It does not seem reasonable to cut off access to homes for that amount of time. Thus, a temporary bridge should be considered the best option for this site.

VII. Appendices

- Site Pictures
- Town Map
- Bridge Inspection Report
- Hydraulics Memo
- Preliminary Geotechnical Information
- Natural Resources Memo
- Archaeology Memo
- Historic Memo
- Utilities
- Local Input
- Plans
    - Proposal
        - Typical Sections
        - Existing Conditions
        - Layout
        - Profile

Northbound Approach.

Southbound Approach.

Looking Upstream.

Looking Downstream.

Bridge Deck.

Complete section loss of the steel beams.

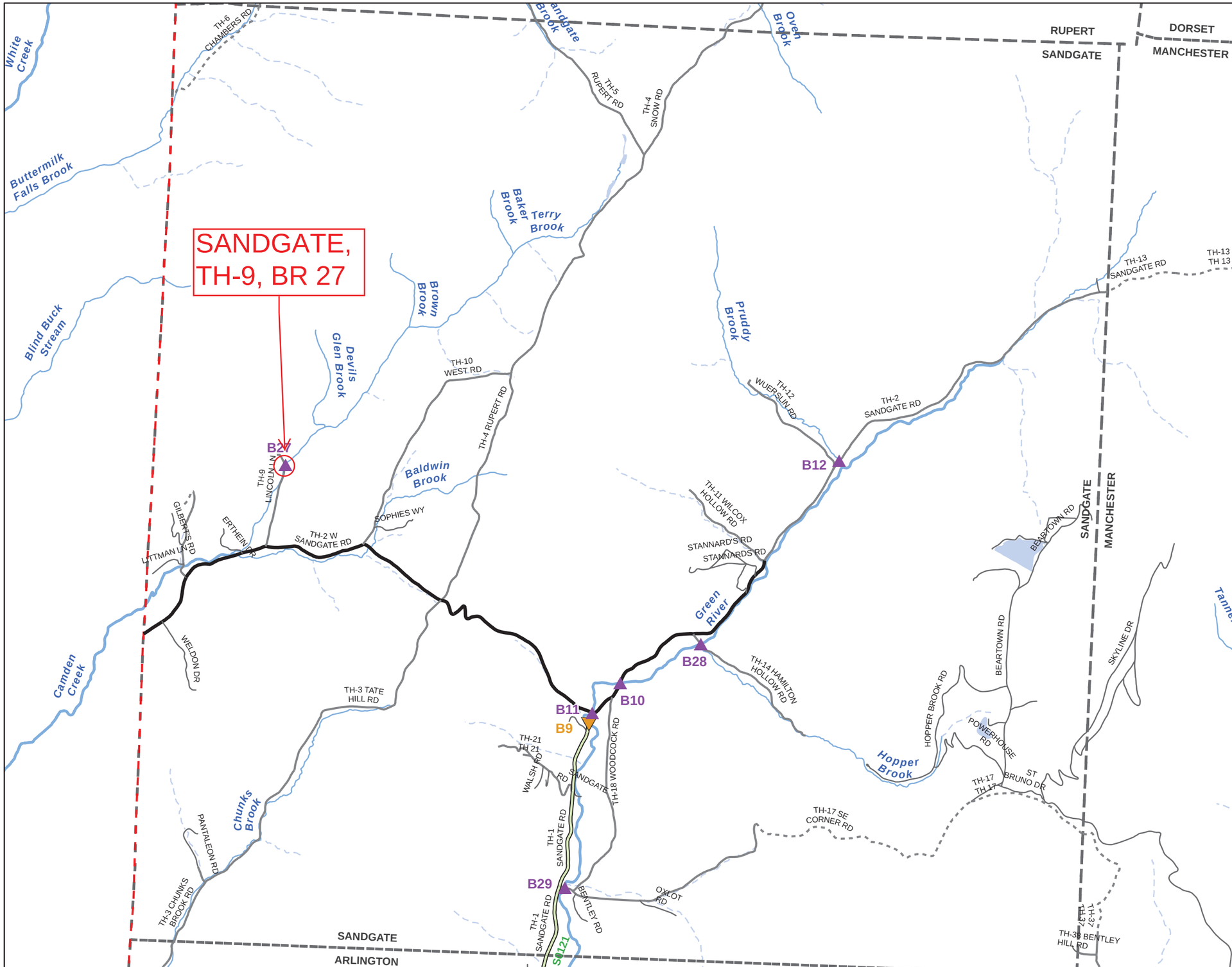
Complete section loss of the steel beams.

Complete section loss of the steel beams.

Complete section loss of the steel cross bracing.

Southern abutment.

Northern abutment.

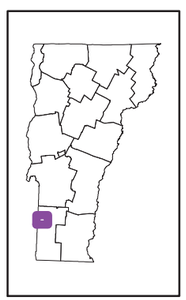


Scale 1:42,519

N

- INTERSTATE
- STATE LONG
- STATE SHORT
- TOWN LONG
- FAS/FAU
- FAS/FAU HWY
- INTERSTATE
- STATE HIGHWAY
- CLASS 1
- CLASS 2
- CLASS 3
- CLASS 4
- LEGAL TRAIL
- PRIVATE
- DISCONTINUED
- DISTRICT
- POLITICAL BOUNDARY
- NAMED RIVERS-STREAMS
- UNNAMED RIVERS-STREAMS

Produced by:
Mapping Unit
Vermont Agency of Transportation
August 2011



SANDGATE
BENNINGTON COUNTY
DISTRICT # 1

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

Vermont Agency of Transportation ~ Structures Section ~ Bridge Management and Inspection Unit

Inspection Report for SANDGATE **bridge no.:** 00027 **District:** 1

Located on: C3009 **over** TERRY BROOK **approximately** 0.6 MI JCT TH2 & TH9 **Owner:** 03 TOWN-OWNED

CONDITION

Deck Rating: 3 SERIOUS

Superstructure Rating: 3 SERIOUS

Substructure Rating: 4 POOR

Channel Rating: 5 FAIR

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 100211002702111

Federal Sufficiency Rating: 018.2

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1960 **Year Reconstructed:** 0000

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 01

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 99

ADT: 000020 **% Truck ADT:** 02

Year of ADT: 2008

GEOMETRIC DATA

Length of Maximum Span (ft): 0024

Structure Length (ft): 000026

Lt Curb/Sidewalk Width (ft): 0

Rt Curb/Sidewalk Width (ft): 0

Bridge Rdwy Width Curb-to-Curb (ft): 14.7

Deck Width Out-to-Out (ft): 15

Appr. Roadway Width (ft): 015

Skew: 09

Bridge Median: 0 NO MEDIAN

Min Vertical Clr Over (ft): 99 FT 99 IN

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: STEEL BM W TIMBER DK

Number of Approach Spans: 0000 **Number of Main Spans:** 001

Kind of Material and/or Design: 3 STEEL

Deck Structure Type: 8 TIMBER

Type of Wearing Surface: 7 WOOD OR TIMBER

Type of Membrane 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 0 DOES NOT MEET CURRENT STANDARD

Transitions: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail Ends: 0 DOES NOT MEET CURRENT STANDARD

Structural Evaluation: 2 INTOLERABLE, REPLACEMENT NEEDED

Deck Geometry: 6 EQUAL TO MINIMUM CRITERIA

Underclearances Vertical and Horizontal: N NOT APPLICABLE

Waterway Adequacy: 5 OCCASIONAL OVERTOPPING OF BRIDGE & ROADWAY WITH SIGNIFICANT TRAFFIC DELAYS

Approach Roadway Alignment: 4 MEETS MINIMUM TOLERABLE CRITERIA

Scour Critical Bridges: 8 STABLE FOR SCOUR

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 2 ALLOWABLE STRESS (AS)

Posting Status: P POSTED FOR LOAD

Bridge Posting: 5 NO POSTING REQUIRED

Load Posting: 03 BRIDGE IS LEGALLY LOAD POSTED AT ONE END ONLY

Posted Vehicle: 6 GROSS LOAD ONLY

Posted Weight (tons): 08

Design Load: 0 OTHER OR UNKNOWN

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 102012 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

*10/02/2012 - * Wood plank deck is quite poor with heavy decay. The steel beam superstructure is also poor with recent distress apparent since the last inspection just a few months ago, with beams 4 and 5 crushing. Abutment #1 also is poor with a large area of distress and displacement along the laid up stone from TS Irene. * Condition is such, that the bridge should now be closed to all traffic until completely replaced. ~ MJ/DK*

4/17/2012 - Quality Control check. A full inspection will be performed this fall. Deck and superstructure have no significant further deterioration changes; though both are in poor condition and need complete upgrading. Tropical storm Irene caused erosion at the northwest corner and a partial failure of the laid up stone stem of abutment #1. A void roughly 3 feet in diameter formed with adjacent stone work are displaced just right of centerline. The damage is not a major concern at present but repairs in the interim are advisable and the abutment is certainly susceptible to further high-water effects. Since the bridge is overall in poor shape and the abutment is compromised, along with a opening which is not hydraulically adequate, we suggest the entire bridge be upgraded. ~ MJ

STRUCTURE INSPECTION, INVENTORY and APPRAISAL SHEET

Vermont Agency of Transportation ~ Structures Section ~ Bridge Management and Inspection Unit

Inspection Report for SANDGATE **bridge no.:** 00027 **District:** 1

Located on: C3009 **over** TERRY BROOK **approximately** 0.6 MI JCT TH2 & TH9 **Owner:** 03 TOWN-OWNED

CONDITION

Deck Rating: 8 VERY GOOD

Superstructure Rating: 5 FAIR

Substructure Rating: 6 SATISFACTORY

Channel Rating: 5 FAIR

Culvert Rating: N NOT APPLICABLE

Federal Str. Number: 100211002702111

Federal Sufficiency Rating: 018.2

Deficiency Status of Structure: SD

AGE and SERVICE

Year Built: 1960 **Year Reconstructed:** 2013

Service On: 1 HIGHWAY

Service Under: 5 WATERWAY

Lanes On the Structure: 01

Lanes Under the Structure: 00

Bypass, Detour Length (miles): 99

ADT: 000020 **% Truck ADT:** 02

Year of ADT: 2008

GEOMETRIC DATA

Length of Maximum Span (ft): 0024

Structure Length (ft): 000026

Lt Curb/Sidewalk Width (ft): 0

Rt Curb/Sidewalk Width (ft): 0

Bridge Rdwy Width Curb-to-Curb (ft): 15

Deck Width Out-to-Out (ft): 16

Appr. Roadway Width (ft): 015

Skew: 09

Bridge Median: 0 NO MEDIAN

Min Vertical Clr Over (ft): 99 FT 99 IN

Feature Under: FEATURE NOT A HIGHWAY OR RAILROAD

Min Vertical Underclr (ft): 00 FT 00 IN

STRUCTURE TYPE and MATERIALS

Bridge Type: STEEL BM W TIMBER DK

Number of Approach Spans: 0000 **Number of Main Spans:** 001

Kind of Material and/or Design: 3 STEEL

Deck Structure Type: 8 TIMBER

Type of Wearing Surface: 7 WOOD OR TIMBER

Type of Membrane: 0 NONE

Deck Protection: 0 NONE

APPRAISAL *AS COMPARED TO FEDERAL STANDARDS

Bridge Railings: 0 DOES NOT MEET CURRENT STANDARD

Transitions: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail: 0 DOES NOT MEET CURRENT STANDARD

Approach Guardrail Ends: 0 DOES NOT MEET CURRENT STANDARD

Structural Evaluation: 2 INTOLERABLE, REPLACEMENT NEEDED

Deck Geometry: 7 BETTER THAN MINIMUM CRITERIA

Underclearances Vertical and Horizontal: N NOT APPLICABLE

Waterway Adequacy: 5 OCCASIONAL OVERTOPPING OF BRIDGE & ROADWAY WITH SIGNIFICANT TRAFFIC DELAYS

Approach Roadway Alignment: 4 MEETS MINIMUM TOLERABLE CRITERIA

Scour Critical Bridges: 8 STABLE FOR SCOUR

DESIGN VEHICLE, RATING, and POSTING

Load Rating Method (Inv): 2 ALLOWABLE STRESS (AS)

Posting Status: P POSTED FOR LOAD

Bridge Posting: 5 NO POSTING REQUIRED

Load Posting: 03 BRIDGE IS LEGALLY LOAD POSTED AT ONE END ONLY

Posted Vehicle: 6 GROSS LOAD ONLY

Posted Weight (tons): 08

Design Load: 0 OTHER OR UNKNOWN

INSPECTION and CROSS REFERENCE

X-Ref. Route:

Insp. Date: 052013 **Insp. Freq. (months)** 24 **X-Ref. BrNum:**

INSPECTION SUMMARY and NEEDS

05/24/2013 - Special 12 month inspection: Improvements made since last inspection with repair to abut. #1 and two added steel beam stringers and a new hemlock 6x6 deck. Considered temporary measures until bridge is replaced, as the original steel stringers have progressive corrosion which will again, eventually effect load capacity. Bridge is posted for 16.000 lbs.~ MJ

