Connecting people to information through integrated data and maps.

ESRI INTERNATIONAL USER CONFERENCE

JULY 2014

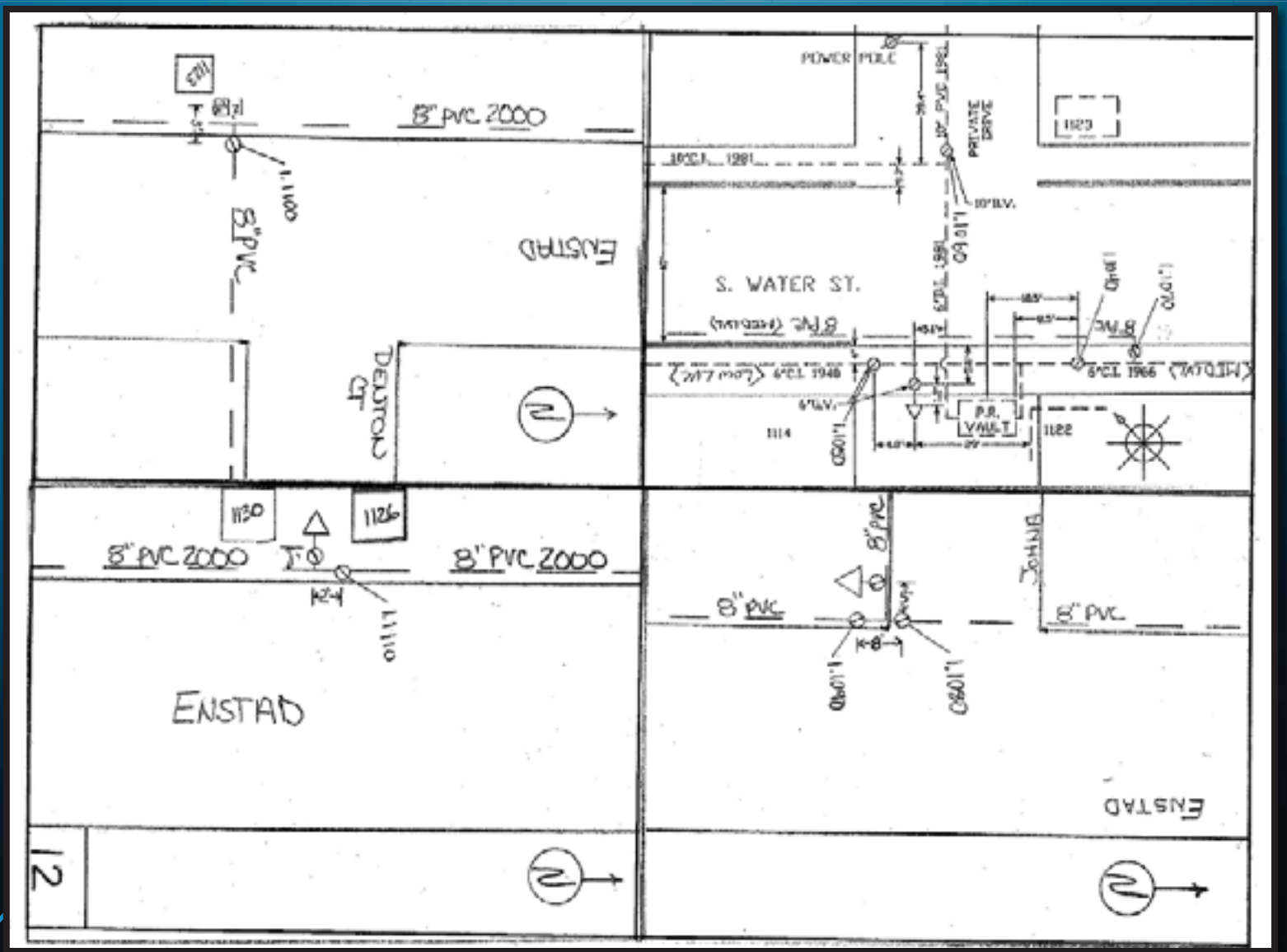
SAN DIEGO, CA

EVALUATE THE SYSTEM

- The Big Meeting:
  - PW Director
  - Superintendent of Water & Streets
  - Superintendent of Sewer & Stormwater
  - Engineering Division: Civil, Environmental & GIS
- Graded each GIS feature:
  - All points, lines, and polygons assigned
    - Confidence levels: High, Medium, Low
    - Precision/Accuracy: aerial photo, GPS, or survey

