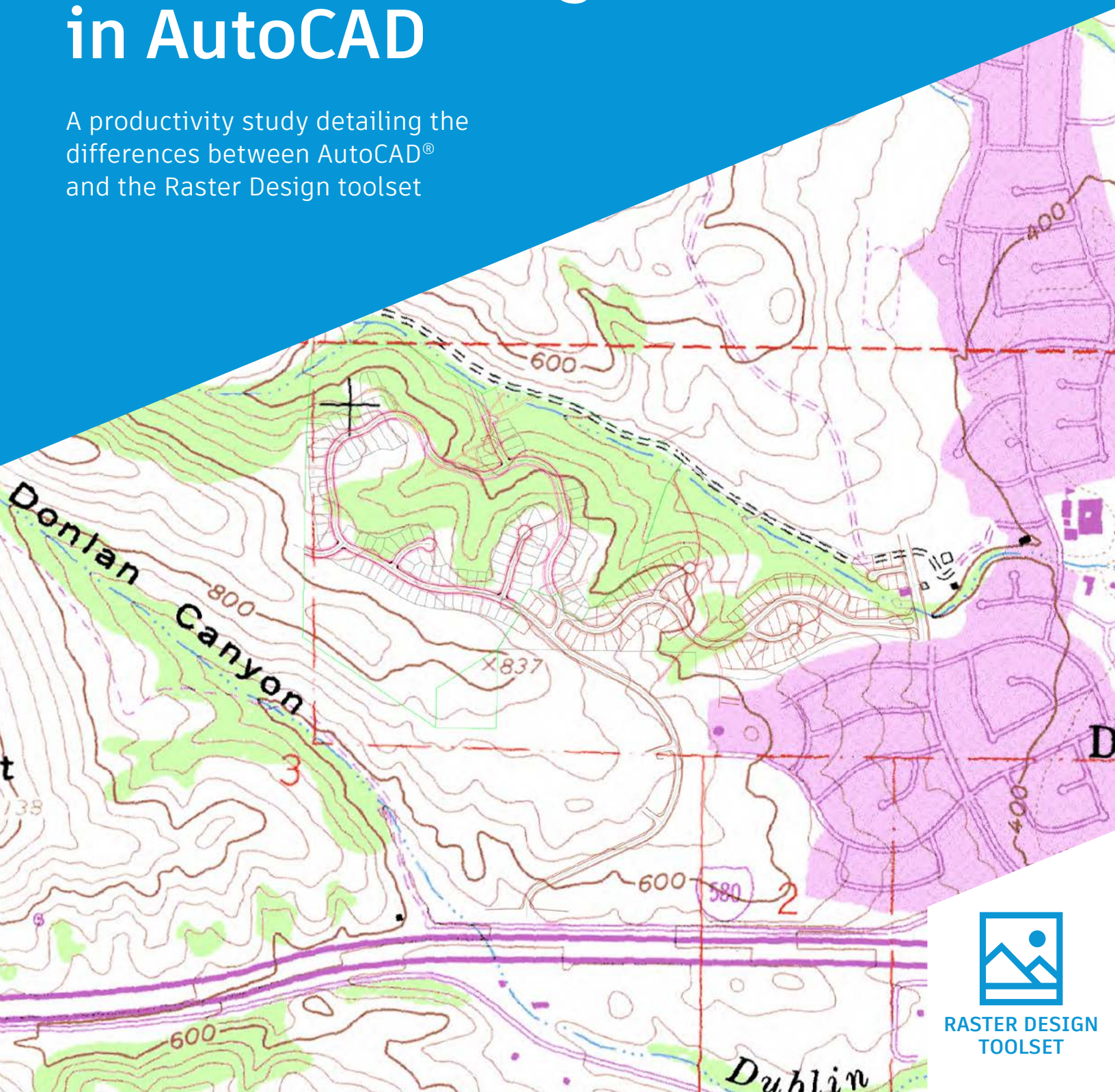


The Benefits of Using the Raster Design Toolset in AutoCAD

A productivity study detailing the differences between AutoCAD® and the Raster Design toolset



RASTER DESIGN TOOLSET

The Raster Design toolset (previously referred to as AutoCAD Raster Design) is now included with AutoCAD as a specialized toolset, and provides raster design tools to edit scanned drawings and convert raster images to DWG™ objects. It is built specifically to allow users to insert raster images into design drawings. Purpose-built raster and vector tools help with image cleanup and editing, allowing more time for design. This study details the productivity gains that users may experience when using AutoCAD with the Raster Design toolset rather than just basic AutoCAD when working on a drawing that requires the use of raster images to convey design intent.*

Executive Summary

Designed by Autodesk and commissioned to an independent consultant, this study explores common challenges when preparing designs in basic AutoCAD and the potential productivity gains by using the Raster Design toolset. A set of design documents were recreated using both basic AutoCAD and AutoCAD with the Raster Design toolset,

with tasks ranging from image editing and cleanup, Raster Entity Manipulation (REM), vectorization, and image transformation functionality. The Raster Design toolset provided a 48% overall productivity gain over the time taken to accomplish the demonstrated tasks in basic AutoCAD (depending on user expertise level with the Raster Design toolset).

