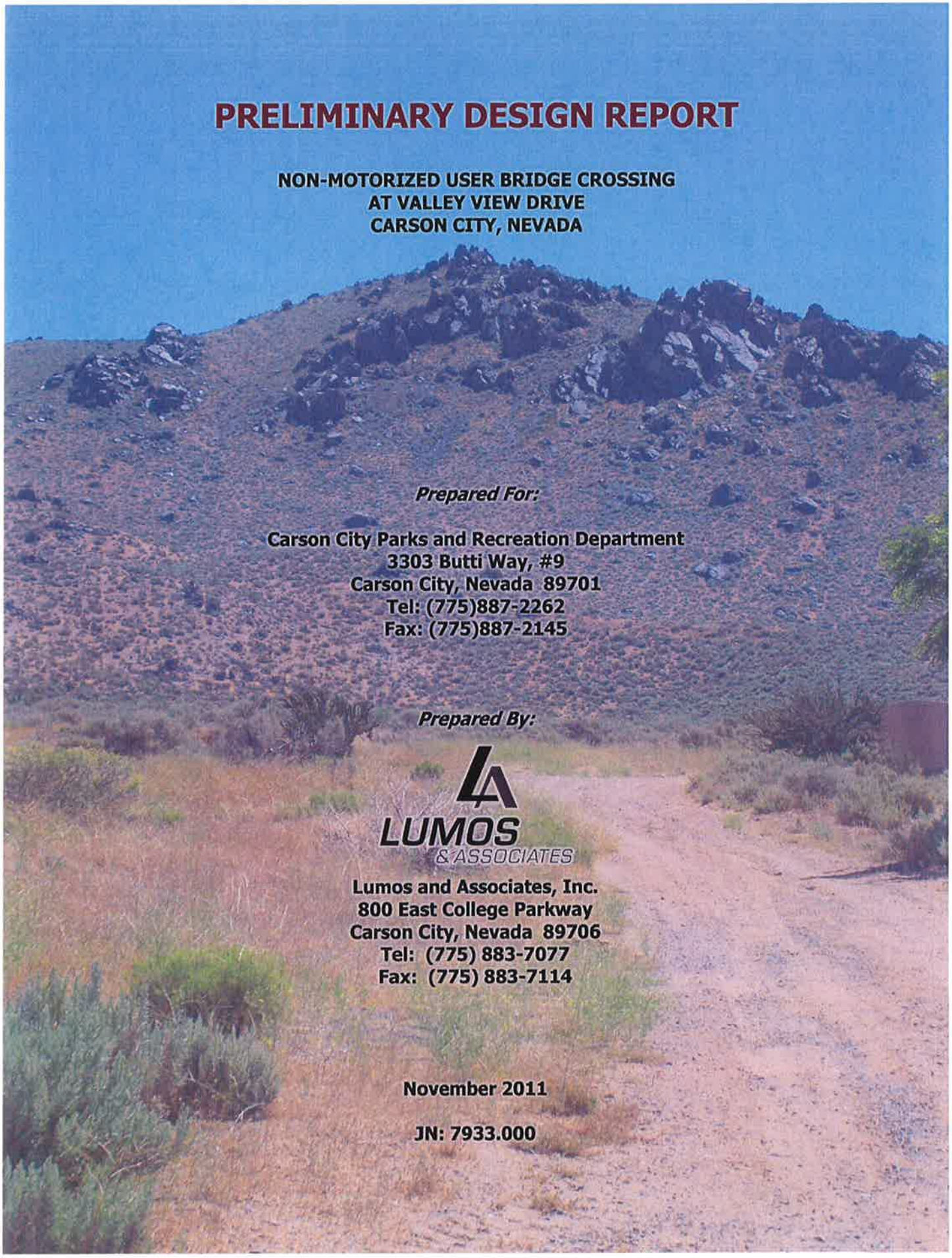
PRELIMINARY DESIGN REPORT

NON-MOTORIZED USER BRIDGE CROSSING
AT VALLEY VIEW DRIVE
CARSON CITY, NEVADA



Prepared For:

Carson City Parks and Recreation Department
3303 Butti Way, #9
Carson City, Nevada 89701
Tel: (775)887-2262
Fax: (775)887-2145

Prepared By:

Lumos and Associates, Inc.
800 East College Parkway
Carson City, Nevada 89706
Tel: (775) 883-7077
Fax: (775) 883-7114

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EXECUTIVE SUMMARY

INTRODUCTION

Valley View Drive has traditionally been the main path of travel for equestrians, hikers, and mountain bikers to access the Prison Hill Recreation Area trail system (Prison Hill) from the west side of South Edmonds Drive. However, the construction of Phase 2B of the Carson City Freeway (freeway) will bisect Valley View Drive between Line Drive and South Edmonds Drive and will cut-off this route to Prison Hill. The idea for the Non-Motorized User Bridge Crossing (bridge) at Valley View Drive was conceived by local equestrian user groups that frequently use Valley View Drive. The equestrians approached the Carson City Open Space Advisory Committee (OSAC) four years ago and advocated for a bridge at Valley View Drive. The OSAC requested $50,000 be allocated from the Quality of Life Initiative (Q18) Funds by the Board of Supervisors as seed money for construction. The Board of Supervisors approved this request and the funds were administered by the Carson City Parks and Recreation Department (Parks Department). The Parks Department discussed the feasibility of the project with the Nevada Department of Transportation (NDOT), and NDOT recommended that the money should be used to develop a preliminary design report and plan. NDOT stated they would be more receptive to endorsing the project if there was a preliminary design to review and if the possible conflicts with the construction of the freeway had been addressed.

Lumos and Associates, Inc. (Lumos) was tasked with developing a Preliminary Design Report for the proposed bridge and met with NDOT, the Parks Department, and the Carson City Public Works Department to discuss various aspects of the bridge project and how it relates to the future freeway. This meeting established that the bridge shall meet NDOT standards and shall be similar in look and appearance to the existing NDOT freeway bridges. Another meeting was held with the bridge users to discuss various features of the bridge. The users provided helpful information as to what deck surface, railing type, etc. would be most favorable to them, which has been implemented in the preliminary design where feasible.

The purpose of this report is to analyze the various options of bridge construction, to determine the best choice of construction type for the bridge, and to provide a preliminary design narrative and plans for the selected construction type. Lumos partnered with Hyytinen Engineering, a structural engineering firm, to evaluate the structural components of the construction type alternatives and to develop the preliminary bridge design. Lumos evaluated cost, constructability, design criteria, aesthetics, and amenities of the chosen bridge type. Since there are currently no funds available to construct the bridge, Lumos discussed potential funding sources and provided an Opinion of Probable Costs that can be used to pursue grants and other monies. Lumos also discussed the approximate timeline for the bridge design, permitting, agency coordination, and construction. Although phasing of the proposed bridge project is an option, this report does not address construction stages or timelines for potential phasing.

BENEFITS

Carson City has developed a *Unified Pathways Master Plan* as part of an ongoing effort to provide off-street routes to connect schools, residential neighborhoods, open space, and recreational areas within Carson City. The Carson Area Metropolitan Planning Organization (CAMPO), the Parks Department, and Lumos have recently completed the "Carson City Freeway Corridor Multi-Use Path Alignment Alternatives Study", which evaluates possible alignments for a paved path along Phase 2 of the freeway corridor. This multi-use path will be a continuation of the path constructed along Phase 1. For the freeway segment between Koontz Lane and Clearview Drive, the preferred path alignment is along the west side of the NDOT right-of-way. Although the Koontz Lane and Clearview Drive bridges will allow pedestrians and mountain bikers/bicyclists to cross from the proposed multi-use path to the east side of the freeway, the bridges do not have facilities for equestrian users. A non-motorized bridge crossing over the freeway would provide a location for equestrians to safely cross the freeway and would also provide a crossing for pedestrians and mountain bikers/bicyclists where they do not have to contend with vehicle traffic. The project's bridge crossing is proposed at Valley View Drive because it has historically been used by equestrians in southeast Carson City to access the Prison Hill Recreation Area. The bridge will be part of an overall plan to connect the various trail systems in Carson City, as proposed in the Carson City *Unified Pathways Master Plan* and the CAMPO *Regional Transportation Plan.*

LOCATION

The proposed bridge will be located on Valley View Drive in southeast Carson City, Nevada and will span the freeway between the Valley View Drive and Line Drive intersection and the Valley View Drive and South Edmonds Drive intersection.

CONSTRUCTION TYPE

Lumos evaluated three options for the proposed bridge construction type: cast-in-place concrete, pre-fabricated steel trusses, and pre-fabricated girders (concrete or steel). Lumos assessed the constructability and cost of each construction type and also discussed the various advantages and disadvantages. Some of the advantages/disadvantages considered were constructability, vibration characteristics, appearance, traffic control, safety requirements, etc.

Based on our analysis, the preferred alternative is to use a pre-fabricated girder bridge, incorporating precast concrete girders, for the construction of the Non-Motorized User Bridge Crossing at Valley View Drive. The bridge will be similar in appearance to the existing freeway bridges, will cost the least amount to build of the options, will be more durable and have less maintenance issues than a steel bridge, will transmit less vibration than a steel bridge, and the amenities requested by the users can be more easily incorporated.

DESIGN

The proposed bridge will be 208 feet long and 28 feet wide and consist of two spans with a center pier support and will slope from east to west at approximately 3.6%. A common concern with multi-use paths on bridges is a horse's reaction to other users on the bridge or to movement under the bridge. The proposed bridge will consist of an equestrian path centered between two pedestrian/bicyclist paths, which will give more visual separation from the horse to

the traffic below. The equestrian pathway will be 12 feet wide and will be covered with an 8-inch layer of granular soil. The two pedestrian/bicyclist pathways will be six (6) feet wide each and will have a concrete surface. Additionally, the pathways will be separated by 54-inch tall, 12-inch thick concrete walls to provide further protection between the pedestrians/bicyclists and equestrians. The exterior railing for the bridge will consist of a 60-inch high concrete barrier rail as the base and a chain link fence barricade on the upper portion similar to the railings on the Koontz Lane and Clearview Drive bridges.

At each end of the bridge, a transition will be constructed from the bridge deck surface to existing grades. Mount/Dismount areas are proposed to be located in the vicinity of the transition areas and will include a concrete mounting block. This will allow a location for the equestrian users to dismount their horses before crossing the bridge, if they so choose. The east and west ends of the proposed bridge will be a confluence of pedestrians, mountain bikers/bicyclists, equestrians, and vehicles. Signs, pavement, markings, and lighting will be incorporated into the design to manage user movements.

The bridge structure will be within the NDOT right-of-way, but a portion of the transition from the bridge to existing grades on both the west and east ends will be within Carson City right-of-way. The project site limits will not encroach on private lands.

NDOT COORDINATION

Since the bridge will be located within the NDOT right-of-way and will cross over the freeway, it is crucial to examine all aspects of the project as it relates to the freeway construction plans. Lumos has identified several potential conflicts that should be coordinated with NDOT and could be modified during the final design phase of the freeway. Some potential low cost changes include the relocation of a freeway sign and landscaping improvements.

NDOT has developed an architectural treatment plan for the freeway bridges, which involves assigning a specific surface treatment, coating type, and color type to each element of the NDOT bridges. The Valley View Drive bridge colors and finishes shall match the NDOT architectural treatments of the Koontz Lane and Clearview Drive bridges.

Carson City, Gardeners Reclaiming Our Waysides (GROW), and NDOT have developed an aesthetic treatment concept for the entire freeway dubbed "Carson City's History in Motion". The project consists of landscaping and placing sculptural features at bridges and grade separations. Each bridge has been assigned a "theme" that represents the history and culture of Carson City (e.g. The Pony Express, Basque Sheepherders, V&T, etc.). The proposed bridge would provide an opportunity for an additional theme to be implemented.

NDOT completed a final Environmental Impact Statement (EIS), dated May 21, 1986, for the freeway corridor. If funding for the proposed bridge project is obtained from a federal agency, the EIS may need to be re-evaluated to confirm that the conditions of the original freeway EIS are still applicable. Re-evaluating the EIS will incur additional costs to the project.

Although the bridge project will be administered by Carson City, it will span the NDOT freeway. An agreement will need to be established between Carson City and NDOT to determine who will have ownership and maintenance responsibility of the bridge.

PROJECT TIMELINE

Assuming that the preferred alternative, a pre-fab girder bridge with precast concrete girders, will be used and that all funding is in place, the timeline for the completion of the bridge would consist of approximately six (6) months for engineering and design, six (6) months for agency review and permitting, and nine (9) months for construction. However, the construction period could increase due to unforeseen difficulties in material procurement and possible weather delays.

FUNDING AND OPINION OF PROBABLE COST

Currently, no funding is in place for the design or construction of the bridge from either Carson City or NDOT. Therefore, it will be the task for the users to petition various funding sources for grants or other monies available for recreation/trail projects. The local equestrian, cycling, hiking, and mountain biking organizations can be proactive by using this Preliminary Design Report as a tool to promote the project, write grant applications, speak to legislative officials, and appeal to agencies for funding. With support from NDOT and Carson City, this project will have more merit when approaching government officials.

The Opinion of Probable Cost for the proposed bridge is approximately **$2,700,000** in present day dollars. This includes engineering, construction management, EIS re-evaluation, traffic control, earthwork, site work, bridge structure, and a 20% contingency.

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Lumos and Associates, Inc.
800 East College Parkway
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Tel: (775) 883-7077
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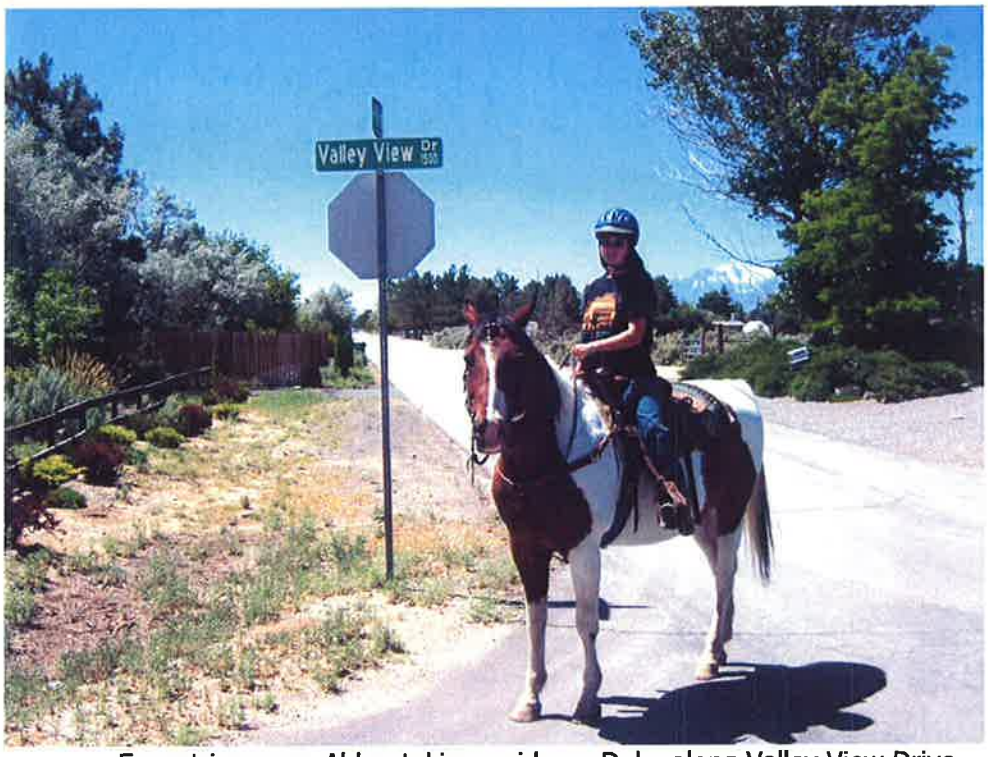
TABLE OF CONTENTS

*Cover Photo – Valley View Drive looking east towards Prison Hill Recreation Area

1.0 INTRODUCTION AND PURPOSE

Valley View Drive has traditionally been the main path of travel for equestrians, hikers, and mountain bikers to access the Prison Hill Recreation Area (Prison Hill) trail system from the west side of South Edmonds Drive. However, the construction of Phase 2B of the Carson City Freeway (freeway) will bisect Valley View Drive between Line Drive and South Edmonds Drive and will cut-off this route to Prison Hill. The idea for the Non-Motorized User Bridge Crossing (bridge) at Valley View Drive was conceived by local equestrian user groups that frequently use Valley View Drive. Although there are bridges crossing the freeway corridor at Koontz Lane to the north and Clearview Drive to the south, these bridges are not suitable for equestrian users due to the close proximity to traffic and unfavorable walking surfaces for horses. The equestrians approached the Carson City Open Space Advisory Committee (OSAC) four years ago and advocated for a bridge at Valley View Drive. The OSAC requested $50,000 be allocated from the Quality of Life Initiative (Question 18) funds by the Board of Supervisors as seed money for construction. The Board of Supervisors approved this request and the funds were administered by the Carson City Parks and Recreation Department (Parks Department). The Parks Department discussed the feasibility of the project with the Nevada Department of Transportation (NDOT), and NDOT recommended that the money should be used to develop a preliminary design report and plan. NDOT stated they would be more receptive to supporting the project if there was a preliminary design to review and if the possible conflicts with the construction of the freeway had been addressed.



Equestrian user, Abby, taking a ride on Duke along Valley View Drive

Lumos and Associates, Inc. (Lumos) was tasked with developing a Preliminary Design Report for the proposed bridge and met with NDOT, the Parks Department, and the Carson City Public Works Department to discuss various aspects of the project and how it relates to the future freeway. This meeting established that the bridge shall meet NDOT standards and shall be similar in look and appearance to the existing NDOT freeway bridges. Another meeting was held with the bridge users to discuss various features of the bridge. The users provided helpful information as to what deck surface, railing type, etc. would be most favorable to them, which has been implemented in the preliminary design where feasible.

The Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds provides design recommendations for equestrian bridges and offers valuable information on preferred features for equestrian users. Lumos has recently completed the "Carson City Freeway Corridor Multi-Use Path Alignment Alternatives Study" (Multi-Use Path Study) for the Parks Department and Carson Area Metropolitan Planning Organization (CAMPO). The *Designing Sidewalks and Trails for Access, Part II: Best Practices Design Guide* was used for design recommendations for both *Recreation Trails* and *Shared Use Paths.* In addition, the American Association of State Highway Officials (AASHTO) *Guide for the Development of Bicycle Facilities* and the NDOT *Structures Manual* were also used as a reference. These documents, together with input from the Carson City Public Works Department, Parks Department, NDOT, and users, have been utilized to develop the preliminary design for the Non-Motorized Bridge Crossing at Valley View Drive.

The purpose of this report is to analyze the various options for bridge construction, to determine the best choice of construction type for the bridge, and to provide a preliminary design narrative and plans for the selected construction type. Lumos has partnered with Hyytinen Engineering, a structural engineering firm, to evaluate the structural components of the construction type alternatives and to develop the preliminary bridge design. We will evaluate cost, constructability, design criteria, aesthetics, and amenities of the chosen bridge type. Since there are currently no funds available to construct the bridge, we will discuss potential funding sources and provide an Opinion of Probable Costs that can be used to pursue grants and other monies for construction of the bridge. We will also discuss the approximate timeline for the bridge design, permitting, agency coordination, and construction. Although phasing of the proposed bridge project is an option, this report does not address construction stages or timelines for potential phasing. A preliminary design has been developed that illustrates a proposed site layout, bridge profile, and structural details and shows how the bridge can be integrated into the freeway corridor.

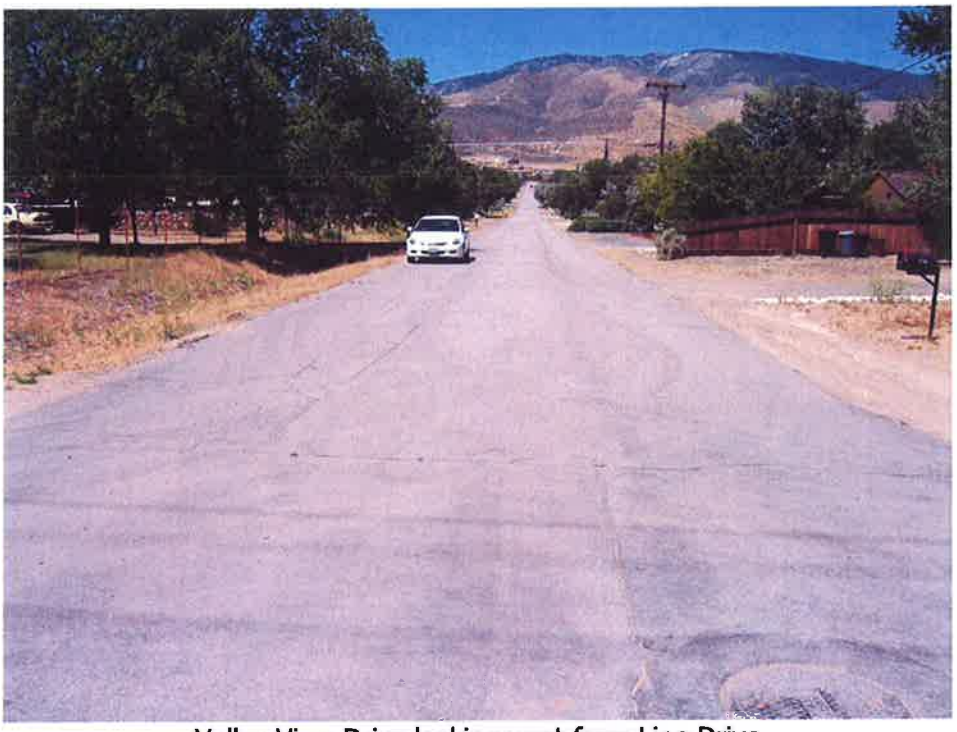
2.0 PROJECT LOCATION

The proposed bridge will be located in Carson City, Nevada within the Southwest ¼ of Section 28, Township 15 North, Range 20 East M.D.B.&M. Valley View Drive, which is in southeast Carson City, runs east from Center Drive and extends west from Conte Drive. Once the freeway is constructed, it will divide Valley View Drive between Line Drive to the west and South Edmonds Drive to the east. The proposed bridge will span the freeway between these two intersections and will approximately follow the original alignment of Valley View Drive (See Figure 1 in Appendix A).

