

March 9, 2009

Project BL-07-01046

Mr. S. Rick Brown, PE
SRF Consulting Group, Inc.
One Carlson Parkway North, Suite 150
Minneapolis, MN 55447-4443

Re: Addendum 1 to Geotechnical Evaluation
Lowry Avenue Bridge Replacement Project
Interim Connection Retaining Wall
Lowry Avenue between Marshall Street and the West Bank of the Mississippi River
Minneapolis, Minnesota
Bridge No. 27B60
State Aid Project No. 27-753-16

Dear Mr. Brown:

This letter serves as Addendum 1 to our Geotechnical Evaluation Report for this project, dated December 29, 2008. This Addendum addresses design and construction of the proposed retaining wall for support of the eastbound interim connection, along with deep foundation recommendations for the Interim West Abutment.

Background

Our Geotechnical Evaluation Report provided geotechnical design and construction recommendations for the planned replacement of the Lowry Avenue Bridge over the Mississippi River in Minneapolis, Minnesota. The proposed bridge will consist of a seven-span, tied arch structure. Currently, construction will include the spans from the west to east sides of the Mississippi River (West and East Abutments, and Piers 4, 5 and 6). In the future, the West Abutment will be removed and the bridge will extend to the west side of the existing railroad. The bridge will accommodate two lanes of traffic in each direction and will therefore require widening of the existing Lowry Avenue. Initially, Lowry Avenue will not be widened much to the west of the West Abutment, necessitating a temporary retaining wall to connect the proposed eastbound bridge lanes with the existing eastbound Lowry Avenue lanes.

We provided recommendations for construction of the eastbound interim connection using a temporary fascia covering and lightweight fill embankment. We also recommended leaving the existing crib wall in place.

New Information

According to SRF Consulting Group, Inc. (SRF), we understand that the project team has chosen to use a cast-in-place retaining wall with a combination of soil and lightweight fill to support the proposed eastbound interim connection. A driven pile foundation system will support the proposed retaining wall. The interim connection extends from about Sta. 317+17 to the West Abutment at about Sta. 319+34, for a total length of about 220 linear feet. At the widest point (i.e., at the Interim West Abutment), the new fill for the interim connection has a width of about 36 feet. We also understand that the proposed construction sequence will consist of driving the foundation piles, constructing the retaining wall and abutment, backfilling the entire wall and abutment with soil fill, removing approximately 10 feet of soil fill, placing 5 feet of lightweight fill, capping the lightweight fill with about 3 feet of soil fill, and placing roadway pavement.

We also understand that the planned bottom-of-pile-cap (BOPC) elevations for Pier 4 and the East Abutment have changed. The current design elevations are about 810 and 798 for Pier 4 and the East Abutment, respectively.

Recommendations

Based on a maximum fill height of about 22 ½ feet, we estimate that the existing fill and underlying native soils will consolidate between about 3 to 5 inches. Due to the predominantly granular nature of the existing fill and native soils, we anticipate that primary consolidation will occur within about one week after filling operations are complete. Therefore, we recommend that project planning include a one-week delay between placing the soil fill and removing the upper 10 feet of soil fill in order to place lightweight fill.

To evaluate cast-in-place (CIP) pipe piles for support of the proposed interim retaining wall and Interim West Abutment, we used the same calculation methods and assumptions discussed in our previously referenced geotechnical evaluation for this project. We evaluated 10-inch, 12-inch and 16-inch CIP, closed-end pipe piles for the interim retaining wall and 16-inch CIP, closed-end pipe piles for the Interim West Abutment. Because project the anticipated axial compression loads for the retaining wall are not known at this time, we are attaching a Nominal Compression Capacity versus Pile Length graphs. We recommend using a maximum Factored Resistance of 400 kips for the 16-inch CIP piles, 360 kips for the 12-inch CIP piles and 300 kips for the 10-inch CIP piles. As a revision to Section C.2. on page 12 of our previous report, we recommend a maximum Factored Resistance of 1,600 kips for the 32-inch CIP piles and 400 kips for the 16-inch CIP piles.

To reflect the changes in proposed bottom-of-pile-cap elevations for Pier 4 and the East Abutment, we have updated Table 2 of our report below.

Table 2. Assumed Pile Cap Elevations

Substructure	BOPC Elevation
West Abutment	808
Pier 1	805
Pier 2	804
Pier 3	800
Interim West Abutment	828
Pier 4	810
Pier 5	798
Pier 6	798
East Abutment	798

As a result of the changed bottom-of-pile-cap elevation for Pier 4, we have revised the Nominal Compression Capacity versus Pile Length and Nominal Uplift Capacity versus Pile Length graphs for Pier 4.

