FOR CONTRACT NO.: 07-3P2904

INFORMATION HANDOUT

MATERIALS INFORMATION

GEOTECHNICAL DESIGN REPORT

ROUTE: 07-LA-60-R26.5

State of California | Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: **MR. PETER SHIH,** Senior Engineer
D07 Office of Maintenance

Date: March 28, 2006

File: 07-LA-60 PM 26.53
EA 59-930321
SD 595307060027

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South - 1

Subject: **Geotechnical Design Report for Surficial Slope Stabilization**

As requested a field review was made to evaluate the existing slope conditions along the westbound side of LA-60 at the intersection with Golden Springs Drive in the City of Diamond Bar. At that time a survey request was made, and the topographic map generated was used for the design of a surficial stabilization system. This report contains recommendations and specifications for the design of the stabilization system.

Topography and Site Conditions

The slope is facing Golden Springs Drive and is approximately 27.0 meters (89 feet) high ranging in elevation from 260 meters above mean sea level (msl) to 287 meters above msl. The overall slope ratio is 1H:1V, and the slope contains two narrow benches. The first bench is 8 meters above the roadway and the second is 20 meters above the roadway.

The slope was cut prior to construction of the LA-60 freeway (Figure 1) and is currently sparsely vegetated. Based on current field observations and comparing photos taken in 1968 this slope has been stable through the years and appears to be globally stable at the present time. However, due to factors such as natural rock weathering processes and excessive rainfall from last winter, localized surficial instabilities have occurred on the slope face (See Figure 2).

Site Geology

The slope material has been mapped as sediments of the Puente Geologic Formation (Soquel Member) and consists of dense to very dense, massive to medium bedded sandstone interbedded with silty shale, and localized conglomerate. The strike of the beds are generally northeast, dipping at a low angle to the northwest.

A shear zone of unknown age, but obviously younger than the Soquel Member crosses the cut, striking west and dipping approximately 45 degrees to the south. This shear zone likely creates a zone of weakness within the lower most cut, thus contributing to the erosion problems.

STABILIZATION RECOMMENDATIONS

Surficial erosion will be minimized by the installation of a diamond shaped twisted steel wire mesh bonded to the slope with tensioned rock dowels and anchor plates. In addition, an erosion

control mat should be placed between the mesh and bare slope face and be hydroseeded. The attached topographic map shows the location of the proposed steel wire mesh installation.

This type of system has been used effectively to reduce erosion and surficial instabilities on slopes throughout the state. It effectively reduces maintenance costs, and can be colored to match soil and vegetation colors, greatly reducing its visibility.

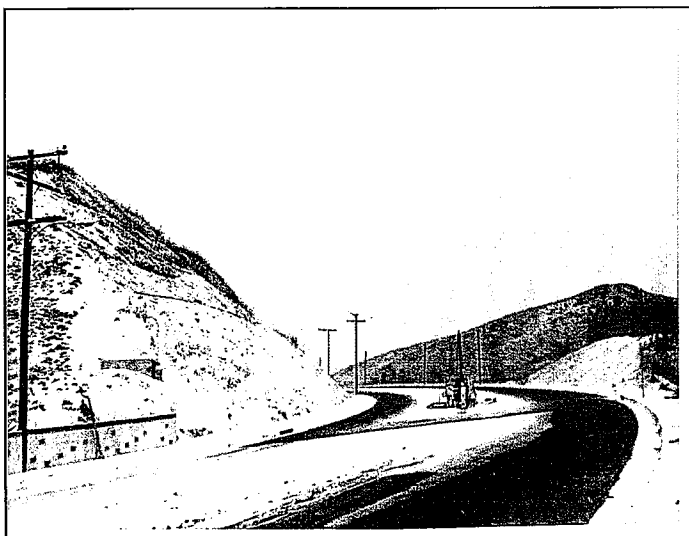


Figure 1: Photo taken in 1968 looking northerly at the cut along the west side of Golden Springs Drive. Drill rig in median represents centerline of LA-60 trending perpendicular to Golden Springs Drive.

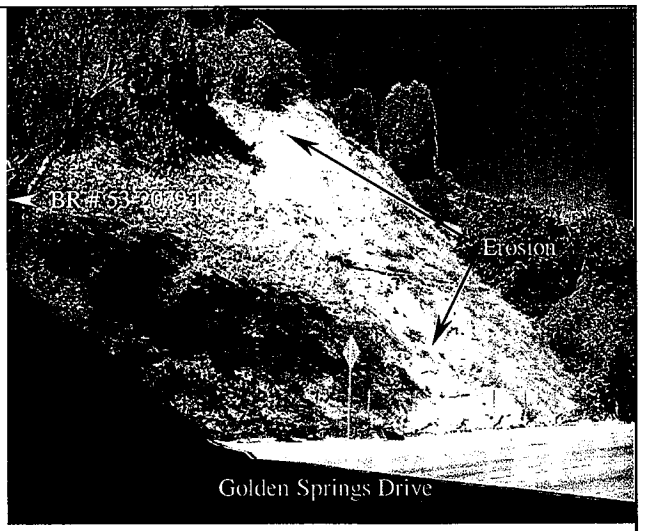


Figure 2: Photo from November 2005 looking northerly at the cut along the west side of Golden Springs Drive. Northwest abutment of Golden Springs Drive UC just off the picture in the upper left.

