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Figure

56-3A Stationing Conventions

56-3B Collection of Field Data

56-4A Pavement Widths for Rural Two-Lane Roads with Shoulders

56-4B Pavement Widths for Rural Multi-Lane Roads with Shoulders

56-4C Pavement Widths for Urban Two-Lane Roads with Curbs

56-4D Pavement Widths for Urban Multi-Lane Roads with Curbs

56-4E Partial 3R Work – Mainline Pavement and Approaches Considerations

56-4F Partial 3R Work – Roadside, Culverts, and Traffic Considerations

CHAPTER FIFTY-SIX

PARTIAL 3R PROJECTS

56-1.0 INTRODUCTION

Many highways cannot satisfy the values for full Resurfacing, Restoration, and Rehabilitation (3R) criteria. For these reasons, the Department has adopted a partial 3R concept with different limits for geometric design criteria for pavement rehabilitation on an existing highway. This is due to constraints in right-of-way, construction time, pavement conditions, or cost. The criteria for rehabilitation of an existing highway is based on sound engineering practices, experience, and assessment of the basic principles of geometric design and how the criteria for other types of construction can be adapted to an existing highway within practical limits. The goal of partial 3R is to preserve and maintain the existing highway system.

This Chapter provides the Department's criteria and guide to the development of a partial 3R project. The objective of this Chapter is to unify and standardize the project development, design criteria, field data collection, and final presentation of plans and related documents used in the development of a partial 3R project. This Chapter should not be interpreted as specifications and should not replace sound judgment. The designer should refer to the INDOT *Standard Drawings* or the *Standard Specifications* to resolve questions concerning materials, standard details, workmanship, pay items, pay units, etc.

See Chapter Fifty-two, or the AASHTO *Policy for Geometric Design of Highways and Streets* for additional information.

Where a partial 3R project scope of work includes costly items such as bridge reconstruction or replacement or major alignment corrections which have a long service life, the project should be returned to the Engineering Assessment stage, for consideration as 3R, 4R, or possibly new construction.

56-2.0 ENGINEERING ASSESSMENT

The district Office of Design, in cooperation with the Planning Division and its Office of Pavement Engineering, will determine the need for and propose partial 3R work on a given route. The district will make a recommendation and justification regarding the type of partial 3R

project. The recommendation will be reviewed by the Planning Division's Safety Team and Mobility Team. The Teams will use their Pavement Management System to determine the needs of the pavement and to document the condition of the pavement prior to approving the appropriate type of treatment. The Teams will then discuss their findings with the district. The Planning Division and the district are to ultimately concur in whether the partial 3R project should be designed as a preventative maintenance, functional, or structural treatment, or instead, a full 3R project. The Safety Team leader may make recommendations relative to highway safety needs. The Planning Division then authorizes the project. This information is provided to the district's Office of Design, which then begins the design process.

Right-of-way acquisition should not be required for partial 3R work.

The following defines the scope of work to be performed for each type of partial 3R project.

56-2.01 Types of Partial 3R Projects

56-2.01(01) Preventative Maintenance Treatment

Preventative maintenance consists of a pavement-surface treatment used to preserve and extend the service life of the pavement. It should be designed in accordance with Section 52-7.04(01).

56-2.01(02) Functional Treatment

A functional treatment should be used to correct pavement deficiencies such as roughness or poor frictional properties. The intent is to improve the roadway serviceability by correcting distresses caused by traffic or environmental conditions. It should be designed in accordance with Section 52-7.04(02).

56-2.01(03) Structural Treatment

A structural treatment should be used where the existing pavement structure has failed due to a load-related distress. It should be designed in accordance with Section 52-7.04(03).

56-2.02 Analysis of Accident Data

Accident data should be analyzed in accordance with Section 55-5.01, except that a formal report is not necessary. Each location with a definite accident pattern should be indicated on the accident-data computer printout. Spot-improvements work at such a location should either be incorporated into the project or programmed separately.

56-2.03 Project Classification

Classification of work as partial 3R, full 3R, partial 4R, or full 4R must be determined in accordance with Section 40-6.0.

56-3.0 PRELIMINARY DESIGN PROCESS

Preliminary project parameters and criteria are discussed and outlined below.

56-3.01 Review of Earlier Work in the Project Site

The designer should review the existing project files, plans, and resurface-contract documents, if applicable, for additional information. Such plans include original stationing, roadbed characteristics, structure information, and original drainage patterns. Previous resurface-contract documents can include valuable supplemental information. See Figure 5-2B for a blank Request for Traffic Projections form. See Figure 5-2C for a blank Request for Accident Records form.

56-3.02 Preliminary Project Schedule

The designer should prepare a preliminary schedule with estimated completion dates for the following key activities or mileposts.

