

Item # 7B

**Carson City, A Consolidated Municipality
Agenda Report**

Date Submitted: October 23, 2006

Agenda Date Requested: November 2, 2006

Time Requested: 15 Minutes

To: Mayor and Supervisors

From: Public Works Engineering

Subject Title: Presentation, discussion and action on the East Highway 50 Sewer and Water Service Area Study; to accept the East Highway 50 Sewer and Water Service Area Study; to direct staff to notify the property owners of the range of potential cost; to conduct a workshop to determine the acceptance of the proposed project; and then to report the results of the workshop to the Board of Supervisors to determine whether the formation of a local improvement district should proceed.

Staff Summary: Staff has reviewed the East Highway 50 Sewer & Water Service Area Study and will make a presentation on the alternatives prepared to provide water and sewer service to the area generally east of Deer Run along the Highway 50 corridor.

Type of Action Requested: (check one)
 Resolution Ordinance
 Formal Action/Motion Other (Specify)

Does This Action Require a Business Impact Statement: Yes No

Recommended Board Action: I move to accept the East Highway 50 Sewer and Water Service Area Study; to direct staff to notify the property owners of the range of potential cost; to conduct a workshop to determine the acceptance of the proposed project; and then to report the results of the workshop to the Board of Supervisors to determine whether the formation of a local improvement district should proceed.

Explanation for Recommended Action: See staff summary

Applicable Statue, Code, Rule or Policy: N/A

Fiscal Impact: Not determined at this time.

Explanation of Impact: If it is determined that the project should go forward, the full range of costs and the distribution of those costs will be presented in the formation of a Local Improvement District.

Funding Source: N/A

Alternatives: Do not accept the report.

Supporting Material: Power Point Presentation Materials; Executive Summaryt from Study


Prepared By: Lawrence A Werner, P.E., P.L.S., City Engineer

Reviewed By:




(Public Works Director)

Date: 10-23-06




(City Manager)

Date: 10-23-06



(District Attorney)

Date: 10-23-06



(Finance Director)

Date: 10-23-06

Board Action Taken:

Motion: _____ 1) _____ Aye/Nay
2) _____

(Vote Recorded By)

PRESENTATION, DISCUSSION AND ACTION ACCEPTANCE AND EXECUTION:

The Board of Supervisors for Carson City, Nevada at their publicly noticed meeting of November 2, 2006 approved the acceptance of the attached Presentation, Discussion, and Action on the Highway 50 Sewer and Water Service Area Study. Further, the Board of Supervisors authorizes the Mayor of Carson City, Nevada to set his hand to this document and record his signature for the execution of this study in accordance with the action taken.

CARSON CITY, NEVADA

MARV TEIXEIRA, MAYOR

DATED this 2nd day of November, 2006.

ATTEST:

ALAN GLOVER, CLERK-RECORDER

DATED this 2nd day of November, 2006.

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East Highway 50 Sewer and Water System Preliminary Feasibility Study

FINAL REPORT

August 2006



BHC
CONSULTANTS

720 Third Avenue, Suite 1200
Seattle, WA 98104
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EXECUTIVE SUMMARY

Background

Carson City (City) is planning for significant growth in the East Highway 50 area. The City commissioned the preparation of a preliminary engineering feasibility study (Study) to better understand the potential sewer and water infrastructure requirements for different planned land use scenarios, including possible alternatives, costs, and issues that would likely be required to serve this area.

The investigations, analyses and findings for the Study were summarized as the work progressed in a series of task technical memoranda. A Task 1 memorandum, *Projected Sewer Flows and Water Demands*, (Draft, August 2005) outlined the Highway 50 East study/service areas; identified current planned (at the time) as well as preliminary potential future land use and zoning plans in these areas; and estimated peak sewer flows and water demands under different land use/development scenarios. Based on these projected sewer flows and water demands, potential future sewer and water conveyance improvements were investigated, and the evaluations and findings were summarized in a Task 2 Memorandum, *Sewer and Water Conveyance Improvement*, (Draft, December 2005). After these draft memoranda were reviewed by, and discussed with City staff, these documents were merged into a draft final report. Comments and requests made by City staff on the draft memoranda and draft final report were addressed and are reflected in this final report.

Study/Service Areas and Land Use/Zoning

Two separate areas situated in the northeast and southeast area of the Highway 50 East planning area were studied. These are referred to as the Upper Basin/East Portal and Lower Basin/Hwy 50 East study areas, respectively. Current planned land use/zoning, as well as three other preliminary planned land use/zoning plans entitled *Envision Carson City* (May 2005) were studied: 1) Scenario 1 – Compact Growth; 2) Scenario 2 – Mixed-Use Activity Centers; and 3) Scenario 3 – Urban Expansion. During the course of the Study, the Carson City Board of Supervisors adopted Scenario 1. As such, after completion of the Task 2 Memorandum Scenarios 2 and 3 were dropped from further consideration and analysis in the final analysis/report.

During the course of the Study, Lyon County expressed an interest in having the flow from Mound House being conveyed to, and treated by Carson City's Wastewater Reclamation Plant. This was studied, but was also dropped after completion of the Task 2 Memorandum, primarily due to Lyon County wanting to pursue and consider other potential alternatives. Consequently, accommodating

flows from Mound House was eliminated from further consideration and analysis in the final analysis/report.

