

VIII. Environmental Assessment

VIII. ENVIRONMENTAL ASSESSMENT

Introduction

The following information provides an assessment of the possible impacts resulting from implementation and construction of the water quality plan components. The components addressed by the assessment include only those involving structures or facilities and where sufficient data exists to support need for the facilities. Figure VIII-1 summarizes in which assessment category positive and negative impacts are likely. Negative impacts may require further analysis to determine their severity or whether or not they can be overcome. Positive impacts indicate a relative enhancement or improvement over existing conditions.

Locations of point source facilities are included in Figures VIII-2 through VIII-5. Locations of non-point source facilities are indicated on Figures VI-8, 9, 14 and 15. Areas of priority erosion control implementation are indicated on Figure VI-16.

The assessment was prepared in accordance with guidance provided by the U.S. Environmental Protection Agency in the publication, Environmental Assessment of Water Quality Management Plans (October, 1976). The impact categories of economic, land use, social, physical, and ecologic provide a useful framework for addressing a broad spectrum of impacts and issues that components of a water quality plan may raise. The assessment hopes to provide a rational method of weighing trade-offs and benefits resulting from the implementation of the water quality plan.

economic impact

The economic impacts of implementing the point and non-point elements of the water quality management plan are generally positive. These positive impacts occur in the form of increases in employment, personal income, and population on a county-wide basis. The negative impacts result from slightly higher housing costs in areas prioritized for erosion control and increases in public revenues to support detention and sewage disposal facilities. However, both these negative impacts are countered through increases in employment sectors by the creation of new jobs and personal income sources.

Equitable distribution of these increases among wage earners is insured through appropriate utility service charges in financing wastewater treatment facilities, mill levy increases for financing multi-purpose stormwater detention/open space facilities, and appropriate cost increases to consumers of new housing starts in areas where slope stabilization costs are incurred (mostly along benchlands or within the canyons).

The possibility of additional water quality management costs exist in other areas related to storm runoff control. These are in programs such as street cleaning or control of runoff from hazardous wastes such as radioactive tailings. These costs will be estimated as the data base for water quality impact becomes more inclusive.

Estimated economic impact of the Water Quality Management Plan is shown in Figure VIII-6.

Plan Components

Impact Category

Non-Point Facilities	Point Facilities					Impact Category	Economic	Land Use	Physical	Social	Ecologic	
	South Valley	Central Valley	Salt Lake City	Magna	Detention Facilities						Non-Living	Living
	+	+	+	+	+	EMPLOYMENT						
	+	+	+	+	+	POPULATION						
	+	+	+	+	+	INCOME						
	+	-	-	-	-	PUBLIC REVENUES						
	+	+	+	+	+	PUBLIC EXPENDITURES						
	+	+	+	-	-	RESIDENTIAL						
	+	+	+	+	+	INDUSTRIAL						
	+	+	+	+	+	COMMERCIAL						
	+	+	+	+	+	INSTITUTIONAL						
	+	+	+	+	-	PARKS						
	+	+	+	+	+	AGRICULTURAL						
	+	+	+	+	+	TRANSPORTATION						
	+	+	+	+	+	VISUAL						
	+	+	+	+	+	TOPOGRAPHIC						
	+	+	+	-	-	FLOODWAYS						
	+	+	+	+	-	RECREATION						
	+	+	+	+	+	EDUCATION						
	+	+	+	-	-	HEALTH						
	+	+	+	-	-	SAFETY						
	+	-	-	-	-	SOILS						
	+	-	-	-	-	GEOLOGY						
	+	+	+	+	+	AIR QUALITY						
	+	+	+	+	+	WATER QUALITY						
	+	+	+	-	-	WILDLIFE						
	+	+	+	-	-	VEGETATION						

FIGURE VII-1. SUMMARY OF ENVIRONMENTAL IMPACTS RESULTING FROM IMPLEMENTING THE WATER QUALITY PLAN.

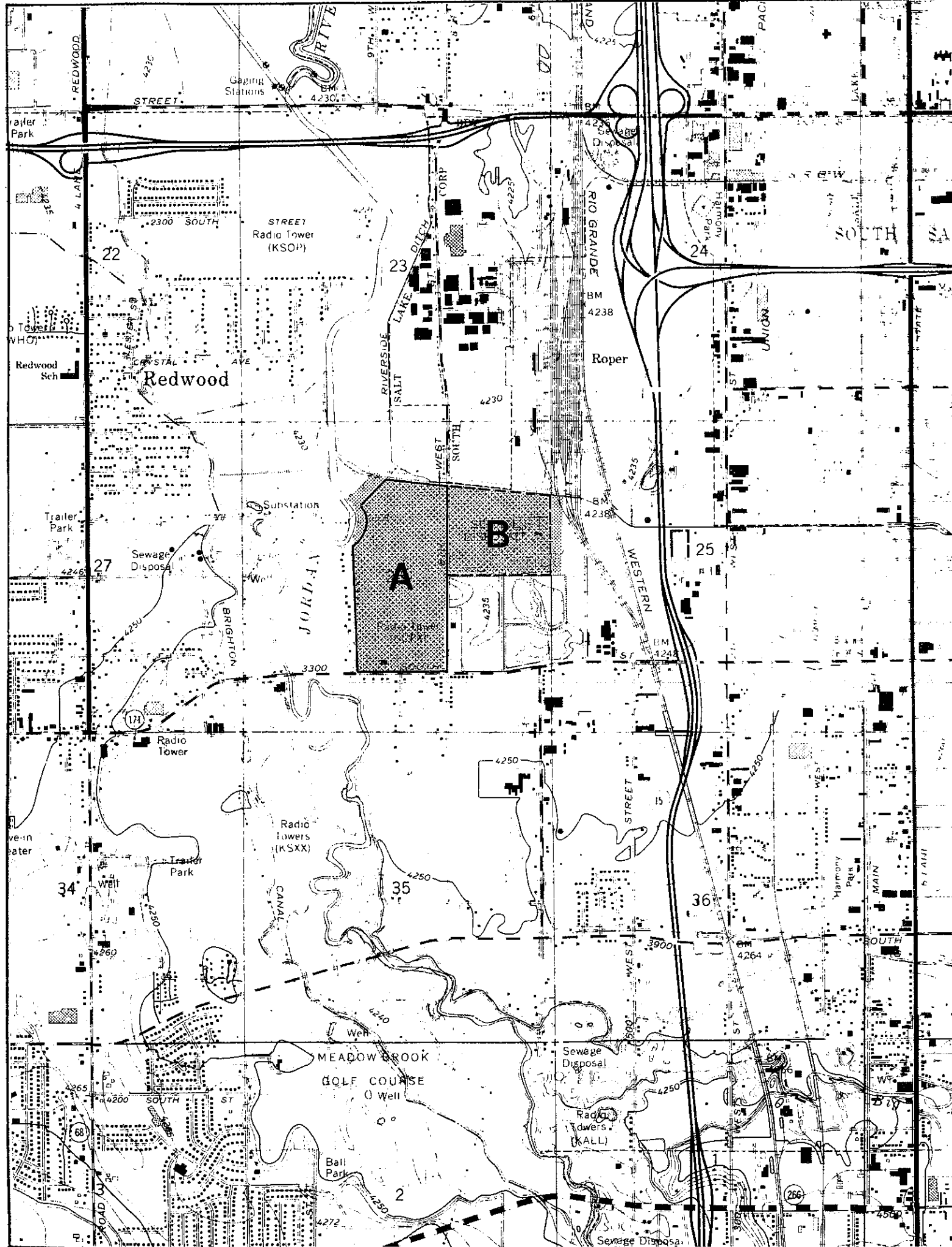
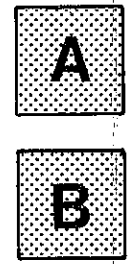


FIGURE VIII-2. FACILITY SITE LOCATION CENTRAL VALLEY



A PRINCIPAL SITE AREA
B POSSIBLE SECONDARY SITE EXPANSION

Salt Lake County Water Quality & Pollution Control
208 Water Quality Plan

acres
40

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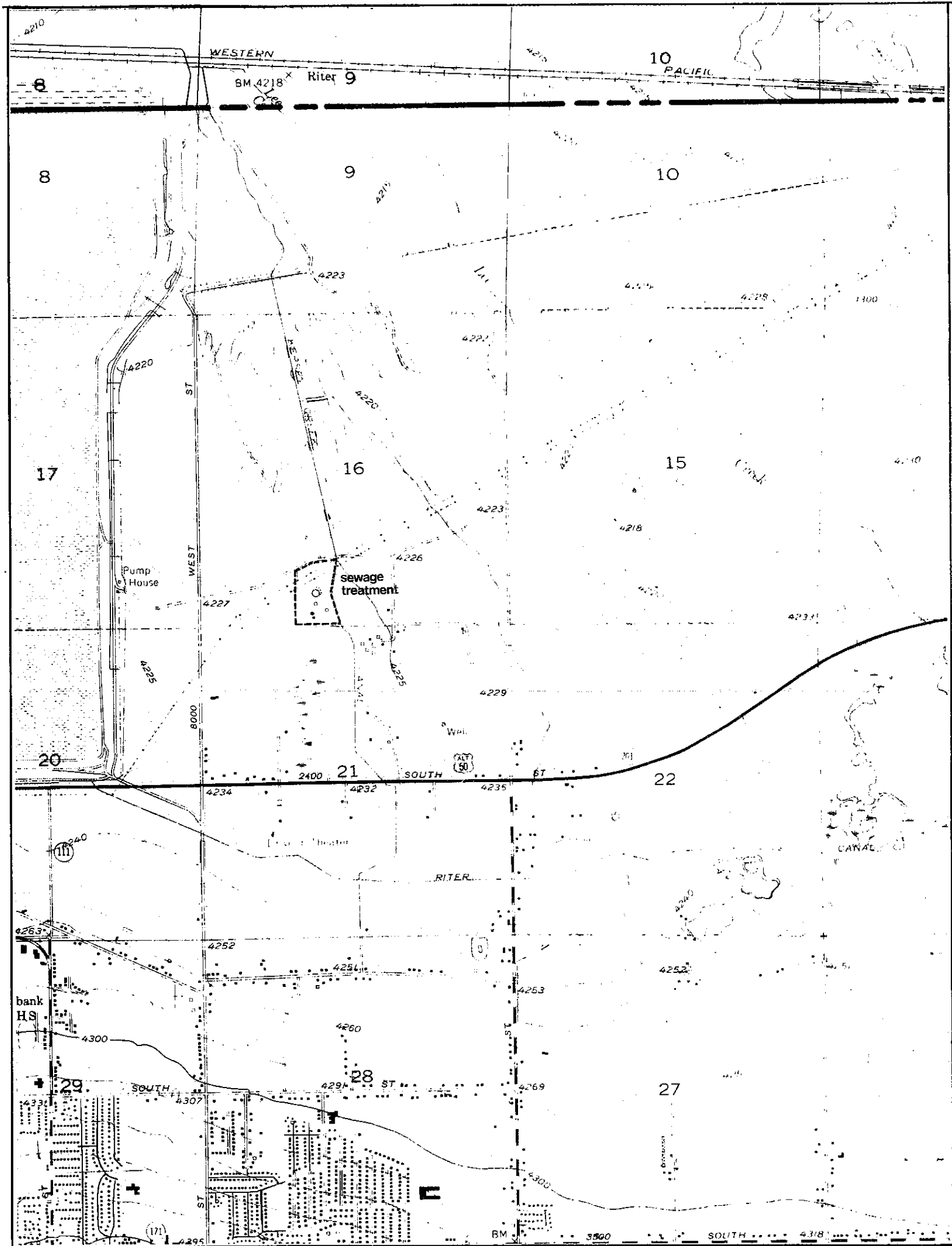
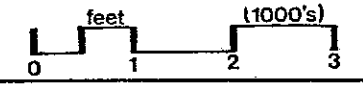


FIGURE VIII-3. LOCATION MAGNA FACILITY SITE LOCATION

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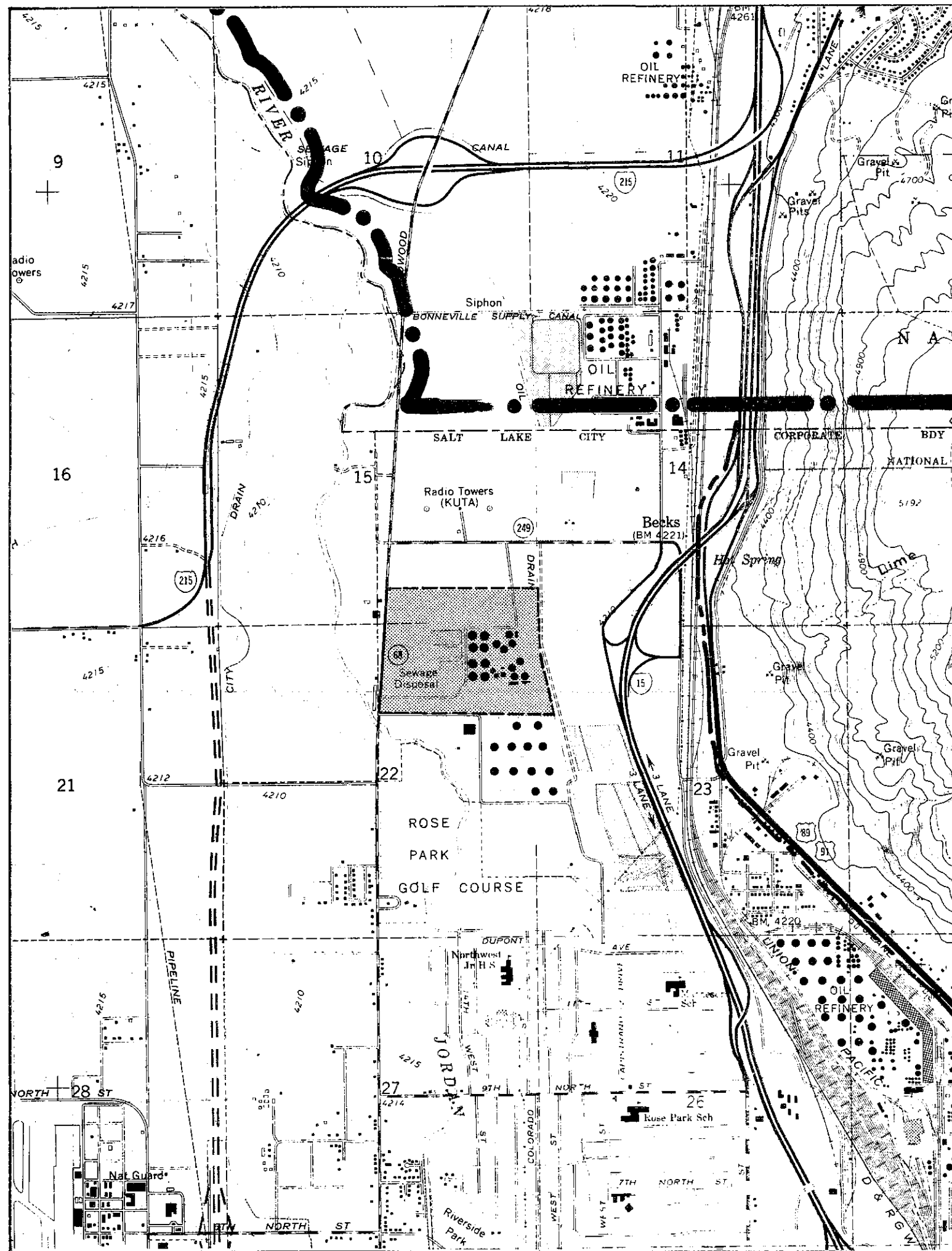


FIGURE VIII-4. SALT LAKE CITY FACILITY SITE LOCATION

Salt Lake County Water Quality & Pollution Control
208 Water Quality Plan

acres
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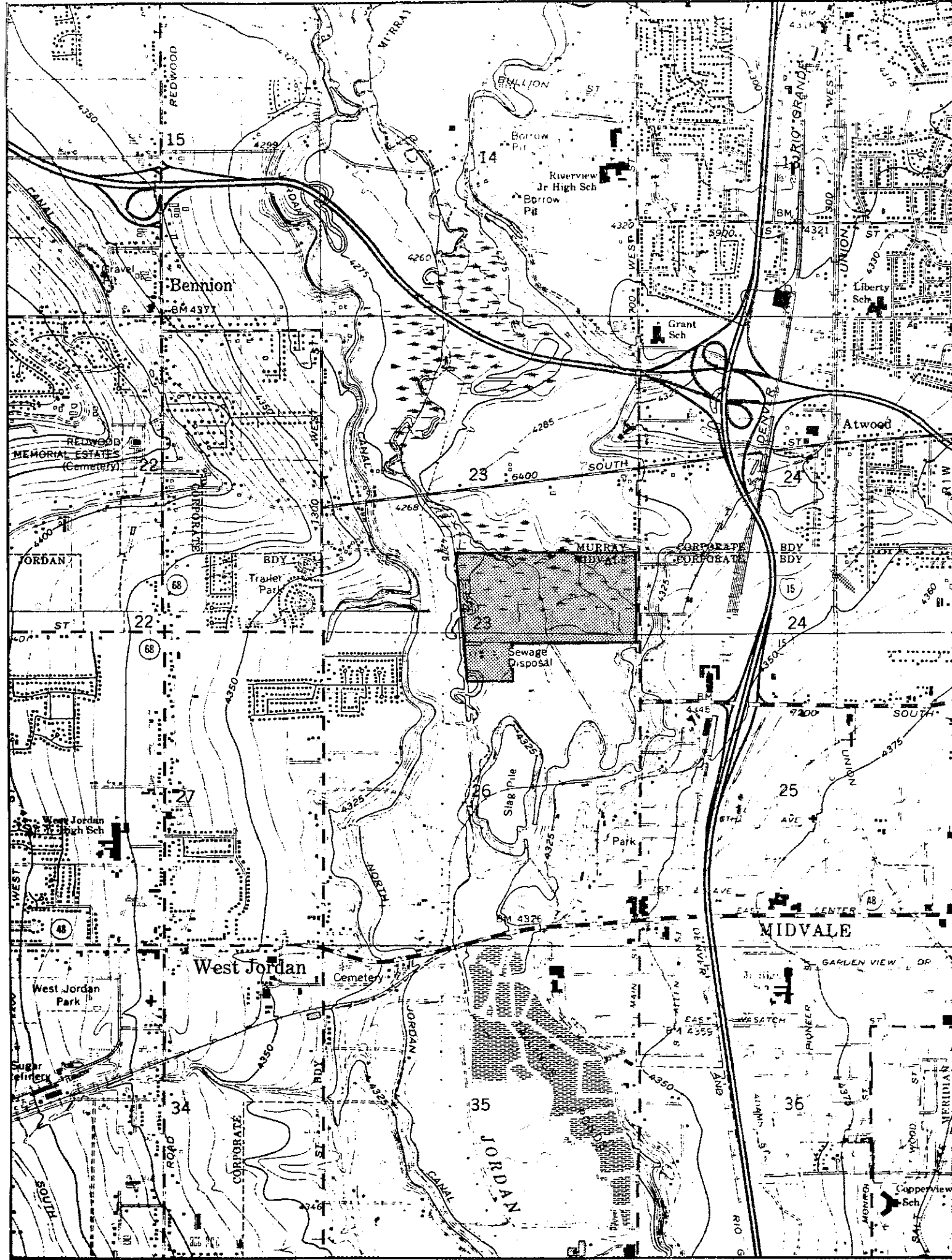


