FOR CONTRACT NO.: 01-47940**4**

INFORMATION HANDOUT

MATERIALS INFORMATION

(***NOT A PART OF THE CONTRACT***)

Final Hydraulic Report for Middle Fork Smith River Bridge dated October 17, 2011

Foundation Report for Middle Fork Smith River Bridge (Replace) dated February 26, 2013

Foundation Report for the North Retaining Wall dated February 13, 2013

Foundation Report for Retaining Wall at PM 20.5 dated March 1, 2012

Foundation Report Addendum for Retaining Wall at PM 20.5 dated February 20, 2013

Foundation Report for Retaining Wall at PM 25.5 dated March 1, 2012

Foundation Report Addendum for Retaining Wall at PM 25.5 dated February 20, 2013

Cutslope Recommendations dated February 21, 2013

Northern Spotted Owl Survey Protocol (January 2012)

Wildlife Pre-Construction Surveys for the Willits Bypass

PERMITS, LICENSES, AGREEMENTS, CERTIFICATIONS (PLAC's)

UNITED STATES ARMY CORPS OF ENGINEERS
NATIONWIDE PERMIT 14

CALIFORNIA NORTH COAST REGION WATER QUALITY CONTROL BOARD
401 CERTIFICATION

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
1600 STREAMBED ALTERATION AGREEMENT

ROUTE: 01-DN-199-20.3/25.9

State of California - Department of Transportation
Division of Engineering Services
Structure Design Services

FINAL HYDRAULIC REPORT

Middle Fork Smith River Bridge

Br. No. 01-0080 (NEW)

1 - DN - 199 - PM 24.08

Located 2 miles east of Patrick Creek, California

PROJECT DESCRIPTION:
Proposed Arch-Span Bridge Replacement (*EA: 01-479401, EFIS: 01 0000 0371*)

Prepared by:

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October 17, 2011

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General Notes:

1) *Unless otherwise indicated, elevations shown in the report are based on the North American Vertical Datum of 1988 (NAVD88). Field survey data used for the HEC-RAS model was provided by District 1 Survey Branch (Sept. 2011).*

2) *The hydraulic/scour results and recommendations provided in this report are based on information and survey data currently available. Some assumptions and simplifications for the hydraulic modeling were necessary due to limitations of the HEC-RAS modeling software and other site-specific factors [i.e. the complex arch-span design and the significant hydraulic skew (bridge/bent alignment relative to the direction of flow)].*

3) *Due to the length of the proposed bridge and the significant bridge skew (relative to the direction of flow), there is roughly 320 feet (measured longitudinally along the main channel) between the approximate upstream and downstream limits of the proposed bridge. For simplification purposes, the area between the upstream and downstream limits is referred to as the "bridge limits" in the report/study.*

GENERAL INFORMATION

It is proposed to remove an existing arch-span bridge (Br. No. 01-0015) and replace it with a new bridge structure (Br. No. 01-0080). The existing structure name of "*Middle Fork Smith River*" would be maintained. The proposed bridge location is just south of the existing bridge along a revised route alignment on State Route 199 in Del Norte County. The bridge site is located roughly 2 miles east of Patrick Creek, California, along State Route 199.

The original bridge was built in 1925 by the U.S. Bureau of Public Roads and widened in 1972 by Caltrans. The existing structure is a continuous 8-span, Cast-In-Place (CIP), Reinforced Concrete (RC) structure consisting of four approach spans at the south end, a main span, and 3 approach spans on the north end. The main span is 83 feet in length (measured along the centerline) and consists of a CIP/RC 2-rib open-spandrel arch with a CIP/RC deck. The approach spans are continuous CIP/RC slabs on RC 2-column bents and abutments. All existing foundations are RC spread footings. The existing bridge is 149 feet in total length (measured along the centerline) and 25 feet in total width.

Based on the proposed General Plan (GP) sheet for the bridge replacement (dated 5/5/11), the new bridge/side-hill viaduct structure is proposed to have a total length (measured along the centerline) of 343 feet-6 inches and a total width of 43 feet-6 inches. The proposed bridge is an eleven-span (32 feet-3 inches, 9 spans at 31 feet, 32 feet-3 inches), CIP/RC arch-span bridge structure with a proposed structure depth (top deck slab) of 1 foot-6 inches. Foundations shown on the proposed GP include spread footings and 36-inch Cast-In-Drilled-Hole (CIDH) piles. Preliminary geotechnical recommendations for the Type Selection Meeting (May 2011) indicated using spread footings or CIDH piles for the abutments, inclined mined shaft or micro-piles for the skewbacks, and CIDH piles for all pier locations (the CIDH piles will be socketed into rock). The existing bridge will also be removed as part of the project.

In January 2011, the Structure - Hydraulics & Hydrology Branch received a letter (dated 1/6/11) from Bridge Design Branch 1 requesting a DRAFT Final Hydraulic Report (FHR) be completed by 3/1/11 in order to meet the project schedule. Additional field survey data was required for the completion of the final hydraulic modeling and analysis for the Final Hydraulic Report. The requested supplemental survey data was not available until September 2011 due to local high-flow conditions.

DESCRIPTION OF WATERSHED

The Smith River, which has three major tributaries: the North Fork, the Middle Fork, and the South Fork, flows naturally for its entire length - there are no dams located along this entire river system *(http://www.rivers.gov/wsr-smith.html)*. Typical flows in the river include seasonal precipitation runoff and melting snowpack from the winter. The Smith River flows westerly until it eventually outfalls into the Pacific Ocean near the California-Oregon border.

The watershed area located upstream of the bridge site is natural, undeveloped mountainous forestland with relatively steep slopes. According to the FEMA Flood Insurance Study (FIS), most of Del Norte County is located within the Six Rivers National Forest and logging is a major industry in the area. Based on USGS 7.5-Minute Series topographic maps, elevations within the watershed vary from roughly 6,308 feet (Youngs Peak) in the higher elevations to roughly 949 feet near the proposed bridge site (National Geodetic Vertical Datum of 1929, NGVD29).

The Watershed Modeling System (WMS, Version 8.3) software program was used to delineate the watershed using available topographic data from the USGS National Elevation Dataset (NED) (10-meter Digital Elevation Maps, DEM's). The WMS program calculated a watershed (drainage) basin area of 76.9 square miles above the bridge site. For comparison purposes, a watershed delineation using USGS 7.5-Minute Series (Topographic) Quadrangle maps (*Shelly Creek Ridge, Broken Rib Mountain, Devil's Punchbowl*, and *Hurdygurdy Butte*) estimated the watershed basin area as 76.6 square miles. An estimated watershed basin area of 76.9 square miles was considered for this hydraulic study.

PEAK DISCHARGES

The "Peak flow FreQuency" flood-frequency analysis program (PKFQWin) is software available from the USGS to estimate the magnitude and frequency of floods based on historical (peak) flow data. The program is based on the Bulletin 17B procedure and uses Log Pearson Type III distribution for the analysis. A USGS streamgage (No. 11531000) located on Middle Fork Smith River in Gasquet, California, recorded a total of 16 (annual) peak flow records between 1912 and 1965 (water years).

Based on the available historical peak data, PKFQWin (Version 5.2) calculated the frequency discharges at the gaged site. To estimate the frequency discharges at the (ungaged) bridge site, the basin transfer method was used to adjust for the difference in watershed areas. The estimated 50-year and 100-year frequency discharges at the proposed bridge site are 22,900 cubic feet per second (cfs) and 25,900 cfs, respectively. The USGS streamgage also recorded a peak discharge for the December 1964 event, which is considered the current "flood of record" for the bridge site. Based on the calculated frequency discharges, the December 1964 event was approximately a 100-year frequency discharge.

For comparison purposes, peak discharges at the proposed bridge site were also estimated using the calculated drainage area and the Regional Flood-Frequency Analysis method for the North Coast (NC) Region. The mean annual precipitation for the bridge site watershed was calculated as 95.1 inches per year based on a weighted precipitation average (Source: Oregon Climate Service map, 1990). At the proposed bridge site, the estimated 50-year and 100-year frequency using this method were 29,700 cfs and 33,500 cfs, respectively.

Comparing the estimated peak discharges based on the two methods, statistical analysis using actual streamgage data was considered to provide more reliable discharges for the study. It may be noted that the USGS streamgage was located further downstream on the same fork of the Smith River as the bridge site and both watersheds share similar general basin characteristics. For this study, the estimated 50-year and 100-year frequency discharges at the proposed bridge site are 22,900 cfs and 25,900 cfs, respectively.

WATER SURFACE ELEVATIONS (WSEL's)

Field survey data for the bridge site was provided by the District 1 Survey Branch in CAiCE file format. Supplemental field survey data necessary for the final hydraulic model was obtained by the District 1 Survey Branch in August/September 2011 as local site and weather conditions allowed. The survey data was based on the NAVD88 vertical datum and was used to obtain representative channel cross-sections along the study reach.

A hydraulic model of the bridge site was created using HEC-RAS (Version 4.0) software based on geometric data provided by the field surveys, assumed channel details, and information shown on the proposed General Plan sheet *(Refer to Page 13, **ATTACHMENT 1, FIGURE 1 & 2**)*. The Hydrologic Engineering Center - River Analysis System (HEC-RAS) is a one-dimensional hydraulic analysis program developed by the U.S. Army Corps of Engineers (USACOE).

Based on available photos of the bridge site and engineering judgment, Manning's roughness coefficients ("n") for the main channel area and the more heavily-vegetated, immediate overbank (channel) areas were estimated as 0.032 and 0.048, respectively. The HEC-RAS program composited the adjacent channel "n" values at cross-section locations where applicable. Composited "n" values calculated by the HEC-RAS program for the main channel were verified for reasonableness.

Due to the significant bridge skew angle (the orientation of the bridge structure relative to the direction of flow) and the overall length of the proposed bridge, there is roughly 320 feet (measured longitudinally along the main channel) between the approximate upstream and downstream limits of the proposed bridge. For simplification purposes, the area between the upstream and downstream limits is referred to as the "bridge limits" in this study/report.

The calculated WSEL's vary along the entire study reach; therefore, the maximum WSEL calculated within the bridge limits is conservatively assumed as a single representative value for the entire bridge site *(Refer to Page 14, **ATTACHMENT 2 - FIGURE 3 & 4**)*. Based on the estimated 50-year and 100-year frequency discharges, the HEC-RAS model for the proposed conditions calculated corresponding water surface elevations for the bridge site as 943.0 feet and 945.6 feet, respectively.

For information and comparison purposes only, the HEC-RAS model for the existing bridge (Br. No. 01-0015) calculated 944.7 feet and 945.9 feet for the 50-year and 100-year frequency discharge WSEL's, respectively. These estimated WSEL's were based on the highest local WSEL within the existing bridge limits.

It should be noted that the water surface elevations provided in the report are based on "unobstructed flow conditions" and do not consider any drift accumulation (loading) at the bridge piers. The December 1964 flood was associated with "*very heavy drift accumulation*" at the existing bridge piers, which may have influenced the locally-observed highwater (H.W.) elevations by partially blocking a portion of the bridge waterway area. *(A bridge report dated 2/12/65 noted the observed highwater elevation at Abutment 1 of the existing bridge was roughly 5 feet higher on the upstream side than on the downstream side of the bridge.)* Considering the longer arch-span replacement bridge is expected to provide improved drift passage conditions and more available freeboard during high-flow events than the existing bridge, any potential drift-related effects to local WSEL's at the new bridge are expected to be significantly reduced in comparison with existing conditions.

PEAK VELOCITY

For both existing and proposed conditions, the HEC-RAS models indicate subcritical flow (regime) conditions along the study reach. Calculated local peak velocities vary greatly along this reach (and within each cross-section) due to several site-specific factors, including channel geometry changes, variations in longitudinal channel slope, Manning's roughness "n" coefficients, and other variables.

Based on the 100-year frequency discharge, the HEC-RAS model calculated average and local peak velocities for the cross-sections located within the proposed bridge limits. At these cross-section locations, average flow velocities in the main channel area ranged from roughly 9 to 16 feet per second. Using the flow velocity distribution function in the HEC-RAS program, local peak velocities calculated within the bridge limits ranged from roughly 11 to 22 feet per second. For practical purposes, the local peak velocity calculated within the proposed bridge limits is 22 feet per second.

WATERWAY CAPACITY & MINIMUM SOFFIT ELEVATION

The HEC-RAS model results indicate the waterway capacity of the proposed bridge structure is sufficient to convey the estimated discharges with additional available freeboard for drift passage. For new bridge structures, the typical hydraulic requirement regarding the minimum soffit elevation is controlled by the highest value of the following three criteria. Unless there are other site-specific or project requirements, new bridges must typically be able to adequately convey the 50-year discharge plus any site-specific (or any mandated) freeboard, the 100-year discharge with no additional freeboard, and the "flood of record" (historical highwater) at the bridge site.

Based on the calculated WSEL's at the bridge site and considering 3.0 feet of freeboard above the 50-year WSEL for drift passage purposes, the recommended minimum soffit elevation for the bridge site is 946.0 feet. For the purpose of this study, the lowest elevation of the bottom of top deck slab (for the entire bridge) is considered the minimum bridge soffit elevation. It may be noted the December 1964 highwater elevation at Abutment 1 on the upstream side of the existing bridge was roughly 947 feet, which is 1.0 foot higher than the recommended minimum soffit elevation. However, as mentioned previously, the improved drift passage conditions provided by the proposed bridge is expected to help minimize any potential drift-related WSEL effects. Therefore, the recommended minimum soffit elevation of 946.0 feet (the 50-year WSEL plus 3.0 feet of freeboard) is considered more appropriate for bridge design purposes.

DRIFT POTENTIAL

The bridge site is located in a steep mountainous area surrounded by thick forest and areas of heavy brush and vegetation. Upstream of the bridge site, potential sources of significant floating drift are located within or adjacent to the waterway. Logging is a major industry in the area. Although general logging practices have significantly improved over the years, the additional drift material generated by the logging industry within the watershed may impact the overall amount of drift material which may be anticipated to pass through the bridge site in the future.

Actual floating drift conditions at the bridge site for any given flood event may be affected by many factors, including the size/quantity/characteristics of the drift material, the flow conditions affecting the overall ability to transport the floating drift downstream, and the length of time between large flood events. Larger flow events are generally associated with higher water depths and velocities (higher energy/momentum) and have a higher ability to transport larger/heavier drift. Larger/heavier floating drift will also tend to follow a general path along the main channel (within the deepest section in the channel) where the highest water depths and local velocities are generally located.

The December 1964 flood event is considered the current "flood of record" for the bridge site and was associated with heavy drift accumulation at the existing bridge. A Supplementary Bridge Report (SBR) dated 2/12/65 indicated the observed highwater (H.W.) on the downstream side for the 1964 flood event was about 7 feet below top of curb at Abutment 1; the upstream side of Abutment 1 was about 2 feet below top of curb. Based on the noted descriptions, the estimated elevations were roughly 947 feet on the upstream side and 942 feet on the downstream side.

The report also noted "*very heavy drift accumulation*" on the upstream side of the bridge during the flood, which may have affected the observed WSEL's by partially blocking some of the bridge waterway opening. The heavy drift accumulation also damaged the original upstream bridge rail and caused other damage. Bridge site photos taken after the December 1964 event show large trees and other drift material scattered on the overbanks, including one large tree trunk (log) still lodged within the arched section of the existing bridge structure *(Refer to Page 15, **ATTACHMENT 3 - PHOTO 1**).*

Based on the historical streamgage data analysis results, the December 1964 flood event was approximately a 100-year frequency discharge. For bridge design considerations regarding potential floating drift (loading) conditions in the future, similar floating drift as observed during the December 1964 flood event may be reasonably expected to occur during another 100-year frequency discharge at the proposed bridge.

Compared to existing conditions, the proposed bridge is expected to provide some significant hydraulic and drift-related improvements. Although both are arch-span bridges, the length (measured along the bridge centerline) of the main arch-span section will be significantly increased from 83 feet to 155 feet. The longer arch-span section will span over the main channel area (where most of the larger/heavier drift material will be transported) and will provide a larger opening for improved drift passage through the bridge waterway. Additional improvements include: fewer vertical column supports located within the arch-span section, wider horizontal "open-span" lengths between piers/columns, and a higher roadway/bridge deck profile (providing additional vertical freeboard).

In considering the overall risk of potential drift-related issues at the proposed bridge during high-flow conditions, it may be noted that although the existing (shorter) arch-span bridge did suffer some damage from the December 1964 flood due to the very heavy drift accumulation, the overall bridge remained structurally stable (no major or catastrophic failure occurred). Considering the hydraulic-related improvements of the new arch-span bridge, a similar event to the December 1964 flood would be expected to cause fewer drift-related issues and less damage (if any).

POTENTIAL SCOUR & LONG-TERM CHANNELBED TRENDS

Potential scour for the proposed bridge site was evaluated based on the Hydraulic Engineering Circular No. 18 (HEC-18) Manual, "*Evaluating Scour at Bridges*" (4th Edition, March 2001). Total scour at a highway crossing generally consists of three main components: general/contraction scour, local scour at piers/abutments, and long-term channelbed aggradation/degradation. Potential lateral stream/thalweg migration is also evaluated as part of the scour analysis procedure.

The hydraulic and scour analysis for this study was based on current information available, site-specific assumptions, and HEC-RAS model results based on the 100-year frequency discharge. The scour assessment considered a design period of 75 years, which is a typical design period considered for a new bridge structure.

General / Contraction Scour

Based on limited historical cross-section data and assumed site-specific/geotechnical factors, potential general/contraction scour within the proposed bridge limits is assumed negligible.

Local Scour at Piers / Abutments

Preliminary geotechnical recommendations for the May 2011 Type Selection Meeting indicated spread footings or CIDH pile foundations for the abutments, inclined mined shaft or micro-piles for the skewback locations, and CIDH piles for all pier locations (the CIDH piles will be socketed into rock). For this study, it is assumed that all foundation locations (regardless of final type selected) will be solidly founded and primarily rely on local (competent) bedrock for overall stability. However, some pier/column locations are located within the waterway under higher flow conditions and may be subject to some localized pier scour, which could potentially affect the overall foundation design. Additionally, there is some unknown potential for local bank/slope failure, which may also cause some amount of "ground" exposure (below the local finished grade elevation) at some pier/foundation locations.

Considering the general location and local ground elevations of both proposed abutments and the HEC-RAS results for the proposed bridge, no significant local abutment scour is anticipated. It is assumed that the foundations at both abutments and at all the main arch-span section "skewbacks" (Piers 6 and 11) will be basically anchored directly into relatively shallow bedrock (similar to the existing foundations); therefore, these foundations are generally not expected to be susceptible to any significant amount of local abutment/pier scour or other type of foundation exposure. Based on the pier/column locations shown on the proposed GP sheet, the potential local pier scour estimated in this study is intended for some columns located at Piers 2-5.

Many factors can influence calculated local pier scour. The pier scour analysis for this study considered basic assumptions which include: fully "scourable" material at pier/column locations (no local bank protection or channelbed armoring effect is assumed), 2-foot square columns on 36-inch CIDH pile foundations, local "peak" velocities at the approximate pier locations, and the steep bank/side slopes - roughly 1:1 at some locations - remain stable (i.e. no undermining or other bank failure occurs). It should be noted that the scour calculation equations consider the local water depths and velocities at the column locations; therefore, proposed columns located lower (in elevation) on the bank would be generally subject to higher local water depths and velocities (i.e. higher local pier scour depth).

Based on the estimated local water depths and velocities obtained from the HEC-RAS model at the approximate column locations, the calculated local pier scour depths for the columns at Piers 2-5 ranged from roughly 3 feet to 8 feet. *(The calculated scour values varied widely mainly due to different local depths/velocities.)* For bridge foundation design considerations, the maximum-calculated local pier scour depth of 8 feet may be conservatively assumed for all "exposed/outer bank" columns at Piers 2-5 that are not fully protected behind the existing rock gabion wall (to be partially left in place). The calculated scour depth is applied below the local finished grade ground elevation at each pier. It should also be noted that some factors may significantly reduce or limit calculated local pier scour.

"Channelbed armoring" is a site-specific factor related to the size/gradation distribution of local "channelbed" material at the pier locations. The presence of larger-sized material tends to reduce localized pier scour since larger material generally requires higher velocities to cause scour. Without reliable information available at this time regarding local "channelbed" material properties at the proposed column locations, channelbed armoring was not considered for this study. Other site-specific factors may also reduce or limit the estimated local pier scour, such as local bedrock elevations or any local pier/bank protection (*Refer to **"Bank/Slope Protection"**, Pages 8-9).* Updated local pier scour estimates may be provided if additional site-specific information becomes available after the hydraulic report has been submitted to Bridge Design Branch 1.

In addition to local pier scour, potential local bank/slope failures may cause some amount of localized "ground exposure" (below the local finished grade elevation) at some of the proposed pier/column locations. Site-specific factors include: the actual pier location/elevation, local bank material composition and physical properties, bank slope characteristics, local bank vegetation (type/size/quantity), potential long-term lateral thalweg/channel migration toward the bank area or pier locations, and other final foundation design factors (i.e. pier size/shape/configuration).

Long-Term Channelbed Trends

Based on limited historical cross-section data, the main channel area at the current bridge site appears to have remained relatively (vertically) stable. Available photos of the existing bridge site indicate some local rock outcroppings are located in portions of the main channel area and overbanks, which would be expected to help minimize any long-term changes to the local channelbed. Based on limited cross-section data and assumed site-specific/geotechnical factors, potential long-term channelbed aggradation or degradation within the proposed bridge limits is assumed negligible.

Lateral Stream / Thalweg Migration

Based on limited historical cross-section data available for the existing bridge site, the main channel area and general thalweg location at the existing bridge appear to have remained relatively (horizontally/laterally) stable. The proposed bridge will be significantly longer than the existing bridge and will also extend further to the south than the existing bridge limits. Accurately forecasting future lateral stream/thalweg migration trends within the proposed bridge limits is difficult due to many unknown variables.

Considering the history of the existing bridge site, the potential for significant lateral stream/thalweg migration within the proposed bridge limits in the future is assumed to be relatively low. In the event that significant lateral stream/thalweg migration toward the Abutment 1/Piers 2-5 foundation locations does become an issue in the future, it may be a relatively gradual process that would likely allow adequate time to detect (during scheduled bridge inspections or site visits) and address any concerns, as required.

ADDITIONAL CONSIDERATIONS

The Caltrans Geotechnical Branch should be consulted regarding any site-specific geotechnical considerations which may potentially impact the structure foundation design. Geotechnical studies may help determine any local geotechnical features or conditions (i.e. bedrock outcroppings, "non-scourable" layers of soil material, local soil material characteristics/composition/etc.) which may limit the estimated local pier scour depths provided in the report and may also provide information related to the general long-term channel (lateral and vertical) stability within the proposed bridge limits. The Caltrans Geotechnical Branch may better determine relative long-term bank/slope stability and provide recommendations regarding bank/slope protection to further stabilize and/or protect the piers and local banks from future significant water-related damage.

Bank / Slope Protection

The existing northeast bank slope (located just upstream of Abutment 9) and the existing southwest bank slope (located just downstream of Abutment 1) are currently protected with extensive fully-grouted Rock Slope Protection (RSP). Along the southwest bank slope, there is also an existing rock gabion wall located near the top of bank. The field survey data indicates relatively steep banks (roughly 1:1 and steeper slopes at some locations) on both sides of the main channel. It is presumed the existing bank protection was installed to help protect the bank and roadway approaches from water-related damage during high-flows and also provide some relative bank stability to the steep banks.

Based on available bridge reports, it appears some grouted RSP was first installed on the banks around 1966. Historical documentation for the existing bridge indicates high flows have caused periodic and significant water-related damage to both existing grouted RSP banks, which sometimes required extensive repairs *(Refer to Page 15, **ATTACHMENT 3 - PHOTO 2 & 3**)*. Reported damage to the grouted RSP banks due to high-flow events (such as the December 1964 flood) include local bank slope damage/failure, bank undermining (bank toe failure), partial bank washout, and other related damage.

Due to the proposed route re-alignment and locations of Abutment 1 and Piers 2-6, some of the proposed columns will be located along the existing southwest bank. It is unknown whether the final bridge site design will preserve the existing fully-grouted RSP in place, remove portions of it, or possibly extend it further to incorporate and provide local scour/bank protection at the new pier locations. If adequate bank protection is used to protect the proposed pier/column locations, potential local pier scour may be assumed negligible - provided the bank protection remains in place and effective (undamaged). Based on preliminary indications, it appears that a portion of the existing rock gabion wall will be preserved for the new structure. Provided the existing gabion wall remains in place and functioning properly (no local bank failure or undermining occurs), the rock gabion wall is expected to fully protect some of the columns/foundations at Piers 2-5 (i.e. the "interior" columns of the side-hill viaduct portion).

Based on documented history for the existing bridge, it is assumed that high-flow events may periodically cause some damage to the local natural banks and existing bank/slope protection (fully-grouted RSP). Properly-designed, long-term channel bank protection and/or bank stabilization measures may help minimize the occurrence and/or severity of periodic damage caused by high-flow events in the future. It should be noted that long-term bank protection (such as the existing grouted RSP and/or rock gabion wall) generally require periodic inspections, maintenance, and repairs (as needed) in order to maintain the overall integrity and effectiveness of the entire bank protection system. Additionally, it would be recommended the toe of the existing bank slope protection (fully-grouted RSP) is sufficiently "keyed-in" below the local channelbed to minimize future potential bank undermining/failure, which may affect the overall stability of the local banks and possibly cause some amount of "ground exposure" at some of the pier locations.

SUMMARY INFORMATION FOR THE BRIDGE DESIGNER

VERTICAL DATUM REFERENCE:

Unless otherwise indicated, elevations in the report are based on the North American Vertical Datum of 1988 (NAVD88).

General / Contraction Scour [1]	*(negligible)*
Long-Term Channelbed Elevation Change [1]	*(negligible)*
Maximum Local Pier Scour (Depth) at Piers 2 through 5 [2]	8 feet
Local Pier Scour Elevation at Piers 2 through 5 [3]	*(varies)*
Local Peak (Water) Velocity at Proposed Bridge *(based on 100-year discharge)*	22 ft./sec.
Recommended Minimum Soffit Elevation *(includes 3.0 feet of freeboard for drift passage)*	946.0 feet

NOTES:

[1] *Assumed within the proposed bridge limits and considered for a 75-year design period (typical for a new bridge structure).*

[2] *Based on fully "scourable" material (no local bank protection or channelbed armoring effect considered) at columns located on the main channel banks. The maximum scour depth is conservatively assumed for all pier locations. Local pier scour may be assumed "negligible" at columns/foundations fully protected behind the rock gabion wall or fully protected by local pier/bank protection, provided the wall and/or bank protection remains in place and functioning properly.*

[3] *Local Pier Scour Elevation varies and is determined by applying the scour depth to the local finished grade ground elevation at each column location.*

Hydrologic / Hydraulic Summary			
Total Drainage Basin Area: 76.9 square miles			
	Design Flood	**Base Flood**	**Overtopping Flood**
Frequency, *years*	50	100	N/A
Discharge, *cubic feet per second (cfs)*	22,900	25,900	N/A
Water Surface Elevation at Bridge *, *feet*	943.0	945.6	N/A
Flood plain data are based upon information available when the plans were prepared and are shown to meet federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.			

* *Maximum local WSEL calculated within the bridge limits and based on "unobstructed flow conditions" (no drift loading).*
N/A = Not Applicable

LIST OF ACRONYMS

CAiCE	Computer-Aided Civil Engineering *(software program)*
cfs	cubic feet per second
CIDH	Cast-In-Drilled-Hole (pile)
CIP	Cast-In-Place
DEM	Digital Elevation Map
FEMA	Federal Emergency Management Agency
FHR	Final Hydraulic Report
FIS	Flood Insurance Study (FEMA)
GP	General Plan
HEC-18	Hydraulic Engineering Circular No. 18 "*Evaluating Scour at Bridges*"
HEC-RAS	Hydrologic Engineering Center - River Analysis System *(software program)*
NAVD88	North American Vertical Datum of 1988
NED	National Elevation Dataset (USGS)
NC	North Coast (Region) - *Regional Flood-Frequency Analysis method*
NGVD29	National Geodetic Vertical Datum of 1929
PKFQWin	Peak Flow FreQuency - *USGS (software program)*
RC	Reinforced Concrete
RSP	Rock Slope Protection
USACOE	United States Army Corps of Engineers
USGS	United States Geological Survey
WMS	Watershed Modeling System *(software program)*
WSEL	Water Surface Elevation

REFERENCES

1) California Department of Transportation (Caltrans) - Bridge Inspection Reports (BIR's), Supplemental Bridge Reports (SBR's), Bridge File, As-Built Plans, Photos, Digital Highway Inventory Photography Program (DHIPP) - aerial photos, Final Hydraulic Report (FHR) request letter from Bridge Design Branch 1 *(dated 1/6/11)*, Proposed General Plan (GP) Sheet: "*Middle Fork Smith River Bridge (Replace)*" *(dated 5/5/11)*

2) Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS)
Del Norte County, CA and Incorporated Areas
Flood Insurance Study Number 06015CV000B
(Last Revised: November 26, 2010)

3) United States Geological Survey (USGS)
7.5-Minute Series (Topographic) Quadrangle Maps:
Shelly Creek Ridge, Broken Rib Mountain, Devil's Punchbowl, Hurdygurdy Butte

4) Additional References:

- Google (search engine)	*http://www.google.com/*
- Google Maps	*http://maps.google.com/*
- Google Earth	
- National Wild & Scenic Rivers	*http://www.rivers.gov/wsr-smith.html*

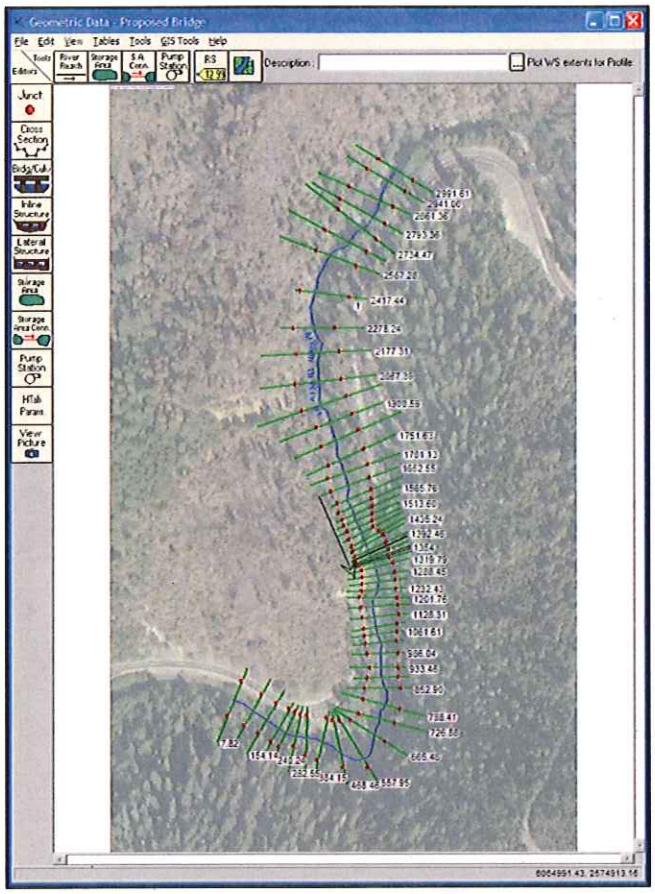

FIGURE 1 - Geometric Data of HEC-RAS Model (Proposed Conditions)

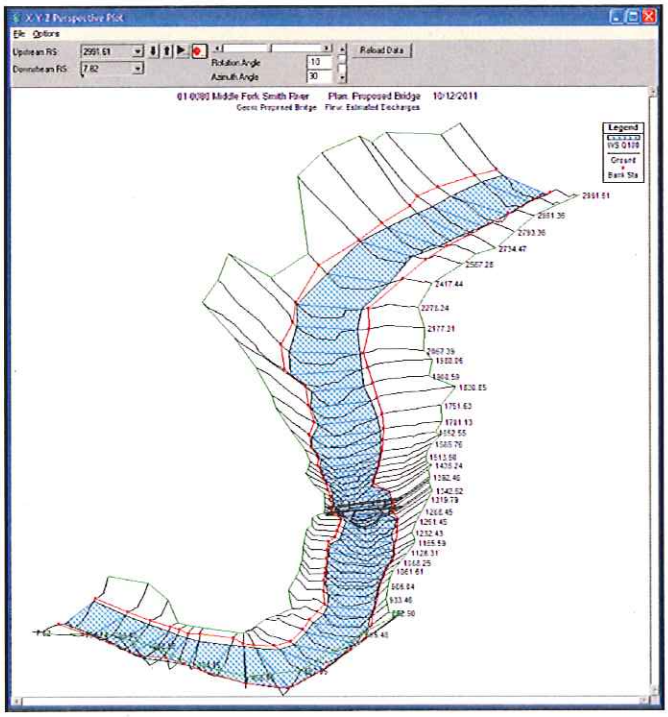

FIGURE 2 - XYZ Perspective Plot of HEC-RAS Model (Proposed Conditions)

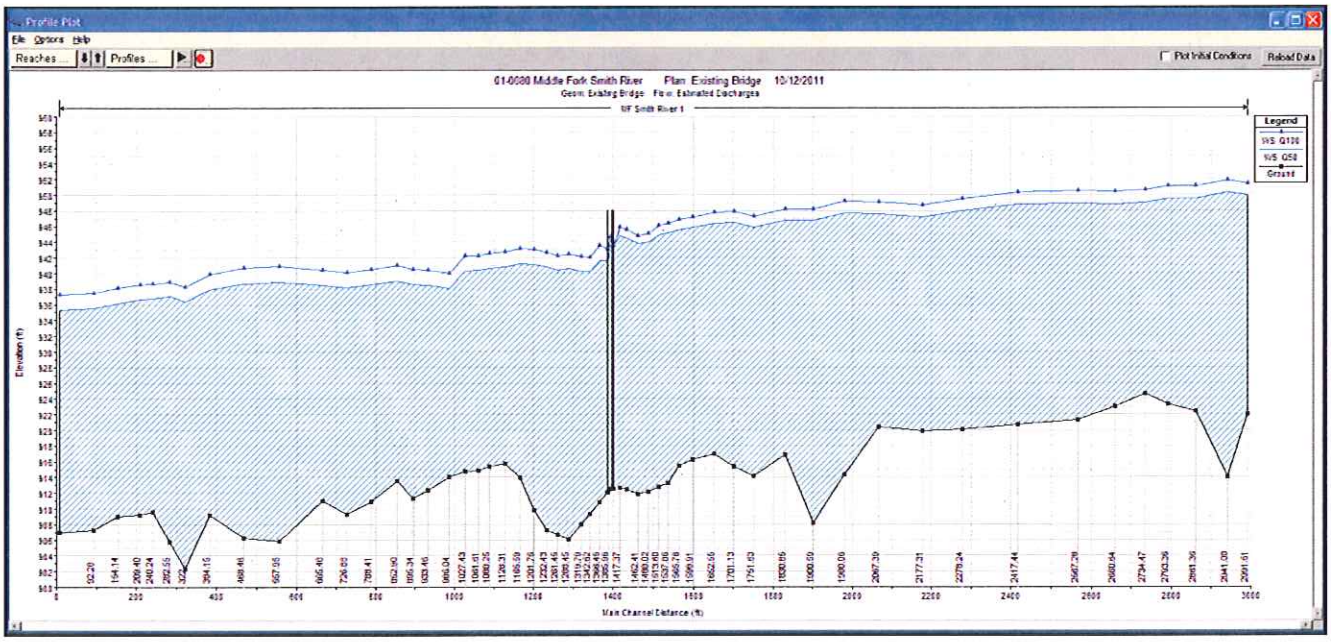

FIGURE 3 - Longitudinal Channel Profile Plot of HEC-RAS Model (Existing Conditions)

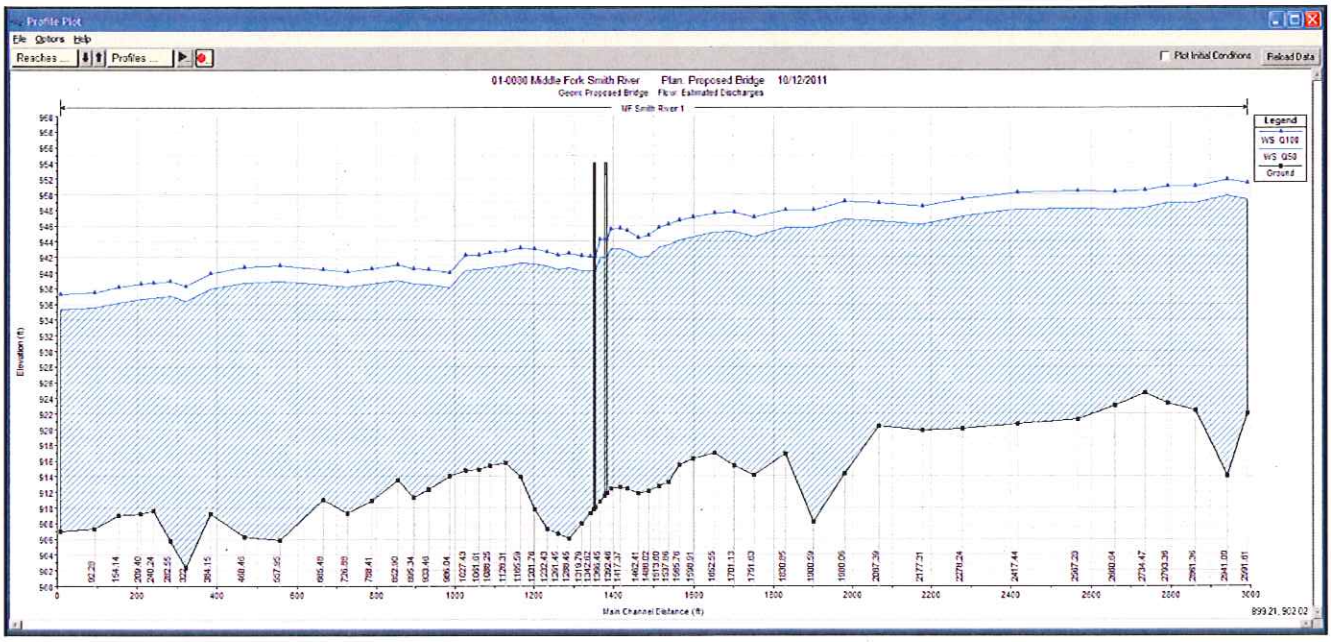

FIGURE 4 - Longitudinal Channel Profile Plot of HEC-RAS Model (Proposed Conditions)

Photo No. 7
Looking toward Crescent City

PHOTO 1 - Existing Arch-Span Bridge after December 1964 Flood
(Photo Date: 2-12-65)

Photo No. 5
Underminded RSP DS from Abut 1

Photo No. 5
Scour under RSP @ US side of E abut

PHOTO 2 & 3 - Past Damage to Existing Fully-Grouted RSP (Bank Protection)
(Photo Dates: 8-4-77 and 3-22-73)

Memorandum

Flex your power!
Be energy efficient!

To: JEFF SIMS
BRANCH CHIEF
Design Branch 1
Office of Bridge Design North
Division of Engineering Services

Attn: Kevin Harper
Project Engineer

Date: February 26, 2013

File: 01-DN-199- PM 24.04
Middle Fork Smith River
Bridge (Replace)
Br. No. 01-0080
EA 01-479401
EFIS 0100000371

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report (FR) for Middle Fork Smith River Bridge (Replace)

INTRODUCTION

As requested, the Office of Geotechnical Design-North (OGDN) has prepared this Foundation Report (FR) for the proposed replacement of the existing Middle Fork Smith River Bridge (Br. No. 01-0015) located on Route 199 at PM 24.04, in northern Del Norte County, California. The new Middle Fork Smith River Bridge (Replace) has been assigned the new Bridge Number 01-0080 and a PM of 24.04 (see Plate No. 1). This report supersedes the Preliminary Foundation Report for the Middle Fork Smith River Bridge dated February 28, 2011.

PROJECT DESCRIPTION/SCOPE OF WORK

The Middle Fork Smith River Bridge replacement is part of the Patrick Creek Narrows project which proposes to construct improvements at various locations on Route 199 to enable the reclassification of the route as part of the Surface Transportation Assistance Act (STAA) truck route network. The improvements are primarily intended to enhance safety for STAA access and include widening lanes and shoulders, providing longer radius curves, and improving sight distances. Specifically, the Patrick Creek Narrows project will include improvements at three locations indentified as Location 1 (approximately PM 20.5), Location 2 (approximately PM 24.0) and Location 3 (approximately PM 25.6).

Included in the scope of this FR are four new structures proposed for the Location 2 portion of the of the Patrick Creek Narrows project. Based on the provided General Plan (dated December 10, 2012) the four proposed structures (referenced from the proposed centerline “B” Line) are:

- A soldier pile wall with anchors south of Abutment 1 from Station 505+38.69 to Station 506+86.33 (Right)
- A viaduct and arch bridge from Station 506+86.33 to Station 510+31.83

- A soldier pile wall with anchors south of Abutment 12 from Station 509+49.00 to Station 510+23.50 (Right)
- A Standard Plan Type 5 Retaining Wall at Abutment 12 (Left)

A fifth structure is proposed as part of the Location 2 improvements and is based on the 2010 Standard Plan B3-1, as presented on the "Retaining Wall Type 1 (Mod) - North Retaining Wall" sheet (dated October 9, 2012). Foundation recommendations for this wall are provided in a separate FR.

The scope of our work included performing a literature and historical review in an effort to obtain geological and geotechnical data pertaining to the subject site that could provide insight into the project design and construction. The historical review included searching Caltrans intranet As-Built and geotechnical report records from the Bridge Inspection Records Information System (BIRIS), the Document Retrieval System (DRS), and the Digital Archive of Geotechnical Data (GeoDOG) databases. Our Office has evaluated the site conditions and geology based on a review of the obtained As-Built Plans, geologic literature and mapping, aerial photographs, multiple site visits and a subsurface investigation performed during October 2010, May 2011, and June 2011. The foundation recommendations elevations provided in this report are based on the NAVD88 (vertical datum) and the horizontal coordinates are based on the NAD83 (horizontal datum).

EXISTING SITE CONDITIONS AND BACKGROUND

The existing bridge was built in 1925 by the U.S. Bureau of Public Roads and widened in 1972 by Caltrans. The structure is a continuous, eight span cast-in-place (CIP) reinforced concrete (RC) structure consisting of four approach spans at the south end, a main span, and three approach spans at the north end. The main span is a CIP/RC two-rib open-spandrel arch with CIP/RC deck. The approach spans are continuous CIP/RC slabs supported on RC two-column bents and abutments. All supports are founded on spread footings. The bridge was widened and the railing was replaced in 1972. New spread footings (that matched existing) were constructed for the widening at Piers 3 and 7. At the abutments, the existing footings were used to support the widening and new railing. At Abutment 1, a wingwall was also constructed. The bridge has two lanes, is 149 feet long and 25 feet wide, and spans the Middle Fork Smith River. There is no As-Built Log of Test Boring for the existing structure or for the widening of the existing structure. The As-Built U.S. Bureau of Public Roads sheet dated October 1923 states that, "all footings are to bear on firm solid rock and to be carried deeper than shown if necessary."

A gabion wall was constructed south of the existing bridge in 1986. The As-Builts indicate that the gabion wall extends as high as 16.5 feet, is approximately 230 feet in length. The gabion wall was constructed to replace a deteriorating "brow log" along the edge of the existing northbound lane. The embankment was eroding undermining the logs and the pavement was distressed. The project plans indicate the gabion wall will be situated beneath the northbound lane of the proposed, modified Route 199 ("B" Line) alignment, and that the gabion wall will generally remain in place for the proposed construction. The Report and Plans for the existing gabion wall are provided in Appendix B.

FIELD INVESTIGATION AND TESTING PROGRAM

The Office of Geotechnical Design-North conducted a subsurface investigation in October 2010, May 2011, and June 2011. The subsurface investigation program consisted of placing a total of fifteen mud rotary borings reaching a maximum depth of approximately 124 feet. The mud rotary borings were advanced using a self-casing wireline coring method. Sampling recovery of the subsurface materials was achieved by utilizing the Standard Penetration Test (SPT) sampler in soil materials and diamond coring in rock materials. A summary of information regarding the borings drilled during the subsurface investigation program is included in Table No. 1.

Table No. 1- Summary of the 2010 and 2011 Subsurface Investigations for the proposed replacement Middle Fork Smith River Bridge (Br. No. 01-0080) project

Boring No.	Completion Date	Drill Rig Type	Hammer Type	Hammer Efficiency (%)	Ground Surface Elevation (ft)	Boring Depth (ft)
RC-10-001	10/12/10	Acker	Auto	80	948.6	100.0
RC-10-002	10/20/10	Acker	Auto	80	948.8	124.1
RC-10-003	10/27/10	Acker	Auto	80	951.3	107.0
RC-11-004	05/15/11	Acker	Auto	80	952.5	120.0
RC-11-005	05/19/11	Acker	Auto	80	950.5	120.0
RC-11-006	05/25/11	Acker	Auto	80	949.3	118.5
RC-11-007	05/25/11	Acker	Auto	80	949.6	30.0
RC-11-008	06/08/11	Burley 5500	Cathead	See note	925.2	92.5
RC-11-009	06/10/11	Burley 5500	Cathead	See note	939.7	80.1
RC-11-010	06/12/11	Burley 5500	Cathead	See note	932.5	81.8
RC-11-011	06/14/11	Burley 5500	Cathead	See note	957.8	60.0
RC-11-012	06/15/11	Burley 5500	Cathead	See note	959.7	50.0
RC-11-013	06/22/11	Mobile B-47	Safety Hammer	55	940.8	79.5
RC-11-014	6/26/11	Acker	Auto	80	947.8	110.0
RC-11-015	6/28/11	Acker	Auto	80	949.1	60.0

Note: The efficiency of the Cathead hammer is not known.

LABORATORY TESTING PROGRAM

Laboratory testing was performed on selected samples of the subsurface materials obtained from the 2010 and 2011 subsurface investigations. Tests were performed to determine the corrosion and engineering properties of the subsurface materials. The corrosion test results for the soil samples are in the "Corrosion Evaluation" section of this report. Strength testing on selected rock samples consisted of unconfined compressive strength tests (ASTM D 7012) and point load index tests (ASTM D 5731). As a general guide, an effort was made for selection of specimens for rock compressive strength testing which produced a testing frequency corresponding to a

depth interval of no more than 5 feet with the intent of providing a general representation of the subsurface conditions. The results of the laboratory testing performed for the entire Patrick Creek Narrows project are included as Appendix C. A summary of the laboratory testing performed can also be found on the respective Log of Test Borings (LOTBs) for each of the four sites.

It should be noted that upon reviewing the photos and stress strain curves associated with unconfined compressive strength testing, it appears that several samples failed along rock discontinuities such as healed fractures and bedding planes. Therefore, rock strength test results were influenced by the discontinuities, and the reported unconfined compressive strength could be significantly lower than the true intact rock unconfined compressive strength. The test results noted test method compliance deficiencies regarding length-to-diameter ratios of several test specimens. These results have been labeled with an asterisk on both the laboratory test results and the Log of Test Borings (LOTB).

Point Load strength indices were converted to Uniaxial Compressive Strengths (UCS) utilizing correlations offered in ASTM D5731-08. A majority of the point load tests were noted to have been performed parallel to a "plane of weakness"; thus, with the rock specimens exhibiting anisotropic strength, the intact rock UCS should be considered significantly greater in value.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Geologic Setting

The project is located within the northern section of the Klamath Mountains geomorphic province. Within the province there are a number of major terranes, several of which are subdivided into two or more subterranes. The terranes were accreted in a westward succession, are generally younger from east to west, and are penetratively deformed and bordered by major faults (McLaughlin and others, 2000). The project site is located in the Smith River subterrane of the Western Klamath terrane. The Western Klamath terrane is the youngest in the Klamath Mountains and became attached to North America approximately 150 million years ago during the Mesozoic Era (Harden 1998). Local to the project site, the USGS (USGS Map I-2148) identifies the Smith River subterrane to include the Galice Formation and the Josephine ophiolite.

Site Geology

Based on the Geologic Map of the Weed Quadrangle, California, (see Plate Nos. 2a thru 2c), the site appears to be underlain with materials of the Galice Formation (Jg) which are generally described as consisting of marine slate (mild slatey to phyllitic argillite), partially serpentinized peridotite, metagraywacke, stretched pebble conglomerate, greenstone and metavolcanic breccia. The local Josephine Ophiolite (Jv, Jgd, Jum) is generally described as consisting of gabbro, pyroxenite, pillow basalt, serpentinite, and a sequence of ultramafic rocks. The subsurface investigation of the project site revealed materials typical of the Galice Formation. Older USGS published geologic mapping is also provided (see Plate Nos. 3a and 3b) which depicts with greater detail the location of geologic deposits and faults.

The site is located in steep mountainous terrane along the Middle Fork Smith River. The roadway was constructed by cutting into the steep rock terrane above the river. The formational rock exposed on the hillside, both above and below the roadway, is metamorphosed. There are numerous discontinuity sets visible throughout the formational rock mass. Approximately 400 feet south of the existing bridge is a cut slope on the left side of the northbound Route 199 that exposes formational rock similar to that which was encountered in the borings during the 2010 and 2011 subsurface investigations (see Photo 1, Plate No. 1). The dip magnitude of the bedding planes ranges from approximately 30 to 45 degrees, and the dip direction is generally towards the northeast. From the proposed soldier pile wall location to the south end of the proposed bridge, there exists adversely oriented bedding which could promote toppling or wedge failures (see Photo 2, Plate No. 2). This slope also exhibits evidence of rock slides and some shallow-depth slipouts that may be a result of the orientation of the bedding planes. Numerous boulders and an abundance of rock debris were observed nestled throughout the hillside slope. If disturbed, this hillside slope could generate rock fall and rock slides.

Formational rock outcrops appeared to be absent on the ground surface adjacent, easterly of the roadway, for a distance of roughly 200 feet north of the existing bridge. Rock was encountered below the sand, cobbles and boulders (material interpreted as alluvium). Alluvium is visible in the slope on the east side of the northbound lane (Photos 3 and 4, Plate No. 4b); this material is described in the Log of Test Borings. Bedding planes of the rock encountered in the borings below the alluvium have a dip magnitude that ranges from approximately 30 to 45 degrees. Formational rock exposed in the easterly edge of the river channel, southerly of the existing bridge, exhibited bedding which dipped, generally towards the northeast.

Subsurface Conditions

During the 2010 and 2011 subsurface investigations, seven borings (RC-10-001, RC-10-002, RC-10-003, RC-11-004, RC-11-005, RC-11-006 and RC-11-007) were drilled in the existing northbound lane of Route 199 and eight borings (RC-11-008 through RC-11-015) were drilled on the shoulder of Route 199 or on the bank of the Middle Fork Smith River.

The seven borings drilled in the northbound lane of Route 199 encountered 12 to 26 inches of asphalt concrete and 5 to 15 feet of fill overlying metamorphic rock. The fill material consists of loose to very dense poorly graded sand with silt, clay, gravel and cobbles. Some organic material (tree roots, tree bark and rootlets) and well graded gravel was also encountered.

Boring RC-11-008 (drilled below the northbound lane of Route 199 adjacent to the gabion wall) encountered approximately 4.5 feet of material interpreted as alluvium consisting of hard cobbles with trace amount of poorly graded sand. Underlying the alluvium is metamorphic rock.

Borings RC-11-009 and RC-11-010 (drilled through the grouted rock slope protection (RSP) adjacent to and below the roadway) encountered 6.0 and 8.5 feet of grouted RSP, respectively; the RSP contained hard and very hard cobbles and boulders. Within the RSP section, a 0.5 foot thick void was encountered in Boring RC-11-010. In addition, in Boring RC-11-009 complete drill-fluid circulation was lost between elevations 935.6 and 923.5 feet, and casing was installed from elevation 939.7 feet (ground surface) to roughly elevation 924 feet. Metamorphic rock was encountered underlying the grouted RSP section.

Borings (RC-11-011 and RC-11-012) were drilled on the slope above Route 199 northeast of the existing bridge. These borings encountered approximately 15 feet to 21 feet of alluvium consisting of rounded and subrounded, hard and very hard cobbles with silty sand and clayey sand. Gravel and boulders as large as 1.2 feet (intersecting length) were encountered in these borings. A boulder is visible in the slope as shown in Photo No. 3 (Plate No. 4b). Underlying the alluvium is metamorphic rock.

Borings (RC-11-013 through RC-11-015) were drilled on the slope below the roadway, northeast of the existing structure. These borings encountered approximately 2.5 feet to 7.0 feet of material interpreted as alluvium consisting of very dense, round and subrounded, hard and very hard cobbles with sandy silt and gravel and poorly graded gravel with silt. Underlying the alluvium is metamorphic rock.

The metamorphic rock encountered in all the borings consisted of interbedded metagraywacke, metasiltstone, slate, and greenstone. The formational rock is typically moderately weathered to fresh, moderately hard to very hard with some soft and very soft zones (sheared), and intensely fractured to slightly fractured with some very intensely fractured zones. Some zones included very hard and hard quartz veins and calcite veins. The metamorphic rock was encountered to the maximum depth explored, 124.1 feet (elevation 824.7 feet).

During the 2010 subsurface investigation, Boring RC-10-001 was drilled to a depth of 100 feet (elevation of 848.6 feet). During the drilling operation, seventy feet of 3.75-inch diameter steel drill rod became detached at a depth of thirty feet and was not retrievable; hence the drill rod remains in the ground.

Refer to the Log of Test Borings (LOTBs) dated September 6, 2012 for more information concerning the subsurface conditions.

Groundwater

During the 2010 and 2011 subsurface investigations, four of the fifteen borings were finished as open standpipe piezometers. Groundwater elevation was measured in Borings RC-10-002, RC-10-003, RC-11-004 and RC-11-007. Measurement of the groundwater level was not performed in borings which necessitated immediate backfill due to environmental permitting or lane restrictions (RC-10-001, RC-11-005, RC-11-006 and Borings RC-11-008 through RC-11-015). Groundwater levels indicated in this report and shown on the LOTB sheets reflect the measured groundwater levels in the borings on the specified date. Table No. 2 lists the elevations of the measured groundwater. The similarity of the groundwater elevations for Borings RC-10-003, RC-11-004 and RC-11-007 (at the NB lane south of the existing bridge) suggest hydraulic connectivity. Based on geologic conditions at the site, the occurrence of groundwater in a perched and/or confined (under pressure) aquifer condition should be expected. Groundwater surface elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on rainfall patterns and water levels in the river.

Table No. 2 - Groundwater Measurement Data

Boring Number	Groundwater Elevation on 10/21/10 (ft)	Groundwater Elevation on 05/23/11 (ft)	Groundwater Elevation on 06/13/11 (ft)
RC-10-002	931.9	931.0	931.0
RC-10-003	--	943.3	944.7
RC-11-004	--	942.3	943.8
RC-11-007	--	--	943.7

SCOUR EVALUATION

The Final Hydraulics Report (FHR) prepared by the Structure Hydraulics and Hydrology Branch for the subject bridge (dated October 17, 2011) was considered in the development of the recommendations presented in this FR. The following conclusions are provided in the FHR:

1. The potential for general/contraction scour or long-term channelbed aggradation or degradation is "negligible" within the proposed bridge limits; these conclusions are noted to be based on "assumed site-specific/geotechnical factors."
2. At Piers 2 through 5 a maximum-calculated local pier scour depth of 8 feet is conservatively assumed where an "exposed/outer bank column" condition exists and the location is not fully protected behind the existing rock gabion wall.
3. In addition to local pier scour, the potential for local bank/slope failures may cause some amount of localized "ground exposure" (below the local finish grade elevation at some of the pier/column locations.
4. The abutment and skewback foundations of the proposed bridge are not expected to be susceptible to any significant amount of local abutment/pier scour or other type of foundation exposure. This conclusion is based on the premise that these support locations will mimic the existing bridge foundation conditions and be founded in scour resistant rock and/or protected by bank protection (RSP).

The FHR conclusions presented above are intended as a summary; it is recommended that the FHR be reviewed for a more complete and detailed presentation of the scour potential evaluation. The GP for Bridge No. 01-0080 (dated December 10, 2012) indicates that RSP will be placed on the river channel slopes at Piers 6 and 11, the extent of which is to be provided on the "Road Plans."

CORROSION EVALUATION

Composite soil samples were collected from Borings RC-10-001 thru RC-11-004, RC-11-007 and RC-11-012 drilled during the 2010 and 2011 subsurface investigations. The Office of Testing and Technology Service, Corrosion Technology Branch tested the composite samples for

corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil samples: chloride concentration is 550 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves as an indicator for the possible presence of soluble salts and is not used to define a site as being corrosive. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite samples were considered to be non-corrosive. Refer to Table 3 for a summary of the test results attached in Appendix C.

Table No. 3 - Corrosion Test Summary of the Composite Samples for the Middle Fork Smith River Replacement Bridge (Br. No. 01-0080)

SIC Corrosion Number	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (ohm-cm)	Chloride Content (ppm)	Sulfate Content (ppm)
C701626	R-10-001	0.0-5.0	8.15	4255	N/A	N/A
C701627	R-10-002	0.0-5.0	8.11	6210	N/A	N/A
C701628	R-10-003	0.0-5.5	7.62	5980	N/A	N/A
C701629	R-11-004	0.0-3.0	7.67	2395	N/A	N/A
C701630	R-11-007	0.0-5.0	7.70	6056	N/A	N/A
C701631	R-11-012	0.0-5.0	6.36	42840	N/A	N/A

SEISMIC RECOMMENDATIONS

Based on the Caltrans Seismic Design Criteria and the Caltrans Fault Database of 2011, the controlling fault for the site is the Cascadia Subduction Zone (Fault ID No. 5) with **Mmax** of 8.3. The fault is located southwest of the site, and the rupture distance to the fault plane from the bridge site is estimated to be 37 miles. The fault is referred to as a reverse fault with a dip angle of 15 degrees.

Based on the 2010 and 2011 subsurface investigations, the V_{S30} was estimated to be 2500 feet per second.

Using the above shear wave velocity, the spectral acceleration (SA) generated from the probabilistic method is higher than the SA generated by the Cascadia Subduction Zone. As a result, the attached ARS curve is based on the 5% probability of exceedance in 50 years (975 years return period). The design ARS curve with an estimated peak ground acceleration of 0.31g is attached in Appendix A.

The potential for surface rupture at the site due to fault movement is considered insignificant since there are no known faults projecting towards or passing directly through the project site. The liquefaction potential is also considered to be insignificant.

AS-BUILT FOUNDATION DATA

According to the As-Built Foundation Plans for the existing bridge (Br. No. 01-0015), the four approach spans at the south end and the three approach spans at the north end are supported on spread footings. The main span, the CIP/RC two-rib open-spandrel arch, is supported on shallow angled and stepped concrete footings. It was noted on the plans that "all footings to bear on firm solid rock and to be carried deeper than shown if necessary"; hence, the exact bottom of footing elevations could not be determined from the available plans. The bearing capacity of the spread footings used in the design could not be determined from the available data.

According to the As-Built Gabion report and plans, the gabion wall is approximately 230 feet in length with a maximum height of 16.5 feet. The plan indicates the general dimensions of the gabion baskets are: 3 feet in height, 3 and 6 feet in width with lengths of 1.5, 3 and 6 feet. The gabion baskets are situated beneath the northbound lane of the existing Route 199 and extend a maximum of 7.5 feet from the wall face to the existing centerline of Route 199. The gabion wall was constructed with several underdrain outlet pipes that extend through the face of the wall. For greater detail on the existing gabion wall, the Gabion Wall 1983 Project Report and the 1986 As-Built Project Plans are included in Appendix B, attached.

FOUNDATION RECOMMENDATIONS

Retaining Wall at Abutment 1 Right (Soldier Pile Wall with Ground Anchors)

According to the "Abutment 1 Layout" sheet (dated November 30, 2012) the retaining wall at Abutment 1 is to consist of anchored, steel-section soldier piles placed in CIDH concrete; timber lagging is to be placed between piles and is to be overlain with a permanent cast-in-place concrete facing. The wall is to extend southerly, off of Abutment 1, in a wingwall-like configuration, for approximately 155 feet, at an offset of roughly 20 feet right of the "B" Line. The wall height is to range from 5 to 22 feet and will be restrained with a maximum of two rows of ground anchors. The proposed wall will be constructed downslope of the existing gabion wall; hence, fill placed for backfill behind the proposed wall will effectively encapsulate approximately 135 feet of the existing gabion wall. The proposed ground anchors are to be installed through the existing gabion wall. The Contractor should review the Gabion Wall 1983 Project Report and the 1986 As-Built Project Plans located in the Appendix B of this report.

Lateral Loading

The following generalized parameters for determining the lateral earth pressure acting from the top of the wall to the bottom of lagging may be determined based on a soil internal friction angle (Φ) of 34° and a total unit weight (γ_t) of 125 pcf. The recommended parameters are based on the assumption that an adequate drainage system will be provided to prevent the development of hydrostatic pressure behind the wall from groundwater.

Lateral Resistance

From Station 505+38.7 to Station 505+71, passive lateral resistance for the effective width of the pile may be determined based on the following generalized parameters: an internal friction angle (Φ) of 40° and a total unit weight (γ_t) of 135 pcf. From Station 505+71 to Station 506+86.3, a passive lateral resistance may be based on the following generalized parameters: an internal friction angle (Φ) of 45° and a total unit weight (γ_t) of 145 pcf. To meet global stability requirements and to provide adequate resistance to the vertical component of the ground anchor load, the following minimum pile embedment criteria is provided: for a wall height less than 10 feet, a minimum pile embedment of 10 feet is required and for wall heights between 10 feet and 25 feet, a minimum pile embedment of 20 feet is required. A horizontal bench (a minimum of 5 feet width) at the finished grade in front of the wall is recommended and the lagging should be installed at least 2 feet below the bench finished grade.

Ground anchors are anticipated to be installed at an angle of 20 degrees from the horizontal; an unbonded length of at least 25 feet is recommended.

Drainage

To provide free-draining conditions, to reduce the amount of compactive effort for fill near the proposed wall face, and to minimize the potential for post construction material migration, Coarse Aggregate is recommended to be placed as fill material between the existing gabion wall and the back of the wall lagging. The Coarse Aggregate should consist of crushed rock meeting a grading corresponding to 1-½ inch x ¾ inch grading per Section 90-1.02C(4)(b) of the 2010 Caltrans Standard Specifications. The project plans indicate that a barrier slab will be placed atop the fill prism between the gabion wall and proposed wall; hence, the Coarse Aggregate should provide an acceptable leveling course. Where pavement is proposed atop the Coarse Aggregate fill, it may be preferable to place a Class A1 Subgrade Enhancement Geotextile (per Section 88-1.02O of the 2010 Caltrans Standard Specifications) to provide separation between the overlying dissimilar material of the pavement section base coarse.

The parameters provided above are based on the assumption that an adequate drainage system will be provided to prevent the development of hydrostatic pressure behind the wall. In addition, the existing drainage system of the gabion wall should be maintained such as by extending the underdrain outlets pipes through the face of the proposed soldier pile wall.

Abutment 1 and Piers 2 through 5 (Cast-In-Drilled-Hole Piles)

According to the General Plan sheet (dated December 10, 2012), the proposed Middle Fork Smith River Bridge (replacement) will be placed downstream of the current structure and will have a total length of 345.5 feet. The new bridge is being proposed with a five span, 157.0 feet long, viaduct segment providing the southerly approach to a 155 foot long (skewback to skewback) arch structure spanning the river. The southerly viaduct approach segment is proposed partially as a sidehill configuration and will be constructed over a portion of the existing gabion wall. The northerly approach segment is proposed as a 33.3 feet long span to an abutment.

The Structure Designer has selected 36-inch, 42-inch and 48-inch diameter Cast-In-drilled-Hole (CIDH) piles for support of Abutment 1 and Piers 2 through 5. The recommended pile tip elevations for the support locations of the bridge are based on the cut-off elevations and factored loads provided in communications from the Office of Bridge Design North, Branch 1 per Memo To Designers 3-1 (July 2008). Abutment 1 and Piers 2 through 5 foundations were designed using the Load and Resistance Factor Design (LRFD) method. The calculated geotechnical resistance of all CIDH piles is based on side resistance within the penetrated rock. At the Abutment 1 location, one pile diameter of skin friction was excluded at the top of the pile. At Piers 2 through 5, 8 feet of skin friction was excluded at the top of the pile due to local pier scour as recommended in the FHR (see "Scour Evaluation" section).

Table No. 4 - Pile Foundation Recommendations for Abutment 1 and Piers 2 through 5.

Support Location	Pile Type	Cut-off Elevation (ft)	Service-1 Limit State Load (kips) per Support	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)
					Strength Limit		Extreme Event			
					Comp. (φ = 0.5)	Tension (φ = 0.5)	Comp. (φ = 1)	Tension (φ = 1)		
Abut 1 Left	42-inch CIDH	947.2	180	1	360	0	80	0	922.0 (a-1) 934.2 (a-II)	922.0
Abut 1 Right	42-inch CIDH	928.2	180	1	360	0	80	0	900.0 (a-1) 914.8 (a-II)	900.0
Pier 2 Left Bearing Support	36-inch CIDH	945.3	220	1	320	0	282	0	918.0 (a-1) 926.9 (a-II)	918.0
Pier 2 Right	42-inch CIDH	925.0	450	1	600	0	230	0	890.0 (a-I) 909.0 (a-II)	890.0
Pier 3 Left Bearing Support	48-inch CIDH	944.3	260	1	300	0	282	0	920.0 (a-1) 926.4 (a-II)	920.0
Pier 3 Right	42-inch CIDH	918.0	440	1	580	0	250	0	880.0 (a-I) 900.8 (a-II)	880.0
Pier 4 Left Bearing Support	36-inch CIDH	938.8	330	1	440	0	350	0	905.0 (a-1) 918.7 (a-II)	905.0
Pier 4 Right	42-inch CIDH	924.0	460	1	720	0	500	0	880.0 (a-I) 901.2 (a-II)	880.0
Pier 5	42-inch CIDH	921.3	670	1	1110	0	1250	200	855.0 (a-I) 878.9 (a-II) 904.9 (b-II)	855.0

Notes:

1) *Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), and (b-II) Tension (Extreme Event).*
2) *There is no Design Tip Elevation for settlement because the piles are embedded in rock.*

Table No. 5 - Pile Data Table for Abutments 1 and Piers 2 through 5

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)
		Compression	Tension		
Abut 1 Left	42-inch CIDH	720	0	922.0 (a)	922.0
Abut 1 Right	42-inch CIDH	720	0	900.0 (a)	900.0
Pier 2 Left Bearing Support	36-inch CIDH	640	0	918.0 (a)	918.0
Pier 2 Right	42-inch CIDH	1200	0	890.0 (a)	890.0
Pier 3 Left Bearing Support	48-inch CIDH	600	0	920.0 (a)	920.0
Pier 3 Right	42-inch CIDH	1160	0	880.0 (a)	880.0
Pier 4 Left Bearing Support	36-inch CIDH	880	0	905.0 (a)	905.0
Pier 4 Right	42 inch CIDH	1440	0	880.0 (a)	880.0
Pier 5	42 inch CIDH	2220	200	855.0 (a) 904.9 (b)	855.0

Notes:

1) *Design tip elevations for all support locations are controlled by: (a) Compression (b) Tension.*
2) *There is no Design Tip Elevation for settlement because the piles are embedded in rock.*
3) *The specified tip elevation shall not be raised.*

Piers 6 and 11 (Micropiles)

Micropiles have been selected for support of Piers 6 and 11 skewback locations. The micropiles are 10-inches in diameter and are inclined. The recommended micropile lengths for the skewback support locations of the bridge are based on the skewback reference elevations presented on the "Skewback Details No. 1" sheet, and on factored loads provided in communications from the Office of Bridge Design North, Branch 1 per Memo To Designers 3-1 (July 2008). The skewback foundations were designed using the Load and Resistance Factor Design (LRFD) method. The calculated geotechnical resistance of the micropiles is based on side resistance within the penetrated rock, excluding a five foot length of micropile at the top of micropile and a one foot length of micropile at the tip. We recommend a grout-to-ground ultimate bond strength (α_{bond}) of 50 psi (7.2 ksf) for determining the plunge length of the micropiles.

Table No. 6 - Micropile Foundation Recommendations for Piers 6 and 11

Location	Pile Type	Cut-off Elevation (ft)	Service-1 Limit State Load (kips) per Support	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Length (ft)	Specified Length (ft)
					Strength Limit		Extreme Event			
					Comp. (φ = 0.7)	Tension (φ = 0.7)	Comp. (φ = 1)	Tension (φ = 1)		
Pier 6 Skewbacks	10 inch diameter Micropile	varies	1760	1	448	140	640	200	40.0 (a-I) 18.0 (b-I) 40.0 (a-II) 18.0 (b-II)	40.0
Pier 11 Skewbacks	10 inch diameter Micropile	varies	1825	1	448	140	640	200	40.0 (a-I) 18.0 (b-I) 40.0 (a-II) 18.0 (b-II)	40.0

Notes:

1) *Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (b-I) Tension (Strength Limit), (a-II) Compression (Extreme Event), and (b-II) Tension (Extreme Event).*
2) *There is no design length for settlement because the micropiles are embedded in rock.*
3) *The Specified Length shall not be shortened.*

Table No. 7 - Micropile Data Table for Piers 6 and 11

Location	Pile Type	Nominal Resistance (kips)		Design Length (ft)	Specified Length (ft)
		Compression (φ = 0.7)	Tension (φ = 0.7)		
Pier 6 Skewbacks	10-inch inclined micropile	640	200	40.0 (a) 18.0 (b)	40.0
Pier 11 Skewbacks	10-inch inclined micropile	640	200	40.0 (a) 18.0 (b)	40.0

Notes:

1) *Design tip elevations for all support locations are controlled by: (a) Compression, (b) Tension.*
2) *There is no design length for settlement because the micropiles are embedded in rock.*
3) *The specified tip elevation shall not be shortened.*

Micropile Load Testing

A total of four proof tests are required to be performed on production micropiles. We recommend one proof test be performed at each skewback location (6L, 6R, 11L, and 11R). One performance (verification) test is desired on a designated pre-production micropile and is required to be performed in tension to verify that the micropile grout-to-ground ultimate bond strength (α_{bond}) is achieved. We would prefer that the performance test be located in the vicinity of Pier 6L of the proposed structure; the performance test pile should mimic the orientation of the production piles, and the grouted section be constructed such that it does not extend closer

than 5 feet to surface grade to mimic the design α_{bond} neglect zone. It is recommended this testing be performed as the first order of work and the steel should not be ordered for the piles until the performance test is performed and evaluated. Pile grout should attain the required design compressive strength prior to applying test loads.

Abutment 12 (Spread Footing)

Based on the "Index to Plans" and "Foundation Plan" sheets (dated December 6, 2012), Abutment 12 is to be supported on a spread footing with a bottom of footing (BOF) elevation of 936.0 feet; Structure Design has indicated that the footing will be designed utilizing a working stress design (WSD) method. Based on the subsurface investigation, the spread footing may be founded partially in formational rock and partially in soil with cobbles and boulders. To reduce the potential for differential settlement, sub-excavation of materials beneath the footing is recommended to a minimum of 3 feet below BOF and laterally to a minimum of 2 feet beyond the foundation footprint. The sub-excavation should be backfilled with concrete backfill according to Section 19-3.02G of the 2010 Standard Specifications to bring the excavation to grade.

Table No. 8 - Foundation Design Recommendations for Spread Footings

Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Bottom of Sub-excavation Elevation (ft)	Minimum Footing Embedment Depth (ft)	WSD (LRFD Service-I Limit State Load Combination)		LRFD		
	B	L						Service	Strength $\Phi_b = x$	Extreme Event $\Phi_b = x$
						Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Abut 12	12.0	42.5	936.0	933.0	5.0	4.0	4.0	N/A	N/A	N/A

Table No. 9 - Spread Footing Data Table

Support Location	Working Stress Design (WSD)		Load and Resistance Factor Design (LRFD)		
	Permissible Gross Contact Stress (Settlement) (ksf)	Allowable Gross Bearing Capacity (ksf)	Service Permissible Net Contact Stress (Settlement) (ksf)	Strength Factored Gross Nominal Bearing Resistance $\Phi_b = x$ (ksf)	Extreme Event Factored Gross Nominal Bearing Resistance $\Phi_b = x$ (ksf)
Abut 12	4.0	4.0	N/A	N/A	N/A

The recommended Permissible Gross Contact Stress and Allowable Gross Bearing Capacity are based on the following design criteria:

1) The spread footing will have an effective width that will produce an equivalent uniform vertical stress, which does not exceed the values of the Permissible Gross Contact Stress and the Allowable Gross Bearing Capacity.

2) The spread footing is to be constructed at or below the bottom of footing elevation and have the minimum footing embedment depth shown in Table 8.

Retaining Wall at Abutment 12 Right (Soldier Pile Wall with Ground Anchors)

The following recommendations are for the soldier pile wall with ground anchors at Abutment 12 Right as shown on the Abutment 12 Details No. 1 through 4 sheets (dated December 12, 2012).

The wall is proposed with anchored steel-section soldier piles placed in CIDH concrete; timber lagging is proposed between piles which will be overlain with a permanent cast-in-place concrete facing. The proposed wall is approximately 77 feet long, with heights generally ranging between 5 and 17 feet; however, the wall is proposed to extend to as high as approximately 28 feet adjacent to Pier 11 Right Skewback for what appears to be temporary excavation support for the Pier 11 Right Skewback construction.

Lateral Loading

The following generalized parameters for determining the lateral earth pressure acting from the top of the wall to the bottom of lagging may be determined based on an internal friction angle (Φ) of 34° and a total unit weight (γ_t) of 125 pcf. The recommended parameters are based on the assumption that an adequate drainage system will be provided to prevent the development of hydrostatic pressure behind the wall from groundwater.

Lateral Resistance

Passive lateral resistance for the effective width of the pile may be determined based on the following generalized parameters: an internal friction angle (Φ) of 45° and a total unit weight (γ_t) of 145 pcf.

To meet global stability requirements and to provide adequate resistance to the vertical component of the ground anchor load, the following minimum pile embedment criteria is provided: for a wall height less than 10 feet, a minimum pile embedment of 10 feet is required and for wall heights between 10 feet and 20 feet, a minimum pile embedment of 15 feet is required.

Ground anchors are anticipated to be installed at an angle of 20 degrees from the horizontal; an unbonded length of at least 25 feet is recommended.

Retaining Walls at Abutment 12 Left (Wingwall)

The left wingwall proposed at Abutment 12 is to be constructed as a Retaining Wall Type 5 (Case 1) of the 2010 Revised Standard Plan (RSP), sheet RSP B3-4A. The wall extends 23 feet off of Abutment 12 and is supported on a stepped spread footing with a Design Height ("H") from 4 to 10 feet. Based on subsurface materials encountered at Abutment 12, the spread footing for the left wingwall may be founded partially in rock and partially in soil with cobbles and boulders. To reduce the potential for excessive differential settlement, sub-excavation of materials beneath the footing is recommended to a minimum of 3 feet below BOF and laterally to a minimum of 1 foot beyond the foundation footprint. The sub-excavation should be backfilled with concrete backfill according to Section 19-3.02G of the 2010 Standard Specifications to bring the excavation to grade. If the foundation support materials are prepared as recommended above, the net bearing stress demand (for a permissible settlement of ½ inch), and the gross uniform bearing stress demands provided on sheet RSP B3-4A will be met. The demand criteria is met based on the corresponding effective footing widths (B') provided on RSP B3-4A, and on the BOF elevations shown on the Foundation Plan (revision date 12-6-12). If any revisions to the wall configuration occurs (such as revising the loading conditions, wall height, bottom of footing elevations, etc.), OGDN should be contacted and allowed to provide supplemental recommendations if needed.

General Notes to Designer

1. It is recommended that a Type "D" excavation is to be shown on the plans at the Pier 6 and 11 skewback locations.

Construction Considerations

Naturally Occurring Asbestos (NOA)

1. As mentioned in the "Site Geology and Subsurface Conditions" section, locally the Josephine Ophiolite formation is noted to contain serpentinite/ultramafic rocks. However, a review of detailed geologic mapping (Plate No. 3a) reveals that State Route 199 transects serpentinite formations at a distance of no closer than 2 miles to the project site. Furthermore, Caltrans and United States Forest Service (USFS) mapping do not designate the area of the project site as "likely" to contain NOA. The Caltrans NOA database indicates the closest NOA location on Route 199 to be between PM 21.44 to 21.74. Ultramafic/serpentinite rocks were not encountered in our surface and subsurface exploration at the site; therefore, concludes that the project site has a very low potential for the presence of serpentinite /ultramafic rocks and NOA. In consideration for the potential presence of NOA materials, the North Region Hazardous Material Officer should be contacted to determine if the project has the need for Airborne Toxic Control Measures (ATCMs) during project construction.

Rock Cores

1. Rock core samples from the 2010 and 2011 subsurface investigations are available for viewing by bidders at the California Department of Transportation, Transportation Laboratory, 5900 Folsom Blvd., Sacramento, CA. It is highly recommended that the Contractor inspect/observe the core samples at the Translab facility before bidding.

CIDH Piles and Micropiles-Piers 2 through 11

1. Groundwater was encountered during the 2010 and 2011 subsurface investigations. Groundwater will be encountered during construction. Wet pile installation methods will likely be necessary for the CIDH piles. Installation of micropiles will likely encounter groundwater based on the observations from the exploratory borings.

2. Within the subsurface materials underlying the site, significant variation in the lithology, weathering, fracturing and hardness of the metamorphic rock was encountered, even within relatively short distances (see LOTB sheets). The Contractor should anticipate significantly varying rock conditions laterally (between adjacent pile locations) and vertically (within each pile excavation).

3. The self-casing wire-line drill system drilling techniques utilized during the subsurface investigations make it difficult to directly assess borehole stability and the potential for sidewall collapse. The encountered subsurface conditions shown on the LOTBs, and the surface exposures observed in field investigations, suggest that significant drill-hole sidewall collapse and materials caving should be anticipated when constructing CIDH piles and micropiles.

4. If temporary casing is used during installation of CIDH piles, it shall be removed before or during concrete placement in a manner that permits development of the required side resistance. If temporary casing is used during installation of micropiles, it shall be removed before or during grout placement.

5. A loss of drilling circulation was experienced during the 2010 and 2011 subsurface investigation. Drilling concrete/grout loss should be anticipated at all support locations during construction of CIDH piles and micropiles.

6. Hard and very hard cobbles and boulders were encountered during the subsurface investigations as shown on the LOTBs. The Contractor should anticipate encountering very hard cobbles and boulders during construction of the piles.

7. The Contractor should anticipate difficult drilling and construction measures for CIDH and micropile installations due to the presence of grouted, boulder-size Rock Slope Protection (RSP) on the bank southeast of the existing bridge (near Borings RC-11-009 and RC-11-010). Voids were also encountered within the RSP at this location. The Contractor should be prepared to drill through the RSP section, or perform other remedial measures during the construction of the piles, which could include breaking-up the RSP and/or removal by sub-excavation.

8. The geotechnical resistance (or ultimate geotechnical bond capacity) of constructed micropiles is based on effective development of the micropile grout-to-ground ultimate bond strength (α_{bond}), which requires that the micropile grout completely encase the centralized micropile casing such that no annular space remains between the outer surface of the casing and the drilled-hole sidewalls.

9. The plans show Abutment 1 through Pier 4 being constructed over an existing gabion wall. The project design is predicated on the continuing function of the retaining wall. The Contractor must take care not to adversely affect the long term performance of the gabion wall. This may require the use of shoring, underpinning and permanent casings.

10. During the excavation of the foundations for Abutment 1, Pier 2, Pier 3, Pier 4 and Pier 5, the Contractor needs to be prepared to remove any remaining sections from the pre-existing brow log that may not have been removed during construction of the gabion wall.

11. At Abutment 1, Piers 2 though 6, the Contractor will encounter adverse bedding and will need to be prepared to stabilize any excavations at these locations.

12. The Office of Geotechnical Design North should be invited to a pre-construction meeting.

Spread Footing – Abutment 12

1. Based on the subsurface investigation, the Abutment 12 spread footing may be founded partially in rock and partially in soil with cobbles and boulders. To reduce the potential for differential settlement, sub-excavation of materials beneath the footing is recommended to a minimum of 3 feet below BOF and laterally to a minimum of 2 feet beyond the foundation footprint and replaced with concrete backfill in accordance with Section 19-3.02G of the 2010 Standard Plans. The bottom of excavation will have a uniform surface prior to placing the lean concrete. Prior to set-up of the concrete backfill, the top surface of the concrete backfill shall be provided with a roughened surface (such as by scarifying with a steel trowel) to maintain effective development of the concrete-to-soil frictional resistance.

Spread Footing – Abutment 12 Left Type 5 Retaining Wall

1. Based on the subsurface investigation, the Abutment 12 Left Type 5 Retaining Wall spread footing may be founded partially in rock and partially in soil with cobbles and boulders. To reduce the potential for differential settlement, sub-excavation of materials beneath the footing is recommended to a minimum of 3 feet below BOF and laterally to a minimum of 1 foot beyond the foundation footprint and replaced with concrete backfill in accordance with Section 19-3.02G of the 2010 Standard Plans. The bottom of excavation will have a uniform surface prior to placing the concrete backfill. Prior to set-up of the concrete backfill, the top surface of the concrete backfill shall be provided with a roughened surface (such as by scarifying with a steel trowel) to maintain effective development of the concrete-to-soil frictional resistance.

Soldier Pile Walls with Ground Anchors at Abutment 1 and 12

1. As discussed in the "Groundwater" section of this FR, groundwater was encountered at relatively shallow depth during the 2010 and 2011 subsurface investigations. During pile and anchor installation, the Contractor will encounter groundwater, and the groundwater may occur in a perched and/or confined (under pressure) aquifer state. Localized dewatering may be necessary to obtain dry conditions; however, some installations may require drilling and the placement of concrete and grout in wet conditions. Construction methods for a wet condition requires the displacement of water via a closed system using a concrete pump or a tremie tube to place concrete properly at the base of the hole.

2. The Contractor should use their expertise to select methods and equipment for the construction of the soldier piles and ground anchors that is appropriate for the range and variability of the foundation conditions shown on the LOTBs. Significant rock properties include, but are not limited to the degree of fracturing and weathering, rock hardness and the rock compressive strength. The bedding contacts and attitude (strike and dip) should also be considered. The Contractor should anticipate varying rock conditions from one soldier pile location to the next and within each soldier pile excavation.

3. The LOTBs also indicate soil material containing sand, gravels, cobbles and boulders. There is a wide range in size and hardness of these materials. The Contractor should be prepared to break up, drill through or remove this material.

4. Caving of the holes drilled for the soldier piles and ground anchors should be anticipated due to the presence of cohesionless soils with cobbles and boulders, weathered rock and fractured rock. The Contractor should use their expertise to select appropriate construction methods and equipment to prevent or control caving. This may include permanent casing in the unbonded zone.

5. Significant loss of drilling fluids occurred while drilling mud-rotary borings at the site during the 2010 and 2011 subsurface investigation. The drill fluid loss was likely due to the presence of cracks and voids associated with formational fracturing and the grouted RSP. We expect a significant potential for concrete/grout loss during pile and ground anchor construction. Controlling measures, such as the use of a "grout sock", could potentially reduce grout loss for ground anchor installation.

6. At the Abutment 1 wall location, the Contractor should be prepared to partially remove and or drill through the existing gabion wall which will include drilling through hard cobbles and wire mesh. Methods to control caving of the gabion rock and loss of grout into the gabion rock should be employed by the Contractor. This may include permanent casing.

7. If the gabions are removed, or partially removed at the Abutment 1 wall location, the Contractor will be required to maintain stability of the roadbed and remaining gabion baskets.

The Foundation Recommendations included in this Foundation Report are based on project information that has been provided by the Office of Bridge Design North, Design Branch 1. Any questions regarding the above recommendations should be directed to the attention of Jacqueline A Martin (916) 227-1051 or Mark Hagy (916) 227-1077, Geotechnical Services, Office of Geotechnical Design-North.

