CS21802: Dynamo for Construction Workflows

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Class summary

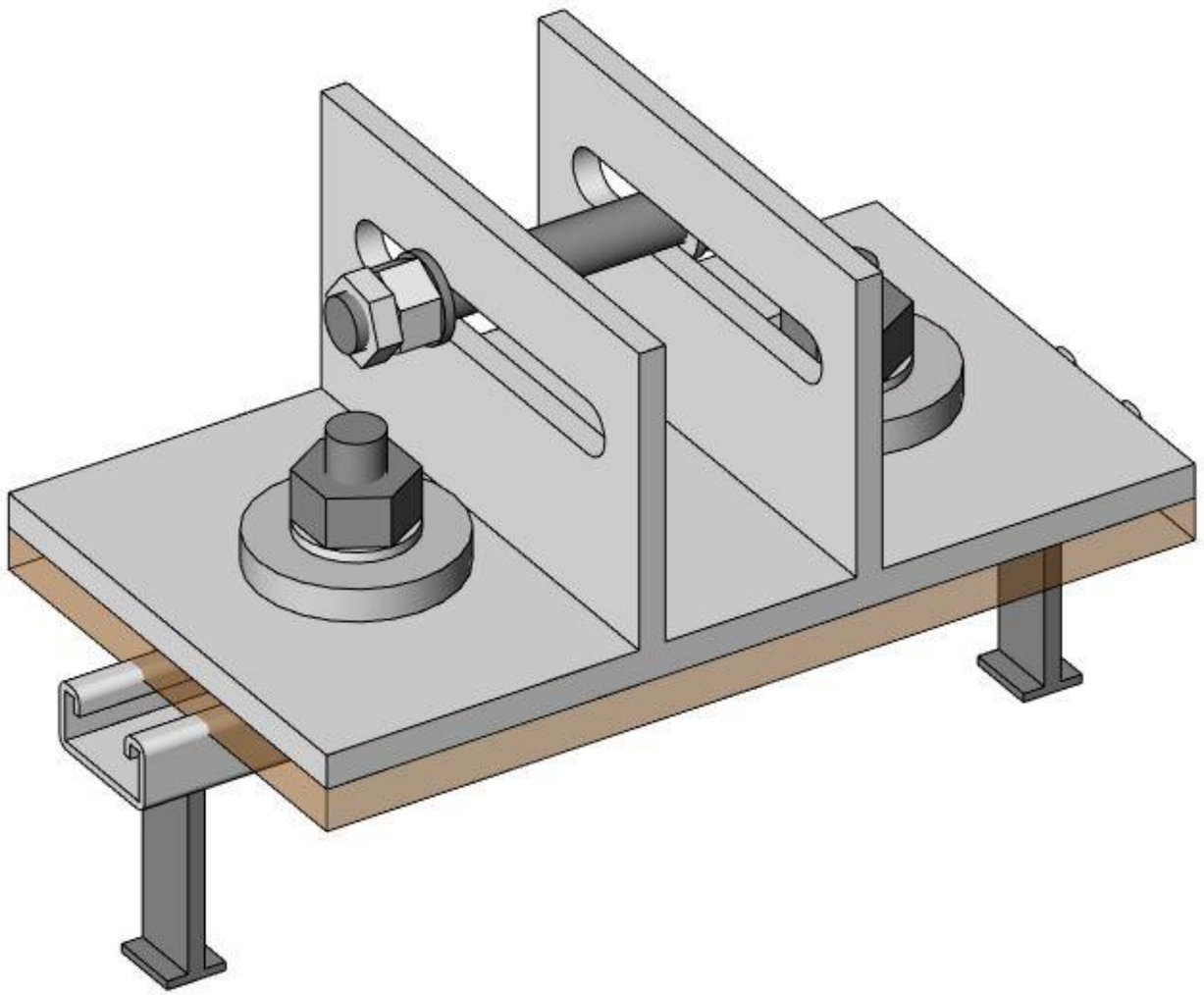
We’ve all seen the Dynamo extension used for twisting dramatic towers, and we’ve even seen it used to recreate some of our favorite Star Wars characters. But if you’re a general contractor or work in the construction industry, you may be wondering if Dynamo can do anything for you. In this class, we will demonstrate real construction problems that were solved with the Dynamo extension. You will see demonstrations analyzing slab flatness, cut-and-fill volume calculation, and installation simulation. With the skills and examples taught in this class, you will learn ways that Dynamo could be a game changer for your business too. This session features Dynamo Studio and Revit.

