

### III.B. Embankments Checklist

C-R-S:	PID:	Reviewer:	Date:
--------	------	-----------	-------

Settlement	
Y N X 1	<p>If soil conditions and project requirements warrant, have settlement issues been addressed?</p> <p>If not applicable (X), go to Question 14</p>
Y N X 2	<p>Have consolidation properties of the foundation soils been determined?</p> <p>Check methods used:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> laboratory consolidation tests</li> <li><input type="checkbox"/> empirical correlations with moisture content and Atterberg values</li> <li><input type="checkbox"/> other</li> </ul>
Y N X 3	<p>Have calculations been performed to estimate the total expected embankment settlement and the time of consolidation?</p> <p>Check method used:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> EMBANK or equivalent software</li> <li><input type="checkbox"/> hand calculations</li> </ul>
Y N X 4	<p>If differing foundation soil and/or loading conditions occur throughout the embankment area, have sufficient analyses been completed to evaluate consolidation at locations representative of the most critical conditions?</p>
Y N X 5	<p>Have the total settlement and the time of consolidation analyses indicated acceptable values at all locations for the scope of the embankment work?</p>
Y N X 6	<p>If total settlement or time of consolidation is unacceptable, have the stations and lateral extent of the problem areas been defined?</p>
Y N X 7	<p>Has a method been chosen as a solution to the settlement issues?</p> <p>Check methods used:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> waiting periods with monitoring</li> <li><input type="checkbox"/> drainage blanket and wick drains</li> <li><input type="checkbox"/> surcharge (preloading)</li> <li><input type="checkbox"/> removal and replacement of weak soil</li> <li><input type="checkbox"/> lowering proposed grade / change alignment</li> <li><input type="checkbox"/> lightweight fill</li> <li><input type="checkbox"/> other</li> </ul> <p style="text-align: right;">List Other items:</p>

### III.B. Embankments Checklist

Y	N	X	8	Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)?	
Y	N	X	9	Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others?	
Y	N	X	10	Have all necessary notes, specifications, and details for the chosen solution been determined?	
Y	N	X	11	Have the need, locations, type, plan notes, and reading schedule for settlement platforms been determined?	
Y	N	X	12	Have the effects of the predicted settlement and the chosen solution been determined and accounted for on the construction schedule?	
Y	N	X	13	Has the effect of any foundation soil consolidation (including differential settlement) been evaluated with regard to adjacent structures (e.g., bridges, buildings, culverts, utilities) which will also undergo settlement and be subject to stresses induced by the consolidation of the surrounding soil?	

Notes :

Stage 1:

### III.B. Embankments Checklist

Stability	
Y N X	14 If soil conditions and project requirements warrant, have stability issues been addressed?  If not applicable (X), go to Question <b>29</b>
Y N X	15 Has the total (short term) and effective (long term) shear strength of the foundation soils been determined?  Check method used: <input type="checkbox"/> laboratory shear tests <input type="checkbox"/> estimation from SPT or field tests
Y N X	16 Have the values of shear strength for proposed embankment fill material, as determined from <u>Geotechnical Bulletin 6 Shear Strength of Proposed Embankments</u> (GB 6), been used in the stability analyses?
Y N X	17 Have calculations been performed to determine the F.S. for stability?  Check method used: <input type="checkbox"/> GSTABL7, or equivalent software <input type="checkbox"/> hand calculations
	18 Have the following F.S. been met or exceeded, as determined by the calculations, for the given stability conditions:
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 bridge abutments (not on deep foundations)
Y N X	19 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 conditions?
Y N X	20 If the F.S. was not met or exceeded, have the stations and lateral extent of the problem areas been defined?
Y N X	21 Has a method been chosen as a solution to the stability issues?  Check the method(s) used: <input type="checkbox"/> flattening slopes <input type="checkbox"/> counterberm

### III.B. Embankments Checklist

					<input type="checkbox"/> lightweight embankment <input type="checkbox"/> reinforced soil slope <input type="checkbox"/> soil nailing <input type="checkbox"/> drainage blanket and wick drains <input type="checkbox"/> removal of soft soil, adding shear key <input type="checkbox"/> reduced grade / change alignment <input type="checkbox"/> stage construction <input type="checkbox"/> controlled rate of fill placement <input type="checkbox"/> drilled shaft slope stabilization <input type="checkbox"/> other	
					List Other items:	
Y	N	X	22	Based on accepted design practices, and where applicable, adhering to published guidelines and design recommendations from FHWA, have calculations been performed to evaluate the effectiveness of the chosen solution(s)?		
Y	N	X	23	Has an economic analysis been performed to evaluate the cost benefits of the recommended solution compared to others?		
Y	N	X	24	Have all necessary notes, specifications, and details for the chosen solution been determined?		
Y	N	X	25	Have the need, location, type, plan notes, and reading schedule for piezometers and inclinometers been determined?		
Y	N	X	26	If piezometers will be used, has the critical pressure value been determined and the appropriate information included in the plans?		
Y	N	X	27	Have the effects of the stability solution been determined and accounted for on the construction schedule?		
Y	N	X	28	Has the effect of the stability solution been evaluated with regard to structures (e.g., bridges, buildings, culverts, utilities) which may be subject to unusual stresses or require special construction considerations?		

Notes:

Stage 1:

### III.B. Embankments Checklist

Sidehill Fills					
Y	N	X	29	<p>If soil conditions and project requirements warrant, have sidehill fill issues been addressed?</p> <p>If not applicable (X), go to Question <b>34</b></p>	
Y	N	X	30	<p>In accordance with <u>Geotechnical Bulletin 2: Special Benching and Sidehill Embankment Fills (GB 2)</u>, have sidehill fills been evaluated to determine if special benching or shear keys are needed?</p>	
			31	<p>In accordance with GB 2, if special benching or shear keys are required, has</p>	
Y	N	X		<p>a Plan Note G110 from L&amp;D3 been included in the General Notes?</p>	
Y	N	X		<p>b quantities for both excavation and embankment been calculated for the benched areas and added to the plan General Quantities?</p>	
Y	N	X		<p>c the special benching or shear keys been indicated on the appropriate cross sections?</p>	
Y	N	X	32	<p>Have water bearing zones been identified and their impact addressed?</p>	
Y	N	X	33	<p>Have subsurface drainage controls been adequately addressed?</p>	

Notes:

Stage 1:

### III.B. Embankments Checklist

Special				
Y	N	X	34	Have all of the environmental factors, including wetlands, stream mitigation, and landfills, been considered and incorporated prior to design and analysis of embankment settlement and stability, including EPA or other government agencies' involvement, mitigation, or special design or construction considerations?
			35	If an embankment is to be placed through standing water or over weak, wet soils (with or without a fabric separator), the fill should be placed by the method of end dumping to a given height above the standing water or until compaction is achievable over the soft soil. If end dumping is to be specified,
Y	N	X	a	has the material type for the fill to be end dumped been specified?
Y	N	X	b	has the need for a fabric separator or filter layer been determined?
Y	N	X	c	has the height of fill to be end dumped been determined?
Y	N	X	d	have all notes and specifications for end dumping been developed?

Notes:

Stage 1: