Traffic Design Section
Discovery Review Findings Summary

November 3, 2021

Prepared by:

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Montana Department of Transportation
Traffic Design Section
2701 Prospect Avenue
Helena, MT 59601

Thank you for taking the time to complete the U.S. CAD Discovery Review Process. During this journey your team has helped us gain a deeper understanding about the Traffic Design Section. By reviewing the Autodesk's Discovery Documentation and the information you provided during our Discovery Review Session, we've compiled the information and summarized the findings within this document.

Our goal through this process is to help the Traffic Design Section achieve more. We understand the challenges that exist within the industry and your significant investments to make your Department of Transportation great. Through this process we trust that you will have also gained more insight into your organization.

Herein you will find our findings and recommendations. We trust that you will find this information useful in your pursuit to achieve more as an organization.

We look forward to strengthening our partnership with MDT and the Traffic Design Section.

Best Regards,

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EXECUTIVE SUMMARY

Montana Department of Transportation (MDT) enlisted U.S. CAD to gather information about your section and provide recommendations based on our experience and knowledge. Prior to U.S. CAD's Discovery Review Session, the Traffic Design Section participated in a thorough discovery process performed by Autodesk. Through our Discovery Process, U.S. CAD was able to verify existing workflows and uncover insights about how the Traffic Design Section performs business, technologies currently used, required deliverables, existing pain points, the Traffic Design Section objectives, and goals. The information gathered from the completed Autodesk's Discovery Documentation and U.S. CAD Discovery Review Session was used to help us better understand these areas of your organization and to prepare this document.

During our review of your Autodesk Discovery Documents, and while performing the Discovery Review Session we identified/noted the following items:

- The current process of 2D only designs limits analysis compared to 3D modeling
- The existing Swept Path Analysis software may be a redundant expense
- The current data management system and procedures limit collaboration between design teams
- Currently there is no automated way to apply AASHTO constraints/criteria to designs
- Tables created currently are static and must be updated when the design changes

This report highlights our understanding of the items listed above and our proposed recommendations as a part of the MDT CADD Implementation process.

U.S. CAD observed several immediate opportunities that would allow the Traffic Design Section to utilize the AEC Collection. Note, in the future, once other bureaus have completed their migration to the Autodesk AEC Collections, there could be potential opportunities for increased cross collaboration.

This report is broken out into the following sections:

Department Profile	The organizational structure of the division and interactions with internal and external teams.
Recommendations	In this section we provide our specific recommendations on process and solutions based on our findings during the Discovery Process.
Training Program	This section identifies the potential training opportunities based on the team's wish list items, pain points, goals, and objectives.
Next Steps	In this section we provide our specific recommendations on process and solutions utilizing a Production Project where additional "Fit Gaps" may be exposed requiring additional training.

DEPARTMENT PROFILE

The Department Profile section provides our understanding of the organizational structure, key staff within the organization, departmental relationships, and how the Traffic Design Section interacts with other internal MDT bureau's/departments.

During the Discovery process, U.S. CAD was introduced to several staff members who are integral components of the MDT Traffic Design Section. These employees have immense knowledge and skills working within the Traffic Design Section ecosystem and related disciplines. Their knowledge of the inner workings of MDT's Traffic Design Section provided us with the needed details for a thorough understanding of day-to-day operations.

The key staff members, along with the additional Traffic Design Section staff create, consume, and share data within the necessary MDT design functional areas.

During the Discovery process, the Traffic Design Section personnel assisted U.S. CAD in identifying four key design disciplines comprising the Traffic Design Section. The disciplines identified are as follows:

- Geometrics
- Electrical
- Signing
- Safety Design

These four design disciplines have similar workflows and deliverables, but there are enough differences between them for each to be detailed separately in this section.