Key learning objectives

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

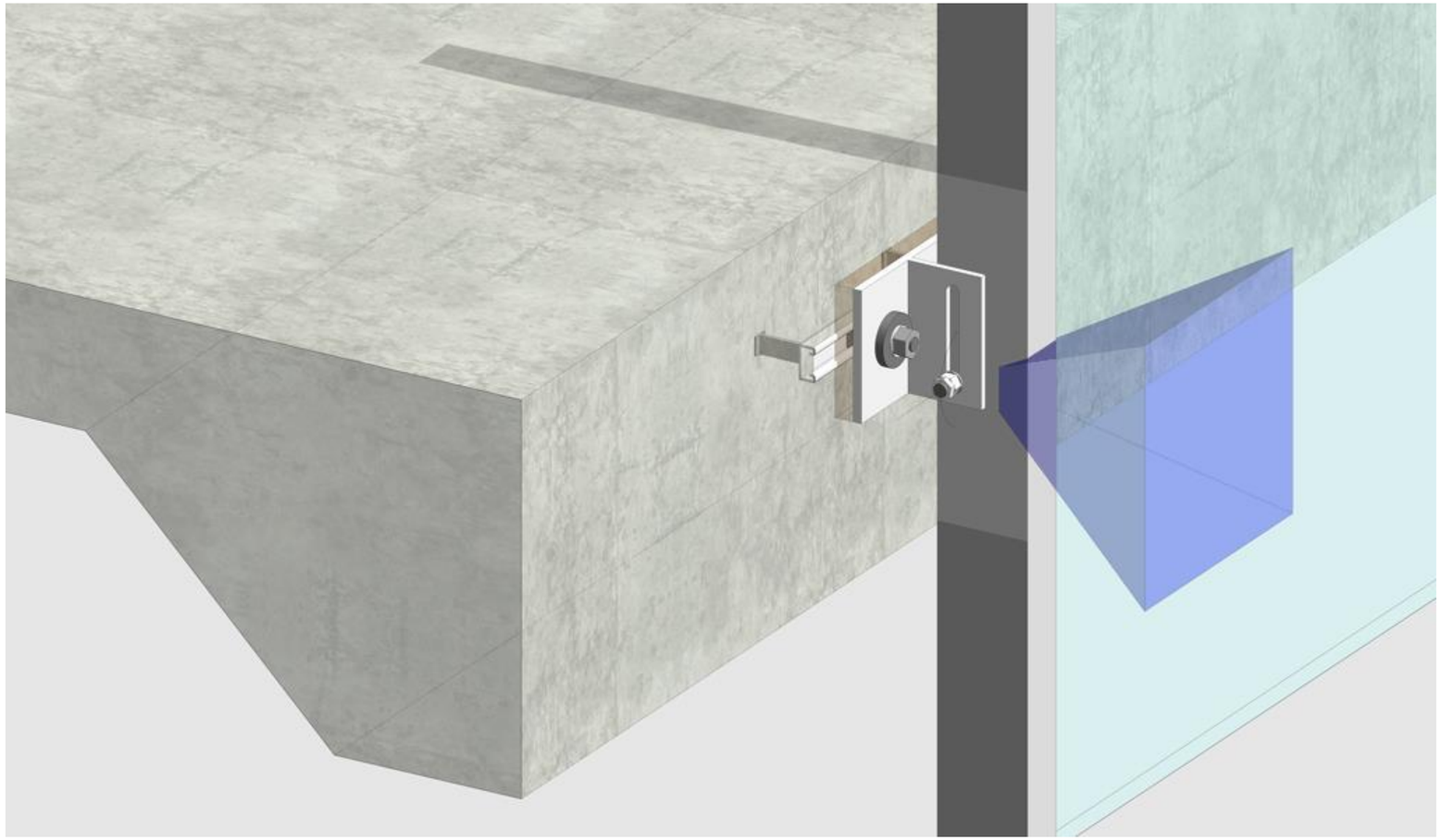
- Learn Construction Specific uses for Dynamo
- Learn Some Dynamo Basics
- Identify Tasks Dynamo Could be useful for
- Get an introduction to Dynamo’s online community and package manager

