CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Reata Pass / Beardsley Wash
CLOMR

by: The Greiner Team

The Desert Greenbelt

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17756
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Date Signed 6-1-95
ARIZONA, U.S.A.

May 1995

VOLUME V

CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Upper Reata Pass Wash
Operations and Maintenance

by: The Greiner Team

The Desert Greenbelt
SCOTTSDALE ARIZONA

MARCH 1995

SCOTTSDALE DESERT GREENBELT PROJECT
Upper Reata Pass Wash
Operations and Maintenance

INTRODUCTION

Although it retains its desert character, the Upper Reata Pass Wash Desert Greenbelt Channel will be altered from its original natural condition. The maintenance of flood control structures and management of vegetation comprise the bulk of the required operations and maintenance. As shown on Figure 1-1, the Wash consists of four distinctly different reaches:

- Reach 1 goes from the upstream end of the wash above Pinnacle Peak Road to the northern end of the constructed levee at the former apex location. This reach is characterized by the stabilization of existing banks and the Pinnacle Peak Road Bridge and associated improvements. Fig. 1-2

- Reach 2 stretches from upstream at the levee and former apex location where the low flow channel begins downstream to the channel transition into the bridge at Foothills Drive. Reach 2 is a low-flow channel with levee/floodwalls on a natural overbank. Fig. 1-3

- Reach 3 is a full cut channel from north of Foothills Drive downstream to the confluence with the eastern tributary. Fig. 1-4

- Reach 4 Is located from the tributary confluence south to the Dear Valley Road alignment. Reach 4 consists of a natural wash. With occasional west bank widening and stabilization and a containment levee/floodwall on the downstream west overbank. Fig. 1-5

EQUIPMENT AND CREW TYPES AND ACCESS

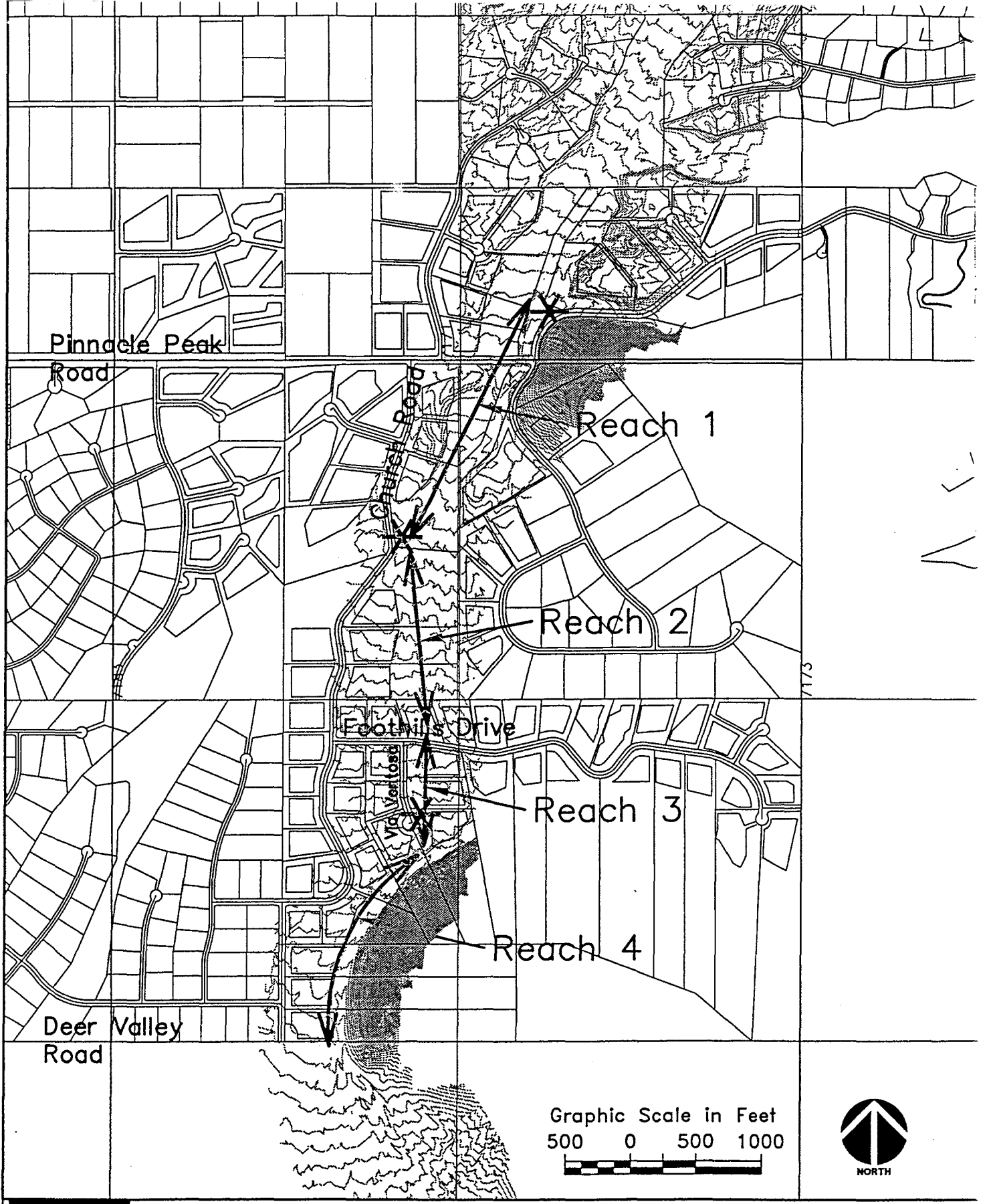
There are three dedicated maintenance access locations shown on Figure 1-1. During major storms, a City of Scottsdale official should monitor the Wash from the following locations:

- Pinnacle Peak Road east of the bridge crossing Reata Pass Wash.

- The levee adjacent to Church Road at the trail crossing.

- The east side of the cul-de-sac on Via Ventosa south of Foothills Drive, west side of the wash

Areas within the Wash may be accessed by light trucks and small vehicles, such as Bobcats, and their required crews for inspections and maintenance. Large vehicles, such as dump trucks, should remain on adjacent roads, to avoid equipment and resources damage.



The Desert Greenbelt

Upper Reata Pass Wash
Operations and Maintenance
Keymap

✳ Access Location

Figure 1–1

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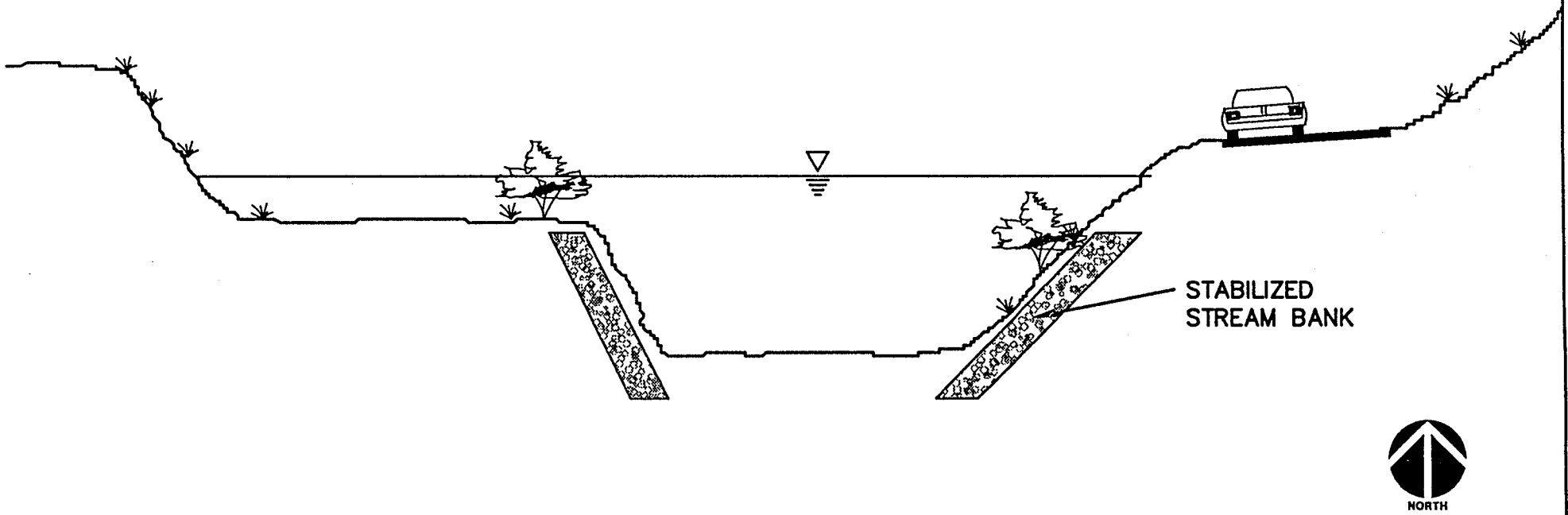

The Desert Greenbelt

Upper Reata Pass Wash
Typical Cross Section
Reach 1

▽ – 100 YEAR FLOOD ELEVATION

NOT TO SCALE

Figure 1–2

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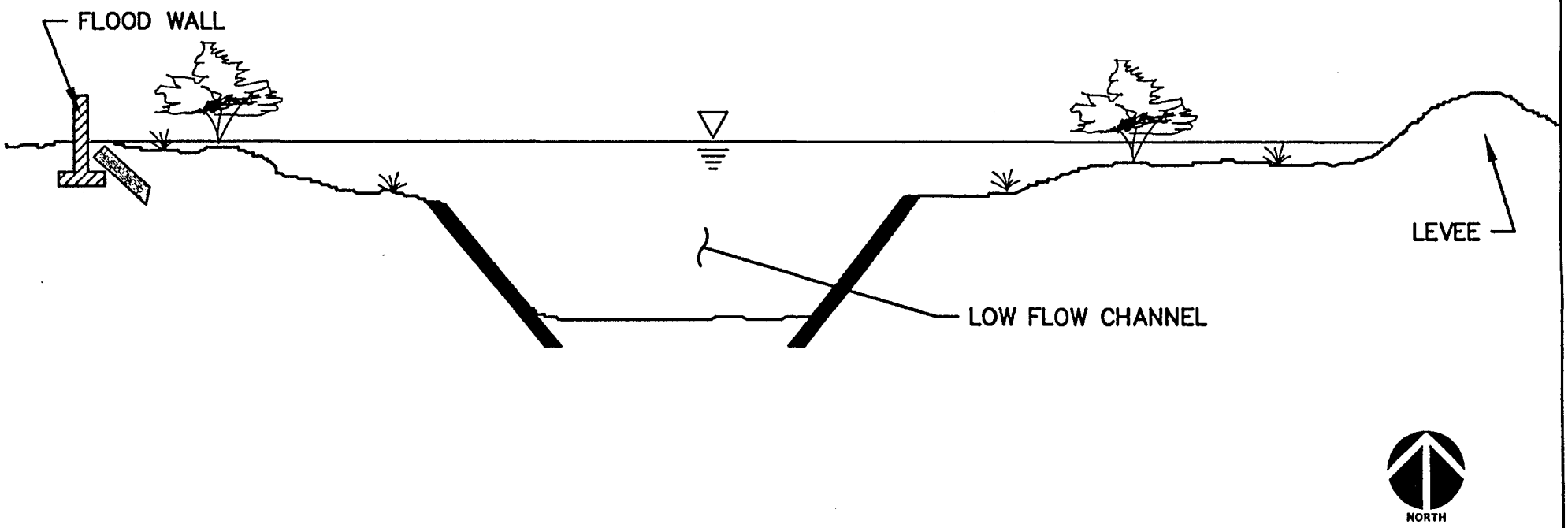

The Desert Greenbelt

Upper Reata Pass Wash
Typical Cross Section
Reach 2

▽ – 100 YEAR FLOOD ELEVATION

NOT TO SCALE

Figure 1–3

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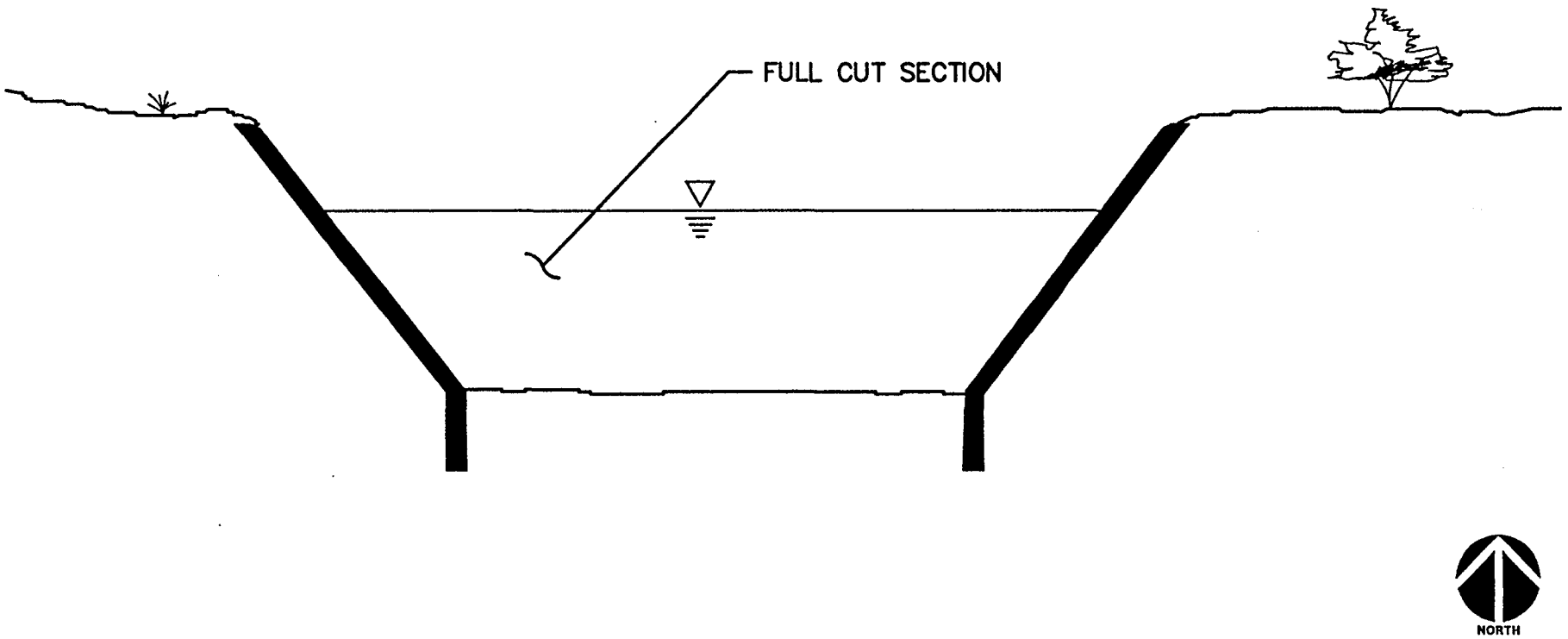

The Desert Greenbelt

Upper Reata Pass Wash
Typical Cross Section
Reach 3

▽ – 100 YEAR FLOOD ELEVATION

NOT TO SCALE

Figure 1–4

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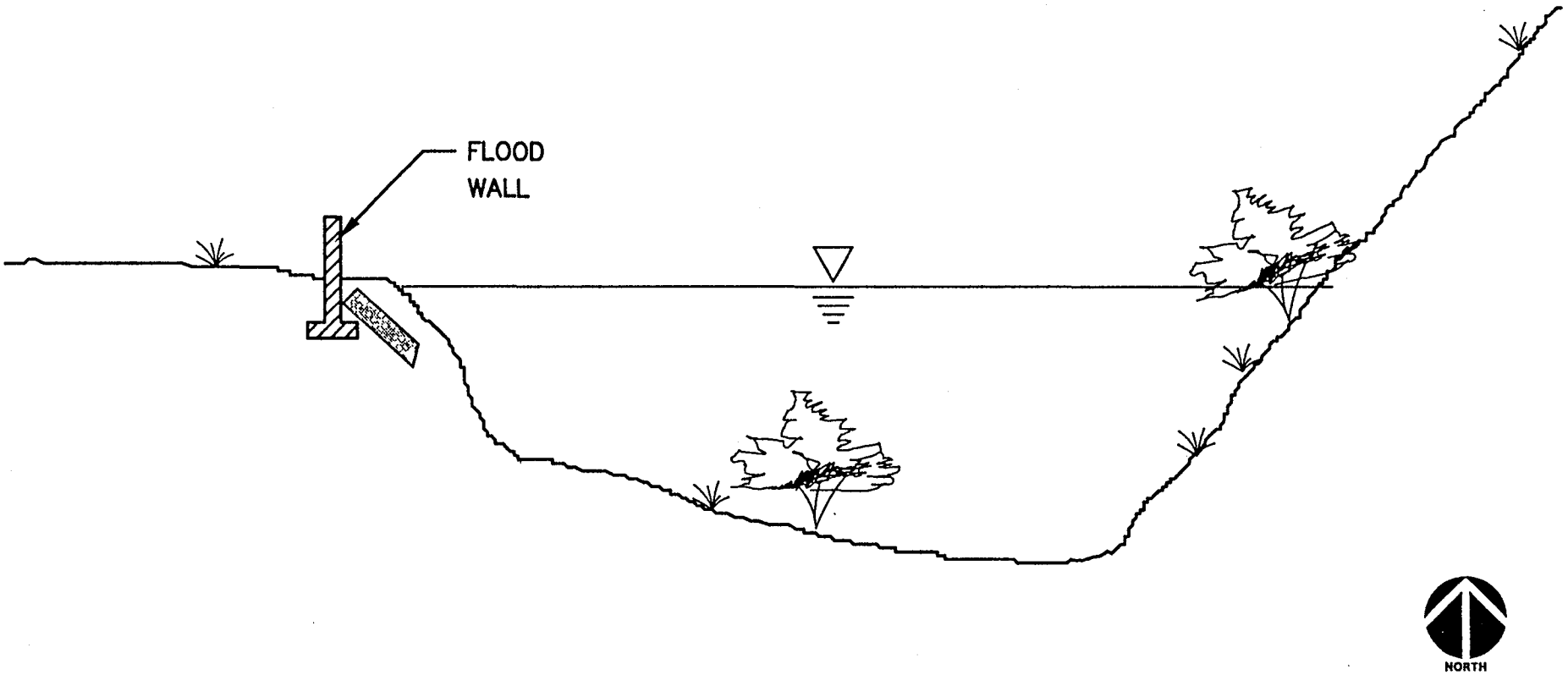

The Desert Greenbelt

Upper Reata Pass Wash
Typical Cross Section
Reach 4

▽ – 100 YEAR FLOOD ELEVATION

NOT TO SCALE

Figure 1–5

INSPECTION FREQUENCY

- In areas with trails, vegetation management inspection should be performed seasonally as well as after major storms (Reach 1). In areas without Trails (Reaches 2-4), inspections of vegetation management should be performed during the spring and fall and after major wind/rain storms.

- Inspections of Flood Control Structures should be made during the spring and after major storms for all reaches.

VEGETATION MANAGEMENT

Reach 1

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance and open space values.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary. This reach is to retain a near natural state excluding the bridge and related improvements at Pinnacle Peak Road.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition which may pose clogging problems for downstream sections. Unnatural litter should be removed.

- Obstructions along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users.

Reach 2

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance, outside of excavated low flow channels.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary. Efforts should be focused within the low-flow channel, leaving the overbanks in a near natural state.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition which may pose clogging problems for downstream sections. Unnatural litter should be removed, but natural revegetation should be allowed to continue.

Reach 3

- Vegetation, especially exposed roots, which pose a threat to structural flood control measures should be removed.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition which may pose clogging problems for downstream sections. Unnatural litter should be removed.

Reach 4

- Trees, shrubs, cacti and other native material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance, and open space values.

- Trimming of trees and shrubs required to maintain floodwater conveyance be limited to that which is necessary. Regular preemptive cutting of lower branches and removal of large shrubs may be required within the sandy bottom wash. Banks should left in a near natural state.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearances unless of a sufficient size which may pose clogging problems for downstream sections. Unnatural litter should be removed.

FLOOD CONTROL

Periodic evaluation to determine if repetitive occupance can be solved with design modification.

Reach 1

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. major sediment deposition, considered to affect the design conveyance capacity, must be removed. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications must maintain the design conveyance capacity and should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the bridge, drop structure and floodwall at Pinnacle Peak Road, must be repaired as soon as possible to prevent or minimize further damage.

- Bank protection and stabilization materials, such as gabions, walls and false rock, must be repaired as soon as possible. Repairs should retain the aesthetic and environmental quality of the area.

Reach 2

- Emergency and small-scale modifications may be made to channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the low-flow channel banks and levee/floodwalls, must be repaired as soon as possible as needed to prevent or minimize further damage.

Reach 3

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area. Repairs should maintain the high visual quality of the channel.

- Stormwater conveyance structures, such as the bridge at Foothills Drive and the full-cut channel bank protection, must be repaired as soon as possible to prevent or minimize further damage.

Reach 4

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the levee/floodwall, must be repaired as soon as possible to prevent or minimize further damage.

- Bank protection and stabilization materials, such as gabions, walls and segmental blocks, must be repaired as soon as possible. Repairs should retain the aesthetic and environmental quality of the area.

ANNUAL COST CONSIDERATIONS

The following O&M cost chart, Figure 1-6, identifies the activities, cost and frequency standards used to estimate an annual O&M cost for the Upper Reata Pass Wash, including trails, signs and related facilities.

UPPERREA.GRE

UPPER REATA PASS WASH – O & M ESTIMATE

Activity	Unit	Inventory	Cost Per Unit Meas.[1]			Total	Recommended Activity[2] Frequency Standard	Annualized Cost
			Labor	Equipt.	Material			
Multi-Use Path/Trail Inspection & Minor Maintenance	Mile	0.1	10.36	2.51	---	12.87	52 x per year	$66.92
Multi-Use Sweep	Mile	0.1	23.19	28.07	---	51.26	17 x per year	$87.14
Multi-Use Striping	LF of Path	528	---	---	---	0.35	1 x 3 years	$60.72
Multi-Use Signage	Sign	20	---	---	---	44.19	1 x 9 years	$98.20
Multi-Use Concrete Repair (10' wide)	SF of Repair	5,280	---	---	---	5.50	8% annually	$2,323.20
Vegetation Management	Mile X 100'	3.45	154.60	37.40	---	192.00	4 x annual	$2,949.60
Litter Control & Vandalism Repair	Mile X 100'	3.45	154.60	37.40	---	192.00	18 x annually[4]	$11,923.20
Sediment Removal	Sediment Basin & Bridges	3	631.50	365.10	---	996.60	1 x per major event	$2,989.80
Erosion Repair	Mile X 100'	3.45	421.00	291.60	250.00	962.60	1 x per major event	$3,320.97
Structural Repair	Location	2				10,500.00[3]	1 x per 5 years	$4,200.00
TOTAL								$28,019.57

1. Cost per unit measures obtained from City of Scottsdale Field Services
2. Recommended Activity Frequency Standards from City of Scottsdale Field Services, adjustments made to conform to flood control facilities
3. Obtained from Annual Average Cost figures Maricopa County Flood Control District for 1990-1994
4. Frequency of litter and vandalism activities can be reduced in no/low public access areas

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Figure 1-6

CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Reata Pass / Beardsley Wash
Operations and Maintenance

by: The Greiner Team

FINAL

The Desert Greenbelt

May 1995

SCOTTSDALE DESERT GREENBELT PROJECT
Reata Pass/Beardsley Wash
Operations and Maintenance

INTRODUCTION

The Reata Pass/Beardsley Wash study area encompasses both the Reata Pass Wash, below the Deer Valley Road alignment, and the Beardsley Washes. The Upper Reata Pass Wash, north of the Deer Valley Road alignment, is covered in a separate report. The Northern and Southern Beardsley Washes confluence with Reata Pass Wash from the east. Figure 1-1 shows the relationship of the study units and depicts the relative limits of the washes.

Portions of the washes are naturally contained while other portions disperse onto the desert floor. Most of the study area is currently privately owned unsubdivided land, but large parcels are in various planning stages. The future land use conditions will vary considerably from the existing undeveloped Sonoran Desert landscape.

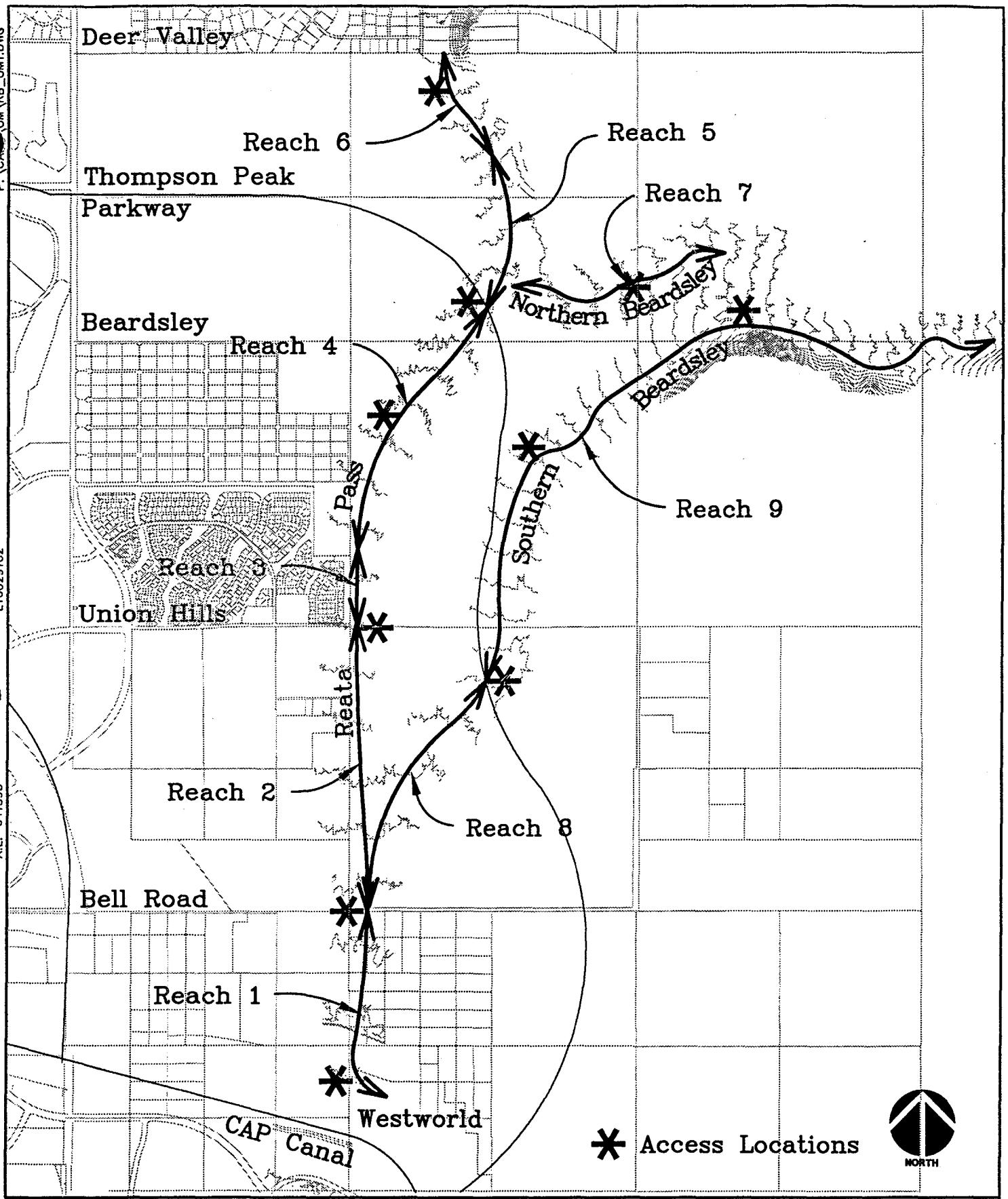
For Operations and Maintenance (O&M) purposes, the washes have been categorized by reach. Nine reaches have been designated. Reach cross-sections are presented in Figures 1-2 to 1-4.

- Reach 1 - The southern end of this reach is at the confluence of the Reata Pass Wash with the Westworld Channel. The reach extends northward, east of 96th Street following the alignment of the existing natural Beardsley Wash, to the confluence of Reata Pass Wash Desert Greenbelt Channel and Southern Beardsley Wash immediately upstream of Bell Road. The reach is about one-half mile long and is characterized as a broad, natural floodplain protected on the east and west by levees. A full-cut channel is located at the south end. A multi-use trail occupies the lower elevations. At a higher elevation but within the overbank, a paved multi-use path parallels the channel.

- Reach 2 - From the confluence of the Reata Pass Desert Greenbelt Channel and Southern Beardsley Washes, Reach 2 extends northerly, to the future Union Hills Road. The typical components of Reach 2 include a cut low-flow channel connecting existing washes, flanked by a multi-use trail and a paved multi-use path. The entire reach is contained within a broad corridor protected on the east and west banks by levees. The reach is about one mile in length.

- Reach 3 – The expanded Ironwood Channel north of the future Union Hills Drive constitutes this reach. The existing channel will be widened for full containment. The multi-use path/trail is on the east overbank.

- Reach 4 - Reach 4 starts from the overflow channel and continues northeast, terminating near where the future Thompson Peak Parkway will cross. The reach is about one mile in length. The reach is a broad, levee protected corridor with a natural low-flow channel, with a parallel multi-use trail and multi-use path.



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The Desert Greenbelt

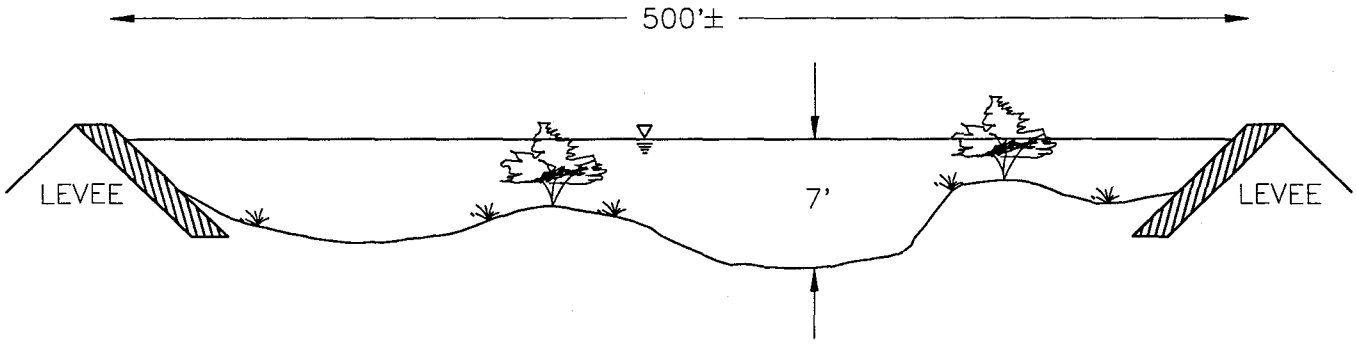
Reata Pass/Beardsley Wash Channel

Keymap

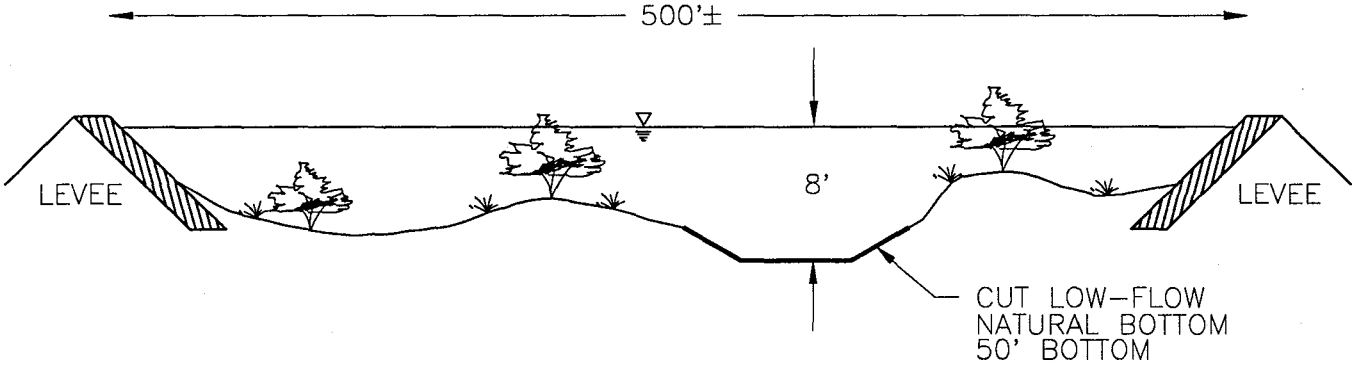
Not to Scale

Greiner

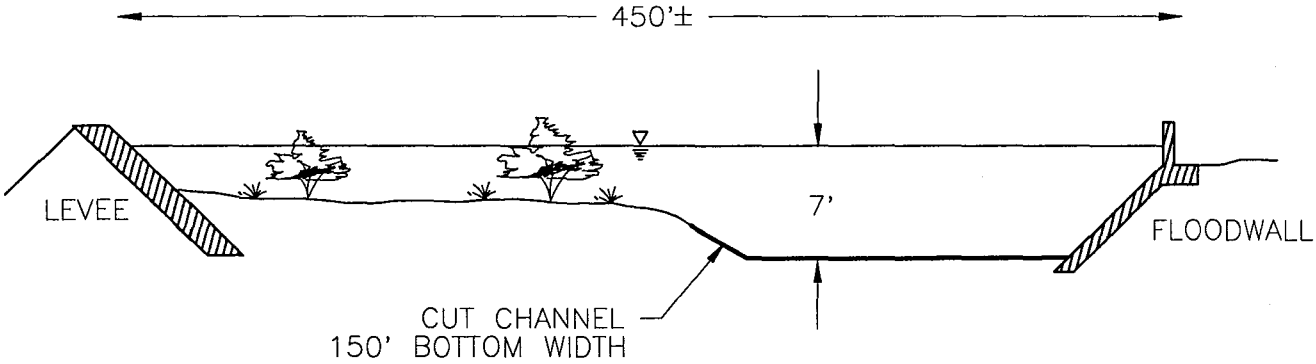
Figure 1-1



REACH 1



REACH 2



REACH 3

The Desert Greenbelt

Reata Pass/Beardsley Wash
Typical Section Variations
Reaches 1 thru 3

- Sections look downstream
- Levees may be covered with fill and revegetated in areas.

Not to Scale

Greiner

Figure 1-2

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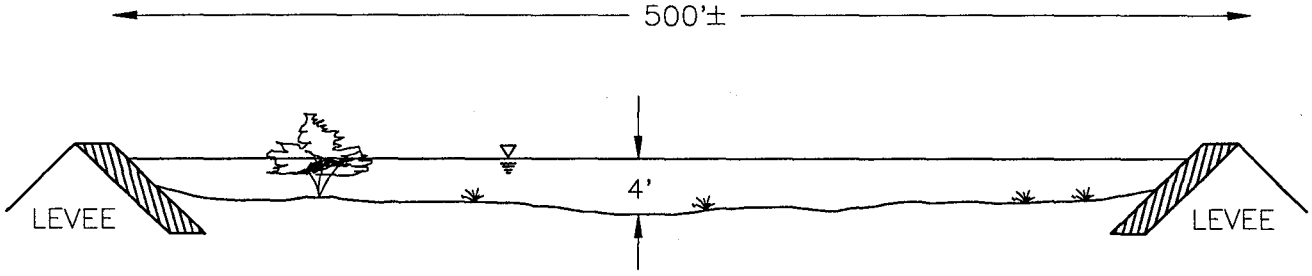
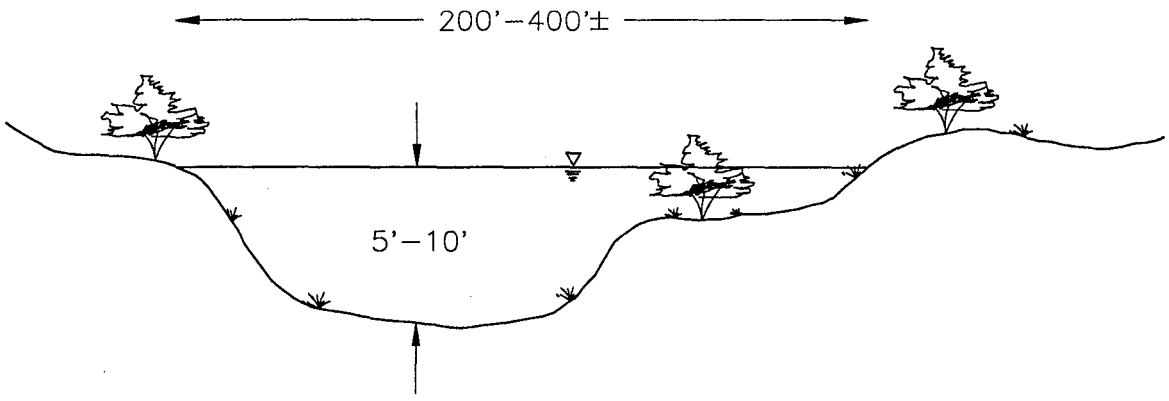
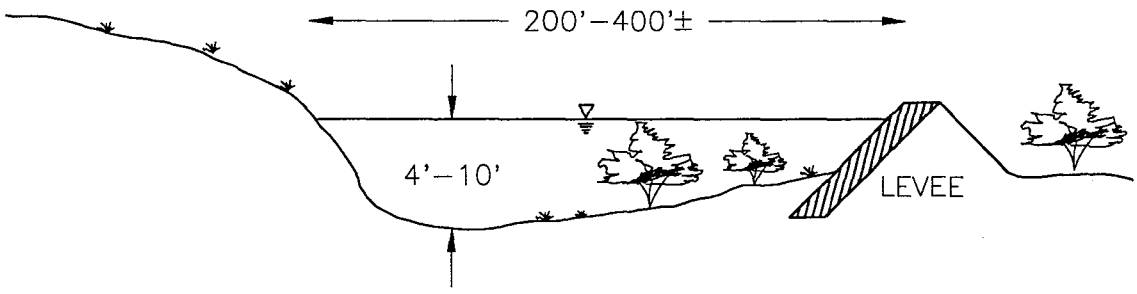


REACH 4



REACH 5



REACH 6

The Desert Greenbelt

Reata Pass/Beardsley Wash
Typical Section Variations
Reaches 4 thru 6

- Sections look downstream
- Levees may be covered with fill and revegetated in areas.

Not to Scale

Greiner

Figure 1–3

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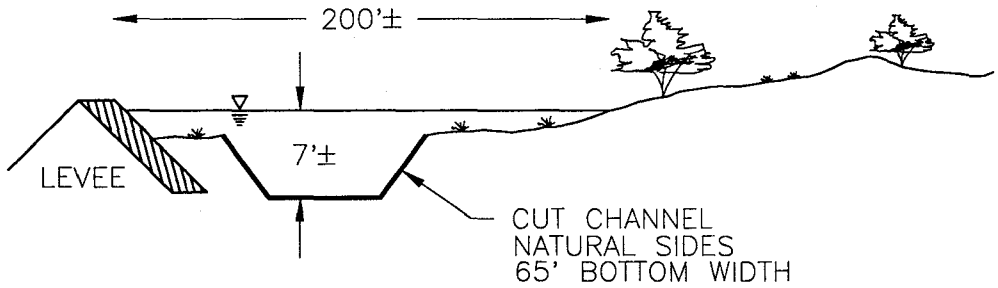
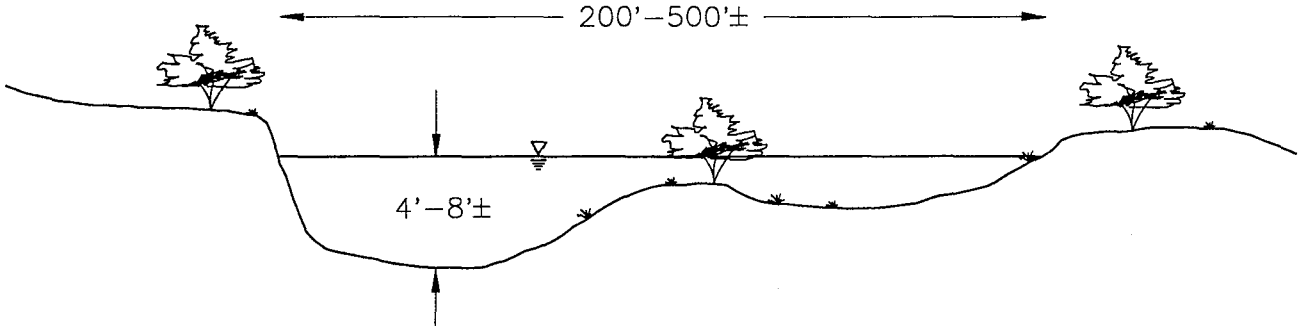
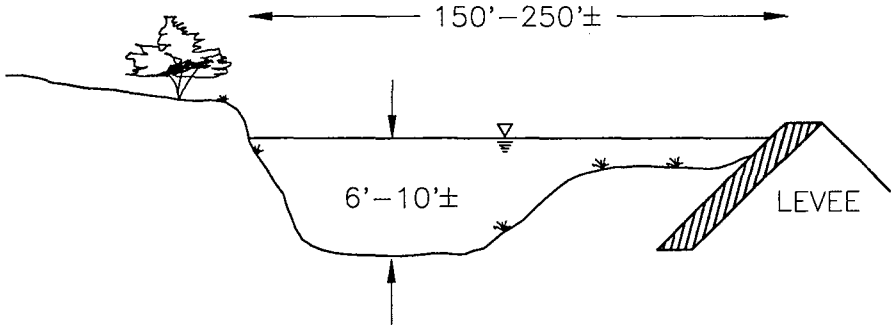


REACH 7



REACH 8



REACH 9

The Desert Greenbelt

Reata Pass/Beardsley Wash
Typical Section Variations
Reaches 7 thru 9

- Sections look downstream
- Levees may be covered with fill and revegetated in areas.

Not to Scale

Greiner

Figure 1–4

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- Reach 5 - This reach begins south of the future Thompson Peak Parkway and continues northerly about 3/4 mile. Although the wash is naturally contained in this reach, some channelization is required to effectively convey water under Thompson Peak Parkway. A paved multi-use path and a multi-use trail follow the low-flow channel.

- Reach 6 – This reach extends from the upstream end of the natural containment northerly to the Deer Valley Road alignment. The mountains provide containment to the east, but a levee is necessary on the west. The multi-use path and trail leave the channel and connect to the system at the west.

- Reach 7 - Generally following an overall east-west direction, Reach 7 lies upstream from a point where the future Thompson Peak Parkway and Reach 5 converge. The portion Northern Beardsley Wash within the Desert Greenbelt is Reach 7. This reach, about one-mile long, is a natural bottom with a cut controlled by natural containment at the north, and by a short overbank levee on the south.

- Reach 8 - Beginning at the northern end of Reach 1 near Bell Road, Reach 8 advances upstream along Southern Beardsley Wash in a north-northeast direction to the future Thompson Peak Parkway alignment. The configuration of this reach varies between 200 and 400 feet wide, and it is natural contained and approximately one mile in length. A multi-use trail meanders within the corridor.

- Reach 9 – This reach extends for over two miles from Thompson Peak Parkway to the upstream end of Southern Beardsley Wash. A levee is required for containment along most of the northwest bank. The mountains provide natural containment on the southeast bank. A multi-use trail follows the bottom of the wash.

INSPECTION AND ACCESS

Observation and inspection of the Reata Pass/Beardsley Wash should be made during major storm events by a City of Scottsdale official. Since the majority of the Reata Pass/Beardsley Wash are undeveloped areas, vehicular access may be restricted until cross roads are completed. Most access points are from major roads; other locations will be more clearly defined during development of the larger properties. Figure 1-1 displays maintenance access locations.

Several land developments are proposed at the access points. Extensions to Beardsley Road, Union Hills Drive, Bell Road and the planned Thompson Peak Parkway will improve access.

INSPECTION FREQUENCY

- Inspection of flood control structures, i.e., channel, should be made annually in the spring and after major storms for all reaches.

- Inspection of vegetation, trails and other areas should be made seasonally and after major storms.

- Paths should be inspected weekly and swept monthly.

VEGETATION MANAGEMENT

Reach 1

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary and encourages the health of plant material, protects wildlife habitat or preserves scenic and open space values.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may pose clogging problems for downstream sections. Unnatural litter should be removed.

- Obstructions along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users.

- Active multiple uses of the trails place greater stress on the natural system. Frequent evaluation of plant material should be conducted.

- Naturally occurring plant material should be maintained in the cut channel (natural bottom), if not affecting stormwater conveyance.

Reach 2

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance, outside of excavated low-flow channels.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary. Efforts should be focused within the low-flow channel, leaving the overbanks in a near natural state.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may pose clogging problems for downstream sections. Unnatural litter should be removed, but natural revegetation should be allowed to continue.

- Obstructions along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail uses.

Reach 3

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance outside of excavated channels.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary and encourages the health of plant material, protects wildlife habitat or preserves scenic and open space values.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may pose clogging problems for downstream sections. Unnatural litter should be removed, but natural revegetation should be allowed to continue.

- Obstructions along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail uses.

- Naturally occurring plant material should be maintained in the cut channel (natural bottom), if not affecting stormwater conveyance.

Reach 4

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary and encourages the health of the plant material, protects wildlife habitat or preserves scenic and open space values.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may pose clogging problems for downstream sections. Unnatural litter should be removed.

- Obstruction along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users.

- Trees and shrubs located along the channel and within the overbank area should remain in their natural condition.

Reach 5

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary. Regular preemptive cutting of lower branches and removal of large shrubs may be required within the sandy bottom wash. Banks may be left in a near natural state.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size that they may pose clogging problems for downstream sections. Unnatural litter should be removed.

- Obstructions, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users in the low flow areas and adjacent to paved multi-use paths.

- High velocities and high use, especially near the planned Thompson Peak Parkway crossing and confluence of Reach 5, may create greater potential for erosion and stress on plant material. More frequent inspection of plant material should be planned in this area.

Reach 6

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary. Regular preemptive cutting of lower branches and removal of large shrubs may be required within the sandy bottom wash. Banks may be left in a near natural state.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size that they may pose clogging problems for downstream sections. Unnatural litter should be removed.

- High velocities may create greater potential for erosion and stress on plant material. More frequent inspection of plant material should be planned in this area.

Reach 7

- Trees, shrubs, cacti and other native plant material should be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance, outside of excavated channels.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary. Efforts should be focused within the cut channel, leaving the overbanks in a near natural state.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may

pose clogging problems for downstream sections. Unnatural litter should be removed, but natural revegetation should be allowed to continue.

- Obstruction along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users, in accordance with Multi-use Paths and Trails Report.

Reach 8

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary and encourages the health of plant material, protects wildlife habitat or preserves scenic and open space values.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may pose clogging problems for downstream sections. Unnatural litter should be removed.

- Obstructions along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users.

Reach 9

- Trees, shrubs, cacti and other native plant material shall be maintained to encourage health of the existing plant material, wildlife-habitat value and natural appearance.

- Trimming of trees and shrubs required to maintain floodwater conveyance should be limited to that which is necessary and encourages the health of plant material, protects wildlife habitat or preserves scenic and open space values.

- Naturally occurring tree, plant and cactus litter, such as branches or limbs, should be left to maintain a natural appearance unless of a sufficient size and unstable condition that they may pose clogging problems for downstream sections. Unnatural litter should be removed.

- Obstructions along trails, such as low branches, should be removed as necessary to maintain adequate clearance for multi-use trail users.

- Trees and shrubs located on the overbank should remain in their natural condition.

FLOOD CONTROL

Periodic evaluation should be made to determine if repetitive occurrence can be solved with design modification for all reaches.

Reach 1

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Major sediment deposition, considered to affect the design conveyance capacity, must be removed. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications must maintain the design conveyance capacity and should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as inlets, levees and energy dissipators must be repaired as soon as possible to prevent or minimize further damage.

- Bank protection and stabilization materials, such as concrete, soil cement and levees, must be repaired as soon as possible. Repairs should retain the aesthetic and environmental quality of the area.

Reach 2

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications must maintain the design conveyance capacity and should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the low-flow channel banks and levee, must be repaired as soon as possible to prevent or minimize further damage.

Reach 3

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area. Repairs should maintain the high visual quality of the channel.

- Stormwater conveyance structures, such as the bridge at Union Hills Drive, the cut channel bank protection and the levee/floodwalls must be repaired as soon as possible to prevent or minimize further damage.

- Sediment deposition should be investigated for removal after any considerable flow within the cut channel.

- Bank protection and stabilization materials, such as concrete, soil cement and levees, must be repaired as soon as possible. Repairs should retain the aesthetic and environmental quality of the area.

Reach 4

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications must maintain the design conveyance capacity and should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the low-flow channel banks and levee, must be repaired as soon as possible to prevent or minimize further damage.

Reach 5

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the bridge at Thompson Peak Parkway, must be repaired as soon as possible to prevent or minimize further damage.

Reach 6

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

- Stormwater conveyance structures, such as the levee and potential wet crossings for the development, must be repaired as soon as possible to prevent or minimize further damage.

Reach 7

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Large rocks may be left in the channel unless causing a backwater problem. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the levee/floodwall, must be repaired as soon as possible to prevent or minimize further damage.

- Bank protection and stabilization materials must be repaired as soon as possible.

Reach 8

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Large rocks may be left in the channel unless causing a backwater problem. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

Reach 9

- Emergency and small-scale modifications may be made to the channel to maintain floodwater conveyance. Minor sediment deposition may be removed as necessary and used as fill elsewhere or taken to a landfill. Large rocks may be left in the channel unless causing a backwater problem. Local scour holes should be filled. Any maintenance modifications should retain the aesthetic and environmental quality of the area.

- Damage to stormwater conveyance structures, such as the levee/floodwall, must be repaired as soon as possible to prevent or minimize further damage.

FLOOD WARNING & CLOSURE DEVICES

- City of Scottsdale flood warning procedures should be followed.

- Closure devices could be designed at bridges, drop structures and other likely entry points to the floodway. Barricades and warning signs should be placed at locations where permanent closure devices are impractical.

- As the adjacent area becomes more densely developed, the need for warning and closure devices becomes more critical; however, these devices could be designed along with crossing and drainage structures.

ANNUAL OPERATIONS & MAINTENANCE COSTS

Operations and maintenance costs for flood control channels and appurtenances are dependent on many factors such as intensity and frequency of storm events, age and condition of facilities, preventative maintenance practices and quality of construction.

The Reata/Beardsley Wash System will retain much of the existing natural conditions after construction of levees and flood containment devices.

In the area where natural containment can be employed, such as much of Reach 6, maintenance and operation costs should be minimized. The emphasis of maintenance activities should be on monitoring and encouraging the health of the natural ecosystem through periodic vegetation management practices.

The following charts (Figures 1-5 and 1-6) provides an estimated annual cost of generalized maintenance and operation activities.

REATO&M.GRE

CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Sediment Field Tests

by: The Greiner Team

The Desert Greenbelt

SCOTTSDALE, ARIZONA

OCTOBER 1994

INTRODUCTION

Sediment samples were collected for all reaches within the Desert Greenbelt corridors. Each sample was taken for a reach of similar sediment characteristics. In sandy areas, the sample was collected from about one to two feet below the existing grade and a sieve test determined the gradation. In areas of larger sediment, a pebble counting method, a variation of Wolman's technique, was used to determine gradation. The results for each sample are included in this report. The results are divided into sections by wash area. Each section begins with a map identifying the sediment sample locations by number corresponding to the gradation results.The weight gradations will be used as the reach sediment pool in HEC-6.

In washes of a high degree of variance in gradation results, graphical representations of the weight gradation, sieve size versus percent passing by weight, are included. Areas of high variance include reaches for which the pebble counting method was used. The gradation of sediment size by number of particles in transformed to gradation by weight by applying a spherical volume to each particle. In washes of a low degree of variance, graphical representations for the most coarse and most fine samples are included.

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Section 1	Rawhide Wash (maps 1&2)
Section 2	Upper Reata Wash (map 3)
Section 3	Lower Reata Wash (map 4)
Section 4	Middle Reata Wash (map 5)
Section 5	Beardsley Wash (map 6)
Section 6	Pima Road Channel (map 7-9)

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CITY OF SCOTTSDALE DESERT GREENBELT PROJECT

Upper Reata Pass Wash Preferred Alternative

by: The Greiner Team

DO NOT REMOVE

The Desert Greenbelt

SCOTTSDALE, ARIZONA

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17756
SHI-EN
SHIAU
Date Signed 3-21-95
ARIZONA, U.S.A.

MARCH 1995

CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

PREFERRED ALTERNATIVE REPORT

Introduction

Scottsdale enjoys a wealth of natural beauty, history and Arizona culture that is embodied in its rugged mountains and desert environment. In keeping with its image, the City made the decision to implement a policy to effectively manage stormwaters, on a regional basis while providing passive recreational opportunities for the community in a natural desert setting. The concept of the Desert Greenbelt offers North Scottsdale the opportunity to blend effective flood control and open space amenities within the environmentally sensitive desert landscape, while balancing homeowner concerns, development objectives, public safety, public landholder requirements and City-wide goals.

In November 1992, the Scottsdale City Council adopted an amendment to the Drainage Element of the ***General Plan*** which established the Desert Greenbelt concept and the proposed corridors. The Desert Greenbelt will use natural washes wherever possible and preserve the rugged character of the surrounding desert environment. The Desert Greenbelt system for this project is being designed to contain the 100-year alluvial fan flood hazard which currently exists in Scottsdale north of the CAP Canal.

In July, 1993, the City retained the Greiner Team to perform the ***Desert Greenbelt Preliminary Design and Analysis.*** The study includes three individual project corridors: Rawhide Wash, Pima Road Channel and Reata Pass/Beardsley Wash, which includes the Upper Reata Pass Wash (Figure I-1). The project has included four phases: Identifying the Concepts; Developing the Concepts; Consolidating the Concepts; and Final Refinement/Preliminary Design. Each phase includes Public Participation; Environmental Analysis; Visual, Multi-Use Recreation and Land Use Evaluation; Hydrology/Hydraulic Engineering; and Funding Alternatives. These phases included:

- Identifying Concepts - data gathering, survey/mapping, review of various treatments and alternatives (see Snapshot Report)

- Developing the Concepts - full-scale alternatives developed, integrated pubic concerns, refined hydrologic/hydraulic analyses (see Specific Option Report)

- Consolidating the Concepts - identified specific issues and remedies, presented specific recommendations regarding identifiable environmental, aesthetic, planning, land-use, recreational and hydraulic issues

- Final Refinement/Preliminary Design - preliminary 10-percent design drawings; final environmental analysis and mitigation plan; address public involvement issues; estimates of capital, operation and maintenance costs and funding mechanisms.

This Preferred Alternative Report along with its accompanying addenda represents the culmination of this effort. Upon receiving final public comment on these documents, the final 10-percent Preliminary Design Drawings will be completed and presented to Council, providing direction for the full implementation of the **Scottsdale Desert Greenbelt Projects.**

UPPER REATA PASS WASH PREFERRED ALTERNATIVE REPORT

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CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

UPPER REATA PASS WASH
PREFERRED ALTERNATIVE REPORT

Definition of the Alternative

The alluvial fan apex was originally identified as the upstream extent of the Upper Reata Pass Wash project. In response to further engineering analysis performed by a City consultant, the point of Desert Greenbelt project construction required for floodwater containment has been moved further upstream to include the proposed Pinnacle Peak Road bridge (Station 19+50). The proposed major improvements above the apex (Station 32+00) consist of stabilization of erodible banks. A levee (west of Station 33+00) was positioned to contain the southwest flow from the apex. Beginning at the apex, a low-flow channel is designed to revert flows to the south along a secondary wash. Between Stations 30+00 and 48+00, improvements consist of the low-flow channel with overbank floodwalls. Transition to the Foothills Drive bridge begins at Station 48+00. A major feature in this area is the transition from the low-flow channel with natural overbanks to a full-cut cross-section. The constructed flow-line returns to the natural flow-line at Station 61+00. On the west bank from Station 58+00 to 63+00, erosion protection is necessary although natural containment exists. The east bank is naturally contained and protected by the rocky mountain slopes from Station 60+00 to 76+36.77. Natural containment on the west bank is lost at Station 64+50. A combination expanded channel width and levee will provide containment from this point south. Although the Upper Reata Pass Wash designation ends at Station 76+36.77, the channel improvement and levee will be extended south to connect with a ridge on the Reata/Beardsley Wash as part of a phased approach. The plan sheets for the Upper Reata Pass Wash are Sheets UR1, UR2, and UR3.

