APPENDIX A: PHOTO LOG

Fairview – West (Phase I)

FINAL Existing and Projected Conditions Report

June 14, 2016

PHOTO 1 – Looking east at the intersection of MT 201 and MT 200/Ellery Avenue in Fairview (RP 69.5).

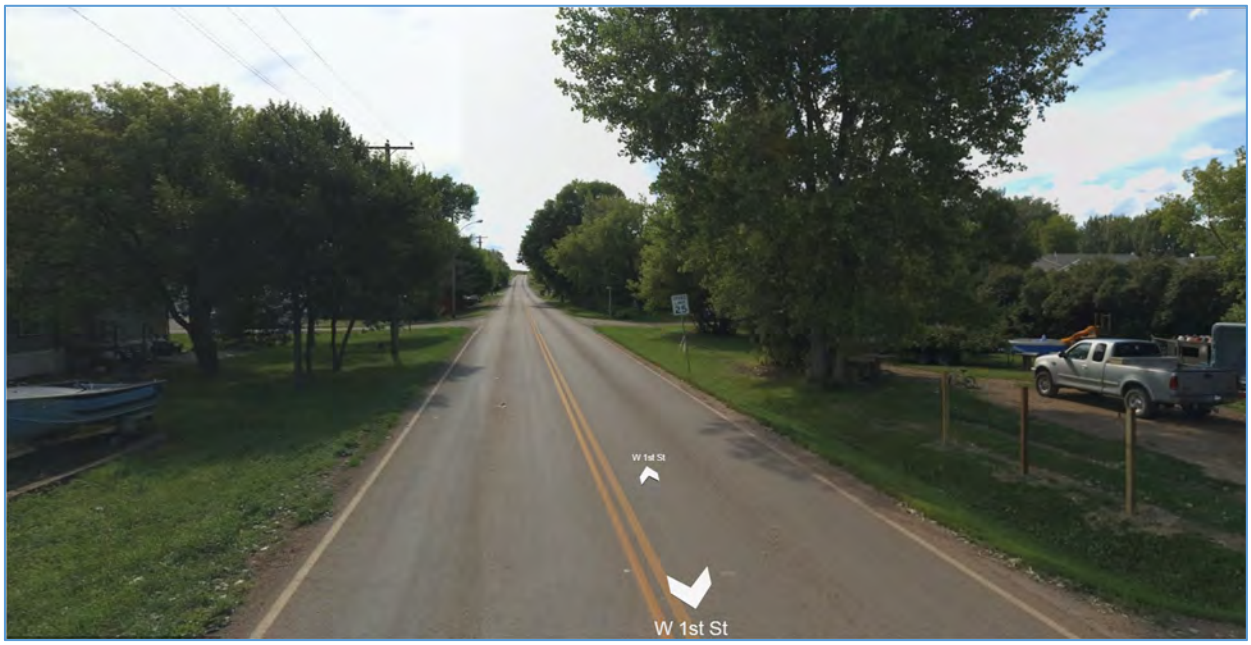


PHOTO 2 – Looking west along MT 201 near RP 69.5 in Fairview.

PHOTO 3 – Looking west at the intersection of MT 201 and Central Avenue in Fairview (RP 69.45).

PHOTO 4 – Looking west along MT 201 from just east of North Western Avenue (RP 69.42).

PHOTO 5 – Looking west at the intersection of MT 201 and South Western Avenue in Fairview (RP 69.38).

PHOTO 6 – Looking west at the existing bridge over the USRS Main Canal (RP 69.35).

PHOTO 7 – Looking east along MT 201 from just west of the USRS Main Canal (RP 69.35).

PHOTO 8 – Looking west near the intersection MT 201 and South Dawson Avenue (RP 69.16).

PHOTO 9 – Looking westerly from RP 69.14 on MT 201. The fencing at left encloses a cemetery.

PHOTO 10 - Looking east from RP 69.14 on MT 201.

PHOTO 11 – MT 201 just east of the water storage tank maintained by the Town of Fairview (RP 69.10).

PHOTO 12 – Looking northwesterly at grade and curves on MT 201 west of Fairview (RP 69.0).

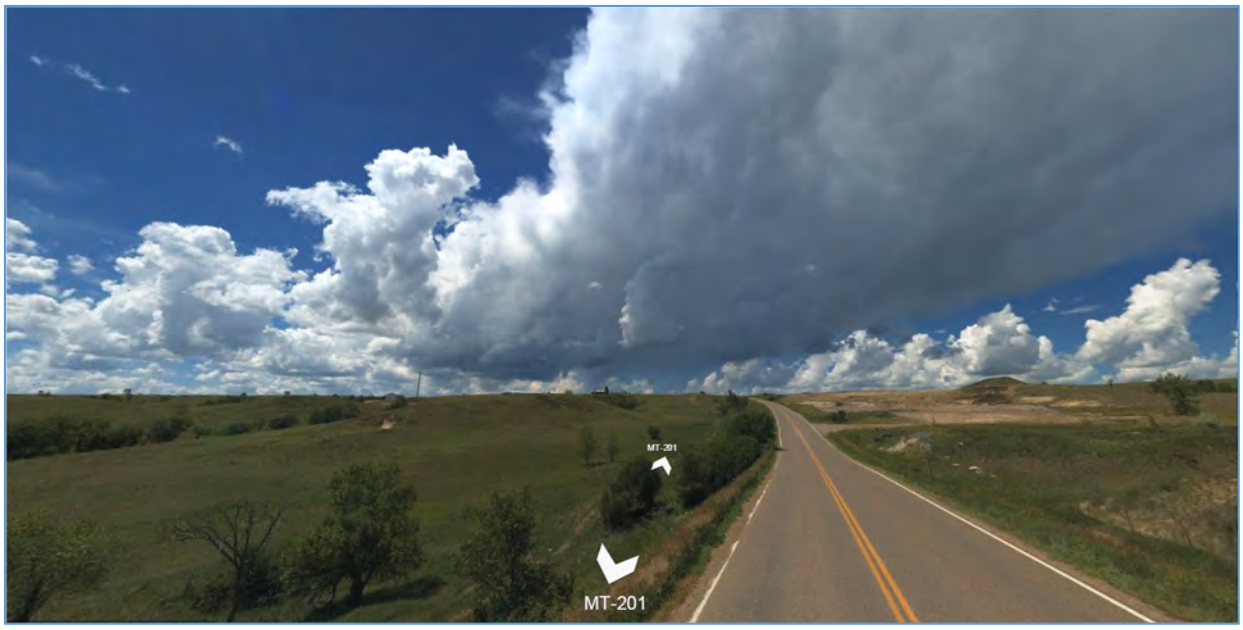


PHOTO 13 – View to the northwest near an approach to a gravel pit near RP 68.80.

PHOTO 14 – Looking southeasterly from near the top of the grade west of Fairview near RP 68.46.

PHOTO 15 – Looking southeasterly along MT 201 near an approach located at RP 68.40.

PHOTO 16 – Looking west along MT 201 from near the Fairview Airport near RP 68.30.

PHOTO 17 – Looking east at 6% grade sign located near the airport at RP 68.24.

PHOTO 18 – Looking west from near the approach to the Fairview Airport (RP 68.19).

PHOTO 19 – Looking east at the intersection of MT 201 and gravel pit access roads near RP 67.70.

PHOTO 20 – Looking westerly along MT 201 from RP 67.70.

PHOTO 21 – Looking easterly at MT 201 from the end of the study corridor (RP 67.40).

PHOTO 22 – View to the west along MT 201 from the west end of the study corridor at RP 67.40.

APPENDIX B: MDT OPERATIONAL REVIEW FOR MT 201 AND MT 200/ELLERY AVENUE

Fairview – West (Phase I)

FINAL Existing and Projected Conditions Report

June 14, 2016

Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

MASTERFILE COPY

Memorandum

To: Damian Krings, PE
Road Design Engineer

From: DCB Danielle C. Bolan, P.E.
Traffic Operations Engineer

Date: August 14, 2014

Subject: STPP 20-2(31)62
UPN 8168000
Operational Review
MT-200 & MT-201 – Fairview

We have completed an Operational Review for the intersection of MT-200 and MT-201 located in Richland County (Fairview city limits). The purpose of this review is to determine the appropriate traffic control and lane configuration for this intersection, as well as identify any operational issues since installation of all-way stop control (AWSC). Data used in this study includes turning movement counts, a post-intersection improvements crash history and field observations. **The study concluded that the current AWSC is an appropriate form of traffic control at this intersection. The existing lane configuration is appropriate as well.**

Existing Conditions

This intersection currently has AWSC. Posted speed limits on all approaches are 25 mph. All approaches were observed accommodating significant truck traffic at about 32% of total intersection traffic. An aerial photograph of the intersection is shown in figure 1.

MT-200 (N-20) is a principal arterial running north-south. MT-200 is locally known as Ellery Avenue. This highway has 12-foot lanes and 8-foot shoulders on each side within the study area. Both the southern and northern approaches consist of two lanes in each direction with the left lanes accommodating through and left-turn movements and the right lanes accommodating through and right-turn movements. Just north of Fairview, MT-200 veers east and continues into North Dakota about 0.3 miles past the intersection.

MT-201 (P-201) is a minor arterial on the west leg of the intersection. The east leg of this intersection is a city street which accommodates street parking. No vehicles were observed parking when data was being collected at this intersection. Both the east and west legs are locally known as 1st Street. MT-201 (west leg) has 12-foot lanes and less than one-foot shoulders on each side within the study area. The city street (east leg) has a total road width of approximately 32 feet. Both the eastern and western approaches to the intersection consist of one lane in each direction with ingress into the intersection as full movement access. This intersection marks the eastern end of MT-201.

There is a downhill grade towards the intersection on MT-201 from the west. At Dawson Avenue, MT-201 has a 4.8 percent grade. The steepness of the grade decreases toward the intersection with MT-200 where the grade is 0.5 percent.

Each leg of the intersection includes two overhead flashing red lights. These lights are attached to a mast arm which extends into the intersection from a pole in the northeast quadrant of the intersection. MT-200 stop signs are 36"x36" and MT-201 stop signs are 30"x30". Each stop sign has an "ALL WAY" plaque beneath it.

Sharbano Park is located in the northeast quadrant of this intersection. The park includes basketball courts and a pool. Private residences are located in the remaining three quadrants.

Figure 1. An aerial photograph of the intersection.

Traffic Volumes

Traffic counts were manually taken at this intersection in May of 2014. A total of seven hours of data were collected throughout the day. Due to an incident involving a trailer malfunction, counts after 5pm were not collected. This data was supplemented with data from a previous count MDT performed at this intersection on August 9, 2011. This was done by filling in time gaps in the 2014 data with the 2011 data, when available. The 2011 counts appear to be representative of 2014 traffic because the pattern and magnitude of the 2011 flows are similar to that in 2014. Figure 2 shows recorded AM, noon and PM peak observed volumes.

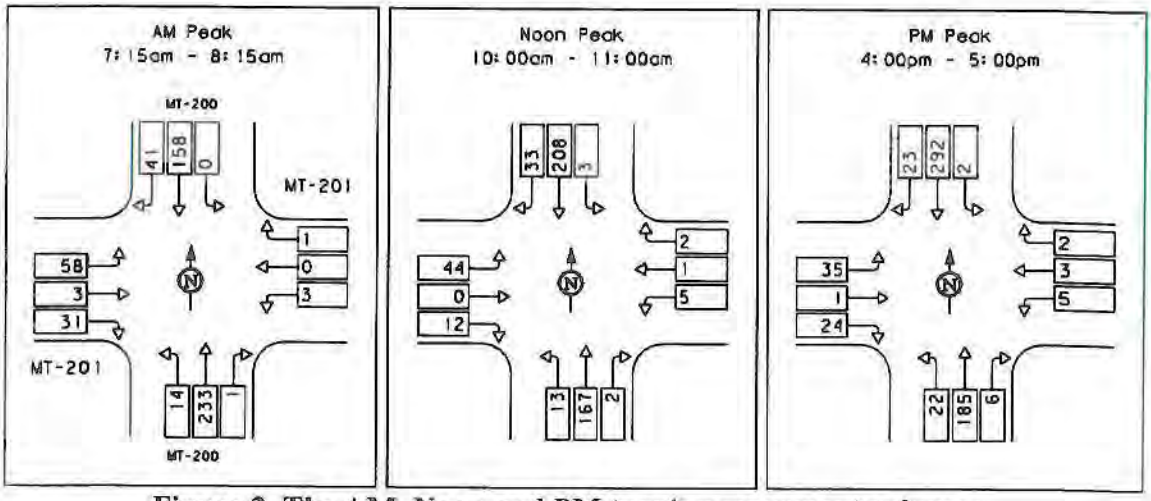
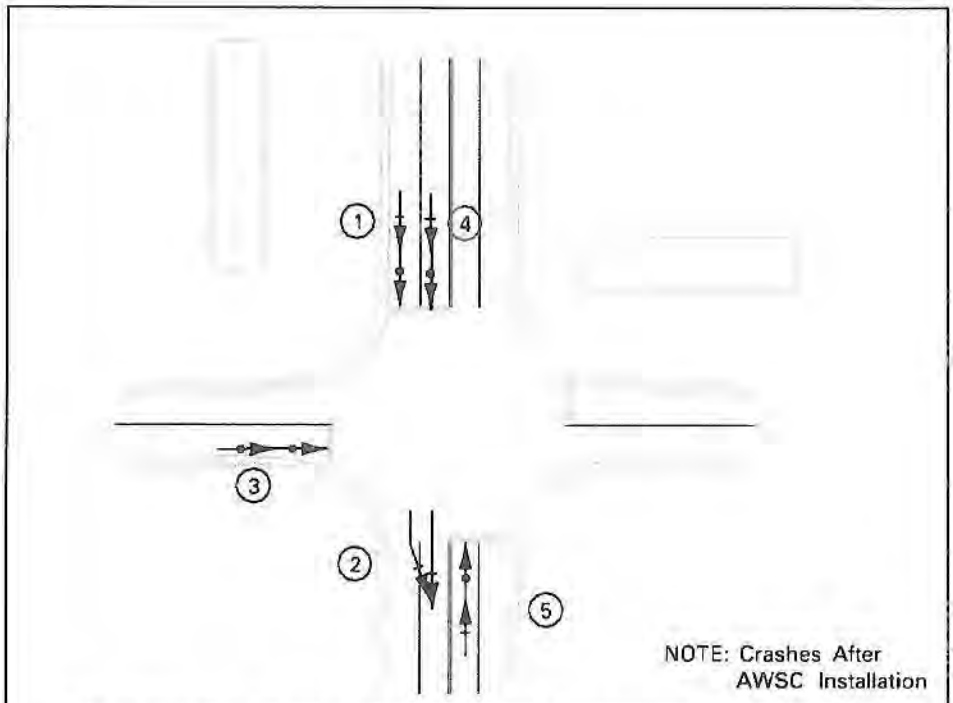


Figure 2. The AM, Noon and PM turning movement volumes.

Some significant observations about the traffic patterns were made. Significant truck traffic was observed on the eastbound approach of MT-201 and on both approaches of MT-200. The westbound approach of MT-201 only served a few trucks. Five pedestrian were observed using the intersection at sporadic times during the six hours of observation. Bicycle volumes appeared to be insignificant during the data collection period.

Crash History

A crash history was taken for the time after the intersection underwent improvements in October 2012 and spanning to December 2013, for a total of one year and two months. Intersection improvements were made under UPN 7832 and consisted of AWSC installation and geometric improvements. Crashes prior to this project were addressed by this project. A total of five crashes occurred after the project and are shown in figure 3.



1	11/13/2012	7:30	CLOUDY	DAY	ICY	REAR END
2	11/14/2012	17:40	CLEAR	DARK	SNOW	SIDESWIPE SD
3	7/9/2013	13:05	CLEAR	DAY	DRY	REAR END
4	7/30/2013	7:40	RAIN	DAY	WET	REAR END
5	8/1/2013	10:40	CLEAR	DAY	DRY	REAR END

Figure 3. Crash Diagram (After AWSC Installation on October 2012)

Four rear end crashes (1, 3, 4, 5) occurred after intersection improvements were installed. One sideswipe same-direction crash (2) also occurred. This crash involved a snowbank encroaching on the southbound right lane, causing a driver in that lane to encroach on the left southbound lane, resulting in the sideswipe. This crash cannot be considered addressable by signalization.

None of these crashes indicate a need for a revised or higher form of traffic control.

Signal Warrants

According to the Manual on Uniform Traffic Control Devices – 2009 Edition for an intersection such as this, traffic signal control may be considered if one or more of the nine traffic signal warrants is satisfied. Traffic signal warrants were checked using the manual volume counts collected at this intersection in May 2014 and August 2011. Where applicable, warrants were checked for the 70% factor.

Criterion was not met for any hours for the eight- and four-hour signal warrants using our counts.

MUTCD traffic signal warrants were checked and no criterion was met to consider traffic signal control.

Observations

In general, the vehicles at this intersection are much larger than average with many double-trailer semi-trucks, crew cab pickup trucks with large trailers, and a passenger car population consisting of larger than average vehicles. About 57% of the traffic on the eastbound approach was observed to be truck traffic (as opposed to the 32% for the total intersection).

Queues consisting of up to five vehicles were observed on the eastbound approach. Many of the vehicles in these queues were trucks. Rolling queues that cleared relatively quickly were often observed. Many truck drivers appeared tentative when moving through the intersection and traveled slowly. Truck drivers were seen giving hand gestures to waive the right-of-way to opposing vehicles. This is a contributing factor for the observed long queues.

A significant amount of users were observed disobeying the stop control by making only a small reduction in speed at the stop sign. This substandard adherence to the stop control was observed on all legs of the intersection. Many of the offenders appeared to blatantly disregard the stop sign in order to get in front of slow moving trucks. Offenders appeared to take advantage of trucks' poor start-up acceleration by running the stop sign and cutting in front of a truck that was making an opposing movement.

Capacity Analysis

Capacity analysis of the intersection was performed using HCS 2010 software. An equal lane distribution for through movements was used for the north-south approach volumes, as was observed in the field. The percentage of truck traffic observed on each approach was applied to each approach for the analysis. Capacity results for existing conditions are displayed in figure 4 below.

	EB	WB	NB (Left Lane)	NB (Right Lane)	SB (Left Lane)	SB (Right Lane)	Intersection
AM Peak							
Delay (s)	10	9	10	10	9	10	10
v/c	0.16	0.01	0.21	0.19	0.17	0.24	
LOS	B	A	A	A	A	A	A
Noon Peak							
Delay (s)	10	8	9	9	9	10	9
v/c	0.12	0.01	0.17	0.14	0.18	0.23	
LOS	A	A	A	A	A	A	A
PM Peak							
Delay (s)	10	9	10	10	10	10	10
v/c	0.14	0.01	0.25	0.19	0.22	0.27	
LOS	B	A	B	A	A	B	B

Figure 4. Existing All-Way Stop Capacity Results

This analysis indicates that the existing intersection has acceptable operations. For every lane, LOS is never worse than a "B", delay is never greater than 11 seconds, and v/c is never greater than 0.27.

Future intersection capacity was projected for a 2034 design year. Growth rates were obtained from the report *MT16/MT200 Glendive to Fairview Corridor Planning Study* (2012) prepared by *DOWL HKM*. This report assumes a 13.7% annual growth rate (AGR) for 3 to 5 years into the future followed by zero growth. This sharp increase in traffic growth is reasonable to assume based on typical traffic growth brought on by oil industry booms in this region. For this study, we applied a short-term AGR of 13.7% through 2017 and then applied an AGR of 1% thereafter. Future projected capacity results are shown in figure 5 below.

	EB	WB	NB (Left Lane)	NB (Right Lane)	SB (Left Lane)	SB (Right Lane)	Intersection
AM Peak							
Delay (s)	13	10	13	13	12	14	13
v/c	0.33	0.01	0.42	0.36	0.32	0.48	
LOS	B	B	B	B	B	B	B
Noon Peak							
Delay (s)	12	9	12	11	12	13	12
v/c	0.24	0.01	0.32	0.26	0.33	0.44	
LOS	B	A	B	B	B	B	B
PM Peak							
Delay (s)	13	10	15	13	14	15	14
v/c	0.28	0.03	0.50	0.38	0.42	0.52	
LOS	B	B	C	B	B	C	B

Figure 5. 2034 All-Way Stop Capacity Results

This analysis indicates that the intersection in 2034 is expected to have acceptable operations. For every lane, LOS is a "B" except for "C" grades on the northbound inside lane and the southbound outside lane. For every lane, delay is never greater than 15 seconds and v/c is never greater than 0.52.