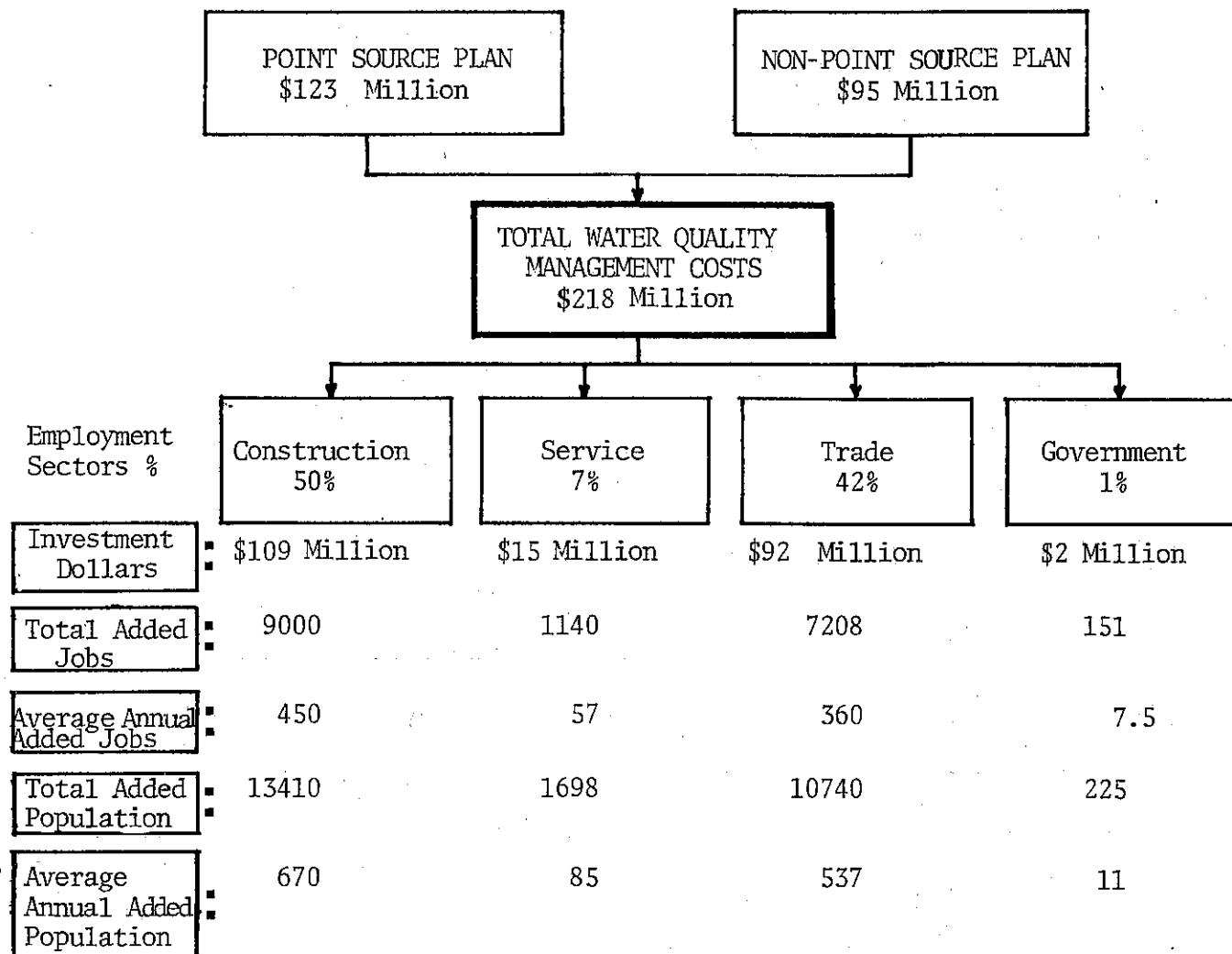
FIGURE VIII-5. SOUTH VALLEY FACILITY SITE LOCATIONS

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acres
40

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		With Plan	Without Plan
Population		816,611	790,538
Total Employment		398,164	380,665
JOBS	Construction	24,607	15,607
	Trade	98,946	91,740
	Service	112,675	111,535
	Government	59,915	59,764
Total Income (10 ⁹)		13.3	13.1
Public Expenditure (10 ⁹)		120.2	120.
Public Revenues		120.2	120.

Figure VIII-6. Estimated Economic Impact of Proposed Water Quality Management Actions.

land use impact

POINT SOURCE PLAN

Central Valley Facilities

The impact of the proposed Central Valley facilities on adjacent land uses is projected to be minimal. Detailed development plans for the Big Cottonwood Planning District (Salt Lake County Planning Commission, 1974) indicate that the proposed facility site will not incur long-term conflict with neighborhood or residential development. The proposed plant site should be surrounded by industrial uses on the east, north, and a portion of the west property lines. Property not developed for facility use on 3300 South should develop into related non-conflicting industrial use. The plant site does impact land proposed to be developed for the Jordan River Parkway. Unless facility design accommodates open space or recreational opportunity in the northwest corner of the site, conflicting land use relationships between parkway and facilities development will be a possibility.

Magna Facilities

Evaluation of present development plans for projected land use near the Magna facility site indicates that no conflicting uses will result from wastewater treatment plant expansion. The Magna plant site is in very close proximity to the Salt Lake County Sanitary Landfill which is being considered for expansion and improvement so as to comply with Federal and State landfill regulations. Projected land use around both facility sites indicates maintaining the "Salt Desert" and "Marsh" environment.

Salt Lake City Facilities

Expansion of wastewater treatment facilities at the present Salt Lake plant site will produce possible conflicts with proposed high density residential development. Recently, approximately 40 acres of high density residential zoning

was granted south of the treatment plant site. However, some related industrial development near the plant could provide a buffer between any use conflicts. (The residential zoning conflicts with the proposed industrial classification shown in the present master plan)

Although the most recent Salt Lake City master plan does not indicate Jordan River Parkway facilities north of the Glendale Golf Course, the facility site sits in close proximity to the Jordan River and recreational use present at the golf course. Any expansion of these facilities necessitates the addition of landscaping (shrubs, lawn, and preferably trees) sufficient to soften the conflict between the physical settings.

South Valley Facilities

The sources of projected land use in the study area were derived from detailed "District Development Plans" completed by the City of West Jordan and Salt Lake County in cooperation with Midvale and Murray City. These plans reflect a combination of citizen goals together with estimates of acreage required to accommodate anticipated uses and demands relating to park/open space, transportation, etc. A short discussion of each projected use will touch on the main conflicts or possible constraints.

Residential

The only significant residential projection is in the continued location of a large mobile home park directly adjacent to the north of the proposed plant site. However, the existence of land presently utilized for sewage lagoons could present some opportunities for "buffer zone" incorporation into plant expansion. The existence of the mobile home park does present the possibility of land use conflict due to sewage odor. Remaining residential acreage is planned above grade of the plant site and of sufficient distance

to preclude odor problems due to the northern and southern wind patterns.

Industrial

The majority of the acreage within the site corridor is projected for industrial use. The term "Industrial Reserve" is used from direct reference to the Little Cottonwood District Development Plan. This "reserve" area has since been developed for use as sewage lagoons.

Agriculture

The land east of the irrigation canal and west of the plant site is projected for continued agricultural use. The land characteristics, together with the existing Utah Power & Light corridor, sufficiently limit the use of of this land to either agricultural or open space use.

Park/Open Space

A continuous corridor of land on each side of the Jordan River has been projected for the length of Salt Lake Valley. The intent here is consistent with the citizen goals and policy of reserving land for the Jordan River Parkway and opportunities for Parkway implementation are open with the development of a regional treatment facility at this location.

Treatment plant grounds and facility design should provide for dedication of a portion of the plant site for parkway utilization either in the form of bikeways/walkways or open space design that provides stop/rest benches, landscaping, etc.

Insofar as two additional public parks are planned in the area close to the sewage treatment facility, plans should contribute to Parkway implementation that will provide incremental links between Park facilities.

Transportation/Circulation

Proposals exist for the extension of 7200 South Street East to connect to 7000 South. As a major collector street, this extension will be designed at either an 80' or 106' right-of-way. The road will pass through or close to the new treatment facility site.

Coordination with State and County highway design teams will be necessary during the Step I facility design phase in order to incorporate and integrate grading, excavation, and open space considerations at the time the new treatment facility is built. Access considerations to the new plant and parkway areas should also be included during this design phase.

Commercial

No commercial facilities are planned outside the present downtown Midvale location.

Figures VIII-7, 8, 9, 10, 11, 12, 13, and 14 summarize both existing and projected land use near the Central Valley, Magna, Salt Lake City and South Valley Facilities respectively.

NON-POINT SOURCE PLAN

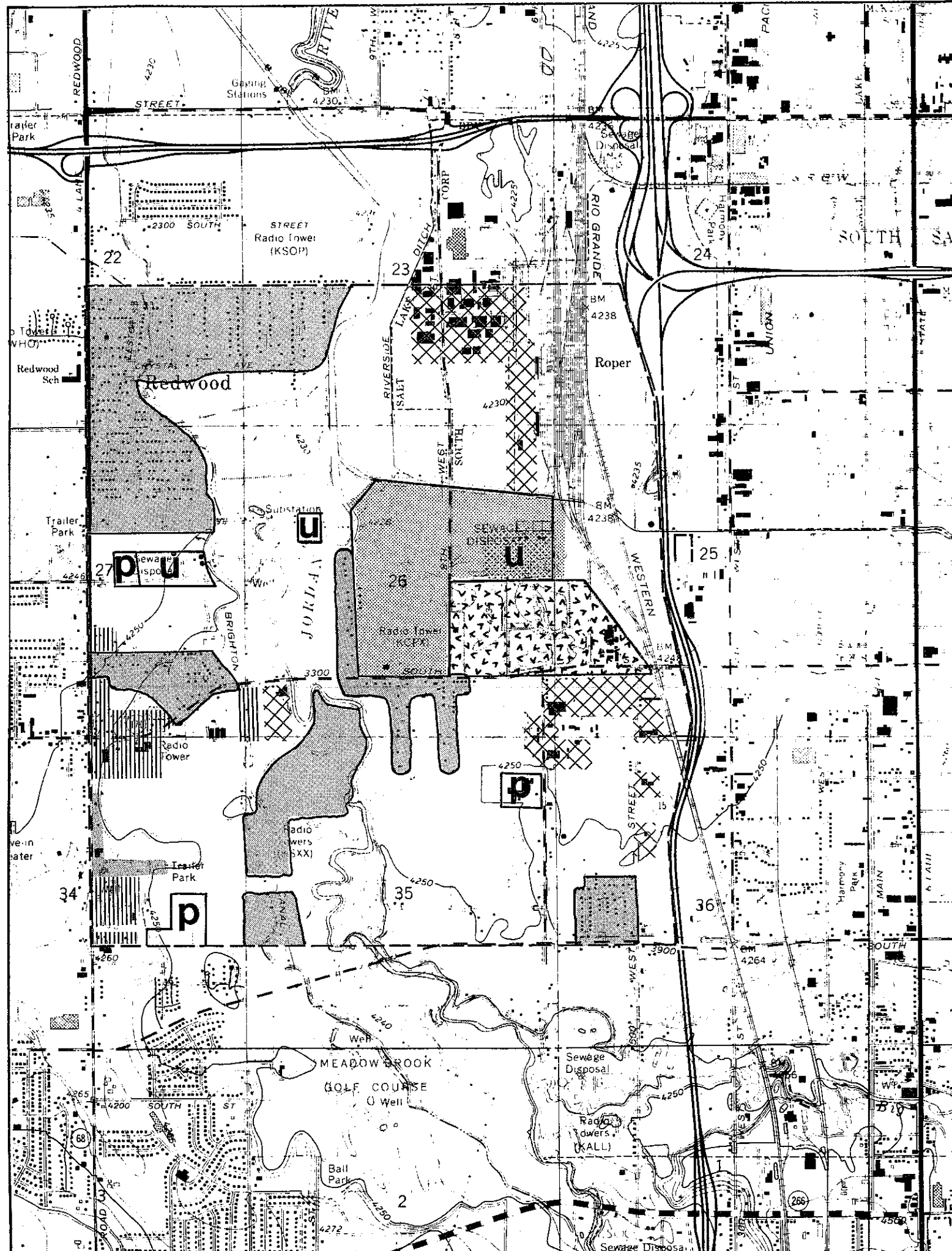
The impacts on land use resulting from proposed actions under the non-point source plan are confined to those regulatory programs which produce structural improvements. Such improvements include stormwater detention facilities as well as some structural improvement for erosion control in sensitive canyon/foothill areas.

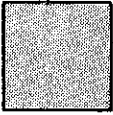


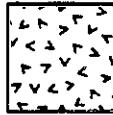



Detention facilities range in their design and location, from 200 acre tracts located near floodway zones to three and four acre facilities built in and around neighborhood and community parks (Reference Figures VI-8, 9, and 14).

The integration of water pollution control modifications into stormwater runoff facilities for flood control will have little - if any - negative impact on adjacent land uses. Where additional modifications increase stormwater detention time, the added ground inundated by the detention will be confined to park-open space uses owned and maintained by public entities. Positive land use relationships will be created where detention facilities are built in conjunction with parks and open spaces. Those facilities not located in neighborhood parks will be placed close to the Jordan River where storm drains discharge. All of these facilities will be integrated into the overall parkway design.

Erosion control along sensitive foothill or canyon settings may include - when appropriate - the construction of retaining walls, diversion ditches, flow dissipators, flumes, and berms. No adverse land use conflicts are anticipated from the installation of these kinds of facilities. Insofar as excavation and grading operations for development commonly produce negative visual and flood-related impacts on adjacent residential areas, the stabilization of such operations will reduce the present negative impacts. Priority areas for erosion control measures are referenced to Figure VI-16.

FIGURE VIII-7. EXISTING LAND USE,
CENTRAL VALLEY FACILITY



-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  VITRO TAILINGS - HAZARDOUS WASTE
-  PUBLIC UTILITY
-  PUBLIC PARK/INSTITUTIONAL
-  AGRICULTURAL/VACANT

SOURCE: SALT LAKE COUNTY PLANNING COMMISSION, PROPERTY PLAT LAND USE INVENTORY, 1975. SALT LAKE COUNTY WATER QUALITY, PHOTO-INTERPRETATION @ 1" = 200'. 1975.

Salt Lake County Water Quality & Pollution Control
208 Water Quality Plan

acres
40

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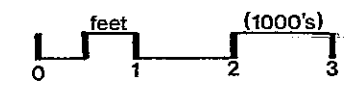
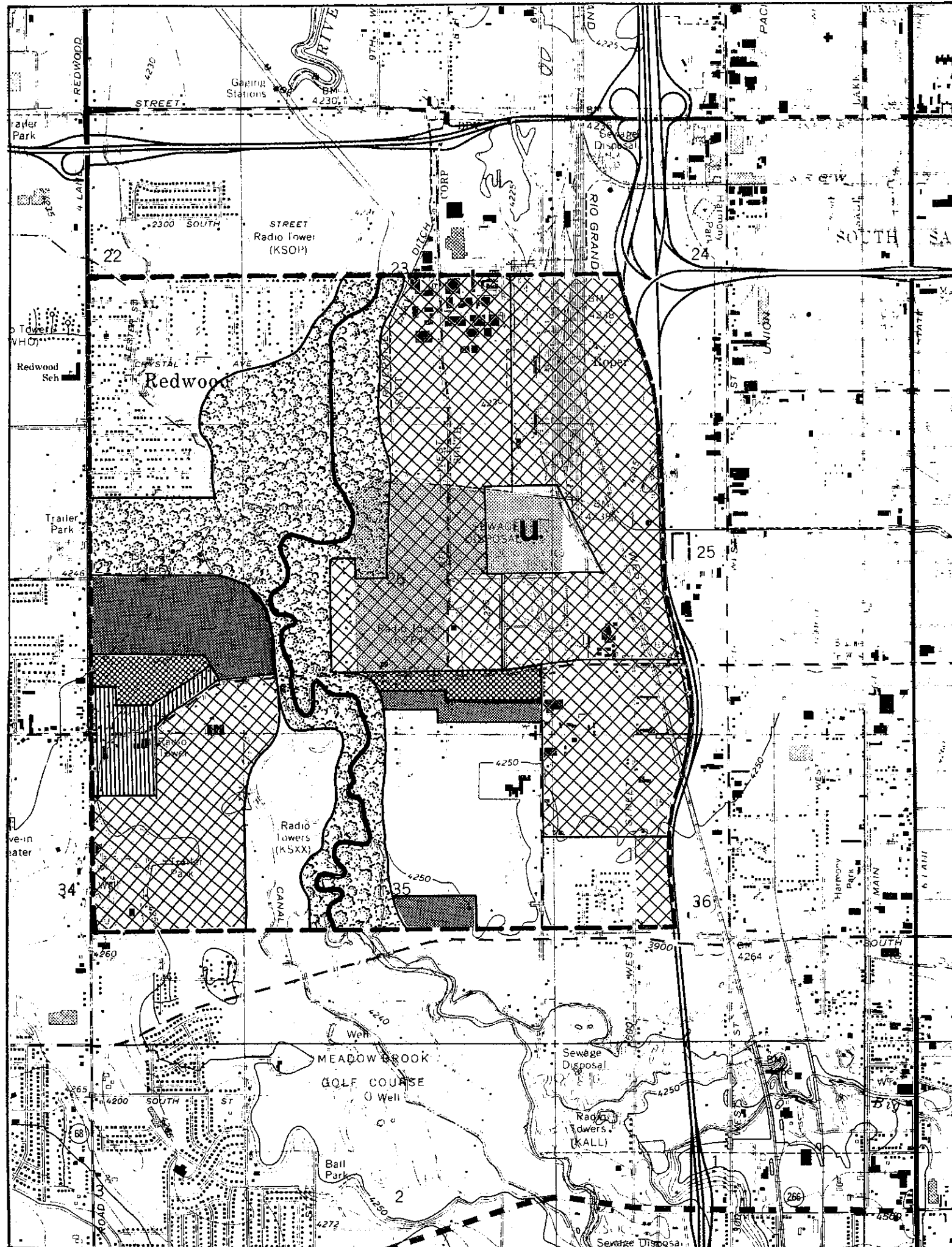
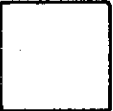
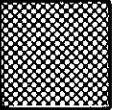
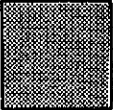
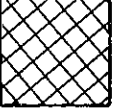