Selection Rationale

Station 13+00 to 40+00 (See Sheet UR1)

Objectives/Issues

- A bridge is proposed at the Pinnacle Peak Road crossing which will convey the floodwaters to provide access for residents to the east and containment at the west
  - A floodwall/levee training dike is required to cut-off the western breakout overtopping at Pinnacle Peak Road
  - Trail clearance is required under the bridge
  - Relocate the existing channel grade drop from south of Pinnacle Peak Road to north of Pinnacle Peak Road

- Design drop structure to accommodate multi-use trail users
- In the vicinity of the bridge, roadway approaches may need to be raised

- Recreational features are limited to the portion of wash upstream of Station 36+00
  - A multi-use trail is the only recreation feature included in Upper Reata Pass Wash
  - The multi-use trail transitions, from easements to the southwest, into the Desert Greenbelt System near Station 33+00
- The need and selected technique for slope stabilization
  - The existing slope and bank condition is highly erodible
  - Existing facilities require protection
  - Due to the Pinnacle Peak Road crossing and the multi-use trail, the area is highly visible
  - Recommend subsurface bank protection with revegetation
- Containment of flow at the apex
  - Provide levee along the west side of the channel to tie together existing ridges which cuts off flow to the southwest
  - Protect slope of levee against scour and erosion
  - Through contouring and revegetation blend engineered structure into the natural ridges
  - Combined trail/maintenance access is to be provided across the levee

Hydrology and Hydraulics Summary

- With the exception of the potential breakout at the Pinnacle Peak Road crossing, the wash is naturally contained upstream of the apex
- The supercritical flow of 11,236 cubic feet per second (cfs) is shallow (up to 3 to six feet in depth) and wide (200 to 400 feet) with velocities of 16 to 22 feet per second (fps)

Constraints/Public Comment

- Upstream of Station 27+00 decrease corridor width due to physical constraints of mountain ridges and existing structures
  - High flows impact infrastructure and existing structures on unprotected erodable banks
  - Homeowners east of the wash are endangered by road flooding restricting access
  - Owners of impacted structures request bridge and other improvements to eliminate flooding of property.
  - Aesthetics of improvements are of prime concern
  - Trail corridor delineation to encourage travel on designated trails only

Benefits/Impacts

- Containment of the 100-year storm event within the designated drainage corridor eliminates Federal Emergency Management Agency (FEMA) designated flood hazard areas outside the channel
- An all-weather crossing for residents east of the wash
- Stabilization of banks provides erosion protection to structures
- Grade separation of trail crossing at Pinnacle Peak Road

Sections 30+00 to 48+00 (See Sheets UR1 and UR2)

Objectives/Issues

- Retain character of existing braided broad washes
  - Preserve maximum amount of existing vegetation practicable
  - Select containment method with least impact
- Containment
  - Combination of levee and flood wall preferred

- Avoid impacting existing vegetation
- Blend with natural features

- Facilitate flow/sediment movement
  - Deepen and widen existing wash bottom
  - Stabilize nose of vegetation islands (only as needed, due to erosion potential)

Hydrology/Hydraulics Summary

- The majority of flow is within the low-flow channel
- Depths within the low-flow channel are up to 6 to 7 feet with velocities near 25 fps in the supercritical regime
- The overbank area conveys 1 to 2 feet of flow depth at lower velocities of near 10 fps

Constraints/Public Comment

- Downstream of Station 31+00, construction of a low-flow channel is necessary
  - The proposed alignment follows existing sandy bottom wash
  - Selected alignment will minimize impact to existing vegetation
- Adjacent property owners desire retention of existing desert wash character
  - Access is required for residents and wildlife across floodwall/levee
  - The lowest possible height of floodwall/levee is preferred

Benefits/Impacts

- Building envelopes on adjacent lots remain fully usable
- Most vegetation and overall wash character will remain
- Widening of sandy bottom wash to accommodate low-flow channel will have some adverse visual impact
- Containment of the 100-year storm event within designated drainage corridor eliminates FEMA designated flood hazard areas outside the channel

Station 48+00 to 61+00 (See Sheet UR2)

Objectives/Issues

- A full-cut channel is required in this high-ground area to link upstream and downstream natural wash segments
  - A bridge will be provided at the Foothills Drive crossing
  - Channel capacity will contain the 100-year storm event
- The proposed channel joins an existing wash at Station 61+00
  - The flow-line of the proposed channel must meet the existing natural wash
  - Accommodate the flow from the existing natural wash
- The need and selected technique for slope stabilization
  - The existing soils are highly erodible
  - Existing public and private structures require protection
  - Due to the Foothills Drive crossing, the area is highly visible
  - Recommend high level of armoring on side slopes due to high velocities

Hydrology/Hydraulics

- The supercritical flow is totally contained within the full-cut channel
- Depths are up to 7 feet with velocities near 27 fps

Constraints/Public Comment

- The proposed channel alignment impacts two existing vacant lots north of Foothills Drive and highly impacts three to the south
  - It is desired to retain viable building envelopes on as many lots as feasible
  - Neighborhood desires lots and envelopes to retain similar sizes in conjunction with the subdivision

- Proposed channel alignment has been refined in response to comments from adjacent neighbors, and is intended to minimize viewshed and environmental impacts while providing the required engineering criteria
- The neighborhood desires erosion control techniques which blend with the natural desert character

Benefits/Impacts

- Provision of all-weather access on Foothills Drive for residents to the east
- Retention of viable building envelopes on four of the five impacted lots
- Containment of the 100-year storm event within designated drainage corridor eliminates FEMA designated flood hazard areas outside the channel

Stations 61+00 to 76+36.77 (See Sheets UR2 and UR3)

Objectives/Issues

- Protect existing erodible banks
- Provide containment downstream of Station 65+00
  - Widen natural channel where necessary to minimize height of floodwall
- Retain existing tree masses to extent practicable
  - Stabilize nose of vegetation islands as necessary
- Provide transition downstream of Station 76+36.77 to the Reata/Beardsley Wash
  - Containment downstream of Station 76+36.77 is lacking
  - Construction of approximately 1500 feet of floodwall below Station 76+36.77 along the western overbank will provide containment by linking the floodwall in Upper Reata pass Wash with a ridge to the south, adjacent to a natural channel
- Northbound multi-use path/trail users from Reata/Beardsley Wash will be delivered to western routes south of Station 76+36.77

Hydrology/Hydraulics Summary

- The supercritical flow of 11,746 cfs is naturally contained at the upstream end of this section
- A combination of channel widening and floodwall/levees provide containment along the downstream end of this section
- Maximum depths range from 6 to 8 feet with velocities from 15 to 20 fps

Constraint/Public Comment

- Natural undulating character of the wash requires several design concepts
- Retaining viable building envelopes on adjacent lots
- Preserve existing vegetation in natural wash to extent practicable
- Control direction of flow below Station 0+00 to prevent increased flood hazard to the southwest
- Design of multi-use trail/path to south should insure users to be aware of no access through this portion of the wash

Benefits/Impacts

- Vacant lots along western side of channel are fully developable
- Containment of the 100-year storm event within designated drainage corridor eliminates FEMA designated flood hazard areas outside the channel

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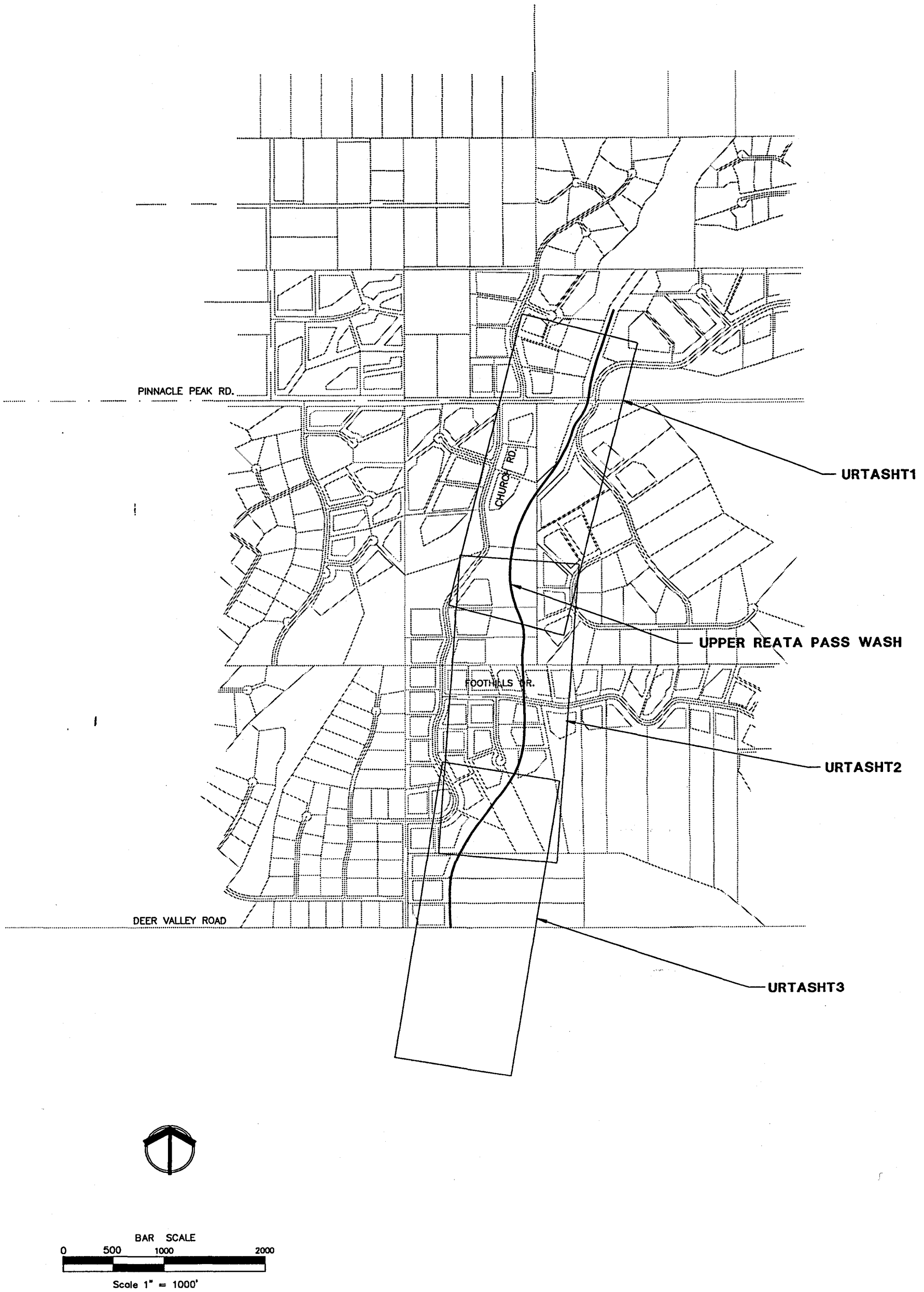


The Desert Greenbelt

DRAWING NO. Key1 of Key1

PROJECT NAME
Upper Reata Pass Wash

DRAWING TITLE
Preliminary 10% Plans

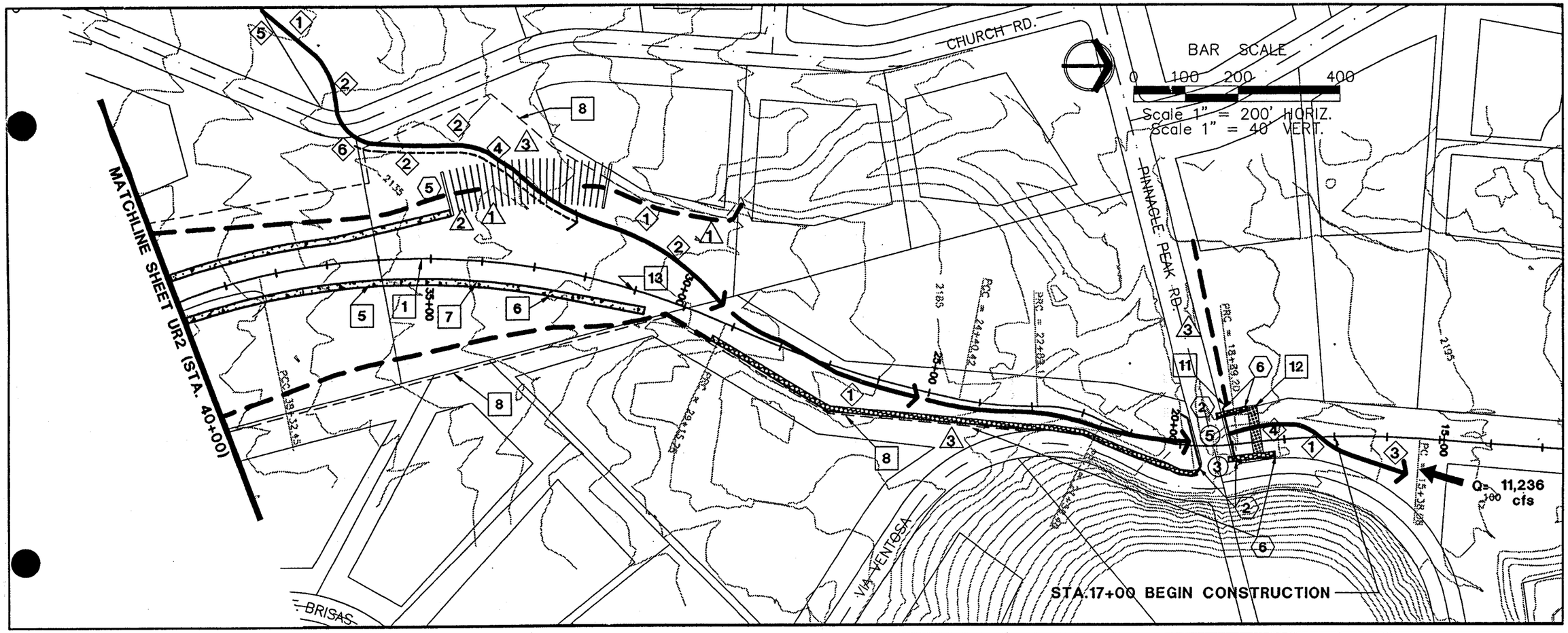
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

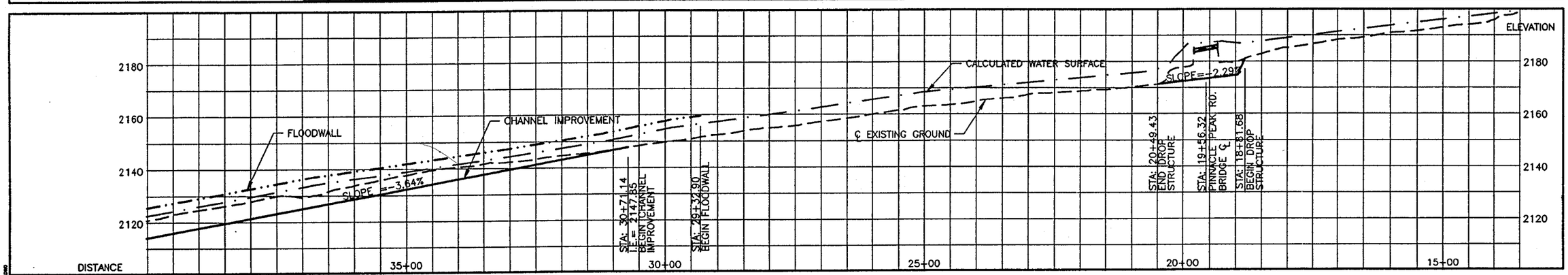
ENGINEERS

SEAL

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED R.E.P.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.





CHANNEL IMPROVEMENTS

1. CHANNEL CENTERLINE
5. 2:1 SIDE SLOPE (TYP.)
6. TOP OF LOW-FLOW SIDE SLOPE, VARIES. (TYP.)
7. TOE OF LOW-FLOW SIDE SLOPE, VARIES. (TYP.)
8. DRAINAGE RIGHT OF WAY/EASEMENT.
11. PINNACLE PEAK RD. BRIDGE/CULVERT. (DESIGNED BY OTHERS)
12. STA. 17+80, CONSTRUCT 5' DROP STRUCTURE OF REINFORCED CONCRETE WITH ENERGY DISSIPATOR.
13. STA. 31+00, BEGIN LOW FLOW CHANNEL.

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES.
2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM.
4. TRAIL ACCESS OVER FLOODWALL/LEVEE.
5. TRAIL WITHIN EASEMENTS.
6. LOCATE ROAD CROSSING FOR. OPTIMUM SIGHT LINES.

LAND USE

1. IMPROVEMENTS DESIGNED TO FACILITATE WASH ACCESS FOR ADJACENT PROPERTY OWNERS.
3. BRIDGE/BOX CULVERT PROVIDES AN ALL WEATHER CROSSING.
5. GRADE SEPARATED MULTI-USE TRAIL CROSSING.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION.
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM.
3. COLOR, FORM, AND TEXTURE BLEND W/ THE DESERT SETTING.

AESTHETIC APPLICATIONS

2. EXTENDED WING WALL.
5. SOIL RAMP OVER FLOODWALL.
6. FAUX ROCK.

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- BANK PROTECTION
- DROP STRUCTURE
- CONCRETE
- FLOODWALL
- LEVEE
- CHANNEL RIGHT OF WAY
- 5' CONTOURS

REVISIONS	DATE	BY	AUTH.

PROJ. NO. EO29102
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ENGINEERS

SEAL

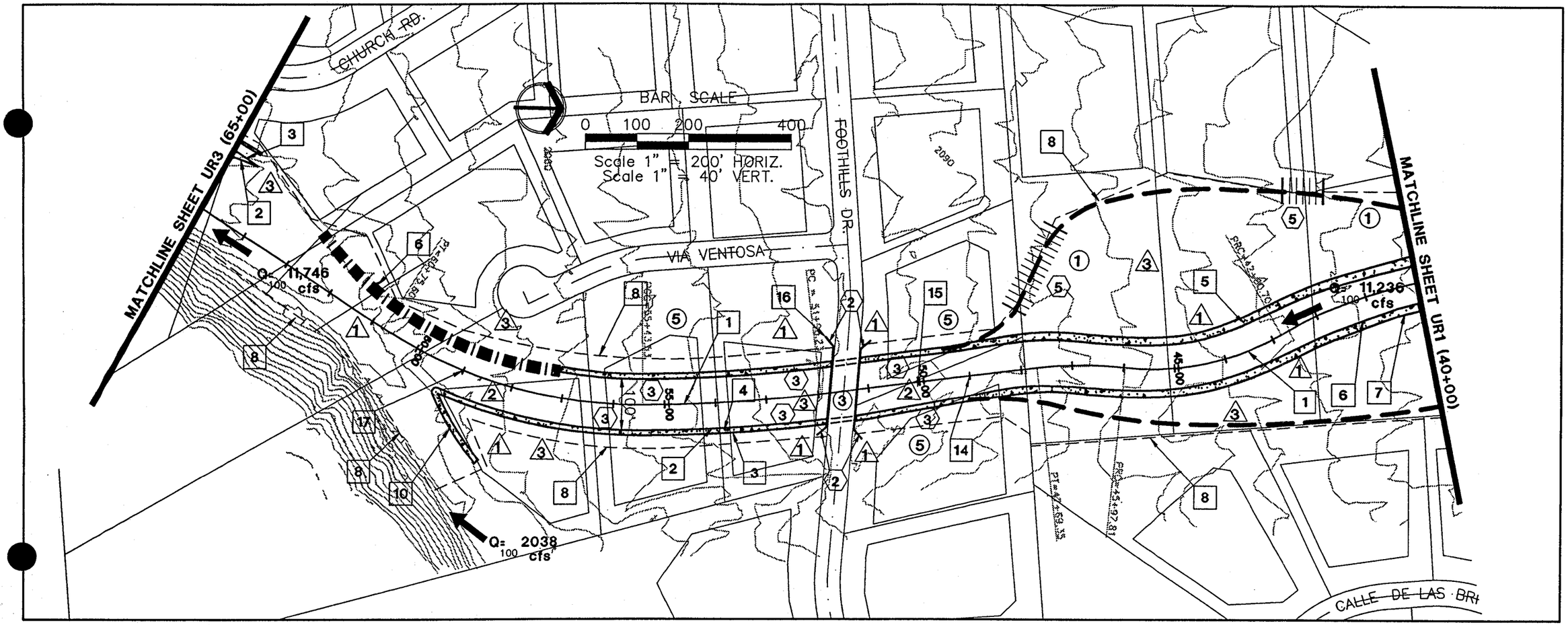
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

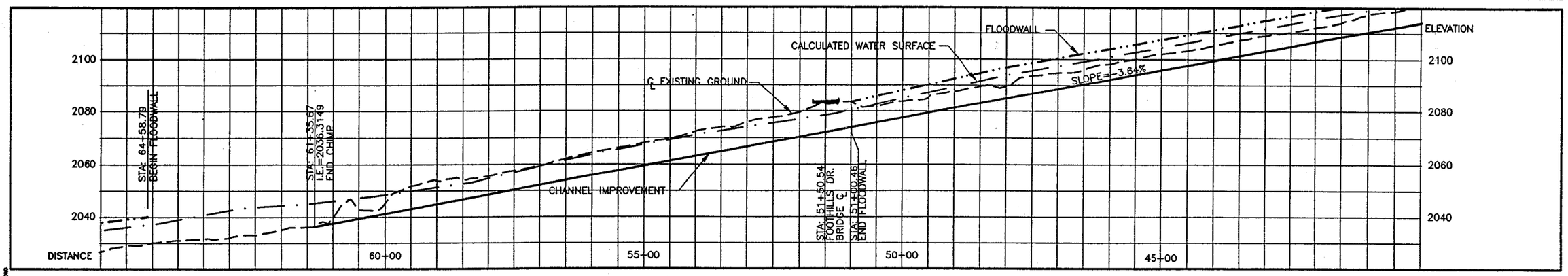
PROJECT NAME: Upper Reata Wash

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. UR1 of UR3

The Desert Greenbelt





CHANNEL IMPROVEMENTS

1. CHANNEL CENTERLINE
2. TOE OF CHANNEL IMPROVEMENT.
3. TOP OF CHANNEL IMPROVEMENT.
4. 1:1 SIDE SLOPE.
5. 2:1 SIDE SLOPE (TYP.)
6. TOP OF LOW-FLOW SIDE SLOPE, VARIES. (TYP.)
7. TOE OF LOW-FLOW SIDE SLOPE, VARIES. (TYP.)
8. DRAINAGE RIGHT OF WAY.
9. SUBSURFACE SCOUR CUT OFF WALL.
10. WRAP CUT CHANNEL SIDE SLOPE INTO TRIBUTARY BANK.
14. AT STATION 49+00, BEGIN TRANSITION TO FULL CUT CHANNEL.
15. AT STATION 50+00, END TRANSITION.
16. CONSTRUCT BRIDGE AT FOOTHILLS DRIVE.
17. AT STATION 59+00, END FULL CUT CHANNEL.

PATHS / TRAILS

LAND USE

1. IMPROVEMENTS DESIGNED TO FACILITATE WASH ACCESS FOR ADJACENT PROPERTY OWNERS.
3. BRIDGE/BOX CULVERT PROVIDES AN ALL WEATHER CROSSING.
5. GRADE SEPARATED MULTI-USE TRAIL CROSSING.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION.
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM.
3. COLOR, FORM, AND TEXTURE BLEND W/ THE DESERT SETTING.

AESTHETIC APPLICATIONS

2. EXTENDED WING WALL.
3. BENCHING INTO SLOPE.
5. SOIL RAMP OVER FLOODWALL.

LEGEND

- BANK PROTECTION
- BURIED FLOODWALL
- CONCRETE
- FLOODWALL
- LEVEE
- CHANNEL RIGHT OF WAY
- 5' CONTOURS

AUTH.	BY	REVISIONS	DATE

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED R.E.P.
SCALE: AS NOTED

ENGINEERS

SEAL

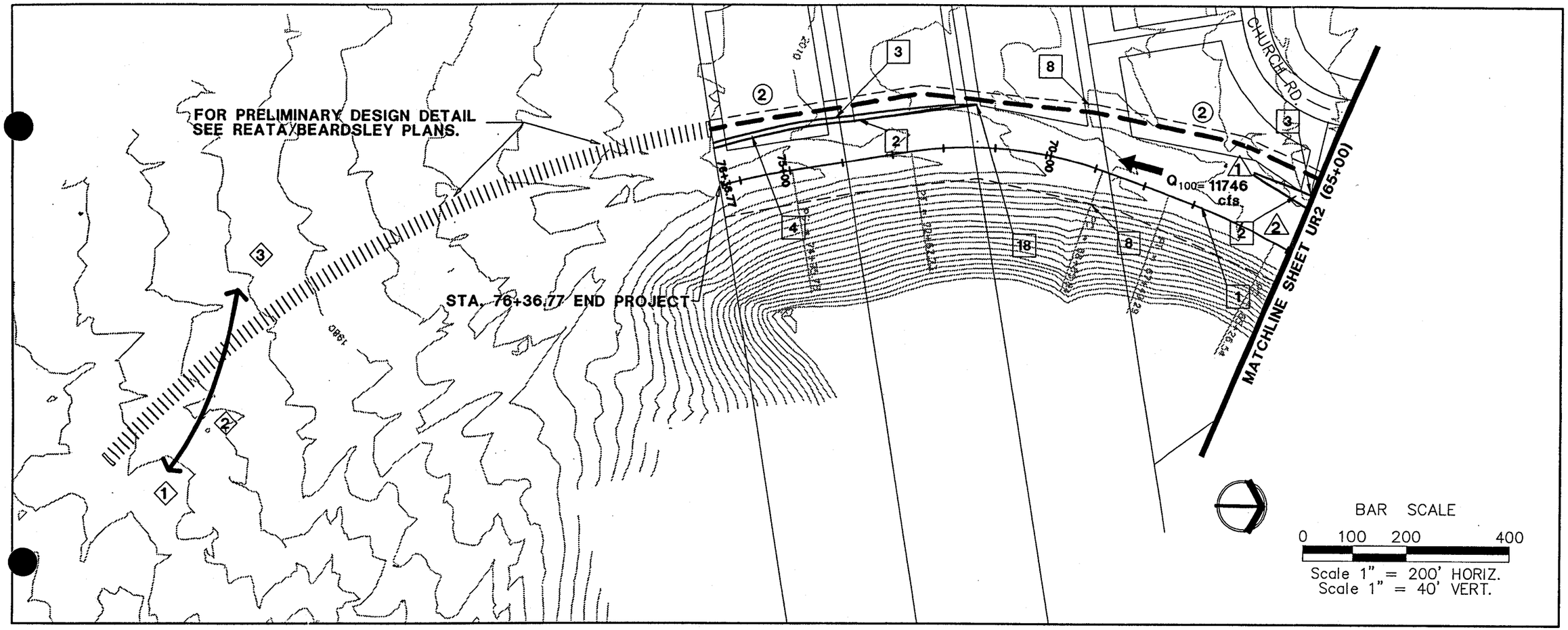
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

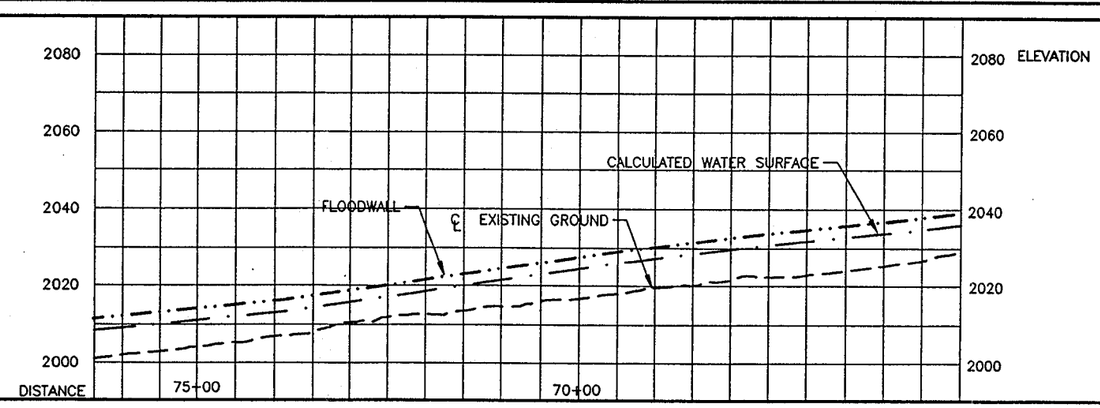
PROJECT TITLE: Upper Reata Wash

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
UR2 of UR3

Desert Greenbelt





HYDROLOGY/HYDRAULICS

1. CHANNEL CENTERLINE.
2. TOE OF CHANNEL IMPROVEMENT.
3. TOP OF CHANNEL IMPROVEMENT.
4. 1:1 SIDE SLOPE.
5. DRAINAGE R.O.W.
   STA.71+36 TO STA. 76+36, BANK IMPROVEMENTS

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES.
2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. TRANSITION NORTHBOUND TRAIL TO ALIGNMENT TO BE DETERMINED.

LAND USE

1. IMPROVEMENTS DESIGNED TO FACILITATE WASH ACCESS FOR ADJACENT PROPERTY OWNERS.
2. LOCATE EROSION PROTECTION TO RETAIN BUILDABLE PARCEL.
3. BRIDGE /BOX CULVERT PROVIDES AN ALL WEATHER CROSSING.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION.
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM.
3. COLOR, FORM, AND TEXTURE BLEND W/ THE DESERT SETTING.

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- FLOODWALL
- LEVEE
- CHANNEL RIGHT OF WAY
- 5' CONTOURS

AUTH.	BY	REVISIONS	DATE

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED R.E.P.
SCALE: AS NOTED

ENGINEERS

SEAL

Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

PROJECT NAME: Upper Reata Wash

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
UR3 of UR3

Desert Greenbelt

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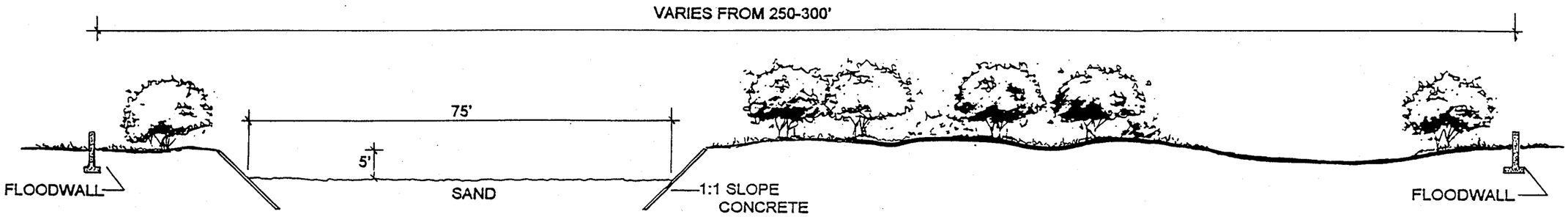
CRT GREENBELT

CHANNEL NORTH OF FOOTHILLS DRIVE



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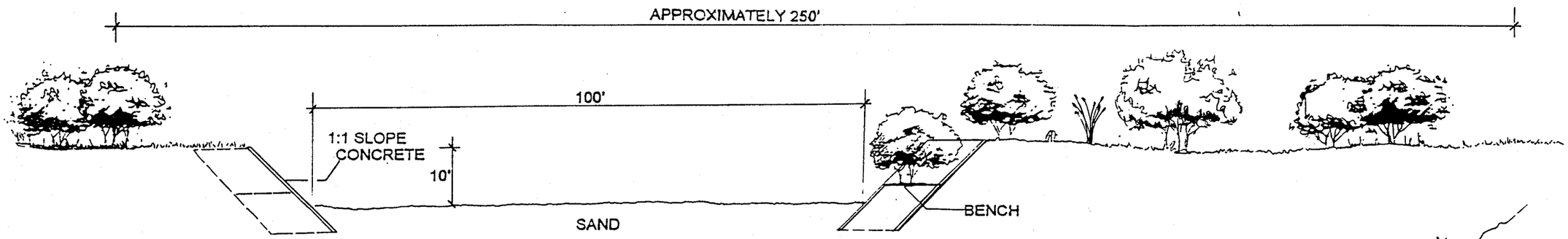

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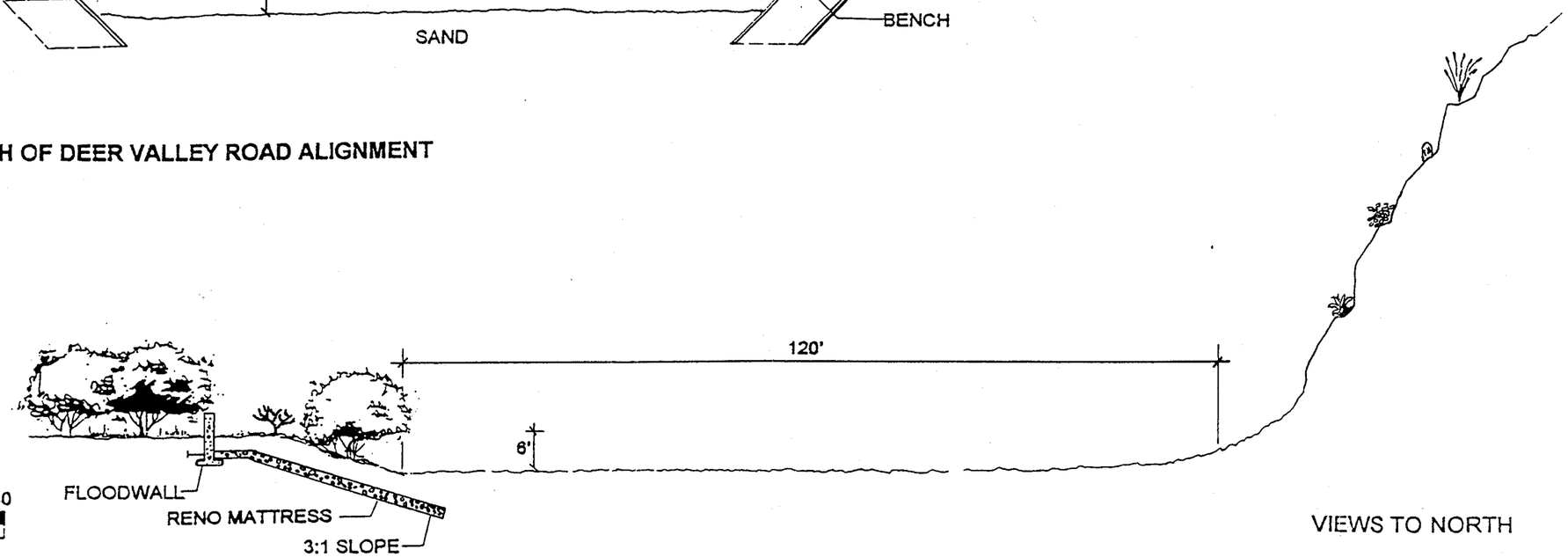

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SCALE IN FEET

VIEWS TO NORTH

CROSS SECTIONS OF UPPER REATA CHANNEL

The Desert Greenbelt

CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

Reata Pass / Beardsley Wash
Preferred Alternative Report

by: The Greiner Team

The Desert Greenbelt

SCOTTSDALE, ARIZONA

May 1995

Registered Professional Engineer (Civil)
CERTIFICATE NO.
17756
SHI-EN
SHIAU
Date Signed 5/8/95
ARIZONA, U.S.A.

CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

PREFERRED ALTERNATIVE REPORT

Introduction

Scottsdale enjoys a wealth of natural beauty, history and Arizona culture that is embodied in its rugged mountains and desert environment. In keeping with its image, the City made the decision to implement a policy to effectively manage stormwaters on a regional basis, while providing passive recreational opportunities for the community in a natural desert setting. The concept of the Desert Greenbelt offers North Scottsdale the opportunity to blend effective flood control and open space amenities within the environmentally sensitive desert landscape, while balancing homeowner concerns, development objectives, public safety, public landholder requirements and City-wide goals.

In November 1992, the Scottsdale City Council adopted an amendment to the Drainage Element of the ***General Plan*** which established the Desert Greenbelt concept and the proposed corridors. The Desert Greenbelt will use natural washes wherever possible and preserve the rugged character of the surrounding desert environment. The Desert Greenbelt system for this project is being designed to contain the 100-year alluvial fan flood hazard which currently exists in Scottsdale north of the Central Arizona Project (CAP) Canal.

In July 1993, the City retained the Greiner Team to perform the ***Desert Greenbelt Preliminary Design and Analysis.*** The study includes three individual project corridors: Rawhide Wash, Pima Road Channel and Reata Pass/Beardsley Wash which includes the Upper Reata Pass Wash (Figure I-1). The project has included four phases: Identifying the Concepts; Developing the Concepts; Consolidating the Concepts; and Final Refinement/Preliminary Design. Each phase includes Public Participation; Environmental Analysis; Visual, Multi-Use Recreation and Land Use Evaluation; Hydrologic/Hydraulic Engineering; and Funding Alternatives. These phases included:

- Identifying Concepts – data gathering, survey/mapping, review of various treatments and alternatives (see Snapshot Report).

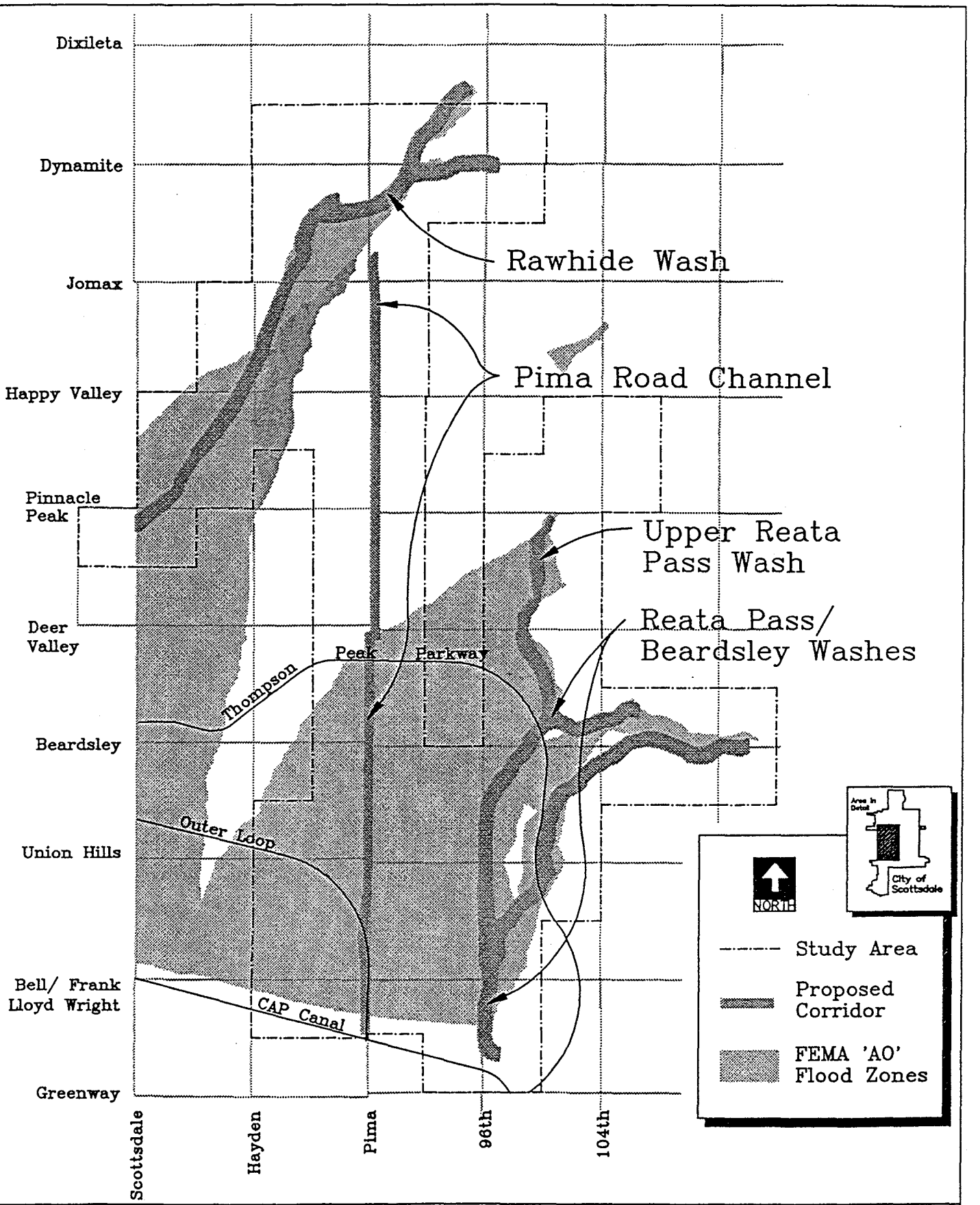
- Developing the Concepts – development of full-scale alternatives, integration of pubic concerns, refinement of hydrologic/hydraulic analyses, development of the Snapshot Study (see Specific Option Reports).

- Consolidating the Concepts – identification of specific issues and remedies; presentation of specific recommendations regarding identifiable environmental, aesthetic,

planning, land-use, recreational and hydraulic issues; development of the Specific Option Reports.

- Final Refinement/Preliminary Design – preliminary 10-percent design drawings; final environmental analysis and mitigation plan; address public involvement issues; estimates of capital, operation and maintenance costs; and funding mechanisms.

This Preferred Alternative Report, along with its accompanying addenda, represent the culmination of this effort. Upon receiving final public comment on these documents, the final 10-percent Preliminary Design Drawings will be completed and presented to Council, providing direction for the full implementation of the **Scottsdale Desert Greenbelt Project**.



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Scottsdale D.G.

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The Desert Greenbelt

Principal Washes and Channels

Scale: 1"=6000'

City of Scottsdale and Greiner, Inc.

Figure I-1

REATA PASS / BEARDSLEY WASH PREFERRED ALTERNATIVE REPORT

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CITY OF SCOTTSDALE
DESERT GREENBELT PROJECT

REATA PASS / BEARDSLEY WASH
PREFERRED ALTERNATIVE REPORT

Definition of the Alternative

The Reata/Beardsley Wash system is composed of the southern portion of the Reata Pass Wash, south of the Deer Valley Road alignment, with tributary flow from Northern Beardsley Wash and Southern Beardsley Wash. The outlet is into the Bureau of Reclamation Retention Basin at the Westworld equestrian facility. On Reata Pass Wash below Station 152+00, containment must be provided to retain flow within the main wash corridor. With the exception of the west bank for a quarter-mile south of the Deer Valley Road alignment, the remaining portion of the Reata Pass Wash is naturally contained.

The confluence of the Southern Beardsley Wash and the Reata Pass Wash is just above the existing north half of the Bell Road Bridge. Natural containment of the Southern Beardsley Wash is intermittent on the west side. The McDowell Mountains provide containment on the east.

The proposed confluence of the Northern Beardsley Wash and the Reata Pass Wash occurs at Reata Pass Wash Station 168+00. The lower half mile of Northern Beardsley Wash is being realigned for better control of stormwater. The upper portion of this wash (above Northern Beardsley Wash Station 36+00) is naturally contained.

Bridges are proposed at the southern half of Bell Road (Reata Pass Wash Station 45+00); Union Hills Drive (Reata Pass Wash Station 98+50); and two on Thompson Peak Parkway (Reata Pass Wash Station 166+00 and Southern Beardsley Wash 169+00).

Selection Rationale

Below Reata Pass Wash Station 18+00 (See Sheet RTA1)

Objectives/Issues

- Conveyance of flows into and between existing retention basins at Westworld.
  - Connection between first basins may require larger weir structure due to higher, less attenuated flow.
  - Impact of future Thompson Peak Parkway on basins should be included in analysis.
  - Work with Westworld on outlet issues.

- Construct one of two options for an energy dissipator system.
    - Locate structure near confluence of the Reata Pass Wash and the Westworld channel.
    - Protect slopes of Westworld channel and allow energy dissipation to occur naturally as the flow enters the first basin.
    - Design resolution to require participation of the Bureau of Reclamation, the City of Scottsdale and Westworld Management.

- Alignment of transition from the Reata Pass Wash to the Westworld channel.
    - The hydraulic characteristics are the deciding factors for channel alignment.
    - The existing Westworld channel requires widening and bank protection.
    - Must still provide inlet for upstream Westworld channel flow.

- Channel section through this area is a manmade, cut trapezoidal channel.
    - Erosion protection is necessary on the side slopes.

- Impact to existing infrastructure and facilities.
    - Protection or relocation of existing utilities as necessary.
    - Use and operation of existing facilities and commercial operation to be maintained through coordination with Westworld maintenance staff.
        - During construction, detours and directional signage may be required to assist users.
        - Construction will require phasing dependent upon Westworld facility usage.
    - Extensive multi-use path/trail connections at Westworld trailhead.

Hydrology/Hydraulics Summary

- Within the full-cut channel velocities are near 20 feet per second (fps) before entering into the Westworld channel.

- Depths are near seven feet with a top-width of about 180 feet.

Constraints/Public Comment

- Existing facilities and utilities constrain the channel alignment.
- Circulation element associated with multi-use path/trail.
  - Crossing conflicts between automobile/pedestrian/equestrian/cyclist circulation at Westworld road.
  - Consider alternatives for separation of users.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor.
- Continuation of the multi-use path/trail system in keeping with the General Plan.
- Protection of infrastructure and existing facilities from flood damage.

Reata Pass Wash Station 18+00 to Station 47+00 and to Southern Beardsley Wash Station 113+00 (See Sheets RTA1, RTA2 and SB1)

Objectives/Issues

- Ensure containment of 100-year storm within the natural wash corridor.
- Remove constriction by the Old Verde Canal (Reata Pass Wash Station 26+00) to allow passage of anticipated flow.
- Retain the natural desert wash character.
- Integrate proposed improvements with existing improvements at Bell Road (Reata Pass Wash Station 44+50).
- Design confluence to ensure proper conveyance of flow under Bell Road.

Hydrology/Hydraulics Summary

- Velocities in this reach are between 10 and 16 fps.
- Flow depth is five to six feet over widths of near 450 feet.

Constraints/Public Comment

- Retention of viable, developable parcels.

- Location of the Bell Road bridge.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor eliminates the Federal Emergency Management Agency (FEMA) designated flood hazard area outside of the channel.

- Continuation of the multi-use path/trail system in keeping with the General Plan.

  - Multi-use path/trail located within Reata Pass Wash.

  - Multi-use trail is located in Southern Beardsley Wash. A multi-use path is currently under study.

- Grade separation at street crossings for multi-use path/trail crossings.

- All-weather access at major roads.

Reata Pass Wash Station 47+00 to Station 113+00 (See Sheets RTA2 to RTA4)

Objectives/Issues

- Ensure containment of 100-year storm within the natural wash corridor.

- Retain the natural desert wash character.

- Lack of natural containment within the designated corridor.

- Need for manmade connections between existing washes to create a continuous low-flow channel.

  - Natural ground slope is toward the southwest.

- Integration of existing manmade overflow channel adjacent to Ironwood Village with Greenbelt improvements.

- Protection of existing developments west of the corridor.

- Ensure proper conveyance under Union Hills Drive (Reata Pass Wash Station 98+50).

Hydrology/Hydraulics Summary

- Velocities are between 11 and 15 fps, with the exception of the overflow channel at Ironwood Village where velocities are near 20 fps.

- Flow depths are between two and six feet due to the undulating character of the ground.
- Within the overflow, channel depths are near 7 feet.

Constraints/Public Comment

- Coordination with various landowners regarding future development options.
- A shorter bridge length at Union Hills Drive restricts corridor width.
- Coordination with developer may refine alignment widths dependent on adjoining land uses, containment options and developer design participation.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor eliminates FEMA designated flood hazard area outside of the channel.
- Continuation of the multi-use path/trail system in keeping with the General Plan.
- Grade separation at street crossings for multi-use path/trail crossings.
- All-weather crossings on major roads.

Station 113+00 to Station 153+00 (See Sheets RTA5 and RTA6)

Objectives/Issues

- Ensure containment of 100-year storm within the natural wash corridor.
- Retain the natural desert wash character.
- Lack of natural containment within the designated corridor.
- Protection of existing developments to the west.

Hydrology/Hydraulics Summary

- Velocities are between 10 and 15 fps with depths of five to six feet.
- Levees on each side of the natural braided wash provide containment.

Constraints/Public Comment

- Retain existing vegetation to the extent practicable.
- Restrict corridor width to near 400 feet.
- Coordination with developer may refine alignment widths dependent on adjoining land uses, containment options and developer design participation.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor eliminates FEMA designated flood hazard area outside of the channel.
- Continuation of the multi-use path/trail system in keeping with the General Plan.
- Potential minor road system may use wet crossing subject to Master Plan and City approval.
    - Requires floodwarning and path/trail notification signage.

Reata Pass Wash Station 153+00 to Station 216+00 (See Sheets RTA6 to RTA8)

Objectives/Issues

- Retain the natural desert wash character.
- Provide alignment allowing conveyance under Thompson Peak Parkway (Reata Pass Wash Station 166+00).
- Realignment of the lower portion of the Northern Beardsley Wash to relocate confluence north of the Thompson Peak Parkway bridge.
- Containment of southwest breakout flows in the quarter-mile south of the Deer Valley alignment.
    - Direct flow into the existing channel adjacent to the mountain at the southeast.
- Continuation of the multi-use path/trail system per the General Plan.

Hydrology/Hydraulics Summary

- Velocities range from 12 to 20 fps for generally supercritical flow.
- Depths vary from five to seven feet within the natural channel.

Constraints/Public Comment

- Relationship of the proposed Thompson Peak Parkway bridge and the confluence of Reata Pass Wash with Northern Beardsley Wash.
- Undulating character of the existing wash.
- Coordination with developer may refine alignment widths dependent on adjoining land uses, containment options and developer design participation.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor eliminates the FEMA designated flood hazard area outside of the channel.
- Continuation of the multi-use path/trail system in keeping with the General Plan.
- Grade separation at street crossings for multi-use path/trail crossings.
- All-weather crossings on major roads.
- Potential minor road system may use wet crossing subject to Master Plan and City approval.
    - Requires floodwarning and path/trail notification signage.

Southern Beardsley Wash Above Station 113+00 (See Sheets SB1 to SB6)

Objectives/Issues

- Confluence with Reata Pass Wash and State Land channel (Thompson Peak Wash)
- Design confluence to ensure proper conveyance of flow under Bell Road.
- Retain the natural desert wash character.
- Need to contain western breakout flows within the designated corridor.
- Ensure containment of the 100-year storm within the natural wash corridor.

Hydrology/Hydraulics Summary

- Velocities are near 10 fps for mainly supercritical flow.
- Water depths are near five feet within the lower portion, and near nine feet within the naturally deep upper channel.

- There is natural containment on both sides from Station 113+00 to Station 170+00 at Thompson Peak Parkway.

- Continuous natural containment is on the east bank only above Station 170+00.

Constraints/Public Comment

- Due to an abundance of large rock, the multi-use path/trail must be located on the overbank.

- Coordination with developer regarding land-use issues.

- Containment structure must withstand high velocities.

- Coordination with developer may refine alignment widths dependent on adjoining land uses, containment options and developer design participation.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor eliminates the FEMA designated flood hazard area outside of the channel.

- Continuation of the multi-use path/trail system in keeping with the General Plan.

- Grade separation at street crossings for multi-use path/trail crossings.

- All-weather crossings on major roads.

Northern Beardsley Wash Above Station 15+00 (See Sheets NB1 and NB2)

Objectives/Issues

- Retain the natural desert wash character.

- Ensure containment of the 100-year storm within the natural wash corridor.

- Realignment of the wash between Station 15+00 and Station 37+00 to facilitate confluence with Reata Pass Wash above the proposed Thompson Peak Parkway bridge.

    - The hydraulic characteristics are the deciding factors for channel alignment.

    - Channel section is a cut trapezoidal channel with erosion protection on the side slopes.

Hydrology/Hydraulics Issues

- Velocities are near 19 fps within the cut portion of the channel, but only nine fps in the natural upper portion.
- Depths are near five to six feet throughout the wash.

Constraints/Public Comment

- Due to an abundance of large rock, the multi-use path/trail must be located on the overbank.
- Coordination with developers regarding land-use issues.
- Containment structure must withstand high velocities.
- Coordination with developer may refine alignment widths dependent on adjoining land uses, containment options and developer design participation.

Benefits/Impacts

- Containment of the 100-year storm within designated drainage corridor eliminates the FEMA designated flood hazard area outside of the channel.
- Continuation of the multi-use path/trail system in keeping with the General Plan.

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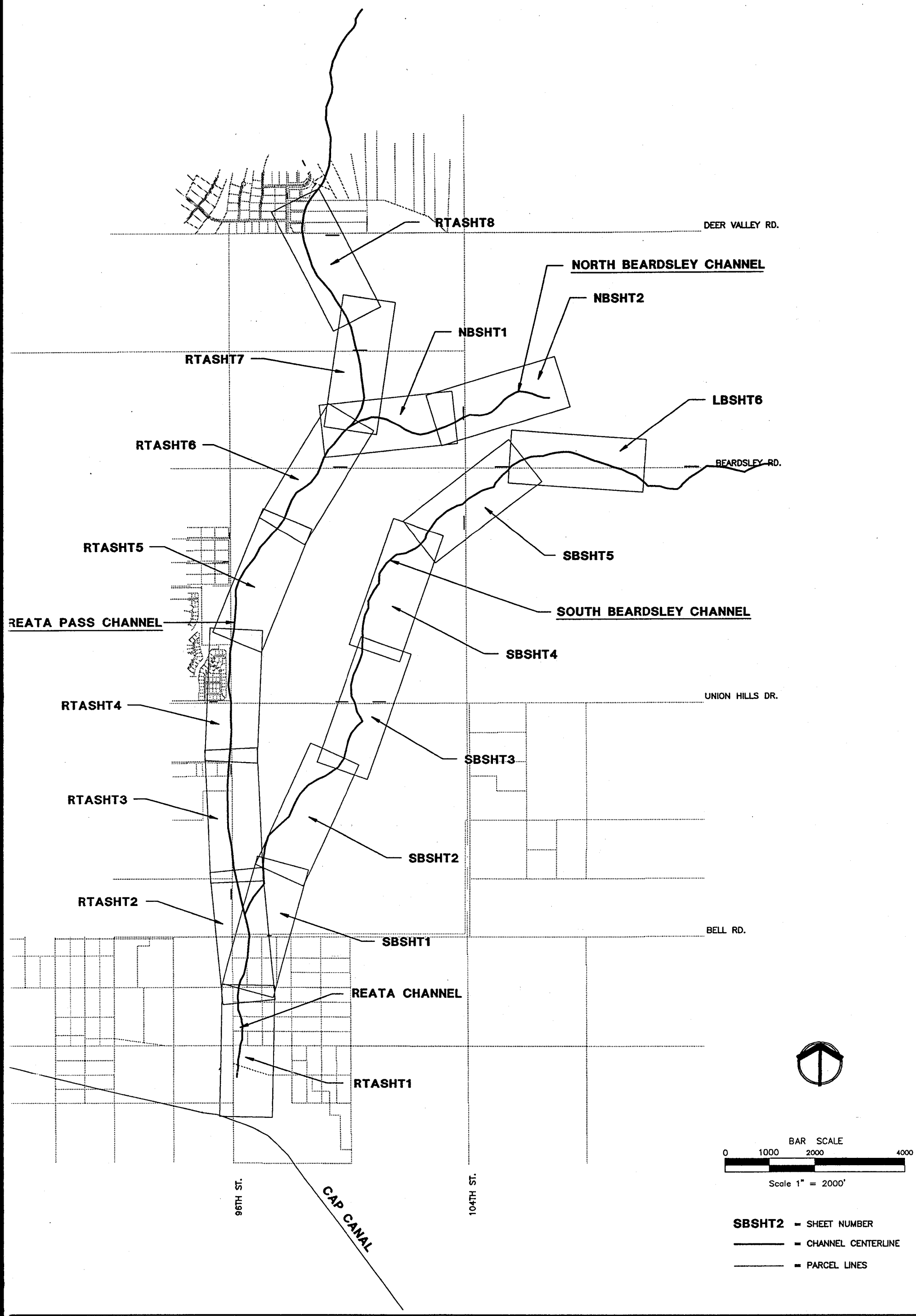


e Desert Greenbelt

DRAWING NO. KEY1 of KEY1

PROJECT NAME
REATA PASS/BEARDSLEY WASH

DRAWING TITLE
Preliminary 10% Plans

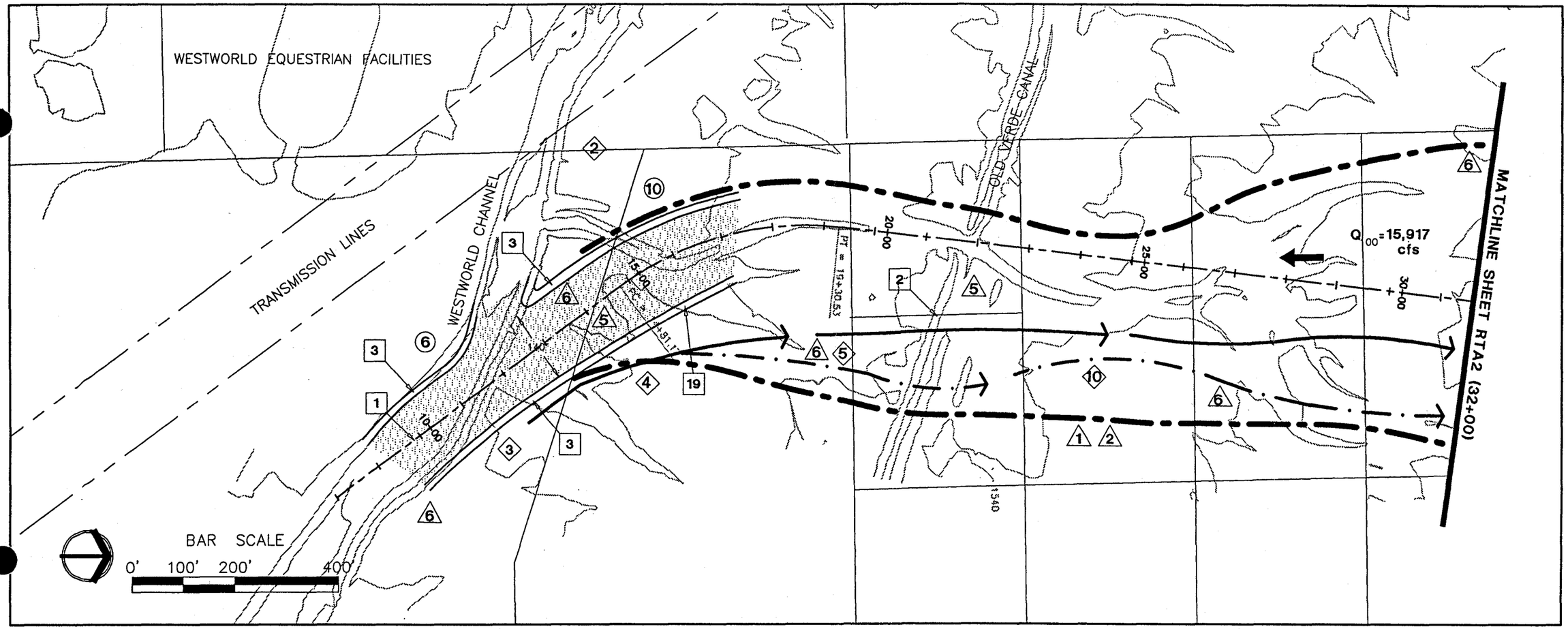
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

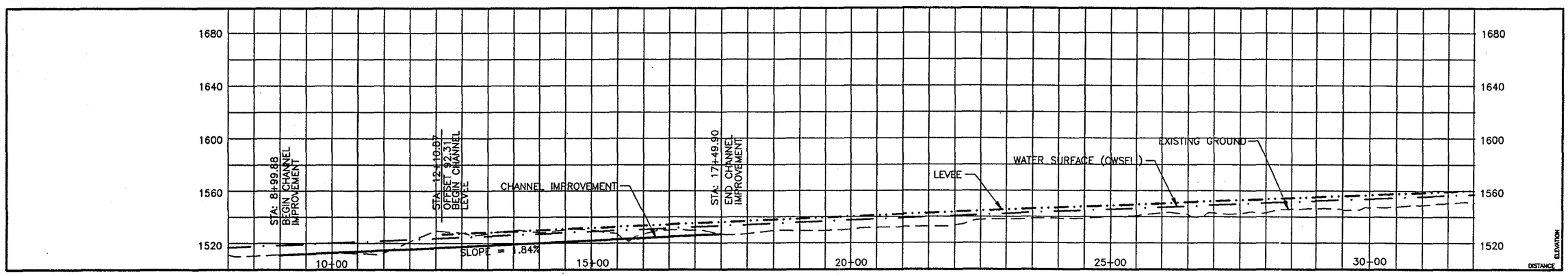
ENGINEERS

SEAL

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED R.E.P.
SCALE: AS NOTED

DATE	REVISIONS	BY	AUTH.





