# NMEA Stream Processing with ArcGIS Collector and FME

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TESSELLATIONS

# Project Background

- Small oil spill in the field
- No field staff in immediate area with field data collection experience

- Client's GIS team quickly deployed ArcGIS Online and Collector
- Field staff able to use mobile device to collect spill boundary

# Lessons Learned

- No accuracy information collected
- While survey quality data is not required, client **does** need to be able to say how much confidence they have in the spill boundary outline.
- Want to be able to use outline to calculate size of spill with confidence

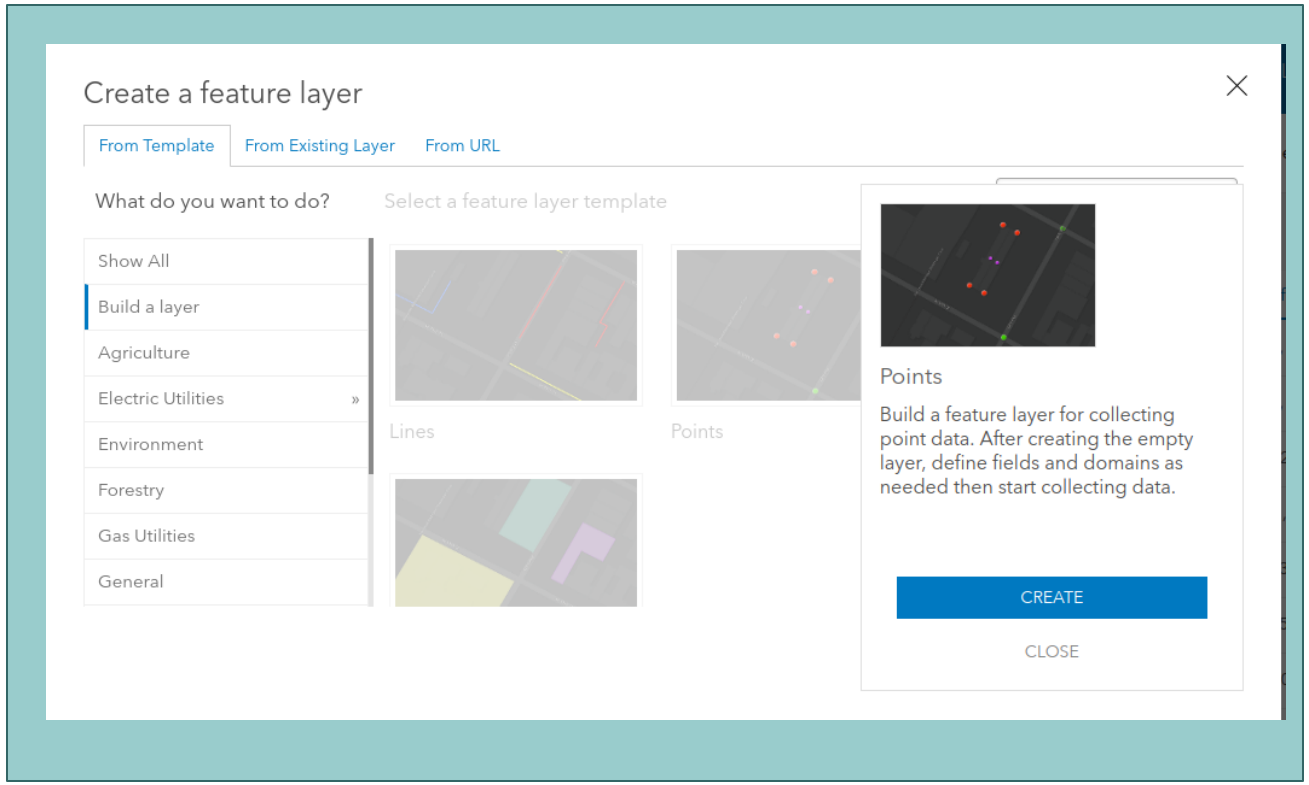
# Designing a Solution

- Criteria:
  - Easily deploy
  - Easy to train field staff
  - Use existing Esri / Client technology
- Result of Analysis
  - Continue to use Collector
  - Send dedicated iPad to field staff
  - Add low-cost GPS Receiver
  - Post-process NMEA stream for accuracy data

