

FED. ROAD DIST. NO.	STATE	P. W. A. PROJ. NO.	SHEET NO	TOTAL SHEETS
3	COLO.	245-D-R	1	

Rev. Guard Fence 6-14-37 J.P.K.

INDEX OF SHEETS

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COLORADO STATE HIGHWAY DEPARTMENT

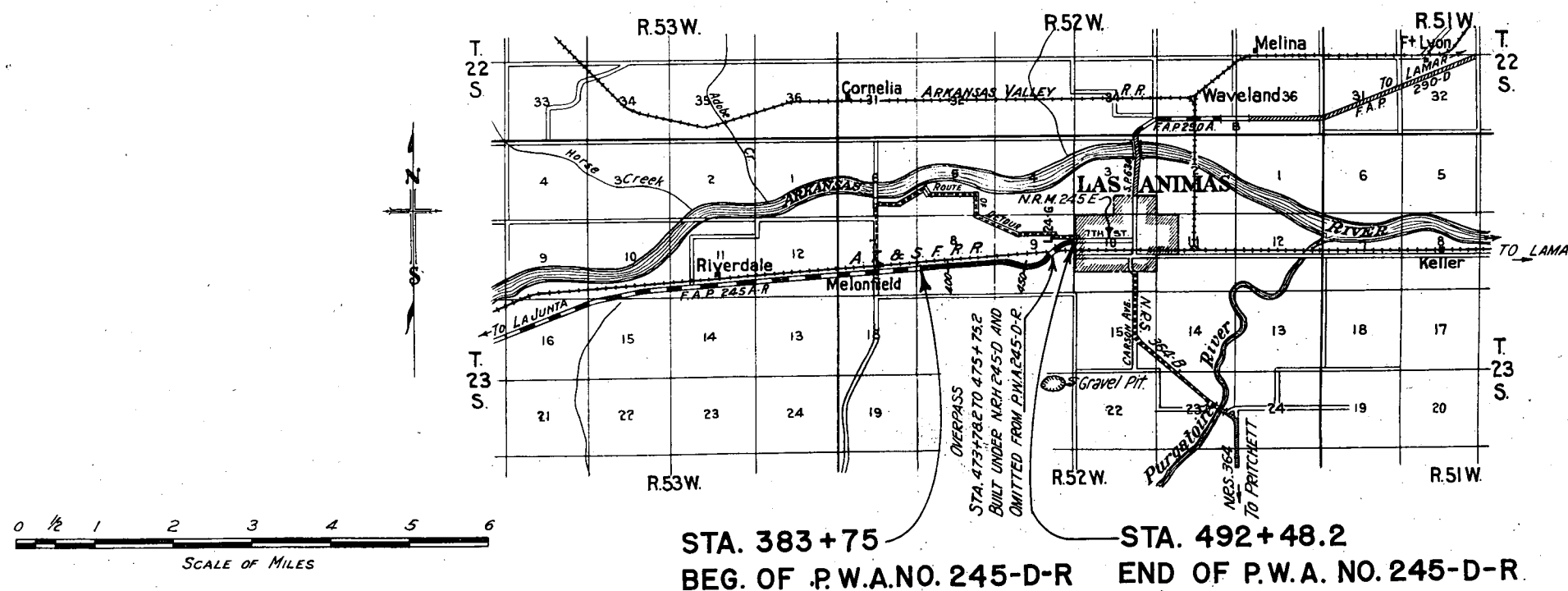
PLAN AND PROFILE OF PROPOSED P. W. A. DOCKET COLO. 804-D PROJECT NO. 245-D-R STATE HIGHWAY NO. 650 BENT COUNTY

SCALES OF ORIGINAL TRACINGS

ON PLAN, 1 IN. = 100 FT.
 ON PROFILE 1 IN. = 100 FT. HORIZONTAL
 1 IN. = 10 FT. VERTICAL
 GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD
 GROSS LENGTH OF PROJECT 10,910.4 FEET = 2.066 MILES
 NET LENGTH OF PROJECT 10,713.4 FEET = 2.029 MILES

CONVENTIONAL SIGNS

CENTER LINE OF SURVEY
 RIGHT OF WAY LINE
 TOWNSHIP LINE
 SECTION LINE
 ONE QUARTER SECTION LINE
 BARBED WIRE FENCE
 RAILROAD TRACKS
 POLE LINE
 COMBINATION WIRE FENCE



STA. 383+75
 BEG. OF P.W.A. NO. 245-D-R
 STA. 492+48.2
 END OF P.W.A. NO. 245-D-R

NOTE

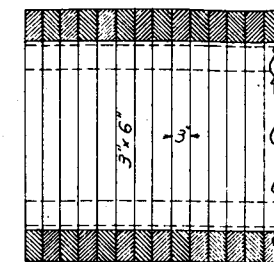
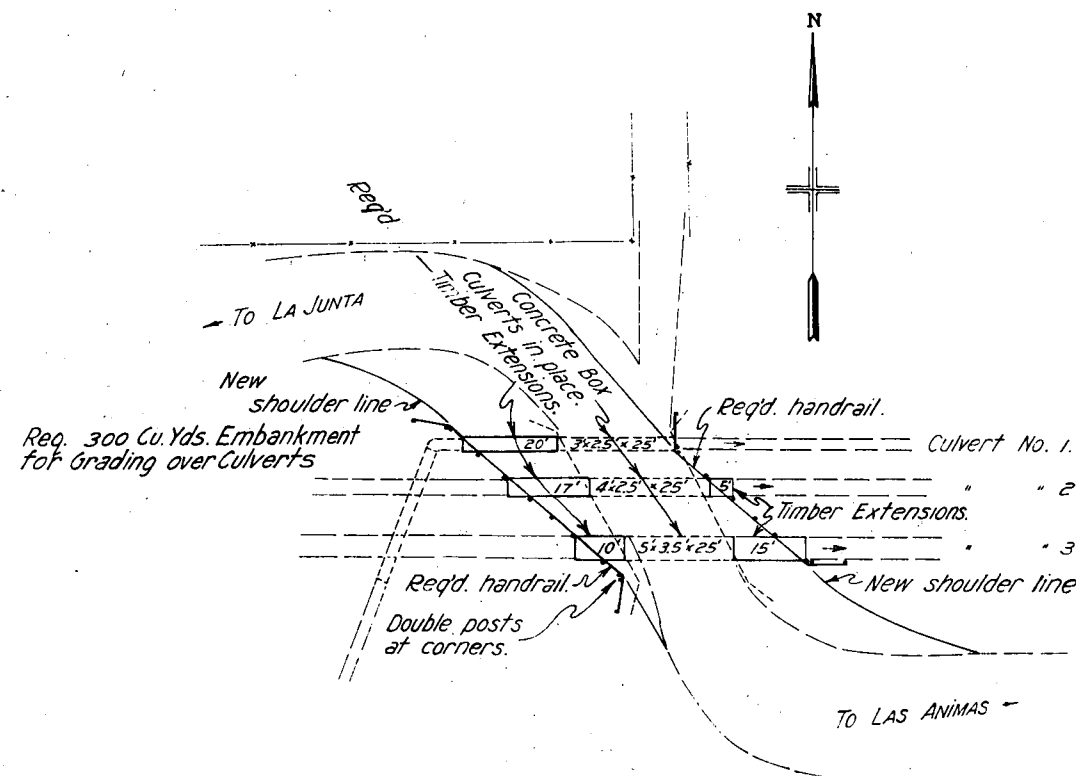
It is recommended that the bidders on this Project go over the plan details with one of the following field representatives of this department:

James D. Bell Div. Engr. Pueblo
 J.A. Salmonson Res. Engr. Las Animas

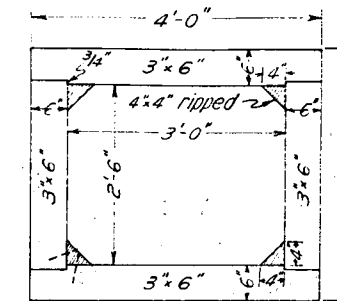
RECOMMENDED FOR APPROVAL
 J.A. Salmonson ASSISTANT ENGINEER
 APPROVED
 Charles D. Vane STATE HIGHWAY ENGINEER
 RECOMMENDED FOR APPROVAL
 DIST. ENG. BUREAU PUBLIC ROADS
 RECOMMENDED FOR APPROVAL
 CHIEF ENG. BUREAU PUBLIC ROADS
 APPROVED
 DIRECTOR BUREAU PUBLIC ROADS

DETOUR REQUIREMENTS

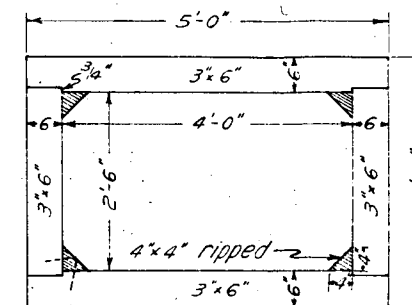
ED. ROAD DIST. NO.	STATE	P. W. A. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	245-D-R	3	



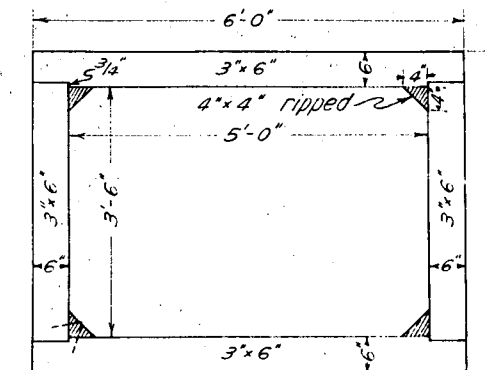
SIDE VIEW OF CULVERTS
No. 1, 2, & 3.



END VIEW OF CULVERT NO. 1.



END VIEW OF CULVERT NO. 2



END VIEW OF CULVERT NO. 3.

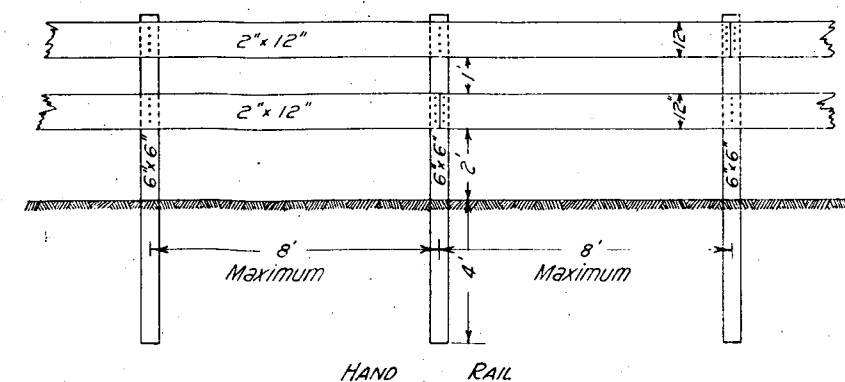
DETOUR IMPROVEMENTS REQUIRED AT A POINT 3.2 MILES FROM WEST END OF DETOUR SHOWN ON TITLE SHEET

GENERAL NOTES FOR CULVERT EXTENSIONS

- All timber to be treated.
- All side, roof, and floor timbers to be 3"x6".
- All corner fillets to be 4"x4" ripped diagonally.
- Reductions from full sawn material will be permitted up to 3/16" one dimension face only for Misc. Untreated Material.
- NAILING DIRECTIONS**
- Each successive set of timbers to be nailed to the previous set with 50 d nails @ 12" centers - staggered; and 2-50 d nails at each end of each timber.
- Corner fillets to be nailed with 30 d nails @ 6" centers - staggered.

