COPY

RECLAMATION PLAN

RIVER RANCH OPERATION
HANSON AGGREGATES ARIZONA, INC.

LITCHFIELD, ARIZONA

OCTOBER 31, 2006

Prepared for: Hanson Aggregates Arizona, Inc.
4127 East Van Buren, Suite 205
Phoenix, Arizona 85008

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Phoenix, Arizona 85004

Brown and Caldwell Project No. 130982.101

ADMINISTRATIVE COMPLETENESS CHECKLIST

Arizona Revised Statutes (A.R.S.) Arizona Administrative Code (A.A.C.) REFERENCE	PLAN REQUIREMENTS	LOCATION WITHIN APPLICATION	COMPLETENESS		
		(Applicant Completes)	YES	NO	N/A
ARS 27-1271.B.1 AAC R11-3-201-B	Owner/Operator Information	Page 2-1			
ARS 27-1271.B.3	Description of Current Operation	Page 2-1			
ARS 27-1271-B.4 AAC R11-3-501-A and R11-3-503	Postaggregate Mining Use	Page 2-4			
ARS 27-1271-B.9.b AAC R11-3-602	Postaggregate Mining Re-grading and Erosion Control	Page 2-5			
ARS 27-1271.B.9.a AAC R11-3-601	Postaggregate Mining Plan for Structures and Equipment	Page 2-6			
ARS 27-1271.B.9.a AAC R11-3-601	Postaggregate Mining Plan for Excavations in the Agua Fria River Floodway	Page 2-7			
ARS 27-1271-B.7 AAC R11-3-603	Postaggregate Mining Road Reclamation	Page 2-7			
ARS 27-1271.B.9c AAC R11-3-Article 7	Soil Conservation and Revegetation	Page 2-8			
ARS 27-1271-B.10	Conceptual Schedule for Disturbance and Reclamation	Page 2-8			
ARS 27-1271-B.11 AAC R11-3-802	Estimated Reclamation Costs	Page 2-9, Appendix B			
ARS 27-1233 AAC R11-3-209	Fees	Page 3-1			
ARS 27-1291 and 27-1292 AAC R11-3-Article 8	Financial Assurance Mechanism	Page 4-1			
ARS 27-1271-B.6 AAC R11-3-501-B.8	Vicinity Map	Figure 1			
ARS 27-1271-B.6 AAC R11-3-501-B.8	Existing Site Conditions	Figure 2			
ARS 27-1271-B.6 AAC R11-3-501-B.1	Postaggregate Mining Contours	Figure 3			
ARS 27-1271-B.6 AAC R11-3-501-B.1,7	Postaggregate Reclamation Plan	Figure 4			

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1.0 INTRODUCTION

This Reclamation Plan (Plan) was written for the River Ranch operation (Site) operated by Hanson Aggregates of Arizona, Inc. (Hanson) in Litchfield, Arizona. State law requires a reclamation plan for all aggregate mining operations that are located on private land, create disturbance areas larger than 5 acres, and have continued operations after April 1, 1997 (Aggregate Mined Land Reclamation Act [AMLRA], Arizona Revised Statute [A.R.S.] 27-1202 et. seq.). Plans must be submitted to the Arizona State Mine Inspector (ASMI) before January 1, 2007. Beginning January 1, 2007, all new aggregate mining operations located on private land must have an approved reclamation plan before exceeding a cumulative disturbance area of 5 acres.

The Site requires a plan since it meets the following criteria:

- It is located on private land;
- It has a disturbance area larger than 5 acres; and
- It will continue aggregate mining operations with a disturbance area greater than 5 acres after January 2007.

2.0 RECLAMATION PLAN NARRATIVE

2.1 OWNER/OPERATOR INFORMATION

Pursuant to the records of the Maricopa County Tax Assessor, the Site has one owner: Hanson Aggregates Arizona, Inc. Hanson is the responsible party for the reclamation obligations. The required owner and operator information is provided below.

2.1.1 Owner/Operator Name and Address

Owner/Operator: Hanson Aggregates Arizona, Inc.
4127 East Van Buren Street, Suite 205
Phoenix, Arizona 85008

2.1.2 Contact Person Name and Address

Operator's contact person (for regulatory contact):

[redacted]

2.1.3 Responsible Party

Hanson Aggregates of Arizona, Inc. is the responsible party for the reclamation described in this Reclamation Plan.

[redacted]
Signature

[redacted]
Date

[redacted]
Name

[redacted]
Title

2.2 CERTIFICATE OF DISCLOSURE

The certificate of disclosure required by A.R.S. 27-1205 was prepared by Hanson Aggregates Arizona, Inc and will be submitted separately.

2.3 CURRENT OPERATION

2.3.1 Description of Current Operations

The Site location is shown on Figure 1. Features of the Site include:

- Multiple parcels encompassing approximately 569 acres.
- Located northeast of the intersection of Camelback Road and El Mirage Road in Litchfield, Arizona.
- Existing mining operation with a processing plant area, reclaimed areas, and undeveloped land set aside for future mining.
- A portion of the Site is inside the floodplain of the Agua Fria River. The Site is bisected by the Colter Channel.
- Current access is provided by paved roads from the west using El Mirage Road.

Figure 2 shows existing site conditions. The ground surface elevation ranges from approximately 960 feet above mean sea level (amsl) in the southern area of the site to 1,040 feet amsl in the northern area of the Site.

Equipment, structures, and facilities on the Site are utilized for aggregate crushing and screening. Details of the processing area are as follows:

- Located on the west-central section of the property, north of the Colter Channel.
- Approximately 35 acres disturbed in the processing area.
- Equipment and facilities for aggregate mining processing include:
  - Two crushing and screening plants;
  - One wash plant and water reclaim system;
  - One ready-mix concrete batch plant;
  - Site Administration offices;
  - Maintenance shop;
  - Truck scale and scale house;
  - Fueling area with secondary containment; and
  - Portable office/control structures.
- Utilities on the Site include:
  - Water provided by two on-site production wells;
  - Power provided by overhead power lines and portable generators;
  - Sanitary facilities by septic system; and
  - Solid waste disposal provided by licensed solid waste contractor.

- Numerous aggregate stockpiles are present in the processing plant area, with an average slope at the angle of repose or approximately 1.5 horizontal to 1 vertical (1.5H:1V).

Details of the current mining area are as follows:

- Currently, unconsolidated aggregate material is being removed from above the groundwater level. The groundwater level is located at approximately 188 feet below land surface (bls) at approximately 845 feet amsl.

- Approximately 117 acres disturbed in the mining area.

- Active location north and south of Colter Channel; various setbacks from property boundary; slope angles that vary from 0.7H:1V to 3H:1V; the base of the pits are relatively level with steep active walls where excavation occurs.

- Previously mined area located east of the processing area that has been reclaimed with a total disturbance area of approximately 40 acres.

2.3.2 Current Permits, Licenses, and Approvals

A portion of the Site is located within the Agua Fria River floodplain and falls under the jurisdiction of the Maricopa County Flood Control District. The Site has a Floodplain Use Permit (FUP #FA94-20A) with the most recent renewal issued in 2002.

Operations will comply with applicable air, storm water, and hazardous/regulated materials management regulations. The facility currently has the following permits/plans:

- An Individual Maricopa County Air Quality Permit;
- Storm Water Pollution Prevention Plan (SWPPP);
- Spill Prevention, Control, and Countermeasures (SPCC) Plan;

Although these permits/plans indirectly regulate operations at the Site, they do not have the authority to control or limit the depth or extent of mining.

2.3.3 Description of Future Disturbance

All future aggregate mining and reclamation activities on the Site are planned to occur within the property boundaries (Figure 3). The plan for future operations will include phased expansion both north and south of the process area. The total mining disturbance is approximately 187 acres.

The North mining area is an expansion of the current active pit to include the area north of the processing area. The excavation will have the following characteristics:

- Excavation of one pit area.
- Minimum setback of 100 feet from the property boundary.
- Maximum final depth of mining of approximately 80 feet bls.
- Pit walls will be mined to slope of 1H:1V and will be backfilled with inert material to achieve a final reclaimed slope of 3H:1V.
- Unpaved haul roads that lead to the primary crushing, screening, and stockpile areas (disturbance included in pit disturbance area).

The South mining area is an expansion of the current active pit to include the area south of Colter Channel. The excavation will have the following characteristics:

- Excavation of one pit area.
- Minimum setback of 100 feet from the property boundary.
- Maximum final depth of mining of approximately 80 feet bls.
- Pit walls will be mined to slope of 1H:1V and will be backfilled with inert material to achieve a final reclaimed slope of 3H:1V.
- Unpaved haul roads that lead to the primary crushing, screening, and stockpile areas (disturbance included in pit disturbance area).

The processing area will include the installation of a hot-mix asphalt plant.

2.4 POSTAGGREGATE MINING USE

2.4.1 Description of Total Future Disturbance

The postaggregate mining land use is designated for naturalized open space with areas of inert material backfill. No part of the reclaimed site will be designated as grazing, fish/wildlife habitat, forestry, or recreation.

2.4.2 Surrounding Area Land Use

The Site is located in a commercial and residential portion of Litchfield, Arizona. Surrounding land uses generally consist of:

- Glendale airport located to the east;
- Operating aggregate mines and open space to the north, east, and south; and
- Residential development to the west.

The planned postaggregate mining land use as naturalized open space and inert backfill is consistent with surrounding land uses.

2.5 POSTAGGREGATE MINING RE-GRADING AND EROSION CONTROL

2.5.1 Description of Final Topography

The final topography for all areas planned to be reclaimed (Figure 4) will include pit wall slopes no steeper than 3H:1V.

Processing plant material stockpiles will be depleted and removed by the end of the mining operations. Fines storage ponds will be allowed to dry and naturally revegetate.

2.5.2 Slope Stability Evaluation

Acceptable static and pseudostatic factors of safety were estimated for 3H:1V slopes. The factors of safety for both static and seismic conditions were greater than 1.5. It was assumed that groundwater would be below the bottom of the pit at the end of mining. The complete slope stability evaluation is detailed in Appendix A.

It should be noted the slope stability analyses only considered potential deep seated failure planes. Near surface or localized failures and deformation were not addressed in the stability analyses. The slopes may be susceptible to localized surface slumping and should be periodically inspected as part of the post-closure monitoring plan.