Halfen Detail Tolerance Simulation



Need to explain how Halfen Connection detail works for a legal case

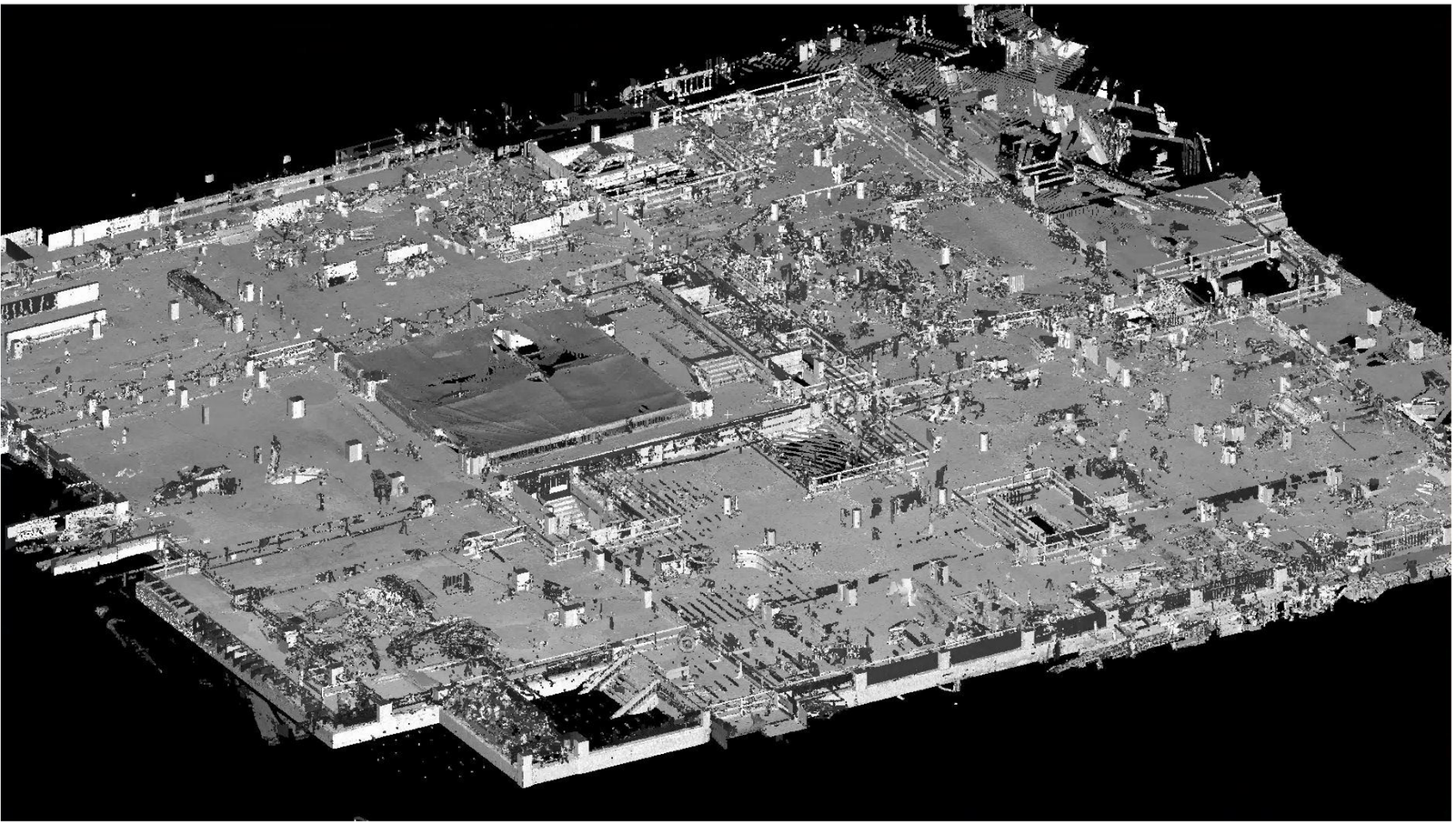
This family has 3 parameters to replicate the tolerances in a halfen channel



