CIVIL DESIGNER Roads

Civil Designer's Roads module is a comprehensive design program offering interactive embankment design and area calculations for highways, rural roads, urban streets, single/dual carriageway roads, railways, airports, harbours and parking areas. It also includes regression analysis of the alignment of existing roads, sight distance checks, speed profiling and water film thickness calculations.

In Road Strings, we developed an underlying triangle mesh structure that utilises state of the art spatial indexing and triangle connectivity strategies. This means faster redraws of roads, junction modelling and volume calculations, as well as better validation of the translated DTM surface.

Handles more than 400km of Road with 2500 Different Roads Per Project

Design single or dual carriageway roads of over 400km in length (in a single project), with up to 2500 different roads per project. You can also design split horizontal and vertical alignments where roads are built through difficult terrain.

Alignment Regression Functionality

Use Regression Analysis to extract HPIs and curve radii from CAD lines, polylines or terrain strings.

Road Texturing

Apply installed textures to any road or road component for realistic 3D rendering and design verification purposes.



Road Rehabilitation Functionality

Use the Road Rehabilitation functionality to:

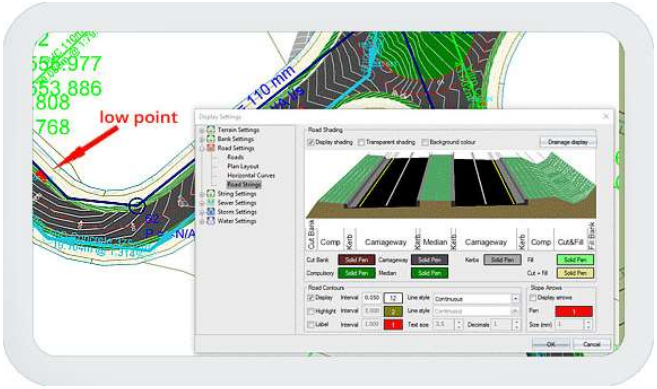
- Remove co-linear points using horizontal and vertical alignment regression analysis.
- Extract alignments from a terrain strings model.
- Extract road edge data and layerwork limits from CAD entities.
- Create crowned dual carriageways.
- Specify median connection options, connect at a grade or include existing median features from the DTM.
- Model retaining walls using variable size components.

Roundabout Design using the Stockdale Method

Use the Stockdale method to design the vertical alignment for complicated roundabouts with more than four incoming legs. Crown lines on the roundabout circle and approach roads are indicated so their convergence, or 'kiss-points', provide the framework for the vertical alignment.

Display Symbols at Low or High Points Along the Road Edge String

Automatically display symbols at low or high points along the road edge string, which is useful for determining the positions of kerb inlets or highlighting flat spots and drainage problem areas at sections of super elevation development.



Road Template Editor

Use the Road Control Panel to easily set up the basic parameters of a road by defining the template, road widths and cross falls, and road surfaces in one window. Use Road templates to easily design the road profile and view the end result. The powerful new Template Editor has interactive design for compulsory additions, cut and fill slopes, kerbs and layerworks. Add pre-defined features, such as retaining walls, side drains, sidewalks, and parking areas, to the template using drag and drop. Import road template control points from a drawing and create a CAD drawing from a road template. The test function allows you to immediately see how the end product is going to function.

Road Components

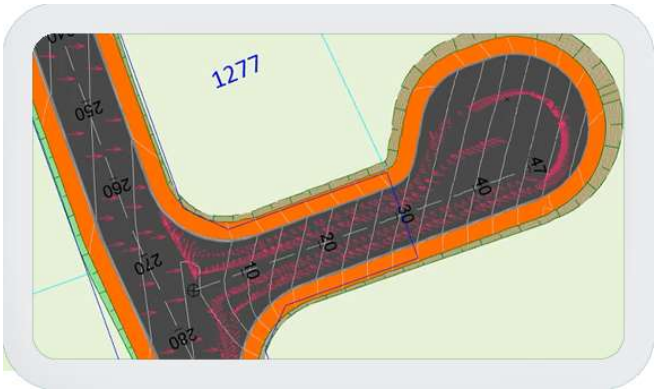
Components, which are super building blocks for templates, give you the flexibility to create and apply a typical cross-section template and then add/remove components from individual cross-sections using the Cross-Section Editor or Edge Control spreadsheet.