2.5.3 Erosion Control Plan

Storm water drainage controls will be established as part of a site SWPPP. Specific erosion control measures include:

- Storm water will be routed into pit areas.

- Rip-rap will be used to line discharge points where erosion control is required. The location and size of rip-rap lined areas is not indicated on a Site map; however, the cost is included in Appendix B to show the appropriate financial assurance;

- Earthen berms will be used to prevent outfalls and prevent storm water from flowing off site; and

- The SWPPP will be followed in addition to site-specific best management practices.

2.6 POSTAGGREGATE MINING PLAN FOR STRUCTURES AND EQUIPMENT

2.6.1 Structures to be Removed

The Site will have no permanent structures after cessation of mining. Temporary structures currently on site or planned to be on site include:

- Two crushing and screening plants;
- One wash plant and water reclaim system;
- One hot-mix asphalt plant;
- One ready-mix concrete batch plant;
- Site Administration offices;
- Maintenance shop;
- Truck scale and scale house;
- Fueling area with secondary containment; and
- Four portable office/control structures.

2.6.2 Unreclaimed Structures

Once mining on the property has ceased, all structures will be dismantled and removed as part of the postaggregate mining reclamation effort.

2.6.3 Facilities, Wells, and Improvements to be Reclaimed

All improvements, facilities, and aboveground storage tanks (ASTs) planned for removal are located in the processing plant area. Facilities in the processing area include:

- Two on-site production wells
- Above-ground fuel storage tanks;
- Three septic systems;
- Portable bins removed by contract waste removal services; and
- Overhead power lines and three transformers.

All of these items will be dismantled and removed as part of the reclamation efforts. The facilities with concrete pads and/or concrete secondary containment will be removed and the pad will be broken up and buried on site.

2.6.4 Access Restriction/Public Safety

Fencing already exists around the mining area and will be maintained to restrict public access following closure. Final mining slopes will be backfilled to 3H:1V or flatter to provide an acceptable factor of safety against deep seated failure. Signs will be installed around the site perimeter and maintained to identify potential hazards. Portions of the property are located within the floodway of the Agua Fria River and are subject to modified reclamation efforts which are discussed below.

2.7 POSTAGGREGATE MINING PLAN FOR EXCAVATIONS IN THE AGUA FRIA RIVER FLOODWAY

Areas within and immediately surrounding the Agua Fria River's floodway will be reclaimed to naturalized, open space. Areas of the Site that fall within the Jurisdictional Waters of the U.S. cannot be graded or backfilled and remain in compliance with section 404 of the Clean Water Act, 33 U.S.C. 1251 et seq.; 40 C.F.R. 230. In such areas, final slopes established during mining are to conform to existing floodway and floodplain topography. Restrictions on public access will be maintained through the use of signs posted along the property boundaries.

2.8 POSTAGGREGATE MINING ROAD RECLAMATION

2.8.1 Road Description

The Site currently contains paved and unpaved roads, including:

- 21,400 feet of haul and plant roads;
- 12,100 feet of access roads; and
- 300 feet of asphalt paved access road.

The 21,400 feet of haul and plant roads will be reclaimed. Roads located on pit floors and slopes will be incorporated into the final reclaimed topography. Paved access roads will be broken up and buried on site. The 12,100 feet of unpaved access roads will remain on the Site for site access and inspections. Culverts, if any, will be removed and drainage patterns restored to match reclaimed topography. Compacted road beds will be ripped/scarified to match surface drainage patterns of surrounding reclaimed land.

2.8.2 Reclaimed Road Erosion Control Plan

The reclamation of compacted road surfaces will eliminate the concentrated and erosive flow patterns associated with typical road runoff. The uneven and loosened surfaces created by scarifying and ripping will facilitate infiltration and generate relatively non-erosive sheet flow under heavy precipitation events.

2.9 SOIL CONSERVATION AND REVEGETATION

2.9.1 Topsoil Conservation Plan

The topsoil and overburden recovered from mining operations is currently being stored in a berm located along the western edge of the property. The berm has been naturally vegetated, which minimizes fugitive loss or erosion prior to reclamation.

2.9.2 Revegetation Plan

Soil placement will not occur at the Site. Natural revegetation is expected to be successful at the Site over time because the naturally occurring geologic materials are sufficiently fine-grained to provide a suitable growth medium for vegetation.

Care and maintenance of the reclamation effort will involve annual inspections of the Site to monitor slope movement, erosion, and vegetation growth. Annual inspection reports will be published on the anniversary date of site closure until the Site is released by the ASMI.

2.10 CONCEPTUAL SCHEDULE FOR DISTURBANCE AND RECLAMATION

The conceptual schedule includes:

- Disturbance operations are ongoing;
- Mining operations are anticipated to continue through approximately 2030.
- Reclamation activities will be concurrent with mining activities as conditions allow.
- Reclamation of the final mined areas will be initiated within 12 months of the permanent cessation of mining activities and is anticipated to be completed within 12 months of the start date.
- Reclamation will be deemed complete once the reclaimed surfaces have been regraded to a safe and stable condition, access restriction measures are in place, and the ASMI verifies that the owner or operator has fulfilled the requirements of the approved reclamation plan.

2.11 PROBABLE FUTURE CONDITIONS

The profitable operation of a mine is based on a variety of factors including the amount and quality of geologic resources available for extraction, site-specific hydrogeologic conditions, permitting constraints, economic factors affecting the cost of extraction and processing, and market conditions which influence the supply and demand for these materials or finished

products containing these materials. Changes to any of these factors can have significant impacts to mine profitability and can thus require operators to modify mining, processing, or operational methods or expand or temporarily cease operations.

Further, the means and methods described in this Plan to operate a mining facility and implement reclamation are based on the application of currently-available technologies and practices. These technologies and practices are constantly evolving and the operations described in this Plan may be modified if the currently-specified means and methods become out-dated, obsolete, cost ineffective, or impracticable.

Consequently, factors affecting profitable operation or means and methods are likely to change due to unanticipated or unknown future conditions. Therefore, the operator of the facility described in this Plan reserves the right to adapt their operations or plans to these changing, unanticipated, or unknown future conditions to the extent that these operational changes do not cause substantial non-compliance with existing permits or authorizations.

Probable future development at the Site will include a hot-mix asphalt plant.

2.12 ESTIMATED RECLAMATION COSTS

The unit costs developed for this Reclamation Plan are based primarily on two key cost estimating databases (RS Means Facilities Construction Cost Data – 2004, RACER Cost Estimating software version 8.1.2), along with estimated productivity for material movement based primarily on the Caterpillar Handbook (edition 31).

Material volumes and surface areas have been calculated using the topographic base maps provided. Material volumes were calculated using Digital Terrain Model (DTM) surfaces for cuts and fills. Surface areas were defined by plan projection of outlined areas.

Administrative costs were based on Arizona Rock Products Association (ARPA) recommendations.

The estimated costs developed for this Reclamation Plan include:

- Earthwork and re-grading;
- Demolition and removal of structures and improvements;
- Road reclamation;
- Care and maintenance;
- General construction;
- Cost adjustment; and
- Administrative costs.

A summary of the estimated reclamation costs is listed in Table 1 at the end of this section. The sources and calculation of the estimated reclamation costs are detailed in Appendix B.

2.12.1 Pit Walls Re-grading Cost

Pit walls will be backfilled with inert material to the final reclamation slope of 3H:1V, therefore, postaggregate mining re-grading will not be required.

There is no cost for this category.

2.12.2 Stockpile, Dumps, and Fines Area Cost

Aggregate stockpiles are expected to be removed by the end of operations. No permanent rock or overburden dumps are expected on the Site after mining operations cease. The fines storage area reclamation will not require financial assurance.

There is no cost for this category.

2.12.3 Structure Demolition Cost

The reclamation activities detailed in this category include:

- Removal of four portable office/control structures
- Removal of truck scale and scale house;
- Demolition and removal of office facilities;
- Demolition and removal of maintenance facilities;
- Removal of overhead electrical line (approximately 2,600 feet) and three transformers;
- Removal of two water wells;
- Removal of three septic systems;
- Removal of 300 feet of paved roads that will be broken up and buried on site and the underlying roadbed re-graded;
- Demolition and removal of fueling area with secondary containment; and
- Breakup and burial of concrete pads (approximately 42,300 square feet).

The total estimated cost for this category is $413,000.

2.12.4 Road Reclamation Cost

There is an estimated 21,400 feet of haul and plant roads that will be reclaimed. The cost to remove 300 feet of paved road is included in Section 2.12.3.

The cost of ripping/scarifying the roads is estimated at $5,000.

2.12.5 Care and Maintenance Cost

Care and maintenance for the reclamation effort at this operation consists of:

- An annual inspection of the Site;
- Preparation of the required annual report describing the site conditions; and
- Trash removal.

Three annual inspections are anticipated before the Site is released from the ASMI.

The cost of care and maintenance is estimated at $7,000.

2.12.6 Construction Cost

Construction efforts for reclamation include:

- Installing a rip-rap erosion control lining; and
- Installation of security and restricted access signs.

The cost of construction is estimated at $18,000.

2.12.7 Plant Removal Cost

The estimated reclamation costs detailed in this section include the dismantling, loading onto transport, and removal of the following equipment:

- Two crushing and screening plants;
- One wash plant and water reclaim system;
- One hot-mix asphalt plant; and
- One ready-mix concrete batch plant.

The cost of plant removal is estimated at $242,000.

2.12.8 Cost Adjustment

A price index factor has been included to adjust from 2004 pricing to estimated 2006 pricing on operating and material costs. The index factor supplied is the Consumer Price Index for the period 2004 through February 2006.

- CPI = 1.0498

The basis for adjustment is 2004 = 1.0000. The factor indicates that prices (on average) have increased 4.98% since 2004. The Consumer Price Index adjustment is not applied to the Administrative costs because it is a fixed percentage of the operating and material costs.

The cost adjustment is estimated at $34,000.

2.12.9 Administrative Cost

The estimated administrative cost includes:

- Contingency;
- Mobilization/demobilization;
- Indirect costs;
- Contractor profit; and
- Contract administrative costs.

The total estimated administrative cost is $259,000.

2.12.10 Total Reclamation Cost

The total estimated reclamation cost for this reclamation plan is $978,000.