The Traffic Design Section's Geometrics discipline primarily focuses on creating two dimensional drawings of roundabouts, turn lanes, intersection striping, bus turnouts (bus stops), parking lots, and maintenance turnouts for MDT roadway projects using MicroStation. The preliminary phase includes researching, acquiring, and analyzing speed and traffic data, Google Earth aerial imagery and PathWeb data. The Geometrics Section also utilizes data from MDT's Survey and Road Design Section to create their designs. Additional software used in the Geometrics Section is Transoft AutoTurn for swept path analysis and Transoft Torus for roundabout design. After the preliminary phase of the project is complete, Geometrics notifies the Road Design Section that the design layout and details are available for consumption. Adobe PDF's are also made available for project reviewers. The Road Design Section then renames the detail drawings and references the Geometrics drawing file for their roadway design.

After the Alignment and Grade Report (AGR) meeting the Geometrics Section finalized their design and details adds the coordinates to their design features and submits it back to Road Design. After the plan in hand meeting occurs the Road Design Section packages the final plans, and the plans are reviewed. If there are any plan review comments, they are incorporated, and the final package is delivered.

Some of the tools currently used by the Traffic Design Section Geometrics include:

Activity	Solutions	Additional Solutions(s)
Preliminary Project Work	MicroStation	
Swept Path Analysis	Transoft AutoTURN	
Roundabout Projects	Transoft Torus	
Finalize Project (linework and details)	MicroStation	
Deliverables / Reports	MicroStation (.dgn), Adobe (.pdf)	DMS

The Traffic Design Section's Electrical group focuses on creating above and below ground electrical systems using MicroStation as well as performing lighting analysis for roadway projects. Their preliminary

phase includes researching, obtaining, and evaluating traffic safety data, crash information, and other traffic related reports. Google Earth imagery, SID files, and PathWeb data is leveraged during this phase. The Electrical Section utilizes data from MDT's Survey, Road Design and Geometrics Section, to create their plans. AGI 32 Luminaire design software is used for lighting analysis as well.

The design is then finalized, along with plan sheets and details being created. This data is then delivered to the project manager along with special provisions and cost estimates as Adobe PDF's. There is a plan in hand review and any review comments are then incorporated and the plans are then finalized and included in the final package for delivery.

Some of the tools currently used by the Traffic Design Section Electrical include:

Activity	Solutions	Additional Solutions(s)
Project Design	MicroStation	
Lumination	AGi32 Luminaire	
Deliverables / Reports	MicroStation (.dgn), Adobe (.pdf)	DMS

The Traffic Design Section's Signing staff produce signing and striping design plans for roadway projects. The Signing Section leverages MicroStation, Google Earth, SID files, and PathWeb data to create their design plans. They also use Microsoft Excel for specifications and summary (specsums) sheets and link them to their design .dgn file along with Transoft GuideSIGN for nonstandard sign creation. Another function of the Signing Section is to create cost estimates utilizing AASHTOWare. The signing aspect of the project is then delivered to the Road Design Section to be incorporated into the project package.

After the Alignment and Grade Report (AGR) meeting, revisions or correction are made and the final plan package is compiled and delivered.

Some of the tools currently used by the Traffic Design Section Signing include:

Activity	Solutions	Additional Solutions(s)
Preliminary Project Work	MicroStation*	Pathweb, Google Earth, and SID files
Project Design	MicroStation	
Specsums	MicroStation	
Quantities	AASHTOWare	
Nonstandard sign creation	Transoft GuideSIGN	
Deliverables / Reports	MicroStation (.dgn), Adobe (.pdf)	DMS

Internal MDT maps and plans are also frequently leveraged for data as well in paper and digital form.

The Traffic Safety Section of Traffic Design has a similar workflow to the Road Design Section. During the preliminary work phase Traffic Safety begins setting up their plan sheets, including but not limited to title sheets, standard details, typical sections in MicroStation and summaries in Microsoft Excel. Once Traffic Safety is notified from the Survey Section that the projects survey data is complete, the Traffic Safety Sections reviews the data. A survey request is sent to the Survey Section if additional data is needed. The Survey Section delivers a .dtm of the project as well as a .dgn file. The Traffic Safety Section may have to merge the surveys together and annotate the survey features within the .dgn file once received.

