

Lake Hazel/Gowen Relocation Alignment Study Report

Prepared for



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And



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1. INTRODUCTION

The Ada County Highway District (ACHD) and the City of Boise entered into a Memorandum of Understanding (MOU) for the development of the Lake Hazel Road extension and Gowen Road relocation. The purpose of the MOU was to cooperate in a study of roadway alignment options that would satisfy projected transportation needs in the area and provide a roadway network that is compatible with the Boise Airport Master Plan.

Extending Lake Hazel Road south of the Airport has been planned for nearly ten years to increase connectivity in the southern Ada County region. The Communities in Motion regional long range transportation plan identifies Lake Hazel as a principal arterial that connects Greenhurst Road in Canyon County to I-84 at Eisenman Road. Communities in Motion identifies the Lake Hazel Corridor as a “viable alternative to I-84” for local commuters.

The Boise Airport’s current Master Plan includes relocation of the air traffic control tower and development of the third runway south of Gowen Road to accommodate commercial air service. The Master Plan includes an option to relocate Gowen Road south of the third runway to eliminate conflict with the proposed taxiway to the third runway.

The study area is largely undeveloped. However, there are several large scale subdivisions and planned communities currently being proposed within the study area. The potential for this area to develop rapidly provided an added sense of urgency to complete the alignment study. Identifying the Lake Hazel corridor prior to development will allow the corridor to be preserved and minimize future property impacts.

2. PROJECT DESCRIPTION

This project lies south of the Boise Airport and extends west from I-84 to the end of Lake Hazel Road, west of Cole Road. Much of the area south of the airport is currently undeveloped, flat sage brush zoned as Industrial Open Space and Rural Preservation. New housing developments are encroaching on the west side of the project area, while the east end of the project continues to develop as industrial and commercial land uses. The project area is bounded to the north by Gowen Road and the Boise Airport. The south boundary is the base of the south Boise bench.



The study corridor is approximately seven miles long and three miles wide. In addition to developing a corridor to extend Lake Hazel Road east to Eisenman Road and I-84, this study also includes connections to Orchard Street, Gowen Road, and a schematic local/collector street network to accommodate access control on Lake Hazel Road. Access management strategies, roadway features, and structural requirements to cross the New York Canal and railroad are significant aspects of the study.

This project also included an environmental scan, preliminary geotechnical reconnaissance, traffic study, and identification of design constraints. An important aspect of the project was public involvement and coordination with key stakeholders such as surrounding neighborhoods, Boise City, the Airport, and developers.

3. STAKEHOLDER INVOLVEMENT

In November and December of 2005, the project team conducted one-on-one interviews with stakeholders who have an interest in the Lake Hazel/Gowen Road area, including the Boise Airport, Idaho National Guard, affected property owners, local businesses and residents. These interviews were informal and helped the project team gather insightful information while engaging key stakeholders.

The purpose of the interviews included the following:

- Introduce stakeholders to the project,
- Learn stakeholder issues, concerns and thoughts about the project,
- Answer questions

Representatives from ACHD, Parametrix and RBCI conducted the interviews. Most interviews took place at the interviewee's business or at ACHD. Refer to Appendix A for the list of stakeholders interviewed, the questions asked, and the summaries of the interviews.

The project team conducted two public open houses for this study. The first open house was held on April 13, 2006. The purpose of the open house was to present the results of the environmental scan, traffic analysis information, and range of alignment alternatives. The study team used the public meeting as an opportunity to gather input on the range of potential improvements. There were 200 attendees at the open house and 44 comment sheets were received. After the open house, a petition signed by 231 residents of the Moon Ridge Subdivision was received, along with 16 letters, emails and comment sheets from other open house attendees. Refer to Appendix B for the summary report for the first public meeting.



The second open house and stakeholder meeting was held on June 7, 2007. The purpose of the open house was to present a recommended alignment for Lake Hazel Road and surrounding roadways and an access management plan. There were 145 attendees at the open house and 35 comment sheets were received. Refer to Appendix C for the summary report for the second public meeting.

Individual stakeholders (agencies, land owners, etc) were invited to attend the open houses prior to the general public in an effort to gather additional feedback and comments about the project.

4. FIELD SURVEYS AND MAPPING

Mapping was based on the existing Community Planning Association of Southwest Idaho (COMPASS) GIS information and the most recent COMPASS aerial mapping and ortho photographs. This task included obtaining existing utility facility maps from various utility companies and agencies. Utilities were not located in the field as a part of this planning study. The project team worked with ACHD's Utility Coordinator to obtain utility maps and incorporate utility information into the project base map. This task also included contacting irrigation districts and canal companies in the project area. Significant utilities within the project area include the Idaho Power transmission corridor and the Chevron pipeline.

Field surveys of specific surface features such as the New York Canal and railroad were obtained to supplement the base mapping obtained from COMPASS.

5. TRAFFIC FORECASTS

5.1 LAKE HAZEL ROAD

To accommodate the 2030 forecasted traffic, four through lanes (two in each direction) are required on Lake Hazel Road between Maple Grove Road and I-84 at Memory Road. Left turn lanes will need to be provided in accordance with the access management plan.