Steel Wire Mesh Specifications (Tecco Mesh)

The steel wire mesh shall have a minimum tensile strength of 1770 N/mm^2 and be corrosion resistant. In addition, the mesh shall be powder coated to the color "desert sand," however samples of this color shall be submitted to the Resident Engineer for approval prior to ordering of materials. Joining of the mesh along the seams shall be completed by the use of fasteners with a strength greater than the minimum tensile strength of the wire mesh.

Rock Dowels

Rock dowels (Anchors) composed of threaded rebar 28mm in diameter shall be installed at a vertical and horizontal spacing as shown on the plans, and shall be a length of 2.5 meters. Dowels shall be installed at an inclination of 15 degrees down from horizontal with a 60mm minimum borehole diameter, and be treated for corrosion resistance.

The rock dowels shall be installed in the open hole with a minimum of two centralizers, and shall be grouted in the open hole so that the grout fills the annulus of the hole to the slope surface. The hole shall be pre-wetted prior to receiving grout, and the grout mix shall conform to Caltrans Standard Specifications.

Prior to placement of each anchor plate and hexagonal nut, soil and rock shall be excavated a minimum radius of 0.3 meter around the rebar anchor, and a minimum depth of 0.3 meter

measured into slope. The hexagonal nut shall then be threaded on to the rebar and tensioned to 50 kN.

Secondary Anchors
Secondary mesh anchors shall be composed of steel rebar formed in the field, or may be prefabricated, and shall be a minimum length of 0.6 meter with a 140 degree bend in the driving end. These anchors shall be installed along the edges of the mesh with a spacing no less than 3.2 meters. In addition the secondary anchors shall be installed at the corners of the mesh, such that no mesh edges are left hanging or unfastened to the slope.

Erosion Control Mat
An erosion mat shall be placed between the slope and the mesh. The mat shall consist of extruded polypropylene monofilaments with a minimum thickness of 10mm and a maximum thickness of 15mm and shall be colored black. The erosion control mat shall be rolled out and fastened to the slope with no loose folds. Secondary anchors as described above, with a minimum length of 0.3 meter shall be used to fasten the erosion control mat to the bare slope.

