

Field Survey Planning in Remote Areas Using Imagery and Route Analysis

2015 ESRI European Petroleum User Group

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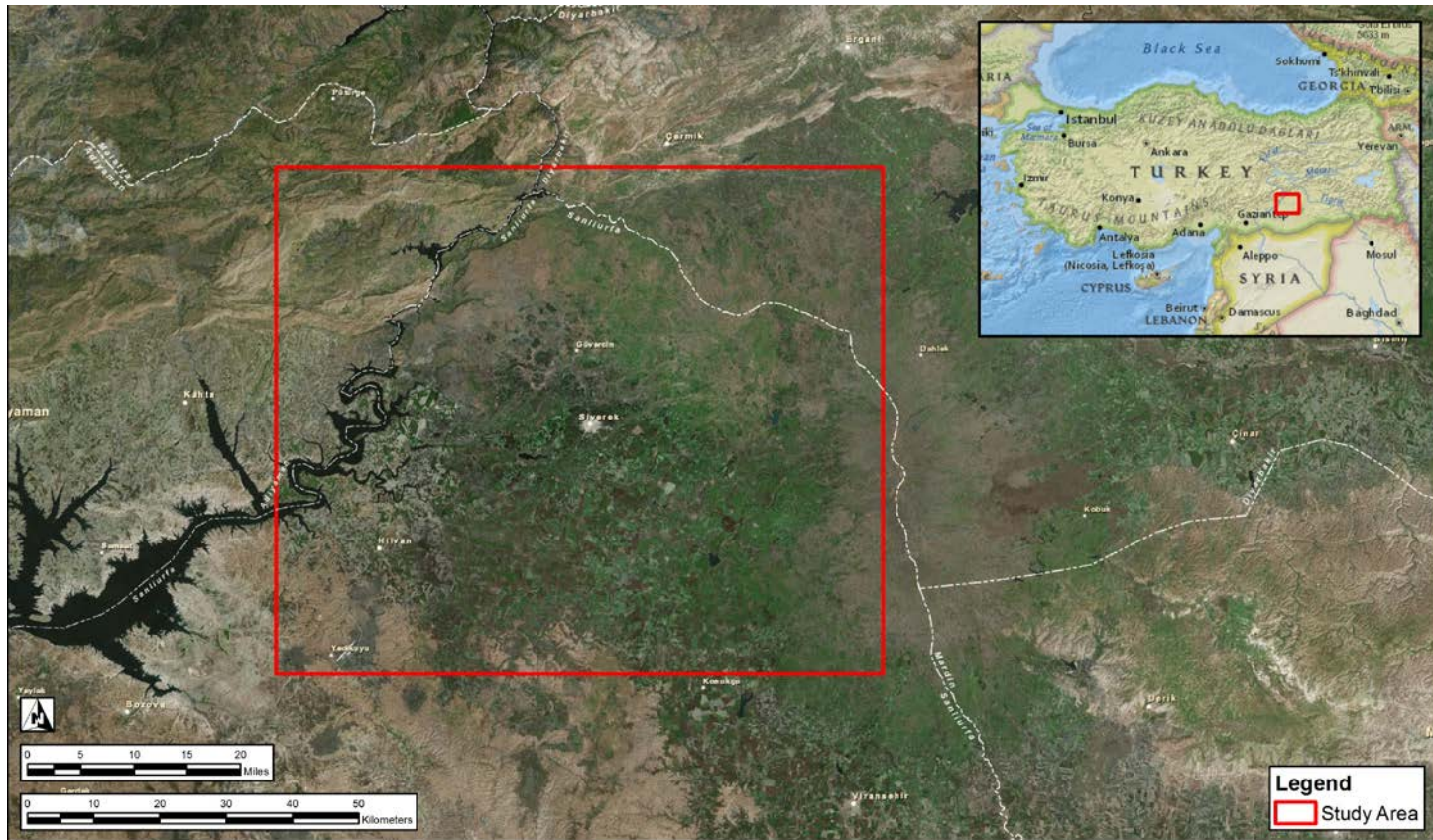


Agenda

- Project Overview
- Project Requirements
- GIS Solution
- Conclusions
- Further Developments

Project Overview

- Environmental & Social Impact Assessment (ESIA) for Oil & Gas Development
- Multiple baseline field studies (due diligence, ecology, water resources)
- GIS critical throughout project lifecycle from planning through reporting



Project Requirements: Overview

“Identify survey locations and develop a journey management plan in accordance with client Health & Safety protocols for remote areas”