FIGURE VIII-8. PROJECTED LAND USE,
CENTRAL VALLEY FACILITY

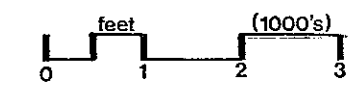


-  RESIDENTIAL - LOW DENSITY
(1-7 UNITS PER ACRE)
-  RESIDENTIAL - HIGH DENSITY
(14-20 UNITS PER ACRE)
-  RESIDENTIAL - MEDIUM DENSITY
(7-14 UNITS PER ACRE)
-  INDUSTRIAL
-  COMMERCIAL
-  JORDAN RIVER PARKWAY
-  PUBLIC UTILITY

Salt Lake County Water Quality & Pollution Control
208 Water Quality Plan

acres
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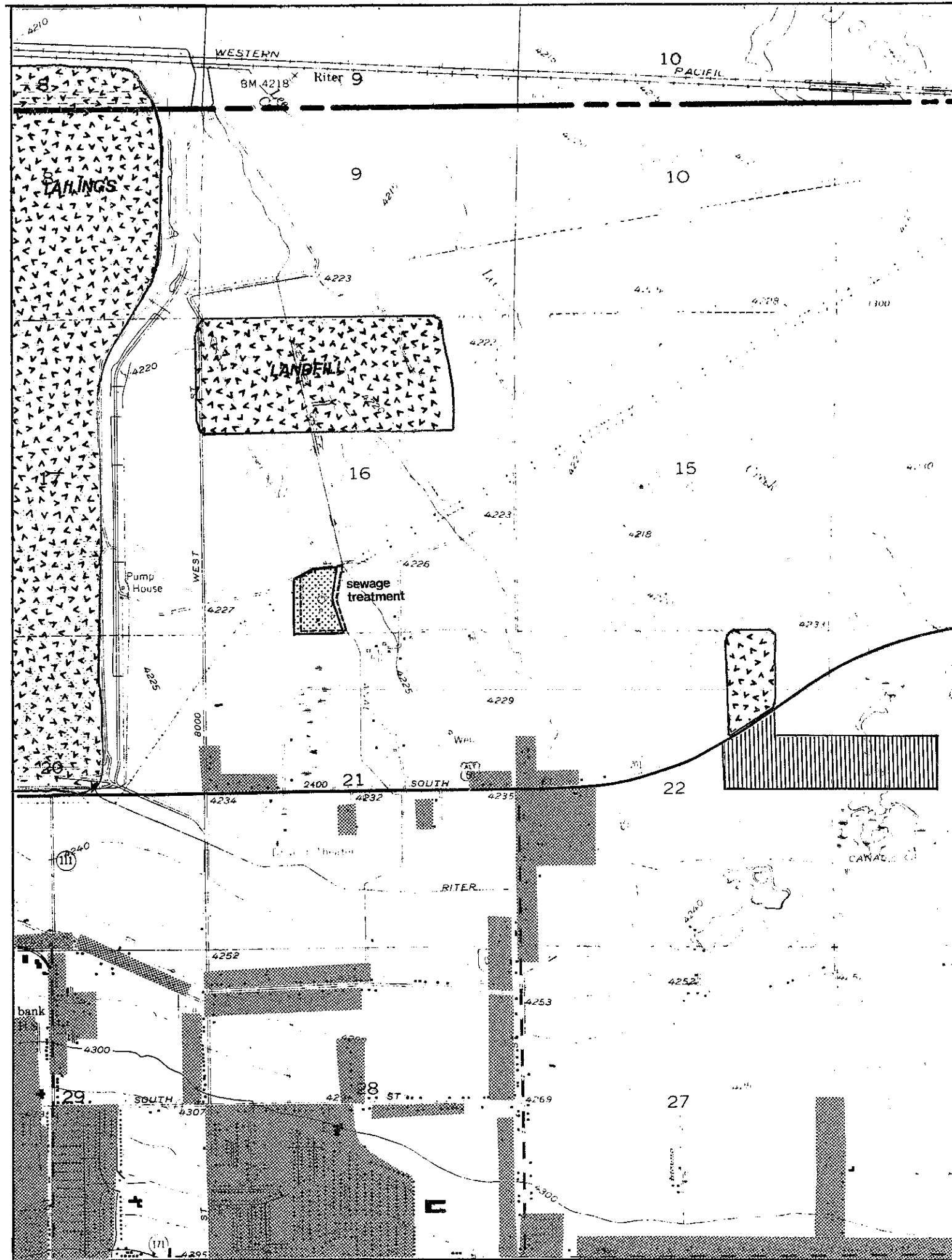
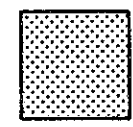
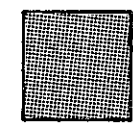
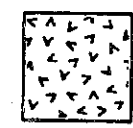




FIGURE VIII-9. EXISTING LAND USE, MAGNA FACILITY

-  EXISTING FACILITY SITE BOUNDARIES
-  RESIDENTIAL
-  INDUSTRIAL
-  COMMERCIAL
-  AGRICULTURAL/VACANT

SOURCE: SALT LAKE COUNTY PLANNING COMMISSION, PROPERTY PLAT LAND USE INVENTORY, 1975. SALT LAKE COUNTY WATER QUALITY, PHOTO-INTERPRETATION @ 1" = 200', 1975.

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acres
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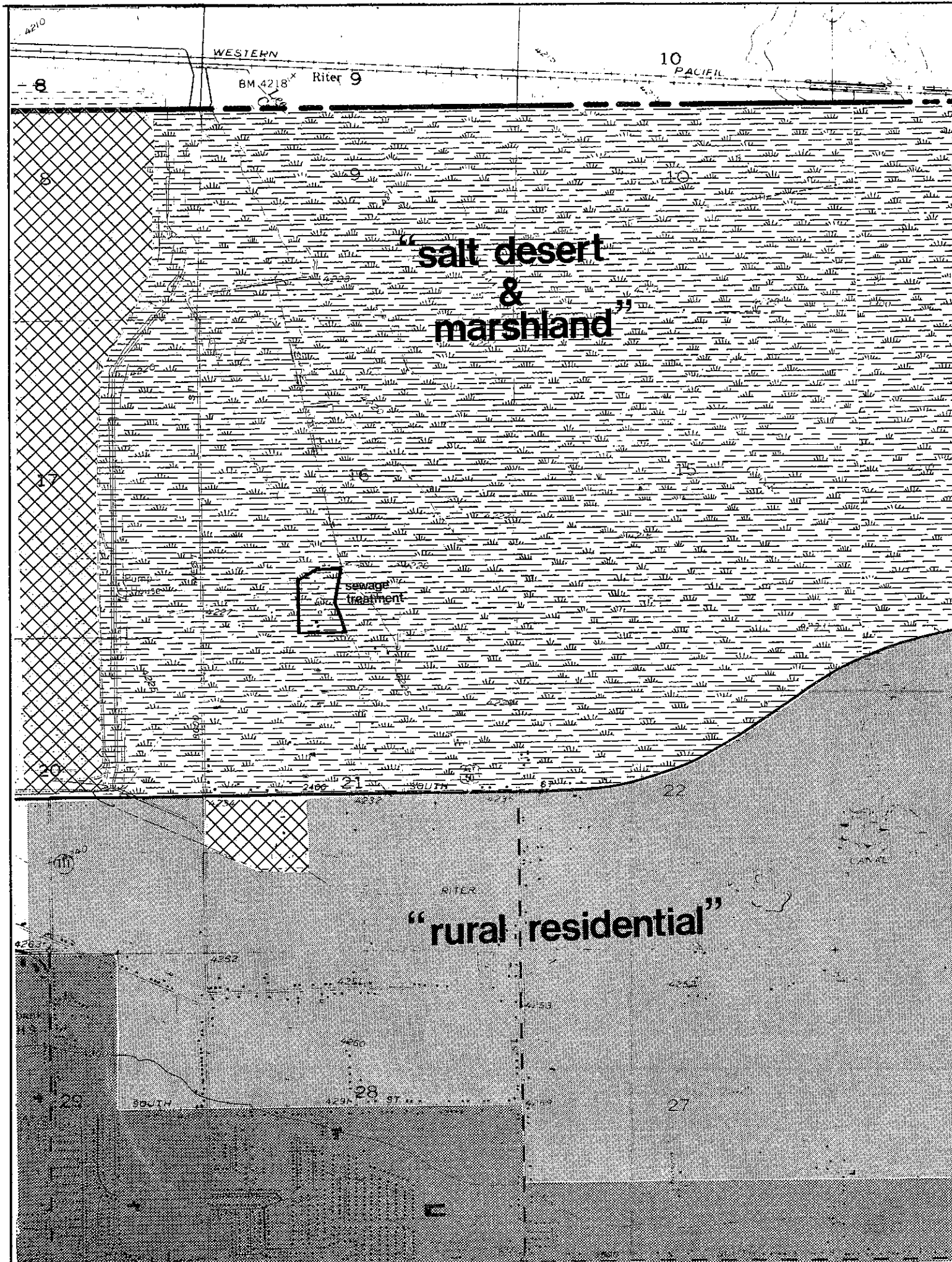
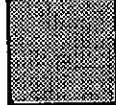
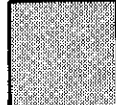
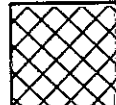
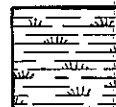


FIGURE VIII-10. PROJECTED LAND USE, MAGNA FACILITY

-  RESIDENTIAL
-  "RURAL RESIDENTIAL"
-  INDUSTRIAL
-  "SALT DESERT & MARSHLAND"

SOURCE: SALT LAKE COUNTY PLANNING COMMISSION, MAGNA DISTRICT DEVELOPMENT PLAN, 1974, AND SALT LAKE VALLEY MASTER PLAN, 1965.

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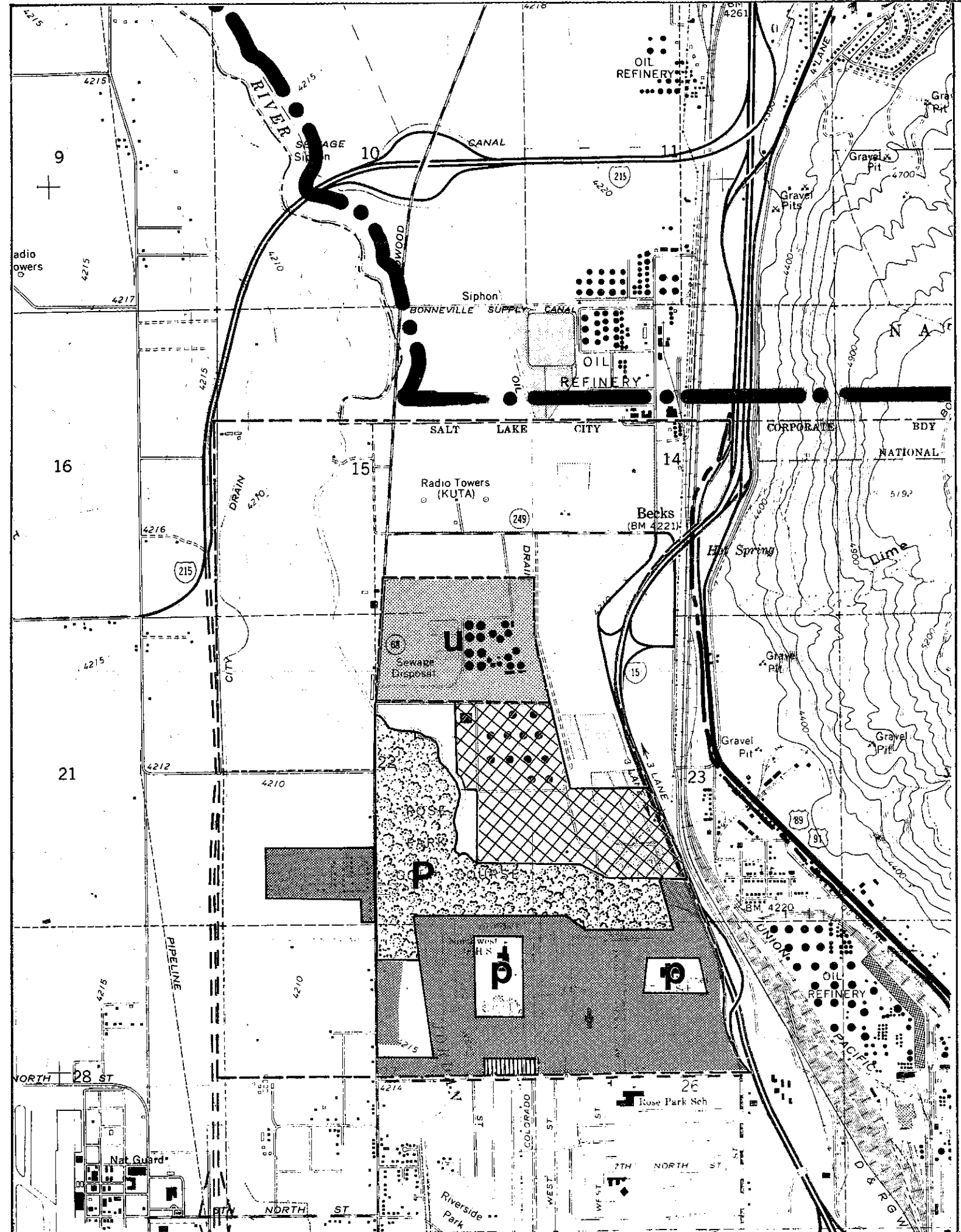


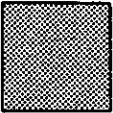

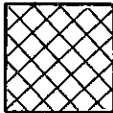
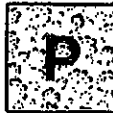



acres
40

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FIGURE VIII-11. EXISTING LAND USE,
SALT LAKE CITY FACILITY



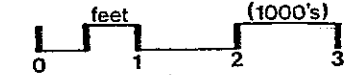
-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  PUBLIC PARK/OPEN SPACE
-  PUBLIC FACILITIES
-  PUBLIC UTILITY (SEWAGE DISPOSAL)
-  VACANT/AGRICULTURAL

SOURCE: SALT LAKE COUNTY PLANNING COMMISSION, PROPERTY PLAT LAND USE INVENTORY, 1975. SALT LAKE COUNTY WATER QUALITY. PHOTO-INTERPRETATION @ 1" = 200', 1975.

Salt Lake County Water Quality & Pollution Control
208 Water Quality Plan

acres
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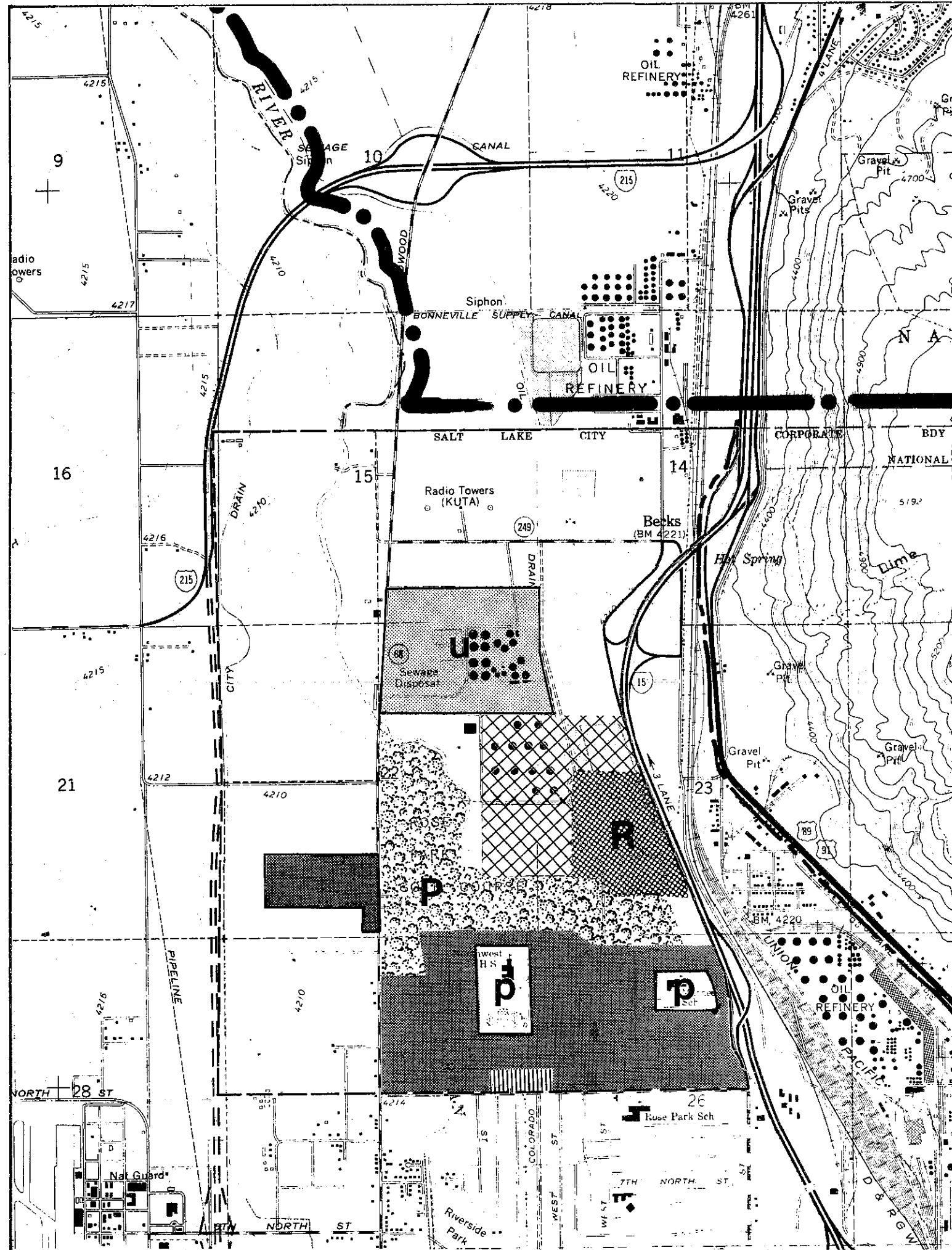
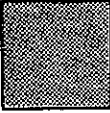
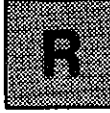

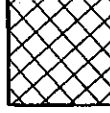

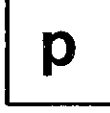




FIGURE VIII-12. PROJECTED LAND USE, SALT LAKE CITY FACILITY

-  RESIDENTIAL - LOW DENSITY
-  PROPOSED RESIDENTIAL - HIGH DENSITY
-  COMMERCIAL
-  INDUSTRIAL
-  PARK/OPEN SPACE
-  PUBLIC FACILITIES
-  PUBLIC UTILITY (SEWAGE TREATMENT)
-  VACANT/AGRICULTURAL

