

CHAPTER 8

ALTERNATE DISCHARGE

STUDY TEAM

Objective

“How do we implement a practical, comprehensive approach for the discharge of current and future treated wastewater?”

Introduction

The largest flow component of the Las Vegas Wash (Wash) is treated wastewater, and it therefore plays a significant role in any considerations regarding management of the Wash.

The responsibility for treatment of wastewater generated within the Las Vegas Valley (Valley) rests with three separate agencies: 1) City of Henderson, 2) City of Las Vegas, and 3) Clark County Sanitation District. These agencies, who have been working together since the early 1990's, formed a partnership, the Las Vegas Valley Dischargers (Dischargers), to assess long-term treatment needs and to evaluate alternative approaches to wastewater treatment and water quality protection from a regional perspective.

In 1997 the Dischargers commissioned the Wastewater Needs Assessment Study (NAS) (Appendix 8.1, Executive Summary). The goal of the NAS was to develop a thirty-year plan that addresses the long-term needs of the Dischargers, and to identify alternative methods to accommodate existing and projected wastewater flows of the Valley. A continuation of this effort is to expand the findings of the NAS to provide guidance on the engineering, scientific and environmental solutions for effluent disposal and to provide a plan that will be acceptable to the Dischargers and the other stakeholders.

The Alternate Discharge Study Team was formed to assist the Dischargers in developing potential solutions to long-term discharge needs associated with the projected continued increase in wastewater flow. Throughout this process, the Dischargers sought stakeholder input in terms of providing

Las Vegas Valley Dischargers

- *City of Henderson*
- *City of Las Vegas*
- *Clark County
Sanitation District*



specific recommendations to identify potential discharge options and providing technical support throughout the process.

The Process

The Alternate Discharge Study Team (Team) is comprised of representatives from federal, state, and local agencies and two members of the Southern Nevada Water Authority's (SNWA) Water Quality Citizens Advisory Committee. Members represent agencies that have an interest in all aspects of water resource management in southern Nevada.

The Team developed recommended actions addressing the Valley's future treated wastewater. With this, the following two goals were developed by the Team to work toward throughout the process.

- Goal One -** Determine how much water the Clark County Wetlands Park needs.
- Goal Two -** Provide support to wastewater Dischargers in development and implementation of a practical plan for the discharge of current and future treated wastewater.

The Team started by developing potential options to address current and projected treated wastewater flows. The process included brainstorming all possible options, delineating those that were the most realistic, discussing both engineering and ecological alternatives, and narrowing down the initial selection to those that would be the most feasible. In addition, the Team developed an extensive set of selection criteria and definitions (Table 8.1) by which to review the alternate discharge options. Discussions resulted in an initial list of 18 alternatives.

After applying the selection criteria and reviewing the options, the 18 alternatives were narrowed down to 13 and then grouped in four main categories (Figure 8.1). The Team recognized that when looked at indi-

Biological Discharge Alternatives

1. Constructed wetlands parallel to Wash.
2. Floating wetland in Lake Mead.
3. Impoundment for wetlands, creating spillway to Lake Mead.
4. Aeration of Las Vegas Bay.

Structural Discharge Alternatives

5. Divert treated wastewater to washes along Lake Mead.
6. Divert treated wastewater to other bays at surface.
7. Outfall/Diffuser above Hoover Dam.
8. Discharge above the Narrows.
9. Leave as-is, but improve Wash to handle flows.
10. Intercept part of treated wastewater at discharge points (to reduce erosion).
11. Intercept discharge after Lake Las Vegas.