Although HCM is an effective tool for many situations, it has limitations for modeling heavy vehicle traffic. The HCM method for modeling all-way stop intersections assumes heavy vehicle behavior based on nationwide averages and thus has limitations for modeling unusual instances of truck driving behavior. The truck driving behavior at this intersection is unusual as many trucks were observed traveling very slow when performing their movements which caused significant rolling queues. However the queues cleared relatively quickly if there was a break in flow, which happened routinely. The HCM results for this study appear representative of the actual delay and capacity of the intersection because delay was observed to be low and the intersection appeared to be operating at a low v/c ratio. However HCM modeling does not represent queue lengths well for this unusual situation.

Dedicated Left-Turn Lane Capacity Analysis

A lane configuration with dedicated left-turn lanes on the north and south approaches was analyzed. A side-by-side comparison between the existing lane configuration and a lane configuration with dedicated left-turn lanes is shown in Figure 6.

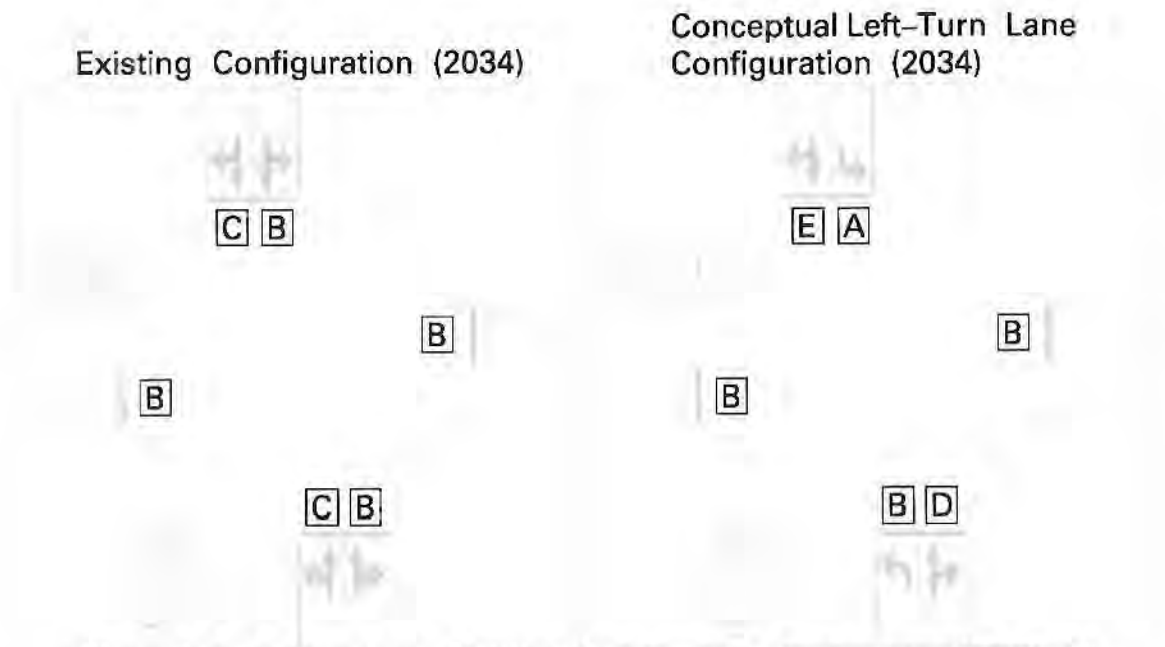


Figure 6. Left-Turn Lane, Existing Configuration Comparison (PM Peak)

Unbalanced flows are enhanced by the implementation of a dedicated left-turn lane because there is relatively low left-turn demand. Analysis indicates that the conversion to a dedicated left-turn lane configuration would worsen intersection operations. There is a relatively large decrease in LOS to the through/right-turn lanes compared to a relatively small increase in LOS to the left-turn lanes. Significant failures on the northbound and southbound through/right-turn lanes are expected with a LOS of "D" and "E" respectively. Failures of this magnitude are not seen in the existing lane configuration because the existing configuration distributes traffic more evenly between the lanes.

Roundabout Analysis

We did not identify any safety or capacity issues addressable by a roundabout that the AWSC does not already address. In addition, the level of design complexity including issues regarding right-of-way, geometrics and access control suggest that a roundabout is unfeasible at this time.

Conclusions

- No signal warrants are met at this time.
- No crashes during the post-intersection improvements crash history are addressable by a revised or higher form of traffic control.
- Capacity results indicate that the intersection currently operates, and is expected to operate in the 2034 design year, with acceptable delay, v/c ratio and LOS on all approaches.
- Queues of up to five vehicles were observed on the eastbound approach. These queues are likely caused by slower than average trucks moving through the intersection. These queues did not appear to be causing a detriment to delay or LOS as the queues continued to roll forward and cleared relatively quickly.
- Analysis indicates that a lane configuration with dedicated left-turn lanes on the north-south approaches would cause a detriment to overall intersection operations compared to the existing configuration.
- A significant amount of users were observed disobeying the stop control by making only a small reduction in speed at the stop sign.

Based on the conclusions drawn from this study, we have determined that AWSC and the existing lane configuration are appropriate at this time.

Attachments: Traffic Signal Warrant study worksheet

Cc with attachment:

Shane Mintz – Glendive District Administrator
Jim Frank – Glendive Engineering Services
Steve Hiedner – Glendive District Projects Engineer
Darcy O'Dell – Traffic Geometric Design
Steve Rogne – Traffic Signing & Pavement Markings Design
Spencer Johnson – Traffic Engineering Analysis
Ivan Ulberg – Traffic Design Engineer
Traffic File

Traffic Signal Warrant Analysis Form

District: Glendive | Time Period: 5/14/2014
County: Richland | Calc. By: Spencer Johnson | Date: 6/10/2014
Route: MT201(C-201) & MT200(P-20) | Check By: | Date:

Major Road: MT200 | Lanes: 4 | Critical Approach Speed: 25
Minor Road: MT201 | Lanes: 2 | Critical Approach Speed: 25

Volume Levels

1) Critical approach speed of major road traffic > 40 mph (70 kph): [ ] Yes [x] No

2) In built up area of isolated community of < 10,000 population: [x] Yes [ ] No

If Number 1 or 2 above is answered "Yes" then use "70%" volume level: [x] 70% [ ] 100%

Warrant 1 - Eight Hour Vehicular Volume Satisfied: [ ] Yes [x] No

Warrant is satisfied if Condition A or B is "100% satisfied." Warrant is also satisfied if both Condition A and B are "80% satisfied." If using "70%" volumes, warrant is satisfied if Condition A or B is "70% satisfied." If using "70%" volumes, warrant is also satisfied if both Condition A and B are "56% satisfied."

Condition A - Mininum Vehicular Volume

100% (70%) Satisfied: [ ] Yes [x] No

80% (56%) Satisfied: [ ] Yes [ ] No

Record hours where condition is met and the coorisponding volumes in the boxes provided. Condition is satisfied if the minimum volumes are met for eight hours.

	Minimum Requirements				Hour							
Approach Lanes:	1		2 or more									
Volume Level:	100% (80%)	70% (56%)	100% (80%)	70% (56%)	6:15	7:15	8:15	10:00	11:00	12:00	15:00	16:00
Both Approaches Major Road	500 (400)	350 (280)	600 (480)	**420 (336)**	399	**447**	404	**426**	369	**424**	**485**	**530**
Highest Approach Minor Road	150 (120)	**105 (84)**	200 (160)	140 (112)	35	92	58	56	73	58	70	60

Condition B - Interruption of Continuous Traffic

100% (70%) Satisfied: [ ] Yes [x] No

80% (56%) Satisfied: [ ] Yes [ ] No

	Minimum Requirements				Hour							
Approach Lanes:	1		2 or more									
Volume Level:	100% (80%)	70% (56%)	100% (80%)	70% (56%)	6:15	7:15	8:15	10:00	11:00	12:00	15:00	16:00
Both Approaches Major Road	750 (600)	525 (420)	900 (720)	**630 (504)**	399	447	404	426	369	424	485	530
Highest Approach Minor Road	75 (60)	**53 (42)**	100 (80)	70 (56)	35	**92**	**58**	**56**	**73**	**58**	**70**	**60**

Traffic Signal Warrant Analysis Form

Warrant 2 - Four Hour Vehicular Volume 100% (70%) Satisfied: [ ] Yes [x] No

Plot four volume combinations on the applicable figure below. If the four points are above the appropriate line, then the warrant is satisfied.

Figure A. Criteria for "100%" volume level:

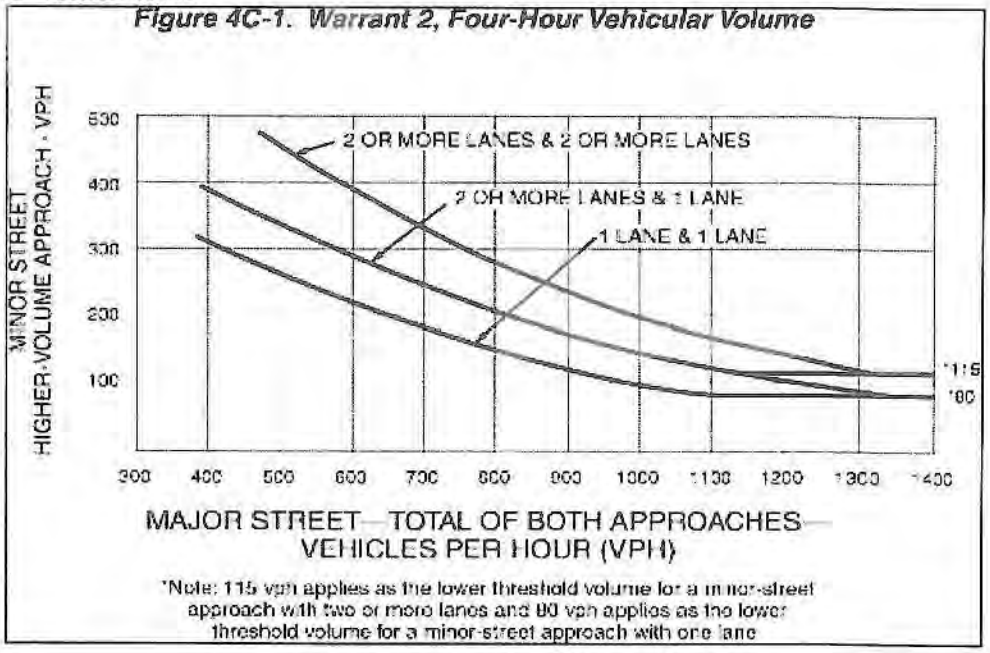
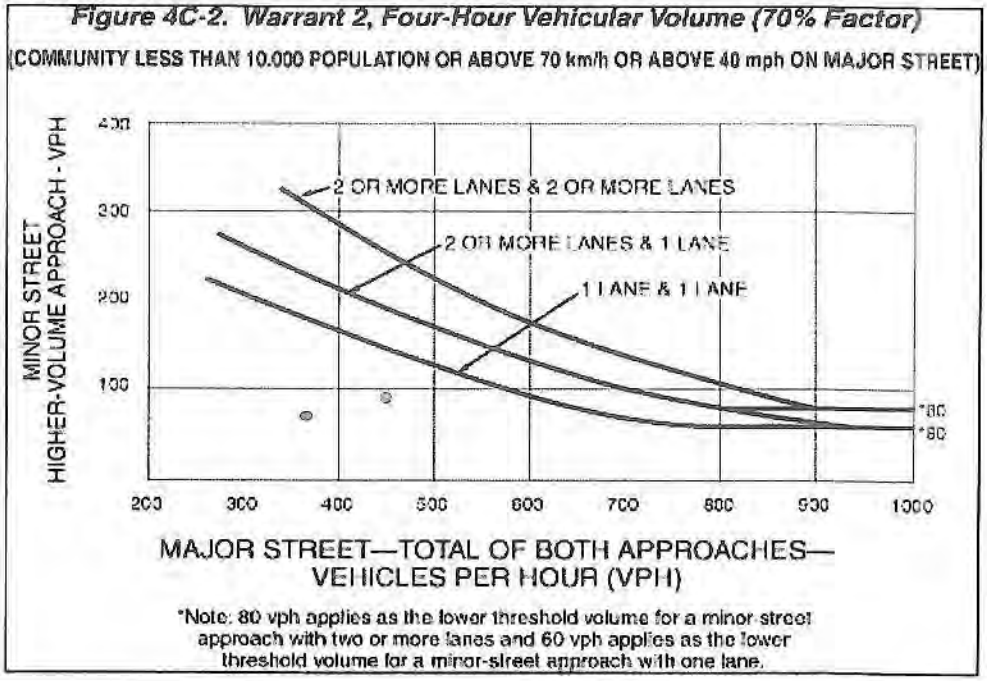


Figure B. Criteria for "70%" volume level:



7:15
11:00
15:00
16:00

Traffic Signal Warrant Analysis Form

Warrant 3 - Peak Hour 100% (70%) Satisfied: ☐ Yes ☐ No

Unusual condition justifying use of warrant: N/A

Record hour where criteria are fulfilled and the cooresponding delay or volume in boxes provided. Plot the peak hour volume combination on the applicable figure below. If all three criteria are fulfilled or the plotted point lies above the appropriate line, then the warrant is satisfied.

Criteria	Approach Lanes		No. of Approaches		Hour	Fulfilled?	
	1	2	3	4		Yes	No
1)Delay on Minor Approach (veh-h):	4	5					
2)Volume on Minor Approach (veh/h):	100	150					
3)Total Entering Volume (veh/h):			650	800			

Figure A. Criteria for "100%" volume level:

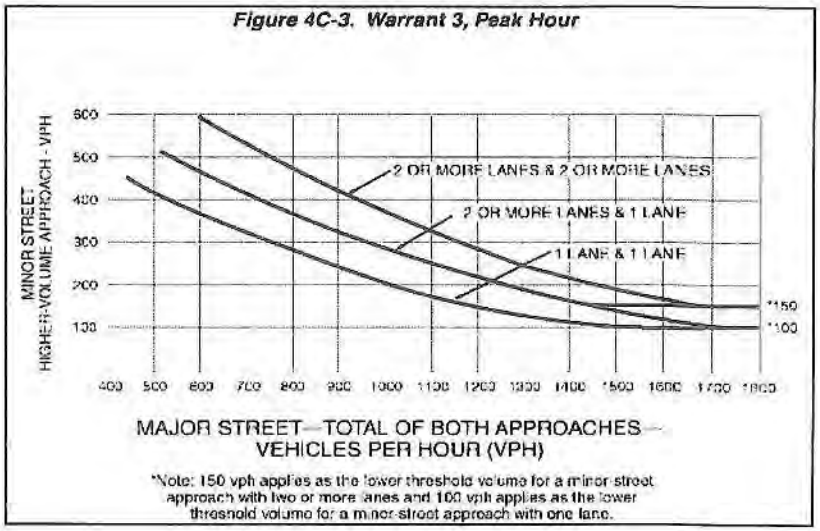
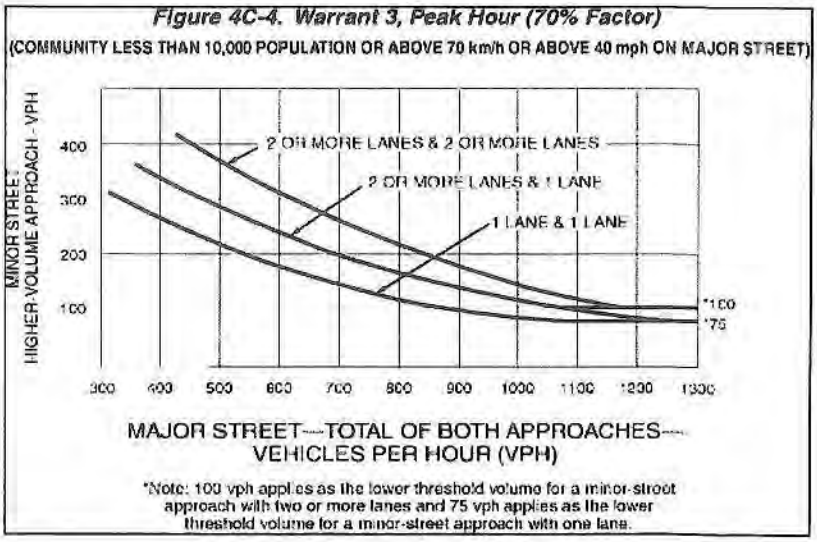


Figure B. Criteria for "70%" volume level:



Traffic Signal Warrant Analysis Form

Warrant 4 - Pedestrian Volume

Satisfied: [ ] Yes [x] No

Record hours where criteria are fulfilled and the cooresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three criteria are fulfilled.

Criteria	Hour				Fulfilled?	
					Yes	No
1. Pedestrian volume crossing the major road is 100 ped/h or more for each of any 4 hours or is 190 ped/h or more for any one hour.						x
2. There are less than 60 gaps per hour in the major road traffic stream of adequate length for pedestrians to cross during the same hours as the pedestrian volume criterion is satisfied.						x
3. The nearest traffic signal along the major road is located more than 300-ft (90-m) away. Or, the nearest traffic signal is within 300-ft (90-m) but the proposed traffic signal will not restrict the progressive movement of traffic.					x	

Warrant 5 - School Crossing

Applicable: [ ] Yes [x] No

Satisfied: [ ] Yes [ ] No

Record hour where criteria are fulfilled and the cooresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three criteria are fulfilled.

Criteria	Hour	Fulfilled?	
		Yes	No
1. There are a minimum of 20 students during the highest crossing hour.			x
2. There are fewer adequate gaps in the major road traffic stream, during the period when the students are using the crossing, than the number of minutes in the same period.			
3. The nearest traffic signal along the major road is located more than 300-ft (90-m) away. Or, the nearest traffic signal is within 300-ft (90-m) but the proposed traffic signal will not restrict the progressive movement of traffic.		x	

Warrant 6 - Coordinated Signal System

Satisfied: [ ] Yes [x] No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 1000-ft (300-m).

Criteria	Fulfilled?	
	Yes	No
1. On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way road, adjacent signals do not provide the necessary degree of vehicle platooning and the proposed adacent signals will collectively provide a progressive operation.		x

Traffic Signal Warrant Analysis Form

Warrant 7 - Crash Experience

Satisfied: [ ] Yes [x] No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three criteria are fulfilled.

