

Golder Associates Ltd.

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ADDENDUM TO
REPORT ON
DESIGN OF TEMPORARY WETLAND ACCESS ROADS
REHABILITATION OF THE HIGHWAY 401
SALMON RIVER BRIDGE, SITE NO. 11-207
G.W.P 82-98-00
MINISTRY OF TRANSPORTATION, ONTARIO
DISTRICT 8, KINGSTON

Submitted to:

Lea Associates Ltd.
Suite 900, 625 Cochrane Drive
Markham ON
L3R 9R9

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1.0 REVIEW OF TENSAR DESIGN

The stratigraphy and soil parameters including the subsurface information from our Foundation Investigation and Design Report were supplied to Tensar Earth Technologies Inc. (Tensar), a specialty geogrid embankment designer / manufacturer to develop necessary design details for both the temporary access roads and the crane pads over the floodplain. To provide the necessary liaison with the specialty designer, we retained Mr. Phil Perzia, P.Eng. of Forza Solutions to assist in development of the design requirements for this temporary access road and crane pad geogrid / geotextile rockfill embankment.

Tensar carried out the design for the reinforced geogrid embankment as well as produced a set of drawings for inclusion into the contract. Discussions were held between Golder and Forza throughout the design stage to ensure that the geometry, soil conditions and design assumptions were carried out in accordance with that which were provided. The design assumptions / calculations and results of the stability analyses carried out by Tensar are included in Appendix B attached to the end of this report.

The settlement and stability of the embankment is improved by the use of geogrid. The overall stability of the embankment is improved by the addition of layers of biaxial and uniaxial geogrid. The addition of geogrid increases the local stability as well as allows for reduced setback requirements. The factor of safety for global stability increases about 25 percent with the addition of geogrid reinforcement for the 1.5 m setback case.

The maximum settlement of the subsoils under the embankments as well as differential settlements will also be reduced with the addition of geogrid layers. Settlement analyses to determine the settlement under embankments constructed using geogrid reinforcement were not carried out, since there are no direct methods available. Limited monitoring data from other similar jobs indicates that the differential settlement under geogrid embankments is less than the settlement under non-geogrid reinforced embankments under similar loading conditions (up to 25 percent). The differential settlement is defined as the settlement between the middle and edges of the embankment and/or the settlement between the outrigger pads.

The drawings were prepared based on the access road / crane pad layout and equipment loading provided by Lea Associates. Prior to construction, the Contractor should ensure that the access road / crane pad layout, equipment types and loading conditions are the same as those assumed in the design by Tensar. If there are any changes to these assumptions, the design drawings should be modified accordingly by Tensar, working with the Contractor.

GOLDER ASSOCIATES LTD.

Sarah E. M. Poot, P.Eng.,
Geotechnical Engineer



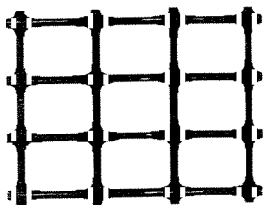
Fintan J. Heffernan, P.Eng.,
Designated MTO Contact

SEP/SJB/MSD/FJH/sep

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APPENDIX B

DESIGN CALCULATIONS
FOR REINFORCED GEOGRID EMBANKMENTS



Tensar Earth Technologies, Inc.

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Atlanta, Georgia 30328
Tel: 404-250-1290
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DESIGN CALCULATIONS

Prepared for

MTO Highway 401 – Salmon River Bridge

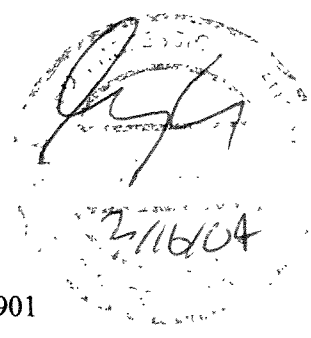
Shannonville, Ontario (Canada)

TET #E04901

3/12/2004

Prepared by: Willie Liew

DESIGN ASSUMPTIONS



Project Name: MTO Highway 401 – Salmon River Bridge
Location: Shannonville, Ontario, Canada

Project number: E04901
Engineer: WL
Date: 3/12/04

THE FOLLOWING ASSUMPTIONS HAVE BEEN ADOPTED BY TET FOR THE PURPOSES OF DEVELOPING THIS FINAL DESIGN OF THE REINFORCED FOUNDATION USING TENSAR GEOGRIDS. ALL ASSUMPTIONS MUST BE VERIFIED BY OTHERS PRIOR TO CONSTRUCTION!

1. DESIGN METHODOLOGY

Tensar Design Guidelines

2. SOILS

Foundation soil properties and ground water tables used in the calculation were provided by Golder Associates, Inc. Following are the summary of the soil parameters used in the design:

Embankment Fill:
Foundation Soil:

$$\gamma = 19.0 \text{ kN/m}^3, \phi = 38^\circ, C = 0 \text{ kPa}$$

<i>Location</i>	<i>Elevation (m)</i>	<i>Stratigraphy</i>	<i>γ (kN/m³)</i>	<i>Strength</i>
Large Crane Pad North West Quad, Pier A	79.7 – 78.9	Soft silty clay with organics	18	$s_u = 30 \text{ kPa}$
	78.9 – 78.2	Loose sand	20	$\phi' = 30^\circ$
	78.2 – 77.4	Soft silty clay	18	$s_u = 30 \text{ kPa}$
	77.4 – 72.1	Stiff to very stiff silty clay to clay	18	$s_u = 75 \text{ kPa}$
	72.1 – 66.0	Firm to stiff clayey silt	18	$s_u = 25 \text{ kPa}$
Large Crane Pad South West Quad, Pier A	79.6 – 77.6	Soft to stiff silty clay with organics	18	$s_u = 30 \text{ kPa}$
	77.6 – 75.8	Loose sand and gravel with organics	20	$\phi' = 30^\circ$
	75.8 – 72.0	Stiff to very stiff silty clay to clay	18	$s_u = 75 \text{ kPa}$
	72.0 – 65.5	Firm to stiff clayey silt	18	$s_u = 25 \text{ kPa}$
Large Crane Pad North East Quad, Pier D	79.5 – 78.1	Loose sand and gravel with organics	20	$\phi' = 30^\circ$
	78.1 – 76.7	Soft to firm silty clay with organics	18	$s_u = 30 \text{ kPa}$
	76.7 – 74.1	Stiff silty clay to clay	18	$s_u = 75 \text{ kPa}$
	74.1 – 69.1	Soft to firm clayey silt	18	$s_u = 25 \text{ kPa}$
Large Crane Pad South East Quad, Pier D	79.7 – 78.2	Very soft to soft silty clay with organics	18	$s_u = 20 \text{ kPa}$
	78.2 – 77.4	Very loose silty sand to sand and gravel	20	$\phi' = 28^\circ$
	77.4 – 75.1	Stiff to very stiff silty clay to clay	18	$s_u = 75 \text{ kPa}$
	75.1 – 72.1	Stiff clayey silt	18	$s_u = 50 \text{ kPa}$
Small Crane Pad North and South Side Pier B West Side	78.2 – 75.7	Loose sand and gravel with organics	20	$\phi' = 28^\circ$
	75.7 – 71.9	Stiff to very stiff silty clay to clay	18	$s_u = 75 \text{ kPa}$
	71.9 – 65.4	Soft to firm clayey silt	18	$s_u = 25 \text{ kPa}$
Small Crane Pad North and South Side Pier C East Side	79.1 – 76.6	Loose sand and gravel with organics	20	$\phi' = 28^\circ$
	76.6 – 72.6	Stiff to very stiff silty clay to clay	18	$s_u = 75 \text{ kPa}$
	72.6 – 66.1	Soft to firm clayey silt	18	$s_u = 25 \text{ kPa}$

3. **Embankment Geometry**

- Embankment height:
 - 17.9m x 17.1m wide Large Crane Pads: 1.1m to 2.0m
 - 14.5m x 12.5m wide Small Crane Pads: 1.7m to 3.0m
 - 5.5m wide access roads to small and large crane pads: 1.1m to 3.0m
 - 4.0m wide access roads under bridge: 1.0m
- The proposed side slope of the embankment is 1.5H:1V.

4. **LOADING**

- Small crane pads with 3.0m x 3.0m crane mat centered on each outrigger = 70 kPa (Assumed 520kN maximum load on each outrigger)
- Large crane pads with 4.5m x 4.5m crane mat on each outrigger = 70 kPa (Assumed 1300 kN maximum load on each outrigger)
- Access road to small and large crane pads with 12 tons (118 kN) assumed to be distributed over 2 tires spaced at 1.65m with a width of 0.388m. Total pressure = 184 kPa.
- Access road under bridge with 12 kPa traffic loading

5. **GROUNDWATER**

Groundwater was assumed to be at existing grade (bottom of embankment).

6. **MINIMUM FACTORS OF SAFETY**

Geogrid Pullout (Static)	= 1.5
Global stability (Static)	= 1.3

7. **NOTES**

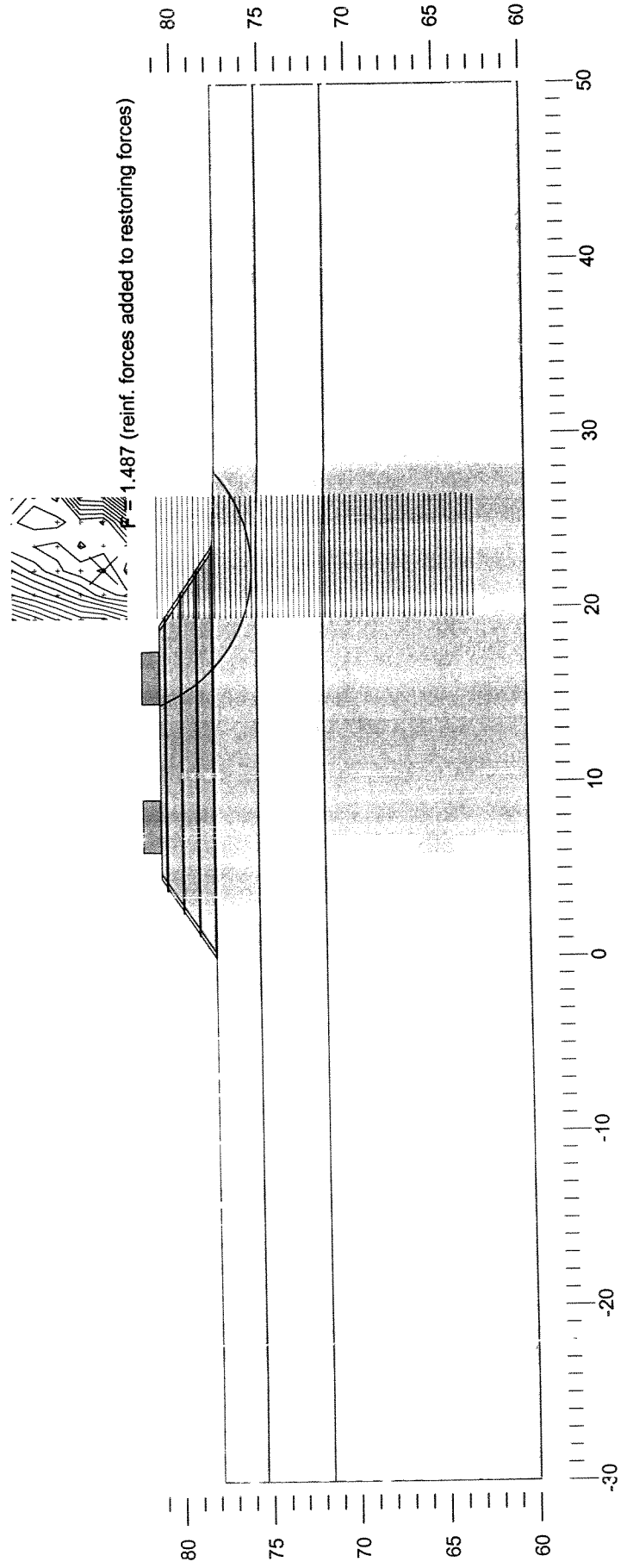
- A. The design presented herein is based on the information provided to Tensar Earth Technologies, Inc. (TET). TET accepts no liability for the information or verification of information.
- B. Settlement, seismic and rapid drawdown were not considered in the design. Total and differential settlement and their effects on this system are the responsibility of the owner or owner's representative. Tensar Earth Technologies, Inc. accepts no responsibility or liability for the evaluation of settlements.
- C. Tensar Earth Technologies, Inc. assumes no liability for interpretation of subsurface conditions, suitability of soil design parameters, and subsurface groundwater conditions.
- D. The owner or owner's representative is responsible to review and verify the design parameters described in 1 – 6 prior to construction.