TABULATION OF DETOUR QUANTITIES

LOCATION	REQUIREMENT	MISCELLANEOUS TREATED TIMBER	MISCELLANEOUS UNTREATED TIMBER
		M FT. B M	M FT. B M
On detour as shown on title sheet.	2000 tons Gravel Surfacing to be placed at the approximate rate of 500 tons per mile		
3.2 miles from west end of detour (See title sheet)	Extend Culvert No. 1, 20' west.	1.643	
	" " " 2, 17' " & 5' east.	2.072	
	" " " 3, 10' " " 15' "	2.955	
"	Remove and rebuild 95' handrail.		
"	Build 45' handrail.	.270	.180
"	300 cu. yds. embankment for widening and raising roadway.		
TOTALS		6.940	.180



HAND RAIL

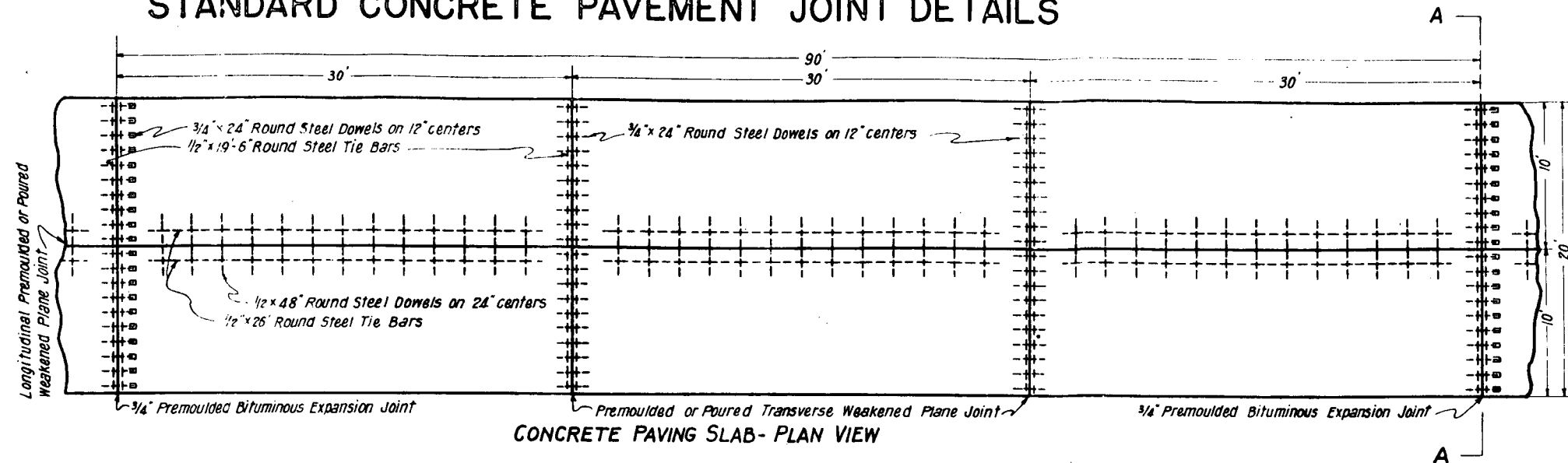
NOTES FOR HANDRAIL

- All posts to be treated timber.
- All rails to be untreated timber. (SISIE)
- " " " painted white with 3 coats of white lead and linseed oil.
- Rails to be nailed to posts with 4-50 d nails at each post, and 4-50 d nails at each end of each rail.

STANDARD CONCRETE PAVEMENT JOINT DETAILS

STANDARD M-8-A

SEE STANDARD M-4-D (SHEET 1) FOR DETAILS OF STANDARD CONCRETE PAVING SECTIONS



GENERAL NOTES

The cost of all dowels, tie bars, metal sleeves and expansion joint material shall be included in the contract unit price per square yard for item 37a- Concrete Pavement.

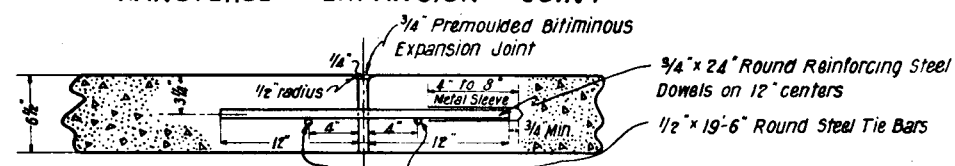
Patented tie bars of approved design may be used in lieu of the 1/2 inch steel tie bars provided for on details.

All bars must be accurately and firmly supported in proper position by means of metal chairs or other devices until concrete has been cured.

Dowel bars must be tied or clipped to tie bars in such manner that the dowels and tie bars remain in parallel positions shown on details.

Dowel bars and tie bars must be assembled in mats at least 10 feet long. The length of tie bars shown on details is the length required for mats assembled in one piece.

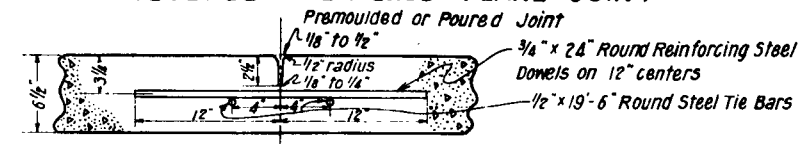
TRANSVERSE EXPANSION JOINT



1/4 inch Premoulded Bituminous Expansion Joints, with steel dowels at 12 inch centers and 2-1/2 inch x 19-6 inch round steel tie bars placed parallel to joint and 4 inches from center at joint, are required to be constructed 90 feet apart perpendicular to center line of pavement.

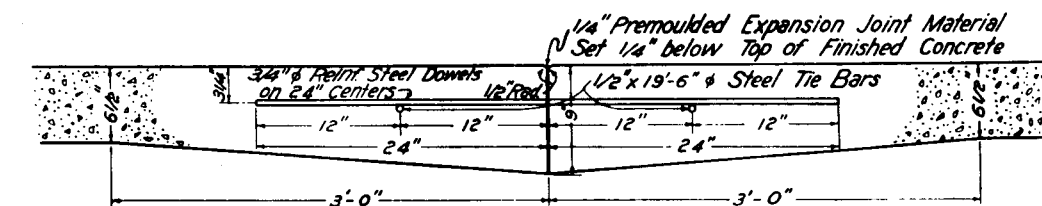
NOTE: The Steel Dowel is to be treated on one half its length to break bond, and the Metal Sleeve is to be placed on the treated part. The oil used in treatment of bars shall have an S.A.E. viscosity rating of not less than 250.

TRANSVERSE WEAKENED PLANE JOINT

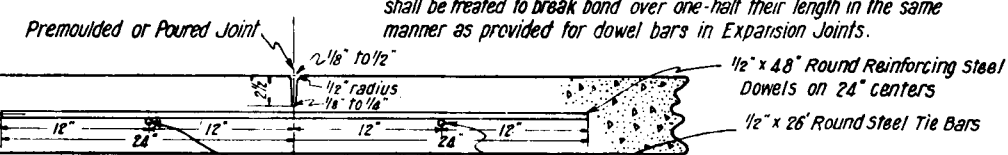


Two Transverse weakened Plane Joints with steel dowels at 12 inch centers and 2-1/2 inch x 19-6 inch round steel tie bars placed parallel to joint and 4 inches from joint, shall be constructed between expansion joints at 30 ft. intervals perpendicular to center line of pavement. Dowel bars in Transverse Weakened Plane Joints shall be treated to break bond over one-half their length in the same manner as provided for dowel bars in Expansion Joints.