Criteria		Hour				Met?		Fulfilled?	
						Yes	No	Yes	No
1. One of the warrants to the right is met.	Warrant 4.1 at 80% of volume requirements: 80 ped/h for 4 hrs or 152 ped/h for 1 hr.						x		x
	Warrant 1, Condition A (80% Satisfied)						x		
	Warrant 1, Condition B (80% Satisfied)						x		
2. Adequate trial of other remedial measures has failed to reduce crash frequency.		Measures Tried:							
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:							x

Warrant 8 - Roadway Network

Satisfied: [ ] Yes [x] No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed

Criteria			Met?		Fulfilled?	
			Yes	No	Yes	No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/h during typical weekday peak hour.	Entering Volume:		x		x
	b. 5-year projected volumes that satisfy one or more of Warrants 1, 2 or 3.	Warrant(s) Satisfied:		x		
2. Total entering volume at least 1,000 veh/h for each of any 5 hrs of a non-normal business day. (Sat. or Sun.)		- Hour				x
		- Volume				

Characteristics of Major Routes		Met?		Fulfilled?	
		Yes	No	Yes	No
1. Part of the road or highway system that serves as the principle roadway network for through traffic flow.	Major Road:				
	Minor Road:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Road:				
	Minor Road:				
3. Appears as a major route on an official plan.	Major Road:				
	Minor Road:				

Conclusions Warrants Satisfied: No

Signal Warranted: [ ] Yes [x] No

Signal Justified: [ ] Yes [x] No

Remarks:

APPENDIX C: MISCELLANEOUS DATA

Fairview – West (Phase I)

FINAL Existing and Projected Conditions Report

June 14, 2016

S 327(2)	1950			
Fairview -West				
Begin	End	Length		
180+00.00 Sta	258+33.70 Sta	7,833.70 ft		261+66.40 is project end point on MT 200/Ellery Avenue, one block south of MT 201
68.0 RP	69.5 RP	1.48 mi		
on MT 201	MT 200/Ellery Ave			

S 361(4)	1950			
Girard - Fairview				
Begin	End	Length		
148+50.00 Sta	180+00.00 Sta	3,150.00 ft		Note the project begins at MT 16 well west of Fairview West project area
67.4 RP	68.0 RP	0.60 mi		Only showing portion of the project that is within our study corridor

FAIRVIEW WEST - PHASE 1 STUDY CORRIDOR

Vertical Alignment Review

f:/trans/15601_000_Fairview-West_PhaseI/DATA/As Builts/AsBuilt_Data.xlsx

Design Standards				
Design Speed		**45**	**55**	**60**
K-value	Crest	61	114	151
	Sag	79	115	136
Maximum Grade	Level	3%	3%	3%
	Rolling	**4%**	**4%**	**4%**
	Mountainous	7%	7%	7%
Length (ft) [ii]		135	165	180

[i] *Minimum length calculaed as L_{min} = 3V (Traffic Engineering Manual, Equation 26.4-3)*

From STA	To STA	From RP	To RP	Curve Type	Curve Length (ft)	Grade Back	Grade Ahead	K-value	Design Speed Met (mph)	Meets Standards	
138+50.00	144+50.00	67.20	67.31	CREST	600.0	4.5%	-1.7%	95.5	45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
152+00.00	154+00.00	67.46	67.50	SAG	200.0	-1.7%	-0.3%	135.1	55	YES	
165+00.00	167+00.00	67.70	67.74	CREST	200.0	-0.3%	-0.5%	833.3	60	YES	
171+00.00	173+00.00	67.82	67.86	CREST	200.0	-0.5%	-1.4%	212.8	60	YES	
178+50.00	180+50.00	67.96	67.99	SAG	200.0	-1.4%	0.7%	92.6	45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
182+00.00	184+00.00	68.04	68.08	CREST	200.0	0.7%	-1.1%	109.9	45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
186+00.00	188+00.00	68.11	68.15	SAG	200.0	-1.1%	0.0%	181.8	60	YES	
192+00.00	194+00.00	68.23	68.27	SAG	200.0	0.0%	2.5%	80.0	45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
196+50.00	202+50.00	68.31	68.42	CREST	600.0	2.5%	-6.6%	65.9	45	NO	Profile Grade exceeds 4% max for rolling terrain; doesn't meet standard for rolling terrain based on rate of curvature
217+50.00	221+50.00	68.71	68.78	SAG	400.0	-6.6%	1.3%	50.6	< 45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
223+00.00	225+00.00	68.81	68.85	CREST	200.0	1.3%	-5.3%	30.3	< 45	NO	Profile Grade exceeds 4% max for rolling terrain; doesn't meet standard for rolling terrain based on rate of curvature
232+00.00	236+00.00	68.98	69.05	SAG	400.0	-5.3%	0.0%	75.5	<45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
237+50.00	239+50.00	69.10	69.14	CREST	200.0	0.0%	-4.8%	41.7	< 45	NO	Profile Grade exceeds 4% max for rolling terrain; doesn't meet standard for rolling terrain based on rate of curvature
251+50.00	253+50.00	69.36	69.39	SAG	200.0	-4.8%	-2.5%	87.0	45	NO	Does not meet current standard for rolling terrain based on rate of curvature.
256+50.00	258+50.00	69.44	69.48	SAG	200.0	-2.5%	-0.6%	105.3	45	NO	Does not meet current standard for rolling terrain based on rate of curvature.

Note that vertical curve lengths were not provided on as-builts for S 327(2), lengths were estimated based on plan review and scaling.

Beginning of study corridor occurs on 1.74% grade section of MT 201 at about Sta 149+00

Sta 258+33.7 is centerline of MT 201 and MT 200/Ellery Ave intersection

Sta 149+00 = RP 67.4

Sta 180+00 = RP 68.0

Horizontal Alignment

Design Standards - Non-NHS Primary, Rural Minor Arterial in Rolling Terrain

Design Speed	45	55	60
SSD (ft)	360	495	570
Radius (ft)	590	960	1200
Length (ft) [ii]	n/a	n/a	n/a
Superelevation Rate	e_{max} = 8.0%	e_{max} = 8.0%	e_{max} = 8.0%

[ii] *For open roadways use the following criteria that results in the greatest curve length (MDT Road Design Manual, 9.2.7). SEE BELOW*

As-built Data

	Curve PI (STA)	Curve PI (RP)	Curve Type	Radius (ft)	Length (ft)	Deflection Angle	Superelevation	Min. Sight Obstruction (ft) [i]	Design Speed Met (mph)	Meets Standards	Comments	
1	148+87.60	67.40	SIMPLE	1,910	1,100.6	33°01' LT	UNKNOWN	16.0	60	YES		D = 3°00'
2	198+12.30	68.37	SIMPLE	1,146	900.0	45°00' RT	UNKNOWN	35.3	55	YES		D = 5°00'
3	213+99.40	68.67	SIMPLE	7,640	1,633.3	12°15' RT	UNKNOWN	5.3	60	YES		D = 0°45'
4	231+30.00	69.00	SIMPLE	1,146	1,122.0	56°06' LT	UNKNOWN	14.1	55	YES		D = 5°00'

Superelevation not listed on As-builts; Typical Sections refer to 2% Normal Crown

[i] Minimum sight obstruction calculated based on design speed met.

9.2.7 Minimum Length of Curve

Short horizontal curves may provide the driver with the appearance of a kink in the alignment. To improve the aesthetics of the highway, the designer should lengthen short curves, if practical, even if not necessary for engineering reasons. The following guidance should be used to establish minimum curve lengths for deflection angles (Δ) of 5° or less:

1. Open Roadways. For open roadways, use the following criteria that results in the greatest curve length:

   a. The minimum radius that results in a normal crown cross slope.
   b. The length of curve in feet or meters = 15V, where V is the design speed in mph or 3V, where V is the design speed in km/h. Double this length for controlled access facilities.
   c. A 500'(150 m) length of curve for a 5-degree deflection add 100'(30m) for each 1-degree decrease in the central angle.

   If this criteria cannot be met, the designer should document this in the Alignment Review Report.

2. Urban. The minimum length of curves on low-speed urban streets will be determined on a case-by-case basis.

9.2.8 Computation

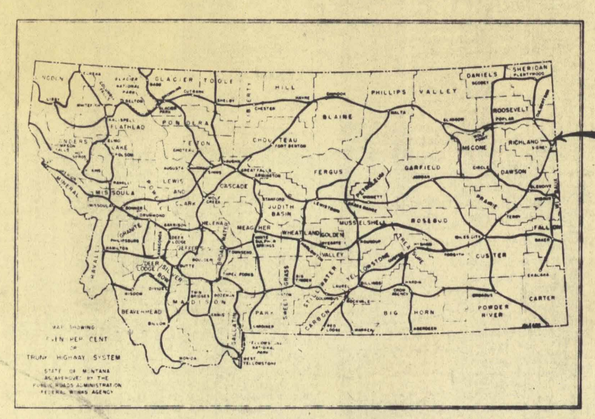
Section 9.6 presents the applicable mathematical details for the computation of horizontal curves.

Minimum length of curve

a. ?
b. 15V = 15*55=825'
c. 500+2(100)=700' D = 3°00'
c. 500+4.75(100)=975' D = 0°45'
c. 500+0(100)=500' D = 5°00'

INDEX OF SHEETS

TITLE PAGE . . . . SHEET No. 1
TYPICAL CROSS-SECTIONS OF IMPROVEMENT . SHEET No. 2
SUMMARY SHEET . . SHEET No. 2
PLAN AND PROFILE . SHEET No. 3~4
CROSS-SECTION . . . SHEET No. 5~13
MASS DIAGRAM . . SHEET No. 14



STATE OF MONTANA

STATE HIGHWAY COMMISSION

FED. ROAD DIV. NO.	STATE	FAS	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MONT.	S-327(2)		1	14

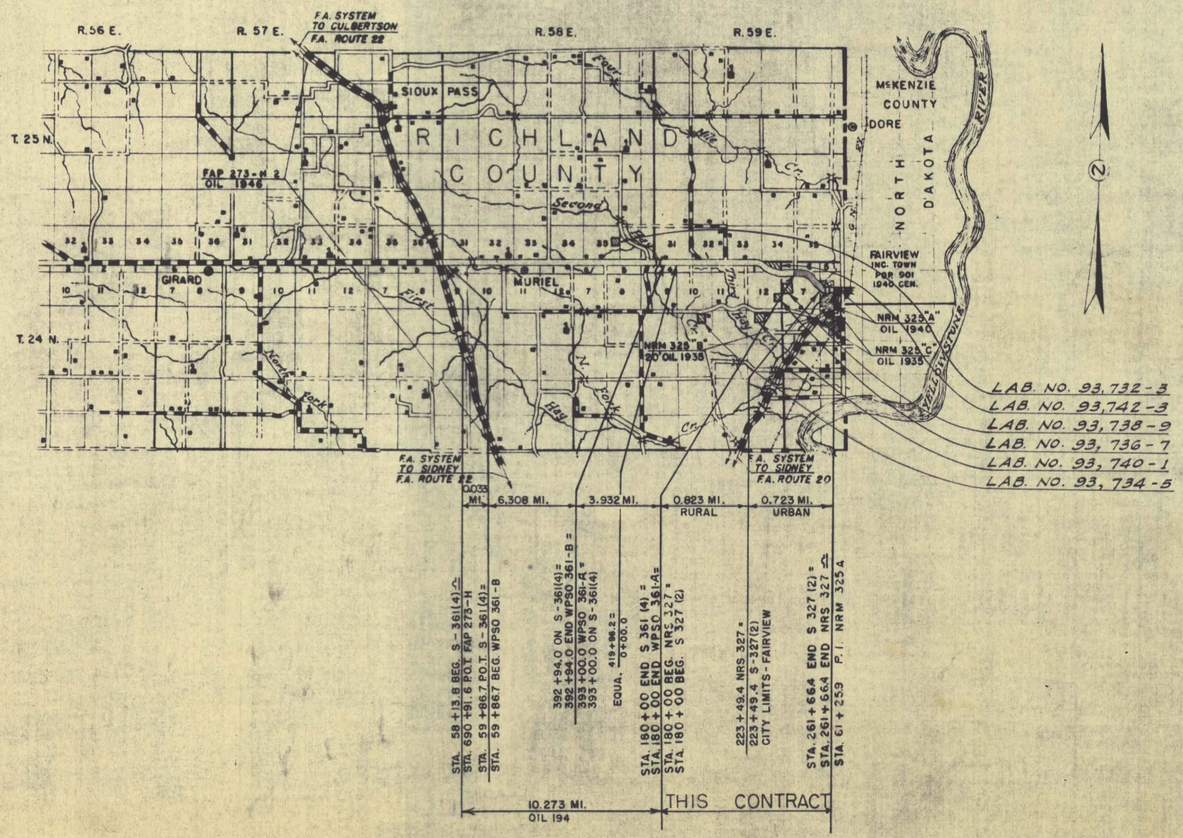
STATE NUMBER 3327-02
PLANS COMPLETED
CONTRACT COMPLETED

PLAN AND PROFILE OF PROPOSED
FEDERAL AID SECONDARY PROJECT NO. S 327 (2)
FAIRVIEW - WEST
RICHLAND COUNTY

LENGTH 1.546 MILES

SCALES

HORIZONTAL: 1 Inch = 200 Feet
VERTICAL: 1 Inch = 20 Feet
CROSS SECTIONS--HOR. & VERT.: 1 Inch = 10 Feet
REDUCTION PRINTS ½ ORIGINAL SCALE



CONVENTIONAL SIGNS

STATE AND NATIONAL LINE
COUNTY LINE
CITY, VILLAGE OR BOROUGH LINE
TOWNSHIP LINE
SECTION LINE
RESERVATION LINE
FENCE LINE
GUARD RAIL
UNFENCED PROPERTY
RIGHT OF WAY LINE
RIGHT OF WAY LINE FENCED
TRAVELED WAY
RAILROADS
RETAINING WALLS
BASE OR SURVEY LINE
LEVEE
CULVERTS IN PLACE (PLAN)
NEW CULVERTS (PLAN)
NEW CULVERTS (PROFILE)
TROLLEY POLE
POWER POLE
TELEPHONE OR TELEGRAPH POLE
MARSH
DITCH
RIP RAP
BRIDGE

LEGEND OF COMPLETED WORK

GRADED ROAD
GRAVELED ROAD
OILED ROAD
PAVED ROAD

CULVERTS

STATION	LINEAL FEET NEW CMP. DR. 15"	18"	24"	30"	36"			REMOVE	RELAY	USE IN PLACE	LENGTHEN LT.	RT.		C.Y. CULV. EXC.	REMARKS
190+00			6							24"x40' CMP.		6		3	DRAIN.
209+14				6						30"x110' CMP.	6			3	DRAIN - SKEW.
210+82		4								18"x86' CMP.	4			3	DRAIN
217+40		6								18"x52' CMP.	6			3	DRAIN
220+19					8					36"x76' CMP.	4	4		5	DRAIN.
221+48		4								18"x72' CMP.		4		3	DRAIN.
TOTALS		14	6	6	8									20	RURAL
236+77			8							24"x48' CMP.	4	4		5	DRAIN.
251+15								15"x40' CMP.	15"x40' CMP.					10	RD. APP. RT.
251+38	8							1.X1.X5 WD. BX.						3	WALK APP. RT.
252+19	10							15"X23' CMP.	15"X23' CMP.		10			10	GARAGE ENT. RT.
252+75								15"X30' CMP.	15"X37' CMP.					10	ST. APP. LT.
252+92								15"X30' CMP.	15"X32' CMP.					5	ALLEY ENT. RT.
254+78								15"X180' CMP.	15"X180' CMP.					15	ST. APP. LT. & RT.
255+03								WD. EDG.						3	16' RT.
255+65	8							4"X26' TIE.						3	WALK APP. LT.
256+59	32							1.5X1.5X10' WD. BX.						10	ALLEY ENT. RT.
256+70								DT. BLK. & EDG.						5	RT.
256+84	32							12"X12' CMP.						10	GARAGE ENT. RT.
256+92								12"X4' CMP.						1	TO GARDEN.
256+95								DT. BLK. & EDG.						5	RT.
258+33	56							1.1X1.5X8' WD. BX.						16	ST. APP. RT.
SUB-TOT.	146	—	—	—	—				210		—	—		110	URBAN TYP. SEC. 1
TOTAL	146	14	6	6	8				210		—	—		130	URBAN & RURAL

ADDITIONAL SURFACING

STATION	TONS TOP C'RSE.	CU.YDS. S.B.B.C.	REMARKS
188+70	6	18	FM. ENT. RT.
195+50	6	18	RD. APP. LT.
TOTALS	*12	*36	RURAL
233+00	6	18	FM. ENT. RT.
238+50	6	18	CEMETERY ENT. RT.
240+10	6	18	ST. APP. LT.
243+80	6	18	ST. APP. RT.
246+15	6	18	RD. APP. LT.
246+80	6	18	RD. APP. RT.
248+80	6	18	RD. APP. LT.
249+26	6	18	DRIVEWAY RT.
249+58	6	18	DRIVEWAY RT.
251+15	6	18	ST. APP. RT.
252+75	6	18	ST. APP. LT.
252+90	6	18	ALLEY ENT. RT.
254+48	6	18	ST. APP. RT.
254+75	12	36	ST. APP. LT. & RT.
256+55	6	18	ALLEY ENT. LT.
258+33	6	18	ST. APP. LT.
TOTALS	*102	*306	URBAN-TYP. SEC. NO. 1
TOTALS	*114	*342	

*- INCLUDED IN SURFACING FRAME.

GRADING

STATION	CUBIC YARDS EXC. UNCL.	EMB.	STA. YDS. O'HAUL	REMARKS
180+00.0	2259	2259	16650	
211+78	176	928	7000	
223+49.4			4730	
		CONTINGENCY		
TOTALS	2435	3187	28380	RURAL
223+49.4	1802	1050	210	
242+72.0	346	794	3200	
258+66.0				
		CONTINGENCY	682	
SUB-TOT.	2148	1844	4092	URB.-TYP. SEC. NO. 1
258+66.0	448	0		
261+66.4				
SUB-TOT.	448	0	—	URB.-TYP. SEC. NO. 3
TOTALS	2596	1844	4092	URBAN
TOTALS	5031	5031	32472	URBAN & RURAL

MARKERS & MONUMENTS
(STD. 38-M-1)

1 - PROJ. MARKER (END OF PROJ.) (URBAN)
11 - R/W. MONUMENTS (RURAL)
22 - R/W. MONUMENTS (URBAN)

SNOW FENCE
(STD. 23-SF-1)

STA. 201+00.0 TO 203+00.0 - 200 LIN. FT. SN. FC. LT.
STA. 202+00.0 TO 204+00.0 - 200 LIN. FT. SN. FC. LT.
(SET IN DOUBLE ROW 45° ANGLE FROM ℄)

SUMMARY

LENGTH OF ROADWAY, RURAL, TYP. SEC. NO. 1 & 2	4349.4 FT.	=	0.823 MI.
LENGTH OF PARTICIPATING BRIDGES, RURAL	00.0 FT.	=	0.000 MI.
LENGTH OF NON-PARTICIPATING BRIDGES, RURAL	00.0 FT.	=	0.000 MI.
TOTAL LENGTH OF S-327(2) RURAL	4349.4 FT.	=	0.823 MI.
LENGTH OF ROADWAY, URBAN, TYP. SEC. NO. 1 & 2	3466.6 FT.	=	0.656 MI.
LENGTH OF ROADWAY, URBAN, TYP. SEC. NO. 3	300.4 FT.	=	0.057 MI.
LENGTH OF PARTICIPATING BRIDGES, URBAN	51.0 FT.	=	0.010 MI.
LENGTH OF NON-PARTICIPATING BRIDGES, URBAN	00.0 FT.	=	0.000 MI.
TOTAL LENGTH OF S-327(2) URBAN	3818.0 FT.	=	0.723 MI.
TOTAL LENGTH OF S-327(2)	8167.4 FT.	=	1.546 MI.

-NOTES- (STD. 53-SN)

EXCEPT AS FOLLOWS: A SHRINKAGE FACTOR OF 35% WAS USED THROUGHOUT.

SURFACING

STATION FROM	TO	LINEAL FEET GROSS	NET	+	−	FOR	TONS COV. C'RSE.	TOP C'RSE.	CU.YDS. S.B.B.C.	GALLONS MIX	SEAL	PROCESS. MI.	REMARKS
180+00.0	200+00.0	2000.0	2000.0				78	653	1177	4889	1556	0.379	TYP. SEC. NO. 1 (7" S.B.B.C.)
200+00.0													
218+96.0	219+04.0				8.0	TBR. STK-PASS IN PL.	1	2		30	7	0.001	24.0' RDWY.
	223+49.4	2349.4	2341.4				91	765	2023	5723	1821	0.443	TYP. SEC. NO. 2 (10" S.B.B.C.)
						APPROACHES		12	36				
						COMPACTION		286	647				
						REINFORCEMENT			162				
TOTALS		4349.4	4341.4	—	8.0		170	1718	4045	10642	3384	0.823	RURAL
223+49.4													
236+41.4	236+40.4			1.0		EQUATION							
247+59.5	248+10.5				51.0	TBR. BR. IN PLACE	2	12		159	38	0.010	20.0' RDWY.
	258+66.0	3516.6	3466.6				135	1132	2041	8474	2696	0.656	TYP. SEC. NO. 1
						APPROACHES		102	306				
						COMPACTION		249	449				
						REINFORCEMENT			117				
SUB-TOTALS		3516.6	3466.6	1.0	51.0		137	1495	2933	5633	2734	0.666	URBAN-TYP. SEC. NO. 1
258+66.0	261+66.4	300.4	300.4				12	190	319	734	234	0.057	TYP. SEC. NO. 3
						APPROACHES							
						COMPACTION		38	64				
						REINFORCEMENT			16				
SUB-TOTALS		300.4	300.4	—	—		12	228	399	734	234	0.057	URBAN-TYP. SEC. NO. 3
TOTALS		3817.0	3767.0	1.0	51.0		149	1723	3332	9367	2968	0.723	URBAN
TOTALS		8166.4	8108.4	1.0	59.0		319	3441	7377	20009	6352	1.546	URBAN & RURAL

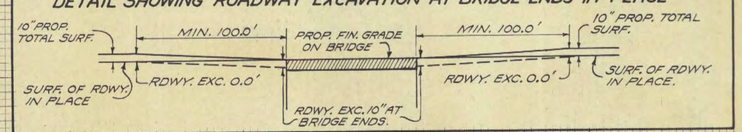
TYPICAL SECTION FOR APPROACHES
(STD. 291-RA-1)

EXCEPT AS FOLLOWS:-
USE 6" S.B.B.C. INSTEAD OF 6" GRAVEL
QUANTITIES { TOP COURSE = 6 TONS, S.B.B.C. = 18 CU. YDS } ONE SIDE ONLY.