CHANNEL IMPROVEMENTS

1. OUTLET STRUCTURE/COORDINATION OF ENHANCED CHANNEL X-SECTION DOWNSTREAM INTO EXISTING BASINS.
2. REMOVE EXISTING LEVEE.
3. ARMORED SIDE SLOPE 3:1.
4. NATURAL SIDE SLOPE 3:1.

PATHS / TRAILS

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM
4. TRAIL ACCESS OVER FLOODWALL/LEVEE.
5. TRAIL WITHIN EASEMENTS.
10. MULTI-USE PATH & TRAIL TO BE LOCATED IN OVERBANK.

LAND USE

6. ADJACENT LAND USE IMPACTED BY FINAL ALIGNMENT.
10. DETERMINE MOST APPROPRIATE USE OF REMNANT PARCEL.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

4. FILL OVER SOIL CEMENT LEVEE
7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING

DATE	REVISIONS	BY	AUTH.

PROJ. NO. E029102
JOB NO. W.C.L.
DESIGN M.T.C.
DRAWN S.E.S.
CHECKED
SCALE: AS NOTED

ENGINEERS

SEAL

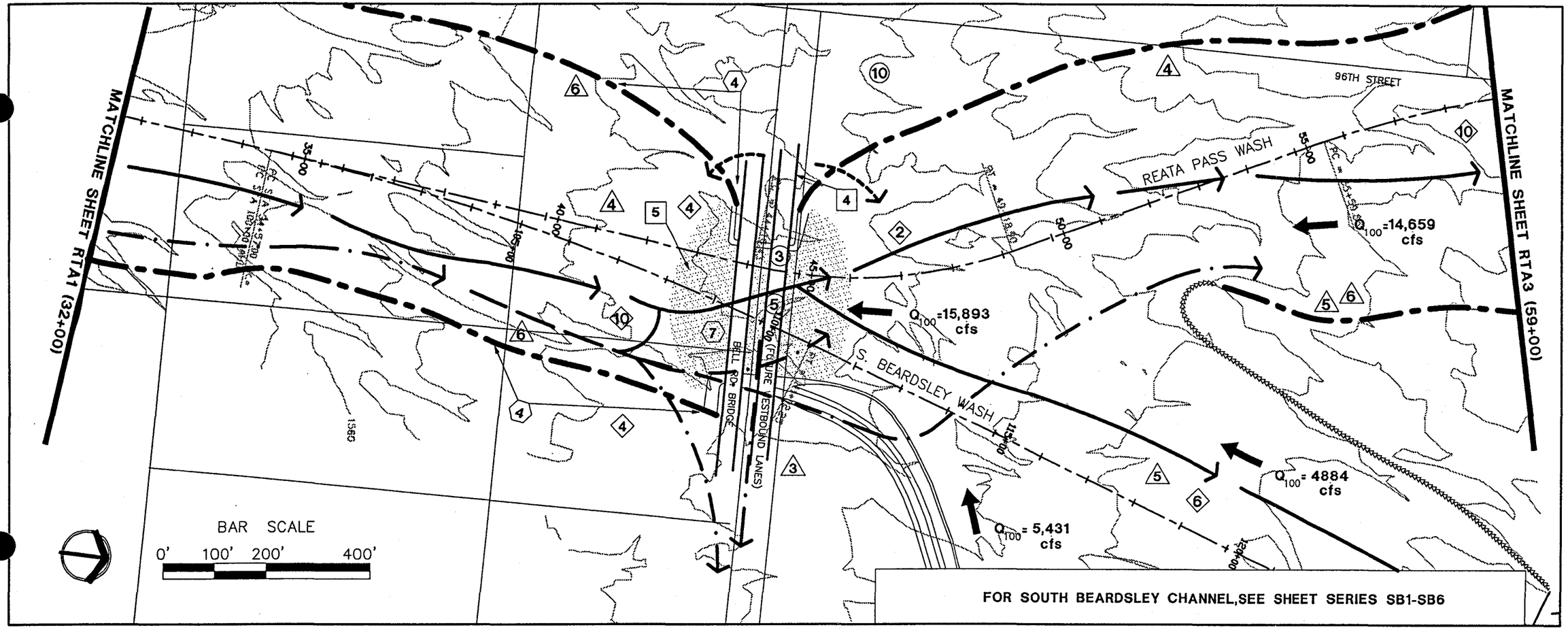
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

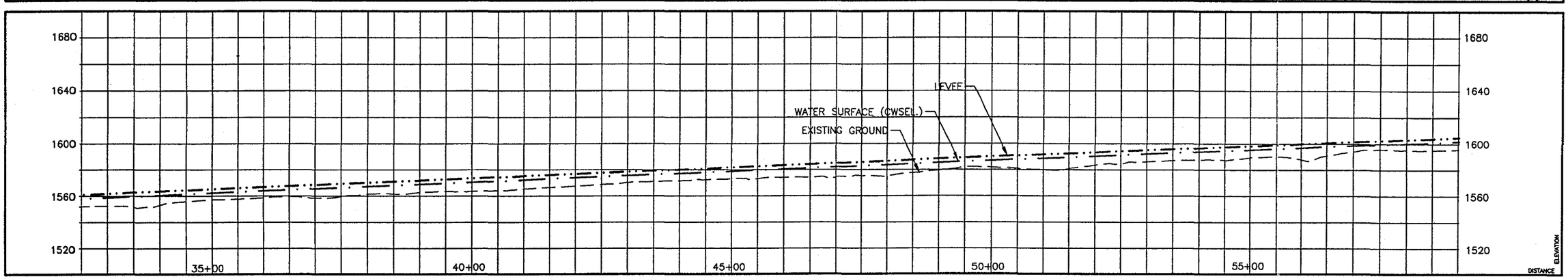
PROJECT NAME: REATA PASS/BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. RTA1 of RTA8

Desert Greenbelt





CHANNEL IMPROVEMENTS

4. CONSTRUCT BRIDGE ADJACENT TO EXISTING HALF.
5. REGRADE TO IMPROVE CONVEYANCE TO BRIDGE.

PATHS / TRAILS

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
4. TRAIL ACCESS OVER FLOODWALL/LEVEE
10. MULTI-USE PATH & TRAIL TO BE LOCATED IN OVERBANK.

LAND USE

3. BRIDGE PROVIDES AN ALL-WEATHER CROSSING.
5. GRADE SEPARATED MULTI-USE PATH & TRAIL CROSSING.
10. DETERMINE MOST APPROPRIATE USE OF REMNANT PARCEL.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

4. FILL OVER SOIL CEMENT LEVEE
7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING

DATE	REVISIONS	BY	AUTH.

PROJ. NO. E029102
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SCALE: AS NOTED

ENGINEERS

SEAL

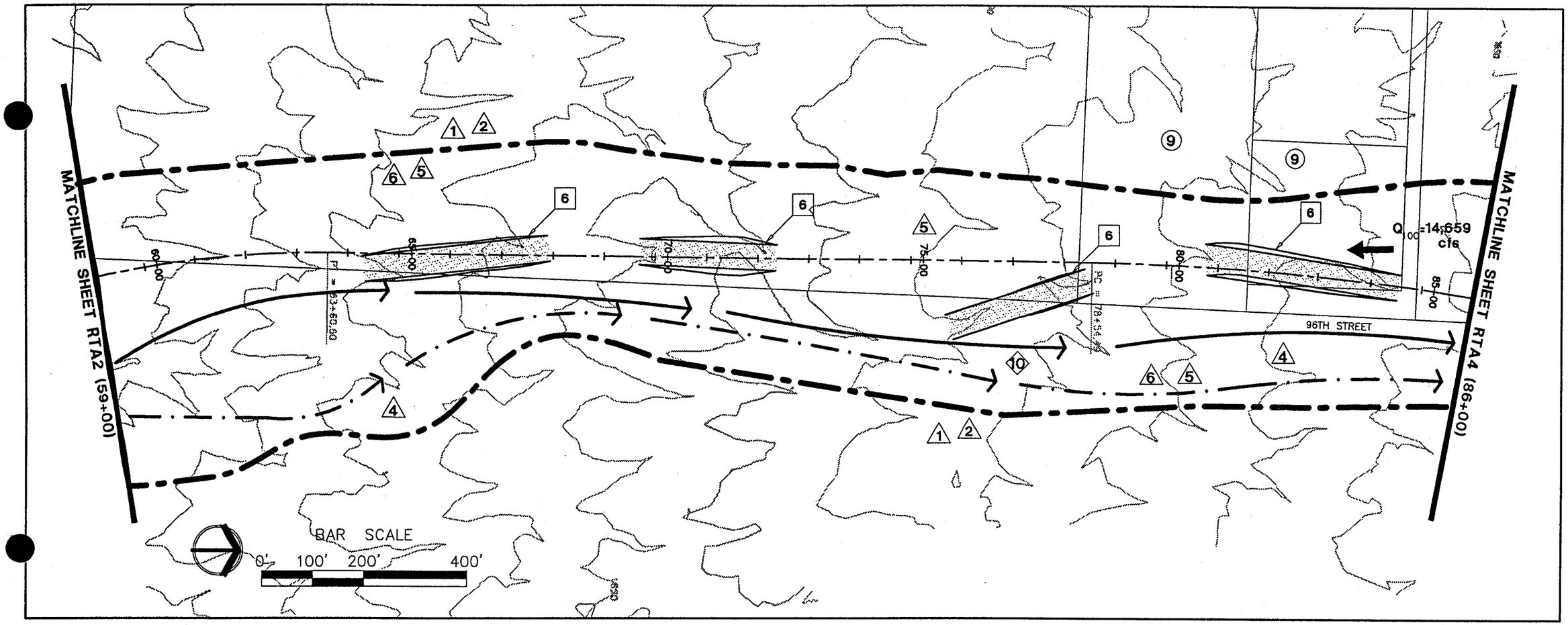
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

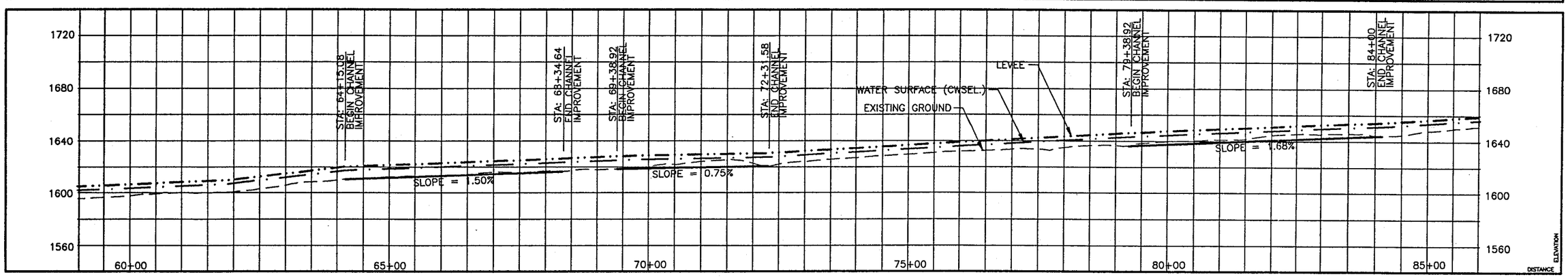
PROJECT NAME: REATA PASS/BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. RTA2 of RTA8

Desert Greenbelt





CHANNEL IMPROVEMENTS

6. EXCAVATE CONTINUOUS LOW-FLOW CHANNEL.

PATHS / TRAILS

10. MULTI-USE PATH & TRAIL TO BE LOCATED IN OVERBANK.

LAND USE

9. RETAIN VIABLE DEVELOPABLE PARCEL TO EXTENT PRACTICABLE.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
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- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH.

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

ENGINEERS

SEAL

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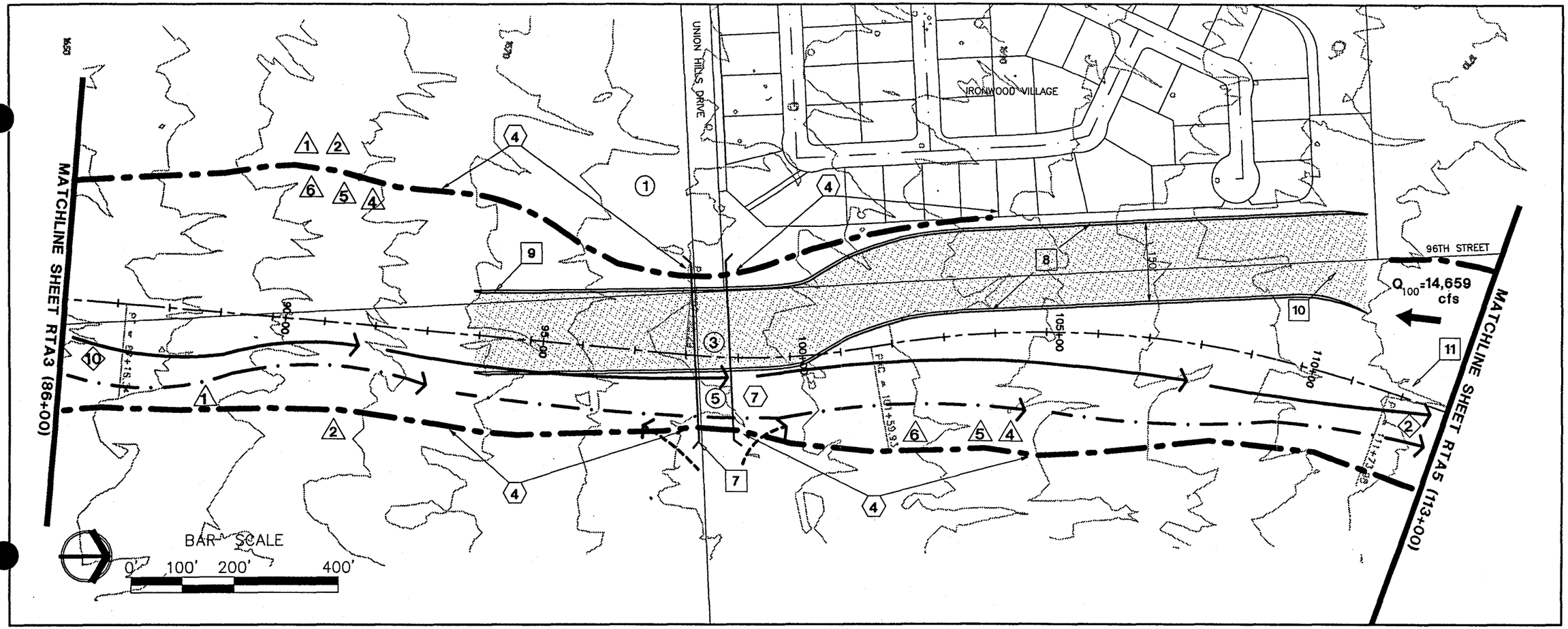
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

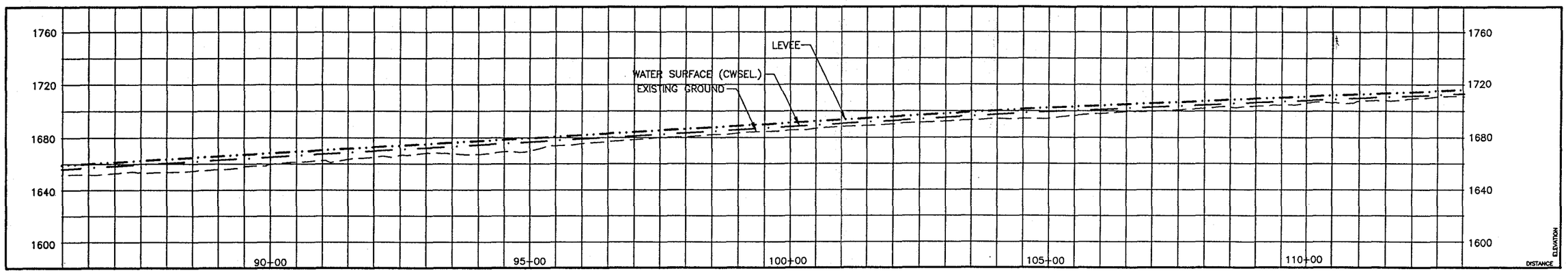
PROJECT NAME: REATA PASS/BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
RTA3 of RTA8

Desert Greenbelt





CHANNEL IMPROVEMENTS

7. CONSTRUCT BRIDGE.
8. IMPROVE AND STABILIZE EXISTING BANKS.
9. EXTEND CUT CHANNEL THROUGH BRIDGE.
10. GRADE OVERFLOW CHANNEL. ARMOR WEIR TO OVERFLOW CHANNEL.

PATHS / TRAILS

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
10. MULTI-USE PATH & TRAIL TO BE LOCATED IN OVERBANK.

LAND USE

1. IMPROVEMENTS DESIGNED TO FACILITATE WASH ACCESS FOR ADJACENT PROPERTY OWNERS
3. BRIDGE/BOX CULVERT PROVIDES AN ALL-WEATHER CROSSING.
5. GRADE SEPERATED MULTI-USE PATH & TRAIL CROSSING.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION.
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE

AESTHETIC APPLICATIONS

4. FILL OVER SOIL CEMENT LEVEE
7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH.

ENGINEERS

SEAL

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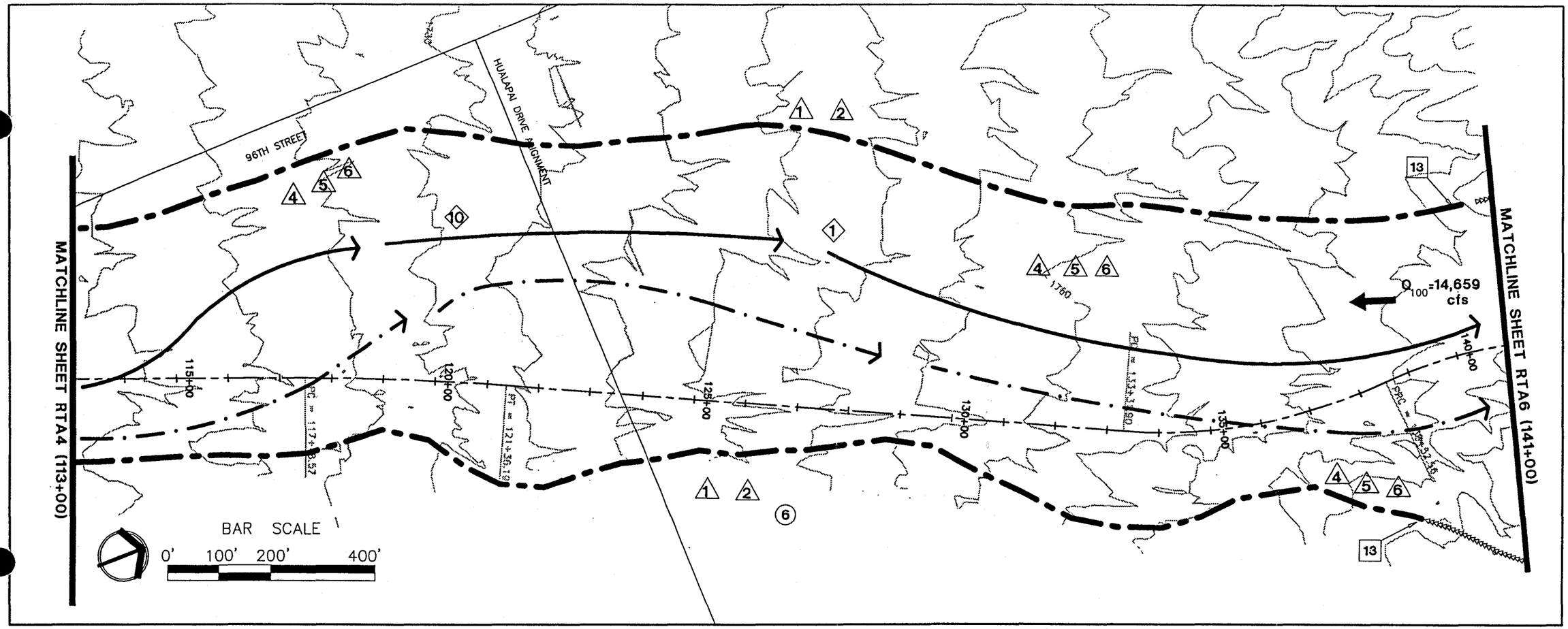
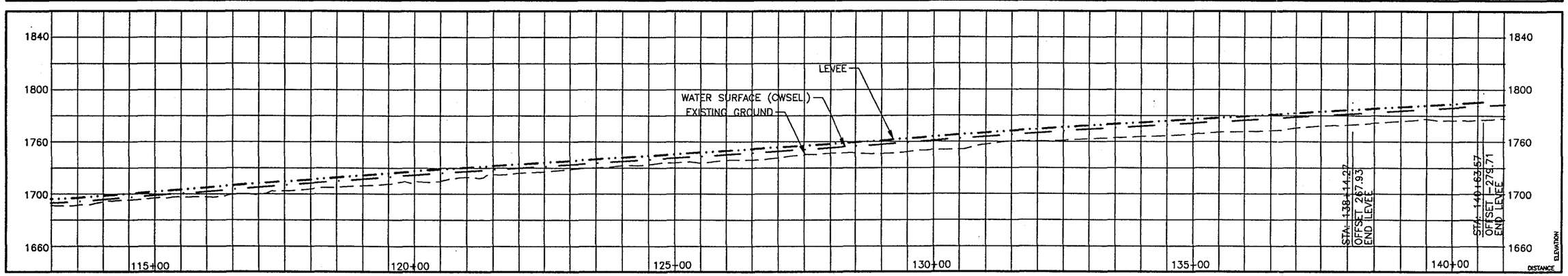
PROJECT NAME: REATA PASS/BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. RTA4 of RTA8

Desert Greenbelt





CHANNEL IMPROVEMENTS

13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES
10. MULTI-USE PATH & TRAIL TO BE LOCATED IN OVERBANK.

LAND USE

6. ADJACENT LAND USE IMPACTED BY FINAL ALIGNMENT.

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNEG FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH.

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PROJECT NAME: REATA PASS/BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
RTA5 of RTA8

the Desert Greenbelt

ROBERT GREENBELT

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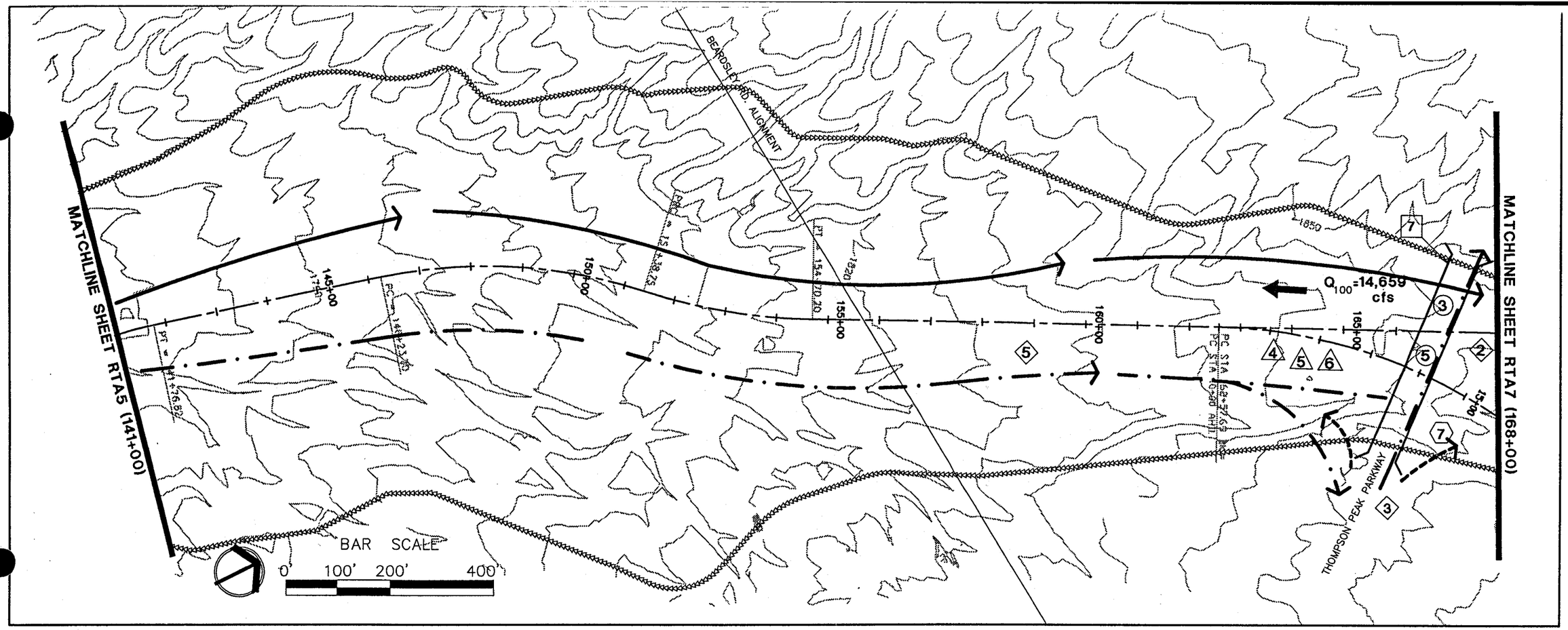

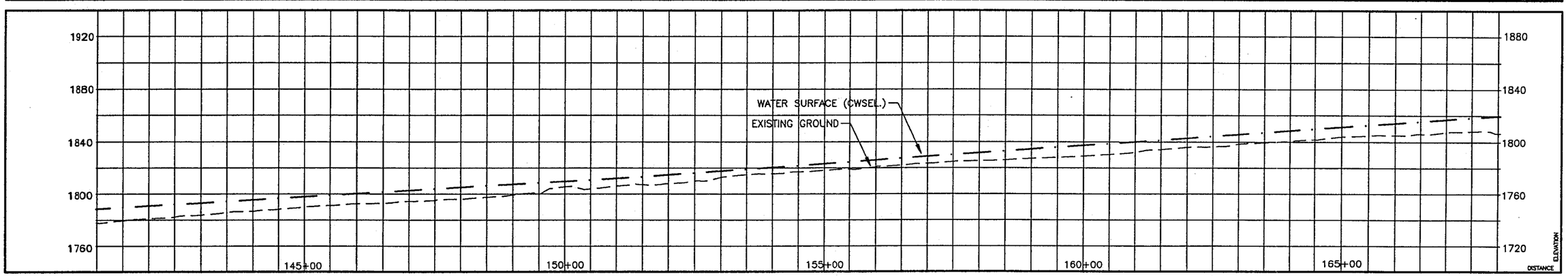

CHANNEL IMPROVEMENTS

7. CONSTRUCT BRIDGE.

PATHS / TRAILS

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM
5. TRAIL WITHIN EASEMENT

LAND USE

3. BRIDGE/BOX CULVERT PROVIDES AN ALL-WEATHER CROSSING.
5. GRADE SEPARATED MULTI-USE PATH & TRAIL CROSSING.

MITIGATION

AESTHETIC APPLICATIONS

7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

REVISIONS	DATE	BY	AUTH

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
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SCALE: AS NOTED

ENGINEERS

SEAL

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PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
RTA6 of RTA8

The Desert Greenbelt

DESIGN MEDIUM/LT

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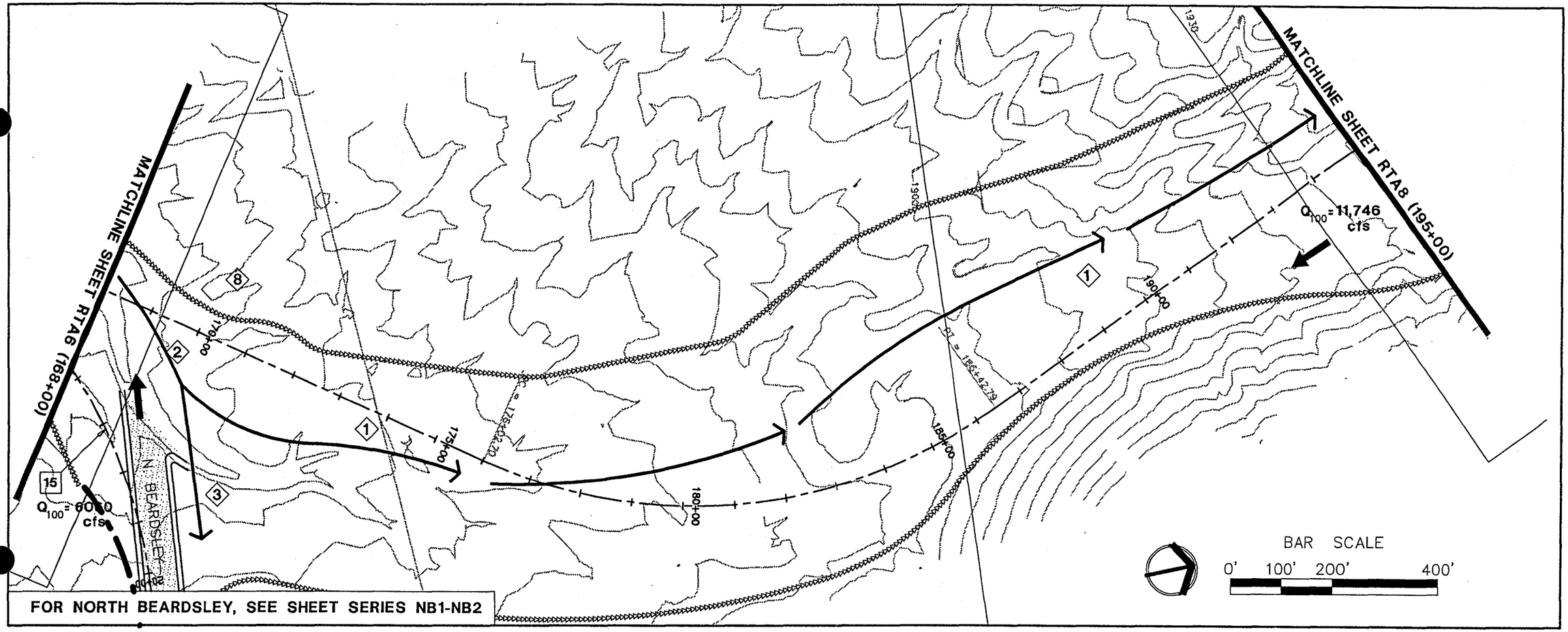

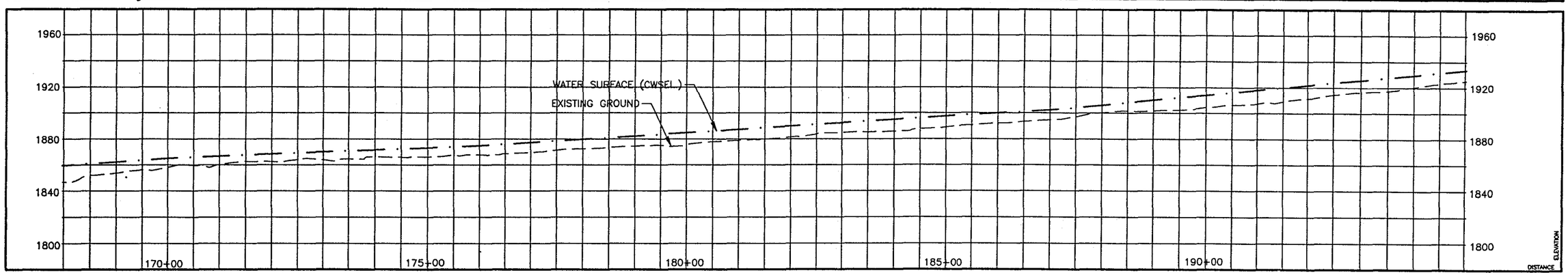

CHANNEL IMPROVEMENTS

15. FOR NORTH BEARDSLEY CHANNEL, SEE SHEET SERIES NB1-NB2.

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES.
2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF MULTI-USE TRAIL INTO A REGIONAL SYSTEM.
8. MULTI-USE PATH ALIGNMENT CURRENTLY UNDER STUDY.

LAND USE

MITIGATION

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- FLOODLINE

REVISIONS	DATE	BY	AUTH.

ENGINEERS

PROJ. NO. EO29102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
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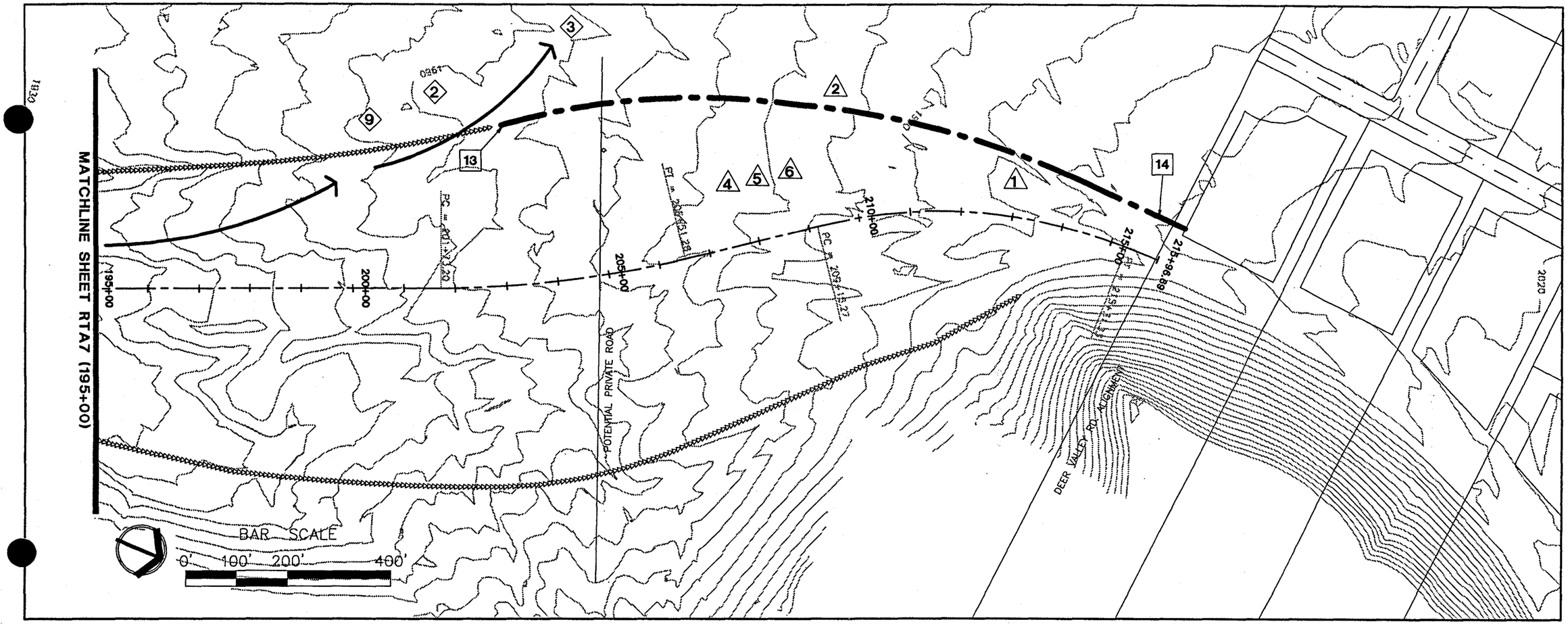
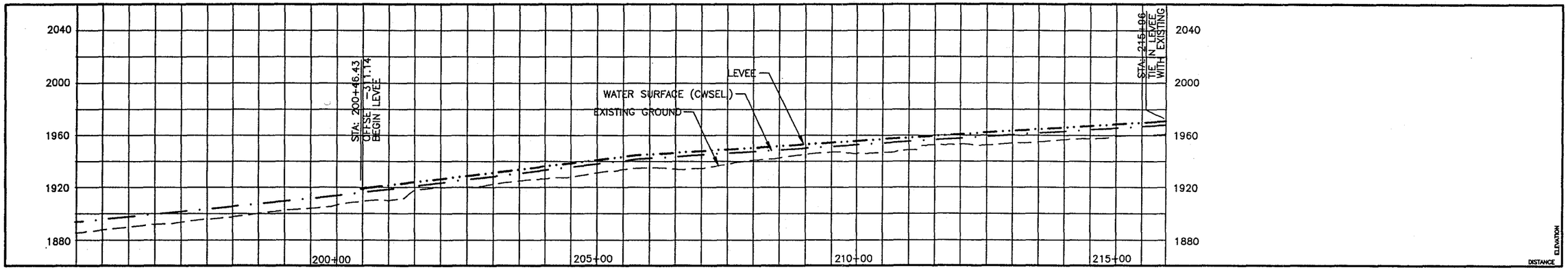
PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. RTA7 of RTA8

Desert Greenbelt





CHANNEL IMPROVEMENTS □

13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.
14. LINK WITH UPPER REATA PASS IMPROVEMENTS.

PATHS / TRAILS ◇

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF MULTI-USE TRAIL INTO A REGIONAL SYSTEM.
9. MULTI-USE TRAIL ALIGNMENT CURRENTLY UNDER STUDY IN GENERAL PLAN AMENDMENT.

LAND USE ○

MITIGATION △

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION.
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS ⬡

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING

DATE	REVISIONS	BY	AUTH.

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JOB NO.
DESIGN W.C.L.
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CHECKED S.E.S.
SCALE: AS NOTED

ENGINEERS

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Phoenix, AZ
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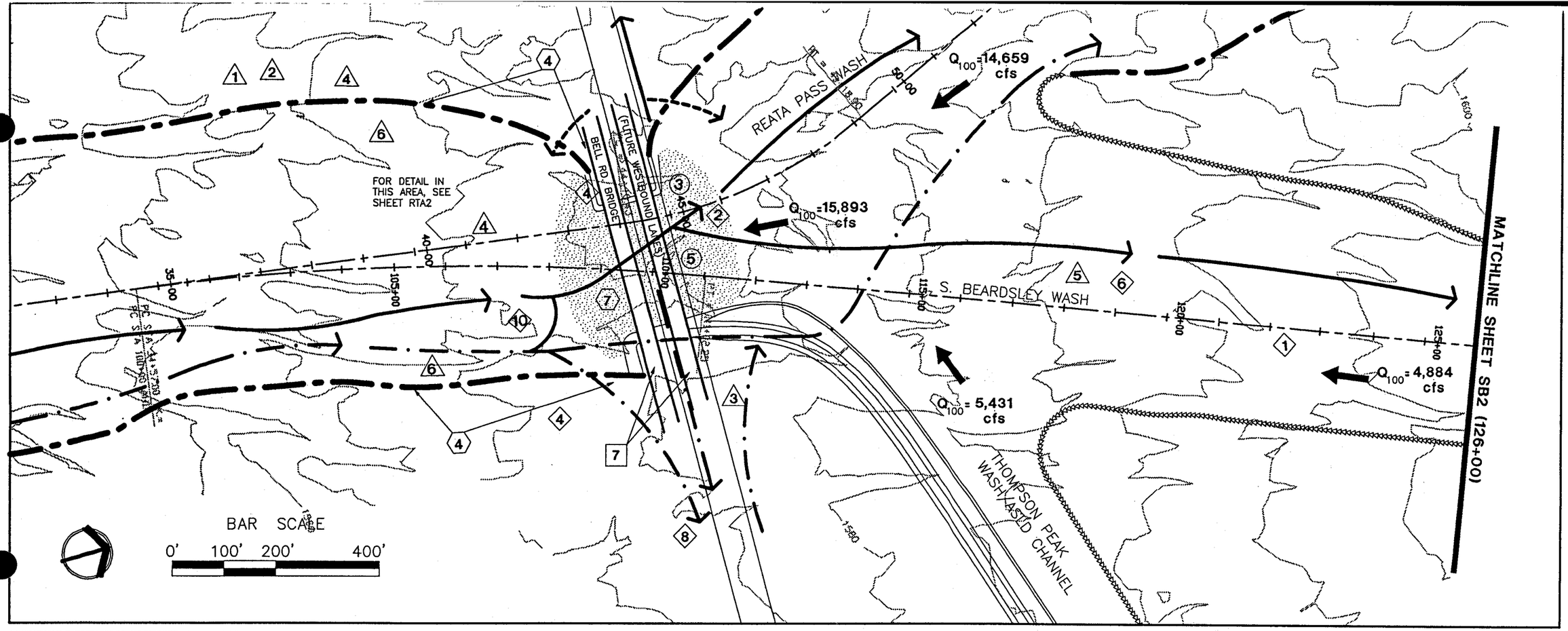
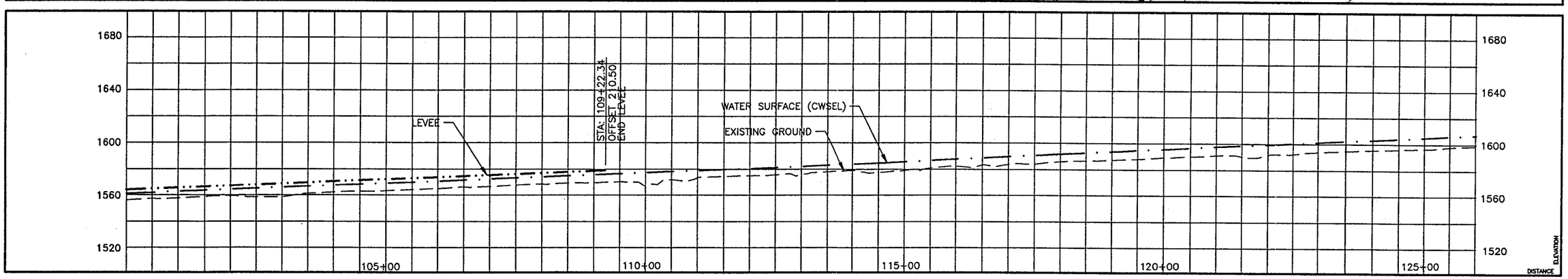
PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. RTA8 of RTA8

Desert Greenbelt





CHANNEL IMPROVEMENTS

7. CONSTRUCT BRIDGE.

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES.
2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM.
4. TRAIL ACCESS OVER FLOODWALL/LEVEE.
8. MULTI-USE PATH CURRENTLY UNDER STUDY IN GENERAL PLAN ADMENDMENT.

LAND USE

3. BRIDGE/BOX CULVERT PROVIDES AN ALL WEATHER CROSSING
5. GRADE SEPARATED MULTI-USE PATH & TRAIL CROSSING
7. LOW FLOW CHANNEL IS BRIDGED

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION.
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM.
3. COLOR, FORM, AND TEXTURE BLEND W/ THE DESERT SETTING.
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

4. FILL OVER SOIL CEMENT LEVEE
7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

AUTH.	BY	REVISIONS	DATE

ENGINEERS

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
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CHECKED S.E.S.
SCALE: AS NOTED

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Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
SB1 of SB6

The Desert Greenbelt

DESERT GREENBELT

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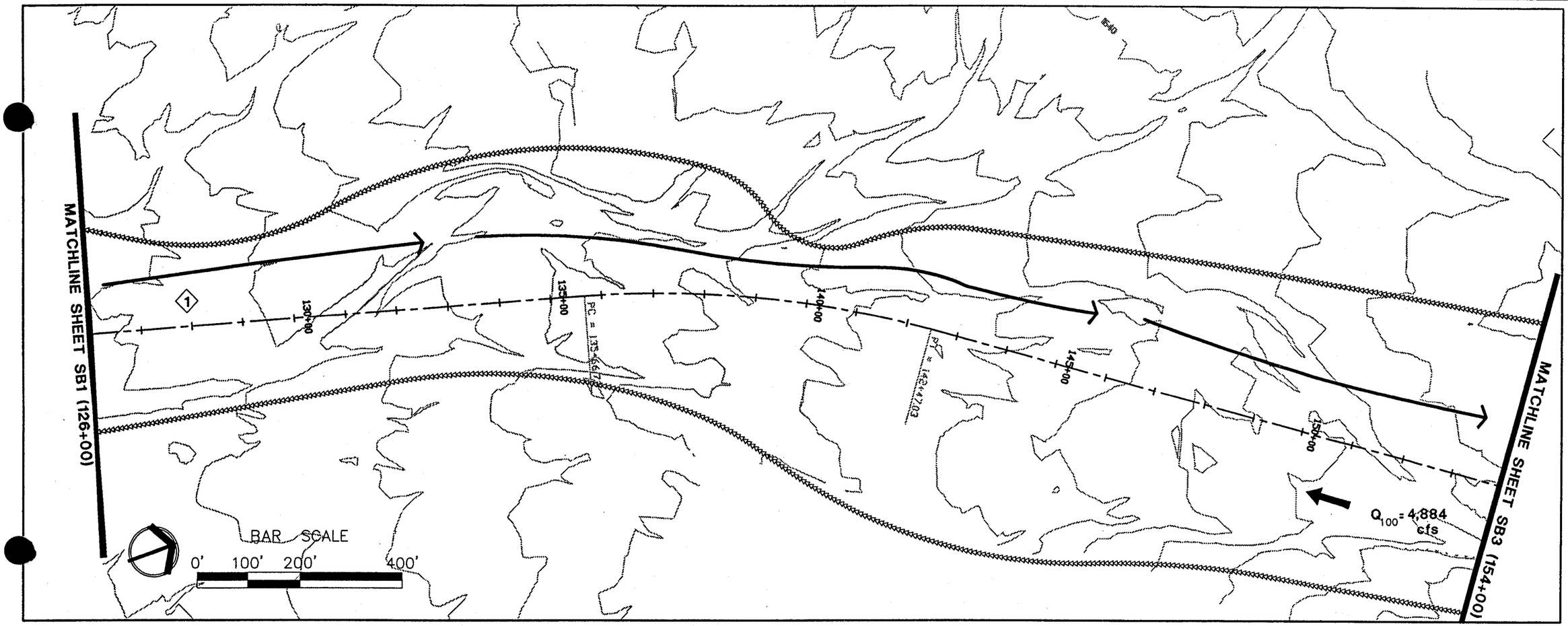

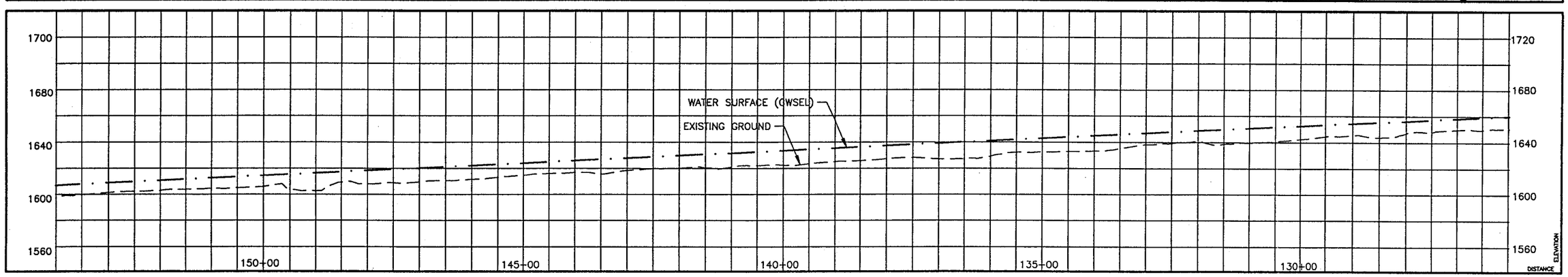

CHANNEL IMPROVEMENTS □

PATHS / TRAILS ◇

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES

LAND USE ○

MITIGATION △

AESTHETIC APPLICATIONS ⬡

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH.

PROJ. NO. E029102
JOB NO.
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ENGINEERS

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Phoenix, AZ
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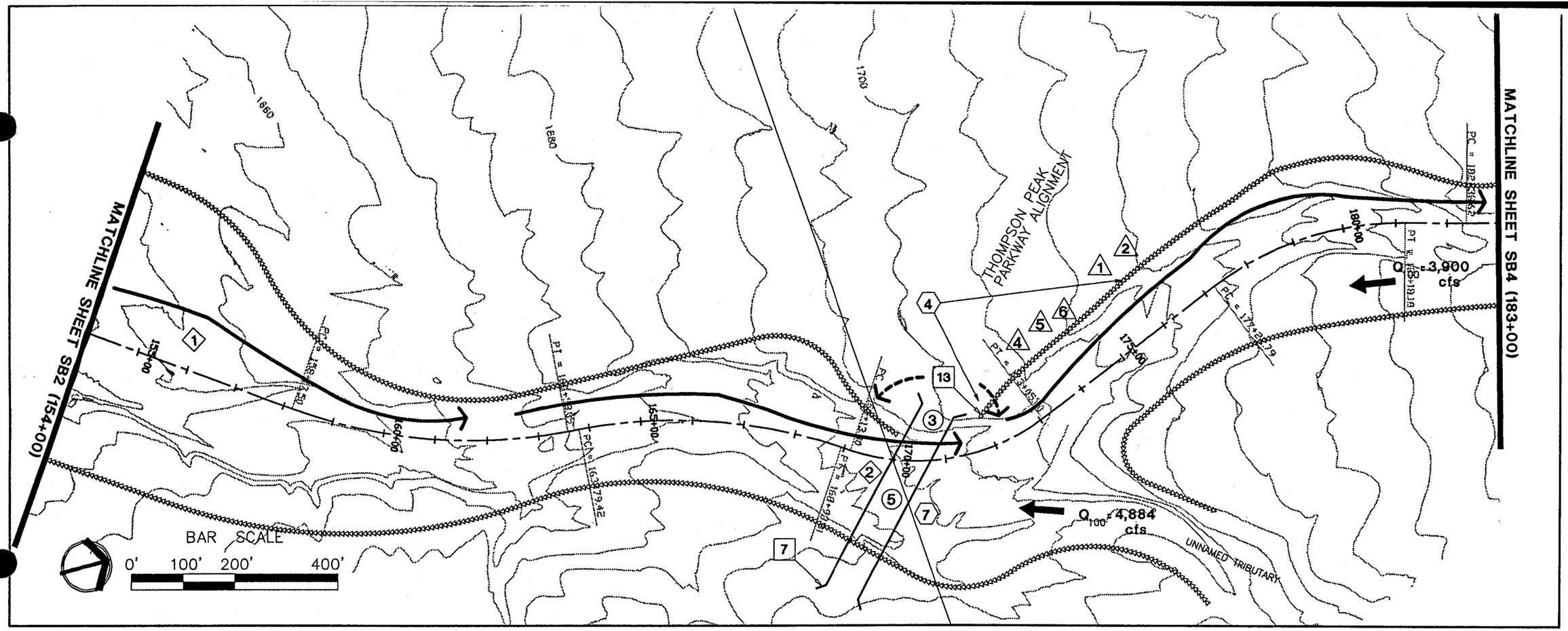
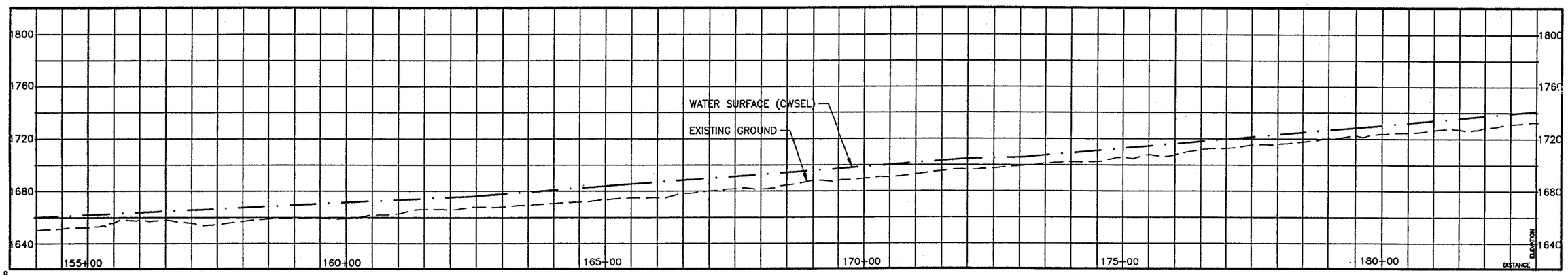
PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
SB2 of SB6

The Desert Greenbelt





CHANNEL IMPROVEMENTS

7. CONSTRUCT BRIDGE.
13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES
2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.