TABLE 1. ESTIMATED RECLAMATION COST SUMMARY

SECTION	RECLAMATION ITEM	COST
2.12.1	Pit Walls Re-grading	-
2.12.2	Stockpile, Dumps, and Fines Area	-
2.12.3	Structure Demolition	$413,000
2.12.4	Road Reclamation	$5,000
2.12.5	Care and Maintenance	$7,000
2.12.6	Construction	$18,000
2.12.7	Plant Removal	$242,000
2.12.8	Cost Adjustment	$34,000
2.12.9	Administration	$259,000
2.12.10	**Total Reclamation Cost**	**$978,000**

3.0 FEES

The Reclamation Plan submittal fee is $3,800 for an existing aggregate mining unit. A check covering this fee was submitted with this Plan.

4.0 FINANCIAL ASSURANCE

Corporate self-insurance will be the Financial Assurance Mechanism used to cover the estimated reclamation cost. The required corporate information needed to satisfy the corporate financial test requirements of Arizona Administrative Code (A.A.C.) R11-3-809.C will be submitted under separate correspondence within 60 days.

5.0 REFERENCES

Arizona Administrative Code, Title 11 – Mines, Chapter 3. State Mine Inspector Aggregate Mined Land Reclamation, Articles 1-8 (proposed).

Arizona Department of Water Resources, Ground Water Site Inventory Database, June, 2005.

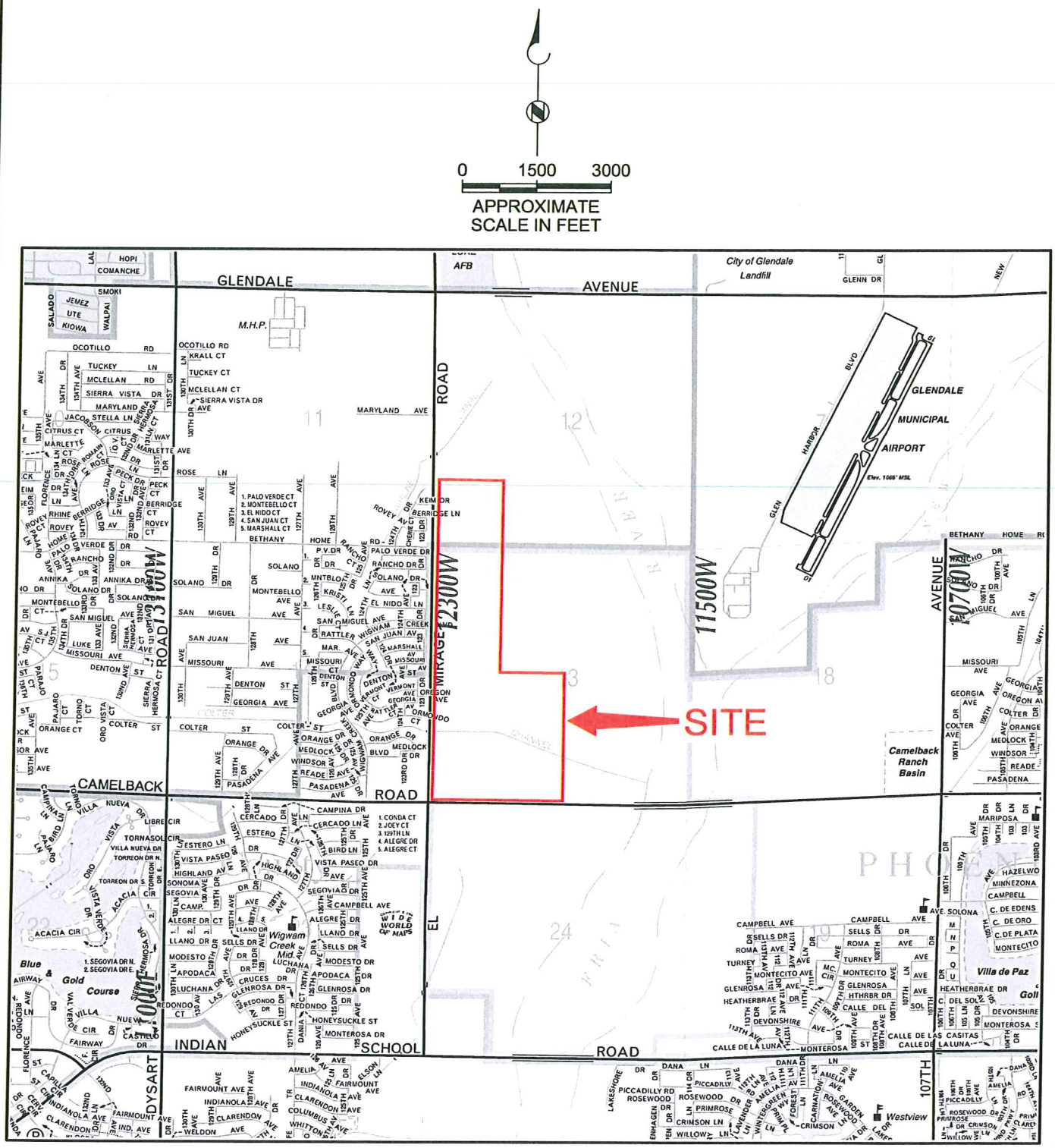
Arizona Revised Statutes, Title 27 – Minerals, Oil and Gas, Aggregate Mined Land Reclamation, Articles 1-6.

Arizona State Mine Inspector Division of Mined Land Reclamation, January, 1997, *Mined Land Reclamation Statutes and Rules.*

Caterpillar Performance Handbook, Edition 31, Caterpillar Inc., October, 2000.

RACER Cost Estimating software v. 8.1.2., 2006.

RS Means, *Facilities Construction Cost Data, 2004*, 19th Annual Edition, Reed Construction Data, 2003.



Hanson

Figure 1

VICINITY MAP
RIVER RANCH SITE
(PLANT #40)

5159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA

BROWN AND CALDWELL

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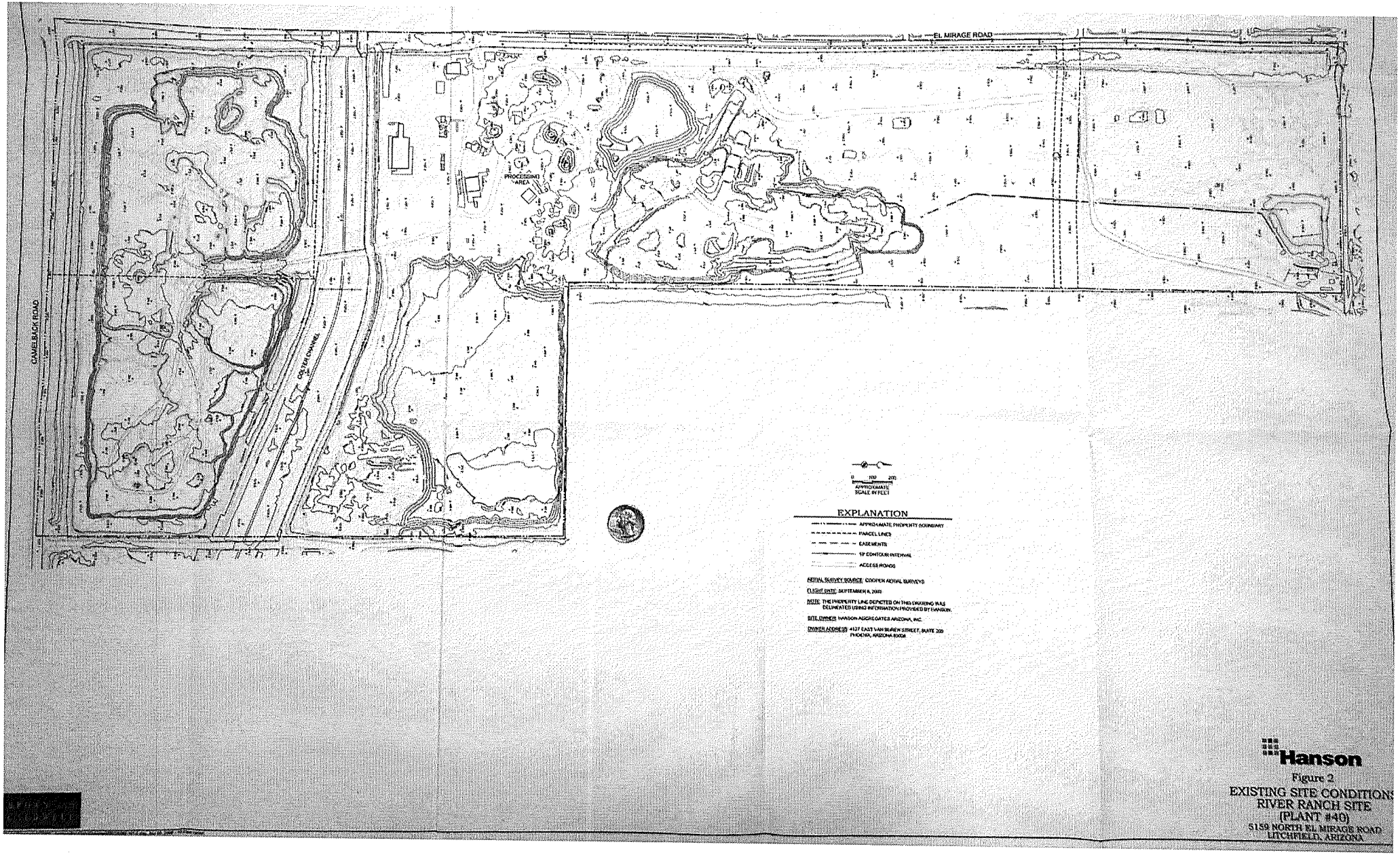
Figure 2

EXISTING SITE CONDITIONS
RIVER RANCH SITE
(PLANT #40)

