

Bentley
Advancing Infrastructure

CONNECT Edition



OpenRoads ConceptStation

Rapid Conceptual Design

OpenRoads ConceptStation empowers highway engineering professionals to rapidly create conceptual road and bridge designs in a matter of hours – not days. You can create intelligent digital models in context to the real-world environment. OpenRoads ConceptStation combines engineering drawing tools and associated costs to facilitate better decision making in the preliminary design phase. Engineers and designers can evaluate more options during the planning and pre-bid stage of the project.

The benefits include increasing design productivity, identifying potential high-risk items, and minimizing project development costs. Once the optimal design is identified, you can readily upload the model to OpenRoads' detailed design products to streamline highway and bridge design. Differentiate your firm in design/build bids by quickly analyzing innovative concepts with optimized designs, lower costs, and less risk.

The CONNECT Edition

The SELECT® CONNECT Edition includes SELECT CONNECT services, new Azure-based services that provide comprehensive **learning, mobility,** and **collaboration** benefits to every Bentley application subscriber. *Adaptive Learning Services* helps users master use of Bentley applications through CONNECT Advisor, a new in-application service that provides contextual and personalized learning. *Personal Mobility Services* provides unlimited access to Bentley apps, ensuring users have access to the right project information when and where they need it. *ProjectWise® Connection Services* allow users to securely share application and project information, to manage and resolve issues, and to create, send, and receive transmittals, submittals, and RFIs.

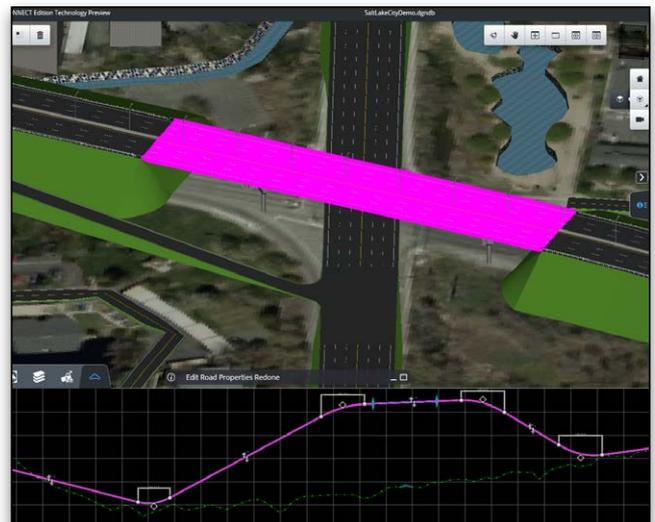
Leverage Contextual Information

OpenRoads ConceptStation allows you to jump-start the conceptual design process by locating and downloading data-rich context information for a given location to model in a real-world setting. You can easily import a wide range of data including terrain models, raster DEMs, images, GIS, reality meshes, and more to create intelligent 3D models in context with minimal effort.

The software includes GeoCoordination Services to help find, download, and import geospatial data and transform the data to 3D models to effortlessly view the information. The easy-to-use data assembly capabilities helps your organization reduce the time required to locate existing condition data and decrease the overall design schedule.

Use Civil Engineering Sketching Functionality Tools

With OpenRoads ConceptStation, you can take advantage of easy-to-use engineering drawing tools to sketch roads, ramps, intersections, bridges, guardrails, street lights, and more in hours. OpenRoads ConceptStation ensures AASHTO standards (class, design speed, and default curve radius)



Draw roads, bridges, guardrails, streetlights, and more in hours using engineering-friendly drawing tools that adhere to AASHTO standards.

are adhered to in the design. The road vertical alignment is created with the best-fit on existing ground vertically. Superelevation is determined automatically using Method 5 and will adapt the percentage used based on the design speed.

“OpenRoads ConceptStation allows HNTB to easily assemble existing condition data from different sources in the beginning of the project.”

– Mark Urban, Senior Vice President
Design-Build Projects, HNTB Corporation

You can choose from a wide variety of road classes such as freeways, interstates, rural minor arterial, urban collector, urban principal arterial, and many more. Road templates make it easy to design the speed of the road, edit horizontal and vertical alignments, and edit curve radius graphically or precisely using heads-up editing. Apply street markings with ease using the Street Marking modification tool.

OpenRoads ConceptStation takes conceptual bridge design to the next level. You can use templates to easily place and edit bridges with just a few clicks of the mouse, and determine the number of spans, design speed, classification, and bridge type. You can set girder, support and abutment type. The superelevation is determined automatically. After the bridge is placed, it is generated following the horizontal and vertical alignment of the road.