LAND USE

3. BRIDGE/BOX CULVERT PROVIDES AN ALL-WEATHER CROSSING.
5. GRADE SEPARATED MULTI-USE PATH & TRAIL CROSSING.

MITIGATION

4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

4. FILL OVER SOIL CEMENT LEVEE
7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH

PROJ. NO. E029102
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ENGINEERS

SEAL

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Phoenix, AZ
Engineers, Architects and Planners

PROJECT PHASE: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
SB3 of SB6

The Desert Greenbelt

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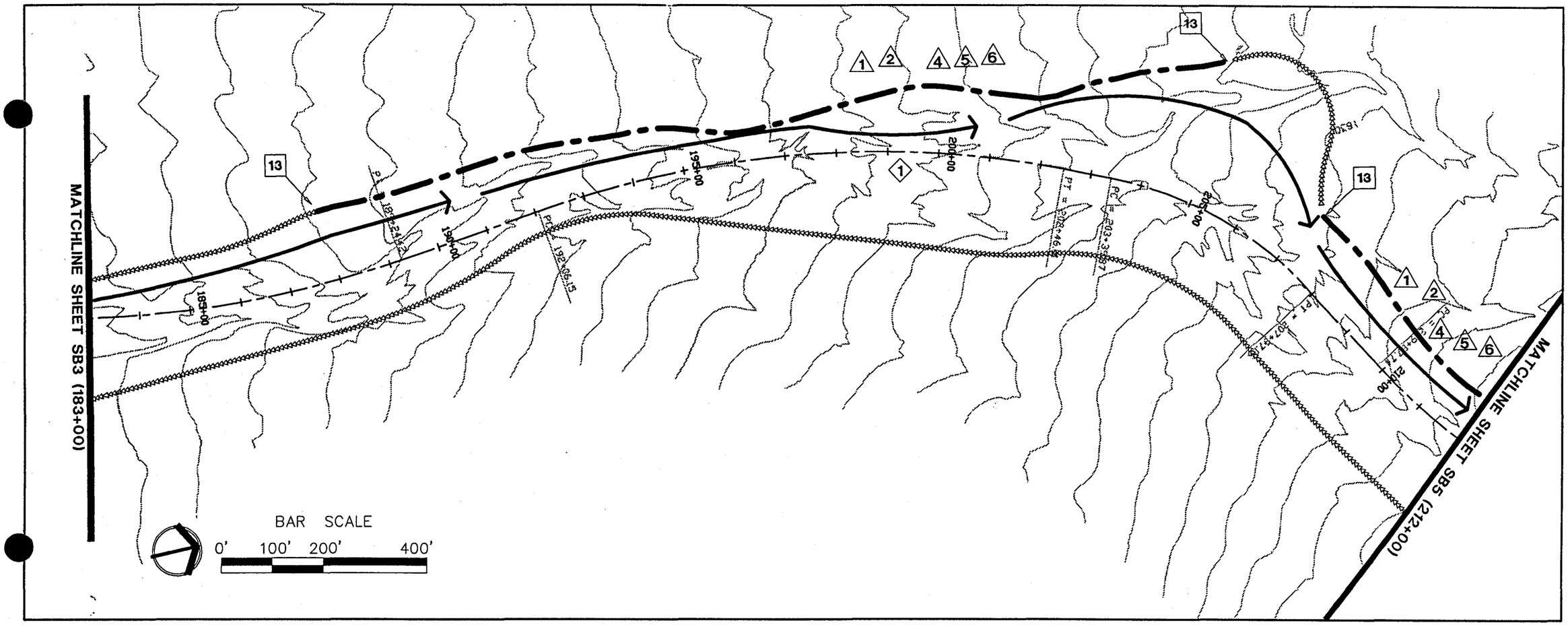

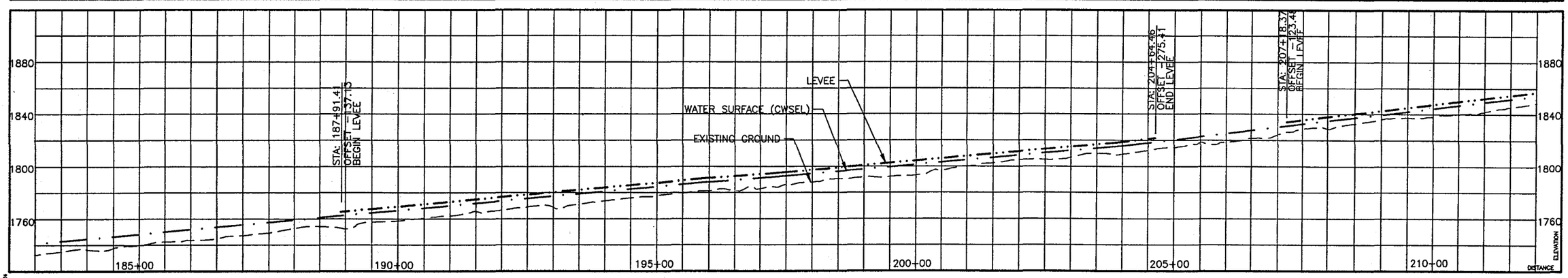

CHANNEL IMPROVEMENTS □

13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.

PATHS / TRAILS ◇

1. TRAILS TO FOLLOW LOW-FLOW CHANNELS OR NATURAL WASHES

LAND USE ○

MITIGATION △

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE

AESTHETIC APPLICATIONS ⬡

4. FILL OVER SOIL CEMENT LEVEE
7. INTERPRETIVE ART

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH.

ENGINEERS

PROJ. NO. E029102
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DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
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SEAL

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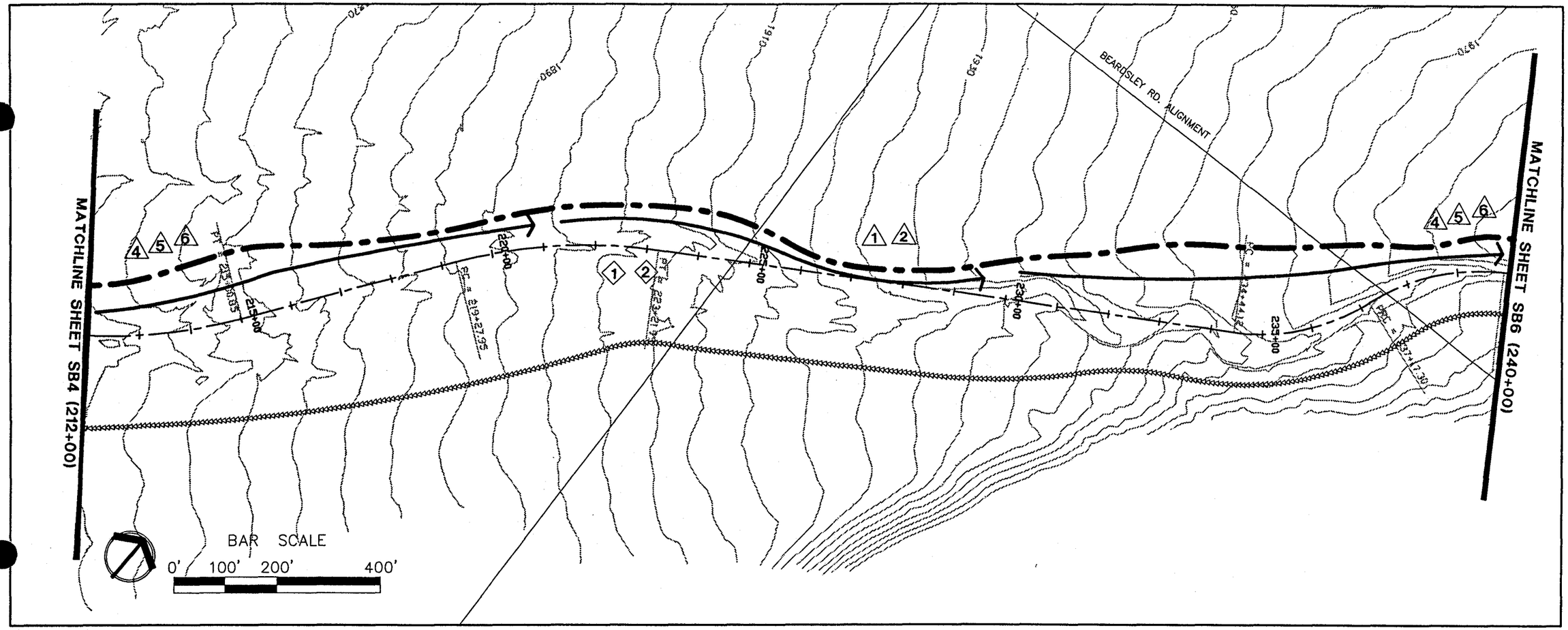
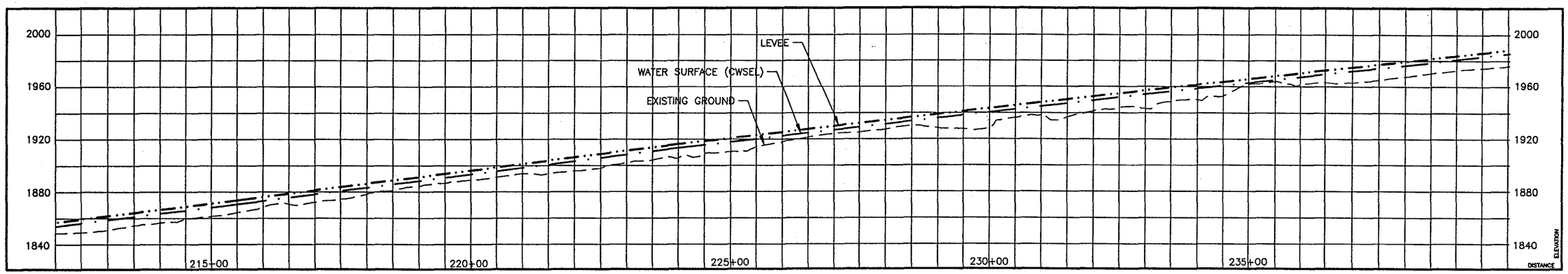
PROJECT TITLE: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
SB4 of SB6

Desert Greenbelt





CHANNEL IMPROVEMENTS

PATHS / TRAILS

1. TRAILS TO FOLLOW LOW-FLOW CHANNEL OR NATURAL WASHES
2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.

LAND USE

MITIGATION

4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING

REVISIONS	DATE	BY	AUTH.

ENGINEERS

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SEAL

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Phoenix, AZ
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PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. SB5 of SB6

Desert Greenbelt

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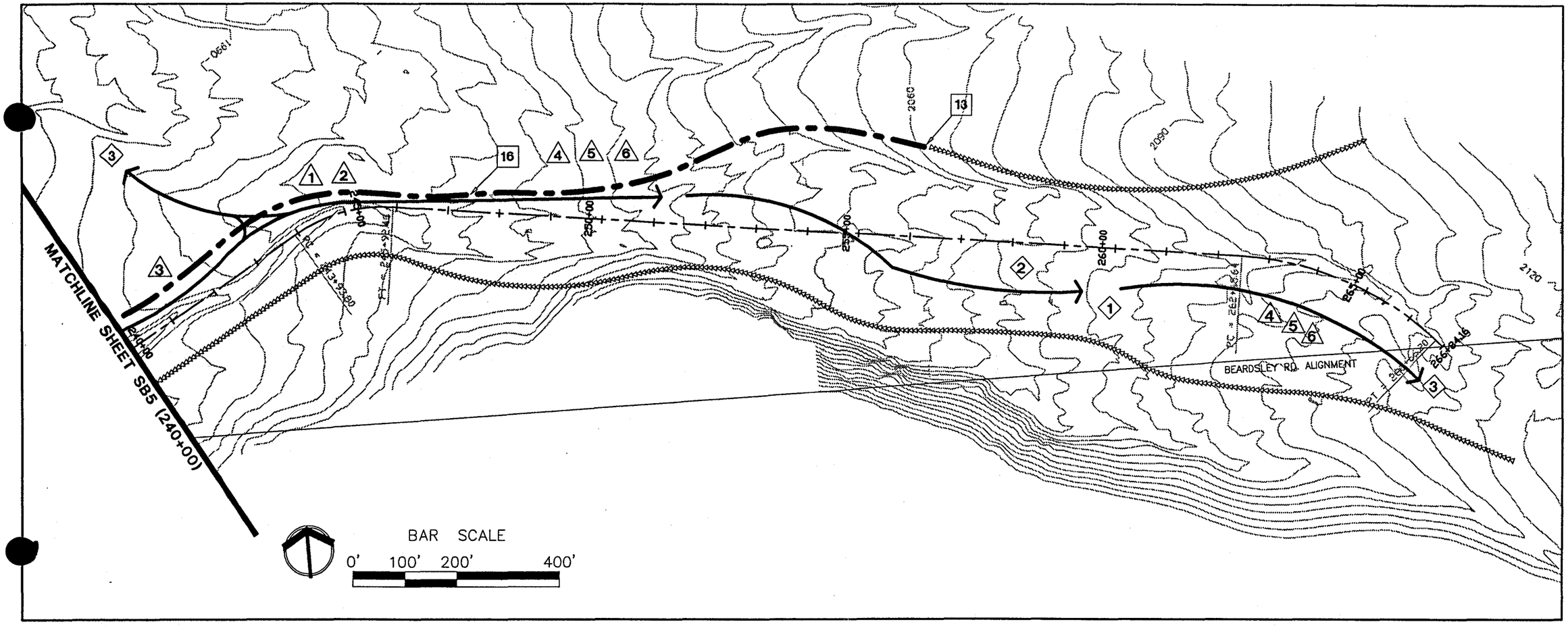
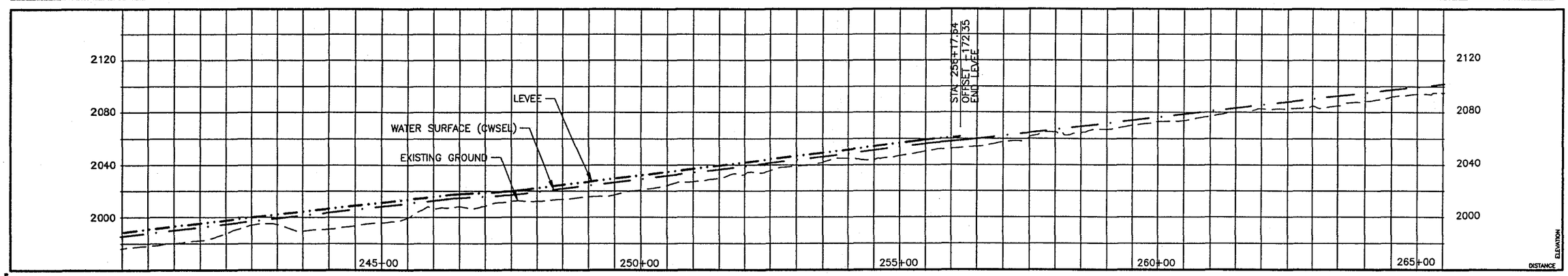
BROCHURE





CHANNEL IMPROVEMENTS

13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.
16. CONSTRUCTION TO CONTAIN BREAKOUT FLOW.

PATHS / TRAILS

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM.

LAND USE

MITIGATION

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

REVISIONS	DATE	BY	AUTH.

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE AS NOTED

ENGINEERS

SEAL

Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

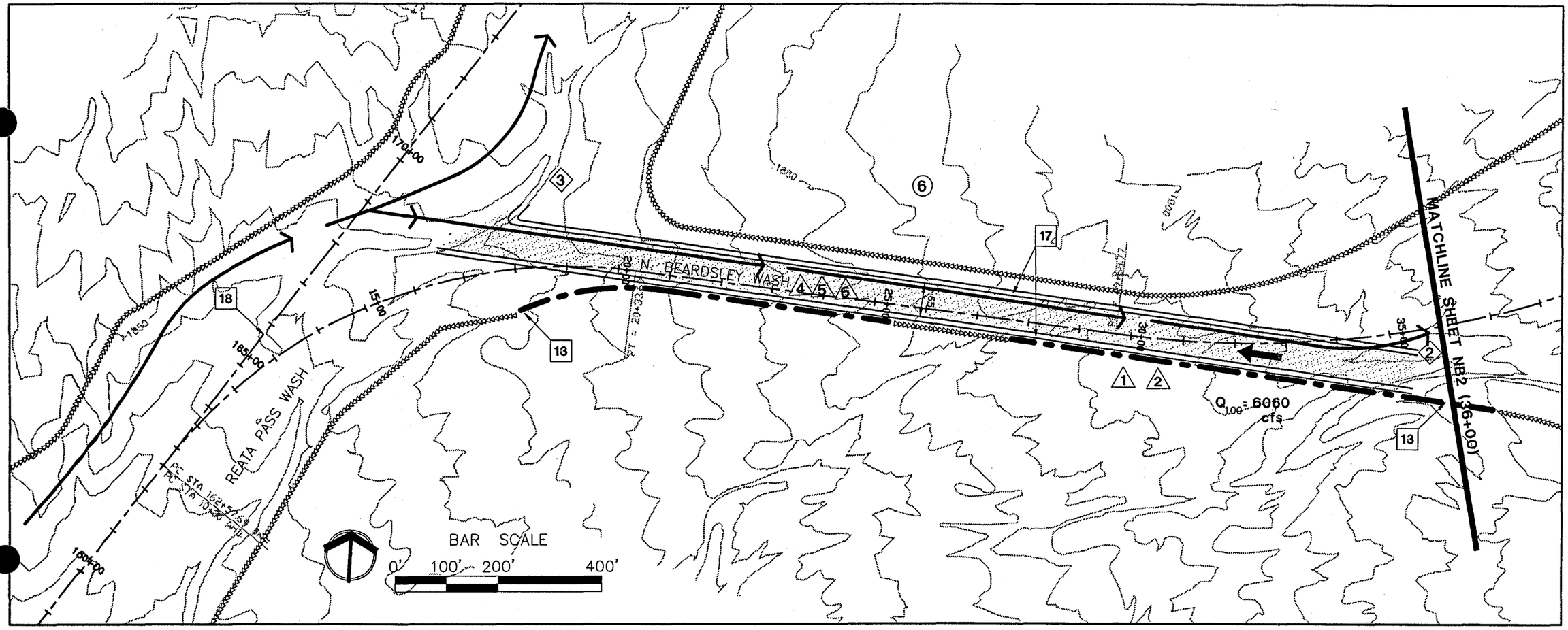
PROJECT NAME: REATA PASS\BEARDSLEY WASH

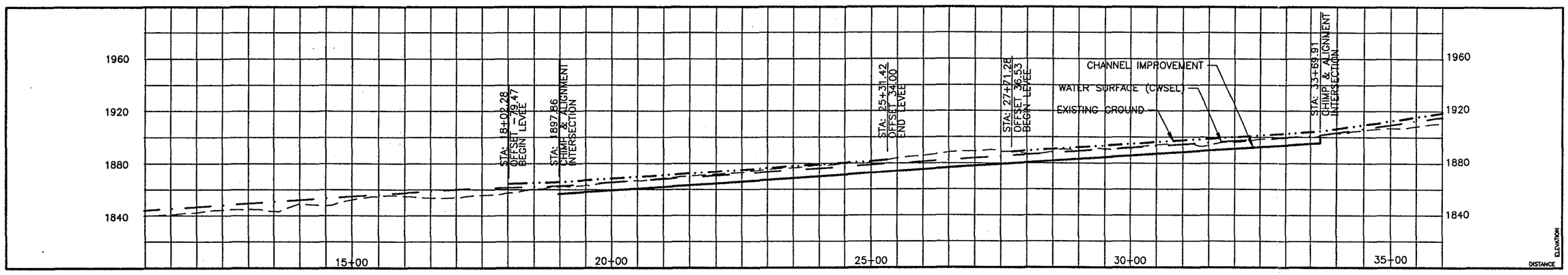
DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. SB6 of SB6

C:\PNA\CORPHOT\CADD\LBRITE

T SHEET





CHANNEL IMPROVEMENTS □

13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.
17. 1:1 SIDE SLOPE, LEAVE IN NATURAL STATE.
18. FOR REATA CHANNEL SEE SHEET SERIES RTA1 - RTA8.

PATHS / TRAILS ◇

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM.

LAND USE ○

6. ADJACENT LAND USE IMPACTED BY FINAL ALIGNMENT.

MITIGATION △

1. FLOODWALL/LEVEE DESIGNED TO MINIMIZE IMPACT ON EXISTING VEGETATION
2. FLOOD PROTECTION WALLS DESIGNED FOR 100 YR. EVENT STORM
4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE

AESTHETIC APPLICATIONS ⬡

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

DATE	REVISIONS	BY	AUTH.

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED S.E.S.
SCALE: AS NOTED

ENGINEERS

SEAL

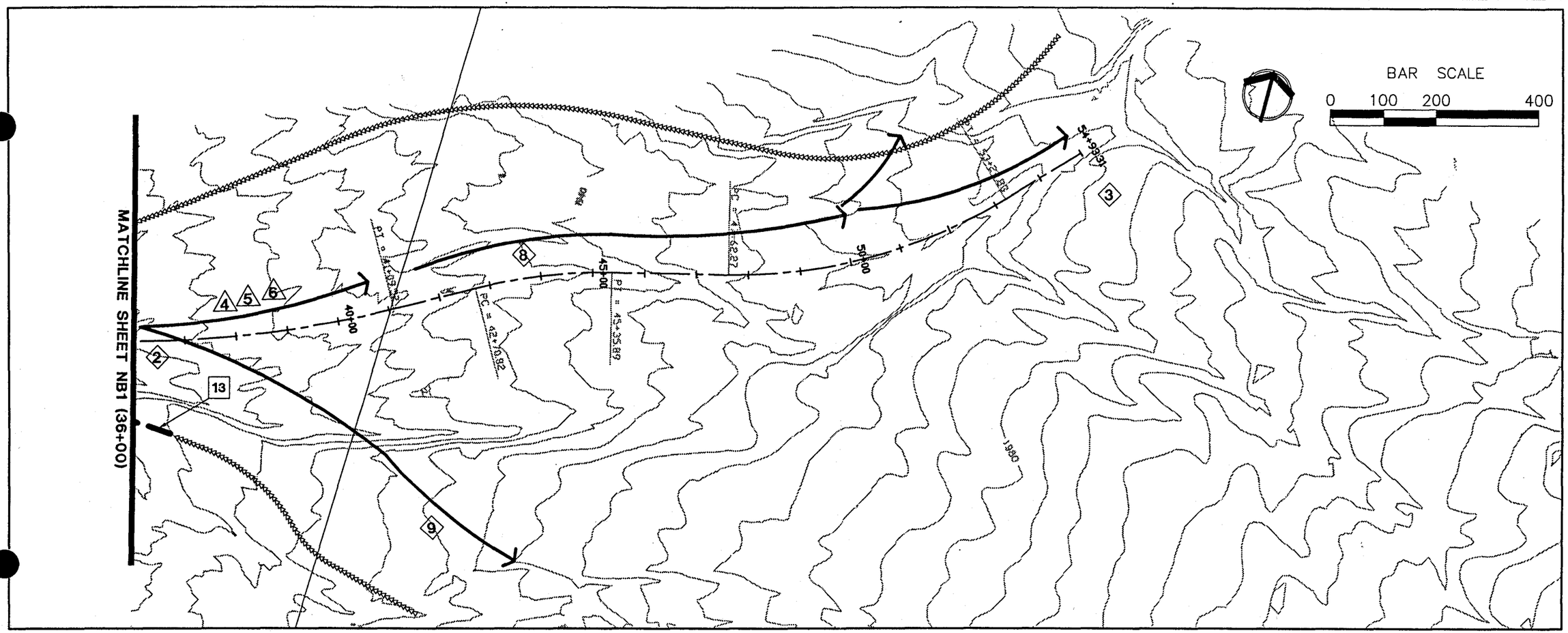
Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

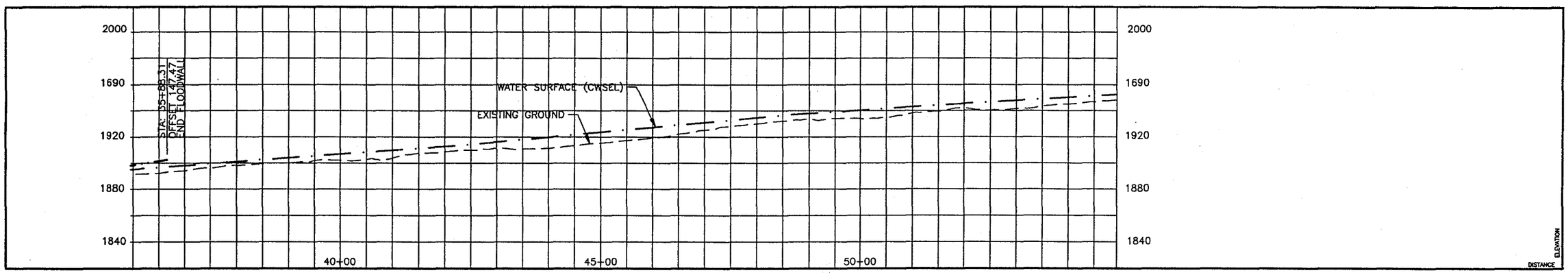
PROJECT NAME: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO. NB1 of NB2

Desert Greenbelt





CHANNEL IMPROVEMENTS

13. TIE LEVEE INTO EXISTING NATURAL CONTAINMENT.

PATHS / TRAILS

2. INSTALL SIGNAGE TO DIRECT TRAIL USERS.
3. LINKAGE OF EXISTING MULTI-USE TRAIL INTO A REGIONAL SYSTEM.
8. MULTI-USE TRAIL ALIGNMENT CURRENTLY UNDER STUDY IN GENERAL PLAN AMENDMENT.

LAND USE

MITIGATION

4. RETAIN EXISTING VEGETATION TO EXTENT PRACTICABLE.
5. SALVAGE VEGETATION IMPACTED BY CONSTRUCTION.
6. REVEGETATE DISTURBED AREAS WHERE PRACTICABLE.

AESTHETIC APPLICATIONS

LEGEND

- MULTI-USE TRAIL
- MAINTENANCE ACCESS
- PATH
- FLOODWALL
- CHANNEL RIGHT OF WAY
- SOIL CEMENT LEVEE
- NATURAL CONTAINMENT
- ACCESS LEVEE
- CONCRETE SLOPE
- BANK PROTECTION
- REGRADE
- DROP STRUCTURE
- GRADE CUT
- 10+00 CHANNEL CENTERLINE AND STATIONING
- 5' CONTOURS

AUTH.	BY	REVISIONS	DATE

PROJ. NO. E029102
JOB NO.
DESIGN W.C.L.
DRAWN M.T.C.
CHECKED R.E.P.
SCALE: AS NOTED

ENGINEERS

SEAL

Greiner
Greiner, Inc.
Phoenix, AZ
Engineers, Architects and Planners

PROJECT TITLE: REATA PASS\BEARDSLEY WASH

DRAWING TITLE: Preliminary 10% Plans

DRAWING NO.
NB2 of NB2

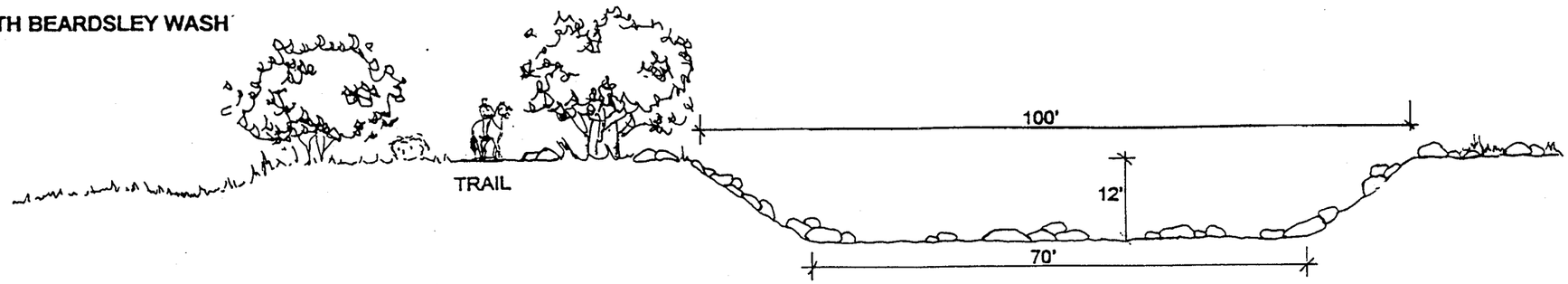
Desert Greenbelt

DESERT GREENBELT

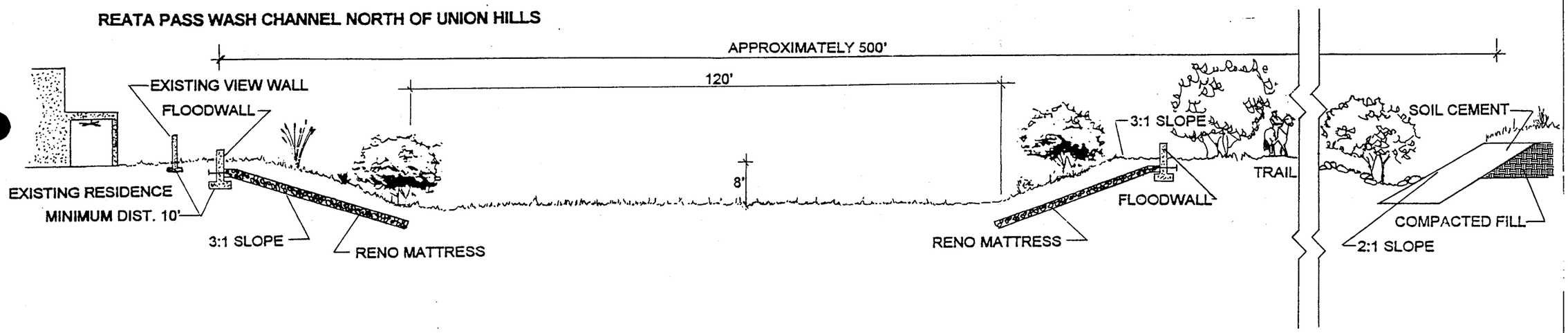
J:\E029102\CADD\LIBRITE

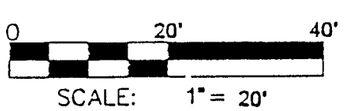
REATA PASS/BEARDSLEY WASH TYPICAL CROSS SECTIONS
NORTH OF UNION HILLS DRIVE

NORTH BEARDSLEY WASH



REATA PASS WASH CHANNEL NORTH OF UNION HILLS

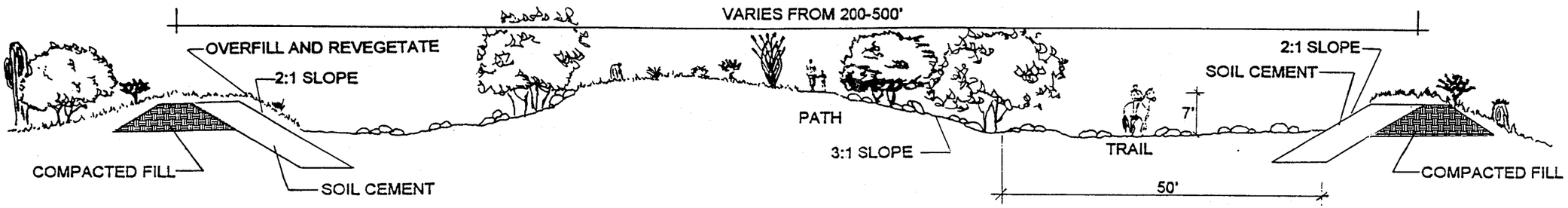


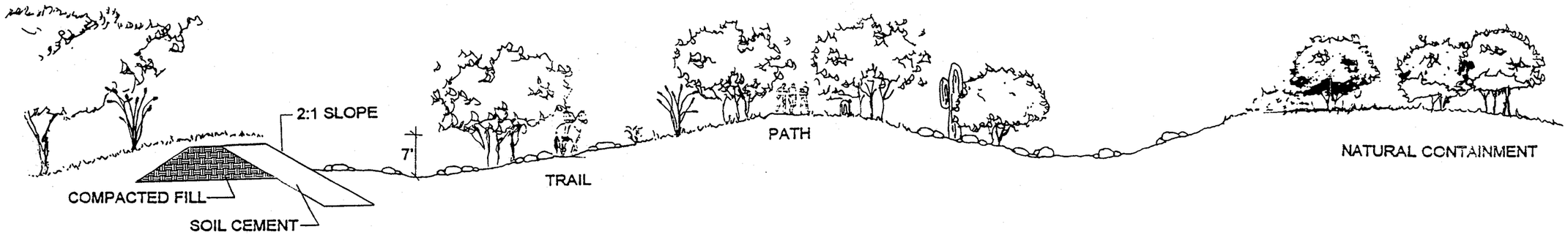


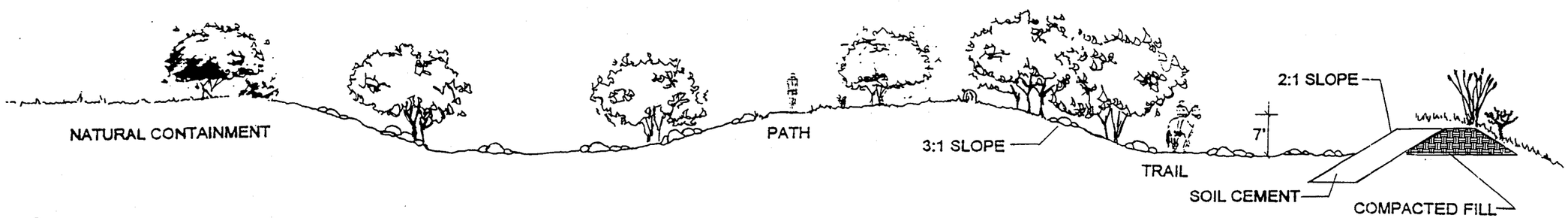
VIEWS TO NORTH

The Desert Greenbelt

CHANNEL NORTH OF BELL ROAD TO DEER VALLEY ROAD







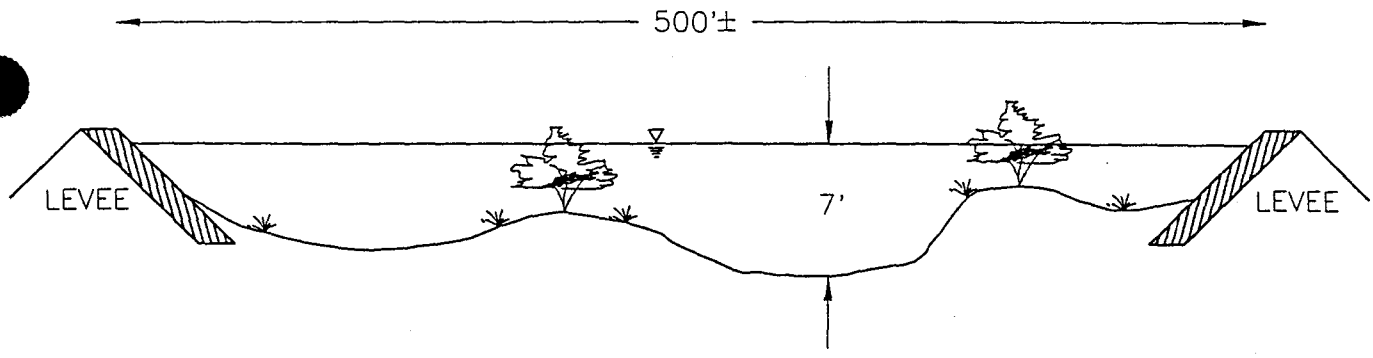
0 20 40

SCALE IN FEET

VIEWS TO NORTH

TYPICAL CROSS SECTIONS OF LOWER REATA/BEARDSLEY CHANNEL CONTAINMENT

The Desert Greenbelt



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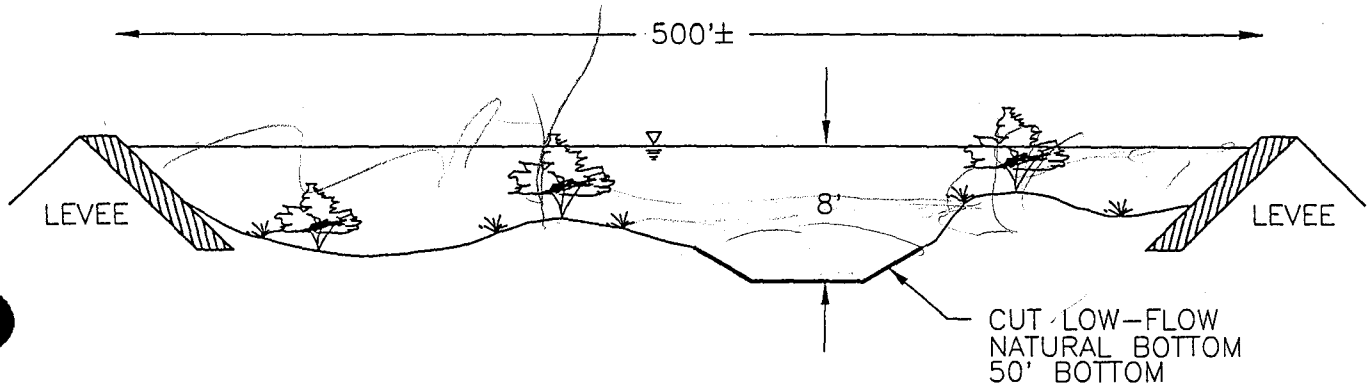

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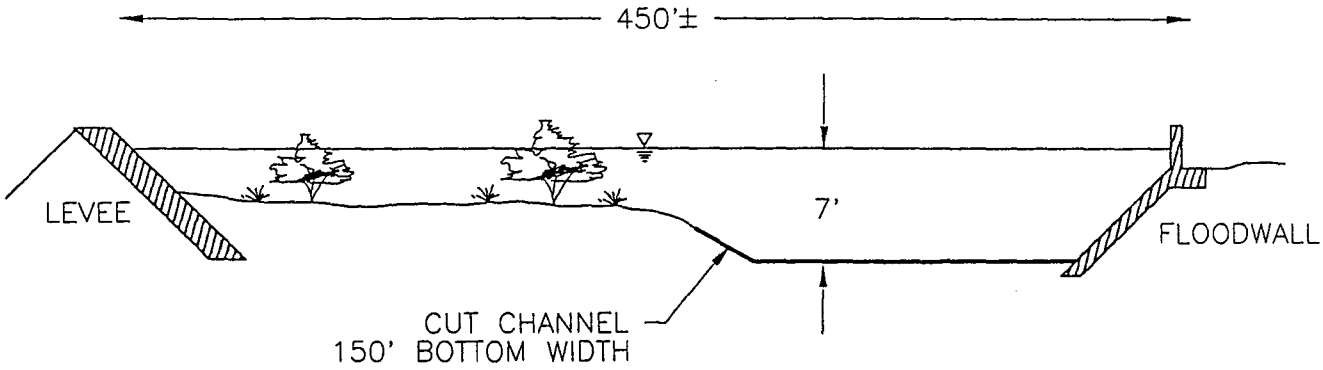


REACH 3

The Desert Greenbelt

Reata Pass/Beardsley Wash
Typical Section Variations
Reaches 1 thru 3

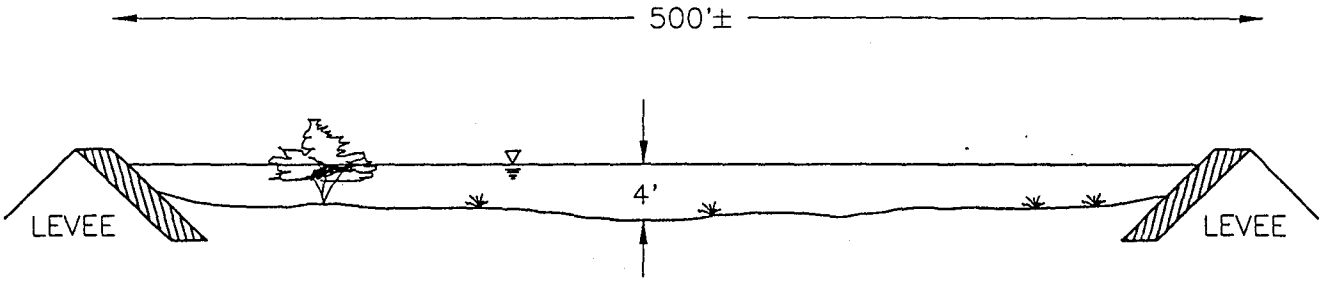
- Sections look downstream
- Levees may be covered with fill and revegetated in areas.

Not to Scale

Greiner

Figure 1-2

E029102 p:\CADD\EXHIBITS\OM\RBTYPSEC.DWG Scottsdale D.G. E1PC26 A.L. 041795 11:A



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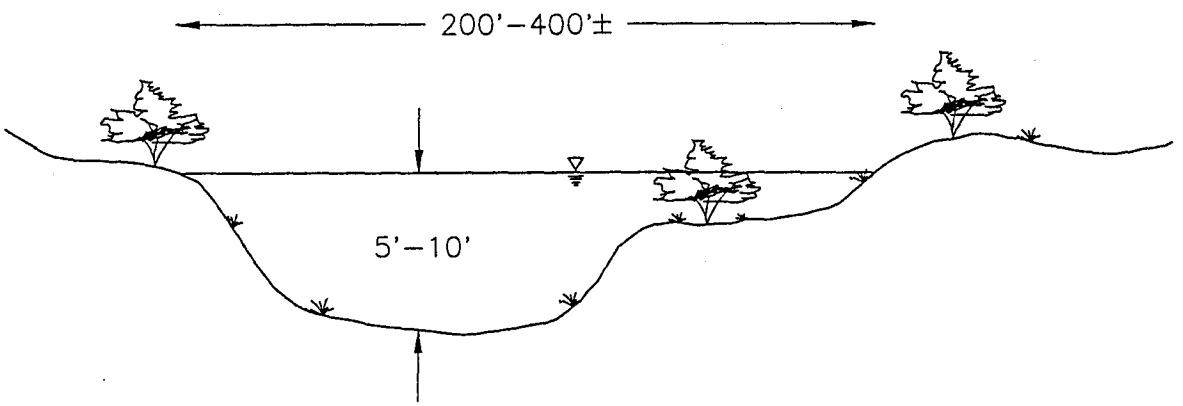

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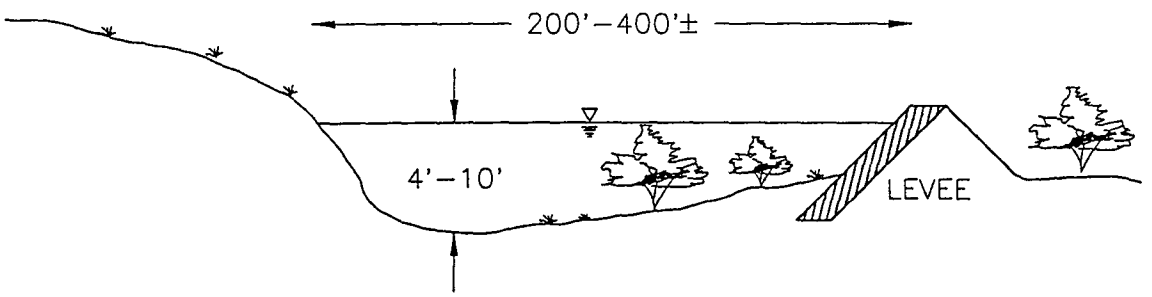

REACH 6

The Desert Greenbelt

Reata Pass/Beardsley Wash
Typical Section Variations
Reaches 4 thru 6

- Sections look downstream
- Levees may be covered with fill and revegetated in areas.

Not to Scale

Greiner

Figure 1–3

E029102
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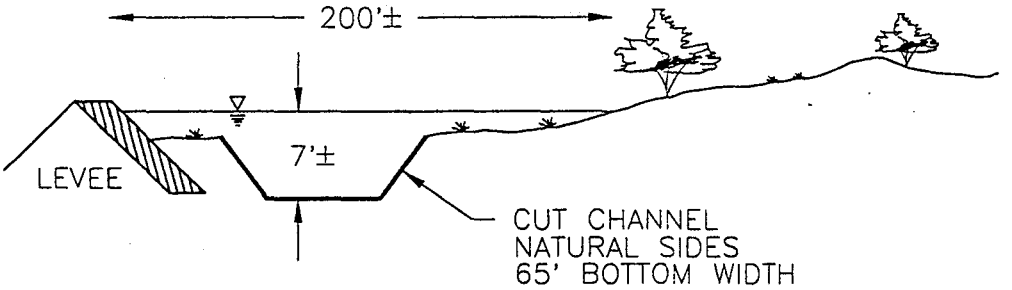
Scottsdale D.G.
E1PC26
A.L.
041795
11: A



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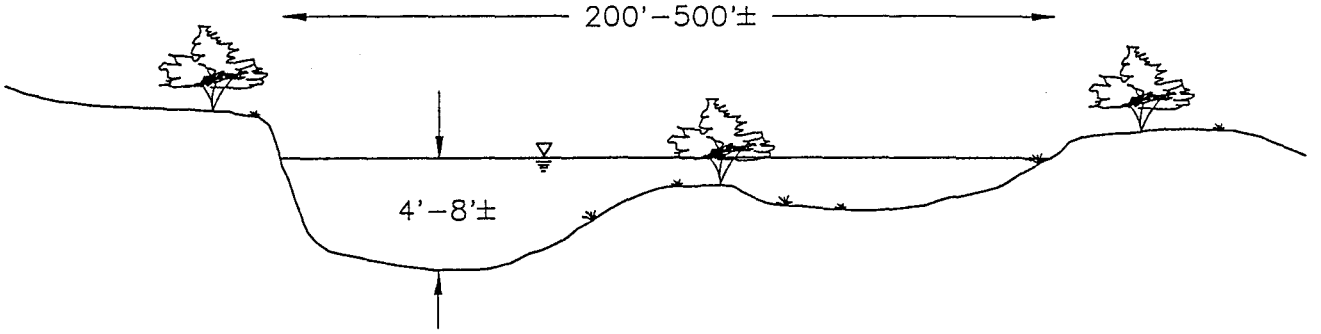

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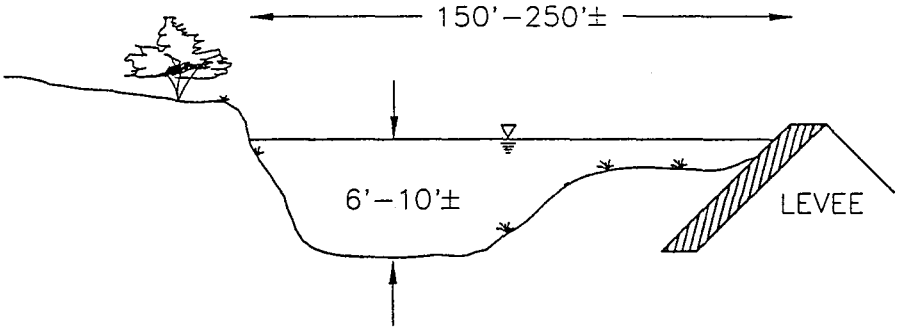

REACH 9

The Desert Greenbelt

Reata Pass/Beardsley Wash
Typical Section Variations
Reaches 7 thru 9

- Sections look downstream
- Levees may be covered with fill and revegetated in areas.

Not to Scale

Greiner

Figure 1–4

E029102
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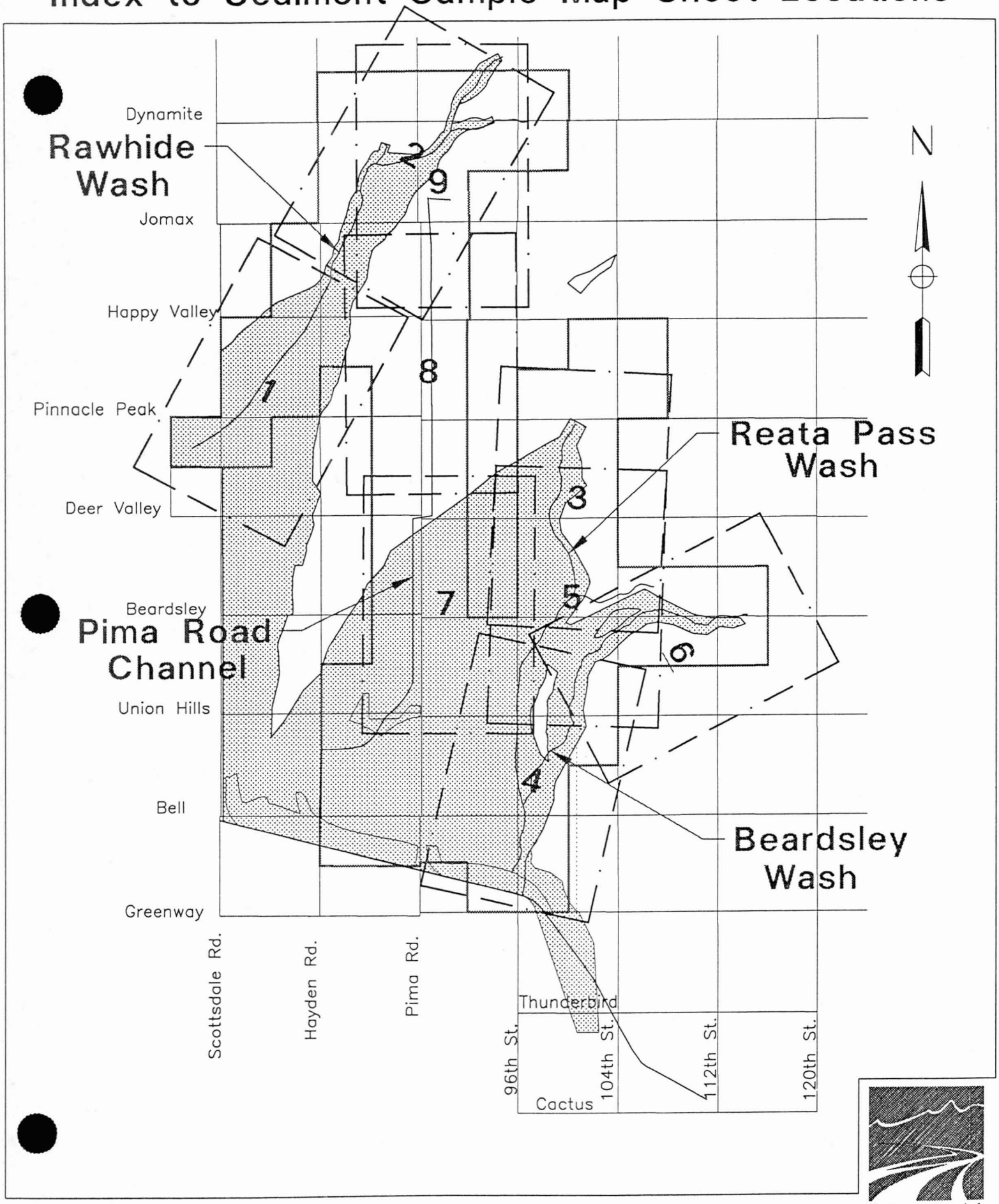
Scottsdale D.G.
E1PC26
A.L.
041795
11:A

Index to Sediment Sample Map Sheet Locations



Greiner

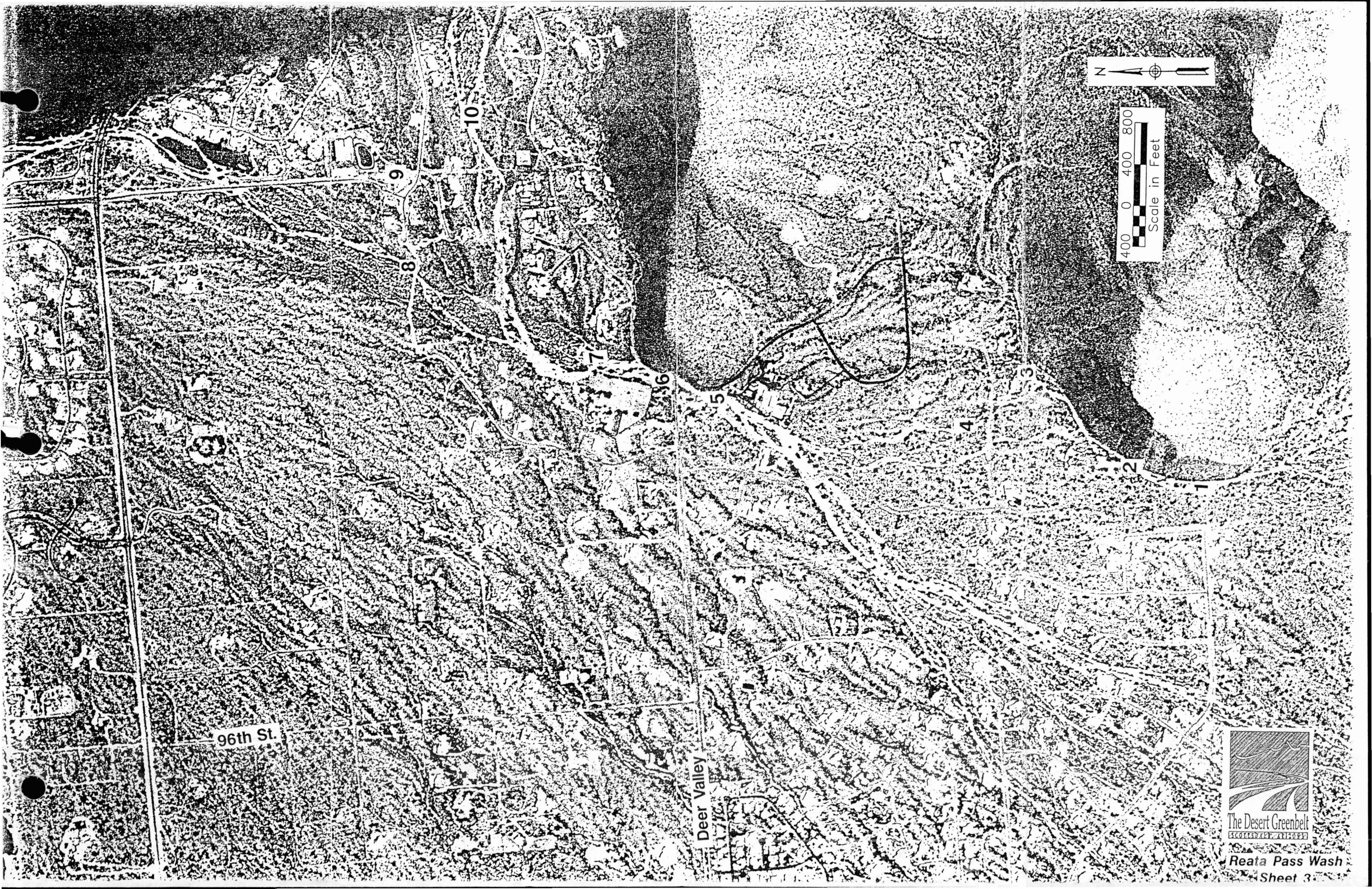
N.T.S.

