

TITLE SHEET

# Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

## PROJECT NAME

PCC OVERLAYS AND WIDENING - BONDED & UNBONDED  
[Project Description]

REVISIONS

PROJECT IDENTIFICATION NUMBER

PROJECT NUMBER

R.O.W. PROJECT NUMBER

INDEX OF SHEETS

No.	Description
A.1	Title Sheet
A.2	Legend and Survey Control
A.3	Estimated Quantities and Reference Information
B.1	Existing Section and Milling Sheet
B.2	Bonded and Unbonded Typical Cross Section
B.3	Bonded PCC Overlay Jointing (with and without Widening)
B.4	Unbonded PCC Overlay Jointing (with and without Widening)
B.5	Miscellaneous Details
B.6	Profile Transition Details
B.7	Right Turn and Bridge Approach Details
B.8	Shoulder and Paved Access Details
B.9	Guardrail and Paved Shoulder Detail
C.1	Quantity Tabulations
D.1	Existing Roadway Plan and Profile for Reference Only
J.1	Staging and Traffic Control Notes
J.2	Staging Construction Open to Traffic
L.1	Staking Layout
L.2	Jointing Layout

The information included herein does not represent a specific project, but may be used as an example of what should be included for a PCC bonded or unbonded overlay project.

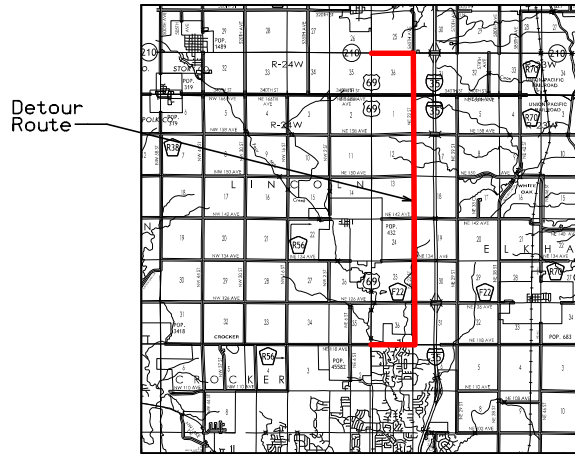
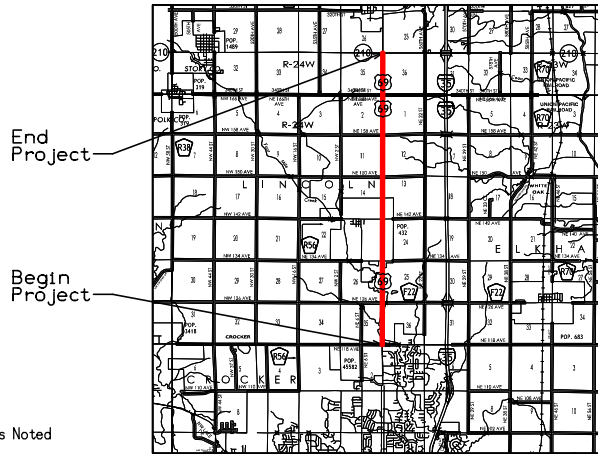
This index is representative of an overlay project (bonded or unbonded) with many details including: staging, traffic control, varying existing cross-sections, turn lanes, transitions for bridges, and construction under traffic. Sheets B.7 to L.2 are optional, depending on the scope of the project.

The location map is helpful to the contractor when planning haul routes, traffic control, and staging.

The detour map is used only if roadway is closed to traffic during construction. If through traffic is allowed during construction, typically traffic control zones are kept to a 0.25 mile maximum length without the use of pilot cars as long as adequate sight distance is available. Construction zones that utilize pilot cars are typically 2.5 to 3 miles in length or no more than 10 minutes wait time per zone.

The title sheet shows general project information including name, description, jurisdiction, index of sheets, mileage summary, traffic, and engineering certification.

MILEAGE SUMMARY			
Div.	Location	Lin. Ft.	Miles
1			
Total Length			



DESIGN TRAFFIC DATA			
20_	AADT	_____	V.P.D.
20_	AADT	_____	V.P.D.
	TRUCKS	_____ %	
Total Design ESALs _____			

INDEX OF SEALS		
SHEET NO.	NAME	TYPE

Signature \_\_\_\_\_ Date \_\_\_\_\_

Printed or Typed Name \_\_\_\_\_

My license renewal date is \_\_\_\_\_

Pages or sheets covered by this seal: \_\_\_\_\_

PCC OVERLAYS - BONDED AND UNBONDED

LETTING DATE

# LEGEND AND SURVEY CONTROL

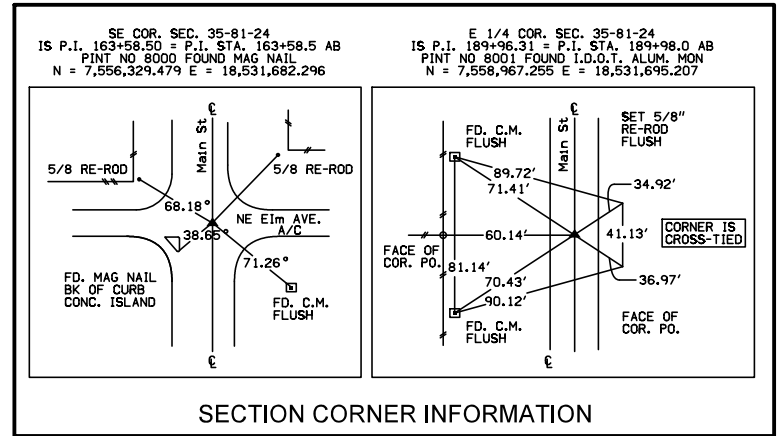
## SURVEY SYMBOLS

- DU Centerline Draw or Stream (Up)
- D Centerline Draw or Stream (Down)
- EP Edge of Paved Roads (ML or SR)
- SNP Unpaved Shoulder
- TPD Telephone Pedestal
- SI Sign
- PIP Pipe Culvert
- PRO Profile Shot
- FW Wire Fence
- PLG Location of General Photo
- CU Back of Curb
- TLNR Tree Line Right
- DIK Centerline of Dike or Dam
- RIP Rip-Rap
- IN Storm Sewer Intake
- MIS Miscellaneous
- LUM Luminaire
- TDC Tree Deciduous
- GU Gutter In Front of Curb
- BLD Building or Foundation
- PR Electric Riser Pole
- UB Utility Box
- SL Speed Limit Sign
- MH Utility Access (Manhole)
- SWK Sidewalk
- UE Utility Elevation
- FHD Fire Hydrants
- WV Water Valve
- CON Concrete or A/C Slab
- LIN Miscellaneous Line
- ENP Edge Paved Entrance & Park Lot
- ENT Centerline BL of Entrance
- RET Retaining Walls
- FCL Chain Link and Security Fence
- CUL Culvert
- EB Electrical Box
- ENU Edge Unpaved Entrance & Parking

- SHR Shrub
- SEP Septic Tank
- TEV Evergreen Tree
- TLNL Tree Line Left
- BIN Grain Bin
- BNK Stream Bank
- LP L.P. Tank
- BD Bridge Deck
- FWD Wood Fence
- GV Gas Valve
- WEL Well
- EG Edge of Gravel Road
- GDL Guard Rail (Rail and Cable)
- EW Edge of Water
- FLG Flag Poles
- WH Water Hydrant
- HDG Hedge Row
- BB Billboard
- OUT Tile Outlet
- BL Topo Breakline
- GP Guard Post (Less Than 4 Posts)
- UV Underground Utility Vault
- SH Paved Shoulder
- TV Satellite TV Dish
- SNK Sink Hole
- MM Mile Marker Post
- TVP TV Pedestal
- INB Storm Sewer Beehive Intake
- TFR Tree Fruit

## UTILITY LEGEND

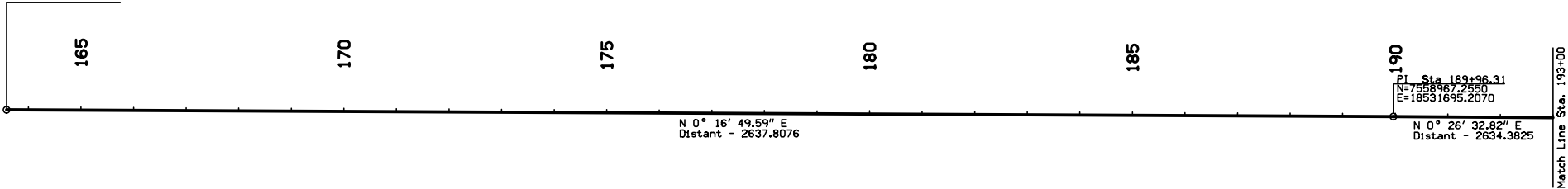
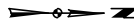
- Power Pole
- E2 - Private Electric
- FO - Fiber Optic
- F02 - Data / Phone
- C - Cable
- G - Natural Gas
- San. - Sanitary Sewer Line
- St.S. - Storm Sewer Line
- W - Domestic Water



AS-BUILT VERTICAL PROFILE					
NAME	LOCATION	STATION	FORWARD GRADE	ELEVATION	CURVE LENGTH

EXISTING REFERENCE POINTS AND BENCHMARKS						
POINT	NORTHING	EASTING	STATION	OFFSET	DESCRIPTION	ELEVATION

POT Sta 163+58.50  
N=75563279.4790  
E=18531682.2960



Section corner information or other control monuments may be necessary to establish alignment.

This sheet lists the survey symbols, utility legends, and survey control information. The control information is used to establish the alignment for the project.

Benchmark information is used to establish alignment and elevation.

# ESTIMATED QUANTITIES AND REFERENCE INFORMATION

ESTIMATED PROJECT QUANTITIES					
ITEM NO.	ITEM	UNIT	ESTIMATED QUANTITIES		
			Division 1	Division 2	TOTAL
1	EMBANKMENT-IN-PLACE	CY	1,721.0	123.0	1,844.0
2	TOPSOIL, FURNISH AND SPREAD	CY	680	0	680
3	TOPSOIL, STRIP, SALVAGE AND SPREAD	CY	363.0	111.0	474.0
4	GRANULAR SHOULDERS	TON	6,902.0	1,690.0	8,592.0
5	PAVED SHOULDER, HOT MIX ASPHALT MIXTURE, 6 IN.	SY	1,423.5		1,423.5
6	SHOULDER CONSTRUCTION, EARTH	STA	10.20	5.10	15.30
7	PATCHES, FULL-DEPTH REPAIR	SY	16.0	32.0	48.0
8	PATCHES BY COUNT (REPAIR)	EACH	2	4	6
9	PAVEMENT MILLING	SY	58,659.0	25,292.0	83,951.0
10	BRIDGE APPROACH	SY	198.9		198.9
11	SEPARATION LAYER HMA*	SY	70,101.00		70,101.00
12	SEPARATION LAYER - GEOTEXTILE*	SY	70,101.00		70,101.00
13	AGGREGATE, COVER - SAND	TON	1.0	0.3	1.3
14	BINDER BITUMEN, CRS-2	GAL	19.2	6.4	25.6
15	PORTLAND CEMENT CONCRETE OVERLAY, FURNISH ONLY	CY	16,954.0	7,283.0	24,237.0
16	PORTLAND CEMENT CONCRETE OVERLAY, PLACEMENT ONLY	SY	87,180.0	37,450.0	124,630.0
17	SURFACING, DRIVEWAY, CRUSHED STONE	TON	26.0		26.0
18	SUBDRAIN, LONGITUDINAL, (SHOULDER) 4 IN. DIA.	LF	27,783.0	9,875.0	37,658.0
19	SUBDRAIN OUTLET	EACH	122	46	168
20	REMOVAL OF STEEL BEAM GUARDRAIL	LF	825.0		825.0
21	STEEL BEAM GUARDRAIL	LF	750		750
22	REMOVAL OF PAVEMENT	SY	12,725.7	404.0	13,129.7
23	SAFETY CLOSURE	EACH	13	6	19
24	FIELD OFFICE	EACH	1		1
25	CONSTRUCTION SURVEY	LS	0.74	0.26	1.0
26	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED	STA	1,254.85	494.44	1,749.29
27	PAVEMENT MARKINGS REMOVED	STA	1.70		1.70
28	TRAFFIC CONTROL	LS	0.74	0.26	1.0
29	FLAGGERS	EACH	20.0		20.0
30	PILOT CARS	EACH	10.0		10.0
31	MOBILIZATION	LS	0.74	0.26	1.0
32	MOBILIZATION, EROSION CONTROL	EACH	1		1

ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
9	PAVEMENT MILLING Profile milling will be required on this project, refer to Typical on sheet B.1 for locations and details. For unbonded or bonded overlays on asphalt or composite pavement. Meet the following requirements for profile milling: 1. Pavement milling equipment shall be equipped with automatic horizontal and vertical controls capable of milling existing pavement at an elevation corresponding to the approved profile grade and cross slope with a tolerance of 0 to -0.5 foot. 2. The contractor will achieve a milled surface for 100% of the pavement surface. The contractor is required to scuff the pavement surface in areas that the mill did not initially touch due to the profile. Profile milling and profile design will consist of the requirements of the Standard Specifications.
10	BRIDGE APPROACH Refer to Typical on sheet B.7.
11*	SEPARATION LAYER HMA
12*	SEPARATION LAYER - GEOTEXTILE
13	AGGREGATE, COVER - SAND - NOTE: CONSIDER GEOTEXTILE IN LIEU OF SAND The item quantity is for 2 applications and is based on 128 sq. yds. at a rate of 10 pounds per square yard per application. Place on existing PCC patches for unbonded overlay.
14	BINDER BITUMEN, CRS-2 - NOTE: CONSIDER GEOTEXTILE IN LIEU OF BINDER The item quantity is for 2 applications and is based on 128 sq. yds. at a rate of 0.10 gallons per square yard per application. Apply on aggregate sand cover over existing PCC patches after milling (for unbonded overlay).
15	PORTLAND CEMENT CONCRETE OVERLAY, FURNISH ONLY Quantity increase 10% for irregularities. Refer to Typical on sheet B.2. Measurement shall be the quantity shown in the contract documents. The basis of payment will be as indicated in specifications.
16	PORTLAND CEMENT CONCRETE OVERLAY, PLACEMENT ONLY Refer to Typical on sheets B.2, B.3 and the Specifications.
17	SURFACING, DRIVEWAY, CRUSHED STONE
18	SUBDRAIN, LONGITUDINAL, (SHOULDER) 4 IN. DIA.
19	SUBDRAIN OUTLET Refer to Tabulation on sheet C.1. Approximately 2734 cu. yds. of trench material from the subdrain installation shall be disposed of by the contractor as per the Specifications.
20	REMOVAL OF STEEL BEAM GUARDRAIL Refer to Tabulation on sheet B.9.
21	STEEL BEAM GUARDRAIL
22	REMOVAL OF PAVEMENT Refer to Tabulation on sheet C.1. The contractor to dispose of removed pavement as per the standard Specifications.
23	SAFETY CLOSURE Refer to Tabulation on sheet C.1.
24	FIELD OFFICE
25	CONSTRUCTION SURVEY This item does NOT include existing monument or centerline point preservation work which was done previously by others.
26	PAINTED PAVEMENT MARKING
27	PAVEMENT MARKINGS REMOVED Refer to Tabulation on sheet C.1.
28	TRAFFIC CONTROL Refer to the Traffic Control Plan, Tabulation sheet C.1.
29	FLAGGERS - (use when project is constructed open to traffic)
30	PILOT CARS - (use when project is constructed open to traffic)
31	MOBILIZATION
32	MOBILIZATION, EROSION CONTROL

\*Choose a separation layer type for PCC unbonded overlay over concrete.

Some items may be eliminated based on the specifics of the project.

This sheet lists the estimated quantities for the project. Reference is made to the tabulations, specific details, or other sheets where necessary.

Projects are sometimes separated into divisions to track quantities and payment. For example, Division 1 is funded separately than Division 2 on this sample project.

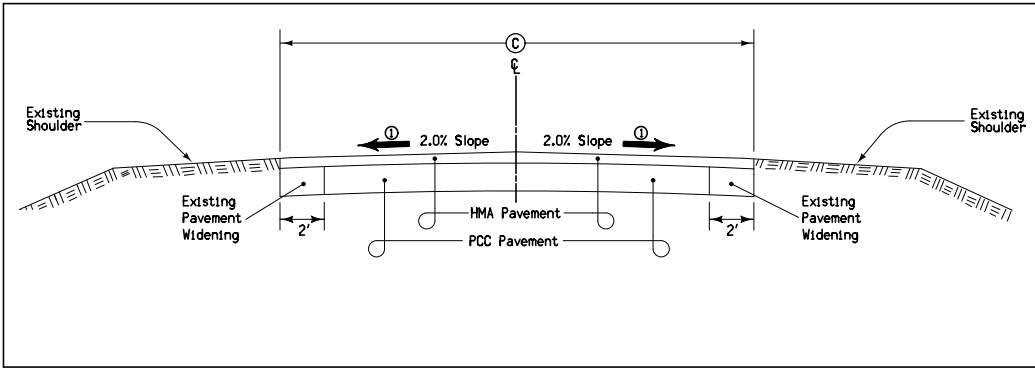
The existing longitudinal subdrains shall remain functional at all times. Any damage to these tile lines or outlets due to the carelessness of the contractor, will be replaced at their expense with no cost to the Owner.

The contractor to note that a profile grade is not being provided and that he/she will be required to cross section the roadway and design a profile grade as stated in the Standard Specifications.

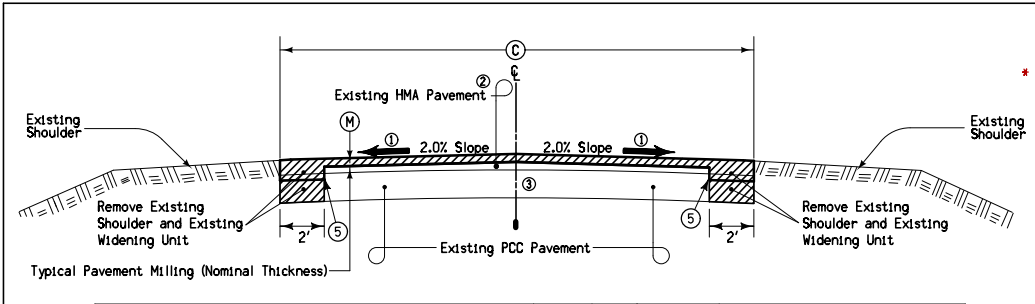
# EXISTING SECTION AND MILLING SHEET

**Bonded Overlays**  
 Milling of existing pavement may be necessary to:  
 1) achieve the proposed profile,  
 2) reduce high spots to ensure minimum overlay thickness,  
 3) remove significant surface distortions (2 inches or greater), and  
 4) match curb or adjacent structures.  
 For bonded overlays, milling to improve bonding is a lower priority than items 2), 3), and 4). A minimum of 4 in. PCC or 3 in. HMA of remaining pavement is recommended after milling.

**Unbonded Overlays**  
 Refer to table 9 of the Guide to Concrete Overlays, Third Edition. If using a 1 in. HMA separation layer and faulting is >3/8 in., grind pavement to remove faulting or increase HMA to 1 1/2 in. thickness. If faulting is ≤ 3/8 in., no action is required. If using a geotextile separation layer, and faulting is > 1/4 in., grind pavement to remove faulting. If faulting is ≤ 1/4 in., no action is required.



EXISTING PAVEMENT CROSS SECTION

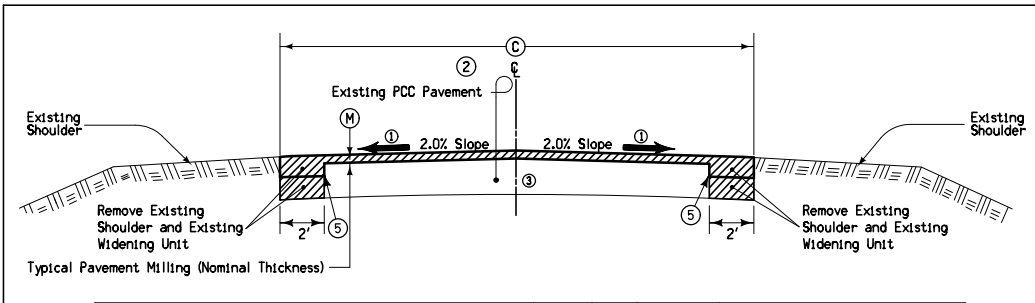


- ① Typical section shown may be modified appropriately in areas of super elevated curves or other locations specifically designated by the engineer.
  - \* ② After milling, the remaining HMA surface will serve as the separation layer (unbonded overlay over PCC) OR the existing HMA will be completely removed.
  - ③ Refer to sheet C.1 for tabulation of the existing pavement.
  - ④ Allowable milling depth ranges from \_\_\_ inch to \_\_\_ inches in this area.
  - ⑤ Provide a vertical clean edge similar to milling machine results.
- ▨ Pavement milling or removal.

\*Milling option is based on overlay type.

TYPICAL CROSS SECTION  
HMA PAVEMENT MILLING

Location		① (M)	(C)	Pavement Milling	Remarks
Road Identification	Station To Station	Inches	Feet	Sq. Yds.	



- ① Typical section shown may be modified appropriately in areas of super elevated curves or other locations specifically designated by the engineer.
  - ② Mill existing pavement as necessary to meet proposed profile.
  - ③ Refer to sheet C.1 for tabulation of the existing pavement.
  - ④ Allowable milling depth ranges from \_\_\_ inch to \_\_\_ inches in this area.
  - ⑤ Provide a vertical clean edge similar to milling machine results.
- ▨ Pavement milling or removal.

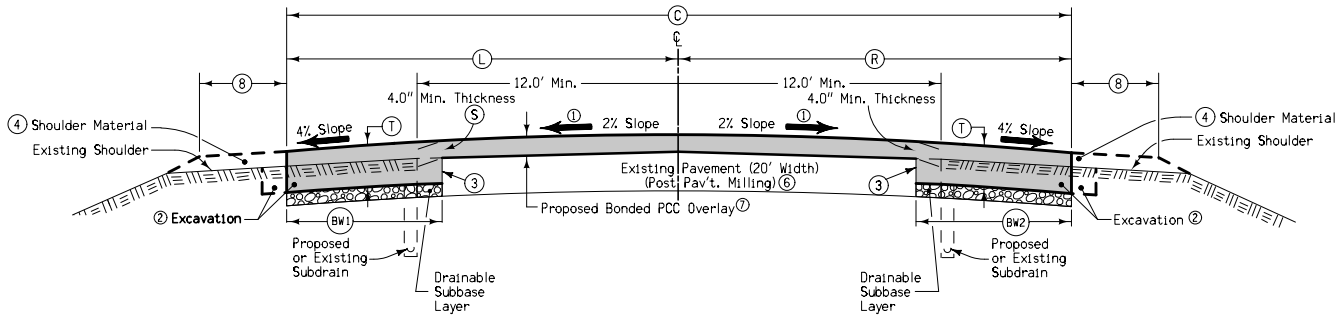
TYPICAL CROSS SECTION  
PCC PAVEMENT MILLING

Location		① (M)	(C)	Pavement Milling	Remarks
Road Identification	Station To Station	Inches	Feet	Sq. Yds.	