LONGITUDINAL EXPANSION JOINT FOR PAVEMENT THICKENED IN CENTER OF SLAB



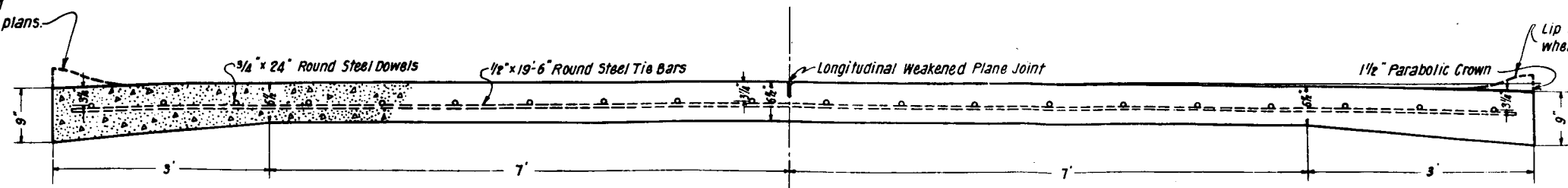
Longitudinal Expansion Joint is to be constructed with steel dowels @ 24 inch centers and 2-1/2 inch x 26 inch steel tie bars placed parallel to joint and 12 inch on either side of the joint. The steel dowels and tie bars shall not be treated to break bond. This type of longitudinal joint shall be used only where the paving slab is thickened in the center.



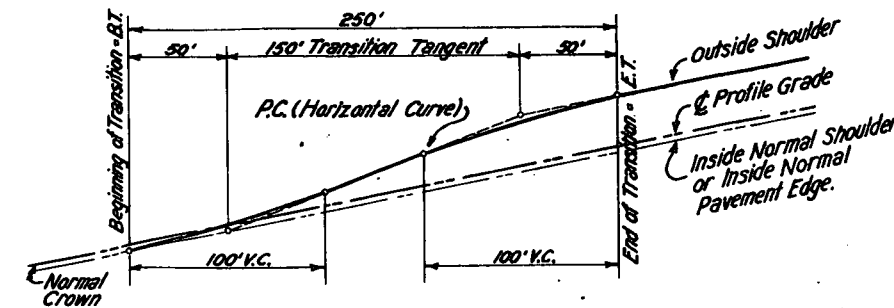
Longitudinal Weakened Plane Joint with steel dowels at 24 inch centers, and 2-1/2 inch x 26 inch round steel tie bars placed parallel to center line and 12 inch from center line of pavement. The Steel Dowels for longitudinal joint shall not be treated to break bond.

LONGITUDINAL WEAKENED PLANE JOINT

Lip Curb to be placed where called for on plans.



VERTICAL SECTION PERPENDICULAR TO CENTERLINE AT A-A



NOTE: CASE I

Diagram illustrating a sag vertical curve with a transition length of 250'. The curve is defined by a parabolic profile grade. Key points and dimensions shown include:

- Beginning of Transition = B.T.** and **End of Transition = E.T.**
- Transition Tangent** length of 150'.
- Segment lengths of 50' from B.T. to the start of the 100' V.C. and 50' from the end of the 100' V.C. to E.T.
- Normal crown** and **Normal Pavement Edge** lines.
- 100' V.C.** (Vertical Curve) segments.
- RCC (Horizontal Curve)** label.
- Outside Shoulder** and **Inside Normal Shoulder or Inside Normal Pavement Edge** labels.

CASE II: COMPOUND CURVE

The diagram illustrates the geometry of a transition curve. Key features include:

- Horizontal Curve:** A dashed line representing the horizontal alignment, consisting of a Normal Crown, a P.R.C. (Horizontal Curve), and another Normal Shoulder.
- Profile Grade:** A solid line showing the vertical profile of the road, which transitions from the Normal Crown to the P.R.C. and back to the Normal Shoulder.
- Labels and Dimensions:**
 - Normal Crown:** The initial section of the road.
 - P.R.C. (Horizontal Curve):** The main curve section.
 - Transition Tangent:** The section where the profile grade transitions from the Normal Crown to the P.R.C.
 - Transition Tangent (100' for curve of shorter radius):** A note indicating the length of the transition tangent for shorter radius curves.
 - Dimensions:** Various lengths are marked, including $1.5x + 1.5y + 20'$ for the Minimum Transition, x , y , $1/2 x$, $1/2 y$, $x' - V.C.$, and $y' - V.C.$.
 - Other Labels:** B.T. (Beginning of Transition), E.T. (End of Transition), and Inside Normal Shoulder or Inside Normal Pavement Edge.

CASE III: REVERSE CURVES

EXAMPLE: Let a represent the amount of superelevation on 1st curve;
 b " " " " 2nd " ;
 x " " " " transition tangent on 1st " ;
 y " " " " " 2nd " ;
 then, $a:b = x:y$.

GENERAL NOTES

The normal inside edge of the Pavement slab is to remain at the standard elevation of 0.125 ft. below the profile grade, and the outside edge of the slab is to be super-elevated at the rate per foot width of roadway given in the table. The Section is to be rotated about the normal inside edge of the Pavement, with a 1% parabolic crown for curves of 10° and under, and a flat crown for widened Sections.

The normal inside edge of the Graded or Surfaced Section is to remain at the standard elevation of 0.02 ft per foot width of roadway below the profile grade, or as shown on the Typical Section for the Project. Also, the centerline pivot point is to be used until the superelevation equals 0.02 ft per foot width of roadway, but when this elevation is exceeded the normal inside shoulder pivot point is to be used.

When the degree of curvature exceeds 10°, the inside edge of the Pavement slab or the inside shoulder of the Graded or Surfaced Section is to be widened from the normal inside edge or shoulder, respectively, as shown by the table and plan or by cross-sections. Curves of 10° or less are not to be widened.

The slope of the shoulders and widened sections shall conform to the rate per foot width of roadway required, except that the inside shoulder of paved sections shall maintain the Typical Section slope until this slope is exceeded by the required superelevation slope.

