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Modeling Urban Hydrology in LA County using LARIAC4 LiDAR data

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Background

2012- NPDES(National Pollutant Discharge Elimination System) MS4 permit

- Required LACFCD to map/keep track catchments (watershed) areas of all major outfalls that they maintain.
- Paper maps
- Labor intensive
- Time consuming

New Method:

- Use LARIAC4 LiDAR data
- Automated delineation through LP360 & Esri ArcGIS Pro
- Reduce time

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Goals

Create streamlines for all of LA County

- Two methods
- Derive catchment area from streamlines.

Integrate Storm Drain Network with Surface Flow data

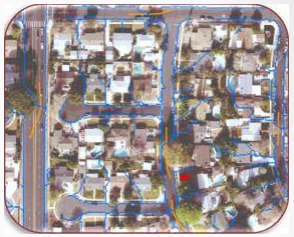
- Identify necessary data
- Create connection between both datasets
- Identify broken connections

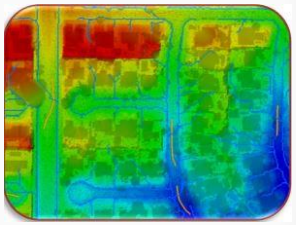
Create Trace Network

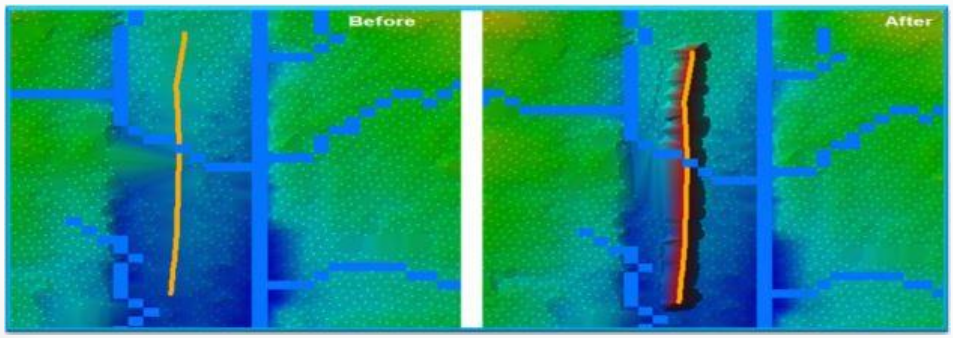
- To visualize and analyze the surface flow and underground data.

LP360 Method

- LARIAC4 Lidar point cloud data to create DEM
- Hydrology toolset to create surface flow, flow accumulation, flow direction, etc.
- Data affected by cars, trees, etc...
- Used LP360 tool to create a more accurate surface flow







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Block_76

LP360

- There are around 100 sinks to verify
- Takes time to fill or reclass the sinks.

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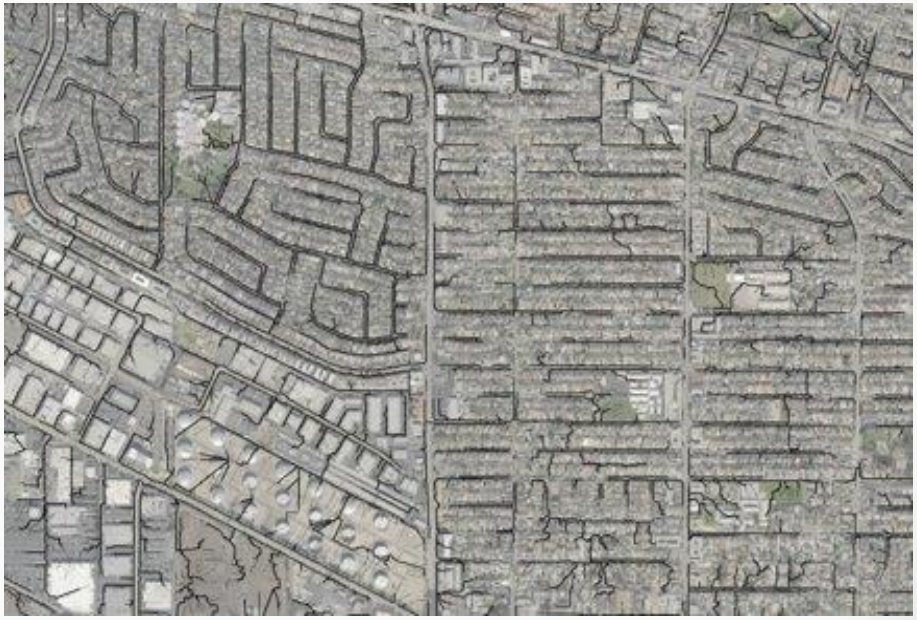
Derive Continuous Flow Method