*10/02/2012 - * Wood plank deck is quite poor with heavy decay. The steel beam superstructure is also poor with recent distress apparent since the last inspection just a few months ago, with beams 4 and 5 crushing. Abutment #1 also is poor with a large area of distress and displacement along the laid up stone from TS Irene. * Condition is such, that the bridge should now be closed to all traffic until completely replaced. ~ MJ/DK*

4/17/2012 - Quality Control check. A full inspection will be performed this fall. Deck and superstructure have no significant further deterioration changes; though both are in poor condition and need complete upgrading. Tropical storm Irene caused erosion at the northwest corner and a partial failure of the laid up stone stem of abutment #1. A void roughly 3 feet in diameter formed with adjacent stone work are displaced just right of centerline. The damage is not a major concern at present but repairs in the interim are advisable and the abutment is certainly susceptible to further high-water

VT AGENCY OF TRANSPORTATION PROGRAM DEVELOPMENT DIVISION

HYDRAULICS UNIT

TO: Chris Williams, Structures Project Manager

FROM: Ryan Lizewski, Hydraulics Project Engineer (VHB)
via Nick Wark, VTrans Hydraulic Engineer

DATE: August 16, 2013

SUBJECT: SANDGATE - BO1441(30), C3009 BR27 over TERRY BROOK

We have completed our preliminary hydraulic study for the above referenced site, and offer the following information for your use:

Existing Bridge Information

The site is located on C3009 in the Town of Sandgate, approximately 4,000 feet upstream of the confluence with Baldwin Brook. There are no record plans available. The original date of construction for the original bridge appears to be 1960 based on the Structure Inspection, Inventory. It is a single span steel beam with timber deck bridge. The existing abutments are stone with a concrete seat supporting the steel beams. The northern (right) stone abutment appears to have been recently encased with concrete, and the timber deck replaced. Other properties of the bridge include:

Number of Spans	1	
Bridge Skew Angle	9	deg
Abutment Skew Angle	0	deg
Width: Out to Out[1]	15	ft
Width: Out to Out[2]	15.2	ft
Approach Width[1]	15	ft
Span[1]	24	ft
Span[2]	23.7	ft
Superstructure Depth	1.7	ft
Low Chord Elevation	888.8	ft (NAVD)
Opening Height	5.5	ft

1 – normal to roadway
2 – normal to river

The existing bridge does not meet the hydraulic standard. The bridge only passes the $Q_{2.33}$ storm (with 1.7' of freeboard). As modeled, water will overtop the approach road at Q_{10} and the bridge deck at $Q_{50.}$ The standard requires a minimum of 1 foot of freeboard for the Q_{25} discharge for local roads.

Recommendations

The bridge replacement option selection criteria should at a minimum meet the hydraulic standard and to the extent practicable provide a bridge opening that does not restrict the bank full width, nor provide an unrealistic widening of the existing channel, or create any worse backwater flooding conditions than the existing conditions. The Vermont Agency of Natural Resources (VANR) Bank Full Width (BFW) Equation estimates the BFW of Terry Brook to be approximately 28.3 feet, but the estimated BFW width within the study reach area is approximately 25 feet based on actual field conditions. The existing bridge does not currently span the BFW, the current span is approximately

18.5 feet between the abutments at the waterline.

It has been assumed that if the existing bridge is replaced, a replacement structure will be located in the existing roadway alignment having the same basic surface geometry based on the site constraints.

- The first option analyzed maintains the existing 24 foot clear span (23.7 feet normal to the stream channel, vertical abutments and no stone fill above the existing ground) and raises the low chord and roadway profile as shown in Figure 1. The low chord elevation must be raised approximately 2.0 feet to an elevation 890.8 feet to meet the hydraulic standard. Raising the bridge deck elevation will require adjustments to the roadway approaches. This bridge option does not span the BWF. The model predicts up to a 1.0 foot increase in the 100-year water surface elevation in the vicinity of the bridge and upstream for the entire model length for this option. The predicted increase does not appear that it would impact any upstream structures.

- The second option to better span the BFW would require a replacement bridge having a minimum single 25.3 foot clear span (25 feet normal to the stream channel) between the abutment faces with no stone fill in front of vertical abutments as shown in Figure 2. The low chord elevation would need to be raised approximately 0.9 feet to an elevation 889.7 to meet the hydraulic standard. Raising the bridge deck elevation will require adjustments to the roadway approaches. This option would also require shifting the western bridge abutment approximately 5.5 feet and the eastern abutment approximately 2 feet further from the brook. Expansion of the eastern abutment was limited due to the site constraints including the approach of Lincoln Lane. Widening of Terry Brook immediately upstream and downstream from the bridge would be required for this option. The model predicts an increase of 0.1 feet in the 100-year water surface elevation in the vicinity of the bridge; however, within 20 feet of the bridge water surface elevations return to or below existing for this option.

- A third option which spans the BFW would require the bridge having a minimum single 39.5 foot clear span (39 feet normal to the stream channel) with integral abutments with a stone fill 1.5(h):1(v) slope as shown in Figure 3. The low chord elevation would need to be raised approximately 0.9 feet to an elevation 889.7 to meet the hydraulic standard. This option would require moving each abutment approximately 8.3 feet away from the river and regrading the channel in the vicinity of the Bridge. Expansion of the eastern abutment proposed in this option may not be viable due to the site constraints including the approach of Lincoln Lane. The model predicts up to a 0.2 foot increase in the 100-year water surface elevation in the vicinity of the bridge diminishing to a 0.04 foot increase upstream for the entire model length for this option. The predicted increase does not appear that it would impact any upstream structures.

Ultimately ANR and the COE will need to approve the span length and we would recommend early coordination if anything less than the minimum BFW span is selected.

As noted above, scour was not reviewed during the preliminary design. However based on the velocities from the analyses, it is anticipated that a minimum of Type III Stone Fill will be necessary for armoring the abutments and disturbed channel banks near the replacement structure. Stone fill sizing will be verified during final hydraulic design.

Temporary Bridge

As part of this analysis we did not size a temporary bridge. If a temporary bridge is determined to be necessary let us know and we will work with you to size one.

Please contact us if you have any questions or if we may be of further assistance.

cc: Hydraulics Project File via NJW
Hydraulics Chrono File

FIGURE 1

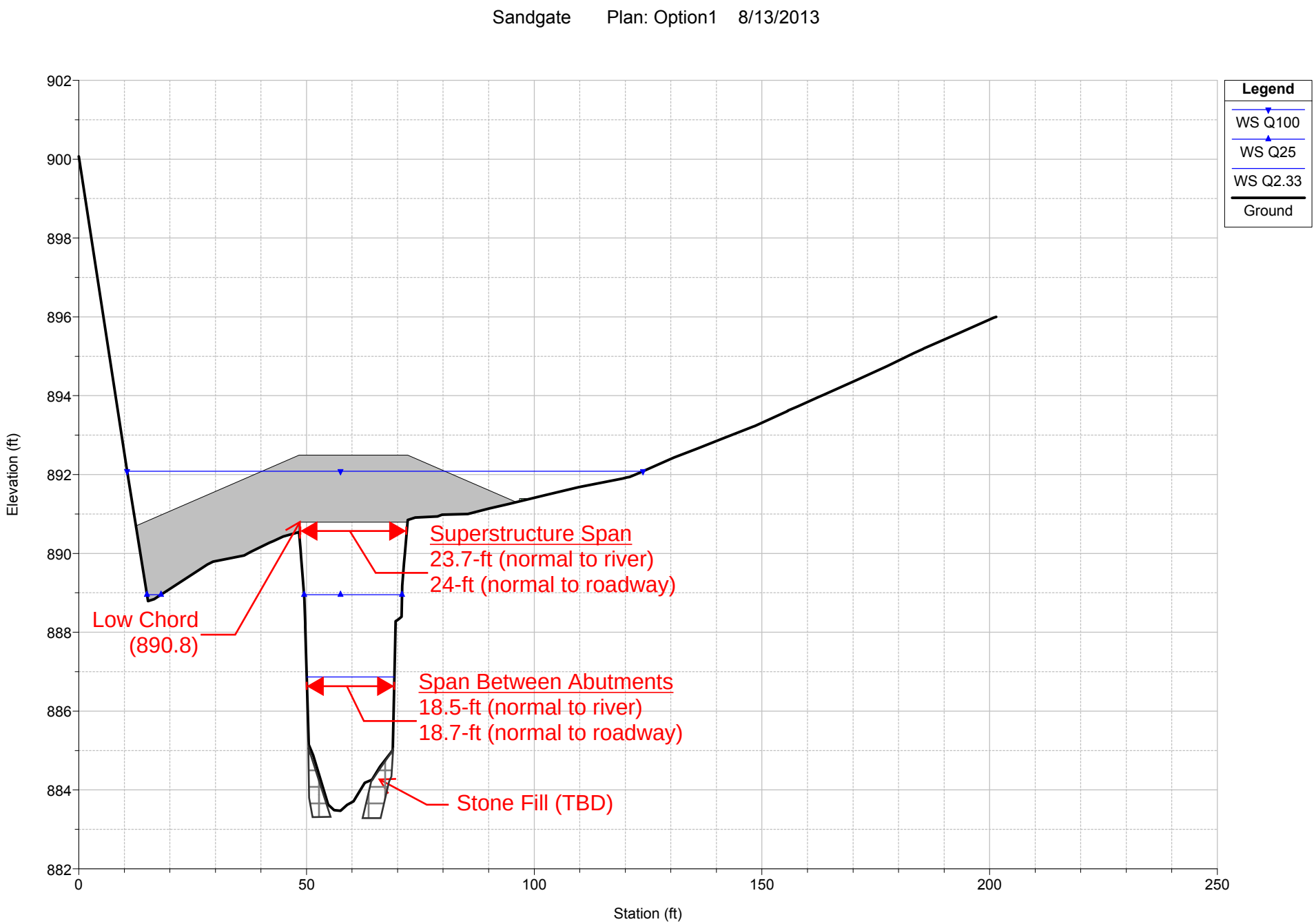

Sandgate Plan: Option1 8/13/2013
Legend
WS Q100
WS Q25
WS Q2.33
Ground
Elevation (ft)
Station (ft)
902
900
898
896
894
892
890
888
886
884
882
0
50
100
150
200
250
Superstructure Span
23.7-ft (normal to river)
24-ft (normal to roadway)
Low Chord
(890.8)
Span Between Abutments
18.5-ft (normal to river)
18.7-ft (normal to roadway)
Stone Fill (TBD)

