

## APPENDIX C

Highway Innovation Developments, Enhancements and Advancements (IDEA)

Checklists for Different ERS Types

## Appendix C1

### Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Extensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

#### Section 1: ERS Components

1.1	Tab 1.1 Facing Unit		Item
	Yes	No	
1.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	<input type="checkbox"/>	<input type="checkbox"/>	List the types of facing units (e.g. standard, cap, corner, base, etc.).
1.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each facing component.
1.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide description of Connection Details
1.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions and tolerances for each type of unit (e.g. standard, cap, corner, base, etc.) in plan and section drawings.
1.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Describe wet- or dry-cast fabrication process.
1.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Provide the target 28-day minimum compressive strength.
1.1.8	<input type="checkbox"/>	<input type="checkbox"/>	For dry-cast units, provide the target concrete density and maximum water absorption.
1.1.9	<input type="checkbox"/>	<input type="checkbox"/>	For wet-cast units, provide the target percent air range.
1.1.10	<input type="checkbox"/>	<input type="checkbox"/>	Provide inter-unit shear test results and design shear capacity envelopes.
1.1.11	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.12	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.1.13	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.14	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limits on the facing units that are created by curved ERS sections and corners.

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1.2	Tab 1.2 Extensible Reinforcement		
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each style or type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	List short- and long-term facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle ( $\rho$ ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

1.3	Tab 1.3 Other Components		
	Yes	No	Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/>	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	<input type="checkbox"/>	<input type="checkbox"/>	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	<input type="checkbox"/>	<input type="checkbox"/>	Coping - Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.

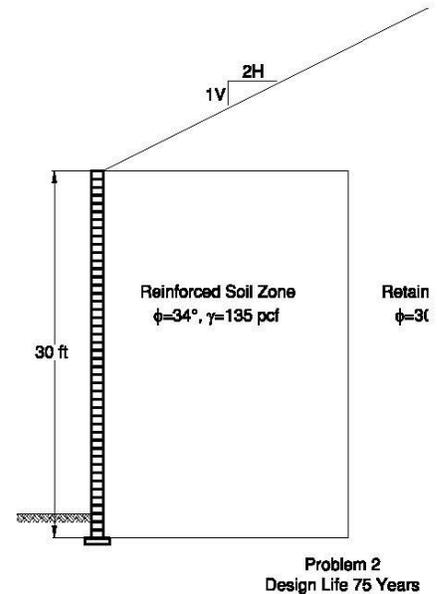
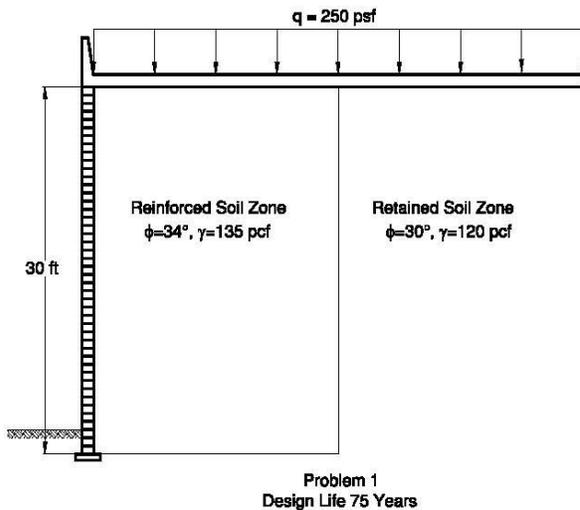
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1.3	Tab 1.3	Other Components
1.3.5	<input type="checkbox"/> <input type="checkbox"/>	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	<input type="checkbox"/> <input type="checkbox"/>	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

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### Section 2: ERS Design

2.1	Tab 2.1	Design Methodology
	Yes No	No Item
2.1.1	<input type="checkbox"/> <input type="checkbox"/>	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	<input type="checkbox"/> <input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	<input type="checkbox"/> <input type="checkbox"/>	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	<input type="checkbox"/> <input type="checkbox"/>	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.



### Section 3: Construction

3.1	Tab 3.1	Construction Procedures
	Yes No	Item
3.1.1	<input type="checkbox"/> <input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.

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3.1	Tab 3.1	Construction Procedures
3.1.2	<input type="checkbox"/> <input type="checkbox"/>	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/> <input type="checkbox"/>	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/> <input type="checkbox"/>	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/> <input type="checkbox"/>	Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	<input type="checkbox"/> <input type="checkbox"/>	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	<input type="checkbox"/> <input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	<input type="checkbox"/> <input type="checkbox"/>	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	<input type="checkbox"/> <input type="checkbox"/>	Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	<input type="checkbox"/> <input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.

**Section 4: Quality Control**

4.1	Tab 4.1	Manufacturing	
	Yes	No	Item
4.1.1	<input type="checkbox"/> <input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.	
4.1.2	<input type="checkbox"/> <input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.	
4.1.3	<input type="checkbox"/> <input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.	

4.2	Tab 4.2	Construction	
	Yes	No	Item
4.2.1	<input type="checkbox"/> <input type="checkbox"/>	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.	

**Section 5: Performance**

5.1	Performance History		
	Yes	No	Item

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5.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	<input type="checkbox"/>	<input type="checkbox"/>	The oldest three structures.
5.1.3	<input type="checkbox"/>	<input type="checkbox"/>	The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	<input type="checkbox"/>	<input type="checkbox"/>	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

## Appendix C2

### Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

#### Section 1: ERS Components

1.1	Tab 1.1 Facing Unit		
	Yes	No	Item
1.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	<input type="checkbox"/>	<input type="checkbox"/>	List the types of facing units (e.g. standard, cap, corner, base, etc.).
1.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each facing component.
1.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide description of Connection Details
1.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions and tolerances for each type of unit (e.g. standard, cap, corner, base, etc.) in plan and section drawings.
1.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Describe wet- or dry-cast fabrication process.
1.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Provide the target 28-day minimum compressive strength.
1.1.8	<input type="checkbox"/>	<input type="checkbox"/>	For dry-cast units, provide the target concrete density and maximum water absorption.
1.1.9	<input type="checkbox"/>	<input type="checkbox"/>	For wet-cast units, provide the target percent air range.
1.1.10	<input type="checkbox"/>	<input type="checkbox"/>	Provide inter-unit shear test results and design shear capacity envelopes.
1.1.11	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.12	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.1.13	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.