Project Delivery

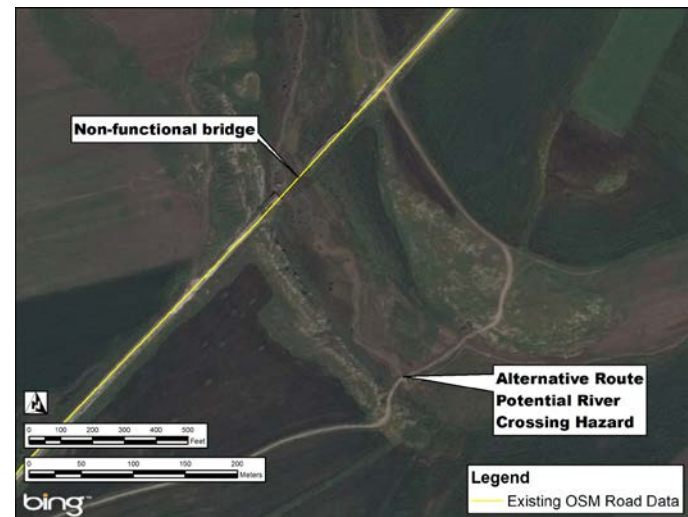
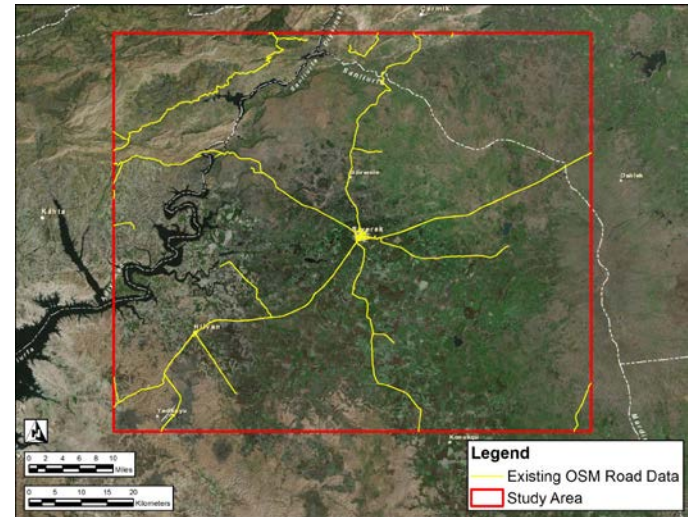
- Visit representative sites to establish baseline environmental conditions.

Health & Safety Protocols

- Pre-determined detailed trip itinerary.
- Required rest stop locations, driving time limits, speed restrictions, daylight.
- Avoid dangerous areas, road conditions.

Efficiency

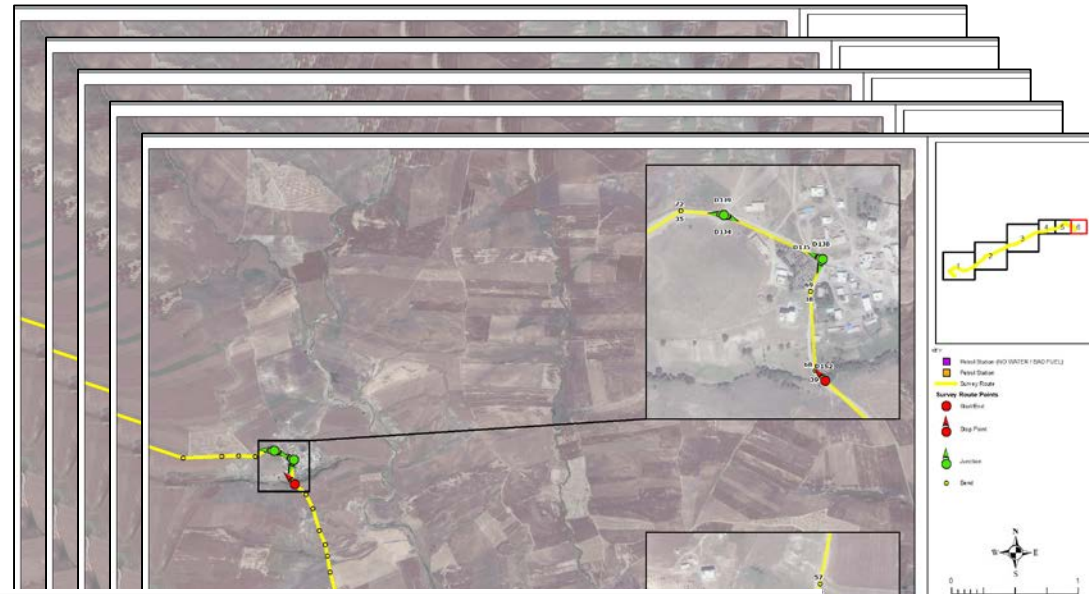
- Conduct field survey efficiently at lowest cost.