This sheet shows the typical cross section for milling of existing pavement as well as a tabulation of milling thickness and areas.

# BONDED AND UNBONDED TYPICAL CROSS SECTION

## BONDED OVERLAY



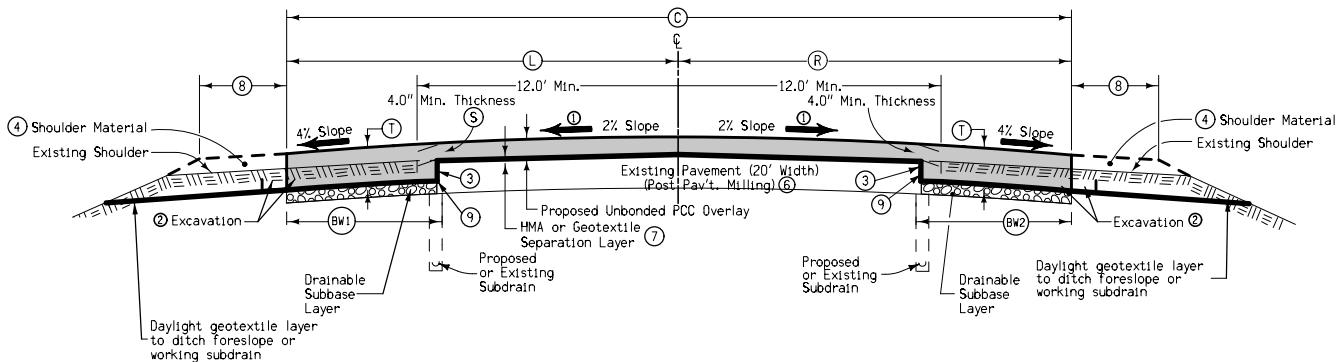
- ① Typical section shown may be modified appropriately in areas of super elevated curves or other locations specifically designated by the engineer. At existing super elevated areas match existing cross slopes and transition rates.
- ② Excavation quantities include trench width (BW) plus 1' x both Lt. & Rt. sides.
- ③ Provide a vertical clean edge similar to milling machine results.
- ④ Shoulder material as specified on sheet B.8.
- ⑤ Refer to jointing and widening details on sheet B.3
- ⑥ Refer to milling detail on sheet B.1.
- ⑦ Milling should be considered to reduce high spots, remove distortions, and match curb or existing structures.
- ⑧ Shoulder width varies by project.

Note: The contractor shall pave proposed shoulders thru all unpaved side road, paved side roads, and entrance intersections. At the existing paved intersections, the existing pavement will be removed.

Location		⑤	②	③	④	Overlay Quantities (Per Location)			⑦	⑧	⑨	⑩	Remarks
Road	Station To Station	Inches	Feet	Feet	Feet	② Excavation Cu. Yds.	PCC Overlay Cu. Yds.	PCC Overlay Sq. Yds.	Inches	Feet	Feet	Feet	

TYPICAL CROSS SECTION  
PCC BONDED OVERLAY WITH BASE WIDENING  
(AFTER PAVEMENT MILLING)

## UNBONDED OVERLAY



- ① Typical section shown may be modified appropriately in areas of super elevated curves or other locations specifically designated by the engineer. At existing super elevated areas match existing cross slopes and transition rates.
- ② Excavation quantities include trench width (BW) plus 1' x both Lt. & Rt. sides.
- ③ Provide a vertical clean edge similar to milling machine results. Use non-woven vertical geotextile separation layer for drainage if existing pavement is PCC. See sheet B.4.
- ④ Shoulder material as specified on sheet B.8.
- ⑤ Refer to jointing and widening details on sheet B.4.
- ⑥ Refer to milling detail on sheet B.1.
- ⑦ Separation layer may be either 1 inch well-drained asphalt surface mixture or non-woven geotextile. The separation layer must be either daylighted past the edge of the shoulders or connected into a longitudinal subdrain system using drainable subbase layer.
- ⑧ Shoulder width varies by project.
- ⑨ Either drain to working subdrain or daylight fabric

Note: The contractor shall pave proposed shoulders thru all unpaved side road, paved side roads, and entrance intersections. At the existing paved intersections, the existing pavement will be removed.

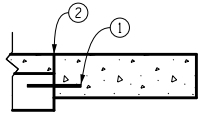
Location		⑤	②	③	④	Overlay Quantities (Per Location)			⑦	⑧	⑨	⑩	Remarks
Road	Station To Station	Inches	Feet	Feet	Feet	② Excavation Cu. Yds.	PCC Overlay Cu. Yds.	PCC Overlay Sq. Yds.	Inches	Feet	Feet	Feet	

TYPICAL CROSS SECTION  
PCC UNBONDED OVERLAY WITH BASE WIDENING  
(AFTER PAVEMENT MILLING)

This sheet includes the typical cross sections for PCC bonded and unbonded overlays. A tabulation is given for specific dimensions and quantities.

# BONDED PCC OVERLAY JOINTING (WITH AND WITHOUT WIDENING)

**Minimum 4 ft. paved shoulder**

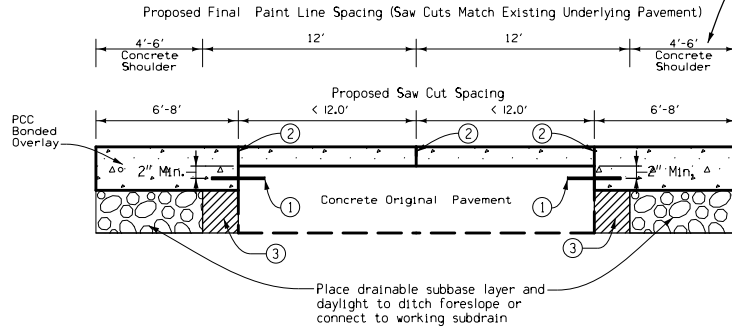


A. Tie widening unit to existing concrete  
Cut transverse joints to full depth plus 1/2".  
Match existing joint locations.

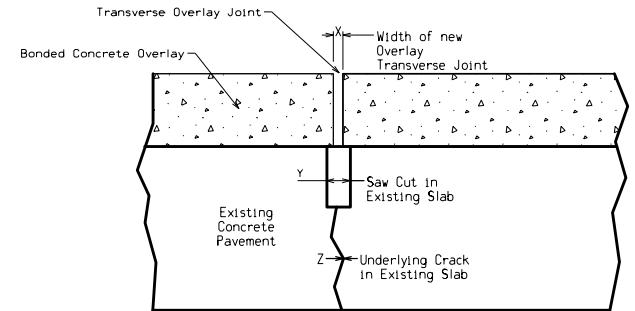
## COC-B TIE BAR LOCATION WITH WIDENING

### KEYED NOTES:

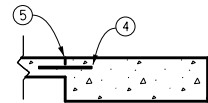
- ① Epoxy coated No. 4 tie bar 36" long at 30" spacing. Drill and epoxy bars into existing concrete
- ② Full depth plus 1/2"
- ③ Existing widening unit:  
if Asphalt, remove unit,  
if concrete, unit may remain if stable, and 3' wide,  
if no widening unit, excavate and place drainable subbase.



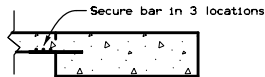
**COC-B**  
CONCRETE ON CONCRETE - BONDED OVERLAY WITH WIDENING



**FULL DEPTH SAWCUT**  
(COC-B) CONCRETE ON CONCRETE - BONDED OVERLAY  
(Transverse and longitudinal joint detail in concrete overlay of existing concrete pavement)

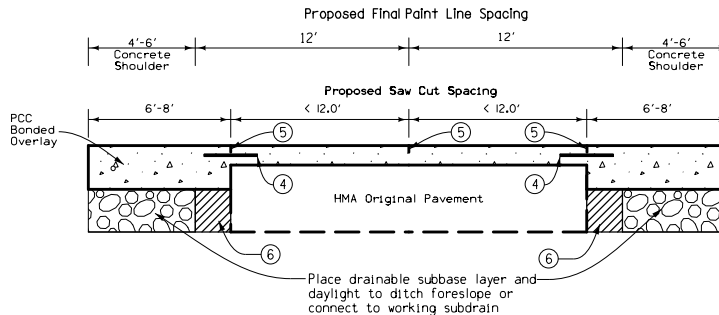


A. Tie bar placement with overlay thickness  $\geq 5"$



B. For bonded concrete overlays  $< 5"$  and in cold weather states with drainable subbase under the paved shoulder/widening unit, secure the tie bar to the asphalt pavement, using a minimum of three staples or epoxy. For concrete overlays  $< 5"$  and no drainable subbase, do not use tie bars in the paved shoulders/widening unit.

## COA-B TIE BAR LOCATIONS WITH WIDENING



**COA-B**  
CONCRETE ON ASPHALT - BONDED OVERLAY WITH WIDENING

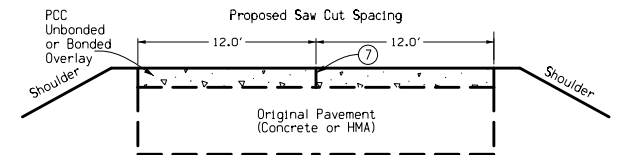
### GENERAL NOTES

A. Refer to "Design Lessons Learned" in the document "Guide for the Development of Overlay Construction Documents" for explanation on pavement widening drainage, location of tie bar, location of sawcut, thickened edge, restraint and use of fibers.

### KEYED NOTES:

- ④ Consideration shall be given to placement of epoxy coated tie bar at mid-depth. Placement must allow adequate overlay thickness to accommodate maximum sized aggregate under the bar and minimum 2" above the bar. Tie bars are No. 4 bars 36" long @ 30" centers.
- ⑤ T/3 saw cut (do not sever bar)
- ⑥ Existing widening unit:  
if Asphalt, remove unit,  
if concrete, unit may remain if stable, and 3' wide,  
if no widening unit, excavate and place drainable subbase.

**Note:**  
Overlay joint width shall be equal to or greater than crack width of the existing slab. If "Y" is 0.50 in. or greater, the underlying crack width in the existing slab should be measured. If crack "Z" is 0.25 in. or greater, and existing pavement does not have dowel bars, the joints should be evaluated to determine if load transfer rehabilitation is required to eliminate faulting. If there are numerous joints with this condition, the existing pavement may not be a good candidate for a bonded overlay. The existing joints should be filled/sealed to prevent intrusion of mortar during overlay placement. In all cases, "X" must be  $Z+0.125$  in.



## COC-B or COA-B

CONCRETE ON CONCRETE OR ASPHALT - BONDED OVERLAY WITHOUT WIDENING

### KEYED NOTES

- ⑦ If BCOC, then use full depth sawcut.  
If BCOA, then use T/3 sawcut.