8. **REFERENCES**

- A. Detailed Foundation Investigation and Design, Rehabilitation of the Highway 401, Salmon River Bridge, Site No. 11-207 submitted to Lea Associates Ltd., prepared by Golder Associates, Ltd. dated August 2003.
- B. Contract plan "Access Roads/Crane Pad Locations, Salmon River Bridge, prepared by LEA Consulting, Ltd. dated February 19 2004.

- C. Table 1 – Summary of Design Parameters, Crane Pads – Salmon River Bridge and Table 3 – Summary of Embankment Heights, Crane Pads – Salmon River, prepared by Golder Associates, Ltd. dated January 2004.
- D. Facsimile from FORZA! Solutions on crane pads size and loading conditions.

	70	1000	0	1
Crane				
Prism Facing	19	1	38	1
Reinforced Fill	19	0	38	1
Loose Sand w/ Or	20	0	28	1
Stiff Clay	18	75	0	1
Stiff Clay	18	25	0	1



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Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-18-04
 Label A NORTHWEST & SOUTHWEST QUAD
 Label B SMALL CRANE PAD - PIER B (DH = 3m) WATER
 AT BASE OF EMBANKMENT

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 6
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 4
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	70	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Loose Sand w/ Or	20	0	28	0	1	0	.6
5 Stiff Clay	18	75	0	0	1	0	.6
6 Stiff Clay	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

-30 77.85

0	77.85
4.57	80.9
6.07	80.9
6.08	81.9
9.07	81.9
9.08	80.9
14.57	80.9
14.58	81.9
17.57	81.9
17.58	80.9
19.07	80.9
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	77.85
0	77.85
4.57	80.9
19.07	80.9
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	77.85
0.3	77.85
4.87	80.9
18.77	80.9
23.34	77.85
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 4 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	77.85
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 5 (Stiff Clay)

X-Coord	Y-Coord
-30	75.35
23.64	75.35
28.64	75.2
50	75.2

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	71.55
23.64	71.55
28.64	71.4
50	71.4

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	77.85
23.64	77.85
28.64	77.7
50	77.7

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	23.64	77.85	28.7	0
2	1.29	21	78.75	4.6	0
3	2.58	18.38	79.65	4.6	0

4	3.87	15.72	80.55	4.6	0
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Summary of Reinforcement:

Tallowable	Total Length
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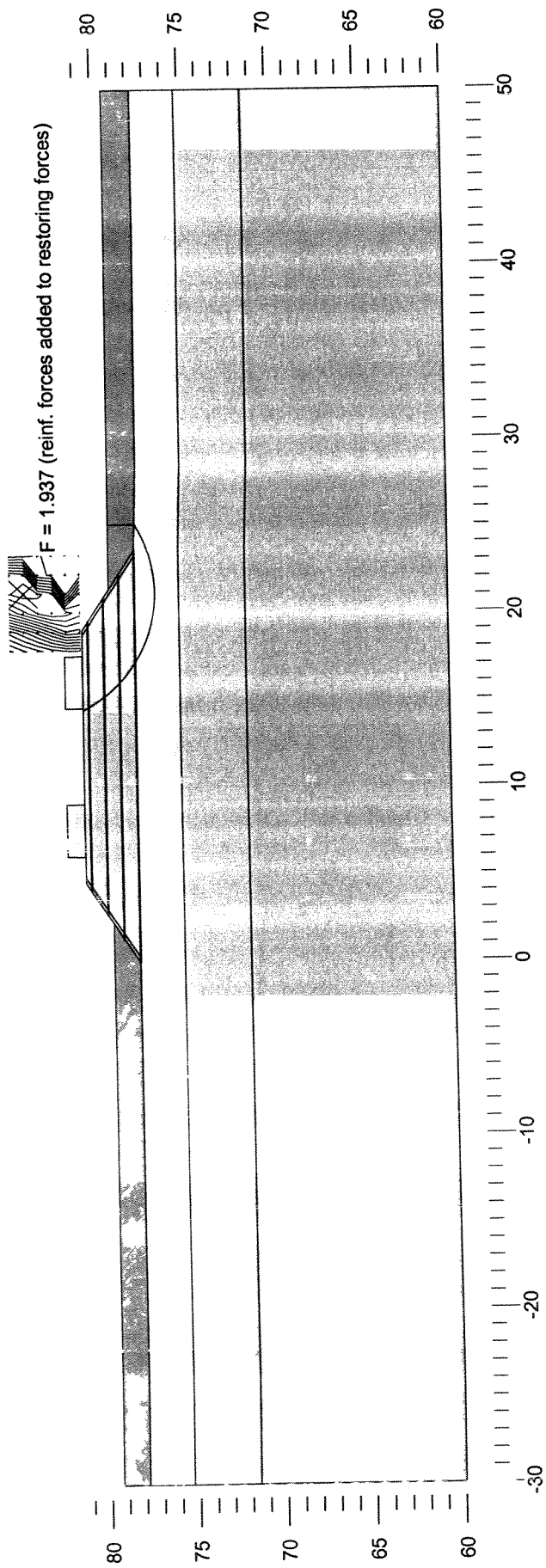
28.7	23.64
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4.6	55.1
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 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-18-04
 NORTHWEST & SOUTHWEST QUAD
 SMALL CRANE PAD - PIER B (DH = 3m) WATER @ MID-EMBANKMENT

	Gamma kN/m ³	C kPa	Phi deg	Piezo Surf.
Water	9.81	0	0	1
Crane	70	1000	0	1
Prism Facing	19	2	38	1
Reinforced Fill	19	0	38	1
Loose Sand w/ Or	20	0	28	1
Stiff Clay	18	75	0	1
Stiff Clay	18	25	0	1



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Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-18-04
 Label A NORTHWEST & SOUTHWEST QUAD
 Label B SMALL CRANE PAD - PIER B (DH = 3m) WATER
 @ MID-EMBANKMENT

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 7
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 4
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Water	9.81	0	0	0	1	0	.6
2 Crane	70	1000	0	0	1	0	.6
3 Prism Facing	19	2	38	0	1	0	.6
4 Reinforced Fill	19	0	38	0	1	0	.6
5 Loose Sand w/ Or	20	0	28	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Stiff Clay	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Water)

X-Coord Y-Coord

-30	79.35
2.23	79.35
4.57	80.9
6.07	80.9
6.08	81.9
9.07	81.9
9.08	80.9
14.57	80.9
14.58	81.9
17.57	81.9
17.58	80.9
19.07	80.9
21.405	79.35
50	79.35

Upper Surface of Material # 2 (Crane)

X-Coord	Y-Coord
-30	77.85
0	77.85
4.57	80.9
6.07	80.9
6.08	81.9
9.07	81.9
9.08	80.9
14.57	80.9
14.58	81.9
17.57	81.9
17.58	80.9
19.07	80.9
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 3 (Prism Facing)

X-Coord	Y-Coord
-30	77.85

0	77.85
4.57	80.9
19.07	80.9
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 4 (Reinforced Fill)

X-Coord	Y-Coord
-30	77.85
0.3	77.85
4.87	80.9
18.77	80.9
23.34	77.85
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 5 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	77.85
23.64	77.85
28.64	77.7
50	77.7

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	75.35
23.64	75.35
28.64	75.2
50	75.2

Upper Surface of Material # 7 (Stiff Clay)

X-Coord	Y-Coord
-30	71.55
23.64	71.55

28.64	71.4
50	71.4

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	77.85
23.64	77.85
28.64	77.7
50	77.7

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

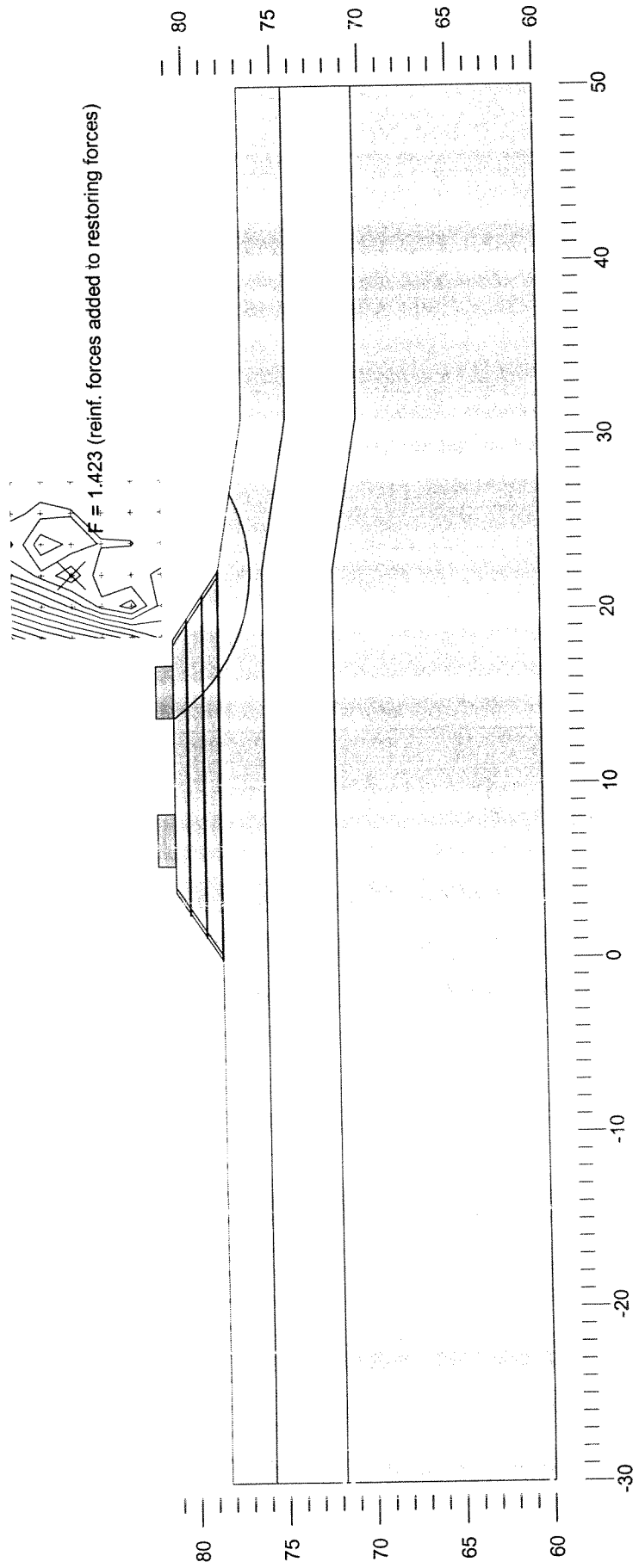
Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	23.64	77.85	28.7	0
2	1.29	21	78.75	4.6	0
3	2.69	18.25	79.65	4.6	0
4	4.05	15.54	80.55	4.6	0

