

Stormwater Model Review

Pre and Post Project

Node Comparisons



Abstract

Sarasota County Watershed Management uses a stormwater model and GIS to check for impacts to stormwater run-off in new developments and capital improvement projects. We check the current model data against the proposed changes. If there is an adverse impact upstream or down stream, the model is not accepted. We export output data from the model for the 100 year 24 hour storm event. The data is imported into a Geodatabase. In ArcMap, we join this table to the node layer and display the nodes based on the change in stage max from the model. We can visually determine where possible impacts in stormwater run-off will occur. This also helps when looking for a solution in localized flooding. The engineers can run different scenarios and look at the effects in the whole model.

Background

Sarasota County Watershed Management started creating GIS layers in 1998. Using a stormwater model, field surveys, and AutoCAD, the catchments, floodplain, and nodes were digitized using SWFWMD 1 foot contour aerials NAD27 StatePlane Florida west. Drawings were then converted in AutoCAD to NAD83 StatePlane Florida west FIPS 0902 U.S. Survey feet. ArcInfo coverages were made using ArcCad. These coverages are now stored in SDE feature classes. Using the flood protection model input Dbf's we added watershed, basin, subbasin fields to the catchments attribute table. Dissolving the catchments based on the respective fields BASINS, WATERSHED, and SUBBASIN these layers were created. As the layers were being created and attributes populated watershed management realized what a powerful tool GIS would be for model review.

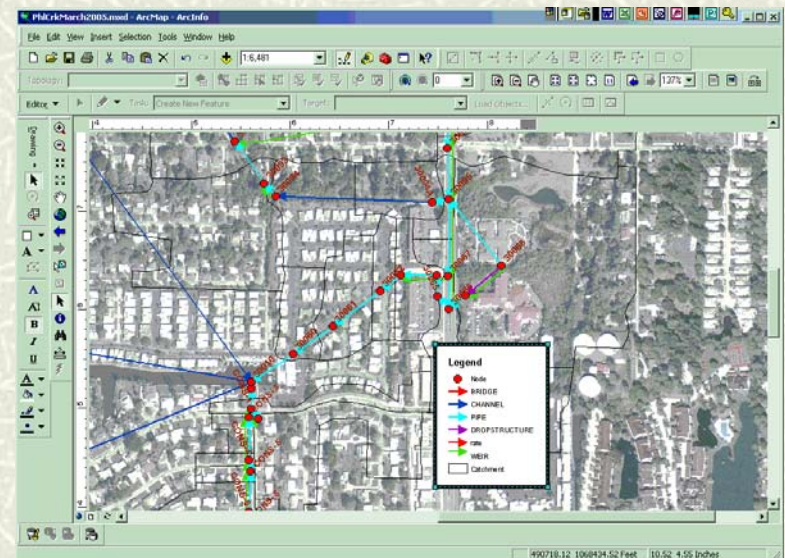
One of our objectives is to streamline the model review process. Allowing the engineers to see the big picture quicker and more accurately.

Finding Changes

The max stage used to be compared using spreadsheets. Looking for stage increases or stage decreases could be time consuming.

	A	B	C	D	E	F	G
1					Diff		
2		Pre		Post	ft		
18	10022	13.423	10022	13.423	0		
19	10024	13.57	10024	13.57	0		
20	10026	13.572	10026	13.572	0		
21	10028	11.192	10028	10.013	-1.179		
22	10030	10.362	10030	8.727	-1.635		
23	10032	10.426	10032	8.812	-1.614		
24	10034	10.499	10034	8.88	-1.619		
25	10038	11.056	10038	10.244	-0.812		
26	10040	11.471	10040	10.619	-0.852		
27	10042	12.803	10042	12.801	-0.002		
28	10044	13.354	10044	13.353	-0.001		
29	10046	10.503	10046	9.794	-0.709		
30	10048	12.559	10048	12.559	0		
31	10050	13.472	10050	13.472	0		
32	10101	2.642	10101	2.562	-0.08		
33	10102	4.29	10102	3.555	-0.735		
34	10103	5.397	10103	5.315	-0.082		
35	10104	4.685	10104	3.81	-0.875		
36	10105	5.702	10105	5.702	0		
37	10106	4.869	10106	3.967	-0.902		
38	10107	13.035	10107	13.035	0		
39	10108	4.874	10108	3.971	-0.903		
40	10109	13.012	10109	13.012	0		
41	10110	4.974	10110	4.064	-0.91		
42	10111	13.191	10111	13.191	0		
43	10112	4.974	10112	5.148	0.174		
44	10113	8.441	10113	7.742	-0.699		
45	10114	14.177	10114	14.51	0.333		
46	10115	9.471	10115	9.471	0		
47	10117	12.602	10117	12.659	0.057		
48	101171	9.696	101171	9.696	0		
49	101172	9.501	101172	9.501	0		
50	10119	13.609	10119	13.624	0.015		
51	10121	13.65	10121	13.66	0.01		

Finding the affected nodes on a map is very difficult also.