005	Project Started
040	Project Scope Complete
060	Start Plan Development
075	Survey Complete
085	Preliminary Field Check
110	Geotechnical Investigation (if required)
115	Final Pavement Design Approval
185	District Plans Complete
205	Plans Signed
215	Utilities Coordination

245 Ready for Letting

56-3.03 Environmental Document

The designer should verify the need for an environmental document and identify the required environmental permits. Each project requires a level of environmental documentation. For a partial 3R project, such documentation consists of a Categorical Exclusion. A Categorical Exclusion is described in Section 7-1.01(01).

56-3.04 Bridge Structure Considerations

Where a bridge structure is encountered within the project limits, the designer should consult with the district bridge engineer concerning needed improvements or needed repairs. A memorandum should be written to the Planning Division's Bridge Management Team with a copy to the Production Management Division's Bridge Rehabilitation and Ratings Team. The memorandum should provide details about the proposed project, and should request their comments and recommendations. The memorandum should address proposed milling, spot pavement replacement, horizontal and vertical clearances if they are factors, weight restrictions, and all other factors which can affect the structures.

56-3.05 Unusual Soil Conditions

If there are indications of peat deposits, rock outcroppings, or other unusual soil conditions, long-term repair of such items should be programmed separately through INSTIP.

56-3.06 Stationing

Stationing should match the existing plans where possible. If the project limits extend beyond the stationing limits of the existing plans, the stationing should be extended to include the project limits. Stationing should refer to the Reference Post System (RPS). For known features, see the Physical Features Inventory. Stations should be marked onto the pavement with traffic paint rather than spray paint. Stationing marking options are shown in Figure 56-3A.

If new English-units stationing must be used, it should have an assumed starting station of 100+00.

5. Indicate all of the information required relative to the items listed on the Review of Traffic Items.
6. The district Highway Management Division, prior to the field survey, should have furnished a list of structures to be replaced, side ditches to be cleaned, etc. All dimensions, elevations, or other information needed to design the changes in these items should be gathered at this time.
7. If gabions or riprap are required, obtain all of the data necessary to incorporate them into the design.
8. If new or additional guardrail is required, information should be collected for design.
9. If an outcropping is to be removed, gather enough information in the field to be able to calculate the quantity involved.
10. If subgrade failures or slope failures are observed, the Production Management Division's Office of Geotechnical Services should be contacted for further evaluation.

The above is not a full nor a complete list of items necessary to collect field information. Additional field research may be needed to accomplish the design.

Additional survey data may be required. If so, a survey may be performed to gather additional information such as structure inlet and outlet elevations, existing pavement grades, drainage areas, channel cross sections, horizontal or vertical realignment of existing facility, right-of-way needs, etc.

56-3.08 Plans Development

See Section 14-2.03 for these requirements.

56-3.09 Field Check

See Sections 14-2.03(03) and 14-2.03(08) for these requirements.

56-3.10 Pavement Design

See Section 52-9.0 for these requirements.

56-3.11 Revised Project Schedule

The designer should prepare a revised schedule for processing the project through the design phases including additional activities that were not included in the preliminary schedule. This revised schedule should be submitted to the district Office of Design and should be updated on a monthly basis or as required. The revised schedule should allow a minimum of 14 weeks prior to the letting date as the time at which the contract documents should be complete and ready for transmittal.

56-4.0 GENERAL DESIGN PARAMETERS

56-4.01 General Standards Requirements

All INDOT *Standard Specifications* and *Standard Drawings* will apply. All deviations from the *Standard Specifications* and *Standard Drawings* will be subject to approval by the Contract Administration Division director. A deviation from the *Standard Specifications* will require detail drawings and special provisions subject to the approval of the Contract Administration Division director. The designer should see Section 19-2.0 for instructions on writing special provisions.

56-4.02 References and Research Sources

References and research sources available for use as design references for supplemental information include the following:

1. INDOT *Standard Drawings*;
2. INDOT *Standard Specifications*;
3. AASHTO's *A Policy on Geometric Design of Highways and Streets*;
4. Chapter Fifty-two, Pavement and Underdrain Design Elements;
5. Chapter Fifty-four, Geometric Design of Existing Freeway (4R);
6. Chapter Fifty-five, Geometric Design of Existing Non-Freeway (3R);
7. Road Logs and Bridge Logs;
8. Pavement Management System;

9. No-Passing Zone Logs; and
10. Other miscellaneous sources including previous plans, pavement histories, etc.

56-4.03 Desirable and Minimum Pavement-Width Requirements

The values shown in Figures 56-4A, 56-4B, 56-4C, and 56-4D should be used for the design of pavement, travel-lane, shoulder, and curb-offset widths.

The figures are titled as follows:

- 56-4A Pavement Width for Rural Two-Lane Road with Shoulders
- 56-4B Pavement Width for Rural Road of 4 or More Lanes with Shoulders
- 56-4C Pavement Width for Urban Two-Lane Road with Curbs
- 56-4D Pavement Width for Urban Road of 4 or More Lanes with Curbs.