Use one template and easily modify its' components to suit local conditions, such as cut/fill, side drains, crash barriers, retaining walls, etc. For example, you can force the use of a side drain through alternating cut/fill conditions, or add a gutter, parking bay and sidewalk.

Superfast Intersection, Roundabout and Cul-de-Sac Design Using Road Strings

Our Road Strings Intersection, Mini-Roundabout and Cul-de-sac design wizards allow for quick and easy design perimeter input of intersections with lead in and out tapers, bell-mouth radii, traffic islands, edge control, kerbs and layerworks. and traffic circles with traffic circle radii, crossfalls or crowns, bell-mouth radii, kerbs and layerworks.

You can save these to libraries for instant re-use in existing or future projects. This design wizard also allows for easy design verification and optimisation.



Minimum Sight Distance Check with Full 3D Analysis

Calculate the areas along the road alignment where the driver cannot see a specified object over a specified minimum sight distance. Problem areas are marked in a defined pen colour on both the vertical and horizontal alignments. Calculations take into account if the driver's sight is obstructed by vertical curves, horizontal bends, cuttings and drains, or a combination thereof, and include ground points beyond the road toe point within the road reserve as well as information outside the road reserve.

Horizontal, Vertical Alignment & Superelevation According to TRH17, AASHTO or TD 9_93

The horizontal alignment stake position displays dynamically on the plan view so you know exactly where the horizontal curves are. The vertical alignment function allows you to display up to 100 profiles, such as the ground line at centreline plus the left and right road reserves, while the grade envelope guides you according to the design criteria. During horizontal and vertical alignment design, you are warned when specified design criteria are exceeded.

Dynamic Contouring & Slope Arrows

Our Strings based roads design functionality includes dynamic contouring and slope arrows,

which provides a real time indication and verification of the design's slope integrity and stormwater behaviour. You can set blacktop flat slope tolerances (%) warnings, as required.

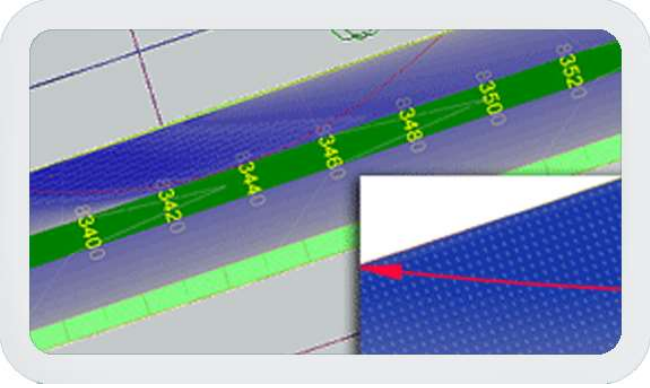
Extract an Entire Road Design From a 3D CAD Drawing

Extract the horizontal and vertical alignments, as well as the road's super elevation, from a 3D CAD drawing. You can then use this existing design information as a starting point for:

- Vertical and horizontal re-alignments.
- Road widenings.
- New/upgraded intersections.
- Design speed verification.
- Sight distance analysis.
- Speed profiling of climbing lanes.
- Water Film Thickness Analysis

Water Film Thickness Analysis

Analyse the combination of a carriageway's cross fall and vertical alignment for surface flow exceeding a user defined depth, which is highlighted in an overlaid colour map.



Create Multiple Design Codes

Create and store multiple design codes/criteria for horizontal/vertical alignment and super-elevation. You can then apply these to different projects and/or road segments.