5.2 ORCHARD STREET AND PLEASANT VALLEY ROAD

Two alignment alternatives were considered for the intersection of Orchard Street and Pleasant Valley Road. The peak hour traffic operations at this intersection led to the selection of a recommended alternative with the southwest approach of Orchard Street forming a T-intersection with Pleasant Valley Road and the extension of Orchard Street. The major traffic movements at this intersection are from the interstate to the area south of Lake Hazel Road via Orchard Street and Pleasant Valley Road. The recommended alternative results in less delay, improved level of service and smaller queue lengths because the largest traffic movements are configured as through movements rather than turning movements.

The Orchard Street and Pleasant Valley Road intersection operates with an acceptable level of service with two northbound and southbound through lanes, corresponding to a four/five-lane roadway. However, three northbound and three southbound through lanes are required at the Pleasant Valley Road/Lake Hazel Road intersection as well as at the Victory Road/Orchard Street intersection. Therefore, a six/seven lane roadway is recommended on Pleasant Valley Road and on Orchard Street to maintain lane continuity between Lake Hazel Road and I-84 at Orchard Street. This roadway configuration would also improve intersection delays and reduce queue lengths at the Orchard Street/Pleasant Valley Road intersection. If parallel roadway network capacity is increased, or future development changes from current land-use assumptions, Orchard Street and Pleasant Valley Road may not warrant six/seven lanes.

Refer to Appendix D for the final Traffic Study Report.

6. ALTERNATIVE DEMOGRAPHICS FOR SOUTH AREA

The standard demographics for the COMPASS model showed employment and household growth in most of the Traffic Analysis Zones (TAZ) in the study area for 2030; however, there was a possibility that the forecasts were low due to potential developments and proposed planned communities identified by the City of Boise and Ada County. In addition, the projected households in 2030 for two TAZs west of Maple Grove Road were lower than the number of existing single-family housing units combined with the number of proposed residential units identified in traffic impact studies on file with ACHD.

For the initial study alternative forecasts, no modifications were requested to the demographics due to the uncertainty of future developments and to maintain COMPASS' endorsement of the model's results. However, after the Proposed Intersection Lane Configurations document was reviewed in February of 2006, the initial study demographics were revised to reflect potential developments identified by ACHD and the City of Boise. At ACHD's request, these special model runs were created and used in the analysis in an attempt to avoid underestimating future traffic demand.

The special model run includes estimates for multiple planned communities throughout south Ada County and the northwest foothills. Approximately 69,000 housing units were added, with a large proportion in the vicinity of the study area. The inclusion of these developments does not constitute an endorsement or

approval by COMPASS or any of its member agencies; however, approval of these modifications was given by ACHD for use in this study. A summary of the estimated demographics for the special model run is included as Appendix E. At the time of this study, two standard forecast models were available that represented different growth patterns throughout the Treasure Valley. The “Trend” and “Community Choices” models have the same regional growth control totals but have significant differences in their demographic distributions. The Trend model reflects the current pace of growth in the valley. The projections are estimated using current land-use patterns and densities, which are approved by the Demographic Advisory Committee. The Community Choices model reflects the vision that the public has for future growth in the valley. The model includes land-use growth patterns that are concentrated within the areas of impact, which allow more open space between communities. The forecasts used to establish the preliminary study alternatives utilized the Trend demographics model. However, the Community Choices model was approved in the later stages of this study and used for the final study alternatives forecasts.

7. ENVIRONMENTAL SCAN

An environmental scan was conducted to document existing environmental resources in the study area and to identify potential environmental impacts. The scan indicated that significant environmental impacts are not anticipated with the construction and operation of the recommended alternative. New impervious surface would be created by constructing the proposed improvements, resulting in the need for additional storm water facilities as mitigation for the additional runoff. Minor impacts are anticipated with canal crossings. Construction impacts such as noise, stormwater runoff, dust, and traffic delays and detours would occur; however, these will be temporary.



The project is anticipated to require two permits prior to the beginning of construction. As more than one acre of ground-disturbing activities will occur, a National Pollutant Discharge Elimination System Construction General Permit will be required. If placement of fill and/or excavation is required below the ordinary high water mark of Five Mile Creek, Eight Mile Creek or any canals, a Joint Application for Permits will need to be completed and submitted to the Army Corps of Engineers.

The development, implementation, and maintenance of best management practices and other mitigation measures would help further minimize the effects to environmental resources as a result of project construction and operation.

If federal funds are planned to be used for construction, this project would be subject to further detailed environmental documentation and impact analysis in accordance with the National Environmental Policy Act. The Environmental Scan Report is included as Appendix F.

8. ALIGNMENT ALTERNATIVES

8.1 CONCEPT ALIGNMENT ALTERNATIVES

Multiple alignments were developed for Lake Hazel Road and major connecting roads. Alternatives were constrained by topographic features, existing and planned developments, environmental impacts, and public comments. Each alternative considered provided connections to Lake Hazel Road, Orchard Street,

Pleasant Valley Road, Production Street, Eisenman Road, and the Isaac's Canyon Interchange. The Lake Hazel Road corridor crosses the New York Canal, Five Mile Creek tributaries, and the Union Pacific Railroad. Eight Mile Creek, the south Boise Bench, and expansion of the Boise Airport third runway are also major design constraints.

Early in development of the alignment alternatives it became apparent that three separate sections along the corridor have unique features independent of each other. As a result, the corridor was investigated in three segments (west, middle, and east). The corridor and segment alternatives are shown in Figure 8-1.