The executive summary therefore only includes the investigations, analyses and findings for the previous and recently adopted/Scenario 1 land use/zoning plans. See Figures ES-1 and ES-2

Projected Sewer and Water Flows

Projected Sewer Flows

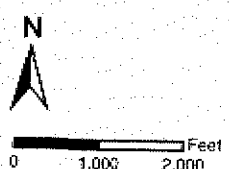
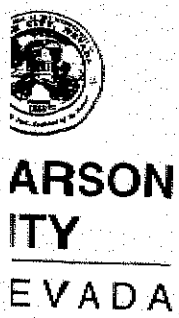
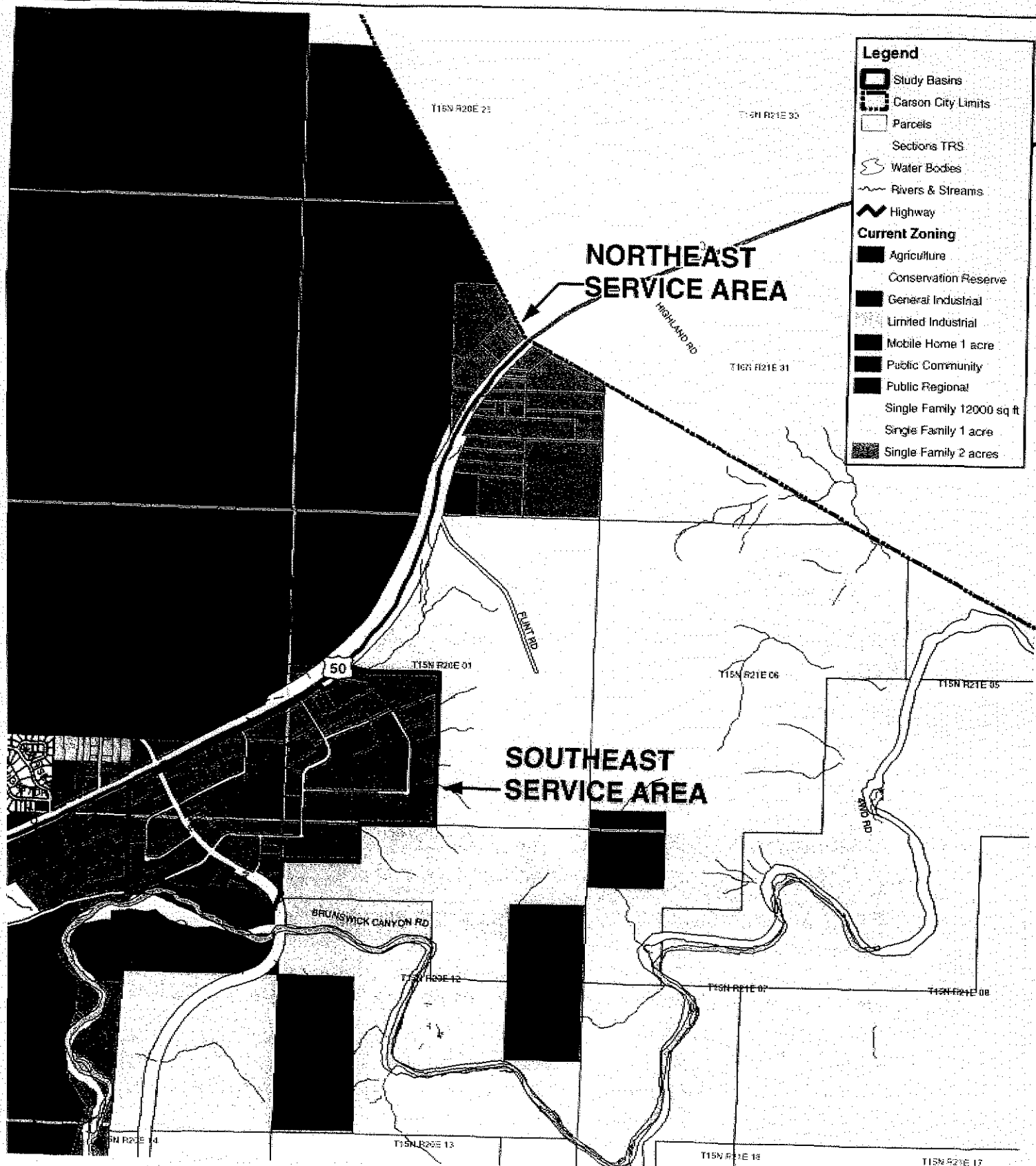
The projected peak hour sewer flows determined for the Upper Basin/East Portal and Lower Basin/Hwy 50 East areas and the previous and recently adopted land use/zoning plans are summarized in the following table. It is noted that the flows for the previous and recently adopted land use/zoning plans are very similar.

| Summary of Projected Peak Hour Sewer Flows | | | |
|---|--------------------------------------|--------------------------------------|-----------------------|
| Planned Land-Use/Zoning | Upper Basin/East Portal (gpm) | Lower Basin/Hwy 50 East (gpm) | Combined (gpm) |
| Previous | 489 | 815 | 1,304 |
| Recently Adopted/Scenario 1 | 483 | 932 | 1,415 |

Projected Water Flows

The projected peak water flows that were determined for the Upper Basin/East Portal and Lower Basin/Hwy 50 East and the previous and recently adopted land use/zoning plans are summarized in the following table. Similar to the projected sewer flows, the projected water flows (or demands) for the previous and recently adopted land use/zoning plans are very similar.