Climbing & Auxiliary Lane Analysis with Speed Profiling

Our speed profiling calculation automatically suggests climbing lanes based on the Speed Profile analysis of the vertical alignment. You have precise control of the road edge levels so you can apply complex super-elevation conditions. The function also makes provision for changes in lane widths for climbing lanes or auxiliary lanes.
Create auxiliary lanes by specifying the lane width, start and end position, the taper lead-in and lead-out lengths, and the layer works template to be applied.

Road Expert Automates Recalculations

Our Road Expert allows you to keep track of changes you have made and automates recalculations in the event of changes to the design.

Import & Export LandXML Road Data for Greater Data Portability

Import and Export DTM, Roads, Sewer, Storm and Water data to and from a LandXML file.

Road Quantities with Layerworks

Calculate road quantities from cross-sections using the end area method, adjusted by a compaction factor and topsoil stripping. The results include:

- Unadjusted cut and fill volumes
- Adjusted cut available for fill
- Adjusted excess cut
- Adjusted fill shortfall
- Topsoil stripping
- Bank areas
- Topsoil cover
- Roadbed Prep

COLTO slope finishing quantities are also supplied. You can calculate layerwork volumes and yield the total volume for each layer and the preparation area for each layer in cut and fill.

View Road Centrelines on Google Earth

View road centrelines on Google Earth for realistic 3D rendering, design verification and presentation purposes.

Linear Road Furniture

Draw Linear Road Furniture, such as guardrails, barriers and fences, for realistic 3D rendering and design verification purposes.



Point Control

Assign a Point Control name to each road template point. You can add Point Control Rules to any road, which allows the location of points or components within a cross-section to target the CAD entity or Road String, as per the rules specified.

Intelligent Profile Selection for Multiple Cut/Fill Conditions

Edge conditions, drainage and batter slopes are automatically adjusted on the road profile according to your specified cut and fill conditions. This means you can automatically have different road widths, side drains, retaining walls and cut/fill slopes, according to the depth/height of cut or fill.

Edge Level Graphical View

The Edge Level graphical view includes the vertical alignment with an option to display the left and right road edges, which allows you to see the effects of the combination of vertical alignment and super-elevation on the road edge levels.

Road Segments

Split a single road into segments where different design criteria apply to different sections of the same road, for example, during rural to urban environment transitions. You can apply pre-set design criteria to different segments of the same road to accommodate design speed changes without needing to change the existing design model.

Super Elevation Slaved to Horizontal Alignment

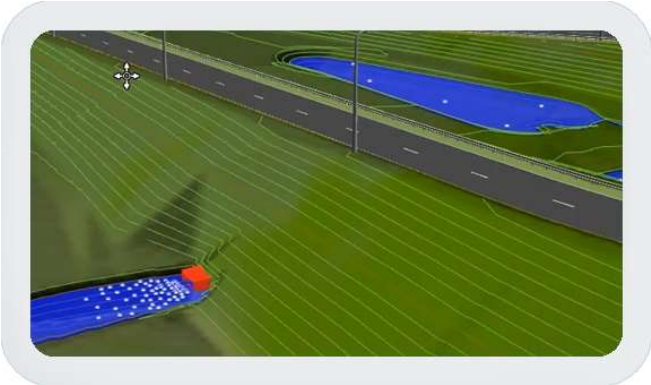
Calculate the super elevation and run off lengths based on the horizontal curves according to the TRH17 standards or custom standards, including reverse, compound and broken-back curves. You can also specify the super elevation independent of the horizontal curves.

Crossing Services

Specify additional services, such as telecommunication ducts, electrical cables etc, which you can then:

- Display on the plan layout and as crossing services on long and cross-sections.
- View/edit in spreadsheet form.

Crossing services are included on layout plans, as well as long and cross-section production drawings.



