

## WhirlyBird Aerial Services

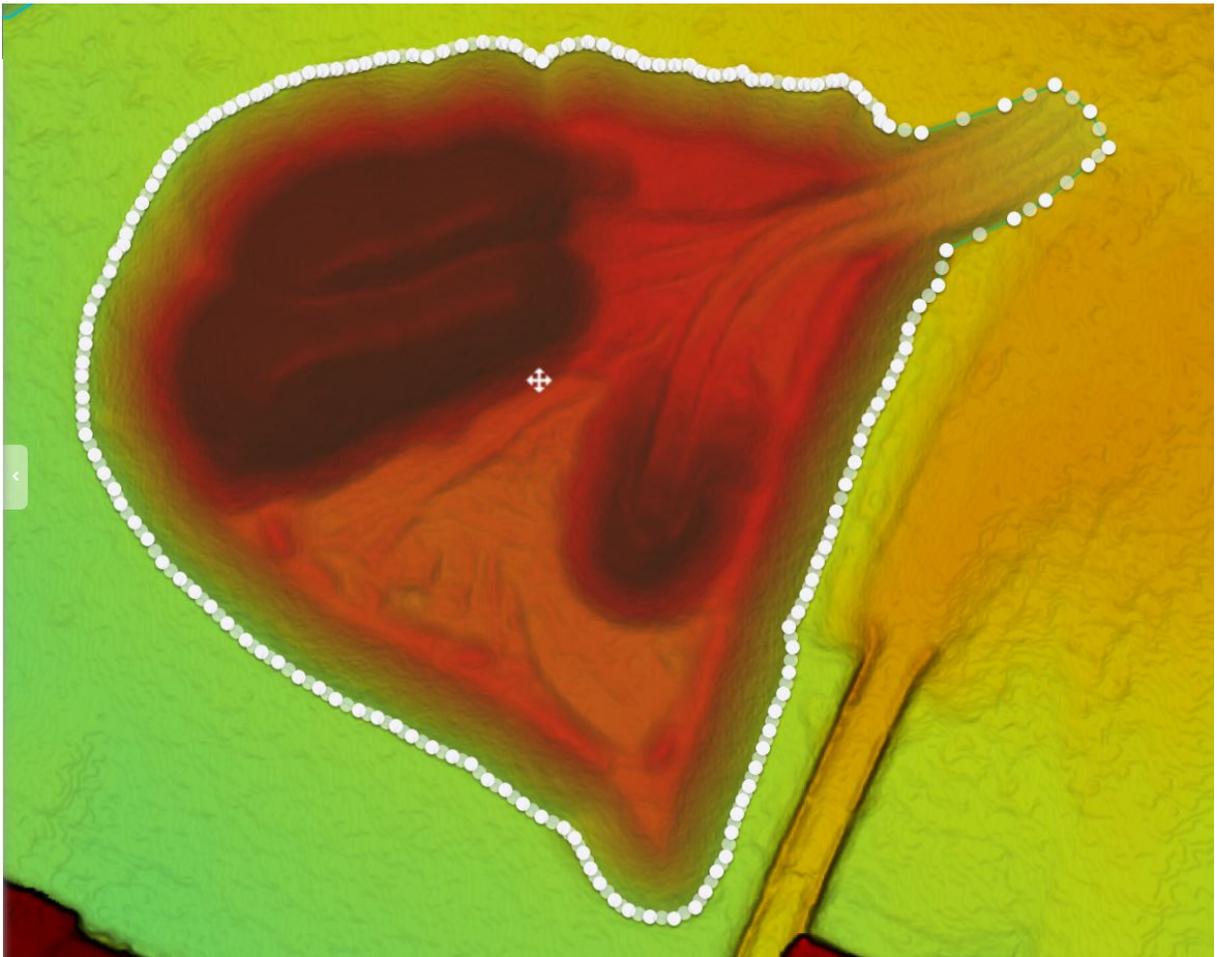
### Mining & Gravel Pit Volume Measurements

Operating a mine, rock quarry or gravel pit, can be a very time consuming job. Keeping track of how much material you have on hand for your customers, and making sure that you are accounting for every ton that gets shipped out, shouldn't have to be as time consuming as it has been. That is where WhirlyBird Aerial Services can help, by quickly and accurately providing the owner with current data on their mine without it taking as long to get that information.

