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Chapter 4 The Nevada State Freight Rail Strategic Plan

Chapter 4 presents the Freight Rail Strategic Plan portion of the Nevada State Rail Plan. The 13 innovative approaches described in the Blueprint for Action are applied here to accelerate statewide freight rail development and funding.

A. Meeting the Opportunity of Rail Development

The new Nevada State Rail Plan (NVSRP) is informed by a well-grounded perspective that there is ample private-sector capital available for good rail projects.[1] Unconstrained by the usual mindset that there is not enough money, the NVSRP moves the state into a proactive, and therefore cutting-edge relationship with its freight rail system and the marketplace. Nevada's abundant resources, particularly of land and its many above- and below-ground uses, present an ideal foundation for a rail-enabled economic and environmental improvement strategy. More than a rail plan, the NVSRP is designed to make a vital contribution to Nevada's recovery from the pandemic-induced economic crisis.

The NVSRP illuminates the path for sustainable growth of rail in Nevada and the United States. Historic shortsightedness in U.S. transportation policy and commerce has limited the high-return opportunity of using more rail to serve Nevada's burgeoning development. This service gap occurs in different manifestations across the country, not just in Nevada. As robust as the rail industry is in North America, there are significant benefits yet to be tapped from railroads' energy, capital, labor, and space efficiency for moving goods and people over land. Optimizing the use of the wheel is key to using land conscientiously, thereby capitalizing on efficiencies that will deliver a cascading array of benefits to Nevada's economy and environment.

United States freight railroads and services are some of the more stable and attractive investments in the world, yet the industry remains underutilized.[2] It *can* be supported in becoming a high-growth, high *social* return industry, if leaders within the industry itself and government act and invest in the best interests of current and future generations. In this critical moment of battered public-sector budgets, funding for freight rail projects is available from well-capitalized private-sector investors and lenders who are eager to invest in rail infrastructure. This Freight Rail Strategic Plan has been structured to attract and facilitate a surge of private-sector investment in Nevada's rail infrastructure to help the state's businesses grow rapidly and sustainably.

A clear-eyed awareness of current societal challenges is required to bring context to this opportunity. Innovation and collaboration are now strategic imperatives for businesspeople, citizens, and government staff to work together to solve major social issues. Transportation congestion, mounting costs for building and maintaining roads and highways, air quality challenges, and supply chain imperatives are some of the multifaceted infrastructural issues that can only be solved with the pragmatic collaboration that has been modeled during the development of the 2021 NVSRP.

Two hundred and thirty stakeholders, including many of the largest industrial land developers and shippers in the state, participated in the Nevada State Rail Plan process. These stakeholder's participation has been motivated by a shared interest in advancing "good rail projects." The Freight Rail

[1]Investable Universe, "Hot Rails: Private Equity's Boxcar Barons See Deals in U.S., Europe" article, source link, published August 12, 2020.
[2]Bezinga website, "Best Railroad Stocks" article, source link, published June 2, 2020.

Strategic Plan is designed to support those rail projects that expand access to the marketplace, improve operations, and contribute to the quality of community life. Nevada, working collaboratively among its many energized stakeholders can benefit greatly from an additional influx of private-sector capital for new infrastructure and commerce. The process of creating the NVSRP has established the system and tool set that empowers stakeholders to think and work together on this rail-enabled economic and environmental improvement strategy. The rest of this chapter illuminates the fundamentals of this strategy, with the next section highlighting the value of engagement with key stakeholder groups.

B. Radical Inclusion Is a Fundamental Building Block

Recognizing rail opportunities, defusing problems, and identifying knowledge gaps statewide require a team of partners. A fundamental building block of NVSRP's success is its orientation toward including "All", rather than "Some" parts of a state in a rail plan. Planning efforts typically apply value assessments whereby only the "highest rated" regions and projects are funded and advanced. The NVSRP illustrates that *all* of the track miles of a state's railroads comprise a connected system. This aligns with the perspective that all communities make valuable contributions to a state's well-being. It is eminently practical and responsible to include all miles, and even feet, of track as well as all regions, towns, and projects. The NVSRP has advanced with radical inclusion in its outreach and coordination strategies. The following is an explanation of why such extensive engagement was conducted.

B-1. Radical Inclusion Part 1: *Businesses and Industries*

The NVSRP has centered its outreach on the business community in Nevada in preparation for optimizing entire supply chains and transportation corridors. It is impractical and wasteful to advance rail plans on an individual project basis. The NVSRP deploys "Collaborative Infrastructure Development" that aggregates the logistical needs and opportunities of individual businesses into viable regional and corridor rail development plans. Projects and operating plans must be developed collaboratively to achieve the volume necessary to warrant rail infrastructure investment and Class I engagement.

Collaboration begins with engagement and dialogue. For example, business leaders throughout the state have been asked about sharing existing or new rail facilities, even proprietary facilities with businesses having complementary logistics needs. Their chorus of replies reflected a genuine intrigue with the concept. Aggregating shippers to share the use of rail facilities also establishes the critical mass of railcar volumes essential for railroads to justify new or improved rail service.

Establishing this degree of transparency and trust requires earnest and robust stakeholder engagement. Businesspeople are wary of sharing their plans unless they are engaged in interpersonal dialogues. Typical state rail plan stakeholder outreach is conducted through town hall meetings, poster presentations, surveys, and relatively few interviews. These methods provide a limited window through which one might see the rail growth opportunities in a state. The NVSRP incorporates a comprehensive communications strategy that includes email and telephone contact, knocking on doors, and meeting to connect *personally* with stakeholders. From the outset, stakeholders who have contributed to the NVSRP have not simply been surveyed for their input—they have been engaged in an ongoing partnership for rail development.

Even as the NVSRP goes to print, new stakeholders with roles in logistics-oriented commerce, development, and planning in Nevada continue to be brought into the effort. The most sustainable policies, programs, and strategies are developed from input that elevates and incorporates all

perspectives. Throughout the state of Nevada, stakeholders have enthusiastically expressed appreciation for this opportunity to contribute and collaborate.

> "And most importantly, I want to say how much I appreciate that NNRDA has been allowed to provide so much input in this process."
>
> ~ Sheldon Mudd, Executive Director, Northeastern Nevada Regional Development Authority

B-2. Radical Inclusion Part 2: *Key State Policy Makers & Private Sector Influencers*

Key Nevada policy makers and influencers, as well as business and community stakeholders collaborated to advance the likelihood that rail plan recommendations will be embraced and enacted. For example, support was gathered for the NVSRP's transportation and land use policies and plans through focused outreach to the Nevada State Land Use Planning Advisory Council, land developers throughout the state, local and county elected leaders, and professional urban and rural planners. Likewise, the NVSRP's Mining Materials Supply Chain Logistics Strategy has been discussed with the Nevada Division of Minerals, the Nevada Mining Association, The Mackay School of Earth Sciences, and many mining companies and suppliers.

B-3. Radical Inclusion Part 3: *County Planners and Economic Development Agencies*

Regional, county, and local economic development and planning staff field many early-stage opportunities when rail logistics knowledge can inform a business's optimal choice of location and transport mode. Nationally, these key staff have a generalized belief that rail-based development is good for the economy and the environment. However, their understanding of many of the unique aspects of rail development is typically limited due to a dearth of academic and professional education in rail transportation. Rail planning depends on providing these participants with this relevant knowledge.

B-4. Radical Inclusion Part 4: *Land Developers and Landowners*

The optimal use of freight railroads begins with informed conception of logistics services at each property. With land in Nevada undergoing rapid industrial development, there is a compelling and urgent call to engage with landowners on how freight and people will move to, from, and within their sites. The NVSRP team has met over the course of the last year with the largest landowners and developers in the state, including the developers of the 110,000-acre Tahoe-Reno Industrial Center in Sparks, the owners of the 70,000-acre planned Innovation Park, and the managers of Clark County's 17,000-acre Apex Industrial Park. The NVSRP team engaged with developers controlling over 650,000 acres who have stepped into ongoing dialogue for advancing rail-enabled development.

C. Supply-Chain Infrastructure Planning

Transportation Infrastructure Can Be Conceived to Support Whole Supply Chains

The United States enjoys an abundance of natural resources and robust private-sector commerce, accompanied by an ongoing increase in truck activity. Consequently, transportation departments in every state are struggling to fund road construction and maintenance to keep up with growing road wear and congestion. Meanwhile, the country benefits from a freight rail system that is almost entirely funded and maintained by the private sector. Given the critical role of transportation infrastructure in our nation's most important supply chains, it is imperative that states lead the transition to a balanced

use of roads and rail. Nevada's current surge of industrial development and its adjacency to California and west coast ports present a rich opportunity to plan infrastructure for supply chain optimization that minimizes the public costs and community impacts of this growth.

What is commonly called "supply chain optimization" has been narrowly focused on individual companies' material sourcing and product distribution. Consequently, in 21st century North America, neither the marketplace nor the public sector has been able to comprehensively plan infrastructure for efficient supply chain systems.[3] For example, in 2008 at the height of America's ethanol-production boom, hundreds of billions in investment capital poured into the ethanol industry to fund individual "competing" infrastructure projects. Ethanol production skyrocketed while the ad hoc transportation and distribution system remained inadequate for meeting the nation's important energy needs.

Nevada's long-standing mining industry presents a compelling opportunity to apply "whole systems" supply chain infrastructure planning. Section C.2 describes the NVSRP's *Mining Materials Supply Chain Logistics Strategy*. Nevada's mines in the 21st century have become a global provider of silver, gold, copper, and "strategic minerals" critically needed for electronics and alternative energy systems. Supply chain infrastructure planning will bring transportation efficiencies and enhanced market access to Nevada's mining industry. This opportunity has been well-received across the industry. During a NVSRP Regional Meeting, the North American head of logistics for a Nevada gold mining company expressed their company's "interest in connecting with their South American operations" via rail through west coast ports. Nevada has a timely opportunity to expand and diversify its commercial base by empowering its mining industry with a rail-enabled logistics system that connects producers, suppliers, and customers across the state and world. The logistics system to be forged by the *Mining Materials Supply Chain Logistics Strategy* would also allow Nevada to retain more value in the supply chain as it enables an expansion of in-state "Beneficiation." Beneficiation refers to the economic and environmental improvements experienced by natural resource-producing regions when moving up the mining value chain. Section C.2 provides a global perspective on Nevada's Beneficiation opportunity. First is an overview of the state's mining activity.

C-1. Nevada's Mining Industry – Overview & Trends

Mining continues to be a major industry in the Nevada economy with an $8 billion gross value of produced minerals in 2018.[4] For the past 5 years, Nevada mining has consistently ranked in the top 10 in global investment attractiveness, including a 3rd place ranking in 2019.[5] The mining industry provides a fairly small share of overall Nevada employment (1.2% in 2016, predominantly in rural communities). However, the two major mining companies, Barrick Mining and Newmont Mining, both consistently rank in the top ten highest assessed taxpayers in the state. This speaks to the fact that the mining industry is a powerful economic contributor to Nevada.

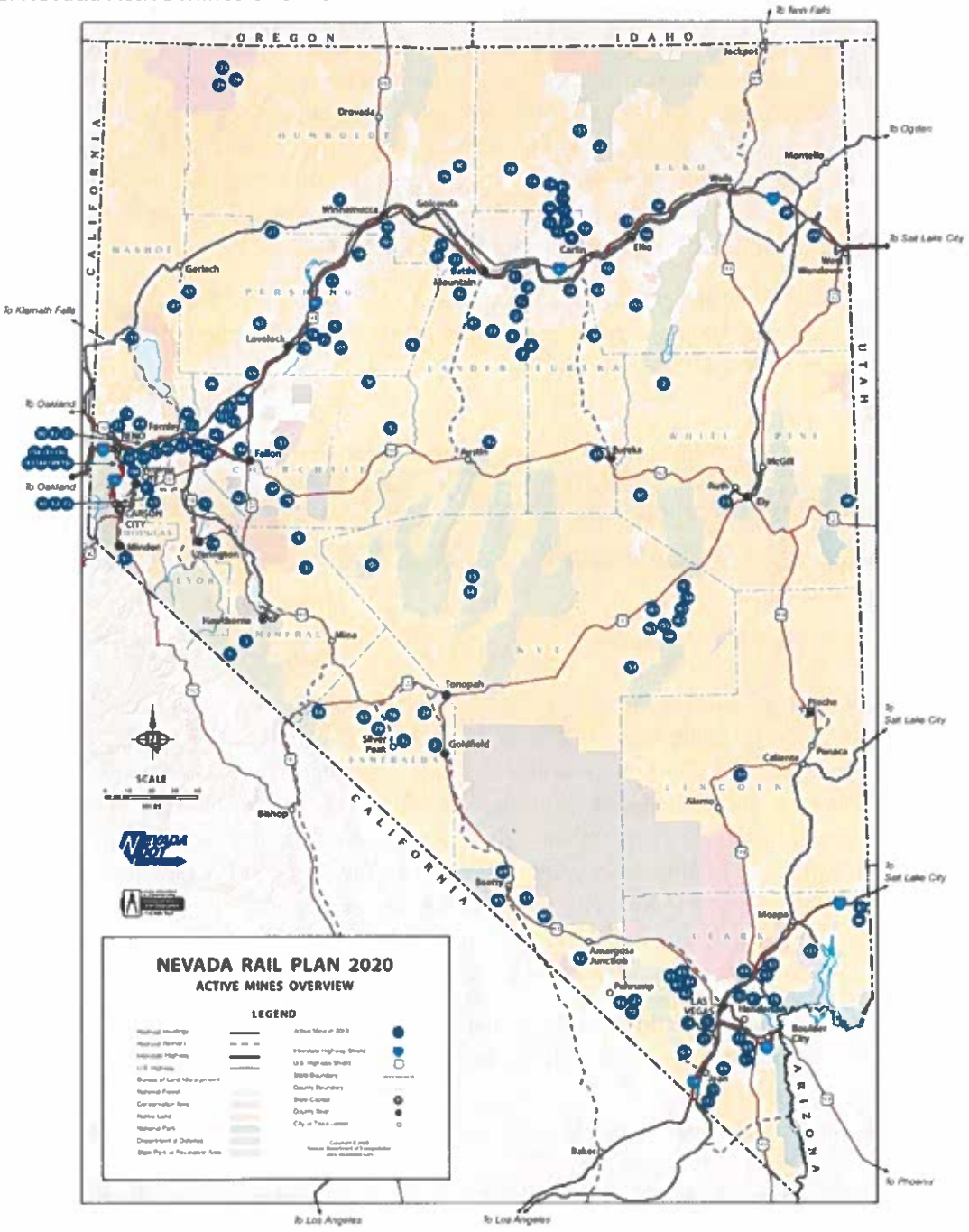
[3] Vimmerstedt, Laura J.; Bush, Brian & Peterson, Steve, "Ethanol Distribution, Dispensing, and Use: Analysis of a Portion of the Biomass-to-Biofuels Supply Chain Using System Dynamics", PLoS One Journal, source link, published May 2014.

[4] Nevada Commission on Mineral Resources – Division of Minerals, Report "Major Mines of 2018", source link, page 26.

[5] Fraser Institute Survey of Mining Companies, 2019 Annual Survey of Mining Companies, source link.

Currently there are 20 major minerals mined in Nevada with 103 active mining sites as of 2018, shown in the map below.[6]

Figure 4-1: Nevada Active Mines Overview



[6] Nevada Mining Association website, source link, website accessed July 9, 2020.

Gold, silver, copper, barite, magnesium, and, increasingly, lithium are among the more important minerals mined, based on revenue and production. Nevada is the fifth largest gold producer in the world and is responsible for 83% of U.S. gold production.[7] Nevada ranks second in geothermal energy mined in the U.S. (California is the top producer).

Due to stable prices, conducive regulatory environment, and continued population growth, the Nevada mining industry in gold, silver, etc. is projected to continue to be strong for many years to come. The projected exponential demand in electric vehicles and batteries will require significant increases in lithium and copper production.[8] In 20 years, 56% of all light-duty commercial vehicles and 31% of all medium-duty commercial vehicles are projected to be electric. [9] Demand for copper in vehicles is expected to increase by 1,700 kilotons by 2027. Tesla operates their "Gigafactory", a lithium-ion battery and electric vehicle subassembly factory in Sparks. Nevada has the only mine producing lithium in the U.S., called the "Lithium Hub", located near the Tesla Gigafactory facility.

The Nevada Department of Employment, Training and Rehabilitation projects 2026 employment in the Natural Resources and Mining sector to be stable at a 1.1% employment share of the overall state workforce compared to a 1.2% share in 2016.[10]

Table 4-1: Nevada Long-Term Industrial Employment Projection from 2016-2026[11]

Industry Title	2016 Employment	2016 Employment Share (to all NV Industries)	2026 Employment	2026 Employment Share (to all NV Industries)	2016-2026 Total Change
Natural Resources & Mining	16,671	1.2%	18,345	1.1%	+1,674

C-2. Mining Materials Supply Chain Logistics Strategy

Elevating the planning focus from individual projects to encompass the whole network of mining industry supply chains will deliver measurable financial, economic, environmental, and social benefits to Nevada's businesses and communities. The foundation for this supply chain strategy exists as Nevada already engages in vigorous cross-sector collaboration among its mining industry, government, and academia. The Nevada Mining Association, the Nevada Division of Minerals, the Nevada Bureau of Mines and Geology and the Mackay School of Geology and Earth Sciences collaborate with each other and with the many mining and mining supply companies in the state. Each of these organizations has provided input into the *Mining Materials Supply Chain Logistics Strategy*.

Following is an inquiry-based outline of the analytical process for "mapping" the Nevada mining industry and improving its supply chain efficiencies and opportunities. This supply chain mapping will guide

[7] Nevada Commission on Mineral Resources – Division of Minerals, Report "Major Mines of 2018", source link, page 23.
[8] Nevada Commission on Mineral Resources – Division of Minerals, Report "Major Mines of 2018", source link, page 26.
[9] Nevada Mining Association, Presentation "Mining Through Uncertainty", source link, page 98.
[10] Nevada Department of Employment, Training and Rehabilitation, 2016-2026 Long-Term Employment Projections, source link.

Nevada to a system for transporting and distributing mining materials before and after extraction and will inform the smartest siting of new processing and manufacturing facilities.

Mapping the current mining materials and supply chain

1. Where is each mine located in the state?
2. What company owns each mine?
3. What company operates each mine?
4. What activity is going on at each mine? What materials are mined?
5. What supplies in what quantities are brought into each mine?
6. Where do those supplies originate?
7. What transportation mode(s) and facilities are used for each supply item?
8. What ore elements and volumes are produced at each mine?
9. At which mines are the ores currently refined onsite?
10. If refined onsite, where and how are the refined minerals shipped?
11. Where are the in-state and out-of-state processing, refining, and smelting facilities?
12. Where and how is each ore element transported to offsite refining or smelting?
13. What quantity and type of byproducts are generated at each mine and where and how are they shipped?
14. What quantity and type of waste products are generated at each mine and how and where are they disposed?

Mapping the materials and supply chain for mines in development

15. Apply the same questions above to mining projects, proposed or in development

Mapping current transportation, storage, and distribution facilities

16. Where are the in-state rail- and truck-served mining supply warehouse and unloading facilities?
17. Where are the in-state rail- and truck-served mining materials distribution and storage facilities?

Discerning the optimal mining materials and supply chain logistics system

18. What are the requirements and metrics for mining supply provision?
19. What are the requirements and metrics for mining materials transportation?
20. What are the requirements and metrics for mining materials storage?
21. What are the requirements and metrics for mining materials distribution?
22. What is the competitive landscape of mines in the state?
23. What new supply chain developments would enhance mining operations?
24. Where can new rail line construction enhance mining operations and minimize transportation costs and impacts?
25. Where can new rail loading facilities enhance mining operations and minimize transportation costs and impacts?
26. Which communities and residents should be included in evaluation of siting new facilities and infrastructure?

Diversification and Beneficiation—logistics for new processing and associated product manufacturing

27. Where can new smelting, processing, or refining facilities be optimally located in relation to the needs, benefits, and impacts of transporting mining products, by-products, and waste streams?
28. What new associated product manufacturing facilities are made viable by Nevada's mining activity and location in the market?

29. Where can new associated product manufacturing facilities be optimally located in relation to the rest of the supply chain?

The *Mining Materials and Supply Chain Logistics Strategy* outlined above can be a collaborative effort among the University of Nevada-Reno, the Nevada Mining Association, and the Nevada Bureau of Mines. The Nevada Mining Association's co-sponsorship of the project will go a long way toward fast-tracking the effort and minimizing the staff time required to map out the entire mining supply chain system. Conversations in the state during the development of the NVSRP has provided early indications that the project is well-received by the association and its members. An efficient budget could be funded by a combination of potential sponsors such as the Governor's Office of Economic Development, the Nevada Mining Association, individual mining company sponsors, and Nevada charitable foundations. Several federal agencies that offer planning grants, such as the U.S. Department of Agriculture, particularly for rural areas, may be motivated to co-fund this innovative effort as well.

Rail lines and rail-served transload, storage, and distribution facilities conceived to improve efficiencies and expand opportunities for Nevada's entire mining industry will provide the infrastructure backbone for beneficiation, a transformational enhancement of the state's economic well-being.

C-3. Beneficiation of Nevada's Natural Resource Economy

The western states of the U.S. are rich in primary mineral resources and thereby make a significant contribution to the wealth and economic security of the nation. These extractive resources are abundant and varied, ranging from volume aggregates to high value precious metals. Whereas the agricultural Mid-West and Great Plains are America's breadbasket providing food security for the nation, the western states provide a similarly important resource security. Thanks to this natural endowment the U.S. does not suffer the same vulnerability of other global economic powerhouses such as China, Japan, and India who are far more dependent on importing primary resources.

The value of extractive goods, especially the non-oil resources found in Nevada and other western states, goes beyond economic security and resource self-sufficiency. Materials from aggregates to copper to lithium to silver are crucial feedstocks to U.S. manufacturing, technology, and construction industries as well as a major revenue earning export.

Despite this disproportionate economic importance and value contributed by Nevada mining, the state is one of the lowest contributors to U.S. gross domestic product (GDP).[12] This dichotomy is partly explained by the methodology employed in GDP calculations, but it also reflects how the state is not taking full advantage of its significant natural resource endowment. The state has a strong mining focus concentrated on the initial stage of a four-phase value chain which starts with extraction and moves through processing to manufacturing and distribution. There are historic reasons why the development of Nevada focused on extraction but looking ahead there is a clear opportunity to change the dynamics of the resources supply chain, bringing more of the higher value activities into the state.

There are economic and environmental benefits for Nevada's embrace of higher value activities. This is referred to as "Beneficiation", an economic development term for a strategy that leverages an existing sector to create additional jobs and economic activity in subsequent stages of the value chain. In the

[12] Statista website, "Which States are Contributing the Most to U.S. GDP?" article, source link , published June 8, 2020.

resources sector, this often means creating new industries that process a region's resources locally rather than simply exporting raw materials. In the case of gems, this could involve cutting and polishing the stones. For metals, it could be building capacity in the refining and manufacturing processes. As highlighted by the Nevada Bureau of Mines 2018 report, "Opportunities for Precious Metals Toll Processing and Copper Concentrate Processing in Nevada"[13]...

> "...a case could be made for establishing a concentrate processing facility in Nevada, if production from other western states that is now exported and the potential production from undeveloped resources in Nevada and other states are considered along with the current Nevada production.
>
> "Development of a concentrate processing facility may attract downstream copper facilities such as rod plants, wire manufacturers, brass mills, and copper-alloy manufacturers."
>
> "Transportation of concentrate to a new processing facility requires accessibility to highway and rail systems."
>
> "Tentatively, a swath of potential locations along the I-80 corridor west from Wells west to about Fernley then south between highways US-95 and US-95A toward Yerington is initially proposed. At first look, this swath of land appears to provide access to transport and utilities required to support a processing facility. Potential areas for siting a concentrate processing facility are highlighted on the map on figure 1. These areas have access to highway and rail systems, the electrical grid, and natural gas pipelines as well as having no current sources of air emissions within the boundaries of the basin."

Although local beneficiation is often recommended in development strategies for resource rich but economically poor countries in Africa, Asia, and South America it is equally applicable to major economies such as Canada or Australia, and it is highly applicable to Nevada.

The state's rail strategy is key to realizing the economic development advantages of beneficiation. Advancing higher value industries requires an effective and reliable freight transportation network with sufficient capacity and scalability to support growth. This growth can only be served when Nevada's rail network is augmented to accommodate rail movement between in-state businesses. As pointed out in the freight data analysis reported in Chapter 2, the share of intra-state freight rail activity (originate and terminate the same railcar load of freight within the state) is currently about .25% of overall rail traffic in Nevada.

Fortunately, as described in Chapter 2, Nevada enjoys an existing core of rail infrastructure including operational and dormant freight lines and sidings, as well as relatively attractive topography for building new rail connections. Therefore, rail can be a powerful catalyst for a successful beneficiation program in Nevada, providing the robust freight infrastructure necessary to support inbound, outbound, and intra-state supply chain movements. Without rail, beneficiation will be limited by the constraints of road-based transport and its consequent environmental and congestion impacts.

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[13] Nevada Bureau of Mines and Geology, Report 57: "Opportunities for Precious Metals Toll Processing and Copper Concentrate Processing in Nevada", source link, accessed August 26, 2020.

The economic benefits are significant for the state. By expanding up the mining value chain, Nevada will realize increased employment, a greater diversity of jobs, higher salaries, and increased state tax revenues from a growing business sector and expanding population. These benefits create a virtuous circle whereby greater state revenues fund improvements in infrastructure attracting even more businesses and residents.

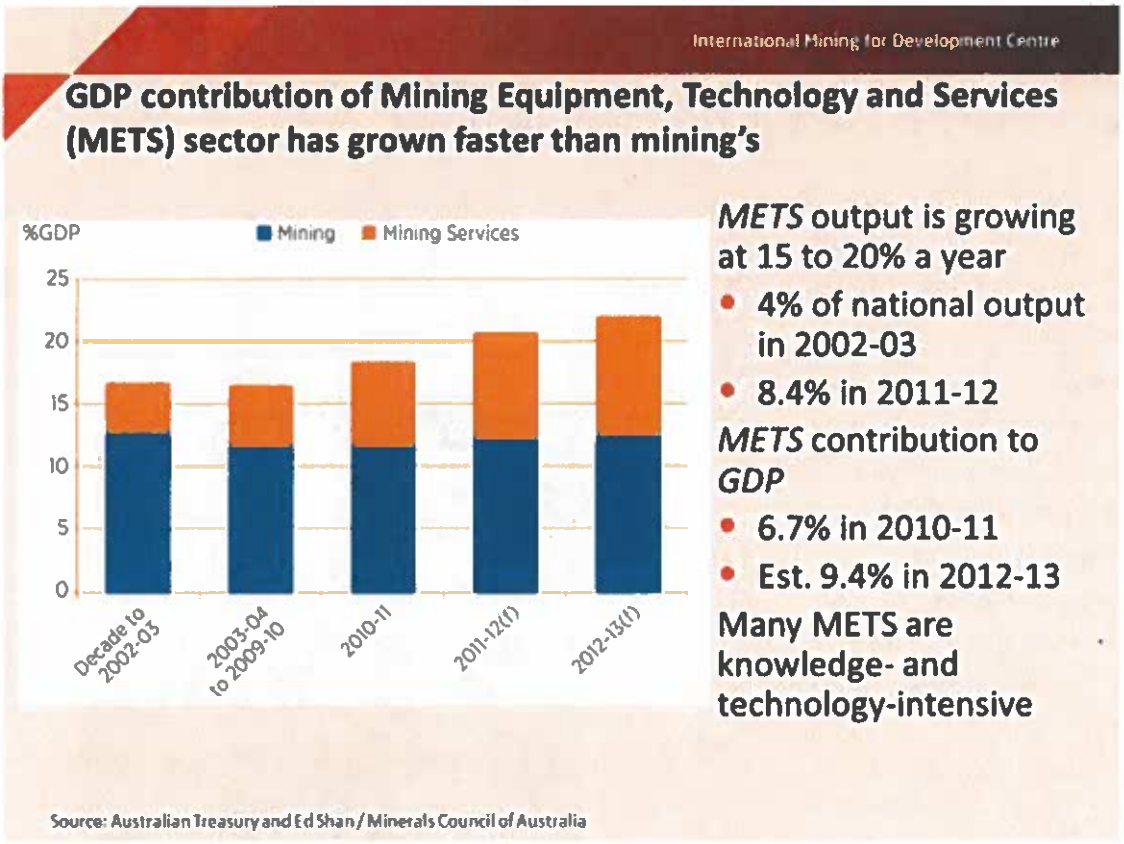
The relative impacts of beneficiation differ by commodity but can bring substantial economic growth to all primary extractive resource sectors. Case studies, research, and analysis around the world demonstrate that any movement up the value chain generates economic benefit. The greatest economic benefits derive from the increased value of added-value processing and manufacturing. One example is when the Indonesian government restricted the export of raw nickel ore, bauxite, and tin in 2014 to encourage the development of local processing capacity. This resulted in exports of refined metals growing at an annual average rate of 9.2% over five years (to 2019), from $9.3 billion to $13.4 billion.[14] In 2019, China implemented policies to reduce exports of raw rare earth elements, triggering new economic development from downstream processing of products such as magnets, catalysts, alloys, and glass. South Africa has also attempted to develop a diamond cutting and polishing sector by restricting licenses for the sale of mined diamonds.

Examples of beneficiation are not limited to the developing world. In 2003 the Australian government sought to move up the extractive industry value chain to reduce commodity price volatility and over-dependence on the export of raw extracted materials to China. The country took creative steps to bring diversity and high value production into its mining states. One successful approach took advantage of mining industry clusters to create a Mining Equipment, Technology and Services (METS) sector. The METS sector has grown into a major economic contributor for Australia, growing at double the rate of the mining sector and contributing an equal share of GDP by 2012.[15] See the tables below from the International Mining Development Centre/World Bank.

[14] Mining.com website, "Indonesia moving up the mining value chain – report", source link, published July 28, 2020.

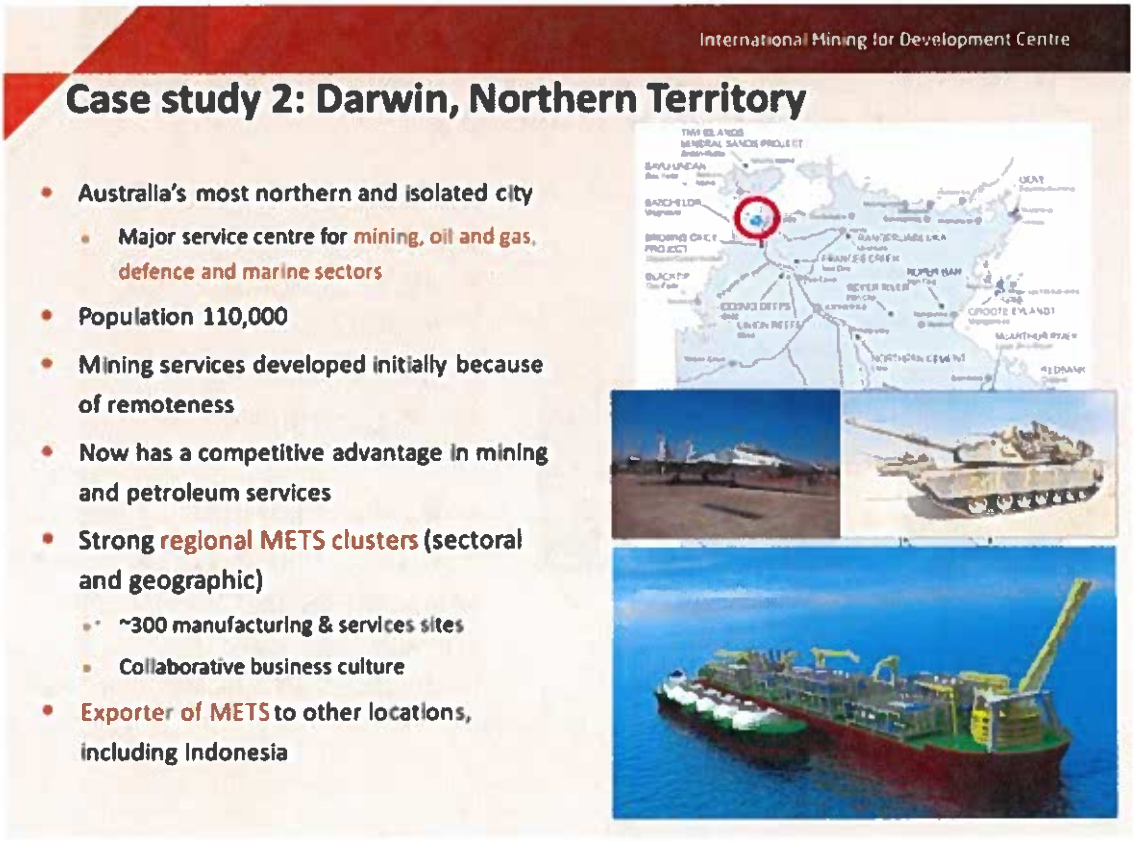
[15] International Mining for Development Centre/World Bank, Presentation: "Enabling the development of industrial capacity: Resource corridors, clusters and SEZs", source link, accessed August 26, 2020.

Table 4-2: GDP contribution of Mining Equipment, Technology and Services Sector[16]



[16] International Mining for Development Centre/World Bank, Presentation: "Enabling the development of industrial capacity: Resource corridors, clusters and SEZs", slide 4, source link, accessed August 26, 2020.

Table 4-3: METS Case Study 2 – Darwin, Northern Territory[17]



This Australian example shows that the opportunities for economic benefits from beneficiation expand to new and aligned industries in addition to direct downstream manufacturing. A further benefit is that diversifying economic activity up the mining value chain reduces the impact of fluctuating commodity prices on the state's economy. Having such downstream industries in-state provides diversity which reduces the proportion of output affected by often-volatile commodity prices in a global market.

Nevada is positioned to benefit substantially from beneficiation simply because it's location in the continental United States gives it direct access to North America, the world's largest economic zone. Having such a large market means Nevada depends far less on international exports than other developed, resource-rich countries such as Australia and Norway. A dependency on exports gives leverage to the importing nations who will seek to keep a greater share of economic value by importing raw materials rather than processed or manufactured product. For Nevada, a huge and free internal North American market, connected by transcontinental transportation corridors, removes this constraint, and clears a path for developing an economy which moves up the vertical value chain.

In addition to the economic factors, there are clear environmental benefits as well. Nevada's roads are increasingly congested, and air quality is suffering. High volume road movements of extracted materials trucked to out-of-state facilities, primarily in California is a prime cause of these impacts. These truck

[17] International Mining for Development Centre/World Bank, Presentation: "Enabling the development of industrial capacity: Resource corridors, clusters and SEZs", slide 8, source link, accessed August 26, 2020.

movements, in coordination with a robust expansion of the intra-state rail network, would be redirected to far shorter, less environmentally damaging local road and rail hauls to in-state facilities. Moreover, the additional revenues from beneficiation would fund investments that improve the road and highway network and its integration with rail.

C-4. Nevada's Other Commodity Supply Chains

Mining, as Nevada's largest user and producer of materials that can be effectively carried by rail, should be the industry to focus on with this rail-enabled, supply chain improvement strategy. The lessons learned, including the rail expansion strategies identified can then be applied to other regional supply chains that are most active in Nevada:

- Food and beverage
- Building materials
- Chemicals
- Waste, scrap, and recycling[18]
- Manufacturing
- Agricultural products
- Energy

C-5. Rail Electrification Addresses Nevada Governor's Executive Order on Climate Change

Rail electrification in Nevada harmonizes with Nevada Governor Steve Sisolak's 2019-22 Executive Order on Climate Change, which calls for, in Section 6: B. *"Support for transportation electrification and demand management, including infrastructure, fleet procurement, alternative funding mechanisms and other programs."*[19]

During the 20-year horizon of the NVSRP, Nevada transportation will likely follow the global transition to non-petroleum-based power for freight and passenger vehicles.

A statement on electrification by the Rail Electrification Council[20] is included in the Appendix. The National Electrical Manufacturers Association developed the Rail Electrification Council[21] (Council) to promote the adoption of electricity as the principal motive power of domestic railroad (freight and passenger) transportation and as an enabler of electric grid integration and innovation.

D. Funding Rail Development in Nevada

The freight railroad industry is, at the most fundamental level, a support industry – an industry that enables efficient operations of other industries, such as mining, energy, automotive, and agriculture. Diverse Nevada industries need better connections to Class I railroads via new and revitalized short

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[18] *A draft report on recycling in Nevada cites transportation as challenge in reaching Nevada's goal of recycling 25% of its waste. Economical rail transportation can be a key enabler of the hub-and spoke collection scheme envisioned by the report; pages 3, 21, and 26* – "2021 Waste Reduction and Recycling Report" - Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Sustainable Materials Management

[19] Nevada State Government Website, " Governor Sisolak Signs Executive Order Directing Administration to Collaborate on Achieving Nevada's Climate" article, source link, published November 22, 2019.

[20] For more information, please visit: https://www.nema.org/directory/products/rail-electrification-council

[21] For more information, please visit: https://www.nema.org

lines, industry tracks and yards, transload facilities, and intermodal terminals. Other sections of this strategic plan list many of these needs and opportunities, of varied sizes, regions, and stages of development. While big railroads themselves do not need funding support, many of these customer projects do. Several will likely falter otherwise.

State government should not have to fund freight rail development, as railroads and shippers are engaged in private-sector, income-producing activity that can attract private-sector funding. This statement is true for large rail projects and smaller projects. This is not the same as saying that those projects do not need public support, a distinction explained in the Appendix Item, Funding Resources and Strategies. All other funding recommendations of the NVSRP can be found there.

E. Stewarding Plans to Action

Focused action (not just static reports) begins with dynamic reformulation of plan documents. How are the multifaceted perspectives and collective intelligence of stakeholders catalogued and organized? Where and how will the documents be housed? Will they be in written and/or electronic interactive format to allow for ongoing stakeholder input? Is the content presented in a narrative and/or outline format? To provide for accessibility and collaboration, Nevada will host the 2021 rail plan on the NDOT website www.nevadadot.com/rail.

This interactive website database should have four sections:

- Asset Inventory = Data and maps at state, regional, corridor, property, and project levels
- Dialogues = A matrix of facilitated stakeholder discussions by region, industry, or topic
- Planning = Organized process for systematic advancement of each initiative
- Stewardship and Funding = Details of plan implementation from start to completion

Providing education, information, context for collaboration, and technical assistance to businesses is a proven recipe for success. Here are two analogous examples:

1. The nationwide network of extension offices sponsored by the U.S. Department of Agriculture spans the country and is often associated with states' university systems. Extension offices are run by employees and volunteers—teams of experts in crops, fertilizers, environmental sustainability, and economics relating to agriculture, animal husbandry, and landscaping. They provide locally relevant information to farmers, businesses, and residents—bringing agricultural expertise, training, and knowledge to those who need it.

2. The network of over 1,000 Small Business Development Centers across the United States are sponsored by the U.S. Small Business Administration and hosted by universities, state economic development agencies, and private sector partners. They provide educational assistance, professional business advice, counseling, and information to entrepreneurs and small/medium sized companies to support their growth and create jobs for long-term economic impact.

Unlike many business support programs, the proposed Nevada Freight Rail Development Fund could quickly transfer financial support from partner and sponsor seed funding sources to a conglomerated social enterprise that provides consulting services, site selection services, industry partnerships, and services.

In summary, NDOT's Rail Division (or a new purpose-built entity) can function as a clearinghouse for rail information, expertise, financing, and training, in order to:

- Support small shippers so they can flourish into the big rail users of tomorrow.
- Bring resources to small- and medium-sized rail infrastructure projects.
- Bring rail awareness to all large-lot shippers and receivers in Nevada.
- Encourage the sharing of tracks and facilities, particularly for new branch lines.
- Introduce shippers and receivers who would not normally interact or cooperate.
- Stimulate the reactivation of the Nevada Northern Railway and the creation of other short lines.
- Create a culture of collaboration among Nevada's shippers, receivers, transportation providers, developers, and public planners.

The next section identifies a comprehensive set of recommendations for expanding and improving Nevada's rail system, beginning with important background on Nevada's rail network and its opportunity.

F. Rail Service Expansion Recommendations

The NVSRP's recommendations for expanding rail service outlined in this section address these fundamental characteristics of the Nevada Rail System:

- Rail trackage consists of three east-west main lines
- There are few branch lines
- Rail service between Nevada and California is limited
- Rail service between Nevada and the rest of the country is limited
- Rail service in Nevada is oriented around a few large shippers
- Rail service between Nevada businesses is practically non-existent

Background for Expanding the Nevada Rail System

Railroads arrived in Nevada during the continental drive to connect the rest of the country to California, most famously when the Central Pacific built across northern Nevada to connect with the Union Pacific at Promontory Point, Utah on May 10, 1869, marking the completion of the first transcontinental railroad. In 1905, a second main line was built through the state, this time across southern Nevada, by a Union Pacific subsidiary to connect the UP in northern Utah with Los Angeles. Between 1907 and 1909 the third and final main line across Nevada was built—the Western Pacific, which largely paralleled the Central Pacific (by then part of the Southern Pacific's vast rail system) across northern Nevada. All three main lines are now owned by the UP, which uses these lines primarily as connections between California and the rest of the nation.

The frenzy of railroad-building in Nevada during the first decade of the 20th century included the construction of 22 independent short lines, including the Nevada Northern Railway to Ely, the Eureka & Palisade Railroad to Eureka, the Nevada Central Railway to Austin, the Virginia & Truckee Railroad to Carson City and Virginia City, the Carson & Colorado to Keeler, CA, the Tonopah & Goldfield Railroad to Goldfield from the north, the Las Vegas & Tonopah Railroad to Goldfield from the south, and the Tonopah & Tidewater Railroad to Ludlow, CA. None of these 22 short lines have survived as a common carrier of freight, and almost all have long been abandoned and scrapped. Rail mileage in Nevada peaked in 1914 at 2,422 miles, diminishing over time to its current 1,193 active rail miles. There are currently 603 active freight short lines in the U.S., and Nevada is the only state in the Lower 48 without one. However, there are several large mining and industrial development projects in Nevada which would appear to be prime candidates for the construction of new short lines, and these should be encouraged for multiple reasons:

- To make these projects more economically viable in the long run,
- To reduce the impact of these projects on Nevada's road network and environment, and
- To spearhead the economic development of additional areas in the state.

Opportunities for rail service expansion abound, as there is currently negligible intrastate movement of freight by rail. That is, almost no Nevada shipper transports freight to a Nevada receiver by rail. However, there are numerous opportunities to save transportation expense, and reduce environmental impact and highway wear by using railroads for freight movements such as mined ores to in-state processing facilities or users, and municipal solid waste to processing facilities or disposal sites.

As another example of the latent opportunity, there is only one warehouse or distribution center in Nevada that utilizes its sidetrack connection to the rail system. However, the reliability of railroad linehaul service has greatly improved with the recent advent of Precision Scheduled Railroading (PSR), which, by making similar improvements to local switching service, will bring rail service reliability in line with truck service. This potential service quality improvement will require local presence and attention.

In October of 1980, the United States Congress passed a body of federal legislation that eased regulations on the railroad industry. The new regulatory framework allowed large railroads (Class Is) to sell line segments to entrepreneurial rail operators better equipped to focus on local rail service and customer development. In addition to lower operating costs, these regional (Class II) and short line (Class III) operators initiated flexible hours and work assignments, all vital to the task of assisting shippers through start-up and ongoing use of rail transportation. Nevada has no such Class II or Class III rail operations, a limitation that must be addressed to advance many of the projects and strategies identified in Chapter 5's Rail Service and Investment Program.

This limitation has created a rail service gap that the state of Nevada should and can address. Simply spending more money or passing new legislation will not enable more rail service. Nevada needs a "shortline approach" to statewide rail business development, which can be accomplished in a number of ways. That approach must be co-created with Union Pacific Railroad and BNSF.

Transforming rail service in Nevada demands planning and development at the level of the logistics needs of individual shippers and receivers. There are many shippers and logistics-oriented land developers already active in the state. Fostering their expanded use of rail with targeted individual commercially relevant action is the way the NVSRP will deliver the most robust and expedited economic benefit to the state. A state's freight rail planning effort can deliver a measurable expansion and improvement in rail service when it coordinates engagement with shippers around their individual locations, specifically promoting aligned building design, site layout, volumes, destinations, timelines, and all the factors that go into modal choice. This degree of granularity and commercial interaction with the private sector must now become standard practice in public-sector infrastructure planning.

The success of this approach is eminently achievable with a commitment to inclusion and organization. The NVSRP's prior development of an accurate and organized database of all stakeholders and conversations renders ongoing collaborative dialogue with the state's approximately 1,100 shippers and property owners manageable. The tools and relationships created by the NVSRP have established a statewide system for this effort.

The NVSRP is designed to be implemented in its entirety, in a well-coordinated, integrated sequence. The following 17 Rail Service Recommendations comprise a systematic solution to the challenge of optimizing the use of rail for the economic expansion and environmental improvement within Nevada. It is more productive and efficient to transform a system all at once. Each recommendation is accompanied by a link to its coverage in the NVSRP.

Table 4-4: Freight Rail Service Recommendations

	Recommendation	Page Location	Agency
1	Expand Nevada freight rail service to and from California and points east	Blueprint for Action Approach #12,xxvii	NDOT/GOED
2	Initiate and expand new intermodal services	Chapter 4, p28	NDOT/GOED
3	Facilitate shippers' early-stage use of the rail network	Chapter 4, p28	RDA
4	Preserve and utilize existing rail assets, including branch lines / industrial lead tracks	Chapter 4, p28	RDA
5	Develop rail operating plans that serve local Nevada	Blueprint for Action Approach #5, vii	RDA
6	Balance long-term project planning with near-term improvements for existing shippers	Chapter 4, p30	RDA
7	Aggregate shippers' needs into corridor plans through the state freight plan	Blueprint for Action Approach #11, xi	GOED/RDA
8	Co-locate new rail shippers in industrial parks when sensible	Chapter 4, p58	RDA
9	Provide rail-informed expertise to shippers and land developers	Chapter 4, p23	RDA
10	Provide financing solutions for all-size rail infrastructure	Chapter 4, p23	GOED/RDA
11	Evaluate freight movement data for meaningful commercial opportunities	Blueprint for Action Approach #4, xxvii	RDA
12	Facilitate collaborative dialogue among suppliers, customers, transportation providers, developers, and citizens	Blueprint for Action Approach #2, v	RDA
13	Initiate rail-served supply chain planning and add to the state freight plan	Chapter 4, p8	NDOT /GOED/RDA
14	Enact freight transportation land use strategies	Chapter 4, p30	State Lands
15	Establish Partnership with UPRR and BNSF	Blueprint for Action Approach #12, xxvii	NDOT/GOED
16	Support BNSF expansion in Nevada	Chapter 4, p31	RDA
17	Fundamental Performance Measures for Improving Nevada's Rail System	Chapter 4, p32	NDOT/GOED

The following sections cover recommendations 2, 3, 4, 6, 14, 16, 17. See chart above for coverage of the other recommendations. The Blueprint for Action describes Items 1, 5, 7, 11, 12, and 15.

Recommendation #2: Initiate and expand new intermodal services

Akin to transloading service is rail intermodal service where containers are transferred between trucks and railcars. This allows shippers without onsite rail infrastructure to take advantage of rail savings on their long-distance containerload moves. There are two intermodal terminals in Nevada that are under-utilized and available for rapid growth. The Union Pacific has intermodal facilities in Sparks and North Las Vegas that are currently only used once per week to handle traffic to and from one destination—Chicago. However, the Ports of Oakland, Long Beach, and Los Angeles are all interested in handling international container traffic to and from Nevada. Adding frequency and new lanes, particularly lanes to ports in California, should be an objective for Nevada. Clearing the volume hurdle to justify that service will take a coordinated effort.

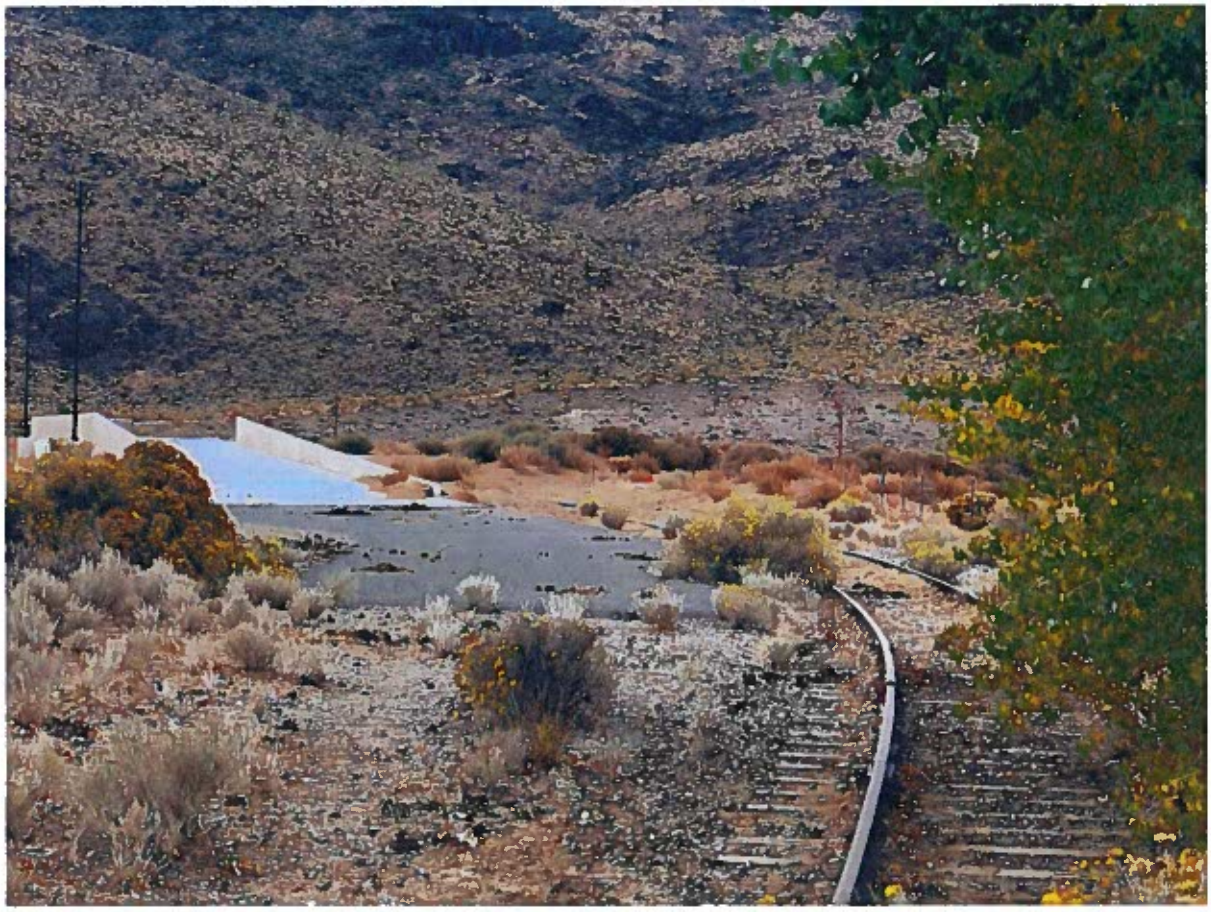
Recommendation #3: Facilitate shippers' early-stage use of the rail network

Logistics plans and decision-making in the private sector, especially those that involve long-term investment in fixed assets like rail loading facilities and rail line construction must meet a high hurdle of shipper confidence in their modal choice. While rail service usually offers higher capacity with cost and labor savings, transit times are often longer and less predictable than trucking. Shippers will choose rail, but often need to start out with limited capital commitment and risk. The country's best rail operators overcome shipper skepticism in rail's reliability by offering flexible service and infrastructure options for shippers as they begin to use rail. Here are the critical characteristics of early-stage rail service delivery:

- test-runs of railcars to build shippers' confidence
- Incubation of new rail shippers via trucking to transloading sites
- New rail infrastructure scaled to lower the start-up capital costs
    - Creative approaches to new transload trackage and service
    - Lower cost, flexible approaches to interchange trackage
- Shared use of track and facilities among multiple shippers

Recommendation #4: Utilize existing rail Infrastructure

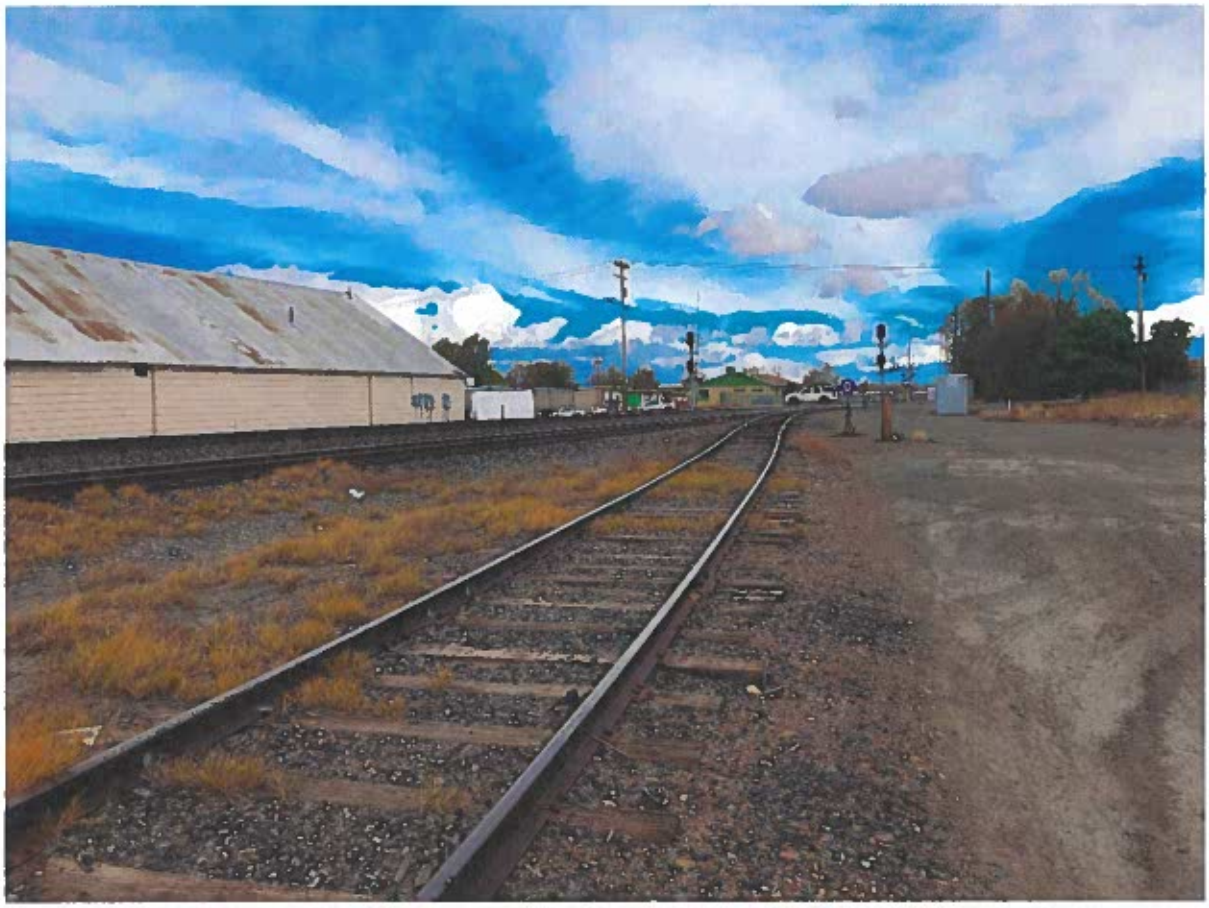
Early benefits from rail service expansion in Nevada can be generated by utilizing what already exists. Out of 239 companies with private sidetracks in Nevada, 99 (or 41%) do not use them. Out of 83 Union Pacific sidetracks in Nevada that are not normally used for train operations, 80 (or 96%) are also not used as team tracks or transloading tracks by rail shippers. Many of the sidetracks that see traffic are underutilized. Rail shippers can be introduced to the opportunity of using existing infrastructure, if supported with the needed rail expertise. Here is a photo of one idle transload site in Innovation Park.



Transloading Site Idle at Innovation Park

Using existing infrastructure avoids or delays the cost of new construction as labor and materials for a new turnout cost $50,000+ and the track is $150-to-$200 per foot thereafter. Loading or unloading railcars requires dock space and possibly pneumatic and/or conveyor systems that are separate from truck loading infrastructure. Add to that $150,000 if the new turnout is along a main line requiring Positive Train Control hardware and labor. If a customer wants to locate on a main line designated as Restricted Access, then an additional $3 million is needed for two main line turnouts and enough running track to closet an entire local train.

With such a large initial cost for new rail infrastructure, it is difficult for shippers and receivers, particularly small ones, to test rail service or to justify rail investment without sharing costs of connectivity. This underscores the importance of using existing assets to incubate new rail shippers. In particular, rail/truck transloading can provide the economical introduction for new rail bulk shippers and receivers. There are already public transloading terminals in Sparks, Darwin, Elko, and North Las Vegas, with another on the way in Hawthorne. The 83 existing and underutilized UP sidetracks can serve as new transloading sites, particularly for accommodating early-stage rail shippers. The next photo shows one of these sidetracks in Winnemucca.



Winnemucca House Tracks

Recommendation #6: Balance long-term planning of large projects with near-term improvements for existing shippers

Decades of declining attention to rail service has led to many shippers having access to or being sited near a rail line yet not using rail. Reconnecting as many of these existing shippers to rail is the quickest path to improving Nevada's economy and environment. Existing rail shippers, as demonstrated by the data, are likely not using rail as robustly as they could. Engaging with these shippers at the outset of the NVSRP's implementation will deliver an early return on the plan's promise, at a very low cost. This near-term rail service expansion then forms a foundation of growing commercial activity making feasible development of more substantial rail infrastructure projects, such as intermodal terminals and industrial parks. Otherwise, the viability of these projects depends on a few large users, adding to project risk. Waiting to land the large rail users takes time that can be used to interact with existing businesses to increase their profitability, employment, and contribution to state revenue.

Recommendation #14: Enact effective freight transportation land use strategies

Nevada's land has been undergoing rapid development across its two primary metropolitan areas of Reno and Las Vegas. Commercial absorption rate in the Reno region in 2019 was 3.45MM sq. ft. of new

space leased or sold.[22] The commercial property absorption rate for Las Vegas in 2019 was 4.75MM sq. ft, outpacing both Los Angeles and San Francisco. [23]

This development pace must be met with the careful preservation of land along rail rights-of-way. Rail service requires access to rail lines. It is important to direct non-rail users away from rail adjacent property to optimize the productivity of Nevada's existing rail network. As the state embarks on facilitating the rail service expansion envisioned in the new NVSRP, it must recognize that effective freight transportation land use will be a critical element of attracting private-sector investment.

In the same way that communities preserve land along scenic lakefronts for low-impact, non-industrial uses, land adjacent to rail lines should be utilized as much as possible for rail-served industrial activities. Land is no longer so plentiful in Nevada that the state can afford to use it unwisely. There are a range of programs, protocols, laws, tax concepts, and regulations that can be evaluated by Nevada's governing and community leaders for effectuating the best use of its rail assets and related land.

What sensible approaches should Nevada consider?

- Support developers and shippers in designing sustainable logistics plans
- Preserve land along rail ROW's for rail-served development
- Create statewide rail-served property database
- Co-locate utility and transportation corridors
- Co-locate innovative passenger rail services on freight rail lines
- Offer property tax incentives to shippers using Nevada's rail system
- Establish low-interest, long-term financing for rail infrastructure
- Develop corridor rail development and operating plans
- Support real estate brokers to market properties as "rail access sites"

Land use planning is widely practiced in transit-oriented development, but rarely applied to logistics-oriented development. Given the important opportunity to optimize its use of rail transportation, Nevada has much to gain from a pragmatic, effective approach to *freight* transportation land use. Nevada, acting collaboratively among its public- and private-sector stakeholders can take the lead in modeling this approach for other states. The Nevada State Land Use Planning Advisory Council has expressed their interest in supporting a collaborative transportation land use planning process between local governments and private-sector stakeholders.