8.1.1 West Segment Alternatives (Existing Lake Hazel Road to Orchard Extension)

Multiple constraints exist along the west end of the corridor. Each alternative was required to tie into the existing Lake Hazel Road alignment. Cole Road and the New York Canal are approximately 2000 feet east of the termination point of existing Lake Hazel Road. Minimizing impacts to existing residential development along Cole Road, Cole Road/Lake Hazel Road intersection geometry, and crossing the canal were significant considerations that led to the development of three primary alignment alternatives for the west segment.

8.1.2 Middle Segment Alternatives (Orchard Extension to Production Extension)

Eight Mile Creek and expansion of the Boise Airport third runway were the two primary features that defined alternatives for this section. The Boise Airport required a minimum one-half mile separation between the north boundary of the extension of Lake Hazel Road and the south boundary of the third runway.



All of the primary alternatives satisfied the horizontal distance separation requirements and generally traverse from the northwest to the southeast along a similar bearing to what is proposed for the future airport runway. Pleasant Valley Road is located within this section of the corridor. Minimizing the skew angle of the Pleasant Valley Road/Lake Hazel Road intersection was a design requirement for alternatives considered.

The primary analysis of alignment options indicated that properly designed alignments in this segment are only constrained to the north by the airport setback and to the south by Eight Mile Creek. For this reason, a corridor zone was carried forward rather than individual alignments.

8.1.3 East Segment Alternatives (Production Extension to Isaac's Canyon Interchange)

All alignment alternatives considered in this segment cross the Union Pacific Railroad and connect to the Isaac's Canyon Interchange. Design constraints include the elevation of the railroad, existing right-of-way for the west end of the Isaac's Canyon interchange and Eisenman Road, and the bench west of the interchange. Boise City's planned industrial park west of Eisenman Road and minimizing the skew angle at the railroad crossing were also considered during the development of options.

Similar to the middle segment, a corridor zone was carried forward for this segment rather than individual alignments. However, the corridor zone for the east segment is much narrower than the middle segment due to the design constraints within the east segment.

8.1.4 Connecting Road Alternatives

Developing a complete transportation network was one of the goals of the study. The Boise Airport is considering options to either close or minimize traffic on Gowen Road once the new taxiway from the third runway is constructed. Any changes to Gowen Road are likely to occur in coordination with the construction of Lake Hazel Road. A more likely option being considered by the Boise Airport is to construct a taxiway bridge over Gowen Road and maintain traffic on Gowen Road. All Lake Hazel Road alternatives included connections to Cole Road, Orchard Street, Pleasant Valley Road, Production Street, and Eisenman Road. Connections to Orchard Street, Production Street, and Eisenman Road require these roads to be extended south to the Lake Hazel Road Corridor. The connecting road options are shown in Figure 8-1.

The Boise Airport has developed plans for realigning Orchard Street, between the New York Canal and Gowen Road, approximately ¼ mile west of the existing road. Three primary Orchard Street extension options were developed based on planned development in the area and projected traffic operations for Lake Hazel Road, Orchard Street, and Pleasant Valley Road.

Two primary options for extending Production Street were developed. Both options connect to the Lake Hazel Road corridor on a north-south bearing in line with Apple Street, north of I-84. One option turns to the west, avoiding the airport runway expansion and existing development, before turning north to line up with the existing Production Street/Gowen Road intersection. The other primary alignment extends from Lake Hazel Road due north to Gowen Road. This alignment is located partially along an existing private road that would need to be converted to a public road.

The option for the extension of Eisenman Road is a north-south alignment that utilizes existing right-of-way that was purchased by the Idaho Transportation Department as a part of the Isaac's Canyon Interchange construction. This alignment option is also consistent with planned development in the area.

8.1.5 Future Land Development

Land use within and around the Lake Hazel Road corridor is primarily undeveloped ground with some grazing and gravel extraction uses. The west end of the corridor is primarily residential development and the east end of the corridor is primarily industrial development. There are several planned developments within the corridor that were in various stages of the development application process at the time of this study. Future land use is generally thought to consist of industrial uses north of the Lake Hazel Road corridor and residential or mixed use development south of the corridor.