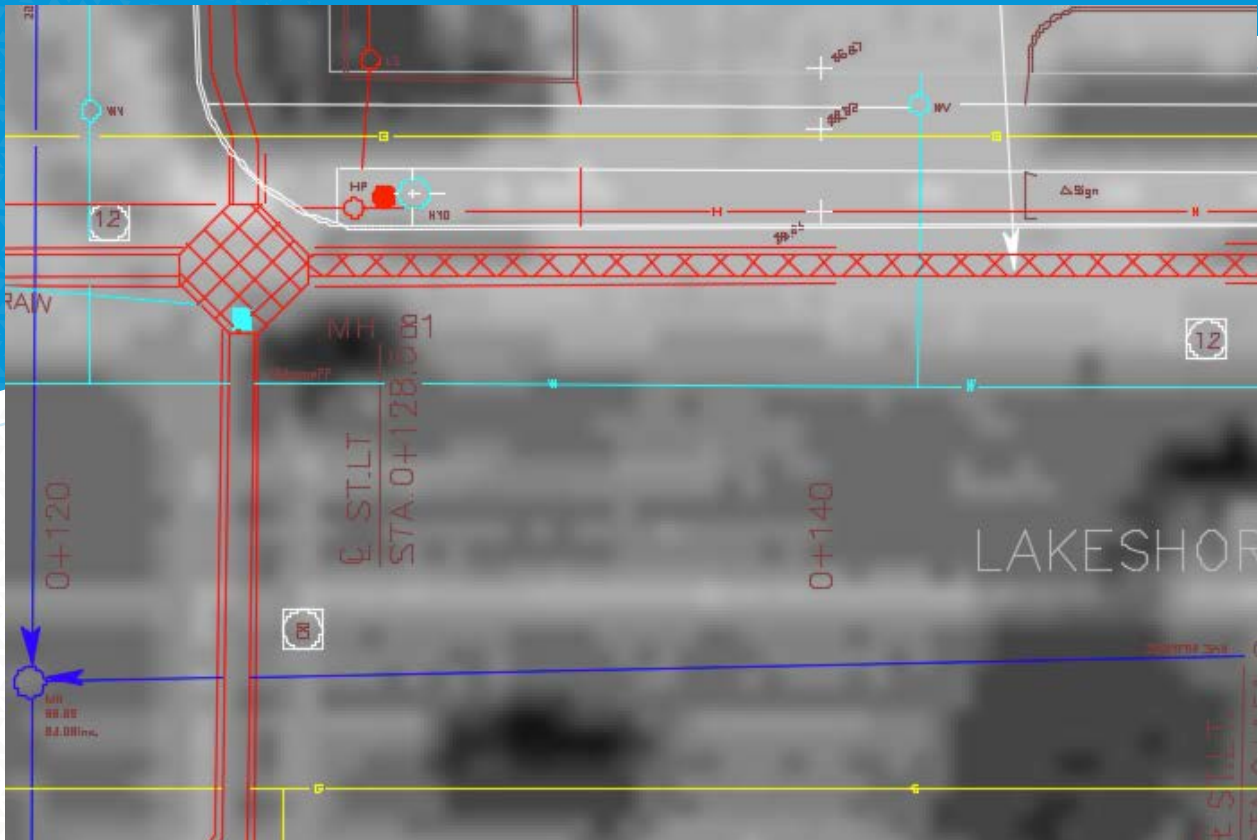


Image credit - Oakville Hydro

Key Findings

Using the Raster Design toolset:

Inserting and scaling a raster image was **51% faster**.

The time taken to manage and view raster image properties was **reduced by 94%**.

Vectorizing raster line entities and recognizing raster text gave a **45% time saving**.

Overall **productivity gain of 48%** when using the Raster Design toolset.