Recommendation #16: Support BNSF service in Nevada

The only common carrier currently hauling rail freight in Nevada besides the Union Pacific is the BNSF Railway, which was awarded trackage rights on the two main lines across northern Nevada by the Surface Transportation Board as a condition to the Union Pacific's acquisition of the Southern Pacific in 1996. BNSF's rights include the ability to serve any private sidetrack between Winnemucca and Wells and to serve any new private sidetrack on a main line from Winnemucca west. Of 96 existing private sidings in Nevada that BNSF has the right to serve, it has only served 30 at one time or another.

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[22] Kidder Matthews, "Market Trends Reno Industrial" Report, source link, accessed September 10, 2020.
[23] Statista website, "Absorption rate of industrial property in selected markets in the U.S. 2019" statistical report, source link, published March 23, 2020.

This traditional public policy and regulatory approach has not led to Nevada's shippers, and therefore the economy, having the benefit of the extensive market reach of these two carriers' combined network. Unpacking and addressing the commercial realities that have suppressed the opportunity of having two rail service providers is key to Nevada's economy. The NVSRP is designed to facilitate the expansion of both UP and BNSF service in Nevada. The United States has leaned on "competition" as an orienting principle for regulations concerning transportation. The NVSRP advocates that these competing Class I railroads evolve into a collaborative relationship focused on the best interests of the Nevada shipping community. The resulting expansion of market reach from having equitable and reliable access to both carriers' networks will raise the attractiveness of rail transportation for shippers. Both companies will enjoy an improved modal balance with trucks.

Recommendation #17: Focus on fundamental performance measures for improving Nevada's rail system

Here are three performance measures on which to focus stakeholders' efforts to generate a meaningful contribution to the state's businesses and communities.

Table 4-5: Performance Measures

#	Performance Measurement	Data Point
1	Percent of truckload quantity shippers that are using rail	140 out of 1,075 or 13%
2	Number of railcars moving interstate to and from Nevada Businesses	Baseline 2018: 113,020
3	Number of railcars moving intrastate between Nevada businesses	Baseline 2018: 664

G. Nevada State Rail Plan Regions

Nevada's resource-rich landscape, high industrial activity, long distances, and adjacency to California and West Coast ports present a potent opportunity for freight rail development. Developing a modern rail system that serves the state's unique industrial development calls for a similarly unique approach for each region of the state. Identifying a set of logical regions empowers stakeholders to collaborate around the strategies that are most applicable for their region.

Nevada's rail assets, development activity, and political jurisdictions point to the selection of eight regions on which to organize the implementation process.

- Region 1: Clark County
- Region 2: Lincoln County
- Region 3: Nevada Northern Railway
- Region 4: I-80 Corridor
- Region 5: Fernley/Hazen/Fallon/Silver Springs/Innovation Park
- Region 6: Reno/Sparks/Stead
- Region 7: Mina Branch
- Region 8: Beatty/Pahrump

The factors that were assessed in distinguishing each region were:

- Population density and distribution
- Existing and potential industrial activity
- Natural resources
- Physical rail assets
- Availability of developable land
- Relationship to the larger transportation network

Cataloguing stakeholders, industries, projects, and freight data for these eight distinct regions reflects a deep and worthwhile investment of resources. This positions the NVSRP for an amplified contribution to the state. In the face of strained budgets and environmental challenges, states need a system for coordinating policy development, community planning, and public and private investment in rail.

Each of the eight NVSRP Regions can support rail growth in Nevada. This potential stems from the state's surging economic and population growth, which in most regions includes the prevalence of mining, where bulk movements lend themselves to the efficiencies and environmental advantages of rail transportation.

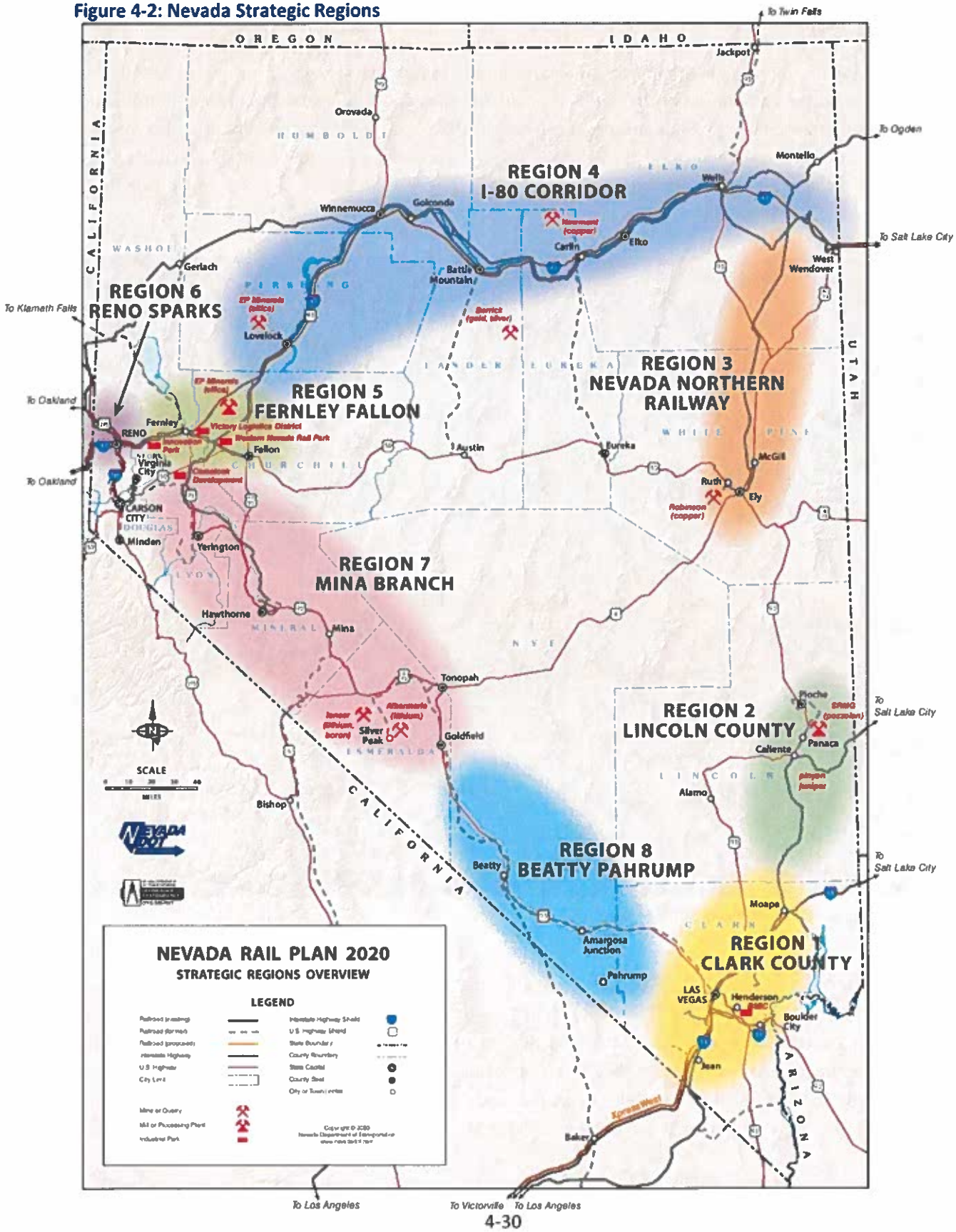
The next section of the Freight Rail Strategic Plan introduces strategies for each region, along with its data and maps. These sections are designed to become Action Plans around which the stakeholders will coordinate their collective productivity in their region. As such, they are continually expanded and refined.

Each regions' data, as applicable, includes:

- Potential rail service growth projects-Listed for each region
- Major land developments-Listed for each region
- Active mines--Listed for each region
- Businesses with sidetracks and nearby truckload shippers (Appendix 1)
- Truckload shippers that are not located adjacent to a rail line (Appendix 2)

Next is a map of Nevada displaying the location of the eight Strategic Regions:

Figure 4-2: Nevada Strategic Regions



G-1. Region 1: Clark County

Overview

Las Vegas is the youngest major metropolitan area in the United States, having grown from its founding in 1905 upon the completion of the San Pedro, Los Angeles, and Salt Lake Railroad to a metropolitan population of 2¼ million in 2020, making Las Vegas the 28th most populous city in the U.S. Las Vegas is experiencing significant industrial growth due to its large labor pool, low cost of electricity, zero personal income tax, zero franchise or inventory tax, favorable business climate, and proximity to California's huge consumption markets.

Warehouses with Rail Across the Street

The Union Pacific Railroad—heir to the San Pedro, Los Angeles, and Salt Lake Railroad—is the only railroad serving Region 1, but it has not shared in most of the area's phenomenal growth. Of 73 facilities in Region 1 with private sidetracks, 24 are inactive. Of 19 new $5 million+ manufacturing facilities built in the Las Vegas area since 2017, only one is planning on using UP (Ryze Renewables' $74 million biodiesel production plant on the Nellis Industrial Lead). In the 17,273 acres of the Apex Industrial Park in North Las Vegas, only two shippers have constructed rail sidings (Lhoist and Boral CM). Of Apex's

700,000 square feet of warehouse space with rail docks, only 100,000 square feet are in service. There have been an additional 6.4 million square feet of warehouse space built next to UP right-of-way in Region 1 without any rail sidetracks at all. UP currently offers limited intermodal service between its container-on-flat-car (COFC) yard in North Las Vegas and southern California. Service to and from Chicago once a week is the only intermodal lane operating to the east.

Nevada Division of State Lands statement recommending contruction of a crossing for the Floyd Edsall Training Complex [excerpted from 1/21/2021 letter in Appendix]:

> The Agency recommends that the project team consider amending the Region 1 Project List to add a rail crossing and rail connection near the Nevada National Guard's Floyd Edsall Training Complex (FETC) in North Las Vegas. The FETC is currently bisected by the Union Pacific rail line and lacks access to the rail line itself. The existing rail line provides challenges to the National Guard's mission capabilities by limiting access to portions of the FETC for training and other uses. Access across the railroad is needed on the FETC site to allow the National Guard to fully utilize this property for heavy vehicle training. Without a rail crossing near the FETC, the National Guard's and other heavy vehicles in the area are unable cross the railroad tracks due to weight restrictions imposed by Union Pacific.
>
> Additionally, the FETC site and other industrial developments in the area do not have access to the rail line. A new rail connection to the Union Pacific rail line near the FETC would benefit the National Guard's readiness to carry out its missions and response. Currently, the National Guard has equipment used to support readiness and response efforts stored off site FETC due of the lack of rail access. A rail connection near FETC would allow the National Guard to store its equipment onsite and transport this equipment more efficiency from the complex. Additionally, a new connection in this area would support the City of North Las Vegas' economic development efforts in this area by providing existing and planned industrial developments with new rail access. Before the plan is adopted, the Agency would like to set up a meeting with NDOT and the National Guard to explore these potential Region 1 rail projects in further detail.

Key Strategies

- Develop rail-served industry southwest of the Las Vegas-Henderson metro area to increase economic development with less traffic impact on downtown Las Vegas
- Preserve as much as practical of remaining developable commercial land for rail-served industry
- Connect as many of the existing shippers to rail as possible
- Support developers and shippers in North Las Vegas with their rail planning efforts
- Redevelop Black Mountain Industrial Center for rail-served heavy industry
- Establish two-way intermodal service to San Pedro Bay, CA

The Region I map below is followed by Inset Maps for three areas of concentrated industrial activity.

Figure 4-3: Region 1 - Clark County

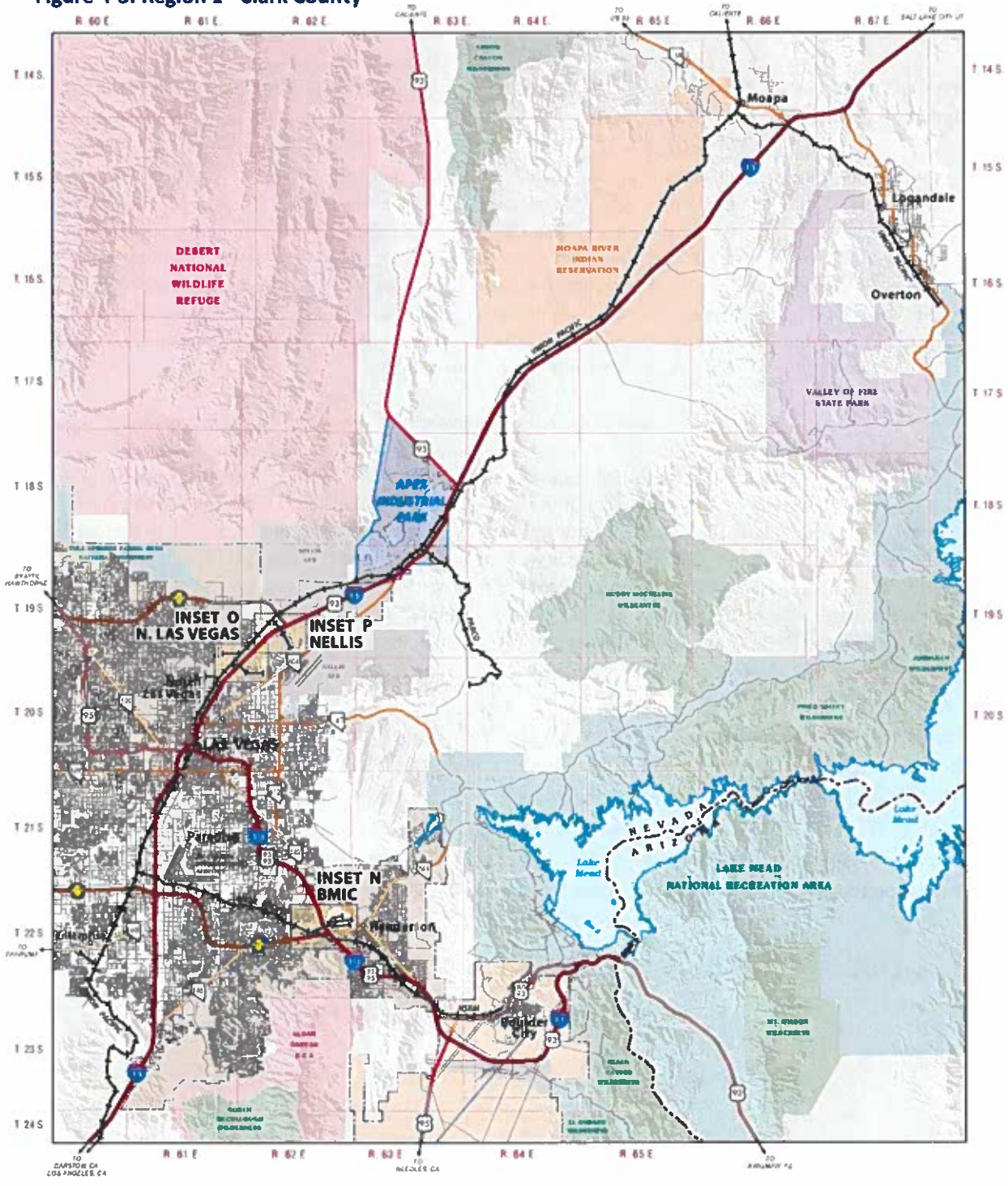
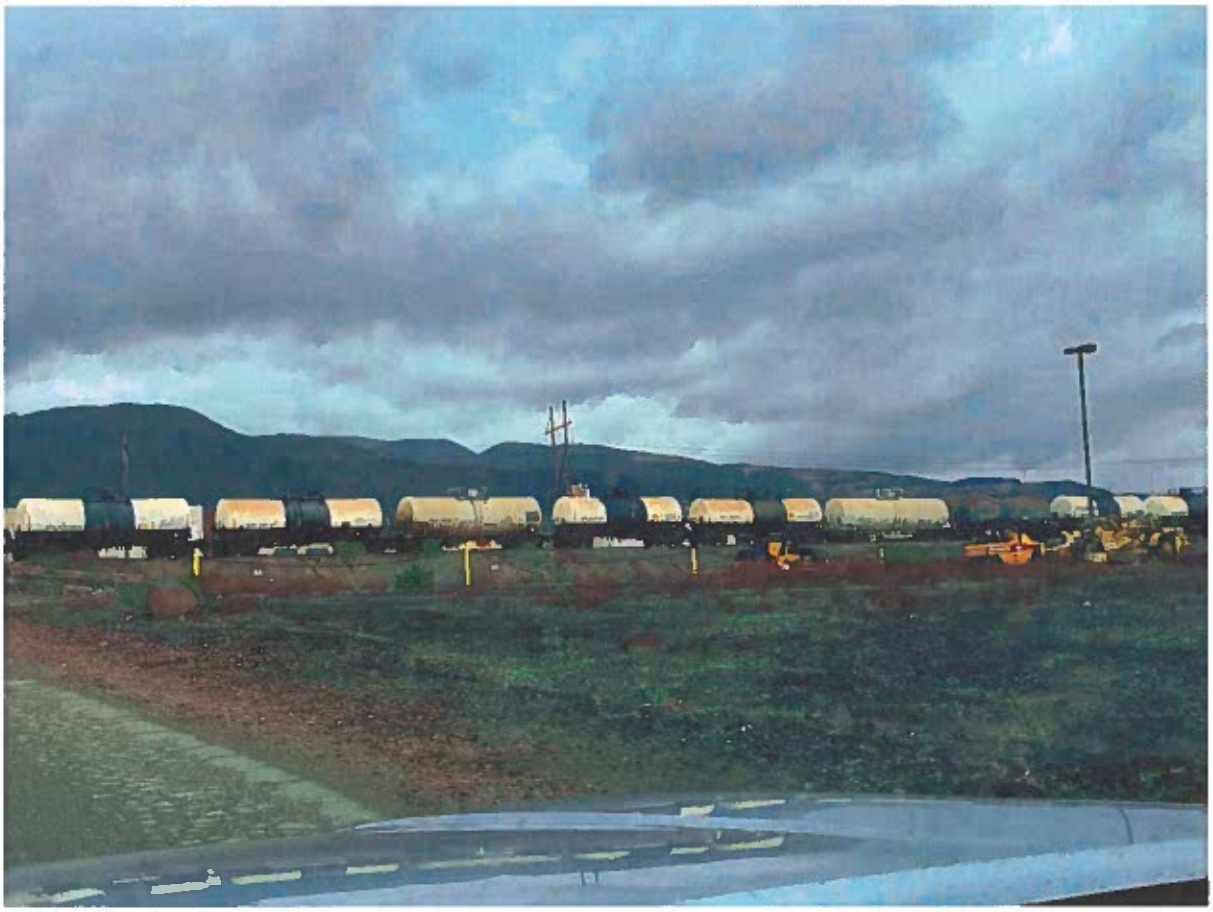


Figure 4-4 presents an example of land well-positioned for new rail-served operations. The Black Mountain Industrial Complex is now owned by Olin Chlor-Alkali (214 acres), doing business as ioneer Americas, which already leases space to Timet, Lhoist, and Borman with ample available acreage. Xtreme Manufacturing (20 acres) also has space available adjacent to existing rail. The highest and best use for these brownfield sites would be heavy industry.

The numbered and colored disks correspond to line items with details on each property that are catalogued in the NVSRP's statewide database presented in the Appendix as the ***Inventory of Nevada Industry: Businesses with sidetracks and nearby truckload shippers*** (black disks for businesses with active rail sidetracks, purple for those with inactive rail sidetracks, and red for those next to rail right-of-way that could build new sidetracks easily), and as Appendix Item ***Truckload Shipper Inventory*** (blue disks for truckload shippers farther away from rail right-of-way).



ioneer Americas' Tank Cars in BMI

A Guide for Looking at Next Three Inset Maps

Inset maps, such as the three shown in Region 1 (Figures 4-4, 4-5, and 4-6), highlight dense concentrations of businesses with two characteristics: 1) proximity to active tracks, and 2) elevated shipping activity in truckload or carload lots. These areas are particularly intriguing due to their potential

for becoming centers of carload traffic growth with frequent and reliable switching service and localized solicitation effort. This is doubly true for the areas in Figures 4-5 and 4-6, which are within a mile of one another, making them a ready-made platform for carload initiatives.

Figure 4-4: Region 1 – Black Mountain Industrial Complex Area

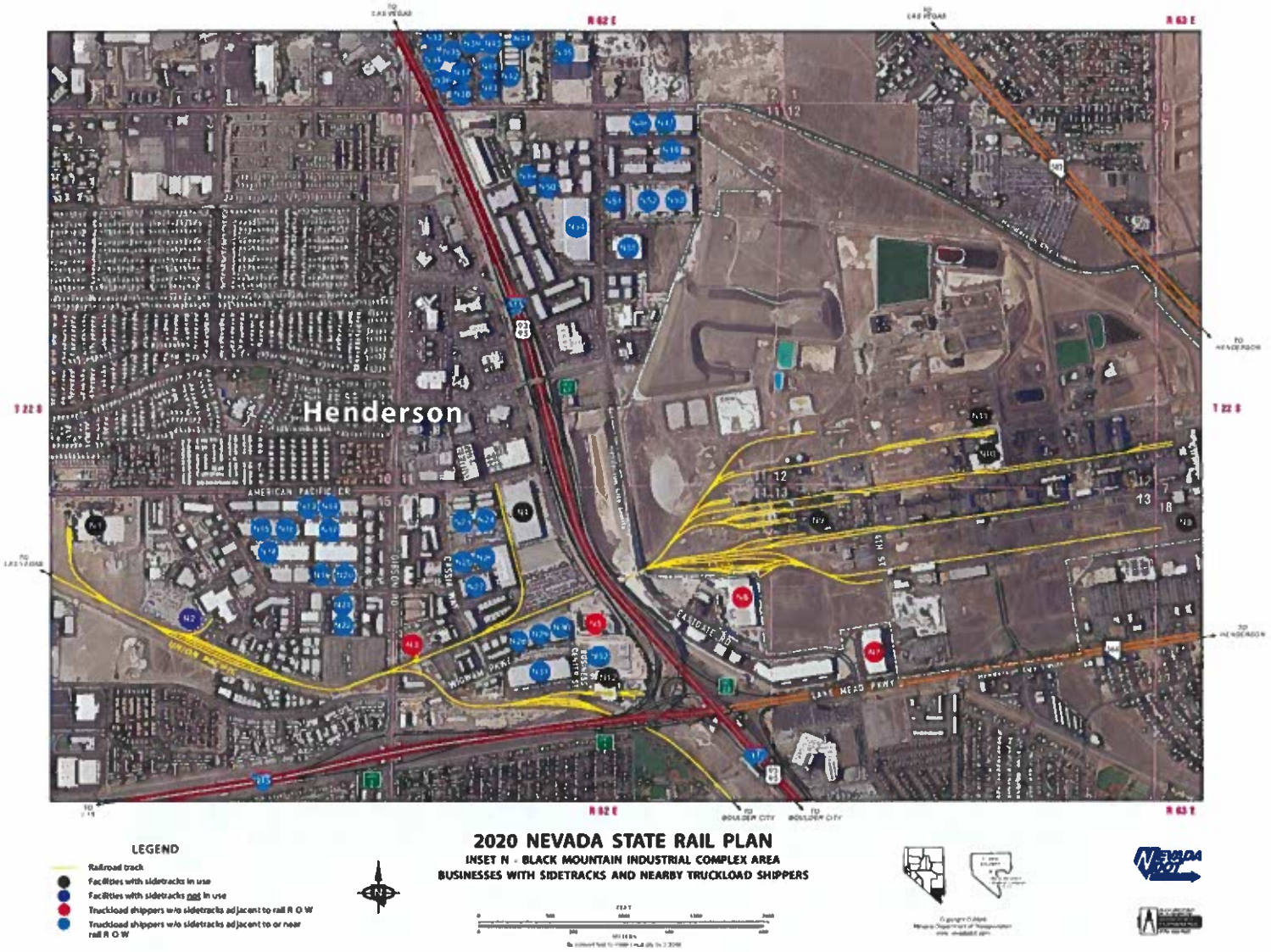


Figure 4-5: Region 1 – North Las Vegas Area

Figures 4-5 and **4-6** show active and prospective rail customers that are clustered in North Las Vegas. In all, these maps show 21 businesses that use their sidetracks, 10 businesses that do not use their sidetracks, and 10 businesses located adjacent to UP right-of-way that could easily build sidetracks. Other businesses with blue tags are intermodal candidates that can also be reached with future sidetrack construction at moderate expense.

Figure 4-6: Region 1 – Nellis Area

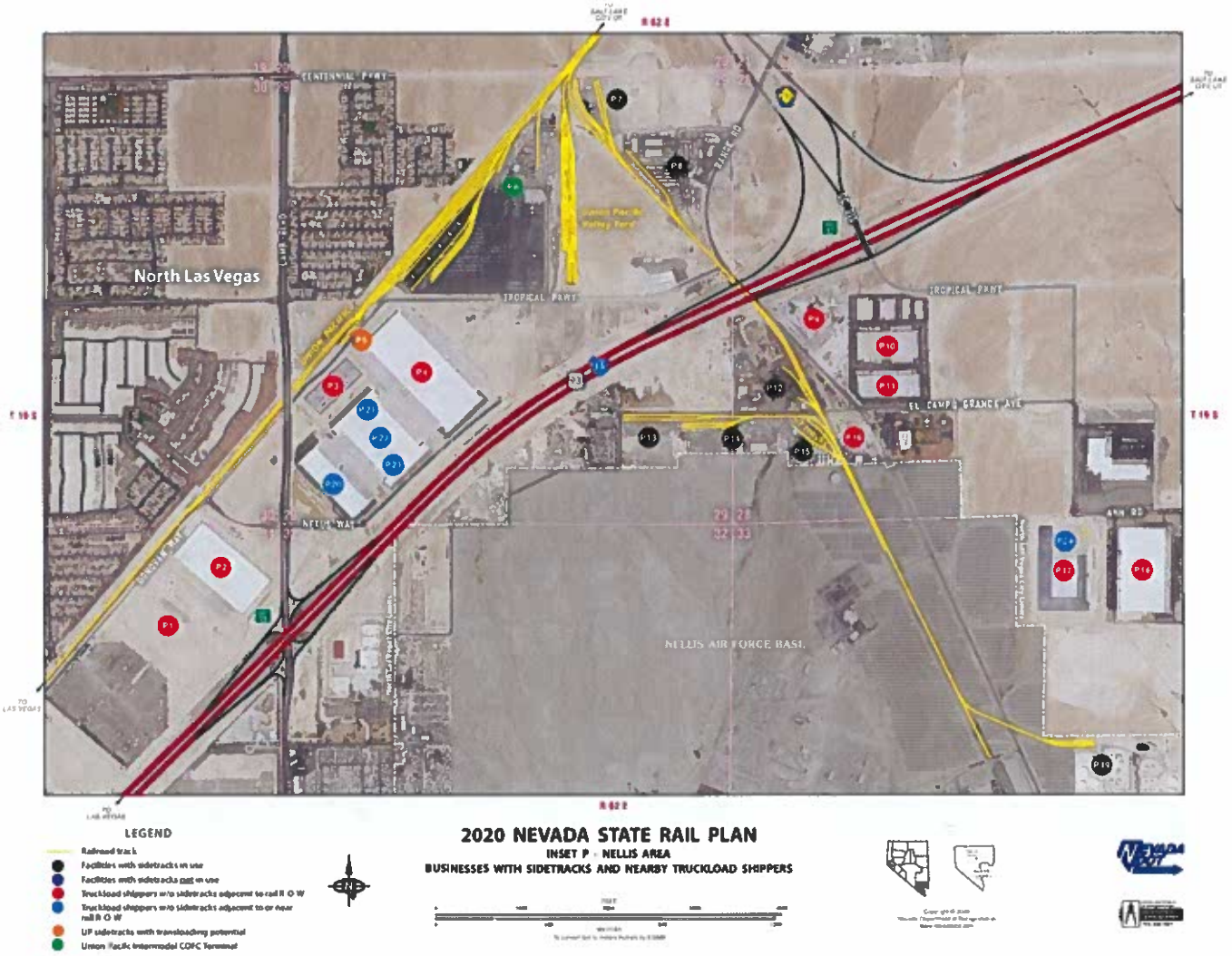


Table 4-6: Region 1 – Project List

Project Name	County	Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Blue Diamond property	Clark	Development	Rail Connection	TBD	0.1	$250,000	Blue Diamond Branch Line	1	4
Ryze Renewables	Clark	Expand rail terminal	Terminal Expansion	alternative fuel	0.25	$2,000,000	Ryze Renewables	1	4
Apex Industrial Park	Clark	Connect to UP main line	Rail Connection	TBD	4	$5,000,000	Land Development Associates		
Nevada National Guard's Floyd Edsall Training Complex (FETC)	Clark	Add a rail crossing and rail connection	Rail Crossing	Material	NA	$250,000	Nevada National Guard		

*miles to reach site, not including serving tracks at site

Table 4-7: Region 1 – Active Mines

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
42	43	Apex Landfill Pit	Las Vegas Paving Corp.	Aggregate	Clark	4027000	691000
43	44	Apex Lhoist Quarry	Las Vegas Paving Corp.	Aggregate, sand	Clark	4026900	687340
44	45	Apex Lhoist Quarry	Lhoist North America	Limestone, dolomite	Clark	4026900	687340
53	54	Blue Diamond Hill Mine	Gypsum Resources, LLC	Gypsum, limestone	Clark	3994300	643650
54	55	Blue Diamond Pit	Las Vegas Paving Corp.	Sand, gravel	Clark	3986500	659800
56	57	Boulder Ranch Quarry	CTC Crushing LLC	Sand, gravel	Clark	3978450	687100
64	65	El Dorado Quarry	Portable Aggregate Producers, LLC	Sand, gravel	Clark	3980374	687952
76	77	Henderson Community Pit	Various (Bureau of Land Management manages pit)	Sand, gravel	Clark	3980500	687800
78	79	Lima Nevada Gypsum Mine	H. Lima Nevada LLC	Gypsum	Clark	4006000	692840
80	81	Lone Mountain	Las Vegas Paving Corp.	Aggregate	Clark	4012520	648880
81	82	Lone Mountain	Mel Clark, Inc.	Sand, gravel	Clark	4008000	650340
82	83	Lone Mountain	Nevada Ready Mix Corp.	Sand, gravel	Clark	4013180	650790
83	84	Lone Mountain	Wells Cargo, Inc.	Sand, gravel	Clark	4013069	649060
84	85	Lone Mountain Community Pit	Various (Bureau of Land Management manages pit)	Sand, gravel	Clark	4013220	648880
85	86	Mesquite Community Pit	BJ Rees's Enterprise	Sand, gravel	Clark	4074700	760420
86	87	Mesquite Community Pit	Various (Bureau of Land Management manages pit)	Sand, gravel	Clark	4074700	760420
88	89	Money Pit	Southern Nevada Liteweight, Inc.	Silica sand	Clark	3961020	665500
96	97	PABCO Apex Quarry	Pacific Coast Building Products, Inc.	Gypsum	Clark	4009484	691057
100	101	Pole Line Pit	Boulder Sand and Gravel, Inc.	Sand, gravel	Clark	4009352	678819
103	104	Rainbow Quarries	Las Vegas Rock, Inc.	Landscape rock, sand, gravel	Clark	3974880	638780
109	110	Sierra Ready Mix Quarry	Sierra Ready Mix, LLC	Sand, gravel	Clark	3953030	653740
112	113	Simplot Silica Products Pit	J. R. Simplot Co.	Silica sand	Clark	4039110	727470
113	114	Sloan Quarry	Aggregate Industries	Crushed stone	Clark	3978918	661472
114	115	South Jean Pit	Service Rock Products	Sand, gravel	Clark	3955100	657120
116	117	Spring Mountain Pit	Wells Cargo, Inc.	Sand, gravel	Clark	3990171	657163

Regional Development Authority

The regional Development Authority contact for this region is Perry Ursem of the Las Vegas Global Economic Alliance.

G-2. Region 2: Lincoln County

Overview

Lincoln County has a Union Pacific main line track that runs through the center of Caliente, but does not have scheduled local service, active sidings, or an operating transloading site, in spite of the presence of ample yard trackage in the center of town. Resumption of local freight train service and transloading activity at that location is not desired by citizens and leaders who are intent on preserving the ambience of the historic Caliente rail depot that sits alongside the yard.

Caliente City Hall Station

Lincoln County's low population of 5,345 residents renders each potential rail user as critical to the area's economy and the viability of renewed local rail service. Salt River Materials Group has contracted

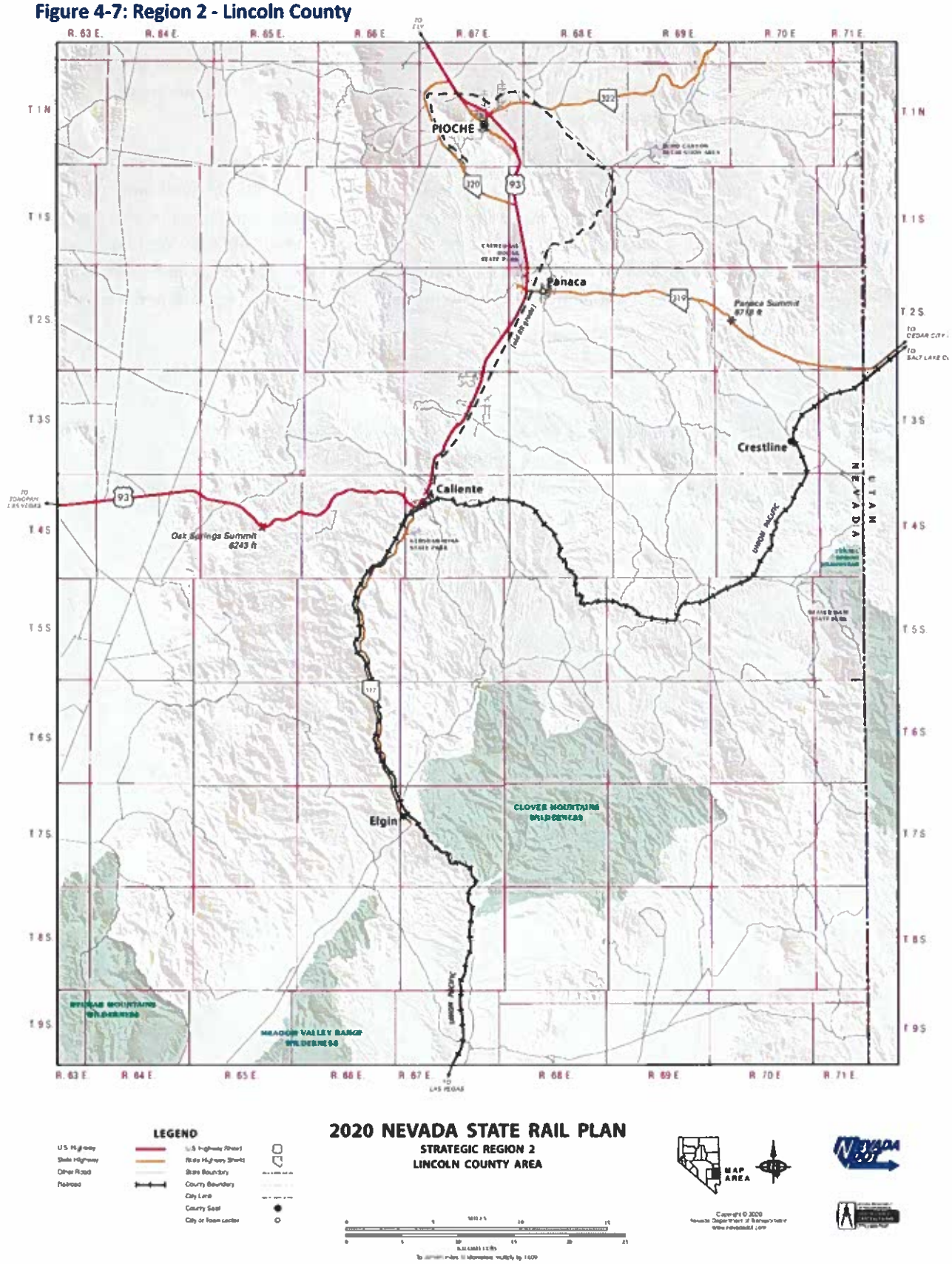
with the U.S. Bureau of Land Management (BLM) for access to the largest pozzolan deposit in the U.S., 15 miles north of Caliente. Pozzolan is used in concrete and fertilizer, instead of fly ash from coal-fired power plants, which is becoming scarce as those plants shutter. Beginning at 500 railcars per year, Salt River's growth plans would increase that volume to several thousand railcars per year, creating a solid base for the resumption of local rail service.

A Nevada bio-tech entrepreneur has been working with BLM on access to thousands of acres of invasive Pinon Pine and Juniper growth for harvesting and processing into a variety of fuels and valuable byproducts while removing a wildfire fuel. The county owns 320 acres near the state line at Crestline, alongside the UP main with available power and water. In combination with the development of local rail service, the county would like to construct a recycling facility there. Lincoln County's sparse rural population demands that each potential industrial development opportunity be approached with multi-stakeholder creativity and collaboration.

Key Strategies

- Establish truck to rail transloading site for pozzolan and future commodities
- Evaluate Crestline site for future rail-served industrial development
- Evaluate land south of Caliente town-center for future rail-served commercial development

Figure 4-7: Region 2 - Lincoln County



LEGEND

U.S. Highway
State Highway
Other Road
Railroad
U.S. Highway Shield
State Highway Shield
State Boundary
County Boundary
City Limit
County Seat
City or Town Location

2020 NEVADA STATE RAIL PLAN
STRATEGIC REGION 2
LINCOLN COUNTY AREA

MAP AREA

Table 4-8: Region 2 – Project List

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Panaca Mines	Lincoln	Connect to UP main line	Rail Connection	pozzolan	15	$22,000,000	Salt River Materials Group	2	20

*miles to reach site, not including serving tracks at site

Table 4-9: Region 2 – Active Mine

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
117	118	Tenacity Perlite Mine	Wilkin Mining and Trucking Co., Inc.	Perlite	Lincoln	4157600	675240

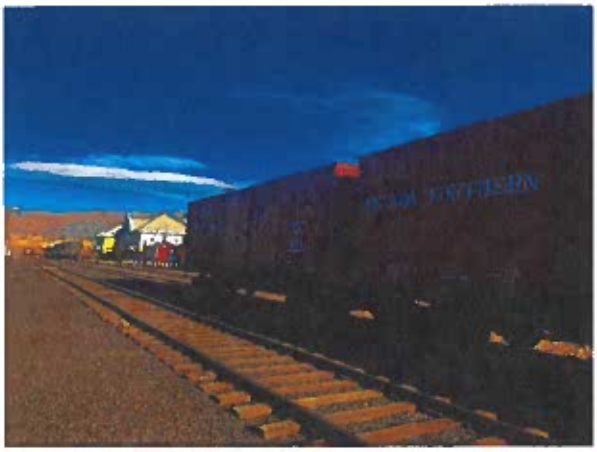
Regional Development Authority

The regional Development Authority contact for this region is Jeff Fontaine, Lincoln County Regional Development Authority.

G-3. Region 3: Nevada Northern Railway

Overview

The Nevada Northern Railway (NNRY) is a 146-mile rail line built in 1905-06 from connections with the Southern Pacific Railroad (SP) and Western Pacific Railroad (WP) south to reach copper deposits west of Ely. The copper largely played out by 1978 and a copper smelter in McGill closed in 1983, when all railroad operations ceased. In 1986, the last operating owner, Kennecott Copper, transferred all rail assets to a non-profit, the White Pine Historical Railroad Foundation, which leases a short segment around Ely for a tourist rail operation. In 2009, White Pine Historical Railroad Foundation leased the northern 128.5 miles to a car storage operator, but that has not proven to be viable and a suit was initiated in 2015 to evict the operator from the property.



Nevada Northern Boxcars

Nevada Northern Passenger Cars

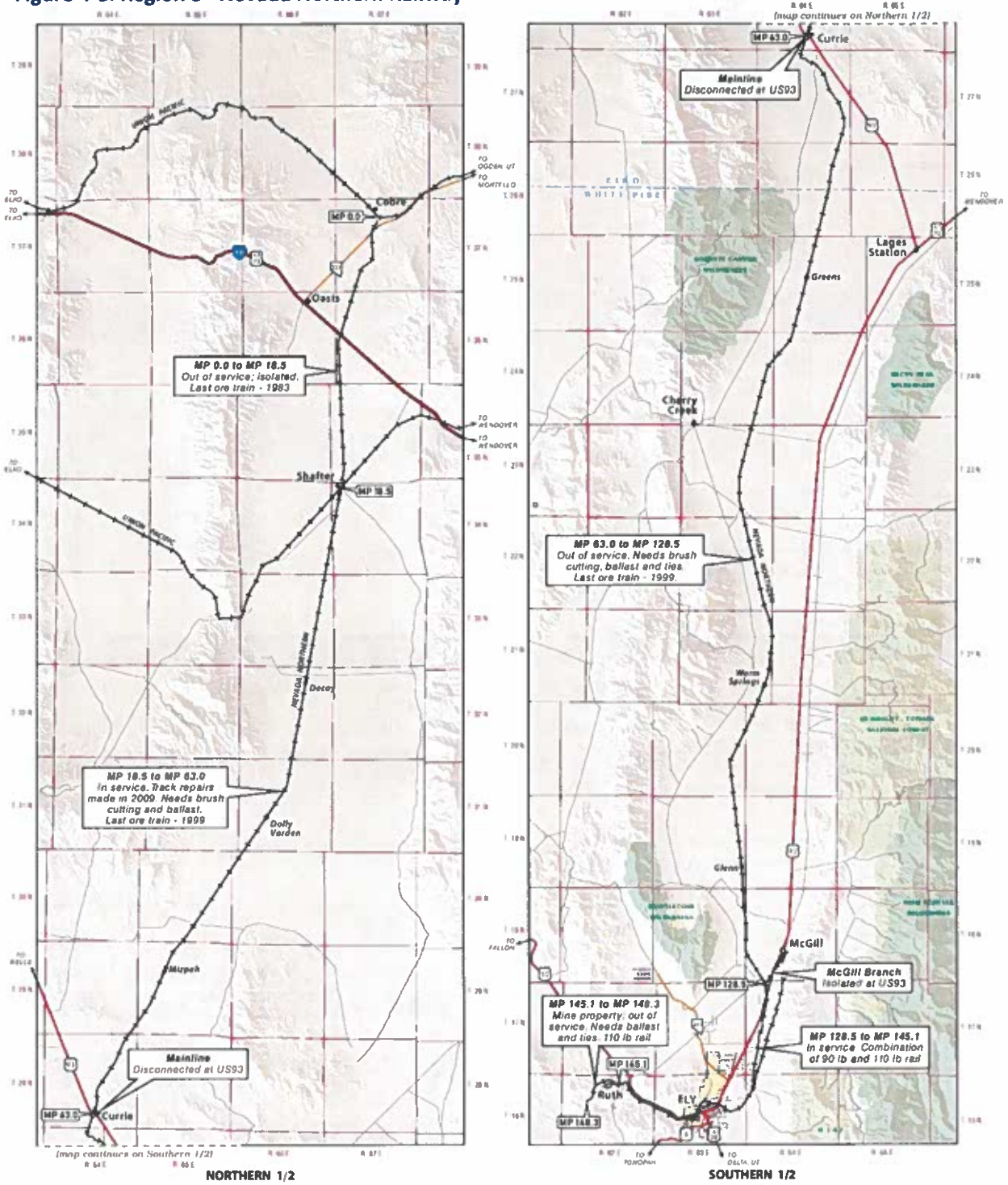
Because the original 60-pound rail (weight per 3-foot section) from 1905-06 was never upgraded for most of the NNRY's length, the resumption of standard operations with modern heavy cars and engines would require the replacement of most of NNRY's rail. (Contemporary rail weight ranges from 110-

pound to 136 pound). However, given the mineral wealth in this area, a baseload opportunity that justifies the financial investment of a major rebuild may exist. Promising prospects for expanded mining near the NNRY right-of-way include the Long Canyon gold mine (4 miles west of milepost 7), the Victoria copper & silver mine (8 miles west of MP 53), the Kinsley gold mine (21 miles east of MP 71), the Robinson copper mine (1-mile south of MP 145, which currently trucks copper ore to Wendover, UT for transloading into railcars), and the Pan gold mine and Gold Rock gold mine (40 miles west of MP 148). There are also expanding hemp operations now at 2,500 acres, and hay growing areas north of Ely, which consume much fuel and lime in bulk and ship all over the West.

Key Strategies

- Initiate robust engagement with all potential rail shippers in the corridor to aggregate the overall prospects for rail line utilization
- If substantial enough, proceed to evaluate approximate rebuilding and operating costs to establish preliminary viability
- If viable, develop a complete proforma business and financial model for the reconstruction and operation of the restarted NNRY
- Proceed to structure a development, operating, and funding strategy that serves all stakeholders

Figure 4-8: Region 3 - Nevada Northern Railway



LEGEND

2020 NEVADA STATE RAIL PLAN

STRATEGIC REGION 3

NEVADA NORTHERN RAILROAD AREA

Table 4-10: Region 3 – Project List

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Victoria Mine	Elko	Connect to Nevada Northern	Rail Connection	copper, silver, fuel, lime, etc.	8	$12,000,000	US Mine Corporation	3	4
Long Canyon Mine	Elko	Connect to Nevada Northern	Rail Connection	refractory ore, I/B fuel, lime	2	$3,000,000	Nevada Gold Mines	3	4
Pan & Gold Rock Mines	White Pine	Transloading on Nevada Northern	Transload	cyanide, sulfates	0.1	$200,000	Kinross Gold	3	4
Silver Lion Farms	White Pine	Transloading on Nevada Northern	Transload	I/B fuel, fertilizer; O/B hemp	0	$200,000	Silver Lion Farms	3	4
Robinson Mine	White Pine	Re-connect to Nevada Northern	Rail Connection	O/B copper concentrate; I/B fuel, lime, steel balls	1	$1,000,000	Robinson Mine	3	4
Kinsley Mine	White Pine	Transloading on Nevada Northern	Transload	cyanide, sulfates	0.1	$200,000	Liberty Gold	3	4
Nevada Northern Railway	White Pine	Rebuild track and Rt. 93 rail crossing	Track Rebuild	copper, hemp, fuel, tourists	128	$100,000,000	Nevada Northern Railway	3	4

*miles to reach site, not including serving tracks at site

Table 4-11: Region 3 – Active Mines

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
9	10	**Emigrant Mine (open pit)**	Newmont Mining Corp.	Gold, silver	Elko	4496802	586981
13	14	**Hollister Mine (underground mine)**	Hecla Mining Co.	Gold, silver	Elko	4550620	536640
19	20	**Goldstrike Meikle Mine (underground mine)**	Barrick Goldstrike Mines, Inc.	Gold, silver	Elko	4539278	551865
21	22	**Jerritt Canyon Mine (underground mines)**	Jerritt Canyon Gold LLC (joint venture with Sprott Mining Inc., 80%; Whitebox Asset Management, 20%)	Gold, silver	Elko	4579621	583571
25	26	**Long Canyon Mine (open pit)**	Newmont Mining Corp.	Gold	Elko	4539742	708395
27	28	**Midas Mine (underground mine)**	Hecla Mining Co.	Gold, silver	Elko	4565942	518521
55	56	**Boehler Pit**	Staker Parson Co.	Sand, gravel	Elko	4522100	606780
65	66	**Elburz Pit**	Vega Construction and Trucking Co.	Sand, gravel	Elko	4533600	622900
99	100	**Pilot Peak Quarry**	Graymont Western US., Inc.	Limestone	Elko	4522627	731144
137	138	**Elko Hot Springs**	Elko County School District	Space Heating	Elko	4521706	604406
152	153	**Tuscarora**	Ormat Nevada, Inc.	Electricity	Elko	4590782	570913
158	159	**Huntington**	Noble Energy, Inc.	Oil	Elko	4474961	607223
1	2	**Bald Mountain Mine (open pit)**	KG Mining (Bald Mountain), Inc.	Gold, silver	White Pine	4422307	624496
29	30	**Pan Mine (open pits)**	Fiore Gold, Ltd.	Gold, silver	White Pine	4349710	609300

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
32	33	**Robinson Mine (open pits)**	KGHM International, Ltd.	Copper, gold, molybdenum, silver	White Pine	4347450	674222
89	90	**Mount Moriah Quarry**	Mount Moriah Stone Quarries, LLC	Building stone, landscape rock	White Pine	4343795	751603

Regional Development Authority

The regional Development Authority contact for this region is Sheldon Mudd, Northeastern Nevada Regional Development Authority.

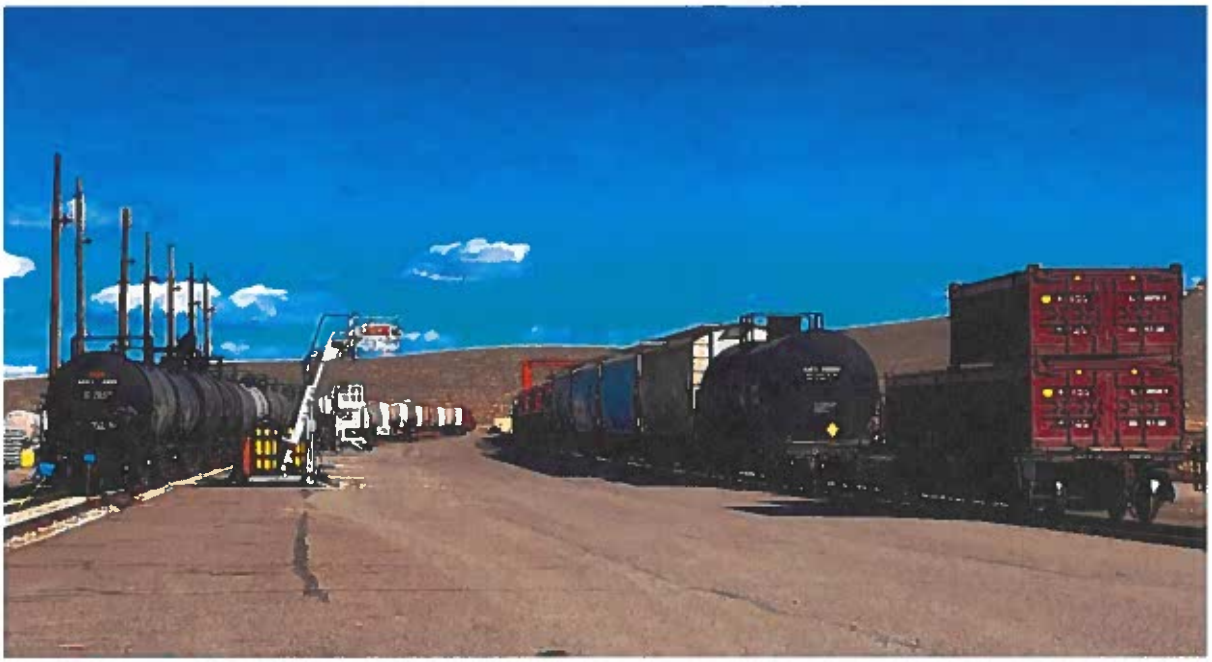
G-4. Region 4: I-80 Corridor

Overview

The I-80 corridor from W. Wendover to Lovelock can benefit from a rail-enabled development strategy that embraces the potential connected nature of this corridor—towns connected with each other and the corridor connected with California, ocean ports, and points east. The counties and towns throughout this northern Nevada corridor share adjacency to the Interstate 80 Freeway and two UP main line tracks that traverse the entire state. Despite the presence of the physical infrastructure of these rail lines, limited local rail service and therefore limited connections east and west constrain the commercial opportunities for businesses and communities along this otherwise vital trade corridor.

Trucks on Interstate 80

This is an area of intense mining activity, where there are already 36 active private sidetracks that mostly support movement of mining materials. There are also 52 in-service sidetracks owned by UP that would be suitable for rail/truck transloading. The construction of new branch lines to new mining areas is a growing possibility. For example, the impact of trucks using Highway 766 north out of Carlin to reach the Goldstrike gold processing facilities could be mitigated with a new branch line to Goldstrike. And the impact of trucks using U.S. 95 north out of Winnemucca to reach the pending Thacker Pass lithium mine and processing facility could be mitigated with a new branch line to Thacker Pass. Also, as traffic builds on Route 93 between Wells and Southern Idaho the adjacent, dormant but apparently intact rail right-of-way could be reactivated to divert existing agricultural and possible future mining traffic.



Northeastern Nevada Regional Railport

There are a multitude of idiosyncratic rail opportunities. For example, EP Minerals, which has three private sidetracks in Colado, loads 4500 containers of diatomaceous earth per year for export through the Port of Oakland. EP ships its containers to Oakland by truck. Baker Hughes Oilfield Operations operates a large barite mine in Argenta with two private sidetracks in use. Barite is used as a thickening agent in drilling mud. Most of the barite used in the Permian Basin, which produced 40% of the oil & gas in the U.S. in 2019, is trucked into Texas at great expense from Mexico. The common denominator of rail opportunities across Region 4 is the need for individual attention to unique circumstances.

Nevada's mining suppliers and mining producers, heavily concentrated in Region 4 can build new strategic supply partnerships around the intrastate transportation of material by rail.

Key Strategies

- Initiate a rail-enabled, corridor-wide development strategy

  This strategy will provide a cohesive organizing principle around which stakeholders can plan land use and business attraction. The success of this strategy begins with two steps:

  a) Turning these two important rail line arteries toward *serving* the region, not just carrying freight *through* the region, and
  b) Implement the NVSRP's comprehensive rail-centric supply chain strategy for the mining industry. *Read more about this strategy in C-2. Mining Materials Supply Chain Logistics Strategy.*

  Attending initially to mining, the largest industry in the region, will enable the growth of local rail service that would then be in an ideal position to serve other commodities and economic development efforts.

  Economic development leaders throughout the corridor shared these observations:

a) Approximately one-third of industrial prospects want access to rail service.
b) The real or perceived lack of rail-served properties handicaps their economic development efforts.

Sheldon Mudd, Executive Director of the Northeastern Nevada Regional Development Authority (NNRDA) reported that in the two years since he has been with NNRDA a total of 35 Requests for Information (RFI) or Company Leads have registered their interest in this region. Of those, 12 (or 34%) requested property with access to rail – most specifically requesting a spur line into their site.

The region has benefited from landing two of those companies resulting in $65MM worth of capital investment and approximately 40 new jobs. Another prospect is expected to yield up to $1B in capital investment and roughly 20 jobs. The rest have been lost meaning that the region missed out on $1.6B in capital investment and approximately 4,700 jobs, many due to shortcomings in the process of offering rail service. Improved awareness of and support for rail logistics decision-making will directly result in the development and enhancement of new and existing industry in the region.

There is an abundance of interest among Region 4 economic development and community leaders in rail-based activity. Their efforts will benefit from a deeper education on the commercial, operational, and physical characteristics of rail operations. This knowledge is critical to choosing properties that are conducive to efficient rail operations. Well-conceived land use decisions lead to local rail-served industrial development that undergirds a corridor-wide supply chain logistics strategy.