If an existing width is greater than the value shown in the figures, the existing width should be used.

The minimum width of pavement widening, where used, should be 2 ft for constructability. The maximum width of pavement widening should not exceed that shown in Section 52-9.02(09). If widening varies from side to side of the existing pavement, a strip map or a typical cross section showing widening by stations should be provided. If cut or fill slopes are required, cross sections should be provided.

56-4.04 Mainline-Pavement Considerations

Considerations to be made regarding specific mainline pavement and approaches items for each type of partial 3R treatment are shown in Figure 56-4E. Some of these items are further detailed below.

Work of a larger magnitude than that shown in Figure 56-4E for a given treatment may be done. Such work should be considered as a spot improvement, designed to the appropriate standards.

56-4.04(01) Auxiliary Lane

Incorporating or upgrading a turn lane, parking lane, passing blister, or other auxiliary lane to reduce the disruption of the flow of traffic should only be considered for a structural treatment.

A geotechnical evaluation may be required. A partial 3R project involves few agreements and should require no additional right of way. The guidelines in Chapter Forty-six may not be attainable due to budgetary constraints and right-of-way acquisition. An auxiliary lane which cannot be considered in the project may be separately programmed as a spot improvement or into a future full 3R or 4R project. See Chapter Fifty-four or Fifty-five for appropriate requirements.

56-4.04(02) Castings

Castings need not be reset if the overlay depth is equal to the milling depth. However, if the finished grade is different from the original grade, the adjustment of the castings should be incorporated into the work.

In an unincorporated area, Department storm-sewer or sanitary-sewer castings should be adjusted to grade as required. In an incorporated area, the local utilities should be required to adjust castings as required. See Chapter Thirty-six for more information.

In an area to be surface milled, all utility castings, and storm-sewer and sanitary-sewer castings, should be located and identified.

56-4.04(03) Cross Slopes

1. Travel Lanes. Pavement cross slopes on a tangent section should be reviewed for each type of partial 3R treatment. Improving pavement cross slope, where required, may be completed through staged construction, e.g., combining surface milling with pavement core investigation with a variable-depth cross section of HMA Intermediate course in accordance with the INDOT *Standard Specifications* prior to placing a uniform-depth HMA Surface course.

A preventative-maintenance treatment is exempt from crown correction only if an existing rural-pavement cross slope is 2%, or if an existing urban-pavement cross slope is 1.5 to 3%. If the slope is outside this range, a combination of surface milling and a uniform-depth HMA Surface course should be used.

2. Shoulders. For a paved shoulder of 4 ft or narrower, the cross slope should match the mainline cross slope. For a paved shoulder wider than 4 ft, the cross slope should match the existing shoulder slope, or should desirably be 4%. An aggregate- or earth- shoulder slope should be 4% to 8%. In a horizontal curve, shoulder slope should be determined in accordance with Section 43-3.0.

56-4.04(04) Curbs

In areas where the curb height is not adequate for drainage, the pavement adjacent to the curb should be milled to the depth required for adequate drainage. If the curb is not structurally adequate, curb replacement should be considered. The pavement in such an area should be evaluated for possible future replacement.

56-4.04(05) Monuments

All existing Department monuments should be perpetuated. The designer is responsible for contacting the county surveyor for a list of monuments to be reset, witnessed, and monumented. Each affected monument is to be shown on the plans, or the required information is to be provided prior to construction.

56-4.04(06) Sight-Distance Improvement

Existing geometrics should be maintained if no adverse accident history exists. See Chapter Fifty-five for desirable geometric criteria.

56-4.04(07) Subsurface Drainage

Subsurface drainage should be considered and perpetuated where it currently exists. For a structural treatment, addition of subsurface drainage should be considered. See Section 52-10.0 for subsurface-drainage-design requirements.

56-4.04(08) Superelevation and Horizontal Curve

For a functional or structural treatment, evaluation of an existing curve and superelevation should be performed. For a structural treatment, the pavement slope should be in accordance with the superelevation requirements shown in Section 43-3.0 where possible.

56-4.04(09) Surface Milling

Milling of HMA pavement will be used to adjust roadway cross section, develop or maintain curb exposure, remove wheel ruts, tie the new pavement into existing pavement, improve drainage, or remove undesirable areas or layers of pavement. Surface milling will be required as described in Section 52-7.05. Existing layers of HMA Surface Sand on or near the surface should be removed. Cores should be taken and analyzed by the district Office of Testing to ensure that the proposed milling can be performed. Where milling is proposed near a signalized intersection, the designer should coordinate with the district Office of Traffic to either avoid or replace existing signal loops. Details for milling at the project termini are shown in the INDOT *Standard Drawings*.