**COC-B = Concrete on Concrete - Bonded Overlay**  
**COA-B = Concrete on Asphalt - Bonded Overlay**

This sheet illustrates the jointing layout for PCC bonded overlays and widening units. For bonded overlays on concrete, new joints in the overlay shall align with existing joints. Transverse joints shall be cut to full depth plus 0.5 in. If construction is completed under traffic, a 4 ft paved shoulder is recommended



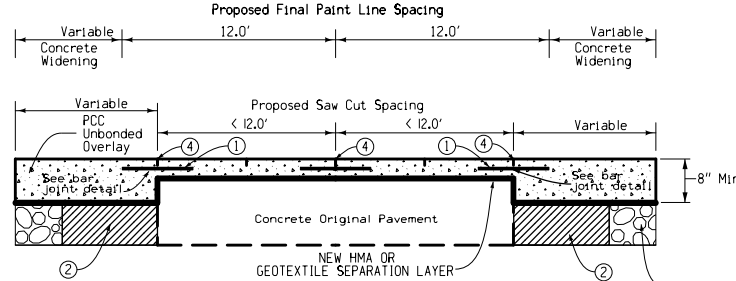
# UNBONDED PCC OVERLAY JOINTING (WITH AND WITHOUT WIDENING)

### KEYED NOTES:

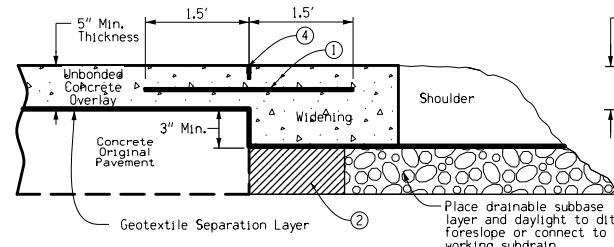
- ① Consideration shall be given to placement of epoxy coated tie bar at mid-depth. Placement must allow adequate overlay thickness to accommodate maximum sized aggregate under the bar and minimum 2" above the bar. If overlay is <math>\le 5'</math> or placement at mid-depth is not possible, secure tie bar to pavement using a minimum of three staples or epoxy. Tie bars are No. 4 bars 36" long @ 30" centers.
- ② Existing widening unit:  
 if Asphalt, remove unit,  
 if concrete, unit may remain if stable, and 3' wide,  
 if no widening unit, excavate and place drainable subbase.
- ③ Nonwoven geotextile shall either daylight to ditch foreslope or terminate above drainable subbase or connect to working subdrain.
- ④ T/3 (do not sever bar)
- ⑤ For unbonded overlays equal to or less than 6 inches thick, maximum joint spacing in feet is 1.5 times the overlay thickness in inches.  
  
 For unbonded overlays greater than 6 inches thick, maximum joint spacing in feet is 2 times the overlay thickness in inches. Maximum recommended spacing is 15 feet.
- ⑥ An option is to place nonwoven geotextile prior to HMA separation layer

### GENERAL NOTES:

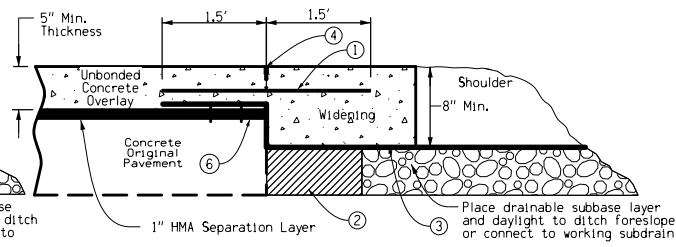
- A. If widening is completed using construction joint:  
 a. Fabric must be in good condition and placed as shown.  
 b. Tie widening unit with No.4 epoxy coated tie bars. Drill and epoxy or insert during overlay pour.
- B. Before concrete pour, measure and document distance from centerline to outside edge of existing pavement. To establish sawcut between overlay and widening unit, use documented dimensions and locate sawcut using the same measuring method.
- C. Refer to "Design Lessons Learned", in the document "Guide for the Development of Concrete Overlay Construction Documents" for explanation on pavement widening, drainage, location of tie bar, location of sawcut, thickened edge, restraint and use of fibers.
- D. For unbonded concrete overlays without widening, consideration should be given to day-light nonwoven geotextile and HMA separation to ditch foreslope or connect to working subdrain.



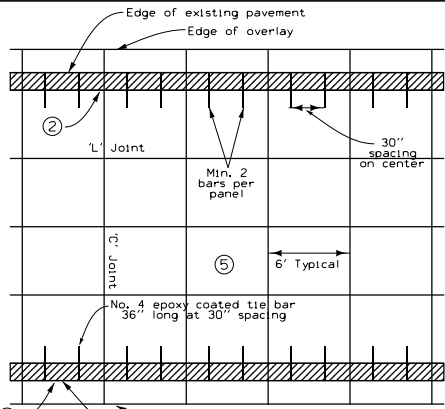
**COC-U**  
CONCRETE ON CONCRETE - UNBONDED OVERLAY WITH WIDENING



**COC-U**  
WIDENING DETAIL  
NONWOVEN GEOTEXTILE SEPARATION LAYER FOR WIDENING UNIT



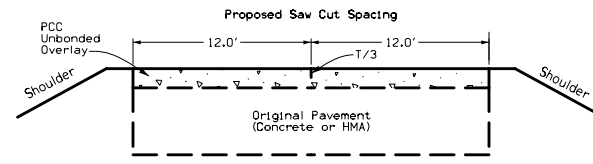
**COC-U**  
WIDENING DETAIL  
HMA SEPARATION LAYER AND NONWOVEN GEOTEXTILE FOR WIDENING UNIT



PLAN VIEW

UNBONDED OVERLAY WITH WIDENING - JOINT LAYOUT

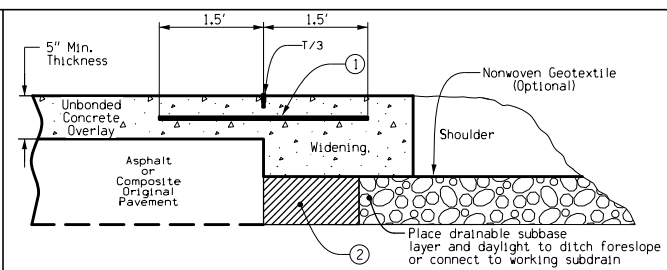
Note: Dimensions of panels may change based on project specifics  
 L= Longitudinal Joint (T/3)  
 C= Sawed Transverse Joint (T/3)



**COC-U OR COA-U**

CONCRETE ON CONCRETE OR ASPHALT - UNBONDED OVERLAY

For COC-U without widening, see detail above for draining separation layer



**COA-U**

WIDENING DETAIL

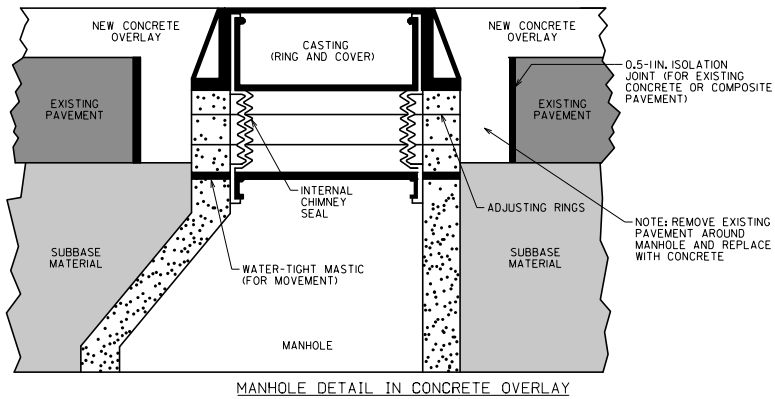
CONCRETE ON ASPHALT OR COMPOSITE UNBONDED OVERLAY WITH WIDENING

**COC-U = Concrete on Concrete - Unbonded Overlay**  
**COA-U = Concrete on Asphalt - Unbonded Overlay**

**Consider 13.3oz/yd<sup>2</sup> @ 130 mils, typical weight geotextile, for unbonded overlays ≤ 4 in. thick.**  
**Consider 14.7oz/yd<sup>2</sup> @ 170 mils, typical weight geotextile, for unbonded overlays ≥ 5 in. thick.**

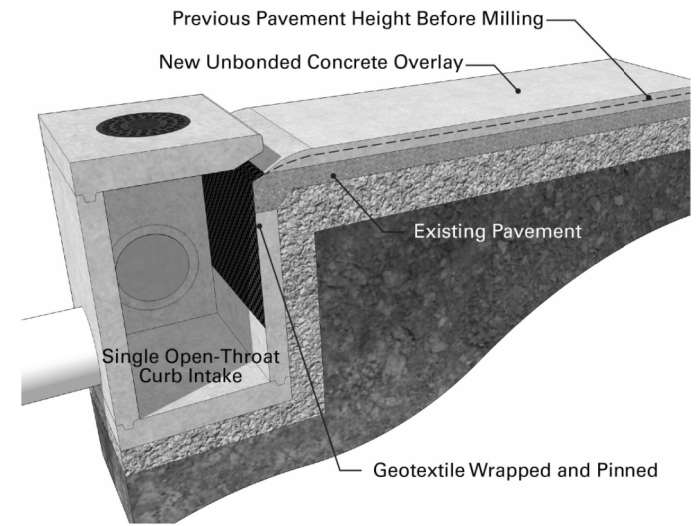
**This sheet includes jointing layout for PCC unbonded overlays and widening units. For unbonded overlays, new joints do not have to align with existing joints.**

# MISCELLANEOUS DETAILS



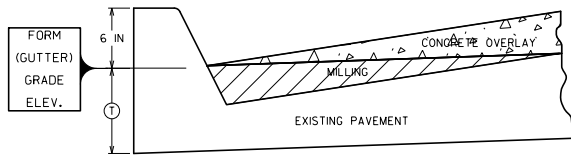
MANHOLE DETAIL IN CONCRETE OVERLAY

This sheet includes miscellaneous details for urban and rural PCC overlays. For unbonded overlays, it is critical to connect the separation layer to an acceptable drainage outlet.