| Peak Water Flows | | | |
|--------------------------------|--|--|------------------------|
| Planned Land-Use/Zoning | Upper Basin/East Portal MDD (gpm) | Lower Basin/Hwy 50 East MDD (gpm) | Fire Flow (gpm) |
| Previous | 648 | 1,083 | 4,000 |
| Recently Adopted/Scenario 1 | 453 | 1,059 | 4,000 |



All data layers obtained from Carson City 2005.
 No warranty is made concerning the accuracy, currency,
 or completeness of data depicted on this map.
 MAP DATE: AUGUST 2006

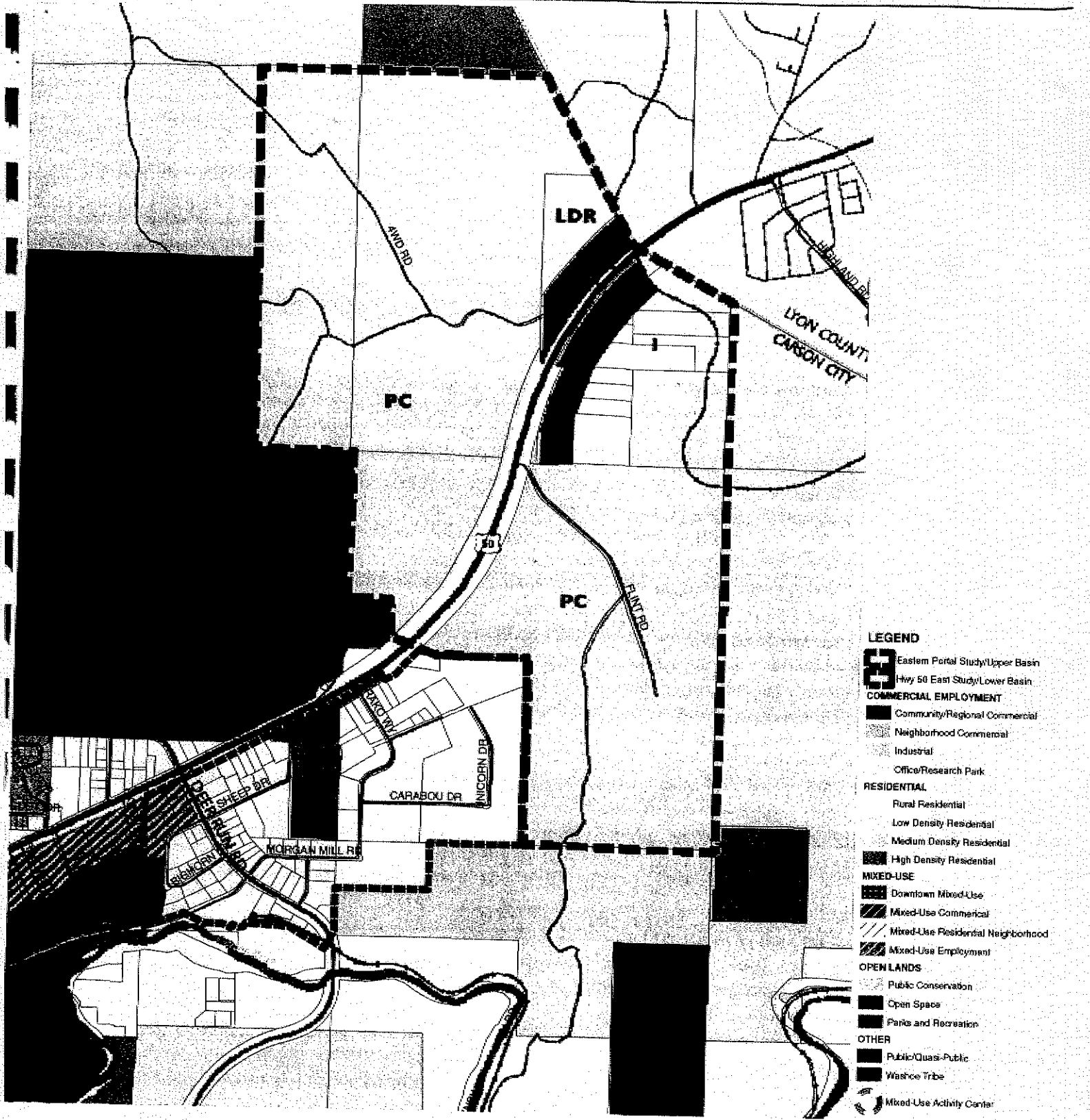
East HWY 50 Water & Sewer Systems Preliminary Feasibility Study

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**PREVIOUSLY
 CURRENT
 ZONING**

Fig ES-1

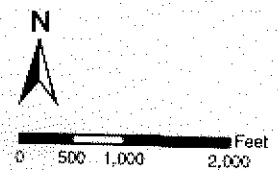
g:\Map_Generation\Carson City\project\19\CE-07\003_19529_08\002\map\August2006\ES-1 - Current Zoning 6/11.mxd



- LEGEND**
- Eastern Portal Study/Upper Basin
 - Hwy 50 East Study/Lower Basin
 - COMMERCIAL EMPLOYMENT**
 - Community/Regional Commercial
 - Neighborhood Commercial
 - Industrial
 - Office/Research Park
 - RESIDENTIAL**
 - Rural Residential
 - Low Density Residential
 - Medium Density Residential
 - High Density Residential
 - MIXED-USE**
 - Downtown Mixed-Use
 - Mixed-Use Commercial
 - Mixed-Use Residential Neighborhood
 - Mixed-Use Employment
 - OPEN LANDS**
 - Public Conservation
 - Open Space
 - Parks and Recreation
 - OTHER**
 - Public/Quasi-Public
 - Washoe Tribe
 - Mixed-Use Activity Center

COMPACT GROWTH

East HWY 50 Sewer & Water Systems Preliminary Feasibility Study



Source: 'Envision Carson City'
 The source from which this is taken from has been prepared for the City of Carson City for the purposes of the Carson City Master Plan, Carson City GIS, Carson City Assessor, TIGER, and Clark Associates.