# Deciding on a GPS Device

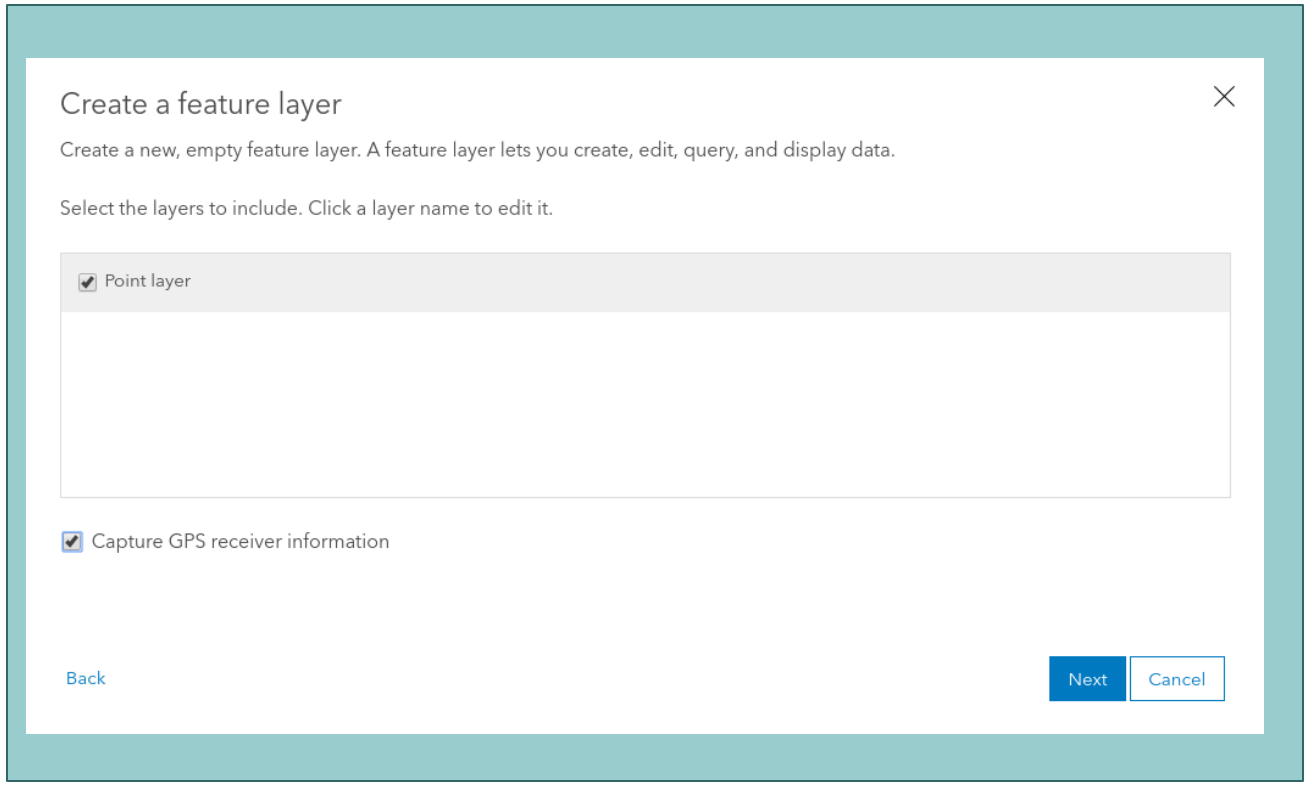

- Bad Elf provided the cheapest solution
- Only GNSS Surveyor model allows access to GPGST
- This full broadcast set of sentences comprise the following messages on the different models.
- Bad Elf GPS Pro: GPGGA, GPRMC, GPGSV, GPGSA,
- Bad Elf GPS Pro+: GPGGA, GPRMC, GPGSV, GLGSV, GNGSA
- Bad Elf GNSS Surveyor: GPGGA, GPRMC, GPGSV, GPGSA, GPGST

# Configuring Map




- Collector (Classic) only provides automatic saving of accuracy information for points
- Conveniently set up a point layer with the accuracy information to quickly confirm a station starting point