Here is an outline of the steps for establishing the foundation of an I-80 Corridor rail-enabled development strategy:

A. Illuminate the Current Status of Rail
   a. Existing rail activity- (Partially Completed)
   b. Existing rail track and facilities-(Completed)
   c. Name and location of all rail shippers and receivers-(Completed)
   d. Identification of all businesses that were shipping or receiving by rail and are not currently-(Completed)
   e. Location and growth capacity of transloading operations-(Completed)
      i. Private facility only
      ii. Public service available
   f. UP and BN service characteristics- (Partially Completed)

B. Identify the Opportunities
   a. Pinpoint potential transloading sites-(Completed)
   b. Identify shippers and receivers that should be contacted-(Completed)
   c. List land that has been identified and invested in by local government for rail-served industry
   d. Identify land that is attractive for rail service that has not been invested in by local government
   e. Assess what will be required to provide rail service at each of these properties
   f. Identify each of the major rail infrastructure projects under consideration- (Partially Completed)
   g. Complete the *Mining Materials Supply Chain Logistics Strategy*-(Outlined)

Figure 4-9: Region 4 - I-80 Corridor

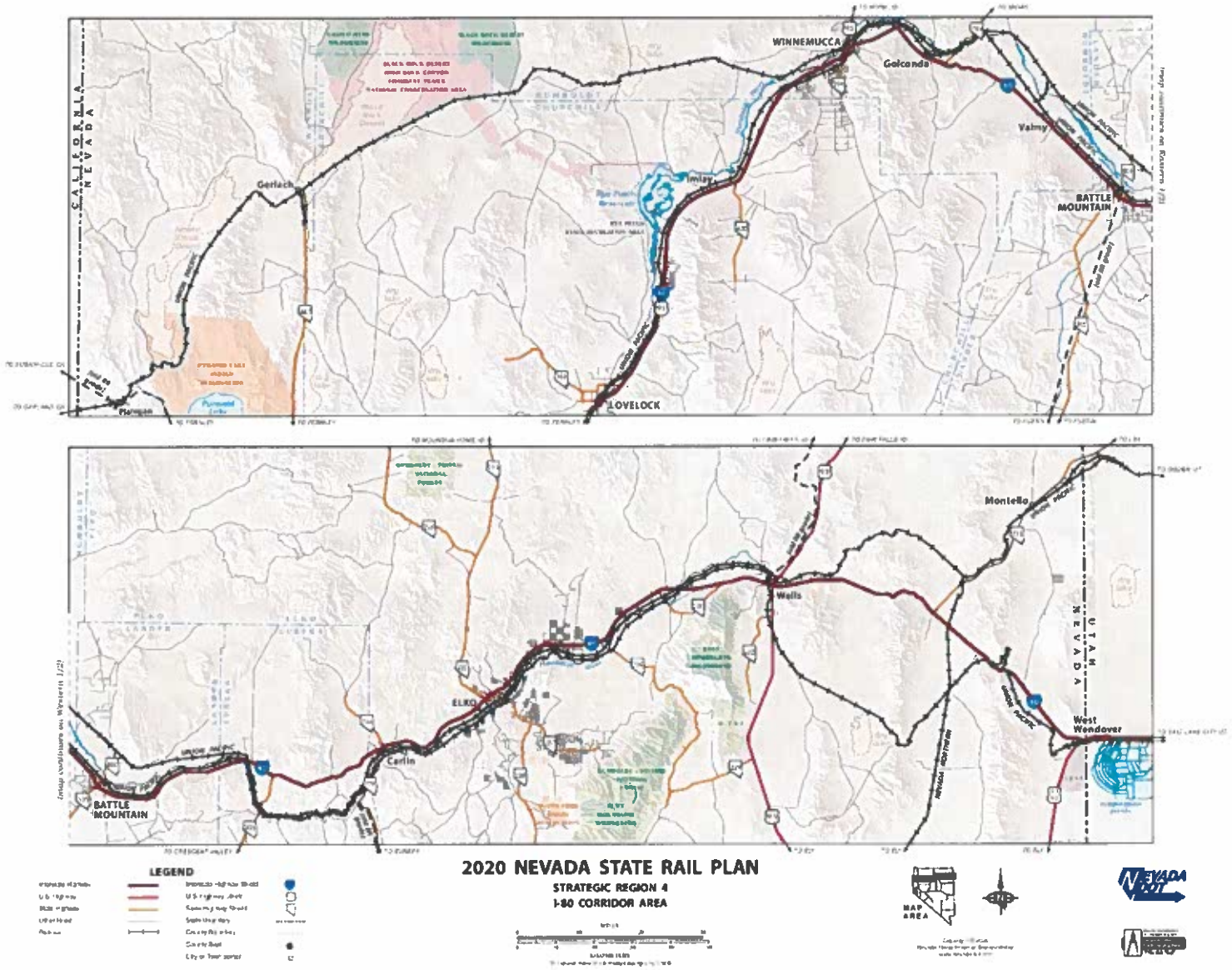


Table 4-12: Region 4 – Project List

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
NGM Rail Connections	Eureka & Lander	Connect Cortez & Goldrush mines to Goldstrike gold processing facilities	Rail Connection	refractory ore, I/B fuel, lime, ammonium nitrate, sulfuric, peroxide, cyanide, ash, etc.	50+	$100,000,000	Nevada Gold Mines	4	4
Midas Mine	Humboldt	Connect to UP main line	Rail Connection	refractory ore, I/B fuel, lime	30	$60,000,000	Hecla Mines	4	4
Repurpose Sewer Treatment Property	Humboldt	Build connection to UP	Rail Connection	TBD	0.1	$1,000,000	City of Winnemucca	4	4
Thacker Pass Project	Humboldt	Connect to UP main line	Rail Connection	I/B molten sulfur, caustic soda, cyanide, soda ash, fuel	50	$100,000,000	Lithium Nevada Corporation	4	4
Fire Creek Mine	Lander	Connect to UP main line	Rail Connection	refractory ore, I/B fuel, lime	15	$30,000,000	Hecla Mines	4	4
Wells Heavy Industrial Park	Elko	Connect to UP main line	Rail Connection	TBD	.1	$4,000,000	City of Wells	4	4
Lander County Railpark	Lander	Connect to UP main line	Rail Connection	TBD	.1	$2,000,000	Lander County	4	4

*miles to reach site, not including serving tracks at site

Table 4-13: Region 4 – Active Mines

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
3	4	**Chukar (underground mine)**	Newmont Mining Corp.	Gold, silver	Eureka	4514625	565713
10	11	**Exodus Mine (underground)**	Newmont Mining Corp.	Gold, silver	Eureka	4530175	553868
15	16	**Gold Quarry (open pit)**	Newmont Mining Corp.	Gold, silver	Eureka	4515151	565991
16	17	**Goldstar (formerly West Genesis) (open pit)**	Newmont Mining Corp.	Gold, silver	Eureka	4533815	552725
17	18	**Goldstrike Arturo Mine Project (open pit)**	Barrick Goldstrike Mines, Inc. (joint venture with Premier Mines Ltd., 40%)	Gold, silver	Eureka	4543001	548221
18	19	**Goldstrike Betze-Post (open pit)**	Barrick Goldstrike Mines, Inc.	Gold, silver	Eureka	4537038	551878
22	23	**Leeville Mine (underground mine)**	Newmont Mining Corp.	Gold, silver	Eureka	4531532	556645
30	31	**Pete-Bajo Mine (underground mine)**	Newmont Mining Corp.	Gold, silver	Eureka	4528190	559441
34	35	**Ruby Hill Mine (leaching old pads)**	Ruby Hill Mining Co., LLC	Gold, silver	Eureka	4375649	587385
35	36	**Silverstar (formerly Genesis) (open pit)**	Newmont Mining Corp.	Gold, silver	Eureka	4533745	553720
93	94	**Nevada Barth Iron Mine**	Saga Exploration Co.	Iron ore	Eureka	4492240	562180
155	156	**Blackburn**	Grant Canyon Oil and	Oil	Eureka	4453769	573200

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
			Gas, LLC				
163	164	Tomera Ranch	Tomera Oil Fields, LLC	Oil	Eureka	4485941	574331
20	21	Hycroft Mine (open pits)	Hycroft Resources and Development, Inc.	Gold, silver	Humboldt	4526602	358640
23	24	Lone Tree Complex (leaching old pads)	Newmont Mining Corp.	Gold, silver	Humboldt	4520101	482251
24	25	Lone Tree Mine (Brooks Pit) (open pit)	Newmont Mining Corp.	Gold, silver	Humboldt	4518782	479712.1
26	27	Marigold Mine (open pits)	SSR Mining	Gold, silver	Humboldt	4507224	485220
38	39	Turquoise Ridge Joint Venture (underground mine)	Barrick Gold Corp. (joint venture with Newmont Mining Corp., 25%)	Gold	Humboldt	4562779	479465
39	40	Twin Creeks Mine (open pit and underground mine)	Newmont Mining Corp.	Gold, silver	Humboldt	4566061	485471
87	88	MIN-AD Mine	MIN-AD, Inc.	Dolomite	Humboldt	4525800	440120
123	124	Bonanza Opal Mine	Bonanza Opal Mines, Inc.	Precious opal	Humboldt	4633240	327520
127	128	Rainbow Ridge Opal Mine	Rainbow Ridge Opal Mines, Inc.	Opalized wood, precious opal	Humboldt	4628820	332830
128	129	Royal Peacock Opal Mine	Royal Peacock Opal Mine, Inc.	Precious opal	Humboldt	4628180	326360
130	131	Blue Mountain	AltaRock Energy	Electricity	Humboldt	4538407	404447
5	6	Cortez Hills (open pit)	Barrick Cortez, Inc.	Gold, silver	Lander	4446701	533501
6	7	Cortez Hills (underground mine)	Barrick Cortez, Inc.	Gold, silver	Lander	4446420	533387
7	8	Cortez Pipeline Mine (open pit)	Barrick Cortez, Inc.	Gold, silver	Lander	4455317	524233
11	12	Fire Creek Mine (underground)	Hecla Mining Co.	Gold, silver	Lander	4479271	529591
31	32	Phoenix Mine (open pits)	Newmont Mining Corp.	Gold, copper, silver	Lander	4488081	488921
45	46	Argenta Mine	Baker Hughes Oilfield Operations, Inc.	Barite	Lander	4498100	523540
72	73	Greystone Mine	M-I Swaco	Barite	Lander	4457850	510540
90	91	Mountain Springs Mine	M-I Swaco	Barite	Lander	4462620	496480
126	127	May Turquoise Mine	Red Widow Mine Co.	Turquoise	Lander	4466496	527135
129	130	Beowawe	Terra-Gen Power, LLC	Electricity	Lander	4489415	532398
141	142	McGinness Hills, McGinness Hills II, III	Ormat Nevada, Inc.	Electricity	Lander	4382385	507530
4	5	Coeur Rochester Mine (open pit)	Coeur Rochester, Inc.	Silver, gold	Pershing	4460022	402550
12	13	Florida Canyon Mine (open pits)	Alio Gold (US), Inc.	Gold, silver	Pershing	4492602	395130
37	38	Sunrise Gold Placer Mine	Sunrise Minerals LLC	Gold	Pershing	4509602	419820

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
57	58	**Buff-Satin Mine (stockpile)**	Vanderbilt Minerals Corp.	Clay	Pershing	4454650	385140
61	62	**Colado Mine**	EP Minerals, LLC	Diatomite, perlite	Pershing	4460730	352910
66	67	**Empire Mine**	Empire Mining Co.	Gypsum	Pershing	4485750	304800
73	74	**Gypsum Mountain Mine**	Silver State Minerals, LLC	Gypsum	Pershing	4448381	382857
92	93	**Nassau (Section 8) Mine (stockpile)**	American Colloid Co.	Clay	Pershing	4453880	388920
104	105	**Relief Canyon Quarry**	Nevada Cement Co.	Limestone	Pershing	4449781	401478
108	109	**Sexton Mine**	Nutritional Additives Corp.	Dolomite	Pershing	4522140	438740
140	141	**Jersey Valley**	Ormat Nevada, Inc.	Electricity	Pershing	4448142	458876

Regional Development Authority

The regional Development Authority contact for this region is Sheldon Mudd, Northeastern Nevada Regional Development Authority.

G-5. Region 5: Fernley/Hazen/Fallon/Silver Springs/Innovation Park

Overview

The salient factor for Region 5 is intense interest in developing new industrial parks. The following new projects are in various stages of development.

Table 4-14: Region 5 Industrial Parks Under Development

Industrial Parks in Fernley-Hazen-Fallon-Silver Springs-Sparks			
Name	Acreage	Location	Distance from Rail
Pyramid Commercial Center*	3,333	NW of Wadsworth	2 mi., former R-O-W
Victory Logistics	3,894	NE of Fernley	Abuts 2 branch lines
Tahoe Reno Industrial II	6,345	SW of Fernley	3 mi. to closest parcel
Northern Nevada Industrial Center	20,251	Stagecoach	7 mi. to Mina Branch
Silver Springs Opportunity Fund	2,746	Silver Springs	½ mi. to 4 parcels
Geothermal Rail/Dark Horse Rail	3,177	NW of Hazen	2 parcels abut main line
Western Nevada Rail Park	226	NW of Hazen	In operation on main line
Churchill Hazen Industrial Park	2,308	S of Hazen	Abuts 2 branch lines
Lahontan Rail Industrial Park	620	NE of Silver Springs	Abuts Mina Branch
Tahoe-Reno Industrial Center	19,749	Storey County	Limited rail is present
Innovation Park	67,000	Storey County	Rail is adjacent
40-Mile Desert Project	25,000	Churchill County	Abuts UP main east of Hazen
Unnamed project, City of Fallon*	3,625	NW of Fallon	1 mi to Fallon Branch
Unnamed project, City of Fallon*	3,070	NE of Fallon	1 mi to Fallon Branch
Total	161,344	acres	

**land deals not finalized*

Integrating these Fernley area developments with rail infrastructure and service is important to the state as well as the country, given their size and location on the corridor to and from California. For reference, the entire land mass of Salt Lake City, UT is 70,000 acres and San Francisco, CA covers 71,000 acres.

While some land and economic development leaders do not consider rail service to be a salient selling point, most of the current project sponsors are working on rail-served industrial parks. Even those

developers that have been low-key about rail in the past are expressing their interest in providing rail service to enhance the attractiveness of their properties.

Branch line in the Tahoe-Reno Industrial Center

Innovation Park is the name for the 67,000-acre development planned by Blockchains, Inc. acquired from the developers of the Tahoe-Reno Industrial Center. The brand may be in the process of also being applied to the 20,000-acres remaining within the Tahoe-Reno Industrial Center. Its total land mass of 107,000 acres makes it one of the top three largest industrial parks in the world.[24] The Tahoe-Reno Industrial Center is a vibrant industrial park, yet largely dependent upon trucks for freight. Of its 35 tenants with shipping needs of at least truckload quantities only 6 (17%) use rail. Our analysis suggests only 2-4% of freight flowing into and out of this development utilizes rail. Tesla, for instance, ships an average of 52 truckloads of auto parts per night (round trip) from its Gigafactory in Innovation Park over the Donner Pass to its assembly plant in Fremont, CA. The Fremont facility already has adjacent rail, and a routing for a new 2.5-mile spur to connect the Gigafactory to rail has been identified. This one project would enable the elimination of 36,400 truck trips a year on I-80 through Sparks, Reno, and northern California.

[24] World Atlas website, "The World's Largest Industrial Areas" article, source link, published June 10, 2019.

Key Strategies

- Support existing industrial parks and shippers in connecting to rail by attending to their specific logistics requirements and current rail infrastructure.

In our engagement with land developers some believed rail could not be constructed to their properties. Months of dialogue in the Region uncovered a series of conflicting beliefs about where in the Tahoe-Reno Industrial Center rail could and could not be constructed and used, due to possible steep grades, tight curves, or poor engineering and construction. However, track inspection has shown the existing track to be adequate for servicing the park's tenants located adjacent to the rail corridor and topographical analysis conducted by NDOT in 2020 has identified a viable route to connect the remainder of the park tenants to rail, including Tesla, as well as the nearby Innovation Park acreage.

- Support new land developers in the Fernley/Hazen/Fallon/Silver Springs corridor in their efforts to develop rail service.

The high number of vast land developments underway in Region 5 presents one of the state's most urgent opportunities to improve economic well-being and environmental sustainability through the logistics efficiencies of rail. Continuing the engagement with new land developers in this part of the region is needed to encourage their utilization and promotion of rail freight service in their industrial developments. It is crucial to continue to provide on-going support to these developers as they navigate the often-challenging process of dealing with railroads, tenants, federal government, state entities and other stakeholders when trying to enable rail service to their sites.

One 4,000-acre development in the region was operating under the misunderstanding that a viable rail connection could not be constructed to their property. NDOT's preliminary topographical analysis has established two rail right-of-way alignments that could be used to build in rail service.

This is a major opportunity for the region to secure rail freight service and address the current over-dependence on trucking freight because of the large scale of these new industrial sites. The largest land developers in Region 5 contacted by SRF have indicated they see rail as a core element of their land development. The developments that were accounted for via Land Development Project Assessment forms (Appendix Item) completed by developers include approximately 40,000 acres of land with 9,000 acres of industrial space being available in 2021 and 2022. All these developers are located aside or close to the UPRR Main line and 75% have industrial lead track status in place or accessible. The majority also have their industrial sites rail engineered with Union Pacific approval in place.

- Complete a detailed business case analysis of Fernley Multimodal Freight Facility.

  In parallel to the NVSRP report SRF has also completed a feasibility study for the Northern Nevada Development Agency (NNDA) (Appendix Item) The study concluded that locating a new multimodal

freight facility at Fernley is commercially feasible and will result in a significant conversion of truck freight to rail. The feasibility study identifies the potential for; 1) conversion of existing through-region truck freight, 2) conversion of existing truck freight out of the region, and 3) generation of new out of region freight flows.

The study proposes an Integrated Multimodal Cargo Transfer Facility (IMCTF) model for the Region to maximize the economic benefits of freight rail utilization. Unlike traditional multimodal terminals which are focused on container freight, the IMCTF model accommodates multiple freight types and a large land footprint. These aspects are important because the Fernley IMCTF will be able to capture the regional demand for mining and manufactured freight as well as containers. The additional land capacity of the Region is also a key factor as it enables the Fernley facility to offer extended freight services such as transloading and warehouse operations.

- Focus on rail development opportunities along the Fallon Branch, especially near the town of Fallon
- Reinstitute commercial service on the Mina Branch to Hawthorne, thereby stimulating rail activity that can utilize new logistics services in Fernley area
- Continue and expand stakeholder engagement and collaboration

This region is currently dominated by truck freight, accounting for 90% of all current freight flows. Although this report has identified major opportunities for increasing rail freight traffic, supported by land developers openly encouraging rail development, successfully achieving this potential will be dependent upon numerous stakeholders. Stakeholder engagement and collaboration is therefore of crucial importance.

A Guide to Region 5 Industrial Park Insets

The following nine maps, beginning with an overview map of all major industrial developments (Tim Tucker's planned 40-mile Desert Project is not shown) zoom in on the planned industrial parks listed previously. Region 5 is a hotbed of such activity due to the proximity of California and the lack of such large areas of developable land to the west in Region 6. Intense pressure on I-80 from traffic congestion, pavement degradation, and the incidence of truck accidents can be relieved through the proactive facilitation of rail service into these developments.

Figure 4-10: Region 5 – Industrial Parks

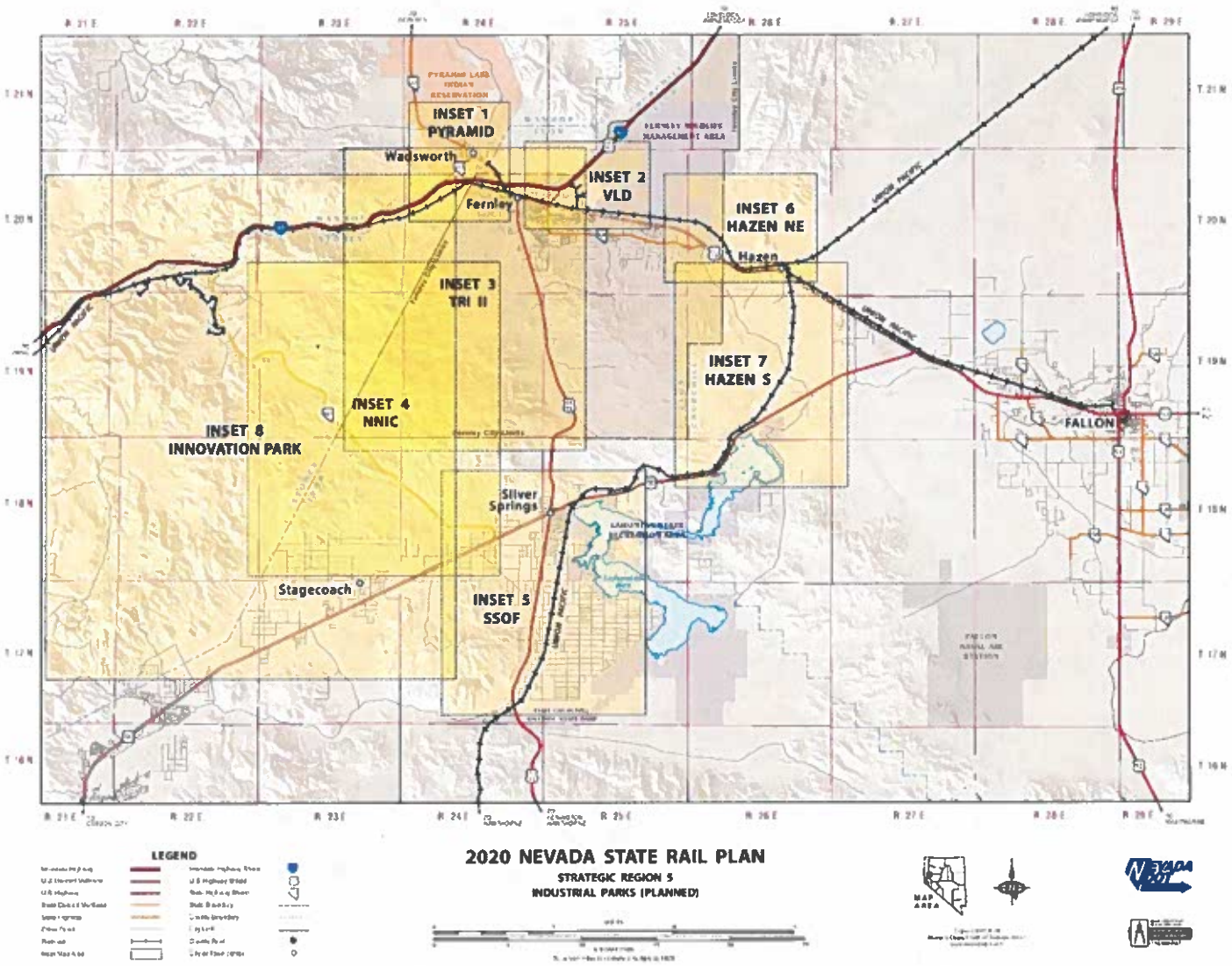


Figure 4-11: Region 5 – Pyramid Commercial

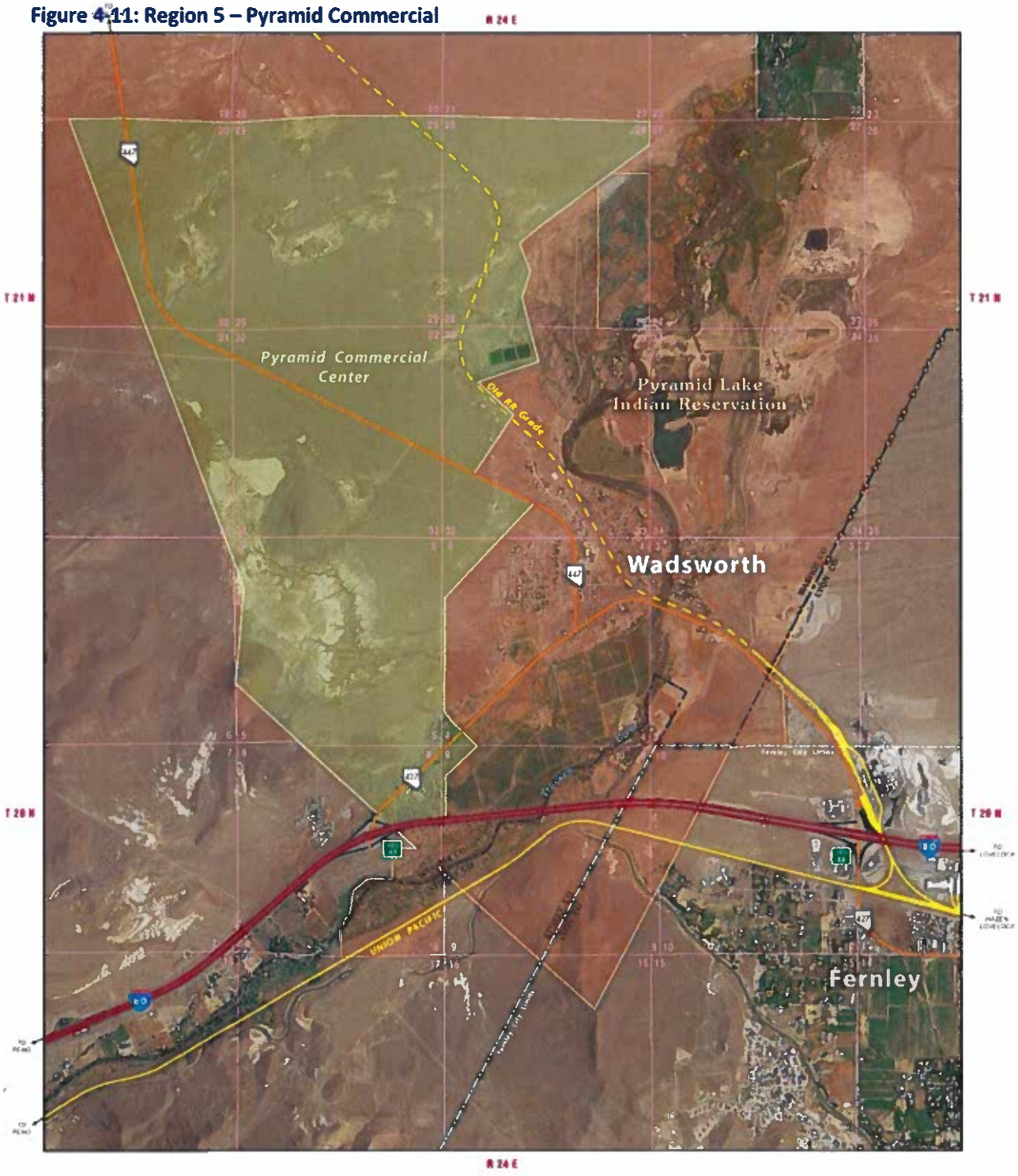


Figure 4-12 Region 5 – Victory Logistics District

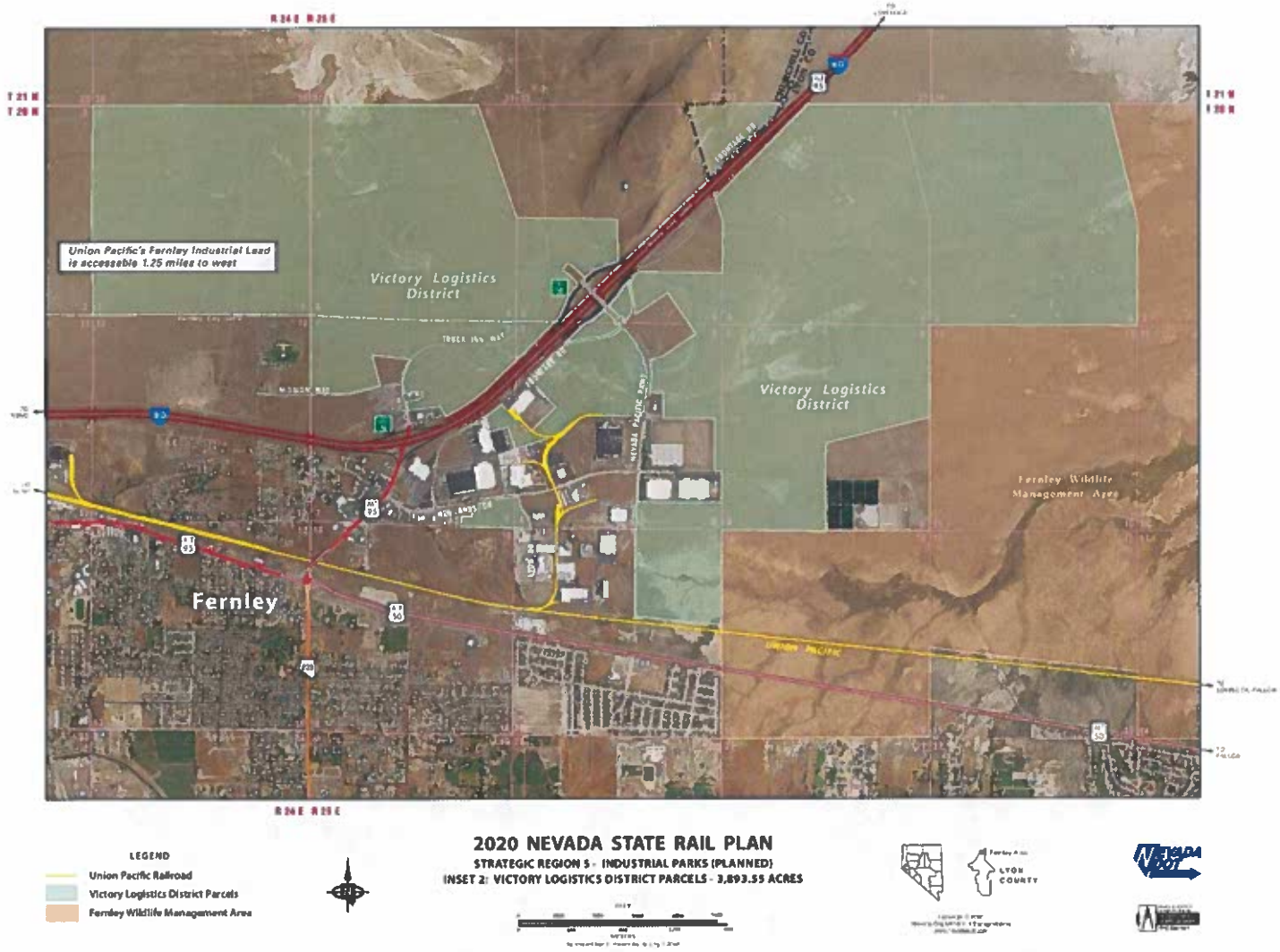
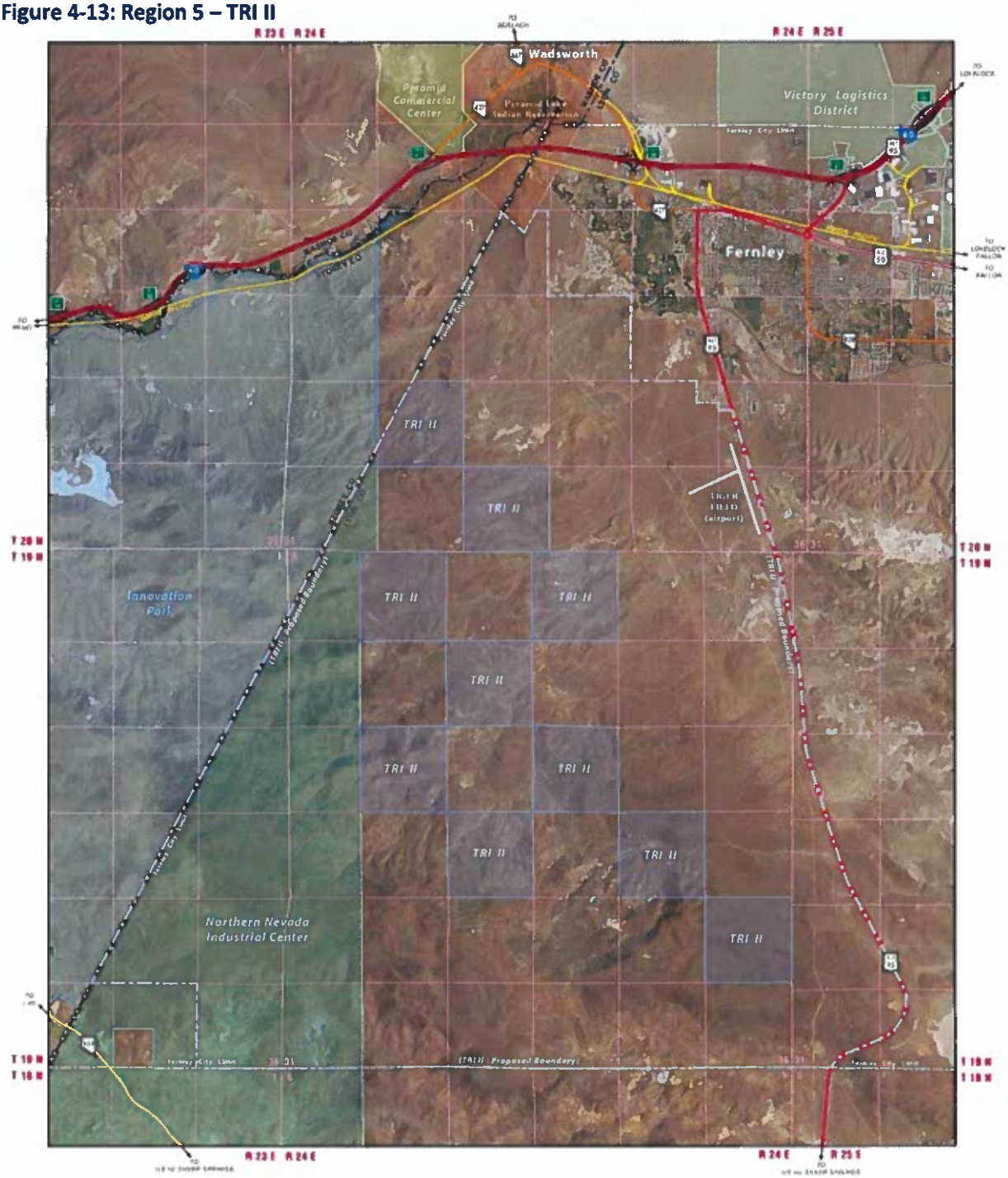


Figure 4-13: Region 5 – TRI II



LEGEND

- Union Pacific Railroad
- TRI II Proposed Boundary
- TRI II Parcels
- Innovation Park
- Northern Nevada Industrial Center
- Victory Logistics District
- Pyramid Commercial Center
- Pyramid Lake Indian Reservation

2020 NEVADA STATE RAIL PLAN

STRATEGIC REGION 5 - INDUSTRIAL PARKS (PLANNED)
INSET 3: TRI II PARCELS - 6,344.87 ACRES

LYON COUNTY

Figure 4-14: Region 5 – NNIC

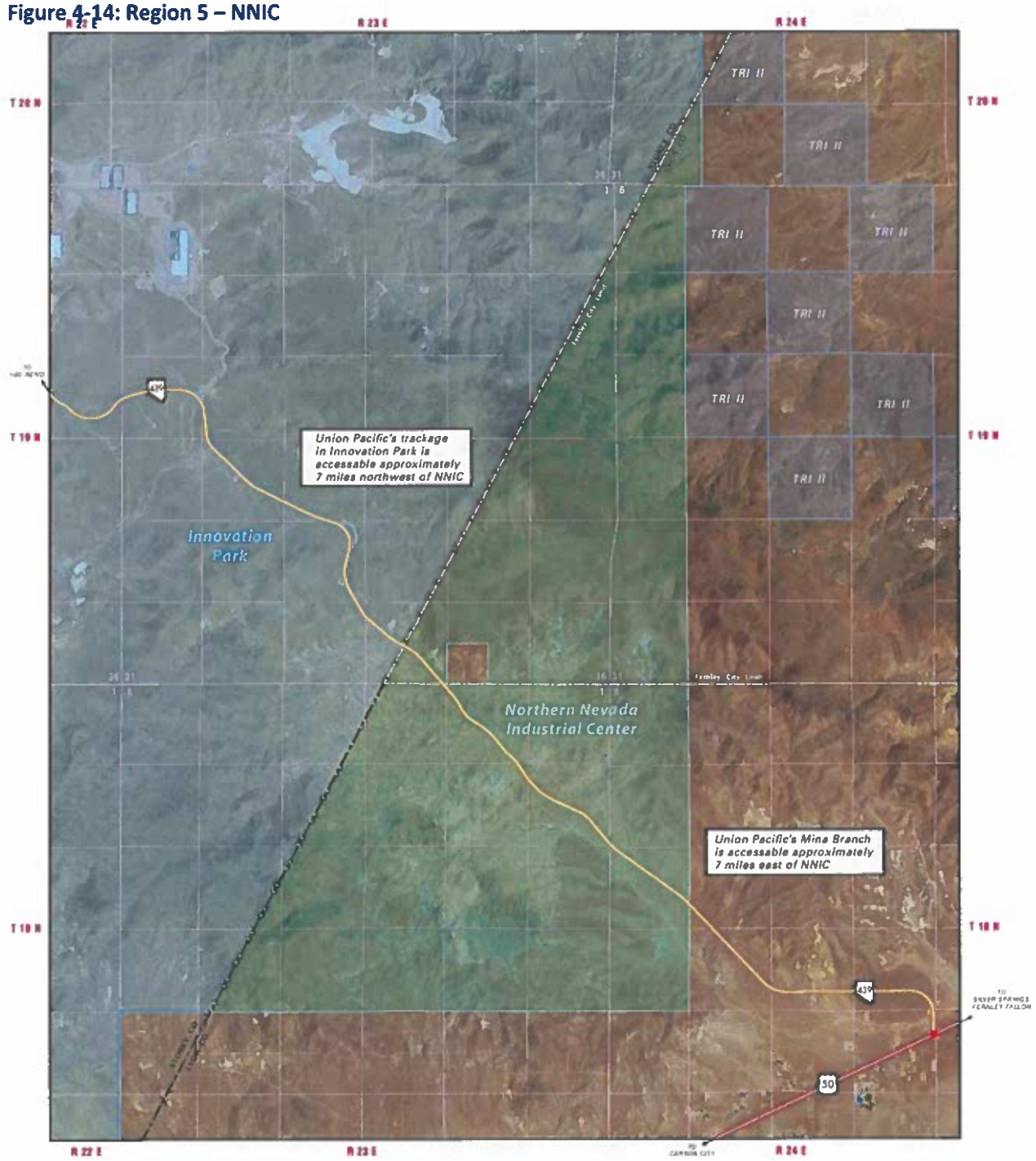


Figure 4-15: Region 5 – SSOF

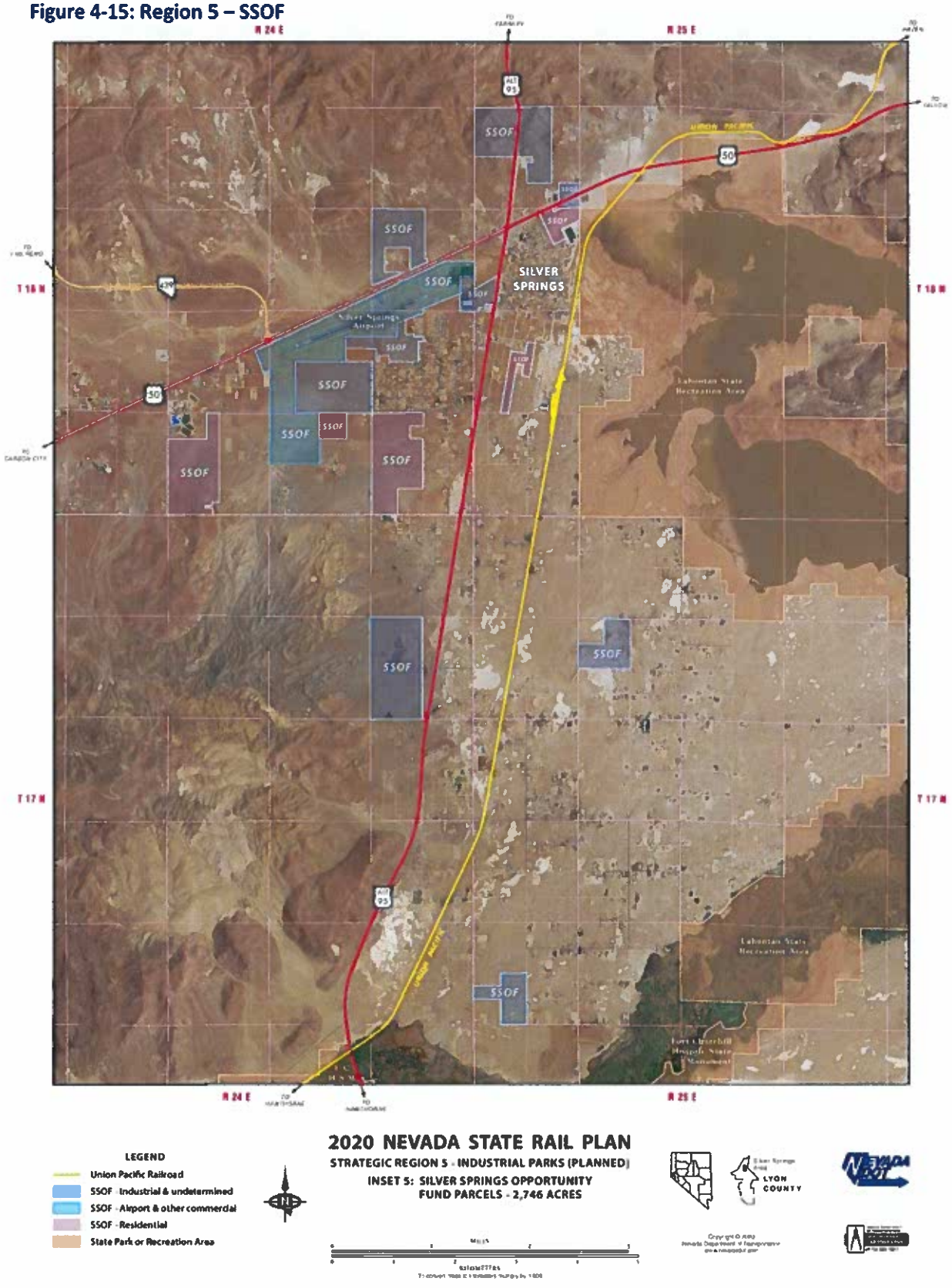


Figure 4-16: Region 5 – Hazen NW

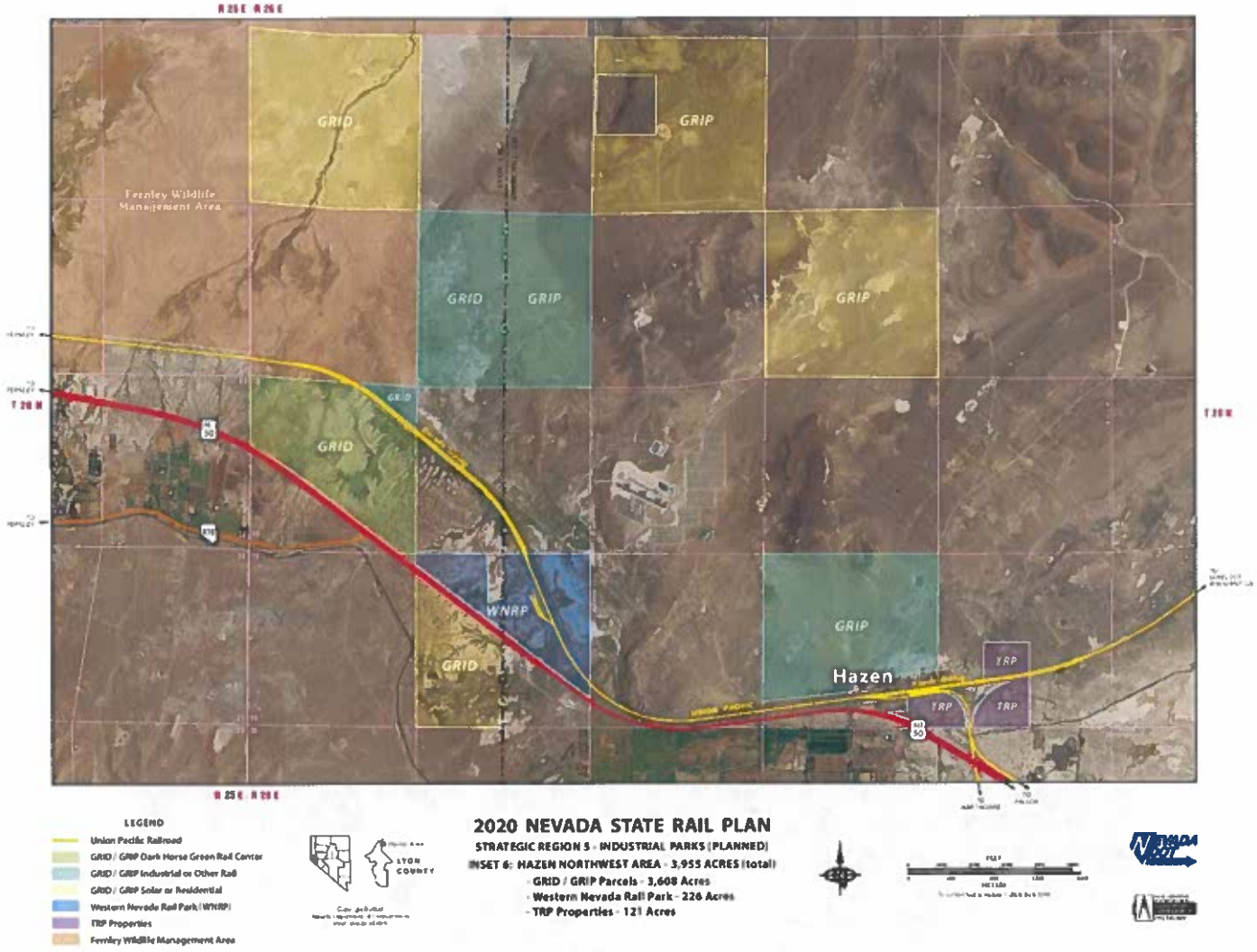


Figure 4-17: Region 5 – Hazen South

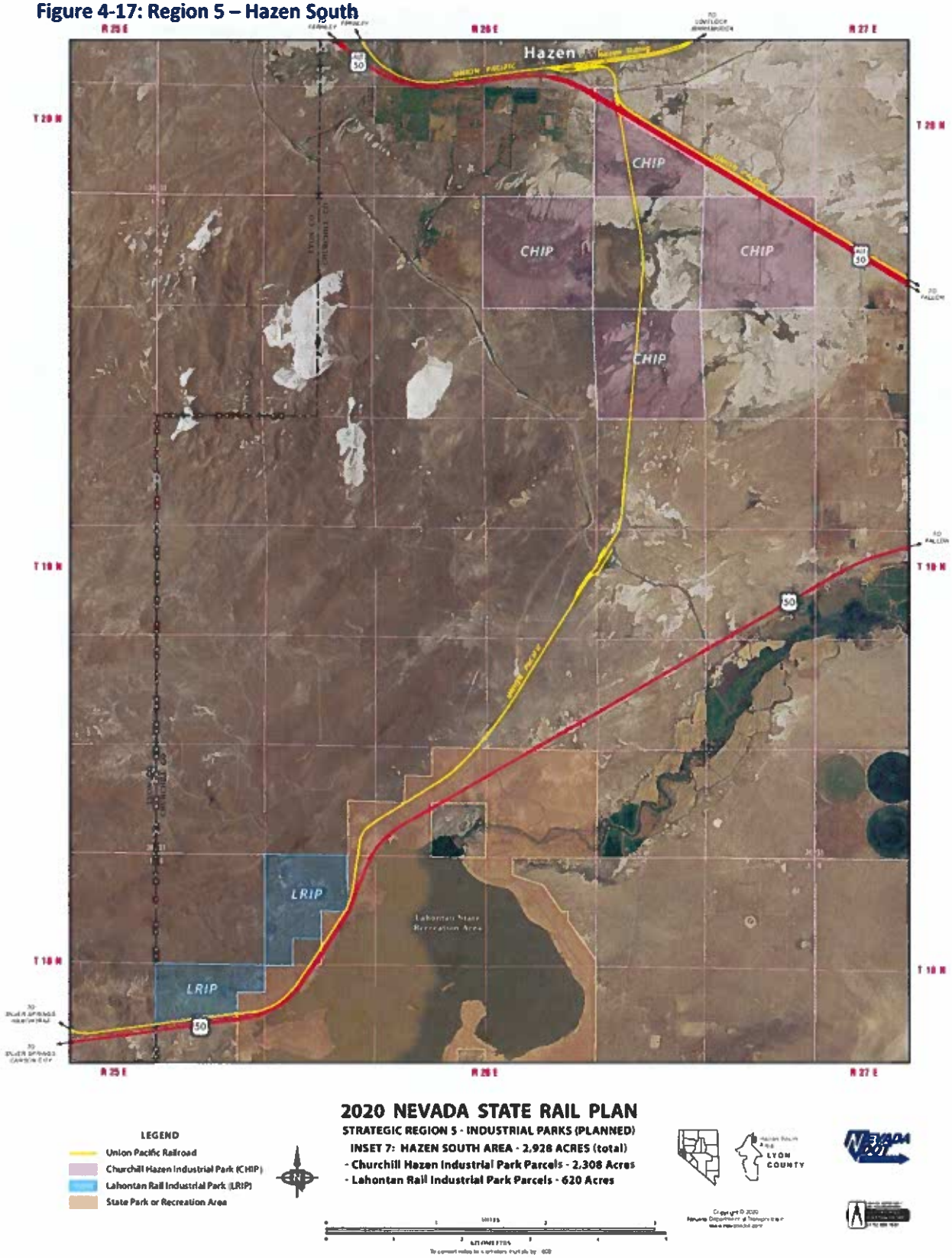


Figure 4-18: Region 5 – Innovation Park

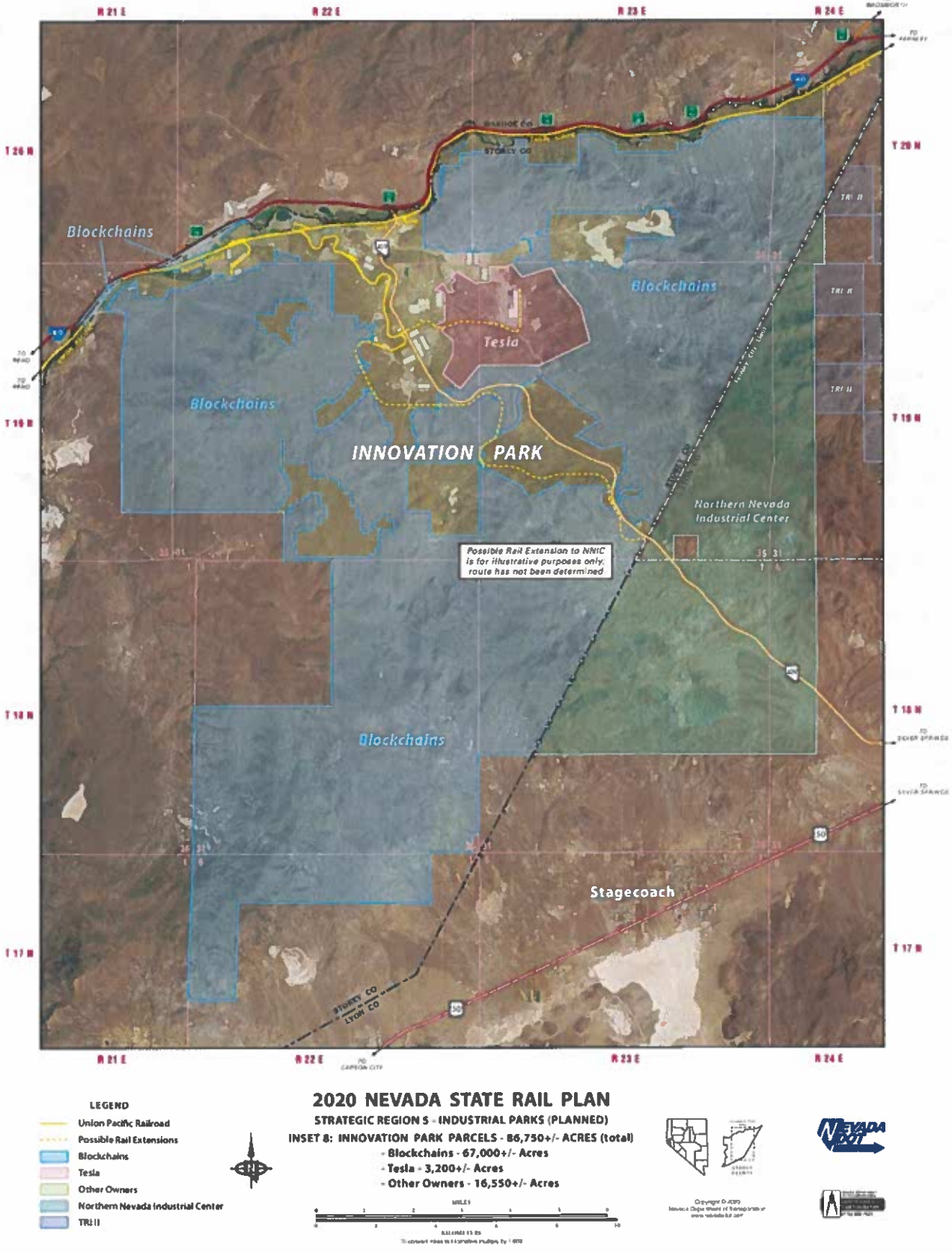
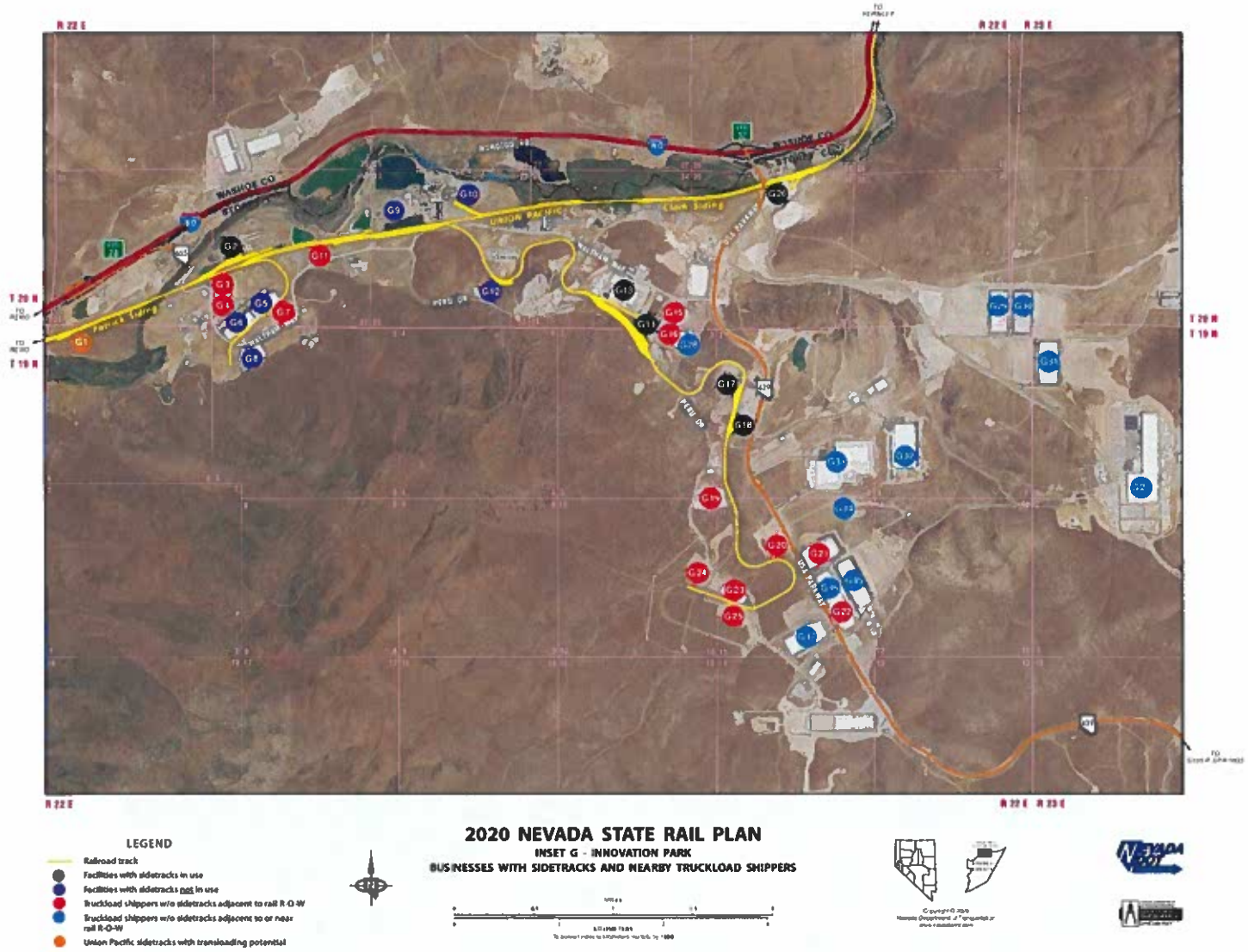


Figure 4-19: Innovation Park (Inset)



The above map and the following map show details of the existing rail infrastructure where existing and potential rail customers are clustered in Region 5. Notice that Tesla's Gigafactory (blue disk G27 in lower right), which ships an average of 52 truckloads per night via I-80 over the Donner Pass to Tesla's assembly plant in Fremont, CA, is only 2.5 miles away from an active branch line. The rail right-of-way for this connection (not shown) has already been set aside by the TRI General Improvement District and Tesla.

Figure 4-20: Fernley Northeast Area

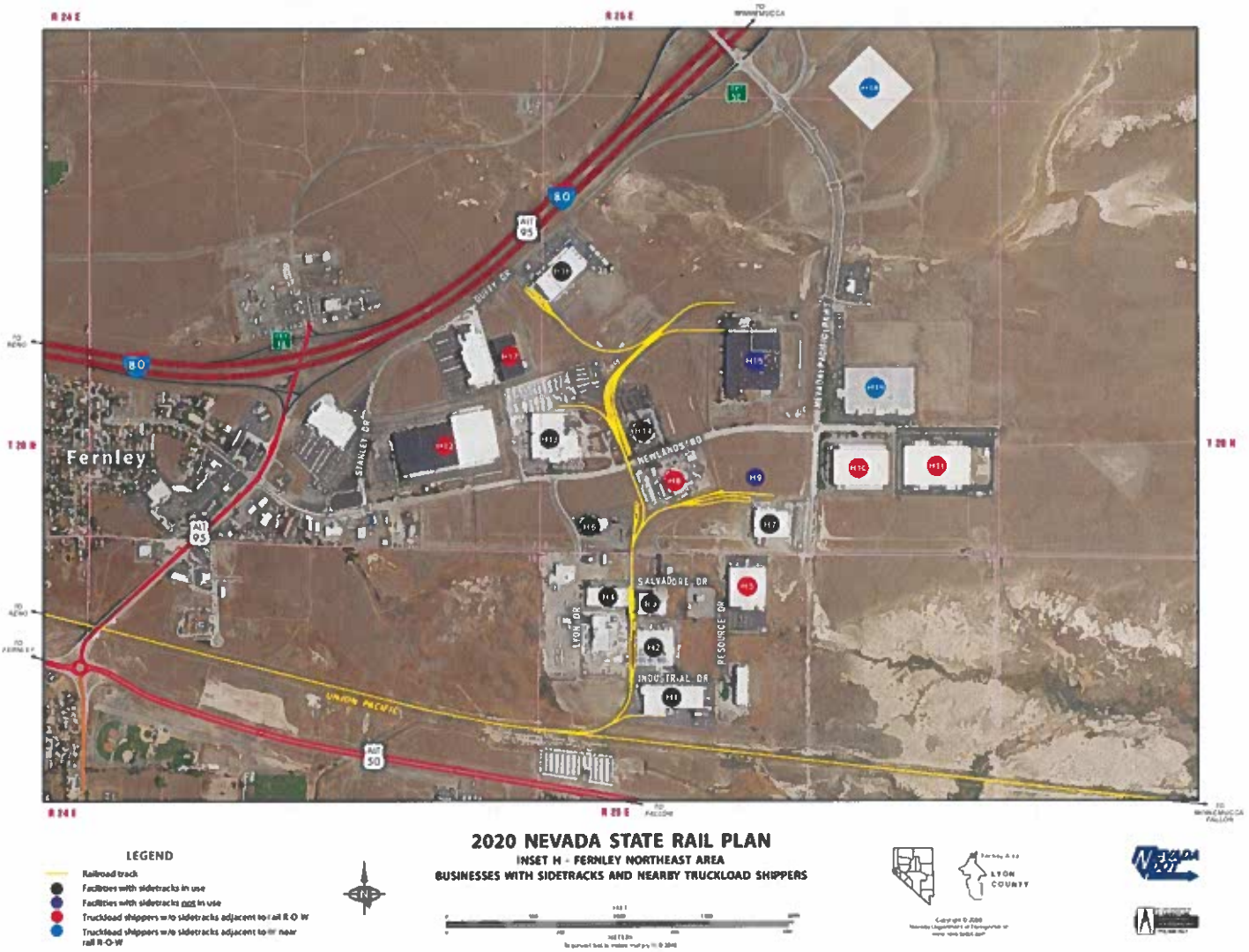


Table 4-15: Region 5 Project List

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
40-Mile Desert Land Development	Churchill	Connect to UP main line	Rail Connection	TBD	0.1	$4,000,000	TOT, LLC	5	4
Lahontan Rail Industrial Park	Churchill	Connect to Mina Branch	Rail Connection	TBD	0.2	$400,000	TOT, LLC	5	4
Geothermal Resources Industrial Park	Churchill	Connect to UP main line	Rail Connection	TBD	0.1	$4,000,000	GRIP LLC	5	4

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Limestone Mine	Churchill	Transloading site off main	Transload	specialized limestone	0.2	$4,000,000	Advanced Carbonate Technologies, LLC	5	4
Victory Logistics	Churchill	Connect to Fernley Industrial Lead Connect to LA Pacific Lead	Rail Connection	TBD	0.4 1.25	$4,000,000	Mark IV Capital	5	4
TRP Properties	Churchill	Connect to Fallon Branch	Rail Connection	TBD	0.1	$300,000	Omaha Track Hazen Project	5	4
Churchill Hazen Industrial Park	Churchill	Connect to Fallon Branch	Rail Connection	TBD	0.1	$300,000	TOT, LLC	5	4
Northern Nevada Industrial Center	Lyon	Connect to TRIC lead	Rail Connection	TBD	7	$14,000,000	Reno Engineering	5	4
Sierra Springs Opportunity Fund	Lyon	Connect 15-591-09 (120 ac.) Connect 15-581-03 (91 ac.)	Rail Connection	TBD	0.6 0.6	$2,000,000	Sierra Springs Opportunity Fund	5	4
Geothermal Rail Industrial Development	Lyon	Connect to UP main line	Rail Connection	TBD	0.1	$4,000,000	GRID LLC	5	4
Gigafactory Project	Storey	Connect to TRIC lead	Rail Connection	battery packs, drivetrains	2.5	$5,000,000	Tesla	5	4
Sierra Biofuels Plant	Storey	Connect to TRIC lead	Rail Connection	O/B syncrude feedstock	0	$0	Fulcrum BioEnergy	5	4
Innovation Park	Storey	Industrial Park	Rail Connection	TBD	0.1	$4,000,000	Blockchains, Inc.	5	4
Pyramid Commercial Center	Washoe	Connect to Fernley Industrial Lead	Rail Connection	TBD	1.7	$5,000,000	Reno Engineering	5	4

Table 4-16: Region 5 – Active Mines

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
58	59	**Churchill Mine**	Nevada Cement Co.	Limestone	Churchill	4427500	349540
67	68	**Fernley Operation Mine**	EP Minerals, LLC	Diatomite	Churchill	4410158	332267
77	78	**Huck Salt**	Huck Salt Co.	Salt	Churchill	4346860	374550
95	96	**Nightingale Pit**	Imerys Filtration Minerals, Inc.	Diatomite	Churchill	4422800	321060
101	102	**Popcorn Mine**	EP Minerals, LLC	Perlite	Churchill	4344290	345870
131	132	**Brady Hot Springs**	Ormat Nevada, Inc.	Electricity	Churchill	4407088	327912
132	133	**Brady Hot Springs**	Olam Spices and Vegetables, Inc.	Vegetable dehydration	Churchill	4406553	327273
134	135	**Desert Peak II**	Ormat Nevada, Inc.	Electricity	Churchill	4402148	332634
135	136	**Dixie Valley**	Terra-Gen Power,	Electricity	Churchill	4424433	426925

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
			LLC				
144	145	**Patua**	Cyrq Energy	Electricity	Churchill	4383471	321797
145	146	**Salt Wells**	Enel North America, Inc.	Electricity	Churchill	4352375	364296
147	148	**Soda Lake Nos. 1, 2**	Cyrq Energy	Electricity	Churchill	4380171	341112
150	151	**Stillwater 2**	Enel Stillwater, LLC	Electricity	Churchill	4378439	366194
151	152	**Tungsten Mountain**	Ormat Nevada, Inc.	Electricity	Churchill	4391619	440784
46	47	**Basalite Dayton Pit**	Basalite Concrete Products, LLC	Sand, gravel	Storey	4357606	282597
60	61	**Clark Mine**	EP Minerals, LLC	Diatomite	Storey	4381500	295120
106	107	**River Canyon III**	Joy Engineering	Aggregate	Storey	4379781	286375
110	111	**Sierra Stone Quarry**	CEMEX Construction Materials Pacific, LLC	Aggregate	Storey	4372283	274829
120	121	**Trico Pit**	Gopher Construction Co.	Aggregate	Storey	4382000	283800

Regional Development Authority

The regional Development Authority contact for this region is Rob Hooper, Northern Nevada Development Authority.