Until recently, a mining company would have to hire surveyors to come out and take numerous measurements of every pile of material on the property, which can be a very time consuming and expensive task. Now, due to the advancements in drone technology and specialized software, mining operations can now get their volume calculation results even faster! Saving the company thousands of dollars, a year. Depending on the size of the mine, the mapping portion could take a week or more to finish. Now it can be accomplished in hours. Using existing Ground Control Points, a mine can achieve the greatest accuracy by using surveyors to take specific measurements at the top and bottom of the piles, and then letting the drone do the rest. We can fly over large areas, taking numerous photos of the necessary areas in a short amount of time. When finished, we take our information and combine it with the GCPs, when available, and the newly acquired measurements from the surveyors and put all that information into our specialized software. The result is extremely accurate volumetric measurements that will tell the mine operator how many cubic yards of material are in each pile. Whether you take these measurements quarterly, every six months, or once a year – WhirlyBird Aerial Services can accommodate your needs. Give us a call today at 512-560-2650, to find out how we can help.

## Here are some examples of our work.

In the photos below, you can see how the stockpile measurements are calculated. In this first photo, we start off using the Elevation mode where it can give us a much better view of where the actual lowest points of the piles are. We then carefully draw a line around the base of the pile and then the measurements are quickly figured out.



**Elevation Mode**

Once we have finished with the Elevation mode, we switch back over to the 2D mode, where we can make some other fine-tuned adjustments. Then we can look at our various measurements...Area, Cut, Fill and Volume in Cubic Yards.



**2D Mode**

Once all the calculations are done for each stockpile being measured, we can give the owners a full-sized view of the mining area with the measurements for each stockpile shown. This photo will be a more standard sized photo, but we can also provide a very large geo-tif file that could be blown up as large as needed to provide an historical document that could also be used for future planning and development purposes.



**Geo-tif Overview with Measurements**

## Multiple Mapping Benefits!

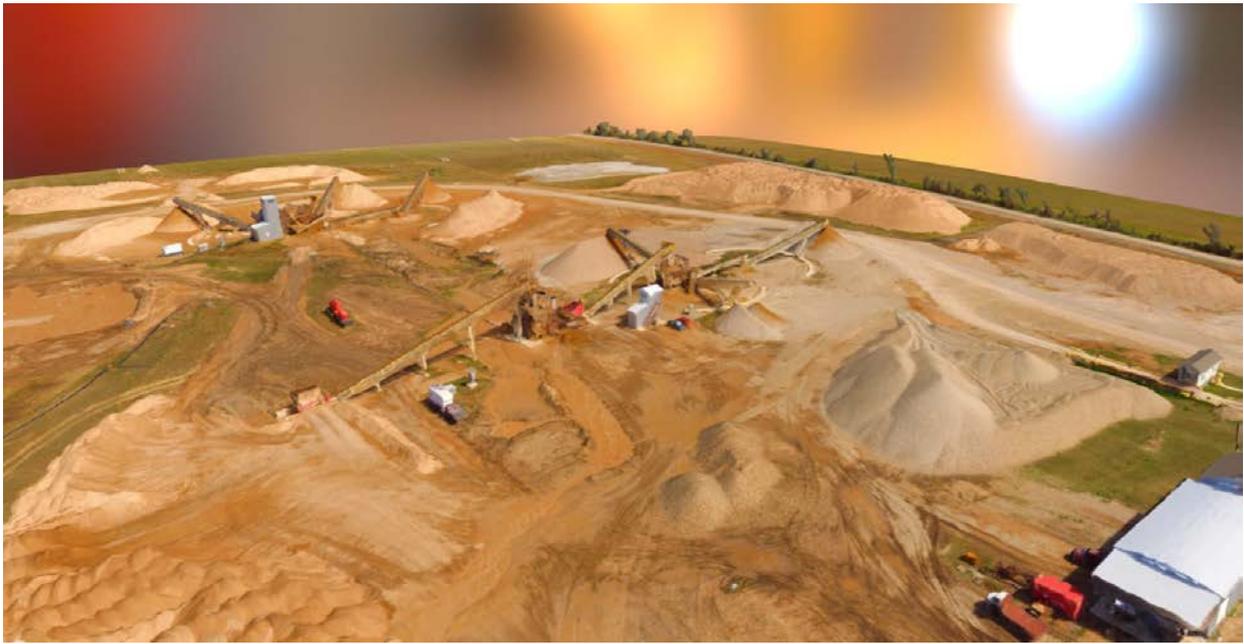
This photo represents a hi-res photo of an area approximately 126 acres in size. It is made up of almost 800 photographs that were then stitched together. The property owner asked us to do this for historical context of their property, and we'll repeat this on an annual basis so they can keep track of how much wider their footprint is where they were digging from year to year.



**2D Map For Historical Purposes & Planning**

## 3D Mapping

Another benefit of this process is being able to make a moveable 3D map of the property. This also helps when measuring stockpiles because it gives the viewer a much better idea of how tall some of the piles are, where their bases are, etc. And it's all included in the cost quoted for your location.



See the fully functioning model on our website at  
<http://www.whirlybirdaerialservices.com/3d-models.html>

For more information and a quote for your specific needs, please  
contact WhirlyBird Aerial Services  
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