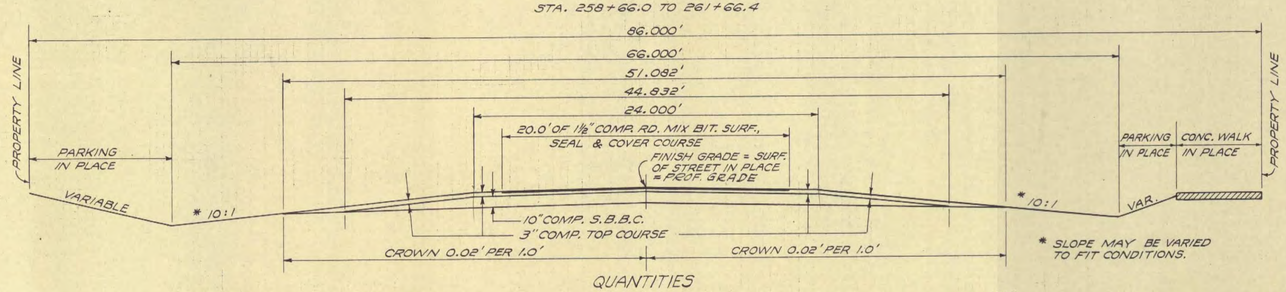
SURFACING FOR BRIDGES
(STD. 233-RA-3)

EXCEPT AS FOLLOWS:-
USE COVER COURSE MATERIAL (35 LBS. PER SQ. YD.) INSTEAD OF STONE CHIPS.

DETAIL SHOWING ROADWAY EXCAVATION AT BRIDGE ENDS IN PLACE



TYPICAL SECTION NO. 3
STA. 258+66.0 TO 261+66.4



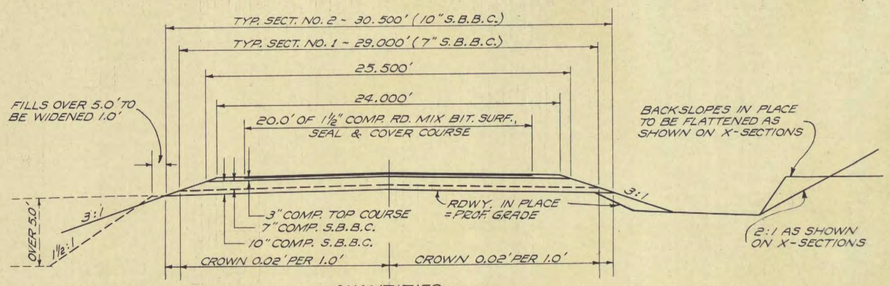
QUANTITIES

	COVER C'RSE. (35 LBS. PER SQ. YD.)	GRAVEL TOP C'RSE. (2850 LBS. PER CU. YD.)	S.B.B.C.		OIL MIX (1.1 GAL'S. PER SQ. YD.)	SEAL (0.35 GAL. PER SQ. YD.)
AREA SQ. FT.		11.989	28.679	SQ. YDS. PER STA.	222.222	222.222
CU. YDS. PER STA.		44.404	106.219	GAL'S. PER STA.	244.444	77.778
CU. YDS. PER MILE			5608.4	GAL'S. PER MILE	12906.6	4106.7
TONS PER STA.	3.889	63.276				
TONS PER MILE	205.3	3341.0				

ADD 20% COMPACTION TO TOP COURSE AND S.B.B.C.
ADD 5% REINFORCEMENT TO S.B.B.C. ONLY.

TYPICAL SECTIONS NO. 1 & 2

TYPICAL SECTION NO. 1 { STA. 180+00.0 TO 200+00.0, STA. 223+49.4 TO 258+66.0 }
TYPICAL SECTION NO. 2 - STA. 200+00.0 TO 223+49.4



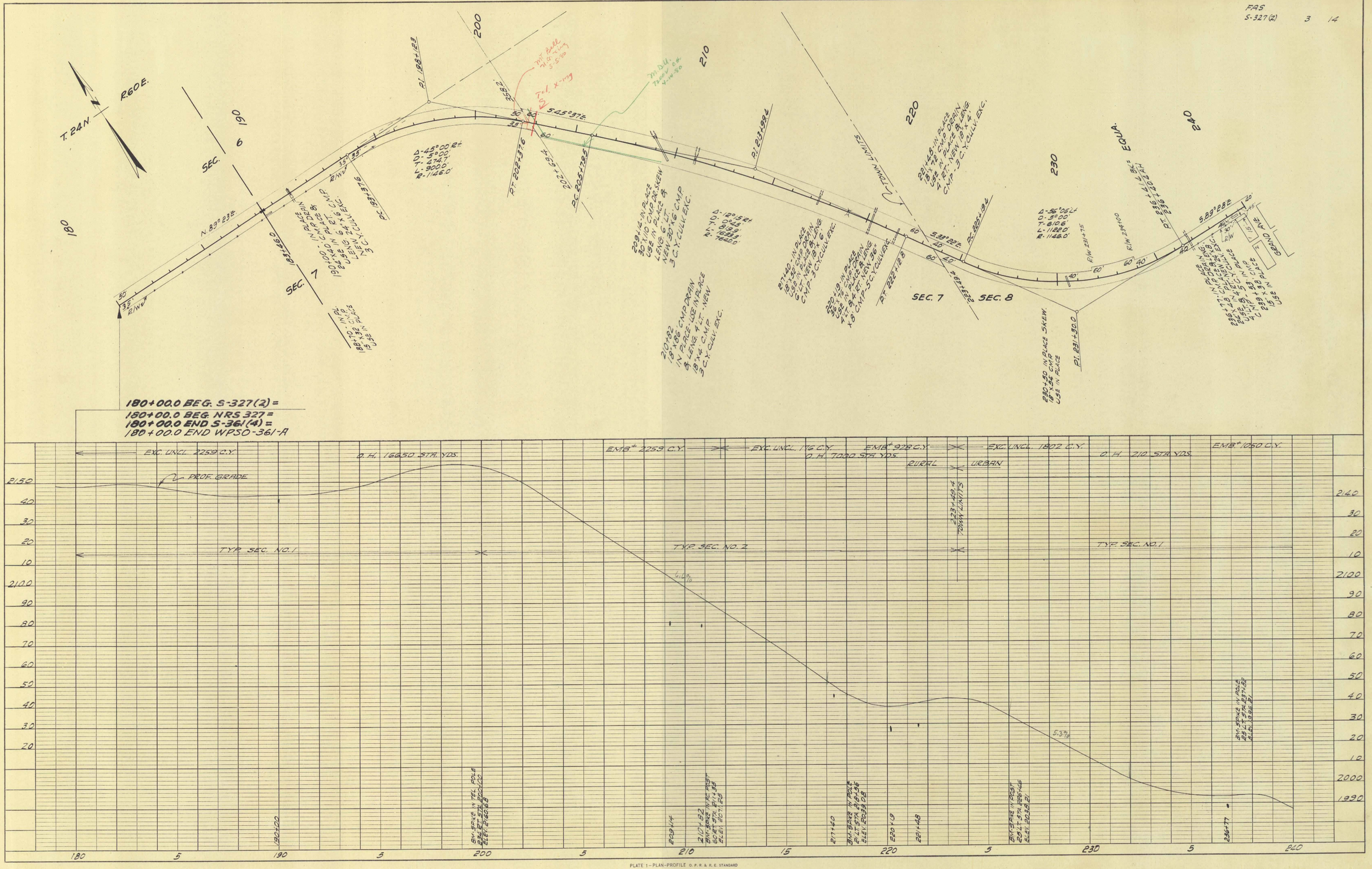
QUANTITIES

	COVER C'RSE. (35 LBS. PER SQ. YD.)	GRAVEL TOP C'RSE. (2850 LBS. PER CU. YD.)	TYP. SECT. NO. 1 7" COMP. S.B.B.C.	TYP. SECT. NO. 2 10" COMP. S.B.B.C.		OIL MIX (1.1 GAL'S. PER SQ. YD.)	SEAL (0.35 GAL. PER SQ. YD.)
AREA SQ. FT.		6.188	15.895	23.332	SQ. YDS. PER STA.	222.222	222.222
CU. YDS. PER STA.		22.919	58.870	86.415	GAL'S. PER STA.	244.444	77.778
CU. YDS. PER MILE			3108.3	4562.7	GAL'S. PER MILE	12906.6	4106.7
TONS PER STA.	3.889	32.660					
TONS PER MILE	205.3	1724.4					

ADD 20% COMPACTION TO TOP COURSE AND S.B.B.C.
ADD 5% REINFORCEMENT TO S.B.B.C. ONLY.

FINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED, NOTE BOOK, NO., BY, DATE

ORIGINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED, NOTE BOOK, NO., BY, DATE



PLAN	SURVEYED	BY	DATE
	PLOTTED		
NOTE BOOK	ALIGNMENT CHECKED		
NO.	RT. OF WAY CHECKED		

PROFILE	SURVEYED	BY	DATE
	PLOTTED		
NOTE BOOK	GRADES CHECKED		
NO.	BM. NOTED		
	STRUCTURE NOTAT'NS CH'KD.		

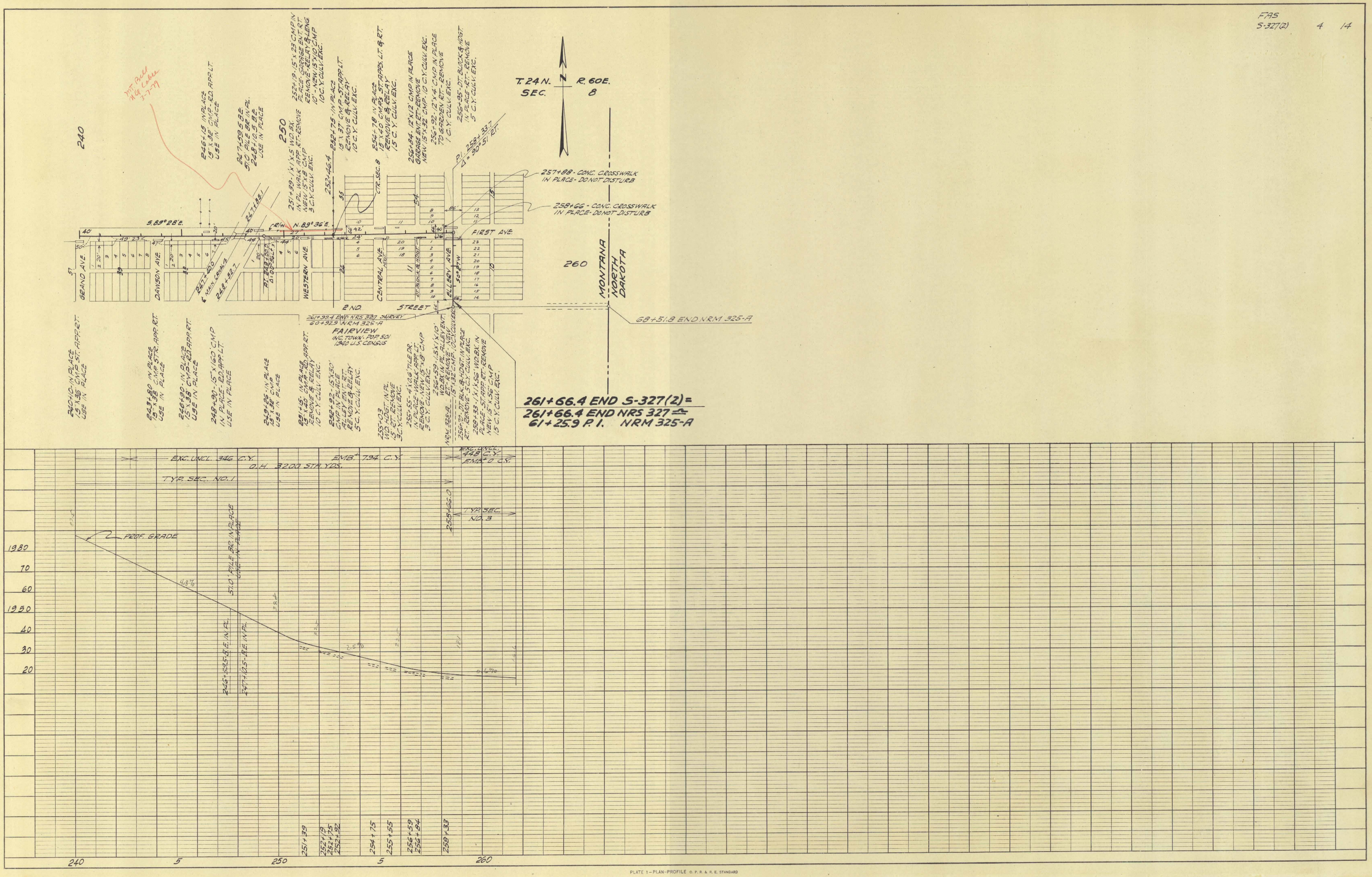


PLATE 1 - PLAN-PROFILE O. P. R. & R. E. STANDARD

FED. ROAD DIV. NO.	STATE	FAS	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	MONT.	S-361(4)		1	63

STATE NUMBER 3361-04

PLANS COMPLETED

CONTRACT COMPLETED

INDEX OF SHEETS

TITLE PAGE . . . . SHEET No. 1
TYPICAL CROSS-SECTIONS OF IMPROVEMENT . SHEET No. 2
SUMMARY SHEET . . SHEET No. 2-3
PLAN AND PROFILE . SHEET No. 4-9
CROSS-SECTION . . . SHEET No. 10-60
MASS DIAGRAM . . SHEET No. 61-63

STATE OF MONTANA

STATE HIGHWAY COMMISSION

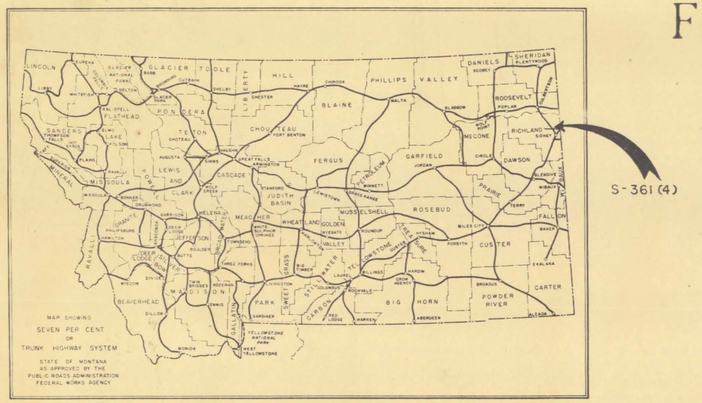
PLAN AND PROFILE OF PROPOSED

FEDERAL AID SECONDARY PROJECT NO. S 361 (4)

GIRARD - FAIRVIEW

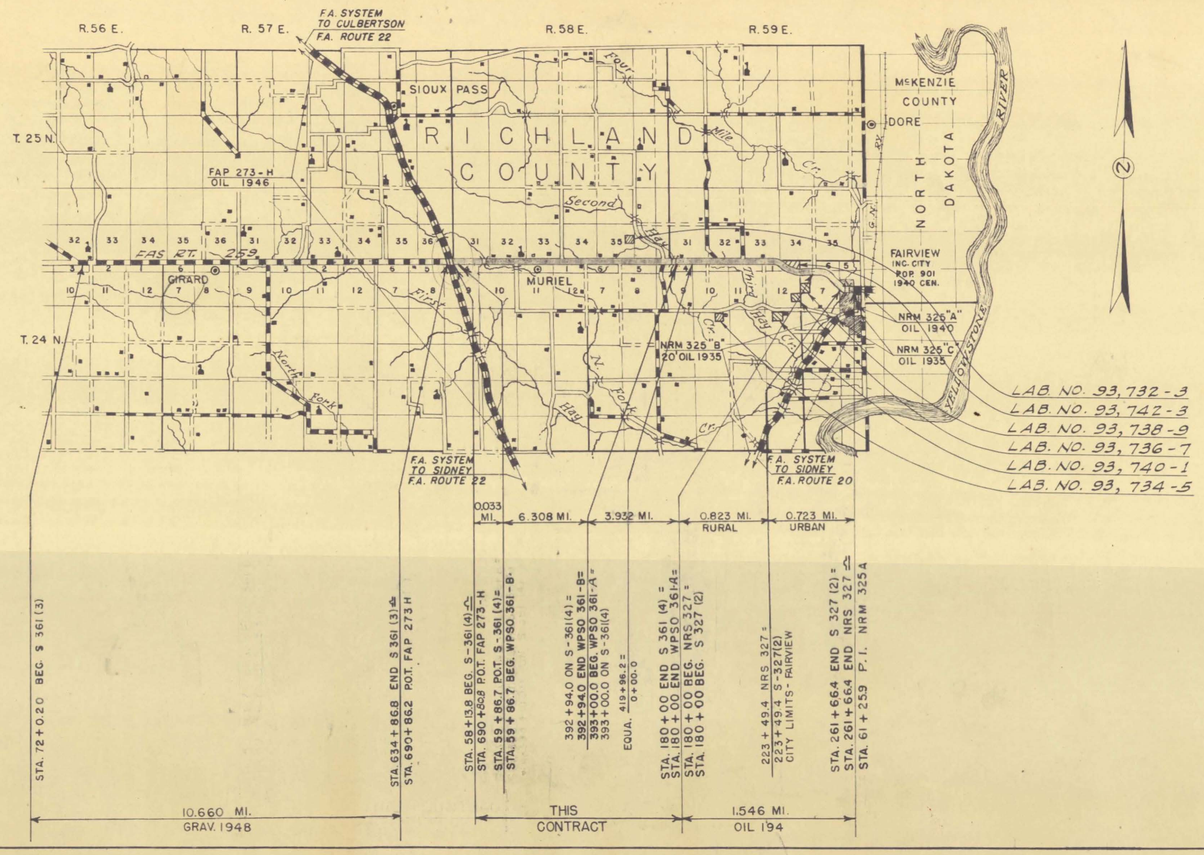
RICHLAND COUNTY

LENGTH 10.273 MILES



SCALES

HORIZONTAL: 1 Inch = 200 Feet
VERTICAL: 1 Inch = 20 Feet
CROSS SECTIONS--HOR. & VERT.: 1 Inch = 10 Feet
REDUCTION PRINTS ½ ORIGINAL SCALE



CONVENTIONAL SIGNS

STATE AND NATIONAL LINE
COUNTY LINE
CITY, VILLAGE OR BOROUGH LINE
TOWNSHIP LINE
SECTION LINE
RESERVATION LINE
FENCE LINE
GUARD RAIL
UNFENCED PROPERTY
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RIGHT OF WAY LINE FENCED
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RETAINING WALLS
BASE OR SURVEY LINE
LEVEE
CULVERTS IN PLACE (PLAN)
NEW CULVERTS (PLAN)
NEW CULVERTS (PROFILE)
TROLLEY POLE
POWER POLE
TELEPHONE OR TELEGRAPH POLE
MARSH
DITCH
RIP RAP
BRIDGE

LEGEND OF COMPLETED WORK

GRADED ROAD
GRAVELED ROAD
OILED ROAD
PAVED ROAD

SUMMARY NO. 1

LENGTH OF ROADWAY - FAS 361 SURVEY	172.9 FT = 0.033 MI.
LENGTH OF PARTICIPATING BRIDGES - FAS 361 SURVEY	0.0 FT = 0.000 MI.
LENGTH OF NON-PARTICIPATING BRIDGES - FAS 361 SURVEY	0.0 FT = 0.000 MI.
TOTAL LENGTH OF S-361(4) FAS 361 SURVEY	172.9 FT = 0.033 MI.
LENGTH OF ROADWAY - FORMERLY WPSO 361-B	33,174.3 FT = 6.283 MI.
LENGTH OF PARTICIPATING BRIDGES - FORMERLY WPSO 361-B	133.0 FT = 0.025 MI.
LENGTH OF NON-PARTICIPATING BRIDGES - FORMERLY WPSO 361-B	0.0 FT = 0.000 MI.
TOTAL LENGTH OF S-361(4) - FORMERLY WPSO 361-B	33,307.3 FT = 6.308 MI.
LENGTH OF ROADWAY - FORMERLY WPSO 361	20,765.5 FT = 3.932 MI.
LENGTH OF PARTICIPATING BRIDGES - FORMERLY WPSO 361	0.0 FT = 0.000 MI.
LENGTH OF NON-PARTICIPATING BRIDGES - FORMERLY WPSO 361	0.0 FT = 0.000 MI.
TOTAL LENGTH OF S-361(4) - FORMERLY WPSO 361	20,765.5 FT = 3.932 MI.
TOTAL LENGTH OF S-361(4)	54,245.7 FT = 10.273 MI.