The outside ditch on superelevated Sections is to be modified, where necessary to provide drainage. Otherwise, this ditch shall conform to normal ditch section shown for Project.

The rate of superelevation per foot width of roadway to be applied at the outside shoulder of the roadway is computed as follows:

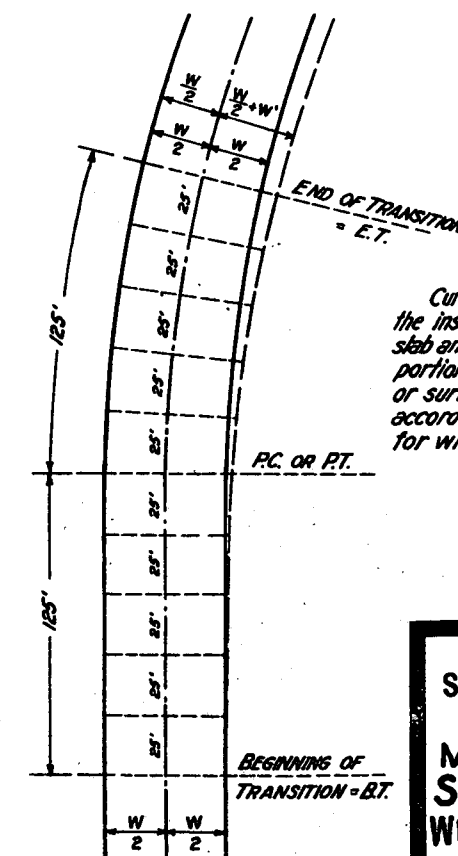
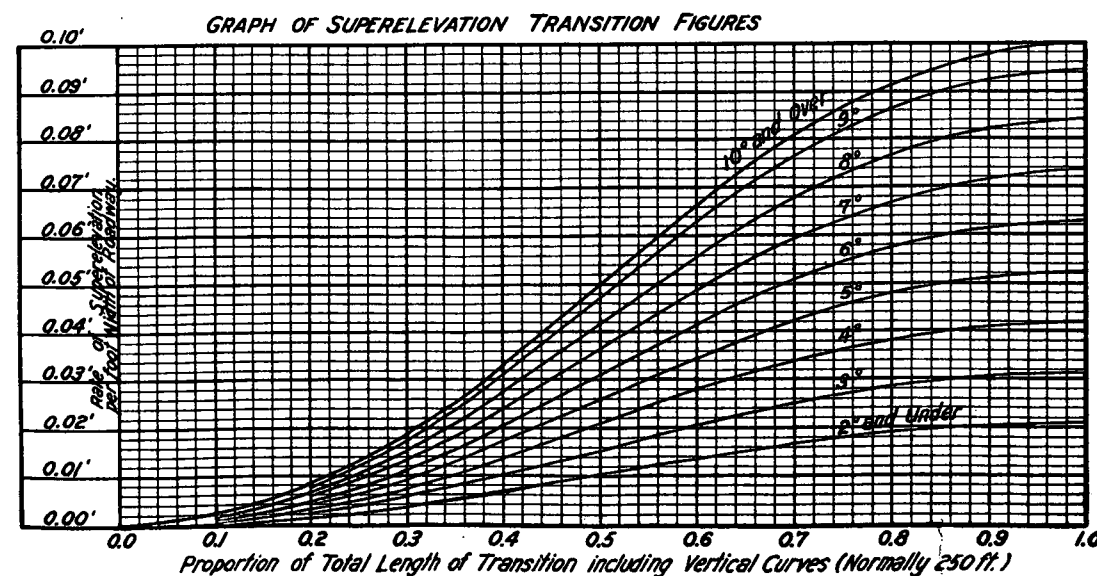
The full superelevation per foot width of roadway rate for a given degree of curvature is:

0.0105 ft. x Degree of Curvature.

The maximum superelevation of 0.10 ft. per foot width, applying to curves of 10° and over, is not to be exceeded.

Special transition problems not covered by this standard sheet shall be covered by appropriate notes included with curve data on plans.

DISTANCE FROM B.T. (PROPORTION)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	Max. 1.0
Degree of Curvature	RATE OF SUPERELEVATION (IN FEET) PER FOOT WIDTH OF ROADWAY									
2° and Under	0.00044	0.00175	0.00394	0.00700	0.01050	0.01400	0.01706	0.01925	0.02066	0.02100
3°	0.00066	0.00263	0.00591	0.01050	0.01575	0.02100	0.02559	0.02888	0.03084	0.03150
4°	0.00088	0.00350	0.00788	0.01400	0.02100	0.02800	0.03413	0.03850	0.04113	0.04200
5°	0.00109	0.00438	0.00984	0.01750	0.02625	0.03500	0.04266	0.04819	0.05141	0.05250
6°	0.00131	0.00525	0.01181	0.02100	0.03150	0.04200	0.05119	0.05775	0.06169	0.06300
7°	0.00153	0.00613	0.01378	0.02450	0.03675	0.04900	0.05972	0.06738	0.07197	0.07350
8°	0.00175	0.00700	0.01575	0.02800	0.04200	0.05600	0.06825	0.07700	0.08225	0.08400
9°	0.00197	0.00788	0.01772	0.03150	0.04725	0.06300	0.07678	0.08663	0.09253	0.09450
10° and Over	0.00208	0.00833	0.01875	0.03333	0.05000	0.06667	0.08125	0.09166	0.09792	0.10000
	OFFSETS FOR WIDENING - W' - (IN FEET)									
Over 10° - Under 12°	0.03	0.12	0.27	0.48	0.75	1.08	1.47	1.92	2.43	3.00
" 12° - " 15°	0.04	0.16	0.36	0.64	1.00	1.44	1.96	2.56	3.24	4.00
" 15° - " 20°	0.05	0.20	0.45	0.80	1.25	1.80	2.45	3.20	4.05	5.00
" 20° - "	0.06	0.24	0.54	0.96	1.50	2.16	2.94	3.84	4.86	6.00



Curves of over 10° are to have the inside portion of the pavement slab and shoulder, or the inside portion and shoulder in a graded or surfaced section, widened in accordance with the plan, offsets for widening, and cross sections.