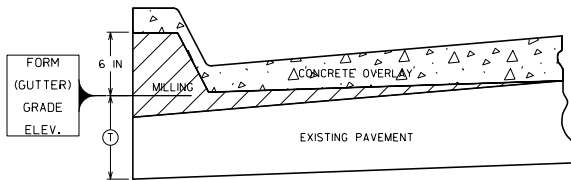


DRAINAGE OF SEPARATION LAYER INTO INTAKE

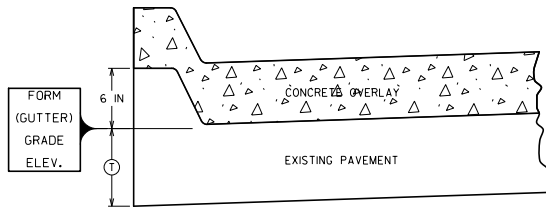
## CURB AND GUTTER DETAILS



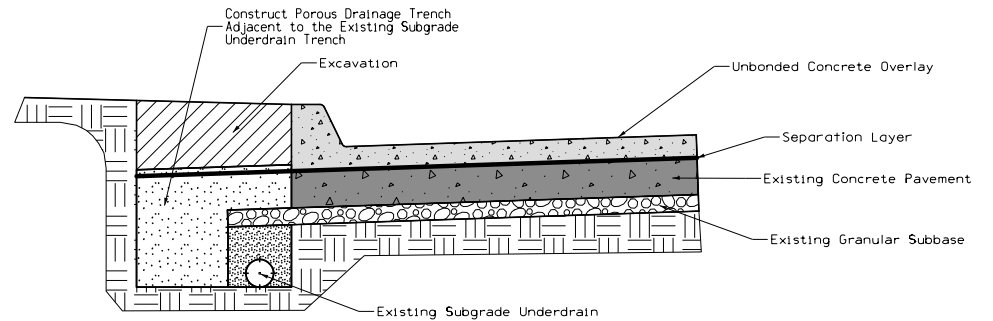
MILLING DETAIL WHEN LEAVING EXISTING CURB IN PLACE



MILLING DETAIL WHEN REMOVING AND REPLACING CURB



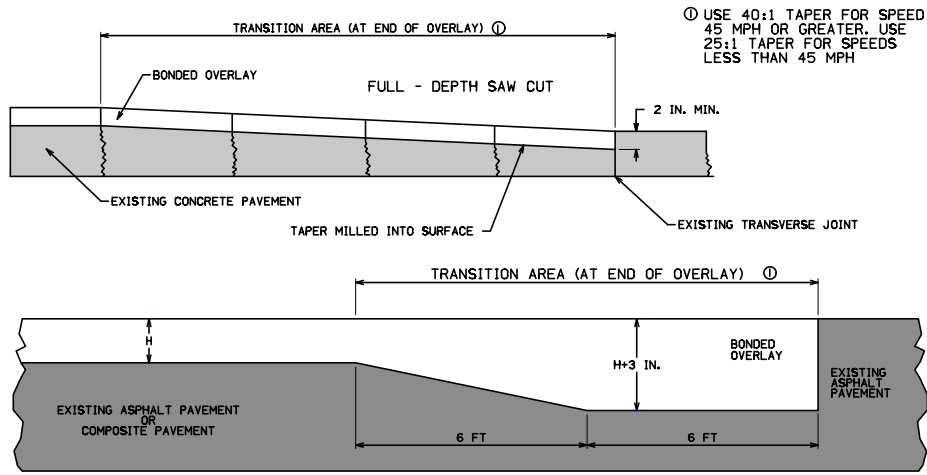
MILLING DETAIL OF CURB OVERLAY



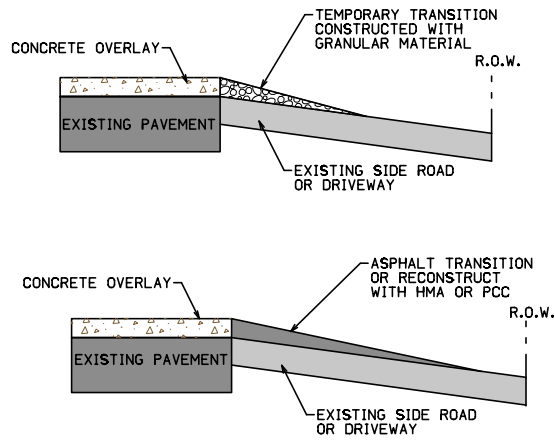
DRAINAGE OF SEPARATION LAYER - UNDERDRAIN SYSTEM  
(EXISTING CURB REMOVED AND REPLACED)



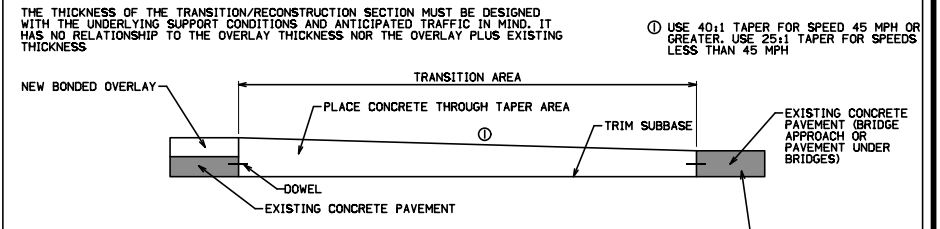
# PROFILE TRANSITION DETAILS



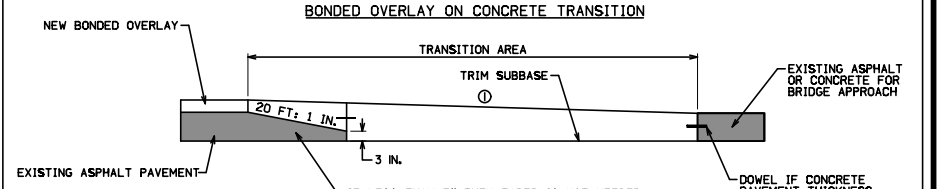
MILL AND FILL PROFILE TRANSITIONS FOR BONDED CONCRETE OVERLAYS ON END TRANSITION



TEMPORARY TRANSITION DETAILS

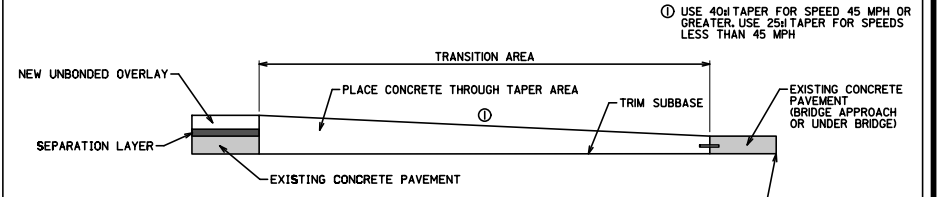


NOTE: RECOMPACT AND RESHAPE EXISTING SUBBASE IN AREA OF TRANSITION AND RECONSTRUCTION. IF THE SECTION IS UNDER BRIDGE, THE EXISTING PAVEMENT MAY REQUIRE RECONSTRUCTION TO INCREASE THE THICKNESS TO PROVIDE FOR EQUAL LOAD-CARRYING CAPABILITIES AS THE OVERLAY SECTION.

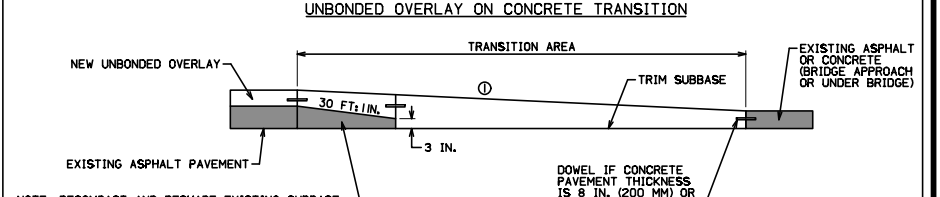


NOTE: RECOMPACT AND RESHAPE EXISTING SUBBASE IN AREA OF TRANSITION AND RECONSTRUCTION. IF LESS THAN 5" THEN TAPER IS NOT NEEDED.

BONDED OVERLAY ON ASPHALT TRANSITION



NOTE: RECOMPACT AND RESHAPE EXISTING SUBBASE IN AREA OF TRANSITION AND RECONSTRUCTION. IF THE SECTION IS UNDER BRIDGE, THE EXISTING PAVEMENT MAY REQUIRE RECONSTRUCTION TO INCREASE THE THICKNESS TO PROVIDE FOR EQUAL LOAD-CARRYING CAPABILITIES AS THE OVERLAY SECTION.



NOTE: RECOMPACT AND RESHAPE EXISTING SUBBASE IN AREA OF TRANSITION AND RECONSTRUCTION. IF LESS THAN 5" THEN TAPER IS NOT NEEDED.

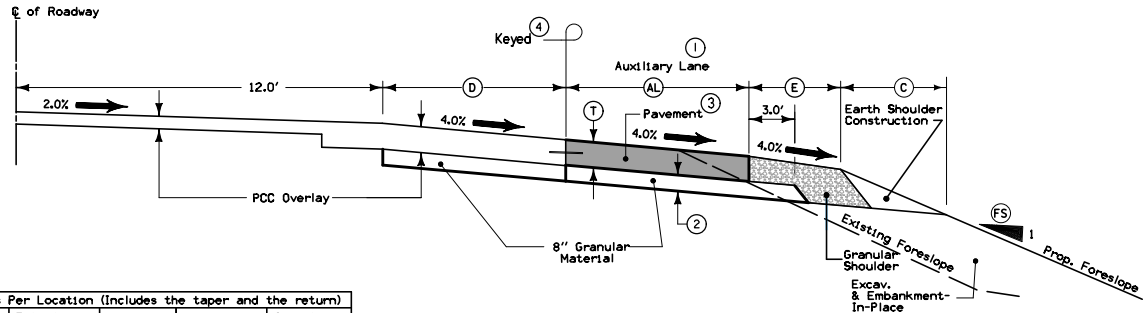
UNBONDED OVERLAY ON ASPHALT TRANSITION

This sheet provides typical profile transition details for PCC bonded and unbonded overlays. The transition length is dependent on the speed limit of the roadway. A common taper for vertical transition is 40:1. The thickness of the transition/reconstruction section must be designed with the underlying support conditions and anticipated traffic in mind

# RIGHT TURN AND BRIDGE APPROACH DETAILS

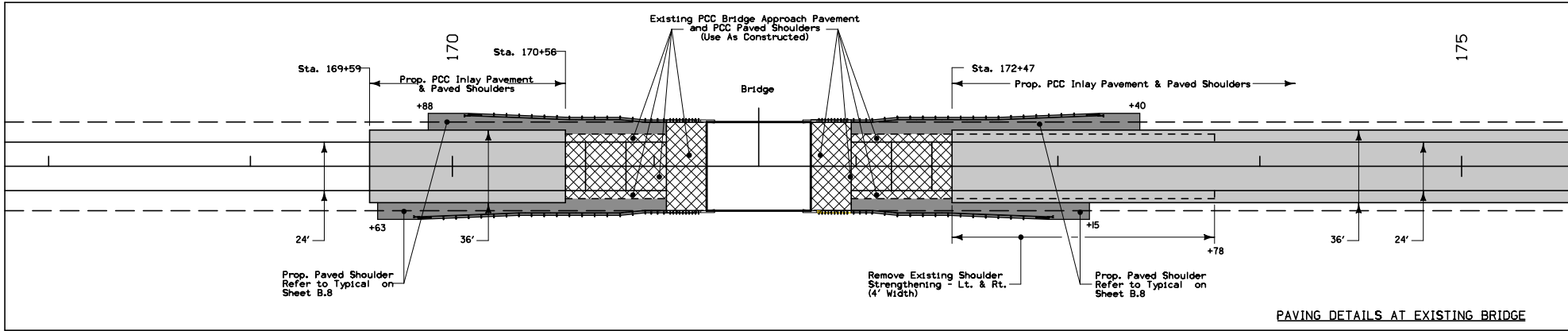
**Notes:**

- ① Details shall be similar for construction on either side (by stationing) of roadway.
- ② Construct minimum 8" granular material.
- ③ Pavement for auxiliary lane shall be constructed according to requirements specified for through roadway pavement.
- ④ For Joint details see Standard Joint details



LOCATION				Design Quantities Per Location (Includes the taper and the return)											
ROAD IDENTIFICATION	STATION TO STATION	SIDE		(D)	(E)	(T)	(AL)	(C)	(FS)	PCC Pavement Sq. Yds.	Granular Material Cu. Yds.	Embankment In-Place Cu. Yds.	Excavation Cu. Yds.	Earth Shldr. Construction Sta.	Granular Shoulder Tons

**TYPICAL HALF SECTION  
PCC RIGHT TURN LANE**  
(Adjacent to new PCC Overlay Pavement)

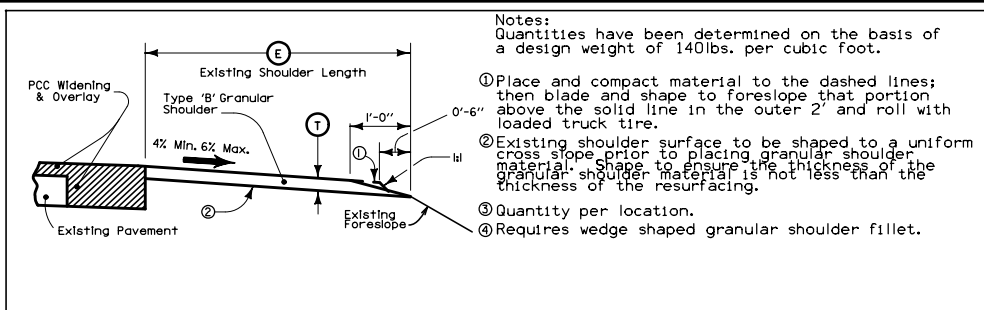


**PAVING DETAILS AT EXISTING BRIDGE**

This sheet illustrates a typical cross section for a right turn lane and a plan view of a bridge approach.