Summary of Reinforcement:

Tallowable	Total Length
28.7	23.64
4.6	54.79

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-18-04
 NORTHEAST & SOUTHEAST QUAD
 SMALL CRANE PAD - PIER C (DH = 2.6m) WATER AT BASE OF EMBANKMENT

	Gamma C kN/m ³	Phi deg	Piezo Surf.
Crane	70	1000	0 1
Prism Facing	19	1	38 1
Reinforced Fill	19	0	38 1
Loose Sand w/ Or	20	0	28 1
Stiff Clay	18	75	0 1
Stiff Clay	18	25	0 1



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Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-18-04
 Label A NORTHEAST & SOUTHEAST QUAD
 Label B SMALL CRANE PAD - PIER C (DH = 2.6m)
 WATER AT BASE OF EMBANKMENT

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 6
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 3
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	70	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Loose Sand w/ Or	20	0	28	0	1	0	.6
5 Stiff Clay	18	75	0	0	1	0	.6
6 Stiff Clay	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord
 -30 78.29

0	78.29
3.9	80.9
5.4	80.9
5.41	81.9
8.4	81.9
8.41	80.9
13.9	80.9
13.91	81.9
16.9	81.9
16.91	80.9
18.4	80.9
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	78.29
0	78.29
3.9	80.9
18.4	80.9
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	78.29
0.3	78.29
4.2	80.9
18.1	80.9
22	78.29
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 4 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	78.29
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 5 (Stiff Clay)

X-Coord	Y-Coord
-30	75.79
22.3	75.79
31	74.39
50	74.39

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	71.79
22.3	71.79
31	70.39
50	70.39

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	78.29
22.3	78.29
31	76.89
50	76.89

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	22.3	78.29	28.7	0
2	1.29	19.64	79.19	4.6	0
3	2.58	17	80.09	4.6	0

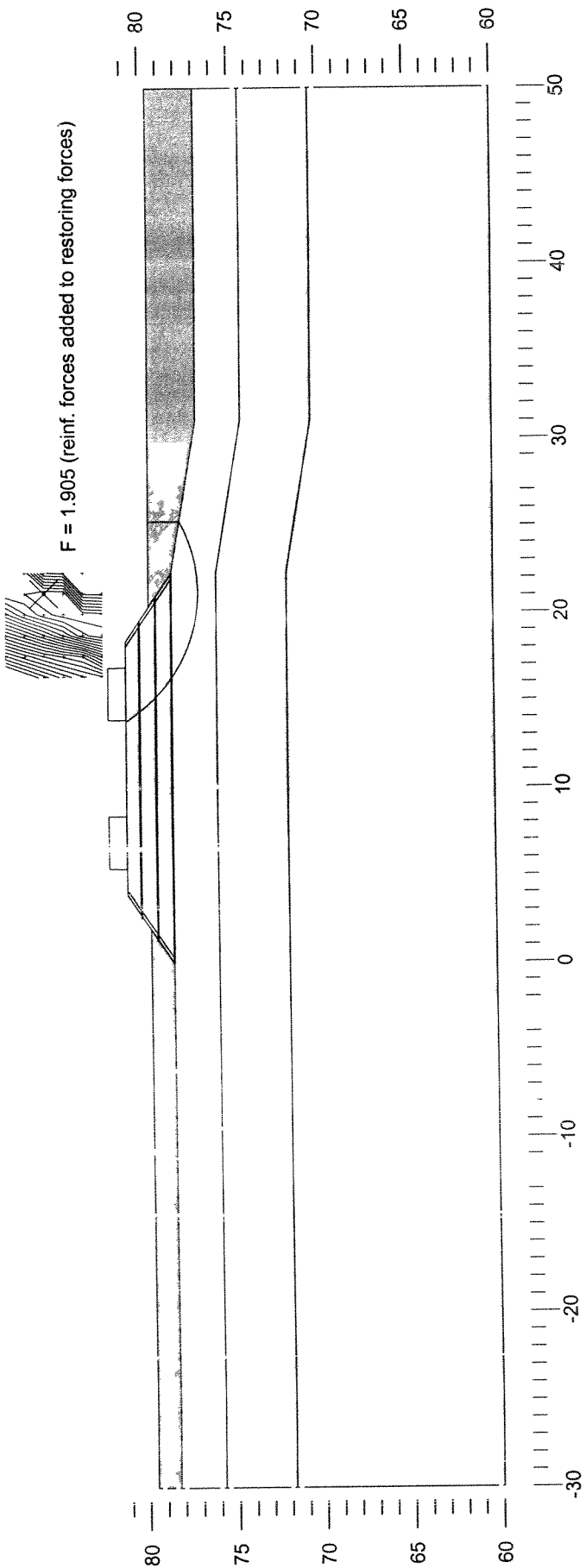
Summary of Reinforcement:

Tallowable	Total Length
28.7	22.3
4.6	36.64

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 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-18-04
 NORTHEAST & SOUTHEAST QUAD
 SMALL CRANE PAD - PIER C (DH = 2.6m) WATER AT MID-EMBANKMENT

	Gamma C kN/m3	Phi deg	Piezo Surf.
Water	9.81	0	1
Crane	70	1000	0
Prism Facing	19	12	38
Reinforced Fill	19	0	38
Loose Sand w/ Or	20	0	28
Stiff Clay	18	75	0
Stiff Clay	18	25	0



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Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-18-04
Label A NORTHEAST & SOUTHEAST QUAD
Label B SMALL CRANE PAD - PIER C (DH = 2.6m)
WATER AT MID-EMBANKMENT

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 7
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 1
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 3
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Water	9.81	0	0	0	1	0	.6
2 Crane	70	1000	0	0	1	0	.6
3 Prism Facing	19	12	38	0	1	0	.6
4 Reinforced Fill	19	0	38	0	1	0	.6
5 Loose Sand w/ Or	20	0	28	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Stiff Clay	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Water)

X-Coord

Y-Coord

-30	79.59
1.94	79.59
3.9	80.9
5.4	80.9
5.41	81.9
8.4	81.9
8.41	80.9
13.9	80.9
13.91	81.9
16.9	81.9
16.91	80.9
18.4	80.9
20.36	79.59
50	79.59

Upper Surface of Material # 2 (Crane)

X-Coord	Y-Coord
-30	78.29
0	78.29
3.9	80.9
5.4	80.9
5.41	81.9
8.4	81.9
8.41	80.9
13.9	80.9
13.91	81.9
16.9	81.9
16.91	80.9
18.4	80.9
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 3 (Prism Facing)

X-Coord	Y-Coord
-30	78.29

0	78.29
3.9	80.9
18.4	80.9
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 4 (Reinforced Fill)

X-Coord	Y-Coord
-30	78.29
0.3	78.29
4.2	80.9
18.1	80.9
22	78.29
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 5 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	78.29
22.3	78.29
31	76.89
50	76.89

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	75.79
22.3	75.79
31	74.39
50	74.39

Upper Surface of Material # 7 (Stiff Clay)

X-Coord	Y-Coord
-30	71.79
22.3	71.79

31	70.39
50	70.39

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	78.29
22.3	78.29
31	76.89
50	76.89

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	22.3	78.29	28.7	0
2	1.29	19.64	79.19	4.6	0
3	2.58	17	80.09	4.6	0

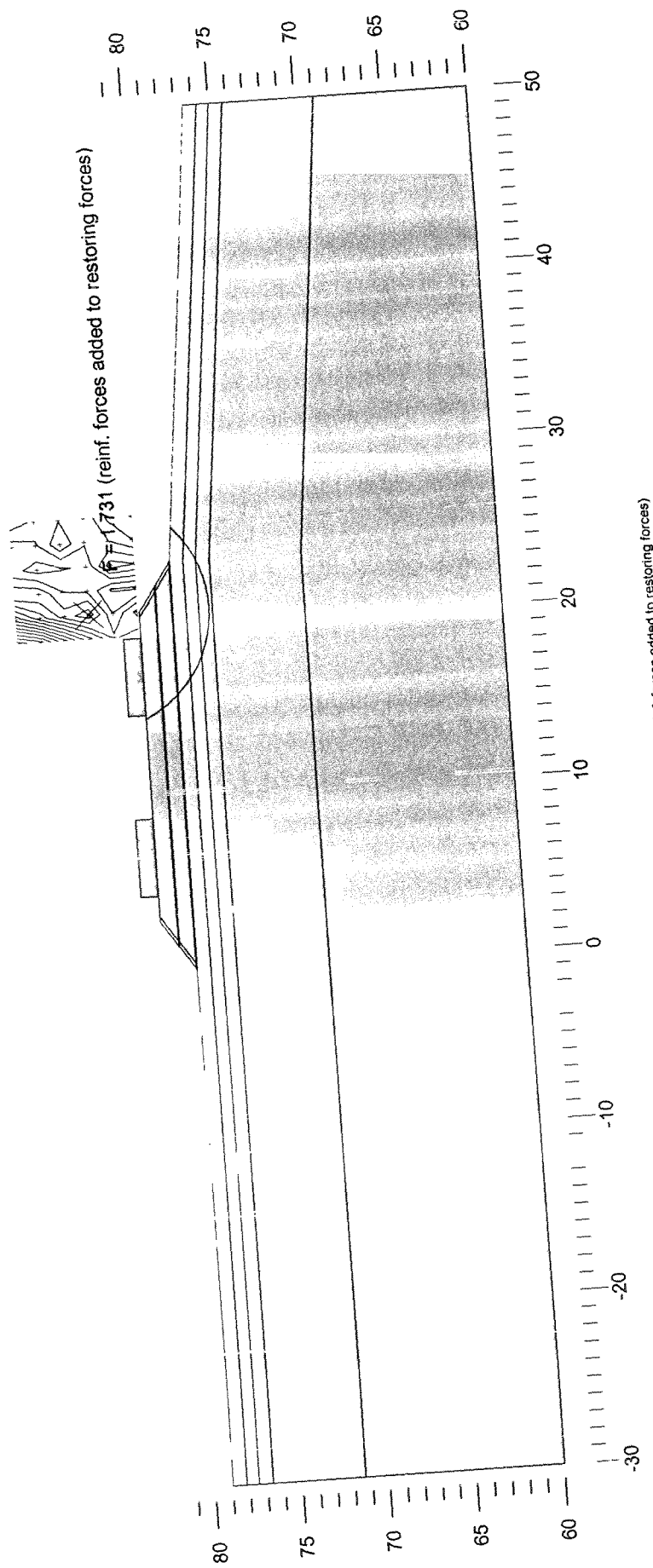
Summary of Reinforcement:

Tallowable	Total Length
28.7	22.3
4.6	36.64

□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-17-04
 NORTHWEST QUAD - PIER A
 LARGE CRANE PAD - (DH = 2m)

	Gamma kN/m ³	C kPa	Phi deg	Piezo Surf.
Crane	70	100	0	1
Prism Facing	19	2	38	1
Reinforced Fill	19	0	38	1
Silty Clay w/ Or	18	30	0	1
Loose Sand	20	0	30	1
Silty Clay	18	30	0	1
Stiff Clay	18	75	0	1
Clayey Silt	18	25	0	1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\LARGE-1\PIERA.GSL

Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-17-04
 Label A NORTHWEST QUAD - PIER A
 Label B LARGE CRANE PAD - (DH = 2m)

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 8
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 2
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	70	100	0	0	1	0	.6
2 Prism Facing	19	2	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	30	0	0	1	0	.6
5 Loose Sand	20	0	30	0	1	0	.6
6 Silty Clay	18	30	0	0	1	0	.6
7 Stiff Clay	18	75	0	0	1	0	.6
8 Clayey Silt	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

-30	79
0	79
2.85	80.9
4.35	80.9
4.36	81.9
8.85	81.9
8.86	80.9
14.85	80.9
14.86	81.9
19.35	81.9
19.36	80.9
20.85	80.9
23.7	79
50	76.5

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79
0	79
2.85	80.9
20.85	80.9
23.7	79
50	76.5

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79
0.3	79
3.15	80.9
20.55	80.9
23.4	79
23.7	79
50	76.5

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
---------	---------

-30	79
23.7	79
50	76.5

Upper Surface of Material # 5 (Loose Sand)

X-Coord	Y-Coord
-30	78.2
23.7	78.2
50	75.7

Upper Surface of Material # 6 (Silty Clay)

X-Coord	Y-Coord
-30	77.5
23.7	77.5
50	75

Upper Surface of Material # 7 (Stiff Clay)

X-Coord	Y-Coord
-30	76.7
23.7	76.7
50	74.2

Upper Surface of Material # 8 (Clayey Silt)

X-Coord	Y-Coord
-30	71.4
23.7	71.4
50	68.9

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79
23.7	79
50	76.5

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	23.7	79	28.7	0
2	1.35	21	79.9	4.6	0

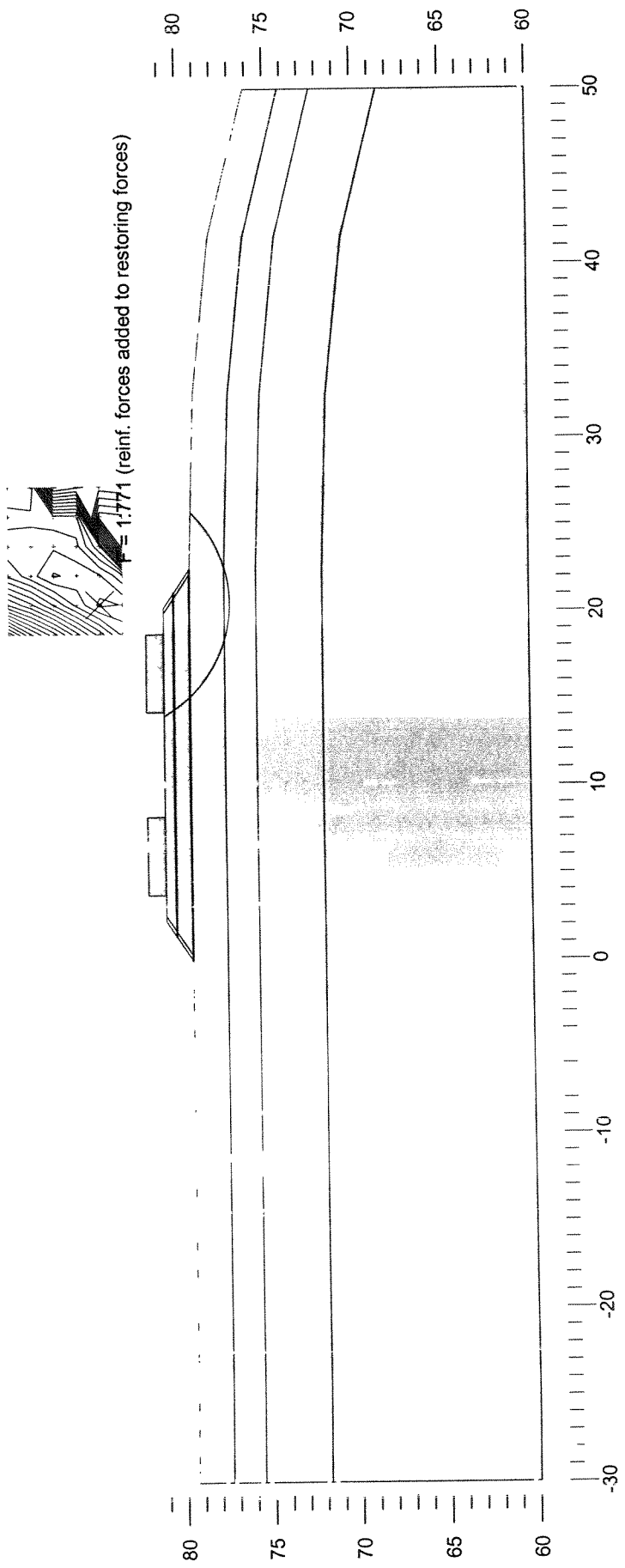
Summary of Reinforcement:

Tallowable	Total Length
28.7	23.7
4.6	21

□

Tensar Earth Technologies - Atlanta
E04901
MTO HWY 401 - SALMON RIVER BRIDGE
2-18-04
SOUTHWEST QUAD - PIER A (DH = 1.47m)
LARGE CRANE PAD

	Gamma C kN/m3	Phi deg	Piezo Surf.
Crane	70	1000	0
Prism Facing	19	1	38
Reinforced Fill	19	0	38
Silty Clay w/ Or	18	30	0
Loose Sand	20	0	30
Stiff Clay	18	75	0
Clayey Silt	18	25	0



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\LARGEC~1\PIERA2.GSL

Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-18-04
 Label A SOUTHWEST QUAD - PIER A (DH = 1.47m)
 Label B LARGE CRANE PAD

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 7
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 2
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	70	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	30	0	0	1	0	.6
5 Loose Sand	20	0	30	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Clayey Silt	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord
 -30 79.4

0	79.4
2.25	80.9
3.75	80.9
3.76	81.9
8.25	81.9
8.26	80.9
14.25	80.9
14.26	81.9
18.75	81.9
18.76	80.9
20.25	80.9
22.5	79.4
32.5	79.1
41.5	78.2
50	76.1

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79.4
0	79.4
2.25	80.9
20.25	80.9
22.5	79.4
32.5	79.1
41.5	78.2
50	76.1

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79.4
0.3	79.4
2.55	80.9
19.95	80.9
22.2	79.4
22.5	79.4
32.5	79.1

41.5	78.2
50	76.1

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
-30	79.4
22.5	79.4
32.5	79.1
41.5	78.2
50	76.1

Upper Surface of Material # 5 (Loose Sand)

X-Coord	Y-Coord
-30	77.4
22.5	77.4
32.5	77.1
41.5	76.2
50	74.1

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	75.6
22.5	75.6
32.5	75.3
41.5	74.4
50	72.3

Upper Surface of Material # 7 (Clayey Silt)

X-Coord	Y-Coord
-30	71.8
22.5	71.8
32.5	71.5
41.5	70.6
50	68.5

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79.4
22.5	79.4
32.5	79.1
41.5	78.2
50	76.1

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	22.5	79.4	28.7	0
2	1.35	19.8	80.3	4.6	0

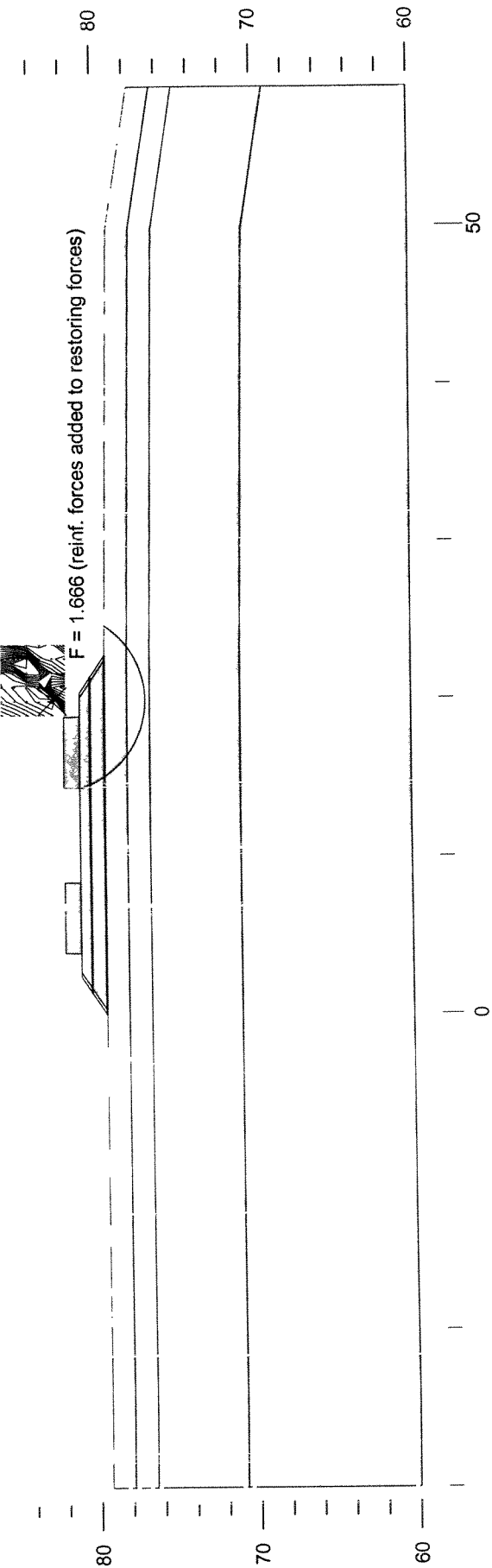
Summary of Reinforcement:

Tallowable	Total Length
28.7	22.5
4.6	19.8

□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-18-04
 NORTHEAST QUAD - PIER D (DH = 1.57m)
 LARGE CRANE PAD

	Gamma kN/m3	C kPa	Phi deg	Piezo Surf
Crane	70	1000	0	1
Prism Facing	19	1	38	1
Reinforced Fill	19	0	38	1
Loose Sand w/ Or	20	0	30	1
Silty Clay w/ Or	18	30	0	1
Stiff Clay	18	75	0	1
Clayey Silt	18	25	0	1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\LARGEC-1\PIERD.GSL

Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-18-04
 Label A NORTHEAST QUAD - PIER D (DH = 1.57m)
 Label B LARGE CRANE PAD

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 7
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 2
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	70	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Loose Sand w/ Or	20	0	30	0	1	0	.6
5 Silty Clay w/ Or	18	30	0	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Clayey Silt	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

-30 79.33

0	79.33
2.4	80.9
3.9	80.9
3.91	81.9
8.4	81.9
8.41	80.9
14.4	80.9
14.41	81.9
18.9	81.9
18.91	80.9
20.4	80.9
22.8	79.33
49.8	79.1
58.8	77.7

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79.33
0	79.33
2.4	80.9
20.4	80.9
22.8	79.33
49.8	79.1
58.8	77.7

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79.33
0.3	79.33
2.7	80.9
20.1	80.9
22.5	79.33
22.8	79.33
49.8	79.1
58.8	77.7

Upper Surface of Material # 4 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	79.33
22.8	79.33
49.8	79.1
58.8	77.7

Upper Surface of Material # 5 (Silty Clay w/ Or)

X-Coord	Y-Coord
-30	77.93
22.8	77.93
49.8	77.7
58.8	76.3

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	76.53
22.8	76.53
49.8	76.3
58.8	74.9

Upper Surface of Material # 7 (Clayey Silt)

X-Coord	Y-Coord
-30	70.83
22.8	70.83
49.8	70.6
58.8	69.2

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79.33
22.8	79.33
49.8	79.1
58.8	77.7

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
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1

0

0

0

0

Does not act.