The piles supporting the retaining wall and Interim West Abutment will be subject to downdrag loads as a result of the new fill placement. We anticipate that the downdrag loads in combination with the factored loads will cause the piles to settle more than ½ inch as consolidation of the soil occurs. Once this settlement occurs, the piles will no longer be subject to a downdrag load.

After consolidation of new fill, existing fill and underlying native soils, we anticipate total and differential deformation of the pile heads will be less than 1-inch and ½-inch, respectively, under the assumed factored loads. Piles driven with the driving control methods referenced in our previous report are not designed to settle. The majority of deformation at the pile head will be due to elastic shortening of the pile under the design loads.

Due to anticipated pile driving practices, the proposed pile to be driven for the eastbound interim connection wall support will likely produce vibrations and possible settlement in adjacent structures. As a result of these vibrations, we recommend survey monitoring of the existing crib wall supporting the existing eastbound lane of Lowry Avenue. The most critical area for vibrations and settlement will likely be where the pile driving is closest to the existing wall. We recommend monitoring of settlement and tilting of the existing wall in the vicinity of Sta. 317+15. We also recommend locating and driving piles at least 5 pile diameters from the existing wall.

We also understand that piling will be driven approximately 3-feet from the existing, timber pile supported west abutment. We recommend that the west abutment also be monitored for both settlement and tilting with the use of survey points.

Remarks

This addendum should be attached to and considered a part of our original Geotechnical Evaluation Report. With the exception of any results or recommendations changed by this Addendum, the information contained in our Geotechnical Evaluation Report remains unchanged.

If you have any questions about this Addendum, please contact Matt Glisson at 952.995.2246 or Jeff Gebhard at 952.995.2252.

Sincerely,

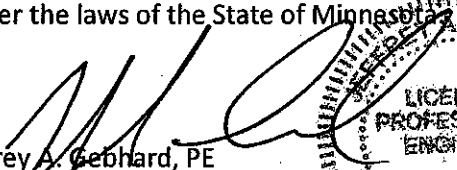
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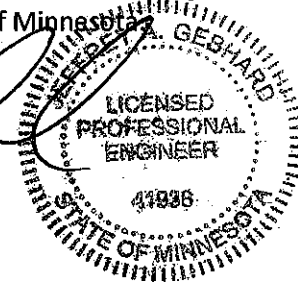
Matthew R. Glisson, PE
Project Engineer

Professional Certification:

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Jeffrey A. Gebhard, PE
Principal Engineer
License Number: 41938