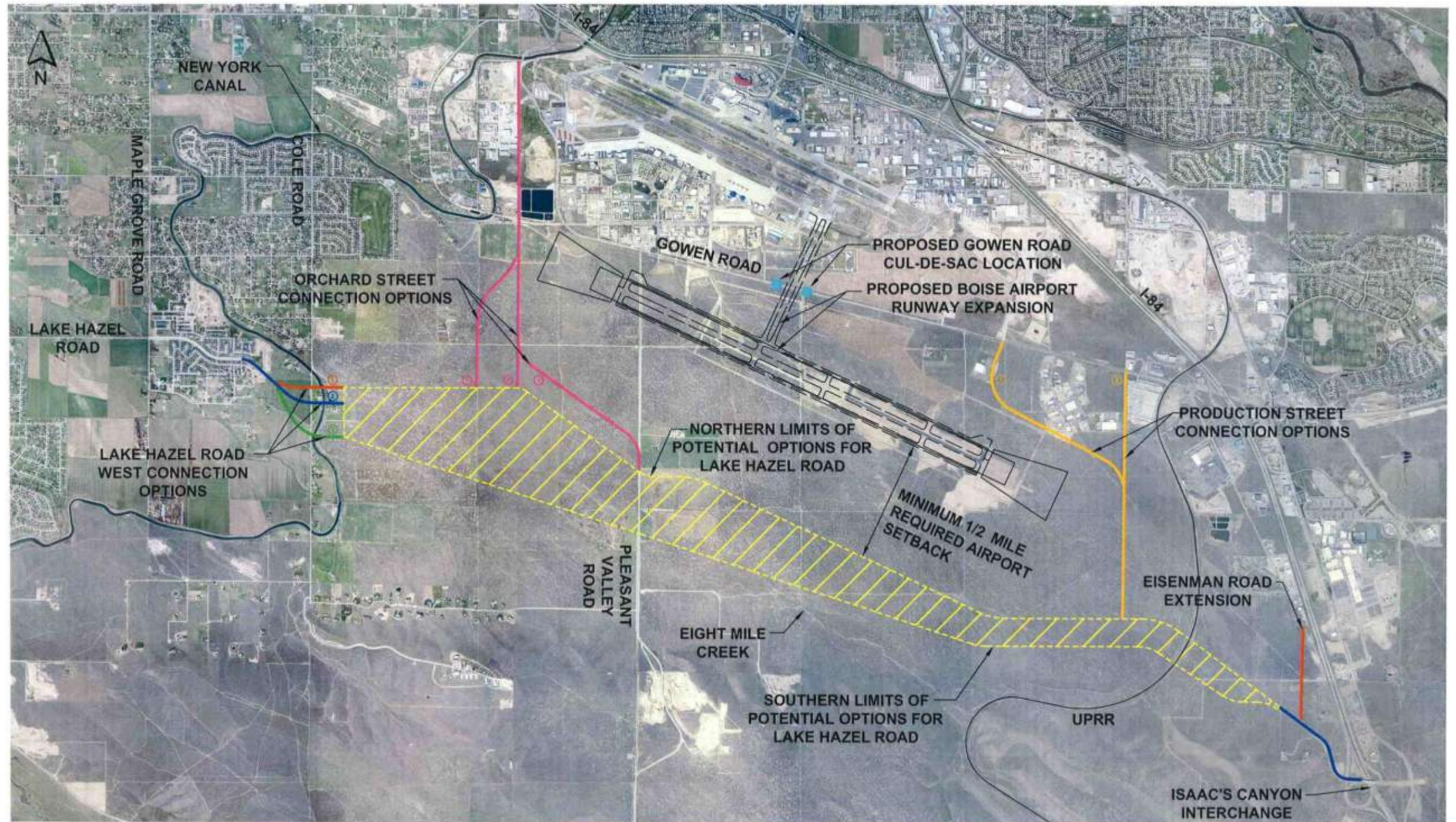


Figure 8-1. Alignment Alternatives

8.2 RECOMMENDED ALIGNMENT

The recommended Lake Hazel Road corridor and connecting road alignments were determined based on projected traffic and transportation needs, stakeholder comments, planned and existing developments, environmental impacts, and site constraints. Recommended alignments were determined for each segment of the Lake Hazel corridor to develop a single recommended alignment for the entire corridor. The recommended alignments are shown in Figure 8-2. Modifications to the recommended alignments may be considered in the future to maximize the efficiency of the roadway network as future developments are proposed. The recommended alignment minimizes impacts to the major features identified for each segment along the corridor and meets the criteria outlined by key stakeholders and developers along the corridor.

8.2.1 West Segment

Public comments, planned development and minimizing impacts to existing residences were key factors in selecting the north alternative as the recommended alignment for the west segment. The recommended alignment crosses Cole Road and the New York Canal approximately 500' south of the Cole Road crossing of the New York Canal. The close proximity of these two crossings will require Cole Road to be reconstructed between the Canal and the proposed Lake Hazel Road/Cole Road intersection. Based on concept roadway profiles and cross sections, it was concluded that the proposed intersection can be designed without exceeding 5% approach grades. Future grading footprints were analyzed to determine any potential impacts to existing structures. No impacts to structures were identified for the west segment recommended alignment.