Reinforcement

Tallowable

Tconnection

Layer

Position

per unit

per unit

No.

X1

Length

Elevation

width

width

1

0

22.8

79.33

28.7

0

2

1.38

20.05

80.23

4.6

0

Summary of Reinforcement:

Tallowable

Total Length

28.7

22.8

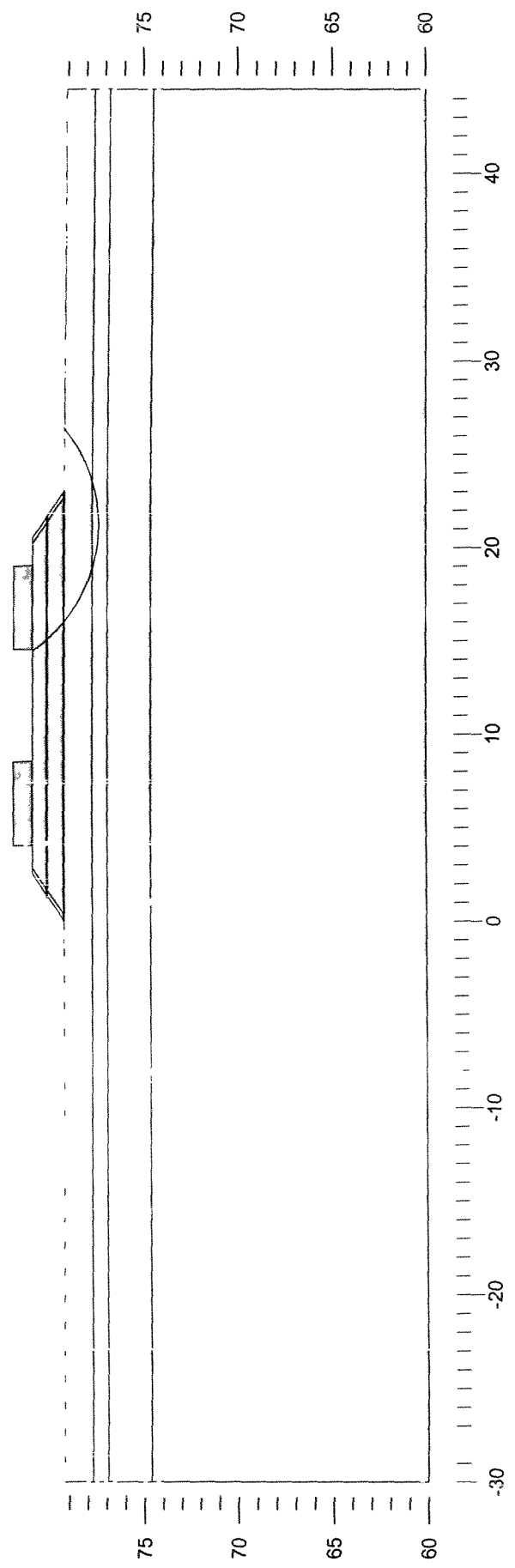
4.6

20.05

□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-18-04
 SOUTHEAST QUAD - PIER D (DH = 1.67m)
 LARGE CRANE PAD

	Gamma C kN/m3	Phi deg	Piezo Surf.
Crane	70	1000	0 1
Prism Facing	19	1	38 1
Reinforced Fill	19	0	38 1
Silty Clay w/ Or	18	20	0 1
Loose Silty Sand	20	0	28 1
Stiff Clay	18	75	0 1
Stiff Clay Silt	18	50	0 1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\LARGEC-1\PIERD2.GSL

Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-18-04
 Label A SOUTHEAST QUAD - PIER D (DH = 1.67m)
 Label B LARGE CRANE PAD

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 7
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 2
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	70	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	20	0	0	1	0	.6
5 Loose Silty Sand	20	0	28	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Stiff Clay Silt	18	50	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord
 -30 79.23

0	79.23
2.51	80.9
4.01	80.9
4.02	81.9
8.51	81.9
8.52	80.9
14.51	80.9
14.52	81.9
19.01	81.9
19.02	80.9
20.51	80.9
23.02	79.23
44.5	79.1

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79.23
0	79.23
2.51	80.9
20.51	80.9
23.02	79.23
44.5	79.1

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79.23
0.3	79.23
2.81	80.9
20.21	80.9
22.72	79.23
23.02	79.23
44.5	79.1

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
-30	79.23

23.02	79.23
44.5	79.1

Upper Surface of Material # 5 (Loose Silty Sand)

X-Coord	Y-Coord
-30	77.73
23.02	77.73
44.5	77.6

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	76.93
23.02	76.93
44.5	76.8

Upper Surface of Material # 7 (Stiff Clay Silt)

X-Coord	Y-Coord
-30	74.63
23.02	74.63
44.5	74.5

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79.23
23.02	79.23
44.5	79.1

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	23.02	79.23	28.7	0
2	1.27	20.4	80.13	4.6	0

Summary of Reinforcement:

Tallowable	Total Length
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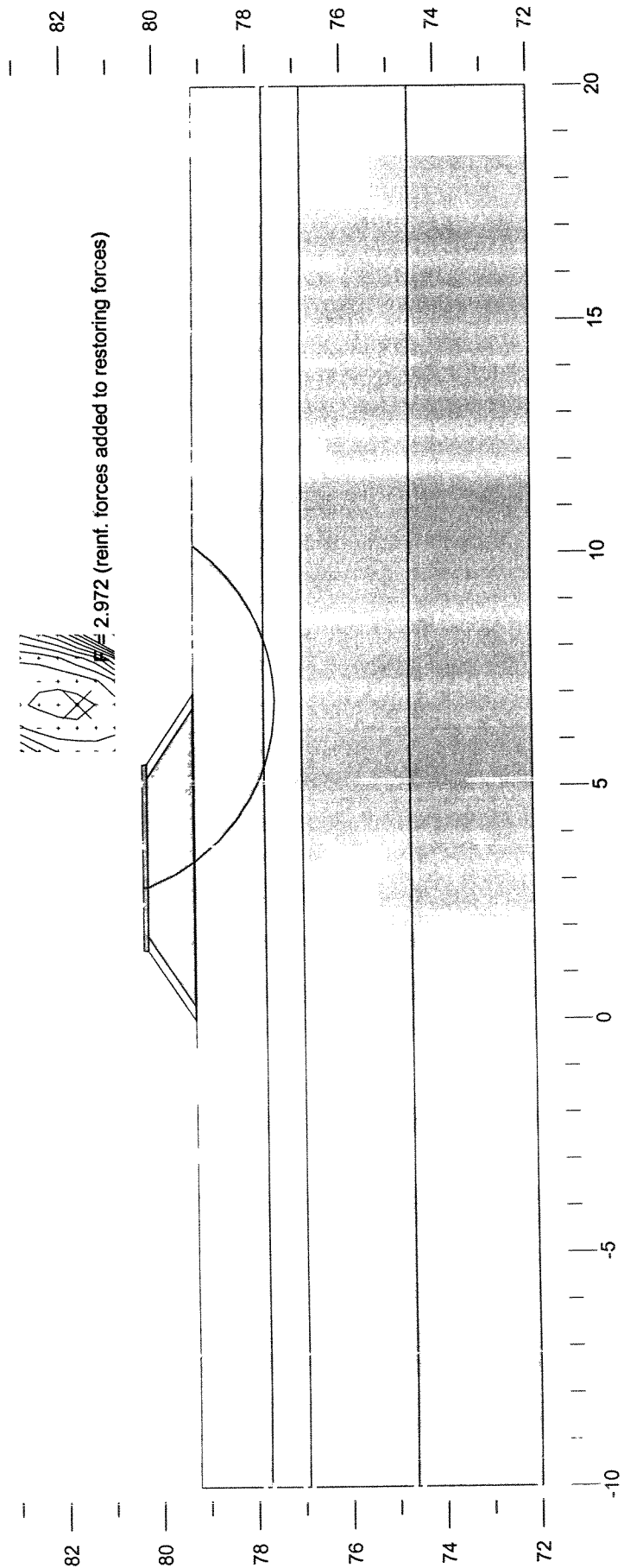
28.7	23.02
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4.6	20.4
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□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-20-04
 SOUTHEAST QUAD - PIER D (DH = 1m)
 ACCESS ROAD UNDER BRIDGE

	Gamma C kN/m3	Phi deg	Piezo Surf.
Traffic	120	0	1
Prism Facing	19	1	38
Reinforced Fill	19	0	38
Silty Clay w/ Or	18	20	0
Loose Silty Sand	20	0	28
Stiff Clay	18	75	0
Stiff Clay Silt	18	50	0



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS~1\ACCB.R.GSL

Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-20-04
Label A SOUTHEAST QUAD - PIER D (DH = 1m)
Label B ACCESS ROAD UNDER BRIDGE

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 7
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 2
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 1
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Traffic	120	0	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	20	0	0	1	0	.6
5 Loose Silty Sand	20	0	28	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Stiff Clay Silt	18	50	0	0	1	0	.6

Upper Surface of Material # 1 (Traffic)

X-Coord Y-Coord
-10 79.23

0	79.23
1.5	80.23
1.51	80.33
5.49	80.33
5.5	80.23
7	79.23
20	79.1624

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-10	79.23
0	79.23
1.5	80.23
5.5	80.23
7	79.23
20	79.1624

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-10	79.23
0.3	79.23
1.8	80.23
5.2	80.23
6.7	79.23
7	79.23
20	79.1624

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
-10	79.23
7	79.23
20	79.1624

Upper Surface of Material # 5 (Loose Silty Sand)

X-Coord	Y-Coord
-10	77.73

7	77.73
20	77.6624

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-10	76.93
7	76.93
20	76.8624

Upper Surface of Material # 7 (Stiff Clay Silt)

X-Coord	Y-Coord
-10	74.63
7	74.63
20	74.5624

Piezometric Surface No. 1

X-Coord	Y-Coord
-10	79.23
7	79.23
20	79.1624

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.
2	0	0	0	0	Does not act.

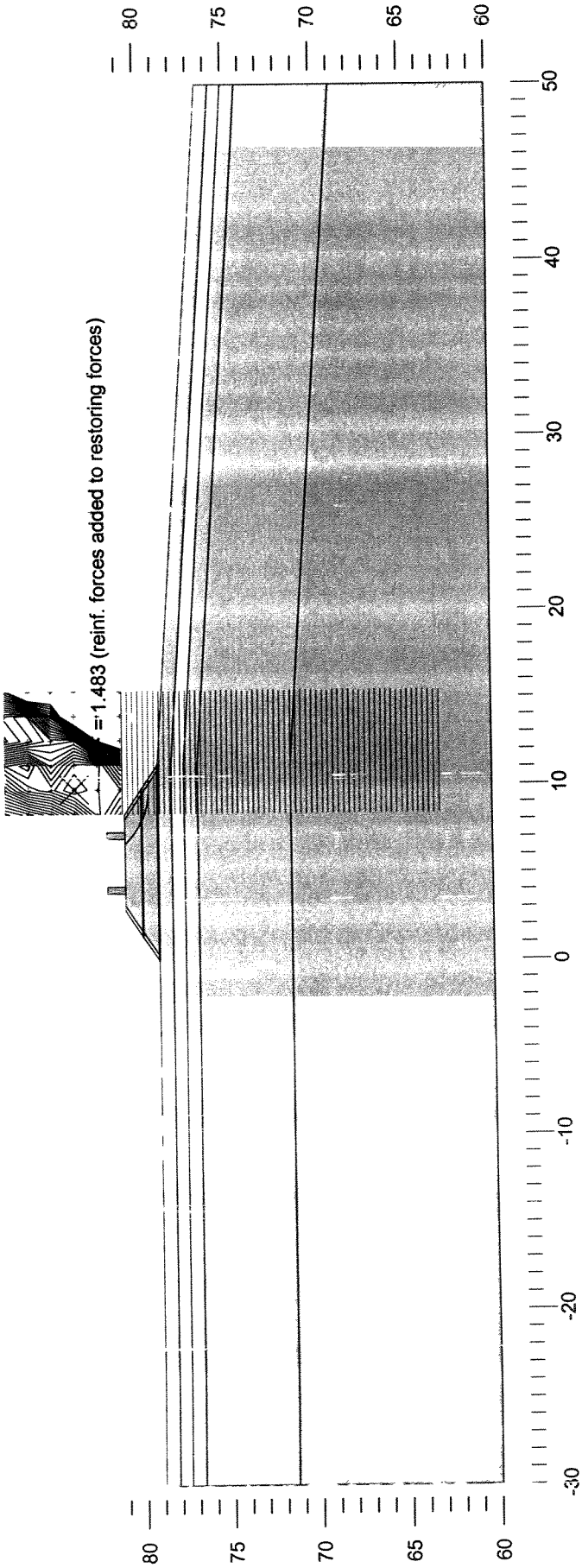
Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	7	79.23	4.6	0

Summary of Reinforcement:

Tallowable	Total Length
4.6	7

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-17-04
 NORTHWEST QUAD - PIER A (DH = 1.9m)
 ACCESS ROAD TO LARGE CRANE PAD

	Gamma C kN/m ³	Phi deg	Piezo Surf.
Crane	184	1000	0 1
Prism Facing	19	1	38 1
Reinforced Fill	19	0	38 1
Silty Clay w/ Or	18	30	0 1
Loose Sand	20	0	30 1
Silty Clay	18	30	0 1
Stiff Clay	18	75	0 1
Clayey Silt	18	25	0 1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS-1\ACCESSPA.GSL

Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-17-04
Label A NORTHWEST QUAD - PIER A (DH = 1.9m)
Label B ACCESS ROAD TO LARGE CRANE PAD

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 8
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 1
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 2
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	184	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	30	0	0	1	0	.6
5 Loose Sand	20	0	30	0	1	0	.6
6 Silty Clay	18	30	0	0	1	0	.6
7 Stiff Clay	18	75	0	0	1	0	.6
8 Clayey Silt	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord

Y-Coord

-30	79
0	79
2.85	80.9
3.85	80.9
3.86	81.9
4.24	81.9
4.25	80.9
6.96	80.9
6.97	81.9
7.35	81.9
7.36	80.9
8.35	80.9
11.2	79
50	76.5

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79
0	79
2.85	80.9
8.35	80.9
11.2	79
50	76.5

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79
0.3	79
3.15	80.9
8.05	80.9
10.9	79
11.2	79
50	76.5

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
---------	---------

-30	79
11.2	79
50	76.5

Upper Surface of Material # 5 (Loose Sand)

X-Coord	Y-Coord
-30	78.2
11.2	78.2
50	75.7

Upper Surface of Material # 6 (Silty Clay)

X-Coord	Y-Coord
-30	77.5
11.2	77.5
50	75

Upper Surface of Material # 7 (Stiff Clay)

X-Coord	Y-Coord
-30	76.7
11.2	76.7
50	74.2

Upper Surface of Material # 8 (Clayey Silt)

X-Coord	Y-Coord
-30	71.4
11.2	71.4
50	68.9

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79
11.2	79
50	76.5

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	11.2	79	28.7	0
2	1.35	8.5	79.9	4.6	0

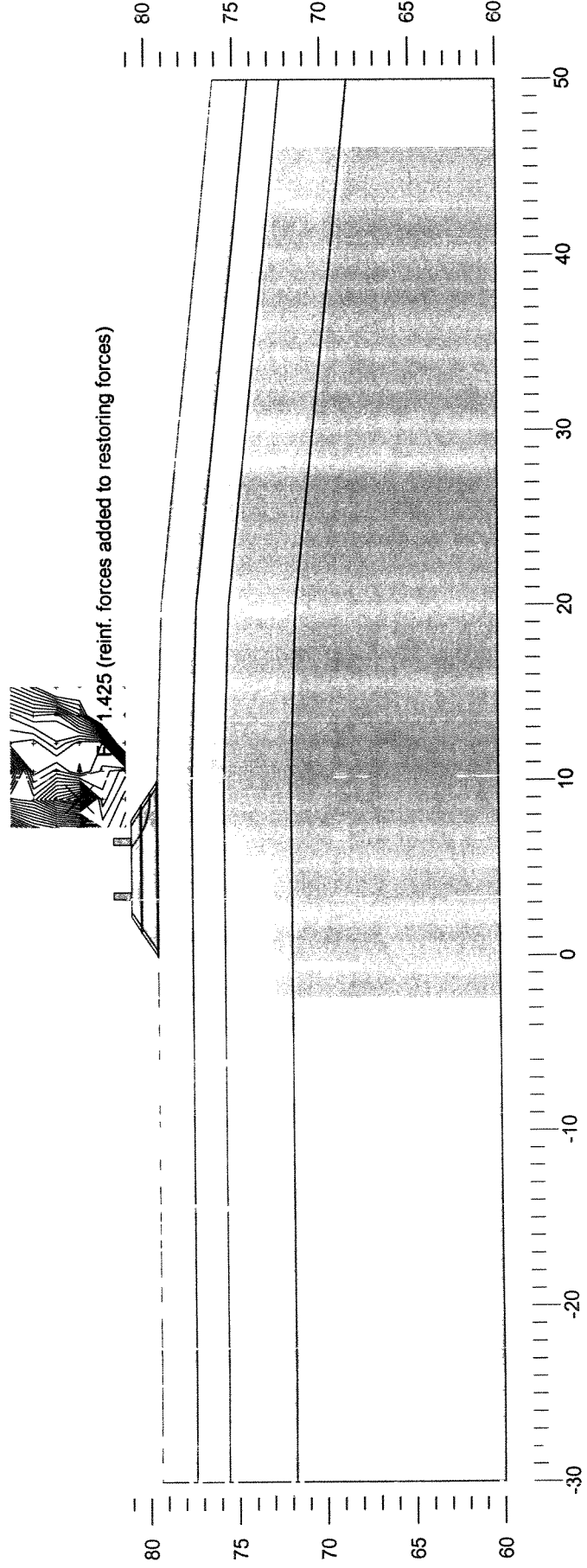
Summary of Reinforcement:

Tallowable	Total Length
28.7	11.2
4.6	8.5

□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-17-04
 SOUTHWEST QUAD - PIER A (DH = 1.47m)
 ACCESS ROAD TO LARGE CRANE PAD

	Gamma C kN/m3	Phi deg	Piezo Surf.
Crane	184	0	1
Prism Facing	19	38	1
Reinforced Fill	19	0	38
Silty Clay w/ Or	18	30	0
Loose Sand	20	0	30
Stiff Clay	18	75	0
Clayey Silt	18	25	0



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS-1\ACCPA2.GSL

Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-17-04
Label A SOUTHWEST QUAD - PIER A (DH = 1.47m)
Label B ACCESS ROAD TO LARGE CRANE PAD

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 7
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 1
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 2
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	184	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	30	0	0	1	0	.6
5 Loose Sand	20	0	30	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Clayey Silt	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

0	79.4
2.25	80.9
3.25	80.9
3.26	81.9
3.65	81.9
3.66	80.9
6.36	80.9
6.37	81.9
6.76	81.9
6.77	80.9
7.75	80.9
10	79.4
20	79.1
29	78.2
50	76.1

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79.4
0	79.4
2.25	80.9
7.75	80.9
10	79.4
20	79.1
29	78.2
50	76.1

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79.4
0.3	79.4
2.55	80.9
7.45	80.9
9.7	79.4
10	79.4
20	79.1

29	78.2
50	76.1

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
-30	79.4
10	79.4
20	79.1
29	78.2
50	76.1

Upper Surface of Material # 5 (Loose Sand)

X-Coord	Y-Coord
-30	77.4
10	77.4
20	77.1
29	76.2
50	74.1

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	75.6
10	75.6
20	75.3
29	74.4
50	72.3

Upper Surface of Material # 7 (Clayey Silt)

X-Coord	Y-Coord
-30	71.9
10	71.8
20	71.5
29	70.6
50	68.5

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79.4
10	79.4
20	79.1
29	78.2
50	76.1

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	10	79.4	28.7	0
2	1.35	7.3	80.3	4.6	0