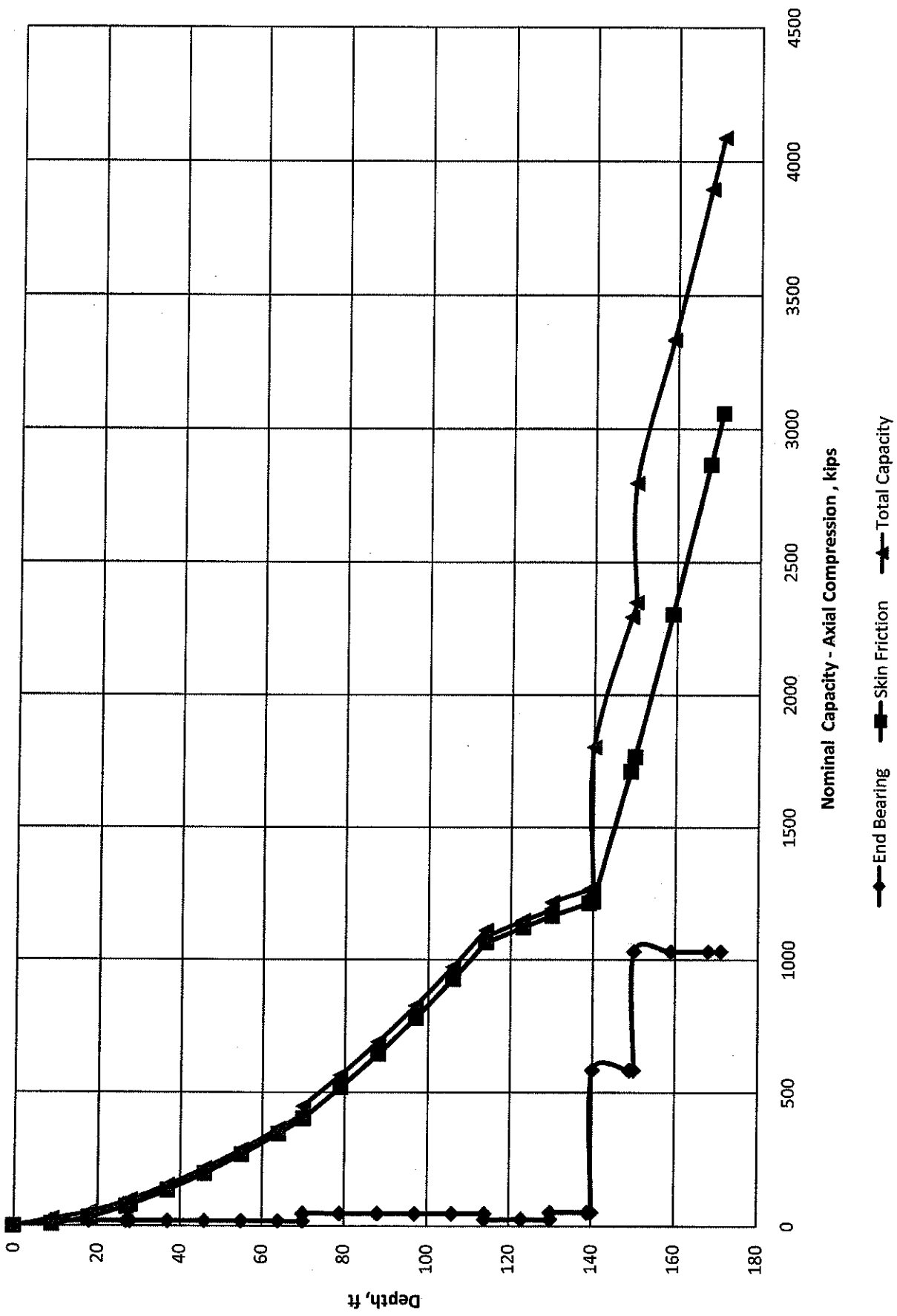


Attachments:
Axial Pile Results

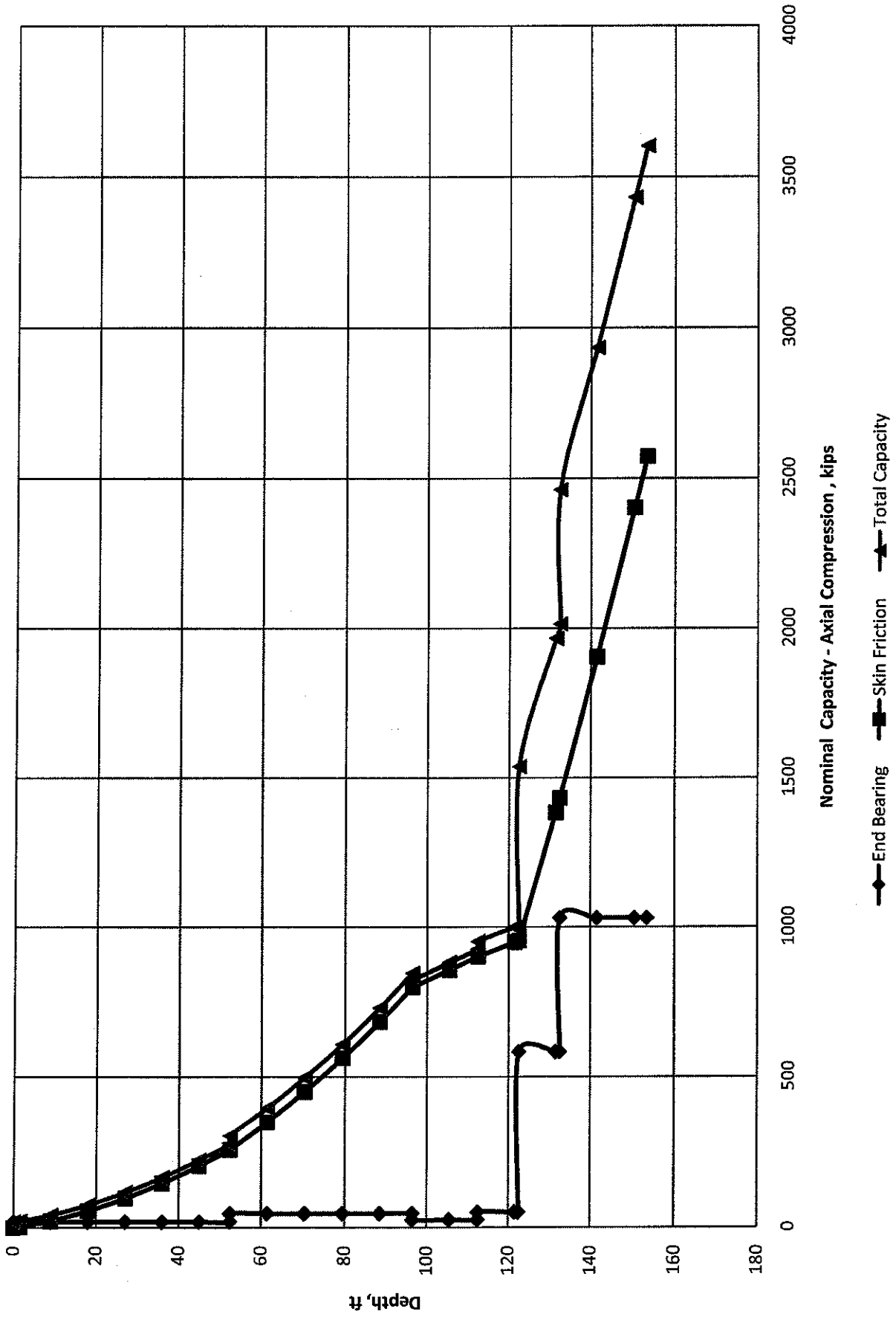
c: John Thiesse; BKBM