All data layers obtained from Carson City 2005.
 No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.

MAP DATE: AUGUST 2006

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Envision Carson City Adopted/Scenario 1

Mapping/Map_Generation/Carson_City/Project/ES-1/ES-2/062807_000/Map24/August2006/ES-2/Envision_Scenario_1/ES-2.mxd

Existing Sewer System Capacity

The existing interceptor sewers in the Lower Basin/Hwy 50 East study area appear to have sufficient capacity to accommodate future build-out in the Lower Basin/Hwy 50 East study area. However, these sewers do not have sufficient capacity to accommodate future build-out in the Upper Basin/East Portal area. As such, it will be necessary at some point to install larger or parallel pipes in the Lower Basin/Hwy 50 East to accommodate future flows from the Upper Basin/East Portal study area to the Morgan Mill Pump Station.

It is important to also recognize that the future sewer flows from the study/service area impact the capacity of the Morgan Mill Pump Station, force main and other downstream facilities. The evaluation of those impacts was beyond the scope of this Study. However, it is understood that preliminary investigations by Capital Engineering indicate that these facilities are undersized for buildout of the Study/service area. It is recommended that the City further investigate, evaluate, and consider the impacts and requirements for accommodating these future flows in the downstream sewer facilities.

Future Sewer System Improvements

In the present condition, the Upper Basin/East Portal study area has no sewer conveyance facilities, and the Lower Basin/Hwy 50 East study area is only partially served by the City's existing sewer system. Alternative trunk/interceptor alignments were evaluated to serve the upper basin. Local sewers to serve the Upper and Lower Basins were also determined.

Trunk/Interceptor Alternatives

Four alternative trunk/interceptor alignments appeared viable and were studied. See Figure ES-3. The alignments are generally described from the Carson City/Lyon County boundary down-gradient to the Morgan Mill Pump Station as follows:

Alternative 1 – This alignment is located primarily within the Highway 50 East roadway and extends from the Carson City/Lyon County boundary to Detroit Road, then south on Detroit Road within an existing utility easement to Morgan Mill Pump Station.

Alternative 2 – This alignment is located along the edge of the Highway 50 East right-of-way, and to the extent possible, along existing City right-of-way or utility easements. This alignment extends from the Carson City/Lyon County boundary to Flint Drive, southeasterly along Flint Drive and then southwesterly, cross-country, to Astro Drive. The alignment then turns south along Drako Way and west along Morgan Mill Road to the Morgan Mill Pump Station.

Alternative 3 – This alignment is the same as Alternative 1 from the City/County boundary to a point just east of Drako Way. From this point, the alignment deviates from Highway 50 East and turns southwesterly cross-country to the intersection of Drako Way and Astro Drive. From this point, the alignment is the same as Alternative 2.

Alternative 4 – This alignment is a combination of Alternatives 2 and 1. That is, the alignment is the same as Alternative 2 from the Carson City/Lyon County boundary to Drako Way. At Drako Way the alignment turns north to Highway 50 East and then turns west along Highway 50 East, the same as Alternative 1.

Project costs were determined for these alternatives which include: 1) construction costs for identified pipeline and related infrastructure; 2) construction contingency; 3) allied costs (engineering, services during construction and administration). The project costs are summarized in the following table:

| Preliminary Opinion of Probable Project Costs Alternative Trunk/Interceptor Sewer Alignments | |
|---|---|
| Alternative/Description | 2005 Project Cost (Millions) |
| Alternative 1 | \$10.8 |
| Alternative 2 | \$9.7 |
| Alternative 3 | \$10.3 |
| Alternative 4 | \$10.2 |

As can be seen, the project costs for the alternative trunk/interceptor sewers are fairly close to one another (difference of 5 to 11 percent). This difference is considered to be within the margin of error of the cost estimates. Consequently, a best-apparent alternative is not obvious by just comparing costs. Further investigation, analysis and consideration of other factors will be necessary for the City to assess the best-apparent or preferred alternative.

Local Sewer System Improvements

In addition to a trunk/interceptor sewer to convey flows from the Upper Basin/East Portal area, there will be need for local sewers to serve the various parcels/areas in the Upper Basin/East Portal area, as well as the Lower Basin/Hwy 50 East area, which are not currently sewered or served. The local sewers will vary depending on the growth and development of the area (especially the Upper Basin which is mostly undeveloped) as well as the selected trunk/interceptor sewer.