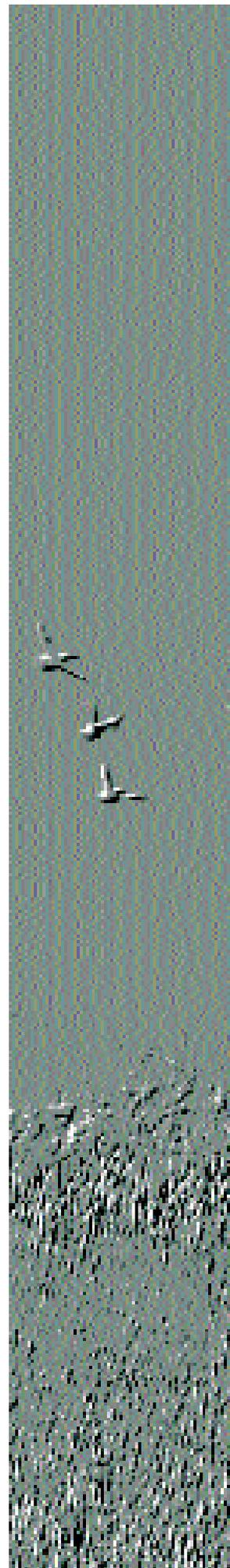
As-Is Discharge Alternative

12. Leave discharge as-is.

Re-Use Discharge Alternative

13. Wastewater re-use.

Figure 8.1 – Alternate discharge options.



| Selection Criteria | Definition |
|--|---|
| WATER RESOURCES | |
| Drinking Water | Meets existing water quality standards and protects water quality. |
| Beneficial Use Standards | Meets beneficial use standards designated for Wash, Bay, Lake Mead. |
| Shallow Ground Water | Meets water quality standards for shallow ground water. |
| Urban Runoff and Stormwater | Meets water quality standards for urban runoff and stormwater. |
| Dispersion of Wash Flow | Increases dispersion of Wash flow in Lake Mead. |
| Requirement to Maintain Higher Quality | Maintains existing water quality. |
| Public Concerns | Addresses issues of public concern (e.g., perchlorate, endocrine disruption, intrusion, pharmaceuticals). |
| Water Quality Aesthetics | Maintains clarity. |
| Meet Clark County Wetlands Park Objectives | Maintains water supply (e.g., return flow credits), and is compatible with Clark County Wetlands Park Master Plan. |
| REDUCE EROSION | |
| Stabilize Las Vegas Wash | Improves current conditions, stabilizes grade, and reduces amount of sediment in Las Vegas Bay. |
| ENVIRONMENTAL RESOURCES | |
| Wildlife and Vegetation | Preserves or enhances habitat for plant and animal species. |
| Fishery | Preserves and protects fishery habitat. |
| Cultural Resources | Preserves cultural resources. |
| Energy | Presents potential for energy generation. |
| Recreation | Preserves or enhances recreational activities (e.g., swimming, bird watching). |
| Noise | Proximity to sensitive areas such as National Recreation Areas, residential areas, critical habitat, etc. |
| Navigation | Preserves or enhances access to recreational areas such as bays or coves. |
| Aesthetics | Preserves or enhances public view to/from designated open spaces, roads, or recreational areas to significant visual landmarks or scenic vistas. |
| Proximity to Sensitive Receptors | Proximity to schools, hospitals, recreation areas, residential areas. |
| Nuisance Factors | Increases nuisance factors such as mosquitoes or snakes. |
| ECONOMIC FEASIBILITY | |
| Capital | Initial construction costs, and cost to acquire land. |
| Operations & Maintenance | Increase in operation and maintenance. |
| Benefits | Benefits derived from capital improvements (e.g., Park entrance fee). |
| IMPLEMENTABILITY | |
| Degree of Difficulty | Project complexity. |
| Project Duration | Ease of construction (i.e., scheduling and timely construction). |
| Established Technologies | Technology accepted by scientific and engineering community. |
| Environmental Complexibility | Potential for delay due to environmental issues. |
| Proximity to Power, Roadways, Infrastructure | Availability of existing infrastructure, and compatibility with existing facilities (e.g., moving Las Vegas Bay Marina). |
| Business Impacts | Degree and duration of impact. |
| Ease of Future Expansion | Ability to add capacity in appropriate increments. |
| Operations | Ease of operations, degree of automation, proximity to existing facilities, and staffing requirements. |
| Regulatory / Permitting | Required NEPA compliance, permitting, and mitigation. |
| Land Use | Compatibility with existing or planned adjacent land uses. |
| Facility Access | Restrict access to existing facilities. |
| Flood Hazards | Potential impacts on properties and structures from flooding (e.g., location in FEMA zones). |
| Available Land | Acquiring land, and the need to purchase/demolish adjacent structures. |
| Zoning | Complies with current or future zoning. Right-of-way, public or private ownership, zoning. |
| Geotechnical/Geologic Considerations | Soil and rock related impacts, risks of unknown geology, and potential for compromise of geotechnical/engineering integrity due to geologic condition. Proximity to fault zones, presence of geologic hazards, and erosion potential. |