Derive streamlines 2000 threshold

LP360

DCF



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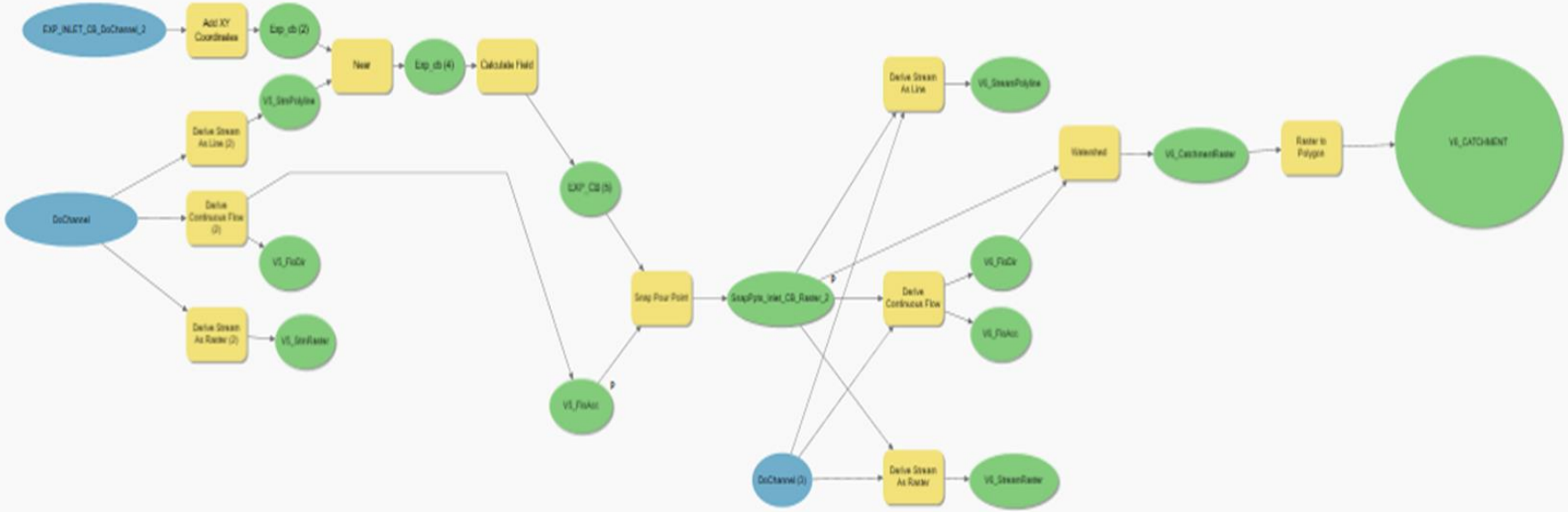
Model Builder for Stream and Catchment Area (DCF Method)