NOTES: STD. 53-SN
EXCEPT AS FOLLOWS: A SHRINKAGE FACTOR OF 35% WAS USED THROUGHOUT

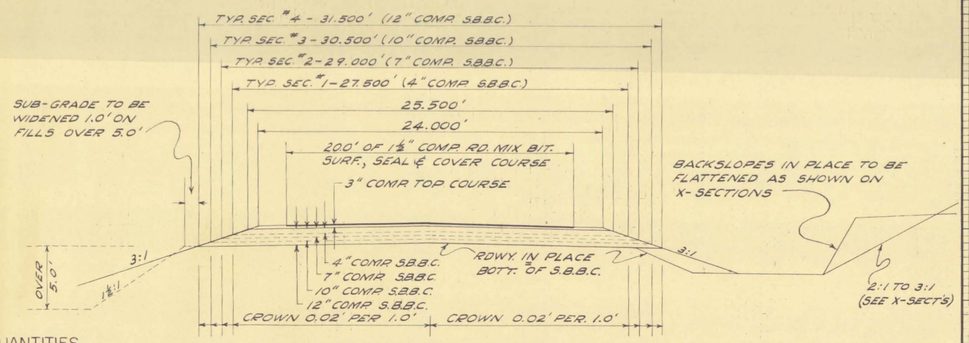
TYPICAL SECTIONS

TYPICAL SECTION NO. 1
58+13.8 TO 122+00.0
132+00.0 TO 211+00.0
325+00.0 TO {419+$\frac{}{}$62 BK. / 0+00.0 AH.

TYPICAL SECTION NO. 2
122+00.0 TO 127+00.0
211+00.0 TO 272+00.0
280+00.0 TO 325+00.0
419+$\frac{}{}$62.2 BK. / 0+00.0 AH. } TO 180+00.0

TYPICAL SECTION NO. 3
127+00.0 TO 132+00.0

TYPICAL SECTION NO. 4
272+00.0 TO 280+00.0



QUANTITIES

GRAVEL –	TYP. SECT'S. 1-2-3-4 COVER COURSE (35 LBS. PER SQ. YD.)	TYP. SECS. NO. 1-2-3-4 TOP COURSE (2850 LBS. PER CU. YD.)	TYP. SEC. NO. 1 4" COMP. S.B.B.C.	TYP. SEC. NO. 2 7" COMP. S.B.B.C.	TYP. SEC. NO. 3 10" COMP. S.B.B.C.	TYP. SEC. NO. 4 12" COMP. S.B.B.C.
AREA SQ. FT.		6.188	8.832	15.895	23.332	28.500
CU. YDS. PER STA.		22.919	32.711	58.870	86.415	105.556
CU. YDS. PER MILE			1727.1	3108.3	4562.7	5573.4
TONS PER STA.	3.889	32.660				
TONS PER MILE	205.3	1724.4				

OIL –	TYP. SECT'S. NO. 1-2-3-4 MIX (1.1 GALS. PER SQ. YD.)	SEAL (0.35 GALS. PER SQ. YD.)
SQ. YDS. PER STA.	222.222	222.222
GALS. PER STA.	244.444	77.778
GALS. PER MILE	12906.6	4106.7

ADD 20% COMPACTION TO TOP COURSE AND S.B.B.C.
ADD 10% REINFORCEMENT TO S.B.B.C. ONLY.

TYPICAL SEC. FOR APPROACHES
STD. 231-RA-1
EXCEPT AS FOLLOWS:-
USE 4" S.B.B.C. INSTEAD OF 4" GRAVEL BASE COURSE.

QUANTITIES
(ONE APPROACH ONLY)

TOP COURSE	4 TONS
S.B.B.C.	12 C.Y.

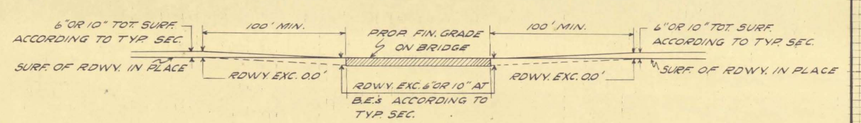
SURFACING

STATION FROM	STATION TO	LINEAL FEET GROSS	LINEAL FEET NET	+	−	FOR	TONS COVER COURSE	TONS TOP COURSE	C.Y. S.B.B.C.	GALLONS MIX.	GALLONS SEAL	PROCESSING MILES	PROCESSING SQ. YDS.	REMARKS
58+13.8	59+86.7	172.9	172.9				7	54	57	423	134	0.033		
						APPROACHES	4	33	33	244	78		222	
						COMPACTION			18					
						REINFORCEMENT			7					
SUB-TOTALS		172.9	172.9	~	~		11	88	117	667	212	0.033	222	FAS 361 SURVEY
59+86.7														
109+64.0	110+40.0				76.0	TR. TBR. BRIDGE IN PLACE	4	22		286	87	0.014		24.0' RDWY.
	122+00.0	122+00.0	6213.3	6137.3			239	2006	2008	15002	4773	1.162		TYP. SEC. NO. 1 (4" S.B.B.C.)
122+00.0	127+00.0	127+00.0	500.0	500.0			19	163	294	1222	389	0.095		TYP. SEC. NO. 2 (7" S.B.B.C.)
127+00.0	132+00.0	132+00.0	500.0	500.0			19	163	432	1222	389	0.095		TYP. SEC. NO. 3 (10" S.B.B.C.)
132+00.0														
191+58.5	191+68.5				11.0	TR. TBR. STOCK PASS IN PL.	1	3		44	11	0.002		26.0' RDWY.
	211+00.0	211+00.0	7900.0	7889.0			307	2577	2531	19284	6136	1.495		TYP. SEC. NO. 1 (4" S.B.B.C.)
211+00.0	272+00.0	272+00.0	6100.0	6100.0			237	1992	3591	14911	4744	1.155		TYP. SEC. NO. 2 (7" S.B.B.C.)
272+00.0	280+00.0	280+00.0	800.0	800.0			31	261	844	1956	622	0.151		TYP. SEC. NO. 4 (12" S.B.B.C.)
280+00.0														
313+74.5	313+85.5				11.0	TR. TBR. STOCK PASS IN PL.	1	3		44	11	0.002		26.0' RDWY.
	325+00.0	325+00.0	4500.0	4489.0			175	1460	2643	10973	3491	0.850		TYP. SEC. NO. 2 (7" S.B.B.C.)
325+00.0														
392+12.0	392+68.0				57.0	TR. TBR. BRIDGE IN PL.	3	17		213	51	0.011		24.0' RDWY.
	392+68.0	392+68.0	6724.0	6737.0										
	393+00.0	393+00.0					242	2200	2206	16468	5240	1.274		TYP. SEC. NO. 1 (4" S.B.B.C.)
						APPROACHES		216	432					
						COMPACTION		2217	3006					
						REINFORCEMENT			1503					
SUB-TOTALS		33,307.3	33,152.3	~	155.0		1298	13304	19536	81623	25924	6.308	~	FORMERLY WPSO 361-B
393+00.0	419+$\frac{}{}$62 / 0+00.0	2676.2	2676.2				105	881	882	6591	2097	0.510		TYP. SEC. NO. 1 (4" S.B.B.C.)
0+00.0														
160+27.0	160+46.0				19.0	TR. TBR. BRIDGE IN PLACE	1	6		68	17	0.003		23.0' RDWY.
160+67.3	160+00.0			67.3		EQUATION								
	180+00.0	18000.0	18050.3				702	5895	10626	44123	14039	3.419		TYP. SEC. NO. 2 (7" S.B.B.C.)
						APPROACHES		132	264					
						COMPACTION		1383	2354					
						REINFORCEMENT			1777					
SUB-TOTALS		20,676.2	20,746.5	67.3	19.0		808	8277	15303	50782	16153	3.932	~	FORMERLY WPSO 361
TOTALS		54,176.4	54,071.7	67.3	174.0		2117	21690	34958	133072	42289	10.273	222	S-361(4)

GRADING

STATION	CUBIC YARDS EXC. UNCL.		CUBIC YARDS EMBY.	STA. YDS. O'HAUL	REMARKS
58+13.8	~		~	~	
59+86.7					
TOTALS	~		~	~	FAS 361 SURV.
59+86.7					
74+75	521		521	160	
96+06	1026		1026	520	
123+93	859		859	3700	
145+05	936		936	3400	
160+48	1382		1382	1000	
181+50	976		976	5700	
201+75	676		676	700	
213+08	559		559	1600	
234+79	1750		1750	1100	
250+69	1744		1744	4100	
276+13	1452		1452	10200	
321+00	3818		3818	32000	
340+19	512		512	300	
392+94.0	2358		2358	41000	
393+00.0			CONTINGENCY	2100	
TOTALS	18549		18549	126940	FORMERLY WPSO 361-B
393+00					
407+49	765		765	450	
3+50	844		844	840	
13+51	612		612	240	
28+52	829		829	620	
39+25	628		628	–	
47+49	437		437	180	
58+61	633		633	700	
67+71	314		314	–	
84+37	771		771	740	
132+13	2442		2442	15950	
180+00	2718		2718	9830	
			CONTINGENCY	5850	
TOTALS	10393		10393	35100	FORMERLY WPSO 361
TOTALS	28942		28942	162040	S-361(4)

DETAIL SHOWING ROADWAY EXCAVATION AT BRIDGE ENDS IN PLACE



SURF. FOR BRIDGES IN PLACE
STD. 235-RA-3
EXCEPT AS FOLLOWS:- USE COVER COURSE MATERIAL (35 # PER SQ. YD.) INSTEAD OF STONE CHIPS.

FINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — NOTE BOOK — NO. — BY — DATE

ORIGINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — NOTE BOOK — NO. — BY — DATE

(CONSTRUCTION)

SUMMARY NO.1

FAS
S-361(4) 2 63

LENGTH OF ROADWAY - FAS 361 SURVEY	172.9 FT.	=	0.036 MI.
LENGTH OF PARTICIPATING BRIDGES - FAS 361 SURVEY	0.0 FT.	=	0.000 MI.
LENGTH OF NON-PARTICIPATING BRIDGES - FAS 361 SURVEY	0.0 FT.	=	0.000 MI.
TOTAL LENGTH OF S-361 (4) FAS 361 SURVEY	172.9 FT.	=	0.036 MI.
LENGTH OF ROADWAY - FORMERLY WPSO 361-B	33,174.3 FT.	=	6.283 MI.
LENGTH OF PARTICIPATING BRIDGES-FORMERLY WPSO 361-B	133.0 FT.	=	0.025 MI.
LENGTH OF NON-PARTICIPATING BRIDGES-FORMERLY WPSO 361-B	0.0 FT.	=	0.000 MI.
TOTAL LENGTH OF S-361 (4) - FOMERLY WPSO 361-B	33,307.3 FT.	=	6.308 MI.
LENGTH OF ROADWAY - FORMERLY WPSO 361	20,765.5 FT.	=	3.932 MI.
LENGTH OF PARTICIPATING BRIDGES - FORMERLY WPSO 361	0.0 FT.	=	0.000 MI.
LENGTH OF NON-PARTICIPATING BRIDGES-FORMERLY WPSO 361	0.0 FT.	=	0.000 MI.
TOTAL LENGTH OF S-361 (4) - FORMERLY WPSO 361	20,765.5 FT.	=	3.932 MI.
TOTAL LENGTH OF S-361 (4)	54,245.7 FT.	=	10.273 MI.

NOTES: STD. 53-SN
EXCEPT AS FOLLOWS: A VARIABLE SHRINKAGE FACTOR WAS USED THROUGHOUT

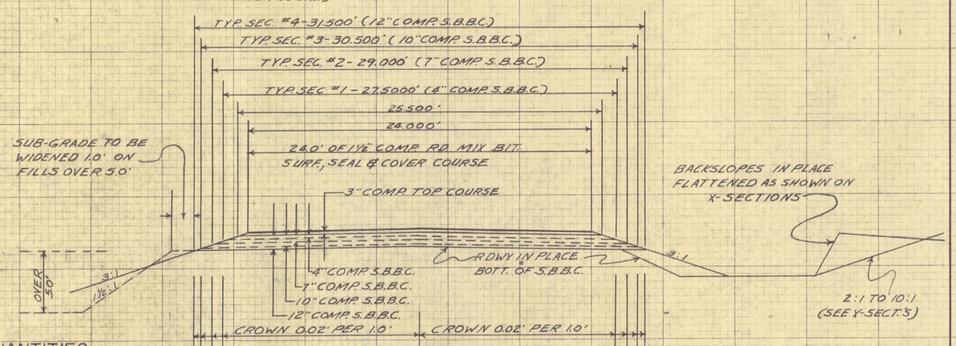
TYPICAL SECTIONS

TYPICAL SECTION NO. 1
58+13.8 TO 122+00.0
132+00.0 TO 211+00.0
328+00.0 TO { 419+96.2 BK. / 0+00.0 AH

TYPICAL SECTION NO. 2
122+00.0 TO 127+00.0
211+00.0 TO 272+00.0
280+00.0 TO 235+00.0
419+96.2 BK. / 0+000 AH } TO 180+00.0

TYPICAL SECTION NO. 3
127+00.0 TO 132+00.0

TYPICAL SECTION NO. 4
272+00.0 TO 280+00.0



QUANTITIES

GRAVEL -	TYP. SECT'S 1-2-3-4 COVER COURSE (235 LBS. PER SQ. YD)	TYP. SECT'S 1-2-3-4 TOP COURSE (2850 LBS. PER CU. YD)	TYP. SEC. NO. 1. 4" COMP. S.B.B.C.	TYP. SEC. NO. 2 7" COMP. S.B.B.C.	TYP. SEC. NO. 3 10" COMP. S.B.B.C.	TYP. SEC. NO. 4 12" COMP. S.B.B.C.
AREA SQ. FT.		6.188	8.832	15.895	23.332	28.500
CU. YDS. PER STA.		22.919	32.711	58.870	86.415	105.556
CU. YDS. PER MILE			1727.1	3108.3	4562.7	5573.4
TONS PER STA.	3.927	32.660				
TONS PER MILE	207.3	1724.4				

ADDED 20% COMPACTION TO TOP COURSE AND S.B.B.C.
ADDED REINFORCEMENT TO S.B.B.C. ONLY

OIL -	TYP. SECT'S NO. 1-2-3-4 MIX (0.44 GALS. PER SQ. YD)	SEAL (0.25 GALS. PER SQ. YD)
SQ. YDS. PER STA.	266.67	266.67
GALS. PER STA.	226.318	118.675
GALS. PER MILE	11,945.330	6.264.99

TYPICAL SEC. FOR APPROACHES
STD. 231-RA-1
EXCEPT AS FOLLOWS:-
USE 4" S.B.B.C. INSTEAD OF 6" GRAVEL BASE COURSE

QUANTITIES
(ONE APPROACH ONLY)

TOP COURSE	6 TONS
S.B.B.C.	12 CU. YD.

SURFACING
INCLUDES REINFORCEMENT & COMPACTION

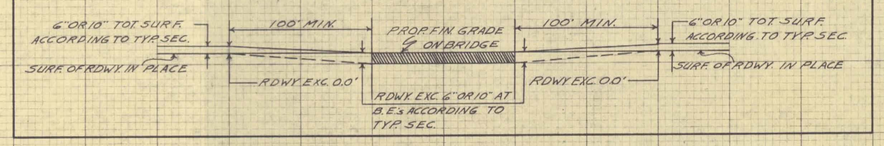
	STATION FROM	STATION TO	LINEAL FEET GROSS	LINEAL FEET NET	+	−	FOR	TONS COVER COURSE	TONS TOP COURSE	C.Y. S.B.B.C.	GALLONS MIX	GALLONS SEAL	PROCESSING MILES	PROCESSING SQ. YDS.			REMARKS
	58+13.8	59+86.7	172.9	172.9			APPROACHES	7	56.5	84	392	136	0.033				
								4	33	33	244	78		222			
	SUB-TOTALS		172.9	172.9	~			11	89.5	117	636	214	0.033	222			FAS 361 SURVEY
FORMERLY WPSO 361-B	59+86.7																
	109+60.0	110+60.0				760	T.R. TBR. BRIDGE IN PLACE	3	26		166	60	0.014				24.0' ROADWAY
		122+00.0	6213.3	6137.3				241	2411	2592	13811	4830	1.162				TYP. SEC. NO. 1 (4" S.B.B.C.)
	122+00.0	127+00.0	500.0	500.0				20	196	380	1129	393	0.095				TYP. SEC. NO. 2 (7" S.B.B.C.)
	127+00.0	132+00.0	500.0	500.0				20	196	358	1129	393	0.095				TYP. SEC. NO. 3 (10" S.B.B.C.)
	132+00.0																
	191+58.5	191+69.5				110	T.R. TBR. STOCK PASS IN PLACE	0.5	4		24	9	0.002				26.0' ROADWAY
		211+00.0	7900.0	7889.0				310	3101	3333	17768	6208	1.495				TYP. SEC. NO. 1 (4" S.B.B.C.)
	211+00.0	272+00.0	6100.0	6100.0				239	2398	4637	13728	4800	1.155				TYP. SEC. NO. 2 (7" S.B.B.C.)
	272+00.0	280+00.0	800.0	800.0				31	314	1090	1795	630	0.151				TYP. SEC. NO. 4 (12" S.B.B.C.)
	280+00.0																
	313+74.5	313+85.5				11.0	T.R. TBR. STOCK PASS IN PLACE	0.5	4		24	9	0.002				26.0' ROADWAY
		325+00.0	4500.0	4489.0				176	1764	3412	10103	3533	0.850				TYP. SEC. NO. 2 (7" S.B.B.C.)
	325+00.0																
	392+12.0	392+69.0				57.0	T.R. TBR. BRIDGE IN PLACE	2	20		131	45	0.011				24.0' ROADWAY
		392+96.0 / 393+00.0	6794.0	6737.0				264	2647	2846	15168	5302	1.276				TYP. SEC. NO. 1 (4" S.B.B.C.)
							APPROACHES		160	312							
	SUB-TOTALS		33,307.3	33,152.3	~	155.0		1307	13241	19160	74973	26212	6.308	~			FORMERLY WPSO 361-B
FORMERLY WPSO 361	393+00	419+96.2 / 0+000.0	2696.2	2696.2				106	1060	1138	6062	2122	0.510				TYP. SEC. NO. 1 (4" S.B.B.C.)
	0+00.0																
	60+27.0	60+46.0				19.0	T.R. TBR. BRIDGE IN PLACE	1	7		36	15	0.003				23.0' ROADWAY
	160+69.3	160+00.0			69.3		EQUATION										
		180+00.0	18000.0	18050.3				709	7096	13698	40636	14203	3.419				TYP. SEC. NO. 2 (7" S.B.B.C.)
							APPROACHES		176	216							
	SUB-TOTALS		20,696.2	20,746.5	69.3	19.0		816	8337	15052	46734	16340	3.932	~			FORMERLY WPSO 361
	TOTALS		54,176.4	54,071.7	69.3	174.0		2134	21667.5	34329	122343	42766	10.273	222			S-361(4) ~~WPSO 361~~

GRADING

STATION	CUBIC YARDS EXC. UNCL.	CUBIC YARDS EMB+	STA. YDS. 0' HAUL	REMARKS
58+13.8	~	~	~	
59+86.7				
TOTALS	~	~	~	FAS 361 SURV.
59+86.7				
83+00.0	1066	1066	661	
109+62.0	477	477	280	
144+30.0	858	858	325	
191+57.0	3846	3846	4596	
248+00.0	7623	7623	26455	
276+34.0	2374	2374	17856	
313+74.5	3768	3768	8375	
341+33.0	972	972	664	
392+11.0	2354	2354	15889	
392+96.0				
393+00.0				
TOTALS	23,338	23,338	75,051	FORMERLY WPSO 361-B
393+00.0				
0+00.0	628	628	1691	
0+51.0	1446	1446	4529	
19+30.0	634	634	1083	
43+00.0	76	76	0	
88+00.0	922	922	2263	
120+36.0	1376	1376	3640	
155+00.0	0	0	0	
180+00.0				
TOTALS	5102	5102	13,256	FORMERLY WPSO 361
TOTALS	28440	28440	88,307	S-361(4)

419+96.2 BK = 0+000 AH EQU.

DETAIL SHOWING ROADWAY EXCAVATION AT BRIDGE ENDS IN PLACE



SURF. FOR BRIDGES IN PLACE
STD. 233-RA 3
EXCEPT AS FOLLOWS:- USE COVER COURSE MATERIAL (235# PER SQ. YD) INSTEAD OF STONE CHIPS.

KEUFFEL & ESSER CO. NEW YORK
TRADE STANDARD MARK REG. U.S. PAT. OFF. CROSS SECTION 10 X 10 100% RAG PAPER MADE IN U.S.A.

SUMMARY NO. 2

FAS S-361-(4) 3 63

APPROACHES & SURFACING

STATION	GALS. MIX T.	GALS. POWR. E.R. CRSE. B.C.				REMARKS
58+138	244	78	4	33	33	W.V.E. APP. TO FAS 212-H (222.50 VGS 200')
TOTALS	244	78	4	*33	*33	FAS 361 SURVEY
11+00					4	FM. ENT. LT.
72+91					12	FM. ENT. RT.
108+82					12	FM. ENT. LT.
109+55					12	FM. ENT. RT.
113+00					12	FM. ENT. LT.
124+40					12	FM. ENT. LT.
132+00					12	FM. ENT. RT.
141+20					12	FM. ENT. RT.
151+00					12	FM. ENT. LT.
151+45					12	FM. ENT. RT.
158+15					12	CO. RD. APP. RT.
167+56					12	FM. ENT. RT.
178+00					12	FM. ENT. LT.
181+40					12	FM. ENT. RT.
191+70					6	FM. ENT. LT. & RT.
211+00					12	CO. RD. APP. LT.
220+75					12	FM. ENT. LT.
256+00					12	FM. ENT. RT.
264+42					12	FM. ENT. LT.
281+69					12	FM. ENT. RT. (DBL.)
301+25					12	FM. ENT. RT.
302+00					12	FM. ENT. LT.
312+07					12	CO. RD. APP. RT.
314+29					12	FM. ENT. LT.
322+50					12	FM. ENT. RT.
340+45					12	FM. ENT. RT.
341+80					12	FM. ENT. RT.
347+05					12	FM. ENT. RT.
358+67					12	CO. RD. APP. LT.
359+50					12	FM. ENT. RT.
366+00					12	FM. ENT. LT.
368+45					12	CO. RD. APP. RT.
369+70					12	FM. ENT. LT.
TOTALS	~	~	~	*216	*192	FORMERLY W.P.50-361-B
399+05					6	FM. ENT. RT.
399+31					6	FM. ENT. LT.
403+00					12	FM. ENT. LT. & RT.
413+85					6	FM. ENT. RT.
417+62					6	RD. APP. RT.
0+00						
3+25					12	FM. ENT. LT.
10+00					12	RD. APP. LT.
11+00					12	RD. APP. LT.
21+70					12	FM. ENT. RT.
22+50					12	FM. ENT. LT.
62+60					12	FM. ENT. RT.
65+60					12	FM. ENT. LT.
68+80					12	FM. ENT. RT.
86+90					12	FM. ENT. RT.
92+90					12	FM. ENT. RT.
105+80					12	RD. APP. RT.
114+00					12	RD. APP. LT.
140+75					12	RD. APP. LT. & RT.
174+70					6	FM. ENT. LT.
TOTALS	~	~	~	*32	*244	FORMERLY W.P.50-361
TOTALS	244	78	4	*31	*29	S-361-(4)

* TOTALS INCLUDED IN SURFACING FRAME
1 SEAL
2 COVER COURSE

NEW SNOW FENCE

STD. 23-SF-1

169+00.0 TO 172+00.0	300 LIN. FT. SN. FC. LT.	
339+00.0 TO 346+00.0	700 LIN. FT. SN. FC. LT.	
	700 LIN. FT. SN. FC. RT.	
365+00.0 TO 368+00.0	300 LIN. FT. SN. FC. LT.	
TOTAL	2000 LIN. FT. FORMERLY	W.P.50 361-B

MONUMENTS & MARKERS

STD. 38-M1

1- PROJ. MARKERS - BEG. OF PROJ. (FAS 361 SURVEY)
1- PROJ. MARKERS - END OF PROJ. (FORMERLY W.P.50 361)
2- R/W. MONUMENTS - (FAS 361 SURV.)
60- R/W. MONUMENTS (FORMERLY W.P.50 361-B)
62- R/W. MONUMENTS (FORMERLY W.P.50 361)

CULVERTS

STATION	LINEAL FT. NEW CMP. 24"	48"	USE IN PLACE	LENGTHEN 24"	48"	REMARKS
60+30			24"X54' CMP			DRAIN
63+75			24"X54' CMP			DRAIN
83+24			48"X52' CMP			DRAIN
90+00			24"X40' CMP			DRAIN
92+37			24"X52' CMP			DRAIN
101+37			24"X52' CMP			RD. APP. RT.
103+40			15"X24' CMP			DRAIN
114+43			24"X48' CMP			DRAIN
121+52			24"X52' CMP			DRAIN
126+50			48"X48' CMP			FM. ENT. RT.
132+00			15"X32' CMP			DRAIN
141+20			30"X56' CMP			DRAIN
151+45			15"X32' CMP			FM. ENT. RT.
155+55		8	15"X42' CMP	4		FM. ENT. LT.
163+75			48"X48' CMP			DRAIN
167+56			24"X48' CMP	4		DRAIN
178+15			15"X44' CMP			CO. RD. APP. LT.
181+25			48"X54' CMP			DRAIN
191+25			15"X44' CMP			FM. ENT. LT.
201+00			24"X54' CMP			DRAIN
211+14			24"X48' CMP			DRAIN
223+00			24"X42' CMP			DRAIN
233+45			24"X44' CMP			DRAIN
243+00	8		24"X48' CMP	4		DRAIN
246+03			48"X52' CMP			DRAIN
261+44	4		24"X48' CMP	4		DRAIN
264+32			15"X44' CMP			DRAIN
271+25		4	48"X60' CMP	4		DRAIN
301+25			15"X32' CMP			DRAIN
303+12			24"X54' CMP			DRAIN
311+12			15"X32' CMP			DRAIN
312+25			15"X32' CMP			DRAIN
314+29			24"X48' CMP			DRAIN
318+25			15"X32' CMP			DRAIN
324+00			15"X32' CMP			DRAIN
336+40			24"X60' CMP			DRAIN
350+57			24"X54' CMP			DRAIN
357+00			15"X32' CMP			DRAIN
362+05			24"X48' CMP			DRAIN
365+50			15"X32' CMP			DRAIN
368+50			24"X48' CMP			DRAIN
378+20			15"X32' CMP			DRAIN
382+50			15"X32' CMP			DRAIN
391+00			15"X32' CMP			DRAIN
TOTALS		12		1	1	FORMERLY W.P.50-361-B
399+05			15"X32' CMP			FM. ENT. RT.
399+31			15"X32' CMP			FM. ENT. LT.
403+00			24"X48' CMP			DRAIN
407+00			15"X32' CMP			DRAIN
407+20			15"X32' CMP			FM. ENT. LT.
407+85			15"X32' CMP			FM. ENT. RT.
413+85			15"X32' CMP			FM. ENT. LT.
417+62			24"X48' CMP			DRAIN
419+62			15"X40' CMP			DRAIN
0+00			15"X32' CMP			DRAIN
3+25			24"X48' CMP			DRAIN
10+00			15"X40' CMP			DRAIN
11+00			30"X44' CMP			DRAIN
13+35			24"X44' CMP			DRAIN
16+30			24"X44' CMP			DRAIN
17+03			24"X44' CMP			DRAIN
17+34			15"X32' CMP			DRAIN
21+70			15"X32' CMP			DRAIN
22+50			15"X32' CMP			DRAIN
25+40			15"X32' CMP			DRAIN
25+90			15"X32' CMP			DRAIN
26+80			15"X32' CMP			DRAIN
29+00			15"X32' CMP			DRAIN
32+70			15"X32' CMP			DRAIN
37+15			15"X32' CMP			DRAIN
40+20			15"X32' CMP			DRAIN
46+75			15"X32' CMP			DRAIN
50+72			15"X32' CMP			DRAIN
57+00			15"X32' CMP			DRAIN
174+70			15"X32' CMP			DRAIN
TOTALS	~	12		~	~	FORMERLY W.P.50-361
TOTALS	~	12		~	~	S-361-(4)

PLATE 3 CROSS SECTION D. P. R. & R. E. STANDARD

ORIGINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — NOTE BOOK NO. — BY — DATE

FINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED — NOTE BOOK NO. — BY — DATE

(CONSTRUCTION)

SUMMARY NO. 2

FAS
S-361-(4)

NEW SNOW FENCE

STD 23-SF-1

171+50 TO 174+50 – 300 LIN. FT. SN. FC. LT.
338+50 TO 344+50 – { 600 LIN. FT. SN. FC. LT.
600 LIN. FT. SN. FC. RT.
351+15 TO 353+15 – 200 LIN. FT. SN. FC. LT.
364+00 TO 367+00 – 300 LIN. FT. SN. FC. LT.
TOTAL 2000 LIN. FT. FORMERLY WPSO 361-B

MONUMENTS & MARKERS

STD 38-MI

1 - PROJ. MARKER - BEG. OF PROJ. (FAS 361 SURVEY)
1 - PROJ. MARKER - END OF PROJ. (FORMERLY WPSO 361)
2 - R/W MONUMENTS - (FAS 361 SURV.)
36 - R/W MONUMENTS (FORMERLY WPSO 361-B)
47 - R/W MONUMENTS (FORMERLY WPSO 361)

ADDITIONAL EXC. & SURFACING

STATION	LINEAL EXC. C.Y.	GALS. MIX	GALS. MIX *	TONS TOP. CRSE	TONS TOP. CRSE #	C.Y. S.B. EXC.	REMARKS
58+13.8		244	78	4	33	33	WIDE APP. TO FAP 273-V (222.5Q VDS PROC.)
TOTALS	~	244	78	4	33	33	FAS 361 SURVEY
61+83							6 FM. APP. LT.
77+88							6 FM. APP. RT.
88+34							6 FM. APP. LT.
103+57				8			6 FM. APP. RT.
107+71							6 FM. APP. LT.
124+24							6 FM. APP. RT.
132+00							6 FM. APP. LT.
141+22					8		6 RD. APP. LT.
151+42					16		12 FM. ENT. LT.
168+05					16		24 RD. APP. LT.
167+55					16		8 RD. APP. RT.
170+57							12 SCHOOL ENT. LT.
177+21							6 FM. APP. RT.
178+54			82				FM. APP. FEN. LT.
211+71							6 FM. APP. RT.
211+78							6 FM. APP. LT.
220+08						16	8 RD. APP. LT.
221+82							6 FM. APP. RT.
227+40			13				OUTLET DITCH LT.
231+97							6 FM. APP. LT.
237+40							6 FM. APP. RT.
238+08							6 FM. ENT. RT.
244+00						16	6 FM. ENT. LT.
265+42							6 FM. APP. LT.
281+44						8	12 FM. APP. RT.
311+87							6 FM. ENT. LT.
312+20						8	18 FM. ENT. RT.
314+31						16	24 RD. APP. RT.
334+95							6 FM. APP. RT.
339+15							6 FM. APP. RT.
360+67							6 FM. APP. LT.
367+00							6 FM. APP. RT.
370+32						16	18 RD. APP. LT.
374+25						16	18 RD. APP. RT.
384+25							6 FM. APP. RT.
388+48							6 FM. APP. LT.
TOTALS	95	~	~	~	140	312	FORMERLY WPSO 361-B
394+08						16	12 FM. ENT. RT.
394+32						16	12 FM. ENT. LT.
413+86							6 FM. APP. RT.
415+57							6 FM. APP. LT.
416+62 }							6 FM. ENT. RT.
0+00 }							
101+38						8	12 RD. APP. LT.
241+70						32	24 RD. APP. LT.
622+68						16	12 FM. ENT. RT.
651+31						16	18 RD. APP. LT.
681+82						16	12 FM. ENT. RT.
751+55						16	12 FM. ENT. LT.
1001+28							6 FM. APP. RT.
1039+17							6 FM. APP. RT.
1055+79						8	6 RD. APP. RT.
1181+40							6 RD. APP. LT.
1224+47							12 FM. APP. RT.
1279+35							6 FM. APP. LT.
1445+70						16	18 RD. APP. LT.
1744+59						16	18 RD. APP. LT.
TOTALS	~	~	~	~	176	276	FORMERLY WPSO 361
TOTALS	95	244	78	4	369	561	S-361-(4)

* TOTALS INCLUDED IN SURFACING-FRAME
+ SEAL
# COVER COURSE

CULVERTS

STATION	LINEAL FT. NEW CMP DRAIN 24"	48"	REPLACE PIPE CULVERT *	USE IN PLACE	LENGTHEN LT.	LENGTHEN RT.	REMARKS
60+30				24"x54" CMP			DRAIN
63+25				24"x54" CMP			DRAIN
83+24				48"x52" CMP			DRAIN
90+00				24"x60" CMP			DRAIN
97+37				24"x56" CMP			DRAIN
101+37				20"x56" CMP			DRAIN
103+60				15"x56" CMP			DRAIN
114+43				24"x48" CMP			DRAIN
121+52				24"x52" CMP			DRAIN
124+30				48"x48" CMP			DRAIN
132+00				15"x32" CMP			DRAIN
136+88				30"x56" CMP			DRAIN
141+20				15"x32" CMP			DRAIN
151+45				15"x44" CMP			DRAIN
155+55		8		48"x48" CMP	4	4	DRAIN
163+75				24"x48" CMP			DRAIN
167+52				15"x44" CMP			DRAIN
175+15				48"x44" CMP			DRAIN
177+25				15"x24" CMP			DRAIN
201+00				24"x48" CMP			DRAIN
211+18			8	24"x54" CMP			DRAIN
223+00				24"x44" CMP			DRAIN
233+45				24"x68" CMP			DRAIN
243+00	8			24"x64" CMP	4	4	DRAIN
261+03				48"x56" CMP			DRAIN
268+51	4			24"x45" CMP	4		DRAIN
281+49				15"x48" CMP			DRAIN
286+28.5		4		48"x60" CMP	4		DRAIN
291+35				15"x32" CMP			DRAIN
301+25				24"x56" CMP			DRAIN
303+18				15"x32" CMP			DRAIN
311+75				15"x32" CMP			DRAIN
312+25				15"x40" CMP			DRAIN
316+29				24"x54" CMP			DRAIN
319+15				24"x48" CMP			DRAIN
324+00				24"x56" CMP			DRAIN
334+40				24"x40" CMP			DRAIN
350+67				24"x44" CMP			DRAIN
359+00				15"x32" CMP			DRAIN
367+05				24"x44" CMP			DRAIN
369+50				15"x32" CMP			DRAIN
378+50				24"x48" CMP			DRAIN
381+00				24"x44" CMP			DRAIN
385+70				24"x48" CMP			DRAIN
388+50				15"x32" CMP			DRAIN
388+50				24"x30" CMP			DRAIN
TOTALS	12	12	8		~	~	FORMERLY WPSO 361
398+05				15"x32" CMP			FM. ENT. RT.
399+31				15"x32" CMP			FM. ENT. LT.
403+00				24"x46" CMP			DRAIN
407+00				15"x32" CMP			FM. ENT. LT.
407+00				15"x32" CMP			FM. ENT. RT.
413+85				15"x32" CMP			FM. ENT. LT.
415+75				24"x46" CMP			DRAIN
415+62 }							
0+00 }							
3+25				15"x40" CMP			RD. APP. RT.
8+10				15"x32" CMP			FM. ENT. LT.
10+00				24"x44" CMP			FM. ENT. RT.
11+00				15"x32" CMP			DRAIN
13+39				15"x40" CMP			RD. APP. LT.
16+80				30"x46" CMP			DRAIN
31+08				24"x66" CMP			DRAIN
37+32				24"x44" CMP			FM. ENT. LT.
62+40				24"x44" CMP			FM. ENT. RT.
65+40				15"x32" CMP			DRAIN
66+30				15"x32" CMP			DRAIN
68+80				15"x32" CMP			DRAIN
72+80				30"x46" CMP			DRAIN
77+16				24"x46" CMP			DRAIN
85+40				15"x32" CMP			DRAIN
95+50				15"x32" CMP			DRAIN
98+13				30"x44" CMP			DRAIN
103+00				15"x32" CMP			DRAIN
110+34				30"x46" CMP			DRAIN
117+10				24"x46" CMP			DRAIN
126+27				24"x48" CMP			DRAIN
133+70				36"x64" CMP			DRAIN
137+25				15"x32" CMP			DRAIN
140+20				24"x46" CMP			DRAIN
148+75				15"x36" CMP			DRAIN
153+72				15"x36" CMP			DRAIN
159+03				24"x44" CMP			DRAIN
174+70				24"x46" CMP			DRAIN
				15"x32" CMP			DRAIN
TOTALS	~	~	~		~	~	FORMERLY WPSO 361
TOTALS	12	12	8		~	~	8.8

* 24"x8' SUPPLIED BY RICHLAND COUNTY

KEUFFEL & ESSER CO. NEW YORK
TRADE STANDARD MARK REG. U.S. PAT. OFF. CROSS SECTION 10 X 10 100% RAG PAPER MADE IN U.S.A.
KEUFFEL & ESSER CO. NEW YORK
TRADE STANDARD MARK REG. U.S. PAT. OFF. CROSS SECTION 10 X 10 100% RAG PAPER MADE IN U.S.A.

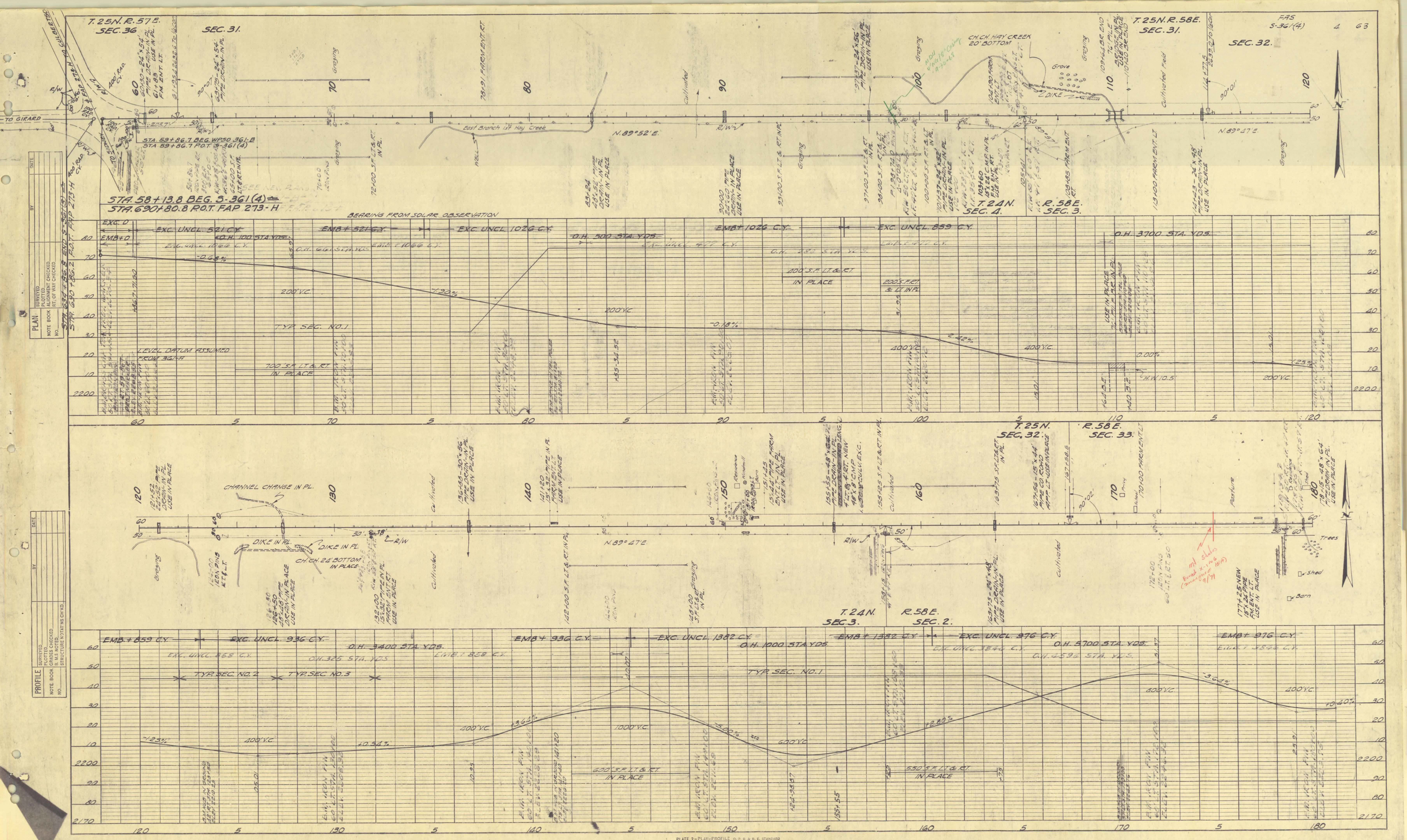


PLATE 2 – PLAN-PROFILE O. P. R. & R. E. STANDARD
KEUFFEL & ESSER CO., NEW YORK.