56-4.04(10) Urban Surface Drainage

Improvements to an urban surface-drainage system to correct water ponding that may be causing pavement stability problems may be included in a partial 3R project. Where surface milling is required to achieve drainage of a low location where water collects, or to remove existing asphalt, pavement cores should be obtained in the area to assess the pavement structure.

56-4.05 Approaches

It has been the practice of the Department to maintain the surfaces of the approaches to its routes. The limits and type of treatment vary with the type of approach. The treatments and limits used to maintain these approaches in conjunction with partial 3R work are provided herein.

Each approach should be in accordance with the INDOT *Standard Specifications* and *Standard Drawings*. Approach-data tables may be provided for supplemental information. See Chapters Forty-six and Fifty-two for approach-design criteria where approach improvements are to be made.

56-4.05(01) Public-Road Approach

This type of approach should be overlaid to the apparent right-of-way line, unless the approach is another Department-maintained route which has recently been, or is scheduled to be treated within two years of completion of the partial 3R project. Shoulders should be constructed on each approach where shoulders exist or are being constructed on the mainline. The approach geometry should comply with the INDOT *Standard Drawings* as nearly as possible, especially where approaching a mainline pavement with $AADT \geq 3,000$. An existing paved public-road approach should be overlaid to match the existing mainline's pavement-edge elevation, and

tapered to match the profile on the approach at the apparent right-of-way line through the use of a milled notch at the terminus. See the INDOT *Standard Drawings* for details.

56-4.05(02) Drive

1. Asphalt. The partial 3R treatment of an asphalt drive consists of a 3-ft wide wedge of HMA for Approaches placed adjacent to the mainline or shoulder pavement as shown on the INDOT *Standard Drawings*. This 3-ft width, depending on the depth of the mainline overlay, may not be practical and may need to be extended to prevent a hump or adverse rollover (grade break) that is unacceptable.
2. Concrete. For a concrete drive, a wedge of HMA for Approaches should be placed over the concrete terminating in a milled notch as shown on the INDOT *Standard Drawings*. The approach design length is based on the overlay depth on the mainline and an acceptable resultant grade on the approach.
3. Aggregate. For an aggregate drive adjacent to a nonpaved shoulder, a 3-ft widening with HMA for Approaches should be placed adjacent to the outer edge of the mainline or shoulder pavement. After placement of the widening, if a grade differential exists, it should be wedged out with compacted aggregate. Rollover criteria should be considered.
4. Field Entrance. This type of drive is earth. Fill is placed as required and compacted to the edge-of-shoulder or -pavement elevation.

56-4.05(03) Mailbox Approach

An existing mailbox approach may be substandard and most often cannot be corrected within the existing right of way. In a preventative maintenance or functional treatment, this type of approach should be overlaid to match the mainline elevation by use of the same paving material specified for the shoulder. In a structural treatment, a substandard approach deemed to be a hazard that can be improved should be improved to the geometrics shown in the INDOT *Standard Drawings*. If the standardized-approach limits intercept the mailbox location, the mailbox should be reset. If the shoulder is not to be paved, a mailbox approach should be provided as described in Section 52-9.02(08).

56-4.06 Roadside Considerations

The designer must keep focused on the objectives of the scope of work that has been established for an individual partial 3R project in order to apply the appropriate roadside-safety improvements.

Roadside-safety improvements should be considered as described in Figure 56-4F. Some of these are further detailed below.

56-4.06(01) Guardrail

Where required, a Guardrail Summary Table should be prepared for each area with guardrail placement or modification.

The field notes and design calculations should be submitted with the project file. Guardrail requiring modifications not shown in the INDOT *Standard Drawings* should be detailed on the plans.

A guardrail end treatment type I may be in place but is now inappropriate due to higher design-year average annual daily traffic counts than it was warranted for. Such treatment should be considered for replacement with a type OS or MS treatment as appropriate for a functional or structural treatment.

56-4.06(02) Linear Grading

Linear grading may be considered only where earth is wedged at the outside edge of the shoulder, the profile grade has been raised due to overlaying or widening the pavement, or earth is wedged behind guardrail to obtain the required earth backup for the posts.

56-4.06(03) Mailbox Assembly

Existing mailbox assemblies may remain in place during the performance of most partial 3R work. If a mailbox assembly is to be moved to accommodate a functional or structural treatment, an assembly as shown in the INDOT *Standard Drawings* should be considered for the replacement. See Section 49-3.01(02) for design criteria.

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If a mailbox height relative to the profile grade is lessened by overlaying its approach, and the box need not be replaced, its height should be adjusted accordingly.

56-4.06(04) Side Ditches

For a structural treatment, efforts should be made to re-establish drainage patterns and grades similar to the original construction. Where right of way is sufficient, efforts should be made to establish flow lines in accordance with Section 52-10.04(04) Item 2.