5159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA



Hanson

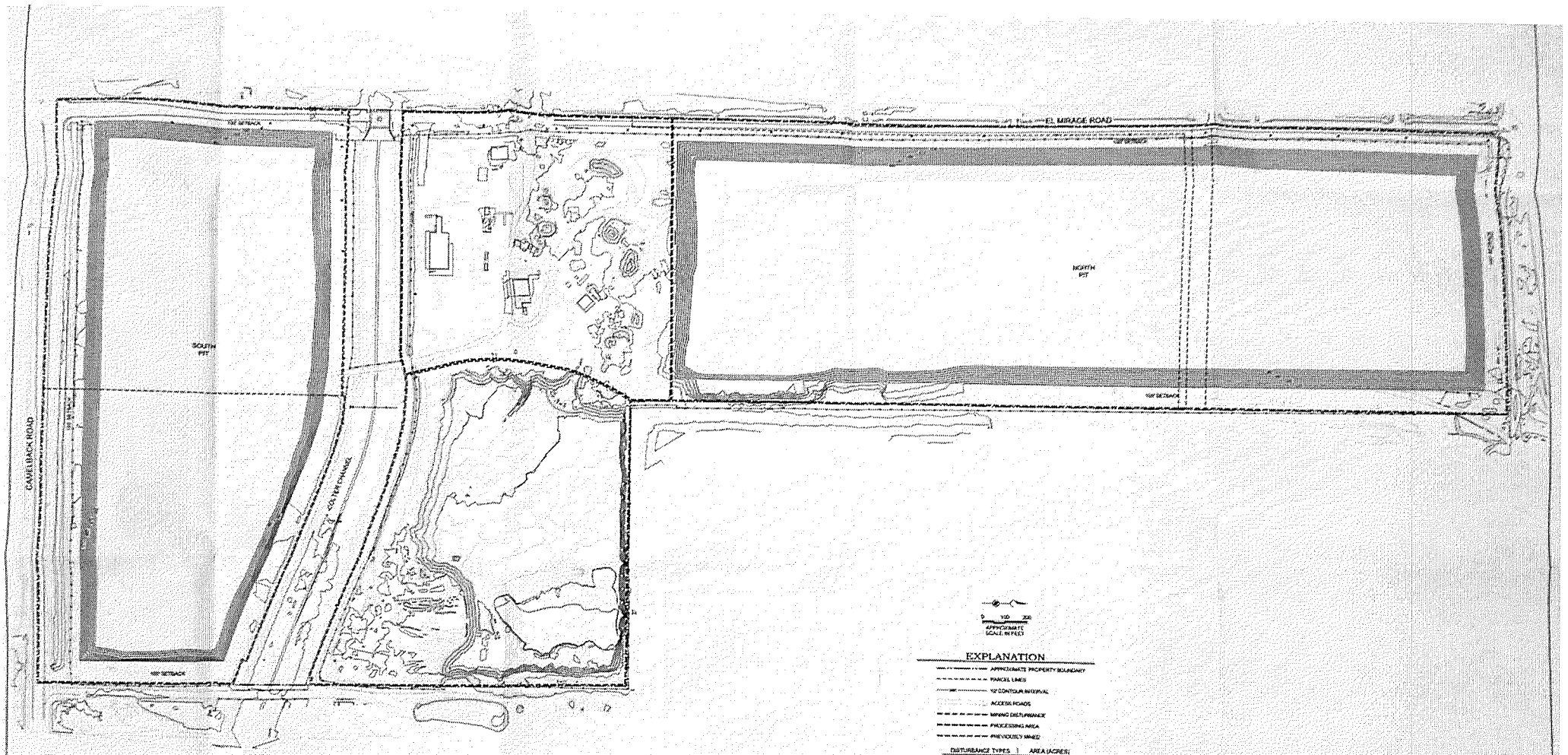
Figure 2
EXISTING SITE CONDITIONS
RIVER RANCH SITE
(PLANT #40)
5159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA

Hanson

Figure 3

POSTAGGREGATE MINING CONTOURS
RIVER RANCH SITE
(PLANT #40)

5159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA



EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- PARCEL LINES
- 10' CONTOUR INTERVAL
- ACCESS ROADS
- MINING DISTURBANCE
- PROCESSING AREA
- PREVIOUSLY MINED

DISTURBANCE TYPES	AREA (ACRES)
MINING	136.5
PROCESSING AREA	34.2
PREVIOUSLY MINED	39.8

NOTE: THE PROPERTY LINE DEPICTED ON THIS DRAWING WAS DELINEATED USING INFORMATION PROVIDED BY HANSON.

SITE OWNER: HANSON AGGREGATES ARIZONA, INC.

OWNER ADDRESS: 4127 EAST VAN BUREN STREET, SUITE 200 PHOENIX, ARIZONA 85008

BROWN AND CALDWELL

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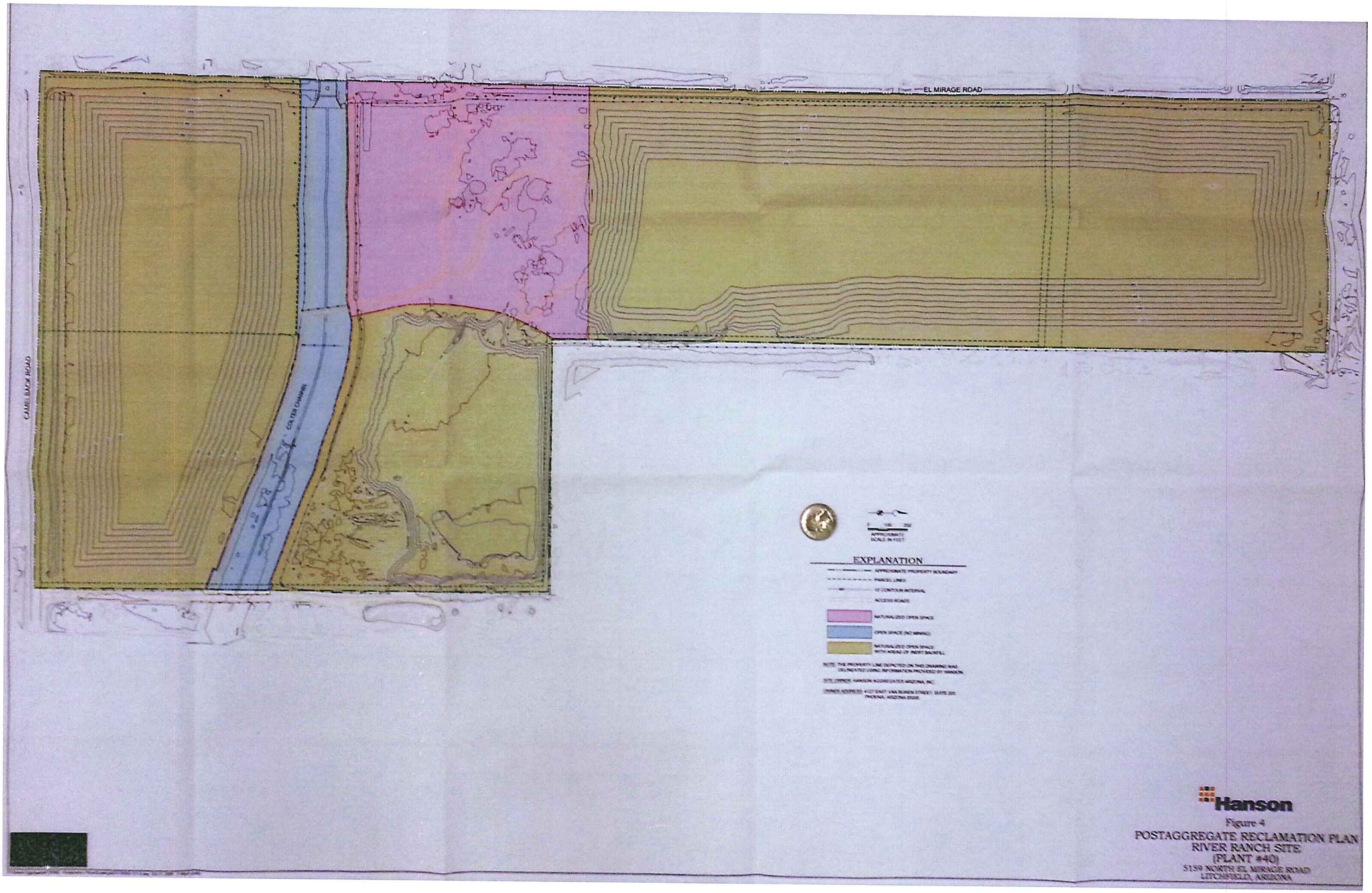
Figure 3

POSTAGGREGATE MINING CONTOURS
RIVER RANCH SITE
(PLANT #40)
8159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA

Figure 4

POSTAGGREGATE RECLAMATION PLAN
RIVER RANCH SITE
(PLANT #40)

5159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA



Hanson

Figure 4

POSTAGGREGATE RECLAMATION PLAN
RIVER RANCH SITE
(PLANT #40)

5159 NORTH EL MIRAGE ROAD
LITCHFIELD, ARIZONA

APPENDIX A

SLOPE STABILITY ANALYSIS

TECHNICAL MEMORANDUM

BROWN AND CALDWELL

October 31, 2006

15-130982.101

TO: Gregg Monger, Regional Environmental Manager
Hanson Aggregates Arizona, Inc.

FROM: Jon C. Bruton, P.E., Managing Geotechnical Engineer

SUBJECT: Slope Stability Evaluation, Hanson River Ranch Operation

This report presents the results of a slope stability evaluation for the Hanson River Ranch Operation (Site). The evaluation was performed in support of preparation of an Aggregate Mined Land Reclamation Plan. The purpose was to evaluate the long-term stability of slopes following site reclamation.

The evaluation consisted of completing the following steps:

- Visiting the area of the Site and observing soil conditions.
- Estimating the engineering properties of on-site soils based on published data.
- Reviewing Arizona Department of Water Resources (ADWR) records to ascertain groundwater levels in the area of the Site.
- Determining peak horizontal ground accelerations for an earthquake with a 10-percent probability of exceedance in 50 years.
- Completing static and seismic slope stability analysis.
- Preparing this summary technical memorandum presenting results of the slope stability evaluation.

SITE DESCRIPTION

The Site is located northeast of the intersection Camelback Road and El Mirage Road in Litchfield, Arizona. The ground surface elevation ranges from 960 feet above mean sea level (amsl) in the southern area of the Site, to 1,040 feet amsl in the northern area of the Site.

The pit slopes will have a final reclaimed grade of 3 horizontal to 1 vertical (3H:1V). The final pit depth will be approximately 80 feet deep.

Currently, unconsolidated aggregate material is being removed above the groundwater level. The groundwater level is located at approximately 190 feet below ground surface (bgs) (ADWR, 2005).

A pit depth of 80 feet bgs, groundwater depth of 188 feet bgs, and final slope grade of 3H:1V were applied in the slope stability evaluation.