G-6. Region 6: Reno/Sparks/Stead

Overview

Region 6 features extensive industrial spurs and branch line infrastructure that is greatly underutilized. There are 39 manufacturing and transloading facilities served by rail in Region 6, but 15 do not use their sidetracks. There are 37 warehouses and distribution centers served by rail in Region 6, with a cumulative total of just over 5 million square feet of space, and none of their sidetracks are being used. One of those warehouses is the moribund BNSF Quality Distribution Center in Sparks. There are also 53 facilities located adjacent to UP right-of-way that ship or receive in truckload lots, but none of which built a sidetrack. Thirty-six of those 53 facilities are warehouses with another 5+ million square feet of space. Here is one large distribution center building in Stead adjacent to the branch line that is not being used.

Stead Warehouse near rail line that does not use rail

UP and BNSF, which operates in Region 6 under rights granted by the Surface Transportation Board in 1996 from UP's merger with SP, do not provide intermodal service between the COFC terminal in Sparks and California. In fact, BNSF does not utilize its intermodal rights in Nevada at all. UP only handles containers to and from Chicago. However, the Port of Oakland has expressed an interest in activating intermodal service to and from Nevada.

Notice in the following Figures 4-21 through 4-26 that almost all of the sidetrack infrastructure in Region 6 is not served off of the UP's main line, but instead off of industrial spurs and branch lines, whose operation need not interfere with main line traffic, and whose proximity to truckload shippers opens up the potential for new sidetracks. This evidences an opportunity for UP to outsource local switching operations and business development to a locally focused subsidiary or independent rail operator.

Key Strategies

- Co-create with UP a local rail service development effort
- Co-create with UP and BNSF a collaborative service development plan where BNSF has existing rights
- Gather the rail service case and operating plan for intermodal service with the Port of Oakland

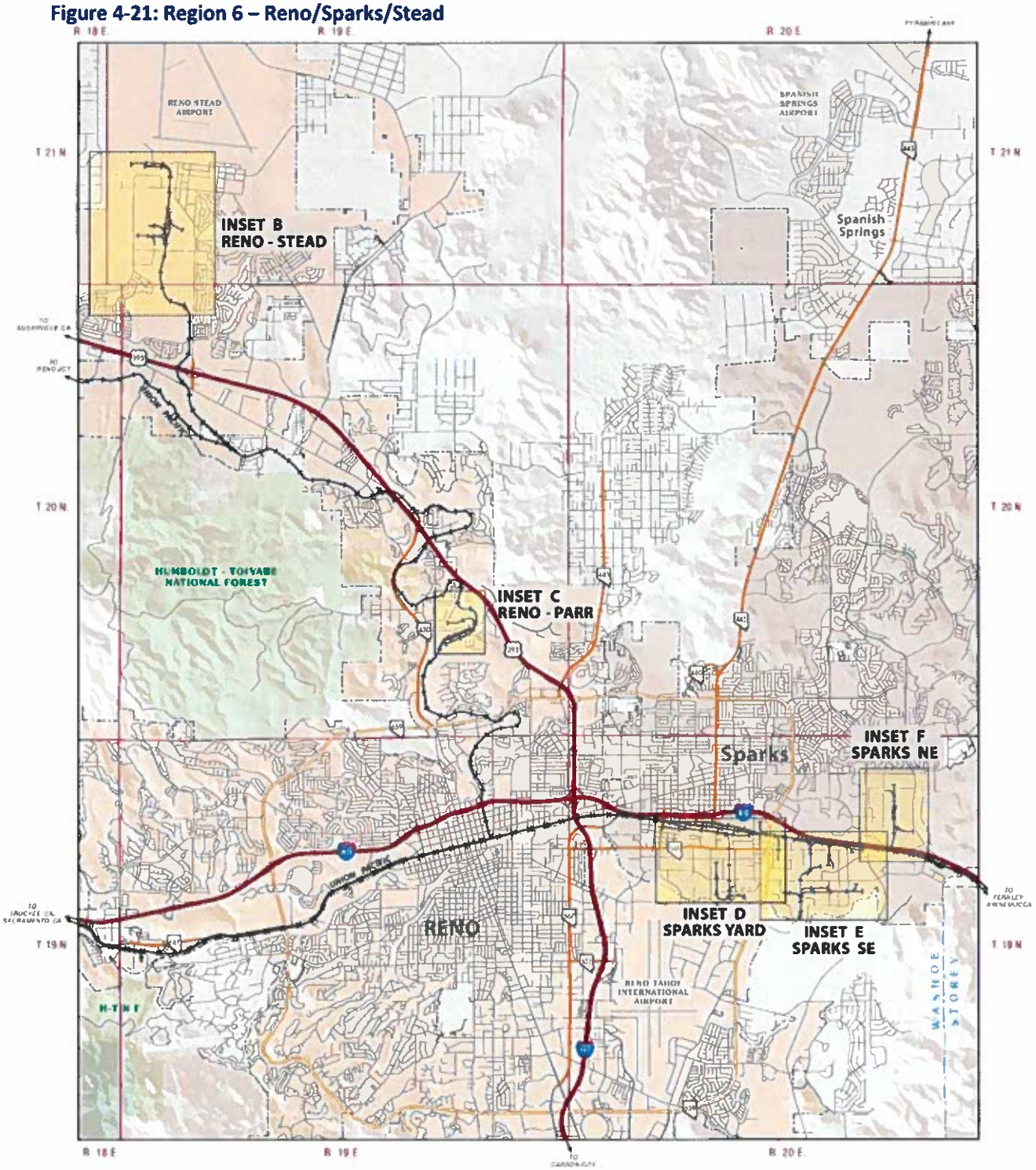
- Conduct supply chain logistics analysis on the regions production and transportation of aggregates, sand, and non-metallic minerals to California
- Establish high-volume interaction with customers
- Establish collaboration with real estate community on awareness and promotion of rail access in sales and leasing of commercial property
- Establish collaboration with economic developers on rail-centric business attraction strategies

A Guide for Looking at Next Six Maps

The next map, Figure 4-21, is an overview of Region 6 that shows the location of five areas of dense concentrations of businesses that have two characteristics: 1) proximity to active tracks, and 2) elevated shipping activity in truckload or carload lots. The following five maps, Figures 4-22 through 4-26, zoom in on these dense concentrations, which are particularly intriguing due to their potential for becoming centers of carload traffic growth when supported by frequent and reliable switching service and localized solicitation effort. This is particularly true for Figures 4-24 through 4-26, which overlap one another, making them a ready-made platform for carload initiatives.

The numbered and colored disks in the inset maps correspond to line items with details on each property that are catalogued in the NVSRP's statewide database presented in the Appendix as the ***Inventory of Nevada Industry: Businesses with sidetracks and nearby truckload shippers*** (black disks for businesses with active rail sidetracks, purple for those with inactive rail sidetracks, and red for those next to rail right-of-way that could build new sidetracks easily), and as Appendix Item ***Truckload Shipper Inventory*** (blue disks for truckload shippers farther away from rail right-of-way).

Figure 4-21: Region 6 – Reno/Sparks/Stead



2020 NEVADA STATE RAIL PLAN

STRATEGIC REGION 6

RENO SPARKS AREA

Figure 4-22: Region 6 – Reno Stead Area

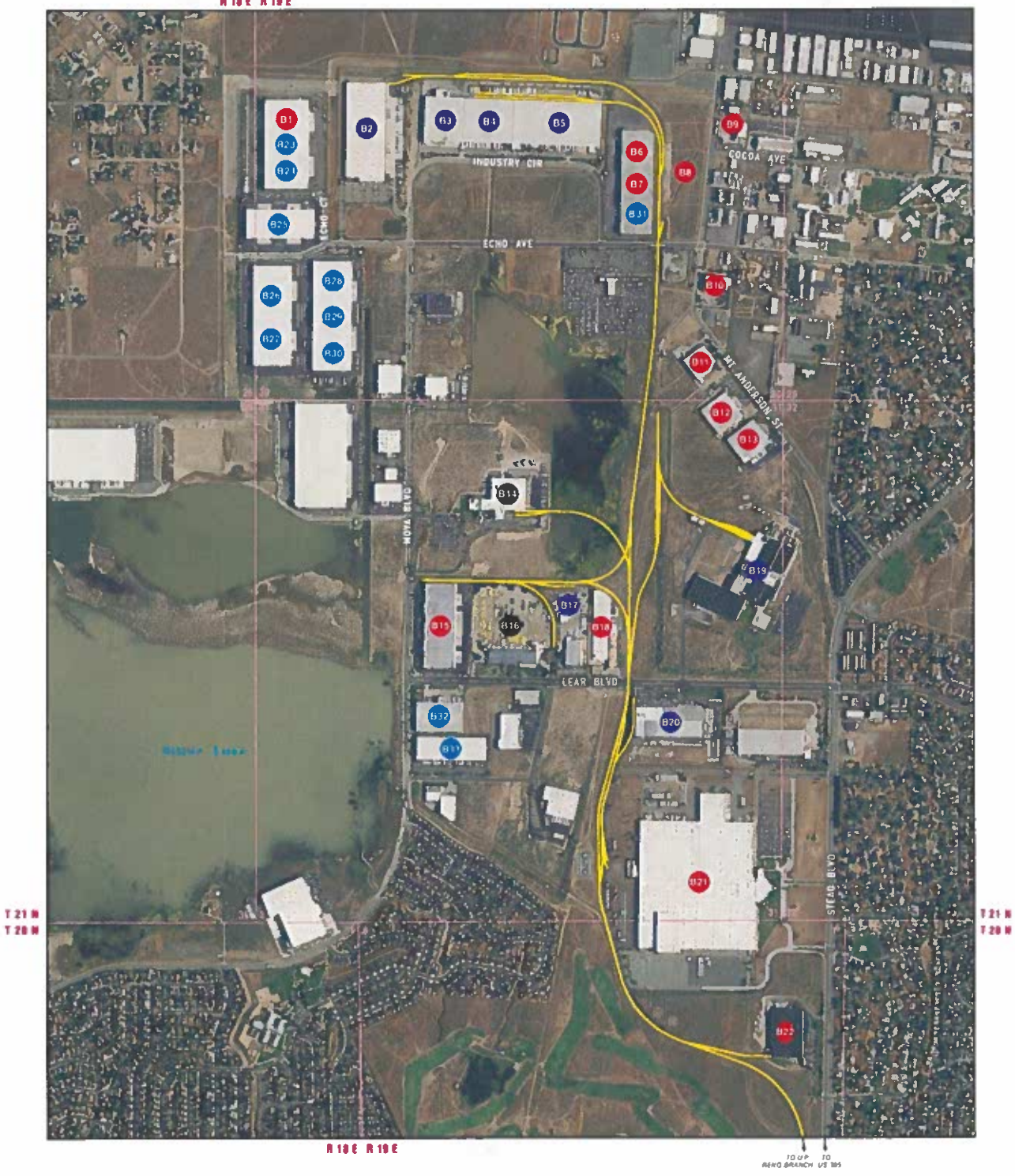


Figure 4-23: Region 6 – Reno Parr Area

LEGEND

- Railroad track
- Facilities with sidetracks in use
- Facilities with sidetracks not in use
- Truckload shippers w/o sidetracks adjacent to rail R-O-W
- Union Pacific sidetracks with transloading potential

2020 NEVADA STATE RAIL PLAN

INSET C - RENO PARR AREA

BUSINESSES WITH SIDETRACKS AND NEARBY TRUCKLOAD SHIPPERS

Figure 4-24: Region 6 – Sparks Yard Area

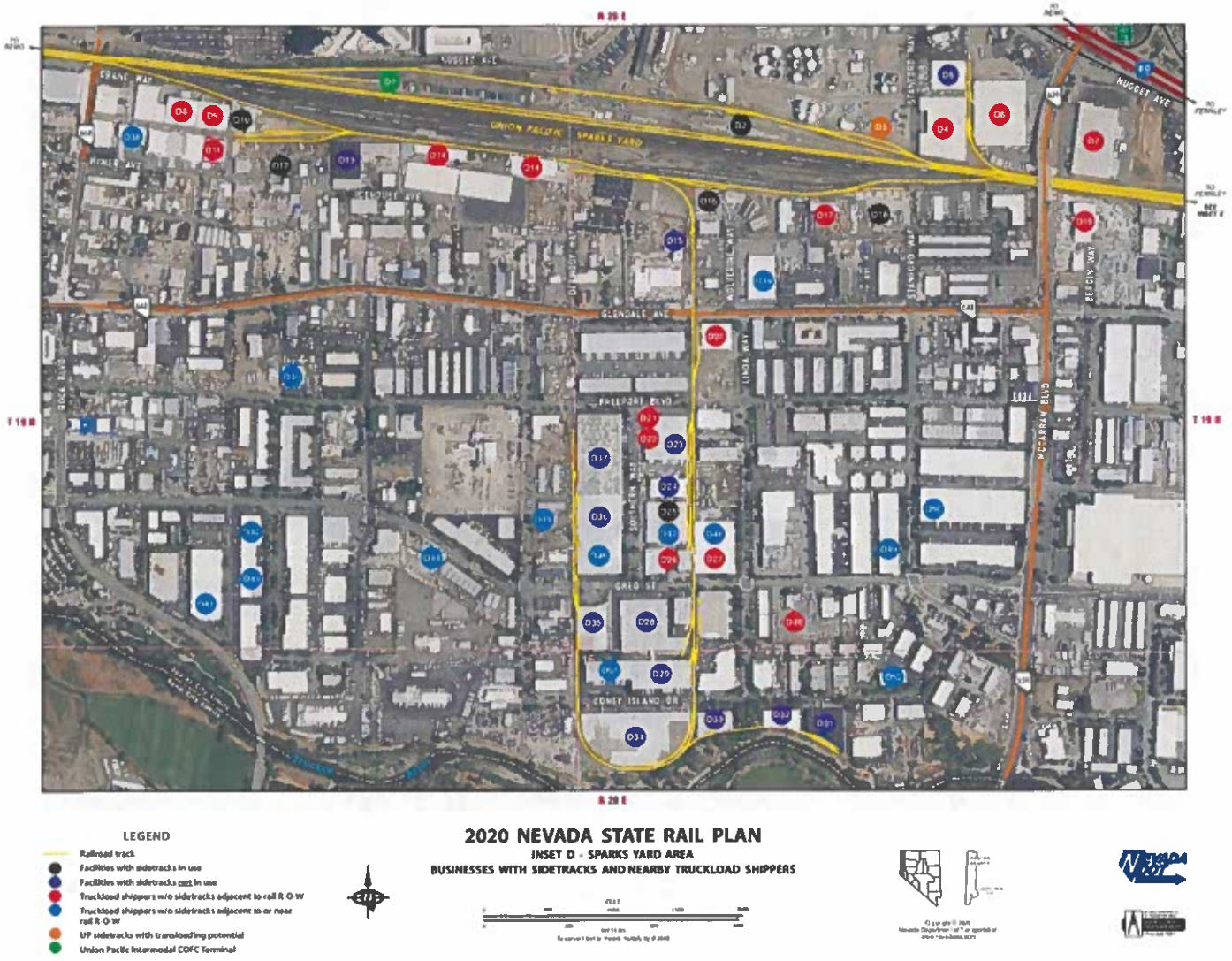


Figure 4-25: Region 6 – Sparks Southeast Area

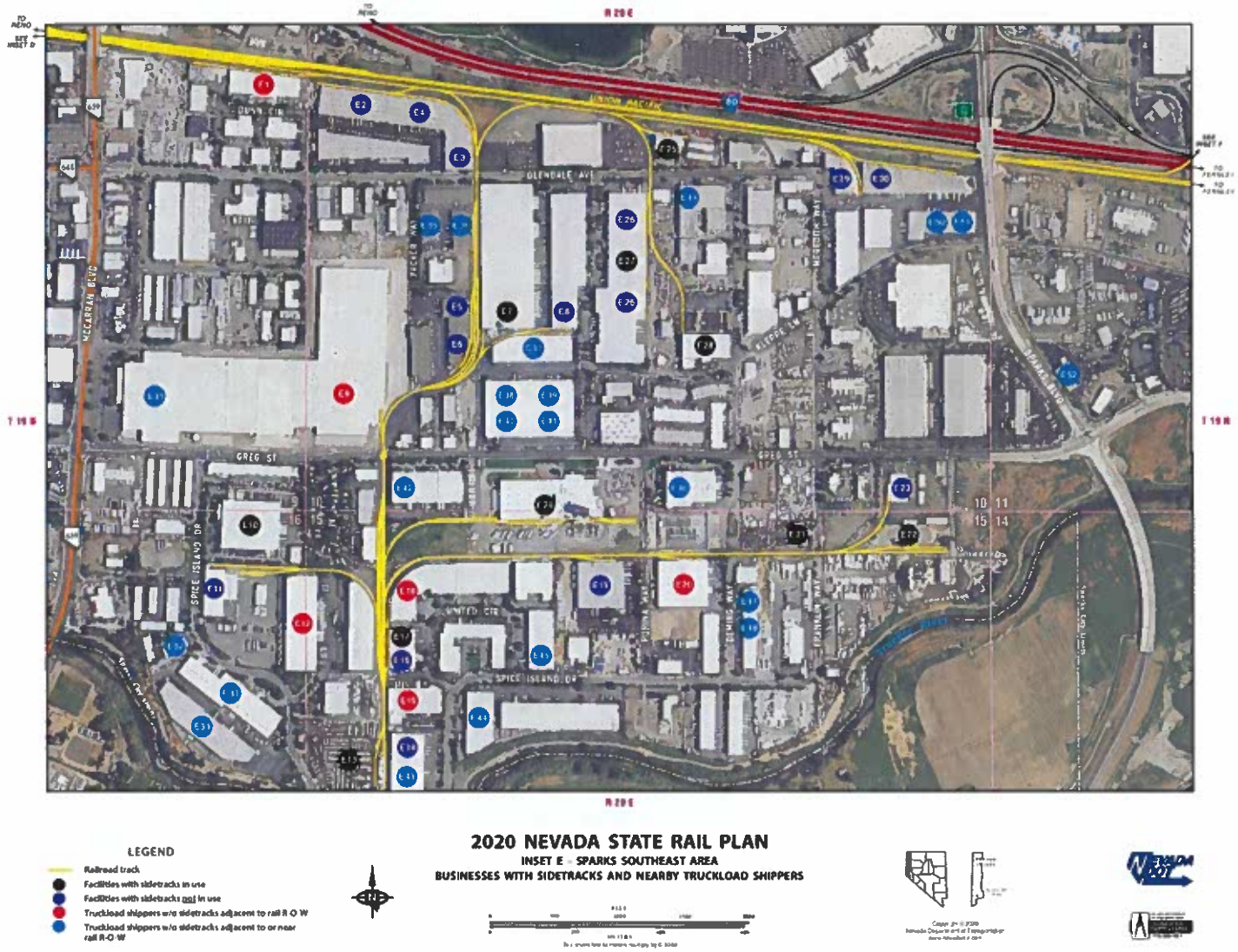


Figure 4-26: Region 6 – Sparks Northeast Area

Table 4-17: Region 6 – Project List

Project Name	County	Short Description	Contracted Description	Commodities	Track MI*	Cost	Company	Region	Horizon
Lear Industrial Center	Washoe	Connect to Leareno Industrial Lead	Rail Connection	to closest of 5 buildings:	0.3	$200,000	Lear Industrial Center	6	4
Pozzolan Transloading Site	Washoe	Connect to Leareno Industrial Lead	Rail Connection	pozzolan	0.1	$100,000	Geofortis Processing & Logistics LLC	6	4

*miles to reach site, not including serving tracks at site

Table 4-18: Region 6 – Active Mines

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
51	52	**Black and Red Cinder Pits**	Cinderlite Trucking, Inc.	Cinder, landscape rock	Carson City	4346880	264860
71	72	**Goni Pit**	Cinderlite Trucking Corp.	Decomposed granite, sand, gravel	Carson City	4344430	263820
50	51	**Bing Materials Pit**	Bing Materials Co.	Sand, gravel	Douglas	4308700	261500
49	50	**Bella Vista Pit**	A and K Earthmovers	Rock, sand	Washoe	4371320	265930
63	64	**Donovan Pit**	R.T. Donovan Co., Inc.	Decomposed granite	Washoe	4395000	270000
70	71	**Golden Valley Pit**	A and K Earthmovers	Aggregate	Washoe	4388960	259020
79	80	**Lockwood Quarry**	Granite Construction Co.	Aggregate	Washoe	4377267	271751
91	92	**Mustang Quarry**	Sierra Nevada Construction, Inc.	Aggregate	Washoe	4379650	273880
98	99	**Paiute Pit**	CEMEX Construction Materials Pacific, LLC	Sand, gravel	Washoe	4391040	304400
105	106	**Rilite Aggregate**	Rilite Aggregate Co.	Sand, rock	Washoe	4365881	266702
115	116	**Spanish Springs Quarry**	Martin Marietta Materials, Inc.	Aggregate, decomposed granite	Washoe	4395944	266114
118	119	**Terraced Hill Clay (Flanigan) Mine**	Nevada Cement Co.	Clay	Washoe	4455060	261500
119	120	**Tracy Pit**	BJ Rees's Enterprise	Sand, gravel	Washoe	4383361	284683
121	122	**Wade Sand Pit**	Granite Construction Co.	Sand	Washoe	4388890	305170
133	134	**Burdette (Galena 3)**	Ormat Nevada, Inc.	Electricity	Washoe	4363504	263276
138	139	**Galena 1**	Ormat Nevada, Inc.	Electricity	Washoe	4364213	263433
139	140	**Galena 2**	Ormat Nevada, Inc.	Electricity	Washoe	4361796	261800
142	143	**Moana Hot Springs**	Avalon Geothermal, LLC	Space heating	Washoe	4374819	258439
143	144	**Moana Hot Springs**	Peppermill Casinos, Inc.	Space heating	Washoe	4375822	258958

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
146	147	**San Emidio**	Ormat Nevada, Inc.	Electricity	Washoe	4472701	296269
148	149	**Steamboat II, III**	Ormat Nevada, Inc.	Electricity	Washoe	4363738	262756
149	150	**Steamboat Hills**	Ormat Nevada, Inc.	Electricity	Washoe	4361484	261630
49	50	**Bella Vista Pit**	A and K Earthmovers	Rock, sand	Washoe	4371320	265930

Regional Development Authority

The regional Development Authority contact for this region is Nancy McCormick, Economic Development Authority of Western Nevada.

G-7. Region 7: Mina Branch

Overview

The Mina Branch Region includes the last 77 miles of a 97-mile branch line from Hazen that formerly went all the way to Mina, Nevada, but now ends at the Hawthorne Army Depot in Hawthorne. UP sold the last 54 miles to the U.S. Army, and it wishes the Army to subcontract with an independent rail operator for those 54 miles so that UP would only traverse 43 miles south from Hazen (which is in Region 5). The Army has agreed in principle to work with Top Rail Solutions of Pittsburg, Kansas to do this, but an interchange between UP and Top Rail remains to be agreed upon and funded.

Hawthorne Army Depot

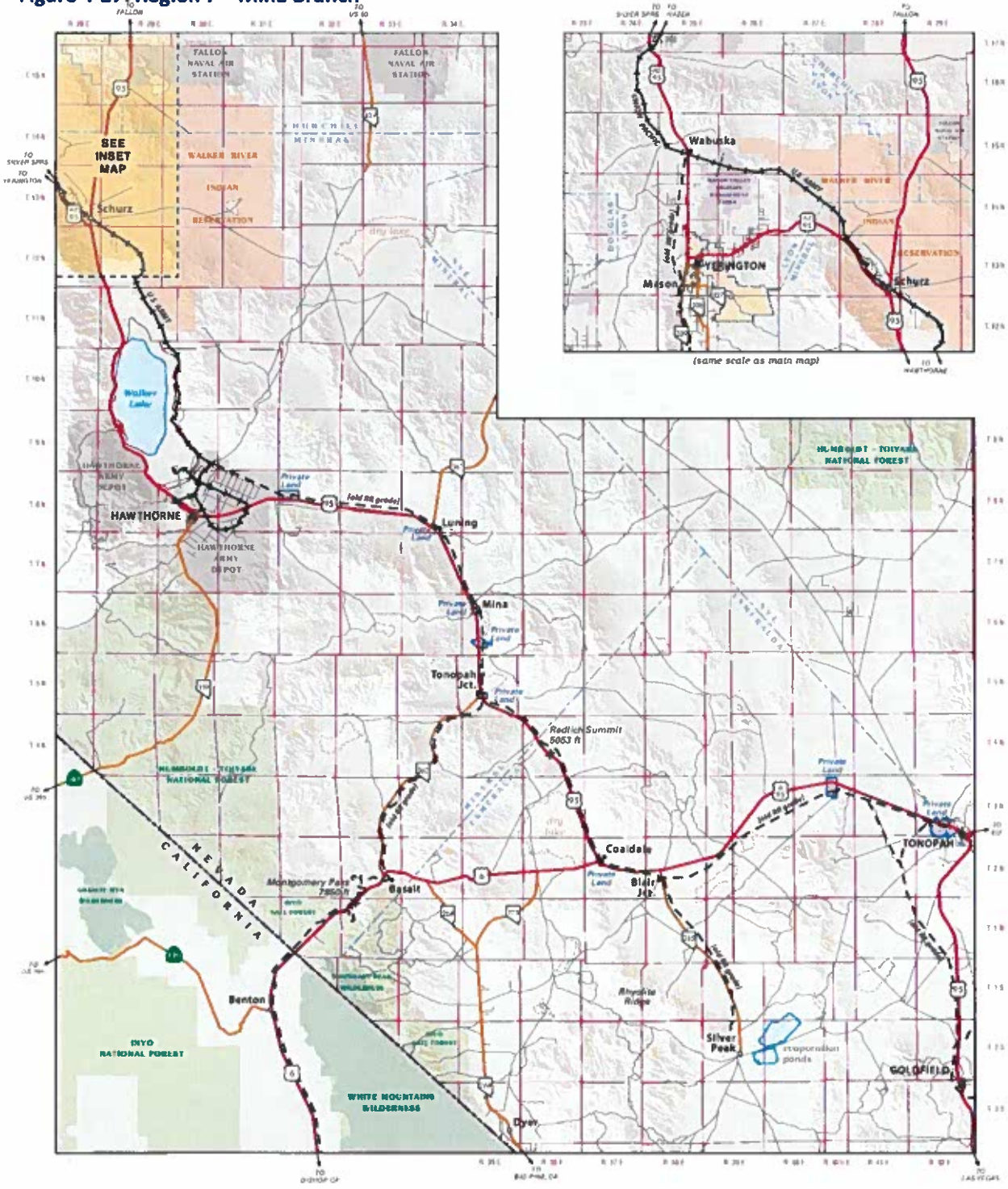
There is only one active customer besides the Army on the Region 7 portion of the Mina Branch, a dairy that transloads animal feeds on a Union Pacific-owned sidetrack in Wabuska. However, there are strong prospects for additional rail traffic. First and foremost are the prospects for empty rail car storage on a portion of the 252 miles of in-service sidetracks inside the Army Depot. There are also good prospects for Top Rail to operate a transloading site inside the Army Depot to handle bulk materials for mining and energy supplies.

Key Strategies

- Explore opportunities to serve copper mines, molybdenum mines, and cattle lots in the Yerington area with a short branch line diverging south from the Union Pacific at Wabuska
- Collaborate with Union Pacific and the U.S. Army on an economical, near-term approach to constructing interchange trackage between UP and Top Rail at Fort Churchill
- Publicize and facilitate car storage and rail/truck transloading at the Hawthorne Army Depot
- Promote collaboration among mining and energy operations that would be better served by having the Mina Branch reconstructed back through Luning to Mina for rail/truck transloading there
- Eventually continue the process of reconstructing an active rail line in steps to Blair Junction and Goldfield Junction, to include stubs directly into nearby mines

Roadbed of former Mina Branch east of Hawthorne

Figure 4-27: Region 7 – Mina Branch



LEGEND

2020 NEVADA STATE RAIL PLAN

STRATEGIC REGION 7

MINA BRANCH AREA

Table 4-19: Region 7 – Project List – One- to Four-Year Horizon

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Cattle Feed Project	Lyon	Transloading on Mina Branch	Transload	various cattle feeds	0.1	$150,000	Snyder Livestock Co Inc	7	4
Ann Mason Project	Lyon	Connect to Mina Branch	Rail Connection	copper & molybdenum ores	8	$16,000,000	Hudbay Minerals	7	4
Pumpkin Hollow	Lyon	Connect to Mina Branch	Rail Connection	copper ores, I/B fuel, lime, etc	8	$16,000,000	Nevada Copper, Inc.	7	4
Hawthorne Army Depot Car Storage	Mineral	Build interchange with UP	Interchange with UP	car storage, transloading bulk	2	$3,000,000	Top Rail Solutions, Inc.	7	4
Round Mountain Gold	Nye	Transloading site at Hawthorne	Transload	ammonium nitr., lime, diesel	TL	$250,000	Kinross Gold	7	4
Bolo Project	Nye	Transloading site at Hawthorne	Transload	ammonium nitr., lime, diesel	TL	$250,000	Barrian Mining	7	4
Gold Resources-Isabella Pearl Mine	Mineral	Transloading site at Hawthorne	Transload	ammonium nitr., lime, diesel	TL	$250,000	Gold Resources	7	4
Extend Mina Branch, Hawthorne to Mina	Mineral	Build on abandoned ROW on BLM	Rail Connection	N/A	33	$50,000,000	Joint Venture	7	4
Basalt Mine (Esmeralda County)	Mineral	Transloading site in Mina	Transload	diatomaceous earth	TL	$250,000	Dicalite Management Group, Inc.	7	4
Rhyolite Ridge	Esmeralda	Connect to Mina Branch at Coaldale	Rail Connection	boron, lithium O/B, I/B various	19	$30,000,000	ioneer USA Corp.	7	5-20

*miles to reach site, not including serving tracks at site

Table 4-20: Region 7 - Project List – Five- to Twenty-Year Horizon

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Extend Mina Br., Mina to Blair Jct.	Esmeralda	Build on abandoned ROW on BLM	Rail Connection	N/A	36	$54,000,000	- Joint Venture	7	5-20
Extend Mina Br., Blair to Goldfield Jct.	Esmeralda	Build on abandoned ROW on BLM	Rail Connection	N/A	23	$35,000,000	Joint Venture	7	5-20
Crow Springs	Esmeralda	Connect to Mina Branch SW of G Jct.	Rail Connection	open-pit perlite and pozzolan	10	$20,000,000	SR Minerals, Inc.	7	5-20
Tonopah Lithium Claims (Am. Lithium)	Nye	Connect to Mina Br. at Goldfield Jct.	Rail Connection	I/B molten sulfur, caustic soda, cyanide, soda ash, fuel	7	$15,000,000	American Lithium	7	5-20

Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
Liberty Project	Nye	Connect to Crow Springs Branch	Rail Connection	Molybdenum, copper	7	$15,000,000	General Moly, Inc.	7	5-20
Gemfield Mine	Esmeralda	Transloading site at Goldfield Jct.	Transload	ammonium nitr., lime, diesel	TL	$250,000	Gemfield Resources	7	5-20
Goldfield Bonanza Mine	Esmeralda	Transloading site at Goldfield Jct.	Transload	ammonium nitr., lime, diesel	TL	$250,000	Lode-Star Mining Inc.	7	5-20
Silver Peak	Esmeralda	Connect to Mina Branch at Blair Jct.	Rail Connection	Lithium	18	$27,000,000	Albemarle Corp	7	5-20
Clayton Valley	Esmeralda	Connect to Albemarle line at Silver Peak	Rail Connection	Lithium	22	$7,000,000	Pure Energy	7	5-20
Hasbrouck Project	Nye	Hasbrouck Project	Rail Connection	ammonium nitr., lime, diesel	TL	$250,000	West Kirkland Mining Inc.	7	5-20
Round Mountain Mine	Nye	Round Mountain Mine	Rail Connection	ammonium nitr., lime, diesel	TL	$250,000	Round Mountain Gold Corp.	7	5-20

Table 4-21: Region 7 – Active Mines

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
14	15	Gold Hill Mine (open pit)	Round Mountain Gold Corp.	Gold, silver	Nye	4291260	495570
33	34	Round Mountain Mine (open pit)	Round Mountain Gold Corp.	Gold, silver	Nye	4283750	493240
36	37	Sterling Mine (permitted open pit)	Coeur Rochester, Inc.	Gold	Nye	4075340	532100
41	42	Amargosa Clay Operation (IMV Pits)	Lhoist North America of Arizona	Clay	Nye	4034845	568580
48	49	Beatty Quarry	Kalamazoo Materials, Inc.	Landscape rock	Nye	4094750	521840
59	60	Cinder Cone Pit	Allied Building Materials, Inc./Cind-R-Lite Co.	Cinder	Nye	4060140	543740
69	70	Gamebird Pit	Wulfenstein Construction Co., Inc.	Sand, gravel	Nye	4001996	599697
94	95	New Discovery Mine	Vanderbilt Minerals Corp.	Clay	Nye	4081905	520520
97	98	Pahrump Community Pit	Various (Bureau of Land Management manages pit)	Sand, gravel	Nye	4004300	596780

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
102	103	Premier Chemicals, LLC, Mine	Premier Chemicals, LLC	Magnesite	Nye	4302120	422900
122	123	Wulfenstein (BLM) Pit	Wulfenstein Construction Co., Inc.	Sand, gravel	Nye	4004300	596800
154	155	Bacon Flat	Grant Canyon Oil and Gas, LLC	Oil	Nye	4258061	622592
156	157	Eagle Springs	Kirkwood Oil and Gas, LLC	Oil	Nye	4273541	627598
157	158	Ghost Ranch	Kirkwood Oil and Gas, LLC/Makoil, Inc.	Oil	Nye	4272319	627902
159	160	Grant Canyon	Grant Canyon Oil and Gas, LLC	Oil	Nye	4256983	624095
160	161	Kate Spring	Western General / Makoil, IInc.	Oil, gas	Nye	4271057	627115
161	162	Sand Dune	Kirkwood Oil and Gas, LLC	Oil	Nye	4272249	627722
162	163	Sans Spring	Grant Canyon Oil and Gas, LLC	Oil	Nye	4258648	617622
164	165	Trap Spring	Makoil, Inc./Frontier Exploration Co.	Oil	Nye	4274130	617171
0	1	Aurora Mine (reprocessing)	Hecla Mining Co.	Gold, silver	Mineral	4240220	334720
2	3	Borealis Mine (leaching old pads)	Borealis Mining Co., LLC	Gold, silver	Mineral	4250000	347250
28	29	Mineral Ridge Mine (open pits)	Mineral Ridge Gold LLC	Gold, silver	Esmeralda	4183158	437800
47	48	Basalt Mine	Grefco Minerals, Inc.	Diatomite	Esmeralda	4205478	393380
52	53	Blanco Mine	Vanderbilt Minerals Corp.	Clay	Esmeralda	4196340	425740
75	76	Heart of Nature Alum/Sulfur Mine	Heart of Nature, LLC	Alum, sulfur	Esmeralda	4195570	441510
111	112	Silver Peak Operations	Rockwood Lithium, Inc.	Lithium carbonate	Esmeralda	4178350	443700
124	125	Gemfield Gems	Gemfield Gems	Chalcedony	Esmeralda	4176832	474068
125	126	Lone Mountain Turquoise Mine	Lone Mountain Mining, LLC	Turquoise	Esmeralda	4201200	463200
8	9	Denton-Rawhide Mine (open pit)	Rawhide Mining, LLC	Gold, silver	Mineral	4319430	379657
136	137	Don A. Campbell, Don A. Campbell II	Ormat Nevada, Inc.	Electricity	Mineral	4299493	384894
40	41	Adams Claim Gypsum Mine	Art Wilson Co.	Gypsum, limestone	Lyon	4345271	267860

FID	ID #	Name	Operator	Commodity	County	Y_U83N	X_U83E
62	63	Dayton Materials (Mustang Pit)	3D Concrete, Inc.	Aggregate, sand	Lyon	4346000	277000
68	69	Fernley Quarry	Nevada Cement Co.	Limestone	Lyon	4380020	310490
107	108	Rocks Road Pit	Desert Engineering	Sand, gravel	Lyon	4312626	316830
153	154	Wabuska	Open Mountain Energy	Electricity	Lyon	4337262	311667
74	75	Hazen Pit	EP Minerals, LLC	Diatomite	Lyon/Churchill	4377320	320220

Regional Development Authority

The regional Development Authority contact for this region is Northern Nevada Development Authority.

G-8. Region 8: Beatty/Pahrump

Overview

Region 8 was established in July after further thought regarding the opportunity of rebuilding a freight rail line between Hawthorne and southern Nevada. An extension of the line southeast of Goldfield and through Nye County might be justified in the future by aggregating the logistics needs of mines and other bulk freight shippers between Goldfield south Nye County, such as the Sunrise Gold Placer gold mine near Beatty.

New mining discoveries and new players are common events in Nevada. In the long run, a pragmatic southern connection could be realized by constructing new track on the existing grade of the abandoned Tonopah & Tidewater RR between Beatty and a connection with the UP at Crucero, CA, and the BNSF at Ludlow, CA.

The long-term prospect for the Mina Branch to connect with southern Nevada should begin by reinstituting commercial rail service south of Wabuska to Hawthorne. Revitalizing the Mina Branch from Hazen to Hawthorne can form the economic and financial anchor for further extensions of the rail line south to Mina, and Esmeralda and Nye Counties, eventually extending further south to complete the long-sought reconnection of north and south Nevada.

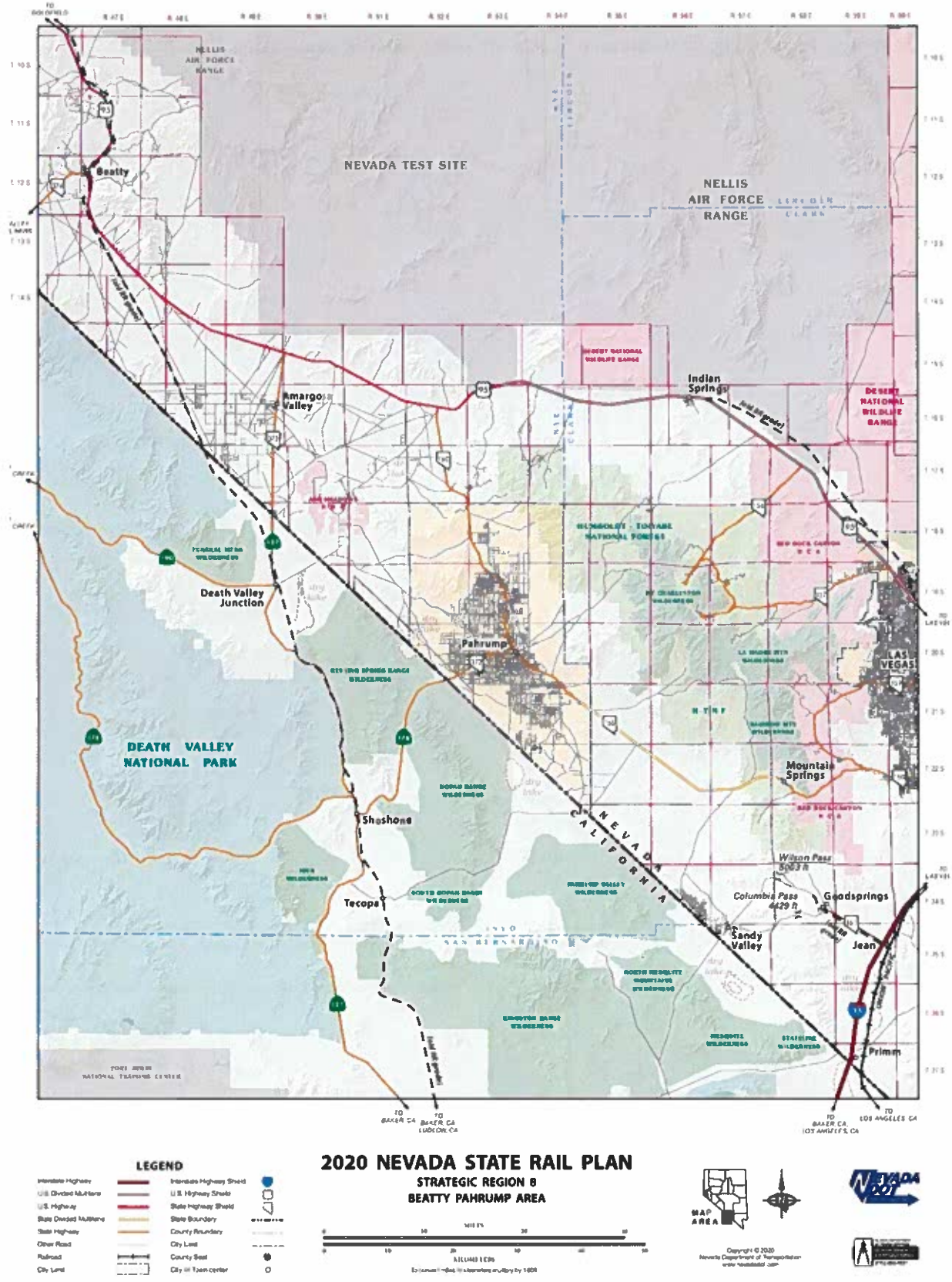
There is also discussion of a new technology corridor on the western side of the state that will combine the transfer of utilities and rail to move both freight and people to intersect with the new high speed rail line and the new Ivanpah airport in Jean, NV located in southern Clark county. The citizens of this area need access to both technology and utilities such as a natural gas pipeline.

Key Strategies

- The process of reconstructing a rail line south from Hawthorne to Luning to Mina to Blair Junction to Goldfield Junction can be continued south into Region 8 to Beatty and connections with UP and BNSF by continuing to promote collaboration among mining and energy companies to pool their efforts in the creation of economical direct rail service.

- Transportation opportunities unique to southern Nye County should be explored, such as the inbound movement of dairy feed, fertilizer made from waste recycling in the Los Angeles area, and general transloading near Pahrump to support a local surge in population.

Figure 4-28: Region 8 – Beatty/Pahrump Area



Regional Development Authority

The regional Development Authority contact for this region is Paul Miller, Nye Co & Esmeralda Regional Economic Development Authority.

Summary—Nevada Freight Rail Strategic Plan

An on-going entity could be established to triage and promote all the projects enumerated for the eight Regions above, providing a forum for their refinement and implementation.

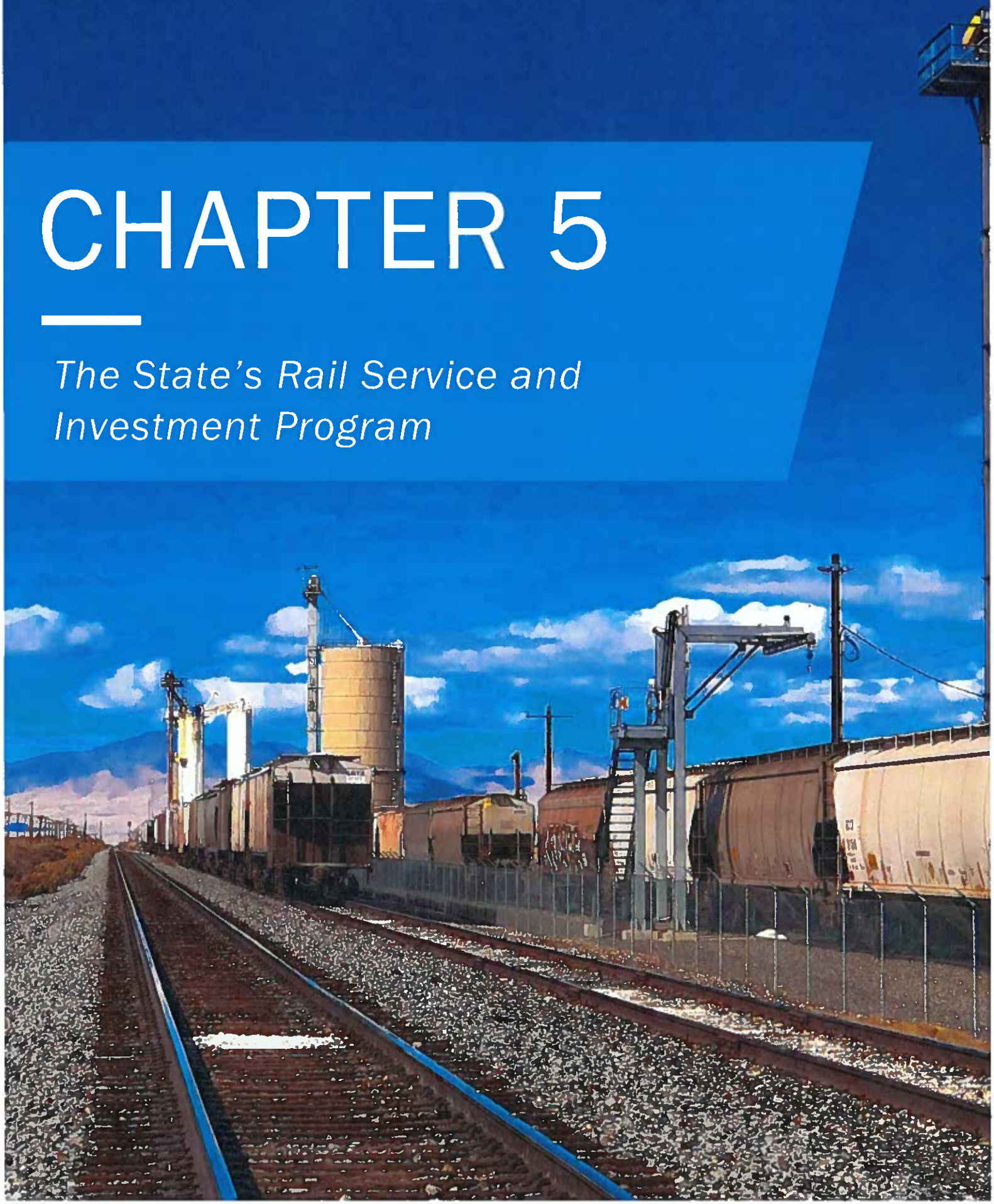
That entity could provide the path to the radical inclusion of all commercial decision-makers in Nevada: the mining, warehousing, and manufacturing industries; policy makers; economic development agencies; landowners and land developers; and the railroads. It could assist in the beneficiation of Nevada's natural resources and to the environmentally friendly expansion of Nevada's employment in industries that need to move large quantities of product.

Such an entity could be the clearinghouse for rail information, financing, expertise, and expertise-in-the-making by:

- Creating and managing a website and associated databases, such as continuously upgraded inventories of Nevada's existing sidetracks, high-potential sidetracks, and large-lot shippers
- Facilitating dialogues among Nevada's various commercial stakeholders
- Shepherding a Freight Rail Development Fund; and perhaps most importantly
- Cultivating partnership with Nevada's two rail freight carriers—Union Pacific and BNSF

CHAPTER 5

The State's Rail Service and Investment Program



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Chapter 5 Tables

Chapter 5 The State's Rail Service and Investment Program

Nevada's Rail Service and Investment Program has been presented in the two previous chapters, Chapter 3 Passenger Rail Strategic Plan, and Chapter 4 Freight Rail Strategic Plan. Doing so in this manner accommodates stakeholders' ability to focus on the area of rail development that is most relevant to their professional, commercial, and/or community interests. Chapter 5 encompasses the list of potential rail growth projects envisioned at the outset of the new Nevada State Rail Plan (NVSRP). It is meant to be expanded throughout the next 4-5 years before the state is required to submit its update to the Federal Railroad Administration.

Freight projects included in the Rail Service and Investment Program (RSIP) are all connected to private sector business growth projects, with benefits accruing to the businesses involved, as well as the communities who enjoy more jobs and sustainable freight transportation. Projects that are commercially relevant can be assessed based on the overall benefit cost calculation of the underlying business development. That evaluation process and decision to proceed connects the investments directly to the results that a rail plan is designed to advance—an improved economy and environment, and a safer transportation system.

Because of Nevada's unique situation of having no active shortline railroads, every rail development project requires the active collaboration of either or both of the state's Class I rail providers, Union Pacific, and BNSF. It has been of the utmost importance to organize and present rail development opportunities of commercial scale that will be meaningful to the Class Is. The quantity, scale, and quality of revenue-generating freight rail projects listed here certainly merits the attention of the railroads, private infrastructure investors, and public infrastructure programs—creating new opportunities for funding and operating partnerships.

The freight rail projects listed below have a total estimated cost of $578MM. This is a sum that private-sector infrastructure investors are well positioned to invest.[1] According to the magazine *Infrastructure Investor*, the top 30 global infrastructure investors allocated $321B to this investment class in 2019 with hundreds of billions of investment capital in the hands of companies not in the top 30. Many of these funds are motivated to invest in North American rail infrastructure projects. The NVSRP elevates the fundability of individual projects by aggregating the opportunities and integrating transportation planning with economic development.

This capital could flow to projects many different ways other than directly from investment funds to the project. In many cases capital flows indirectly from funds to rail-related developments, through rail-experienced banks, through rail asset holding companies, or through rail service provider operating conglomerates.

In addition to this private-sector funding, there is broad-based interest at the federal level in infrastructure funding as an economic stimulus strategy.

[1] "Meet the 30 largest infrastructure investors," Infrastructure Investor Global Summit, source link, (2019)

Projects have been gathered from the over 230 stakeholder interviews that have occurred during the development of the NVSRP. Projects will continue to be added to the investment program as stakeholder engagement continues post-plan preparation.

Table 5-1: Rail Service and Investment Program Freight Project List, All Regions–Four-Year Horizon

#	Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
1	**Blue Diamond property**	Clark	Development	Rail Connection	TBD	0.1	$250,000	Blue Diamond Branch Line	1	4
2	**Ryze Renewables**	Clark	Expand rail terminal	Terminal Expansion	alternative fuel	0.25	$2,000,000	Ryze Renewables	1	4
3	**Apex Industrial Park**	Clark	Connect to UP main line	Rail Connection	TBD	4	$5,000,000	Land Development Associates	1	4
4	**Panaca Mines**	Lincoln	Connect to UP main line	Rail Connection, plus TL	pozzolan	3	$4,000,000	Salt River Materials Group	2	4
5	**Victoria Mine**	Elko	Connect to Nevada Northern	Rail Connection	copper, silver, fuel, lime, etc.	8	$12,000,000	US Mine Corporation	3	4
6	**Long Canyon Mine**	Elko	Connect to Nevada Northern	Rail Connection	refractory ore, I/B fuel, lime	2	$3,000,000	Nevada Gold Mines	3	4
7	**Pan & Gold Rock Mines**	White Pine	Transloading on Nevada Northern	Transload	cyanide, sulfates	0.1	$200,000	Kinross Gold	3	4
8	**Silver Lion Farms**	White Pine	Transloading on Nevada Northern	Transload	I/B fuel, fertilizer; O/B hemp	0	$200,000	Silver Lion Farms	3	4
9	**Robinson Mine**	White Pine	Re-connect to Nevada Northern	Rail Connection	O/B copper concentrate; I/B fuel, lime, steel balls	1	$1,000,000	Robinson Mine	3	4
10	**Kinsley Mine**	White Pine	Transloading on Nevada Northern	Transload	cyanide, sulfates	0.1	$200,000	Liberty Gold	3	4
11	**Nevada Northern Railway**	White Pine	Rebuild track and Rt. 93 rail crossing	Track Rebuild	copper, hemp, fuel, tourists	128	$100,000,000	Nevada Northern Railway	3	4
12	**Wells Heavy Industrial Park**	Elko	Connect to UP main line	Rail Connection	TBD	1	$4,000,000	City of Wells	4	4
13	**NGM Rail Connections**	Eureka & Lander	Connect Cortez & Goldrush mines to Goldstrike gold processing facilities	Rail Connection	refractory ore, I/B fuel, lime, ammonium nitrate, sulfuric, peroxide, cyanide, ash, etc.	50+	$100,000,000	Nevada Gold Mines	4	4

#	Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
14	**Midas Mine**	Humboldt	Connect to UP main line	Rail Connection	refractory ore, I/B fuel, lime	30	$60,000,000	Hecla Mines	4	4
15	**Repurpose Sewer Treatment Property**	Humboldt	Build connection to UP	Rail Connection	TBD	0.1	$1,000,000	City of Winnemucca	4	4
16	**Thacker Pass Project**	Humboldt	Connect to UP main line	Rail Connection	I/B molten sulfur, caustic soda, cyanide, soda ash, fuel	50	$100,000,000	Lithium Nevada Corporation	4	4
17	**Fire Creek Mine**	Lander	Connect to UP main line	Rail Connection	refractory ore, I/B fuel, lime	15	$30,000,000	Hecla Mines	4	4
18	**Lander County Railpark**	Lander	Connect to UP main line	Rail Connection	TBD	0.1	$11,000,000	Lander County	4	4
19	**40-Mile Desert Land Development**	Churchill	Connect to UP main line	Rail Connection	TBD	0.1	$4,000,000	TOT, LLC	5	4
20	**Lahontan Rail Industrial Park**	Churchill	Connect to Mina Branch	Rail Connection	TBD	0.2	$400,000	TOT, LLC	5	4
21	**Geothermal Resources Industrial Park**	Churchill	Connect to UP main line	Rail Connection	TBD	0.1	$4,000,000	GRIP LLC	5	4
22	**Limestone Mine**	Churchill	Transloading site off main	Transload	specialized limestone	0.2	$4,000,000	Advanced Carbonate Technologies, LLC	5	4
23	**Victory Logistics**	Churchill	Connect to Fernley Industrial Lead Connect to LA Pacific Lead	Rail Connection	TBD	0.4 1.25	$4,000,000	Mark IV Capital	5	4
24	**TRP Properties**	Churchill	Connect to Fallon Branch	Rail Connection	TBD	0.1	$300,000	Omaha Track Hazen Project	5	4
25	**Churchill Hazen Industrial Park**	Churchill	Connect to Fallon Branch	Rail Connection	TBD	0.1	$300,000	TOT, LLC	5	4
26	**Northern Nevada Industrial Center**	Lyon	Connect to TRIC lead	Rail Connection	TBD	7	$14,000,000	Reno Engineering	5	4
27	**Sierra Springs Opportunity Fund**	Lyon	Connect 15-591-09 (120 ac.) Connect 15-581-03 (91 ac.)	Rail Connection	TBD	0.6 0.6	$2,000,000	Sierra Springs Opportunity Fund	5	4
28	**Geothermal Rail Industrial Development**	Lyon	Connect to UP main line	Rail Connection	TBD	0.1	$4,000,000	GRID LLC	5	4

#	Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
29	**Gigafactory Project**	Storey	Connect to branch track	Rail Connection	battery packs, drivetrains	2.5	$5,000,000	Tesla	5	4
30	**Sierra Biofuels Plant**	Storey	Connect to branch track	Rail Connection	O/B syncrude feedstock	TL	$2,000,000	Fulcrum BioEnergy	5	4
31	**Innovation Park**	Storey	Industrial Park	Rail Connection	TBD	0.1	$4,000,000	Blockchains, Inc.	5	4
32	**Pyramid Commercial Center**	Washoe	Connect to Fernley Industrial Lead	Rail Connection	TBD	1.7	$5,000,000	Reno Engineering	5	4
33	**Lear Industrial Center**	Washoe	Connect to Leareno Industrial Lead	Rail Connection	to closest of 5 buildings:	0.3	$200,000	Lear Industrial Center	6	4
34	**Pozzolan Transloading Site**	Washoe	Connect to Leareno Industrial Lead	Rail Connection	pozzolan	0.1	$100,000	Geofortis Processing & Logistics LLC	6	4
35	**Cattle Feed Project**	Lyon	Transloading on Mina Branch	Transload	various cattle feeds	0.1	$150,000	Snyder Livestock Co Inc	7	4
36	**Ann Mason Project**	Lyon	Connect to Mina Branch	Rail Connection	copper & molybdenum ores	8	$16,000,000	Hudbay Minerals	7	4
37	**Pumpkin Hollow**	Lyon	Connect to Mina Branch	Rail Connection	copper ores, I/B fuel, lime, etc.	8	$16,000,000	Nevada Copper, Inc.	7	4
38	**Hawthorne Army Depot car storage**	Mineral	Build interchange with UP	Interchange with UP	car storage, transloading bulk	2	$3,000,000	Top Rail Solutions, Inc.	7	4
39	**Round Mountain Gold**	Nye	Transloading site at Hawthorne	Transload	ammonium nitrate, lime, diesel	TL	$250,000	Kinross Gold	7	4
40	**Bolo Project**	Nye	Transloading site at Hawthorne	Transload	ammonium nitrate, lime, diesel	TL	$250,000	Barrian Mining	7	4
41	**Gold Resources-Isabella Pearl Mine**	Mineral	Transloading site at Hawthorne	Transload	ammonium nitrate, lime, diesel	TL	$250,000	Gold Resources	7	4
42	**Extend Mina Br., Thorne to Mina**	Mineral	Build on abandoned ROW on BLM	Rail Connection	N/A	33	$50,000,000	Joint Venture	7	4
43	**Basalt Mine (Esmeralda County)**	Mineral	Transloading site in Mina	Transload	diatomaceous earth	TL	$250,000	Dicalite Management Group, Inc.	7	4
Total Cost:								$580,300,000		

*miles to reach site, not including serving tracks at site; TL = Transload

Table 5-1a: Union Pacific Railroad suggested additions to Nevada Rail Service and Investment Program Freight Project List

#	Area	Project
1	Elko, NV	Run-through tracks to support fluid operation of thru trains, including existing passenger trains, around trains performing yard operations
2	Las Vegas, NV	3.3 miles second main track between Arden and Maul Ave to reduce congestion in a major metropolitan area
3	South Central Route	Siding upgrades to support improved opportunities for trains to meet/pass on single track route

Table 5-2: Rail Service and Investment Program Freight Project List, All Regions–Five to Twenty-Year Horizon

#	Project Name	County	Short Description	Contracted Description	Commodities	Track Mi*	Cost	Company	Region	Horizon
1	Extend Mina Br., Mina to Blair Jct.	Esmeralda	Build on abandoned ROW on BLM	Rail Connection	N/A	36	$54,000,000	Joint Venture	7	5-20
2	Rhyolite Ridge	Esmeralda	Connect to Mina Branch at Blair Jct.	Rail Connection	boron, lithium O/B, I/B various	12	$20,000,000	ioneer Ltd.	7	5-20
3	Extend Mina Br., Blair to Goldfield Jct.	Esmeralda	Build on abandoned ROW on BLM	Rail Connection	N/A	23	$35,000,000	Joint Venture	7	5-20
4	Crow Springs	Esmeralda	Connect to Mina Branch SW of G Jct.	Rail Connection	open-pit perlite and pozzolan	10	$20,000,000	SR Minerals, Inc.	7	5-20
5	Tonopah Lithium Claims Project	Nye	Connect to Mina Br. at Goldfield Jct.	Rail Connection	I/B molten sulfur, caustic soda, cyanide, soda ash, fuel	7	$15,000,000	American Lithium	7	5-20
6	Liberty Project	Nye	Connect to Crow Springs Branch	Rail Connection	Molybdenum, copper	7	$15,000,000	General Moly, Inc.	7	5-20
7	Gemfield Mine	Esmeralda	Transloading site at Goldfield Jct.	Transload	ammonium nitrate, lime, diesel	TL	$250,000	Gemfield Resources	7	5-20
8	Goldfield Bonanza Mine	Esmeralda	Transloading site at Goldfield Jct.	Transload	ammonium nitrate, lime, diesel	TL	$250,000	Lode-Star Mining Inc.	7	5-20
9	Hasbrouck Project	Nye	Hasbrouck Project	Rail Connection	ammonium nitrate, lime, diesel	TL	$250,000	West Kirkland Mining Inc.	7	5-20
10	Round Mountain Mine	Nye	Round Mountain Mine	Rail Connection	ammonium nitrate, lime, diesel	TL	$250,000	Round Mountain Gold Corp.	7	5-20
Total Cost:							$160,000,000 (in 2020 Dollars)			

*miles to reach site, not including serving tracks at site; TL = Transload

The passenger rail projects listed below have a total estimated cost of $7B in 2020 dollars. At least 73% or $5.1B is expected to be private sector investment mostly in the Las Vegas – Rancho Cucamonga, CA Brightline West high speed rail project.