Existing Present Travel Way (PTW) paint markers are used for establishing the roadway centerline as well as as-built data. The Traffic Safety Section begins compiling their design and consuming data from other MDT functional design departments including Geotechnical, Environmental, Bridge, Hydraulics and Right-of-Way. After this compilation of data is done within OpenRoads and Geopak, the Traffic Safety Section can begin their design of the project. The design of the project includes generating alignments, profiles, corridors, cross section, details, and plan production. Quantities are added to AASHTOWare.

This gets the Traffic Engineering Section to their thirty percent milestone and the plans are printed to PDF using DocuPlot.

There is an Alignment and Grade Review (AGR) meeting to review the thirty percent project package and any review comments are then included in the plans. A Scope of Work (SOW) report is generated, and the Traffic Section begins working towards there next milestone of sixty percent plans. The workflow during this milestone includes ditch design, approaches, permanent erosion control, variances, and design exceptions in OpenRoads and Geopak. Quantities are also created using Microsoft Excel. Data is consumed from various MDT functional design sections including Right-Of-Way, Hydraulics, Traffic, and Environmental. The sixty percent milestone is submitted, Plan in Hand, and review comments are incorporated. It is very important to have design limits and details set for the Right-of-Way Section at this milestone.

An authorization notification is received from Right-of-Way and the Traffic Engineering Section begins refining their design to accomplish their ninety percent milestone of Final Plan Review (FPR). The comments from the FPR are made to the design plans and submitted to checker for final review. The submittal package to the review includes, but not limited to, a project transmittal form, design plans, special provisions, and Specifications and Estimate Review (PS&E). Any final edits and reviews occur and the PS&E submittal of one hundred percent is submitted to Engineering Construction Contracting Bureau (ECCB).

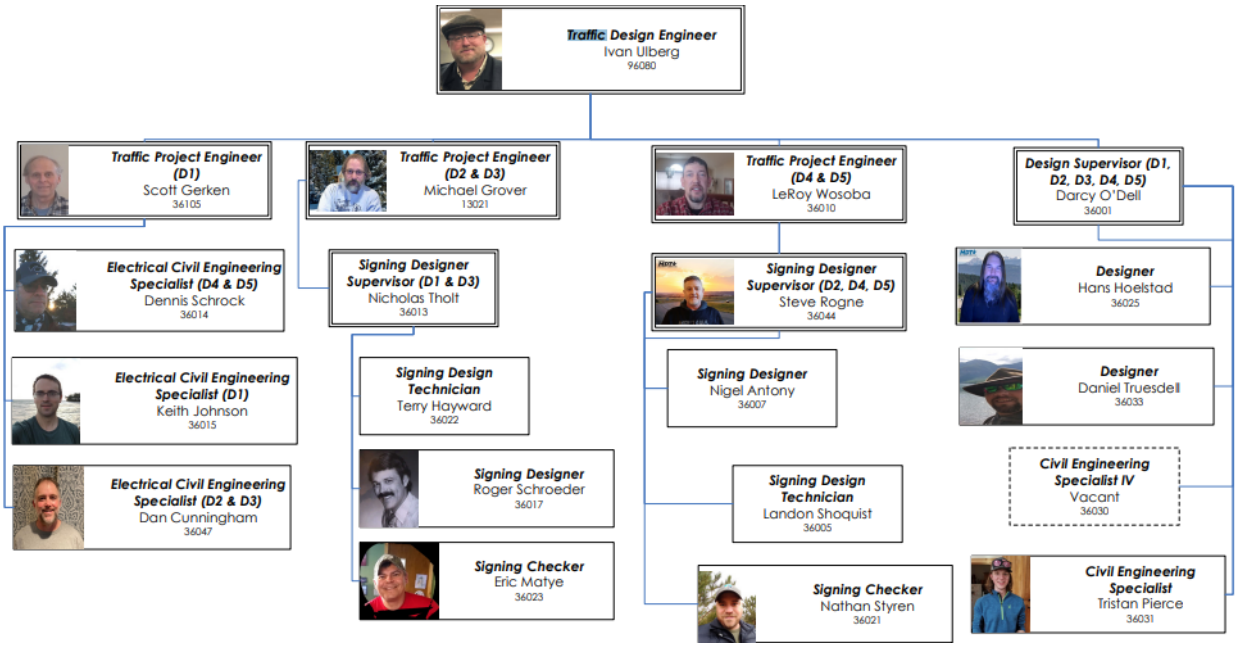
Some of the tools currently used by the Traffic Design Section Safety Design include:

Activity	Solutions	Additional Solutions(s)
Preliminary Project Work	MicroStation	Microsoft Excel
Project Design	OpenRoads, GeoPak	
Quantities	AASHTOWare	
Project Transmittal (ECCB submittal)	Microsoft Word	
Deliverables / Reports	MicroStation (.dgn), Adobe (.pdf)	DMS, Adobe Share

While performing the Discovery Workshop staff members voiced several concerns, challenges, and fears they have for the software migration as shown:

- Will Transoft Solutions GuideSign software still be able to be used in an Autodesk environment?
- Concerned with productivity, specifically learning new software, and converting legacy data.
- What are the schedules for production and how seamless will the conversion be?
- Where does learning fit in with the current workloads?
- Concerned with terminology between software platforms.
- What are all the timelines involved for total adoption?
- Concerned with confronting and revising current workflows and practices.

Below is the Organizational Chart of the MDT Traffic Design Section supplied by MDT.


Traffic Design Engineer
Ivan Ulberg
96080
Traffic Project Engineer (D1)
Scott Gerken
36105
Traffic Project Engineer (D2 & D3)
Michael Grover
13021
Traffic Project Engineer (D4 & D5)
LeRoy Wosoba
36010
Design Supervisor (D1, D2, D3, D4, D5)
Darcy O'Dell
36001
Electrical Civil Engineering Specialist (D4 & D5)
Dennis Schrock
36014
Signing Designer Supervisor (D1 & D3)
Nicholas Tholt
36013
Signing Designer Supervisor (D2, D4, D5)
Steve Rogne
36044
Designer
Hans Hoelstad
36025
Electrical Civil Engineering Specialist (D1)
Keith Johnson
36015
Signing Design Technician
Terry Hayward
36022
Signing Designer
Nigel Antony
36007
Designer
Daniel Truesdell
36033
Electrical Civil Engineering Specialist (D2 & D3)
Dan Cunningham
36047
Signing Designer
Roger Schroeder
36017
Signing Design Technician
Landon Shoquist
36005
Civil Engineering Specialist IV
Vacant
36030
Signing Checker
Eric Matye
36023
Signing Checker
Nathan Styren
36021
Civil Engineering Specialist
Tristan Pierce
36031

RECOMMENDATIONS

Based on the information shared by the Traffic Design Section's disciplines through the Discovery Workbook and Discovery Workshop, U.S. CAD has prepared a summary of our recommendations for each of the four disciplines in the Traffic Design Section as discussed below. This information is prepared for you to consider as you make investments in moving forward toward your goals and objectives. We look forward to the discussions around these recommendations and next steps.

Traffic Design Section (Overall)

U.S. CAD believes that by integrating the use of the products included in the Autodesk AEC Collection in all relevant bureaus and having one localized set of standards for all MDT project data would provide easy access to all MDT sections and external entities if shared. The true intent of standardization would be to provide accurate and consistent data/plans for users to access and reduce the possibility of errors and omissions. The capabilities of the AEC Collection would improve collaboration by providing access to maps, specific project site data, current/past projects, as-built plans, etc. Incorporating this information into the existing projects and utilizing automated processes in the AEC Collection's products would reduce rework and provide for faster project turnaround, inherently improving the workflow for the Traffic Design Section.

The following segments are recommendations for each of the four disciplines within the Traffic Design Section.