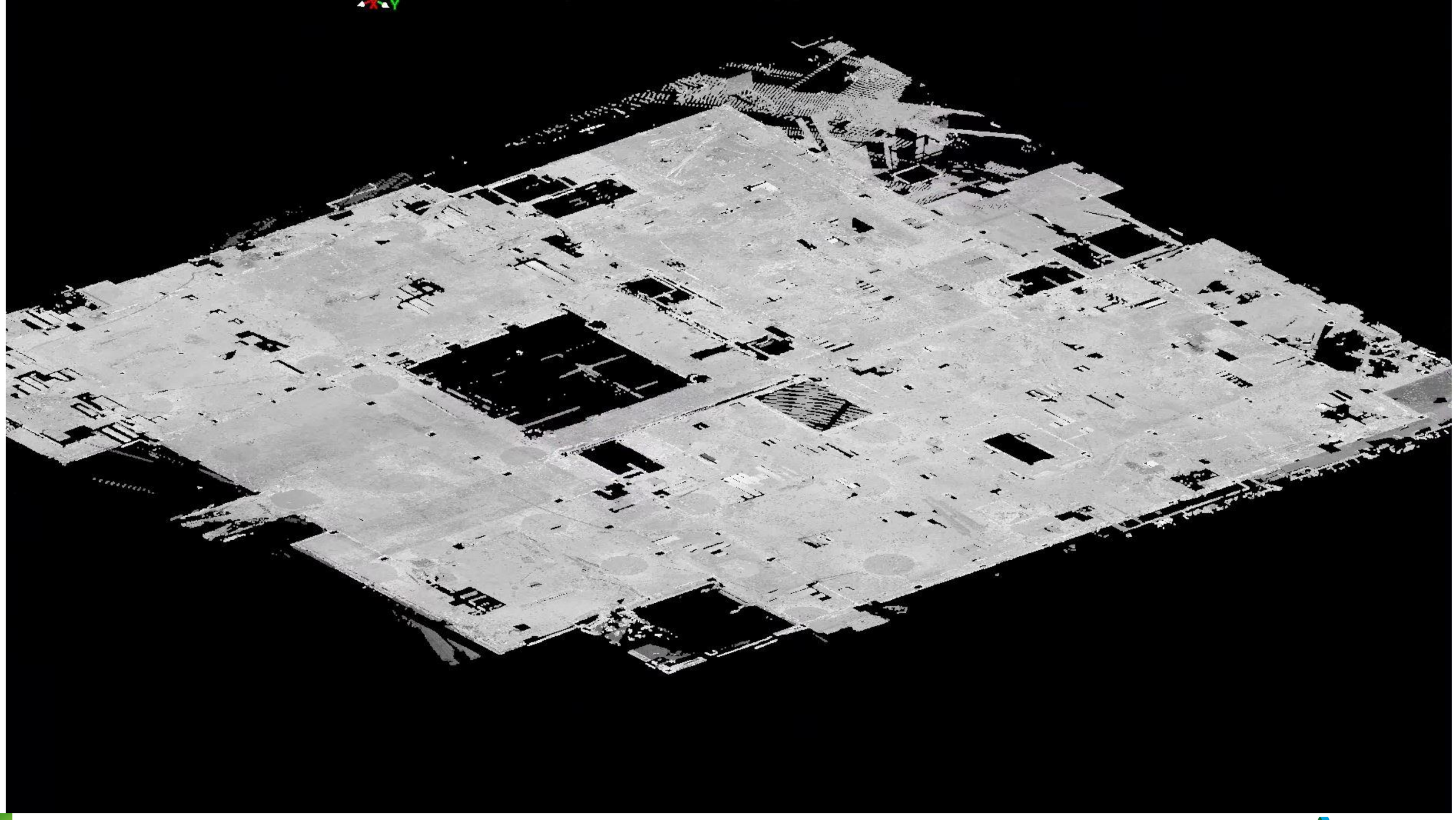
Moves up-down, left-right and in-out of plane. As the contractor we are required to place the halfen channel and slab edge in the desired location plus or minus our specified tolerance. This shows how the connection “absorbs” those tolerances