Addendum 01

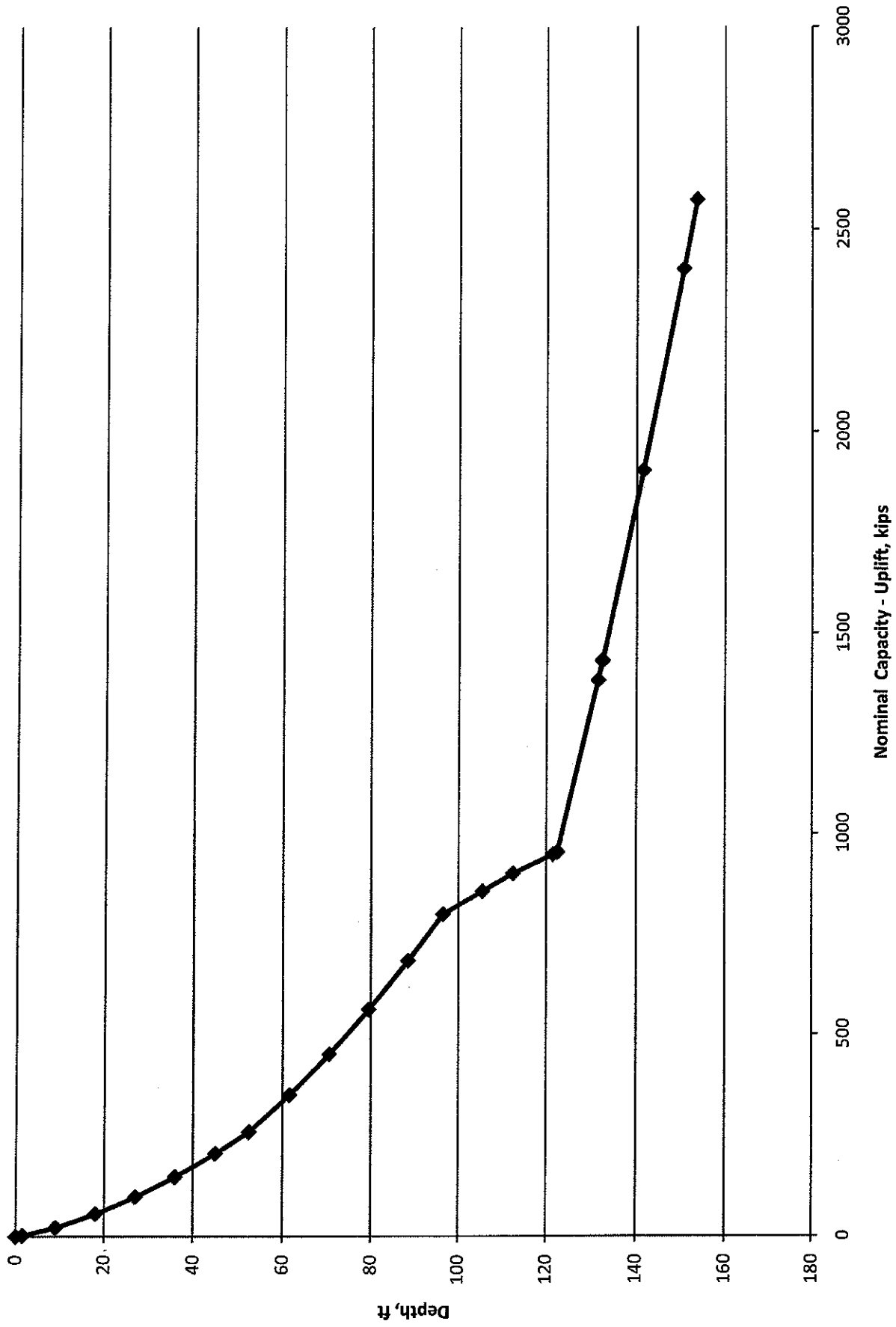
Interim West Abutment - Axial Compression - 16" Diam CIP, CE