MATERIAL PROPERTIES

On-site soil consists of very dense sand and gravel with less than 20 percent silt. Soil strength parameters were estimated based on empirical relationships presented in Peck, Hanson, Thornburn (1974). An angle of internal friction of 36 degrees to 40 degrees would be representative of very dense sand and gravel. An average value of 38 degrees for internal friction was used in the analyses. No cohesion was assumed.

Based on professional experience and review of literature, dry soil density may vary from about 115 to 125 pounds per cubic foot (pcf). Winterkorn and Fang (1975) indicate a maximum dry density of 139 pcf would be representative of very dense sand and gravel. Applying a relative density of 90 percent an in-situ dry density of 120 pcf is indicated, which was used in the slope stability analysis.

METHODS OF ANALYSES

Slope stability analyses of the proposed reclaimed slopes were performed using a computer program to evaluate the overall factor of safety of the property against deep seated slope instability. Static and seismic (pseudostatic) slope stability evaluations were conducted. Analyses were performed using the computer program Slide Version 5.0 developed by Rocscience. Figure 1 shows an example of the output from Slide Version 5.0.

Figure 2 shows a simplified diagram of soil shear resistance and gravitational forces tending to produce land sliding. Spencer's method of analysis was selected since the method checks the factor of safety using two different approaches. The analysis is in terms of effective stress and satisfies two equations of equilibrium; the first with respect to forces and the second with respect to moments. A cylindrical slip surface is assumed and the earth mass within the surface is divided into small vertical slices. The basic assumption of the limit equilibrium approach is that Coulomb's failure criterion is satisfied along the assumed failure surface.

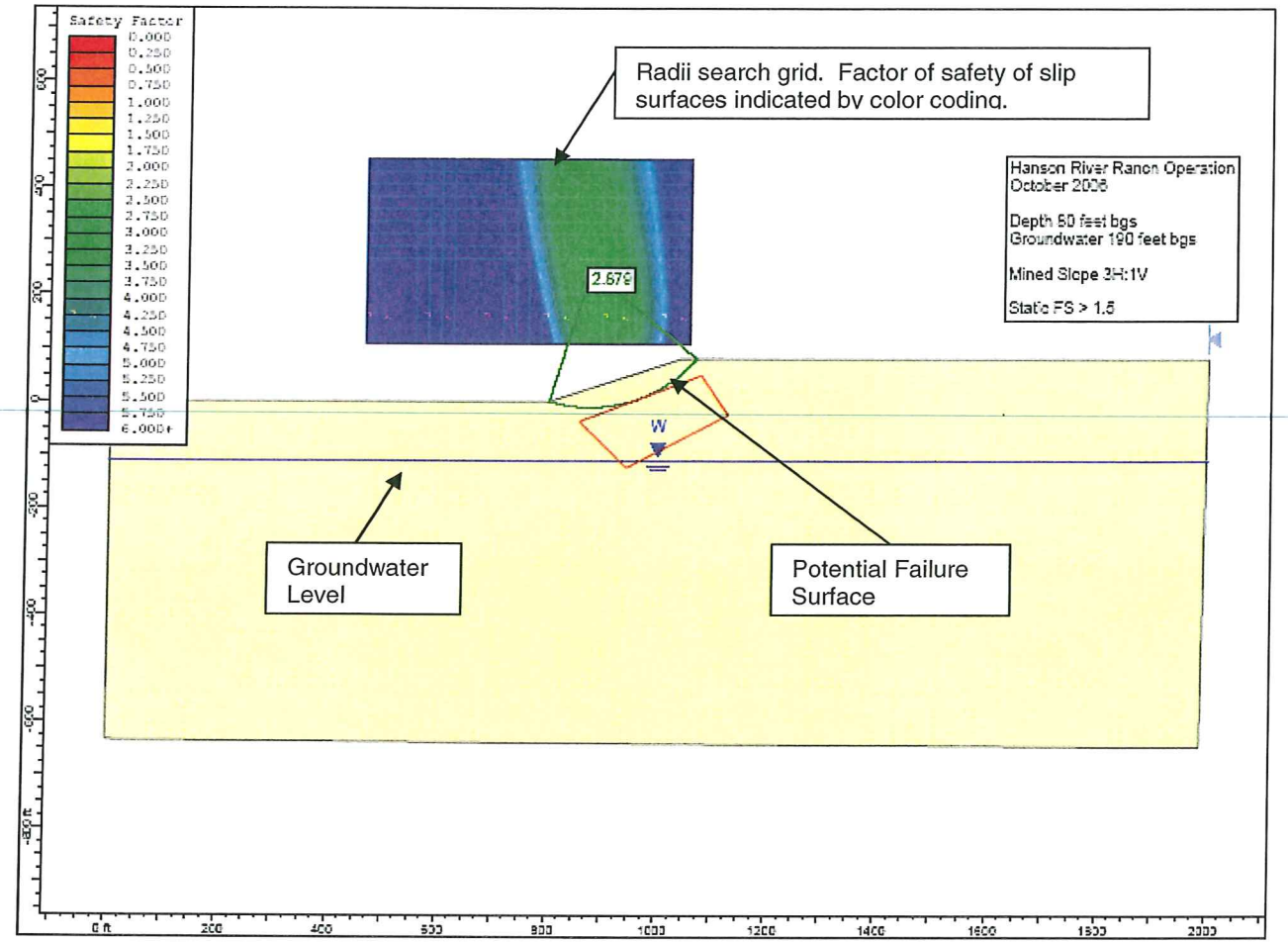
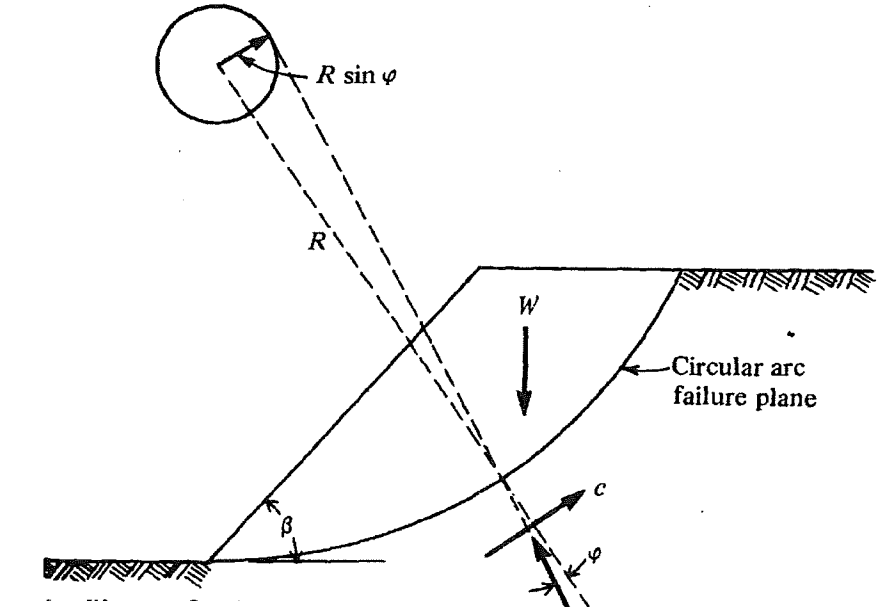


Figure 1. Output from slope stability analysis computer program Slide Version 5.0.



W = Weight of Soil
c = Resultant Cohesion
P = Resultant Force
φ = Friction Angle
β = Slope Angle
R = Radius of Failure Circle

Figure 2 – Simplified Diagram of Slope Forces

In general terms, the calculated factor of safety is the ratio of available soil shear resistance to the gravitational forces tending to produce landsliding. When the soil strength is equal to the slide producing forces, a factor of safety of 1.0 would exist and the slope would be on the verge of movement. Uncertainties are associated with the assumed subsurface conditions, soil strength, groundwater levels, and location of the most critical failure surface. To provide a reasonable margin of safety against these uncertainties, a factor of safety of 1.3 for static (non-seismic) conditions and 1.1 for seismic conditions is accepted engineering practice.

The stability of slopes under seismic loading was evaluated using the pseudostatic method. In a pseudostatic analysis, a horizontal static force and a vertical static force are applied to the slope to simulate the forces created by an earthquake. The horizontal force is applied by the computer program using the weight of the slice being analyzed, multiplied by the horizontal seismic coefficient. The horizontal seismic coefficient was taken as one-half of the peak horizontal ground acceleration (PHGA), as is common practice when conducting analyses of overall slope stability. The vertical force was calculated using a vertical seismic coefficient equal to one-half of the horizontal seismic coefficient. Seismic coefficients are dimensionless factors.

A PHGA with a 10 percent probability of exceedance in 50 years of 0.04g was selected. The PHGA was determined from using a database available through the United States Geological Survey (USGS, 2006). Accordingly, a horizontal seismic coefficient of 0.02 and a vertical seismic coefficient of 0.01 were applied in the pseudostatic slope stability analyses.

FINDINGS

The computer program calculated over 1,000 possible failure surfaces and related factors of safety. Possible slip surfaces were reviewed and engineering judgment was applied to select representative deep seated failure surfaces. The potential slip surfaces and factors of safety for the final slope are shown on Figures 3 and 4.

The factors of safety for both static and seismic conditions were greater than 1.5. This represents acceptable factors of safety against failure of final reclamation slopes.

LIMITATIONS

It should be noted that the slope stability analyses considered potential deep seated failure planes. Near surface failures and deformation were not addressed in the stability analyses. The slope face could be susceptible to slumping due to saturation of near surface soil and erosion.

Even though our analyses of the site with reclaimed slopes indicated a low risk level for deep seated failure, conditions beyond property boundaries and below the existing bottom of the pit could directly affect the stability of the subject site. It should be noted that there is always an inherent risk of slope instability. Consequently we are unable to provide a guarantee regarding slope stability and cannot accept liability for any possible failures.

The analyses and findings presented in this letter report were prepared to support preparation of the site reclamation plan. Prior to initiating final site reclamation, detailed subsurface explorations, laboratory testing to determine the engineering properties of the soil, and engineering analyses should be performed. Recommendations for excavations and fill placement should be prepared and included as part of the construction documents for final site reclamation.

