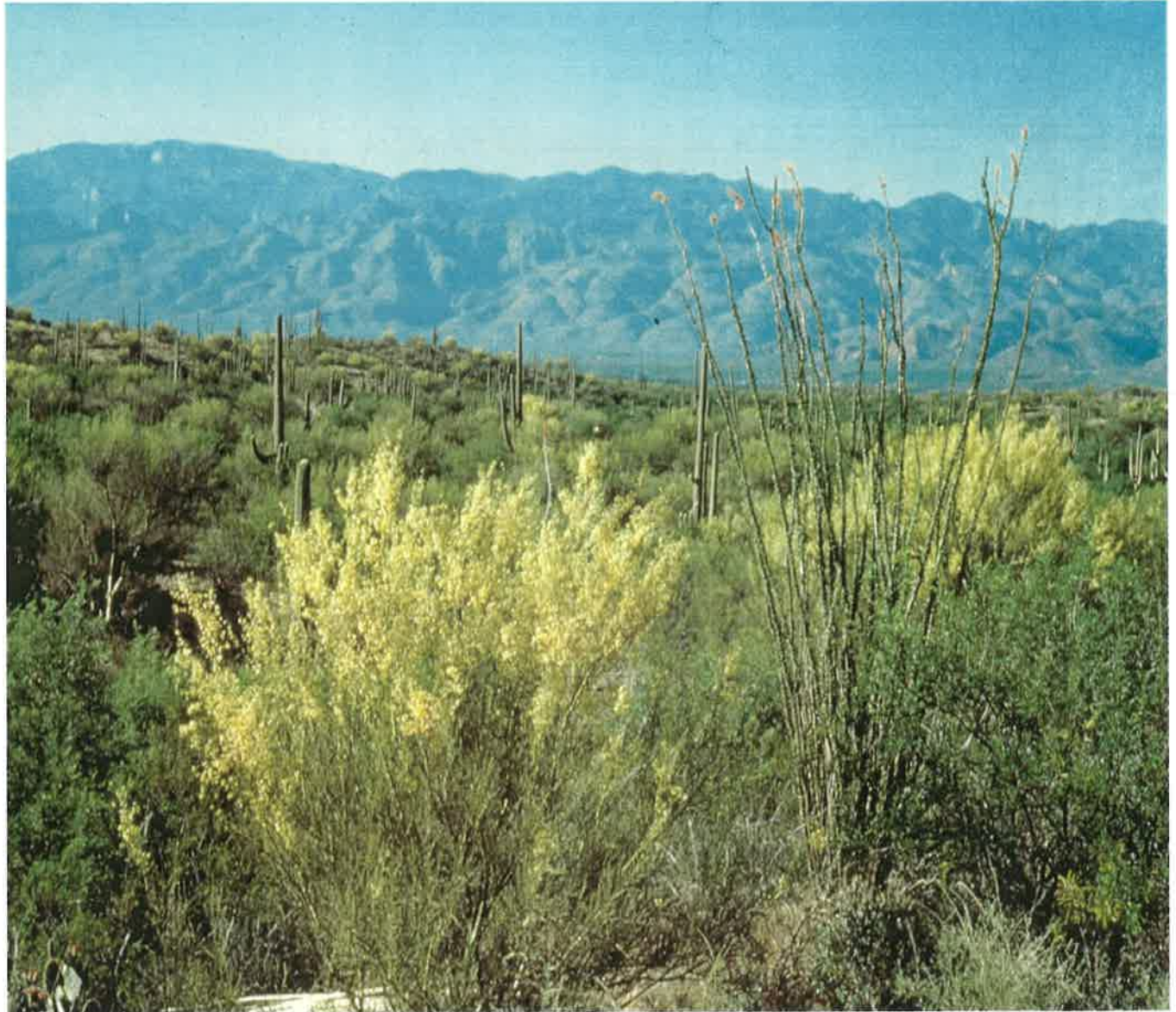


Cultural Landscape Assessment and Determination of Eligibility Cactus Forest Drive



**Dr. Judy Berryman
Ms. Dayle Cheever
Mr. Chris Baker**

for the

**National Park Service
Saguaro National Park**

August 2004

CONTENTS

ACRONYMS AND ABBREVIATIONS v

PURPOSE 1

RESEARCH AND FIELDWORK 1

DETERMINATION OF ELIGIBILITY 2

SUPPORTING DOCUMENTATION 3

Description 3

DISCUSSION OF LANDSCAPE FEATURES 5

Existing Topography and Drainage 5

Land Use – Prehistoric and Ethnographic 6

Land Use – Historic 7

Circulation System 8

Spatial Relationships and Orientation 12

View and Vistas into and out of Landscape 12

Vegetation 15

Landscape Dividers 17

Drainage and Engineering Structures 17

Retaining Walls 18

Retaining Wall: Paved Turnout with Associated Retaining Wall (506 +60 Rt.) 21

Retaining Wall: Paved Turnout with Associated Retaining Wall (702:44 to 705 + 45; 708 + 62 to 709 + 60; 710 + 00 to 711 +2; 719 + 41 to 721 + 00) 24

Retaining Wall: Turnout with Associated Retaining Wall (740 +05 to 741 +78; 743 + 24 to 744 +39) 30

Shoulder Stabilization 35

Culvert Headwalls 37

Low-Water Crossings (washes) 46

Barrier Rocks 48

Buildings and Non-Road Related Structures Contained Within the Landscape 48

SIGNIFICANCE 50

Historic Context 51

INTEGRITY 57

Location 57

Design 58

Setting 58

Materials / Species Composition 59

Workmanship 59

Feeling 59

Association 59

CONCLUSION 59

BIBLIOGRAPHY 63

Documents 63

Maps and Drawings 66

CONTENTS

APPENDIX A: MANAGEMENT DOCUMENTATION RELATED TO THE HISTORIC STATUS OF CACTUS FOREST LOOP ROAD 69

APPENDIX B: A PRELIMINARY REPORT FOR THE MASTER PLAN: SAGUARO NATIONAL MONUMENT, ARIZONA; NATIONAL PARK SERVICE, REGION III, MAY 1937 77

APPENDIX C: SELECTED ADMINISTRATIVE DOCUMENTS RELATED TO THE COMPLETION OF CACTUS FOREST LOOP ROAD 123

APPENDIX D: DESIGN DRAWINGS 135

LIST OF FIGURES

- Figure 1. Cactus Forest Drive Study Area 3
- Figure 2. Proposed District Boundary 4
- Figure 3. 1933 Map Showing Location of Existing Roads (Saguaro National Monument, DOI) 10
- Figure 4. 1936 Projected 6-Year (1938–1943) Road Maintenance Program Map (SAG-4937) 10
- Figure 5. Proposed Loop Road Section A (Office of the Corps of Engineers, San Francisco, 02/17/36) 11
- Figure 6. Existing Circulation Pattern for Cactus Forest Drive 12
- Figure 7. Viewshed Along Road (looking to the north) 13
- Figure 8. Viewshed Looking from Road to Outside the Park (to the west) 13
- Figure 9. View Taken from a Vantage Point looking down at the Road 14
- Figure 10. Viewshed Along Road 14
- Figure 11. Example of Saguaro Cacti Stand Along Roadbed 15
- Figure 12. View of Landscape from Turnout 506-6- Rt.; Example of Desert Vegetation 16
- Figure 13. View of Vegetation Cover from an Unpaved Turnout 16
- Figure 14. Retaining Wall Section as Shown on the National Park Service "As Constructed Drawing" (1936) 19
- Figure 15. U.S. Forest Service National Trail Drawings and Specifications (Trails EM-7720-103) "Rock Retaining Wall" 20
- Figure 16. U.S. Forest Service National Trail Drawings and Specifications (Trails EM-7720-103) "Talus and Rubble Section" 21
- Figure 17. View Looking South of the Turnout and Associated Retaining Wall 22
- Figure 18. Close Up of Wall Construction and Associated Turnout 22
- Figure 19. Back Side (South Side) of the Wall (note lack of mortar) 23
- Figure 20. Portion of the Back Side That Has Collapsed / Tumbled (eastern end) 23
- Figure 21. Existing Cement Stops in Turnout (looking west from the turnout) 24
- Figure 22. Segment 1 – View Along Roadbed Looking Downhill (note: cement channel against retaining wall) 25
- Figure 23. Segment 2 – Back Side of Retaining Wall Showing Boulder Stacking 25
- Figure 24. Segment 2 – Back Side of Wall, Drainage Feature Can Be Seen in Top Portion of Photo 26
- Figure 25. Close-up of Stone Capping and Water Control Feature Built into Retaining Wall 27
- Figure 26. Example of Wall Construction, Rock/Cobble-Size View From Existing Roadbed (note the non-CCC Cement Patching Along Base of Rock Alignment) 28
- Figure 27. Example of Cement Drainage, View from Roadbed 28
- Figure 28. Segment 4 – View of Roadbed Looking North (downhill) – Retaining Wall is not Seen from Road; Back Side of Wall is 4 m to 8 m in Height (12 ft. to 24 ft.) 29
- Figure 29. Existing Paved Turnout (715 + 09) Associated with Retaining Wall 29
- Figure 30. Exposed Wall Along Segment 1 (740 + 05 to 741 + 78) Looking North 31
- Figure 31. Close up of Built-in Water Drains in Wall—This Portion of Wall is One Layer High with Flat Capstones 32
- Figure 32. View of Roadbed and End Wall Looking South 32
- Figure 33. Back Side of Retaining Wall Showing Construction and Setting 33
- Figure 34. Historic Photo (ca. 1950s) Showing Wall Construction and General Setting (same setting and configuration as Figure 11) 34

- Figure 35. Road Surface With Stacked Rock Along the Road Edge (Near Station 775+00) 35
- Figure 36. Close Up of Stacked Rock 36
- Figure 37. View of Rock Alignment Along Road Shoulder; Top Course of Rock Resembles Capstone Found on the Larger Retaining Walls 36
- Figure 38. Rock Culverts (U.S. Forest Service National Trail Drawings and Specifications [Trails EM-7720-103] 1997) 38
- Figure 39. Culverts With Headwalls (U.S. Forest Service National Trail Drawings and Specifications [Trails EM-7720-103] 1997) 39
- Figure 40. Culverts Without Headwalls (U.S. Forest National Trail Drawings and Specifications [Trails EM-7720-103] 1997) 40
- Figure 41. Intake Culvert Headwall – Stacked Rock with Associated Intake Box—Cement Culvert Runs Underneath the Existing Roadbed 41
- Figure 42. Discharge Culvert Headwall (associated with the intake headwall shown above) 41
- Figure 43. Discharge Culvert Headwall; Defined Cement Channel that Runs Under the Existing Roadbed; Minimal Stacking 42
- Figure 44. Intake Culvert Headwall – Associated Stack Rock Feature, 5–6 Courses High 42
- Figure 45. Intake Culvert Headwall – Discharge Headwall in Background 43
- Figure 46. Stacked Discharge Culvert Headwall 43
- Figure 47. Minimal Stacking Intake Culvert Headwall with Capstone and Cement Channel 44
- Figure 48. Stacked Intake Culvert Headwall with Capstone and Cement Channel 44
- Figure 49. Intake Culvert with no Stacking Feature Cut into Existing Bedrock 45
- Figure 50. Topography of Proposed Wash Crossing – Loop Road (1936) 46
- Figure 51. View of Low-Water Crossing Looking from Turnout 506 + 60 47
- Figure 52. Close-Up of Low-Water Crossing 47
- Figure 53. Example of Barrier Rocks Prevent Vehicle Access to an Established Footpath/Trail 48
- Figure 54. Bench and Table Supports 49
- Figure 55. World War II-Era Plane Fuselage Parts Used as Table Cover 50

CONTENTS

ACRONYMS AND ABBREVIATIONS

AMSL	above mean sea level
CCC	Civilian Conservation Corps
cm	centimeter
LCS	List of Classified Structures
NPS	National Park Service
NRHP	National Register of Historic Places
m	meter
PWA	Public Works Administration

ACRONYMS AND ABBREVIATIONS

PURPOSE

The purpose of this evaluation report is to provide historical documentation, a description of existing conditions, and an evaluation of the significance and integrity of Cactus Forest Drive, in Saguaro National Park, Rincon Mountain District.

It is important to note that the National Park Service, in consultation with the Arizona State Historic Preservation Office, determined that Cactus Forest Drive is eligible for the National Register of Historic Places as a potential district in 1994. A section of retaining wall along the road was also determined eligible for the NRHP as a contributing feature of a potential district (IDLCS 60181). The park's List of Classified Structures (LCS), which is a computerized inventory of all historic and prehistoric structures in the park that have historical, architectural, or engineering significance and meet one of the following criteria: either the structure is listed individually or is eligible for the NRHP or the structure is a contributing element of a historic site or district that is listed or is eligible for the NRHP, contains an entry for Cactus Forest Drive (IDLCS 58645). The entry is included in appendix A of this evaluation. The LCS assists park managers in planning, programming, and recording decisions for appropriate treatment, but it does not constitute an evaluation for NRHP eligibility purposes.

It is intended that this report will provide the National Park Service with the necessary information (as outlined in Advisory Council on Historic Preservation procedures 36 CFR 800, and described in *National Register Bulletin No. 15, How to Apply the National Register Criteria of Evaluation*) to make recommendations regarding eligibility of the road landscape for listing in the NRHP.

RESEARCH AND FIELDWORK

During May 10 – 12, 2004, Dr. Judy Berryman and Ms. Dayle Cheever (e²M staff) visited Saguaro National Park and associated road to collect historical documentation, conduct a reconnaissance survey, and record historic features. Coordination at Saguaro was conducted through Ms. Meg Weesner, Chief of Science and Resources Management. Historic and archival research was conducted by Mr. Chris Baker (e²M historian) at the National Park Service Technical Information Center, Denver, Colorado, and the National Archives and Records Administration, Rocky Mountain Region, Denver, Colorado. Additional research was conducted by Dr. Berryman and Ms. Cheever at the Western Archeological and Conservation Center. A review of pertinent documents and background materials at the Western Archeological and Conservation Center was completed during the site visit. Archival information collected by Mr. Baker included background information needed for the historic context “as built construction maps” and historic maps for the park and Cactus Forest Drive. The historic features (retaining walls, culverts, and associated landscape) were recorded by Ms. Cheever and Dr. Berryman.

DETERMINATION OF ELIGIBILITY

Historic Property Inventory Form

Name	Cactus Forest Drive Historic Name: Skyline Loop Road; Loop Road
Location	Saguaro National Park, Rincon Mountain District Tucson, Arizona Tanque Verde Peak 1981 7.5' USGS Pima County
Owner of Property	National Park Service
Classification	Public / Federal
Category	Cultural Landscape (historic designed landscape)
Eligibility Recommendations	Eligible for NRHP as a district
Significance	Criteria A – Historic events/trends The construction of Cactus Forest Drive reflects the nationally and regionally historic trend of Depression (New Deal)-era park development. Civilian Conservation Corps (CCC) activity for Cactus Forest Drive was related to conservation projects and the development of road and recreational areas. The Cactus Forest Drive cultural landscape reflects the government-sponsored work relief program of the Depression (New Deal era) and national park design philosophies of the 1930s. The Cactus Forest Drive / Loop Road has direct association with Arizona's theme of tourism, park development, and Depression-era road projects. Criteria C – Distinctive characteristics of a type, period, or method of construction The existing road alignment, retaining walls, water control features, and culverts are representative and characteristic of CCC construction in terms of form, proportion, structure, plan, style, and materials. The road alignment and associated features are a designed historic landscape reflecting CCC activity. All of the built features associated with the roadbed are related to one another by cultural tradition (CCC), function (historic road; accessibility to viewshed), dates of construction (1935–1939), style (New Deal-era park development), and availability of materials and technology (use of native stone and masonry construction). The existing road is reflective of the understanding of road engineering during Depression-era (CCC) construction.
Contributing Elements	Cactus or Saguaro Stand (Sonoran Desert habitat viewshed) CCC era Construction (includes road, retaining walls, water control features, culverts)
Architect	National Park Service, Office of Chief Engineer
Builder	Civilian Conservation Corps
Period of Significance	1935–1939
Historic Context	CCC construction; New Deal-era park development
Integrity	Integrity of location, setting, design, materials, workmanship, and feeling
Use/Function	Historic road; New Deal-era park development

SUPPORTING DOCUMENTATION

Description

Cactus Forest Drive is an asphalt loop road, approximately 8.4 miles in length, that begins and ends at the park visitor center in the Rincon Mountain District. The road is 15 miles east of the city of Tucson and follows a circuitous, looping route through the saguaro cactus forest of the bajada and foothills. The alignment includes two sections: a two-way section to the Javelina picnic area (approximately 1.6 miles on Route 100) and a one-way alignment over the remainder of its length (approximately 6.8 miles on Route 500). Although specific locations and number of turnouts and overlooks are not shown on the historic plans, it is assumed that some turnouts were incorporated into the circulation pattern to allow visitors to leave the road and view the associated landscape.

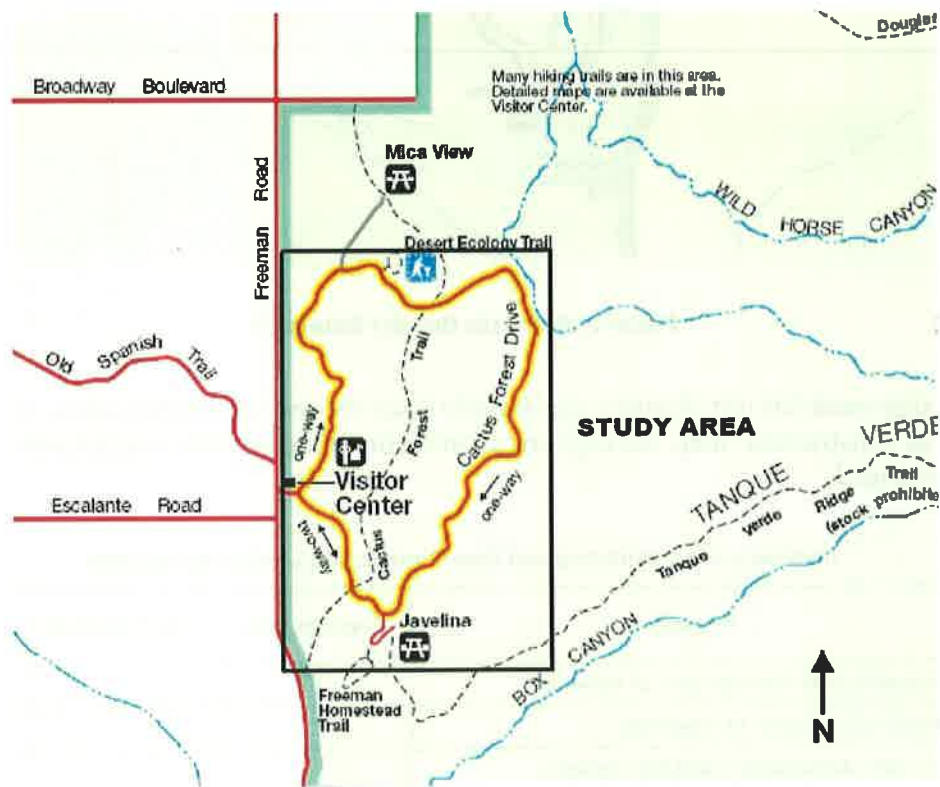


FIGURE 1. CACTUS FOREST DRIVE STUDY AREA

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

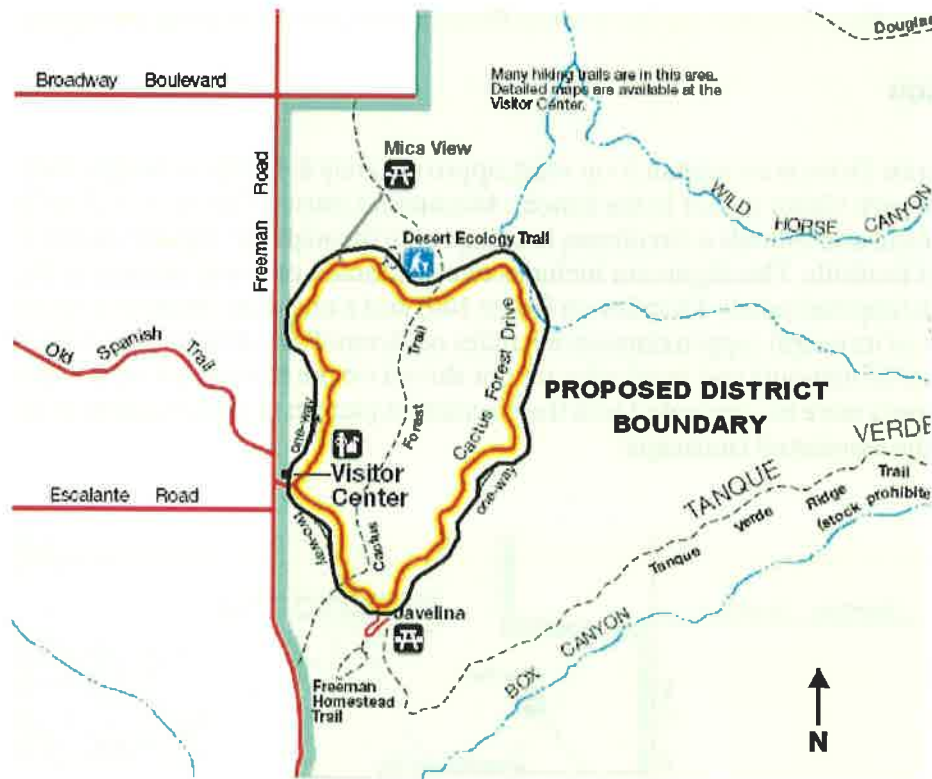


FIGURE 2. PROPOSED DISTRICT BOUNDARY

The road alignment has not changed significantly since the original construction, as shown on the 1936 “as constructed” map. Acreage and existing boundaries of the original tract have also not been changed.

Inventory of Contributing and Non-Contributing Landscape Features

Feature	Contributing	Non-Contributing
Topography and Drainage (part of viewshed)	X	
Natural Features (part of viewshed)	X	
Land Use – Archeological and Ethnographic		X
Land Use – Historic (CCC)	X	
Circulation System	X	
Turnouts		x
Foot trails		X
Spatial Relationship and Organization	X	
View and Vistas	X	
Vegetation	X	

Inventory of Contributing and Non-Contributing Landscape Features

Landscape Dividers (not present)		X
Drainage and Engineering Structures		
– Retaining Walls	X	
– Shoulder Stabilization	X	
– Culvert Headwalls	X	
– Low-Water Crossings	X	
– Barrier Rocks		x
Buildings in the Landscape		X
Javelina Picnic Area		X
Signage		X

DISCUSSION OF LANDSCAPE FEATURES

The historic roadbed and associated stonework reflects the vernacular stonework traditions of the region as well as the influence of the Arts and Crafts movement and ideals of the Rustic style during the World War II and Depression period. The present landscape of Cactus Forest Drive still retains the visual character of the 1930s landscape design. The existing road alignment, retaining walls, water control features, and culverts are representative of CCC-era construction in terms of form, proportion, structure, plan, style, and materials. The condition of the road (e.g., 12.5 to 19 feet wide, curves and general road surface), the presence of relatively few small-scale features (e.g., signs), the rural feeling of the drive, and the overall blend/fit of the road into the landscape (e.g., minimum cut and fill, minimal visual contrasts of color/reflectivity) all contribute to the rustic feeling and driving speed of the road. These factors are all important in National Park Service rustic design and CCC-era construction.

Existing Topography and Drainage

Saguaro National Park is in the eastern portion of the Sonoran Desert (including southern Arizona, northern New Mexico, and southern California) and is part of the larger basin and range physiographic region of the United States. This region is characterized by mountain ranges separated by broad valleys or basins. Saguaro National Park consists of two parts: the Rincon Mountain District and the Tucson Mountain District approximately 30 miles apart. The eastern section is surrounded by mountains on two sides to the north, with the Rincon and Tanque Verde Ridges on the east. The desert in the eastern section is a little higher and wetter than the western section and, as a result, plant life is more lush. The north and west areas of the park are generally flat with uninterrupted forests of saguaro, while the land becomes more mountainous toward the south and east.

Within the park, elevation ranges from 2,180 feet in low deserts to 8,666 feet atop Mica Peak in the Rincon Mountains of Saguaro East (Rincon Mountain District). Typically, water is more plentiful in the Rincon Mountain District because it has a more developed watershed. The range and elevation of Saguaro National Park supports a wide variety of vegetation—from desert scrub to mountain coniferous forest. The saguaro cactus (*Carnegiea gigantea*) is

probably the most recognizable plant of the Sonoran Desert, and both park districts contain exceptional stands of this species.

The CCC-era constructed road is in the Rincon Mountain District, Saguaro National Park. Topographically, the Rincon Mountain District is dominated by the Rincon Mountains, which occupy much of its eastern area. Other features include dry washes, alluvial fans at the mouths of canyons, long sweeping slopes known as bajadas, and pediments that form where eroded bedrock extends out from the mountains.

Cactus Forest Drive follows a circuitous, looping route through the saguaro cactus forest of the bajada and foothills below the mountainous, northwest-facing slopes of Tanque Verde Ridge. The road crosses a number of drainages that require water diversion and culvert features. These features are associated with the CCC-era construction (see drainage and engineering discussions for a more detailed description of individual features).

Land Use – Prehistoric and Ethnographic

Throughout its history, Saguaro National Park has been used for a variety of purposes including human habitation, mining, and grazing, archeological and scientific investigations, park development projects, and visitor education and interpretation.

The local cultural history of the study area is inexorably linked to the physiographic, climatic, and biotic conditions. These variables resulted in several important ramifications for human inhabitants of the area. First, water was available only in the major washes and in seeps and springs in various canyons. As a result, all of the known prehistoric sites within the Rincon Mountain District are found on the first terraces above the major washes and on low terraces above Tanque Verde wash.

Human use of the Rincon Mountain District extends back as far as 10,000 years before present, evidenced by archeological sites. Historic resources include sites associated with mining and ranching, early homesteads, as well as historic trash deposits. A combination of intensive and reconnaissance archeological surveys and historic resource studies have identified both prehistoric sites and historic resources. An archeological survey conducted in 1983 recorded 160 prehistoric and historic sites and 401 isolated artifacts (Simpson and Wells 1983). Recorded resources include camps, villages, agricultural sites, quarries, rock art sites, bedrock mortar locations, rock shelters, and a number of ceramic (sherd) and stone artifact scatters.

The existing alignment for Cactus Forest Drive intersects or crosses over nine archeological sites, eight artifact scatters, and a rock shelter. Eight sites are artifact scatters (stone, ceramic and groundstone) in open settings, variously documented with artifact distributions forming single or multiple site loci. The ninth site is a rock shelter with an associated artifact deposit (Neff and White 2004:12).

It is possible that prehistoric peoples were drawn into the general area because of available water and the presence of large stands of saguaro. Although the existing road was not built on a known prehistoric or American Indian trail, the placement of Cactus Forest Drive is intricately connected to the saguaro stands.

The ethnographic and archeological landscape of the district is currently being evaluated and documented by the National Park Service (Neff and White 2004).

Although the road crosses nine archeological sites along the existing alignment, archeological and ethnographic resources are not a contributing feature to the cultural landscape (historic vernacular landscape). The location of the road and associated CCC-era construction features were not built or located to provide viewing or access to the cultural resources found along the road. The resource values for these resources are addressed in other national park documents.

Land Use – Historic

A brief chronology of the history of the park is provided below.

Year	Event	Description
1916	Settled	Fermin Cruz was the first person to obtain a patent on land within the current Saguaro National Park (Rincon Mountain District) boundaries.
1920	Failed purchase	The Natural History Society of the University of Arizona attempts to purchase some of the land upon which the saguaro thrived near the Rincon Mountains.
1929	Purchased	A representative of the University of Arizona purchases 480 acres of saguaro cactus forest east of Tucson.
1932	Withdrew	The federal government withdrew 4.5 sections in the heart of the saguaro forest from homesteading and assigned them to the state for the benefit of the university.
1932	Advocated	Frank Hitchcock, the influential publisher of the <i>Arizona Citizen</i> , began pursuing the establishment of a national monument to protect an area of saguaro and associated plant life.
1933	Established	Saguaro National Monument was established in March and put under the management of the U.S. Forest Service. Shortly, the monument was removed from Forest Service management and transferred to National Park Service management.
1933	Established	The Emergency Conservation Work program, better known as the Civilian Conservation Corps, was established in March.
1933	Established	In December, CCC Camps Pima (SP-6-A) and Papago (SP-7-A) were established in Tucson Mountain Park.
1934	Abandoned	Camp Papago (SP-7-A) decommissioned due to a lack of water.
1935	Established	CCC Camp Tanque Verde (SP-11-A) was established for projects on university land within the national monument.
1936	Planned/began	Skyline Loop Road, which became Cactus Forest Drive, was planned, staked, and the CCC men from Tanque Verde Camp began construction.
1938	Abandoned	Camp Tanque Verde closed due to lack of water.
1939	Completed	Skyline Loop Road completed by CCC crews from Randolph Park (SP-3-A).