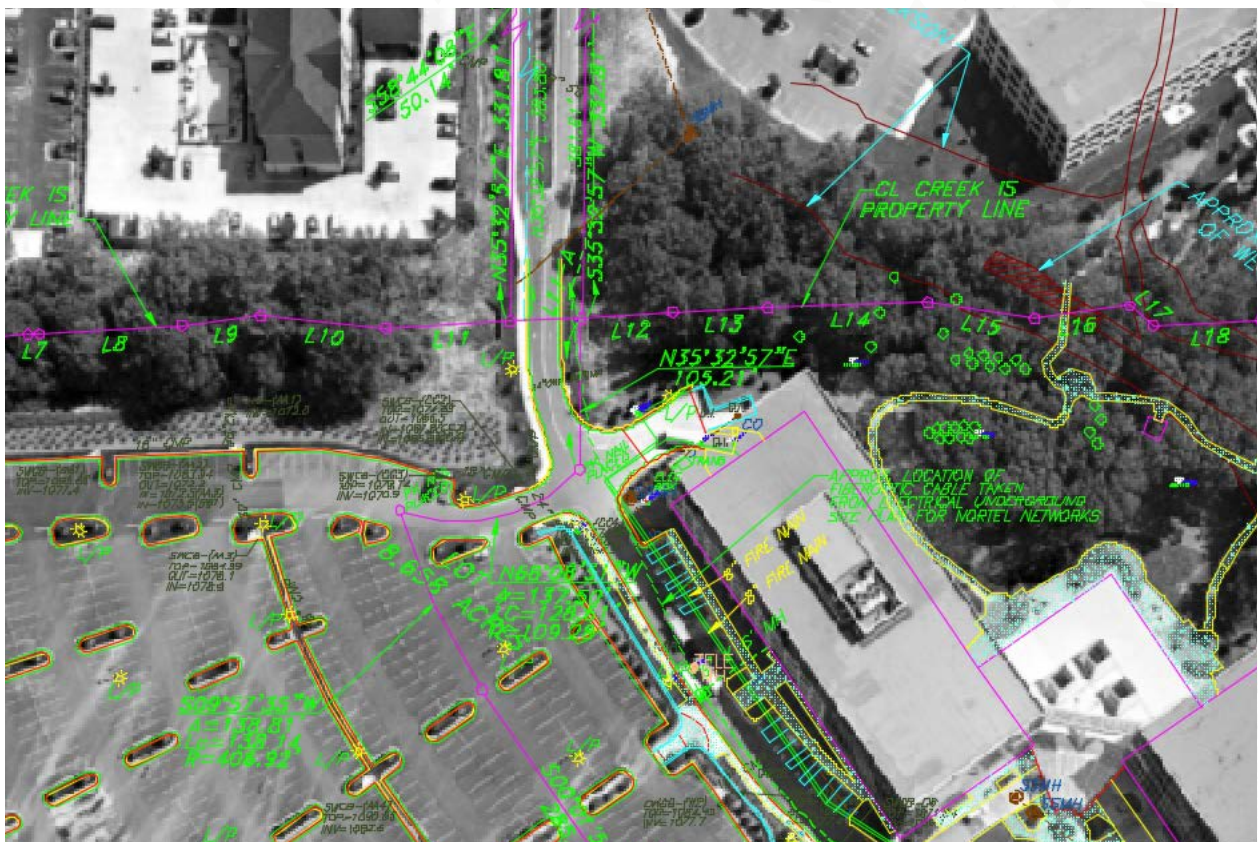
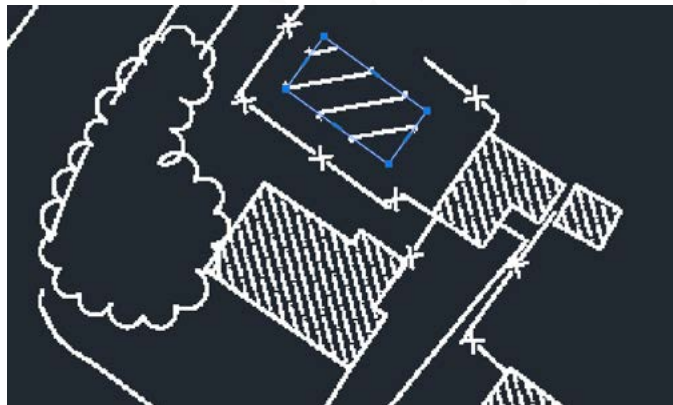


Image credit - Cingular Wireless

The Study

This study explored six common design challenges and showed direct comparisons of the time and effort required to accomplish each specific task in basic AutoCAD versus AutoCAD with the Raster Design toolset.*



The same tasks were completed about 48% faster using AutoCAD with the Raster Design toolset.*

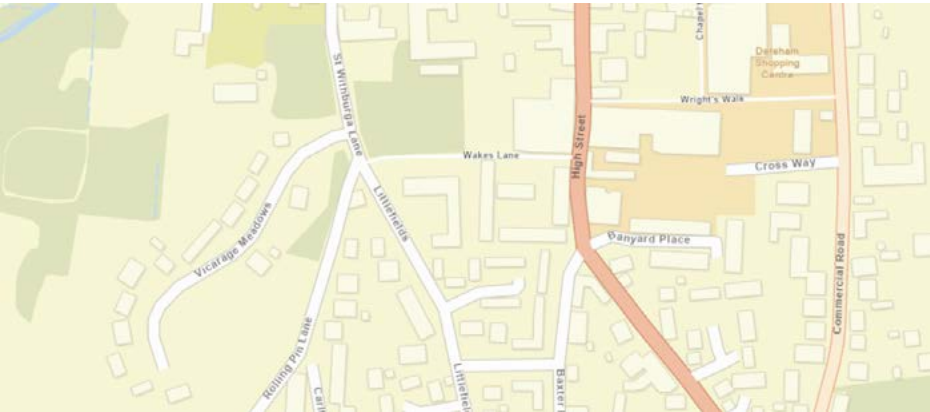
The performance results in this paper were achieved by one user with expert-level experience. Results are reflective from using both basic AutoCAD and AutoCAD with the Raster Design toolset, conducting comparative tests on the same sample AutoCAD project of the conversion of a small greenfield site to a new build community center. The tasks are comprehensive in nature. The total time it took to complete each task using both basic AutoCAD and AutoCAD with the Raster Design toolset is documented in each case.

It was assumed during the study that all symbols and title blocks needed in basic AutoCAD for the design process were local to the document. Searching time is subjective and the methodologies allowed for the quick placement of required blocks in the shortest amount of time possible.

A detailed description of the study follows.

Insert and scale

The task was to insert a base raster image into the drawing file, scale, and set the image to the drawing units. In basic AutoCAD, the insertion and scaling of a raster image can be time consuming. In AutoCAD with the Raster Design toolset, there are tools that provide the user with the ability to add, manage, and scale a raster image quickly and effectively using points on the raster image and known coordinates in the DWG file.



