

Instructions: Use this guidance for 3R projects after a specific type of 3R improvement (e.g., superelevation correction, widening, etc.) has been identified during scoping to determine recommended practices for incorporating that type of improvement into the PS&E. Refer to the PS&E recommendations associated with the proposed type of 3R improvement. The recommendations apply at locations where the type of improvement is proposed. If geometric improvements are proposed for the majority of the project, then consider using a 4R/reconstruction approach instead of these guidelines. Use the recommendations for "Minor Horizontal/Vertical Alignment Adjustments" category if there is any combination of improvements at spot locations. For example, if there is superelevation and widening, use guidance and recommended practices for "Minor Horizontal/Vertical Alignment Adjustments" category. If the recommended practices for each category are not used, it should be viewed as a risk based decision in consultation with the CFT and documented as such, identifying the associated risks and mitigation strategies. If the recommendations are not followed, potential risk mitigation strategies may include the following: 1) Extended scoping duration to allow for a more thorough investigation of the site including more frequent pavement width measurements, measurements of pavement cross slope, roadside features, etc. 2) Check measurements on site visits to ensure proposed widths don't result in unexpected impacts. 3) Ensure Plans, SCR's clearly identify the work required by the contractor if no survey is obtained (e.g., surveying, designing, reviews req'd by Gov't, etc.) and how this work will be paid.

3R Project Type	Pavement only	Widening	Superelevation Correction	Minor Horizontal/Vertical Alignment Adjustments (or a combination of widening and superelevation correction)	Comments
Type Description	All improvements are on the bench intended to rehabilitate the pavement and substantially match existing pavement width and cross slope. Includes restoring normal cross slope. No superelevation corrections in horizontal curves. No widening. No horizontal/vertical alignment adjustments.	Roadway widening that can be attributed to a wider lane or shoulder than existing. Includes situational widening where the proposed lane and shoulder widths equal the existing lane and shoulder width throughout the project, but there are spot locations where there is narrower pavement that must be widened to accommodate the proposed lane and shoulder width. This category includes widening to one or both sides of the roadway to obtain a consistent roadway width. Widening that is used in conjunction with horizontal/vertical alignment adjustments is not included in this category.	Superelevation corrections in horizontal curves at spot locations. Includes any major slope corrections that would result in significant pavement surface elevation changes. No pavement widening. Lane and shoulder widths remain the same as existing. No horizontal/vertical alignment changes or adjustments.	Any horizontal/vertical alignment adjustments at spot locations. Engineered horizontal/vertical alignments are provided in adjustment areas.	
Typical Pavement Widening	No widening except what is required to construct safety edge and acceptable foreslope on proposed pavement	Shoulder widening, on or off the bench. Widening is consistently applied to one or both sides. If widening is anticipated to taper or shift from one side to the other, it should be treated as minor horizontal/vertical adjustments.	No lane or shoulder widening except what is required to construct acceptable foreslope due to change in superelevation. Corrections to superelevation only.	May include widening or spot widening along with horizontal and vertical adjustments.	
Structural Section (applies to situations with new AC surfacing)	FDR + Overlay, Overlay (without FDR), Mill + Overlay, and CIR and Overlay	FDR + Overlay, Overlay (without FDR), Mill + Overlay, and CIR and Overlay, FDR + Additional Aggregate + Overlay, Spread FDR material and/or add aggregate base under the widened pavement section.	FDR + additional aggregate + Overlay. To achieve the desired cross slope, construct supers using recycled/reclaimed pavement material, wedge and level, and/or imported aggregate.	Where the horizontal/vertical is adjusted, typically this includes removing and reusing the existing pavement structure that is handled twice; removed and mixed with new aggregate if necessary and placed to achieve the desired width, thickness and elevation.	
Existing Alignment Changes	No changes to existing horizontal or vertical alignment.	No changes to existing horizontal alignment.	No horizontal changes other than changes as a result of superelevation correction.	Minor horizontal adjustments. Engineered horizontal is provided. This includes spot improvements such as flattening an isolated horizontal curve.	
Profile	Match existing, plus overlay depth. On mill and overlay projects, profile may remain unchanged.	No change to vertical alignment. Match existing, plus overlay depth unless milling or other means are used to match final profile grade with existing.	No change to vertical alignment. Match existing, plus overlay depth unless milling or other means are used to match final profile grade with existing.	Engineered vertical alignment is provided where adjustment are made.	