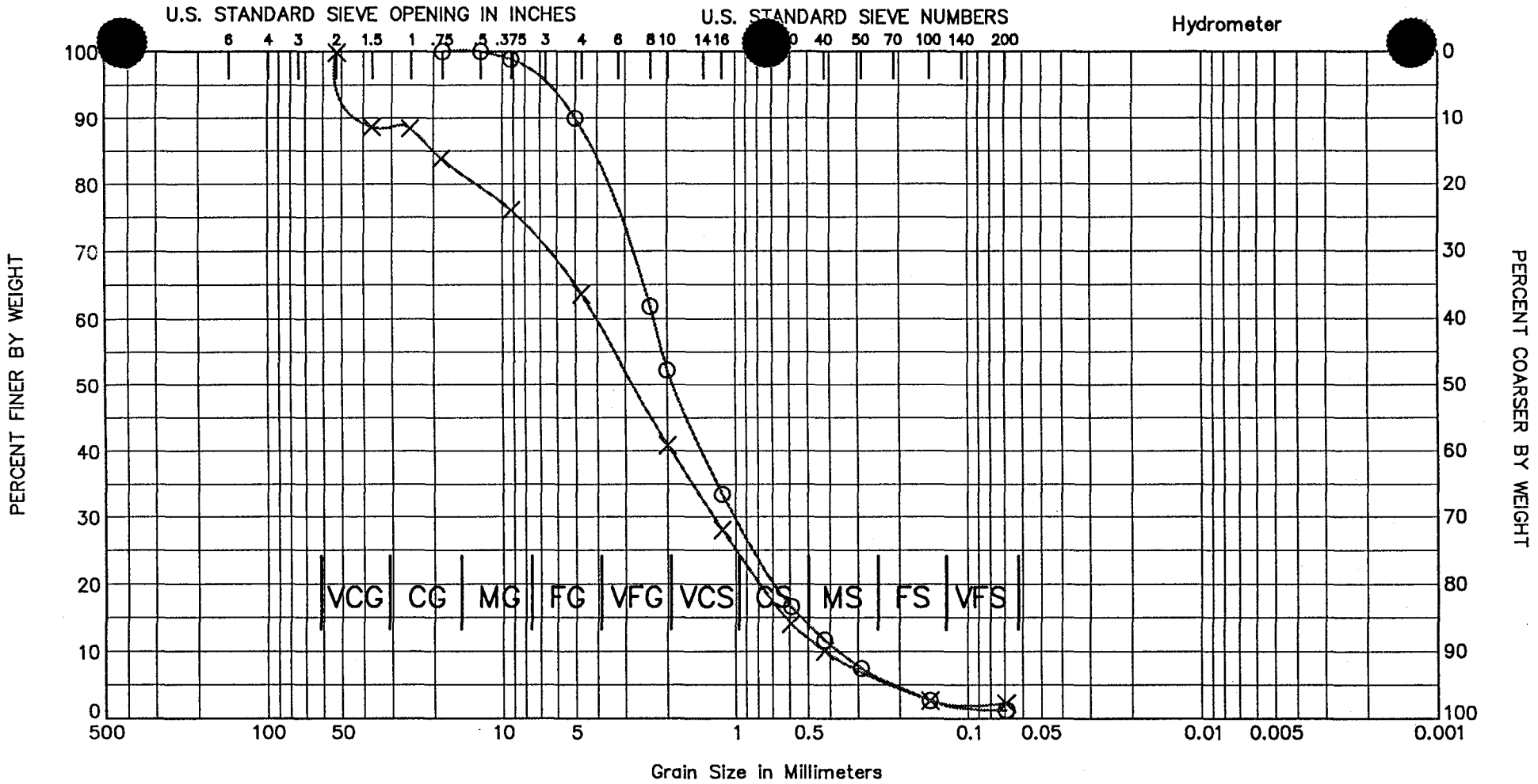
The Desert Greenbelt
SCOTTSDALE ARIZONA

Sediment Field Tests

Section 2

Upper Reata Wash


N
400 0 400 800
Scale in Feet
1
2
3
4
5
6
7
8
9
10
96th St.
Deer Valley
The Desert Greenbelt
Reata Pass Wash
Sheet 3



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Silt or Clay	

Sample no.	Elev. or Depth	Classification	Nat. W%	LL	PL	PL
X 3	Top 2 feet	Very Coarse Sand				
O 8	Top 2 feet	Very Coarse Sand				

Scottsdale Desert Greenbelt

Upper Reata

Boring No.: 1

Sample Date: 4/18/94

Greiner

The Desert Greenbelt
SCOTTSDALE, ARIZONA

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0483

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #1

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : JOHNSON

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3/4"	0	100	
1/2"	1	99	
3/8"	1	98	
1/4"	3	95	
#4	7	88	
#8	29	59	
#10	8	51	
#16	21	30	
#30	16	14	
#40	4	10	
#50	3	7	
#100	3	4	
#200	1	3.0	

D 50% = 2mm

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 2.9%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

Thomas E. Kaczmarowski

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0484

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #2

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : JOHNSON

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
1 1/2"	0	100	
1"	7	93	
3/4"	0	93	
1/2"	0	93	
3/8"	1	92	
1/4"	9	83	
#4	12	71	
	#8 25	46 — 2.36 mm	
#10	#10 5	41	
#16	16	25	
#30	11	14	
#40	3	11	
#50	3	8	
#100	4	4	
#200	1	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 0.7%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0485

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #3

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : AMADOR

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
2"	0	100	
1 1/2"	12	88	
1"	0	88	
3/4"	4	84	
1/2"	5	79	
3/8"	3	76	
1/4"	6	70	
#4	6	64	
#8	19	45	– 2.36 mm
#10	4	41	
#16	13	28	
#30	14	14	
#40	4	10	
#50	3	7	
#100	4	3	
#200	0	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 0.6%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0486

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #4

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : AMADOR

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
1"	0	100	
3/4"	1	99	
1/2"	1	98	
3/8"	0	98	
1/4"	5	93	
#4	8	85	
#8	#8 26	59	
[illegible]	#10 6	53 — 2mm	
#16	#16 18	35	
30	16	19	
40	5	14	
50	4	10	
#100	5	5	
#200	2	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 1.3%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0487

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #5

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : AMADOR

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
1"	0	100	
3/4"	3	97	
1/2"	2	95	
3/8"	1	94	
1/4"	8	86	
#4	12	74	
#8	29	45 - 2.36 mm	
#10	5	40	
#16	14	26	
#30	12	14	
#40	4	10	
#50	3	7	
#100	4	3	
#200	1	2.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 1.7%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0488

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #6

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : JOHNSON

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3/4"	0	100	
1/2"	1	99	
3/8"	2	97	
1/4"	6	91	
#4	8	83	
#8	25	58	
#10	#10 7	51	– 2mm
[illegible]	21	30	
#30	16	14	
#40	4	10	
#50	3	7	
#100	3	4	
#200	1	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 1.3%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0489

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #7

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : JOHNSON

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3/4"	0	100	
1/2"	0	100	
3/8"	1	99	
1/4"	3	96	
#4	6	90	
#8	29	61	
#10	#10 8	53 – 2.0 mm	
[illegible]	19	34	
#30	18	16	
#40	5	11	
#50	4	7	
#100	3	4	
#200	2	2.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 1.6%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0490

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #8

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : AMADOR

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
1/2"	0	100	
3/8"	1	99	
1/4"	3	96	
#4	6	90	
#8	23	67	
#10	7	60 — 2.0 mm	
#16	21	39	
[illegible]	20	19	
#40	5	14	
#50	6	8	
#100	3	5	
#200	2	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 2.8%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0491

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #9

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : JOHNSON

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3/4"	0	100	
1/2"	1	99	
3/8"	2	97	
1/4"	12	85	
#4	13	72	
#8	24	48 — 2.36 mm	
[illegible]	4	44	
[illegible]	12	32	
#30	11	21	
#40	4	17	
#50	5	12	
#100	7	5	
#200	2	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 2.2%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0492

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #10

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : AMADOR

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3/4"	0	100	
1/2"	2	98	
3/8"	1	97	
1/4"	5	92	
#4	7	85	
#8	27	58	
#10	6	52	2.0 mm
[illegible]	19	33	
#30	18	15	
#40	5	10	
#50	3	7	
#100	3	4	
#200	1	3.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 1.3%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/12/94

LAB NO: 94-0493

ATTN : MR. BILL LACE

PROJECT : SIEVE EVALUATIONS
MATERIAL: SILTY SAND
SOURCE : REATA #11

PROJECT NO: 794043
DATE RCVD : 05/06/94
SAMPLED BY: CLIENT
TESTED BY : AMADOR

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
1"	0	100	
3/4"	1	99	
1/2"	1	98	
3/8"	2	96	
1/4"	11	85	
#4	12	73	
#8	31	42	- 2.36mm
[illegible]	6	36	
#16	13	23	
#30	9	14	
#40	2	12	
#50	2	10	
#100	2	8	
#200	3	5.0	

MOISTURE CONTENT (%) 0.0

REMARKS: IN SITU MOISTURE = 3.1%

REVIEWED BY:

RESPECTFULLY SUBMITTED:

THOMAS E. KACZMAROWSKI
LABORATORY SUPERVISOR

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

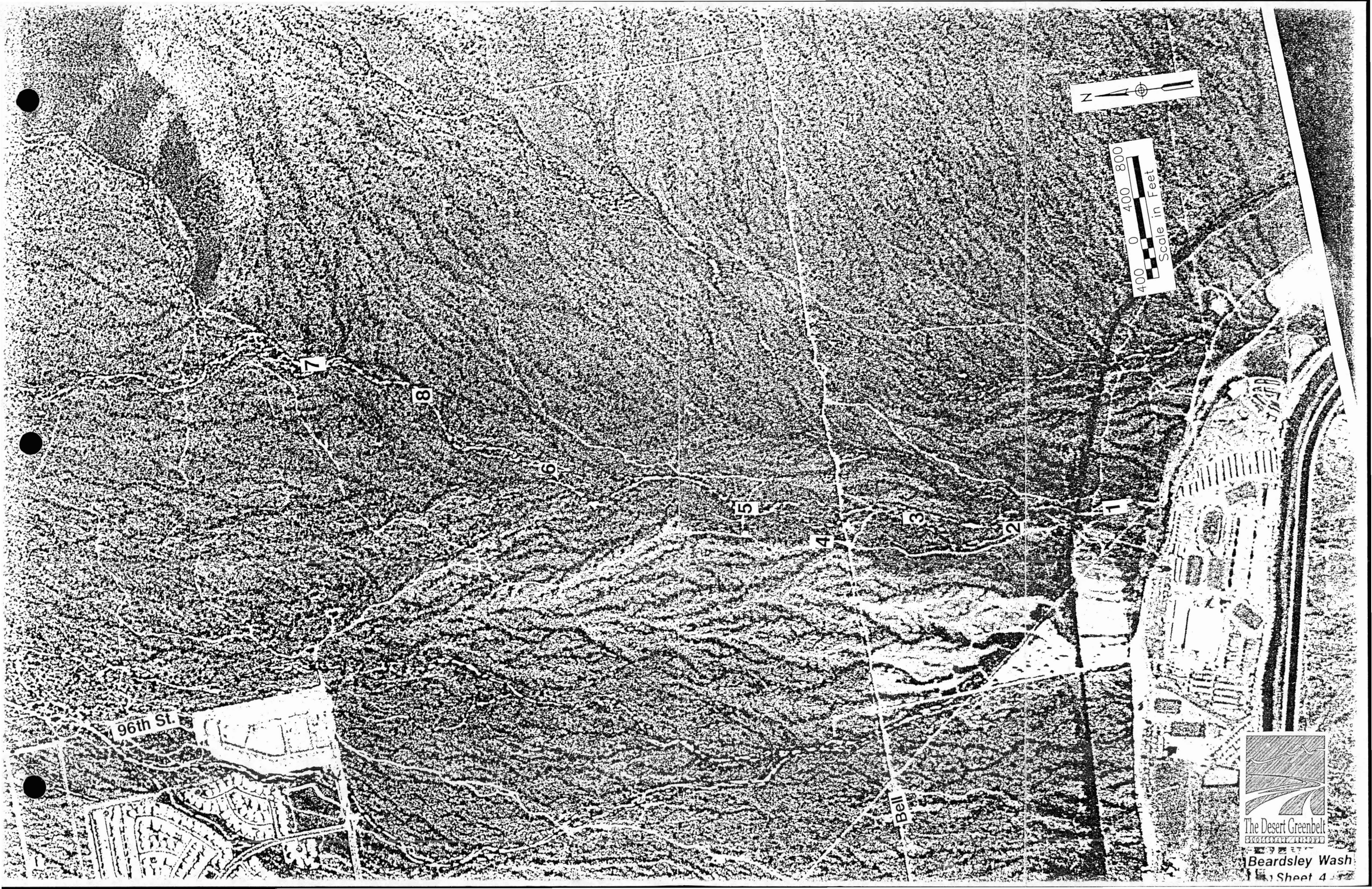
PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

Sediment Field Tests

Section 3

Lower Reata Wash


N
400 0 400 800
Scale in Feet
1
2
3
4
5
6
7
8
96th St.
Bell
The Desert Greenbelt
Beardsley Wash
Sheet 4

SECTION 1

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE LOWER BEARDSLEY CHNL SUB-TYPE _____

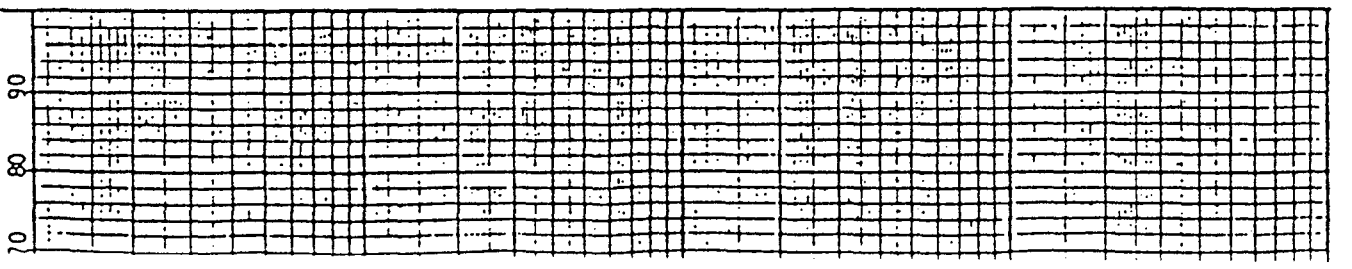
Remarks: SAMPLE OF ACTIVE CHANNEL (NOT BANKS).

PEBBLE COUNT

05/12/94 Party: _____ Wtrshd: _____

Site/Reach: PASS #1 (GOING N) (EAST BANK)

Metric mm	Inches	Particle		Item Count	Total	%Tot	%Cum	PASS #2 (GOING S) Item Count	Total	%Tot	%Cum	PASS #3 (GOING N) Item Count	Total	%Tot	%Cum
.062		SILT/CLAY													
.125		Vry FINE	SANDS												
.25		FINE	SANDS												
.50		MEDIUM	SANDS												
		COARSE	SANDS												
2	.04 - .08	Vry CRSE	SANDS	IIIIII				IIIII				IIIII			
4	.08 - .16	Vry FINE	GRAVELS												
6	.16 - .24	FINE	GRAVELS												
8	.24 - .31	FINE	GRAVELS					I				I			
12	.31 - .47	MEDIUM	GRAVELS	I				I				II			
16	.47 - .63	MEDIUM	GRAVELS	I								I			
24	.63 - .94	COARSE	GRAVELS	I				II				II			
32	.94 - 1.26	COARSE	GRAVELS												
48	1.26- 1.9	Vry CRSE	GRAVELS	II				IIII				I			
64	1.9 - 2.5	Vry CRSE	GRAVELS	IIII				II				I			
96	2.5 - 3.8	SMALL	COBBLES	II								II			
128	3.8 - 5.0	SMALL	COBBLES					I				III			
192	5.0 - 7.6	LARGE	COBBLES	II				IIII				I			
256	7.6 - 10	LARGE	COBBLES	I											
384	10 - 15	SMALL	BOULDERS												
512	15 - 20	SMALL	BOULDERS									I			
1024	20 - 40	MEDIUM	BOULDERS												
2048	40 - 80	LARGE	BOULDERS												
4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



05-12-94

2/2

SECTION 1

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE ~~LOWER BEAR RIVER CHNL~~ SUB-TYPE _____

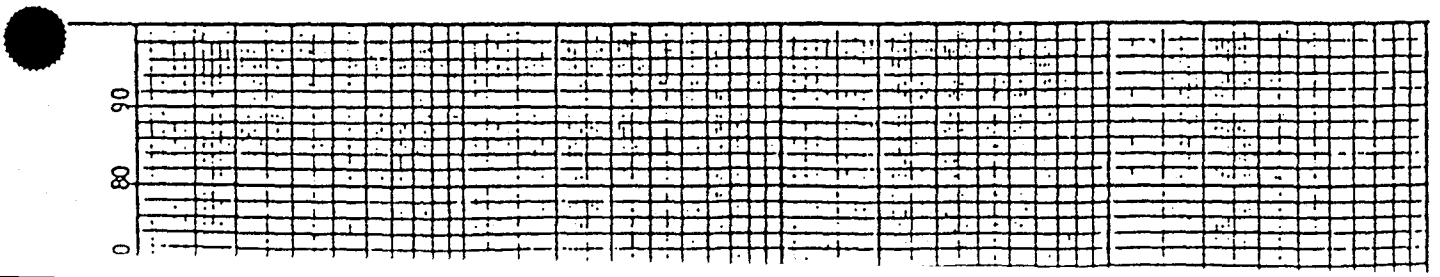
Remarks: (CONT)

PEBBLE COUNT

Date 05/12/94 Party: _____ Wtrshd: _____

Site/Reach: (GOING S) PASS #4 | CLAY PAN (GOING N) PASS #5 (WEST BANK) | % Per

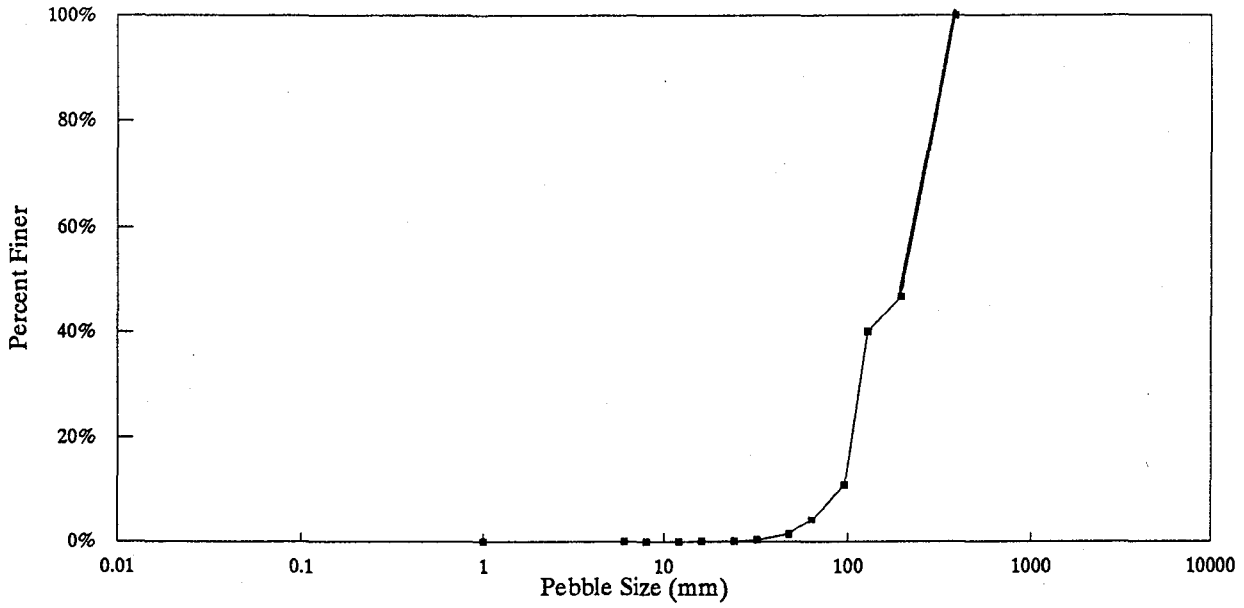
Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY						II					2		
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.5 - 1.0		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS	IIIII				IIIIII					27		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS												
6 - 8	.24 - .31	FINE	GRAVELS	I				III					6		
8 - 12	.31 - .47	MEDIUM	GRAVELS	I									5		
12 - 16	.47 - .63	MEDIUM	GRAVELS	I				I					4		
16 - 24	.63 - .94	COARSE	GRAVELS										5		
24 - 32	.94 - 1.26	COARSE	GRAVELS	I				I					2		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	I									8		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	II									9		
64 - 96	2.5 - 3.8	SMALL	COBBLES	III				III					10		
96 - 128	3.8 - 5.0	SMALL	COBBLES	II				II					8		
128 - 192	5.0 - 7.6	LARGE	COBBLES	III				II					12		
192 - 256	7.6 - 10	LARGE	COBBLES										1		
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS										1		
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 1

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062		2	2.00%	0.000016	0.000031197	0.00%	0.00%
	Vry FINE	0.062	0.0935	0.062 – 0.125			2.00%	0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25			2.00%	0.003451			NA
Sands	MEDIUM	0.25	0.375	0.25 – 0.5			2.00%	0.027612			NA
	COARSE	0.5	0.75	0.5 – 1			2.00%	0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	27	29.00%	1.767146	47.71293843	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		29.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24		29.00%	65.45			NA
	FINE	6	7	6 – 8	0.24 – 0.31	6	35.00%	179.59	1077.56628	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	5	40.00%	523.60	2617.993878	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	4	44.00%	1436.76	5747.020161	0.01%	0.01%
		16	20	16 – 24	0.63 – 0.94	5	49.00%	4188.79	20943.95102	0.02%	0.03%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	51.00%	11494.04	22988.08064	0.03%	0.06%
		32	40	32 – 48	1.26 – 1.9	8	59.00%	33510.32	268082.5731	0.30%	0.36%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	9	68.00%	91952.32	827570.9032	0.94%	1.30%
		64	80	64 – 96	2.5 – 3.8	10	78.00%	268082.57	2680825.731	3.03%	4.33%
	SMALL	96	112	96 – 128	3.8 – 5	8	86.00%	735618.58	5884948.645	6.66%	10.99%
Cobbles		128	160	128 – 192	5 – 7.6	12	98.00%	2144660.58	25735927.02	29.11%	40.10%
	LARGE	192	224	192 – 256	7.6 – 10	1	99.00%	5884948.64	5884948.645	6.66%	46.75%
		256	320	256 – 384	10 – 15		99.00%	17157284.68			NA
	SMALL	384	448	384 – 512	15 – 20	1	100.00%	47079589.16	47079589.16	53.25%	100.00%
Boulders	MEDIUM	512	768	512 – 1024	20 – 40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	88415315		

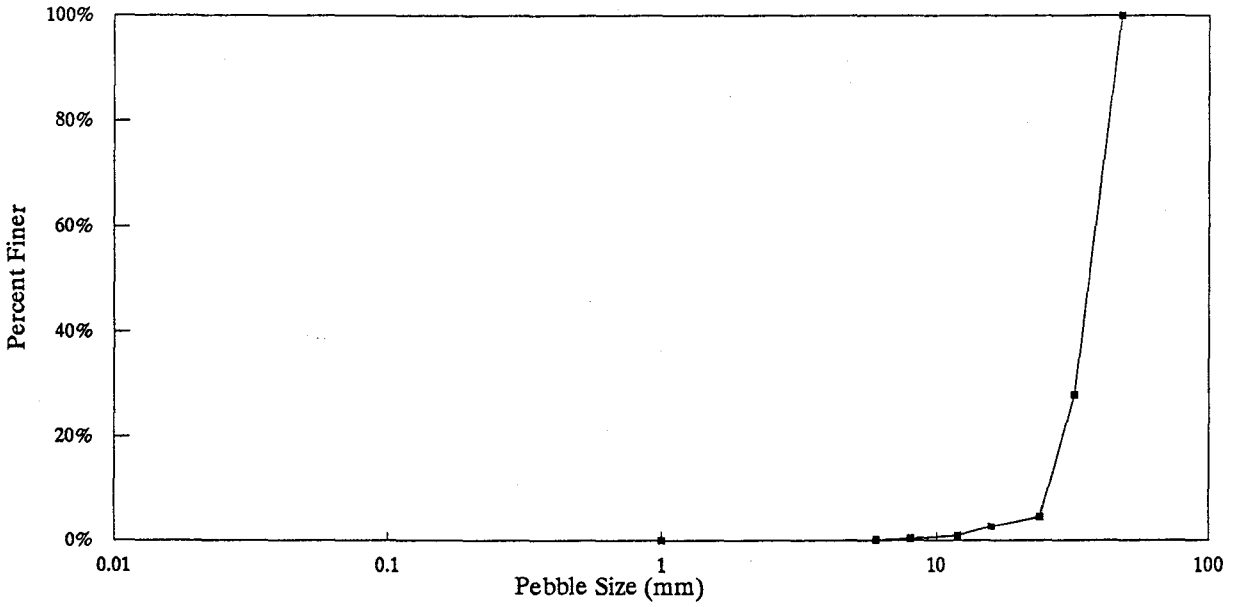
Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^ 3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\sediment.wk3

Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 1

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062		2	2.94%	0.000016	0.000031197	0.00%	0.00%
	Vry FINE	0.062	0.0935	0.062 – 0.125			2.94%	0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25			2.94%	0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5			2.94%	0.027612			NA
	COARSE	0.5	0.75	0.5 – 1			2.94%	0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	27	42.65%	1.767146	47.71293843	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		42.65%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24		42.65%	65.45			NA
	FINE	6	7	6 – 8	0.24 – 0.31	6	51.47%	179.59	1077.56628	0.09%	0.10%
		8	10	8 – 12	0.31 – 0.7	5	58.82%	523.60	2617.993878	0.23%	0.33%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	4	64.71%	1436.76	5747.020161	0.50%	0.83%
		16	20	16 – 24	0.63 – 0.94	5	72.06%	4188.79	20943.95102	1.82%	2.65%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	75.00%	11494.04	22988.08064	2.00%	4.65%
		32	40	32 – 48	1.26 – 1.9	8	86.76%	33510.32	268082.5731	23.33%	27.98%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	9	100.00%	91952.32	827570.9032	72.02%	100.00%
					Total Sampled	68		Total Area	1149075.801		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\lobear2h.wk3

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

CLIENT:	Greiner, Inc.	**DATE:**	03-07-95
	7310 North 16th Street, #160	**LAB NO.:**	95-0179
	Phoenix, AZ 85020	**PROJECT NO.:**	795014
ATTN.:	Mr. Bill Lace	**DATE RVCD.:**	03-05-95
PROJECT:	Sand Evaluation	**SAMPLED BY:**	Client
MATERIAL:	Native	**TESTED BY:**	R. Evans
SOURCE:	Reata #2	**METHOD:**	ASTM C136

PARTICLE SIZE ANALYSIS OF SOILS

SIEVE SIZE	% RETAINED	% PASSING
3 1/2"	0	100
3"	5	95
2 1/2"	T	95
2"	11	84
1 1/2"	11	73
1"	9	64
3/4"	10	54
1/2"	12	42
3/8"	8	34
1/4"	11	23
#4	5	18
#8	7	11
#10	1	10
#16	3	7
#30	3	4
#40	1	3
#50	1	2
#100	1	1
#200	T	0.5

$D_{50} = 3/4''$

Remarks: Moisture = 1.7%

Reviewed:

Respectfully Submitted,

for Michael P. Bonkoski
Laboratory Supervisor

2912 W. CLARENDON
PHOENIX, AZ 85017
TELEPHONE (602) 241-1097
FAX (602) 277-1306

820 E. 47TH STREET, SUITE B-1
TUCSON, AZ 85713
TELEPHONE (602) 623-4547
FAX (602) 623-4603

16921 S. WESTERN AVE., SUITE 109
GARDENA, CA 90247
TELEPHONE (310) 538-3757
FAX (310) 538-0725

SECTION 2

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE LOWER BEARDSLY CHNL SUB-TYPE _____

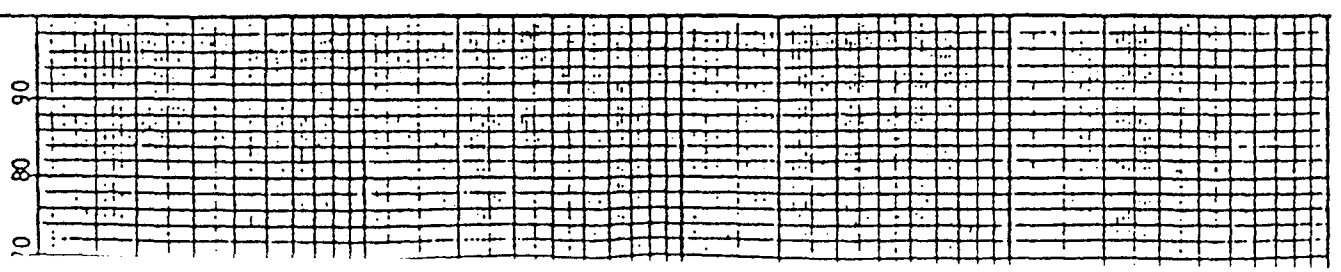
Remarks: ABOVE OLD CANAL

PEBBLE COUNT

Date 05/12/94 Party: _____ Wtrshd: _____

Site/Reach: PASS #1 (GOING S. E. CHANNEL EDGE)

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count (PASS #2 GOING N)	Tot#	%Tot	%Cum	Item Count (GOING ?) PASS #3	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
[illegible]		COARSE	SANDS												
.50 - 2	.04 - .08	Vry CRSE	SANDS	I				IIII				I			
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS					I							
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS					I				I			
12 - 16	.47 - .63	MEDIUM	GRAVELS	I				I				I			
16 - 24	.63 - .94	COARSE	GRAVELS	II				III				IIII			
24 - 32	.94 - 1.26	COARSE	GRAVELS	I				II				II			
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	IIII								III			
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	II				II				I			
64 - 96	2.5 - 3.8	SMALL	COBBLES	II				III				IIII			
96 - 128	3.8 - 5.0	SMALL	COBBLES	III				III				II			
128 - 192	5.0 - 7.6	LARGE	COBBLES	II											
192 - 256	7.6 - 10	LARGE	COBBLES	II								I			
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 5= 9=			Totals....					Totals....				Totals....			



SECTION 2

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE LOWER BEARDSLY CHNL SUB-TYPE _____

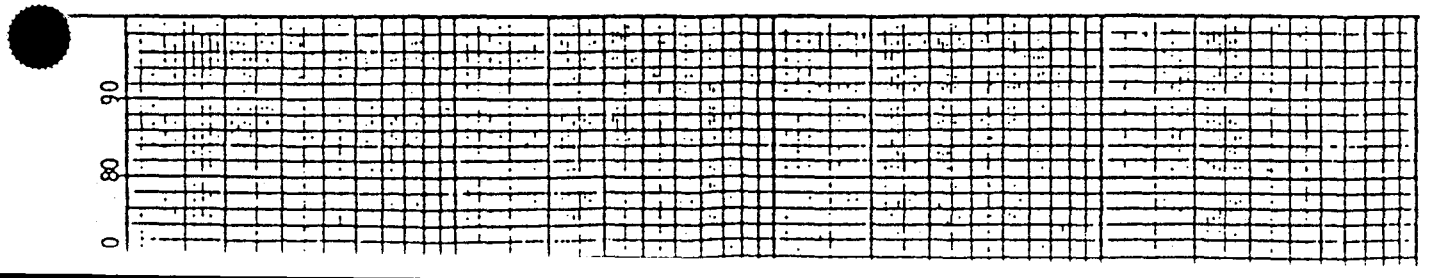
Remarks: ABOVE D-O CANAL

PEBBLE COUNT

Date 05/12/94 Party: _____ Wtrshd: _____

Site/Reach: PASS #4 (GOING N) PASS #5 (GOING S) % Per

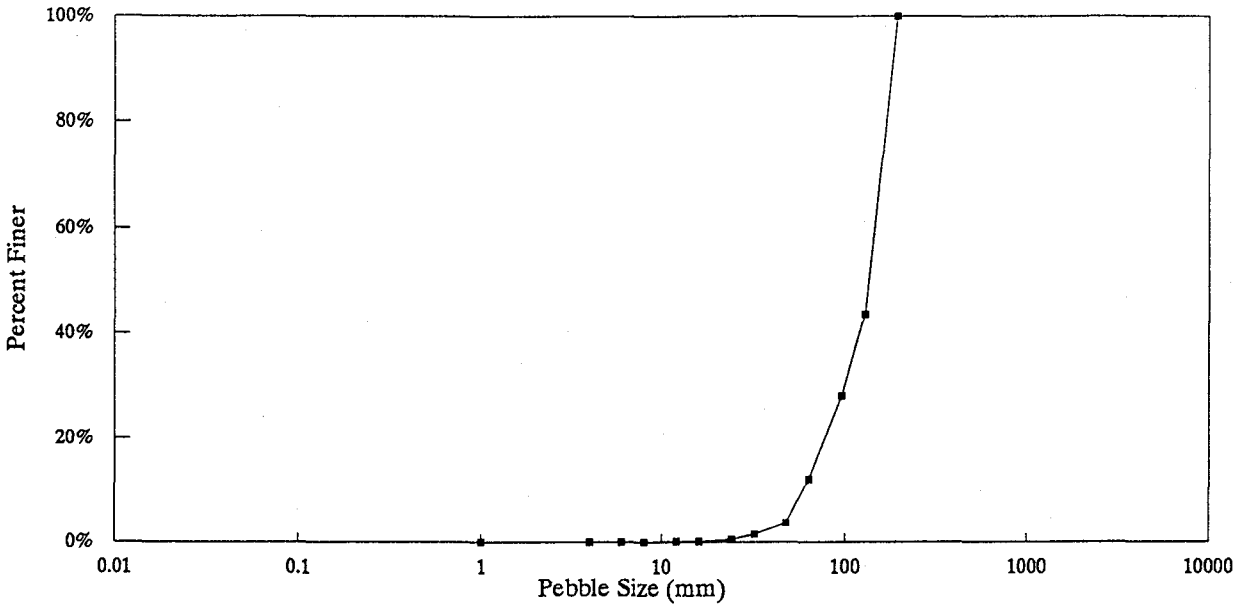
Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
<ss- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
		COARSE	SANDS												
.0 - 2	.04 - .08	Vry CRSE	SANDS	II				IIII					12		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS										1		
6 - 8	.24 - .31	FINE	GRAVELS	I									1		
8 - 12	.31 - .47	MEDIUM	GRAVELS	I				IIII					7		
12 - 16	.47 - .63	MEDIUM	GRAVELS	III				I					7		
16 - 24	.63 - .94	COARSE	GRAVELS										9		
24 - 32	.94 - 1.26	COARSE	GRAVELS	IIII				I					10		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	III				III					13		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	II				IIII					11		
64 - 96	2.5 - 3.8	SMALL	COBBLES	I				III					13		
96 - 128	3.8 - 5.0	SMALL	COBBLES	I									9		
128 - 192	5.0 - 7.6	LARGE	COBBLES	I									3		
192 - 256	7.6 - 10	LARGE	COBBLES	I									4		
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 2

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	12	12.00%	1.767146	21.20575041	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		12.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	1	13.00%	65.45	65.44984695	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	1	14.00%	179.59	179.59438	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	7	21.00%	523.60	3665.191429	0.01%	0.01%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	7	28.00%	1436.76	10057.28528	0.02%	0.03%
		16	20	16 – 24	0.63 – 0.94	9	37.00%	4188.79	37699.11184	0.09%	0.12%
	COARSE	24	28	24 – 32	0.94 – 1.26	10	47.00%	11494.04	114940.4032	0.28%	0.40%
		32	40	32 – 48	1.26 – 1.9	13	60.00%	33510.32	435634.1813	1.04%	1.44%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	11	71.00%	91952.32	1011475.548	2.43%	3.87%
		64	80	64 – 96	2.5 – 3.8	13	84.00%	268082.57	3485073.45	8.36%	12.23%
	SMALL	96	112	96 – 128	3.8 – 5	9	93.00%	735618.58	6620567.225	15.88%	28.11%
Cobbles		128	160	128 – 192	5 – 7.6	3	96.00%	2144660.58	6433981.755	15.43%	43.54%
	LARGE	192	224	192 – 256	7.6 – 10	4	100.00%	5884948.64	23539794.58	56.46%	100.00%
		256	320	256 – 384	10 – 15		100.00%	17157284.68			NA
	SMALL	384	448	384 – 512	15 – 20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 – 1024	20 – 40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	41693154.98		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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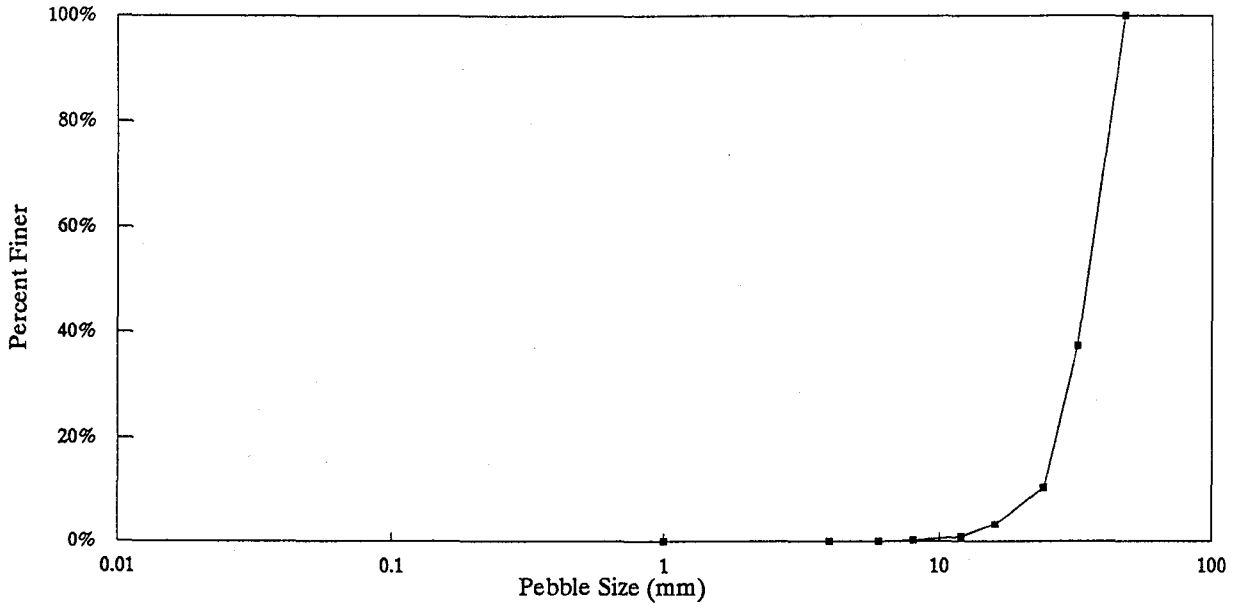
Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 2

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
nds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	12	16.90%	1.767146	21.20575041	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		16.90%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	1	18.31%	65.45	65.44984695	0.00%	0.01%
	FINE	6	7	6 – 8	0.24 – 0.31	1	19.72%	179.59	179.59438	0.01%	0.02%
		8	10	8 – 12	0.31 – 0.7	7	29.58%	523.60	3665.191429	0.23%	0.24%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	7	39.44%	1436.76	10057.28528	0.62%	0.87%
		16	20	16 – 24	0.63 – 0.94	9	52.11%	4188.79	37699.11184	2.34%	3.20%
	COARSE	24	28	24 – 32	0.94 – 1.26	10	66.20%	11494.04	114940.4032	7.12%	10.33%
		32	40	32 – 48	1.26 – 1.9	13	84.51%	33510.32	435634.1813	27.00%	37.32%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	11	100.00%	91952.32	1011475.548	62.68%	100.00%
					Total Sampled	71		Total Area	1613737.971		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear2h.wk3

SECTION 3

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

N 33 33 16.5

W 111 22 20.1

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____ #16 - 17

STREAM TYPE LOWER BEAVERSLY CHNL SUB-TYPE _____

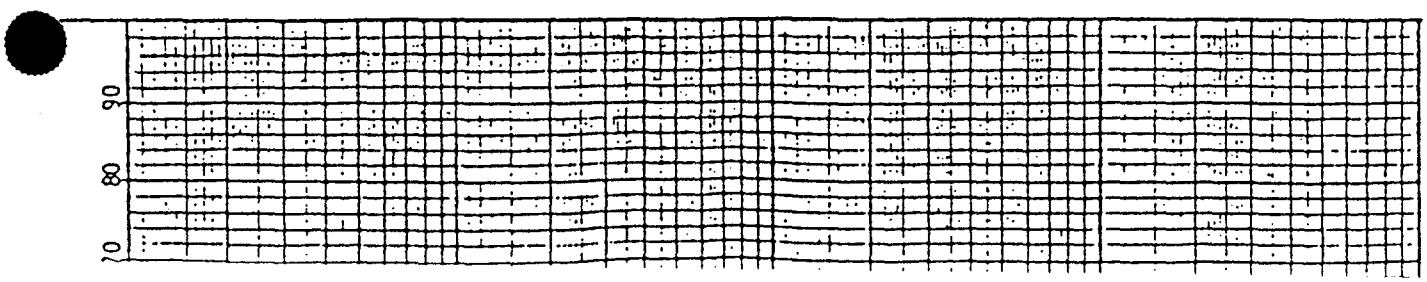
Remarks:

PEBBLE COUNT

Date 05/12/94 Party: _____ Wtrshd: _____

Site/Reach: _____

Metric mm	Inches	Particle		PASS #1 (GOING S - E SIDE OF CHANNEL) Item Count	Tot#	%Tot	%Cum	PASS #2 (GOING N) Item Count	Tot#	%Tot	%Cum	PASS #3 Item Count	Tot#	%Tot	%Cum
<.062		SILT/CLAY		|			|||							
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
		COARSE	SANDS												
.0 - 2	.04 - .08	Vry CRSE	SANDS	|||				||||				||||			
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS												
6 - 8	.24 - .31	FINE	GRAVELS	|								||			
8 - 12	.31 - .47	MEDIUM	GRAVELS	||				|				|||			
12 - 16	.47 - .63	MEDIUM	GRAVELS					|				|			
16 - 24	.63 - .94	COARSE	GRAVELS					||				||			
24 - 32	.94 - 1.26	COARSE	GRAVELS	|				|							
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	|||				|||				||			
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	|				||				|			
64 - 96	2.5 - 3.8	SMALL	COBBLES	||								||			
96 - 128	3.8 - 5.0	SMALL	COBBLES	||||								|			
128 - 192	5.0 - 7.6	LARGE	COBBLES	|				||||				||			
192 - 256	7.6 - 10	LARGE	COBBLES	|											
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 5= 9=				Totals....				Totals....				Totals....			



SECTION 3

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE LOWER BEARDSLY CHNL SUB-TYPE _____

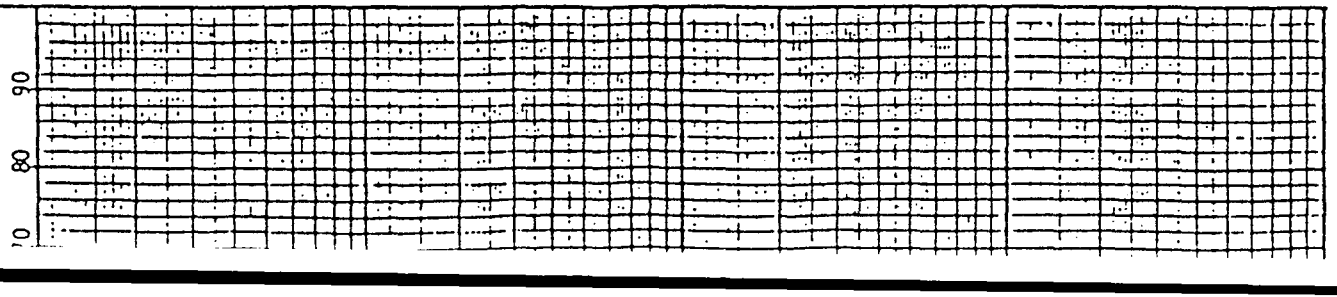
Remarks: JUST SOUTH OF BELL RD.

PEBBLE COUNT

Date 05/12/94 Party: _____ Wtrshd: _____

Site/Reach: PASS #4 (GOING N) (GOING S) PASS #5 % Per

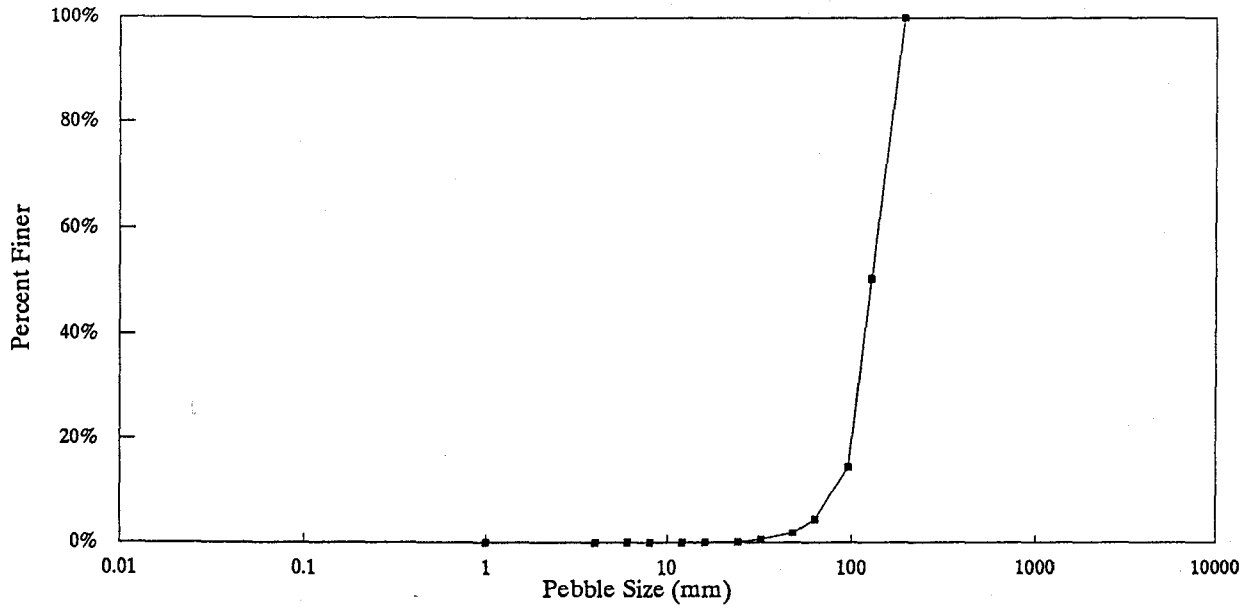
Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY											4		
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
		COARSE	SANDS												
.0 - 2	.04 - .08	Vry CRSE	SANDS	IIIIIIIIII				III					23		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS					I					1		
6 - 8	.24 - .31	FINE	GRAVELS	I				II					6		
8 - 12	.31 - .47	MEDIUM	GRAVELS										6		
12 - 16	.47 - .63	MEDIUM	GRAVELS					I					3		
16 - 24	.63 - .94	COARSE	GRAVELS	I				I					6		
24 - 32	.94 - 1.26	COARSE	GRAVELS					II					4		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS					II					10		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	II				II					8		
64 - 96	2.5 - 3.8	SMALL	COBBLES	I				I					6		
96 - 128	3.8 - 5.0	SMALL	COBBLES	III									8		
128 - 192	5.0 - 7.6	LARGE	COBBLES	II				I					10		
192 - 256	7.6 - 10	LARGE	COBBLES					IIII					5		
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 3

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm		Pebble Size Inches		Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	<	0.062			4	4.00%	0.000016	0.000062394	0.00%	0.00%
	Vry FINE	0.062	0.0935	0.062 –	0.125				4.00%	0.000428			NA
	FINE	0.125	0.1875	0.125 –	0.25				4.00%	0.003451			NA
	MEDIUM	0.25	0.375	0.25 –	0.5				4.00%	0.027612			NA
	COARSE	0.5	0.75	0.5 –	1				4.00%	0.220893			NA
	Vry CRSE	1	1.5	1 –	2	0.04 –	0.08	23	27.00%	1.767146	40.64435496	0.00%	0.00%
	Vry FINE	2	3	2 –	4	0.08 –	0.16		27.00%	14.137167			NA
		4	5	4 –	6	0.16 –	0.24	1	28.00%	65.45	65.44984695	0.00%	0.00%
	FINE	6	7	6 –	8	0.24 –	0.31	6	34.00%	179.59	1077.56628	0.00%	0.00%
		8	10	8 –	12	0.31 –	0.7	6	40.00%	523.60	3141.592654	0.01%	0.01%
Gravels	MEDIUM	12	14	12 –	16	0.47 –	0.63	3	43.00%	1436.76	4310.265121	0.01%	0.01%
		16	20	16 –	24	0.63 –	0.94	6	49.00%	4188.79	25132.74123	0.04%	0.06%
	COARSE	24	28	24 –	32	0.94 –	1.26	4	53.00%	11494.04	45976.16129	0.08%	0.13%
		32	40	32 –	48	1.26 –	1.9	10	63.00%	33510.32	335103.2164	0.56%	0.70%
	Vry CRSE	48	56	48 –	64	1.9 –	2.5	8	71.00%	91952.32	735618.5806	1.24%	1.93%
		64	80	64 –	96	2.5 –	3.8	6	77.00%	268082.57	1608495.439	2.70%	4.64%
	SMALL	96	112	96 –	128	3.8 –	5	8	85.00%	735618.58	5884948.645	9.89%	14.52%
Cobbles		128	160	128 –	192	5 –	7.6	10	95.00%	2144660.58	21446605.85	36.04%	50.56%
	LARGE	192	224	192 –	256	7.6 –	10	5	100.00%	5884948.64	29424743.22	49.44%	100.00%
		256	320	256 –	384	10 –	15		100.00%	17157284.68			NA
	SMALL	384	448	384 –	512	15 –	20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 –	1024	20 –	40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 –	2048	40 –	80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 –	4096	80 –	160		100.00%	15179667417.59			NA
						Total Sampled		100		Total Area	59515259.37		

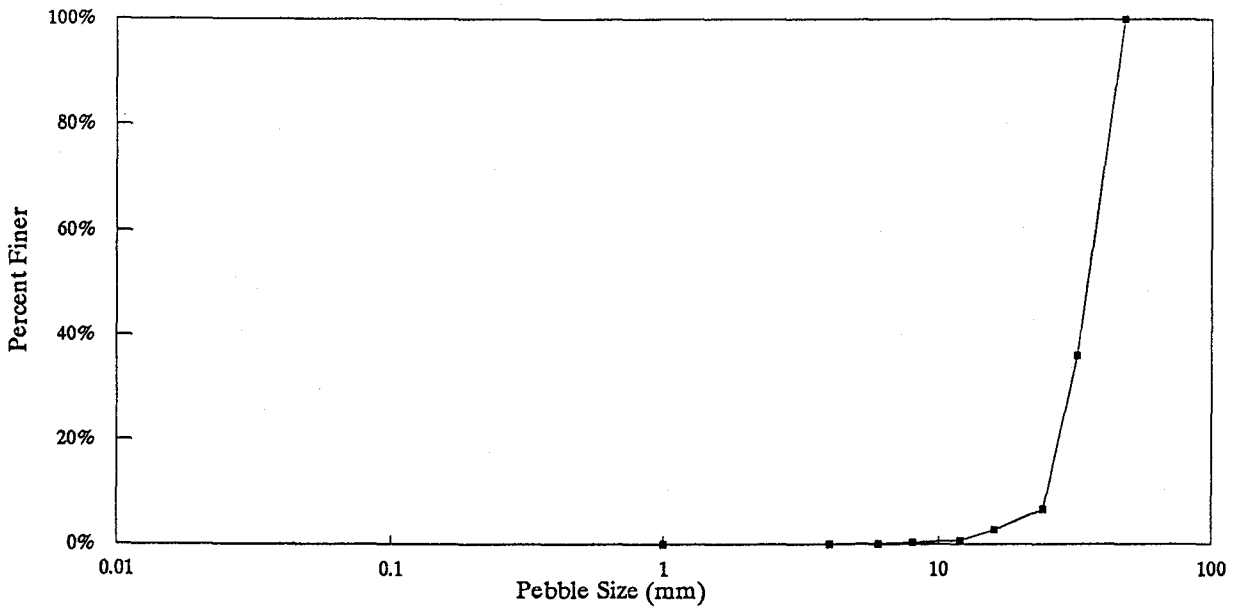
Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear3.wk3

Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 3

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062		4	5.63%	0.000016	0.000062394	0.00%	0.00%
	Vry FINE	0.062	0.0935	0.062 – 0.125			5.63%	0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25			5.63%	0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5			5.63%	0.027612			NA
	COARSE	0.5	0.75	0.5 – 1			5.63%	0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	23	38.03%	1.767146	40.64435496	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		38.03%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	1	39.44%	65.45	65.44984695	0.01%	0.01%
	FINE	6	7	6 – 8	0.24 – 0.31	6	47.89%	179.59	1077.56628	0.09%	0.10%
		8	10	8 – 12	0.31 – 0.7	6	56.34%	523.60	3141.592654	0.27%	0.38%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	3	60.56%	1436.76	4310.265121	0.37%	0.75%
		16	20	16 – 24	0.63 – 0.94	6	69.01%	4188.79	25132.74123	2.18%	2.94%
	COARSE	24	28	24 – 32	0.94 – 1.26	4	74.65%	11494.04	45976.16129	4.00%	6.93%
		32	40	32 – 48	1.26 – 1.9	10	88.73%	33510.32	335103.2164	29.13%	36.06%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	100.00%	91952.32	735618.5806	63.94%	100.00%
					Total Sampled	71		Total Area	1150466.218		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear3h.wk3

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

CLIENT:	Greiner, Inc.	**DATE:**	03-07-95
	7310 North 16th Street, #160	**LAB NO.:**	95-0180
	Phoenix, AZ 85020	**PROJECT NO.:**	795014
ATTN.:	Mr. Bill Lace	**DATE RVCD.:**	03-05-95
PROJECT:	Sand Evaluation	**SAMPLED BY:**	Client
MATERIAL:	Native	**TESTED BY:**	R. Evans
SOURCE:	Reata #4	**METHOD:**	ASTM C136

PARTICLE SIZE ANALYSIS OF SOILS

SIEVE SIZE	% RETAINED	% PASSING
3 1/2"	0	100
3"	8	92
2 1/2"	T	92
2"	6	86
1 1/2"	6	80
1"	12	68
3/4"	5	63
1/2"	9	54
3/8"	5	49
1/4"	7	42
#4	4	38
#8	10	28
#10	2	26
#16	7	19
#30	10	9
#40	3	6
#50	2	4
#100	3	1
#200	T	0.7

$D_{30} = 3/8''$

Remarks: Moisture = 1.7%

Reviewed:

Respectfully Submitted,

for Michael P. Bonkoski
Laboratory Supervisor

2912 W. CLARENDON
PHOENIX, AZ 85017
TELEPHONE (602) 241-1097
FAX (602) 277-1306

820 E. 47TH STREET, SUITE B-1
TUCSON, AZ 85713
TELEPHONE (602) 623-4547
FAX (602) 623-4603

16921 S. WESTERN AVE., SUITE 109
GARDENA, CA 90247
TELEPHONE (310) 538-3757
FAX (310) 538-0725

SECTION 4

Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

N 33° 28 34.1
W 111° 53 17.2

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE LOWER BEARDSLY CHNL SUB-TYPE _____

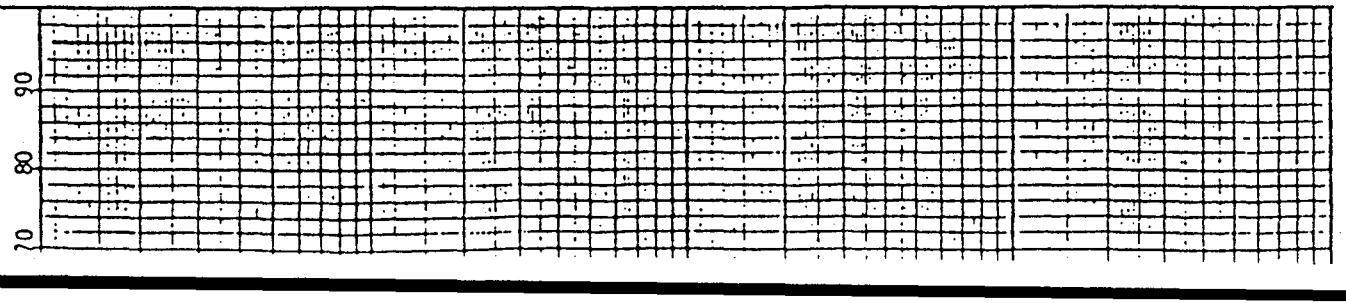
Remarks: NORTH OF [illegible] Rd.