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Attachments:

PLATES

Plate No. 1	Vicinity Map
Plate No. 2a thru 2c	Regional Geology Map
Plate No. 3a thru 3b	Quadrangle Geology Map
Plate Nos. 4a & 4b	Photographs

APPENDICES

Appendix A	Design Acceleration Response Spectrum
Appendix B	Gabion Wall Project Report and Plans
Appendix C	Laboratory Test Results

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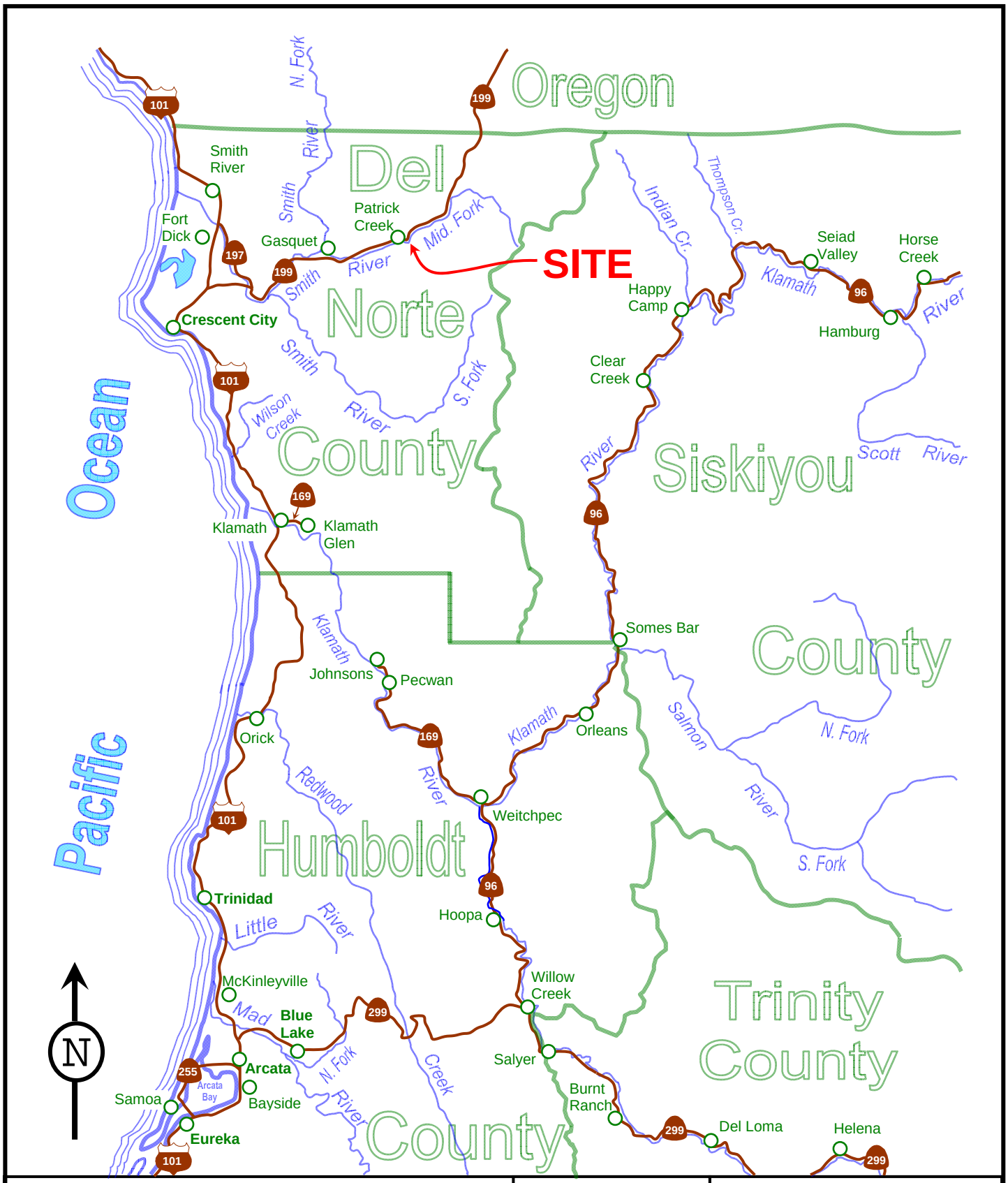
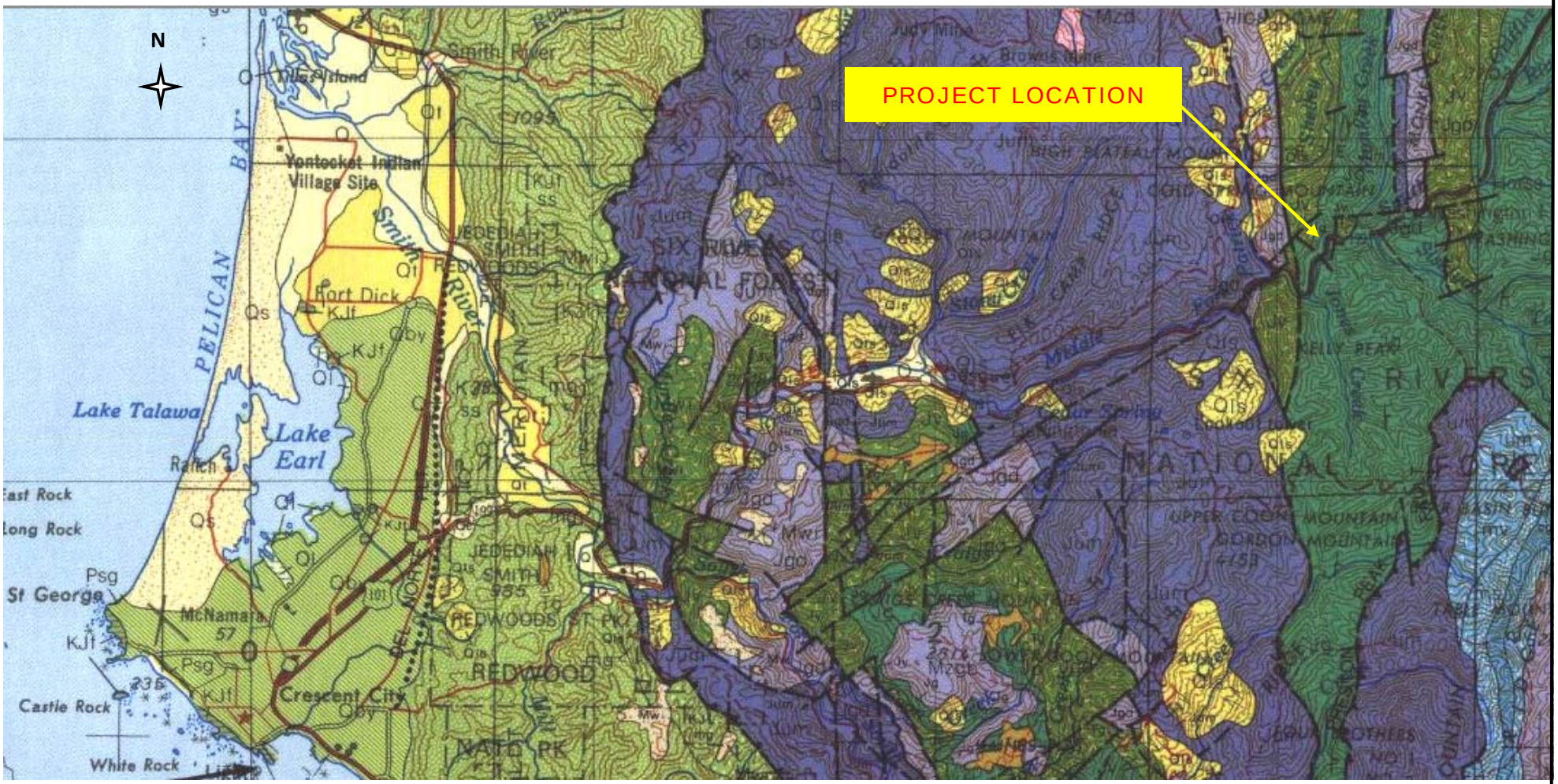


CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 01-479401 Date: February 2013	**VICINITY MAP**
	01-DN-199 PM 24.04 **Bridge No. 01-0080** **FOUNDATION REPORT**	Plate No. 1



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See Plate Nos. 2a and 2b for explanation and symbols key.

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design North	EA: 01-479401 Date: February 2013	**REGIONAL GEOLOGY MAP**	
	FOUNDATION REPORT **Br. No. 01-0080** **01-DN-199-PM 24.04**		Plate No. 2a

ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only; see referenced publication for more accurate age designations and unit descriptions.

CENOZOIC

QUATERNARY

Holocene

- t — Dredge and mine tailings
- Q — Alluvium
- Qls — Landslide deposits
- Qs — Dune and beach sand
- Ql — Lake deposits
- Qu — Shelf, slope, and basin deposits *(Offshore)*
- Qt — Terrace deposits

Pleistocene

- Qg — Glacial deposits *(Outwash and morainal)*
- Qmt — Marine terrace deposits
- Qc — Fluvial deposits *(Gravel, sand, and silt)*
- Qby — Battery Formation *(Marine and continental; blue sandstone and clay)*

TERTIARY

- QT — Undifferentiated Plio-Pleistocene marine and non-marine deposits

Pliocene

- Psg — St. George Formation *(Marine; bluish-gray siltstone and shale)*
- Pum — Marine mudstone undifferentiated *(Offshore)*

Miocene

- Tg — Tertiary gravels *("Auriferous")*
- Tc — Tertiary continental deposits *(Conglomerate and sandstone)*
- Mwi — Wimer Formation *(Marine; friable yellow siltstone, sandstone, and conglomerate)*
- Kh — Hornbrook Formation *(Marine; massive arkosic sandstone, conglomerate, and shale)*

High Cascade Volcanics

- Qv — Volcanic rocks *(a-andesite; b-basalt d-dacite; p-pyroclastic deposits pb-Black Butte pyroclastic flow ps-Shastina pyroclastic flow)* ✱ - Cinder cone or volcano
- Qvs — Volcanic rocks of Shasta Valley *(a-andesite; p-pyroclastic deposits)*
- Pv — Volcanic rocks *(a-andesite; b-basalt)* ✱ - Cinder cone or volcano

- Tv — Western Cascade Volcanics *(a-andesite with some basalt and dacite; p-andesite tuff breccia; t-rhyolite tuff; i-andesite and basalt intrusions and plugs; r-rhyolite domes)*

MESOZOIC

CRETACEOUS

- KJf — Franciscan Complex* *(ss-sandstone, shale, conglomerate; ch-chert; gs-greenstone and locally chert; mg-metagraywacke; sfm-South Fork Mountain Schist; rc-schist of Redwood Creek; ♦ -blueschist blocks)*
  - ss, ch, gs, mg, sfm, rc
  - *Horizontal pattern denotes melange terrane

JURASSIC

- um — Ultramafic rocks -partly to completely serpentinized

WESTERN JURASSIC BELT

- Jg — Galice Formation *(Marine; slate, metagraywacke, and greenstone)*
- Jv — Volcanic rocks *(Pillow lava and breccia)*
- Jgd — Gabbro, diorite, and related rocks
- Jum — Ultramafic rocks—partially to completely serpentinized

- Jcm — Condrey Mountain Schist

PLUTONIC ROCKS

- Mzg — Granitic rocks
- Mzd — Dioritic rocks
- Mzgb — Ultramafic-gabbroic rocks

WESTERN PALEOZOIC AND TRIASSIC BELT

MzPz - Undifferentiated
- rct - Rattlesnake Creek terrane
- hft - Hayfork terrane
- nft - North Fork terrane

TRIASSIC

- MzPz$_s$ — Stuart Fork Formation *(Phyllitic quartzite with some blueschist)*

PERMIAN

- MzPz — rct, hft, nft
  - ms - metasedimentary rocks
  - mvs - metavolcaniclastic sedimentary rocks
  - mv - metavolcanic rocks
  - cg - conglomerate and sedimentary breccia
  - ch - chert
  - ls - limestone and marble
  - gb - gabbro
  - um - serpentinite and metaserpentinite
  - sch - amphibolite and greenschist
  - bs - blueschist
  - ♦ - blueschist blocks

CARBONIFEROUS

DEVONIAN

SILURIAN

ORDOVICIAN

PALEOZOIC

EASTERN KLAMATH BELT

- Jp — Potem Formation *(Marine; argillite and tuffaceous sandstone)*
- Jbg — Bagley Andesite
- Ja — Arvison Formation *(Volcaniclastic and pyroclastic rocks)*
- Jmd — Modin Formation *(Andesitic volcaniclastic and pyroclastic rocks)*
- Rp — Pit Formation *(Marine; shale and siltstone; includes Brock Shale and Hosselkus Limestone)*
- RTb — Bollibokka Group *(Dekkas and Nosoni Formations, undifferentiated); (Andesite, mudstone, and tuff)*
- Rml — McCloud Limestone
- Cb — Baird Formation *(Pyroclastic rocks and keratophyre)*
- Cbg — Bragdon Formation *(Marine; shale, graywacke, and minor conglomerate)*
- Dkn — Kennett Formation *(Marine; siliceous shale and tuff; ls = crystalline limestone)*
- Dc — Copley Greenstone
- DSg — Gazelle Formation *(Marine; sandstone, shale, chert, conglomerate, and limestone)*
- Smc — Moffett Creek Formation *(Sheared sandstone and shale)*
- SOd — Duzel Formation *(Marine; phyllite, graywacke, chert, and limestone)*
- Oam? — Antelope Mountain Quartzite
- Ov, Ogb, Op — Ov-Mafic volcanic rocks and diabase; Ogb-Gabbroic and dioritic rocks *(Minor pyroxenite)*; Op-Trinity peridotite *(Partially serpentinized)*

CENTRAL METAMORPHIC BELT
(Devonian or older)

- Pza — Abrams Mica Schist *(Grouse Ridge Formation)*
- Pzs — Salmon Hornblende Schist

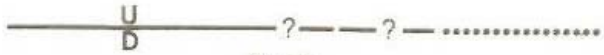
Reference: Wagner, D. L. and Saucedo, G.J., Geologic Map of California Weed quadrangle, California, 1:250,000: California Division of Mines and Geology (California Geological Survey), Regional Geologic Map Series, Map No. 4A.

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design North	EA: 01-479401 Date: February 2013	**GEOLOGY MAP LEGEND**	
	01-DN-199; PM 24.04 Bridge No. 01-0080 FOUNDATION REPORT		Plate No. 2b

MAP SYMBOLS

Contact

Observed or approximately located; queried where gradational or inferred.



Fault

Solid where well located; dashed where approximately located or inferred; dotted where concealed by younger rocks or water; queried where continuation or existence is unceratin. U, upthrown side; D, downthrown side (relative or apparent).

Thrust fault—barbs on the upper plate. Generally dips less than 45°, but locally may have been subsequently steepened. Dashed where approximately located or inferred; dotted where concealed by younger rocks or water; queried where continuation or existence is uncertain.

Anticlinal fold

Synclinal fold

Strike and dip of beds

Strike and dip of foliation

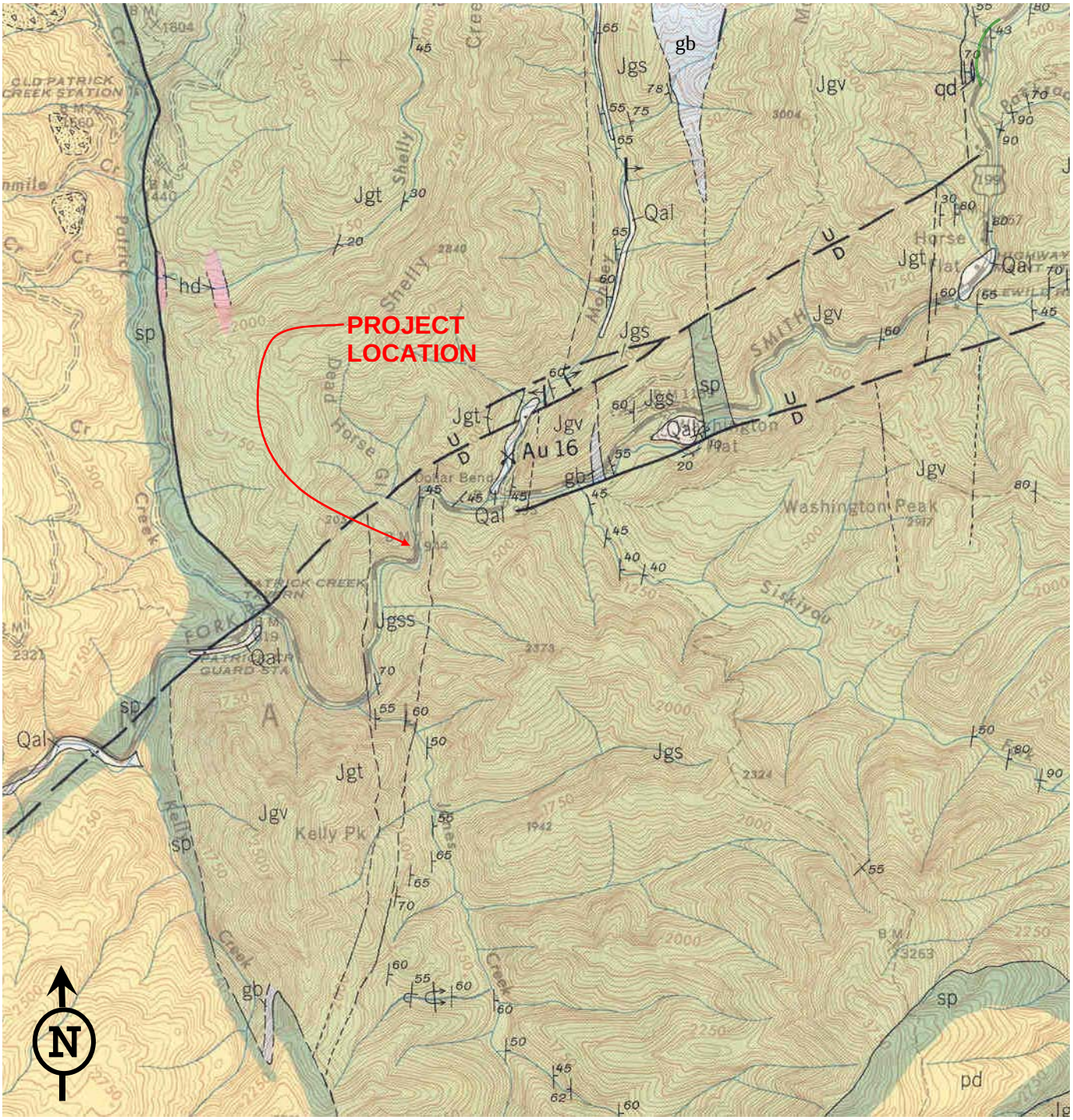
Blueschist blocks

Joints

(Prominent joints in granitic rocks of Castle Crags.)

Reference: Wagner, D. L. and Saucedo, G.J., Geologic Map of California Weed quadrangle, California, 1:250,000: California Division of Mines and Geology (California Geological Survey), Regional Geologic Map Series, Map No. 4A.

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design North	EA: 01-479401	**GEOLOGY MAP LEGEND (Cont'd.)**	
	Date: February 2013		
	01-DN-199; PM 24.04 Bridge No. 01-0080 FOUNDATION REPORT		Plate No. 2c



APPROXIMATE SCALE: 1:50,000

0 0.5 1.0 1.5 2.0 2.5 miles

0 1 2 3 4 kilometers

See Plate No. 3b for map explanation.

Base Map Reference:
Portion of "Geology Map and the Structure Sections of the Gasquet Quadrangle, California", Plate 11, Scale 1:50,000, from Cater, F.W., Jr. and Wells, F.G. (1953) "Geology and Mineral Resources of the Gasquet Quadrangle, California-Oregon"; United States Geologic Survey Bulletin 995-C.

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North

EA: 01-479401	**QUADRANGLE GEOLOGY MAP**
Date: February 2013	
01-DN-199 PM 24.04 **Bridge No. 01-0080** **FOUNDATION REPORT**	Plate No.3a

ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only; see referenced publication for more detailed stratigraphic relationships and unit descriptions.

QUATERNARY

Recent

Qal

Alluvium

Deposits in present stream valleys and bench gravels

TERTIARY

Miocene (?)

Tg

Gravel deposits

Poorly sorted clay, sand and gravel on upland surface above 1900 feet. Some of coarser material partly decomposed

UNCONFORMITY

Miocene

Tm

Upper Miocene beds

Soft, friable shale and siltstone

rp

Albite rhyolite porphyry dikes

JURASSIC OR CRETACEOUS

Late Jurassic or Early Cretaceous

INTRUSIVE ROCKS

qd

Quartz diorite

Granitoid light-colored rocks, containing visible quartz

hd

Hornblende diorite

Medium- to coarse-grained rock. The proportion of light to dark minerals varies widely from place to place

gb

Gabbro and related rocks

Gray, medium-grained rocks. Composition ranges between wide limits and grades into hornblende diorite

sp

Serpentine

Completely serpentinized peridotite sheared into small blocks and aggregations of curved or bellied shiny translucent yellow, green, or black plates

pd

Periodotite undifferentiated

Green medium-grained rocks consisting of olivine with or without other mafic minerals. Weathers red. In places largely altered to serpentine but not crushed

we

Wehrlite

Dark coarse-grained rock consisting of olivine and diallage

JURASSIC

Upper Jurassic

Jgs
Jgv **Jgf**
Jgss
Jgt **Jgl** **Jga**

Galice formation

Jgs, *dark-gray to black fine-grained thinly layered rocks generally with slaty cleavage, a few thin sandstone beds and some thin layers of grit;* **Jgss**, *medium-grained, massive, thick-bedded sandstone;* **Jgv**, *large thicknesses of andesitic flows, tuffs, and breccias;* **Jgf**, *predominantly flows, in places special phases of volcanic rocks are mapped separately or are indicated without boundaries by letters symbols;* **Jgt**, *predominantly tuffs;* **Jga**, *agglomerate;* **Jgl**, *limestone*

Jd

Dothan formation

Massive sandstone and thin layers of black or dark-gray slate; also some interlayered basalt flows

Landslide

Highly sheared rock

Contact, showing dip

Dashed where approximately located

Indefinite contact

Includes gradational and inferred contacts

U D 60

Fault, showing dip

Dashed where approximately located; dotted where concealed. U, *upthrown side;* D, *downthrown side*

Trace of axial plane of anticline

Trace of axial plane of syncline

Axis of overturned anticline

Vertical plunging fold

45

Strike and dip of beds

55

Strike and dip of overturned beds

90

Strike of vertical beds

50

Strike and dip of joints

Lode mine or prospect

Placer mine

MINES AND PROSPECTS

CHROMITE

2. Pine Flat Chromite
5. Richey
6. Logan
7. Tangarene
8. Toujours Gai
9. Holiday group
17. Chrome Hill No. 1
18. Bonanza
19. High Plateau
20. Judy
21. Skyline
22. Angela
23. Black Jack
24. Niggerhead
25. Fairview
26. Margy
27. French Hill Chrome Mine
33. Hawkins
34. Fourth of July
36. Coon Mountain group
37. Coon Creek No. 1
38. Cooncan
39. Big Dipper
40. Patterson
41. Thursday Evening
42. Apex
43. Sunset
44. Zinc Saddle
46. Camp 8

CHROMITE

47. Sunrise
48. Grumpy
49. Gilmore
52. Bluebird

QUICKSILVER

Hg 4. Big Boy
10. Webb
50. Sunnybrook
51. Diamond Creek

GOLD

Au 11. Continental
12. Name unknown
13. Name unknown
14. Blue Rock
15. Name unknown
16. Name unknown
28. Morrel Placer
29. French Hill Placer
30. French Hill Placer
31. Name unknown
32. Name unknown
35. Name unknown

COPPER

Cu 1. Name unknown
3. Cleopatra
45. Higgins

Reference: "Geology Map and the Structure Sections of the Gasquet Quadrangle, California", Plate 11, Scale 1:50,000, from Cater, F.W., Jr. and Wells, F.G. (1953) "Geology and Mineral Resources of the Gasquet Quadrangle, California-Oregon"; United States Geologic Survey Bulletin 995-C.

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design North	EA: 01-479401 Date: February 2013	**QUADRANGLE GEOLOGY MAP LEGEND**
		01-DN-199 PM 24.04; Bridge No. 01-0080 FOUNDATION REPORT	Plate No. 3b

Photo No. 1. Cut-slope approx. 350 to 400 feet south (near Approx. Station 505+00, Rte. 99) of existing bridge on the left side of northbound Route 199. Viewing facing northwest.

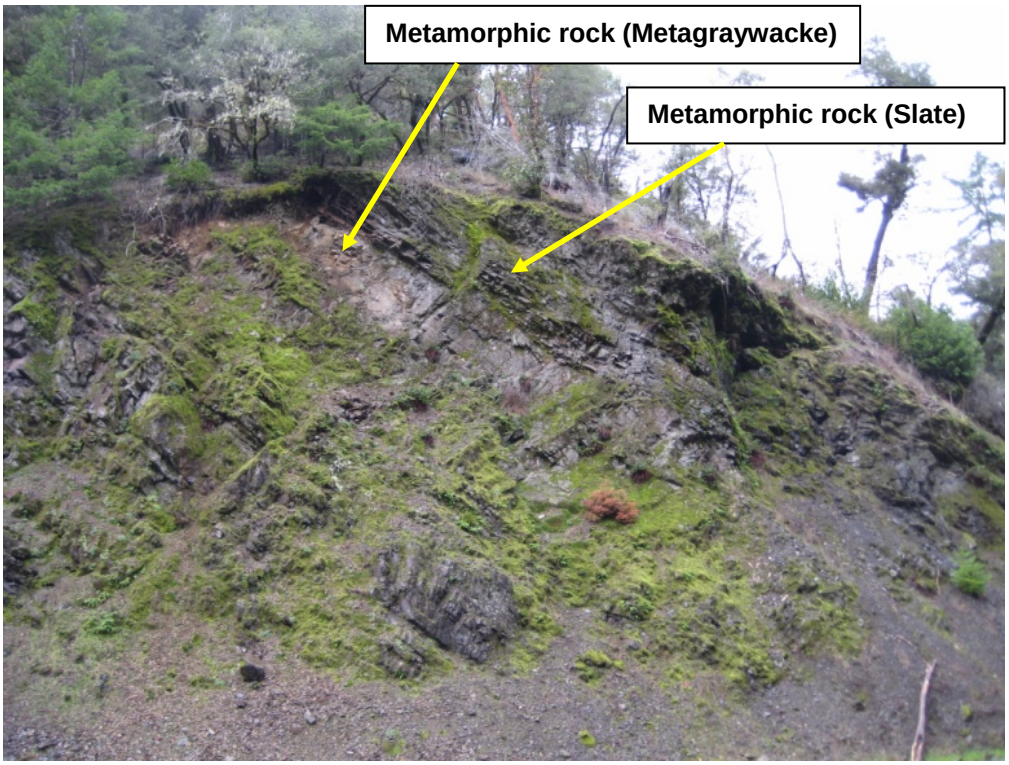


Photo No. 2.
Cut-slope on west shoulder of Rte. 99 (approx. Station 509 to approx. Station 506). Viewing facing southwest.

Photo No. 3. Slope on the right side of Northbound Rte. 199 (from approx. Station 510+70 to 513+25, Rte. 99). Viewing facing northwest.

Photo No. 4.
Slope at North end of existing bridge on the right side of the northbound Rte. 199 (from approx. Station 510+35 to 512+50, Rte. 99). Viewing facing northeast.

CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 01-479401 Date: February 2013	**PHOTOGRAPHS**
	01-DN-199 PM 24.04; BRIDGE NO. 01-0080 **Middle Fork Smith River Bridge** **FOUNDTAION REPORT**	Plate No. 4b

APPENDIX A

DESIGN ACCELERATION RESPONSE SPECTRUM

Middle Fork Smith River Bridge
Br. No. 01-0080
01-DN-199-PM 24.04

Middle Fork Smith River

Bridge No. **01-0080**

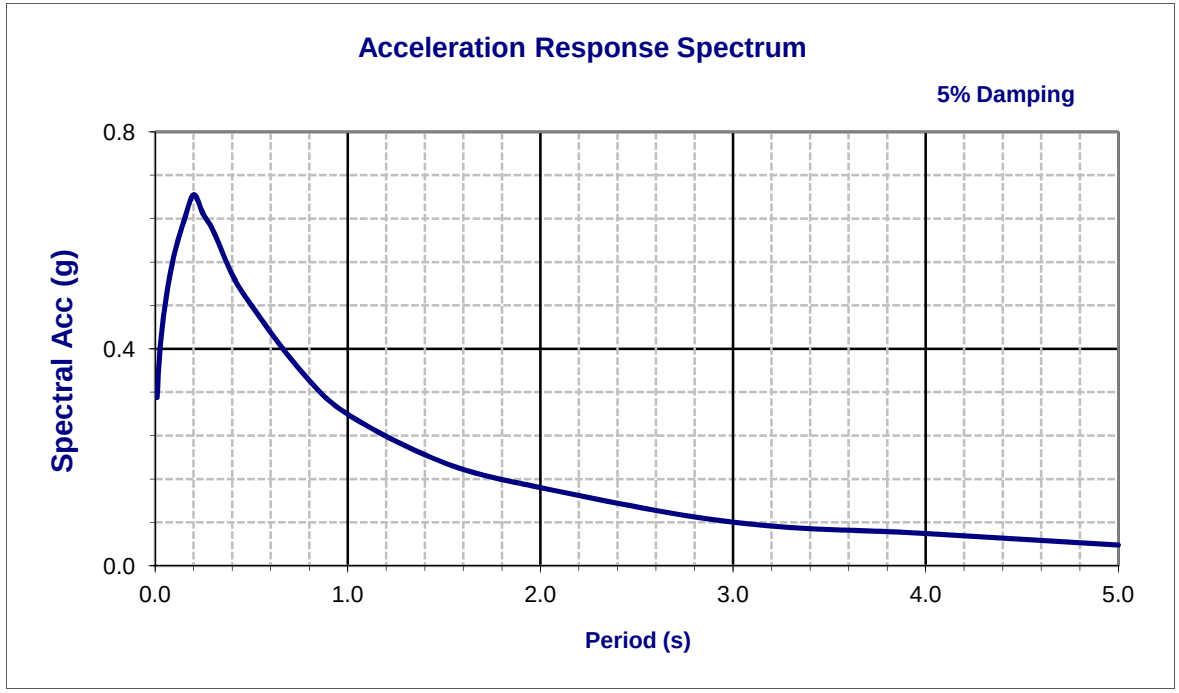
EFIS **0100000371**

Latitude 41.8793

Longitude -123.8273

Control **Probabilistic**

Period (s)	Sa(g)
0.010	0.310
0.020	0.373
0.030	0.416
0.050	0.477
0.075	0.532
0.100	0.575
0.120	0.602
0.150	0.636
0.200	0.684
0.250	0.648
0.300	0.619
0.400	0.537
0.500	0.480
0.750	0.362
1.000	0.279
1.500	0.190
2.000	0.144
3.000	0.080
4.000	0.059
5.000	0.038



Nearest Deterministic Fault Data

Fault	Cascadia Subduction Zone		R_{rup}	37	miles
Fault ID	4		R_{jb}	35	miles
Style	R		R_x	70	miles
Mmax	8.3		V_{S30}	2500	ft/sec
Dip	15	deg			
Z_{TOR}	3.1	miles			

Notes

Please note the Design ARS curve is based on the USGS 5% Probability of Exceedance in 50 years (975 years return period).

Final

Design Response Spectrum

1/18/2013 8:46 AM

APPENDIX B

As-BUILT GABION WALL REPORT AND PLAN SHEETS

Middle Fork Smith River Bridge
Br. No. 01-0080
01-DN-199-PM 24.04

1. DLP
2. Proj. Engr.
REE

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION & HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION
DISTRICT 1

01-DN-199-24.0/25.2
01101 200610
Repair Crib

APPROVED BY:

Delbert A. Brown
Deputy District Director
Project Development & Construction

12/23/83
Date

CO-SIGNED BY:

Edward M. Wall, Reviewer
Office of Planning & Design

12/23/83
Date

PROJECT REPORT

TO: Delbert A. Brown
Deputy District Director
Project Development & Construction

FROM: A. O. Sauls
District Project Studies Engineer

INTRODUCTION

This project proposes to construct gabion retaining walls at two locations to replace existing deteriorating log cribs on Route 199 in Del Norte County from 0.1 mile south to 1.1 miles north of the Middle Fork Smith River Bridge No. 1-15.

The estimated cost of the project is $215,000. It is to be funded as an HA22 project from the 1984-85 fiscal year Minor Capital Outlay Program, Category "A".

PROJECT DEVELOPMENT CATEGORY

This project has been determined to be a Category 5 project as it will not increase traffic capacity, will not require additional right of way and is of minimal economic, social or environmental significance.

This proposal is an FHWA Categorical Exclusion project. Mr. R. C. Slovensky, FHWA Reviewer, concurred with this determination (see Attachment "D").

BACKGROUND

Two locations requiring crib or brow log replacement were identified by the District Maintenance Department.

EXISTING FACILITIES

This portion of Route 199 was adopted into the State Highway System June 1, 1927.

The highway is classified as a primary route in the Federal Highway System Classification and is designated as FAP 199.

Designated a Scenic Highway in its entirety, Route 199 is, for the most of its length (29 of 36 miles), a two-lane mountainous highway paralleling the Designated Wild and Scenic Smith River.

The pavement width varies from 22' on the older two-lane sections to 60' on the newer constructed four-lane portions. The pavement width at these two sections is 22'.

Right of way at the two locations is 66' on either side of the highway centerline, 132' total width. The right of way is from a Special Use Permit from the Six Rivers National Forest.

TRAFFIC DATA

The following data was compiled by the District's Transportation Planning and Traffic Branches.

ADT (1981)	=	2,000	D	=	60%
ADT (1984)	=	2,250	T	=	13%
ADT (2004)	=	4,450	TI	=	10.0

No accidents have been recorded at either location in the last three years.

DEFICIENCIES AND JUSTIFICATION

At PM 24.0/24.1, the existing brow log (Attachment "E") along the edge of the northbound lane is deteriorating. The embankment is being eroded away, undermining the log. Pavement distress is showing at the present time. The continued deterioration of the brow log will eventually cause a portion of the northbound lane to sink, possibly leaving a one-lane traffic condition at this location.

At PM 25.1/25.2, there are three short existing timber cribs (Attachment "F") deteriorating, causing the northbound lane to sink. Maintenance continues to fill in the area with asphalt concrete in order to maintain a smooth riding surface. The roadway will continue to sink as the timber cribs deteriorate, eventually reducing Route 199 to one lane traffic.

No major construction is planned for this area in the foreseeable future.

PROPOSAL DESCRIPTION

It is proposed to construct gabion retaining walls at both locations. The wall at PM 24.0/24.1 will be 228' long and at PM 25.1/25.2 the wall will be 198' long. It is proposed to construct the walls to allow for a 12' lane (11' existing), no paved shoulders but with 3' of lateral support to accommodate the metal beam guardrail. To construct a 32' paved section was not considered feasible when dealing with 200' long spot locations to be repaired.

Construction of a 28' or 32' section would require major realignment, including the use of sidehill viaduct or large cuts. This type of improvement would be expensive and would not conform to the Roadway Reconstruction and Restoration Program criteria.

Both a crib ($280,000) and a non-tied back wall ($414,000) were considered at these locations as alternates to the gabion retaining wall. The gabion wall is being proposed as the more aesthetic and economical alternate.

The installation of a gabion wall at these two locations has been discussed with the District Materials Engineer, who feels it is a viable alternate to cribs and the foundation materials are suitable for their installation.

The current cost for construction of both locations is estimated to be $215,000. No right of way is anticipated as we have 66' of right of way on either side of the highway centerline under a special use permit from Six Rivers National Forest. A telephone line owned by General Telephone of the Northwest that is attached to fir trees at PM 24.0/24.1 will have to be moved by its owner prior to removal of the trees. The possible cutting of four trees at PM 24.1/24.1 will be coordinated with the local District Ranger. — M.O.U. Should have been a part of contract. MK

Provisions will have to be made to provide one way traffc during construction. The District Traffic Branch has recommended traffic signals at PM 24.0/24.1 and stop signs at PM 25.1/25.2.

At PM 24.0/24.1, 210' of tuthill guardrail will be removed and disposed of.

Any exposed slopes will be revegetated to control erosion.

It is anticipated that all construction materials will be obtained from commercial sources.

PROPOSED FUNDING

It is proposed to fund this as an HA22 project from the Minor Capital Outlay Program, Category A, in the 1984-85 fiscal year.

The recommended project budgetary description is as follows:

01-DN-199-24.0/25.2
From 0.1 mile south to 1.1 miles
north of Middle Fork Smith River
Bridge No. 1-15 (Portions)
Repair Cribs

The proposed work conforms to the HA22 program criteria.

OTHER CONSIDERATIONS

The small amount of asphalt concrete to be removed, about 100 tons, cannot economically be recycled. It will be broken up and incorporated into the work.

No navigable streams, wetlands, endangered species or archaeological sites are affected or involved.

PROJECT REVIEWS

This proposal has been reviewed by Mr. R. C. Slovensky, FHWA Reviewer, who concurs with the work, and indicated it will be eligible for Federal FAP funding.

ENVIRONMENTAL CERTIFICATION

The work described is categorically exempt under Class 1 Section 1510.1 of Caltrans' Environmental Regulations.

Date 12/21/83

By J. E. Thorne
J. E. Thorne, Chief
Environmental Planning Branch

RIGHT OF WAY CERTIFICATION

I have reviewed the right of way data contained in the Project Report, and find it to be complete, current, and accurate.

By F. O. Lemstrom
F. O. Lemstrom, Chief
Right of Way Appraisal Branch

PROJECT PERSONNEL

Project Report Prepared By	A. B. Toland	Ext. 343
Project Report Supervised By	G. F. Hoffman	Ext. 343
Dist. Project Studies Engineer	A. O. Sauls	Ext. 239
Chief, Environmental Planning	J. E. Thorne	Ext. 241
Proj. Devel. & Const. Supv	Delbert A. Brown	Ext. 300
Right of Way Supervisor	F. O. Lemstrom	Ext. 210
Right of Way Supervisor	J. A. Marcuz	Ext. 342

RECOMMENDATIONS

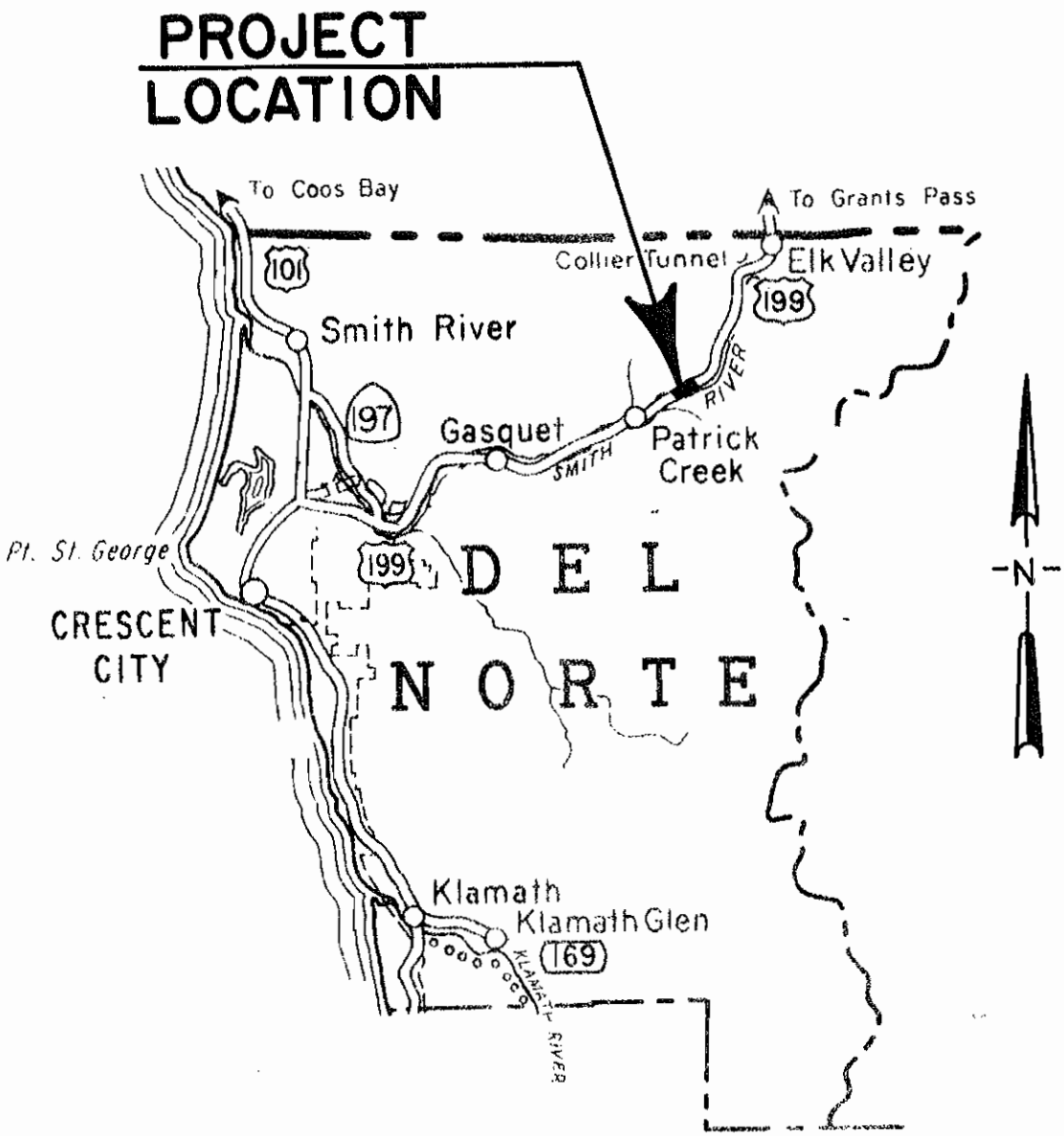
The District staff recommends approval of this project report.

ATTACHMENTS

A. Location Map
B. Vicinity Map
C. Estimate Sheet
D. Category Exemption Sheet
E. Photos
F. Photos
G. FHWA Review Sheet
H. Right of Way Estimate Sheets
I. Typical Section of PM 24.0/24.1
J. Typical Section of PM 25.1/25.2

ABT:scl

cc:AJPhillips-HO-3	1-DAB
EMWall-HO	2-JRMcC
RCSlovensky-FHWA	3-Const.
JV	
JAB	1-RKS
AOS	2-PWW
JGH	
JET	1-DLC
ARK	2-Proj. Engr.
R/W Engr.	
FOL	
JAMarcuz	
JAMartin+1	
General Files	
Project Studies File-4	



LOCATION MAP

01-DN-199-24.0/25.2

FROM 0.1 MI. SOUTH TO

1.1 MI. NORTH M.F. SMITH

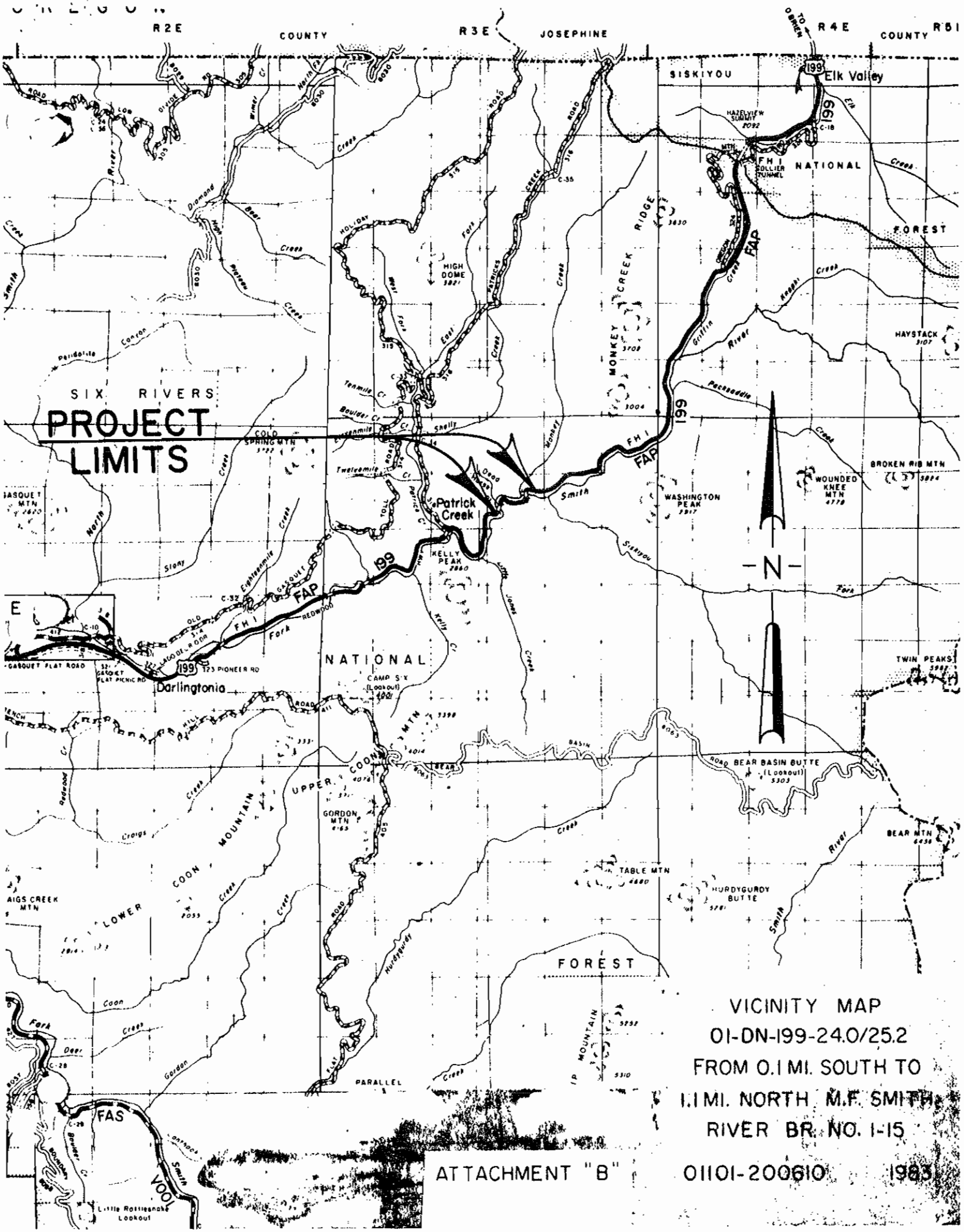
RIVER BR. NO. 1-15

ATTACHMENT "A"

01101-200610 1983

Scale in Miles

5 0 10 20



VICINITY MAP
01-DN-199-24.0/25.2
FROM 0.1 MI. SOUTH TO
1.1 MI. NORTH M.F. SMITH
RIVER BR. NO. 1-15

ATTACHMENT "B" 01101-200610 1983

PRELIMINARY ESTIMATE OF COST

H-0 149 - * (REV 7/73)

SHEET 1 OF 1

BID OPENING	EXPENDITURE AUTHORIZATION	BUDGET ALLOCATION	DATE
	200610	$220,000	11-22-83

DISTRICT	COUNTY	ROUTE	P M	SOURCE OF FUNDS
01	DN	199	24.0/25.2	HA 22

FEDERAL AID NUMBER

DESCRIPTION

From 0.1 mile south to 1.1 mile north of Middle Fork Smith River Bridge No. 1-15 (Portions)

ITEM NUMBER CODE	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
	Clearing & Grubbing	LS			2000 00
	Aggregate Base	CY	150	30 00	4500 00
	Asphalt Concrete	TON	215	50 00	10750 00
	Gabion	CY	880	100 00	88000 00
	Metal Beam Guard Rail	LF	565	20 00	11300 00
	Cable End Anchor	EA	3	300 00	900 00
	18" CSP PM 25.14	LF	30	38 00	1140 00
	18" CSP DD	LF	6	25 00	150 00
	GMP DI w/grate (H=3.0)	EA	1	800 00	800 00
	Remove & Dispose G.R.	LF	210	2 00	420 00
	Striping	LS			400 00
	Signs	LS			4000 00
	Sub-Total				124,360 00
	Traffic Signals	LS			50,000 00
	Traffic Control	LS			13,000 00

LENGTH IN MILES

COST PER MILE

MADE BY GB

CHECKED BY

Attachment "C"

SUB TOTAL	187,360.00
CONTINGENCIES 20% +	24,872.00
TOTAL	211,232.00
CALL	$215,000 00

APPROVED

DIST DIR OF TRANSPORTATION

CATEGORICAL EXEMPTION/EXCLUSION DETERMINATION

01-DN-199	24.0/25.2	101	200610	5-10-83
t.Co. Rte.	P.M.	C. U.	E. A.	Date

roposal Description and Purpose:

Repair crib at PM 24.0/24.1 and 25.1/25.2. These cribs will be replaced with metal or concrete cribs, tied back wall or viaduct.

---

1. Will the project involve substantial controversy on environmental grounds? no

2. Is there a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances? no

3. Will there be a significant cumulative impact by this project and successive projects of the same type in the same place, over time? no

CATEGORICAL EXEMPTION (CEQA)

1. Does this project fall within exempt class 1, 3, 4, 5, 6, or 11, and might it impact on an environmental resource or hazard designated in the Environmental Goals and Policy Report issued by the Governor, or an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law? no

2. If Class 1 (c) project, will it result in significant damage to or removal of a scenic resource? no

CATEGORICAL EXCLUSION (NEPA)

1. Will the project involve significant impacts on properties protected by Section 4(f) of the DOT Act or Section 106 of the National Historic Preservation Act? no

2. Is the project inconsistent with any Federal, State, or local law or administrative requirement relating to the environment such as the Endangered Species Act of 1973, Executive Order 11990 (Wetlands) or Executive Order 11988 (Floodplains)? no

CALTRANS DETERMINATION

Based on an examination of this proposal and the above statements, it is determined that the project is:

☒ Categorically exempt. Class 1 Section 1510.1 of Caltrans Environmental Regulations.

☐ Categorically exempt. General rule exemption. This project does not fall within an exempt class, but it can be seen with certainty that there is no possibility that the activity may have a significant effect on the environment.

AND, (if applicable)

☒ Categorically excluded.

Signature-Environmental Branch Chief — Date 5/11/83

Signature-Originating Branch Chief — Date 5-10-83

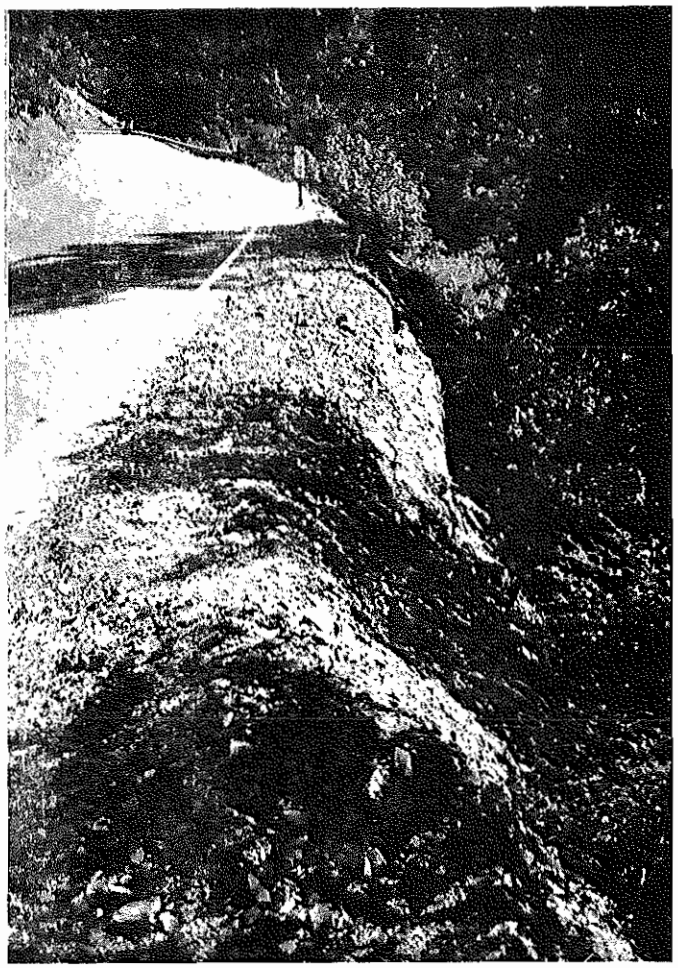
FHWA DETERMINATION (if applicable)

Based on the evaluation of this project, it is determined that the project meets the criteria of and is properly classified as a Categorical Exclusion.

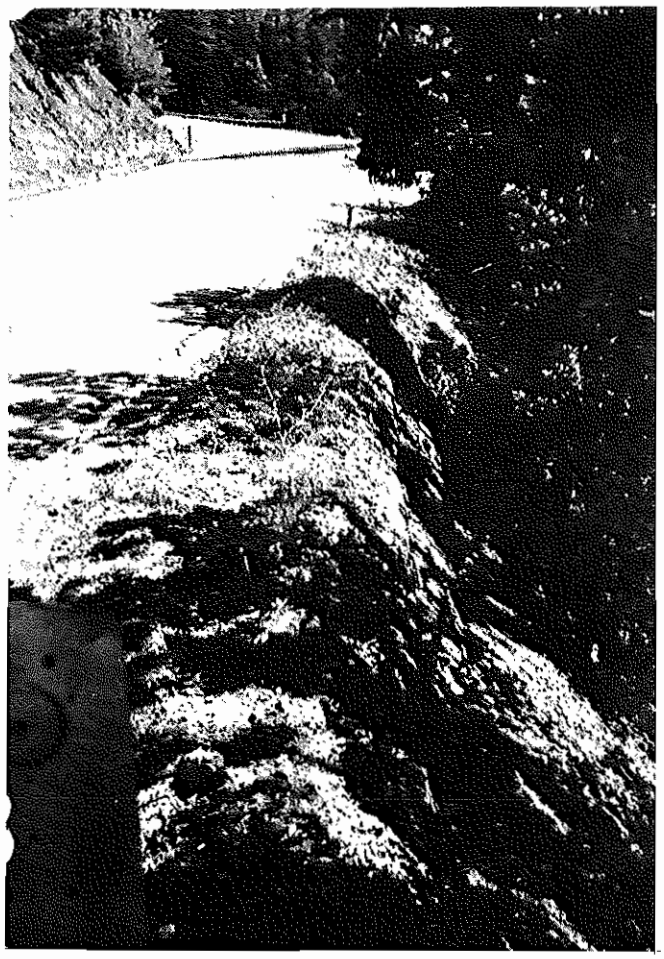
Signature - FHWA — Date 7/21/83

ATTACHMENT "D"

ree



P.M. 25.13



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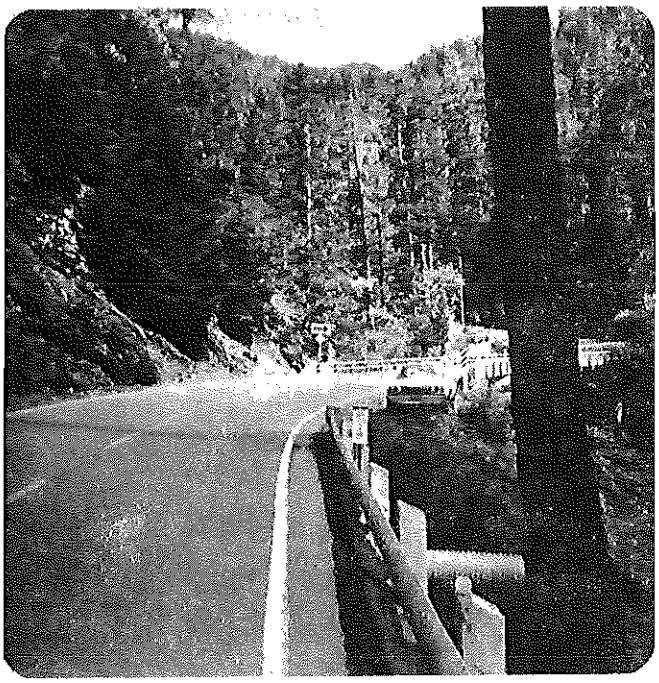
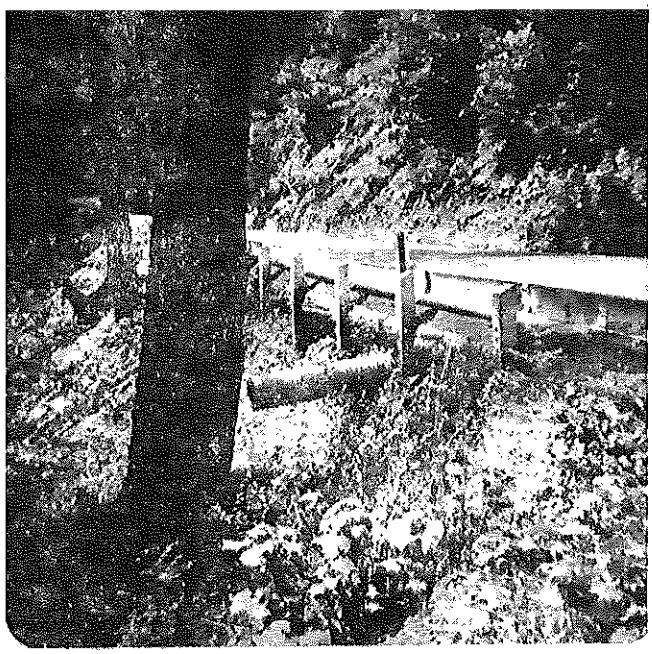
ATTACHMENT "F"





P.M. 24.07

ATTACHMENT "E"

Memorandum

To : Files

Date: 4/21/83

File : 01-DN-199-22.9/25.
01-199540

From : DEPARTMENT OF TRANSPORTATION
Program Management - Federal Aid Coordination

Subject: PROJECT REPORT REVIEW BY FHWA

[X] Project meets FHWA criteria for basic design concept and Federal-Aid funding eligibility at this stage of development subject to comments below and subsequent reviews as necessary before final approval.

[ ] Design questions - Deferred to Project Development Branch Chief for further review and determination of eligibility at this stage.

[ ] Project does not meet FHWA criteria at this stage for reasons noted below.

Alternatives to be investigated in addition to crib should include tied pile walls + viaduct sections which will provide width necessary for future 32' roadway section. One-way traffic control is ok during construction if necessary.

Potential class of Funds: FAP

FHWA Area Engineer

Federal-Aid Coordinator

RS 7/19/83

ATTACHMENT "G"

TO: Del Brown

ATTN: Arlon Sauls

Dist 1 Co DN Rte 199 PM 24.0/25.2
E.A. 200610
Date 12-1-83
Proj. Des: From 0.1 Mile South to 1.1 Miles North MF Smith River Br. 1-15

Subj: Right of Way Data -- Alternate None

1. R/W Cost Estimate:

A)	Acquisition, including Excess Land & Damages to Remainder	$ 0.00
B)	Utility Relocation (State share)	$ 0.00
C)	Clearance/Demolition	$ 0.00
D)	RAP	$ 0.00
	Total R/W Estimate	$ 0.00
E)	Construction Contract Work	$ 0.00

2. Parcel Data:

Type	Dual/Appr.	Utilities	RR Involvements	
X 0		U4-1 1	C&M Agree	0
A 0		-2 0	Service Contr	0
B 0	0	-3 0	Lic/RE	0
C 0	0	-4 0	Misc R/W Work:	
D 0	0	U5-7 0	Rap Displ	0
E XXXX	XXXX	-8 1	Clear/Demo	0
F XXXX		-9 0	Const Permits	

Total 0
Areas: R/W 0
Excess 0

No. Excess Parcels 0

Ent PMCS _____ By: _____
Revised _____

3. Description of Major Items of Construction Contract Work:

None required.

4. General Description of R/W and Excess (zoning, use, major improvements, critical or sensitive parcels, etc.):

No additional right of way required.

5. Effect on Assessed Valuation:

None

6. General Description of Utilities Affected (including determination of liability discussion):

General Telephone facility will require relocation, but the utility pays 100% of the cost.

7. General Description of Affected Railroad Facilities:

None

ATTACHMENT "H"

8. Summary of RAP Displacements: None
Single family_____ Business/nonprofit_____
Multi-family_____ Farm_____
Based on_____ Housing Availability Study dated_____
it is anticipated that sufficient replacement housing (will/will not) be available without Last Resort Housing.

9. Summary of Housing Units Required: None
A. Owner-Occupied_____ B. Tenant-Occupied_____
C. It is anticipated that _____ of the required units (are/will be) categorized as affordable low or moderate income housing units and that (all/_____) of such affordable units (should/should not) be replaced pursuant to Caltrans' policy. (Date of Community Housing Assessment _____ if District believes affordable units should be replaced.)

10. Discussion of material/disposal requirements and sources:

None

11. Discussion of Potential Relinquishments/Abandonments:

None

12. Discussion of Existing/Potential Airspace Sites:

None

13. Anticipated R/W Schedule & Lead Time Requirements:

Allow 6 months from the receipt of maps from R/W Engineering - Utilities only.

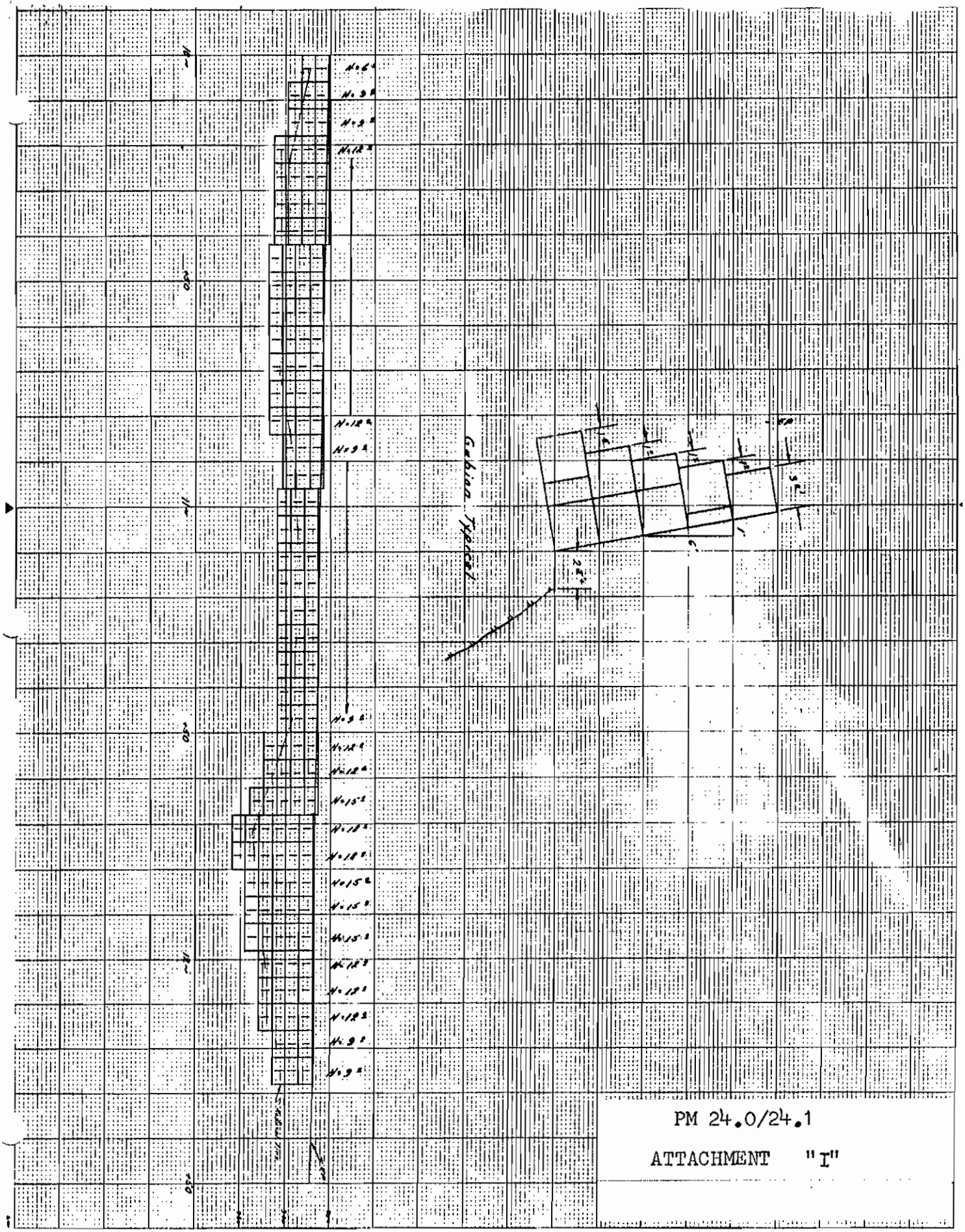
14. It is anticipated all R/W work will be performed by Caltrans' staff

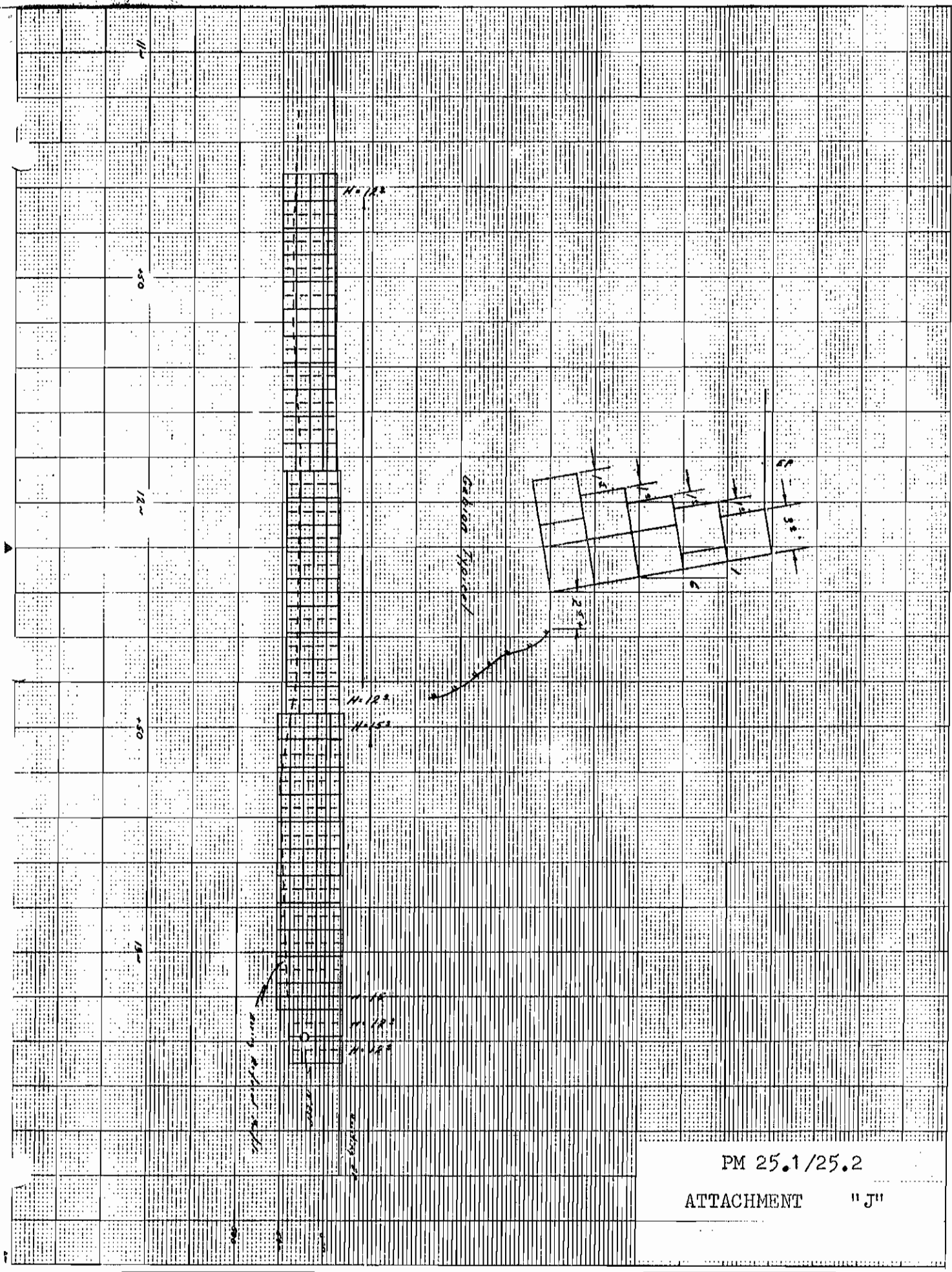
[X] Yes [ ] No (Discuss):

Evaluations prepared by:
1. R/W Name George Eitzen Date 12-1-83
2. Railroad Name N/A Date _____
3. Utilities Name John D. Tyler Date 12-1-83

I have reviewed the above data and find it to be complete, current, and accurate.

Frederick D. Carlson Date 12-2-83
Chief, Right of Way
Appraisal Branch


Gabion Typical
PM 24.0/24.1
ATTACHMENT "I"



DIST	COUNTY	ROUTE	POST MILES	
01	DN	199	25.1/25.2	

	REGIN POST	STUDS	TRUSS	POS

DEPARTMENT OF TRANSPORTATION
DISTRICT APPROVED PROJECT REPORT EVALUATION
DPD-PD 11 (Rev 1/83)

COPY OF EVALUATION TO DISTRICT
2/16/84 (Date sent) (Initials)

DATE OF REPORT
12/23/83

ROUTING					
1. R. Baker	RIGHT OF WAY	6. W. Amos - Planning & Design		FILE	1-DN-199
2. J. HEBNER	SPECIAL STUDIES	7. R. Almanzo		PM	24.0/25.2
3. R.S. WATERHOUSE	TRAFFIC REVIEWER	8. E. Wall	COORDINATOR	EA	200610
4. R. Peter	ENVIRONMENTAL PLANNING	9. W.D. BETHELL	PROJECT PLANNING	SAFETY INDEX	
5. R. Vogel	LANDSCAPE ARCHITECTURE	10. PLANNING & DESIGN FILES	TRAFFIC FILES		

EVALUATION

LIMITS

From 0.1 mi S/to 1.1 mi N/of Middle Fork Smith River Bridge No. 1-15

PROPOSAL & COSTS

Repair Crib

$215,000 HA22

PUBLIC HEARINGS Has Report Adequately Covered:

Need For Route Adoption?	☐ YES	☑ N.A.	☐ NO*	New Connection?	☐ YES	☑ N A	☐ NO*
Freeway Agreement?	☐ YES	☑ N.A.	☐ NO*	FHWA Requirement?	☑ YES	☐ N A.	☐ NO*
Public Hearing?	☐ YES	☑ N A.	☐ NO*	Project Category?	☑ YES		☐ NO*

ENVIRONMENTAL PLANNING: Is (Categorical Exemption) (Negative Declaration) Suitable? ☐ YES ☐ NO*

TRAFFIC REVIEWER: Concur With District Approval? [signature] ☒ YES ☐ CONDITIONAL* ☐ NO*

PROJECT QUALIFIES FOR: SAFETY N/O HB-11 ☐ HB-12 ☐ | OPERATIONAL HB-42 ☐ HB-43 ☐ HB-44 ☐

COORDINATOR: Project is: ☐ Emergency* ☐ Urgent* ☑ Normal ☐ Not Urgent ☐ Not Justified*

Are Limits Logical?	☑ YES		☐ NO*	Any Untried or Unusual Features?	☐ YES*		☑ NO
Problem and Need Adequately Demonstrated?	☑ YES	☐ Partly*	☐ NO*	Included in Approved Program	☑ YES	☐ N.A.	☐ NO*
Does Project Satisfy Need?	☑ YES	☐ Partly*	☐ NO*	Concur With District Approval	☑ YES	☐ Conditional*	☐ NO*
Is Project Cost Effective?	☑ YES	☐ Partly*	☐ NO*				
Any Nonstandard Design Features?	☐ YES*		☑ NO	If Yes, Were They Approved Prior to Project Report Approval?	☐ YES		☐ NO*

EVALUATION OF PROJECT REPORT QUALITY

As appropriate, rate how the following have been covered for completeness and clarity.	SPECIAL STUDIES	PUBLIC HEARING	TRAFFIC	COORDINATOR	PROJECT PLANNING
Limits and Proposed Work	3	3	3	4	
Deficiencies and Justification					
Alternative Solution					
Maps and Charts					
Overall Impression					

RATING LEGEND:
1. Poor or Inadequate
2. Fair
3. Normal
4. Above Average

*COMMENTS REQUIRED - Enter on back of form.
(Include heading with each comment, i.e., "Logical Limits", "Nonstandard Design Features", etc., features to be brought to District's attention, date comments made, and commentor's initials.)

2-1

1-10

2-9

2-2

2-0

2-8

1-9

2-4

2-5

Dist.	County	Route	Post Miles	Sheet No.	Total Sheets
01	DN	199	24.0,25.1	1	9

FOR CHIEF, PROJECT DEVELOPMENT BRANCH
REGISTERED CIVIL ENGINEER No 15809

CHIEF, OFFICE OF OFFICE ENGINEER
REGISTERED CIVIL ENGINEER No 8854

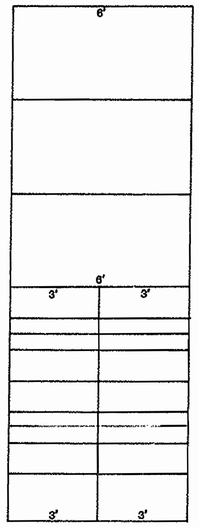
DATE APPROVED March 17, 1986

INDEX OF SHEETS

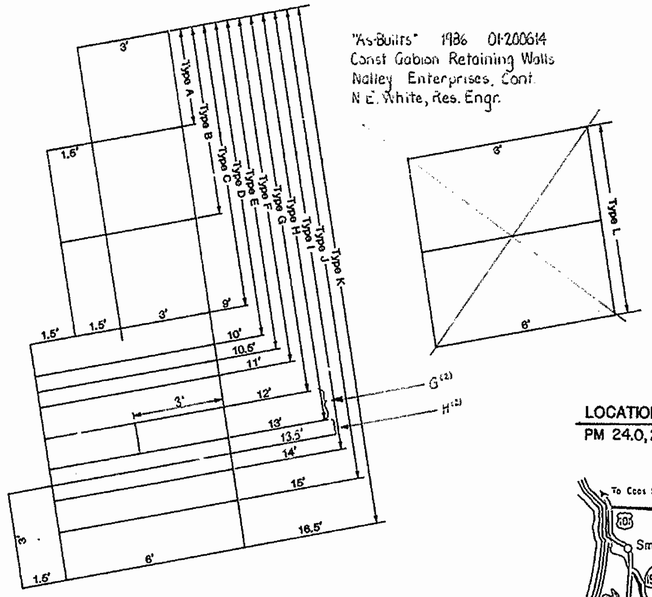
Sheet No. 1 Title, Location Map and Details
" " 2 Standard Plans List
" " 3-4 Construction Plan and Profile
" " 5 Drainage Details
" " 6-7 Striping and Delineation
" " 8-9 Temporary Signal System

" " 1-26 General Cross Sections

HEIGHT AND VOLUME OF GABION TYPES		
TYPE	HEIGHT	C.Y.
A	3'	2
B	6'	5
C	9'	8
D	10'	9.33
E	10.5'	10
F	11'	10.67
G	12'	12
H	13'	13.33
I	14'	14.67
J	15'	16
K	16.5'	19
L	6'	4

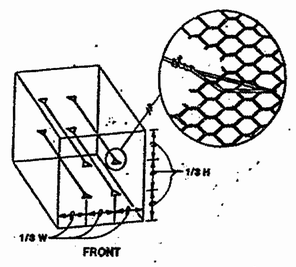


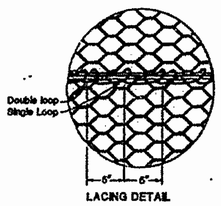
GABION FRONT ELEVATION
Scale: 1" 2'



GABION SIDE ELEVATION
Scale: 1" 2'

"As-Builts" 1986 01-200614
Const Gabion Retaining Walls
Nolley Enterprises, Cont.
N.E. White, Res. Engr.





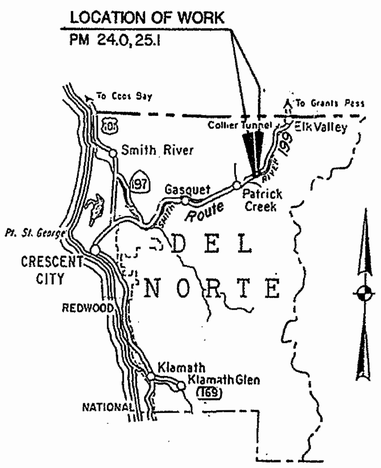
LACING DETAIL

INTERIOR CONNECTING WIRE DETAIL
NOT TO SCALE

A.C. SUMMARY (TYPE "B" ASPHALT CONCRETE)		
DESCRIPTION		TONS
LOCATION 1	STRUCTURAL SECTION	40
	0.10' A.C. OVERLAY	45
LOCATION 2	STRUCTURAL SECTION	37
	0.10' A.C. OVERLAY	48
TOTAL		170

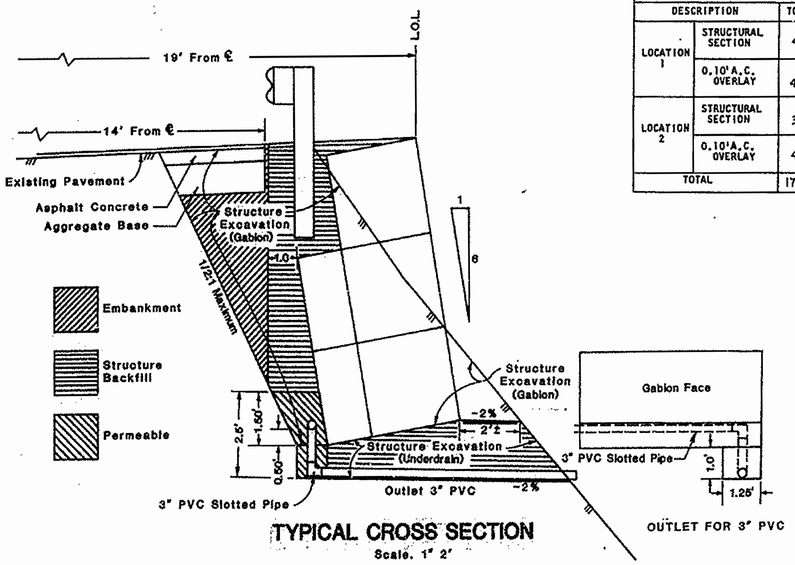
MISCELLANEOUS QUANTITY SUMMARY				
ITEM	UNIT	QUANTITY LOCATION 1	QUANTITY LOCATION 2	TOTAL
GABION WALL	CY	415	300	715
STRUCTURE EXCAVATION (GABION)	CY	700	660	1360
STRUCTURE BACKFILL (GABION)	CY	200	140	340
EMBANKMENT*	CY	190	125	315
STRUCTURE EXCAVATION (UNDERDRAIN)	CY	18	8	26
STRUCTURE BACKFILL (UNDERDRAIN)	CY	17	7	24
CLASS 1 PERMEABLE MATERIAL	CY	11	14	25
3" SLOTTED PLASTIC PIPE UNDERDRAIN	LF	500	325	825
CLASS 3 AGGREGATE BASE	CY	50	40	90
METAL BEAM GUARD RAILING (WOOD POST)	LF	275	345	620
TEMPORARY RAILING (TYPE K)	LF	280	260	540

* Not a pay item.



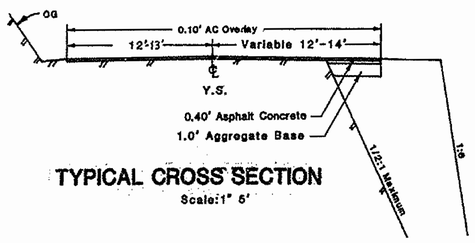
LOCATION MAP
No Scale

The Contractor shall possess either a Class A license or the following Class C licenses at the time this contract is awarded: Class C-12, C-32, C-34, C-42.



