INDUSTRY LEADING SOFTWARE
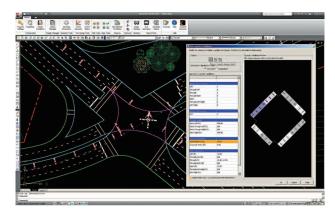
Technological Breakthrough
for Intersection Design

THE FUTURE OF INTERSECTION DESIGN IS HERE

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NEXUS is innovative CAD software for planning and developing roadway intersection designs for new construction and rehabilitation projects. Engineers can generate vehicle movements for the intersection and adjust the geometric design accordingly with the **Vehicle Envelope Method** of design that uses the proven AutoTURN engine. NEXUS takes the intersection design process a step further by incorporating vehicles, capacity conditions, sight distance analysis, conflict point evaluation, and 3D grading analysis into the drawing.

>> Design intersections with optimal safety and operational standards in much less time compared to traditional drafting methods.

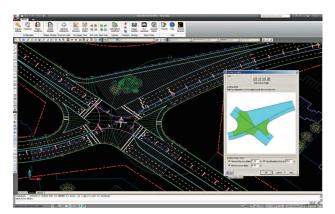## » GENERATE INTERSECTION DESIGN

Automate the layout of an entire intersection (even intersections on curves) with schematic pavement markings and edges using your choice of method including: defining the schematic lane configuration; importing HCS+ or user capacity data; selecting a pre-defined leg template; or applying an intersection template.

» DESIGN MANAGER

With NEXUS, you can save, manage, recall, and compare multiple intersection design iterations within a single CAD drawing without the need for CAD layer management. This creates a much simpler design process by helping the preliminary design move quickly forward to the approval and final design stage.
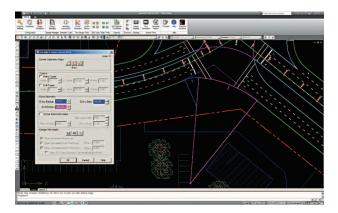
» ROAD GRADING FUNCTIONALITY

Quickly develop intersection road surface grading and display drainage patterns in 3D even in base CAD applications. Work with easy to use tools to refine cross slopes and curb profiles. In addition, the developed intersection alignments can be exported to a LandXML format to work with other vertical CAD products.
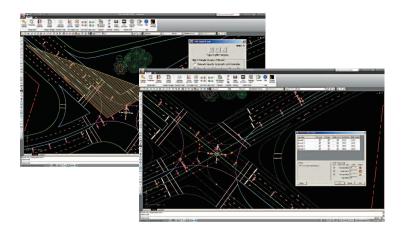
» VEHICLE DESIGN MOVEMENTS

Dynamically configure corner geometry types for Arc, Biarc, and Triarc. Entry and Exit Tapers can be added to any of these types. Unique to NEXUS, you also can design corner geometry with the patent pending **Vehicle Envelop Method** using vehicle turning movement to govern the slip lane edge of the corner island envelope ensuring that the design works for the selected vehicle.

>> With grading applied, the intersection design's high and low points can be analyzed in a three dimensional way.

>> Easily generate vehicle movements for the intersection and adjust the geometric design accordingly.

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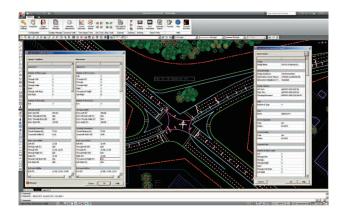
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CONNECT WITH A NEW ENGINEERING STANDARD

>> Check how different design geometry will have on the safety operations of an intersection and the effect on vehicles and pedestrians.

PERFORM DESIGN VEHICLE CHECKS

Evaluate vehicle movements through an intersection using AutoTURN compatible design and checking vehicle simulations. By setting the turning radius, speed, entry and exit lanes, and selecting the design vehicle – movements are easily performed for checking the geometry of an intersection.
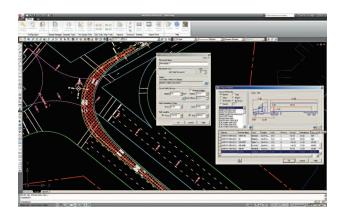

>> Use different reporting types to evaluate a newly created intersection layout. Reports can be used for proposals and presentations.