3.0 EXISTING CONDITIONS

Valley View Drive is a paved city street with minimal traffic that is typically limited to local residents. Currently, Valley View Drive is bordered by an open drainage ditch along the southern edge and a dirt shoulder on the northern edge, which has been used by equestrians as a route to Prison Hill. However, this route has been recently cut-off by a chain link fence that NDOT has constructed along the freeway right-of-way (ROW). Although the funding for construction of the freeway is uncertain at this time, NDOT has already begun some improvements in anticipation of the freeway construction. These improvements include, in addition to the ROW fencing, the construction of the Koontz Lane and Clearview Drive bridges, relocation of conflicting utilities, and construction of a drainage channel along the west side of South Edmonds Drive. South Edmonds Drive is a two-lane, paved city street and is classified by NDOT as a minor arterial. Although South Edmonds Drive does not have sidewalks or bike lanes, it has large, dirt shoulders, which Lumos has observed being used by pedestrians.

Valley View Drive dead end looking east towards Prison Hill.



Valley View Drive looking west from Line Drive

Valley View Drive looking east from South Edmonds Drive towards Prison Hill

South Edmonds Drive looking south from Valley View Drive

South Edmonds Drive looking north from Valley View Drive

Koontz Lane Bridge

Clearview Drive Bridge

The proposed freeway corridor will be approximately 220 feet wide and 18 to 23 feet below original ground elevations at the Valley View Drive crossing, with side slopes that fall at a 2:1 slope from the existing grade to the freeway road surface (See NDOT Phase 2B Freeway Plans in Appendix C). Per the freeway plans, a concrete barrier rail will be installed at the Valley View Drive dead end on the west side of the chain link fence and the slopes will be covered with a mix of hydroseed and rock slope stabilization. The plans also indicate that a freeway sign will be located approximately 75 feet south of the proposed bridge location. The items above will be addressed in *Section 6.7 NDOT Coordination.*

4.0 BENEFITS

Carson City has developed a *Unified Pathways Master Plan* as part of an ongoing effort to provide off-street routes to connect schools, residential neighborhoods, open space, and recreational areas within Carson City. The Multi-Use Path Study, which Lumos recently completed with the Parks Department, evaluates possible alignments for a paved path along Phase 2 of the freeway corridor, which will be a continuation of the path constructed along Phase 1. For the freeway segment between Koontz Lane and Clearview Drive, the preferred path alignment is along the west side of the NDOT ROW. Several existing east-west routes used by equestrians, hikers, pedestrians, mountain bikers, and bicyclists will be interrupted by the freeway, such as the Valley View Drive route to Prison Hill, and the proposed multi-use path will provide a link between these routes. Although the Koontz Lane and Clearview Drive bridges will allow pedestrians and bicyclists to cross from the west side of the freeway to the east side of the freeway, the bridges do not have facilities for equestrian users. A non-motorized bridge crossing over the freeway would provide a location for equestrians to safely cross the freeway and would also provide a crossing for pedestrians and bicyclists where they do not have to contend with vehicle traffic. The project's bridge crossing is proposed at Valley View Drive because it has historically been used by equestrians in southeast Carson City to access the Prison Hill Recreation Area. The bridge would provide connectivity between the Prison Hill Recreation Area to the east and the proposed multi-use path to the west.

5.0 CONSTRUCTION TYPE ALTERNATIVE ANALYSIS

5.1 Introduction

Lumos has evaluated three options for the proposed bridge construction type: cast-in-place concrete, pre-fabricated steel trusses, and pre-fabricated girders (concrete or steel). We assessed the constructability and cost of each construction type and also discussed the various advantages and disadvantages. Some of the advantages/disadvantages considered were vibration characteristics, appearance, traffic control requirements, safety requirements, etc.

The equestrian users expressed concern about how much the bridge would vibrate with the various construction types. Horses typically have trouble crossing bridges with too much vibration either from other bridge users or from the traffic below. Horses, as well as people, will react differently to various levels of vibration, which

reflects their perception of the sturdiness of the structure. The topic of vibration and methods of dampening vibration is addressed in *Section 6.5 Vibration*.

NDOT has expressed they would prefer a bridge that resembles the existing freeway bridges. The Koontz Lane bridge and Clearview Drive bridge are cast-in-place concrete and comply with the NDOT Landscape and Aesthetic Corridor Plan for the freeway (See *Section 7.4 Aesthetics*).

If the proposed bridge is constructed after the freeway is built, traffic control will be a significant portion of the project budget. The level of traffic control required varies depending on the construction type selected. Safety is paramount for any construction site and is addressed with each construction type.

Although the different construction types have varying components, the bridge length (208 feet) and width (28 feet) will be equal for all three alternatives. The cross-section of the bridge will also be identical, which consists of three (3) pathways: a 12-foot wide center path for equestrian users and two (2) 6-foot wide flanking paths for pedestrian/bicyclist users (See *Section 6.10 Width and Height*). The pedestrian/bicyclist pathways will have a concrete surface and the equestrian pathway will have a granular soil surface (See *Section 7.1 Deck Surface*). The pathways will be separated by a 54-inch high wall, and the exterior rails will be solid to a height of 5 feet with chain link fence extending to 12 feet high (See *Section 6.11 Railing Design*).

5.2 Cast-in-Place Concrete Bridge

A cast-in-place (CIP) concrete bridge would consist of a CIP concrete bridge structure, a CIP concrete bridge deck, a CIP center pier, and CIP abutments and would closely match the appearance of the existing bridges at Koontz Lane and Clearview Drive. Since the Koontz Lane and Clearview Drive bridges were constructed prior to excavating the freeway trench, the contractor was able to erect conventional falsework founded above existing grade. If the proposed bridge could be constructed prior to the completion of the freeway, then a similar construction method would be used. However, funding is not currently in place, and the bridge will most likely be constructed after the freeway is complete. This would entail erecting falsework over the freeway approximately 16 feet above the road surface, which would require extensive traffic controls and safety measures to protect the public and the construction workers during construction. The impact to freeway traffic and the additional expense for constructing a CIP concrete bridge after the freeway is complete is cost prohibitive at this time. Also, the construction period would be longer than a pre-fabricated girder bridge concrete or pre-fabricated steel truss bridge. Therefore, this option will not be evaluated further in this report.

5.3 Pre-Fabricated Steel Truss Bridge

5.3.1 Constructability

A pre-fabricated (pre-fab) steel truss bridge will consist of a steel truss bridge, a CIP concrete bridge deck, and CIP concrete abutments. A steel truss bridge could either be a single span or a double span bridge. A single span, steel truss bridge can span 208± feet without a center support and would not require a center pier. This would be a significant reduction in cost in comparison to a double span, steel truss bridge (See *Section 5.3.2 Cost*). The bridge will be manufactured in sections offsite and then shipped by truck to the project site. The maximum width that can be shipped is 12 feet, and the maximum length is 100 feet. Therefore, the bridge would need to be broken into three (3) longitudinal sections and three (3) horizontal sections, which logically would be the equestrian path and the two (2) pedestrian/bicyclist paths. The contractor will then splice the sections together onsite and use a crane to position the bridge on the abutments. All field splices shall be performed in accordance with the *NDOT Standard Specifications for Road and Bridge Construction*. Presumably, the freeway will only need to be shut down for one night to set the bridge structure on the abutments. The exterior rails and path separation walls will be part of the steel bridge truss components. However, the lower portion of the exterior rails requires a solid panel of some type to obscure the horses' view of the vehicles traveling under the bridge. NDOT also requires a solid rail on the bottom, as well as the chain link fence on top. The CIP concrete bridge deck will be poured directly onto the steel structure without falsework by using stay-in-place metal decking.

5.3.2 Cost

Proposed Bridge = 208 feet long x 28 feet wide = 5,824 square feet

Bridge = $165/sf x 5,824 sf = $960,960
Concrete fill (CIP) = $6/sf x 5,824 sf = $34,944
Installation = $10/sf x 5,824 sf = $58,240
Granular soil = $2/sf x 5,824 sf = $11,648
Rails, walls, screens, etc. = $7/sf x 5,824 sf = $40,768
Abutments (2) = $40,000/abutment x 2 = $80,000

Total=$1,186,560*

*Add $40,000 for center pier (only required if double span)

5.3.3 Advantages

The advantage to using a pre-fab steel truss bridge is the interruption of traffic would be minimal. Most likely, the freeway would only need to be closed for one night to place the bridge, and the remaining bridge and site work could be completed with traffic on the freeway. Additionally, no falsework is required,

which would reduce the need for extra safety measures over the freeway. Although the lead time for fabricating the steel bridge could be lengthy, the actual construction period would be significantly shorter than a pre-fab girder bridge.

5.3.4 Disadvantages

The biggest disadvantage to using a pre-fab steel truss bridge is that it would not match the existing concrete freeway bridges. A pre-fab steel truss bridge can be very attractive in the right setting; however, all the modifications that are required for safety (e.g. solid panels in the exterior rails, chain link fence, etc.) would mar the aesthetic qualities of the bridge. If chain link fence or panels were not used, the additional "custom" steel treatments (steel panels and custom curved railing) would greatly increase the cost. Another disadvantage is that steel does not have as much mass as concrete and would not dampen vibration as well. Since the bridge exterior rail and path separation walls would be part of the steel trusses, there is a risk that bicycle handle bars, reins, stirrups, etc. could be caught and cause injuries to bridge users. The Design Guidebook suggests installing rub rails in such cases, but that would add additional costs to the bridge. A pre-fab steel truss bridge would require more maintenance than a concrete bridge and is less durable. For instance, the metal decking has a tendency to rust, which would have to be addressed during design. Even with the cost saving measures mentioned in *Section 5.3.3 Advantages*, the pre-fab steel truss bridge would cost approximately 7.5% more to construct than the pre-fab girder bridge.

5.4 Pre-Fabricated Girder Bridge (Preferred Alternative)

5.4.1 Constructability

A pre-fab girder bridge will consist of pre-fab girders, a CIP concrete bridge deck, a CIP center pier, and CIP abutments. The girders and concrete deck would be tied together to form a composite girder/deck assembly. The pre-fab girders can be made of steel or precast concrete, which can be fabricated offsite by a manufacturer and shipped to the site. Currently, there are no local certified manufacturers of steel or concrete girders.

If steel girders are used, either standard wide flange shapes or built-up plate girders are acceptable. These girders can either be shipped in 100± foot segments, or shorter sections can be shipped to the site with bolted field splices used to join the sections onsite. All field splices shall be performed in accordance with the *NDOT Standard Specifications for Road and Bridge Construction*. Concrete girders can be shipped to the site in 100± foot segments. The steel or concrete girders would be placed by a crane, which would require a temporary shutdown of the freeway for one night per side of the center pier. The falsework for the concrete deck would be placed over the girders to pour the CIP concrete deck to create a composite girder/deck

assembly. Removable wood forms or stay-in-place (SIP) metal deck forms can be used for this CIP concrete bridge deck.

5.4.2 Cost

Proposed Bridge = 208 feet long x 28 feet wide = 5,824 square feet

Precast concrete girders* = $100/sf x 5,824 sf = $582,400
Concrete deck (CIP) = $30/sf x 5,824 sf = $174,720
Concrete guardrails (CIP) = $20/sf x 5,824 sf = $116,480
Installation = $10/sf x 5,824 sf = $58,240
Granular soil = $2/sf x 5,824 sf = $11,648
Rails, walls, screens, etc. = $7/sf x 5,824 sf = $40,768
Abutments (2) and center pier (1) = $40,000 each x 3 = $120,000

Total=$1,104,256

*Steel girders cost approximately $121/sf and would increase the total cost of the bridge to $1,226,560.

5.4.3 Advantages

The advantage to using steel girders is that the steel girder sections can be shipped to the site in shorter segments, thus more easily managed by the contractor and also reducing shipping costs.

One of the advantages of using a precast concrete girder bridge is that it could closely resemble the existing cast-in-place bridges constructed for the freeway. The concrete of the bridge structure could be stained and the surface treatment could match the NDOT Landscape and Aesthetic Corridor Plan (See *Section 7.4 Aesthetics*). Additionally, concrete barrier rail can be used for the exterior rails with the chain link fence on top, which meets the NDOT bridge rail requirements. The mass of a precast concrete girder bridge would be 20% to 25% more than a steel girder bridge. The increase in dead load mass of the bridge would reduce the amount of vibrations felt by users on the bridge. Also, a precast concrete girder bridge would have better durability than a bridge constructed of steel girders or trusses, and the maintenance would be minimal in comparison to steel. Out of all the options, a precast concrete girder bridge would cost the least amount.

5.4.4 Disadvantages

The disadvantage of using a steel girder bridge is that overall cost to use steel girders is still more than precast concrete girders, even with savings on shipping costs. Also, the steel girders would transmit slightly more vibrations than the concrete girders. Another disadvantage is the additional time required to procure the steel girders. Since there are no local steel girder manufacturers, the lead time for ordering and shipping the girders could extend construction

time and increase costs. Although the steel girders can be shipped in smaller segments than the concrete girders, which would save in shipping costs, the overall cost of a steel girder bridge is still more than a precast concrete girder bridge.

A disadvantage of using a precast concrete bridge is that the falsework for the bridge deck would require additional safety measures due to traffic on the freeway below, which would increase project costs. The use of stay-in-place metal decking could reduce some of these issues, but then the problem of the metal deck rusting would need to be resolved. Traffic would have to be interrupted for longer than a pre-fab steel truss bridge, but it would be a shorter period of time than the cast-in-place concrete bridge. Another disadvantage is the additional time required to procure the concrete girders. Since there are no local concrete girder manufacturers, the lead time for ordering and shipping the girders could extend construction time and increase costs. With the above considerations, it is estimated that the length of construction would be longer than a pre-fab steel truss bridge and approximately the same as a steel girder bridge.

5.5 Construction Type Selection

Based on the analysis above, the preferred alternative is to use pre-fabricated girder bridge, incorporating precast concrete girders, for the construction of the Non-Motorized User Bridge Crossing at Valley View Drive. The bridge will be similar in appearance to the existing freeway bridges, will cost the least amount to build of the three options, will be more durable and have less maintenance issues than a steel bridge, and will transmit less vibration than a steel bridge. The amenities requested by the users can also be more easily incorporated.

6.0 DESIGN CRITERIA

6.1 Design Standards

The proposed bridge shall be designed in accordance with the latest editions of the *NDOT Standard Specifications for Road and Bridge Construction, NDOT Standard Plans for Road and Bridge Construction, Standard Specifications for Public Works Construction*, and *Standard Details for Public Works Construction* as accepted by Carson City.

6.2 Design Loads

The proposed bridge shall be designed to meet the design criteria of the most recent editions of the *AASHTO LRFD Bridge Design Specifications* and *AASHTO LRFD Guide Specification for the Design of Pedestrian Bridges,* as well as all current interims. Along with the anticipated dead loads, the bridge shall be designed to support a 100 psf uniform live load. This loading meets the requirements for pedestrians, bicyclists, and equestrians. A vehicle loading based on service type vehicles shall

also be included in the live loads. Lateral loads on the bridge shall include wind and seismic loads. Carson City requires that a minimum design wind load based on a 100 mph, Exposure C, wind level shall be used for design. The *NDOT Structures Manual (2008)* recommends that the most severe wind load within a 75 year span shall be used for design. Seismic design loads shall be based on the site specific seismic design parameters, with a preliminary acceleration coefficient of 0.4g being anticipated. However, NDOT recommends a minimum seismic coefficient of 0.5g for Carson City. The bridge shall also be designed to accommodate the anticipated expansion and contraction stresses and movements.

6.3 Land Requirements

The bridge structure will be within the NDOT ROW, but a portion of the transition from the bridge to existing grades on both the west and east ends will be within Carson City ROW. ***The project site limits will not encroach on private lands.***

6.4 Geometrics

The centerline of the proposed bridge will cross the freeway at approximately STA "O" 137+75 and will be constructed perpendicular to the freeway, which follows the original alignment of Valley View Drive. Before the dead end was created on Valley View Drive, the western portion of Valley View Drive intersected South Edmonds Drive at a ninety degree angle. The eastern portion also intersects South Edmonds Drive at a ninety degree angle but is offset approximately eighteen (18) feet to the north before continuing east towards Conte Drive. Lumos considered skewing the bridge so that it would connect the Valley View Drive dead end with the intersection of South Edmonds Drive and the eastern portion of Valley View Drive. However, it was determined that maintaining a perpendicular angle to the freeway would be preferable. This decision was based on several factors, such as bridge length, abutment size, bridge transition size, utility conflicts, and ROW conflicts. If the bridge was skewed, the bridge length would be extended by approximately 50 linear feet, which would increase the project cost. Additional costs would also be incurred because the abutments would need to be longer to retain more of the cut slope and the bridge transition areas would need to be larger to tie-in to the proposed multi-use path, roadway, and grades. The western bridge transition would conflict with an existing utility pole and would most likely encroach on private property. Constructing the bridge at a perpendicular angle will allow for ease of access from any direction, minimize conflicts with existing improvements, and will also match the configuration of existing bridges over the freeway.

On the west side of the bridge, a transition will be constructed between the bridge and proposed multi-use path. The bridge structure will end approximately 10 linear feet east of the NDOT ROW, and the bridge transition will project approximately 15 linear feet into the Carson City ROW for Valley View Drive. The grades at the Valley View Drive dead end and the proposed multi-use path may need to be raised slightly to allow for a smoother transition from the bridge deck to existing grade. A mount/dismount area could be constructed on the west side of Line Drive, which

would be outside of the main pathway between the bridge, the proposed multi-use path, and Line Drive.

On the east side of the bridge, a transition will be constructed from the bridge to the shoulder along South Edmonds Drive. The bridge structure will end approximately 50 feet to the west of the NDOT ROW, and there will be approximately 20 feet between the end of the bridge transition and the edge of South Edmonds Drive. This will provide adequate space for a mount/dismount area to be constructed north of the transition area, which can double as an approach to the South Edmonds Drive crosswalk. The shoulder along the west side of South Edmonds Drive slopes at approximately 10% towards the NDOT ROW, but the slope for the bridge transition and mount/dismount area will flatten this slope to approximately 0.5%.

A preliminary bridge profile has been developed for this bridge location. This profile shows that the proposed bridge will have a total span of 208 linear feet between the centerline of the east abutment and the centerline of the west abutment. The abutments are estimated to be 2 feet wide, but the footing sizes have not been calculated. Using center support columns, the bridge will be a two span bridge: the west span will be about 100 linear feet and the east span will be about 108 linear feet. The bridge will slope from the east abutment to the west abutment at approximately a 3.6% slope. The slope from the abutments down to the freeway road surface will match the existing freeway corridor conditions of 2:1. The slope will be armored with concrete slope paving similar to the existing Koontz Lane and Clearview Drive bridges.

It is proposed to use 54-inch deep precast, pre-stressed, concrete girders to span the 100± linear feet and 108± linear feet spans. Although a 48-inch deep girder would suffice, the additional six (6) inches of depth will alleviate some of the vibration and deflection issues. These girders can be cast in a manufacturer's plant, cured and stressed, and then shipped to the bridge site. Once the two end abutments and the center support system are in place and the bearing seats are ready, then the precast girders will be craned into place. Forms for the CIP concrete bridge deck will be installed when the girders are properly located. This bridge deck will span over the top of the precast concrete girders and become an integral composite concrete section with them. After the concrete deck has cured, the CIP concrete exterior barrier rails and path separation walls will be placed. Then the final surface slabs and granular soil will be placed in the various lanes, along with any other screening and fencing.

The following geotechnical reports have been reviewed for the preparation of this Preliminary Design Report: "Geotechnical Investigation for the Carson City Freeway Phase 2B", completed in November 2005 by Black Eagle Consulting, Inc.; "Geotechnical Investigation Report, Grade Separation Koontz Lane at US-395/I-580", completed in November 2004 by NDOT Materials Division; and "Geotechnical Report Carson Freeway Clearview Drive Grade Separation", completed in December 2003 by NDOT Materials Division. Based on the data in these reports, it is anticipated that shallow foundation systems will be able to be used for both the two end abutments and for the center support columns. No deep piling or other more extensive deep

foundation systems are anticipated to be required. The geotechnical conditions differ significantly between the Clearview Drive and Koontz Lane bridge locations and can be assumed to vary as much at the proposed bridge locations. Additional investigation shall be performed in the vicinity of the proposed bridge abutments and center pier to fully understand the soil conditions at the project site prior to commencing design.

