Re-Imagining Hillyard: One-Way Couplet Conversion to Two-Way Streets

Project Description

The Market/Haven corridor in the Hillyard neighborhood currently operates as a one-way couplet that prioritizes regional vehicle throughput at the expense of local safety, accessibility, and business vitality. With the opening of the new freeway at Wellesley Avenue in 2023 and its planned extension to the interstate in 2030, regional traffic will increasingly bypass Market and Haven Streets as the new freeway operates parallel to these facilities, less than a quarter mile to the east. This creates an opportunity to redesign the corridor as a safer, slower, and more community-oriented street system.

Hillyard is experiencing renewed investment following decades of disinvestment tied to the closing of several major employers, which lead to high rates of unemployment, generational poverty, and low property values. The state lists the Social Vulnerability Index for the project area 9 out of 10, mostly due to the percentage of residents living in poverty (10/10) and high unemployment rates (9/10). Hillyard's recent designation as a State Creative District underscores its renewed cultural identity and growing business activity. However, unsafe and vehicle-oriented streets remain a barrier to revitalization. Converting the couplet to two-way operations supports neighborhood goals by calming traffic, improving multimodal access, and strengthening the business district. The project was recently placed on the City's six-year transportation plan and this effort will provide the necessary design work for the City to pursue grant funding for final design and construction.

Project.Goal¿**Convert the Market/Haven couplet to two-way traffic to calm vehicle speeds, improve pedestrian and cyclist safety, and support a more connected and vibrant Hillyard community**.

Tasks:

- Conduct community outreach and incorporate feedback into developing design alternatives.
- Collect traffic speed, crash history data, daily volumes, and turning movement counts to supplement data available from the City.
- Design and evaluate three primary alternatives: Restore the Grid and Intersection Control with Traffic Signals, and Intersection Control with Roundabouts.
- Develop microsimulation traffic models for existing and future conditions for the no-build and the three alternatives.
- Improve pedestrian and bicycle facilities, including crossings, sidewalks, and network connectivity, particularly around the central business area in Hillyard.
- Provide conceptual designs, traffic performance results, and recommendations to the City.

Conduct Community Outreach and Develop Design Alternatives

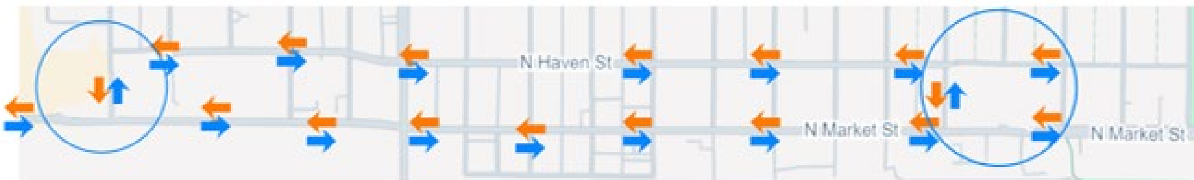
Two community outreach events were conducted during the initial stage of the project.

- *Neighborhood Council Meeting:* Residents emphasized the need for slower speeds, safer crossings, and improved pedestrian facilities.
- *Business Focus Group*: Business owners highlighted challenges with fast traffic, limited crossing opportunities, and difficulty attracting foot traffic. Provision of parking was also emphasized.

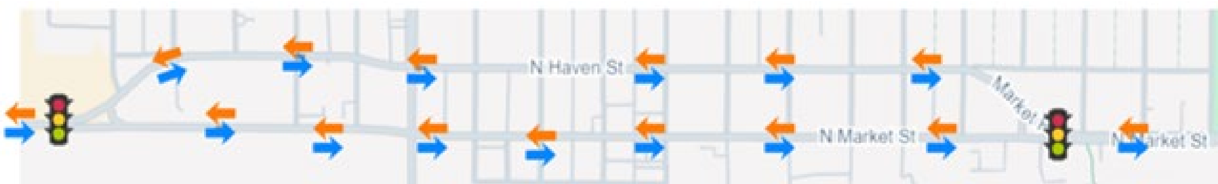
Project constraints include: maintaining acceptable traffic operations; adhering to City, State, and Federal Standards; minimizing reconstruction at Wellesley Avenue due to recent rebuild; avoiding rightof-way impacts to the regional bicycle trail and nearby railroad; and working within the existing curb-to-curb width where possible to control costs.

Market Street currently operates as a two-lane, one-way arterial carrying northbound traffic, while Haven Street functions as a two-lane, one-way arterial carrying southbound traffic. At each end of the one-mile couplet, traffic from Market and Haven merges onto Market Street using diagonal crossover connections. Based on community outreach and a review of existing literature on converting one-way streets to two-way operation, three design alternatives were developed.