Process

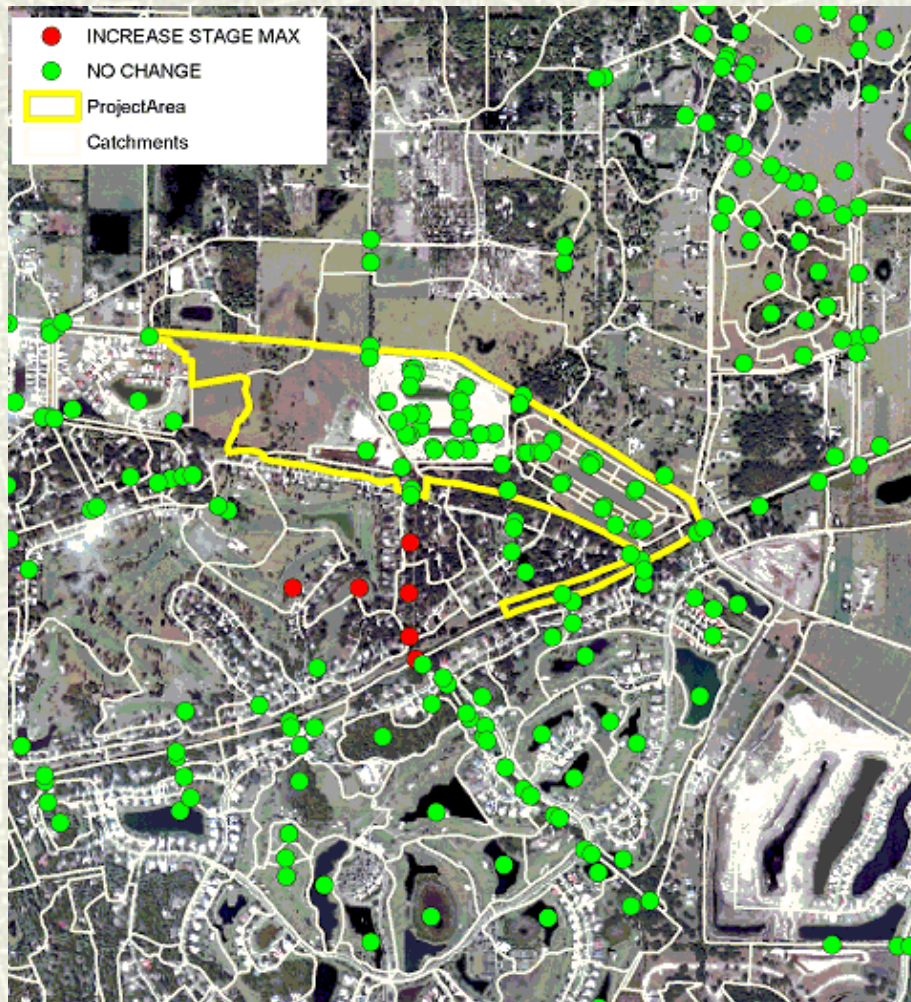
Sarasota County Watershed Management uses a stormwater model; the model simulations are based on the 100 year 24 hour storm event, and ArcGIS desktop 9.0 to check for impacts to Stormwater run-off in new developments. The node comparison looks at the elevation at which flooding will occur at that particular node (stage max).

The node output stage max dbf from the existing model and the proposed model are exported.