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

Year	Event	Description
1939-1940	Constructed	Crews from Randolph Park constructed an administration building on university land within monument boundaries.
1941	Abandoned	Camp Pima was abandoned and dismantled on June 21.
1951	Paved	Cactus Forest Drive regraded and hard surface paved.
1956	Acquired	National Park Service acquires half of state and University of Arizona land within the monument boundary. This included Cactus Forest Drive.
1959	Acquired	National Park Service acquires the remainder of state and University of Arizona land within the monument boundary.
1961	Added	Tucson Mountain Park added to Saguaro National Monument.
1970s	Acquired	The National Park Service acquired the last of the private inholdings in the monument.
1976, 1991, 1994	Adjusted	The boundaries of Saguaro National Monument were adjusted.
1976	Designated	The 71,400-acre Saguaro Wilderness Area was designated.
Late 1970s	Removed	The administration buildings (visitor contact station/residence) constructed by the CCC in the Rincon Mountain District (on former university land) was torn down.
1994	Designated	Saguaro National Monument became Saguaro National Park.

A large area of the Rincon Mountain District is encompassed by the NRHP-listed Rincon Mountain Foothills Archeological District. Historic resources of the Rincon Mountain District include mining and ranching sites as well as historic trash deposits. Resources already listed on the NRHP as part of the Rincon Mountain Foothills Archaeological District include the Manning Cabin (NRHP listed), the Lime Kilns, and the Freeman Homestead (both listed on the State Register of Historic Places); none of these are found along Cactus Forest Drive.

Features associated with Cactus Forest Drive include the existing roadbed and alignment, multiple course-stone retaining walls, masonry culverts, drainage-control features, and a rest area built during the 1930s by the CCC. Although a number of the turnouts are probably associated with CCC-era construction, the archival information does not specifically define where or how many turnouts were put in during initial road construction. It is likely that additional turnouts were informally added through the years in order to meet the needs of the park.

See “Historic Context” (significance) for expanded discussion on historic land use.

Circulation System

The layout of the landscape is intact. Although the road was not constructed entirely as envisioned (much of the proposed rock work along the road was eliminated in 1937), the existing roadbed and associated rock work and support features are reflective of the 1936 – 1939 construction plan. The road base was asphalted in 1951, replacing the original gravel base. Replacement of the gravel in 1951 did not affect the integrity of the layout and design of the roadbed.

Cactus Forest Drive is an example of the National Park Service design and planning. The designed landscape incorporates features and building materials reflective of the rustic style desired for that time. The layout was intended to provide access to a saguaro forest. Features such as road width, existing landscape along the roadway, the blend/fit of the road into the landscape, minimum cut and fill slopes and the use of natural road contribute to the landscape character. The original setting is intact and views in all directions remain relatively unchanged. The layout of the road and associated water control features blend in with the historic and existing environment.

Most of the work was undertaken by the CCC enrollees assigned to Camp Tanque Verde (SP-11-A). The road was completed by men from a side camp—Randolph Park (SP-3-A).

The nature trails are not associated with CCC construction. Though it is unclear when all the nature trails were laid out, the 1937 preliminary master plan contains no mention of new trails. A master plan development outline from 1952 does discuss the presence of a self-guided nature trail “around the Cactus Forest Loop Road.” This, however, is probably not a foot trail, but a self-guided auto tour. The document entitled Mission 66 for Saguaro National Monument: describes a “self guiding booklet assists the visitor along the drive and there are a number of in-place exhibits at the more important stops”; NPS n.d.). The use of the word “drive” suggests a self-guided auto tour rather than a foot trail. The 1952 plan outline also states that future development should include the development of “natural history trails adjacent to Cactus Forest Loop Road . . . and a trail into the archeological exhibit-in-place in section 5” (NPS 1952). A 1958 master development outline states that there are foot trails at the visitor center and at several interpretive stops along Cactus Forest Drive (NPS 1958). There is no detailed discussion regarding trail expansion. A 1965 master plan brief lists the reconstruction and construction of the Rincon Mountain trail system (NPS 1965). From available information, it appears that the trails were laid out in the 1950s and 1960s.

The circulation pattern for Cactus Forest Drive has not changed over time to accommodate increased traffic flow. Comparison of the 1936 map to the existing layout shows no apparent change in the circulation pattern. There have been changes to the road edge due to larger vehicles and possible roadside vegetation damage due to cars pulling off along the road. The exact configuration, number, and location of CCC-era turnouts are not specified in the “as built” plans or in available documents.

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

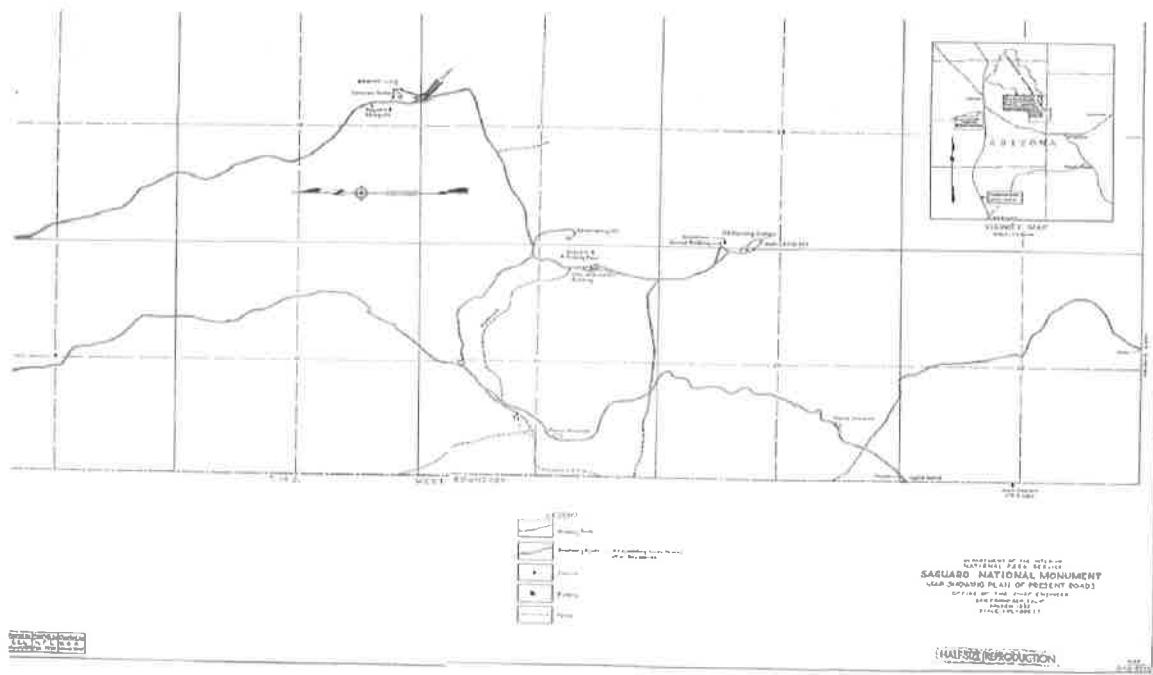


FIGURE 3. 1933 MAP SHOWING LOCATION OF EXISTING ROADS (SAGUARO NATIONAL MONUMENT, DOI)

Note: This map shows the location of a picnic grounds in the southern portion of the park, the University of Arizona building, and the spur road to Observatory Hill.

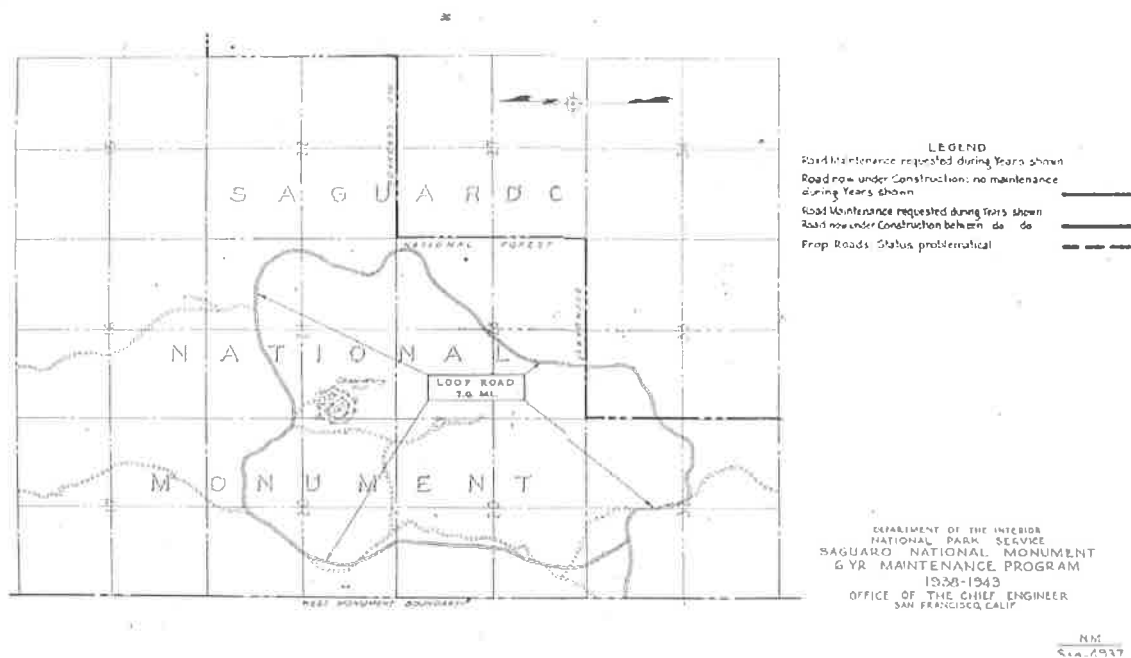


FIGURE 4. 1936 PROJECTED 6-YEAR (1938-1943) ROAD MAINTENANCE PROGRAM MAP (SAG-4937)

Note: Map shows the layout and alignment of the loop road.

Determination of Eligibility
Cactus Forest Drive, Saguaro National Park

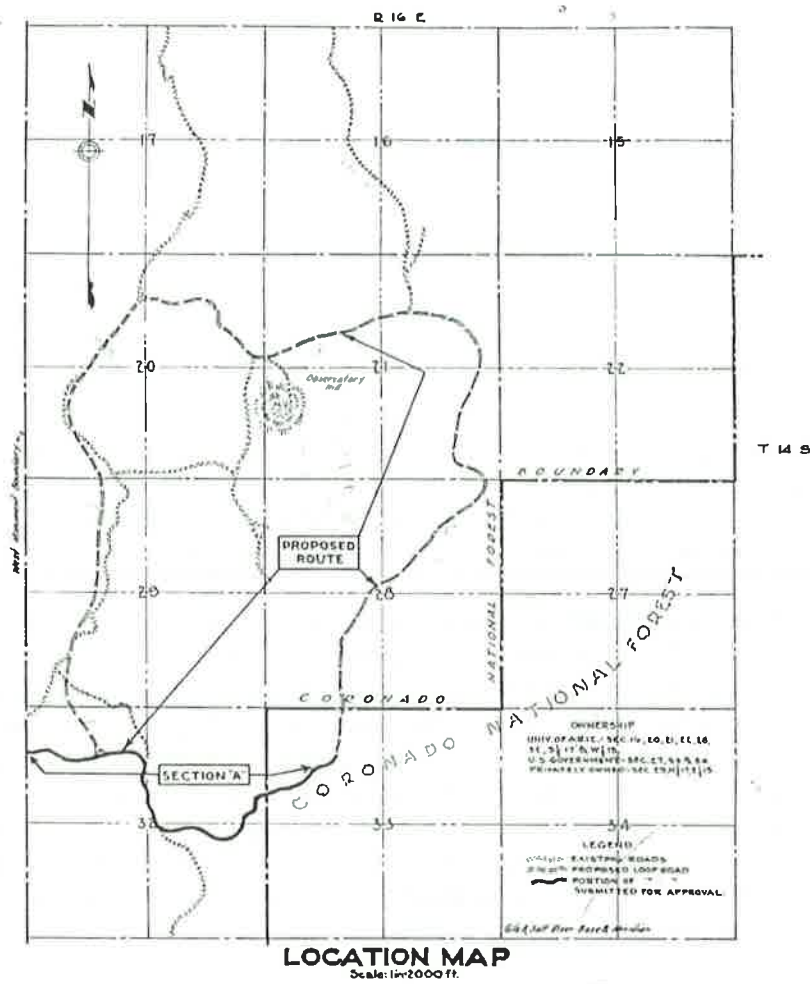


FIGURE 5. PROPOSED LOOP ROAD SECTION A (OFFICE OF THE U.S. ARMY CORPS OF ENGINEERS, SAN FRANCISCO, 02/17/36)

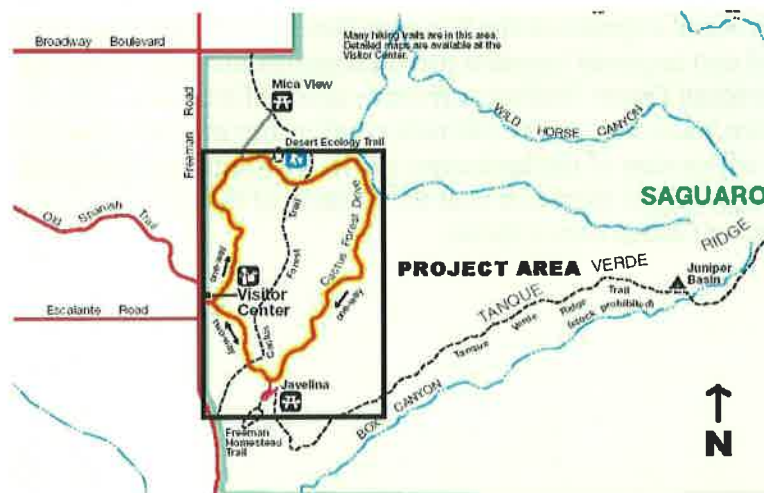


FIGURE 6. EXISTING CIRCULATION PATTERN FOR CACTUS FOREST DRIVE

Spatial Relationships and Orientation

Spatial organization for Cactus Forest Drive has always been influenced by the presence of the saguaro cactus forest and related habitats. In addition to the CCC-constructed road, there are some 128 miles of trails that offer additional enjoyment of the desert and mountain ecology. These trails are not CCC-constructed, but are accessible from Cactus Forest Drive.

Architectural styles and building materials reflect the National Park Service rustic design philosophy of the 1930s. In keeping with principles of designing in harmony with nature, the road and associated structures incorporated native materials such as local stone and were sited to minimize intrusion on the landscape and maximize the ability of visitors to experience the pristine natural setting from their motor vehicles. The scale of building was simple and minimalist. Naturally occurring features were incorporated into the road path or avoided through design so as not to substantially alter the setting. Water-control features were placed in naturally occurring drainage paths to redirect or reroute runoff.

Cactus Forest Drive is an example of National Park Service design and planning. Layout, architectural styles, and building materials express the cultural values, traditions, and concerns of this time period. The layout was intended to provide access to a saguaro forest. In keeping with the National Park Service rustic style, the scale, rural feeling, and slow, scenic drive fits well into the existing landscape. The width of the road, the minimum amount of cut and fill slope, and the minimal visual contrasts support the original intent and design elements of the drive. The original setting is intact and views in all directions remain relatively unchanged since the period of significance. With the exception of modern development to the west, the visual landscape associated with the road remains intact. The layout of the road and associated water-control features blend in with the historic and existing environment.

View and Vistas into and out of Landscape

The Cactus Forest Drive overlooks and turnouts at various locations provide opportunities for park visitors to view and experience the Sonoran Desert landscape in an unobstructed setting. The various paved and unpaved turnouts provide opportunities for park visitors to view and experience the Sonoran Desert landscape from a variety of locations. Because of its layout, Cactus Forest Drive maintains a more intimate relationship with the desert landscape, transitioning to a wider view of the landscape and its surroundings. Ongoing urban development is beginning to encroach near the borders of the park (western side) and can be seen from portions of Cactus Forest Drive.



FIGURE 7. VIEWSHED ALONG ROAD (LOOKING TO THE NORTH)



FIGURE 8. VIEWSHED LOOKING FROM ROAD TO OUTSIDE THE PARK (TO THE WEST)

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK



FIGURE 9. VIEW TAKEN FROM A VANTAGE POINT LOOKING DOWN AT THE ROAD



FIGURE 10. VIEWSHED ALONG ROAD

Vegetation

The Rincon Mountain District possesses a multi-storied canopy of vegetation, which includes the saguaro cactus (*Carnegiea gigantea*) and leguminous trees (foothill paloverde (*Cercidium microphyllum*), and mesquite (*Prosopis* sp)) (NPS 2002). It was the dense stands of saguaro cactus at the western end of the district that triggered preservation efforts in the 1920s and eventually became the focus of tourism.

The cactus or saguaro forest is considered a symbol of the American Southwest. These cacti are probably the most recognizable plant of the Sonoran Desert, and exceptional stands of this species can be seen from Cactus Forest Drive. The saguaros are distinctive because of their size and their characteristic branching arms. Plants can be up to 50 feet high (they average 35 feet at maturity) with branches beginning some 12 feet above the ground. Diameters average around 30 inches, with individual plants living up to 200 years. The Cactus Forest Drive road overlooks and turnouts provide opportunities for park visitors to view and experience the Sonoran Desert landscape.



FIGURE 11. EXAMPLE OF SAGUARO CACTI STAND ALONG ROADBED

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK



FIGURE 12. VIEW OF LANDSCAPE FROM TURNOUT (506 +60 RT.); EXAMPLE OF DESERT VEGETATION



FIGURE 13. VIEW OF VEGETATION COVER FROM AN UNPAVED TURNOUT

Landscape Dividers

Landscape dividers such as walls, fences, and hedges are not present along Cactus Forest Drive.

Drainage and Engineering Structures

Drainage and engineering structures consist of three retaining walls, natural water crossings, 24 culvert headwalls, associated barrier stones and shoulder stabilization.

Feature	Location (As shown on Engineering Map)	UTM Coordinates (Zone 12; NAD 27)	Contributing	Non-Contributing
Retaining Wall, turnout	506 + 60	N/A		X
Retaining Wall, turnout, culvert headwalls	702:44 to 705 + 45; 708 + 62 to 709 + 60; 710 + 00 to 711 + 2; 719 + 41 to 721 + 000	N/A	X	
Retaining Wall, turnout, culvert headwalls	740 + 05 to 741 + 78; 743 + 24 to 744 + 39	N/A	X	
Shoulder Stabilization, culvert headwalls	775 + 00	N/A	X	
Culvert headwalls (not associated with retaining walls)	N/A	0527400/3561255	X	
Culvert headwalls (not associated with retaining walls)	N/A	0527508/3561032	X	
Culvert headwalls (not associated with retaining walls)	N/A	0527581/3560661	X	
Culvert headwalls (not associated with retaining walls)	N/A	0527026/3560246	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526971/3560161	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526946/3560100	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526876/3559998	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526884/3560004	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526821/3559949	X	

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

Feature	Location (As shown on Engineering Map)	UTM Coordinates (Zone 12; NAD 27)	Contributing	Non-Contributing
Culvert headwalls (not associated with retaining walls)	N/A	0526801/3559886	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526803/3559886	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526724/3559678	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526755/3559559	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526649/3559483	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526274/3559149	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526176/3558874	X	
Culvert headwalls (not associated with retaining walls)	N/A	0526009/3558791	X	

Retaining Walls

The retaining walls were built to protect fills from streams and along cut banks. The three retaining walls constructed along the roadbed are defined as a combination of mortar and non-mortar cut-block walls. The amount of force that an individual wall holds depends on wall height, the nature of the material retained, and the anticipated weight of traffic and equipment resting on the fill.

A 1939 report (included in appendix C of this document), describes road construction specifications for the Cactus Forest Loop. The road was to be a minimum width of 18 feet with increased width at all curves, unnecessary ditches were not to be built and the natural hydrologic characteristics of washes, arroyos, and hillsides were to be left unchanged (as much as possible). Rock walls were to be surfaced with weathered rock well anchored to the foundation wall. Rock work was “applied with more freedom and irregularity [than usual] so that an appearance of more ruggedness and informality may be achieved” (Job Application and Completion Record 1939). Mortar joints were to be deeply raked. The mix ratio of the mortar was one part Portland cement to three to four parts sharp sand.

An example of a retaining wall section from the 1936 “as constructed drawing” is shown below. As shown, the rock surface is not less than 12 inches above the surface, with a 1:3 ratio of cement mortar to rock.

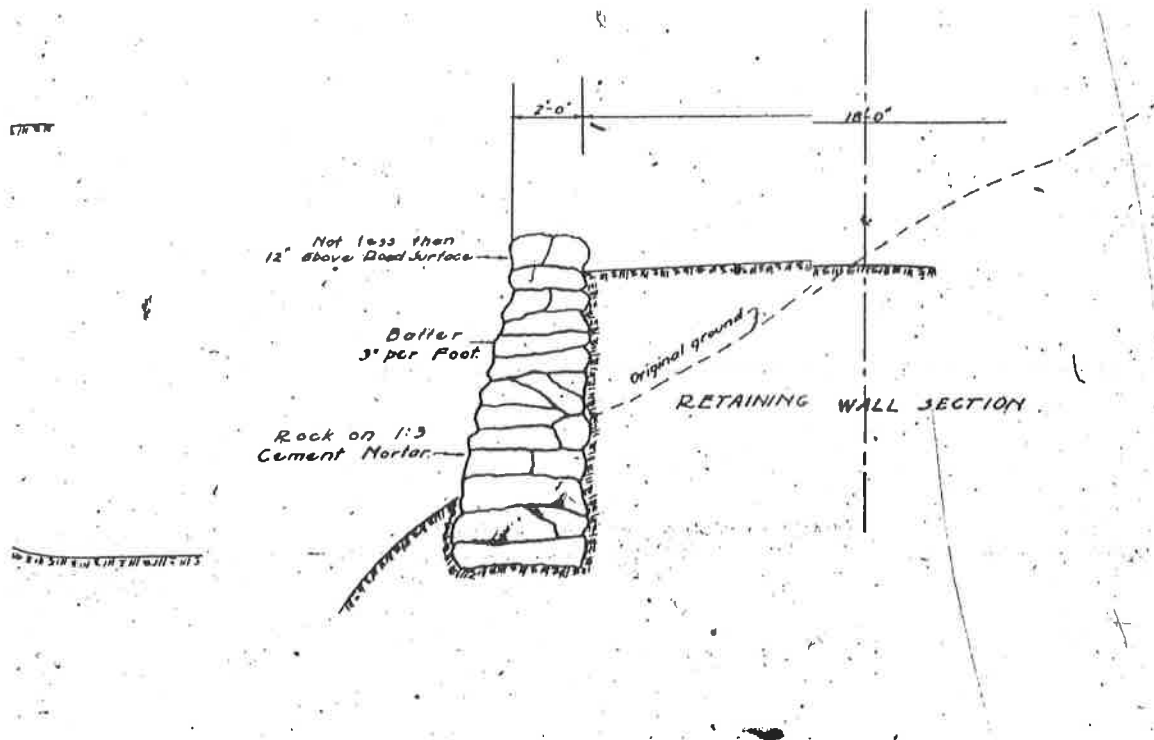


FIGURE 14. RETAINING WALL SECTION AS SHOWN ON THE NATIONAL PARK SERVICE "AS CONSTRUCTED DRAWING" (1936)

Although the two CAD drawings provided below come from recent U.S. Forest Service trail drawings (U.S. Forest Service, National Trail Drawings, Washington, D.C.), the rock retaining walls on Cactus Forest Drive are similar or the same as the drawings that parallel standards found in the 1940s *Truck Trail Handbook* and the construction style shown in the 1936 "as constructed drawing." Although the walls and culverts associated with Cactus Forest Drive were clearly constructed by the CCC, the drawings provided below illustrate design standards that were common during the period of significance; comparisons with figure 14 ("as constructed drawing") exemplify common design standards. Two of the retaining walls discussed below are contributing features of the cultural landscape.

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

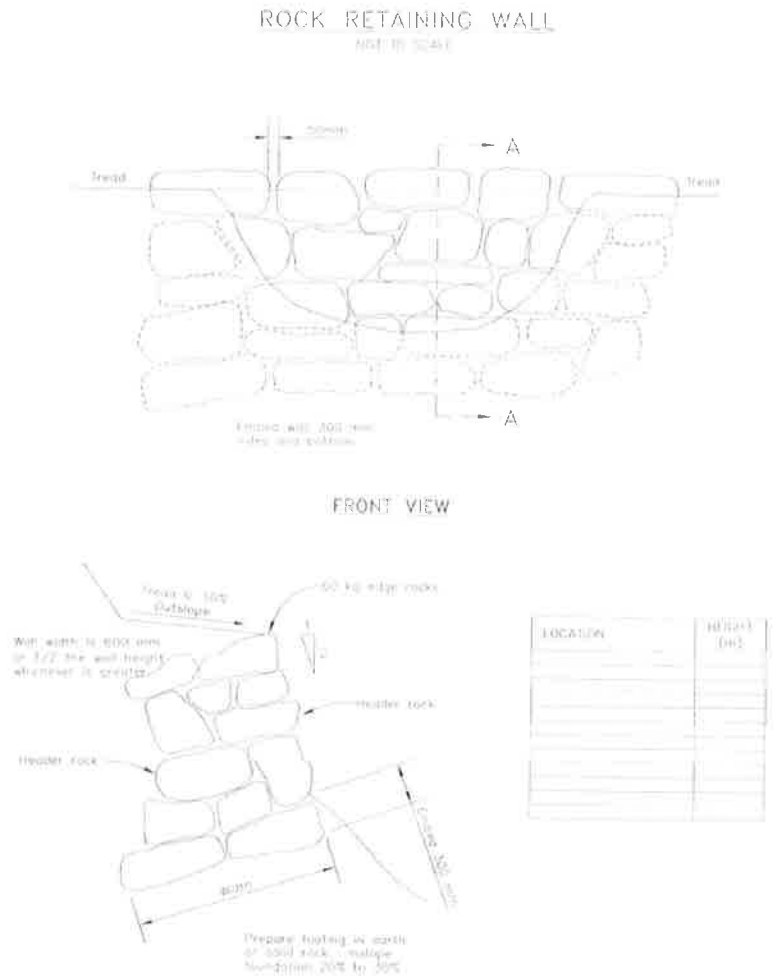


FIGURE 15. U.S. FOREST SERVICE NATIONAL TRAIL DRAWINGS AND SPECIFICATIONS (TRAILS EM-7720-103) "ROCK RETAINING WALL"

TALUS AND RUBBLE ROCK SECTION

NOT TO SCALE

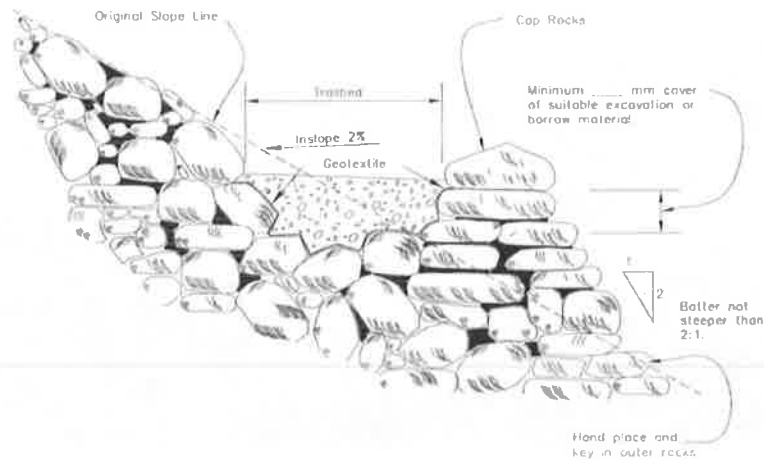


FIGURE 16. U.S. FOREST SERVICE NATIONAL TRAIL DRAWINGS AND SPECIFICATIONS (TRAILS EM-7720-103)
"TALUS AND RUBBLE SECTION"

Retaining Wall: Paved Turnout with Associated Retaining Wall (506 +60 Rt.)

This retaining wall is stacked rock with concrete / cement bonding; the block at the lowest level is adjacent to the asphalt pavement associated with the turnout. The wall is seven courses high, with some tumbling found at the eastern end. For the most part, the stones appear to be boulders and large stones rather than quarry material. Although construction techniques are similar to the other two retaining walls found along the road, there is some doubt as to the age of this feature. The construction appears to be more haphazard with concrete used in areas of apparent repair. The turnout is paved with cement car stops. There is no signage for this turnout. The two ends of this wall appear to have been damaged and/or altered.

This wall is probably not part of the original CCC-era construction; there are no park maintenance records or other archival information indicating date of construction and/or maintenance. Although the archival information is inconclusive, the manner of construction and the size of boulders used in the wall suggest non-CCC-era construction. This feature is not considered a contributing element to the significance of the proposed historic district.