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1.1	Tab 1.1	Facing Unit
1.1.14	<input type="checkbox"/> <input type="checkbox"/>	Describe any limits on the facing units that are created by curved ERS sections and corners.

1.2	Tab 1.2	Inextensible Reinforcement	
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each style or type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each type that is to be used with the facing system. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life based on AASHTO required electrochemical requirements.
	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life based on AASHTO required electrochemical requirements.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide detail drawings that show dimensional tolerances.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.9	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

1.3	1.3	Other Components	
	Yes	No	Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply Tab to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/>	Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?

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**Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement**

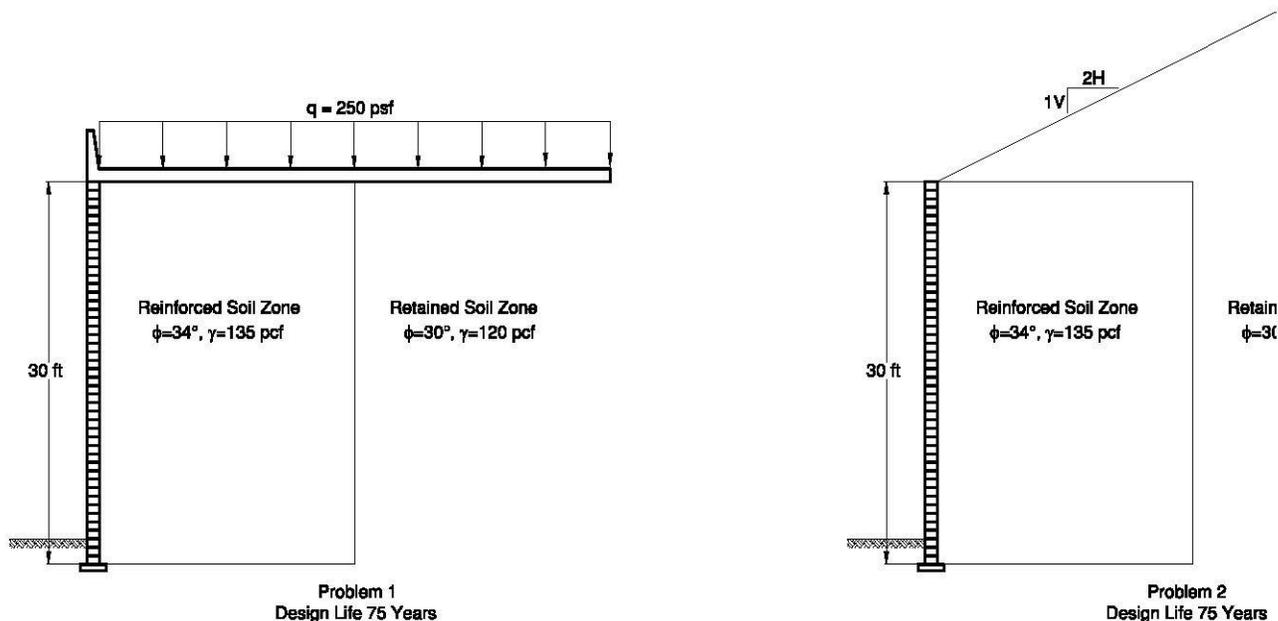
1.3	1.3	Other Components
1.3.3	<input type="checkbox"/> <input type="checkbox"/>	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	<input type="checkbox"/> <input type="checkbox"/>	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.
1.3.5	<input type="checkbox"/> <input type="checkbox"/>	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	<input type="checkbox"/> <input type="checkbox"/>	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

## Appendix C2

### Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement

#### Section 2: ERS Design

2.1	Tab 2.1	Design Methodology
	Yes No	No Item
2.1.1	<input type="checkbox"/> <input type="checkbox"/>	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	<input type="checkbox"/> <input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	<input type="checkbox"/> <input type="checkbox"/>	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example
	Yes No	Item
2.2.1	<input type="checkbox"/> <input type="checkbox"/>	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.



**Appendix C2**  
**Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement**

**Section 3: Construction**

3.1	Construction Procedures	
	Yes	No Item
3.1.1	<input type="checkbox"/>	<input type="checkbox"/> Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	<input type="checkbox"/>	<input type="checkbox"/> Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/>	<input type="checkbox"/> Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/> Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/> Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	<input type="checkbox"/>	<input type="checkbox"/> Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	<input type="checkbox"/>	<input type="checkbox"/> Describe the procedures to install soil in the reinforced soil zone.
3.1.7	<input type="checkbox"/>	<input type="checkbox"/> Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	<input type="checkbox"/>	<input type="checkbox"/> Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	<input type="checkbox"/>	<input type="checkbox"/> Describe the procedures to install soil in the reinforced soil zone.

**Section 4: Quality Control**

4.1	Tab 4.1	Manufacturing
	Yes	No Item
4.1.1	<input type="checkbox"/>	<input type="checkbox"/> Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	<input type="checkbox"/>	<input type="checkbox"/> Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	<input type="checkbox"/>	<input type="checkbox"/> Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.
4.2	Tab 4.2	Construction
	Yes	No Item
4.2.1	<input type="checkbox"/>	<input type="checkbox"/> Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then

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**Initial Technical Evaluation Checklist for Concrete Modular Block Unit Paired with Inextensible Reinforcement**

4.2	Tab 4.2	Construction
		state that they are so included and refer the reviewer to the appropriate section of the submittal.