GENERAL PLAN OF WIDENING

**COLORADO
STATE HIGHWAY DEPARTMENT.
STANDARD
METHODS FOR
SUPERELEVATION &
WIDENING OF CURVES**

Designed by <i>REL</i>	Approved by <i>J. Marshall</i>
Made by <i>R.B.B.</i>	
Checked by <i>F.S.A.</i>	Date: <i>FEB 23rd 1937</i>

Diagram illustrating the construction and placement of a standard road barricade:

- Top Sign:** A shield-shaped sign with "ROAD 65" and "DE 72ND" below it.
- Directional Sign:** A rectangular sign with an arrow pointing right.
- Warning Sign:** A diamond-shaped sign that says "ROAD CLOSED".
- Barricade Structure:** A series of rectangular blocks with alternating black and white stripes.
 - Top width: 10"
 - Bottom width: 20"
 - Height: 4'-0" Min.
 - Material: 1" x 12" pointed with 8" white stripes.
 - Placement: Barricade may be set on standards instead of set in ground. See sketch.
 - Postage: 6" x 6" posts pointed white. Minimum spacing of posts to be 8'-0".
- Annotations:**
 - Left side: "Length necessary to close shoulders borrow pit. To be bolted so as to be detachable for use as a by pass for construction machinery."
 - Right side: "Length necessary to close shoulders and borrow pit."
 - Bottom: "Barricade to be of sufficient length to entirely close road surface."
- General Note:** "All standard signs on barricade except reflectorized sign will be furnished by the Department."

Posts to be 6"x6" painted white. Base and brace to be 2"x6", painted white, and nailed with 12d nails. Base to be weighted if necessary for stability.

**SIGN REQUIRED ON
ALL P.W.A. PROJECTS**

Sign to be made on 1" material with at least three cleats on back. Background to be white, letters to be black. Sign to be placed on two 4"x4"x10' posts set 4ft. in the ground. One sign is required to be located at each end of each unit of construction.

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Rev. 5-3-37-S.B.L.-W.P.A. Signs

[illegible]

This Distance to be governed by the maximum day and night visibility which is influenced by grade, curvature, interference of local signs, shrubbery, fences, etc.

Exact location is to be staked by the Engineer, but in no case shall it be more than 8 feet from the travelled zone.

8'±

Diagram of a rectangular sign with the following dimensions and layout:

- Overall Dimensions:** 3'4" high by 5'0" wide.
- Text Layout:**
 - SLOW:** Large, bold, black letters, underlined. Height: 4".
 - ROAD UNDER CONSTRUCTION:** Large, bold, black letters. Height: 6".
 - CONTRACTOR'S NAME:** Smaller, black letters. Height: 3".
- Spacing and Margins:**
 - Vertical spacing between 'SLOW' and 'ROAD UNDER CONSTRUCTION' is 5".
 - Vertical spacing between 'ROAD UNDER CONSTRUCTION' and 'CONTRACTOR'S NAME' is 6".
 - Horizontal spacing between 'SLOW' and 'ROAD UNDER CONSTRUCTION' is 1'3".
 - Horizontal spacing between 'ROAD UNDER CONSTRUCTION' and 'CONTRACTOR'S NAME' is 1'3".
 - Horizontal spacing between 'SLOW' and 'CONTRACTOR'S NAME' is 1'3".

Contractor shall be required to have at least two such arrows for use on barricades at the ends of each project.

Reflector Buttons shall be of a type and size, and the sign shall be subject to Department approval.

The diagram illustrates the cross-section of a road with a 40' vertical curve. The left side is a 1/2 CUT SECTION with a 20' shoulder and a 0.0% grade. The right side is a 1/2 FILL SECTION with a 20' shoulder and a 2% grade. Both sections are labeled 'Not steeper than 8%'.

The diagram illustrates a vertical curve design for a road. It is divided into two main sections: a 'CUT SECTION' at the top and a 'FILL SECTION' at the bottom. Both sections show a 30' vertical curve with a 10% grade. The cut section includes a 40' vertical curve with a 20' shoulder and a 20' section. The fill section includes a 30' vertical curve with a 10% grade. Slopes are indicated as 'Not steeper than 8%' and '0.0%'. The diagram also shows the 'Shoulder Line' and 'CUT SECTION' labels.

TYPICAL METHOD OF MARKING HIGHWAY UNDER CONSTRUCTION
TRAFFIC PERMITTED ON ROAD UNDER CONSTRUCTION

The diagram illustrates the typical method of marking a highway under construction, showing various traffic signs and road conditions. The road is divided into sections with different markings and signs:

- Left Section:**
 - Stretch of Fresh Gravel - Road:** Marked with "Loose Gravel" signs.
 - Loose Gravel:** Marked with "Loose Gravel" signs.
 - Permanent Detour Arrows:** Marked with "Permanent Detour Arrows" signs.
 - Bridge Out - Traffic Using Detour Around Structure:** Marked with "Bridge Out - Traffic Using Detour Around Structure" signs.
 - Detour Arrows:** Marked with "Detour Arrows" signs.
 - Slow:** Marked with "Slow" signs.
 - Turn:** Marked with "Turn" signs.
 - Slow:** Marked with "Slow" signs.
- Middle Section:**
 - UNDER CONSTRUCTION:** Marked with "UNDER CONSTRUCTION" signs.
 - Placing C.M.P. Traffic Using Shoulders:** Marked with "Placing C.M.P. Traffic Using Shoulders" signs.
 - New Grade, Traffic Travelling in Borrow Pits:** Marked with "New Grade, Traffic Travelling in Borrow Pits" signs.
 - Detour Arrows:** Marked with "Detour Arrows" signs.
 - Slow:** Marked with "Slow" signs.
 - New Grading:** Marked with "New Grading" signs.
 - Slow:** Marked with "Slow" signs.
- Right Section:**
 - Soft Shoulders:** Marked with "Soft Shoulders" signs.
 - Road Under Construction:** Marked with "Road Under Construction" signs.
 - Slow:** Marked with "Slow" signs.
 - New Gravel, Compact But Shoulders Soft:** Marked with "New Gravel, Compact But Shoulders Soft" signs.

The diagram also shows various road conditions and signs, including "Road Under Construction", "Loose Gravel", "Stretch of Fresh Gravel - Road", "Loose Gravel", "Permanent Detour Arrows", "Bridge Out - Traffic Using Detour Around Structure", "Detour Arrows", "Slow", "Turn", "Slow", "UNDER CONSTRUCTION", "Placing C.M.P. Traffic Using Shoulders", "New Grade, Traffic Travelling in Borrow Pits", "Detour Arrows", "Slow", "New Grading", "Slow", "Soft Shoulders", "Road Under Construction", "Slow", and "New Gravel, Compact But Shoulders Soft".