Steps:

- Insert a raster image
- Scale the raster image to use the appropriate units in the DWG file

Insert and scale	AutoCAD	Raster Design toolset
Setting options/Raster design options	1:30	1:00
Insert a raster image	1:00	1:00
Correlating and scaling a raster image	2:30	1:10
Saving image data and coordinates	1:30	0:00
Total time to complete task	6:30	3:10
Time savings with the Raster Design toolset		51%

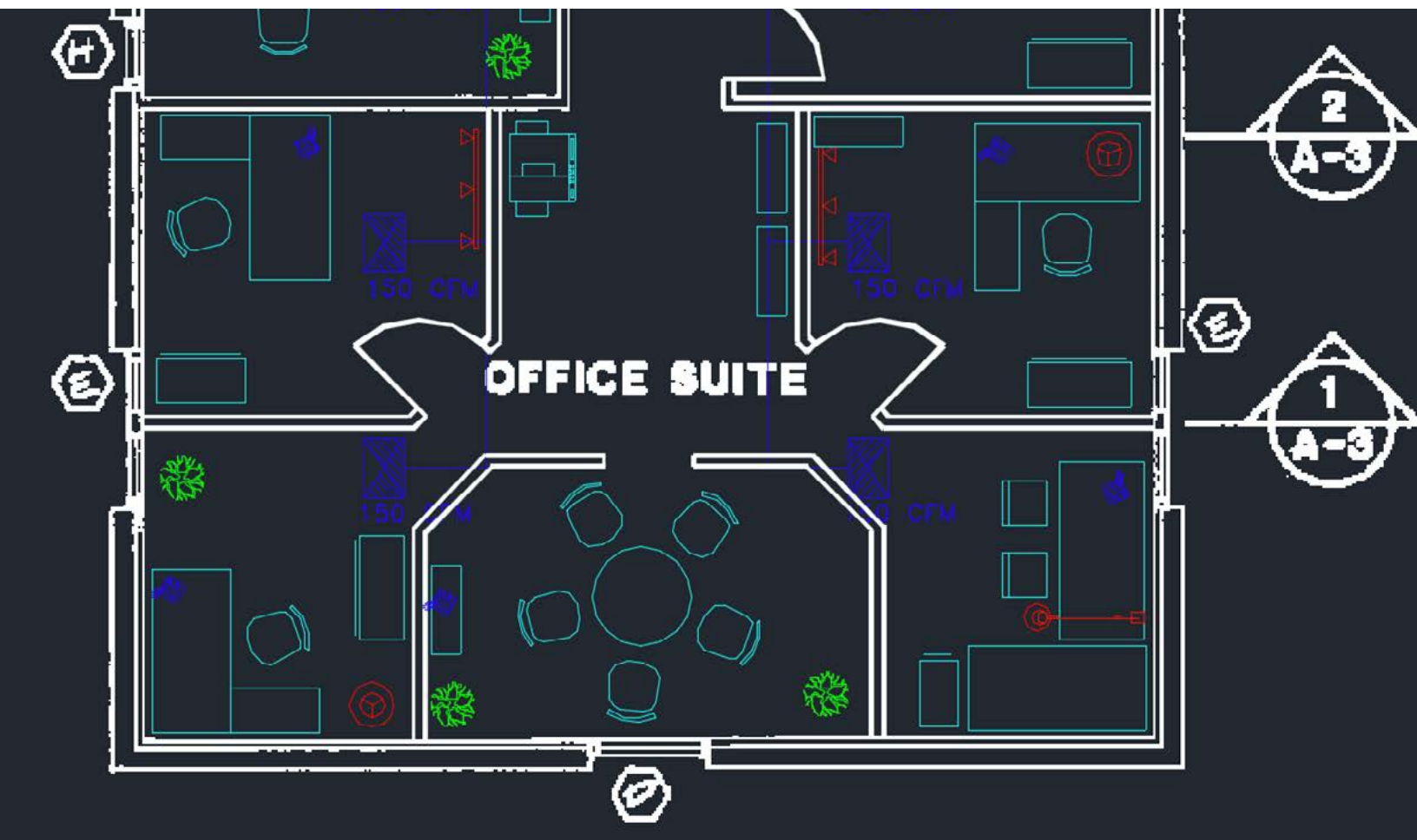
(Figures shown in minutes and seconds)

Advantages:

In basic AutoCAD, the correlation/scaling and coordinate values of a raster image would need to be calculated and saved manually. The Image Insertion wizard in the Raster Design toolset provides tools to execute this in one workflow from image selection to insertion in the DWG file, including managing multiple raster images and saving their data.

If the Raster Design toolset is being used with GIS applications such as the Map 3D toolset, the Raster Design toolset provides options for coordinate transformation while inserting an image that has a different coordinate system than that of the drawing.

Images can also be multispectral. This option is available for multiple images when inserted as a multispectral dataset.

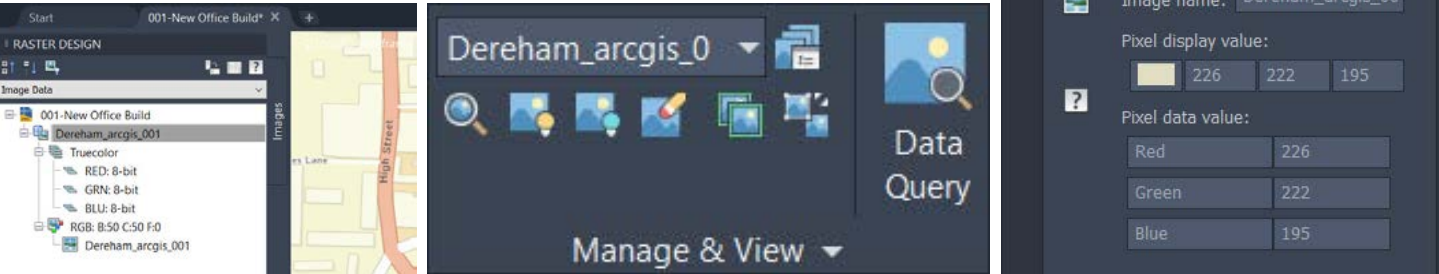


Manage and view

The task was to manage the inserted raster image and work with the current drawing, adding drawing objects that use the raster image as a reference. Image data was also required to match layer and object colors in the drawing.