- **LP360 to ArcGIS Pro 2.9+**
- **Derive Continuous Flow Method (DCF)**

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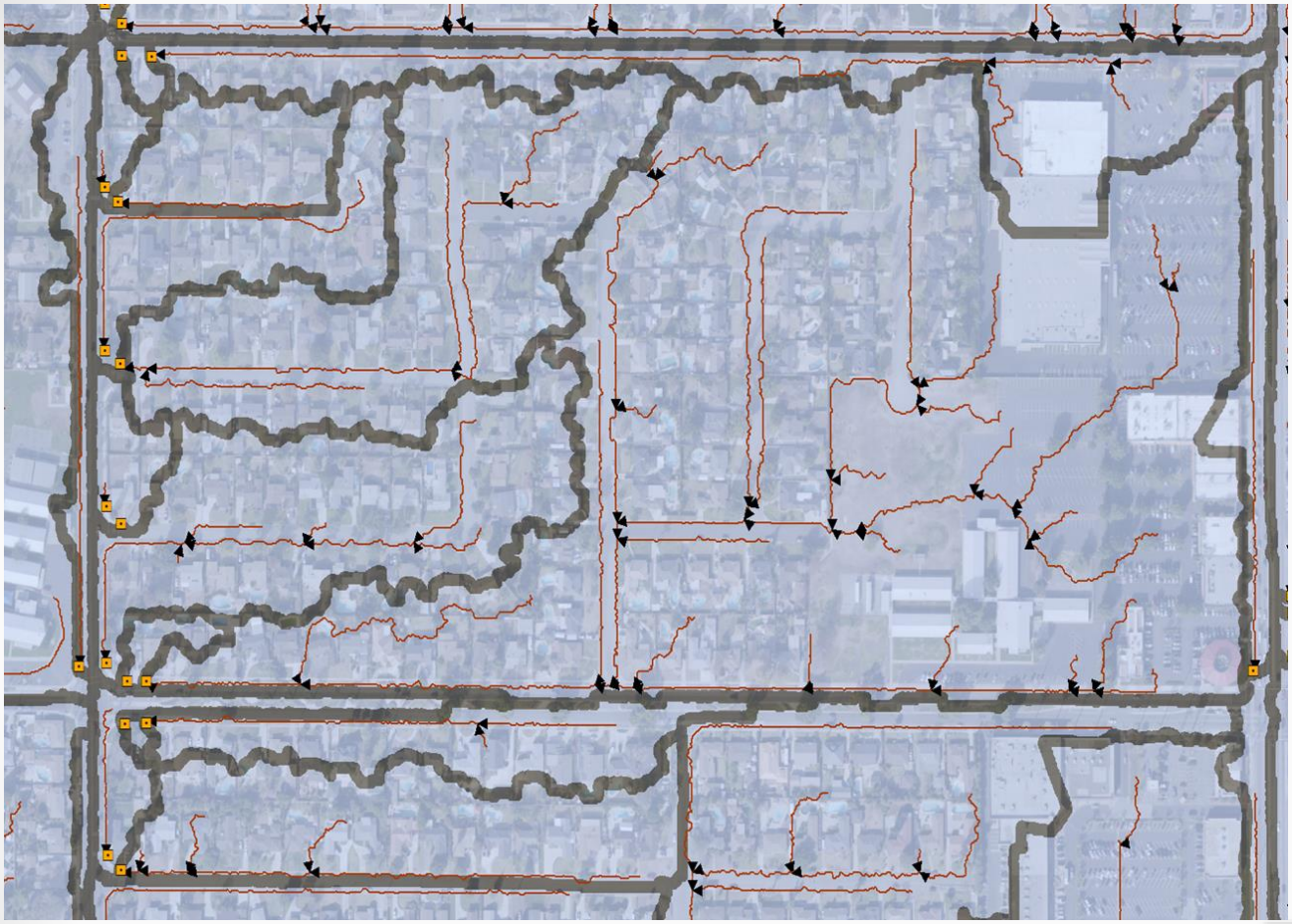
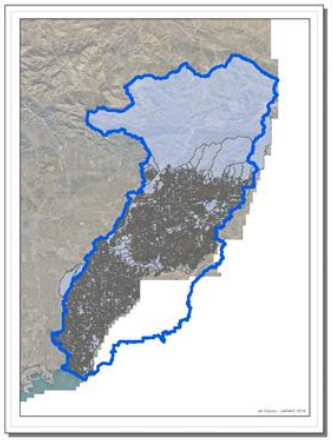
DCF Results