Superelevation	Match existing superelevation in horizontal curves.	Match existing cross slope and superelevation in horizontal curves.	Adjustments to superelevation in horizontal curves either throughout alignment or in spot locations	Horizontal/vertical adjustments dictate that new superelevations are developed/developed and provided.	From PDDM, p. 9-17: On 3R projects, provide proper superelevation and transitions. When standard superelevation rates are impractical, the highest achievable rate applies, subject to approval through the design exception process. Where exceptions are necessary, speed studies should identify locations for speed and warning sign installations
Earthwork	No excavation or embankment.	Earthwork required for widening. Includes excavation of an existing slope to make room for widening as well as placing embankment if there is not room on the bench for widening.	Earthwork may or may not be required. Finished grade changes are achieved by adding aggregate and/or re-grading subgrade, FDR and added aggregate material.	Likely includes earthwork under the road/double handling of material, etc. depending on extent of horizontal/vertical adjustments	

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Drainage Culverts	Varies, typically culverts replaced/upsized in same location	Culverts replaced or extended depending on proposed ditch grades.	Culverts replaced with changes to vertical alignment. Culverts potentially move based on changes to profile/ditches and low points.	Culverts likely replaced with changes to vertical alignment. Culverts potentially move based on changes to profile/ditches and low points.	The condition of the existing culverts should be assessed during scoping. The determination if culverts need to be replaced should be made at the scoping review based on stability of existing culvert condition and signs of capacity problems.
Drainage Ditches	No changes to ditch locations	New alignment of ditches where widening takes place.	Ditch location may change based on extent of superelevation correction.	Revisions to the ditches based on road geometry	
Utilities	Possible changes to utilities due to potential change due to overlay depth such as resetting manholes.	May require earthwork, therefore obtaining utility information is desirable.	Potential changes to utilities due to superelevation corrections, such as resetting manholes, etc.	May require earthwork, therefore obtaining utility information is desirable.	All existing utility information should be compiled as early as possible to determine any potential conflicts. The decision to obtain utility information should be consistent with survey/topographical information. Determine if additional underground utility survey (e.g., potholing) will be necessary as early as possible.
Guardrail	Guardrail and/or terminals replaced with no or minor work off of bench. May need spot embankment widening for terminals.	Guardrail and/or terminals replaced with no or minor work off of bench. May need spot embankment widening for terminals.	Guardrail and/or terminals replaced with minor work (excavation/embankment) off of bench in a few spot locations	Guardrail and/or terminals replaced with major work (excavation/embankment) off of bench in a few spot locations	Determination of guardrail conformance to the current standard should be made at the scoping review to determine project scope.
Clear Zone	Typically not addressed unless there is a specific safety issue.	The clear zone width may be determined and documented on a project-by-project basis. Where feasible and environmentally acceptable, recommended clear zone width for the project will be constructed.	Typically not addressed unless there is a specific safety issue.	The clear zone width may be determined and documented on a project-by-project basis. Where feasible and environmentally acceptable, recommended clear zone width for the project will be constructed.	Determination of clear zone infractions should be made at the scoping review. The scope of work should then determine the detail required to fix any clear zone issues
Sight Distance	Typically not addressed unless there is a specific safety issue.	Typically not addressed unless there is a specific safety issue.	Typically not addressed unless there is a specific safety issue.	Typically not addressed unless there is a specific safety issue.	Sight distances can be field checked and documented when survey is not required. Where improvements are proposed to increase SSD, they usually include major shifts to horizontal/vertical alignment.
Geotechnical	Geotechnical work may or may not be included. Examples of scope items include rockfall ditches, slope scaling.	Geotechnical work may or may not be included. Examples of geotechnical scope items include locations of small cuts/fills, slope stabilization, small walls, underdrains, rockfall ditches, slope scaling.	Geotechnical work may or may not be included. Examples of scope items include minor cuts/fills, rockfall ditches, slope scaling.	May include spot locations for geotechnical scope elements such as walls, underdrains, RSS, etc.	Geotech scope of work may be independent of roadway work. Typical items vary.
Cultural and Environmental Resources	No impacts off of bench	Possible impacts throughout widened sections.	Possible impacts at spot locations	Possible impacts throughout project	Cultural and environmental resources are typically GPS'ed by the resource specialist. Areas without GPS reception need to be marked prior to surveying. Accuracy requirements must be mutually agreed. Not all GPS'ed data will have the same accuracy depending upon the equipment and the technique employed.