Geometrics

The current process of 2D-only designing limits project analysis capabilities compared to the abundant analyzation potential offered in 3D modeling. Currently, the Traffic Design Section's Geometric discipline does not utilize applications available in the Autodesk AEC Collection for analyzing and reporting quantity data and calculations. The Traffic Design Section could, however, benefit from being made aware of the automated and collaboration tools available within the Autodesk AEC Collection. Having knowledge of the available tools and how they are being leveraged within other MDT bureaus will help bridge the data gap and improve efficiencies between functional areas. U.S. CAD believes the software that will be leveraged most often by the Traffic Design Section would be Civil 3D, Infraworks, Autodesk Vehicle Tracking and BIM 360. Specific capabilities for each software recommendation are listed below.

Civil 3D

As the crown jewel of the AEC Collection, Civil 3D takes the process of designing in a 2D environment and instantly turns elements into intelligent 3D model components that are dynamic in nature. As a result of this dynamic capability, designers can make a change in one area of the project, and several other connected areas will be updated as a result. Civil 3D's dynamic capability will assist in the use of tables which currently are static and have to be updated when the design changes. This can save a tremendous amount of time by reducing the editing process as well as eliminating potential errors. Civil 3D also automates the process of reporting as a result of utilizing intelligent Civil objects that not only are inter-connected but also possess a rich collection of data.

Infraworks

Infraworks can be used for preliminary research, importing, and exporting data from Civil 3D, Map 3D, GIS applications and additional software platforms. This makes Infraworks an excellent resource for starting projects that do not have survey data to begin with. Various data sources can be integrated into the Infraworks model during the life cycle of the model as well. As a result, Infraworks can create intelligent 3D project models that can be shared with design functional areas to create collaboration between MDT bureaus.

Autodesk Vehicle Tracking

The existing Swept Path Analysis software may be a redundant expense for MDT. Autodesk Vehicle Tracking will be a vital piece to the Traffic Design Section future workflow. Not only does Autodesk Vehicle Traffic provide the ability to generate Swept Path Analysis in a user-friendly environment, built into Civil 3D, but it also has a vast library of vehicles included in it. Additionally, Autodesk Vehicle tracking provides the ability to create custom vehicles and then allows those custom vehicles to be shared amongst the design team. Autodesk Vehicle Tracking also automates the process of roundabout design in a 3D environment and incorporates signing and striping standards as well.

BIM 360

The current data management system and procedures limit collaboration between design teams. The Autodesk cloud collaboration tool, BIM 360, will be a crucial piece to the Traffic Design Section future workflow. Being able to share, review, and manage data in one centralized location will be a huge benefit. As part of the AEC Collection workflow, BIM 360 can consume Civil 3D data from the cloud in the same manner as if the data were stored locally, thereby improving collaboration between team members. Autodesk's BIM 360 provides access to data anywhere and anytime as well as design collaboration, project management and document management tools.

The following table outlines the Traffic Design Section's Geometrics discipline's current activities, recommended Autodesk solutions, as well as additional solutions to be implemented.

Activity	Solutions	Additional Solutions(s)
Preliminary Project Work	Civil 3D	InfraWorks
Swept Path Analysis	Autodesk Vehicle Tracking (AVT)	Transoft AutoTURN*
Roundabout Projects	Autodesk Vehicle Tracking (AVT)	Transoft Torus*
ADA Ramp Projects	Civil 3D	Transoft AQCESSRAMP*
Finalize Project (linework and details)	Civil 3D	
Deliverables / Reports	Civil 3D (.dwg), Adobe (.pdf)	BIM 360, PCMS

*Transoft solutions may not be needed. Workflow with Autodesk AEC solutions will need to be validated.

These solutions are the basis for the proposed training outlined in the Training Program section below, after the Recommendations section.

Electrical

The current process of 2D-only designs limits project analysis capabilities compared to the abundant analyzation potential offered in 3D modeling. Currently, the Traffic Design Section's Electrical discipline does not utilize applications available in the Autodesk AEC Collection for analyzing and reporting quantity data and calculations. The Traffic Design Section could, however, benefit from being made aware of the automated and collaboration tools available within the Autodesk AEC Collection. Having knowledge of the available tools and how they are being leveraged within other MDT bureaus will help bridge the data gap and improve efficiencies between functional areas. U.S. CAD believes the software that will be leveraged most often by the Traffic Design Section would be Civil 3D, Infraworks, and BIM 360. Specific capabilities for each software recommendation are listed below.