POWERFUL INTERSECTION EDITING CAPABILITY

Edit virtually every element of an intersection to quickly refine your design. Dynamic modify the parameters for lane configurations, auxiliary lanes, road legs, bike lanes, median and corner islands, and even crosswalks. As each component is interrelated, NEXUS will automatically update the entire design to fit with the changes.
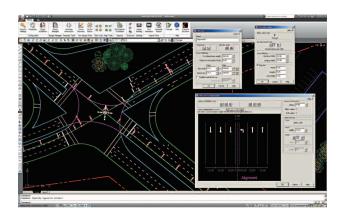
ASSESS SAFETY FACTORS

Make safety a priority in your intersection design with NEXUS. Assess the safety issues of an intersection for vehicle turning maneuvers, left turns on major streets, and at critical points. using sight line analysis on right-of-way traffic and landscaping features. Set up a intersection conflict point diagram with different sections where vehicle paths cross, merge, and diverge to see where accidents can potentially occur.

>> Place vehicle simulations on a specific level/layer and use different colors, line styles, and drawn options for swept path envelopes and vehicle components.

CREATE INTERSECTION REPORTS

With NEXUS, you can create, compare, and share your data from a previously generated intersection design with an Intersection Summary Report and a Capacity Conditions Report detailing key design elements with information on the intersections that can be exported to a .txt format file.

>> Graphical and text displays in the drawing make keeping track of all your changes a simpler process.

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AUTODESK
Authorized Developer

Bentley
Sustaining Infrastructure

» INTERSECTION LAYOUT DESIGN FEATURES

- Generate intersections using any or a combination of the 4 different methods: Lane Configuration; Capacity Conditions; Leg Templates; Intersection Templates
- Create intersection layouts with schematic pavement markings and edges, traffic direction arrows, control radii, corner geometry, and island envelopes
- Define the alignment location in relation to the intersection lane and road lanes
- Add legs by selecting a predefined template or user-generated template
- Specify the median island envelope and divisional island envelope width
- Define the parameters related to the storage length in auxiliary lane
- Specify stop bar parameters for length, line width, and start position
- Set crosswalk parameters for line width, width, and start position
- Save, update, recall, and preview different intersection iterations

» INTERSECTION GEOMETRY GENERATION

- Define bay taper ratio and auxiliary taper type (straight line taper; symmetrical; reverse curve; asymmetrical reverse curve; partial tangent taper)
- Insert crosswalks with the ability to define the start position and rotation
- Draw islands, corner islands, and medians on a specific layer
- Add bike lines with Bicycle Lane Symbol schematic pavement markings
- Ability to align one stop bar to another stop bar in the adjacent lanes
- Include road gutters created from a constant offset from the road edge
- Define corner island envelope including slip lane width, entry and exit offset
- Choose from three corner geometry types: Arc, Biarc, Triarc (Entry and exit tapers can be added)
- Configure the control radius affecting the median opening length

» DESIGN VEHICLE PATHS AND MOVEMENT

- Ability to define complex corner geometry with design vehicle movement
- Generate vehicle paths for left and right turns to determine nose median position, stop bar location, and corner geometry to meet swept path requirements
- Generate movements for multiple turning lanes (radius or speed)
- Calculate the best-fit Triarc corner geometry based on the inner tire track of the design vehicle path
- Define the slip lane edge of a corner island envelope based on the outer tire track of the design vehicle path

» DYNAMIC INTERSECTION EDITING FEATURES

- Add and remove legs from the intersection by selecting lines and arcs
- Ability to replace, rotate, and shift geometry/alignments of a selected leg
- Edit lane configurations by adding/deleting lanes (up to 10 lanes per leg), lane directions, and medians
- Ability to control road widening elements including: functional area length and end offset; approach taper and start; departure taper and start
- Control lane settings for lane width, lane taper, and taper length

» REPORTING FEATURES

- **Intersection Summary Report** – Ability to create and view a summary report with all relative intersection design information
- **Capacity Conditions Report** – Create a table with data on capacity conditions and the intersections summary report side by side to compare requirements