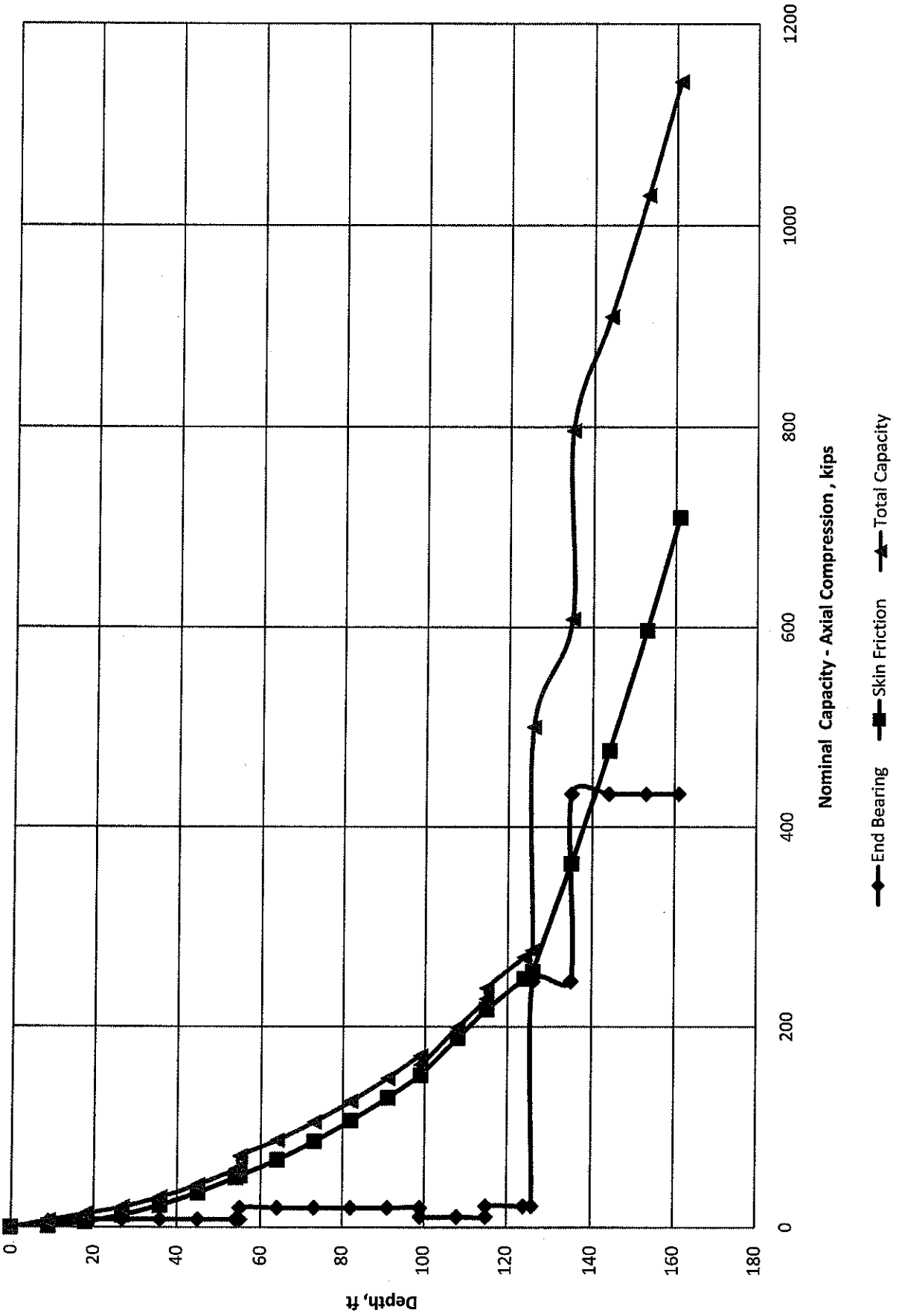
Pier 4 - revised - Axial Compression - 16" Diam CIP, CE



Pier 4 - revised - Uplift - 16" Diam CIP, CE



Interim Retaining Wall - Axial Compression - 10" Diam CIP, CE



Interim Retaining Wall - Axial Compression - 12" Diam CIP, CE