56-4.06(05) Side Slopes

For a preventative maintenance or a functional treatment, side slopes of steeper than 3:1 are acceptable.

A roadside slope which appears to be steeper than 3:1 in a structural treatment will require a survey preparation of shoulder cross-section to determine the slope. Each location which appears to be hazardous should be analyzed to determine if an adverse accident history exists, if it is cost effective to provide guardrail, or if a slope correction to a traversable level can be made. Possible guardrail locations will be identified at the field check. See Sections 45-3.01 and 45-3.02 for guidance in determining side slope. Where significant widening is proposed on the side of an existing embankment, preliminary plans with cross sections should be sent to the Office of Geotechnical Services for evaluation.

56-4.06(06) Sidewalk

This work is not routinely incorporated into a partial 3R project. However, if it becomes necessary to work where a sidewalk exists, curb ramps should be treated as shown in Figure 56-4F.

56-4.07 Culvert and Drainage-Structure Considerations

Culvert modification or replacement requirements for structural-treatment work are described in Section 31-4.04.

56-4.08 Traffic-Related Work

Traffic-related safety improvements should be considered as described in Figure 56-4F. Some of these items are further discussed below.

56-4.08(01) Highway Signs

Existing regulatory and warning signs anticipated to be impacted by structural-treatment construction operations should be reset or replaced as required in accordance with the INDOT *Standard Specifications* and *Standard Drawings*. See Chapter Seventy-five for guidelines regarding highway signs.

A summary sheet or details should be included in the plans to list the locations for new and replacement sign types and required sign posts sizes and quantities.

56-4.08(02) Pavement Markings and Delineation

1. Markings. All permanent pavement markings, including transverse markings, should be replaced in kind. The district Office of Traffic should review the locations and quantities for such markings. The designer should contact the district Office of Traffic to coordinate the desired pavement-marking plan. New locations for markings should not be included in the project unless approved by the district Office of Traffic. The designer should consider the use of pavement markings as described in Chapter Seventy-six.
2. Snowplowable Raised Pavement Markers (RPMs). The designer should contact the district Office of Traffic to confirm the existence of RPMs within the project limits and for layout patterns that deviate from the INDOT *Standard Drawings*. See Section 76-3.02(05) for design criteria, and the INDOT *Standard Drawings* for basic layouts. If no existing RPMs are present, placement of new ones should be considered for a functional or structural treatment in accordance with Department policy.

All existing RPMs should be reviewed for replacement. Where RPMs exist, the designer has the following options for replacing removed RPMs.

- a. Install refurbished castings and new prismatic reflectors.
- b. Install new castings and new prismatic reflectors.

- c. Replacements will be programmed by the district into the INSTIP annual replacement contract.

The first option is the most desirable and the third option is the most economical. A detailed plan sheet should be provided for each layout that differs from those shown on the INDOT *Standard Drawings*. A sheet may be included in the plans to list the color combinations and quantities of RPMs required.

56-4.08(03) Traffic Signal

Each detector-loop location should be identified and shown on the plans. Each detector housing affected by the overlay operation should be adjusted to grade. Adjustments to existing signal equipment such as signal-head reorientation, if required, may be incorporated into the work. A summary sheet or details should be included in the plans to list or detail the locations where loops, detector housings, or hand holes are to be replaced or adjusted.

A traffic signal should otherwise only be considered for upgrading or placement in a structural-treatment project.

56-4.09 Design Exception Criteria

56-4.09(01) Level One Criteria Subject to Design Exception

If a work item is shown in Figure 56-4E or Figure 56-4F as A for a given type of treatment, a Level One or Level Two design exception request is required. A Level One exception is subject to approval of the Production Management Division director. Such work items are listed below.

1. Functional Treatment, A.
 - a. Cross-slope correction to 2%
 - b. Sidewalk curb ramp, repair existing
 - c. Sidewalk curb ramp, place in existing sidewalk per ADA requirements

2. Structural Treatment, A.
 - a. Cross-slope, convert tilt section to crown section
 - b. Cross-slope correction to 2%
 - c. Sidewalk curb ramp, repair existing
 - d. Sidewalk curb ramp, place in existing sidewalk per ADA requirements
 - e. Superelevation rate, improve to standard

56-4.09(02) Level One Criteria Not Subject to Design Exception

Some work items shown in Figure 56-4E or Figure 56-4F as B or C for a given type of treatment are Level One criteria, but a design exception request is not required. Such B work items are listed below.

1. Preventative Maintenance Treatment, B.
 - a. Cross-slope correction to 2%
 - b. Sidewalk curb ramp, repair existing
 - c. Sidewalk curb ramp, upgrade existing to ADA requirements

2. Functional Treatment, B.
 - a. Cross-slope, convert tilt section to crown section
 - b. Shoulder width
 - c. Sidewalk curb ramp, upgrade existing to ADA requirements
 - d. Superelevation rate, improve to standard

3. Structural Treatment, B.
 - a. Lane width
 - b. Shoulder width
 - c. Sidewalk curb ramp, upgrade existing to ADA requirements

The C work items are listed below.