# Configure Map



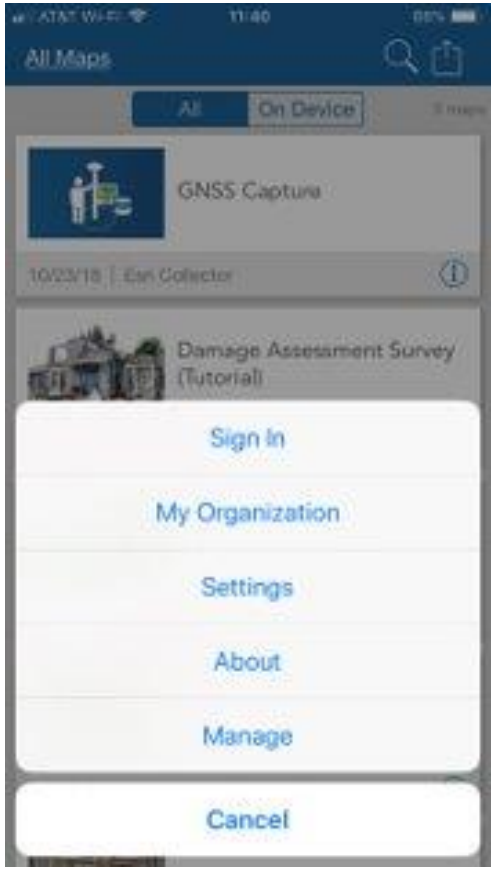

| | | |
|---|---|---|
| OBJECTID | OBJECTID | ObjectID |
| Receiver Name | esrignss_receiver | String |
| Horizontal Accuracy (m) | esrignss_h_rms | Double |
| Vertical Accuracy (m) | esrignss_v_rms | Double |
| Latitude | esrignss_latitude | Double |
| Longitude | esrignss_longitude | Double |
| Altitude | esrignss_altitude | Double |
| PDOP | esrignss_pdop | Double |
| HDOP | esrignss_hdop | Double |
| VDOP | esrignss_vdop | Double |
| Fix Type | esrignss_fixtype | Small Integer |
| Correction Age | esrignss_correctionage | Double |
| Station ID | esrignss_stationid | Small Integer |
| Number of Satellites | esrignss_numsats | Small Integer |

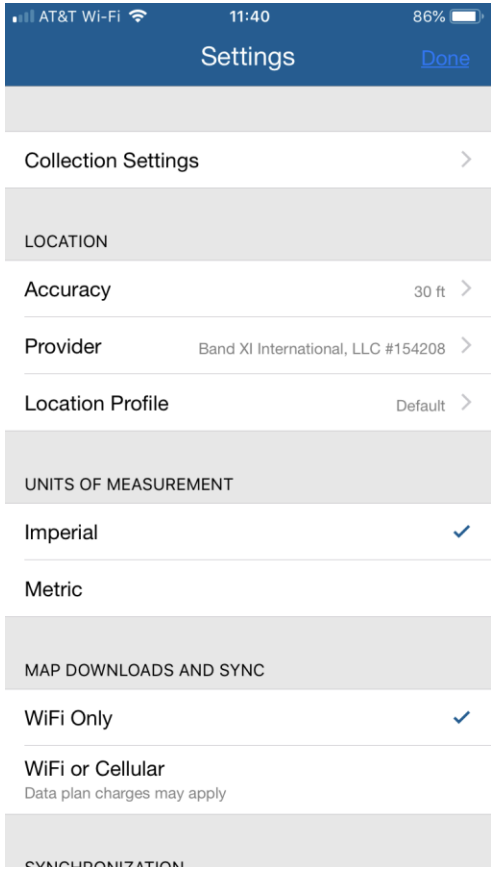
# Configure Map

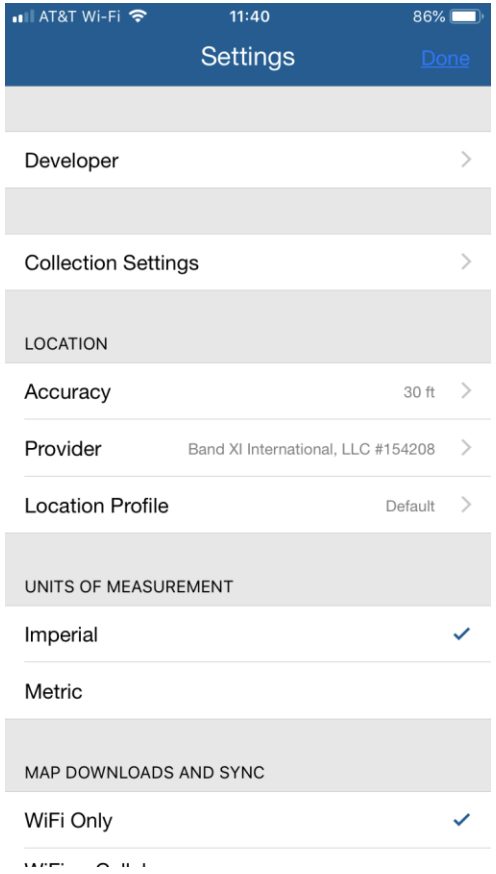
- Create line for collecting actual spill boundary or other boundary features
- Really want the accuracy information along the path of collection.
- Lines do not have a method for saving the accuracy information from the GPS device directly in Collector
- Did not want to build a custom application
- Collector does let us save the raw NMEA stream, which we can post-process