FIGURE 2

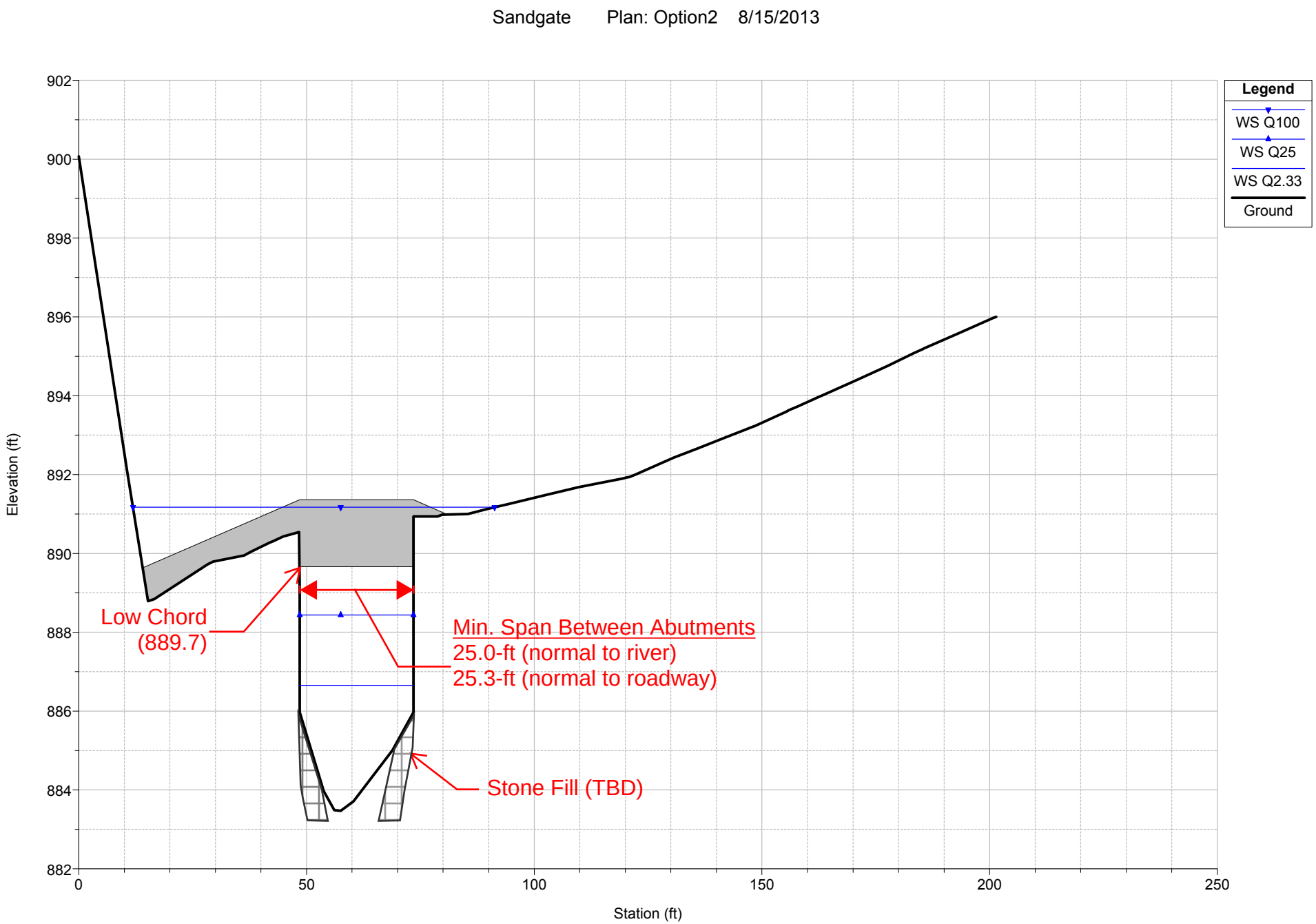
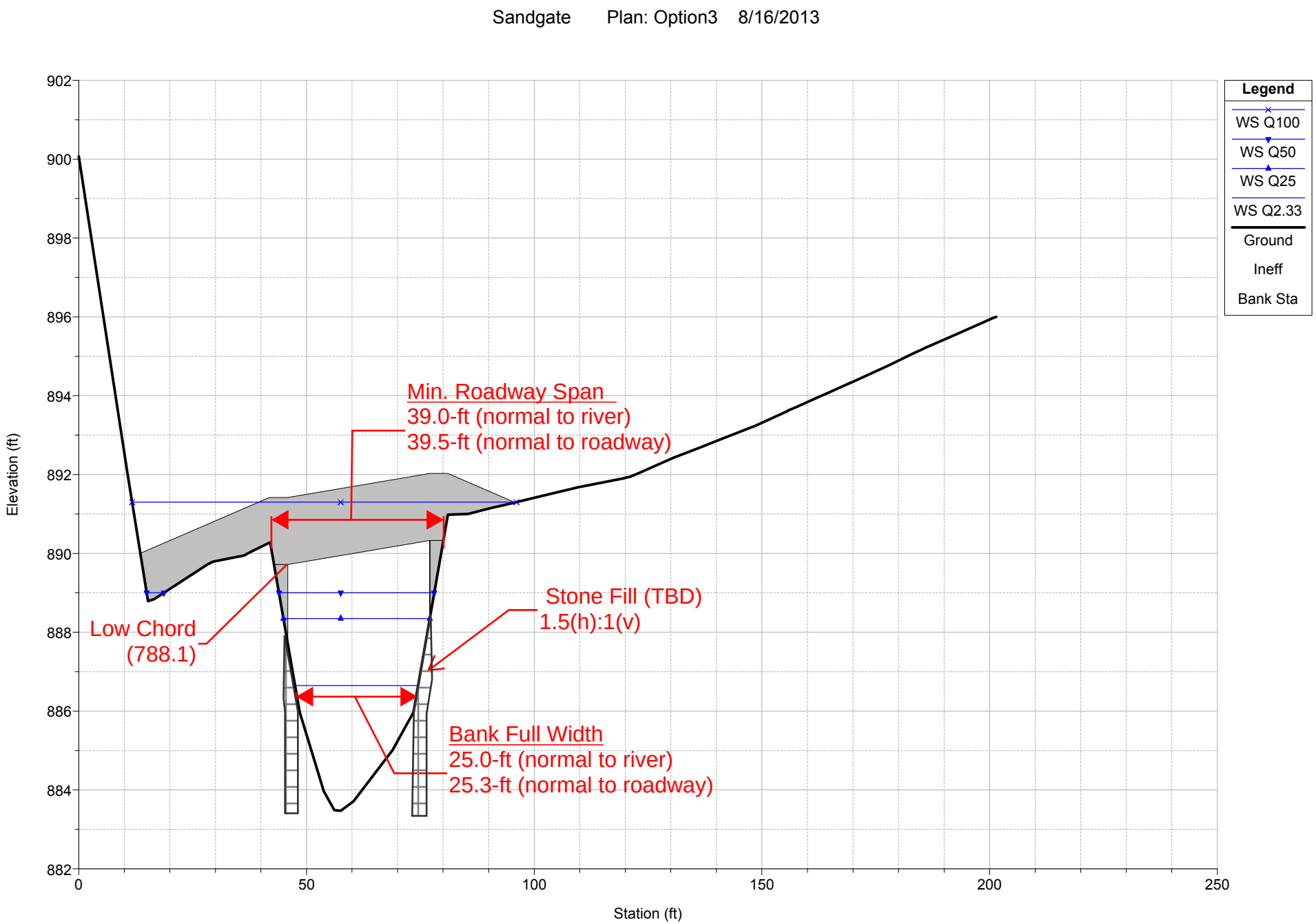

Sandgate Plan: Option2 8/15/2013
Legend
WS Q100
WS Q25
WS Q2.33
Ground
Elevation (ft)
Station (ft)
902
900
898
896
894
892
890
888
886
884
882
0
50
100
150
200
250
Low Chord
(889.7)
Min. Span Between Abutments
25.0-ft (normal to river)
25.3-ft (normal to roadway)
Stone Fill (TBD)

FIGURE 3


Sandgate Plan: Option3 8/16/2013
Legend
WS Q100
WS Q50
WS Q25
WS Q2.33
Ground
Ineff
Bank Sta
Min. Roadway Span
39.0-ft (normal to river)
39.5-ft (normal to roadway)
Stone Fill (TBD)
1.5(h):1(v)
Low Chord
(788.1)
Bank Full Width
25.0-ft (normal to river)
25.3-ft (normal to roadway)
Elevation (ft)
Station (ft)
902
900
898
896
894
892
890
888
886
884
882
0
50
100
150
200
250

AGENCY OF TRANSPORTATION **OFFICE MEMORANDUM**

To: Chris Williams, Project Manager, Structures

CEE CCB

From: Callie Ewald, P.E. Geotechnical Engineer, via Christopher C. Benda, P.E., Soils and Foundations Engineer

Date: June 21st, 2013

Subject: Sandgate BO 1441(30) – Lincoln Lane (TH-9) Bridge 27

In an effort to assist the Structures Section with their bridge type study, the Soils and Foundations Unit within the Materials and Research Section has completed a review of available geological data near Lincoln Lane (Town Highway 9) crossing over Terry Brook in Sandgate, Vermont. This review included our in-house bridge boring files, record plans, USDA Natural Resources Conservation soil survey records, surficial geology and bedrock maps of the State and the Agency of Natural Resources Well logs.

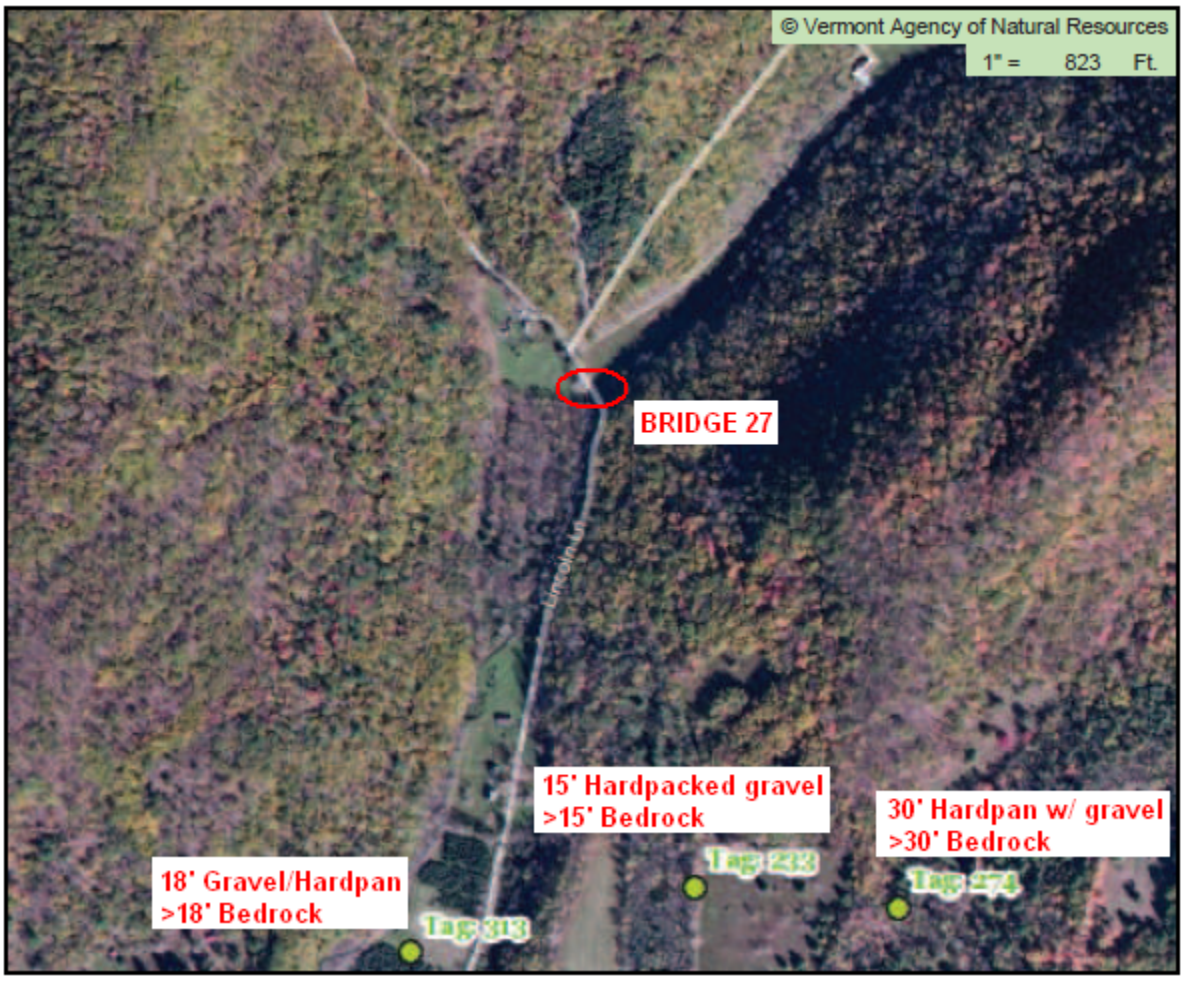


Figure 1, ANR Well Data near Bridge 27

Note: Depth to bedrock is illustrated in red print next to each private well.

The Agency of Natural Resources (ANR) documents and publishes all water wells that are drilled for residential or commercial purposes. Published online, the logs can be used to determine general characteristics of soil strata in the area. The soil description given on the logs is done in the field, by unknown personnel, and as such, should only be used as an approximation. Based on subsurface information reported by well drilling reports on file at ANR and the USDA web soil survey, the surficial geology in the vicinity of the subject area is expected to consist of gravel and sand. Bedrock was encountered in all three wells between 15 and 30 feet below the ground surface. Three well locations located between 1800 and 2000 feet from the bridge location are shown in Figure 1.

The Natural Resources Conservation Service USDA soil descriptions indicate that the subject area is classified as Copake gravelly fine sandy loam. These deposits are usually found along floodplains and are evidenced in the water well records nearby and the 1970 Surficial Geologic Map of Vermont. Bedrock in the area is expected to be Phyllite and Metasiltstone according to the new 2011 Bedrock Map of Vermont. No exposed bedrock outcrops were seen near Bridge 27. Cobbles can be seen along the stream bottom as shown in Figure 2.

Figure 2, Looking south at Terry Brook

Relying on information gathered for this scoping report, we anticipate possible foundation options for a bridge replacement include the following:

- Precast arch supported on spread footings, or
- Reinforced concrete abutments on spread footings, or an
- Integral abutment bridge on steel H-piles

The depth and concentration of any boulders at this site should be confirmed with borings as their presence can have a significant impact on the feasibility of using piles.

Based on the lack of site specific information, we recommend drilling two borings at opposite ends of the proposed bridge in order to more fully assess the subsurface conditions at the site

including, but not limited to, the soil properties, ground water conditions and the depth to bedrock. Shallow bedrock may be anticipated due to the information from the wells as well as the geography of the site. If shallow bedrock is encountered, more borings will be necessary to establish a more accurate bedrock profile across the footprint of the proposed bridge. Access and traffic control should be relatively simple, especially if the borings are completed in the roadway, and overhead wires should not impede drilling.

If you have any questions, please feel free to call us at 828-1235.

c: WEA/Read File
CCB/Project File
CEE

State of Vermont
Program Development Division
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

[phone] 802-828-3979
[fax] 802-828-2334
[ttd] 800-253-0191

Agency of Transportation

To: James Brady, VTrans Environmental Specialist

From: Glenn Gingras, VTrans Environmental Biologist

Date: 6/5/2013

Subject: Sandgate BO 1441(30) - Natural Resource ID

I have completed my natural resource scoping review for the above referenced project. My evaluation has included the following resources: wetlands, wildlife habitat, agricultural soils, and rare, threatened and endangered species. I have reviewed all existing mapped information and performed a site review of the project area.

Wetlands/Watercourses
There are no wetlands within the project area.