Steps:

- Zoom to the extents of the image, not the visible drawing objects
- Show and hide the image (where applicable) to work with new/existing objects in the drawing
- Query image data to ascertain color values in the image for new layer and object properties



Manage and view	AutoCAD	Raster Design toolset
Zoom to raster image extents	0:30	0:00
Show/hide raster image in host drawing	1:30	0:00
Raster data query	7:00	0:30
Total time to complete task	9:00	0:30
Time savings with the Raster Design toolset		94%

(Figures shown in minutes and seconds)

Advantages:

The Raster Design toolset can save large amounts of time on some of the smaller, tedious tasks required when managing raster images in basic AutoCAD. During this task, it was obvious that the Manage & View panel provided specific raster image management tools that are not available in basic AutoCAD.

The Raster design toolset also provides a highly functional Raster Design palette for easy management of raster images in a drawing. This provides comprehensive image data including image properties, image colors, and image file location, which is not available in basic AutoCAD.



Map credit - American Digital Cartography Inc. and U.S. Geological Survey

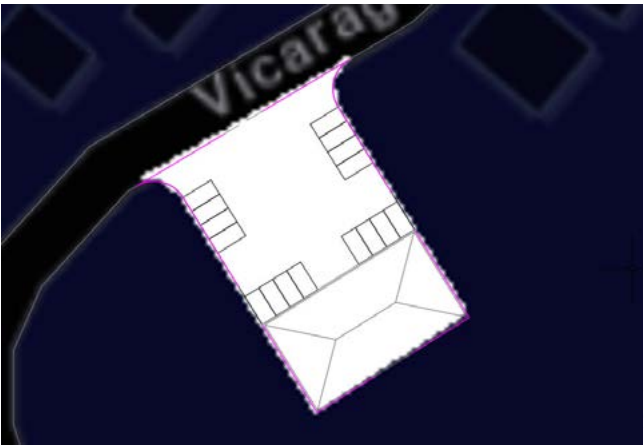
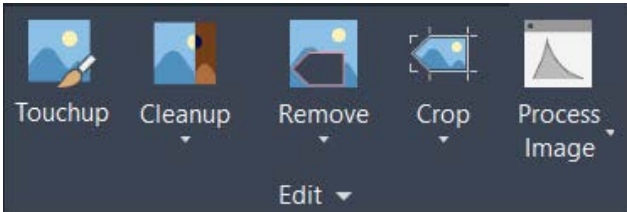
Edit

The task was to edit the raster image to highlight the AutoCAD objects representing the new community center project for planning purposes. Objects would include lines, polylines, and hatching, combined with suitable annotation. Basic AutoCAD does provide tools to do this, but the Raster Design toolset provides specialized tools that give the same results with quicker, more efficient workflows.

The Raster Design toolset allows you to work with the image and edit the image to your requirements. You can remove and crop the image to allow for the highlighting of AutoCAD objects in the drawing, that are using the raster image for reference. These tools are not available in basic AutoCAD and make for some large time savings for the Raster Design toolset user.

Steps:

- Generate AutoCAD objects in the drawing, using the raster image for reference
- Utilize the Raster Design toolset to edit the raster image, highlighting the AutoCAD objects



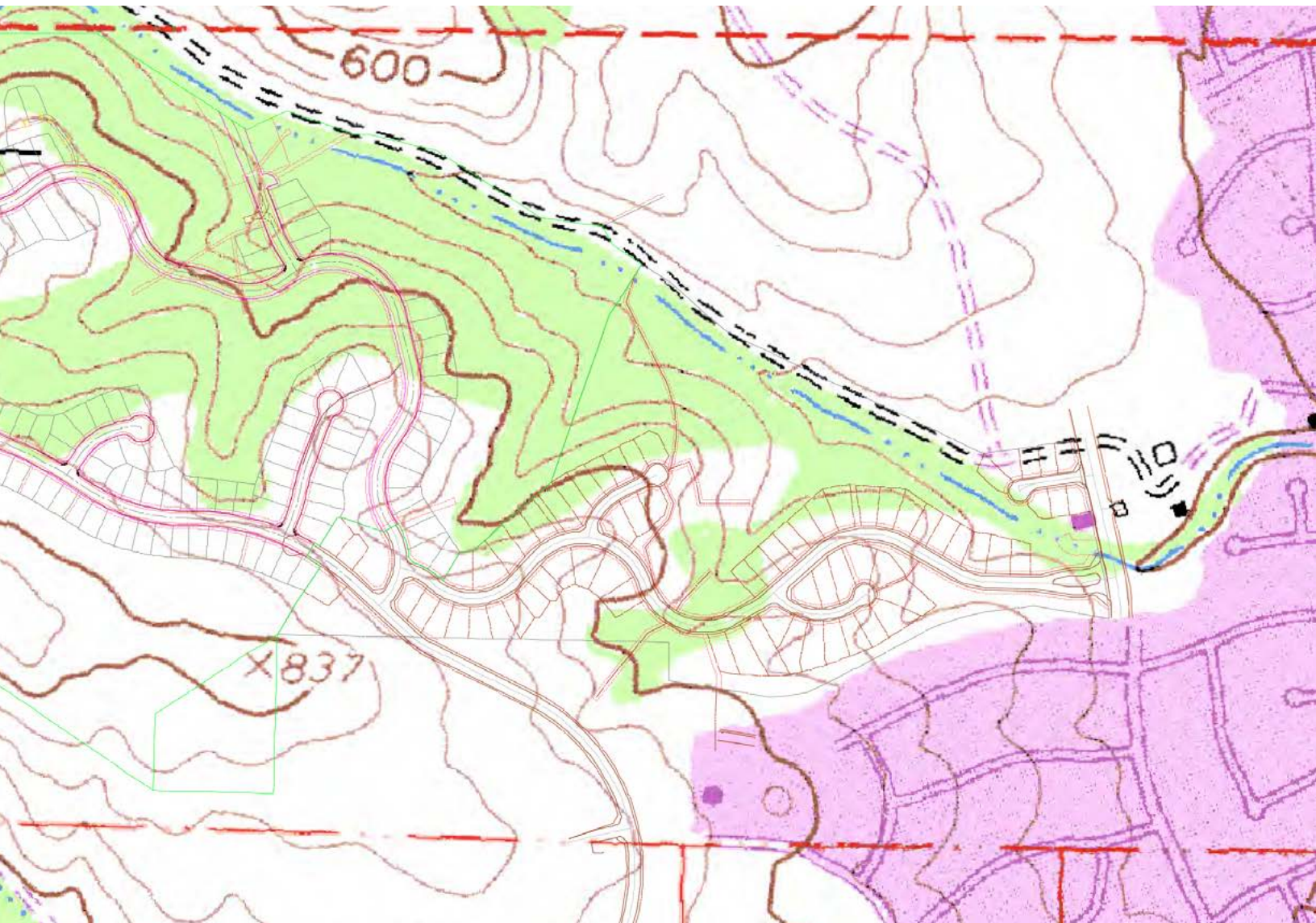
Edit	AutoCAD	Raster Design toolset
Generate AutoCAD objects	30:00	30:00
Create raster image region	15:00	15:00
Remove raster image region in drawing	15:00	5:00
Invert raster image to highlight AutoCAD objects	15:00	2:00
Total time to complete task	75:00	52:00
Time savings with the Raster Design toolset		31%