6.5 Vibration

At this preliminary level of design, a specific vibration study has not been completed for the options considered. However, the following "rules" of vibration design were implemented to help in our preliminary design reviews:

1. *By increasing the stiffness of the supporting members:*
   Since the stiffness of a given member is related to the cube of the depth of the member, a good way to increase the stiffness of a system is to increase the depth of the members. By increasing the member depth from 48" to 54", this 6" increase in depth results in a 42% increase in stiffness. Also by making the beam/slab (girder/concrete deck) a composite system, the combined composite system becomes much stiffer than if the beam and slab were left as individual elements. Another way to increase the stiffness of a system is to decrease the span of the main support members (i.e., double span bridge).

2. *By increasing the mass of the system:*
   If a supporting system has a very small amount of mass in relation to the span, the system is much more susceptible to vibration problems. The larger the mass, the harder it is to "excite" the system. If the system is "excited" this results in greater vibrations. Concrete has more mass than steel; therefore, concrete will create less vibrations in the system.

3. *By increasing the damping of the system:*
   The addition of elements, such as the exterior concrete barrier walls and concrete dividing walls between the traffic lanes (See *Section 6.10 Width and Height*), helps in providing additional damping which reduces the effects of vibrations.

4. *By using a material for the main walking surface that will not readily transmit vibrations:*
   The use of a granular soil (See *Section 7.1 Deck Surface*) will allow for significant cushioning of the effects of the horse's hooves on the bridge. A very hard surface would allow vibrations from the horse's hooves to be transmitted more easily.

5. *Seek to develop a system that has a natural frequency that is much different than the main source of anticipated vibrations:*
   In a final design phase, the natural frequency of a framing system can be estimated and compared to that of the source of the anticipated vibrations. If their natural frequencies are similar to each other, adjustments can be made to

alter the frequency of the bridge system to make it different than the source vibrations.

6.6 Connectivity

The bridge will be part of an overall plan to connect the various trail systems in Carson City, as proposed in the Carson City *Unified Pathways Master Plan* and the CAMPO *Regional Transportation Plan.* The bridge will interconnect the Prison Hill Recreation Area with the proposed multi-use path to be constructed along Phase 2 of the freeway.

On the west side of the bridge, there will be a transition into the proposed multi-use path. At this juncture, the path shifts from within the NDOT ROW to Line Drive. A portion of Valley View Drive at the dead end will be regraded to accommodate the bridge transition and the proposed multi-use path.

On the east side of the bridge, a transition shall be constructed from the bridge to the existing shoulder of South Edmonds Drive. The intersection with South Edmonds should consist of a crosswalk with flashing light indicators to alert vehicles of equestrians, hikers, pedestrians, mountain bikers, or bicyclists crossing. The portion of Valley View Drive that is east of South Edmonds Drive is offset north by about 18 feet from the western portion of Valley View Drive. A waiting area will need to be constructed just north of the bridge transition to allow for the users to stop before crossing South Edmonds Drive to the north side of Valley View Drive. The mount/dismount area will be west of the waiting area to provide sufficient space for pedestrians and bicyclists to remain clear of the horses. Lumos considered placing the crosswalk at the south side of Valley View Drive, but users typically use the north side of Valley View Drive to access the Prison Hill trail system. Also, the south side of Valley View Drive at the South Edmonds Drive intersection has a power pole and a large amount of vegetation, which is not a preferable crossing location.

6.7 NDOT Coordination

Since the bridge will be located within the NDOT right-of-way and will cross over the freeway, it is crucial to examine all aspects of the project as it relates to the freeway construction plans. Lumos has identified several potential conflicts that should be coordinated with NDOT and could be modified during the final design phase of the freeway. The following items are either "no cost" or minimal cost changes to the freeway construction cost estimate:

A butterfly freeway sign is located approximately 75 feet south of the bridge at STA "O" 137+00, which will be blocked from view for southbound vehicles. We propose that NDOT move the sign 1,500 feet north of the bridge to STA "O" 152+00. For the southbound traffic, the sign indicates that South Carson Street and the end of the freeway is 1 ½ miles. For the northbound traffic, the sign indicates that Fairview Drive is 1 mile, Highway 50 East is 2 ½ miles, and College Parkway is 4 miles. Moving the sign will add a quarter of a mile to the sign for southbound traffic and subtract a quarter of a mile for the northbound traffic. The new sign location

will be 775 feet north of the Koontz Lane bridge and will not be in conflict with any other freeway improvements. Lumos has discussed the proposed sign location with the design engineer for the freeway project, and they have determined the proposed sign location is acceptable. However, the median configuration will need to be revised at the new sign location. The latest edition of the NDOT construction and hydraulic plans indicate a median drainage ditch in the vicinity of the proposed sign location. The ditch will need to be filled and paved similar to the design of the current sign location. Since the ditch will be blocked by the sign, a drop inlet will need to be installed. The drop inlet can be connected to the storm drain pipe that is crossing the freeway at approximately station "O" 151+50. Additionally, the sign base will need to be protected with concrete barrier rail, cable barrier rail, and impact attenuators.

The median configuration at the location of the proposed bridge is currently designed for the freeway sign. However, this configuration can be modified to protect the proposed bridge's center pier. The layout of the concrete barrier rail, cable barrier rail, and impact attenuators shall match the protective devices for the existing bridges' center piers.

Lumos has reviewed the freeway lighting plan, and there are currently no freeway lights indicated in the vicinity of the bridge. Electrical conduit is shown along the west side of the freeway to provide power to the lights for the freeway sign, which could be rerouted to service the bridge. At the proposed site for the freeway sign relocation, the lighting plan indicates that electrical conduit will be along the east side of the freeway and possibly could be used for the relocated freeway sign.

A 4-foot x 8-foot concrete drainage channel has already been constructed by NDOT and is approximately 152 feet to the right of freeway centerline, which will be in conflict with the eastern bridge transition. Our solution is to extend the existing 4-foot x 8-foot reinforced concrete box (RCB), which ends approximately 75 feet north of the bridge, 200 feet south to clear all bridge improvements. A concrete slab could be placed on top of the existing concrete drainage channel to convert the channel into a RCB. The RCB will have two (2) feet of cover, similar to existing conditions at other locations along the freeway alignment.

There is a 36-inch reinforced concrete pipe storm drain located 52 feet to the right of the freeway centerline. It is approximately six (6) feet below the surface and should not conflict with the abutments or center pier.

The minimum vertical clearance allowed by NDOT for a pedestrian bridge over a freeway is 18 feet for the permanent structure and 16 feet during construction for falsework and safety equipment. The proposed bridge has a vertical clearance of 18 feet.

NDOT's Landscape and Aesthetic Corridor Plan for the freeway will need to be maintained on the bridge and abutments. The NDOT landscaping plan for the freeway consists of hydro-seeding cut slopes with native plant seed mixtures and placement of rock slope protection and boulder clusters along the freeway corridor.

At the location of the proposed bridge, the rock slope protection extends approximately 50 feet towards the top of the cut slope on the eastern bank and 10 feet on the western bank. The rocks would need to be removed for the construction of the bridge, so it might benefit NDOT if they revise the pattern for the rock slope protection on the eastern bank to only project a short distance up the hillside, similar to the western bank. This would reduce the amount of rock to be removed. The landscaping plan shows one boulder in the vicinity of the bridge that could be relocated either north or south of the bridge concrete slope paving. Additional boulders could be added to create clusters similar to the landscaping scheme planned for the other freeway bridges.

The concrete barrier rail at the Valley View Drive dead end will not be needed. However, the End of Road marker and Right Arrow sign are still necessary but will have to be incorporated with the bollards blocking the bridge entrance. There is an existing street sign at the southeast corner of the Valley View Drive and Line Drive intersection, and it shall need to be removed or relocated. See *Section 7.4.2 Signage* for more detail.

Lumos has reviewed the soundwall and retaining wall plans, and currently there are no plans for installing either in the vicinity of the bridge.

6.8 Utilities

NDOT, Carson City, and local utility companies have already begun the process of relocating or abandoning existing utility lines that cross the freeway corridor. According to Carson City Public Works Department, the sanitary sewer line, which extends east from a manhole in Line Drive to the manhole in South Edmonds, has been abandoned and will be removed when the freeway corridor is excavated. The gas line within Valley View Drive has also been abandoned by Southwest Gas and will be removed when the freeway corridor is excavated.

Existing overhead electric lines follow the alignment of the freeway on the west side of the NDOT ROW, within the chain link fence line. According to NV Energy, these power lines are primary distribution lines. The lines are high enough that they will not conflict with the bridge structure. However, there is a power pole at the northwest corner of the proposed bridge location that may be difficult to work around during construction. A guy wire projects east from the pole and may need to be temporarily moved during construction. The other possible conflict during construction may be where the contractor decides to place the crane while setting the concrete girders. Although the power lines do not conflict with the bridge structure, they would be in the way if the contractor uses a crane on Valley View Drive. If the contractor places the crane on South Edmonds Drive or in the center of the freeway, the power lines can be avoided.

6.9 Drainage

Stormwater runoff on the bridge will be managed by crowning the bridge deck at approximately 1.8% and allowing the water to sheet flow to the outside edges. The

bridge is designed to have a 3.6% slope to the west, which will discharge the flows towards the existing drainage ditch along Valley View Drive. An infiltration system will be constructed within the equestrian pathway to collect runoff that percolates through the granular soil and will then be piped to the culvert under Line Drive.

At the east end of the bridge, the existing concrete drainage channel constructed by NDOT runs through the proposed bridge transition area (see photo next page). However, the transition area can be constructed over the channel if it is converted into an RCB. The concrete drainage channel actually becomes a RCB at approximately 100 feet north of the bridge at STA "W2-2" 116+50[1] (STA "O" 138+65). This RCB could be extended 200 linear feet to approximately 100 feet south of the bridge at STA "W2-2" 118+50 (STA "O" 136+65). This could be achieved by topping the channel with a concrete slab and doweling the slab into the concrete walls of the channel to create a RCB. The existing RCB has access points for maintenance every 300 linear feet via drop inlets. A drop inlet will be installed at approximately STA "W2-2" 117+90 to collect the flows from the existing drainage swale along the west side of South Edmonds Drive (approximately 10 feet east of the NDOT drainage channel) and to provide maintenance access.

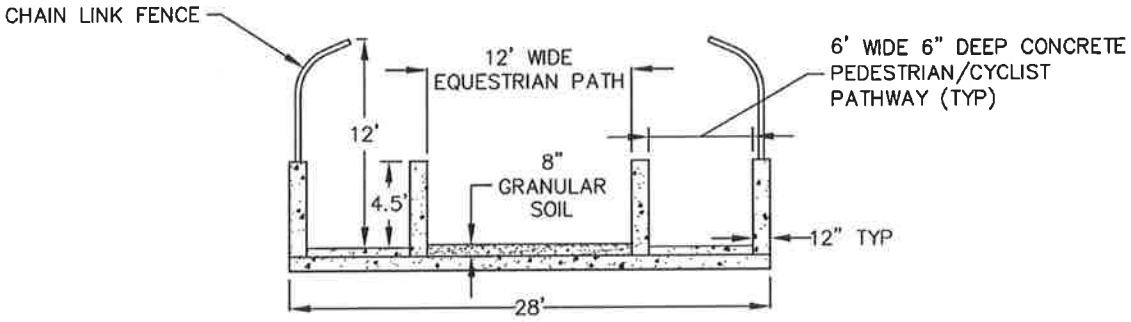
NDOT concrete drainage channel

[1] For clarification, the NDOT stationing for the concrete drainage channel and RCB is designated as "W2-2". The station numbers for "W2-2" descend downstream towards the north, which is contrary to the freeway stationing which ascends to the north.

6.10 Width and Height

The bridge is designed to be a total of 28 feet wide and will be separated into three (3) pathways. The center pathway will be 12 feet wide and will be used by equestrians. The two outer pathways will be six (6) feet wide each and will be used by hikers, pedestrians, mountain bikers, and bicyclists. The pathways will be separated by 54-inch tall, 12-inch thick concrete walls. Other configurations of the bridge cross-section were considered, including separating the bridge into two paths (one equestrian and one pedestrian) with one separation wall. The decision to select the following cross-section was based on the reasons stated in *Section 6.12 Conflict Management between Users* and *Section 7.3 Horse Calming*.

The chain link fence mounted on the five (5) foot high exterior barrier rail will extend to a height of 12 feet above the concrete pedestrian/bicyclist pathway and will project approximately three (3) feet toward the center of the bridge, which should allow for clear space above the equestrian user path.



Bridge Cross-Section

The width of the bridge was based on recommendations in the FHWA Design Guidebook and discussions regarding the trail widths of the proposed multi-use path. The guidebook specified a minimum of 10 feet for an equestrian bridge but recommends a width of 12 feet. The width issue was discussed at the user meeting, and the 12 feet width was acceptable. The existing Koontz Lane and Clearview Drive bridges have sidewalks on either side of the roadway, which are 5'-6" wide; however, Lumos chose six (6) feet for the Valley View Drive bridge pedestrian/bicyclist pathways. The height of the chain link fence meets NDOT's minimum requirements of 12 feet.

6.11 Railing Design

NDOT requires the exterior railing to be a minimum of 42 inches high, and the Design Guidebook recommends a minimum of 54 inches for the separation wall. This height was acceptable to the users at the meeting. It was also discussed at the user meeting that the concrete barrier rail base is preferred to an open concept, and that the top portion should not be obstructed (i.e., chain link fence). This is due to the fact that horses are typically less frightened if their vision is not obstructed.

The exterior railing for the bridge will consist of a five (5) foot high concrete barrier rail as the base and a chain link fence barricade on the upper portion. The chain link fence will extend vertically four (4) feet high before curving towards the center of the bridge. This configuration will be similar to the railings on the Koontz Lane and Clearview Drive bridges. Also, the chain link fence shall be of heavy duty strength and have connections strong enough to support the aesthetic "theme" treatments (see *Section 7.4.1 Theme*). The separation railing between the equestrian and the pedestrian/bicyclist pathways will be 54 inches high, 12 inches thick, CIP concrete walls. The concrete railings may be a target for graffiti, but preventative measures, such as a anti-graffiti coating, security lighting, etc., may discourage such behavior.

Railing on Koontz Lane Bridge

6.12 Conflict Management between Users

The east and west ends of the bridge will be a confluence of pedestrians, hikers, mountain bikers, bicyclists, equestrians, and vehicles, which may instigate potential conflicts between the users. At the west end of the bridge, the bridge transition will intersect the proposed multi-use path and will terminate at the Valley View Drive dead end; and the eastern bridge transition will lead to a crossing on South Edmonds Drive. To minimize the possibility of conflicts, the users on the bridge will be required to stop at the ends of the bridge and allow passage of the users on the proposed path or vehicles on South Edmonds Drive. This will be implemented by posting stop signs at the ends of the bridge. Signs will also be posted and physical barriers installed to prohibit motorized vehicle traffic from entering the bridge and to encourage trail etiquette (See *Section 7.4.2 Signage* for examples). User conflicts on

the bridge will also be mitigated by constructing concrete separation walls between the equestrian and pedestrian/bicyclist pathways and by designating one-way traffic on the pedestrian/bicyclist pathways. The southern pathway shall be marked as eastbound traffic only, and the northern pathway shall be marked as westbound traffic only. With the disparity of all the different users, it is imperative that potential concerns are addressed during the design process to ensure that all users are comfortable crossing the bridge.

7.0 AMENITIES

7.1 Deck Surface

The bridge deck will be constructed of concrete. On top of the concrete deck, an eight (8) inch layer of granular soil will be placed within the equestrian pathway and a six (6) inch concrete surface will be placed within the outer pedestrian/bicyclist pathways. Although the bridge deck will be sloped at 3.6%, this should not increase the rate of erosion of the equestrian pathway. However, a stabilizer for the granular soil should beconsidered to reinforce the earthen surface. Stabilizer Solutions (StaLok) has been used successfully on other Parks Department projects and may be appropriate for the equestrian pathway. The concrete deck surface should also have a rough finish that will provide a "tooth" between the granular soil and concrete. Lumos considered using a geogrid to stabilize the granular soil but concluded it would not be suitable for this use. A recommended soil gradation is as follows:

ASTM SIEVE SIZE	% PASSING BY WEIGHT
3/8"	100%
No. 4	90-100%
No. 8	55-80%
No. 16	40-70%
No. 30	25-50%
No. 200	10-20%

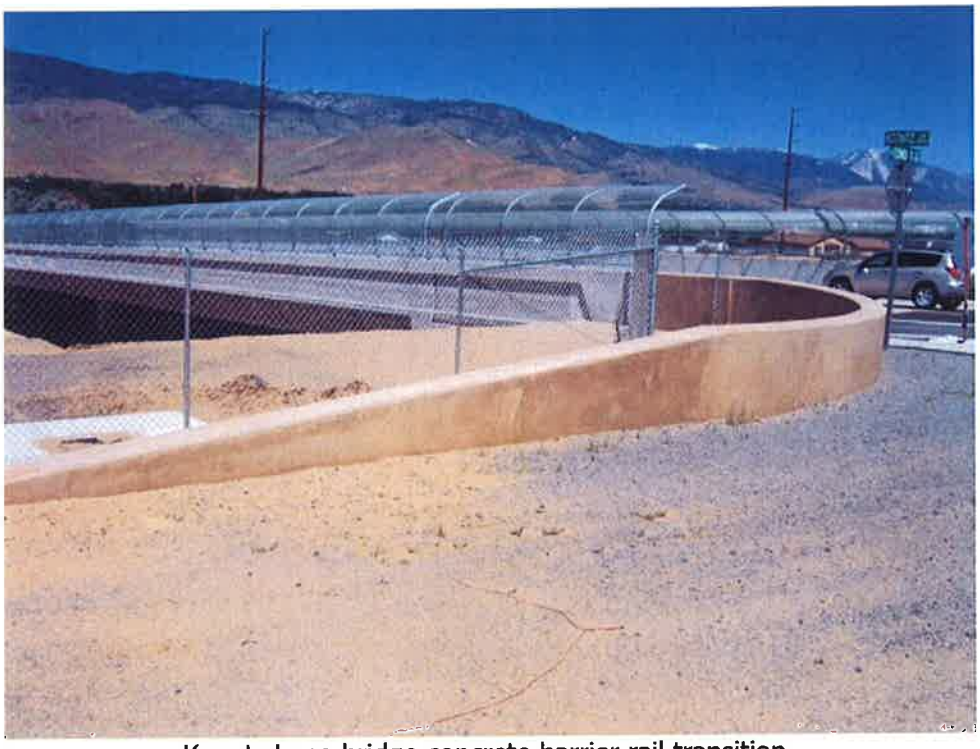
Other deck surface options were evaluated and discussed with the Parks Department and the users, such as concrete, asphalt, rubber tiles, and wood. The users stated that concrete does not provide enough traction and hooves can leave marks in asphalt in warm weather. The users did not show any interest in rubber tiles, and the Parks Department is not in favor of a wood surface due to maintenance issues.

7.2 Mount/Dismount Area

Mount/Dismount areas shall be located at the western and eastern bridge transitions and shall include a concrete mounting block. This will allow a location for the equestrian users to dismount their horses before crossing the bridge if they so choose. Some users stated they prefer to remain on their horses to cross a bridge because they feel they can maintain better control of their horses, but some users prefer to dismount. The mount/dismount areas could also provide a location for trash cans to dispose of trash and/or horse manure, which was requested at the user meeting.

7.3 Horse Calming

A common concern with multi-use paths on bridges is a horse's reaction to other users on the bridge or to movement under the bridge. One method of horse calming is to camouflage the bridge so that it blends in with the rest of the path, such as constructing planters along the edges of the bridge to mimic the vegetation on the path. However, this method is cost prohibitive for this project. Instead, the proposed bridge will consist of an equestrian path centered between two pedestrian/bicyclist paths, which will give more visual separation from the horse to the traffic below. In addition, the 54-inch high concrete walls separating the pathways will minimize the chances of a horse shying away into the other pathways. Lastly, the Design Guidebook recommends that bridge rails should be curved outward at the end of the bridge to provide a subtle transition to the open path, similar to what was constructed on the Koontz Lane and Clearview Drive bridges. In an attempt to further provide a gradual transition for the horses, the exterior barrier rails and the separation walls will slowly taper to finish grade to ease the horses back onto the path.



Koontz Lane bridge concrete barrier rail transition.

7.4 Aesthetics

7.4.1 Theme

Carson City, Gardeners Reclaiming Our Waysides (GROW), and NDOT have developed an aesthetic treatment concept for the entire freeway dubbed "Carson

City's History in Motion". The project will consist of landscaping and placing sculptures at bridges and grade separations. Each bridge has been assigned a "theme" that represents the history and culture of Carson City (e.g. The Pony Express, Basque Sheepherders, V&T, etc.). The proposed bridge would provide an opportunity for an additional theme to be implemented. During the design phase, the design engineer should coordinate with GROW and NDOT to develop a theme for the project and also to ensure the proper type of chain link fence is used to withstand the weight of the sculptural features.