8.2.2 Middle Segment

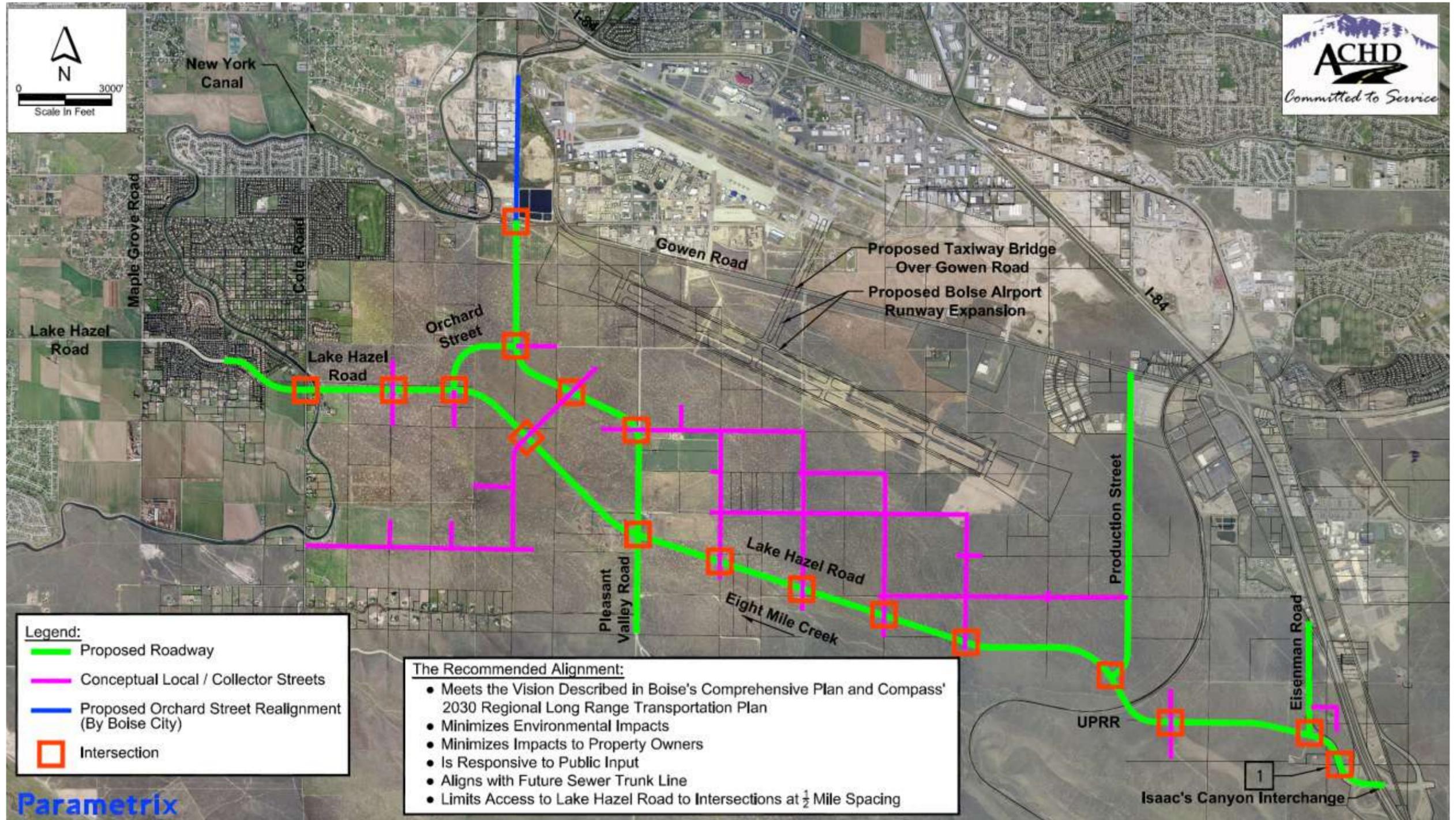
This segment has minimal design constraints. The most significant constraint along this segment is maintaining horizontal separation from the proposed runway identified in the Boise Airport Master Plan. The topography in this section is generally flat and there are no significant grade issues. The recommended alignment is approximately parallel to the proposed runway extension, maintains the required horizontal separation from the runway, and avoids impacts to Eight Mile Creek. This segment of the corridor has the most flexibility to accommodate alignment changes that may be proposed with future developments.

In the future, Boise City would like to construct a sanitary sewer trunk line in the location of the proposed middle segment of Lake Hazel Road. The City prefers to locate the sewer line within the future Lake Hazel Road right-of-way. It is essential that coordination with Boise City occur during future right-of-way preservation and design phases to ensure the right-of-way and road alignment will accommodate the sewer trunk line.

8.2.3 East Segment

The recommended alignment for this segment of the corridor integrates Boise City's proposed industrial development, minimizes the skew angle for the railroad crossing, and connects to the Isaac's Canyon Interchange. The railroad crossing is a significant design constraint for this section. Concept roadway profiles and cross sections indicate that this segment could be developed as either an at-grade or grade separated crossing. Lake Hazel Road should cross over the top of the railroad due to topography and drainage issues if a grade separated crossing is developed. It is likely that the railroad would require a grade separated crossing, which has been included in the cost estimates developed for this study.





1] Access was granted by ITD during the design and construction of the Isaac's Canyon Interchange.

Figure 8-2. Recommended Alignments

8.2.4 Connecting Roads

The alignments selected for the Orchard Street and Production Road connections to Lake Hazel Road were based on stakeholder and public preference as well as efficiency of the connection and minimizing impacts. Development of the Orchard Street/Pleasant Valley Road connection will require close coordination with Boise City to enable co-location of the roadway and a proposed sanitary sewer trunk line in the future right-of-way.