REFERENCES:

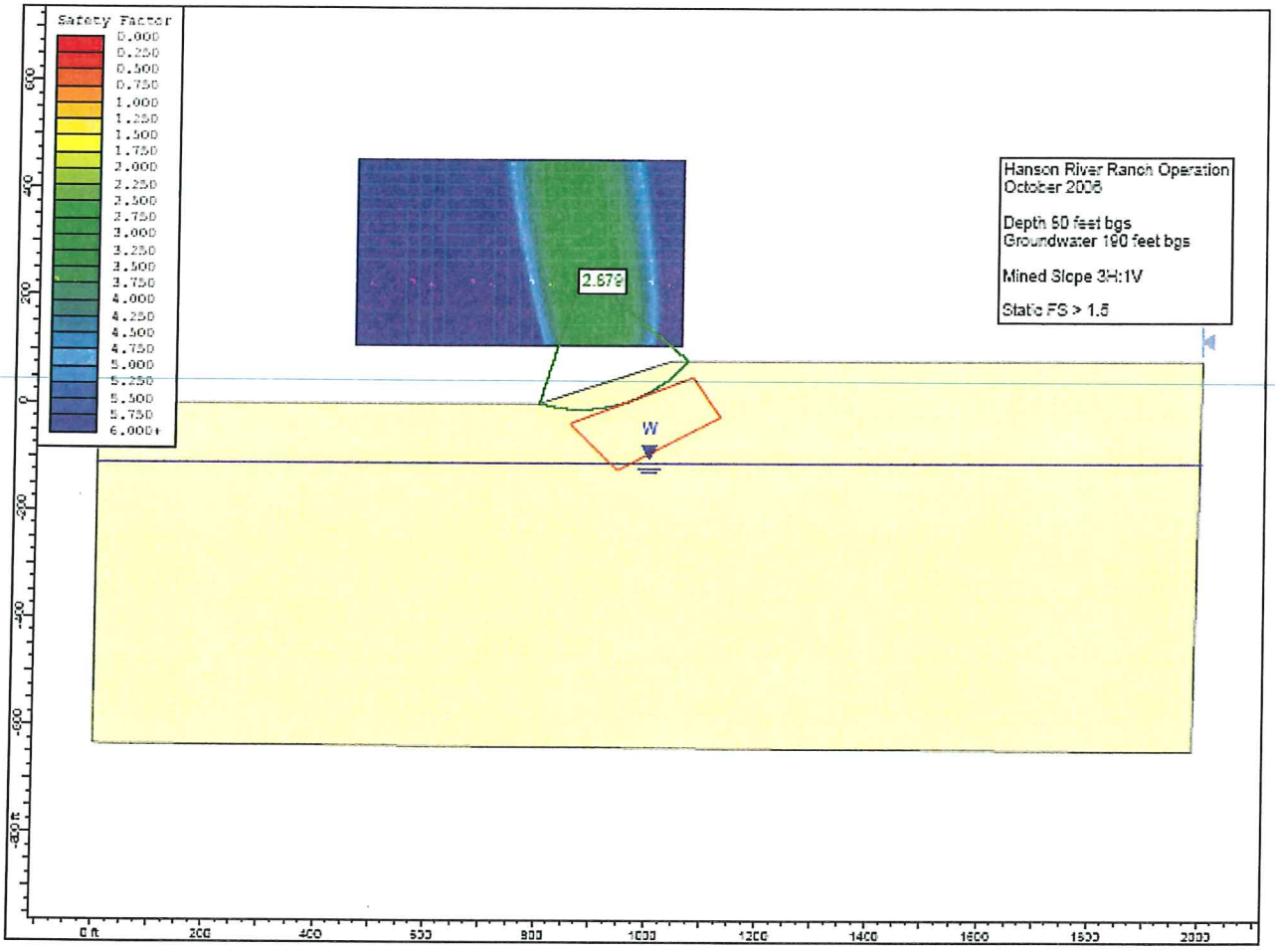
Arizona Department of Water Resources, 2005. Ground Water Site Inventory Database. June.

Peck, R.B. Hanson, W.E. and Thornburn, T.H., 1974. Foundation Engineering, John Wiley & Sons, New York, NY, pgs 13, 310.

Rocscience, 2006. Slide Version 5.0. Toronto, Canada.

U.S. Geological Survey (USGS), 2006. Earthquake Search, http://eqint.cr.usgs.gov/eq-men/html/lookup-2002-interp-06.html, Earthquake Center, Earthquake Hazards Program.

Winterkorn, H.F., Fang, H., 1975. Foundation Engineering Handbook. Van Nostrand Reinhold Company. San Francisco, California. p 257.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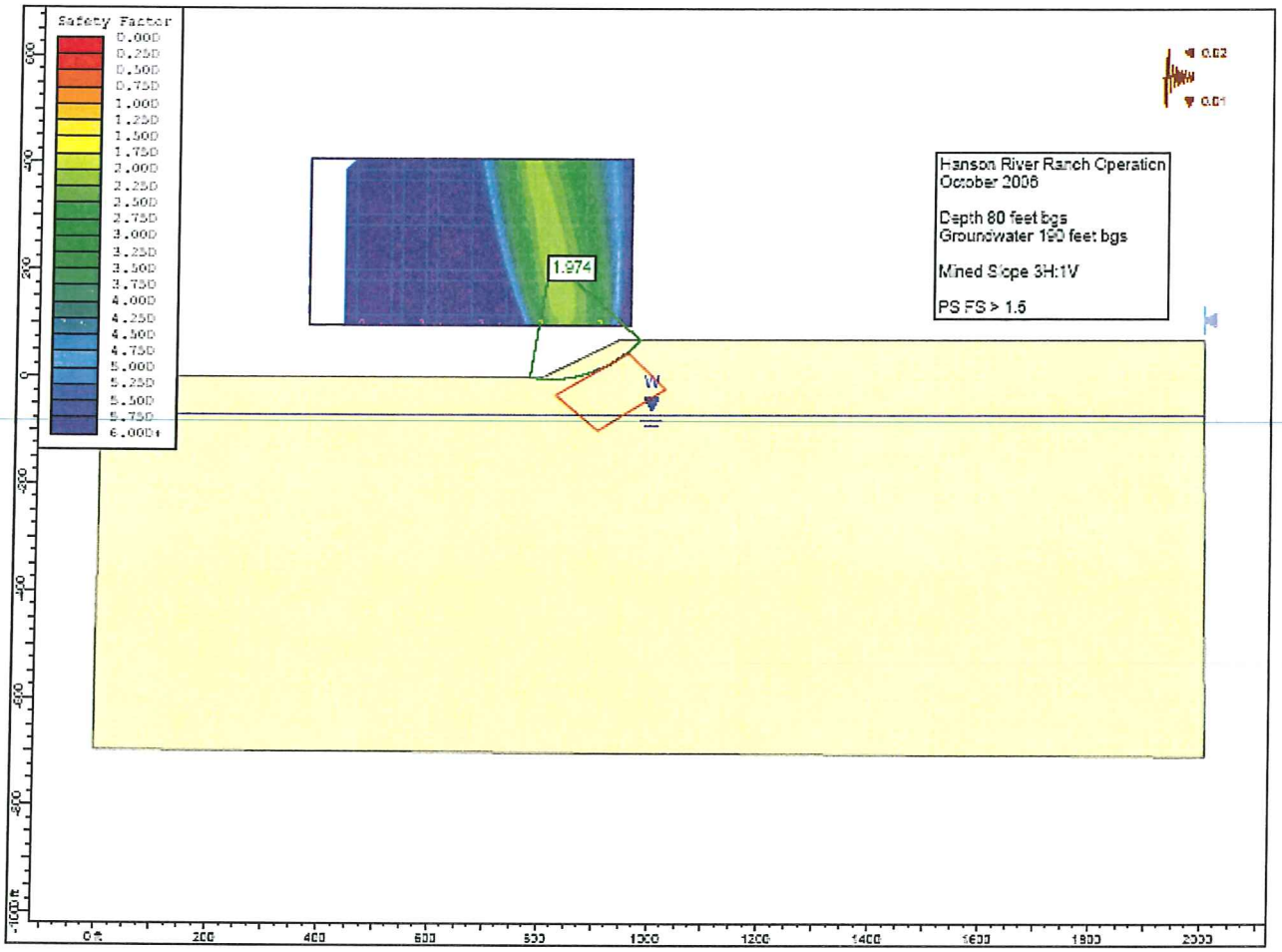
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
2.672
W
Hanson River Ranch Operation
October 2006
Depth 50 feet bgs
Groundwater 190 feet bgs
Mined Slope 3H:1V
Static FS > 1.5
0 ft
200
400
600
800
1000
1200
1400
1600
1800
2000

Figure 3


Safety Factor
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0.500
0.750
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3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.974
Hanson River Ranch Operation
October 2006
Depth 80 feet bgs
Groundwater 190 feet bgs
Mined Slope 3H:1V
PS FS > 1.5
0.02
0.01
0ft
200
400
600
800
1000
1200
1400
1600
1800
2000

Figure 4

APPENDIX B

ESTIMATED RECLAMATION COSTS

Appendix B
Reclamation Cost Estimate
Hanson - River Ranch Operation

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		1 of 13

Project	Subject
Hanson River Ranch	Estimated Cost Summary (1 of 2)