Fifth Street Bridge – The Ranching Theme

7.4.2 Signage

The bridge will require a variety of signs and pavement markings to designate allowable user type, direction of travel, trail etiquette, etc. For instance, the signage at the western bridge transition will include End of Road Indicators at the Valley View Drive dead end, a No Motorized Vehicle sign, and Trail Etiquette sign. The eastern bridge transition will require a No Motorized Vehicle sign, a Trail Etiquette sign, and Pedestrian and Equestrian Crossing signs on South Edmonds Drive. Since the pedestrian/bicyclist pathways will be one-way paths, pavement markings will be added to the pathways dedicating the south pathway for those traveling east and the north pathway for those traveling west. Stop signs will be placed at either end of the bridge for the bridge users to stop before crossing the proposed multi-use path or South Edmonds Drive.

All signage shall comply with the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD), NDOT's *Standard Plans for Road and Bridge Construction*, and the *NRS Chapter 484B – Rules of the Road.*

No Motorized Vehicles

Trail Etiquette

Pedestrian and Equestrian Crossing

End of Road Marker

Dead End Sign

Bicyclist and Pedestrian One Way Pavement Markings[2]

7.4.3 Color

NDOT has developed an architectural treatment plan for the freeway bridges, which involves assigning a specific surface treatment, coating type, and color type to each element of the NDOT bridges. The Valley View Drive bridge colors and finishes shall match the NDOT architectural treatments of the Koontz Lane and Clearview Drive bridges. The concrete barrier rail, exposed abutment face, concrete slope paving, and center concrete pier shall have a smooth surface and be light taupe in color. The concrete girders shall have a smooth surface and be dark taupe in color. The chain link fence shall also match NDOT specifications and shall be galvanized steel.

7.4.4 Lighting

The lighting for the bridge should consist of deck surface lighting, under bridge lighting, and intersection lighting at South Edmonds Drive. The deck surface lighting will promote public safety by increasing visibility of users to each other

[2] Photos from National Trails Training Partnership (http://www.americantrails.org/)

and to law enforcement and will also detour vandalism and criminal behavior. The bridge under lighting shall match the existing freeway bridges. The crossing at South Edmonds will be illuminated by a street light, as well as with flashing crossing indicators mounted on poles (see picture below), which will notify vehicles on South Edmonds Drive that a user is crossing.

All lighting shall be in compliance with the Federal Highway Administration's (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD), NDOT's *Standard Plans for Road and Bridge Construction*, the International Energy Code Council (IECC) *Energy Code*, the *NRS Chapter 484B – Rules of the Road*, and the Dark Sky requirements of Carson City.

Flashing Pedestrian Crossing Indicators

8.0 PROJECT TIMELINE

Assuming that the preferred alternative, a pre-fab girder bridge with precast concrete girders, will be used and that all funding is in place, the timeline for the completion of the bridge would consist of approximately six (6) months for engineering and design, six (6) months for agency review and permitting, and nine (9) months for construction. The construction period could increase due to unforeseen difficulties in material procurement and possible weather delays.

9.0 AGENCY COORDINATION

Although the bridge project will be administered by Carson City, it will span the NDOT freeway. An agreement will need to be established between Carson City and NDOT to

determine who will have ownership and maintenance responsibility of the bridge. It is not the intent of this report to determine the type of agreement, but rather to identify some critical elements that will need to be coordinated. These items include, but are not limited to, the following:

- Maintenance of the bridge structure
- Inspection of the bridge structure
- Maintenance of the aesthetic treatments
- Maintenance of the bridge deck surface
- Maintenance of the bridge appurtenances
  - Rails
  - Fencing
  - Signage
  - Drainage
  - Light fixtures
- Responsibility for bridge power costs
  - Above deck lighting
  - Under deck lighting
  - South Edmonds Drive crossing

10.0 FUNDING OPTIONS

Currently, no funding is in place for the design or construction of the bridge from either Carson City or NDOT. Therefore, it will be the task for the users to petition various funding sources for grants or other monies available for recreation/trail projects. The local equestrian, cycling, hiking, and mountain biking organizations can be proactive by using this Preliminary Design Report as a tool to promote the project, write grant applications, speak to legislative officials, and appeal to agencies for funding. With support from NDOT and Carson City, this project will have more merit when approaching government officials. Some of the possible funding sources, though very limited in recent years, are as follows:

- Federal
  - Recreational Trail Program
  - Transportation Enhancement
  - Earmarks
- State
  - Nevada Question 1
  - NDOT Community Match
- Carson City

11.0 PERMITS/CLEARANCES

11.1 NDOT Encroachment Permit

The bridge and part of the transitions will be entirely within the NDOT ROW and will require an NDOT Encroachment Permit.

11.2 Environmental Clearances

NDOT completed a final Environmental Impact Statement (EIS), dated May 21, 1986, for the freeway corridor. The EIS examines the entire 9.19 mile "South Edmonds Alignment" as was selected by NDOT as the preferred route for the freeway. The assessed area includes a 250 foot wide corridor along the proposed freeway alignment. The EIS was re-evaluated in December 1999, and NDOT and FHWA confirmed that the conditions of the EIS had not changed. Construction was then approved for Phase 1A and 1B. The EIS was re-evaluated again October 2001 for Phase 2 and was found to still be valid. If funding for the proposed bridge project is obtained from a federal agency, the EIS may need to be re-evaluated to confirm that the conditions of the original freeway EIS are still applicable. Re-evaluating the EIS will incur additional costs to the project.

11.3 Carson City ROW Permit

The bridge transitions will be located within Carson City ROW for Valley View Drive and South Edmonds Drive and will require a permit from Carson City.

11.4 Other

Depending on what other funding sources are secured for the bridge, other permits or clearances may be required.

12.0 PRELIMINARY DESIGN

The preliminary design plans are located in Appendix B.

13.0 OPINION OF PROBABLE COST

The Opinion of Probable Cost is located in Appendix D.

The unit prices in the Opinion of Probable Cost were extrapolated from the Carson City Freeway Phase 2A contractors' bid tabulation from NDOT and from various local road projects. The engineering and construction management unit price was presumed to be approximately 16% of the total construction budget. The traffic control cost was derived from the V&T Phase 2C project, which included the placement of the bridge over Highway 50. The earthwork quantity is an estimate using our best engineering judgment, since an actual grading plan has not been completed.
The following is a brief overview to clarify some of the cost items:

- Earthwork - This item includes all excavation, import/export of material, backfill, compaction, and grading of the transition areas, mount/dismount areas, Valley View Drive and proposed multi-use path grade adjustments, and bridge abutments and center pier.

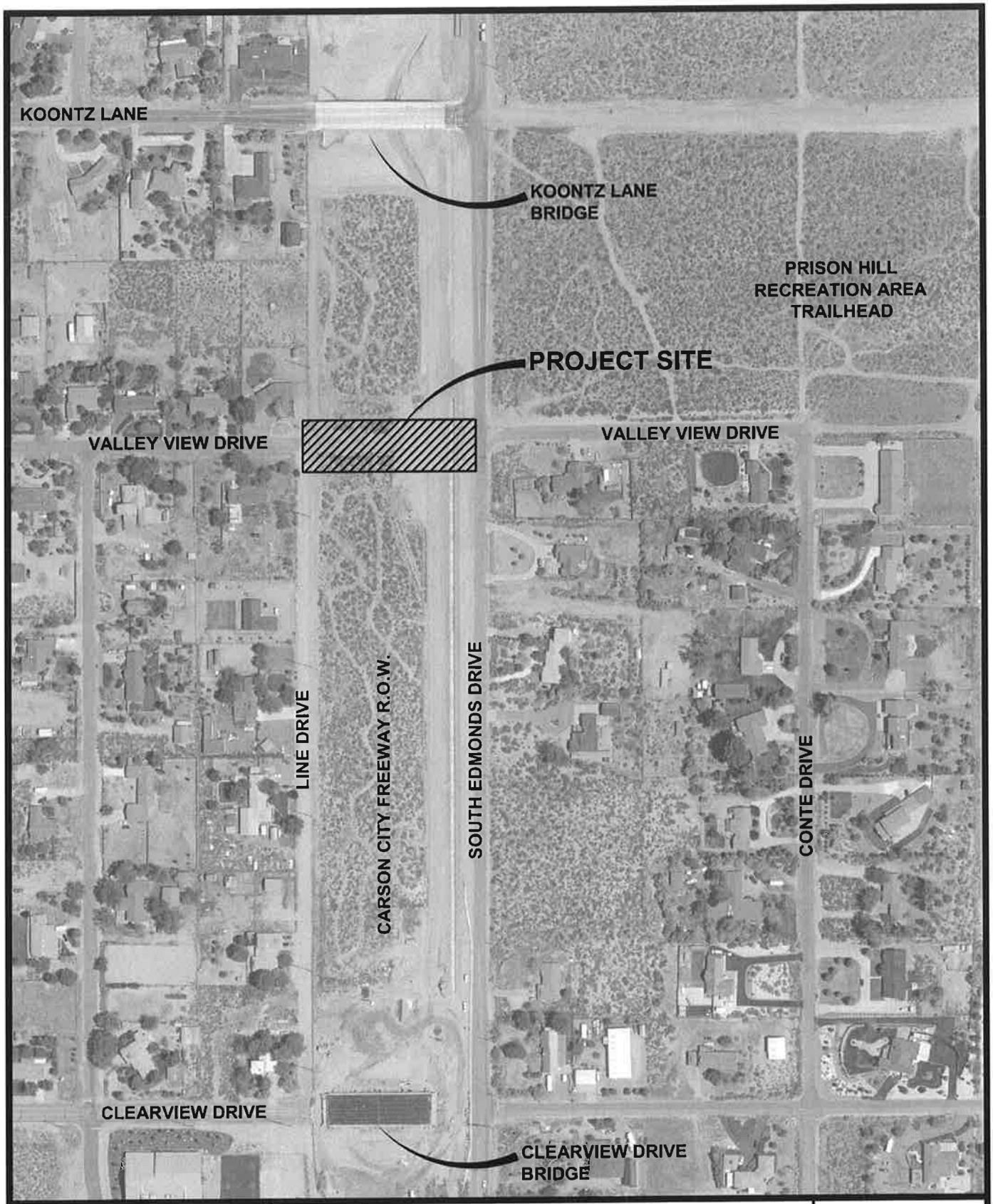
- Drainage Improvements - This item includes all storm drain pipe and fittings; drainage structures; trench excavation, backfill, bedding, and compaction; and drainage swales pertinent to the proper drainage of the transition areas. This item also includes the bridge deck infiltration system, as well as placing a concrete cap on top of the existing NDOT concrete drainage channel to form an RCB.

- Lighting - This item includes all lighting for the project, including the flashing crossing indicators and the intersection luminaire at the South Edmonds Drive crossing, bridge deck surface lighting, and under deck lighting.

- Landscaping and Revegetation - This item includes the removal and replacement of existing rock slope protection, removal and replacement of boulder clusters, and hydro-seeding the disturbed slopes with native plant seed mixtures.

APPENDIX A

Location and Vicinity Map



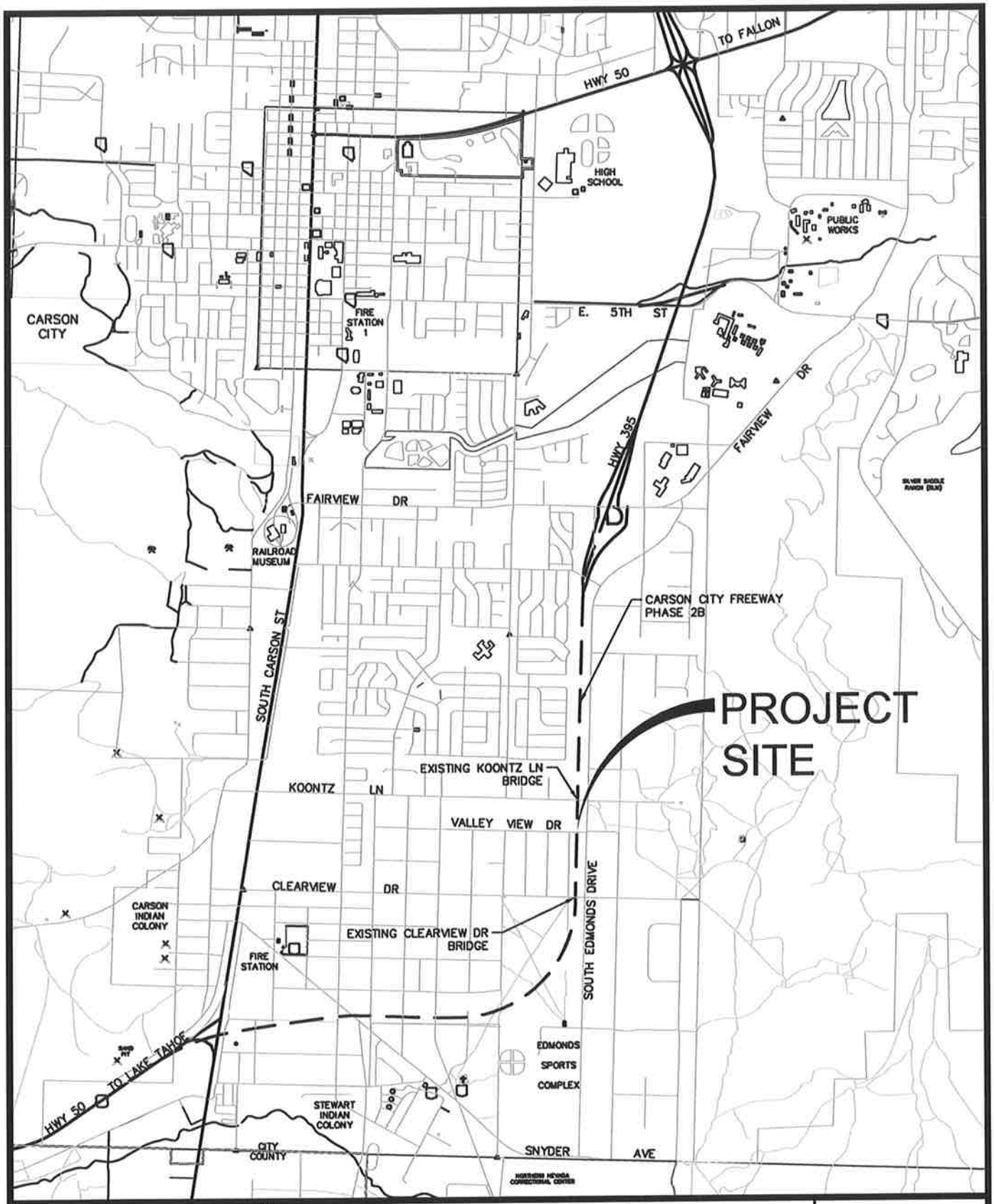
LUMOS & ASSOCIATES
800 E. COLLEGE PARKWAY
CARSON CITY, NEVADA 89706
PH. (775) 883-7077 FAX (775) 883-7114

Carson City Parks and Recreation Department

NON-MOTORIZED BRIDGE CROSSING LOCATION MAP

CARSON CITY NEVADA

Date:	November 2011
Scale:	1"=250'
Job No:	7933.000
FIGURE	1



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800 E. COLLEGE PARKWAY
CARSON CITY, NEVADA 89706
PH. (775) 883-7077 FAX (775) 883-7114

Carson City Parks and Recreation Department

NON-MOTORIZED BRIDGE CROSSING VICINITY MAP

CARSON CITY NEVADA

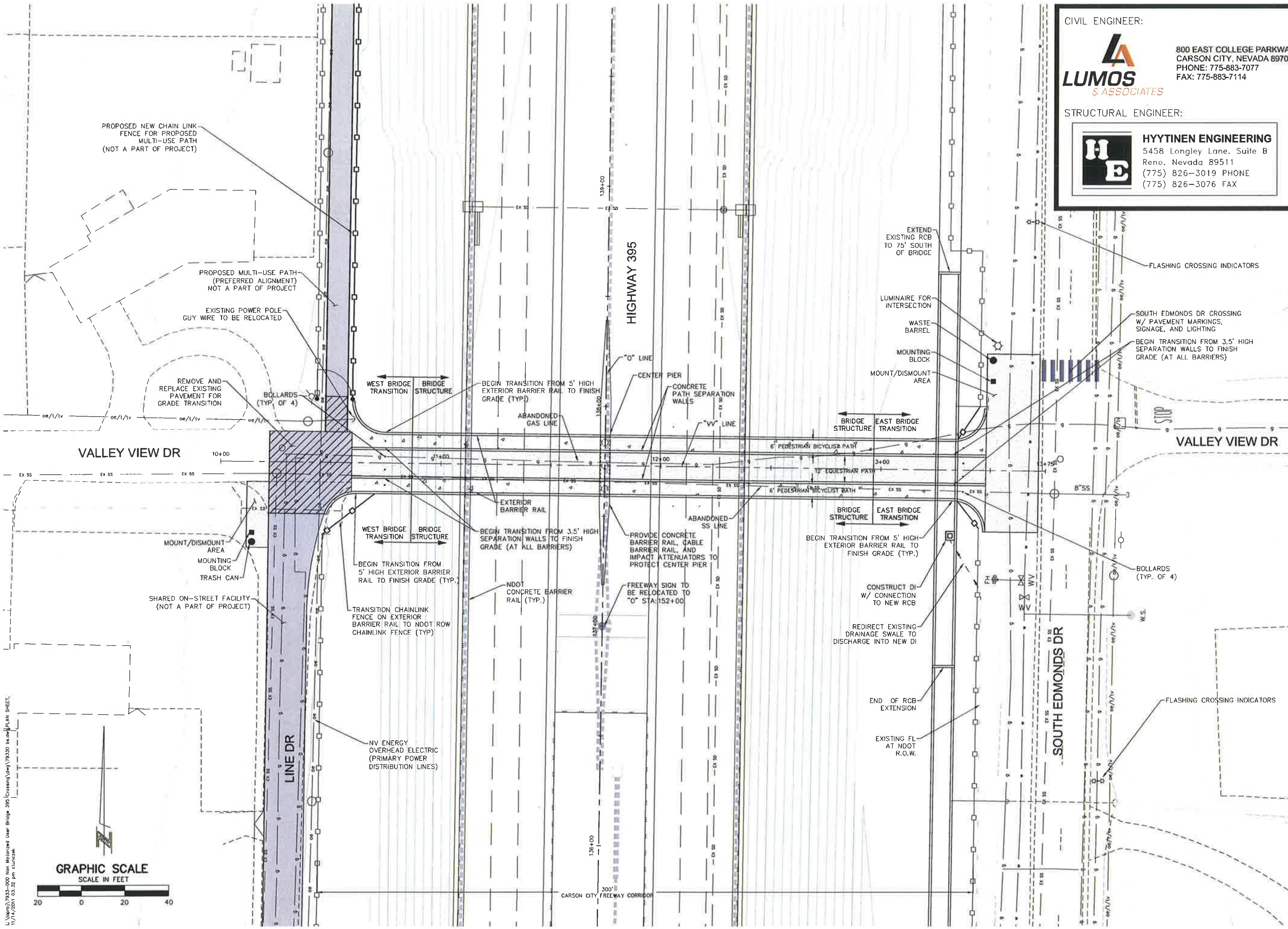
Date: November 2011
Scale: 1"=150'
Job No: 7933.000
FIGURE 2

APPENDIX B

Preliminary Bridge Design

Sheet C1 Bridge Plan View

Sheet C2 Bridge Profile and Cross Sections


PROPOSED NEW CHAIN LINK FENCE FOR PROPOSED MULTI-USE PATH (NOT A PART OF PROJECT)
PROPOSED MULTI-USE PATH (PREFERRED ALIGNMENT) NOT A PART OF PROJECT
EXISTING POWER POLE GUY WIRE TO BE RELOCATED
REMOVE AND REPLACE EXISTING PAVEMENT FOR GRADE TRANSITION
BOLLARDS (TYP. OF 4)
VALLEY VIEW DR
10+00
MOUNT/DISMOUNT AREA
MOUNTING BLOCK
TRASH CAN
SHARED ON-STREET FACILITY (NOT A PART OF PROJECT)
LINE DR
WEST BRIDGE TRANSITION
BRIDGE STRUCTURE
BEGIN TRANSITION FROM 5' HIGH EXTERIOR BARRIER RAIL TO FINISH GRADE (TYP.)
ABANDONED GAS LINE
HIGHWAY 395
"O" LINE
CENTER PIER
CONCRETE PATH SEPARATION WALLS
"VV" LINE
11+00
12+00
EXTERIOR BARRIER RAIL
BEGIN TRANSITION FROM 3.5' HIGH SEPARATION WALLS TO FINISH GRADE (AT ALL BARRIERS)
BEGIN TRANSITION FROM 5' HIGH EXTERIOR BARRIER RAIL TO FINISH GRADE (TYP.)
NDOT CONCRETE BARRIER RAIL (TYP.)
TRANSITION CHAINLINK FENCE ON EXTERIOR BARRIER RAIL TO NDOT ROW CHAINLINK FENCE (TYP)
PROVIDE CONCRETE BARRIER RAIL, CABLE BARRIER RAIL, AND IMPACT ATTENUATORS TO PROTECT CENTER PIER
FREEWAY SIGN TO BE RELOCATED TO "O" STA. 152+00
ABANDONED SS LINE
NV ENERGY OVERHEAD ELECTRIC (PRIMARY POWER DISTRIBUTION LINES)
300' CARSON CITY FREEWAY CORRIDOR
139+00
138+00
137+00
136+00
EXTEND EXISTING RCB TO 75' SOUTH OF BRIDGE
LUMINAIRE FOR INTERSECTION
WASTE BARREL
MOUNTING BLOCK
MOUNT/DISMOUNT AREA
BRIDGE STRUCTURE
EAST BRIDGE TRANSITION
6' PEDESTRIAN BICYCLIST PATH
12' EQUESTRIAN PATH
13+00
13+75
8" SS
STOP
VALLEY VIEW DR
FLASHING CROSSING INDICATORS
SOUTH EDMONDS DR CROSSING W/ PAVEMENT MARKINGS, SIGNAGE, AND LIGHTING
BEGIN TRANSITION FROM 3.5' HIGH SEPARATION WALLS TO FINISH GRADE (AT ALL BARRIERS)
BEGIN TRANSITION FROM 5' HIGH EXTERIOR BARRIER RAIL TO FINISH GRADE (TYP.)
BOLLARDS (TYP. OF 4)
CONSTRUCT DI W/ CONNECTION TO NEW RCB
REDIRECT EXISTING DRAINAGE SWALE TO DISCHARGE INTO NEW DI
END OF RCB EXTENSION
EXISTING FL AT NDOT R.O.W.
SOUTH EDMONDS DR
FLASHING CROSSING INDICATORS
W.S.
GRAPHIC SCALE
SCALE IN FEET
20 0 20 40