Civil 3D

As the crown jewel of the AEC Collection, Civil 3D takes the process of designing in a 2D environment and instantly turns elements into intelligent 3D model components that are dynamic in nature. As a result of this dynamic capability, designers can make a change in one area of the project, and several other connected areas will be updated as a result. Civil 3D's dynamic capability will assist in the use of tables which currently are static and have to be updated when the design changes. This can save a tremendous amount of time by reducing the editing process as well as eliminating potential errors. Civil 3D also

automates the process of reporting as a result of utilizing intelligent Civil objects that not only are inter-connected but also possess a rich collection of data.

Infraworks

Infraworks can be used for preliminary research, importing, and exporting data from Civil 3D, Map 3D, GIS applications and additional software platforms. This makes Infraworks an excellent resource for starting projects that do not have survey data to begin with. Various data sources can be integrated into the Infraworks model during the life cycle of the model as well. As a result, Infraworks can create intelligent 3D project models that can be shared with design functional areas to create collaboration between MDT bureaus.

BIM 360

The current data management system and procedures limit collaboration between design teams. The Autodesk cloud collaboration tool, BIM 360, will be a crucial piece to the Traffic Design Section future workflow. Being able to share, review, and manage data in one centralized location will be a huge benefit. As part of the AEC Collection workflow, BIM 360 can consume Civil 3D data from the cloud in the same manner as if the data were stored locally, thereby improving collaboration among team members. Autodesk's BIM 360 provides access to data anywhere and anytime as well as design collaboration, project management and document management tools.

The following table outlines the Traffic Design Section's Electrical discipline's current activities, recommended Autodesk solutions, as well as additional solutions to be implemented.

Activity	Solutions	Additional Solutions(s)
Project Design	Civil 3D	InfraWorks
Lumination	AGi32 Luminaire	
Deliverables / Reports	Civil 3D (.dwg), Adobe (.pdf)	BIM 360, PCMS

These solutions are the basis for the proposed training outlined in the Training Program section below, after the Recommendations section.

Signing

The current Swept Path Analysis software may be a redundant expense as a result of the vast capabilities of the software contain in the Autodesk AEC Collection. Currently, the Traffic Design Section's Signing discipline does not utilize applications available in the Autodesk AEC Collection for analyzing and reporting quantity data and calculations. The Traffic Design Section could, however, benefit from being made aware of the automated and collaboration tools available within the Autodesk AEC Collection. Having knowledge of the available tools and how they are being leveraged within other MDT bureaus will help bridge the data gap and improve efficiencies between functional areas. U.S. CAD believes the software that will be leveraged most often by the Traffic Design Section would be Civil 3D, Infraworks, Autodesk Vehicle Tracking and BIM 360. Specific capabilities for each software recommendation are listed below.

Civil 3D

As the crown jewel of the AEC Collection, Civil 3D takes the process of designing in a 2D environment and instantly turns elements into intelligent 3D model components that are dynamic in nature. As a result of this dynamic capability, designers can make a change in one area of the project, and several other connected areas will be updated as a result. Civil 3D's dynamic capability will assist in the use of tables which currently are static and have to be updated when the design changes. This can save a tremendous amount of time by reducing the editing process as well as eliminating potential errors. Civil 3D also automates the process of reporting as a result of utilizing intelligent Civil objects that not only are inter-connected but also possess a rich collection of data.

Infraworks

Infraworks can be used for preliminary research, importing, and exporting data from Civil 3D, Map 3D, GIS applications and additional software platforms. This makes Infraworks an excellent resource for starting projects that do not have survey data to begin with. Various data sources can be integrated into the Infraworks model during the life cycle of the model as well. As a result, Infraworks can create intelligent 3D project models that can be shared with design functional areas to create collaboration between MDT bureaus.