» SIGHT LINE EVALUATION

- Toggle the display of sight lines on or off for a selected intersection design
- Add a new sight line assessment to an intersection design with the ability to override the default design criteria
- Generate sight triangles for left and right turns with user-defined stopping sight distances or from AASHTO 2004
- Check sight lines on opposing left turns on major streets to see if adequate sight distance is provided
- Use design values for: Perception-Brake Time; Deceleration; Acceleration due to Gravity; Approach Speeds
- Evaluate any critical points like pedestrian waiting to cross for the stopping distance and sight distance

» CONFLICT POINT ANALYSIS

- Determine the number of conflict points that cross, merge, or diverge
- Assess the conflict points based on a schematics of the paths (left, right, through) and right/left turning radius
- Select the drive paths that need to be considered for conflict point analysis
- Ability to draw: Conflict Points; Tally of Crossing Points; Merge Points; Diverge Points; and Total Points

» SURFACE GRADING DESIGN ABILITIES

- Ability to create a 3D grading model of an intersection with vertical profiles designed for each of the alignments
- Draw basic contour lines based on the contour intervals for evaluating drainage patterns
- View a graphical display of the vertical profile with adjustable ranges
- Add, edit, and move the VPI (Vertical Points of Interest) to a specific station and elevation
- Edit the cross slopes between a fixed alignment and offset alignment
- Ability to add slopes at stations within a cross slope region, and add a cross slope region to a corner region
- Check for maximum cross slope or minimum alignment slope in the design

» CAPACITY CONDITIONS EVALUATION

- Import **HCS+** (Highway Capacity Software) file data for signalized and unsignalized intersections to initialize geometric design and traffic flow
- Update intersection from capacity conditions for signalized or unsignalized intersections by setting the parameters for number of entry lanes and exit lanes, storage length, crossing parameter (Travel Distance or Crosswalk Width), entry lane widths, and lane adjustments (Right Turn Signalized)

» COMPATIBILITY

- Minimum AutoTURN 8.0, AutoTURN Pro 3D 8.0 or AutoTURN InSite 2.0 (sold separately) installed on the same workstation or network server
- Autodesk® AutoCAD® 2007 – 2016 series of products (except AutoCAD LT)
- Autodesk® AutoCAD® Civil 3D® 2010 – 2015
- Bentley® MicroStation® XM, V8i
- Full support for 64 bit operating systems
- System requirements:
  Workstation: Windows® XP, Vista, Windows® 7, Windows® 8
  Network Server: Windows® Server 2000, 2003, 2008

For more information on NEXUS visit our website at
www.transoftsolutions.com

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TAKE A LOOK AT WHAT USERS HAD TO SAY

"Huge time savings in developing initial design options. I like the fact that vehicle paths are tied to intersection geometry."
George Koumoutsidis, Stantec Inc.

"Power of NEXUS lies in: fast conceptual design, integration of AutoTURN turning movements, channelization development, and compound curves generation."
Grant Ngieng, ISL Engineering and Land Services Ltd.

"Ability to develop design options quickly; ability to work with curved alignments; ability to link the design to vehicle turning movements."
Derek Hull, Aplin & Martin Consultants Ltd.

"There are numerous features (in NEXUS) that provide a lot of flexibility to investigate alternative intersection layouts, for example, adding lanes and refining the curb geometry."
H.S., Portland, Oregon

COME TOGETHER WITH NEXUS

LOWER COSTS FOR DESIGN
In focus group tests, NEXUS was shown to save more than 65% in overall design costs through the innovative methods of generating, editing, and checking intersection layouts.

SAVE TIME AND EFFORT
The success of NEXUS comes from the speed of generating the intersection geometry while accounting for the operational performance at the same time.

SAFETY. SAFETY. SAFETY.
From vehicle conflict points to driver sight lines, NEXUS lets you evaluate these safety aspects to ensure your intersection design meet set standards.

MAKING CHANGES IS EASY
As each design component is related and interdependent on each other, NEXUS allows you to monitor the performance of the entire intersection design as changes are made.

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