**OPTIONAL RIGHT TURN  
AND BRIDGE APPROACH  
DETAILS**

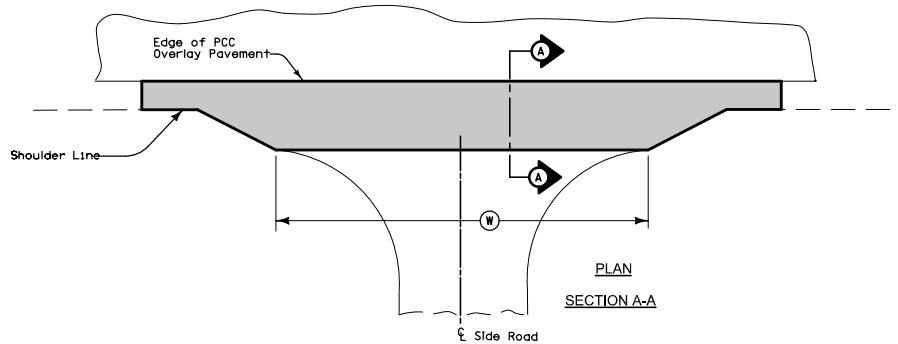
## SHOULDER AND PAVED ACCESS DETAILS



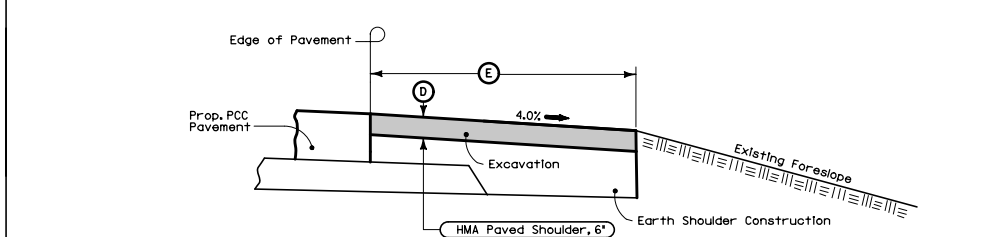
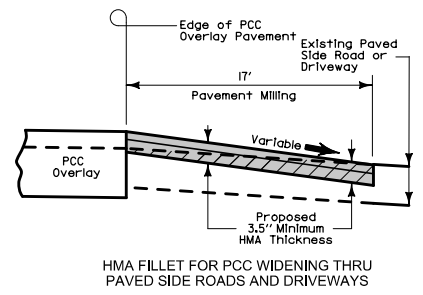
- Notes:**  
Quantities have been determined on the basis of a design weight of 140lbs. per cubic foot.
- ① Place and compact material to the dashed lines; then blade and shape to foreslope that portion above the solid line in the outer 2' and roll with loaded truck tire.
  - ② Existing shoulder surface to be shaped to a uniform cross slope prior to placing granular shoulder material. Shape to ensure the thickness of the granular shoulder material is not less than the thickness of the resurfacing.
  - ③ Quantity per location.
  - ④ Requires wedge shaped granular shoulder fillet.

LOCATION			TONS	T	E
ROAD IDENTIFICATION	STATION TO STATION	SIDE	③	Inches	Feet

TYPICAL SECTION  
FOR  
GRANULAR SHOULDER  
ADJACENT TO PCC WIDENING & OVERLAY



- Note:**  
Uniform thickness fillets of hot mix asphalt shall be constructed.  
Fillet sizes as shown are recommended and shall be used for design and estimating purposes. The Engineer shall establish the size of each individual fillet to accommodate conditions at the site.  
Sawcut and Pavement Milling prior to placement of fillet will be required; both items will be paid for as Pavement Milling.
- ① Estimated at 145 lbs./cu. ft.
  - ② Quantities as per location.



- ① Quantities are per location.
  - ② Estimated for one application. (Not a bid item)
- TYPICAL SECTION  
HOT MIX ASPHALT PAVED SHOULDER

Location ⑤			QUANTITIES ①							
Road Identification	Station to Station	Side	D	E	Excavation Cu. Yds.	Paved Shoulder Sq. Yds.	Hot Mix Asphalt Tons	Tack Coat Gals. ②	Asphalt Binder Tons	Earth Shldr. Constr. Stgs.
			Inches	Feet						

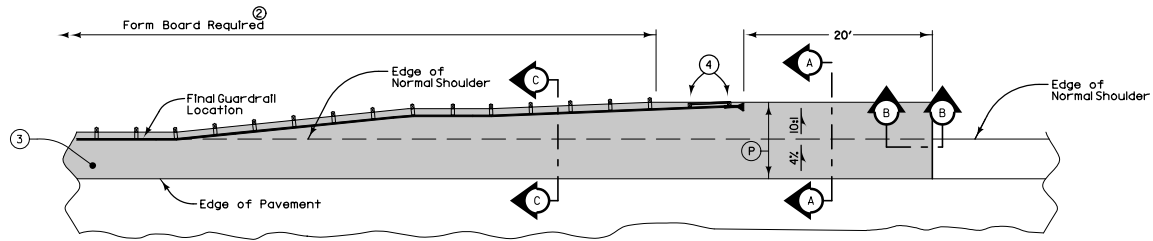
Location				W	Hot Mix Asphalt 3.5" Depth ①	Pavement Milling ②	Remarks
Road Identification	Station	Side Road/Driveway	Side	Feet	Tons	Sq. Yds.	

This sheet provides optional details and quantity tabulations for granular shoulders, paved shoulders and fillets for paved side roads with PCC overlay widening.

OPTIONAL SHOULDER AND PAVED ACCESS DETAILS

12:56:29 PM 5/3/2018 Y81..I00TRoadJ:\2013\_projects\113.0057\OVERLAY REFERENCE GUIDE\10-04-2017\77069100.B6-B7-B8-B9.sht

# GUARDRAIL AND PAVED SHOULDER DETAIL



- ① 6" subgrade treatment (not required on this project).
- ② When guardrail posts are installed prior to construction of paved shoulder, nail 1" x 6" untreated form boards along the face of guardrail posts for the length shown. This board is to prevent shoulder material from contacting the sides of the posts and altering the function of the guardrail. Form board not required for final 2 posts.
- ③ Continue paved shoulder to existing paved shoulder or 20' beyond the end of guardrail.
- ④ Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement.

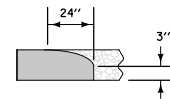
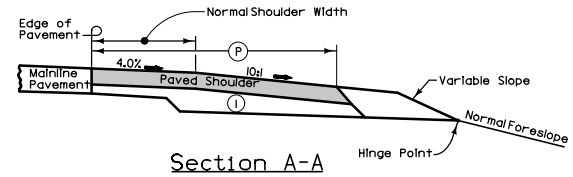
6" HMA Paved Shoulder at guardrail. 7" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse joints in shoulder at mid-panel of the mainline pavement. Place longitudinal joint at W/2 from edge of mainline pavement when W is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal & reinstallation of guardrail will be allowed with no additional payment.

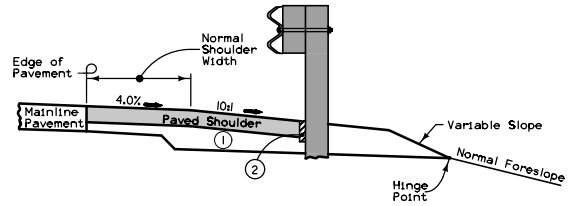
Location				P Feet	Subgrade Treatment ①	Paved Shoulder SY	Excavation CY	Remarks
Road Identification	Station To Station	Side	Type					

**Note:**  
Follow jurisdiction standards for guardrail details.



Section B-B

Roll down at granular shoulder or earth.



Section C-C with Form Board

This sheet provides details and quantity tabulations for a guardrail. It is important to review local jurisdictional or agency standards for guardrail design and construction prior to utilization of this information.

**OPTIONAL GUARDRAIL AND PAVED SHOULDER DETAIL**

## QUANTITY TABULATIONS

POINTS OF ACCESS Refer to Cross-Sections															TABULATION OF SAFETY CLOSURES						
Location		② Type A, B, or C	Length of Opening			④ W	① ② PR	② SR	Pipe Culvert					Driveway Surface Area		Driveway Surfacing Material Tons	Remarks	STATION	CLOSURE TYPE		REMARKS
Station	Side		① Case 1 or 2	1 1/2" Dropped Curb Lin. Ft.	3" Dropped Curb Lin. Ft.				② H	② Size Inches	② Pipe Length Lin. Ft.	② Lt. Lin. Ft.	② Rt. Lin. Ft.	Aprons No.	HMA Sq. Yds.				PCC Sq. Yds.	Road Qty.	

LONGITUDINAL SUBDRAIN SHOULDER AND BACKSLOPE																				
Location				Longitudinal Subdrain						Subdrain Outlet					Remarks					
Line No.	Road or Lane Ident.	Station to Station	Side	Depth ① (Inches)	Shoulder		Backslope		Bridge Berm ①		Station	Size (Inches)	Standard Road Plan and Type	Porous * Backfill (Cu. Yds.)		Crushed Stone (Cu. Yds.)				
					Size (Inches)	Length (Feet)	Size (Inches)	Length (Feet)	Size (Inches)	Length (Feet)										

TABULATION OF SILT FENCE			
LOCATION		LENGTH	REMARKS
STATION TO STATION	SIDE		

PAVEMENT MARKINGS																				
* See Typical 9001 for 'A' and 'B' designation																				
② Broken Center Line (Yellow)    ⑤ No-Passing Zone Line (Yellow)    ⑦ Edge Line Right (White)    ⑨ Dotted Line (White)    ⑪ Channelizing Line (White)    ⑬ Stop Line (White)    ⑮ Yellow Curb    ⑰ Yield Line (White) ③ Double Center Line (Yellow)    ⑥ Broken Lane Line (White)    ⑧ Edge Line Left (Yellow)    ⑩ Solid Lane Line (White)    ⑫ Channelizing Line (Yellow)    ⑭ Crosswalk Line (White)    ⑯ White Curb    ⑱ Double Dotted Line (Yellow)																				
Location		Length (In Stations)																		Remarks
Road Identification	Station to Station	Side		②	③	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮*	⑯*	⑰*	⑱*	
		L	R																	

REMOVAL OF PAVEMENT Refer to Tabulation 102-5						* Not a Bid Item
Station to Station	Pavement Type	Area (Sq. Yds.)	Saw Cut # (Lin. Ft.)	Intakes and Utility Accesses (No.)	Remarks	
This tab is used for bridge approaches and vertical transitions.						