TYPICAL CROSS SECTION
Scale: 1" 2'

OUTLET FOR 3" PVC



TYPICAL CROSS SECTION
Scale: 1" 5'

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY

IN DEL NORTE COUNTY
NORTH OF PATRICK CREEK AT 0.1 MILE
SOUTH OF MID FORK SMITH RIVER BRIDGE
NO. 1-15 AND AT 0.2 MILE NORTH
OF MID FORK SMITH RIVER BRIDGE NO. 1-16

To be supplemented by Standard Plans dated July, 1984

Contract No. 01-200614

	Date	Approved Recommended by
R.E. Easton	10/84	D.L. Comstock
D.L. Comstock	10/84	D.A. Brown

1

DC OE-94 PF

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

01201 200611

10-84.05

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

SCALE 1" = 50' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1" = 20' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1" = 10' or 1" = 100' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1" = 40' MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

To accompany plans dated March 17, 1986

DISTRICT	COUNTY	ROUTE	POST MILES	SHEET NO.	TOTAL SHEETS
01	DN	199	24.0/25.1	2	9

GENERAL ROAD WORK

- ■ A-10 Symbols and Abbreviations
- ■ A-20A Pavement Markers and Traffic Lines, Typical Details
- ■ A-20B Pavement Markers and Traffic Lines, Typical Details
- ☐ A35-A P.C.C. Paving Details
- ☐ A35-B Approach Slab
- ■ A62-A Excavation and Backfill Miscellaneous-Limits of Payment
- ☐ A62-B Excavation and Backfill Bridge Surcharge and Wall-Limits of Payment
- ☐ A62-C Excavation and Backfill Bridge - Limits of Payment
- ☐ A62-D Excavation and Backfill Details Concrete and Asbestos-Cement Pipe Culverts
- ☐ A62-E Excavation and Backfill Details Reinforced Concrete Box and Arch Culverts
- ■ A62-F Excavation and Backfill Details Metal Culverts
- ☐ A73 Type III Barricade, Dikes and Road Intersections
- ■ A74-A Markers and Delineators
- ☐ A74-B Survey Monuments
- ☐ A75-A Concrete Barrier Type 50
- ☐ A75-B Concrete Barrier Type 50
- ☐ A77-A Metal Beam Barrier
- ☐ A77-B Metal Beam Barrier
- ■ A77C-1 Metal Beam Guard Railing-Standard Hardware
- ■ A77C-2 Metal Beam Guard Railing
- ☐ A77-D Barrier and Guard Rail Anchors
- ■ A77-E Cable Anchor Assembly (Breakaway)
- ☐ A77-F Thrie Beam Barrier
- ☐ A77G Thrie Beam Barrier
- ■ A79-A Guard Rail Flares
- ■ A79-B Miscellaneous Guard Rail Details
- ☐ A79-C Guard Rail Connections to Bridge Rails, Retaining Walls and Abutments
- ☐ A79-D Guard Rail Connections to Bridge Sidewalks and Curbs
- ☐ A80 Emergency Passageways
- ☐ A81 Barrier Transitions
- ☐ A83 Portable Scale
- ☐ C7-A Reinforced Concrete Crib Wall Types A, B, C and D-Construction Details
- ☐ C7-B Reinforced Concrete Crib Wall Types A, B, C and D-Design Data
- ☐ C7-C Reinforced Concrete Crib Wall Types I, II, III, IV, V, VI, VII, VIII and IX
- ☐ C7-D Reinforced Concrete Crib Wall Types X, XI & XII
- ☐ C7-E Reinforced Concrete Crib Wall Header & Stretcher Details
- ☐ C7-F Reinforced Concrete Crib Wall Design Data - Types I thru XII
- ☐ C8-A Steel Crib Wall-Construction Details
- ☐ C8-B Steel Crib Wall-Design Data
- ☐ C8-C Steel Crib Wall-Design Data
- ☐ C9-A Timber Crib Wall Types A, B, C and D-Construction Details
- ☐ C9-B Timber Crib Wall Types A, B, C and D-Design Data
- ☐ D72 Drainage Inlets - OS, OL, GOL
- ☐ D73 Drainage Inlets - G1, G2, G3, G4, G5, G6
- ■ D74 Drainage Inlets - GT1, GT2, GT3, GT4, G0, GD0
- ☐ D75 Pipe Inlets
- ■ D77-A Grate Details
- ■ D77-B Bicycle Proof Grate Details
- ☐ D78 Gutter Depressions
- ☐ D80 Single Box Culvert
- ☐ D81 Double Box Culvert
- ☐ D83 Box Culvert Miscellaneous
- ☐ D84 Box Culvert Wingwall, Types "A" "B" & "C"
- ☐ D85 Box Culvert Wingwall, Types "D" & "E"
- ☐ D86-A Box Culvert Warped Wingwalls
- ☐ D86-B Pipe Culvert Headwalls, Endwalls & Warped Wingwalls
- ☐ D86-C Arch Culvert Headwalls, Endwalls & Warped Wingwalls
- ■ D87-A Overside Drains
- ■ D87-B Overside Drains and Underdrains
- ☐ D88 Construction Loads on Culverts
- ☐ D89 Pipe Headwalls and Strut Details
- ☐ D90 Pipe Culvert Headwalls, Endwalls & Wingwalls Types "A" "B" & "C"
- ☐ D93 Drainage Inlet Riser Connections
- ☐ D94 Flared End Sections
- ☐ D95 Concrete Arch Culverts
- ☐ D96 Pipe Riser with Debris Rock Cage
- ■ D97A CMP Coupling Band Details No. 1, Flanged End CSP Channel Coupling Band Details-Downdrains, Standard and Positive Joints
- ■ D97B-1 CMP Coupling Band Details No. 2, Annular, Reformed End, and Helical Coupling Bands-Downdrains, Standard and Positive Joints
- ■ D97B-2 CMP Coupling Band Details No. 3, Flanged End CSP Channel Coupling Band Details-Downdrains, Standard and Positive Joints
- ■ D97C-1 CMP Coupling Band Details No. 4, Universal Coupling Bands Standard and Positive Joints
- ■ D97C-2 CMP Coupling Band Details No. 5, Universal Coupling Bands Standard and Positive Joints
- ☐ D97D CMP Coupling Details No. 6-Standard Joint
- ■ D97E-1 CMP Coupling Details No. 7-Positive Joint
- ■ D97E-2 CMP Coupling Details No. 8-Positive Joints and Downdrains
- ☐ D97-F Reinforced Concrete Pipe or Non-Reinforced Concrete-Pipe Standard and Positive Joints
- ☐ D98-A Standard Inlet Structure Shoulder Installation Details and Details of Slotted Drain Connections
- ☐ D98-B 12" Thru 24" Slotted C.S.P. Drain Details
- ☐ D98-C Alternative Hinged Cover for Type OL & OS Inlets & Trash Rack for Type OGP Inlet
- ☐ D98D-1 Edge Drain Details
- ☐ D98D-2 Edge Drain Details
- ☐ F-10 Chain Link Fence
- ☐ F-20 Barbed Wire and Wire Mesh Fence
- ☐ N8-A Curbs and Driveways
- ☐ N8-B Wheelchair Ramp Details No. 1
- ☐ N8-C Wheelchair Ramp Details No. 2
- ☐ T-10 Traffic Control System for Lane Closure on Freeways and Expressways, Miscellaneous Details
- ☐ T-11 Traffic Control System for Lane Closure on Multilane Conventional Highways, Miscellaneous Details
- ☐ T-12 Traffic Control System for Lane Closure on Multilane Conventional Highways, Miscellaneous Details
- ■ T-13 Traffic Control System for Lane Closure on Two Lane Conventional Highways
- ☐ T-14 Details for Ramp Closures, Miscellaneous Details

BRIDGE

- ☐ B0-1 Bridge Details
- ☐ B0-3 Bridge Details
- ☐ B0-5 Bridge Details
- ☐ B0-13 Bridge Details
- ☐ B1-11 Closure Wall Details-Box Girder
- ☐ B2-3 16" Cast-in-Drilled-Hole Concrete Pile
- ☐ B2-5 Pile Details-Class 45 and Class 70
- ☐ B2-8 Pile Details-Class 45C and Class 70C
- ☐ B2-9 Load Test Anchor Pile Details
- ☐ B3-1 Retaining Wall-Type I H=4'-30'
- ☐ B3-2 Retaining Wall-Type I H=32'-36'
- ☐ B3-3 Retaining Wall-Type I A
- ☐ B3-4 Retaining Wall-Type 2
- ☐ B3-5 Counterfort Retaining Wall - Type 3
- ☐ B3-6 Counterfort Retaining Wall - Type 4
- ☐ B3-7 Retaining Wall - Type 5
- ☐ B3-8 Retaining Wall Details No. 1
- ☐ B3-9 Retaining Wall Details No. 2
- ☐ B3-11 Retaining Wall Type 6 - 6' Max.
- ☐ B6-1 T-Beam Details
- ☐ B6-10 Utility Openings - T-Beam
- ☐ B6-21 Joint Seals
- ☐ B7-1 Box Girder Details
- ☐ B7-5 Deck Drains
- ☐ B7-6 Deck Drains - Types D-1 and D-2
- ☐ B7-10 Utility Opening - Box Girder
- ☐ B7-11 Utilities Details
- ☐ B8-5 Cast-in-Place Prestressed Girder Details
- ☐ B11-7 Chain Link Railing
- ■ B11-30 Temporary Railing (Type K)
- ☐ B11-47 Cable Railing
- ☐ B11-51 Tubular Hand Railing
- ☐ B11-52 Chain Link Railing Type 7
- ☐ B11-53 Concrete Barrier Type 25
- ☐ B11-54 Concrete Barrier Type 26
- ☐ B13-1 Slope Protection Detail No. 1
- ☐ B13-2 Slope Protection Detail No. 2
- ☐ B14-1 Structural Steel Plate Vehicular Undercrossing
- ☐ B14-2 Structural Steel Plate Arches
- ☐ B14-3 Supply Line & Communication & Sprinkler Control Conduit

SIGNS, SIGNALS & LIGHTING

OVERHEAD SIGNS - TRUSS

- ☐ S1-12 Overhead Signs, Truss, Instructions and Examples
- ☐ S2-11 Overhead Signs, Truss, Single Post Type, Post Type II thru VIII
- ☐ S3-11 Overhead Signs, Truss, Two Post Type, Post Type 1-S thru VII-S
- ☐ S4-6 Overhead Signs, Truss, Single Post Type, Structural Frame Members
- ☐ S5-6 Overhead Signs, Truss, Two Post Type, Structural Frame Members
- ☐ S6-8 Overhead Signs, Truss, Structural Frame Details
- ☐ S7-8 Overhead Signs, Truss, Frame Juncture Details
- ☐ S8B Overhead Signs, Steel Frame Removable Sign Panel Frames
- ☐ S8-BA Overhead Framed Panel Details for Mounting on Removable Sign Panel Frames
- ☐ S8C Overhead Signs, Truss, Sign Panel Mounting Details Laminated Panel, Type A
- ☐ S8D Overhead Signs, Truss, Removal Sign Panel Frames 110" and 123" Sign Panels
- ☐ S9-12 Overhead Signs, Walkway Details No. 1
- ☐ S10-9 Overhead Signs, Walkway Details No. 2
- ☐ S11-10 Overhead Signs, Walkway Safety Railing Details
- ☐ S13-10 Overhead Signs, Truss, Pile Foundation

OVERHEAD SIGNS - LIGHTWEIGHT

- ☐ S14A-5 Overhead Signs, Lightweight, Balanced-Single Steel, Post Connection and Mounting Details
- ☐ S14B-4 Overhead Signs, Lightweight, Balanced-Single Steel Post Details
- ☐ S15-8 Overhead Signs, Lightweight, Type A, Connection Details
- ☐ S16-7 Overhead Signs, Lightweight, Type B, Connection Details
- ☐ S17-8 Overhead Signs, Lightweight, Type C, Connection Details
- ☐ S18A-8 Overhead Signs, Lightweight, Sign Panel Mounting Details, Laminated Panel, Type A
- ☐ S18B-7 Overhead Signs, Lightweight, Light Fixture Mounting Details
- ☐ S20A-7 Overhead Signs, Lightweight, Post Details
- ☐ S20B-9 Overhead Signs, Lightweight, Foundation
- ☐ S21-4 Overhead Signs, Box Beam, Instructions and Examples
- ☐ S22-2 Overhead Signs, Box Beam, Two Post Type Frame Members
- ☐ S23-4 Overhead Signs, Box Beam, Two Post Type Frame Details
- ☐ S24-4 Overhead Signs, Box Beam, Two Post Type Cantilever Frame Details
- ☐ S25-4 Overhead Signs, Box Beam, Two Post Type Frame Juncture Details
- ☐ S26-5 Overhead Signs, Box Beam, Two Post Type Post Details
- ☐ S27-5 Overhead Signs, Box Beam, Single Post Type Frame Members
- ☐ S28-5 Overhead Signs, Box Beam, Single Post Cantilever Frame Details
- ☐ S29-4 Overhead Signs, Box Beam, Single Post Cantilever Frame Juncture Details
- ☐ S30-6 Overhead Signs, Box Beam, Single Post Cantilever Post Details
- ☐ S31-3 Overhead Signs, Box Beam, Single Post Butterfly Frame Details
- ☐ S32-4 Overhead Signs, Box Beam, Single Post Butterfly Frame Juncture Details
- ☐ S33-4 Overhead Signs, Box Beam, Single Post Butterfly Post Details
- ☐ S34A-5 Overhead Signs, Box Beam, Sign Panel Mounting Details, Single Sheet Sign Panel

OVERHEAD SIGNS - BOX BEAM CLOSED TRUSS ALTERNATIVE

- ☐ S39-6 Overhead Signs, Box Beam & Closed Truss Alternative Foundation
- ☐ S40A-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Frame Members
- ☐ S40B-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single and Two Post Type General Frame Details
- ☐ S40C-1 Overhead Signs, Box Beam, Closed Truss Alternative, Ribbed Sheet Metal Details
- ☐ S40D-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Frame Details
- ☐ S40E-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Frame Juncture Details
- ☐ S40F-1 Overhead Signs, Box Beam, Closed Truss Alternative, Two Post Type Post Details
- ☐ S40G-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Type Frame Members
- ☐ S40H-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Cantilever Frame Details
- ☐ S40I-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Cantilever Frame Juncture Details
- ☐ S40J-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Cantilever Post Details
- ☐ S40K-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Butterfly Frame Details
- ☐ S40L-3 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Butterfly Frame Juncture Details
- ☐ S40M-1 Overhead Signs, Box Beam, Closed Truss Alternative, Single Post Butterfly Post Details

OVERHEAD SIGNS - TUBULAR

- ☐ S40N Overhead Signs, Tubular, Instructions and Examples
- ☐ S40P Overhead Signs, Tubular, Single Post Type Layout and Pipe Selection
- ☐ S40Q Overhead Signs, Tubular, Two Post Type Layout and Pipe Selection
- ☐ S40R Overhead Signs, Tubular, Structural Frame Details No. 1
- ☐ S40S Overhead Signs, Tubular, Structural Frame Details No. 2
- ☐ S40T Overhead Signs, Tubular, Foundation Details

ROADSIDE SIGNS

- ■ S41-3 Roadside Signs, Typical Installation Details No. 1
- ■ S42-15 Roadside Signs, Wood Posts, Typical Installation Details No. 2
- ☐ S43-A Roadside Signs, Laminated Wood Box Posts, Typical Installation Details No. 3
- ☐ S43-B Roadside Signs, Steel Post, Typical Installation Details
- ☐ S44-7 Roadside Signs, Typical Installation Details No. 4

TRAFFIC SIGNAL and HIGHWAY LIGHTING DETAILS

- ■ ES-1A Traffic Signal and Highway Lighting Details, Symbols and Abbreviations
- ■ ES-1B Traffic Signal and Highway Lighting Details, Symbols and Abbreviations
- ■ ES-2A Traffic Signal and Highway Lighting Details, Service Equipment
- ☐ ES-2B Traffic Signal and Highway Lighting Details, Service Equipment
- ☐ ES-2C Traffic Signal and Highway Lighting Details, Service Equipment
- ☐ ES-2D Traffic Signal and Highway Lighting Details, Service Equipment
- ■ ES-3A Traffic Signal and Highway Lighting Details, Signal Heads and Mountings
- ☐ ES-3B Traffic Signal and Highway Lighting Details, Signal Heads and Mountings
- ■ ES-3C Traffic Signal and Highway Lighting Details, Signal Heads and Mountings
- ■ ES-3D Traffic Signal and Highway Lighting Details, Signal Heads and Mountings
- ☐ ES-3E Traffic Signal and Highway Lighting Details, Signal Heads and Mountings
- ☐ ES-4A Traffic Signal and Highway Lighting Details, Controller Cabinet Details
- ■ ES-4B Traffic Signal and Highway Lighting Details, Controller Cabinet Details
- ☐ ES-4C Traffic Signal and Highway Lighting Details, Controller Cabinet Details
- ■ ES-5A Traffic Signal and Highway Lighting Details, Detectors
- ■ ES-5B Traffic Signal and Highway Lighting Details, Detectors
- ☐ ES-5C Traffic Signal and Highway Lighting Details, Detectors
- ☐ ES-5D Traffic Signal and Highway Lighting Details, Detectors
- ☐ ES-5E Traffic Signal and Highway Lighting Details, Detectors
- ☐ ES-5F Traffic Signal and Highway Lighting Details, Detectors

TRAFFIC SIGNAL and LIGHTING STANDARDS

- ☐ ES-6A Traffic Signal and Lighting Standards, Type I Standards and Pushbutton Posts
- ☐ ES-6B Lighting Standards, Types 15 and 21
- ☐ ES-6D Lighting Standards, Types 30 and 31
- ☐ ES-6DA Lighting Standards, Type 32
- ☐ ES-6E Lighting Standards Types 30 and 31, Base Plate Details
- ☐ ES-6F 10 Degree Lighting Standards
- ☐ ES-6H 10 Degree Lighting Standards Details
- ☐ ES-6J Traffic Signal and Lighting Standards Case 1 Arm Loading, Wind Velocity=70 MPH Arm Lengths 15' to 30'
- ☐ ES-6K Traffic Signal and Lighting Standards Case 2 Arm Loading, Wind Velocity=70 MPH Arm Lengths 20' to 30'
- ☐ ES-6L Traffic Signal and Lighting Standards Case 3 Arm Loading, Wind Velocity=70 MPH Arm Lengths 20' to 45'
- ☐ ES-6M Traffic Signal and Lighting Standards Case 4 Arm Loading, Wind Velocity=70 MPH Arm Lengths 25' to 45'
- ☐ ES-6N Traffic Signal and Lighting Standards Type 40-0-80
- ☐ ES-6O Traffic Signal and Lighting Standards Case 1 Arm Loading, Wind Velocity=80 MPH Arm Lengths 25' to 30'
- ☐ ES-6P Traffic Signal and Lighting Standards Case 2 Arm Loading, Wind Velocity=80 MPH Arm Lengths 20' to 30'
- ☐ ES-6Q Traffic Signal and Lighting Standards Case 3 Arm Loading, Wind Velocity=80 MPH Arm Lengths 20' to 45'
- ☐ ES-6R Traffic Signal and Lighting Standards Case 4 Arm Loading, Wind Velocity=80 MPH Arm Lengths 25' to 45'
- ☐ ES-6S Traffic Signal and Lighting Standards Details No. 1
- ☐ ES-6T Traffic Signal and Lighting Standards Details No. 2
- ☐ ES-6U Slip Base Insert for Type 10 & 15 Lighting Standards
- ☐ ES-6V Left Turn Signal and Sign Standard Type 33
- ☐ ES-7A Traffic Signal and Highway Lighting Details, Electrical Details Structure Installations
- ☐ ES-7B Traffic Signal and Highway Lighting Details, Electrical Details Structure Installations
- ☐ ES-7C Traffic Signal and Highway Lighting Details, Electrical Details Structure Installations
- ☐ ES-7D Traffic Signal and Highway Lighting Details, Electrical Details Structure Installations
- ☐ ES-7E Traffic Signal and Highway Lighting Details, Electrical Details Structure Installations
- ☐ ES-7F Traffic Signal and Highway Lighting Details, Electrical Details Structure Installations
- ■ ES-8 Traffic Signal and Highway Lighting Details, Pull Box Details
- ☐ ES-9A Cantilever Flashing Beacon Details, Types 9, 9A, 9B
- ☐ ES-9B Cantilever Flashing Beacon Details, Types 9, 9A, 9B
- ☐ ES-10 Traffic Signal and Highway Lighting Details, Isolux Diagrams
- ☐ ES-11 Traffic Signal and Highway Lighting Details, Foundation Installations
- ☐ ES-12 Pedestrian Undercrossing Fluorescent Lighting Fixture
- ■ ES-13 Traffic Signal and Highway Lighting Details, Wiring Details and Fuse Ratings
- ☐ ES-15 Pedestrian Overcrossing Fluorescent Lighting Fixture

EXTINGUISHABLE MESSAGE SIGN

- ☐ ES-27A Extinguishable Message Sign, 10" Letters
- ☐ ES-27B Extinguishable Message Sign, 10" Letters
- ☐ ES-28 Extinguishable Message Sign and Flashing Beacons

SIGN LIGHTING DETAILS

- ☐ ES-29 Mercury Sign Lighting Equipment
- ☐ ES-30 36" Fluorescent Sign Lighting Equipment
- ☐ ES-31 72" Fluorescent Sign Lighting Equipment
- ☐ ES-32 Sign Lighting Equipment
- ☐ ES-33 Internally Illuminated Street Name Sign

"As-Builts" 1986 01-200614
Nally Enterprises, Cont.
N. E. White, Res. Engr.

STANDARD PLANS LIST

(July, 1984 Edition)

The Standard Plan sheets indicated by a marked box are applicable to this CONTRACT NO. 01-200614

2

10-81-05

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

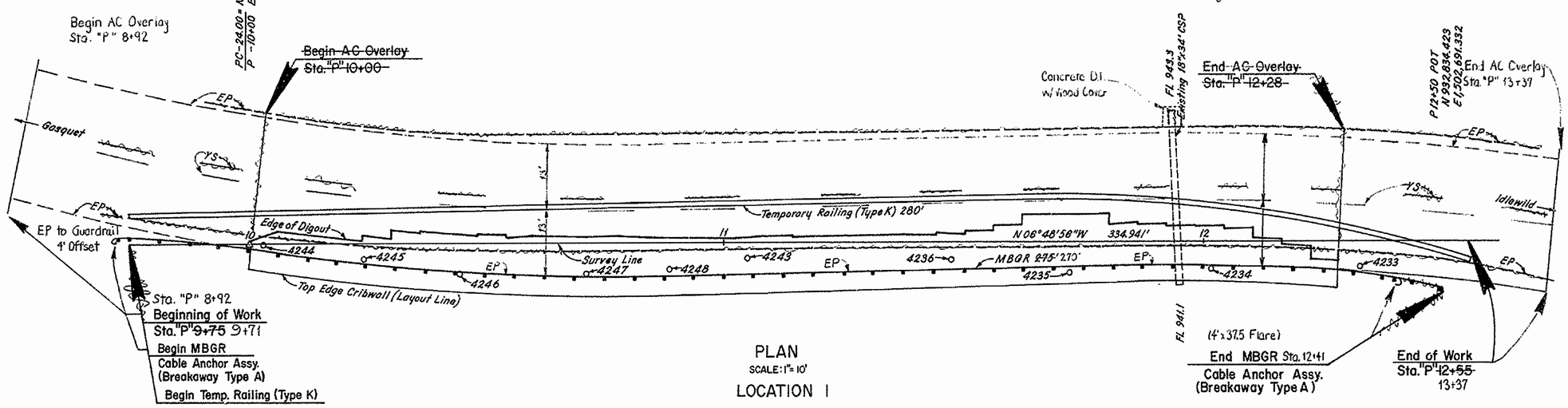
DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

01 DN 199 24.0.25.1 3 9

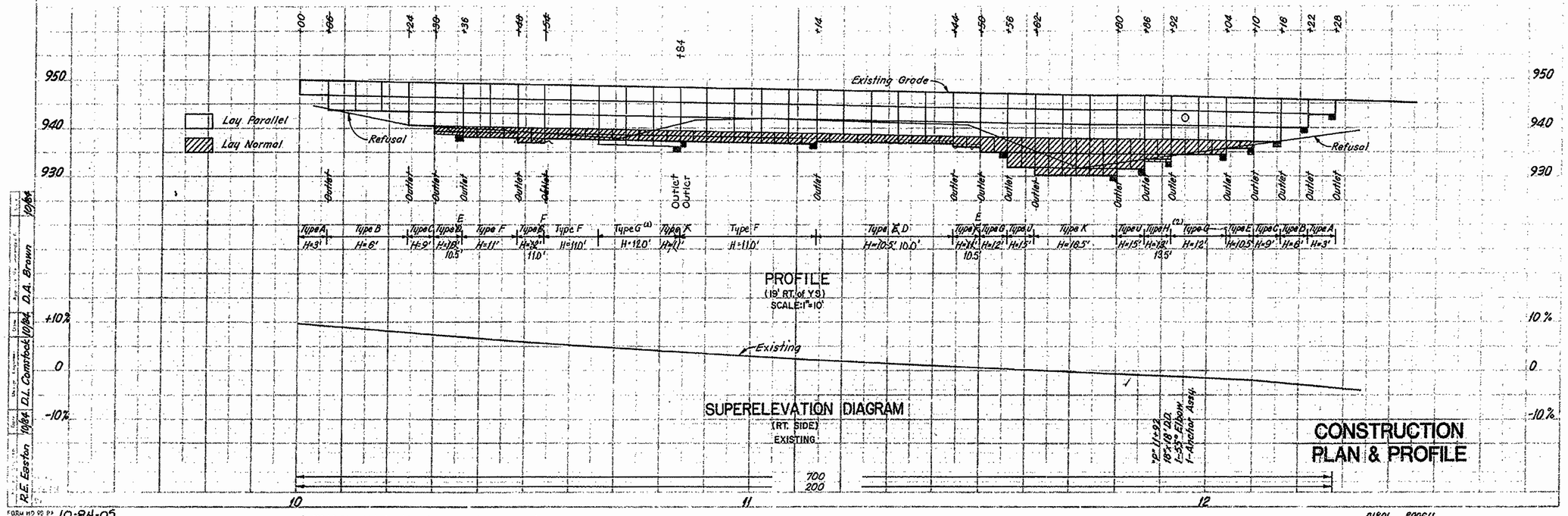
Donald L Comstock
18809
March 17, 1986

T17N, R3E, H.B.&M.
Section 10

"Kordsins" 1986 01-200614
Nally Enterprises, Const.
N.E. White, Res. Engr



PLAN
SCALE: 1" = 10'
LOCATION 1



CONSTRUCTION
PLAN & PROFILE

R.E. Easton 10/84 D.L. Comstock 10/84 D.A. Brown 10/84

3

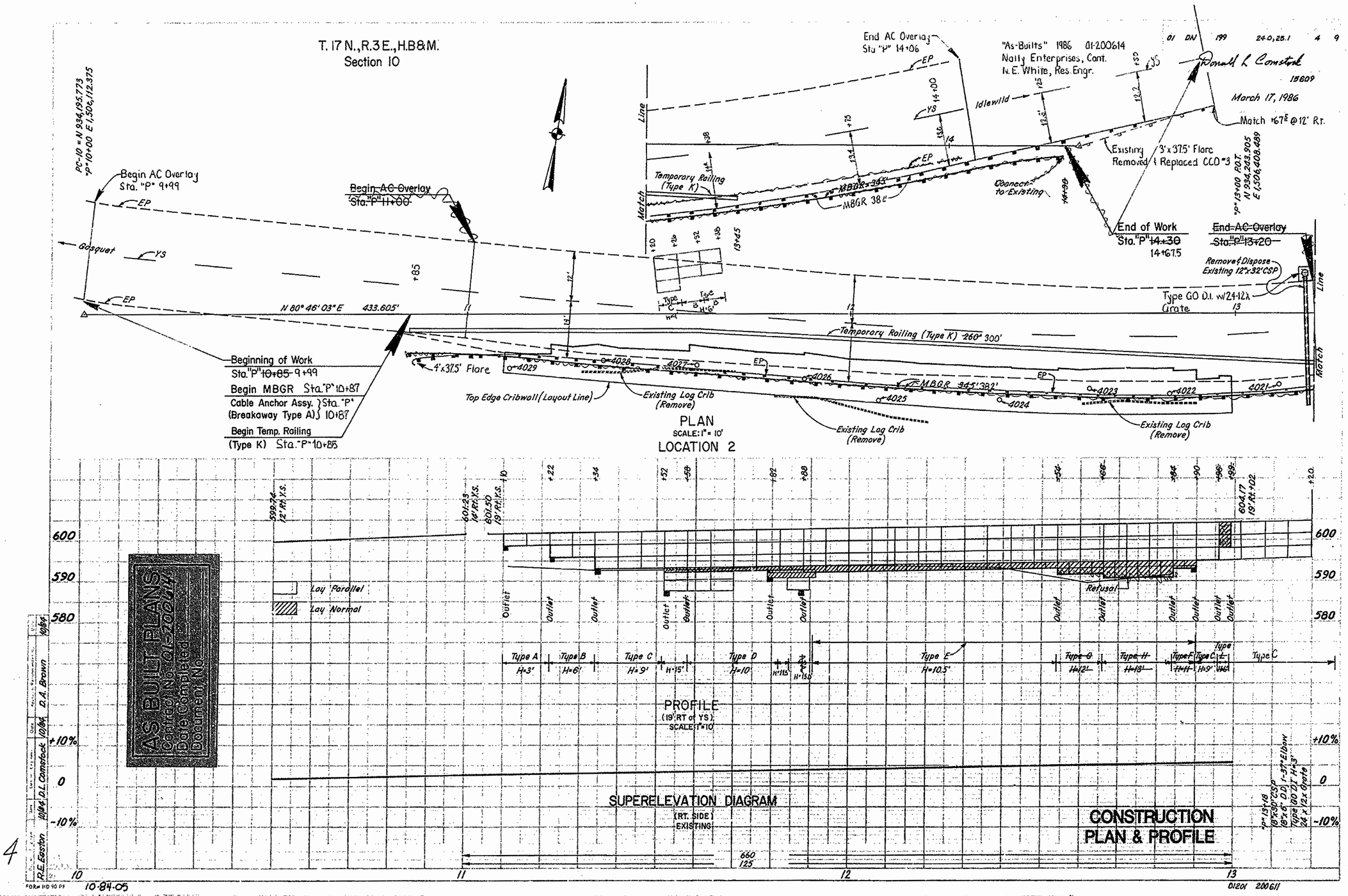
FORM HD 90 D1 10-84-05

01201 200611

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.
DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1" = 50' SCALE 1" = 20' SCALE 1" = 10' or 1" = 100' SCALE 1" = 40'



I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT, TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

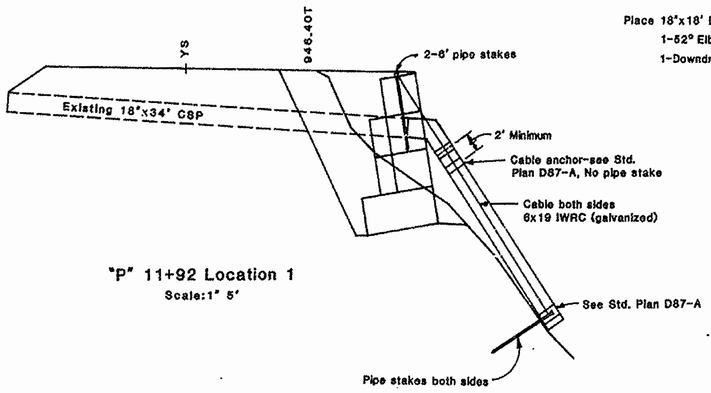
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

"As-Builts" 1986 01-200614
Nally Enterprises, Cont.
N E. White, Res. Engr.

Dist	County	Route	Post Mile Total Project	Sheet No	Total Sheets
01	DN	199	24.0,25.1	5	9

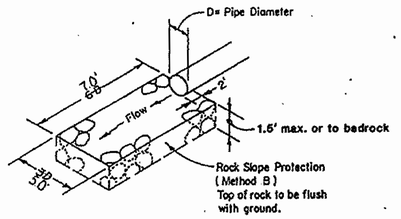
Donald L. Comstock
DESIGN ENGINEER — REGISTERED CIVIL ENGINEER NO. 15609

DATE APPROVED March 17, 1986

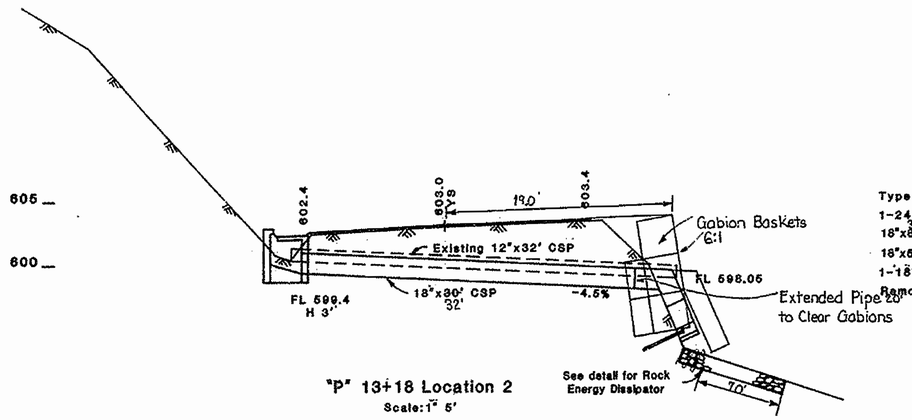


"P" 11+92 Location 1
Scale: 1" 5'

Place 18"x16' Downdrain
1-52° Elbow
1-Downdrain Cable Anchor Assembly System



DETAIL FOR ROCK ENERGY DISSIPATOR AT DRAINAGE OUTLET
DIMENSIONS AS SHOWN OR AS DIRECTED
No Scale



"P" 13+18 Location 2
Scale: 1" 5'

Type GO DI H-3'
1-24-12X Grate 239 lbs.
18"x30' CSP 1-64° elbow
18"x6' Downdrain
1-18" Anchor Assembly
Remove & Dispose 12"x32' CSP

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

NOTE: ALL PIPE JOINTS SHALL BE POSITIVE

DRAINAGE DETAILS

Project Engineer	Date	Design Engineer	Date	Approval Recommended by	Date
R.E. Easton	10/86	D.L. Comstock	10/86	D.A. Brown	10/86

5

10-84-05

FORM HD 92 PF

01201 200611

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donald Bradford TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

"As-Builts" 1986 01-200614
Nolty Enterprises, Cont.
N.E. White, Res. Engr.

Dist.	County	Route	Post Mile Total Project	Sheet No.	Total Sheets
01	DN	199	24.0, 25.1	6	9

TRAFFIC ENGINEER — REGISTERED CIVIL ENGINEER No. 22257

DATE APPROVED March 17, 1986

REMOVE PAINTED TRAFFIC STRIPE *			
LOCATION POST MILES FROM	TO	DESCRIPTION	LF
LOCATION 1			
23.99	24.08	4" DASHED YELLOW CENTERLINE	475
23.99 RT.	24.01 RT.	4" SOLID WHITE EDGE STRIPE	105
LOCATION 2			
25.09	25.17	4" DASHED YELLOW CENTERLINE	425
25.09	25.10	4" SOLID WHITE EDGE STRIPE	50
TOTAL			1055

* Not a Pay Item

TEMPORARY TRAFFIC STRIPE *			
LOCATION POST MILES FROM	TO	DETAIL NO.	4" WHITE EDGE STRIPE LF
LOCATION 1			
23.99 RT.	24.02 RT.	39	150
LOCATION 2			
25.09 RT.	25.12 RT.	39	135
TOTAL			285

* Not a Pay Item- Included in Temporary Signal System.

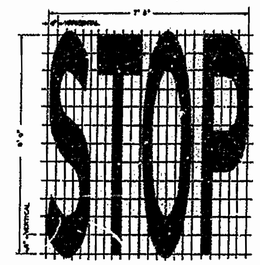
TRAFFIC STRIPE				
LOCATION POST MILES FROM	TO	DETAIL NO.	4" SOLID WHITE EDGE STRIPE	4" DASHED YELLOW CENTERLINE
LOCATION 1				
23.99	24.08	5		475
23.99 RT.	24.08 RT.	39	475	
LOCATION 2				
25.09	25.17	5		425
25.09 RT.	25.15	39	325	
TOTAL				900
TOTAL				1700 LF

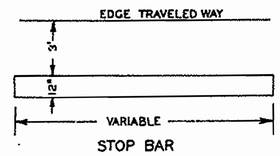
STATIONARY CONSTRUCTION AREA SIGNS					
LOCATION PM	CODE	SIGN SIZE INCHES	ORIENTATION	WOOD POSTS SIZE * ONE	TWO
LOCATION 1					
23.50	≠C16 **(R65)	48x48	FNBT	4"x6"	
23.74	C13	60x24	FSBT		4"x4"
23.72	≠ R41 ** C29(1500)	48x48 20x7	FNBT	4"x6"	
23.85 LT.	≠ C36 C29(1000)	48x48 20x7	FNBT	4"x6"	
23.85 RT.	≠ C36 C29(1000)	48x48 20x7	FNBT	4"x6"	
24.20	C13	60x24	FNBT		4"x4"
24.21 LT.	≠ C36 C29(500)	48x48 20x7	FSBT	4"x6"	
24.21 RT.	≠ C36 C29(500)	48x48 20x7	FSBT	4"x6"	
24.14	≠ R41 ** C29(1500)	48x48 20x7	FSBT	4"x6"	
24.50	≠C18 **(R65)	48x48	FSBT	4"x6"	
LOCATION 2					
24.74	≠C18 **(R65)	48x48	FNBT	4"x6"	
24.87	≠ R41 ** C29(1000)	48x48 20x7	FNBT	4"x6"	
24.97	C13	60x24	FSBT		4"x4"
25.00 LT.	≠ C36 C29(500)	48x48 20x7	FNBT	4"x6"	
25.00 RT.	≠ C36 C29(500)	48x48 20x7	FNBT	4"x6"	
25.27 LT.	≠ C36 C29(500)	48x48 20x7	FSBT	4"x6"	
25.27 RT.	≠ C36 C29(500)	48x48 20x7	FSBT	4"x6"	
25.30	C13	60x24	FNBT		4"x4"
25.53	≠ R41 ** C29(1500)	48x48 20x7	FSBT	4"x6"	
25.67	≠ C18 **(R65)	48x48	FSBT	4"x6"	
TOTAL				16	8

* LENGTHS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR.
≠ ILLUMINATED.
** FLASHING BEACON.

EXISTING ROADSIDE SIGNS				
LOCATION PM	CODE	SIGN SIZE INCHES	ORIENTATION	REMOVE AND SALVAGE
LOCATION 1				
23.66	W42 W42A	36x36 24x24	FNBT	1
24.24	W42 W42B	36x36 24x18	FSBT	1
TOTAL				2

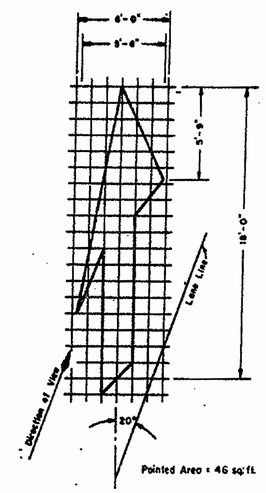
LAYOUT OF STOP
Painted Area = 38.58 sq. ft.





STOP BAR

GRID SIZE:
12" Square



NO. 4 ARROW

TEMPORARY PAVEMENT MARKINGS		
LOCATION PM	LEGEND OR TYPE	SQ. FT.
LOCATION 1		
23.93	12" LIMIT LINE	12.00
23.99	1-#4 LANE DROP ARROW (RT.)	46.00
24.06	1-#4 LANE DROP ARROW (LT.)	46.00
24.11	12" LIMIT LINE	12.00
LOCATION 2		
25.09	12" LIMIT LINE	12.00
25.09	1-#4 LANE DROP ARROW (RT.)	46.00
25.15	1-#4 LANE DROP ARROW (LT.)	46.00
25.17	12" LIMIT LINE	12.00
TOTAL		232.00

REMOVE PAVEMENT MARKERS *
120 EACH

* NOT A PAY ITEM, FOR INFORMATION ONLY.

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

Project Engineer M. Eagan 10/86
Project Studies Engineer D.L. Comstock 10/86
Approved Recommended by D.A. Brown 10/86

TRAFFIC ITEM DETAILS AND SUMMARIES

6

FORM DC-0343-F (REV. 11/76) 10-84-05

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

01201 200611

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

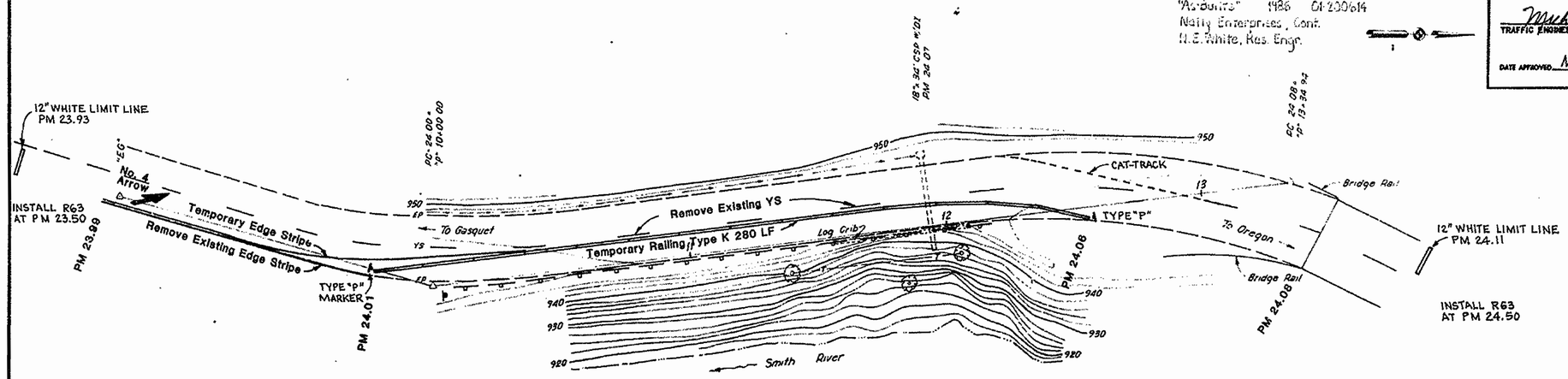
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

Dist.	County	Route	Post Miles / Kilo Begin	Sheet No.	Total Sheets
01	DN	199	24.0, 25.1	7	9

TRAFFIC ENGINEER — Michael D. Eggan — REGISTERED CIVIL ENGINEER No. 22957

DATE APPROVED March 17, 1986

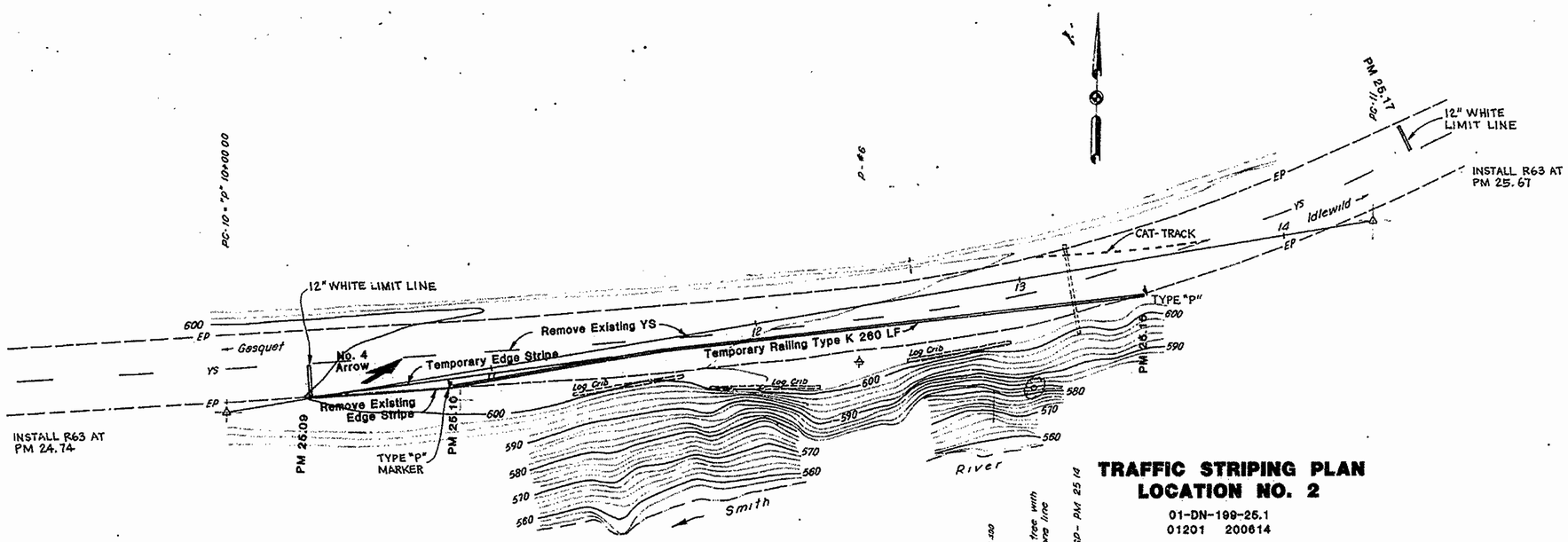
"As-Builts" 1986 01-200614
Natty Enterprises, Const.
H.E. White, Res. Engr.



TRAFFIC STRIPING PLAN
LOCATION NO. 1

01-DN-199-24.0
01201 200614

Not to Scale



TRAFFIC STRIPING PLAN
LOCATION NO. 2

01-DN-199-25.1
01201 200614

Not to Scale

Project Engineer	Date	Project Studies Engineer	Date	Approved Recommended By	Date
M. Eggan	10/84	D.L. Comstock	10/84	D.A. Brown	10/84

7

10-84-05

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

01201 200611

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

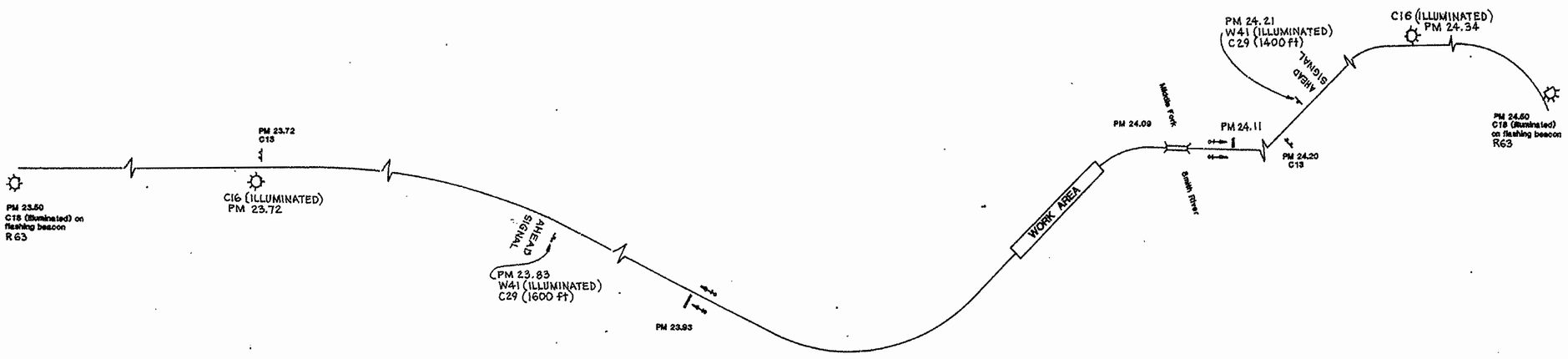
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

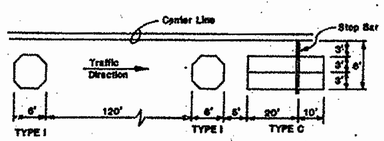
Dist.	County	Route	Post Mile Total Project	Sheet No.	Total Sheets
01	DN	199	24.0, 25.1	8	9

Michael D Eagan
TRAFFIC ENGINEER — REGISTERED CIVIL ENGINEER NO. 22957

DATE APPROVED March 17, 1986

"As-Built" 1986 01-200614
Natly Enterprises, Cont.
N.E. White, Res. Engr.

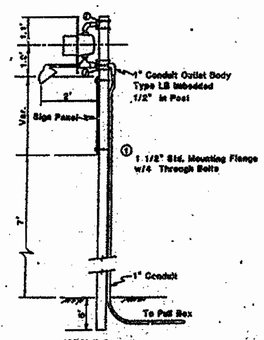




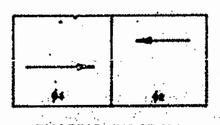
DETECTOR LAYOUT
One set each direction of traffic

1 = Type C Loop Detector

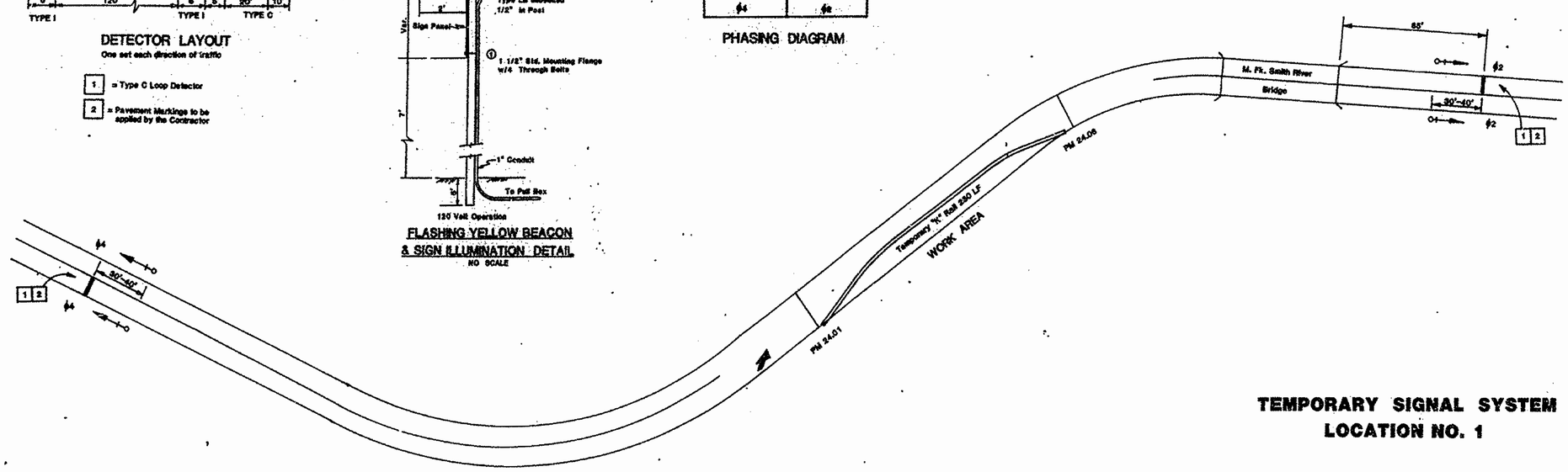
2 = Pavement Markings to be applied by the Contractor



FLASHING YELLOW BEACON
& SIGN ILLUMINATION DETAIL
NO SCALE



PHASING DIAGRAM



TEMPORARY SIGNAL SYSTEM
LOCATION NO. 1

Not to Scale

Project Engineer	Date	Project Studies Engineer	Date	Approved Recommended by	Date
J.M. Eagan	10/86	D.L. Comstock	10/86	D.A. Brown	10/86

8

FORM DC-CS-65-PP (REV. 11/78) 10-84-05

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

01201 200611

AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donell Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

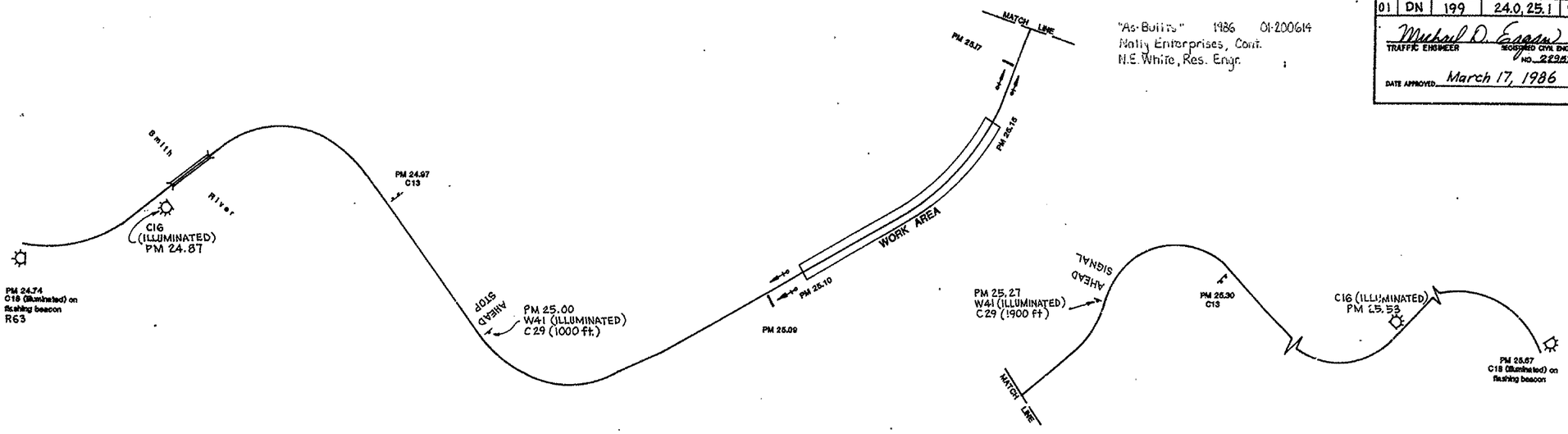
MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM

Dist.	County	Route	Post Miles Total Project	Sheet No.	Total Sheets
01	DN	199	24.0, 25.1	9	9

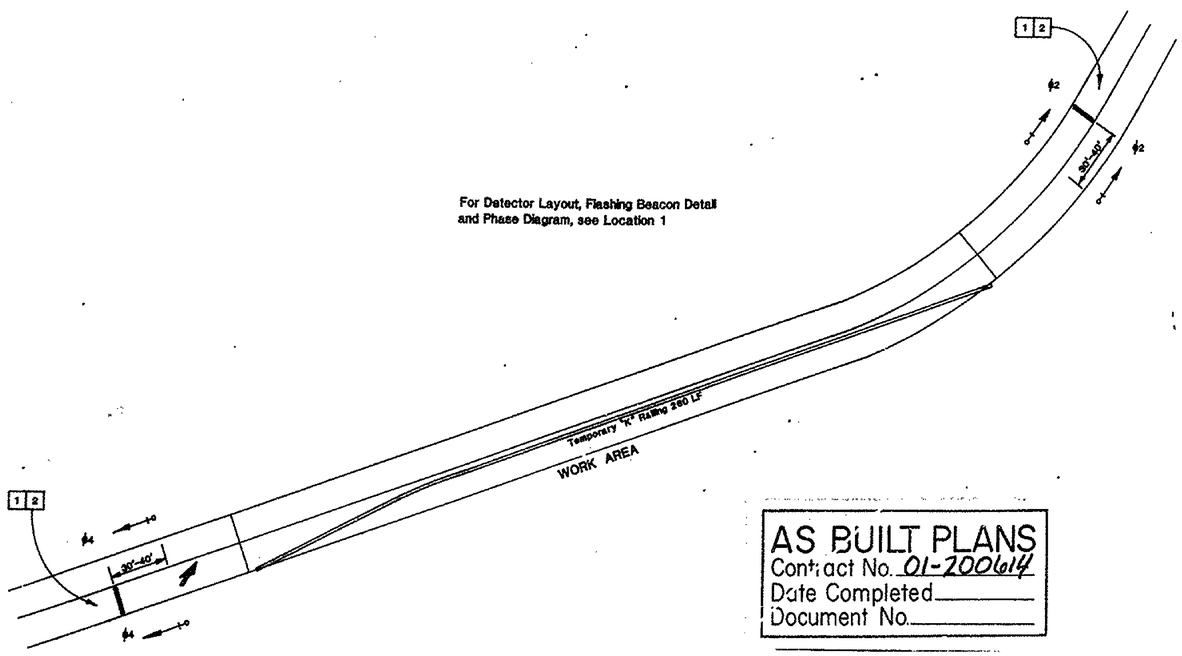
TRAFFIC ENGINEER — REGISTERED CIVIL ENGINEER NO. 22987

DATE APPROVED March 17, 1986

"As-Builts" 1986 01-200614
Nolty Enterprises, Cont.
N.E. White, Res. Engr.



For Detector Layout, Flashing Beacon Detail and Phase Diagram, see Location 1



AS BUILT PLANS
Contract No. 01-200614
Date Completed
Document No.

TEMPORARY SIGNAL SYSTEM
LOCATION NO. 2

Not to Scale

Project Engineer	Date	Project Studies Engineer	Date	Approval Recommended by	Date
M. Eagan	10/86	D.L. Comstock	10/86	D.A. Brown	10/86

9

10-84-05

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 3

01201 200611

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT TAKEN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO AUTHORIZATION BY THE DIRECTOR OF TRANSPORTATION.

DATE 8-1-87 SIGNATURE Donald Blackford TITLE SUPERVISOR OF MICROFILM SERVICES

MICROFILM - STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - MICROFILM
SCALE 1" = 50' SCALE 1" = 20' SCALE 1" = 10' or 1" = 100' SCALE 1" = 40'

APPENDIX C

LABORATORY TEST RESULTS

Middle Fork Smith River Bridge
Br. No. 01-0080
01-DN-199-PM 24.04

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-012**

Report Date: April 14, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-001-10	26.5	27	8.1	8.2	D-L	60.0	56	57.97		43.5	968	1.28	185.87	1.07	1.37	199	24.5	31	4,554	
RC-10-001-11	31.2	31.4	9.5	9.6	D-L	59.5	56	57.72		48.7	176	0.23	34.08	1.07	0.25	36	24.5	6	835	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-10-001-12	39.5	39.9	12.0	12.2	D-L	60.0	54	56.92		59.8	898	1.23	178.73	1.06	1.31	189	24.5	30	4,379	
RC-10-001-16	55	56	16.8	17.1	D-L	60.0	51	55.32		61.3	3,520	5.12	742.14	1.05	5.35	777	24.5	125	18,183	
RC-10-001-23	91	91.3	27.7	27.8	D-L	60.0	54	56.66		46.7	1,901	2.63	382.03	1.06	2.79	404	24.5	65	9,360	
RC-10-002-08	20.6	21	6.3	6.4	D-P	60.0	55.0	57.45		48.2	2,358	3.18	461.07	1.06	3.38	491	24.5	78	11,296	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-10-001_10

R-10-001_11

R-10-001_12

R-10-001_16

R-10-001_23

R-10-002_08

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-1

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-012**

Report Date: April 14, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-002-09	25	25.4	7.6	7.7	D-L	60.0	54.0	56.92		52.0	1,795	2.46	357.47	1.06	2.61	379	24.5	60	8,758	
RC-10-002-09A	27.4	28	8.4	8.5	D-L	60.0	53.0	56.39		49.3	2,640	3.69	535.60	1.06	3.90	565	24.5	90	13,122	
RC-10-002-10	32.3	32.6	9.8	9.9	D-L	60.0	55.0	57.45		40.1	1,408	1.90	275.27	1.06	2.02	293	24.5	46	6,744	
RC-10-002-10A	33.3	33.6	10.1	10.2	D-L	60.0	57.0	58.48		36.2	194	0.25	36.52	1.07	0.27	39	24.5	6	895	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-10-002-11	36.8	37.1	11.2	11.3	D-L	60.0	55.0	57.45		41.9	1,496	2.02	292.47	1.06	2.15	311	24.5	49	7,166	
RC-10-002-12	41.3	42	12.6	12.8	I-L	44.0	40.0	53.40	56	29	528	0.82	119.44	1.03	0.85	123	21	17	2,508	

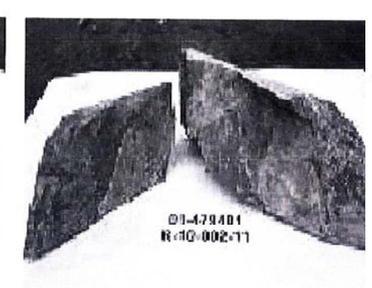
NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-10-002_09

R-10-002_09A

R-10-002_10

R-10-002_10A



R-10-002_11

R-10-002_12

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 024.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-2

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-012**

Report Date: April 14, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-002-13	45.9	46.2	14.0	14.1	D-L	60.0	57.0	58.48		40.7	528	0.69	99.60	1.07	0.74	107	24.5	17	2,440	
RC-10-002-16	62.5	62.9	19.0	19.2	D-L	60.0	56.0	57.97		32.3	528	0.70	101.38	1.07	0.75	108	24.5	17	2,484	
RC-10-003-10	37.4	37.8	11.4	11.5	D-L	60.0	55.0	57.45		37.2	1,760	2.37	344.09	1.06	2.53	366	24.5	58	8,430	
RC-10-003-11A	43	43.7	13.1	13.3	D-L	60.0	55.0	57.45		50.9	1,936	2.61	378.49	1.06	2.78	403	24.5	64	9,273	
RC-10-003-14	58.9	59.6	18.0	18.2	D-L	60.0	55.0	57.45		35.4	2,288	3.08	447.31	1.06	3.28	476	24.5	76	10,959	
RC-10-003-16	68	68.4	20.7	20.8	D-L	60.0	55.0	57.45		24.8	968	1.30	189.25	1.06	1.39	201	24.5	32	4,637	Specimen length (L) less than required by ASTM D 5731-08 (article 8.2)

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-10-002_13

R-10-002_16

R-10-003_10

R-10-003_11A

R-10-003_14

R-10-003_16

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-3

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.0 Br. No. 01-0080** **GL Tracking No.: 11-012**

Report Date: April 14, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-10-003-17	71.8	72.3	21.9	22.0	D-L	60.0	55.0	57.45		34.2	1,144	1.54	223.66	1.06	1.64	238	24.5	38	5,480	
RC-10-003-18	79.5	80	24.2	24.4	D-P	60.0	56.0	57.97		25.7	2,552	3.38	490.01	1.07	3.61	524	24.5	83	12,005	Specimen length (L) less than required by ASTM D 5731-08 (article 8.2)
RC-10-003-19	80.5	81	24.5	24.7	D-L	60.0	55.0	57.45		34.6	352	0.47	68.82	1.06	0.51	73	24.5	12	1,686	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-10-003-20	86	86.6	26.2	26.4	D-L	60.0	57.0	58.48		43.7	880	1.14	166.01	1.07	1.23	178	24.5	28	4,067	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-10-003_17

R-10-003_18

R-10-003_19

R-10-003_20

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 024.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-4

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-057**

Report Date: July 13, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-11-004-06	15.5	16	4.7	4.9	I-L	52.0	49.5	62.11	61.2	35.9	792	0.91	132.47	1.10	1.01	146	24.5	22	3,246	
RC-11-004-07	20	20.5	6.1	6.2	A-L	25.5	22.0	41.20	60.6		722	1.89	274	0.92	1.73	251	21	40	5,759	
RC-11-004-09	27	27.4	8.2	8.4	D-L	60.0	53	56.39		47.9	3,784	5.29	767.70	1.06	5.59	810	24.5	130	18,809	
RC-11-004-11	32	32.4	9.8	9.9	D-L	60.0	57	58.48		47.0	704	0.92	132.80	1.07	0.98	143	24.5	22	3,254	
RC-11-004-17	60.5	60.9	18.4	18.6	D-L	60.0	56	57.97		41.0	1,311	1.74	251.77	1.07	1.86	269	24.5	43	6,168	
RC-11-004-20	74.4	74.8	22.7	22.8	D-L	60.0	55	57.45		70.0	2,640	3.56	516.13	1.06	3.79	549	24.5	87	12,645	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-11-004_06

R-11-004_07

R-11-004_09

R-11-004_11

R-11-004_17

R-11-004_20

Caltrans	CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 01-479401 Date: February 2013	**POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS**
		01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-5

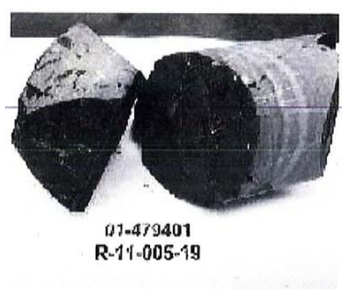
Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-057**

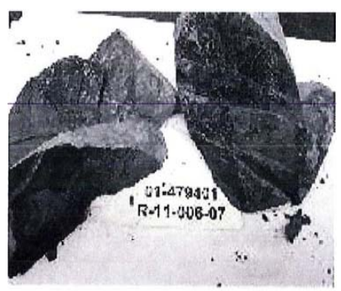
Report Date: July 13, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-11-005-19	86	86.4	26.2	26.3	D-L	60.0	56	57.97		67.3	968	1.28	185.87	1.07	1.37	199	24.5	31	4,554	
RC-11-006-07	32	32.5	9.8	9.9	D-L	60.0	58	58.99		43.5	176	0.22	32.63	1.08	0.24	35	24.5	6	799	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-006-09	42	42.5	12.8	13.0	D-L	60.0	55	57.45		38.5	1,936	2.61	378.49	1.06	2.78	403	24.5	64	9,273	
RC-11-006-13	68.5	69.5	20.9	21.2	D-L	60.0	53	56.39		43.8	2,640	3.69	535.60	1.06	3.90	565	24.5	90	13,122	
RC-11-006-16	81	81.4	24.7	24.8	D-L	60.0	57	58.48		63.1	2,464	3.20	464.82	1.07	3.44	499	24.5	79	11,388	
RC-11-006-17	88.5	89	27.0	27.1	D-L	60.0	55	57.45		53.9	880	1.19	172.04	1.06	1.26	183	24.5	29	4,215	

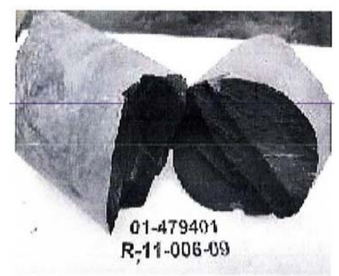
NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness



R-11-005_19

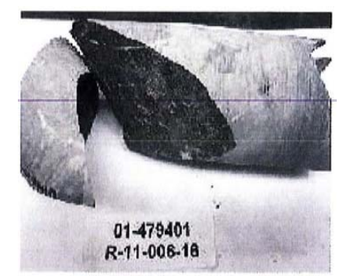


R-11-006_07

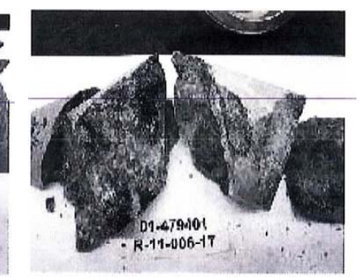


R-11-006_09

R-11-006_13



R-11-006_16



R-11-006_17

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Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-6

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-057**

Report Date: July 13, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-11-006-21	103.5	104.5	31.5	31.9	D-L	60.0	57	58.48		47.0	396	0.52	74.70	1.07	0.55	80	24.5	13	1,830	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-11-006_21

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Office of Geotechnical Design - North

EA: 01-479401
Date: February 2013

POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS

01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT

Plate No. C-7

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-067**

Report Date: September 27, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-11-007-05	18.0	18.5	5.5	5.6	D-L	60.0	59	59.50		60.0	88	0.11	16.04	1.08	0.12	17	24.5	3	393	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-007-07	26	26	8	8	D-L	60	58	59		100	176	0	33	1	0	35	24.5	6	799	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-008-03A	11.0	11.5	3.4	3.5	D-L	60.0	59	59.50		96.0	88	0.11	16.04	1.08	0.12	17	24.5	3	393	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-009-10	39.7	40.1	12.1	12.2	D-L	60.0	59	59.50		60.0	88	0.11	16.04	1.08	0.12	17	24.5	3	393	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-010-05A	19.9	20.3	6.1	6.2	D-L	60.0	55	57.45		60.0	1,584	2.14	309.68	1.06	2.27	330	24.5	52	7,587	
RC-11-010-11	47.0	47.4	14.3	14.4	D-L	60.0	55	57.45		75.0	528	0.71	103.23	1.06	0.76	110	24.5	17	2,529	

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-11-007_05

R-11-007_07

R-11-008_03A

R-11-009_10

R-11-010_05A

R-11-010_11

CALTRANS
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Geotechnical Services
Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-8

Point Load Strength Index of Rock; ASTM D 5731 - 08

Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-067**

Report Date: September 27, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-11-010-13	54.5	54.9	16.6	16.7	D-L	60.0	58	58.99		70.0	352	0.45	65.26	1.08	0.48	70	24.5	11	1,599	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-011-05	17.0	17.4	5.2	5.3	D-L	60.0	59	59.50		60.0	88	0.11	16.04	1.08	0.12	17	24.5	3	393	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-011-12	51.1	51.5	15.6	15.7	D-L	60.0	58	58.99		85.0	440	0.56	81.57	1.08	0.61	88	24.5	14	1,999	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-012-13	47.6	48	14.5	14.6	D-L	60.0	59	59.50		60.0	176	0.22	32.08	1.08	0.24	35	24.5	5	786	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-013-05	17.0	17.4	5.2	5.3	D-L	46.5	44	44.97		47.0	88	0.19	28.07	0.95	0.18	27	22	4	617	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-11-010_13

R-11-011_05

R-11-011_12

R-11-012_13

R-11-013_05

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Office of Geotechnical Design - North

EA: 01-479401	POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS
Date: February 2013	
01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT	Plate No. C-9

Point Load Strength Index of Rock; ASTM D 5731 - 08

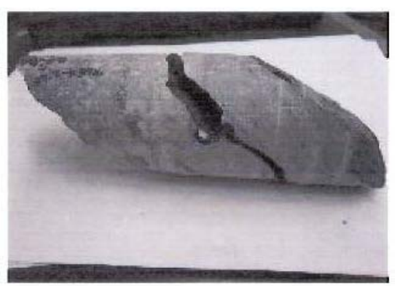
Dist-EA: 01-479401 **Dist-Co-Rte-PM: 01-DN-199 PM 24.04 Br. No. 01-0080** **GL Tracking No.: 11-067**

Report Date: September 27, 2011

Boring I.D.	Depth (feet)		Depth (m)		Test Type	Initial Distance Between Contact Points, D (mm)	Final Distance Between Contact Points, D' (mm)	Equivalent Diameter, D_e (mm) per Section 10.1 of ASTM D 5731-08	Width, W (mm)	Length, L (mm)	Failure Load (lbs)	Uncorrected Point Load Strength Index, I_s; per EQ. #1 of ASTM D 5731-08		Size Correction Factor, F; per EQ. #4 of ASTM D 5731-08	Size Corrected Point Load Strength Index, $I_{s(50)}$; per EQ. #3 of ASTM D 5731-08		Generalized Index to Strength Conversion Factor, K, per Table 1 of ASTM D 5731-08 (approximated where appropriate)	Estimated Uniaxial Comp. Strength, s_c per EQ. #6 of ASTM D 5731-08		Remarks
	top	bottom	top	bottom								(MPa)	(PSI)		(MPa)	(PSI)		(MPa)	(PSI)	
RC-11-014-10	33.0	33.5	10.1	10.2	D-L	60.0	58	58.99		75.0	352	0.45	65.26	1.08	0.48	70	24.5	11	1,599	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)
RC-11-014-11	37.3	37.6	11.4	11.5	D-L	60.0	58	58.99		60.0	704	0.90	130.52	1.08	0.97	141	24.5	22	3,198	
RC-11-014-22	92.0	92.4	28.0	28.2	I-L	47.5	44.0	57.98	60	60	1,232	1.63	236.46	1.07	1.74	253	24	39	5,675	
RC-11-015-08	32.5	33	9.9	10.1	D-L	46.5	43	44.72		65.0	88	0.20	28.39	0.95	0.19	27	24.5	5	696	Compresive strength less than 2,200 psi required by ASTM D 5731-08 (article 1.4)

NOTES:
Test Type Abbreviations: D - Diametral, A -Axial, B - Block, I - Irregular Lump.
Orientation of Load (if anisotropic): P - Perpendicular to plane of weakness, L - Parallel to plane of weakness

R-11-014_10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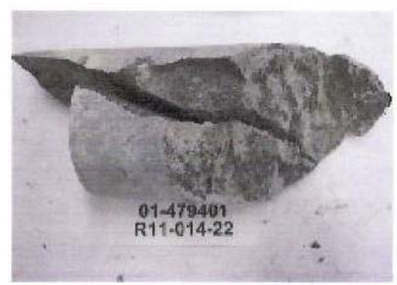

R-11-014_22

R-11-015_08

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Office of Geotechnical Design - North

EA: 01-479401
Date: February 2013

POINT LOAD STRENGTH INDEX OF ROCK TEST RESULTS

01-DN-199; PM 24.04; Br. No. 01-0080 FOUNDATION REPORT

Plate No. C-10

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-012	DATE	3/8/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0080	CHECKED BY	LP 4/14/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-10-001-06	13.5-14	2.39	5.00	2.09	2.2	12790	166	2851	
R-10-001-07	16.5-17	2.39	2.67	1.12	1.2	13190	167	2940	**
R-10-001-08	22-22.5	2.39	4.74	1.98	2.1	14075	172	3137	**
R-10-001-15	52-52.4	2.39	3.58	1.50	1.6	16604	168	3701	**
R-10-001-16A	58.3-58.9	2.37	5.40	2.28	2.4	17457	172	3957	
R-10-001-17	62.7-63.3	2.39	2.94	1.23	1.3	8618	169	1921	**
R-10-001-18	66-67	2.39	5.61	2.35	2.4	24317	168	5420	
R-10-001-19	70-70.8	2.39	5.49	2.30	2.4	14412	166	3212	
R-10-001-20	75-75.6	2.39	3.65	1.53	1.6	15022	166	3348	**
R-10-001-20A	77.7-78.2	2.39	4.79	2.00	2.1	10263	166	2288	
R-10-001-21	80.7-81.5	2.40	4.48	1.87	2.0	21565	168	4767	**
R-10-001-21A	84.6-85	2.39	2.97	1.24	1.3	7548	170	1682	**
R-10-001-24	96-96.7	2.40	2.77	1.15	1.2	25840	163	5712	**
R-10-002-13A	48-48.6	2.38	4.95	2.08	2.2	5844	171	1314	
R-10-002-17	65-65.8	2.37	5.28	2.23	2.4	31863	178	7223	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-012	DATE	3/8/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0080	CHECKED BY	LP 4/14/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-10-002-19	75.2-76	2.39	5.69	2.38	2.6	7435	173	1657	
R-10-002-19A	78-78.5	2.39	3.61	1.51	1.6	27459	169	6121	**
R-10-002-20	80.1-80.7	2.39	4.36	1.82	1.9	3629	168	809	**
R-10-002-21	85-85.5	2.40	4.50	1.88	2.0	6969	172	1540	**
R-10-002-21A	88.5-89	2.40	3.60	1.50	1.6	19587	167	4330	**
R-10-002-23	97.4-98.2	2.39	5.08	2.13	2.2	46501	170	10365	
R-10-002-25	105-105.5	2.39	5.26	2.20	2.3	63448	170	14143	
R-10-002-26	112-112.5	2.40	5.25	2.19	2.3	25019	168	5530	
R-10-002-28	120-121.5	2.39	5.42	2.27	2.4	26704	171	5952	
R-10-003-05	14.5-15	2.39	3.52	1.47	1.6	27461	171	6121	**
R-10-003-06	17.6-18.3	2.40	5.08	2.12	2.3	12570	170	2779	
R-10-003-07	23.5-24	2.40	5.64	2.35	2.5	15809	169	3495	
R-10-003-09	33.2-33.6	2.40	2.40	1.00	1.1	16348	168	3614	**
R-10-003-11	40.6-41.2	2.39	4.06	1.70	1.8	15671	174	3493	**
R-10-003-13	50.8-51.3	2.39	3.48	1.46	1.6	11365	175	2533	**

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION **01-DN-199** **PM 24.0** GL No. **11-012** DATE **3/8/2011**
TEST BY **AZM**
JOB NUMBER **01-479401** **Middle Fork Smith River Bridge** Bridge No. **01-0080** CHECKED BY **LP 4/14/11**

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-10-003-15	62.3-63.4	2.39	5.45	2.28	2.5	10917	175	2433	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-057	DATE	7/7/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 7/19/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-11-004-12	37-37.5	2.41	4.97	2.06	2.1	18492	162	4054	
R-11-004-13 **	41.5-41.9	2.40	3.71	1.55	1.7	10442	175	2308	
R-11-004-14 **	45.5-46	2.38	4.38	1.84	2.0	17602	173	3957	
R-11-004-15 **	51-51.5	2.40	3.89	1.62	1.7	14688	167	3247	
R-11-005-06	20.5-21	2.41	5.27	2.19	2.4	3926	169	861	
R-11-005-07	29-29.5	2.41	5.36	2.22	2.4	24217	171	5309	
R-11-005-09	37-37.5	2.41	5.30	2.20	2.4	34442	170	7550	
R-11-005-10	43-44	2.41	5.55	2.30	2.5	13665	170	2996	
R-11-005-11	48.5-49.5	2.41	5.57	2.31	2.5	24938	170	5467	
R-11-005-15 **	69-69.5	2.41	3.94	1.63	1.8	7909	173	1734	
R-11-005-21	97.5-98	2.43	5.47	2.25	2.5	19941	169	4300	
R-11-006-04 **	16-16.5	2.40	4.13	1.72	1.8	12897	170	2851	
R-11-006-08	35-36	2.40	5.66	2.36	2.5	21755	171	4809	
R-11-006-08A	38-39	2.40	5.55	2.31	2.5	11566	174	2557	
R-11-006-09A **	44-45	2.40	4.12	1.72	1.8	27837	168	6153	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-057	DATE	7/7/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 7/19/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-11-006-10 **	49.1-49.6	2.40	4.65	1.94	2.1	25475	174	5631	
R-11-006-11	55-56	2.40	5.28	2.20	2.4	30552	171	6753	
R-11-006-12	63-64	2.40	5.53	2.30	2.5	20598	169	4553	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-007-06 **	22.6-23.2	2.40	4.35	1.81	1.9	6244	168	1380	
R11-007-07A **	27.4-28	2.40	4.00	1.67	1.8	7167	169	1584	
R11-008-03 **	9.5-10	2.40	3.49	1.45	1.6	26448	171	5846	
R11-008-04 **	12.5-13	2.40	4.69	1.95	2.1	7892	170	1745	
R11-008-05	18.5-19	2.40	4.92	2.05	2.2	15960	171	3528	
R11-008-06 **	22.5-23	2.40	4.56	1.90	2.1	20855	179	4610	
R11-008-07	27.5-28.5	2.39	5.35	2.24	2.4	13610	171	3034	
R11-008-08	34.5-35.5	2.38	4.88	2.05	2.2	11900	172	2675	
R11-008-09	41.5-42.5	2.40	4.97	2.07	2.2	11578	171	2559	
R11-008-11	45-45.5	2.40	4.96	2.07	2.2	21067	167	4657	
R11-008-12	48-48.5	2.40	5.07	2.11	2.3	29944	170	6619	
R11-008-14 **	59.6-60.2	2.38	3.91	1.64	1.7	9910	173	2228	
R11-008-15 **	62.5-63.5	2.39	4.19	1.75	1.8	11696	168	2607	
R11-008-15A	66.3-67.3	2.40	5.00	2.08	2.2	27786	170	6142	
R11-008-18 **	78-78.5	2.39	4.70	1.97	2.0	6454	168	1439	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-008-18A **	81-81.5	2.39	3.78	1.58	1.5	7556	158	1684	
R11-009-04	12.5-13.5	2.40	4.99	2.08	2.2	4585	169	1014	
R11-009-05 **	17.5-18	2.40	3.50	1.46	1.6	8248	172	1823	
R11-009-05A **	19-19.5	2.40	3.39	1.41	1.5	12314	170	2722	
R11-009-11	46.5-47.1	2.40	4.98	2.08	2.2	14456	170	3195	
R11-009-12 **	48.5-49	2.40	3.99	1.66	1.8	6467	170	1430	
R11-009-13	53.8-54.1	2.40	5.35	2.23	2.4	11031	172	2438	
R11-009-14 **	60.1-60.6	2.40	4.68	1.95	2.1	45209	169	9993	
R11-009-16	68.6-69.1	2.40	4.80	2.00	2.2	25737	171	5689	
R11-009-18	78-79	2.40	5.63	2.35	2.3	23860	153	5274	
R11-010-01	3.2-3.7	2.40	4.86	2.03	2.3	68741	182	15195	
R11-010-05 **	17.3-17.7	2.40	4.58	1.91	2.0	13428	169	2968	
R11-010-06	23-23.6	2.40	5.28	2.20	2.3	16704	168	3692	
R11-010-07	27.7-28.2	2.40	5.11	2.13	2.3	18754	170	4146	
R11-010-07A **	31.8-32.3	2.40	4.39	1.83	2.0	8859	171	1958	

Note: No moistures recorded

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GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-010-09	38-38.5	2.40	4.93	2.05	2.2	10504	170	2322	
R11-010-14 **	60.3-60.7	2.40	3.99	1.66	1.8	11323	169	2503	
R11-010-15	64-64.6	2.40	5.30	2.21	2.3	19496	168	4310	
R11-010-16	70-70.5	2.40	4.98	2.08	2.2	15701	169	3471	
R11-010-17 **	73-73.6	2.40	4.02	1.68	1.8	23439	168	5181	
R11-011-02 **	8.8-9.5	2.40	3.43	1.43	1.7	118608	188	26218	Machine Reached Limit
R11-011-04	13.3-14.5	2.40	5.31	2.21	2.6	51046	186	11284	
R11-011-06	24-24.7	2.40	5.69	2.37	2.5	5734	171	1267	
R11-011-07 **	26.7-27.2	2.40	4.67	1.95	2.1	3449	171	762	
R11-011-07A **	28-28.5	2.40	2.99	1.25	1.3	6936	170	1533	
R11-011-10	43-43.6	2.40	4.91	2.05	2.2	12673	173	2801	
R11-011-10A **	46-46.5	2.40	3.01	1.25	1.4	3907	172	864	
R11-012-04 **	14.6-15	2.40	3.60	1.50	1.8	82418	186	18218	
R11-012-08 **	25.3-25.8	2.40	2.80	1.17	1.2	19188	168	4241	
R11-012-09 **	32-32.6	2.40	3.48	1.45	1.6	9818	171	2170	

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UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-012-11	41-42	2.40	5.06	2.11	2.3	34072	173	7532	
R11-013-04	11.9-12.5	1.87	3.82	2.04	1.0	5960	170	2170	
R11-013-07	22.5-23.2	1.88	4.40	2.34	1.2	7594	172	2736	
R11-013-09	27.8-28.3	1.87	4.43	2.37	1.2	3136	171	1142	
R11-013-11	32.4-32.9	1.87	3.80	2.03	1.0	4312	170	1570	
R11-013-12	36-37	1.86	4.53	2.44	1.2	9521	173	3504	
R11-013-13	43-43.5	1.88	4.44	2.36	1.2	6846	169	2466	
R11-013-14	49-49.5	1.87	3.97	2.12	1.1	9180	167	3342	
R11-013-16	55-55.5	1.87	4.45	2.38	1.2	19548	170	7118	
R11-013-17	61-61.5	1.87	4.48	2.40	1.2	6904	170	2514	
R11-013-19	69.5-70	1.87	4.02	2.15	1.2	14154	181	5154	
R11-014-08 **	20.3-20.6	2.38	2.72	1.14	1.2	11805	166	2654	
R11-014-09 **	25-26	2.38	4.35	1.83	1.9	18734	169	4211	
R11-014-12 **	43-43.5	2.38	4.38	1.84	1.9	19442	169	4370	
R11-014-13	46.5-47.4	2.40	5.58	2.33	2.5	21160	171	4677	

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GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION 01-DN-199 PM 24.0 GL No. 11-067 DATE 8/22/2011
TEST BY AZM
JOB NUMBER 01-479401 Middle Fork Smith River Bridge Bridge No. 01-0016 CHECKED BY

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-014-15	55-55.8	2.40	5.47	2.28	2.4	10596	168	2342	
R11-014-15A	57-57.8	2.40	5.58	2.33	2.5	10562	172	2335	
R11-014-16	61.5-62	2.40	5.52	2.30	2.4	9157	169	2024	
R11-014-17	66-66.5	2.39	5.59	2.34	2.5	12281	169	2737	
R11-014-17A	68.9-70.4	2.40	5.42	2.26	2.5	10193	178	2253	
R11-014-19 **	76-76.5	2.39	4.43	1.85	2.0	13362	171	2978	
R11-015-05	18.8-19.9	1.88	4.54	2.41	1.3	21241	172	7652	
R11-015-06 **	21-21.4	1.87	3.19	1.71	0.9	7783	170	2834	
R11-015-07 **	26-26.4	1.87	3.64	1.95	1.0	17054	172	6209	
R11-015-09 **	36.8-37	1.87	3.31	1.77	0.9	16207	172	5901	
R11-015-11	41-41.6	1.87	3.89	2.08	1.0	13875	169	5052	
R11-015-11A **	44-44.6	1.87	3.62	1.94	1.0	12931	167	4708	
R11-015-13	54-55	1.87	4.49	2.40	1.2	5259	168	1915	
R11-015-15	59-59.4	1.86	4.02	2.16	1.1	8322	170	3063	

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STATE OF CALIFORNIA
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GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-012	DATE	3/8/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0080	CHECKED BY	LP 4/14/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-10-001-06	13.5-14	2.39	5.00	2.09	2.2	12790	166	2851	
R-10-001-07	16.5-17	2.39	2.67	1.12	1.2	13190	167	2940	**
R-10-001-08	22-22.5	2.39	4.74	1.98	2.1	14075	172	3137	**
R-10-001-15	52-52.4	2.39	3.58	1.50	1.6	16604	168	3701	**
R-10-001-16A	58.3-58.9	2.37	5.40	2.28	2.4	17457	172	3957	
R-10-001-17	62.7-63.3	2.39	2.94	1.23	1.3	8618	169	1921	**
R-10-001-18	66-67	2.39	5.61	2.35	2.4	24317	168	5420	
R-10-001-19	70-70.8	2.39	5.49	2.30	2.4	14412	166	3212	
R-10-001-20	75-75.6	2.39	3.65	1.53	1.6	15022	166	3348	**
R-10-001-20A	77.7-78.2	2.39	4.79	2.00	2.1	10263	166	2288	
R-10-001-21	80.7-81.5	2.40	4.48	1.87	2.0	21565	168	4767	**
R-10-001-21A	84.6-85	2.39	2.97	1.24	1.3	7548	170	1682	**
R-10-001-24	96-96.7	2.40	2.77	1.15	1.2	25840	163	5712	**
R-10-002-13A	48-48.6	2.38	4.95	2.08	2.2	5844	171	1314	
R-10-002-17	65-65.8	2.37	5.28	2.23	2.4	31863	178	7223	

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GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-012	DATE	3/8/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0080	CHECKED BY	LP 4/14/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-10-002-19	75.2-76	2.39	5.69	2.38	2.6	7435	173	1657	
R-10-002-19A	78-78.5	2.39	3.61	1.51	1.6	27459	169	6121	**
R-10-002-20	80.1-80.7	2.39	4.36	1.82	1.9	3629	168	809	**
R-10-002-21	85-85.5	2.40	4.50	1.88	2.0	6969	172	1540	**
R-10-002-21A	88.5-89	2.40	3.60	1.50	1.6	19587	167	4330	**
R-10-002-23	97.4-98.2	2.39	5.08	2.13	2.2	46501	170	10365	
R-10-002-25	105-105.5	2.39	5.26	2.20	2.3	63448	170	14143	
R-10-002-26	112-112.5	2.40	5.25	2.19	2.3	25019	168	5530	
R-10-002-28	120-121.5	2.39	5.42	2.27	2.4	26704	171	5952	
R-10-003-05	14.5-15	2.39	3.52	1.47	1.6	27461	171	6121	**
R-10-003-06	17.6-18.3	2.40	5.08	2.12	2.3	12570	170	2779	
R-10-003-07	23.5-24	2.40	5.64	2.35	2.5	15809	169	3495	
R-10-003-09	33.2-33.6	2.40	2.40	1.00	1.1	16348	168	3614	**
R-10-003-11	40.6-41.2	2.39	4.06	1.70	1.8	15671	174	3493	**
R-10-003-13	50.8-51.3	2.39	3.48	1.46	1.6	11365	175	2533	**

Note: No moistures recorded

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OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION **01-DN-199** **PM 24.0** GL No. **11-012** DATE **3/8/2011**
TEST BY **AZM**
JOB NUMBER **01-479401** **Middle Fork Smith River Bridge** Bridge No. **01-0080** CHECKED BY **LP 4/14/11**

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-10-003-15	62.3-63.4	2.39	5.45	2.28	2.5	10917	175	2433	

Note: No moistures recorded

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UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-057	DATE	7/7/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 7/19/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-11-004-12	37-37.5	2.41	4.97	2.06	2.1	18492	162	4054	
R-11-004-13 **	41.5-41.9	2.40	3.71	1.55	1.7	10442	175	2308	
R-11-004-14 **	45.5-46	2.38	4.38	1.84	2.0	17602	173	3957	
R-11-004-15 **	51-51.5	2.40	3.89	1.62	1.7	14688	167	3247	
R-11-005-06	20.5-21	2.41	5.27	2.19	2.4	3926	169	861	
R-11-005-07	29-29.5	2.41	5.36	2.22	2.4	24217	171	5309	
R-11-005-09	37-37.5	2.41	5.30	2.20	2.4	34442	170	7550	
R-11-005-10	43-44	2.41	5.55	2.30	2.5	13665	170	2996	
R-11-005-11	48.5-49.5	2.41	5.57	2.31	2.5	24938	170	5467	
R-11-005-15 **	69-69.5	2.41	3.94	1.63	1.8	7909	173	1734	
R-11-005-21	97.5-98	2.43	5.47	2.25	2.5	19941	169	4300	
R-11-006-04 **	16-16.5	2.40	4.13	1.72	1.8	12897	170	2851	
R-11-006-08	35-36	2.40	5.66	2.36	2.5	21755	171	4809	
R-11-006-08A	38-39	2.40	5.55	2.31	2.5	11566	174	2557	
R-11-006-09A **	44-45	2.40	4.12	1.72	1.8	27837	168	6153	

Note: No moistures recorded

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UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-057	DATE	7/7/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 7/19/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R-11-006-10 **	49.1-49.6	2.40	4.65	1.94	2.1	25475	174	5631	
R-11-006-11	55-56	2.40	5.28	2.20	2.4	30552	171	6753	
R-11-006-12	63-64	2.40	5.53	2.30	2.5	20598	169	4553	

Note: No moistures recorded

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UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-007-06 **	22.6-23.2	2.40	4.35	1.81	1.9	6244	168	1380	
R11-007-07A **	27.4-28	2.40	4.00	1.67	1.8	7167	169	1584	
R11-008-03 **	9.5-10	2.40	3.49	1.45	1.6	26448	171	5846	
R11-008-04 **	12.5-13	2.40	4.69	1.95	2.1	7892	170	1745	
R11-008-05	18.5-19	2.40	4.92	2.05	2.2	15960	171	3528	
R11-008-06 **	22.5-23	2.40	4.56	1.90	2.1	20855	179	4610	
R11-008-07	27.5-28.5	2.39	5.35	2.24	2.4	13610	171	3034	
R11-008-08	34.5-35.5	2.38	4.88	2.05	2.2	11900	172	2675	
R11-008-09	41.5-42.5	2.40	4.97	2.07	2.2	11578	171	2559	
R11-008-11	45-45.5	2.40	4.96	2.07	2.2	21067	167	4657	
R11-008-12	48-48.5	2.40	5.07	2.11	2.3	29944	170	6619	
R11-008-14 **	59.6-60.2	2.38	3.91	1.64	1.7	9910	173	2228	
R11-008-15 **	62.5-63.5	2.39	4.19	1.75	1.8	11696	168	2607	
R11-008-15A	66.3-67.3	2.40	5.00	2.08	2.2	27786	170	6142	
R11-008-18 **	78-78.5	2.39	4.70	1.97	2.0	6454	168	1439	

Note: No moistures recorded

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UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-008-18A **	81-81.5	2.39	3.78	1.58	1.5	7556	158	1684	
R11-009-04	12.5-13.5	2.40	4.99	2.08	2.2	4585	169	1014	
R11-009-05 **	17.5-18	2.40	3.50	1.46	1.6	8248	172	1823	
R11-009-05A **	19-19.5	2.40	3.39	1.41	1.5	12314	170	2722	
R11-009-11	46.5-47.1	2.40	4.98	2.08	2.2	14456	170	3195	
R11-009-12 **	48.5-49	2.40	3.99	1.66	1.8	6467	170	1430	
R11-009-13	53.8-54.1	2.40	5.35	2.23	2.4	11031	172	2438	
R11-009-14 **	60.1-60.6	2.40	4.68	1.95	2.1	45209	169	9993	
R11-009-16	68.6-69.1	2.40	4.80	2.00	2.2	25737	171	5689	
R11-009-18	78-79	2.40	5.63	2.35	2.3	23860	153	5274	
R11-010-01	3.2-3.7	2.40	4.86	2.03	2.3	68741	182	15195	
R11-010-05 **	17.3-17.7	2.40	4.58	1.91	2.0	13428	169	2968	
R11-010-06	23-23.6	2.40	5.28	2.20	2.3	16704	168	3692	
R11-010-07	27.7-28.2	2.40	5.11	2.13	2.3	18754	170	4146	
R11-010-07A **	31.8-32.3	2.40	4.39	1.83	2.0	8859	171	1958	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-010-09	38-38.5	2.40	4.93	2.05	2.2	10504	170	2322	
R11-010-14 **	60.3-60.7	2.40	3.99	1.66	1.8	11323	169	2503	
R11-010-15	64-64.6	2.40	5.30	2.21	2.3	19496	168	4310	
R11-010-16	70-70.5	2.40	4.98	2.08	2.2	15701	169	3471	
R11-010-17 **	73-73.6	2.40	4.02	1.68	1.8	23439	168	5181	
R11-011-02 **	8.8-9.5	2.40	3.43	1.43	1.7	118608	188	26218	Machine Reached Limit
R11-011-04	13.3-14.5	2.40	5.31	2.21	2.6	51046	186	11284	
R11-011-06	24-24.7	2.40	5.69	2.37	2.5	5734	171	1267	
R11-011-07 **	26.7-27.2	2.40	4.67	1.95	2.1	3449	171	762	
R11-011-07A **	28-28.5	2.40	2.99	1.25	1.3	6936	170	1533	
R11-011-10	43-43.6	2.40	4.91	2.05	2.2	12673	173	2801	
R11-011-10A **	46-46.5	2.40	3.01	1.25	1.4	3907	172	864	
R11-012-04 **	14.6-15	2.40	3.60	1.50	1.8	82418	186	18218	
R11-012-08 **	25.3-25.8	2.40	2.80	1.17	1.2	19188	168	4241	
R11-012-09 **	32-32.6	2.40	3.48	1.45	1.6	9818	171	2170	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