Salt Lake County Water Quality & Pollution Control
208 Water Quality Plan

acres
40

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feet (1000's)
 0 1 2 3



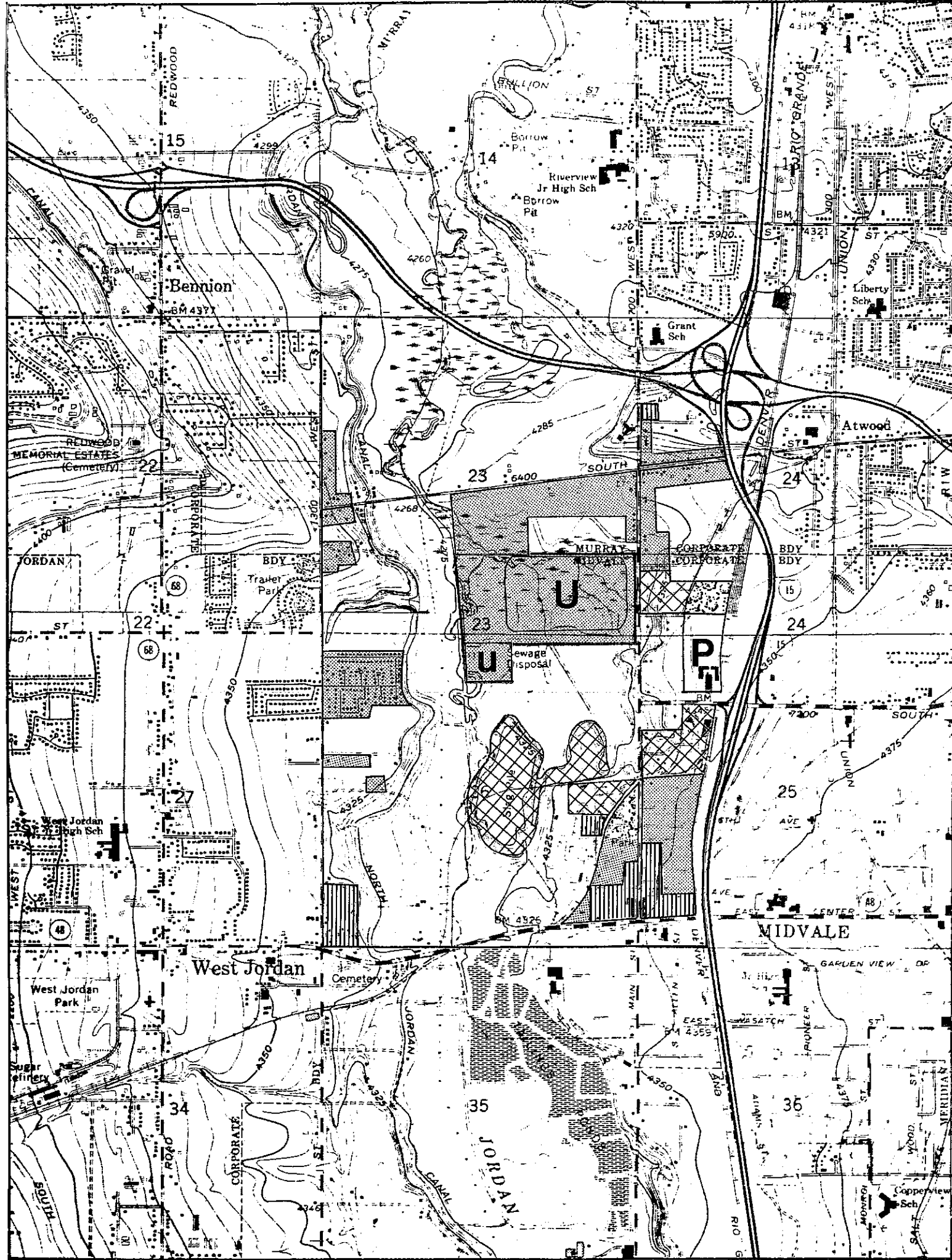
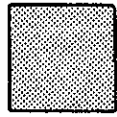
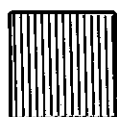
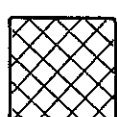






FIGURE VIII-13, EXISTING LAND USE, SOUTH VALLEY FACILITY

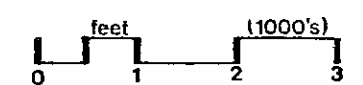
-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  PARK/OPEN SPACE
-  PUBLIC UTILITY (EXISTING FACILITIES)
-  PUBLIC MAINTENANCE FACILITY
-  AGRICULTURAL/VACANT

SOURCE: SALT LAKE COUNTY PLANNING COMMISSION, PROPERTY PLAT LAND USE INVENTORY, 1975, SALT LAKE COUNTY WATER QUALITY, PHOTO-INTERPRETATION @ 1" = 200', 1975.

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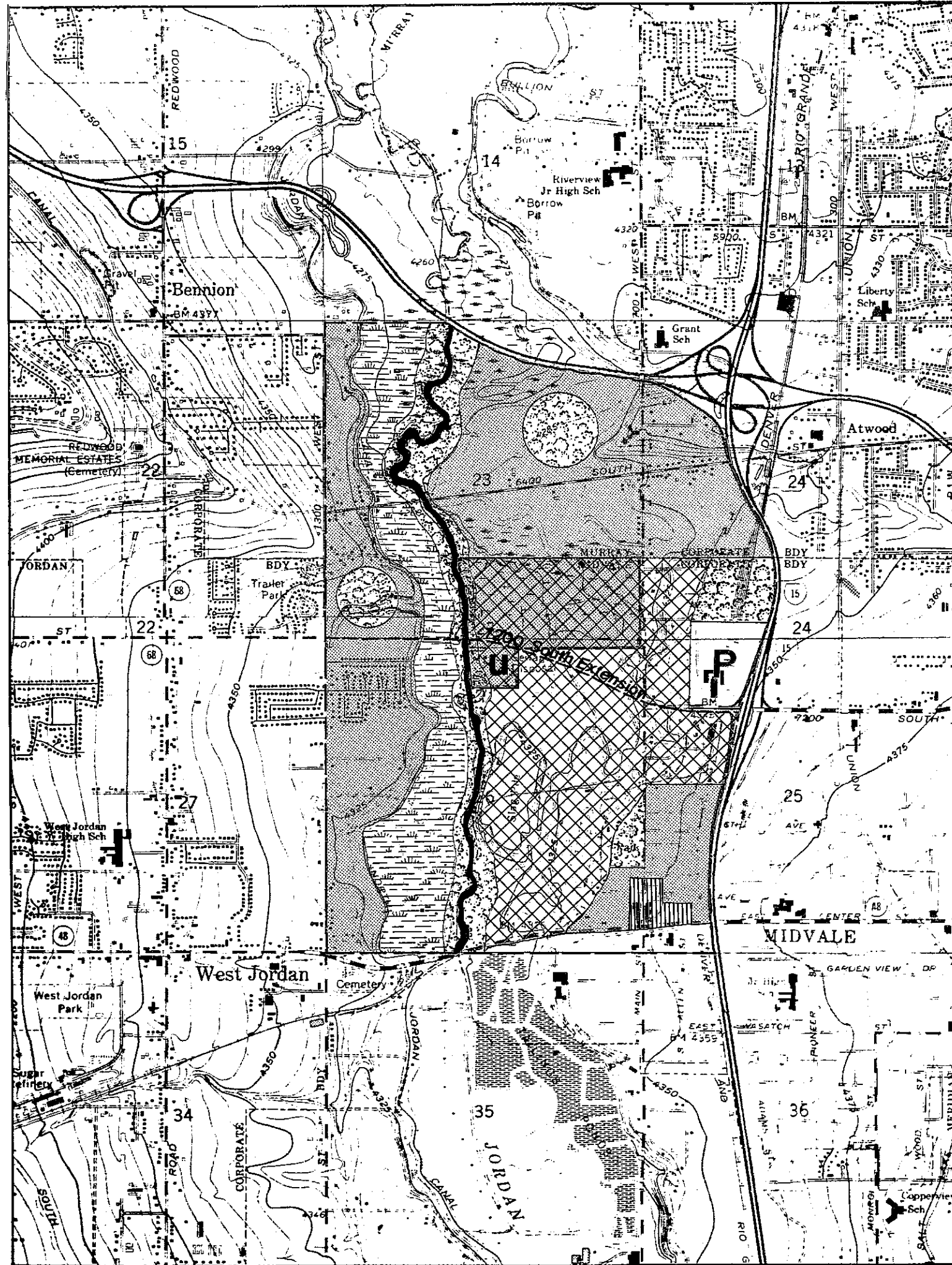
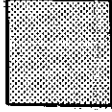

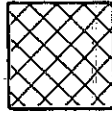



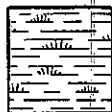



FIGURE VIII-14. PROJECTED LAND USE, SOUTH VALLEY FACILITY

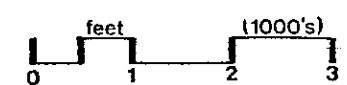
-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  PARK/OPEN SPACE
-  PUBLIC MAINTENANCE FACILITIES
-  PUBLIC UTILITY (SEWAGE DISPOSAL)
-  AGRICULTURAL
-  PROPOSED PARKS

SOURCES: SALT LAKE COUNTY PLANNING COMMISSION, "LITTLE COTTONWOOD DISTRICT DEVELOPMENT PLAN," DUNCAN & JONES, ASSOC. 1976. WEST JORDAN CITY, "WEST JORDAN MASTER PLAN," PLANNING & RESEARCH ASSOC. 1977

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and make direct access by children unattractive. Such design integration is entirely possible through careful site selection where wetlands conditions are prevalent or where wetland conditions could be expanded or allowed to dominate. Existing park facilities in the county have demonstrated this design approach to be viable and attractive.

The health and safety impacts of erosion control are generally positive. The reduction of surface runoff volume and velocity play a key role in reducing down-slope or downstream flood effects. The benefits of erosion control are of a preventive, indirect nature. Prevention of loss of life and property is only one benefit, while others include savings in tax dollars, operation and management expenditures, soil loss, and flooding loss.

EDUCATION

The concept of public parks serving a multiple use carries unlimited benefits to education. There are particularly beneficial aspects to wetlands enhancement in the public park multiple use role. The opportunities available to park users in a multiple use park go far beyond traditional recreational diversion:

- 1) The provision of diversity of vegetation and wildlife species offers educational benefits in the study of biology, ecology, and related subjects.
- 2) Density and diversity of landscaping materials - through the enhancement of natural floral species - offers greater artistic benefits.
- 3) The variety of leisure recreational activities can be expanded through diversity of landscape design.

- 4) Preservation or enhancement of diverse habitat conditions fosters greater wildlife diversity - the symbol of healthy ecologic conditions.

The design of detention and desilting facilities fits well into a multiple use park/open space concept. Erosion control, however, provides fewer educational benefits. Erosion measures are site-specific in their application, and apply to areas impacted by grading, excavation, or other land-disturbing activities. The addition of erosion controls to construction scheduling will serve little educational benefit except for those who are interested in measuring their impacts and describing their benefits to the community.

RECREATION

The benefits to recreation from stormwater detention facility construction include the possible enrichment of the recreational experience through diversification of vegetative and wildlife, species. The multiple use of park facilities will also enable gaining economies in park development through the coordination and integration of various Federal Grant programs. Other educational benefits will add to the value of such multiple use facilities.

The impacts of erosion control on recreation are minimal. The addition of vegetation or other slope stabilization measures will add only visual improvement as a recreational benefit.

SOCIAL IMPACTS

Central Valley Facilities

There are two possible social impacts that can be expected with construction of facilities at the proposed site:

- 1) Recreational facilities or recreational quality relating to the Jordan River Parkway may be impaired unless adequate measures are taken to integrate the public wastewater treatment facilities with public parkway development. These measures should be given heavy consideration in the design and construction of new facilities.
- 2) Public health and safety may be desperately impaired if measures to remove flood hazards are not taken. The inundation of sewage treatment facilities may cause untold damage to confinement and control efforts for disease related to sewage wastes. Loss of life of plant personnel is also a consideration for ignorance of real flooding hazard.

Magna Facilities

There are no anticipated social impacts as a result of expanding the Magna facilities. There exist no recreational, educational, or residential resources that could be impaired and no natural hazards to public health or safety.

Salt Lake City Facilities

There are two possible social impacts relating to construction of treatment works at the Salt Lake City plant site:

- 1) Impairment of public health and safety due to location within the intermediate zone floodway.
- 2) Objectionable odor problems affecting the quality of the nearby high density residential environment.

South Valley Facilities

Possible social impacts may occur in the following categories:

Recreation

The compatibility between the proposed regional treatment facility and proposed community and Jordan River Parkway facilities depends largely on how the new sewage plant integrates open space design into its surrounding landscape, what kinds of recreationally oriented amenities are provided, and how the plant deals with potential odor problems which could make recreational activity undesirable near the plant.

Since extensive recreational opportunities exist near the plant and are projected to satisfy local needs for all county residents, the possibility of the new facility expansion being incompatible with recreation use does exist. However, design considerations could effectively mitigate any anticipated conflict.

Public Safety

The construction of additional vehicular access, development of recreational facilities and close proximity to mobile home residential use, all present increased hazards to public safety. These are hazards that are, however, created as a result of increased use not directly attributable to the operation of a wastewater treatment facility.

The facility itself may reduce these risks through the incorporation of a number of safety measures which include:

- * Constructing facilities that provide limited access opportunities directly inside plant equipment or structures.
- * Providing adequate fencing, landscape buffers, and fencing that direct or inhibit human activity within treatment plant works.
- * Provision of around-the-clock personnel or security.

Public Health

The expansion of treatment facilities in close proximity to mobile home residential use does present the possibility of increased airborne pollutants and odor.

Education

Educational opportunities will possibly accompany the development of public wastewater facilities in conjunction with Jordan River Parkway facilities. As described under "Projected Water Quality Impacts," the attainment of new effluent standards through advanced sewage plant design and process will be a reality.

The educational value to be gained at this site involves a public demonstration as to the preservation of environmental quality concurrent with development activity. The provision of public open space areas around the plant may give incentive to such demonstrations for school, civic, and church groups in addition to providing a local environment pleasant to visit or at least not unpleasant.

Cultural Resource Survey

It is emphasized that any construction of facilities between the Jordan River low water channel and existing facilities may necessitate a "cultural resource survey" through the State Historic Preservation office. (See Appendix A-7.)

ecologic impact

NON-LIVING MATTER

Soils

Central Valley Facilities

The soil conditions at the Central Valley facilities site include hazards for erosion, shrink-swell, high watertable, salt/alkali, high water runoff potential and very slow permeability. This combination of conditions may produce diseconomies in the life and performance of the facilities over time. Mitigation of high shrink-swell potential, salt/alkali, and watertable problems should be demonstrated in any design details for facilities at this site. In addition, the high runoff and erosion potential imply additional sensitivity to construction runoff and controlling grading and excavation. Because this site can potentially contribute large loads of suspended sediment and associated pollutants to Class 3A receiving waters, such controls should be mandatory and addressed in the Step I completion phase.

Magna Facilities

The soil mapping units present on the Magna facilities site possess the same limiting characteristics as those of the Central Valley facilities site. The same mitigating procedures that apply to new construction for the Central Valley site apply to construction at the Magna site.

Examples of such procedures include:

1. Gravel "collaring" around building foundations to prevent shrink-swell.
2. Provision of sub-surface underdrain system for disposal of seasonal high watertable seepage. Include drainage around gravel collars.
3. Treatment of all subsurface utilities with salt/alkali retardant material or chemical to prevent premature wear of such utilities.
4. Design of erosion control plan in connection with surface drainage plan so as to preclude unnecessary discharge of polluted stormwater into receiving streams.

Salt Lake City Facilities

The Decker Association soils are characterized by high shrink-swell potential, strong salt/alkali effects, and slow permeability. These are the primary soil conditions that will impact the expansion of the Salt Lake facilities. Mitigation such as those given in examples above should apply under these circumstances.

South Valley Facilities

The existing soil conditions at the subject site indicate that a high seasonal water table (0"-30") is present within five of the six mapping units which cover the site. Three of six mapping units possess strong salt/alkali conditions and a high water runoff potential. Other constraining factors present on the site include high erosion hazard, very rapid permeability, very slow permeability, and high shrink-swell potential.

The implications of these soil constraints are that additional data in the form of test borings at greater depths are necessary to corroborate the problems that may result from construction on the site without installation of proper mitigating techniques.

The soil conditions present for the Jordan Valley, Magna, Salt Lake City, and South Valley facility sites are summarized in Figures VIII-22 through VIII-25 respectively.

Geology

A description of primary geologic features in Salt Lake County has previously been presented in Figure III-8. Therefore only a description of geologic conditions at each wastewater facility site and general influences to detention facilities will be presented here.

The point source management plan involves construction of wastewater treatment facilities at four locations in Salt Lake County (Reference Figure IV-3). Geologic conditions at wastewater facility sites are characterized by a preponderance of Lake Bonneville deposits that have been eroded and carved by the meandering Jordan River and the River in turn has left flood plain deposits of post Lake Bonneville age. All deposits are those of Quaternary age, ranging from cobbly alluvial material to fine silted clays:

The River ran across the lake bottom sediments of what is now the Jordan Valley and cut a valley in them marked by several prominent terraces on each side. The Jordan River changes from an erosional stream to a depositional stream at about 3300 South and from this point Northward has been engaged in flood plain and levee building for the past few thousands of years.

Both geologic mapping sources, the United States Geological Survey and the Utah Geological and Mineralogical Survey point out that the South Valley facility site is located within a marshland or swamp. Clarification of this marshland identification is necessary in determining its applicability as a "wetlands" area, as defined by the U.S. Corps of Engineers in the administration of dredge and fill permits as authorized under Section 314b of the 1977 Clean Water Act. Local Corps officials have already informally indicated that this site is categorized as a wetland. Permits for any excavation near the river or within the identified wetland will most likely have to be secured.

The North Valley Plant site (also termed Central Valley Plant) marks the division between floodplain deposits and those with associated delta complexes of the same age. Changes in elevation at the North Plant site are indicative of Provo and younger aged Lake bottom silts and sands of ancient Lake Bonneville.