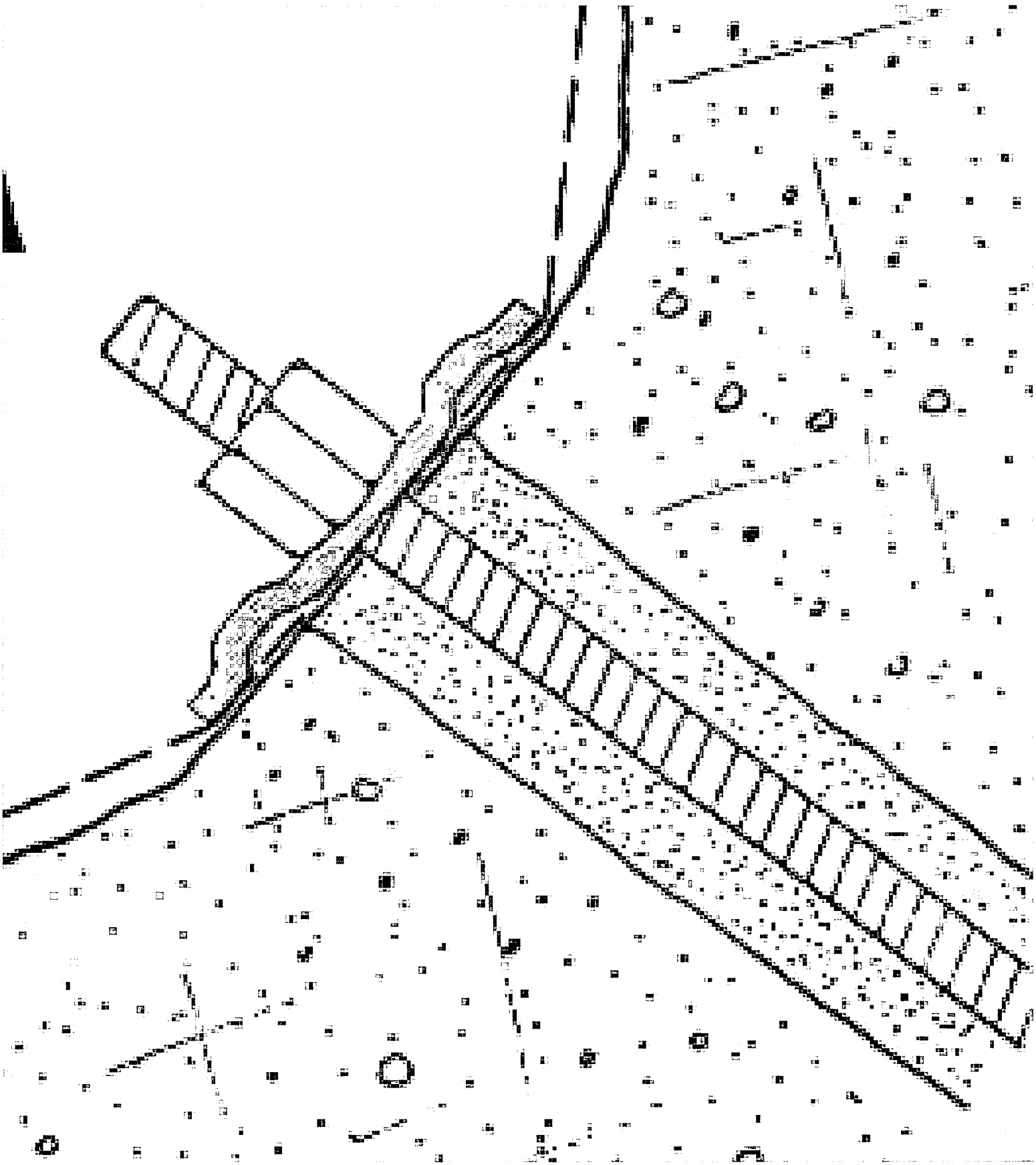
Hydroseeding
After installation of the twisted wire mesh the slope shall be hydroseeded, such that the erosion control mat receives the hydroseed into its void space. District Landscape should be contacted to obtain the proper seed types for this area.

If you have any questions and/or further assistance is required please contact Jeremy Lancaster at (562) 864-3425 or Gustavo Ortega at (562) 864-5292.

Jeremy Lancaster, C.E.G.
Engineering Geologist, Branch C
Office of Geotechnical Design South-1

Gustavo Ortega, C.E.G., C.HG.
Special Geological Studies
Office of Geotechnical Design South-1