Autodesk Vehicle Tracking

The existing Swept Path Analysis software may be a redundant expense for MDT. Autodesk Vehicle Tracking will be a vital piece to the Traffic Design Section future workflow. Not only does Autodesk Vehicle Traffic provide the ability to generate Swept Path Analysis in a user-friendly environment, built into Civil 3D, but it also has a vast library of vehicles included in it. Additionally, Autodesk Vehicle tracking provides the ability to create custom vehicles and then allows those custom vehicles to be shared amongst the design team. Autodesk Vehicle Tracking also automates the process of roundabout design in a 3D environment and incorporates signing and striping standards as well.

BIM 360

The current data management system and procedures limit collaboration between design teams. The Autodesk cloud collaboration tool, BIM 360, will be a crucial piece to the Traffic Design Section future workflow. Being able to share, review, and manage data in one centralized location will be a huge benefit. As part of the AEC Collection workflow, BIM 360 can consume Civil 3D data from the cloud in the same manner as if the data were stored locally, thereby improving collaboration among team members. Autodesk's BIM 360 provides access to data anywhere and anytime as well as design collaboration, project management and document management tools.

The following table outlines the Traffic Design Section's Signing discipline's current activities, recommended Autodesk solutions, as well as additional solutions to be implemented.

Activity	Solutions	Additional Solutions(s)
Preliminary Project Work	Civil 3D / InfraWorks	Pathweb, Google Earth, and SID files
Project Design	Civil 3D	
Specsums	Microsoft Excel	Microsoft Excel
Quantities	AASHTOWare	Civil 3D QTO Manager
Nonstandard sign creation	Transoft GuideSIGN	Civil 3D
Deliverables / Reports	Civil 3D (.dwg), Adobe (.pdf)	BIM 360, PCMS

These solutions are the basis for the proposed training outlined in the Training Program section below, after the Recommendations section.

Safety Design

The current process of incorporating AASHTO constraints and criteria into project designs is a very manual process. Currently, the Traffic Design Section's Safety Design discipline does not utilize applications available in the Autodesk AEC Collection for analyzing and reporting quantity data and calculations. The Traffic Design Section could, however, benefit from being made aware of the automated and collaboration tools available within the Autodesk AEC Collection. Having knowledge of the available tools and how they are being leveraged within other MDT bureaus will help bridge the data gap and improve efficiencies between functional areas. U.S. CAD believes the software that will be leveraged most often by the Traffic Design Section would be Civil 3D, Infraworks, and BIM 360. Specific capabilities for each software recommendation are listed below.

Civil 3D

Civil 3D allows designers to apply AASHTO criteria to their designs using onboard settings installed with the software. Additionally, Civil 3D takes the process of designing in a 2D environment and instantly turns elements into intelligent 3D model components that are dynamic in nature. As a result of this dynamic capability, designers can make a change in one area of the project, and several other connected areas will be updated as a result. Civil 3D's dynamic capability will assist in the use of tables which currently are static and have to be updated when the design changes. This can save a tremendous amount of time by reducing the editing process as well as eliminating potential errors. Civil 3D also automates the process of reporting as a result of utilizing intelligent Civil objects that not only are inter-connected but also possess a rich collection of data.

Infraworks

Infraworks contains the ability to apply AASHTO criteria to models similar to Civil 3D. Infraworks can be used for preliminary research, importing, and exporting data from Civil 3D, Map 3D, GIS applications and additional software platforms. This makes Infraworks an excellent resource for starting projects that do not have survey data to begin with. Various data sources can be integrated into the Infraworks model during the life cycle of the model as well. As a result, Infraworks can create intelligent 3D project models that can be shared with design functional areas to create collaboration between MDT bureaus.

BIM 360

The current data management system and procedures limit collaboration between design teams. The Autodesk cloud collaboration tool, BIM 360, will be a crucial piece to the Traffic Design Section future workflow. Being able to share, review, and manage data in one centralized location will be a huge benefit. As part of the AEC Collection workflow, BIM 360 can consume Civil 3D data from the cloud in the same manner as if the data were stored locally, thereby improving collaboration among team members. Autodesk's BIM 360 provides access to data anywhere and anytime as well as design collaboration, project management and document management tools.

The following table outlines the Traffic Design Section's Safety Design current activities, recommended Autodesk solutions, as well as additional solutions to be implemented.

