Take the tedium out of your Corridors: "Auxiliary" Corridors for more dynamic models

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Creating true BIM Corridors in Civil 3D that yield proper Surfaces, quantities, and Cross Sections can often be fairly tedious. And this is a big deal, because that's the promise of BIM, after all. You may have found yourself creating many different Alignments and Profiles in odd intersections or cul-de-sacs, for example. The problem is that managing the values in these profiles can be fairly tedious and error prone, slowing down your workflows and bogging down your project. This is where Auxilliary Corridors come in. Through this strategy we can create background corridors that dynamically link baseline profiles to primary baselines. If this sounds confusing, it's because it's hard to put into words. You just have to come to this class. With this strategy you can create detailed, complex corridor models that are more powerful than anything you've probably seen before. The promises of BIM will finally come home once you start implementing Auxiliary corridors in your complex projects

Learning Objectives

At the end of this class, you will be able to:

- Learn how to create more dynamic corridor models with advanced targeting strategies and baseline linking

- Learn how to respond to design changes much quicker by utilizing Auxiliary corridors

- Learn how to incorporate unique assemblies and subassemblies to allow the "what-if" question to be asked at any time in the project

- Learn how to build truly detailed corridor models without the tedious profile creation

About the Speakers

Brian Levendowski, PE, is the infrastructure support manager and an application engineer for CAD Technology Center, an Autodesk, Inc., Gold Partner in Minnesota. He is a highly rated Autodesk University speaker, and he has extensive experience providing advanced-level training, consultation, and support to the infrastructure industry. He is currently leading several advanced implementations of Building Information Modeling (BIM) software, including AutoCAD Civil 3D software, for both small and large firms. With a practical background as a design engineer, inspector, and land surveyor, he has valuable real-world experience, and he truly understands the application of Autodesk software in the infrastructure industry.

Eric White is an Engineering Specialist with WSB & Associates, a Minneapolis MN based firm providing, engineering, planning, environmental, land surveying and construction services. He provides geometric design and drafting for a variety of transportation projects. Eric has been using Autodesk products for over 15 years and is an AutoCAD Civil 3D certified professional. He is also responsible for providing in-house training, support and CAD management services.

Identifying the Case

Auxiliary Corridors (ACs), though quite powerful, cannot be used in all situations, nor are they needed. We use them, firstly, when we're already using a Corridor for our design. This could be for designing roads, railways, airports, ditches, swales, trails; basically, anything that is typically defined with an alignment or is linear in nature. Even if you won't show the alignment stationing in the plan set, you may still use a Corridor. Secondly, if the Corridor drainage is fairly straightforward, but the horizontal geometry is complex, it may be a case for ACs.

Consider a cul-de-sac: horizontally, it could be quite complex, with an asymmetrical shape, or perhaps a middle island. But vertically, the design may be fairly straightforward. It could be sheet draining at a 2% slope from right to left side, or perhaps the crown of the road coming into the cul-de-sac is carried right through the cul-de-sac. This would be a case for ACs.

The Concept

In the Cul-de-sac example explained above, to properly model the curb we have to define a Baseline running along the bulb of the cul-de-sac, as shown below. With any Corridor Baseline, we need to also define a Profile. In this case, simply defining this Profile can be tedious. If we say it's going to sheet drain towards the top (from the centerline profile), we could easily calculate an elevation at a given point, but what we need is an entire Profile.

To define this Profile, we won't do it manually, but rather cut a Surface Profile from a Surface generated by our AC. This AC is built on the same centerline alignment that our road is modeled on. The point of this is two-fold: generating the bulb profile is simple and foolproof, and also, if the centerline Profile changes, the AC will change, which will change the AC Surface, which will change the bulb Surface Profile used in our main Corridor.