Reclamation Item	Description and Units	Est. Cost	Number of Units	Cost	References/Notes
Pit Walls					
	Re-Grading and Topsoiling (Cu.Yds)	$ 0.35		$ -	
(No Mulch or Fertilizer)	Revegetation Cost - Broadcast (Acre)	$ 300		$ -	
	Revegetation Cost - Hydro-seed (Acre)	$ 1,175		$ -	
	Containerized Trees (Each)	$ 10		$ -	
			Pit Walls Sub-Total =	$ -	
Stockpiles,Overburden or Fines Areas					
	Re-Grading and Topsoiling (Cu.Yds)	$ 0.35		$ -	
	Revegetation Cost - Broadcast (Acre)	$ 300		$ -	
	Revegetation Cost - Hydro-seed (Acre)	$ 1,175		$ -	
	Containerized Trees (Each)	$ 10		$ -	
			Stockpiles, OB or Fines Areas Sub-Total =	$ -	
Roads					
(Side Slope < 30%)	Rip/Scarify (Linear Ft.)	$ 0.19	21,400	$ 5,000	
(Side Slope >30%)	Re-Grading and Topsoiling (Linear Ft.)	$ 1.69		$ -	
(No Mulch or Fertilizer)	Revegetation Cost - Broadcast (Acre)	$ 300		$ -	
	Revegetation Cost - Hydro-seed (Acre)	$ 1,175		$ -	
			Roads =	$ 5,000	
Structures					
(Break-up and bury Slab)	Demolition & Removal - Metal Building(Sq. Ft.)	$ 3.03	25,800	$ 78,000	
(Break-up and bury Slab)	Demolition & Removal - Secondary Containment (Sq. Ft.)	$ 6.78	1,200	$ 8,000	
(Break-up and bury Slab)	Demolition & Removal - Concrete Building(Sq. Ft.)	$ 15.86		$ -	
	Powerline Removal - Single Pole Utility (Linear Mile)	$ 10,000	0.51	$ 5,000	
	Transformer Removal (Each)	$ 5,000	3	$ 15,000	
	Demolition - Chain Link Fencing (Linear Ft)	$ 3.47		$ -	
	Septic Tank Removal (Each)	$ 1,000	3	$ 3,000	
	Asphalt Demolition (Sq. Ft.)	$ 2.41	300	$ 1,000	
	Well removal (Ft Depth)	$ 33.55	480	$ 16,000	2 wells
(Break-up and bury Slab)	Demolition - Concrete Roads and Pads (Sq. Ft.)	$ 6.78	42,300	$ 287,000	
			Structures =	$ 413,000	
Care and Maintenance					
	Site Monitoring and Reporting (Annual)	$ 2,000	3	$ 6,000	
	Trash Removal (Ton)	$ 60	16	$ 1,000	
			Care and Maintenaince =	$ 7,000	
Construction					
	Construction - Chain Link Fencing (Linear Ft.)	$ 9.21		$ -	
	Install Rip Rap Erosion Lining (Sq. Yd)	$ 54.00	250	$ 14,000	
	Install access restriction sign	$ 66.40	65	$ 4,000	
			Construction =	$ 18,000	
			Est. Reclamation Operating and Material (O&M) Cost Sub-Total =	$ 443,000	

Appendix B
Reclamation Cost Estimate
Hanson - River Ranch Operation

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		2 of 13
Project			Subject			
Hanson River Ranch			Estimated Cost Summary (2 of 2)			

Reclamation Item	Description and Units	Est. Cost	Number of Units	Cost	References/Notes
Est. Reclamation Operating and Material (O&M) Cost Sub-Total (from page 1) =				$ 443,000	
Material Haulage for Backfill					
	Truck and Loader - 2000Ft. One Way (Cu. Yd)	$ 0.98		$ -	
	Dozer and Scraper - 1000Ft. One Way (Cu Yd)	$ 0.68		$ -	
			Material Haulage =	$ -	
Plant Removal					
(Processing Equipt)	Removal - Plants			$ 242,000	
(Beltline)	Removal - Conveyor			$ -	
			Plant Removal =	$ 242,000	
	Est. Reclamation Operating and Material (O&M) Cost Sub-Total =			$ 685,000	
Cost Adjustment					
Adjustment for period between 2004 and 2006	Consumer Price Index Increase		0.0498	$ 34,000	
			Cost Adjustment =	$ 34,000	
	Est. Reclamation Operating and Material (O&M) Cost Total =			$ 719,000	
Administrative Costs					
% of O&M Cost	on & Removal - Secondary Containmen	10%		$ 72,000	ARPA Recommendations
% of O&M Cost	General Mobilization/De-Mobilization	4%		$ 29,000	ARPA Recommendations
% of O&M Cost	Indirect costs	2%		$ 14,000	ARPA Recommendations
% of O&M Cost	Contractor Profit	10%		$ 72,000	ARPA Recommendations
% of O&M Cost	Contract Administration	10%		$ 72,000	ARPA Recommendations
			Administrative Costs =	$ 259,000	
	Total Estimated Financial Assurance Amount =			$ 978,000	

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		3 of 13
Project			Subject			
Hanson River Ranch			Unit Cost Basis			

The unit cost basis for the estimate is based on two key databases (RS Means - Facilities Construction Cost Data -2004, RACER Cost Estimating software Version 8.1.2). Equipment rental rates and operator labor rates are based on the RS-MEANS CREWS data, as referenced for each piece of equipment. The unit rates can be adjusted by the city cost index for specific locations, however, no adjustment was made since the Phoenix Area rates are close to the national average.

CREWS DATA

Earthmoving Equipment, cost $/hr — References/Notes: RS Means : Facilities Construction Cost Data

List	Labor (1)*	Equipment (2)*	Total	References/Notes
980G Loader	$34	$123	$157 $/hr	crew B-10M pg 1099
775D Haul Truck	$26	$130	$156 $/hr	crew B-34A, pg 1104
Water Truck	$26	$46	$72 $/hr	crew B-34A, pg 1104
D10 Dozer	$34	$189	$223 $/hr	crew B-10M, pg 1099
325 Excavator	$35	$68	$103 $/hr	crew B12-D, pg 1099
16H Motor Grader	$34	$90	$124 $/hr	crew B-11L, pg 1099
631E Scraper	$34	$160	$194 $/hr	crew B-33D, pg 1099
80 ton Crane	$35	$104	$139 $/hr	crew B-95A, pg 1100
120 ton Crane	$35	$227	$262 $/hr	crew B-95A, pg 1100

LABOR DATA

Mechanical labor	$34	$0	$34 $/hr	crew A-1A
Demolition & Remc	$26	$0	$26 $/hr	crew A-1

MISC COST DATA

Demolition/Removal Metal Building and foundation	$	3.03	$/Sq. Ft.	RACER (ver. 8.1.2)
Demo/Removal Block Building and foundation	$	6.06	$/Sq. Ft.	RACER (ver. 8.1.2)
Demolition/Removal - Concrete Pads/roads 12"	$	6.78	$/Sq. Ft.	RACER (ver. 8.1.2)
Demolition/Removal Chainlink Fencing	$	3.47	$/Sq. Ft.	RACER (ver. 8.1.2)
Removal of Single Pole Powerline	$	10,000	$/Mile	Brown and Caldwell Data
Removal of electrical Transformers	$	5,000	Each	Brown and Caldwell Data
Well removal - 6' casing, Auger drill rig	$	33.55	$/ft	Contractor Quote
Construction of chain link fence	$	9.21	$/ft	RACER (ver. 8.1.2)
Installation of access restriction/public safety signs	$	66.40	$/sign	RACER (ver. 8.1.2)
Trash Removal	$	60	Ton	Allied Waste Quote
Transport and Unloading, Heavy	$	1,250	$/load	Brown and Caldwell Data
Transport and Unloading, Light	$	850	$/load	Brown and Caldwell Data
Broadcast seeding				
w/ Straw mulch, fertilizer, desert scrub seed mixture	$	607	$/acre	Brown and Caldwell Data
w/o mulch and fertilizer	$	300	$/acre	Brown and Caldwell Data
HydroSeed				
w/ mulch and desert scrub type seed mixture	$	1,175	$/acre	Brown and Caldwell Data
Septic System Removal	$	1,000	$/tank	Estimated

(1) Labor includes operating and maintenance labor
(2) Equipment costs include operating, maintenance, ownership costs
* Labor and Equipment Costs are rounded to the nearest dollar

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		4 of 13
Project			Subject			
Hanson River Ranch			Dozing Cost			

D10 Re-grading from 1.5H:1V slope to 3H:1V slope

					References/Notes
	D10 Dozing Productivity				
	Optimum Production (CY/Hr)		950		(1) pg 1-43 (200 Foot Push)
Push Factors	Operator experience		0.875		(1) pg 1-45
	Type of material		0.8		(1) pg 1-45
	Grade of Push		1.6		(1) pg 1-45
	Weight Correction		0.71		(1) pg 1-41 Material Weight = 1.62 T/CY
Work Factor	50 minutes/hour		0.83		(1) pg 1-45
	Average Production (CY/Hr)		629		
	Average Daily Production (CY)		5,036		(8 hour work day)
	D10 Dozer Cost				
	Dozer Rental (Monthly)	$	18,600		(2) 01590-200 4370, pg 21
	Ownership Cost (Daily)			$ 845	(22working days/month)
	Dozer Operating Cost (Hourly)	$	83		(2) 01590-200 4370, pg 21
	Operating Cost(Daily)			$ 664	(8 hour work day)
	Dozer Labor Cost (Hourly)	$	34		(2) crew B-10M, pg 1099
	Labor Cost (Daily)			$ 272	(8 hour work day)
	Dozer Total Cost (Daily)			$ 1,781	
	Demolition & Removal - Secondary Containment (Sq. Ft.)				
	Cost per CY			$ 0.35	

(1) Caterpillar Performance Handbook, Edition 31
(2) RS Means 2004

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		5 of 13
Project			Subject			
Hanson River Ranch			Scarifying Cost			

				References/Notes
	Scarifying - Motor Grader			
	16H Grader Productivity			
	Ripper beam (ft)	9.75		(1) pg 3-13, 17.8 inch max depth
	Max first gear with std tires (mph)	2.4		(1) pg 3-12
	Feet per mile	5,280		
	Half Speed in ft/hr	6,336		assumes 2 passes are
	Double pass factor	0.5		adequate for road scarifying
	Effective speed in ft/hr	3,168		
	Optimum area/hour (Sq.Ft./Hr)	30,888		
Work Factor	50 minute hour	0.83		(1) pg 3-15
	Average area/hour (ft^2/hr)	25,637		
	Average area Daily (Sq. Ft.)	205,096		(8 hour work day)
	16H Grader Cost			
	Grader Rental (Monthly)	$ 9,175		(2) 01590-200 1930 pg 20
	Ownership Cost (Daily)		$ 417	(22working days/month)
	Grader Operating Cost (Hourly)	$ 38		(2) 01590-200 1930 pg 20
	Operating Cost(Daily)		$ 304	(8 hour work day)
	Grader Labor Cost (Hourly)	$ 34		(2) crew B-33D, pg 1099
	Labor Cost (Daily)		$ 272	(8 hour work day)
	Removal -			
	Grader Total Cost (Daily)		$ 993	
	Cost per Sq. Ft.		$ 0.0048	
	Cost per Linear Ft of Road		$ 0.19	(40 Foot wide road)

(1) Caterpillar Performance Handbook, Edition 31
(2) RS Means 2004

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		6 of 13
Project			Subject			
Hanson River Ranch			Excavator Costing			