JOB LOCATION	01-DN-199 PM 24.0	GL No.	11-067	DATE	8/22/2011
				TEST BY	AZM
JOB NUMBER	01-479401 Middle Fork Smith River Bridge	Bridge No.	01-0016	CHECKED BY	LP 9/20/11

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-012-11	41-42	2.40	5.06	2.11	2.3	34072	173	7532	
R11-013-04	11.9-12.5	1.87	3.82	2.04	1.0	5960	170	2170	
R11-013-07	22.5-23.2	1.88	4.40	2.34	1.2	7594	172	2736	
R11-013-09	27.8-28.3	1.87	4.43	2.37	1.2	3136	171	1142	
R11-013-11	32.4-32.9	1.87	3.80	2.03	1.0	4312	170	1570	
R11-013-12	36-37	1.86	4.53	2.44	1.2	9521	173	3504	
R11-013-13	43-43.5	1.88	4.44	2.36	1.2	6846	169	2466	
R11-013-14	49-49.5	1.87	3.97	2.12	1.1	9180	167	3342	
R11-013-16	55-55.5	1.87	4.45	2.38	1.2	19548	170	7118	
R11-013-17	61-61.5	1.87	4.48	2.40	1.2	6904	170	2514	
R11-013-19	69.5-70	1.87	4.02	2.15	1.2	14154	181	5154	
R11-014-08 **	20.3-20.6	2.38	2.72	1.14	1.2	11805	166	2654	
R11-014-09 **	25-26	2.38	4.35	1.83	1.9	18734	169	4211	
R11-014-12 **	43-43.5	2.38	4.38	1.84	1.9	19442	169	4370	
R11-014-13	46.5-47.4	2.40	5.58	2.33	2.5	21160	171	4677	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
OFFICE OF GEOTECHNICAL SUPPORT
GEOTECHNICAL LABORATORY

UNCONFINED COMPRESSION TEST RESULTS (ASTM D7012-07 Method C)

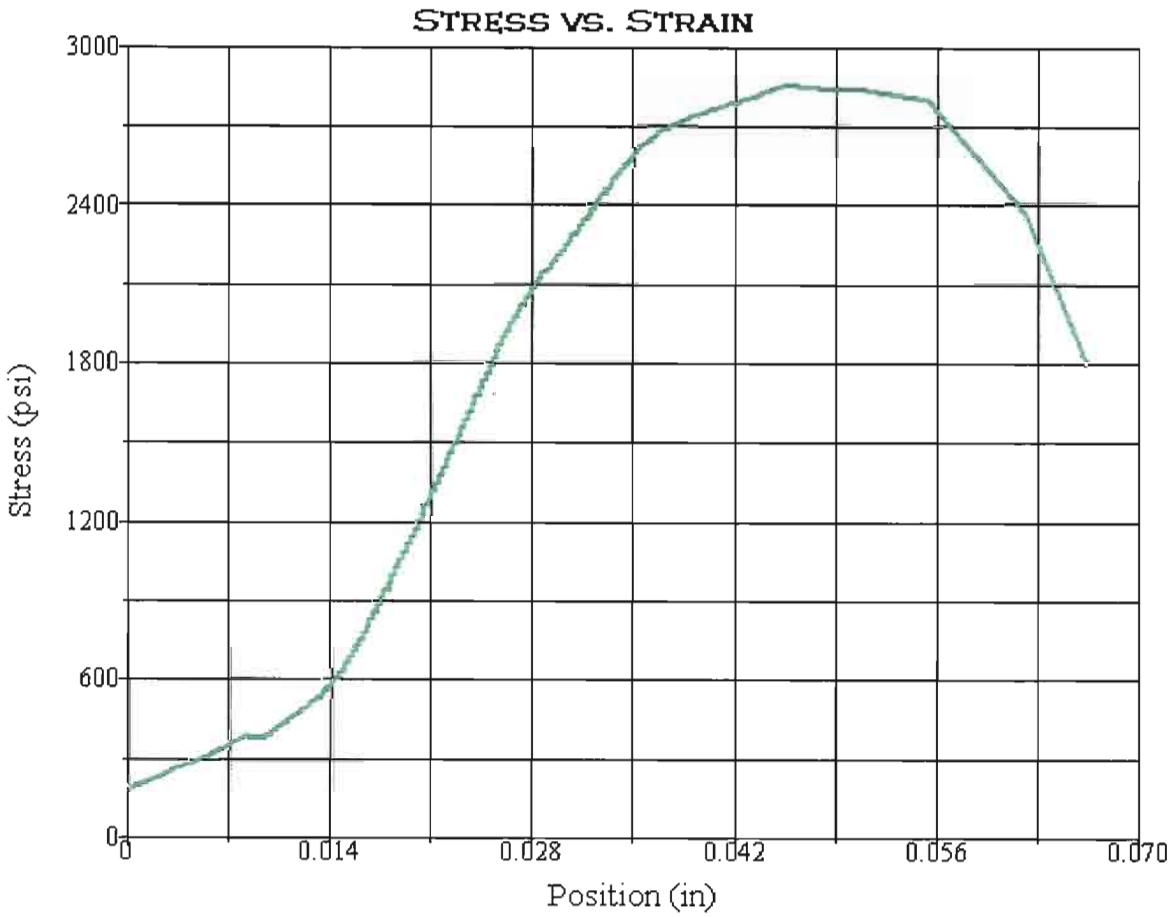
JOB LOCATION 01-DN-199 PM 24.0 GL No. 11-067 DATE 8/22/2011
TEST BY AZM
JOB NUMBER 01-479401 Middle Fork Smith River Bridge Bridge No. 01-0016 CHECKED BY

SAMPLE NO.	DEPTH FT.	DIA. IN.	LENGTH IN.	L/D RATIO	WEIGHT LBS.	LOAD LBS.	DENSITY PCF	STRENGTH PSI	REMARKS
R11-014-15	55-55.8	2.40	5.47	2.28	2.4	10596	168	2342	
R11-014-15A	57-57.8	2.40	5.58	2.33	2.5	10562	172	2335	
R11-014-16	61.5-62	2.40	5.52	2.30	2.4	9157	169	2024	
R11-014-17	66-66.5	2.39	5.59	2.34	2.5	12281	169	2737	
R11-014-17A	68.9-70.4	2.40	5.42	2.26	2.5	10193	178	2253	
R11-014-19 **	76-76.5	2.39	4.43	1.85	2.0	13362	171	2978	
R11-015-05	18.8-19.9	1.88	4.54	2.41	1.3	21241	172	7652	
R11-015-06 **	21-21.4	1.87	3.19	1.71	0.9	7783	170	2834	
R11-015-07 **	26-26.4	1.87	3.64	1.95	1.0	17054	172	6209	
R11-015-09 **	36.8-37	1.87	3.31	1.77	0.9	16207	172	5901	
R11-015-11	41-41.6	1.87	3.89	2.08	1.0	13875	169	5052	
R11-015-11A **	44-44.6	1.87	3.62	1.94	1.0	12931	167	4708	
R11-015-13	54-55	1.87	4.49	2.40	1.2	5259	168	1915	
R11-015-15	59-59.4	1.86	4.02	2.16	1.1	8322	170	3063	

Note: No moistures recorded

* Sample fell apart while preparing for testing -- Not suitable for testing

** The test specimen length/diameter ratio was not in compliance with the test method

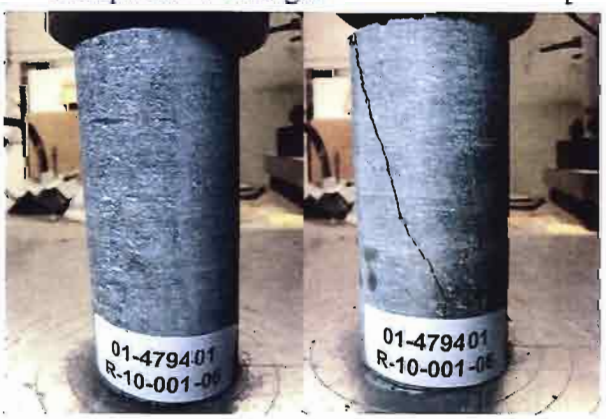


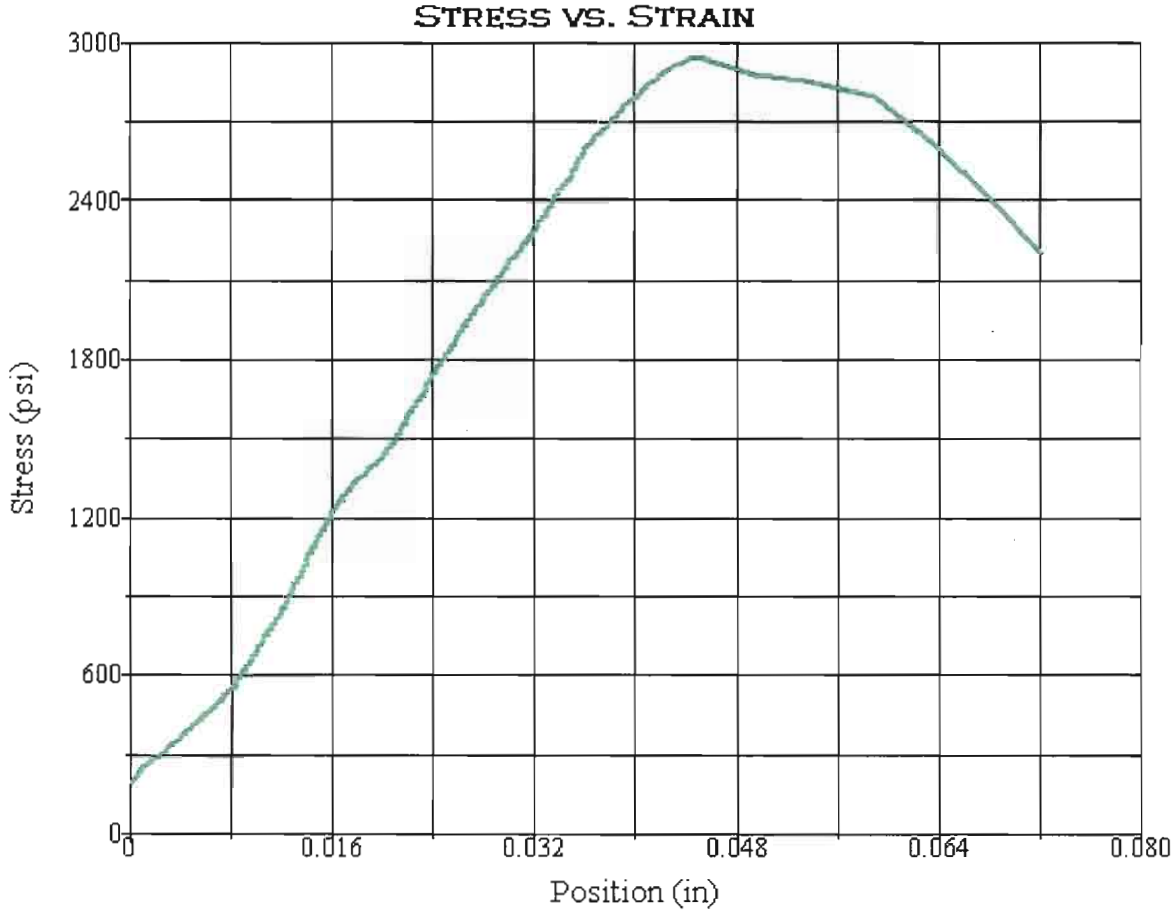
Test Summary

Counter:	924
Elapsed Time:	00:01:16
Operator:	AZM
Sample:	R-10-001-06
Resident Engineer:	
Ticket:	GL# 11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	12:37:02 PM
End Date:	3/18/2011
End Time:	12:38:18 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-006

Test Results

Specimen Gage Length:	5.0000 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	12790 lbf
Compressive Strength:	2851 psi



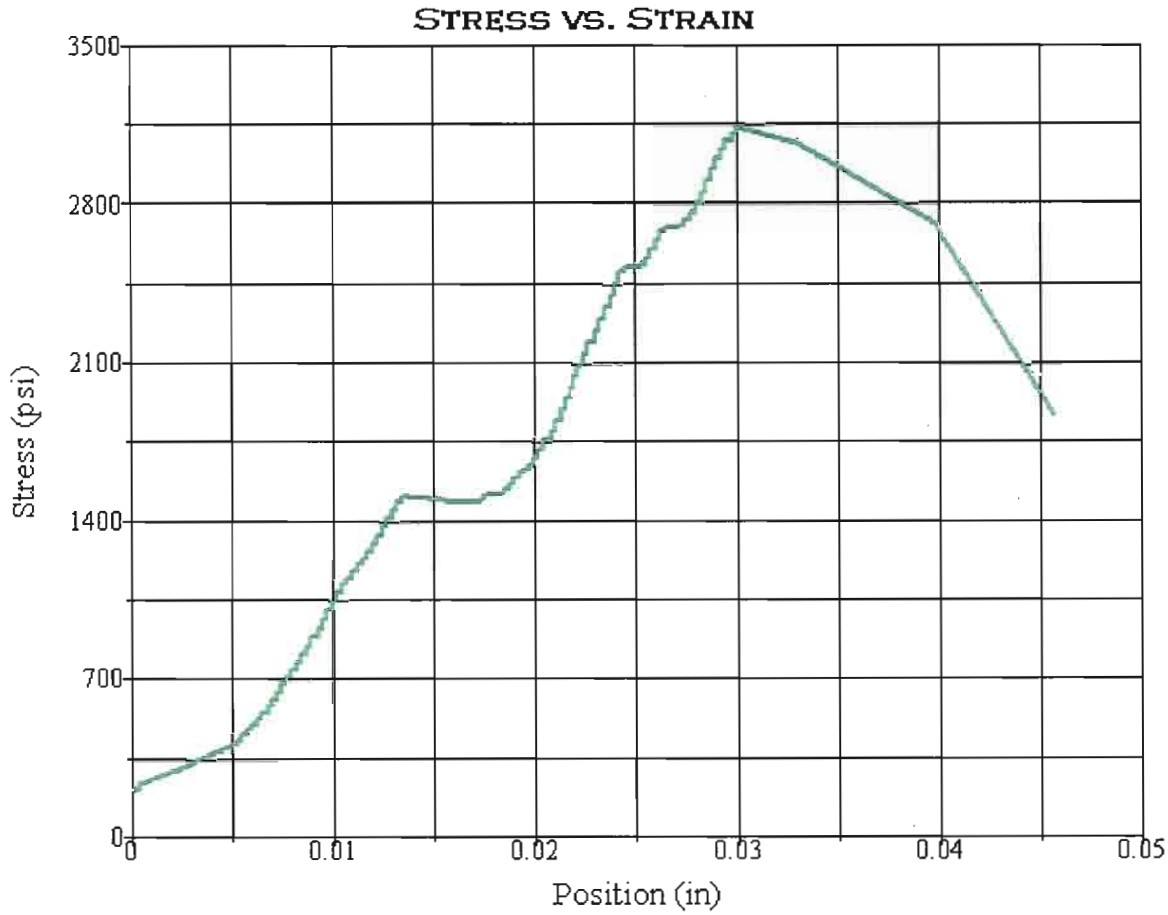


Test Summary

Counter:	925
Elapsed Time:	00:01:19
Operator:	AZM
Sample:	R-10-001-07
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	12:44:23 PM
End Date:	3/18/2011
End Time:	12:45:42 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-007

Test Results

Specimen Gage Length:	2.6700 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	13190 lbf
Compressive Strength:	2940 psi

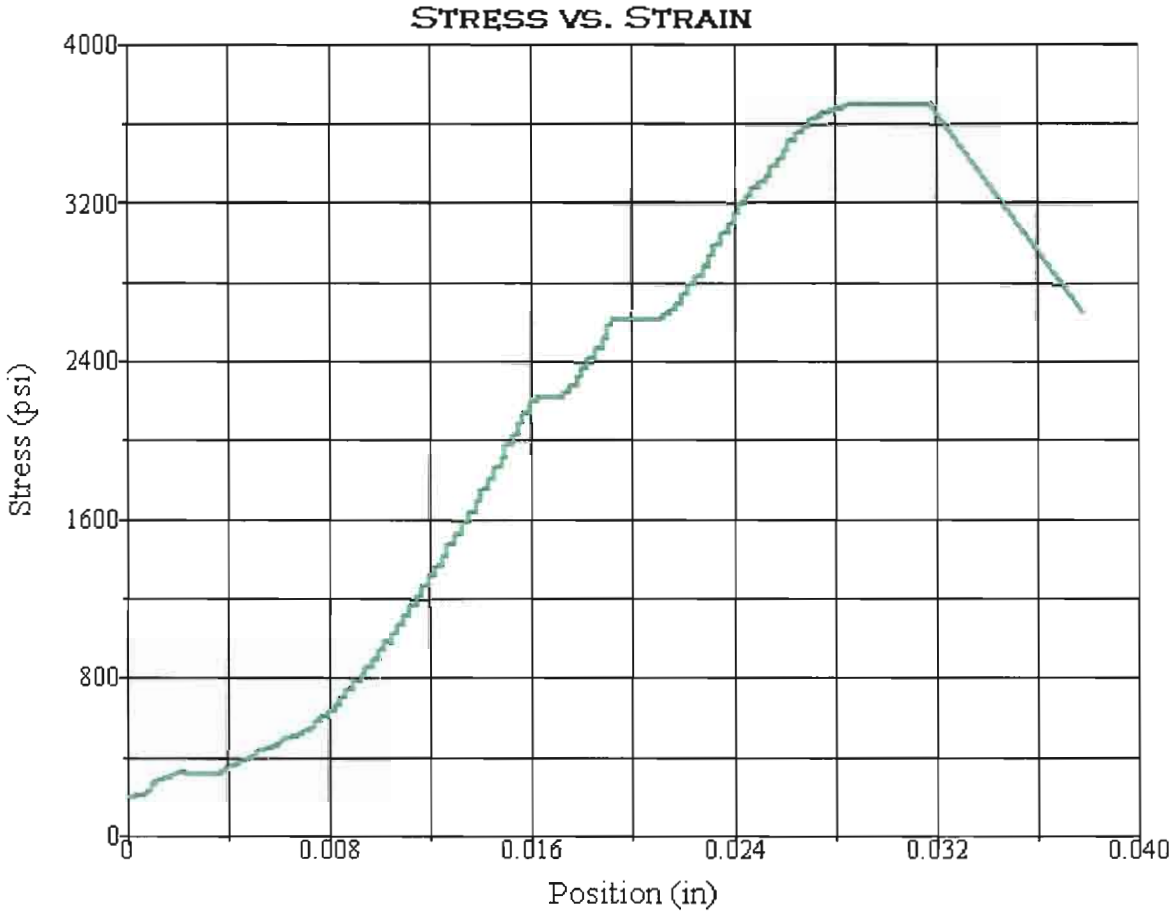


Test Summary

Counter:	926
Elapsed Time:	00:01:23
Operator:	AZM
Sample:	R-10-001-08
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	12:52:47 PM
End Date:	3/18/2011
End Time:	12:54:10 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-008

Test Results

Specimen Gage Length:	4.7400 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	14075 lbf
Compressive Strength:	3137 psi

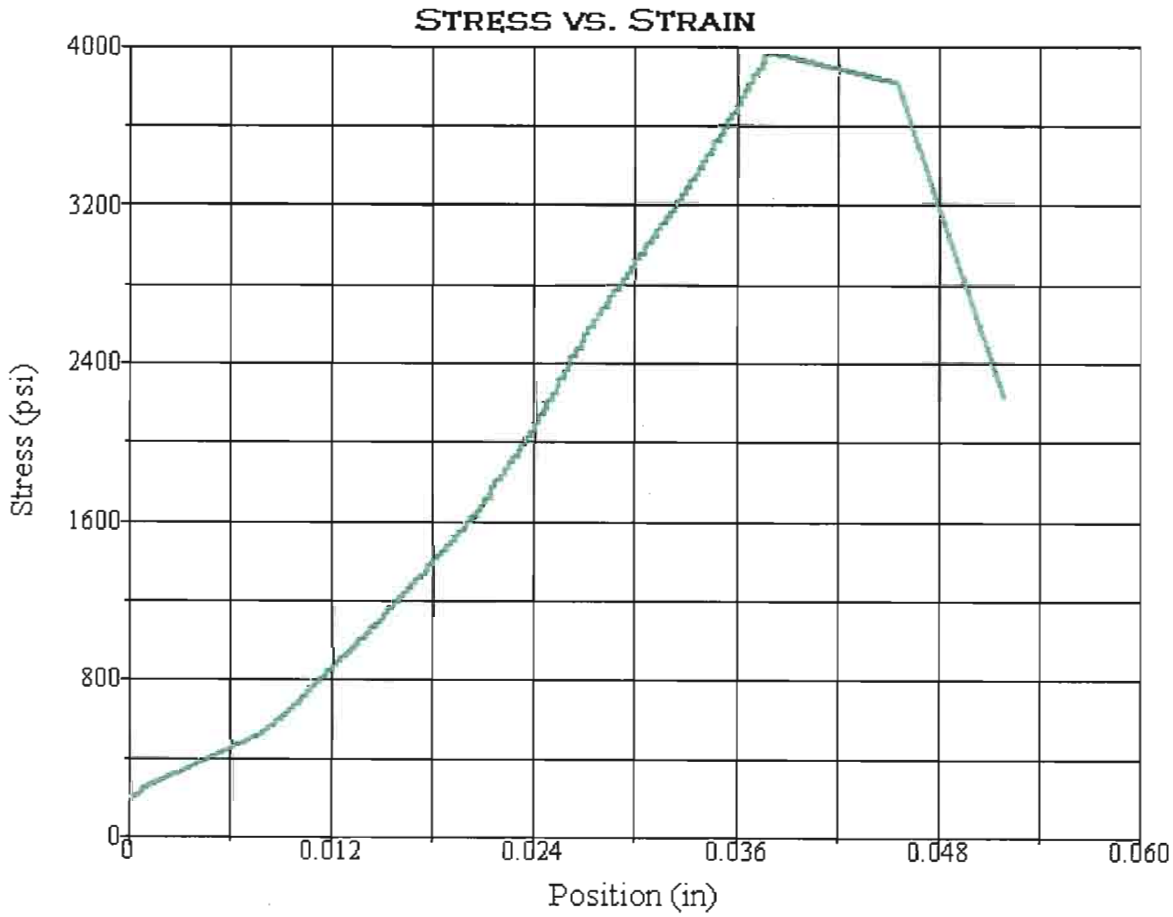


Test Summary

Counter:	927
Elapsed Time:	00:01:39
Operator:	AZM
Sample:	R-10-001-15
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	1:00:41 PM
End Date:	3/18/2011
End Time:	1:02:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-012

Test Results

Specimen Gage Length:	3.5800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	16604 lbf
Compressive Strength:	3701 psi

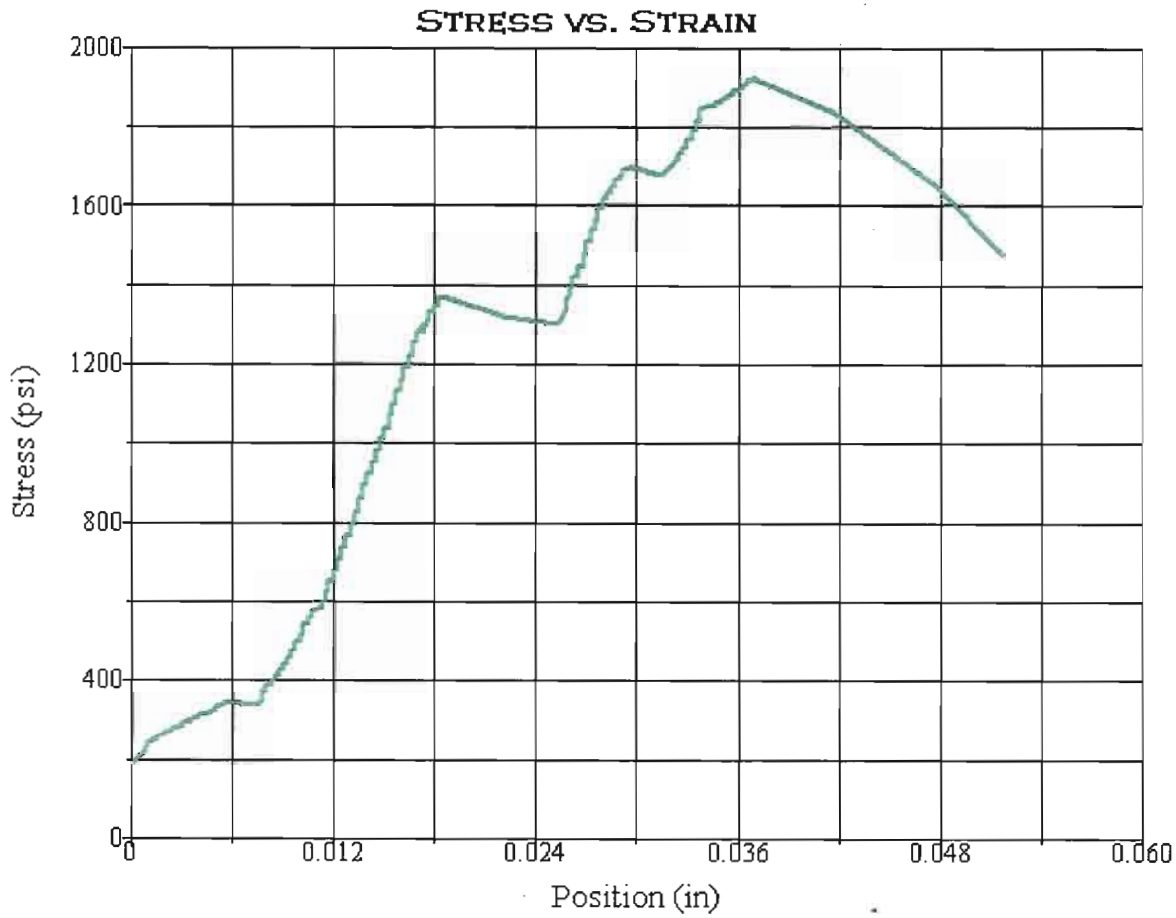


Test Summary

Counter:	928
Elapsed Time:	00:01:47
Operator:	AZM
Sample:	R-10-001-16A
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	1:08:15 PM
End Date:	3/18/2011
End Time:	1:10:02 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-014

Test Results

Specimen Gage Length:	5.4000 in
Diameter:	2.3700 in
Area:	4.4115 in²
Maximum Load:	17457 lbf
Compressive Strength:	3957 psi

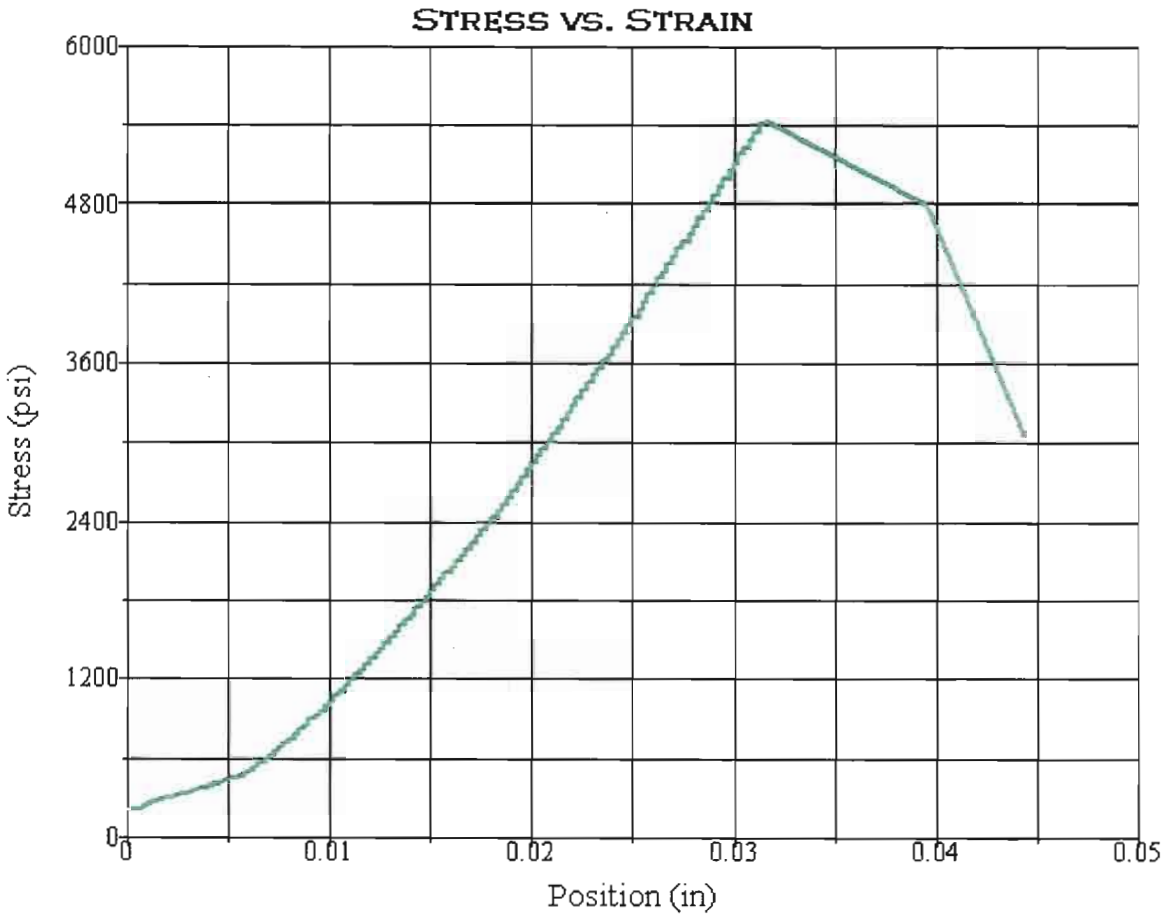


Test Summary

Counter:	929
Elapsed Time:	00:00:49
Operator:	AZM
Sample:	R-10-001-17
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	3:46:17 PM
End Date:	3/18/2011
End Time:	3:47:06 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-15

Test Results

Specimen Gage Length:	2.9400 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	8618 lbf
Compressive Strength:	1921 psi

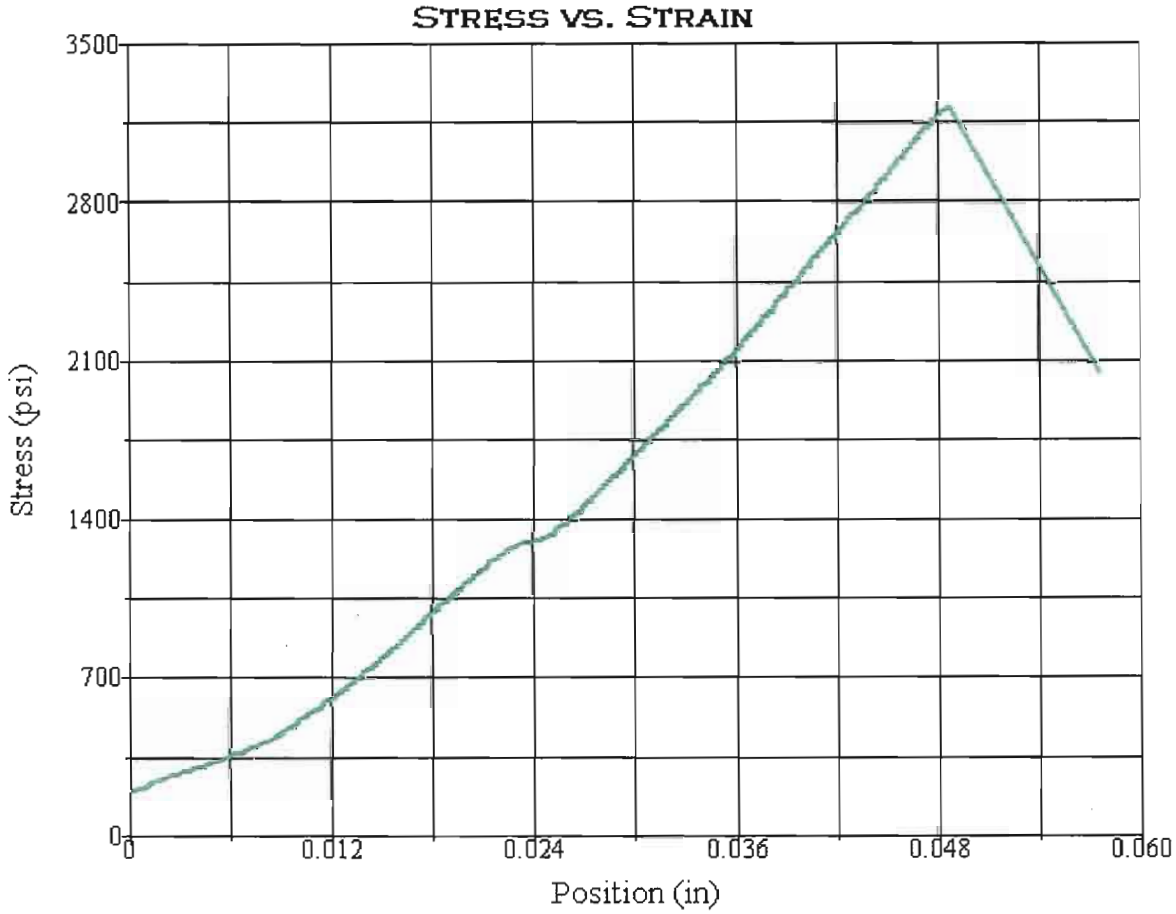


Test Summary

Counter:	931
Elapsed Time:	00:02:28
Operator:	AZM
Sample:	R-10-001-18
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	07-181604
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:07:38 PM
End Date:	3/18/2011
End Time:	4:10:06 PM
Workstation:	D1K00YB1
Tested By:	AZM
Test	Q11-016

Test Results

Specimen Gage Length:	5.6100 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	24317 lbf
Compressive Strength:	5420 psi

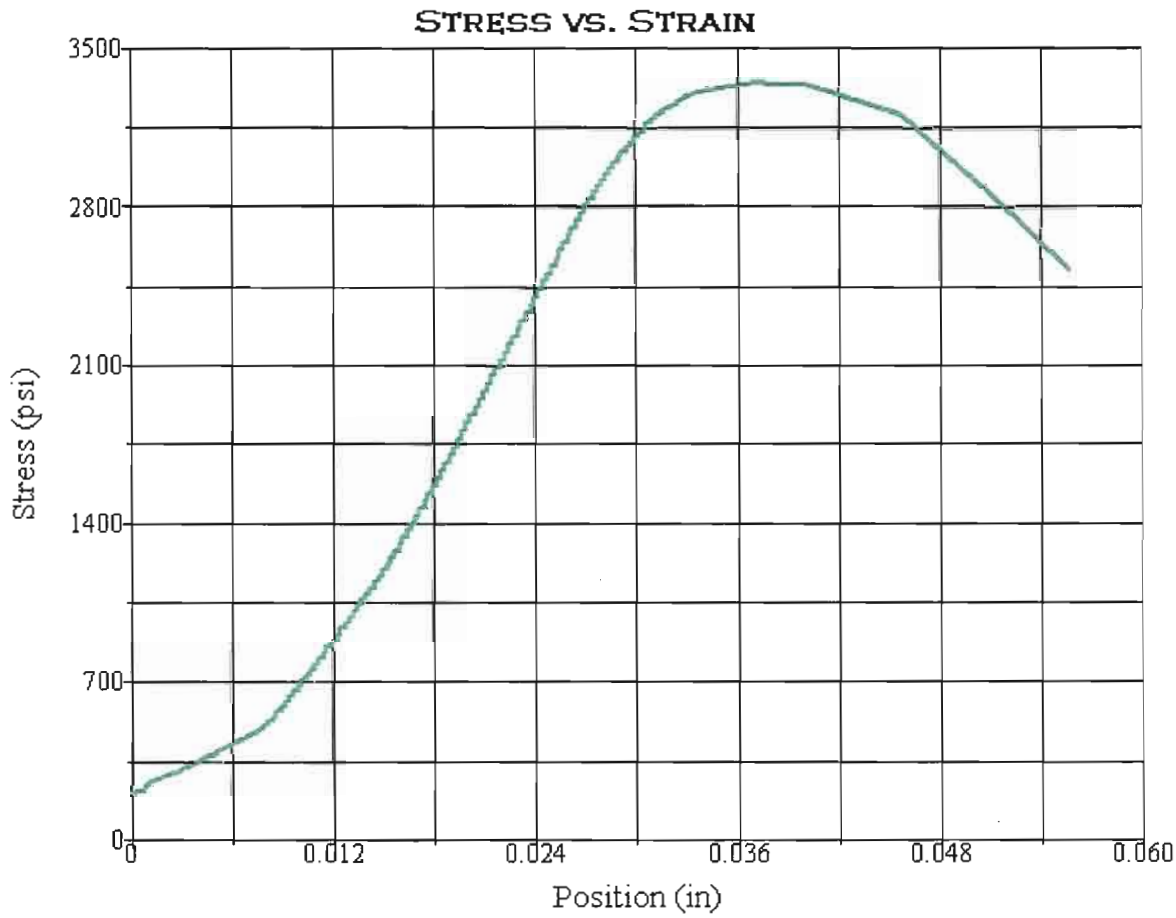


Test Summary

Counter:	932
Elapsed Time:	00:01:25
Operator:	AZM
Sample:	R-10-001-19
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:17:13 PM
End Date:	3/18/2011
End Time:	4:18:38 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-017

Test Results

Specimen Gage Length:	5.4900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	14412 lbf
Compressive Strength:	3212 psi

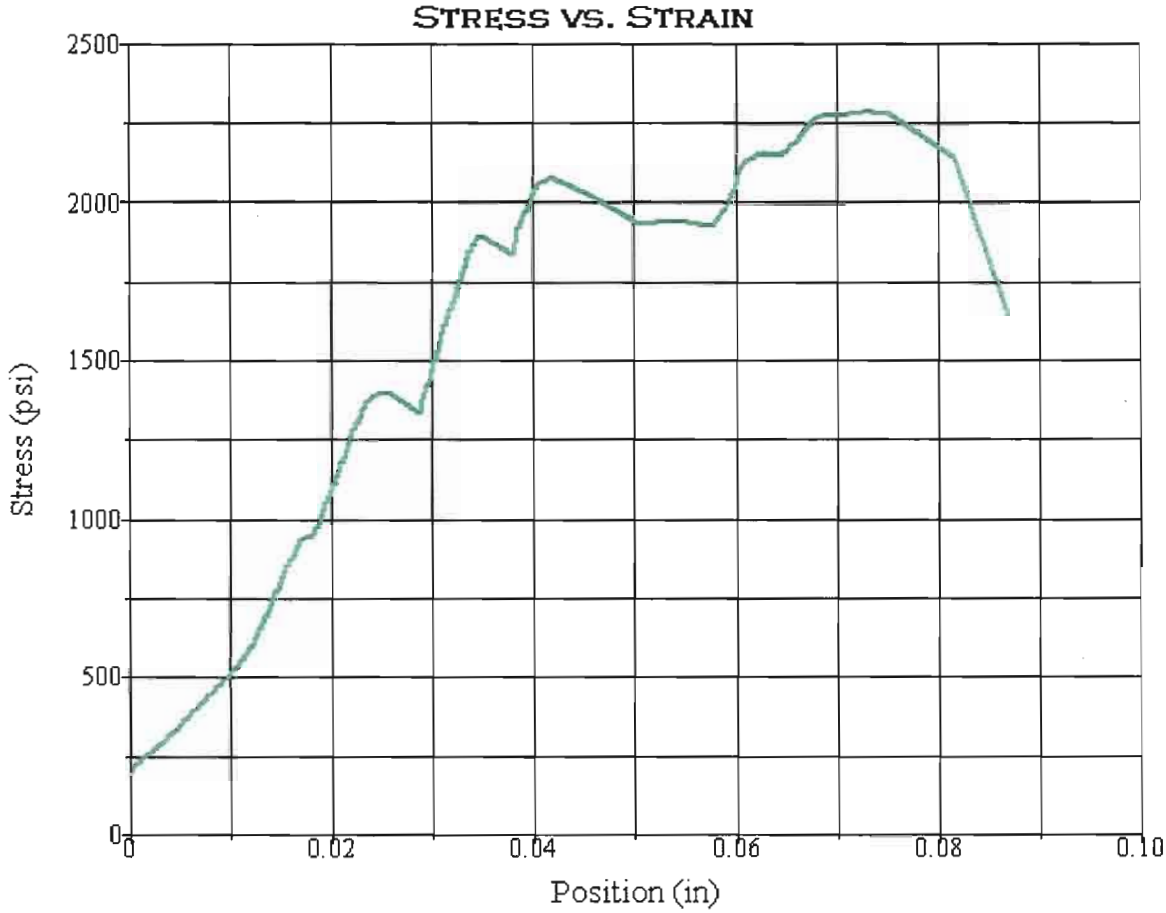


Test Summary

Counter:	930
Elapsed Time:	00:01:29
Operator:	AZM
Sample:	R-10-001-20
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	3:56:21 PM
End Date:	3/18/2011
End Time:	3:57:50 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-018

Test Results

Specimen Gage Length:	3.6500 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	15022 lbf
Compressive Strength:	3348 psi

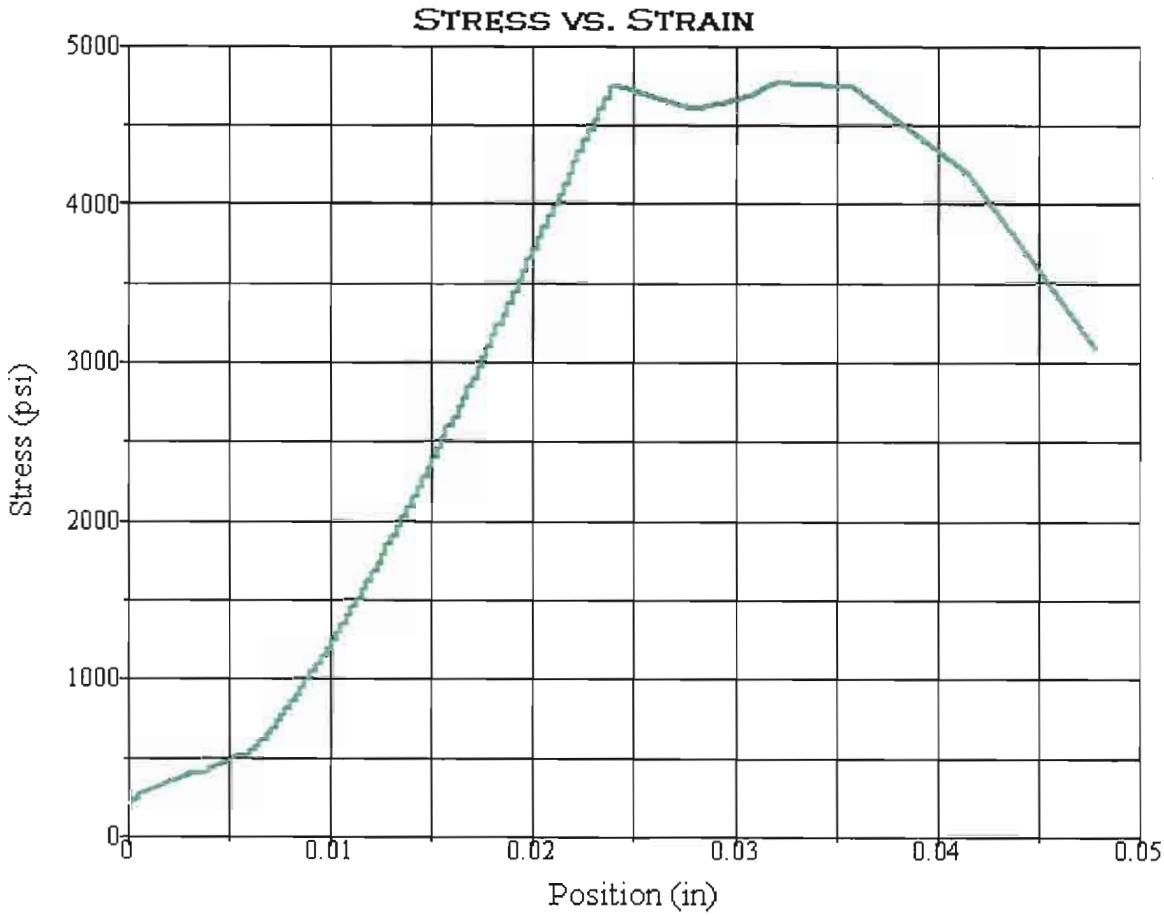


Test Summary

Counter:	933
Elapsed Time:	00:01:00
Operator:	AZM
Sample:	R-10-001- 20A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:27:00 PM
End Date:	3/18/2011
End Time:	4:28:00 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-019

Test Results

Specimen Gage Length:	4.7900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	10263 lbf
Compressive Strength:	2288 psi

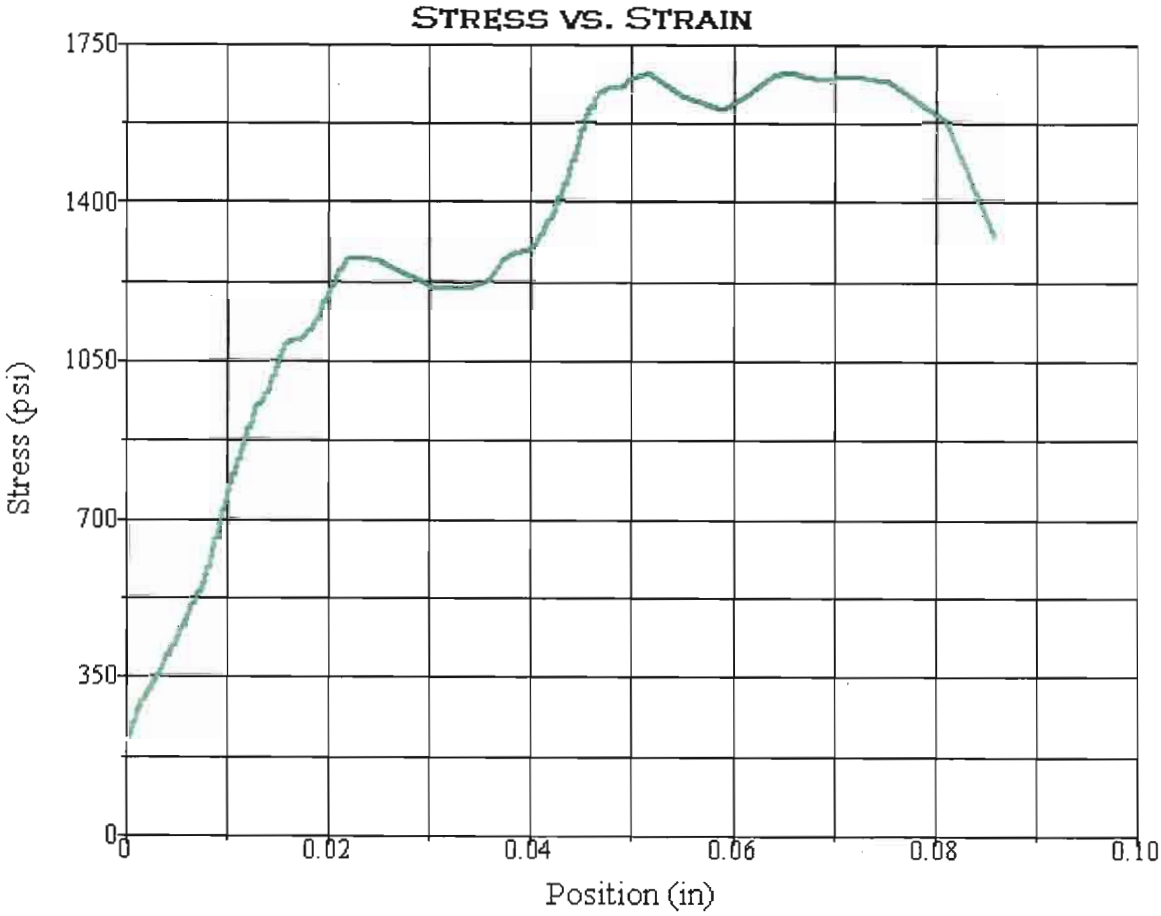


Test Summary

Counter:	934
Elapsed Time:	00:02:10
Operator:	AZM
Sample:	R-10-001-21
Resident Engineer:	
Ticket:	GL # 11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:34:37 PM
End Date:	3/18/2011
End Time:	4:36:47 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-20

Test Results

Specimen Gage Length:	4.4800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21565 lbf
Compressive Strength:	4767 psi

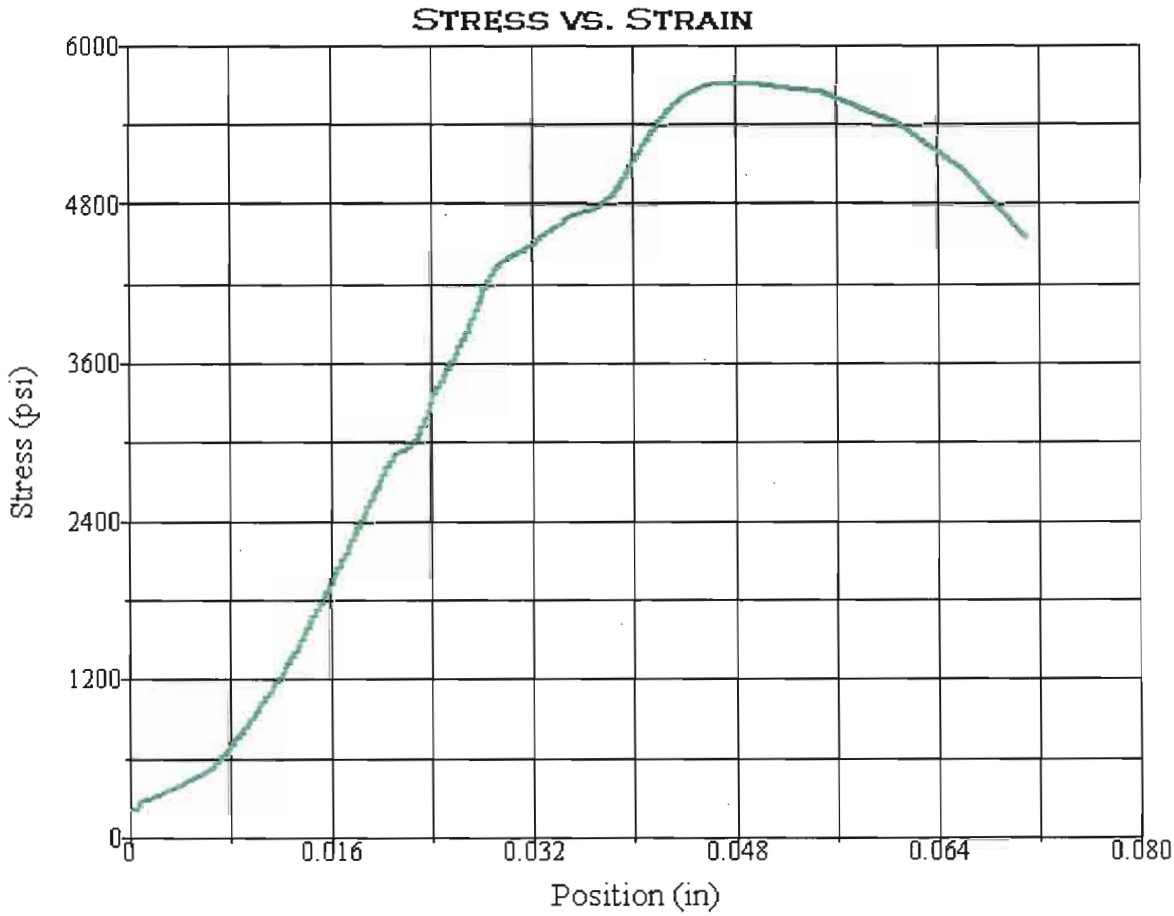


Test Summary

Counter:	935
Elapsed Time:	00:00:43
Operator:	AZM
Sample:	R-10-001-21A
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:42:41 PM
End Date:	3/18/2011
End Time:	4:43:24 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-021

Test Results

Specimen Gage Length:	2.9700 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	7548 lbf
Compressive Strength:	1682 psi

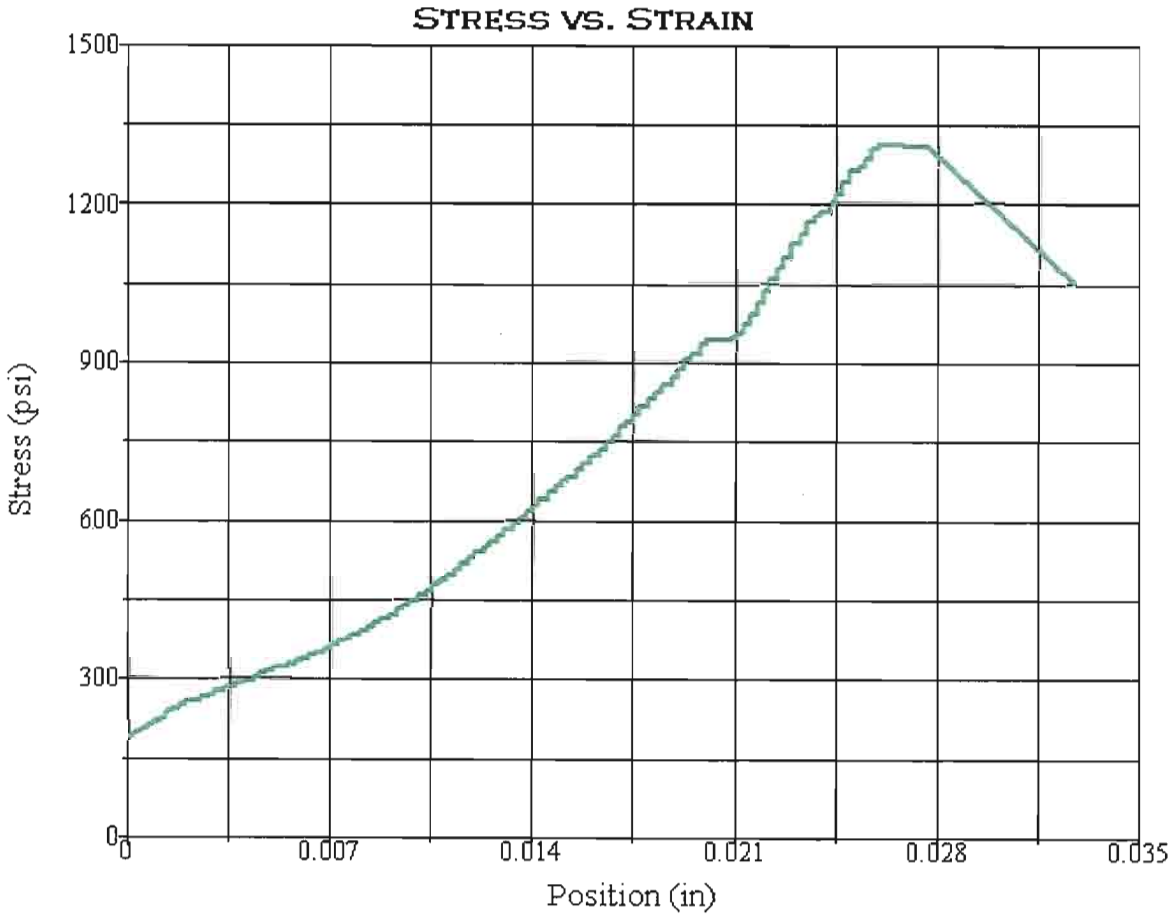


Test Summary

Counter:	936
Elapsed Time:	00:02:37
Operator:	AZM
Sample:	R-10-001-24
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:50:40 PM
End Date:	3/18/2011
End Time:	4:53:17 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-023

Test Results

Specimen Gage Length:	2.7700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25840 lbf
Compressive Strength:	5712 psi

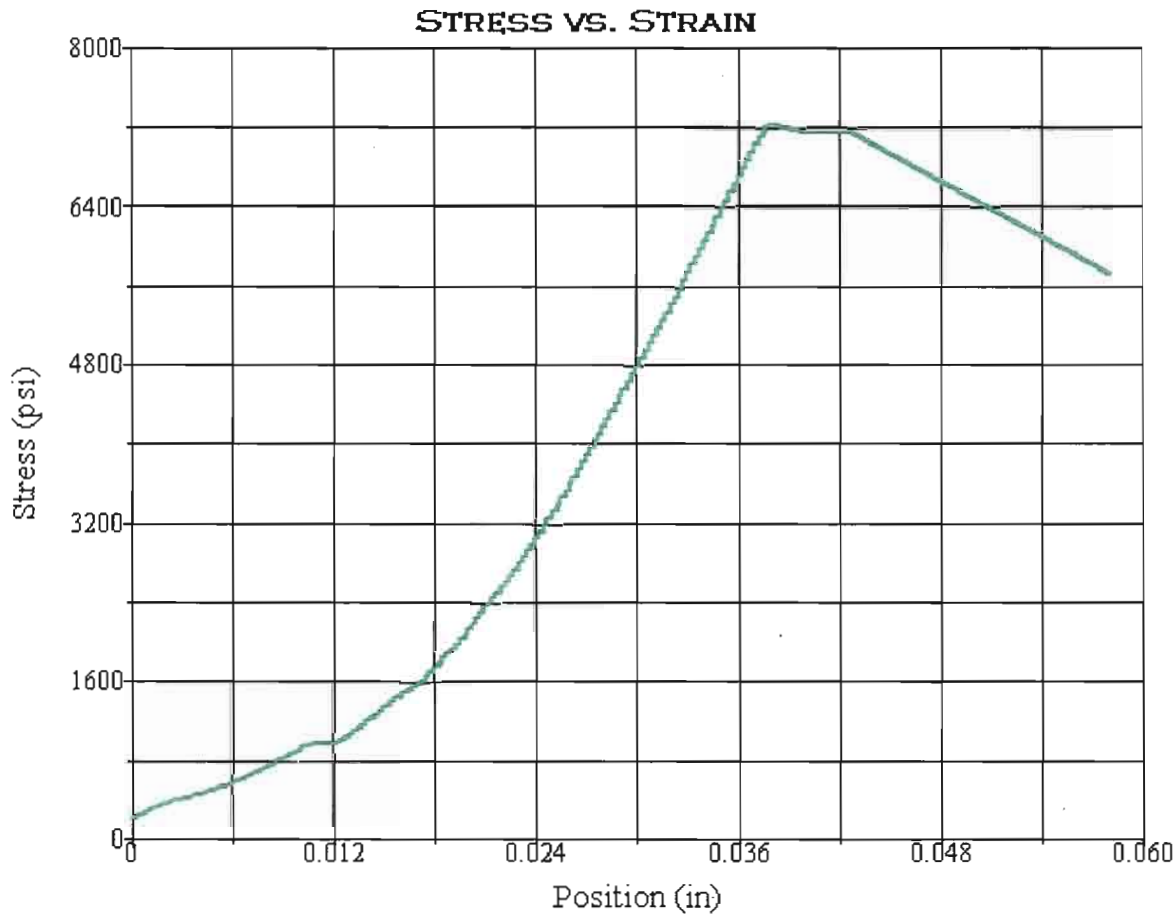


Test Summary

Counter:	939
Elapsed Time:	00:00:31
Operator:	AZM
Sample:	R10-002-013A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:24:39 PM
End Date:	3/24/2011
End Time:	2:25:10 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-032

Test Results

Specimen Gage Length:	4.9500 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	5844 lbf
Compressive Strength:	1314 psi

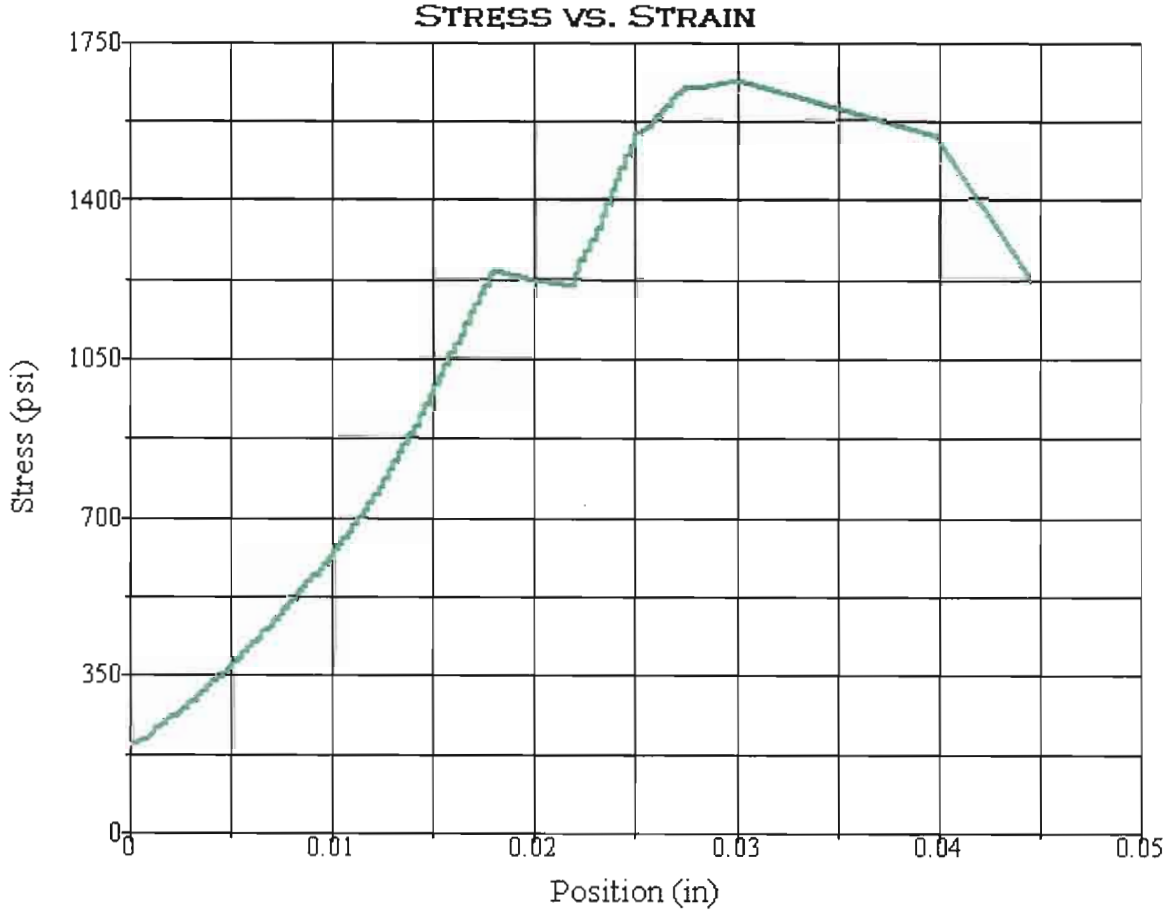


Test Summary

Counter:	940
Elapsed Time:	00:03:18
Operator:	AZM
Sample:	R10-002-17
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:39:54 PM
End Date:	3/24/2011
End Time:	2:43:12 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-034

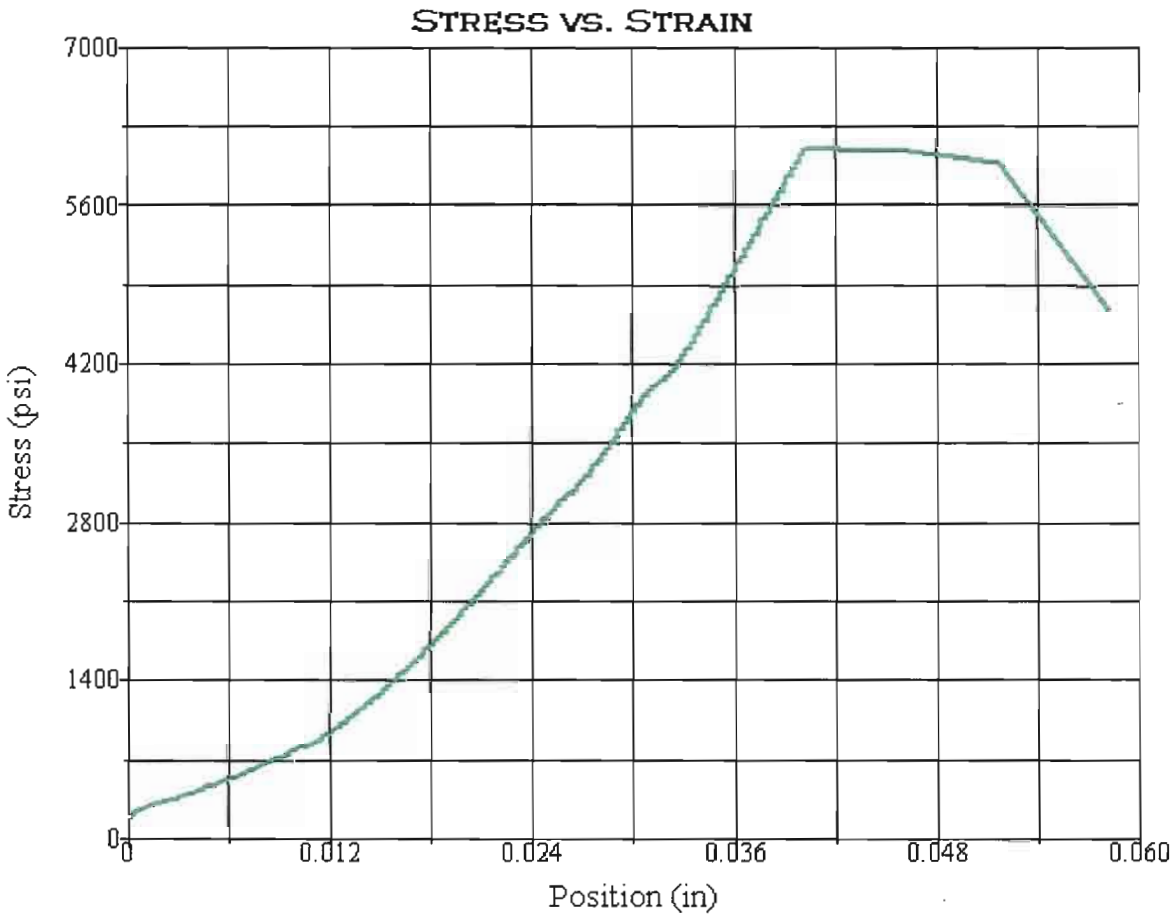
Test Results

Specimen Gage Length:	5.2800 in
Diameter:	2.3700 in
Area:	4.4115 in²
Maximum Load:	31863 lbf
Compressive Strength:	7223 psi



Test Summary	
Counter:	941
Elapsed Time:	00:00:42
Operator:	AZM
Sample:	R10-002-19
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:52:16 PM
End Date:	3/24/2011
End Time:	2:52:58 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-035

Test Results	
Specimen Gage Length:	5.6900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	7435 lbf
Compressive Strength:	1657 psi

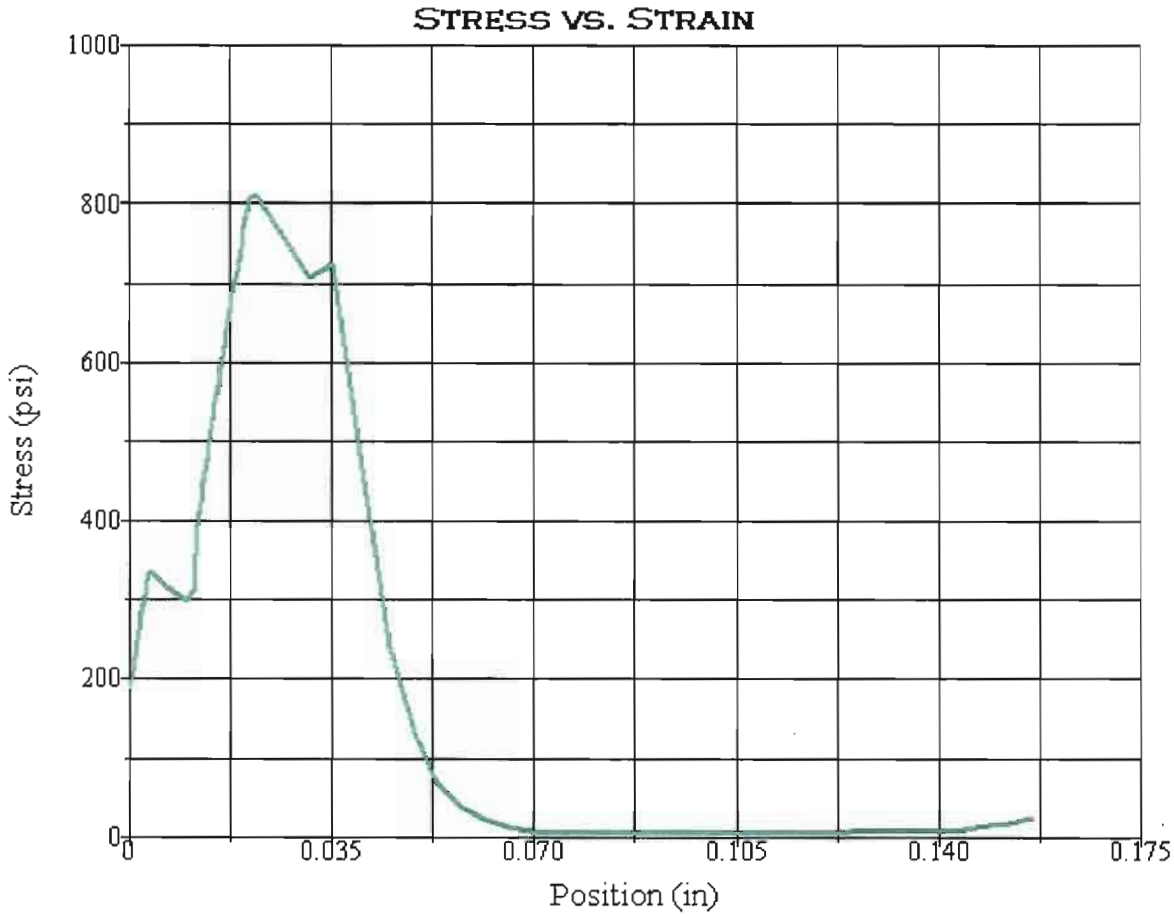


Test Summary

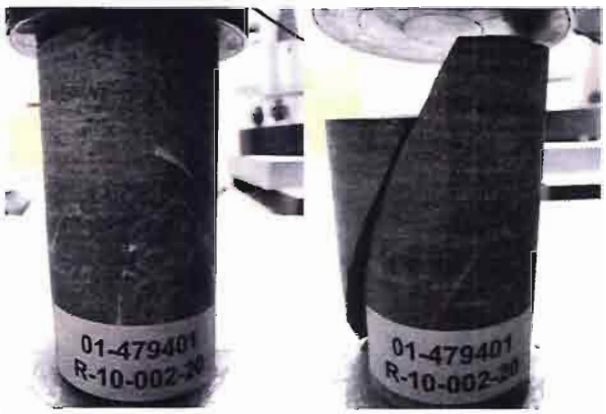
Counter:	942
Elapsed Time:	00:02:49
Operator:	AZM
Sample:	R10-002-19A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:59:08 PM
End Date:	3/24/2011
End Time:	3:01:57 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-036

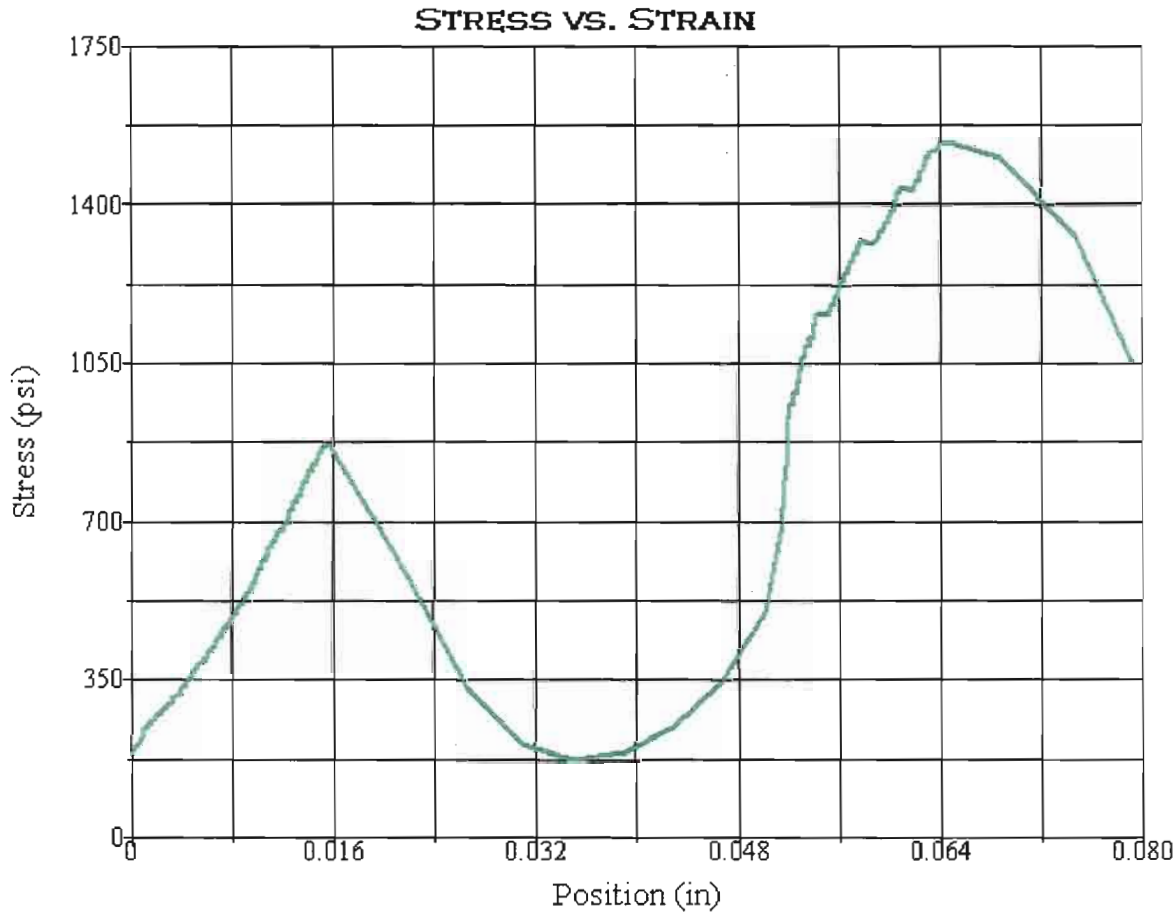
Test Results

Specimen Gage Length:	3.6100 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	27459 lbf
Compressive Strength:	6121 psi



Test Summary		Test Results	
Counter:	0	Specimen Gage Length:	4.3600 in
Elapsed Time:	00:00:20	Diameter:	2.3900 in
Operator:	AZM	Area:	4.4863 in²
Sample:	R10-002-20	Maximum Load:	3629 lbf
Resident Engineer:		Compressive Strength:	809 psi
GL#	11-012		
E.A. NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	3/24/2011		
Start Time:	3:08:53 PM		
End Date:	3/24/2011		
End Time:	3:09:13 PM		
Workstation:	D1K00YB1		
Tested By:	AZM		
Lab Test	Q11-037		



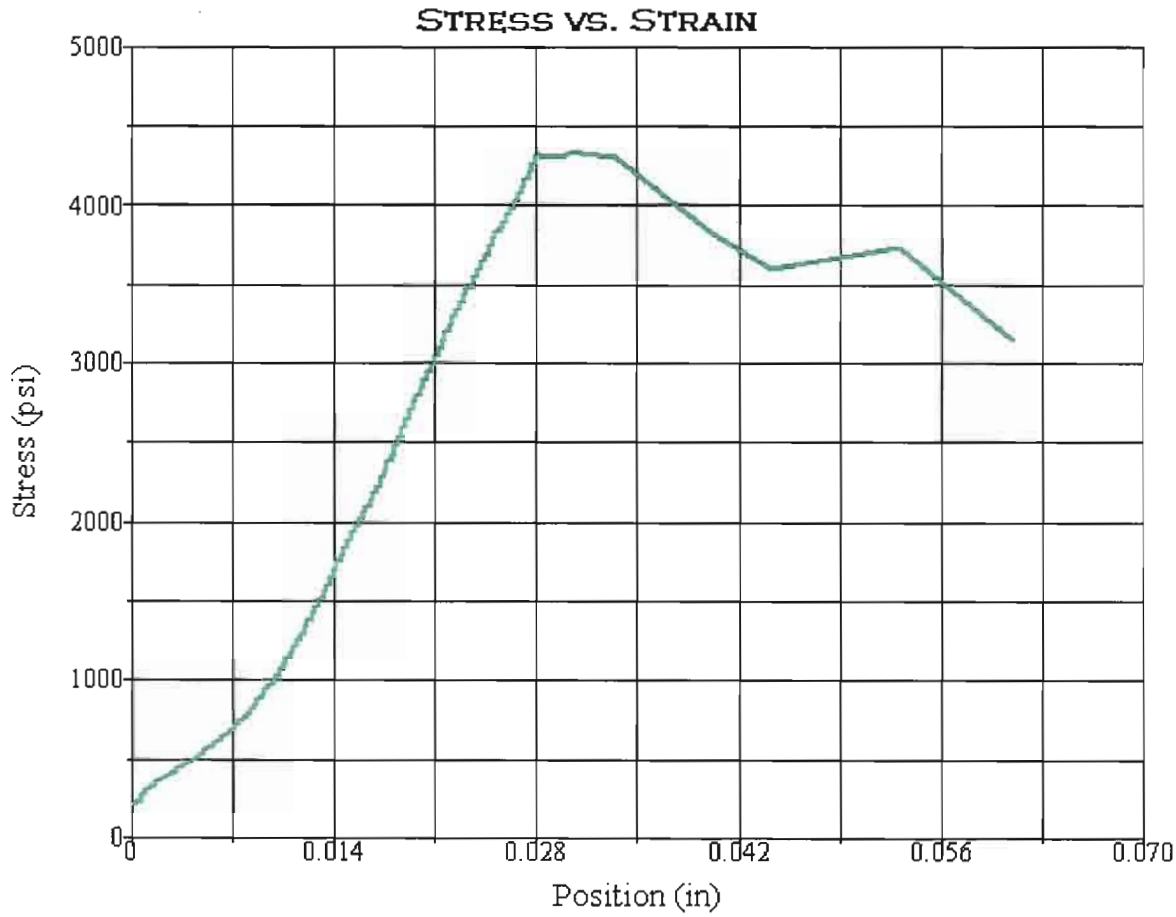


Test Summary

Counter:	944
Elapsed Time:	00:00:38
Operator:	AZM
Sample:	R10-002-21
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:22:29 PM
End Date:	3/24/2011
End Time:	3:23:07 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-038

Test Results

Specimen Gage Length:	4.5000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6969 lbf
Compressive Strength:	1540 psi

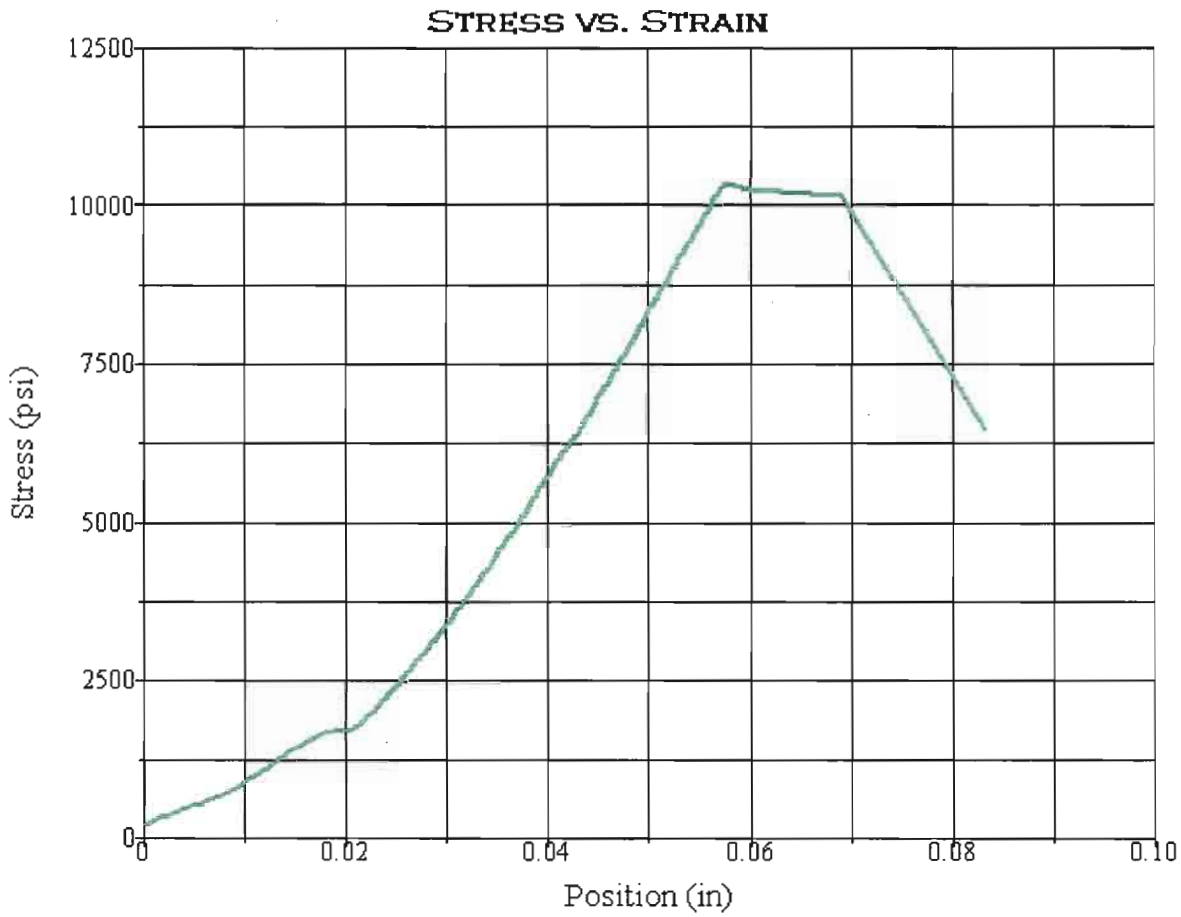


Test Summary

Counter:	945
Elapsed Time:	00:01:56
Operator:	AZM
Sample:	R10-002-21A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:27:24 PM
End Date:	3/24/2011
End Time:	3:29:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-039

Test Results

Specimen Gage Length:	3.6000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	19587 lbf
Compressive Strength:	4330 psi

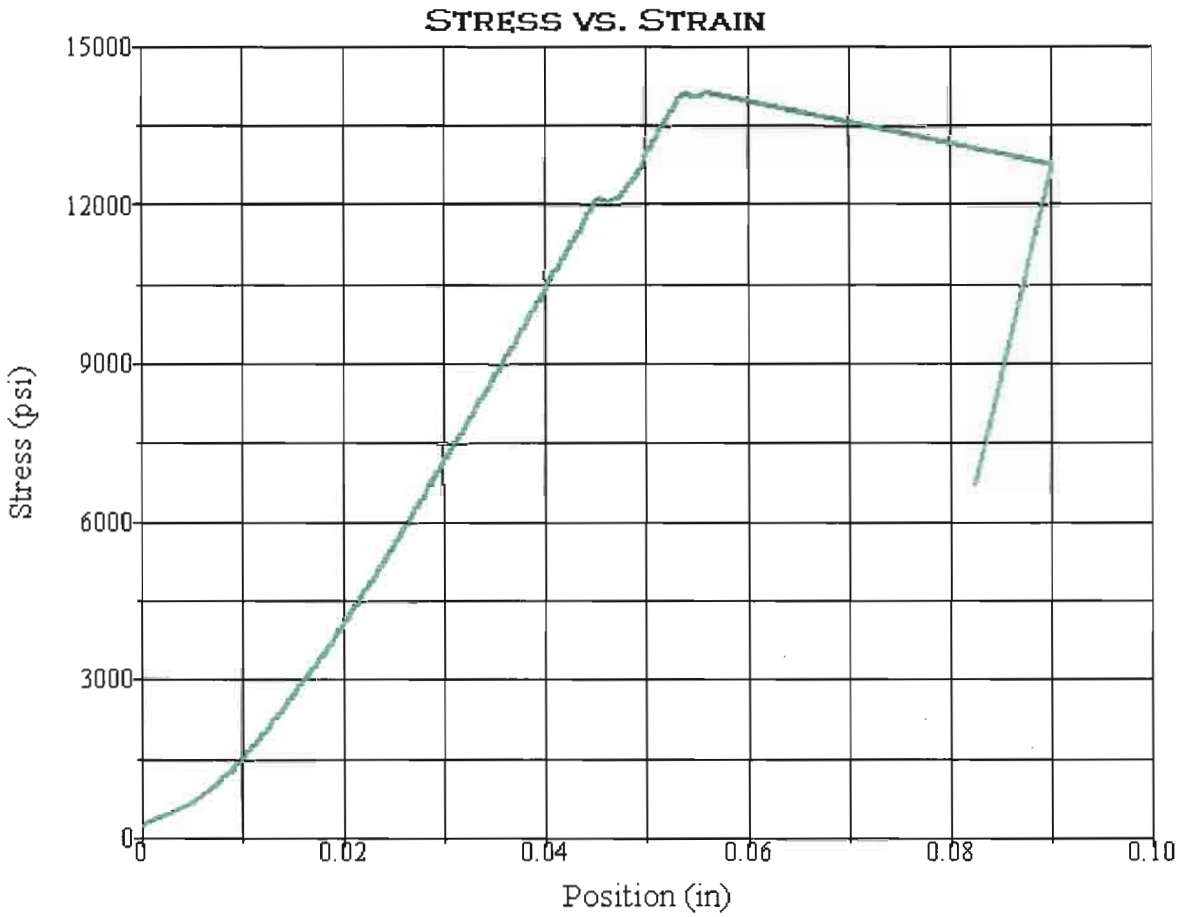


Test Summary

Counter:	946
Elapsed Time:	00:04:49
Operator:	AZM
Sample:	R10-002-23
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:33:23 PM
End Date:	3/24/2011
End Time:	3:38:12 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-040