<u>Goal</u> - How “good” is our GIS

HAND DRAWINGS FROM PW DIRECTOR – BORLAND'S CARDS –



THE PROBLEM

One example:

- February 2011
- McMenamins - Edgefield
- A fire hydrant was hit
- Field crew unable to locate the shut off valve using GIS and as-built drawings
- Spatial data >50 ft off

POSSIBLE SOLUTIONS

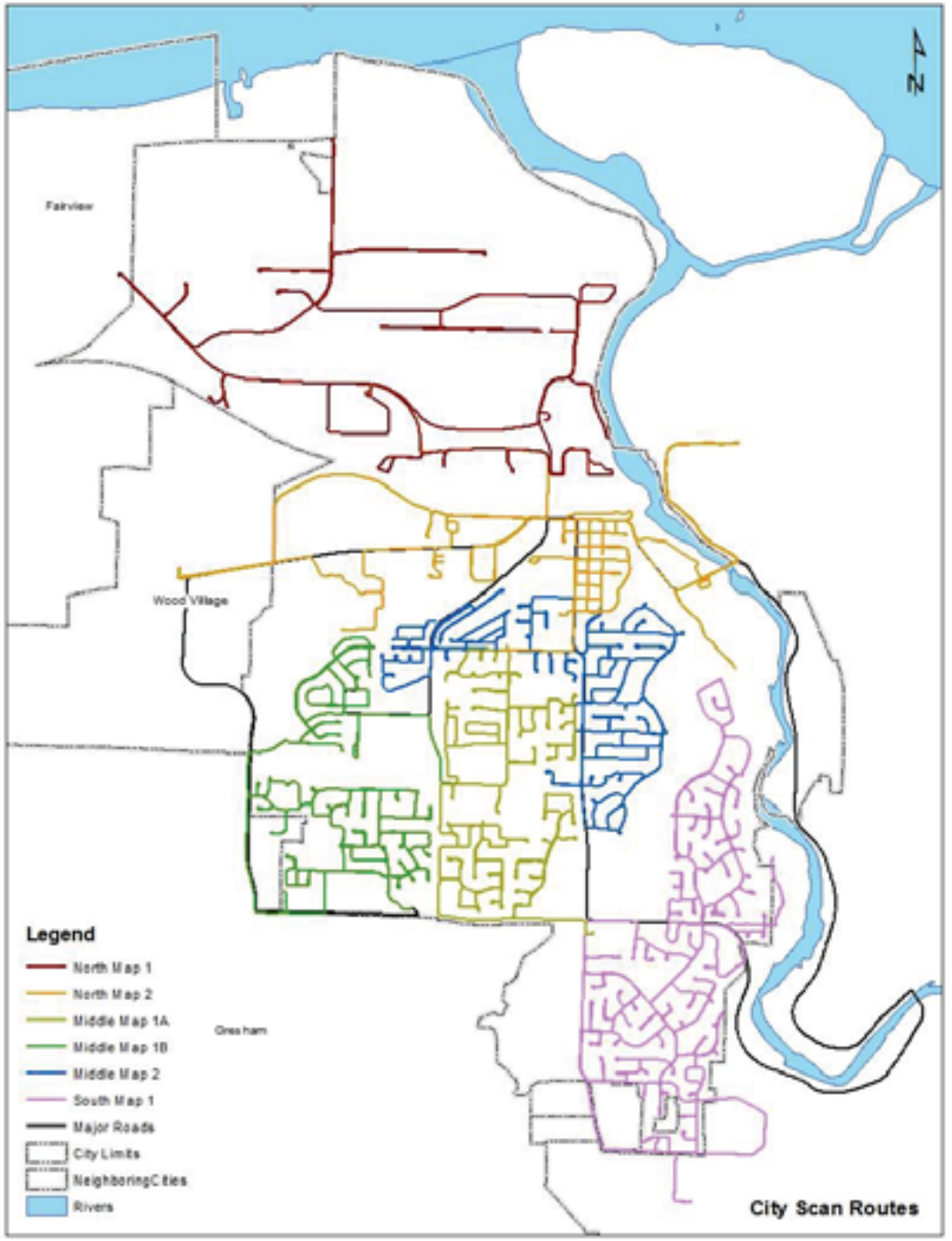
- Tape measure the town
  - Hand drawings from PW Director – example from another city
  - Lots of $, lots of time (years) – too many crew hours
  - Multiple crews – inconsistency
  - Laborious to integrate into GIS
- GPS the city
  - Lots of $, lots of time (years)
  - Many crew hours
- Field Survey every street
  - Requires Request For Proposal (RFP) process
  - Lots of $$$$
  - Limited data capture (only select features)
- 3D Mobile LiDAR Scan
  - < 8 hours
  - Captures everything in site at once:
  - Each point has location, elevation, and measurement information
  - Overnight post processing
  - 4 hours of training the next day, ready to get data into GIS
  - Saved on a single hard drive with backup of raw data files, city owned data
  - Record of the City of Troutdale 2011
  - Easily repeatable in future