PEBBLE COUNT

Date 05/12/94 Party: _____ Wtrshd: _____

Site/Reach: PASS #1 (E. BANK, GOING N) GOING N PASS #2 PASS #3

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
		COARSE	SANDS												
.50 - 2	.04 - .08	Vry CRSE	SANDS	II				I				IIII			
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS	I				II							
6 - 8	.24 - .31	FINE	GRAVELS	II				I				II			
8 - 12	.31 - .47	MEDIUM	GRAVELS	III				I				III			
12 - 16	.47 - .63	MEDIUM	GRAVELS	II				II							
16 - 24	.63 - .94	COARSE	GRAVELS					III				II			
24 - 32	.94 - 1.26	COARSE	GRAVELS	III				II							
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	III				I				II			
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS					I				II			
64 - 96	2.5 - 3.8	SMALL	COBBLES	I				III				I			
96 - 128	3.8 - 5.0	SMALL	COBBLES	I				I				I			
128 - 192	5.0 - 7.6	LARGE	COBBLES	II				II				II			
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



SECTION 4

STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

NKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE LOWER BEARDSLY CHNL SUB-TYPE _____

Remarks: JUS[illegible] [illegible] [illegible] PEBL [illegible]

PEBBLE COUNT

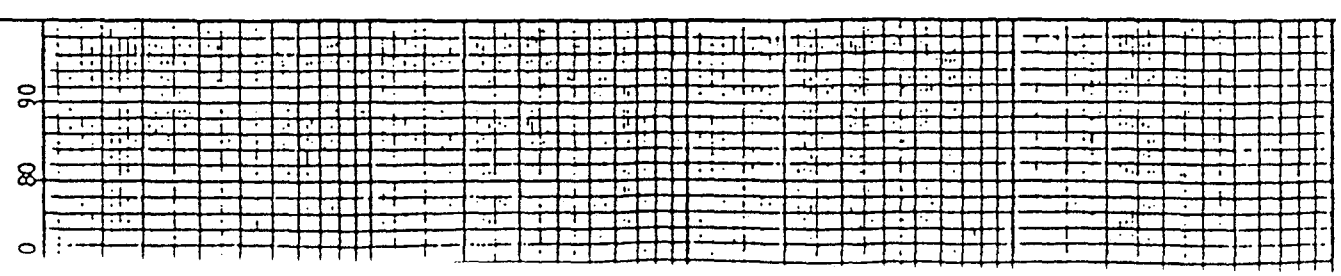
te 05/12/94 Party: _____ Wtrshd: _____

ite/Reach: [illegible] #4 (GOING S)

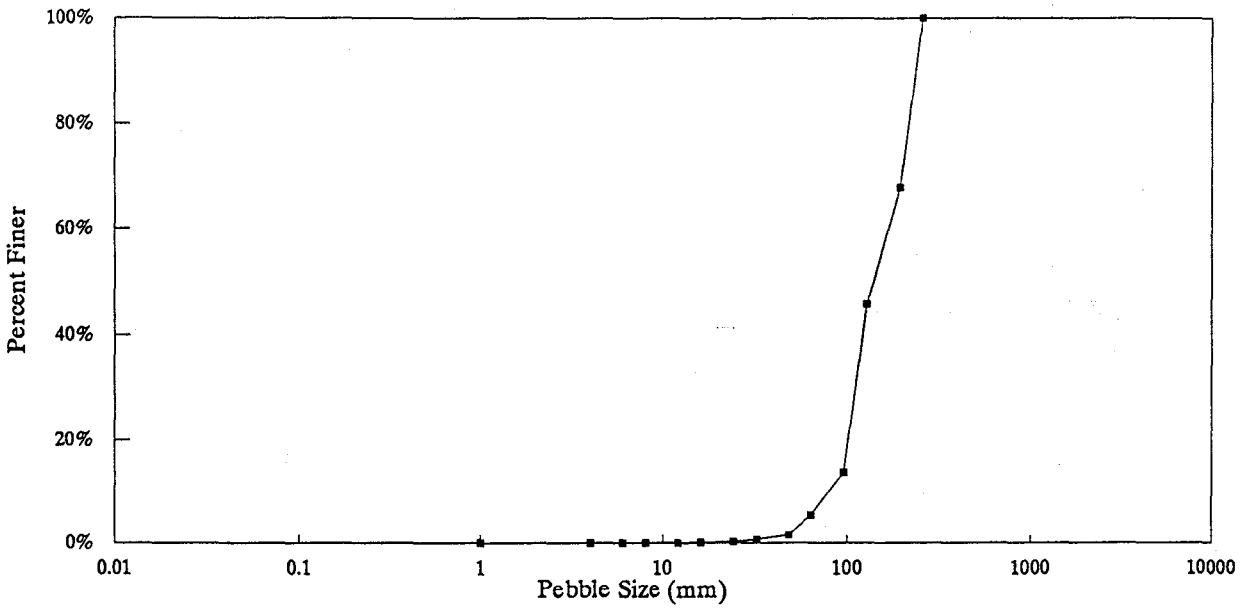
W- CHANNEL (GOING N) PASS #5

% Per

etric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
ess- .062		SILT/CLAY													
062- .125		Vry FINE	SANDS												
125- .25		FINE													
.25 - .50		MEDIUM													
[illegible]		COARSE													
1.0 - 2	.04 - .08	Vry CRSE		II				III					13		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE		II				II					7		
6 - 8	.24 - .31			II				III					10		
8 - 12	.31 - .47	MEDIUM		IIII				II					13		
12 - 16	.47 - .63												4		
16 - 24	.63 - .94	COARSE		I				IIII					10		
24 - 32	.94 - 1.26												5		
32 - 48	1.26- 1.9	Vry CRSE		II									8		
48 - 64	1.9 - 2.5			II									5		
64 - 96	2.5 - 3.8	SMALL	COBBLES	I				II					8		
96 - 128	3.8 - 5.0							III					6		
128 - 192	5.0 - 7.6	LARGE		I				I					8		
192 - 256	7.6 - 10			II									2		
256 - 384	10 - 15	SMALL	BOULDERS	I									1		
384 - 512	15 - 20														
512 - 1024	20 - 40	MEDIUM													
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= 9=			Totals....					Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	13	13.00%	1.767146	22.97289628	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		13.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	7	20.00%	65.45	458.1489286	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	10	30.00%	179.59	1795.9438	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	13	43.00%	523.60	6806.784083	0.01%	0.02%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	4	47.00%	1436.76	5747.020161	0.01%	0.03%
		16	20	16 – 24	0.63 – 0.94	10	57.00%	4188.79	41887.90205	0.08%	0.11%
	COARSE	24	28	24 – 32	0.94 – 1.26	5	62.00%	11494.04	57470.20161	0.11%	0.21%
		32	40	32 – 48	1.26 – 1.9	8	70.00%	33510.32	268082.5731	0.50%	0.71%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	5	75.00%	91952.32	459761.6129	0.86%	1.57%
		64	80	64 – 96	2.5 – 3.8	8	83.00%	268082.57	2144660.585	4.01%	5.58%
	SMALL	96	112	96 – 128	3.8 – 5	6	89.00%	735618.58	4413711.484	8.25%	13.84%
Cobbles		128	160	128 – 192	5 – 7.6	8	97.00%	2144660.58	17157284.68	32.08%	45.92%
	LARGE	192	224	192 – 256	7.6 – 10	2	99.00%	5884948.64	11769897.29	22.01%	67.92%
		256	320	256 – 384	10 – 15	1	100.00%	17157284.68	17157284.68	32.08%	100.00%
	SMALL	384	448	384 – 512	15 – 20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 – 1024	20 – 40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	53484871.88		

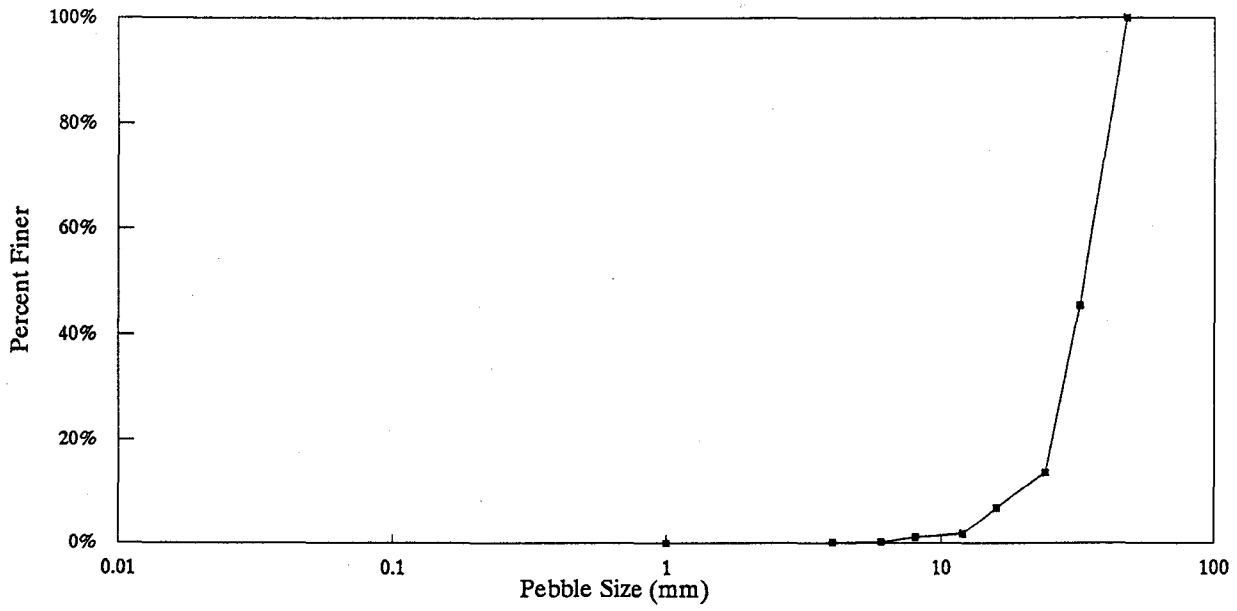
Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear4.wk3

Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 4

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	13	17.33%	1.767146	22.97289628	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		17.33%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	7	26.67%	65.45	458.1489286	0.05%	0.06%
	FINE	6	7	6 – 8	0.24 – 0.31	10	40.00%	179.59	1795.9438	0.21%	0.27%
		8	10	8 – 12	0.31 – 0.7	13	57.33%	523.60	6806.784083	0.81%	1.08%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	4	62.67%	1436.76	5747.020161	0.68%	1.76%
		16	20	16 – 24	0.63 – 0.94	10	76.00%	4188.79	41887.90205	4.97%	6.74%
	COARSE	24	28	24 – 32	0.94 – 1.26	5	82.67%	11494.04	57470.20161	6.83%	13.56%
		32	40	32 – 48	1.26 – 1.9	8	93.33%	33510.32	268082.5731	31.84%	45.40%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	5	100.00%	91952.32	459761.6129	54.60%	100.00%
					Total Sampled	75			Total Area 842033.1595		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear4h.wk3

Wildland Hydrology Consultants

Sample #5

STREAM CHANNEL TYPE and SUB-TYPE DATA

KFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

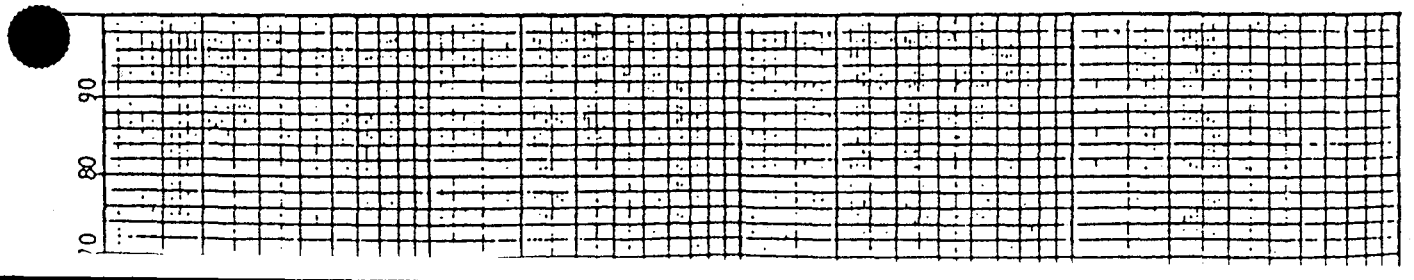
Remarks:

PEBBLE COUNT

5/17/94 Party: Bill, Candace, Al, Collis Wtrshd: BEAVERSLY WASH

:/Reach: #5

ric mm	Inches	Particle		PASS #1 (CONC CRK) Item Count	Tot#	%Tot	%Cum	PASS #2 Item Count	Tot#	%Tot	%Cum	E. BANK PASS #3 Item Count	Tot#	%Tot	%Cum
s- .062		SILT/CLAY										) ON BANK			
2- .125		Vry FINE	SANDS												
5- .25		FINE	SANDS												
- .50		MEDIUM	SANDS												
		COARSE	SANDS												
- 2	.04 - .08	Vry CRSE	SANDS	|||||				||||||				||			
- 4	.08 - .16	Vry FINE	GRAVELS												
- 6	.16 - .24	FINE	GRAVELS												
- 8	.24 - .31	FINE	GRAVELS												
- 12	.31 - .47	MEDIUM	GRAVELS	|||											
- 16	.47 - .63	MEDIUM	GRAVELS	||								|			
- 24	.63 - .94	COARSE	GRAVELS					|							
- 32	.94 - 1.26	COARSE	GRAVELS									|			
2 - 48	1.26- 1.9	Vry CRSE	GRAVELS	||				1				||||			
0 - 64	1.9 - 2.5	Vry CRSE	GRAVELS									|||			
- 96	2.5 - 3.8	SMALL	COBBLES	|||				|||||				||			
6 - 128	3.8 - 5.0	SMALL	COBBLES	|				||				|			
8 - 192	5.0 - 7.6	LARGE	COBBLES	|				||				|||			
2 - 256	7.6 - 10	LARGE	COBBLES	|				|				||			
6 - 384	10 - 15	SMALL	BOULDERS	|				|							
4 - 512	15 - 20	SMALL	BOULDERS												
2 - 1024	20 - 40	MEDIUM	BOULDERS												
4 - 2048	40 - 80	LARGE	BOULDERS												
8 - 4096	80 - 160	Vry LRGE	BOULDERS												
unt Note: 3= 9=				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants

SAMPLE #5

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

PEBBLE COUNT

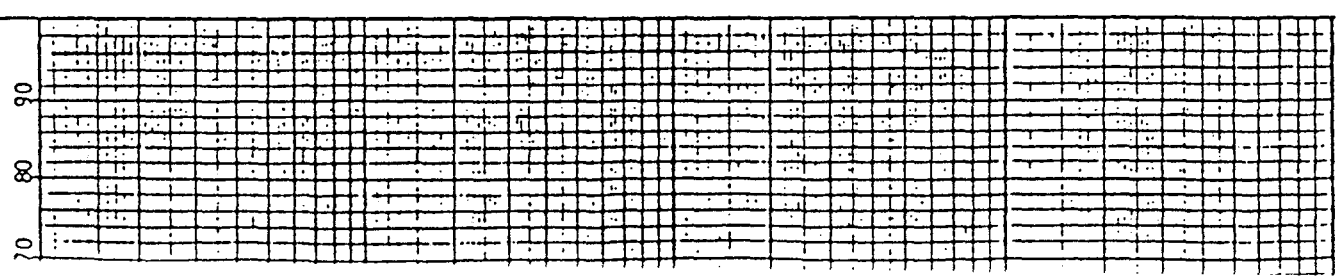
___/___/___ Party: _____ Wtrshd: _____

Site/Reach: WEST Bank 2 (looking U.S.)

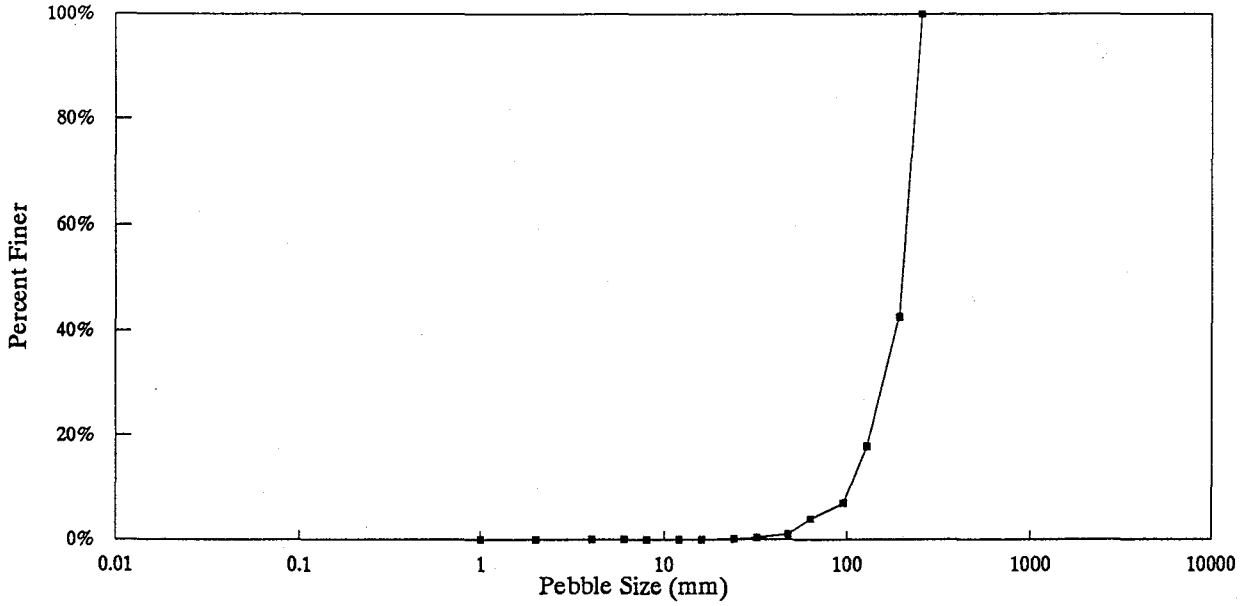
Looking D.S. WEST BANK (INSIDE)

% Per

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
.062		SILT/CLAY											1		
.125		Vry FINE	SANDS												
.25		FINE	SANDS												
.50		MEDIUM	SANDS												
		COARSE	SANDS												
2	.04 - .08	Vry CRSE	SANDS	IIII				IIIII					23		
4	.08 - .16	Vry FINE	GRAVELS	I				II					3		
6	.16 - .24	FINE	GRAVELS					I					1		
8	.24 - .31	FINE	GRAVELS	II				II					4		
12	.31 - .47	MEDIUM	GRAVELS										3		
16	.47 - .63	MEDIUM	GRAVELS	II				II					7		
24	.63 - .94	COARSE	GRAVELS	I									2		
32	.94 - 1.26	COARSE	GRAVELS	II				I					4		
48	1.26 - 1.9	Vry CRSE	GRAVELS	II				I					10		
54	1.9 - 2.5	Vry CRSE	GRAVELS	II				III					8		
96	2.5 - 3.8	SMALL	COBBLES	II				II					14		
128	3.8 - 5.0	SMALL	COBBLES	I									5		
192	5.0 - 7.6	LARGE	COBBLES										6		
256	7.6 - 10	LARGE	COBBLES	I									5		
384	10 - 15	SMALL	BOULDERS	I				I					4		
512	15 - 20	SMALL	BOULDERS												
1024	20 - 40	MEDIUM	BOULDERS												
2048	40 - 80	LARGE	BOULDERS												
4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	23	23.23%	1.767146	40.64435496	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	3	26.26%	14.137167	42.41150082	0.00%	0.00%
		4	5	4 – 6	0.16 – 0.24	1	27.27%	65.45	65.44984695	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	4	31.31%	179.59	718.3775201	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	3	34.34%	523.60	1570.796327	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	7	41.41%	1436.76	10057.28528	0.01%	0.01%
		16	20	16 – 24	0.63 – 0.94	2	43.43%	4188.79	8377.58041	0.01%	0.02%
	COARSE	24	28	24 – 32	0.94 – 1.26	4	47.47%	11494.04	45976.16129	0.04%	0.06%
		32	40	32 – 48	1.26 – 1.9	10	57.58%	33510.32	335103.2164	0.28%	0.34%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	65.66%	91952.32	735618.5806	0.62%	0.95%
		64	80	64 – 96	2.5 – 3.8	14	79.80%	268082.57	3753156.023	3.14%	4.09%
	SMALL	96	112	96 – 128	3.8 – 5	5	84.85%	735618.58	3678092.903	3.08%	7.17%
Cobbles		128	160	128 – 192	5 – 7.6	6	90.91%	2144660.58	12867963.51	10.77%	17.94%
	LARGE	192	224	192 – 256	7.6 – 10	5	95.96%	5884948.64	29424743.22	24.63%	42.57%
		256	320	256 – 384	10 – 15	4	100.00%	17157284.68	68629138.72	57.43%	100.00%
	SMALL	384	448	384 – 512	15 – 20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 – 1024	20 – 40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	99		Total Area	119490664.9		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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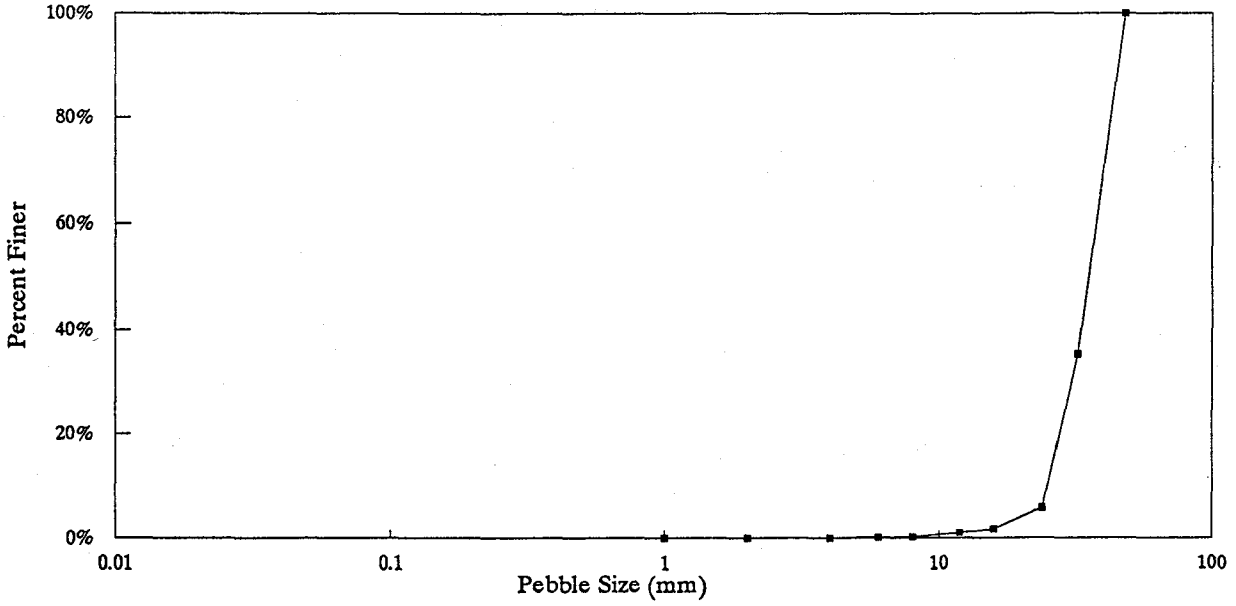
Conversion from Percentage by size to Percentage by weight
09/27/94

Lower Beardsley Chnl
Section 5

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	23	35.38%	1.767146	40.64435496	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	3	40.00%	14.137167	42.41150082	0.00%	0.01%
		4	5	4 – 6	0.16 – 0.24	1	41.54%	65.45	65.44984695	0.01%	0.01%
	FINE	6	7	6 – 8	0.24 – 0.31	4	47.69%	179.59	718.3775201	0.06%	0.08%
		8	10	8 – 12	0.31 – 0.7	3	52.31%	523.60	1570.796327	0.14%	0.21%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	7	63.08%	1436.76	10057.28528	0.88%	1.10%
		16	20	16 – 24	0.63 – 0.94	2	66.15%	4188.79	8377.58041	0.74%	1.83%
	COARSE	24	28	24 – 32	0.94 – 1.26	4	72.31%	11494.04	45976.16129	4.04%	5.88%
		32	40	32 – 48	1.26 – 1.9	10	87.69%	33510.32	335103.2164	29.46%	35.33%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	100.00%	91952.32	735618.5806	64.67%	100.00%
					Total Sampled	65		Total Area	1137570.504		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^ 3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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1/2

Wildland Hydrology Consultants

SAMPLE #6

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

N 33° 28' 55.1 ~~39' 16.~~

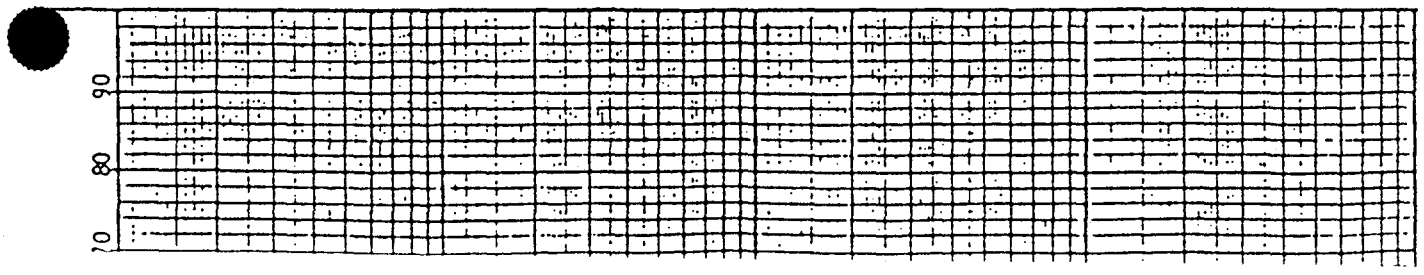
W 111° 52' ~~7~~ 06.7

PEBBLE COUNT

Date/17/94 Party: BILL, CANDACE, AL, COLLIE Wtrshd: BEARSLY

Site/Reach: MAINSTEM CONFLUENCE PASS #1 (W. BANK TO E. BANK #1) CONT. MOVING N; BANK TO BANK PASS #2

metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
ss- .062		SILT/CLAY													
62- .125		Vry FINE	SANDS												
25- .25		FINE	SANDS												
5 - .50		MEDIUM	SANDS												
0		COARSE	SANDS												
0 - 2	.04 - .08	Vry CRSE	SANDS					IIIIIIII							
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS					I							
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS					I							
2 - 16	.47 - .63	MEDIUM	GRAVELS	I				I							
16 - 24	.63 - .94	COARSE	GRAVELS					I							
24 - 32	.94 - 1.26	COARSE	GRAVELS	IIII				III							
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	III				IIII							
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	II				III							
64 - 96	2.5 - 3.8	SMALL	COBBLES	IIIIIII				I							
96 - 128	3.8 - 5.0	SMALL	COBBLES	I				I							
128 - 192	5.0 - 7.6	LARGE	COBBLES	IIIIII				I							
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS	I											
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= ∴ 9= ⌘				Totals....				Totals....				Totals....			



2/2

Wildland Hydrology Consultants

SAMPLE #6 at the confluence

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____ Photo 6-11

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

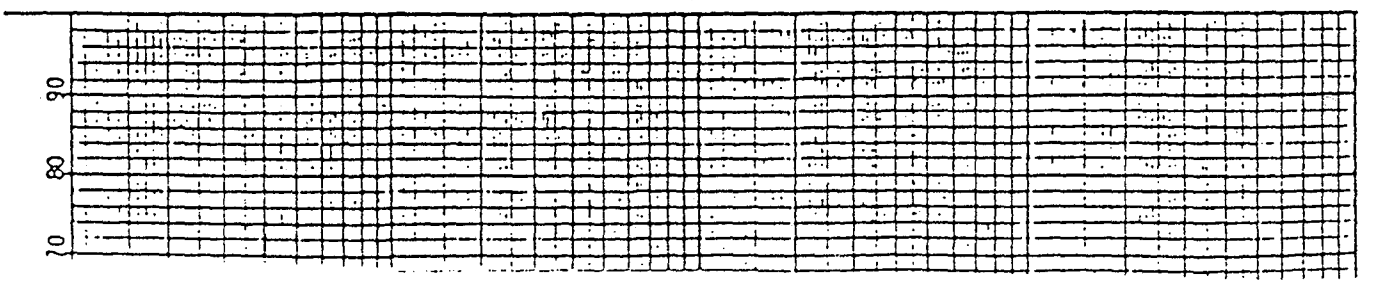
Remarks:

PEBBLE COUNT

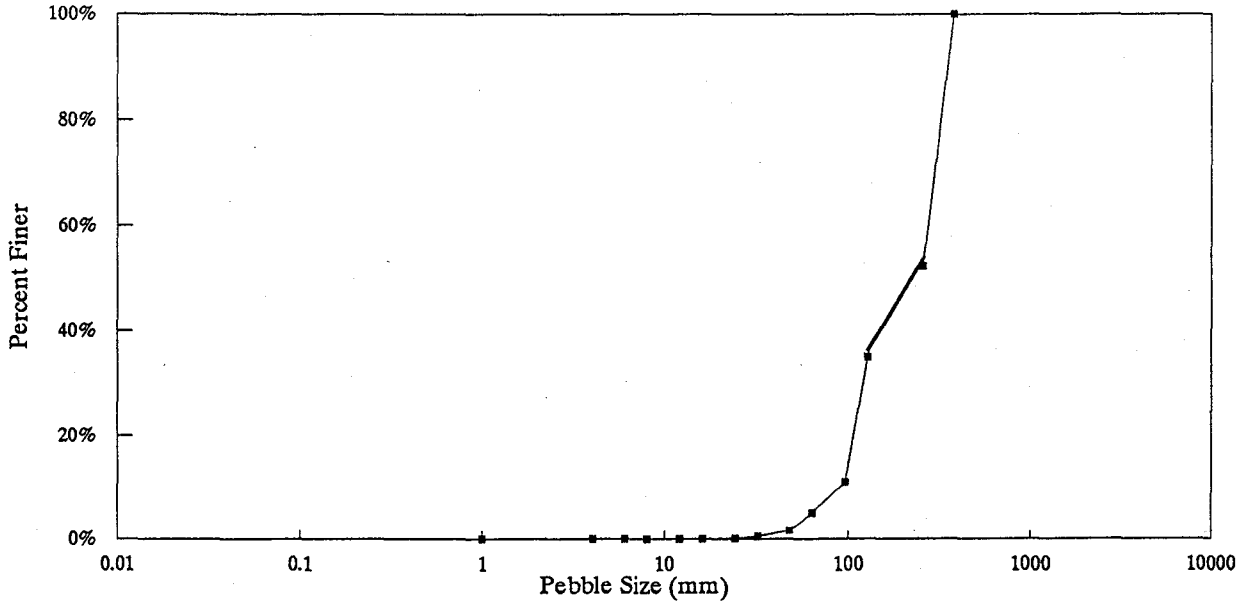
Date ___/___/___ Party: _____ Wtrshd: _____

Site/Reach: across the channel.

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count (% Per)	Tot#	%Tot	%Cum
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS												
1 - 2	.04 - .08	Vry CRSE	SANDS	𝍸				𝍸				25			
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS									1			
6 - 8	.24 - .31	FINE	GRAVELS	1								1			
8 - 12	.31 - .47	MEDIUM	GRAVELS					𝍸				3			
12 - 16	.47 - .63	MEDIUM	GRAVELS					1				3			
16 - 24	.63 - .94	COARSE	GRAVELS					𝍸				4			
24 - 32	.94 - 1.26	COARSE	GRAVELS									7			
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	𝍸				1				11			
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	𝍸				𝍸				12			
64 - 96	2.5 - 3.8	SMALL	COBBLES	𝍸				𝍸				13			
96 - 128	3.8 - 5.0	SMALL	COBBLES	𝍸				𝍸				8			
128 - 192	5.0 - 7.6	LARGE	COBBLES	1				𝍸				11			
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS	1								1			
384 - 512	15 - 20	SMALL	BOULDERS									1			
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 𝍸 9= 𝍸				Totals....				Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm		Pebble Size Inches		Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	<	0.062					0.000016			
	Vry FINE	0.062	0.0935	0.062 –	0.125					0.000428			NA
	FINE	0.125	0.1875	0.125 –	0.25					0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 –	0.5					0.027612			NA
	COARSE	0.5	0.75	0.5 –	1					0.220893			NA
	Vry CRSE	1	1.5	1 –	2	0.04 –	0.08	25	24.75%	1.767146	44.17864669	0.00%	0.00%
	Vry FINE	2	3	2 –	4	0.08 –	0.16		24.75%	14.137167			NA
		4	5	4 –	6	0.16 –	0.24	1	25.74%	65.45	65.44984695	0.00%	0.00%
	FINE	6	7	6 –	8	0.24 –	0.31	1	26.73%	179.59	179.59438	0.00%	0.00%
		8	10	8 –	12	0.31 –	0.7	3	29.70%	523.60	1570.796327	0.00%	0.00%
Gravels	MEDIUM	12	14	12 –	16	0.47 –	0.63	3	32.67%	1436.76	4310.265121	0.00%	0.01%
		16	20	16 –	24	0.63 –	0.94	4	36.63%	4188.79	16755.16082	0.02%	0.02%
	COARSE	24	28	24 –	32	0.94 –	1.26	7	43.56%	11494.04	80458.28225	0.08%	0.10%
		32	40	32 –	48	1.26 –	1.9	11	54.46%	33510.32	368613.538	0.37%	0.48%
	Vry CRSE	48	56	48 –	64	1.9 –	2.5	12	66.34%	91952.32	1103427.871	1.12%	1.59%
		64	80	64 –	96	2.5 –	3.8	13	79.21%	268082.57	3485073.45	3.53%	5.12%
	SMALL	96	112	96 –	128	3.8 –	5	8	87.13%	735618.58	5884948.645	5.96%	11.08%
Cobbles		128	160	128 –	192	5 –	7.6	11	98.02%	2144660.58	23591266.43	23.88%	34.97%
	LARGE	192	224	192 –	256	7.6 –	10		98.02%	5884948.64			NA
		256	320	256 –	384	10 –	15	1	99.01%	17157284.68	17157284.68	17.37%	52.34%
	SMALL	384	448	384 –	512	15 –	20	1	100.00%	47079589.16	47079589.16	47.66%	100.00%
Boulders	MEDIUM	512	768	512 –	1024	20 –	40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 –	2048	40 –	80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 –	4096	80 –	160		100.00%	15179667417.59			NA
						Total Sampled		101		Total Area	98773587.5		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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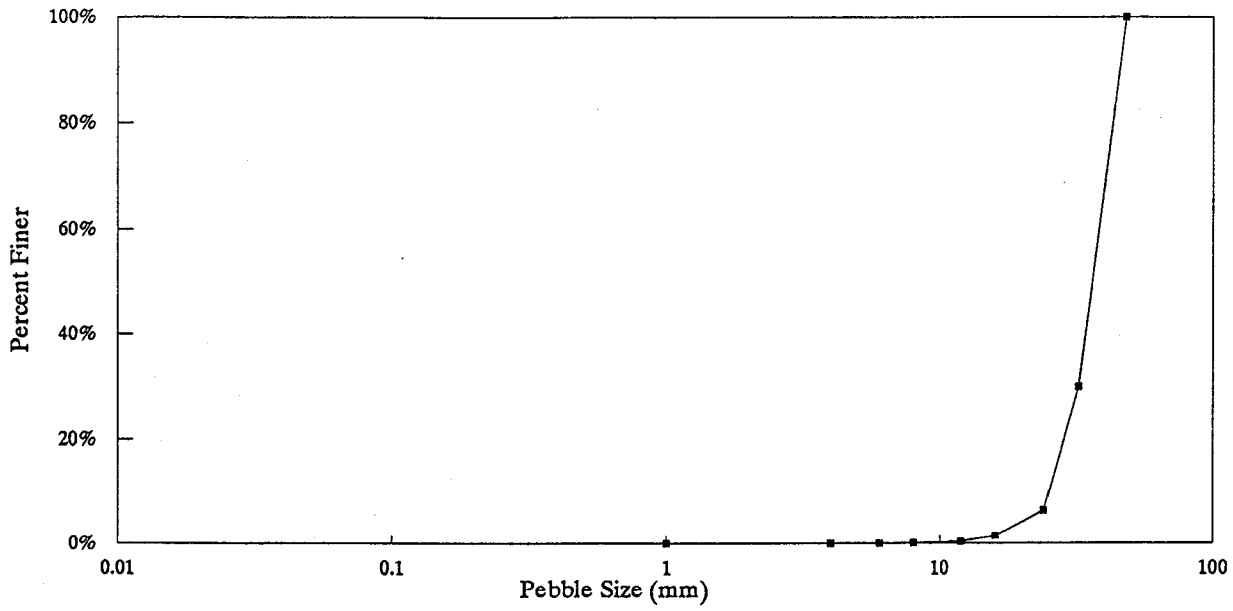
Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	25	37.31%	1.767146	44.17864669	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		37.31%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	1	38.81%	65.45	65.44984695	0.00%	0.01%
	FINE	6	7	6 – 8	0.24 – 0.31	1	40.30%	179.59	179.59438	0.01%	0.02%
		8	10	8 – 12	0.31 – 0.7	3	44.78%	523.60	1570.796327	0.10%	0.12%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	3	49.25%	1436.76	4310.265121	0.27%	0.39%
		16	20	16 – 24	0.63 – 0.94	4	55.22%	4188.79	16755.16082	1.06%	1.46%
	COARSE	24	28	24 – 32	0.94 – 1.26	7	65.67%	11494.04	80458.28225	5.11%	6.56%
		32	40	32 – 48	1.26 – 1.9	11	82.09%	33510.32	368613.538	23.40%	29.96%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	12	100.00%	91952.32	1103427.871	70.04%	100.00%
					Total Sampled	67		Total Area	1575425.136		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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1/2

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

Wildland Hydrology Consultants

SAMPLE #7

N 33° 39' 20.
W 111° 51' 44.

(FROM [illegible])

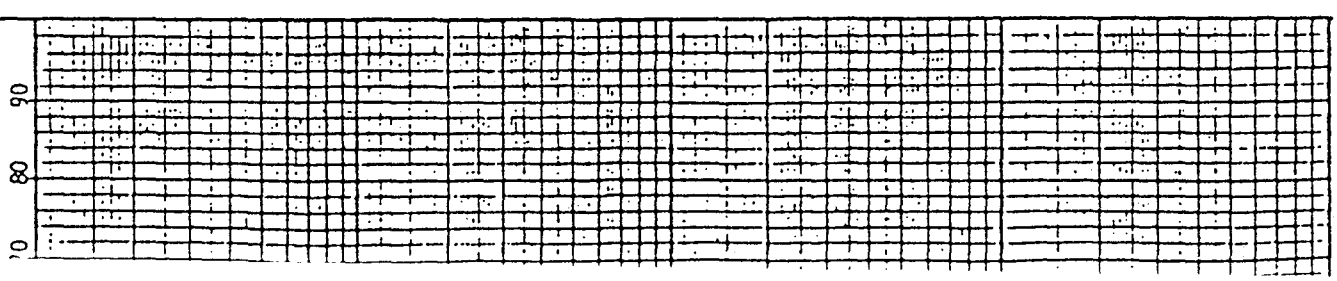
PEBBLE COUNT

05/17/94 Party: [illegible] Wtrshd: BEARCLY. C

Site/Reach: [illegible] WARRICAN/MAPLEY FENCE

E to W, FANG TO - BANK

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
<.062		SILT/CLAY													
.062-.125		Vry FINE	SANDS												
.125-.25		FINE													
.25-.50		MEDIUM													
.50-[illegible]		COARSE													
[illegible]-2	.04-.08	Vry CRSE		|||				||						
2-4	.08-.16	Vry FINE	GRAVELS												
4-6	.16-.24	FINE		|											
6-8	.24-.31														
8-12	.31-.47	MEDIUM		|				|||						
12-16	.47-.63														
16-24	.63-.94	COARSE		|				||						
24-32	.94-1.26			|||				|||						
32-48	1.26-1.9	Vry CRSE						|						
48-54	1.9-2.5							|						
54-96	2.5-3.8	SMALL	COBBLES	|||				||||						
96-128	3.8-5.0			||||||				||||||						
128-192	5.0-7.6	LARGE		|				|||						
192-256	7.6-10			|											
256-384	10-15	SMALL	BOULDERS	|											
384-512	15-20														
512-1024	20-40	MEDIUM													
1024-2048	40-80	LARGE													
2048-4096	80-160	Vry LRGE													
Count Note: 3= 9=			Totals....					Totals....				Totals....			



Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Sample # 7

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____ Pisto

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____ B-17

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

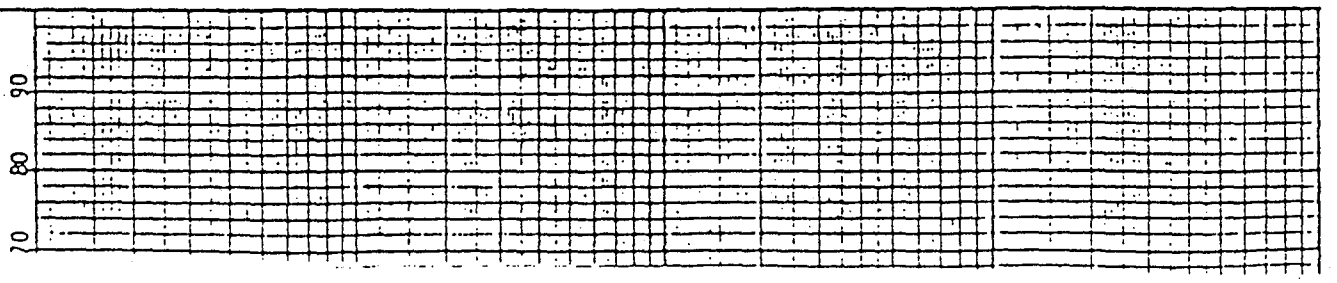
Remarks:

PEBBLE COUNT

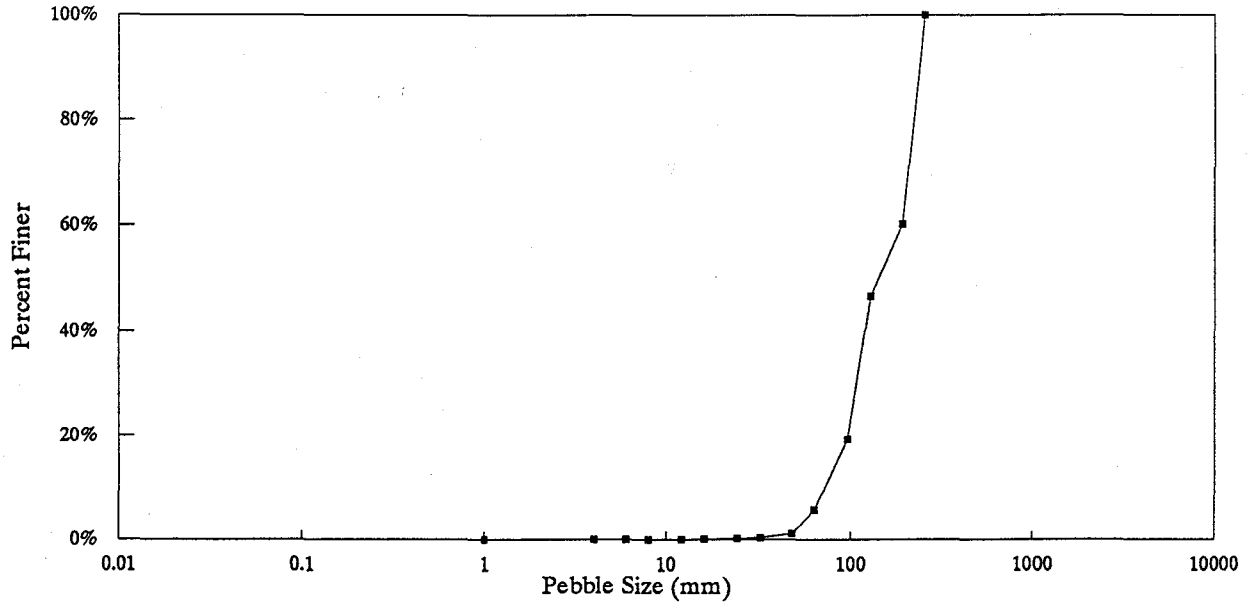
Date ___/___/___ Party: _____ Wtrshd: _____

Site/Reach: 25

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
													% Per		
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS	𝍸											
1.0 - 2	.04 - .08	Vry CRSE	SANDS	𝍸				𝍸					14		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS										1		
6 - 8	.24 - .31	FINE	GRAVELS					1					1		
8 - 12	.31 - .47	MEDIUM	GRAVELS					1					5		
12 - 16	.47 - .63	MEDIUM	GRAVELS	11									2		
16 - 24	.63 - .94	COARSE	GRAVELS	𝍸				11					10		
24 - 32	.94 - 1.26	COARSE	GRAVELS	1				11					9		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	11				11					5		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	11				1					7		
64 - 96	2.5 - 3.8	SMALL	COBBLES	111				𝍸					15		
96 - 128	3.8 - 5.0	SMALL	COBBLES	111									16		
128 - 192	5.0 - 7.6	LARGE	COBBLES	111				1111					11		
192 - 256	7.6 - 10	LARGE	COBBLES	1									2		
256 - 384	10 - 15	SMALL	BOULDERS	𝍸				1					2		
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= ∴ 9= 𝍸				Totals....				Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data

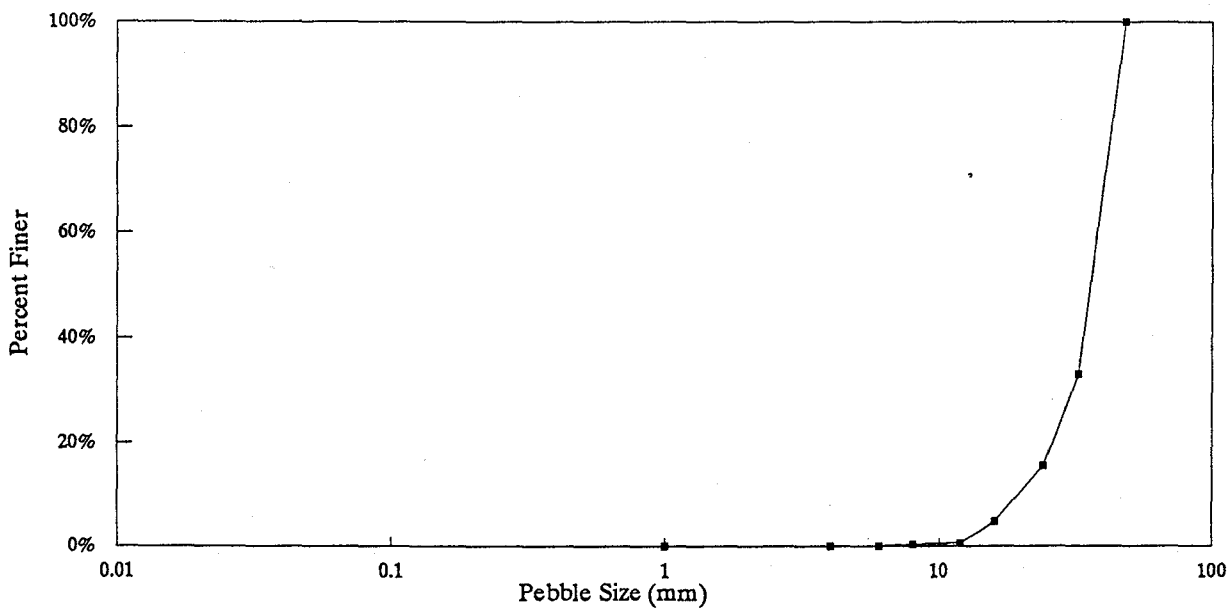


Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	14	14.00%	1.767146	24.74004215	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		14.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	1	15.00%	65.45	65.44984695	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	1	16.00%	179.59	179.59438	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	5	21.00%	523.60	2617.993878	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	23.00%	1436.76	2873.51008	0.00%	0.01%
		16	20	16 – 24	0.63 – 0.94	10	33.00%	4188.79	41887.90205	0.05%	0.06%
	COARSE	24	28	24 – 32	0.94 – 1.26	9	42.00%	11494.04	103446.3629	0.12%	0.17%
		32	40	32 – 48	1.26 – 1.9	5	47.00%	33510.32	167551.6082	0.19%	0.37%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	7	54.00%	91952.32	643666.258	0.74%	1.11%
		64	80	64 – 96	2.5 – 3.8	15	69.00%	268082.57	4021238.597	4.65%	5.77%
	SMALL	96	112	96 – 128	3.8 – 5	16	85.00%	735618.58	11769897.29	13.62%	19.38%
Cobbles		128	160	128 – 192	5 – 7.6	11	96.00%	2144660.58	23591266.43	27.30%	46.68%
	LARGE	192	224	192 – 256	7.6 – 10	2	98.00%	5884948.64	11769897.29	13.62%	60.30%
		256	320	256 – 384	10 – 15	2	100.00%	17157284.68	34314569.36	39.70%	100.00%
	SMALL	384	448	384 – 512	15 – 20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 – 1024	20 – 40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	86429182.39		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear7.wk3

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	14	25.93%	1.767146	24.74004215	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		25.93%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	1	27.78%	65.45	65.44984695	0.01%	0.01%
	FINE	6	7	6 – 8	0.24 – 0.31	1	29.63%	179.59	179.59438	0.02%	0.03%
		8	10	8 – 12	0.31 – 0.7	5	38.89%	523.60	2617.993878	0.27%	0.30%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	42.59%	1436.76	2873.51008	0.30%	0.60%
		16	20	16 – 24	0.63 – 0.94	10	61.11%	4188.79	41887.90205	4.35%	4.95%
	COARSE	24	28	24 – 32	0.94 – 1.26	9	77.78%	11494.04	103446.3629	10.75%	15.70%
		32	40	32 – 48	1.26 – 1.9	5	87.04%	33510.32	167551.6082	17.41%	33.11%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	7	100.00%	91952.32	643666.258	66.89%	100.00%
					Total Sampled	54			Total Area	962313.4194	

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear7h.wk3

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

CLIENT:	Greiner, Inc.	**DATE:**	03-07-95
	7310 North 16th Street, #160	**LAB NO.:**	95-0177
	Phoenix, AZ 85020	**PROJECT NO.:**	795014
ATTN.:	Mr. Bill Lace	**DATE RVCD.:**	03-05-95
PROJECT:	Sand Evaluation	**SAMPLED BY:**	Client
MATERIAL:	Native	**TESTED BY:**	R. Evans
SOURCE:	South Beardsley Btwn #3 & #7	**METHOD:**	ASTM C136

PARTICLE SIZE ANALYSIS OF SOILS

SIEVE SIZE	% RETAINED	% PASSING
3 1/2"	0	100
3"	12	88
2 1/2"	6	82
2"	T	82
1 1/2"	10	72
1"	12	60
3/4"	7	53
1/2"	8	45
3/8"	5	40
1/4"	7	33
#4	4	29
#8	7	22
#10	2	20
#16	6	14
#30	7	7
#40	2	5
#50	2	3
#100	1	2
#200	1	0.7

Remarks: Moisture = 2.3%

Reviewed:

Respectfully Submitted,

Thomas V. Wells

for Michael P. Bonkoski
Laboratory Supervisor

2912 W. CLARENDON
PHOENIX, AZ 85017
TELEPHONE (602) 241-1097
FAX (602) 277-1306

820 E. 47TH STREET, SUITE B-1
TUCSON, AZ 85713
TELEPHONE (602) 623-4547
FAX (602) 623-4603

16921 S. WESTERN AVE., SUITE 109
GARDENA, CA 90247
TELEPHONE (310) 538-3757
FAX (310) 538-0725

Wildland Hydrology Consultants

SAMPLE #8

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

N 33° 39' 07.7
W 111° 51' 51.5

PEBBLE COUNT

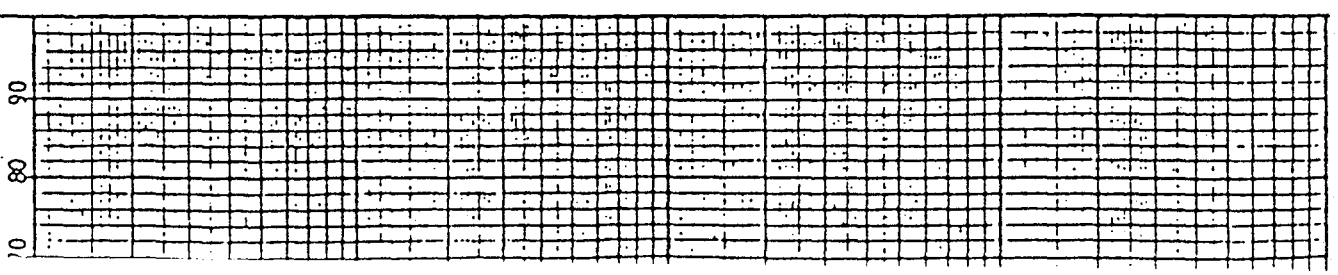
Date: 05/17/94 Party: BILL, CANDACE, AL, COLLIS Wtrshd: BEARDSLY WASH.

Site/Reach: PASS #1 SOUTH OF C/m Prof.

BANK TO BANK: GOING N.

PASS #2

metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
ss- .062		SILT/CLAY													
62- .125		Vry FINE	SANDS												
25- .25		FINE	SANDS												
5 - .50		MEDIUM	SANDS												
C		COARSE	SANDS												
0 - 2	.04 - .08	Vry CRSE	SANDS	|||||				||||||						
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS	||											
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS	|				|							
2 - 16	.47 - .63	MEDIUM	GRAVELS	|											
6 - 24	.63 - .94	COARSE	GRAVELS	||				||||						
24 - 32	.94 - 1.26	COARSE	GRAVELS	|				|||						
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	||											
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	||											
64 - 96	2.5 - 3.8	SMALL	COBBLES	||||				||||						
96 - 128	3.8 - 5.0	SMALL	COBBLES												
28 - 192	5.0 - 7.6	LARGE	COBBLES	||				||						
92 - 256	7.6 - 10	LARGE	COBBLES												
56 - 384	10 - 15	SMALL	BOULDERS	|				|							
84 - 512	15 - 20	SMALL	BOULDERS												
12 - 1024	20 - 40	MEDIUM	BOULDERS												
24 - 2048	40 - 80	LARGE	BOULDERS												
48 - 4096	80 - 160	Vry LRGE	BOULDERS												
ount Note: 3= 9=				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined Sample #2

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

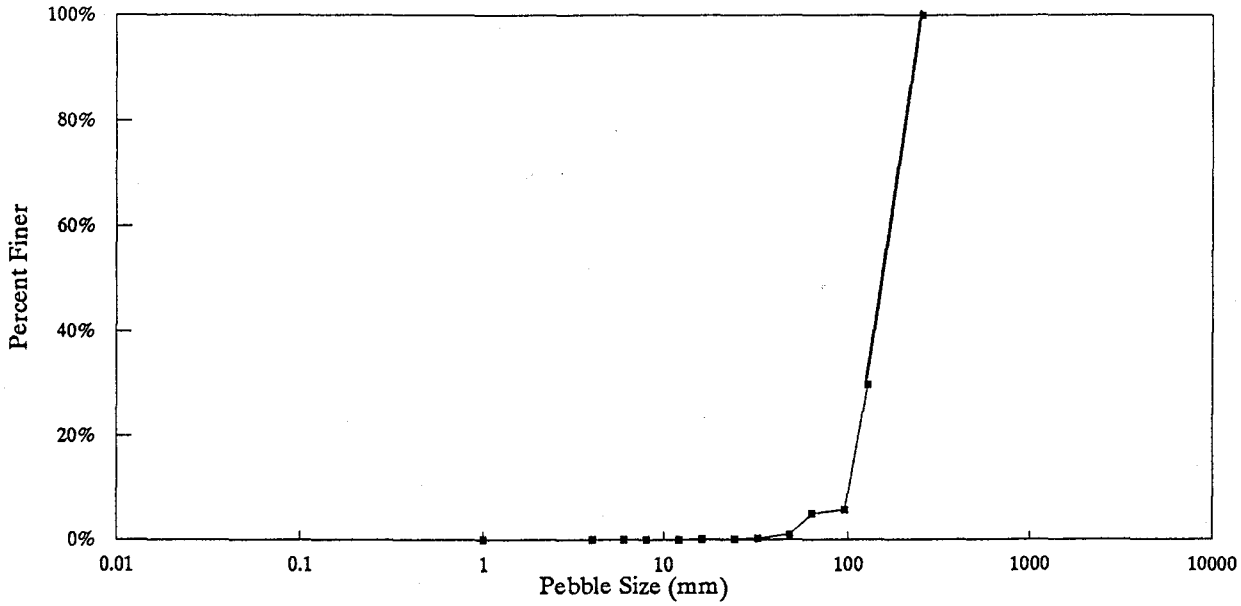
PEBBLE COUNT

Date ___/___/___ Party: _____ Wtrshd: _____

Site/Reach: 25

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
													% Per		
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS	//////				//////					30		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS					/					3		
6 - 8	.24 - .31	FINE	GRAVELS	/				//					3		
8 - 12	.31 - .47	MEDIUM	GRAVELS	/				//					5		
12 - 16	.47 - .63	MEDIUM	GRAVELS					/					2		
16 - 24	.63 - .94	COARSE	GRAVELS	/				/					8		
24 - 32	.94 - 1.26	COARSE	GRAVELS	//				/					8		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	𝍸									2		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	///				///					8		
64 - 96	2.5 - 3.8	SMALL	COBBLES	//////				/					15		
96 - 128	3.8 - 5.0	SMALL	COBBLES	/									1		
128 - 192	5.0 - 7.6	LARGE	COBBLES	//				//////					11		
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS	/				/					4		
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 𝍸 9= 𝍸				Totals....				Totals....				Totals....			