Test Results

Specimen Gage Length:	5.0800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	46501 lbf
Compressive Strength:	10365 psi

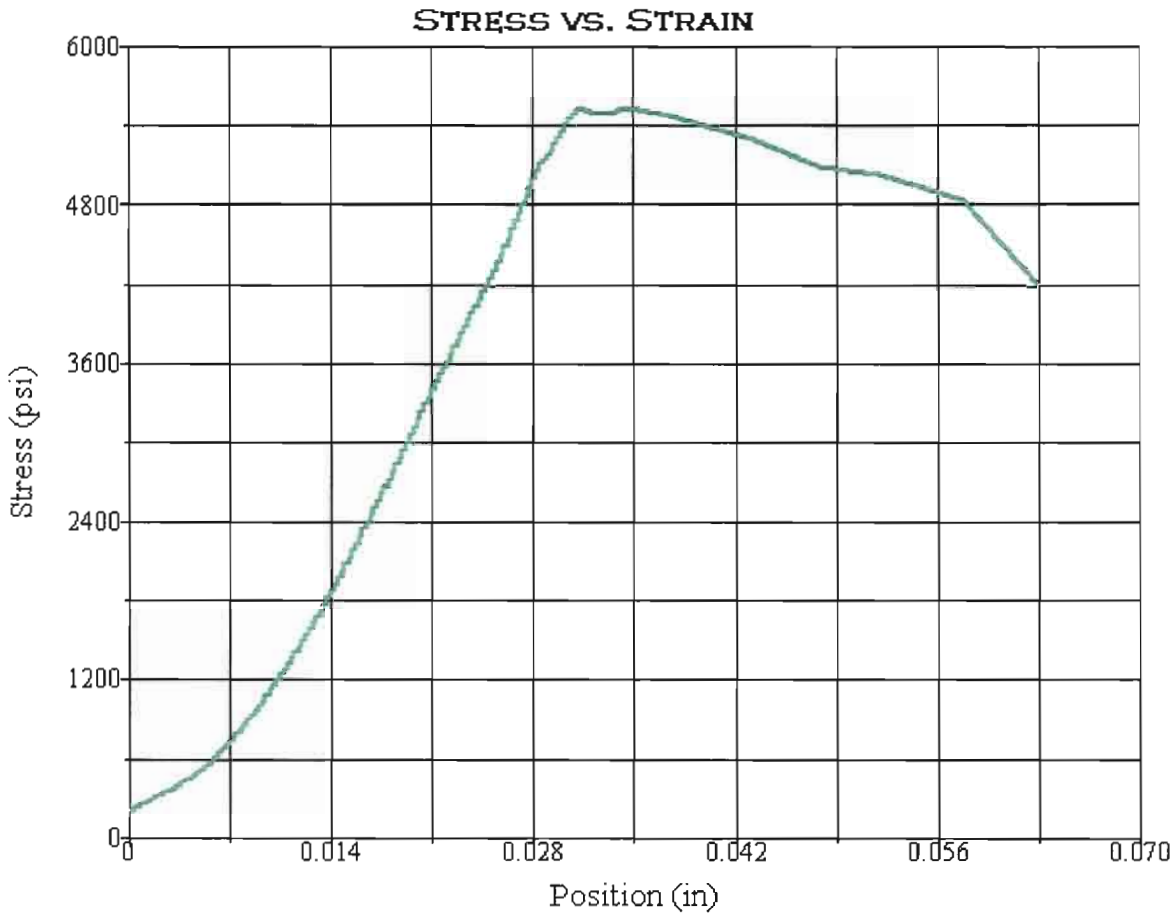


Test Summary

Counter:	947
Elapsed Time:	00:06:36
Operator:	AZM
Sample:	R10-002-25
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:42:57 PM
End Date:	3/24/2011
End Time:	3:49:33 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-041

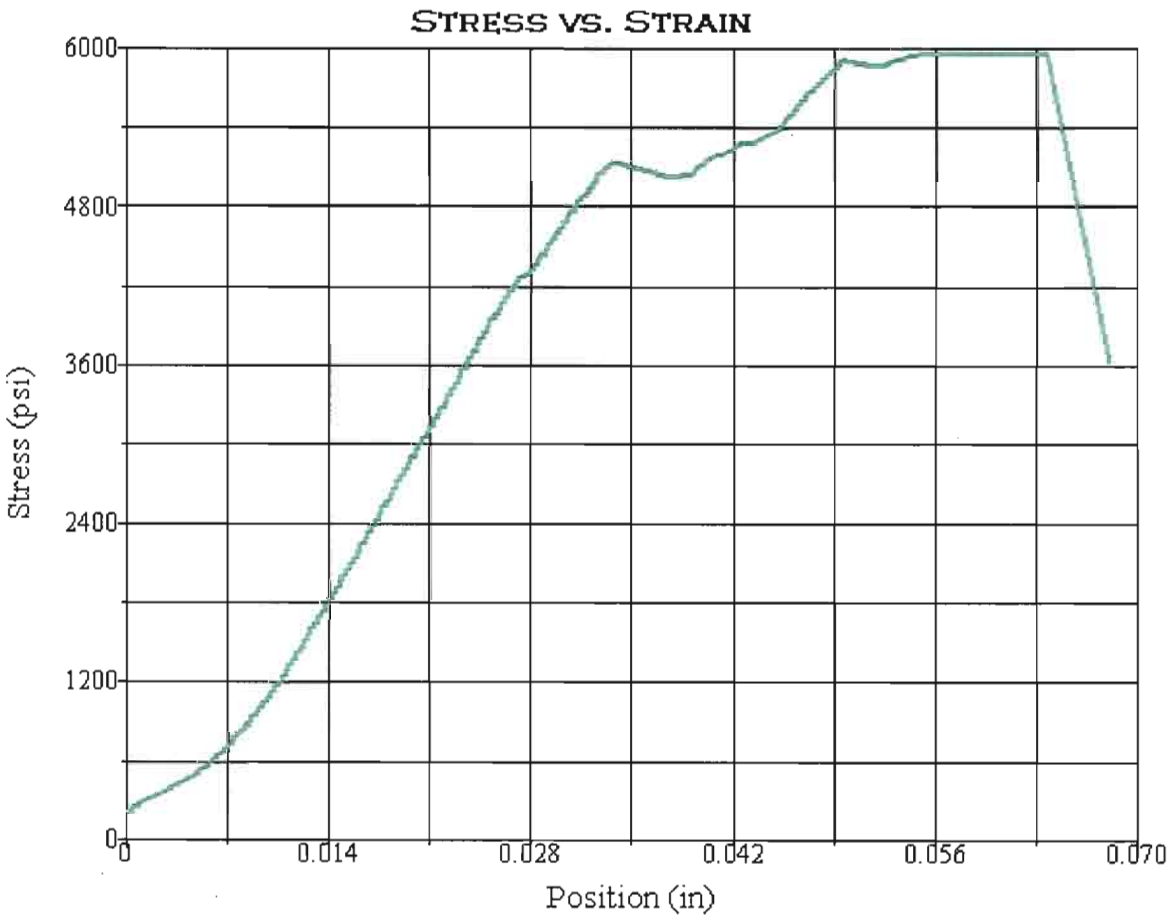
Test Results

Specimen Gage Length:	5.2600 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	63448 lbf
Compressive Strength:	14143 psi



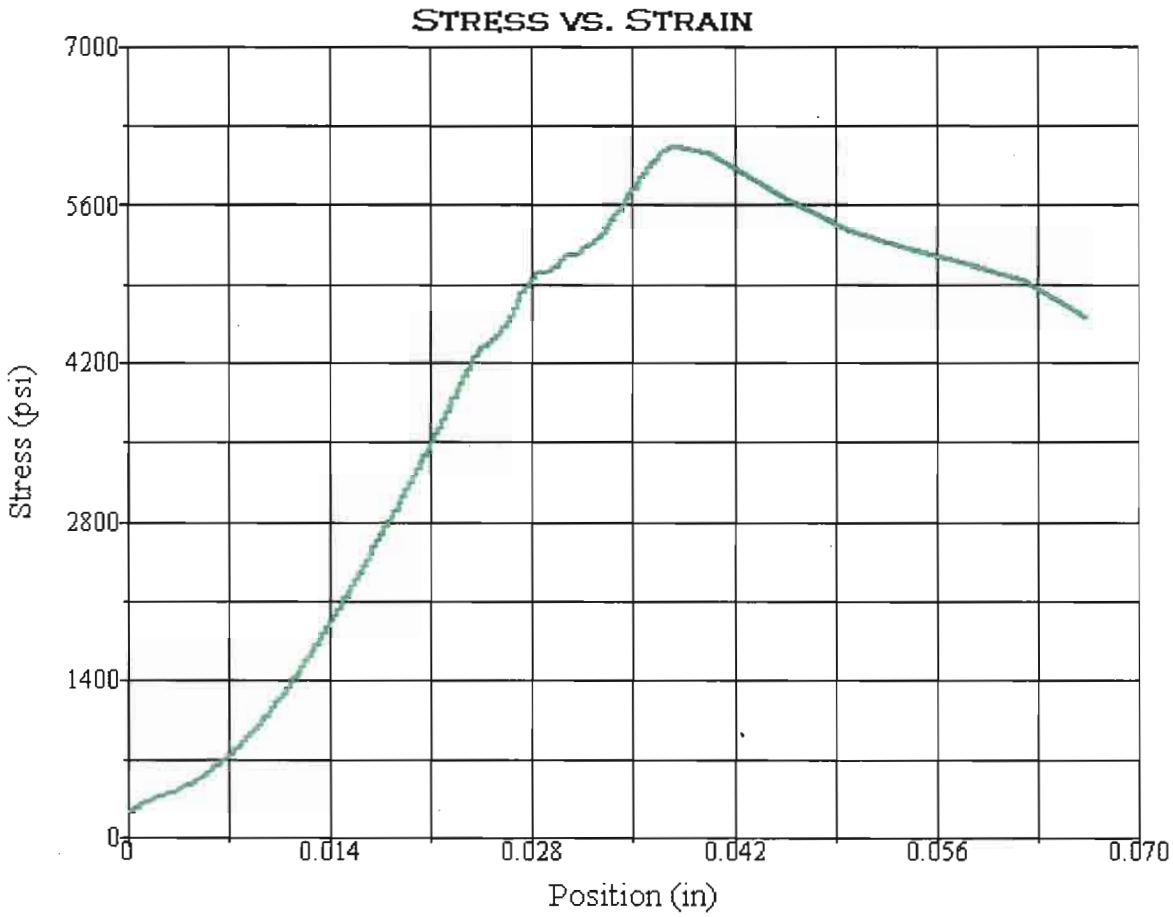
Test Summary	
Counter:	948
Elapsed Time:	00:02:32
Operator:	AZM
Sample:	R-10-002-26
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:54:10 PM
End Date:	3/24/2011
End Time:	3:56:42 PM
Workstation:	D1K00YB1
Tested By:	AZM
LabTest	Q11-042

Test Results	
Specimen Gage Length:	5.2500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25019 lbf
Compressive Strength:	5530 psi



Test Summary	
Counter:	949
Elapsed Time:	00:02:43
Operator:	AZM
Sample:	R10-002-28
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:59:45 PM
End Date:	3/24/2011
End Time:	4:02:28 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-043

Test Results	
Specimen Gage Length:	5.4200 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	26704 lbf
Compressive Strength:	5952 psi

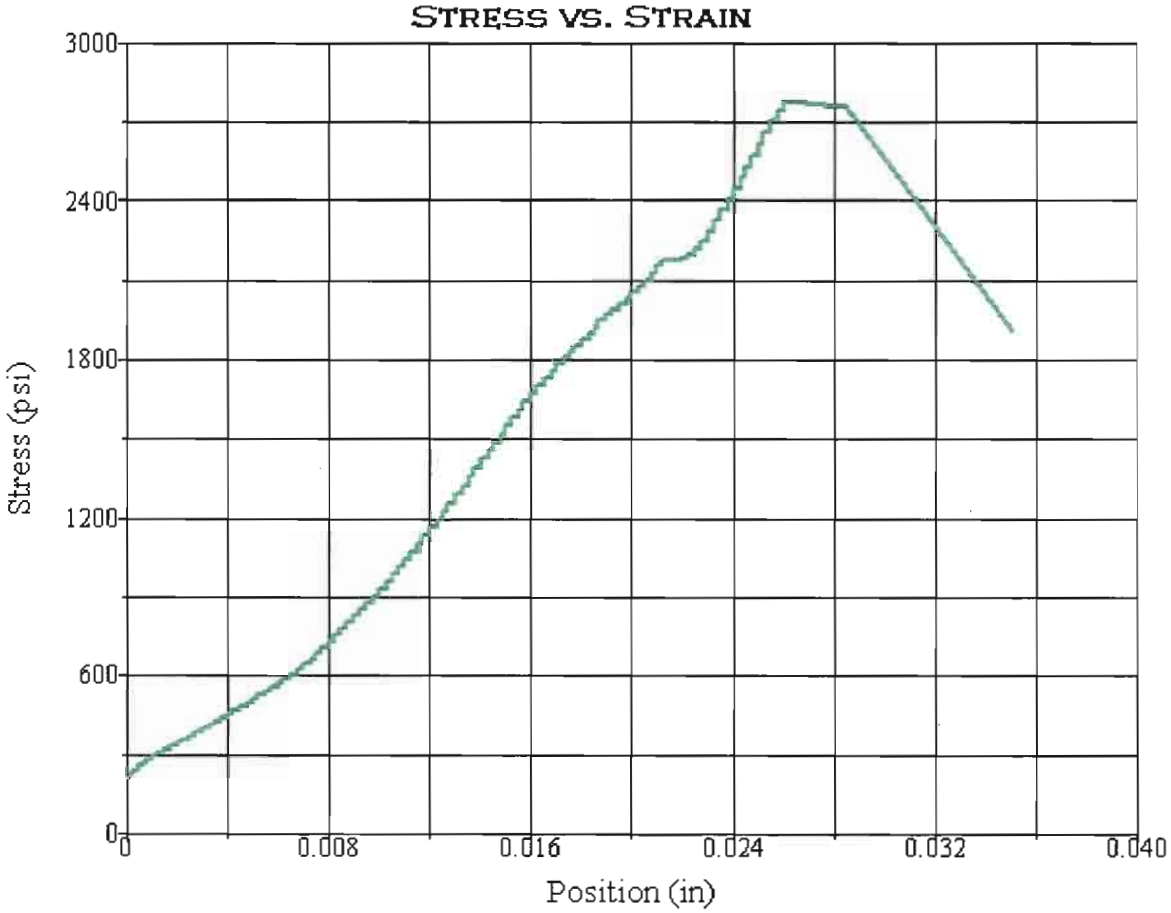


Test Summary

Counter:	950
Elapsed Time:	00:02:48
Operator:	AZM
Sample:	R10-003-05
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:05:48 PM
End Date:	3/24/2011
End Time:	4:08:36 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-044

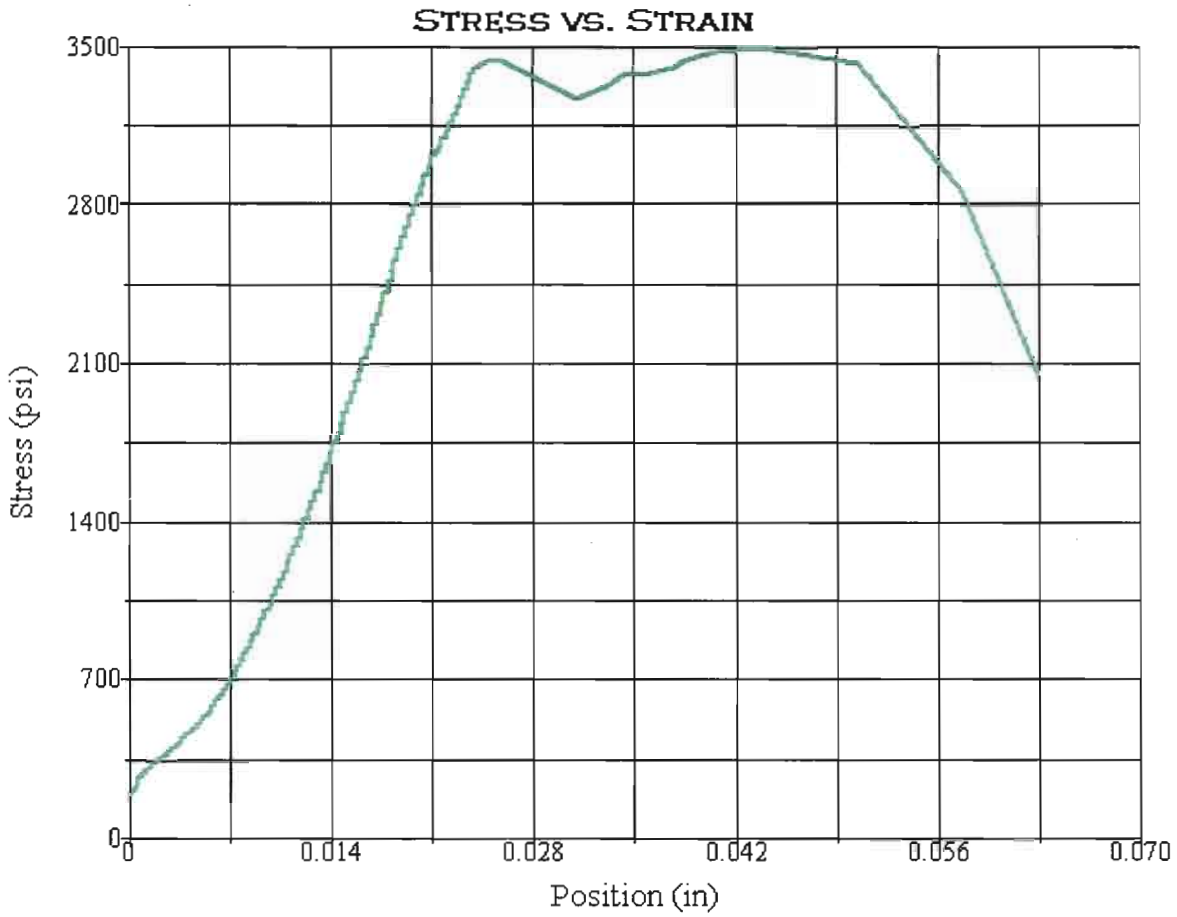
Test Results

Specimen Gage Length:	3.5200 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	27461 lbf
Compressive Strength:	6121 psi

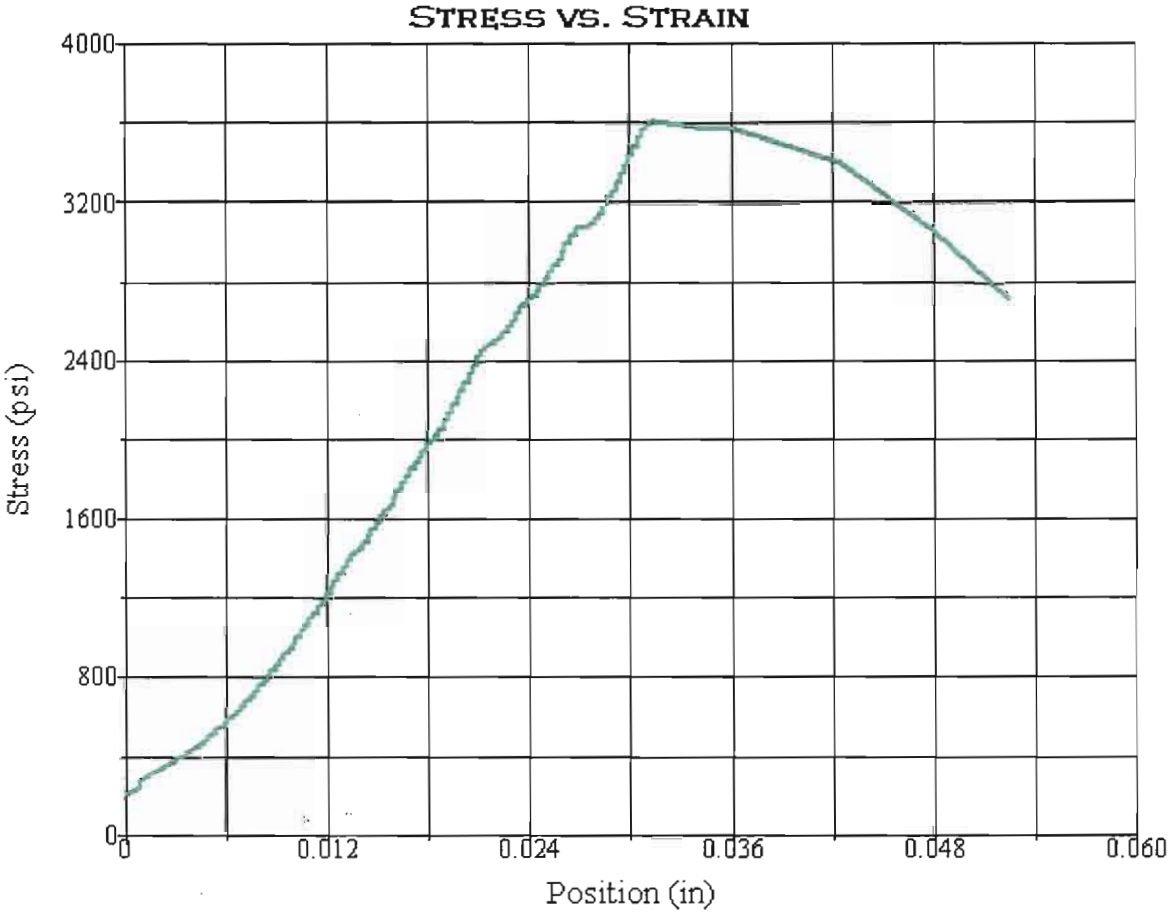


Test Summary	
Counter:	951
Elapsed Time:	00:01:12
Operator:	AZM
Sample:	R-10-003-06
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:11:57 PM
End Date:	3/24/2011
End Time:	4:13:09 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-045

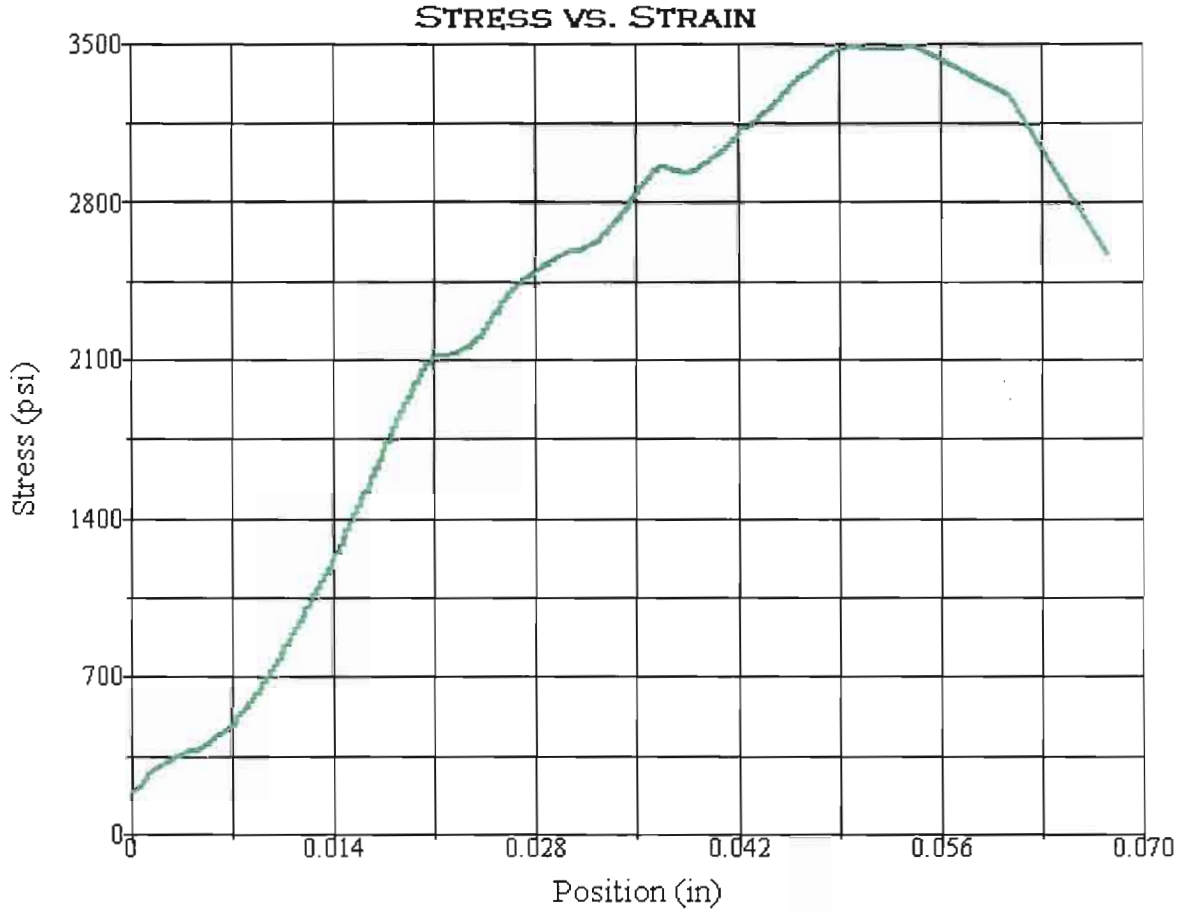
Test Results	
Specimen Gage Length:	5.0800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12570 lbf
Compressive Strength:	2779 psi



Test Summary		Test Results	
Counter:	952	Specimen Gage Length:	5.6400 in
Elapsed Time:	00:01:33	Diameter:	2.4000 in
Operator:	AZM	Area:	4.5239 in²
Sample:	R10-003-07	Maximum Load:	15809 lbf
Resident Engineer:		Compressive Strength:	3495 psi
GL#	11-012		
E.A. NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	3/24/2011		
Start Time:	4:15:30 PM		
End Date:	3/24/2011		
End Time:	4:17:03 PM		
Workstation:	D1K00YB1		
Tested By:	AZM		
Lab Test	Q11-046		



Test Summary		Test Results	
Counter:	953	Specimen Gage Length:	2.4000 in
Elapsed Time:	00:01:37	Diameter:	2.4000 in
Operator:	AZM	Area:	4.5239 in²
Sample:	R10-003-09	Maximum Load:	16348 lbf
Resident Engineer:		Compressive Strength:	3614 psi
GL#	11-012		
E.A. NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	3/24/2011		
Start Time:	4:20:19 PM		
End Date:	3/24/2011		
End Time:	4:21:56 PM		
Workstation:	D1K00YB1		
Tested By:	AZM		
LabTest	Q11-047		

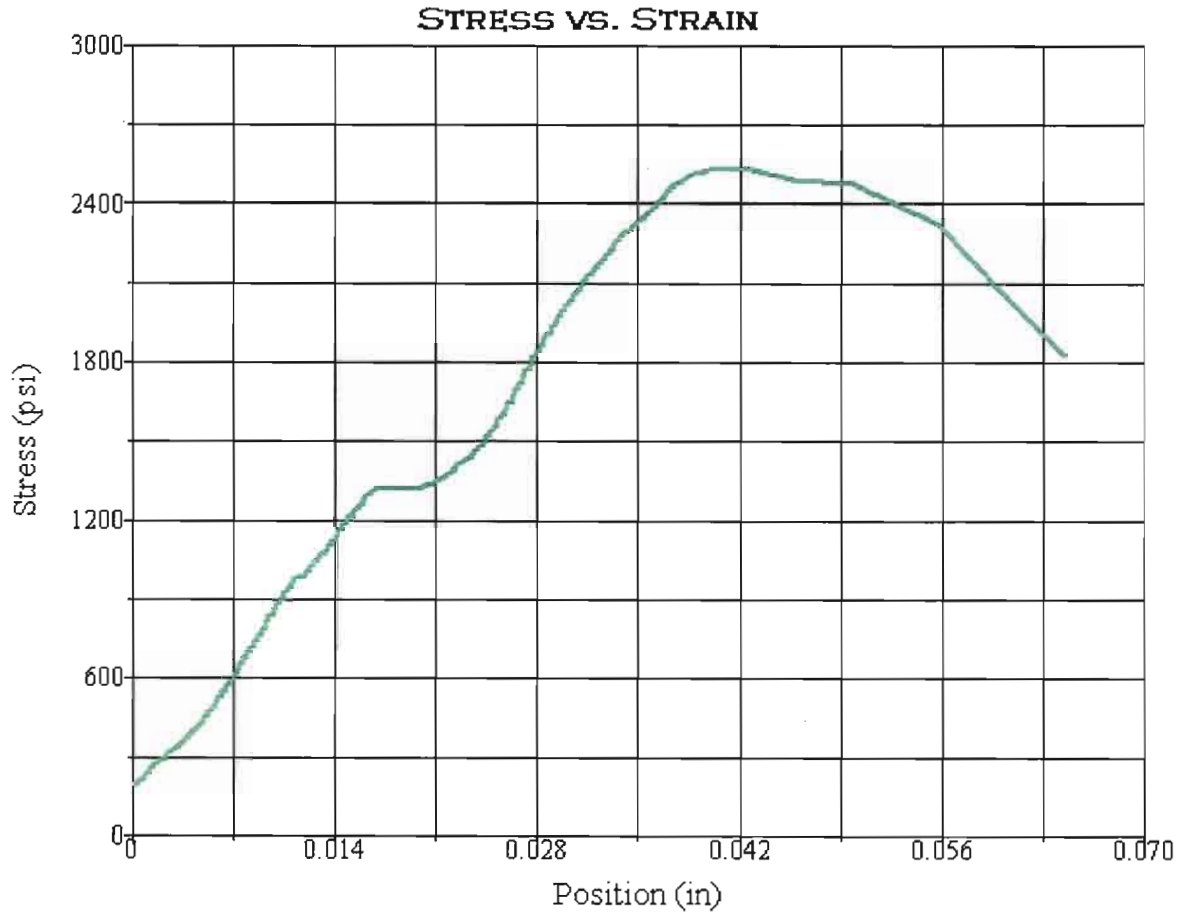


Test Summary

Counter:	954
Elapsed Time:	00:01:33
Operator:	AZM
Sample:	R11-003-11
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:25:38 PM
End Date:	3/24/2011
End Time:	4:27:11 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-049

Test Results

Specimen Gage Length:	4.0600 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	15671 lbf
Compressive Strength:	3493 psi

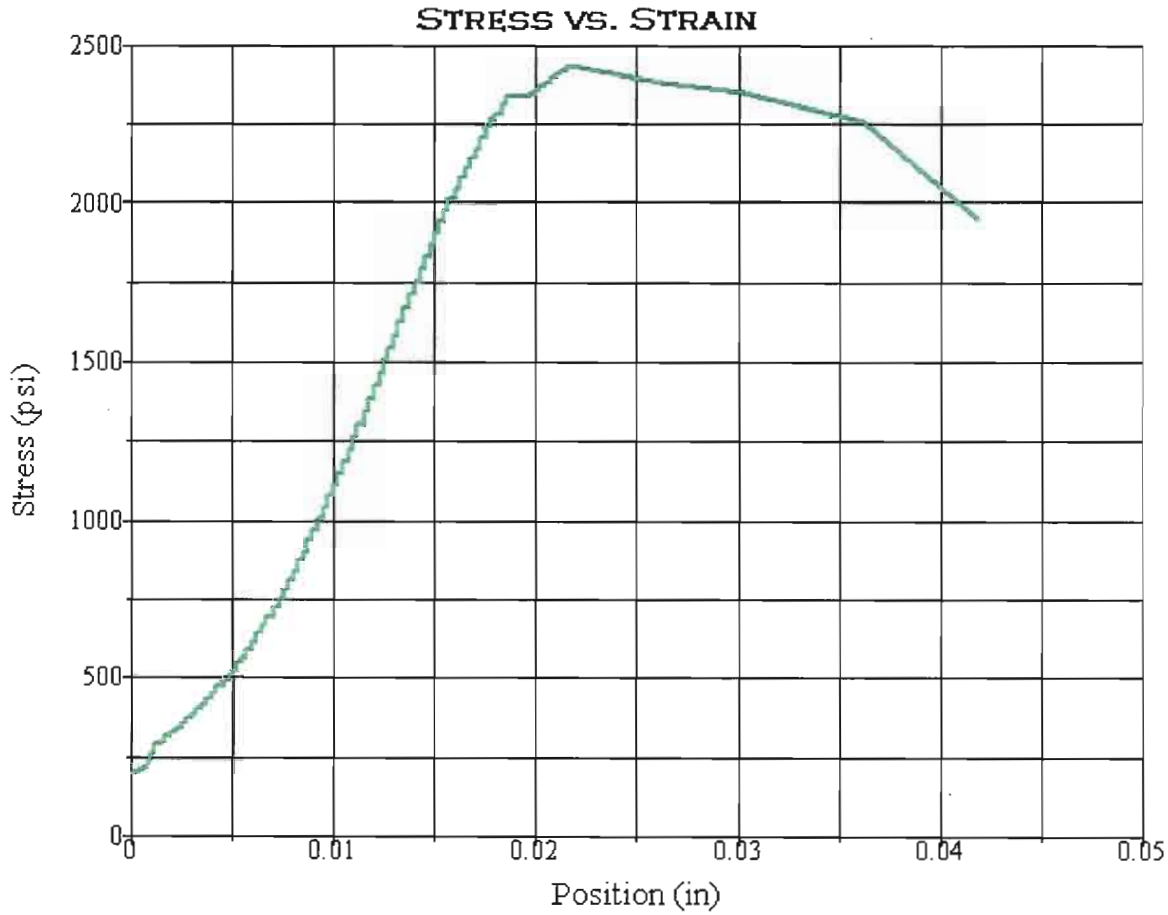


Test Summary

Counter:	955
Elapsed Time:	00:01:07
Operator:	AZM
Sample:	R10-003-13
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:33:08 PM
End Date:	3/24/2011
End Time:	4:34:15 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-051

Test Results

Specimen Gage Length:	3.4800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	11365 lbf
Compressive Strength:	2533 psi

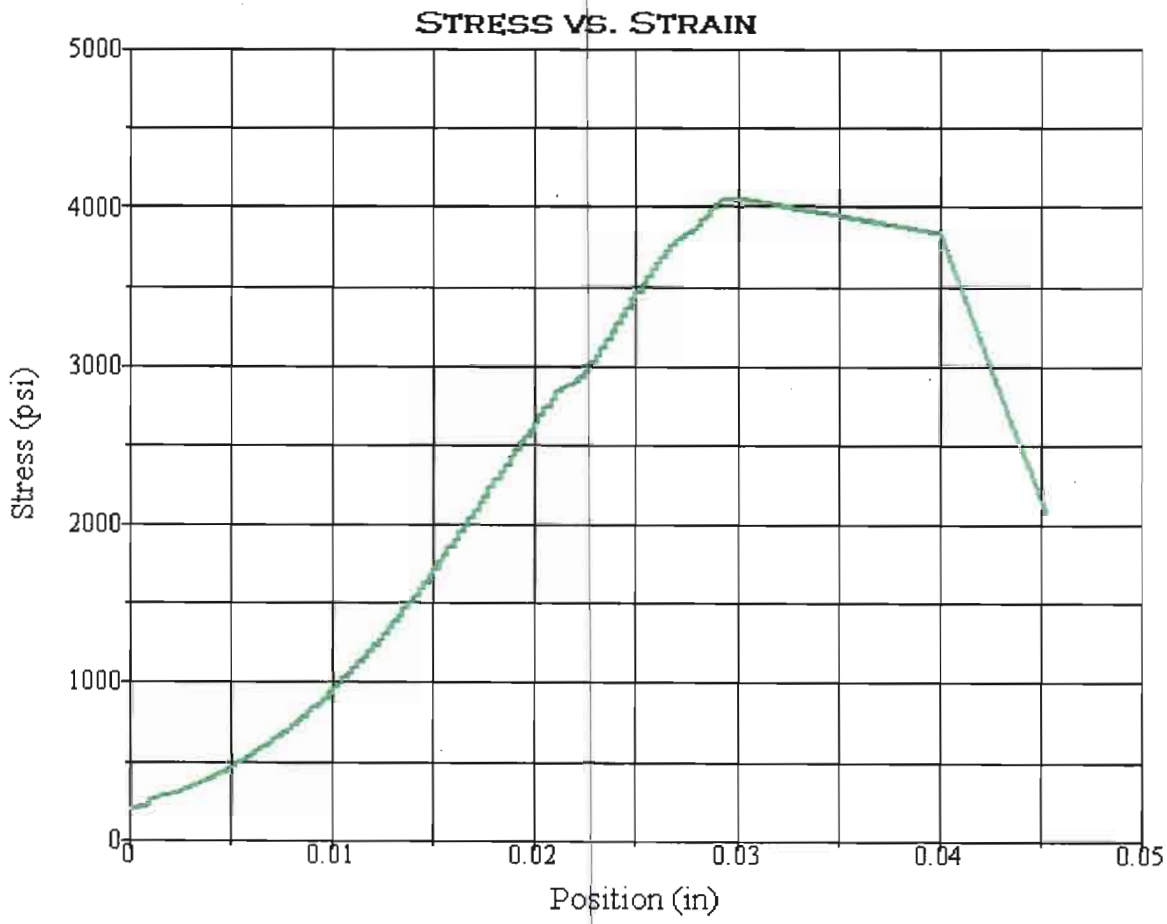


Test Summary

Counter:	956
Elapsed Time:	00:01:02
Operator:	AZM
Sample:	R10-003-15
Resident Engineer:	
GL#	11-012
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:36:59 PM
End Date:	3/24/2011
End Time:	4:38:01 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-053

Test Results

Specimen Gage Length:	5.4500 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	10917 lbf
Compressive Strength:	2433 psi

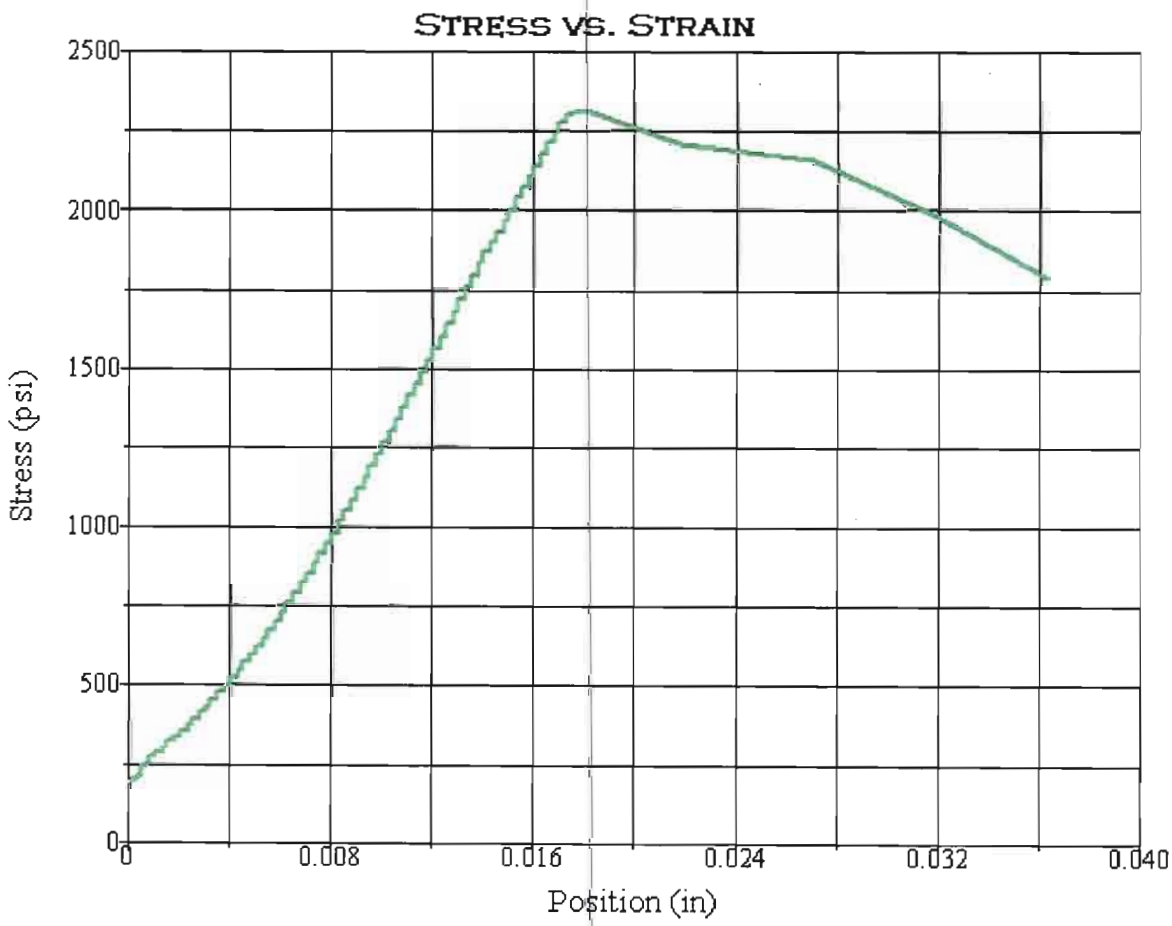


Test Summary

Counter:	1310
Elapsed Time:	00:01:49
Operator:	AZM
Sample:	R-11-004-12
Resident Engineer:	
Ticket:	GL # 11-057
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	11:31:56 AM
End Date:	7/14/2011
End Time:	11:33:45 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-160

Test Results

Specimen Gage Length:	4.9700 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	18492 lbf
Compressive Strength:	4054 psi



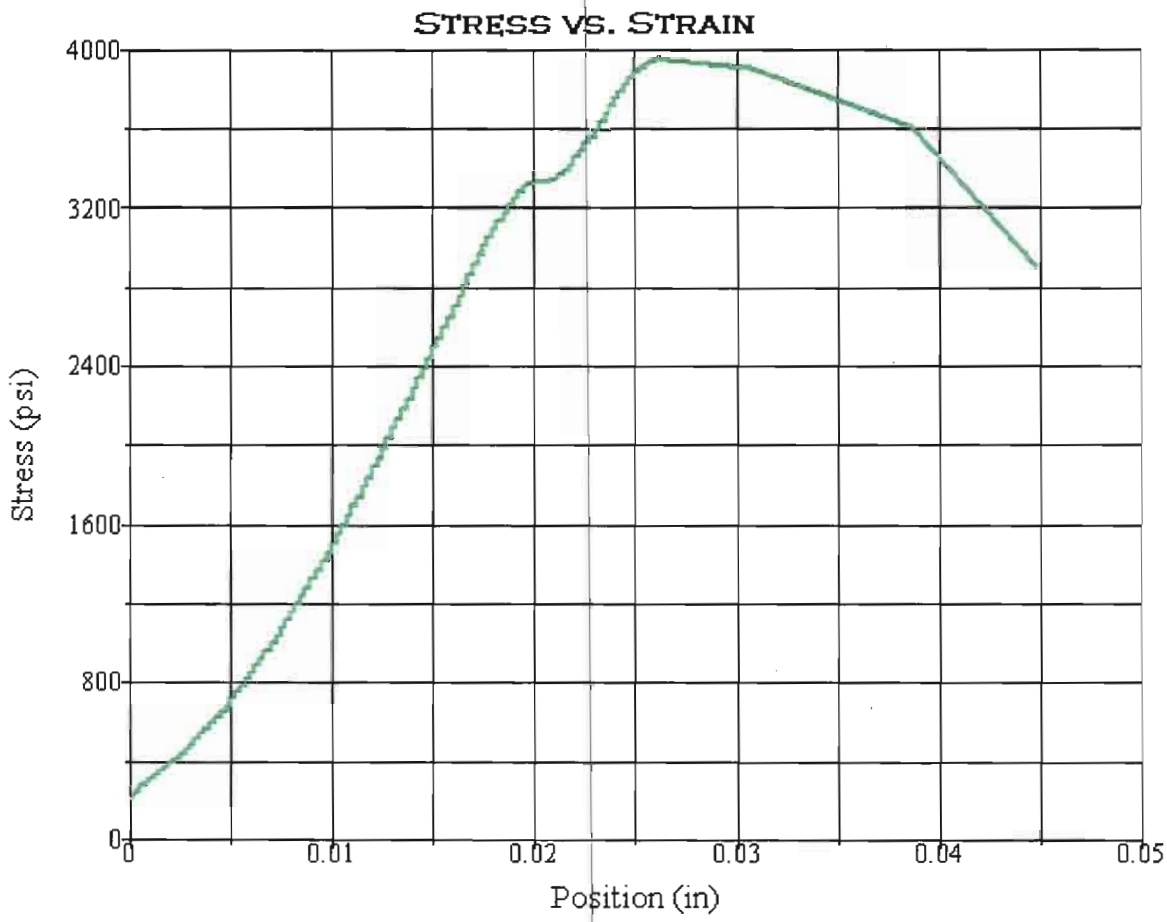
Test Summary

Counter:	1311
Elapsed Time:	00:01:00
Operator:	AZM
Sample:	R-11-004-13
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	11:41:18 AM
End Date:	7/14/2011
End Time:	11:42:18 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-161
NOTE:	L/D<2

SAMPLE FELL APART WHILE PREPARING

Test Results

Specimen Gage Length:	3.7100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10442 lbf
Compressive Strength:	2308 psi

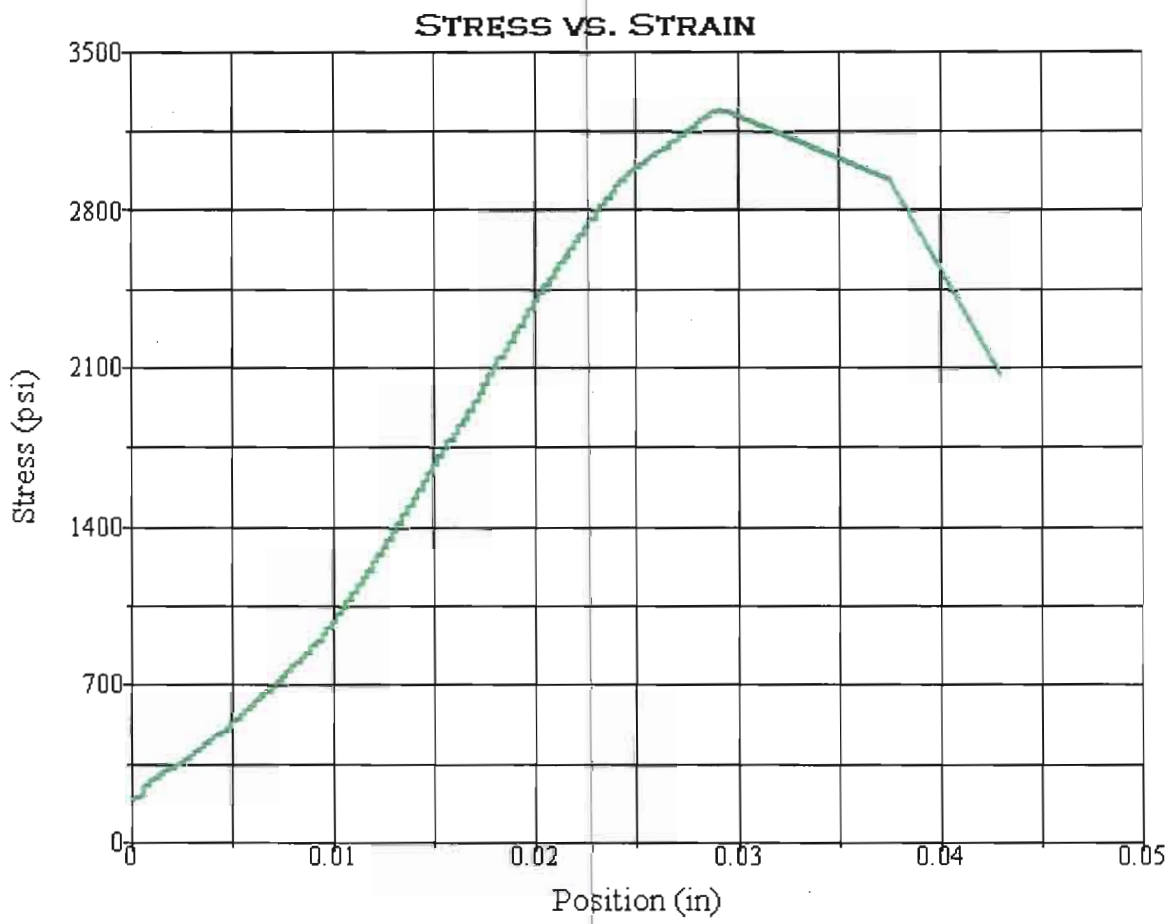


Test Summary

Counter:	1312
Elapsed Time:	00:01:46
Operator:	AZM
Sample:	R-11-004-14
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	11:49:23 AM
End Date:	7/14/2011
End Time:	11:51:09 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-162
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.3800 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	17602 lbf
Compressive Strength:	3957 psi

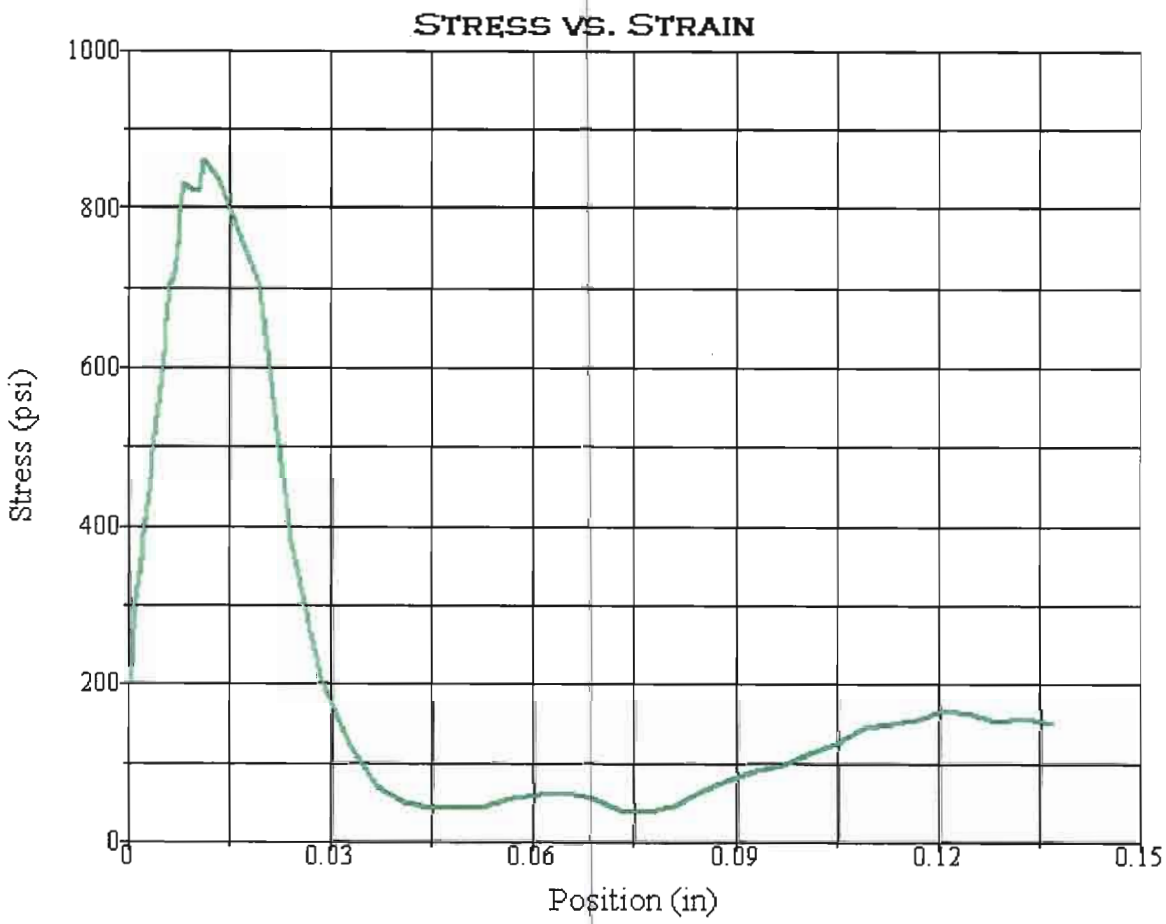


Test Summary

Counter:	1313
Elapsed Time:	00:01:26
Operator:	AZM
Sample:	R-11-004-15
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	12:00:00 PM
End Date:	7/14/2011
End Time:	12:01:26 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-163
NOTE:	L/D< 2

Test Results

Specimen Gage Length:	3.8900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	14688 lbf
Compressive Strength:	3247 psi

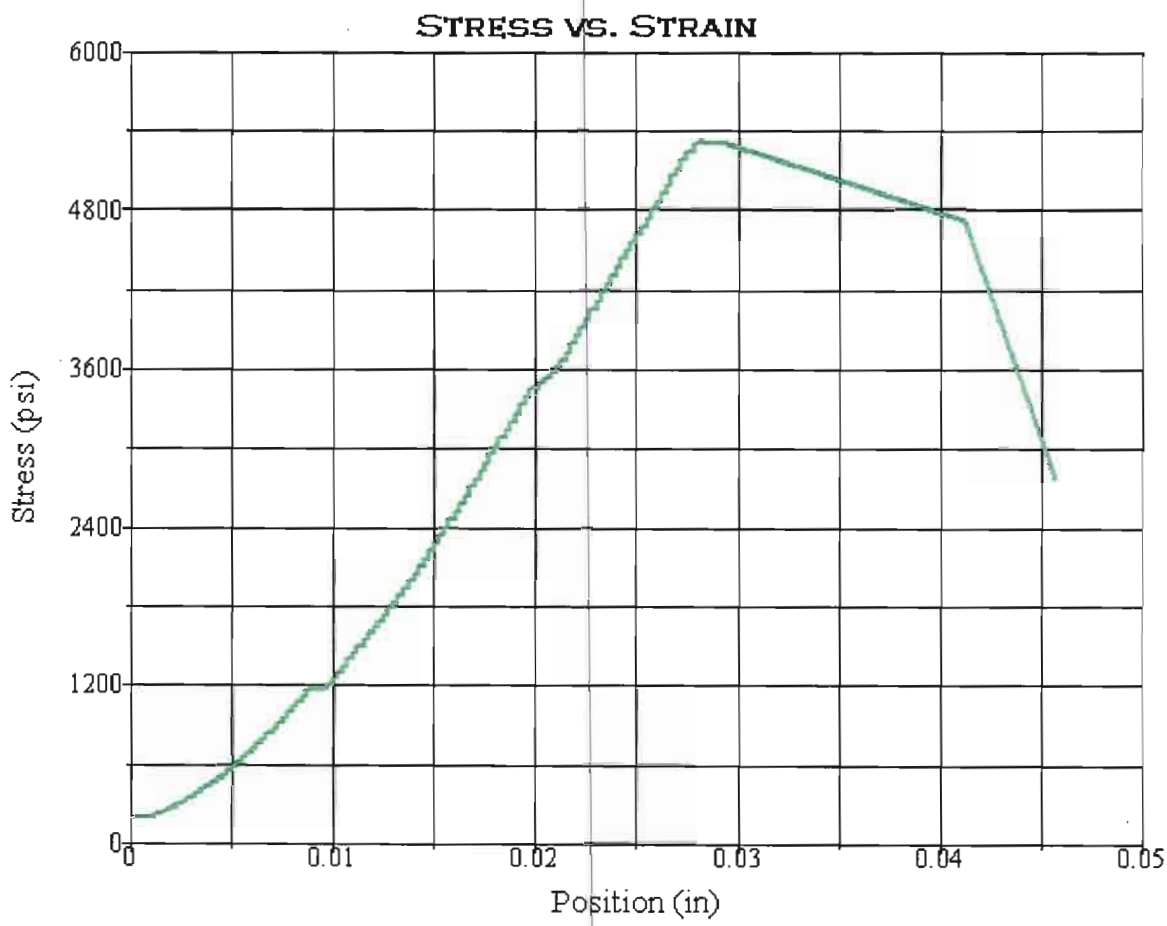


Test Summary

Counter:	0
Elapsed Time:	00:00:20
Operator:	AZM
Sample:	R-11-005-06
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	1:46:45 PM
End Date:	7/14/2011
End Time:	1:47:05 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-165

Test Results

Specimen Gage Length:	5.2700 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	3926 lbf
Compressive Strength:	861 psi

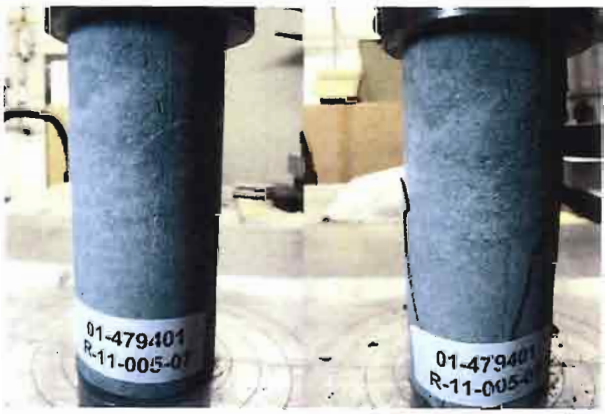


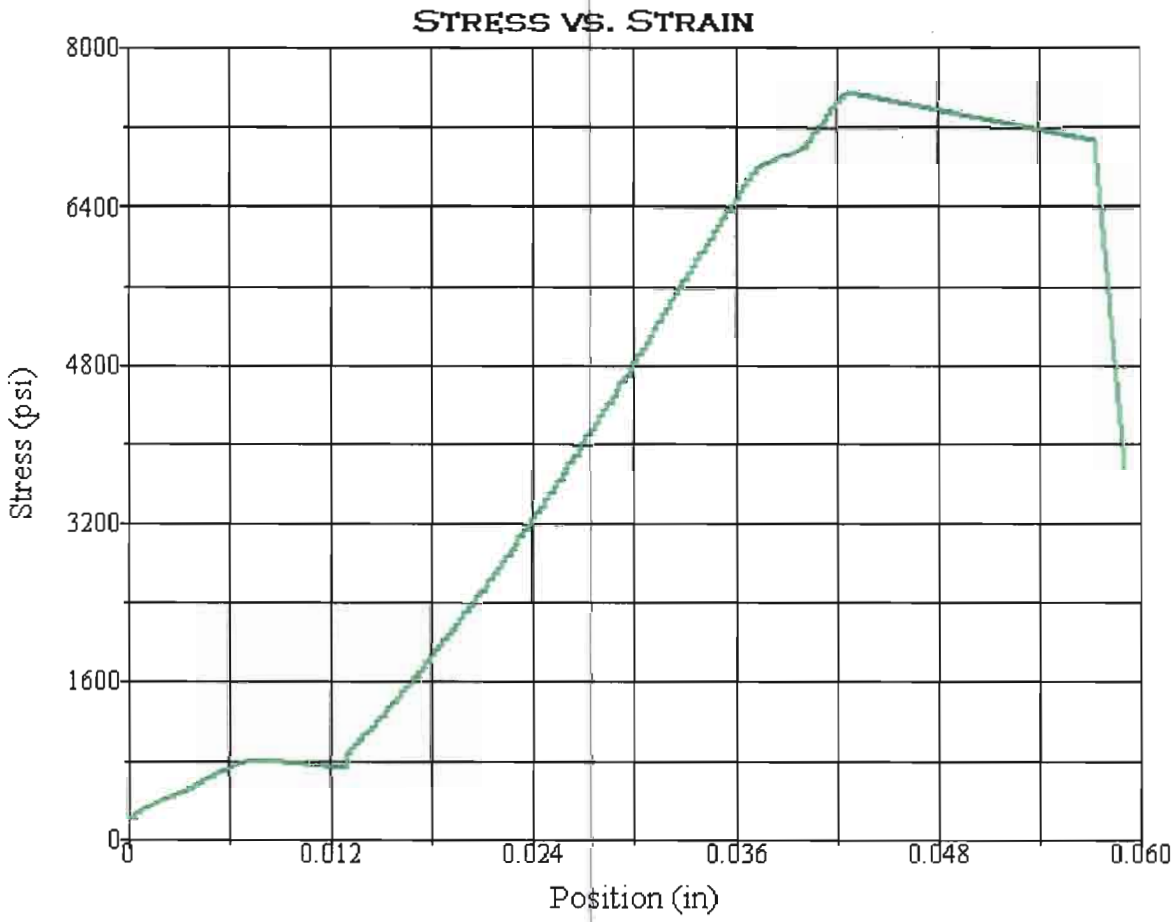
Test Summary

Counter:	1315
Elapsed Time:	00:02:27
Operator:	AZM
Sample:	R-11-005-07
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	1:52:53 PM
End Date:	7/14/2011
End Time:	1:55:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-166

Test Results

Specimen Gage Length:	5.3600 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	24217 lbf
Compressive Strength:	5309 psi



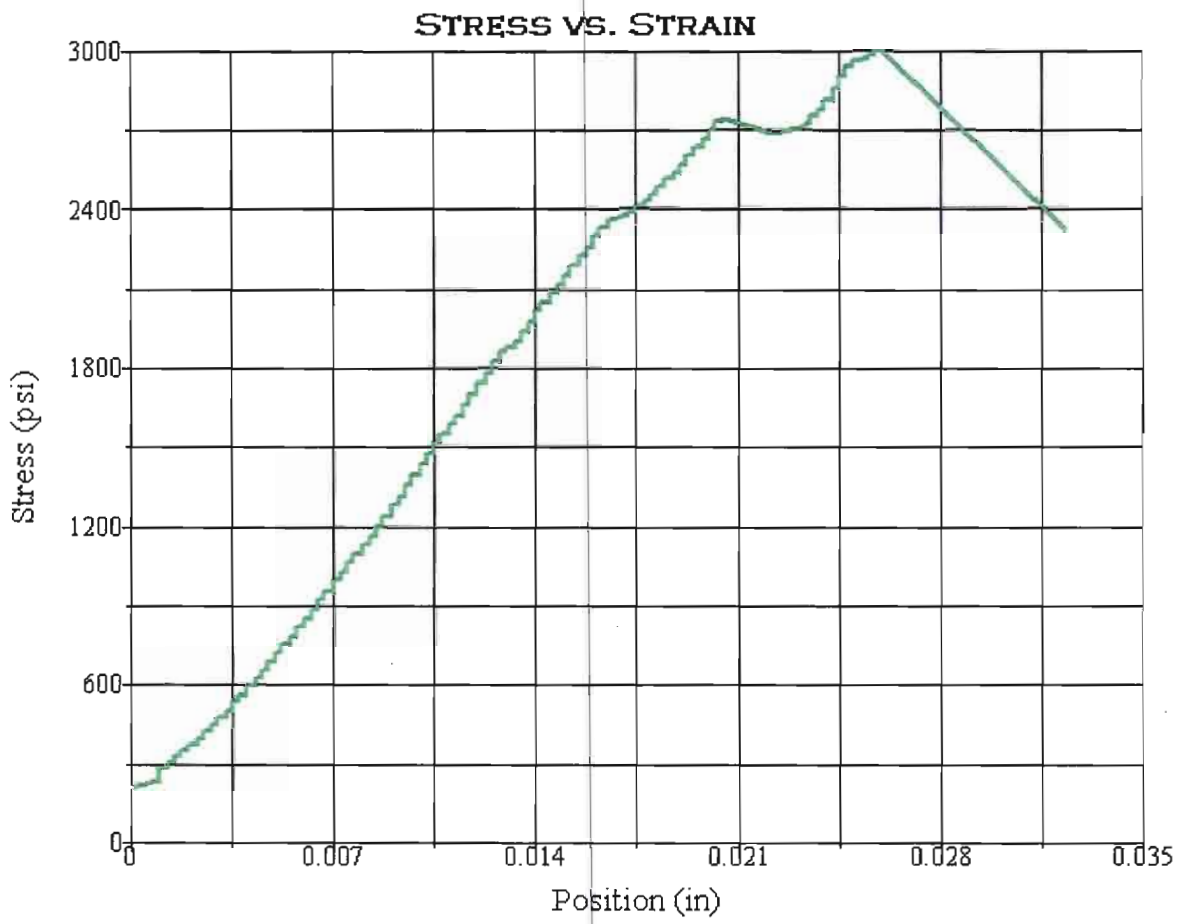


Test Summary

Counter:	1316
Elapsed Time:	00:03:28
Operator:	AZM
Sample:	R-11-005-09
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	2:08:42 PM
End Date:	7/14/2011
End Time:	2:12:10 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-167

Test Results

Specimen Gage Length:	5.3000 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	34442 lbf
Compressive Strength:	7550 psi

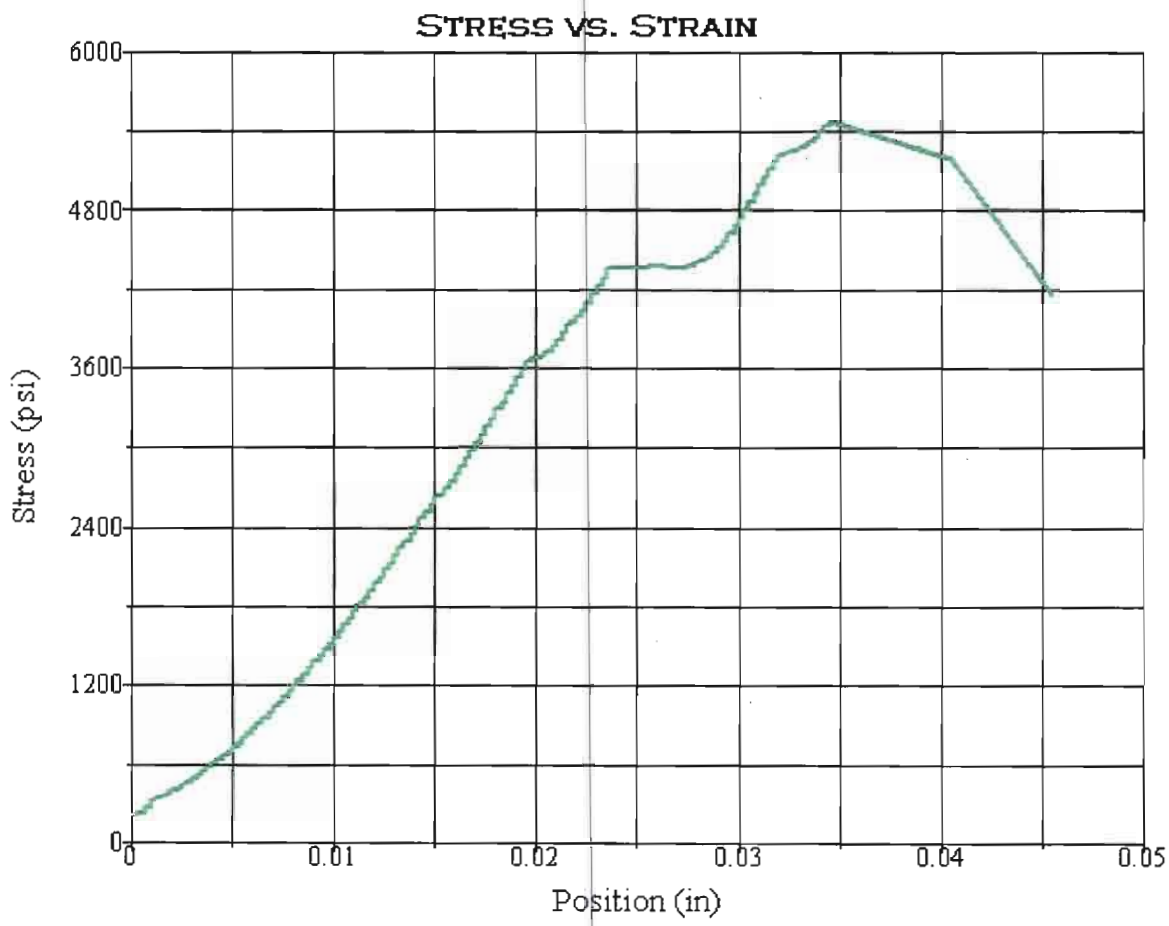


Test Summary

Counter:	1317
Elapsed Time:	00:01:18
Operator:	AZM
Sample:	R-11-005-10
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	2:21:03 PM
End Date:	7/14/2011
End Time:	2:22:21 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-168

Test Results

Specimen Gage Length:	5.5500 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	13665 lbf
Compressive Strength:	2996 psi

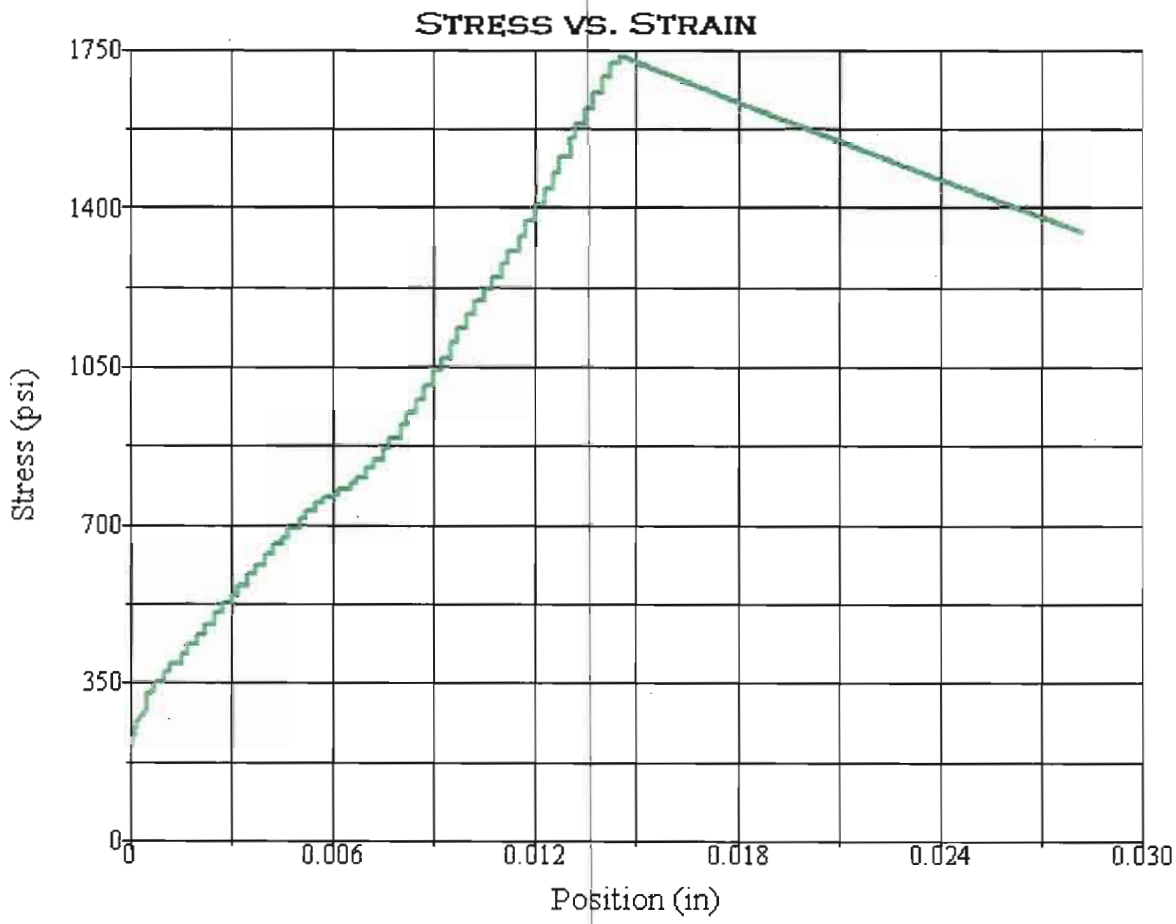


Test Summary

Counter:	1318
Elapsed Time:	00:02:28
Operator:	AZM
Sample:	R-11-005-11
Resident Engineer:	
Ticket:	GL # 11-057
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	2:32:21 PM
End Date:	7/14/2011
End Time:	2:34:49 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-169

Test Results

Specimen Gage Length:	5.5700 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	24938 lbf
Compressive Strength:	5467 psi

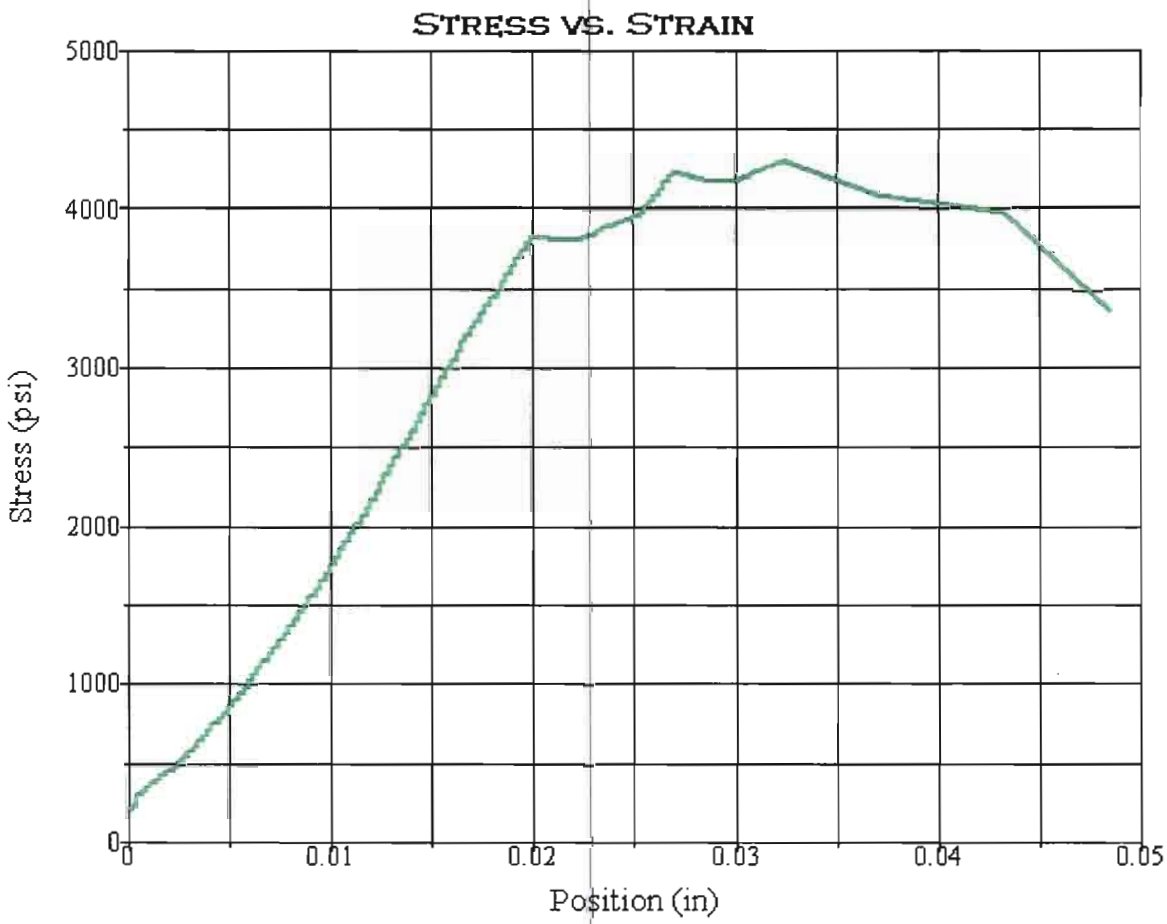


Test Summary

Counter:	1319
Elapsed Time:	00:00:41
Operator:	AZM
Sample:	R-11-005-15
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	3:57:39 PM
End Date:	7/14/2011
End Time:	3:58:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-170
NOTE:	L/D<2

Test Results

Specimen Gage Length:	3.9400 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	7909 lbf
Compressive Strength:	1734 psi

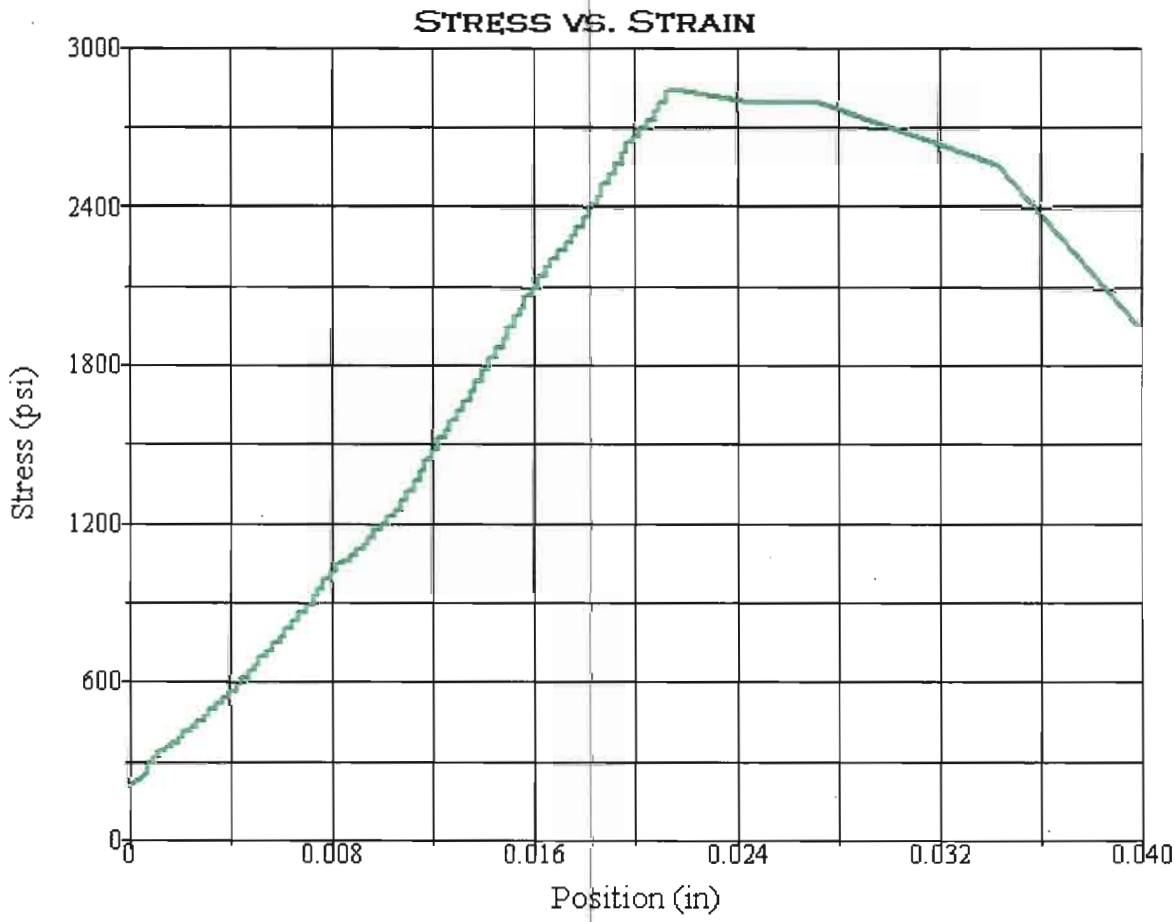


Test Summary

Counter:	1320
Elapsed Time:	00:01:55
Operator:	AZM
Sample:	R-11-005-21
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	11:12:53 AM
End Date:	7/18/2011
End Time:	11:14:48 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-171

Test Results

Specimen Gage Length:	5.4700 in
Diameter:	2.4300 in
Area:	4.6377 in²
Maximum Load:	19941 lbf
Compressive Strength:	4300 psi

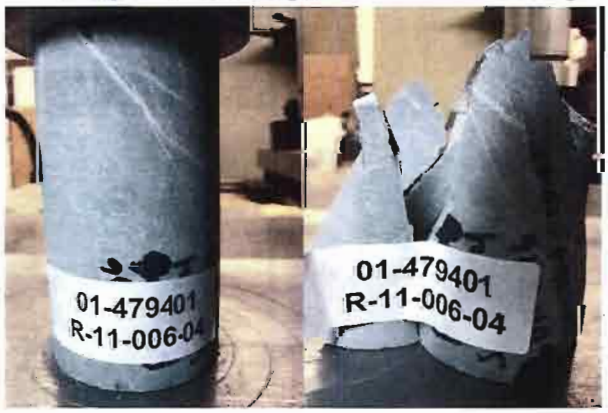


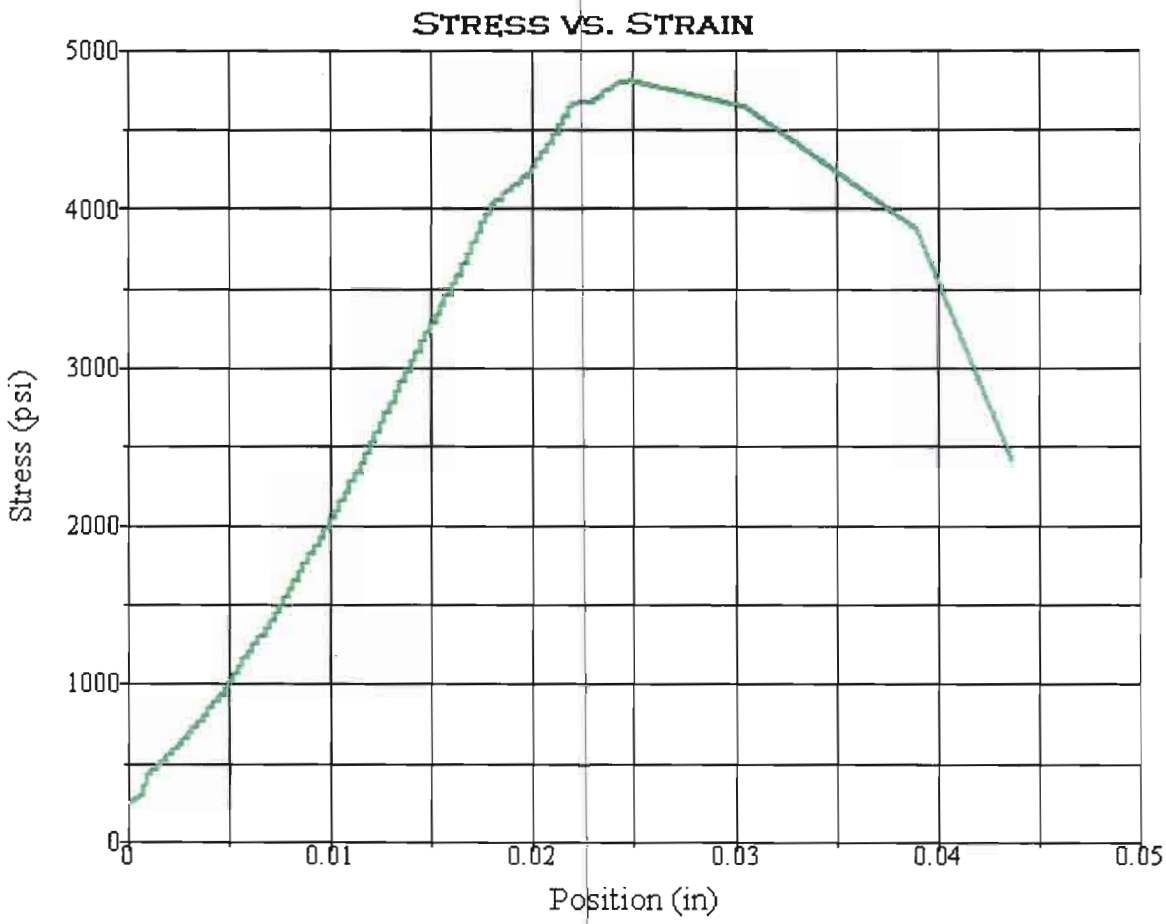
Test Summary

Counter:	1321
Elapsed Time:	00:01:15
Operator:	AZM
Sample:	R-11-006-04
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	11:23:23 AM
End Date:	7/18/2011
End Time:	11:24:38 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-172
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.1300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12897 lbf
Compressive Strength:	2851 psi



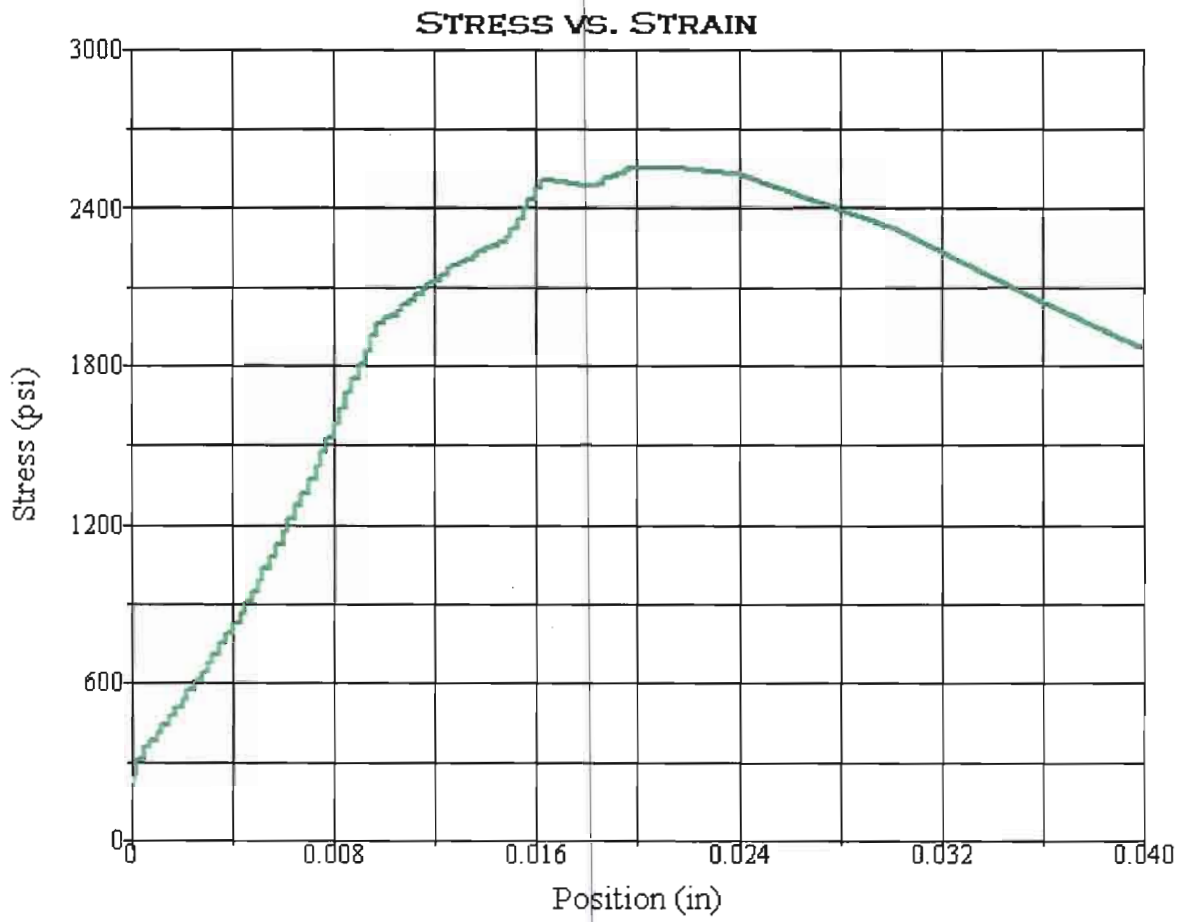


Test Summary

Counter:	1322
Elapsed Time:	00:02:07
Operator:	AZM
Sample:	R-11-006-08
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	11:44:58 AM
End Date:	7/18/2011
End Time:	11:47:05 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-174