CITY OF TROUTDALE'S 3D MOBILE MAPPING PROJECT

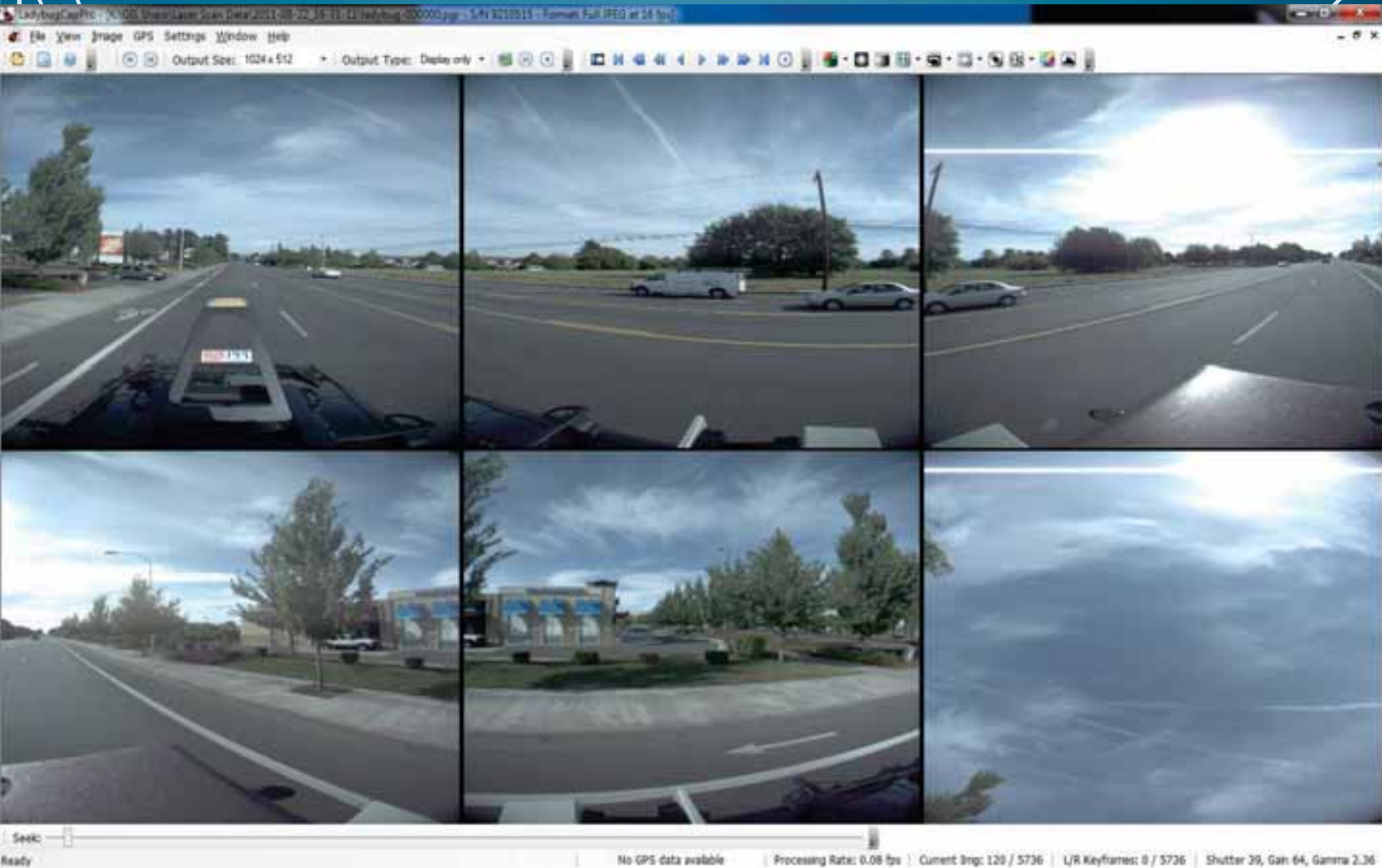
- August 22, 2011
- Rented IP-S2 system from PPI Group, Portland
- Created a map with 6 routes - 1 hour sections
- Set up a base station at a well site - near the center of city
- If we have an extra 30 min. at the end of the day
  - we scan the county streets within the city limits