Project Requirements: Journey Documentation

Plan Requirements

- Paper maps of predetermined daily routes
- Paper tabular itinerary documenting all road junctions and survey/rest stops
- Pre-loaded GPS for navigation



RouteID	WaypointID	PointType	Surface	Speed	Description	LegDist_KM	ArrivalTime	DepartureTime
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RouteID	WaypointID	PointType	Surface	Speed	Description	LegDist_KM	ArrivalTime	DepartureTime
1	D1SP	Start Point	Surfaced	60	Leave heading southwest and turn right onto heading northwest.	0.000	13:00	13:00
5	D1J1	Junction	Surfaced	60	At junction with turn right onto the slip road to head northeast	2.944	13:02	13:02
13	D1J2	Junction	Surfaced	60	Turn left and head north at town of road	11.157	13:14	13:14
20	D1J3	Junction	Surfaced	60	North of fork left remaining on blacktop road	7.255	13:21	13:21
32	D1J4	Junction	Surfaced	60	Turn right onto gravel/surfaced track running through small farming settlement	6.216	13:27	13:27
36	D1J5	Junction	Gravel	20	Turn right onto track heading to well site	1.153	13:31	13:31
38	D1S1	Stop	Gravel	20	STOP - Leave site along entrance route	0.395	13:32	14:17

The Solution: Project Delivery

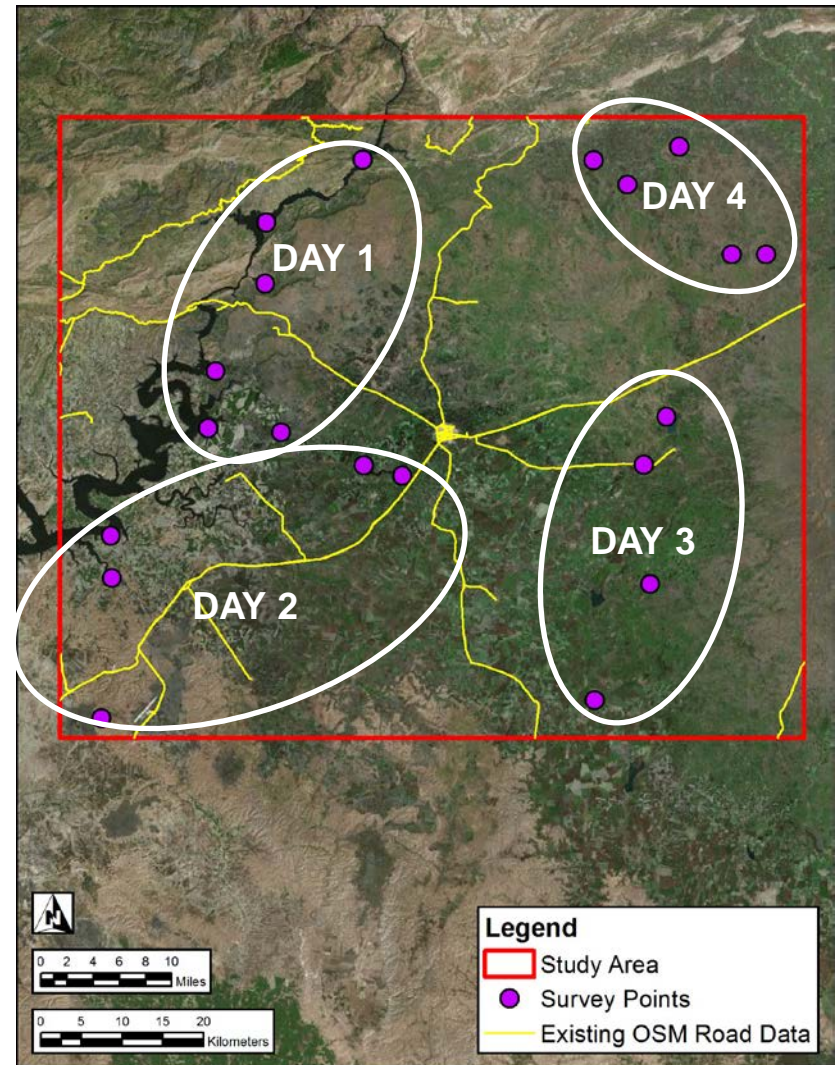
Identify Survey Sites

- Acquire satellite imagery
- Share project data on web-GIS viewer
- Enable specialists to identify survey points

“The process is very easy and surprisingly enjoyable.”