FIGURE 17. VIEW LOOKING SOUTH OF THE TURNOUT AND ASSOCIATED RETAINING WALL



FIGURE 18. CLOSE UP OF WALL CONSTRUCTION AND ASSOCIATED TURNOUT



FIGURE 19. BACK SIDE (SOUTH SIDE) OF THE WALL (NOTE LACK OF MORTAR)



FIGURE 20. PORTION OF THE BACK SIDE THAT HAS COLLAPSED / TUMBLED (EASTERN END)



FIGURE 21. EXISTING CEMENT STOPS IN TURNOUT (LOOKING WEST FROM THE TURNOUT)

Retaining Wall: Paved Turnout with Associated Retaining Wall (702:44 to 705 + 45; 708 + 62 to 709 + 60; 710 + 00 to 711 + 2; 719 + 41 to 721 + 00)

This retaining wall feature follows several road curves and consists of four segments. The wall is three courses wide, with two to three exposed courses perpendicular to the roadbed (maximum width of 22–24 inches; 19–20 inches high along roadbed). Relatively small stones were used in the construction with some concrete between the stones. The majority of the material appears to have been quarried from source rock found up-slope of the wall. The construction and height of the back side of the wall is dependent on the slope of the road. Some of the stacked blocks are held together with concrete or cement. Because of the steepness of the slope, a “stair step” construction or alignment is found along the back side, rather than a straight or vertical face. In addition to the drainage features constructed within the wall, there are nine culvert headwalls associated with the roadbed. A small cement channel has been added to divert the water away from the wall. Although maintenance records are inconclusive regarding date of construction, the cement channel is probably not CCC related. Although not historic, the channel has protected the historic integrity of the wall.



FIGURE 22. SEGMENT 1 – VIEW ALONG ROADBED LOOKING DOWNHILL (NOTE: CEMENT CHANNEL AGAINST RETAINING WALL)

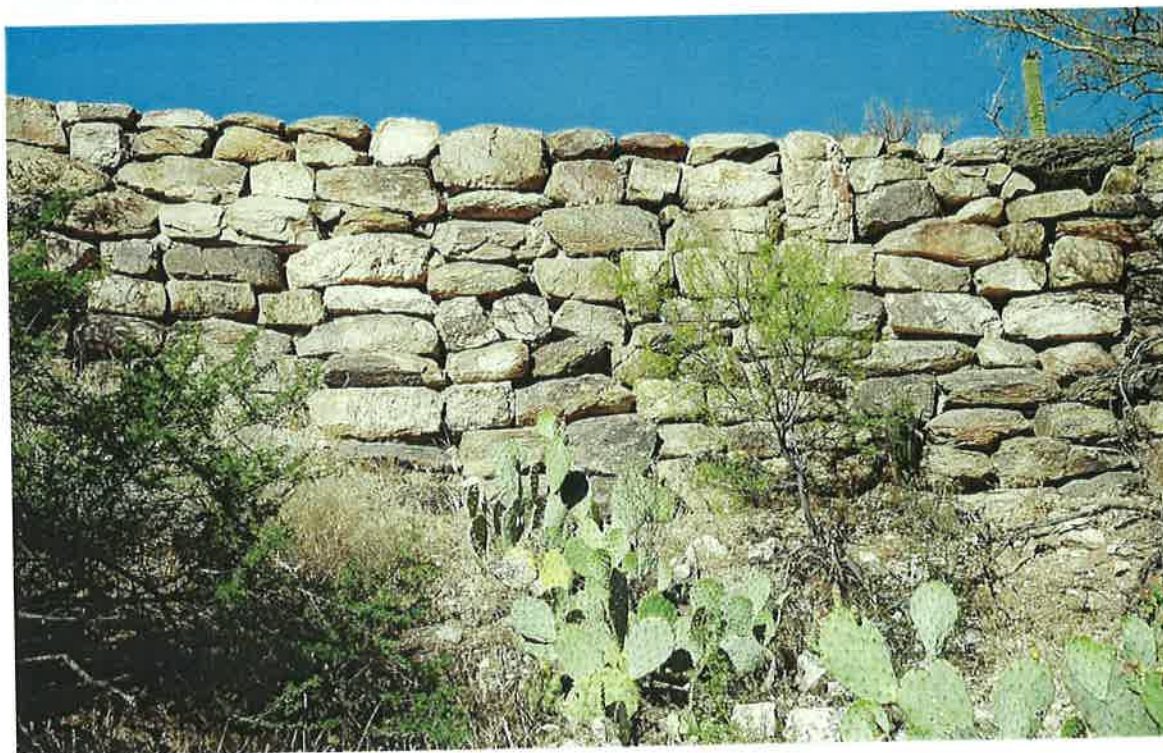


FIGURE 23. SEGMENT 2 – BACK SIDE OF RETAINING WALL SHOWING BOULDER STACKING



FIGURE 24. SEGMENT 2 – BACK SIDE OF WALL, DRAINAGE FEATURE CAN BE SEEN IN TOP PORTION OF PHOTO



FIGURE 25. CLOSE-UP OF STONE CAPPING AND WATER CONTROL FEATURE BUILT INTO RETAINING WALL



FIGURE 26. EXAMPLE OF WALL CONSTRUCTION, ROCK / COBBLE-SIZE VIEW FROM EXISTING ROADBED (NOTE THE NON-CCC CEMENT PATCHING ALONG BASE OF ROCK ALIGNMENT)



FIGURE 27. EXAMPLE OF CEMENT DRAINAGE, VIEW FROM ROADBED



FIGURE 28. SEGMENT 4 – VIEW OF ROADBED LOOKING NORTH (DOWNHILL) – RETAINING WALL IS NOT SEEN FROM ROAD; BACK SIDE OF WALL IS 4 M TO 8 M IN HEIGHT (12 FT. TO 24 FT.)

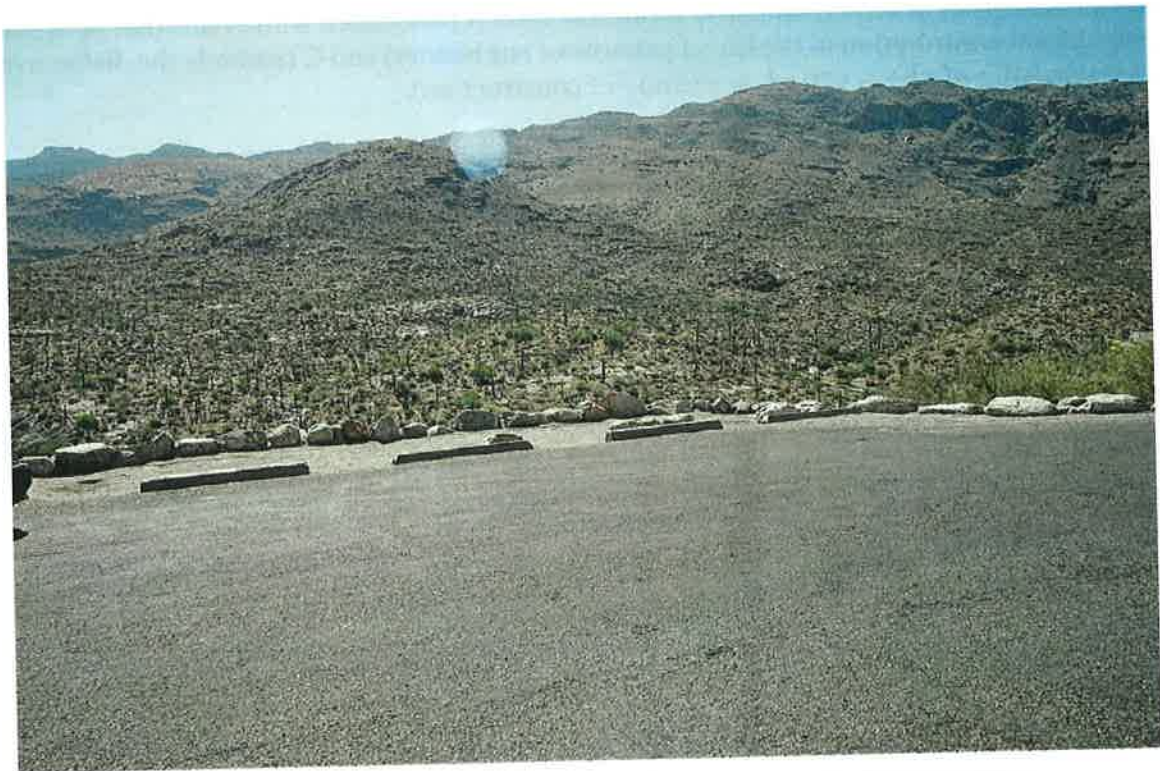


FIGURE 29. EXISTING PAVED TURNOUT (715 + 09) ASSOCIATED WITH RETAINING WALL

Retaining Wall: Turnout with Associated Retaining Wall (740 +05 to 741 +78; 743 +24 to 744 +39)

This wall feature is constructed similarly to the previous retaining wall. It runs along several road curves and consists of two segments. The wall is three courses wide, with two to three exposed courses perpendicular to the roadbed (17 to 18 inches wide, 18 to 20 inches high from the roadbed). Stone size and layout to the terrain are similar to the previous retaining wall. The construction and height of the back side of the wall is dependent on the slope of the road. There is concrete / cement bonding in the structure. The height of the wall ranges between 15 to 18 feet, depending on changes in elevation and slope of the road. Several water drains are built into the wall structure. Unlike the other extended retaining wall, this one is not constructed on a stair-step design, having a more vertical facade. In addition to the built-in drains, there are two associated culvert headwalls.

A Classified Structures Single Entry Report (LCS) form was completed for this feature (appendix A). The retaining wall was determined to be eligible for NRHP nomination (12/09/1994) as contributing to a potential district. Significance was listed at the local level. The LCS describes this feature as:

Historic Function	NPS Class I Principal Road, turnout, road retaining wall
Current Uses	NPS Class I Principal Road, turnout, road retaining wall
Sub structure	Stone
Super structure	Asphalt

National Register criteria considered applicable were A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embody the distinctive characteristics of a type, period, or method of construction).

A historic wall vibration study was conducted on a portion of this wall (King 2003; appendix A). The walls at the upper culvert were determined to be similar in appearance and sensitivity to the retaining walls.



FIGURE 30. EXPOSED WALL ALONG SEGMENT 1 (740 + 05 TO 741 + 78) LOOKING NORTH

Note: Wall height is two layers along the roadbed with a top/capstone. Indentation seen on the right side (west) of the roadbed is an associated culvert headwall.

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK



FIGURE 31. CLOSE UP OF BUILT-IN WATER DRAINS IN WALL—THIS PORTION OF WALL IS ONE LAYER HIGH WITH FLAT CAPSTONES



FIGURE 32. VIEW OF ROADBED AND END WALL LOOKING SOUTH

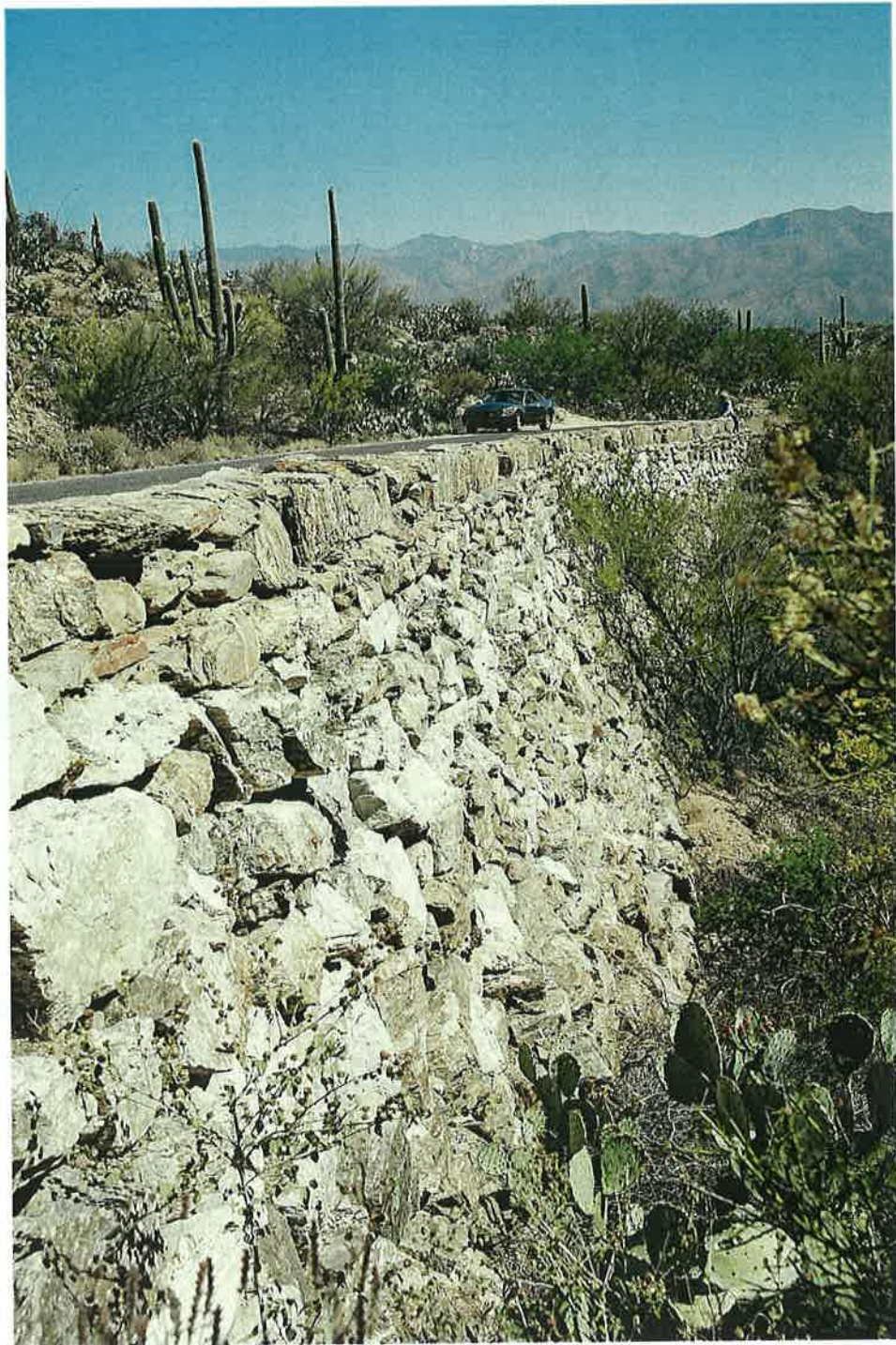


FIGURE 33. BACK SIDE OF RETAINING WALL SHOWING CONSTRUCTION AND SETTING



FIGURE 34. HISTORIC PHOTO (CA. 1950s) SHOWING WALL CONSTRUCTION AND GENERAL SETTING (SAME SETTING AND CONFIGURATION AS FIGURE 11)

Shoulder Stabilization

In addition to the three retaining walls, a section of the road (775 +00) has evidence of shoulder stabilization in the form of a small alignment of rock. This feature may be the remnant of a more developed wall that has been impacted through road use or may have been created in this form. The feature is a couple of courses of rock, with larger stones on top and smaller ones below the road edge. Although there is some stacking, there is minimum vertical relief. There are no associated dry washes, water crossing, or culvert headwalls. This feature may have been created to divert water from the original road surface or is a remnant of a design feature that made more sense when the road was the original gravel surface. Although there is minimum vertical relief, materials, workmanship, and the location of the structure (i.e., below the current road grade in what was presumably the original gravel roadbed) indicate that the construction is associated with the CCC (New Deal era). The shoulder stabilization feature does contribute to the cultural landscape.

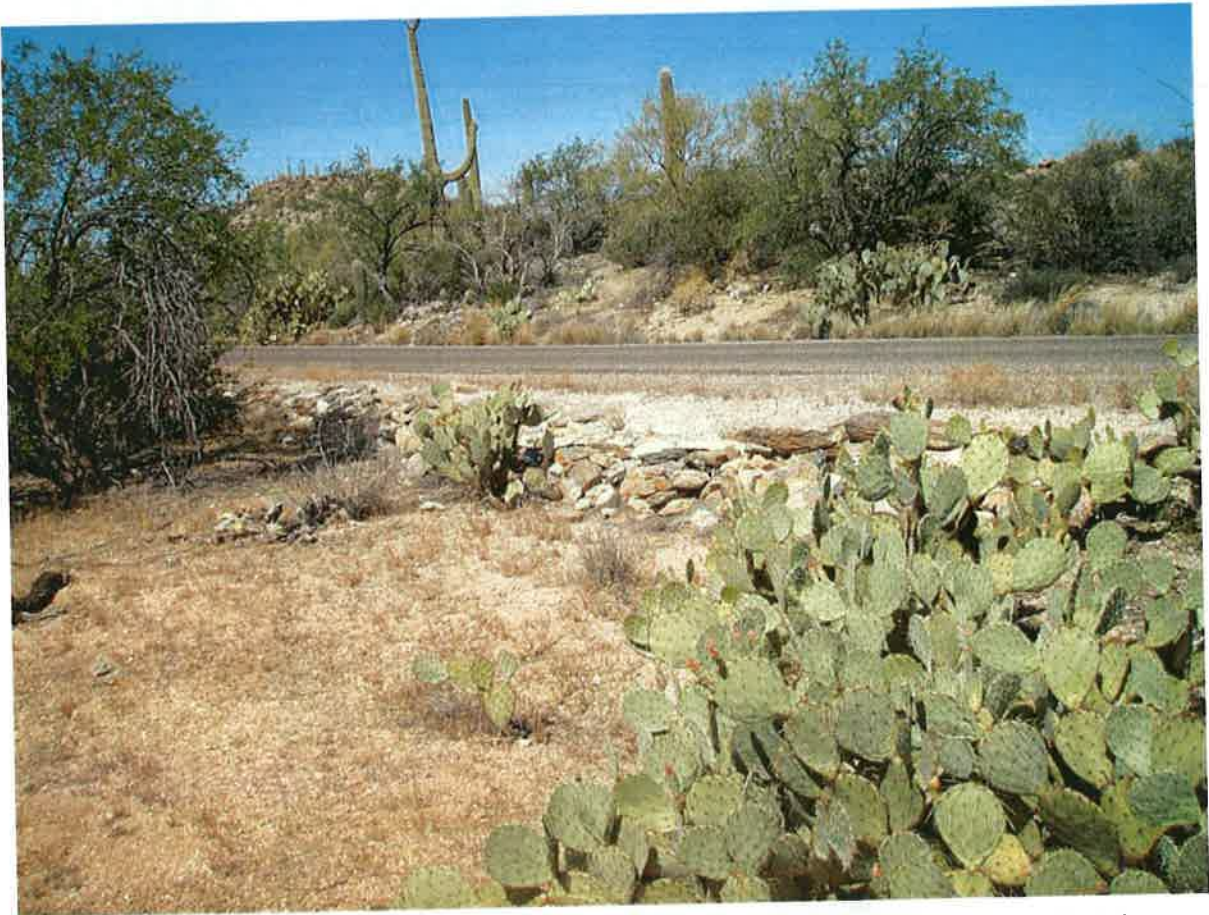


FIGURE 35. ROAD SURFACE WITH STACKED ROCK ALONG THE ROAD EDGE (NEAR STATION 775+00)



FIGURE 36. CLOSE UP OF STACKED ROCK



FIGURE 37. VIEW OF ROCK ALIGNMENT ALONG ROAD SHOULDER; TOP COURSE OF ROCK RESEMBLES CAPSTONE FOUND ON THE LARGER RETAINING WALLS

Culvert Headwalls

Twenty-four culvert headwalls were identified during the current survey (seven associated with the retaining walls, the remaining found as individual features concentrated along the southeastern section of the loop road). Additional culverts may have been constructed and have since been covered with sediment. Generally, a rock-lined culvert / intake box was constructed on one side of the road with the pipe or cement casement excavated under the road and emerging a short distance downslope on the other side. Although the majority of the culvert headwalls are lined with cut or appropriately sized natural stone, a number of inlets were cut into existing natural outcrops. The training handbook used by the CCC crews or the extent of each individual's construction background is unknown. However, it is likely that standards similar to those found in a 1940s edition of *Truck Trail Handbook* (U.S. Department of Agriculture, Division of Engineering) were used for construction. Examination of individual features found along the Cactus Forest Drive roadbed show a design and execution that generally conform to the descriptions given in the 1940s handbook. In all cases, rock-lined culverts were used to divert the water from the roadbed. Standards found in the handbook for stone include:

“ . . . in localities where large durable flat rocks can be readily obtained for a cover to extend between walls, stone culverts may be economical. Rock that is susceptible to disintegration should not be used. The selected site for the culvert should be the best available from the following standpoints: economy of excavation for installation; utilization of natural water course to improve efficiency of inlet and outlet; discharge onto stable material; and avoidance of installation on sharp curves, except at natural stream bed crossings

At both inlets and outlets, the bottom grades of ditches should be designed to avoid sudden changes of velocity that would tend to cause silt deposits . . . each end of a culvert should be not less than 1 ½ feet beyond the shoulder of the road. This is a minimum requirement, greater projection may increase the safety of travel and prolong the life of the culvert through protection against damage by vehicles. The inlet culvert should be connected to the road ditch by a lead-in ditch not less than 10 feet in length and with a uniform grade of not less than 3 percent. The ditch should be regular in shape, free from abrupt changes in direction, and paved where necessary. Outlets must discharge so as not to erode the fill section. Spill troughs or extra length culverts will be necessary on some locations. In others, stone rip rap protection for the fill bank will be needed” (*Truck Trail Handbook* 1940: 466-468; 469-470).

A representative sample of the types of culvert headwalls was photographed and described in terms of construction technique and condition. Individual feature locations were plotted using a Garmin Plus III hand-held GPS unit and station markers. Individual culverts include an intake box with associated depression, which capture runoff water. Collected water was transported through a corrugated metal pipe or a cement box (corrugated pipe 15 to 19 inches / 0.4 to 0.5 m in diameter), underneath the roadbed and discharged on the opposite (downslope) side of the road. When needed (depending on slope and soil conditions), a small retaining wall was constructed around the discharge pipe. Variations between individual

headwalls include height and width of the culvert, size of the drainage pipe, and type of retaining wall. Intake features are generally rectangular in outline and measure 24 inches to 36 inches (0.6 m to 0.9 m) in width, 40 inches to 70 inches (1 m to 1.8 m) in length, and 20 inches to 48 inches (0.5 m to 1.2 m) in height (stacked walls 3 m to 6 m high). Individual blocks are made of natural stone and measure 12 inches to 24 inches (0.3 m to 0.6 m) in length, and 4 inches to 8 inches (10.2 cm to 20.3 cm) thick.

In many cases, general erosion, slope wash, and vegetation has obscured, and in some cases covered over, the culvert headwalls. Several of the intake and discharge boxes have no associated stone block. The features consist of an excavated hole for a catchment basin and a discharge pipe. Although the CAD drawings provided below come from a recent (1997) U.S. Forest Service trail drawing, the construction for culverts and headwalls would have been similar or the same found in the 1940s *Truck Trail Handbook*.

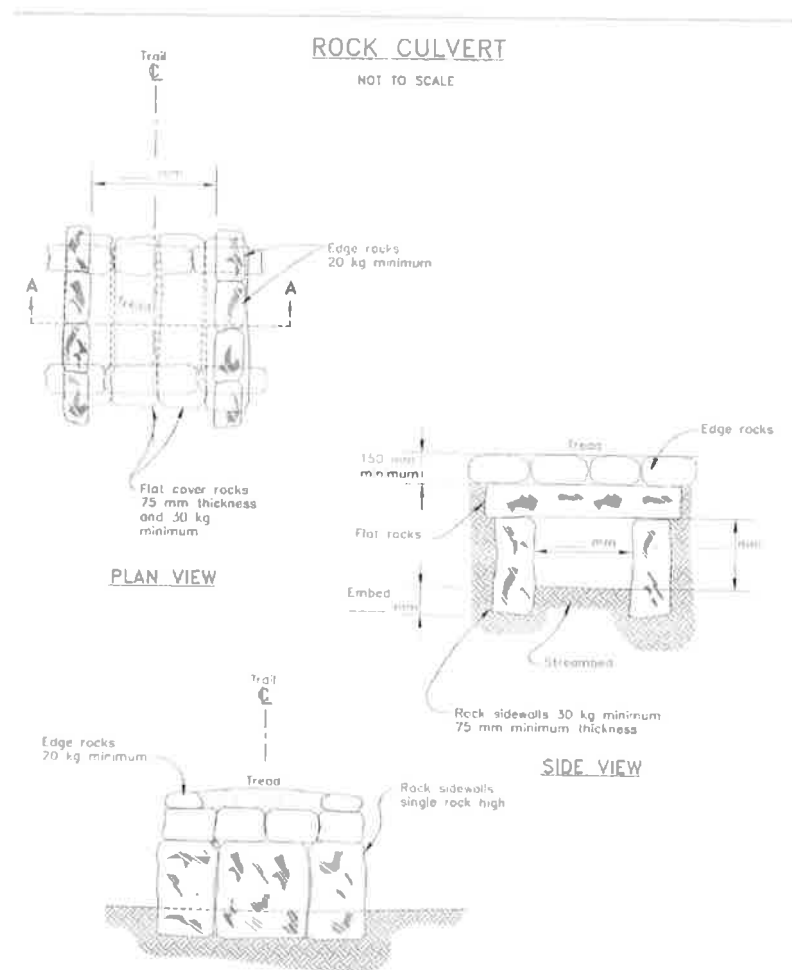


FIGURE 38. ROCK CULVERTS (U.S. FOREST SERVICE NATIONAL TRAIL DRAWINGS AND SPECIFICATIONS [TRAILS EM-7720-103] 1997)

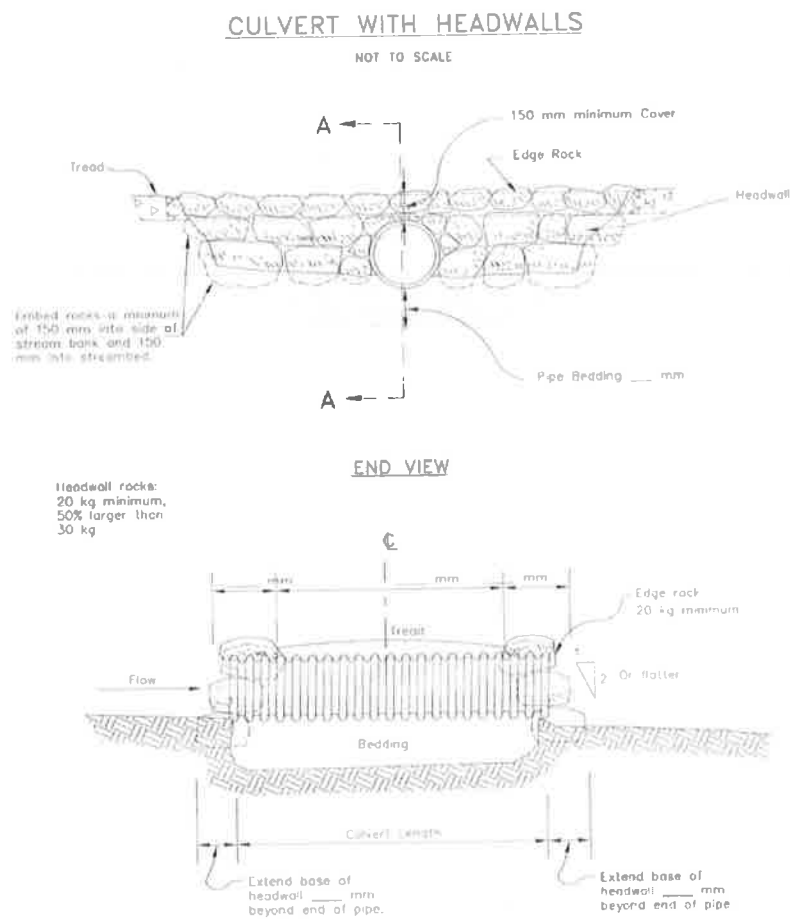


FIGURE 39. CULVERTS WITH HEADWALLS (U.S. FOREST SERVICE NATIONAL TRAIL DRAWINGS AND SPECIFICATIONS [TRAILS EM-7720-103] 1997)

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

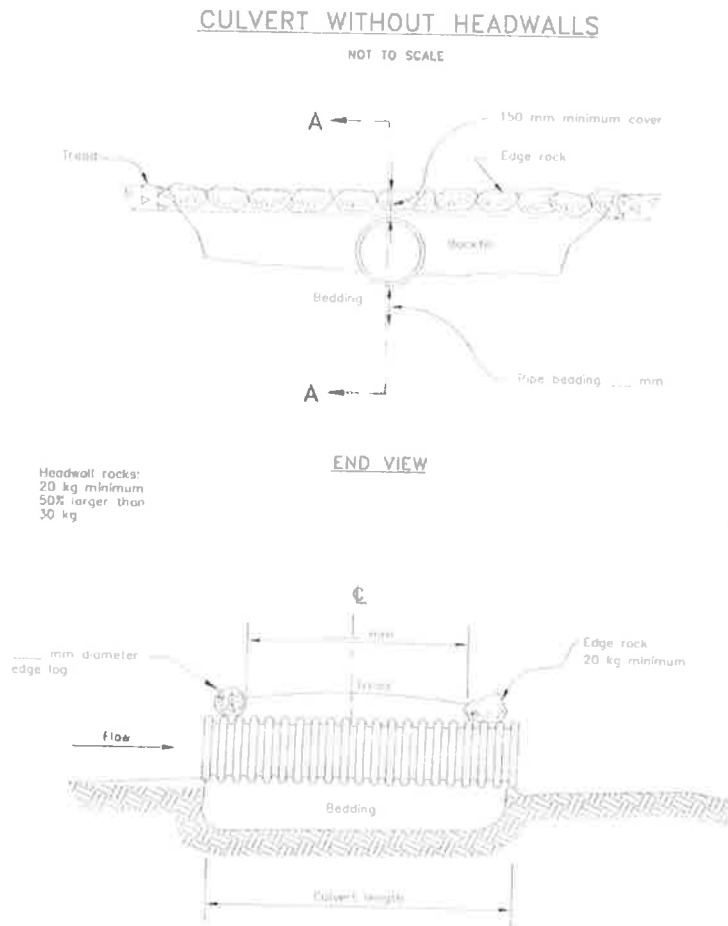


FIGURE 40. CULVERTS WITHOUT HEADWALLS (U.S. FOREST NATIONAL TRAIL DRAWINGS AND SPECIFICATIONS [TRAILS EM-7720-103] 1997)



FIGURE 41. INTAKE CULVERT HEADWALL – STACKED ROCK WITH ASSOCIATED INTAKE BOX—CEMENT CULVERT RUNS UNDERNEATH THE EXISTING ROADBED



FIGURE 42. DISCHARGE CULVERT HEADWALL (ASSOCIATED WITH THE INTAKE HEADWALL SHOWN ABOVE)

Note the vegetation in and around the headwall.