L:\lopro\7933-000 Non Motorized User Bridge 395 Crossing\dwg\79330 bs.dwg PLAN SHEET, 11/14/2011 03:32 pm clumzek

CIVIL ENGINEER:

LUMOS & ASSOCIATES

800 EAST COLLEGE PARKWAY
CARSON CITY, NEVADA 89706
PHONE: 775-883-7077
FAX: 775-883-7114

STRUCTURAL ENGINEER:

HYYTINEN ENGINEERING
5458 Longley Lane, Suite B
Reno, Nevada 89511
(775) 826-3019 PHONE
(775) 826-3076 FAX

LUMOS & ASSOCIATES

800 E. COLLEGE PARKWAY
CARSON CITY, NEVADA 89706
TEL (775) 883-7077
FAX (775) 883-7114

WWW.LUMOSENGINEERING.COM

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MATERIALS TESTING

Carson City Parks and Recreation Department

NON-MOTORIZED USER BRIDGE CROSSING
VALLEY VIEW DRIVE
BRIDGE PLAN VIEW

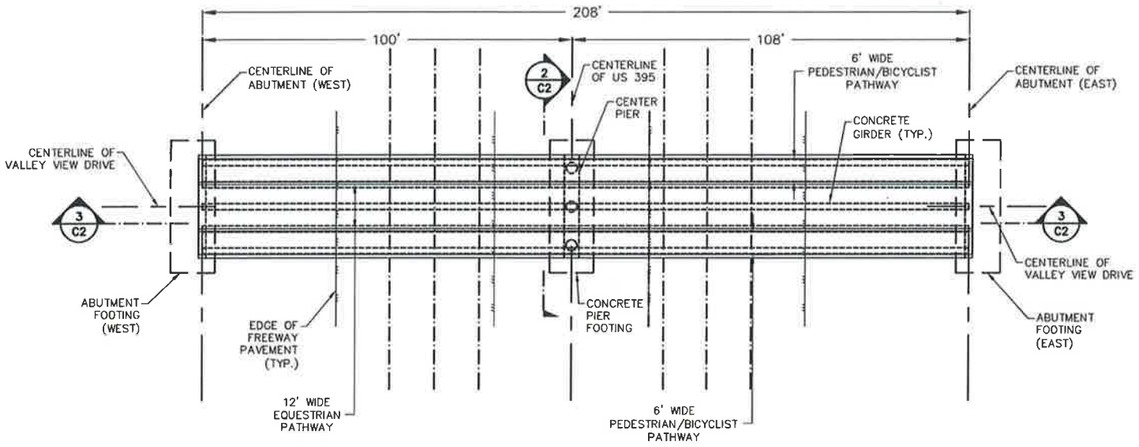
NEVADA

CARSON CITY

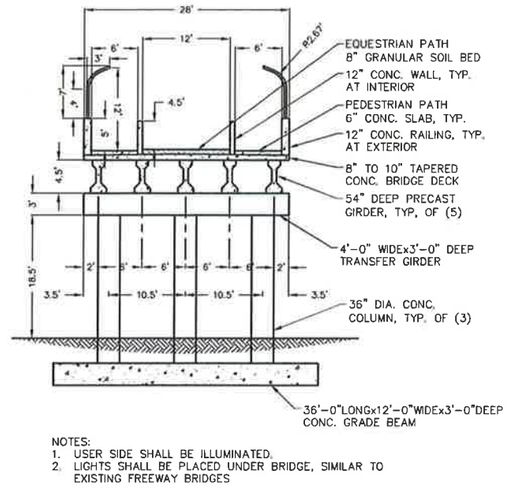
REV	DATE	DESCRIPTION	BY

C1

DATE: November 2011
DRAWN BY: KLN
DESIGNED BY: CT
CHECKED BY: MB
JOB NO.: 7933.000



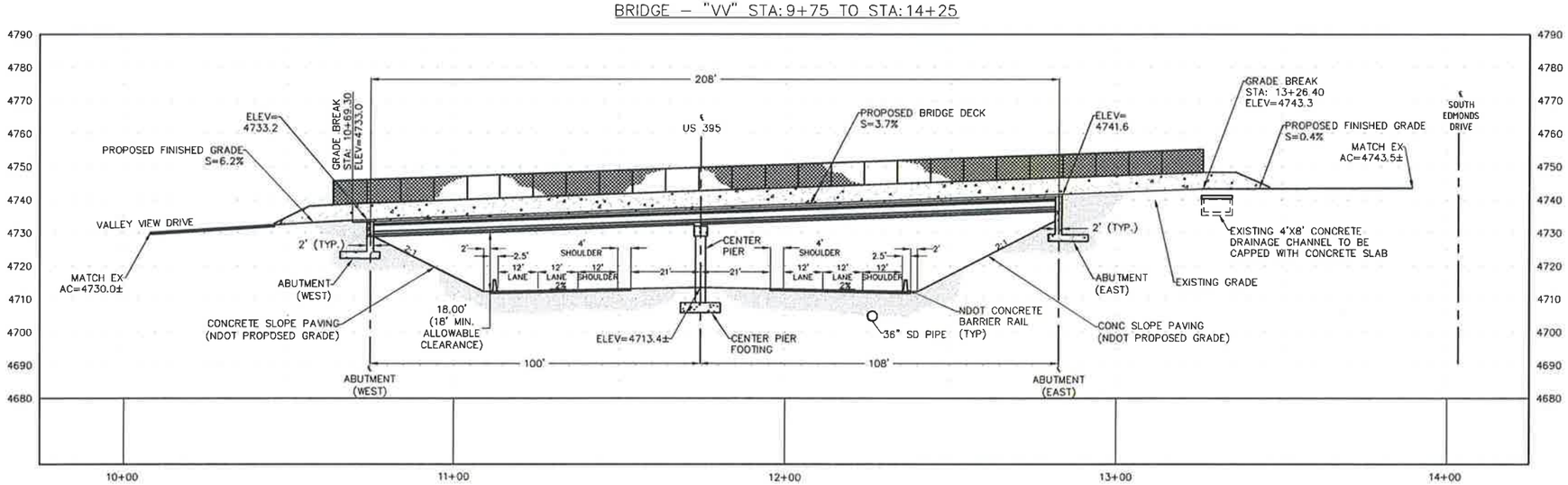
BRIDGE PLAN (1)
SCALE: 1"=20'



NOTES:
1. USER SIDE SHALL BE ILLUMINATED.
2. LIGHTS SHALL BE PLACED UNDER BRIDGE, SIMILAR TO EXISTING FREEWAY BRIDGES

BRIDGE CROSS SECTION (2)
SCALE: 1"=10'

BRIDGE – "VV" STA: 9+75 TO STA: 14+25



BRIDGE PROFILE (3)
SCALE: 1"=30' (VERTICAL AND HORIZONTAL)

CIVIL ENGINEER:
LUMOS & ASSOCIATES
800 EAST COLLEGE PARKWAY
CARSON CITY, NEVADA 89706
PHONE: 775-883-7077
FAX: 775-883-7114

STRUCTURAL ENGINEER:
HYYTINEN ENGINEERING
5458 Longley Lane. Suite B
Reno, Nevada 89511
(775) 826-3019 PHONE
(775) 826-3076 FAX

LUMOS & ASSOCIATES
800 E. COLLEGE PARKWAY
CARSON CITY, NEVADA 89706
TEL (775) 883-7077
FAX (775) 883-7114
WWW.LUMOSENGINEERING.COM

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Carson City Parks and Recreation Department

NON-MOTORIZED USER BRIDGE CROSSING VALLEY VIEW DRIVE
BRIDGE PROFILE AND CROSS SECTIONS

CARSON CITY NEVADA

REV	DATE	DESCRIPTION	BY

C2

DATE:	November 2011
DRAWN BY:	KLN
DESIGNED BY:	CT
CHECKED BY:	MB
JOB NO.:	7933.000

APPENDIX C

NDOT Phase 2B Plans

1. Construction Plan and Notes
   "L" 124+00.00 to "O" 138+00.00

2. Hydraulic Details Plan and Notes
   "L" 124+00.00 to "O" 138+00.00

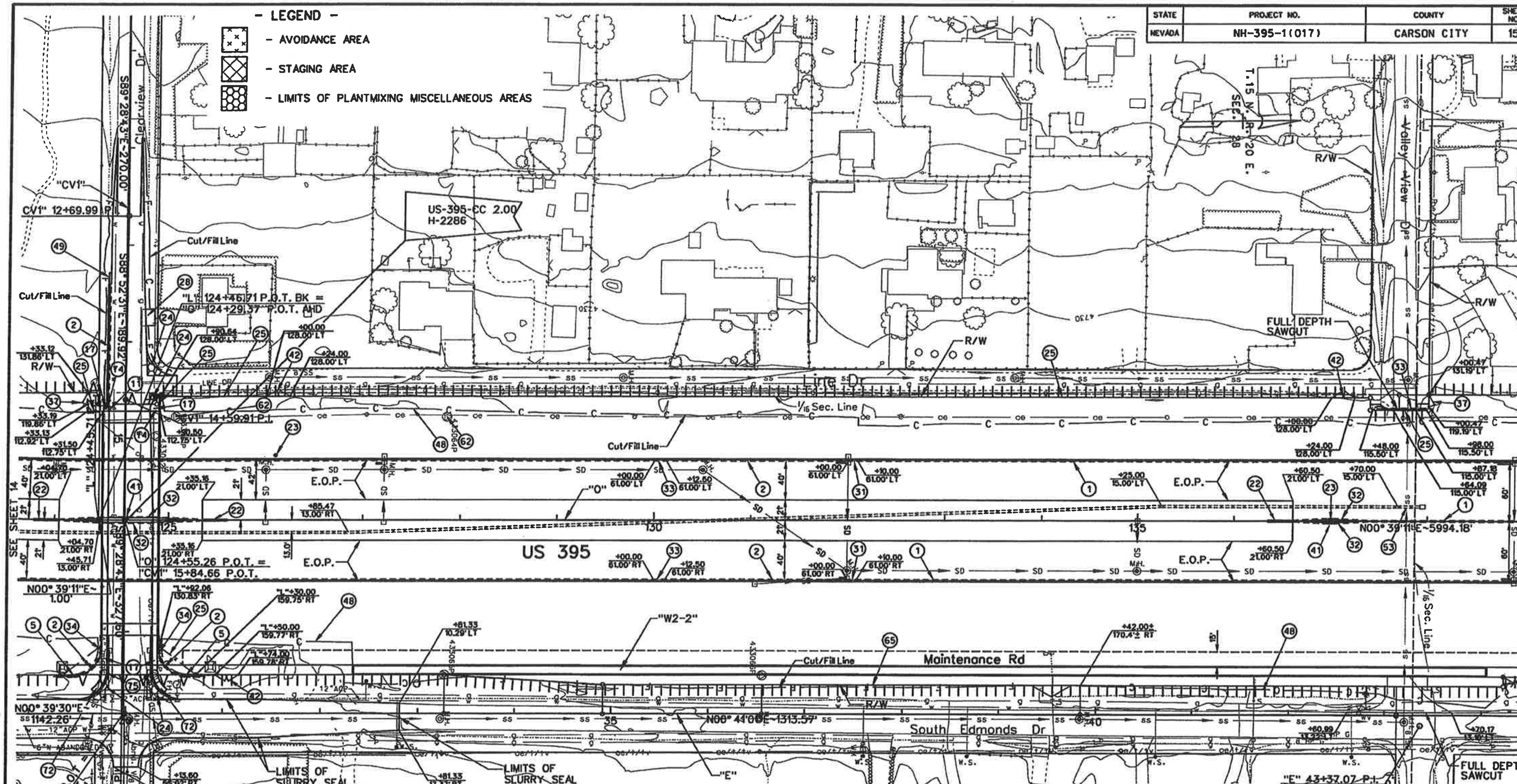
3. Lighting Plans
   "L" 124+00.00 to "O" 181+00.00

4. Landscape Plan
   "L" 124+00.00 to "O" 138+00.00

5. Sound Wall Plan
   General Notes and Quanitites

6. Signage Plans
   a. Permanent Sign Installations
   b. Sign Details
   c. Overhead Sign Structure Detail

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	15



NOTE:
FOR CONSTRUCTION NOTES SEE SHEET 15A.

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY LSF
DRAWN BY CFV
CHECKED BY JCR
REVIEWED BY TDL

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

CONSTRUCTION PLAN

"L" 124+00.00 TO "O" 138+00.00

FILE NAME:X:\870-Carson Bypass\2B\Roadway\Plans\870-2B-c10.dgn - 4/9/2008 - 15:40:06 JPS

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	15A

No.	Location	Note
1	"O" 132+10.00, 61.00' LT TO "O" 139+00.00, 61.00' LT "O" 132+10.00, 61.00' RT TO "O" 139+00.00, 61.00' RT "O" 137+39.50, 1.00' LT TO "O" 143+49.23, 1.00' LT	CONSTRUCT CONCRETE BARRIER RAIL, TYPE FA. NDOT STD. R-8.6.2.
2	"O" 130+12.50, 61.00' LT TO "O" 132+00.00, 61.00' LT "O" 130+12.50, 61.00' RT TO "O" 132+00.00, 61.00' RT "CV1" 13+40.00, 17.00' RT TO "CV1" 14+66.87, 17.00' RT "CV1" 17+13.65, 34.50' LT TO "CV1" 17+46.97, 64.20' LT "CV1" 17+13.52, 22.50' RT TO "CV1" 17+46.89, 52.58' RT	CONSTRUCT CONCRETE BARRIER RAIL, TYPE A. NDOT STD. R-8.6.1.
5	"CV1" 17+46.97, 64.20' LT TO "CV1" 17+47.17, 84.20' LT "CV1" 17+46.89, 52.58' RT TO "CV1" 17+46.84, 72.58' RT	CONSTRUCT TYPE A BARRIER RAIL VERTICAL TAPER. NDOT STD. R-8.6.5.
11	"CV1" 14+66.87, 17.00' RT TO "CV1" 14+71.87, 17.00' RT	CONSTRUCT CONCRETE CURB AND GUTTER TYPE 5. NDOT STD. R-5.1.1 AND SHEETS 75 AND SD10.
17	"CV1" 14+66.87, 17.00' RT TO "CV1" 14+71.87, 17.00' RT "CV1" 14+56.45, 34.47' LT TO "CV1" 14+71.97, 25.09' LT "CV1" 17+03.64, 29.00' LT TO "CV1" 17+63.60, 41.09' LT "CV1" 17+03.53, 17.00' RT TO "CV1" 17+63.61, 29.47' RT	CONSTRUCT CONCRETE SIDEWALK. NDOT STD. R-5.2.1, AND SHEETS 75, 76 AND SD10.
22	"L" 124+04.70, 1.00' LT "L" 125+35.16, 1.00' LT "O" 136+60.50, 1.00' LT	INSTALL IMPACT ATTENUATOR, 70 MPH. SEE SHEETS SD1, SD4 AND SD5.
23	"O" 126+10.00 LT "O" 137+00.00, 0.00'	INSTALL OVERHEAD SIGN, SEE SIGNING PLANS.
24	"CV1" 14+04.72, 20.53' LT TO "CV1" 14+34.97, 21.97' LT "CV1" 14+53.59, 24.37' LT TO "CV1" 14+59.65, 24.64' LT "CV1" 17+39.54, 27.50' LT TO "CV1" 17+69.54, 58.92' LT "CV1" 17+39.27, 15.50' RT TO "CV1" 17+69.27, 47.07' RT	PLANTMIX MISCELLANEOUS AREAS.
25	"O" 124+33.13, 112.92' LT TO "O" 124+31.50, 112.75' LT "O" 124+90.50, 112.75' LT TO "O" 124+90.64, 128.00' LT "O" 124+90.64, 128.00' LT TO "O" 126+00.00, 128.00' LT "O" 126+24.00, 128.00' LT TO "O" 137+00.00, 128.00' LT "O" 137+24.00, 128.00' LT TO "O" 138+00.47, 119.19' LT "O" 124+92.06, 130.83' RT TO "O" 125+50.00, 159.77' RT	INSTALL 72-INCH CHAIN LINK FENCE. NDOT STD. R-6.3.1.
28	"CV1" 13+66.26, 18.70' LT TO "CV1" 13+83.24, 19.50' LT	CONSTRUCT SINGLE FAMILY CONCRETE DRIVEWAY. SEE SHEET 2U.
31	"O" 132+00.00, 61.00' LT TO "O" 132+10.00, 61.00' LT "O" 132+00.00, 61.00' RT TO "O" 132+10.00, 61.00' RT	CONSTRUCT TYPE A BARRIER RAIL TO TYPE FA BARRIER RAIL TRANSITION. NDOT STD. R-8.6.3.
32	"O" 124+04.70, 1.00' LT TO "O" 125+35.16, 1.00' LT "O" 124+04.70, 1.00' RT TO "O" 125+35.16, 1.00' RT "O" 136+60.50, 1.00' LT TO "O" 137+39.50, 1.00' LT "O" 136+60.50, 1.00' RT TO "O" 137+39.50, 1.00' RT	CONSTRUCT CONCRETE BARRIER RAIL TYPE FB. NDOT STD. R-8.6.2.
33	"O" 130+00.00, 61.00' LT TO "O" 130+12.50, 61.00' LT "O" 130+00.00, 61.00' RT TO "O" 130+12.50, 61.00' RT "O" 137+48.00, 115.50' LT TO "O" 137+98.00, 115.50' LT	INSTALL PORTABLE PRECAST CONCRETE BARRIER RAIL. NDOT STD. R-8.7.1.
34	"CV1" 17+03.65, 34.50' LT TO "CV1" 17+13.65, 34.50' LT "CV1" 17+03.52, 22.50' RT TO "CV1" 17+13.52, 22.50' RT	CONSTRUCT BRIDGE BARRIER TO TYPE A BARRIER RAIL TRANSITION. SEE SHEET SD2.
37	"O" 124+33.15, 125.86' LT "O" 138+00.47, 125.19' LT	INSTALL 12' SINGLE SWING GATE. NDOT STD. R-6.3.3.
41	"O" 124+18.37, 0.00' TO "O" 125+21.41, 0.00' "O" 136+74.22, 0.00' TO "O" 137+25.78, 0.00'	CONSTRUCT 4" CONCRETE ISLAND PAVING, NDOT STD. R-8.6.2.
42	"O" 125+50.00, 159.71' RT TO "O" 125+74.00, 159.78' RT "O" 126+00.00, 128.00' LT TO "O" 126+24.00, 128.00' LT "O" 137+00.00, 128.00' LT TO "O" 137+24.00, 128.00' LT	INSTALL 24' DOUBLE SWING GATE. NDOT STD. R-6.3.3.
48	"O" 124+75±, 314'± LT TO "O" 143+84±, 110'± LT "O" 125+41±, 314'± LT TO "O" 128+12±, 162'± RT "O" 134+42±, 170'± RT TO "O" 143+84±, 140'± RT	ROUND CUT SLOPE, NDOT STD. R-1.1.1.
49	"CV1" 13+40.00, 17.00' RT	INSTALL IMPACT ATTENUATOR, 45 MPH.
53	"O" 137+70.00, 15.00' LT	INSTALL CABLE BARRIER TERMINAL.
62	"O" 125+07.02, 107.06' LT "O" 127+85.36, 106.87' LT	PERPETUATE SURVEY MONUMENT.
65	"O" 125+74.00, 159.78' RT TO "O" 138+80.31, 160.48' RT	INSTALL 62" CHAIN LINK FENCE. SEE SHEET SD9.
72	"CV1" 17+39.54, 29.00' LT TO "CV1" 17+63.60, 41.09' LT "CV1" 17+39.27, 17.00' RT TO "CV1" 17+63.61, 29.47' RT	CONSTRUCT SPECIAL TYPE CURB RAMP. SEE SHEETS 76 AND SD10.
74	"CV1" 14+66.87, 17.00' RT TO "CV1" 14+83.87, 17.00' RT "CV1" 14+56.45, 34.47' LT TO "CV1" 14+83.97, 25.53' LT	CONSTRUCT SPECIAL TYPE CURB RAMP. SEE SHEETS 75 AND SD11.
75	"CV1" 17+03.64, 29.00' LT TO "CV1" 17+63.60, 41.09' LT "CV1" 17+03.53, 17.00' RT TO "CV1" 17+63.61, 29.47' RT	CONSTRUCT CONCRETE CURB AND GUTTER TYPE 5 MODIFIED. SEE SHEETS 76 AND SD10.