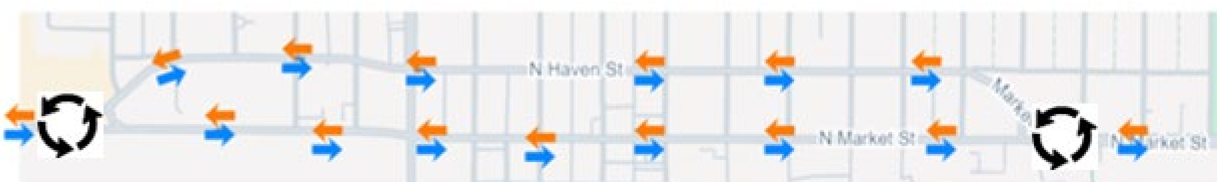
Restore the Grid – Market and Haven are converted to two-way traffic. Market remains an arterial, but Haven converts to a local street. Crossover roads at the north and south ends of the couplet are removed to keep the main traffic movement on Market.



Intersection Control with Signals – Market and Haven are converted to two-way traffic. Market and Haven stay as arterials but both converted to two-way traffic. Crossover streets at the couplet ends remain to distribute traffic to both streets. The couplet ends are controlled by traffic signals.

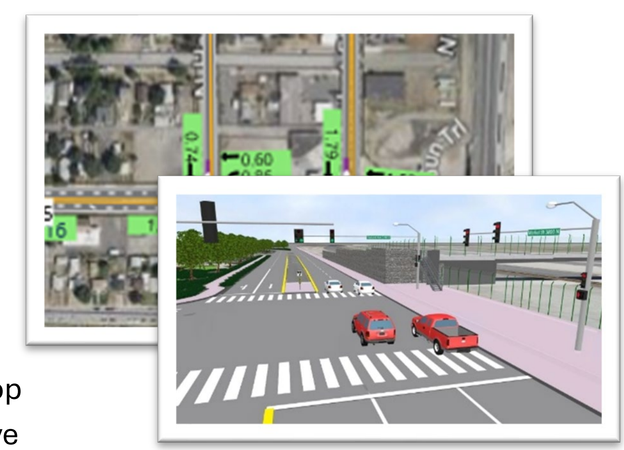


Intersection Control with Roundabouts - Market and Haven are converted to two-way traffic. Market and Haven stay as arterials but both converted to two-way traffic. Crossover streets at the couplet ends remain to distribute traffic to both streets. The couplet end are controlled by roundabouts.



Traffic Microsimulation Modeling

Traffic microsimulation models (7 in Synchro and 5 in VISSIM) were developed to analyze existing and future conditions. The existing conditions Vissim model was calibrated to observed traffic volumes and speeds. The calibrated model was then used as the basis for developing the future models. The regional travel forecast model recently updated by the Metropolitan Planning Organization for the region was utilized to develop estimates of traffic for 2050 for the project area. Extensive



Screenshots from the Synchro and Vissim Models volume balancing procedures were required to adapt future volumes to the proposed conditions before entering results into the microsimulation models. Key traffic operations metrics were developed to inform the project decision matrix.

Pedestrian and Bicycle Safety Improvements in the Business District

Community members reported discomfort crossing the couplet and biking along the corridor. The team also conducted a walk safety audit with officials from the local public health district to assess current conditions. Key findings from the public meetings and the audit were the need for: wider sidewalks, enhanced crossings of the arterials at key locations, an east-west bicycle connection, and preservations of the existing access to the regional bicycle path. For the Business District designs, the National Association of City Transportation Officials (NACTO) Urban Design Guide were referenced due to the reference's alignment with the stated goals of the project. StreetMix and 3DStreet open source software were used to model the business district design's to make them readily understandable at public meetings.

View of Market Street Business District Design in StreetMix and 3DStreet

Intersection Designs at Couplet Ends

The couplet ends were designed in Civil3D according to applicable local, state, and federal standards. Twenty different alternatives were tested due to the complex geometry created by the diagonal crossover roads. Below are the most feasible designs for the north and south couplet ends for the three alternatives. The signalized intersection for the north couplet end required additional research on how the traffic signal phasing would work for an intersection configured this way. The roundabout design for the south couplet end required additional designs to accommodate a freight vehicle. An innovative spiral roundabout design was determined to be the most acceptable solution.