Test Results

Specimen Gage Length:	5.6600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21755 lbf
Compressive Strength:	4809 psi

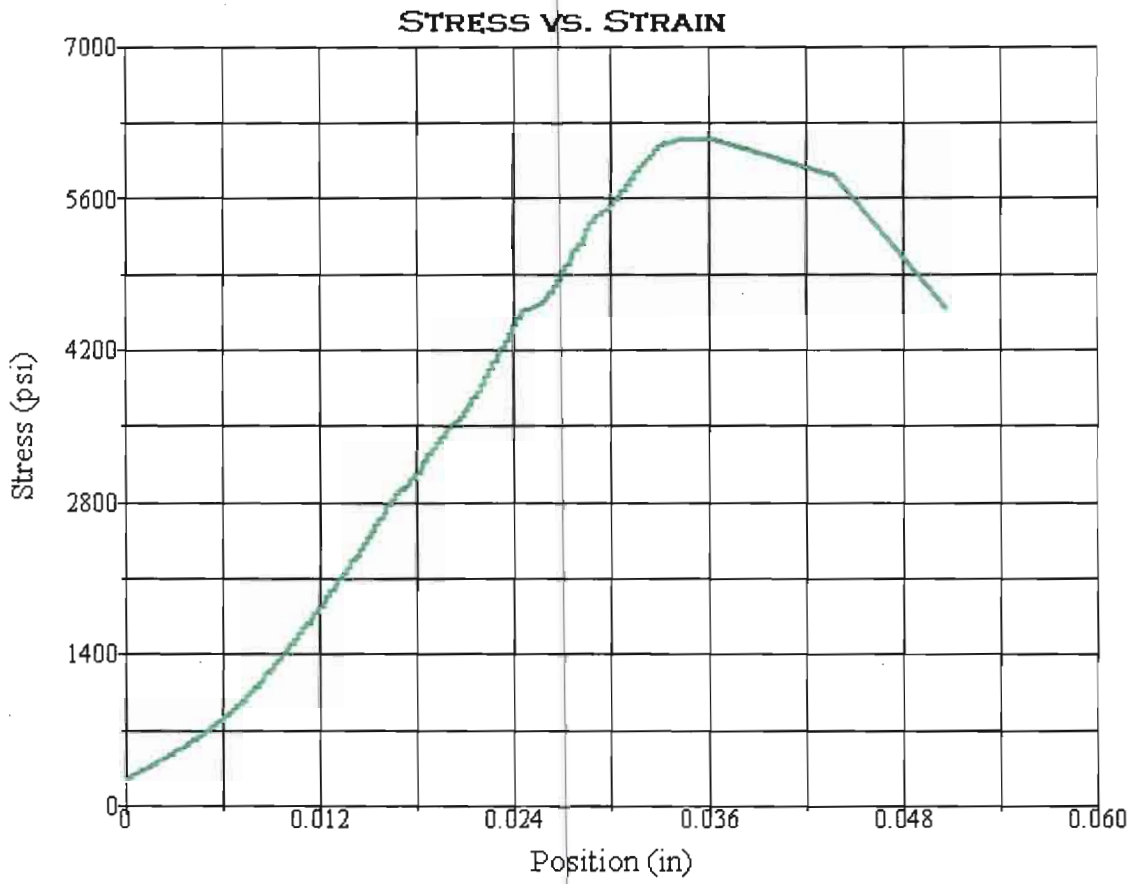


Test Summary

Counter:	1323
Elapsed Time:	00:01:04
Operator:	AZM
Sample:	R-11-006-08A
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	12:07:49 PM
End Date:	7/18/2011
End Time:	12:08:53 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-175

Test Results

Specimen Gage Length:	5.5500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11566 lbf
Compressive Strength:	2557 psi

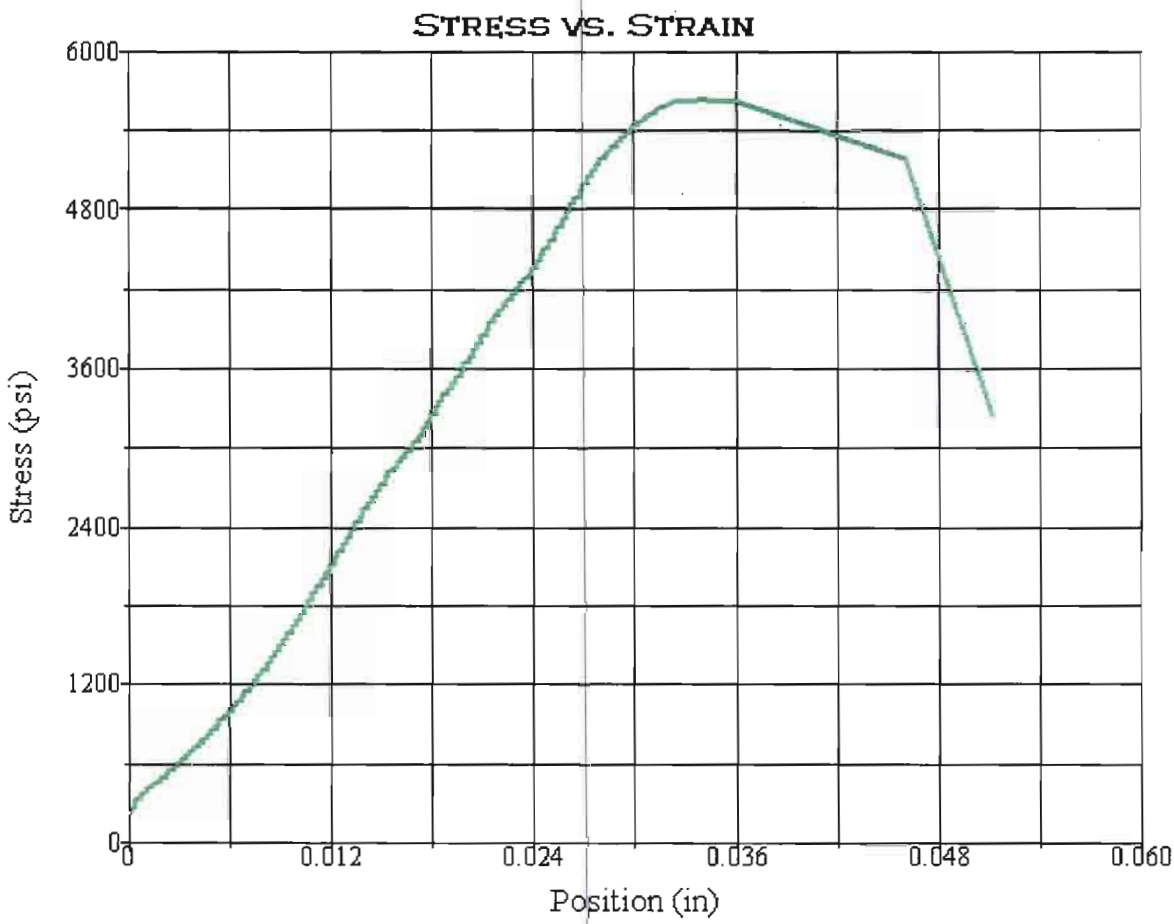


Test Summary

Counter:	1327
Elapsed Time:	00:02:48
Operator:	AZM
Sample:	R-11-006-09A
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:10:56 PM
End Date:	7/18/2011
End Time:	2:13:44 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-177
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.1200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	27837 lbf
Compressive Strength:	6153 psi

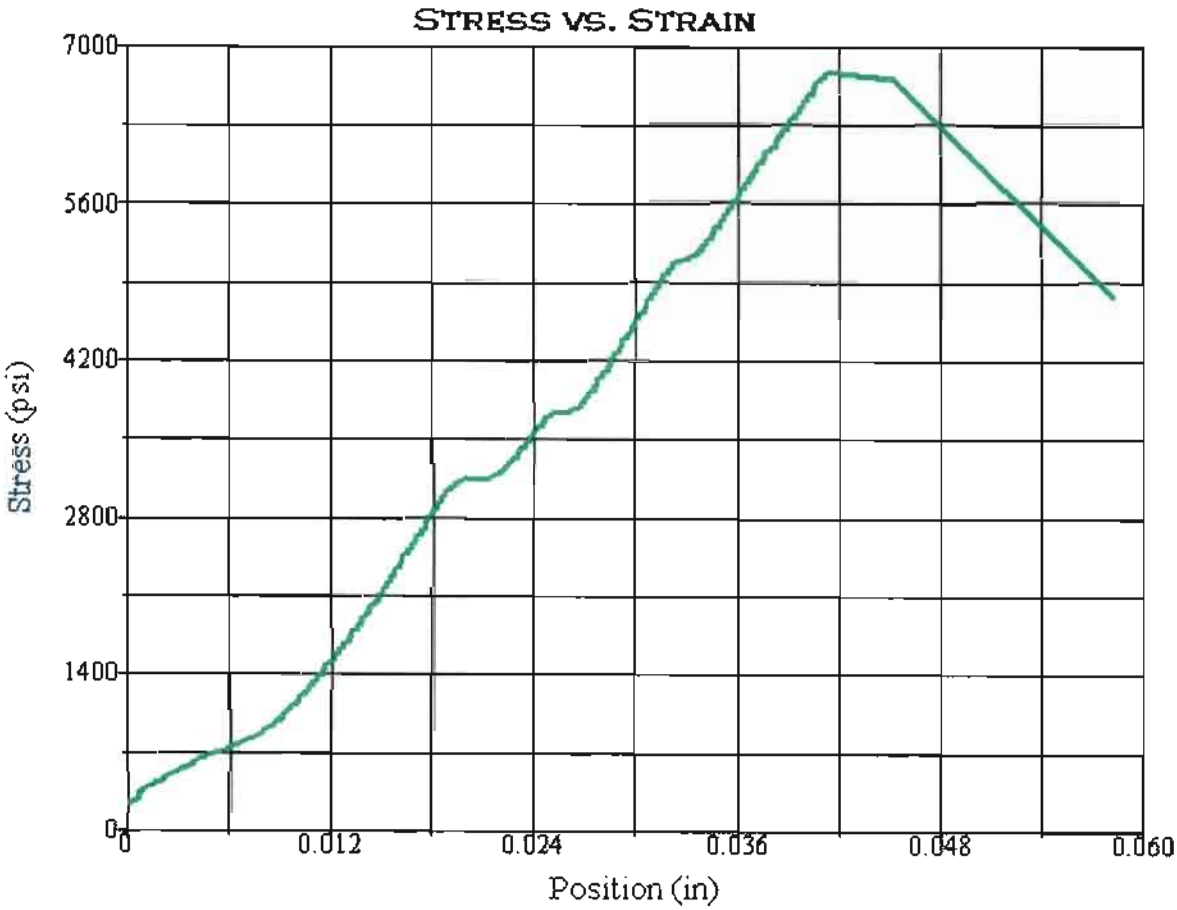


Test Summary

Counter:	1328
Elapsed Time:	00:02:32
Operator:	AZM
Sample:	R-11-006-10
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:20:15 PM
End Date:	7/18/2011
End Time:	2:22:47 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-178
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.6500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25475 lbf
Compressive Strength:	5631 psi

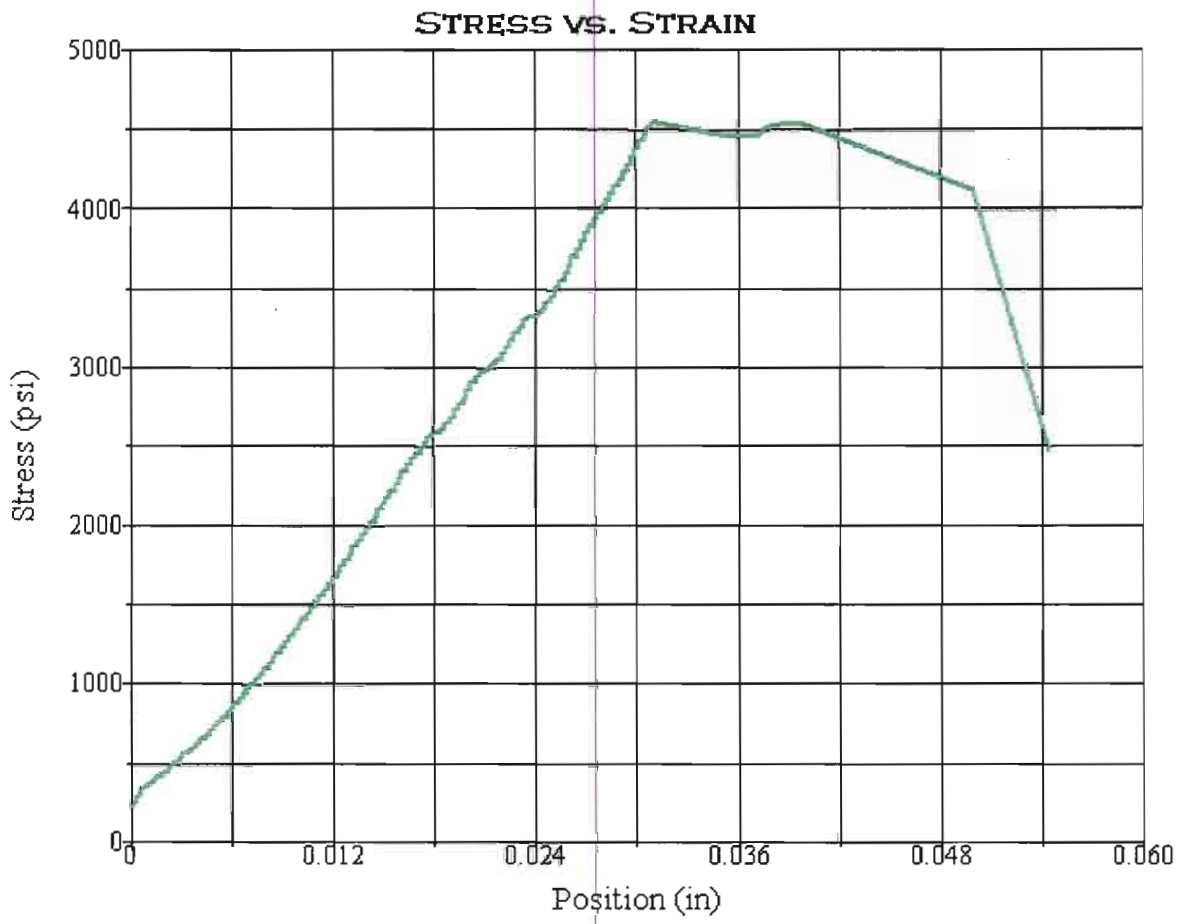


Test Summary

Counter:	1329
Elapsed Time:	00:03:04
Operator:	AZM
Sample:	R-11-006-11
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:34:10 PM
End Date:	7/18/2011
End Time:	2:37:14 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-179

Test Results

Specimen Gage Length:	5.2800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	30552 lbf
Compressive Strength:	6753 psi

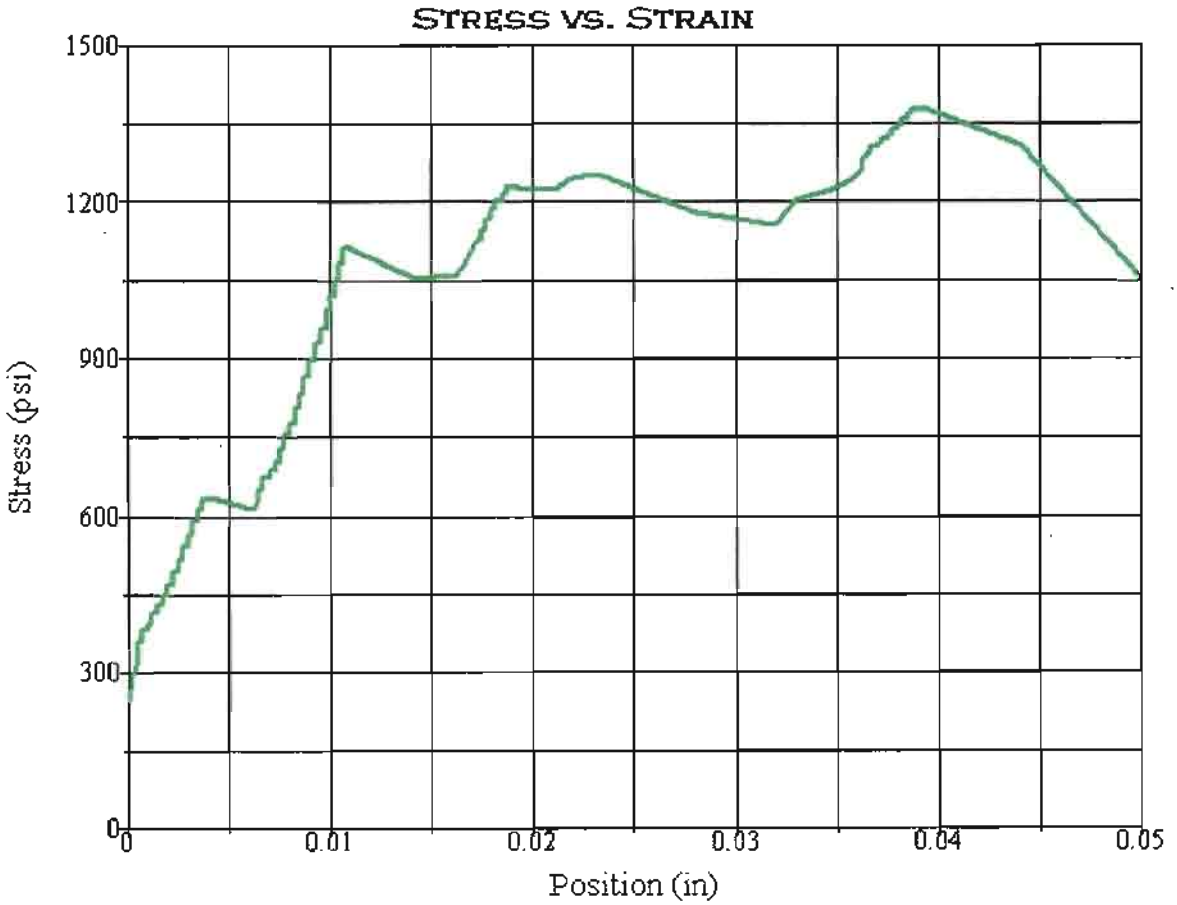


Test Summary

Counter:	1330
Elapsed Time:	00:02:01
Operator:	AZM
Sample:	R-11-006-12
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:46:31 PM
End Date:	7/18/2011
End Time:	2:48:32 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-180

Test Results

Specimen Gage Length:	5.5300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	20598 lbf
Compressive Strength:	4553 psi

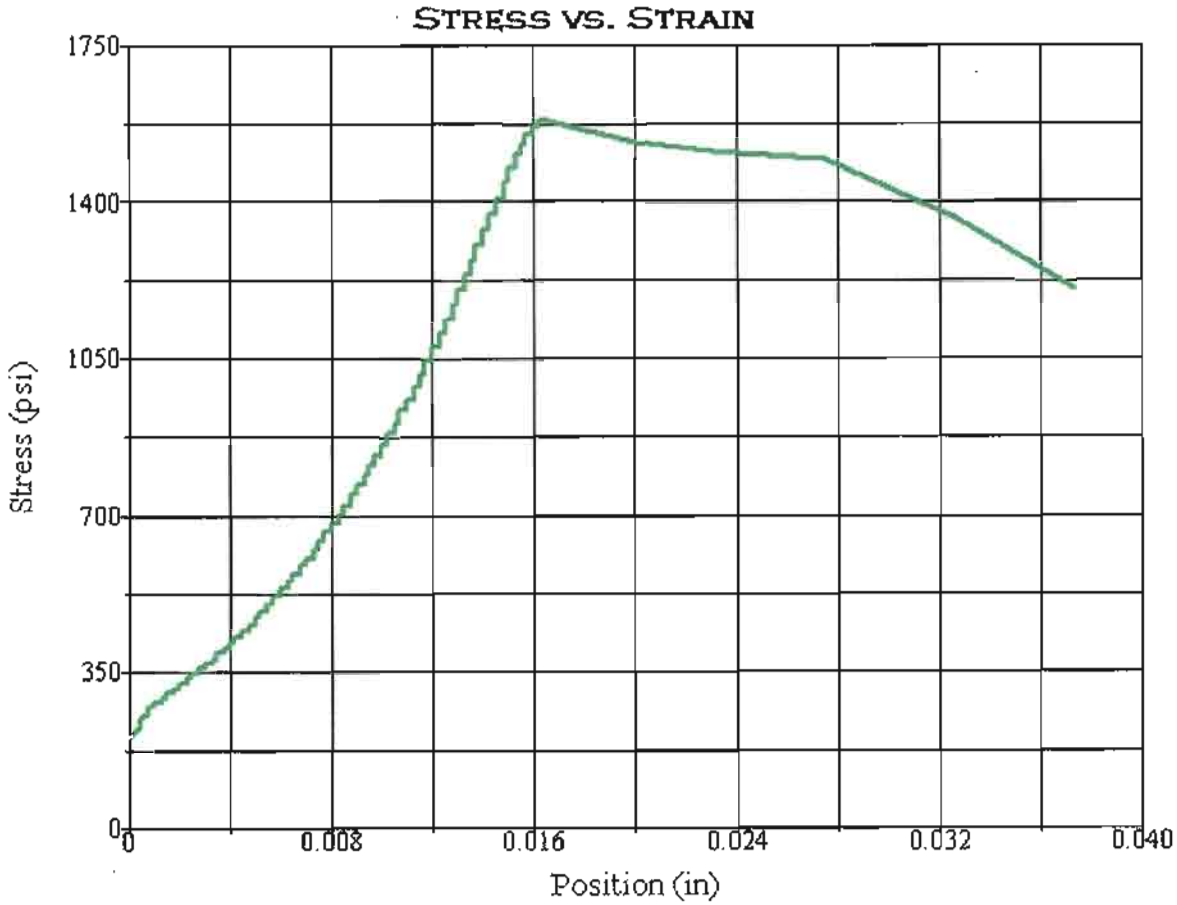


Test Summary

Counter:	1437
Elapsed Time:	00:00:30
Operator:	AZM
Sample:	R11-007-06
Resident Engineer:	
Ticket:	GL# 11-067
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:02:20 PM
End Date:	8/22/2011
End Time:	3:02:50 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-245
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.3500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6244 lbf
Compressive Strength:	1380 psi

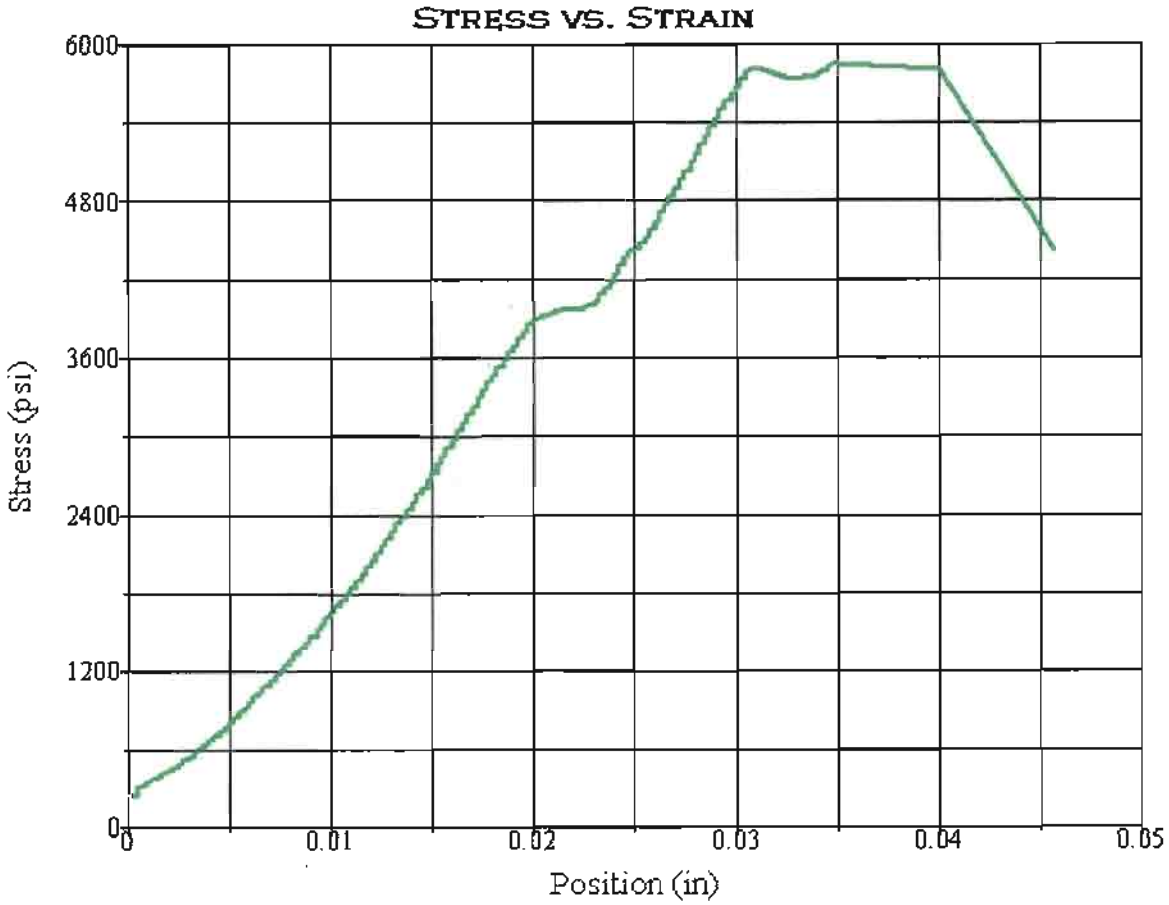


Test Summary

Counter:	1438
Elapsed Time:	00:00:39
Operator:	AZM
Sample:	R11-007-07A
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:15:45 PM
End Date:	8/22/2011
End Time:	3:16:24 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-246
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.0000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	7167 lbf
Compressive Strength:	1584 psi

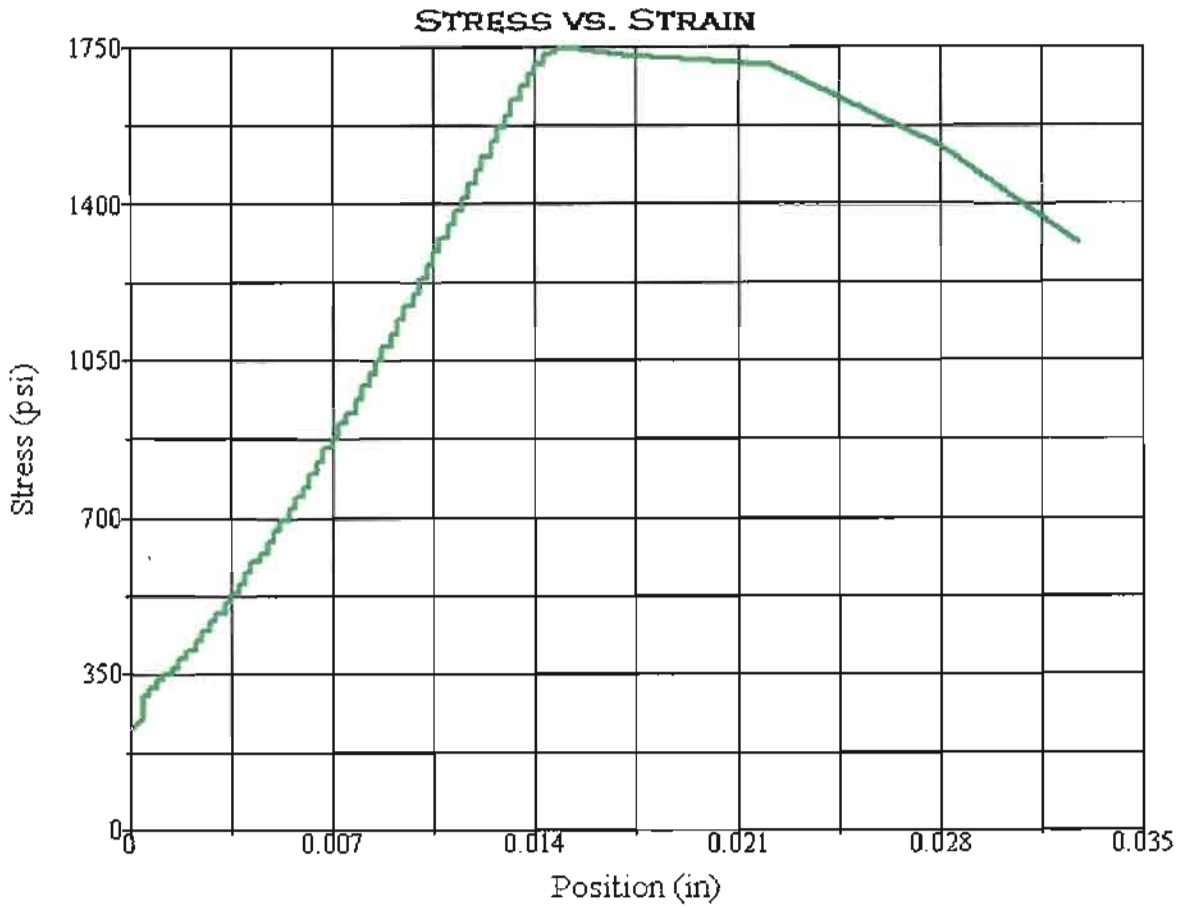


Test Summary

Counter:	1439
Elapsed Time:	00:02:39
Operator:	AZM
Sample:	R11-008-03
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:21:16 PM
End Date:	8/22/2011
End Time:	3:23:55 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-247
RATIO	L/D<2

Test Results

Specimen Gage Length:	3.4900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	26448 lbf
Compressive Strength:	5846 psi

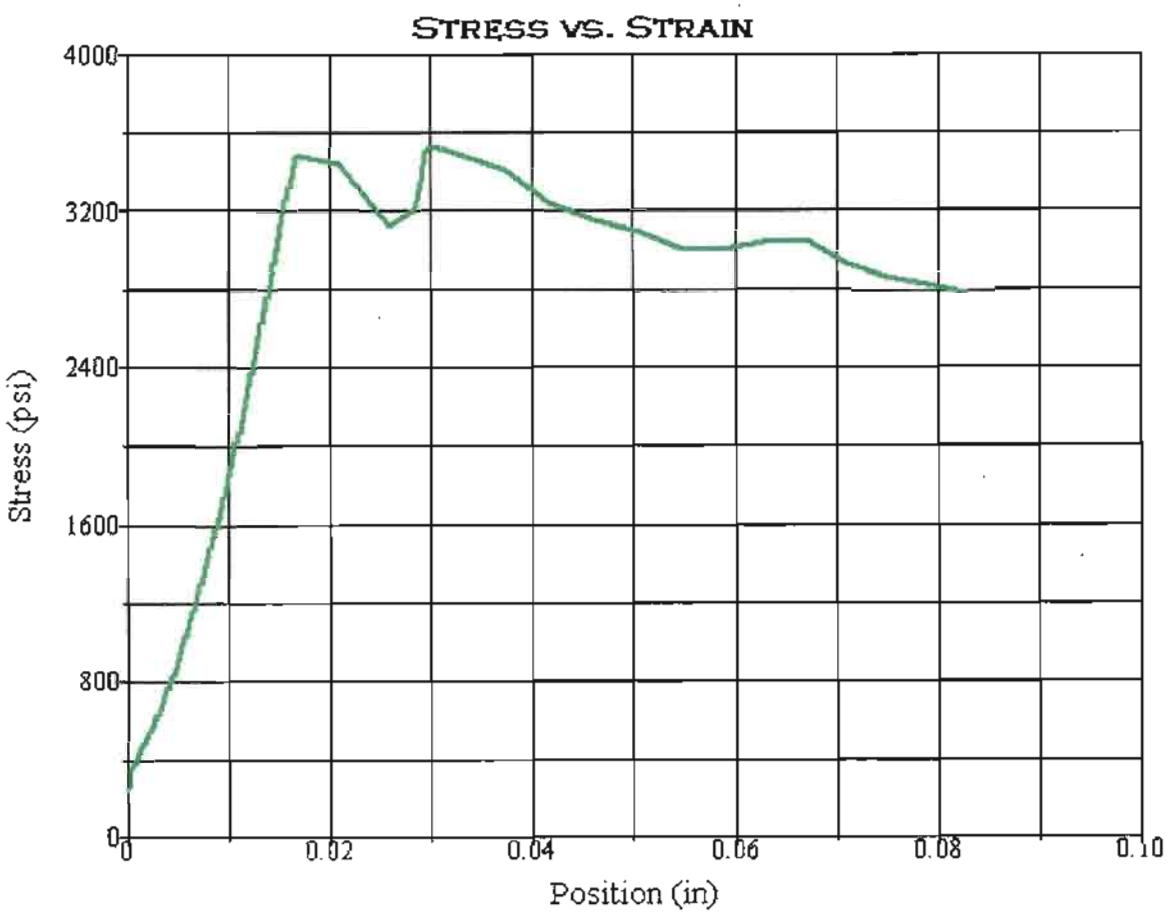


Test Summary

Counter:	1440
Elapsed Time:	00:00:43
Operator:	AZM
Sample:	R11-008-04
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:30:58 PM
End Date:	8/22/2011
End Time:	3:31:41 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-249
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.6900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	7892 lbf
Compressive Strength:	1745 psi



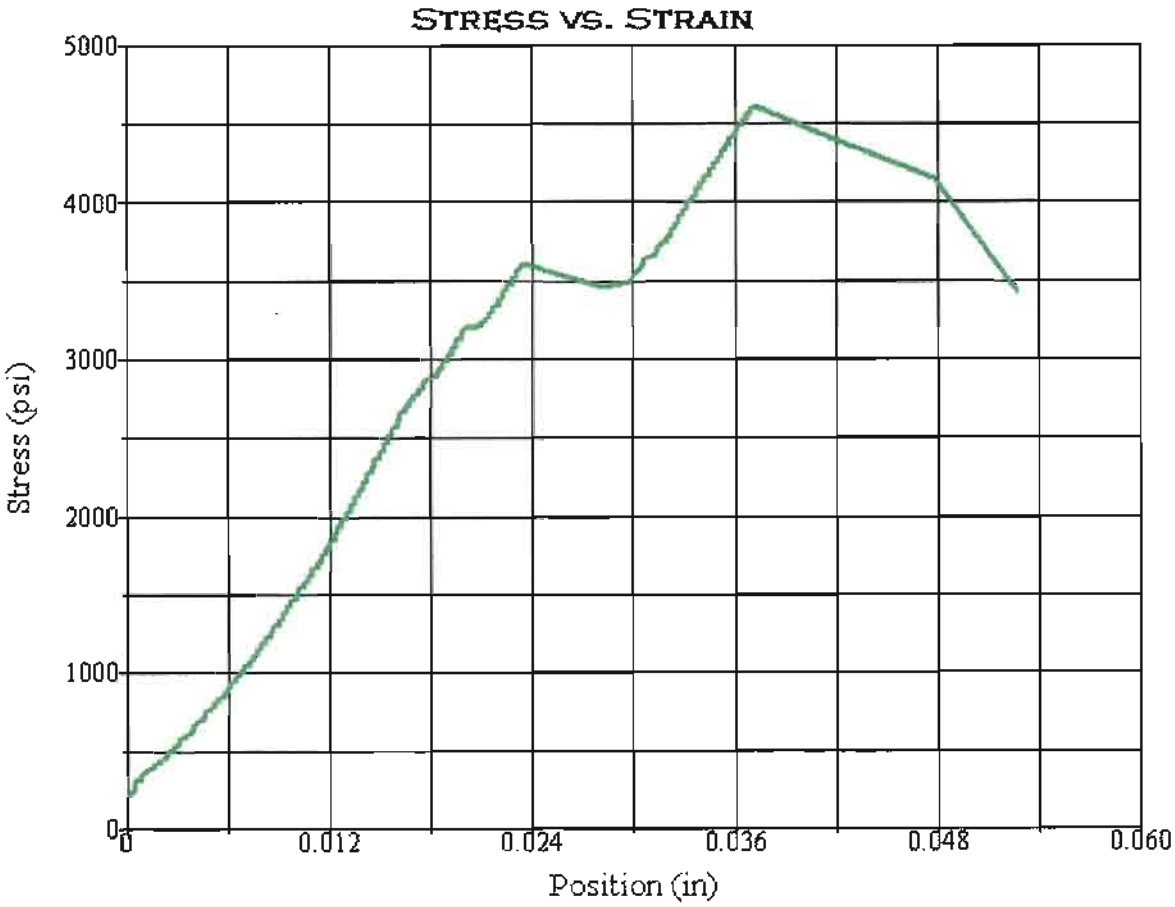
Test Summary

Counter:	1441
Elapsed Time:	00:01:33
Operator:	AZM
Sample:	R11-008-05
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:39:34 PM
End Date:	8/22/2011
End Time:	3:41:07 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-250

RATIO:

Test Results

Specimen Gage Length:	4.9200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	15960 lbf
Compressive Strength:	3528 psi

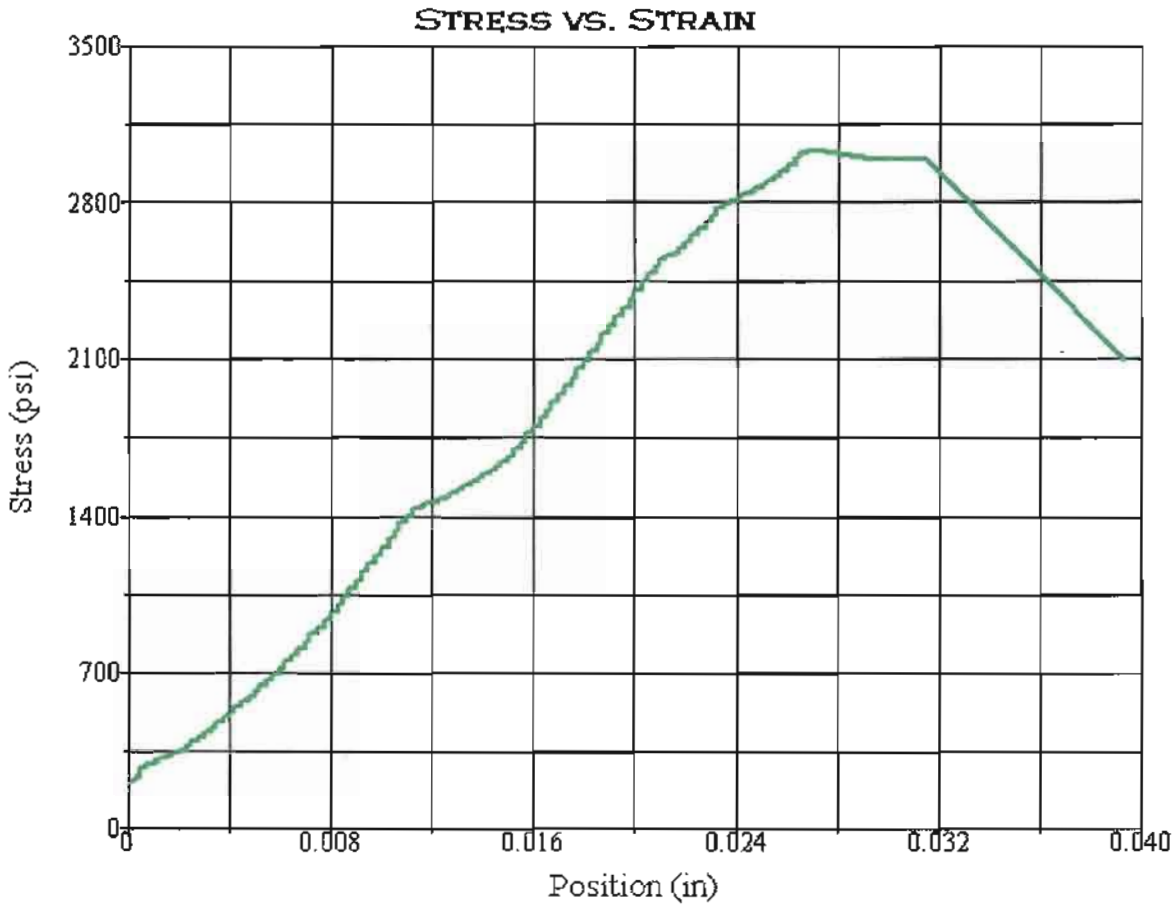


Test Summary

Counter:	1442
Elapsed Time:	00:02:03
Operator:	AZM
Sample:	R11-008-06
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:47:11 PM
End Date:	8/22/2011
End Time:	3:49:14 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-251
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.5600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	20855 lbf
Compressive Strength:	4610 psi

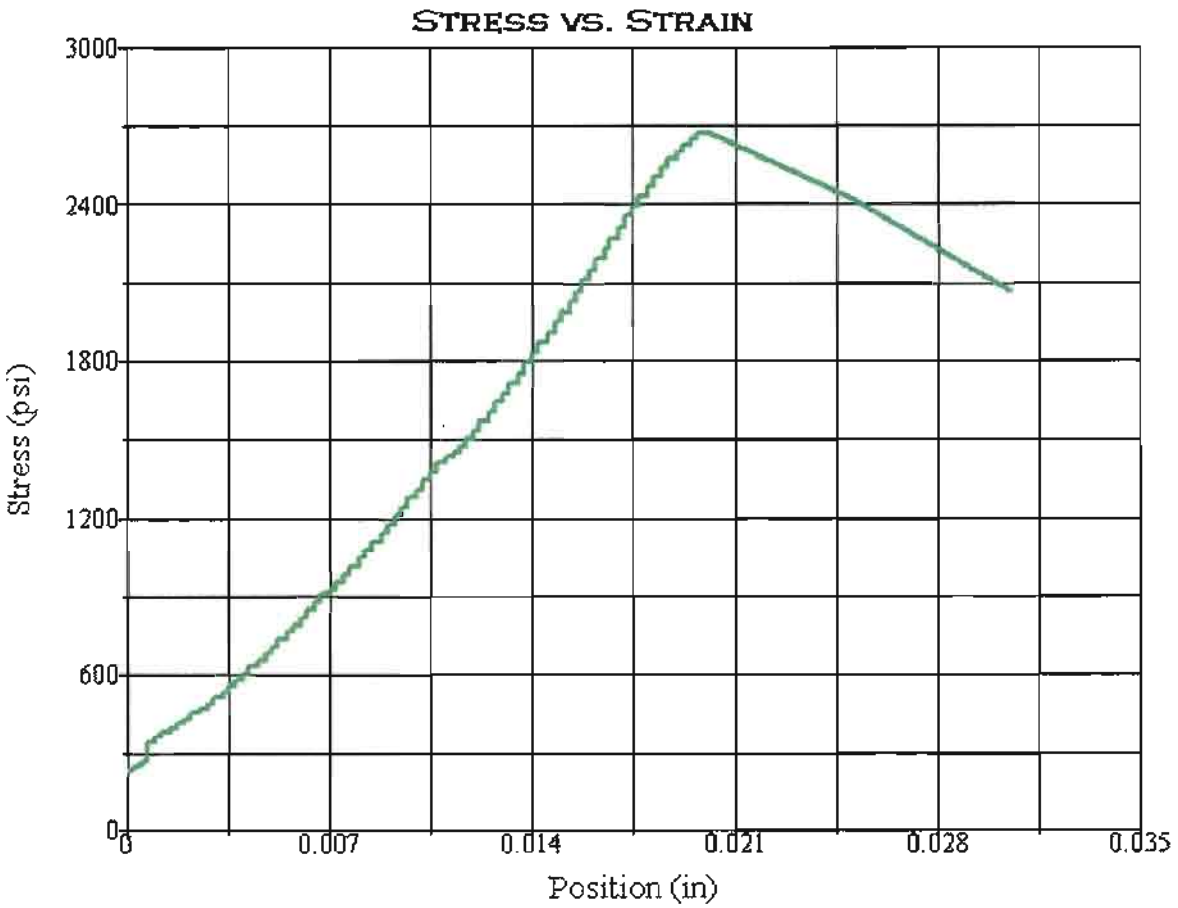


Test Summary

Counter:	1443
Elapsed Time:	00:01:20
Operator:	AZM
Sample:	R11-008-07
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:54:53 PM
End Date:	8/22/2011
End Time:	3:56:13 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-252

Test Results

Specimen Gage Length:	5.3500 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	13610 lbf
Compressive Strength:	3034 psi

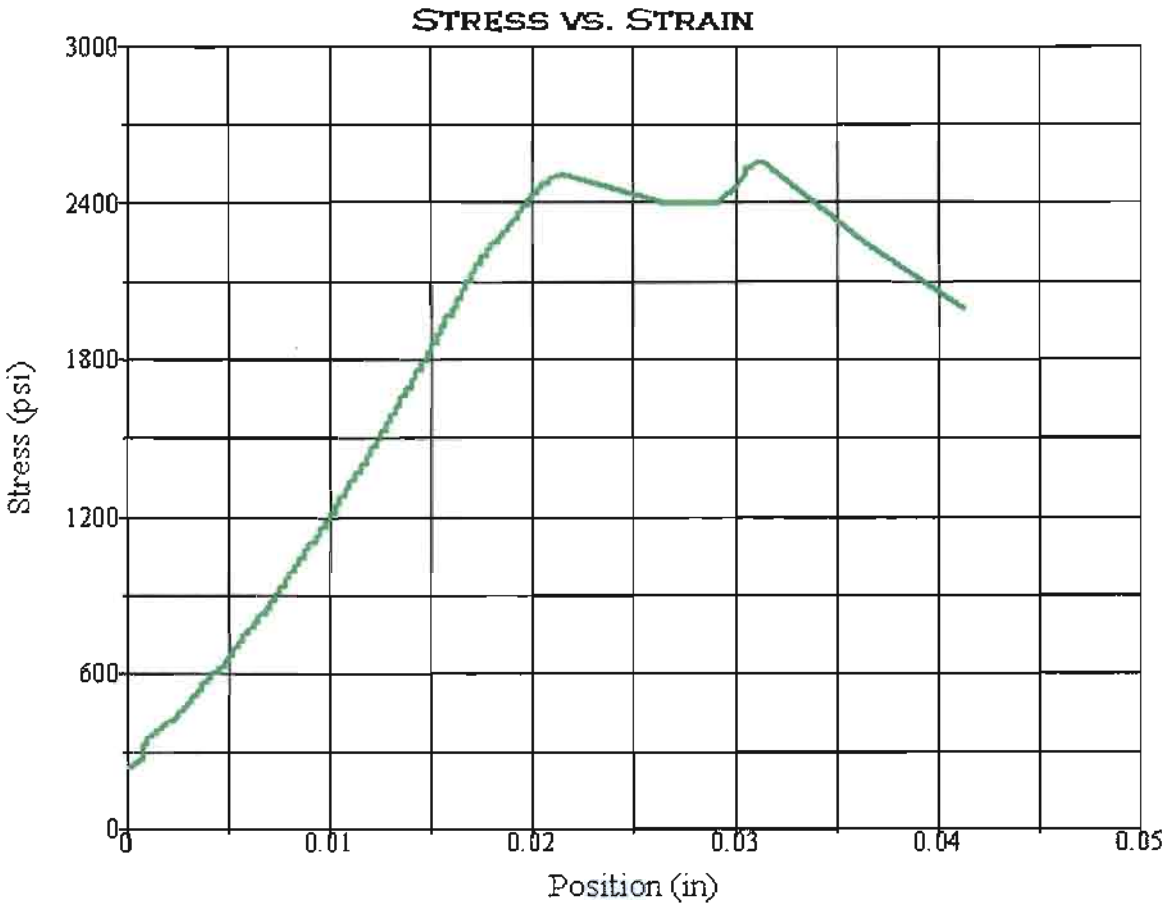


Test Summary

Counter:	1444
Elapsed Time:	00:01:07
Operator:	AZM
Sample:	R11-008-08
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:03:59 PM
End Date:	8/22/2011
End Time:	4:05:06 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-253

Test Results

Specimen Gage Length:	4.8800 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	11900 lbf
Compressive Strength:	2675 psi

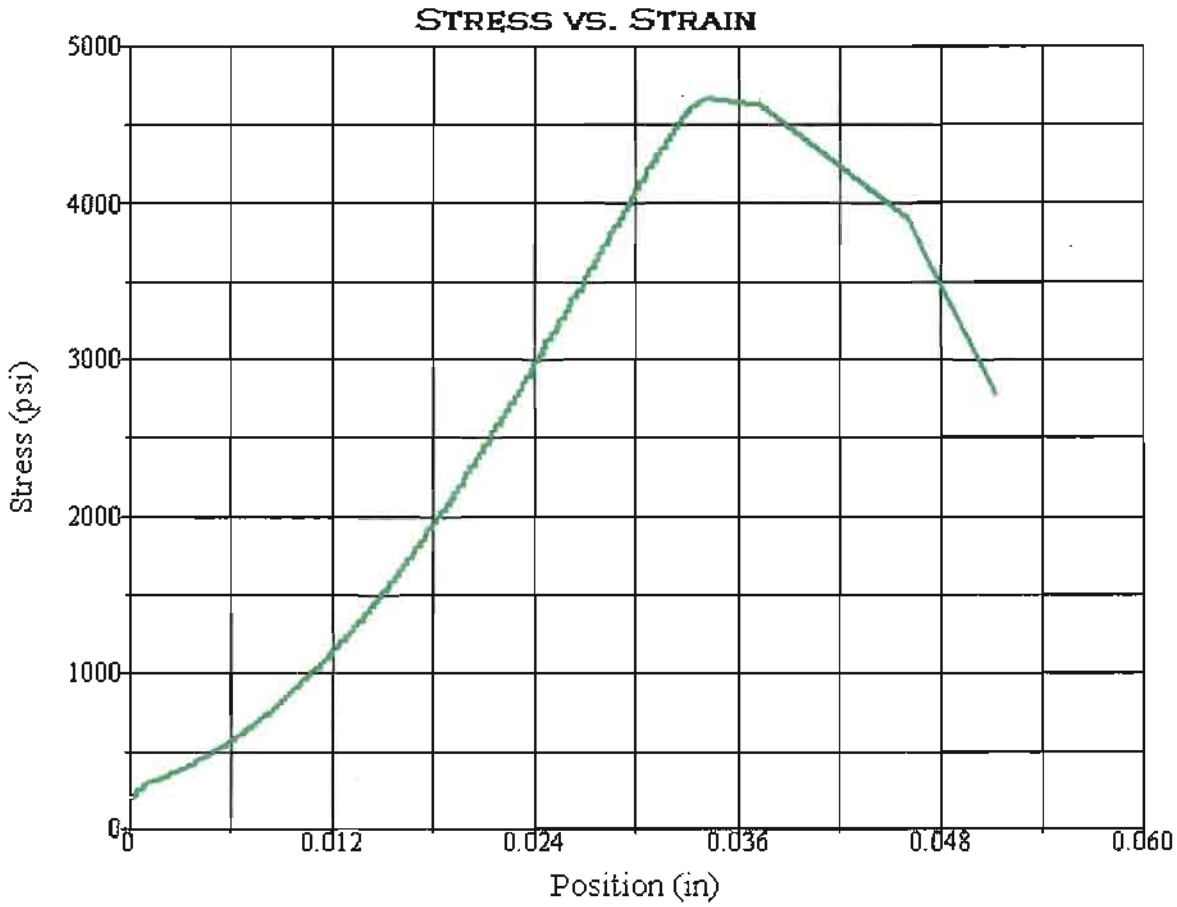


Test Summary

Counter:	1445
Elapsed Time:	00:01:04
Operator:	AZM
Sample:	R11-008-09
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:11:28 PM
End Date:	8/22/2011
End Time:	4:12:32 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-254

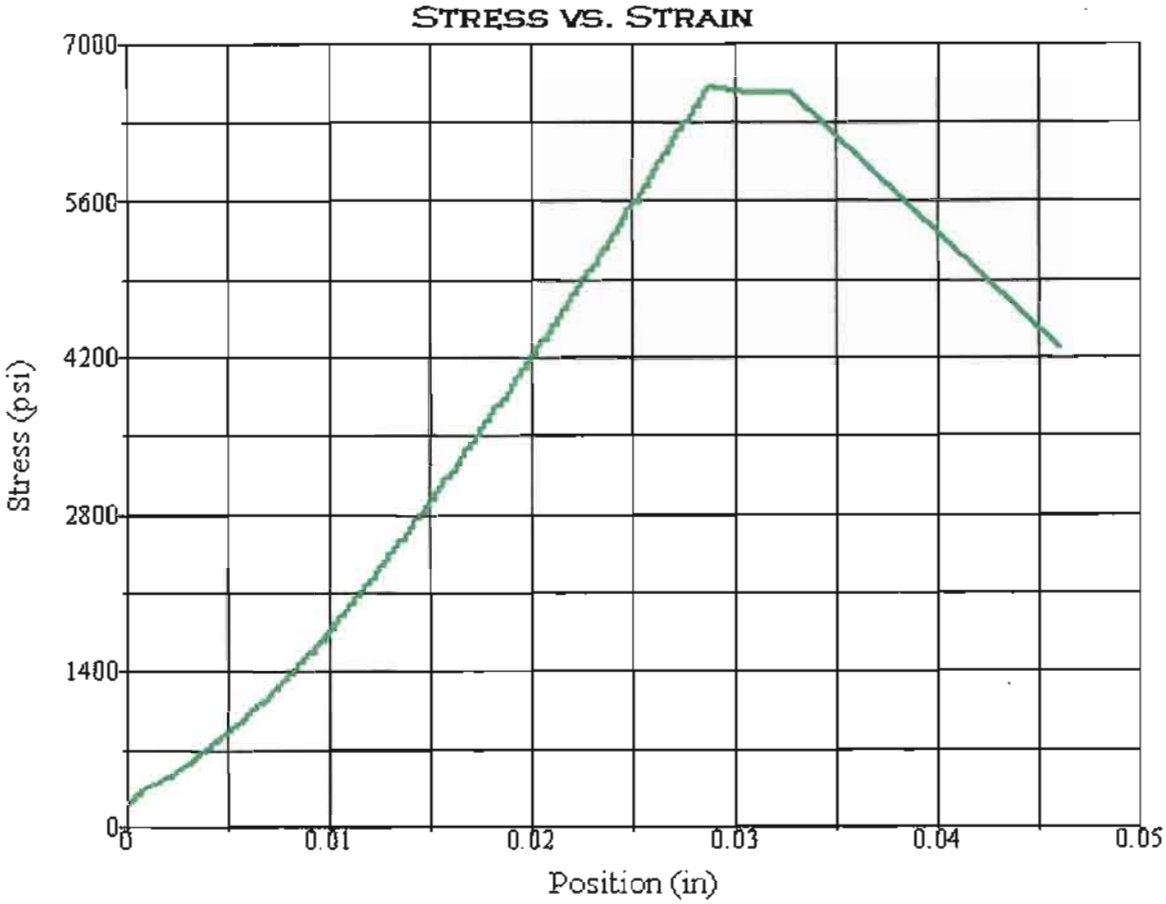
Test Results

Specimen Gage Length:	4.9700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11578 lbf
Compressive Strength:	2559 psi



Test Summary	
Counter:	1446
Elapsed Time:	00:02:06
Operator:	AZM
Sample:	R11-008-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:18:47 PM
End Date:	8/22/2011
End Time:	4:20:53 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-255

Test Results	
Specimen Gage Length:	4.9600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21067 lbf
Compressive Strength:	4657 psi

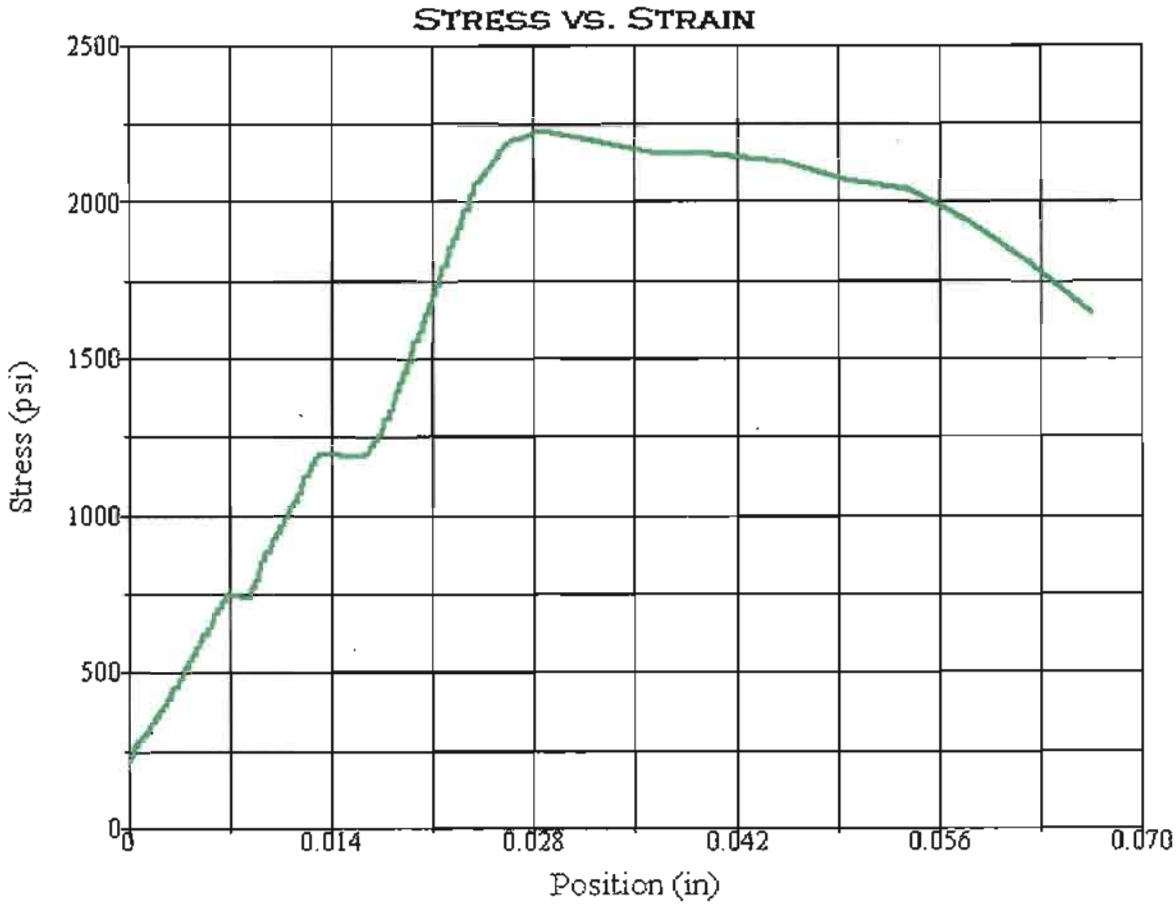


Test Summary

Counter:	1447
Elapsed Time:	00:03:01
Operator:	AZM
Sample:	R11-008-12
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:30:39 PM
End Date:	8/22/2011
End Time:	4:33:40 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-256

Test Results

Specimen Gage Length:	5.0700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	29944 lbf
Compressive Strength:	6619 psi

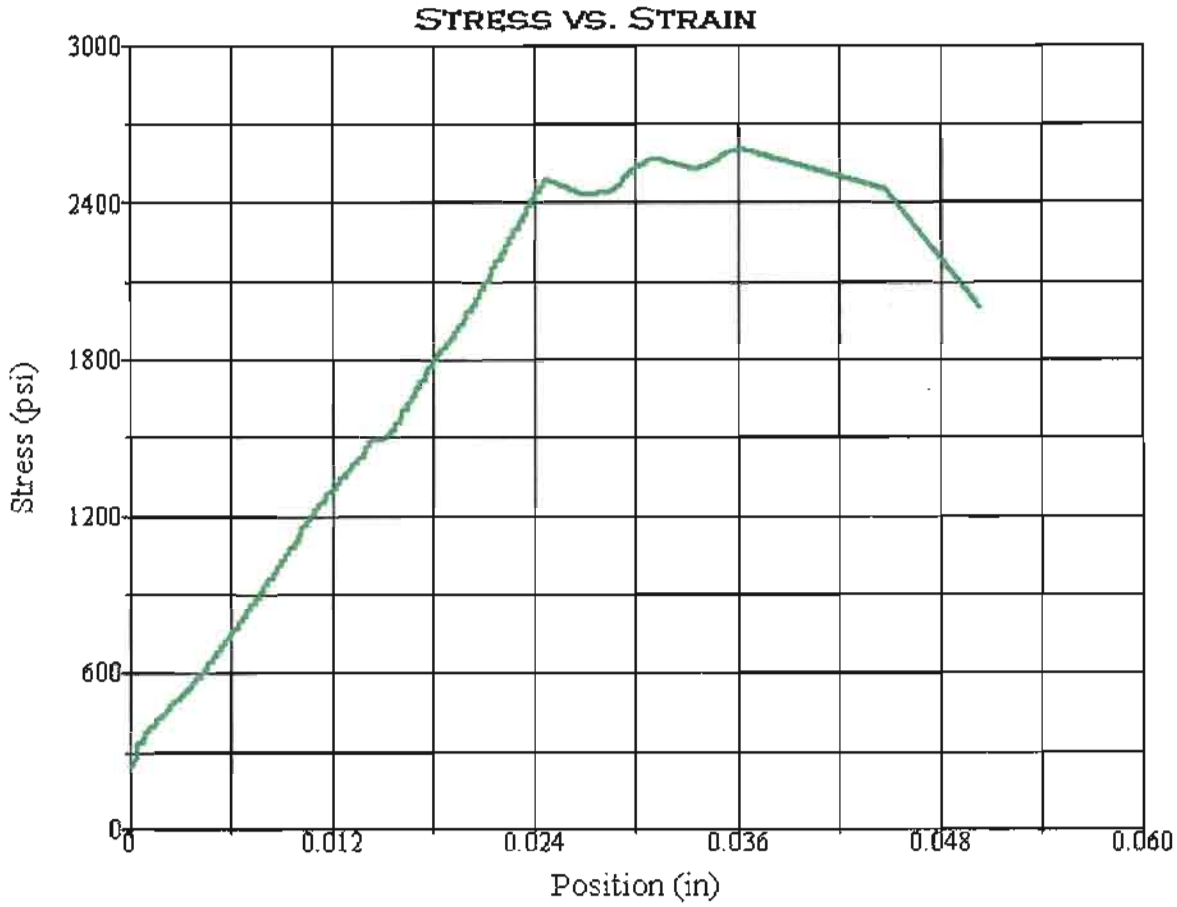


Test Summary

Counter:	1448
Elapsed Time:	00:00:58
Operator:	AZM
Sample:	R11-008-14
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:55:47 PM
End Date:	8/22/2011
End Time:	4:56:45 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-257
RATIO:	L/D<2

Test Results

Specimen Gage Length:	3.9100 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	9910 lbf
Compressive Strength:	2228 psi

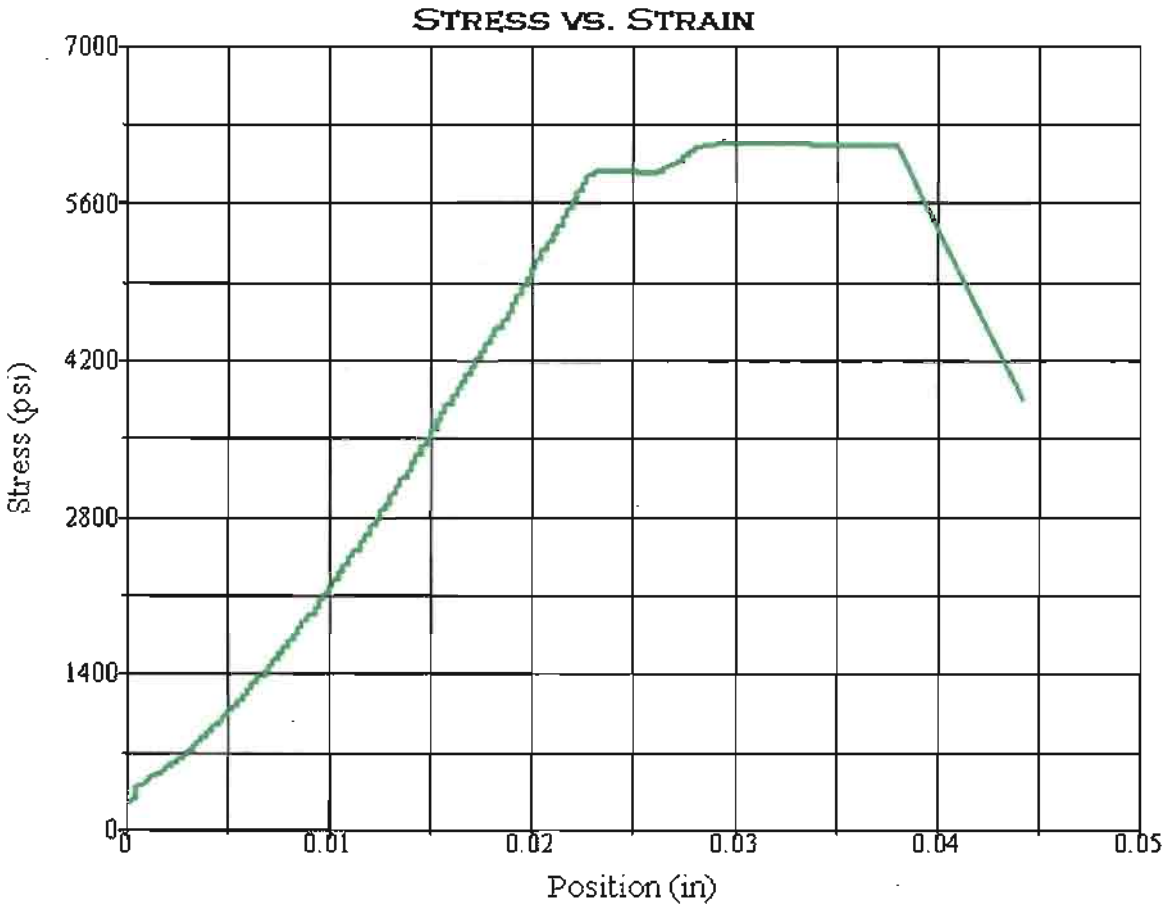


Test Summary

Counter:	1449
Elapsed Time:	00:01:06
Operator:	AZM
Sample:	R11-008-15
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	5:02:49 PM
End Date:	8/22/2011
End Time:	5:03:55 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-258
RATIO:	L/D<2

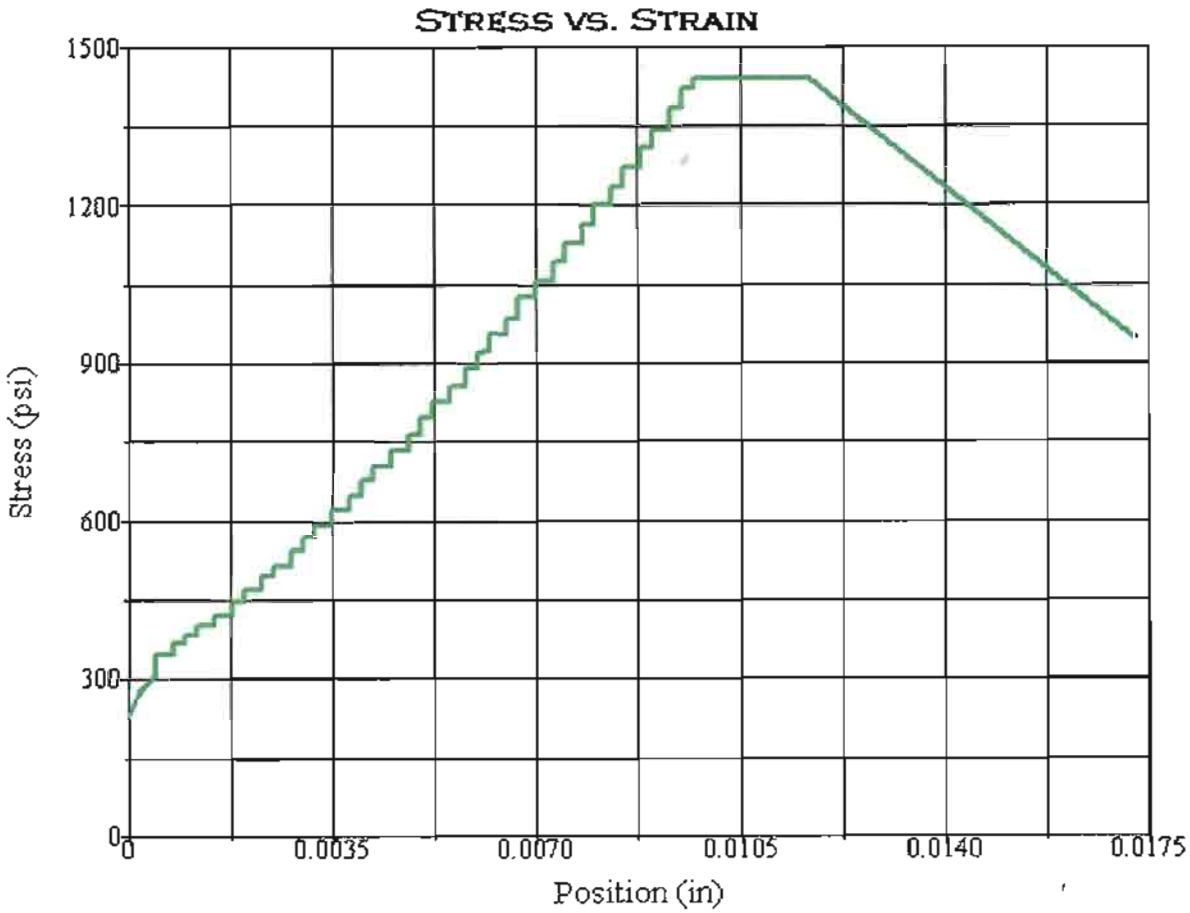
Test Results

Specimen Gage Length:	4.1900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	11696 lbf
Compressive Strength:	2607 psi



Test Summary	
Counter:	1450
Elapsed Time:	00:02:45
Operator:	AZM
Sample:	R11-008-15A
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	5:09:08 PM
End Date:	8/22/2011
End Time:	5:11:53 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-259

Test Results	
Specimen Gage Length:	5.0000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	27786 lbf
Compressive Strength:	6142 psi

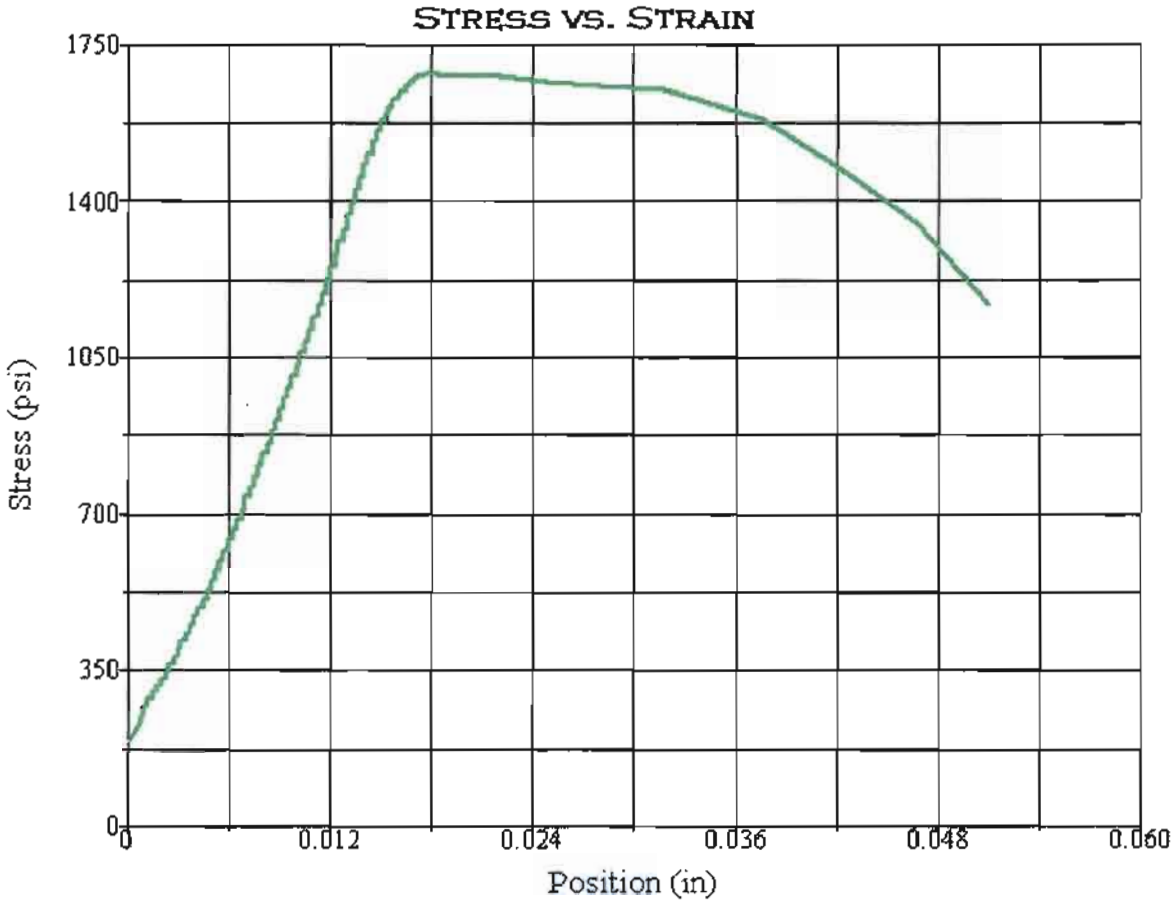


Test Summary

Counter:	1451
Elapsed Time:	00:00:32
Operator:	AZM
Sample:	R11-008-18
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:16:10 PM
End Date:	8/24/2011
End Time:	2:16:42 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-260

Test Results

Specimen Gage Length:	4.7000 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	6454 lbf
Compressive Strength:	1439 psi

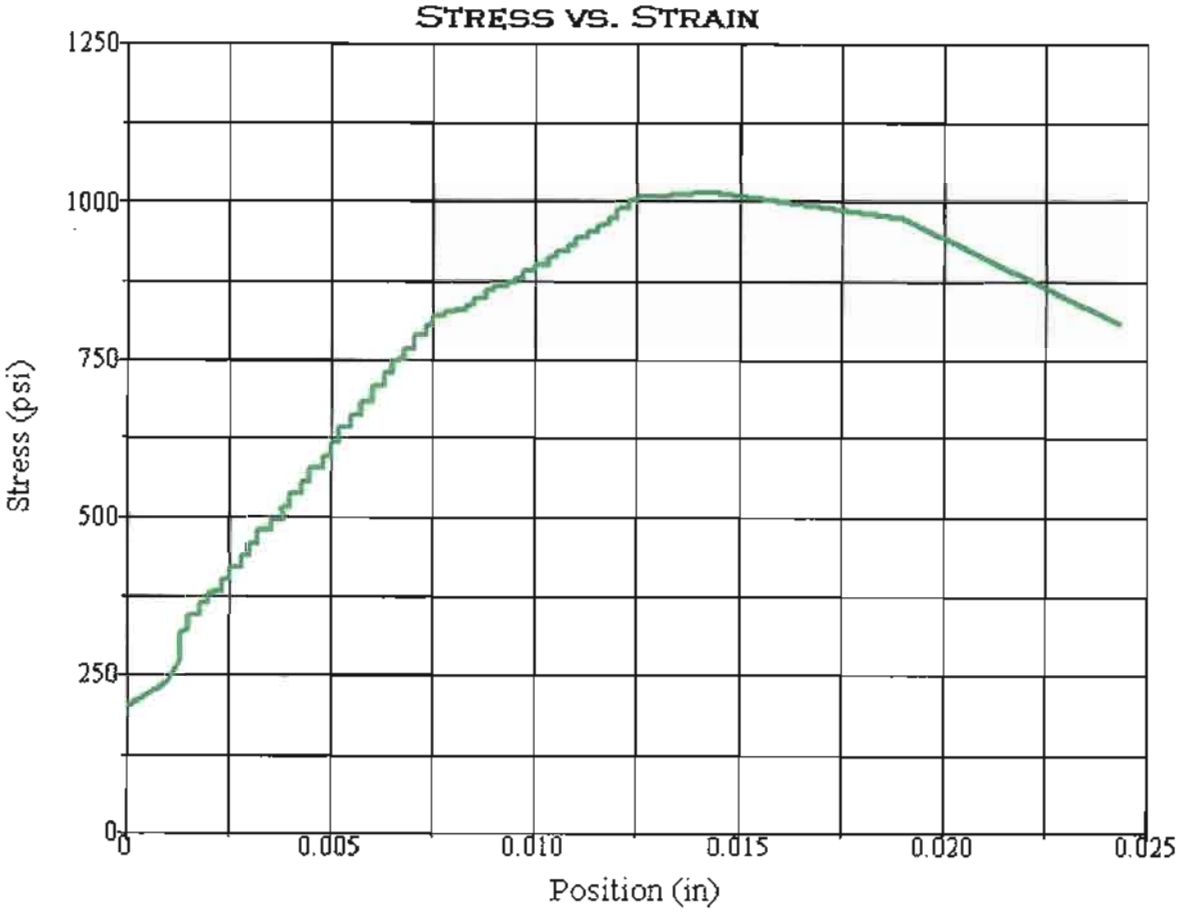


Test Summary

Counter:	1452
Elapsed Time:	00:00:43
Operator:	AZM
Sample:	R11-008-18A
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:28:15 PM
End Date:	8/24/2011
End Time:	2:28:58 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-161

Test Results

Specimen Gage Length:	3.7800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	7556 lbf
Compressive Strength:	1684 psi

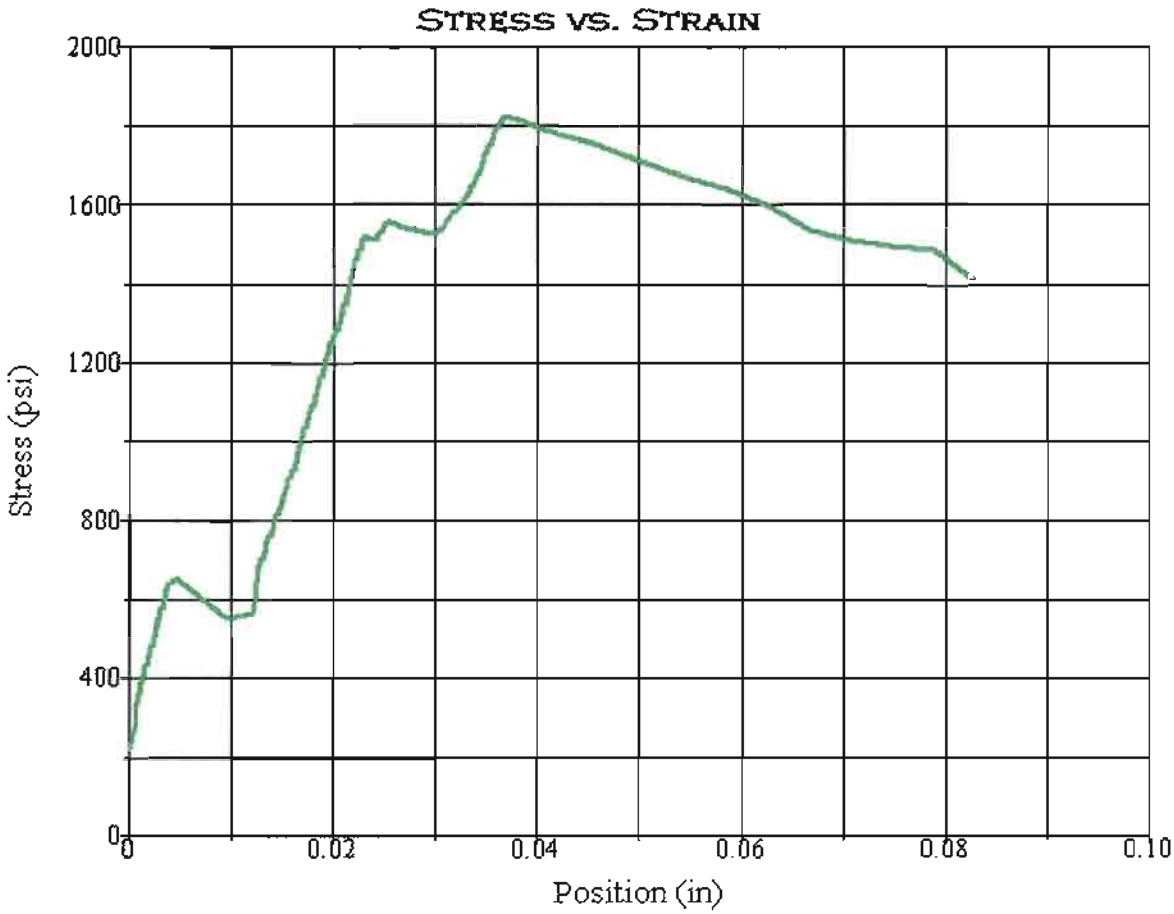


Test Summary

Counter:	1453
Elapsed Time:	00:00:21
Operator:	AZM
Sample:	R11-009-04
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:34:27 PM
End Date:	8/24/2011
End Time:	2:34:48 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-162

Test Results

Specimen Gage Length:	4.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	4585 lbf
Compressive Strength:	1014 psi

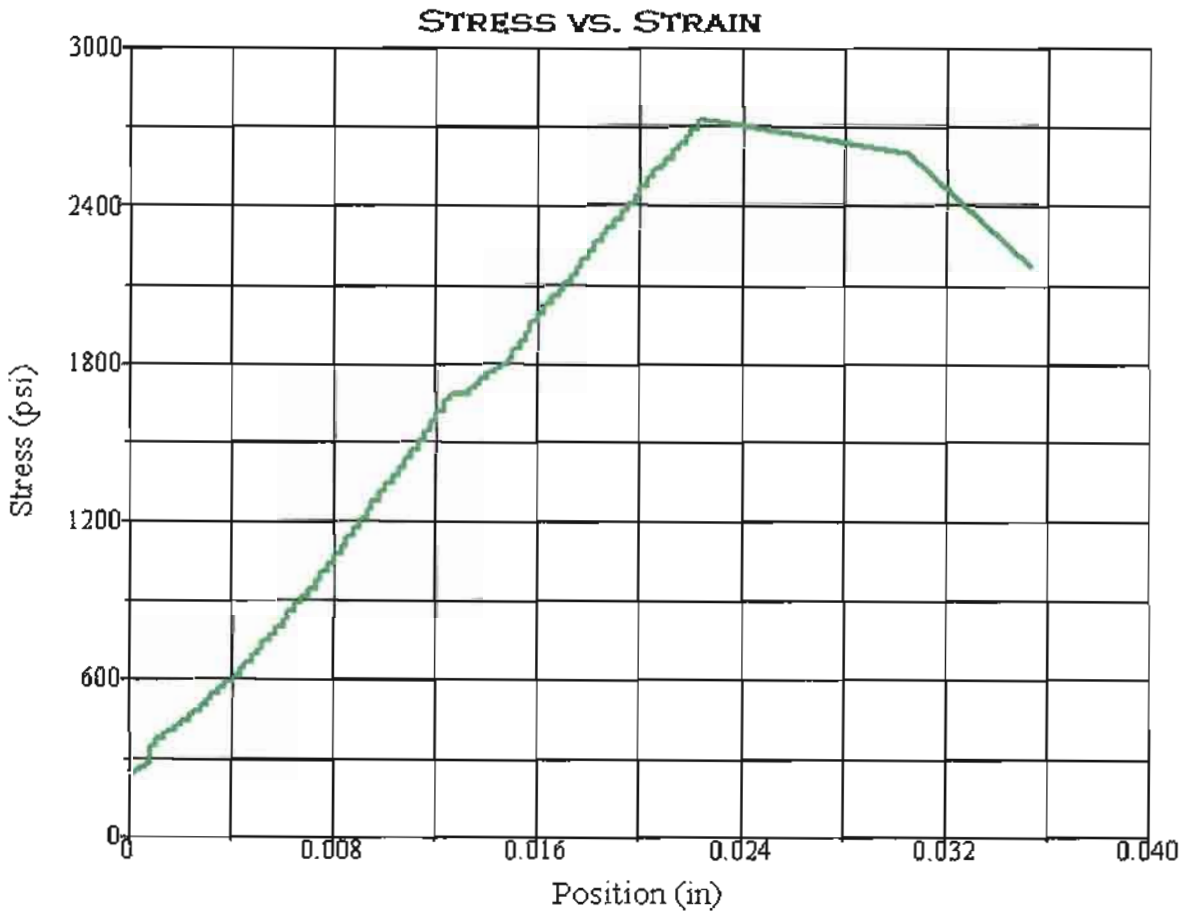


Test Summary

Counter:	1454
Elapsed Time:	00:00:45
Operator:	AZM
Sample:	R11-009-05
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:48:31 PM
End Date:	8/24/2011
End Time:	2:49:16 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-263

Test Results

Specimen Gage Length:	3.5000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	8248 lbf
Compressive Strength:	1823 psi