Local sewer requirements for Alternative 1 trunk/interceptor sewer were identified to provide the City with a general idea of the potential requirements and an order of magnitude cost for local sewer system improvements. Once a preferred trunk/interceptor sewer alternative is selected, the local sewers can then be better determined for that

specific alternative. For example, if either Alternatives 2 or 3 were chosen, there would likely be need for a section of sewer along the south side of Highway 50 East between N Deer Run Road and Drako Way. Preliminary, conceptual sewer layouts for local sewers for both the Lower Basin/Hwy 50 East and Upper Basin/East Portal areas were developed based on Alternative 1 and are shown on Figures ES-4 and ES-5.

Project costs were determined for these local sewer improvements for the Lower and Upper Basins and are summarized in the following table.

| Preliminary Opinion of Probable Project Costs Local Sewer System Improvements | |
|--|---|
| Description | 2005 Project Cost (Millions) |
| Lower Basin | \$6.4 |
| Upper Basin | \$4.1 |

Water System

Existing Water System

Currently, only a portion of the Lower Basin/Hwy 50 East study area is serviced by the City water system. This area consists of water distribution pipes ranging in size from 6- to 12-inch in diameter. Two water supply wells, Well #40 and Well #33, are located in the general area. A 16-inch water line supplies the 2.6 million gallon East Carson Tank, which is located adjacent to the Lower Basin/Hwy 50 East study area.

At present, there is no local water distribution system in the Upper Basin/East Portal study area. The recently constructed 3.0 MG Hwy 50 East Tank and supply system, located just east of the study area, will provide storage for the anticipated development in the Upper Basin/East Portal area. Two 75-horsepower booster pumps (located at the East Carson Water Tank site) and a 10,300 foot, 16-inch water line, supply water to the Highway 50 East Tank.



CARSON CITY NEVADA

East HWY 50 Sewer & Water Systems

Proposed Sewer System

- Proposed Manholes
- ~ Proposed 8" Sewer Lines

Alternative 1 Sewer Route

- ▨ Proposed 48" Pipe

Existing Sewer System

- Manholes
- ▣ Pump Station
- ~ Gravity Main

Base Layers

- ▨ Eastern Portal Study Basin
- ▨ Hwy 50 East Study Basin
- ▨ Carson City Limits

Parcels

- ~ Proposed V & T Railroad Lines

Street Centerlines

- ~ 10ft Contours
- ~ 2ft Contours

Rivers & Streams

- ~ Water Bodies



Existing Sewer System: Carson City - January 2008.
Proposed Sewer System is APPROXIMATE.

All other data derived from Carson City 2008.
No warranty is made concerning the accuracy, currency,
or completeness of data depicted on this map.