Terry Brook flows through the project area. This brook supports a variety of aquatic organisms including wild brook trout. Efforts to minimize water quality impacts during construction will need to be evaluated as the project design moves forward. A small unnamed tributary of Terry Brook flows adjacent to the project area although no impacts would be anticipated to this stream.

The US Corps of Engineers and the Agency of Natural Resources- Department of Environmental Conservation would regulate all activities below ordinary high water.

Wildlife Habitat
The project corridor ranks as in the range of 5 on the wildlife habitat regional linkage analysis. This indicates that the area is of highest importance to wildlife movement. Traffic in this area is very limited so no improvements to terrestrial wildlife movement are recommended.

Terry Brook supports a variety of aquatic organisms including wild brook trout. The design of the new structure will need to accommodate aquatic organism passage (AOP) in accordance to the VT Fish and Wildlife AOP guidelines. As the design moves forward it would be beneficial to receive feedback from the fisheries biologist on the various alternatives.

Rare, Threatened and Endangered Species
There are no mapped federally or State listed rare, threatened or endangered species within the project area according to latest GIS information available, therefore no impacts are anticipated.

Agricultural Soils
There are prime agricultural soils within the project area: Pootatuck fine sandy loam, 0 to 3 percent slopes and Copake gravelly fine sandy loam, 3 to 8 percent slopes. No impacts are anticipated as a result of this project.

1:3,825

Sandgate BO 1441(30)

N

Project Location

Deer Wintering Areas

Endangered Species - In House Backup

Vermont Wetlands (VSWI)

1 (less important)

2

3

4

5 (more important)

EcologicOther_RTENATCOM_internal

<all other values>

CATEGORY

Invertebrate Animal

Vertebrate Animal

Vascular Plant

Nonvascular Plant

Palustrine Natural Community

Terrestrial Natural Community

Map created by Glenn Gingras,
PDD-Environmental Section

© 2010 DigitalGlobe Image courtesy of USDA © 2013 Microsoft Corporation

VERMONT

Jeannine Russell
VTrans Archaeology Officer
State of Vermont
Environmental Section
One National Life Drive
Montpelier, VT 05633-5001
www.aot.state.vt.us

[phone] 802-828-3981
[fax] 802-828-2334
[ttd] 800-253-0191

Agency of Transportation

To: James Brady, VTrans Environmental Specialist

From: Jeannine Russell, VTrans Archaeology Officer
via Brennan Gauthier, VTrans Assistant Archaeologist

Date: 6/6/2013

Subject: Sandgate BO 1441(30) – Archaeological Resource ID

James,

A field visit was conducted on 6/4/2013 in order to assess archaeological sensitivity in the general area around the slated bridge replacement/rehab in Sandgate, Bennington County, Vermont. Background information in the form of historic maps and town histories was collected before visiting the site. There are no mapped archaeological sites in the project area, and upon review, it was evident that the four quadrants were heavily damaged during TS Irene.

There are no zones of archaeological sensitivity to map in the project area. A stone wall on the opposite side of the brook was identified, but is not significant enough to warrant further review and will most likely be avoided during construction. Feel free to contact me with any questions or concerns that may arise as part of this project.

Sincerely,

Brennan

Brennan Gauthier
VTrans Archaeologist
Vermont Agency of Transportation
Program Development Division
Environmental Section
1 National Life Drive
Montpelier, VT 05633
tel. 802-828-3965
fax. 802-828-2334
Brennan.Gauthier@state.vt.us

VTrans Working to Get You There
Vermont Agency of Transportation

Brady, James

From: Newman, Scott
Sent: Wednesday, April 17, 2013 2:50 PM
To: Brady, James
Cc: O'Shea, Kaitlin; Williams, Chris
Subject: Sandgate BO 1441(30) resource ID
Attachments: photo.JPG

We're in the area and stopped by this CW project. There are no historic or 4(f) resources in the APE.

Thanks,
Scott

FW: SANDGATE BO 1441(30) TH 9, Bridge 27 over TERRY BROOK - Local Input Request

From: **Marjorie Peff** (sandgateclerk@live.com) This sender is in your contact list.
Sent: Wed 5/22/13 10:12 AM
To: 'Pat Hall' (pahall375@msn.com); 'eleanor lacross' (elacross@yahoo.com); 'Celeste Keel' (celeste.keel@brsu.org); tabor1@myfairpoint.net; Jpboehlert@aol.com; 'John LaVecchia' (jbllog@comcast.net); 'Jeanne Zoppel' (jl46vt@yahoo.com)

3 attachments
CommunityInputQuestions.doc (45.5 KB) , LocalConcernsLetter-2013-05-21.pdf (37.6 KB) , Sandgate Town Map Br 27.pdf (106.5 KB)

Fyi-marge

From: Williams, Chris [mailto:chris.williams@state.vt.us]
Sent: Tuesday, May 21, 2013 11:48 AM
To: 'sandgateclerk@live.com'
Cc: manders@bcrcvt.org; Bascom, Scott
Subject: SANDGATE BO 1441(30) TH 9, Bridge 27 over TERRY BROOK - Local Input Request

Hello,

Please see the attached correspondence requesting your input on a bridge project we will begin working on soon in our Scoping section. No hard copies will be sent unless requested.

I have attached the cover letter, Community Input questions, and a Town map showing the location of the subject bridge. The Community Input questions are in Microsoft Word format so you can type your responses after the questions and send back via email if that is convenient.

Let me know if you have questions and I look forward to hearing from you.

06/03/2013 00:21 8023758350 SANDGATE VERMONT PAGE 05/06

Local & Regional Input Questionnaire

Community Considerations

1. Are there any scheduled public events in the community that will generate increased traffic (e.g. vehicular, bicycles and/or pedestrians), or may be difficult to stage if the bridge is closed during construction? Examples include: a bike race, festivals, cultural events, farmers market, concerts, etc. that could be impacted? If yes, please provide date, location and event organizers' contact info. NO
2. Is there a "slow season" or period of time from May through October where traffic is less?
   NO
3. Please describe the location of emergency responders (fire, police, ambulance) and emergency response routes. FIRE - ARLINGTON VT POLICE SHERIFF - BENN.
   AMBULANCE - ARLINGTON STATE POLICE - SHAFTSBURY
4. Where are the schools in your community and what are their schedules?
   NO SCHOOLS IN SANDGATE
5. Is the proposed project on an established or planned school bus or public transit route(s)?
   NO
6. Are there any businesses (including agricultural operations) that would be adversely impacted either by a detour or due to work zone proximity?
   NO
7. Are there any important public buildings (town hall or community center) or community facilities (recreational fields or library) in close proximity to the proposed project?
   NO
8. Are there any town highways that might be adversely impacted by traffic bypassing the construction on another local road?
   NO
9. Are there any other municipal operations that could be adversely impacted if the bridge is closed during construction? If yes, please explain.
   NO
10. Please identify any local communication channels that are available—e.g. weekly or daily newspapers, blogs, radio, public access TV, Front Porch Forum, etc. Also include any unconventional means such as local low-power FM.
    N/A
11. Is there a local business association, chamber of commerce or other downtown group that we should be working with?
    NO

Design Considerations

1. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?
   NO
2. Are there any concerns with the width of the existing bridge?
   NO
3. What is the current level of bicycle and pedestrian use on the bridge?
   VERY LOW

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4. If a sidewalk or wide shoulder is present on the existing bridge, should the new structure have one? NO

5. Is there a need for a sidewalk or widened shoulder if one does not currently exist? Please explain. NO - LOW TRAFFIC PEDESTRIAN AREA

6. Does the bridge provide an important link in the town or statewide bicycle or pedestrian network such that bicycle and pedestrian traffic should be accommodated during construction?
NO

7. Are there any special aesthetic considerations we should be aware of?
NO

8. Are there any traffic, pedestrian or bicycle safety concerns associated with the current bridge? If yes, please explain.
NO

9. Does the location have a history of flooding? If yes, please explain.
NO

10. Are you aware of any nearby Hazardous Material Sites?
NO

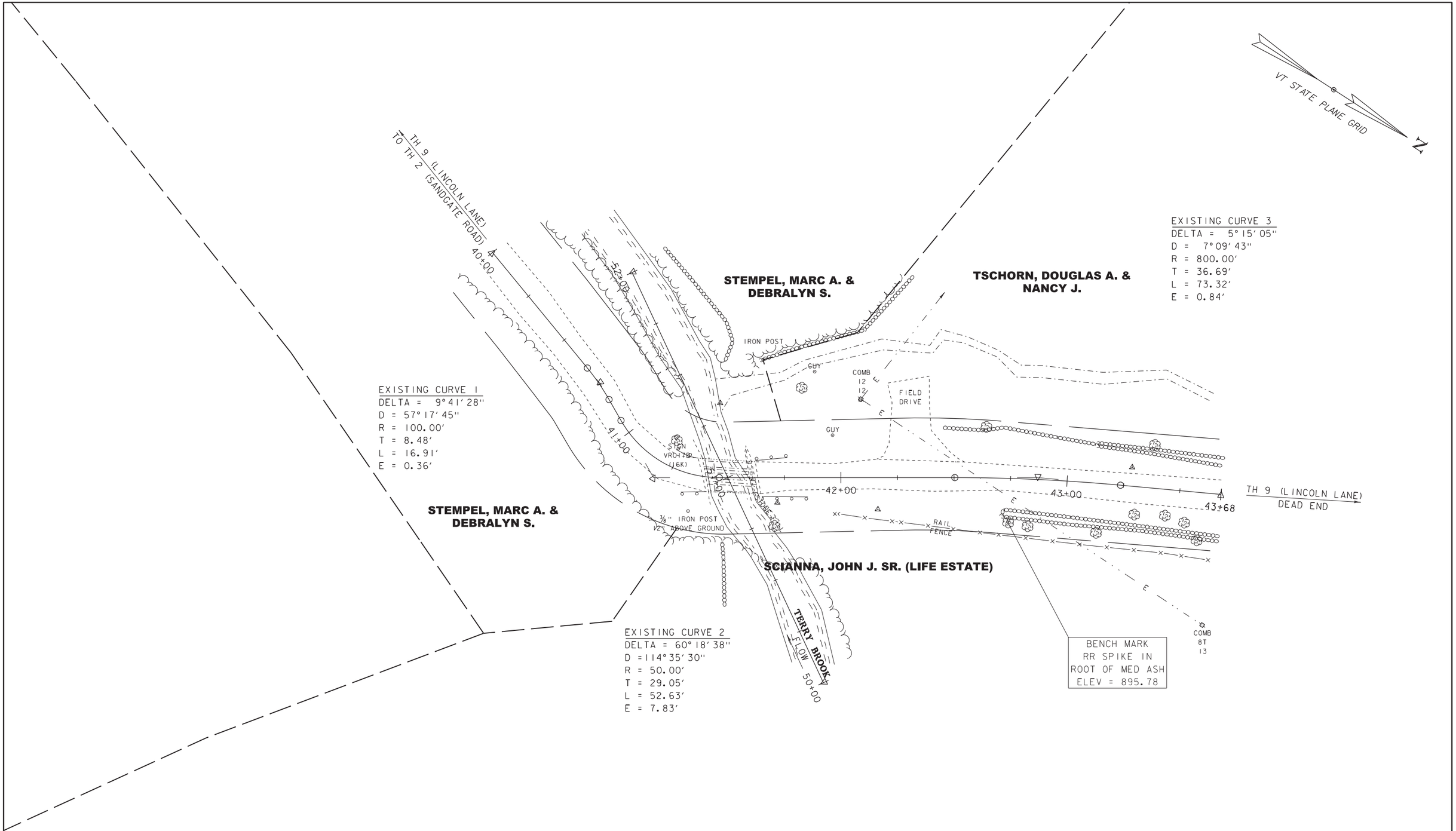
11. Are you aware of any historic, archeological and/or other environmental resource issues?
NO

12. Are there any other comments you feel are important for us to consider that we have not mentioned yet?
NO

Land Use & Public Transit Considerations – to be filled out by the municipality or RPC.

