



SUBJECT 3D Roadway Design	FINAL NUMBER RD 13 - 03(B)	EFFECTIVE DATE 12/31/2013	VALIDATION DATE 12/18/2015	SUPERSEDES or RESCINDS
WEB LINK(S) http://www.oregon.gov/ODOT/HWY/TECHSERV/Pages/technicalguidance.aspx				
TOPIC/PROGRAM <u>Highway Design Manual</u>	APPROVED SIGNATURE Original signed by: Bob Pappé, P.E.,PLS State Traffic/Roadway Engineer			

PURPOSE

To provide clarification concerning the required content, process/workflows, delivery timelines, and quality control of digital 3D Roadway Design data for Oregon’s Statewide Transportation Improvement Program (STIP) projects.

GUIDANCE

This bulletin updates 3D Roadway Design in Chapter 16 of the [Oregon Highway Design Manual](#) (HDM). Supplemental resources related to 3D Roadway Design are also provided in Appendix M (Digital Design Packages) and Appendix N (Digital Design Quality Control) of the HDM. It also clarifies when the Agency will require designers (Consultant and Agency) to provide roadway digital design documents to bidders at project Advertisement for Oregon STIP projects.

DEFINITIONS

eBIDS is an acronym for ODOT’s Electronic Bidding Information Distribution System, which is an online tool that enables contractors, suppliers and other interested parties to locate, view, and download bid-related documents for design-bid-build highway and bridge construction projects that ODOT currently has advertised to bid.

eBIDS Handoff Package refers to digital roadway design data that is uploaded as an eBIDS reference document. Data that is required to be provided as part of this package is listed in Appendix M of the HDM.

Construction Survey Handoff Package refers to digital roadway design data that is provided to the ODOT Project Manager's office during the Construction Administration phase of the project. Data that is required to be provided as part of this package is listed in Appendix M of the HDM.

BACKGROUND/REFERENCE

Currently, roadway designers use computer software to create alignments and roadway models. The related line work is then displayed in one or more computer design files. These files are combined with computer design files from other designers to create the paper plan sets. At the time of project Advertisement, digital data is not consistently provided for contractors' use on STIP projects. In some cases, the digital design data is provided by roadway designers to their respective ODOT construction Project Manager's (PM's) office at a milestone called "Construction Survey Handoff". In other cases, the data is provided just in time for the corresponding work. The Construction Survey Handoff milestone typically occurs somewhere between Plans Specification & Estimate (PS&E) delivery and the Contractor's Pre-Survey meeting. Exact process and quality control check varies by designer office and construction office.

ODOT has established a long-term vision for ODOT construction documents to be generated from electronic data (vs. paper sheets). ODOT's [Engineering Automation White Paper](#) presents key concepts for a 25-year vision across project delivery disciplines (surveyors, designers, inspectors, contractors, etc.). The initial short-term goals of the 25-year vision are summarized in the [Construction Machine Automation Plan](#) and include a vision of moving ODOT from paper-based to electronic data-based platforms for bidding and construction. The short-term plan includes a wide variety of goals for multiple disciplines. Those most relevant to roadway designers are:

- Continued digital design delivery (data that is currently processed by third parties into 3D design data) – standardized and formatted to support this period's machine control and survey stakeout goals
- Machine Control focused on roadway earthwork and grading, and trench excavation for pipe installation
- Digital "Engineering Data Packet" available to contractors upon project Advertisement

In order to move from current practice toward implementing the short-term vision for ODOT's Construction Machine Automation Plan, the agency formed the [3D Roadway Design Committee](#) (3D RDC) in April 2012. The purpose of the 3D RDC is to create the process, standards and practices to enable the delivery of consistent, quality roadway digital design documents, based on accurate, detailed original ground surveys, for contractors and the Agency's construction administration staff.

Chapter 16 (3D Roadway Design) and the related Appendix M (Digital Design Packages) and Appendix N (Digital Design Quality Control) of the Highway Design Manual are products of the 3D RDC.

SPECIFIC CHAPTER UPDATES

After the first year requiring eBIDS Handoff Package at bid for most projects, it was discovered that some minor changes and clarification needed to be made in the documentation. Throughout chapter 16 and appendix M, minor wording changes are made to better explain the concepts. To further assist the practitioner, these specific areas in chapter 16 and appendix M are modified.

Section 16.1 – Introduction. Text was added to this section.

Section 16.2.3 – Digital File Formats. Text was updated.

Section 16.3.1 – Template Considerations. Text was updated.

Section 16.3.1.1 – Template Drops. Text was updated.

Section 16.3.2.2 – Roadway Designer Options. Text was added to this section.