The maximum grades shown are to be the limiting grades for all except extreme cases.

When the length of the approach as determined by the intersection of these grades with the natural ground is such as to damage the Property so served, or cause unreasonable conditions, the grades may be modified.

In such cases, methods used, and maximum grades, shall be as indicated on the plans, or provided by work order.

All Work shall be done in accordance with the Standard Specifications of the Colorado State Highway Department adopted Aug. 1, 35. Whenever traffic is permitted on a road while under construction, the Contractor shall at all times adequately and appropriately mark any and all hazards on the Project with well painted, well maintained barricades, and standard caution and warning signs. The Contractor shall also mark with standard directional signs any places where the direction of the flow of traffic is not plain.

Whenever traffic is prohibited from a Project under construction, the Detour will be marked by the Department and the barricades at either end of the Project shall be erected and maintained by the Contractor.

All signs and barricades shall be immediately moved, added to, removed, or changed to appropriately mark hazards, or conditions altered, corrected, or changed by construction progress.

The Contractor shall furnish:

- (1) All barricade material. It shall always be well painted, as per sketch, and well maintained.*
- (2) A reflectorized arrow of an approved type for each barricade at the ends of the Project; and at other barricades required where traffic is permitted on road under construction.*
- (3) "SLOW-ROAD UNDER CONSTRUCTION" signs as required.*
- (4) Any special signs the Department may deem necessary for the protection of traffic over the Project.*
- (5) At least three (3) flares or torches for each barricade, and other flares to illuminate such signs as are called for on these plans, or as the Department may direct.*

Flares or torches shall be placed between 3 and 5 feet ahead of the sign or object to be illuminated, and shall be kept burning from sunset to sunrise.

Costs of all of the foregoing materials and work by the Contractor shall be included in the original contract prices for the Project.

The Highway Department will furnish all standard signs not required to be furnished by the Contractor.

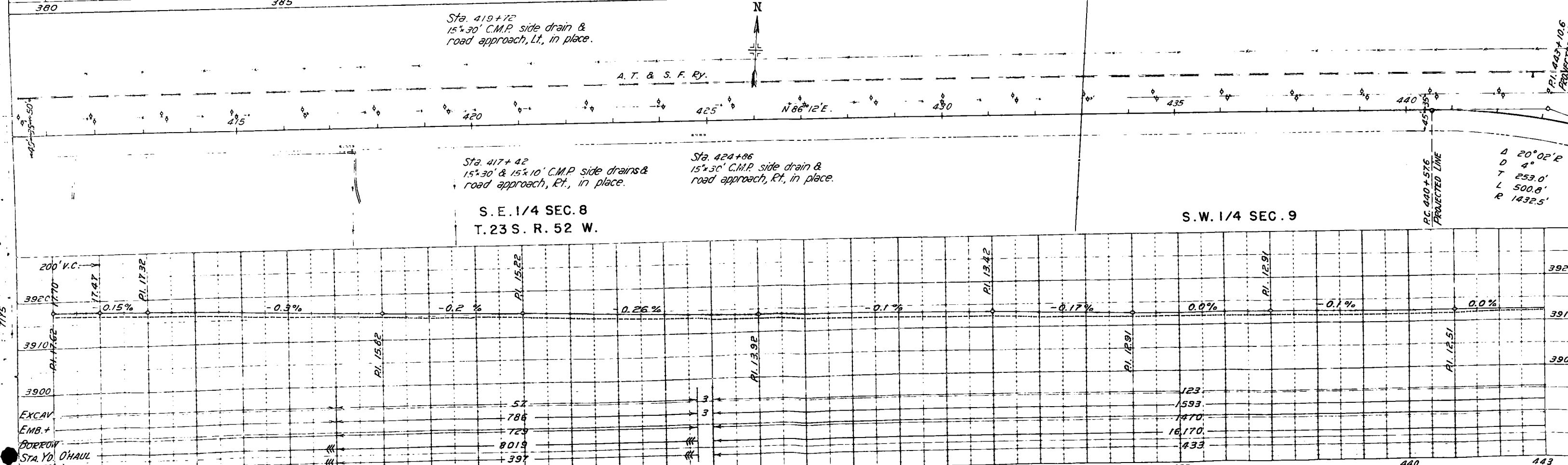
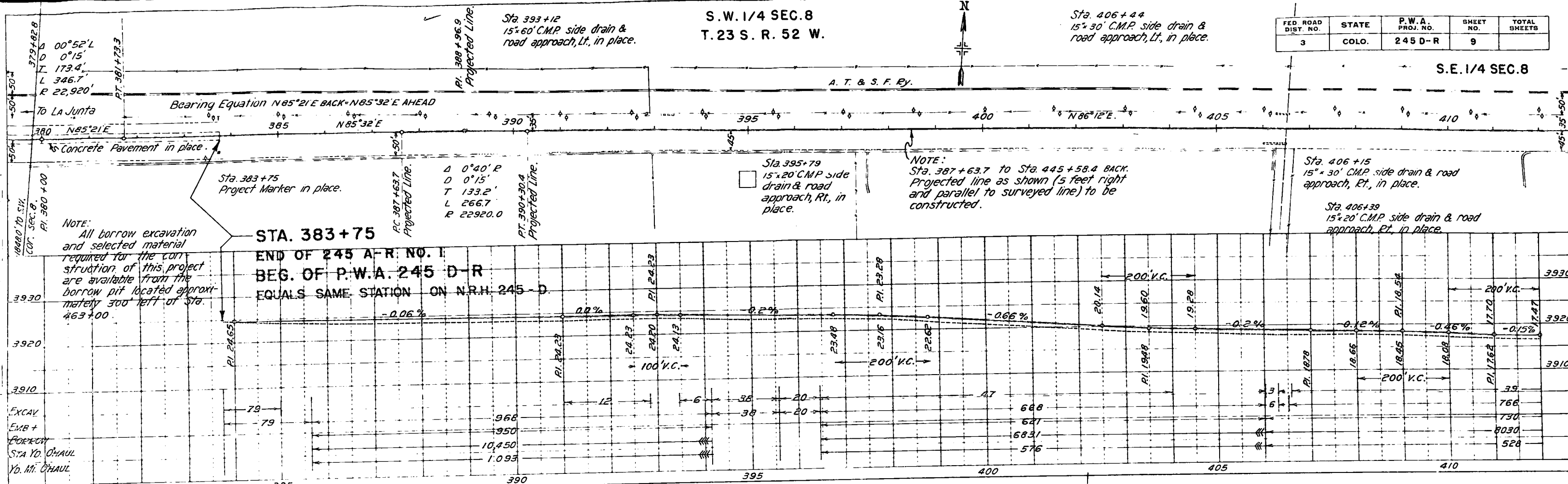
COLORADO
STATE HIGHWAY DEPARTMENT
TYPICAL
SIDE APPROACH ROADS
ROADWAY CONSTRUCTION
TRAFFIC SIGNS