Scottsdale Desert Greenbelt Sediment Sample Data

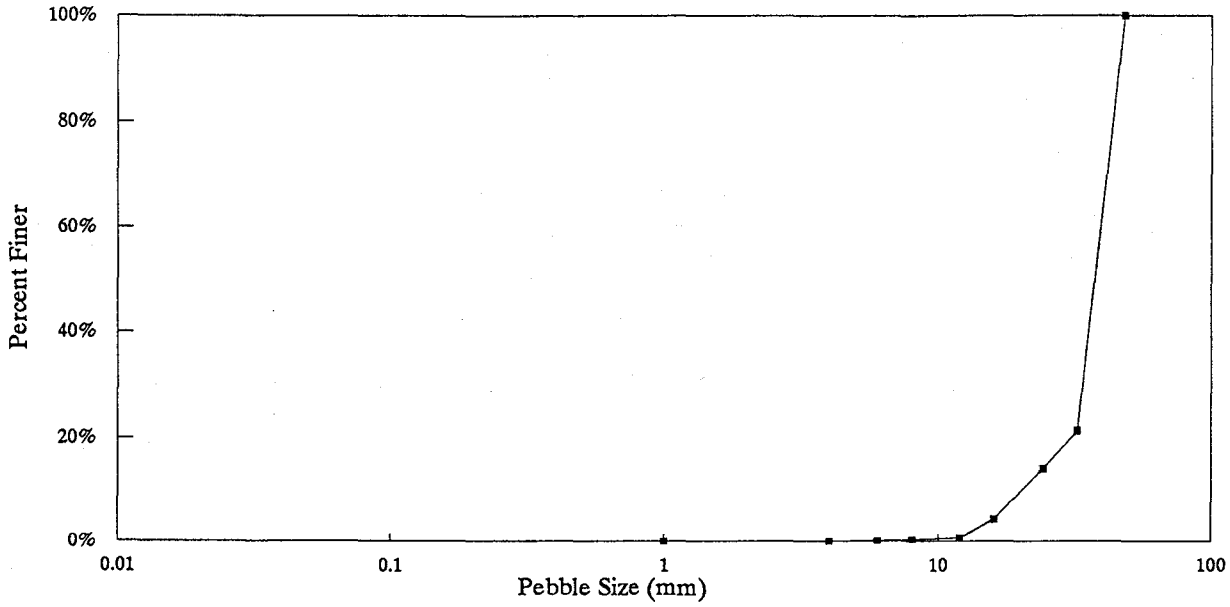


Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	30	30.00%	1.767146	53.01437603	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		30.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	3	33.00%	65.45	196.3495408	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	3	36.00%	179.59	538.7831401	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	5	41.00%	523.60	2617.993878	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	43.00%	1436.76	2873.51008	0.00%	0.01%
		16	20	16 – 24	0.63 – 0.94	8	51.00%	4188.79	33510.32164	0.03%	0.04%
	COARSE	24	28	24 – 32	0.94 – 1.26	8	59.00%	11494.04	91952.32258	0.09%	0.13%
		32	40	32 – 48	1.26 – 1.9	2	61.00%	33510.32	67020.64328	0.07%	0.20%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	69.00%	91952.32	735618.5806	0.75%	0.95%
		64	80	64 – 96	2.5 – 3.8	15	84.00%	268082.57	4021238.597	4.11%	5.06%
	SMALL	96	112	96 – 128	3.8 – 5	1	85.00%	735618.58	735618.5806	0.75%	5.81%
Cobbles		128	160	128 – 192	5 – 7.6	11	96.00%	2144660.58	23591266.43	24.09%	29.91%
	LARGE	192	224	192 – 256	7.6 – 10		96.00%	5884948.64			NA
		256	320	256 – 384	10 – 15	4	100.00%	17157284.68	68629138.72	70.09%	100.00%
	SMALL	384	448	384 – 512	15 – 20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 – 1024	20 – 40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	97911643.84		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Lobear8.wk3

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	30	43.48%	1.767146	53.01437603	0.01%	0.01%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		43.48%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	3	47.83%	65.45	196.3495408	0.02%	0.03%
	FINE	6	7	6 – 8	0.24 – 0.31	3	52.17%	179.59	538.7831401	0.06%	0.08%
		8	10	8 – 12	0.31 – 0.7	5	59.42%	523.60	2617.993878	0.28%	0.36%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	62.32%	1436.76	2873.51008	0.31%	0.67%
		16	20	16 – 24	0.63 – 0.94	8	73.91%	4188.79	33510.32164	3.59%	4.26%
	COARSE	24	28	24 – 32	0.94 – 1.26	8	85.51%	11494.04	91952.32258	9.84%	14.10%
		32	40	32 – 48	1.26 – 1.9	2	88.41%	33510.32	67020.64328	7.17%	21.27%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	100.00%	91952.32	735618.5806	78.73%	100.00%
					Total Sampled	69		Total Area	934381.5191		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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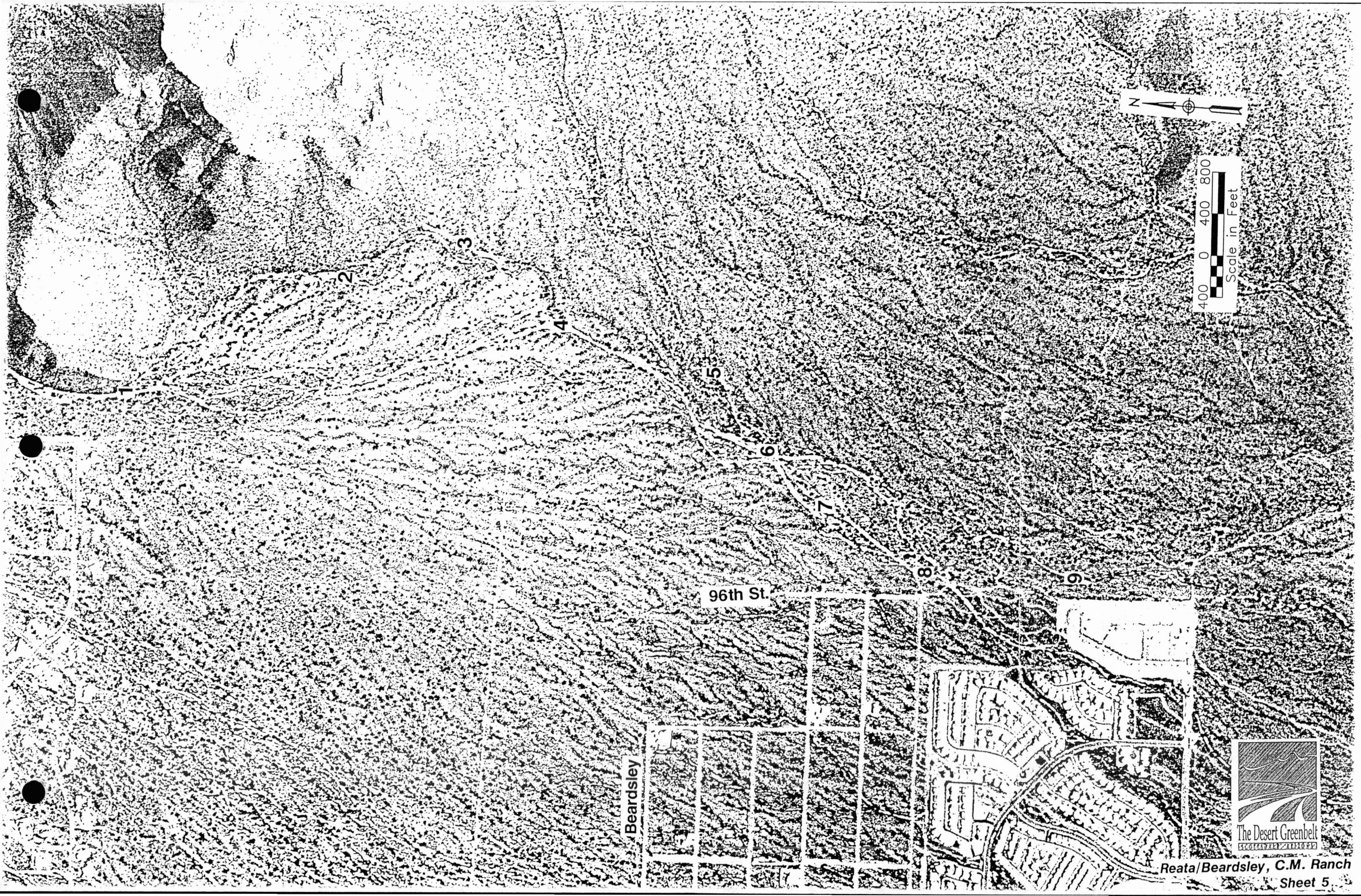
Sediment Field Tests

Section 4

Middle Reata Wash



Reata/Beardsley, C.M. Ranch
Sheet 5

Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks: ROCKS AT LARGE AT 18" MEDIAN ≅ 5" ; BANKS ≅ 15-20% BY VOL - ROCKS.

PICS 1-16, @ 1st SPLIT, JUST SOUTH OF C/M FENCE. @ SAMPLE SITE. #10 - SAMPLE SITE 11-13 → SITE ≅ @ ROAD CROSSING SITE.

C/M SAMPLE #1 (CORRIGAN / MARKEY PROP.)

(SEE SAMPLE #)

PEBBLE COUNT

Date 05 / 24 / 04 Party: _____ Wtrshd: REATA.

Site/Reach: JUST SOUTH OF C/M FENCE (N. END OF PROP)

N 33° 40' 52.5"
W 111° 51' 53.5"

LOC Refer to following page

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE													
.25 - .50		MEDIUM													
[illegible] - 1.0		COARSE													
1.0 - 2	.04 - .08	Vry CRSE													
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE													
6 - 8	.24 - .31														
8 - 12	.31 - .47	MEDIUM													
12 - 16	.47 - .63														
16 - 24	.63 - .94	COARSE													
24 - 32	.94 - 1.26														
32 - 48	1.26- 1.9	Vry CRSE													
48 - 64	1.9 - 2.5														
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0														
128 - 192	5.0 - 7.6	LARGE													
192 - 256	7.6 - 10														
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20														
512 - 1024	20 - 40	MEDIUM													
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= ∴ 9= ⌑			Totals....					Totals....				Totals....			

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0580

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #1
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : M. DEWAARD

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	9	91	
1 1/2"	2	89	
1"	2	87	
3/4"	1	86	
[illegible]"	5	81	
[illegible]"	4	77	
1/4"	10	67	
#4	8	59	
#8	19	40	
#10	4	36	
#16	11	25	
#30	10	15	
#40	3	12	
#50	3	9	
#100	5	4	
#200	2	2.4	

Moisture Content (%) 1.0

REMARKS: IN SITU MOISTURE = 1.0 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks: ≈12" SAND & FINE GRAVEL ; TOP LAYER , BELOW INTO LARGER ROCKS.

PICS # 14 & 15 - SAMPLE

15-17 = UP & DOWN STREAM.

19-24 → @ CONFLUENCE

C/M SAMPLE #2 - [illegible]

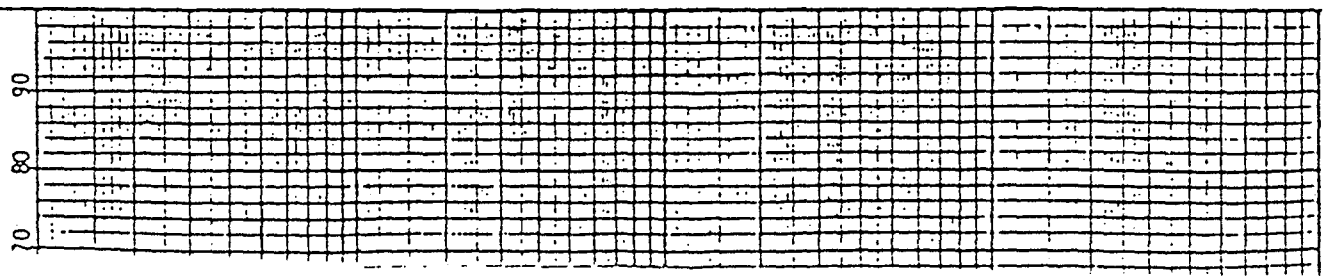
PEBBLE COUNT

Date 05/24/94 Party: _____ Wtrshd: RFATA

Site/Reach: JUST N-OF COMPOUND

N 33° 40' 40.1"
W 111° 51' 5[illegible].7" ⇒ LOCATION refer to following page

Metric mm	Inches	Particle		Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE													
.25 - .50		MEDIUM													
[illegible]		COARSE													
[illegible]	.04 - .08	Vry CRSE													
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE													
6 - 8	.24 - .31														
8 - 12	.31 - .47	MEDIUM													
12 - 16	.47 - .63														
16 - 24	.63 - .94	COARSE													
24 - 32	.94 - 1.26														
32 - 48	1.26- 1.9	Vry CRSE													
48 - 64	1.9 - 2.5														
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0														
128 - 192	5.0 - 7.6	LARGE													
192 - 256	7.6 - 10														
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20														
512 - 1024	20 - 40	MEDIUM													
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= 9=			Totals....					Totals....				Totals....			



ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0581

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #2
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : M. DEWAARD

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	1	99	
3/4"	2	97	
1/2"	1	96	
3/8"	2	94	
1/4"	5	89	
#4	7	82	
#8	18	64	
#10	6	58	
#16	15	43	
#30	15	28	
#40	6	22	
#50	6	16	
#100	9	7	
#200	3	3.8	

Moisture Content (%) 1.1

REMARKS: IN SITU MOISTURE = 1.1 %

Reviewed by:

Respectfully Submitted:

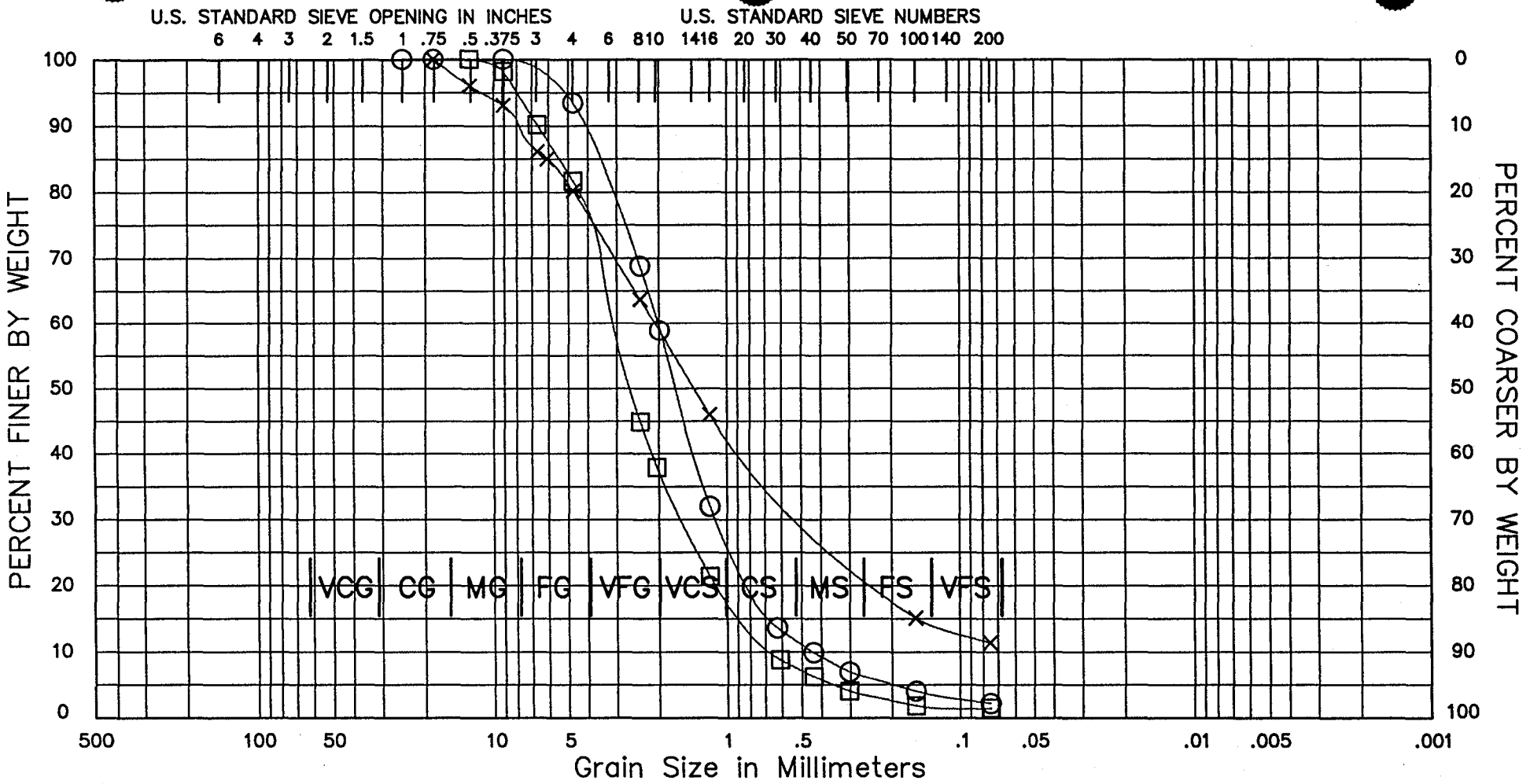
THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

SEDIMENT SAMPLE CONTENT GRAPH



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Silt or Clay	

Sample	Elev or Depth	Classification	Nat. W%	LL	PL	PL
× 1	Top 2 Feet	Very Coarse Sand				
○ 2	Top 2 Feet	Very Coarse Sand				
⊡ 9UR	Top 2 Feet	Very Coarse Sand				

Scottsdale Desert Greenbelt

MID TO UPPER REATA

Boring No.:

Sample Date: 4/18/94

Project: e029102

P:\AARON\MIDREAT.DWG

Greiner

The Desert Greenbelt

Wildland Hydrology Consultants 1/2

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

FIG. 1-3; JUST S. OF ROAD TO COMPOUND.

#4-6 — CHANNEL GOING S., ROCK SAMPL.

C/M SAMPLE #3 BANK. - SEDIMENT SAMPLE & ROCK COUNT)

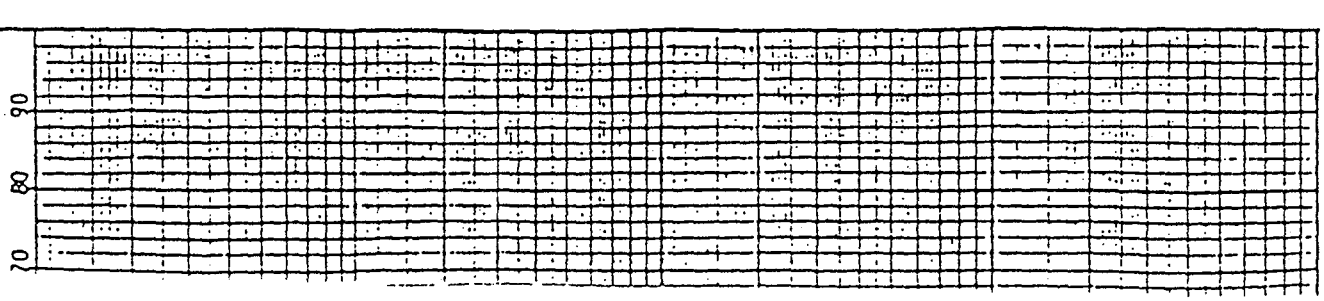
PEBBLE COUNT

Date 05/24/94 Party: _____ Wtrshd: KEATA

Site/Reach: JUST S. OF COMPOUND ROAD, JUST N. OF [illegible]

N 33° 40' 29.4"
W 111° 51' 50.4" → LOCATION

Metric mm	Inches	Particle		Item Count (mm)	Tot#	%Tot	%Cum	Item Count (inches)	Tot#	%Tot	%Cum	Item Count (mm)	Tot#	%Tot	%Cum
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE													
.25 - .50		MEDIUM													
.50 - 1.0		COARSE													
1 - 2	.04 - .08	Vry CRSE													
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE													
6 - 8	.24 - .31														
8 - 12	.31 - .47	MEDIUM													
12 - 16	.47 - .63														
16 - 24	.63 - .94	COARSE													
24 - 32	.94 - 1.26														
32 - 48	1.26- 1.9	Vry CRSE													
48 - 64	1.9 - 2.5														
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0														
128 - 192	5.0 - 7.6	LARGE													
192 - 256	7.6 - 10														
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20														
512 - 1024	20 - 40	MEDIUM													
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= ∴ 9= ⌘				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants 2/2

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

C/M SAMPLE #3 (CONT)

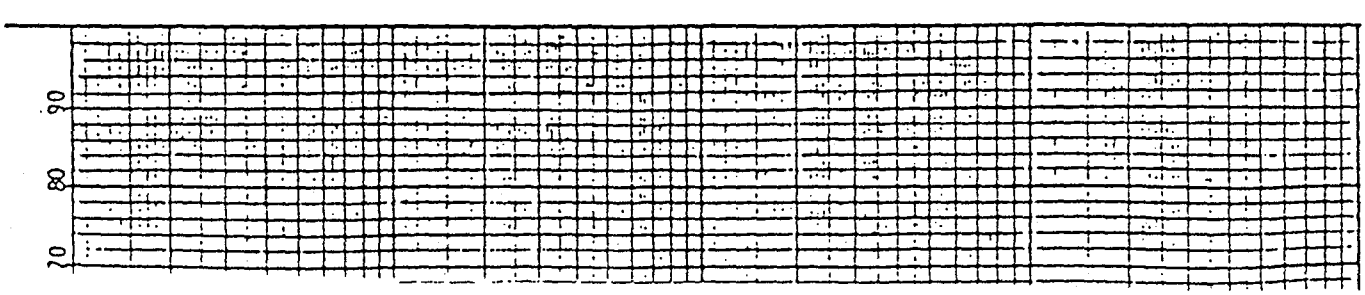
PEBBLE COUNT

Date 05/24/94 Party: _____ Wtrshd: REATA

Site/Reach: FROM C/M COMPOUND ROAD GOING SOUTH

Metric mm	Inches	Particle		Item Count (mm)	Tot#	%Tot	%Cum	Item Count (INCHES)	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE													
.25 - .50		MEDIUM													
.50 - 1.0		COARSE													
1.0 - 2	.04 - .08	Vry CRSE		IIIIIIIIIII				IIIIIIIIIIIIIII					60		
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE						I					2		
6 - 8	.24 - .31			I				I					2		
8 - 12	.31 - .47	MEDIUM		II				I					5		
12 - 16	.47 - .63			I									1		
16 - 24	.63 - .94	COARSE											1		
24 - 32	.94 - 1.26			I									2		
32 - 48	1.26- 1.9	Vry CRSE		I									3		
48 - 64	1.9 - 2.5												3		
64 - 96	2.5 - 3.8	SMALL	COBBLES	I				II					6		
96 - 128	3.8 - 5.0			I									4		
128 - 192	5.0 - 7.6	LARGE		I				II					4		
192 - 256	7.6 - 10							I					2		
256 - 384	10 - 15	SMALL	BOULDERS	II									2		
384 - 512	15 - 20			II									2		
512 - 1024	20 - 40	MEDIUM		I									1		
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= 9=				Totals....				Totals....				Totals....			

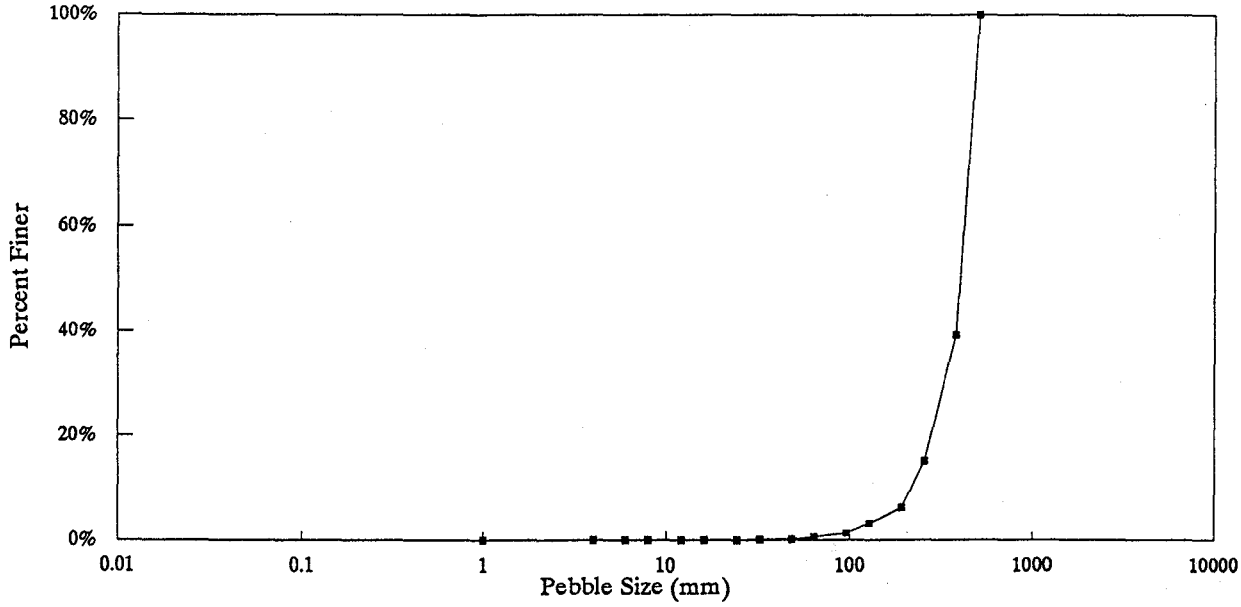
% Per



Conversion from Percentage by size to Percentage by weight
09/27/94

Reata
Section 3

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	60	60.00%	1.767146	106.0287521	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		60.00%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	2	62.00%	65.45	130.8996939	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	2	64.00%	179.59	359.1887601	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	5	69.00%	523.60	2617.993878	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	1	70.00%	1436.76	1436.75504	0.00%	0.00%
		16	20	16 – 24	0.63 – 0.94	1	71.00%	4188.79	4188.790205	0.00%	0.00%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	73.00%	11494.04	22988.08064	0.01%	0.01%
		32	40	32 – 48	1.26 – 1.9	3	76.00%	33510.32	100530.9649	0.03%	0.03%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	3	79.00%	91952.32	275856.9677	0.07%	0.10%
		64	80	64 – 96	2.5 – 3.8	6	85.00%	268082.57	1608495.439	0.41%	0.52%
	SMALL	96	112	96 – 128	3.8 – 5	4	89.00%	735618.58	2942474.322	0.75%	1.27%
Cobbles		128	160	128 – 192	5 – 7.6	4	93.00%	2144660.58	8578642.339	2.19%	3.46%
	LARGE	192	224	192 – 256	7.6 – 10	2	95.00%	5884948.64	11769897.29	3.01%	6.47%
		256	320	256 – 384	10 – 15	2	97.00%	17157284.68	34314569.36	8.78%	15.25%
	SMALL	384	448	384 – 512	15 – 20	2	99.00%	47079589.16	94159178.32	24.08%	39.33%
Boulders	MEDIUM	512	768	512 – 1024	20 – 40	1	100.00%	237182303.40	237182303.4	60.67%	100.00%
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	390963776.1		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^ 3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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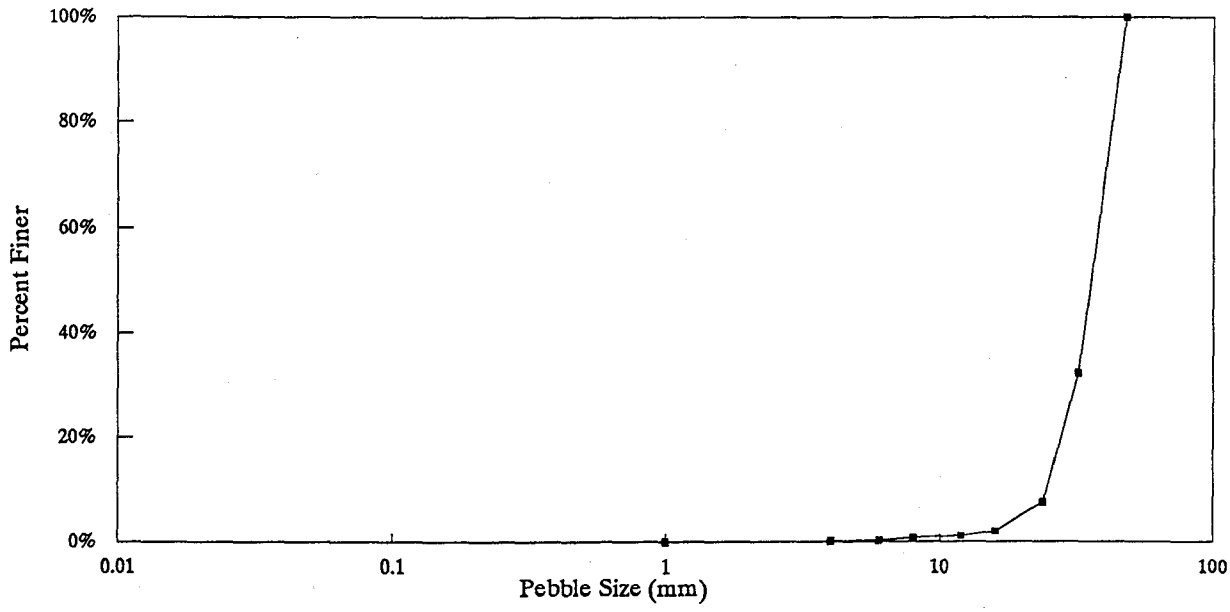
Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	60	75.95%	1.767146	106.0287521	0.03%	0.03%
	Vry FINE	2	3	2 – 4	0.08 – 0.16		75.95%	14.137167			NA
		4	5	4 – 6	0.16 – 0.24	2	78.48%	65.45	130.8996939	0.03%	0.06%
	FINE	6	7	6 – 8	0.24 – 0.31	2	81.01%	179.59	359.1887601	0.09%	0.15%
		8	10	8 – 12	0.31 – 0.7	5	87.34%	523.60	2617.993878	0.64%	0.79%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	1	88.[illegible]1%	1436.76	1436.75504	0.35%	1.14%
		16	20	16 – 24	0.63 – 0.94	1	89.[illegible]7%	4188.79	4188.790205	1.03%	2.17%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	92.41%	11494.04	22988.08064	5.63%	7.80%
		32	40	32 – 48	1.26 – 1.9	3	96.20%	33510.32	100530.9649	24.63%	32.42%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	3	100.00%	91952.32	275856.9677	67.58%	100.00%
					Total Sampled	79		Total Area	408215.6696		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0582

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #3
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : M. DEWAARD

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	9	91	
1 1/2"	12	79	
1"	6	73	
3/4"	4	69	
1/2"	5	64	
3/8"	6	58	
1/4"	4	54	
#4	6	48	
#8	17	31	
#10	3	28	
#16	8	20	
#30	6	14	
#40	2	12	
#50	2	10	
#100	4	6	
#200	2	4.2	

Moisture Content (%) 1.1

REMARKS: IN SITU MOISTURE = 1.1 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____ PIC #7-8

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____ @ CONFLUENCE

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____ UPPER EARLY

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks: ON SIDE TRIB - LOR. ROCKS . MAIN CHANNEL W/ GRAVEL.

4/M SAMPLE #4 - SEDIMENT ? DUE TO EROSION, ROCKS SETTLE OUT. (UPPER BANK)

PEBBLE COUNT

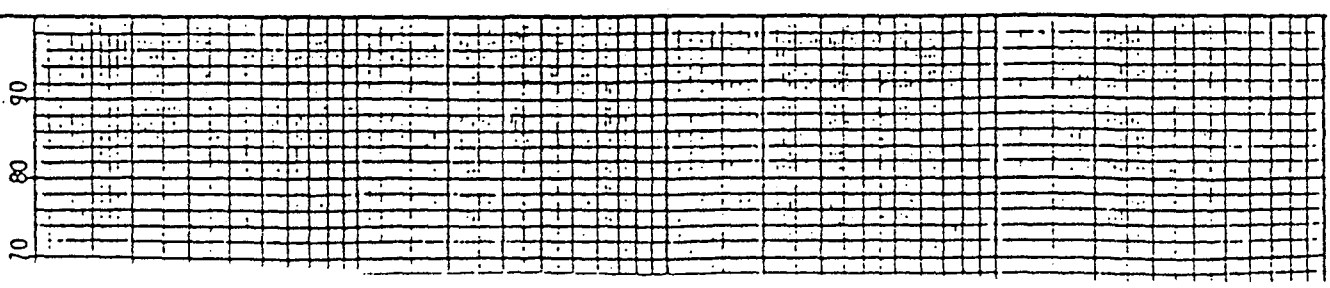
Date 05/24/94 Party: _____ Wtrshd: REATA

Site/Reach: @ CONFLUENCE

N 33° 40' 28.3"
W 111° 51' 54.2"

*See following page

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE													
.25 - .50		MEDIUM													
.50 - 1.0		COARSE													
1 - 2	.04 - .08	Vry CRSE													
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE													
6 - 8	.24 - .31														
8 - 12	.31 - .47	MEDIUM													
12 - 16	.47 - .63														
16 - 24	.63 - .94	COARSE													
24 - 32	.94 - 1.26														
32 - 48	1.26- 1.9	Vry CRSE													
48 - 64	1.9 - 2.5														
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0														
128 - 192	5.0 - 7.6	LARGE													
192 - 256	7.6 - 10														
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20														
512 - 1024	20 - 40	MEDIUM													
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= 9=			Totals....					Totals....				Totals....			



ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0583

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #4
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : R. EVANS

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	7	93	
1 1/2"	0	93	
1"	0	93	
3/4"	1	92	
[illegible]"	1	91	
3/8"	1	90	
1/4"	5	85	
#4	6	79	
#8	22	57	
#10	5	52	
#16	16	36	
#30	15	21	
#40	5	16	
#50	4	12	
#100	5	7	
#200	3	3.6	

Moisture Content (%) 1.3

REMARKS: IN SITU MOISTURE = 1.3 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

Wildland Hydrology Consultants

1/2

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

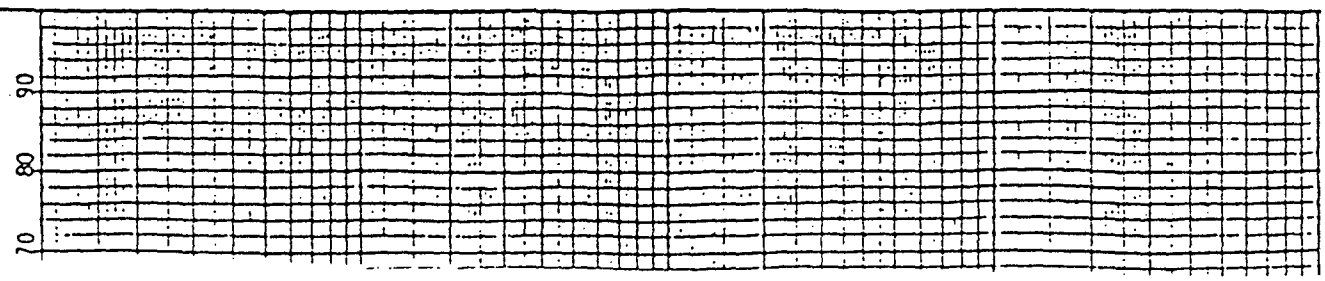
F/M SAMPLE #5 (200# COUNT

PEBBLE COUNT

Date 05/24/94 Party: _____ Wtrshd: _____

Site/Reach:

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE													
.25 - .50		MEDIUM													
.50 - [illegible]		COARSE													
[illegible]	.04 - .08	Vry CRSE													
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE													
6 - 8	.24 - .31														
8 - 12	.31 - .47	MEDIUM													
12 - 16	.47 - .63														
16 - 24	.63 - .94	COARSE													
24 - 32	.94 - 1.26														
32 - 48	1.26- 1.9	Vry CRSE													
48 - 64	1.9 - 2.5														
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0														
128 - 192	5.0 - 7.6	LARGE													
192 - 256	7.6 - 10														
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20														
512 - 1024	20 - 40	MEDIUM													
1024 - 2048	40 - 80	LARGE													
2048 - 4096	80 - 160	Vry LRGE													
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

FIG #9 UPPER B1

C/M SAMPLE #5 (PEBBLE COUNT - CONT)

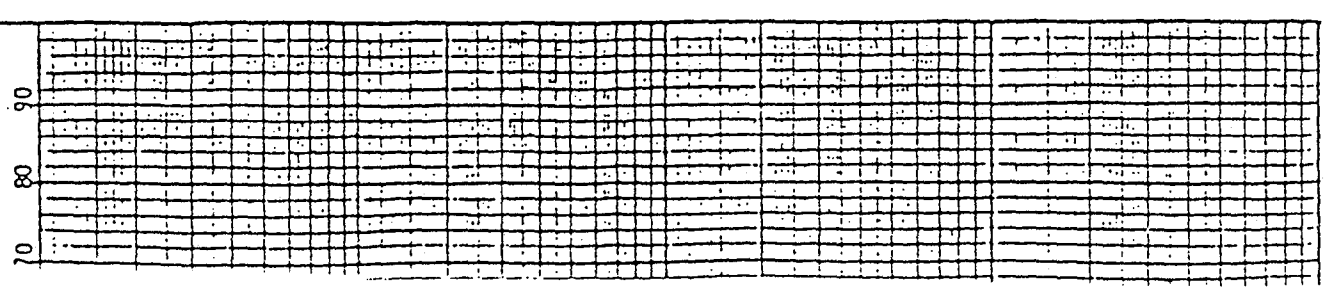
PEBBLE COUNT

Date 8/24/94 Party: _____ Wtrshd: UPPER SAVIO

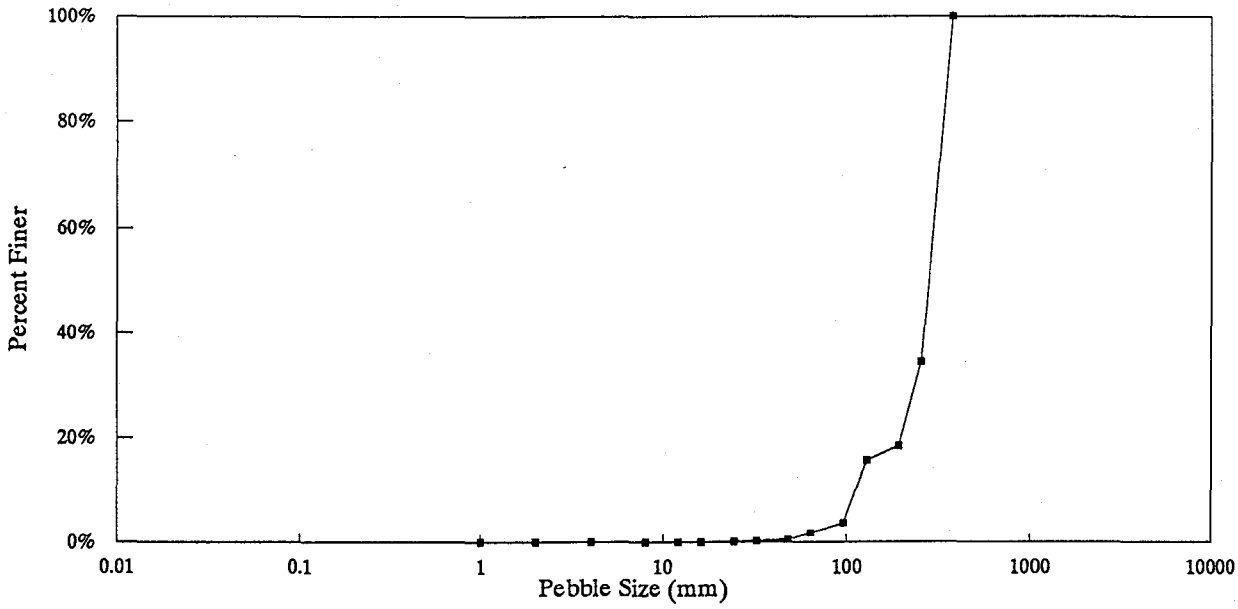
Site/Reach:

N 33° 40' 4.6"
W 111° 52' 2.5"

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
Less- .062		SILT/CLAY		mm				IN							
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
[illegible]		COARSE	SANDS												
[illegible]	.04 - .08	Vry CRSE	SANDS	||||||||				|||||					29		
2 - 4	.08 - .16	Vry FINE	GRAVELS					|					1		
4 - 6	.16 - .24	FINE	GRAVELS					|					2		
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS										2		
12 - 16	.47 - .63	MEDIUM	GRAVELS	|				|					2		
16 - 24	.63 - .94	COARSE	GRAVELS	||				|					8		
24 - 32	.94 - 1.26	COARSE	GRAVELS	|				|					6		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	|				|||||					7		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	|				||					7		
64 - 96	2.5 - 3.8	SMALL	COBBLES	||				|					11		
96 - 128	3.8 - 5.0	SMALL	COBBLES	|||				||					6		
128 - 192	5.0 - 7.6	LARGE	COBBLES	|||				||					12		
192 - 256	7.6 - 10	LARGE	COBBLES	|									1		
256 - 384	10 - 15	SMALL	BOULDERS	|				|					2		
384 - 512	15 - 20	SMALL	BOULDERS					|					3		
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm		Pebble Size Inches		Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	<	0.062					0.000016			
	Vry FINE	0.062	0.0935	0.062 –	0.125					0.000428			NA
	FINE	0.125	0.1875	0.125 –	0.25					0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 –	0.5					0.027612			NA
	COARSE	0.5	0.75	0.5 –	1					0.220893			NA
	Vry CRSE	1	1.5	1 –	2	0.04 –	0.08	29	29.29%	1.767146	51.24723016	0.00%	0.00%
	Vry FINE	2	3	2 –	4	0.08 –	0.16	1	30.30%	14.137167	14.13716694	0.00%	0.00%
		4	5	4 –	6	0.16 –	0.24	2	32.32%	65.45	130.8996939	0.00%	0.00%
	FINE	6	7	6 –	8	0.24 –	0.31		32.32%	179.59			NA
		8	10	8 –	12	0.31 –	0.7	2	34.34%	523.60	1047.197551	0.00%	0.00%
Gravels	MEDIUM	12	14	12 –	16	0.47 –	0.63	2	36.36%	1436.76	2873.51008	0.00%	0.00%
		16	20	16 –	24	0.63 –	0.94	8	44.44%	4188.79	33510.32164	0.02%	0.02%
	COARSE	24	28	24 –	32	0.94 –	1.26	6	50.51%	11494.04	68964.24193	0.03%	0.05%
		32	40	32 –	48	1.26 –	1.9	7	57.58%	33510.32	234572.2515	0.11%	0.16%
	Vry CRSE	48	56	48 –	64	1.9 –	2.5	7	64.65%	91952.32	643666.258	0.30%	0.46%
		64	80	64 –	96	2.5 –	3.8	11	75.76%	268082.57	2948908.304	1.37%	1.83%
	SMALL	96	112	96 –	128	3.8 –	5	6	81.82%	735618.58	4413711.484	2.05%	3.87%
Cobbles		128	160	128 –	192	5 –	7.6	12	93.94%	2144660.58	25735927.02	11.94%	15.81%
	LARGE	192	224	192 –	256	7.6 –	10	1	94.95%	5884948.64	5884948.645	2.73%	18.54%
		256	320	256 –	384	10 –	15	2	96.97%	17157284.68	34314569.36	15.92%	34.47%
	SMALL	384	448	384 –	512	15 –	20	3	100.00%	47079589.16	141238767.5	65.53%	100.00%
Boulders	MEDIUM	512	768	512 –	1024	20 –	40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 –	2048	40 –	80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 –	4096	80 –	160		100.00%	15179667417.59			NA
						Total Sampled		99		Total Area	215521662.3		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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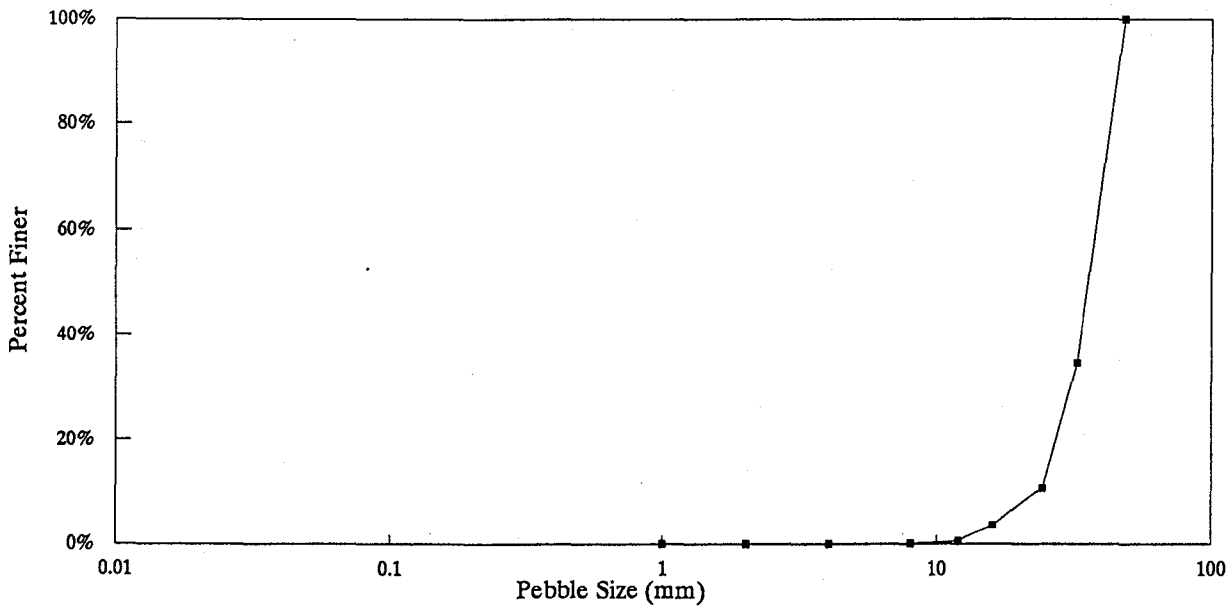
Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	29	45.31%	1.767146	51.24723016	0.01%	0.01%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	1	46.88%	14.137167	14.13716694	0.00%	0.01%
		4	5	4 – 6	0.16 – 0.24	2	50.00%	65.45	130.8996939	0.01%	0.02%
	FINE	6	7	6 – 8	0.24 – 0.31		50.00%	179.59			NA
		8	10	8 – 12	0.31 – 0.7	2	53.13%	523.60	1047.197551	0.11%	0.13%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	56.25%	1436.76	2873.51008	0.29%	0.42%
		16	20	16 – 24	0.63 – 0.94	8	68.75%	4188.79	33510.32164	3.40%	3.82%
	COARSE	24	28	24 – 32	0.94 – 1.26	6	78.13%	11494.04	68964.24193	7.00%	10.82%
		32	40	32 – 48	1.26 – 1.9	7	89.06%	33510.32	234572.2515	23.82%	34.64%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	7	100.00%	91952.32	643666.258	65.36%	100.00%
					Total Sampled	64		Total Area	984830.0648		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^ 3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Reata5b.wk3

ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0584

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #5
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : R. EVANS

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3 1/2"	0	100	
3"	6	94	
2 1/2"	0	94	
2"	4	90	
1 1/2"	10	80	
1"	6	74	
[illegible]"	5	69	
1/2"	8	61	
3/8"	5	56	
1/4"	10	46	
#4	6	40	
#8	13	27	
#10	3	24	
#16	8	16	
#30	8	8	
#40	3	5	
#50	2	3	
#100	1	2	
#200	1	0.8	

Moisture Content (%) 0.9

REMARKS: IN SITU MOISTURE = 0.9 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____ PIC 12 & 13

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

C/M SAMPLE #6 - SEDIMENT SAMPLE

PEBBLE COUNT

Date 5/24/94 Party: _____ Wtrshd: CONFLUENCE

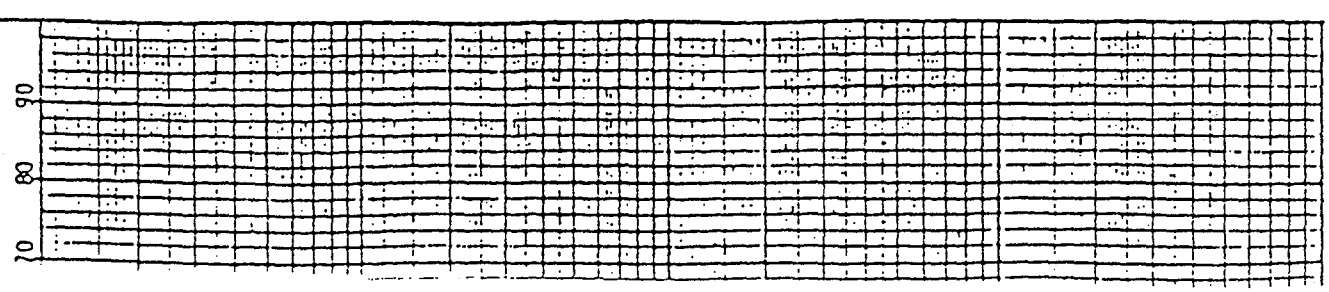
Site/Reach: BEAVER BROOKLYN

N [illegible]

W [illegible]

See following page

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
[illegible]		COARSE	SANDS												
[illegible]	.04 - .08	Vry CRSE	SANDS												
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS												
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS												
12 - 16	.47 - .63	MEDIUM	GRAVELS												
16 - 24	.63 - .94	COARSE	GRAVELS												
24 - 32	.94 - 1.26	COARSE	GRAVELS												
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS												
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS												
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0	SMALL	COBBLES												
128 - 192	5.0 - 7.6	LARGE	COBBLES												
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=			Totals....					Totals....				Totals....			



ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0585

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #6
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : M. DEWAARD

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	1	99	
1"	1	98	
3/4"	2	96	
[illegible]"	3	93	
3/8"	2	91	
1/4"	6	85	
#4	8	77	
#8	21	56	
#10	6	50	
#16	17	33	
#30	14	19	
#40	5	14	
#50	4	10	
#100	5	5	
#200	2	3.1	

Moisture Content (%) 0.8

REMARKS: IN SITU MOISTURE = 0.8 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

TELEPHONE (602) 241-1097 / FAX (602) 234-0699
TELEPHONE (310) 538-3757 / FAX (310) 538-0725

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

Wildland Hydrology Consultants

PIC #14

C/M SAMPLE #7

PEBBLE COUNT

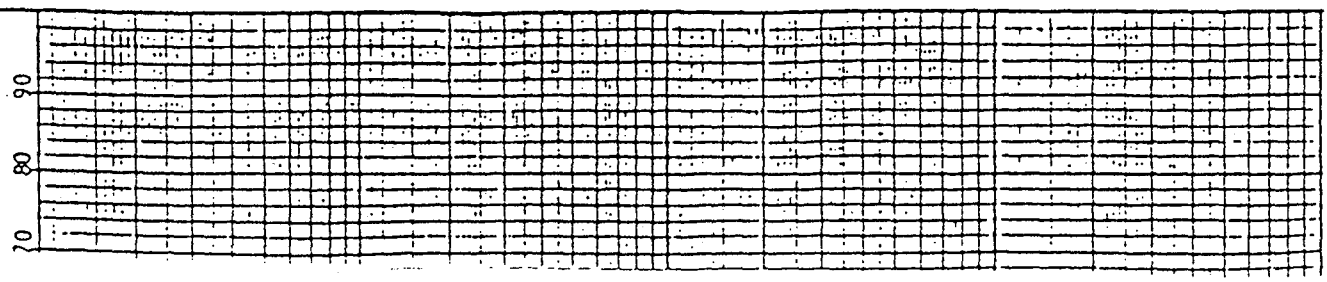
Date 5/24/94 Party: _____ Wtrshd: MAIN REMA -

Site/Reach: JUST IN OF PINA ACERS BELOW UPPER BARRIER.

N 33° 39' 54.9"
W 111° 52' 35.2"

LOCATION see following page

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS												
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS												
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS												
12 - 16	.47 - .63	MEDIUM	GRAVELS												
16 - 24	.63 - .94	COARSE	GRAVELS												
24 - 32	.94 - 1.26	COARSE	GRAVELS												
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS												
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS												
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0	SMALL	COBBLES												
128 - 192	5.0 - 7.6	LARGE	COBBLES												
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= ∴ 9= ⌘				Totals....				Totals....				Totals....			



ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0586

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #7
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : R. EVANS

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	1	99	
3/4"	0	99	
[illegible]"	1	98	
3/8"	2	96	
1/4"	6	90	
#4	7	83	
#8	26	57	
#10	6	51	
#16	16	35	
#30	14	21	
#40	5	16	
#50	5	11	
#100	6	5	
#200	3	2.0	

Moisture Content (%) 1.3

REMARKS: IN SITU MOISTURE = 1.3 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

PHOENIX, ARIZONA 85017
GARDENA, CALIFORNIA 90247

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STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

Wildland Hydrology Consultants

PIC #5 LOOKING UPSTREAM

SAMPLE #8

PEBBLE COUNT

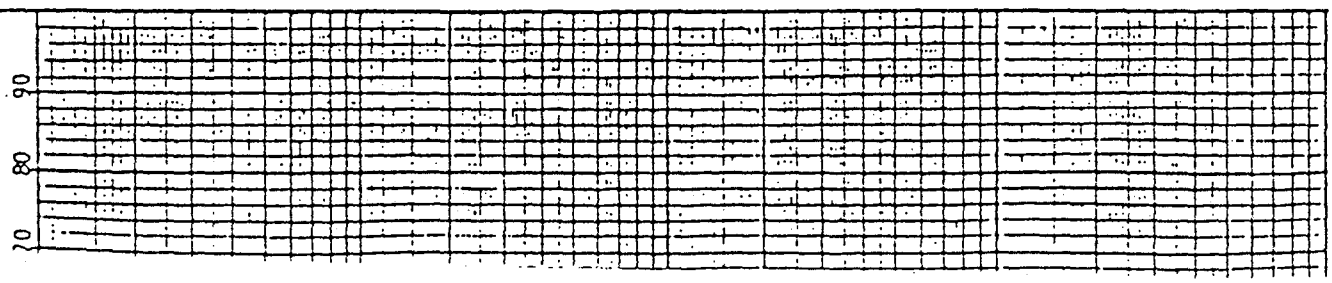
Date 11/14/94 Party: _____ Wtrshd: MAIN PARA

Site/Reach: NEAR C/M GAGE - NE CORNER OF A AREA

N 33° 39' 42.1" W 111° 52' 23.6"

LOCATION See following page

Metric mm	Inches	Particle		Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS												
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS												
6 - 8	.24 - .31	FINE	GRAVELS												
8 - 12	.31 - .47	MEDIUM	GRAVELS												
12 - 16	.47 - .63	MEDIUM	GRAVELS												
16 - 24	.63 - .94	COARSE	GRAVELS												
24 - 32	.94 - 1.26	COARSE	GRAVELS												
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS												
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS												
64 - 96	2.5 - 3.8	SMALL	COBBLES												
96 - 128	3.8 - 5.0	SMALL	COBBLES												
128 - 192	5.0 - 7.6	LARGE	COBBLES												
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=			Totals....					Totals....				Totals....			



ATL Inc.
GEOTECHNICAL AND MATERIALS CONSULTANTS

PARTICLE SIZE ANALYSIS OF SOILS

CLIENT: GREINER, INC.
7310 NORTH 16TH STREET, #160
PHOENIX, AZ 85020

DATE: 05/31/94

LAB NO: 94-0587

ATTN : MR. BILL LACE

PROJECT : SANDS EVALUATION
MATERIAL: C/M #8
SOURCE : NOT NOTED

PROJECT NO: 794043
DATE RCVD : 05/25/94
SAMPLED BY: CLIENT
TESTED BY : R. EVANS

METHOD ASTM C136

SIEVE SIZE	% RETAINED	% PASSING	SPECIFICATION
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	1	99	
3/4"	1	98	
[illegible]"	2	96	
3/8"	2	94	
1/4"	8	86	
#4	8	78	
#8	23	55	
#10	5	50	
#16	15	35	
#30	18	17	
#40	5	12	
#50	4	8	
#100	4	4	
#200	2	2.4	

Moisture Content (%) 1.2

REMARKS: IN SITU MOISTURE = 1.2 %

Reviewed by:

Respectfully Submitted:

THOMAS E. KACZMAROWSKI
Laboratory Supervisor

2922 WEST CLARENDON
16921 S. WESTERN AVE., SUITE 109

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Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

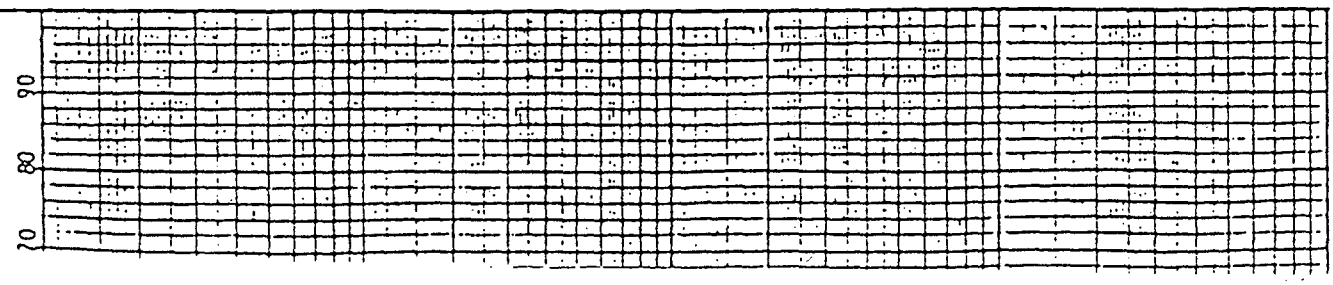
C/M SAMPLE #9 SEDIMENT SAMPLE & CONT.

PEBBLE COUNT

Date 05/24/94 Party: _____ Wtrshd: REATA – E-BRANCH

Site/Reach: BELOW EPHEMERAL CONFLUENCE N 33° 39' 30.6" W 111° 52' 27.8"

Metric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS	||||||||||				||||||||||							
2 - 4	.08 - .16	Vry FINE	GRAVELS					||||							
4 - 6	.16 - .24	FINE	GRAVELS					|							
6 - 8	.24 - .31	FINE	GRAVELS					||							
8 - 12	.31 - .47	MEDIUM	GRAVELS	||				||							
12 - 16	.47 - .63	MEDIUM	GRAVELS	|											
16 - 24	.63 - .94	COARSE	GRAVELS					|							
24 - 32	.94 - 1.26	COARSE	GRAVELS	|											
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	||				||							
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	|||											
64 - 96	2.5 - 3.8	SMALL	COBBLES	|				||							
96 - 128	3.8 - 5.0	SMALL	COBBLES	||											
128 - 192	5.0 - 7.6	LARGE	COBBLES	|||				|							
192 - 256	7.6 - 10	LARGE	COBBLES												
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= ∴ 9= ⌑				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

4M SAMPLE #9 (CONT)

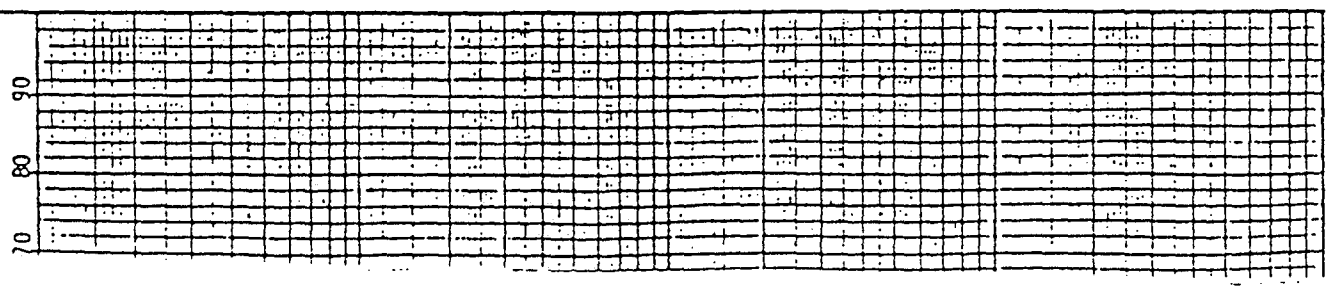
PEBBLE COUNT

Date 05/24/94 Party: _____ Wtrshd: E. BRANCH - HERTA

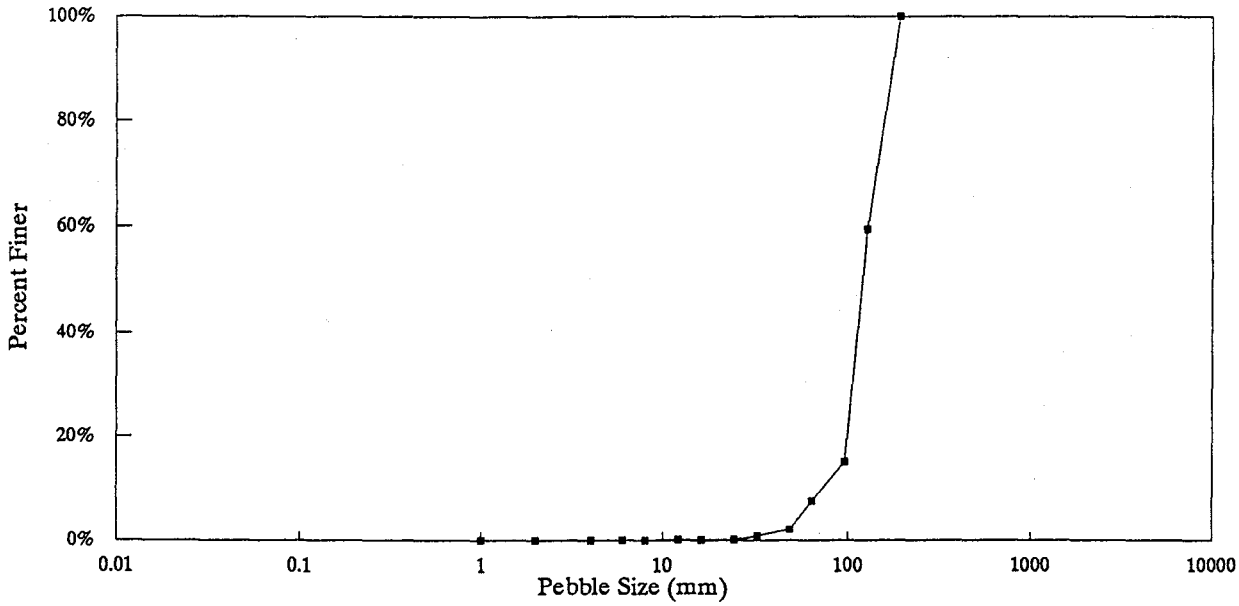
Site/Reach: BELOW BEARSLY CONFLUENCE

Metric mm	Inches	Particle		Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum
Less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1.0		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS	卌 卌				卌 卌					36		
2 - 4	.08 - .16	Vry FINE	GRAVELS					卌					11		
4 - 6	.16 - .24	FINE	GRAVELS	11				11					5		
6 - 8	.24 - .31	FINE	GRAVELS					11					4		
8 - 12	.31 - .47	MEDIUM	GRAVELS	卌									8		
12 - 16	.47 - .63	MEDIUM	GRAVELS	卌				1					6		
16 - 24	.63 - .94	COARSE	GRAVELS					1					2		
24 - 32	.94 - 1.26	COARSE	GRAVELS										1		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	1				1					6		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	1									4		
64 - 96	2.5 - 3.8	SMALL	COBBLES					111					6		
96 - 128	3.8 - 5.0	SMALL	COBBLES	1									3		
128 - 192	5.0 - 7.6	LARGE	COBBLES	11									6		
192 - 256	7.6 - 10	LARGE	COBBLES	11									2		
256 - 384	10 - 15	SMALL	BOULDERS												
384 - 512	15 - 20	SMALL	BOULDERS												
512 - 1024	20 - 40	MEDIUM	BOULDERS												
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= ∴ 9= ⌘			Totals....					Totals....				Totals....			