Initial Route Planning

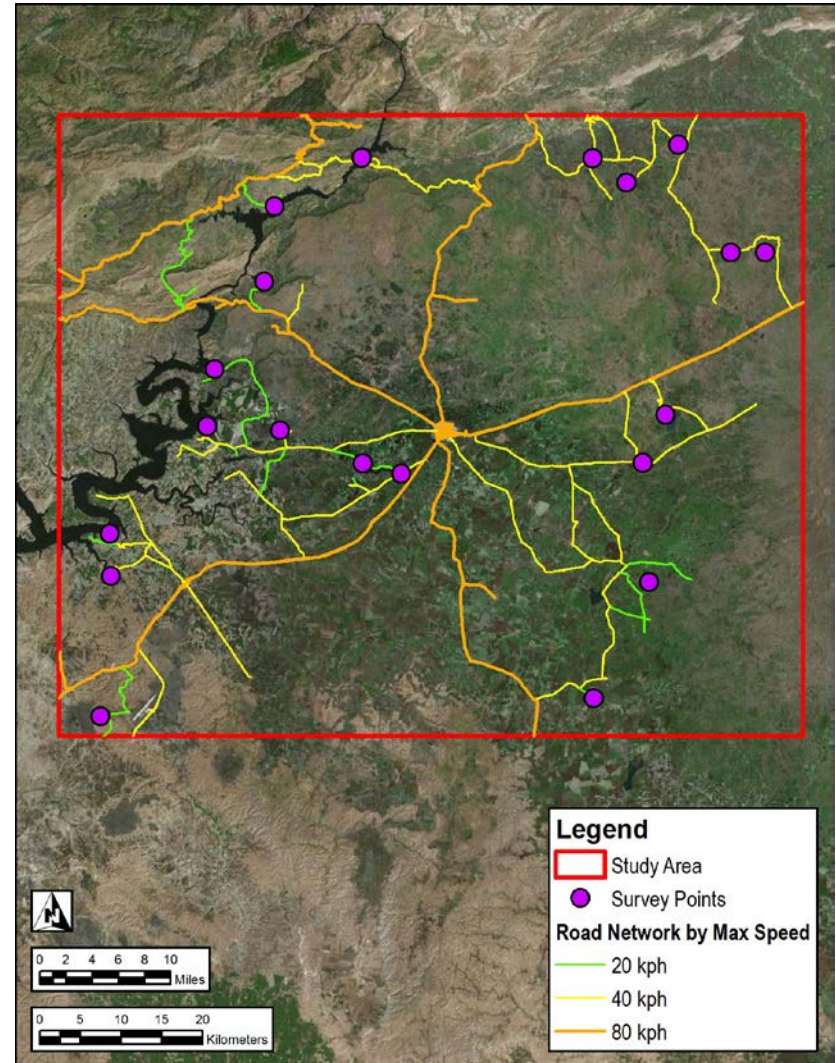
- Are the sites accessible?
- How long will it take to get to them?
- Estimated total trip time: 4 days



The Solution: Health & Safety Restrictions

Building Network Dataset

- Digitized routes to sites from imagery
- Ensured connectivity to main road network
- Avoided potential vehicle hazards
- Assigned speed limits based on road surface