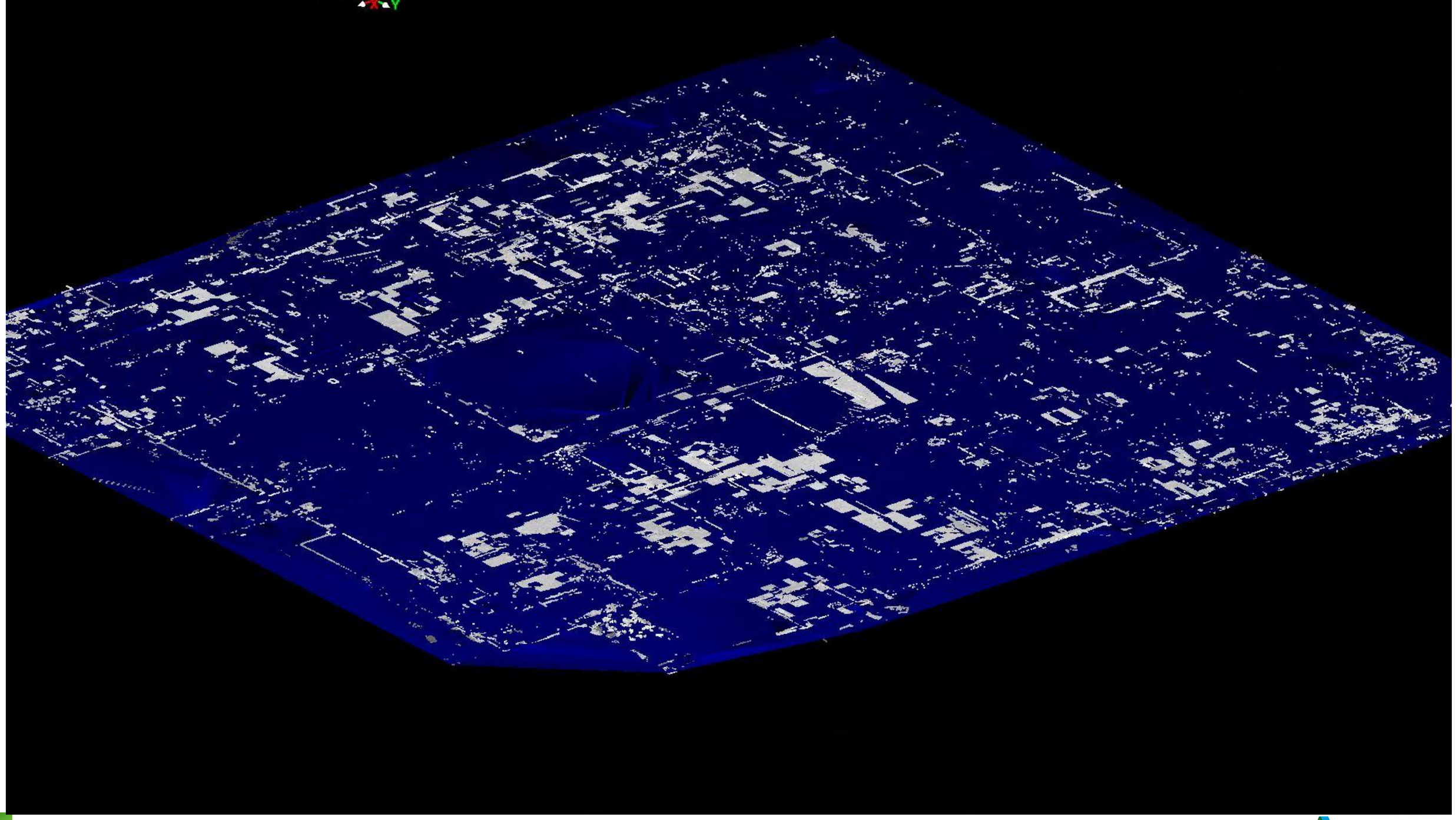
Play Movie

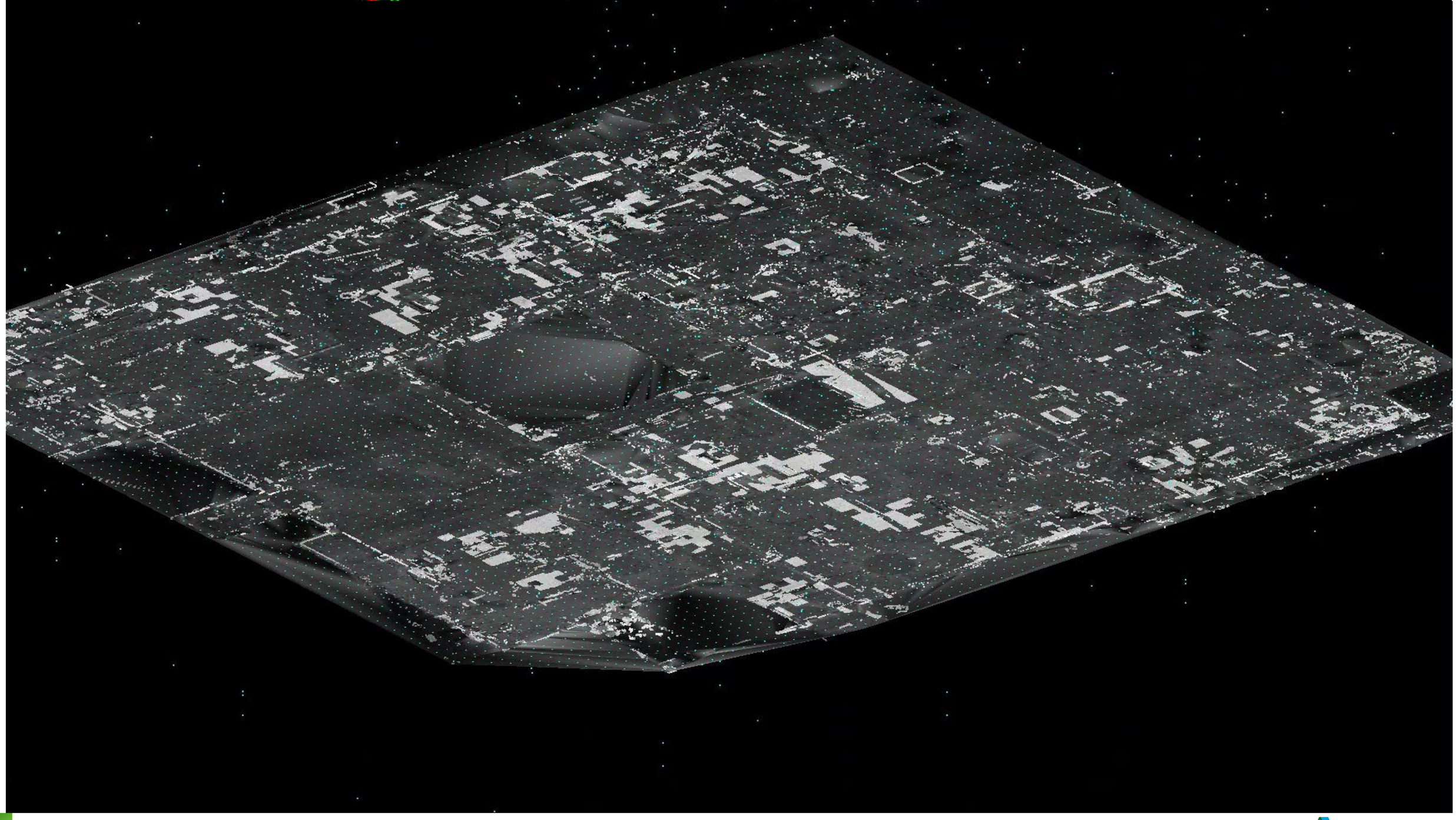
Slab Flatness Analysis

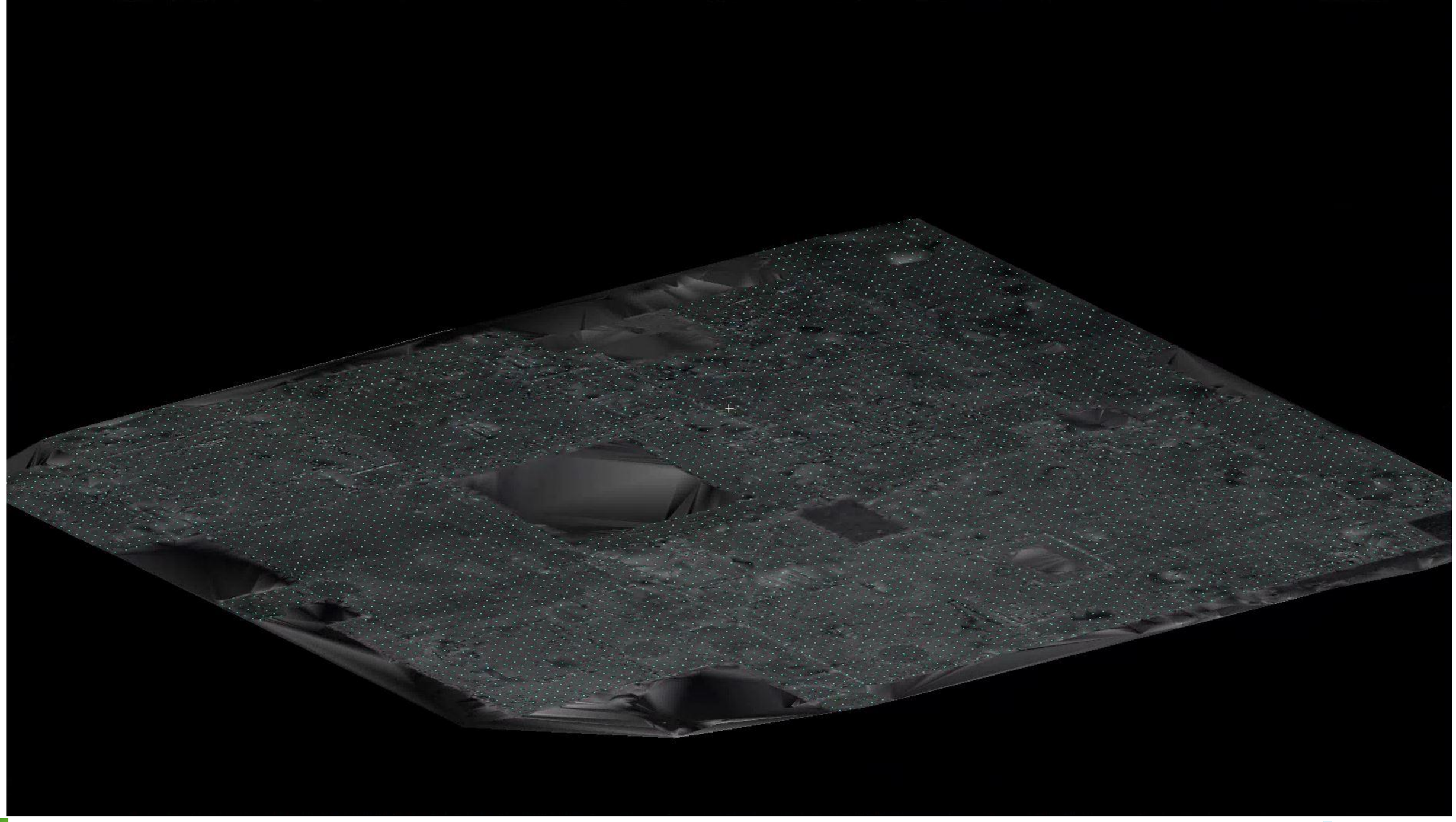


Often times after we pour slabs or demo an existing building down to the slabs, we need to add a topping slab to level the floors. Floor finishes like terrazzo are especially expensive and leveling out the elevation changes in the floor with concrete can be cheaper than just using terrazzo.