FIGURE 43. DISCHARGE CULVERT HEADWALL; DEFINED CEMENT CHANNEL THAT RUNS UNDER THE EXISTING ROADBED; MINIMAL STACKING



FIGURE 44. INTAKE CULVERT HEADWALL – ASSOCIATED STACK ROCK FEATURE, 5-6 COURSES HIGH



FIGURE 45. INTAKE CULVERT HEADWALL – DISCHARGE HEADWALL IN BACKGROUND

Note: This culvert headwall is unusual in that it is arched with multiple courses.



FIGURE 46. STACKED DISCHARGE CULVERT HEADWALL



FIGURE 47. MINIMAL STACKING INTAKE CULVERT HEADWALL WITH CAPSTONE AND CEMENT CHANNEL



FIGURE 48. STACKED INTAKE CULVERT HEADWALL WITH CAPSTONE AND CEMENT CHANNEL



FIGURE 49. INTAKE CULVERT WITH NO STACKING FEATURE CUT INTO EXISTING BEDROCK

The exact number and placement of culverts is not shown on the 1936 “as constructed” plans for Cactus Loop Road. It is assumed that all of the stacked rock features associated with existing culverts are related to the CCC (New Deal era). Additional culverts may have been excavated (particularly those without stacked rock) during the pavement of the road surface in the 1950s. The culvert headwalls are contributing features of the cultural landscape.

Low-Water Crossings (washes)

A number of low-water crossings are found along Cactus Forest Drive. These features are unimproved water crossings in which the existing roadbed is often below the water flow. While not a unique feature, the low-water crossings are a natural feature incorporated into the road design. An example of a water crossing from the 1936 “as constructed plans” is shown below. A note on the plan states that, “minor changes in alignment may be made in the field if found practicable and agreed upon by the respective field representatives and superintendent. The low-water crossings are contributing features of the cultural landscape because the historic design for the road used them instead of more constructed drainage features.

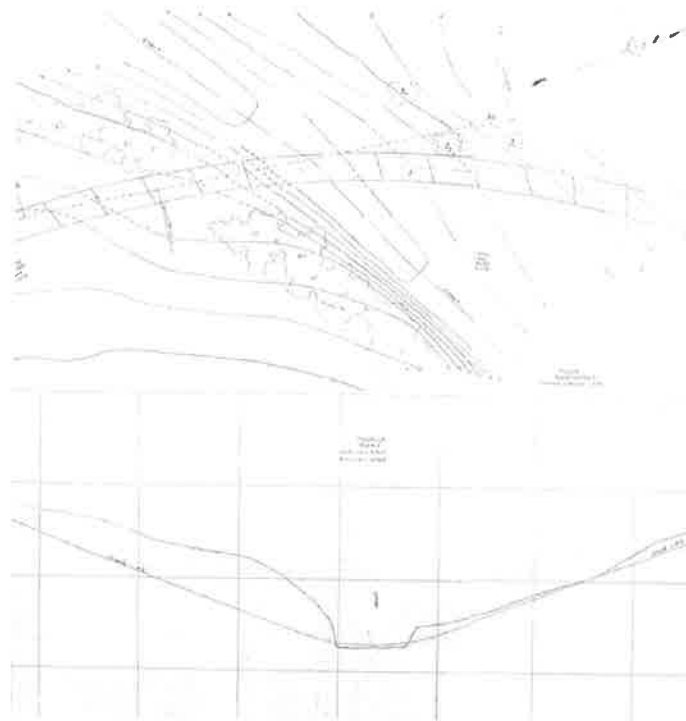


FIGURE 50. TOPOGRAPHY OF PROPOSED WASH CROSSING – LOOP ROAD (1936)



FIGURE 51. VIEW OF LOW-WATER CROSSING LOOKING FROM TURNOUT 506 + 60



FIGURE 52. CLOSE-UP OF LOW-WATER CROSSING

Barrier Rocks

Barrier rocks are features found along the road to prevent cars from stopping or pulling over. They are in no particular configuration, plan, or outline. There is no evidence that the location of individual barrier rocks are associated with the CCC construction of the road. Therefore, they are not considered contributing features of the cultural landscape.



FIGURE 53. EXAMPLE OF BARRIER ROCKS PREVENT VEHICLE ACCESS TO AN ESTABLISHED FOOTPATH/TRAIL

Buildings and Non-Road Related Structures Contained Within the Landscape

The visitor center / museum is contained in the landscape; however, it is not associated with CCC construction and is not reflective of the National Park Service rustic style developed during the 1920s and 1930s. The existing public facilities are most likely associated with the National Park Service modern style, epitomized by the “Mission 66” visitor center. This form of architecture (National Park Service Modern) falls outside the CCC period of significance and was not evaluated in this study.

A 1935 site map shows two picnic grounds for the Rincon Mountain District, but no detail is provided. The locations of the picnic areas do not correlate with the current location of the Javelina picnic area. The 1937 park master plan (appendix B) does not show the location of a

picnic area at Javelina. Fragmentary documentary evidence does imply that the CCC planned to build picnic areas associated with the loop road. It is unclear, however, if they were ever built. There is no evidence of CCC-related picnic areas along the loop today.

A few of the individual picnic sites at Javelina have tables and benches supported by mortared cobbles or cut stone. This construction is consistent with design elements and execution with CCC construction. The fact that there was not a spur road to Javelina until after the CCC era makes it unlikely that the CCC built the structures. The table covers (shades) are World War II-era plane fuselages and are not associated with the period of significance. The associated parking lot, restroom, and ramadas are not CCC related. The spur road to the Javelina picnic area does not appear on maps until 1951, and is not associated with the period of significance.

None of the buildings or non-road related structures within the landscape are considered contributing features of the cultural landscape.



FIGURE 54. BENCH AND TABLE SUPPORTS



FIGURE 55. WORLD WAR II-ERA PLANE FUSELAGE PARTS USED AS TABLE COVER

SIGNIFICANCE

To be determined eligible for listing in the NRHP, according to *National Register Bulletin 15*, “a property must be shown to be significant . . . [and be] associated with important events or persons, . . . importance in design or construction, or . . . [have] informational potential.” These themes are categorized into the following criteria for evaluation:

- Criterion A: “be associated with events that have made a significant contribution to the broad patterns of our history”.
- Criterion B: “be associated with the lives of persons significant in our past”.
- Criterion C: “embody the distinctive characteristics of a type, period, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction”.
- Criterion D: “have yielded, or may be likely to yield, information important in prehistory or history”.

The bulletin continues, “the basis for judging significance and, ultimately, eligibility under the criteria is historic context,” which is defined as “historical patterns that can be identified through consideration of the history of the property and history of the surrounding area.” The property must also be able to convey its significance through characteristics that make it representative of properties associated with the specific aspect(s) of the past under which they are evaluated (integrity).

Historic Context

The historic context presented below provides a framework for evaluating the significance of Cactus Forest Drive and its eligibility for NRHP listing.

National Monument and Park (1933 – present)

The dense stand of saguaro cactus east of Tucson that eventually became Saguaro National Monument became the focus of preservation efforts as early as 1920 when the Natural History Society of the University of Arizona pursued the purchase of some of the land upon which the cacti thrived. They were unable to realize their goal. Nine years later, Homer Shantz, president of the University of Arizona, tried to interest the National Park Service in acquiring the property in order to protect the unique biotic community. The National Park Service was not particularly responsive, so he took matters into his own hands and had a representative (John Harrison) purchase rights to all land with saguaro except those upon which homestead requirements were being met. Through this arrangement, the university gained control over 480 acres (mostly in sections 10 and 15 of township 14 south, range 16 east). This was just the beginning. Shantz envisioned a 9-square-mile tract ranging from desert floor to the top of one of the mountains (Clemensen 1987). Shantz's preservation efforts were aided by President Hoover when, on August 2, 1932, he promulgated an executive order that withdrew 4.5 sections in the heart of the saguaro forest from homesteading and assigned them to the state for the benefit of the university.

Also in 1932, Frank Hitchcock, the influential publisher of the *Arizona Citizen*, began pursuing the establishment of a national monument to protect an area of saguaro and associated plant life. Yellowstone Superintendent Roger Toll visited southern Arizona in February to assess the suitability of different monument sites. In his report he states that the ideal location would be the saguaro cactus located 16 miles east of Tucson. However, he also stated that the area was controlled by both the University of Arizona and private citizens and should only be acquired if the government could purchase the land.¹ The funding was not forthcoming. Clearly, this was a setback for monument proponents. Hitchcock decided on another tact. Shantz, and eventually National Forest Supervisor Fred Winn, drafted a monument proclamation. Hitchcock traveled to Washington, DC, and using his influence with the Republican Party, gained the ear of the secretary of agriculture and President Hoover. Shortly before he left office, the president established Saguaro National Monument (March 1, 1933) with Executive Proclamation 2031 (Clemensen 1987). The new monument roughly encompassed the current Rincon Mountain District of Saguaro National Park and included state, private, former national forest, and university land within its boundaries.

The land making up the area containing the dense stands of saguaro cactus (west side of the monument) was held by the University of Arizona and private entities/individuals. The National Park Service asked the university to donate their land to the federal government, but the school finances were severely strained by the depression and the board of regents refused to donate the land. Instead, they asked that they be reimbursed \$56,000 for their initial investment. There were, however, no federal funds available to pay for the land. The university

¹ Toll also visited an area designated Tucson Mountain Park by Pima County. He considered this location less desirable than the dense, well branched, mature stand of saguaro east of town.

and National Park Service were at an impasse. By 1935, there was a legitimate concern that the park service would never acquire the specific resource the monument had been created to preserve. Negotiations and political maneuvering continued for almost two decades. Finally, in 1951, the university officials had selected public domain land of comparable value they were willing to exchange for land inside monument boundaries. It took another 8 years before the exchange was finalized and all the university (and state) land came under federal ownership (Clemensen 1987).

The National Park Service was also able to purchase title to four tracts of private land within monument boundaries in the 1950s. In 1961, Tucson Mountain Park was added to the monument. The final private inholdings in the western portion of the Rincon Mountain District were either purchased or excluded from the monument in the 1970s. Adjustments to the boundaries of the monument were made in 1976, 1991, and 1994. Much of the monument was designated wilderness in 1976. The monument became Saguaro National Park on October 14, 1994.

National Parks During the New Deal (1933-1942)

In 1933, during the depths of the Great Depression, Franklin Delano Roosevelt was elected president by promising vigorous action and renewed hope. Shortly after he entered office, the president began acting on his promise. He developed an agenda to reform the banking and securities exchange industries, provide central planning for agriculture and industry, and to direct government relief to the jobless. The program, known holistically as the New Deal was far reaching and met with varying level of success. It did, however, contribute to development and improvement of National Park Service holdings at an unprecedented speed. This was enabled primarily through two programs; federal projects funded through emergency appropriations and administered by the Public Works Administration (PWA) and emergency conservation work carried out by the CCC (McClelland, 1994, 1998). Basically, the PWA funded capital improvements, such as roads and buildings in the parks, and the CCC carried out the work according to the standards and designs of the National Park Service. Work at each specific park was supervised by a resident landscape architect (Carr 1999).

The PWA was established by Executive Order 6174 on June 16, 1933 under the authority of Title II of the National Industrial Recovery Act and the Secretary of the Interior, Harold L. Ickes, was appointed director of the PWA. Funds were provided to projects based on their value to national planning and their role in fulfilling comprehensive plans. During the first year of the PWA, the National Park Service received approval for roads and trail work valued at \$17,059,450 and other physical improvements valued at \$2,145,000. Projects ranged from the development and improvement of trails, roads, and water systems to the construction of a wide range of park structures (for example: comfort stations, ranger stations, patrol cabins, fire lookouts, garages, maintenance shops, residences). In the West, the PWA funds provided the National Park Service with the funds to build infrastructure and facilities to meet the demands of increasing visitation (McClelland 1994, 1998).

The PWA projects were fundamentally construction projects, but they had a strong relationship to park service landscape design philosophy. The landscape division of the National Park Service (later renamed the branch of plans and design), under the tutelage of Thomas Vint, was given responsibility for producing building plans, specifications, and

estimates (McClelland 1994, 1998; Carr 1998). All projects were based on larger master plans that conformed to larger principles for landscape protection and harmonized park development. Structures were designed to be compatible with their surroundings and local traditions. Native materials were used extensively to help accomplish this goal and rustic design was implemented where applicable. Roads were designed to standards established by the National Park Service that "maintained the characteristics that were hallmarks of national park roads" (McClelland 1994). Within the framework of standardized design there was ample opportunity for modification based on the unique character of each park and construction site.

The CCC undertook the actual implementation of the projects. In March 1933, President Franklin Delano Roosevelt sent a message to Congress in which he proposed to create a program for young men to be put to work on public lands and perform conservation-related tasks. Within 8 days, Congress passed the Emergency Conservation Work Act and by early April, Roosevelt appointed a director (Robert Fetchner) and advisory council, and appropriated \$10,000,000 for the program. Almost immediately, the Emergency Conservation Work Act became known as the CCC. There were no new agencies created to oversee the program. Instead, the Departments of War, Labor, Agriculture, and Interior managed the implementation of the Emergency Conservation Work Act / Civilian Conservation Corps (Merrill 1981; Otis et al. 1986; Lacy 1976).

The Department of Labor was responsible for the selection and enrollment of participants. Once selected, enrollees would receive a physical examination and training from the War Department. The agency would also organize the men into companies and clothe, equip, and condition them for work in the field. Enrollment was for 6 months, with the option for reenlistment.

Upon the completion of training, the enrollees were sent to camps throughout the nation. The day-to-day management of the camps also fell under the purview of the War Department. The Departments of Agriculture and Interior focused on the planning and implementation of work projects on lands under their control, as well as on state and private lands (Department of Agriculture) and all state, county, and local parklands (Department of the Interior). The Department of the Interior also oversaw the CCC Indian Division (Merrill 1981; Otis et al. 1986).

The National Park Service wasted no time in taking advantage of the program. By mid-May 1933, 63 camps accommodating 12,600 men were prepared at national parks and monuments, and 105 camps were assigned to state parks. That summer, total enrollment at state and national parklands was 35,000 and 2,300 individuals were assigned to supervisory and advisory roles. Work undertaken in the first year included forest improvement projects, firebreak construction and maintenance, trail and campground clean up, construction of fire and recreation-related structures, road and trail building, fire suppression, survey work, insect and weed control, erosion and flood control, campground construction, and general landscaping (McClelland 1994, 1998).

The available pool of labor provided a boost to a concept Vint defined as "landscape naturalization", which was essentially the use of plantings, topographical features, naturalistic outdoor furniture, and other elements that help artificial projects harmonize with the

surroundings. Landscape naturalization projects occurred throughout the park system. Roadside naturalization also evolved during this period. A twofold process, roadside naturalization involved the grading of slopes naturalistically to form concave and convex curves and revegetation with native species, either through active plantings or natural recovery. These bank naturalization projects became one of the CCC's most widespread project types (McClelland 1994).

Naturalistic road and landscape design was integrated into what was to become a benchmark project type of the CCC/PWA (New Deal) period—road construction. On public lands nationwide, the design and construction of scenic roads and overlooks became a thriving program in the 1930s. However, there were also projects that involved the construction of service roads and fire roads. These were not always designed with the same care as the scenic roads, but there was an effort to minimize road scars and maximize landscape protection and screening (McClelland 1994, 1998).

There were attempts to make the CCC a permanent agency, but the end came with the United States' entry into World War II. In fact, the CCC was besieged by budget cuts and experienced a steady decline after 1936. By 1939, it was consolidated with other federal relief programs into the Federal Security Agency and on December 24, 1941, the Congressional Appropriations Committee recommended the termination of the CCC by July 1, 1942. The end of the CCC symbolized the end of the era of naturalistic park design and building. A new emphasis on modern materials, streamlined design, and mechanized technology took its place (McClelland 1994).

The Civilian Conservation Corps in Arizona (1933 – 1941)

The Army initially designated 28 camps in Arizona, the first being a conditioning camp at Fort Huachuca (A-1-A). The first work camp was the Forest Service's Treasure Park Camp (F-15-A). By the end of June 1933, there were 20 CCC camps spread across the state. Spanning the active years of the CCC, 1933 – 1941, 50 CCC camps were in Arizona and associated with the Bureau of Reclamation (2 camps), national parks and monuments (4 camps), Soil Conservation Service (15 camps), National Forests (18 camps), state parks (4 camps), Division of Grazing (4 camps), municipalities (1 camp), U.S. Fish and Wildlife Service (1 camp), and county parks (1 camp). These camps employed 52,905 men who worked on a variety of projects ranging from construction to reforestation (Seymour 1998; Merrill 1981).

The Civilian Conservation Corps at Saguaro National Park

The discussion of the CCC at Saguaro National Park does not necessarily lend itself to a linear approach. As noted above, the land ownership at Saguaro National Monument was convoluted with private inholdings. Also, the CCC was active in Tucson Mountain Park, which was added to the monument in 1961, but was a county park at the time of CCC involvement. Some continuity comes from the fact that the National Park Service had oversight of all non-federal park CCC activities through the State Parks Division.²

² The National Park Service, through the State Parks Division, administered aid to state, county, and city parks. Personnel from the park service provided funds for camps, and designed and oversaw construction projects in the parks.

The Civilian Conservation Corps at Tucson Mountain Park

Pima County applied for two CCC camps to do work in Tucson Mountain Park soon after the establishment of the program. Camps Pima (SP-6-A, DSP-1-A, and CP-1 at various times) and Papago (SP-7-A) were authorized in 1933. By December, the two camps were established and work in the park began in earnest. Camp Papago was short lived and was closed in May 1934 due to lack of water. While in the park, Camp Papago enrollees occupied themselves with road work and the construction of one masonry dam and two earthen dams. Camp Pima residents provided a great deal more work in the park. The men of the camp constructed picnic ground fireplaces, tables, benches, ramadas, bathrooms, roads, trails, and dams. They also obliterated old trails and mine roads, installed cattle guards and fences, and reseeded various areas with native grasses. Beginning in 1936, attention shifted to the construction of an administration facility at the southern part of the park (outside the current national park boundary) and water facilities to provide water to game animals and birds (Clemensen 1987).³ Camp Pima was abandoned on June 21, 1941. The CCC legacy in the Tucson Mountain District is evident in the remains of Camp Pima, five picnic areas, 13 dams, and the two water supply facilities.

The Civilian Conservation Corps at Saguaro National Monument

There were no development plans for the new Saguaro National Monument when the CCC was created. Therefore, the National Park Service did not request any CCC camps for the monument. University President Shantz, however, decided to attract a CCC camp to the portion of the monument controlled by the University of Arizona. In order to be eligible for aid, he arbitrarily created a state park out of a 10-square-mile area at the western end of the monument.⁴ He considered potential projects including the construction of a limited stretch of automobile road, water development, and the obliteration of old homestead and squatter sites, mines, and old roads.

Shantz's request for a camp was accepted and on July 20, 1935, the first CCC men arrived at Camp Tanque Verde (SP-11-A), which was north of the monument boundary. Initially, much CCC work consisted of razing and removing old shacks that had been occupied as recently as 1930, filling mine shafts, cleaning up litter, and removing road scars. Within 8 months, 12 miles of road were reclaimed and the Loma Verde Mine was filled with 800 tons of cans, litter, and other debris cleaned from the park. The CCC men had removed 12 shacks and two picnic areas and filled 30 prospecting holes and work was begun on the road to Observatory Hill (Clemensen 1987).

Concurrent with CCC projects on university land, the management vision of the monument was altered by outside forces. The initial management vision of Saguaro National Monument was to keep it as undeveloped as possible so it could be used as a research reserve. Visitation

³ Specifically, Camp Pima enrollees built five picnic areas, 26 check dams (masonry and earth fill), King Canyon Road, Wasson Peak horse trail, an administration building, and two water facilities with windmills and galvanized water tanks.

⁴ According to A. Berle Clemensen, Saguaro State Park was never officially designated as such. His review of legislative journals, governors' papers and calendars, and annual reports of the Arizona State Land Commission, contain no mention of the state park or any legislative actions creating the park (Clemensen 1987).

would be restricted, as well. However, the mere fact that the monument was so close to a fairly large urban area would mean that visitation would occur whether encouraged or not. In addition, the Tucson Chamber of Commerce was printing brochures advertising the monument creating the need for at least some development.⁵ To this end, Skyline Loop Road (Cactus Forest Drive) was planned as early as 1936. By March, the engineer's drawings were complete and the route was staked (Clemensen 1987). The route was mostly on university land, although it did cross some private land with the owners' consent. Construction began shortly thereafter and continued as the primary CCC Camp Tanque Verde project until its completion in 1939. The road was not constructed entirely as envisioned. Specifically, much of the proposed rock work along the road was eliminated in 1937 due to financial constraints and the difficulty in finding adequate rock. Camp Tanque Verde was closed on April 30, 1938 because there was not enough water to support it. Since the road was not completed, men from a side camp, Randolph Park (SP-3-A), finished it (Clemensen 1987). The road construction specifications included a minimum width of 18 feet with increased width at all curves, unnecessary ditches were not to be built and the natural hydrologic characteristics of washes, arroyos, and hillsides were expected to be left unchanged (as much as possible). Rock walls were to be surfaced with weathered rock well-anchored to the foundation wall. Rock work was "applied with more freedom and irregularity [than usual] so that an appearance of more ruggedness and informality may be achieved" (Job Application and Completion Record 1939).⁶ Mortar joints were to be deeply raked. The mix ratio of the mortar was one part Portland cement to three to four parts sharp sand (Job Application and Completion Record 1939). The original gravel road was regraded and hard surfaced in 1951.

The Randolph Park CCC crews were also involved in the construction of an administration building in 1939 – 1940. The initial engineer's drawings indicate that a rather extensive complex was planned, but it appears that only one building was built, a combination visitor center/residence. The structure was demolished in the late 1970s (Clemensen 1987). Even though the master plan does not discuss picnic areas, CCC documents allude to the construction of a picnic area (Haile Jr. 1938). However, current archival research has failed to reveal any detail about proposed picnic area(s). It is unclear whether any were actually built. The only existing picnic area discussed in later management documents (1950s and 1960s) is the Javelina picnic area (NPS 1952, NPS 1958, NPS 1965, NPS n.d.). Moreover, the 1930s road design drawings do not indicate that the spur road to the Javelina picnic area was extant, planned, or constructed. It is unlikely that the CCC would build a picnic area with no apparent access. It would not be unexpected for the planned picnic area to have been a victim of inadequate funding.

Other CCC work on university land included the installation of pipeline and telephone lines, planting of tamarisk, the erection of a boundary fence (which has since been removed), leveling of the top of Observatory Hill (which has reverted to a natural state), and the

⁵ The formulation of the first master plan for the monument was undertaken in 1937. Even though the plan never got beyond the preliminary stages of development, it did provide some direction for infrastructural development. Roads, an administrative area, one picnic ground, and two interpretive features (an informative sign at the lime kilns and a cactus garden near the visitor center) were planned. The preliminary report on the 1937 master plan is included in appendix B.

⁶ Appendix C contains a small selection of administrative documents associated with the work of the Randolph Park crew and the abandonment of Camp Tanque Verde.

construction of several check dams (which have been altered significantly by ranchers over the years) (Clemensen 1987).

INTEGRITY

To be listed in the NRHP, a property, according to *National Register Bulletin No. 15*, “must not only be shown to be significant under National Register Criteria, but it also must have integrity.” According to *National Register Bulletin No. 16A*, integrity is defined as the “authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic or prehistoric period.” To determine whether historic properties retain integrity and address the question of whether they possess physical features that convey their significance, the NRHP recognizes seven aspects of qualities that, in various combinations, define integrity. The seven aspects include: location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity, a property, according to *National Register Bulletin No. 15*, “will always possess several, and usually most, of the aspects.”

The CCC (New Deal-era) structural features retain the aspects of location, setting, design, materials, workmanship, association, and feeling. CCC (New Deal-era) structural features include the roadbed, rock-lined pipe culverts, rock retaining walls, and turnouts with rock retaining walls. Although additional turnouts may have been constructed after the CCC period of construction, they do not detract from the overall integrity of the Cactus Forest Drive landscape. The existing visitor center, fee station, support buildings, trails, and picnic areas are not CCC (New Deal-era) structures, but are generally consistent in scale and design with the overall setting. The road alignment and associated landscape does retain integrity for listing in the NRHP.

Aspect	Status
Location	Original Location; original alignment and configuration
Design	Additional rock walls and rock work were eliminated from the construction plan in 1937; existing roadbed reflects original design
Setting	Reflective of Saguaro Forest; surrounding landscape of the road during construction similar to existing landscape
Materials	Stone walls and culverts in place; gravel road surface replaced with asphalt
Workmanship	Stone features reflect the original craftsmanship and design elements followed by the CCC
Feeling	The road alignment, viewshed, surrounding vegetation, and associated rock walls maintain the original feeling of designing in harmony with nature
Association	Direct association with CCC (New Deal-era) construction and fits into the Nationwide historic context: NPS Rustic Style / New Deal Era Activity

Location

Cactus Forest Drive (originally designated Skyline Loop Road) was designed and planned by the National Park Service and staked by CCC crews from the Tanque Verde camp in 1936. The

original dirt road was completed in 1939 and hard surfaced in 1951. The existing roadbed and water control features are in the same setting and location as was found at project completion in 1939.

Design

Although the road was not constructed entirely as envisioned (much of the proposed rock work along the road was eliminated from the plan in 1937), the existing roadbed and associated rock work and support features are reflective of 1936 – 1939 construction techniques. The road base was asphalted in 1951, removing the original gravel base. Replacement of the gravel in 1951 did not affect the integrity of the layout and design of the roadbed because the width, vertical alignment (grade, cut banks, and fill slopes), horizontal alignment (radii of curves), edges (presence or absence of shoulders), and associated features (retaining walls, culverts) reflect the original configuration during construction.

There was a question as to whether the current two-way section of road retains integrity. It does retain integrity in design due to two observations. First, the current road width (including the two-way section) varies from 12.5 to 19 feet. This is well within the standards adopted in the original road, which called for a minimum width of 18 feet (see appendix C). Second, there is no indication that the road was originally designed as a one-way road.

No significant changes have been made to the retaining walls, turnout curbing, and culverts; however, there is a lack of integrity associated with a number of the culvert headwalls and portions of the retaining walls that have been impacted by erosion (silting), vegetation overgrowth, and resurfacing and patching of the roadbed. Patching and repaving the roadbed has created an asphalt “lip” against the retaining walls and along the turnout curbing. The asphalt and/or cement patches have changed the original design and feeling of the masonry features. Vegetation overgrowth and/or silt from erosion have covered and reduced the drainage function of a number of the culvert headwalls.

Since the road was designed and constructed to allow visitors the opportunity to observe the natural desert ecosystem of the saguaro forest, the integrity of road design as it relates to the ecological community is an important consideration. The saguaro, plant, and animal mixture has changed since CCC (New Deal-era) construction, mostly due to natural processes and agriculture, but not to the level that the integrity of design is affected.

Setting

Integrity of setting is fundamentally a manifestation of the character of the place in which the property is situated and how it relates to surrounding features and open space. The views in all directions remain relatively unchanged since the period of significance. With the exception of modern development to the west, the visual landscape associated with the road remains intact. Surrounding topographic features and vegetation have not changed dramatically (beyond changes brought about by natural processes, visitor use, and agriculture). The original road design has been maintained relatively unchanged and the intended use of the road has as a scenic loop has continued. Therefore, the integrity of setting is intact.

Materials / Species Composition

The majority of original construction (stone) material is in place and has not been modified. The road base was asphalted in 1951, removing the original gravel base.