4. Preventative Maintenance Treatment, C.
 - a. Bridge railing, upgrade to current standards
 - b. Cross-slope, convert tilt section to crown section
 - c. Lane width
 - d. Shoulder width
 - e. Sidewalk curb ramp, place in existing sidewalk per ADA requirements
 - f. Superelevation rate, improve to standard

5. Functional Treatment, C.
 - a. Bridge railing, upgrade to current standards
 - b. Lane width

6. Structural Treatment, B.
 - a. Bridge railing, upgrade to current standards

56-4.10 Maintenance of Traffic

A partial 3R project should be able to be completed without a road closure. If a road closure is necessary, the designer should follow the procedure described in Sections 82-2.0 and 82-7.02.

The designer should ascertain that there is sufficient roadway and shoulder width to safely accommodate both the contractor's equipment and the flow of traffic. If a roadway shoulder is to be utilized to carry traffic during construction, it must be capable of withstanding the expected traffic load and volume. A traffic-control plan should be developed as described in Section 82-2.0. The designer should consider the use of temporary traffic-control devices as described in Chapter Eighty-three.

Pavement Treatment →	Prvnt. Maint.	Func-tional	Structural
<i>Approach,</i>			
Drive, Relocate or Redesign	C	C	B
Drive, wedge 3 ft adjacent to mainl. pvmt.	A	A	A
Mailbox, Improve to Standard or Incorporate	C	C	B
Mailbox, Overlay Existing	A	A	A
Public Road, Treat to Mainline R/W Line	A	A	A
<i>Auxiliary Lane,</i>			
Improve to Current Standards or Incorporate			
Channelization Lane	C	C	B
Climbing Lane	C	C	C
Parking Lane	C	C	B
Passing Blister	C	C	B
Turn Lane	C	C	B
<i>Casting,</i>			
Adjust to Grade	C	B	A
<i>Cross-Slope Correction,</i>			
Convert Tilt Section to Crown Section	C	B	A
Correct to 2%	B	A	A
<i>Curbs,</i>			
Repair	B	B	B
Replace	C	B	B
<i>Drainage Structure,</i>			
Repair, Clean, or Adjust	B	B	B
<i>Intersection,</i>			
Improve Sight Distance and Radii	C	C	B
<i>Lanes,</i>			
Widen to Minimum or Desirable Standards ¹	C	C	B
<i>Median,</i>			
Convert to Two-Way Left-Turn Lane	C	C	B
<i>Monument,</i>			
Perpetuate	A	A	A

Key to letters A, B, and C is shown at the end of the table.

PARTIAL 3R WORK
Mainline Pavement and Approach Considerations

Figure 56-4E

Pavement Treatment →	Prvnt. Maint.	Func-tional	Structural
<i>Patching</i>	B	A	A
<i>Shoulders,</i> Widen to Minimum or Desirable Standards ²	C	B	B
<i>Sight-Distance Improvement,</i> Horizontal	C	B	B
Vertical	C	B	B
<i>Subsurface Drainage,</i> Underdrain, Clean or Repair	B	B	B
Underdrain, Place or Replace	C	C	B
<i>Superelevation Rate,</i> Improve to Current Standards ³	C	B	A
<i>Underpass Vertical Clearance,</i> Maintain Current Distance	A	A	A
<i>Urban Surface Drainage,</i> Mill as Required to Maintain or Correct	B	A	A

Key to letters in table:

A = Item should be included as part of the project.

B = Item may be included.

C = Item should not be included. If it is considered, it should be programmed separately as a spot improvement.

Notes:

¹ Minimum and desirable standards are shown in Figures 56-4A, 56-4B, 56-4C, and 56-4D.

² Minimum and desirable standards are shown in Figures 56-4A, 56-4B, 56-4C, and 56-4D.
Paved shoulders are desirable they can be placed without affecting drainage or side ditches.

³ Current standards are shown in Section 43-3.0

PARTIAL 3R WORK
Mainline Pavement and Approach Considerations

Figure 56-4E (Continued)

	4 Lanes, Total Width ^{1,2}	6 Lanes, Total Width ¹	Travel-Lane Width	TWLTL	Curb-Offset Distance
Suburban ³	D = 28 ft M = 24 ft	D = 40 ft M = 35 ft	D = 12 ft M = 11 ft	D = 12 ft M = 11 ft	D = 2 ft M = 1 ft
Intermediate ³	D = 28 ft M = 24 ft	D = 40 ft M = 35 ft	D = 12 ft M = 11 ft	D = 12 ft M = 11 ft	D = 2 ft M = 1 ft
Built-Up ³	D = 28 ft M = 22 ft	D = 40 ft M = 32 ft	D = 12 ft M = 10 ft	D = 12 ft M = 11 ft	D = 2 ft M = 1 ft

D =Desirable, M = Minimum. TWLTL = two way left turn lane.