**Section 5: Performance**

5.1	Performance History	
	Yes	No
		Item
5.1.1	<input type="checkbox"/>	<input type="checkbox"/> Provide a description of the system's development and usage history. Then describe the following:
5.1.2	<input type="checkbox"/>	<input type="checkbox"/> The oldest three structures.
5.1.3	<input type="checkbox"/>	<input type="checkbox"/> The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/> Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

**Section 6: Other Information**

6.0	Other Information	
6.1	<input type="checkbox"/>	<input type="checkbox"/> In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

**Appendix C3**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement**

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

**Section 1: ERS Components**

1.1	Facing Unit		
	Yes	No	Item
1.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	<input type="checkbox"/>	<input type="checkbox"/>	List each type of facing unit.
1.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each facing unit.
1.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions, tolerances and typical steel reinforcement schedule (if any is used) for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Provide the target 28-day minimum compressive strength.
1.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Provide the target percent air range.
1.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Producers will change mix design to accommodate state requirements.
1.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings-
1.1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through wall face. Provide specifications.
1.1.10	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.11	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limits on the facing units that are created by curved wall sections and corners.

**Appendix C3**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement**

1.2	Tab 1.2 Extensible Reinforcement		
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each style or type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	List short- and long-term facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle ( $\rho$ ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

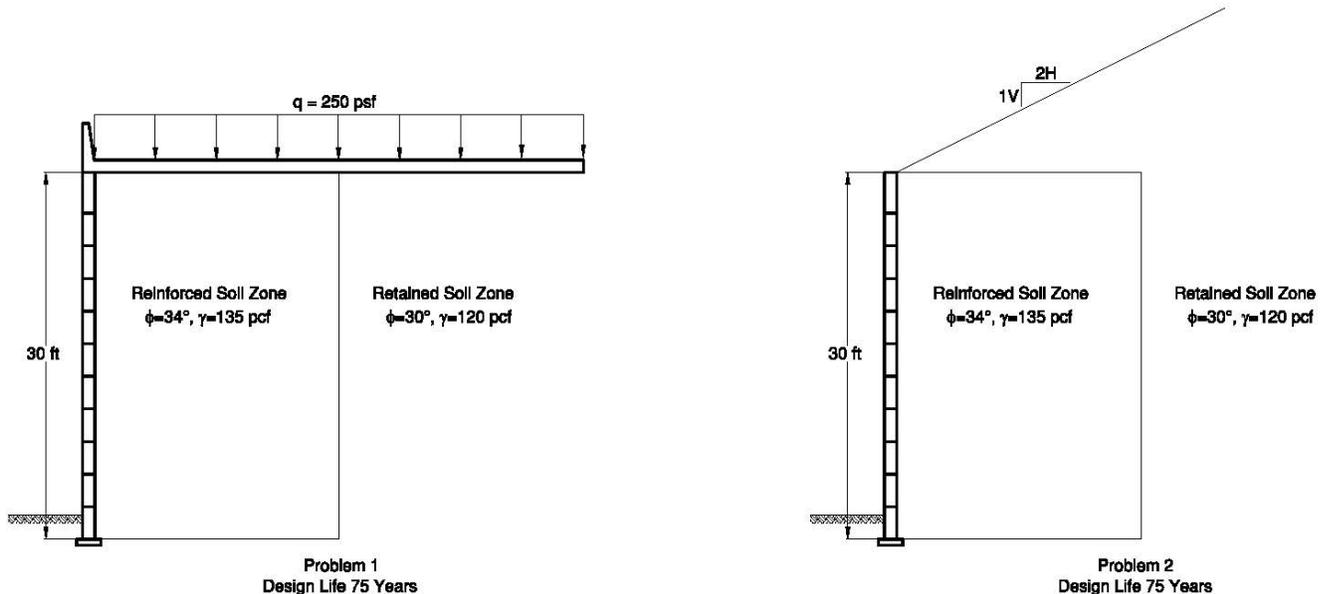
1.3	Other Components		
	Yes	No	Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to a wall component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/>	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?

**Appendix C3**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement**

1.3.3	<input type="checkbox"/>	<input type="checkbox"/>	Drainage - Describe with text any internal and external drainage measures that are inherent in the wall system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into wall components.
1.3.4	<input type="checkbox"/>	<input type="checkbox"/>	Coping – Describe with text standard coping that may be used with the wall system, not including the previously described cap units. Provide typical dimensions, and plan and section view drawings.
1.3.5	<input type="checkbox"/>	<input type="checkbox"/>	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	<input type="checkbox"/>	<input type="checkbox"/>	Slip Joints – describe with text how slip joints are made to accommodate potential differential settlement. Provide typical plan and elevation view drawings.

**Section 2: ERS Design**

2.1	Design Methodology		
	Yes	No	Item
2.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.



**Appendix C3**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement**

2.2	Design Example		
	Yes	No	Item
2.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.

**Section 3: Construction**

3.1	Construction Procedures		
	Yes	No	Item
3.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Describe procedures to install earth reinforcement at curved sections of the wall and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to maintain the design vertical and horizontal alignment of the wall face.
3.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to prevent erosion behind and in front of the wall during construction.
3.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe experience or other special qualifications that are required of the wall construction contractor.
3.1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.

**Section 4: Quality Control**

4.1	Manufacturing		
	Yes	No	Item
4.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.

**Appendix C3**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Extensible Reinforcement**

4.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.
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4.2	Construction		
	Yes	No	Item
4.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required during construction of the wall system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	<input type="checkbox"/>	<input type="checkbox"/>	The oldest three structures.
5.1.3	<input type="checkbox"/>	<input type="checkbox"/>	The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

6: Other

6.0	Other Information		
6.1	<input type="checkbox"/>	<input type="checkbox"/>	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

**Appendix C4**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement**

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

**Section 1: ERS Components**

1.1	Facing Unit		
	Yes	No	Item
1.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	<input type="checkbox"/>	<input type="checkbox"/>	List each type of facing unit.
1.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each facing unit.
1.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions, tolerances and typical steel reinforcement schedule (if any is used) for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Provide the target 28-day minimum compressive strength.
1.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Provide the target percent air range.
1.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Producers will change mix design to accommodate state requirements.
1.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through wall face. Provide specifications.