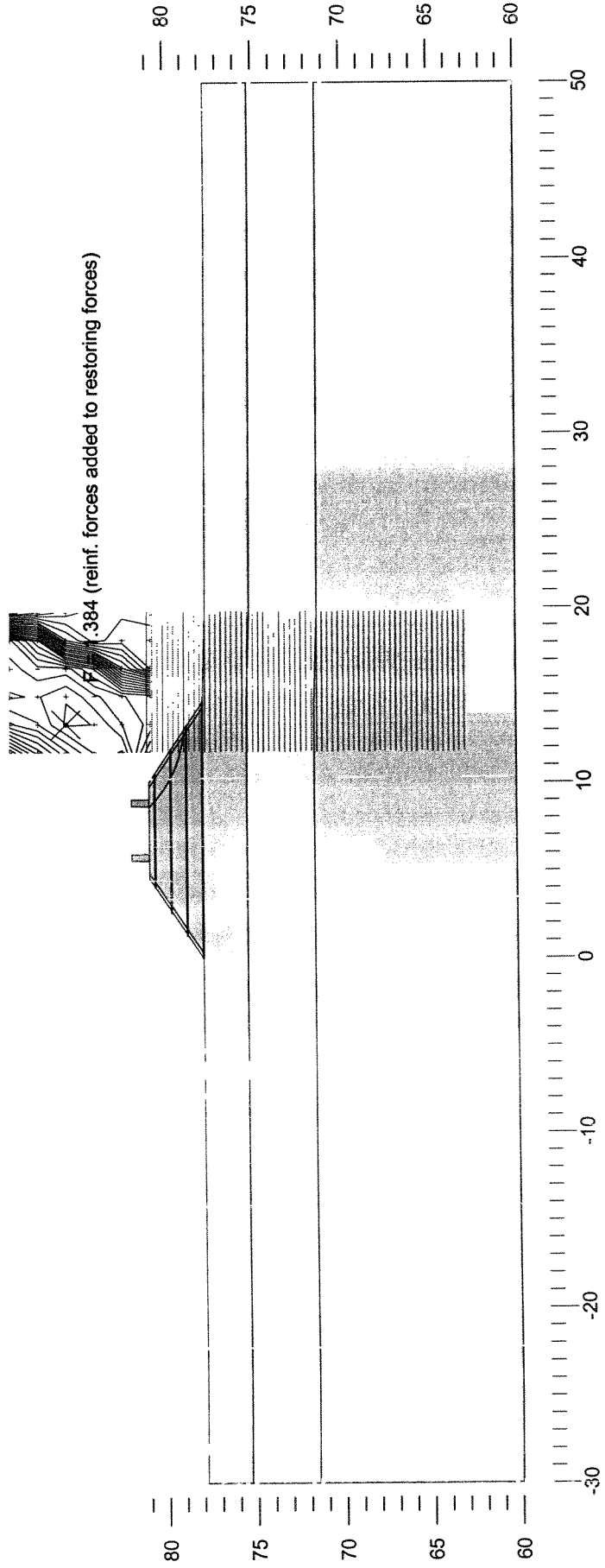
Summary of Reinforcement:

Tallowable	Total Length
28.7	10
4.6	7.3

□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-17-04
 NORTHWEST & SOUTHWEST QUAD - PIER B (DH = 3m)
 ACCESS ROAD TO SMALL CRANE PAD

	Gamma C kN/m3	Phi kPa	Phi deg	Piezo Surf.
Crane	184	1000	0	1
Prism Facing	19	1	38	1
Reinforced Fill	19	0	38	1
Loose Sand w/ Or	20	0	28	1
Stiff Clay	18	75	0	1
Stiff Clay	18	25	0	1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS-1\ACCPB.GSL

Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-17-04
Label A NORTHWEST & SOUTHWEST QUAD - PIER B (DH
= 3m)
Label B ACCESS ROAD TO SMALL CRANE PAD

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 6
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 1
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 4
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	184	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Loose Sand w/ Or	20	0	28	0	1	0	.6
5 Stiff Clay	18	75	0	0	1	0	.6
6 Stiff Clay	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

-30 77.85

0	77.85
4.57	80.9
5.57	80.9
5.58	81.9
5.97	81.9
5.98	80.9
8.68	80.9
8.69	81.9
9.07	81.9
9.08	80.9
10.07	80.9
14.64	77.85
19.64	77.7
50	77.7

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	77.85
0	77.85
4.57	80.9
10.07	80.9
14.64	77.85
19.64	77.7
50	77.7

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	77.85
0.3	77.85
4.87	80.9
9.77	80.9
14.34	77.85
14.64	77.85
19.64	77.7
50	77.7

Inner Surface of Material # 4 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	77.85
14.64	77.85
19.64	77.7
50	77.7

Upper Surface of Material # 5 (Stiff Clay)

X-Coord	Y-Coord
-30	75.35
14.64	75.35
19.64	75.2
50	75.2

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	71.55
14.64	71.55
19.64	71.4
50	71.4

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	77.85
14.64	77.85
19.64	77.7
50	77.7

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	14.64	77.85	28.7	0
2	1.29	12	78.75	4.6	0
3	2.58	9.36	79.65	4.6	0

4	4.05	6.5	80.55	4.6	0
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Summary of Reinforcement:

Tallowable	Total Length
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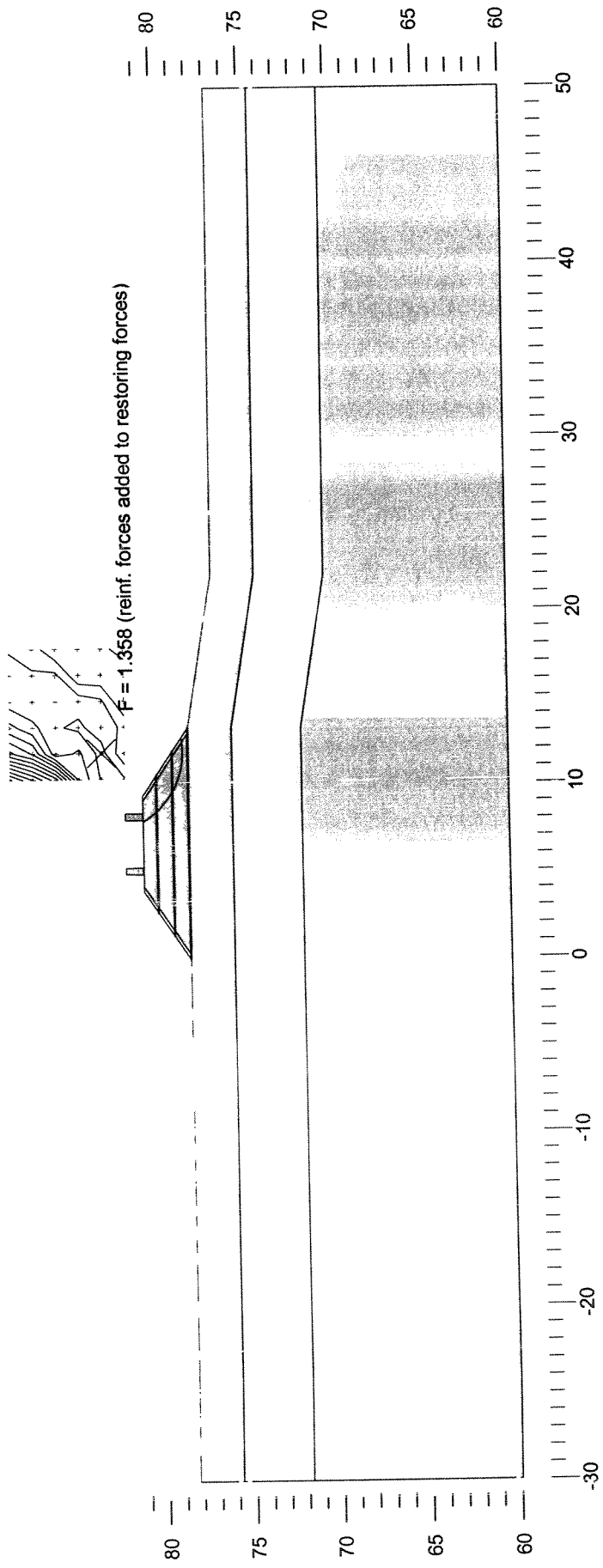
28.7	14.64
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4.6	27.86
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Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-17-04
 NORTHWEST & SOUTHWEST QUAD - PIER C (DH = 2.6m)
 ACCESS ROAD TO SMALL CRANE PAD

	Gamma C kN/m3	Phi deg	Piezo Surf.
Crane	184	1000	0
Prism Facing	19	1	38
Reinforced Fill	19	0	38
Loose Sand w/ Or	20	0	28
Stiff Clay	18	75	0
Stiff Clay	18	25	0



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS~1\ACCPC.GSL

Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-17-04
Label A NORTHWEST & SOUTHWEST QUAD - PIER C (DH
= 2.6m)
Label B ACCESS ROAD TO SMALL CRANE PAD

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 6
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 1
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 3
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	184	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Loose Sand w/ Or	20	0	28	0	1	0	.6
5 Stiff Clay	18	75	0	0	1	0	.6
6 Stiff Clay	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

0	78.29
3.9	80.9
4.9	80.9
4.91	81.9
5.29	81.9
5.3	80.9
8	80.9
8.01	81.9
8.4	81.9
8.41	80.9
9.4	80.9
13.3	78.29
22	76.89
50	76.89

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	78.29
0	78.29
3.9	80.9
9.4	80.9
13.3	78.29
22	76.89
50	76.89

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	78.29
0.3	78.29
4.2	80.9
9.1	80.9
13	78.29
13.3	78.29
22	76.89
50	76.89

Upper Surface of Material # 4 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	78.29
13.3	78.29
22	76.89
50	76.89

Upper Surface of Material # 5 (Stiff Clay)

X-Coord	Y-Coord
-30	75.79
13.3	75.79
22	74.39
50	74.39

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	71.79
13.3	71.79
22	70.39
50	70.39

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	78.29
13.3	78.29
22	76.89
50	76.89

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	13.3	78.29	28.7	0
2	1.33	10.63	79.19	4.6	0
3	2.65	7.96	80.09	4.6	0

Summary of Reinforcement:

Tallowable	Total Length
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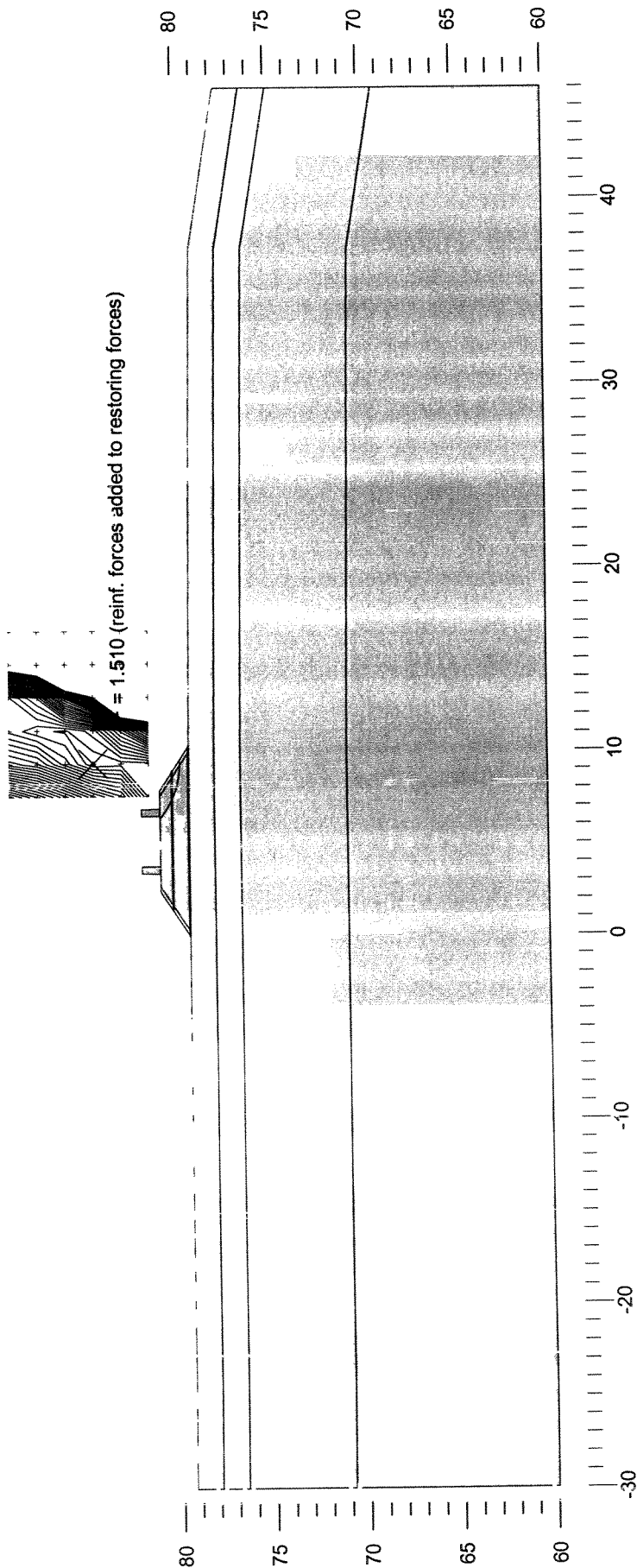
28.7	13.3
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4.6	18.59
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□