% per



Scottsdale Desert Greenbelt Sediment Sample Data

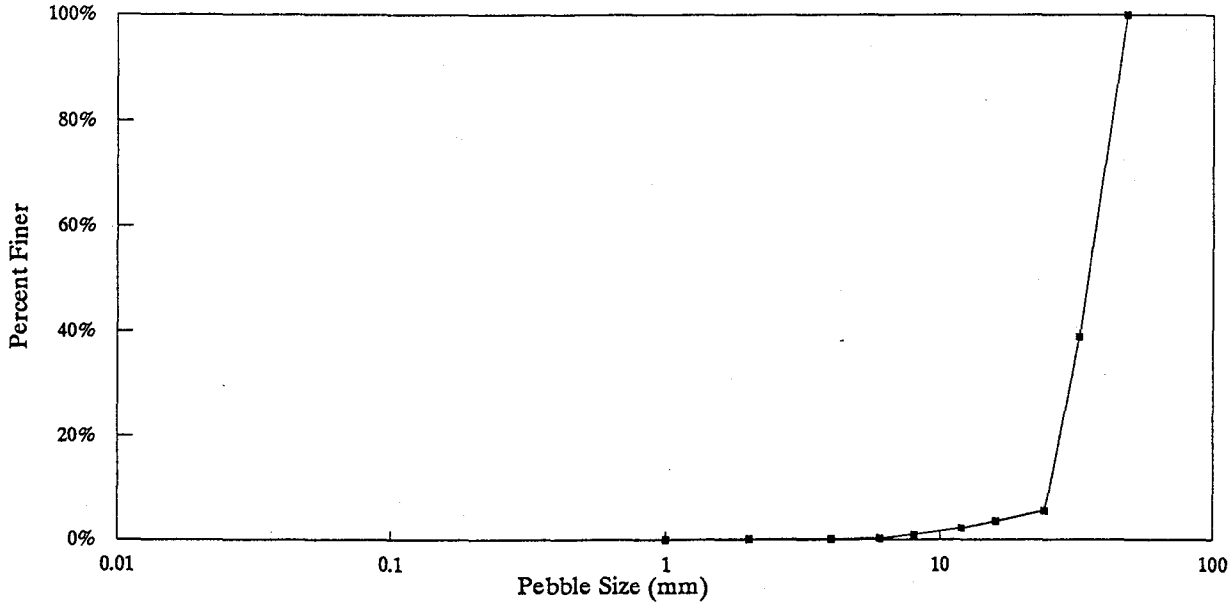


Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm		Pebble Size inches		Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	<	0.062					0.000016			
	Vry FINE	0.062	0.0935	0.062 –	0.125					0.000428			NA
	FINE	0.125	0.1875	0.125 –	0.25					0.003451			NA
	MEDIUM	0.25	0.375	0.25 –	0.5					0.027612			NA
	COARSE	0.5	0.75	0.5 –	1					0.220893			NA
	Vry CRSE	1	1.5	1 –	2	0.04 –	0.08	36	36.00%	1.767146	63.61725124	0.00%	0.00%
	Vry FINE	2	3	2 –	4	0.08 –	0.16	11	47.00%	14.137167	155.5088364	0.00%	0.00%
		4	5	4 –	6	0.16 –	0.24	5	52.00%	65.45	327.2492347	0.00%	0.00%
	FINE	6	7	6 –	8	0.24 –	0.31	4	56.00%	179.59	718.3775201	0.00%	0.00%
		8	10	8 –	12	0.31 –	0.7	8	64.00%	523.60	4188.790205	0.01%	0.02%
Gravels	MEDIUM	12	14	12 –	16	0.47 –	0.63	6	70.00%	1436.76	8620.530241	0.03%	0.05%
		16	20	16 –	24	0.63 –	0.94	2	72.00%	4188.79	8377.58041	0.03%	0.08%
	COARSE	24	28	24 –	32	0.94 –	1.26	1	73.00%	11494.04	11494.04032	0.04%	0.12%
		32	40	32 –	48	1.26 –	1.9	6	79.00%	33510.32	201061.9298	0.69%	0.81%
	Vry CRSE	48	56	48 –	64	1.9 –	2.5	4	83.00%	91952.32	367809.2903	1.27%	2.07%
		64	80	64 –	96	2.5 –	3.8	6	89.00%	268082.57	1608495.439	5.54%	7.61%
	SMALL	96	112	96 –	128	3.8 –	5	3	92.00%	735618.58	2206855.742	7.60%	15.21%
Cobbles		128	160	128 –	192	5 –	7.6	6	98.00%	2144660.58	12867963.51	44.29%	59.49%
	LARGE	192	224	192 –	256	7.6 –	10	2	100.00%	5884948.64	11769897.29	40.51%	100.00%
		256	320	256 –	384	10 –	15		100.00%	17157284.68			NA
	SMALL	384	448	384 –	512	15 –	20		100.00%	47079589.16			NA
Boulders	MEDIUM	512	768	512 –	1024	20 –	40		100.00%	237182303.40			NA
	LARGE	1024	1536	1024 –	2048	40 –	80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 –	4096	80 –	160		100.00%	15179667417.59			NA
						Total Sampled		100		Total Area	29056028.89		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Reata9.wk3

Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	36	43.37%	1.767146	63.61725124	0.01%	0.01%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	11	56.63%	14.137167	155.5088364	0.03%	0.04%
		4	5	4 – 6	0.16 – 0.24	5	62.65%	65.45	327.2492347	0.05%	0.09%
	FINE	6	7	6 – 8	0.24 – 0.31	4	67.47%	179.59	718.3775201	0.12%	0.21%
		8	10	8 – 12	0.31 – 0.7	8	77.11%	523.60	4188.790205	0.69%	0.90%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	6	84.34%	1436.76	8620.530241	1.43%	2.33%
		16	20	16 – 24	0.63 – 0.94	2	86.75%	4188.79	8377.58041	1.39%	3.72%
	COARSE	24	28	24 – 32	0.94 – 1.26	1	87.95%	11494.04	11494.04032	1.91%	5.63%
		32	40	32 – 48	1.26 – 1.9	6	95.18%	33510.32	201061.9298	33.35%	38.98%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	4	100.00%	91952.32	367809.2903	61.02%	100.00%
					Total Sampled	83		Total Area	602816.9142		

Summary of Columns, and Definitions of Results		
Assumed Spherical Volume per item	=	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size	=	[number of items]*[Volume per item]
Percent per by weight	=	[Volume of items in each sediment size category]/[Volume of all items in all categories]
		The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

w:\123r3\sediment\Reata9h.wk3

Sediment Field Tests

Section 5

Beardsley Wash

Beardsley / C.M. Ranch
Sheet 6

ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

CLIENT:	Greiner, Inc.	**DATE:**	03-07-95
	7310 North 16th Street, #160	**LAB NO.:**	95-0181
	Phoenix, AZ 85020	**PROJECT NO.:**	795014
ATTN.:	Mr. Bill Lace	**DATE RVCD.:**	03-05-95
PROJECT:	Sand Evaluation	**SAMPLED BY:**	Client
MATERIAL:	Native	**TESTED BY:**	R. Evans
SOURCE:	North Beardsley #1	**METHOD:**	ASTM C136

PARTICLE SIZE ANALYSIS OF SOILS

SIEVE SIZE	% RETAINED	% PASSING
3 1/2"	0	100
3"	0	100
2 1/2"	0	100
2"	4	96
1 1/2"	9	87
1"	14	73
3/4"	8	65
1/2"	13	52
3/8"	6	46
1/4"	9	37
#4	5	32
#8	13	19
#10	2	17
#16	5	12
#30	6	6
#40	2	4
#50	1	3
#100	1	2
#200	T	2.3

Remarks: Moisture = 2.5%

Reviewed:

Respectfully Submitted,

for Michael P. Bonkoski
Laboratory Supervisor

2912 W. CLARENDON
PHOENIX, AZ 85017
TELEPHONE (602) 241-1097
FAX (602) 277-1306

820 E. 47TH STREET, SUITE B-1
TUCSON, AZ 85713
TELEPHONE (602) 623-4547
FAX (602) 623-4603

16921 S. WESTERN AVE., SUITE 109
GARDENA, CA 90247
TELEPHONE (310) 538-3757
FAX (310) 538-0725

7

1/2

Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks: KYONE COMPOUND, C/M PROPERTY

PIC # 1-3 UPSTREAM, DOWNST. & BANK.

C/M SAMPLE #1

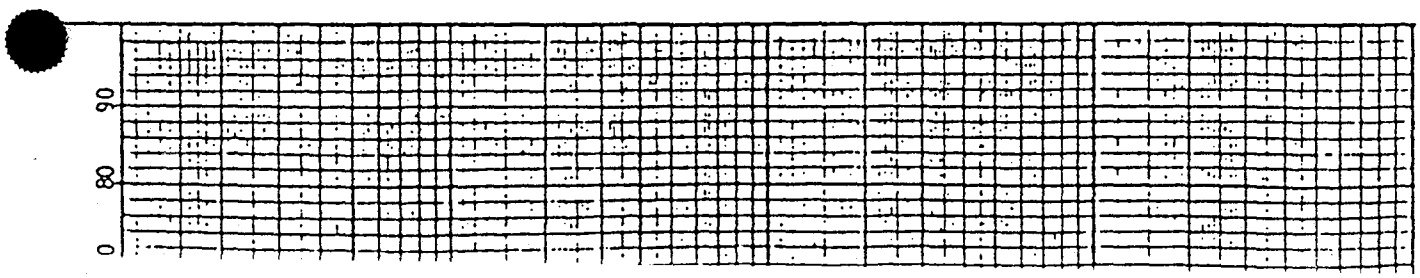
PEBBLE COUNT

Date 06/26/94 Party: _____ Wtrshd: UPPER BEARDS

Site/Reach:

N 33° 40' 23.7" W 111° 51' 17.3" LOCATION

Metric mm	Inches	Particle		Item Count (mm)	Tot#	%Tot	%Cum	Item Count (IN)	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
less- .062		SILT/CLAY													
.062- .125		Vry FINE	SANDS												
.125- .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.5 - 1		COARSE	SANDS												
1.0 - 2	.04 - .08	Vry CRSE	SANDS	II											
2 - 4	.08 - .16	Vry FINE	GRAVELS												
4 - 6	.16 - .24	FINE	GRAVELS					II							
6 - 8	.24 - .31	FINE	GRAVELS	I											
8 - 12	.31 - .47	MEDIUM	GRAVELS	IIII				I							
12 - 16	.47 - .63	MEDIUM	GRAVELS	I				II							
16 - 24	.63 - .94	COARSE	GRAVELS	II				II							
24 - 32	.94 - 1.26	COARSE	GRAVELS	II				I							
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS					I							
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	III				I							
64 - 96	2.5 - 3.8	SMALL	COBBLES	II				IIIII							
96 - 128	3.8 - 5.0	SMALL	COBBLES					III							
128 - 192	5.0 - 7.6	LARGE	COBBLES	III				III							
192 - 256	7.6 - 10	LARGE	COBBLES	I											
256 - 384	10 - 15	SMALL	BOULDERS	III				I							
384 - 512	15 - 20	SMALL	BOULDERS					II							
512 - 1024	20 - 40	MEDIUM	BOULDERS	I				I							
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

2/2

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

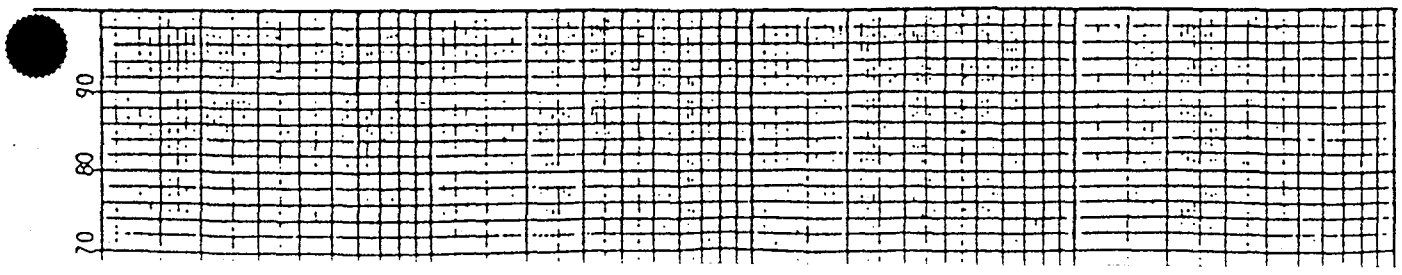
CM SAMPLE #1

PEBBLE COUNT

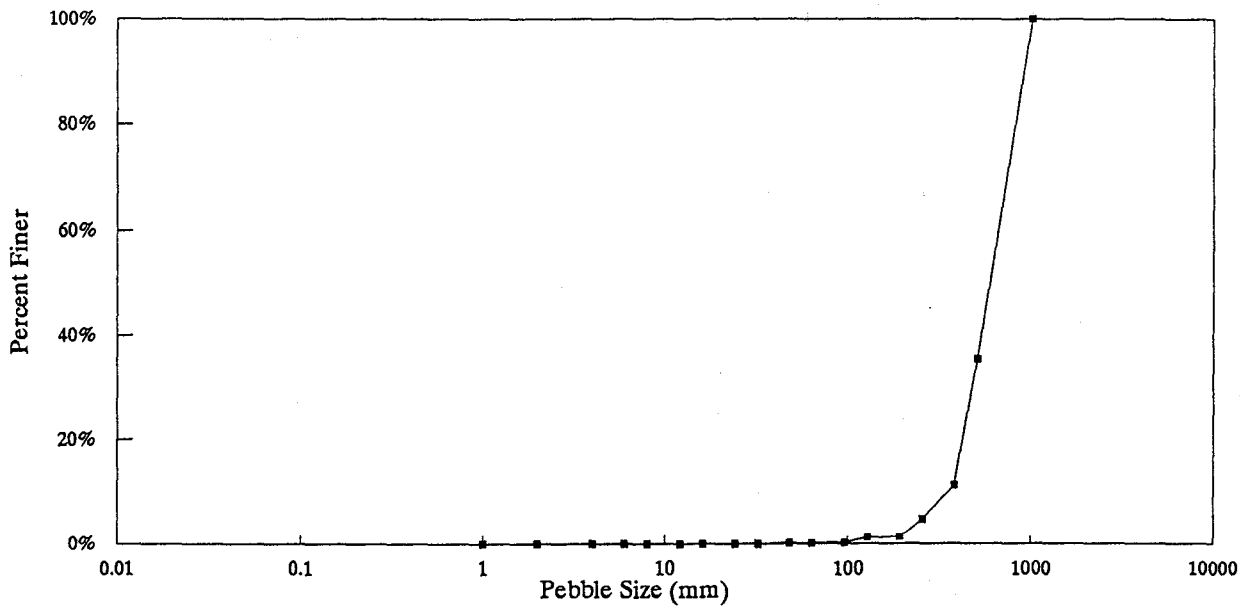
05/26/94 Party: _____ Wtrshd: UPPER BEAVERSLY

Site/Reach:

Metric mm	Inches	Particle		Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum	Item Count	Total	%Tot	%Cum
.5 - .062		SILT/CLAY		(hm)				(N)							
.062 - .125		Vry FINE	SANDS												
.125 - .25		FINE	SANDS												
.25 - .50		MEDIUM	SANDS												
.50 - 1		COARSE	SANDS												
1 - 2	.04 - .08	Vry CRSE	SANDS	III				I					6		
2 - 4	.08 - .16	Vry FINE	GRAVELS					I					1		
4 - 6	.16 - .24	FINE	GRAVELS										2		
6 - 8	.24 - .31	FINE	GRAVELS					II					3		
8 - 12	.31 - .47	MEDIUM	GRAVELS	I				I					7		
12 - 16	.47 - .63	MEDIUM	GRAVELS	III				IIII					10		
16 - 24	.63 - .94	COARSE	GRAVELS					I					5		
24 - 32	.94 - 1.26	COARSE	GRAVELS	IIII									7		
32 - 48	1.26 - 1.9	Vry CRSE	GRAVELS	III				IIII					8		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	II				II					8		
64 - 96	2.5 - 3.8	SMALL	COBBLES	III				I					11		
96 - 128	3.8 - 5.0	SMALL	COBBLES	I									4		
128 - 192	5.0 - 7.6	LARGE	COBBLES	III				IIII					13		
192 - 256	7.6 - 10	LARGE	COBBLES										1		
256 - 384	10 - 15	SMALL	BOULDERS					II					6		
384 - 512	15 - 20	SMALL	BOULDERS	I				I					4		
512 - 1024	20 - 40	MEDIUM	BOULDERS					I					3		
1024 - 2048	40 - 80	LARGE	BOULDERS	I									1		
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	6	6.00%	1.767146	10.60287521	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	1	7.00%	14.137167	14.13716694	0.00%	0.00%
		4	5	4 – 6	0.16 – 0.24	2	9.00%	65.45	130.8996939	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	3	12.00%	179.59	538.7831401	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	7	19.00%	523.60	3665.191429	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	10	29.00%	1436.76	14367.5504	0.00%	0.00%
		16	20	16 – 24	0.63 – 0.94	5	34.00%	4188.79	20943.95102	0.00%	0.00%
	COARSE	24	28	24 – 32	0.94 – 1.26	7	41.00%	11494.04	80458.28225	0.00%	0.00%
		32	40	32 – 48	1.26 – 1.9	8	49.00%	33510.32	268082.5731	0.01%	0.01%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	57.00%	91952.32	735618.5806	0.03%	0.04%
		64	80	64 – 96	2.5 – 3.8	11	68.00%	268082.57	2948908.304	0.10%	0.14%
	SMALL	96	112	96 – 128	3.8 – 5	4	72.00%	735618.58	2942474.322	0.10%	0.24%
Cobbles		128	160	128 – 192	5 – 7.6	13	85.00%	2144660.58	27880587.6	0.95%	1.19%
	LARGE	192	224	192 – 256	7.6 – 10	1	86.00%	5884948.64	5884948.645	0.20%	1.39%
		256	320	256 – 384	10 – 15	6	92.00%	17157284.68	102943708.1	3.50%	4.89%
	SMALL	384	448	384 – 512	15 – 20	4	96.00%	47079589.16	188318356.6	6.40%	11.29%
Boulders	MEDIUM	512	768	512 – 1024	20 – 40	3	99.00%	237182303.40	711546910.2	24.19%	35.48%
	LARGE	1024	1536	1024 – 2048	40 – 80	1	100.00%	1897458427.20	1897458427	64.52%	100.00%
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100			Total Area	2941048152	

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^ 3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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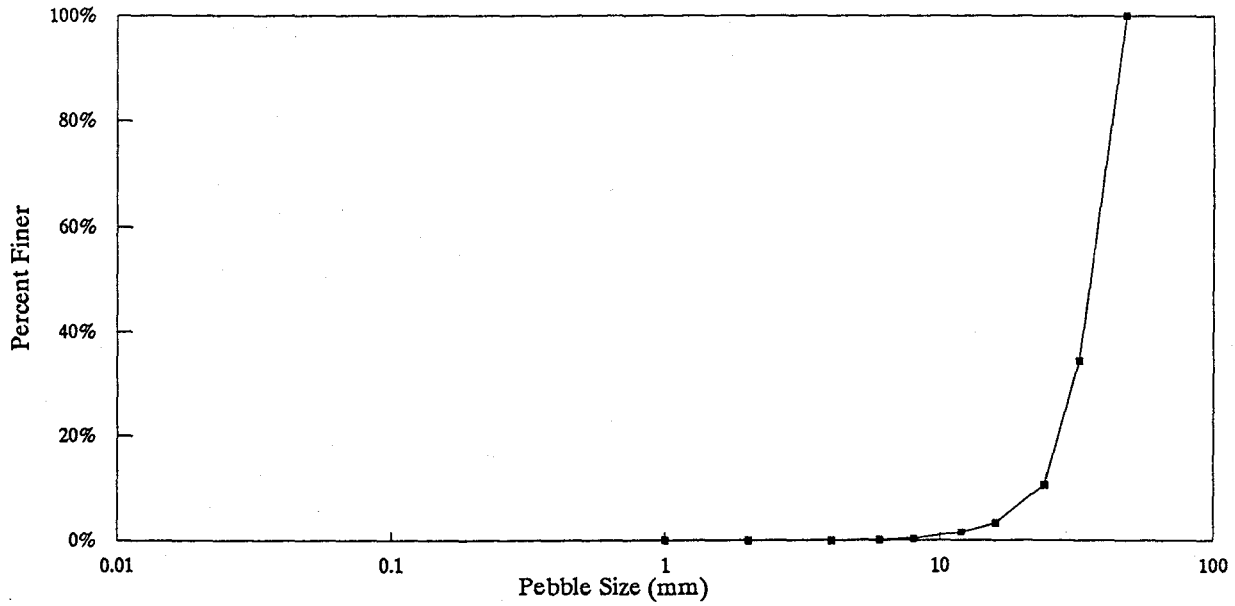
Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	6	10.53%	1.767146	10.60287521	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	1	12.28%	14.137167	14.13716694	0.00%	0.00%
		4	5	4 – 6	0.16 – 0.24	2	15.79%	65.45	130.8996939	0.01%	0.01%
	FINE	6	7	6 – 8	0.24 – 0.31	3	21.05%	179.59	538.7831401	0.05%	0.06%
		8	10	8 – 12	0.31 – 0.7	7	33.33%	523.60	3665.191429	0.33%	0.39%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	10	50.88%	1436.76	14367.5504	1.28%	1.67%
		16	20	16 – 24	0.63 – 0.94	5	59.65%	4188.79	20943.95102	1.86%	3.53%
	COARSE	24	28	24 – 32	0.94 – 1.26	7	71.93%	11494.04	80458.28225	7.16%	10.69%
		32	40	32 – 48	1.26 – 1.9	8	85.96%	33510.32	268082.5731	23.85%	34.54%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	8	100.00%	91952.32	735618.5806	65.46%	100.00%
					Total Sampled	57		Total Area	1123830.552		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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ATL, INC.
CONSTRUCTION QUALITY CONTROL
GEOTECHNICAL CONSULTANTS

CLIENT:	Greiner, Inc.	**DATE:**	03-07-95
	7310 North 16th Street, #160	**LAB NO.:**	95-0183
	Phoenix, AZ 85020	**PROJECT NO.:**	795014
ATTN.:	Mr. Bill Lace	**DATE RVCD.:**	03-05-95
PROJECT:	Sand Evaluation	**SAMPLED BY:**	Client
MATERIAL:	Native	**TESTED BY:**	R. Evans
SOURCE:	South Beardsley #2	**METHOD:**	ASTM C136

PARTICLE SIZE ANALYSIS OF SOILS

SIEVE SIZE	% RETAINED	% PASSING
3 1/2"	0	100
3"	12	88
2 1/2"	6	82
2"	7	75
1 1/2"	7	68
1"	5	63
3/4"	4	59
1/2"	5	54
3/8"	3	51
1/4"	6	45
#4	4	41
#8	14	27
#10	3	24
#16	9	15
#30	8	7
#40	2	5
#50	1	4
#100	1	3
#200	T	2.7

Remarks: Moisture = 2.0%

Reviewed:

Respectfully Submitted,

for Michael P. Bonkoski
Laboratory Supervisor

2912 W. CLARENDON
PHOENIX, AZ 85017
TELEPHONE (602) 241-1097
FAX (602) 277-1306

820 E. 47TH STREET, SUITE B-1
TUCSON, AZ 85713
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16921 S. WESTERN AVE., SUITE 109
GARDENA, CA 90247
TELEPHONE (310) 538-3757
FAX (310) 538-0725

Wildland Hydrology Consultants

½

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

PICTURE 4-5 DOWNST

#6-7 UPST

8 & 9 FROM ROAD LOOKING UP THE DOWN STREAM

/M SAMPLE #2

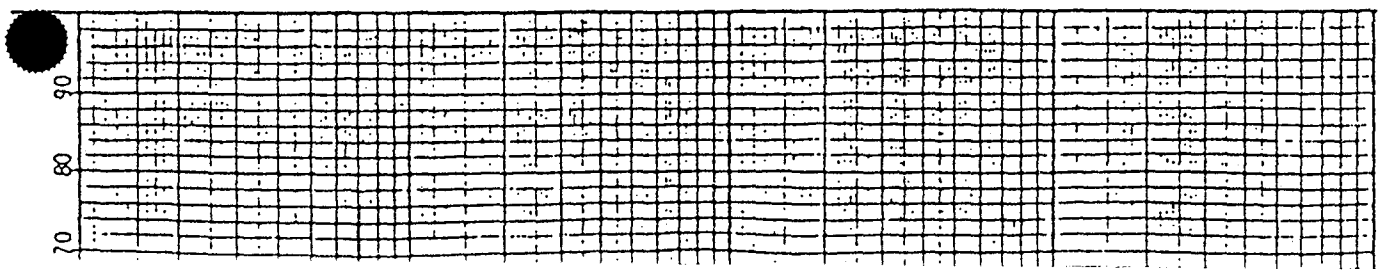
PEBBLE COUNT

5/26/94 Party: _____ Wtrshd: BEARMSLT —

Reach: ABOVE SPLIT.

N 33° 40' 8.9"
W 111° 50' 3.6" → LOCATION.

c mm	Inches	Particle		Item Count (mm)	Tot#	%Tot	%Cum	Item Count (IN)	Tot#	%Tot	%Cum	Item Count #10-14	Tot#	%Tot	%Cum
.062		SILT/CLAY													
.125		Vry FINE	SANDS									LOOKING NORTH ACROSS			
.25		FINE	SANDS									CHANNEL → UP &			
.50		MEDIUM	SANDS									DOWNSTREAM.			
[illegible]		COARSE	SANDS												
2	.04 - .08	Vry CRSE	SANDS	|||||||				|||||									
4	.08 - .16	Vry FINE	GRAVELS					||							
6	.16 - .24	FINE	GRAVELS					||							
8	.24 - .31	FINE	GRAVELS					||							
12	.31 - .47	MEDIUM	GRAVELS	||											
16	.47 - .63	MEDIUM	GRAVELS												
24	.63 - .94	COARSE	GRAVELS												
32	.94 - 1.26	COARSE	GRAVELS												
48	1.26 - 1.9	Vry CRSE	GRAVELS												
54	1.9 - 2.5	Vry CRSE	GRAVELS					||							
96	2.5 - 3.8	SMALL	COBBLES															
128	3.8 - 5.0	SMALL	COBBLES																
192	5.0 - 7.6	LARGE	COBBLES																
256	7.6 - 10	LARGE	COBBLES																
384	10 - 15	SMALL	BOULDERS												
512	15 - 20	SMALL	BOULDERS												
1024	20 - 40	MEDIUM	BOULDERS												
2048	40 - 80	LARGE	BOULDERS												
4096	80 - 160	Vry LRGE	BOULDERS												
nt Note: 3= 9=				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

SAMPLE #2

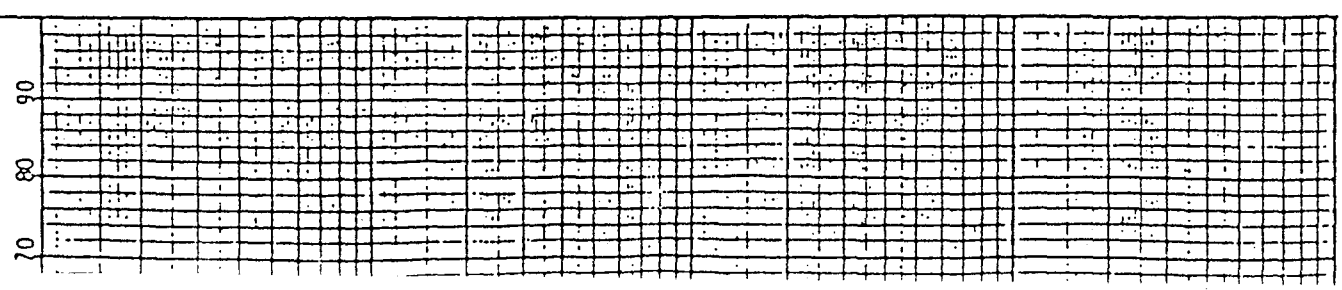
PEBBLE COUNT

Date: 05/26/94 Party: _____ Wtrshd: BEAVERSLY

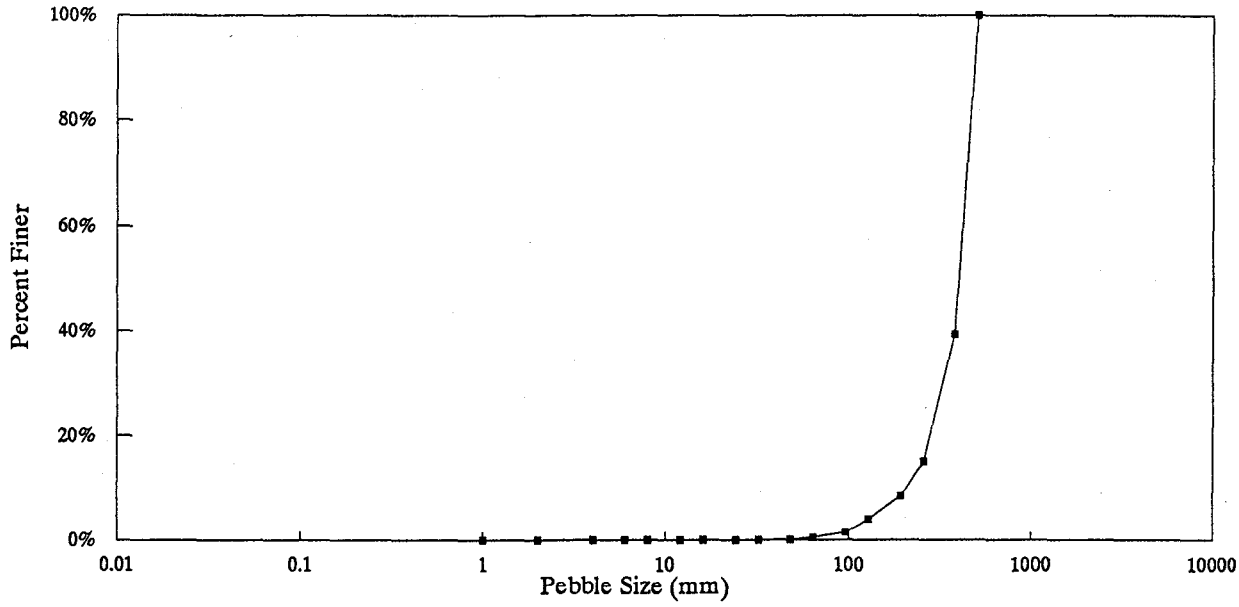
Site/Reach: ABOVE SPLIT

Metric mm	Inches	Particle		Item Count (mm)	Tot#	%Tot	%Cum	Item Count (IN)	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
...ss- .062		SILT/CLAY													
...62- .125		Vry FINE	SANDS												
...25- .25		FINE	SANDS												
...5 - .50		MEDIUM	SANDS												
...		COARSE	SANDS												
...0 -	.04 - .08	Vry CRSE	SANDS	|||||				|||					20		
2 - 4	.08 - .16	Vry FINE	GRAVELS					|||||					7		
4 - 6	.16 - .24	FINE	GRAVELS	|				|					4		
6 - 8	.24 - .31	FINE	GRAVELS					|					3		
8 - 12	.31 - .47	MEDIUM	GRAVELS	|				|					5		
12 - 16	.47 - .63	MEDIUM	GRAVELS	|									2		
16 - 24	.63 - .94	COARSE	GRAVELS	||				|					4		
24 - 32	.94 - 1.26	COARSE	GRAVELS	|									2		
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS	|				|					2		
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	||									4		
64 - 96	2.5 - 3.8	SMALL	COBBLES	||||				|||					12		
96 - 128	3.8 - 5.0	SMALL	COBBLES	||				|||					10		
128 - 192	5.0 - 7.6	LARGE	COBBLES	|||				||					10		
192 - 256	7.6 - 10	LARGE	COBBLES	|									6		
256 - 384	10 - 15	SMALL	BOULDERS					||					3		
384 - 512	15 - 20	SMALL	BOULDERS	|				|					4		
512 - 1024	20 - 40	MEDIUM	BOULDERS	|				|					2		
1024 - 2048	40 - 80	LARGE	BOULDERS												
2048 - 4096	80 - 160	Vry LRGE	BOULDERS												
Count Note: 3= 9=				Totals....				Totals....				Totals....			

% per



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	20	20.00%	1.767146	35.34291735	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	7	27.00%	14.137167	98.96016859	0.00%	0.00%
		4	5	4 – 6	0.16 – 0.24	4	31.00%	65.45	261.7993878	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	3	34.00%	179.59	538.7831401	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	5	39.00%	523.60	2617.993878	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	41.00%	1436.76	2873.51008	0.00%	0.00%
		16	20	16 – 24	0.63 – 0.94	4	45.00%	4188.79	16755.16082	0.00%	0.00%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	47.00%	11494.04	22988.08064	0.00%	0.01%
		32	40	32 – 48	1.26 – 1.9	2	49.00%	33510.32	67020.64328	0.01%	0.01%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	4	53.00%	91952.32	367809.2903	0.05%	0.06%
		64	80	64 – 96	2.5 – 3.8	12	65.00%	268082.57	3216990.877	0.41%	0.47%
	SMALL	96	112	96 – 128	3.8 – 5	10	75.00%	735618.58	7356185.806	0.94%	1.41%
Cobbles		128	160	128 – 192	5 – 7.6	10	85.00%	2144660.58	21446605.85	2.74%	4.16%
	LARGE	192	224	192 – 256	7.6 – 10	6	91.00%	5884948.64	35309691.87	4.52%	8.67%
		256	320	256 – 384	10 – 15	3	94.00%	17157284.68	51471854.04	6.58%	15.25%
	SMALL	384	448	384 – 512	15 – 20	4	98.00%	47079589.16	188318356.6	24.08%	39.34%
Boulders	MEDIUM	512	768	512 – 1024	20 – 40	2	100.00%	237182303.40	474364606.8	60.66%	100.00%
	LARGE	1024	1536	1024 – 2048	40 – 80		100.00%	1897458427.20			NA
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	100		Total Area	781965291.4		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter]) ^ 3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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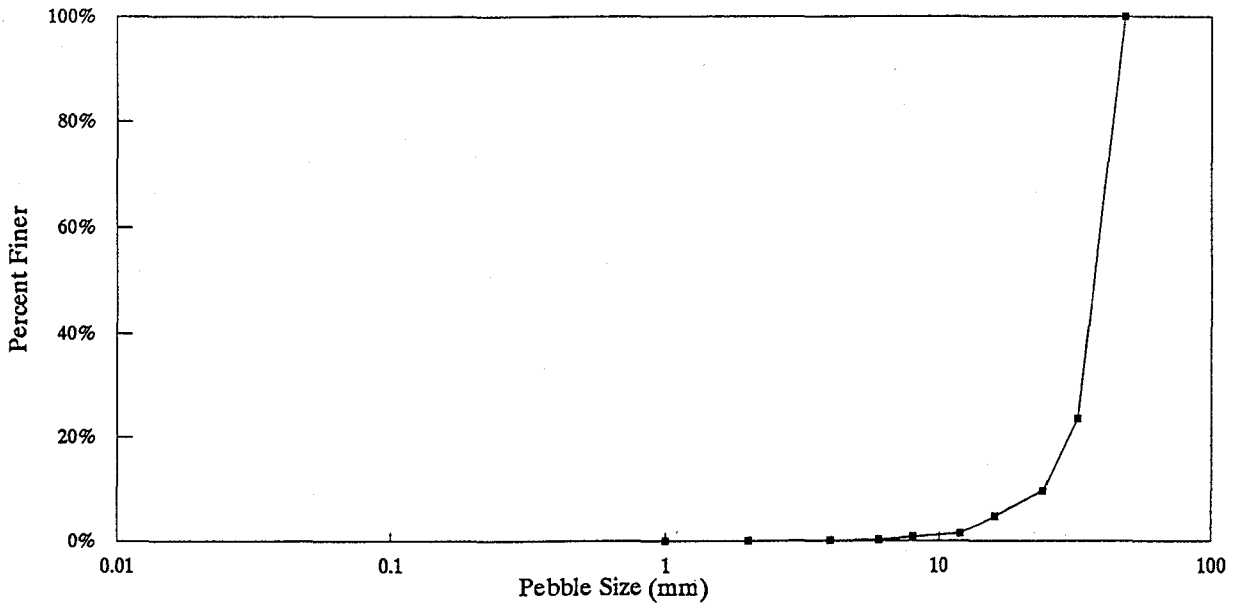
Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
s	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	20	37.74%	1.767146	35.34291735	0.01%	0.01%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	7	50.94%	14.137167	98.96016859	0.02%	0.03%
		4	5	4 – 6	0.16 – 0.24	4	58.49%	65.45	261.7993878	0.05%	0.08%
	FINE	6	7	6 – 8	0.24 – 0.31	3	64.15%	179.59	538.7831401	0.11%	0.19%
		8	10	8 – 12	0.31 – 0.7	5	73.58%	523.60	2617.993878	0.54%	0.74%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	2	77.36%	1436.76	2873.51008	0.60%	1.34%
		16	20	16 – 24	0.63 – 0.94	4	84.91%	4188.79	16755.16082	3.48%	4.82%
	COARSE	24	28	24 – 32	0.94 – 1.26	2	88.68%	11494.04	22988.08064	4.78%	9.60%
		32	40	32 – 48	1.26 – 1.9	2	92.45%	33510.32	67020.64328	13.93%	23.53%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	4	100.00%	91952.32	367809.2903	76.47%	100.00%
					Total Sampled	53		Total Area	480999.5646		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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STREAM CHANNEL TYPE and SUB-TYPE DATA

Wildland Hydrology Consultants

1/2

KFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

PC -
15 - UP STREAM
16 - DOWN ST.
17 - S. BANK
18 - N. BANK

SAMPLE #3

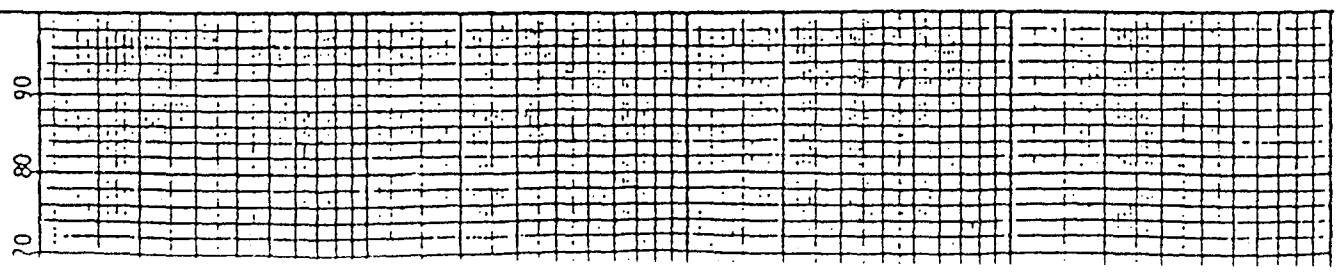
PEBBLE COUNT

e 05/26/94 Party: _____ Wtrshd: LOWER BEAR RIVER

te/Reach: @ C/M ROAD; FORK TO COMPOUND.

LOCATION - N 33° 40' 8.6" W 111° 51' 9.8"

tric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
ss- .062		SILT/CLAY		(mm)				(1 W)							
62- .125		Vry FINE	SANDS												
25- .25		FINE	SANDS												
5 - .50		MEDIUM	SANDS												
.0		COARSE	SANDS												
0 - 2	.04 - .08	Vry CRSE	SANDS	||||				|||||||							
2 - 4	.08 - .16	Vry FINE	GRAVELS	|											
4 - 6	.16 - .24	FINE	GRAVELS	||				|							
6 - 8	.24 - .31	FINE	GRAVELS					|							
8 - 12	.31 - .47	MEDIUM	GRAVELS												
12 - 16	.47 - .63	MEDIUM	GRAVELS	|											
16 - 24	.63 - .94	COARSE	GRAVELS												
24 - 32	.94 - 1.26	COARSE	GRAVELS												
32 - 48	1.26- 1.9	Vry CRSE	GRAVELS					||							
48 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	||				||							
64 - 96	2.5 - 3.8	SMALL	COBBLES	||||				||||							
96 - 128	3.8 - 5.0	SMALL	COBBLES	|				||							
28 - 192	5.0 - 7.6	LARGE	COBBLES	|||				||							
92 - 256	7.6 - 10	LARGE	COBBLES	|||				||							
56 - 384	10 - 15	SMALL	BOULDERS					|							
84 - 512	15 - 20	SMALL	BOULDERS	||											
12 - 1024	20 - 40	MEDIUM	BOULDERS	|				|							
24 - 2048	40 - 80	LARGE	BOULDERS												
48 - 4096	80 - 160	Vry LRGE	BOULDERS												
ount Note: 3= 9=				Totals....				Totals....				Totals....			



Wildland Hydrology Consultants

STREAM CHANNEL TYPE and SUB-TYPE DATA

BANKFULL WIDTH _____ Ave. BANKFULL DEPTH _____

Ratio: W/D (Width/Depth) = _____

SINUOSITY _____ (Ratio: Stream Length/Valley Length)

CONFINEMENT _____ (Ratio: Width floodplain/Width bankfull)

Wfp/Wbf: 1.0-1.5 = Confined 1.5-2.5 = Moderate Confinement 2.5+ = Unconfined

Channel Materials _____ Landform-Soils _____

Riparian Vegetation(V1-V10) _____ Depositional Pattern(B1-B8) _____

Meander Pattern(M1-M8) _____ Ratio: Bank Ht/Bankfull Ht _____

Bank Vegetation: % Total Area(Mass) _____ Bank Roots: % Total Bank Ht _____

Bank Soils Profile Description: _____

STREAM TYPE _____ SUB-TYPE _____

Remarks:

SAMPLE #3

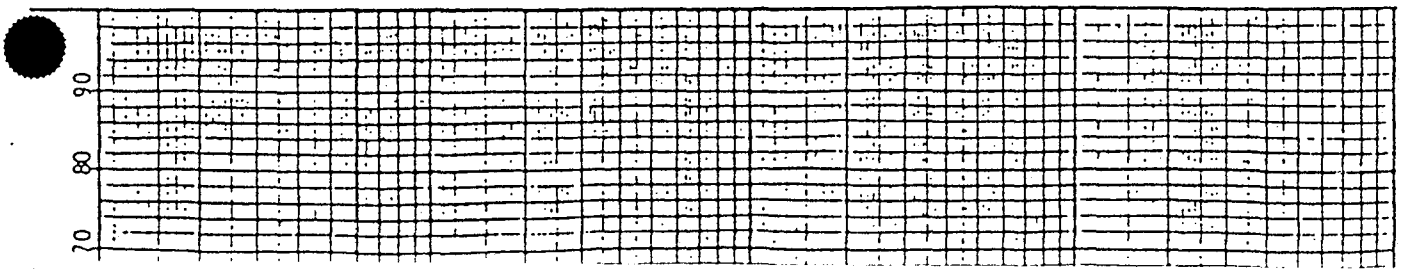
PEBBLE COUNT

05/26/94 Party: _____ Wtrshd: LOWER BIG RUSLY,

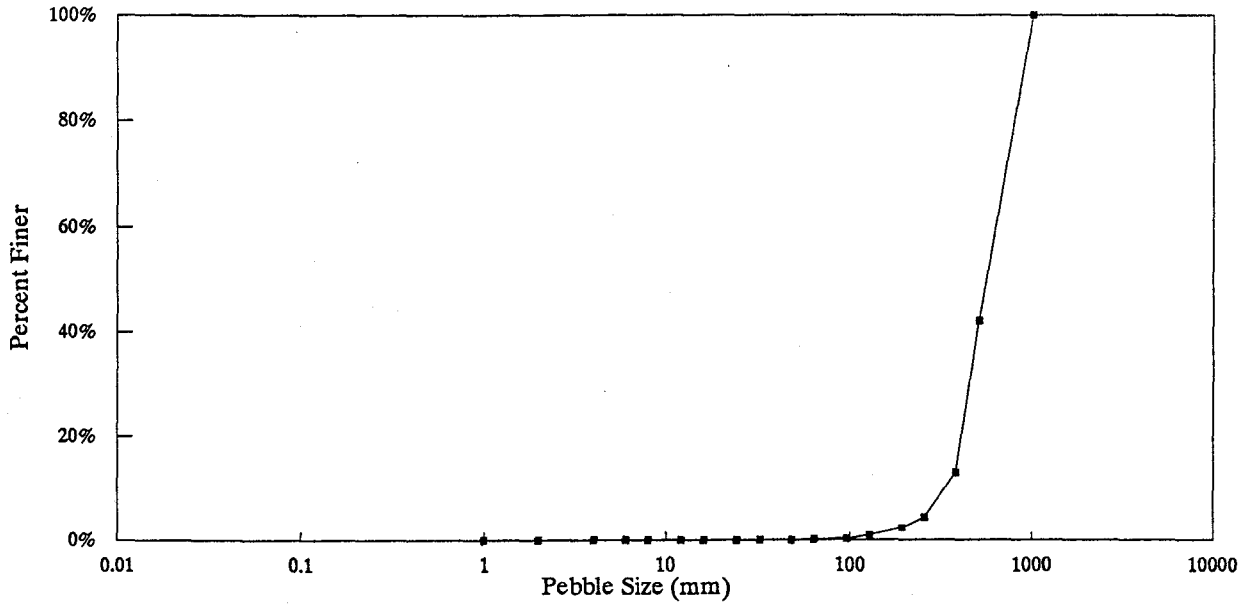
e/Reach: @ CM COMPOUND ROAD FORK

% per

ric mm	Inches	Particle		Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum	Item Count	Tot#	%Tot	%Cum
s- .062		SILT/CLAY		(mm)				(in)							
2- .125		Vry FINE	SANDS												
5- .25		FINE	SANDS												
- .50		MEDIUM	SANDS												
		COARSE	SANDS												
-	.04 - .08	Vry CRSE	SANDS	|				||||					17		
- 4	.08 - .16	Vry FINE	GRAVELS										1		
- 6	.16 - .24	FINE	GRAVELS					|					4		
- 8	.24 - .31	FINE	GRAVELS					|					2		
3 - 12	.31 - .47	MEDIUM	GRAVELS	||									2		
- 16	.47 - .63	MEDIUM	GRAVELS	|				|					3		
5 - 24	.63 - .94	COARSE	GRAVELS	||				|||					5		
4 - 32	.94 - 1.26	COARSE	GRAVELS	||||				|					6		
2 - 48	1.26- 1.9	Vry CRSE	GRAVELS					|					3		
0 - 64	1.9 - 2.5	Vry CRSE	GRAVELS	|									5		
4 - 96	2.5 - 3.8	SMALL	COBBLES	|				|||					11		
6 - 128	3.8 - 5.0	SMALL	COBBLES	|				||					6		
8 - 192	5.0 - 7.6	LARGE	COBBLES	||||				||					11		
2 - 256	7.6 - 10	LARGE	COBBLES	|				||					8		
6 - 384	10 - 15	SMALL	BOULDERS	|				||					4		
4 - 512	15 - 20	SMALL	BOULDERS	||||									6		
2 - 1024	20 - 40	MEDIUM	BOULDERS					||					4		
4 - 2048	40 - 80	LARGE	BOULDERS	|									1		
8 - 4096	80 - 160	Vry LRGE	BOULDERS												
unt Note: 3= ⁝ 9= ⊠				Totals....				Totals....				Totals....			



Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ds	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	17	17.17%	1.767146	30.04147975	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	1	18.18%	14.137167	14.13716694	0.00%	0.00%
		4	5	4 – 6	0.16 – 0.24	4	22.22%	65.45	261.7993878	0.00%	0.00%
	FINE	6	7	6 – 8	0.24 – 0.31	2	24.24%	179.59	359.1887601	0.00%	0.00%
		8	10	8 – 12	0.31 – 0.7	2	26.26%	523.60	1047.197551	0.00%	0.00%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	3	29.29%	1436.76	4310.265121	0.00%	0.00%
		16	20	16 – 24	0.63 – 0.94	5	34.34%	4188.79	20943.95102	0.00%	0.00%
	COARSE	24	28	24 – 32	0.94 – 1.26	6	40.40%	11494.04	68964.24193	0.00%	0.00%
		32	40	32 – 48	1.26 – 1.9	3	43.43%	33510.32	100530.9649	0.00%	0.01%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	5	48.48%	91952.32	459761.6129	0.01%	0.02%
		64	80	64 – 96	2.5 – 3.8	11	59.60%	268082.57	2948908.304	0.09%	0.11%
	SMALL	96	112	96 – 128	3.8 – 5	6	65.66%	735618.58	4413711.484	0.13%	0.24%
Cobbles		128	160	128 – 192	5 – 7.6	11	76.77%	2144660.58	23591266.43	0.72%	0.96%
	LARGE	192	224	192 – 256	7.6 – 10	8	84.85%	5884948.64	47079589.16	1.44%	2.40%
		256	320	256 – 384	10 – 15	4	88.89%	17157284.68	68629138.72	2.09%	4.50%
	SMALL	384	448	384 – 512	15 – 20	6	94.95%	47079589.16	282477535	8.62%	13.12%
Boulders	MEDIUM	512	768	512 – 1024	20 – 40	4	98.99%	237182303.40	948729213.6	28.96%	42.08%
	LARGE	1024	1536	1024 – 2048	40 – 80	1	100.00%	1897458427.20	1897458427	57.92%	100.00%
	Vry LARGE	2048	3072	2048 – 4096	80 – 160		100.00%	15179667417.59			NA
					Total Sampled	99		Total Area	3275984013		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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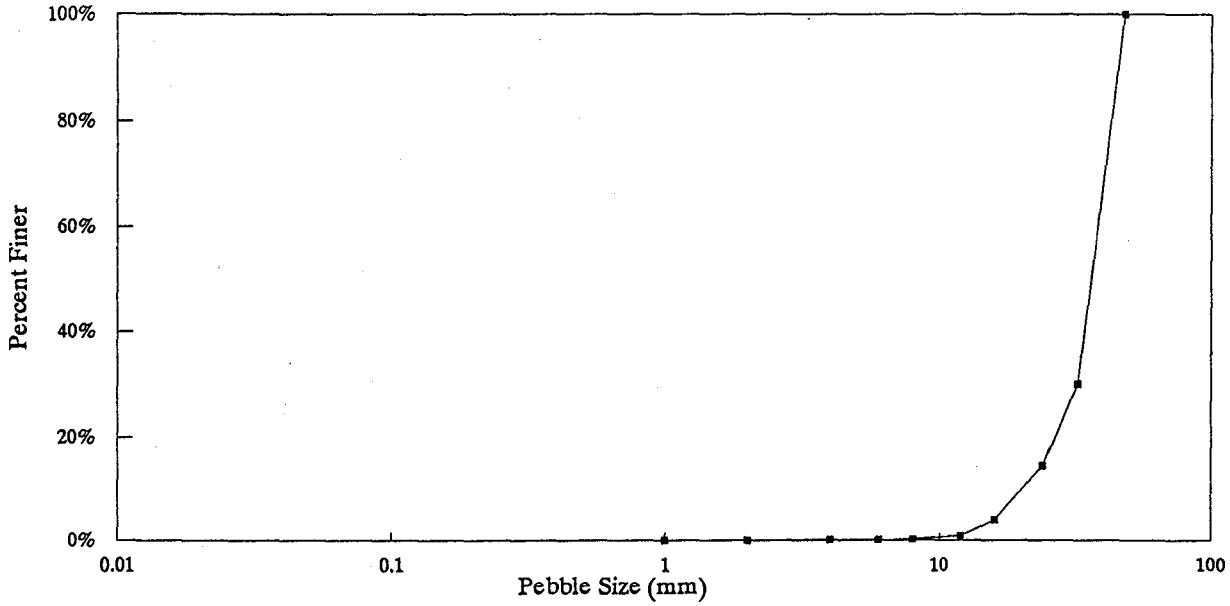
Scottsdale Desert Greenbelt Sediment Sample Data



Particle Type		Seive diameter (mm)	Average diameter (mm)	Pebble Size mm	Pebble Size Inches	Number of Items Sampled per size Category	Percent Smaller by number	assumed spherical Volume per item (mm^3)	Combined Volume per Sediment Size (mm^3)	% in each category (by weight)	Percent Smaller (by weight)
	SILT/CLAY		0.031	< 0.062				0.000016			
	Vry FINE	0.062	0.0935	0.062 – 0.125				0.000428			NA
	FINE	0.125	0.1875	0.125 – 0.25				0.003451			NA
ls	MEDIUM	0.25	0.375	0.25 – 0.5				0.027612			NA
	COARSE	0.5	0.75	0.5 – 1				0.220893			NA
	Vry CRSE	1	1.5	1 – 2	0.04 – 0.08	17	35.42%	1.767146	30.04147975	0.00%	0.00%
	Vry FINE	2	3	2 – 4	0.08 – 0.16	1	37.50%	14.137167	14.13716694	0.00%	0.01%
		4	5	4 – 6	0.16 – 0.24	4	45.83%	65.45	261.7993878	0.04%	0.05%
	FINE	6	7	6 – 8	0.24 – 0.31	2	50.00%	179.59	359.1887601	0.05%	0.10%
		8	10	8 – 12	0.31 – 0.7	2	54.17%	523.60	1047.197551	0.16%	0.26%
Gravels	MEDIUM	12	14	12 – 16	0.47 – 0.63	3	60.42%	1436.76	4310.265121	0.66%	0.92%
		16	20	16 – 24	0.63 – 0.94	5	70.83%	4188.79	20943.95102	3.19%	4.11%
	COARSE	24	28	24 – 32	0.94 – 1.26	6	83.33%	11494.04	68964.24193	10.51%	14.62%
		32	40	32 – 48	1.26 – 1.9	3	89.58%	33510.32	100530.9649	15.32%	29.94%
	Vry CRSE	48	56	48 – 64	1.9 – 2.5	5	100.00%	91952.32	459761.6129	70.06%	100.00%
					Total Sampled	48		Total Area	656223.4002		

Summary of Columns, and Definitions of Results	
Assumed Spherical Volume per item =	4/3*@pi*(0.5*[item diameter])^3
Combined Volume for each Sediment Size =	[number of items]*[Volume per item]
Percent per by weight =	[Volume of items in each sediment size category]/[Volume of all items in all categories]
	The volume all samples of a given sample size is directly proportional to the weight of the samples. In other words, volume was used throughout the calculations in place of the weight, to determine the percentage of each sediment size by weight.

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