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Appendix B

NHI Web-Based Training Standards Guide

NATIONAL HIGHWAY INSTITUTE

U.S. Department of Transportation
Federal Highway Administration

Table of Contents

Introduction

Background

The National Highway Institute (NHI) Web-based Training Standards and Style Guide provides the standards to be followed when developing Web-based Training (WBT) for the National Highway Institute.

Document Content

This Guide focuses on:

Section	Description
Introduction	Provides basic background information regarding this document and its intended use, and introduces the basic terms and concepts used in NHI courseware development.
Process	Provides an explanation of the activities and deliverables within each phase of the ADDIE process.
Instructional Design Standards*	Provides guidance on the instructional quality that NHI expects for the courseware and defines instructional standards.
Adobe Presenter	Provides guidance on the functional and development standards that grant a consistent look and feel to the NHI courseware.
Appendix	Provides additional information and document templates referenced in this document.

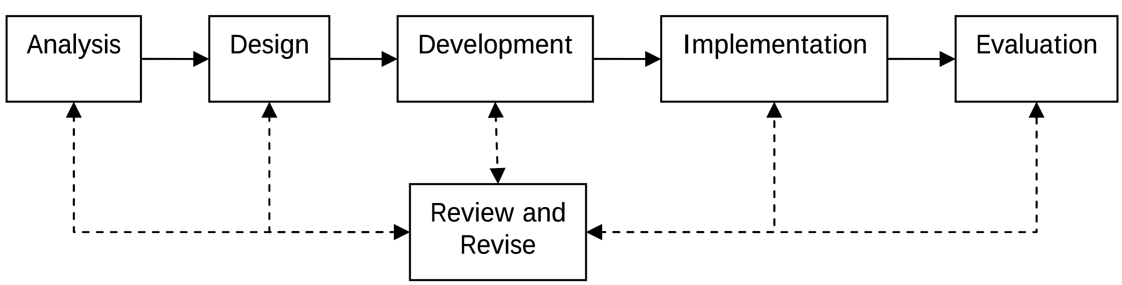
*For clarification of these standards or for permission to deviate from NHI standards, contact NHI at (703) 235-0500.

Process Overview

WBT courseware will be developed using the Instructional Systems Design (ISD) process, sometimes known as the ADDIE process. Phases of this process include:

1. Analysis
2. Design
3. Development
4. Implementation
5. Evaluation

The flow chart below illustrates the NHI WBT content development process.



Development Team

It is NHI's expectation that a fully-qualified instructional systems designer (ISD) will be responsible for the development of analysis and design phase deliverables. In the appropriate phases of the project, NHI expects the ISD to work with a multi-disciplinary team that includes:

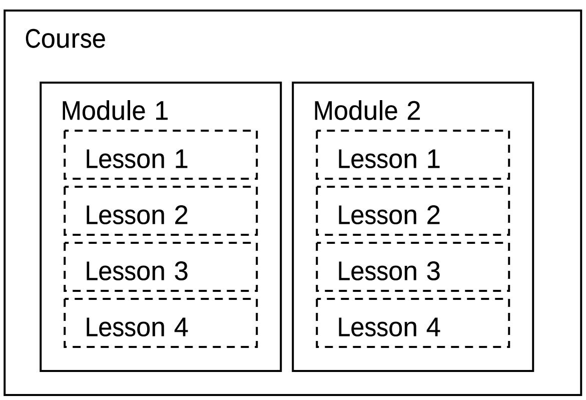
- Subject Matter Expert(s)
- NHI ISDs
- Content Reviewer(s) (also Subject Matter Experts) to include a designated "Lead Reviewer"
- Graphic Artist(s)
- Quality Assurance Specialist(s)
- Web Developer(s)/Programmer(s) *
- Audio/Video Producer(s) **

* Adobe Presenter does not require the use of a Web programmer/developer. However, experience with other Adobe products like Flash, Captivate, Acrobat, etc. would be helpful.

** An audio/video producer may be needed when professional audio narration or video is planned.

Taxonomy

NHI WBT courseware is developed using the following taxonomy:



All courses will include modules; lessons are optional. For purposes of the Sharable Content Object Reusability Model (SCORM), a sharable content object (SCO) is defined at the module level.

Course learning outcomes are equivalent to course learning objectives.

Deliverables

The following should be specified as deliverables in contracts for custom e-Learning courseware development:

Phase	Deliverable(s)
Planning	Work Plan (tasks, resources, start/end dates, dependencies)
Analysis	High-level Design Plan (HDP) (approach, scope, outcomes)
Design	• Detailed-level Design Plan (DDP) (instructional strategies, media) • Prototype Storyboards and Published Prototype (1 Lesson or designated Module portion)
Development	• Published storyboards consisting of detailed PowerPoint Slides

	including audio scripts and media elements • Published Beta PowerPoint files for each module, end-of-course assessment answer key) • Published pilot-ready PowerPoint files
Implementation	• Final PowerPoint and audio files • Final Media Source files (i.e., Flash, Captivate, video, etc.) • Final Resource files
Evaluation*	Test Items as submitted in Beta and Final PowerPoint files

**NHI will provide a URL for the standard NHI Level 1 course evaluation form for insertion in the Assessment Report Screen*

Samples of each of these deliverables will be provided upon request.

NHI shall hold ownership of the final courseware, including the PowerPoint files and all final and raw audio, video, Flash (.FLA) and graphic files. The final deliverable files shall be provided to NHI on CD-ROM following the NHI folder and file naming conventions.

Process

Analysis Phase

Sound instructional design practice requires designers/developers to analyze the business driver(s), target audience needs, content, budget, schedule, and delivery options as part of the Analysis Phase of a WBT development project.

Figure 2.1 – 1 depicts the analysis phase within the ADDIE Process.

Figure 2.1 - 1

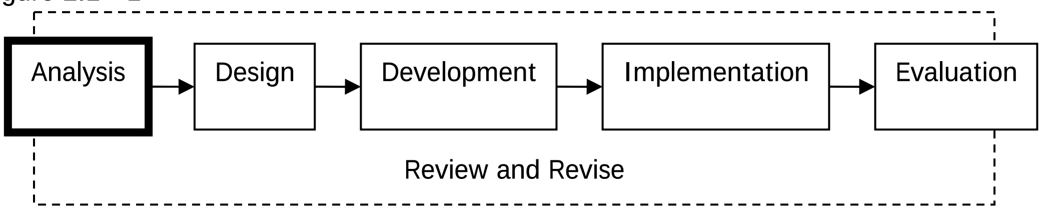
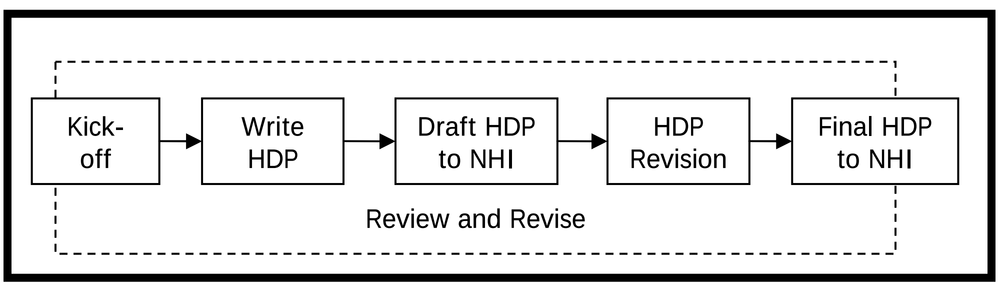


Figure 2.1 - 2 depicts primary tasks and deliverables within the Analysis phase, with review and revision occurring throughout the phase.

Figure 2.1 - 2



High-level Design Plan (HDP)

The HDP contains the findings and recommendations as a result of the analysis phase. This high-level document ensures the course is instructionally sound (defined as job relevant, task based, problem centered, interactive, engaging and well organized).

The HDP template contains the following sections:

- Introduction and Background
- Statement of Business Need
- Target Audience Characteristics
- Course Goal(s)
- Course Learning Outcomes (Terminal Learning Objectives, required; Enabling Objectives, optional)
- Overarching Instructional Approach (e.g., theme, metaphor)
- Delivery Method(s)
- Course Structure (diagrams of modules that show chunking and sequence of instruction)
- Use of media (animation, audio, video), if recommended
- Level of Interactivity
- Estimated Course Duration, by module
- Evaluation Strategy (high-level)

Designers/Developers must use the NHI-provided HDP template. The MS Word 2000 template contains boilerplate text and provides all the sections that must be completed. Specific instructions are included in the template.

HDP Approval Criteria

A draft version of the HDP will be submitted to NHI. The NHI team and others designated by the Training Program Manager will review and provide comments. Developer/Designers are required to address the comments, providing details on what was changed and/or the reason(s) why the comment was not incorporated. Iterative versions of the document are considered draft, until all issues are resolved to NHI's satisfaction – then the document can be submitted as final.

Design Phase

Once the initial analysis is complete and approved, the design of the content can begin. The detailed-level design plan expands on the areas outlined in the high-level plan to build the basic course structure. The information in this report establishes the baseline for the project design and development.

Figure 2.2 – 1 depicts the Design phase within the ADDIE Process.

Figure 2.2 - 2

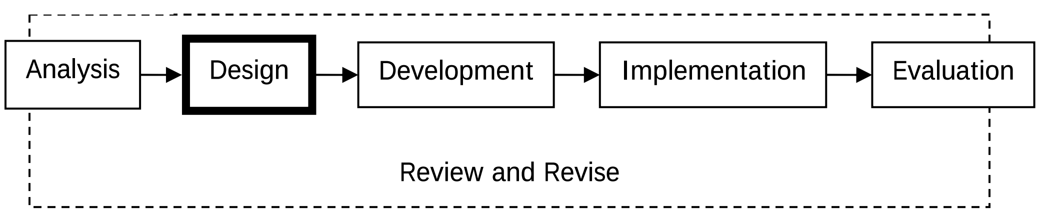
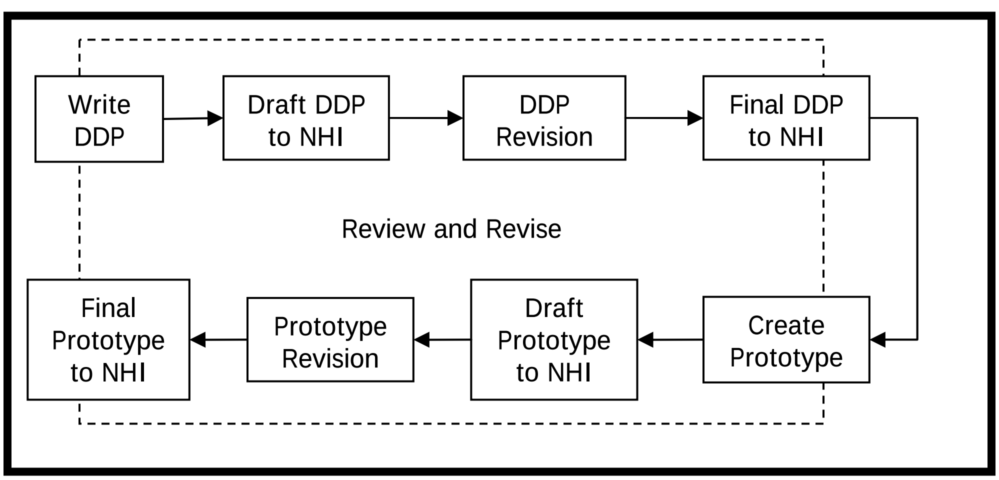


Figure 2.2 - 2 depicts primary tasks and deliverables within the Design phase, with review and revision occurring throughout the phase.

Figure 2.2 - 2



Detailed-level Design Plan (DDP)

NHI requires designers/developers to develop a DDP. This detailed plan provides the details on how the content will map to the objectives and how the content will be presented, practiced and tested. Using the content outline and the content identified in the HDP, projected timelines for tasks and milestones are also developed. These tasks and milestones are based on procedures for design, testing, implementation, and evaluation for online course development.

The DDP template contains the following sections:

- Introduction and Background
- Course Level Details
- Module Level Details
- Lesson Level Details (if lessons are used)
- Content and exercises mapped to each course learning outcome (in bulleted or outline format)
- Graphics designated to enhance content
- Estimated Duration, by course, module and lesson (if applicable)
- Proposed use of narration, if applicable
- Specific use of additional audio and/or video, if recommended
- Level 2 evaluation and remediation strategy, including number and type of test items and feedback/remediation standards
- Identification of prototype content

DDP Approval Criteria

A draft version of the DDP will be submitted to NHI. The NHI team and others designated by the Training Program Manager will review and provide comments. Developer/Designers are required to address the comments, providing details on what was changed, and/or the reason(s) why the comment as not incorporated. Iterative versions of the document are considered draft, until all issues are resolved to NHI's satisfaction – then the document can be submitted as final.

Preliminary work on PowerPoint storyboards for the prototype may begin prior to the final approval of the DDP. However, the initial draft DDP must precede any work on the storyboards.

Prototype

The prototype provides a functional sample of the content designed and developed in accordance with the WBT standards and instructional strategies identified in the DDP. Changes required to the WBT standards and instructional strategies are identified and approved by NHI early in the design phase. Global changes at the prototype phase are considerably less time-and cost-intensive than later in the design or development process.

Developers/Designers will designate a specific lesson as the prototype, which should approximately be twenty screens. Rationale for this selection as the prototype may include the following:

- Content for this section is among the most stable or best-documented in the material.
- All functionality to be included in the project is included in this subsection.
- This content is the foundation for other content in the project, and its development will facilitate the development of other content.

The prototype must be delivered to NHI as a published file. The purpose of the prototype is to illustrate:

- Creativity
- Level of interactivity
- Opportunities for practice
- Writing style
- Understanding of adult learning principles
- Adherence to standards
- Accuracy of content
- Treatment of content

Prototype Approval Criteria

The draft version of the Prototype will be reviewed by the NHI team and others designated by the Training Program Manager. This may be done as a group review via Web conference or individually. If reviewed individually, reviewers will provide written comments on a supplied comment form. If reviewed via a Web conference, the Developer/Design team is responsible for capturing all comments. All comments must be addressed, providing details on what was changed, and/or the reason(s) why the comments are not incorporated. Iterative versions of the prototype are considered draft, until all issues are resolved to NHI's satisfaction – then the prototype can be submitted as a published file.

Development Phase

NHI defines a storyboard set as a set of PowerPoint slides with attached audio file for a single module, due to the relatively short length of the modules. Delivery, review and revision cycles will occur on a module-by-module basis.

Figure 2.3 – 1 depicts the Development phase within the ADDIE Process.

Figure 2.3 - 1

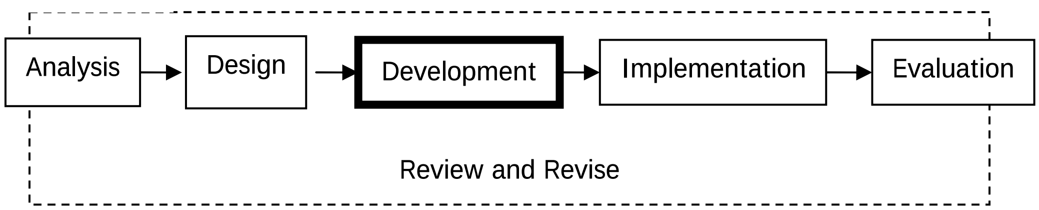
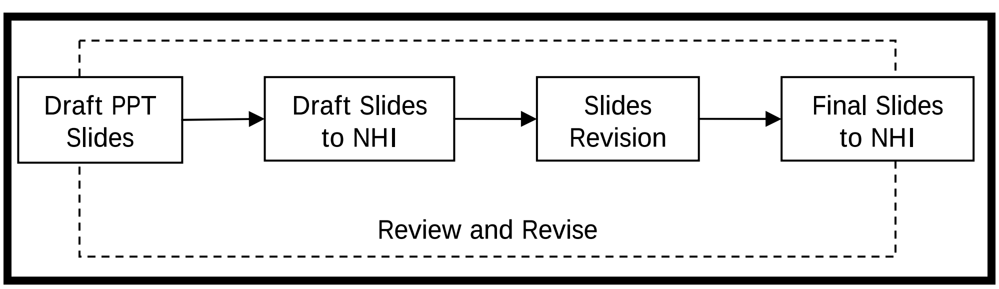


Figure 2.3 - 2 depicts primary tasks and deliverables within the Development phase, with review and revision occurring throughout the phase. One module is one review set. The development process should be repeated for each module in the course and the end-of-course assessment.

Figure 2.3 - 2



Draft PowerPoint Slide Presentation

The designer/developer will create draft PowerPoint storyboard slides for each module that include:

- On-screen text
- Visuals (e.g., royalty-free photos, diagrams, descriptions of planned Flash animations)
- Narration script in the Notes section
- MS Word script for professionally-narrated audio, if any, that is in addition to the narration, sorted by actors/voices)
- Script for new video, if any
- End-of-course test answer key

Each draft module should be delivered as a published. The designer/developer will submit for review and comment:

- Published draft PowerPoint files
- Any ancillary, support, or resource files
- Rough cut (scratch) audio – if provided

The designer/developer will submit an end-of-course assessment as a separate .ppt file and all relevant supporting files. The designer/developer will also submit a traceability document that supports the end-of-course assessment as a Level 2 evaluation. The traceability document will allow NHI to quickly and easily determine validity of the Level 2 instrument, as well as facilitate later updates of content. It will identify, by objective, the:

  - Assessment item that effectively tests learner mastery of an objective
  - Location in the courseware of supporting content

Use the following file naming conventions for draft deliverables:

File Type Abbreviation	**File Type**
PP	PowerPoint Presentation
RM	Reference Manual
EX	Exam
OM	Other Materials
Draft Deliverable	**Naming Convention**
Each module .ppt file	Course Number_Type_Date_Desc.Ext EX: 123456_PP_20090120_Module1OverviewofErosionControl_Draft.ppt
Each module .ppc file	Auto-generated audio file by Adobe Presenter
Ancillary Files	Course Number_Type_Date_Desc. Ext EX:123456_OM_20090120Module1OverviewofErosionControl.VideoScript_Draft.doc
Audio .wav file	Course Number_Type_Date_Desc. Ext EX. 123456_OM_20090120_Module1OverviewofErosionControl_Draft.wav
End-of-course assessment.ppt file	Course Number_Type_Date_Desc.Ext EX: 123456_EX_20090120_DraftTestA.ppt
End-of-course answer key .doc file	Course Number_Type_Date_Desc.Ext EX: 123456_EX_20090120_DraftAnswerKey.ppt

NOTE: The module title should be consistently abbreviated in the file name.

Storyboard Approval Criteria

The draft version of the Storyboards will be reviewed by the NHI team and others designated by the Training Program Manager. The reviewers will provide written comments on a supplied comment form. Developer/Designers are required to address the comments, providing details on what was changed, and/or the reason(s) why the comment as not incorporated. Iterative versions of the storyboards are considered draft, until all issues are resolved to NHI's satisfaction – then the storyboards can be published and will be used to create the pilot-ready version of all course materials.

Implementation Phase

NHI will coordinate and conduct an online pilot of the WBT with representative members of the target audience. A minimum of six participants is required.

Figure 2.4 – 1 depicts the Implementation phase within the ADDIE Process.

Figure 2.4 - 1

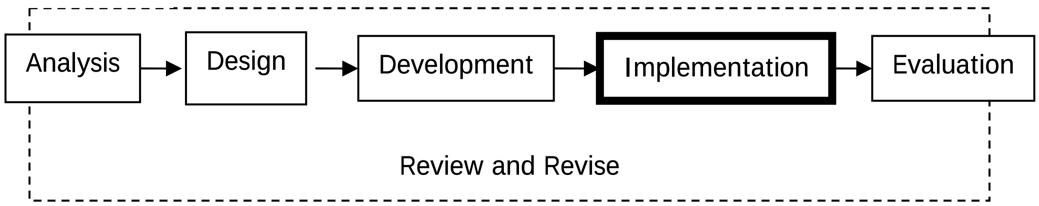
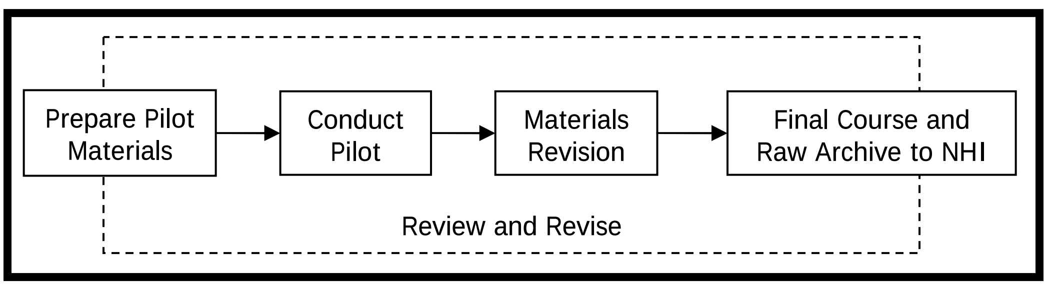


Figure 2.4 - 2 depicts primary tasks and deliverables within the Implementation phase, with review and revision occurring throughout the phase. The course, including the end-of-course assessment, is used for the pilot test. Upon completion of the implementation phase, the course is ready for wide-spread deployment.

Figure 2.4 - 2



1.1.1 Pilot-Ready Materials

The following final products are required for pilot:

- Published PowerPoint files for each module
- Published PowerPoint files for end-of-course assessment
- Script (included in the Notes section within PowerPoint)
- Embedded link to the Level 1 online course evaluation

Use the following file naming conventions for pilot deliverables:

Pilot Deliverable	Naming Convention
Each module .ppt file	Course Number_Type_Date_Desc.Ext EX:123456_PP_20090120_Module1OverviewofErosionControl_Pilot.ppt
End-of-course assessment .ppt file	Course Number_Type_Date_Desc. Ext EX: 123456_EX_20090120_TestA_Pilot.ppt
Ancillary Files	Course Number_Type_Date_Desc.Ext EX: 123456_OM_20090120_Module1OverviewofErosionControl_Pilot.wav
Script (if using professional talent)	Course Number_Type_Date_Desc.Ext EX: 123456_OM_20090120_Script_Pilot.doc
Level 1 online course evaluation URL embedded in .ppt file	URL provided to vendor by NHI

The designer/developer should plan to participate in the pilot by reviewing all Level 1 and Level 2 data collected by NHI. The ISD will submit feedback to the designer/developer using the Participant Evaluation Form template within two days of the conclusion of the pilot. The ISD and designer/developer will review the feedback and decide which feedback to implement and which to set aside.

Post-Pilot Updates

The designer/developer will create a set of final course materials that reflect the documented and agreed upon changes resulting from the pilot.

Use the following file naming conventions the final deliverables:

Final Deliverable	Naming Convention
Each module .ppt file	Course Number_Type_Date_Desc.Ext EX: 123456_PP_20090120_module1_Final.ppt
Each end-of-course assessment.ppt file	Course Number_Type_Date_Desc.Ext EX: 123456_EX_20090120_EXFinal.ppt
All supporting files (.swf)	Course Number_Type_Date_Desc.Ext EX: 123456_OM_20090120_module1.swf
All original supporting files	Course Number_Type_Date_Desc.Ext EX: 123456_OM_20090120_Module1.wav

Evaluation Phase

NHI evaluates both the courseware that was developed as well as the development process itself. Upon completion of the courseware evaluation, the designer/development team discusses Lessons Learned over the life of the project.

Figure 2.5 – 1 depicts the Evaluation phase within the ADDIE Process.

Figure 2.5 - 1

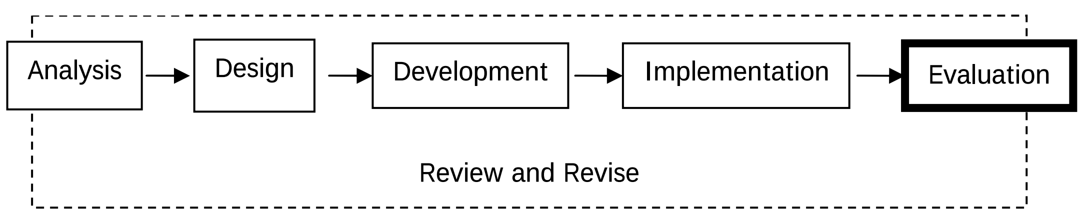
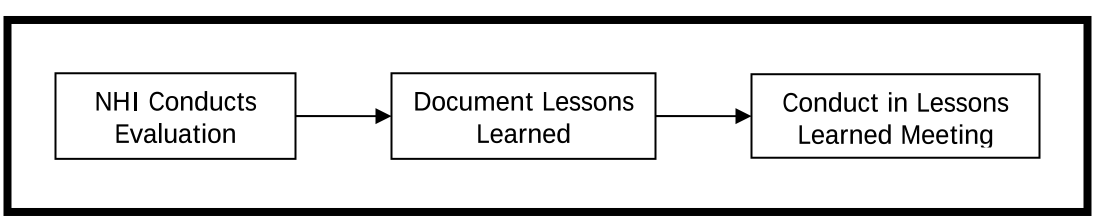


Figure 2.5 - 2 depicts primary tasks and deliverables within the Evaluation phase. NHI evaluates the course for efficacy; NHI and the design/development team document lessons learned. Upon completion of the Evaluation phase, the project is considered complete.