Greater emphasis this decade for passenger transportation solutions that reduce traffic congestion and energy consumption and provide environmentally sustainable mobility will motivate public commitments to invest in passenger rail projects.

Table 5-3: Rail Service and Investment Program Passenger Project List, All Regions–Four-Year Horizon

#	Project Name	Status Description	Track Mi*	Cost	Company	Region	Horizon
1	**Amtrak California Zephyr**	Additional Nevada stops requires station funding, UP approval; Elko ADA improvements requires station funding	719	$40,000,000	Amtrak and NDOT	3, 4, 5, 6	0 - 4
2	**Xpress-West—Rancho Cucamonga to Las Vegas**	Nevada and California approved issuing PABs, construction expected to begin in 2021, service to begin in 2023	44 in NV	$5B: $200M in NV PABs	Fortress Investments	1	0 - 4
3	**Thruway expansion & "C"-Route: Reno to Las Vegas by way of Central California**	Both require state funding commitments for operations and capital improvements; Existing railroad lines could host a demonstration run in 2021; requires UP/BNSF/Amtrak deal	670 LV to Reno + 108 to SF	$2,000,000 for demo run	Amtrak, NDOT and Caltrans	1, 5, 6	0 - 4
4	**Nevada Northern Railway**	McGill Extension requires grant financing, grade crossing funds	2	TBD	Nevada Northern	3	0 - 4
5	**Virginia & Truckee Railway Commission**	Virginia City Grade Crossing project requires grant program; 2.5-mile long Carson River Canyon extension has environmental approvals, R-O-W and is 90% designed awaiting funding solution	2.5	TBD	Virginia & Truckee Railway Commission	6, 7	0 - 4
6	**Nevada Southern Railway— "The Hoover Dam Limited"**	Project needs to be evaluated in coordination with Union Pacific, Nevada Southern Railway, Nevada State Railroad Museum, potential casino sponsors and concessionaire	29	$3,000,000	UP and private contractor	1	0 - 4
7	**Las Vegas Xpress X-Train Los Angeles to Las Vegas**	Planned start of service in September 2021 requires securing $100 million in private financing	50 in LV	$100MM	Las Vegas Xpress	1	0 - 4
8	**Reno, Nevada, and Innovation Park**	Requires UP approvals, funding, and a contract operator	18	$25MM	TBD	5,6	0 - 4
9	**Extension of the Las Vegas Monorail to Brightline West Las Vegas Terminal**	Evaluation by Brightline West, NDOT, RTC of Southern Nevada, Allegiant Stadium, McCarran Airport and Las Vegas Monorail can arrange funding through public-private partnership	10	$750MM	Las Vegas Monorail	1	0 - 4
Total Cost:				**$817,000,000 + $5.1B Private Funds**			

Table 5-4: Rail Service and Investment Program Passenger Project List, All Regions–Five to Twenty Year Horizon

#	Project Name	Status Description	Track Mi*	Cost	Company	Region	Horizon
1	**Multistate Intercity Equipment Pool**	Requires funding agreement between NV, CA, AZ, and UT	N/A	TBD	NV, CA, AZ, and UT	1,5,6	5-20
2	**Southwest Multi-State Rail Planning Study**	Requires development of a multi-state high speed funding compact and federal funding commitment	TBD	TBD	NV, CA, AZ, and UT	1,2,4,57, 6,8	5-20
3	**Extension of Amtrak's Capital Corridor to Reno/ Sparks**	Requires Amtrak/UP approvals, CA/NV coordination and shared funding of capital improvements required by Union Pacific	100	$100MM	Amtrak, Caltrans, NDOT	5,6	5-20
4	**Thruway expansion &"C-Route": Reno to Las Vegas by way of Central California**	Requires Amtrak/UP/BNSF approvals, CA/NV coordination and shared funding of capital improvements required by Union Pacific and BNSF	670 LV to Reno + 108 to SF	$250MM for trainsets and trackwork	Amtrak, NDOT and Caltrans	1,5,6	5-20
5	**Amtrak Salt Lake City-to-Las Vegas and Los Angeles Service**	Requires Amtrak and UP approvals, funding for new equipment and station improvements	212 in NV	$100MM for trainsets and trackwork	Amtrak, NV and UT	1,2	5-20
6	**Virginia & Truckee Railway Commission**	Carson City extension requires evaluating alternate alignments, additional river crossings and environmental documentation, plus funding solutions	TBD	TBD	Virginia & Truckee	6	5-20
7	**Reno Area Transit Service**	Will need evaluation by RTC Washoe County	107	$400MM+	TBD/RTC	6	5-20
8	**Brightline West—Las Vegas Commuter**	Requires Brightline West approval and public funding for regional stations, additional passing tracks and regional trainsets	35	$250MM	TBD/RTC	1	5-20
Total Cost:				**$1.1 Billion (in 2020 Dollars)**			

The Nevada Statewide Transportation Improvement Program (STIP) is a list of transportation projects eligible for federal funding.

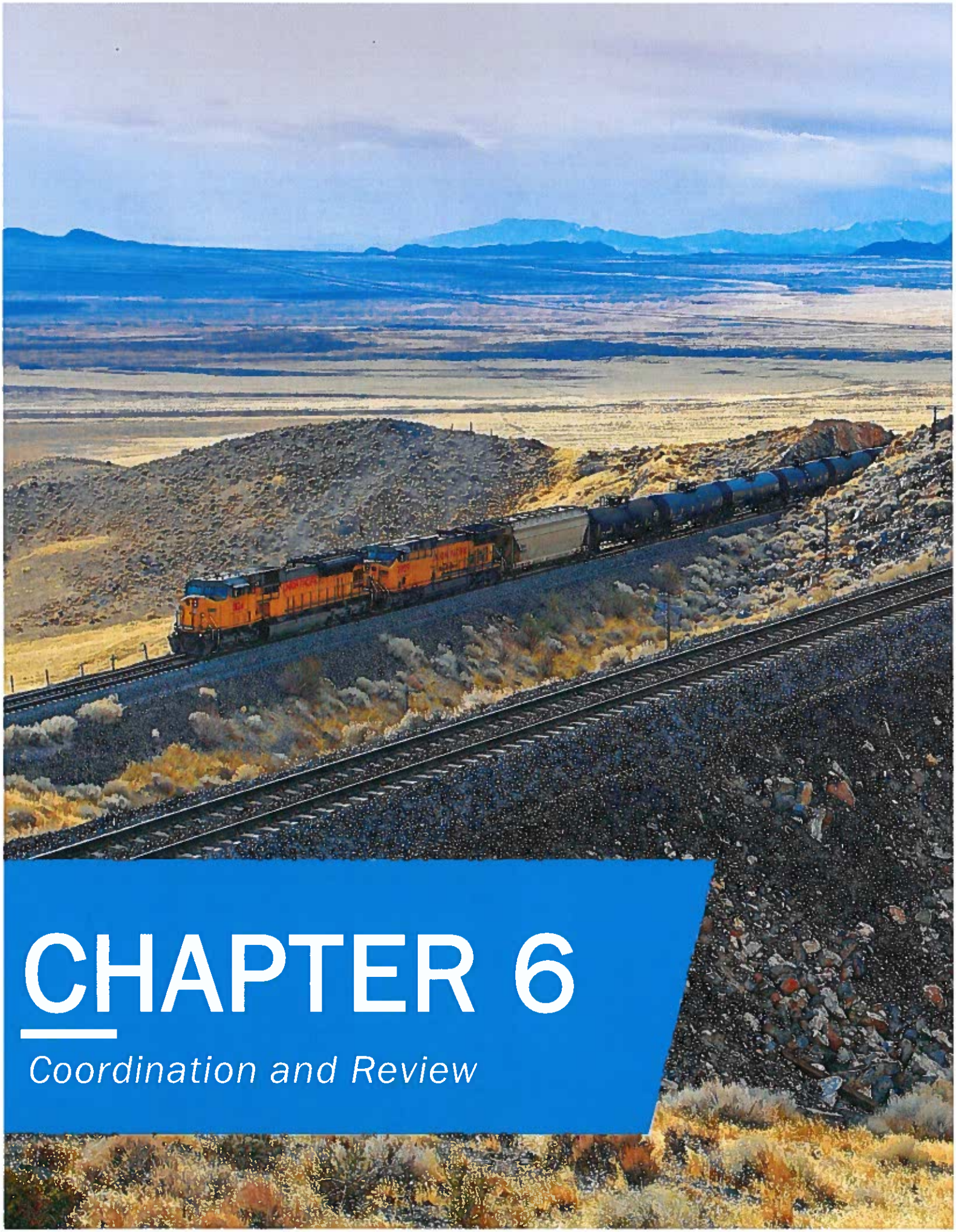
Table 5-5: 2021 Nevada Statewide Transportation Improvement Program (STIP) List[2]

MPO	Title	STIP Cost (2021-2024)	Federal Funds	Federal	State	Local
RTC Washoe	Golden Valley Road Railroad Crossing	$275,000	Rail	52%	0%	48%
Non MPO	Rail Crossings Humboldt County	$55,000	Rail	90%	0%	10%
RTCSNV	El Campo Grande Railroad Crossing	$192,000	Rail	90%	1%	9%
Non MPO	Morison Avenue Railroad Crossing Golconda	$421,000	Rail	63%	0%	37%
RTC Washoe	Highland Avenue Railroad Crossing	$305,000	Rail	51%	0%	49%
RTCSNV	Railroad Crossings Consolidation Logandale	$283,056	Rail	90%	1%	9%
RTC Washoe	Silver Lake Drive Railroad Crossing	$410,000	Rail	63%	0%	37%

Table 5-1a: Union Pacific Railroad suggested additions to Nevada Rail Service and Investment Program Freight Project List

AREA:	PROJECT
Elko, NV	Run-through tracks to support fluid operation of thru trains, including existing passenger trains, around trains performing yard operations
Las Vegas, NV	3.3 miles second main track between Arden and Maul Ave to reduce congestion in a major metropolitan area
South Central Route	Siding upgrades to support improved opportunities for trains to meet/pass on single track route

[2] NDOT website, 2019 Statewide Transportation Improvement Program (STIP) Database, source link, accessed August 22, 2020.



CHAPTER 6

Coordination and Review

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Chapter 6 Coordination and Review

A. Approach to Public and Agency Participation

Outreach for the new Nevada State Rail Plan (NVSRP) began with comprehensive research into Nevada's history, rail development, the overarching economics of the state, and the structures of public sector planning and economic development.

NDOT's rail program and its state rail planning activities are staffed by one person with assistance from the DOT's cartography team. NDOT management provides oversight and input into rail planning activities. These activities have included close interaction with NDOT staff. Approximately half of all in-person, telephone, or video conference stakeholder meetings have been attended by NDOT staff.

NVSRP staff reached out to each statewide and regional agency involved in planning and transportation in Nevada. Other stakeholders involved in commerce, logistics, economic development, and governance were identified and contacted after internet research and networking conversations. These stakeholder groups included:

- Freight shippers (both truck and rail)
- Land developers
- Mining operators
- Railroad personnel
- State and local government employees
- Academics
- Tribes
- Citizen groups (for example, The Sierra Club)

These stakeholders were cataloged by role, region, and - where appropriate - specific supply chain. Interviews led to local insights and further recommendations for stakeholder engagement which were immediately pursued. Also, as participating stakeholders were engaged, they subsequently informed others of the NVSRP process who enthusiastically requested invitations to participate.

There are three Class I railroads operating in Nevada – freight operators Union Pacific Railroad and BNSF Railway, and long-distance passenger rail provider Amtrak. There is no regional passenger rail service in Nevada. NVSRP staff have been in close contact with both freight railroads throughout this process. Additionally, NVSRP's passenger rail team solicited input from Amtrak. While there are no Class II or III "Regional" or "Short line" freight railroads there are three passenger excursion operations; each was engaged by NVSRP staff.

Nevada's two transit authorities – the Regional Transportation Commission (RTC) of Washoe County and the Regional Transportation Commission of Southern Nevada are housed in their respective area's Municipal Planning Organizations. Representatives from both were engaged by the NVSRP team to explore opportunities for regional passenger rail service.

B. Coordination with Neighboring States

The NVSRP team reached out to Departments of Transportation in California and Utah, the two states with which Nevada shares rail connections. Caltrans, UDOT, and NDOT are now in ongoing dialogue. Caltrans rail planners have expressed a policy and planning priority of developing new bi-state freight and

passenger rail services to and from Nevada. They are supportive of new inland intermodal shuttles between California ports and warehousing and industrial shippers in Northern and Southern Nevada.

NVSRP staff explored the role of rail shippers' associations in Nevada. The American Institute for Shippers' Associations, Inc. defines Shippers' Associations as: "Generally non-profit transportation membership cooperatives which arrange for the domestic or international shipment of members' cargo. Associations will contract for the physical movement of the cargo with motor carriers, railroads, ocean carriers, air carriers, and others. The ability to aggregate and ship the collective membership cargo at favorable volume rates is the key to the existence of the modern-day Shippers' Association." In addition to rate negotiating these regional entities are forums for shippers to share knowledge. NVSRP staff interviewed the Southwest Association of Rail Shippers (SWARS) and the Northwest Association of Rail Shippers and found that no Nevada shippers are members of either organization. The rate benefits of participating in a shipper association remain available to Nevada's shippers.

Nevada has no rail connections with Arizona, Idaho, or Oregon. Following is a list of all neighboring state rail planning offices and links to their rail plans and other transportation planning documents and administrative entities.

				Email	Phone Number
California	**Rail Plan**	https://dot.ca.gov/programs/rail-and-mass-transportation/california-state-rail-plan			
	Freight Mobility Plan	https://dot.ca.gov/programs/transportation-planning/freight-planning/ca-freight-advisory-committee/cfmp-2020			
	Advisory Board	Rail Planning Branch, https://catc.ca.gov/			
	Contact	Hilary Norton	Vice Chair of Commission	hnorton@tpgre.com	213-448-2900
	Contact	James Jack	Capitol Strategic Advisors	james@capitolstrategic.com	916-325-8591
	Contact	Andy Cook	Chief, Office of Planning & Operations, Caltrans	Andrew.Cook@dot.ca.gov	916-653-0806
Utah	**Rail Plan**	https://drive.google.com/file/d/15Zjl8Rojq8iL5icZgS-OKiziFKwhY-4K/view			
	Advisory Board	https://www.udot.utah.gov/connect/business/public-entities/planning/ Board is State Rail Plan specific, can't find any online evidence that it remained in existence past the writing of the rail plan. Dan Kuhn was on the committee and a major participant in the plan.			
	Contact	Jordan Backman,	Railroad Planner, UDOT	jbackman@utah.gov	385-226-4255

				Email	Phone Number
Arizona	Rail Plan	https://azdot.gov/planning/transportation-programs/state-rail-plan			
	Advisory Board	https://www.azmc.org/binational-committees/transportation-infrastructure-ports/			
	Contact	John Halikowski	ADOT Director	jhalikowski@azdot.gov	602-712-7227
Oregon	Rail Plan	https://www.oregon.gov/ODOT/Planning/Documents/OSRP.pdf			
	Advisory Board	https://www.oregon.gov/odot/RPTD/Pages/RAC.aspx			
	Contact	Paul Langner,	Committee Chair	plangner@teevinbros.com	503-741-0175
	Contact	Cary Goodman,	ODOT Rail Program Coordinator	cary.goodman@odot.state.or.us	503-986-4230
Idaho	Rail Plan	https://apps.itd.idaho.gov/apps/freight/Idaho-Statewide-Rail-Plan.pdf			
	Advisory Board	https://itd.idaho.gov/board/			
	Contact	Bill Moad,	Chairman	contact info not readily available	
	Contact	Sue Higgins	Secretary	sue.higgins@itd.idaho.gov	208-334-8808
	Contact	Rail department is unstaffed			

The Western States Freight Coalition (WSFC)[1] was founded by Bill Thompson of Nevada Department of Transportation in 2014 to facilitate peer exchange among state DOT freight program managers and coordinate preparation of FAST Act compliant state freight plans. Leadership rotates among participating states and WSFC is now led by Utah. The Western Association of State Highway and Transportation Officials (WASHTO) is reportedly planning to absorb WSFC's activities into its operation.

C. Involvement of Stakeholders in the Preparation and Review of the State Rail Plan

SRF and NDOT worked to create a plan that expands and improves on typical stakeholder engagement. SRF, with NDOT's significant participation, has conducted in-depth dialogues with 235 (and counting) stakeholders from every related public- and private-sector arena. In many cases the dialogues have led to second and third conversations. These conversations continue to illuminate the challenges, opportunities, and needs particular to Nevada's regions and industries that would not have been otherwise discerned.

NVSRP staff toured the entire state's rail network and made extensive use of satellite imagery. This has proven to be an effective method for the identification of 1) every rail siding in the state, 2) every truckload shipper in the state, and 3) every non-rail shipper located adjacent to a rail line.

[1] *Western State Freight Coalition*, Christopher Chesnut, Dan Anderson, source link, (April 2019)

Approximately 140 shippers were interviewed in-person during several cross-state trips made by NVSRP staff (before the COVID virus curtailed travel starting in March 2020), or through individual telephone interviews.

One hundred and seventy-five stakeholders participated in ninety-minute regional video meetings (complete attendance lists and meeting metrics are contained in the Technical Appendix):

Region 1 - Southern Nevada [Clark County] - July 28, 2020

Region 2 - Lincoln County - July 27, 2020

Region 3 - Ely-North to W. Wendover [White County; some Elko County] - July 23, 2020

Region 4 - I-80 Corridor, Lovelock to Wendover [Elko County; Eureka County, Lander County; Humboldt County; Pershing County] - July 29, 2020

Region 5 - TRIC-Fernley-Fallon-Silver Springs [Washoe County; Storey County; Douglas County; Lyon County; Churchill County] - July 27, 2020

Region 6 - Carson City-Reno-Sparks-Stead - July 30, 2020

Region 7 - Wabuska-Yerington-Mineral County-Tonopah-Esmeralda County [Mineral County; Esmeralda County; some Nye County] - July 29, 2020

Region 8 - Nye County from Hawthorne to Jean - created post-Regional Team Meetings

Stakeholders were also invited to the two statewide IntelliConferences (described below). Lastly, stakeholders were invited to share their input directly with NVSRP staff at any time throughout the NVSRP process.

From the outset, stakeholders who have contributed to the NVSRP have not simply been surveyed for their input—they have been enrolled in an ongoing partnership for rail development. Typical state rail plan stakeholder outreach is conducted through town hall meetings, poster presentations, surveys, and a few interviews. The NVSRP incorporates a comprehensive communications strategy that includes email, calling, and knocking on doors as needed to connect *personally* with stakeholders.

This regional and statewide teamwork is made practical by an innovative, online, time-saving program for multi-stakeholder dialogue. The program design accommodates stakeholders participating asynchronously, on their own schedules, from the convenience and safety of their remote locations. This inquiry-based dialogue methodology—**IntelliConference**—has been developed by a non-profit transportation policy development organization, *OnTrackNorthAmerica*, founded and led by the principals of Strategic Rail Finance. The **IntelliConference** system facilitates asynchronous online summits of stakeholder representatives for efficient gathering of collective input and intelligence. The **IntelliConference** methodology also supports real-time, in-person and virtual summits. With each successive summit, new points of view are added to an ongoing dialogue that incorporates diverse perspectives. This methodology puts into practice cutting-edge research in civic and large-group engagement.

As a complement to these summits, the NDOT Rail website at www.nevadadot.com/mobility/rail-planning serves as a portal for ongoing multi-stakeholder input. All participating stakeholders and interested observers can follow this evolving process. The website also serves as the platform for compiling and cataloguing relevant reports, projects, plans, and events.

D. Issues Raised During Preparation of the NVSRP and Their Consideration

Issues identified during interviews and meetings included:

- Access to rail service is a critical requirement for advancing mining business plans
- Traffic congestion is exacerbated by increasing truck traffic
- Truck crashes are a problem in the state
- Need for information sharing and collaboration between government planning and economic development entities
- Need for educating industrial real estate developers and shippers about rail options
- Need for connections to and relationships with West Coast ports where Nevada can provide economical green- and brown-field facilities for shipping container staging to buffer port traffic
- Need for additional Amtrak passenger rail service frequencies along with re-opening Amtrak stations in Lovelock and Sparks
- Exploration of nascent regional passenger rail options in the Reno-Sparks and Las Vegas regions

All suggestions, concerns, and requests for service were catalogued, aggregated, and considered for immediate action where appropriate. Most of these stakeholders have continued to engage in NVSRP teamwork activities within one-on-one and group conversations.

E. Recommendations Made by Participants

Recommendations were solicited and came from many stakeholders during NVSRP outreach. The outreach was conducted via one-on-one interviews. All stakeholder comments were noted and have been included in the Technical Appendix. Eight developers in Region 5 were given Land Development Project Assessment forms for their eleven projects. Eight Assessment forms were returned and have been used internally by the NVSRP project team. A sample Assessment Form is included in the Technical Appendix.

Nevada's primary freight railroad – Union Pacific participated in each of the seven NVSRP regional meetings in July and provided general guidance for those seeking new or enhanced service. Stakeholders have been forthcoming with their knowledge and wisdom, and frequently introduce others and make recommendations to NVSRP staff on new participants.

Stakeholders participating in NVSRP Regional team meetings stepped into creative brainstorming on solving challenges and collaborating on opportunities.

F. Coordination with Other Planning Functions

NDOT works closely with all Nevada state and local planning entities to coordinate planning efforts and prioritize transportation spending. The NVSRP is fully integrated with:

- 2017 Nevada State Freight Plan[2]

[2] *Nevada State Freight Plan*, Michael Gallis & Associates, ch2m, Cambridge Systematics, source link, (January 2017)

- 2018 One Nevada Transportation Plan[3]
- And all Nevada Municipal Organization and Regional Transportation Commission planning:
    - Washoe County RTC[4]
    - Carson Area Metropolitan Planning Organization[5]
    - Regional Transportation Commission of Southern Nevada[6]
    - Tahoe Regional Planning Agency[7]

In preparation for the NVSRP, multiple readings of the state transportation plan, state freight plan, and 2012 Nevada state rail plan have been completed to synthesize previously developed intelligence. Additionally, plan authors have been working with the Northern Nevada Development Authority to create a plan for rail service in its catchment area. The Fernley Multimodal Freight Facility Feasibility Study has been completed and included in the Appendix.

F.1 U.S. Department of Defense Strategic Rail Corridor Network (STRACNET)

The U.S. Department of Defense's (DOD) Military Traffic Management Command (MTMC) evaluates and determines the Department's needs for rail service that is essential for national defense. MTMC selected these rail lines in the 1970s to form a DOD Strategic Rail Corridor Network (STRACNET), involving 38,000 miles serving over 170 defense installations. Please refer to **Figure 6-1** for more detail.

Hawthorne Army Depot is the only DOD installation located in Nevada that requires rail service. Although the Sierra Army Depot is located just across the state line in California, the Union Pacific's Feather River Corridor from Winnemucca provides a key link for the movement of military materials to and from the base. Additionally, MTMC has identified the UPRR Overland Route mainline through northern Nevada and the South-Central Route mainline through southern Nevada as elements of STRACNET. Please refer to **Figure 6-2** for more detail.

[3] *One Nevada Transportation Plan,* Nevada DOT, source link, (November 2018)
[4] RTC Metropolitan Planning website, source link
[5] Carson City official website, source link
[6] RTC Southern Nevada website, source link
[7] Tahoe Regional Planning Agency website, source link

Figure 6-1: STRACNET and Defense Connector Lines

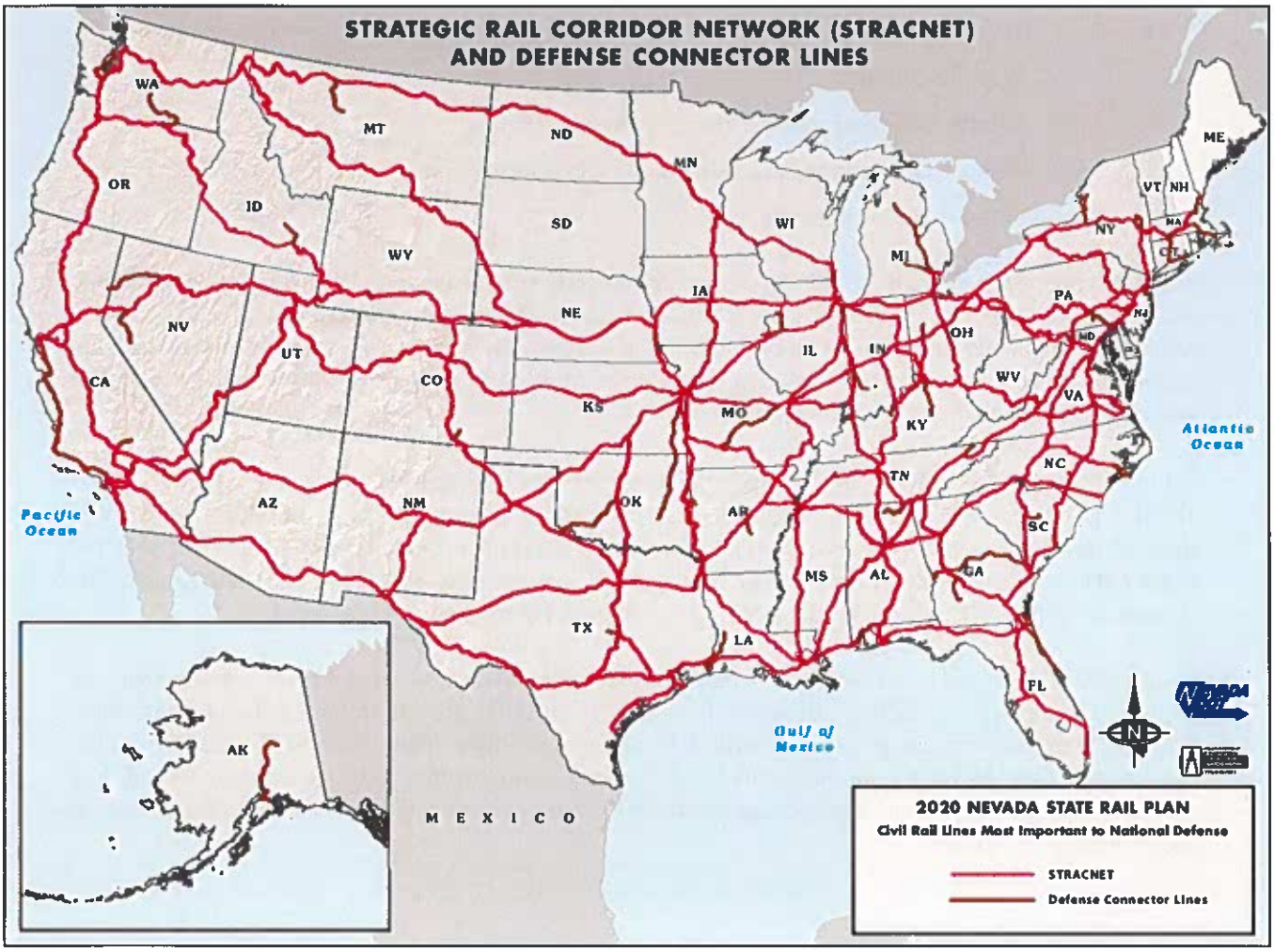
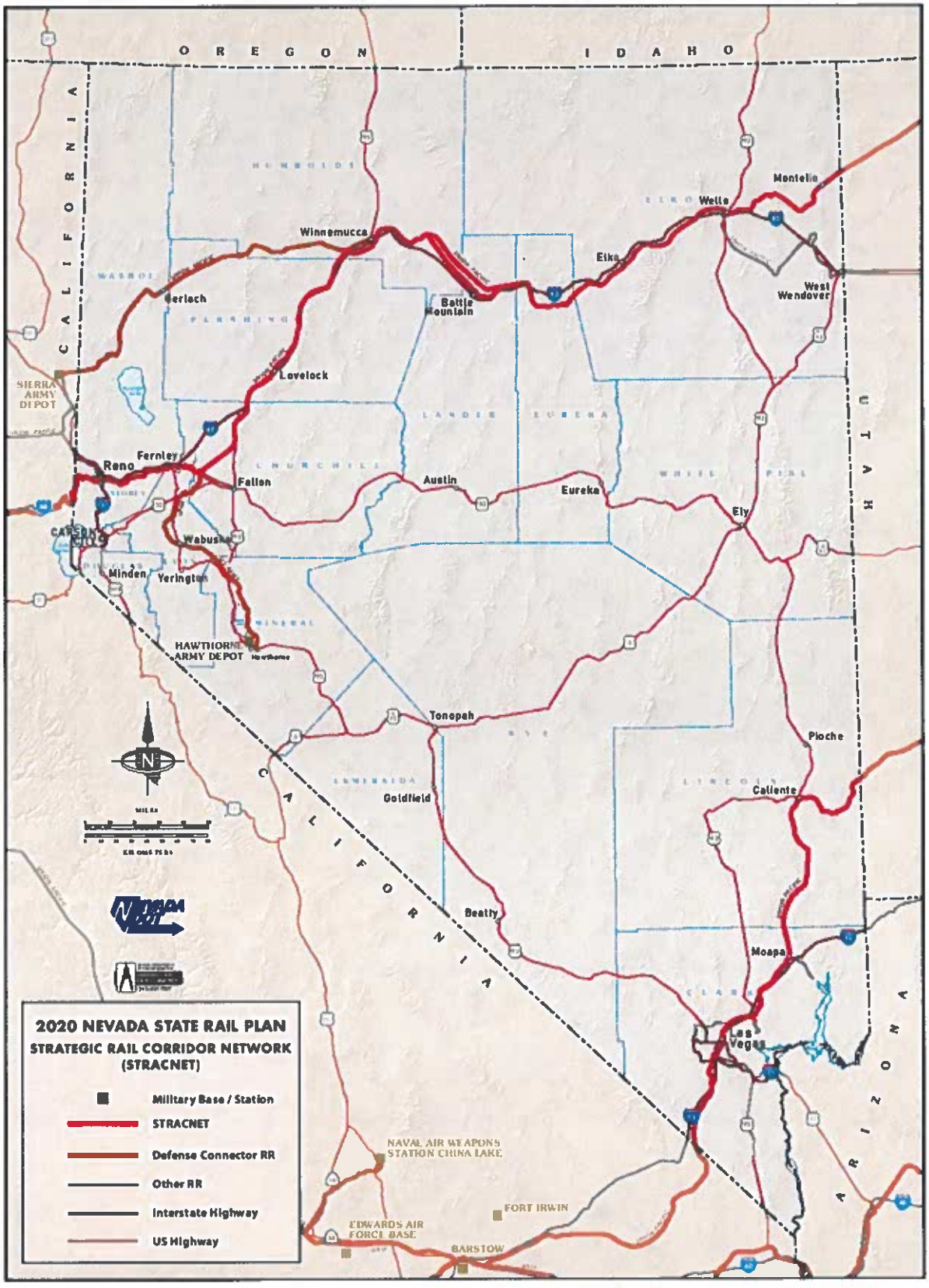


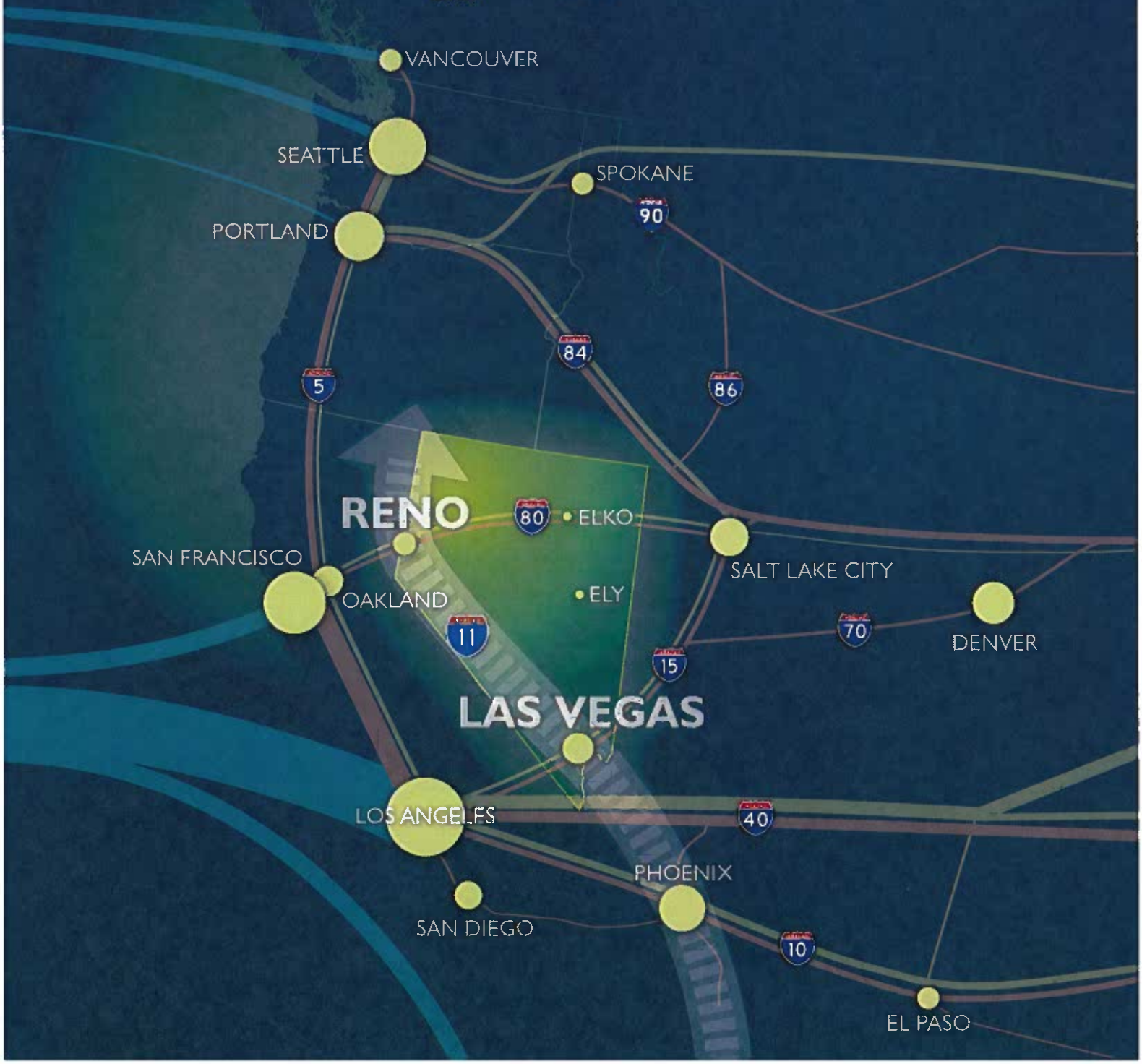
Figure 6-2: STRACNET in Nevada



NEVADA STATE FREIGHT PLAN

A strategic framework for freight mobility and economic competitiveness

JANUARY 2017



Nevada State Freight Plan

A Strategic Framework for Freight Mobility and Economic Competitiveness

Prepared for

January 2017

MICHAEL GALLIS & ASSOCIATES

ch2m.

CAMBRIDGE
SYSTEMATICS

Preface

In July 2014, the Nevada Department of Transportation (NDOT) issued a request for proposal (RFP) to develop the first Nevada State Freight Plan (the Freight Plan). The objective of the Freight Plan was to "provide a strategic framework enhancing freight mobility and a statewide economy with a collective benefit when implemented and integrated with economic development strategies." The Consultant Team of Michael Gallis & Associates, CH2M, Cambridge Systematics, and Morse Associates Consulting was retained to develop the Freight Plan. The Freight Plan was to be developed in close collaboration with NDOT and a State Freight Advisory Committee (FAC) that would be created as part of the planning process. The focus of the Consultant Team was to produce a plan that, when fully implemented, would provide Nevada with a competitive economic advantage and transform its role and began on January 28, 2015, and was to be completed in the summer of 2016.

The Freight Plan builds on previous work completed by the state of Nevada in assessing and planning its freight infrastructure. A significant amount of work has already been completed in the assessments and planning of various modes and components of the state's transportation and freight logistics infrastructure. In preparation of the Freight Plan, the Consultant Team reviewed and evaluated existing reports, maps, and other materials regarding freight, updated data, and sought out numerous other sources of information to develop the current context and potential competitive position for the state.

Introduction

Stakeholder Involvement

Significant stakeholder involvement, including meetings and interviews with more than 100 participants from approximately 75 public agencies and private organizations, provided important input during development of the Freight Plan. Stakeholders included truckers, railroads, manufacturers, ports, airports, third-party logistics providers, real estate brokers, industrial developers, economic development agencies, freight policy institutes, and planning agencies, not only within the state but also in California and throughout the western United States. Particularly important outcomes of this outreach effort included the formation of the FAC, the Western States Freight Coalition (WSFC), and regional focus groups, shown on Figure P-1. The FAC recommends projects, policies, and services that NDOT presents to the Nevada State Transportation Board for approval or further consideration. The Federal Highway Administration

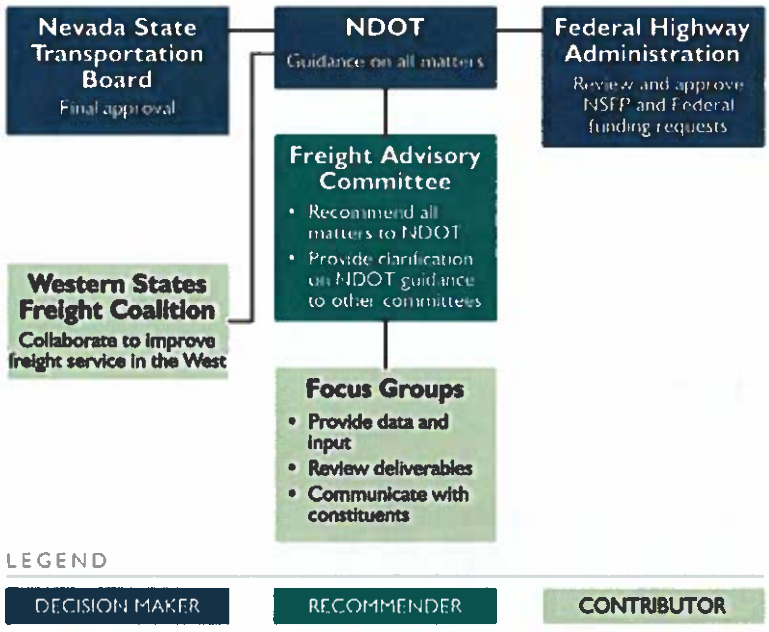


Figure P-1. Organizational Chart

(FHWA) certifies that this Freight Plan is compliant with the Fixing America's Surface Transportation (FAST) Act.

The FAC consists of a representative cross section of public and private freight stakeholders within Nevada. The FAC met at key milestones to provide insight and perspective to ensure the Freight Plan is relevant to the needs, goals, and objectives of their respective constituencies as well as help to build local and industry support for the process and the resultant planning document. The FAC will continue after completion and adoption of the Freight Plan as the primary forum for stakeholders to provide guidance on the implementation and future evolution of the Freight Plan.

Figure P-2. The Western States Freight Coalition
This map depicts the 11 states that currently belong to the Western States Freight Coalition (Source: MG&A, 2016 based on ESRI 2014, NTAD 2014, NDOT 2015).

The WSFC was formed by NDOT leadership recognizing that economic and transportation networks do not follow political geographies. Efforts within a single state have implications on other surrounding states that are best addressed by greater interaction among the various state Departments of Transportation (DOTs) during planning and implementation. At the onset of this project, one of the early efforts was outreach to other partnering states to form a quasi-coalition (referred to as the WSFC) and collaborate on a strategic freight vision for the Western states. As a result of this effort, the coalition has evolved as a valuable forum for peer exchange between the DOT freight program leads in each of the 11 states, including Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The WSFC representatives will continue to meet bimonthly following completion and adoption of this Freight Plan. The main purpose of these ongoing meetings will be to share, discuss, support, and learn from each other about important items issues in each state. This will provide a better understanding of common freight issues, and a forum to collaborate on the management of all freight services and facilities in the region in a concentrated effort to significantly enhance the freight environment in the western United States and secure a competitive advantage in global trade.

The FAST Act

In December 2015, Congress passed the FAST Act, the first long-term surface transportation bill in a decade (AASHTO, 2016). The legislation provides 5 years of Federal funding certainty for highway, highway safety, and transit programs; a modest increase in federal funding levels; reforms supporting more efficient project delivery; focused resources for highway freight infrastructure investments; and a continuation of performance-based program implementation (AASHTO, 2016). Apportionments to Nevada total $1.923 billion over 5 years, as well as the potential to utilize the Discretionary Grant Program's $4.5 billion for nationally significant freight and highway projects. The FAST Act also extends the Interstate 11 (I-11) designation from Mexico to Interstate 80 (I-80), a facility of particular significance and freight importance for Nevada.

The Global Connection

In an increasingly integrated global economy, it is important to look at the state of Nevada as a component of the global economy and its transportation system as a component of the global trading and distribution network. Creating a competitive advantage for Nevada required looking beyond the internal dynamics of the freight transportation system to better understand how this system affects economic activity and how changes in the composition of the economy will create new demands on the freight system.

Changing patterns of global economic activity have resulted in a changing pattern of trade corridors and hubs. Along with rapidly evolving technologies and the merging and alliances of various businesses, these changing patterns offer great opportunities and present significant challenges for the state of Nevada to reposition itself within the global, national, and western U.S. freight network.

Leadership and Economic Diversity

Nevada is currently undertaking tremendous efforts to grow and diversify its economy. Part of this effort has been to take initiative and leadership in studying, testing, and implementing progressive legislation for various freight-related technologies and advancements, including automated and connected vehicles and trucks (AV/CV), longer combination vehicles, truck platooning, aviation drones, and the hyperloop.

Triple Trailer Combination Vehicle in Nevada
Source: NDOT, 2015.

The Freight Plan

The Freight Plan makes specific recommendations on improving the state's freight infrastructure to strengthen and diversify its economy. Developing these recommendations necessitated research, analysis, and an understanding of the state's freight system, its economic structure, and the relationship between the two.

The Freight Plan is organized into three major sections:

1. **Vision and Solutions** – Outlines the vision and framework; summarizes the strategic goals, objectives, and performance measures; details the recommended strategies and implementation plan; and describes the funding and financing.

2. **Nevada's Freight Transportation System** – Describes the statewide freight assets and conditions; presents a preliminary natural disaster risk management assessment; details existing and forecasted commodity flows; and presents a supply chain analysis of key industries.
3. **Context and Competitive Market Analysis** – Provides the economic and urban context for assessing Nevada's freight transportation system; outlines a freight system for economic development; details Nevada's freight logistics, economic, and industrial real estate relationships by region; assesses employment and earnings by major trade area; and details critical issues, trends, and drivers, and illustrates their implications for Nevada.

Supplementing the Freight Plan are appendixes containing numerous technical memorandums and white papers completed throughout the planning process. For ease of reference, the appendixes are divided into three parts corresponding with the three sections of the Freight Plan, and provide more in-depth information for readers that want additional background data and analysis on a particular topic.

Contents

Tables

Figures

Acronyms and Abbreviations

3D	three-dimensional
3PL	third-party logistics
AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
AB	Assembly Bill
AC/CV	automated and connected vehicles and trucks
ACEC	area of critical environmental concern
AFB	Air Force Base
ASCE	American Society of Civil Engineers
ASEAN	Association of Southeast Asian Nations
BLM	Bureau of Land Management
BTR	Beyond the Rack
CBER	Center for Business & Economic Research
CFS	Commodity Flow Survey
CRFC	Critical Rural Freight Corridor
CSA	combined statistical area
CSA	Compliance, Safety, Accountability Program
CUFC	Critical Urban Freight Corridor
DOT	Department of Transportation
EDI	electronic data information systems
EPA	U.S. Environmental Protection Agency
EU	European Union
EV	electric vehicle
FAC	Freight Advisory Committee
FAF	Freight Analysis Framework
FAST	Fixing America's Surface Transportation Act
FASTLANE	Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FL	full load
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
Freight Plan	Nevada State Freight Plan
ft^2	square feet
GARVEE	Grant Anticipation Revenue Vehicle
GDP	gross domestic product

GHG	greenhouse gas
GMP	good manufacturing practice
GOED	Governor's Office of Economic Development
GPS	global positioning system
GSP	gross state product
HOS	hours of service
I-11	Interstate 11
I-5	Interstate 5
I-580	Interstate 580
I-80	Interstate 80
IANA	Intermodal Association of North America Statistics
ITS	intelligent transportation system
LAS	McCarran International Airport
LAX	Los Angeles International Airport
LCV	longer combination vehicle
LDV	light-duty vehicle
LRTP	Long-Range Transportation Plan
LTL	less-than-truckload
LVGEA	Las Vegas Global Economic Alliance
M&A	mergers and acquisitions
MODA	Multiple-Objective Decision Analysis
MPO	metropolitan planning organization
MSA	metropolitan statistical area
MTA	Major Trade Area
NAFTA	North American Free Trade Agreement
NAICS	North American Industry Classification System
NCA	National Conservation Area
NDOT	Nevada Department of Transportation
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHS	National Highway System
NHTSA	National Traffic Safety Administration
NRA	National Recreational Area
NSFHP	Nationally Significant Freight and Highway Projects
NSFP	Nationally State Freight Plan
O&D	origin and destination
O&M	operations and maintenance
ODV	over-dimensional vehicle
P3	public-private partnership

PHFS	Primary Highway Freight System
PPP	public-private partnerships
PTC	Positive Train Control
RFID	radio frequency identification
RNO	Reno-Tahoe International Airport
ROW	right-of-way
RPA	Regional Plan Association
RRIF	Railroad Rehabilitations and Improvement
RTP	Regional Transportation Plans
SCTG	Standard Classification of Transported Goods
SFO	San Francisco International Airport
SR 318	State Route 318
SR 99	State Route 99
STIP	State Transportation Improvement Program
TEU	20-foot equivalent unit
TRIC	Tahoe-Reno Industrial Center
U.S.C.	United States Code
UAV	unmanned aerial vehicle
UNLV	University of Las Vegas
UPRR	Union Pacific Railroad
US 395	U.S. Route 395
US 50	U.S. Route 50
US 93	U.S. Route 93
US 95	U.S. Route 95
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
VMT	vehicle-miles travelled
WSFC	Western States Freight Coalition
YOY	year-over-year

Section 1: Vision and Solutions

Nevada has an opportunity to improve in three ways in order to develop a competitive advantage and fulfill its vision for a new freight logistics model:

1. *Add strong crossroads connections to gain broader access to more markets from all major points on the compass.*
2. *Increase Nevada's capacity and efficiency for intermodal rail–truck and air–truck transfers through a more integrated multimodal configuration.*
3. *Improve capacity and performance of our freight network in order for Nevada to realize its full potential.*

The Freight Plan identifies eight strategic goals and related objectives to guide current and ongoing freight-related planning efforts to meet the state's freight transportation needs. Together, these goals address the areas of economic competitiveness, mobility and reliability, safety, infrastructure preservation, technology, environmental sustainability and livability, funding, and collaboration. Objectives with performance measures and targets are identified for each goal.

Accomplishment of these objectives—through a suite of strategies, supported by a series of implementation actions—will make concrete, measureable progress toward the attainment of the freight transportation system goals and ultimate realization of our shared vision for Nevada's freight transportation system.

1.1 The NSFP Vision: A New Freight Logistics Model for Nevada

Nevada State Freight Plan Vision

The Nevada State Freight Plan (Freight Plan) is a strategic framework intended to strengthen the state's freight infrastructure to provide the competitive advantage necessary to grow and diversify its economy. The cost and time required for the transportation of goods are embedded in every economic activity and are no longer separate functions. The Freight Plan provides an actionable blueprint to help ensure that Nevada's freight infrastructure and policies bolster the efficiency and growth of its service modes and the industries they serve. It aims to provide a long-term framework for identifying and capturing new and emerging opportunities to strengthen Nevada's freight logistics network. In order to grow Nevada's current and emerging industries, the state will need robust multimodal connections to regional, national, and global supply chains. By focusing on essential connections, the Freight Plan can contribute to maximizing Nevada's commercial advantages that will attract new business and otherwise strengthen the state's economic base. The Freight Plan could contribute to the construct of building a New Nevada envisioned by Gov. Brian Sandoval in his January 2015 State of the State Address.

A vision statement describes an optimal desired future state; in this case, of Nevada's freight system and economy. The best visions are aspirational, memorable, and succinct. This vision was established to guide the development of the Freight Plan and to define the desired future of Nevada's freight transportation system. It was developed in a collaborative effort with the Nevada Department of Transportation (NDOT) and the Freight Advisory Committee (FAC).

VISION

Establishing a competitive advantage by creating crossroads of national commerce within a multimodal system of superior safety, condition, and performance.

The vision statement is consistent with themes established in several planning and policy documents prepared, as part of separate efforts, by various economic development, land use, and transportation planning agencies within the state. It reflects the state's tremendous efforts to diversify and grow its economy. It also recognizes that safety is a topriority for both the state and the nation and that a multimodal approach is necessary.

A Broader Competitive Focus: Repositioning Nevada in the Western United States

Traditionally, state freight plans tend to focus solely on the freight transportation system and within state boundaries, and, thereby, lose the connection to the economy and the larger context within which opportunities to strengthen their competitive positions are found. Instead, this Freight Plan focuses not only on the network elements within state boundaries, but also on the broader analysis of Nevada's role and function within the regional, national, continental, and global economic and freight logistics network.

Political boundaries do not reflect economic realities; thus, economic regions or Major Trade Areas (MTAs) outline the boundaries within which a higher level of interaction occurs between metro hubs (Figure 1-1). Nevada does not have its own economic region, but rather is part of three MTAs: northern Nevada in the San Francisco MTA, southern Nevada as part of the Los Angeles MTA, and eastern Nevada in the Salt Lake City MTA. This forms a framework for understanding Nevada's economic and freight logistics pattern in the context of the greater economic trade areas in which they are located and especially in Nevada's metro relationships to California and the West Coast ports.

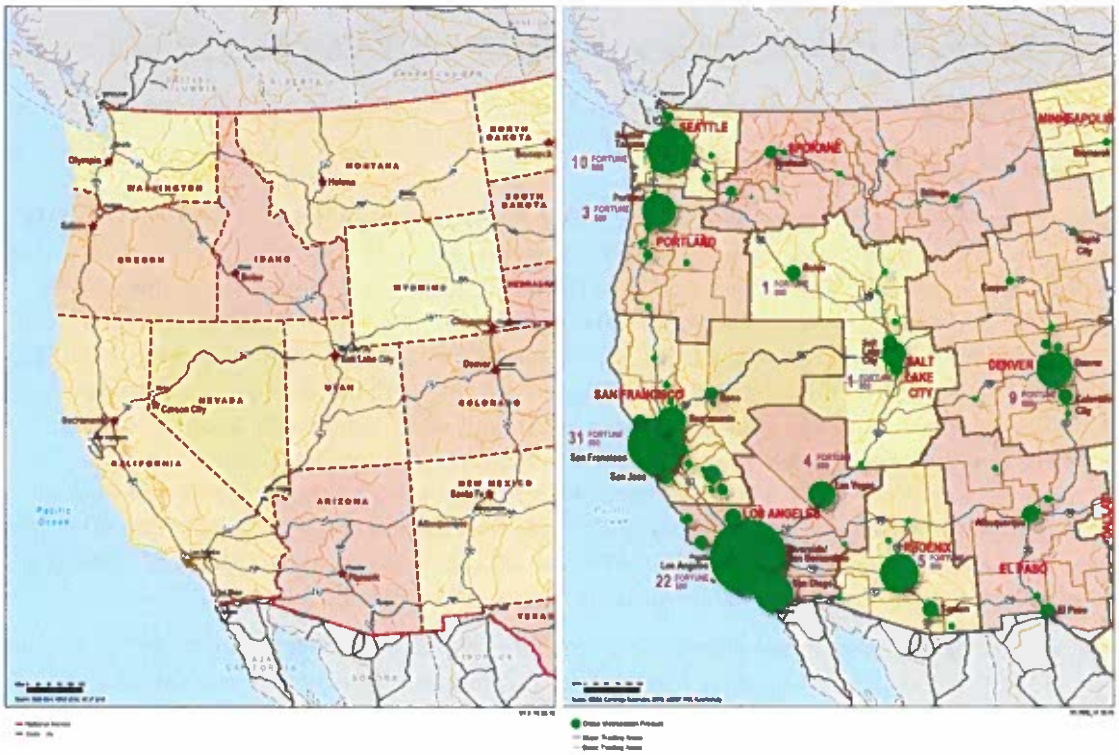


Figure 1-1. Political vs. Economic Geography of the Western United States
The image on the left depicts the political geography of the western United States, while the image on the right depicts the economic geography defined by MTAs within which economic activity occurs. The state of Nevada belongs to three MTAs and is not defined by its political boundaries (Source: Michael Gallis & Associates (MG&A), 2016 based on ESRI, 2014, NTAD 2014, NDOT 2015, BEA, and Rand McNally data).

While incremental improvements to the state's existing freight system will improve various aspects and conditions of the system, they will not create the significant competitive advantage that will change Nevada's desirability nor its position or role and function within the Western grid. To grow the economy will require structural changes within the freight system that can have a transformational effect on the role and function of Nevada. To make this transition, Nevada will have to change from a corridor state to a crossroads state. This involves creating a parallel North American Free Trade Agreement (NAFTA) corridor that connects from Mexico City through Phoenix onto Las Vegas and Reno and into western Canada. This corridor would parallel the Interstate 5 (I-5)/State Route (SR) 99 coastal corridor in California that is becoming highly congested and overbuilt. This would transform the northern and southern Nevada hubs into crossroads with a larger distribution area, direct access to the very large California markets, and provide a more resilient western U.S. freight distribution network.

1.1.1 The Framework for a New Freight Logistics Model

The essential requirements of a growth-facilitating hub system are evident from a review of other metro areas (e.g., Columbus, Ohio; Charlotte, North Carolina; and eastern Pennsylvania), where transportation assets create advantages for firms who do business at these locations. The review points to a freight planning and development strategy that is focused on elevating the market access, modal integration, capacity, and performance of Nevada facilities and transportation services, to create intermodal hubs that are primary, not secondary, in their regional impact and global outreach.

Based on this analysis, Nevada must improve in three ways in order to develop a competitive advantage:

One is to strengthen its position within the distribution network; that is, adding strong crossroads connections to gain broader access to more markets from all major points on the compass.

Another is to increase Nevada's capacity and efficiency for intermodal rail–truck and air–truck transfers through a more integrated multimodal configuration.

The third is to be conscious of capacity and performance issues that must increase in size and efficiency in order for Nevada to realize its full potential.

Building the capacity for crossroads freight movements is not enough without more efficient modal integration in the hubs, just as modal integration is not enough without strengthened network access. Thus, a strategy addressing these three areas of crossroads support, intermodal development, and improved capacity and performance is required for Nevada to develop a multidimensional competitive advantage. A detailed description of the framework is described below.

The Nevada's Existing Freight Logistics Model

Nevada's existing logistics model has evolved incrementally over the past century as a system of stops along national corridors between the coastal gateway ports and inland hubs. It is based on responses to local conditions within a series of east-west corridors that are largely determined by forces outside and beyond the state: the ports in California and the Midwest hubs. The primary urban areas, Las Vegas and Reno-Sparks-Carson City, became the processing or distribution zones for external freight flows of manufactured and retail products as well as a service conduit to rural areas that were primarily involved in resource extraction and agriculture.

Thus, Nevada's major metros function primarily as origin and destination (O&D) points located between the superior crossroads of Northern and Southern California to the west and Salt Lake City to the east. The freight infrastructure in these areas has developed through a series of incremental steps in response to changing and evolving local market conditions. In other words, Nevada's metro areas deliver consumer goods from other hubs. Goods received from external sources exceed the output of goods created or distributed from within Nevada at a ratio of 2:1. The freight corridors on which Nevada relies are serving the inland port and global hubs where intermodal and multi directional transfers can take place. As such, Nevada's metros function only as "stop-drop-and-pick-up" locations that do not have any function other than to serve the local market space. They are not primary multichannel assembly or retail points serving a larger western U.S. distribution network. Continuing incremental improvements to these hubs can have benefits for the local economy, but will not have the transformative effect of adding the inland hub functions needed to create and sustain the competitive advantages necessary to grow and diversify Nevada's economy.

Instead, Nevada's best long-term economic results would come from a major change in the current logistics role within the Western trade pattern and a major improvement in its intermodal infrastructure to increase its distribution functions. Such a transformational investment requires adding assets and market size needed to create sub hubs that offer auxiliary space and services to the larger global hubs, eventually generating the growth in distribution and manufacturing needed to become bona fide inland ports (Figure 1-2).