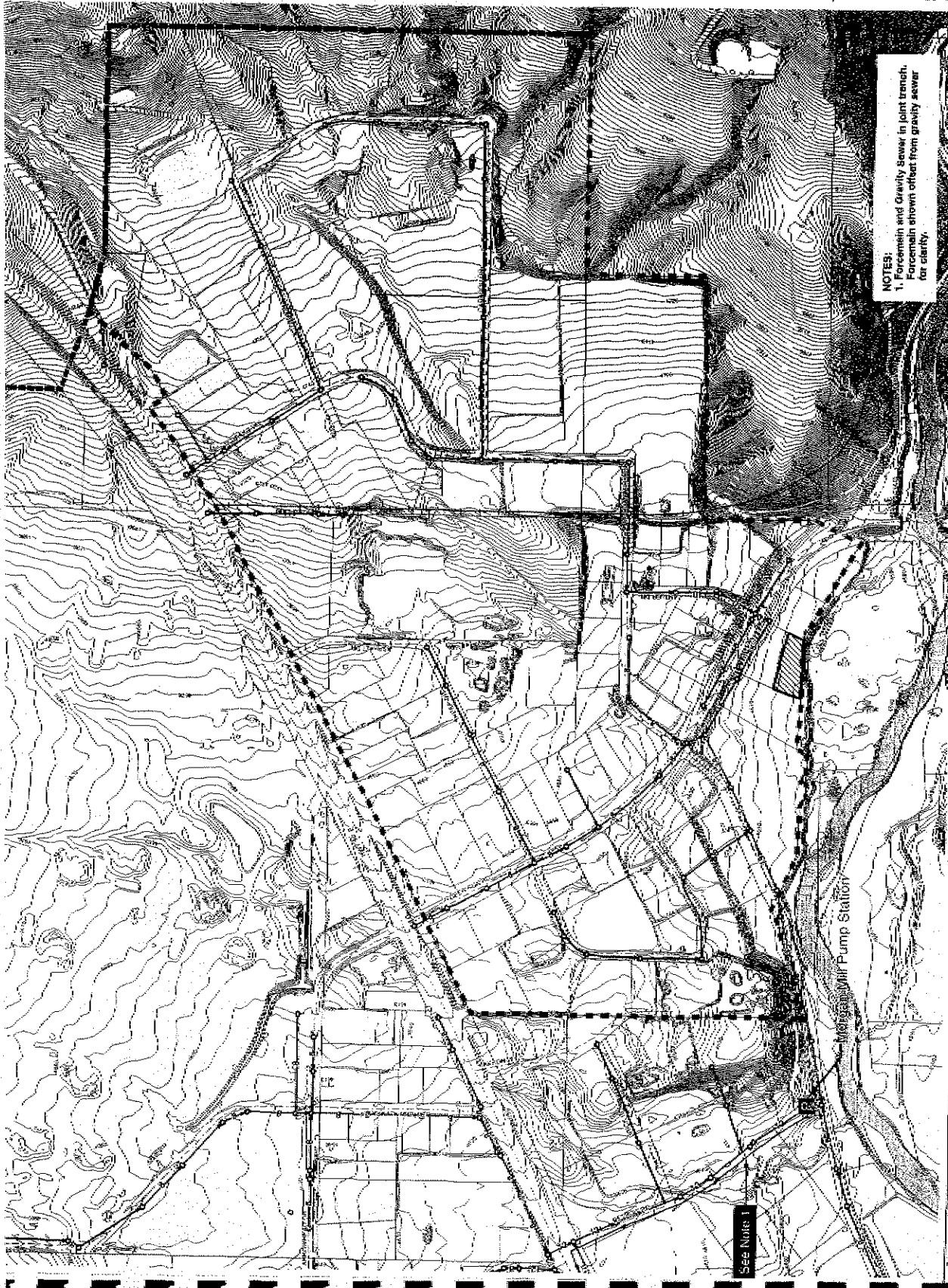
MAP DATE: AUGUST 2008

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Preliminary Feasibility Study LOWER BASIN CONCEPTUAL LOCAL SEWER SYSTEM IMPROVEMENTS

Fig
ES-4



NOTES:
1. Forcemain and Gravity Sewer in joint trench. Forcemain shown offset from gravity sewer for clarity.

See Maps 1

Melrose Mill Pump Station

Map Date: August 2008. Project: Lower Basin Conceptual Local Sewer System Improvements. Scale: As Shown. Contour Interval: 2 Feet. Elevation: Mean Sea Level.



CARSON CITY NEVADA

East HWY 50 Sewer & Water Systems

- Proposed Sewer System**
 - Proposed Manholes
 - Proposed B' Sewer Lines
- Alternative 1 Sewer Route**
 - Proposed Circular PS
- Existing Sewer System**
 - Manholes
 - Pump Station
 - Gravity Main
- Base Layers**
 - Eastern Portal Study Basin
 - Hwy 50 East Study Basin
 - Carson City Limits
 - Parcels
- Proposed V & T Railroad Line**
 - Street Centerlines
 - 10ft Contours
 - 2ft Contours
 - Rivers & Streams
 - Water Bodies