The key point to ACs, is that we link either Secondary Baseline Profiles, or Corridor Target Profiles to our centerline Alignment and Profile via an AC.
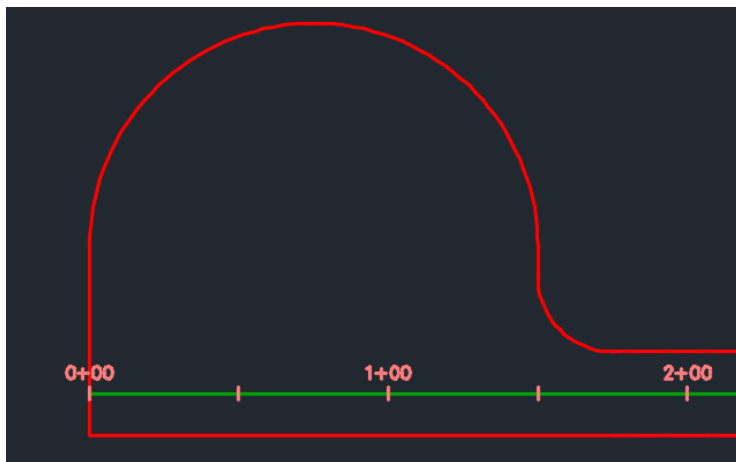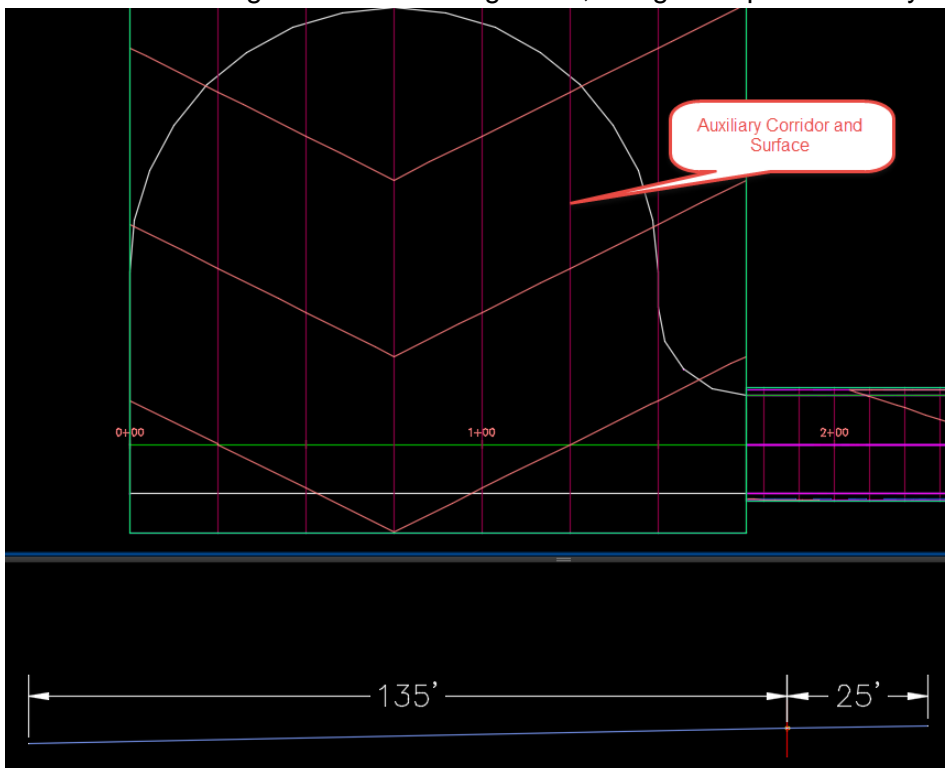
The Process

To explain the process, we'll use the cul-de-sac example above. Every project may require a slightly different application of ACs, but the concept remains the same.