NOTE:

FOR CONSTRUCTION PLAN SEE SHEET 15.

100% SUBMITTAL
NOT FOR CONSTRUCTION

THOMAS D. LANE
CIVIL

DESIGNED BY LSF
DRAWN BY GFV
CHECKED BY JCR
REVIEWED BY TDL

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

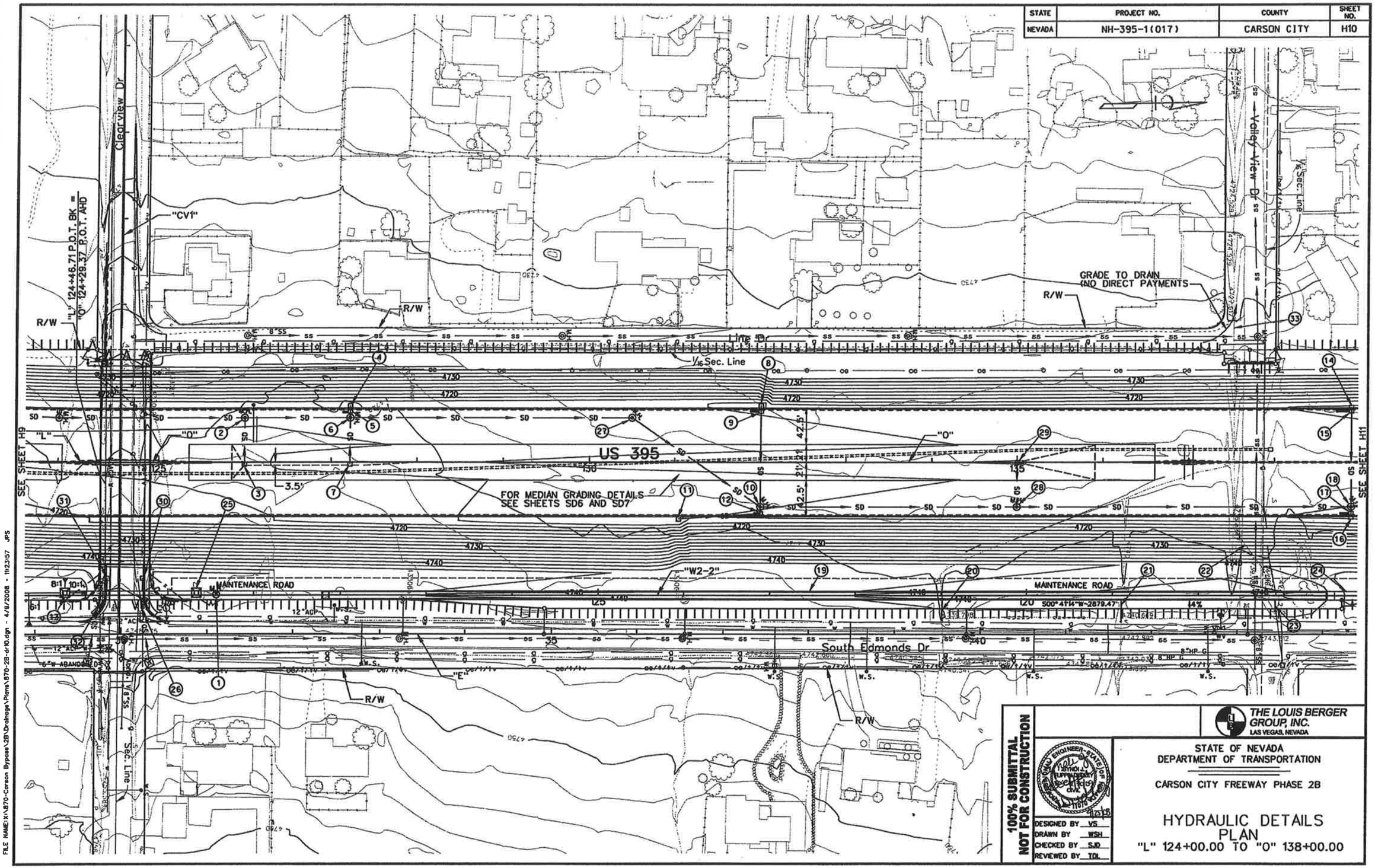
CARSON CITY FREEWAY PHASE 2B

CONSTRUCTION NOTES

"L" 124+00.00 TO "O" 138+00.00

REFERENCE FILES: 870-2B-border.mst
FILE NAME: X:\B70-Carson Bypass\2B\Roadway\Plans\870-2B-ct0.dgn - 4/9/2008 - 15:40:10 JPS

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	H10



REFERENCE FILES: 870-dgnusl - 870-28-Prop Contour.mst - 870-08by-10E-NDOT.mst - 870-28-Drainage.mst - 870-28-Grading.mst - 870-28-closed.mst - 870-28-border.mst - 870-28-Geom.mst - 870-28-border_mst - 870-ROW.mst - 870-28-Removal-Contours.mst - 870-28-Removal-Topo.mst - 870-28-Topo-of-Slope.mst - 870-28-Add-Topo-Trees.mst - 870-28-Grading.mst - 870-28-Drainage.mst - 870-28-closed.mst - 870-28-border.mst - 870-28-Geom.mst - 870-28-border.mst - 870-ROW.mst - 870-28-Removal-Topo.mst

FILE NAME: X:\870-Carson Bypass\28\Drainage\Plans\870-28-dr10.dgn - 4/8/2008 - 11:23:57 JPS

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NOT FOR CONSTRUCTION

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

HYDRAULIC DETAILS PLAN

"L" 124+00.00 TO "O" 138+00.00

DESIGNED BY VS
DRAWN BY WSH
CHECKED BY SJD
REVIEWED BY TDL

No.	Location	Note
1	"W2-2" 129+44.00	CONSTRUCT RCB MANHOLE 3.00' RT (SEE SHEET H40. H144).
2	"O" 126+00.00	CONSTRUCT TYPE 2 MH 52.00' LT. INSTALL 36" x 118' RCP. CONNECT TO TYPE 2 MH 52.00' LT OF "O" 127+21.33 (SEE SHEET H34. H68. H127).
3	"O" 126+00.00	CONSTRUCT TYPE 2 DI 2.17' RT. INSTALL 15" x 52' RCP. CONNECT TO TYPE 2 MH 52.00' LT OF "O" 126+00.00 (SEE SHEET H68. H125).
4	"O" 127+21.33	CONSTRUCT TYPE 2A DI 66.00' LT. INSTALL 15" x 5' RCP. CONNECT TO TYPE 2 DI 59.83' LT OF "O" 127+21.33 (SEE SHEET H69. H125).
5	"O" 127+21.33	CONSTRUCT TYPE 2 DI 59.83' LT WITH 6' TRENCH DRAIN. INSTALL 15" x 5' RCP. CONNECT TO TYPE 2 MH 52.00' LT OF "O" 127+21.33 (SEE SHEET H69. H109. H111. H125).
6	"O" 127+21.33	CONSTRUCT TYPE 2 MH 52.00' LT. INSTALL 36" x 325' RCP. CONNECT TO TYPE 2 MH 52.00' LT OF "O" 130+50.00 (SEE SHEET H34. H69. H127).
7	"O" 127+21.33	CONSTRUCT TYPE 2 DI 2.17' RT. INSTALL 15" x 52' RCP. CONNECT TO TYPE 2 MH 52.00' LT OF "O" 127+21.33 (SEE SHEET H69. H125).
8	"O" 132+00.00	CONSTRUCT TYPE 2A DI 66.00' LT. INSTALL 15" x 5' RCP. CONNECT TO TYPE 2 DI 59.83' LT OF "O" 132+00.00 (SEE SHEET H69. H125).
9	"O" 132+00.00	CONSTRUCT TYPE 2 DI 59.83' LT WITH 10' TRENCH DRAIN. INSTALL 15" x 109' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 132+00.00 (SEE SHEET H69. H109. H111. H125).
10	"O" 132+00.00	CONSTRUCT TYPE 2 MH 52.00' RT. INSTALL 36" x 296' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 135+00.00 (SEE SHEET H34. H69. H127).
11	"O" 131+05.00	CONSTRUCT TYPE 2A DI 66.00' RT. INSTALL 15" x 94' RCP. CONNECT TO TYPE 2 DI 59.83' RT OF "O" 132+00.00 (SEE SHEET H69. H125).
12	"O" 132+00.00	CONSTRUCT TYPE 2 DI 59.83' RT WITH 6' TRENCH DRAIN. INSTALL 15" x 5' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 132+00.00 (SEE SHEET H69. H109. H111. H125).
13	"W2-2" 131+20.00	CONSTRUCT TYPE 2B DI 3.00' RT WITH CONCRETE APRON. CONNECT TO 8' X 3' RCB 3.00' RT OF "W2-2" 131+20.00 (SEE SHEET H40. H108. H114. H115).
14	"O" 138+90.00	CONSTRUCT TYPE 2A DI 64.00' LT. INSTALL 15" x 3' RCP. CONNECT TO TYPE 2 DI 59.83' LT OF "O" 138+90.00 (SEE SHEET H69. H125).
15	"O" 138+90.00	CONSTRUCT TYPE 2 DI 59.83' LT WITH 16' TRENCH DRAIN. INSTALL 15" x 109' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 138+90.00 (SEE SHEET H69. H109. H111. H125).
16	"O" 138+90.00	CONSTRUCT TYPE 2A DI 64.00' RT. INSTALL 15" x 3' RCP. CONNECT TO TYPE 2 DI 59.83' RT OF "O" 138+90.00 (SEE SHEET H69. H125).
17	"O" 138+90.00	CONSTRUCT TYPE 2 DI 59.83' RT WITH 10' TRENCH DRAIN. INSTALL 15" x 5' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 138+90.00 (SEE SHEET H69. H109. H111. H125).
18	"O" 138+90.00	CONSTRUCT TYPE 2 MH 52.00' RT. INSTALL 42" x 306' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 142+00.00 (SEE SHEET H35. H69. H127).
19	"W2-2" 116+50.00 TO "W2-2" 128+20.00	CONSTRUCT RECTANGULAR CONCRETE CHANNEL (SEE SHEET H40. H101. H105. H106. H107. H121).
20	"W2-2" 120+99±	REMOVE CMP END SECTION AND CLEAN EXISTING CMP. CONSTRUCT CONCRETE COLLAR 29'± LT. INSTALL 24" X 26' CMP AND CONNECT TO RECTANGULAR CONCRETE CHANNEL 4.00' LT OF "W2-2" 120+99.00 (SEE SHEET H70. H108. H114).
21	"W2-2" 118+89±	REMOVE CMP END SECTION AND CLEAN EXISTING CMP. CONSTRUCT CONCRETE COLLAR 31'± LT. INSTALL 24" X 28' CMP AND CONNECT TO RECTANGULAR CONCRETE CHANNEL 4.00' LT OF "W2-2" 118+89.00 (SEE SHEET H70. H108. H114).
22	"W2-2" 117+23±	REMOVE CMP END SECTION 30'± RT. 24" X 45' CMP. AND CMP END SECTION 67'± RT OF "W2-2" 117+50±.
23	"W2-2" 117+10±	REMOVE CMP END SECTION AND CLEAN EXISTING CMP. CONSTRUCT CONCRETE COLLAR 18'± LT. INSTALL 24" X 15' CMP AND CONNECT TO RECTANGULAR CONCRETE CHANNEL 4.00' LT OF "W2-2" 117+10.00 (SEE SHEET H70. H108. H114).
24	"W2-2" 102+00.00 TO "W2-2" 116+50.00	CONSTRUCT 8' X 4' X 1450' RCB (SEE SHEET H41. H42. H105. H106).
25	"W2-2" 129+66.75	CONSTRUCT TYPE 2B DI 3.00' RT WITH CONCRETE APRON. CONNECT TO 8' X 3' RCB 3.00' RT OF "W2-2" 129+66.75 (SEE SHEET H40. H108. H115).
26	"E" 30+23.91	REMOVE 23" X 14" X 35' HE-RCP AND 23" X 14" HE-RCP END SECTION. CONSTRUCT CONCRETE COLLAR 33.21' LT. INSTALL 23" X 14" X 11' HE-RCP. CONNECT TO 8' X 4' RCB 4.00' LT OF "W2-2" 130+31.81 (SEE SHEET H71. H108. H114).
27	"O" 130+50.00	CONSTRUCT TYPE 2 MH 52.00' LT. INSTALL 36" x 179' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 132+00.00 (SEE SHEET H34. H127).
28	"O" 135+00.00	CONSTRUCT TYPE 2 MH 52.00' RT. INSTALL 36" x 386' RCP. CONNECT TO TYPE 2 MH 52.00' RT OF "O" 138+90.00 (SEE SHEET H34. H71. H127).
29	"O" 135+00.00	CONSTRUCT TYPE 2A DI 0.00' LT. INSTALL 15" X 49' RCP. CONNECT TO TYPE 2 MH 52.00' LT OF "L" 135+00.00 (SEE SHEET H71. H125).
30	"CV1" 17+19.48	CONSTRUCT TYPE 3 DI 29.00' LT. INSTALL 24" X 14' RCP. CONNECT TO 8' X 4' RCB 4.00' RT OF "W2-2" 130+29.79 (SEE SHEET H72. H114. H126).
31	"CV1" 17+19.48	CONSTRUCT TYPE 3 DI 17.00' RT. INSTALL 24" X 14' RCP. CONNECT TO 8' X 4' RCB 4.00' RT OF "W2-2" 130+71.49 (SEE SHEET H72. H114. H126).
32	"E" 29+72.39	REMOVE 23" X 14" X 39' HE-RCP AND 23" X 14" HE-RCP END SECTION. CONSTRUCT CONCRETE COLLAR 33.23' LT. INSTALL 23" X 14" X 11' HE-RCP. CONNECT TO 8' X 4' RCB 4.00' LT OF "W2-2" 130+80.04 (SEE SHEET H72. H108. H114).
33	"O" 137+51±	REMOVE CMP END SECTION 119±' LT. 24" X 46' CMP. AND CMP END SECTION 164±' LT OF "O" 137+51±.

100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY VS
DRAWN BY WSH
CHECKED BY SJD
REVIEWED BY TDL

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

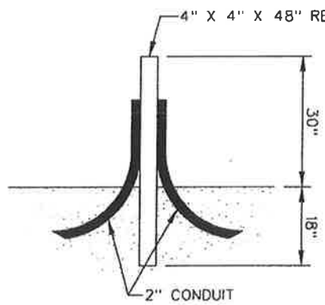
CARSON CITY FREEWAY PHASE 2B

HYDRAULIC DETAILS PLAN NOTES

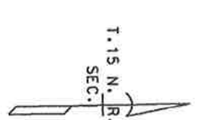
"L" 124+00.00 TO "O" 138+00.00

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	T10

PULL BOX SCHEDULE		
PULL BOX/ JUNCTION BOX	STATION OFFSET	TYPE
(la)	"CV1" 14+66.0, ± 65.0' LT	No. 7
(lb)	"O" 125+20.0, ± 65.0' LT	No. 7
(lc)	"O" 126+95.0, ± 65.0' LT	No. 3½
(ld)	"O" 128+95.0, ± 65.0' LT	No. 3½
(le)	"O" 130+95.0, ± 65.0' LT	No. 3½
(lf)	"O" 132+95.0, ± 65.0' LT	No. 3½
(lg)	"O" 134+95.0, ± 65.0' LT	No. 3½
(lh)	"O" 136+95.0, ± 65.0' LT	TYPE 2
(li)	"O" 136+95.0, ±	TYPE 2
(ma)	"CV1" 14+68.0, ± 33.0' LT	No. 3½
(ya)	"O" 126+05.0, ± 65.0' LT	No. 7
(va)	"CV1" 14+40.0, ± 22.0' RT	No. 5
(vb)	"O" 126+25.0, ± 70.0' LT	No. 5



DETAIL "A"
NTS



100% SUBMITTAL
NOT FOR CONSTRUCTION

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

PROFESSIONAL ENGINEER - STATE OF NEVADA
NANCY L GEISLER
4-27-08
No. 12838
CIVIL
EXP 6-30-07

DESIGNED BY ALB
DRAWN BY WHW
CHECKED BY NLG
REVIEWED BY TDL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

LIGHTING PLAN

"L" 124+00.00 TO "O" 138+00.00

REFERENCE FILES:870-dsgn.mst - 870-ROW.mst - 870-23_lighting.mst 870-23-Removal-topo.mst - 870-2B-Geom.mst - 870-2B-Aed-Topo-Trees.mst
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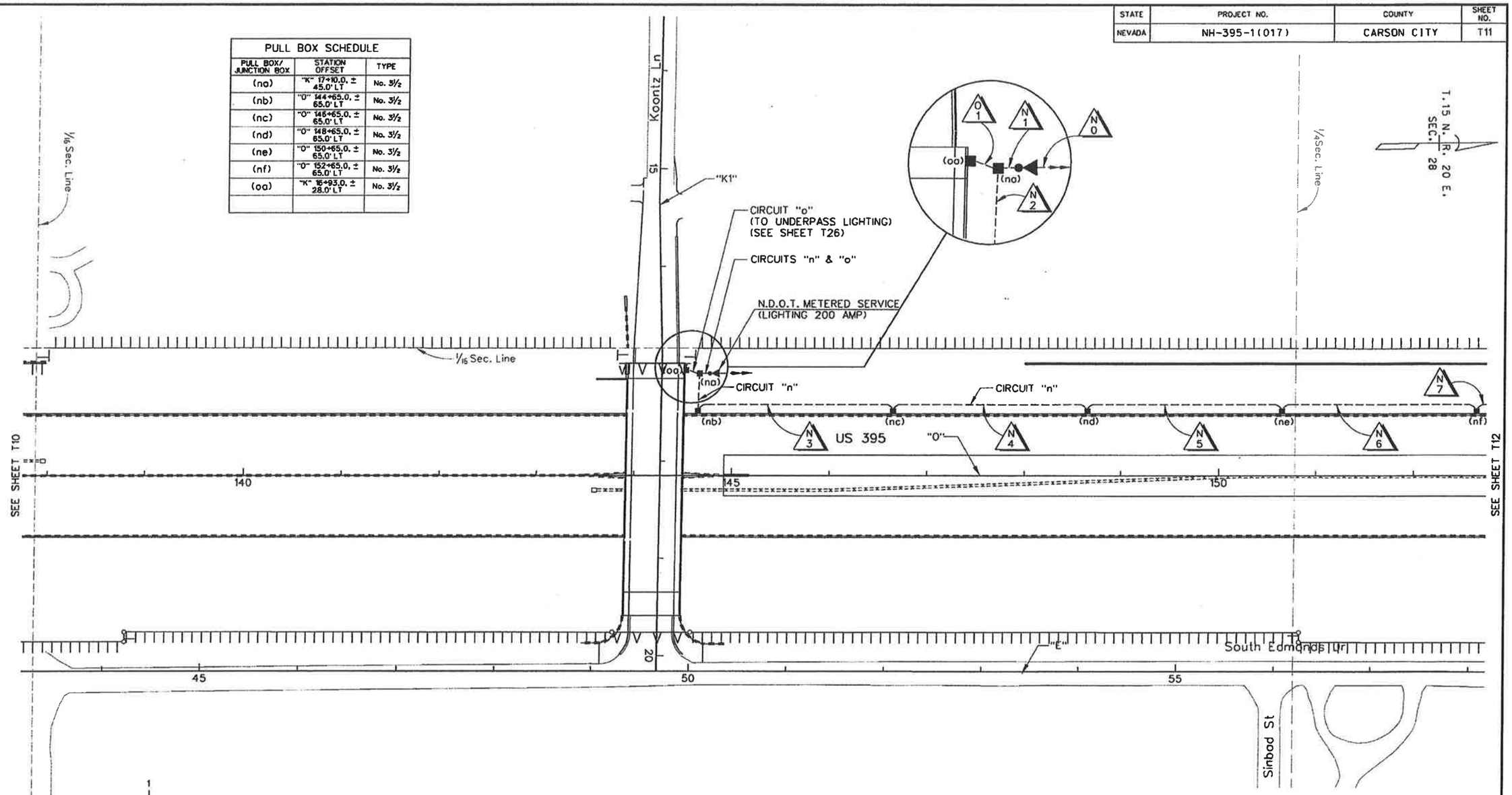
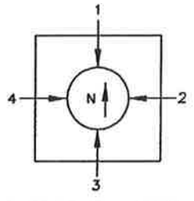
STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	T11