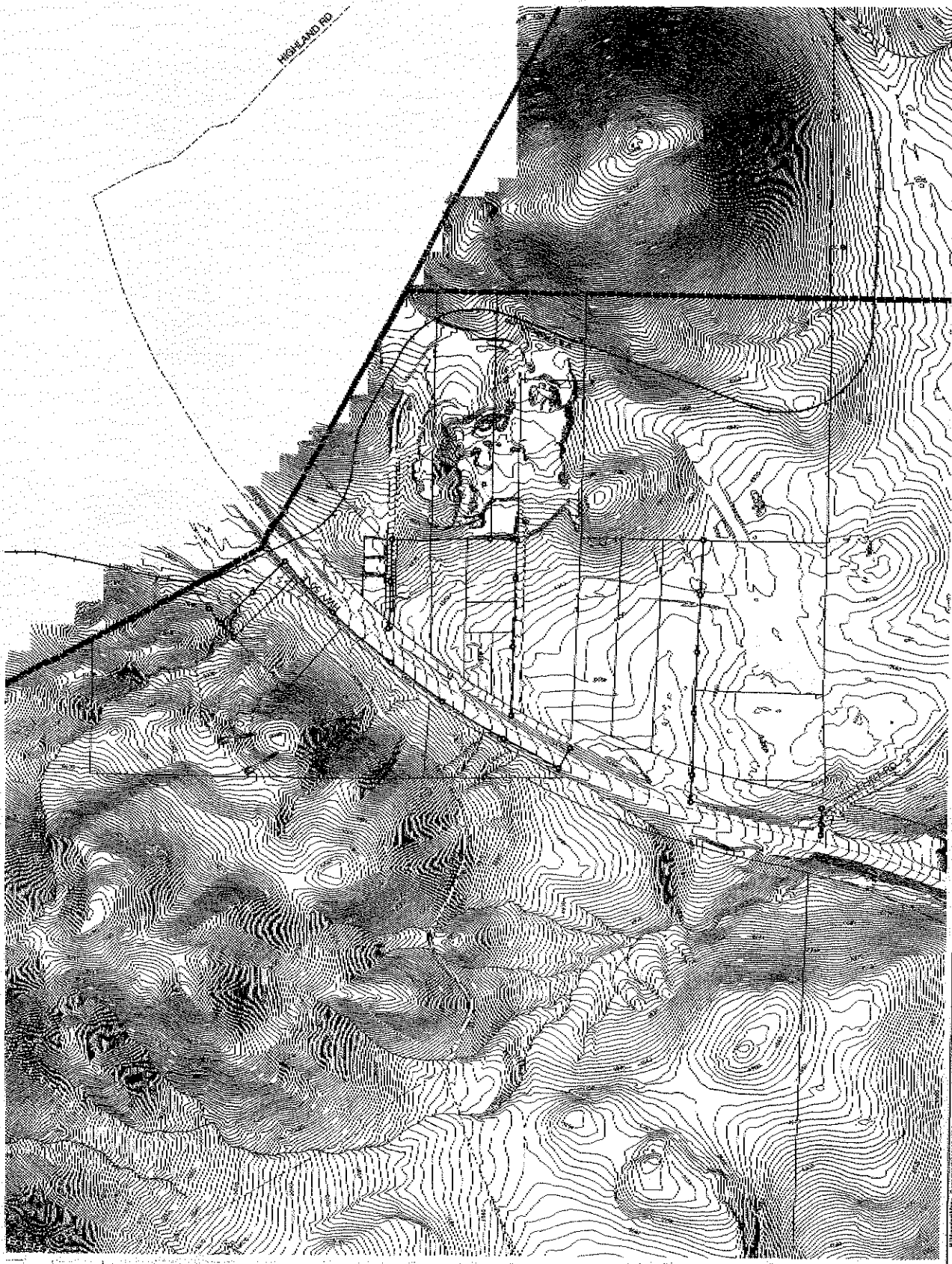


Existing Sewer System: Carson City - January 2000
 Proposed Sewer System is APPROXIMATE.
 All other data layers obtained from Carson City 2005.
 No warranty is made concerning the accuracy, currency,
 or completeness of data depicted on this map.
 MAP DATE: AUGUST 2006

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Preliminary
 Feasibility Study
**UPPER BASIN
 CONCEPTUAL LOCAL
 SEWER SYSTEM
 IMPROVEMENTS**

7/6
 ES-5



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Future Water System Improvements

Based on water system modeling and analysis, water system improvements were developed for both the Lower Basin/Hwy 50 East and Upper Basin/East Portal areas for the two different planned land use/zoning scenarios. After reviewing and discussing with City staff the proposed conceptual improvements, which were considered a minimum, modifications were made to these layouts to: 1) provide operational flexibility; 2) reflect practical experience and requirements; and 3) provide some flexibility for future development which may be different than currently planned. See Figure ES-6.

Project costs were determined for the proposed water system improvements for both the Lower and Upper Basins and are summarized in the following table:

| Preliminary Opinion of Probable Project Costs Proposed Water System Improvements | |
|---|---|
| Description | 2005 Project Cost (Millions) |
| Lower Basin | \$4.9 |
| Upper Basin | \$6.7 |

It needs to be recognized that an evaluation of the water supply availability was not a part of this Study. Existing supply and storage capabilities should be assessed to determine if additional sources and/or storage are required. Additionally, the available pressure and flow rates at the proposed connections to the existing system in the Lower Basin/Hwy 50 East area will need to be verified. It is recommended that the City's entire water system be modeled to make these assessments.

Other Factors and Considerations

To implement the water and sewer improvements, coordination, review, approvals and permits will be needed from the Nevada Department of Transportation (NDOT), Bureau of Land Management, V & T Railroad, as well as other agencies.

Dealing with the requirements and stipulations of NDOT in particular, needs to be thoroughly investigated, considered and factored into both the sewer and water system design and decision making process. For example, the casing of pipelines and other special construction procedures and requirements (e.g., traffic control, daily restoration) for working in the highway and conditions of their occupancy permits (obligation to relocate utilities in future) have significant present as well as potential future cost impacts.

If the improvements are not within right-of-way or established easements, permanent (and temporary) easements or right-of-way acquisition with other agencies or private property owners will be needed.



CARSON CITY NEVADA

East HWY 50 Sewer & Water Systems

Existing Water System

- Water Valve
- Well
- PRV
- Tank

Base Layers

- ▨ Eastern Portal Study Basin
- ▨ Hwy 50 East Study Basin
- ▨ Carson City Limits
- ▨ Modeled Land Use Area

Proposed

- ▨ Proposed V & T Railroad Line
- ▨ Street Centerlines
- ▨ Contours 2ft
- ▨ Rivers & Streams
- ▨ Water Bodies



Existing Water system: Carson City - January 2008
 Proposed Water system is APPROXIMATE.
 All other data layers obtained from Carson City 2006.
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MAP DATE: AUGUST 2006.

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Preliminary
 Feasibility Study