Species composition focuses on the dominant native and introduced plant and animal species. The landscape retains integrity species composition. Since 1933, the saguaro or giant cactus has been protected within Saguaro National Park. Preserved along with them are many other plants of the Sonoran Desert community including other cacti, desert trees and shrubs, and associated animals. Cattle grazing was eliminated in 1979, increasing the survival rate for the saguaros. Natural forces, vandalism, and cactus rustling continue to take some toll on the saguaro forests.

Workmanship

The roadbed and road alignment, retaining walls, and culvert headwalls (24) are all good examples of the stone masonry skills of the CCC workers. These features reflect the original craftsmanship and design elements followed by the CCC workers. Although the roadbed has been repaved and a number of the water-control features have been covered over with vegetation and/or silt; the character-defining features are intact.

Feeling

Cactus Forest Drive was originally designed as a scenic loop road allowing visitors to experience the park's ecosystem at a leisurely pace. The road continues to serve this purpose while maintaining the original road alignment and many original features that reflect the naturalistic design elements and philosophies followed by the National Park Service and original craftsmanship practiced by the CCC workers. Therefore, Cactus Forest Drive retains integrity of feeling.

Association

The existing roadbed and associated rock work and support features are directly associated with CCC (New Deal-era Context) construction and early park development. Through their intact materials, workmanship, location, and layout, the structures still convey the relationship between the original National Park Service road design, CCC construction, and the development of Saguaro National Park.

CONCLUSION

Based on the preceding analysis, the National Park Service has determined that Cactus Forest Drive meets NRHP criteria and reflects the nationally and regionally historic trend of New Deal-era park development. It is eligible under criteria A and C and retains integrity of location, design, setting, materials, workmanship, feeling, and association.

The existing Cactus Forest Drive roadbed and features are in the same setting and location they were at project completion and the layout and design of the road is relatively unchanged, allowing the road to convey its association with the New Deal naturalistic road design, CCC construction, and the development of Saguaro National Park. The visual landscape and the surrounding topographic features and vegetation have not changed dramatically and the majority of original construction (stone) material is in place and has not been modified. Elements that communicate workmanship (the roadbed and road alignment, retaining walls, and culvert headwalls) reflect the original craftsmanship and design elements followed by the CCC workers. Finally, Cactus Forest Drive conveys feeling through the fact that it continues to serve as a scenic drive and reflects the naturalistic design of the National Park Service and the original craftsmanship practiced by the CCC workers.

Cactus Forest Drive is eligible under criteria A and C and is associated with the national context: Historic Landscape Design of the National Park Service. Specifically it reflects the New Deal era in which federal aid programs enabled unprecedented park development through the PWA and CCC. The National Park Service designed road is representative of the National Park Service's naturalistic design philosophies of the 1930s and contains elements of typical CCC workmanship. All of the built features associated with the roadbed are related to one another by cultural tradition (CCC), function (historic road; accessibility to viewshed), dates of construction (1935 – 1939), style (New Deal-era park development), and availability of materials and technology (use of native stone and masonry construction).

The cultural landscape consists of the following contributing features:

Topography and Drainage and Natural Features—Cactus Forest Drive was designed to follow a circuitous, looping route through the saguaro cactus forest of the bajada and foothills below the mountainous, northwest-facing slopes of Tanque Verde Ridge. Features associated with Cactus Forest Drive include the existing roadbed and alignment, multiple course-stone retaining walls, masonry culverts, drainage-control features, and a rest area built during the 1930s by the CCC. There are a number of turnouts, but archival information does not specifically define where or how many turnouts were put in during initial road construction.

Historic Land Use—Cactus Forest Drive and associated features were designed by the National Park Service and built during the mid to late 1930s by the CCC and are reflective of landscape and road design, planning, and construction in the National Park Service during the New Deal era.

Circulation System and Spatial Relationship and Organization—Cactus Forest Drive is an example of the National Park Service naturalistic design. The layout was intended to provide access to a saguaro forest. Features such as road width, existing landscape along the roadway, the blend/fit of the road into the landscape, minimum cut and fill slopes and the use of natural road contribute to the landscape character.

View and Vistas—Because of its layout, Cactus Forest Drive maintains a more intimate relationship with the desert landscape, transitioning to a wider view of the landscape and its surroundings. The Cactus Forest Drive overlooks and turnouts at various locations provide

opportunities for park visitors to view and experience the Sonoran Desert landscape in an unobstructed setting.

Vegetation—The dense stands of saguaro cactus through which the road travels were pivotal in determining the road design. The road, overlooks, and turnouts provide opportunities for park visitors to view and experience the Sonoran Desert landscape

Retaining Walls—The retaining walls were built to protect fills from streams and along cut banks. The two contributing retaining walls constructed along the roadbed consist of mortar cut-block walls.

Shoulder Stabilization—A section of the road has evidence of shoulder stabilization in the form of a small alignment of rock. This feature may have been created to divert water from the original road surface or is a remnant of a design feature that made more sense when the road was the original gravel surface.

Culvert Headwalls—Twenty-four culvert headwalls were identified during the current survey. Variations between individual headwalls include height and width of the culvert, size of the drainage pipe, and type of retaining wall. In many cases, general erosion, slope wash, and vegetation has obscured, and in some cases covered over, the culvert headwalls. Several of the intake and discharge boxes have no associated stone block. It is assumed that all of the stacked rock features associated with existing culverts are related to the CCC (New Deal era).

Low-Water Crossings—A number of unimproved low-water crossings found along Cactus Forest Drive were incorporated into the road design. They are contributing features because the historic design for the road used them instead of more constructed drainage features.

This evaluation reaffirms the two previous determinations that the road is eligible for the NRHP as a historic district and a section of retaining wall along the road is eligible for the NRHP as a contributing feature of a potential district.

DETERMINATION OF ELIGIBILITY
CACTUS FOREST DRIVE, SAGUARO NATIONAL PARK

BIBLIOGRAPHY

Documents

Birnbaum, Charles.

1996 *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes*. Preservation Brief 36, National Park Services.

1996 *The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. Secretary of Interior, National Park Service.

Carr, Ethan.

1999 *Wilderness by Design: Landscape Architecture and the National Park Service*. Lincoln, NB: University of Nebraska Press.

Clemensen, A. Berle.

1987 *Cattle, Copper and Cactus: The History of Saguaro National Monument*. Historic Resource Study: Saguaro National Monument. Denver: National Park Service, Denver Service Center.

Crosswhite, Frank

2003 The Annual Saguaro Harvest and Crop Cycle of the Rapago, with Reference to Ecology and Symbolism. *Desert Plants* 2(1). Tucson, AZ

Dalton, H. E.

1940 *MA-1-A Work Accomplishments November 1, 1939 to December 30, 1939*. 8NS-079-92-223, Box 130. Denver, CO: National Archives and Records Administration.

Haile, J.H. Jr.

2003 J.H. Haile Jr., CCC Inspector, to The Acting Regional Director, Region III, National Park Service, 17 March 1938. 8NS-079-94-139, Box 153. Denver, CO: National Archives and Records Administration.

Lacy, Leslie Alexander

1977 *The Soil Soldiers: The Civilian Conservation Corps in the Great Depression*. Randor, PA: Chilton Book Company.

Merrill, Perry H.

1981 *Roosevelt's Forest Army: A History of the Civilian Conservation Corps 1933-1942*. Montpelier, VT: Perry H. Merrill.

Meyer, Michael, C. and William Sherman

1995 *The Course of Mexican History*. New York: Oxford University Press.

BIBLIOGRAPHY

McClelland, Linda Flint.

- 1994 "Historic Park Landscapes in National and State Parks" National Register of Historic Places Multiple Property Documentation Form, National Park Service, Washington DC.

McClelland, Linda Flint.

- 1998 *Building the National Parks: Historic Landscape Design and Construction.* Baltimore, MD: The Johns Hopkins University Press.

National Park Service.

- 1937 *A Preliminary Report for The Master Plan: Saguaro National Monument, Arizona: National Park Service, Region III, May 1937.* NRG 079-00-294, Box 5. Denver, CO: National Archives and Records Administration
- 1939 *Job Application and Completion Record.* 8NS-079-92-223, Box 132. Denver, CO: National Archives and Records Administration.
- 1939a *Work Program Outline, Saguaro Forest State Park.* 8NS-079-92-223, Box 131. Denver, CO: National Archives and Records Administration.
- 1952 *Master Plan Development Outline, Saguaro National Monument Arizona.* NRG 079-00-279, Box 17. Denver, CO: National Archives and Records Administration.
- 1958 *Master Plan Development Outline, Saguaro National Monument: General Development.* NRG 079-01-0004, Box 10. Denver, CO: National Archives and Records Administration.
- 1959 Memorandum to Regional Director, Region III from Jerome C. Miller, Acting Regional Chief of Operations, Saguaro National Monument, Mission 66 Prospectus Revision - Saguaro. NRG 079-95-040, Box 123. Denver, CO: National Archives and Records Administration.
- 1962 Memorandum to Regional Director, Southwest Region from Monte E. Fitch, Superintendent, Saguaro National Monument, Annual Mission 66 Construction Completion report and Summary. NRG 079-95-040, Box 151. Denver, CO: National Archives and Records Administration.
- 1962a Memorandum to Regional Director, Southwest Region from Monte E. Fitch, Superintendent, Saguaro National Monument, Complete List of Area Buildings With Assigned Numbers. NRG 079-95-040, Box 16. Denver, CO: National Archives and Records Administration
- 1963 Memorandum to Regional Director, Southwest Region from Paul A. Judge, Superintendent, Saguaro National Monument, Regarding Mission 66 Accomplishments. NRG 079-95-040, Box 151. Denver, CO: National Archives and Records Administration.

- 1965 *Master Plan Brief for Saguaro National Monument.* NRG 079-01-0004, Box 10 Denver CO: National Archives and Records Administration.
 - 2002 *Cactus Forest Trail, Environmental Assessment: Saguaro National Park, Arizona.* Available at the National Park Service Technical Information Center, Denver, CO.
 - n.d. *History of Saguaro National Monument.* NRG 079-95-040, Box 40. Denver, CO: National Archives and Records Administration
 - n.d. *Mission 66 for Saguaro National Monument.* NRG 079-01-0004, Box 10. Denver, CO: National Archives and Records Administration.
- Meyer, Michael, C. and William Sherman
- 1995 *The Course of Mexican History.* New York: Oxford University Press.
- Neff, Loy and Charney White
- 2004 Testing Plan and Scope of Work for Archaeological Testing at Nine Sites on Cactus Forest Drive, Saguaro National Park Rincon Mountain District, Arizona. *Western Archaeological Conservation Center Publications in Anthropology*, Tucson, AZ.
- Otis, Alison T, William D. Honey, Thomas C. Hogg, and Kimberly K. Lakin.
- 1986 *The Forest Service and the Civilian Conservation Corps: 1933-1942.* Washington, DC. United States Forest Service.
- Paige, John C.
- 1985 *The Civilian Conservation Corps and the National Park Service, 1933-1942.* Washington, DC. Department of the Interior, National Park Service.
- Salmond, John A.
- 1967 *The Civilian Conservation Corps.* Durham, Duke University Press.
- Seymour, Gregory R.
- 1998 The Civilian Conservation Corps in Arizona. *Kiva*. Vol 64, No. 4:359-77.
- Simpson, Kay and Susan J. Wells
- 1983 Archaeological Survey in the Eastern Tucson Basin: Saguaro National Monument. *Western Archaeological Conservation Center Publications in Anthropology*, No. 22, Vol I and II. Tucson, AZ.
 - 1984 Archaeological Survey in the Eastern Tucson Basin: Saguaro National Monument, Rincon Mountain Unit, Tanque Verde Ridge, Rincon Creek, and Mica Mountain Areas. *Western Archaeological Conservation Center Publications in Anthropology*, No 22, Vol III and IV. Tucson, AZ.

BIBLIOGRAPHY

- Sowards, Adam M.
2000 Administrative Trails, Environmental Consequences, and the Use of History in Arizona's Tonto National Forest, 1926-1996. *The Western Historical Quarterly*. Vol 31, No. 2: 189-214.
- Spicer, Edward H.
1962 *Cycles of Conquest: The Impact of Spain, Mexico and the United States on the Indians of the Southwest, 1533-1960*. University of Arizona Press, Tucson, AZ.
- Stacy V.K. Pheribia and Julian Hayden.
1975 Saguaro National Monument: An Archaeological Overview. *National Park Service, The Arizona Archaeological Center*. Tucson, AZ.
- Wells, Susan J.
1986 An Archaeological Survey of the Camp Pima Environmental Study Area: Saguaro National Monument: Tucson Mountain Unit. In *Miscellaneous Historic Period Archaeological Period Projects in the Western Region*, compiled by Martin D. Tagg. *Western Archaeological Conservation Center Publications in Anthropology*, No. 37, Tucson, AZ.
- Wilson, John P.
1995 *Islands in the Desert: A History of the Uplands of Southeastern Arizona*. University of New Mexico Press, Albuquerque, NM.

Maps and Drawings

National Park Service

- 1935 *Saguaro National Monument, Proposed Observatory Site*. Available at the National Park Service Technical Information Center. Denver, CO.
- 1935a *Saguaro National Monument, Map Showing Plan of Present Roads*. Available at the National Park Service Technical Information Center. Denver, CO.
- 1936 *Saguaro National Monument, Proposed Loop Road/Section "A"*. Available at the National Park Service Technical Information Center. Denver, CO.
- 1936a *Saguaro National Monument, Topography of Proposed Wash Crossing - Loop Road*. Available at the National Park Service Technical Information Center. Denver, CO.
- 1936b *Saguaro National Monument, Proposed Dip Across Wash on Loop Road*. Available at the National Park Service Technical Information Center. Denver, CO.

- 1936c *Saguaro Forest Park, Park Roads.* Available at the National Park Service Technical Information Center. Denver, CO.
- 1939 *Revised Layout Plan For the Headquarters Area for Saguaro National Monument.* Available at the National Park Service Technical Information Center, Denver CO.
- 1951 *Roads and trails Systems, Saguaro national Monument.* Available at the National Park Service Technical Information Center. Denver, CO.
- 1957 *Resurface Cactus Loop Road, Cactus Forest, Saguaro National Monument.* Available at the National Park Service Technical Information Center. Denver, CO.
- 1986 *Rincon Mountain Unit Historic Base Map Saguaro National Monument.* Available at the National Park Service Technical Information Center. Denver, CO.
- n.d. *Saguaro National Monument, 6yr. Maintenance Program, 1938-1943.* Available at the National Park Service Technical Information Center.

BIBLIOGRAPHY

**APPENDIX A: MANAGEMENT DOCUMENTATION RELATED TO THE HISTORIC
STATUS OF CACTUS FOREST LOOP ROAD**

APPENDIX A

MAY-4-2004 09:39 FROM:ENGINEERING-ENVIRONM (858)453-8648

TO:13037219202

P.2/6

LIST OF CLASSIFIED STRUCTURES (LCS)
SINGLE ENTRY REPORT

Identification	
IDLCS: 58645	Structure Number: RMR500
Structure Name 1: Cactus Forest Drive	
Structure Name 2: Loop Road	
Structure Name 3:	
Park Alpha Code: SAGU	Name: SAGUARO NATIONAL PARK
ORGCODE: 8670	County: PIMA
	Regional Office: WESTERN
State: AZ	
Subunit ORGCODE:	Name:
Alpha Code:	County: PIMA
State: AZ	
Number of UTM's: 0	Zone/Easting/Northing
Significance	
NR Status: DETERMINED ELIGIBLE - SHPO	Date: 12/09/94
Significance: LOCAL	Date: / /
NHL: NO	
Significance	
Built by CCC. Rockwork shows high degree of craftsmanship, typical of CCC work. Road was specifically designed to provide a scenic view of saguaro & other types of cactus and followed principles of rustic design.	
Historical Information	
Period of Construction: HISTORIC	
Date: 1934-	(BU) Designer: CCC (O)
Date: -	() Designer: ()
Date: -	() Designer: ()
Date: -	() Designer: ()
Functions, Uses, Materials, Impacts, and Condition	
Historic Functions	Current Uses
NPS CLASS I PRINCIPAL ROAD	NPS CLASS I PRINCIPAL ROAD
TURNOUT	TURNOUT
ROAD RETAINING WALL	ROAD RETAINING WALL
Buildings	Materials
Structures	
Foundation:	Sub-structure: STONE
Framing:	
Walls:	Super-structure: ASPHALT
Roof:	
Other:	
Volume:	
Description	
Road winding through "forest". Culverts, retaining walls and pullouts with low stone curbing. Has been paved but alignment is close to original.	
Impact Level: LOW	Impact Types: VISITATION
Condition: GOOD	EROSION

MAY-4-2004 09:39 FROM:ENGINEERING-ENVIRONM (858)453-8648

TO:13037219202

P.3/6

LIST OF CLASSIFIED STRUCTURES (LCS)
SINGLE ENTRY REPORT
Continued

IDLCS	Park Structure Name	Number
58645	SAGU Cactus Forest Drive	RMR500
Management Information		
NPS Legal Interest: FEE		
Life:	Exp. Date: / /	Federal Owner:
		Local Owner:
Management Category: SHOULD BE PRES. & MAINT Management Date: 03/06/95		
Management Agreement: NONE Agmt. Exp. Date: / /		
Proposed Ultimate Treat: NO TREATMENT Doc: NONE Date: / /		
Approved Ultimate Treat: Doc: Date: / /		
Treatment Responsibilities		Treatment Costs
Interim Treatment: NPS		Interim: \$0 Date: 03/93
Ultimate Treatment: NPS		Ultimate: \$0 Date: /
Routine Maintenance: NPS Level of Estimate:		
Cyclic Maintenance: NPS		Estimator:
Approved Ultimate Treatment Completed: NO		
Management Text		
Revise nomination for CCC structures to include this road and submit.		
Major Bibliographical References		
Nat. Reg.:		CSI: Nat. Cat: NO
HABS:		BRIDGES:
HAER:		DAMS:
		QTRS:
CLI	CRBIB	Other
1.	HRS 1. 013746	1.
2.	HS ASSESS 2.	2.
3.	HSR 3.	3.
4.	CLR 4.	4.
5.	5.	
Documentation Level: FAIR		
Date Entered/Updated: 12/05/94		Logger: JMD

Date of Report: 09/26/95

page 2 of 2

MAY-4-2004 09:39 FROM: ENGINEERING-ENVIRONM (858)453-8648

TO: 13037219202

P. 4/6

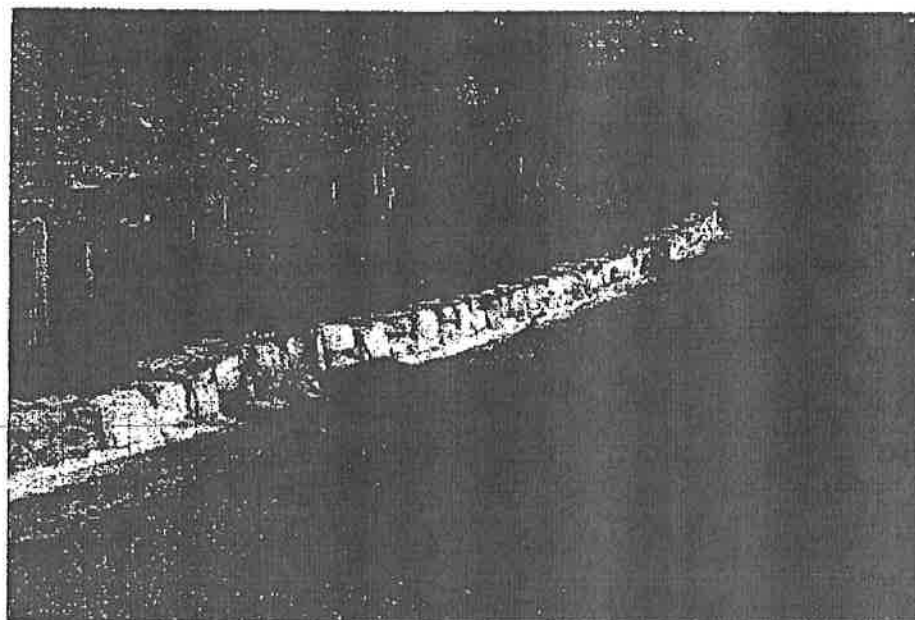
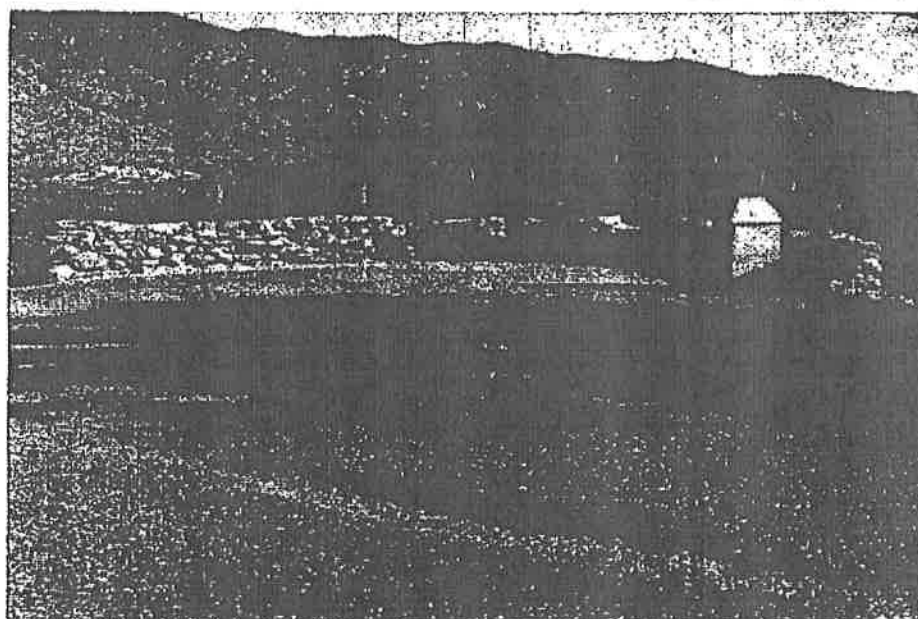


PHOTO * GUARD # 3224
LIGHT IMPRESSIONS
Rochester, NY



APPENDIX A

MAY-4-2004 09:42 FROM:ENGINEERING-ENVIRONM (858)453-8648

TO:13037219202

P.5/6

1. Cactus Forest Drive, retaining wall and curbing, looking SE
 2. IDLCS # 58645
 3. Saguaro National Park
 4. Photo by Jamie Donahoe
 5. Date: March 1993
 6. Negative at Southwest Cultural Resource Center Photographic Archives
-

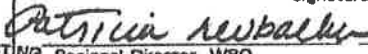
1. Cactus Forest Drive, rockwork across from Marker 1, looking SE
2. IDLCS # 58645
3. Saguaro National Park
4. Photo by Jamie Donahoe
5. Date: March 1993
6. Negative at Southwest Cultural Resource Center Photographic Archives

MAY-4-2004 09:42 FROM:ENGINEERING-ENVIRONM (858)453-8648

TO:13837219202

P.6'6

DETERMINATION OF SIGNIFICANCE

PARK NAME, STATE: Saguaro National Park, Arizona		
STRUCTURE NAME(S): Cactus Forest Drive		
PROPERTY/DISTRICT NAME: CCC Structures at Saguaro National Park		
LOCATION	Street Address: Rincon Mountain District Municipality:	Town/City: Tucson County: Pima
DATE BUILT: 1934	DLCS: 58645	PARK #: RMR500
SIGNIFICANCE	National ☐	State & Regional ☐ Local ☒
NATIONAL REGISTER CRITERIA:	A ☒ B ☐ C ☒ D ☐	
The Cactus Forest Drive was built and designed to provide visitors with a scenic view of saguaro and other kinds of cactus. In keeping with the principles of designing in harmony with nature, the road and associated structures reflected the desert environment, incorporating native materials such as local stone, and were sited to minimize the intrusion on the landscape and maximize its purpose. The retaining walls, pullout curbing and culvert headwalls are all good examples of the stone masonry skills of the CCC workers.		
Continuation Sheet? <u>N</u>		
DESCRIPTION Cactus Forest Drive winds through the Rincon Mountain District of the park giving park visitors an overview of the cactus forests. It has been repaved, but the character-defining features are still intact. The road features pullouts at highlights of the drive and they are numbered. The pullouts and many sections of the road itself are edged with low rock walls. In addition, there is an extensive system of road retaining walls.		
Continuation Sheet? <u>N</u>		
<u>National Park Service, WRO</u>	<u>State Historic Preservation Office</u>	<u>Comments</u>
Individually Eligible ☐		
Contributes to:		
Property ☐	Concur ☐	
District ☐		
Potential District ☒		
Not Eligible & Does Not Contribute to Property/District ☐	Do Not Concur ☐	
Insufficiently Documented, Treat as Eligible ☐		
Signature		
 CTNG Regional Director, WRO		 State Historic Preservation Officer
NOV 22 1994		12-7-94
A STATEMENT OF CONTEXT HAS ACCOMPANIED THIS RECOMMENDATION.		

Form Prepared By: James M. Donahoe

NPS, MARROW/NO 11/10/94

APPENDIX A

**APPENDIX B: A PRELIMINARY REPORT FOR THE MASTER PLAN: SAGUARO
NATIONAL MONUMENT, ARIZONA; NATIONAL PARK SERVICE, REGION III, MAY
1937**

APPENDIX B

151/D-102
D-102

A PRELIMINARY REPORT
FOR
THE MASTER PLAN--SAGUARO NATIONAL MONUMENT
ARIZONA
National Park Service--Region III

Respectfully Submitted to Superintendent Frank Pinkley
Southwestern Monuments, Casa Grande, Arizona

MAY, 1957

Contributors

Dr. W. B. McDougall
Regional Wildlife Technician

Mr. W. H. Wirt
Regional Forester

Mr. Vincent Vandiver
District Geologist

Mr. H. H. Cornell
Regional Landscape Architect
(Compiled and arranged by)

Collaborators

Mr. Hugh Miller, Asst. Supt.
Southwestern Monuments

Mr. Chas. A. Richey
Asst. Regional Landscape Arch.