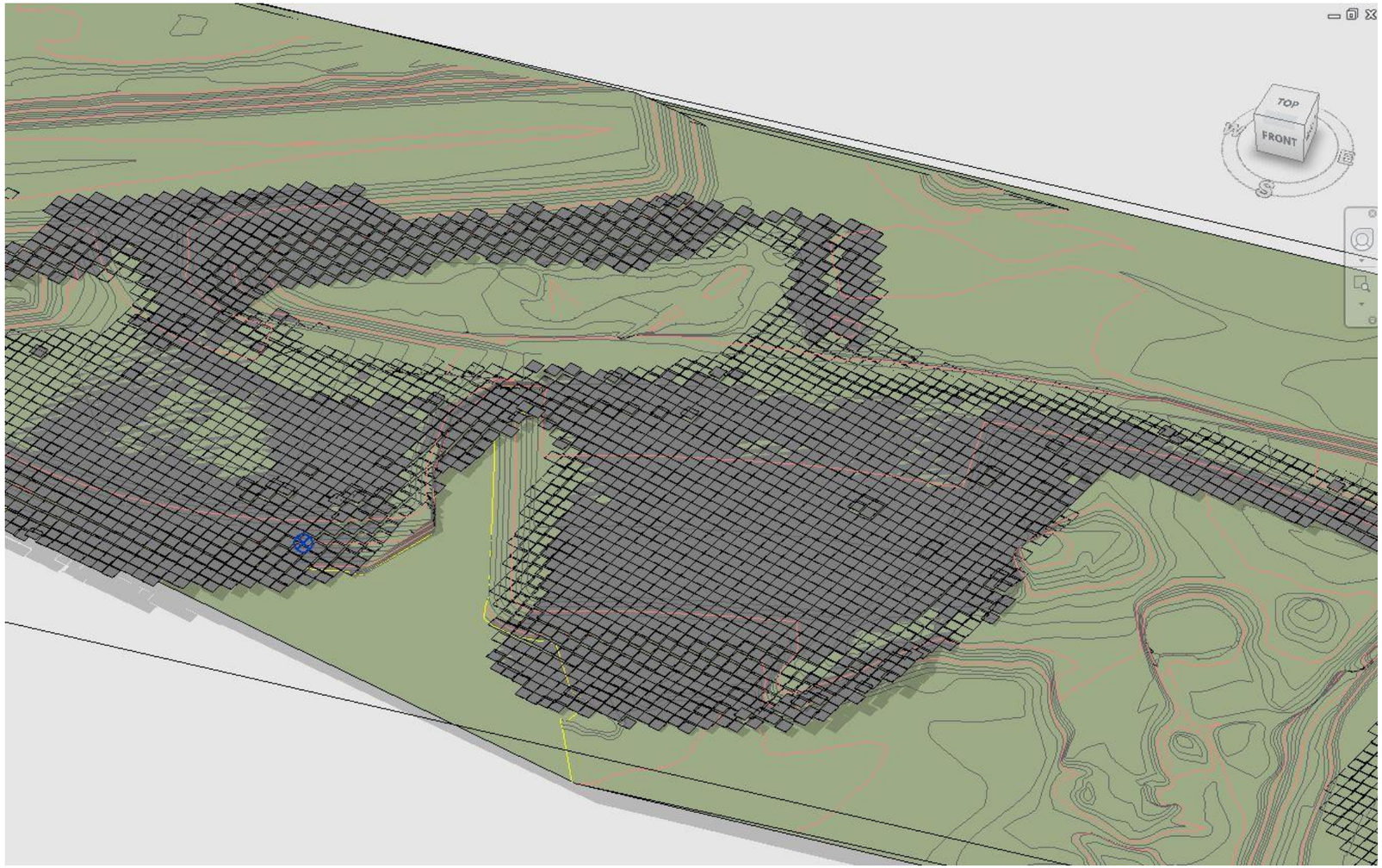








Cut and Fill Analysis



Now for the next example we are going to show how to take the slab flatness workflow and take it one step further to comparing to a designed elevation rather than a planar elevation.