# Configure Collector

- Access Settings
- Turn on Developer mode

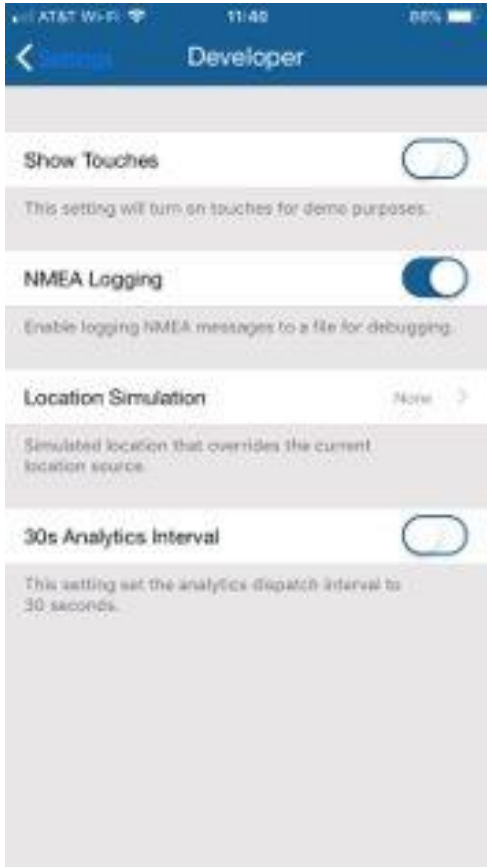


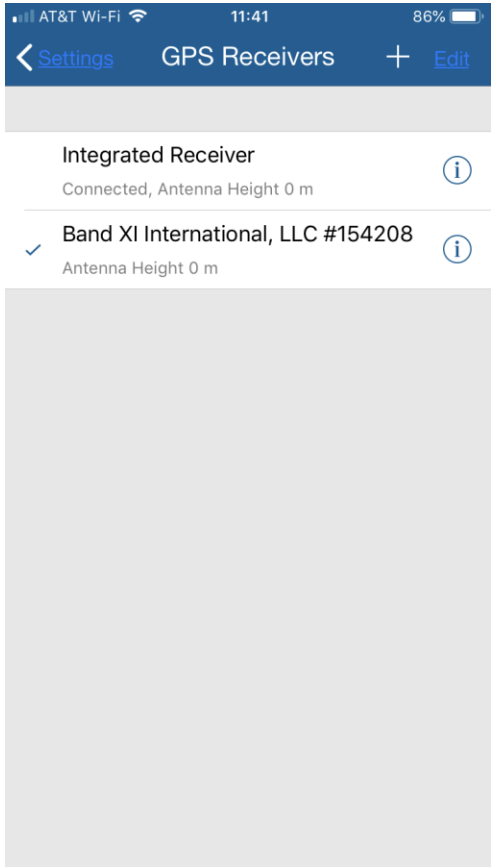



# Configure Collector

- Turn on NMEA Streaming
- Connect Bad Elf GPS Device



# Collect / Capture Data

- Collect data in the field.
- Lines and survey points will automatically update to your AGOL account based on the map settings
- The NMEA stream will save to a log file on the device
- Back at the office, we have the staff use iTunes to download the log file from the iPad

# Configure FME

- To process NMEA streams in FME, install GPSBabel
- https://www.safe.com/integrate/nmea-gps/
- https://www.gpsbabel.org/