ROUTE MAP

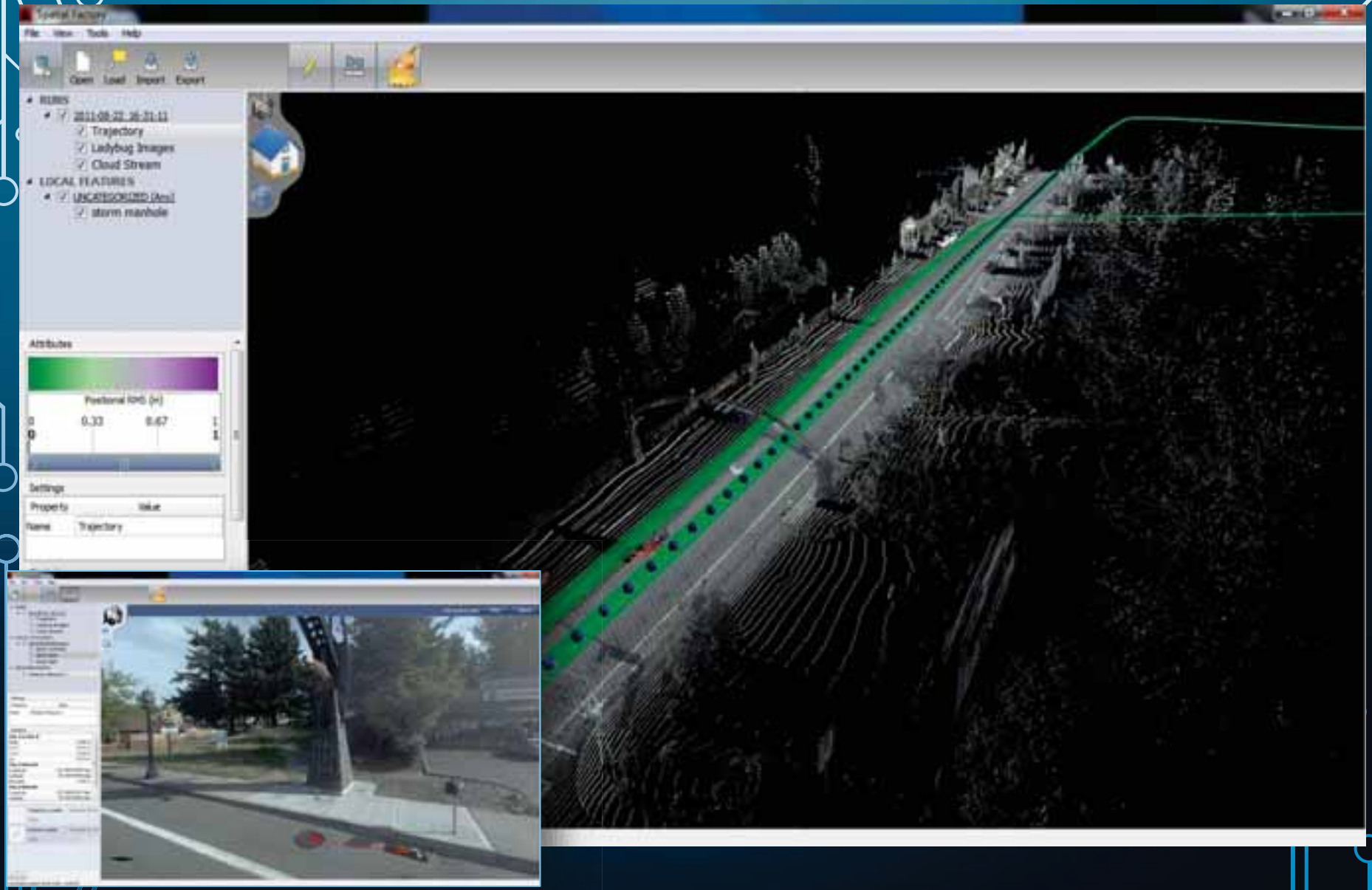
- 6 - 1 hour sections
- Timed by staff
- Reboot points selected
- Transition paths
- North - morning
- South – afternoon
- Trajectory map product