1. Does your municipal land use plan reference the bridge in question? If so please provide a copy of the applicable section or sections of the plan.
NO
2. Please provide a copy of your existing and future land use map, if applicable.
N/A
3. Are there any existing, pending or planned development proposal that would impact future transportation patterns near the bridge? If so please explain.
N/A
4. Is there any planned expansion of public transit service in the project area? If not known please contact your Regional Public Transit Provider.
N/A

06/03/2013 00:21 8023758350 SANDGATE VERMONT PAGE 03/06

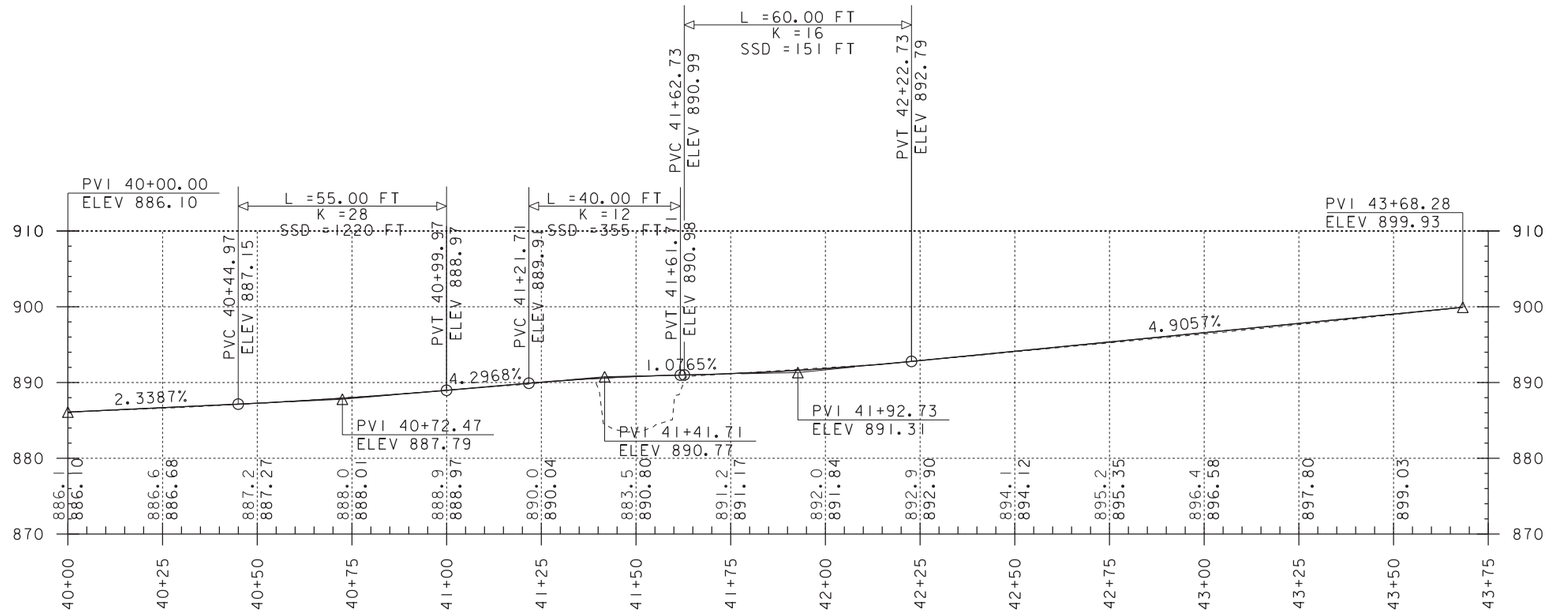


EXISTING BRIDGE DATA
STEEL BEAM WITH TIMBER DECK
BUILT 1960
26' LONG, 15' WIDE

EXISTING CONDITIONS

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13J086/s13J086border.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
EXISTING CONDITIONS LAYOUT SHEET	SHEET 1 OF 14



TH 9 EXISTING PROFILE

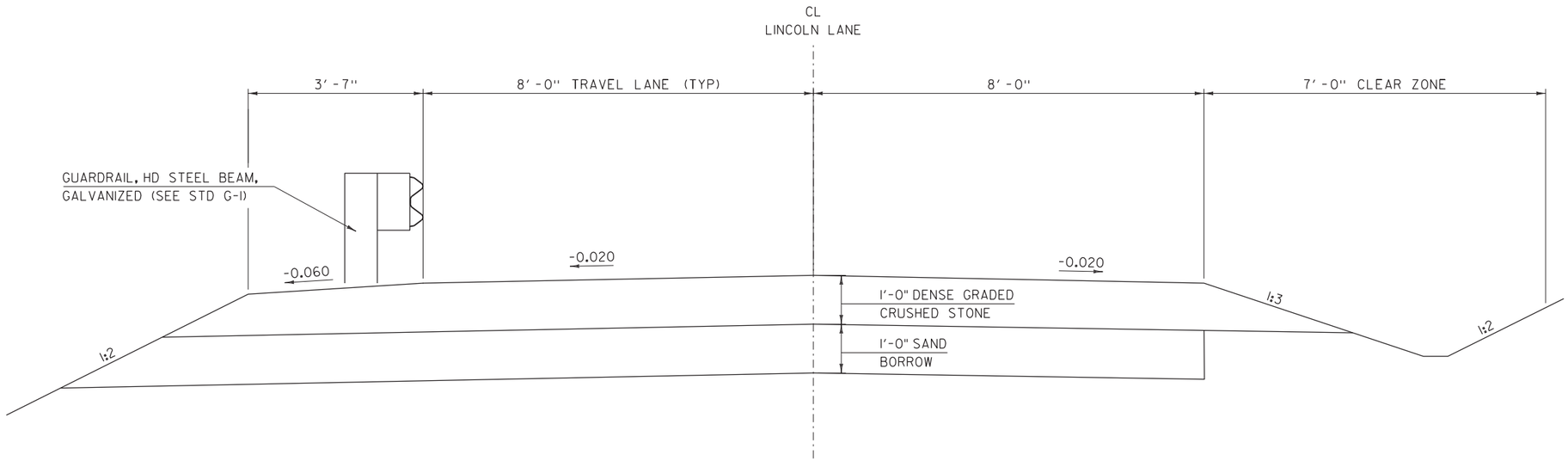
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

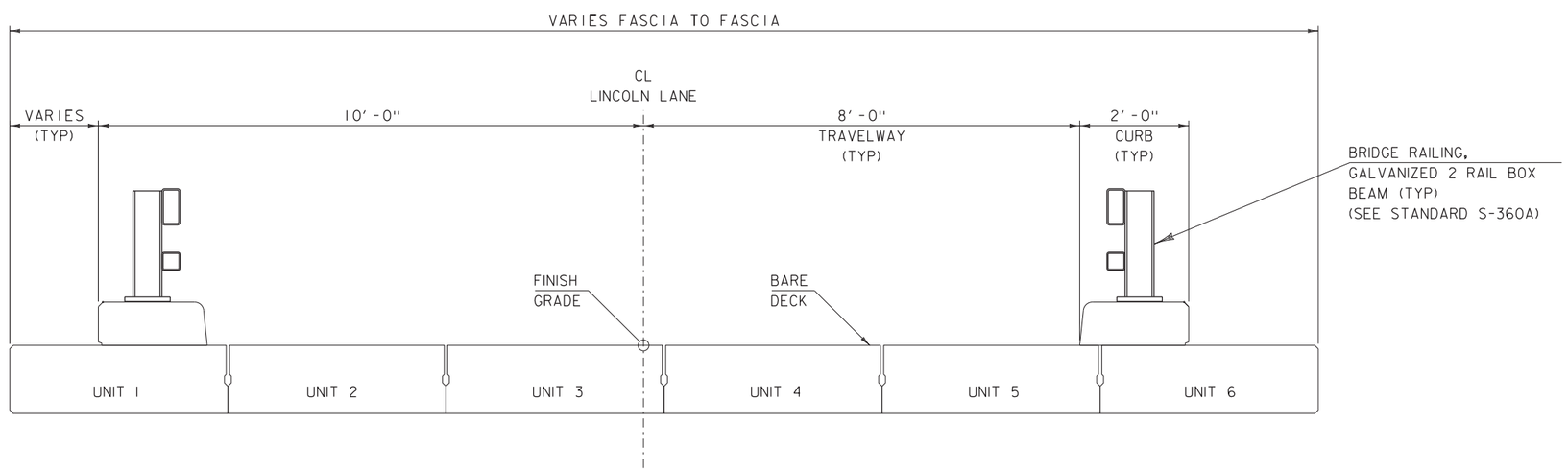
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/s13j086profile.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
PROFILE SHEET - EXISTING	SHEET 2 OF 14



TH 9 ROADWAY TYPICAL SECTION

SCALE 3/4" = 1'-0"



BRIDGE TYPICAL SECTION

SCALE 3/4" = 1'-0"

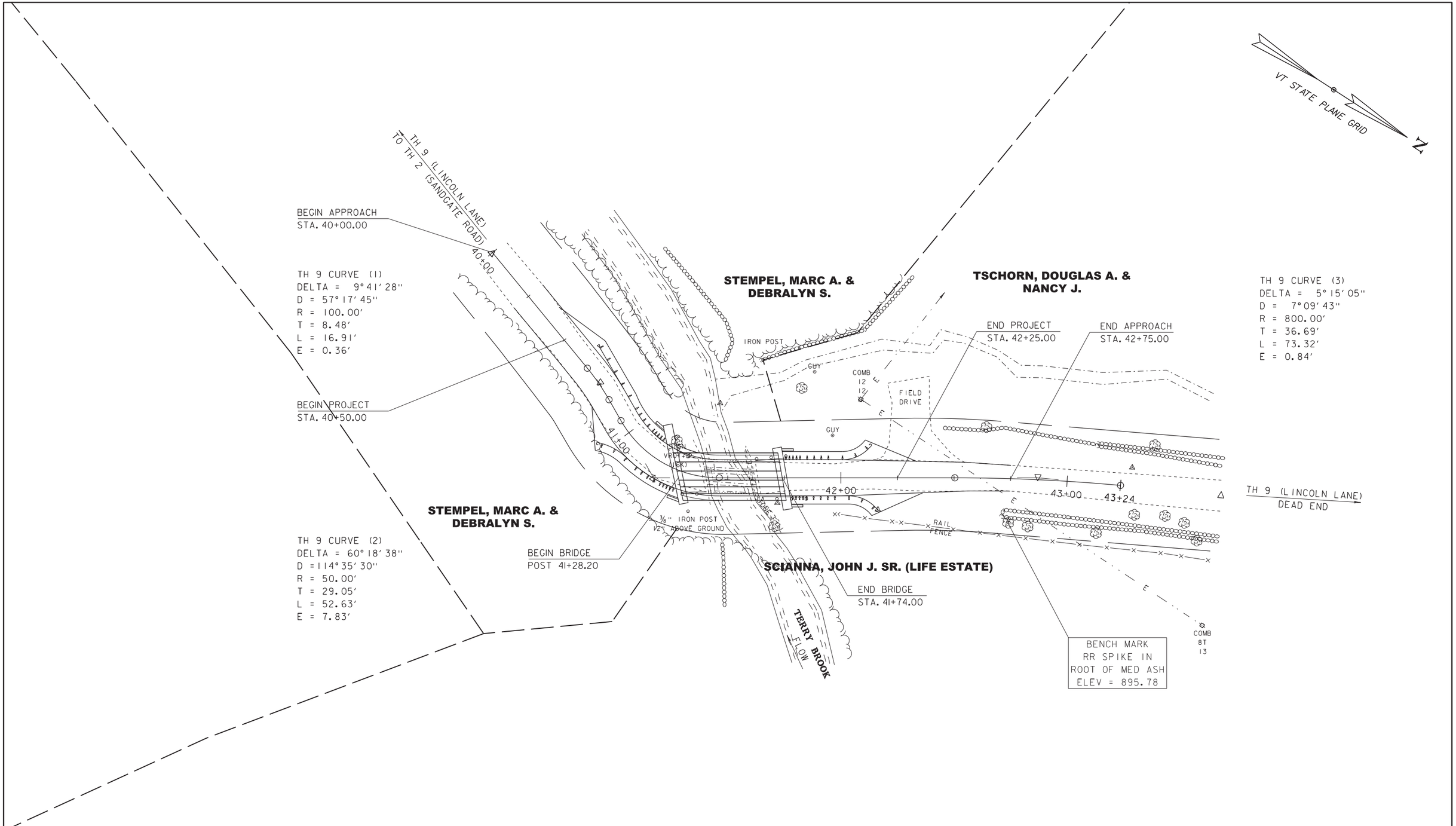
MATERIAL TOLERANCES (IF USED ON PROJECT)	
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: SANDGATE

PROJECT NUMBER: BO 1441(30)

