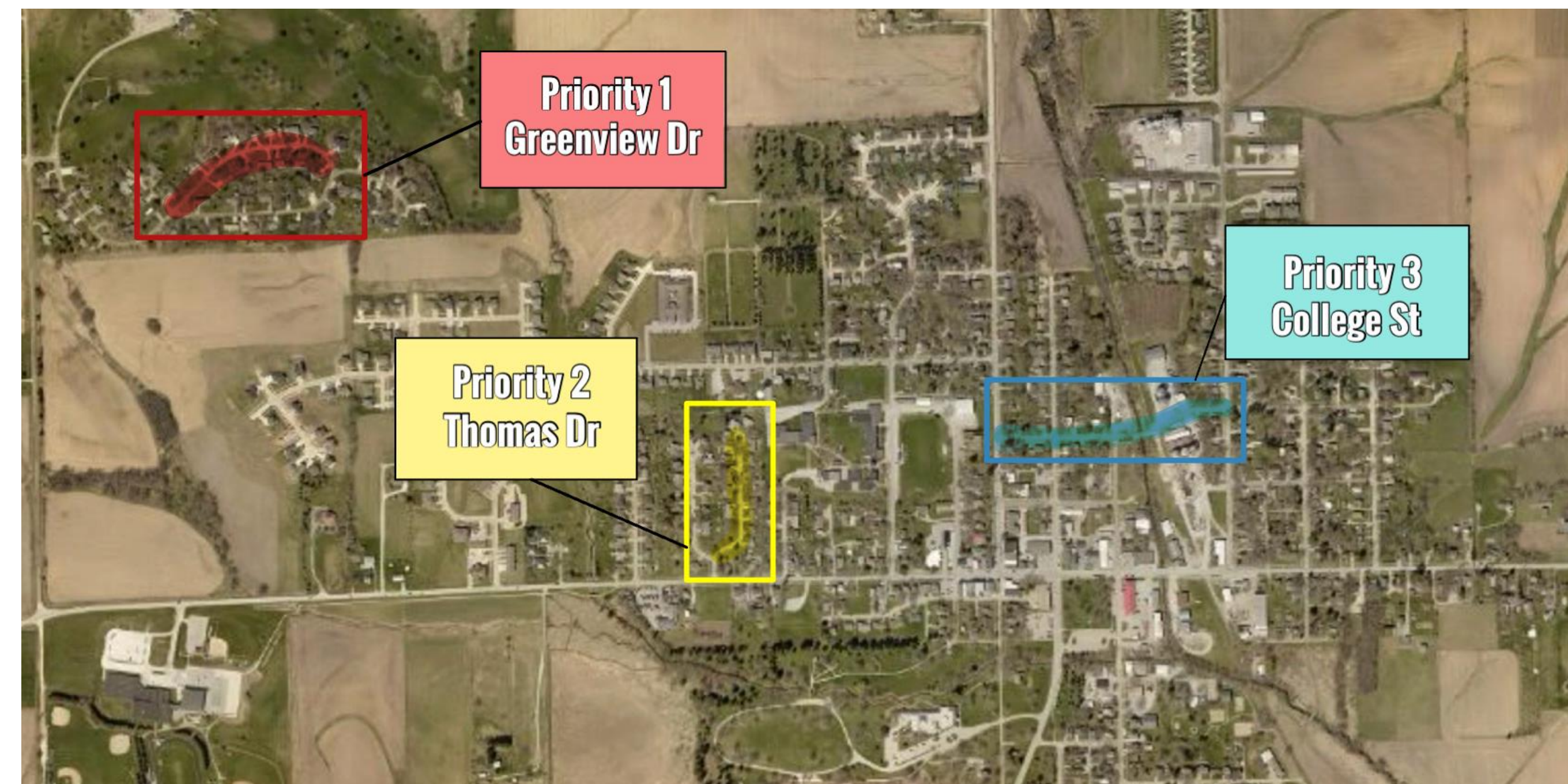


Utility Evaluation and Replacement

Makenna Schnieder, Reggie Porter, Nicole Barcenas

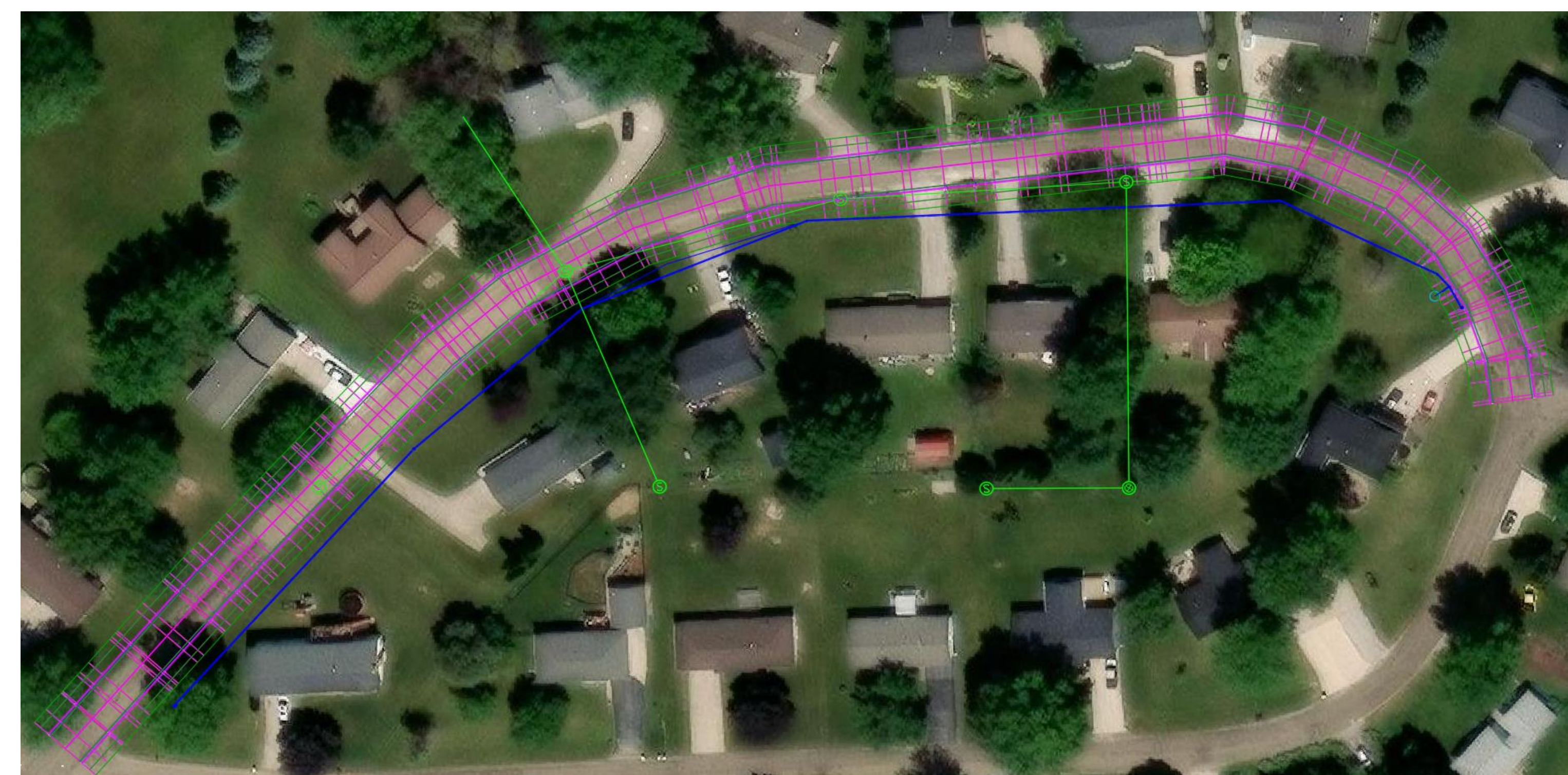
Project Location and Objectives

The City of West Branch is located east of Iowa City and is situated within Cedar and Johnson counties. This project will provide the municipality with a long-term system to prioritize community infrastructure needs while balancing the limitations of capital funding to budget projects dynamically. Key deliverables will include a comprehensive cost-estimation tool and a full engineering redesign of the highest-priority project, as determined by the Multi-Criteria Decision Analysis (MCDA) ranking system.



Multi-Utility Decision Analysis (MCDA)

Multi-Criteria Decision Analysis (MCDA) is a data-driven framework used to evaluate complex alternatives by weighing multiple technical criteria, such as safety, condition, and growth, to determine the most effective project sequence. This ranking system provides a way for the city to identify which infrastructure segments will be prioritized for immediate construction. The ranking system utilizes a structured, three-phase framework to transition from raw data collection to a finalized implementation plan.



Design Objective

The project upgrades the water and sanitary sewer mains and fully reconstructs the street with new asphalt. The street profile was revised to meet DOT and SUDAS standards while keeping the existing alignment. Both utilities maintained their alignments, with water main depth set to 6–6.5 ft and sewer depths adjusted to match the new road elevation.

Project Cost Estimate

Cost Estimate		
Utilities/Construction		\$655,100
Admin/Engineering	5%	\$32,400
Contingency	25%	\$162,500
Total Cost		\$850,000

- **Phase 1: Utility Scoring** – Individual assets are evaluated and assigned scores of 1, 3, or 5 based on standardized condition and safety criteria.
- **Phase 2: Weighting & Asset Condition** – Importance weights are applied to each utility type to compute a comprehensive "Overall Street Asset Condition" score.
- **Phase 3: Corridor & Final Ranking** – Scores are bundled into geographic corridors to identify project synergies and produce a final prioritized list for construction

Score	Criteria Level	Description
1	Low Priority	Excellent condition; no growth projected; high safety
2	Moderate	Fair condition; steady growth; minor safety concerns
5	Critical	Failing condition; high growth area; significant safety risks

References

RS Means Construction 2024