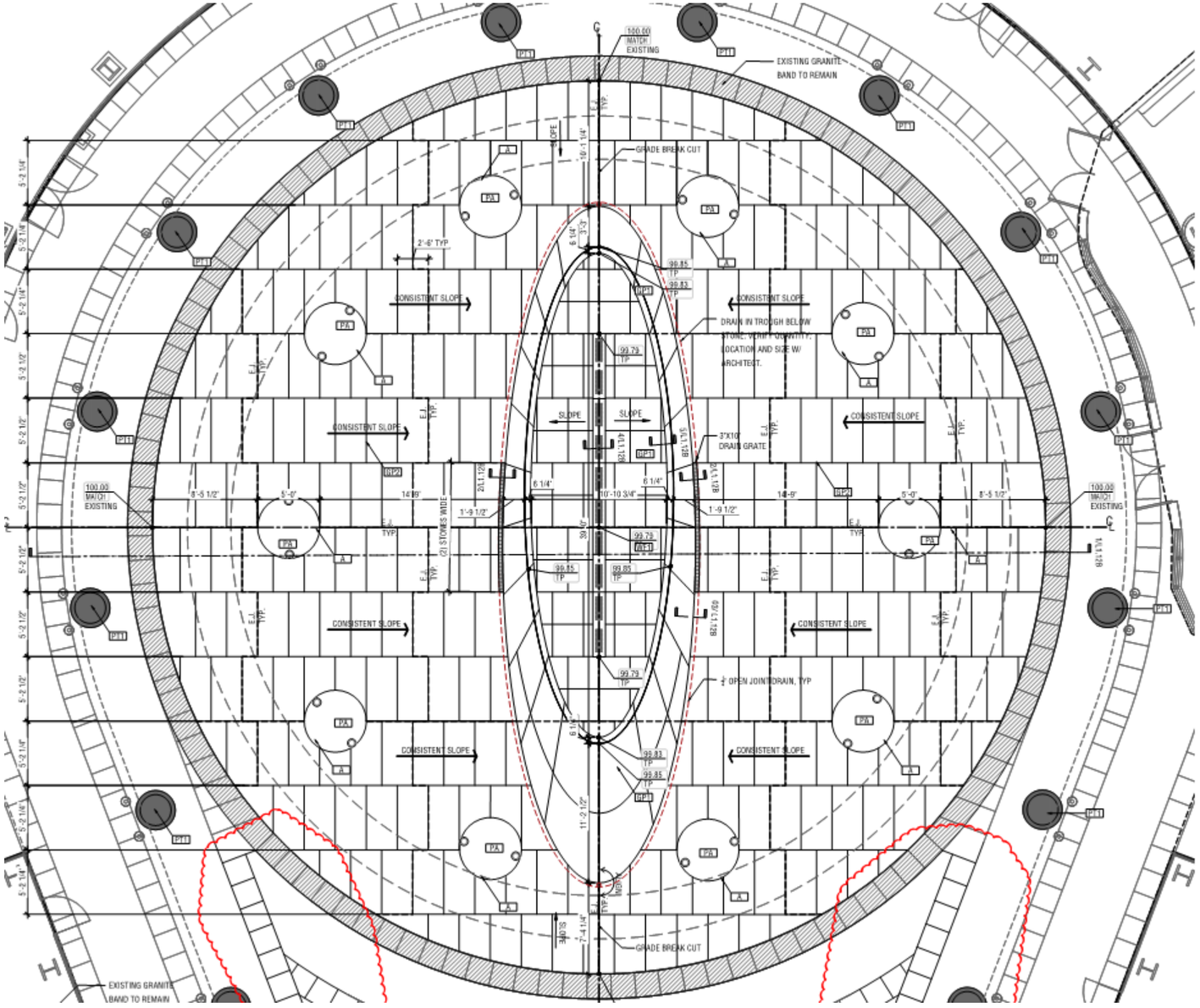
```
public static void ClosestVerticeToPointZDiff (Autodesk.DesignScript.Geometry.Mesh topo, Point[] samplePoints, String filePath )
{

    List<Point> meshPoints = topo.VertexPositions.ToList();
    //StreamWriter sr = new StreamWriter(@"C:\\Users\brendannichols\Documents\Projects\Trinity Forest\PointDistance.txt");
    StreamWriter sr = new StreamWriter(filePath);
    //List<Point> sortPoints = meshPoints.OrderBy(p => p.Z).ToList();
    for (int i =0; i < samplePoints.Length-1; i++)
    {
        Point samplePoint = samplePoints[i];
        Point moneyPoint = null;
        double currentDistance = 1000;
        for(int j = 0; j <meshPoints.Count-1; j++)
        {
            double xDist = (samplePoint.X - meshPoints[j].X);
            double yDist = (samplePoint.Y - meshPoints[j].Y);
            double distance = Math.Sqrt((xDist * xDist) + (yDist * yDist));
            if (distance < currentDistance)
            {
                currentDistance = distance;
                moneyPoint = meshPoints[j];
            }
        }
        string s = Convert.ToString(samplePoint.X) + "," + Convert.ToString(samplePoint.Y) + "," + Convert.ToString(samplePoint.Z) + "," + Conv
        sr.WriteLine(s);

    }
}
```

We'll also show how you can make use of a programming environment to create new nodes for Dynamo

Installation Simulation



This example we will look at how a fountains installation had some potential issues. Dynamo was used to simulate the installation far in advance to understand the potential problem.

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