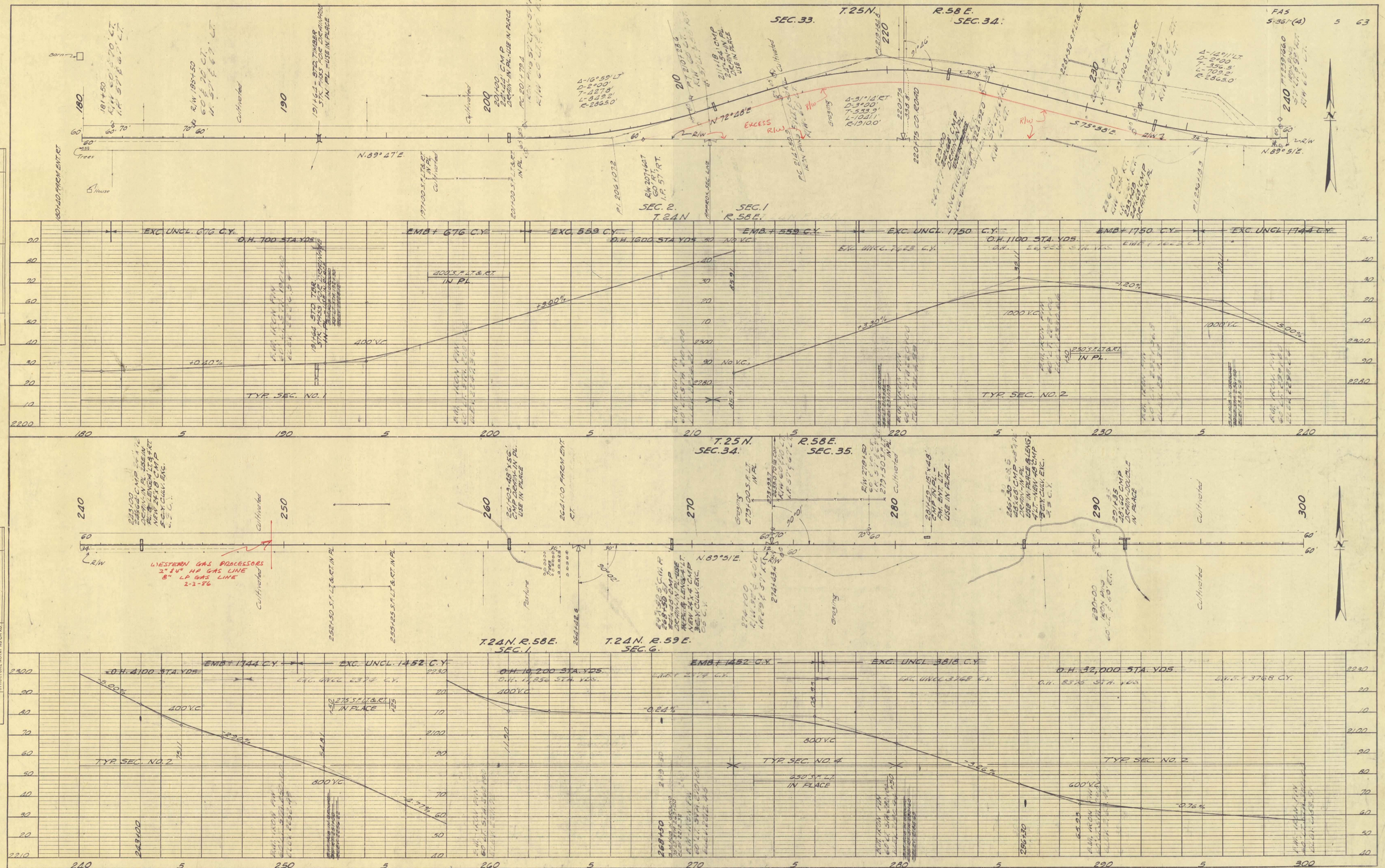
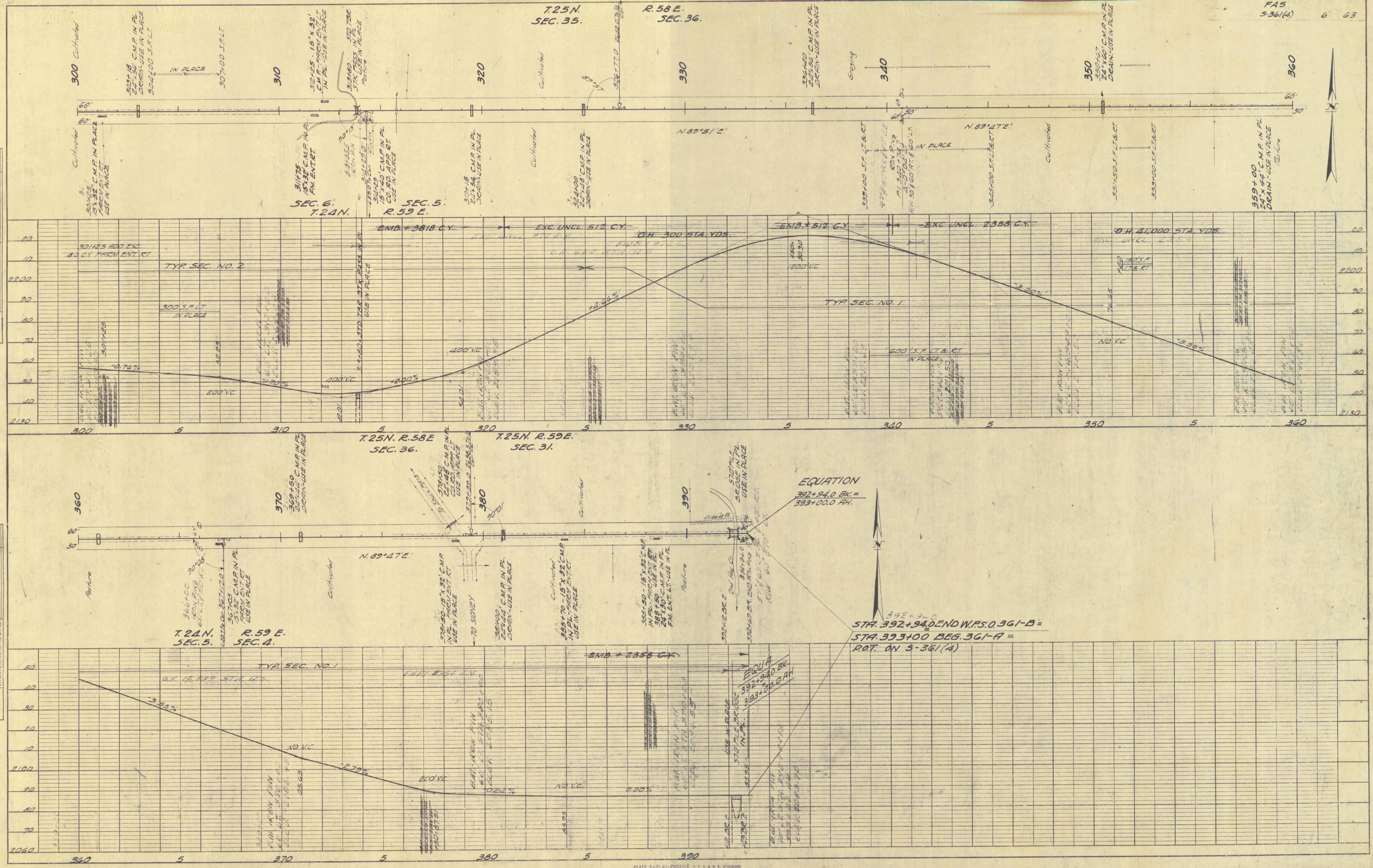


PLATE 2—PLAN—PROFILE O. P. R. & N. E. STANDARD

KEUFFEL & ESSER CO. NEW YORK.


FAS 5-361(4) 6 63
T.25N. SEC.35.
R.58E. SEC.36.
SEC.6. T.24N.
SEC.5. R.59E.
T.25N. R.58E SEC.36.
T.25N. R.59E. SEC.31.
T.24N. SEC.5.
R.59E. SEC.4.
N.89°51'E.
N.89°47'E.
EMB.+3818 C.Y.
EXC.UNCL. 512 C.Y.
O.H. 300 STA.YDS.
EMB.+512 C.Y.
EXC.UNCL. 2358 C.Y.
O.H. 41,000 STA.YDS.
TYP. SEC. NO. 2
TYP. SEC. NO. 1
EQUATION
392+94.0 BK. =
393+00.0 AH.
STA. 392+94.0 END W.P.S. 0.361-B =
STA. 393+00 BEG. 361-A =
R.O.T. ON S-361(4)
PLAN
PROFILE
SURVEYED
PLATS
ALIGNMENT CHECKED
RT. OF WAY CHECKED
NOTE BOOK
NO.
BY
DATE
STRUCTURE NOTATNS CH'KD.
PLATE 2—PLAN-PROFILE C.P.R.&R.R. STANDARD
KEUFFEL & ESSER CO., NEW YORK.

FAS
S-361(4) 7 63

PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
GRADES CHECKED
BRIDGE NOTE
STRUCTURE NOTATIONS CHKD.
NOTE BOOK
NO.
BY
DATE

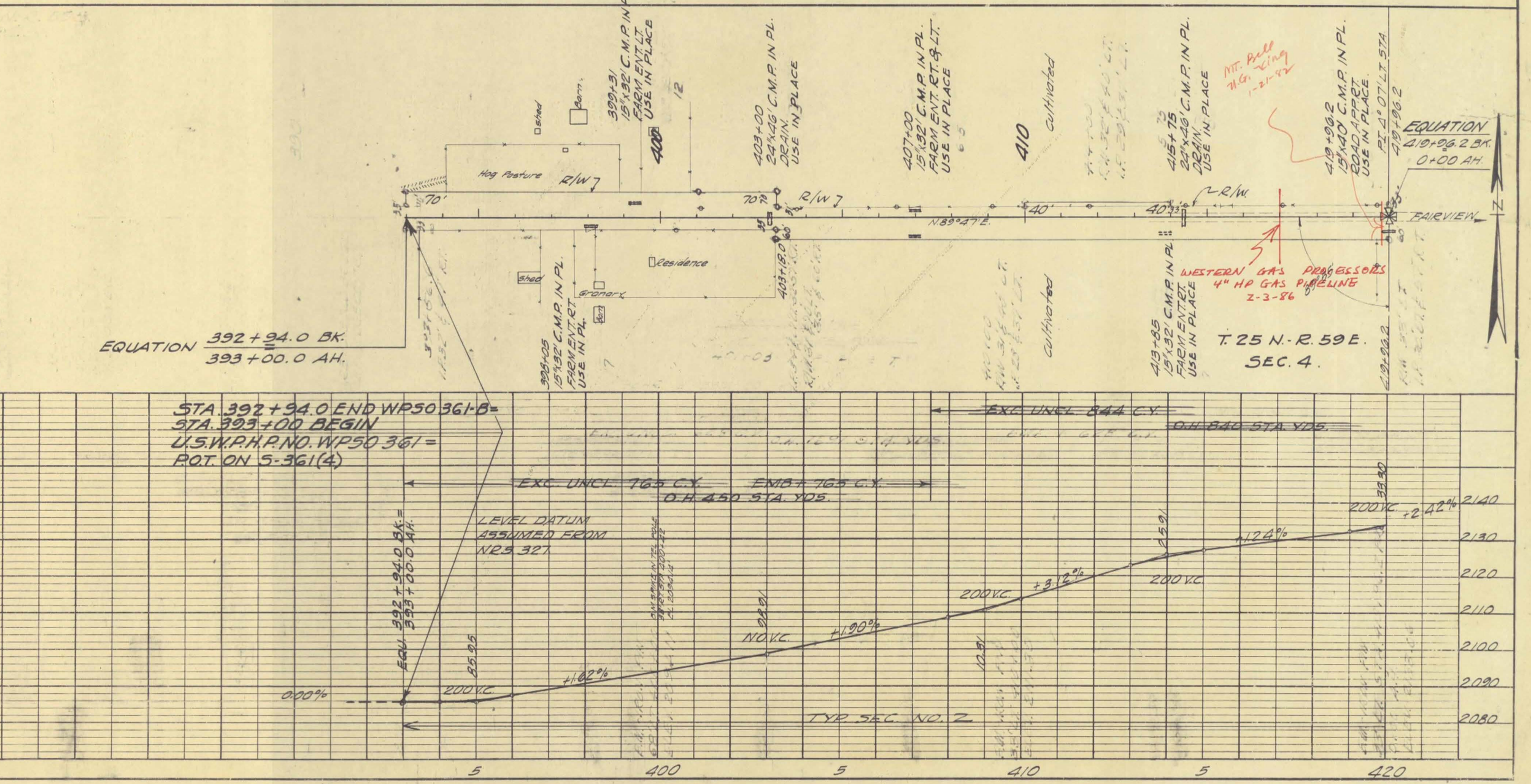


PLATE 2 - PLAN-PROFILE C. F. R. & R. E. STANDARD
KEUFFEL & ESSER CO. NEW YORK.

FAS
S-361(4) 8 63

PLAN		BY	DATE
	SURVEYED		
	PLOTTED		
NOTE BOOK	ALIGNMENT CHECKED		
NO.	RT. OF WAY CHECKED		

PROFILE		BY	DATE
	SURVEYED		
	PLOTTED		
NOTE BOOK	GRADES CHECKED		
	BRIDGE NO.		
NO.	STRUCTURE NO. (ATTYS CHKD.)		

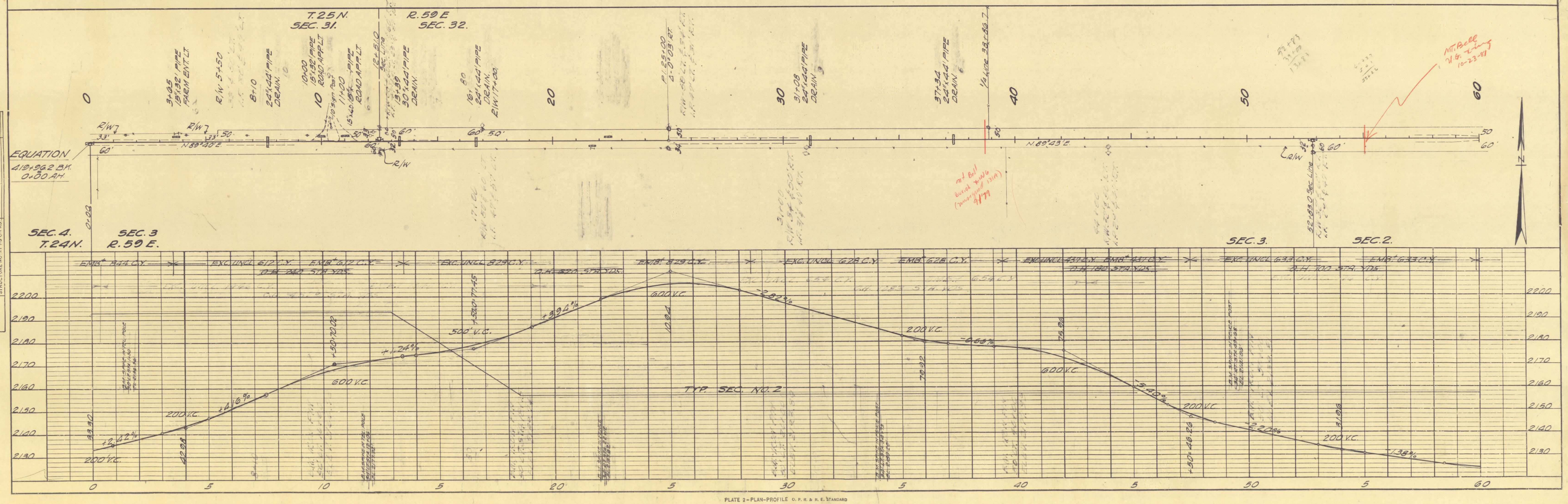
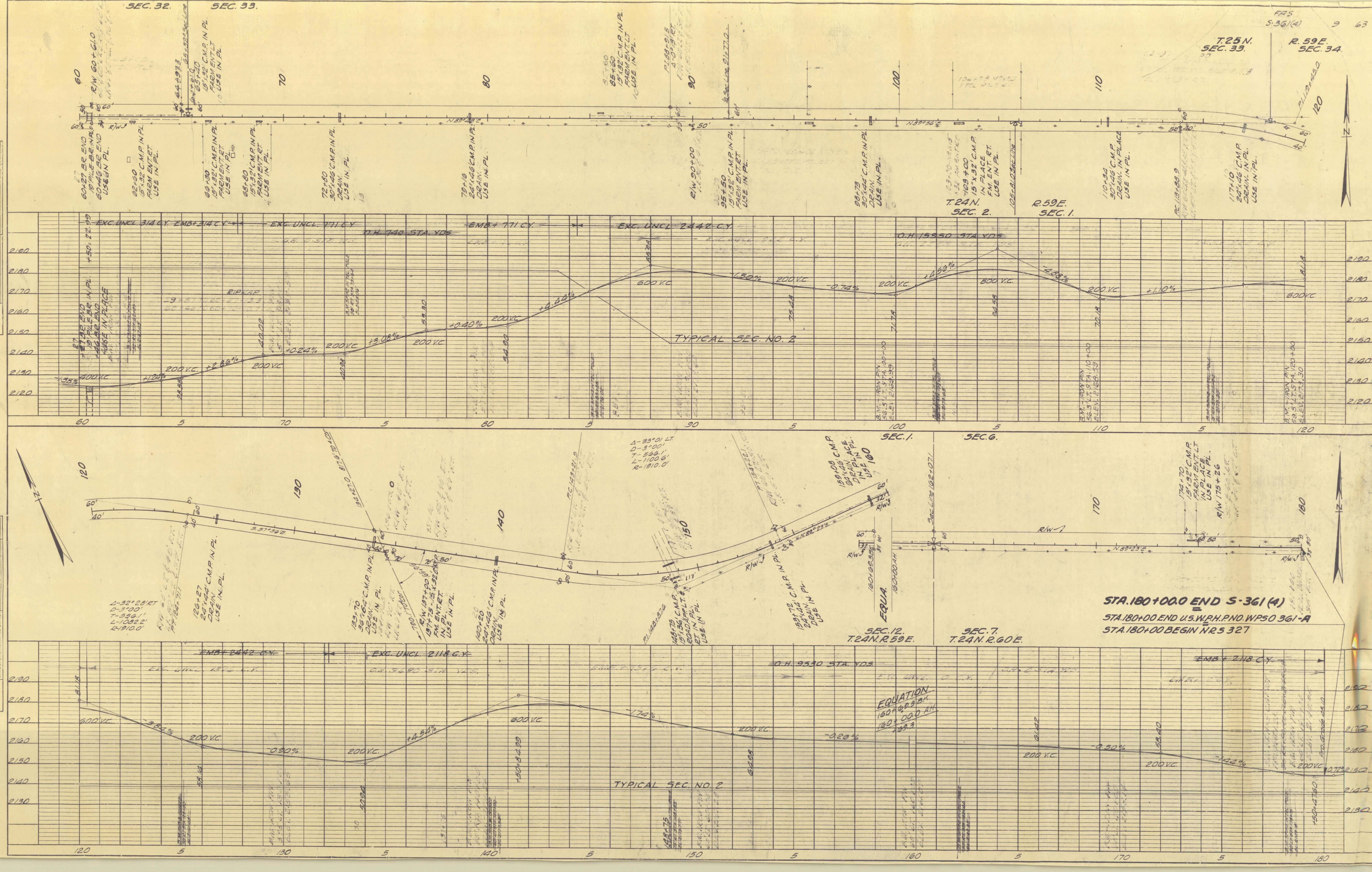


PLATE 2—PLAN-PROFILE O. P. R. & R. E. STANDARD
KEUFFEL & ESSER CO., NEW YORK.