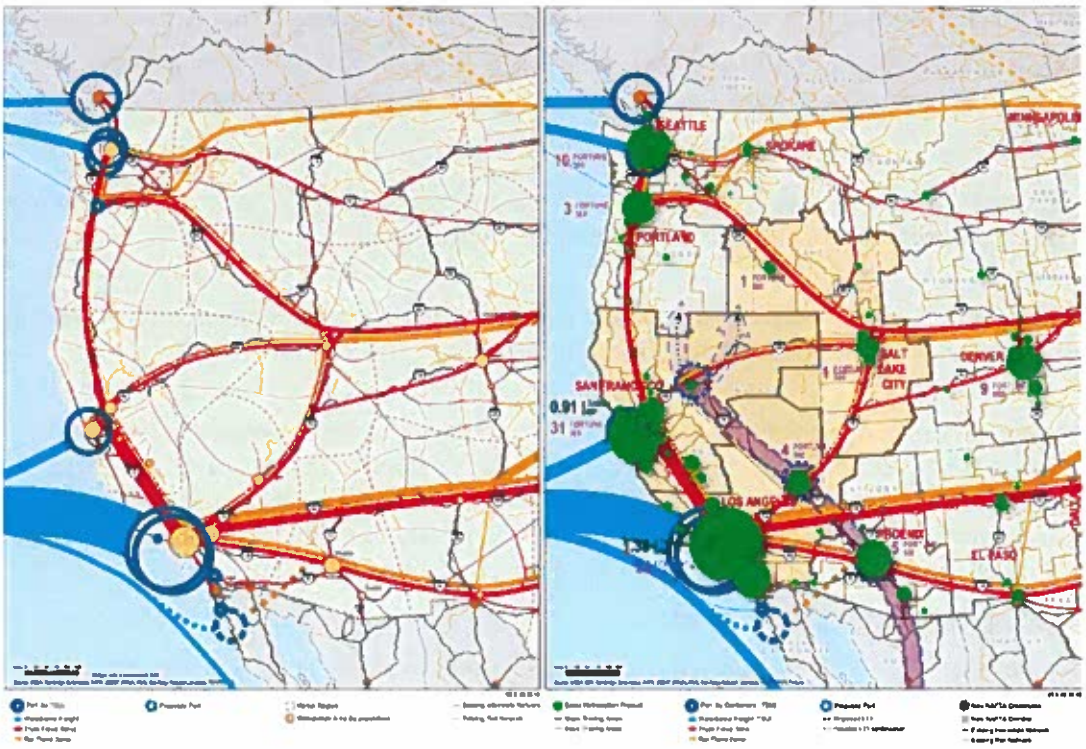


Figure 1-2. Creating the Future Corridor System of Nevada in the Western United States
The image on the left depicts current freight flows in the western United States, showing that Nevada's major metros of Las Vegas and Reno are simply stops along corridors, while the image on the right depicts a potential new future with Nevada's major metro hubs as crossroads having NAFTA connectivity and increased market access (Source: MG&A, 2015 based on USDOT (FHWA, FRA), AAPA, Oak Ridge National Laboratory, U.S. Census Bureau, BEA, Fortune data).

Nevada's New Freight Logistics Model

Urban growth and economic activity in California, the western United States, and within Nevada are transforming the state and its relationship to the domestic and global trading network. With the goal of creating a competitive advantage for the state, the new freight logistics model or framework is initiating a long-term shift away from being secondary service O&D points to regional hubs that are well positioned to serve regional, national, and international markets.

The key element of the strategy is to unite the focus of Nevada stakeholders around creating a strong crossroad intermodal network (north-south as well as east-west) to feed a strong logistics and manufacturing base supported by high-quality and integrated multimodal transfer facilities. To do so requires an awareness of competitive services close to Nevada's metro hubs and their ability to capture distribution and manufacturing growth emanating from Southern and Northern California, as well as take into account the logistics hub services of other major metro areas, including Salt Lake City and Phoenix. This long-term model or framework will guide shorter-term decision making about the policies, regulations, and investments needed to initiate an evolutionary process towards transforming the state's freight infrastructure and competitive position within the western United States, contributing to statewide efforts to create a New Nevada.

Figure 1-3. Conceptual Diagram of the Western NAFTA Corridor in the National Context
This conceptual diagram depicts the eastern U.S. NAFTA corridor and the potential for I-11 to be part of a western U.S. continental corridor. Within this conceptual configuration, the West Coast corridor, I-5, would function as an arterial distributor, while I-11 would become the continental superhighway connecting the three nations of North America. It is important to note that this is a conceptual diagram that does not show exact alignments, but is rather intended to depict the possibility of having a NAFTA corridor in the western United States as strong as that in the eastern United States (Source: MG&A, 2015).

Market Access: From Corridors to Crossroads

A competitive metro hub provides a multimodal crossroads system that allows freight to flow north and south as well as east and west; Nevada does not have this. There are no interstate or rail connections between Las Vegas and Phoenix, the only two top 100 U.S. metropolitan areas that lack such connections. Moreover, there are no interstate or rail connections between Las Vegas and Reno-Sparks-Carson City. The lack of these connections adds time and cost to trucking services, inhibits intermodal growth at prospective rail hubs at Las Vegas and Reno, and limits greater Nevada participation in NAFTA trade.

Multi-dimensional access improvements include additions to the direction from which freight can be competitively collected and distributed as well as improvements in the facilities that transfer goods from one mode to another. At present, both Las Vegas and Reno have limited market access due to the road and rail pattern in Nevada. The two primary corridors traversing the state, I-15 and I-80, provide only east-west and southeast-northwest access. Thus, Las Vegas and Reno are classified as having one-dimensional distribution because they are simply stops along corridors. Adding direct connections between and beyond Reno and Las Vegas will greatly improve the range in which freight could be collected and distributed from these points and improve connectivity to the growing NAFTA trade (Figure 1-3). An intermodal I-11 corridor represents a significant opportunity to increase both metros'

ability to perform distribution functions, becoming crossroads with multi-directional access. This added connectivity would increase synergy between Nevada's major hubs and improve their access to western U.S. markets, eventually to Canada and Mexico.

Improvements in west-east intermodal rail would add additional freight capabilities for Nevada shippers and receivers. Large volumes of freight transferred from super post-Panamax vessels can nearly triple the amount of 20-foot equivalent units (TEUs) released to a port from a single vessel. The efficient inland distribution of such volumes on the land side will increasingly require railroad economies of scale connections to overcome the inherent inefficiencies clearing these containers: one container, per one chassis, per one truck. The ability of Nevada rail yards to efficiently handle marine cargo and domestic intermodal containers would remove large volumes of containerized cargo from congested urban highways, thereby adding highway capacity and improving air quality along the service corridor. With large enough manufacturing logistics distribution bases at Reno and Las Vegas, intermodal rail would provide efficient lower cost services by splicing into larger intermodal trains moving between California and major inland ports to the east.

Metro Modal Configuration: From Fragmentation to Integration

Along with providing multidimensional access, competitive hubs provide efficient intermodal interchanges, which facilitate the transfers between an efficient and high-volume mode such as rail, the long-distance reach provided by air, and flexible pick-up and delivery by truck (Figure 1-4). Each mode has been developed independent of others, at different times in history, different periods in growth, and under different economic conditions. Thus, freight infrastructure is fractured and movements require a dray function to provide connectivity between the yards, terminals, ports, airports, and other ancillary services. This induces unnecessary conflict between freight and passenger volumes, thereby reducing safety and reliability. These trips also add cost and increase negative environmental effects.

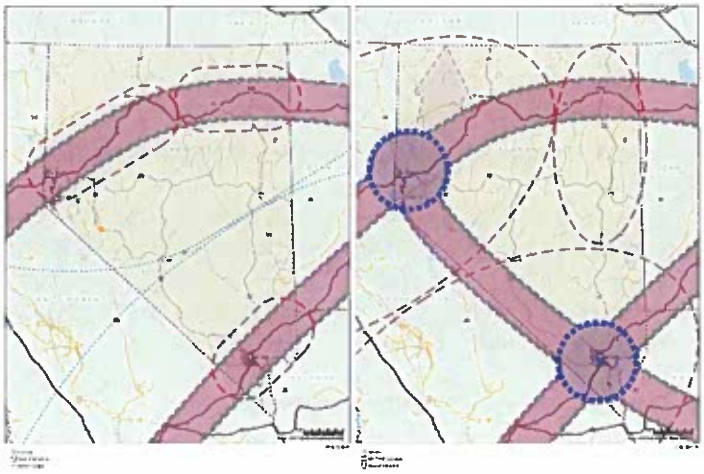


Figure 1-4. Changing Geometry to Increase Access
Two primary corridors provide single-dimensional distribution and access to nearby metros: I-15 from Los Angeles to Salt Lake and onto the East Coast markets and I-80 from San Francisco to Chicago. Nevada has two hubs along these corridors: Reno-Sparks-Carson City in northern Nevada and Las Vegas in southern Nevada; Adding a connection between the hubs (right) strengthens Nevada's geometry within the distribution network, creating crossroads with broader access to more markets and allowing them to take on more inland port distribution functions (Source: MG&A, 2015).

Modal fragmentation causes two problems within metropolitan areas. One is that it induces unnecessary conflict between freight and passenger volumes that are involved in transfer between the dispersed facilities in metropolitan areas, which reduces reliability and safety. The second is that these trips add cost and increase negative environmental effects. Mode integration seeks to use future capital

investments as the financial vehicle for either creating better connectivity or relocating facilities closer together to coterminous locations where transfers can take place without the need of a dray.

As in most urban centers in the United States, Las Vegas and Reno have a scattered and fragmented pattern of air, rail, trucking, customs, and other freight service functions, and have never emerged as major freight centers. There are extremely modest intermodal yards in Reno and Las Vegas, as well as a few bulk transloading facilities throughout the state. Although there is major through-railroad activity in Nevada, the trains do not stop in the state and they do not create cost and congestion relief advantages for Nevada shippers going east and west. This fragmented pattern of logistics forces trucks involved in freight movements and transfers through heavily urbanized areas results in conflicts and inefficiencies. This is a major inhibitor to a development-positive rail system that will be needed to further unite the state into the global economy and to increase its logistic function within its western U.S. context. Additionally, Nevada airports have both the capacity and the desire to increase their air cargo role; however, more locally generated freight volume is needed to create greater interest among the airlines.

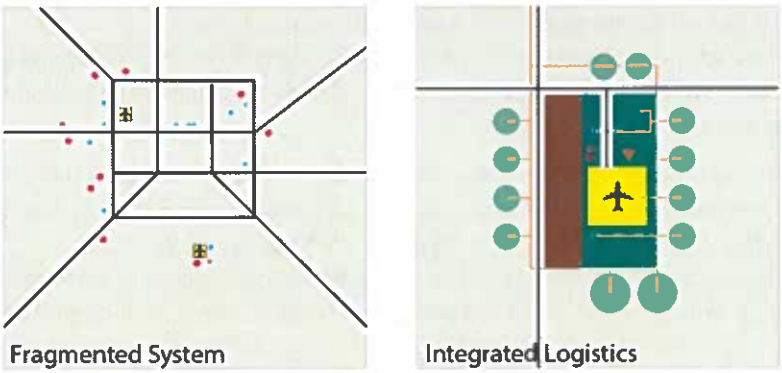


Figure 1-5. Modal Configuration: Fragmented System vs. Integrated Logistics
Both Las Vegas and Reno currently have fragmented systems, as pictured left; however, increasing integration will create the seamless system, as pictured right (Source: MG&A, 2015).

A more integrated multimodal configuration would increase Nevada's capacity and efficiency for intermodal rail-truck and air-truck transfers (Figure 1-5). Consolidating intermodal rail yards, truck terminals, and freight service at the major airports would increase efficiency while reducing urban truck transfer traffic. Linking together the modes would form highly efficient and integrated logistics centers in both Las Vegas and Reno, providing them with a competitive advantage over other metropolitan areas.

An integrative model known as a freight village is a similar but broader facilities concept than an inland port, an area within which various operators carry out activities relating to transport, logistics, and the distribution of goods. The primary features of a freight village are multimodal service, warehousing, distribution, intermodal terminal, customs service, and freight forwarding.

Capacity and Performance

The third important criterion is increased capacity and performance to strengthen the last-mile services. Capacity constraints and performance inhibitors are typically barriers to improving the freight system and can affect the reliability and efficiency of the freight network. Capacity constraints typically arise due to the urban growth that takes place around transportation facilities limiting their ability to increase in size and add capacity. For example, facilities are typically "locked" and unable to grow in their current locations, which requires the creation of a new facility at another location or the entire relocation of a facility to a location where it can assemble the required amount of land to add capacity.

Performance inhibitors are also typically the result of urban growth that does not allow a system to modify or adapt itself to the changing needs of the system. This can take place in terms of everything from storage areas to number of lanes, turning radiuses, heights of bridges, and other inhibitors to the movement through the system that would affect its operational performance.

To be conscious of capacity constraints and performance inhibitors that must increase in size and efficiency is critical for Nevada to realize its full potential, reducing traffic bottlenecks and other congestion issues along the major urban and rural highways to allow for freight to move more efficiently. Building a resilient system is also important in achieving more reliable performance of the system.

Conclusions

Creating a new aspirational plan provides a framework for prioritizing decision making by establishing a new vision and set of goals for the future of the freight logistics system. A New Nevada will be well served by a concerted public and private sector effort to improve market access, modal configuration, and capacity and performance simultaneously in order to build a more competitive freight network that is reliable, cost effective, and safe.

This framework and new model will help focus public and private sector resources on Reno and Las Vegas' proximity to major California gateways and to their Phoenix and Salt Lake connections to explore how Nevada's production, transportation, and communication assets can be applied to foster competitiveness and growth. It will also support global logistics-based growth through the creation of a vital trade crossroads with the addition of a NAFTA freight corridor through Nevada, such as I-11, to link Reno, Las Vegas, and Phoenix together and to Canada and Mexico.

Without the visionary concept, Nevada will simply continue to grow incrementally and maintain the same economic and freight logistics relationships: functioning as local hubs or stops along the corridor that serve O&D functions. By identifying the long-term concept of Nevada's hubs functioning as crossroads with integrated modal configuration and increased capacity and performance, the state can determine the best path of incremental improvements that are also steps towards the visionary goal of a New Nevada.

1.2 Strategic Goals, Objectives, Performance Measures, and Targets

The FAC agreed on eight strategic goals to be included in the Freight Plan to Nevada's freight transportation system. These strategic goals are intended to guide current and ongoing freight-related transportation planning efforts and serve as a touchstone by which to gauge the success of these efforts. The goals identified for Nevada's freight transportation system were informed by federal, state, and local planning efforts, and are consistent with the federal goals established under Title 23, United States Code (U.S.C.), Section 167, *National Freight Policy*. Together, these goals address the areas of economic competitiveness, mobility and reliability, safety, infrastructure preservation, technology, environmental sustainability and livability, funding, and collaboration.

In addition to articulating goals for the state's freight transportation system, objectives, performance measures, and performance targets are identified for each goal, with emphasis on highways that are under NDOT's control. Accomplishment of these objectives will make concrete, measureable progress toward the attainment of the goals and ultimate realization of the Nevada freight transportation system vision.

1.2.1 Performance Management

Figure 1-6. Transportation Performance Management

State and federal transportation agencies have long used asset and performance management techniques to assess, measure, and gauge infrastructural and operational capabilities of their systems. Nevada has been involved in performance management since 2007 when Legislative Assembly Bill 595 was passed. The bill requires NDOT "to develop a performance management plan for measuring its performance, which must include performance measures approved by the Board of Directors."

In an effort to incorporate uniformity in these measures and emphasize a performance-based approach in applying the Federal Highway Program, the U.S. Department of Transportation (USDOT), by way of MAP-21 legislation, has proposed several draft performance measures across key management areas, including safety, pavements, bridges, freight, emissions, performance, and congestion. This approach will incorporate performance management into federal and state transportation programs, unify high-level national transportation goals, and link key measures to state and local funding opportunities

The performance management process, illustrated in Figure 1-6, begins with shared goals and objectives, performance measures and targets for gauging progress, and a plan for achieving the goals. Achievements are measured and reported periodically, and goals revised as needed. To avoid confusion and facilitate achieving consensus, the definitions below will help to maintain clarity and consistency in communications and across all documents produced for the planning effort:

- ***Vision:*** An inspirational statement defining the optimal desired future state
- ***Goal:*** What the organization wants to achieve over the long term
- ***Objective:*** A specific accomplishment that helps to achieve a goal
- ***Performance measure:*** The measure used to systematically track and periodically assess progress toward accomplishing an objective or goal using quantitative and/or qualitative data
- ***Performance target:*** A specific, measurable target that helps to achieve an objective—how much of a desired result and by when
- ***Performance plan:*** A set of strategies (projects, programs, or policies) for achieving the targets, and ultimately the goals, including implementation actions
- ***Target achievement:*** A measure of the performance to assess if and how well a target is achieved
- ***Performance reporting:*** A report documenting performance and target achievement, helpful for re-evaluating goals and plans

1.2.2 Establishing the Goals

Federal Requirements

It is essential that Nevada's goals be consistent with federal goals established under Title 23, U.S.C., Section 167, *National Freight Policy*, which are:

(1) To invest in infrastructure improvements and to implement operational improvements that

  (A) Strengthen the contribution of the national freight network to the economic competitiveness of the United States,

  (B) Reduce congestion, and

  (C) Increase productivity, particularly for domestic industries and businesses that create high value jobs;

(2) To improve the safety, security, and resilience of freight transportation;

(3) To improve the state of good repair of the national freight network;

(4) To use advanced technology to improve the state of good repair of the national freight network;

(5) To incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network;

(6) To improve the economic efficiency of the national freight network; and

(7) To reduce the environmental impacts of the national freight network.

Nevada Context

In addition to the federal freight goals, the Consultant Team reviewed policy and planning documents prepared, as parts of separate efforts, by various economic development, land use, and transportation planning agencies within the state. The intent of this review was to identify goals and strategies related to goods movement and the economy developed as part of these previous efforts as well as common themes that cross jurisdictions. Prior reports and planning documents used during this review include the following:

- *Moving Nevada Forward: A Plan for Excellence in Economic Development* (Nevada Board of Economic Development)
- *Unify Regionalize Diversify* (The Brookings Institution)
- *Greater Reno-Sparks-Tahoe Economic Development Three-Year Strategic Plan* (Economic Development Authority of Western Nevada)
- *Envisioning Nevada's Future* (Nevada Vision Stakeholder Group)
- *Comprehensive Economic Development Strategy 2014* (Western Nevada Development District)
- *Comprehensive Economic Development Strategy* (Las Vegas Global Economic Alliance)

Examples of Existing Reports Reviewed

- *2035 Regional Transportation Plan* (Carson Area Metropolitan Planning Organization)
- *I-11 and Intermountain West Corridor Study* (ADOT and NDOT)
- *Connecting Nevada* (NDOT)
- *I-15 Corridor System Master Plan* (ADOT, Caltrans, NDOT, and UDOT)
- *I-80 Corridor System Master Plan* (Caltrans, NDOT, UDOT, WYDOT)
- *Nevada State Rail Plan* (NDOT)
- *Southern Nevada Strong* (Regional Transportation Commission of Southern Nevada)
- *Regional Transportation Plan, 2013-2035* (Regional Transportation Commission of Southern Nevada)
- *Mobility 2035* (Tahoe Metropolitan Planning Organization)
- *2035 Regional Transportation Plan* (Regional Transportation Commission of Washoe County)
- Northeastern Nevada Regional Development Authority's website
- Northern Nevada Development Authority's website

There is significant commonality in these documents relating to the need for a robust transportation system that serves the needs of Nevada's communities and businesses. The following are relevant themes frequently mentioned in these documents:

- Increasing economic competiveness
- Improving efficiency and productivity
- Safety and security
- Proper maintenance of the infrastructure
- Environmental protection and sustainability
- Adequate funding
- Compatibility of infrastructure with local land use decisions and community values
- Economic diversification
- Intermodal connectivity

1.2.3 Performance Measures and Targets

In addition to identifying goals and objectives for the Freight Plan, performance measures and targets are defined for each objective as a method of tracking the state's performance against the objectives, and revealing trends over time. The performance measures and targets were developed based on state and federal performance management techniques as well as federal guidance.

Table 1-1 lists the goals, objectives, performance measures and targets, and then provides a summary assessment of baseline conditions and analysis. A full description of the goals, objectives, performance measures, and targets is included in Appendix 1A: Analysis of Strategic Goals, Objectives Performance Measures, and Targets.

Table 1-1. Baseline Performance of Nevada's Freight System

WHAT IS THE PLAN TRYING TO ACHIEVE?

The Freight Plan identifies eight strategic goals and related objectives to guide current and ongoing freight-related planning efforts to meet the state's freight transportation needs. The goals identified for Nevada's freight transportation system were informed by federal, state, and local planning efforts, and are consistent with the federal goals established under Section 167, National Freight Policy, of Title 23, Highways, of the United States Code. Together, these goals address the areas of economic competitiveness, mobility and reliability, safety, infrastructure preservation, technology, environmental sustainability and livability, funding, and collaboration.

Strategic Goals of the Freight Plan

Economic Competitiveness

Improve the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness.

Mobility & Reliability

Provide an efficient and reliable multimodal freight transportation system for shippers and receivers across the State.

Safety

Improve the safety of the freight transportation system.

Infrastructure Preservation

Maintain and improve essential multimodal infrastructure within the State.

Advanced Innovative Technology

Use advanced technology, innovation, competition, and accountability in operating and maintaining the freight transportation system.

Environmental Sustainability & Livability

Reduce adverse environmental and community impacts of the freight transportation system.

Sustainable Funding

Fully fund the operations, maintenance, renewal, and expansion of the freight transportation system.

Collaboration, Land Use, and Community Values

Establish an ongoing freight planning process to coordinate the freight transportation system and ensure consistency with local land use decisions and community values.

Table 1-1
Baseline Performance of Nevada's Freight System

BASELINE PERFORMANCE

Summary of Goals, Objectives, Performance Measures and Targets, and Baseline Conditions

Objectives with performance measures and targets are identified for each goal, with emphasis on highways that are under NDOT's control. Accomplishment of these objectives will make concrete, measureable progress toward the attainment of the freight transportation system goals and ultimate realization of our shared vision for Nevada's freight transportation system.

Mobility & Reliability	Safety	Advanced Innovative Technology
Provide an efficient and reliable multimodal freight transportation system for shippers and receivers across the state.	Improve the safety of the freight transportation system.	Use advanced technology, innovation, competition, and accountability in operating and maintaining the freight transportation system.
Objective: **Choke Points on Major Truck Routes:** Reduce the number of locations where the average truck speed is below 40 mph.	**Objective:** **Highway Safety:** Improve daily highway system operations management to eliminate freight-associated motor vehicle fatalities.	**Objective:** **Freight-related R&D:** Support research and development of innovative freight-related technologies that can advance improvements and measure system performance.
Measure: Truck speeds on I-15, I-80, I-580, US 395, US 93, US 95, I-215/CC-215	**Measure:** Number of fatal motor vehicle crashes involving trucks	**Measure:** Number of freight related research tasks completed annually by the NDOT Research Section
Baseline: **2015 Conditions:** 42 locations with speeds below 40 mph	**Baseline:** **2009-2013 Statewide Average:** 13.8 fatalities	**Baseline:** **2014 Freight-Specific Research:** None **2015 Freight-Specific Research:** TBD
Target: ≥ 10% reduction by 2021	**Target:** < 10 fatalities by 2021	**Target:** ≥ 2 per year
Score: ◆	**Score:** ◆	**Score:** ■
Analysis: Travel speeds during afternoon peak periods (4 to 6 pm) on the major truck routes were evaluated to identify some of the chokepoints on major truck corridors. During the month of July 2015, there were 42 locations where the average truck speed during the afternoon peak period dropped below 40 miles per hour.	**Analysis:** While total highway fatalities in Nevada have been trending downward, truck-involved motor vehicle crash fatalities remained relatively flat from 2009 through 2013.	**Analysis:** While there were no recent research programs directly related to freight-specific technologies initiated in 2013-2014, the NDOT Research Section's primary mission is the advancement of innovations in transportation; therefore, many research programs initiated benefit the freight transportation system either directly or indirectly.

▼ Maintain or Needs Some Improvement ◆ Needs More Improvement ● Needs Significant Improvement ■ Not Yet Scored

Table 1-1 (Continued)
Baseline Performance of Nevada's Freight System

BASELINE PERFORMANCE

Summary of Goals, Objectives, Performance Measures and Targets, and Baseline Conditions (Continued)

Infrastructure Preservation

Maintain and improve essential multimodal infrastructure within the state.

Objective: **Pavement Condition:** Maintain a minimum 95% of state-maintained pavements in fair or better condition.	**Objective:** **Bridge Conditions:** Target of less than 5% of NDOT state-maintained bridges are in poor condition and a minimum 50% in good condition.	
Measure: Percentage of state-maintained pavements in fair or better condition	**Measure:** Percentage of NDOT state-maintained bridges that are in good and poor condition	
Baseline: **Roadways in fair or better condition:** 71%	**Baseline:** **Bridges in poor condition:** NHS - 2% Non-NHS - 1%	**Baseline:** **Bridges in good condition:** NHS - 48% Non-NHS - 51%
Target: ≥80% by 2021	**Target:** Maintain 5%	**Target:** Maintain 50%
Score: ▼	**Score:** ▼	**Score:** ▼
Analysis: At the current annual average expenditure for pavement rehabilitation, it is projected that the state-maintained roadway network will deteriorate from 75% to less than 50% of roads in fair or better condition by 2027. ** NDOT is actively working on adjusting their pavement management system reporting capabilities to enable the reporting of pavement conditions in accordance with FHWA's recently proposed metrics*	**Analysis:** Bridge preservation funding for the 2015-2017 biennium is expected to be decreased by over 30% as compared to 2013-2014 expenditures. Under the current funding plan, bridge preservation backlog is expected to increase by nearly 300% by 2027.	

▼ Maintain or Needs Some Improvement ◆ Needs More Improvement ⬢ Needs Significant Improvement ■ Not Yet Scored

Table 1-1 (Continued)
Baseline Performance of Nevada's Freight System

BASELINE PERFORMANCE

Summary of Goals, Objectives, Performance Measures and Targets, and Baseline Conditions (Continued)

Environmental Sustainability & Livability

Reduce adverse environmental and community impacts of the freight transportation system.

Objective:

Vehicular Emissions: Reduce vehicular emissions by reducing congestion, deploying technologies that improve the fuel-efficiency of commercial vehicles, and providing better mode choice and integration to encourage utilization of the most sustainable options.

Measure: Percentage of trucks registered within the state having an engine model-year of 2010 or newer	**Measure:** Truck speeds on I-15, I-80, I-580, US 395, US 93, US 95, I-215/CC-215
Baseline: **2015 Trucks registered in Nevada with MY2010 or newer engines:** 22%	**Baseline:** **2015 Conditions:** 42 locations with speeds below 40 mph
Target: ≥ 4% new trucks registered per year	**Target:** 10% reduction by 2021.
Score: ▼	**Score:** ◆
Analysis: A majority of Nevada-based trucking fleets operate within California, and are required to meet the CARB GHG emissions standards, providing a direct benefit to Nevada. As a result, there has been a steady increase of approximately 4% per year of newer vehicles (14% in 2013 to 18% in 2014), which is expected to continue to rise through 2023 as fleets continue to be upgraded.	**Analysis:** Travel speeds during afternoon peak periods (4 to 6 pm) on the major truck routes were evaluated to identify some of the chokepoints on major truck corridors. During the month of July 2015, there were 42 locations where the average truck speed during the afternoon peak period dropped below 40 miles per hour.

▼ Maintain or Needs Some Improvement ◆ Needs More Improvement ● Needs Significant Improvement ■ Not Yet Scored

Table 1-1 (Continued)
Baseline Performance of Nevada's Freight System

BASELINE PERFORMANCE

Summary of Goals, Objectives, Performance Measures and Targets, and Baseline Conditions (Continued)

Collaboration, Land Use, and Community Values

Establish an ongoing freight planning process to coordinate the freight transportation system and ensure consistency with local land use decisions and community values.

Objective:

Collaboration: Establish and foster an inclusive, long-term relationships and processes between and within the public sector, private sector, communities, agencies, and other transportation stakeholders regarding freight transportation.

Measure: Establish and meet regularly with the FAC

Baseline: FAC has been established as an early action item during the NSFP development

Target: Meet quarterly

Score: ▼

Analysis: State, local, and regional agencies and key private industry stakeholders have been invited to provide representatives to serve on the FAC. The FAC will help to guide the development of the Freight Plan and provide recommendations regarding projects, policies, programs, advanced technologies, and services to be presented to the Nevada State Transportation Board for further consideration. Upon completion of the Freight Plan, NDOT will continue to engage the FAC in ongoing freight planning efforts.

Sustainable Funding

Fully fund the operations, maintenance, renewal, and expansion of the freight transportation system.

Objective	Objective
Pavement Funding: Provide consistent and adequate sources of funding to support the state's pavement preservation goal	**Bridge Funding:** Provide consistent and adequate sources of funding to support the state's bridge preservation goal
Measure: Percentage of available funding to full funding required to meet state's pavement preservation needs	**Measure:** Percentage of available funding to full funding required to meet state's bridge preservation needs
Target: Fund 60% of capital needs by 2021	**Target:** Fund 75% of capital needs
Score: ●	**Score:** ●

Analysis: The only dedicated revenue source for transportation infrastructure in Nevada is the fuel tax, which was last increased in 1992. This funding stream has been stretched as a result of increased demands being placed on the freight transportation system, decreased purchasing power due to inflation, and declining revenues as new technologies and tougher federal standards have led to the development of more fuel efficient vehicles. Additional funding sources will need to be identified to adequately meet the preservation and capital improvement needs of the freight transportation system.

▼ Maintain or Needs Some Improvement ◆ Needs More Improvement ● Needs Significant Improvement ■ Not Yet Scored

Table 1-1 (Continued)
Baseline Performance of Nevada's Freight System

BASELINE PERFORMANCE

Summary of Goals, Objectives, Performance Measures and Targets, and Baseline Conditions (Continued)

Economic Competitiveness

Improve the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness.

Objective:

Freight transportation that provides a competitive advantage: Support and enhance the state's economic competitiveness through transportation investments that improve and sustain the following critical factors of the state's freight transportation system: mobility and reliability; safety; infrastructure preservation; advanced innovative technology; environmental sustainability and livability; collaboration land use and community values; and sustainable funding.

Measure: Composite indicator reflective attainment in critical factor objectives

Baseline:

Chokepoints on major truck routes ◆	Highway safety ◆	Pavement conditions ▼
Bridge conditions ▼	Freight-related R&D ■	Collaboration ▼
Vehicular emissions ▼	Funding ⬢	

Target: ≥75% of critical factor objectives have positive trends towards meeting their performance targets by 2021

Score: ◆ Progress on about 45% of critical factor objectives are trending positive

Analysis: The vision for the Nevada State Freight System is that it will provide the state with a competitive advantage. The combined impacts of improvements in the critical factors of freight transportation are envisioned to create this advantage. Tracking our overall progress towards achieving the established performance targets for the objectives established for the critical factors provides a measure to ascertain progress toward achieving this competitive advantage.

▼ Maintain or Needs Some Improvement ◆ Needs More Improvement ● Needs Significant Improvement ■ Not Yet Scored

1.3 Performance and Implementation Plan

The next step in the performance planning process, as illustrated on Figure 1-6, is to develop performance plans for achieving the near-term targets and ultimately the state goals. This Performance and Implementation Plan presents a suite of strategies and actions to achieve the vision and goals of the Freight Plan. The strategies meet at least one identified goal, although many of the strategies contribute to meeting multiple goals. The strategies include major investments in freight transportation infrastructure, as well as low-cost programs and policies designed to enhance freight operations and freight-supported economic development.

Incremental improvements to the existing freight system within the state will improve various aspects and conditions, but will not create the significant competitive advantage that will change Nevada's desirability or its position or role and function within the Western grid. Large-scale transformational solutions have the ability to instigate major change, but typically come with more involved planning, approval, and construction processes, and, therefore, require longer timeframes for implementation. The following suite of strategies identified as part of the Freight Plan includes a combination of both scales of projects in order to meet the vision. Table 1-2 summarizes the 18 strategies presented and identifies the goal(s) that each strategy either directly or indirectly addresses.

Table 1-2. Freight Plan Goals and Strategies
Each strategy directly (☀) or indirectly (☾) addresses specific goals

	Strategies	Economic Competitiveness	Safety	Mobility and Reliability	Infrastructure Preservation	Collaboration, Land Use, and Community Values	Innovative Technology	Environmental Sustainability and Livability	Sustainable Funding
1	I-11 Corridor	☀	☾	☀		☾	☾		
2	Freight Villages	☀	☾		☾		☾		
3	Freight Vehicular Emission Reduction			☾	☾		☾	☀	
4	Roadway Preservation Program		☾	☾	☀		☾		☾
5	Short-line Freight Rail Preservation Program	☾			☀			☾	☾
6	At-Grade Crossing Safety Improvement and Grade Separation Program		☀	☾	☾				☾
7	Freight Transportation, Land Use and Economic Development Integration	☾				☀		☾	☾
8	Freight Advisory Committee					☀			
9	Western State Freight Coalition	☾	☾	☾		☀	☾		
10	Logistics and Manufacturing Local Workforce Education and Training Policy Initiative	☀		☾		☾			
11	Freight Technologies and Trends Research	☾					☀	☾	

	Strategies	Economic Competitiveness	Safety	Mobility and Reliability	Infrastructure Preservation	Collaboration, Land Use, and Community Values	Innovative Technology	Environmental Sustainability and Livability	Sustainable Funding
12	Autonomous/Connected Vehicle Systems	☾	☾	☾			☀	☾	
13	Freight Truck Parking Expansion and ITS Program		☀	☾			☀		☾
14	Truck Inspection and Over-Dimensional Vehicle Program		☀						☾
15	Freight System Resiliency		☾	☀	☾			☾	
16	Nevada State Freight Plan Update	☀	☾	☀	☾	☾	☾	☾	☾
17	Implementation of Freight Project Priorities	☀	☀	☀	☀	☀	☀	☀	
18	Sustainable Transportation Funding	☾	☾	☾	☾	☾	☾	☾	☀

1.3.1 Nevada's Highway Freight Network

An important component of the Freight Plan and precursor to aligning prioritized projects with available funding sources is defining Nevada's Highway Freight Network, which is a combination of the National Highway Freight Network and additional corridors that are also important for Nevada. Together, there are six components Nevada's Highway Freight Network, defined by USDOT or states agencies, as indicated in Table 1-3.

Table 1-3. Components of Nevada's Highway Freight Network

National/State Network	Component	Defined by	Mileage Cap
National Highway Freight Network (NHFN)	Primary Highway Freight System (PHFS)	USDOT	None
	Critical Rural Freight Corridors (CRFCs)	NDOT	150
	Critical Urban Freight Corridors (CUFCs)	NDOT and MPOs	75
	Other Interstates Not on NHFN	USDOT	None
Additional corridors important to Nevada	Critical Multistate Freight Corridors	NDOT	None
	Other Nevada Freight Corridors	NDOT and MPOs	None

State transportation agencies are responsible for defining the Critical Rural Freight Corridors (CRFCs), Critical Urban Freight Corridors (CUFCs), and Other Nevada Freight Corridors. Having a defined network is required to apply for certain federal funding opportunities. For instance, only projects on the National Highway Freight Network (NHFN) are eligible for funding from the National Highway Freight Program (NHFP) and the new freight-related discretionary grant program: Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies (FASTLANE).

Because the mileage cap for the nationally defined system is disproportionately low within large states like Nevada, two additional corridor categories important to Nevada were added to help prioritize state funding for projects not on the NHFN. Critical Multistate Freight Corridors are major US highways that traverse the state of Nevada and our neighboring states—helping to fill the large expanses where no interstate freeways exist, and provide critical long-distance connectivity. Other Nevada Freight Corridors are additional highways that serve regional and local freight mobility. Figures 1-7 through 1-9 illustrate Nevada's Highway Freight Network. The selection process, along with a complete list of corridors and criteria for selecting them, is included in Appendix 1B.

1.3.2 Project Prioritization

A key element of the Freight Plan is a list of prioritized improvement projects that will form a direct input into the State Transportation Improvement Program (STIP) and Regional Transportation Plans (RTP) developed by the metropolitan planning organizations (MPOs). To continue to advance transportation and freight mobility in the state, follow-through of these concepts to implementation is required.

A Multiple-Objective Decision Analysis (MODA) tool also used to identify Nevada's Highway Freight Network, was used to efficiently input and sort projects. With a methodology in place, updating this project list on an established interval can be completed in a consistent manner, allowing defensible comparisons of new projects. The project list was separated into four broad regions across the state—Las Vegas, Reno-Sparks, Carson City, and rural areas—and the projects sorted by MODA value within each region. The prioritized list was further refined based on input received from the FAC, NDOT, public agency partners, and key industry stakeholders and separated into three categories: critical, very important, and important. The current list of prioritized projects is found in Appendix 1B. Figures 1-7 through 1-9 show all projects on the list, including a sampling of several critical projects, overlaid onto Nevada's Highway Freight Network.

Figure 1-7. Nevada's Highway Freight Network and Projects: Statewide

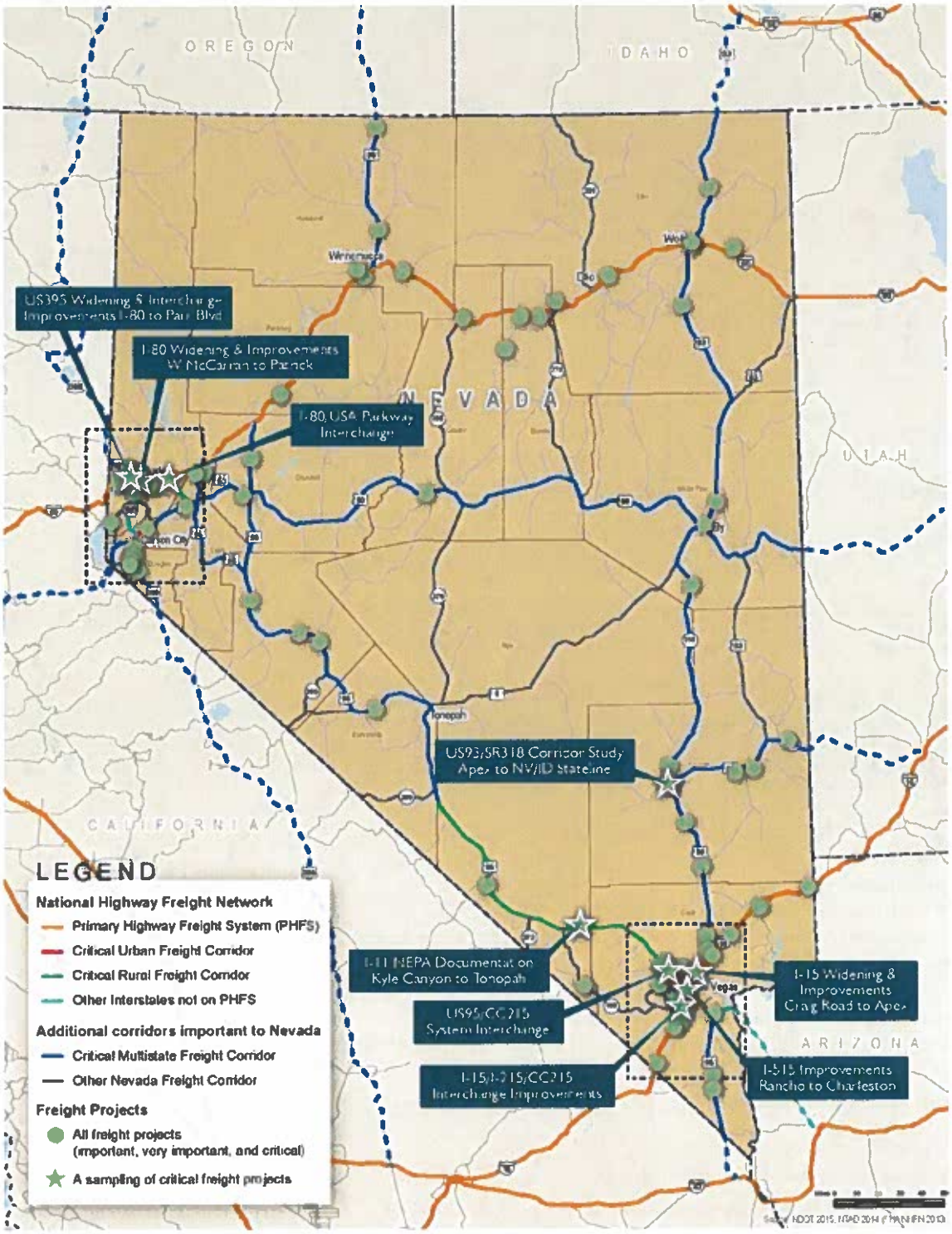


Figure 1-8. Nevada's Highway Freight Network and Projects: Las Vegas Area

Figure 1-9. Nevada's Highway Freight Network and Projects: Reno-Sparks Area

1.3.3 Implementation Actions

A full description of each strategy is provided in Appendix 1B. Table 1-4 below summarizes these strategies and actions that NDOT and its partners will need to carry out to realize advancement of the Nevada freight system. The list of actions is not meant to be final or fully inclusive. As actions are completed and regular performance monitoring identifies new issues, this list is meant to evolve to the changing needs of the state's freight system. The table provides the following information to facilitate implementation:

Timeframe to Initiate Action: Immediate (0-2 years), short term (3-5 years), and mid term (6+ years). Because the Freight Plan is expected to be updated every 5 years, most actions list the specific task required to be accomplished within the next 5 years. For longer-term or phased strategies, immediate or near-term actions are likely to have follow-on implementation actions to be initiated with the subsequent Freight Plan update.

Lead Agency/Department: Agency/organization responsible for initiating action. It is the responsibility of this agency to ensure that these actions are identified in any relevant plans and/or programs required to instigate initiation. Additionally, the lead agencies listed have various boards, commissions, or councils who may have a role in approving these actions.

Required Partnerships: Key partners or stakeholders to accomplish the implementation action. Many actions will require a wider stakeholder interest group, but those listed are the primary agencies or organizations whose input will be critical to decision making. The broader list of partners should be determined on a project-by-project basis at project initiation.

Funding Category: Primary funding program or agency responsible for implementation. Where a specific funding source is known, it is identified.

Funding Need Approximation: Monetary estimate to complete implementation action. In some cases, this estimate is for the initial phase of implementation (oftentimes a study), with a full funding need to be estimated as each project progresses.

Table 1-4. Freight Strategies and Implementation Actions

Strategy	Actions		Timeframe to Initiate Action	Lead Agency/ Department	Required Partnerships	Potential Funding Source	Funding Need Approximation
1. Advance multi-use corridor planning for I-11.	1.1	Conduct an analysis of the regional freeway system in Southern Nevada, and determine how and where the I-11 corridor would most appropriately fit in the network.	Immediate/ongoing	NDOT	• FHWA • RTCSNV • City of Boulder City • City of Henderson • City of Las Vegas • City of North Las Vegas • Clark County	NDOT – Other	$2.5 million
	1.2	Perform a series of studies to assess the strategic extension of I-11 from Las Vegas to the Canadian border, comprising two levels of investigation: (1) detailed corridor planning to determine a single preferred I-11 corridor between the Las Vegas metropolitan area and Northern Nevada border, and (2) high-level visioning to assess the most logical connection to Canada, based on the greatest economic and trade-related opportunities.	Immediate	NDOT	• FHWA • Washoe RTC • CAMPO • RTCSNV • Western States Freight Coalition • Cities/Counties	NDOT – Other	$2.5 million
	1.3	Update the Nevada Rail Plan with an analysis of the feasibility of completing a freight rail connection between Las Vegas and Reno-Sparks-Carson City.	Near-Term	NDOT	• FRA • Washoe RTC • CAMPO • RTCSNV • Western States Freight Coalition • Cities/Counties • UPRR	NDOT – Other	$500,000
2. Facilitate private development of freight village(s) in Northern and/or Southern Nevada.	2.1	Identify and facilitate private development opportunities for intermodal facilities.	Immediate/ongoing	GOED	Economic development agencies	GOED	NA
3. Deploy technologies that improve the fuel-efficiency of commercial vehicles, and provide better mode-choice and integration to encourage the most sustainable freight transportation options.	3.1	Encourage use of cleaner vehicle technologies to reduce freight vehicular emissions.	Near-Term	Nevada Trucking Association	• NDOT • DMV	NA	NA
	3.2	Work with the FAC to develop a mode policy that encourages moving freight in the most sustainable manner.	Immediate	NDOT	• FAC • State Transportation Board	NA	NA
	3.3	Build a compelling public benefits analysis and demonstration of potential market feasibility for new intermodal and/or bulk transload rail services from/to the State.	Near-Term	GOED	• NDOT • UPRR • LVCVA • RTCSNV • Washoe RTC	GOED	$100,000
	3.4	Pursue electrification at truck stops to reduce vehicle emissions from idling	Near-Term	Private Truck Stops	• NDOT • Nevada Trucking Association • Department of Conservation and Natural Resources • Nevada Governor's Office of Energy	Private	TBD
	3.5	Establish incentives to encourage the trucking industry to invest in next generation truck technologies.	Near-Term	Nevada Trucking Association	• NDOT • DMV	NDOT – Other	TBD
4. Preserve and renew Nevada's freight highway network.	4.1	Update the State Highway Preservation Report every two years to keep an accurate assessment of current maintenance needs to renew funding allotments by the Nevada State Legislature.	Immediate/ongoing	NDOT	NA	NDOT – Other	TBD

Table 1-4. Freight Strategies and Implementation Actions

Strategy	Actions		Timeframe to Initiate Action	Lead Agency/ Department	Required Partnerships	Potential Funding Source	Funding Need Approximation
	4.2	Determine a reliable source of funding for implementation of needed preservation/maintenance requirements.	Immediate	NDOT	• State Transportation Board • State legislature • Nevada Trucking Association • FHWA	NDOT – Other	TBD
5. Develop a preservation and expansion program for short-line freight rail infrastructure.	5.1	Establish a policy to strengthen NDOT's role in rail planning and implementation, including funding. Establish a policy and criteria for state involvement in rail preservation. Based on criteria, identify investments on short-line rail infrastructure and service preservation.	Immediate	FAC	• FRA	FRA	NA
	5.2	Develop a new rail spur to the Apex Industrial site in Southern Nevada to serve existing and near-term anticipated manufacturers.	Immediate	RTCSNV	• NDOT • City of North Las Vegas • Apex Holding Company	City of North Las Vegas	$35 million
6. Strengthen NDOT's Rail Safety and Security Program	6.1	Secure additional funding for NDOT's Rail Safety and Security Program. Additional funding from private stakeholders, discretionary grants, or other Federal, state, or local sources could help to fund more significant changes, such as closures or physical grade separations.	Near-Term	NDOT	• UPRR • MPOs • Cities • Counties	TBD	TBD
7. Develop a method to track and integrate freight transportation, land use, and economic development planning along major freight corridors in Nevada.	7.1	Form land use advisory committees throughout the state to coordinate with NDOT on changes in land use strategies that may impact access along state-owned freight corridors, as well as new land developments that may impact the movement of freight vehicles.	Immediate/ongoing	• Cities • Counties	• MPOs • NDOT • GOED • Economic development agencies	NA	NA
8. Maintain organization of the FAC to advise on implementation of freight strategies statewide.	8.1	Establish a schedule and process for convening or engaging the FAC in freight-related planning issues and progress upon completion of the NSFP.	Immediate/ongoing	NDOT	• FAC	NA	NA
9. Maintain organization and coordination of the WSFC to advise and support on regional freight issues, projects, and policies.	9.1	Establish the mission, organizational structure, process, and schedule for engaging the WSFC in freight-related planning issues upon completion of the NSFP.	Immediate/ongoing	NDOT	• WSFC	NA	NA
10. Encourage logistics and manufacturing-based companies and organizations to pursue workforce development training opportunities.	10.1	Advise on known educational/training opportunities at FAC meetings and encourage members to pursue educational opportunities	Immediate/ongoing	FAC	• GOED • Nevada System of Higher Education • DETR	Knowledge Fund	TBD
11. Pursue freight-related research through NDOT's Research Section to improve the State's readiness and adaptability to new freight movement and technology trends.	11.1	Develop freight related problem statements to submit to NDOT's Research Section.	Immediate/ongoing	FAC	• Nevada Trucking Association • UNR, UNLV, and other research entities	State Planning and Research Program	TBD
12. Incorporate autonomous system technologies into Nevada's freight system.	12.1	Understand and develop strategies to respond to advances in autonomous/connected vehicle technology and their impact on the freight transportation system, including related "smart infrastructure" to support implementation.	Immediate	Nevada Center for Advanced Mobility	• NDOT • GOED • DMV	GOED	NA
	12.2	Understand and develop strategies to respond to drone or unmanned aerial vehicle technology as a potential supportive freight-delivery technique.	Immediate	Nevada Institute for Autonomous Systems	• NDOT • GOED • FAA • DMV	GOED	NA
13. Increase the number of truck parking spaces and facilities, along with supportive ITS improvements.	13.1	Create a Nevada Truck Rest Stop Implementation Plan. Phase I is largely completed as part of the NSFP, and Phase II would consist of continued data collection and analysis, including surveys and interviews that will result in identification of issues as well as recommendations for additional truck parking areas.	Near-Term	NDOT	• Nevada Trucking Association • WSFC	National Highway Freight Program	$500,000

Table 1-4. Freight Strategies and Implementation Actions

Strategy	Actions		Timeframe to Initiate Action	Lead Agency/ Department	Required Partnerships	Potential Funding Source	Funding Need Approximation
	13.2	Implement investments in partnership with private and public stakeholders on truck parking ITS and expanding rest areas along interstate and interregional highways. Explore multistate partnerships.	Near-Term	NDOT	• FAC • WSFC	National Highway Freight Program	$2.5 million
14. Enforce regulatory compliance through aggressive inspections, use advanced inspection technologies to reduce costs and improve efficiencies for law enforcement and operators alike, and develop reasonable standards for over-dimensional vehicles to operate with fewer impediments on the freight network.	14.1	Identify locations for permanent truck inspection equipment, stations, and data system. Develop a scalable implementation plan with potential phased improvements (e.g., truck weigh stations, pre-screening lanes). Determine a method to sustainably fund improvements and operations, including full-time staffing and determine a fee schedule and appropriate use of fines (e.g., use truck fines to fund the inspection program). Change the Nevada Revised Statutes to allow permit fees to be charged in excess of administrative needs. The additional fees could be used for inspections or pavement preservation. Explore use of a consolidated online website or application to issue and store state-required permitting and credentials, allowing streamlined access for freight carriers and law enforcement compliance officers alike.	Immediate	• NDOT • Nevada Highway Patrol	Nevada Trucking Association	NDOT – Other	$500,000
	14.2	Construct the inspection stations at key locations, including integration of advanced technologies to gather information – reducing layover time for truckers and limiting the number of on-hand staff required (e.g. Drivewyze or PrePass, which use electronic transponders to quickly access vehicle information and ensure compliance with state requirements).	Mid-Term	• NDOT • Nevada Highway Patrol	TBD	National Highway Freight Program	$2 million
	14.3	Develop design standards to require an 18-foot-0-inch bridge clearance for all new construction be considered, and implemented when feasible.	Near-Term	NDOT	Nevada Trucking Association	TBD	TBD
15. Develop response plans and mitigation strategies for potential threats to Nevada's freight transportation system.	15.1	Research and document risks, mitigation measures, and emergency plans in a Comprehensive Disaster Risk Assessment.	Near-Term	NDOT	Nevada Highway Patrol	NDOT – Other	$200,000
	15.2	Conduct a Hazardous Commodity Flow Study to document by what route and mode all hazardous materials are transported throughout Nevada.	Near-Term	NDOT	• State Emergency Response Commission • Nevada Dept. of Public Safety, HAZMAT Permitting Office	National Highway Freight Program	$300,000
16. Update the NSFP at regular intervals to insure relevance of goals, objectives, and performance measures, and maintain a prioritized list of projects and programs.	16.1	Integrate recommendations from the NSFP into NDOT's performance-based Long Range Transportation Plan (LRTP).	Immediate	NDOT	• MPOs • Cities • Counties	NA	NA
	16.2	Integrate freight performance measures into NDOT's annual Performance Management process, allowing the monitoring of performance and progress of freight improvements. Based on the resultant analysis, maintain a list of high priority freight performance needs.	Near-Term	NDOT	• FAC • MPOs	NDOT – Other	TBD
	16.3	Conduct periodic updates to Nevada's defined National Highway Freight Network.	Near-Term	NDOT	FAC	NA	TBD
	16.4	Conduct a wholesale update to the NSFP every five years.	Mid-Term	NDOT	FAC	NDOT – Other	$1.5 million
	16.5	Hire or allocate support staff to the NDOT Freight Program to implement these strategies.	Immediate/ongoing	NDOT	FAC	NDOT – Other	TBD
17. Implement projects defined in the NSFP prioritized list of improvements.	17.1	Incorporate the fiscally constrained freight investment plan into the long-range transportation plan, and update as needed.	Near-Term	NDOT	FAC	In conjunction with NDOT's LRTP	NA

Table 1-4. Freight Strategies and Implementation Actions

Strategy	Actions		Timeframe to Initiate Action	Lead Agency/ Department	Required Partnerships	Potential Funding Source	Funding Need Approximation
	17.2	Periodically identify and prioritize additional freight-related capital improvement projects, and update the prioritized list of projects and fiscally constrained freight investment plan	Near-Term	NDOT	FAC	NA	NA
18. Pursue an "all of the above" strategy to achieve sustainable transportation funding to operate, maintain, and expand Nevada's freight transportation system.	18.1	Stay abreast of legislative changes that may result in grant opportunities.	Immediate/ongoing	NDOT	• FAC • WSFC • AASHTO	NA	NA
	18.2	Strategize project opportunities for this five-year round of NSFHP grants; prepare necessary planning and environmental studies to meet grant requirements.	Immediate	NDOT	FAC	National Highway Freight Program	Varies depending on project
	18.3	Maintain coordination with FAC and WSFC to collaborate on potential funding opportunities that are conducive to multi-state projects or partnerships.	Immediate/ongoing	NDOT	NA	NA	NA
	18.4	Communicate to the public and stakeholders the status quo outlook for the condition and performance of the State Highway System and how this could change with fuel tax indexing if approved by the voters in November 2016.	Immediate	FAC	• NDOT • DMV • Nevada Trucking Association • MPOs • National Association of Counties	NA	NA
	18.5	Prepare a "business case" document that assesses quantitatively and/or qualitatively the economic and non-economic benefits of full implementation of the state's long-range transportation plan to the significant beneficiary groups.	Near-Term	NDOT	TBD	NDOT – Other	$1 million

Table Organization Notes:

- Timeframes to initiate action:
  - Immediate = 0-2 years
  - Near-Term = 3-5 years
  - Mid-Term = 6-10 years
- Required partnerships, funding category or funding needs noted as "To Be Determined (TBD)" require additional study or project identification to further define.

1.3.4 Fiscally Constrained Freight Investment Plan

Developing and updating a fiscally constrained freight investment plan from the list of prioritized freight infrastructure projects is one of the Freight Plan's major strategy solutions (see #17). As an outcome of the FAST Act, each state has been awarded an allotment of formula funds over a 5-year period, from fiscal years 2016 to 2020. These funds may be obligated for various project types, with some restrictions on the percentage of uses (e.g., no more than 10 percent for intermodal or freight rail projects). In addition to the NHFP funds, Nevada has other federal, state, regional, and local funding sources available to implement this freight program.

The current list of prioritized projects found in Appendix 1B, Attachment E formed the foundation for the investment plan, and was screened to identify possible candidate projects for funding through the NHFP. The objective of this screening was to make a recommendation for the priority use of these formula funds that Nevada will receive over the 5 years of the FAST Act. To be eligible for use of these formula funds, projects must be located on the NHFN.

The amount of money available to Nevada under the NHFP over the 5 years of the FAST Act will be about $57.9 million, plus NDOT's 5 percent match of $2.9 million, for a total of $60.8 million available for projects. In considering possible candidate projects for funding from the NHFP, only projects on the NHFN, under $12 million, and not currently funded were considered. Projects were further screened based on their importance to freight mobility and limited funding priority from other funding sources.

Table 1-5 outlines the funding allocation scheme for Freight Plan implementation actions and proposed list of projects eligible for use of the NHFP funds. Projects are divided into the five fiscal years and meet each year's specified apportionment. Table 1-6 outlines the early project development activities for a few priority projects that are not good candidates for the NHFP, but are important for freight mobility and could be good candidates for future FASTLANE grants.

Table 1-5. Projects to be Funded by the National Highway Freight Program

Strategy	Actions		Funding Year and Costs*					
			2016	2017	2018	2019	2020	Total
13. Increase the number of truck parking spaces and facilities, along with supportive ITS improvements.	13.1	Create a Nevada Truck Rest Stop Implementation Plan. Phase I is largely completed as part of the NSFP, and Phase II would consist of continued data collection and analysis, including surveys and interviews that will result in identification of issues as well as recommendations for additional truck parking areas.		$500,000				$500,000
	13.2	Implement investments in partnership with private and public stakeholders on truck parking ITS and expanding rest areas along interstate and interregional highways. Explore multistate partnerships			$1,000,000	$1,000,000	$500,000	$2,500,000
14. Enforce regulatory compliance through aggressive inspections, use advanced inspection technologies to reduce costs and improve efficiencies for law enforcement and operators alike, and develop reasonable standards for over-dimensional vehicles to operate with fewer impediments on the freight network.	14.2	Construct the inspection stations at key locations, including integration of advanced technologies to gather information.		$500,000	$500,000	$500,000	$500,000	$2,000,000
15. Develop response plans and mitigation strategies for potential threats to Nevada's freight transportation system.	15.2	Conduct a Hazardous Commodity Flow Study to document by what route and mode all hazardous materials are transported throughout Nevada.		$300,000				$300,000
17. Implement projects defined in the NSFP prioritized list improvements.	17.2	Deliver low-cost, high-impact projects:						
		#21C, I-80/I-580/US395 Interchange Improvements NEPA Study	$12,870,000					$10,354,961
		#22, I-80 Safety Improvements (eastern Truckee Canyon)		$7,000,000				$7,000,000
		#45E, I-15 Widening, Apex Interchange to Garnett Interchange (US93) NEPA Study		$1,000,000				$1,000,000
		#100, Upgrade US95 to 4-lane divided highway from Kyle Canyon to Tonopah, NEPA Study		$200,000				$200,000
		#74, I-80 Truck Climbing Lanes at Emigrant Pass			$6,000,000			$6,000,000
		#76, I-80 Truck Climbing Lanes at Pequop Summit			$3,500,000			$3,500,000
		#54B, New Via Nobila interchange on I-15 to provide access the South Limited Transition Area (industrial area)				$11,000,000		$11,000,000
		#85A, I-80/SR306 Interchange Improvements					$1,200,000	$1,200,000
		#32, I-80 Exit 176 Improvements: realign intersection at Pilot Travel Center					$1,500,000	$1,500,000
		#18C, North Virginia Street Improvements from Parr Blvd to BUS395					$9,700,000	$9,700,000
		Total estimated project cost(s)	***$12,870,000***	***$9,500,000***	***$11,000,000***	***$12,500,000***	***$13,400,000***	***$59,270,000***
		National Highway Freight Program (NHFP) funds	***$10,354,961***	***$9,025,000***	***$10,450,000***	***$11,875,000***	***$12,730,000***	***$54,434,961***
		5% Local match (for NHFP funds)	$544,998	$475,000	$550,000	$625,000	$670,000	$2,864,998
		Other Federal funds	$934,958	$0	$0	$0	$0	$934,958
		Local match (for other Federal funds)	$49,209	$0	$0	$0	$0	$49,209
		Additional Local funds	$985,874	$0	$0	$0	$0	$985,874
		National Highway Freight Program Running Balance						
		Unused portion of the NHFP carried forward from prior fiscal years	$0	$211,326	$1,293,209	$1,868,900	$2,397,802	$3,449,916
		Annual Allotment available from the NHFP	$10,566,287	$10,106,883	$11,025,691	$12,403,902	$13,782,114	$57,884,877
		Total available from the NHFP	$10,566,287	$10,318,209	$12,318,900	$14,272,802	$16,179,916	$61,334,793
		NHFP funds used on project(s) this year	$10,354,961	$9,025,000	$10,450,000	$11,875,000	$12,730,000	$54,434,961
		Unused portion of the NHFP carried forward to the next fiscal year	$211,326	$1,293,209	$1,868,900	$2,397,802	$3,449,916	$6,899,832

* Estimated project costs will be refined as the projects are developed further.