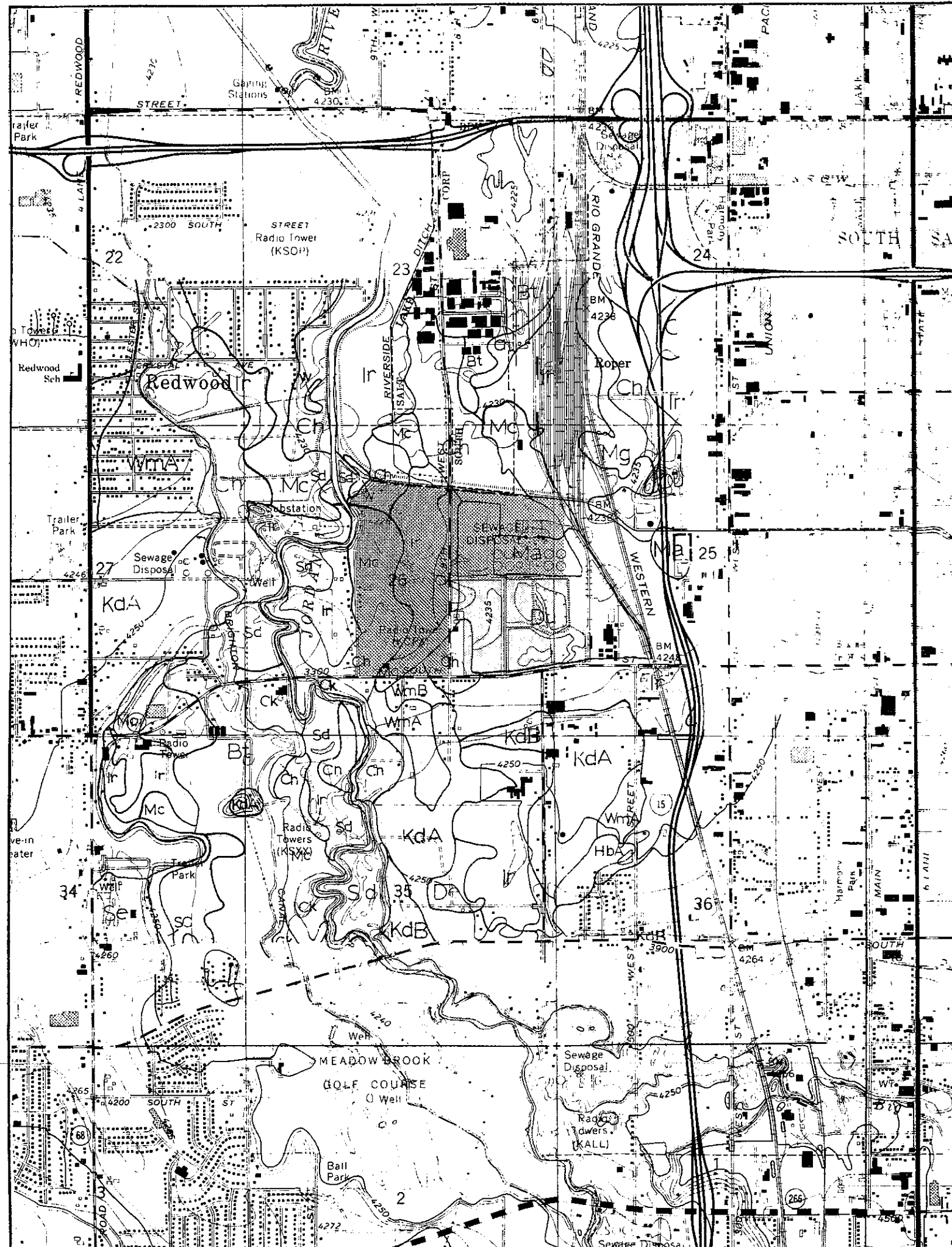


FIGURE VIII 22. EXISTING SOIL CONDITIONS
CENTRAL VALLEY FACILITIES

SOIL SURVEY INCLUDES ONLY THOSE
CONSTRAINING FACTORS TO CONSTRUCTION,
REQUIRING MITIGATION OR SPECIAL SITE
PREPARATION MEASURES.

Source: U.S. Department of Agriculture
Soil Survey of Salt Lake Area
Utah. Soil Conservation Service. 1974.

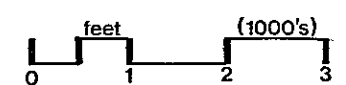
*May be a severe constraint area due to subsidence,
insects, methane gas generation, and radioactive
substances.

SOIL UNIT	SEVERE CONSTRAINING FACTORS					
	High Erosion Hazard	High Shrink-Swell Potential	0'-30" Watertable Depth	Impermeable, Very Slow	High Water Runoff	Strong Salt/Alkali
Ma: Made Land	X					
Mc: Magna Silty Clay		X	X	X	X	
Mg: Magna Silty Clay-Peaty Surface		X	X	X	X	
Ch: Chipman Silty Clay Loam			X		X	
Ir: Ironton Loam			X			X
Du: Dump*						

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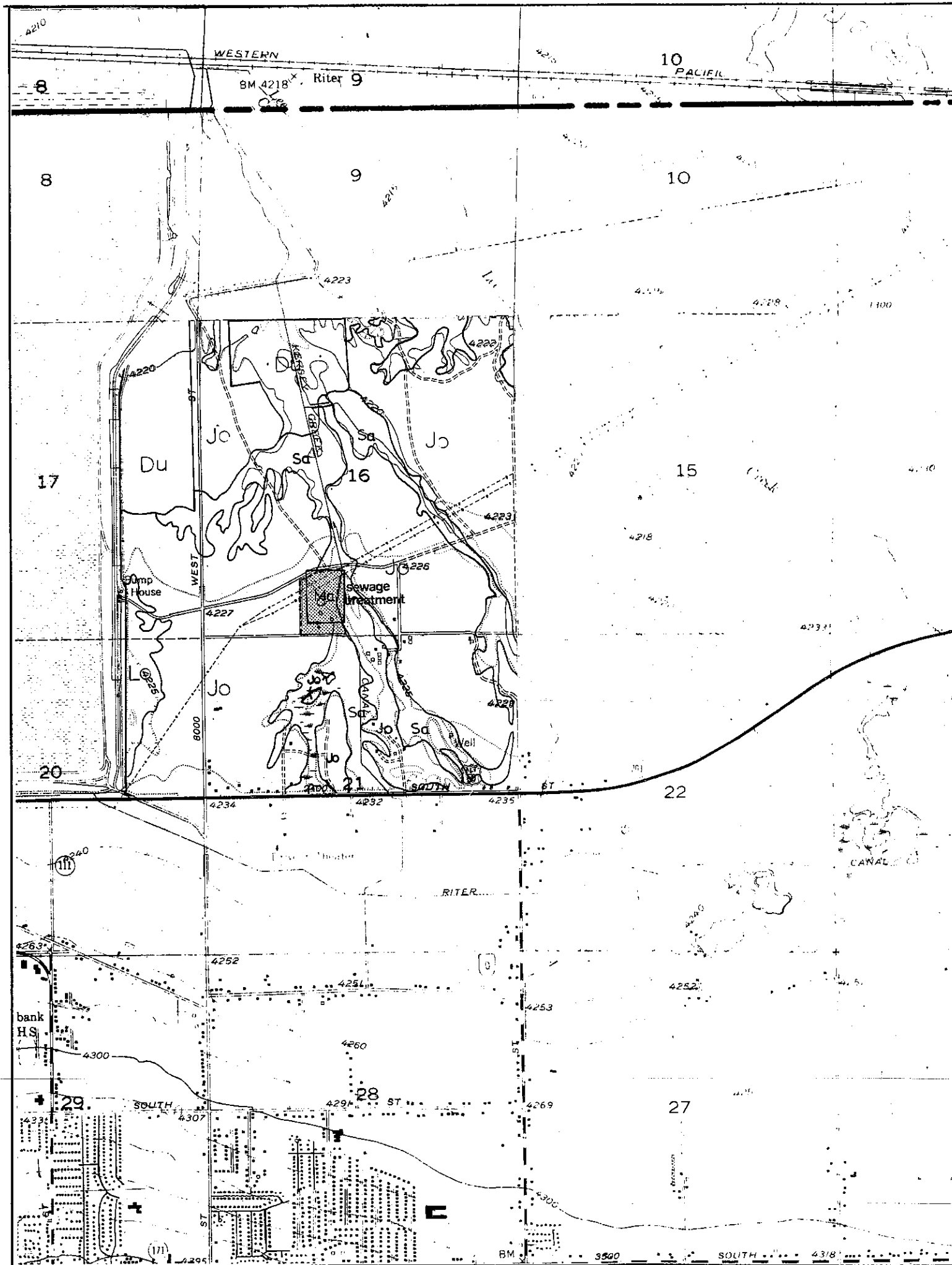


FIGURE VIII-23. EXISTING SOIL CONDITIONS,
MAGNA FACILITIES

SOIL SURVEY INCLUDES ONLY THOSE
CONSTRAINING FACTORS TO CONSTRUCTION,
REQUIRING MITIGATION OR SPECIAL SITE
PREPARATION MEASURES.

SOIL UNIT	SEVERE CONSTRAINING FACTORS	High Erosion Hazard	High Shrink-Swell Potential	Strong Salt/Alkali	Impermeable, Very Slow	High Runoff Potential	0"-30" Watertable
Ma: "Made Land"		X					
Jo: Jordan Silty Clay Loam			X	X	X	X	
Sa: Saltair Silty Clay Loam				X	X	X	X

Source: U.S. Department of Agriculture
Soil Survey of Salt Lake Area
Utah. Soil Conservation Service. 1974.

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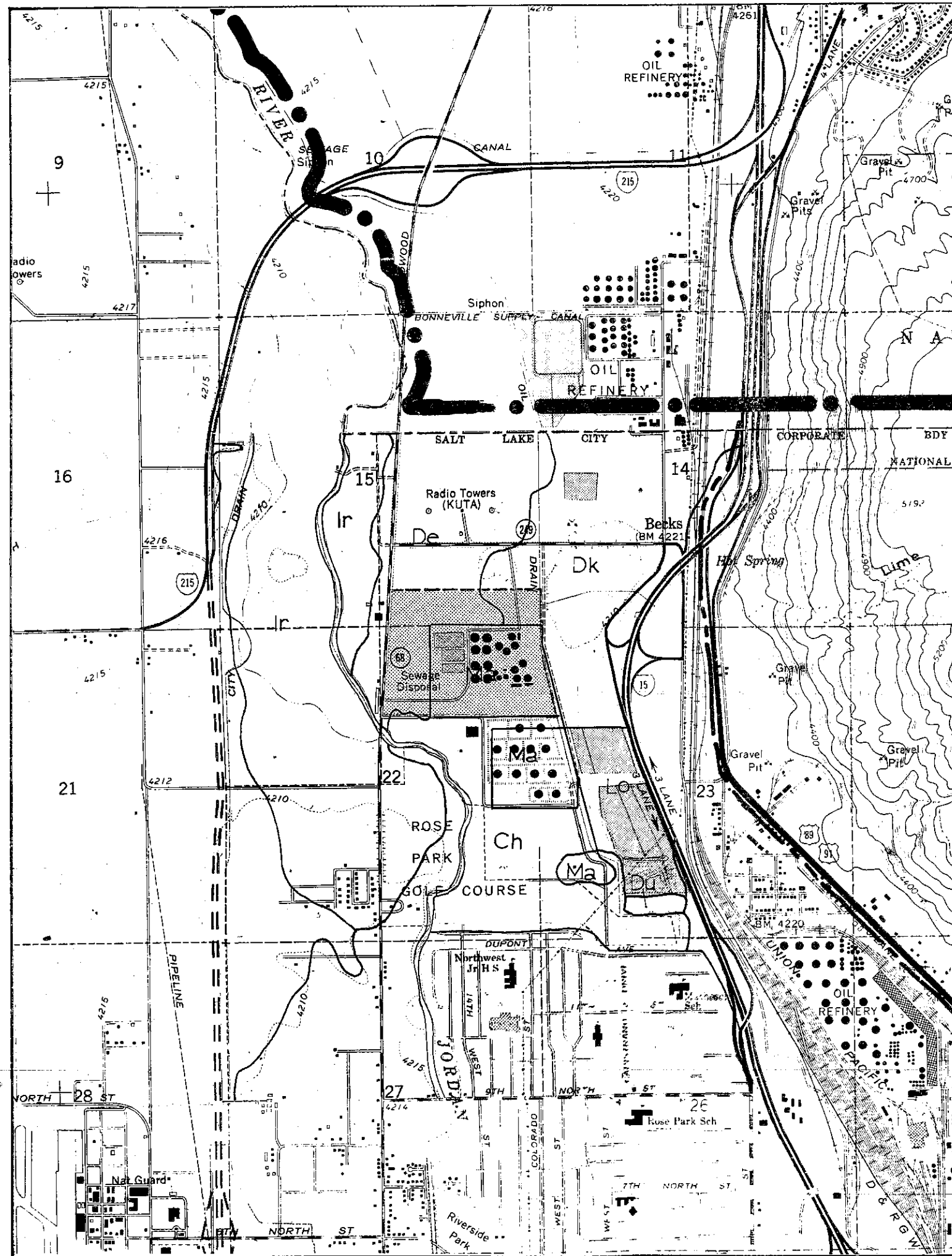
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FIGURE VIII-24. EXISTING SOIL CONDITIONS, SALT LAKE CITY FACILITY

SOIL SURVEY INCLUDES ONLY THOSE CONSTRAINING FACTORS TO CONSTRUCTION, REQUIRING MITIGATION OR SPECIAL SITE PREPARATION MEASURES.



SOIL UNIT	SEVERE CONSTRAINING FACTORS	High Shrink-Swell Potential	Strong Salt/Alkali	Impermeable, Very Slow	High Erosion Hazard
De: Decker Fine Sandy Loam		X	X	X	
Dk: Decker Loam - Strongly Saline/Alkaline		X	X	X	
Ma: Made Land					X

Source: U.S. Department of Agriculture, Soil Survey of Salt Lake Area, Utah, Soil Conservation Service, 1974.

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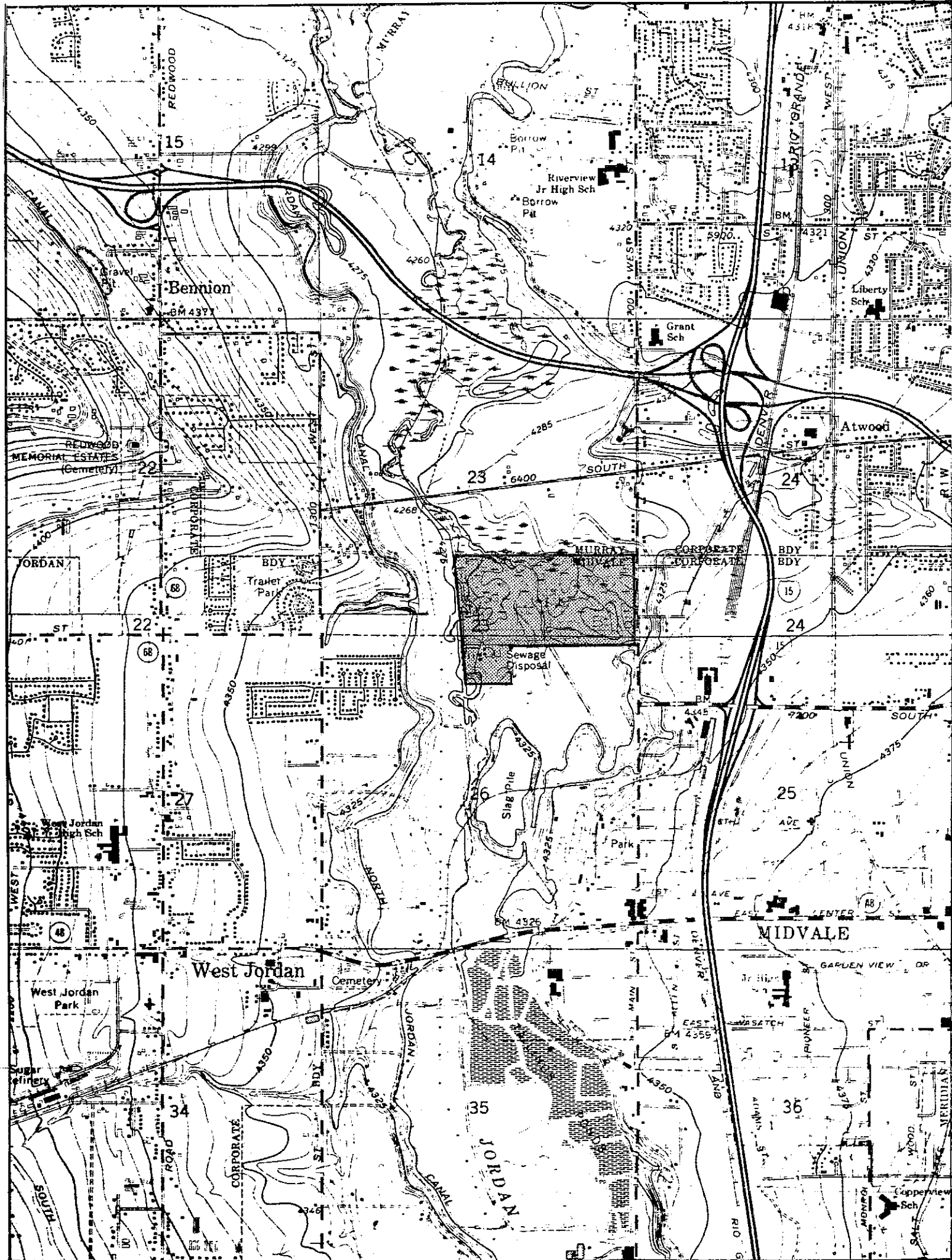


FIGURE VIII-25. EXISTING SOIL CONDITIONS,
SOUTH VALLEY FACILITIES

SOIL SURVEY INCLUDES ONLY THOSE LIMITING
OR CONSTRAINING FACTORS TO CONSTRUCTION,
REQUIRING MITIGATION OR SPECIAL SITE
PREPARATION OR CONSTRUCTION MEASURES.

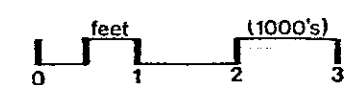
Soil Unit	Severe Constraining Factors					
	High Erosion Hazard	Very Rapid Permeability	0"-30" Water Table	Strong Salt/Alkali	High Runoff Potential	High Shrink-Swell
Mc: Magna Silty Clay			X		X	X
Mg: Magna Silty Clay, Peaty Surface			X		X	X
Mu: Mixed Alluvial Land			X	X		
Ck: Chipman Silty Clay Loam			X	X	X	
Bt: Bramwell Silty Clay Loam	X	X				
Sd: Sandy Alluvial Land	X	X	X	X		

Source: U.S. Department of Agriculture,
Soil Survey of Salt Lake Area,
Utah, Soil Conservation Service,
1974.

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Salt Lake City Facilities are built on the same floodplain/delta complex as the Central Valley facilities, and the Magna treatment works will be located on the Lake Bonneville and Provo silts and sands.

The only limitations involving geologic conditions may occur at the South, Central, and Salt Lake City facilities. These limitations are a function not of the geologic conditions per se (such as those relating to structural bearing capacity, compaction, etc.) but to the condition producing the geologic condition: The Jordan River. Frequency of the intermediate and standard project flood are estimated by the U.S. Corps of Engineers at 100 years and greater than 100 years respectively:

"....an intermediate regional flood has a frequency of occurrence of about once in 100 years on the average, and a standard project flood would occur less frequently than the intermediate regional flood. Although the standard project Flood is a rare event, it can reasonably be expected to occur in the future."
(From U.S. Corps of Engineers, Floodplain Information, March, 1974.)

Floods of major proportions are not only possible at or within identified floodzones, but they are entirely probable, and all but predictable.

The non-point plan elements, primarily stormwater detention facilities, will not be adversely affected by underlying geologic conditions within Salt Lake County. The majority of detention basins are located above substrate with very good drainage comprised of shore facies of sand and gravel of Quaternary age. However, some detention areas will be underlain by ancient lake bottom sands and silts. These areas must be further evaluated to insure that groundwater recharge is possible and that extreme periods of long standing stagnant water can be avoided or sufficiently reduced.