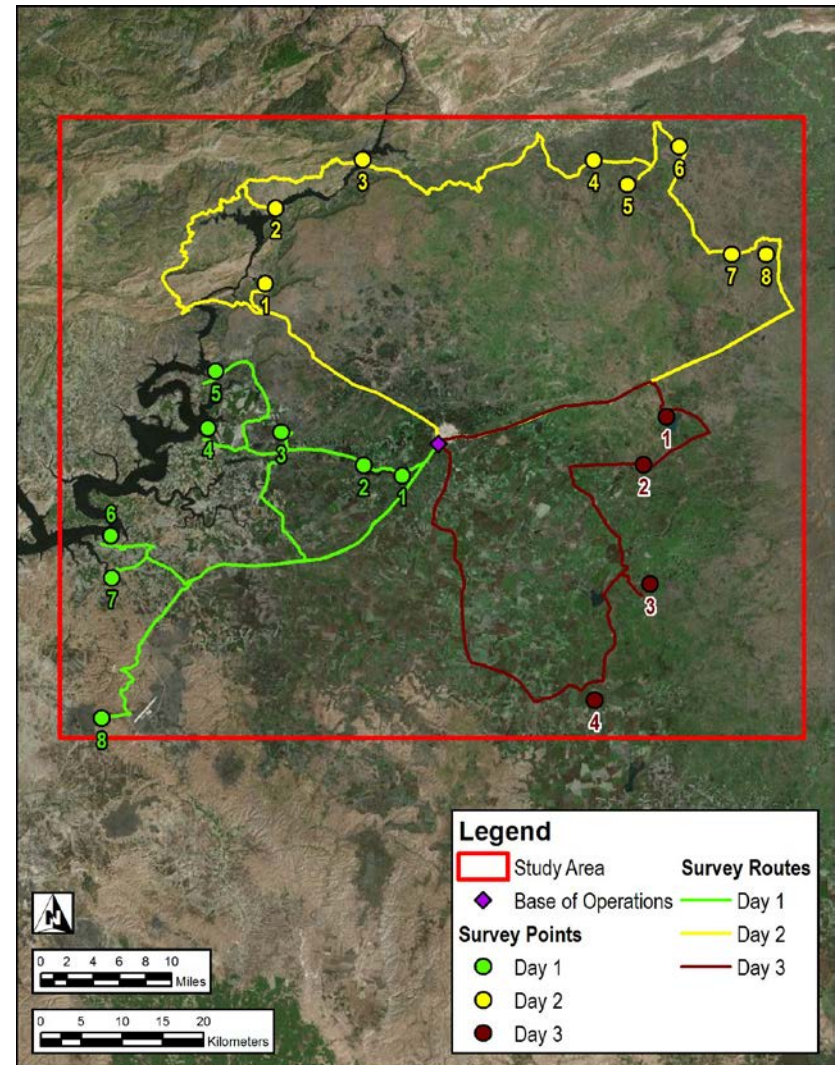
The Solution: Route Optimization

Health & Safety Requirements

- Fixed start / stop times
- Driving time limits

Route Optimization

- Acceptable 3-day route identified
- GIS database ready for route map and itinerary production



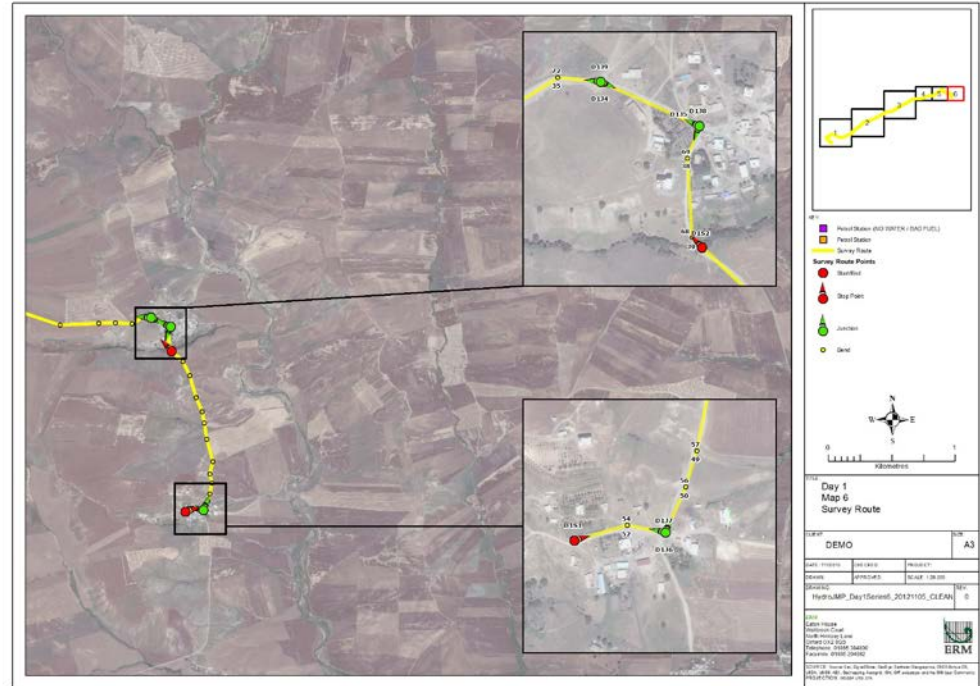
The Solution: Journey Documentation

Health & Safety Requirements

- Paper maps of daily route
- Tabular itinerary
- Pre-loaded GPS for navigation

GIS Solutions

- Data driven pages and map templates
- Automated route calculation templates
- GPS data export tool