cc: JEhsan, HQ-OGDS-1 Sacramento
TLiu, HQ-OGDS-1



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

REGISTERED PROFESSIONAL ENGINEER — CIVIL — STATE OF CALIFORNIA

DRAFT Topographic Map and Layout of Erosion Control Mesh

07-LA-60 PM 26.53

EA: 07-930321

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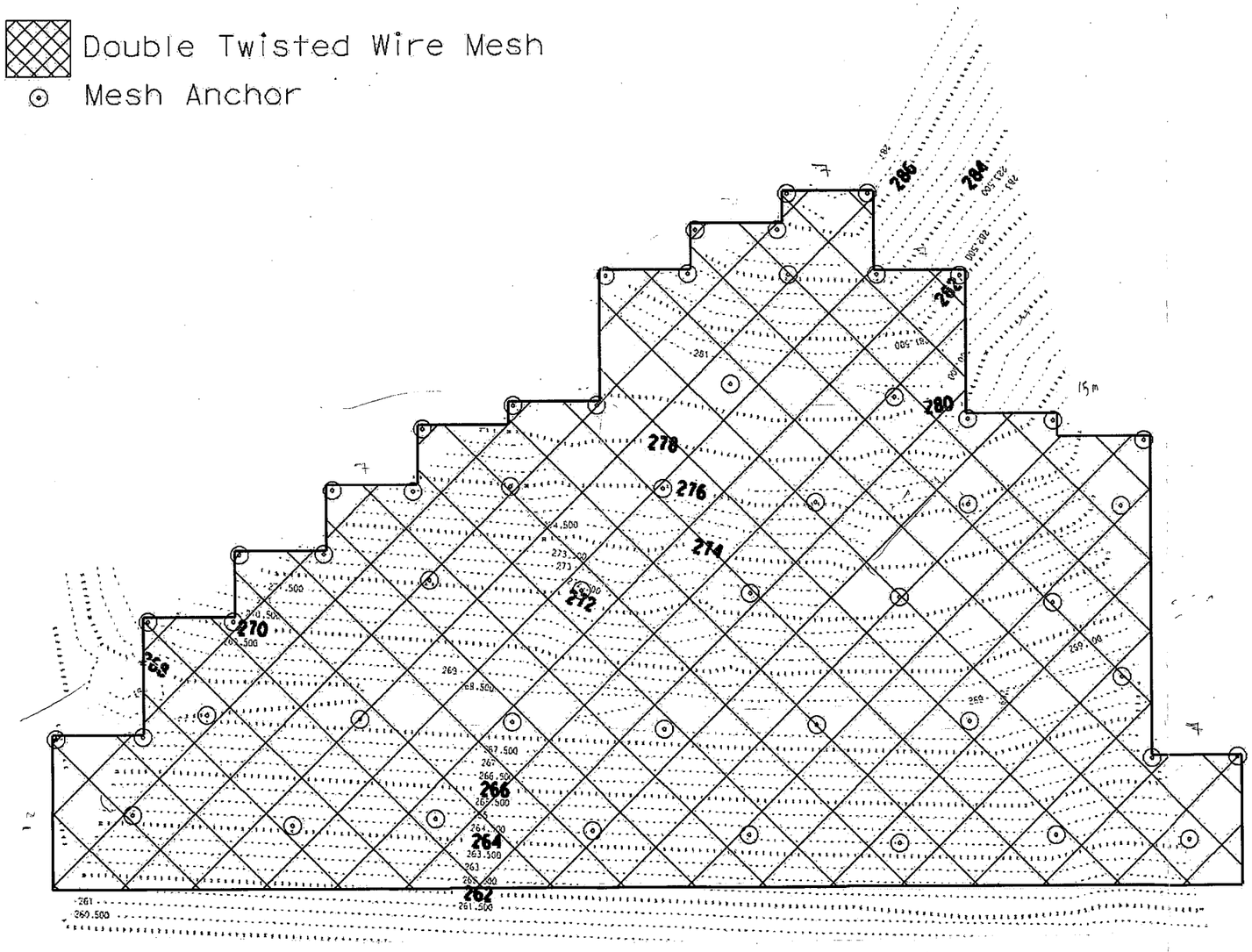
Double Twisted Wire Mesh

⊙ Mesh Anchor



126 90

CALCULATED/ DESIGNED BY	DATE	REVISED BY	DATE REVISED
CHECKED BY			

PROJECT ENGINEER

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USERNAME => $USER
DGN FILE => $REQUEST

CU 00000

EA 000000

LAST REVISION 00-00-00 DATE PLOTTED => $DATE TIME PLOTTED => $TIME

...\Topo Contour 05271 Mod.dgn 03/24/2006 08:57:04 AM

Jeremy Lancaster
03/22/2006 12:47 PM

To: Peter Shih/D07/Caltrans/CAGov@DOT
cc: Gustavo Ortega/D07/Caltrans/CAGov@DOT
Subject: Re: 07-LA-60 PM 26.53 Golden Spring Drive Topographic Map and Mesh Layout

Hello Peter,

Here are quantities and associated cost estimates:

Mesh Quantity.....1420m^2 X $75/m^2 =.....$106,500
Erosion Mat Quantity:.....1420m^2 X $6/m^2 =..... $8,520
Mesh Anchors (Dowels):....52 Anchors X $550/anchor = ...$28,600
Misc. Materials (hydroseeding and other).....$15,000

Total.....$158,620

Generally the mobilization and demobilization costs are included in a project like this, but in this case their may be extra costs associated with traffic control and traffic safety.

Peter Shih

Peter Shih
03/22/2006 10:03 AM

To: Jeremy Lancaster/HQ/Caltrans/CAGov@DOT
cc:
Subject: Re: 07-LA-60 PM 26.53 Golden Spring Drive Topographic Map and Mesh Layout

Jeremy,

Thanks for the info. Do we have a cost estimate? Thanks.

Peter C Shih P.E.
Caltrans District 7
100 South Main Street
Los Angeles, CA 90012
(213)897-2953
Jeremy Lancaster

Jeremy Lancaster
03/20/2006 03:16 PM

To: Peter Shih/D07/Caltrans/CAGov@DOT
cc: Gustavo Ortega/D07/Caltrans/CAGov@DOT
Subject: 07-LA-60 PM 26.53 Golden Spring Drive Topographic Map and Mesh Layout

Peter,

Attached is the topographic map that you sent a while back that has been edited to show mesh limits, and anchor locations. I am a novice at microstation, so the work that I completed may not be the way design would have done it. Basically it is near complete other than adding a cross section of a typical anchor. I have scanned such a cross section and included it in this email. I'm not good enough with microstation to do it myself otherwise I would have.

We will write a geotechnical design report and include the specifications for the mesh and anchors as soon as possible.

Thanks,

Jeremy


Topo Contour 05271 Mod.dg


Anchor Section.jpg

Jeremy Lancaster

03/20/2006 03:16 PM

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