Tensar Earth Technologies - Atlanta
E04901
MTO HWY 401 - SALMON RIVER BRIDGE
2-17-04
NORTHEAST QUAD - PIER D (DH = 1.57m)
ACCESS ROAD TO LARGE CRANE PAD

	Gamma C kN/m3	C kPa	Phi deg	Piezo Surf.
Crane	184	1000	0	1
Prism Facing	19	1	38	1
Reinforced Fill	19	0	38	1
Loose Sand w/ Or	20	0	30	1
Silty Clay w/ Or	18	30	0	1
Stiff Clay	18	75	0	1
Clayey Silt	18	25	0	1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS-1\ACCPD.GSL

Job Number E04901
 Title MTO HWY 401 - SALMON RIVER BRIDGE
 Date 2-17-04
 Label A NORTHEAST QUAD - PIER D (DH = 1.57m)
 Label B ACCESS ROAD TO LARGE CRANE PAD

Maximum Slice Width 1
 Number of Soil Layers: (1 to 20) 7
 Earthquake Acceleration: 0
 No. of External Forces: (0 to 100) 1
 Piezometric Surfaces: (0 to 9) 1
 Unit weight of Water: 9.81
 Reinforcement Layers: (0 to 100) 2
 FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	184	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Loose Sand w/ Or	20	0	30	0	1	0	.6
5 Silty Clay w/ Or	18	30	0	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Clayey Silt	18	25	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord
 -30 79.33

0	79.33
2.4	80.9
3.4	80.9
3.41	81.9
3.8	81.9
3.81	80.9
6.51	80.9
6.52	81.9
6.9	81.9
6.91	80.9
7.9	80.9
10.3	79.33
37.3	79.1
46	77.7

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79.33
0	79.33
2.4	80.9
7.9	80.9
10.3	79.33
37.3	79.1
46	77.7

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79.33
0.3	79.33
2.7	80.9
7.6	80.9
10	79.33
10.3	79.33
37.3	79.1
46	77.7

Upper Surface of Material # 4 (Loose Sand w/ Or)

X-Coord	Y-Coord
-30	79.33
10.3	79.33
37.3	79.1
46	77.7

Upper Surface of Material # 5 (Silty Clay w/ Or)

X-Coord	Y-Coord
-30	77.93
10.3	77.93
37.3	77.7
46	76.3

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	76.53
10.3	76.53
37.3	76.3
46	74.9

Upper Surface of Material # 7 (Clayey Silt)

X-Coord	Y-Coord
-30	70.83
10.3	70.83
37.3	70.6
46	69.2

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79.33
10	79.33
37.3	79.1
46	77.7

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
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1 0 0 0 0 Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	10.3	79.33	28.7	0
2	1.38	7.59	80.23	4.6	0

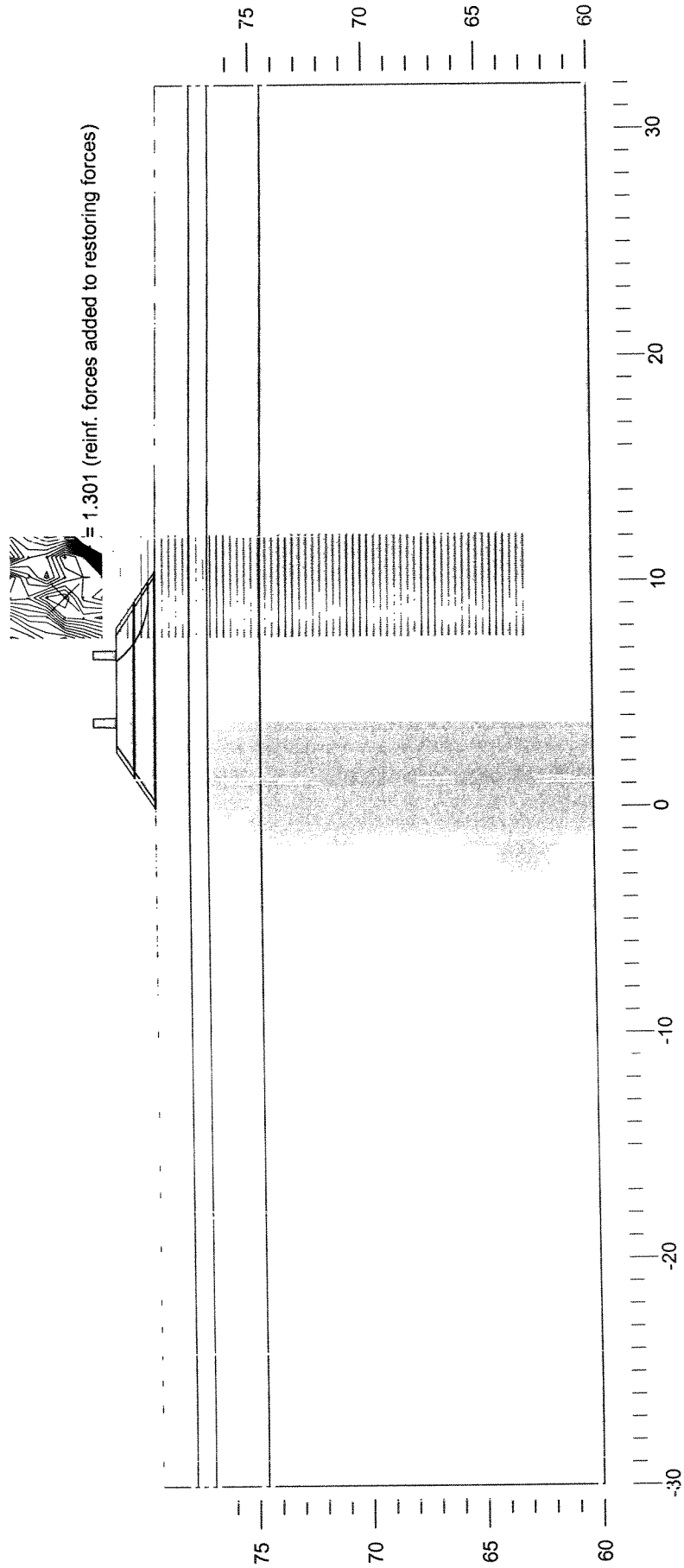
Summary of Reinforcement:

Tallowable	Total Length
28.7	10.3
4.6	7.59

□

Tensar Earth Technologies - Atlanta
 E04901
 MTO HWY 401 - SALMON RIVER BRIDGE
 2-17-04
 SOUTHEAST QUAD - PIER D (DH = 1.67m)
 ACCESS ROAD TO LARGE CRANE PAD

	Gamma kN/m3	C kPa	Phi deg	Piezo Surf.
Crane	184	1000	0	1
Prism Facing	19	1	38	1
Reinforced Fill	19	0	38	1
Silty Clay w/ Or	18	20	0	1
Loose Silty Sand	20	0	28	1
Stiff Clay	18	75	0	1
Stiff Clay Silt	18	50	0	1



DATA FILE NAME..... K:_E\E04901\FINAL\DESIGN\ACCESS-1\ACCPD2.GSL

Job Number E04901
Title MTO HWY 401 - SALMON RIVER BRIDGE
Date 2-17-04
Label A SOUTHEAST QUAD - PIER D (DH = 1.67m)
Label B ACCESS ROAD TO LARGE CRANE PAD

Maximum Slice Width 1
Number of Soil Layers: (1 to 20) 7
Earthquake Acceleration: 0
No. of External Forces: (0 to 100) 1
Piezometric Surfaces: (0 to 9) 1
Unit weight of Water: 9.81
Reinforcement Layers: (0 to 100) 2
FoS against Pullout: 1.5

Material	Unit Wt	Cohesion	Friction Angle	Min. c/p	Piezo Surf.	Ru	Interaction Coefficient
1 Crane	184	1000	0	0	1	0	.6
2 Prism Facing	19	1	38	0	1	0	.6
3 Reinforced Fill	19	0	38	0	1	0	.6
4 Silty Clay w/ Or	18	20	0	0	1	0	.6
5 Loose Silty Sand	20	0	28	0	1	0	.6
6 Stiff Clay	18	75	0	0	1	0	.6
7 Stiff Clay Silt	18	50	0	0	1	0	.6

Upper Surface of Material # 1 (Crane)

X-Coord Y-Coord

0	79.23
2.51	80.9
3.61	80.9
3.62	81.9
4.01	81.9
4.02	80.9
6.62	80.9
6.63	81.9
7.01	81.9
7.02	80.9
8.01	80.9
10.52	79.23
32	79.1

Upper Surface of Material # 2 (Prism Facing)

X-Coord	Y-Coord
-30	79.23
0	79.23
2.51	80.9
8.01	80.9
10.52	79.23
32	79.1

Upper Surface of Material # 3 (Reinforced Fill)

X-Coord	Y-Coord
-30	79.23
0.3	79.23
2.81	80.9
7.71	80.9
10.32	79.23
10.52	79.23
32	79.1

Upper Surface of Material # 4 (Silty Clay w/ Or)

X-Coord	Y-Coord
-30	79.23

10.52	79.23
32	79.1

Upper Surface of Material # 5 (Loose Silty Sand)

X-Coord	Y-Coord
-30	77.73
10.52	77.73
32	77.6

Upper Surface of Material # 6 (Stiff Clay)

X-Coord	Y-Coord
-30	76.93
10.52	76.93
32	76.8

Upper Surface of Material # 7 (Stiff Clay Silt)

X-Coord	Y-Coord
-30	74.63
10.52	74.63
32	74.5

Piezometric Surface No. 1

X-Coord	Y-Coord
-30	79.23
10.52	79.23
32	79.1

Force No.	X-coord.	Y-coord	Hor.comp	Vert.comp	Acts on slice No.
1	0	0	0	0	Does not act.

Reinforcement				Tallowable	Tconnection
Layer	Position			per unit	per unit
No.	X1	Length	Elevation	width	width
1	0	10.52	79.23	28.7	0
2	1.27	7.9	80.13	4.6	0

Summary of Reinforcement:

Tallowable	Total Length
28.7	10.52
4.6	7.9

□