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Conclusions

Real Project Summary (8 Day Survey)

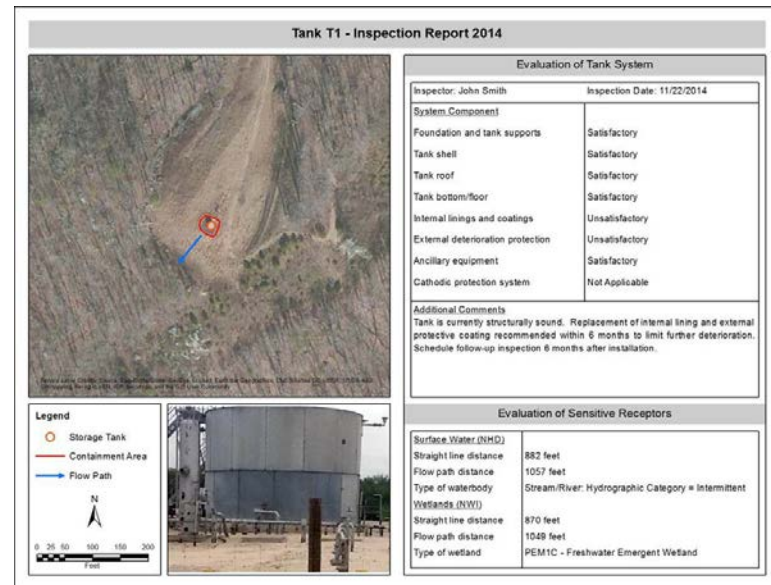
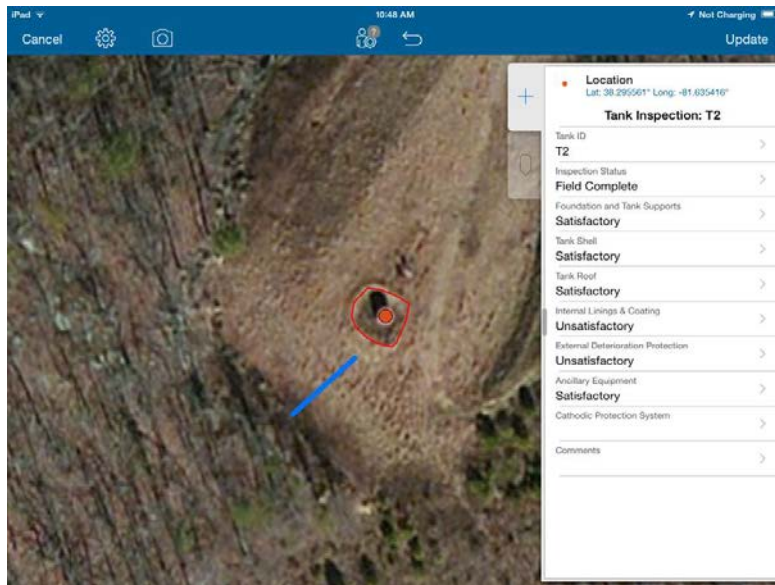
- 47 Survey Points
- 179 Road / Track Junctions
- 1500 Total GPS points
- 127 Survey and Route maps

Conclusions

- GIS web-viewer enhanced site selection
- GIS routing reduced survey days by 20% (10 days – 8 days)
- Cost savings covered GIS development of road network data
- Repeatable methodology for future surveys

Further Developments

- Replaced manual field collection with tablets
 - Collector App
 - Backup mapping and GPS source
 - Automation of site reporting
- Use custom road network for live navigation
 - Navigator App
 - Get maximum ROI from road network development



Questions

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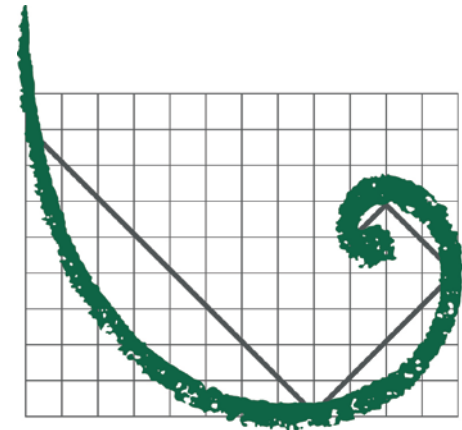
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