LP360

Case Study

Southwest Florida Water Management District

Estimate Mature Building Heights to Construct a 3-D Model

The SWFWMD is one of five water management districts in Florida; we serve ~ 5,000,000 people in our 10,000 sq. mile service area. Our four-part mission is to ensure an adequate and safe water supply, provide flood protection, protect natural water systems and provide supportive data collection and analysis efforts.

Al Karlin

Senior Scientist, Southwest Florida Water Management District

"We are convinced that LP360 is a tool we have to use to provide our desired level of analysis services." - Dr. Al Karlin

Southwest Florida Water Management District

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Challenge

Hernando County Florida needed to create a 3-D model of the City of Brooksville and turned to the Southwest Florida Water Management District office for help in getting the estimated building heights.

Solution

Because of LIDAR's 3-dimensional qualities it is the perfect data source to extract building elevation information. This point cloud characteristic plus the building extraction tools in LP360 also serve to provide valuable input for floodplain analysis. SWFWMD solution workflow:

Our original LIDAR data did not have the buildings classified as our specification only required the following classifications;

1	Unclassified
2	Ground
9	Water
11	Wetlands and low confidence areas, as per FEMA
12	Overlap

By using LP360 building filter and extraction tools we easily extracted the information that we needed.

1. We first used LP360 to automatically classify the building rooftops (Class 6). (Figure 1 & 2, *over*)
2. Using LP360 building extractor we constructed the roof polygons with a minimum area of 200 sq. ft.
3. We visually inspected polygons between 200-800 sq. ft. to make

cont.

QCoherent Software
9668 Madison Blvd., Suite 202
Madison, AL 35758

1-256-461-8289
info@LP360.com

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sure that they were buildings rather than small sheds, dirt-floor structures, parked tractor-trailers, flat-topped shrubs, etc.

4. Then we used LP360 to find:
   - The highest roof elevation (maximum Z contained by the roof polygon)
   - The highest ground elevation within 2' of the roof polygon
   - The lowest ground elevation within 2' of the roof polygon (Figure 3)
5. Then we looked at the difference between the highest and lowest ground elevation, and
   - If it is close to 0 (+/- 0.3'; the error in the LiDAR), then we take the average + 0.75' and use that as the finished floor elevation.
   - If the difference is GT 1', we take the highest ground elevation +0.75' and use that as the finished floor elevation.
   - If the difference is really large, we try to determine whether the house is on stilts by looking at the difference between the roof and highest ground elevation. Then we look at the LIDAR data with the LP360 profile tool and look for a deck, balcony, etc. to estimate the floor elevation.

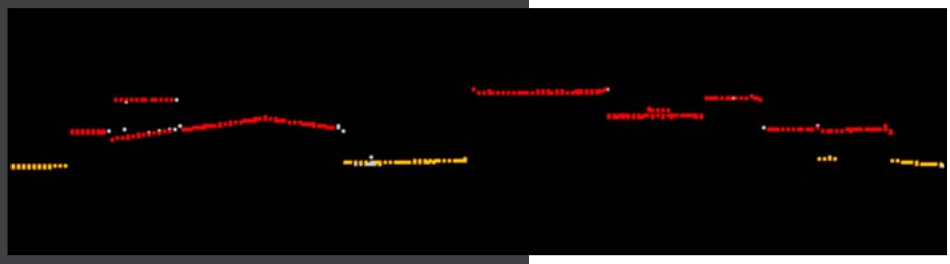

Figure 1 - Classified elevation view (ground (2) and building (6)) displayed in LP360's Profile window

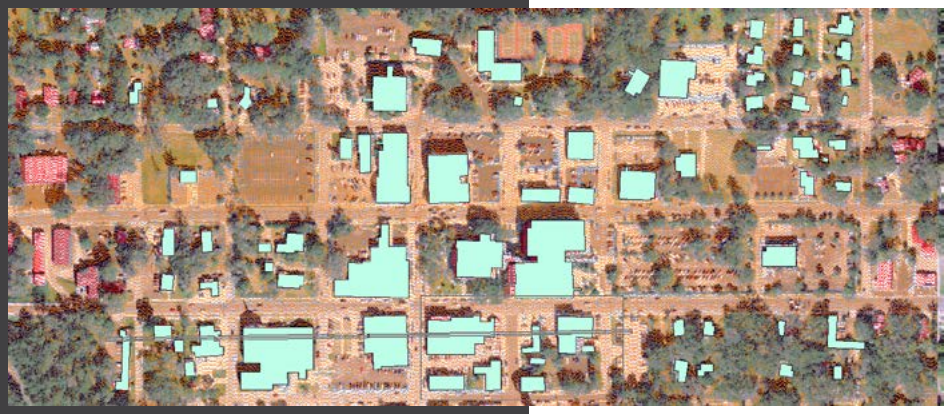

Figure 2 - View of classified and extracted buildings created using LP360's automatic building classification and extractor tool.

In Summary

We found a high correlation between the surveyed finished floor elevation and the average ground elevation around the dripline. With this information we were able to not only estimate mature building heights but we were also able to infer the finished floor heights using LP360's building filter extractor. Using it as the best estimator for finished floor elevation, we can now add another level of detail to our floodplain analysis to determine not only if a property is located in the floodplain, but if the finished floor is in the floodplain as well.

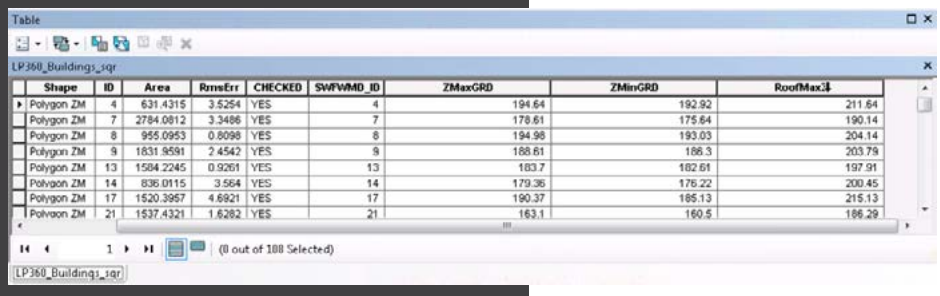

Figure 3 - Table displaying min/max elevation of the ground and building heights.

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