(Figures shown in minutes and seconds)

Advantages:

The Raster Design toolset provides the following advantages:

- Raster-specific editing tools that are not available in basic AutoCAD
- Defined workflows to increase efficiency when incorporating raster images in a drawing
- Image color manipulation to allow easy highlighting of AutoCAD objects



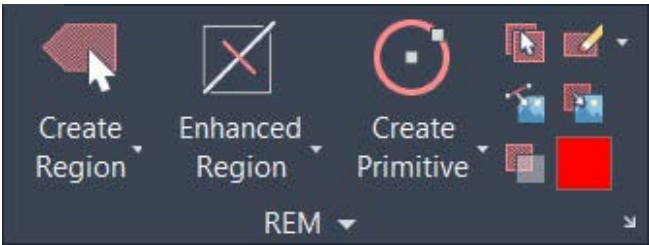
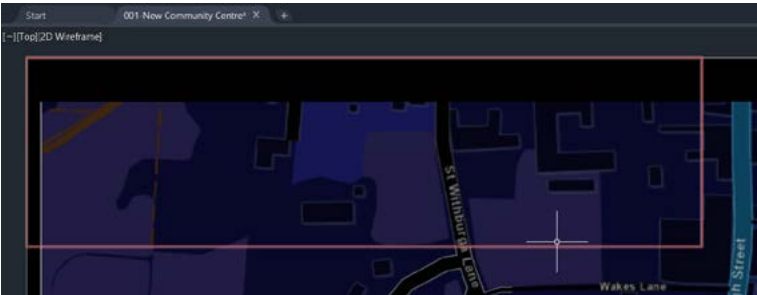
Raster entity manipulation

The Raster Design toolset gives you tools to define regions of varying shapes in the raster image and manipulate them individually. These include polygonal, rectangular, diagonal, circular, and from existing vector entities. Basic AutoCAD does not include these tools that provide substantial time savings when editing the raster image.

The task was to generate a number of Raster entity manipulation (REM) regions in the raster image and remove them in order to rationalize the image in the drawing, reduce the file size, and improve overall drawing appearance by removing extraneous areas of raster text and borders.

Steps:

- Create REM regions using the rectangular and polygonal region tools
- Delete selected REM regions



REM	AutoCAD	Raster Design toolset
Create rectangular REM regions	25:00	10:00
Create polygonal REM regions	30:00	15:00
Delete REM regions	20:00	5:00
Total time to complete task	75:00	30:00
Time savings with the Raster Design toolset		60%

(Figures shown in minutes and seconds)

Advantages:

The Raster Design toolset offers huge time savings here because:

- Basic AutoCAD does not provide similar REM tools
- The REM tools in the Raster Design toolset provide quick, efficient workflows
- The raster image can be edited and manipulated to provide a clear, clean drawing that communicates design intent effectively