Activity	Solution(s)	Additional Solution(s)
Preliminary Project Work	Civil 3D / InfraWorks	Microsoft Excel
Project Design	Civil 3D	
Quantities	AASHTOWare	Civil 3D QTO Manager
Project Transmittal (ECCB submittal)	Microsoft Word	BIM 360, PCMS
Deliverables / Reports	Civil 3D (.dwg), Adobe (.pdf)	BIM 360, PCMS

These solutions are the basis for the proposed Training Program outlined in the section below.

TRAINING PROGRAM

U.S. CAD recommends the following training courses for the Traffic Design Section staff.

- **101 AutoCAD Fundamentals for Bentley Users** – This course, intended to assist those who have utilized Bentley products and have limited or no Autodesk AutoCAD experience, is focused on basic interface and functions within the AutoCAD product.
- **201 Civil 3D Fundamentals I** – This course will introduce the Civil 3D user interface and terminology and provide an understanding of Parcels, Surfaces and Survey.
- **202 Civil 3D Fundamentals II** – This course continues creating the knowledge of Civil 3D features and their functions.
- **203 Civil 3D Fundamentals III** – This course delivers insight into Sections, Section Views, Templates, Styles, Data Shortcuts, Printing, Sheet Setup, Sheet Set Manager and Quantities.
- **601 InfraWorks I** – This course covers the steps on how to import and configure data from within InfraWorks and utilize available tools to create, leverage, and analyze design alternatives for 3D design concepts and visualizations.
- **620 Vehicle Tracking I -** This course covers the basics on how to perform swept path analysis, layout parking lots and roundabouts, and create visualizations for vehicle movements.
- **301 BIM360 Collaborate Pro for Infrastructure I -** This course provides an overview of what the web- based collaboration tool has to offer and how it can be leveraged to collaborate with internal divisions, field personnel and consultants.

By exposing the Traffic Design Section to the Autodesk software tools included in the list above, staff will have the knowledge needed for making informed decisions on what data is available and how to access it. Providing the Traffic Design Section with tools to import, utilize and share data in their current workflows is key to removing existing inefficiencies and frustrations within the Section. It is equally important for the Traffic Design Section to export data capable of being consumed by other MDT Bureaus.

NEXT STEPS

A Production Project will be identified by the MDT CAD Implementation Executive Team. A Production Project provides opportunity for MDT to refine proposed future MDT workflows, identify gaps, and give insight into configuration needs. This process has already led to the creation (and implementation) of the MDT State Kit. The State Kit was utilized on prior Pilot Projects giving deeper insight into how best to update and configure the solution. The Production Project will also provide insight into the requirements for additional content that needs to be included in MDT's State Kit as well as other key configuration elements that will help with production efficiencies.

The MDT CAD Implementation Executive Team have identified early adopters within each functional design area. U.S. CAD will work closely with the early adopters to develop workflow processes and procedures, as mentioned in our recommendations, to ensure their portion of the project can be completed utilizing Autodesk's AEC Collection. U.S. CAD will provide support and mentoring throughout the production project.

- During this phase additional "Fit Gaps" may be uncovered. If there are, additional training may be recommended.
- U.S. CAD and Autodesk will remain engaged with MDT to ensure successful implementation and Production Project completion.
- U.S. CAD and Autodesk will arrange regular meetings with MDT staff to assist them in attaining their goals and objectives.
- Upon completion of the Production Project, MDT to meet with U.S. CAD and Autodesk to explore expanded implementation options and identify the most effective path forward and to meet MDT's larger BIM goals.

In addition to the Production Project, Workflow Road Maps will be developed and presented to MDT. With several MDT Pilot Projects already completed, (or currently being executed) the process of refining the workflows based on MDT feedback can begin. The goal is to confirm workflows that will be included in the initial stages of the broader implementation and training at MDT. The Workflow Road Maps are important to gain clarity of the scope and schedule of the Training and Implementation requirements, as well as the configuration needs for MDT's state-wide rollout of the AEC Collection solution.