- ¹ Total width face to face of curb for one direction of a divided road.
² For a road with a TWLTL, the total width will be increased by the applicable desirable or minimum width of a travel lane.
³ See Section 40-1.02 for definitions.

**PAVEMENT WIDTH FOR URBAN ROAD
OF 4 OR MORE LANES WITH CURBS**

Figure 56-4D

	Total Width 1,2	Travel-Lane Width	TWLTL	Curb-Offset Distance
Suburban ³	D = 26 ft M = 20 ft	D = 12 ft M = 10 ft	D = 12 ft M = 12 ft	D = 1 ft M = 0 ft
Intermediate ³	D = 26 ft M = 22 ft	D = 12 ft M = 10 ft	D = 12 ft M = 11 ft	D = 1 ft M = 0 ft
Built-Up ³	D = 26 ft M = 20 ft	D = 12 ft M = 10 ft	D = 12 ft M = 10 ft	D = 1 ft M = 0 ft

D =Desirable, M = Minimum. TWLTL = two way left turn lane.

¹ Total width face to face of curb.

² For a road with a TWLTL, the total width will be increased by the applicable width of a TWLTL.

³ See Section 40-1.02 for definitions.

PAVEMENT WIDTH FOR URBAN 2-LANE ROAD WITH CURBS

Figure 56-4C

	4 Lanes, Total Paved Width ^{1,2}	6 Lanes, Total Paved Width ¹	Travel- Lane Width	Outside Paved- Shoulder Width	Median Paved- Shoulder Width
Divided	D = 36 ft M = 29 ft	D = 48 ft M = 40 ft	D = 12 ft M = 11 ft	D = 8 ft M = 4 ft	D = 4 ft M = 3 ft
Undivided	D = 32 ft M = 26 ft	D = 44 ft M = 37 ft	D = 12 ft M = 11 ft	D = 8 ft M = 4 ft	N / A

D =Desirable, M = Minimum.

- ¹ Includes widths of travel lanes and paved shoulders for one direction of travel on a divided road.
- ² For a road with a TWLTL, the total width will be increased by the applicable width of a TWLTL.

**PAVEMENT WIDTH FOR RURAL ROAD
OF 4 OR MORE LANES WITH SHOULDERS**

Figure 56-4B

	Total Paved Width ^{1,2,3}	Travel-Lane Width ²	Paved-Shoulder Width	Sealed-Agg. Shld. Width
AAADT ≥ 5,000	D = 28 ft M = 26 ft	D = 12 ft M = 12 ft	D = 6 ft M = 1 ft	N / A
3,000 ≤ AAADT < 5,000	D = 28 ft M = 26 ft	D = 12 ft M = 12 ft	D = 4 ft M = 1 ft	D = 3 ft M = 2 ft
400 ≤ AAADT < 3,000	D = 28 ft M = 24 ft	D = 12 ft M = 11 ft	D = 2 ft M = 1 ft	D = 3 ft M = 2 ft
AAADT < 400	D = 26 ft M = 22 ft	D = 11 ft M = 10 ft	D = 2 ft M = 1 ft	D = 2 ft M = 1 ft

D = Desirable, M = Minimum.

- ¹ Includes widths of travel lanes and paved shoulders only.
- ² Should be widened on a curve where possible as described in Section 43-2.06.
- ³ For a road with a TWLTL, the total width will be increased by the applicable width of a TWLTL.