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Recommendations					
Typical Section Template	Pavement Only Templates ("3R_typ_templates.pdf")	Widening Template ("WideningTemplate.pdf")	Superelevation Correction Template ("SupercorrectionTemplate.pdf")	Minor Horizontal/Vertical or Combination Template ("Horiz_vertTemplate.pdf")	
Pay Items:	See "CFL Engineer's Estimate Manual" for more information and guidance on specific pay items within each section shown below.	See "CFL Engineer's Estimate Manual" for more information and guidance on specific pay items within each section shown below.	See "CFL Engineer's Estimate Manual" for more information and guidance on specific pay items within each section shown below.	See "CFL Engineer's Estimate Manual" for more information and guidance on specific pay items within each section shown below.	
Survey	15210-3000 Centerline, verification and staking (Mile)	15225 Clearing and 15236 finish grade surveying.	15225 Clearing and 15236 finish grade surveying.	15225 Clearing and 15236 finish grade surveying.	
Structural Section	304, 305, 306, 310 items are typically used per pavements recommendations. 401, 402 or 403 (Ton) for Overlay	302 Roadway Aggregate Method 2 (Ton) and 401, 402 or 403 (Ton) is used for the widened section. FDR pay items are used for the existing pavement; 304, 305, 306, and in consultation with the pavements group, 310 may be an option.	304 Full Depth Reclamation (Mile or Sqyd) and 401, 402 or 403 (Ton) May require the use of separate 302 item for imported aggregate. Other FDR pay items such as 305 and 306 can be used as well.	304 Full Depth Reclamation (Mile or Sqyd) and 401, 402 or 403 (Ton) May require the use of separate 302 item for imported aggregate.	
Cross-Sections	Not included in PS&E	Provided as part of PS&E package. With respect to the roadway, cross sections show proposed pavement across entire roadway width and structural section of widening.	Provided as part of PS&E package. With respect to the roadway, cross sections show pavement structural section across entire paved width.	Provided as part of PS&E package. With respect to the roadway, cross sections show structural section for entire roadway width.	
Type of Staking Reports and 3D model	Not included in PS&E	Provide subgrade template and blue top reports for the widened area and blue top report for the existing pavement. Provide the 3D model to the contractor.	Provide blue top reports if there is no earthwork required (e.g., ditches or cut slopes). Provide subgrade template report in addition to blue tops if grading/earthwork is required. Provide the 3D model to the contractor.	Subgrade template and blue top report for entire roadway width. Provide the 3D model to the contractor.	
Typical Survey Method Required	Wheel and tape, Resource grade GPS, Google Earth	Topographic survey. Need to consider the width of the proposed widening when determining survey limits. The width of the survey needs to extend an adequate amount outside of the proposed widening to account for proposed slopes. Typical features to survey include centerline, existing edges of pavement and ground shots outside expected widened section. Includes obtaining utility information.	Topographic survey. Typical features to survey include centerline, existing edges of pavement and sufficient terrain shots outside of existing pavement to account for potential minor ditches/cut slopes and embankment. The extent typically includes one or two terrain shots beyond the existing pavement at the ditch flowline/cut slope or down the fill slope. Includes obtaining utility information.	Full topographic survey. Extents to be determined by Designers in consultation with PM and Survey based on extent of adjustments. Includes obtaining planimetric utility information.	Survey recommendations listed here are exclusive of other discipline needs, such as for drainage cross sections, etc. Designers to provide Survey with survey limits (kmz, etc.).
Earthwork Pay Items Included?	No roadway excavation or embankment.	Yes, embankment and excavation required to construct the widened roadway (and associated ditches, if required) are quantified and paid for using appropriate 204 pay items.	May be required if the superlevation correction changes the elevation of the edge of pavement sufficiently to require excavation or embankment outside of the pavement.	Yes, embankment and excavation required to construct roadway are quantified and paid for using appropriate 204 pay items.	Subexcavation may be included in any of the categories.
Plan Sheet Description	Plan/Plan Sheets, alignment, no curve data, use aerial.	Either Plan/Plan or Plan/Profile Sheets. Show proposed horizontal alignment at centerline, curve data. Provide superelevation diagram as necessary.	Either Plan/Plan or Plan/Profile Sheets. Show proposed horizontal alignment at centerline, curve data. Provide superelevation diagram or table showing superelevation in curves and transitions.	Plan/Profile sheets, proposed horizontal and vertical alignments are shown, curve data, superelevation diagram shown	