# NMEA Stream - log file example

========== Starting NMEA Logging [2018-10-16 20:49:58 +0000] ==========

$GPRMC,204958.00,A,3009.59339,N,09527.38752,W,2.454,244.58,161018,,,A*74

$GPGGA,204958.00,3009.59339,N,09527.38752,W,1,05,2.82,88.8,M,-24.9,M,,*56

$GPGSA,A,3,21,20,10,32,27,,,,,,,,6.73,2.82,6.11*0A

$GPGSV,4,1,14,04,23,262,28,08,10,310,,10,51,330,30,14,28,235,27*73

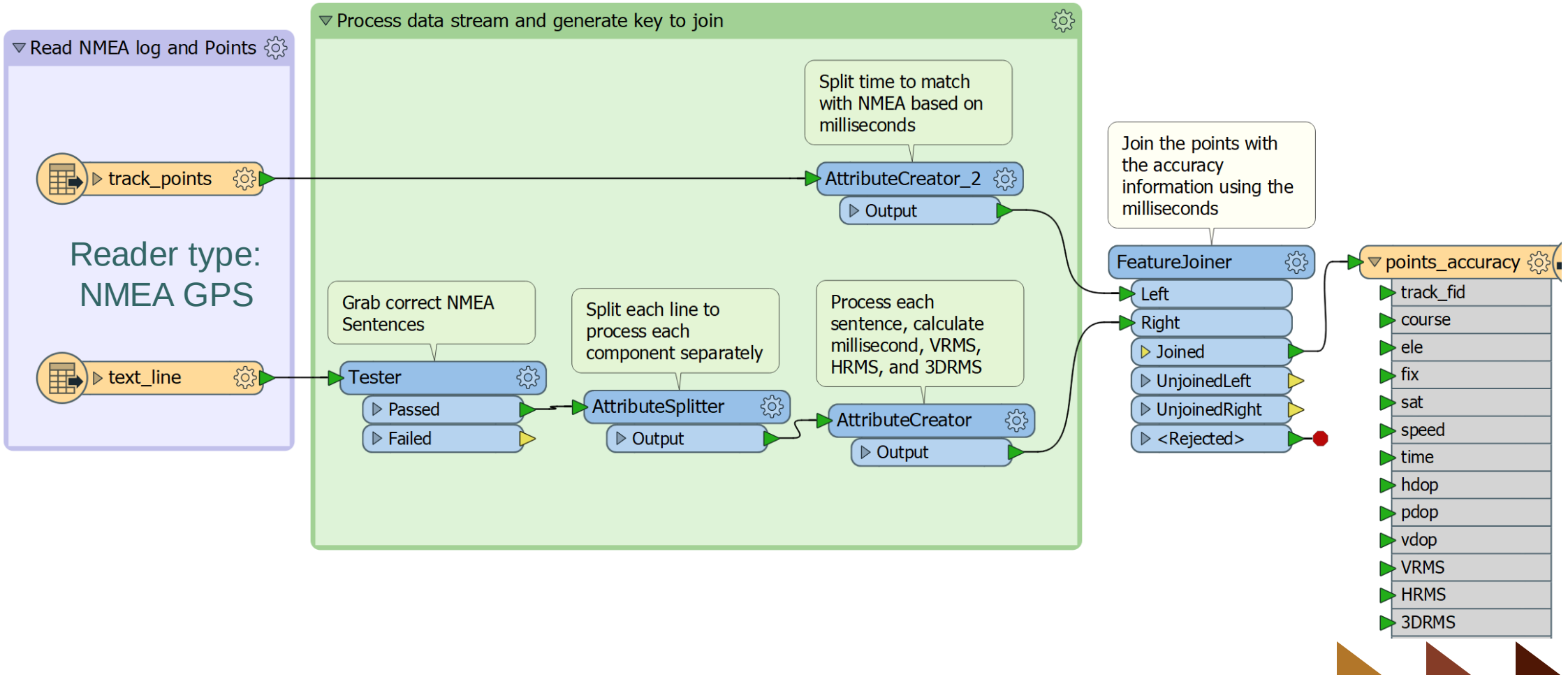
$GPGSV,4,2,14,15,17,049,,20,62,023,21,21,65,159,35,24,37,066,*78