Table 8.1 – Selection criteria and definitions.



vidually, each alternative would probably not accomplish the goals of the Dischargers, and that some combination of options would mostly likely be necessary.

Wastewater treatment in the Valley consists of physical, biological, and chemical processes to reduce particle, chemical, bacterial, and viral pollutants. The treated wastewater is either reused, primarily for landscape irrigation purposes, or returned to Lake Mead via the Wash for return flow credits. Water quality of the effluent complies with federal and state discharge standards as required under the National Pollutant Discharge Elimination System of the Clean Water Act.

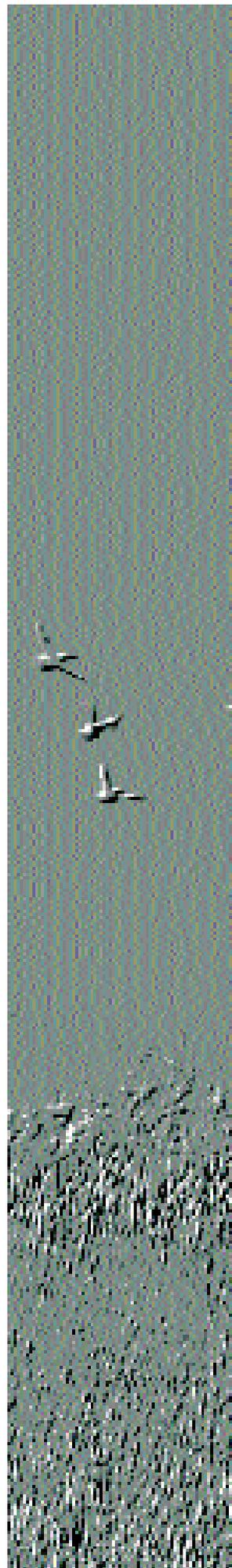
Existing and Projected Flows

Wastewater flow data for the period of record from January 1991 through July 1996 indicates a steady increase in flows for the City of Henderson, the City of Las Vegas and the Clark County Sanitation District. For the year 2027, the Las Vegas Valley projected influent wastewater flow of 282 million gallons per day (mgd) is more than double the 1997 flow. Table 8.2 shows the current and projected capacities for the three Dischargers.

Reuse

The City of Henderson, the City of Las Vegas and the Clark County Sanitation District all use a portion of their treated wastewater (reclaimed water) for reuse for primarily landscape irrigation. In 1998, nearly 13 million gallons of reclaimed water was used each day (average daily). In the summer months, the City of Henderson does not usually discharge because all the water is reused for irrigation purposes. In order to increase the amount of reuse within the community, the Dischargers and the Las Vegas Valley Water District are pursuing opportunities for satellite reclamation facilities with the reclaimed water going to nearby parks and golf courses.