FILE NAME: s13j086typ.dgn
PROJECT LEADER: C. P. WILLIAMS
DESIGNED BY: C. MOONEY
TYPICAL SECTION ALTERNATIVE 1

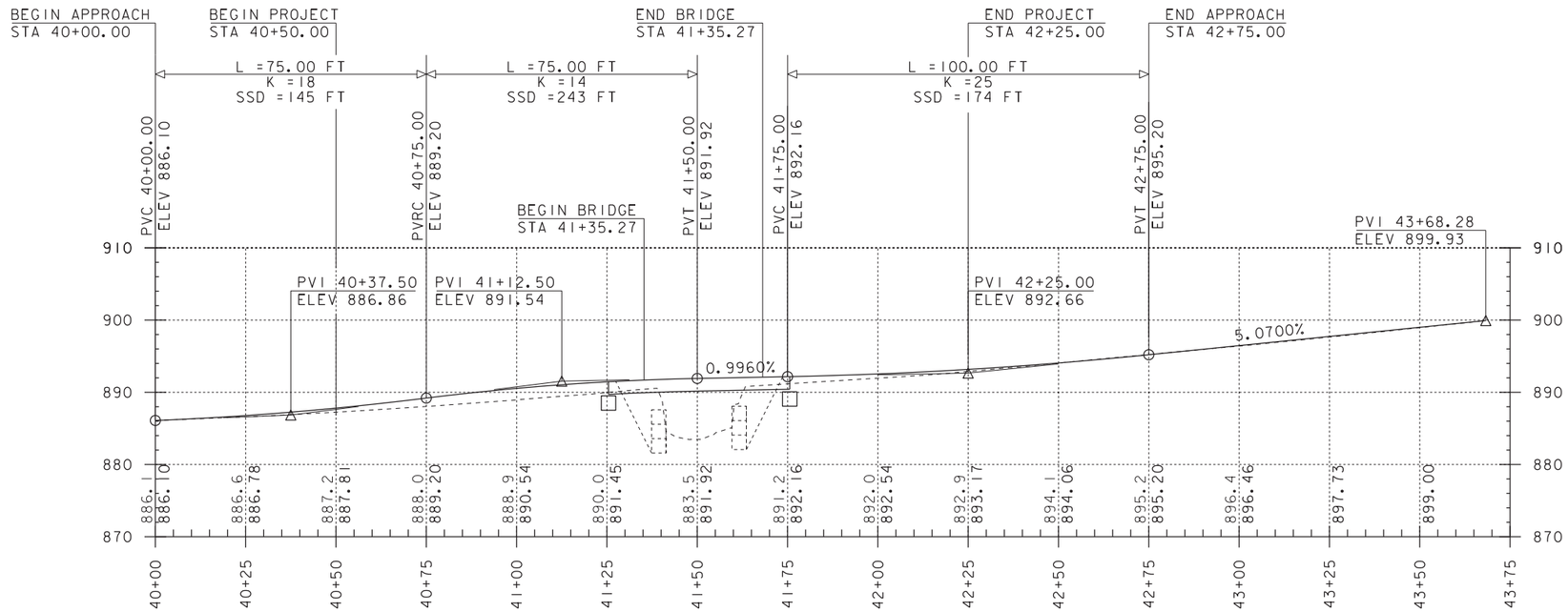
PLOT DATE: 31-DEC-2013
DRAWN BY: C. MOONEY
CHECKED BY: ------
SHEET 3 OF 14



ALTERNATIVE 1 LAYOUT

SCALE 1" = 20′-0"
20 0 20

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13J086/alternative 1.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
LAYOUT SHEET ALTERNATIVE 1	SHEET 4 OF 14



TH 9 PROFILE ALTERNATIVE 1

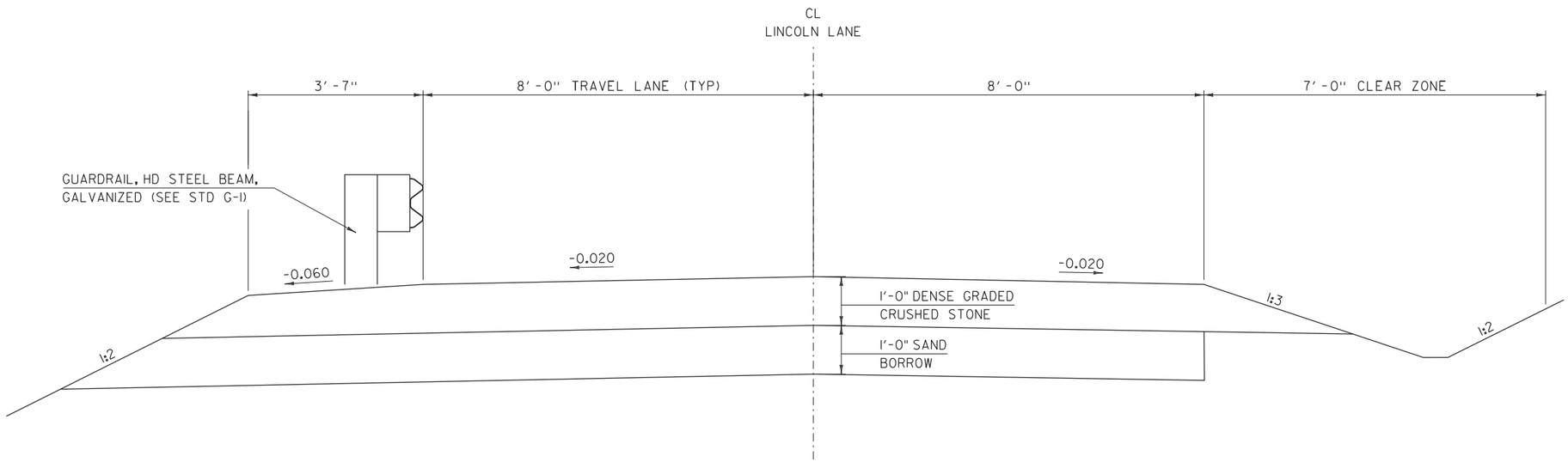
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

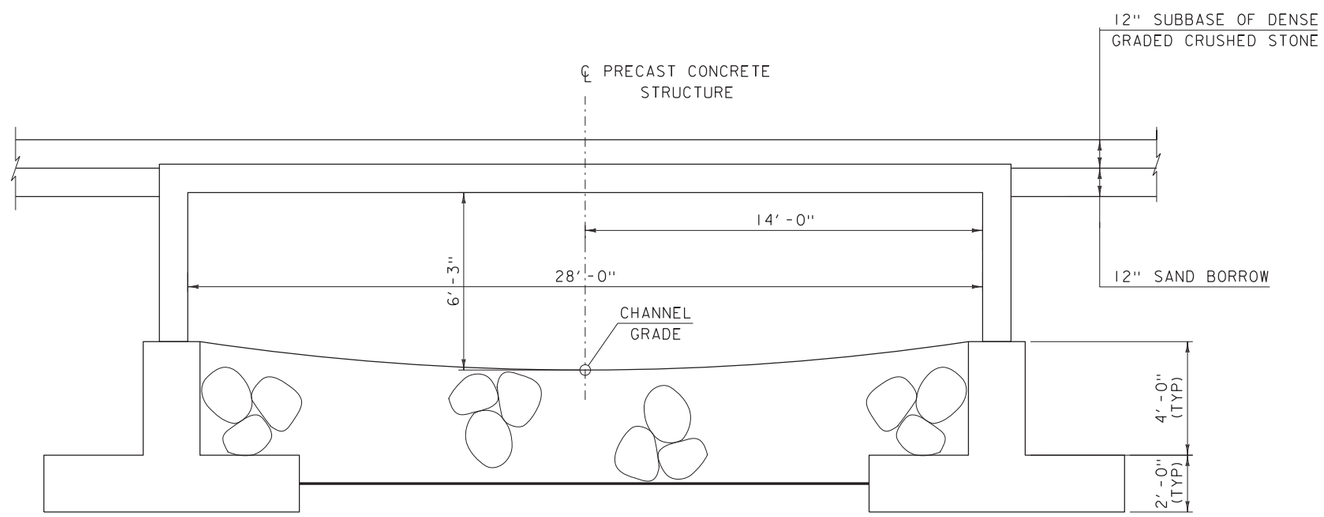
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/s13j086profile.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
PROFILE SHEET - ALTERNATIVE 1	SHEET 5 OF 14



TH 9 ROADWAY TYPICAL SECTION

SCALE 3/4" = 1'-0"



PRECAST CONCRETE STRUCTURE TYPICAL SECTION

SCALE 3/8" = 1'-0"

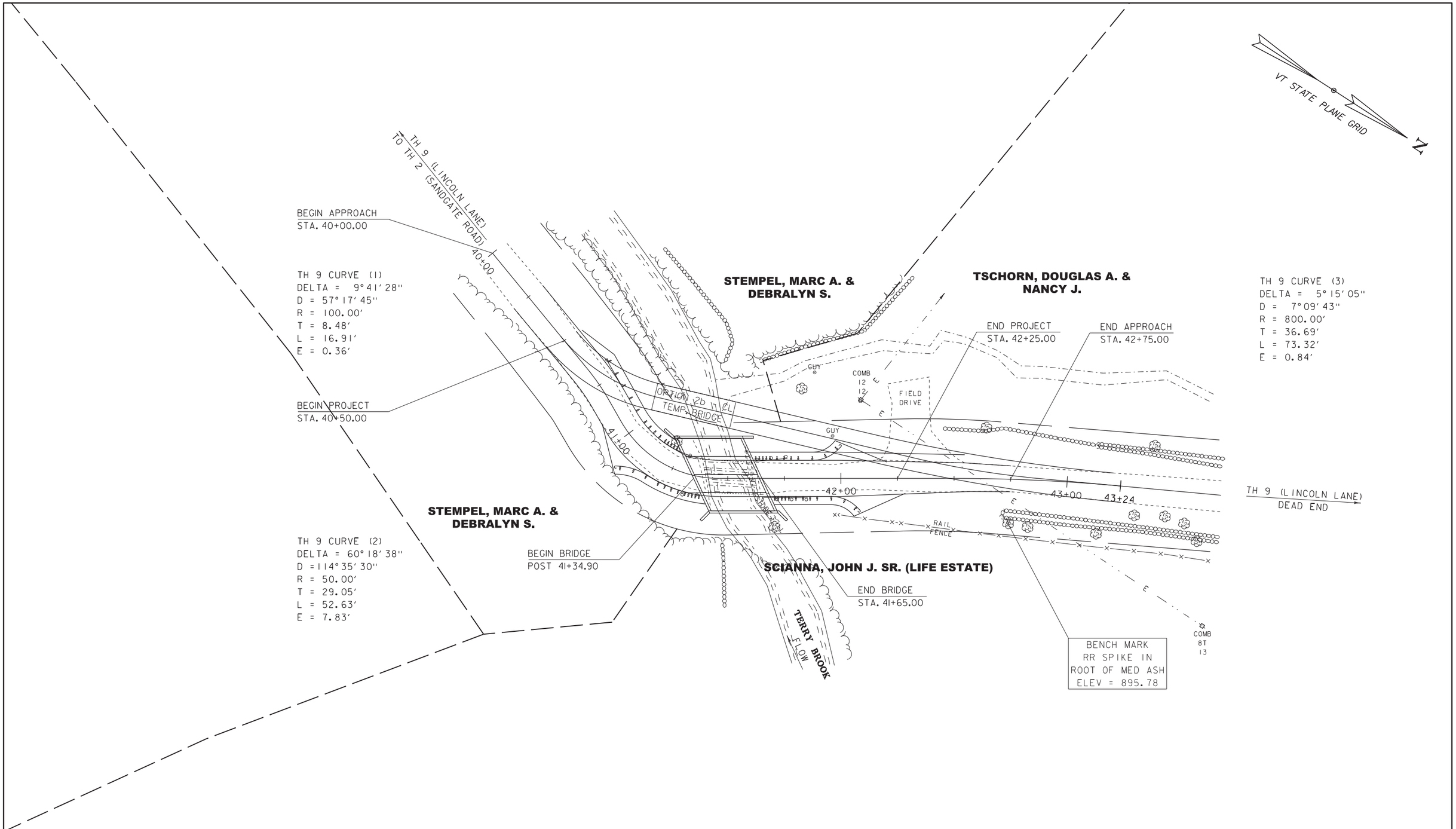
MATERIAL TOLERANCES
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: SANDGATE
PROJECT NUMBER: BO 1441(30)

FILE NAME: s13j086typ.dgn
PROJECT LEADER: C. P. WILLIAMS
DESIGNED BY: C. MOONEY
TYPICAL SECTION ALTERNATIVE 2

PLOT DATE: 31-DEC-2013
DRAWN BY: C. MOONEY
CHECKED BY: ------
SHEET 6 OF 14

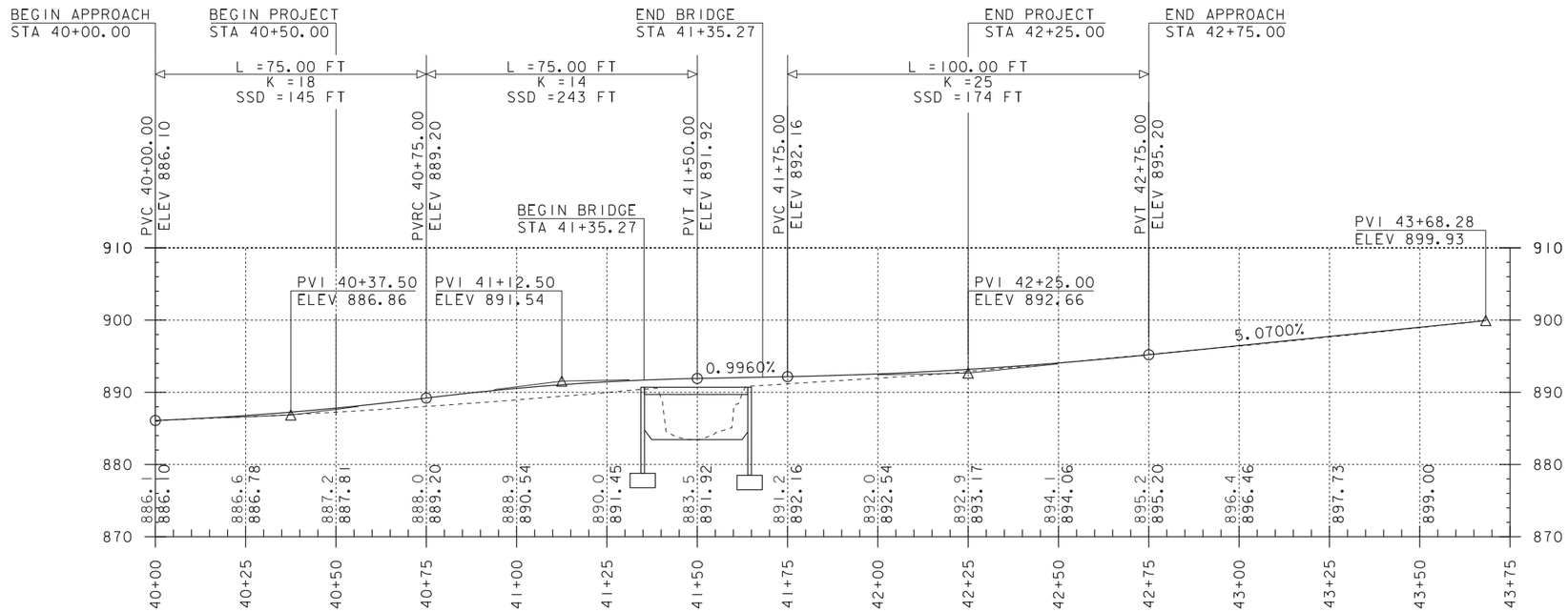


ALTERNATIVE 2 LAYOUT

SCALE 1" = 20′-0"