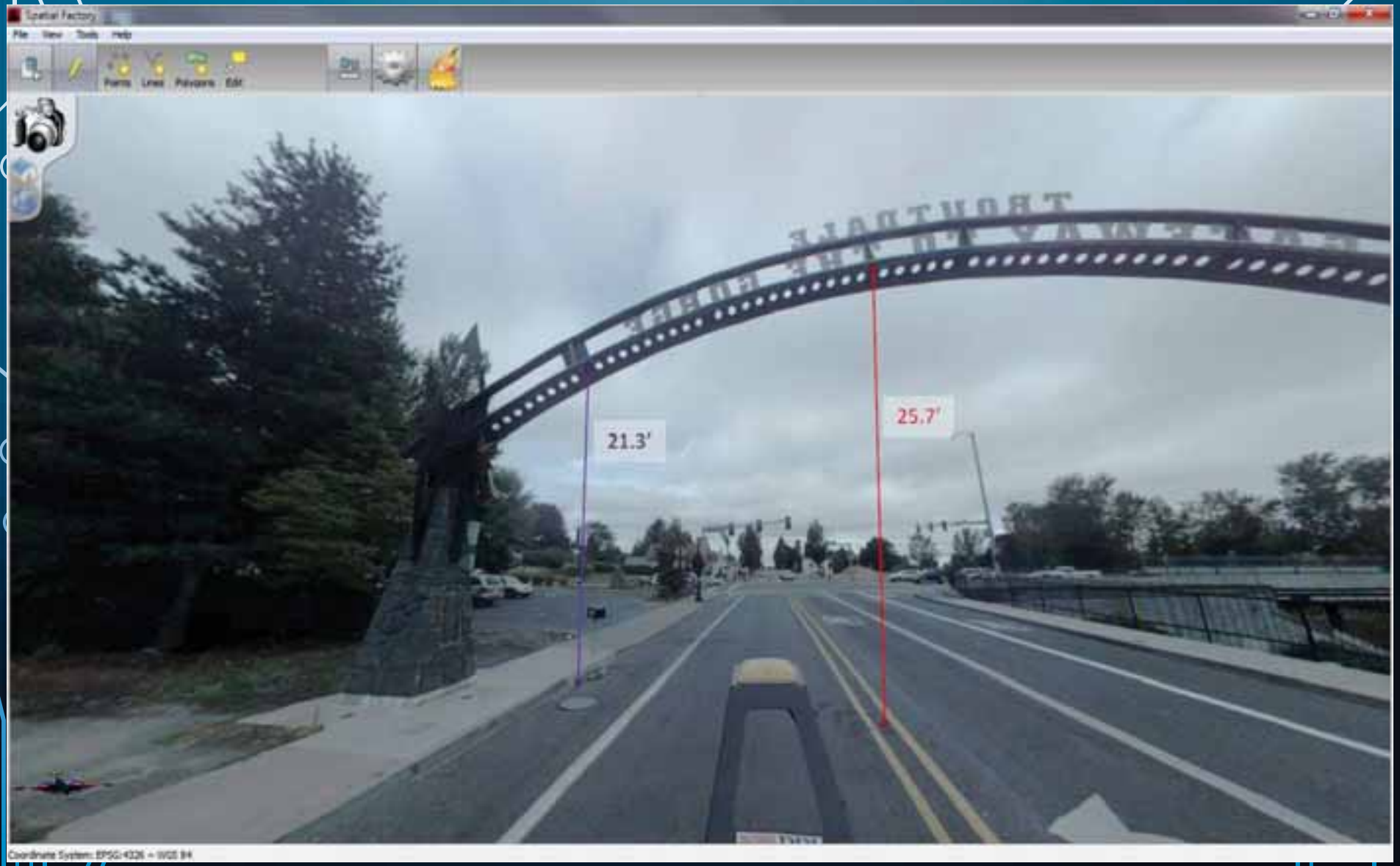
IMAGES CAPTURED EVERY 3 METERS



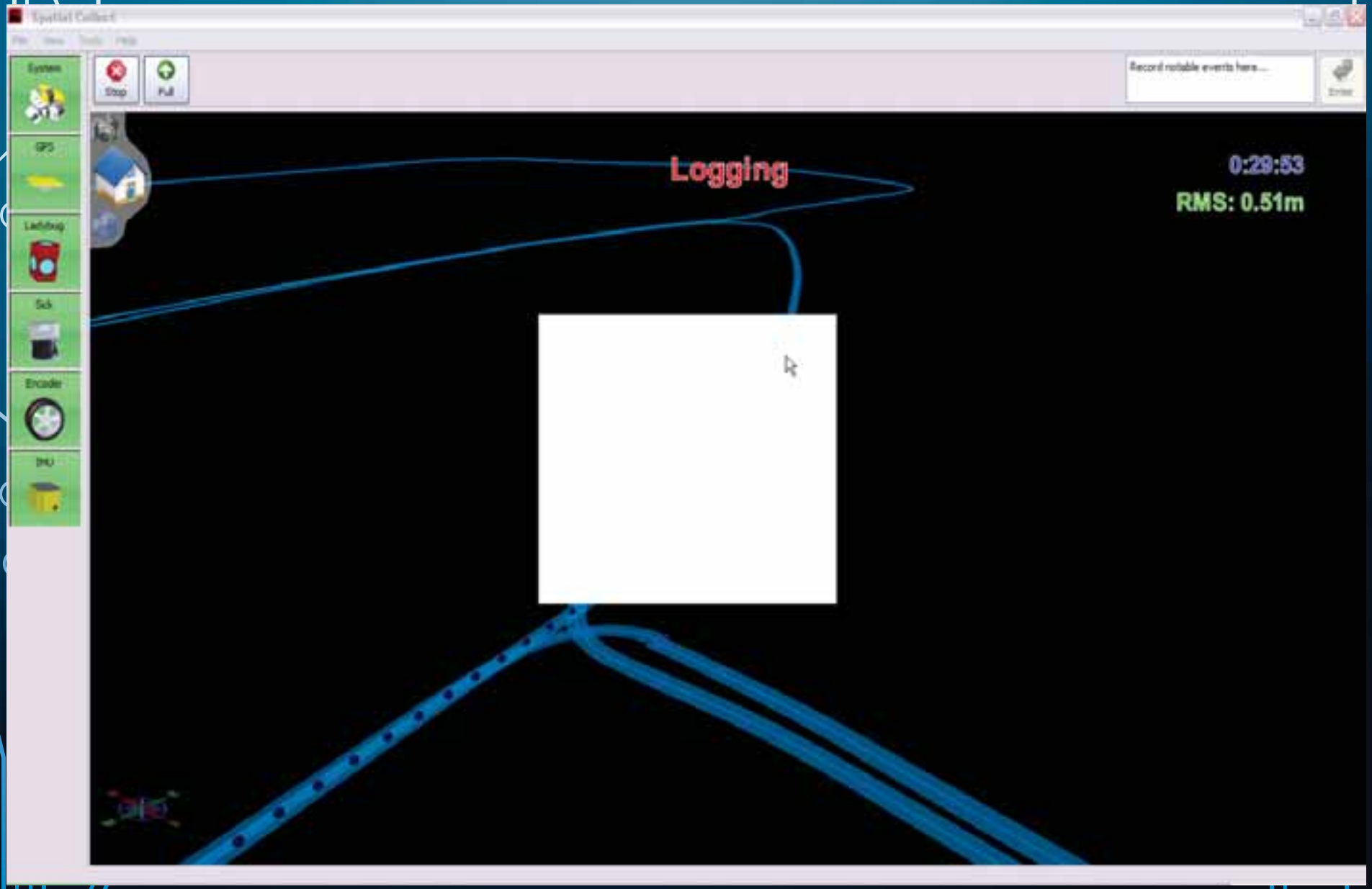
THE POINT CLOUD



EASILY TAKES MEASUREMENTS (+/- 3 CM)



REAL TIME DISPLAY WHILE DRIVING



WHY DID WE CHOOSE TO SCAN ?

Accurately locate all utility surface features and more

- Fire hydrants
- Catch basins
- Storm and sewer manholes (mains)
- Street trees
- Pavement marking
- Street signs
- Water valves (mains)
- Face of curb
- Railroad crossings
- Bridges
- Tunnels
- Utility poles (PGE, Frontier)
- Traffic Signals (Multnomah County)
- and a lot more

Data collection speed and cost

- **1** working day, a total of 8 hours with breaks, ~ 108 miles
- Spent $ 5K for drive time, $ 2K for processing & training, $ 5K software
- Entire city's record fits on a 500 GB ext. hard drive
- City owns the data, we have rights to sell data
- Historical record of the entire city in summer of 2011

2 YEARS LATER … PROGRESS REPORT

- Goal accomplished
- Positive newspaper and web articles
- Extra info gathered simultaneously
- Features gleaned from program:
  - Data transferred to GPS machines
    - attributes updated by field crew during work related activities

Water System
- Fire hydrants: 497
- Water valves: 1551
- Water meters: 4739
- Water mains partially fixed