- Surface flow
- Catchment Area
- Catch Basin

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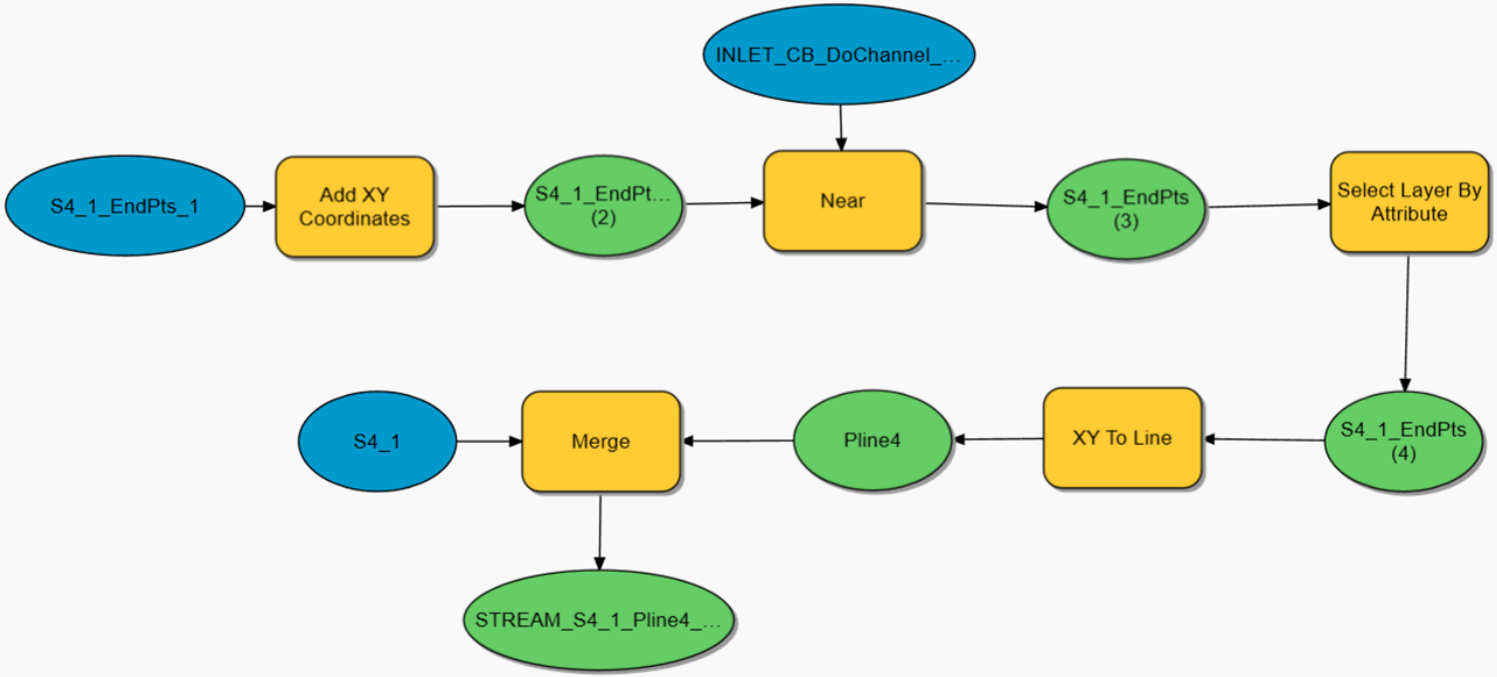
Model Builder for Pseudo Line from Stream to Catch Basin



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Pseudoline Results

- Surface flow
- Catchment Area
- Catch Basin
- Pseudoline

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Integrate Surface flow with SDN