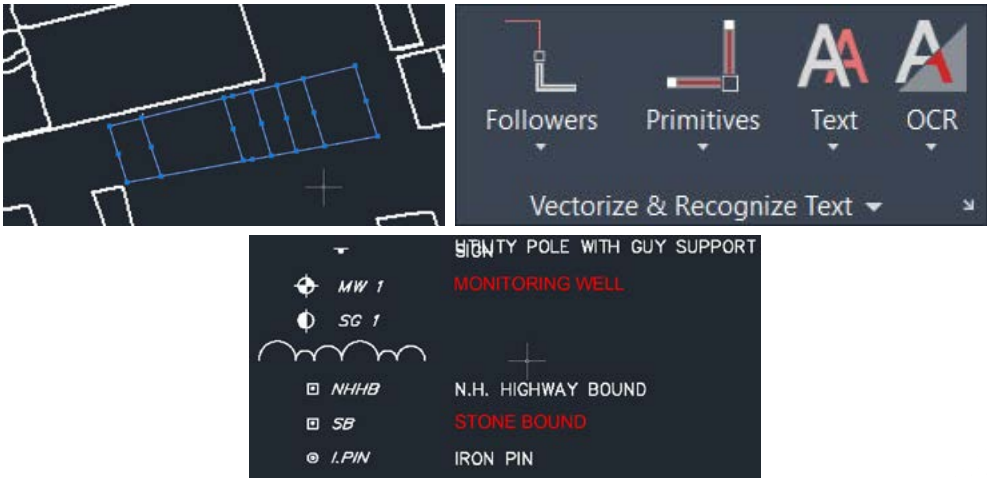
Vectorize and recognize text

The Raster Design toolset provides interactive tools to convert raster entities and text into vector entities and text quickly and effectively. The task was to vectorize raster line entities and use the Optical Character Recognition (OCR) tools to convert raster text entities to Multiline Text (MText) entities.

Basic AutoCAD does not provide any OCR functionality. The Raster Design toolset is already at an advantage by providing a simple and efficient method to convert raster text entities into MText and Text.

Steps:

- Set basic AutoCAD/Raster Design toolset options
- Create vector line primitives and convert to AutoCAD properties
- Set Optical Character Recognition (OCR) settings
- Recognize raster text entities and convert to MText entities



Vectorize and recognize text	AutoCAD	Raster Design toolset
Set basic AutoCAD/Raster Design/OCR options	6:00	6:00
Create vector line primitives from raster image	15:00	5:00
Set vector line primitives to AutoCAD properties	5:00	5:00
Convert/edit raster text to MText	5:00	1:00
Total time to complete task	31:00	17:00
Time savings with the Raster Design toolset		45%

(Figures shown in minutes and seconds)

Advantages:

The advantages of the Raster Design toolset:

- The Raster Design toolset options allow for accurate recognition of raster line entities, making for quick and efficient conversion to vector line primitives
- The Optical Character Recognition (OCR) settings provide a substantial time advantage over basic AutoCAD
- Converting raster text to MText is a quick, efficient workflow



Image credit - Cingular Wireless

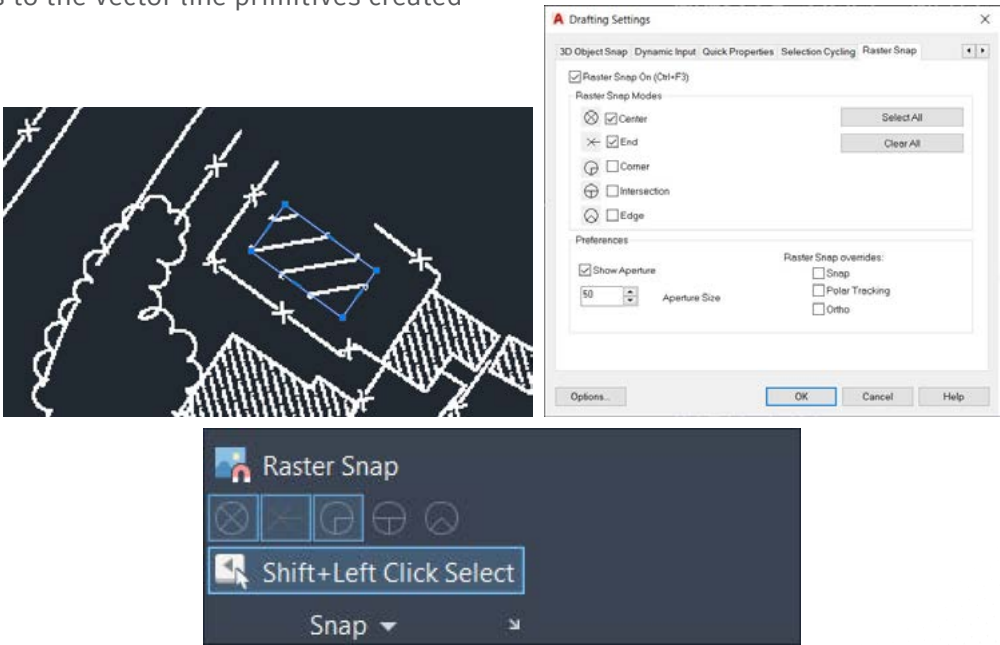
Raster snap

Raster images, by definition, lack object snaps. When attached to a drawing in basic AutoCAD, vector entities are often traced over the raster entities. The object snaps (OSNAP) in basic AutoCAD can perform the same task, but it is often time consuming and can bring inaccuracy.

The Raster Design toolset provides raster snaps that allow the user to snap to raster entities and then generate vector primitives such as lines and polylines.

Steps:

- Enable the raster snap settings in the Raster Design toolset
- Utilize the raster snaps to generate vector primitives
- Add properties to the vector line primitives created



Raster snap	AutoCAD	Raster Design toolset
Enable Raster Snap settings/AutoCAD OSNAP settings	1:00	1:00
Trace vector entities/create vector primitives	30:00	10:00
Add properties to vector entities/primitives	10:00	10:00
Total time to complete task	41:00	21:00
Time savings with the Raster Design toolset		49%

(Figures shown in minutes and seconds)

Advantages:

Creating vector primitives using the raster snaps in Raster Design toolset is dramatically faster than with basic AutoCAD. Not only is it a time-consuming task in basic AutoCAD, it can generate a degree of inaccuracy. Even with the OSNAPS in basic AutoCAD, there is no way of snapping to the raster image entities. The Raster Design toolset provides this functionality, thus providing a substantial time saving over basic AutoCAD.