Figure 2.5 - 2



Course Evaluation

NHI uses Kirkpatrick's Levels of Evaluation model to determine efficacy of training. NHI selected Kirkpatrick's model due to its versatility for evaluating multiple modes of training consistently, and its standing as an industry best practice.

NHI will manage the collection and analysis of Level 1 and Level 2 data. NHI uses a standardized, online Level 1 assessment. The designer/developer will develop the Level 2 evaluation during the Development phase, with the rest of the course. NHI will use the traceability document to assist in courseware evaluation.

Level	Requirement
Level 1	• The learner accesses the NHI standard WBT course evaluation via a URL. • Learners are directed to the Level 1 Course Evaluation link on the report screen of the end-of-course assessment.
Level 2	• In order to comply with IACET standards for continuing education credits (CEUs), NHI courseware must include an assessment of the learners' mastery of the course learning outcomes. All terminal learning objectives must be tested. The threshold for mastery is 70% for the end-of-course assessment. • Learners may take the test only once. If they do not pass the test, they must retake the course. • The traceability of the Level 2 evaluation must be documented prior to the completion of the course development.
Level 3	• Not required by policy. • NHI welcomes discussion of performance evaluation at level 3.
Level 4	• Not required by policy. • NHI welcomes discussion of performance evaluation at level 4.

Process Evaluation

The designer/developer will coordinate and facilitate a one-hour Lessons Learned meeting within two weeks of completion of delivery of the final product. The meeting may be held virtually. The designer/developer will document lessons learned and submit a brief (i.e., approximately six pages) Lessons Learned document in MS Word covering things done well and areas for improvement for:

- Development Process – general comments
- Communication (internal and external)
- Technical issues
- Management

Instructional Design Standards

General Standards

Use the following general standards:

- Design modules that are approximately 30 to 90 minutes in duration. The duration is measured by the amount of time it takes an average learner to read through all the presented material, access provided options, and listen to all included audio.
- Maintain module and lesson consistency by:
  - Developing module and lesson welcome screens that illustrate the relevance of the content to the learner
  - Including estimated module and lesson completion times in a consistent location and manner
  - Ending each lesson with a summary that recaps the content and ties it to the learning outcomes
  - Using tone and voice within the writing and audio
- State learning outcomes clearly and succinctly at the course and module levels
- Allow learner to navigate and determine order of modules or lessons
- Begin each module and lesson with something compelling that will create a desire to learn
- Create the shortest module and lesson titles needed to convey meaning
- Ensure coherent flow between screens by including transitions
- Address one concept, procedure or item of instruction on each page
- Include a resource feature, when applicable, for:
  - Sited documents
  - A bibliography
  - Relevant Web resources
  - Similar items
- Include a glossary
- Provide verbatim audio script text in the Notes section, if audio is used
- Modify the standard Help file if course unique instructions are required
- Provide learners with information in the fewest steps and shortest time possible
- Use royalty-free graphics and photographs to add visual interest
- Use custom illustrations and interactions to teach complex concepts
- Model diversity by avoiding stereotypes of race, gender or ethnicity
- Develop course-level assessments that test every terminal learning objective
- Employ adult learning principles to keep learners motivated
- Employ instructional strategies that take into consideration different learning styles

Screen Layout

All screen layout standards are already incorporated into the templates. Media standards are used to maintain style consistency within the following areas.

Screen Design

- Establish a specific location for the presentation of instructions and prompts
- Provide recurring information in consistent locations
- Use white space to separate blocks of text

Text Layout

- Present information in a top down, left to right instructional format
- Layout content so a screen reader will read the text and alt tags in the correct order.
- Design text layout in short segments or phrases
- Break up blocks of text to make it easier for the learner to scan the content
- Use bullets, numbered lists, tables and charts to break up lengthy sentences

- Line up text under the first letter in any bulleted list, if the bulleted text wraps to a second line
- Do not indent paragraphs
- Left justify text

Text

- Use consistent color for text and graphics throughout a course
- Font size and color:
  - **Course Title** - Trebuchet **16**-point - RGB color: 0, 61, 125
  - **Module Title** - Trebuchet **12**-point - RGB color: 0, 61, 125
  - **Lesson Title** - Trebuchet **12**-point **Bold** - RGB color: 0, 61, 125
  - **Screen Title** - Trebuchet **12**-point **Bold** - RGB color: 0, 61, 125
  - **Instruction text** - Trebuchet **18**-point - RGB color: 0, 61, 125

Use of other font type, size or color must be approved by the NHI Training Team

- Underline hyperlinks **only**; use hyperlinks for glossary words
- Use bold font sparingly to emphasize a word or phrase
- Do not use all capital letters or underlining to emphasize words or phrases
- Use standard Web conventions for hyperlinks (not yet selected, currently being selected, already been accessed)
- Do not use blinking text or repetitive animation

Interactivity

Interactivity should be used throughout the courses to engage the learner and allow him or her to practice applying the information whenever possible. Use of interactivity is strongly encouraged. The level of interactivity is documented in the High-Level Design Plan. NHI uses the following definitions to describe the degree of interactivity:

Level of Interactivity	Description
Level I – Passive	The learner acts solely as a receiver of information. The learner progresses linearly through course reading text from the screen, viewing video or listening to audio. Results in approximately 80 screens per hour of screen time.
Level II – Limited Interaction	The learner makes simple responses to instructional cues. The responses may include answering multiple choice or true/false questions. Results in approximately 60 screens per hour of screen time. Example: Embedded "Knowledge Checks"
Level III – Complex Participation	The learner makes a variety of responses using varied techniques in response to instructional cues. Results in approximately 45 screens per hour of screen time. Example: Building a model/diagram from available parts.

The degree of interactivity in any e-Learning product is based upon relative importance of the content, budget, timeline, shelf life, and audience size. Learners should interact with the courseware consistent with the defined level of interactivity designated for the course. It may be appropriate to design modules within the same course for different levels of interactivity (e.g., foundational principles along with complex, branched case studies for application of those principles; the foundational module might be developed at Level I, whereas the application module might be developed at Level III).

- Use interactive instructional strategies (e.g., an "Explore It" interaction where the learner selects several text labels, graphical elements, or photographs for further information)
- Include a wide variety of interaction types to keep the learner engaged throughout the course
- Adhere to the standard set of learner prompts for each screen and interaction type

Embedded Practice

Use Knowledge Checks as embedded practices. Embedded practice provides opportunities for reinforcement after each concept or skill is presented. Practice exercises are evaluated, but the scores are not sent to the learning management system. Other points to consider include:

- Provide the context for the practice activity by relating it to a concept or job skill in introductory text
- Ensure practice opportunities are directly linked to learning outcomes (i.e., terminal and/or enabling learning objectives)
- Use the standard NHI Knowledge Check screen for embedded practice exercises
- List up to eight (8) possible answer choices for multiple choice questions
  - Format answer choices as:
    a) Answer option
    b) Answer option
    c) Answer option
  - Use radio buttons when there is one correct answer and the standard prompt: "Select the correct answer. Then select the Submit button."
  - Use check boxes when there are multiple correct answers and use the standard prompt: "Select all answers that apply, and then select the Submit button."
- Provide Knowledge Checks debrief slide for 508 compliance

Learner Feedback and Remediation for Embedded Practice

Each Knowledge Check should allow for two tries except for true/false, which allow only one try for a correct answer. Provide the correct answer along with reinforcing feedback when the learner answers correctly. Provide the learner with a "hint" if the learner answers incorrectly on the first try and encourage the learner to try again. Provide the learner with corrective feedback to help enable learning if the learner answers incorrectly the second time. Feedback always starts with either "Correct" or Incorrect", followed by the corrective or reinforcing feedback.

Bookmarking

Adobe Presenter automatically bookmarks the location a learner is at every 10 pages and/ or every time an embedded practice is completed. Should a learner exit a course without completing the module, Adobe Presenter "bookmarks" the page the learner was on. This allows a learner to return to the same location and complete the course.

Course Completion Requirements

Adobe Presenter requires every lesson and/or module end with a scored item. A learner must "submit" at the end in order for the lesson/module to record as complete in LMS tracking. This is accomplished by using one of the following:

- Use a Knowledge Check to provide the summary page for the lesson/module, including one unscored question at the end such as: "Do you understand all of the content covered in this section?" The "No" response would provide feedback telling the learner to go back over the lesson/module for review. The "Yes" response would congratulate the learner and inform them they have successfully completed the lesson/module.
- Provide a scored test at the end of the lesson/module

After successfully completing a course, learners will be able to download a course certificate (there is no requirement to take the end-of-course assessment in order to download a certificate. NHI will provide a URL to the developer to include in the last course screen. The URL is a link to the downloadable Adobe Acrobat course certificate file.

WBT Development Standards

Quality Control (QC) and Quality Assurance (QA)

NHI requires development teams to complete QC and QA reviews on all deliverables (draft and final) prior to submission to NHI. Testing is required on the prototype and final versions. QC, QA, and testing artifacts should be provided to NHI upon request.

In general, the development team should ensure:

- Teaching and testing strategies comply with the standards provided in the NHI WBT Style Guide
- Text complies with the standards provided in the NHI WBT Style Guide
- Media complies with the standards provided in the NHI WBT Style Guide
- Alpha tests are conducted on all supported operating systems and browsers
- LMS integration testing is completed
- Thorough quality assurance testing is conducted on published versions of Alpha, Beta, and Final courseware

The NHI review is neither a QC nor QA review. The role of NHI is to review for **content** accuracy. Development teams must ensure compliance with the NHI WBT guide, SCORM, and Section 508.

Development Tools

All WBT developed for NHI **must** use Adobe Presenter 7, a PowerPoint to Flash conversion tool. Developers will need to purchase a developer's license for Adobe Presenter 6 and the Presenter plug-in. Before starting the development phase, the contractor must obtain the latest version of the NHI WBT Template to use in conjunction with this style guide.

Other tools for use should be non-proprietary, and include:

- Adobe Flash (version 7.0 or later)
- JavaScript
- Adobe Photoshop
- Adobe Premiere
- Adobe Captivate
- Adobe Acrobat

Other development tools require NHI approval.

Graphical User Interface

The graphical user interface (GUI) is standard and included in the templates. Any course unique additions or changes to the GUI are requested, a rationale must be provided in writing to the NHI point of contact for the course, and must be approved.

Curriculum

The course curriculum is provided on the FHWA Adobe Training server. Modules are listed in numerical order.

Module level:

- Create the shortest module titles needed to convey meaning
- Use descriptive headings, e.g.: **Module 1 Overview of Erosion Control**
- Titles limited to 45 characters, including spaces

- The module curriculum is provided within in .ppt file. Lesson Titles appears in the left-hand frame of the WBT template as a set of links to lesson introductory screens within a module
    - Create the shortest lesson titles needed to convey meaning
    - Use Descriptive headings, e.g., **Lesson 2: Planning Erosion Control Measures**
    - Titles limited to 45 characters, including spaces

Navigation

The use of consistent navigation standards will add to learner satisfaction and retention. The following standards apply to all web-based courseware:

- Intuitive, learner controlled navigational
- Provide clear instructions or cues for all required learner activities. Use boilerplate text where provided
- Navigational elements will provide one click access to learners and should include the following:
    - **Resources**: Direct learners to course-level ancillary items (additional reading, source documents, policy documents)
    - **Help**: Direct learners to navigational guidance. NHI provides standard Help content available at https://admin.na3.acrobat.com/_a55098539/wbthelp. This URL has been coded into the NHI WBT template
    - **Glossary**: Direct learners to a course-level list of terms and definitions. The glossary may be delivered as a Flash paper document or as a self-contained Presenter module.

  NOTE: Other navigational buttons may be added, as appropriate. However, the location of navigational buttons is specified in the standard NHI GUI. The buttons (e.g., Submit, Play, and Replay) should be consistent within each course

- Mouse cursor changes and rollover highlights must be consistent within a course
- Learners must be able to control all navigation to accommodate all users. Buttons will have text description labels (alt tags) as part of the template
- Navigation buttons must display in the same position on every page
- Modules and lessons can be completed in any order, unless the instructional design requires sequential accomplishment (if this is required, provide instructions to the learners)
- Use breadcrumbs to help learners quickly identify their location in a course
- Course titles are limited to 60 characters, including spaces
- Module titles are limited to 45 characters, including spaces
- Lesson titles are limited to 45 characters, including spaces
- Screen titles are limited to 45 characters, including spaces
- Use the following screen title standards (these will show in the sidebar and used for navigation):
    - Module X Objectives 1, 2, 3, etc.
    - Module X Review
    - Lesson X Objectives
    - Lesson X Review
    - Module X Quiz Introduction
    - Module X Quiz Results
    - Course Assessment Introduction
    - Course Assessment Results

Media Standards

Media standards provide a consistent look and feel to courses, as well as offering assurance that the media will function as intended on the training platform.

Graphics

- Use the NHI-provided color palette (provided at project onset) as part of the NHI WBT templates
- Use colors that accommodate learners who are color blind
- Establish and maintain a convention for the use of color(s) to denote meaning, however, so not use color as an instructional cue
- Maintain a constant perspective in a series of visuals
- Do not include contractor or other corporate logos in the courseware
- Avoid graphics that may become outdated in a short time
- If using clipart, verify it is royalty free or obtain written permission for use
- Do not use cartoon characters
- All text within the graphic must be readable. If the graphic needs to be scaled down, then there should be a "select to enlarge" feature
- Be consistent with all graphics (with the use of borders, effects and quality)
- Do not use drop shadows
- Make sure there is no advertising in the photo (e.g., car model name, billboard signs, license plates)
- Deliver raw files to NHI as compressed, processed files and .PSD with layers preserved
- A text version of all graphic elements will be provided (e.g. image description for a graphic)

Animation

- Allow user to control the animation to include: start, stop, and replay
- Avoid timed effects (If one or more events are to launch on a page, the learner should trigger the event. Events should not be timed to launch.)
- Do not use blinking graphics or text
- Use special effects when required for emphasis or transition
- Do not use any special effects that detract from learning or as the main element of learning.
- Use animation to display concepts that are difficult to describe with narration and/or text
- Raw files built in flash delivered to NHI as .fla.
- A text version of all animated elements will be provided as appropriate

Audio

- Use audio judiciously (e.g., to demonstrate interpersonal skills, to demonstrate sounds heard on the job, to engage the learner – such as providing a talking coach)
- Include verbatim text of any audio in the Notes section of each Power Point slide
- Ensure audio volume levels are consistent throughout the course
- Use one audio talent to narrate all modules within the same course. If role-playing, multiple voice talent may be used, but roles must be consistent.
- Use sound effects only when they help to convey the content – but they cannot be used to provide the only means for learning
- NHI standards for audio edits
    - Place 1.5 seconds of silence at the beginning of every slide
    - Place 1.5 seconds of silence at the end of every slide
- If audio is recorded outside of the Adobe Presenter tool:
    - Raw audio files delivered to NHI as .WAV or MP3
    - Recommended audio editing tool is Adobe Premiere, but others are acceptable as long as the final product is .wav

Video

- Use video to reinforce, clarify or emphasize a specific behavior or performance objective that cannot be effectively taught using graphics, stills, photographs or animation

- Videos must be captioned to comply with accessibility requirements
- Do not use continuous video clips (more than 15-20 seconds in length) because of file size
- Use appropriate video (e.g., talking head, show and tell, interview, panel discussion, simulation or dramatization)
- Avoid techniques such as zooming, panning, transitional wipes, dissolves and fast motion subjects due to buffering problems which tend to hinder streaming media performance
- Raw files delivered to NHI as compressed digital files – .FLV or .AVI

- Recommended audio editing tool is Adobe Premiere, but others are acceptable as long as the final product is .fla

Platform Standards

All courseware should be designed for use on the minimum platform configurations to reach the widest possible audience. Since NHI does not have control over all courseware consumers training platforms, the following standards were developed internally and represent the baseline for online courseware.

Hardware

Design courseware to perform on the standard hardware configuration in use at the time of development. Minimum configuration includes the following:

- Minimum operating system: Windows 2000
- Minimum processor speed: 328 MHz
- Standard screen resolution: 800 x 600
- Color depth: 16 bit

Browser Specification

Design courseware for optimal viewing using the standard FHWA configuration browser.

- Internet Explorer 6.0
- Flash Player 7.0 or higher

Hosting

All NHI WBT courseware resides on the FHWA Server (http:/fhwa.na3.acrobat.com).

Writing Standards

Adherence to an established writing style provides continuity and consistency within a course and across the curriculum.

General Writing Guidelines

- Use active voice, second person (you), present tense, and conversational tone when appropriate
- Keep language simple, concise and consistent
- Do not use hyphens to break words
- Avoid jargon and slang
- Use examples that are universally understood
- Avoid references that learners with English as a second language would have difficulty understanding
- Avoid the use of contractions (unless the course is consistently conversational in style)
- Avoid language and examples that will reduce the shelf life of the courseware, such as dates and references to current events
- Do not use all capital letters. Learners have more difficulty reading text that is all capitalized than mixed-case letters (and learners perceive all-cap type as being yelled at)

- Italic should only be used for titles of published works and words that are appropriated from other languages and have not become standard English (e.g., *détente)*
- Use "select" in learner prompts ("click" or "click on" are not compliant with Section 508)

Acronyms and Abbreviations

- Write out the full name of the entity, followed by its acronym in parentheses for first time use on a page.
- Acronyms do not include spaces or periods
- Abbreviations should be used when using titles before and after names (e.g., Mr., Mrs., PhD)
- Use abbreviations when the acronym for a corporation, institution or country is more familiar than the full name (e.g., USA, IBM, FBI, FedEx)
- Use abbreviations for mathematical measurements (e.g., lb., kg.)
- Include acronyms in the glossary

Punctuation

- Use one space after periods and colons
- Do not use serial commas immediately preceding "and" or "or" (a serial comma is the last comma in a series of items)
- Use a hyphen to connect words in a sequence (e.g., 2003-2004, pp. 28-72)
- Do not use hyphens to separate syllables within a word
- Do not use hyphens to connect two related parts of a sentence
- Place all punctuation inside the quotation marks
- Establish and adhere to a standard symbol for first and second level bullets
- Do not use an Em Dash
- Use an En Dash to connect related parts of a sentence (e.g., NHI expects the vendor to ensure – through thorough quality testing – compliance to this Guide, SCORM, AICC, and Section 508)
- Use a space before and after an En Dash (as shown in example above)
- Do not use a "/" – it is read as "slash" by screen readers

Bullets

- Maintain parallel construction in a bullet list (e.g., start all bulleted items with a verb)
- Use no more than two levels in a bulleted or numbered list
- Use numbered bullets where sequence is important (e.g., the five sequential steps of the ADDIE model); use symbols for bullets when order is not important
- Use a colon at the end of the introductory sentence (i.e., stem of before bullet list)
- Capitalize the first word in each bulleted phrase or sentence
- Do not place a period at the end of learning outcomes, even when stated in a complete sentences
- Begin phrases (bulleted items that are not complete sentences) with caps and end without punctuation
- Do not use "and" or "or" in bulleted sequences on screen
- Do not use a comma after each bulleted item
- Do not put a period at the end of the last bullet in a list of bulleted items
- Do not use a bullet (number or symbol) when there is only one item; there must be at least two items to make a bullet list

Numbers

- Use figures to express the numbers 10 and above, as well as all numbers representing mathematical functions or quantities, dates, ages, time, money and numbers as part of a series
- Spell out the numbers nine and below unless they represent precise measurement (e.g., 8.2578) or are part of a complex mathematical formula
- Spell out any number that begins a sentence, title or heading

Date and Time

- Write out the date in full (e.g., July 4, 1776)
- Use a colon to separate hours and minutes (e.g., 9:00 a.m.)
- Include Time Zone (EST, CST, MST, PST), if applicable

Capitalization

- In headlines, capitalize all words except definite/indefinite articles, prepositions and conjunctions that are shorter than four letters.
- When using bullets, capitalize the first word contained in each bullet
- Capitalize the word “State” whenever referring to one of the 50 States
- Capitalize the word “Federal” as in Federal Government
- Do not capitalize the word “federally”

Emphasis

- Avoid excessive use of bolding (it can be distracting and should be reserved for headings)
- Do not use italics for emphasis (they are hard to read on screen and are used specifically for citations)
- Do not underline (underlined text can be confused with a hyperlink)
- Do not use quotation marks for emphasis
- Use headings and subheadings to draw attention to specific concepts

508 Considerations

This section provides information relevant to Section 508. All NHI technology-based training products must be in compliance with these standards.

The following statement summarizes Section 508, Part 1194.21 regarding software applications and operating systems:

> *Most of the specifications for software pertain to usability for people with vision impairments. For example, on provision requires alternative keyboard navigation, which is essential for people with vision impairments who cannot rely on pointing devices, such as a mouse. Other provisions address animated displays, color, and contrast settings, flash rate, and electronic forms, among others.*

NHI follows standards published by the Access Board (*http://www.access-board.gov/sec508/guide/index.htm*). All courseware developed must be in adherence with the Access Board standards. When requested, the development team must document proof of accessibility.

There is no designated NHI-standard assistive technology. Courseware should be developed for functionality using assistive technology agreed to be the project development team.

508 Compliance Standards

Courses must be accessible to persons with disabilities in accordance with section 508 of the Rehabilitation Act Amendments of 1998. Proposals should address how the course would meet the requirements of this Act.

The Contractor will coordinate with the Contracting Officers Technical Representative (COTR) for overall technical direction. The COTR will convene designated U.S. Department of Transportation (USDOT) staff to serve as technical experts, and assist in the review and approval of course materials. Technical experts will represent USDOT, as appropriate.

The Final Rule, Electronic and Information Technology Accessibility Standards, published in the Federal Register on December 21, 2000, provides guidance on how a Contractor can meet these requirements (see, 36 CFR Part 1194 [Docket no. 2000-01] RIN 3014-AA25). There are also a number of readily available resources on the Rehabilitation Act including several web sites. See, for example, www.section508.gov and www.access-board.gov. Additionally, a number of organizations provide technical information on making websites accessible for the disabled. Such organizations include but are certainly not limited to:

- The Web Consortium (www.w3.org)
- The HTML Writers Guild (www.hwg.org)
- The Rochester Institute of Technology's Equal Access to Software and Information website (http://people.rit.edu/easi/)
- The University of Wisconsin-Madison's Trace Research and Development Center (www.trace.wisc.edu)

See also:

Janet L. Balas. Online Resources for Adaptive Information Technologies, Computers in Libraries (June 1, 1999).

Marilyn J. Cohodas. Does Barrier-Free Compute?, Governing Magazine (April, 2000).

The requirements for Web-based applications as described in § 1194.22 the December 21, 2000 Final Rule, e.g.:

(a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).
(b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
(c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
(d) Documents shall be organized so they are readable without requiring an associated style sheet.
(e) Redundant text links shall be provided for each active region of a server-side image map.
(f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
(g) Row and column headers shall be identified for data tables.
(h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
(i) Frames shall be titled with text that facilitates frame identification and navigation.
(j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.
(k) A text-only page, with equivalent information or functionality, shall be provided to make a Web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.
(l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
(m) When a Web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with § 1194.21 (a) through (1).

(n) Whenever electronic forms are to be completed online, the forms shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.
(o) A method shall be provided that permits users to skip repetitive navigation links.
(p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

Note to § 1194.22: 1. The Board interprets paragraphs (a) through (k) of this section as consistent with the following priority 1 Checkpoints of the Web Content Accessibility Guidelines 1.0 (WCAG 1.0) (May 5, 1999) published by the Web Accessibility Initiative of the World Wide Web Consortium:

Section 1194.22 Paragraph	WCAG 1.0 Checkpoint
(a)	1.1
(b)	1.4
(c)	2.1
(d)	6.1
(e)	1.2
(f)	9.1
(g)	5.1
(h)	5.2
(i)	12.1
(j)	7.1
(k)	11.4

2. Paragraphs (l), (m), (n), (o), and (p) of this section are different from WCAG 1.0. Web pages that conform to WCAG 1.0, level A (i.e., all priority 1 checkpoints) must also meet paragraphs (l), (m), (n), (o), and (p) of this section to comply with this section. WCAG 1.0 is available at: http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505

NHI WBT Section 508 Compliance and Adobe Presenter Tips

The National Highway Institute recognizes the importance compliance with Section 508, not only as a legal requirement, but to provide the most robust, comprehensive, and highest quality training possible. In an effort to remain consistent in our standards and compliant with Section 508 requirements, this section was created to record all of the Section 508 styles, requirements, and lessons learned that we have discovered. NHI uses Adobe Presenter to develop Web-based Training. The information in this section refers exclusively to that development tool.

Slides and Slide Content

All content on the slide must, in some capacity, be reflected in the notes (narration) section of the training.

1. Graphics – Any graphic on the slide must be provided in a written description in the narration. This is referred to as an "Image description" and the correct format for documenting this is as follows.

Image description: <brief, succinct, accurate description of the image>

> This description is not read by the narrator, but would be read by a screen reader if a screen reader is present.

2. Tables – Data that is presented in a table must be either included in the general narration or provided as a table description. A table description is formatted like an image description. The information or data must make sense presented in a narrative format. Redundant or repeated information should be presented logically and not simply repeated.

3. Onscreen content in shapes or presented in a way other than a text box – Some content on the screen may be presented in a PowerPoint shape to make the screen visually interesting. For example, the screen shot below has information about Pay equations in an Information Box.

This information should be presented either in the narration or as a separate description, not read by the narrator, labeled as Information or as appropriate.

4. Links/Hyperlinks – Links to other pages within the document or to external web pages or documents should be documented in the narration in some capacity. If there is a link to another place in the same document (one slide links to another slide) this link should either be described in the narration (i.e. "For more information, please navigate to slide 38.") or the linked slide should be directly after the slide that references it, so that a user navigating with only the keyboard can access the information in a logical way.

   Hyperlinks that are presented onscreen should either be read by the narrator or provided as a link description (similar to an image description) so that a screen reader can read the address to a user who cannot see the screen.

Narration and Audio

The narration or audio of the training should avoid phrases that are not meaningful on their own or apply only to a select group of users, such as the following words/phrases:

- "As you can see"
- "Click on…" (Instead say "Select" and include a description of what is to be selected). Keep in mind that if a user cannot select something due to a mobility or visual impairment, an alternate method of accessing that information should be provided. One method is to provide that information in the slide directly following.
- Avoid ambiguous phrases that refer only to graphically defined images on the screen.

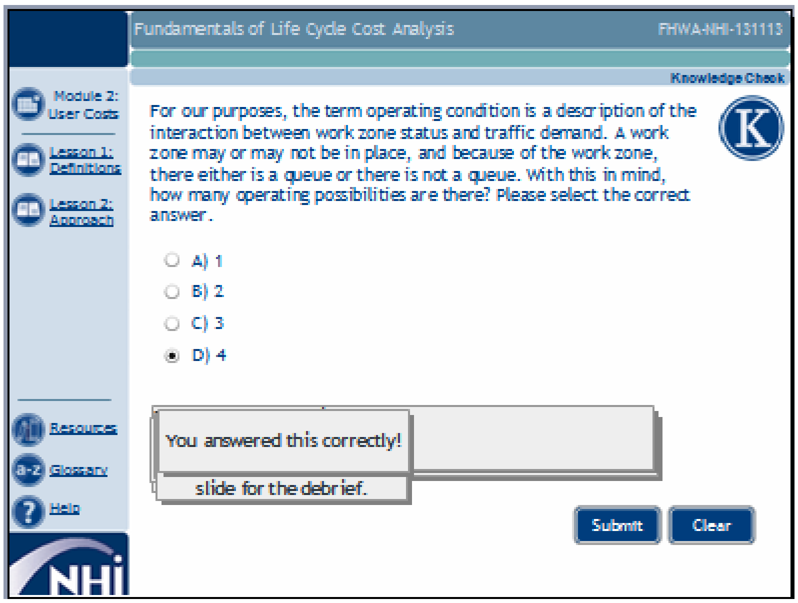
Bulleted or numbered lists in the audio (and in the audio only) should contain a semi-colon after each list item, a semi-colon and the word "and" for the penultimate list item and a period for the last list item.

Knowledge Checks/Knowledge Check Debriefs

In order to be Section 508 compliant, Knowledge Checks must adhere to the following requirements:

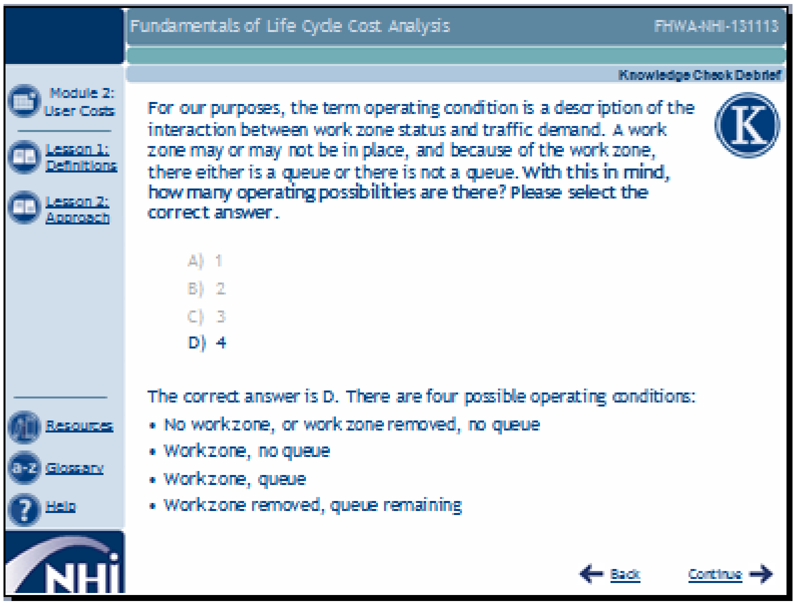
1. There must be two screens for each Knowledge Check: A Knowledge Check screen (that contains the content for the Knowledge Check) and a Knowledge Check Debrief screen (that contains the answer to the Knowledge Check).
2. The Knowledge Check cannot be required
3. The Knowledge Check audio must state the entire question and all of the answer choices.
4. The Knowledge Check Debrief should state the correct answer in sentence format.
5. The Knowledge Check Debrief **screen** should display all of the answer choices, with the incorrect answers grayed out.

Example of Knowledge Check:



Narration (notes section):
For our purposes, the term operating condition is a description of the interaction between work zone status and traffic demand. A work zone may or may not be in place, and because of the work zone, there either is a queue or there is not a queue. With this in mind, how many operating possibilities are there? Please select the correct answer.
a) 1;
b) 2;
c) 3; and
d) 4.

Example of Knowledge Check Debrief:



Narration (notes section):
The correct answer is D. There are four possible operating conditions.
1. No work zone, or work zone removed, no queue;
2. Work zone, no queue;
3. Work zone, queue; and
4. Work zone removed, queue remaining.

Image description: NHI Knowledge Check icon.

How to Create a Knowledge Check Debrief

Knowledge Check Debrief Slides allow Adobe Presenter Knowledge Checks to meet Section 508 compliance. Debrief Slides are required after each Knowledge Check in order for Section 508 compliance to be met.

Step	Action
1	Create a new, blank slide directly after the Knowledge Check. • Select the Knowledge Check slide • Select Insert • Select New Slide A new, blank slide will be inserted following the quiz question slide.
2	Insert quiz content into the debrief slide • On the Knowledge Check slide, hold down the **control key** (CTRL) and select the text box that contains the questions and all answer choices. • **Copy** the objects by right-clicking and selecting copy • On the Knowledge Check debrief slide, **paste** the question and all answer choices. (These two slides should now look identical). Notice that the radio buttons/check boxes or other quiz related elements are on the debrief slide. These must be deleted. o To delete the quiz related elements, select the entire answer. o Right-click on the answer and choose **Grouping** and then **Ungroup.** o You can now delete the radio button, check box, or other quiz element. o Repeat this process for all answer choices until interactive quiz elements are gone.
3	Format debrief slide quiz content.

	• Set all incorrect answers to **Gray, RGB color 150, 150, 150** on the CUSTOM tab in the colors dialog box • Leave the correct answer or answers as **Black, RGB color 0, 0, 0**
4	Insert correct narration • At a minimum, the debrief slide narration should provide the correct answer • Sample narration: o The correct answer is d) All of the above.

End-of-Course Assessment

In order to have students qualify for ECQ's, the exams must have the following settings:

- Every question is required
- There is no feedback
- Each answer is communicated back to the LMS and tallied
- The final score must be given to the student, who must score better than 70% to pass

Give those constraints, this exam or test is not Section 508 compliant. Currently, NHI is in the decision process related to solving this issue, most like learners who cannot complete the exam will call the NHI Training Assistance Center and an NHI representative will proctor the exam for the student verbally.

This version is not Section 508 compliant for several reasons.

- A learner using the keyboard to navigate cannot select the different multiple choice options and the Submit button (the mouse must be used)
- A learner using a screen reader will not know what option has been selected
- Learners using either a screen reader or the keyboard to navigate (or both) will not be able to obtain a score

In the future, NHI will attempt to provide an exam in WBT format that is fully 508 compliant. NHI has communicated this problem to Adobe via the Adobe Support Forum and will continue to monitor updates to Adobe Presenter for features that support Section 508 compliant QuizMaker settings.

LMS Integration

LMS integration is handled internally for all NHI courses. The development team has no tasks associated with integration other than to assist in integration testing, if requested by NHI.

Adobe Presenter

Templates

The purpose of the templates is to provide learners with a consistent look and feel with all online NHI courses they may take. The templates have established standard settings such as (Title, Body, Summary/Wrap-up) pages. There are two WBT templates:

- WBT module template
- WBT end-of-course assessment template

Standardized Screen Types

In addition to standard PowerPoint templates, NHI standards include several standard screen types. Though the layout of each screen is not prescribed, the designer/developer will use the standards screens throughout an NHI course.

The available screen types are documented in the table below.

Screen Type	Description
Module Introduction	The module introduction page orients the learner to the module. Most importantly, it captures the learner's attention and creates a tension for learning. This page should provide the What's In It for Me? (WIIFM). The estimated contact time (module duration) is provided along with the Module learning outcomes.
Lesson Introduction	The lesson introduction page orients the learner to the lesson. Lesson learning outcomes are stated. **NOTE**: Lessons are optional. If the course does not contain lessons, do not use the lesson introduction template.
Content	The content screens provide the body of the instruction. Each screen should address an instructional concept, provide a transitional link between related concepts, provide a practical example or case study, or serve a similar instructional function.
Embedded Questions	The Adobe Presenter Quiz Manager provides six different types of question interaction: • Short answer • Matching • Multiple Choice • Fill-in-the-blank • Rating Scale • True/False The questions can be modified to work as unscored quizzes (i.e., knowledge checks).
Lesson Summary	The lesson summary page wraps up the lesson. Lesson learning outcomes are paraphrased. This page also provides instruction on how to continue (e.g., select another lesson). If desired, one (the same) graphic may be used on every lesson summary page in a course. Refer to section 3.3.4 on course completion requirements **NOTE**: Lessons are optional. If the course does not contain lessons, do not use the lesson summary template.
Module Summary	The module summary page wraps up the module. Module learning outcomes are paraphrased. If the module contains lessons, the connectivity between the module's lessons is emphasized. This page also

Screen Type	Description
	provides instruction on how to continue (e.g., select another module). If desired, one (the same) graphic may be used on every module summary page in a course. . Refer to section 3.3.4 on course completion requirements
End-of-Course Assessment Introduction	The course assessment introduction page orients the learner to the course assessment. Clear instructions on how to take the test are provided. The number of questions in the test is stated. The test scoring page is explained. The learner is informed that the threshold for mastery is 70% for the course test. This page also provides instruction on how to start the test.
End-of-Course Assessment Questions	Similar to the embedded question templates, they include the six different types of question interaction: • Short answer • Matching • Multiple Choice • Fill-in-the-blank • Rating Scale • True/False
End-of-Course Assessment Report	The course assessment report page is the course "scorecard" for the learner. The learner's score on the course is provided as a percentage. The learner is informed, in text, if he or she passed the assessment. The learner is also directed to the Level 1 course evaluation.

Standard Text for Use in NHI WBT

NOTE: Red text denotes text that must be modified in the WBT Screen.

WBT Screen	Standardized Text
Module Introduction	Welcome to the Module Title module. *{Provide the attention gaining devise and the relevance of the material to the intended audience.}* After completing this module, you will be able to: • Terminal Learning outcome • Terminal Learning outcome • Terminal Learning outcome This module will take approximately XX minutes to complete.
Lesson Introduction **NOTE**: Lessons are optional. If the course does not contain lessons, do not use the lesson introduction template.	Welcome to the Lesson Title lesson. *{Provide the attention gaining devise and the relevance of the material to the intended audience.}* After completing this lesson, you will be able to: • Enabling Learning outcome • Enabling Learning outcome • Enabling Learning outcome This lesson will take approximately XX minutes to complete.
Content	No standardized text.

Embedded Practice or Module Knowledge Check – Short Answer	Enter Question Text Enter your answer, and then select Submit.
Embedded Practice or Module Knowledge Check – Matching	Enter Question Text Enter the letter of the item on the right beside the corresponding item on the left, and then select Submit. Y
Embedded Practice or Module Knowledge Check – Multiple Choice	Enter Question Text Select all that apply, and then select Submit.
Embedded Practice or Module Knowledge Check – Fill-in-the-blank	Enter Question Text Enter your answer, and then select Submit.
Embedded Practice – or Module Knowledge Check True/False	Enter Question Text Select your answer, and then select Submit.
Lesson Summary	This lesson provided information on the following key points: • Enter key point
NOTE: Lessons are optional. If the course does not contain lessons, do not use the lesson summary template. Include as many key points as are relevant for the lesson.	• Enter key point • Enter key point You have completed this lesson. Return to the Main Menu to select another option.
Module Summary Note: Include at least one key point for every lesson, if lesson are used. Otherwise, include as many key points as are relevant for the module.	This module provided information on the following key points: • Enter key point • Enter key point • Enter key point You have completed this module. Return to the Main Menu to select another option.
Course Exam Introduction	The course exam contains XX questions. Since you can only take this exam once, be sure you have enough time to complete it. All questions allow for only one answer attempt. Some questions may ask you to "Select ALL the correct answers, then select Submit." Be sure to select ALL the correct choices. Partial answers will be scored as incorrect. You must score at least 70% or better on this exam to be eligible for the XX Continuing Education Credits (CEUs) provided to participants who satisfactorily complete this course.
Course Exam Questions – Short Answer	Enter Question Text Enter your answer, and then select Submit.
Course Exam Questions – Matching	Enter Question Text Enter the lower case letter of the item on the right beside the corresponding item on the left, or select and drag the item on the left with the corresponding letter and then select Submit.
Course Exam Questions – Multiple Choice	Enter Question Text Select all that apply, and then select Submit.

Course Exam Questions – Fill-in-the-blank	Enter Question Text Enter your answer, and then select Submit.
Course Exam Questions – True/False	Enter Question Text Select your answer, and then select Submit.

Adobe Presenter Settings

Most settings are established in the template. Use the following Step/Action tables to re-establish or double check settings to ensure a consistent user experience.

Theme Editor Settings

Theme settings may be edited as part of the publication process. The developer may opt to edit theme settings after selecting *Publish* in the Adobe Presenter menu.

Step	Action
1	Open the **Theme Editor** window by selecting **Adobe Presenter → Presentation Settings → Theme Editor**.
2	Select **NHI Template 1** from the **Theme Name** dropdown menu. **NOTE**: If you do not have the NHI Template 1 option, select **Save As** from beside the **Theme Name** dropdown. In the **Save as ...** window, enter **NHI Template 1**, then select **OK**.
3	Set the following in the **Customize** Options: • Select **Enable Mode Switching** • Select **Default** from the Display option. • Select **Right** from the Location of Layout dropdown menu • Select the **Outline Pane** Checkbox • Deselect the **Thumbnail Pane** Checkbox • Select the **Notes Pane** Checkbox • Select the **Search Pane** Checkbox • Deselect the **Enable Quiz Pane** Checkbox • Select **Notes** from the Default Pane on Startup dropdown menu
4	Deselect all options in the Presenter Info Options.
5	Select **Modify Text Labels → Notes Tab Text** and change the **Custom Text** to **Narration.** Select **OK.**
6	Select **Theme → More Colors** from the Appearance box. In the Color window, enter the following: • **Hue: 140** • **Sat: 240** • **Lum: 48** • **Red: 0** • **Green: 51** • **Blue: 102** Select **OK.** Select **Glow Color → More Colors** from the Appearance box. In the Color window, enter the following: • **Hue: 108** • **Sat: 25** • **Lum: 195** • **Red: 202** • **Green: 212**

	• **Blue: 209** Select **OK.** Select **Font Color** from the Appearance box, and then select White in the Color window. Select **OK.** Select **Background Color → More Colors** from the Appearance box. In the Color window, enter the following: • **Hue: 75** • **Sat: 8** • **Lum: 110** • **Red: 114** • **Green: 121** • **Blue: 113** Select **OK**. Select **OK** on the **Theme Colors** window**.**
7	• Select **Verdana** in the Notes Pane Font. • Select **10** for the Size.
8	Select **OK** on the **Theme Editor** window to save all your settings.

Knowledge Check Settings

Module knowledge checks and the end-of-course assessment are both created using the Quiz Manager. Knowledge checks should be created as ONE question per quiz, or ONE Knowledge Check per quiz. The end-of-course assessment should be created as one quiz with multiple questions.

Module Quiz Manager Settings

Use the following step/action chart to set up a Knowledge Check. Note that you must set up a quiz before you can enter the questions.

Step	Action
1	Open the **Quiz Manager** window by selecting **Adobe Presenter → Quiz Manager**.
2	In the **Quiz Manager** window, select the **Output Options** tab: • Deselect **Display question list in quiz pane** • Deselect **Show incomplete quiz warning**
3	In the **Quiz Manager** window, select the **Reporting** tab, and deselect **Enable reporting for this presentation.**
4	In the **Quiz Manager** window, select the **Default Labels** tab, and set: • In the **Default question button labels** section: o Submit button text: **Submit** o Clear button text: **Clear** • In the **Default question feedback** section: o Select **Correct message**, and enter **Correct. Advance to the next slide for a debrief. Select anywhere to continue.** o Select **Incorrect message**, and enter **Incorrect. Advance to the next slide for a debrief. Select anywhere to continue.** o Select **Retry message**, and enter **Incorrect. {Add hint feedback on slide} Select anywhere to try again.** o Select **Incomplete message**, and enter **You have provided an**

Step	Action
	incomplete answer. Select anywhere to try again. **NOTE:** Custom feedback should be provided to all participants on the debrief slides.
5	In the **Quiz Manager** window, select the **Quizzes** tab.
6	Select **Edit** in the **Quiz** box to open the **Quiz** window.
7	Select the **Quiz Settings** tab.
8	In the **Name** field, enter **Quiz**
9	From the **Required** dropdown, select **Optional – the user can skip this quiz**
10	In the Settings section: • Select **Allow backward movement** • Select **Allow user to review quiz** • Deselect **Include instructions slide** • Deselect **Show score at end of quiz** • Select **Show questions in outline** • Deselect **Shuffle questions** • Deselect **Shuffle answers**
11	Select **Question Review Messages…,** and set: • Correct: **You answered this question correctly.** • Incomplete: **You did not answer this question completely.** • Incorrect: **Incorrect.** **The correct answer is:** Select OK to close the **Question Review Messages…** window.
12	Select **Pass/Fail Options** tab and: • In the **Pass/Fail options** section, set **0% or more of total score to pass** • In the **If passing grade** section, select **Go to next slide** from the **Action** dropdown • In the **If failing grade** section: o Select **Infinite Attempts** o Select **Go to next slide** from the **Action** dropdown**.**
13	Select OK to close the **New Quiz** window

Module Question Settings

After you have set up the quiz, you can create the question(s) for the quiz. Remember that for the embedded Knowledge Checks, there is one question per quiz; for the end-of-course assessment, there is one quiz for the assessment, with multiple questions in the quiz.

Use the step/action chart to set up the quiz questions.

Step	Action
1	In the **Quiz Manager** window, select the quiz to which you are adding a question, then select the drop down arrow next to **Add Question**.
2	Select the type of question indicated in the storyboards, then select **Create Graded Question**. **NOTE**: The type of question used in this example is Multiple Choice. The inputs are similar for other types of questions, unless noted.
3	In the **Question** window, the **Question** section is similar for all questions types. Set the following: • **Name** field: Learning Outcome {x} **NOTE:** Indicate which Learning Outcome/Objective the question addresses.

Step	Action
	• **Question** field: Enter **Knolwedge Check** • **Score** field: 0
4	From the **Type** dropdown, select either single response or multiple response, based on the storyboard.
5	From the **Numbering** dropdown, select the lower case characters (a, b, c, . . .)
6	In the **Answers** section, select **Add**, then enter or copy/paste the text for the answer options. Select the correct answer(s).
7	Select the **Options** tab, and set the following: • In the Type section: o Select **Graded - there are right and wrong answers** from the o Select **Show clear button** • In the If correct answer section: o Select **Go to next slide** from the **Action** dropdown o Select **Show correct message** • In the If wrong answer section: o Enter **2** in the **Allow user** field **NOTE:** Set to **1** for True/False or Yes/No questions. o Select **Go to next slide** from the **Action** dropdown o Select **Show error message** o Select **Show retry message** o Select **Show incomplete message**
8	Select the **Reporting** tab and deselect **Report** answers
9	In the **Question** window, select **OK**.
10	In the **Quiz Manager** window, select **OK**.
11	Repeat for each knowledge check.

How to Create a Knowledge Check Debrief

Knowledge Check Debrief Slides allow Adobe Presenter Knowledge Checks to meet Section 508 compliance. Debrief Slides are required after each Knowledge Check in order for Section 508 compliance to be met.

Step	Action
1	Create a new, blank slide directly after the Knowledge Check. • Select the Knowledge Check slide • Select Insert • Select New Slide A new, blank slide will be inserted following the quiz question slide. **NOTE:** Do not copy and paste the original Knowledge Check slide. You must create a new slide.
2	Insert quiz content into the debrief slide • On the Knowledge Check slide, hold down the **control key** (CTRL) and select the text box that contains the questions and all answer choices. • **Copy** the objects by right-clicking and selecting copy • On the Knowledge Check debrief slide, **paste** the question and all answer choices. (These two slides should now look identical). Notice that the radio buttons/check boxes or other quiz related elements are on the debrief slide. These must be deleted. o To delete the quiz related elements, select the entire answer. o Right-click on the answer and choose **Grouping** and then **Ungroup.** o You can now delete the radio button, check box, or other quiz element. o Repeat this process for all answer choices until interactive quiz elements are gone.

3	Format debrief slide quiz content. • Set all incorrect answers to **Gray, RGB color 150, 150, 150** on the CUSTOM tab in the colors dialog box • Leave the correct answer or answers as **Black, RGB color 0, 0, 0**
4	Insert correct narration • At a minimum, the debrief slide narration should provide the correct answer • Sample narration: o The correct answer is d) All of the above.

Learner Assessment Settings

The end-of-course assessment is also created using the Quiz Manager. The end-of-course assessment should be created as one quiz with multiple questions in a separate PowerPoint file.

End-of-Course Assessment Quiz Settings

Use the following step/action chart to set up an end-of-course assessment. You must set up a quiz before you can enter the questions.

Step	Action
1	Open the **Quiz Manager** window by selecting **Adobe Presenter → Quiz Manager**.
2	In the **Quiz Manager** window, select the **Output Options** tab: • Deselect **Display question list in quiz pane** • Deselect **Show incomplete quiz warning**
3	In the **Quiz Manager** window, select the **Reporting** tab, then select **Enable reporting for this presentation.** Set the following: • **Learning Management System: Adobe Presenter** • **Report Pass or Fail: Report status as defined by report data** • **Choose report data: Report to Adobe Presenter** • **Report score to LMS as: Score** • **Reporting level: Only report the score** Select **OK**
4	In the **Quiz Manager** window, select the **Default Labels** tab, and set: • In the **Default question button labels** section: o Submit button text: **Submit** o Clear button text: **Clear** • In the **Default question feedback** section: o Deselect **Correct message.** o Deselect **Incorrect message.** o Deselect **Retry message.** o Select **Incomplete message**, and enter: **You must answer the question before continuing.**
5	In the **Quiz Manager** window, select the **Quizzes** tab.
6	Select **Add New Quiz** to open the **New Quiz** window.
7	Select the **Quiz Settings** tab.
8	In the **Name** field, enter **{Course Name}.**
9	From the **Required** dropdown, select **Answer all - the user must answer every question to continue**
10	In the Settings section: • Deselect **Allow backward movement** • Deselect **Allow user to review quiz** • Deselect **Include instructions slide** • Select **Show score at end of quiz**

Step	Action
	• Deselect **Show questions in outline** • Deselect **Shuffle questions** • Deselect **Shuffle answers**

11	Select **Pass/Fail Options** tab and:
	• In the **Pass/Fail options** section, set **70% or more of total score to pass**
	• In the **If passing grade** section, select **Go to next slide** from the **Action** dropdown
	• In the **If failing grade** section:
	  o Set **Allow user** to **1 attempts**
	  o Select **Go to next slide** form the **Action** dropdown

12	Select OK to close the **New Quiz** window

End-of-Course Assessment Question Settings

After you have set up the quiz, you can create the questions. For the end-of-course assessment, there is one quiz for the assessment, with multiple questions in the quiz.

Use the step/action chart to set up the quiz questions.

Step	Action
1	In the **Quiz Manager** window, select the quiz to which you are adding a question, then select the drop down arrow next to **Add Question**.
2	Select the type of question indicated in the storyboards, then select **Create Graded Question**. **NOTE**: The type of question used in this example is Multiple Choice. The inputs are similar for other types of questions, unless noted.
3	In the **{Type} Question** window, the **Question** section is similar for all questions types. Set the following: • **Name** field: Learning Outcome {x} **NOTE:** Indicate which Learning Outcome/Objective the question addresses. • **Question** field: Enter **Knowledge Check** • **Score** field: Enter the number of points for the question. **NOTE:** The total number of points for an end-of-course assessment should be 100. Distribute points as evenly as possible through all questions on the assessment, but only include 1 question per learning outcome.
4	From the **Type** dropdown, select either single response or multiple responses, based on the storyboard.
5	From the **Numbering** dropdown, select the lower case characters (a, b, c, . . .)
6	In the **Answers** section, select **Add**, then enter or copy/paste the text for the answer options. Select the correct answer(s).

7	Select the **Options** tab, and set the following:
	• In the Type section:
	  o Select **Graded - there are right and wrong answers** from the
	  o Deselect **Show clear button**
	• In the If correct answer section:
	  o Select **Go to next slide** from the **Action** dropdown
	  o Deselect **Show correct message**
	• In the If wrong answer section:
	  o Enter **1** in the **Allow user** field
	  NOTE: Set to **1** for all question types in the end-of-course assessment.
	  o Select **Go to next slide** from the **Action** dropdown

Step	Action
	o Deselect **Show error message** o Select **Show incomplete message**
8	Select the **Reporting** tab and select **Report answers**, then: • Select the **{Course Name}** from the **Name** dropdown**.** • Do not change the Interaction ID.
9	In the **Question** window, select **OK**.
10	In the **Quiz Manager** window, select **OK**.

Question Formatting on PowerPoint slides

After a Quiz is created in the Adobe Presenter Quiz Manager, the text will not use the same size font or color as the master slide so the font and color must be altered manually.*

Step	Action
1	• Add the Question to the slide in a separate text box • Set font to **Verdana 22 pt Bold** • Align to top-left of grid • Set color to **BLACK** • Set **RGB color 0, 0, 0**
2	• Set answer font to **Verdana 20 pt** • Set **RGB color 0, 0, 0**
3	Format answers if needed. • Select all answers by holding the SHIFT key and clicking each text box. • Select **Format > Object** • On the **TEXT BOX** tab, un-check "*word wrap text in auto-shape"*'. This will cause the text to continue off the page • Select the spot after the last word that fits within the grid and select the **ENTER** key while holding **SHIFT**. Complete for every line of text
4	Format response boxes • Manually adjust the font and color of the response boxes • Set font to **Verdana 20 pt** and **RGB color 0, 0, 0** • Set **box fill colo**r to **RGB 202, 212, 209** or the same color as the sub-navigation bar • Arrange the boxes so no answers are covered
5	Format Submit and Clear buttons • Set font to **Trebuchet 14 pt** and **white color** • Set **box fill color** to **RGB 0, 51, 102** • Place boxes in the lower-right corner of the screen

*To avoid this extra step, create a separate master slide for quizzes to accommodate the different font sizes and colors.

Presentation Settings

Before publishing the PowerPoint file, modify the Presentation Settings as follows.

Step	Action
1	Navigate to the **Adobe Presenter** menu and select **Presentation Settings.**
2	Select the **Appearance** tab. In the **Title** field, enter the module (i.e. Module 1, Module 2, Introduction, End of Course Test, etc.)
3	In the **Theme** field, select NHI Theme 1.
4	Select the **Playback** tab. Select **Auto play on start** and select **Include slide numbers in outline.**
5	Select the **Quality** tab. • In the **Publish For:** field, select **Adobe Connect Pro** • Select **Publish Audio** and choose **CD Quality**

Step	Action
	• For **Image Quality,** select **High** • Deselect **Control Publishing** • Select **Use these settings for new presentations**
6	Select the **Attachments** tab. Here you will attach a PDF version of the presentation. If you have not done so already, print/convert the presentation to Adobe PDF in notes view. **NOTE:** Ensure all text in the notes will fit on the slide in notes view. • Select the **Add** button. • In the **Name** field, enter "**Module {x} PDF"** • In the **Type** field, choose **File** • In the **Location** field, chose the file folder icon. Navigate to the PDF and select it. Choose the Open button to select the PDF. Select Ok to save the attachment.
7	Select **OK** to save your settings and exit the Presentation Settings.

Slide Manager

Before publishing the PowerPoint file, modify the Slide Manger settings as follows.

Step	Action
1	Navigate to the **Adobe Presenter** menu and select **Slide Manager.**
2	Choose the **Select All** button.
3	In Slide 1, choose the hyperlinked word **No** next to the **Advance by User** setting. A drop down will open.
4	Select **Yes** to make all slides user advance.
5	Select **OK** to save the settings and exit the Slide Manager.

Appendix

WBT Sample Template

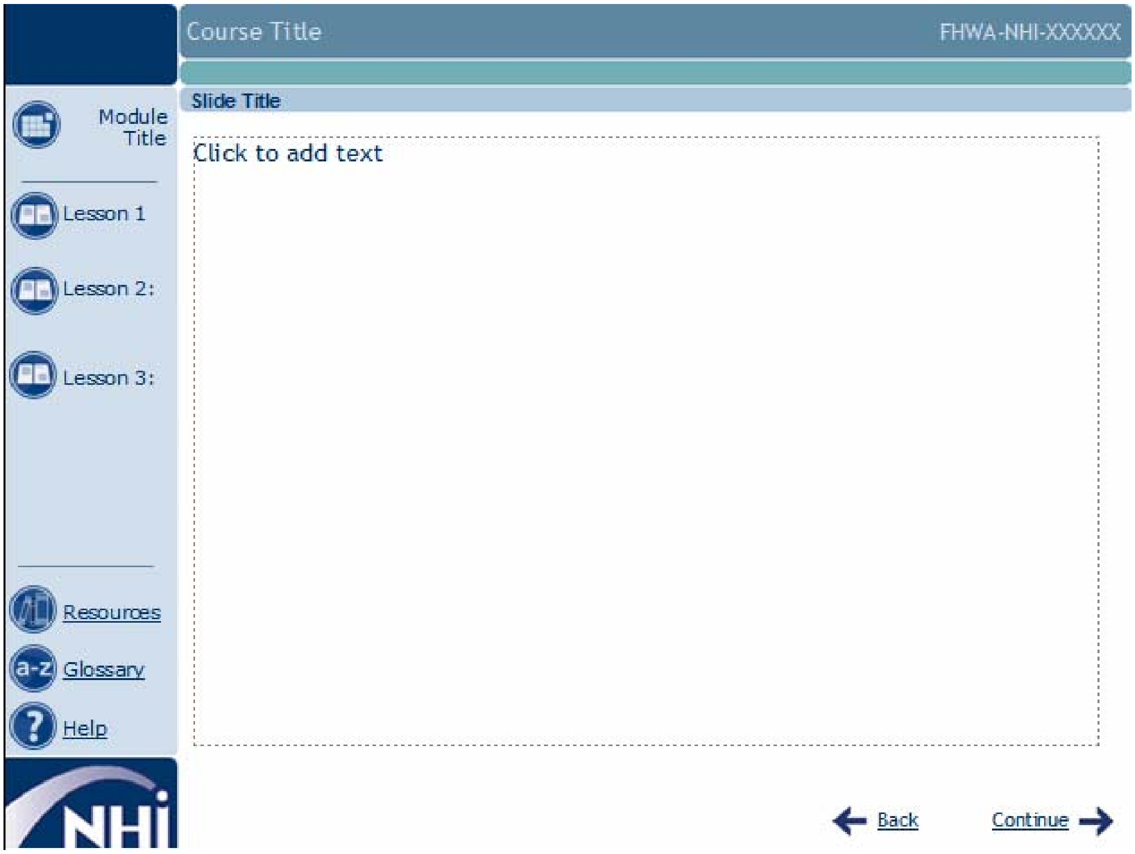
Master Slide:

Title Bar, Course Title: Trebuchet MS, 16pt font
Title Bar, Course Number: Trebuchet MS, 14 pt font

Side Bar, Module Title: Trebuchet MS, 12pt font
Side Bar, Lesson Links: Trebuchet MS, 12pt font
Side Bar, Resources, Glossary, and Help links: Trebuchet MS, 12pt font

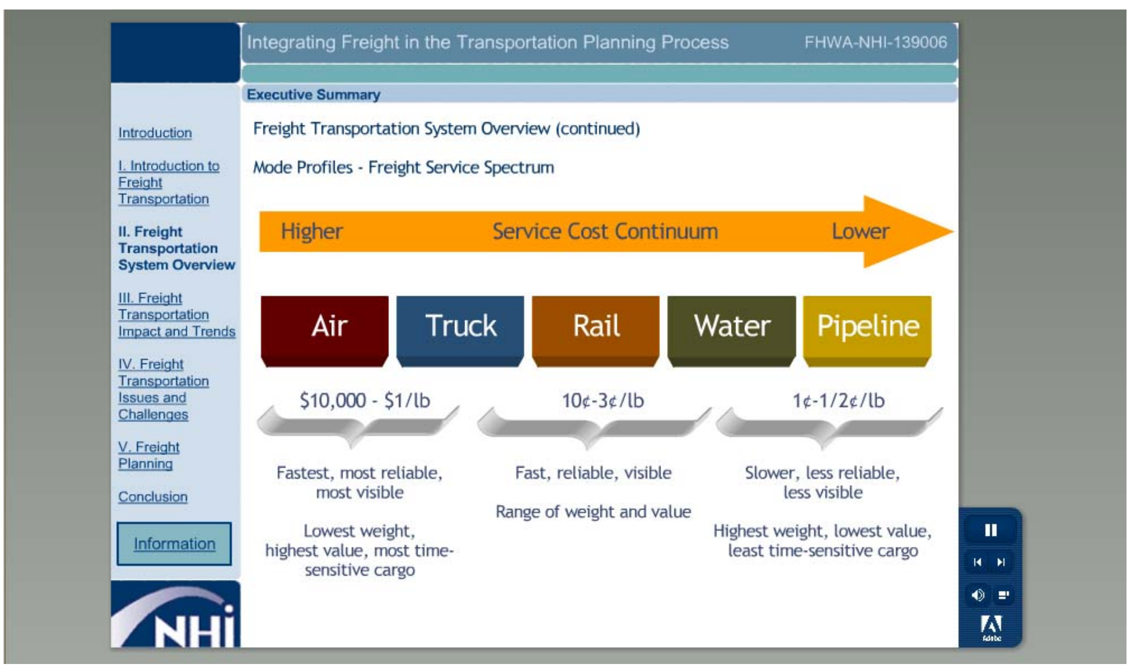
Slide Title Bar: Arial, 12pt font

Slide Text: Suggested, Trebuchet MS, 18pt font no smaller than 16pt



WBT Sample Slides

Screenshot without narration window:



Screenshot that displays narration window:

Level 1 Evaluation

Summative evaluations occur after deployment of the courseware and/or training materials, and validates that the materials meet the need identified effectively and efficiently. NHI uses Kirkpatrick's Levels of Evaluation Model as its standard approach. All training undergoes Level 1 and Level 2 evaluations. Level 3 and Level 4 evaluations are at the discretion of NHI.

Level 1 evaluations measure the learner's reaction to the training. NHI uses a standardized, web-based evaluation form. The training links directly to the evaluation form from the final page in the last module.