The expansion of water reuse is strongly supported by the Valley's stakeholders, including federal, state, and local agencies as well as the general public. The Valley's 208 Water Quality Management Plan Amendment (Montgomery Watson, 1997) recommends that wastewater agencies construct satellite treatment facilities in growing areas of the Las Vegas Valley for reuse projects. The Integrated Resources Plan Advisory Committee, a citizens' committee created by the SNWA to review water management issues and recommend preferred options, recommended maximizing the reuse of wastewater where practical (SNWA, 1997). In addition, one of the recommendations from SNWA's Water Quality Citizens Advisory Committee, recommended greater on-site reuse to reduce the flows from treatment plants into the Wash.



| Discharger | Nominal Average, Annual Capacity (mgd) | Current Flows in 1997 (mgd) | Projected Capacity Requirements for 2027 (mgd) | Capacity Deficit (mgd) |
|----------------------------------|--|-----------------------------|--|------------------------|
| City of Henderson | 19.5 | 9.3 | 40 | 31 |
| City of Las Vegas | 66 | 49 | 111 | 62 |
| Clark County Sanitation District | 88 | 80 | 131 | 51 |
| Total | 165 | 138 | 282 | 144 |

Table 8.2 – Current and projected wastewater facility needs.

A feasibility study performed for SNWA in 1996 determined that a reclaimed water market exists and that the use of reclaimed water in the Valley is beneficial for overall southern Nevada water resource management (Greeley and Hansen, 1996). The primary market for expanded reuse consists of large-scale turf and landscape irrigators (i.e., golf courses, parks and recreational areas, casinos, and schools). In a subsequent 1998 study, it was determined that in the year 2020 the reclaimed water demand for the Las Vegas Valley would approach 77,000 acre-feet per year (Greeley and Hansen, 1998).

Role of Wastewater in Return Flow Credits

A complete discussion of the importance of treated wastewater as a water resource can be found in Chapter 2, Flows in Las Vegas Wash. In short, treated wastewater is a water resource, and any options considered by the Dischargers will include the role of wastewater on return flow credits.

Recommended Actions

In August 1999, the Team recommended to the coordination committee that it support the efforts of the Dischargers to approve a scope of work developed by a consultant (Black & Veatch) to further develop and investigate potential alternative options. The Las Vegas Wash Coordination Committee supported the recommendation.

The Team developed the following recommended actions to support efforts of the Dischargers in their plan to develop potential discharge options to address current and future wastewater flows.

Action 1: Implement the Dischargers Scope of Services, Alternative Discharge Study

Entities: City of Henderson, City of Las Vegas, Clark County Sanitation District



Because of the complexity of the technical and regulatory processes, the Dischargers intend to conduct the Scope of Services (Appendix 8.2) in the following four phases:

- I. Develop a plan for the Dischargers to find the optimal recommended plan for managing the treated effluent from a rapidly growing population.
- II. Prepare the scope for any short-term and long-term studies and the scope for the environmental analyses.
- III. Perform the recommended short and long-term studies and conduct the required environmental analyses.
- IV. Implement the selected alternative(s).

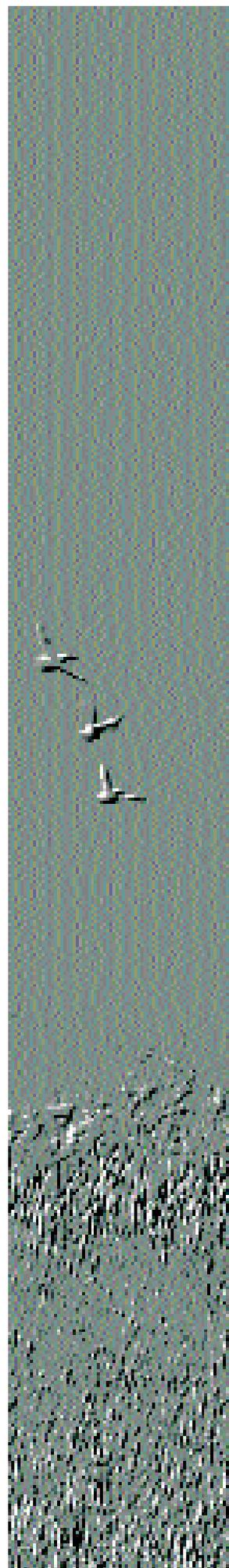
The current Scope of Services will focus on Phases I & II and will employ the following tasks:

1. Project initiation.
2. Compilation and assessment of existing data.
3. Develop issues, constraints (leads to a workshop where the alternatives will be initially ranked and an interim list selected for further evaluation).
4. Interim alternative evaluation (leads to a workshop to further rank the alternatives based on additional information and obtain “short” list of recommendations for further evaluation).
5. Evaluation of the short list and implementation plan for final consideration of options.
6. Concurrent with above steps, provide public outreach support
7. Concurrent with above steps, participate in regular meetings and briefings.

Action 2: Incorporate Options & Selection Criteria Developed by the Alternate Discharge Study Team

Entities: Basic Management, Inc., City of Henderson, City of Las Vegas, Clark County Sanitation District, Colorado River Commission, Las Vegas Wash Management Entity, National Park Service, Nevada Division of Environmental Protection, Southern Nevada Water Authority, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, Water Quality Citizens Advisory Committee

The Team recommended that the original and final list of options be considered as a “place to begin” during the initial process of identifying potential alternative discharge options. Having this available information meant that the consultant (Black & Veatch) could more quickly eliminate some options, and therefore provide a cost-saving benefit to the Dischargers.



Action 3: Utilize the Alternate Discharge Study Team Throughout the Process

Entities: Basic Management, Inc., City of Henderson , City of Las Vegas, Clark County Sanitation District, Colorado River Commission, Las Vegas Wash Management Entity, National Park Service, Nevada Division of Environmental Protection, , Southern Nevada Water Authority, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, Water Quality Citizens Advisory Committee,

The Team represents a diverse stakeholder group with significant technical and historical background. Meeting with the Team throughout the process will provide an opportunity of creative and critical thinking when developing and reviewing the discharge options and will also promote interagency coordination.

Action 4: Integrate Work Done by Other Study Teams into Process

Entities: City of Henderson, City of Las Vegas, Clark County Sanitation District, Las Vegas Wash Management Entity, and other Study Teams as necessary

Because issues of concern in the Wash expand beyond the scope of the Dischargers, the Team recommended that ideas from other study teams be incorporated whenever appropriate. For example, the Erosion & Stormwater Study Team conducted a two-day workshop to develop recommendations on ways to stabilize the Wash. One of the suggestions was that the majority of the flow in the Wash should be diverted out of the Wash, with some of the volume diverted to off-stream wetlands. Knowing this recommendation can help direct the investigation of alternatives to determine if this is a feasible option. Conversely, if the Alternate Discharge Study Team found that work being done by another study team was not an option worth pursuing, that information would be relayed.

Action 5: Update Public Officials and Interested Parties Updated throughout the Process

Entities: City of Henderson, City of Las Vegas, Clark County Sanitation District, and Las Vegas Wash Management Entity

The Team recognized that for this project to be successful the elected officials and other agency managers would need to be updated on a regular basis throughout the process. Having frequent updates would also provide the opportunity to learn early on if a particular entity strongly disagrees with one of the identified alternatives.



Appendices

8.1 Executive Summary of Wastewater Needs Assessment

8.2 Alternative Discharge Study Scope of Services

References

Greeley and Hansen (1996). Water Reuse Feasibility Study, Final Report, Clark County Sanitation District, Las Vegas Valley Water District, and Summerlin.

Greeley and Hansen (1998). Southern Nevada Water Recycling Project, Title XVI Funding Program Feasibility Study Report, City of Las Vegas, City of Henderson, City of North Las Vegas, Clark County Sanitation District, Las Vegas Valley Water District, and Southern Nevada Water Authority.

Montgomery Watson (1997). Las Vegas Valley 208 Water Quality Management Plan Amendment, Clark County Department of Comprehensive Planning.

Southern Nevada Water Authority (1997). Water Resource Plan.