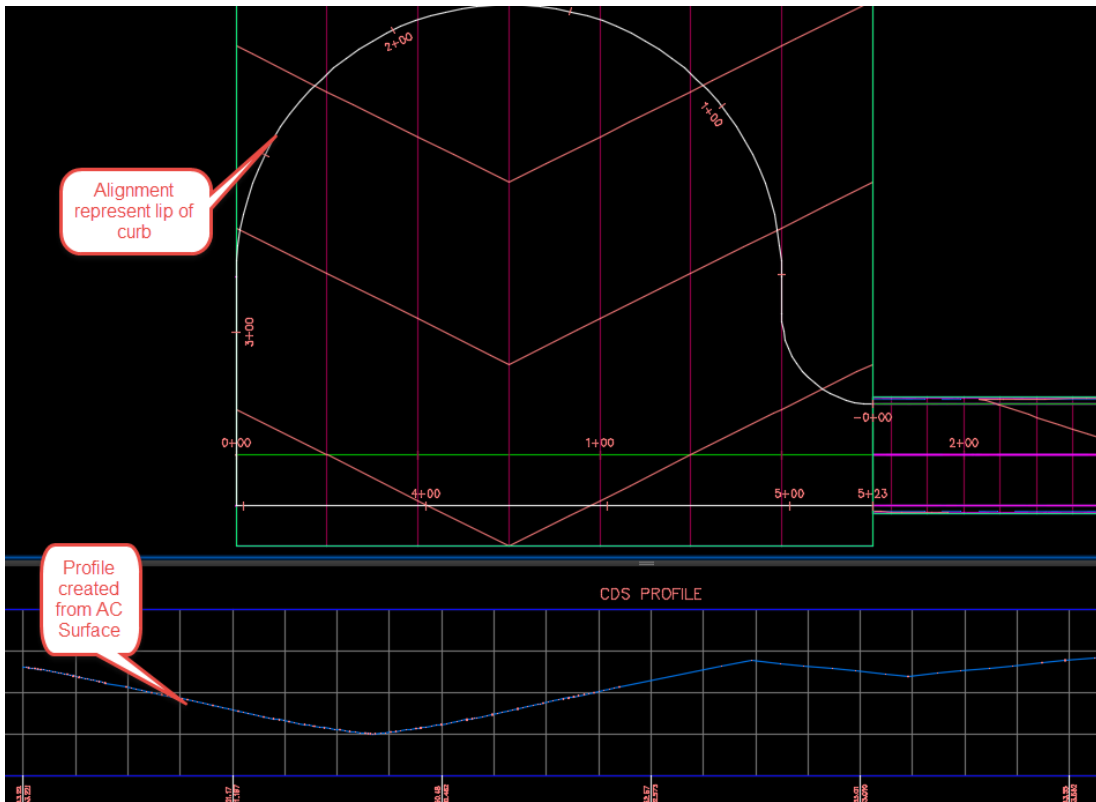1. Construct your main corridor up to the cul-de-sac
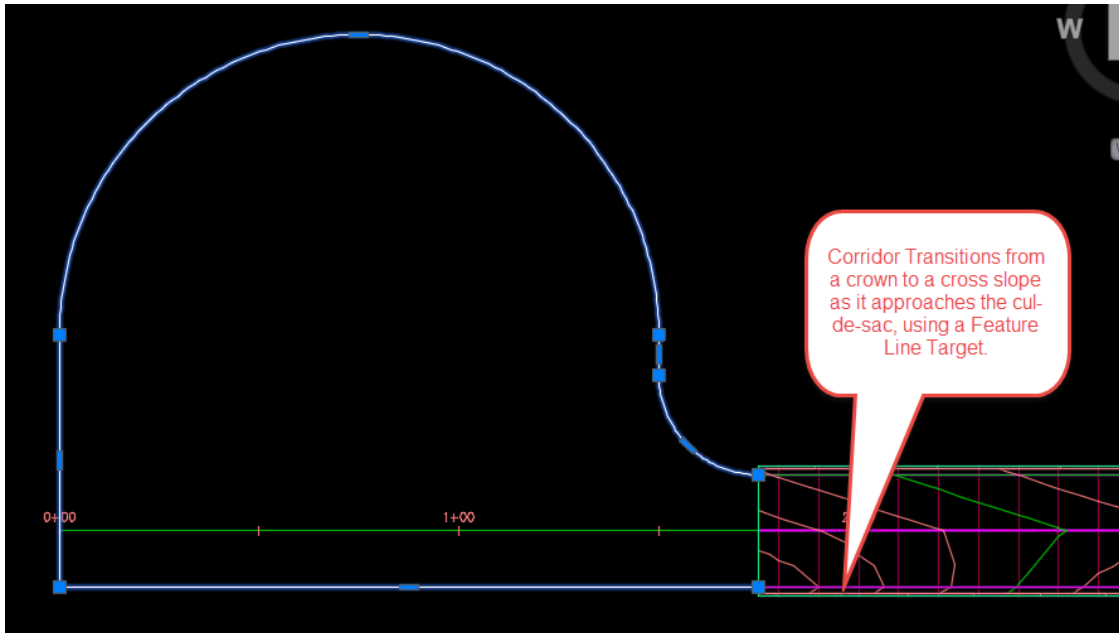
2. Create an AC along the centerline