Mr. Clinton F. Rose
Resident Landscape Architect

Mr. W. Ward Yeager
District Forester

SCANNED 10/5/00

CONTENTS

Key Map

Report by Mr. W. B. McDougall
Regional Wildlife Technician

Report by Mr. W. E. Wirt
Regional Forester

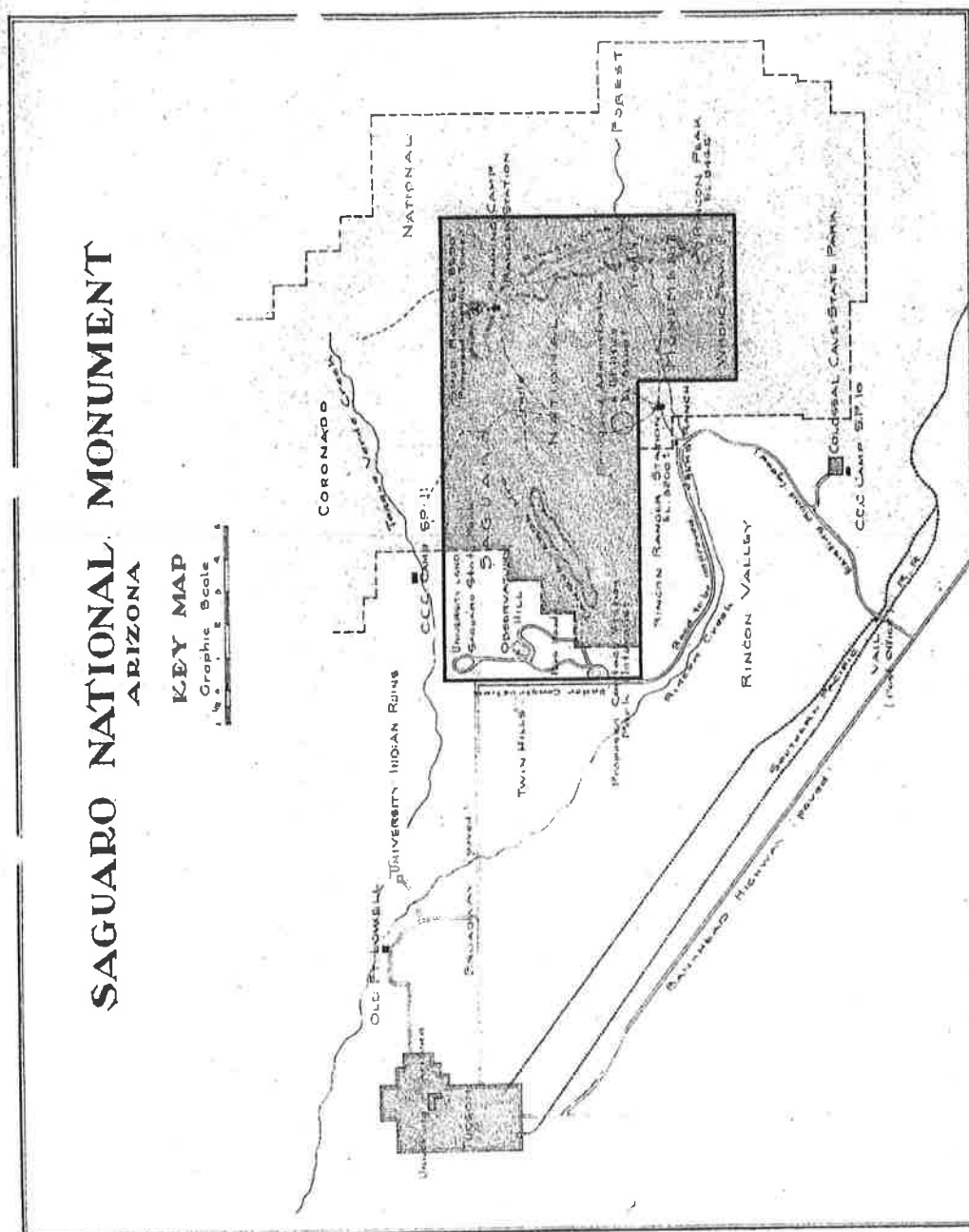
Report by Mr. Vincent Vandiver
District Geologist

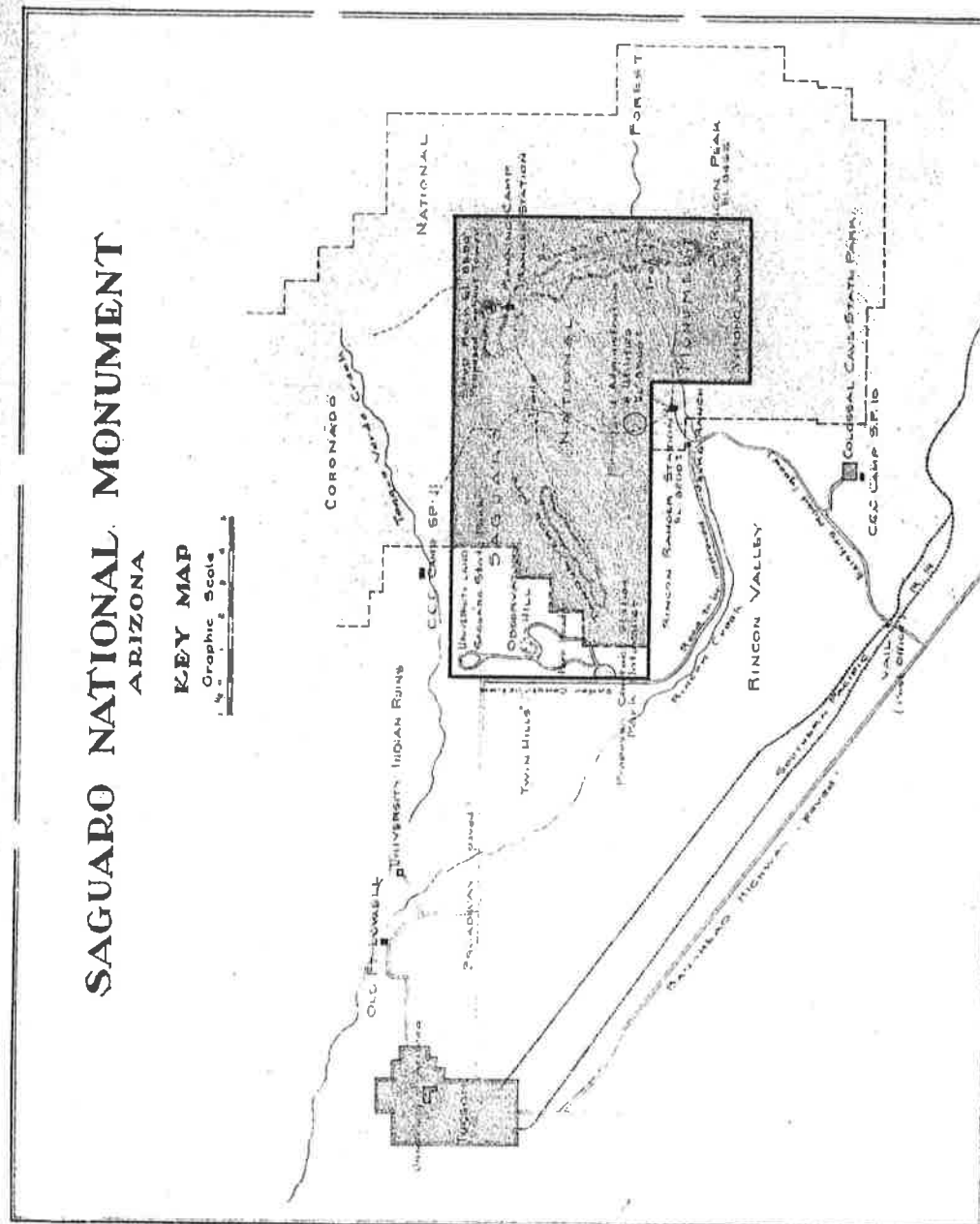
Map to accompany report by Mr. Vandiver

Report by Mr. Harvey H. Cornell
Regional Landscape Architect

Photographs by Mr. Cornell

Photographs by Mr. Vandiver





SPECIAL REPORTMASTER PLAN FOR SAGUARO NATIONAL MONUMENT

(Wildlife Phase)

W. B. McBRIDGALL
WILDLIFE TECHNICIAN

On April 19-22, 1937, three and one-half days were spent at Casa Grande National Monument, Tucson, Arizona, and Saguaro National Monument in conference and field work for the purpose of assembling data for the preparation of a master plan for the Saguaro National Monument. Participating in these conferences and field trips, in addition to the writer, were the following: Hugh Miller, Assistant Superintendent Southwestern National Monuments; H. H. Cornell, C. A. Richey, and C. F. Rose, Landscape Architects; W. H. Wirt and W. Ward Yeager, Foresters; and V. W. Vandiver, Associate Geologist.

In order to avoid excessive duplication in the reports to be submitted by various members of the party, this report is limited, insofar as possible, to observations and conclusions concerning wildlife.

The Saguaro National Monument is preeminently a biological monument. It was established primarily to preserve the saguaro and other types of plant life. Along with the vegetation there is, of course, a more or less normal population of animals. Our party saw one small band of peccaries and several white-tail deer. Mr. Jelks, one of several ranchmen who have grazing rights on the monument, thinks peccaries are quite numerous. He reports seeing one band of about 70. Predators are also thought to be reasonably numerous, especially coyotes and mountain lions. Smaller mammals and birds are abundant. The problems of administration, therefore, are closely concerned with the protection of plant and animal life.

From the wildlife viewpoint, the most important items in needed provisions for administration of this area are:

1. The employment of a Junior Park Naturalist, at a minimum salary of \$2,000, to serve as wildlife administrator. This man should have training in

both botany and zoology, and should have good sense and a pleasing personality to the end that he may be able to get along diplomatically with the several ranchmen who hold grazing rights on the monument. His chief duties will be to patrol the monument area, except that occupied by the Saguaro Forest, in order to prevent illegal hunting or other molestation of plant or animal life; to see that grazing privileges on the monument are in no way abused; and to make taxonomic and ecological observations and studies of the plants and animals of the monument.

2. The employment of a Junior Park Naturalist, well trained in botany, to be stationed the year round in the Saguaro Forest and serve as principal contact man.

The above two men will be a sufficient minimum wildlife personnel provided the personnel recommended by forestry and other branches are also fully provided. These include a Custodian, preferably a forester, who will serve as Chief Ranger; a Forestry Ranger who will spend the summer in the mountains and the winter in the Saguaro Forest; one lookout, three trailmen, and one packer, during the fire season; and two temporary Ranger Naturalists during the season of heavy travel.

It is the consensus of opinion that the main headquarters of the monument should be on the south side in the vicinity of the present Rincon Ranger Station, with a secondary headquarters in the Saguaro Forest to serve as a contact station. So far as wildlife alone is concerned, the needs are simple. In the Saguaro Forest there should be living quarters and a small office-laboratory for the Junior Park Naturalist and the two Ranger Naturalists. At the main headquarters there should be living quarters and an office-laboratory for the Junior Park Naturalist and stable space for the horse that he will need for patrol work.

One of the most regrettable things about this monument is the fact that grazing rights are held by several ranchmen on most of the area outside of the Saguaro Forest. Mr. Jelks, whose ranchhouse is near the Rincon Ranger Station, holds grazing rights on by far the largest area. It is understood, also, that he holds permanent water rights to the only large, permanent spring in the monument. This spring is about two miles north of the Jelks ranch-house and flows about 8,000 gallons a day. At present the water from this spring is piped to the Jelks Ranch.

If some way could be found to buy out Mr. Jelks and add his ranch to the monument, three very desirable attainments could be accomplished at one stroke. First, a very large percentage of the grazed area would be freed from domestic animals. Second, the water rights to a very good and much needed spring would be recovered. Third, an excellent site and office building for the main headquarters would be obtained.

The recommendations of Mr. Wirt, Forester, concerning trails, roads, and overnight cabins are concurred in. No road should ever be built in the monument outside of the Saguaro Forest proper.

SPECIAL REPORT

MASTER PLAN FOR SAGUARO NATIONAL MONUMENT

APRIL 19 - 25, 1937.

BY

W. H. WIRT
FORESTER

GENERAL

In accordance with instructions contained in a Regional Office Memorandum, dated March 30, 1937, I proceeded, with other regional technicians, to Casa Grande National Monument where, at monument headquarters, the matter of a master plan for Saguaro National Monument was considered and plans for an inspection trip to the Saguaro area were made.

The inspection party consisted of the following: Hugh Miller, Assistant Superintendent, Southwestern Monuments. H. H. Cornell, Landscape Architect, Dr. W. B. McDougall, Wildlife Technician, Chas. A. Richey, Associate Landscape Architect, Clinton F. Rose, Assistant Landscape Architect, Vincent W. Vandiver, Associate Geologist, W. Ward Yeager, Assistant Forester, and myself.

After discussing some of the problems connected with the administration and development of the Saguaro area with Assistant Superintendent Miller, we returned to Tucson, Arizona, where arrangements were finally completed for the necessary saddle horses to take us to the Manning Ranger Station and return to the Rincon Ranger Station at the foot of the mountain range.

Through Mr. Fred Winn, Forest Supervisor of the Coronado National Forest, a limited supply of maps were obtained, and during the few minutes we had with Mr. Winn, we secured a good mental picture of the forest service and stockmen's angle of the transfer of the area from USFS to National Park Service.

The first day, April 20, was spent in going over the master plan and maps and discussing development work at the Saguaro State Park Camp and in driving to the Italian ranch, located two or three miles north of the monument. This trip was made for the purpose of investigating the road leading toward the monument

from the north, and also to ascertain if the monument area could be reached over it. It was found that the road terminated at the Italian ranch, but trails continued from there into the higher regions of the national forest land and it is suspected that a trail continues to the monument. However, it was not followed and no statement as to its condition can be made at this time.

We returned to Tucson that afternoon and made final arrangements with Mr. Jelks for our saddle horses and completed other details relative to the 24 mile horseback trip, which was to start at seven o'clock the following morning from the Jelks Ranch, near the Rincon Ranger Station.

On April 21 the party left Tucson about 6:00 AM, arriving at the Jelks Ranch at 7:00 o'clock. At this point in the trip it was learned that there would be some delay, due to not having the horses corralled. However, all hands turned to and within an hour or so the necessary horses were gathered and the party was on its way to the Manning Ranger Station guided by Mr. Knagge, a USFS packer.

While waiting for the horses at Mr. Jelks Ranch, we learned of his viewpoint on the transfer of the area from USFS administration to that of the National Park Service. He explained that the water used on his ranch was piped from springs on the monument area to which he had permanent rights. Mr. Jelks also explained, in some detail, that his ranch, having an estimated value of \$150,000, would be seriously reduced in value should his right now granted by the USFS to graze on the monument area, be withdrawn.

No comments relative to this matter were made to Mr. Jelks. However, I think the feeling is unanimous that Mr. Jelk's plea should be given full consideration.

GENERAL DESCRIPTION

AREA

The total area within the monument boundary is 99 sections, with a perimeter of 48 miles. Within the monument boundary are 15 sections of land owned by the University of Arizona, the State of Arizona, and privately owned. This land is in the western end of the monument and contains the finest stand of Saguaro, as well as practically all of the development and improvements. About 28 miles of the north, east, south, and some of the west sides of the monument border on the USFS lands in the Coronado National Forest.

VEGETATIVE COVER

Three rather distinct vegetative zones are found in Saguaro National Monument. The elevation varies from approximately 3,000 feet in the proximity of the Rincon Ranger Station to a little over 8,500 feet at Spud Rock near the Manning Ranger Station on top of the Rincon Mountains.

The lower elevations and to approximately 4,000 to 4,500 feet, comprise zone one, which contains the desert type of vegetation. The Saguaro cactus in this zone is the outstanding plant and is perhaps at its best on the 15 sections of state and privately owned land, but it is not limited to this area along as it is found on a large part of the remaining desert type area which is estimated to be an additional 15 sections. Other desert type plants found in zone one, are ocotillo, prickly pear, manzanita, and several different shrubs.

In zone two, ranging from about 4,500 to 7,000 or 7,500 feet, the pinon-juniper-oak type of forest exists, covering about 50 or 60 sections of the monument area. This forest is not uniformly dense on all slopes, but, due to its bushy character and a heavy undergrowth of brush on favored areas, it constitutes a high fire hazard.

Zone three, or the area from about 7,000 feet upward, contains the pine type of vegetation made up largely of Arizona yellow pine, ponderosa pine, Chihuahuah pine, and other conifers, including Douglas fir and Arizona cypress. A rather sparse distribution of maple and aspen were found. A number of shrubs and herbaceous plants forming a rather dense ground cover were also noted in zone three. The forest type in this zone represents a high hazard area because of its species, composition, and its high elevation. I am advised that lightning storms are numerous and many lightning strikes and fires resulting therefrom are recorded.

PRESENT USE OF AREA

Practically the entire area within the monument boundary, except that which is privately owned, is covered by grazing permits issued by the forest service when the area was administered by them. These are long time permits and give the four permittees certain definite rights and considerations.

The Converse permit originally covered 22 sections, but has been reduced by sale of permits to about 7 sections on the north

slope of the mountain range. This area has no permanent water and is not considered to have a high grazing value.

The Parker permit covers about 2 sections on the northeast part of the monument and is perhaps the least important of the four permits since the area is rather rough and is considered to be low in grazing value.

The Haskett permit covers about 11 sections toward the west end of the south side of the monument. This area contains good grazing lands and is so located that it is believed it will interfere somewhat with National Park Service administration of the monument.

Mr. Jelk's permit, which is by far the largest of the four, covers almost all of the Rincon drainage and it is upon this area that the center of monument administration would logically fall. Mr. Jelks owns about 5,000 acres of land adjoining the south boundary of the monument and with this land belongs the permanent right to the only spring water found on the south side of the monument. This water is piped about two miles from source to the Jelks Ranch headquarters, which consists of a very fine residence, barns, sheds, corrals, swimming tank, and a landscaped area surrounding the buildings.

In order to obtain the necessary water and approach to the monument the acquisition of this property seems desirable if the National Park Service is to have proper administration of the monument. The forest service has regulated grazing in such a way that no evidence of overgrazing is apparent on the part of the area examined.

FIRE PROTECTION

This area, under the administration of the forest service, was one of the fire protection centers of their organization. The Rincon Ranger Station was the base of their protective operations, while Manning Camp, on top of Rincon Range 12 miles distant by horse trail, was the center of their fire detection organization. There is no single point from which the entire monument could be given proper lookout coverage. Therefore, it was necessary for fire guards stationed on top to ride a patrol from Manning Camp to Spud Rock to Mica Peak and return. This trip was made twice each day. Recognizing this as inadequate protection, the USFS has purchased a steel lookout tower to be

erected near Spud Rock where, with one lookout, the major portion of the high hazard area may be covered during the fire season.

This tower is now at Rincon Ranger Station and arrangements are under way to have it set up near Spud Rock at the location designated by the USFS.

In planning the protection for this area, I have followed the forest service plan with slight deviation to introduce changes necessary for park service administration.

LOOKOUTS

The proposed location, selected by the USFS near Spud Rock, is suitable for lookout purposes and the plan originated by the forest service for erecting a steel tower at this point should be carried to completion. It was their plan to complete the construction of the tower in time for use during the 1937 fire season which is May to September, inclusive.

Manning Camp has been used by the USFS as headquarters for fire guards, trail maintenance crews, and other personnel necessary to adequate protection of the forested area. It is practically the only area on top of the hill where water, in sufficient quantities, can be found during the fire season for the personnel and horses required to handle the protection of this area.

TRAILS

To provide the protection considered necessary, about 45 to 50 miles of trails are used. About 30 miles of these trails should be of first class construction and the remainder of second class construction. Practically the entire 50 miles are in existence at present. However, considerable maintenance and repair or relocation is considered advisable.

The existing trails are as follows:

Chiminea Trail

From Rincon Ranger Station to Manning Camp, about 12 miles distant. Now in fair to good condition except for the upper portion. This is the trail over which supplies will be packed and will have the maximum amount of use by park personnel, construction crews and protection crews.

Happy Valley Saddle Trail

From Rincon Ranger Station to Happy Valley Saddle and to Manning Camp, length about 15 miles. This trail should be of first class construction as it is the only trail up the mountain toward the east boundary and toward Rincon Peak. It is anticipated that this trail will be used extensively during fire season and for wildlife patrol and protection. This trail is considered to be in rather poor condition at the present time.

Manning Camp - Spud Rock - Mica Peak Trail

This trail, about 6 miles in length, is used by the USFS as a patrol trail since it includes the high points which serve as observation points. This trail is in fair condition and should be of first class construction.

Happy Valley Saddle to Rincon Peak Trail

Length about 4 miles, now a second class trail, but an important one since it leads to Rincon peak from which a vast area may be seen. This trail is in need of considerable maintenance.

Telephone Line Trail

Approximately 10 miles in length along the telephone line from Rincon Ranger Station to the junction of line with Manning Camp - Happy Valley Saddle Trail. A second class trail upon which considerable maintenance and possibly some relocation work should be done. An important trail for down hill travel, but too steep and poor quality for up hill trips.

Lateral Trails

Several lateral trails leading from the main trails are shown on the map. Very few of them have been investigated. However, it is believed that certain of them are important and will continue to be so, for forest and wildlife protection, and, for that reason, it is felt that some maintenance may be necessary on them. However, it perhaps may not be necessary until after the area has been studied and typed mapped.

ROADS

At Present no roads exist in the mountainous area of the monument and none are considered advisable.

Roads of truck trails characteristics now lead to buildings at the Rincon Ranger Station and to ranches outside the forest area.

A road approximately 10 to 15 miles in length is considered advisable to serve as a short cut from the cactus area on the west end of the monument to the proposed headquarters on the south side in the vicinity of the Rincon Ranger Station or the Jelks property. This road would skirt the southwest corner of the monument and would reduce the travel from the cactus area to the southern area by about 40 miles. An old and poorly located road exists but improvement and relocation of portions of it would be necessary.

PROPOSED PHYSICAL DEVELOPMENTS

To supply the necessary protection to the monument, it is desirable that the headquarters for the monument be located on the south side in the Rincon drainage, at a point near the junction of the road and the Chiminea trail. A ranger station at the cactus area on the west side of the monument is also considered necessary to provide a point for contacting visitors to that part of the monument.

Following are the developments discussed by the technicians and considered necessary for the administration of this area:

Rincon Headquarters (proposed)

- 5 residences and garages for permanent employees
- 1 office
- 1 dormitory for 6 temporary employees
- 1 barn with saddle room and feed storage space
- 1 equipment shed
- 1 blacksmith and car repair shop
- 2 small corrals
- 1 horse pasture (approximately 12 horses)

Cactus Area (proposed)

- 1 residence and garage for permanent employee
- 1 dormitory and garage for 4 temporary employees
- 1 checking station
- 1 utility building

Manning Camp

- 1 barn with saddle and horse feed storage space
- 1 quarters, with provisions for cooking, capacity 8 men.
- 2 corrals, 1 small and 1 large
- 1 tool house, tool cache for 25 men and repair shop

Maintenance Station on Chiminea Trail

- 1 quarters, containing kitchen, dining space, and room for 8 to 12 men (for trail maintenance crews and park personnel enroute to top or returning to headquarters, estimated use about 30 - 40 days each year)

Maintenance Station on Happy Valley Saddle Trail

Same development as for Chiminea Trail

Spud Rock Lookout

- 1 lookout tower, steel, with 7 x 7 observation room 90 to 100 feet high. Purchased by USFS and now knocked down at Rincon Ranger Station.
- 1 cabin, providing quarters for 2 single men.
- 1 water storage tank or development as necessary.

PROPOSED PERSONNEL

It is believed that proper protection and administration of this area will require the full time of at least 6 permanent men and five temporary employees for about 6 months of the year. The custodian and all men on protection duty should be experienced fire fighters familiar with horses, and associated forest protection duties.

PERMANENT PERSONNEL

- 1 Chief Ranger or Custodian, preferably a forestry trained man with forestry experience.
- 1 Park Ranger with forestry training and experience.
- 1 Junior Park Naturalist with wildlife training.
- 1 Junior Park Naturalist (Cactus Area) to contact visitors.
- 1 packer (care of stock and trail maintenance)

TEMPORARY PERSONNEL

- 1 fire lookout
- 2 trail maintenance men and reserve fire fighters
- 2 temporary rangers

All permanent and temporary men to be available if necessary for forest fire suppression duty.

TRANSPORTATION

Automobiles and trucks will, of course, be necessary as in any other area of this nature, but here horses will also play an important part in protection, since all travel to the top of the area must be made on foot or by saddle horses. Provision must then be made for keeping the necessary horses.

It is suggested that each permanent employee, except the maintenance man and the Ranger at the Cactus area, furnish a saddle horse for his own use and the Park Service furnish the additional necessary saddle and pack horses or mules. All saddle and pack horses and mules to be available during the entire fire season each year. For wildlife and forest protection certain of the horses should be available throughout the entire year.

In planning protection for the Saguaro National Monument, it must be borne in mind that the area requiring protection is roughly a hundred sections or about 64,000 acres, not allowing very much for overlap on USFS land, which, in protection of forest or grass covered areas, is always necessary.

A PRELIMINARY REPORT FOR THE MASTER PLAN

SAGUARO NATIONAL MONUMENT, ARIZONA

May, 1937

VINCENT W. VARDIVER, ASSOCIATE GEOLOGIST

Region III

This area is larger than many of our other national parks or monuments and for that reason and because of the difficulty in getting to the high hazard areas, it is considered necessary to provide the above mentioned personnel.

WEATHER CONDITIONS

Hot, dry weather prevails in this area for several months each year while the summer season is marked by frequent lightning storms, not all of which are accompanied by rains. The annual rainfall is about 12 inches. Temperatures are usually high and humidity gets very low at times. Frequently lightning strikes forest trees and I am informed that an average of about 20 fires are reported on this area each year. One day 21 fires were reported, so one of the lookouts informed me. Two serious fires have been controlled within the last few years. In 1927, about 1 section of area burned over, while in 1933 a small but furious fire burned over about 8 or 10 acres. We are informed that, because of the heat, difficult travel and altitude, approximately half of the men sent to this area to fight fire fall by the wayside or are actually unable to work after reaching the fire. This is an important consideration when plans are being made to get men to the area in case of an emergency.

The forest service in the past has done a very commendable job of protecting this area and it is believed that, if it should remain under their administration, the required protection at this time could be given by them more economically than by the park service, since they have trained personnel, an established headquarters, necessary equipment, and an excellent working knowledge of the area to be protected.

Respectfully submitted

W. H. WIRT

FORESTER

W. H. WIRT

FORESTER

SAGUARO NATIONAL MONUMENTARIZONA

Mr. Herbert Maier, Regional Officer, issued instructions in memorandum dated March 30, 1937 for the representatives of the various divisions of the technical staff to assemble in Coolidge, Arizona, on April 19th, in order to discuss the Master Plan for Saguaro National Monument. Accordingly, at the specified time, the following technicians met at the headquarters of the Southwestern National Monuments, - H. H. Cornell, W. H. Wirt, and W. B. McDougall of the Regional Office; W. Ward Yeager, Charles A. Richey, Clinton F. Rose and Vincent W. Vandiver of the District Office; and Hugh Miller, Acting Superintendent of the Southwestern National Monuments.

The first morning Mr. Miller outlined some of the problems in connection with the administration of the area. In the afternoon we drove to Tucson and made arrangements to inspect as much of the Monument as possible during the time available. Wirt, Yeager and I called upon Mr. Fred Winn, Superintendent of the Coronado National Forest, during the afternoon. Mr. Winn gave us certain information regarding the area and also supplied us with maps which facilitated our investigation.

On the morning of April 20th the party drove to the Camp at SR-11 and continued by car along the county road, north of Tanque Verde Creek, to Italian Ranch. The view from this point gave us a good picture of the northern sector of the Monument. In the afternoon we returned to Tucson and then drove to the Rincon Ranger Station where efforts were made to secure horses for the trip to Manning Camp, which is located near the crest of the Rincon Mountains. Arrangements for horses were finally completed late that night when we contacted Mr. Jelks. He agreed to make every effort to secure the necessary stock for our trip starting from his ranch the following morning.

On April 21st the party arrived early at the Jelks Ranch. While awaiting the arrival of horses Mr. Jelks showed us through his home and surrounding property. He stated that he had been offered \$150,000 for this property less than a year ago. It is indeed an elaborate set-up. We took the trail by horseback along Chiminea Canyon to Manning Camp and returned in the late afternoon via the Telephone Line trail to the Rincon Ranger Station.

On the morning of April 22nd the conference was resumed at the Pioneer Hotel in Tucson with Mr. Miller acting as Chairman. Conclusions were reached with unanimous opinion as to the minimum requirements necessary as regards to staff, buildings, and other facilities to properly administer the area. In the afternoon several members of the party drove to the proposed headquarters area for western side of the Monument which is located in Section 22, T-14-S, and R-16-E.

It appeared obvious to the group attending the conference that two areas of development would be required to administer the Monument. In view of the fact that fire protection was considered of prime importance

it was thought that the Custodian should have the best contact possible with large area along the crests of the Tanque Verde and Rincon ranges. It was therefore decided that the main headquarters area should be located near the head of the trails in the vicinity of the Rincon Ranger Station. The second headquarters area for public contact for the Saguaro area, with a Park Naturalist in charge, was designated for Section 32, T-14-S, and R-15-E. It is my understanding that all such matters as regards to facilities required will be discussed in complete detail by the various technicians concerned. So far as I was able to ascertain the area contains no geologic or scenic features, with the exception of the Saguaro Forest area, in the western sector of the Monument. I can therefore make no recommendations regarding the proposed development or administration. As I see it my assistance in the Master Plan study will necessarily be confined to the matter of adequate water supply and I shall endeavor to outline my observations on this subject in the foregoing pages.

The Saguaro National Monument, situated in south-central Arizona about 15 miles East of Tucson, was established in 1933 by proclamation of President Herbert Hoover. The boundaries as defined include 98.88 square miles or 63,284 acres. In view of the fact that the land situation is somewhat involved, thus complicating the water rights, it would seem well to summarize the holdings of the various interests. -

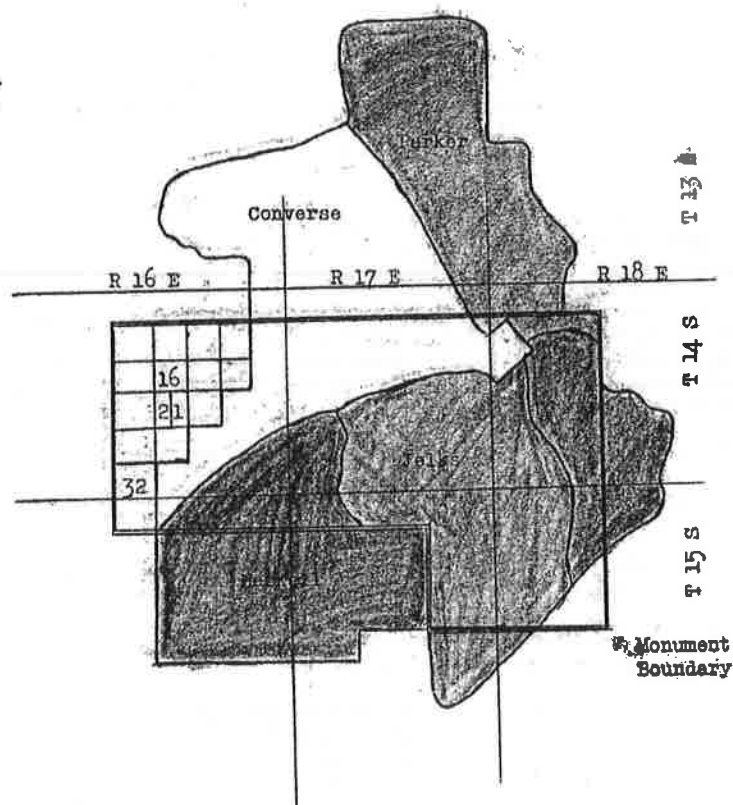
	<u>Sq. Miles</u>	<u>Acres</u>
From Coronado National Forest	83.88	53,683.20
Selected by State of Arizona (For University of Arizona)	6.25	4,000.00
Private Lands	5.00	3,200.00
State of Arizona (Leased to University of Arizona)	3.00	1,920.00
University of Arizona	<u>.75</u>	<u>480.00</u>
	98.88 Sq.Mi.	63,283.20 Acres

Regarding the first item of 83.88 square miles transferred from the Coronado National Forest it should be understood that grazing permits cover all of the area, again encumbering the water rights in at least one major division. The sketch map on the following page shows the general limits of these grazing permits which have been in force for a good many years and the owners of same are depending on them for their livelihood. It appears to me that we should carefully consider the elimination of grazing privileges in this area. It is understood that in the state of Arizona with 72,839,400 acres, only 14,366,400 acres remain in public lands, with a large portion of this unsuitable for agriculture.