TABULATION OF EXISTING PAVEMENT									
No.	Location	Existing Pavement (Type)	Coarse Aggregate			Durability Class	Pavement Thickness (Inches)	Reinforcement (Type)	Detail Typical
			Gravel	Crushed Stone	Source				

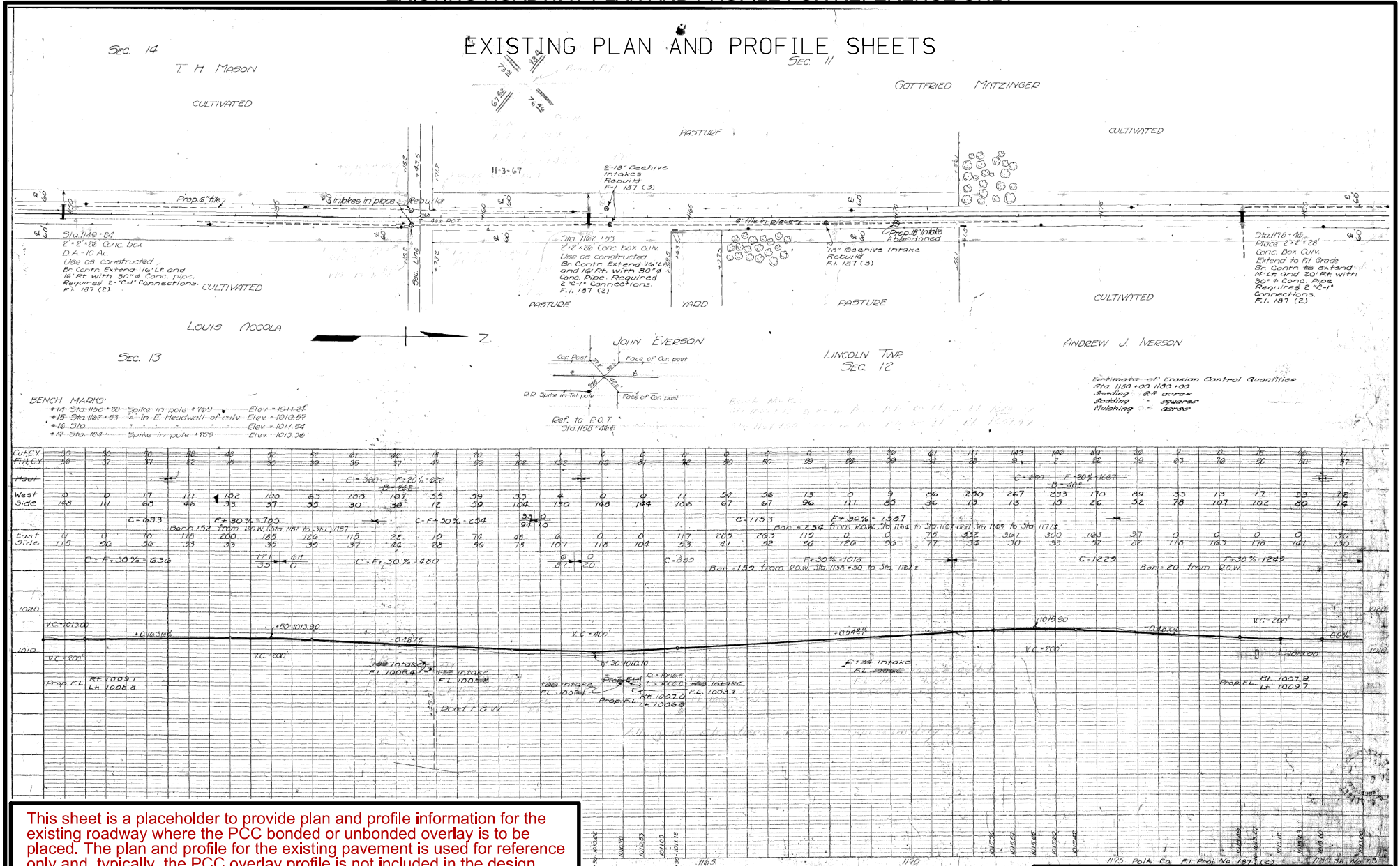
FULL-DEPTH PATCHES																		
Location			Dimension			PCC Patches			HMA Patches	Composite HMA	Subbase Patches	Subbase Patch w/ 'EF' Joint	Subdrain, Longitudinal, (Patches) 4"	'CD' Joints	'CT' Joints	'EF' Joints	Anchor Lugs Removal	Remarks
Count	Station or Milepost	Lane (L, R or B)	Length FT	Width FT	Patch Thickness IN	With Dowels RR-4 SY	Without Dowels RR-2 SY	C R C RR-18 SY										

This sheet provides sample tabulations of typical work items related to a PCC bonded or unbonded overlay. The work item tabulation will vary depending on the scope of the project.

OPTIONAL QUANTITY TABULATIONS

EXISTING ROADWAY PLAN AND PROFILE FOR REFERENCE ONLY

EXISTING PLAN AND PROFILE SHEETS



This sheet is a placeholder to provide plan and profile information for the existing roadway where the PCC bonded or unbonded overlay is to be placed. The plan and profile for the existing pavement is used for reference only and, typically, the PCC overlay profile is not included in the design drawings.

OPTIONAL ROADWAY PLAN AND PROFILE



## STAGING AND TRAFFIC CONTROL NOTES

### STAGING NOTES

- ① Through traffic on Mainline shall be staged to allow work under traffic and work while detoured. Mainline detour route (refer to map on sheet A.1) shall be signed and maintained by the Jurisdiction Maintenance personnel. The contractor shall provide a 2 week notice to the engineer before any detour use is allowed.
- ② The contractor shall maintain access at all times for residents who live and work along mainline, including school bus traffic. No more than two (2) side roads closed at any time.
- ③ Traffic control on the project shall be in accordance with MUTCD, current edition.
- ④ Unless otherwise directed, the contractor shall take appropriate measurements of the existing pavement marking prior to removing or obliterating them to insure their replacements are positioned in similar locations.
- ⑤ If Mainline is open to traffic, no lane closures will be allowed during the following events:

### TRAFFIC CONTROL PLAN

**STAGE 1**  
**TRAFFIC CONTROL**  
 A minimum of one traffic lane shall be maintained on Mainline during daytime hours. During night time hours lane closures will not be allowed.

**CONSTRUCTION**  
 Full Depth Patching  
 Pavement Milling

**STAGE 2**  
**Phase 2A**  
**TRAFFIC CONTROL**  
 Through traffic on Mainline shall be detoured (refer to Detour #1 map on sheet A.1).

**CONSTRUCTION**  
 Excavation for PCC Widening and Subbase Placement  
 PCC Inlay Pavement / PCC Reconstruction Areas / PCC Overlay Pavement  
 Right turn lane construction  
 PCC / HMA tie - in work at side roads  
 Granular Shoulders  
 Paved Shoulders  
 Guardrail updates  
 Pavement Markings

**Phase 2B**  
**TRAFFIC CONTROL**  
 Through traffic on Mainline shall be detoured

**CONSTRUCTION**  
 Excavation for PCC Widening and Subbase Placement  
 PCC Overlay and Widening / PCC Reconstruction Areas  
 Right turn lane construction  
 PCC / HMA tie-in work at side roads  
 Granular Shoulders  
 Paved Shoulders  
 Guardrail updates  
 Pavement Markings

### COORDINATED OPERATIONS

Other work in progress during the same period of time will include the construction of the projects listed. Coordinate operations with those of other contractors working within the same area.

This sheet is required to list specific staging notes and criteria that the contractor will need to follow during construction. If specific staging or phasing is required, it is recommended to list specific staging criteria instead of drawing detailed staging plans. This gives the contractor flexibility in setting up staging operations and possibly making construction operations more efficient. It is critical that the contractor submits traffic control and staging plans for review prior to construction.

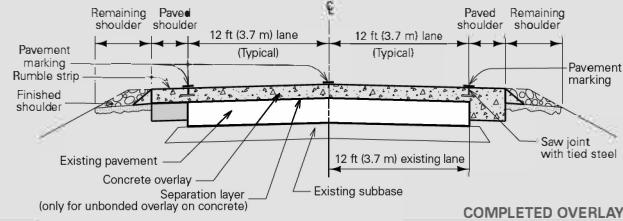
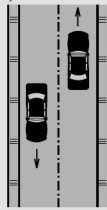
**OPTIONAL STAGING AND TRAFFIC CONTROL**

# STAGING CONSTRUCTION OPEN TO TRAFFIC

## COMPLETED OVERLAY (Two-Lane Roadway with Paved Shoulders, Conventional Paver)

### Applied to:

- Bonded concrete overlay of concrete pavements
- Bonded concrete overlay of asphalt pavements
- Bonded concrete overlay of composite pavements
- Unbonded concrete overlay of concrete pavements
- Unbonded concrete overlay of asphalt pavements
- Unbonded concrete overlay of composite pavements

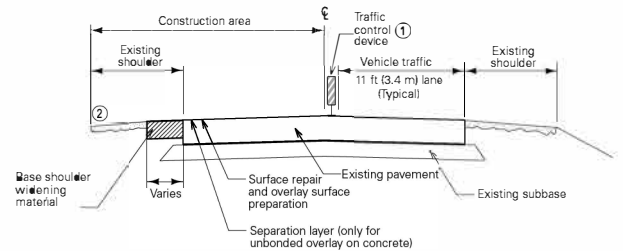
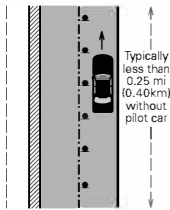


LEGEND	
	Stage work area
	Concrete
	Base shoulder widening materials (e.g., cement-treated base, porous concrete, roller compacted concrete (RCC), asphalt, or concrete)
	Granular material

### STAGE 1. Repair surface, prepare for overlay, and construct base shoulder widening and separation layer

- Install traffic control and close the left lane. Follow jurisdictional requirements for traffic control. Check with jurisdiction regarding allowable lane closure length. If surface repair and preparation for the overlay are minimal, then slow-moving traffic control may be appropriate. Closing the lane may require additional traffic control (e.g., signals, flaggers, and/or pilot cars).
- Repair the surface as appropriate. Prepare the surface for the overlay (or, in the case of concrete overlay on concrete, the separation layer) as described in the contract document.

- Prepare for shoulder widening by trenching the existing shoulder and trimming to the specified width. The trench should be rolled and compacted as necessary to obtain a firm and stable platform as specified in the contract documents. A continuous progression approach with the shoulder trencher and placement of the base shoulder widening material is encouraged.
- Construct separation layer (only for unbonded overlay on concrete).



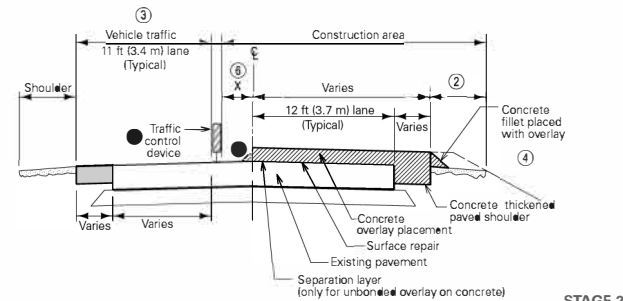
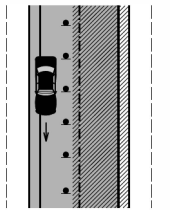
STAGE 1

- ### NOTES:
- Follow jurisdictional requirements for traffic control devices.
  - Treat 3 ft (0.9 m) area outside of proposed paved shoulder with calcium chloride. If the existing shoulder outside the proposed paved shoulder is less than 3 ft (0.9 m), it may be necessary to adjust the slipform paver and/or paver control to accommodate the reduced space.
  - Minimum lane width next to the paver may be reduced for short-term, stationary work on low-volume, low-speed roadways when vehicular traffic does not include longer and wider heavy commercial vehicles.
  - If the overlay is opened to traffic in this stage, and final shoulder backfill is delayed, place fillet as shown or (if overlay creates a dropoff greater than jurisdictional allowance) place granular shoulder.
  - See centerline fillet illustration and subsequent removal on figure 103.
  - For "X" less than 4 ft (1.2 m), adjustments to paver may be necessary to accommodate paver control and paver track.
  - The "X" dimension can be reduced to 3 ft (0.9 m) minimum when the right lane is used as paver control.
  - Mark edgelines and centerlines per MUTCD (FHWA 2009) section 6F.77 (mark both lanes).
  - Construct longitudinal joint.