PAVEMENT WIDTH FOR RURAL 2-LANE ROAD WITH SHOULDERS

Figure 56-4A

OPTION 1

Place a mark every 50 ft

Place an abbreviated station number
every 100 ft

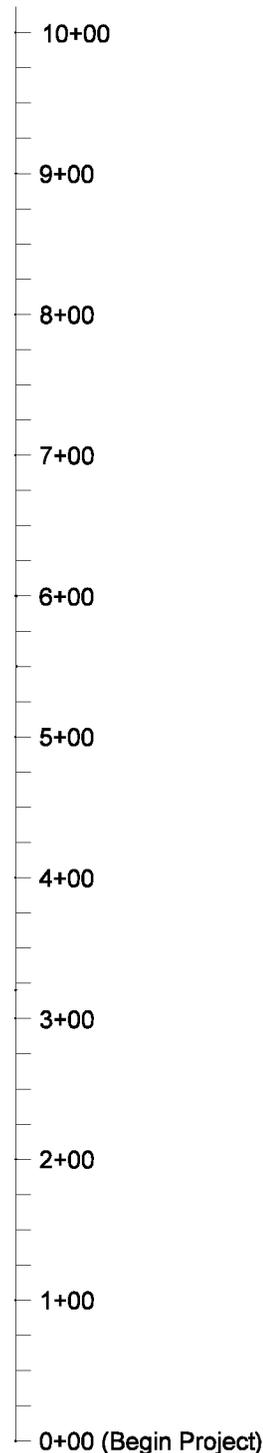
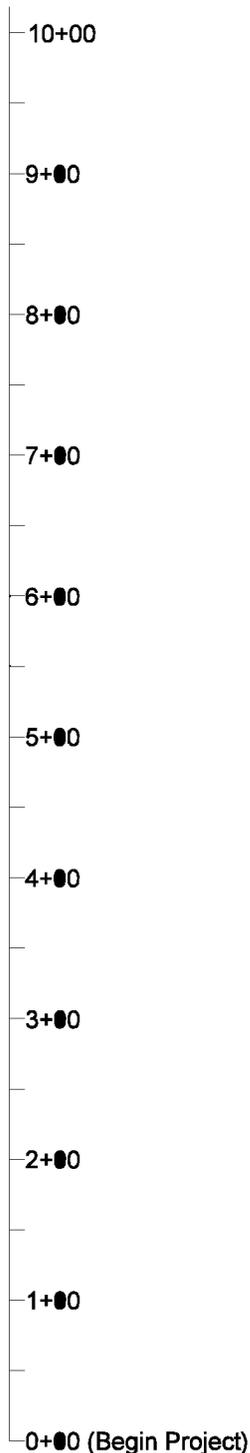
Place a complete station number
every 1000ft

OPTION 2

Place a mark every 25 ft

Place an abbreviated station number
every 100 ft

Place a complete station number
every 1000 ft



STATIONING CONVENTIONS

Figure 56-3A

Pavement Treatment →	Prvnt. Maint.	Func-tional	Struc-tural
<i>Culvert,</i>			
Extend	B	B	A
Modify	B	B	A
Place New	C	C	C
Repair and Clean	B	B	A
Replace	B	B	A
Headwalls, Remove	C	B	A
<i>Eroded Area,</i>			
Grade and Seed or Sod	B	B	A
<i>Guardrail End Treatment,</i>			
Repair Damaged	A	A	A
Replace product not on appvd. list with appvd. prod.	B	B	B
Replace type I with type MS or OS as required.	B	A	A
<i>Highway Sign,</i>			
Replace	C	C	B
<i>Impact Attenuator,</i>			
Repair Damaged	A	A	A
Replace product not on appvd. list with appvd. prod.	B	B	B
<i>Linear Grading</i>	C	C	B
<i>Mailbox,</i>			
Adjust Mounting Height Where Required	A	A	A
Replace Where Required	B	B	A
<i>Obstruction-Free-Zone Clearance,</i>			
Remove Fixed Object > 4 in. Above Ground ³	C	B	B
<i>Pavement Markings and Delineation,</i>			
Pavement Markings, Place	A	A	A
Roadside Delineators, Place or Replace	B	B	B
Raised Pavement Markers, Place	C	B	B
Raised Pavement Markers, Replace	B	B	B
<i>Side Ditch,</i>			
Reshape or Riprap	B	B	B

Key to work incidental to paving is shown at the end of the table.

PARTIAL 3R WORK
Roadside, Culvert, and Traffic Considerations

Figure 56-4F

Pavement Treatment →	Prvnt. Maint.	Functional	Structural
<i>Side Slope,</i> Flatten to Traversable Level	C	C	B
<i>Sidewalk,</i> Repair or Replace	C	C	C
<i>Sidewalk Curb Ramp at Intersection,</i> Repair existing	B	A	A
Upgrade existing to ADA requirements	A	A	A
Place in exist. sdwk. per ADA requirements	A	A	A
<i>Traffic Barrier,</i> Bridge Railing, Upgrade to Current Standards	C	C	C
Guardrail, Repair or Replace Damaged	A	A	A
Guardrail, Replace Obsolete ¹ or Weathered	C	B	B
Guardrail, Place or Lengthen to Current Standards ²	C	B	B
Guardrail to Bridge Railing, Connect	C	A	A
Guardrail Transition, Upgrade to Current Standards	C	C	C
<i>Traffic Signal,</i> Add or Upgrade	C	C	B
Detector Loop or Handhole, Perpetuate	A	A	A

Key to work incidental to paving:

A = Item should be included as part of the project.

B = Item may be included.

C = Item should not be included. If it is considered, it should be programmed separately as a spot improvement.

Notes:

¹ Obsolete guardrail should be treated as shown in Section 49-4.02.

² Treat as described in Section 55-5.04.

³ For example, tree, bush, post, rock, private sign, etc. See Section 55-5.02 for obstruction-free-zone information.

PARTIAL 3R WORK
Roadside, Culvert, and Traffic Considerations

Figure 56-4F (Continued)