Table 1-6. Studies Needed to Advance Freight Priorities, to be Funded from Sources Other than NHFP

Strategy	Actions		Funding Need Approximation
1. Advance multi-use corridor planning for I-11.	1.2	Perform a series of studies to assess the strategic extension of I-11 from Las Vegas to the Canadian border, comprising two levels of investigation: (1) detailed corridor planning to determine a single preferred I-11 corridor between the Las Vegas metropolitan area and Northern Nevada border, and (2) high-level visioning to assess the most logical connection to Canada, based on the greatest economic and trade-related opportunities.	$2,500,000
	1.3	Update the Nevada Rail Plan with an analysis of the feasibility of completing a freight rail connection between Las Vegas and Reno-Sparks-Carson City.	$500,000
15. Develop response plans and mitigation strategies for potential threats to Nevada's freight transportation system.	15.1	Research and document risks, mitigation measures, and emergency plans in a Comprehensive Disaster Risk Assessment.	$200,000
18. Pursue an "all of the above" strategy to achieve sustainable transportation funding to operate, maintain, and expand Nevada's freight transportation system.	18.2	Strategize project opportunities for this five-year round of NSFHP grants; prepare necessary planning and environmental studies to meet grant requirements.	
		– US 93/SR 318 Corridor Study, Apex to Idaho Border	$2,000,000
		– US 50 Corridor Study, US 395 to USA Parkway	$1,000,000

1.4 Funding and Financing

The development of sustainable, adequate transportation funding is the single most significant issue that must be addressed if we are to transform the vision for Nevada's freight transportation system to reality. While this topic often presents political challenges, simply maintaining the freight system that we have today, much less making the significant, transformational improvements necessary to successfully meet the challenges and opportunities of tomorrow, will not be possible unless sustainable, adequate funding is secured. To be successful, the state's funding strategy must address the following six major issues:

1. **Development of a sustainable revenue stream to provide the funding needed to operate, maintain, renew, and expand all transportation modes**
2. **Identification and effective communication of the benefits that transportation investments provide to society to build public support**

3. Development of funding mechanisms to effectively mitigate the loss of purchasing power of transportation revenues as a result of inflation
4. Development of funding mechanisms to mitigate the impacts of increasing vehicle fuel economy on fuel tax revenue streams
5. Equitable cost sharing across all beneficiaries of the transportation system
6. Improved mechanisms for increasing private sector participation in delivering transportation infrastructure and services

1.4.1 Strategic Freight Transportation Funding Issues

There is Only One Transportation System

While federal mandates require that states develop a freight plan, it is important to remember that there is not a separate, stand-alone freight transportation system, but rather a multimodal transportation system that serves the nation's mobility needs, including the movement of freight. This has important implications for how the funding of "freight improvements" should be approached and communicated to the public. Due to the multimodal nature of the transportation system, virtually every freight-related improvement will provide either direct or indirect benefits to other users of the transportation system. Conversely, the vast majority of our surface transportation investments that are not regarded solely as freight improvements, regardless of mode, will provide either direct or indirect benefits to freight users.

Who Should Pay for Freight Improvements and How Much?

The state's multimodal transportation system serves a wide range of users and improvements made to the system provide direct and indirect benefits to virtually everyone living, working, or visiting the state. However, funding dedicated to improving the freight system can only cover a very small fraction of all the improvements that could benefit freight movement. The key to successfully and sustainably funding the needed investments in the state's transportation system, including freight improvements, is to understand and effectively quantify the value that these investments create and who receives this value. With this information, we can devise financial strategies to fund the needed investments by capturing a reasonable portion of this value from the various beneficiaries through appropriate revenue mechanisms. Because each revenue collection mechanism impacts the various groups benefitting from transportation investments differentially, having a variety of diverse revenue sources enhances our ability to create an overall funding structure that achieves reasonable equity among all beneficiaries based upon the relative value received.

Current Funding Shortfalls

The Freight Plan indicates that an estimated $13.5 billion is needed to fund the currently identified high-priority freight projects and services. This number understates the total freight needs because it does not include system operations and maintenance (O&M) costs and does not capture substantial portions of major new initiatives such as I-11 and the creation of intermodal freight villages. The Freight Plan does not attempt to identify a specific "freight" funding shortfall for two reasons. First, while the list of high-priority projects and services identified within the Freight Plan is extensive, it is not an exhaustive list of all of the projects and services that would provide additional benefit to freight users. As stated previously, virtually every transportation investment in every mode could arguably yield benefits for freight users. Secondly, the vast majority of funding that can be used to implement freight-related improvements and services is fungible across a wide array of other transportation improvements. For these reasons, it makes sense to consider the needs of the entire multimodal transportation system and all transportation funding sources when discussing funding shortfalls.

Currently, the best available data on total system needs and revenues are likely those that are contained in the "2035 Nevada Unified Transportation Investment Plan Preview." This document presents needs and revenues compiled from various state and local long-range transportation plans. In constant dollars, the aggregate statewide needs through 2035 are estimated at $47.25 billion and revenues during this same period are estimated at $20.80 billion, indicating a projected funding shortfall of $26.45 billion. While these numbers are the best currently available, they understate the severity of the shortfall as local road and transit needs of communities outside MPO boundaries, and aviation and heavy rail needs and revenues are not included.

Causes of Existing Transportation Funding Shortfalls

The most significant reason for the transportation funding shortfall in the state of Nevada is the heavy reliance on flat fuel taxes. While fuel taxes have served the state well for many decades, they have become increasingly less effective in raising the revenue needed to adequately meet the demands placed on the state's multimodal transportation system. The two most significant factors contributing to the declining effectiveness of the current fuel tax mechanism's ability to meet the growing needs of Nevada's transportation system are inflation and increasing vehicle fuel economy. These factors impact both the revenue collected from state and local fuel taxes as well as federal transportation funding coming to Nevada, the primary source of which is federal fuel taxes.

From 1993 to 2013, each dollar collected in federal and state gas taxes lost approximately 50 percent of its purchasing power and this trend will continue. The indexing of fuel tax rates to inflation instituted by Washoe County in 2003 and by Clark County in 2013 has allowed these jurisdictions to begin recovering the lost purchasing power from the time of implementation forward by annually adjusting fuel tax rates. Indexing, however, does not recover the cumulative inflationary losses experienced prior to its implementation.

While adjusting fuel tax rates can be effective in recovering some of the purchasing power lost as a result of inflation, in general, fuel taxes as a revenue collection mechanism are becoming increasingly less effective and less equitable as:

- Improved vehicle efficiency diminishes the fuel tax revenue collected per mile driven
- Increasing numbers of all-electric vehicles (EVs) are introduced which contribute nothing in fuel taxes

From 2008 to 2013, state gas tax collections per mile driven by light-duty vehicles (LDVs) declined approximately 23 percent. LDV's are significant because they make up about 96% of Nevada's vehicle fleet and account for about 89% of all VMT. This decline is projected to continue with mandated improvements in vehicle fuel efficiency through 2025. If there is no increase in state gas tax rates, the nominal dollar amount collected in 2025 for each mile driven by LDVs is expected to decline to approximately 50 percent of the amount collected in 2008 (Figure 1-10). For the LDV fleet, this trend resulted in an estimated loss of approximately $44 million in revenue for the state's Highway Fund in 2013. Assuming there is no increase in the state's gas tax rate, the annual loss in revenue to the state's Highway Fund in 2025 is estimated at approximately $122 million. The cumulative loss between 2015 and 2025 is estimated to exceed $1.0 billion (Figure 1-11). These estimates do not include the loss in purchasing power of these dollars due to inflation. These large revenue losses, coupled with the impacts of inflation and increasing use of the highway system, will accelerate the growing backlog of road repairs and cripple Nevada's ability to expand the road system at the pace necessary to meet the future needs of its citizens and businesses.

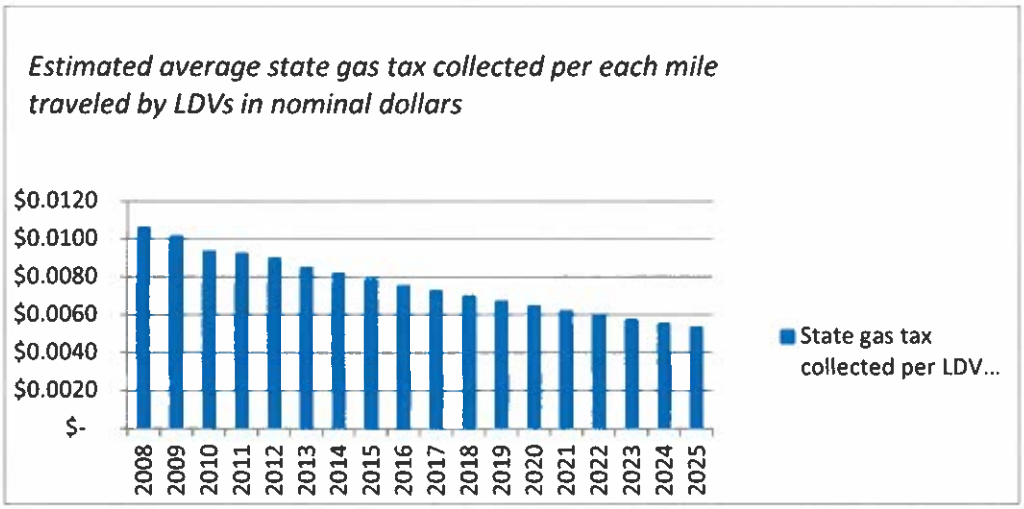


Figure 1-10. Estimated Average State Gas Tax Collected per Each Mile Traveled by LDVs in Nominal Dollars

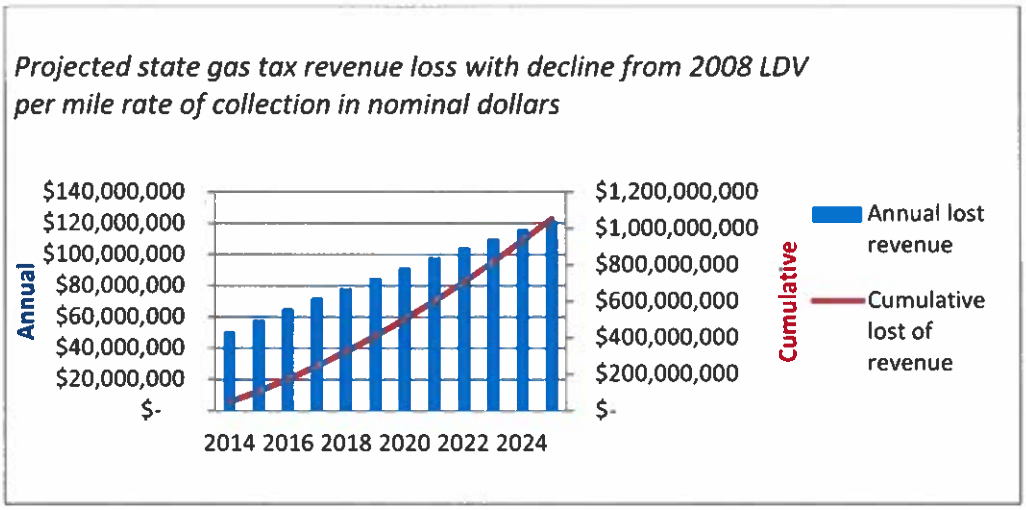


Figure 1-11. Projected State Gas Tax Revenue Loss with Decline from 2008 LDV per Rate of Collection in Nominal Dollars

From Where Will Additional Transportation Funding Come?

While total transportation funding has increased nationwide over the past two decades, funding at the federal level has been fairly stagnant. The significant majority of this increase has been at the local level. Between 1999 and 2014, there were approximately 475 local and 48 statewide transportation-funding questions on ballots across the nation, 72 percent of which were approved. Nevada has been a leader in this regard where local money accounts for more than 50 percent of all transportation funding. Much of the local activity has been motivated by the growing realization that neither the federal nor the state government has the capacity to fully fund transportation needs, and that any increases in federal and state levies to fund these shortfalls would largely be paid by the residents of these local communities. By going to residents directly, local communities increase the level of control, accountability, and efficiency in the use of these funds, and can take on a decisive role in determining their own economic destinies.

Understanding the Difference Between Funding and Financing

The terms funding and financing are often used interchangeably, which is unfortunate and confusing. Transportation funding is typically money that comes from taxes, user fees, or grants that can be spent on infrastructure improvements, services, and/or program initiatives, and does not need to be paid back

or reimbursed. Financing is essentially borrowing money against projected future revenues typically by issuing bonds. These bonds may be repaid from funding sources such as fuel taxes, property taxes, and sales taxes. It is important that the public understand this distinction because this typically means that future revenues have been committed to paying off the bonds and will thus reduce the amount of funding available for making needed transportation improvements in the future. Additionally, the interest paid to bond holders over the life of the bond increases the real cost of the current project. This same confusion often clouds the discussion of public-private partnerships (PPP). PPPs are a financing tool as the persons investing private capital in these endeavors expect to recover their investment with interest commensurate to the risk they are taking. The funding for making this repayment is typically from user fees (e.g., tolls), availability payments funded by tax revenues, development rights, etc. While financing is important, funding remains the single most critical impediment to meeting the state's mobility needs.

1.4.2 Current and Potential Sources of Transportation Funding

Nevada currently has a wide variety of transportation funding sources at the state and local level including:

- State gas taxes
- State special fuel taxes
- Motor vehicle registration taxes
- Driver's license fees
- Motor carrier fees
- Formula and discretionary federal transportation funds (primarily derived from federal fuel taxes)
- Local gas taxes
- Local special fuel taxes
- Sales and use taxes
- Property taxes
- Impact fees
- Assessments through improvement districts
- Development tax
- Government services tax-supplemental

While the majority of current federal, state, and local transportation funding in Nevada is generated by fuel taxes, Nevada should pursue an "all-of-the-above" strategy. Having a variety of funding sources can improve revenue stability and increase overall funding while providing the means to distribute the burden of paying for transportation investments among the beneficiaries in a reasonably equitable manner. Because eligible uses and administrative processes vary from funding source to funding source, having multiple funding sources can provide flexibility and enhance the efficiency of project delivery.

The state's existing funding sources could be expanded along two dimensions: first by annually or biannually adjusting rates of the sources to address inflationary pressures and stabilize the purchasing power of these revenues, where this is not already in place; and second by increasing the rates to generate the new revenue needed to meet the growing needs of our residents, businesses, and visitors.

Improvement districts and impact fees have potential for generating considerable revenue for improvements in defined geographies within the state. One existing source that currently plays a relatively minor role in transportation funding but has potential to generate significant revenue throughout the state is the property tax.

Funding sources that are currently unused in Nevada but that could have major impact include vehicle-miles traveled (VMT) fees and tolling. VMT fees are of particular importance because they can address the dire impacts of increasing fuel economy on motor vehicle fuel tax revenues. Beyond this, VMT fees

and tolling could play significant roles in generating substantial additional revenue needed to meet the mobility needs of the state.

1.4.3 Financing tools

In addition to municipal bonds, Nevada has a wide variety of other financing tools at its disposal that can be used for improving the timeliness and efficiency of delivering transportation infrastructure, including:

- Grant Anticipation Revenue Vehicles (GARVEEs)
- Tax Credit Bonds
- Section 129 loans
- TIFIA loans
- Private Activity Bonds
- Bank debt
- Tax increment financing
- Public-private partnerships
- Railroad Rehabilitations and Improvement (RRIF) loans

Among potential new financing tools, both a State Infrastructure Bank with adequate capitalization and a National Infrastructure Bank have great potential. If adequately capitalized, these institutions could provide low-cost, flexible, patient financing for infrastructure projects of all modes. This type of financial tool could be particularly useful as the state moves to implement new technologies and significant projects whose economic impacts may take decades to be fully realized.

Section 2: Nevada's Freight Transportation System

Nevada has a robust freight transportation system that supports multiple supply chains for a unique set of industries—from natural resource extraction to tourism. An inventory of these assets, supply chains, and commodity flows that make up and influence our freight network is presented here.

2.1 Statewide Inventory: Freight Assets and Conditions

The transportation system plays an important role in the economy, allowing freight movements to aid import and export activities. An efficient transportation network and quality infrastructure components can have positive impacts on both regional and national economies.

Having an understanding of the state's existing freight transportation network provides a baseline to compare future progress. Beyond simply the conditions and operations of the infrastructure itself, this includes serving freight-related industries, ensuring intermodal connectivity, understanding the impact of this infrastructure on the surrounding natural and human-made environment, and the institutional framework for which freight infrastructure plays a role within Nevada.

2.1.1 Major Freight-Dependent Employment Centers

The Nevada Department of Employment, Training, and Rehabilitation maintains detailed records of industry types and number of employees throughout the state. This information establishes the foundation for understanding commodity flow data, described in Section 2.2. It reasons that the number of employees in a freight-related industry is a good indication of the amount of freight coming or going from a particular employment center. Locations with a large number of employees generate a large number of freight shipments, whereas a lesser number of employees are likely not handling as many freight shipments.

Appendix 2A includes detailed maps of the total number of freight-dependent employment centers statewide, with more detailed maps of the Las Vegas and Reno-Sparks metropolitan areas by industry and by geography. Summary-level observations of industry-specific data include:

- **Trucking and warehousing employment centers** generate the highest proportion of truck trips per employee and are a major indicator of where shipments are generated and received. This category includes couriers, the postal service, general warehousing and storage, and freight or specialized trucking companies. The largest concentrations of these facilities are located in the Reno/Sparks and Las Vegas metropolitan areas, specifically along freeway/highway corridors.
- **Manufacturing industries** vary in type, but like trucking and warehousing, are primarily focused in the metropolitan areas, with a heavy concentration at the Sparks Intermodal Facility, with increased activity in the future at the Tahoe-Reno Industrial Center with the opening of the Tesla Giga Battery Plant.
- **Agricultural industries** produce a much smaller proportion of truck trips per employee and unlike the abovementioned, are more widespread and primarily located outside urbanized metropolitan areas. Churchill and Lyon counties have the highest concentration of agriculture facilities in the state.
- **Mining industries** generate a large proportion of truck trips per employee because of the mass of material, including gold, silver, copper ore, nickel ore, sand, and gravel. Like agriculture, these industries are more widespread in less urbanized areas. The highest concentration of mines is near the I-80 corridor in Eureka, Elko, Humboldt, and Lander counties.
- **Construction** includes residential, non-residential, commercial, industrial, highway/bridge, oil and gas pipeline, power/communication system, and heavy construction companies. These industries are typically based in areas of highest population (metropolitan centers).
- **Retail, wholesale, and fulfillment centers** typically generate fewer trucks trips per employee, but still generate a significant number of truck trips due to the large numbers of employees. This category includes internet fulfillment centers—some of the larger are Amazon.com Inc. and Zappos.com. These are primarily located within urbanized areas.

- **Entertainment and accommodations** include the hospitality and tourism industry and is a major driving economic force in Nevada. The largest employers are the mega-resort hotel-casinos, primarily located along the Las Vegas Strip, with 2,000 to 8,500 employees each. Other large hotel-casinos are located throughout the Las Vegas and Reno-Sparks-Carson City areas, along with industries at the borders of Nevada.

2.1.2 Existing Infrastructure

Highways

Figure 2-1 shows the primary interstates and U.S. highways in Nevada, including two interstates, I-80 and I-15. I-80 is an east-west transcontinental route stretching from California to the Atlantic coast, including approximately 400 miles across northern Nevada, connecting to the Reno-Sparks metropolitan area. I-15 is the primary north-south, high-capacity corridor that serves travel across more than 120 miles of southern Nevada and through the Las Vegas metropolitan area. The I-15 corridor was designated by USDOT in 2007 as one of six "Corridors of the Future" because of its regional significance for transportation of goods and people. Additionally, some routes in Nevada are considered National Highway System (NHS) routes designated by the Federal Highway Administration (FHWA) as roadways important to the nation's economy, defense, and mobility. For the non-interstate highways, these corridors tend to be highways that provide access to a major port, airport, public transportation facility, or other intermodal transportation facility (FHWA, 2012). As identified NAFTA, FHWA High-Priority Corridors—including the CANAMEX Corridor—also are illustrated on Figure 2-1.

Figure 2-1. Nevada Interstates and Major Highways

From the perspective of physical condition, NDOT updates the *State Highway Preservation Report* every 2 years, which summarizes the work performed and projected amount of work required to preserve the state-maintained roadway network and bridge infrastructure assets. NDOT is responsible for maintaining more than 1,150 bridges and 20 percent of the roads in Nevada, which carry 52 percent of all automobile traffic and 82 percent of all heavy truck traffic. The last update was conducted in 2015, and projected an anticipated decrease in bridge preservation funding below the current need, which can increase the backlog of bridge work and exacerbate the funding deficiency. When bridges deteriorate and require closure, traffic delays can cost hundreds of thousands of dollars per day, and can have significant impacts to freight.

NDOT maintains a database of statewide roadways, measuring the annual average daily traffic (AADT) for all vehicles and for trucks only. Statewide, the interstates carry the highest truck volumes, ranging from 5,000 total trucks per day on I-80 through the Reno-Sparks area to more than 6,300 trucks per day on I-15 through Las Vegas. The overwhelming majority of truck traffic (more than 75 percent) on both

corridors is combination-unit trucks, which are defined as trucks consisting of at least two units, one of which is a tractor or straight truck power unit.

Nevada has 56 truck parking facilities across the state along the major interstate and highways, including I-15, I-80, and U.S. Routes 93, 95, and 50 (US 93, US 95, and US 50). NDOT maintains a website that graphically shows the locations of all commercial truck parking across the state, the number of spaces provided, and the amenities available.

Nevada has 157 commercial vehicle truck parking spaces per daily 100,000 miles of combination truck vehicle miles of travel (Jason's Law Truck Parking Survey Results and Comparative Analysis. Photo credit: CH2M/Cameron Arizmendez).

Truck parking shortages are a national safety concern, according to FHWA. An inadequate supply of truck parking spaces can result in two negative consequences. First, tired truck drivers may continue to drive because they have difficulty finding a place to park to rest. Second, truck drivers may choose to park at unsafe locations, such as on the shoulder of the road, exit ramps, or vacant lots, if they are unable to locate official, available parking (FHWA, 2016b).

Truck parking facilities with amenities should be spaced closely enough to provide drivers more options for layovers to meet their hours-of-service regulations. Spacing greater than a 2-hour drive could force a driver to stop far short of the required hours-of-service, at a significant operational and financial loss, but spacing closer than that, especially in rural areas, may not be financially feasible for private developers of the facilities. Rest areas are useful for short stops; however, for longer durations, such as fulfilling a 10-hour forced rest, truck drivers prefer to rest where there are amenities. Currently, there are no truck parking facilities with amenities along US 93 between Las Vegas and Ely (more than 3.5 hours apart), so an additional facility along this route is desirable.

Rail

Nevada has two primary rail corridors, both of which run generally east-to-west across the state, with a few supplemental branch lines (Figure 2-2). There are no north-south rail lines in the state connecting the northern and southern regions. UPRR owns and operates all 1,085 mainline route miles in the state. BNSF Railway does not own any tracks in Nevada, but has trackage rights on 804 route miles, or 74 percent, of the freight rail lines in the state. These rail corridors are classified as Class 5 tracks under the Federal Railroad Administration (FRA) Track Safety Standards, with a maximum operating speed of 79 miles per hour (Jacobs, 2012).

According to FRA there are 542 at-grade highway-rail crossings in Nevada, including 290 public, 247 private, and five pedestrian. The majority of the at-grade crossings are located in Elko (104), Clark (96), and Washoe (82) counties (FRA, 2015).

Nevada has 309 railroad route miles of track on seven branch and short lines, serving six Nevada counties (see Figure 2-2). Of the 309 route miles, 107 miles are in service, accommodating commercial freight railroad operations. The Nevada Northern Railway (currently out-of-service track) and the U.S. Army (Thorne Branch) own the remaining 202 miles. The entire network of branch and short lines is single-tracked, consisting of Class 1 and 2 tracks with maximum operating speeds of 10 and 25 miles per hour.

Nevada has two freight intermodal facilities where trailer-on-flat-car or container-on-flat-car can be transferred between railcars and/or trucks. The facilities include the Union Pacific Railroad (UPRR) Sparks Intermodal Facility in northern Nevada and the UPRR Las Vegas Intermodal Facility in southern Nevada.

Additionally, UPRR operates three classification yards, which organize railcar shipments bound for the same destination. The Elko Yard on the Central Corridor line and the Carlin Yard on the Overland Route serve industries in the northern part of the state. Furthermore, the Arden Yard on the South Central Route serves the southern part of the state.

Figure 2-2. Nevada Rail Network

Industrial lead facilities are primarily used for shipping, transloading, and warehousing. In Nevada, the larger industrial facilities include the Northeastern Nevada Regional Railport intermodal transload facility at Elko; spurs at Fernley that serve industrial parks and companies, as well as the future Clean Energy Rail Center; and track access east of Reno for the Tahoe Reno Industrial Center. Industrial lead tracks connect these industrial parks, business parks, and individual companies directly to the branch and main lines. BNSF owns a transload facility in Sparks and can use the UPRR Sparks Intermodal Facility.

Air Cargo

Three airports in Nevada provide commercial freight service, including McCarran International Airport (LAS) in southern Nevada, Reno-Tahoe International Airport (RNO) in northwestern Nevada, and Elko Regional Airport in northeastern Nevada (see Figure 2-3).

LAS is the ninth busiest airport in North America, servicing 42 million annual passengers (Federal Aviation Administration [FAA], 2014). While competitive on the passenger side, the airport also continues to expand air cargo, with 210,000 square feet of cargo and shipping facilities, serving more than 100,000 tons of cargo a year (McCarran International Airport, 2014). The high level of passenger service at the airport – specifically international flights – enables LAS to offer a significant amount of available belly space for air cargo. Furthermore, the abundance of belly cargo capacity available due to these air services gives LAS the potential to effectively compete for air cargo in the greater Southwest region, with the greater advantage that Las Vegas is very cost competitive, specifically related to warehouse and distribution space, and is accessible to various Southwest destinations, including Phoenix and Southern California.

The Marnell Air Cargo Center at LAS opened in 2010 and provides direct access to loading facilities for both trucks and airplanes. Several hundred trucks pick up or deliver goods to the Air Cargo Center each day. This facility is a designated Foreign Trade Zone. In 2013, commercial passenger carriers transported 37 percent of the air cargo that passed through LAS. LAS is located within 1 mile of I-15 and rail service.

Figure 2-3. Nevada Airports with Air Cargo Services

Current tenants include: UPS, US Airways, Airport Terminal Services, Allegiant, Worldwide Flight Services, Inc., Southwest Airlines, and FedEx. In 2014, Reno-Tahoe International Airport (RNO) handled more than 64,500 tons or 129 million pounds of cargo shipments. This was the highest annual cargo tonnage reported at this airport during the last 8 years (Reno-Tahoe Airport Authority, 2014). Approximately 310,000 pounds of cargo arrives or departs the airport each day. Companies handling air cargo at RNO include Amerijet, DHL, FedEx, and UPS (Reno-Tahoe Airport Authority, 2015). RNO is within a designated foreign trade zone, and is located within 2 miles of two major highway corridors, I-80 and U.S. Route 395 (US 395), and less than 1 mile from the UPRR Sparks Intermodal Facility.

The air traffic control tower at Elko Regional Airport closed in 2009, which has reduced both commercial and cargo flights at the airport. Elko Regional Airport has steadily handled an average of 33,000 pounds of air cargo freight annually since 2009 (Gibbs, 2015). It receives two flights per day of Ameriflight cargo and freight in the belly of cargo space of passenger aircraft. Currently, two daily commercial flights are scheduled from Elko Regional Airport to Salt Lake City International Airport, operated by SkyWest Airlines (a Delta affiliate) (Elko Regional Airport, 2015). The number of daily commercial flights has dropped from a peak of six flights per day, which has decreased the capacity to enplane cargo. The Ely Municipal Airport also handles a small amount of small package air cargo.

Pipelines

Pipelines constitute another form of transportation of goods and can carry commodities such as natural gas, petroleum, or bio-fuels. Pipelines are a low-cost modal option if the material can be shipped in this manner. Figure 2-4 shows the pipelines and related infrastructure in Nevada.

Multiple firms pipe natural gas though 1,983 miles of pipeline across Nevada, including Colorado Interstate Gas Company, LLC. (360 miles), Kern River Gas Transmission Company (275 miles), NV Energy (8 miles), Paiute Pipeline Company (860 miles), Southwest Gas Corporation (335 miles); Tuscarora Gas Transmission Company (107 miles); and United States Gypsum Corporation (38 miles) (Jacobs, 2013).

Kinder Morgan Energy Partners and/or its subsidiaries (Buckeye Partners, LP; Calnev Pipeline Company; and SFPP, LP) operate 86 miles of refined petroleum products pipeline in Washoe County that serve the Reno Terminal in Sparks and the Reno-Tahoe International Airport (RNO). They also operate 3 miles of line between the terminal and the airport, as well as 116 miles of refined petroleum products pipeline serving Nellis Air Force Base (AFB) and LAS in southern Nevada (Jacobs, 2013).

1.3 Performance and Implementation Plan

The next step in the performance planning process, as illustrated on Figure 1-6, is to develop performance plans for achieving the near-term targets and ultimately the state goals. This Performance and Implementation Plan presents a suite of strategies and actions to achieve the vision and goals of the Freight Plan. The strategies meet at least one identified goal, although many of the strategies contribute to meeting multiple goals. The strategies include major investments in freight transportation infrastructure, as well as low-cost programs and policies designed to enhance freight operations and freight-supported economic development.

Incremental improvements to the existing freight system within the state will improve various aspects and conditions, but will not create the significant competitive advantage that will change Nevada's desirability or its position or role and function within the Western grid. Large-scale transformational solutions have the ability to instigate major change, but typically come with more involved planning, approval, and construction processes, and, therefore, require longer timeframes for implementation. The following suite of strategies identified as part of the Freight Plan includes a combination of both scales of projects in order to meet the vision. Table 1-2 summarizes the 18 strategies presented and identifies the goal(s) that each strategy either directly or indirectly addresses.

Table 1-2. Freight Plan Goals and Strategies
Each strategy directly (☀) or indirectly (☾) addresses specific goals

	Strategies	Economic Competitiveness	Safety	Mobility and Reliability	Infrastructure Preservation	Collaboration, Land Use, and Community Values	Innovative Technology	Environmental Sustainability and Livability	Sustainable Funding
1	I-11 Corridor	☀	☾	☀		☾	☾		
2	Freight Villages	☀	☾		☾		☾		
3	Freight Vehicular Emission Reduction			☾	☾		☾	☀	
4	Roadway Preservation Program		☾	☾	☀		☾		☾
5	Short-line Freight Rail Preservation Program	☾			☀			☾	☾
6	At-Grade Crossing Safety Improvement and Grade Separation Program		☀	☾	☾				☾
7	Freight Transportation, Land Use and Economic Development Integration	☾				☀		☾	☾
8	Freight Advisory Committee					☀			
9	Western State Freight Coalition	☾	☾	☾		☀	☾		
10	Logistics and Manufacturing Local Workforce Education and Training Policy Initiative	☀		☾		☾			
11	Freight Technologies and Trends Research	☾					☀	☾	

Las Vegas region includes approximately 140 acres of intermodal facilities. The Reno-Sparks metropolitan area includes three intermodal facilities: the Sparks and Parr intermodal yards, and the Reno-Tahoe International Airport (RNO) Air Cargo Center. The Sparks Intermodal Yard is home to a host of manufacturing, trucking, warehousing, and construction companies, as well as the petroleum products tank farm. With its close proximity to RNO, it is a great example of a truly intermodal facility that combines rail, truck, air, and pipeline in a single location.

One of the proposed strategies from the *Southern Nevada Regional Goods Movement Master Plan* (CH2M, 2015) is to improve intermodal connectivity through development of an integrated logistics center, or Freight Village, in the Las Vegas region. This industrial park or mixed-use development would be constructed specifically around high-performance freight servicing facilities, with access to major highways and railroads, and (where possible) pipelines and airports. It should range in size from 300 to 500 acres (CH2M, 2015).

Table 2-1. Nevada Intermodal Facilities

Facility	Type	Function	Location
UPRR Las Vegas Intermodal Facility	Rail-Truck	Intermodal container-on-flatcar and auto carload facility Typically handles paper products, autos, and building materials Storage capacity of 80 trailers and containers Includes two tracks for auto loading/unloading and two for intermodal 97.5-acre facility	Las Vegas Metro Area
Moapa Transload Facility[a]	Rail-Truck	Includes two rail sidings and two conveyor belts to transfer freight	Las Vegas Metro Area
Pan Western Transload Facility	Rail-Truck	Transloading services are provided for box, flat, center beam, gondola, hopper, and liquid railcars Onsite services include: forklifts, straddle cranes, conveyors, pumps and compressors Typically handles aggregates, fuels, liquids, dimensional and over-dimensional freight, as well as hazardous materials 24,000 feet of rail capacity that can accommodate up to 250 railcars 24.8-acre facility	Las Vegas Metro Area
McCarran Air Cargo Center	Air-Truck	Freight and distribution facility; designated foreign trade zone Includes two buildings, totally 200,000 square feet Typically accommodates airline and mail cargo 19.2-acre facility	Las Vegas Metro Area
Northeastern Nevada Regional Railport	Rail-Truck	Rail-to-truck and truck-to-rail capabilities, as well as railcar switching, storage, and warehousing Dry and liquid bulk, hazardous material, and food-grade transloading Companies at facility include Rudy Pipeline, Pacific Steel, and Liebherr Mining Equipment Served by UPRR and BNSF 60-acre facility	Elko County
UPRR Sparks Intermodal Facility	Rail-Truck	Only intermodal terminal in the state with both container-on-flatcar and trailer-on-flat-car facility Specializes in longer trains carrying commodities, such as chemicals, coal, minerals, autos and auto parts, agricultural goods, and petroleum Includes facility that adds and removes helper locomotives to assist train movements over Donner Pass 1,442-acre facility	Reno-Sparks Metro Area

Table 2-1. Nevada Intermodal Facilities

Facility	Type	Function	Location
Parr Intermodal Yard[b]	Rail-Truck	Four-track facility, with paved rail serving industrial development and office facilities Supports general carload business and intermodal and automotive traffic; automotive business consists of outbound shipments of used vehicles 9.1-acre facility	Reno-Sparks Metro Area
Elko Regional Airport	Air-Truck	Typically accommodates airline and mail cargo	Elko
Reno-Tahoe International Airport	Air-Truck	Freight and distribution facility; designated foreign trade zone Typically accommodates airline and mail cargo	Reno-Sparks Metro Area

Sources: CH2M, 2015; Jacobs, 2012; and Elko Regional Airport, 2015

[a] *Moapa Transload Facility is located west of Hidden Valley Road, east of the UPRR rail corridor, between two spur lines. The facility is a small component of the larger parcel.*

[b] *Parr Intermodal Yard is served by the UPRR Reno Branch, but the railroad owns a small section of the overall 205-acre facility, which is comprised of numerous privately owned parcels.*

2.1.4 Environmental Resource Framework

Environmental Features

The analysis of natural environment features included a review of areas of critical environmental concern (ACECs), wilderness areas, National Conservation Areas (NCAs), national monuments, critical habitats, and other land management categories. Nevada has the following environmental features:

- **ACECs**: There are 54 ACECs in Nevada, as identified by Bureau of Land Management (BLM). The ACECs are primarily located in Clark, Lincoln, Nye, and Washoe counties. In Clark County, the Coyote Springs Valley and Hidden Valley ACECs are located northeast of the metropolitan area. The Rainbow Gardens and River Mountains ACECs are located east of Las Vegas, and the Bird Springs and Arden ACECs are located south and southwest of the Las Vegas metropolitan area. In Lincoln and Nye counties, there are ACECs along US 93 and State Route 318 (SR 318) south of US 50, and the Timber Mountain Caldera ACEC is located along the US 95 corridor in Nye County.
- **Wilderness Areas:** Nevada contains 122 federally designated wilderness areas, located in almost every county. Several wilderness areas are located along the US 93 corridor through Lincoln, White Pine, and Elko counties, including Delamar Mountains, Meadow Valley Range, Arrow Canyon, Parsnip Peak, Fortification Range, Mount Grafton, Becky Peak, and Goshute Canyon. In Clark County, there are more than eight federally designated wilderness areas that surround the Las Vegas metropolitan area.
- **NCAs**: The BLM has identified three NCAs on its lands in Nevada, and no national monuments. The Black Rock Desert-High Rock Canyon Emigrant Trails NCA is the only one in northern Nevada and is located in the northwest part of the state far west of US 95 in Washoe, Humboldt, and Pershing counties. In southern Nevada, the Red Rock Canyon NCA is located west of Las Vegas with a portion along the US 95 corridor, and the Sloan Canyon NCA is south of Las Vegas between I-15 and US 95. The Great Basin National Park and Death Valley National Park are located in northern Nevada. Great Basin National Park is located in White Pine County near the Nevada/Utah border, and Death Valley National Park extends between California and Nevada in the southwestern part of Nevada. National Park Service properties in southern Nevada include the Lake Mead National Recreational Area (NRA) in Clark County.

- **Critical habitats**: Critical habitats for 23 wildlife species are located in Nevada.

Topographic Features

Northern Nevada has various dispersed mountain ranges across that entire portion of the state. With more than 150 mountain ranges statewide, the major ranges in northern Nevada include the Battle, Monitor, Ruby, Santa Rosa, Schell Creek, Sierra Nevada, Snake, and Toiyabe ranges. The Ruby range runs along US 93, near I-80, and the Schell Creek and Snake ranges are along the east side of US 93 near US 50. The Sierra Nevada range runs along the Nevada/California border, south of Carson City and west of the US 95 corridor. The Santa Rosa range runs along the east side of US 95, north of I-80, to the Nevada and Oregon border. The Las Vegas Valley is surrounded by the Spring Mountains to the west, Sheep Mountains to the north, Muddy and River Mountains to the east, and the McCullough and Eldorado Mountains to the south.

Major Drainage Features

Drainage features reviewed include major areas of surface water, rivers, reservoirs, wetlands, riparian areas, and Federal Emergency Management Agency (FEMA) flood hazard zones. Some of the most prominent surface water features in Nevada are Lake Tahoe on the Nevada/California border, Pyramid Lake northeast of Reno, Walker Lake southeast of Reno, Humboldt Lake northeast of Reno (near US 95 and I-80), and the Humboldt River, which is the longest river in the state. The Humboldt River runs along the northern half of the state into the Humboldt Sink near US 95 and I-80. The Walker, Truckee, and Carson rivers drain the western part of Nevada. The Truckee River feeds into Pyramid Lake, one of the largest natural lakes in Nevada. The mountainous areas surrounding the Las Vegas Valley feature rough terrain with steep slopes, high ridgelines, and deep natural washes. The Las Vegas Wash drains all stormwater in the Las Vegas Valley into Lake Mead and the Colorado River system. Tributaries to the Las Vegas Wash include Las Vegas Creek, Red Rock Wash, Flamingo Wash, Pittman Wash (which drains into Duck Creek), Sloan Channel, and Monson Channel. FEMA has identified 100-year flood hazard zones throughout the area along smaller rivers and washes.

Major Land Ownership

Figure 2-5 summarizes the percentage of land that belongs to each major landowner/ management category. Developed land in the urban areas is largely privately held, but private land is greatly outnumbered by the percentage of federal land holdings. The BLM, followed by the U.S. Forest Service (USFS) and Nellis AFB, owns the majority of land. Major national forests and parks outside of the Las Vegas metropolitan area are Humboldt-Toiyabe and Inyo National Forests, and Death Valley and Great Basin National Parks. Several Indian reservations are located throughout Nevada. Larger reservations are Moapa River northeast of Las Vegas; Pyramid Lake, Washoe Ranches, and Walker River near Reno-Carson City; and Goshute and Duck Valley (United States Environmental Protection Agency [EPA], 2012).

Topography and land ownership patterns form the major environmental constraints in Nevada. Nevada contains many isolated mountain ranges separated by flatter basins. These ranges generally trend north to south and most are short and narrow, with steep slopes (greater than 12 percent). The western side of the state includes portions of the Sierra Nevada (located primarily in California), as well as many lakes

Table 1-4. Freight Strategies and Implementation Actions

Strategy	Actions		Timeframe to Initiate Action	Lead Agency/ Department	Required Partnerships	Potential Funding Source	Funding Need Approximation
	4.2	Determine a reliable source of funding for implementation of needed preservation/maintenance requirements.	Immediate	NDOT	• State Transportation Board • State legislature • Nevada Trucking Association • FHWA	NDOT – Other	TBD
5. Develop a preservation and expansion program for short-line freight rail infrastructure.	5.1	Establish a policy to strengthen NDOT's role in rail planning and implementation, including funding. Establish a policy and criteria for state involvement in rail preservation. Based on criteria, identify investments on short-line rail infrastructure and service preservation.	Immediate	FAC	• FRA	FRA	NA
	5.2	Develop a new rail spur to the Apex Industrial site in Southern Nevada to serve existing and near-term anticipated manufacturers.	Immediate	RTCSNV	• NDOT • City of North Las Vegas • Apex Holding Company	City of North Las Vegas	$35 million
6. Strengthen NDOT's Rail Safety and Security Program.	6.1	Secure additional funding for NDOT's Rail Safety and Security Program. Additional funding from private stakeholders, discretionary grants, or other Federal, state, or local sources could help to fund more significant changes, such as closures or physical grade separations.	Near-Term	NDOT	• UPRR • MPOs • Cities • Counties	TBD	TBD
7. Develop a method to track and integrate freight transportation, land use, and economic development planning along major freight corridors in Nevada.	7.1	Form land use advisory committees throughout the state to coordinate with NDOT on changes in land use strategies that may impact access along state-owned freight corridors, as well as new land developments that may impact the movement of freight vehicles.	Immediate/ongoing	• Cities • Counties	• MPOs • NDOT • GOED • Economic development agencies	NA	NA
8. Maintain organization of the FAC to advise on implementation of freight strategies statewide.	8.1	Establish a schedule and process for convening or engaging the FAC in freight-related planning issues and progress upon completion of the NSFP.	Immediate/ongoing	NDOT	• FAC	NA	NA
9. Maintain organization and coordination of the WSFC to advise and support on regional freight issues, projects, and policies.	9.1	Establish the mission, organizational structure, process, and schedule for engaging the WSFC in freight-related planning issues upon completion of the NSFP.	Immediate/ongoing	NDOT	• WSFC	NA	NA
10. Encourage logistics and manufacturing-based companies and organizations to pursue workforce development training opportunities.	10.1	Advise on known educational/training opportunities at FAC meetings and encourage members to pursue educational opportunities	Immediate/ongoing	FAC	• GOED • Nevada System of Higher Education • DETR	Knowledge Fund	TBD
11. Pursue freight-related research through NDOT's Research Section to improve the State's readiness and adaptability to new freight movement and technology trends.	11.1	Develop freight related problem statements to submit to NDOT's Research Section.	Immediate/ongoing	FAC	• Nevada Trucking Association • UNR, UNLV, and other research entities	State Planning and Research Program	TBD
12. Incorporate autonomous system technologies into Nevada's freight system.	12.1	Understand and develop strategies to respond to advances in autonomous/connected vehicle technology and their impact on the freight transportation system, including related "smart infrastructure" to support implementation.	Immediate	Nevada Center for Advanced Mobility	• NDOT • GOED • DMV	GOED	NA
	12.2	Understand and develop strategies to respond to drone or unmanned aerial vehicle technology as a potential supportive freight-delivery technique.	Immediate	Nevada Institute for Autonomous Systems	• NDOT • GOED • FAA • DMV	GOED	NA
13. Increase the number of truck parking spaces and facilities, along with supportive ITS improvements.	13.1	Create a Nevada Truck Rest Stop Implementation Plan. Phase I is largely completed as part of the NSFP, and Phase II would consist of continued data collection and analysis, including surveys and interviews that will result in identification of issues as well as recommendations for additional truck parking areas.	Near-Term	NDOT	• Nevada Trucking Association • WSFC	National Highway Freight Program	$500,000

Institutions

The following three organizations are actively involved in freight related issues in Nevada:

- **The Interstate 80 Freight and Logistics Working Group** was formed to investigate topics related to freight mobility. The mission statement of the group was "...to thoroughly investigate all issues relevant and actionable regarding the topic of freight mobility and the I-80 corridor from San Francisco to Cheyenne" (I-80 Vision.org, 2015). The goal of the group was to "determine the existing condition(s) of each topic, identify gaps and/or unmet needs, and develop actions to address deficiencies" (I-80 Vision.org, 2015). While the focus group primarily worked on highway-related issues first, it plans to cover topics vital to all freight modes.
- **The Interstate 15 Mobility Alliance** is an ongoing working group that is led by the DOTs in California, Nevada, Arizona, and Utah, and includes 72 public and private agencies. In 2012, the alliance developed the I-15 Corridor System Master Plan to provide policy and decision makers with a strategic action plan that defines future transportation infrastructure, and supports national, regional, and local approaches to improve freight delivery and relieve congestion. The alliance was selected as one of six Corridor Coalitions nationwide to receive $1,250,000 in funding under the Multistate Corridor Operations and Management Program. This funding will help to execute and accelerate the delivery of the I-15 Dynamic Mobility Project, which will improve real-time information exchange between the states and population centers in the corridor, as well as traveler information with an emphasis on service to the freight industry.
- **The Nevada Trucking Association** is a nonprofit association devoted to promoting the interests of the trucking and bus industries, and opposing regulations and tax burdens they feel inhibit their member's ability to compete and be profitable. It was initially formed in 1932 as the Commercial Motor Operators of Nevada to be a defensive measure as truck and bus operators in Nevada joined together in the face of threatening and oppressive legislation and regulations. The Nevada Trucking Association continues to remind legislators, regulators, media, and the public that the trucking and bus industries are essential to Nevada and America's economy.

2.2 Existing and Forecasted Freight Flows

The existing and forecasted freight flows developed for the years 2012 and 2040 in this Plan were based on the FHWA Freight Analysis Framework (FAF) database[1] (FHWA, 2015), a national commodity flow forecast. The 2012 freight flows in FAF are estimates based on U.S. Census Bureau and U.S. Bureau of Transportation Statistics' nationwide commodity flow survey that gathers information from manufacturing, mining, wholesale, and selected retail and services establishments on commodities shipped, their value, weight, and mode of transportation, and the origin and destination of shipments. The 2040 forecasted freight flows are estimated based on FHWA's baseline[2] economic forecasts of national consumption patterns and foreign trade that are converted into volumes of commodities while applying historical mode shares by commodity and origin-destination pairs. As a result, these forecasts do not reflect what could be achieved through a strategic program of transportation and economic investments and policy strategies. However, state and regional economic forecasts were used to supplement the FAF forecasted freight flows. Together, these forecasts provide insight into where there

[1] FAF version 3.5 containing the most recent published forecast was used in the Freight Plan. This is mainly based on the U.S. Census Bureau and U.S. Bureau of Transportation Statistics 2007 Commodity Flow Survey and other supporting trade and economic data. The 2012 and 2040 freight flow estimates contained in FAF3.5 take into account the effect of the 2008-2009 global recession. Although, in the duration of this Freight Plan, the Census Bureau started to release a newer version of FAF, FAF 4, based on the 2012 Commodity Flow Survey, it was too late for use in this Plan.

[2] Based on a reasonable extrapolation of current economic trends, but do not reflect major shifts in national economy, modal capacity limitations, or changes in transportation costs and technology.

may be opportunities for Nevada to create greater economic advantages through transportation investments.

2.2.1 Existing Freight Flows

In 2012, a total of $150 billion and 146.9 million tons of freight either originated or terminated in Nevada. The freight flows through Nevada were not estimated. The consumption of goods in Nevada is mainly driven by the major population and business centers of the Las Vegas metropolitan statistical area (MSA) and Reno-Sparks-Carson City combined statistical area (CSA); together they contain more than 90 percent of the total population and 94 percent of the total private sector jobs in the state. Approximately one-third of the total private sector jobs in these economies are in the leisure and hospitality industry sector, and approximately a fifth (about 21 percent) are in the trade, transportation, and logistics industry sector. Manufacturing plays a smaller role in the Nevada economy than the national average. The key differences between the regional economies are that the Las Vegas MSA has a higher share of regional jobs in the leisure and hospitality industry sector, but lower shares of regional jobs in the trade, transportation, and logistics, and manufacturing industry sectors than the Reno-Sparks-Carson City CSA. The proximity of Nevada to the international gateway ports in California provides the state's trade, transportation, and logistics industry sector an advantage to store goods imported through the ports, before supplying them to retail trade and wholesale trade stores in both Nevada and California. They also support local manufacturing.

On the other hand, from a gross domestic product (GDP) contribution perspective, the natural resources and mining industry sector is also important to the overall economic vitality of Nevada. The northern central parts of Nevada that are mostly rural are home to the nation's largest gold mine reserve and a variety of non-metallic mineral mines. These ores and minerals have global and national markets; non-metallic minerals are also used in the production of construction-related products in the states metropolitan areas.

Directional Shares

Based on the existing flows shown below, Nevada is primarily a consuming economy (comparing inbound and outbound flow shares in Figure 2-6).

Modal Shares

In 2012, trucks carried the highest percentages of about 78 percent in value and 83 percent in tonnage of the total freight flows for Nevada; this is due to their flexibility and a door-to-door service capability, and is the preferred mode for nearly all movements within the metropolitan areas in the State. In a consumer-driven economy such as Nevada's, the heaviest goods carried by trucks in metropolitan areas are non-metallic minerals and non-metallic mineral products, sand, gravel, building stone, cement, etc. used in construction. In

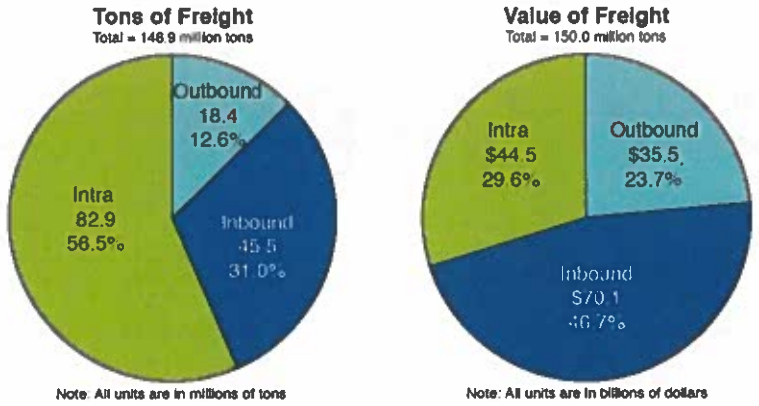


Figure 2-6. Nevada Statewide Freight Flows by Direction of Movement, 2012

These two charts depict the total outbound, inbound, and intra flows by tonnage (left) and value (right). A comparison between inbound and outbound flows reveals the imbalance between the two, with inbound being the dominant by both weight and value. Intra flows are dominated by weight and not value (Source: Disaggregated FHWA FAF3 Database for Nevada). Note: The charts include outbound, inbound, and intra Nevada freight flows but do not include freight flows through Nevada.

addition, trucks also carry waste generated in metropolitan areas to landfills. Among the high-valued goods, trucks carry a majority of the manufactured goods (e.g., machinery, electrical and electronic equipment, apparel and accessories, and miscellaneous), pharmaceutical and other chemical products, and mixed freight.

However, rail is the lifeline of the natural resources and mining industry and scrap metal industry. Rail based goods, except a few ores and minerals (e.g., gold), are generally low-valued goods. Rail also brings in out-of-state bulk or low-valued commodities such as coal, wood products, paper, grain, and other agricultural products, which have limited or no local supply. Some of imported manufactured goods, mixed freight (a variety of household and office supplies), and automobiles also are moved by intermodal rail service. Although they form small shares of total tonnage, goods using air, multiple modes (including intermodal rail service) or postal or courier goods are found to have a very high value per ton. Pipelines in the state bring in gasoline and natural gas to locations in or near the metropolitan areas.

Top Commodities

Total tons and value of the top five commodities overall, as well as the total of all other commodities, and their directional shares in the state are summarized in Table 2-2.

Table 2-2. Nevada's Top Five Commodities by Tons and Value, 2012

These two tables depict the top five commodities by total tonnage (top) and total value (bottom), as well as their shares of outbound, inbound, and intra flows.The majority of top commodities by tonnage belong to resource-based industries and are moved within the state, while the majority of top commodities by value belong to consumer goods industries (retail, food, beverage) and are inbound to the state (Source: Disaggregated FHWA FAF3 Database for Nevada).

SCTG Commodity	Tons (in thousands) by Commodity and Percentage Distribution by Direction				
	All Directions	Outbound	Inbound	Intra	Total
Nonmetal min. prods.	32,296	8%	15%	77%	100%
Gravel	14,182	1%	5%	94%	100%
Nonmetallic minerals	14,178	16%	11%	73%	100%
Waste/scrap	13,061	2%	6%	92%	100%
Coal and petroleum prods.	8,533	2%	84%	14%	100%
All Other	64,602	21%	47%	32%	100%
TOTAL	**146,852**	**13%**	**31%**	**56%**	**100%**
SCTG Commodity	Value (in millions of dollars) by Commodity and Percentage Distribution by Direction				
	All Directions	Outbound	Inbound	Intra	Total
Machinery	19,047	7%	18%	74%	100%
Electronics	15,760	24%	61%	15%	100%
Mixed freight	15,153	30%	51%	19%	100%
Textiles/leather	9,338	38%	49%	13%	100%
Motorized vehicles	8,687	12%	61%	27%	100%
All Other	82,046	27%	49%	27%	100%
TOTAL	**150,031**	**24%**	**47%**	**30%**	**100%**

Note: Standard Classification of Transported Goods (SCTG) is a classification system used by the U.S. Census Bureau to uniformly aggregate and present the data produced from Commodity Flow Survey (CFS). The classification level shown above for SCTG is Level I; it has a 2-digit structure and consists of product categories that have been designed to emphasize the link between industries and their outputs.

Top Trading Partners

The trading partner distribution maps are shown in Figures 2-7 and 2-8. The tonnage-based trade partner distribution shows that there is a strong economic linkage between rest of Nevada and the metropolitan areas. In addition, there is a large amount of tonnage flows within the metropolitan areas

Nevada has 309 railroad route miles of track on seven branch and short lines, serving six Nevada counties (see Figure 2-2). Of the 309 route miles, 107 miles are in service, accommodating commercial freight railroad operations. The Nevada Northern Railway (currently out-of-service track) and the U.S. Army (Thorne Branch) own the remaining 202 miles. The entire network of branch and short lines is single-tracked, consisting of Class 1 and 2 tracks with maximum operating speeds of 10 and 25 miles per hour.

Nevada has two freight intermodal facilities where trailer-on-flat-car or container-on-flat-car can be transferred between railcars and/or trucks. The facilities include the Union Pacific Railroad (UPRR) Sparks Intermodal Facility in northern Nevada and the UPRR Las Vegas Intermodal Facility in southern Nevada.

Additionally, UPRR operates three classification yards, which organize railcar shipments bound for the same destination. The Elko Yard on the Central Corridor line and the Carlin Yard on the Overland Route serve industries in the northern part of the state. Furthermore, the Arden Yard on the South Central Route serves the southern part of the state.

Figure 2-2. Nevada Rail Network

Industrial lead facilities are primarily used for shipping, transloading, and warehousing. In Nevada, the larger industrial facilities include the Northeastern Nevada Regional Railport intermodal transload facility at Elko; spurs at Fernley that serve industrial parks and companies, as well as the future Clean Energy Rail Center; and track access east of Reno for the Tahoe Reno Industrial Center. Industrial lead tracks connect these industrial parks, business parks, and individual companies directly to the branch and main lines. BNSF owns a transload facility in Sparks and can use the UPRR Sparks Intermodal Facility.

Air Cargo

Three airports in Nevada provide commercial freight service, including McCarran International Airport (LAS) in southern Nevada, Reno-Tahoe International Airport (RNO) in northwestern Nevada, and Elko Regional Airport in northeastern Nevada (see Figure 2-3).

LAS is the ninth busiest airport in North America, servicing 42 million annual passengers (Federal Aviation Administration [FAA], 2014). While competitive on the passenger side, the airport also continues to expand air cargo, with 210,000 square feet of cargo and shipping facilities, serving more than 100,000 tons of cargo a year (McCarran International Airport, 2014). The high level of passenger service at the airport – specifically international flights – enables LAS to offer a significant amount of available belly space for air cargo. Furthermore, the abundance of belly cargo capacity available due to these air services gives LAS the potential to effectively compete for air cargo in the greater Southwest region, with the greater advantage that Las Vegas is very cost competitive, specifically related to warehouse and distribution space, and is accessible to various Southwest destinations, including Phoenix and Southern California.

There are two tank farms in the Reno/Sparks area. The larger of these two is the Sparks Solvent/Fuel Site, which is a rail yard and fuel terminal tank farm located in Sparks between I-80 and the UPRR Overland Rail Line just east of Interstate 580 (I-580) and northeast of RNO. Operations at the terminal include storage, distribution, and loading of gasoline heating oil, diesel fuels, military fuels, and fuel additives. Fuel is transported to the facility via a pipeline over the Sierra Nevada Mountains from San Francisco Bay area refineries. The site is the central storage and distribution point for most vehicle and heating fuels supplied to the northern Nevada and eastern California region. The terminal also supplies military fuels, with the exception of the Fallon Naval Air Station, which receives fuel via a dedicated pipeline; the military fuels are trucked from the terminal to their intended destination (Nevada Division of Environmental Protection, 2015).

Figure 2-4. Nevada Pipelines and Related Infrastructure

The major natural gas pipeline through the Las Vegas metropolitan area is located along I-15 and is known as the Kern River Transmission Company system, beginning in southwest Wyoming and running southwest through Utah, southern Nevada, and Southern California. This system has a capacity of 1.8 billion cubic feet per day and delivers more than 90 percent of its product to southern Nevada and Southern California (CH2M, 2015).

Petroleum is the main commodity shipped via pipeline to southern Nevada, and delivered to the holding tanks in the northwest corner of the Las Vegas metropolitan area and at Apex Industrial Park. Nevada does not export or ship anything within the state using pipelines. Tanker trucks are distributed from these locations to fueling stations throughout the Las Vegas metropolitan area and to several mines in northern Nevada, via US 95 and US 93.

2.1.3 Intermodal Relationships

The metropolitan areas of Las Vegas and Reno-Sparks-Carson City are the primary freight hubs within the state, and I-80 and I-15 are the primary freight corridors connecting these hubs with hubs outside of Nevada. Currently, the Nevada hubs are connected to each other by US 95, but not by interstate highway or rail. While they do not carry the volume in Nevada that trucks do, rail, pipeline, and air transport play very important roles in carrying unique items to, from, and within Nevada. The relationship between these modes, hubs, and corridors is an important aspect of a freight network and distribution.

Nevada has very few intermodal facilities with only six rail-truck facilities and three air-truck facilities. Details on these facilities are provided in Table 2-1. Understanding the location and function of the intermodal facilities is important to both identifying the amount and types of freight processed in the region, and maintaining efficiency on connecting freight corridors.

The Las Vegas region includes four intermodal facilities: UPRR Las Vegas Intermodal Facility, UPRR Moapa Transload Facility, Pan Western Transload Facility, and McCarran Air Cargo Center. In total, the

State and Regional Drivers of Freight Demand Growth

Several population-related factors will drive growth in freight demand for consumer goods and create opportunities for investments in the trade, transportation and logistics industry in Nevada, and eventually for Nevada to become a major Western freight hub for the distribution of consumer goods:

- Nevada State Demographer projects that the Nevada's population is projected to grow by about 17.9 percent, or 0.8 percent annually, between 2013 and 2033 (Nevada State Demographer, 2015). The growth rate in population of Nevada's counties that contain the major urban areas is expected to be higher than other counties. Population growth between 2013 and 2033 in the Reno-Sparks-Carson City CSA is about 25.6 percent, or 1.15 percent annually, without the Tesla plant, and about 31.3 percent, or 1.37 percent annually, with the Tesla plant.
- The neighboring states are also projecting growth in population (California Department of Finance, 2015; Arizona State Demographer's Office, 2015; and Utah Governor's Office of Management and Budget, 2015) particularly in Arizona and Utah, the growth rate is projected to be nearly twice that of Nevada. California is expected to add nearly 10 million people between 2010 and 2040. These are potential markets for goods manufactured in Nevada or goods delivered from Nevada as the state develops into a Western freight hub with greater distribution functions.
- Per capita disposable income in the United States is expected to grow. In particular, the University of Las Vegas' (UNLV) Center for Business and Economic Research (CBER) forecasts that personal income per capita in fixed dollars in southern Nevada will rise at a rate of 1.8 percent annually between 2014 and 2040 (UNLV CBER, 2015). This would result in the workforce in Nevada having a higher disposable income to purchase or sell goods.
- People and businesses in Nevada will continue to depend on imported consumer goods coming through the global gateway ports in California and air cargo facilities in Nevada, though the sourcing of trade in Asia may undergo a shift – labor-intensive sectors would move from China to lower-cost Asian countries such as Vietnam and Bangladesh, while China moves up the supply chain (HSBC Global Connections, 2015).