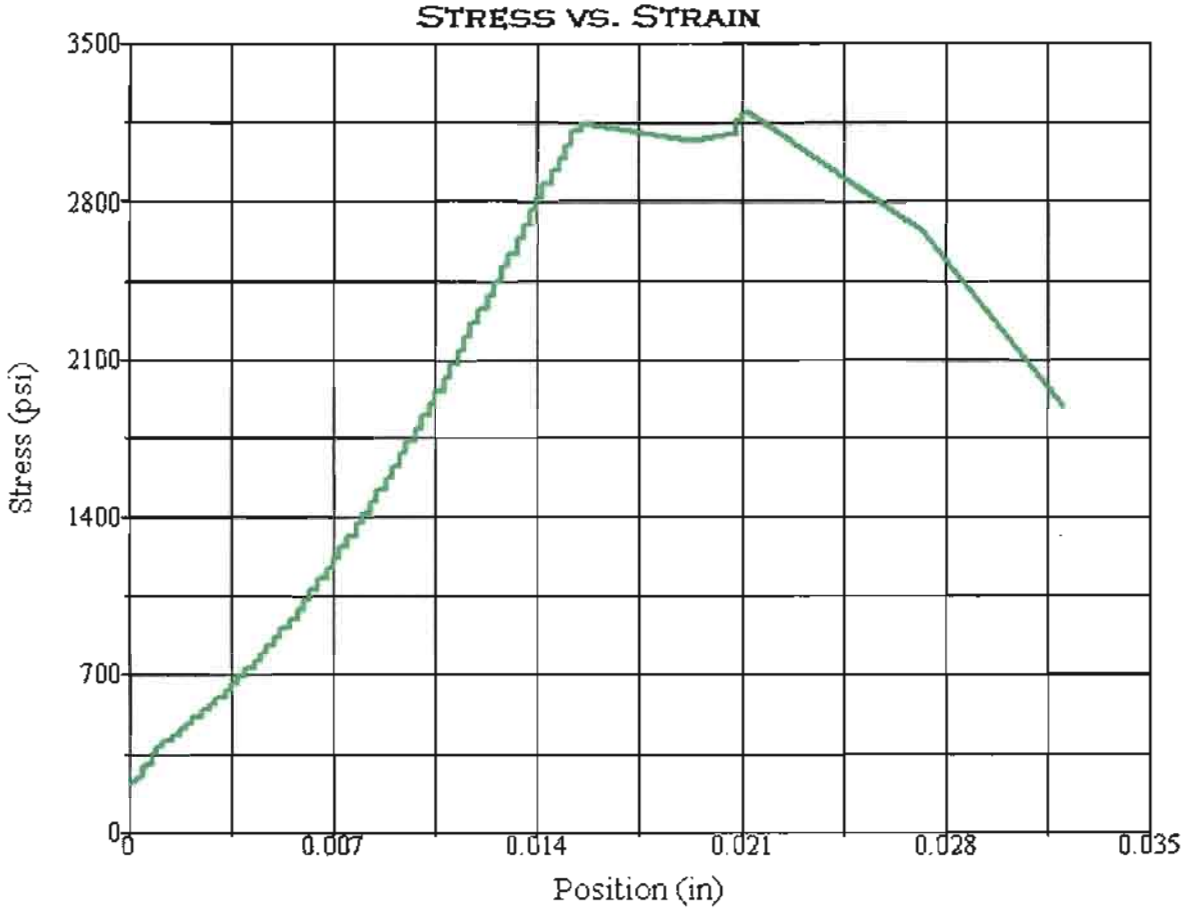


Test Summary

Counter:	1455
Elapsed Time:	00:01:09
Operator:	AZM
Sample:	R11-009-05A
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:11:47 PM
End Date:	8/24/2011
End Time:	3:12:56 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-264

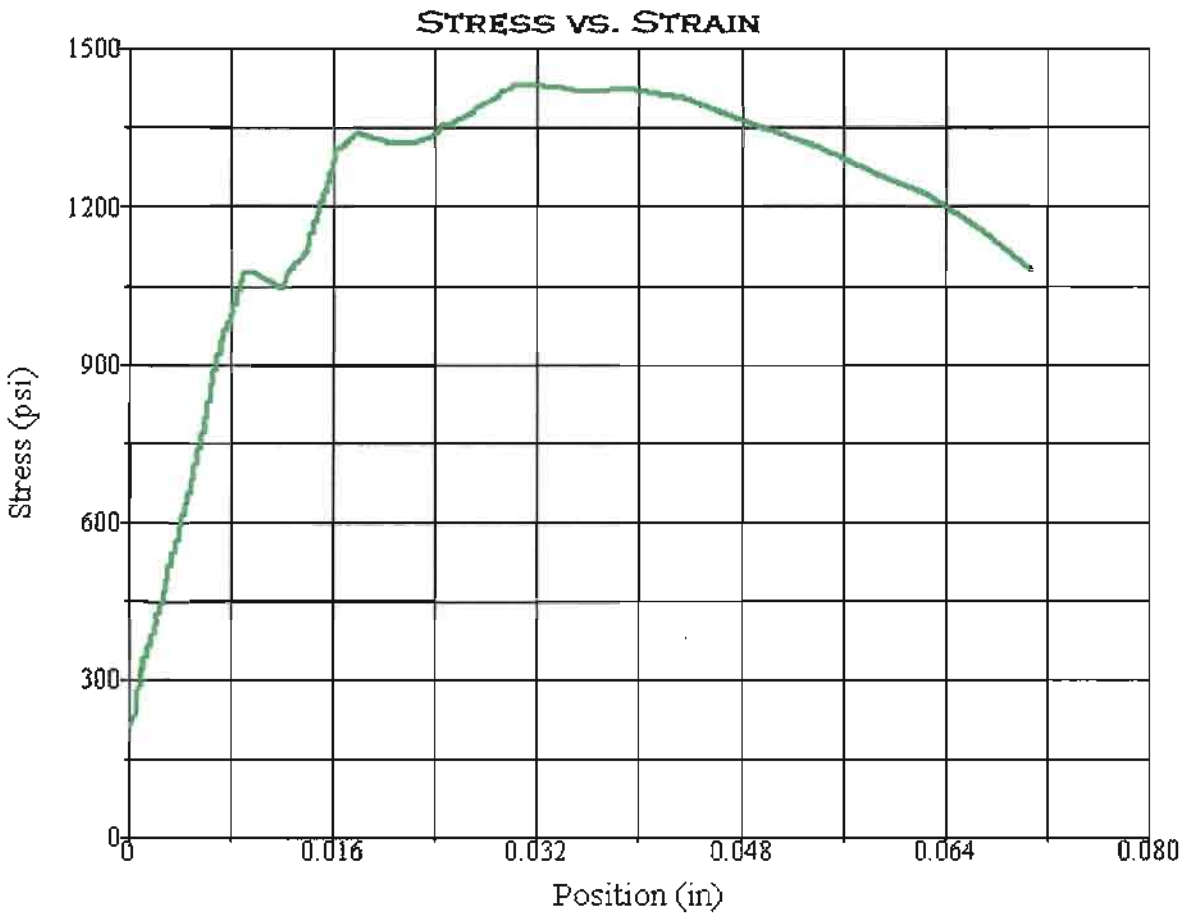
Test Results

Specimen Gage Length:	3.3900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12314 lbf
Compressive Strength:	2722 psi



Test Summary	
Counter:	1456
Elapsed Time:	00:01:23
Operator:	AZM
Sample:	R11-009-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:18:00 PM
End Date:	8/24/2011
End Time:	3:19:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-266

Test Results	
Specimen Gage Length:	4.9800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	14456 lbf
Compressive Strength:	3195 psi

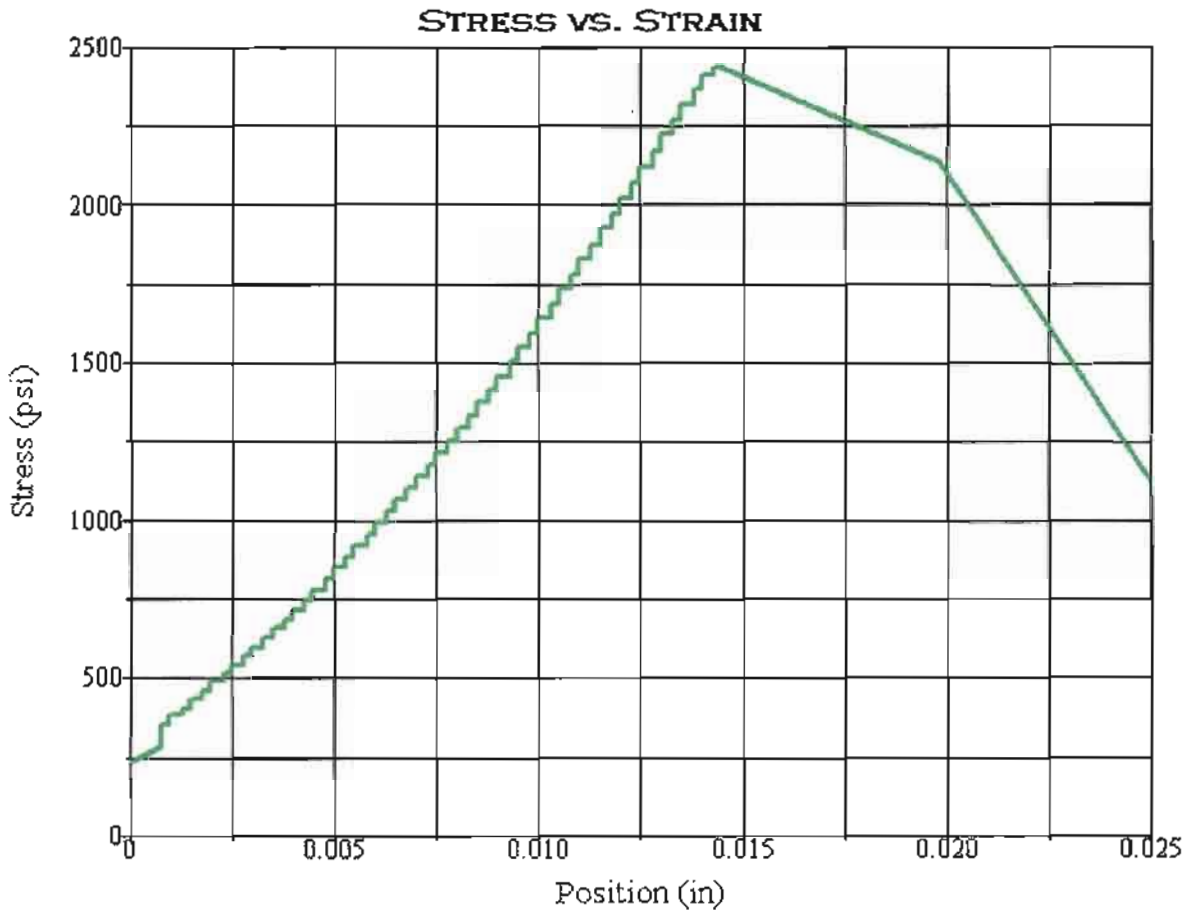


Test Summary

Counter:	1457
Elapsed Time:	00:00:34
Operator:	AZM
Sample:	R11-009-12
Resident Engineer:	RATIO: L/D<2
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:29:51 PM
End Date:	8/24/2011
End Time:	3:30:25 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-267

Test Results

Specimen Gage Length:	3.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6467 lbf
Compressive Strength:	1430 psi

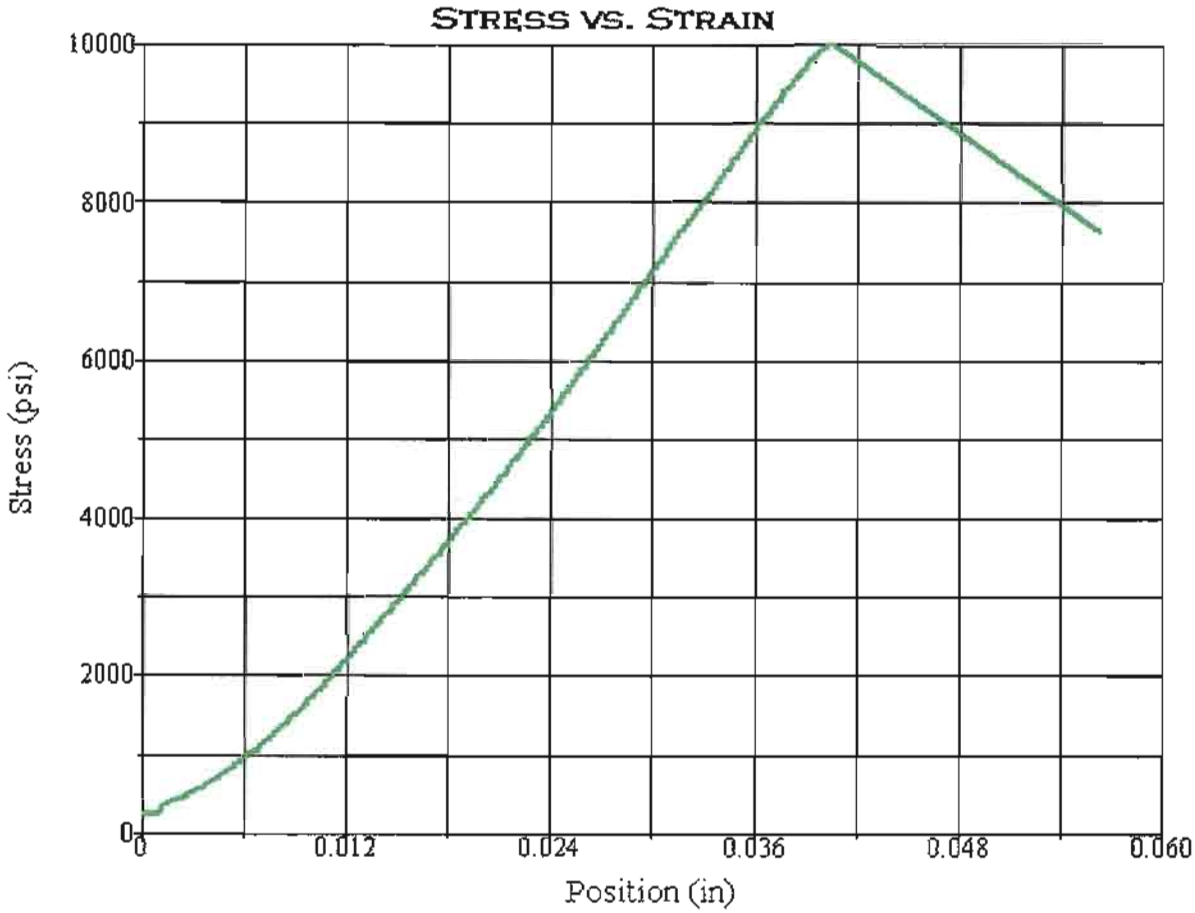


Test Summary

Counter:	1458
Elapsed Time:	00:01:00
Operator:	AZM
Sample:	R11-009-13
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:37:28 PM
End Date:	8/24/2011
End Time:	3:38:28 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-268

Test Results

Specimen Gage Length:	5.3500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11031 lbf
Compressive Strength:	2438 psi

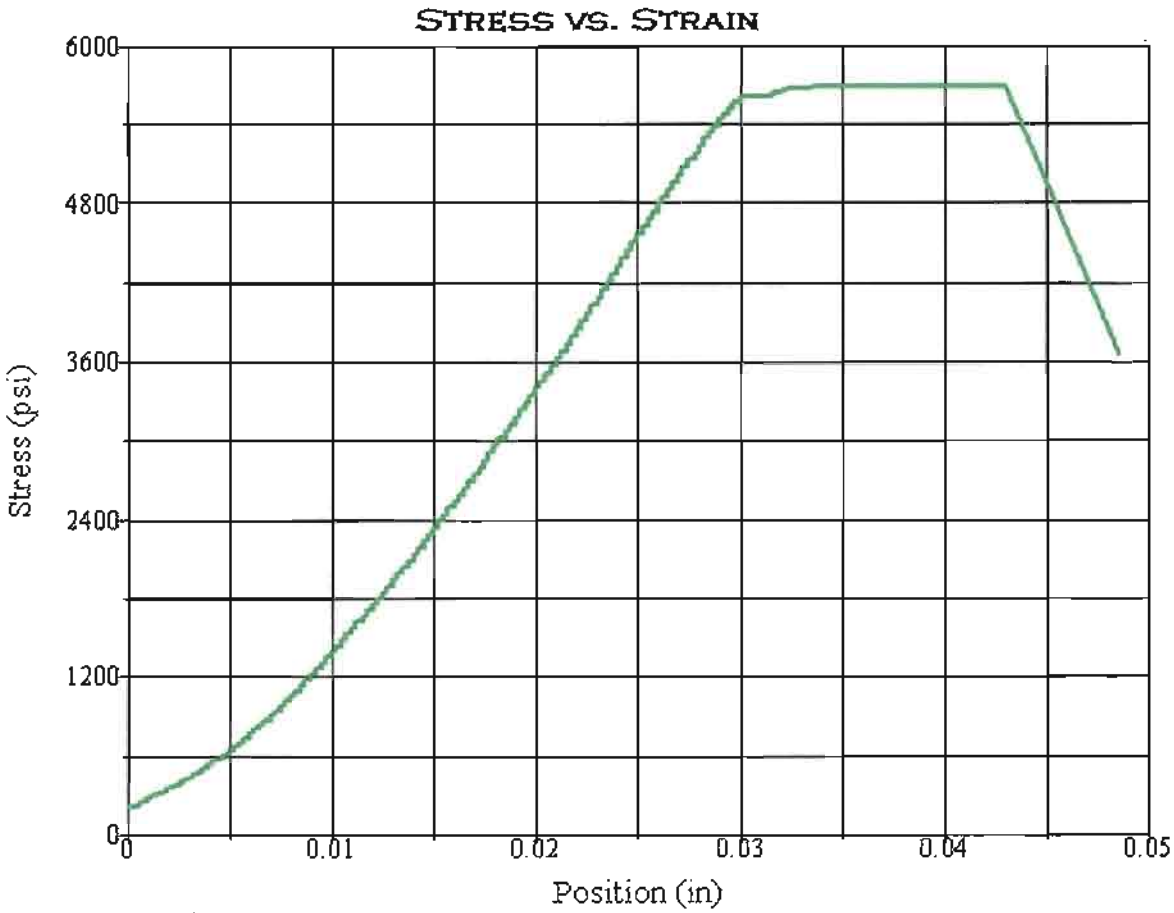


Test Summary

Counter:	1459
Elapsed Time:	00:04:36
Operator:	AZM
Sample:	R11-009-14
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:45:04 PM
End Date:	8/24/2011
End Time:	3:49:40 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-269

Test Results

Specimen Gage Length:	4.6800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	45209 lbf
Compressive Strength:	9993 psi

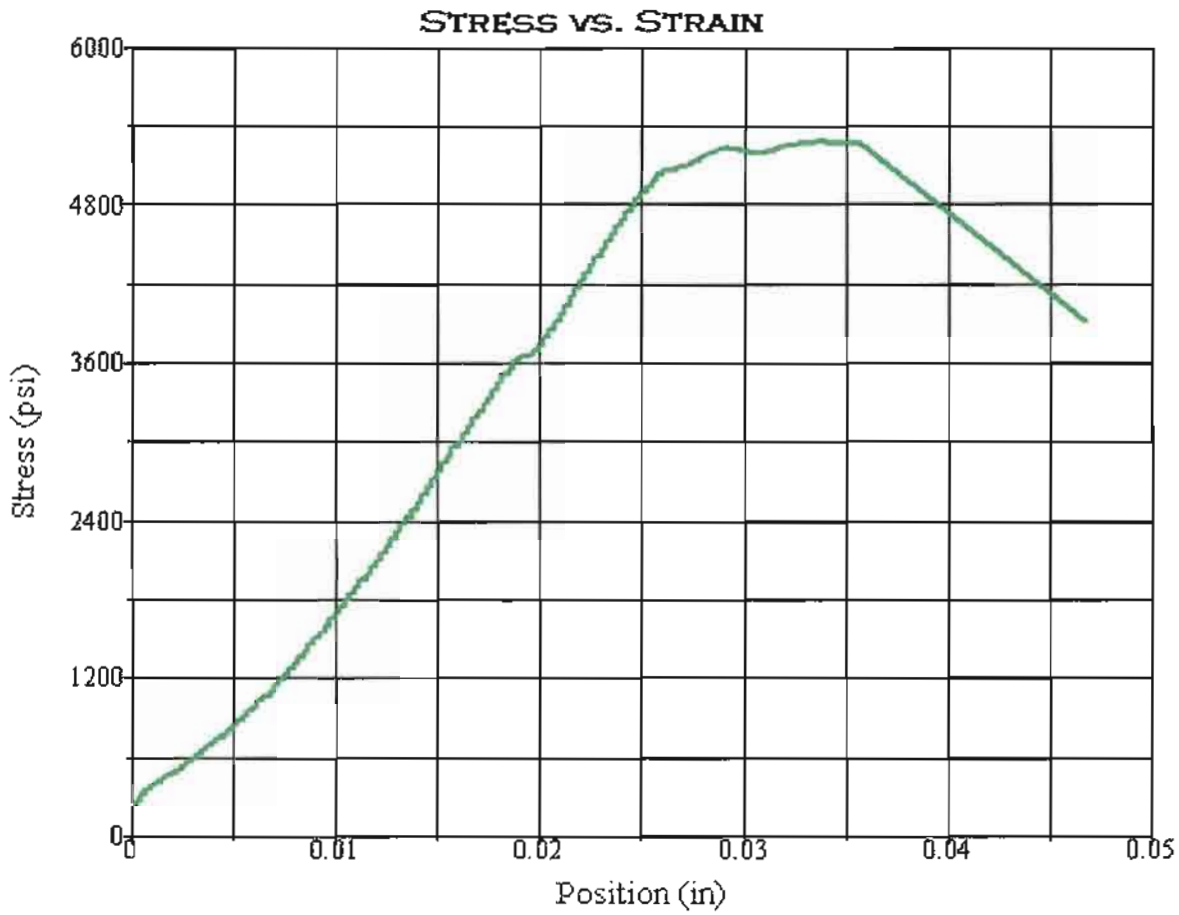


Test Summary

Counter:	1460
Elapsed Time:	00:02:36
Operator:	AZM
Sample:	R11-009-16
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:56:39 PM
End Date:	8/24/2011
End Time:	3:59:15 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-270

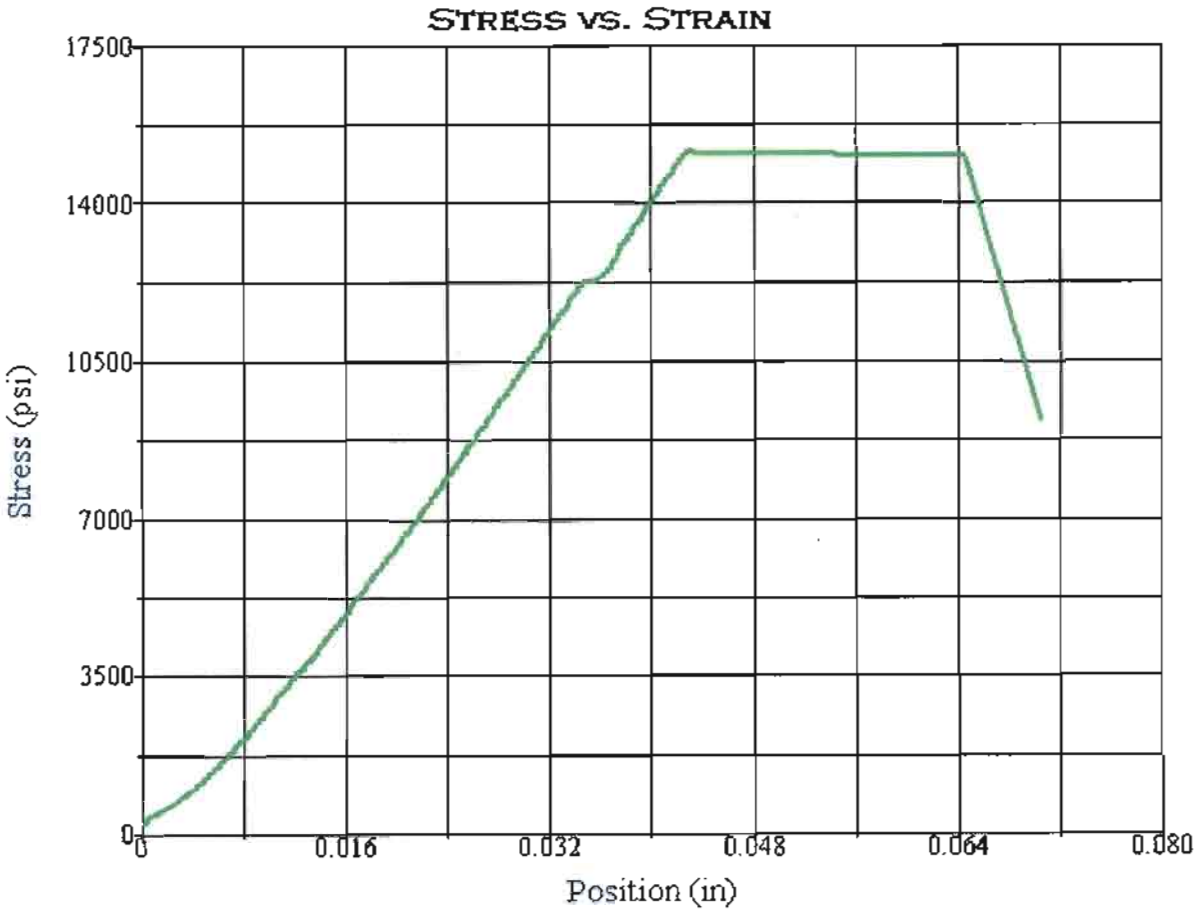
Test Results

Specimen Gage Length:	4.8000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25737 lbf
Compressive Strength:	5689 psi



Test Summary	
Counter:	1461
Elapsed Time:	00:02:22
Operator:	AZM
Sample:	R11-009-18
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	4:05:10 PM
End Date:	8/24/2011
End Time:	4:07:32 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-271

Test Results	
Specimen Gage Length:	5.6300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	23860 lbf
Compressive Strength:	5274 psi

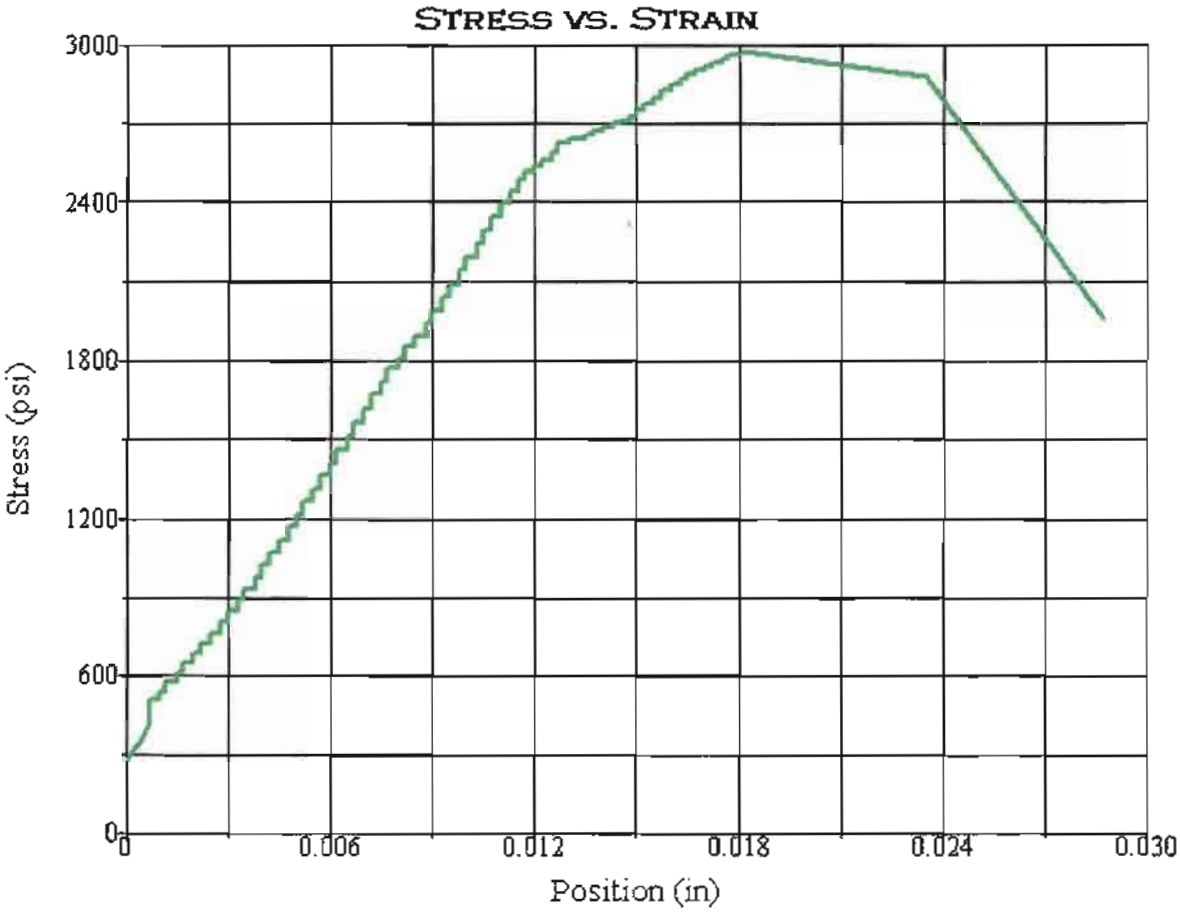


Test Summary

Counter:	1462
Elapsed Time:	00:07:05
Operator:	AZM
Sample:	R11-010-01
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	1:35:28 PM
End Date:	8/25/2011
End Time:	1:42:33 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-272

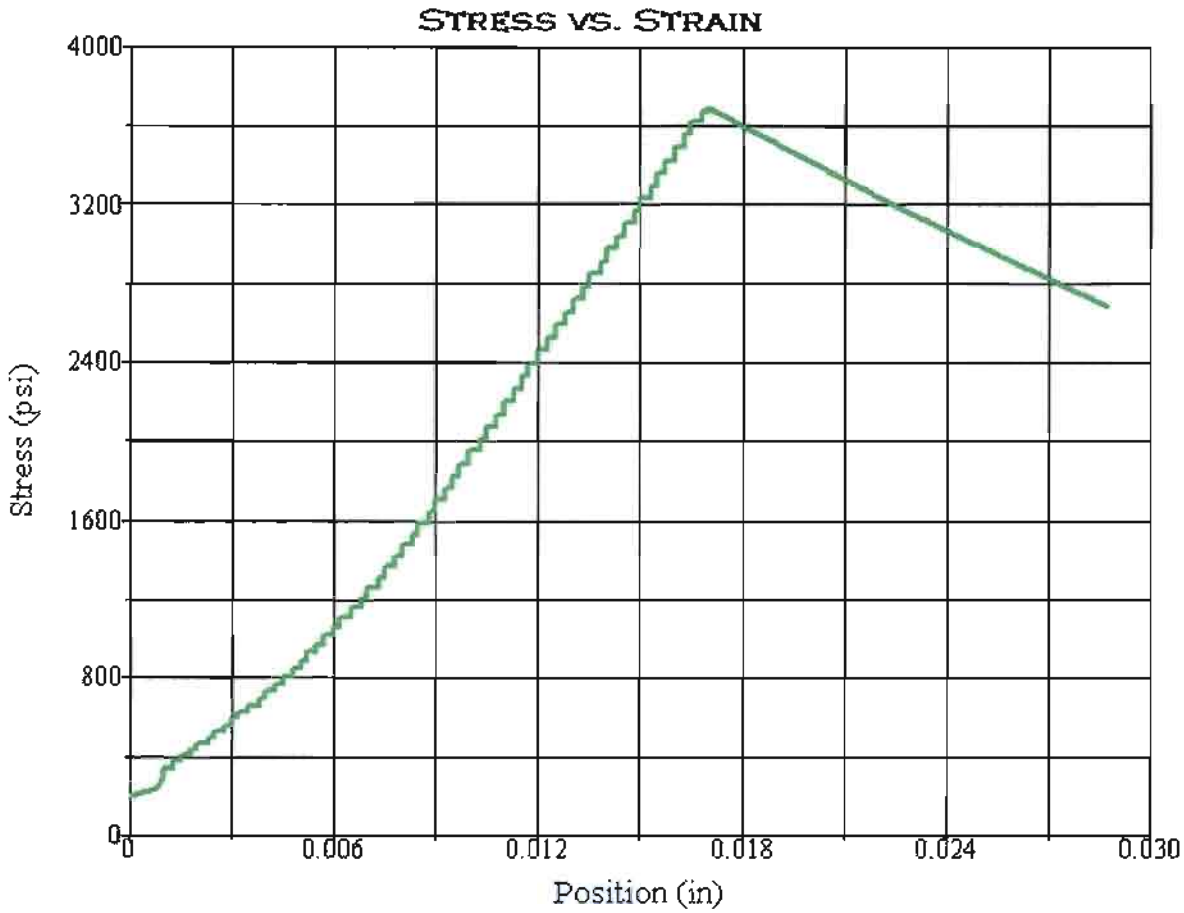
Test Results

Specimen Gage Length:	4.8600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	68741 lbf
Compressive Strength:	15195 psi



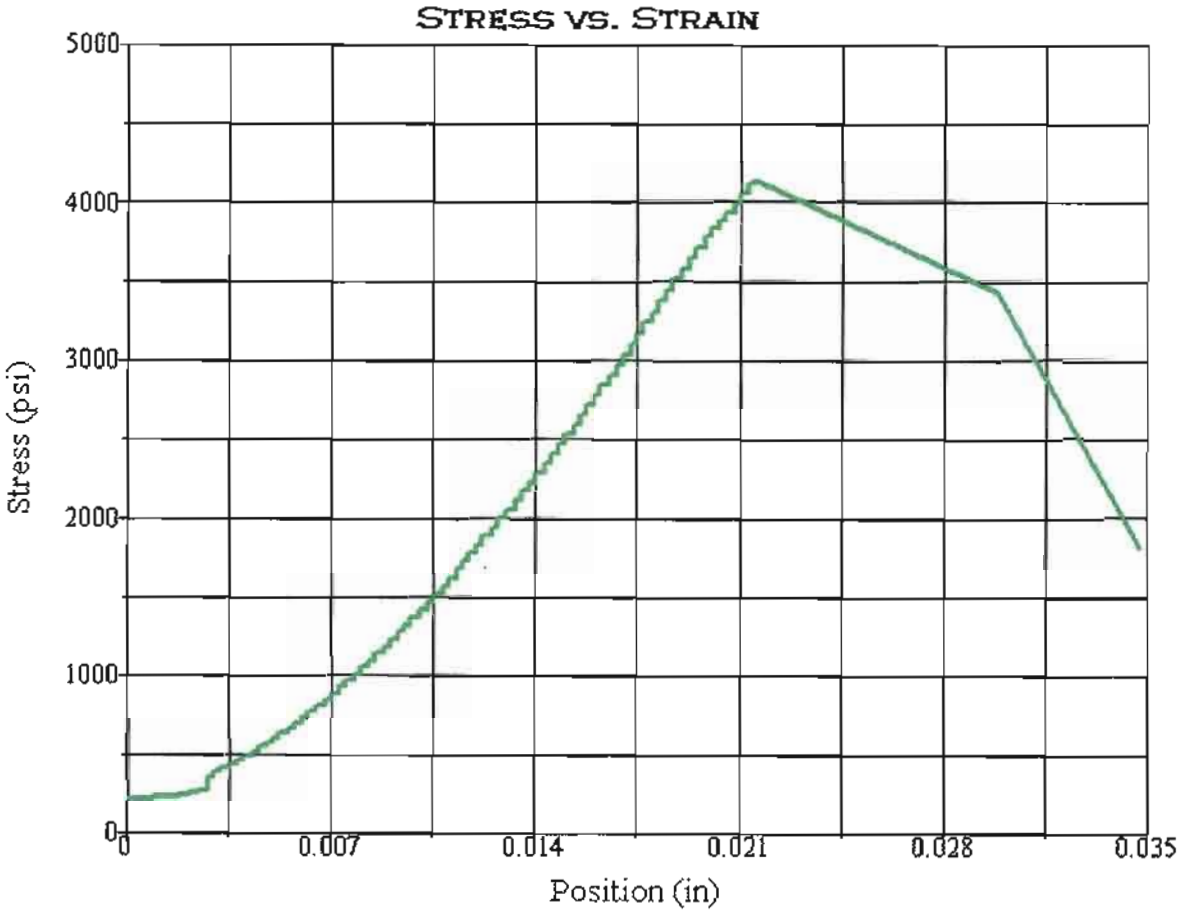
Test Summary	
Counter:	1463
Elapsed Time:	00:01:12
Operator:	AZM
Sample:	R11-010-05
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	1:48:49 PM
End Date:	8/25/2011
End Time:	1:50:01 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-273

Test Results	
Specimen Gage Length:	4.5800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	13428 lbf
Compressive Strength:	2968 psi



Test Summary	
Counter:	1464
Elapsed Time:	00:01:37
Operator:	AZM
Sample:	R11-010-06
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	2:00:04 PM
End Date:	8/25/2011
End Time:	2:01:41 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-275

Test Results	
Specimen Gage Length:	5.2800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	16704 lbf
Compressive Strength:	3692 psi

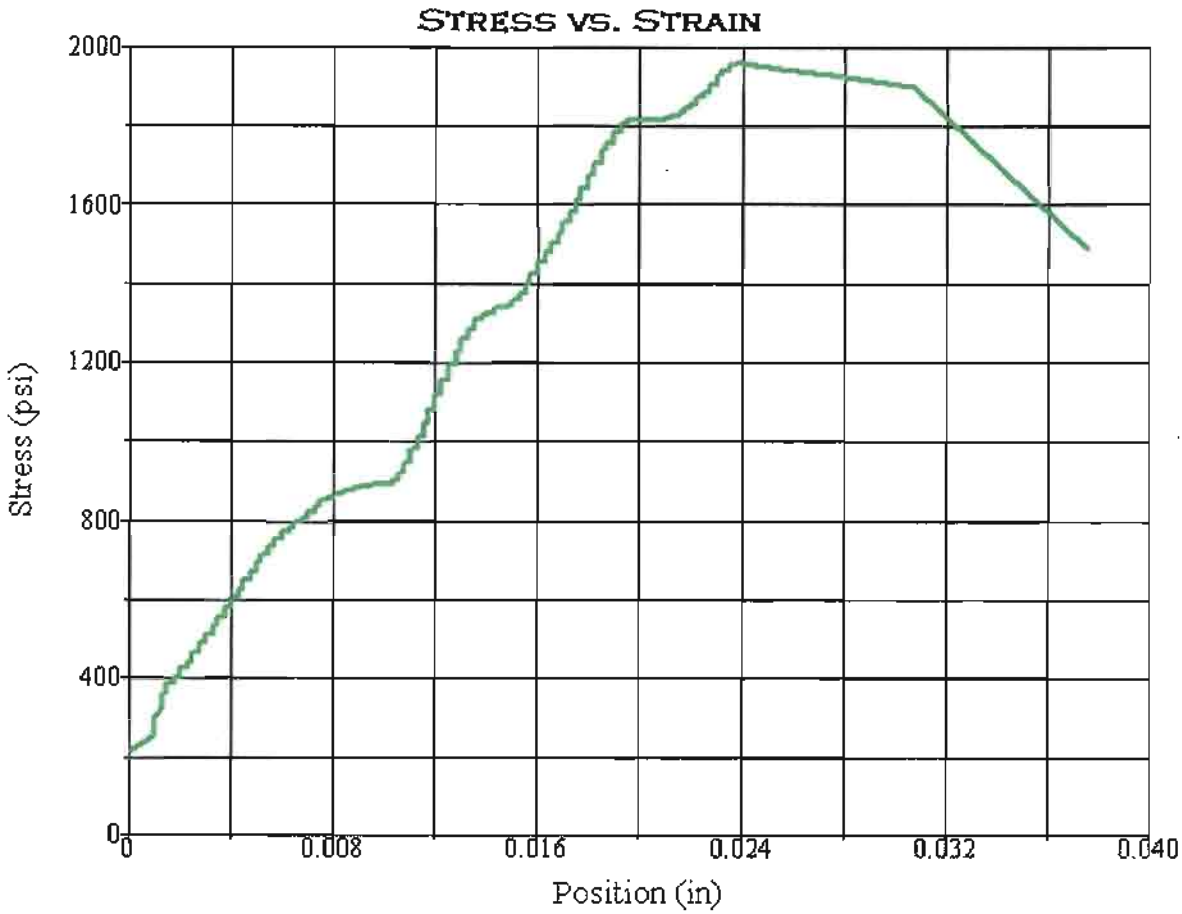


Test Summary

Counter:	1465
Elapsed Time:	00:01:50
Operator:	AZM
Sample:	R11-010-07
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	2:08:33 PM
End Date:	8/25/2011
End Time:	2:10:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-276

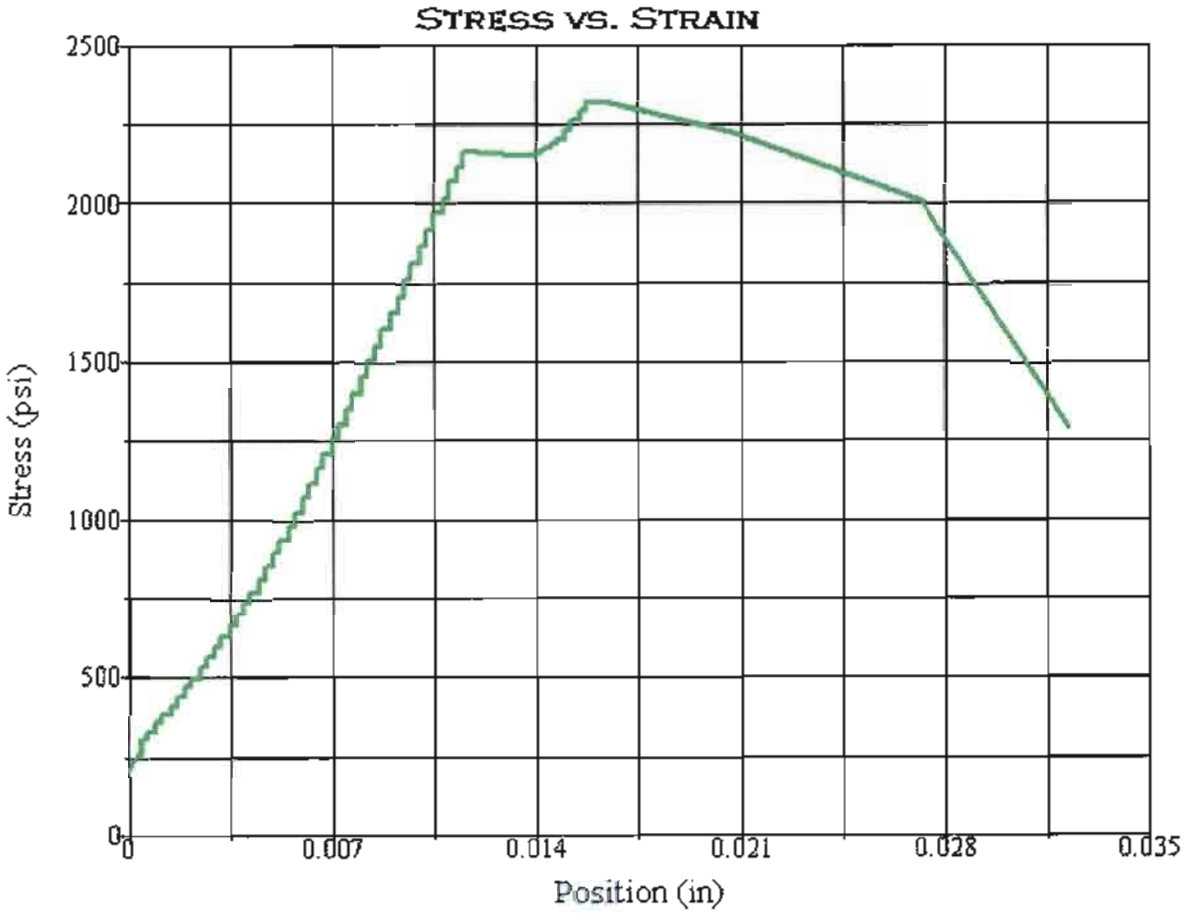
Test Results

Specimen Gage Length:	5.1100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	18754 lbf
Compressive Strength:	4146 psi



Test Summary	
Counter:	1466
Elapsed Time:	00:00:47
Operator:	AZM
Sample:	R11-010-07A
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	2:15:40 PM
End Date:	8/25/2011
End Time:	2:16:27 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-277

Test Results	
Specimen Gage Length:	4.3900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	8859 lbf
Compressive Strength:	1958 psi

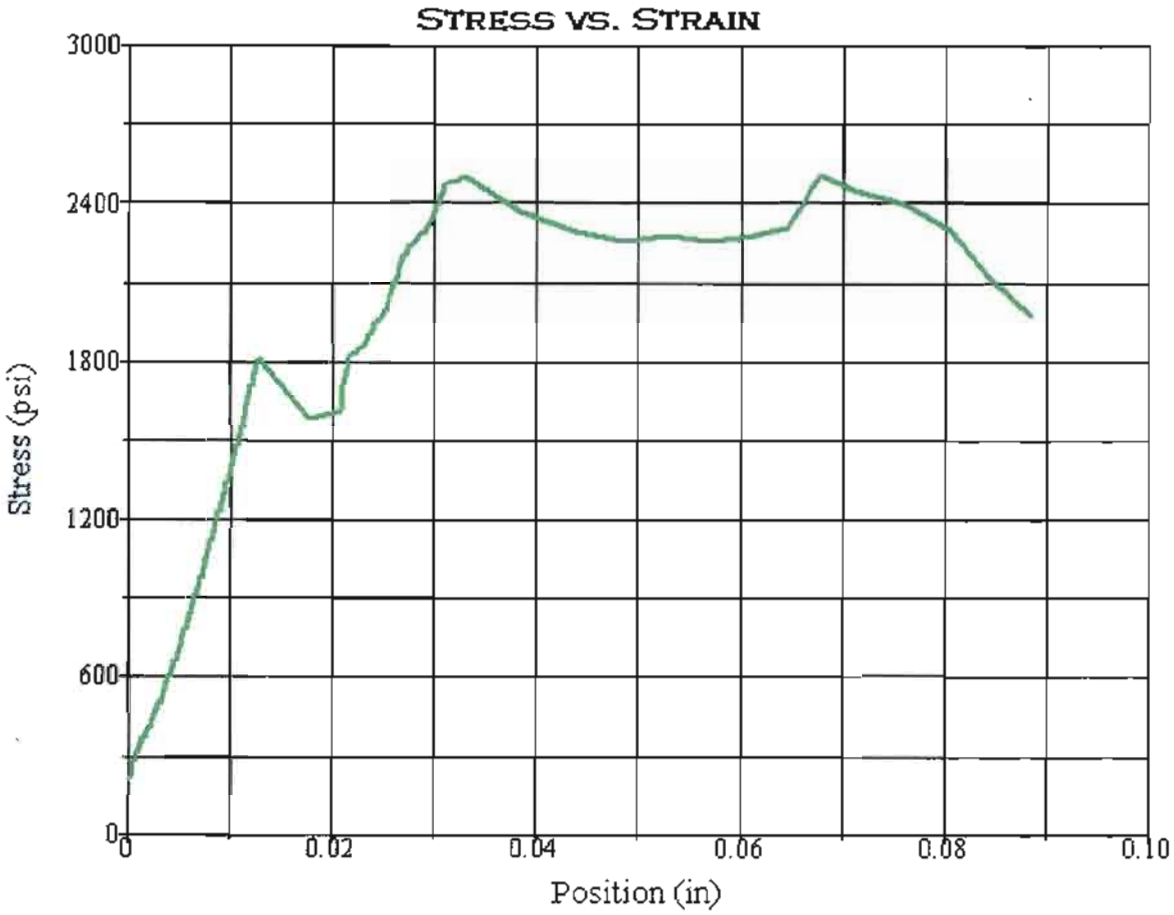


Test Summary

Counter:	1467
Elapsed Time:	00:00:59
Operator:	AZM
Sample:	R11-010-09
Resident Engineer:	
Ticket:	GL3 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:28:37 PM
End Date:	8/25/2011
End Time:	3:29:36 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-278

Test Results

Specimen Gage Length:	4.9300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10504 lbf
Compressive Strength:	2322 psi

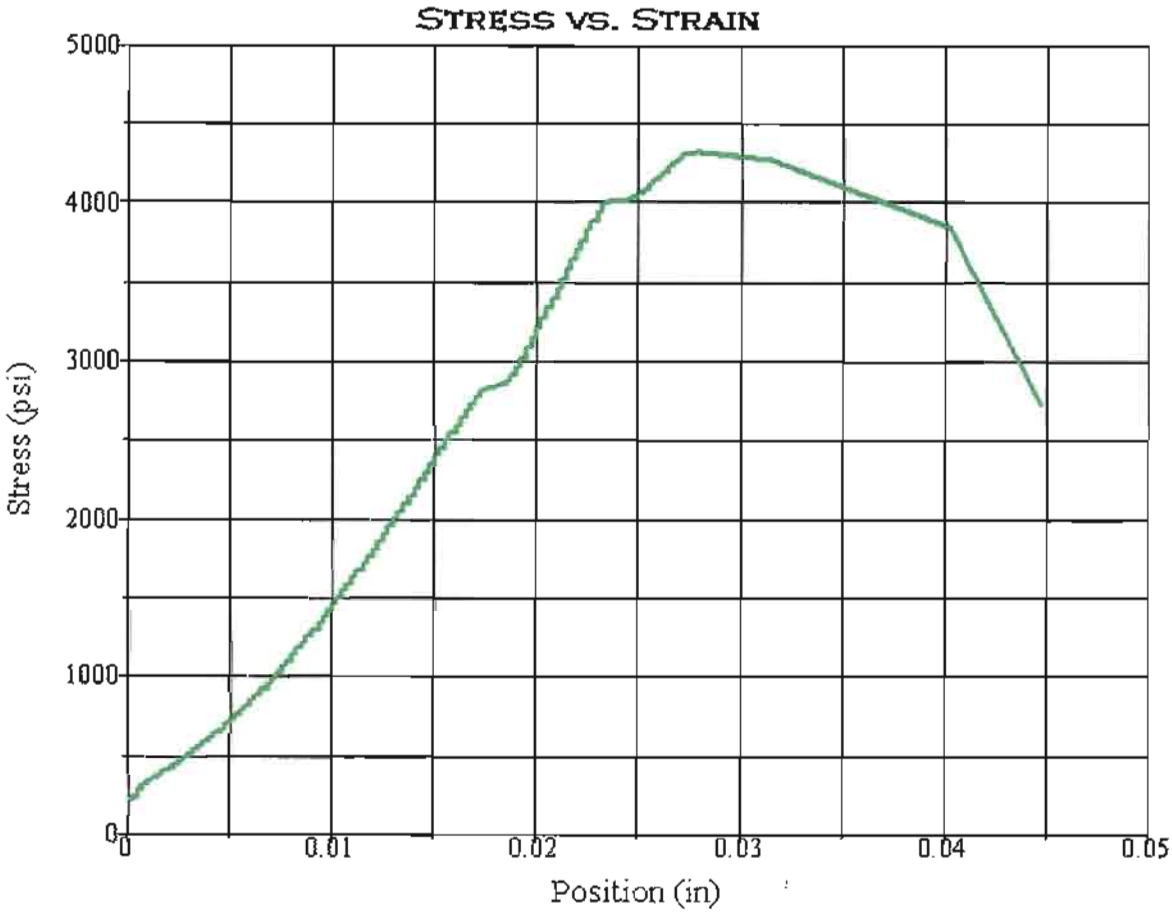


Test Summary

Counter:	1468
Elapsed Time:	00:01:06
Operator:	AZM
Sample:	R11-010-14
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:34:50 PM
End Date:	8/25/2011
End Time:	3:35:56 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-281

Test Results

Specimen Gage Length:	3.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11323 lbf
Compressive Strength:	2503 psi

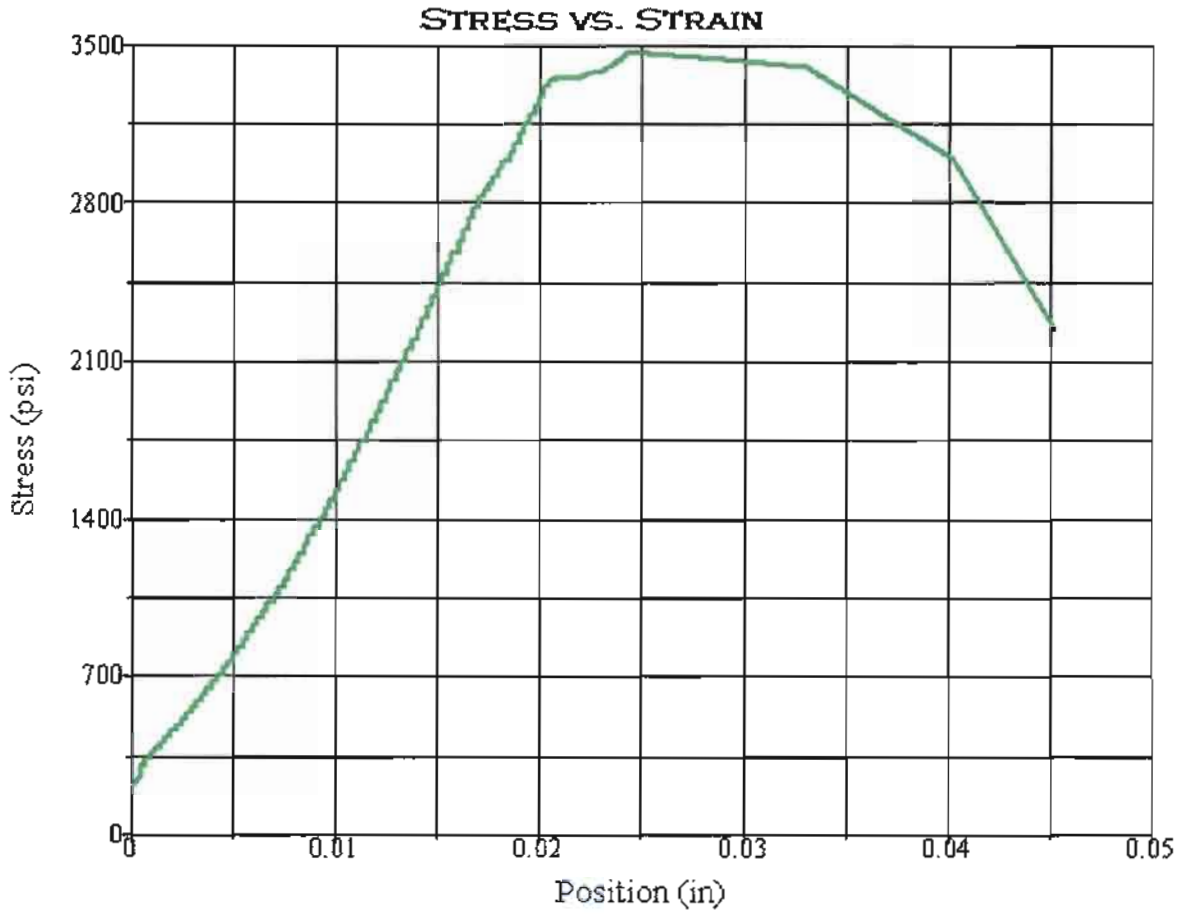


Test Summary

Counter:	1469
Elapsed Time:	00:01:55
Operator:	AZM
Sample:	R11-010-15
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:42:11 PM
End Date:	8/25/2011
End Time:	3:44:06 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-282

Test Results

Specimen Gage Length:	5.3000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	19496 lbf
Compressive Strength:	4310 psi

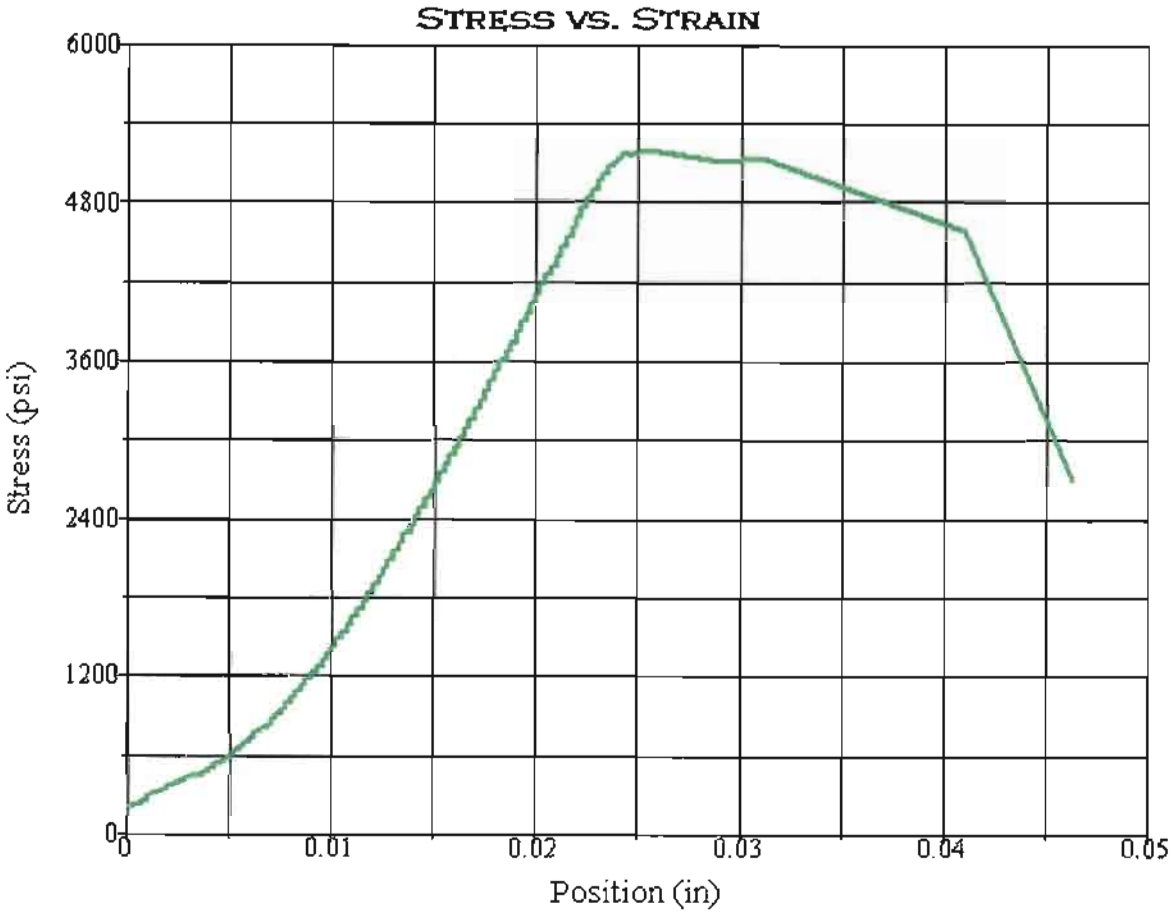


Test Summary

Counter:	1470
Elapsed Time:	00:01:31
Operator:	AZM
Sample:	R11-010-16
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:51:57 PM
End Date:	8/25/2011
End Time:	3:53:28 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-283

Test Results

Specimen Gage Length:	4.9800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	15701 lbf
Compressive Strength:	3471 psi

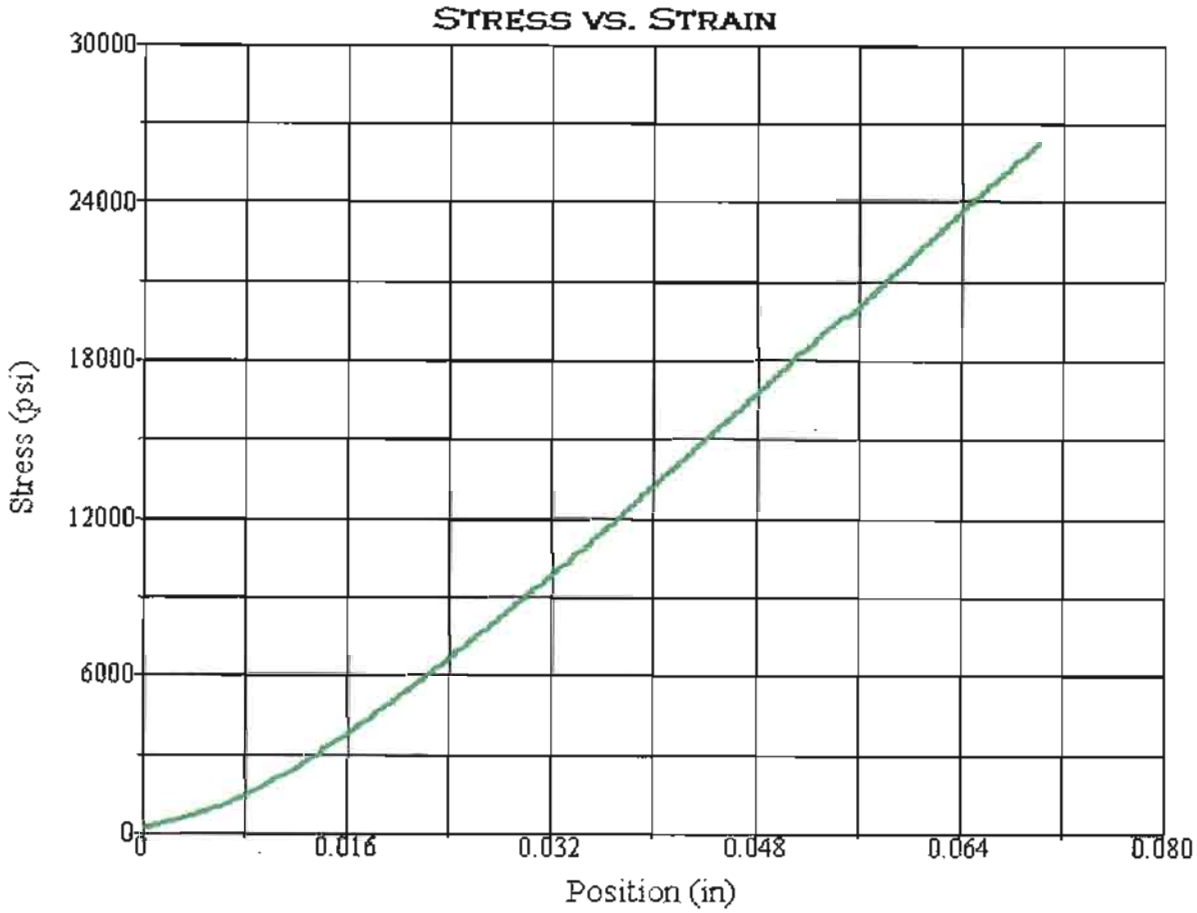


Test Summary

Counter:	1471
Elapsed Time:	00:02:21
Operator:	AZM
Sample:	R11-010-17
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:58:22 PM
End Date:	8/25/2011
End Time:	4:00:43 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-284

Test Results

Specimen Gage Length:	4.0200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	23439 lbf
Compressive Strength:	5181 psi



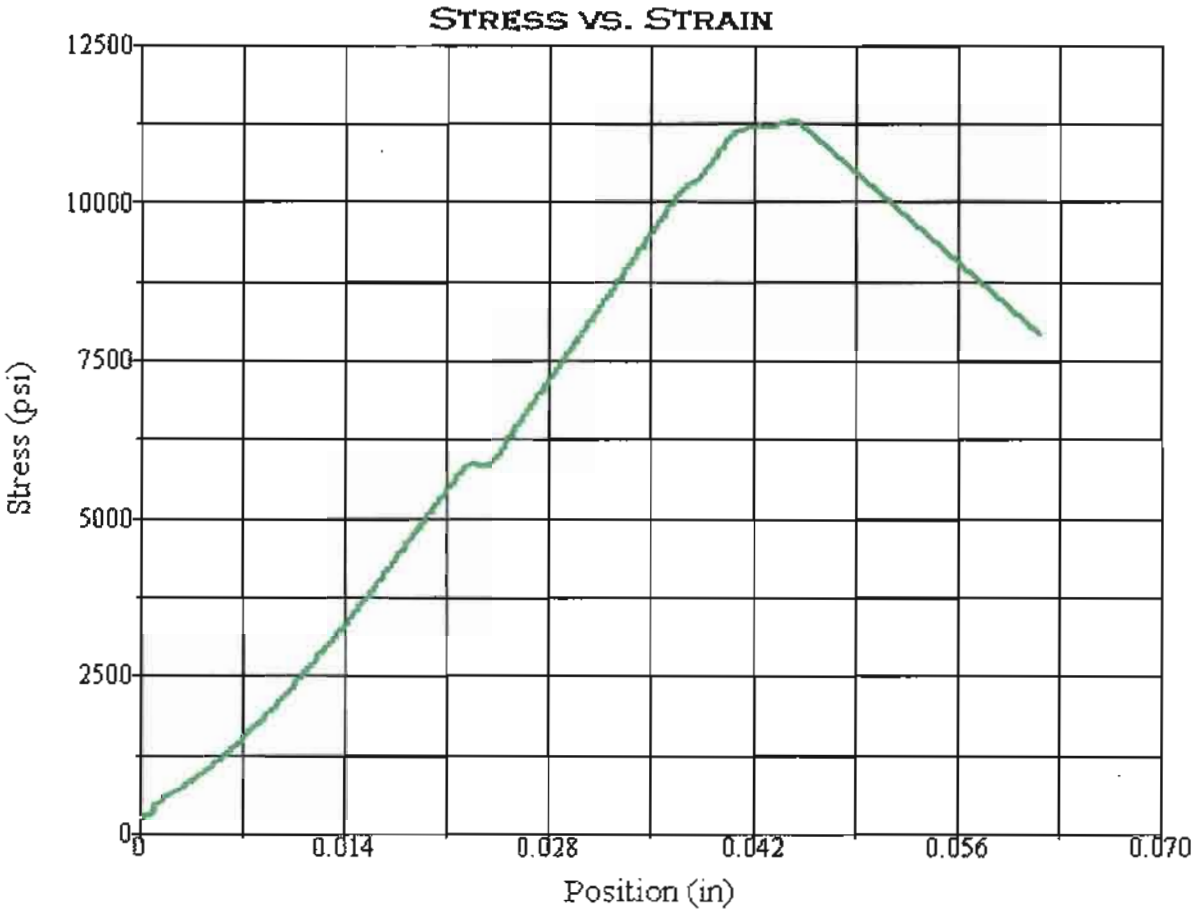
Test Summary

Counter:	1472
Elapsed Time:	00:12:21
Operator:	AZM
Sample:	R11-011-02
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	4:05:12 PM
End Date:	8/25/2011
End Time:	4:17:33 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-285

Test Results

Specimen Gage Length:	3.4300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	118608 lbf
Compressive Strength:	26218 psi

*Test stopped - reached limit of machine

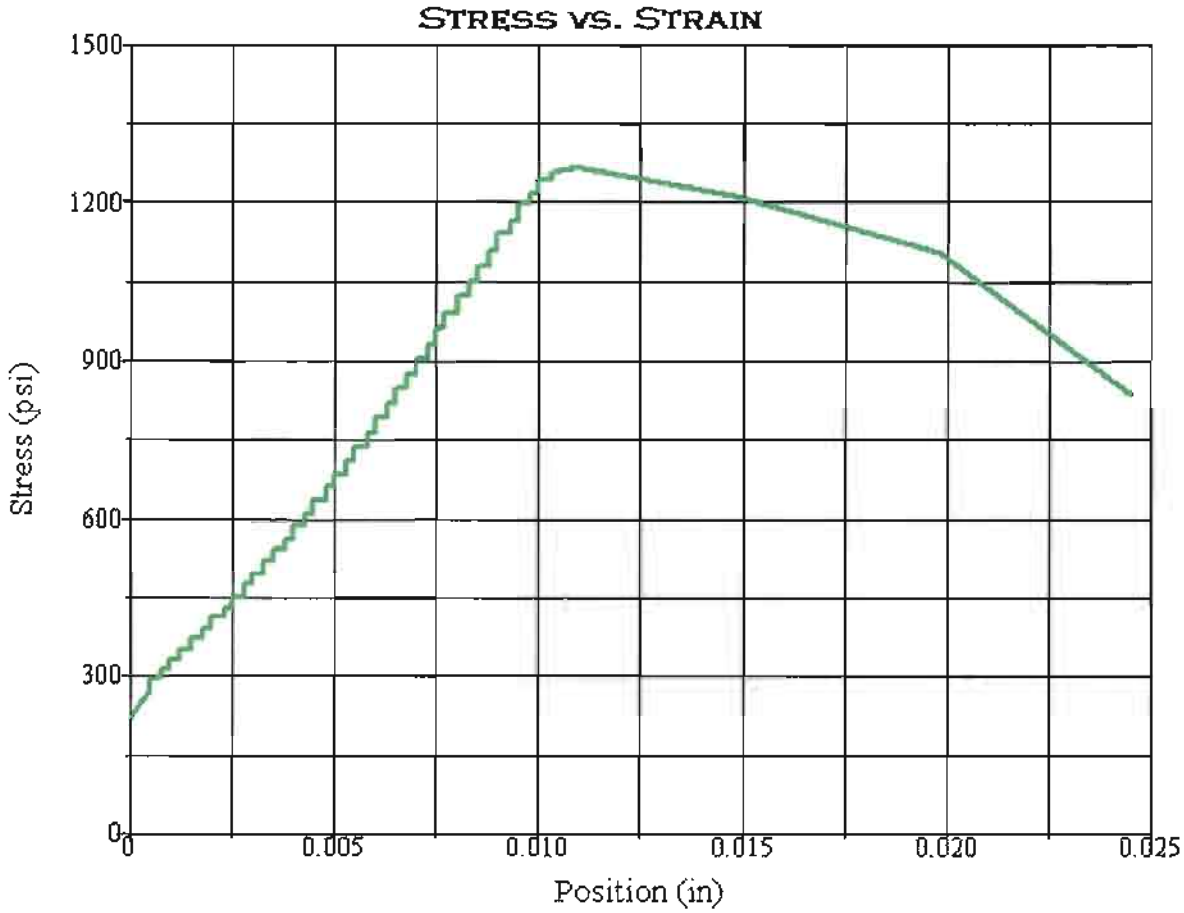


Test Summary

Counter:	1473
Elapsed Time:	00:05:10
Operator:	AMZ
Sample:	R11-011-04
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/26/2011
Start Time:	10:01:04 AM
End Date:	8/26/2011
End Time:	10:06:14 AM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-286

Test Results

Specimen Gage Length:	5.3100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	51046 lbf
Compressive Strength:	11284 psi

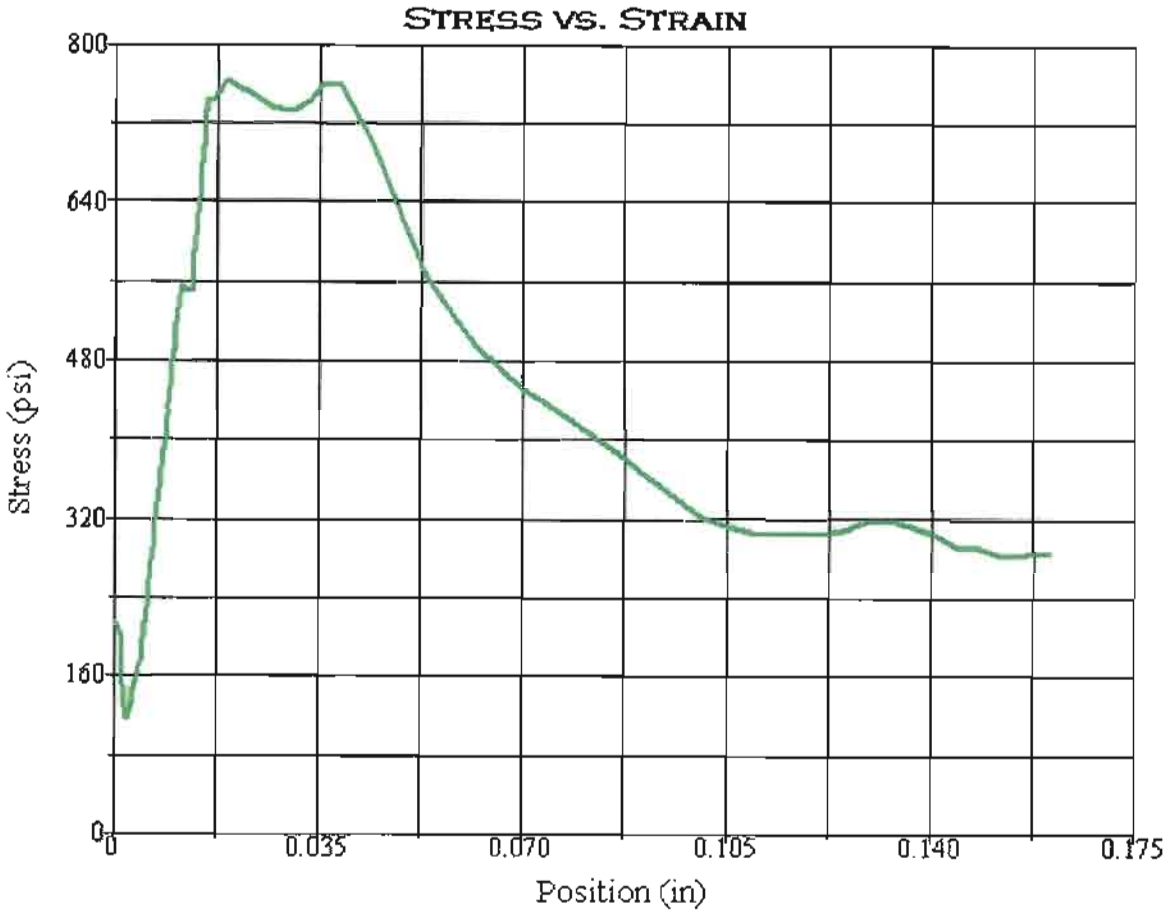


Test Summary

Counter:	1474
Elapsed Time:	00:00:29
Operator:	AZM
Sample:	R11-011-06
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/26/2011
Start Time:	10:15:56 AM
End Date:	8/26/2011
End Time:	10:16:25 AM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-288

Test Results

Specimen Gage Length:	5.6900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	5734 lbf
Compressive Strength:	1267 psi

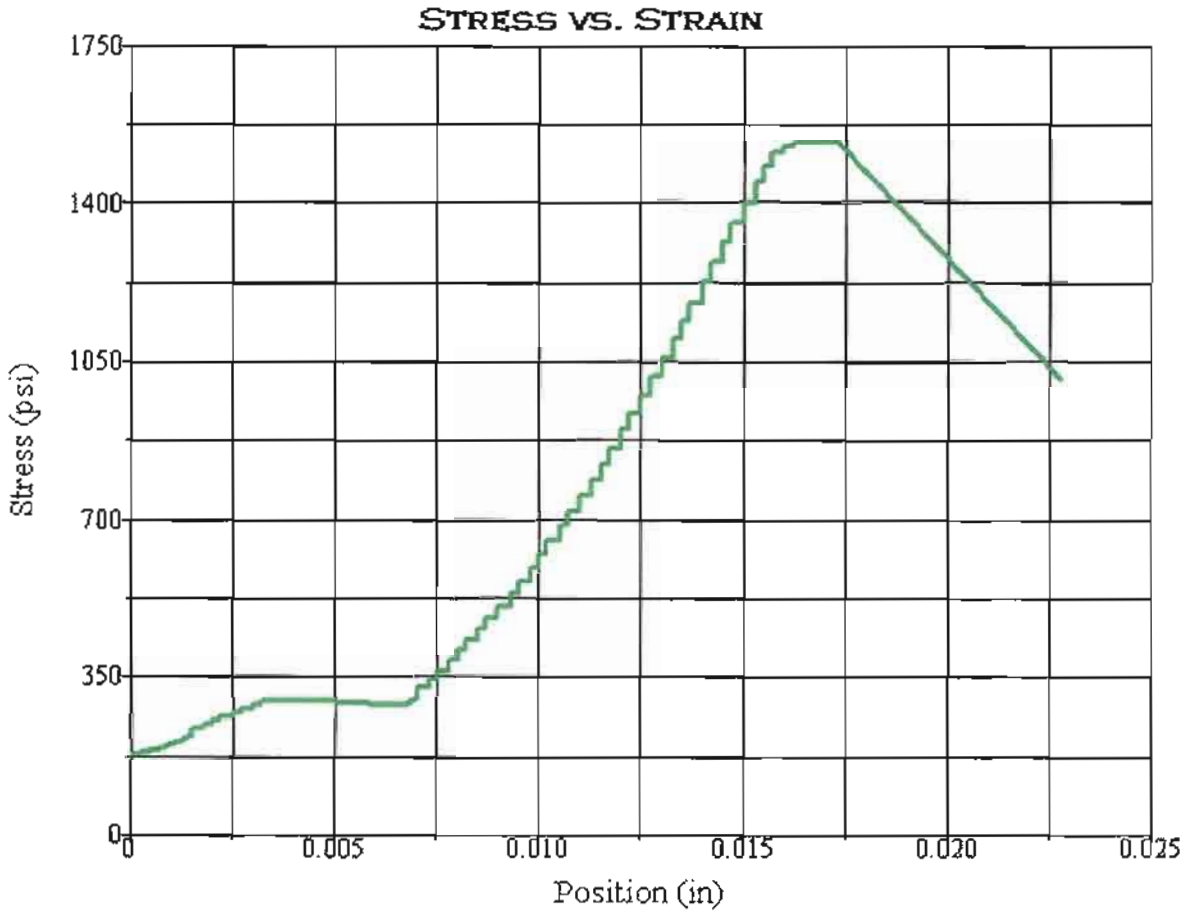


Test Summary

Counter:	1475
Elapsed Time:	00:00:23
Operator:	AZM
Sample:	R11-011-07
RATIO:	L/D< 2
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/26/2011
Start Time:	10:23:06 AM
End Date:	8/26/2011
End Time:	10:23:29 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-289

Test Results

Specimen Gage Length:	4.6700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	3449 lbf
Compressive Strength:	762 psi

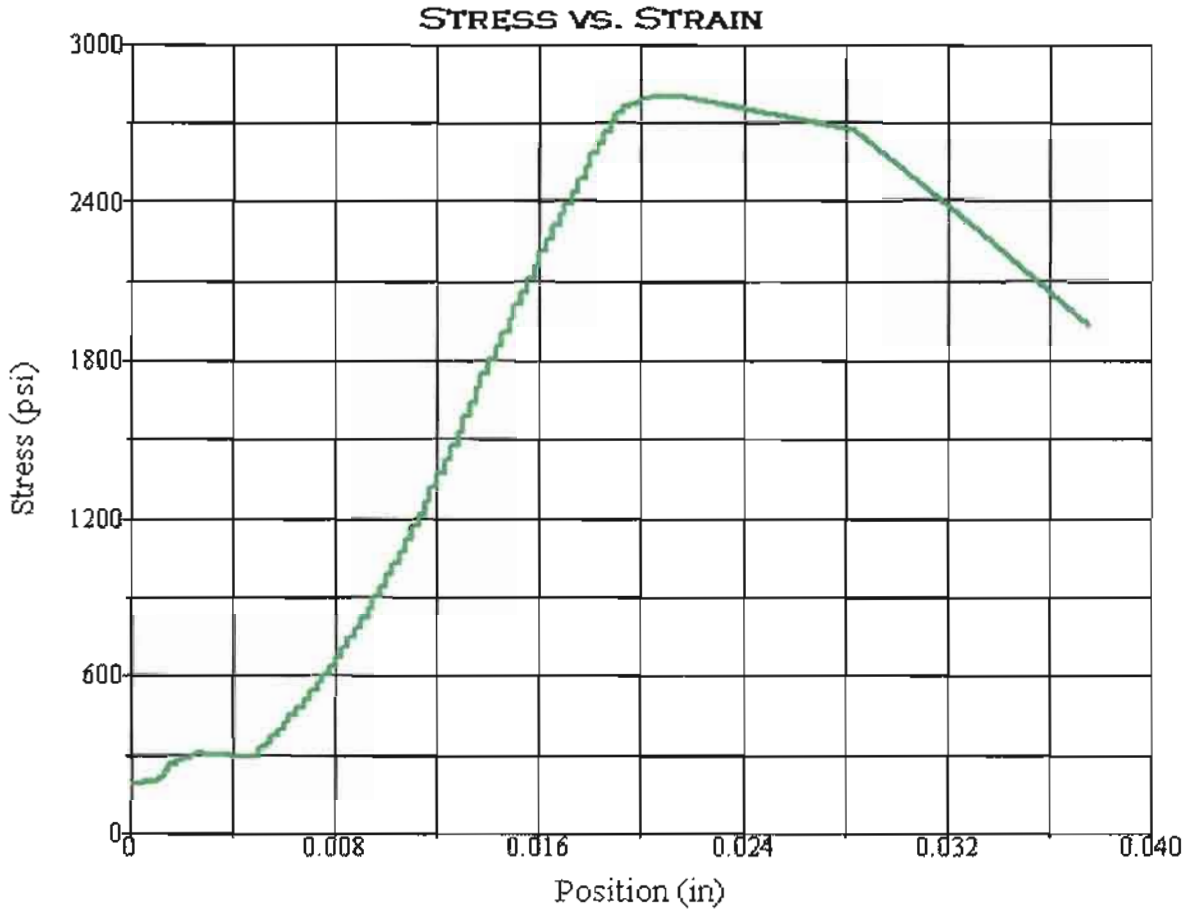


Test Summary

Counter:	1502
Elapsed Time:	00:00:37
Operator:	AZM
Sample:	R11-011-07A
RATIO:	L/D<2
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	11:56:56 AM
End Date:	8/31/2011
End Time:	11:57:33 AM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-290

Test Results

Specimen Gage Length:	2.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6936 lbf
Compressive Strength:	1533 psi

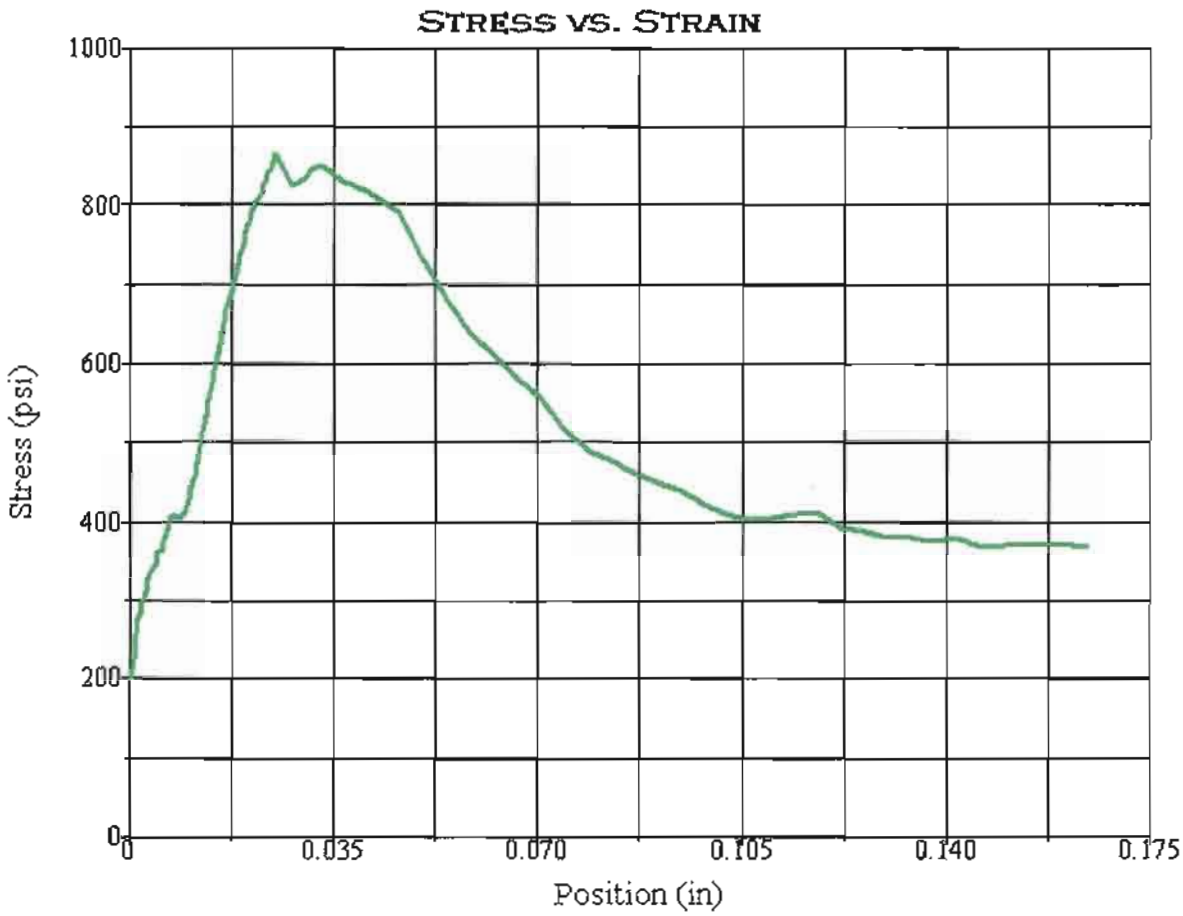


Test Summary

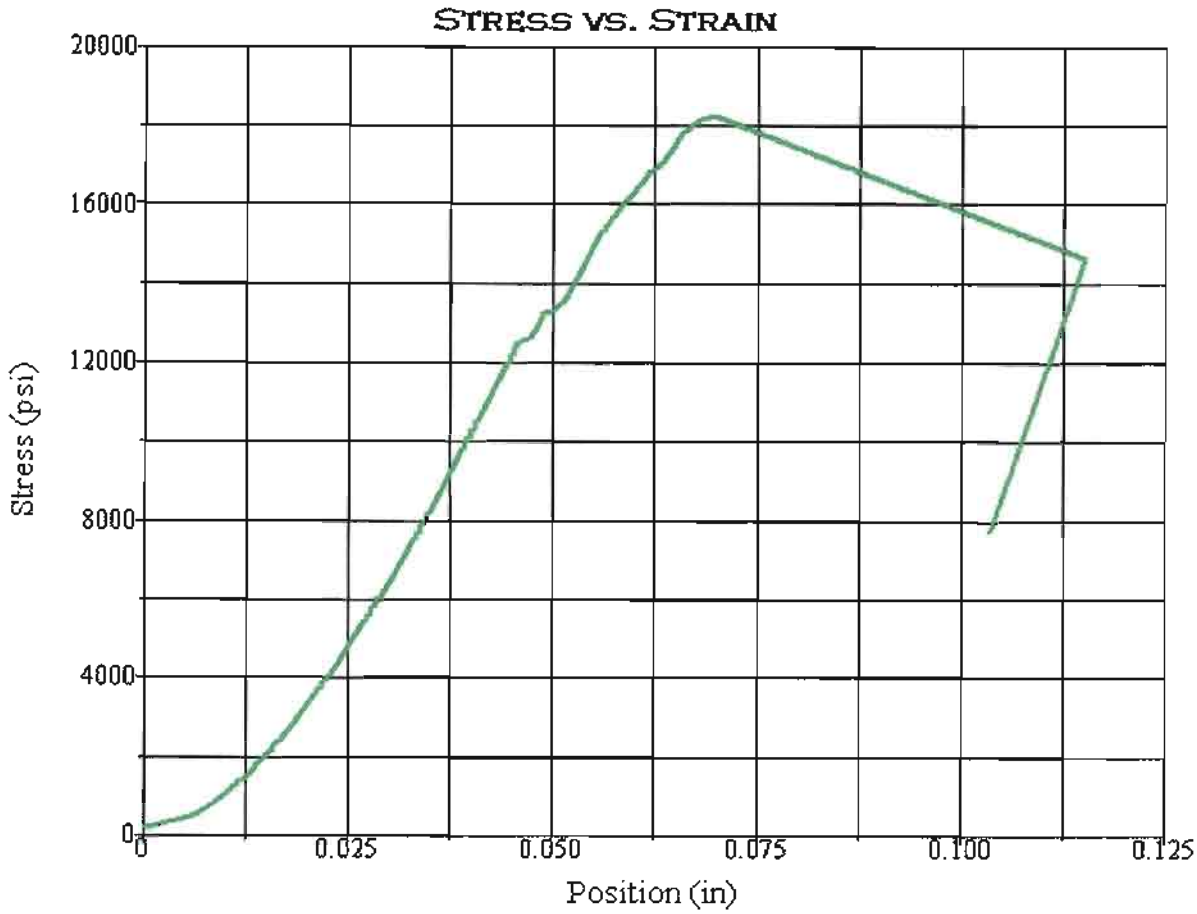
Counter:	1503
Elapsed Time:	00:01:14
Operator:	AZM
Sample:	R11-011-10
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	12:04:25 PM
End Date:	8/31/2011
End Time:	12:05:39 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-291