Civil3D Designs for North Couplet Ends

Civil3D Designs for South Couplet Ends

Project Findings

Additional presentations were conducted after alternative designs were created to ensure they were technically feasible and had community support. These presentations include one to the City's Transportation Commission, another at the Opportunity Northeast Board Meeting, and finally a follow-up presentation at the Neighborhood Council. The Neighborhood Council meeting was also used to gather ratings for the alternatives on the qualitative Social and Environmental project metrics. The Northeast Public Development Authority, who was the client for the project, also provided their qualitative assessment of the alternatives, with the ranking of both groups shown in the following tables. In these tables each metric was rated 1 to 5, with higher values representing more positive impacts It was observed that the public tended to holistically vote on the alternatives (for example voting all 1's on the roundabout regardless of the measures they were evaluating.)

Social and Environmental Measures	No-Build (2050)	Build (2050)		
		Restore the Grid	Intersection Control	Roundabout
Parking Availability	4	3	3	2
East-West Pedestrian and Bicyclist Accessibility	2	3	3	2
Pedestrian and Bicyclist Safety	2	3	3	2
%Green Space/Heat Island	2	3	2	2
Promoted Business Visibility	3	3	3	3

Neighborhood Council Rankings for Social and Environmental Measures

Social and Environmental Measures	No-Build (2050)	Build (2050)		
		Restore the Grid	Intersection Control	Roundabout
Parking Availability	3	4	4	4
East-West Pedestrian and Bicyclist Accessibility	1	5	5	3
Pedestrian and Bicyclist Safety	1	5	5	3
%Green Space/Heat Island	3	5	4	3
Promoted Business Visibility	1	5	5	5

Northeast Public Development Authority Rankings for Social and Environmental Measures

Traffic metrics were also obtained from the traffic simulation models. It was understood that any of the alternatives proposed would likely reduce traffic performance as the roadway function moved from focusing on traffic throughout to community-oriented streets, particularly when forecasted volumes for year 2050 were used. The purpose of the modeling was to determine if the level of traffic impacts were acceptable and to determine the relative difference in impacts between the alternatives.

Traffic Performance Measures	No-Build	Build: Restore the Grid	Build: Signalized	Build: Roundabout
Queue Length	Avg (ft)	Avg (ft)	Avg (ft)	Avg (ft)
Queen @ Market Street	30.21	525.85	187.13	139.57
Wellesely @ Market Street	79.44	771.51	428.61	341.36
Wellesely @ Haven Street	201.52	127.62	641.04	589.34
North Couplet End	35.31	327.52	193.37	643.22
South Couplet End	4.75	165.69	891.58	790.02
Delay	Sec per Vehicle			
Queen @ Market Street	11.1	39.21	23.81	19.9
Wellesely @ Market Street	18.36	52.25	58.44	47.81
Wellesely @ Haven Street	26.6	30.04	59.13	71.11
North Couplet End	7.39	83.6	39.86	36.84
South Couplet End	1.32	35.59	61.2	42.9
Level of Service	LOS A-F			
Queen @ Market Street	B	D	C	B
Wellesely @ Market Street	B	D	E	D
Wellesely @ Haven Street	C	C	E	E
North Couplet End	B	F	D	E
South Couplet End	A	E	E	E
Travel Time	Min			
Northbound End to End Travel Time (min)	4.16	7.2	10.92	6.03
Southbound End to End Travel Time (min)	2.86	13.38	9.44	12.4

Conclusion

Converting the Market/Haven couplet to two-way operations was determined to be feasible, cost-effective, and strongly aligned with Hillyard's revitalization goals, although a single preferred alternative for achieving this conversion did not emerge. The project supports safer streets, improved multimodal access, and a more vibrant business district. With continued community engagement and coordination with the City of Spokane, the NEPDA can advance a transformative redesign that strengthens the neighborhood's long-term social and economic health. The project report and digital files will be turned over to the NEPDA and the City so they can proceed with grant applications to secure project funding for final design and construction.

Successful Collaboration of Faculty, Students, and Licensed Professional Engineers

The Market/Haven Couplet Conversion Project exemplified a highly effective collaboration model between Gonzaga University faculty, civil engineering students, and licensed professional engineers. The project's complexity, spanning community outreach, multimodal safety design, traffic microsimulation, and conceptual roadway engineering required a coordinated effort designed to mirror professional practice while maintaining strong academic mentorship.

Licensed Professional Engineer Involvement

Licensed Professional Engineers were involved in every stage of the project. Both project advisors and the two Design Advisory Board (DAB) members were licensed professional engineers, consistent with the Program's requirement that civil engineering project advisors for senior design hold professional licensure. While DAB membership sometimes includes early-career engineers nearing licensure, this project benefited from a fully licensed advisory team.