The state has a business-friendly climate with lower property taxes, ease of permitting process, etc. Realizing the growth in global population and their growing demand for high-tech products, the Governor's Office of Economic Development is focusing on increasing specialization in manufacturing either using very high technology or advanced knowledge of sciences, as they will not only create high-paying manufacturing jobs in Nevada but also increase exports from the state (Nevada GOED, 2015). The delivery of high-tech products can leverage growth in the trade, transportation, and logistics industry that will result from population-related factors. The state considers that developing programs for training the workforce for advanced manufacturing jobs is essential to keep a steady growth.

On the other hand, the state projects (Nevada DETR, 2015) that mining industries employment will decline by a small amount, but this may not result in a significant reduction in contribution to Nevada's economy and freight demand; marginal productivity gains may be sufficient to keep the freight demand a constant. However, mining-related freight demand for high-value metals such as gold and silver will remain sensitive to short-term fluctuations in market prices.

Nevada lost many construction jobs during the Great Recession (Tuman et al., 2013). The state projects that construction employment will grow at a rate of 5.3 percent annually between 2012 and 2022. This high growth rate over the short term is likely reflective of not just the growth in economy but also continued recovery of jobs lost during the recession. The industry sector and resulting freight demand will remain volatile and sensitive to the health of the U.S. economy.

and reservoirs. From a land management standpoint, the Humboldt-Toiyabe National Forest comprises 6.3 million acres in Nevada (the largest national forest in the lower 48 states), split into more than 10 clusters of forest lands throughout the state. Military land holdings are large, specifically Nellis AFB, located north of the Las Vegas metropolitan area. The area also has several state wildlife areas, wilderness areas, and tribal communities. Most ACECs and critical habitat areas are located in the southeastern and northwestern parts of Nevada. Population clusters are dispersed, with Las Vegas and Reno-Sparks/Carson City being the primary population/employment center in Nevada.

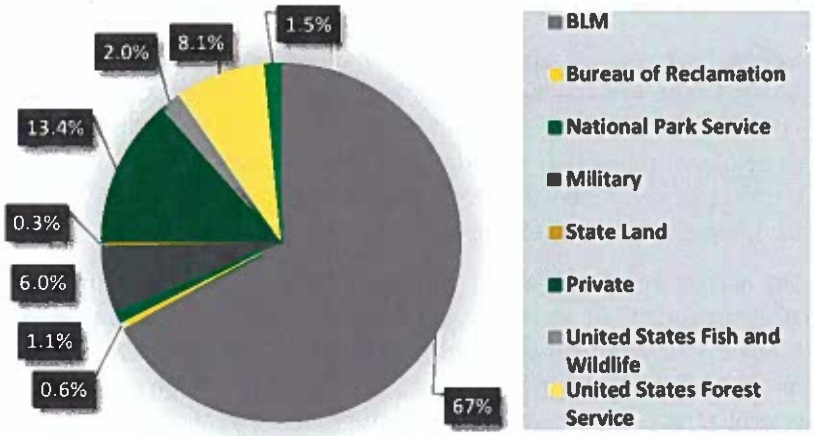


Figure 2-5. Major Land Ownership and Management in Nevada

2.1.5 State Freight Statutes, Regulations, and Institutions

Statutes and Regulations

There are numerous federal, state, and local laws regulating the transport of goods and materials over public highways. This includes, among other things, requirements for overweight and oversized vehicles, route restrictions, day and time restrictions, and limitations related to truck idling on public roadways. Detailed information regarding these laws can be found in Appendix 2A: Statewide Inventory.

Larger vehicles are typically subject to route restrictions. The federal government establishes size and weight standards for the Interstate Highway System, but does not issue permits for oversize or overweight vehicles. This is handled at the state level, and states may allow heavier vehicles to operate on their roadways under special permits or exemptions. The maximum gross vehicle weight (equal to the weight of the vehicle or vehicle combination plus the load) of the most commonly used long-haul vehicles is 80,000 pounds on the Interstate Highway System.

NDOT regulates and permits longer combination vehicles and over-dimensional and overweight vehicles. Loads that are oversized or overweight and not divisible must apply for over-dimensional permits. This includes loads that are 70 feet or less in length and exceed 80,000 pounds. Nevada also enforces time and day restrictions for over-dimensional vehicle (ODVs) and longer combination vehicles (LCVs) to mitigate travel during heavy motorist travel days. Non-reducible, ODVs that exceed the legal width or length are restricted on certain routes for safety and asset management purposes.

Like most states, Nevada also has anti-idling laws to reduce emissions when trucks are not actively transporting goods. Regulations regarding idling are written and managed by the Nevada Bureau of Air Pollution Control, which has jurisdiction over air quality programs throughout the state with the exception of Washoe and Clark counties. These two counties have their own distinct air quality jurisdictions and control over fines and exemptions.

in the state. This is mainly a result of demand for a small amount of consumer goods in rural areas that are stored at distribution facilities in the metropolitan areas, as well as demand for bulky and low-valued non-metallic minerals mined in the rural areas that are essential ingredients for a constantly demanding construction industry in the metros. Outside of the state, Nevada has inbound flows of coal from the Powder River Basin in Wyoming and agricultural and petroleum refinery products from California, and outbound flows of metallic ores and non-metallic minerals and their products to California.

The value-based trade partner distribution pattern shows that Southern California has strong trade linkages to the Las Vegas CSA, while the San Joaquin Valley has strong trade linkages to the Reno-Sparks-Carson City CSA. The former is mainly a result of Southern California being a strong freight hub with an extensive transportation and logistics network that supports the nation's busiest ports for imported goods; the consumer base and manufacturing centers in southern Nevada receive a majority of their imported goods from Southern California. The latter is mainly a result of the San Joaquin Valley region being a major agricultural production center in southwestern United States; the processed food manufacturing centers in northern Nevada make use of the agricultural commodities. In addition, the San Joaquin Valley region supplies goods imported through Port of Oakland. Moreover, Nevada also has strong trade linkages to the Mountain and "East North Central State" regions of the United States. These may be related to freight flows processed at freight hub cities such as Salt Lake City, Denver, Chicago, and Columbus, Ohio.

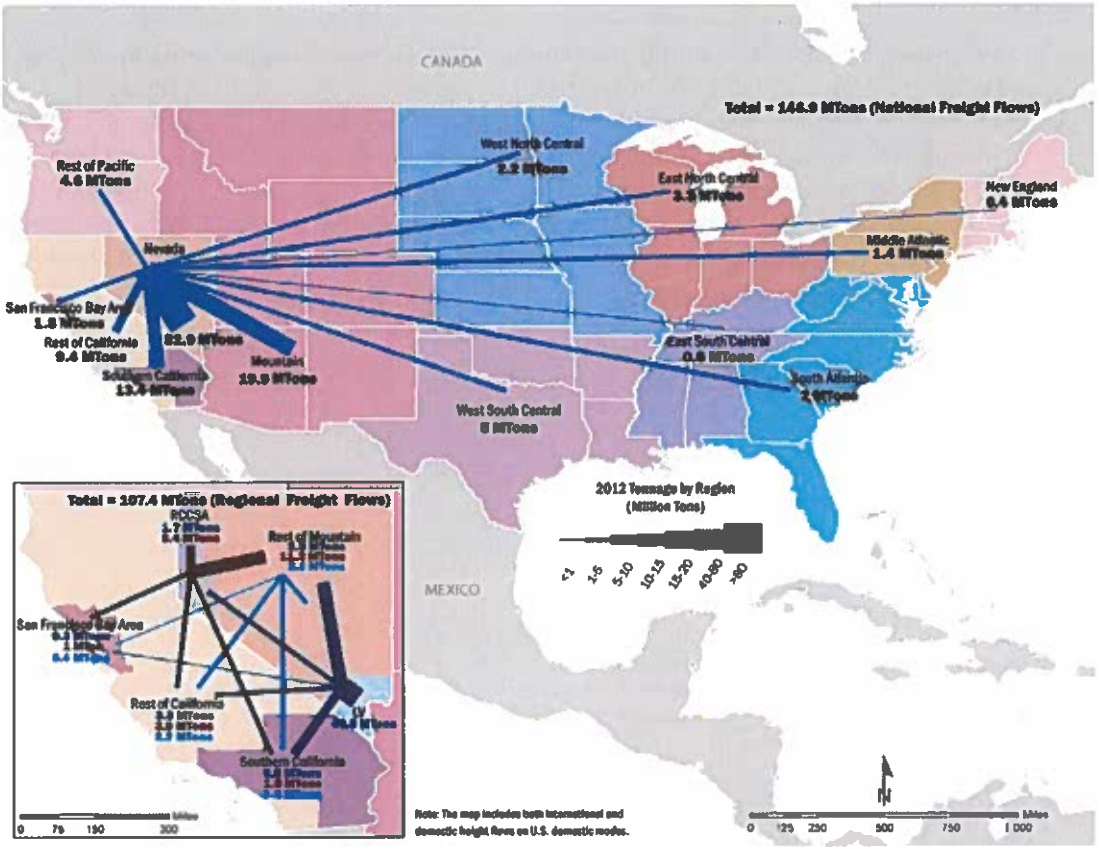


Figure 2-7. Nevada's Statewide and Regional Freight Tonnage by Trading Partner for Domestic and International Combined Markets, 2012

The map depicts the top trading partners for Nevada by total tonnage and the inset depicts intra Nevada flows. The majority of trading by tonnage occurs within the state, however, trading partners outside Nevada also act as key suppliers and consumers, including the rest of Mountain region, Southern California, and the San Joaquin Valley region in California (Source: Disaggregated FHWA FAF3 Database for Nevada).

Note: The charts include outbound, inbound, and intra Nevada freight flows but do not include freight flows through Nevada.

will grow under the baseline scenario at rates of 2.5, 4.6, and 1.9 percent, respectively. The large growth in value of commodities will add pressure on the transportation system operators for improving service quality (availability, reliability, flexibility, etc.) in Nevada. The service quality needs would be the highest in "last mile" connections and mode transfer locations (rail yards, airports, truck terminals, etc.) in the Las Vegas and Reno metro areas. Even with growth in auto and truck traffic, I-15 and I-80 highways within the state would remain generally reliable; however, I-80 would continue to be affected by weather in the Sierras.

Even under the scenario of increased rail usage, the above needs would remain; however, state policy makers would give investment priority to rail service availability and reliability over I-15 and I-80 highway capacity.

Top Commodities

Table 2-3 summarizes the top commodities for Nevada by tons and value under baseline forecasts using FAF data. The growth rates are high in tons for miscellaneous manufacturing products and high in value for precision instruments, motorized vehicles, and miscellaneous manufacturing products, while the growth rates are low to moderate for other top commodities. The high-growth commodities are mostly related to trade and logistics industries, while the low-growth commodities are mostly related to resource-based industries. In other words, the baseline forecasts using FAF data are consistent with the state economic forecasts.

Based on the projected commodity mix under the baseline scenario, there is an opportunity to improve trade balance and generate economic benefits for Nevada. This would mainly come from replacing inbound movements for non-metallic mineral products and electronic products with local manufacturing of such products. In addition, this would come from expanding or developing new high-productivity, technologically advanced, and export-quality manufacturing clusters. Especially in the Las Vegas and Reno metro areas, this would leverage the expansion in the trade, transportation, and logistics industry that will take place to handle increased demand for inbound consumer goods. Increasing nonmetallic mineral exports from the state is also an option to improve economic value of goods movement.

Table 2-3. Nevada's Top Five Commodities in 2040 by Tons and Value and their 2012-2040 Growth Rates

These two tables depict the top five commodities by total tonnage (top) and total value (bottom), as well as their relative growth and shares of outbound, inbound, and intra flows. The majority of top commodities by tonnage will have low to moderate growth rates, while the majority of top commodities by value will have high growth rates. As a result, the growth in consumer goods is expected to outpace growth of products from resource-based industries (Source: Disaggregated FHWA FAF3 Database for Nevada).

SCTG Commodity	2040 Tons (in thousands) by Commodity and Percentage Distribution by Direction					
	All Directions.	Outbound	Inbound	Intra	Total	CAGR Tons, 2012-2040
Nonmetal min. prods.	31,235	11%	21%	68%	100%	-0.1%
Gravel	15,381	2%	3%	95%	100%	0.3%
Nonmetallic minerals	15,262	27%	5%	68%	100%	0.3%
Waste/scrap	12,577	1%	71%	28%	100%	-0.1%
Misc. mfg. prods.	9,213	59%	23%	18%	100%	4.8%
TOTAL (All Commodities)	**183,124**	**19%**	**39%**	**42%**	**100%**	**0.8%**

SCTG Commodity	2040 Value (in millions of dollars) by Commodity and Percentage Distribution by Direction					
	All Directions.	Outbound	Inbound	Intra	Total	CAGR Value, 2012-2040
Precision instruments	55,578	40%	48%	12%	100%	10.5%
Machinery	38,453	8%	23%	68%	100%	2.5%
Electronics	29,769	25%	64%	11%	100%	2.3%
Motorized vehicles	27,780	52%	14%	35%	100%	4.2%
Misc. mfg. prods.	27,667	42%	39%	19%	100%	4.4%
TOTAL (All Commodities)	**333,445**	**32%**	**45%**	**23%**	**100%**	**2.9%**

Note: The tables include freight flows from Nevada (outbound), to Nevada (inbound), and within Nevada (intra), but do not include freight flows through Nevada. Standard Classification of Transported Goods (SCTG) is a classification system used by the U.S. Census Bureau to uniformly aggregate and present the data produced from Commodity Flow Survey (CFS). The classification level shown above for SCTG is Level I; it has a 2-digit structure and consists of product categories, which have been designed to emphasize the link between industries and their outputs.

Top Trading Partners

Baseline forecasts using FAF data show that in 2040, the shares of global, national, and local trade are expected to be about 6.2, 52.0, and 41.8 percent, respectively, of the total trade tons, and about 6.7, 69.9, and 23.4 percent, respectively, of the total value. The top trading partners for Nevada by tons and value with all trade types combined, are summarized in Table 2-4.

Table 2-4. Nevada's Top Five Trading Partners in 2040 by Tons and Value and their 2012-2040 Growth Rates
The table depicts the top trading partners for Nevada by tonnage (top) and value (bottom), their relative growth, and shares of total tonnage and total value, respectively. Data reveals that flows within Nevada will remain the dominant freight flows. Trading with Arizona and the San Joaquin Valley region will have a high tonnage growth rate, while trading with Arizona, the San Francisco Bay Area, and Utah will have a high-value growth rate *(Source: Disaggregated FHWA FAF3 Database for Nevada).*

Trading Partner	2040 Tons *(in thousands)*	% of Total Tons	CAGR Tons, 2012-2040
Intra Nevada	76,542	41.8%	-0.3%
Arizona	15,266	8.3%	5.2%
Southern California	14,937	8.2%	0.5%
Utah	13,387	7.3%	1.6%
San Joaquin Valley	7,819	4.3%	2.3%
TOTAL (All Trading Partners)	**183,124**	**100.0%**	**0.8%**
Trading Partner	2040 Value *(in millions of dollars)*	% of Total Value	CAGR Value, 2012-2040
Intra Nevada	78,067	23.4%	2.0%
Southern California	41,183	12.4%	2.4%
Arizona	19,250	5.8%	4.2%
Utah	16,843	5.1%	3.1%
San Francisco Bay Area	15,893	4.8%	3.8%
TOTAL (All Trading Partners)	**333,445**	**100.0%**	**2.9%**

Note: The tables include freight flows from Nevada (outbound), to Nevada (inbound), and within Nevada (intra), but do not include freight flows through Nevada.

The growth rates are high in tons for trade with Arizona and in value for trade with Arizona and the San Francisco Bay Area, while they are low to moderate for other top trading partners. The relative changes in population of neighboring states, Nevada's outbound and inbound commodity mix, and the relative cost of transportation and logistics in neighboring states are mainly driving this growth.

There is an opportunity to increase economic activity in Nevada. This would mainly come from expanding or developing new high productivity and competitive transportation and logistics services for distribution of goods to the western United States, especially Arizona and the San Francisco Bay Area. These regions currently receive their consumer goods from logistics facilities in Southern California, the San Joaquin Valley region of California, and Mexico.

2.3 Supply Chain Analysis of Key Sectors in Nevada

Supply chains of key sectors (see Figure 2-11) within the state of Nevada, including food and allied manufacturing, advanced manufacturing, and mining and allied activities, were analyzed in this Freight to better understand how these key sectors use the transportation system and what types of transportation system improvements in the state may have positive effects on their businesses opportunities and future growth.

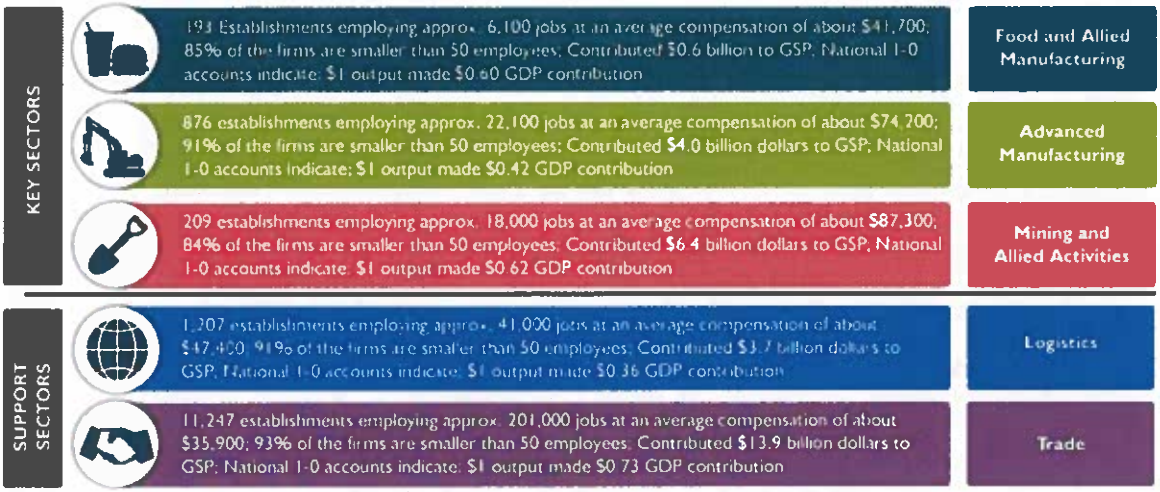


Figure 2-11. Economic Characteristics of Key and Support Sectors in Nevada

The image above summarizes key economic information about the selected key and support sectors in Nevada. The 3-digit NAICS codes used for each sector are noted below (Source: U.S. Census Bureau, 2013 County Business Patterns Data; U.S. Department of Commerce, Bureau of Economic Analysis).

Key Sectors include:

1. **Food and Allied Manufacturing:** 311 - food manufacturing, 312 - beverage and tobacco product manufacturing
2. **Advanced Manufacturing:** 325 - chemical manufacturing, 332 - fabricated metal product manufacturing, 333 - machinery manufacturing, 334 - computer and electronic product manufacturing, 335 - electrical equipment, appliance, and component manufacturing, 336 - transportation equipment manufacturing, 339 - miscellaneous manufacturing
3. **Mining and Allied Activities:** 212 - Mining (except oil and gas), 213 - Support activities for mining

Support Sectors include:

1. **Logistics:** 481 – air transportation, 482 – rail transportation, 483 – water transportation, 484- truck transportation, 488 – support activities for transportation, 491 – postal service, 492 – couriers and messengers, 493 – warehousing and storage
2. **Trade:** 423 – merchant wholesalers, durable goods, 424 – merchant wholesalers, nondurable goods, 425 – wholesale electronic markets and agents and brokers, 441 - motor vehicle and parts dealers, 442 - furniture and home furnishings stores, 443 - electronics and appliance stores, 444 - building material and garden equipment and supplies dealers, 445 - food and beverage stores, 446- health and personal care stores, 447 – gasoline stations, 448 - clothing and clothing accessories stores, 451 - sporting goods, hobby, musical instrument, and book stores, 452 - general merchandise stores, 453 - miscellaneous store retailers, 454 – non-store retailers

Food and allied manufacturing and advanced manufacturing supply chains were studied due to their high growth potential in Nevada (Nevada GOED, 2016). Mining sector supply chains in Nevada were studied because the industry has national significance and is a major employer in the state. Logistics and trade sectors are studied only in the context of the support activity they provide to the key sectors, including delivery, storage, distribution, and sale of raw, semi-finished, and finished products.

The supply chain analysis was completed based on publicly available state- and national-level economic data and information gathered through interviews, which are generalized to maintain confidentiality of the firm names and their data. Figure 2-11 shows a summary of the overall economic characteristics of the key sectors and support sectors in Nevada (U.S. Customs and Border Protection, 2015; BEA, 2015a); the summary assumes a defined set of 3-digit level North American Industry Classification System (NAICS) industries.[3]

[3] NAICS is the standard used by federal statistical agencies to classify businesses for the purpose of collecting, analyzing, and publishing statistical data related to the economy at various jurisdiction levels (nation, state, metropolitan areas, etc.).

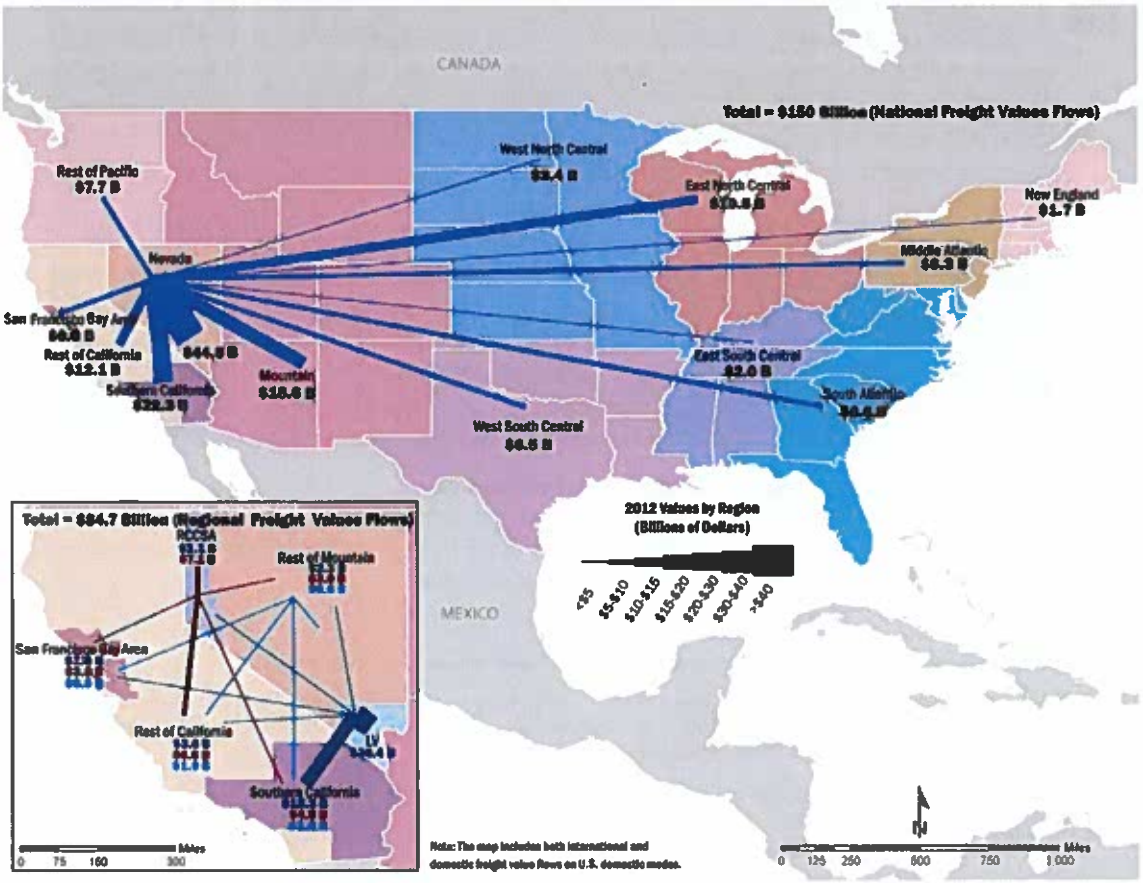


Figure 2-8. Nevada's Statewide and Regional Freight Value by Trading Partner for Domestic and International Combined Markets, 2012

The map depicts the top trading partners for Nevada by total value, and the inset depicts intra Nevada flows. The majority of trading by value occurs within the state; however, trading partners outside Nevada also act as key suppliers and consumers, including Southern California, the rest of the Mountain region, the San Joaquin Valley region in California, and East North Central States region (Source: Disaggregated FHWA FAF3 Database for Nevada). Note: The charts include outbound, inbound, and intra Nevada freight flows but do not include freight flows through Nevada.

2.2.2 Forecasted Freight Flows

Baseline forecasts using FAF data indicate that freight flows that either originate or terminate in Nevada will increase from 146.9 million tons and $150.0 billion in 2012 to 183.1 million tons and $333.4 billion by 2040, which is a growth of about 24.7 percent, or 0.8 percent annually, by tons and about 122.3 percent, or 2.9 percent annually, by value. Growth in freight flows through Nevada were not estimated. Growth will be driven mainly by population-related factors. State and regional economic forecasts indicate that freight demand in the trade, transportation, and logistics industry will have rapid growth in Nevada's metros, while the freight demand in traditional resource-based industries (mining, construction, etc.) across all of Nevada will have slow growth. As new high-tech manufacturing industries are established and jobs are added, freight demand may increase beyond the baseline forecasts.

Total Tonnage Growth versus Total Value Growth

The faster growth in total value of freight flows (2.9 percent annually) compared to total tons of freight flows (0.8 percent annually) between 2012 and 2040 is indicative of a shift in the state's economy from resource-based industries (generally low-valued commodities) to trade, transportation, and logistics industries (generally high-valued commodities). Thus, population-related factors are expected to be the main drivers of the growth in freight demand.

Directional Shares

Figure 2-9 shows the FAF-based relative growth rates of outbound, inbound and intra freight flows. A majority of the intra freight flows are related to resource-based industries; they exhibit a small decline in tons but a moderate growth in value. The intra freight flows will remain the largest portion of future tons and a substantial part of future value of goods. The intra freight flows will require maintenance of Nevada's existing transportation system and limited investment in transportation services and logistics facilities.

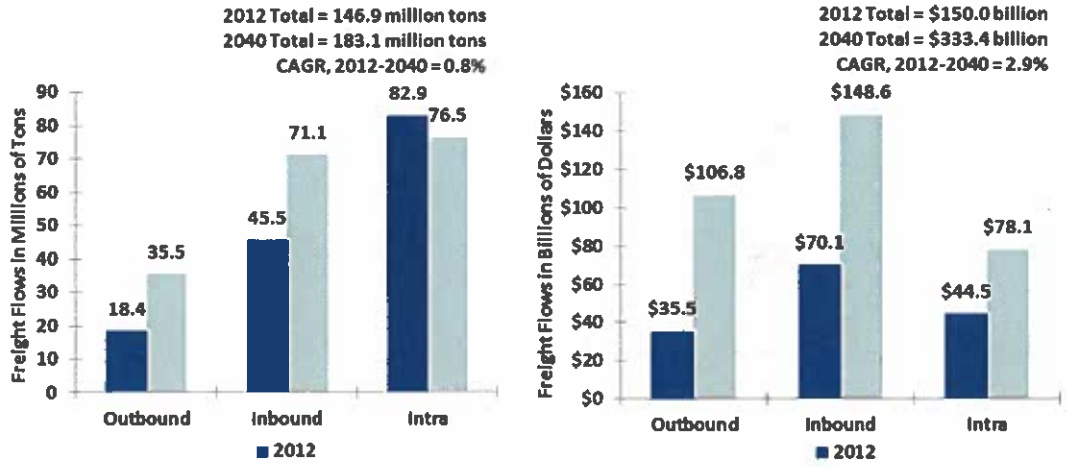


Figure 2-9. Nevada's Growth in Freight Flows in Tons and Value by Direction of Flow, 2012-2040

These two charts depict the relative growth in total outbound, inbound, and intra flows by tonnage (left) and value (right) over the forecast period. A comparison between inbound and outbound flows in 2012 and 2040 reveals the imbalance between the two will increase in tonnage and value (Source: Disaggregated FHWA FAF3 Database for Nevada).

Note: The charts include freight flows from Nevada (outbound), to Nevada (inbound), and within Nevada (intra), but do not include freight flows through Nevada.

On the other hand, a large growth will be witnessed in inbound freight flows both in tons and value as Nevada continues to take advantage of trade (both domestic and international) to meet its demand for consumer goods. Simultaneously, the baseline forecasts using FAF data show that outbound freight will double in tons and triple in value between 2012 and 2040 due to growth in manufacturing. Growth in exports from mines in Nevada contributes only a small amount to the growth in the outbound freight. These statistics indicate a need for significant investment on transportation corridors and/or services and logistics facilities in the vicinity of the Las Vegas and Reno metropolitan areas where manufacturing is concentrated.

The issue of trade imbalance, with a two-to-one inbound-to-outbound ratio, and the resulting empty equipment movements will worsen in the future unless: a) dependence on inbound freight is replaced with locally manufactured goods; c) even more aggressive growth in outbound freight is made possible by investment into goods producing jobs (e.g., Tesla plant for electric cars manufacturing) in the state; and c) Nevada's shippers and trucking firms participate in empty equipment (truck, railcar, etc.) reduction strategies.

Modal Shares

Baseline forecasts using FAF data show that between 2012 and 2040, 29.1 million tons, or 80.2 percent of the total change in tonnage, and $111.3 billion, or 60.7 percent of the total change in value of freight demand for Nevada, are associated with truck-only movements, revealing a high level of dependence on this mode (Figure 2-10). The rail-only mode ranks second in terms of the change in tonnage of freight demand (6.2 million tons or 17.1 percent of the total change in tonnage), while multiple modes and mail mode (includes rail/truck intermodal, ship/truck intermodal, postal or courier goods) ranks second in terms of the change in value of freight demand ($63.4 billion, or 34.6 percent, of the total change in value).

A low percentage of rail-dependent industries (both railcar load and rail/truck intermodal service) and inadequate rail service are considered reasons for Nevada to continue its trajectory of a high truck-only mode share. However, there is an opportunity for increased rail usage. This would require targeting rail-dependent industrial developments, and strategically adding rail services for them, such as service to the gateway ports in California, or service to national distribution centers east of the state. Both of these would require increased coordination with the railroads. These would alter the projected baseline mode shares in favor of rail, which is a more environmentally friendly and fuel efficient mode of transportation on a ton-mile basis.

The baseline forecasts also show that freight tons moved by truck-only and rail-only (not including rail/truck intermodal) will grow at rates of 0.8 and 1.5 percent annually, respectively. As a result, there will be increased O&M costs, capital infrastructure investment needs, and external costs. These needs would be the highest on I-15 and I-80 multimodal trade corridors. On the other hand, freight value moved by truck-only, multiple modes, mail, and air (includes air/truck intermodal)

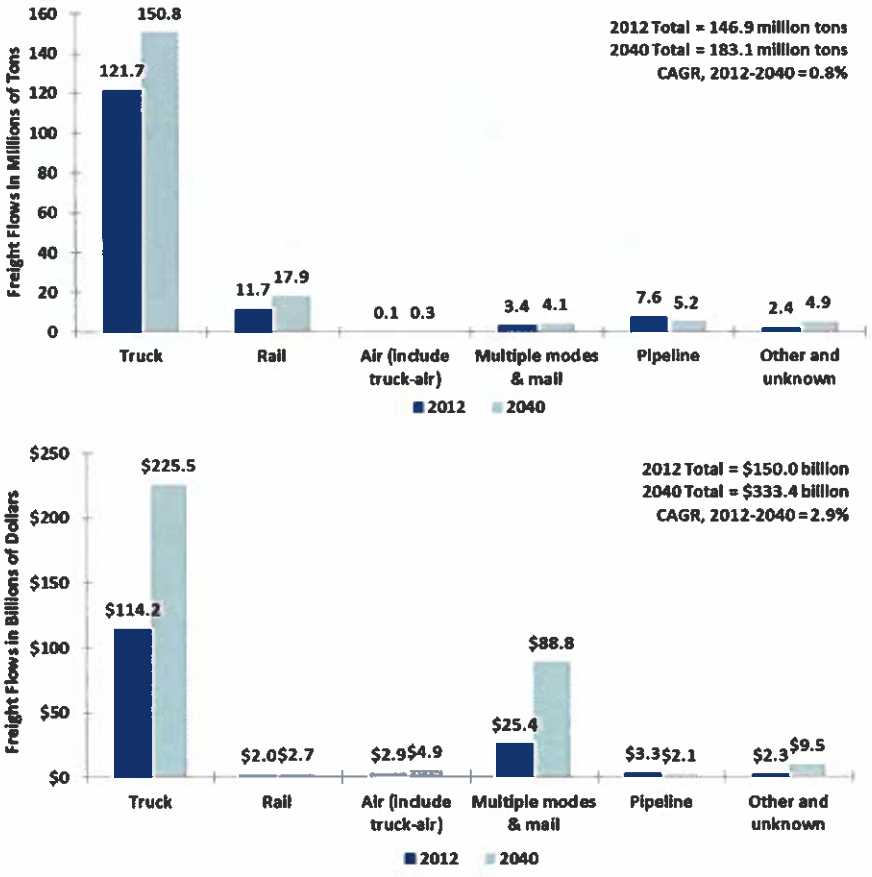


Figure 2-10. Nevada's Growth in Freight Flows, Tons and Value by Mode, 2012-2040
These two charts depict the relative growth in tonnage (top) and value (bottom) by mode of transportation over the forecast period. A comparison between modal flows reveals that trucks will continue to be the dominant mode for freight delivery, though tonnage by rail mode and value by multiple modes and mail mode also rise simultaneously (Source: Disaggregated FHWA FAF3 Database for Nevada).
Note: The charts include freight flows from Nevada (outbound), to Nevada (inbound), and within Nevada (intra), but do not include freight flows through Nevada.

Table 2-5. National Input-Output Accounts based Relative Levels of Expenditures on Transportation Modes by Key Sector and by Supply Chain Direction, 2012

The table depicts relative expenditure in various transportation modes by identified sectors that are key to Nevada by direction of commodity flow based on national input-output accounts data. There is a linkage between industry sectors and their preferred transportation modes, so investments in different transportation modes may benefit supply chains of key sectors in Nevada differently (Source: U.S. Department of Commerce, Bureau of Economic Analysis, National Input-Output Accounts - 2012 Use of Commodities by Industry valued at Producers and Purchasers Prices and 2007 Production of Commodities by Industry – 71 Industries Level; Cambridge Systematics' Analysis).

Transportation Mode	1st Rank Key Sector	2nd Rank Key Sector	3rd Rank Key Sector
	Relative Expenditure for Input Commodities		
Truck	Food and Allied Mfg.	Advanced Mfg.	Mining
Rail	Mining	Food and Allied Mfg.	Advanced Mfg.
Air	Advanced Mfg.	Food and Allied Mfg.	Mining
	Relative Expenditure for Output Commodities		
Truck	Advanced Mfg.	Food and Allied Mfg.	Mining
Rail	Mining	Food and Allied Mfg.	Advanced Mfg.
Air	Advanced Mfg.	Food and Allied Mfg.	Mining

Key:

- High Level (higher >= 50% mode share)
- Moderate Level (>= 10% and < 50% mode share)
- Low Level (>= 5% and < 10% mode share)
- Very Low Level (< 5% mode share)

State-Level Analysis – Highway

Las Vegas's close proximity to the nation's largest seaport complex of the Ports of Long Beach/Los Angeles, as well as Mexico, and Reno-Carson City's short distance to the Port of Oakland enable global supply lines at a competitive pricing.

Interviewed companies across all key sectors used third-party logistics (3PL) or trucking firms for transporting goods. The shipment sizes vary by source and market, there is no one truck size that fits all cargo. So, the interviewed companies used both full load (FL) and less-than-truckload (LTL) trucking services.

Some advanced manufacturing firms operate in both Las Vegas and Reno, where one typically acts as manufacturing center and the other as a specialized supplier or a sales market. The industry representatives cited safety and the travel time via US 95 as two primary concerns. Improving this linkage to interstate standards and providing high-speed freight rail connectivity would greatly increase the safety and efficiency of the movement of production inputs and outputs.

One of the mining firms indicated that I-80 highway carries heavy trucks between the mines and transloading facilities, experiencing inclement winter weather, which requires constant repair and maintenance. In addition, the lack of truck climbing lanes along Emigrant and Golconda Passes hampers traffic flow and reduces safety even during good weather conditions.

State-Level Analysis – Rail

Mining uses a significant amount of rail (particularly, railcar-load service) to transport inputs to production. More rail would be used for mining if rail spurs connecting to the rail along I-80 were in place or if additional bulk transloading[4] facilities existed at Dunphy in Nevada, in addition to the facility at Carlin. For example, diesel is transloaded and trucked from either Sparks or Salt Lake City, Utah, and Cyanide is transloaded and trucked from Winnemucca. This could be avoided if transloading facilities were constructed in Dunphy.

Interviewed companies in other key sectors have a low usage of rail. This is due to limited intermodal rail service options to nationwide distribution centers and ports, and limited loading/unloading locations within Nevada. One food manufacturing firm's split in the Reno area includes 65 percent moving through the Port of Oakland and 35 percent moving through Ports of Los Angeles/Long Beach. The industry representative stated that they would shift over to rail from Sparks to the Port of Oakland if rail availability were to increase.

State-Level Analysis – Air

Air cargo is used more often by the advanced manufacturing sector than the other key sectors for receiving high-valued and global inputs, and delivering high-tech products to overseas destinations. McCarran International Airport (LAS) and Los Angeles International Airport (LAX) are traditionally used for Nevada manufacturers requiring air cargo service. However, there is an onset of rapid growth in air cargo services at Reno-Tahoe International Airport (RNO) (Harrell, 2016), which may increase their use of this airport.

[4] Transloading is transferring a shipment from one mode of transportation to another. Transloading in the United States can mean either of the following: 1) bulk cargo transfer from railcar to truck; or 2) intermodal cargo transfer from import container to domestic container.

Section 3: Context and Competitive Market Analysis

Understanding the changing patterns of Nevada's urbanization and economy within the context of equally changing patterns of global trade and economic activity are important to understanding future demands that will emerge for the state's freight logistics system. Once an economy of primarily tourism, resource extraction, and agriculture, Nevada is beginning to increase its manufacturing and technology industry bases, adding important economic components that continue to alter the demands on its freight logistics system. The freight logistics network of Nevada is itself changing as the economy of the state is beginning an important new stage in its evolution as manufacturing continues to develop in the state's major metropolitan centers.

Developing an effective freight transportation system requires an understanding of the state's economic regions and their characteristics, including activities associated with the manufacture, distribution, and consumption of goods. It also requires a description and analysis of Nevada's relationships with trading partners along a multimodal freight service network with important local, regional, and global elements.

3.1 Nevada in the National and Global Context

3.1.1 Population and Urbanization

Nevada's Population and Urbanization Pattern

Nevada's metros are part of the widely spaced network of urban areas in the western United States. The largest urban center is located in the southern part of the state: the Las Vegas metropolitan area composed of four cities that have grown together to become one continuous urbanized area within Clark County. Las Vegas-Henderson-Paradise was the only metro in Nevada to make the top 100 in terms of population, ranking 30th with 2,069,681 residents (Figure 3-1).

The second largest concentration of population is in northern Nevada, however, the pattern of urbanization is significantly different: more a network of cities than a single large cluster. The cities of Reno and Sparks have grown together to form one continuous urban area. While this core area is the largest concentration in the north, it is part of a larger network that extends to Carson City to the south, Incline Village at Lake Tahoe and East towards Fernley. Reno ranks 116th, with 443,990 residents and Carson City is the smallest classified metro area ranked 381st with 54,522 people. Just 9 miles east of Reno-Sparks along I-80 is the Tahoe-Reno Industrial Center (TRIC), which is emerging as the world's largest industrial park and a growing employment center.

Of the total state population, these three metro areas make up more than 90 percent; Las Vegas contributing the vast majority at 73 percent and Reno-Sparks-Carson City contributing 18 percent. The eastern part of the state is characterized as a set of smaller urban areas clustered along the state's two primary corridors, I-80 and I-15, with a number of small cities and towns serving the mining and agricultural businesses located throughout the area.

Population and Urbanization Across the United States

It is clear that metro and micro areas are unequally distributed across the nation. The geographic pattern, the spacing between them, and the relative sizes are significantly different in the eastern United States than in the West, as divided by the Mississippi River. East of the Mississippi, metro and micro areas are more evenly spaced in a denser pattern with closer proximity to each other. The largest and densest clusters are in the Northeast and Upper Midwest. The area west of the Mississippi can be divided into two basic divisions: 1) between the Mississippi River and a line formed by I-35 starting in San Antonio and continuing northward through Dallas to Kansas City and Minneapolis; and 2) west of I-35 to the Pacific Ocean where the metro and micro areas are widely scattered between vast areas of low density, with the exception of two dense clusters around and between the Los Angeles and San Francisco metro areas. Within this zone, there is a high degree of isolation between metro areas, where largely rural areas surround single large metros or urbanized corridors, resulting in a very dispersed and fragmented market. This wide spacing translates to higher transportation and freight operation costs for businesses as compared to the East Coast.

By 2007, more than 50 percent of the world's population was living in urban areas and that number is projected to surpass 70 percent by 2050 (Site Selection Magazine and IBM Global Business Services, 2013). Census maps showing historical population distribution of the United States demonstrate the westward expansion and increasing urbanization of the nation. In fact, approximately 80 percent of U.S. residents live in urban areas that are increasingly larger and denser, with the total expected to reach nearly 90 percent by 2050 (UN Department of Economic and Social Affairs, 2014). With such a vast majority of individuals and families living in urban areas, cities are viewed as the drivers of economic growth and their competitiveness increasingly important (Site Selection Magazine and IBM, 2013).

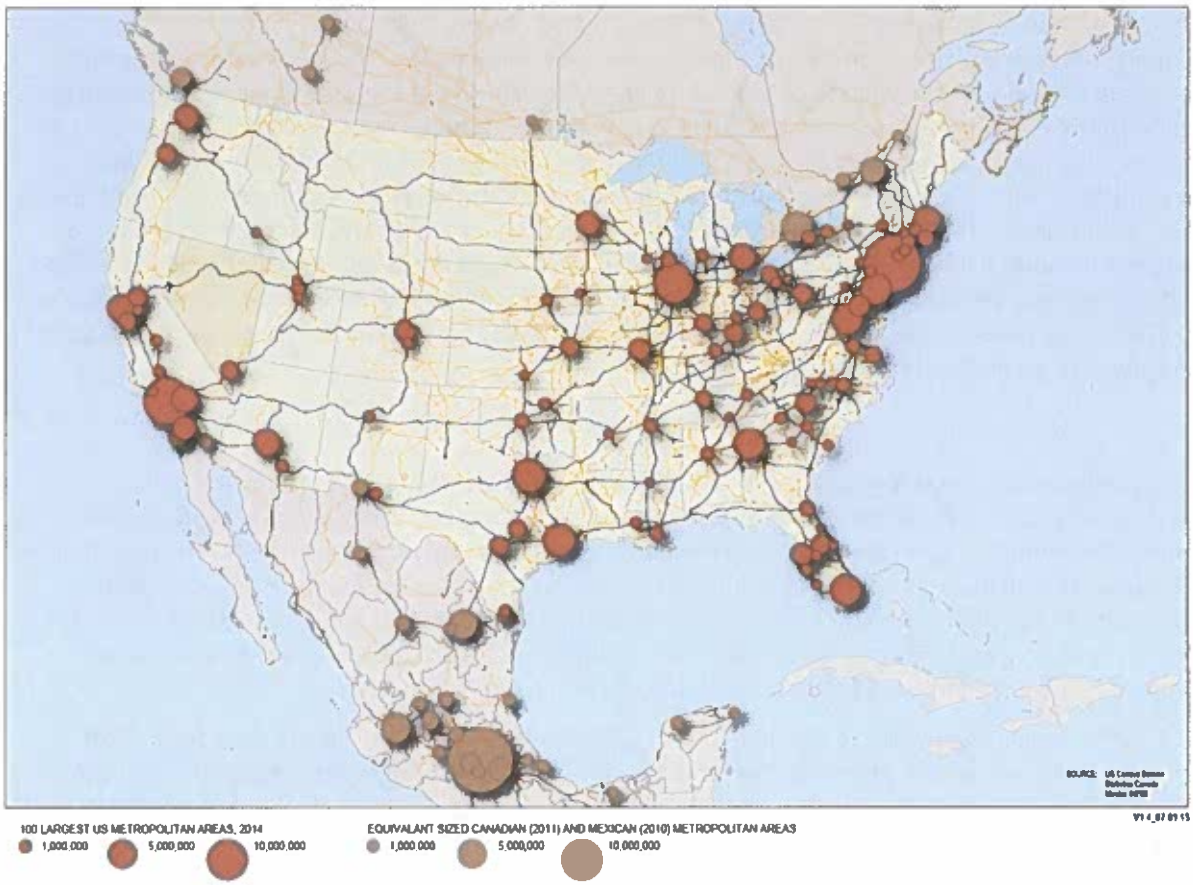


Figure 3-1. 100 Largest Urban Areas, 2014

The top 10 largest MSAs are: New York, Los Angeles, Chicago, Dallas, Houston, Philadelphia, Washington, Miami, Atlanta, and Boston. The Northeast is the most populous U.S. region, with the New York-Newark-Jersey City metro having the greatest population. California is the most populous state, with the 2nd and 11th largest metros: Los Angeles-Long Beach-Anaheim at 13,262,220 and San Francisco-Oakland-Hayward at 4,594,060 (Source: MG&A, 2015 based on U.S. Census, Statistics Canada and Mexico INEGI data).

Population Growth

The pattern of growth across the United States has significantly changed since the Great Recession began in 2007. Since the economy started to recover from the recession in 2009, a new pattern of growth has emerged. Prior to the recession, the western United States was one of the fastest-growing areas in the United States and the metropolitan areas of Las Vegas and Phoenix were among the top 10 metros (over 1 million) in growth. While growth in Nevada and Arizona has slowed compared to the pre-recession rates, it is still robust in these states' metropolitan areas.

Between 2000 and 2009, the Southwest and Intermountain West metros were among the fastest growing large metros (over 1 million) in the United States. However, since 2010, the pattern of population growth has shifted, revealing that the Lower Midwest and Southeast are again the fastest growing. Las Vegas has fallen from the fastest growing large metro to the 16th in terms of percentage growth and 22nd in terms of absolute growth, while Reno is yet slower at 88th and 99th, respectively.

The Freight Connection

Freight transportation as a derived demand is driven by the base of consumers and the inputs and outputs of manufacturing and distribution resources. Nevada as a state, and even its metro hubs, are comparatively lower in population and industrial/distribution output than the larger metro markets in

California, Utah, and Arizona. In this context, larger metro centers tend to provide the base for manufacturing and distribution that is consumed by the smaller region. This is indicated by the large spread of inbound with respect to outbound freight in Nevada. Freight service times are the limiting factor for Nevada's metro areas to serve the larger market area in the western United States. Thus, to bolster a competitive advantage for the delivery of goods that Nevada produces or may distribute beyond its borders, it must provide lower cost and more efficient services. A competitive advantage the state now enjoys is that its current infrastructure is largely uncongested and has future capacity. As congestion builds in major nearby hubs and as population and business move further inland to escape this congestion, Nevada's reach as a distribution point increases. Nevada has comparatively good access to West Coast port facilities and its tourism industry attracts airport services, which provide a basis for an expanded air distribution role.

3.1.2 Economic Activity and Freight Networks

Large metropolitan areas and smaller cities and towns are concentrations of production and consumption that form the basic market areas served by the transportation network. Growing the export component of Nevada's economy is one of the important drivers of the future freight system, as all economic activity requires getting products to market. Building the strength of Nevada's metros within the global supply chain network is an important factor in establishing a competitive advantage. Without greater export functions, Nevada's freight logistics infrastructure will remain a service in support of industry and not a foundation for the attraction of new industry.

The World Bank's *Connecting to Compete* report (2014) states "supply chains are the backbone of international trade and commerce." The report clearly establishes that improving logistics performance is fundamental to economic growth and competitiveness. Moving products efficiently and reliably to market requires nations, states, and metro areas to reduce costs and adopt policies that support trade. In fact, countries that want their firms to move up in global and regional value chains must provide the conditions for predictable and reliable supply chains (Ibid). This same concept can be applied to states and metropolitan areas, as they must also develop reliable and cost-efficient systems. The networked structure of global and regional trade means that small disruptions at one point spreads to others. Though cities do not move, trade patterns do, and they move towards the points of greatest efficiency. In this context, it is important for Nevada to strengthen its position through connections to the global freight network. Countries, regions, and metropolitan areas that do not provide reliable and cost-efficient systems will become increasingly disconnected from world markets (Ibid).

Growth and Change in the World Economy

The state of Nevada has the potential to greatly benefit from the major shifts taking place in the world economy. Understanding the new trade patterns is fundamental to understanding Nevada's fit within the national and continental economies. The major trade corridors linking the United States to the world economy have shifted from the Atlantic to the Pacific, resulting in the growth of trade across the western United States and the state of Nevada. Since the collapse of communism in 1991, the shift of manufacturing from the U.S. Midwest to overseas locations especially in Asia has reignited the Pacific trade lanes. As the growth rate of the Asian Pacific economies continue to lead the world, an increasing amount of trade between Asia and the United States is arriving on the West Coast (Figure 3-2). Total trade through the West Coast ports has surpassed the once dominant ports of the East Coast. This has led to the vast expansion of trade flows from the West Coast to the larger consumer markets on the East Coast via the primary corridors extending from the three major port concentrations at Los Angeles, San Francisco, and the Pacific Northwest.

As the world marketplace integrated after 1991, the competitive advantage that the United States enjoyed by having the largest economy of scale among the Free World nations disappeared as now

China and India had a far greater economy of scale. This drove the creation of trading blocs among the smaller nations of the world in Europe, North America, and the former Soviet Union.

Driven by changes in the global economy, the three nations of North America formed the North American trading bloc. For the first time in history, this has resulted in new north-south trade flows between Mexico, the United States, and Canada. The largest flow of goods is in the eastern United States, with the primary NAFTA corridor extending from Mexico City through Monterrey, Mexico, into Texas and the Upper Midwest and north into Toronto, Canada. This corridor serves the largest population and economic centers in all three nations. A western NAFTA corridor has also emerged, although the western infrastructure was never developed to connect the three nations and, therefore, it suffers from a set of discontinuities in the interstate and rail grid that are not as efficient as those found in the eastern United States.

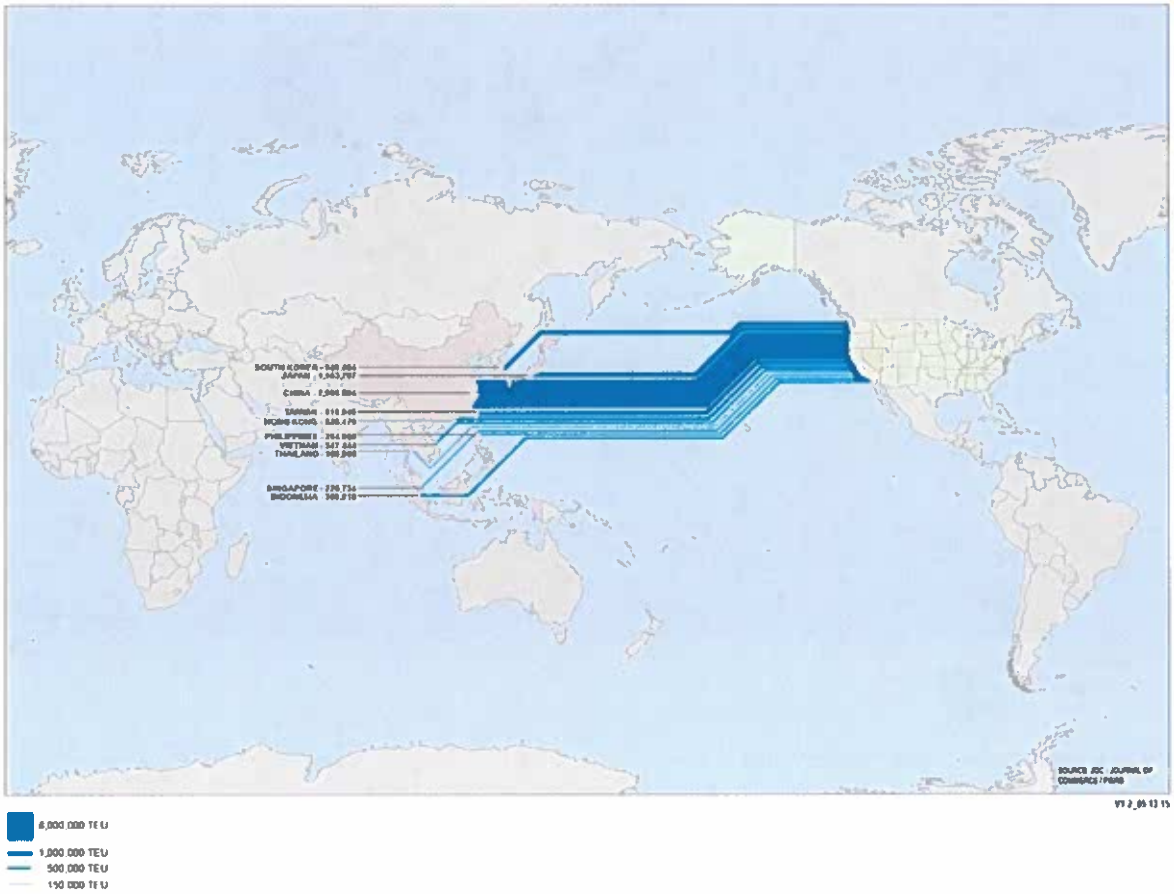


Figure 3-2. U.S. West Coast Containerized Ocean Trade via Asian Ports, 2014
The West Coast is intricately tied to Asia, especially China, through container trade flows arriving at the ports (Source: MG&A, 2015, based on Journal of Commerce/Piers data).

The initial period in the redistribution of global economic activity favored Asia and became known as outsourcing of U.S. manufacturing to other parts of the world. Recently, a counter move has begun, referred to as insourcing whereby companies have chosen to return their manufacturing plants to North America. Many companies have not returned their manufacturing to the United States, but rather to locations in Mexico along the U.S. border to take advantage of Mexican labor rates while serving American consumers. This has increased the importance of the NAFTA corridors, as the north-south movement of goods is increasing. However, Nevada does not have a north-south corridor that can serve as a conduit for the distribution of goods moving between the United States, Mexico, and Canada.

GDP by Metropolitan Area

Metropolitan areas in the eastern United States are more closely spaced and have a higher degree of economic interaction that allows each to benefit from the synergies that develop through those interactions (Figure 3-3). The pattern of metros in the western United States is marked by a more widely spaced pattern; Western metros function as islands of economic activity and not as interactive components of a larger marketplace (Western Regional Alliance, 2012).

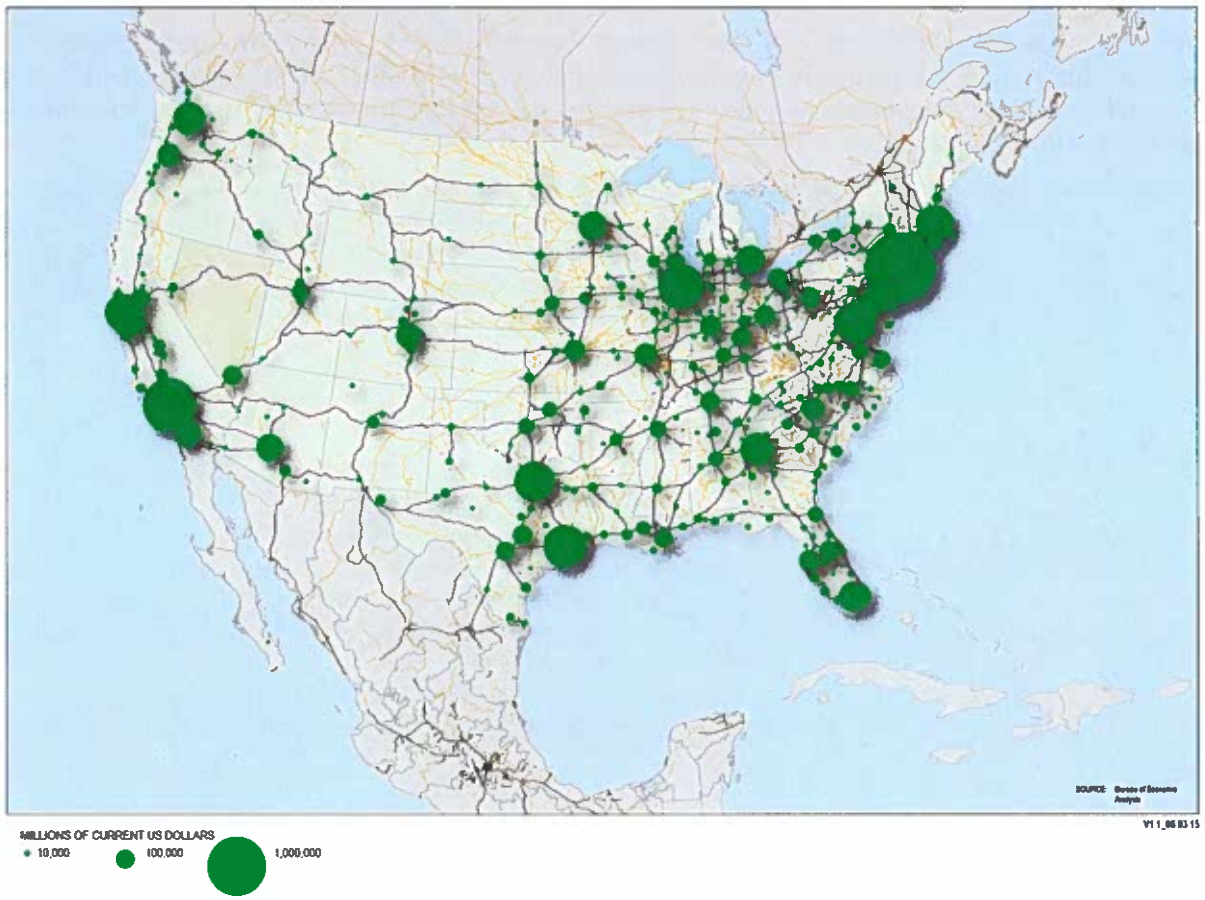


Figure 3-3. Gross Metropolitan Product, 2013

The distribution of metropolitan economies in the United States is not even. The eastern United States has a more densely packed pattern that provides greater synergy to each metropolitan economy, while the Western metros operate as economic islands. Nevada benefits from its close proximity to the massive economic concentrations in California (Source: MG&A, 2015, based on BEA 2013 GMP data).

Nevada's primary economy is concentrated in its metropolitan areas, with important contributions from its mining, resource extraction, and agricultural components found in the rural areas of the state. The growing importance of Nevada's metro areas is that they represent concentrated centers of economic activity and serve as incubators for development and innovation. Nevada has a specific advantage over many of the metro areas in the western United States because it is located in close proximity to the massive economic centers in Northern and Southern California. Between the Nevada metros and the dense pattern found in the eastern United States are a set of metros that are much more isolated and function as more independent economic units. Capitalizing on Nevada's proximity to California will create a greater economic synergy between the two states that will be of significant benefit to both as synergy increases the potential of both components.