“OpenRoads ConceptStation offers roadway and bridge design capabilities to help road and land development engineers create intelligent models with real-world data and cost analysis to improve project results.”

– Mark Urban, Senior Vice President, Design-Build Projects, HNTB Corporation

For example, if the road is at grade, the bridge will be placed at grade as well. Edit the road vertical alignment and the bridge alignment will automatically adjust. The bridge template defines the typical cross-section to apply to the bridge deck. This includes the number of lanes, the barriers, medians, sidewalks, and other artifacts you need to apply to the top of the bridge.

The template also drives the bridge width and ensures the superstructure adapts to it. You can choose from prestressed concrete girder, cast-in-place slab bridge, or cast-in-place box girder. In addition, you can utilize the bridge library to pick a variety of beams and girders, support types, abutments, and wing walls. To edit the bridge supports, simply use the handler manipulator on the support. Click on the arrows in the design and move the mouse to the desired direction. Rotate the arrows and watch the support rotate with ease. Make any necessary edits to the spans, piers, and abutments to design the bridge needed for the optimized design.

Create Conceptual Designs

OpenRoads ConceptStation enables you to create multiple designs with associated costs for better decision making. You can quickly consider different scenarios to discover the best road and bridge designs in context. Make better decisions with interactive discussions with other experts, contractors, and stakeholders early in the design process. The software helps you explore more options to identify high-cost items and potential issues in the preliminary design phase.

OpenRoads ConceptStation provides a cost tab that lets you access estimated costs for the project. As soon as new design elements are added to the concept, the refresh tool can be utilized to provide up-to-date cost estimates for the design. You can easily create a detailed quantities and cost report with each design scenario. You also have the opportunity to include allowances to ensure real-world estimates. The software helps you become more competitive and win more business by generating better, cost-effective designs.

Render in Real Time with Cinematic Quality

Create stunning photo-realistic visualizations in seconds using the dynamic immersive visualization engine platform. Simply click on the Visualize tab and it will launch the LumenRT mode. Using the embedded LumenRT engine, you can visualize your model into a rich 3D environmental context with vehicles, water, skies, trees, plants, and characters. This platform provides natural-looking light and shadows, real-time global illumination, IES point and spotlights, lens flares, and luminous materials.

Interactively adjust time of day, add lens flares, and apply depth of field while benefiting from highly accurate reflections, anti-aliasing, and motion blur. OpenRoads ConceptStation enables you to readily share your concept with colleagues, clients, and stakeholders. You can present alternative civil design concepts in real time and make edits on the fly to meet design needs. Using a photo-like presentation helps your firm present technical information to the public to help explain project impact to the local environment. The 3D model is a great tool to help win public or client approval for the project.

Transition Conceptual Design to Detailed Design

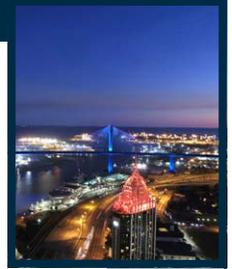
Move your optimized conceptual design to the detailed design phase while maintaining geometric integrity. Ensure your digital model is utilized in OpenRoads for accelerated project delivery and better design quality. Simply click on the Export tab and you will see a dialog to help you browse for the location and name of the files to be exported into OpenRoads.

Once you have specified the file name and saved the data, OpenRoads ConceptStation will automatically create the .alg, .ird, .itl, and .rvk files to provide the geometry, templates, and superelevation to export to OpenRoads for the detailed design phase. Your designers can move conceptual design to detailed design with just a click of the mouse.



“Using OpenRoads ConceptStation, we can identify high-cost items, issues, and propose alternative technical concepts when appropriate for our clients.”

– Mark Urban, Senior Vice President, Design-Build Projects, HNTB Corporation



OpenRoads ConceptStation At-A-Glance

Assemble Context Data

- Import the following file types:
 - » Terrain Models (.DTM, .TIN)
 - » Raster DEM (.IMG, .DEM)
 - » Images (Ingr. TIFF / GEOTIFF (*.tif; *.tiff), Internet TIFF and TIFF64 (*.tiff; *.itiff64), JPEG (*.Jpg; *.jpeg; *.jpe; *.jff), JPEG 2000 (*.jp2; *.j2k; *.jpm), MrSID (*.sid), ERMapper Compressed Wavelets (*.ecw)
 - » GIS (SHP, Esri File Geodatabase, OpenStreetMap), can be mapped to ConceptStation objects and attributes
 - » Filter based on project extent, view, all, fence
 - » DGN as read-only
- Reference Reality Meshes (.3MX) from Bentley ContextCapture
- Reality Data Services
 - » 3D data (Terrain, Imagery, Roads, Hydro, Buildings)