Pavement Designer with TRH4 Pavement Classes

Create various pavement libraries containing several manually defined pavement designs (TRH4 Pavements are built in by default), and then use these files throughout an organisation. The pavement symbol can be generated automatically on cross-section plots.

Multiple Cross-Sections Per Road

Cross-sections are stored in up to 128 road layers. Keep track of construction progress by recording each month's results in a separate layer and calculate cut and fill volumes between any two layers with topsoil stripping and bulking or compaction factors. Extract up to 20 long-sections from any of the 128 layers to define ground lines, and intermediate or hard material lines at user defined offsets on long section drawings.

Kerb Editor with SABS 927 Kerbs

Use the Kerb Editor to create kerb group files containing one or more kerb types. Each kerb contains cross-section geometry as well as quantity

data and can be specified in the road edge level specifications, which allows for long and short kerb quantification as well as inclusion in all cross-section plotting.

Graphical or Spreadsheet Design Tools

Use tabs to easily switch between alignment views or data sheet information and access all the relevant design tools and functions for the vertical alignment and super elevation. Use the graphical display, which shows all relevant information, to insert, add or modify control points.

Additional information on vertical curves and grades displays dynamically in an information box as you move. Crossing services from the sewer module, storm module, water module and other existing services in the services database can be displayed when designing the vertical alignment, as well as in the Cross-Section Editor.

Handles Multiple Backdrop Displays of Huge Sizes

Display a bitmap showing the natural features, cadastral layout drawing or site contours, while defining the horizontal alignment graphically by indicating the position of the HPIs. Once the HPIs have been defined, drag them to modify the alignment. Route planning has never been easier!

Plotting, Sheetfiles (Drawing Templates)

Use our design templates (sheetfiles) to define what the final production drawings will look like, thereby avoiding post-production CAD editing. You can generate production drawings with detailed title blocks, north signs, grids, company logos, annotations, data lists, scale bars and more, so your plotting requires little, if any CAD editing. Flexible sheetfiles allow for precise placement of all the design elements in your title block with customisable settings, so you don't need to cut and paste any design information into a title block.

BIM IFC File Export

Our Industry Foundation Classes (IFC) support allows geometric and attribute information to be customised according to the requirements of the recipient, thereby improving efficiency in any BIM workflow. Prior to export, you can set up custom IFC files, assign the appropriate northern or southern coordinate system and specify the extents of the shared data. Data can be allocated to one or more IFC files and can incorporate all or selected portions of the proposed infrastructure services associated with a project.

Crossing Services Displayed on Plan, Long and Cross-Sections

Import pipe and services databases (sewer pipes, storm water culverts, water networks, electrical layouts and telecommunication cables, etc) into Civil Designer in order to indicate crossing positions of the pipes/cables on road, sewer, storm and water services.

Dynamic Updating of Production Drawings

Production drawings are dynamically updated as you change your design. If you want to create archive copies, simply use the Publish function.

Proximity & Collision Clash Analysis Between any Design or Existing Elements

Check for clashes between any two services, such as sewer, storm, water, road layers or other existing services defined in the crossing services. Problem areas display on the layout drawing and you can display a long section of the chosen branch, as well as the crossing services, in the longitudinal section window. You can then adjust the invert levels and slopes of the affected culverts.

Full Compatibility with DWG & Other Formats

As a founding member of the Open Design Alliance, our inside knowledge of the DWG drawing structure ensures high compatibility when loading and saving DWG and DXF drawing formats. We also support the loading of Caddie CEX, Arcview SHP, Microstation DGN and Ultimate CAD UCX files, which gives you unprecedented flexibility to move between drawings without worrying about incompatibilities and data exchange problems.

Did you know:

- We have a library of FAQ support videos for your reference: **www.civildesigner.com/videos/**
- You can book online Civil Designer training: **www.civildesigner.com/training-centre/**
- We provide introductory self-learning videos: **www.civildesigner.com/training-centre/**

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