Within the boundaries of the Monument are included most of the Tanque Verde Mountains and the northern half of the Rincon Mountains. The Rincon range merges with the Tanque Verde Mountains on the north which in turn joins the more rugged Santa Catalinas. These three mountain uplifts are separated by saddles and each have prominent westerly projections. The general region was broadly folded near the close of the Paleozoic and the mountains usually maintain

(2)

SAGUARO NATIONAL MONUMENT
GRAZING PERMITS



(4)

a northwest trend, however, the faulting shows no such orderly arrangement. Spud Rock, the most prominent land mark of the Monument and the highest point in the Tanque Verde's, attains an elevation of 8,590 feet. Rincon Peak, with an elevation of 8,465 feet, is the highest point in the Rincon Mountains. The elevation of the valley floor at the base of the mountain ranges is around 3,000 feet with a gradual slope to the Santa Cruz River valley, in the vicinity of Tucson, with almost 1,000 feet less in elevation. The mountains in general rise about one mile above the desert plain.

The stratigraphic succession of rocks in the vicinity of Tucson may be found on the following page. The most conspicuous rocks in the Tanque Verde and Rincon Mountains are the schists, gneisses and granites. Along the western flanks of these ranges there are foothill ridges consisting of limestones, sandstones, and shales of Cretaceous, Carboniferous, Devonian and Cambrian ages. These formations are in turn flanked by sands and gravels (valley fill) of Quaternary age. The geology is shown in a general way on the attached map.

Briefly the chances for water along the fractured zones in the igneous or metamorphic rocks are very remote. In the ridges of Mesozoic and Paleozoic rocks which flank the ranges, the possibility of securing an adequate water supply is only slight, due to the rather small serial extent and lack of reservoir character in these rocks. In any development along the base of the mountains we must therefore rely upon the sands and gravels (valley fill) as a potential source of water. There is one exception that I know of to the latter statement and that is the spring in Madrona canyon upon which Mr. Jelks has the water rights.

The conference decided upon three main areas of development as follows; -

- I. The main headquarters area to be established in the vicinity of the Rincon Ranger Station.
- II. A sub-headquarters area with public contact facilities in Section 32; T-14-S; and R-16-E.
- III. The Manning Camp area to provide facilities near the summit of both the Tanque Verde and Rincon ranges.

The details concerning the points discussed as regards to the physical development necessary for the Monument in order to properly administer same in each of the above mentioned areas will be included in the reports of the various technicians who are concerned with the different features.

I. The water possibilities for the proposed main administration area in the vicinity of the Rincon Ranger Station may be summarized as follows: Shallow wells have been sunk at Jelks Ranch and the Rincon Station. Water is secured from the sands and gravels in the valley fill but there is only a veneer of this material here overlying the schists and during dry months these wells are non-productive. To meet the needs of a rather large administrative area exploration for water will probably have to be carried

GENERALIZED STRATIGRAPHIC COLUMN

TUSCON AREA, ARIZONA

AGE	FORMATION	THICKNESS (FEET)	CHARACTER
Quaternary	Alluvium	800	Sand, gravel (Valley fill).
Tertiary		800	Lavas, tuffs and other volcanic products.
Lower Cretaceous		1700	Sandstone and shale.
Carboniferous Devonian	Tornado Martin	1300	Limestone.
Cambrian	Abrigo	430	Limestone and shale (Underlain) in places by Bolan quartzite).
Algonesian	Apache	700	Quartzite, conglome- rate, diabase.
Pre-Cambrian			Schist
Pre-Cambrian and later			Granite
From: Darton, U.S.G.S. Bulletin 845, Sheet 22.			
Quaternary	Alluvium	800	Sand, gravel (Valley Fill)
Tertiary		800	Lavas, tuffs and other volcanic products.

on further out in the valley. The only alternative to this solution that I know of at present is to obtain the water rights on the spring in Madronia Canyon now held by Jelks. This spring produces around 8,000 gallons per day of potable water and the flow is said to be constant. The water flows by gravity from the south flank of the Tanque Verde Mountains to the Jelks Ranch, a distance of two miles, through an inch pipe line. These water rights would no doubt be quite difficult to secure unless negotiations were made at the same time for Jelks grazing permits and his ranch home. He is said to have an investment of around \$150,000 in these properties.

II. The question of a water supply for the sub-headquarters area in Section 32 on the Saguaro Forest side has been studied in detail by Mr. W. A. Burnham, Project Superintendent at SP-11-A, and Mr. J. A. Hunter, one of the Foreman at this camp. They very kindly supplied me with maps showing the location of various water tests and a quantity of reports covering their conclusions in the matter of a water supply. They have had the cooperation of Prof. O.M.P. Smith, Geologist, of the University of Arizona in this study. After months of detailed study they conclude that there are two possible sources of water for this side of the park, - (1) The Tanque Verde wash, which flows westward about one-half mile north of the northern boundary of the Monument, and (2) The Pantano Wash Valley. Both of these drainage areas are shown on the attached map. The Tanque Verde Wash area has not been definitely proven in proximity to the Monument. The McDonald well in Section 7, T-15-S, R-16-E, 150 feet deep, is a reliable high capacity well with water standing at 80 feet. If the sub-headquarters area is to be located in Section 32 the logical place for a test well would be in section 6 along Pantano Wash. Water has been definitely proven in this area and there are some doubts as to what may actually be developed along the Tanque Verde Wash, that is near the Monument boundaries. But in either event a pipe line, pump, and storage facilities will be required. In both cases the water rights will have to be secured from a private land owner who will no doubt ask a share in the water developed. From the records of previous tests it is concluded that water in ample quantities can almost be guaranteed at the proposed site on the Pantano Wash.

III. At Manning Camp there is an alluvium cover over a broad flat basin which is underlain by granite. They have considerable snow at this elevation during the winter and the water collects in the basin and flows out at the granite contact to form Manning Spring. Photos of the spring are attached. The water is excellent and from what information I could obtain from our guide it will form a permanent supply for the proposed development at this site.

On the U.S.G.S. Topographic sheet of the Tucson quadrangle springs are indicated at Spud Rock Ranger Station and near Rincon Peak. These springs were not visited but it is likely that they will supply local needs for trail work and Rangers. I saw nothing which might be considered permanent streams in the Monument area with the exception of the localized flows from Manning and Jelks Springs. There are many pot holes of tremendous size in the canyons which no doubt form reservoirs for water to supply the wildlife. Water may be obtained from these potholes for members of the staff while in isolated spots for at least six or eight months of the year.

By way of summary it is concluded that we will have to make arrangements

(6)

to secure Jelks water rights for his spring to supply the proposed main headquarters development. The alternative to this procedure would be to do some exploratory drilling along Rincon Creek might prove just as expensive with some six or eight miles of pipe line. It is practically assured that water may be secured on Pantano Wash to supply the sub-headquarters area in Section 32. Mr. Burnham estimates that the installation costs for pipe line, pump, and storage equipment would be in the vicinity of \$10,000, excluding 1,900 man days of CCC labor. Operating expenses and depreciation would amount to approximately \$1,000 annually. The spring at Manning Camp on the crest of the mountains will be adequate for the facilities proposed for this section.

In consideration of the expense in connection with the administration of the Saguaro National Monument it must be kept in mind that the present boundaries include an area considerably larger than Mesa Verde National Park.

Photographs and map to be attached to this report.

Respectfully submitted,

(sgd) Vincent W. Vandiver

VINCENT W. VANDIVER
Associate Regional Geologist

A PRELIMINARY REPORT FOR THE MASTER PLAN

SAGUARO NATIONAL MONUMENT, ARIZONA

May, 1937

H. H. CORWELL, REGIONAL LANDSCAPE ARCHITECT

Section III

INTRODUCTORY

At the request of Mr. Frank Pinkley, Superintendent, Southwestern Monuments, and with the concurrence of Mr. Thos. C. Vint, Chief Architect, a reconnaissance trip was arranged by Mr. Herbert Maier, Regional Officer, for the purpose of presenting a report as a preliminary to the proposed Master Plan of Saguaro National Monument.

ITINERARY

The inspection required four days, April 19 to 22, inclusive, the party composed of the following technicians: Dr. W. B. McDougall, Regional Wildlife Technician; Mr. W. H. Wirt, Regional Forester; Mr. Vincent Vandiver, District Geologist; Mr. W. Ward Yeager, District Forester; Mr. Chas. A. Richey, Assistant Regional Landscape Architect; Mr. Clinton F. Rose, Resident Landscape Architect; and myself.

Mr. Hugh Miller, Assistant Superintendent, Southwestern Monuments, made all field arrangements and conducted the tour. The inspection was thorough, including a study of approaches, of related and adjacent areas, and of the more significant points within the Monument proper.

DESCRIPTIVE

The most interesting portion of the itinerary included a trip by horseback over existing trails from Rincon Ranger Station to Manning Camp and return, passing first the scattered mammoth Saguaro, in the desert zone, thence through the Pinon, Juniper, and Oak, up to an elevation of approximately 7,000 feet where the pines (Arizona White and Chihuahua) dominate the picture to the far peaks—at an elevation of 8,500 feet. As the photographs will show, the richer vegetation and allure of sparkling canyon streams afforded no small part of the interest. Wildlife seemed abundant, including deer and peccary.

For the most part, the flow of canyon streams is intermittent. One perennial spring was encountered at Manning Camp; another and larger one not far from Rincon Ranger Station is controlled by the Jelks' Ranch, through water rights granted by the State of Arizona.

ACREAGE

Of the 63,284 acres within the Monument boundaries, 9,800 acres are within the University controlled area as shown on the key map, (8,400 acres owned or leased by the University and State, and 3,200 acres in private holdings). The Coronado National Forest almost enfolds the Monument, except for the western extremities.

GRAZING PERMITS

Long term grazing permits continue as introduced by the Forest Service. They include four—Converse, seven sections; Parker, two sections; Haskell, eleven sections; and Jelks controlling nearly all of the Rincon drainage area.

REGIONAL PLANNING

The Monument is an important part of a definitely planned circulatory drive in the area east of the City of Tucson, the round trip covering a distance of approximately seventy miles. Starting from Tucson, the more important points of interest in order include:

1. Old Fort Lowell
2. University Indian Ruins
3. Saguaro State Park

The Saguaro Area now controlled by the University of Arizona occupies the extreme western section of the Monument. The proposed Monument Contact Station is shown in this area.

4. Administration Headquarters (Proposed)
Located on the key map just within the boundaries and north of the Rincon Ranger Station.
5. Colossal Cave State Park

The connecting circulatory road system leads east from Tucson on Broadway, turning south at the Monument boundary, then west on a proposed new alignment to Jelks' Ranch and the proposed Headquarters, then south to Colossal Cave State Park, and returning to Tucson via the new Bankhead Highway.

ADMINISTRATION HEADQUARTERS (Proposed)

About one mile north of the Rincon Ranger Station at the approximate base of Chiminea Canyon, an excellent site is available for the Administration Headquarters--strategic in its relationship to the existing radiating control trails serving the whole of the Monument. The spring now controlled by the Jelks' Ranch is nearby. It is quite possible that a well could be installed, supplemented by a reserve supply obtained intermittently from the large pools in Chiminea Canyon.

Proposed Buildings:

Administration Building and Office
Five Residences
General Garage
Dormitory for six temporary employees
Barn
Equipment Shed
Blacksmith Shop

Personnel--permanent:

Chief Ranger or Custodian
Park Ranger--Forester
Park Ranger--Wildlife
Maintenance Man
Packer

Personnel--temporary: (8 mo. of the year)

One Fire Lookout
Two Trail Maintenance Men
Two Temporary Rangers

The existing Rincon Ranger Station, outside of the Monument boundaries, is to be abandoned by the Forest Service. The facilities afforded would be inadequate for the Monument.

CONTACT STATION (Proposed)

The location selected on the western Monument boundary affords an entrance to the Saguaro area now controlled by the University of Arizona. The proposed ECW development program (Saguaro State Park) will include a State Park Headquarters which may easily become the contact station for the Monument. A museum may be a part of this development.

Proposed Buildings:

Residence and Garage
Checking Station and Museum
Small Equipment Shed

Personnel--permanent:

One Junior Park Naturalist

INTERIOR DEVELOPMENT

Roads: Approximately 12 miles of park drives, portions of which are now being constructed through ECW, will provide public access to the Saguaro area now controlled by the University. No additional public roads are believed necessary in other parts of the Monument. No truck trails for maintenance or fire control are to be proposed.

Trails: Existing trails as constructed by the Forest Service are sufficiently adequate for fire control. (See report by Regional Forester)

Buildings: (Existing)

Manning Camp Ranger Station—one cabin and barn

Buildings: (Proposed)

Cabin and Lookout Tower near Spud Rock
Maintenance Station on Happy Valley Saddle Trail
A Control Station half way up the trail leading
from the proposed headquarters to Manning
Camp.

CONCLUSION

Fire Control: The proposed Master Plan for the Monument should consider as of first importance a continuation of the present fire control program. Up to the present time, the Forest Service has maintained a most satisfactory program of fire prevention and control. This program should be continued through the adoption of any one of the three following methods; namely -

1. Continuation of the present arrangement.
2. A cooperative plan whereby the National Park Service would assume at least a portion of the responsibilities involved. It is assumed that such an arrangement would be acceptable to the Forest Service because of the close relationship of the Coronado National Forest to the Monument.
3. The National Park Service to assume full responsibility. The preceding pages have attempted to outline the necessary personnel and equipment for such an undertaking.

Wildlife: Protection of wildlife within the area may be considered as next in importance. Existing grazing leases should be terminated as soon as practical. The Jelks' lease is by far the most important. In this connection, it is recommended that the Jelks' Ranch of approximately 8,000 acres in the vicinity of the Rincon Ranger Station be acquired, together with that limited portion of the Coronado National Forest located between the Jelks' property and the Monument. The acquisition of the Jelks' property would automatically release the water rights control of the one large natural spring within the Monument. Also, it is believed that the existing ranch buildings would provide an ideal administrative and utility group for the Monument.

Park Significance: From a standpoint of public interest, it is essential that the Monument boundaries include in ownership the private and State University desert lands forming the western extremity of the proposed Monument boundary. Virtually all of the Saguaro are to be found on these lands. Only a few excellent but scattered specimens exist within the present Monument boundaries, these occurring for the most part in Chisina Canyon. The Saguaro on the University land are quite numerous, but a finer and far more extensive display can be found in Tucson Mountain Park (County), a few miles west of Tucson. If the University land is acquired, it is suggested that the proposed University Observatory to be located on Observatory Hill be relocated, the new location to be outside of the proposed Monument boundaries. Twin Hills, just west of the University lands, has been suggested as a possible site.

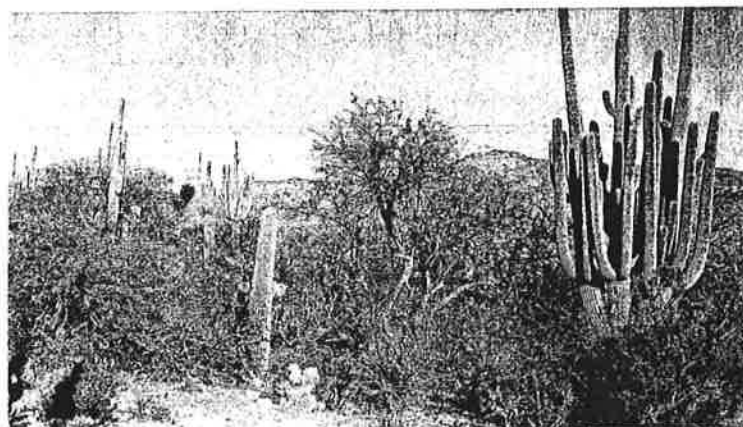
The rugged mountain peaks, pine forests, and abrupt canyons, are indeed interesting, but in scenic value they cannot be considered outstanding. It was stated that in the Coronado National Forest area, directly adjoining, there are points of scenic interest more flattering to this section of the country than anything to be found in the Monument.

It is quite probable that if the Monument with its existing and proposed boundaries, is opened to public activity, this activity will be quite largely local. Even local interest may be rather thinly distributed as there are undoubtedly quite a number of other areas of equal significance in the immediate neighborhood.

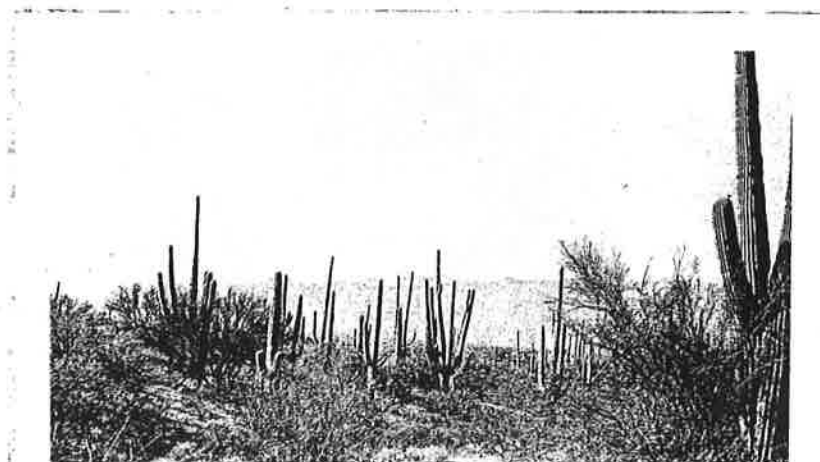
An immediate and reduced program might consider only the establishment of the Monument Contact Station, with the Forest Service retaining its present responsibilities relative to fire control. Such a plan, if acceptable, hinges upon the immediate acquisition of the Saguaro area now controlled by the University of Arizona. This would insure more complete and lasting protection to the Saguaro, and permit a more accurate application of the present C.C.C. camp program as applied to the desert area development as a whole, and as applied particularly to the detailed development of the proposed Contact Station.

A preliminary program of this nature should, perhaps, introduce immediately, necessary facilities and personnel for desirable control of existing wildlife.

SAGUARO NATIONAL MONUMENT
PHOTOGRAPHS TO ACCOMPANY REPORT
BY
H. H. CORRELL, REGIONAL LANDSCAPE ARCHITECT
REGION III



Along Chiminea Trail near Rincon Range Station - Rincon Peak in the distance.



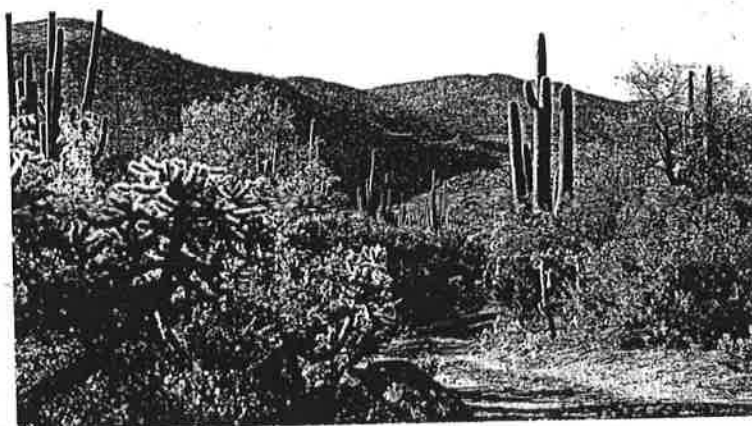
State owned area West of the Tanque Verde Mountains.



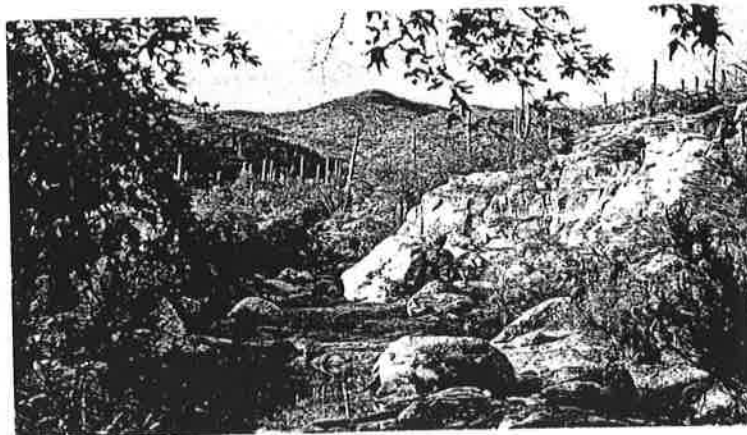
At the base of Telephone Trail Looking North.



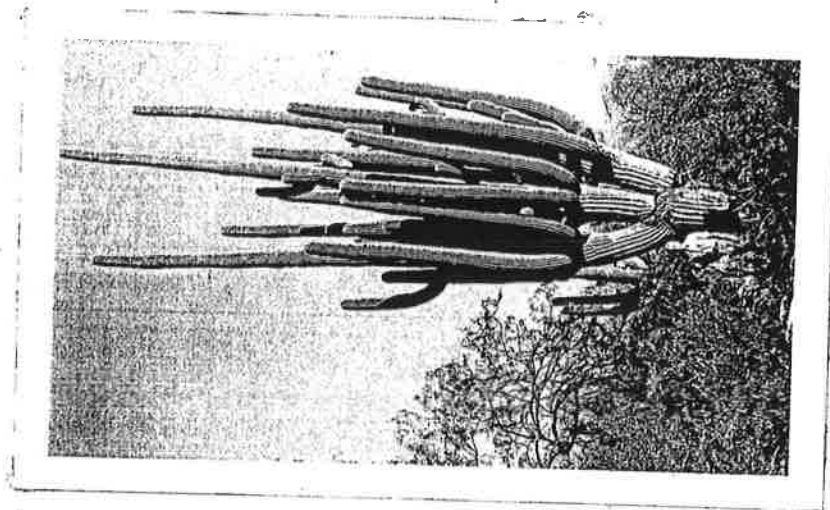
One of the frequent spring fed streams.



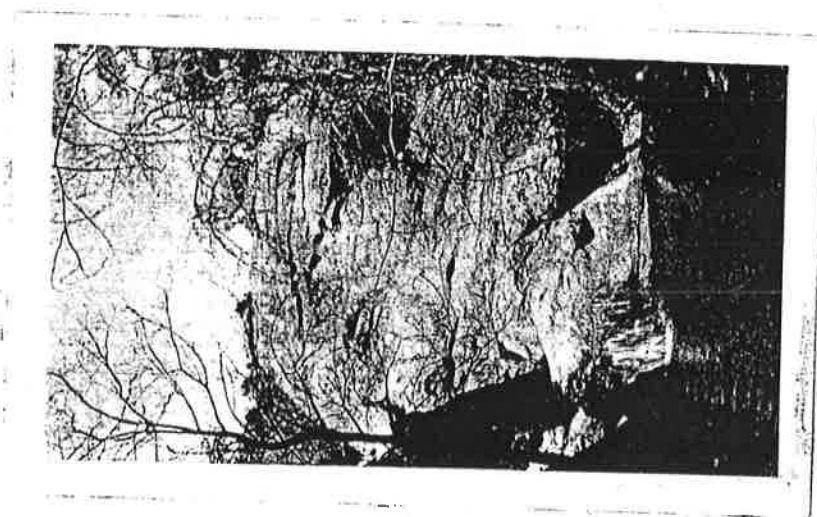
The trail in Chiminea Canyon.



Chiminea Canyon looking North.



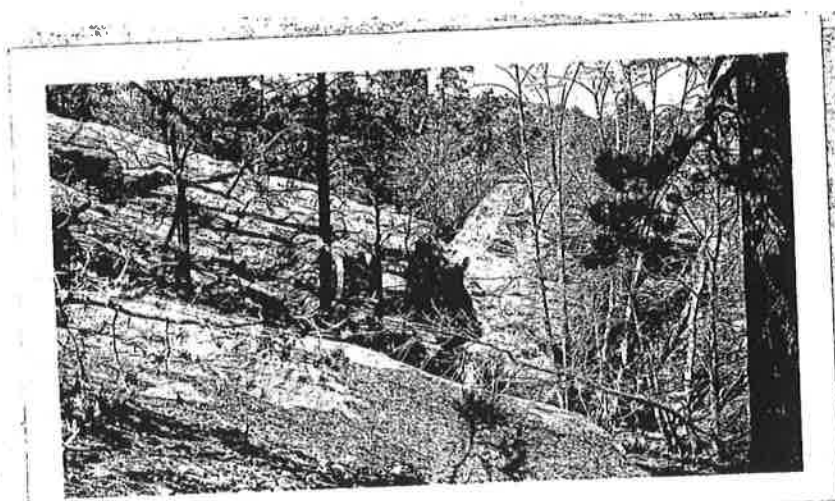
One of the largest saguaros in the Monument.



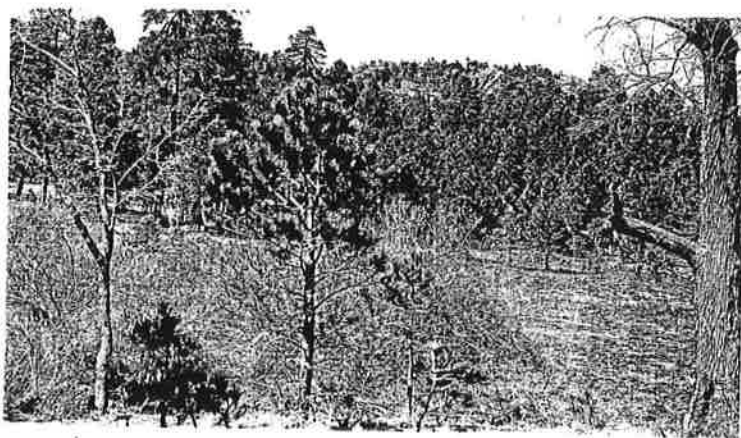
Waterfall & pool.



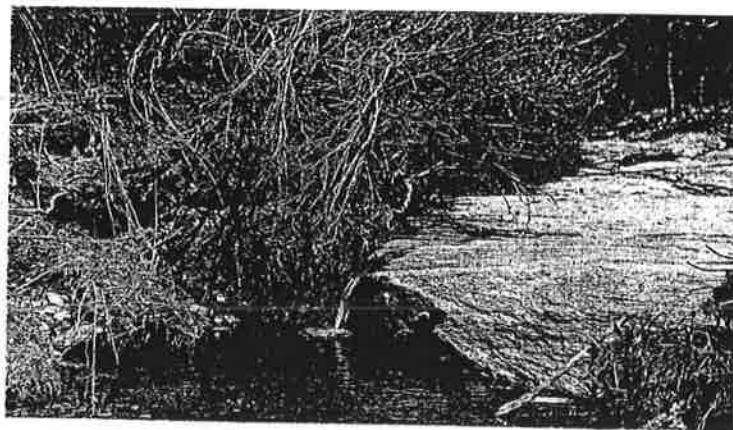
Among the pines - elev. approx. 8000 feet.



Near Manning Ranger Station.



Near Spud Park



The spring at Manning Camp Ranger Station.



Manning Camp Ranger Station - elevation.
approx. 8000 feet.

**PHOTOGRAPHS TO ACCOMPANY REPORT
SERVING NATIONAL DEFENSE
BY
THOMAS W. VAN DYKE, ASSOCIATE SENIOR GEOLOGIST,**



Photo No. 11: A view looking south from near Italian Ranch towards Spud Rock which is the summit of the Pincon and Tanque Verde Mountains. Elevation of the peak is 8,500 feet. That both ranges are somewhat barren is obvious from photograph.



Photo No. 21: The Saguaro National Monument boundary along the south flank of the Tanque Verde Mountains. Miller, Yeager and Wirt in photo looking over the topographic map of the area which the Forest Service have installed. Location is approximately one mile north of Rincon Station.



Photo No. 3: View looking north along Chinisea Canyon about one and one-half miles north of the Rincon Ranger Station. The rock is granite and there are numerous pot holes with considerable water. Most of this canyon is dry for several months of the year however. Miller and Wirt in photo.



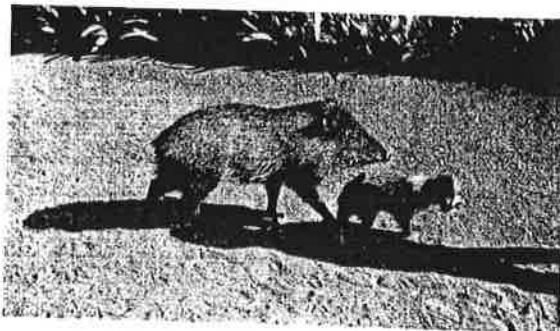
Photo No. 4: One of the numerous pot holes in Chinisea Canyon which contained water at the time of our visit in April. The rocks here are granite and schist.