**Appendix C4**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement**

1.1.10	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text the aesthetic facing options that are available. Provide photos, drawings and brochures as appropriate.
1.1.11	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limits on the facing units that are created by curved wall sections and corners.

1.2	Inextensible Reinforcement		
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each reinforcement type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	For each type provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide sacrificial steel thickness for 75 and 100-year design life.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide the results of any corrosion tests that have been performed.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text and drawing details how the reinforcement connects to facing units.
1.2.9	<input type="checkbox"/>	<input type="checkbox"/>	List each connection device that is used to connect the facing unit and reinforcement.
1.2.10	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.11	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.12	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide sacrificial steel thickness for 75 and 100 year design life.
1.2.13	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide the results of any corrosion tests that have been performed.
1.2.14	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide detail drawings that show dimensional tolerances.
1.2.15	<input type="checkbox"/>	<input type="checkbox"/>	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.

**Appendix C4**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement**

1.2.16	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design (it is recognized that for inextensible reinforcement the value of $\alpha$ may be 1.0). Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025
1.2.17	<input type="checkbox"/>	<input type="checkbox"/>	List soil-reinforcement interface shear (ASTM D5321) tests performed and provide results. List interface friction angle ( $\phi$ ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

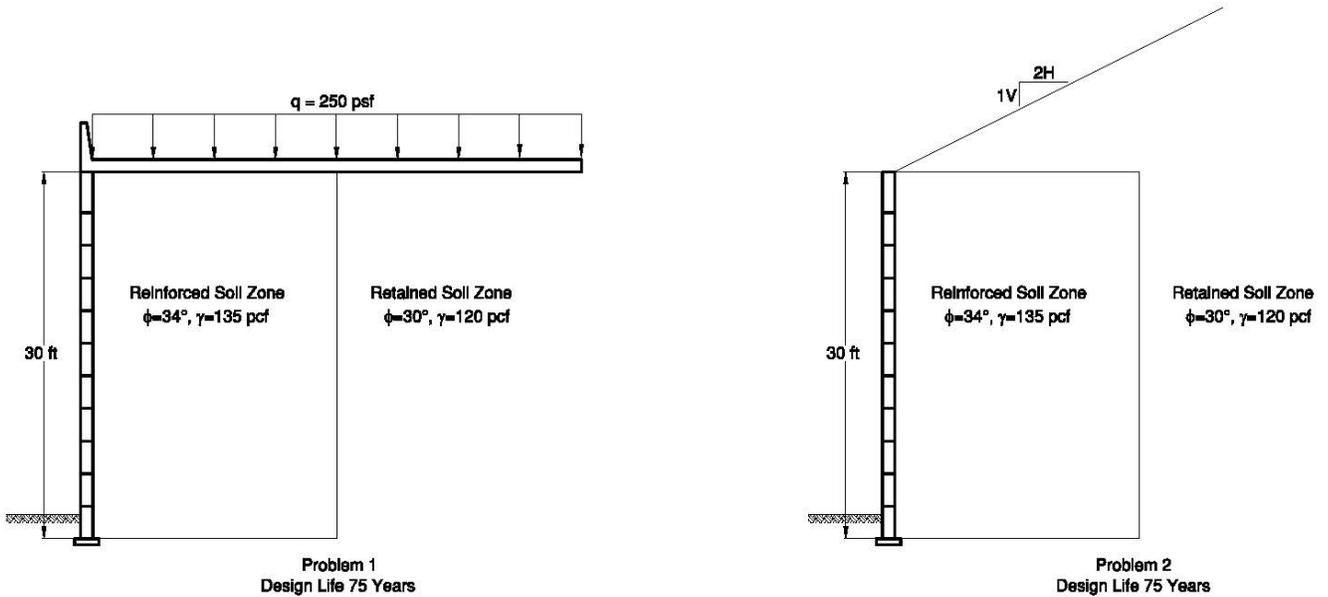
1.3	Other Components		
	Yes	No	Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to a wall component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/>	Reinforced Soil - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	<input type="checkbox"/>	<input type="checkbox"/>	Drainage - Describe with text any internal and external drainage measures that are inherent in the wall system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into wall components.
1.3.4	<input type="checkbox"/>	<input type="checkbox"/>	Coping – Describe with text standard coping that may be used with the wall system, not including the previously described cap units. Provide typical dimensions, and plan and section view drawings.
1.3.5	<input type="checkbox"/>	<input type="checkbox"/>	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	<input type="checkbox"/>	<input type="checkbox"/>	Slip Joints – describe with text how slip joints are made to accommodate potential differential settlement. Provide typical plan and elevation view drawings.

**Section 2: ERS Design**

2.1	Design Methodology		
	Yes	No	Item
2.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.

## Appendix C4 Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement

2.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.



2.2	Design Example		
	Yes	No	Item
2.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.

### Section 3: Construction

3.1	Construction Procedures		
	Yes	No	Item
3.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
3.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.

**Appendix C4**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement**

3.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Describe procedures to install earth reinforcement at curved sections of the wall and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to maintain the design vertical and horizontal alignment of the wall face.
3.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to prevent erosion behind and in front of the wall during construction.
3.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe experience or other special qualifications that are required of the wall construction contractor.
3.1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.

**Section 4: Quality Control**

4.1	Manufacturing		
	Yes	No	Item
4.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Construction		
	Yes	No	Item
4.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required during construction of the wall system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

**5: Performance**

5.1	Performance History		
	Yes	No	Item
5.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	<input type="checkbox"/>	<input type="checkbox"/>	The oldest three structures.
5.1.3	<input type="checkbox"/>	<input type="checkbox"/>	The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

**6: Other**

**Appendix C4**  
**Initial Technical Evaluation Checklist for Precast Concrete Panel Paired with Inextensible Reinforcement**

6.0	Other Information
6.1	<input type="checkbox"/> <input type="checkbox"/> In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

## Appendix C5

### Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

#### Section 1: ERS Components

1.1	Tab 1.1 Facing Unit		
	Yes	No	Item
1.1.	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2	<input type="checkbox"/>	<input type="checkbox"/>	List each type of facing unit and provide a brief description.
1.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each type of facing unit.
1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions and tolerances for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.5	<input type="checkbox"/>	<input type="checkbox"/>	For each type of facing unit, provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.6	<input type="checkbox"/>	<input type="checkbox"/>	For each type of facing unit, describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life.
1.7	<input type="checkbox"/>	<input type="checkbox"/>	For each type of facing unit, provide sacrificial steel thickness for 75- and 100-year design life.
1.8	<input type="checkbox"/>	<input type="checkbox"/>	Provide inter-unit shear test results and design shear capacity envelopes. If inter-unit shear is not applicable, briefly describe why.
1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.10	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.11	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limits on the facing units that are created by curved structure sections and corners.

**Appendix C5**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement**

1.2	Tab 1.2 Extensible Reinforcement		
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each style or type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each style or type that is to be used with the facing system.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide the current NTPEP report (if a NTPEP report is not available, then a custom checklist is required).
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe the facing unit-reinforcement connection with text and drawings and provide specifications for any connection devices.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	List short- and long-term facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design. Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	List soil-geosynthetic interface shear (ASTM D5321) tests performed and provide results. List interface friction angle ( $\rho$ ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

1.3	Tab 1.3 Other Components		
	Yes	No	Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/>	Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	<input type="checkbox"/>	<input type="checkbox"/>	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	<input type="checkbox"/>	<input type="checkbox"/>	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.

## Appendix C5

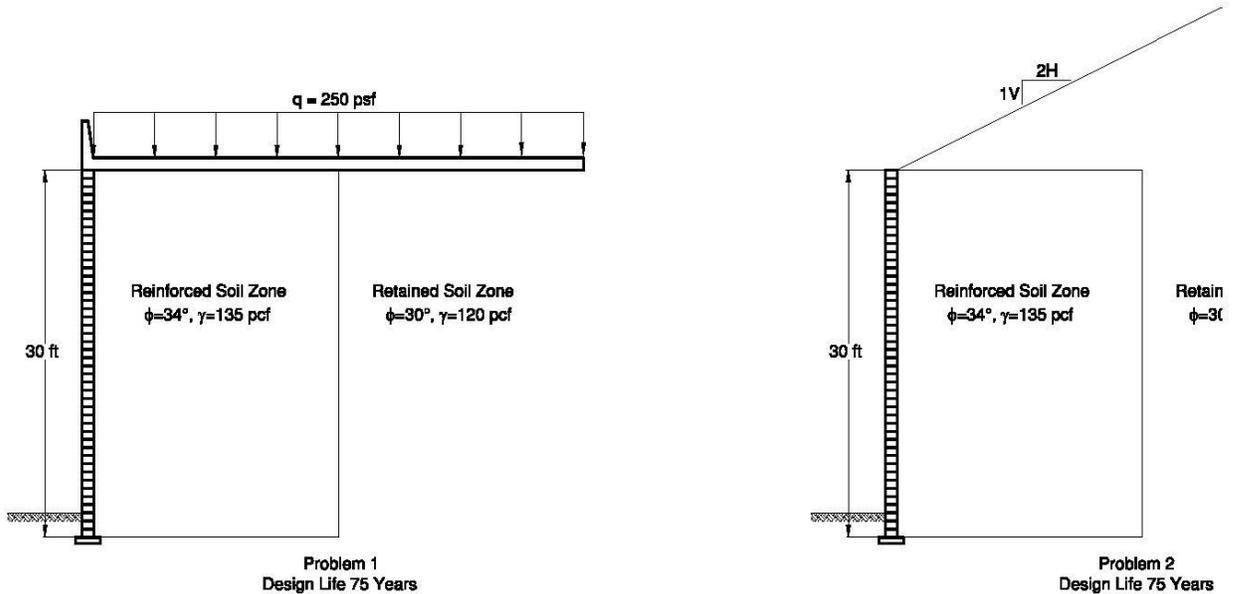
### Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

1.3	Tab 1.3	Other Components
1.3.5	<input type="checkbox"/> <input type="checkbox"/>	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.
1.3.6	<input type="checkbox"/> <input type="checkbox"/>	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

**Appendix C5**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement**

Section 2: ERS Design

2.1	Tab 2.1	Design Methodology	
	Yes	No	No Item
2.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example	
	Yes	No	Item
2.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.



Section 3: Construction

3.1	Tab 3.1	Construction Procedures	
	Yes	No	Item
3.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.

## Appendix C5

### Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

3.1	Tab 3.1	Construction Procedures
3.1.2	<input type="checkbox"/>	<input type="checkbox"/> Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/>	<input type="checkbox"/> Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/> Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/> Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	<input type="checkbox"/>	<input type="checkbox"/> Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	<input type="checkbox"/>	<input type="checkbox"/> Describe the procedures to install soil in the reinforced soil zone.
3.1.7	<input type="checkbox"/>	<input type="checkbox"/> Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	<input type="checkbox"/>	<input type="checkbox"/> Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	<input type="checkbox"/>	<input type="checkbox"/> Describe the procedures to install soil in the reinforced soil zone.

#### Section 4: Quality Control

4.1	Tab 4.1	Manufacturing	
	Yes	No	Item
4.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2	Construction	
	Yes	No	Item
4.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

#### Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	<input type="checkbox"/>	<input type="checkbox"/>	The oldest three structures.

**Appendix C5**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement**

5.1.3	<input type="checkbox"/>	<input type="checkbox"/>	The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

**Section 6: Other Information**

6.0	Other Information		
6.1	<input type="checkbox"/>	<input type="checkbox"/>	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

**Appendix C5**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement**

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

**Section 1: ERS Components**

1.1	Tab 1.1 Facing Unit		
	Yes	No	Item
1.1.	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2	<input type="checkbox"/>	<input type="checkbox"/>	List each type of facing unit and provide a brief description.
1.3	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each type of facing unit.
1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions and tolerances for each type of unit (e.g. standard, crest, corner, base, etc.) in plan and section drawings.
1.5	<input type="checkbox"/>	<input type="checkbox"/>	For each type of facing unit, provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.6	<input type="checkbox"/>	<input type="checkbox"/>	For each type of facing unit, describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life.
1.7	<input type="checkbox"/>	<input type="checkbox"/>	For each type of facing unit, provide sacrificial steel thickness for 75- and 100-year design life.
1.8	<input type="checkbox"/>	<input type="checkbox"/>	Provide inter-unit shear test results and design shear capacity envelopes. If inter-unit shear is not applicable, briefly describe why.
1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.10	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through ERS face. Provide specifications.
1.11	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limits on the facing units that are created by curved structure sections and corners.

**Appendix C5**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement**

1.2	Inextensible Reinforcement		
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each reinforcement type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	For each type provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide sacrificial steel thickness for 75 and 100-year design life.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide the results of any corrosion tests that have been performed.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text and drawing details how the reinforcement connects to facing units.
1.2.9	<input type="checkbox"/>	<input type="checkbox"/>	List each connection device that is used to connect the facing unit and reinforcement.
1.2.10	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.11	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.12	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide sacrificial steel thickness for 75 and 100 year design life.
1.2.13	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide the results of any corrosion tests that have been performed.
1.2.14	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide detail drawings that show dimensional tolerances.
1.2.15	<input type="checkbox"/>	<input type="checkbox"/>	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.16	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design (it is recognized that for inextensible reinforcement the value of $\alpha$ may be 1.0). Discuss how test results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025

## Appendix C5

### Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement

1.2.17	<input type="checkbox"/>	<input type="checkbox"/>	List soil-reinforcement interface shear (ASTM D5321) tests performed and provide results. List interface friction angle ( $\phi$ ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.
1.2	Inextensible Reinforcement		
	Yes	No	Item
1.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the wall system contain what you consider to be an innovation that is related to the reinforcement? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.2.2	<input type="checkbox"/>	<input type="checkbox"/>	List each reinforcement type that is to be used with the facing system.
1.2.3	<input type="checkbox"/>	<input type="checkbox"/>	For each type provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.4	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type describe corrosion protection measures. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.5	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide sacrificial steel thickness for 75 and 100-year design life.
1.2.6	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide the results of any corrosion tests that have been performed.
1.2.7	<input type="checkbox"/>	<input type="checkbox"/>	For each reinforcement type provide detail drawings that show dimensional tolerances.
1.2.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text and drawing details how the reinforcement connects to facing units.
1.2.9	<input type="checkbox"/>	<input type="checkbox"/>	List each connection device that is used to connect the facing unit and reinforcement.
1.2.10	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide physical property specifications. Address ultimate and yield strengths as well as welds if they are applicable.
1.2.11	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device describe corrosion protection measures and provide specifications. If coatings or galvanization are used, provide minimum thickness for 75-year design life (based on the electrochemical requirements listed in AASHTO).
1.2.12	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide sacrificial steel thickness for 75 and 100 year design life.
1.2.13	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide the results of any corrosion tests that have been performed.
1.2.14	<input type="checkbox"/>	<input type="checkbox"/>	For each connection device provide detail drawings that show dimensional tolerances.
1.2.15	<input type="checkbox"/>	<input type="checkbox"/>	List facing unit-reinforcement connection strength tests performed, provide test results and strength envelopes the Applicant recommends for design.
1.2.16	<input type="checkbox"/>	<input type="checkbox"/>	List reinforcement pullout (ASTM D6706) tests performed and provide results. Provide test soil properties, corresponding pullout friction factors ( $F^*$ ) and scale effect correction factors ( $\alpha$ ) Applicant recommends for design (it is recognized that for inextensible reinforcement the value of $\alpha$ may be 1.0). Discuss how test

**Appendix C5**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Extensible Reinforcement**

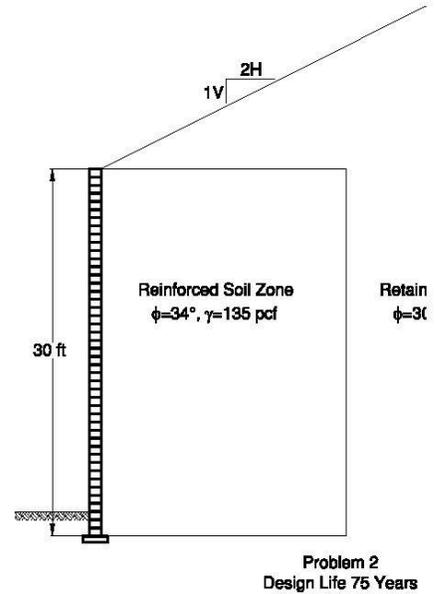
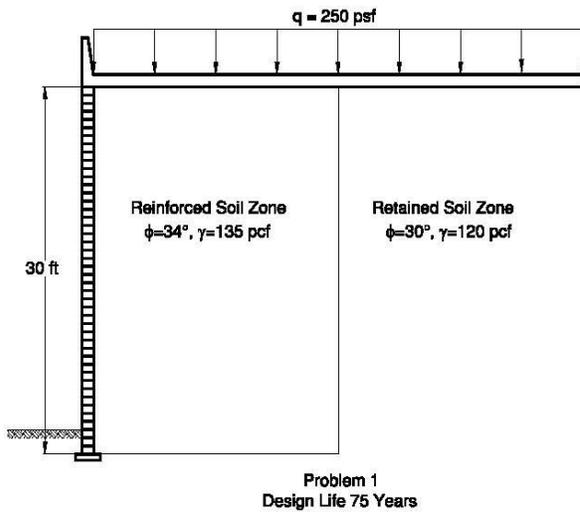
		results support these recommendations based on Appendix B at FHWA-NHI-10-025. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025
1.2.17	<input type="checkbox"/> <input type="checkbox"/>	List soil-reinforcement interface shear (ASTM D5321) tests performed and provide results. List interface friction angle ( <input type="checkbox"/> ) Applicant recommends for design. Discuss how test results support these recommendations. If no tests have been performed, list the default values that should be used based on FHWA-NHI-10-024/025.

1.3	Tab 1.3 Other Components	
	Yes	No Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/> Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/> Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	<input type="checkbox"/>	<input type="checkbox"/> Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	<input type="checkbox"/>	<input type="checkbox"/> Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.
1.3.5	<input type="checkbox"/>	<input type="checkbox"/> Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings. <span style="float: right;"><input type="checkbox"/></span>
1.3.6	<input type="checkbox"/>	<input type="checkbox"/> Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.

**Appendix C6**  
**Initial Technical Evaluation Checklist for Steel Facing Paired with Inextensible Reinforcement**

Section 2: ERS Design

2.1	Tab 2.1	Design Methodology	
	Yes	No	No Item
2.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the system contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.
2.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe how and provide typical plan and section detail drawings of the facing and reinforcement to handle vertical and horizontal obstructions in the reinforced zone.
2.2	Tab 2.2	Design Example	
	Yes	No	Item
2.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Problems 1 and 2—provide complete calculations for both problems using MSEW. If the design is performed with software that is not commercially available or is proprietary, please provide sample calculations with references to support the analysis.



Section 3: Construction

3.1	Tab 3.1	Construction Procedures	
	Yes	No	Item
3.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As

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### Initial Technical Evaluation Checklist for Steel Facing Paired with Inextensible Reinforcement

3.1	Tab 3.1	Construction Procedures	
		items below apply to the innovation, please describe the innovation in further detail.	
3.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Describe procedures to install earth reinforcement at curved sections of the ERS and at corners. Specifically address any measures that are to be taken at intersection or overlapping panels of reinforcement.
3.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.
3.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe experience or other special qualifications that are required of the ERS construction contractor.
3.1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the reinforced soil zone.

#### Section 4: Quality Control

4.1	Tab 4.1	Manufacturing	
	Yes	No	Item
4.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of earth reinforcement components. You may do this by providing a manufacturing QC manual.
4.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2	Construction	
	Yes	No	Item
4.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

#### Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Provide a description of the system's development and usage history. Then describe the following:

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**Initial Technical Evaluation Checklist for Steel Facing Paired with Inextensible Reinforcement**

5.1.2	<input type="checkbox"/>	<input type="checkbox"/>	The oldest three structures.
5.1.3	<input type="checkbox"/>	<input type="checkbox"/>	The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

Section 6: Other Information

6.0	Other Information		
6.1	<input type="checkbox"/>	<input type="checkbox"/>	In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.

## Appendix C7

### Initial Technical Evaluation Checklist for Precast Concrete Modular Gravity Wall System

Guidelines for the Applicant to use this checklist:

1. The submittal should be provided in an electronic format (i.e. portable document format—PDF) with three hardcopies. Please include any other electronic files for computer program calculations that are requested.
2. Organize your submittal in as strict accordance with this checklist as is possible using tabbed sheets to separate the sections. For example, the first section of the submittal should comprise information related to the facing unit under “Tab 1.1 Facing / Gravity Unit”.
3. If a report or drawing is requested for a section, provide it in that section even if it is requested again elsewhere in the submittal, unless noted otherwise. For example, if a drawing of the facing unit-reinforcement connection is requested in both Section 1.1 and Section 2.3, include the requested drawing at both locations. Please do not “refer” the reviewer to another section unless noted otherwise. Failure to comply with this requirement will almost certainly delay the review of the submittal.
4. Mark the checklist at each item to indicate “yes” you have included the relevant information. If you must check “no”, please provide a brief explanation if appropriate.

#### Section 1: ERS Components

1.1	Tab 1.1 Facing / Gravity Unit		
	Yes	No	Item
1.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the facing unit? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Provide specifications for each facing component.
1.1.3	<input type="checkbox"/>	<input type="checkbox"/>	List the types of units (e.g. standard, top, corner, base, etc.)
1.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide standard dimensions, tolerances and typical steel reinforcement schedule (if any is used) for each type of unit (e.g. standard, top, corner, base, etc.) in plan and section drawings.
1.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe the unit fabrication process.
1.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Provide inter-unit shear test results and design shear capacity envelopes.
1.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any unit shear, alignment or bearing devices. Provide specifications and detail drawings.
1.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe with text any filter which is used to prevent migration of fill soil through the ERS face. Provide specifications.
1.1.9	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limits on the facing units that are created by curved structure sections and corners.

1.2	

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**Initial Technical Evaluation Checklist for Precast Concrete Modular Gravity Wall System**

1.2

1.2.1

1.2.2

1.2.3

**Appendix C7**  
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1.2

1.2.4

1.2.5

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1.2

1.2.6

1.3	Tab 1.3 Other Components		
	Yes	No	Item
1.3.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to a system component? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
1.3.2	<input type="checkbox"/>	<input type="checkbox"/>	Reinforced Soil - - Provide the standard Atterberg Limits range, grain-sized distribution range, minimum effective internal angle of friction and limiting electrochemical properties. Are these soil parameters consistent with current AASHTO requirements?
1.3.3	<input type="checkbox"/>	<input type="checkbox"/>	Drainage - Describe with text any internal and external drainage measures that are inherent in the system. That is, they are not optional measures such as blanket and chimney drains or drainage swales, but are built-into ERS components.
1.3.4	<input type="checkbox"/>	<input type="checkbox"/>	Coping—Describe with text coping that may be used with the ERS, not including the previously described cap units. Provide specifications, dimensions, dimensional tolerances and plan and section view drawings.

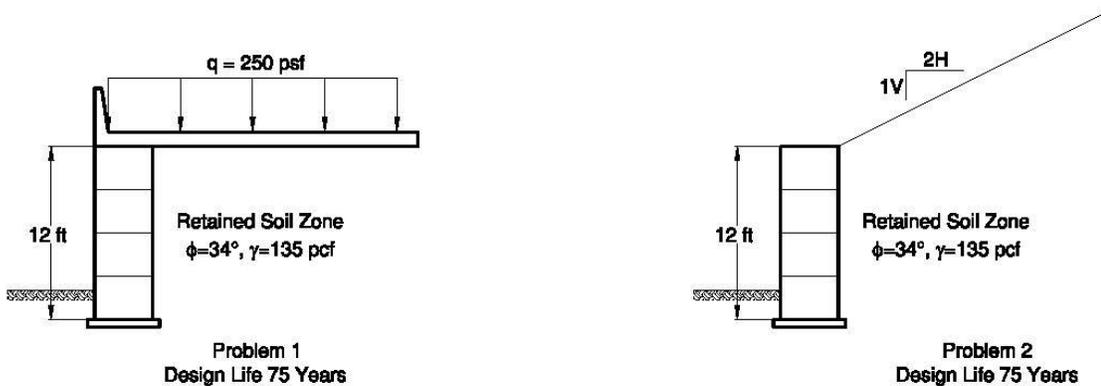
**Appendix C7**  
**Initial Technical Evaluation Checklist for Precast Concrete Modular Gravity Wall System**

1.2				
1.3.5	<input type="checkbox"/>	<input type="checkbox"/>	Traffic Barriers – describe with text traffic barriers (i.e. moment slab, post and beam or other) that may be used with the system and any limitations that may apply. Provide typical plan and section view drawings.	<input type="checkbox"/>
1.3.6	<input type="checkbox"/>	<input type="checkbox"/>	Slip Joints—describe with text how slip joints are made to accommodate potential differential settlement. Provide applicable typical plan and elevation view drawings.	

**Section 2: ERS Design**

2.1	Tab 2.1 Design Methodology		
	Yes	No	Item
2.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the design methodology? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.
2.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Describe the design methodology thoroughly, and provide references to supporting literature as appropriate.

2.2	Tab 2.2 Design Example		
	Yes	No	Item
2.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Problems 1 and 2—provide complete hand calculations for both problems. If a computer program is used, provide a printout of the computer design demonstrating consistency with the hand calculations.



**Section 3: Construction**

3.1	Tab 3.1 Construction Procedures		
	Yes	No	Item
3.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Does the ERS contain what you consider to be an innovation that is related to the construction procedures? If yes, please describe the innovation briefly. As items below apply to the innovation, please describe the innovation in further detail.

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### Initial Technical Evaluation Checklist for Precast Concrete Modular Gravity Wall System

3.1	Tab 3.1	Construction Procedures	
3.1.2	<input type="checkbox"/>	<input type="checkbox"/>	Provide the construction manual for the wall system and at a minimum they should include the following items.
3.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe facing unit installation both at straight and curved sections of the structure and at corners as well as any modifications that are required to be made to the facing unit.
3.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Describe any limitations of facing unit installation at inside and outside curved sections of the wall and at corners as well as any modifications that are required to be made to the facing unit.
3.1.5	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to maintain the design vertical and horizontal alignment of the ERS face.
3.1.6	<input type="checkbox"/>	<input type="checkbox"/>	Describe the procedures to install soil in the retained soil zone.
3.1.7	<input type="checkbox"/>	<input type="checkbox"/>	Describe measures that are required to prevent erosion behind and in front of the structure during construction.
3.1.8	<input type="checkbox"/>	<input type="checkbox"/>	Describe experience or other special qualifications that are required of the ERS construction contractor.

#### Section 4: Quality Control

4.1	Tab 4.1	Manufacturing	
	Yes	No	Item
4.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of facing units. You may do this by providing a manufacturing QC manual.
4.1.3	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required for the manufacturing of any shear, alignment, bearing or connection devices. You may do this by providing a manufacturing QC manual.

4.2	Tab 4.2	Construction	
	Yes	No	Item
4.2.1	<input type="checkbox"/>	<input type="checkbox"/>	Describe the quality control measures that are required during construction of the system. If these measures are described in the system's construction manual then state that they are so included and refer the reviewer to the appropriate section of the submittal.

#### Section 5: Performance

5.1	Performance History		
	Yes	No	Item
5.1.1	<input type="checkbox"/>	<input type="checkbox"/>	Provide a description of the system's development and usage history. Then describe the following:
5.1.2	<input type="checkbox"/>	<input type="checkbox"/>	The oldest three structures.
5.1.3	<input type="checkbox"/>	<input type="checkbox"/>	The tallest three structures.
5.1.4	<input type="checkbox"/>	<input type="checkbox"/>	Provide a list of private- and public sector users who have approved the use of the system. Also provide the contact information for a person at the user agency who may be contacted regarding the wall system's performance.

#### Section 6: Other Information

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6.0	Other Information
6.1	<input type="checkbox"/> <input type="checkbox"/> In this section, please include anything you think will better help a reviewer understand your ERS that has not been adequately address in the previous questions.