The level 1 evaluations used by NHI are created by training evaluation system. Seminars do not use level 1 evaluations.

Create an Evaluation Link

Evaluation links are generated from the course number and the session number that are assigned by the NHI business application.

The evaluation link will appear in this format:

https://www.nhies.info/online-eval.html?coursenumber=[CMTS course number]&sessionnumber=[CMTS session number]

Here is an example:

https://www.nhies.info/online-eval.html?coursenumber=134095&sessionnumber=20090601

Add Link to Course

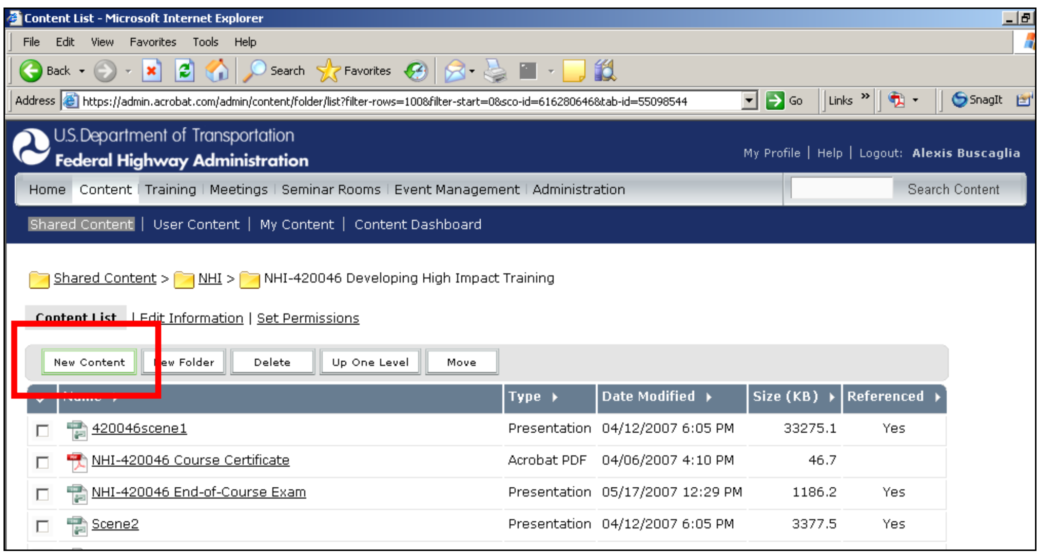
Add the evaluation link to the final slide of the WBT by hyperlinking text or adding a hyperlinked action box. See the samples below:

Box: Text: Go to this link to take the course evaluation.
Print Course Certificate

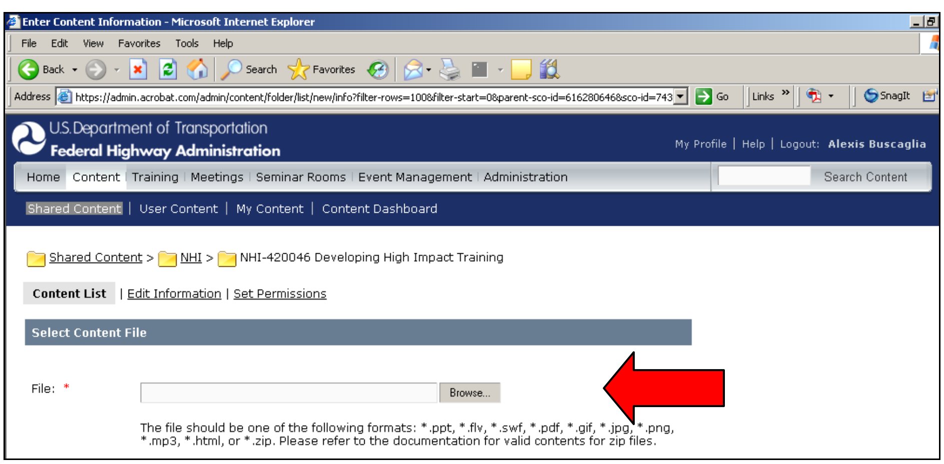
Add Ancillary Files

The following are the directions to upload ancillary files to the FHWA Adobe Server. The NHI Certificate is an example of an ancillary file. Other ancillary files would include glossary, help, and training resources files.

Upload the PDF ancillary file to the course folder on the Adobe server by first selecting "New Content."

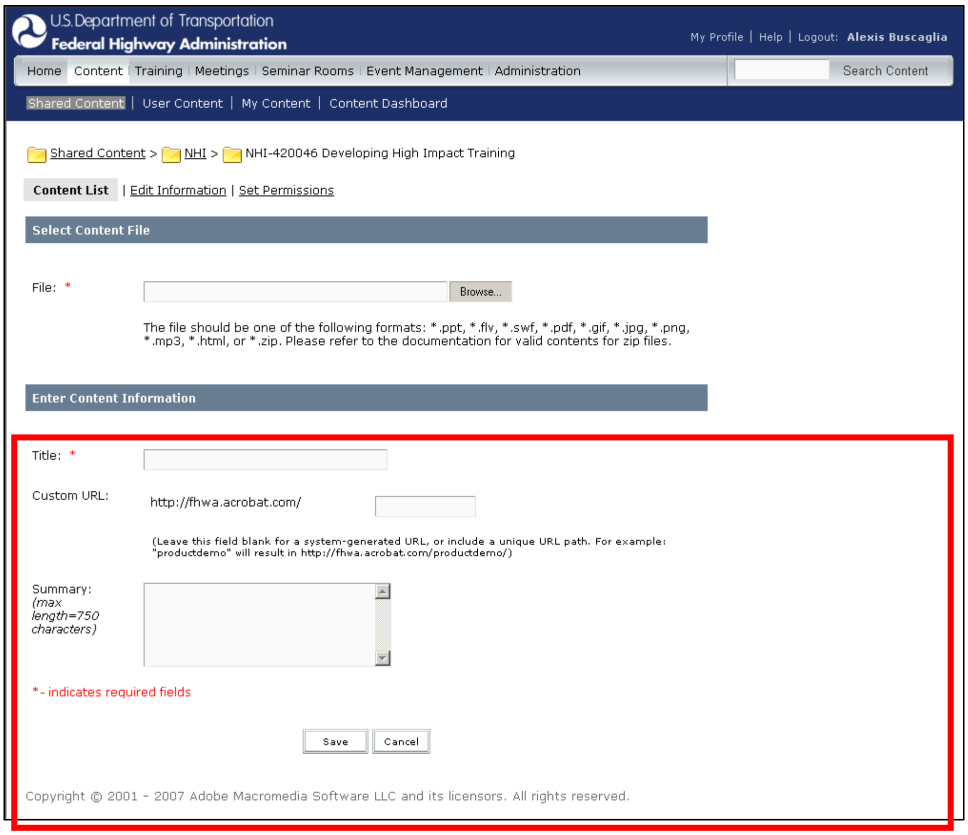


Click on Browse to locate the ancillary files.

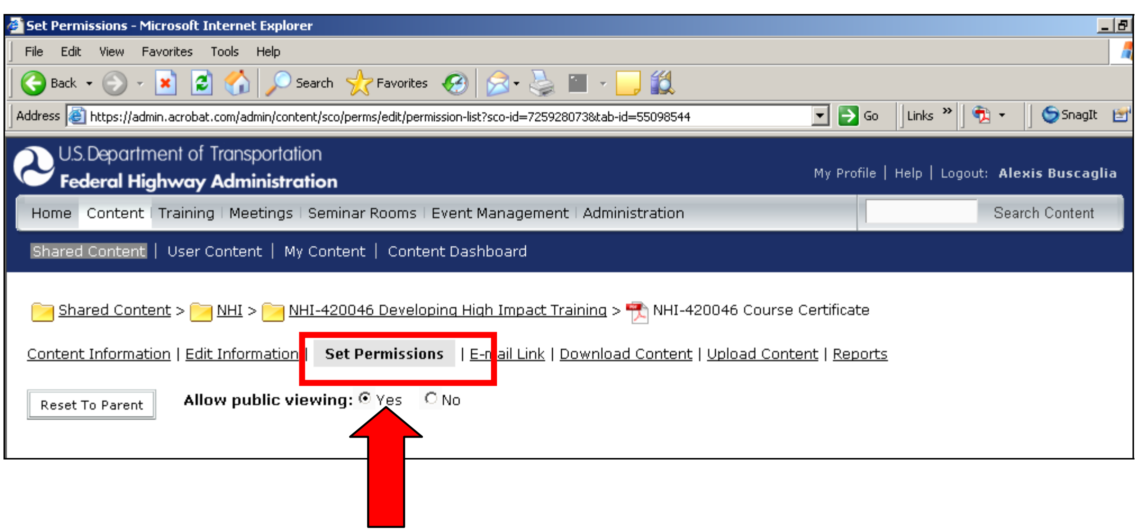


Use the NHI naming convention to name the file under "Enter Content Information." Click "Save" when finished. Note the URL for future use.

Shared Content > NHI > Course Folder > CONTENT		
Content Type	**Name**	**Custom URL**
Content Module	NHI-141045 Resources	n141045resources
Certificate	NHI-141045 Course Certificate	n141045certificate
End of Course Exam	NHI-141045 Glossary	n141045glossary



To set permissions, click on Set Permissions on the same menu bar as "Content Information." Set the permissions as public. Click "Save."



Acronym List

The following acronyms have been used in this document.

Acronym	Definition
ADDIE	Analysis, Design, Development, Implementation, Evaluation
DDP	Detail-level Design Plan
FHWA	Federal Highway Administration
GUI	Graphical User Interface
HDP	High-level Design Plan
ISD	Instructional Systems Design; Instructional Systems Designer
NHI	National Highway Institute
QA	Quality Assurance
QC	Quality Control
SCO	Sharable Content Object
SCORM	Sharable Content Object Reusability Model
W3C	World Wide Web Consortium
WBT	Web-based Training

NHI Web-Based Training Testing Process

Stage	Stage 1 Alpha	Stage 2 Pilot	Stage 3 Soft Launch	Stage 4 Public Offering[1]
Vendor/Contractor Duties	• Publishes WBT materials to their folder on the NHI server.[2] • Conducts QC on WBT materials for content and functionality.[3] • Provides NHI with all ancillary files, which are published to NHI server, and receives hyperlinks to embed in WBT. • Publishes all QC'd materials and creates curricula on NHI server. • Reviews comments submitted by Tech Panel lead. • Implements changes and documents final resolution of all comments. • Submits "Final Resolution of Comments" form to NHI and Tech Panel Lead.	• Publishes revised materials to NHI server and retests to make sure materials are pilot-ready. • Publishes pilot-ready materials to vendor folder on the NHI server as content, following NHI User Guide directions. This includes applying appropriate naming conventions[4] for the pilot and establishing the course in Adobe and the curricula. • Sends registration links to NHI TPM with a written, signed report documenting their testing process and certifying that the product complies with NHI's "pilot-ready" criteria.[5] • Reviews comments submitted by Tech Panel lead following pilot. • Implements pilot recommendation	• Publishes post-pilot revised materials to NHI server and retests. • Provides all tested, revised course materials with final file and folder naming conventions to NHI TPM/ISD. • Reviews comments submitted by NHI Business Support. • Implements Business Support recommendations and documents final resolution of all soft launch recommendations. • Submits "Final Resolution of Soft Launch Comments" form to NHI TPM, ISD, and Business Support.	• If changes were necessary from Stage 3 Business Support review, provides all final course materials as source files to NHI TPM & ISD, following guidelines provides in the NHI WBT Standards & Style Guide. • Removes all old draft materials published to their folder on the NHI server.

[1] It is possible that following the Stage 3 review by Business Support that no changes would need to be made by the vendor and that the materials would be accepted as final at that point. Therefore, the vendor would only need to complete the second bulleted item in Stage 4 and the TPM/ISD would complete only complete the third bullet in Stage 4.
[2] Separate document will be provided to detail the NHI WBT publication process in Adobe Presenter.
[3] NHI will provide guidance on all items to be tested as part of the Quality Control process of a Web-based Training product.
[4] NHI will create separate naming conventions for pilot materials.
[5] NHI will create a criteria for "pilot-ready".

Stage	Stage 1 Alpha	Stage 2 Pilot	Stage 3 Soft Launch	Stage 4 Public Offering[1]
		and documents final resolution of all pilot comments. • Submits "Final Resolution of Pilot Comments" form to NHI and Tech Panel Lead.		