Section 16.3.2.3 – Surface Creation Settings. Text was updated and graphic updated.

Section 16.3.3 – Corridor Matching. Text was added to this section.

Section 16.3.4 – Detailed Modeling. Text was updated.

Section 16.3.4.3 – Gores. Text was updated.

Section 16.3.4.4 – Abutments. Text was updated.

Section 16.3.4.6 – Intersections. Text was updated.

Section 16.3.4.7 – Sidewalk Ramps. Text was updated.

Section 16.3.4.8 – Approaches. Text was added to this section.

Section 16.3.4.9 – Islands & Traffic Separators. Text was updated.

Section 16.3.6 – Model Review. Text was added to this section.

Section 16.4.2 – Alignment Data. Text was updated.

Section 16.4.5 – Cross Section Data. Text was added to this section.

Section 16.4.5.1 – MicroStation Design File. Text was updated.

Section 16.4.5.3 – LandXML Files. Text was updated.

Section 14.4.6 – Quantities. Item #4 text was updated.

Section 16.5 – Digital Design Quality Control. Text added to this section.

Section 16.6 – References and Additional Information. This is a new section that contains verbiage from the previous Appendix N, section N.2.

Section M.1.1 – Digital Design Package Checklists. Text was added to this section

Section M.1.2 – eBIDS File Name Restrictions. Text was added to this section.

Section M.1.3 – Example Digital Design Packages – eBIDS Handoff. Renamed to “Example Digital Design Packages”. Four example projects were removed and replaced with three more recent example projects. Section modified to post example packages for both eBIDS Handoff and Construction Survey Handoff.

Section M.1.4 – Example Digital Design Packages – Construction Survey Handoff.

Deleted this section from appendix. More recent example projects included in revised Section M.1.3.

In addition to the above minor changes, it was decided to revise Appendix N to address roadway digital design quality control, rather than its former focus on workflows. The revised Appendix N provides specific guidance on best practices related to quality control of roadway digital design data. The supporting documents linked to Appendix N also provide numerous tools for practitioners to consider. Workflows and training have been addressed under separate cover and can now be found on ODOT's 3D Roadway Design [Advanced InRoads Training Labs](#) website.

EXCEPTIONS

It is anticipated that preparation of the eBIDS Handoff Package may not be appropriate for some projects due to various constraints such as schedule, scope, and/or budget. Written approval from the appropriate Region Roadway Manager (RRM) shall be obtained prior to the Advance Plans milestone for STIP roadway projects that are identified as candidates for an exception to the eBIDS Handoff package requirement. The exception shall be tracked by the Project leader using the PS&E Completeness Checklist.

RESPONSIBILITIES

This guidance applies to all state and/or federal-aid STIP roadway projects located on the *State System* and designed to 3R or 4R standards (as defined by the [ODOT Highway Design Manual](#)) to be accepted by the Office of Project Letting (OPL) as a PS&E Package on or after January 1, 2015 regardless if delivery is from Agency or consultant forces. See attached Exhibit A for approximate durations of roadway digital design delivery timelines.

A parallel guidance for delivery of digital 3D Roadway Design data for state and/or federal-aid STIP roadway projects located on the *Local System* is provided in the [Local Agency Guidelines Manual, Section B, Chapter 9](#).

Responsible Party	Action
Consultant Contract Agency Project Manager (APM)	<ol style="list-style-type: none"> 1. Ensure Architecture/Engineering (A&E) consultant design contracts with roadway design elements include tasks for delivery of digital roadway design data as outlined in the HDM. 2. Contingency tasks are required for delivery/support of the Construction Survey Handoff Package during the Construction Administration phase, as described under Roadway Designer responsibilities. A&E contract language (eBIDS and Construction Survey Handoff SOW), including tasks describing this work, can be found on the ODOT Procurement Office (OPO) website under Standardized SOW Tasks.

Responsible Party	Action
Project Leaders	<ol style="list-style-type: none"> 1. Ensure Project Schedules provide at least 100 calendar days from Final (Pre-Mylar) Plans Distribution/Completion to Project Advertisement for review/revision of draft eBIDS Handoff package to Construction Project Manager after Final (Pre-Mylar) Plans distribution milestone. 2. Work with roadway designer and provide additional time in schedule to develop digital design models at Advance Plans phase. 3. Verify that an eBIDS package will be delivered or obtain exception documentation from RRM and note on PS&E Completeness Checklist. 4. Upload eBIDS Handoff package (including "Notice of eBIDS Roadway Digital Design Data" Letter) as eBIDS reference documents prior to project Advertisement. See "How-to" Guide: Posting a Roadway Digital Design eBIDS Package for step-by-step instructions.
Surveyor (Agency/Consultant)	<ol style="list-style-type: none"> 1. Provide original ground digital terrain models that meet ODOT survey standards to support the production of detailed digital design models. 2. Coordinate with roadway designer to identify high-accuracy zones for match-in or other design needs prior to conducting original ground survey work.