Photo No. 5: A view of the spring at Manning Camp. There is six or eight feet of alluvium here, the water collects in a rather large basin, and seeps out at the contact of the granite. This is one of the very few permanent springs in the Monument.



Photo No. 6: A view just below Manning Spring to give an idea of the flow of water at the time of our visit last April.



Photos 7 and 8: Views of Property or Wild Pig at Kake Ranch which is not so wild in this instance. We did see one wild head of pigs on the south flank of the Tangua Verdeo while en route to Hemming Camp.

**APPENDIX C: SELECTED ADMINISTRATIVE DOCUMENTS RELATED TO THE
COMPLETION OF CACTUS FOREST LOOP ROAD**

APPENDIX C

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

U. S. Federal Building
Phoenix, Arizona
March 17, 1938



ROUTING	
1	Deserial
2	File
3	
4	
5	
6	
7	
8	
9	
10	

The Acting Regional Director, Region III,
National Park Service,
P. O. Box 1728,
Santa Fe, New Mexico.

Ken R
60 D-028
R

Dear Sir:

Reference is made to your letter of March 7, addressed to Inspectors, in which a report is requested on the possibility of completing work at all camps to be abandoned. It is likely that the work program will continue at the camps to be abandoned, SP-6 and SP-11, until about May 15.

The major job at Saguaro, SP-11, has been the loop road on which work has progressed from both ends towards the middle. On May 15, it is expected that these ends will be within four tenths of a mile of meeting. Suitable turn-arounds will be constructed. All other jobs now unfinished will be complete.

The final picture at SP-11, when we withdraw, will be one of adequate roads to view the area, properly marked, together with picnic facilities. This is considered satisfactory since, as you know, the land ownership situation is badly involved and no adequate water supply has ever been located on the park property.

The work program at SP-6 is progressing in good order and we will be in position to discontinue it at any time after May 15. On that date all jobs upon which we are working now will be complete, except the third unit of the Combination Building.

We are planning our work so that this job will be at a good stopping point on May 15.

Very truly yours,

J. H. Haile, Jr.,
Inspector, CCG.

Symbol No. SP-1-A

JOB APPLICATION AND COMPLETION RECORD

Region Three

Stato Art. 202a

Area Saguaro Forest State ParkName of job Park Roads

Form 7 No. 132 Job No. 139

Job No. 139

Location of job Eastern part of Saguaro Forest State Park

Master plan No. 2101 Working plan No. SF 2107

BLOCK A—PROPOSED WORK

NUMBER OF PERIODS REQUIRED TO COMPLETE JOB ()	WORK CONTEMPLATED				ESTIMATED COSTS		TOTAL
	UNIT	NUMBER UNITS	MAN-DAYS MAN-HOURS	LABOR	MATERIALS	EQUIPMENT	
Previously approved							
Original request							
TOTAL	M4.	4	11600		\$800.00		\$800.00
	x x x x	4	11600		\$800.00		\$800.00

BLOCK B--LABOR SUMMARY

TYPE OF LABOR	UNSKILLED	INTERMEDIATE	SKILLED	PROFESSIONAL AND TECHNICAL	TOTAL
Number of man-hours					
Cost of labor					

Submitted by J. Campbell James

Title Project Superintendent

Date January 16, 1939

BLOCK C—CLEARANCE

PAK AUTHORITY	DATE	PROCUREMENT OFFICER	DATE	INSPECTOR	DATE
<i>1/16/39</i>	<i>1/16/39</i>				

BLOCK D—COMPLETION RECORD

WORK ACCOMPLISHED			TOTAL ENOUGH RANGES COMPLETED JOB			
DATE OF COMPLETION	UNIT	MANHOURS USED	MATERIALS	EQUIPMENT	TOTAL	BALANCE

Approved by [Signature] Title Inspector Date 1/20/59 Release date _____
(JUSTIFICATION ON BACK OF SHEET)

Page (2)
JUSTIFICATIONS

This request is to cover (.4) mile of the major park road in Saguaro Forest State Park left uncompleted on abandonment of Camp SP-11-A on April 30, 1938.

The completion of this road will provide a high standard park road of great scenic value, and will provide a functionable, controlled road to integrate with the park circulation systems as shown by the Master Plan.

Plans SF 9106 and SF 9107 are on file at all offices.

10-352

Page 3

EQUIPMENT REQUIREMENTS

List equipment items essential for completion of job, and state whether available or not.

1 Tractor	Available
1 Trail Builder	"
1 Compressor, 105 cu. ft.	"
1 Compressor, 285 cu. ft.	"
4 Jackhammers	"
1 1/4 yard Concrete Mixer	"
1 Rubber Grader	Not available at camp

SPECIFICATIONS

Include a brief set of specifications, with a description of the proposed procedure and methods. This is mandatory for all roads and structural jobs.

(See Page (3-A))

Page (3-A)
SPECIFICATIONS

This remaining portion of the Park Road will be build to measure up in every particular, to the high standard of construction accomplished in the previously-built portion of this road. Care will be taken that all work on the road, and incident thereto, will be done with minimum disturbance to the terrain and vegetation, and that the finished appearance of the road will harmonize as closely as possible with the surroundings.

The width of the road shall be an 18 ft. minimum, but with increased width at all curves, culverts, and walls as necessity and safety may determine, as directed by the Project Superintendent.

Grades, cuts, fills, culverts, walls, and guard-rails shall be as shown on plans.

Super-elevations on curves shall be in accordance with the attached table, subject to practical modifications as may be directed by the Project Superintendent.

Unnecessary ditches shall be avoided in all constructions, and the hydraulic characteristics of washes, arroyos, and hillsides shall not be changed, except as where special conditions, as in the case of culverts, are encountered.

Walls shall be surfaced with native weathered rock well anchored to the foundation wall. The proper use of layer rock applied with more freedom and irregularity as was the case in some of the previous wall-work should be striven for, so that an appearance of more ruggedness and informality may be achieved.

Guard rails shall be of native weathered rock anchored to walls or to bedrock. Guard rail sections shall be as shown on plans. The rocks used in guard rails shall be of random sizes, and the top course of rock shall be full headers for the most part.

All mortar joints shall be deeply raked. The mortar used in wall and guard-rail work shall be a mix of one part by volume of Portland cement to three or four parts of sharp sand, depending on the grade of sand available.

Page (3-B)
 Super-Elevations Required
 For Skyway Loop Road
 Saguaro Forest State Park

<u>RADIUS</u>	<u>SUPER IN FEET PER FT. WIDTH</u>
200-----	.128
300-----	.128
400-----	.128
500-----	.120
600-----	.112
700-----	.104
800-----	.096
900-----	.088
1000-----	.080
1100-----	.072
1200-----	.064
1300-----	.056
1400-----	.048
1500-----	.040
1600-----	.032
1700-----	.024
1800-----	.016

Super-elevation for curves of radius
 greater than 1800 feet will be 0.012 per foot width.

10-352

PAGE 4

ESTIMATE OF COST

1. Bill of Materials: unit and total prices, differentiate between emergency funds and contributions by park authority or sponsor.
2. Skilled Labor: Number of hours contemplated, hourly rate and total cost for each type of labor, except OOO.
3. Equipment: rental only -- type, hourly rental, total cost, include operator when necessary.

MATERIAL COST JOB 139-152-202

Cement						
80 bbl.	@ 3.60					288.00
Steel Reinforcing						
1/2" round deformed	800#	4.20 cwt.				34.40
3/8" round deformed	450#	4.50 cwt.				20.25
Form Lumber						
2" x 4" 2/L #2 Com OP S4S	450 BM	35.00 c				14.00
2" x 6" #1 " " Rough	500 BM	40.00 c				20.00
1" x 8" #2 " Ship lap	1000 BM	40.00 c				40.00
Nails						
50# 16d Box nails						3.25
50# 8d Box nails						3.25
Lump Lime						
400#	@ .75					3.00
Black annealed tie wire	1/4 roll #12	2.07				1.75
Miscellaneous and contingent material expense						72.10
						<u>500.00</u>

1000lbs. 40% dynamite 1-1/8" x 8" On hand at SP-6-A
 1500 #6 electric blasting caps with 6' wire " " " "
 1500 ft. #14 B&S insulated copper blasting wire " " "

The material to be purchased will conform to the Specifications as set forth by the Federal Specifications Commission.

TECHNICAL COMMENTS

Attach required technical comments by local and district technicians to permit prompt concurrence by regional technicians.
 Estimate of Cost prepared by Engineering Foreman, Earl Patterson.

* Only \$472.74 in addition to the carry over, is available for this structure during the current period however preliminary studies for a drastic revision of this building are under way and undoubtedly a supplemental application for funds will be necessary at a later date when accurate estimates will be available.

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

MA-1-A
Tucson, Arizona.



Work Accomplishments Nov. 1, 1939, to
Dec. 30, 1939.

May 15, 1940

Classification

Job - 113-713
Razing & Obliteration

Removal of 7 miles of barbed wire drift fence; 2 stone tables; 4 benches; Obliteration of 200 sq. yds. picnic and parking space; .25 mile of road; 5 acres clean-up.

Job - 100-157
Structural Improvement

445 feet of adobe wall 7' high, 18" thick on 24" x 18" concrete footing; cement capping. 770 feet of ditch 24" x 30"; Planting 790 Tamarisk shoots. Removal of 445 feet of old adobe wall and concrete footing.

Job - 202-106
Park Road

.25 mile of Park Road, 18 feet wide.

Job - 107-1023
Surveys Other

13000 lin. ft. for proposed pipe line. 5000 lin. ft. extension of Park Road. 1 acre Topography for Headquarters area Saguaro Forest. 5 miles section lines.

Work Accomplishments Jan. 1-1940 to
May 15, 1940, Inclusive.

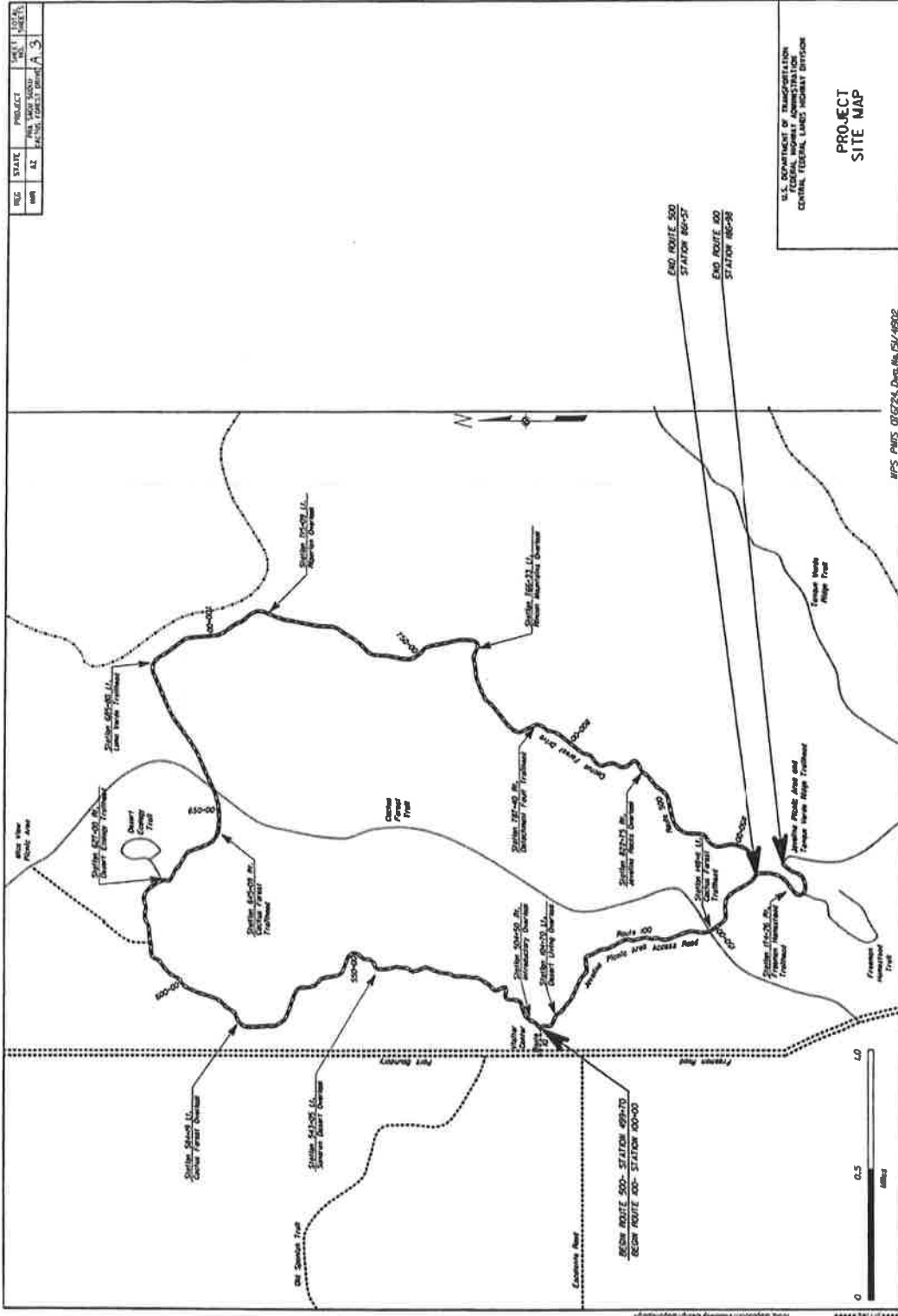
202 Park Road	3.5 miles	18 ft. Gravel Surface ~~XXXXXXXXXX~~
157 Structural Imp. (to Combination Bldg.)	1 each	6 Room Adobe for Ranger-Custodian office and living quarters.
706 Planting	300	Native trees, plants and shrubs.
411 Drainage Struct.	2	2'x2'x22", Cattle Guard type road drains,
718 Walks & Curbs	454 ft.	5 ft. wide, paving brick; curb of brick set in cement outlining parking area.
1014 Archeological Excavation	$\frac{1}{2}$ acre	Indian Ruins, excavated, mapped and back filled
140 Telephone Line	19.5 Mi.	Metallic circuit on treated cedar poles.

H. E. Dalton
H. E. Dalton
Sr. Project Supt.

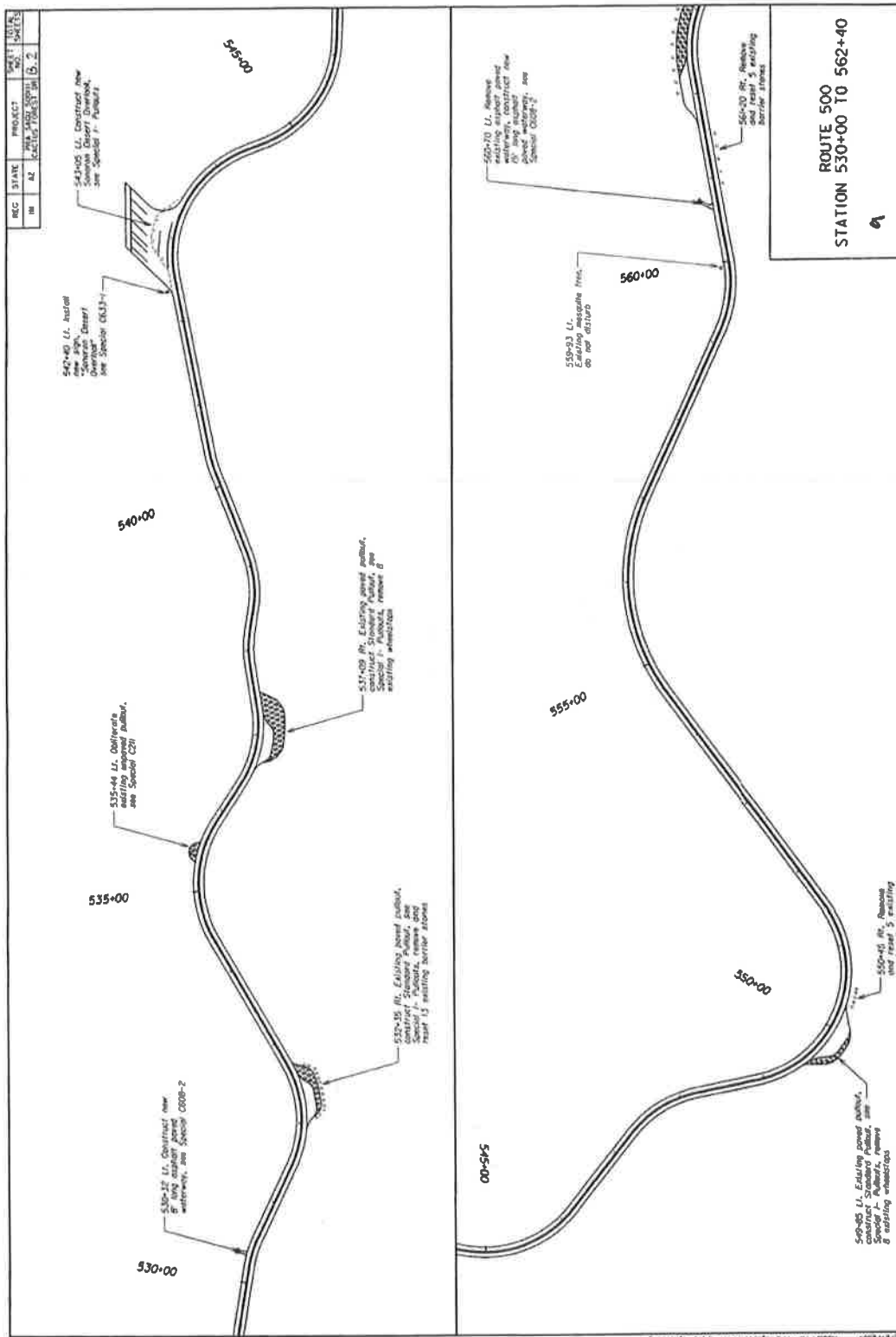
HED:krh

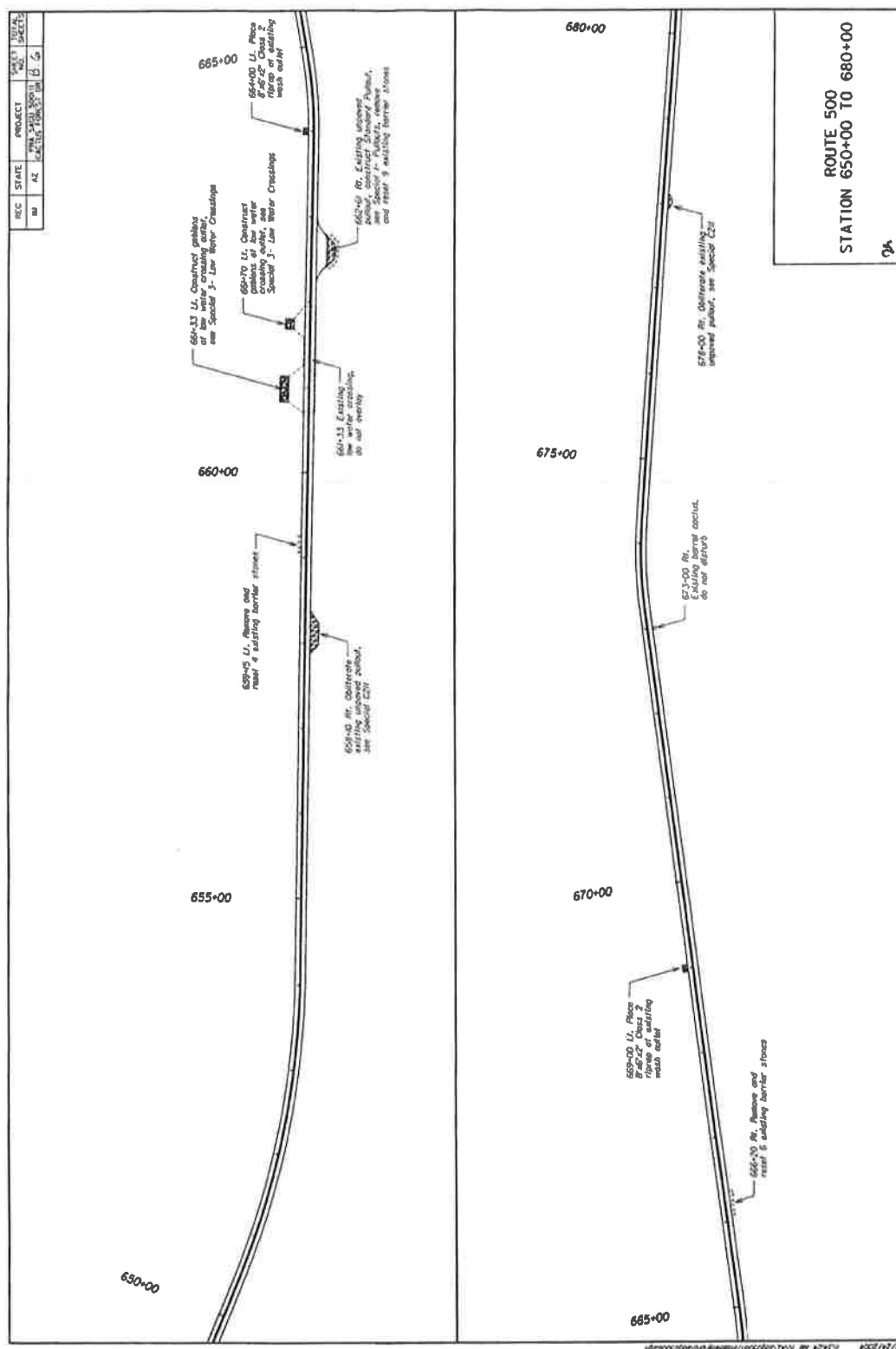
APPENDIX D: DESIGN DRAWINGS

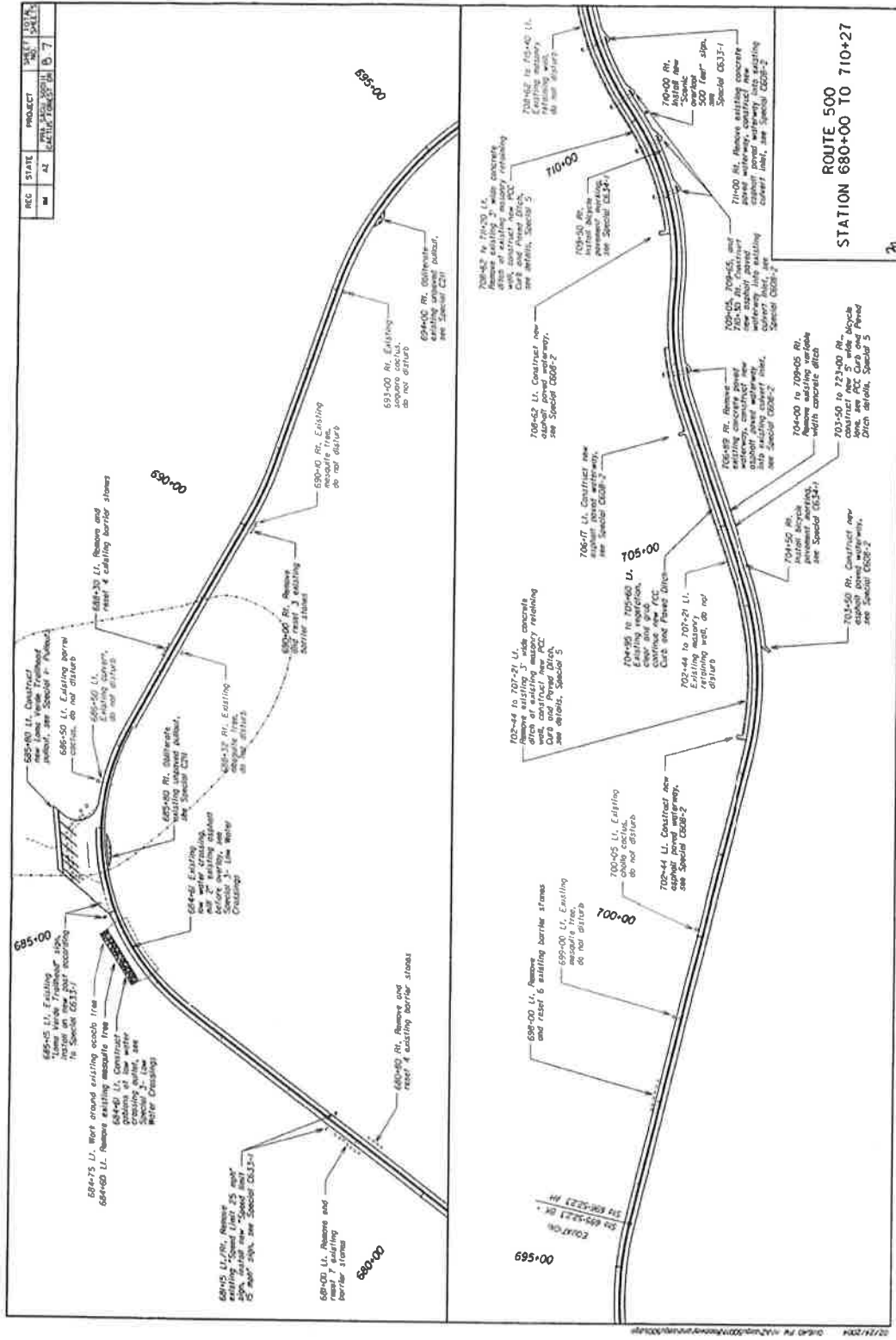
APPENDIX D

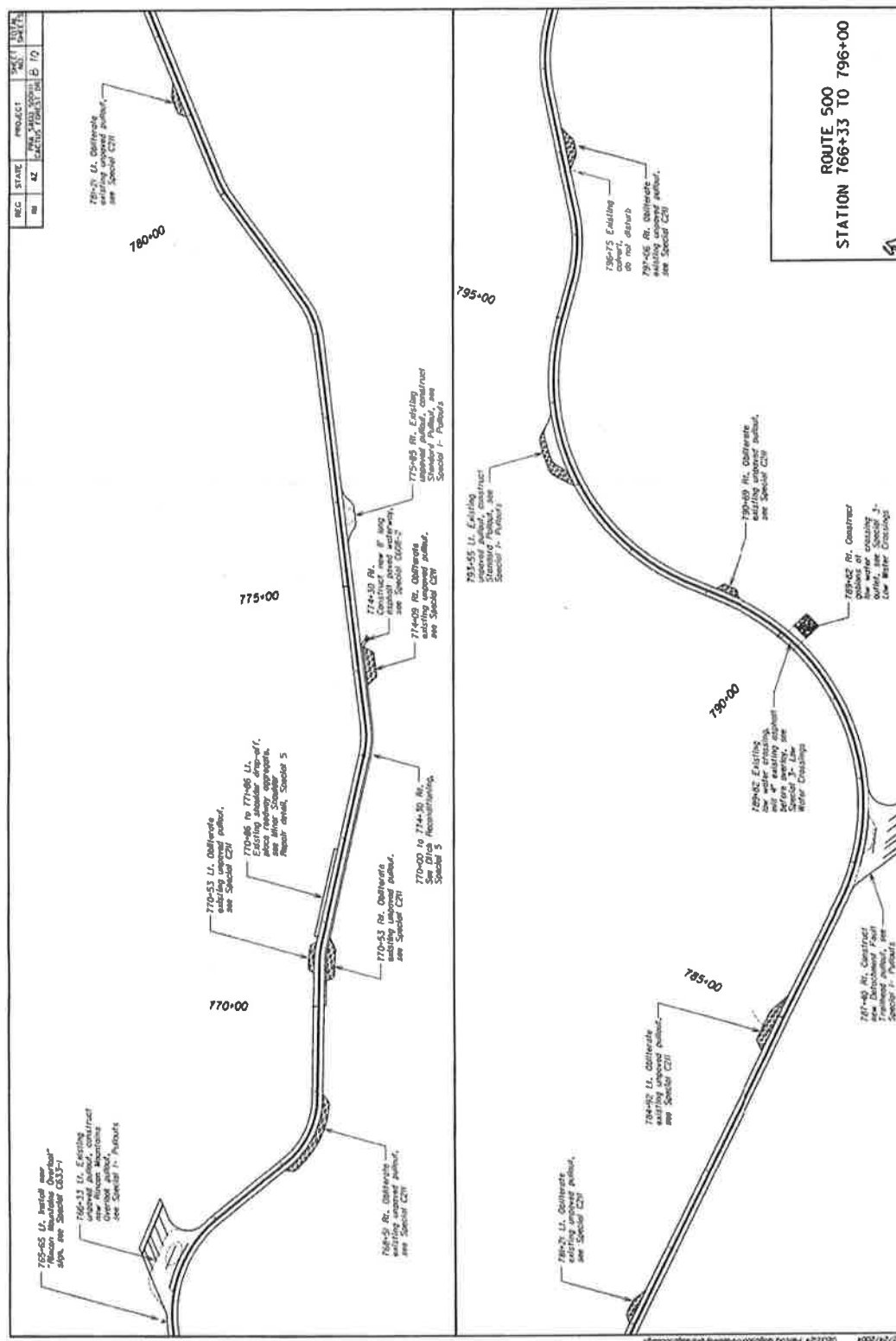












150