PULL BOX SCHEDULE		
PULL BOX/ JUNCTION BOX	STATION OFFSET	TYPE
(na)	"K" 17+10.0, ± 45.0' LT	No. 3½
(nb)	"O" 144+65.0, ± 65.0' LT	No. 3½
(nc)	"O" 146+65.0, ± 65.0' LT	No. 3½
(nd)	"O" 148+65.0, ± 65.0' LT	No. 3½
(ne)	"O" 150+65.0, ± 65.0' LT	No. 3½
(nf)	"O" 152+65.0, ± 65.0' LT	No. 3½
(oa)	"K" 16+93.0, ± 28.0' LT	No. 3½





QUADRANT ARM LOCATION
(TOP VIEW)

100% SUBMITTAL
NOT FOR CONSTRUCTION

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

PROFESSIONAL ENGINEER - STATE OF NEVADA
NANCY L. GEISLER
4-27-08
CIVIL
No. 12938
EXP. 6-30-09

DESIGNED BY ALB
DRAWN BY WHW
CHECKED BY NLG
REVIEWED BY TDL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

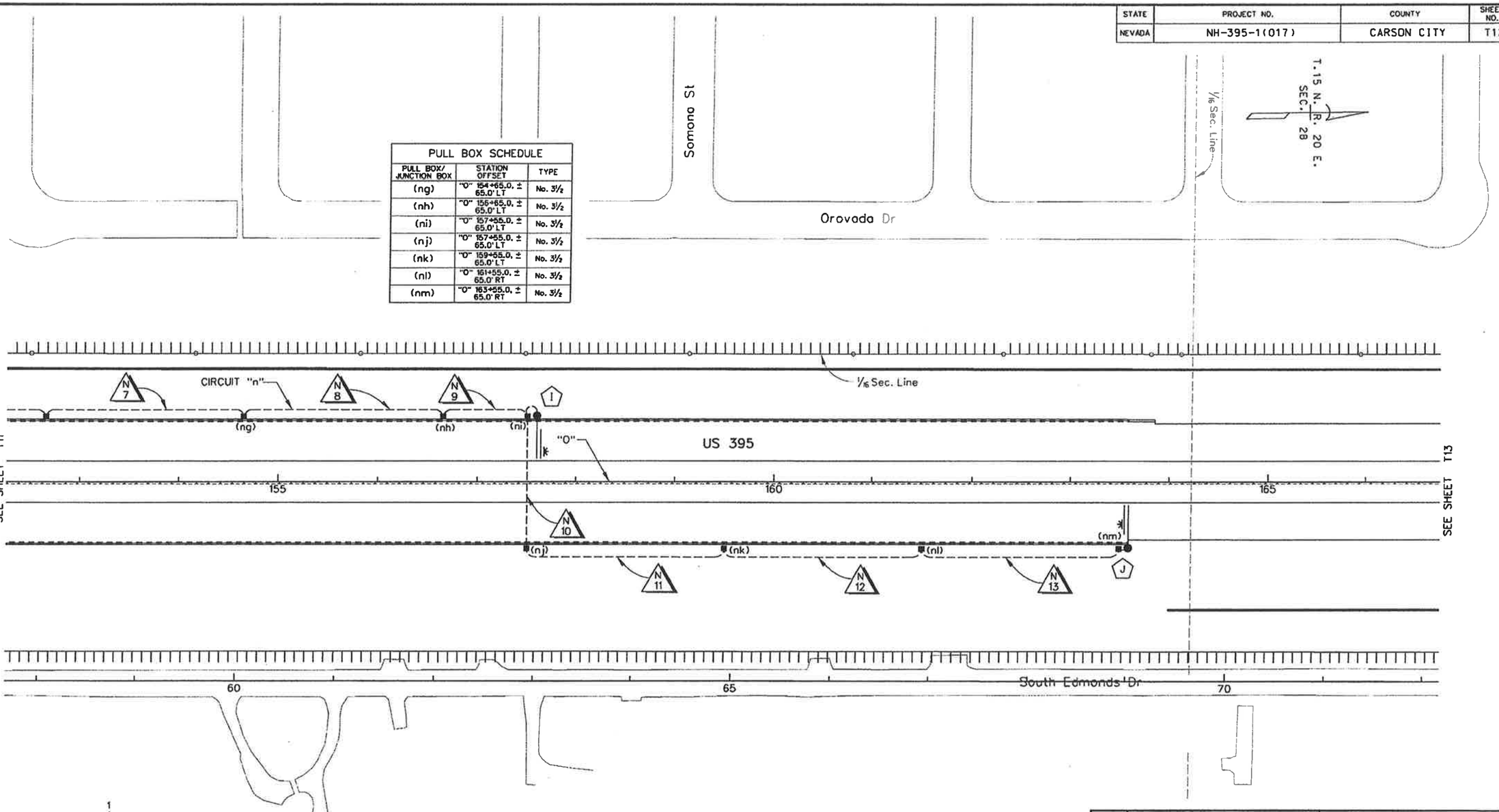
LIGHTING PLAN

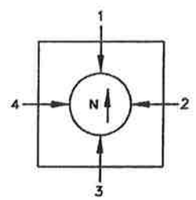
"O" 138+00.00 TO "O" 152+50.0

REFERENCE FILES: 870-dgn.mst · 870-ROW.mst · 870-23-Lighting.mst · 870-2B-Topo.mst 870-23-Geom.mst · 870-2B-border.mst
FILE NAME: X:\870-Carson Bypass\2B\Traffic\Lighting\Plans\870-2B-111.dgn - 11/5/2007 - 11:42:08

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	T12

PULL BOX SCHEDULE		
PULL BOX/ JUNCTION BOX	STATION OFFSET	TYPE
(ng)	"O" 154+65.0, ± 65.0' LT	No. 3½
(nh)	"O" 156+65.0, ± 65.0' LT	No. 3½
(ni)	"O" 157+55.0, ± 65.0' LT	No. 3½
(nj)	"O" 157+55.0, ± 65.0' LT	No. 3½
(nk)	"O" 159+55.0, ± 65.0' LT	No. 3½
(nl)	"O" 161+55.0, ± 65.0' RT	No. 3½
(nm)	"O" 163+55.0, ± 65.0' RT	No. 3½





QUADRANT ARM LOCATION
(TOP VIEW)

100% SUBMITTAL
NOT FOR CONSTRUCTION

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

PROFESSIONAL ENGINEER - STATE OF NEVADA
MANCIL GEISLER
4-21-08
CIVIL
No. 12818
EXP. 6-30-09

DESIGNED BY ALB
DRAWN BY WHW
CHECKED BY NLG
REVIEWED BY TDL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

LIGHTING PLAN

"O" 166+50.00 TO "O" 181+00.00

REFERENCE FILES: 870-dfgn.mst - 870-ROW.mst - 870-2B-Lighting.mst - 870-2B-topo.mst 870-2B-Geom.mst - 870-2B-border.mst
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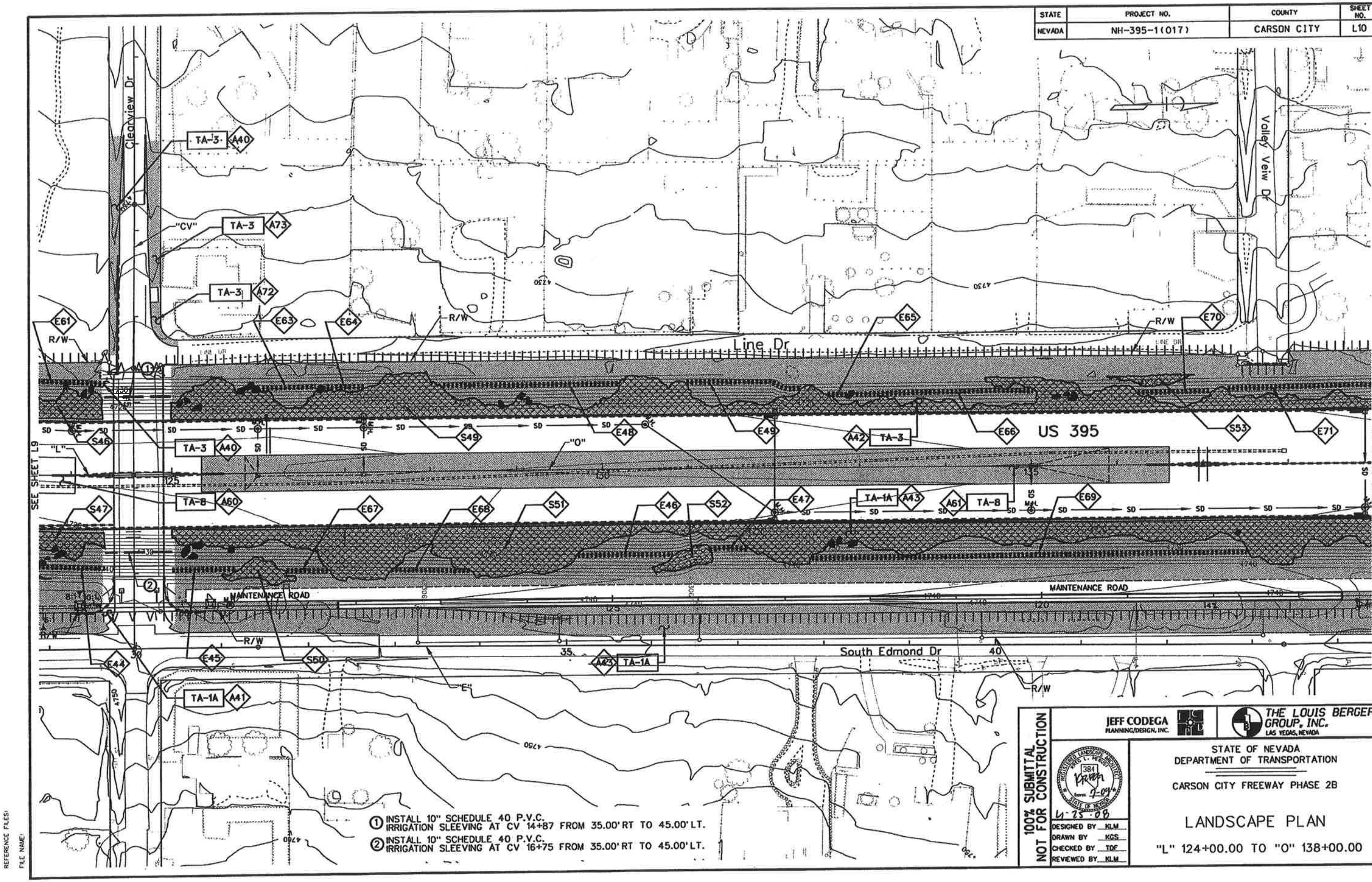
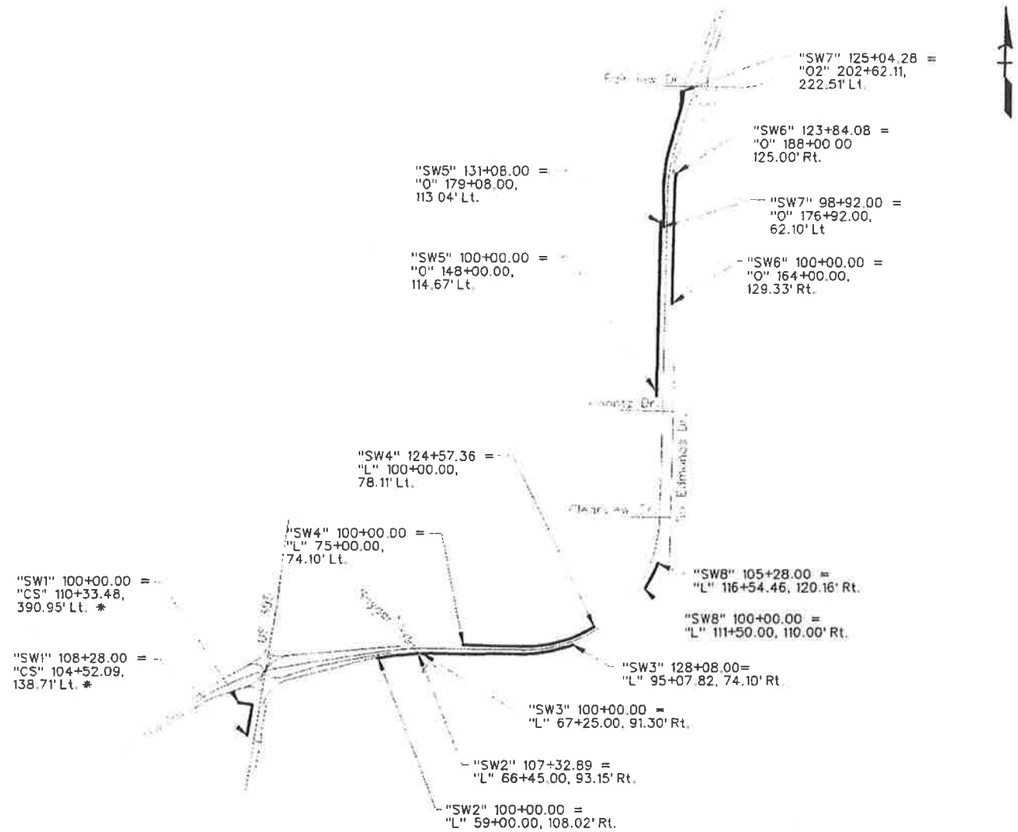

STATE
PROJECT NO.
COUNTY
SHEET NO.
NEVADA
NH-395-1(017)
CARSON CITY
L10
Clearview Dr
Valley Veiw Dr
Line Dr
US 395
South Edmond Dr
MAINTENANCE ROAD
SEE SHEET L9
SEE SHEET L11
R/W
"CV"
"L"
"O"
"E"
TA-3
A40
A73
A72
A42
TA-8
A60
A61
TA-1A
A43
A41
E61
E63
E64
E65
E70
E48
E49
E66
E71
E67
E68
E46
E47
E69
E44
E45
S46
S49
S53
S47
S51
S52
S50
SD
① INSTALL 10" SCHEDULE 40 P.V.C. IRRIGATION SLEEVING AT CV 14+87 FROM 35.00'RT TO 45.00'LT.
② INSTALL 10" SCHEDULE 40 P.V.C. IRRIGATION SLEEVING AT CV 16+75 FROM 35.00'RT TO 45.00'LT.
100% SUBMITTAL
NOT FOR CONSTRUCTION
JEFF CODEGA PLANNING/DESIGN, INC.
THE LOUIS BERGER GROUP, INC. LAS VEGAS, NEVADA
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION
CARSON CITY FREEWAY PHASE 2B
LANDSCAPE PLAN
"L" 124+00.00 TO "O" 138+00.00
DESIGNED BY KLM
DRAWN BY KGS
CHECKED BY TDF
REVIEWED BY KLM
6-25-08
REFERENCE FILES:
FILE NAME:

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	SW-01



SOUNDWALL GENERAL LAYOUT

BID ITEM QUANTITY TABLE

ITEM No.	DESCRIPTION	UNIT	SW1*	SW2	SW3	SW4	SW5	SW6	SW7	SW8	TOTAL
206 0500	STRUCTURE EXCAVATION	CU. YD.	-----	818	2992	2543	2631	2416	2656	417	14327
207 0504	GRANULAR BACKFILL	CU. YD.	-----	583	2154	1790	1907	1736	1890	305	10236
212 1401	AESTHETIC PATTERNING	SQ. YD	-----	2317	8843	8224	6296	5650	7171	996	39307
502 0840	CLASS "AA" CONCRETE, MODIFIED (MAJOR)	CU. YD.	-----	189	656	611	534	529	607	81	3204
502 0864	CLASS "EA" CONCRETE, MODIFIED (MAJOR)	CU. YD.	-----	290	1105	1028	787	706	896	124	4913
502 0878	CONCRETE STAIN	Sq. YD	-----	2060	6655	6575	5045	5088	6017	704	32076
505 0500	REINFORCING STEEL	POUND	-----	60,603	200,455	194,007	101,747	119,087	184,151	13,439	872,008
612 0100	GRAFFITI RESISTANT COATING	SQ. YD.	-----	-----	-----	-----	-----	-----	-----	-----	-----
640 0014	ACCESS DOOR	EACH.	-----	-----	2	2	2	2	2	-----	10

* SW1 Has Been Deleted

GENERAL NOTES:

1. DESIGN SPECIFICATIONS: "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 17th EDITION 2002 AND "GUIDE SPECIFICATIONS FOR STRUCTURAL DESIGN OF SOUND BARRIERS" 1989 WITH INTERIM THROUGH 2002.
2. CONSTRUCTION SPECIFICATIONS: STATE OF NEVADA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION 2001" EXCEPT AS NOTED BELOW AND IN THE SPECIAL PROVISIONS FOR THIS CONTRACT.
3. WIND LOAD: STAND-ALONE SOUNDWALL
   20 PSF FOR $0 < H \leq 14'$
4. SEISMIC LOAD: ACCELERATION COEFFICIENT 0.40 g
5. CONCRETE: CONCRETE SHALL BE CLASS AA MODIFIED (MAJOR) WITH $f_c' = 4.0$ KSI AT 28 DAYS EXCEPT CLASS EA MODIFIED (MAJOR) WITH $f_c' = 4.0$ KSI AT 28 DAYS SHALL BE USED IN BARRIER RAILS AND WALLS.
6. REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60. DIMENSIONS RELATING TO BAR SPACING ARE CENTER TO CENTER. BENDING DIMENSIONS ARE FROM OUT TO OUT OF BARS. BAR SIZES THREE (3) TO NINE (9) ARE INDICATED BY THE FIRST NUMBER OF THE MARK, TEN (10) OR LARGER BY THE FIRST TWO NUMBERS. BAR MARKS ENDING WITH THE LETTER "E" INDICATE THAT THE BAR SHALL BE EPOXY COATED THE FULL LENGTH OF BAR. SIZES FOUR (4) AND FIVE(5), WHEN CONSIDERED AS BARS TO CONTROL TEMPERATURE, SHRINKAGE AND DISTRIBUTION STRESSES BY THE ENGINEER MAY BE ADJUSTED BY THE CONTRACTOR UPON CONCURRENCE AND APPROVAL OF THE ENGINEER.
7. FOUNDATION: SPREAD FOOTINGS. MAXIMUM SOIL RETAINING HEIGHT AT ANY SOUNDWALL LOCATION SHALL BE LIMITED TO 2 FEET ABOVE F.G. SHOWN ON THE PLANS UNLESS NOTED OTHERWISE.
8. AESTHETIC TREATMENT OF SOUNDWALLS SHALL BE AS SHOWN ON THESE PLANS AND ON SHEETS SW-01 THROUGH SW-32.
9. WALL JOINTS SHALL BE PLACED AS SHOWN ON WALL ELEVATIONS.
10. INCIDENTAL ITEMS: ALL ITEMS SHOWN OR NOTED ON THE PLANS WHICH ARE NOT SPECIFICALLY BID ITEMS ARE CONSIDERED INCIDENTAL ITEMS. THE COST OF FURNISHING AND INSTALLING ALL SUCH ITEMS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OTHER ITEMS, UNLESS NOTED OTHERWISE.
11. FOUNDATIONS: THE WALLS SHALL BE FOUNDED ON SPREAD FOOTINGS IN COMPACTED FILL WITH AN ALLOWABLE BEARING PRESSURE OF 1.5 TONS PER SQUARE FOOT.