Responsible Party	Action
Roadway Designer (Agency/Consultant)	<ol style="list-style-type: none"> 1. Work with project leader to incorporate additional time in schedule to develop digital design models at Advance Plans phase. Provide draft eBIDS Handoff Package to Construction Coordinator for review no later than Final (Pre-Mylar) Plans review/distribution milestone. 2. Incorporate comments from Construction Coordinator into final eBIDS Handoff Package no later than one week before project Advertisement. 3. Submit eBIDS Handoff Package (including "Notice of eBIDS Roadway Digital Design Data" Letter) to Project Leader prior to project Advertisement. Provide draft Construction Survey Handoff package to Construction Coordinator no later than 30 days after Bid Opening (Notice to Proceed) milestone. 4. Incorporate comments and provide final Construction Survey Handoff Package to Construction Coordinator no later than Pre-construction Meeting milestone. 5. Attend Pre- Survey meeting with Construction Specialist.
Construction Project Manager	<ol style="list-style-type: none"> 1. Ensure Construction Coordinator reviews draft eBIDS Handoff package and provide feedback to roadway designer within 4 weeks of Final (Pre-Mylar) Plans distribution milestone. 2. Ensure Construction Coordinator reviews draft Construction Survey Handoff package and provides feedback to roadway designer no later than 2 weeks after receiving the package. 3. Include feedback to the pertinent Region Tech Center on digital design data as part of post-construction reviews.

Responsible Party	Action
Region Roadway Manager	<ol style="list-style-type: none"> 1. Incorporate review of roadway digital design data as part of Region Roadway Quality Control (QC) process. 2. Assign QC review of roadway digital design data included in eBIDS Handoff Package and Construction Survey Handoff package. 3. Ensure the uploaded eBIDS Handoff Package includes the data intended by the designer. 4. Ensure draft Construction Survey Handoff package is submitted within 30 days after Bid Opening (Notice to Proceed) milestone. 5. Review and process exception requests to the eBIDS Handoff package requirement in accordance with this Tech Bulletin and the Local Agency Guidelines Manual.

CONTACT INFORMATION

Title: Senior Standards Engineer
Branch/Section: Traffic-Roadway
Phone: (503) 986-3738
E-mail: David.J.Polly@odot.state.or.us

Title: Roadway Manager
Branch/Section: Region 4
Phone: (541) 388-6121
E-mail: Della.D.Mosier@odot.state.or.us

Attachment: EXHIBIT A (Approximate Durations – Roadway Digital Design Delivery Timeline)

EXHIBIT A: Approximate Durations – Roadway Digital Design Delivery Timeline

ESTIMATED DURATION	FINAL (PRE-MYLAR) PLANS DISTRIBUTION/ COMPLETION Milestone	2 weeks	2 weeks	2 or more months	1 week	PROJECT ADVERTISEMENT Milestone	6-8 weeks	30 days after BID OPENING Milestone	10-30 days	PRE-SURVEY MEETING Milestone
TASK	Roadway Designer delivers Final (Pre-Mylar) plans, special provisions, and estimate for review/comment.	Roadway Designer prepares and submits Draft eBIDS Handoff Package* to ODOT Construction Coordinator for Review	Construction Coordinator Reviews Draft eBIDS Handoff package and provides comments to Roadway Designer	Roadway Designer incorporates comments from Construction Coordinator into the eBIDS Handoff package	Roadway Designer provides final eBIDS Handoff package to the Project Leader no later than 1 week prior to Project Advertisement	Project Leader uploads eBIDS Handoff package to eBIDS	Roadway Designer coordinates with Construction Coordinator and prepares Draft Construction Survey Handoff Package*.	Roadway Designer delivers Draft Construction Survey Handoff Package. (30 days after Bid Opening generally coincides with Notice to Proceed)	Roadway Designer and Construction Coordinator work together to revise/finalize Construction Survey Handoff package to be ready for Pre-Survey Meeting.	Roadway Designer attends meeting to provide technical support to Construction Coordinator regarding the Construction Survey Handoff package.

* See Highway Design Manual Appendix M for information regarding Handoff Packages

<-----Minimum Duration to prepare Construction Survey Handoff package starting from Final Plans Distribution Milestone to Pre-Survey Meeting Milestone is 4 months ----->

<----Minimum Duration to prepare eBIDS Handoff package starting from Final Plans Distribution Milestone to PL Delivery is 3 months ---->