$GPGSV,4,3,14,27,24,282,33,32,48,248,40,44,48,218,43,46,39,233,*7D

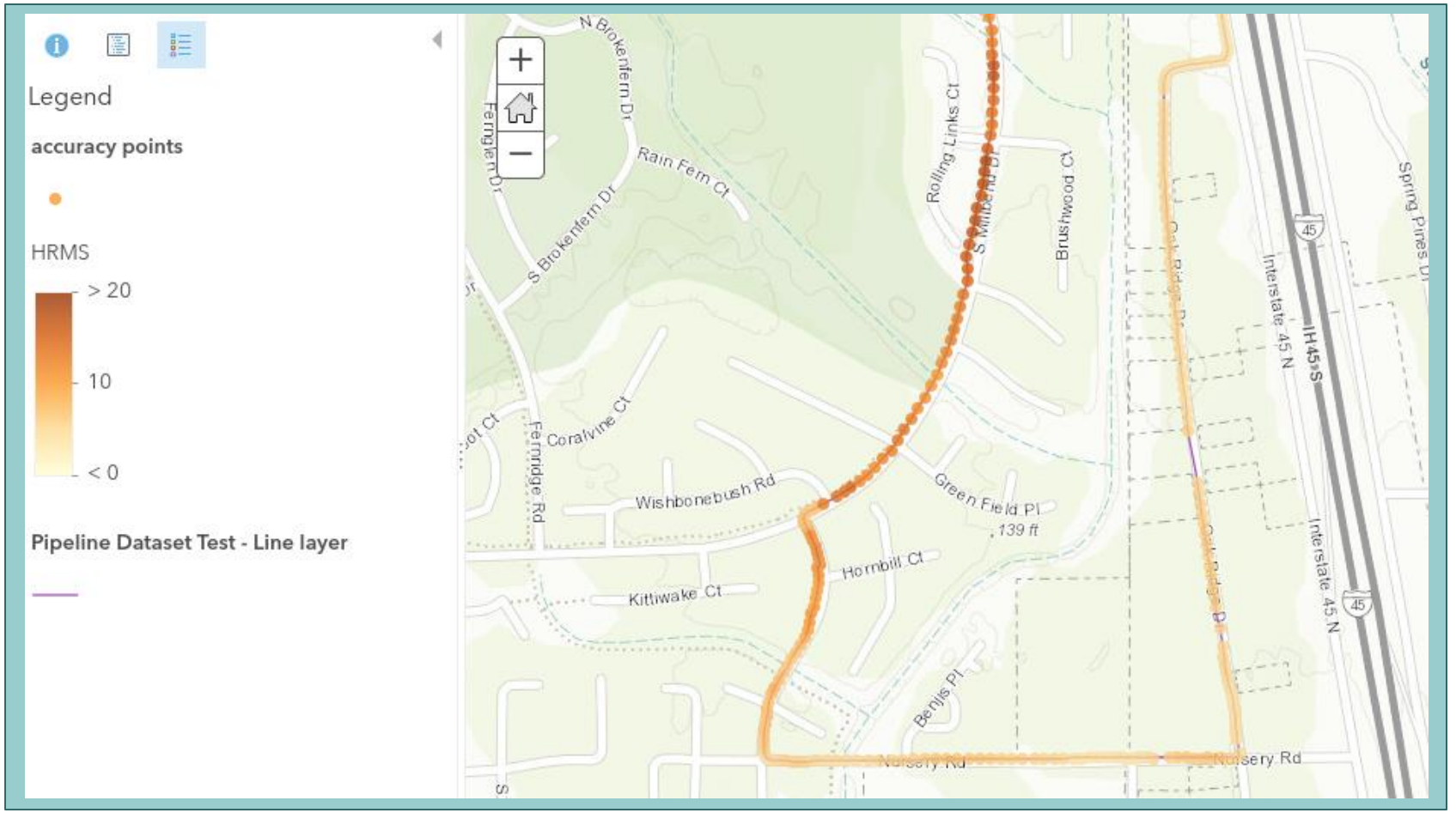
$GPGSV,4,4,14,48,36,237,,51,53,203,37*74

$GPGST,204958.50,34,,,,6.7,6.6,28*72

# FME Workbench



# Final Webmap



# Image Links and Contact

- Photo 1 by **Pixabay** from **Pexels**
- Photo 2 by **Ingo Joseph** from **Pexels**
- Photo by **Hasan Albari** from **Pexels**
- Full list of supported devices:
- https://doc.arcgis.com/en/collector-classic/ios/create-maps/gps-receiver-support.htm

- https://bad-elf.com/collections/bluetooth-gps/products/be-gps-3300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