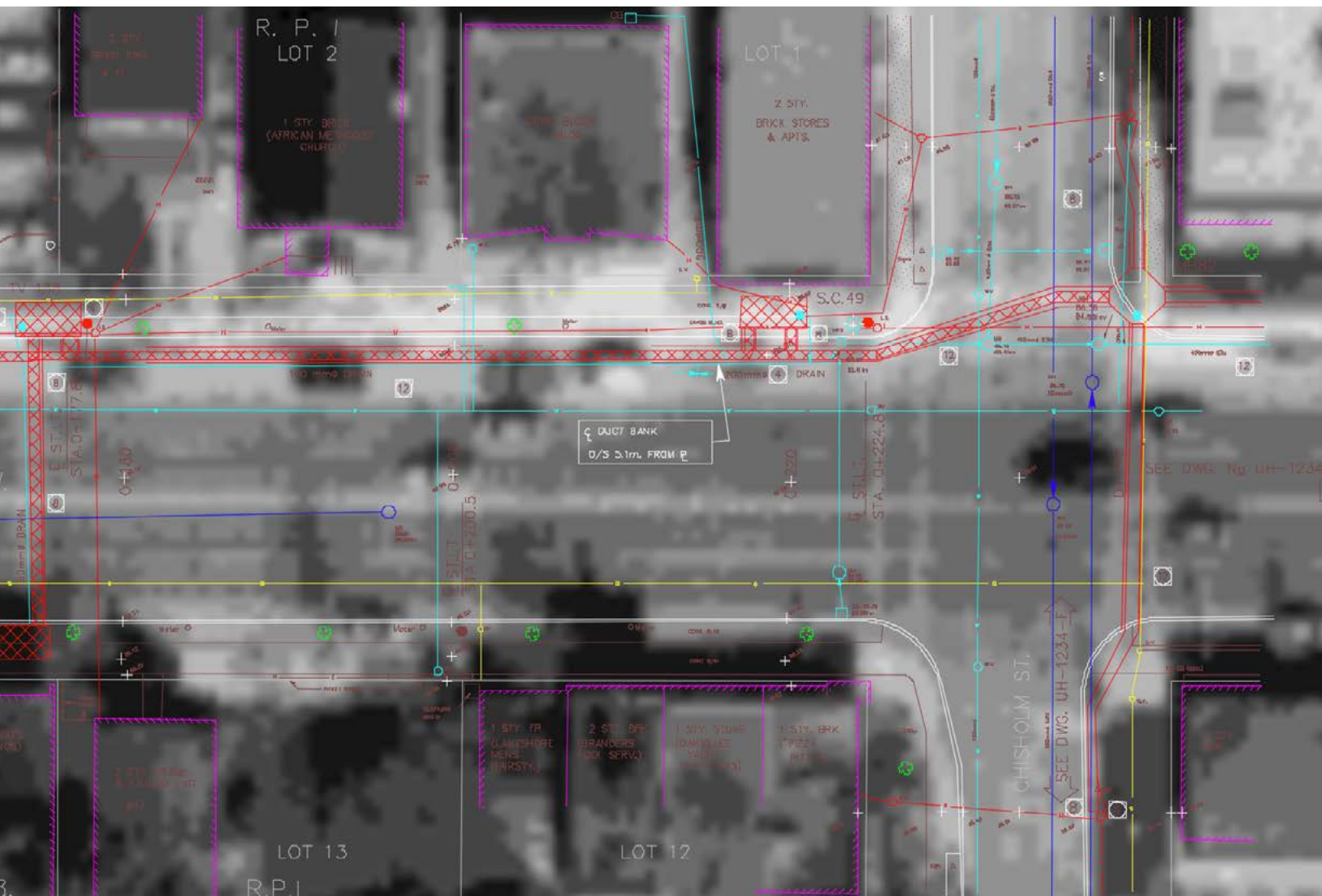


Image credit - Oakville Hydro

Conclusion

In this Raster Design toolset productivity study, the six design tasks analyzed were just a few examples of how the Raster Design toolset can provide tools and workflows to make you more productive.

Project tasks	AutoCAD (mins:secs)	Raster Design toolset (mins:secs)	Time savings
1 Insert and scale	6:30	3:10	51%
2 Manage and view	9:00	0:30	94%
3 Edit	75:00	52:00	31%
4 REM	75:00	30:00	60%
5 Vectorize and recognize text	31:00	17:00	45%
6 Raster Snap	41:00	21:00	49%
Total time	237:30	123:40	
Overall time savings with the Raster Design toolset			48%

(Figures shown in minutes and seconds)

With the Raster Design toolset, it is possible to save about 48% of the 2D CAD working time when compared to basic AutoCAD.*

The advantages of the Raster Design toolset

Based on these six selected tasks, AutoCAD with the Raster Design toolset provides a higher level of productivity when using raster images as compared to basic AutoCAD. The Raster Design toolset is built specifically for use with raster images, and you could realize immediate and substantial productivity benefits such as the ones discussed in this paper.

Interested in learning more about how to use the Raster Design toolset? Explore [Raster Design tutorials](#).

*As with all performance tests, results may vary based on machine, operating system, filters, and even source material. While every effort has been made to make the tests as fair and objective as possible, your results may differ. Product information and specifications are subject to change without notice. Autodesk provides this information "as is", without warranty of any kind, either express or implied.