- » Save change as a copy
- » Modify the design

Design Bridges

- Place bridges
 - » Simple two clicks bridge placement
 - » Number of supports automatically determined from the bridge length
 - » Can set girder type, support type, abutment type, wing walls
 - » Can set bridge deck template
 - » Superelevation determined automatically (Method 5)
- Edit bridges
 - » Simple editing of Horizontal and Vertical
 - » Change girder type, support type, abutment type, wing walls
 - » Change number of spans/supports, number of girder
 - » Rotate supports, move/skew abutment

Bridge Deck Templates

- Create New Template
 - » Easy component based creation
 - » Specialized road template with different components adapted to the bridges
 - » Component material determines quantities and cost
- Mange template
 - » Duplicate, Delete, Copy/Paste, Rename
- Modify template

Design Intersections

- Place intersections
 - » Simple placement
 - » First roads selected sets the elevation of the additional roads
 - » Default radius and taper
 - » Default intersection marking
- Edit intersections
 - » Modification of taper length and offset
 - » Modification of radius

Concept estimated cost: \$15,929,169

Category	Cost	Source
Earthwork	\$8,431,880	Design
Pavement	\$885,668	Design
Structure	\$2,721,544	Design
Drainage	\$755,658	Allowance
Electrical	\$95,175	Allowance
Incidental Items	\$1,910,097	Allowance

Engineers and designers can evaluate more options with associated costs during the planning and pre-bid stage of the project.

System Requirements

Processor

Intel Pentium-based or AMD Athlon-based processor 2.0 GHz or greater

Operating System

Windows 10 (64-bit) – Home, Pro, Enterprise, and Education; Windows 8 (64-bit) – Standard, Pro, and Enterprise; Windows 8.1 (64-bit) – Standard, Pro, and Enterprise; Windows 7 SP1 (64-bit) – Home Basic, Home Premium, Professional, Enterprise, and Ultimate

Memory

1 GB minimum, 2 GB recommended (more memory typically results in better performance)

2 GB GPU graphic cards for optimal performance in the real-time rendering engine

Disk Space

5.5 GB minimum free disk space

Find out about Bentley at: www.bentley.com

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OpenRoads ConceptStation At-A-Glance (continued)

Design Ramps

- Place ramps
 - » Connects two roads with the desired alignment
 - » Automatic auxiliary lane creation based on design speed
 - » Default taper length, taper width design radius, gore radius
 - » Default marking
- Edit ramps
 - » Modification of taper length, taper width design radius, gore radius
- Ramp Designer

Design Roads

- Place roads
 - » Follows AASHTO standards; class, design speed, default curve radius
 - » Best fit existing ground vertically
 - » Template (typical cross-section) based approach
 - » Super elevation determined automatically (Method 5)
 - » Named Roads
- Editing of horizontal alignment
 - » Insert PI, delete PI, move PI
 - » Edit curve radius graphically or precisely using heads-up text editing
- Editing of vertical alignment
 - » Insert PVI, Delete PVI, Move PVI
 - » Edit vertical curve length and slope graphically or precisely using heads-up text editing
- Template drop editing
 - » Easy editing of template drops, editing transition stationing
- Roundabouts Design
- Tunnels Design

Estimate Cost and Quantities

- Project cost overview
 - » High level overall design cost
 - » Includes allowance by default
- Detailed quantities/cost, listing cost items, and

associated quantities

Interoperability with Detailed Civil Design

- Export to OpenRoads
 - » Export ALG, IRD, ITL, RWK
 - » Supports geometry, template, template drop transition, superelevation

Lane Marking

- Lane marking automatically created
- Edit lane marking
 - » Change the lane marking for the full road
 - » Change the lane marking for portion of the road independently of the road template itself

Pavement marking

- Ability to place punctual pavement marking, like turn arrows, etc.
- Ability to place linear pavement marking such as crosswalk

Place City Furniture

- Place and edit guardrails
 - » Ability to choose what symbol to use
 - » Ability to set offset from alignment
 - » Ability to set angle from alignment
- Place and edit street lights and other city furniture
 - » Ability to choose what symbol to use
 - » Ability to set offset from alignment
 - » Ability to set angle from alignment

Roadway Template

- Create new template
 - » Easy component based creation

Aerial Imageries

- Bing Map as images provider

Visualization

- LumenRT Designer



You can easily import a wide range of data including terrain models, raster DEMs, images, GIS, reality meshes, and more to create intelligent 3D models.



Create stunning photo-realistic visualizations in seconds using dynamic immersive visualization capabilities.