Figures VIII-26 and VIII-27 summarize geologic conditions at the Central Valley and South Valley facility sites respectively.

Present Water Quality

Present water quality of the Jordan River, the Jordan River tributaries, irrigation canals, drainage canals, and storm drainage in Salt Lake County has been described in detail in Section III and will not be repeated here.

Projected Water Quality

Future water quality of the Jordan River tributaries has been described in Section III and will not be repeated here. Future water quality of the Jordan River with implementation of the selected point source plan is listed in Table VIII-1 and shown graphically in Figure VIII-28 for low flow (summer) conditions.

Present Air Quality

Present air quality has been discussed in Section III and will not be repeated here.

Projected Air Quality

Future air quality impacts from implementing elements of the point and non-point source plans will be both direct and indirect. Direct impacts result from construction of sewage treatment plants and detention basins. Indirect impacts will result from the operation of these facilities and from additional growth related to expansion of sewage treatment facilities (principally transportation).

As delineated in Sections III, V, and VII, the entities that have jurisdiction over these facilities are so diverse in nature that they cannot reasonably be expected to control air quality impacts generated from the implementation of point and non-point plans. Attainment of the December 31, 1982 or the December 31, 1987 air quality standards is the responsibility of the State Bureau of Air Quality through implementation of the State Implementation Plan (SIP). As of this date, there exists no SIP for Utah.

A discussion of the situation is presented in Section IV and will not be repeated here.

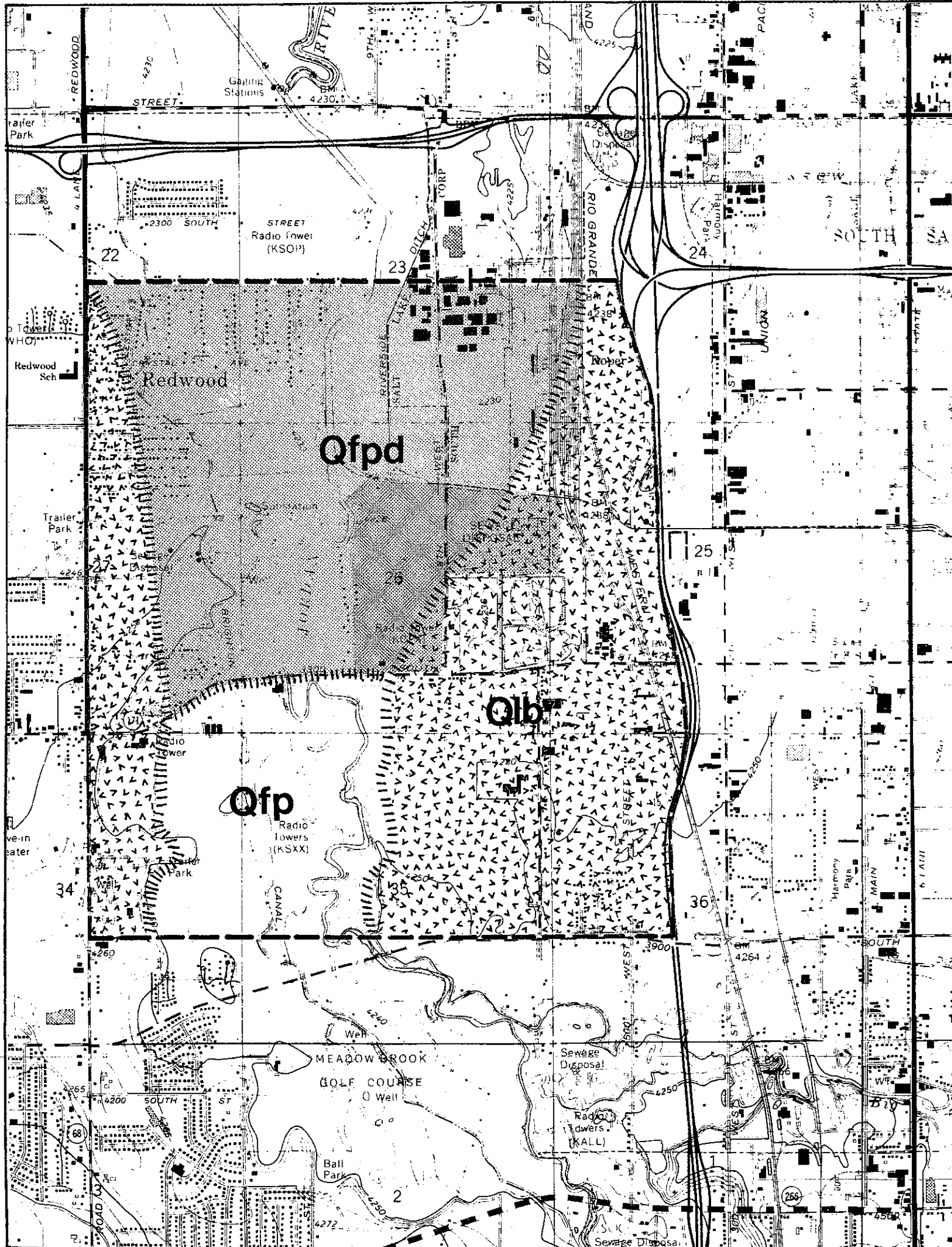
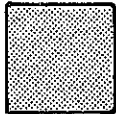





FIGURE VIII-26. GEOLOGY,
CENTRAL VALLEY FACILITY

-  QFPD: JORDAN RIVER FLOOD PLAIN & DELTA COMPLEX
-  QLB: PROVO & YOUNGER LAKE BOTTOM SILTS & SANDS
-  QFP: FLOOD PLAIN DEPOSITS ALONG EXISTING STREAMS
-  RELATIVE BOUNDARY BETWEEN GEOLOGICAL MAPPING UNITS

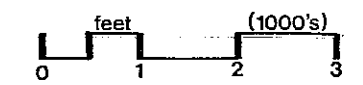
Sources: Utah Geological and Mineralogical Survey. "Geologic Map of Salt Lake County," in Bulletin 69. University of Utah, June, 1960.

United States Geological Survey. "Midvale Quadrangle" and "Salt Lake City South Quadrangle." Denver, CO. (Photo revised, 1969).

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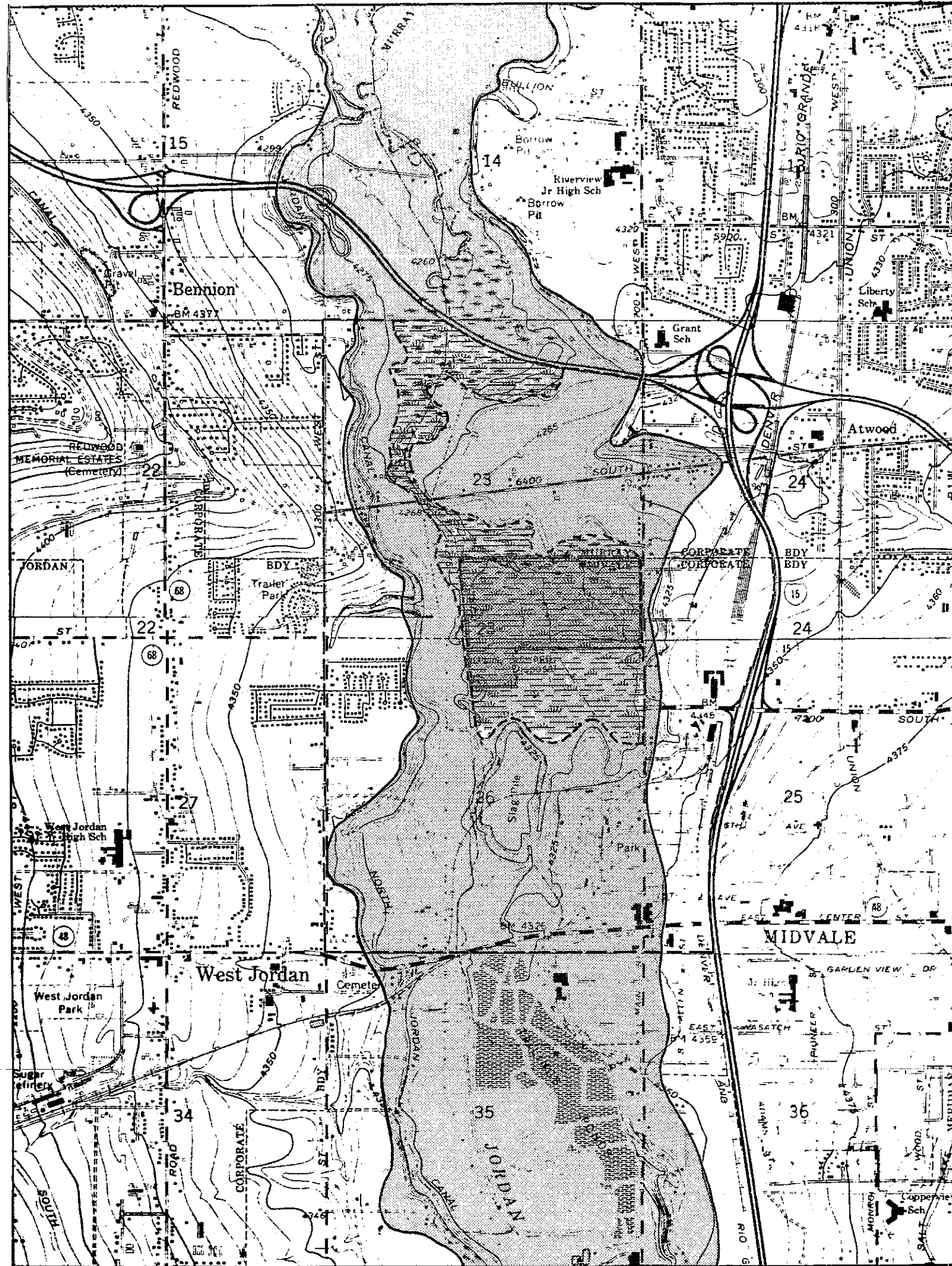
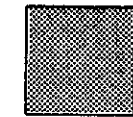


FIGURE VIII-27. GEOLOGY,
SOUTH VALLEY FACILITY



Post Lake Bonneville (Quaternary)
Flood Plain Deposits



Marshland.. (As identified by United
States Geological Survey)

Sources: Utah Geological and Mineralogical
Survey. "Geologic Map of Salt Lake
County," in Bulletin 69.
University of Utah, June, 1960.

United States Geological Survey.
"Midvale Quadrangle" and "Salt Lake
City South Quadrangle." Denver,
CO. (Photo revised, 1969).

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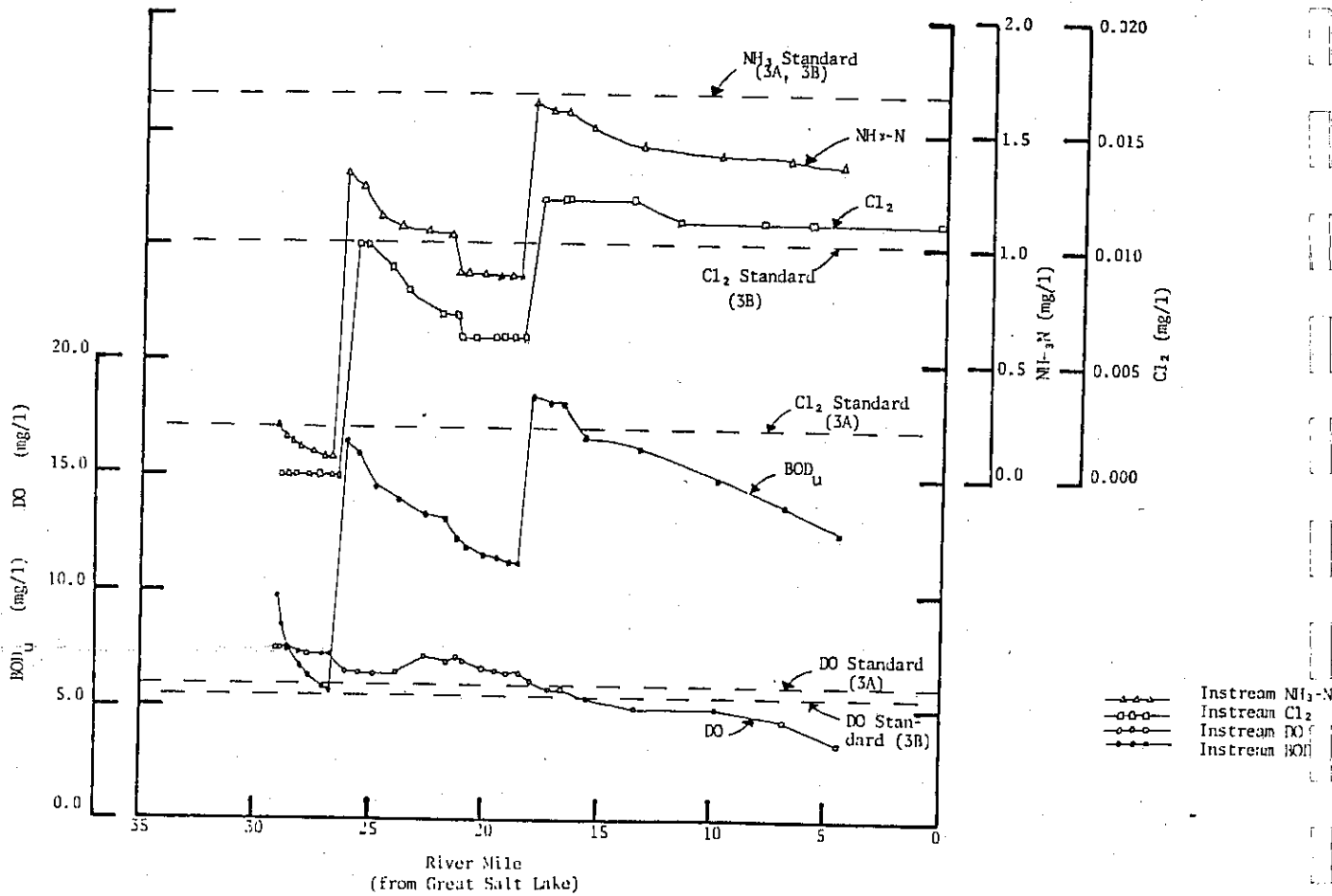
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TABLE VIII-1 . Jordan River Water Quality Projections with Implementation of Selected Municipal Sewage Treatment Plan.

River Mile (from Great Salt Lake)	UBOD, (mg/l)	DO (mg/l)	NH ₃ -N (mg/l)	River Mile (from Great Salt Lake)	Cl ₂ (mg/l)
29.0	9.88	7.54	0.21	28.9	0.000
28.8	8.56	7.47	0.17	28.6	0.000
28.4	7.38	7.41	0.14	28.2	0.000
28.0	6.79	7.34	0.12	27.7	0.000
27.5	6.32	7.27	0.10	27.2	0.000
27.0	5.95	7.21	0.09	26.7	0.000
26.6	5.82	7.19	0.09	26.5	0.000
26.1	16.53	6.51	1.31	25.7	0.010
25.5	15.97	6.50	1.26	25.3	0.010
24.8	14.58	6.48	1.13	24.2	0.009
23.8	13.94	6.52	1.07	23.4	0.008
22.7	13.28	7.06	1.06	22.0	0.007
21.7	13.06	6.99	1.04	21.4	0.007
21.3	12.19	7.10	0.87	21.2	0.006
20.9	11.94	6.94	0.86	20.5	0.006
20.1	11.60	6.74	0.83	19.6	0.006
19.5	11.50	6.69	0.83	19.3	0.006
19.0	11.30	6.57	0.81	18.7	0.006
18.5	11.18	6.50	0.80	18.3	0.006
18.0	18.55	6.09	1.62	17.7	0.012
17.2	18.13	5.88	1.59	16.7	0.012
16.7	18.06	5.86	1.59	16.6	0.012
15.7	16.69	5.42	1.51	14.7	0.012
13.3	16.19	4.99	1.43	11.8	0.011
9.9	14.87	4.92	1.40	8.0	0.011
6.9	13.84	4.42	1.38	5.8	0.011
4.5	12.52	3.56	1.34	0.0	0.011

From: Way, T., 1978, The Jordan River: Ammonia/Chlorine Projections, S.L. County Water Quality and Water Pollution Control, Salt Lake City. See Figure VIII-28 for river and effluent conditions.



*Summer Conditions,
 River, $T=20^{\circ}\text{C}$, $\text{pH}=7.5$, $K_d(\text{Cl}_2)=0.0/\text{day}$, $K_d(\text{NH}_3)=0.15/\text{day}$
 Effluent (mg/l): $\text{BOD}_5=10$, $\text{SS}\leq 10$, $\text{NH}_3=5.0$, $\text{DO}=4.9$, $\text{Cl}_2=0.04$

Figure VIII- 28. Projected Jordan River
 Water Quality Summary*

LIVING MATTER

Wildlife Communities

All terrestrial ecosystems that occur in Salt Lake County will be affected by implementation of the point and non-point source plans. These ecosystems, as described in Section III, are the Great Salt Lake Desert, Grass-Sagebrush, Lower Montane, Upper Montane, and Sub-Alpine ecosystems. General characteristics of these ecosystems are shown below (from 303 (e) EIS).

Ecosystems	Altitudinal Limits* (feet above MSL)	Average Annual* Precipitation (Inches)	Frost Free* Period (Days)
Great Salt Lake Desert	4200-4300	11-16	130-190
Grass-Sagebrush	4300-6000	14-18	160
Lower Montane	6000-7500	18-25	95
Upper Montane	7500-9000	25-35	65
Subalpine	9000-11000	35	65

*Approximate

The approximate extent of these ecosystems in Salt Lake County is shown in Figure VIII-29.

The principle wildlife forms found in the above described ecosystems (and their associated communities) are shown in Appendix A-7. It should be noted that since ecosystem boundaries are of a non-exact nature (especially the montane ecosystems), wildlife forms do migrate between ecosystems and should be considered to occur in specified and adjacent communities.

As identified in U. S. Fish and Wildlife Service Circular 39 (1956), the considered areas for expansion of the South Valley Water Reclamation Facility and possibly the Magna Treatment Plant may be determined to be a Type 1 or Type 2 wetland. The value of Type 1 wetland is for stimulation of waterfowl production by providing breeding areas while the value of a Type 2 wetland is

for supplemental waterfowl feeding. The State Division of Wildlife Resources has indicated that the development of proposed sewage treatment facilities at the South Valley Water Reclamation Facility site and the secondary site ("B" site) at the Central Valley Water Reclamation Facility site would not result in a significant loss of wildlife resource (See Appendix A-7).