### STAGE 2. Construct right shoulder and concrete overlay

- Shift the traffic control to the left lane and close the right lane to traffic. The length of the closure will depend on the jurisdiction's maximum closure length with pilot car. Traffic controls and traffic control signals will be based on jurisdictional requirements.
- Repair and prepare the surface for the overlay or the separation layer and subsequent overlay as described in the contract documents. Construct separation layer (for unbonded overlay).
- Normal space for the paver stringline is 1–1.50 ft (0.30–0.46 m) and the paver track is a minimum of 2.50–3 ft (0.76–0.91 m). 1 ft (0.3 m) incremental encroachment reduction (up to 2 ft (0.6 m) total) is common through

- typical machine adjustment. Speeds should be additionally restricted adjacent to paver when clearance between the paver and vehicle traffic is tight.
- Construct concrete overlay on the existing pavement. Complete right PCC shoulder widening with the overlay. Bull float work shall operate from the outside shoulder only.
- The "X" dimension between the roadway centerline and vertical panel is for the paving machine track and stringline.

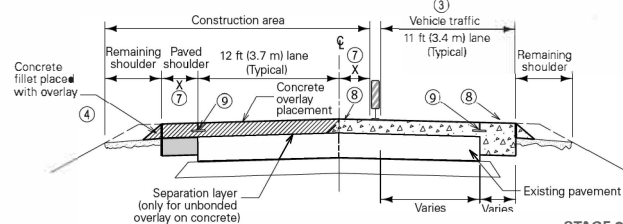
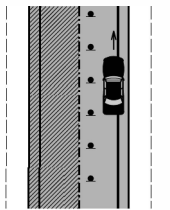


STAGE 2

### STAGE 3. Construct left lane concrete overlay

- Close the opposite lane to traffic and place the concrete overlay according to contract documents, using the same procedures as described in stage 2. Note that stringline may not be necessary for the right edge of the paving when the paved overlay constructed in stage 2 is used as the paver control in this stage. If the right stringline is not used, the "X" dimension could possibly be reduced to 3 ft (0.9 m).

- If the outside edge dropoffs at the shoulder exceeds the jurisdictional allowance for a 1:1 fillet, then construct the granular shoulders in this stage.
- Complete shouldering. Install (mill) rumble strips in the paved shoulders and complete pavement marking and regulatory signing in accordance with contract documents.



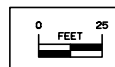
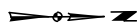
STAGE 3

## Overlay of Two-Lane Roadway with Paved Shoulders (Conventional Paver)

The sheet provides guidance for staging work when the roadway is open to traffic during construction. This staging diagram, as well as others, are found in Chapter 6 of the *Guide to Concrete Overlays* (Third Edition), May 2014.

OPTIONAL STAGING CONSTRUCTION OPEN TO TRAFFIC

# STAKING LAYOUT



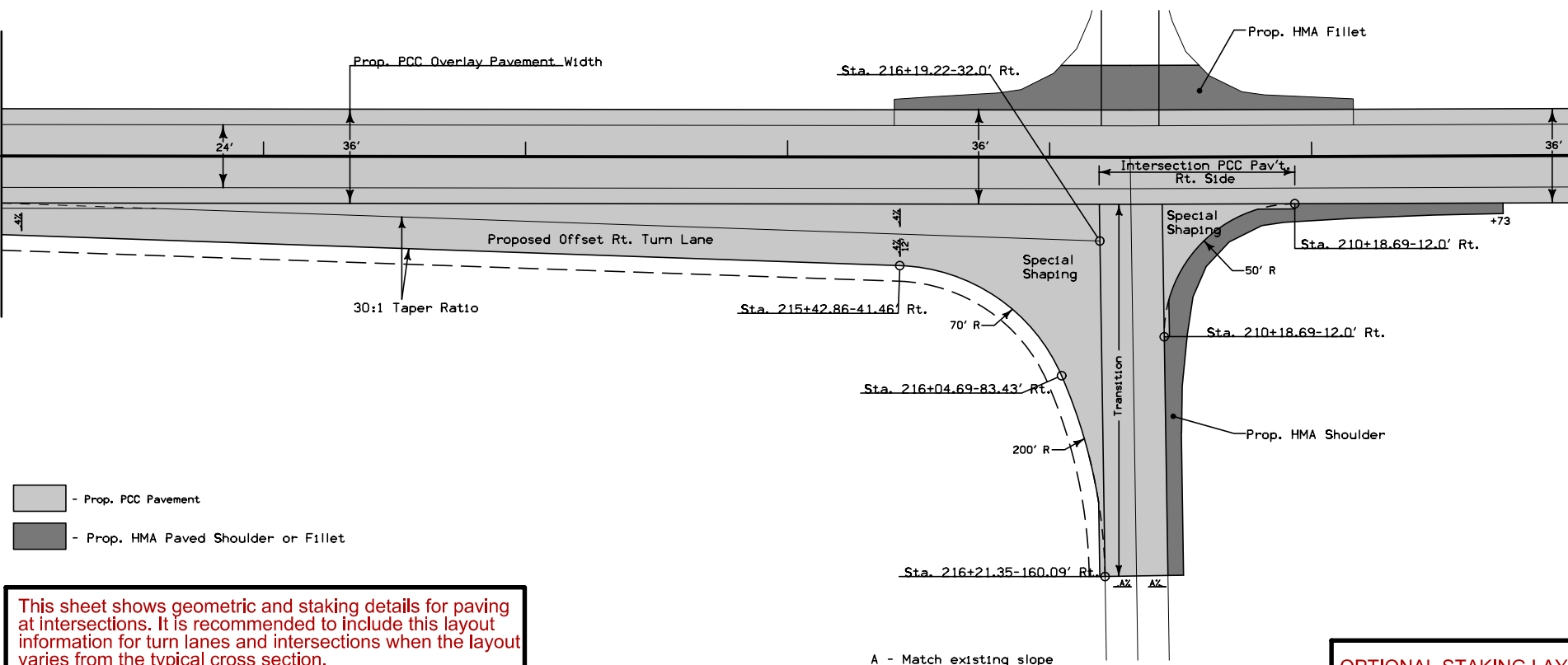
## PAVING, GEOMETRIC & STAKING DETAILS

**NOTES:**

1. For the Rt. Turn Lane pavement quantities and additional information, refer to detail on sheet B.7.
2. For Jointing details, refer to sheet L.2.

215

Match Line Sta. 212+00, refer to sheet L.1



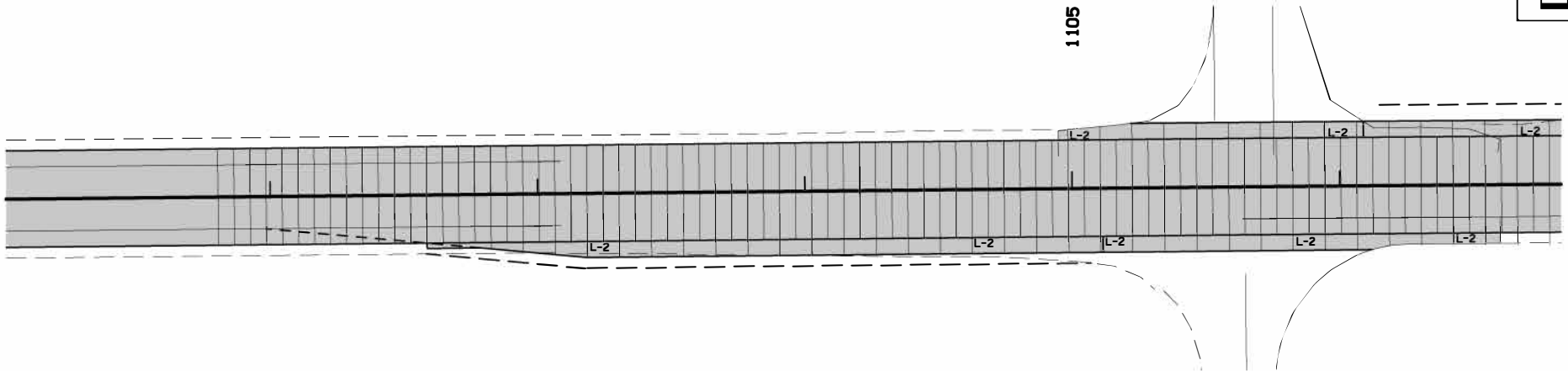
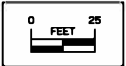
- Prop. PCC Pavement
- Prop. HMA Paved Shoulder or Fillet

This sheet shows geometric and staking details for paving at intersections. It is recommended to include this layout information for turn lanes and intersections when the layout varies from the typical cross section.

A - Match existing slope

**OPTIONAL STAKING LAYOUT**

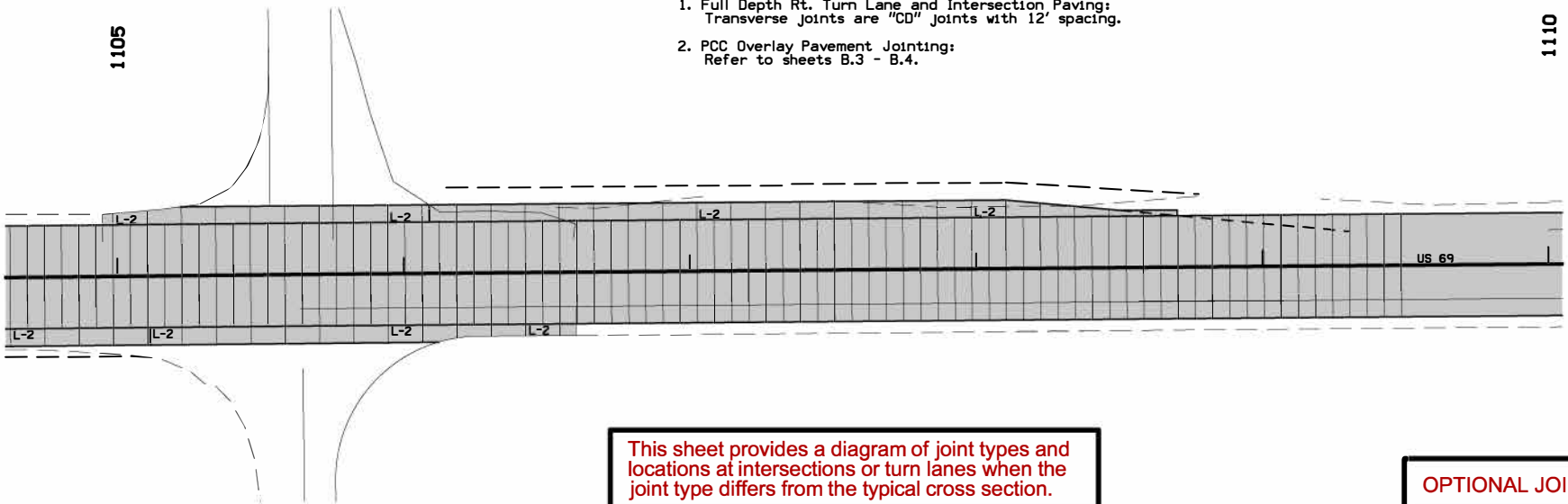
# JOINTING LAYOUT



### JOINTING DETAILS at Sta. 1105+63

- Prop. PCC Pavement

- NOTES:**
1. Full Depth Rt. Turn Lane and Intersection Paving:  
Transverse joints are "CD" joints with 12' spacing.
  2. PCC Overlay Pavement Jointing:  
Refer to sheets B.3 - B.4.



This sheet provides a diagram of joint types and locations at intersections or turn lanes when the joint type differs from the typical cross section.

OPTIONAL JOINTING LAYOUT