

V.A. Landslide Corrections Checklist

C-R-S:	PID:	Reviewer:	Date:
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If you do not have a landslide correction on the project, you do not have to fill out this checklist.

Investigation	
Y N X 1	<p>Has a site reconnaissance been conducted to define the limits of the landslide?</p> <p>If yes, check the visible signs observed:</p> <ul style="list-style-type: none"> <input type="checkbox"/> cracks in pavement <input type="checkbox"/> bulging toe <input type="checkbox"/> sloughed slopes <input type="checkbox"/> scarp <input type="checkbox"/> stream channel pinches <input type="checkbox"/> hydrophytic vegetation <input type="checkbox"/> rotated or dropped guardrail <input type="checkbox"/> bent, cracked, or crushed pipe, culvert, or other structures <input type="checkbox"/> water seepage, flow from embankment, or ice <input type="checkbox"/> slanted or fallen trees or power poles <input type="checkbox"/> deflection of linear features <input type="checkbox"/> other List other items:
Y N X 2	<p>Have a site plan and cross sections been provided to compare ground surface conditions before and after failure?</p>
Y N X 3	<p>Has the history of the landslide area been researched, including movement history, maintenance work, pavement drainage, and past corrective measures?</p>
Y N X 4	<p>Has a site specific geotechnical investigation been performed to investigate the landslide area?</p>
Y N X 5	<p>Has a groundwater monitoring program been performed to identify the phreatic surface through the landslide area?</p>
Y N X 6	<p>Has a landslide failure plane been determined from field observations or instrumentation?</p>

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Analysis	
Y N X 7	<p>Has the landslide mode of failure been determined?</p> <p>Check those that apply:</p> <p><input type="checkbox"/> rotational failure <input type="checkbox"/> translational</p> <p><input type="checkbox"/> block failure <input type="checkbox"/> sheet</p> <p><input type="checkbox"/> surface sloughing <input type="checkbox"/> slump</p> <p><input type="checkbox"/> predisposed</p> <p><input type="checkbox"/> other List other items:</p>
8	<p>Have the subsurface conditions been identified which are the expected source of the failure mode</p> <p>Check those that apply:</p> <p><input type="checkbox"/> general shear strength failure of foundation soils <input type="checkbox"/> loading</p> <p><input type="checkbox"/> along sloped rock surfaces <input type="checkbox"/> erosion</p> <p><input type="checkbox"/> through thin, weak soil layers <input type="checkbox"/> permeable materials</p> <p><input type="checkbox"/> surface / groundwater <input type="checkbox"/> structure</p> <p><input type="checkbox"/> Anthropogenic disturbances <input type="checkbox"/> weathering</p> <p><input type="checkbox"/> impeded drainage</p> <p><input type="checkbox"/> other List other items:</p>
Y N X 9	<p>If water (static or flowing) significantly influences the stability of the landslide, has the source of water been identified, quantified, and water quality assessed?</p>
Y N X 10	<p>Have calculations been performed to determine the F.S. for stability?</p> <p>Check method used:</p> <p><input type="checkbox"/> GSTABL7, or equivalent software</p> <p><input type="checkbox"/> hand calculations</p>
11	<p>Have the following F.S. been met or exceeded, as determined by the calculations, for the given stability conditions:</p>
Y N X	a 1.30 for short term condition
Y N X	b 1.30 for long term condition
Y N X	c 1.10 for rapid drawdown, flood condition
Y N X	d 1.50 for embankment supporting abutments

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Y N X 12 When differing soil or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate the stability at locations representative of the most critical considerations?	
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Design	
Y N X 13	<p>Has a landslide correction method been determined?</p> <p>If yes, check the methods that were evaluated and circle the chosen correction:</p> <ul style="list-style-type: none"> <input type="checkbox"/> benching and regrading (See GB 2) <input type="checkbox"/> counter berm and regrading <input type="checkbox"/> flatten slope <input type="checkbox"/> geotextile reinforced slope <input type="checkbox"/> install surface / subsurface drainage system <input type="checkbox"/> shear key (See GB 2) <input type="checkbox"/> soil nails or tiebacks <input type="checkbox"/> walls, sheeting, or drilled shafts <input type="checkbox"/> soil anchoring <input type="checkbox"/> relocate existing alignments <input type="checkbox"/> lightweight fills <input type="checkbox"/> soil removal / treatment <input type="checkbox"/> chemical treatment <input type="checkbox"/> dynamic compaction <input type="checkbox"/> Bioengineering <input type="checkbox"/> other List other items:
Y N X 14	<p>Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, were calculations performed to evaluate the effectiveness of the chosen solutions?</p>
Y N X 15	<p>Has a cost comparison been performed to evaluate a recommended solution compared to others?</p>

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Plans and Contract Documents				
Y	N	X	16	Have all necessary notes, specifications, and plan details been developed?
Y	N	X	17	Has the vertical and lateral extent of defined landslide conditions been included on the Cross Sections and Plan and Profile sheets?
Y	N	X	18	Has the information obtained from the investigation and analysis been incorporated into the project design?
Y	N	X	19	Have the need, location, plan notes, and monitoring schedule of instrumentation been determined?
Y	N	X	20	Have the effects of the stability solution on the construction schedule and maintenance of traffic been accounted for in the plans?
Y	N	X	21	Have the effects of the original failure and proposed correction on any structures (e.g., bridges, buildings, culverts, utilities) or adjacent properties been evaluated and solutions to any issues incorporated into final design?

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