100% SUBMITTAL NOT FOR CONSTRUCTION

PBS&J

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

PROFESSIONAL ENGINEER (CIVIL) JAIME A. CHANG EXP. 12/31/08 No. 14023 STATE OF NEVADA

4/23/08

DESIGNED BY YD
DRAWN BY JM
CHECKED BY JC
REVIEWED BY JF

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

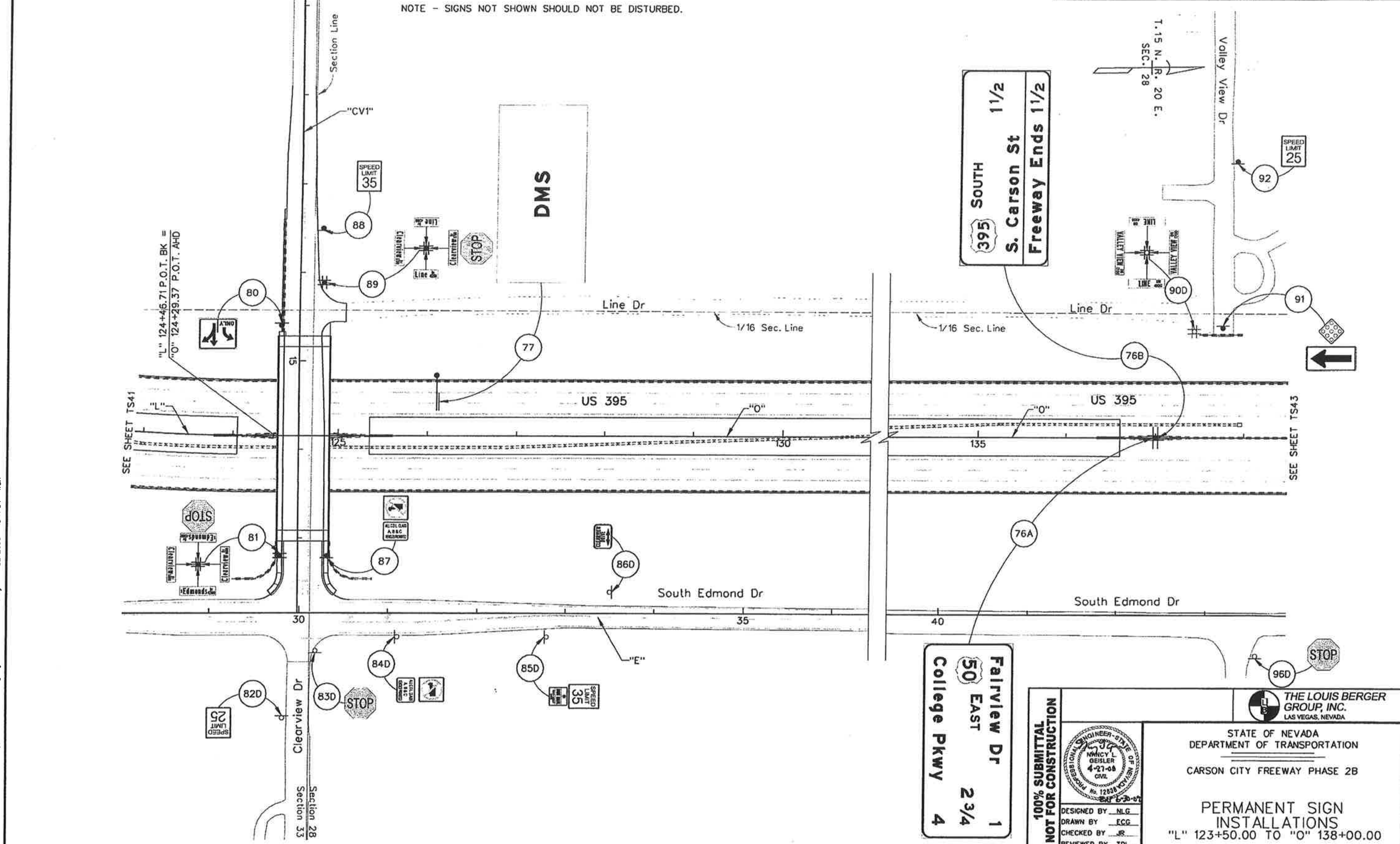
CARSON CITY FREEWAY PHASE 2B

GENERAL NOTES AND QUANTITIES

x \structures nevada\projects\587043\sheets\7043_sw_01.dgn

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	TS42

NOTE - SIGNS NOT SHOWN SHOULD NOT BE DISTURBED.



100% SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BY NLG
DRAWN BY ECG
CHECKED BY JR
REVIEWED BY TDL

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

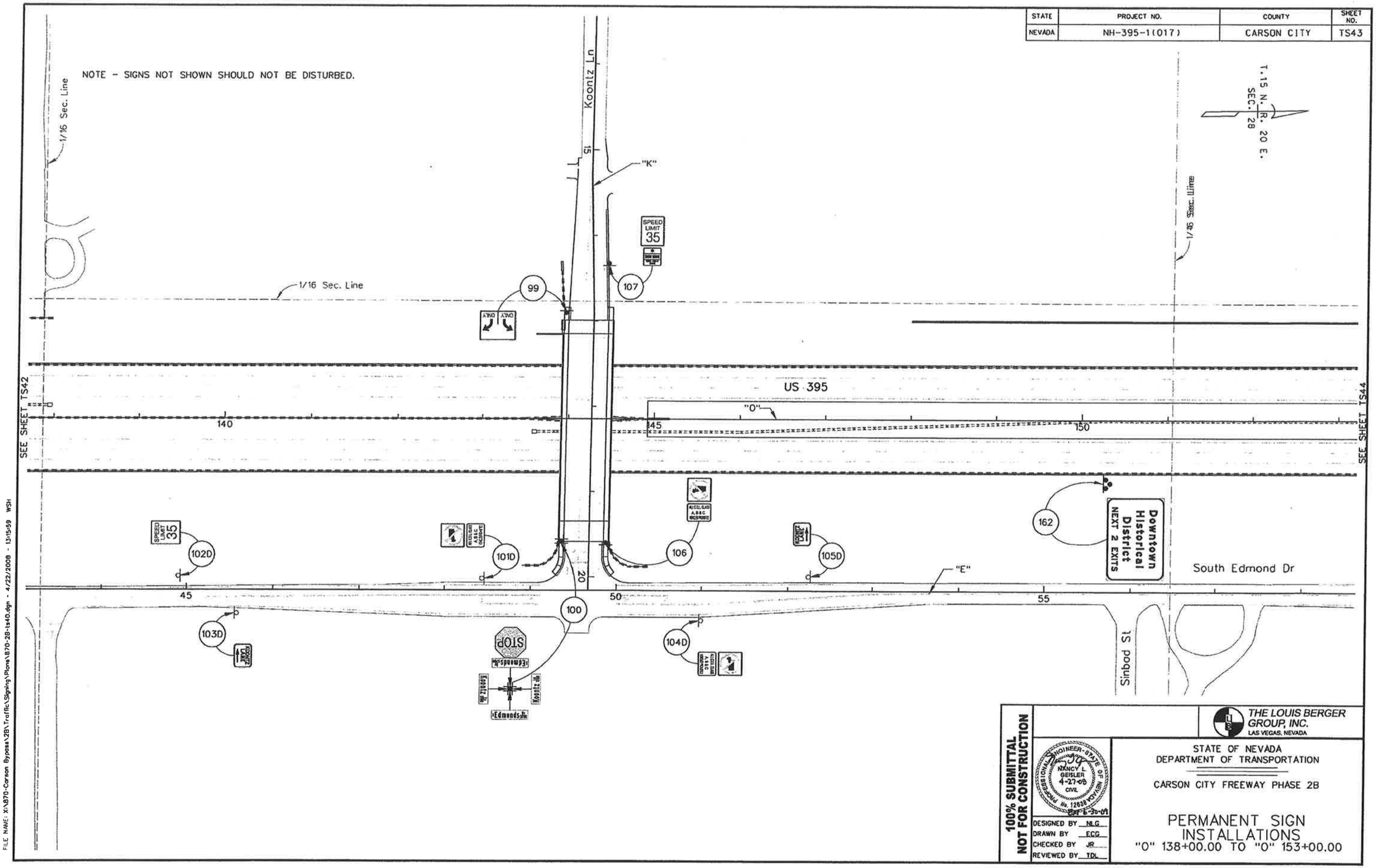
PERMANENT SIGN INSTALLATIONS

"L" 123+50.00 TO "O" 138+00.00

REFERENCE FILES: 870-algn.mst - 870-2B-Geom.mst - 870-2B-Removal-Topo.mst - 870-2B-Geom.mst - 870-2B-Striping.mst - 870-2B-Striping.mst - 870-2B-border.mst - 870-ADD_ROW_06-20-06.dgn - 870-2B-Add-Topo-Tree
FILE NAME: X:\870-Carson Bypass\2B\Traffic\Signing\Plans\870-2B-ts39.dgn - 4/22/2008 - 13:14:34 WSH

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	TS43

NOTE - SIGNS NOT SHOWN SHOULD NOT BE DISTURBED.



DESIGNED BY	N.L.G.
DRAWN BY	E.C.G.
CHECKED BY	J.R.
REVIEWED BY	T.D.L.

100% SUBMITTAL
NOT FOR CONSTRUCTION

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

PROFESSIONAL ENGINEER - STATE OF NEVADA
NANCY L. GEISLER
No. 12688
4-27-09
CIVIL
Exp. 6-30-09

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

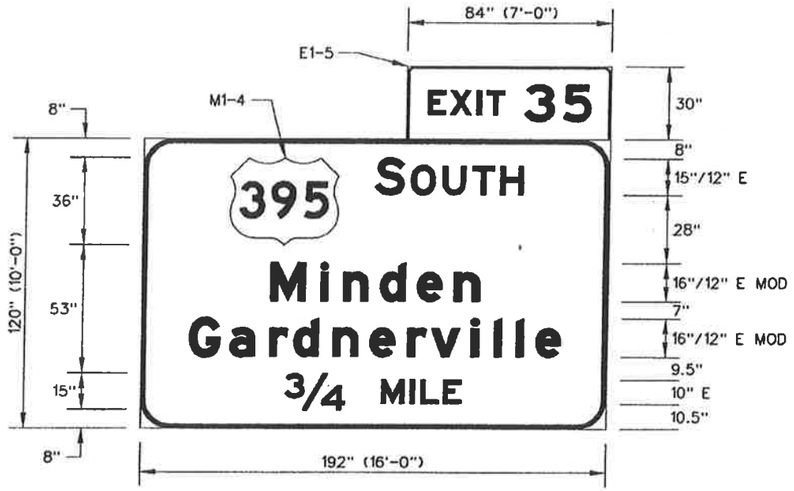
CARSON CITY FREEWAY PHASE 2B

PERMANENT SIGN INSTALLATIONS
"O" 138+00.00 TO "O" 153+00.00

REFERENCE FILES: 870-dgn.mst · 870-2B-Striping.mst · 870-2B-Geom.mst · 870-ADD_ROW_06-20-06.dgn · 870-2B-Removal-Topo.mst · 870-2B-Add-Topo-Trees.mst · 870-2B-border.mst

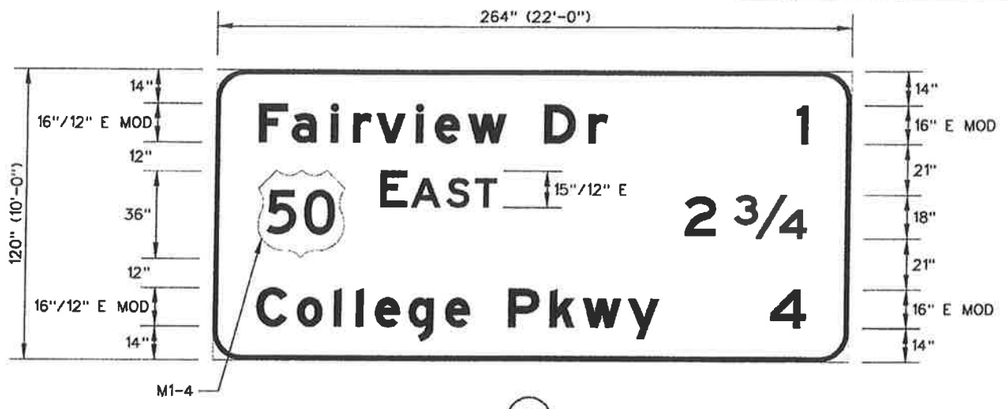
FILE NAME: X:\870-Carson Bypass\2B\Traffic\Signing\Plans\870-2B-ts40.dgn · 4/22/2008 · 13:15:59 WSH

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	TS66



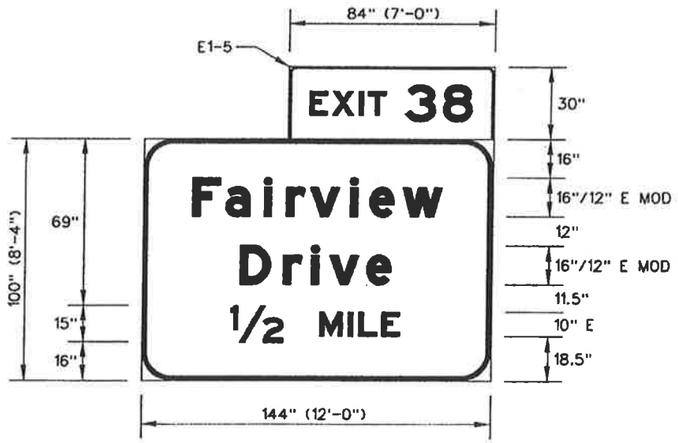
61

LEGEND & BORDER	WHITE
BACKGROUND	GREEN
CORNER RADIUS	12"
BORDER THICKNESS	2"



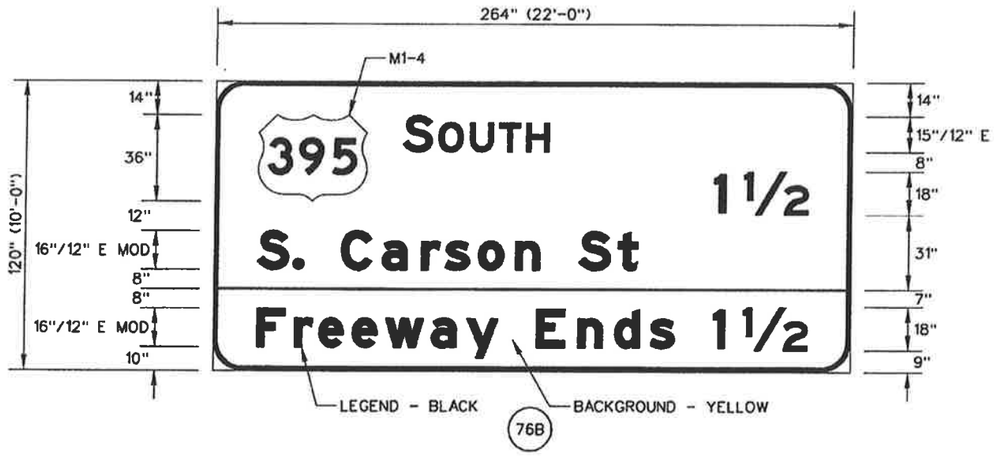
76A

LEGEND & BORDER	WHITE
BACKGROUND	GREEN
CORNER RADIUS	12"
BORDER THICKNESS	2"



98

LEGEND & BORDER	WHITE
BACKGROUND	GREEN
CORNER RADIUS	12"
BORDER THICKNESS	2"



76B

LEGEND & BORDER	WHITE
BACKGROUND	GREEN
CORNER RADIUS	12"
BORDER THICKNESS	2"
DIVIDER THICKNESS	1"

100% SUBMITTAL
NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER - STATE OF NEVADA
No. 12638
NANCY L. GEISLER
4-21-08
CIVIL
EXP 6-30-09

DESIGNED BY NLG
DRAWN BY RTM
CHECKED BY JR
REVIEWED BY TDL

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

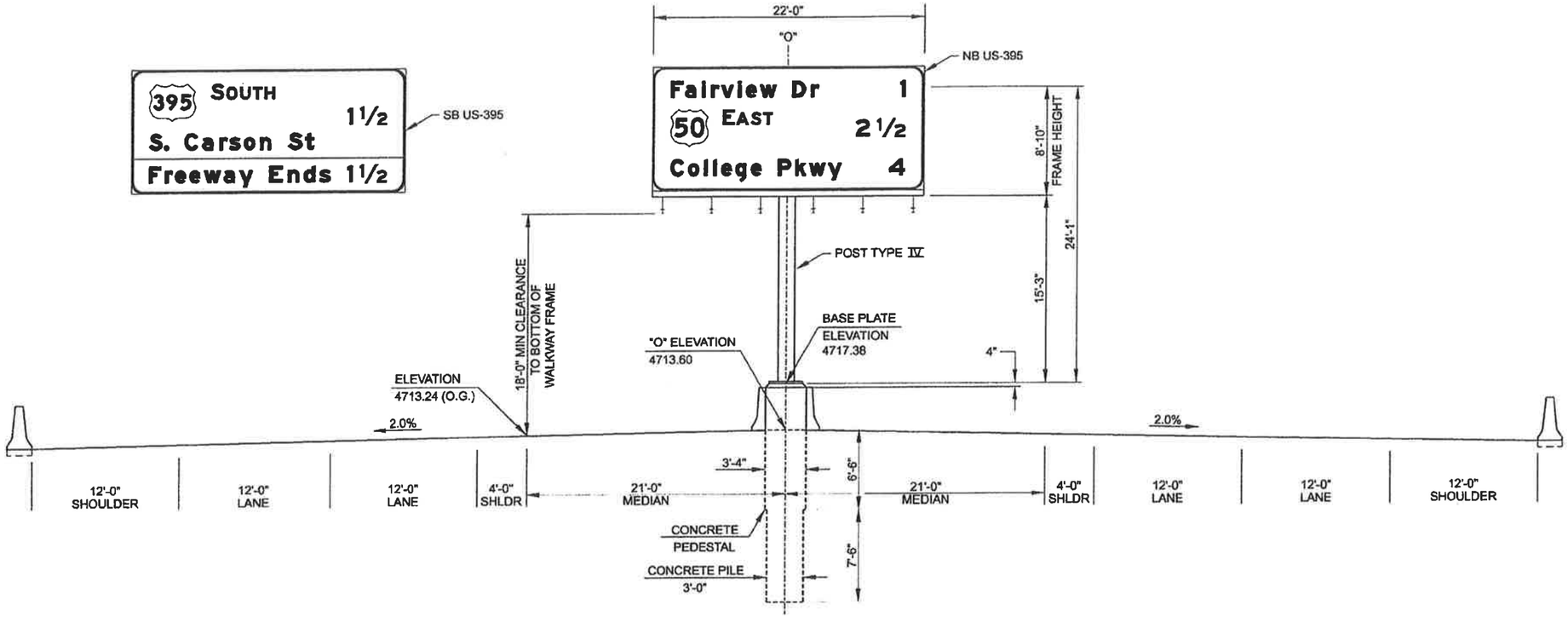
STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

SIGN DETAILS

REFERENCE FILES: 870-2B-border.mst
FILE NAME: K:\870-Carson Bypass\2B\Traffic\Signing\Details\870-2B-SD05.dgn - 4/22/2008 - 14:54:50 WSH

STATE	PROJECT NO.	COUNTY	SHEET NO.
NEVADA	NH-395-1(017)	CARSON CITY	TS81



76

"O" 137+00.00
22'-0" BUTTERFLY SIGN STRUCTURE
4 LIGHT FIXTURES

NOTES:

1. ELEVATIONS DESIGNATED (O.G.) INDICATE TOP OF OPEN GRADE.
2. SEE NDOT STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION FOR SIGN STRUCTURE DETAILS.
3. POST LENGTHS ARE APPROXIMATE. ACTUAL ELEVATIONS AND POST LENGTHS ARE TO BE CONFIRMED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO SUBMISSION OF SHOP DRAWINGS.
4. SEE NDOT STANDARD PLAN T-30.1.16.1-(623) FOR LIGHT FIXTURE SPACING.

100% SUBMITTAL
NOT FOR CONSTRUCTION

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

PROFESSIONAL ENGINEER STATE OF NEVADA
NANCY L GEBLER
4-21-08
CIVIL
No. 12838
EXP. 6-30-09

DESIGNED BY EWR
DRAWN BY RTM
CHECKED BY NLG
REVIEWED BY TDL

STATE OF NEVADA
DEPARTMENT OF TRANSPORTATION

CARSON CITY FREEWAY PHASE 2B

OVERHEAD SIGN STRUCTURE DETAIL

REFERENCE FILES: 870-2B-border.mst
FILE NAME: X:\870-Carson Bypass\2B\Traffic\Signing\Details\870-2B-Butterfly76.dgn - 4/22/2008 - 16:07:26 WSH

APPENDIX D

Opinion of Probable Cost

OPINION OF PROBABLE COST

Items	Quantity	Unit	Unit Price	Total
Engineering/Construction Management*	1	LS	$ 300,000	$ 300,000
EIS Re-evaluation	1	LS	$ 50,000	$ 50,000
SITE				
Traffic Control	1	LS	$ 100,000	$ 100,000
Earthwork	1	LS	$ 10,000	$ 10,000
Remove and Replace AC	1,500	SF	$ 5	$ 7,500
Drainage Improvements	1	LS	$ 15,000	$ 15,000
Exterior Barrier Rail Transition	200	LF	$ 65	$ 13,000
Chainlink Fence Transition	190	LF	$ 65	$ 12,350
Separation Wall Transition	160	LF	$ 33	$ 5,280
Concrete Pathway Transition	400	SF	$ 15	$ 6,000
Granular Soil Pathway Transition	1,000	SF	$ 5	$ 5,000
Mount/Dismount Areas	2,300	SF	$ 5	$ 11,500
Bollards	8	EA	$ 500	$ 4,000
Lighting	1	LS	$ 50,000	$ 50,000
Signage and Pavement Markings	1	LS	$ 10,000	$ 10,000
Landscaping and Revegetation	1	LS	$ 15,000	$ 15,000
Concrete Slope Paving	100	CY	$ 600	$ 60,000
Center Pier Protection	1	LS	$ 75,000	$ 75,000
Sign Relocation	1	LS	$ 150,000	$ 150,000
SITE SUBTOTAL				$ 549,630
BRIDGE				
Installation	1	LS	$ 60,000	$ 60,000
Precast girders	5	EA	$ 120,000	$ 600,000
Abutments	2	EA	$ 40,000	$ 80,000
Center pier	1	EA	$ 75,000	$ 75,000
Concrete deck	5,880	SF	$ 30	$ 176,400
Concrete exterior barrier rails	420	LF	$ 280	$ 117,600
Chainlink fence	420	LF	$ 130	$ 54,600
Separation walls	420	LF	$ 33	$ 13,860
Concrete pathway	2,520	SF	$ 4	$ 10,080
Granular soil pathway	2,520	SF	$ 5	$ 12,600
Aesthetic treatments	1	LS	$ 100,000	$ 100,000
BRIDGE SUBTOTAL				$ 1,300,140
SUBTOTAL				*$ 2,199,770*
20% CONTINGENCY				$ 439,954
TOTAL				**$ 2,639,724**

*16% of Construction Costs