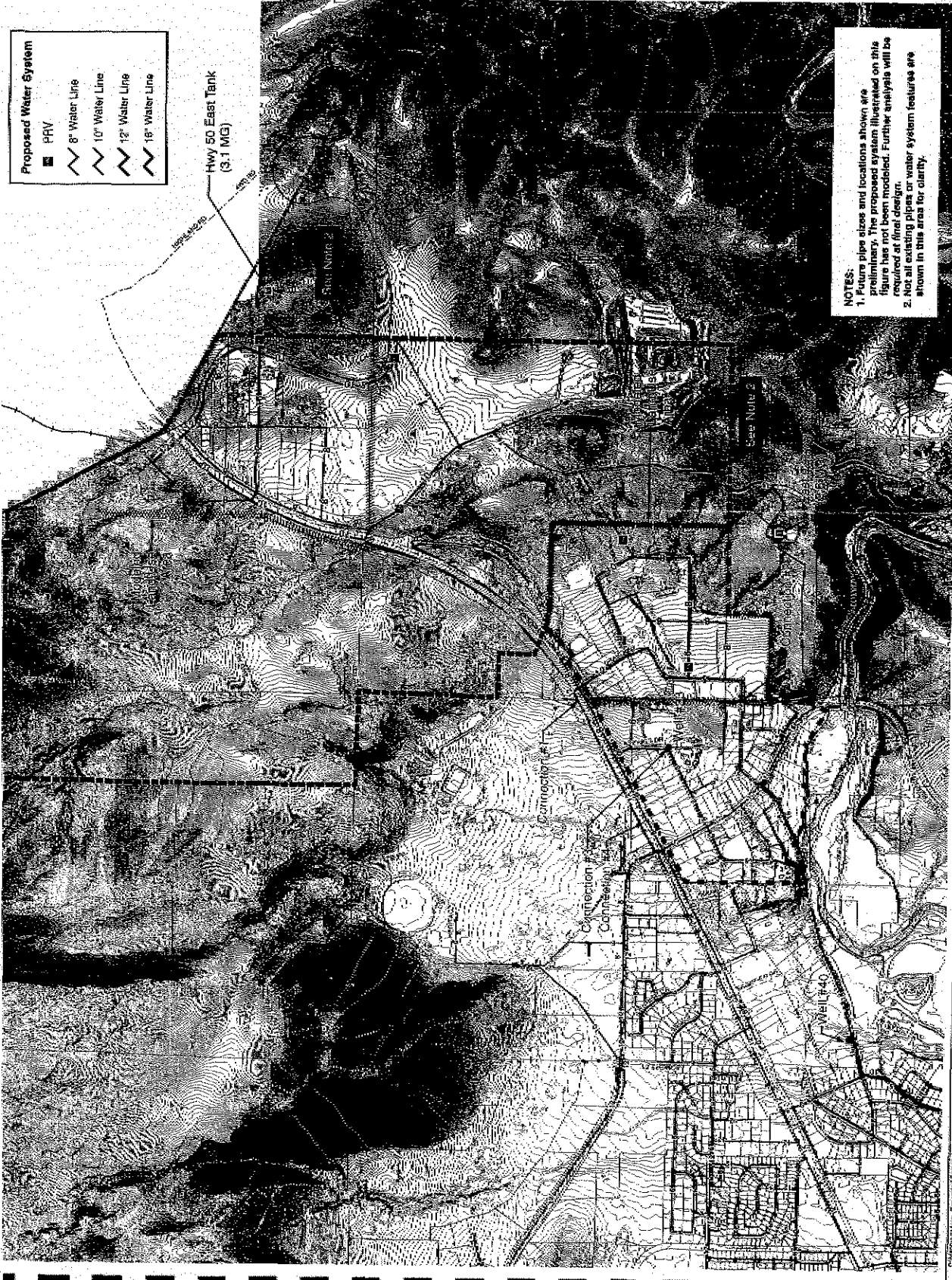
PROPOSED CONCEPTUAL WATER SYSTEM IMPROVEMENTS

Adopted/Scenario 1
 Land Use And Zoning

Fig

ES-6

- Proposed Water System**
- PRV
 - ▨ 8" Water Line
 - ▨ 10" Water Line
 - ▨ 12" Water Line
 - ▨ 16" Water Line



NOTES:
 1. Future pipe sizes and locations shown are preliminary. The proposed system illustrated on this figure has not been modified. Further analysis will be required at final design.
 2. Not all existing pipes or water system features are shown in this area for clarity.

Funding

The City is considering the formation of a special assessment district(s) as one alternative for funding the construction of the sewer and water system improvements. Assessing and evaluating possible funding mechanisms, such as the formation of a special assessment district, was beyond the scope of this Study. Planning level estimates for area charges to fund the project improvements were developed, however.

The following table shows the cost of the sewer and water system improvements for the lower and upper basins based on a net acreage for the lower basin (gross acreage (327 acres) less the acreage for those properties that are currently or could be served (70 acres) and gross acreage for the upper basin. These costs must be considered order of magnitude and are subject to significant change depending on the actual improvements and the participating areas to be served by the improvements.

| Cost of Improvements | | |
|--|----------------------------|----------------------------|
| | Southeast (Lower Basin) | Northeast (Upper Basin) |
| Area (Acres) | 257 acres | 181 acres |
| Local Sewer Improvements (cost/acre) | \$24,900 | \$22,700 |
| Trunk/Interceptor Along Hwy. 50 ^{2&3} (cost/acre) | \$7,400 | \$17,300 |
| Local Water Improvements (cost/acre) | \$19,100 | \$37,000 |
| Total (cost/acre) | \$51,400 | \$77,000 |

1. Costs are rounded to nearest \$100
2. Cost assumes Alternative 1
3. Assumes 30% of the total cost is attributable to the lower basin and 70% of total cost attributable to the upper basin.

Implementation

The improvements determined in this Study are conceptual. Further analyses, study and preliminary design will be necessary to confirm the conceptual designs and costs developed in this Study. Given that the project costs for the trunk/interceptor sewer alternatives are fairly close to one another, further investigation (including the possible need for preliminary design), analyses and consideration of other factors will be necessary for the City to assess the best-apparent or preferred trunk/interceptor alternative.

The next steps would be undertaken once the City determines the funding mechanisms for constructing the improvements and verifies that there is sufficient need, interest and support by property owners to proceed with the improvements. Depending on the level of interest and the area where there is perhaps more need, interest and support for service, the City may also want to consider phasing the improvements. For instance, constructing

the trunk/interceptor sewer may be the likely candidate for the first phase. If there is sufficient interest and support for the infrastructure, a financial analysis and study to assess the formation of special assessment district and perhaps other possible funding mechanisms to construct the improvements will need to be performed. It is recommended that this effort be done in parallel with preliminary design.

It is anticipated that it will take approximately two to three years for preliminary design, formation of a special assessment district(s), final design, permitting, and construction to implement the project.