alignment, using a simple Assembly.
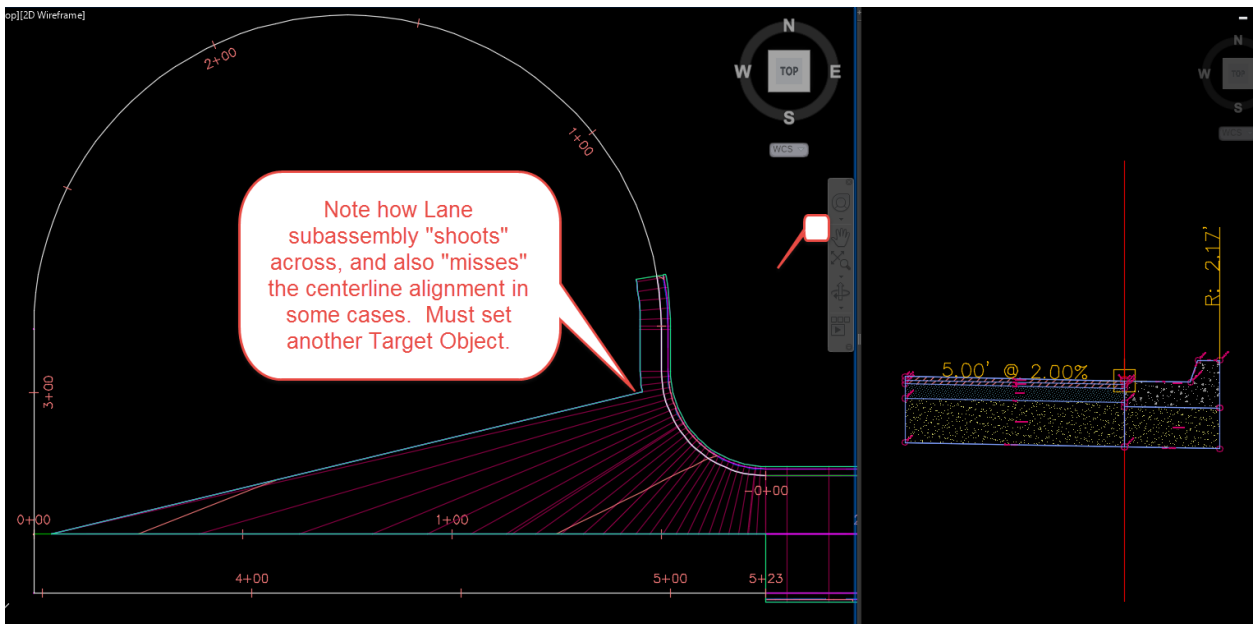
3. Create an alignment from the bulb geometry and cut a Surface Profile of your AC Surface.