20 0 20

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13J086/s13J086border.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
LAYOUT SHEET ALTERNATIVE 2	SHEET 7 OF 14



TH 9 PROFILE ALTERNATIVE 2

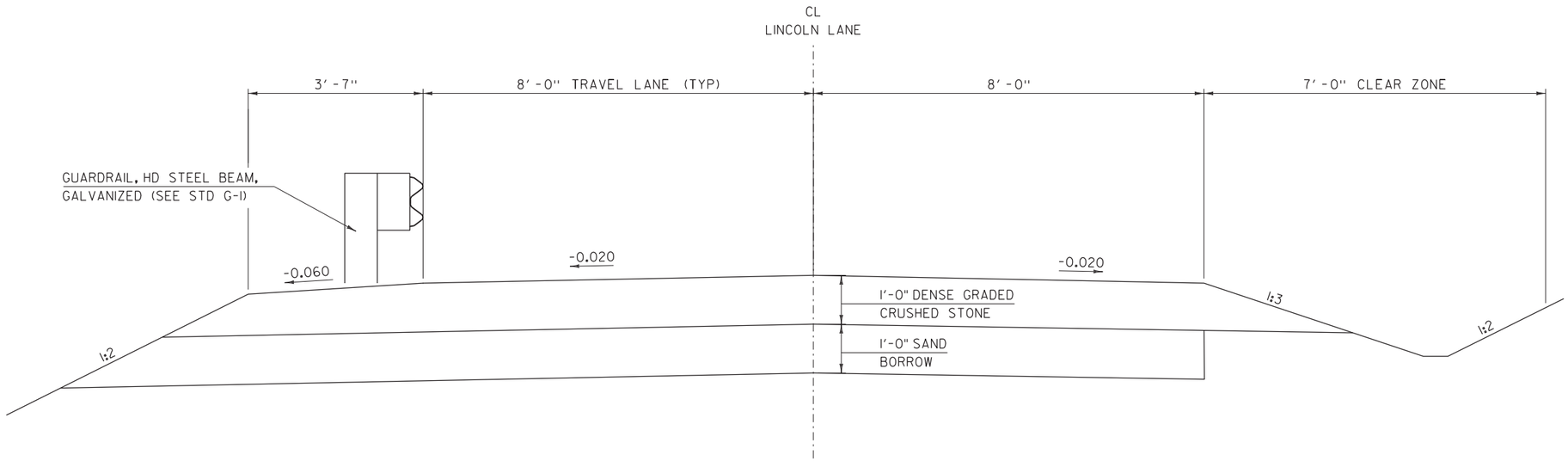
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

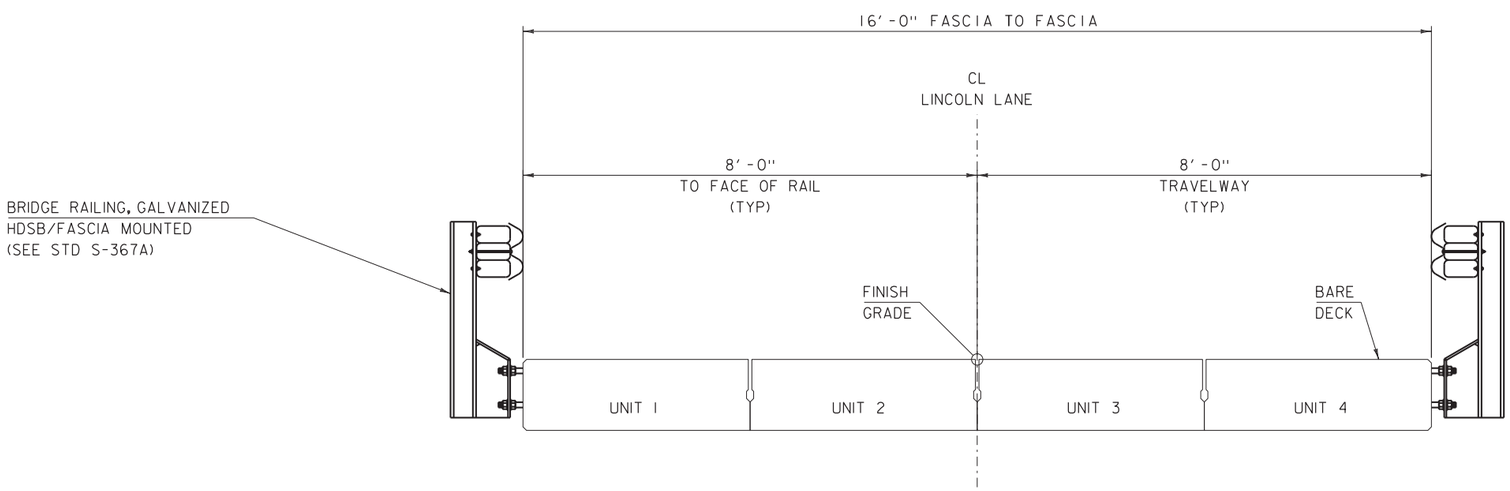
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/s13j086profile.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
PROFILE SHEET - ALTERNATIVE 1	SHEET 8 OF 14



TH 9 ROADWAY TYPICAL SECTION

SCALE 3/4" = 1'-0"



BRIDGE TYPICAL SECTION

SCALE 3/4" = 1'-0"

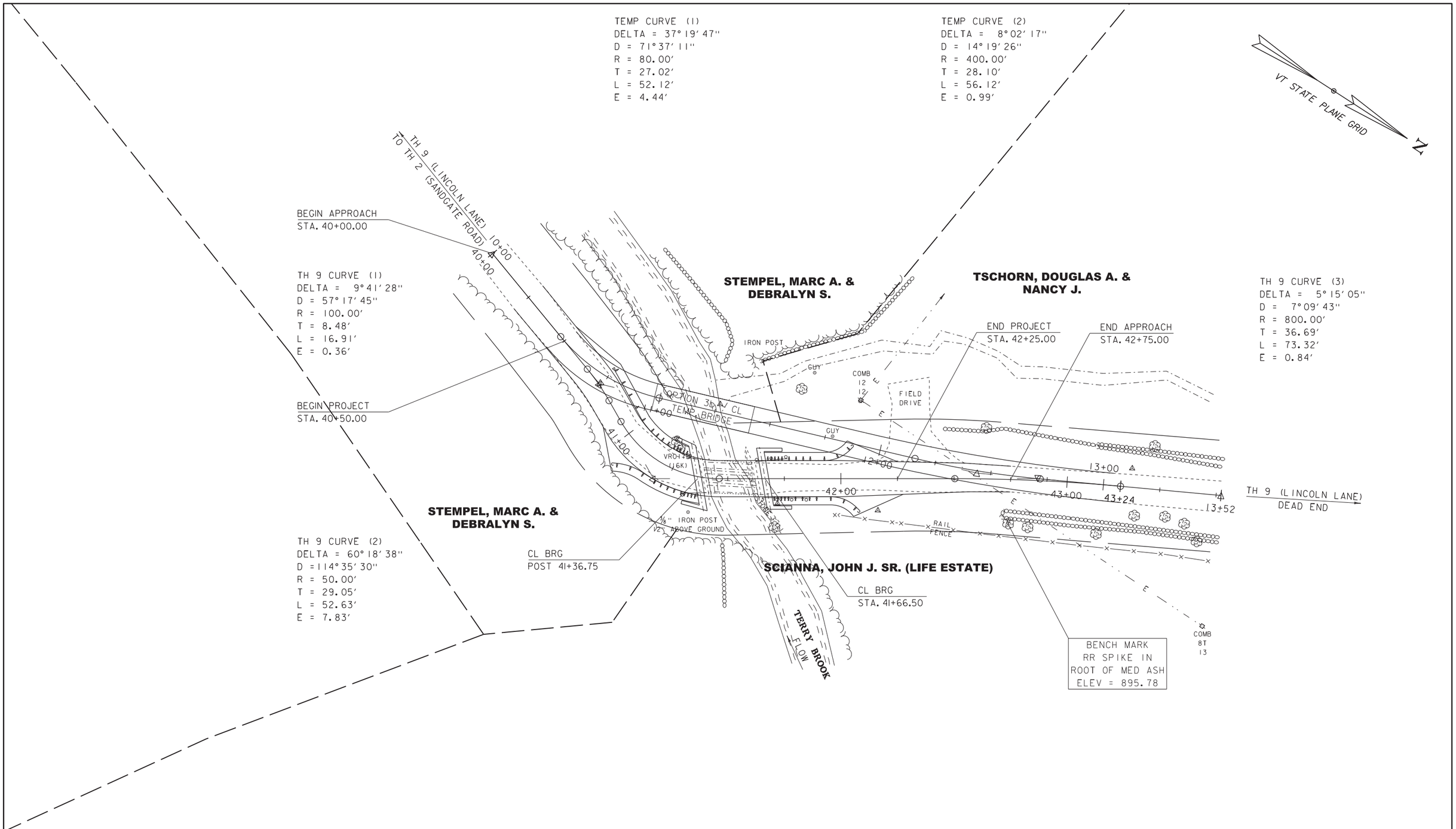
MATERIAL TOLERANCES (IF USED ON PROJECT)	
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: SANDGATE

PROJECT NUMBER: BO 1441(30)

FILE NAME: s13j086typ.dgn
PROJECT LEADER: C. P. WILLIAMS
DESIGNED BY: C. MOONEY
TYPICAL SECTION ALTERNATIVE 3

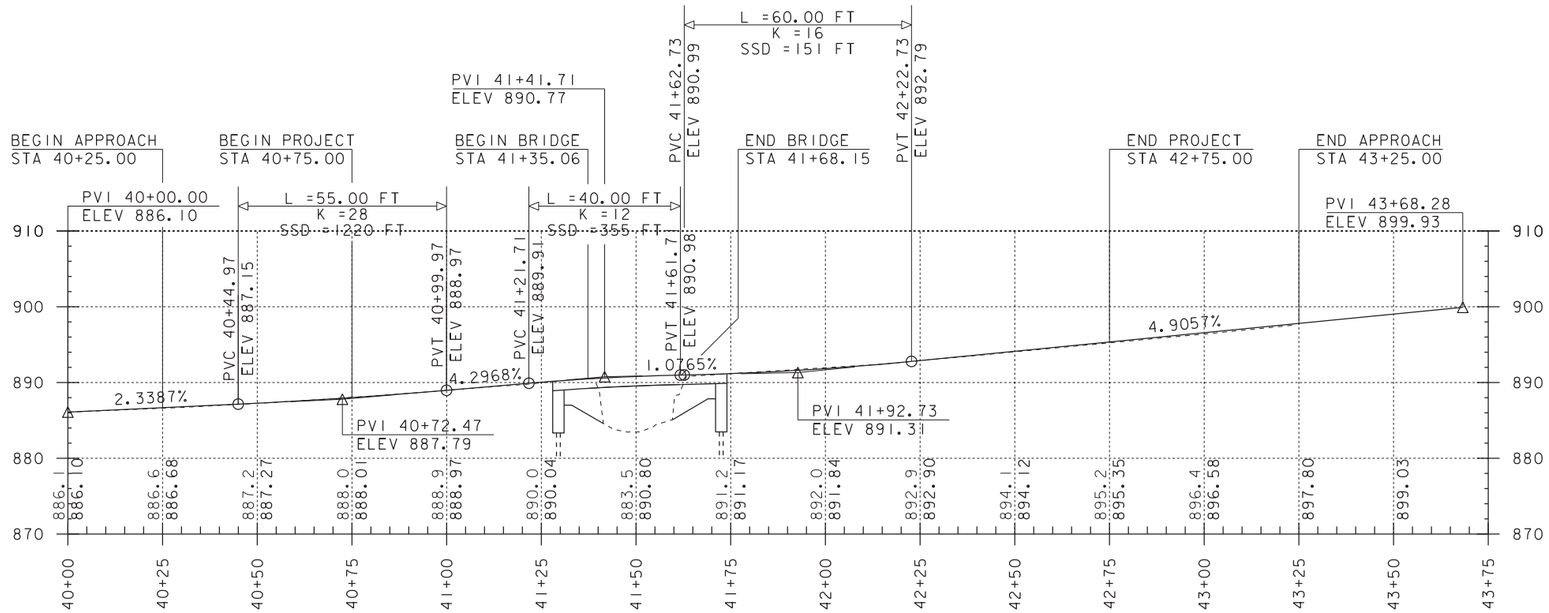
PLOT DATE: 31-DEC-2013
DRAWN BY: C. MOONEY
CHECKED BY: ------
SHEET 9 OF 14



ALTERNATIVE 3 LAYOUT

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/sl3j086border.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
LAYOUT SHEET ALTERNATIVE 3	SHEET 10 OF 14