- Surface flow
- Catchment Area
- Catch Basin
- Storm Drain Network

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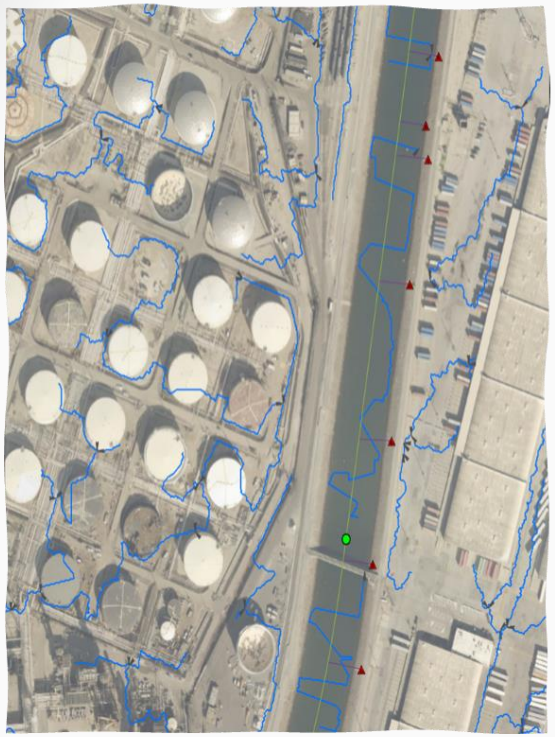
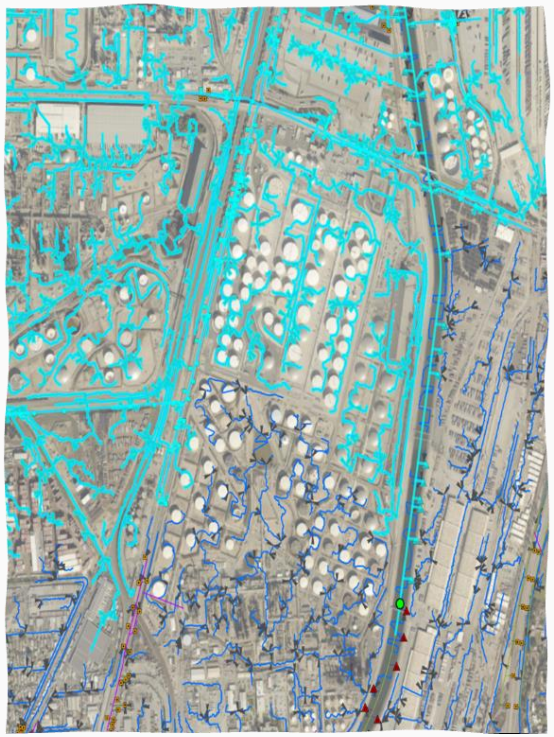
Trace Network

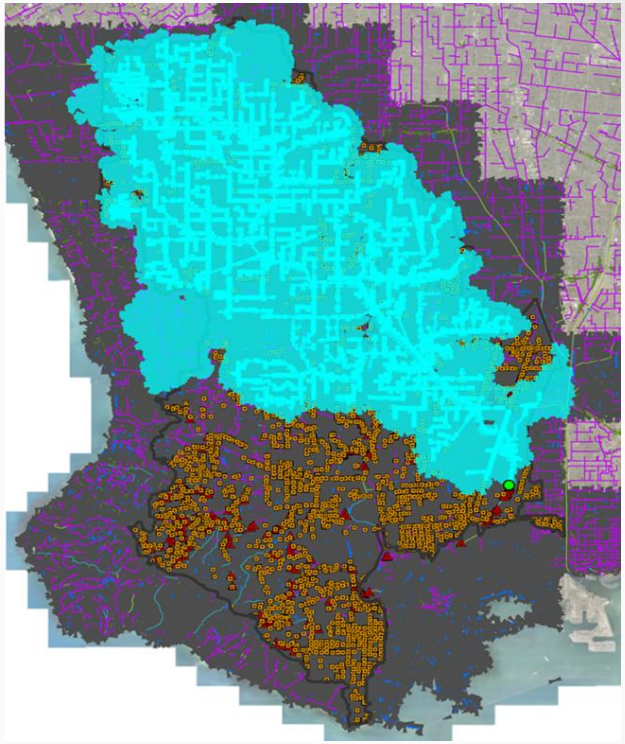
Create Trace Network Dataset

- Inlet
- MS4 Outfall
- Catch Basin
- Culvert
- Embankment
- Force Main
- Gravity Main
- Lateral Line
- Natural Drainage
- Open Channel
- Permitted Connection
- Pseudo Line
- Stream

Trace Network Results







- **To analyze and visualize surface flow and underground data**

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Questions?

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