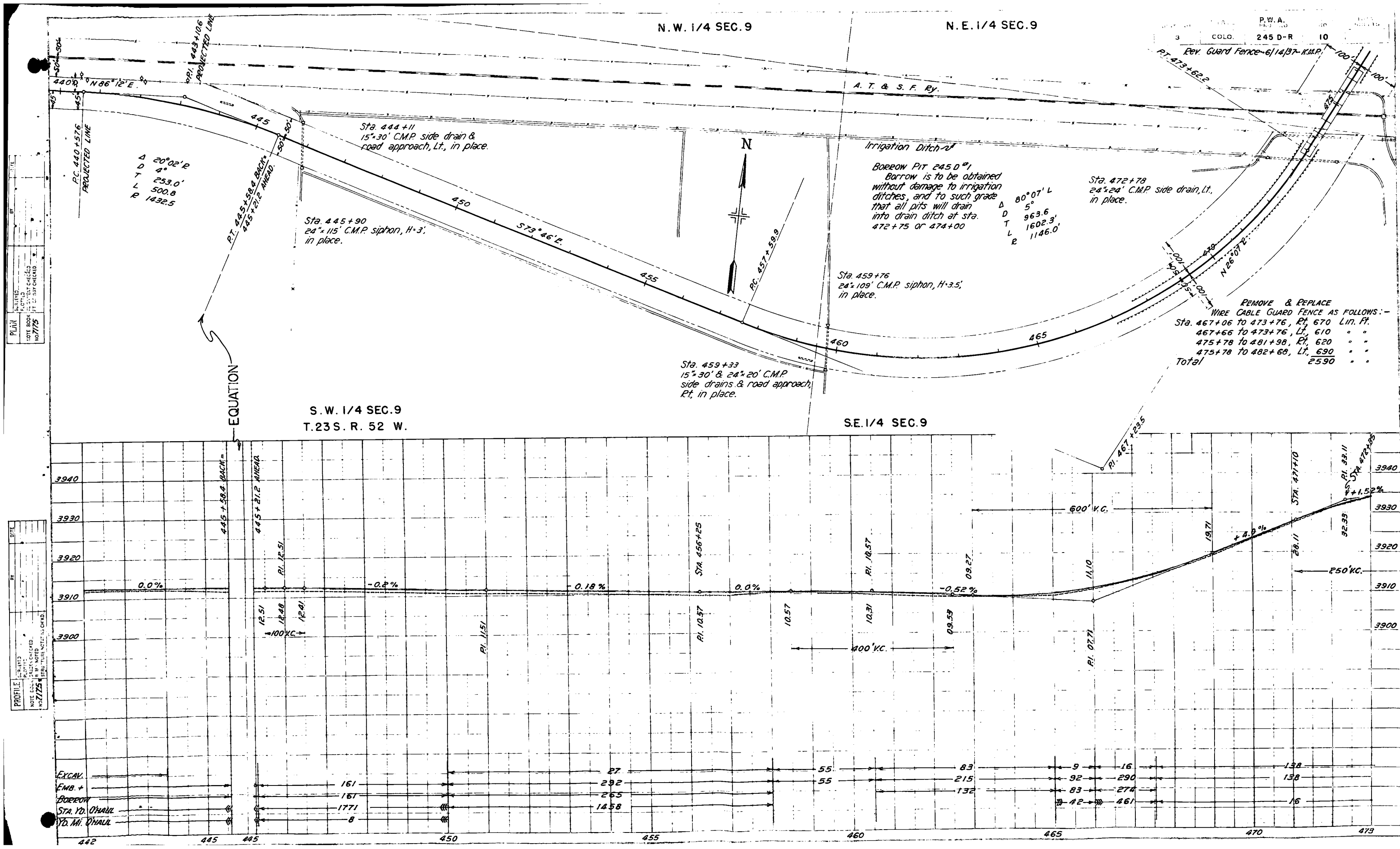
Designed by J.S.M.	Approved by <i>J. Marshall</i> Date: Aug. 20, 1935
Made by S.D.L.	
Check J.S.M.	
Check K.A.K.	

FED. ROAD DIST. NO.	STATE	P.W.A. PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	245 D-R	9	

S.W. 1/4 SEC. 8
T. 23 S. R. 52 W.

S.E. 1/4 SEC. 8





Sta. 474+00
24"x154" C.M.P. cross
culvert in place.

N.E. 1/4 SEC. 9
T. 23 S. R. 52 W.

Sta. 475+35
36"x132" C.M.P. cross culvert
in place.

Sta. 473+48.7 TO 476+04.7
Structure L-24-G. overhead
crossing in place.

Sta. 473+28
2"x2"x172" concrete box
culvert in place.

Concrete Approach
slabs in place

D 64°08' P
D 5°
T 717.9'
L 1282.7'
R 1146.0'

Sta. 485+50
24"x88" C.M.P. siphon,
H-3', in place.

Sta. 489+51
24"x60" C.M.P. cross
culvert in place.

Sta. 492+16.7
18"x106" C.M.P. siphon,
H-2', in place.

N.W. 1/4 SEC. 10

P.W.A.
3 COLO. 245 D-R 11
Rev. Guard Fence - 6/14/37. - K.M.P.

LAS ANIMAS

High School

S.E. 1/4 SEC. 9

Sta. 474+85
24"x20" C.M.P. side drain,
Rt. in place.

STA. 492+48.2
END OF P.W.A. 245 D-R
BEGINNING OF N.R.M. 245-E.
EQUALS SAME STATION ON N.R.H. 245-D.