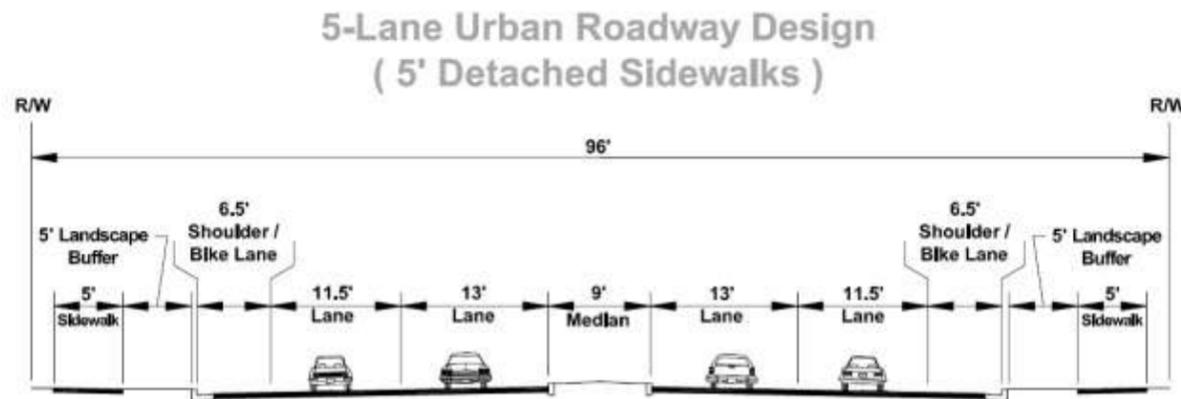
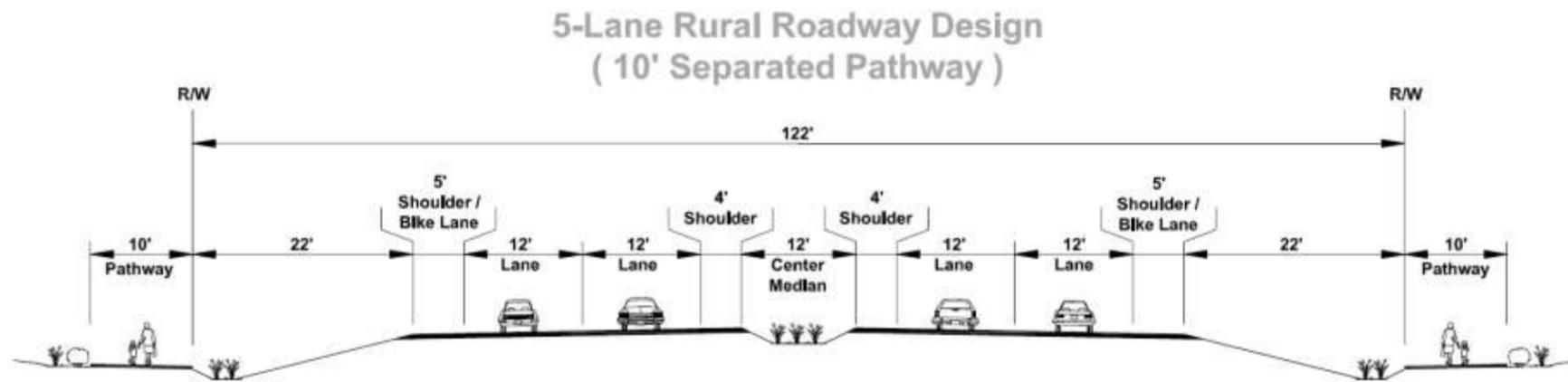
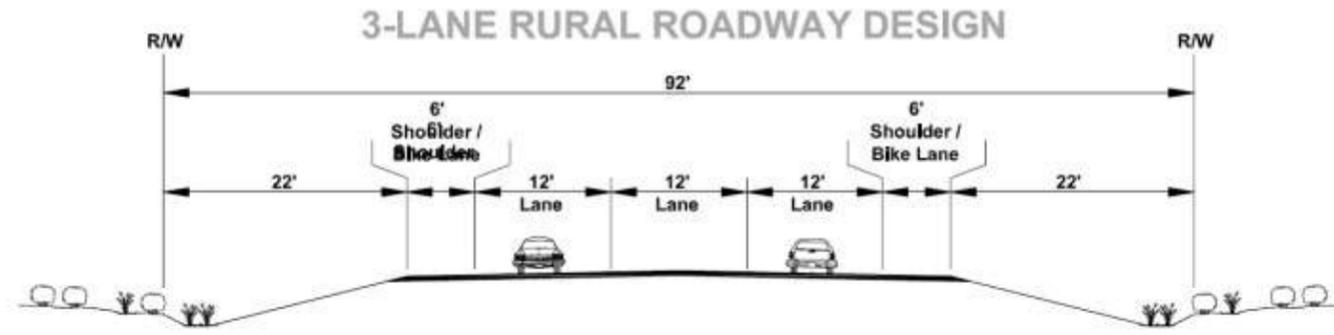
8.2.5 Roadway Typical Section

Lake Hazel Road is identified as a future principal arterial on the 2030 Regional Planning Functional Classification Map. ACHD's Development Policy Manual recommends a design speed of 50 mph for principal arterials. The traffic study conducted for this project recommends two travel lanes in each direction for Lake Hazel Road. ACHD's typical section for a five lane urban roadway is either a 90' or 96' right-of-way based on the use of attached or detached sidewalks. ACHD and Boise City prefer and recommend the use of detached sidewalks for typical sections used in the study area. ACHD has indicated they are willing to work with Boise City and developers to include detached sidewalks on Lake Hazel Road and to develop maintenance agreements for the maintenance of the planter strip. ACHD and Boise City also recommend accommodating bicycles in all typical sections used in the corridor. Due to the potential future land uses along the corridor, a rural roadway section with a 122' right-of-way width was also created for use in this study.

The five lane urban (96' right-of-way) typical section was used for estimating construction costs for the Orchard Street/Pleasant Valley Road extension and the west and east segments of Lake Hazel Road. The rural (122' right-of-way) typical section was used for estimating purposes for the middle segment of the Lake Hazel Road corridor. Construction costs for extending Production Street and Eisenman Road were based on a 92' right-of-way rural typical section with one travel lane in each direction.