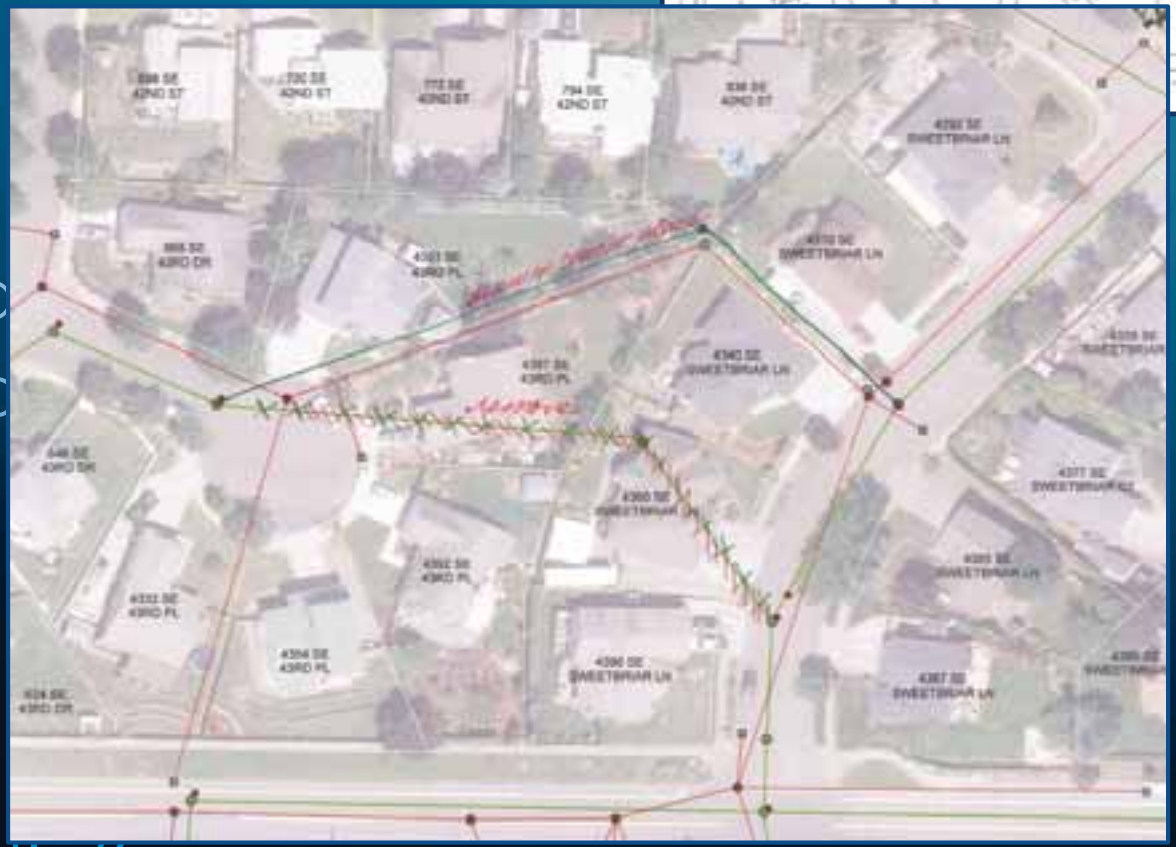
Stormwater System
- Catch basins: 1493 :1562
- Stormwater manholes: 979 : 997
- Drywells:130 :132
- Inlets, culverts, ditch lines
- Stormwater mains fixed (~2 months)

Sewer System
- Sewer manholes: 1180 : 1360
- Sewer cleanouts
- Sewer mains fixed (~15 days)

Streets
- Street signs
- Sidewalks
- Pavement Markings
- Face of curb
- Right of way

COMPARE LOCATIONS – OLD VS. NEW

Engineering as-built



Sewer system fixed

INTEGRATED GIS

Complete Redesign of the City's Enterprise GIS

- New GIS Server: website, GIS data, ArcServer 10.0
- ArcGIS 10.2 for all editors
- All city employees can access data through ArcReader or ArcGIS Online
- Field crews are using Trimble, iPhones & iPad Devices
- Online Interactive Maps & pdfs for the world
- Permitting & Street Trees databases are joined to features
- Building, Planning & Parks Departments layers synced
- Finance Department's utility billing database linked
- FEMA Flood Datasets & digital FIRMs created

- Future Projects:
  - Story maps for the Parks & Rec. Department
  - 3D City Engine integrated maps

We are designing simple and elaborate bridges that connect people to information.