TH 9 PROFILE ALTERNATIVE 3

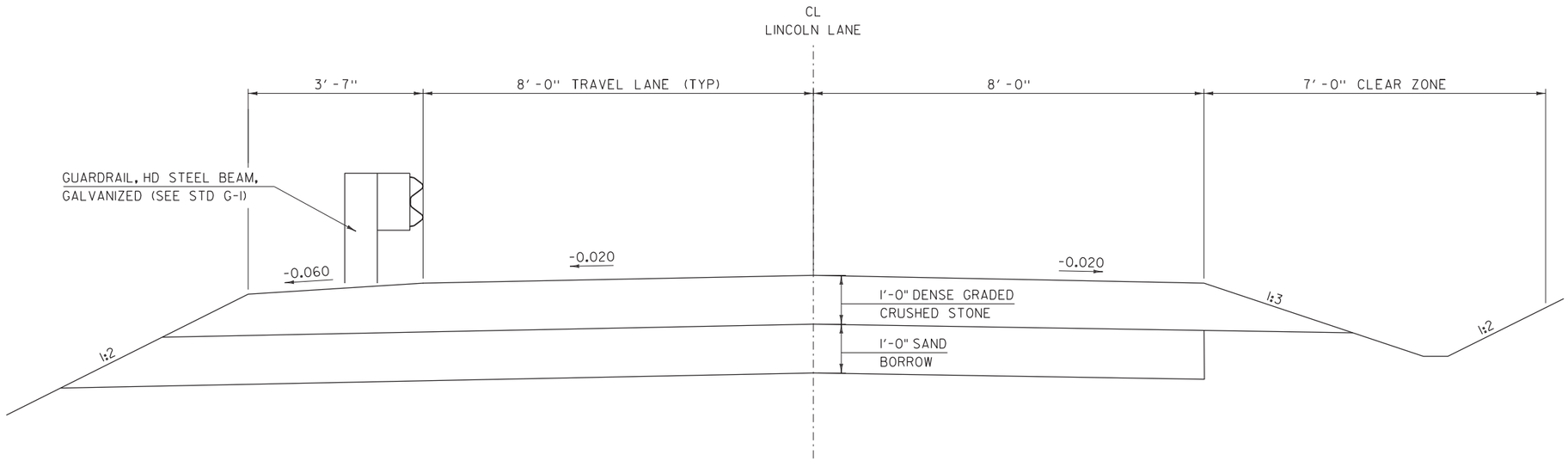
SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

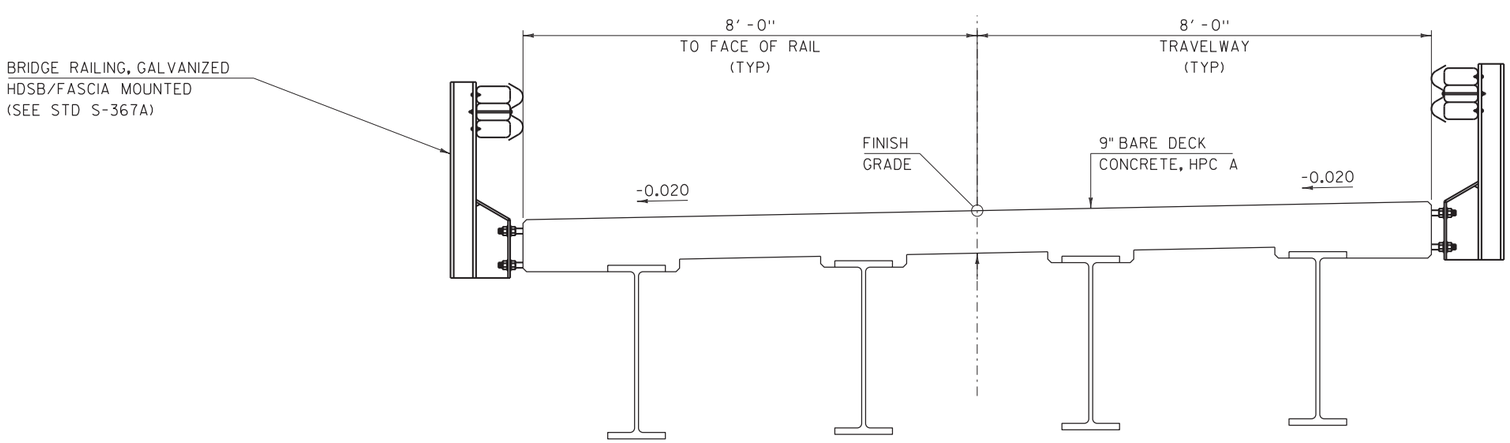
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/s13j086profile.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
PROFILE SHEET - ALTERNATIVE 3	SHEET 11 OF 14



TH 9 ROADWAY TYPICAL SECTION

SCALE 3/4" = 1'-0"



BRIDGE TYPICAL SECTION

SCALE 3/4" = 1'-0"

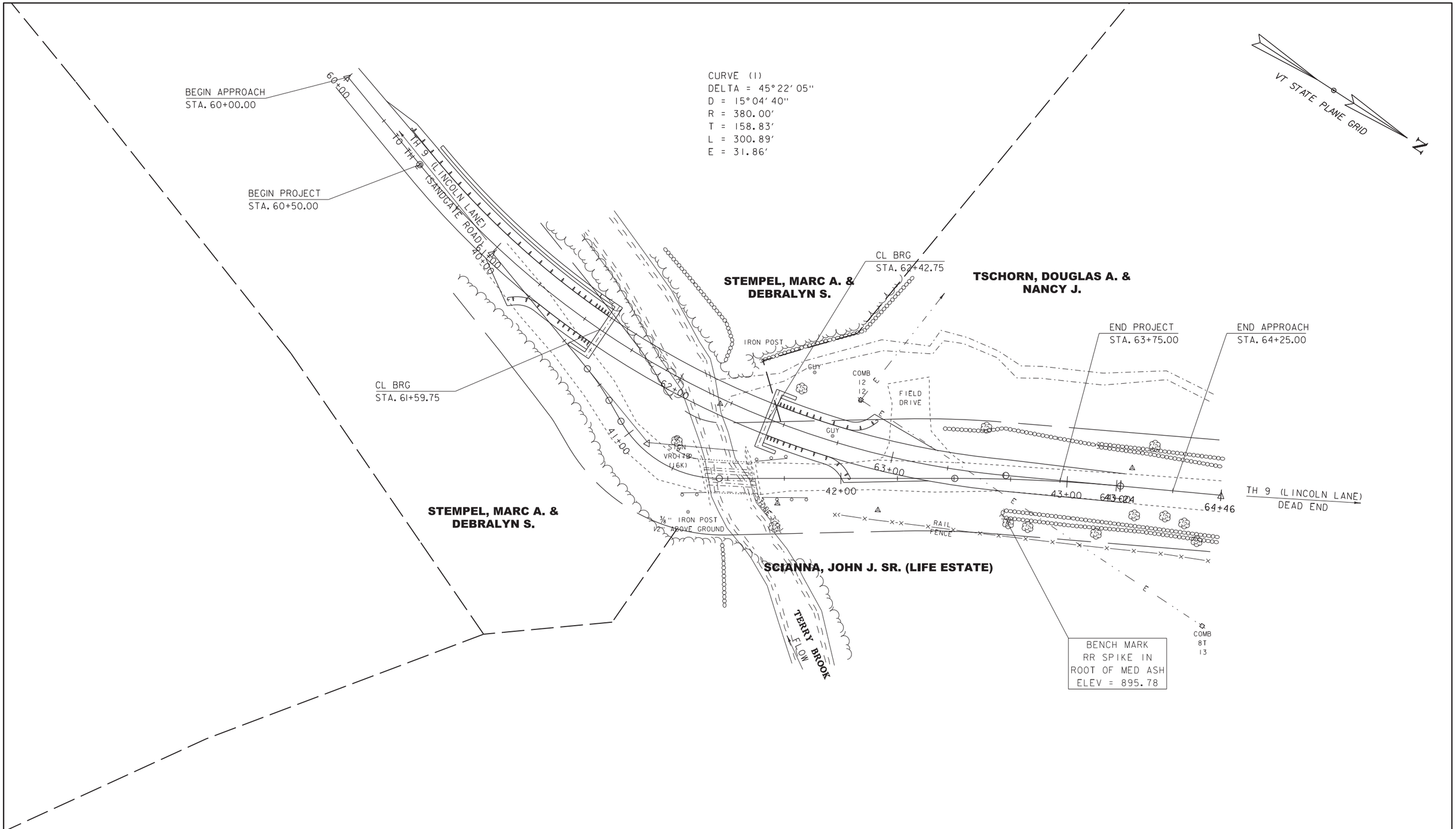
MATERIAL TOLERANCES (IF USED ON PROJECT)	
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: SANDGATE

PROJECT NUMBER: BO 1441(30)

FILE NAME: s13j086typ.dgn
PROJECT LEADER: C. P. WILLIAMS
DESIGNED BY: C. MOONEY
TYPICAL SECTION ALTERNATIVE 4

PLOT DATE: 31-DEC-2013
DRAWN BY: C. MOONEY
CHECKED BY: ------
SHEET 12 OF 14

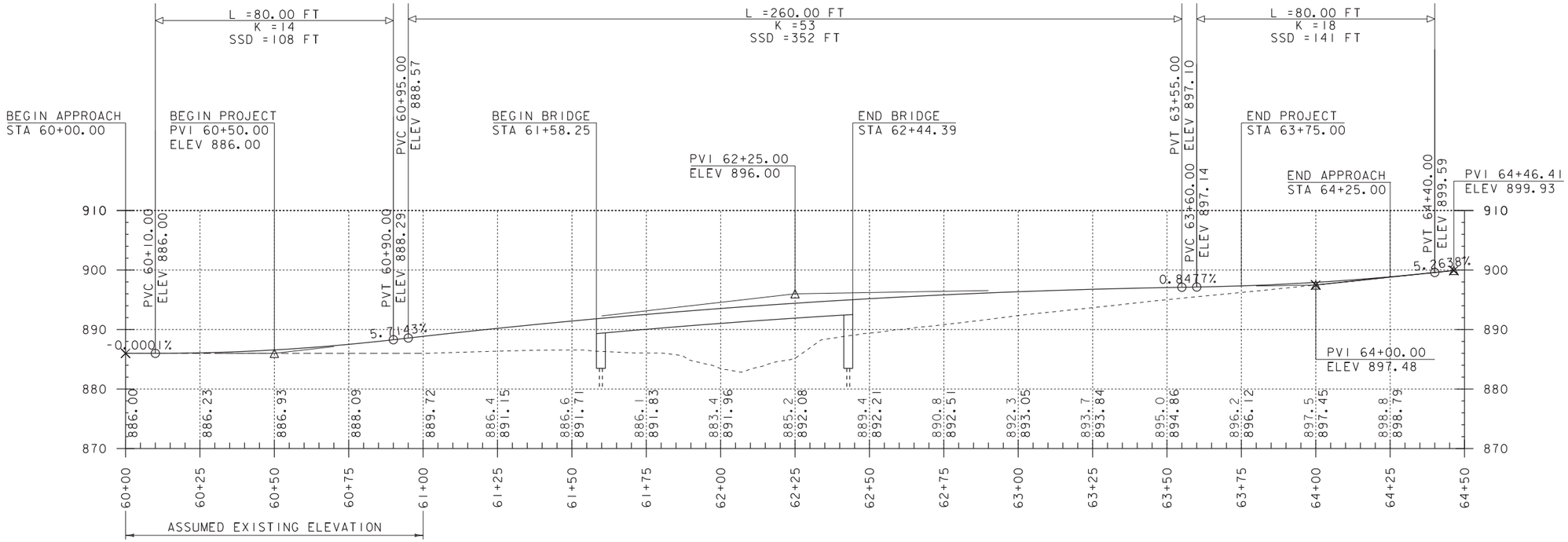


EXISTING BRIDGE DATA
STEEL BEAM WITH TIMBER DECK
BUILT 1960
26' LONG, 15' WIDE

ALTERNATIVE 4 LAYOUT

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/s13j086border.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
LAYOUT SHEET ALTERNATIVE 4	SHEET 13 OF 14



TH 9 PROFILE ALTERNATIVE 4

SCALE: HORIZONTAL 1" = 20'-0"
VERTICAL 1" = 10'-0"

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄

GRADES SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADE ALONG ℄

PROJECT NAME: SANDGATE	
PROJECT NUMBER: BO 1441(30)	
FILE NAME: 13j086/s13j086profile.dgn	PLOT DATE: 31-DEC-2013
PROJECT LEADER: C.P.WILLIAMS	DRAWN BY: D.D.BEARD
DESIGNED BY: C. MOONEY	CHECKED BY: ------
PROFILE SHEET - ALTERNATIVE 2	SHEET 14 OF 14