The final roadway sections for Lake Hazel Road (Eagle Road to Pleasant Valley Road) and Pleasant Valley Road (I-84 to King Road), including number of travel lanes, will be determined by ACHD's Southwest Boise Transportation Study.

Typical section options are shown in Figure 8-3.



- Typical sections will vary throughout the corridor to compliment future land use
- Pedestrian and bicycle facilities will be built with any road construction
- Specific design features such as lighting and median treatments will be developed in the future
- Detached sidewalks will be considered as development occurs
- Wider landscape buffers may be considered when desired
- Access limited to intersections at 1/2 mile spacing

Figure 8-3. Typical Sections

8.3 ADDITIONAL DESIGN ELEMENTS

8.3.1 Geotechnical

The Geologic Reconnaissance Report included in Appendix G indicates that the study area consists of silts and clays overlying basalt. This is a general assessment of the area based on very limited data. Further geotechnical explorations and analysis will need to be conducted during future design phases. The conclusions from the Geologic Reconnaissance Report were utilized in this study for the concept roadway structural section and the structure foundation options.

8.3.2 Roadway

The roadway section was designed for a normal crown, except at curves, which were designed for a maximum 2% superelevation to reduce the curve radius and property impacts. Profile grades range between 0.4% and 3% except at the New York Canal and railroad crossings, which can be designed for a maximum 5% grade.

8.3.3 Drainage

The Drainage and Irrigation Analysis Report included in Appendix H provides specific details on the drainage issues and options associated with the corridor. Five Mile Creek and Eight Mile Creek are the primary drainages through the study area. These drainages can be accommodated with standard pipe culverts.



There are several viable options for collecting and treating drainage from the new roadways. Future drainage design will be based on the selection of an urban or rural roadway section. Collecting drainage in a standard closed conduit storm drain system with pipe and/or pond storage would likely be selected for urban sections of the corridor. This system may be modified by using seepage beds or outlets to drainage swales. Rural sections of the corridor can take advantage of roadside swales to be located in the rural right-of-way footprint. Availability of right-of-way, construction costs, and the ability to obtain parcels for pond sites will factor into the selection of a drainage system during future design phases.

8.3.4 Structures

The Structure Feasibility Analysis Report included in Appendix I provides specific details on the structure issues and options associated with the corridor. The recommended alternative for the structure crossing the New York Canal is a two-span prestressed concrete girder bridge. The recommended alternative for the Union Pacific Railroad overpass is a single-span prestressed concrete girder bridge. Further bridge type analysis should be conducted during future final design phases.

8.4 FUTURE STAKEHOLDER OUTREACH

Extensive stakeholder outreach was a key component of this alignment study. ACHD and Boise City should continue to involve stakeholders in the development of this transportation corridor as future design phases are implemented. Specifically, the Moonridge Subdivision has a vested interest in design details, such as pedestrian crossing signals, that can significantly improve safety and mobility. Coordination with the National Guard will also be critical since the Lake Hazel Road corridor crosses the National Guard's tank trail that currently parallels Pleasant Valley Road.



9. ACCESS MANAGEMENT & COLLECTOR SYSTEM

For an arterial road the management of access locations and their design is a critical element that impacts long term roadway capacity, public safety, and travel time. The intent of the Access Management Plan is to help ensure the proposed conceptual alignment for Lake Hazel Road operates well into the future as a principal arterial with acceptable levels of mobility and safety. The Access Management Plan Report, included as Appendix J, provides recommendations for managing access and the performance basis for those recommendations.

As a result of the corridor study, including an assessment of mobility needs, future land uses, traffic volumes, and an understanding of engineering principles of capacity and functional operation, a corridor specific access management plan has been developed for the Lake Hazel Road corridor. The access management plan recommends full movement access locations be located at public streets uniformly spaced at one-half mile intervals. The plan also recommends no other direct access, including right-in and right-out accesses, be permitted along the proposed Lake Hazel Road corridor. To support this level of access, the Access Management Plan Report includes planning recommendations for a system of local/collector streets that will be necessary to ensure the road system will work efficiently. Temporary access may need to be allowed to provide limited access prior to development of the Lake Hazel Road corridor and collector street system. However, it is critical that temporary access only be allowed with strict conditions allowing ACHD to permanently close the access when they deem alternative access is feasible. Developments should include connectivity to adjacent parcels and permanent access locations.

This level of access management will provide additional system capacity, minimize travel times, and reduce the frequency and severity of crashes. These performance measures will benefit existing and future development as well as the regional transportation network.

10. ADDITIONAL STUDY REGARDING ACCESS NEAR ISAAC'S CANYON INTERCHANGE

Near the completion of the Lake Hazel/ Gowen Alignment Study, Parametrix and Six Mile were directed by ACHD to investigate an access to the Proposed Lake Hazel alignment to the top of the bench near the Isaac's Canyon Interchange. This access does not meet the recommended ½ mile access spacing due to its proximity to the Eisenman Road Intersection and the I-84 EB exit ramp. However, ITD granted access to the developer in this location during the platting of the Issac's Canyon Interchange. Due to this circumstance, ACHD has agreed to approve access to Lake Hazel Road to the property owners at this location. However, this access should not set precedence for this project and the ½ mile access spacing should be adhered to for the rest of this corridor.