4. Using a typical Curb Return Assembly, create a Corridor Region along the new alignment. Set Width and Elevation Targets for the Lane, to the centerline Alignment and Profile.

5. Create another alignment starting from center of cul-de-sac, running on top of centerline, then along left bottom edge (this will help "zero out" the Lane in this area so it doesn't overlap around the corner. Cut a Surface Profile of AC Surface for this Alignment as well.
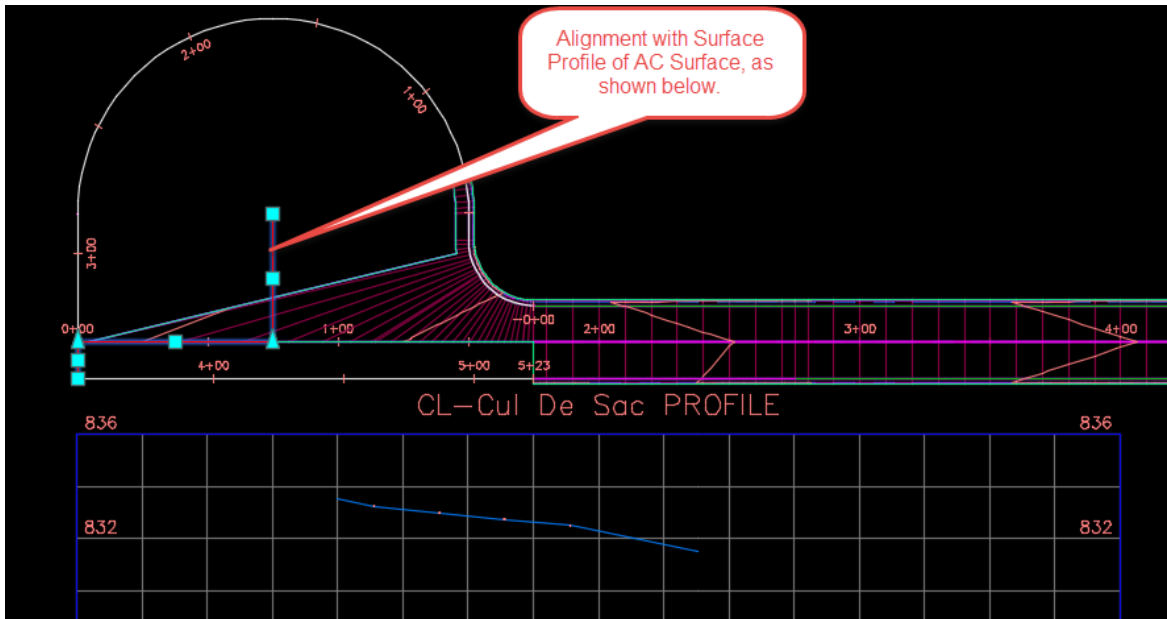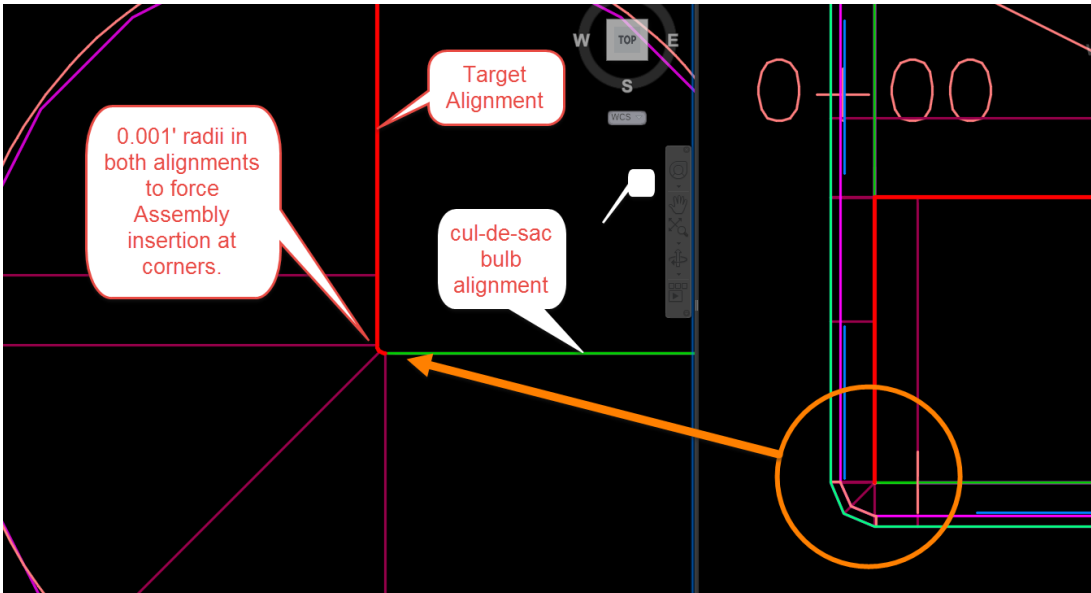