SEC. 32.
SEC. 33.
FAS S-361(4) 9 63
T.25N. SEC. 33.
R.59E. SEC. 34.
T.24N. SEC. 2.
R.59E. SEC. 1.
EXC. UNCL. 314 C.Y. EMB. 314 C.Y.
EXC. UNCL. 771 C.Y.
EMB. 771 C.Y.
EXC. UNCL. 2442 C.Y.
O.H. 7440 STA. YDS
O.H. 15950 STA. YDS
RIP RAP
TYPICAL SEC. NO. 2
SEC. 1.
SEC. 6.
SEC. 12. T.24N. R.59E.
SEC. 7. T.24N. R.60E.
EQUATION
STA. 180+00.0 END S-361(4)
STA. 180+00 END U.S.W.P.H.P.NO. WPSO 361-A
STA. 180+00 BEGIN N.R.S 327
EMB. 2118 C.Y.
EXC. UNCL. 2118 C.Y.
PLAN
PROFILE
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
GRADES CHECKED
BRIDGE NO.
STRUCTURE NOTATIONS CHKD.
NOTE BOOK
NO.
BY
DATE

APPENDIX D: BRIDGE INSPECTION REPORT

Fairview – West (Phase I)

FINAL Existing and Projected Conditions Report

June 14, 2016

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

S00201069+03001

Location : FAIRVIEW Structure Name: none

General Location Data

District Code, Number, Location : **04 Dist 4 GLENDIVE**
County Code, Location : **083 RICHLAND**
Kind fo Hwy Code, Description : **3 3 State Hwy**
Str Owner Code, Description : **1 State Highway Agency**
Intersecting Feature : **USRS CANAL**
Structure on the State Highway System : [X]
Structure on the National Highway System : [ ]
Str Meet or Exceed NBIS Bridge Length : [X]
Latitude : **47°51'23"**
Longitude : **104°02'56"**

MDT Maintenance Section : **43-11 Sidney**
Division Code, Location : **43 MILES CITY**
City Code, Location : **25300 FAIRVIEW**
Signed Route Number : **00201**
Maintained by Code, Description : **1 State Highway Agency**
Kilometer Post, Mile Post : **111.60 km 69.35**

Traffic Data

Current ADT : **940** ADT Count Year : **2009** Percent Trucks : **4 %**

Construction Data

Construction Project Number : **NRS 327 U2**
Construction Station Number : **247+85.00**
Construction Drawing Number : **1215**
Construction Year : **1934**
Reconstruction Year :

Structure Loading, Rating and Posting Data

Loading Data :

Design Loading :		**2 M 13.5 (H 15)**
Inventory Load, Design :	**14.1 mton**	**2 AS Allowable Stress**
Operating Load, Design :	**24.9 mton**	**2 AS Allowable Stress**
Posting :		**5 At/Above Legal Loads**

Rating Data :

	Operating	Inventory	Posting
Truck 1 Type 3 :	**21.35**	**12.1**	
Truck 2 Type 3-S3 :	**32.24**	**18.26**	
Truck 3 Type 3-3 :	**41.49**	**23.5**	

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data :

Structure Length : **15.54 m**
Deck Area : **118.00 m sq**
Deck Roadway Width : **7.32 m**
Approach Roadway Width : **6.70 m**
Median Code, Description : **0 No median**

Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : **99.99 m**
Reference Feature for Vertical Clearance : **N Feature not hwy or RR**
Vertical Clearance Under the Structure : **0.00 m**
Reference Feature for Lateral Underclearance : **N Feature not hwy or RR**
Minimum Lateral Under Clearance Right : **0.00 m**
Minimum Lateral Under Clearance Left : **0.00 m**

Span Data

Main Span

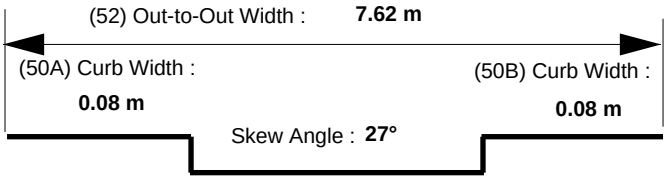
Number Spans : **3**
Material Type Code, Description : **7 Wood or Timber**
Span Design Code, Description : **2 Stringer/Multi-beam or Girder**

Deck

Deck Structure Type : **8 Wood or Timber**
Deck Surfacing Type : **6 Bituminous**
Deck Protection Type : **0 None**
Deck Membrain Type : **0 None**

Approach Span

Number of Spans : **0**
Material Type Code, Description :
Span Design Code, Description :



Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Name	Inventory Route	South, West or Bi-directional Travel			North or East Travel		
		Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	P00201	Both	99.99 m	6.70 m	N/A		
SECONDARY 201							

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

S00201069+03001

Continue

Inspection Data

Sufficiency Rating : **51.8**
Structure Status : **Not Deficient**

Inspection Due Date : 05 December 2016
(91) Inspection Frequency (months) : **24**

NBI Inspection Data

(90) Date of Last Inspection : 11 December 2014
Last Inspected By : Jeff Schmidt - 2089
(90) Inspection Date :
Inspected By :

(58) Deck Rating :	7	(68) Deck Geometry :	4	(36A) Bridge Rail Rating :	0	(62) Culvert Rating :	N
(59) Superstructure Rating :	6	(67) Structure Rating :	4	(36B) Transition Rating :	0	(61) Channel Rating :	7
(60) Substructure Rating :	6	(69) Under Clearance :	N	(36C) Approach Rail Rating :	N	(71) Waterway Adequacy :	9
(72) App Rdwy Align :	6	(41) Posting Status :	A	(36D) End Rail Rating :	0	(113) Scour Critical :	5

Unrepaired Spalls : 0 m sq
Deck Surfacing Depth : 11.00 in

Inspection Hours

Crew Hours for inspection :	1.5	Snooper Required :	N
Helper Hours :	-1	Snooper Hours for inspection :	-1
Special Crew Hours :	-1	Flagger Hours :	-1
Special Equipment Hours :	-1		

Inspection Work Candidates

Candidate ID	Date Requested	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
D41-FY2009-000011	**18 December 2008**	**Approved**	**High**	M Main	332 Timb Bridge Railing	Repl Elem	

Replace rotten guard rail posts and rail. (photo 2012, 7th post on right/upstream/South side.)

Approved. DRC

Not completed (2014)

Late Reason:
Inspection Date: 12/11/2014

INITIAL ASSESSMENT FORM FOR STRUCTURE :

S00201069+03001

Continue

Element Inspection Data

*** * * * * * * * * * Span : Main-0 - -1 * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 32 - Timber Deck/AC Ovly 1 5/8 x 3 1/2 inch creosote boards on edge										
	1	2	118	sq.m.	X	100	0	0	0	
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - New plant mix and chip seal on bridge and roadway.	LZEP
12/05/2012 - entire bridge has new blade patch(photo). TH	GVHZ
12/27/2010 - None	FDEG
12/17/2008 - Deckk snow packed.	SZBR
11/06/2006 - Deck has some rutting. (15.54 X 7.62 = 118.415)	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - None	HAAI
12/01/1998 - None	BLHH
10/03/1996 - None	EXDL
10/01/1994 - None	REFI

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 111 - Timber Open Girder Span 1 and 3 = 10, 4 x 17inch plus 4, 6 x 17 inch and Span 2 = 10, 7 3/4 x 17 inch creosote beams										
	1	1	186	m.		90	10	0	0	
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - For widening purposes there are double girders. Span 1 and 2 (14 total girders) have 2 and 3 and 12 and 13 that are doubled. Span 2 (15 total girders) 2 and 3 and 13 and 14 doubled. Span 2 G7 has side by side replacement on north side.	LZEP
12/05/2012 - Span 2 G7 is 10" x 17" replacement for broken G8(photo). TH	GVHZ
12/27/2010 - None	FDEG
12/17/2008 - REVISION: Span1, 7th LT split, 3rd LT split. General moderate checks.	SZBR
11/06/2006 - Revision: Some beams have checks. SPAN 1: 7th RT has a diagonal crack, 8th RT has a horizontal crack, 3rd LT has some section loss. SPAN 2 and 3 RT outside has some section loss.	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - Same as the last report. Also the 6th from the Rt. in span 2 has a diagonal crack.	HAAI
12/01/1998 - Span# 1 6th rt diagonal crack 7th rt horizontal crack 3rd lt broke. Span #2 rt outside broken. Span #3 rt outside broke with rot starting, Lt outside horizontal crack.	BLHH
10/03/1996 - None	EXDL
10/01/1994 - None	REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

S00201069+03001

Continue

*** * * * * * * * * *** Span : **Main-0 - -1 (cont.) * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 206 - Timber Column Abut 1 = 4, Bent 2 = 4, Bent 3 = 4, Abut 4 = 4										
	1	2	16	ea.		50	50	0	0	
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - Bent 2 P1-P4 all show weathereing with heavy checking. Bent 3 P1-P4 all have heavy checks and weathering.	LZEP
12/05/2012 - Abut 1 P5 and Abut 4 P1 are not visible for inspection and are not included in quantity. TH	GVHZ
12/27/2010 - None	FDEG
12/17/2008 - Surface abrasion, moderate checks. Middle bent pile when struck sound hollow, no deformation.	SZBR
11/06/2006 - None	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - same as the last report. Also all the center piling have ice abrasion and surface rot.	HAAI
12/01/1998 - Piling @ center bents are weatherd with deep vertical cracks.	BLHH

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 216 - Timber Abutment 1 / West and 4 / East each have 3 x 12 inch creosote plank										
	1	2	15	m.		90	10	0	0	
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - Abut 1 has structural material coming through backwall between north end to past P2 for 3'.	LZEP
12/05/2012 - both abutments are mostly buried, can only see 1 plank each. TH	GVHZ
12/27/2010 - Abut 1 left has a split plank. TH	FDEG
12/17/2008 - None	SZBR
11/06/2006 - None	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - The berms are washing out from both abutments. At abutment 4 there is 1' diameter hole washed from under the backing planks.	HAAI
12/01/1998 - None	BLHH
10/03/1996 - None	EXDL
10/01/1994 - None	REFI

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 231 - Paint Stl Cap Painted steel cap for widening 42inlong x 12inwide x 3indeep 4 caps x 2 per side										
	1	3	9	m.		90	0	0	10	0
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - I inserted this element 2014. The cap extensions show freckled rust with pitting and section loss. Paint system has failed. Placed 10 percent in state 4 and left 90 percent in state 1.	LZEP

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

S00201069+03001

Continue

*** * * * * * * * * *** Span : **Main-0 - -1 (cont.) * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 235 - Timber Cap Abuts 1 thru 4 each have 12 inch square creosote beam										
	1	1	28	m.		90	10	0	0	
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - Abut 1 heavy horizontal checking. The caps have been extended both sides with painted steel C channel 12"wide by 3" depth with 42" length that all show rusting/pitting with section loss. Added a new elemement for the steel cap extensions.	LZEP
12/05/2012 - None	GVHZ
12/27/2010 - changed from 55,45 to 90,10 percent. Ends of caps have 8, 3 x 12 1/4 x 35 inch painted steel channel iron extensions(photos). TH	FDEG
12/17/2008 - Heavy checked timber.	SZBR
11/06/2006 - None	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - Same as the last report.	HAAI
12/01/1998 - cap abut 1 has deep horizontal crack(checking. TH 12/6/12) full length. Cap bent 3 has vertical crack(checking. TH 12/6/12) at pinline.	BLHH
10/03/1996 - None	EXDL
10/01/1994 - None	REFI

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 332 - Timb Bridge Railing painted wood 2 1/2 inch x 7 1/4 inch rail with 7 1/4 inch posts, unpainted 5 1/2w x 11 1/4 inch curb										
	1	2	31	m.		55	30	15		
						%	%	%	%	%

Previous Inspection Notes :

12/11/2014 - Post 7 left cracked through, post 7 right cracked/rotted through, post 6 right split in half.	LZEP
12/05/2012 - (photo) rail and 7th post right side is rotten with section loss. TH	GVHZ
12/27/2010 - None	FDEG
12/17/2008 - None	SZBR
11/06/2006 - None. (15.54 X 2 = 31.08)	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - Same as the last report.	HAAI
12/01/1998 - Cracked & rotting rail planks. Rail posts are rotting at bottoms.	BLHH
10/03/1996 - None	EXDL
10/01/1994 - None	REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

S00201069+03001

Continue

General Inspection Notes

12/11/2014 - MDT inspection West to east. Flow downstream to the north. Hazards up and in fair condition.	LZEP
12/05/2012 - bridge was previously widened on both sides. 2 1/2 inch steel utility line is on right side. TH	GVHZ
12/27/2010 - 8' underclearance to bottom of channel. Original concrete Abutments are still in place, upstream/South/right side of bridge(photos). TH	FDEG
12/17/2008 - None	SZBR
11/06/2006 - None	ZYDE
02/14/2005 - None	RCCZ
05/19/2003 - None	CPEM
01/04/2001 - Same as the last report.	HAAI
12/01/1998 - In vertical curve. Berms are scouring out at both abutments.	BLHH
10/03/1996 - Sufficiency Rating Calculation Accepted by ops$u5963 at 11/17/97 14:06:04 OPS$U5963 inspection comments - Structure S00201069+03001 - Date 10/3/96 - Previous comments > Sufficiency Rating Calculation Accepted by ops$u5963 at 3/11/97 10:11:57 Sufficiency Rating Calculation Accepted by ops$u5963 at 3/11/97 09:55:01 Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 15:03:02	EXDL
10/01/1994 - Sufficiency Rating Calculation Accepted by ops$u5963 at 3/11/97 10:11:57 Sufficiency Rating Calculation Accepted by ops$u5963 at 3/11/97 09:55:01 Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 15:03:02	REFI
01/01/1993 - Updated with tape 1994	NB94
03/01/1991 - Updated with tape 1993	NB93
02/01/1989 - Updated with tape 1991	NB91
02/01/1987 - Updated with tape 1989	NB89
01/01/1985 - Updated with tape 1986	NB86
01/01/1983 - Updated with tape 1984	NB84
12/01/1980 - Updated with tape 1983	NB83
01/01/1979 - Updated with tape 1980	NB80

Inspection Photos

S00201069+03001

Location FAIRVIEW Stucture Name: none

Looking East At Approach

Right Side Post 7 Rail Rot

Looking East App

Notes

None

Rt Rail P7 Rot

Notes

None

Inspection Photos

S00201069+03001

Location FAIRVIEW Stucture Name: none

Looking West Abut 1 Checking

Span 2 G 7 Replaced

Looking W Abut1

Notes

None

Span 2 G7 Replace

Notes

None

Inspection Photos

S00201069+03001

Location FAIRVIEW Stucture Name: none

Looking North Profile

Metal Bridge Extensions

Looking N Profile

Notes

None

Bridge Extension

Notes

None

APPENDIX E: MT 201/MT 200 LOS ANALYSIS

Fairview – West (Phase I)

FINAL Existing and Projected Conditions Report

June 14, 2016

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	20	232	2	0	152	29	43	5	12	2	3	0
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	17.67	0.00	0.00	17.76	41.38	46.51	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	239	2	0	157	30	42	5	12	2	3	0
Peak Hour Factor	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	69	1	0	45	9	12	1	3	1	1	0
Total Analysis Volume [veh/h]	24	275	2	0	181	35	48	6	14	2	3	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.85	0.82	0.56	0.54	0.36	0.02
95th-Percentile Queue Length [ft]	21.29	20.62	14.09	13.58	8.93	0.55
Approach Delay [s/veh]	9.46		8.89		9.33	8.32
Approach LOS	A		A		A	A
Intersection Delay [s/veh]	9.23					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	14	159	5	1	304	24	20	2	10	1	6	1
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	13.21	0.00	0.00	15.79	29.17	50.00	0.00	20.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	164	5	1	313	25	20	2	10	1	6	1
Peak Hour Factor	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	48	1	0	92	7	6	1	3	0	2	0
Total Analysis Volume [veh/h]	16	192	6	1	366	29	23	2	12	1	7	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.55	0.54	1.15	1.12	0.19	0.04
95th-Percentile Queue Length [ft]	13.83	13.51	28.69	28.03	4.74	1.00
Approach Delay [s/veh]	8.88		9.69		9.16	8.31
Approach LOS	A		A		A	A
Intersection Delay [s/veh]	9.37					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	20	232	2	0	152	29	43	5	12	2	3	0
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	17.67	0.00	0.00	17.76	41.38	46.51	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	239	2	0	157	30	42	5	12	2	3	0
Peak Hour Factor	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681	0.8681
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	69	1	0	45	9	12	1	3	1	1	0
Total Analysis Volume [veh/h]	24	275	2	0	181	35	48	6	14	2	3	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.85	0.82	0.56	0.54	0.36	0.02
95th-Percentile Queue Length [ft]	21.29	20.62	14.09	13.58	8.93	0.55
Approach Delay [s/veh]	9.46		8.89		9.33	8.32
Approach LOS	A		A		A	A
Intersection Delay [s/veh]	9.23					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	14	159	5	1	304	24	20	2	10	1	6	1
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	13.21	0.00	0.00	15.79	29.17	50.00	0.00	20.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	164	5	1	313	25	20	2	10	1	6	1
Peak Hour Factor	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547	0.8547
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	48	1	0	92	7	6	1	3	0	2	0
Total Analysis Volume [veh/h]	16	192	6	1	366	29	23	2	12	1	7	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.55	0.54	1.15	1.12	0.19	0.04
95th-Percentile Queue Length [ft]	13.83	13.51	28.69	28.03	4.74	1.00
Approach Delay [s/veh]	8.88		9.69		9.16	8.31
Approach LOS	A		A		A	A
Intersection Delay [s/veh]	9.37					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	41.3
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	20	232	2	0	152	29	43	5	12	2	3	0
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	17.67	0.00	0.00	17.76	41.38	46.51	0.00	0.00	0.00	0.00	0.00
Growth Rate	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	73	832	7	0	546	104	146	17	42	7	10	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	226	2	0	148	28	40	5	11	2	3	0
Total Analysis Volume [veh/h]	79	904	8	0	593	113	159	18	46	8	11	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	12.91	12.32	5.79	5.52	2.49	0.13
95th-Percentile Queue Length [ft]	322.69	307.93	144.68	137.93	62.23	3.36
Approach Delay [s/veh]	58.10		26.04		17.28	11.52
Approach LOS	F		D		C	B
Intersection Delay [s/veh]	41.28					
Intersection LOS	E					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	71.7
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	14	159	5	1	304	24	20	2	10	1	6	1
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	13.21	0.00	0.00	15.79	29.17	50.00	0.00	20.00	0.00	0.00	0.00
Growth Rate	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48	3.48
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	49	571	17	3	1089	87	70	7	35	3	21	3
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	155	5	1	296	24	19	2	10	1	6	1
Total Analysis Volume [veh/h]	53	621	18	3	1184	95	76	8	38	3	23	3
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	4.95	4.81	21.43	20.79	1.00	0.19
95th-Percentile Queue Length [ft]	123.86	120.17	535.85	519.84	25.12	4.73
Approach Delay [s/veh]	22.36		105.33		13.09	10.86
Approach LOS	C		F		B	B
Intersection Delay [s/veh]	71.73					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	109.6
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	20	232	2	0	152	29	43	5	12	2	3	0
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	17.67	0.00	0.00	17.76	41.38	46.51	0.00	0.00	0.00	0.00	0.00
Growth Rate	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	91	1035	9	0	680	130	182	22	52	9	13	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	281	2	0	185	35	49	6	14	2	4	0
Total Analysis Volume [veh/h]	99	1125	10	0	739	141	198	24	57	10	14	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	27.08	26.24	10.75	10.23	3.79	0.18
95th-Percentile Queue Length [ft]	676.95	656.10	268.74	255.84	94.87	4.51
Approach Delay [s/veh]	174.39		49.40		21.31	12.06
Approach LOS	F		E		C	B
Intersection Delay [s/veh]	109.60					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 1: MT 200 - MT 201

Control Type:	All-way stop	Delay (sec / veh):	172.2
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	MT 200			MT 200			MT 201			MT 201		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	MT 200			MT 200			MT 201			MT 201		
Base Volume Input [veh/h]	14	159	5	1	304	24	20	2	10	1	6	1
Base Volume Adjustment Factor	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	0.9800	0.9800	0.9800	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	13.21	0.00	0.00	15.79	29.17	50.00	0.00	20.00	0.00	0.00	0.00
Growth Rate	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	61	710	22	4	1355	108	87	9	43	4	26	4
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	193	6	1	368	29	24	2	12	1	7	1
Total Analysis Volume [veh/h]	66	772	24	4	1473	117	95	10	47	4	28	4
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	8.89	8.58	41.79	41.07	1.39	0.25
95th-Percentile Queue Length [ft]	222.15	214.61	1044.86	1026.82	34.82	6.23
Approach Delay [s/veh]	37.59		263.61		14.34	11.34
Approach LOS	E		F		B	B
Intersection Delay [s/veh]	172.16					
Intersection LOS	F					