This additional investigation was to develop conceptual alignment options and identify feasible geometric design solutions for accommodating access in this location. The investigation also included a traffic study to determine the affects the potential access would have on traffic. Refer to Appendix K for the summary of the conceptual alignment study and the traffic study. The conceptual alignment study indicated that access is feasible at the following locations:

- proposed conceptual location for the Eisenman Road intersection with Lake Hazel Road
- relocated I-84 eastbound (EB) exit ramp that would have to be relocated to approximately 1,100 feet east of the proposed Eisenman Road intersection with Lake Hazel Road
- approximately 800 feet west of the I-84 EB exit ramp (approximately 1100 feet east of the proposed Eisenman Road Intersection with Lake Hazel Road)

The traffic study analyzed the proposed signalized, full-access development approach on Lake Hazel Road at this location. The proposed approach location is approximately 800 feet west of the I-84 eastbound (EB) exit ramp and approximately 1,100 feet east of the proposed Eisenman Road intersection on Lake Hazel Road. The results of the traffic study included the following:

A full-access approach with traffic signal control is not recommend at the proposed development approach location provided that Lake Hazel Road has multiple travel lanes and the I-84 EB Ramp intersection is operated as either a:

- Free flow ramp for the southbound right-turn movement or a
- Stop-controlled ramp for the southbound right-turn movement

The operation of the proposed development approach with full access, traffic signal control and multiple travel lanes on Lake Hazel Road would be allowed with the following conditions:

- Traffic signal control for the southbound right-turn movement at the I-84 EB Ramp. It would have dual right-turn lanes and operate like the westbound right-turn movement at the I-84 Ramp intersection on Eagle Road, where right-turns on red are prohibited. ITD would have to approve this right-turn treatment.
- Traffic volumes that result in westbound left-turn vehicle queue of less than 300 feet at the development approach intersection. Traffic volume estimates for this condition are shown in Figure 2 of the Traffic Study summary included in Appendix K and correspond to approximately 15,000 vehicles per day (two-way volume) on the proposed development approach's south leg when Lake Hazel Road reaches the COMPASS 2030 forecasted volume of approximately 43,000 vehicles per day. These estimates are based on the intersection lane configuration shown on Figure 3 of the Traffic Study summary included in Appendix K with 3,110 vehicles per day on the north development approach. Any changes to these factors will result in different traffic volume estimates. However, designs, proposals, traffic studies and engineering reports related to all property owners' development applications will be evaluated in determining any traffic volume limitations.

With two/three lanes on Lake Hazel Road, the signal control at the development approach should meet the following conditions:

- Stop-controlled ramp for the southbound right-turn movement as an interim measure until the ramp intersection warrants other control measures.
- Traffic volumes that result in a westbound left-turn vehicle queue of less than 330 feet at the development approach intersection.

If the proposed intersection location meets traffic signal warrants and is approved by ACHD it should be entirely at the developers' cost. If the traffic volumes for the intersection approaches mentioned above are exceeded, ACHD may limit/restrict future access unless additional system improvements are made.

11. ESTIMATES OF PROBABLE CONSTRUCTION COSTS

Construction cost estimates were prepared for the recommended Lake Hazel Road and connecting road alignments. These estimates are based on a concept study level of design and will change as preliminary and final designs are developed. All costs are given in 2007 dollars and should be adjusted for inflation prior to programming future projects. These costs do not include improving the existing section of Lake Hazel Road between Maple Grove and the east terminus of Lake Hazel Road. These costs also do not include costs for design and right-of-way.

Table 1. Estimated Construction Cost

| Road Section/ Item | Length (Miles) | Estimated Construction Cost |
|--|------------------|-----------------------------|
| Lake Hazel Road Extension (Lake Hazel to Orchard) | 1.50 | \$9,500,000 – \$11,000,000 |
| Lake Hazel Road Extension (Orchard to Production) | 4.50 | \$13,600,000 – \$16,000,000 |
| Lake Hazel Road Extension (Production to I-84) | 2.00 | \$13,400,000 – \$15,500,000 |
| Orchard Street Extension | 1.50 | \$5,300,000 – \$6,200,000 |
| Pleasant Valley Road (Lake Hazel to Orchard) | 0.75 | \$900,000 – \$1,000,000 |
| Production Street Extension | 2.00 | \$2,400,000 – \$2,800,000 |
| Eisenman Road Extension | 1.50 | \$5,300,000 – \$6,200,000 |
| | Study Area Total | \$50,400,000 – \$58,700,000 |

12. CONCLUSIONS

The traffic analysis conducted with this study supports the need for the extension of Lake Hazel Road that has been identified by COMPASS in the regional transportation planning model and functional classification map. The extension of Lake Hazel Road provides ACHD and Boise City an opportunity to implement access management strategies on a principal arterial without impacting existing land uses. Requiring future development to incorporate the one-half mile access spacing and other access management recommendations from this study is a critical element for providing an efficient corridor that will serve the long term transportation needs of the study area.

The corridor is currently located in an undeveloped area. However, this section of southeast Boise is a prime location for future development. As development occurs, the recommended alignment may be modified to fit with development plans as long as the mobility needs of the corridor are met and design constraints are not violated. The recommended alignment in this study should be adopted by ACHD and Boise City as soon as possible in order to preserve the corridor.