6. Add this new alignment and profile as Targets to the Lane Subassembly, then extend your Corridor Region around.
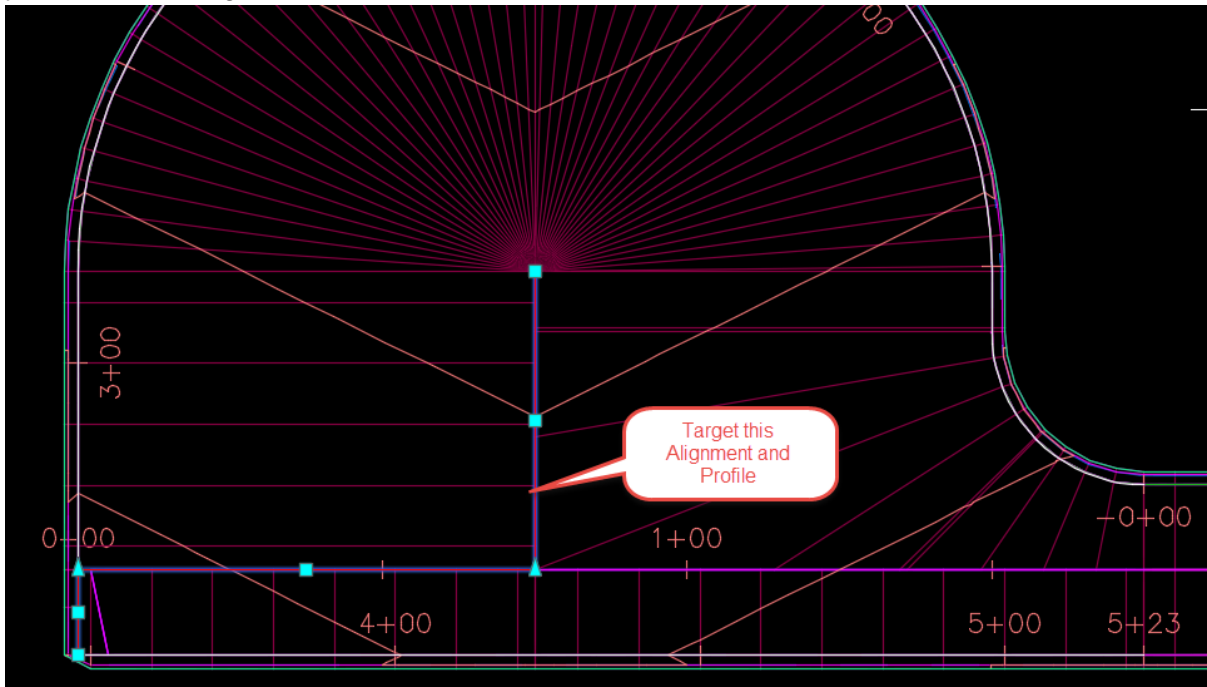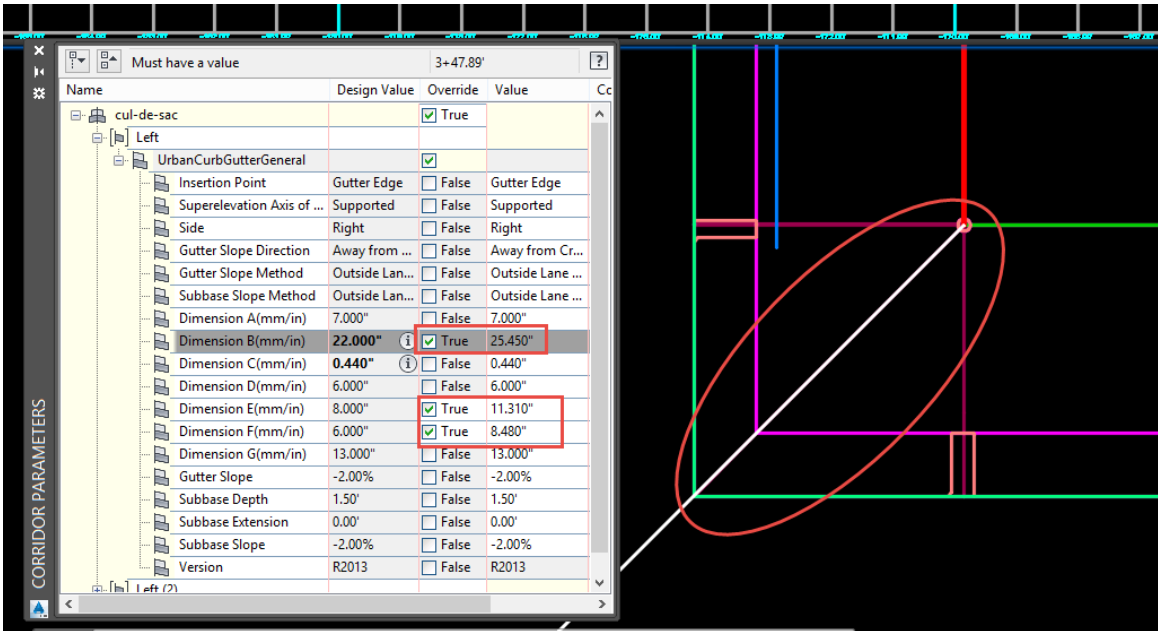
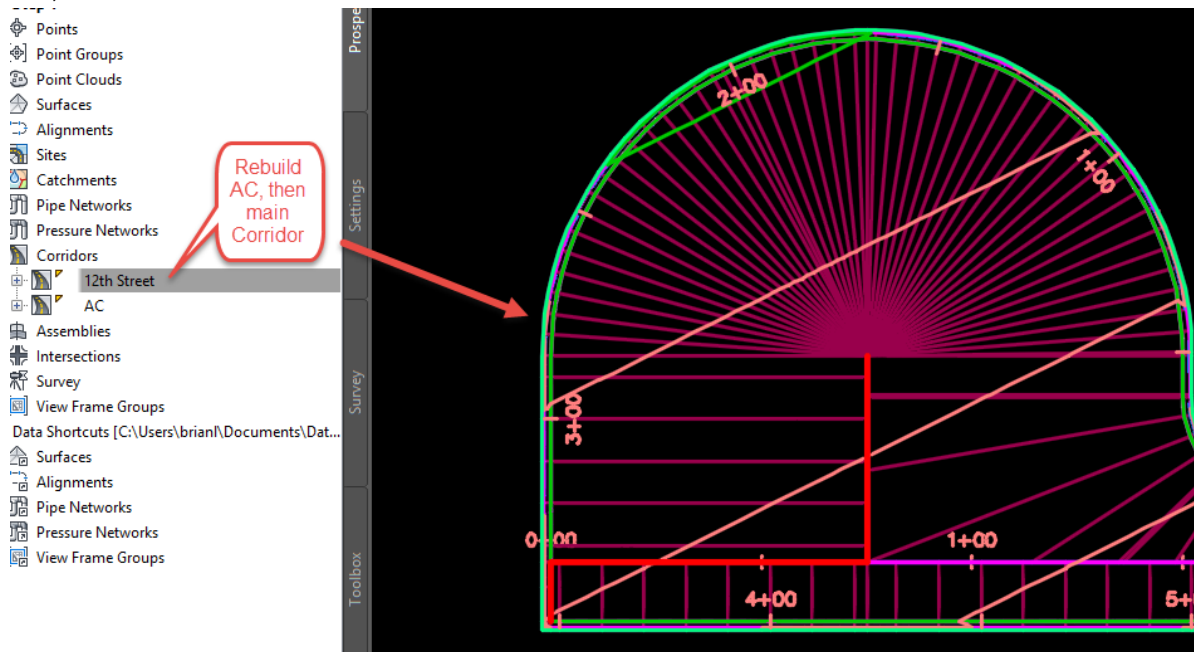7. To fix bottom left corner, add 0.001' curve to cul-de-sac alignment, and to cul-de-sac center alignment target.

8. Adjust midpoint Assembly insertion in Corridor Section Editor to get perfect corner.

9. Adjustments to Centerline Profile or AC Assembly now mostly only require a Rebuild of AC, then a Rebuild of main Corridor

Conclusion

Using ACs allow you to build complex Corridor models that are more dynamic then anything you can generate with just conventional Corridor methods, where we manually define secondary Baseline Profile and Corridor Target Profiles. Remember, ACs are all about automating the creation of these, and keeping them dynamically linked to centerline profiles, or some kind of primary Baseline in your Corridor. You may spend a little extra time creating your AC, but no more then manually creating a Layout Profile. And once it's in place you're set!

We could have a situation where our AC is built on a Baseline that isn't used in the main Corridor, but you'd lose the dynamic link to the primary Baseline. So, always strive to build both Corridors off the same primary Baseline.

Throughout any project, there will always be design changes. The quicker we can respond to those, the more efficient we are, and the better designs we can create. The ability to ask "what if?" get a whole lot better with Auxiliary Corridors!