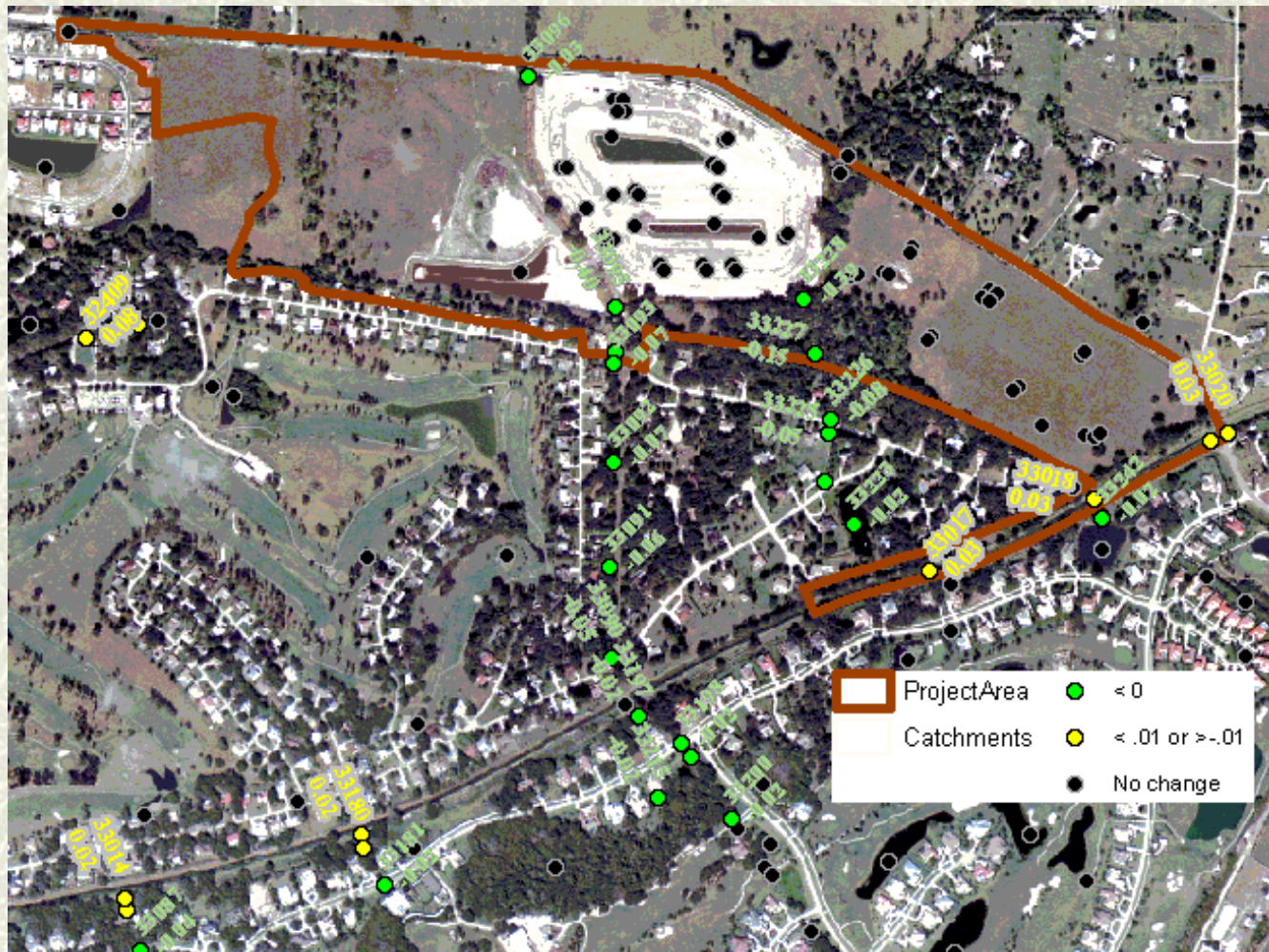
A personal Geodatabase is created in ArcCatalog. The stage max Dbf's are imported. Create A project boundary (polygon) feature classes in the Geodatabase. Import the affected nodes based on the model input Nodemaster dbf.

Comparison should include a column indicating the difference between existing model, and the proposed model. This field is added to the node attribute table. The tables can be joined to the node layer. Once the feature is joined to the tables you calculate the new *difference* field by subtracting the post *StageMax* from the Existing *StageMax*. The changes in flood elevations can be displayed on the map. In addition to a graphic representation, the differences in stages can be labeled on the map.

Node Stage Comparison



Node Stage Comparison



Conclusion

All proposed projects must show that it will not result in adverse off-site impacts. With GIS you can quickly identify the areas where the stage max has increased or decreased. Using ArcMap to locate the changes. The results can be verified based on the Stormwater plans supplied by the consultant. The model can be accepted faster.

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