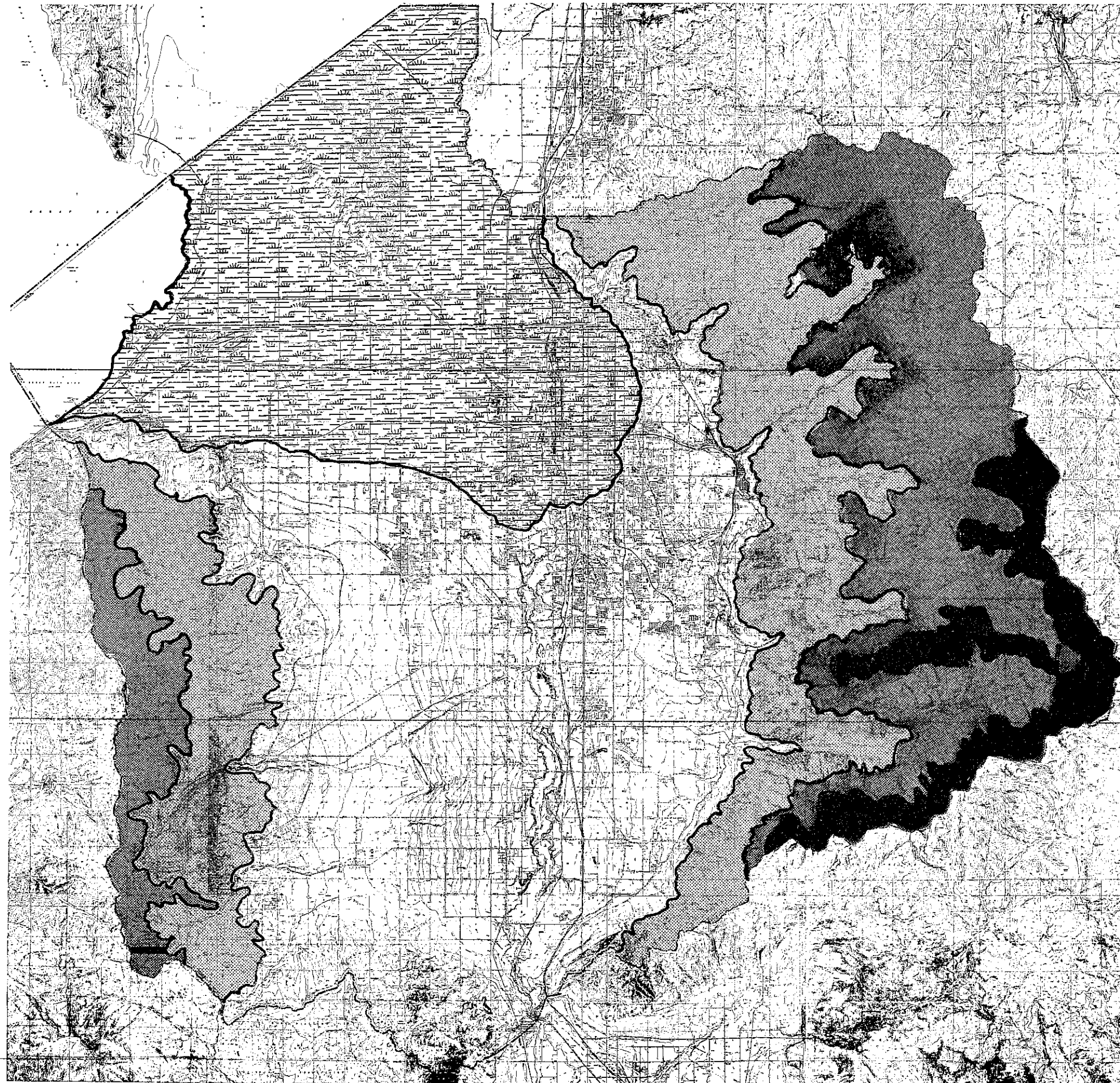
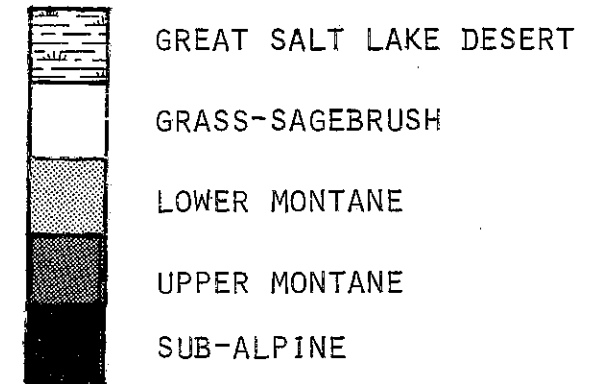


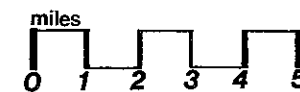
FIGURE VIII- 29.
ECOSYSTEMS HABITAT
TYPES IN
SALT LAKE COUNTY



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Vegetative Communities

The vegetation of the subject sites was determined according to "Range Sites" as described in the Soil Survey of the Salt Lake Area, published by the U.S. Soil Conservation Service:

A range site is a distinctive kind of rangeland that differs from other kinds of rangeland in its potential to produce native plants. It is the product of all environmental factors responsible for its development. In the absence of abnormal disturbance and physical site deterioration, a range site supports a plant community characterized by an association of species that are different from those of other range sites in terms of kinds or proportions of species or in total yield.

Range condition is the present stage of vegetation of a range site in relation to the potential native plant community for the site. Four classes of range condition have been recognized. A range in excellent condition has from 76 to 100 percent of the vegetation characteristic of the potential, or original, vegetation; one in good condition, 51 to 75 percent; one in fair condition, 26 to 50 percent; and one in poor condition, less than 26 percent.

To facilitate the determination of range condition, plants are grouped as decreaser, increaser, or invader plants, according to their response to grazing.

Decreasers are species in the potential native plant community that decrease in relative abundance if such a community is subject to continued excessive grazing. Generally, the decrease results from excessive grazing associated with high performance for the species during the season the plant is grazed.

Increasers are species in the potential native plant community that normally increase in relative abundance if the community is subject to excessive grazing. These plants are generally less desirable to grazing animals.

Invaders are not members of the climax plant community for the site. They invade the community as a result of various kinds of disturbance, mainly excessive grazing.

Climatic zones and their effect on range

Plants growing on the range in different parts of the survey area are affected not only by differences in the kinds of soil, but also by differences in climate. Four distinct climatic zones are recognized in the survey area. These zones are determined on the basis of differences in the amount of

moisture received and on differences in the average annual temperature and the length of the growing season. They are the Upland climatic zone, the Mountain climatic zone, the High Mountain climatic zone, and the Wet and Semiwet climatic zone.

Wet and Semiwet Climatic Zone. - In this zone the climate is characterized by cold, snowy winters and warm, dry summers. The average annual precipitation is 11 to 16 inches. Most of the water for plant production is run-in water from adjacent irrigated soils or from a ground-water table. The period of plant growth begins about April 15 and continues until frost occurs, about September 1. The frost-free period is about 130 to 190 days. Elevations range from 4,200 to 4,300 feet. Average annual temperature is 45°F.

Range sites in the Wet and Semiwet climatic zone are the Alkali Bottoms, Meadow, and Wet Meadow range sites.

- Range Site Plant Characteristics -

Alkali Bottoms Range Site

This site is on low lake terraces, lake plains, and flood plains in the Wet and Semiwet climatic zone. It consists of soils in the Bramwell, Bramwell, hardpan variant Chipman, Decker, Jordan, Lasil, Leland, and Terminal series. Slopes range from 0 to 3 percent. Most of these soils are deep or moderately deep and somewhat poorly drained to very poorly drained. Most are moderately or strongly affected by salt and alkali. The surface layer ranges from fine sandy loam to silty clay loam, and the subsoil or underlying layer ranges from sandy clay loam to silty clay. The Terminal soil has a hardpan at a depth of less than 20 inches.

Intake rate is moderate to slow, and permeability is moderate to very slow. Runoff is slow or very slow, and the hazard of erosion is slight to moderate. In most places the water table is at a depth of 20 to 40 inches. The available water holding capacity is 4 to 14 inches to a depth of 5 feet or to the hardpan. The amount of water available to plants is greatly reduced because of the salt in the soils.

The potential native vegetation consists of 80 to 90 percent perennial grasses, as much as 20 percent shrubs, and less than 5 percent forbs. All of these are tolerant of salts and alkali and a fluctuating water table. Important decreaser grasses are alkali bluegrass, alkali cordgrass, alkali sacaton, Great Basin wildrye, creeping wildrye, native bluegrass, and needle-and-thread. Important increaser grasses are salt-grass, foxtail, and squirreltail. Sedges and rushes also are important increasers. Important shrubs are Nuttall saltbush,

four-wing saltbrush, bud sagebrush, Gardner saltbush, and winterfat. Forbs are native clover, globemallow, bassia, pickleweed, and annual kochia.

Plants that are dominant if the site is in poor condition are greasewood, rubber rabbitbrush, iodinebush, cheatgrass, big sagebrush, and annual weeds.

In areas where irrigation water is available, clearing and seeding to tall wheatgrass is profitable.

Wet Meadow Range Site

This site is on flood plains of the Jordan River in the Wet and Semiwet climatic zone. It consists of soils in the Magna series. Slopes range from 0 to 3 percent. These soils are deep and very poorly drained. The surface layer is mainly silty clay and is high in organic-matter content. The underlying layer is dominantly silty clay. In most places the water table is within 20 inches of the surface at least part of the time. Intake rate is slow, and permeability is very slow. Runoff is very slow, and the hazard of erosion is slight. The available water holding capacity is about 14 inches.

The potential native vegetation consists mainly of water-tolerant grasses and grasslike plants. Important decreaser grasses are slender wheatgrass, tall native bluegrass, tufted hairgrass, redtop, and alkali sacaton. Increaser grasses and grasslike plants are sedges, rushes, saltgrass, Kentucky bluegrass, foxtail, wiregrass, squirreltail, western wheatgrass, Great Basin wildrye, cattail, arrowgrass, and horse-tail.

The important forbs are yarrow, dandelion, plantain, black medic, cinquefoil, curly dock, and native clovers. Shrubs are willows, wildrose, dogwood, hawthorn, cottonwood and river birch.

Plants that are dominant if the site is in poor condition are largely rushes, sedges, saltgrass, rubber rabbitbrush, and annual weeds.

Semiwet Meadow Range Site

This site is on the smooth to undulating, low flood plains of perennial streams that are subject to occasional flooding. It consists of Mixed alluvial land and Sandy alluvial land. These land types are somewhat poorly drained, stratified, mixed alluvium that has textures ranging from loamy sand to clay. They commonly contain gravel or sand below a depth of 3 feet and are very stony or very cobbly in places. The water table is at or near the surface during the period of peak runoff but recedes when runoff subsides.

The potential native vegetation consists mainly of perennial grasses, but there is a small percentage of forbs, shrubs, and overstory trees.

Important decreaser grasses are tufted hairgrass, native bluegrasses, alkali sacaton, redtop, slender wheatgrass, and timothy. Increaser grasses and grasslike plants are saltgrass, Kentucky bluegrass, squirreltail, Sandberg bluegrass, sedges, baltic rush, western wheatgrass, and Great Basin wildrye.

Important forbs are aster, false Solomon's seal, groundsel, native clovers, dandelion, curly dock, Dutch clover, and yarrow. Shrubs and overstory trees are wild rose, willows, hawthorn, cottonwood, river birch, and boxelder.

Plants that are dominate if this site is in poor condition are rubber rabbitbrush, aster, curly dock, gumweed, povertyweed, Canada thistle, foxtail, and bullthistle.⁶

Vegetative communities impacted by the Central Valley, Magna, SLC, and South Valley facility expansion or construction are summarized in Figures 30 through 33.

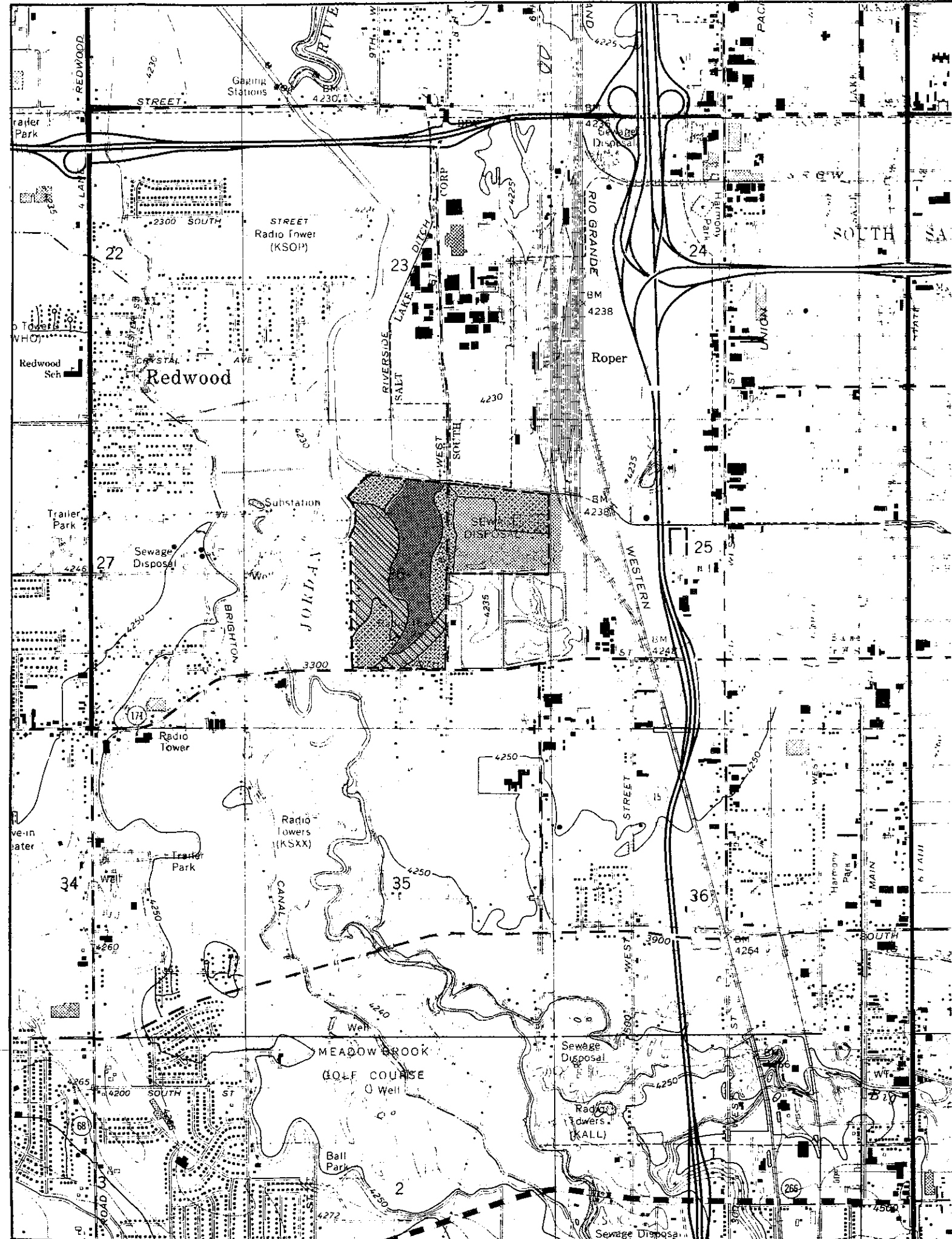
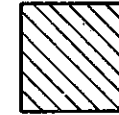
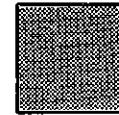


FIGURE VIII-30. EXISTING DOMINANT VEGETATION BY RANGESITE, CENTRAL VALLEY FACILITY

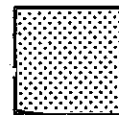


WET MEADOW RANGE SITE

- 90% Grass: Slender Wheatgrass, Tall Native Bluegrass, Tufted Hairgrass, Redtop, Alkali Sacaton, Saltgrass, Sedges, Rushes, Foxtail, Wiregrass, Squirreltail, Western Wheatgrass, Gr. Basin Wildrye, Cattail, Arrowgrass, Horsetail
- 5% Forbs: Aster, Solomon's Seal, Groundsel, Clover, Dandelion, Curly Dock, Dutch Clover, Yarrow
- 5% Shrubs & Trees: Wild Rose, Willow Hawthorn, Cottonwood, River Birch, Box Elder



- Ironton Series:** Wet Meadows, Grasses, Tules, and Sedges (Not in a Rangesite)



- Chipman Series:** Saltgrass, Wiregrass, Alkali Sacaton, Wet Meadow Grasses (Not in a Rangesite)



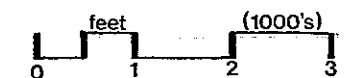
- "Made Land" & Dumps:** No Native Vegetation Present

SOURCE: U.S. DEPARTMENT OF AGRICULTURE
SOIL SURVEY OF SALT LAKE AREA
UTAH, SOIL CONSERVATION SERVICE,
1974.