					References/Notes
	325 Excavator Productivity				
Factors	Heaped bucket capacity (CY)		1.5		(1) pg 5-117 Bucket size selected for the
	Optimum Cycles/Hr		180		(1) pg 5-1555 325 Excavator = 1.5 CY
	Bucket Fill factor		1.0		(1) pg 5-126
	50 minutes/hr		0.83		Material Weight = 1.62T/CY
	Average Hourly Production (CY)		224		
	Average Daily Production (CY)		1,793		(8 hour work day)
	325 Excavator Cost				
	Excavator Rental (Monthly)	$	6,725		(2) 01590 200 0200 pg 20
	Ownership Cost (Daily)			$ 306	(22working days/month)
	Excavator Operating Cost (Hourly)	$	29		(2) 01590 200 0200 pg 20
	Operating Cost(Daily)			$ 232	(8 hour work day)
	Excavator Labor Cost (Hourly)	$	35		(2) crew B12-D, pg 1099
	Labor Cost (Daily)			$ 280	(8 hour work day)
	Excavator Total Cost (Daily)			$ 818	
	Demolition & Removal - Secondary Containment (Sq. Ft.)				
	Cost per CY			$ 0.46	

(1) Caterpillar Performance Handbook, Edition 31
(2) RS Means 2004

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		7 of 13
Project			Subject			
Hanson River Ranch			Scraper Costing			

631E Scraper

				References/Notes
Scraper capacity (heaped)		31 CY		Material Weight = 1.62 T/CY
Rated load		37.5 ton		(1) pg 9-5
Scraper Productivity				
Bank CY/Hr, 4% RR, 1000 ft haul		540		(1) pg 9-67
Material correction		0.93		Material Weight = 1.62 T/CY
50 minute hour		0.83		
Actual bank CY per hour		415		
631 Scraper Cost				
Scraper Rental (Monthly)	$ 14,900			(2) 01590 200 3700 pg 21
Ownership Cost (Daily)			$ 677	(22working days/month)
Scraper Operating Cost (Hourly)	$ 75			(2) 01590 200 3700 pg 21
Operating Cost(Daily)			$ 600	(8 hour work day)
Scraper Labor Cost (Hourly)	$ 34			(2) crew B-33D, pg 1099
Labor Cost (Daily)			$ 272	(8 hour work day)
Scraper Total Cost (Daily)			$ 1,549	
D9 Dozer Cost				
Containment (Sq. Ft.)	$ 14,300			(2) 01590-200 4370, pg 21
Ownership Cost (Daily)			$ 650	(22working days/month)
D9 Operating Cost (Hourly)	$ 65			(2) 01590-200 4370, pg 21
Operating Cost(Daily)			$ 520	(8 hour work day)
D9 Labor Cost (Hourly)	$ 34			(2) crew B-10M, pg 1099
Labor Cost (Daily)			$ 272	(8 hour work day)
D9 Total Cost (Daily)			$ 1,442	
Total Fleet				
Total Fleet Cost (Daily)			$ 4,541	(1 - D9, 2 - 631)
Total Fleet Productivity (BCY/Hr)		830		
Total Fleet Productivity (BCY/Day)			6,640	
Cost per cubic yard moved			$ 0.68	

Cubic yards in 1 linear foot of 40 ft wide road, 1 foot thick (CY)		1.48
Cost of placing 1 linear foot (40 foot wide road)	$	1.01

(1) Caterpillar Performance Handbook, Edition 31
(2) RS Means 2004

Date Checked	Checked By	Job Number	By	Date	Calc. No.	Sheet No.
		130982	KNC	9/28/2006		8 of 13

Project	Subject
Hanson River Ranch	Truck haul (1 of 2)

					References/Notes
	980G Loader Productivity				
	Basic Cycle Time (minutes)		0.55		(1) pg 13-46
Cycle Time Factors	Material type (minutes)		0.02		(1) pg 13-46
	Type of Pile (minutes)		0.02		(1) pg 13-46
	Common ownershp trucks/loaders		0		(1) pg 13-46
	Constant operation		0		(1) pg 13-46
	Small target (minutes)		0.025		(1) pg 13-46
	Fragile target		0		(1) pg 13-46
	Total Cycle Time (minutes)		0.615		
	Optimum Cycles/Hr		98		
Work Factor	50 minutes/hr		0.83		(1) pg 13-47
	Average Cycles/hr		81		
	Bucket Full Load (Cubic Yards)		7.5		(1) pg 13-29
	Bucket Fill Factor		0.9		(1) pg 13-46
	Average Bucket Load (CY)		6.75		
	Average Volume Loaded/Hr		547		
	980G Loader Cost				
	Loader Rental (Monthly)	$	11,500		(2) 01590 200 4810 pg 21
	Ownership Cost (Daily)			$ 523	(22working days/month)
	Loader Operating Cost (Hourly)	$	58		(2) 01590 200 4810 pg 21
	Operating Cost(Daily)			$ 464	(8 hour work day)
	Demolition & Removal - Secondary Containment (Sq. Ft.)				
	Loader Labor Cost (Hourly)	$	34		(2) crew B-10M pg 1099
	Labor Cost (Daily)			$ 272	(8 hour work day)
	Loader Total Cost (Daily)			$ 1,259	
	775D Truck Productivity				
	Truck Volume (CY)		41.1		(1) pg 10-3
	Loader Cycles needed to Fill Truck		6.09		Use Loader Avg Bucket Load (CY)
	Average Cycles per Truck		6		
	Average Truck Payload (CY)		40.5		
	Basic Load Time (minutes)		4.45		Calculated from Loader rate
Cycle Time Factors	Manuever - Load Area (minutes)		0.5		(1) pg 10-8
	Manuever - Dump Area (minutes)		1.1		(1) pg 10-8
	Haul Time (minutes)		1.2		(1) pg 10-8
	Return Time (minutes)		1.2		(1) pg 10-8
	Optimum Truck Cycle Time (minutes)		8.45		(1) pg 10-8
	Optimum Truck Cycles/Hr		7.1		(1) pg 10-8
Work Factor	50 minutes/hr		0.83		Assumption
	Average Truck Cycles/Hr		5.9		
	Average (CY)/Hr (for 1 truck)		239		
	Average (CY)/Hr (for 2 trucks)		478		

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Project	Subject
Hanson River Ranch	Truck Haulage (2 of 2)

775D Truck Cost				References/Notes
Truck Rental (Monthly)	$ 12,800			(1) 01590 200 5620 p22
Ownership Cost (Daily)		$	582	(22working days/month)
Truck Operating Cost (Hourly)	$ 57			(1) 01590 200 5620 p22
Operating Cost(Daily)		$	456	(8 hour work day)
Truck Labor Cost (Hourly)	$ 26			(1) crew B-34A, pg 1104
Labor Cost (Daily)		$	208	(8 hour work day)
Truck Total Cost (Daily)		$	1,246	
Trucks (2) total Cost (Daily)		$	2,492	
Loader Total Cost (Daily)		$	1,259	
Fleet Total Total Cost (Daily)		$	3,750	
Total Fleet Productivity (CY per Day)			3,821	(8 hour work day)
Fleet Cost per CY		$	0.98	

Demolition & Removal - Secondary Containment (Sq. Ft.)

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Project			Subject			
Hanson River Ranch			Crane Costing			

References/Notes

Rubber Tired Hydraulic Crane - 80 Ton Capacity

80 ton Crane Cost				
Crane Rental (Monthly)	$	8,825		(2) 01590 500 2700 pg 27
Ownership Cost (Daily)			$ 401	(22working days/month)
Crane Operating Cost (Hourly)	$	54		(2) 01590 500 2700 pg 27
Operating Cost(Daily)			$ 432	(8 hour work day)
Crane Labor Cost (Hourly)	$	35		(2) crew B-95A, pg 1100
Labor Cost (Daily)			$ 280	(8 hour work day)
Crane Total Cost (Daily)			$ 1,113	(8 hour work day)
Crane Total Cost (Hourly)			$ 139	

Rubber Tired Hydraulic Crane - 120 Ton Capacity

120 ton Crane Cost				
Crane Rental (Monthly)	$	25,400		(2) 01590 500 2740 pg 27
Ownership Cost (Daily)			$ 1,155	(22working days/month)
Demolition & Removal - Secondary Containment (Sq. Ft.)				
Crane Operating Cost (Hourly)	$	83		(2) 01590 500 2740 pg 27
Operating Cost(Daily)			$ 664	(8 hour work day)
Crane Labor Cost (Hourly)	$	35		(2) crew B-95A, pg 1100
Labor Cost (Daily)			$ 280	(8 hour work day)
Crane Total Cost (Daily)			$ 2,099	(8 hour work day)
Crane Total Cost (Hourly)			$ 262	

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Project			Subject			
Hanson River Ranch			Road Preparation			

References/Notes

Rip/Scarify Road Surfaces

Description	Units	Total Cost	References/Notes
Rip/Scarifying Road Surface (Linear Ft)	1	$ 0.19	40 foot wide road
Scraper Transport (Linear Ft)	1	$ 1.01	40 foot wide road
Estimated Cost per Linear Foot for Road Prep =		$ 2.41	Double pass

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		130982	KNC	9/28/2006		12 of 13
Project			Subject			
Hanson River Ranch			Rip Rap Erosion Control			

Material cost, Hauling, and Placing Erosion Control Structures - Rip Rap

Description	Units	Total Cost	References/Notes
18" Minimum thickness, not grouted			
Material (sq. yd.)	1	$ 12	(2) 02340 450 0200 pg 65
Labor (per unit)	1	$ 30	(2) 02340 450 0200 pg 65
Equipment (per unit)	1	$ 12	(2) 02340 450 0200 pg 65
Estimated Cost per Square Yard for Rip Rap Material and Install =		$ 54	

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Project			Subject			
Hanson River Ranch			Plant Removal			

References/Notes

Removal of Crushing/Screening plants and Wash Plants

Description	Units	Total Cost
80 Ton Crane (Hr)	315	$ 44,000
120 Ton Crane (Hr)	128	$ 34,000
Mechanical Labor (Hr)	2,400	$ 82,000
Loading/UnLoading Labor (Hr)	495	$ 13,000
Light Transporation (Trips)	30	$ 26,000
Heavy Transportation (Trips)	34	$ 43,000
Estimated Total Cost for Plant Removal =		$ 242,000

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