Students also presented their work twice to the City Transportation Commissions and to Senior Traffic Planning Engineers ensuring that professional oversight extended beyond the university. In addition, students formally presented their progress three times during the academic year (October, December, and April) to a panel of faculty and the full DAB, receiving iterative feedback that shaped the technical direction of the project.

Interaction Between Students, Faculty, and PEs

The collaboration structure intentionally mirrored a professional consulting environment. The full team (students, faculty advisors, and DAB members) met weekly to review progress, troubleshoot technical challenges, and plan upcoming tasks. One-on-one meetings with faculty or DAB members occurred frequently, especially during periods requiring specialized expertise such as VISSIM calibration, Civil3D geometric design, or interpretation of community feedback.

This structure ensured that students experienced the expectations, communication patterns, and iterative review processes typical of engineering practice. Advisors and DAB members consistently explained the reasoning behind their guidance, helping students understand not only *what* to do but *why* certain engineering decisions were appropriate.

Learning Beyond the Classroom

Students gained exposure to professional practice in ways that cannot be replicated in a traditional classroom setting. They worked on a real project for a real client and interacted directly with the community their designs would affect.

Residents emphasized the need for slower speeds, safer crossings, and improved pedestrian facilities, while business owners highlighted challenges with fast traffic, limited crossing opportunities, and difficulty attracting foot traffic. Students gathered this feedback firsthand during two Neighborhood Council meetings and a business owner focus group. They also participated in a pedestrian safety audit with the Spokane Regional Health District, which identified the need for wider sidewalks, enhanced crossings, and preservation of access to the regional bicycle path.

These experiences taught students how to listen to stakeholders, translate qualitative concerns into engineering criteria, and communicate design decisions to non-technical audiences, skills that are essential in professional practice but rarely taught explicitly in coursework.

Protection of the Health, Safety, and Welfare of the Public

The project directly addressed public safety concerns. The existing Market/Haven couplet prioritized vehicle throughput at the expense of pedestrian and cyclist safety. The uploaded document states that the corridor's unsafe and vehicle-oriented streets remain a barrier to revitalization, and that the project goal was to calm vehicle speeds, improve pedestrian and cyclist safety, and support a more connected and vibrant Hillyard community. One early task was to perform a comprehensive analysis of 10 years of reported crashes in project area. The results of the analysis informed engineering design choices but also highlighted the reality of the safety implications of engineering design decisions.

Students were responsible for designing improvements that adhered to all applicable local, state, and federal roadway standards. They evaluated controlled crossings, sidewalk widening, bicycle connectivity, and intersection control strategies. including signals and roundabouts. to reduce conflict points and improve multimodal safety.

Raising Awareness of Engineering Impacts

Because this was a designated community-engaged learning course, students interacted with residents and business owners throughout the year. They quickly recognized the human impact of their engineering decisions such as how a crosswalk location, lane configuration, or roundabout design could affect daily life for pedestrians, cyclists, and drivers.

Students also saw how different design assumptions produced different outcomes. For example, twenty different roadway design alternatives were tested for the couplet ends due to complex geometry. This iterative process helped students understand the tradeoffs inherent in engineering design.

Engineering as a Tool for Community Problem-Solving

The project clearly demonstrated how engineering can address community challenges. The Hillyard neighborhood has experienced decades of disinvestment, and unsafe streets hinder revitalization, leading to it being recognized by the state as a historically disadvantaged community. The project emphasizes that converting the couplet to two-way operations is feasible, cost-effective, and strongly aligned with Hillyard's revitalization goals, supporting long-term social and economic health. Students saw firsthand how engineering can uplift communities by improving safety, accessibility, and economic vitality.

Fostering Self-Reliance, Cooperation, and Responsibility

This was a large, complex project requiring strong teamwork, communication, and project management. Students quickly realized that success depended on coordinating their tasks efficiently, communicating clearly with advisors, sponsors, and stakeholders, managing deadlines and deliverables, and supporting each other through challenging technical tasks. These skills are essential for professional engineers and were strengthened through the collaborative structure of the project.

Allied Profession Participation

Although the project was completed by a civil engineering team focused on transportation, students engaged with multiple allied professions including public health professionals with the pedestrian safety audit, community development professionals who served as the project sponsors, urban planners with the application of the travel forecasting models, and community engagement specialists from the Center for Community Engagement who trained students in asset-based language and effective public interaction. These interactions broadened students' understanding of how engineering interfaces with public health, community development, and social equity.