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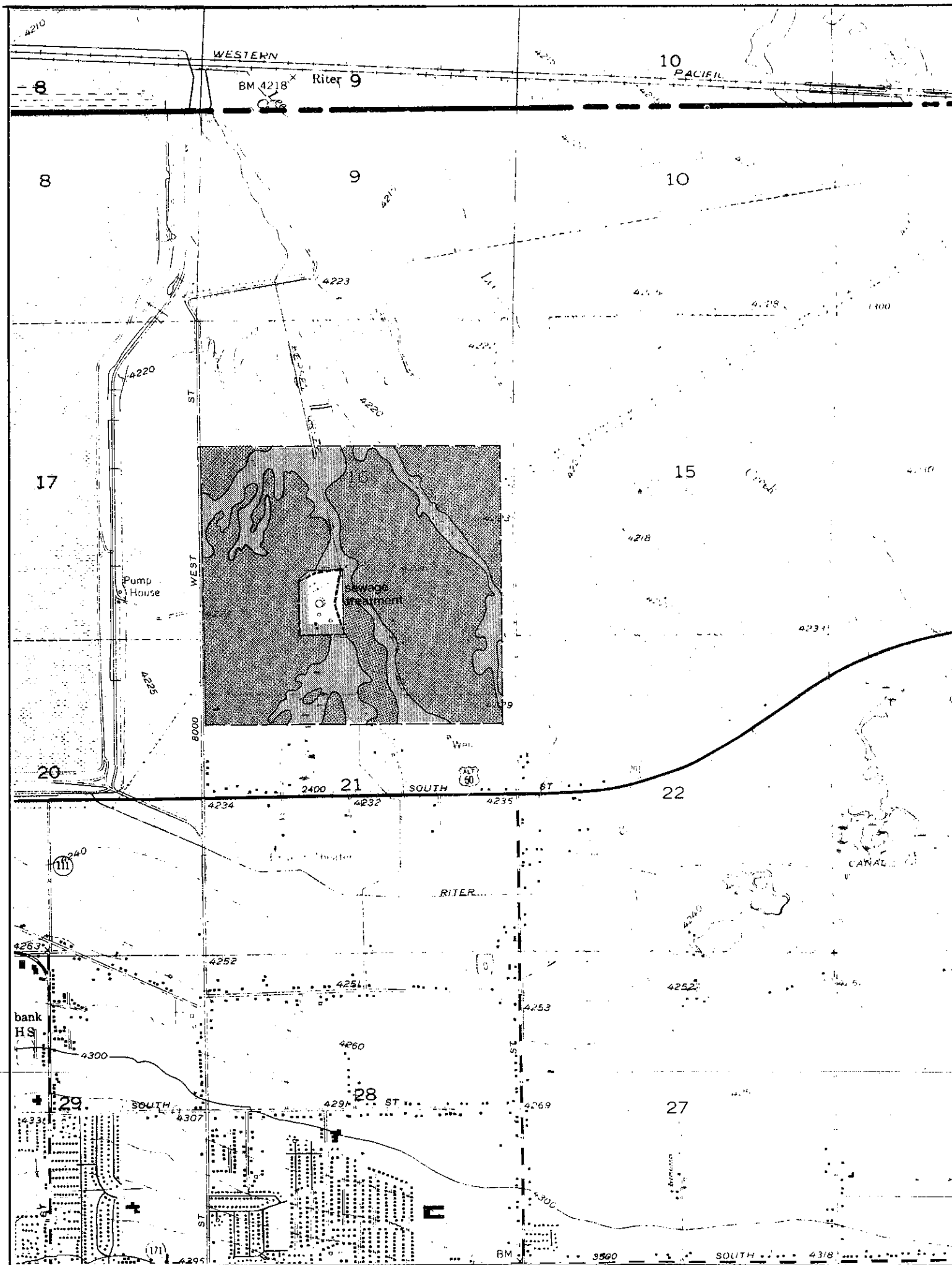
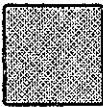

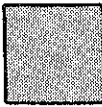


FIGURE VIII-31. EXISTING DOMINANT VEGETATION BY RANGESITE, MAGNA FACILITIES

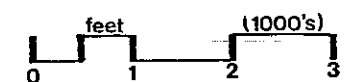
-  **ALKALI BOTTOMS RANGESITE**
 - 80% Grass: Cheatgrass, Annual Weeds, Alkali Bluegrass, Alkali Cordgrass, Alkali Sacaton, Great Basin Wildrye, Creeping Wildrye, Native Bluegrass, Saltgrass, Foxtail, Squirreltail, Cheatgrass
 - 5% Forbs: Clover, Globemallow, Bassia, Pickleweed, Kochia
 - 15% Shrubs & Trees: Saltbush, Forwing Saltbrush, Sagebrush, Gardner Saltbush, Winterfat, Greasewood, Rabbitbrush, Iodine Bush
-  "Idle Land": No Native Vegetation Present
-  Pickleweed, Sceptweed, Saltgrass

SOURCE: U.S. DEPARTMENT OF AGRICULTURE SOIL SURVEY OF SALT LAKE AREA UTAH, SOIL CONSERVATION SERVICE, 1974.

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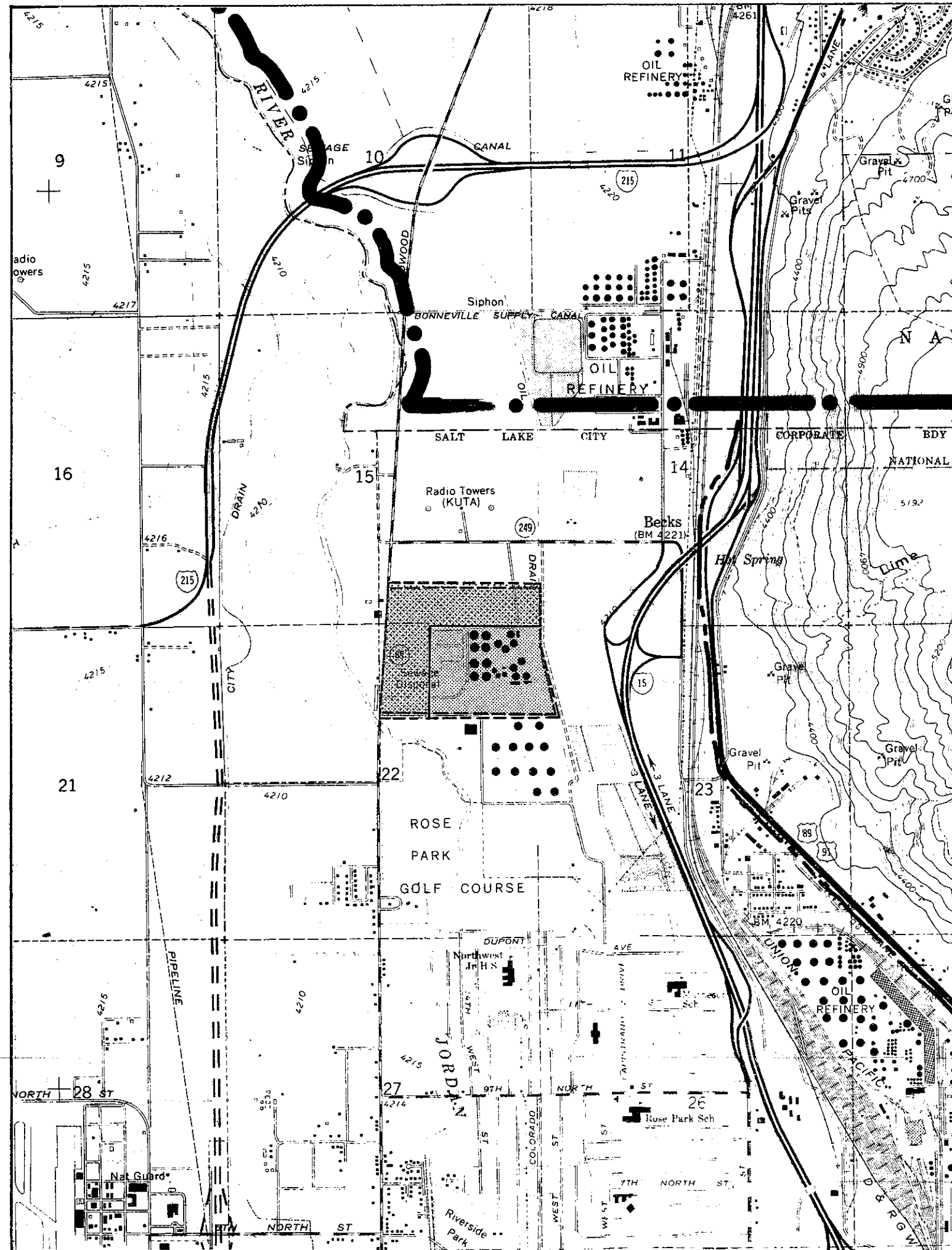
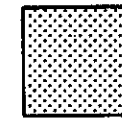


FIGURE VIII-32. EXISTING DOMINANT VEGETATION BY RANGESITE, SLC FACILITIES



ALKALI BOTTOMS RANGESITE

- 80% Grass: Cheatgrass, Annual Weeds, Alkali Bluegrass, Alkali Cordgrass, Alkali Sacaton, Great Basin Wildrye, Creeping Wildrye, Native Bluegrass, Saltgrass, Foxtail, Squirreltail, Cheatgrass
- 5% Forbs: Clover, Globemallow, Bassia, Pickleweed, Kochia
- 15% Shrubs & Trees: Saltbush, Forwing Saltbush, Sagebrush, Gardner Saltbush, Winterfat, Greasewood, Rabbit-Brush, Iodine Bush



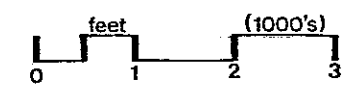
"Made Land": No Native Vegetation Present

SOURCE: U.S. DEPARTMENT OF AGRICULTURE SOIL SURVEY OF SALT LAKE AREA UTAH, SOIL CONSERVATION SERVICE, 1974.

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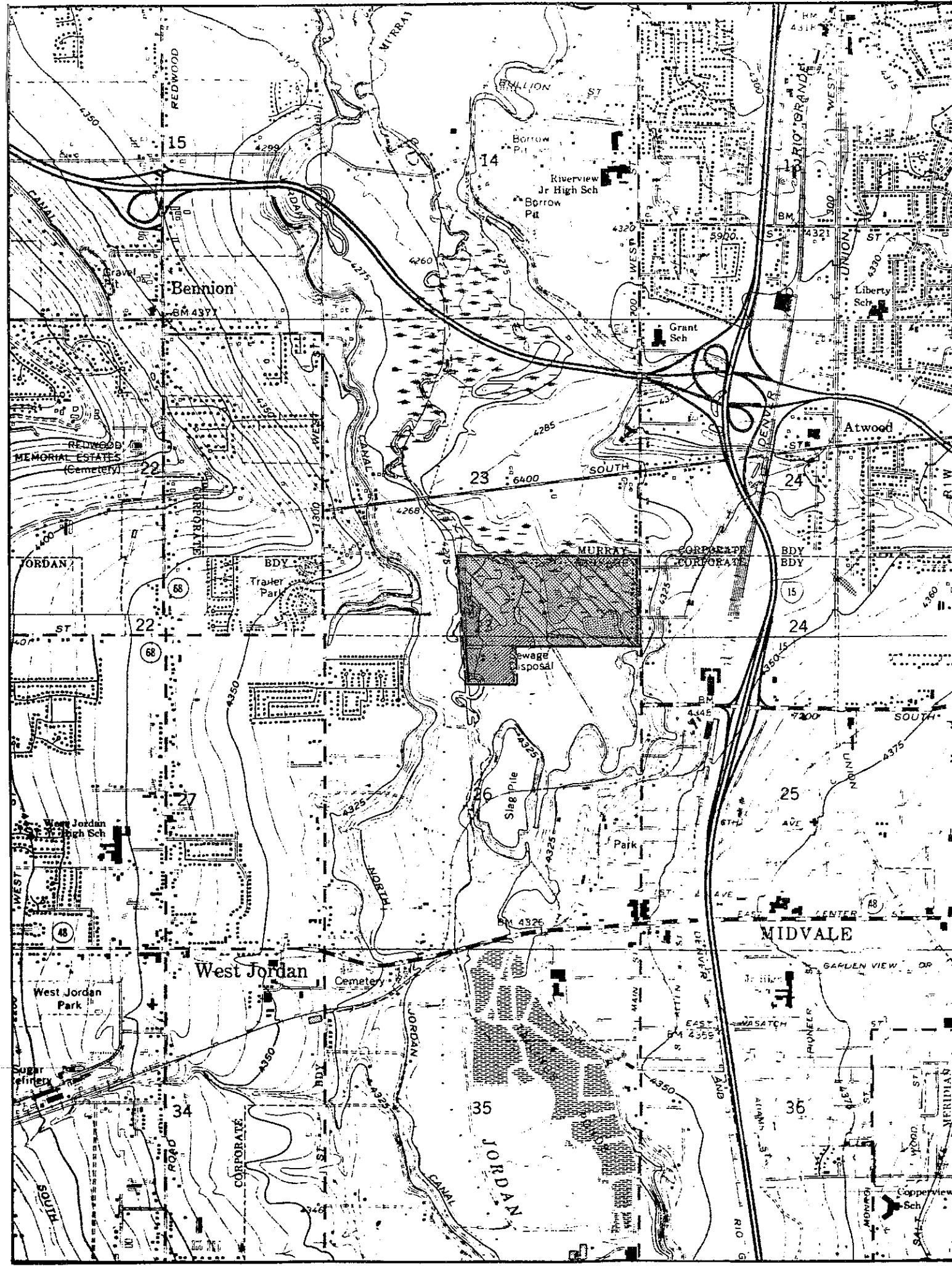
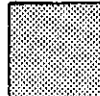

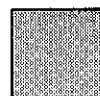



FIGURE VIII-33. EXISTING DOMINANT VEGETATION BY RANGESITE, SOUTH VALLEY FACILITIES

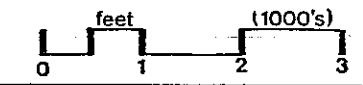
-  **ALKALI BOTTOMS RANGESITE**
 - 80% Grass: Cheatgrass, Annual Weeds, Alkali Bluegrass, Alkali Cordgrass, Alkali Sacaton, Great Basin Wildrye, Creeping Wildrye, Native Bluegrass, Saltgrass, Foxtail, Squirreltail, Cheatgrass
 - 5% Forbs: Clover, Globemallow, Bassia, Pickleweed, Kochia
 - 15% Shrubs & Trees: Saltbush, Forwing Saltbrush, Sagebrush, Gardner Saltbush, Winterfat, Greasewood, Rabbitbrush, Iodine Bush
-  **WET MEADOW RANGE SITE**
 - 90% Grass: Slender Wheatgrass, Tall Native Bluegrass, Tufted Hairgrass, Redtop, Alkali Sacaton, Saltgrass, Sedges, Rushes, Foxtail, Wiregrass, Squirreltail, Western Wheatgrass, Gr. Basin Wildrye, Cattail, Arrowgrass, Horsetail
 - 5% Forbs: Aster, Solomon's Seal, Groundsel, Clover, Dandelion, Curly Dock, Dutch Clover, Yarrow
 - 5% Shrubs & Trees: Wild Rose, Willow Hawthorn, Cottonwood, River Birch, Box Elder
-  **SEMI-WET MEADOW RANGE SITE**
 - 90% Grass: Tufted Hairgrass, Native Bluegrass, Alkali Sacaton, Redtop, Slender Wheatgrass, Timothy, Saltgrass, Kentucky Bluegrass, Squirreltail, Sedges, Baltic Rush, West. Wheatgrass, Gr. Basin Wildrye
 - 5% Forbs: Aster, Solomon's Seal, Groundsel, Clover, Dandelion, Curly Dock, Dutch Clover, Yarrow
 - 5% Shrubs & Trees: Wild Rose, Willow, Hawthorn, Cottonwood, River Birch, Box Elder
-  **EXISTING LAWN DIST.**

Source: U.S. Department of Agriculture Soil Survey of Salt Lake Area Utah. Soil Conservation Service. 1974.

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ecological analysis

This general discussion of the state of the ecological environment will encompass the concepts of floral and faunal density, diversity, productivity, and succession. Specific data concerning the state of the ecological environment is not available at this time. Therefore, this discussion will describe the general habitat and wildlife conditions as extracted from various sources.

A diverse environment is generally a healthy environment. Diversity, in terms of flora and fauna, is indicated by numbers of species and numbers of individuals per species. The greater the number of species and number of individuals per species, the greater the diversity.

Point Source Plan Elements

The diversity of the flora and fauna at the South Valley site is not very great from a micro-environment point of view. Man's encroachment into the natural setting has disrupted the communities by: draining the wetland areas (semi-wet meadow and wet meadow rangesites); constructing large lagoons over approximately 70 acres of wet meadow and alkali bottom rangesites; construction of a secondary trickling filter sewage treatment plant over wet meadow range sites; and deposition of a slag dump from copper and lead concentrator/smelter operations (located to the south of the project area) over more wet meadow rangesites; attendant vegetative damage from air emissions related to the historical smelting operation. The diversity of the study area from a macro point of view is somewhat greater than the micro point of view in that there exists at least three different rangesites (as per SCS) and at least two ecosystem habitat types with three communities (as per 303 (e) in the immediate vicinity of the South Valley.

Wildlife productivity is estimated to be fair to good with good nesting areas for meadow-type birds and small mammals. Nesting areas for larger birds

and waterfowl are limited but forage areas are present and apparently in good condition.

Floral productivity is apparently on the decline. Abundance of "decreasers" (undesirable vegetation associated with receding productivity) occurs within all range sites in the South Valley area. Drainage systems constructed in the area have undoubtedly contributed significantly to this condition. Natural succession toward climax communities has been disrupted by the drainage and construction and smelting activities and has resulted in an unstable condition in various stages of succession occurring in all communities. Healthy communities are fairly homogeneous but do exhibit gradient of successional types from one end of the community spectrum to the other. This condition does not occur at the South Valley.

The diversity of the flora and fauna at the Central Valley site is not very great from a micro- nor a macro-environment point of view. Man's encroachment into the natural setting has disrupted the communities by: draining wetland areas (wet meadow rangesite); deposition of uranium mill tailings on an extensive area (emitting radon gas); construction of a secondary trickling filter sewage treatment plant on a portion of the site; construction of commercial-industrial buildings along the site boundaries. There exists only one rangesite (as per SCS) and one ecosystem habitat type with one, perhaps, two communities.

Wildlife productivity is estimated to be poor to fair with some nesting for meadow-type birds and small mammals.

Floral productivity is on the decline as indicated by an abundance of "decreasers". Natural succession toward climax communities has been disrupted by mill tailings dumping and construction. There exists no gradient of successional floral types in the Central Valley site.

The diversity of the flora and fauna at the Salt Lake City site is poor. The majority of the site consists of "made land" (as per SCS) which means that the area has been totally built up by man. The only native flora or fauna present is from invaders, i.e., those species that have revegetated and are not removed by grounds-keepers. Displaced vegetative communities are those that occur in an alkali bottom rangesite.

Wildlife productivity is estimated to be poor. Vegetative productivity is estimated to be poor.

Floral and faunal diversity at the Magna site is fair to good from a micro-environment point of view. On a larger scale, the habitat is limited to alkali bottom rangesite or saturated alkali soil that is good for waterfowl habitat (as per SCS).

Faunal productivity is limited by man's encroachment in the vicinity of the site. Major developments include a secondary trickling filter sewage treatment plant, the Salt Lake County landfill, Kennecott Copper Corporation's tailings pond, some residential development and large amounts of discarded material on virtually every parcel of open (vacant) land.

Floral productivity is also limited at the Magna site by man's activity. Decreaser species are present but not abundant.

Overall condition of the wildlife habitat at the Magna, Salt Lake City, Central Valley (District No. 1) and the South Valley (Midvale) sites can be described as poor to fair. There should be no significant loss of habitat resource with implementation of the proposed point-source plan.

Non-Point Source Plan Elements

The major elements of the non-point source plan, detention basins and erosion-sediment control programs, should result in the overall improvement of floral and faunal productivity in the valley and the canyons. Due to the

diverse nature of the non-point plan implementation elements, only a general analysis of ecological impacts can be made.

The construction, operation and maintenance of detention facilities for storm/urban runoff quality improvement could result in an increase of riparian habitat. An example of this increase of habitat is the Big Cottonwood Detention Park. The streamside communities have been left unaltered for the greater part. However, much of the park has been landscaped and is covered by lawn. Lawn is not good habitat for wildlife. During high flows, much of the park adjacent to the stream is flooded, or at least the soil is saturated, and native vegetation is prevalent resulting in the preservation of habitat. Other detention facilities could be designed along this conceptual line. However, there is the facet of public health that must be addressed. Standing water is a breeding place for mosquitos and other insect vectors and will be considered in design of these facilities.

Desilting basins are different than other detention facilities in that they are relatively small, compact, concrete facilities that offer no wildlife habitat in and of themselves. Area around desilting could be designed so that habitat is improved or at least maintained. Site by site design criteria must be evaluated by the Department to incorporate conceptual ideas for wildlife habitat maintenance. Again, health aspects must also be considered in design.

Erosion and sediment control programs will result in an overall improvement of wildlife conditions. Programs such as revegetation or building gabion walls (non-structural and structural slope stabilization respectively) actually create improved wildlife habitat where there is none or is in poor condition. Improvement of habitat will result in increased wildlife productivity and in diversity and density.