Test Results

Specimen Gage Length:	4.9100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12673 lbf
Compressive Strength:	2801 psi



Test Summary		Test Results	
Counter:	0	Specimen Gage Length:	3.0100 in
Elapsed Time:	00:00:21	Diameter:	2.4000 in
Operator:	AZM	Area:	4.5239 in²
Sample:	R11-011-10A	Maximum Load:	3907 lbf
	RATIO: L/D<2	Compressive Strength:	864 psi
Resident Engineer:			
Ticket:	GL # 11-067		
E.A./CONTRACT NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	8/31/2011		
Start Time:	12:10:33 PM		
End Date:	8/31/2011		
End Time:	12:10:54 PM		
Workstation:	D1K00YB1		
Tested By:	concrete		
Lab:	Q11-293		

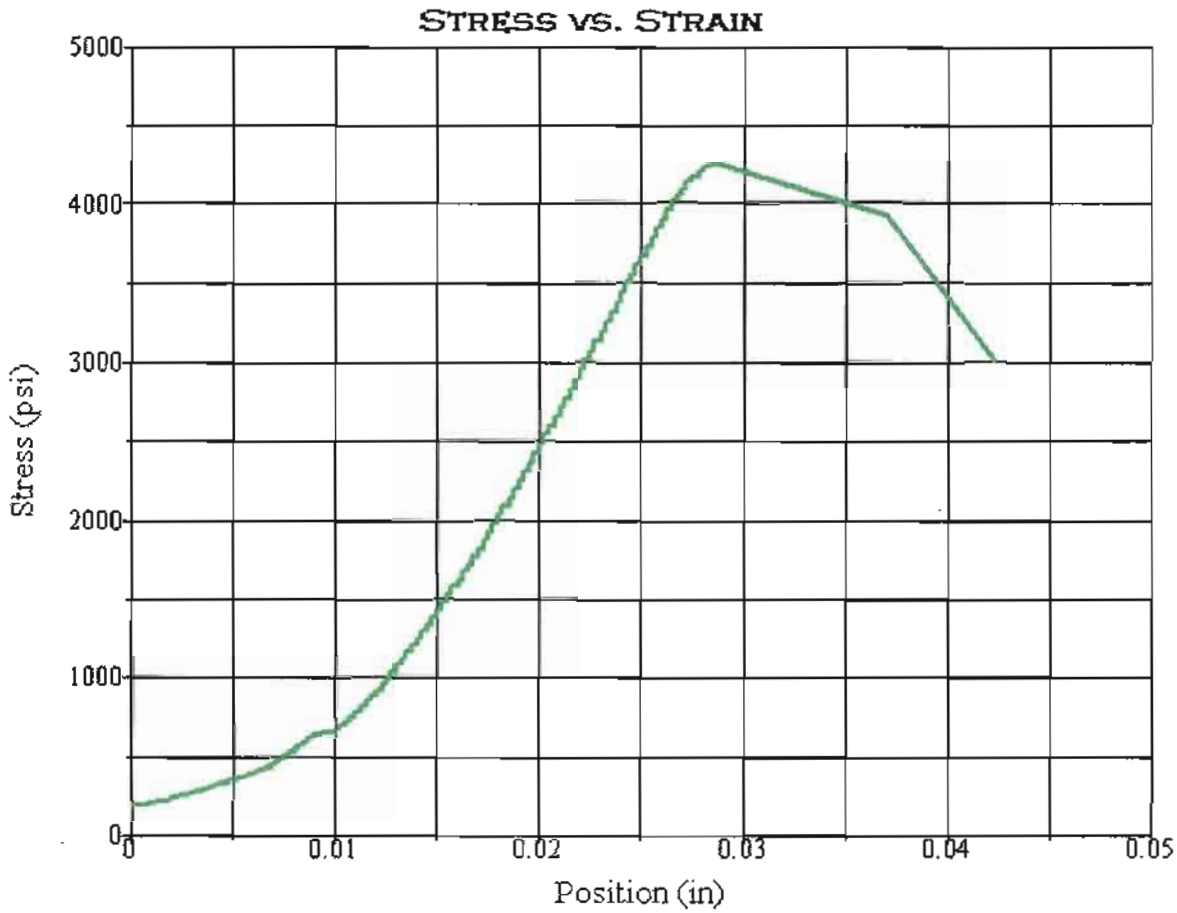


Test Summary

Counter:	1505
Elapsed Time:	00:08:35
Operator:	AZM
Sample:	R11-012-04
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	12:17:05 PM
End Date:	8/31/2011
End Time:	12:25:40 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-295

Test Results

Specimen Gage Length:	3.6000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	82418 lbf
Compressive Strength:	18218 psi

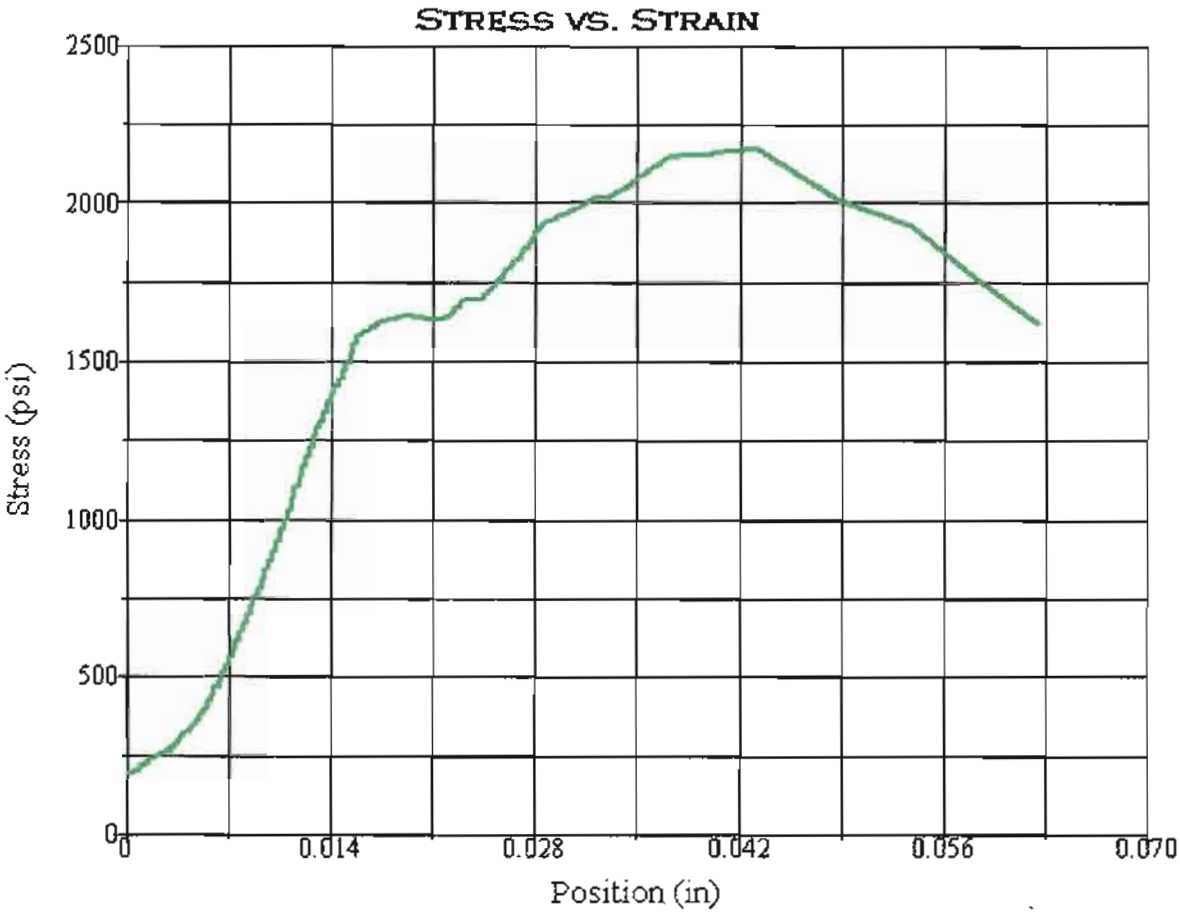


Test Summary

Counter:	1506
Elapsed Time:	00:01:56
Operator:	AZM
Sample:	R11-012-08
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	1:14:13 PM
End Date:	8/31/2011
End Time:	1:16:09 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-296

Test Results

Specimen Gage Length:	2.8000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	19188 lbf
Compressive Strength:	4241 psi

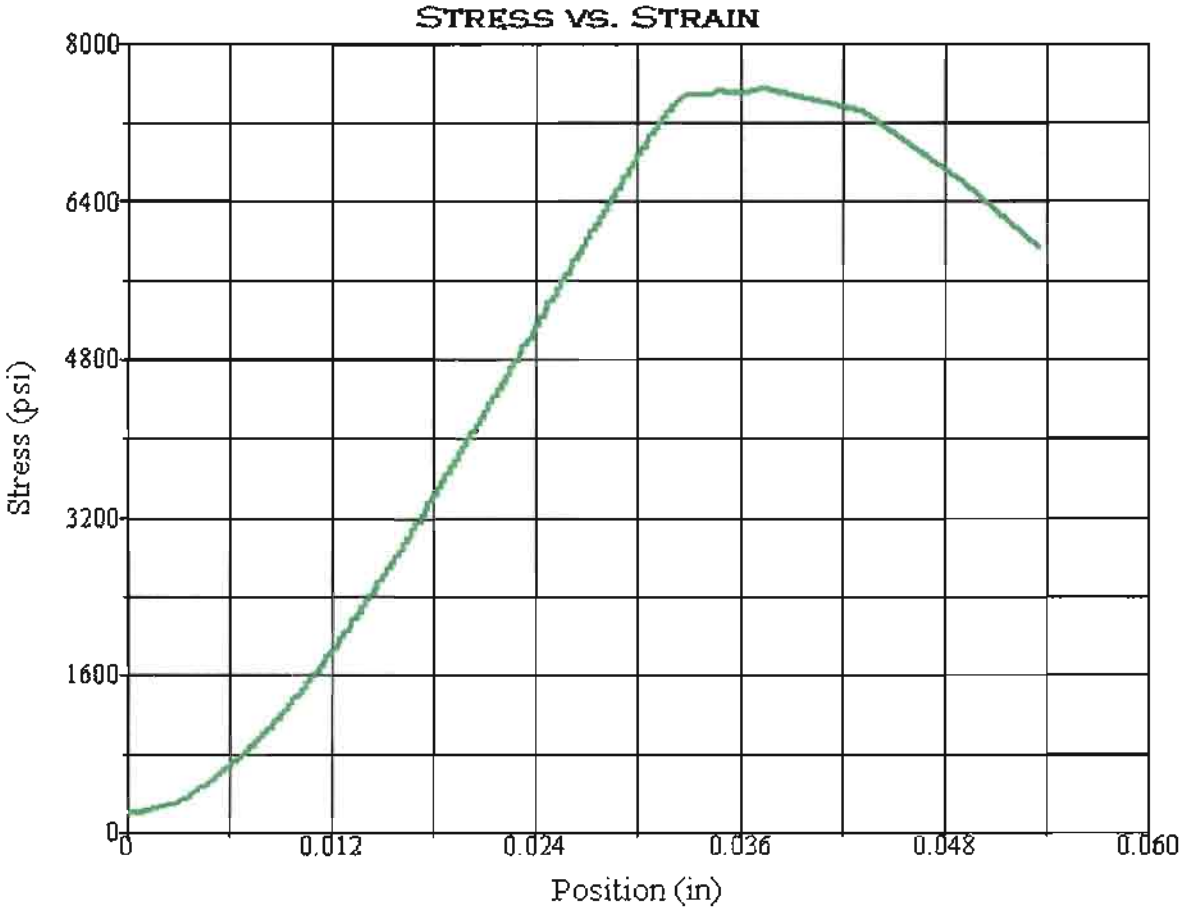


Test Summary

Counter:	1507
Elapsed Time:	00:00:57
Operator:	AZM
Sample:	R11-012-09
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	1:30:43 PM
End Date:	8/31/2011
End Time:	1:31:40 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-297

Test Results

Specimen Gage Length:	3.4800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	9818 lbf
Compressive Strength:	2170 psi

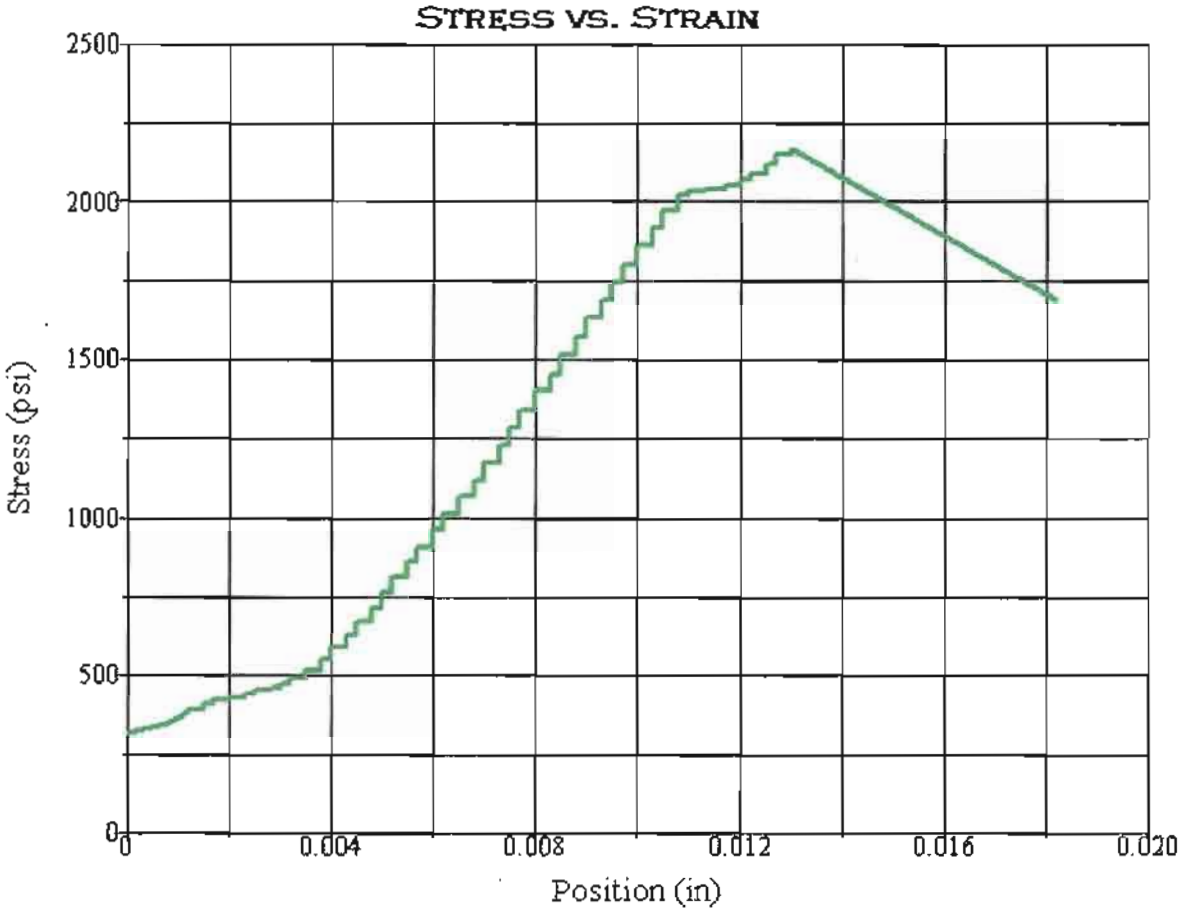


Test Summary

Counter:	1508
Elapsed Time:	00:03:29
Operator:	AZM
Sample:	R11-012-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:10:30 PM
End Date:	8/31/2011
End Time:	8:13:59 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-298

Test Results

Specimen Gage Length:	5.0600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	34072 lbf
Compressive Strength:	7532 psi

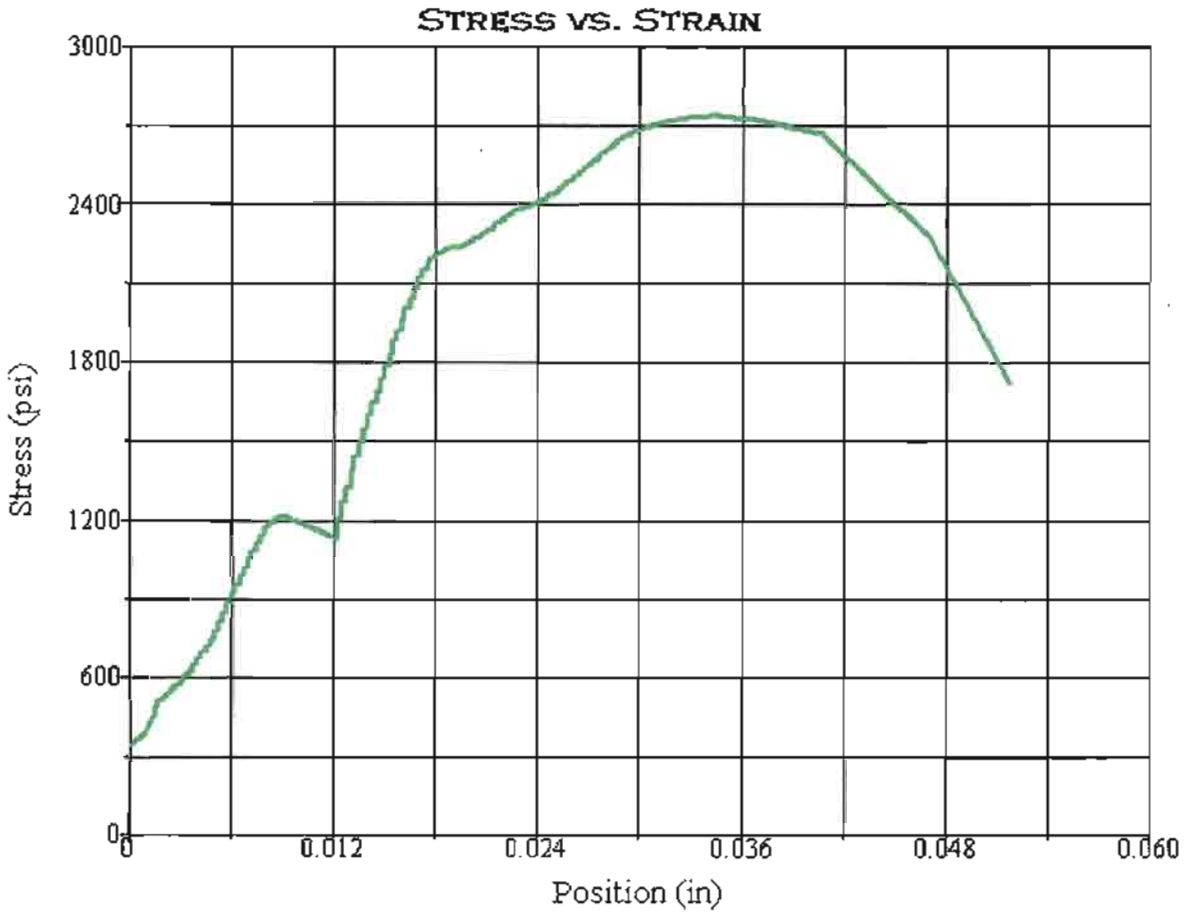


Test Summary

Counter:	1509
Elapsed Time:	00:00:51
Operator:	AZM
Sample:	R11-013-04
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:19:11 PM
End Date:	8/31/2011
End Time:	8:20:02 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-299

Test Results

Specimen Gage Length:	3.8200 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	5960 lbf
Compressive Strength:	2170 psi

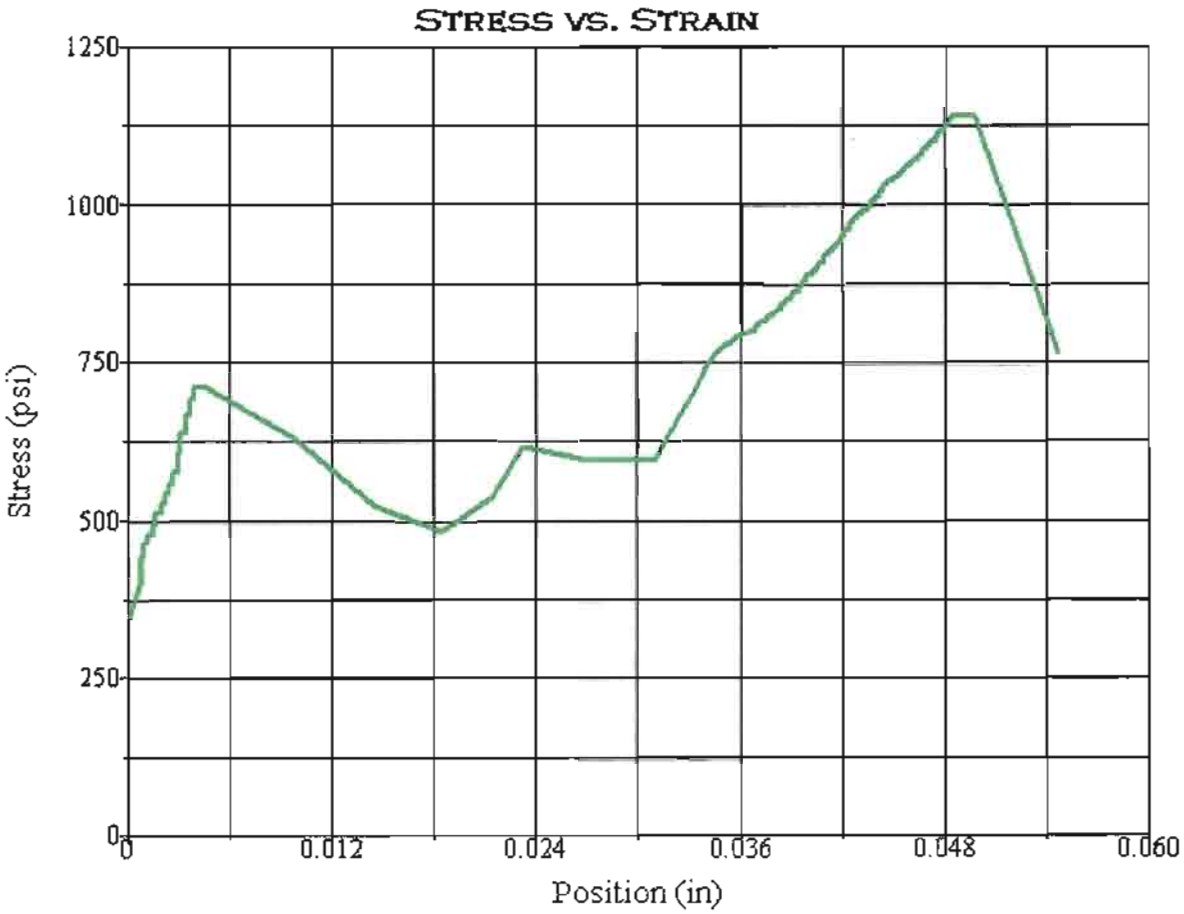


Test Summary

Counter:	1510
Elapsed Time:	00:01:06
Operator:	AZM
Sample:	R11-013-07
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:24:09 PM
End Date:	8/31/2011
End Time:	8:25:15 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-301

Test Results

Specimen Gage Length:	4.4000 in
Diameter:	1.8800 in
Area:	2.7759 in²
Maximum Load:	7594 lbf
Compressive Strength:	2736 psi

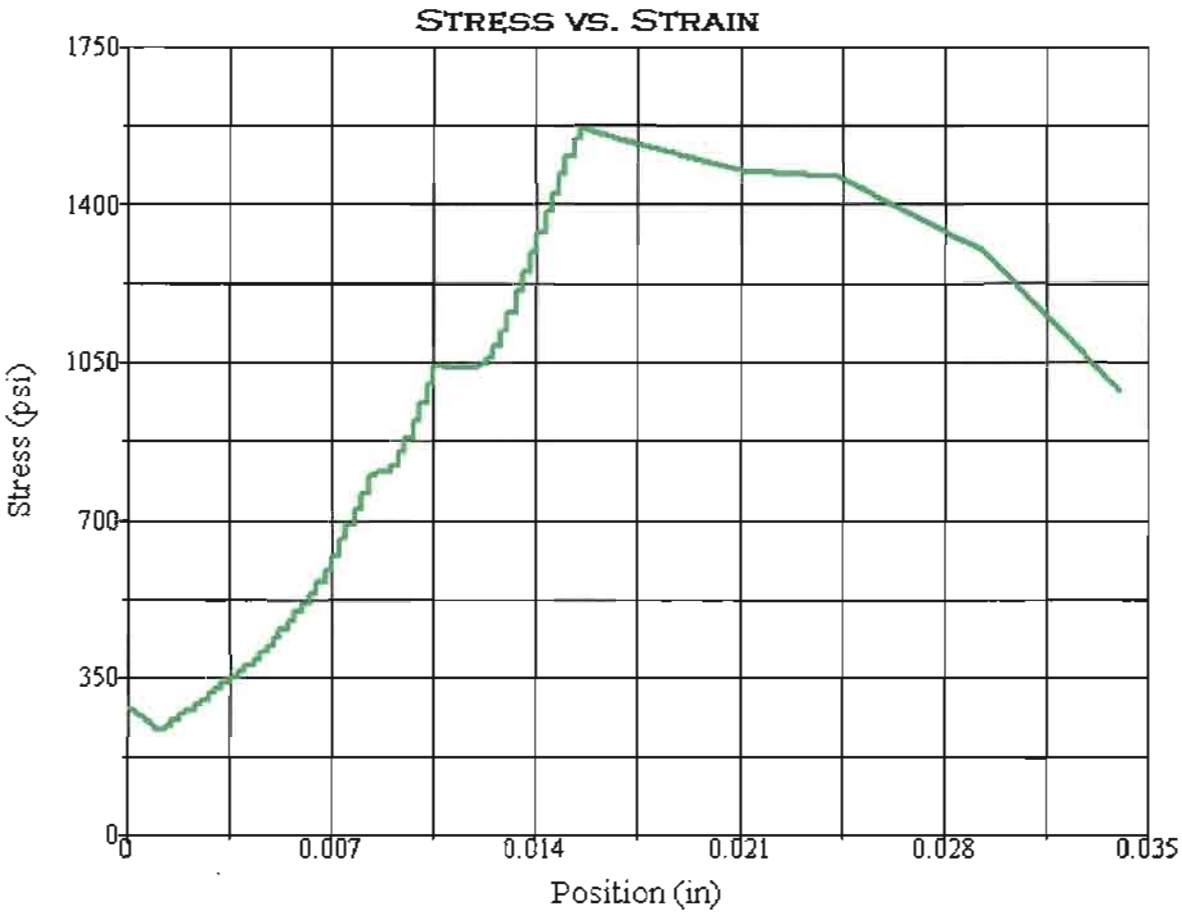


Test Summary

Counter:	1511
Elapsed Time:	00:00:21
Operator:	AZM
Sample:	R11-013-09
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:29:20 PM
End Date:	8/31/2011
End Time:	8:29:41 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-302

Test Results

Specimen Gage Length:	4.4300 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	3136 lbf
Compressive Strength:	1142 psi

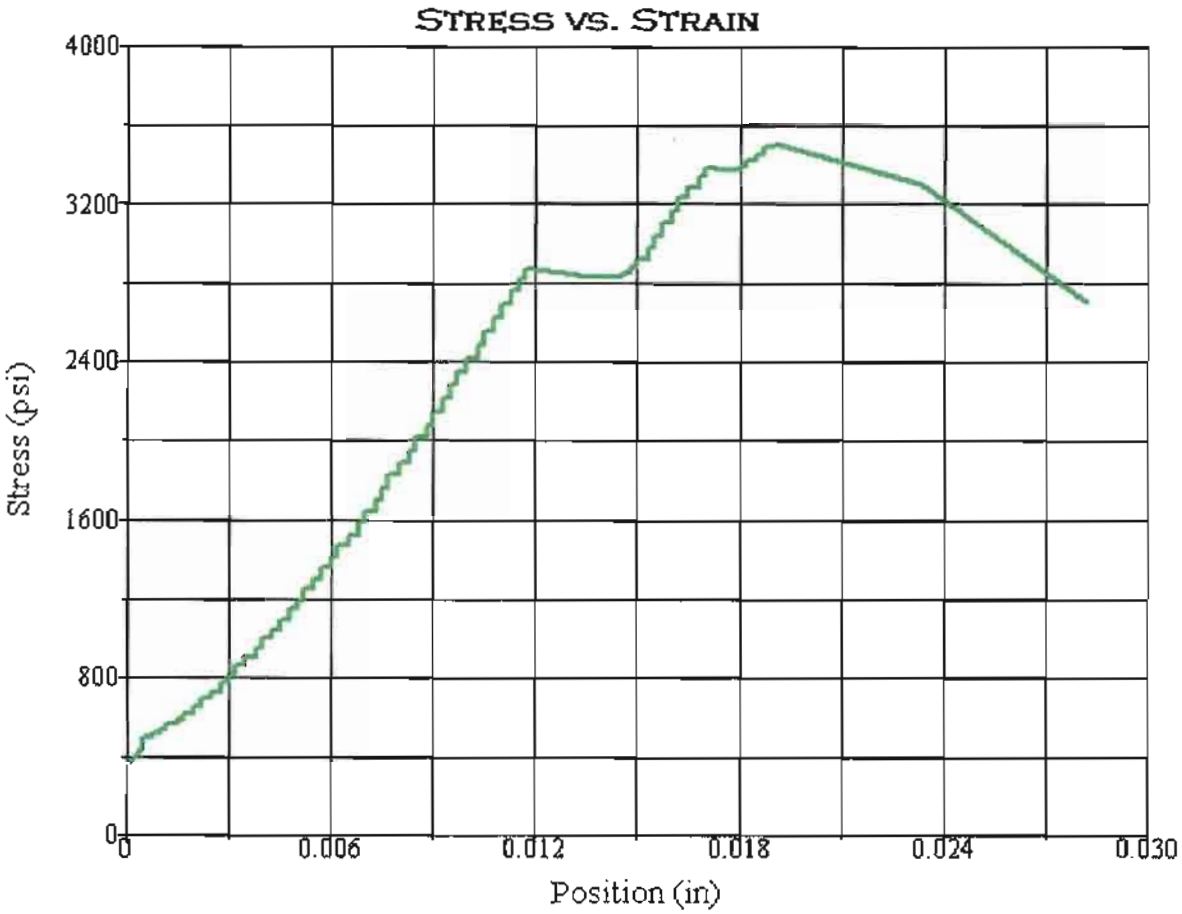


Test Summary

Counter:	1512
Elapsed Time:	00:00:40
Operator:	AZM
Sample:	R11-013-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:11:27 PM
End Date:	9/1/2011
End Time:	3:12:07 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-303

Test Results

Specimen Gage Length:	3.8000 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	4312 lbf
Compressive Strength:	1570 psi

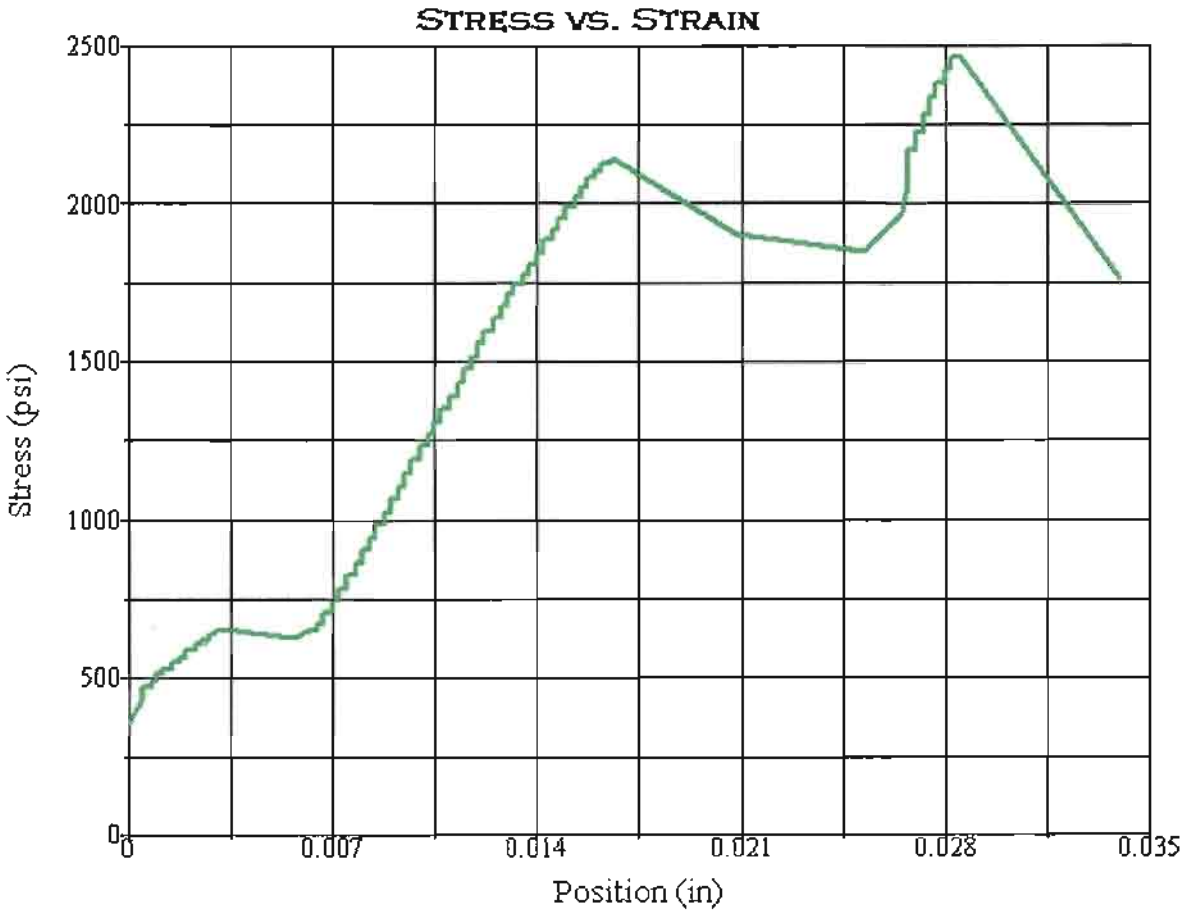


Test Summary

Counter:	1513
Elapsed Time:	00:01:28
Operator:	AZM
Sample:	R11-013-12
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:18:37 PM
End Date:	9/1/2011
End Time:	3:20:05 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-304

Test Results

Specimen Gage Length:	4.5300 in
Diameter:	1.8600 in
Area:	2.7172 in²
Maximum Load:	9521 lbf
Compressive Strength:	3504 psi

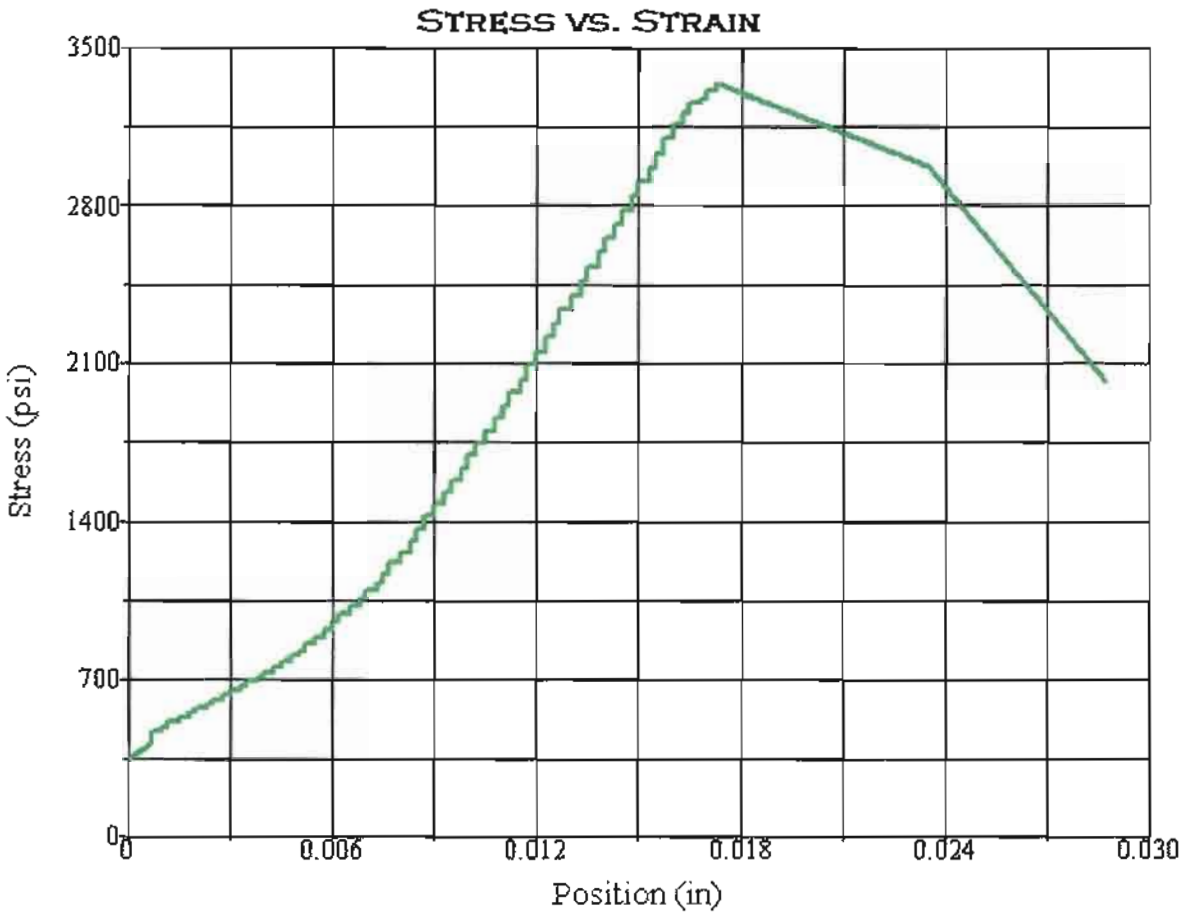


Test Summary

Counter:	1514
Elapsed Time:	00:00:58
Operator:	AMZ
Sample:	R11-013-13
Resident Engineer:	
Ticket:	GL # 11- 067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:27:02 PM
End Date:	9/1/2011
End Time:	3:28:00 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-305

Test Results

Specimen Gage Length:	4.4400 in
Diameter:	1.8800 in
Area:	2.7759 in²
Maximum Load:	6846 lbf
Compressive Strength:	2466 psi

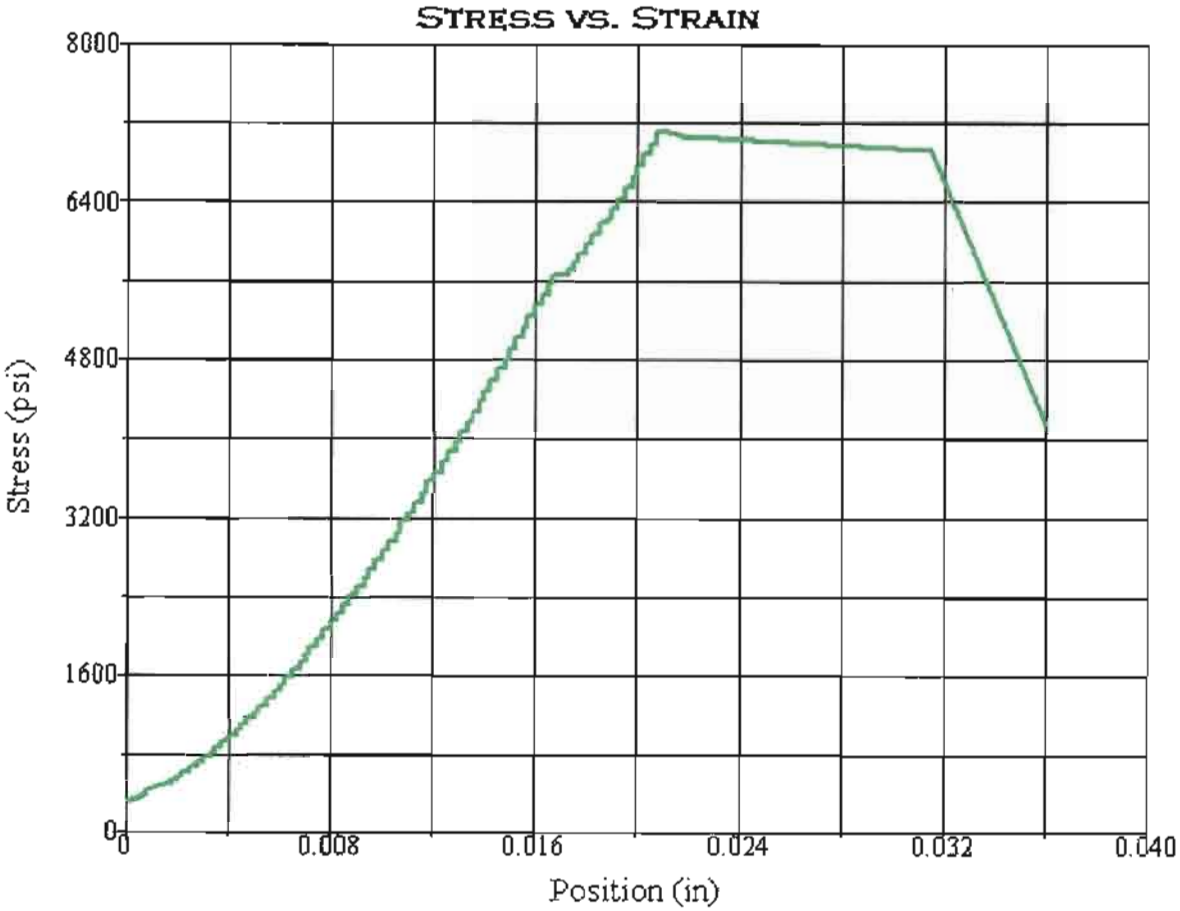


Test Summary

Counter:	1515
Elapsed Time:	00:01:23
Operator:	AZM
Sample:	R11-013-14
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:37:58 PM
End Date:	9/1/2011
End Time:	3:39:21 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-306

Test Results

Specimen Gage Length:	3.9700 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	9180 lbf
Compressive Strength:	3342 psi

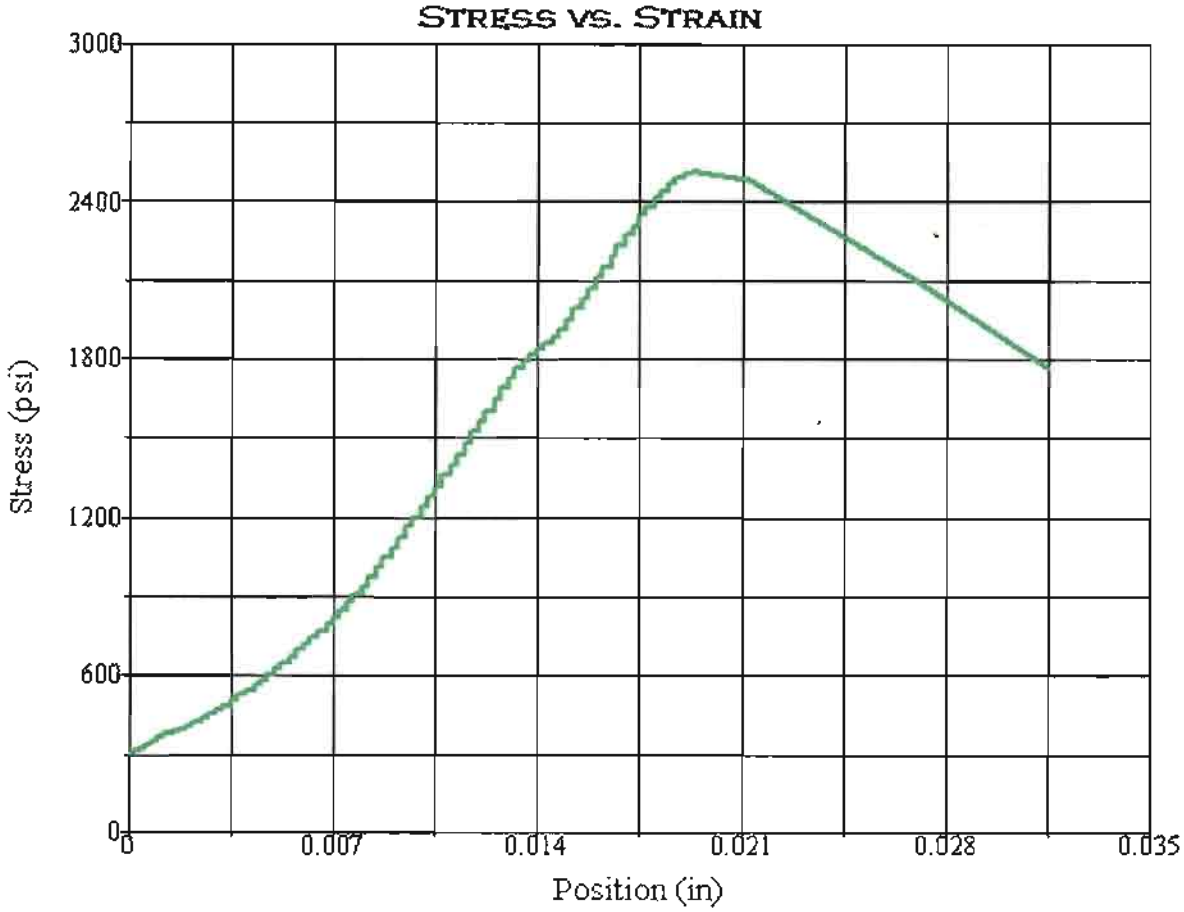


Test Summary

Counter:	1516
Elapsed Time:	00:03:13
Operator:	KS
Sample:	R11-013-16
Resident Engineer:	55-55.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	07-181604
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:25:04 PM
End Date:	9/8/2011
End Time:	2:28:17 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-307

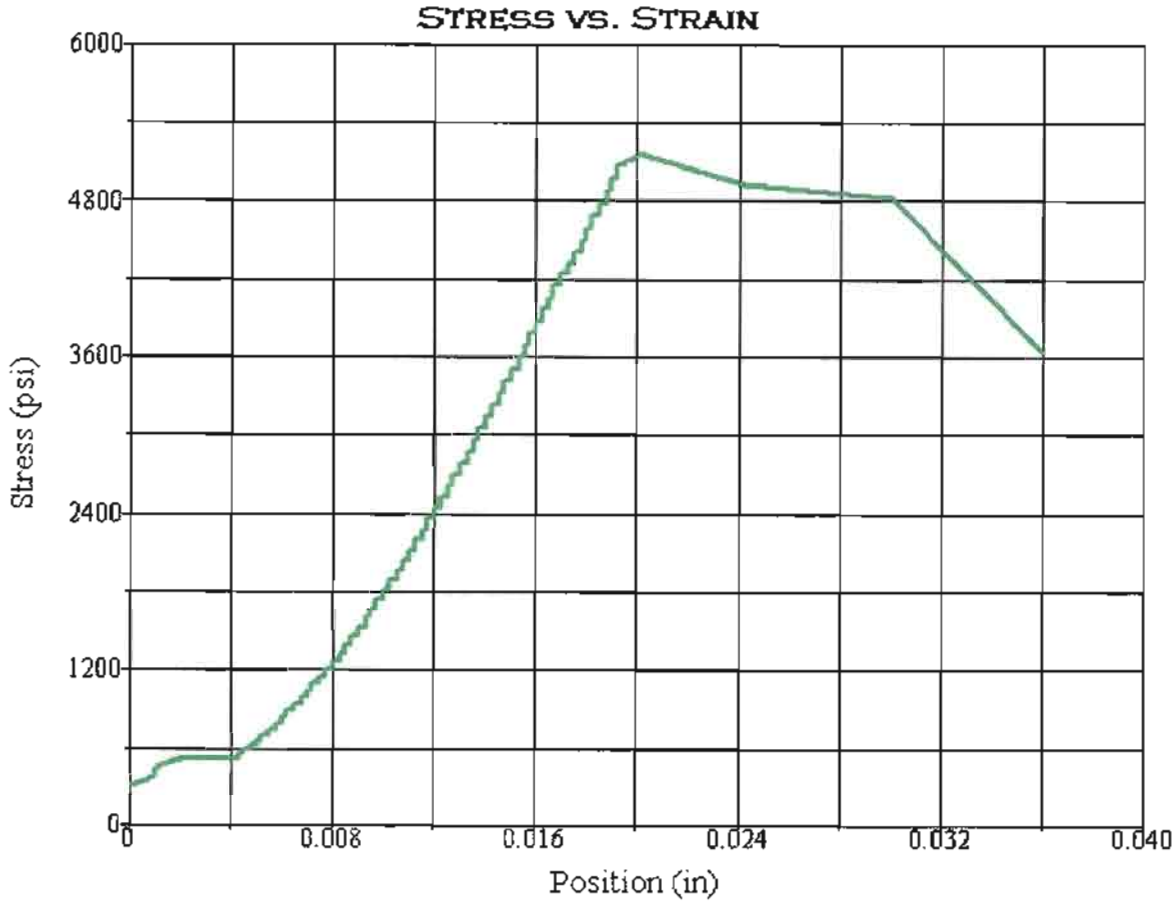
Test Results

Specimen Gage Length:	4.4500 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	19548 lbf
Compressive Strength:	7117 psi



Test Summary	
Counter:	1517
Elapsed Time:	00:01:02
Operator:	KS
Sample:	R11-013-17
Resident Engineer:	61-61.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:37:35 PM
End Date:	9/8/2011
End Time:	2:38:37 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-308

Test Results	
Specimen Gage Length:	4.4800 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	6904 lbf
Compressive Strength:	2514 psi

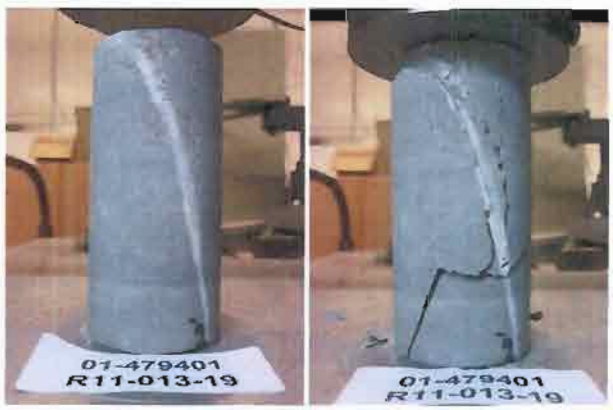


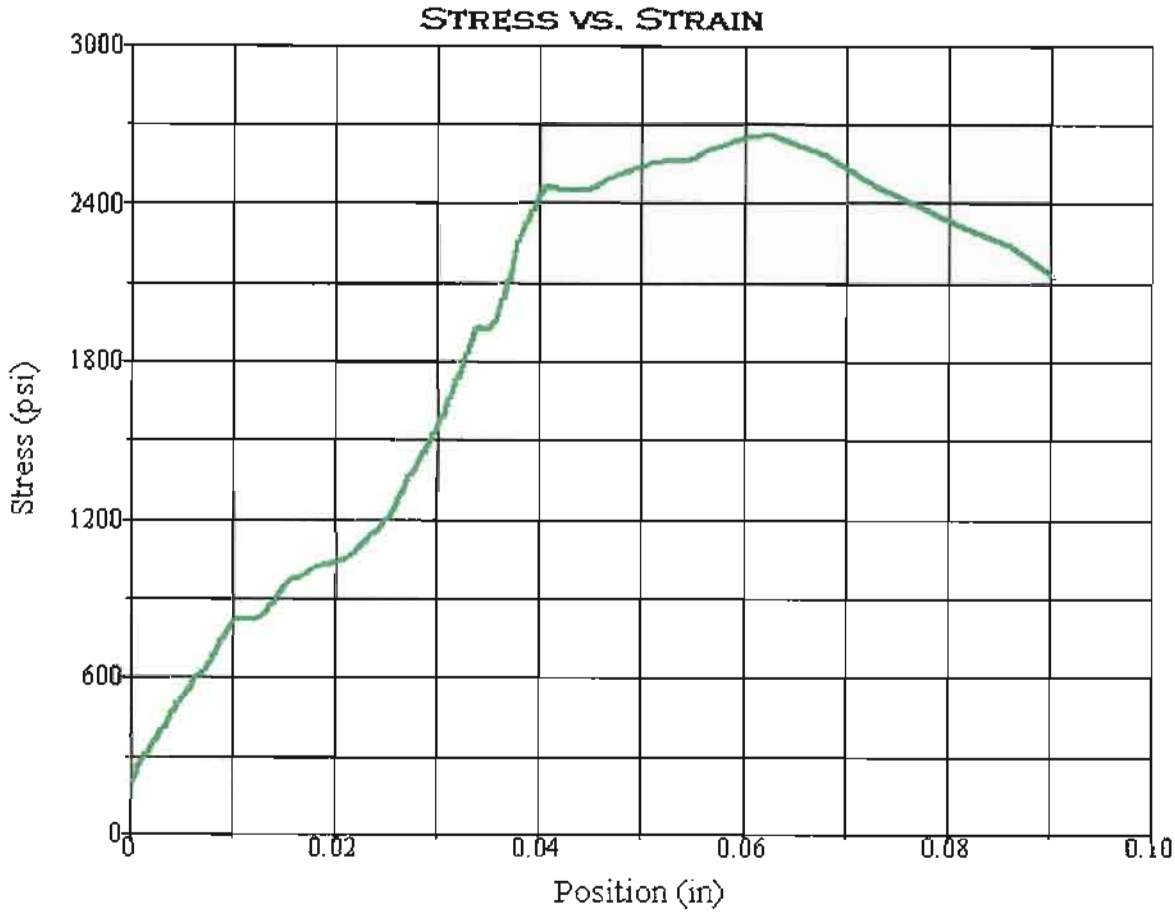
Test Summary

Counter:	1518
Elapsed Time:	00:02:16
Operator:	KS
Sample:	R11-013-19
Resident Engineer:	69.5-70'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:43:07 PM
End Date:	9/8/2011
End Time:	2:45:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-309

Test Results

Specimen Gage Length:	4.0200 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	14154 lbf
Compressive Strength:	5153 psi





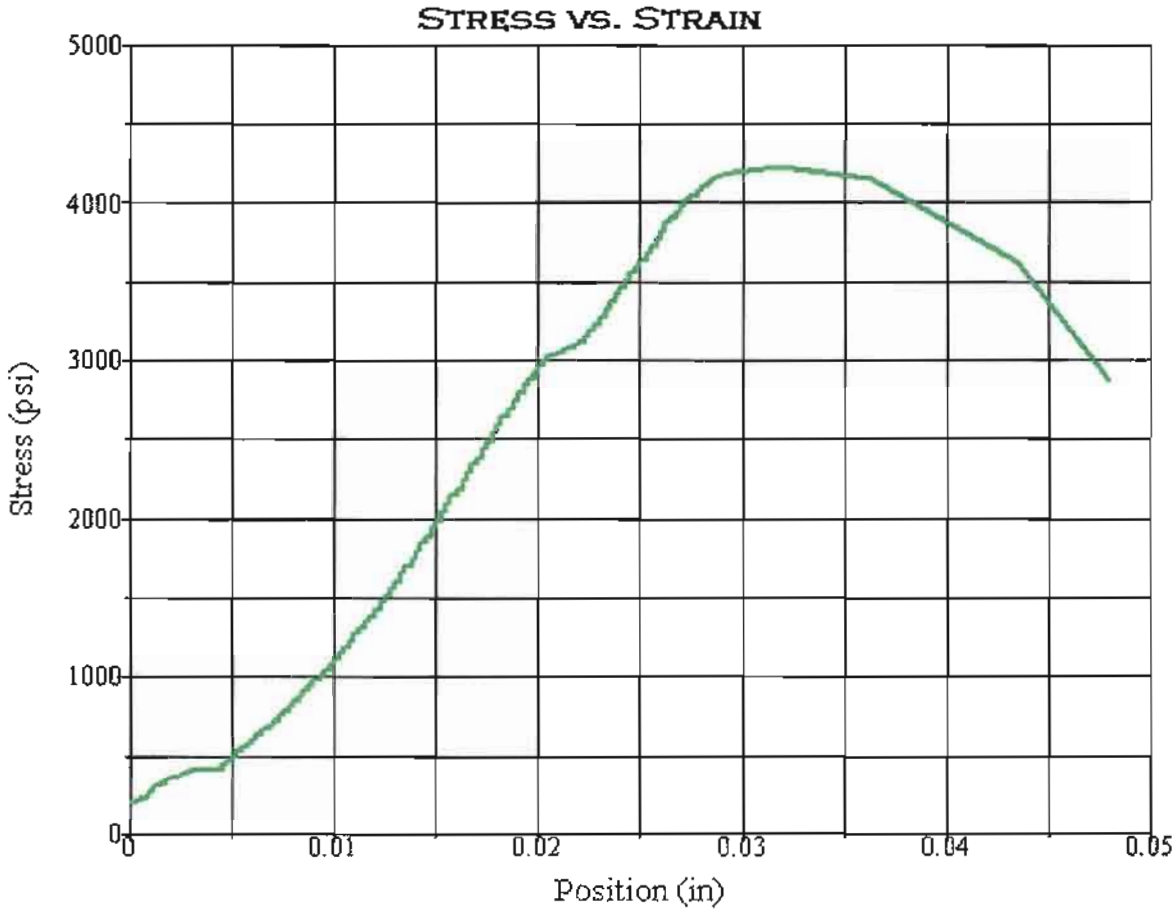
Test Summary

Counter:	1519
Elapsed Time:	00:01:10
Operator:	KS
Sample:	R11-014-08
Resident Engineer:	20.3-20.6'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:53:14 PM
End Date:	9/8/2011
End Time:	2:54:24 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-310

RATIO: L/D<2

Test Results

Specimen Gage Length:	2.7200 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	11805 lbf
Compressive Strength:	2654 psi



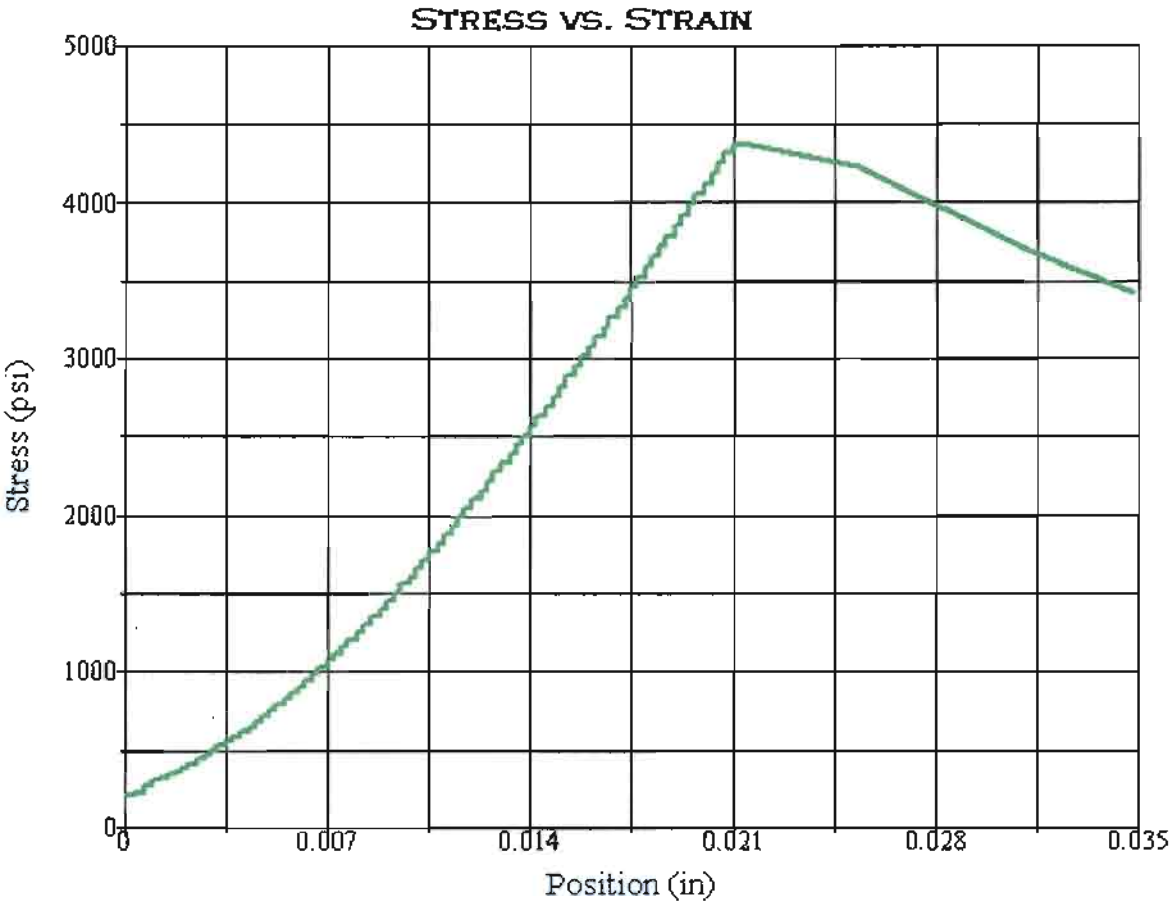
Test Summary

Counter:	1520
Elapsed Time:	00:01:53
Operator:	KS
Sample:	R11-014-09
Resident Engineer:	25-26'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:58:49 PM
End Date:	9/8/2011
End Time:	3:00:42 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-311

RATIO: L/D<2

Test Results

Specimen Gage Length:	4.3500 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	18734 lbf
Compressive Strength:	4211 psi



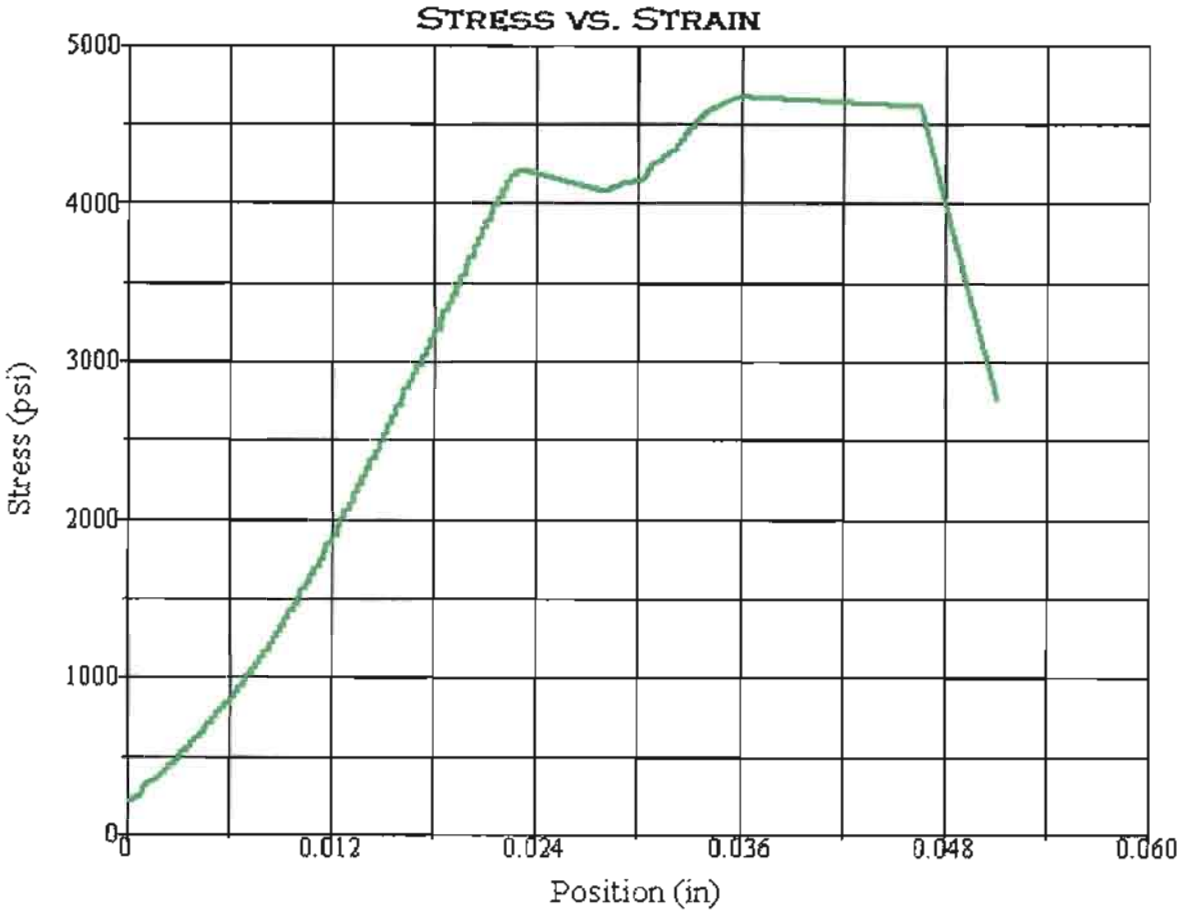
Test Summary

Counter:	1521
Elapsed Time:	00:01:58
Operator:	KS
Sample:	R11-014-12
Resident Engineer:	43-43.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:05:29 PM
End Date:	9/8/2011
End Time:	3:07:27 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-313

RATIO: L/D<2

Test Results

Specimen Gage Length:	4.3800 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	19442 lbf
Compressive Strength:	4370 psi

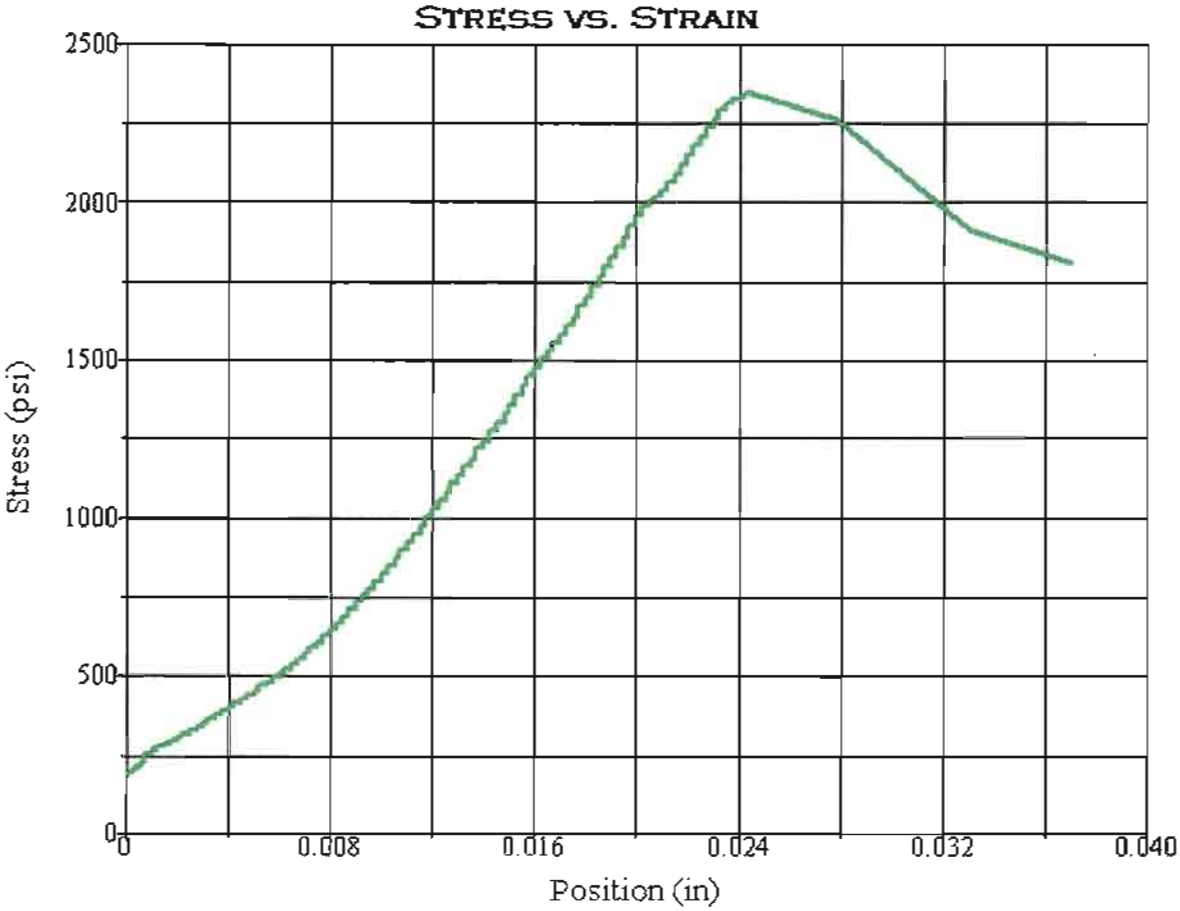


Test Summary

Counter:	1522
Elapsed Time:	00:02:05
Operator:	KS
Sample:	R11-014-13
Resident Engineer:	46.5-47.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:10:21 PM
End Date:	9/8/2011
End Time:	3:12:26 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-314

Test Results

Specimen Gage Length:	5.5800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21160 lbf
Compressive Strength:	4677 psi

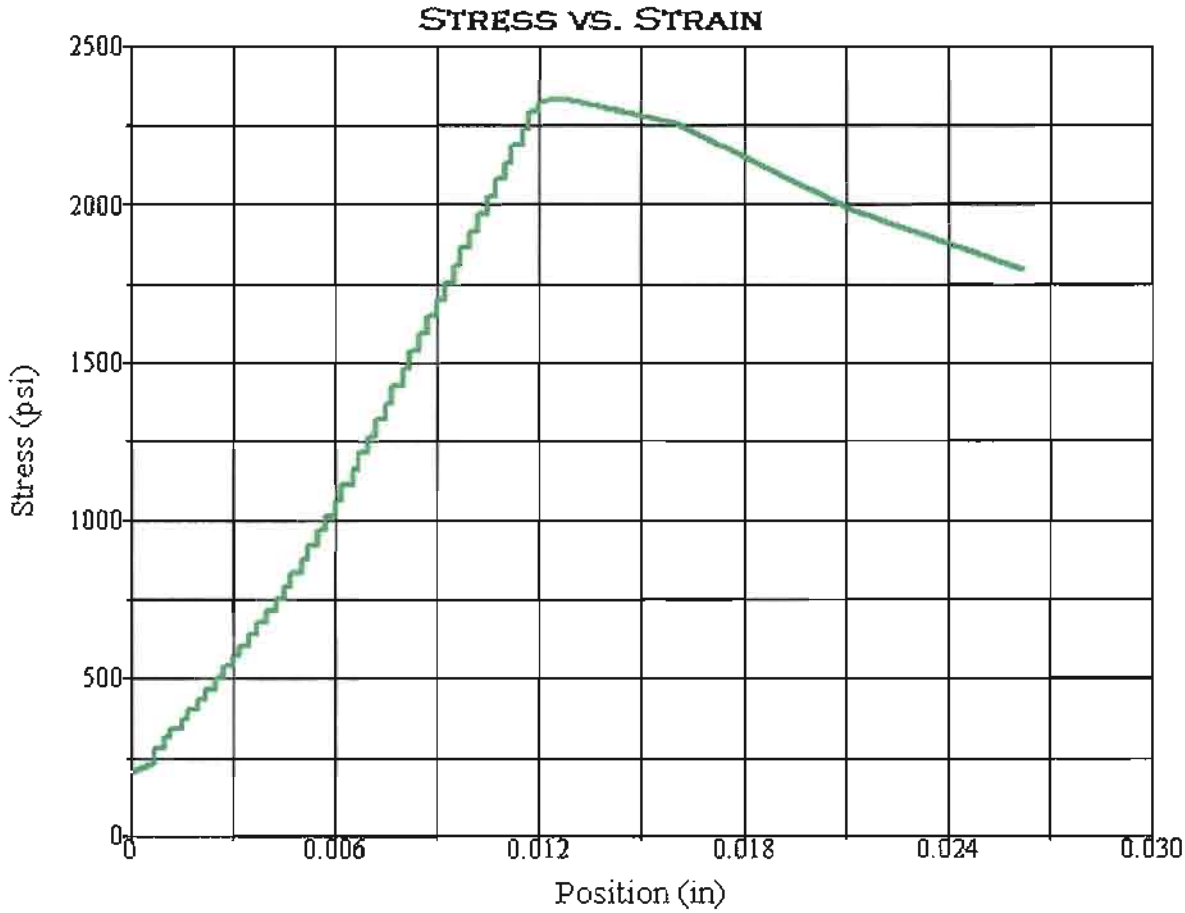


Test Summary

Counter:	1523
Elapsed Time:	00:01:01
Operator:	KS
Sample:	R11-014-15
Resident Engineer:	55-55.8'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:16:14 PM
End Date:	9/8/2011
End Time:	3:17:15 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-315

Test Results

Specimen Gage Length:	5.4700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10596 lbf
Compressive Strength:	2342 psi

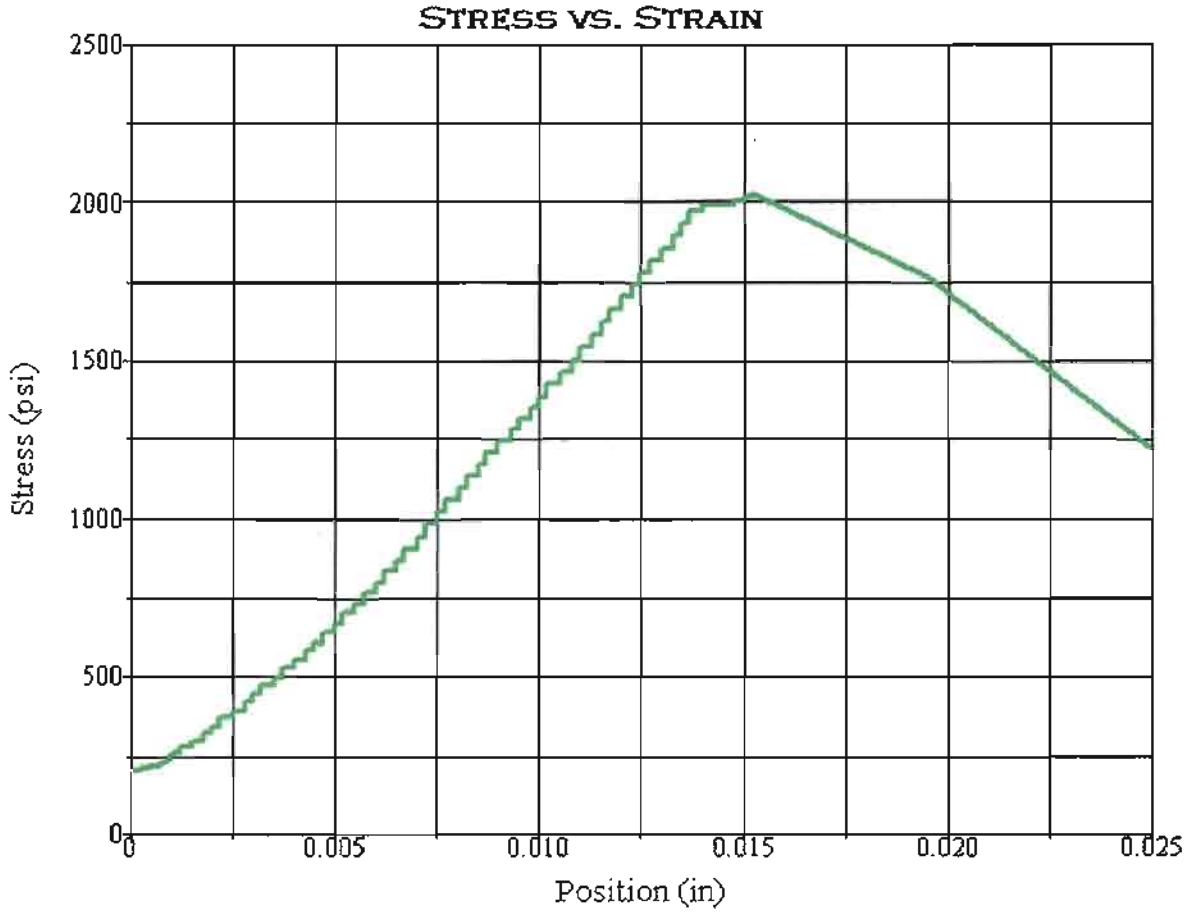


Test Summary

Counter:	1524
Elapsed Time:	00:01:00
Operator:	KS
Sample:	R11-014-15A
Resident Engineer:	57-57.8'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:20:45 PM
End Date:	9/8/2011
End Time:	3:21:45 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-316

Test Results

Specimen Gage Length:	5.5800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10562 lbf
Compressive Strength:	2335 psi

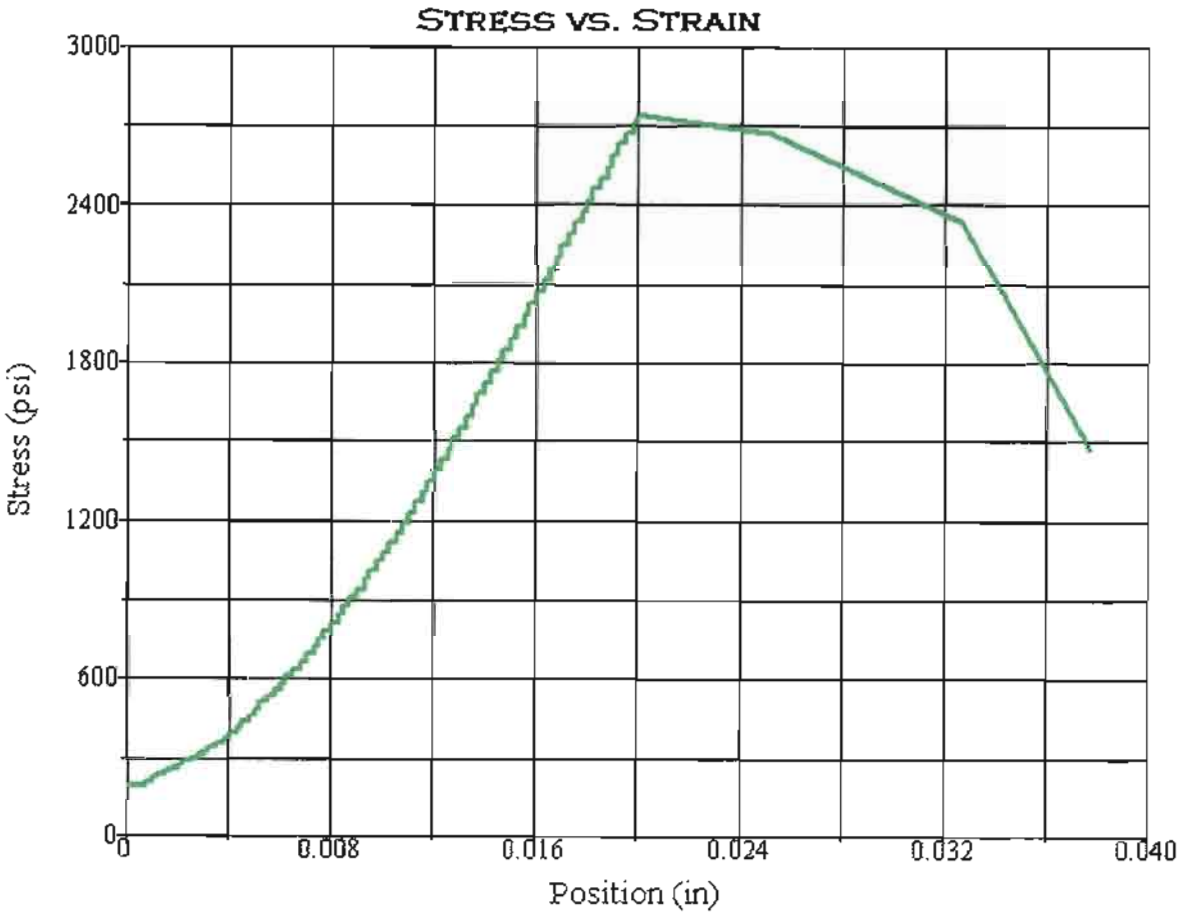


Test Summary

Counter:	1525
Elapsed Time:	00:00:51
Operator:	KS
Sample:	R11-014-16
Resident Engineer:	61.5-62'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:25:17 PM
End Date:	9/8/2011
End Time:	3:26:08 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-317

Test Results

Specimen Gage Length:	5.5200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	9157 lbf
Compressive Strength:	2024 psi

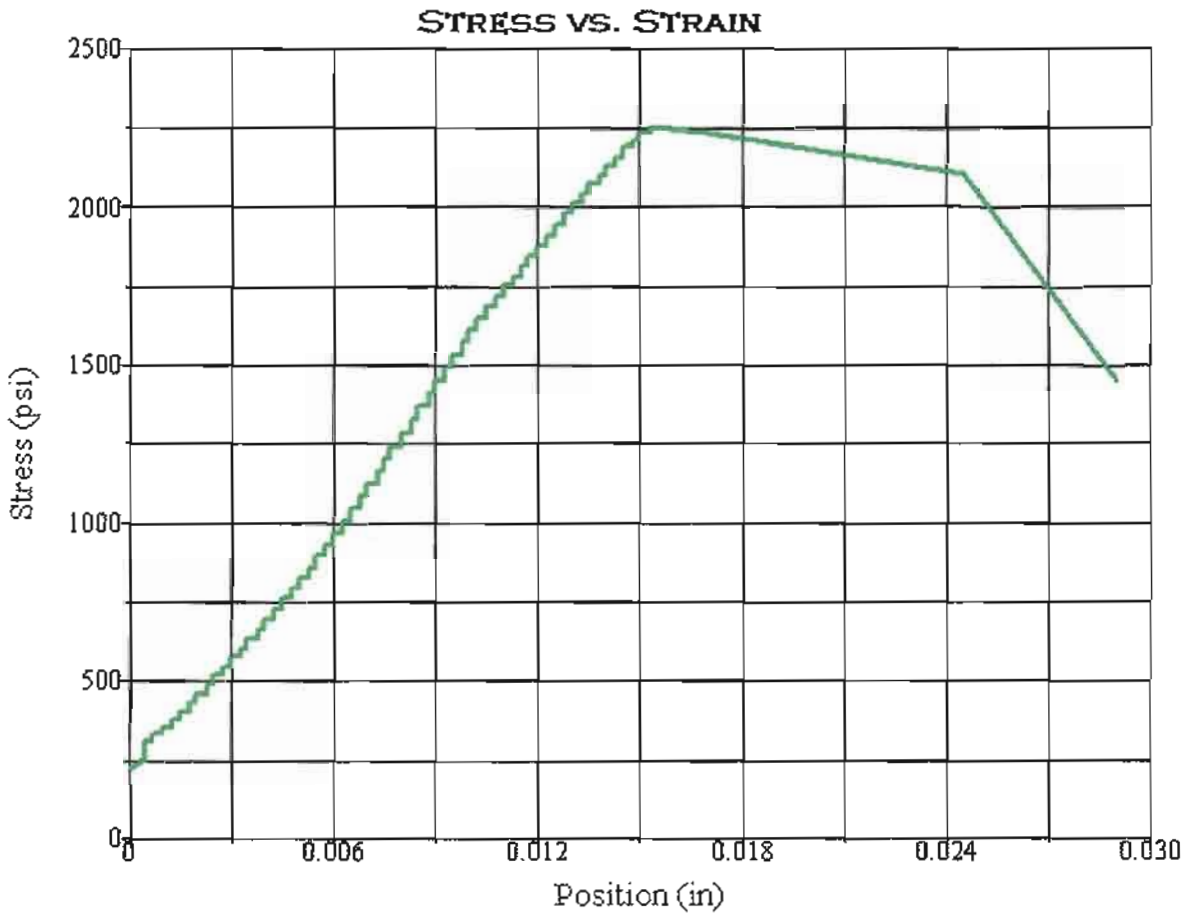


Test Summary

Counter:	1526
Elapsed Time:	00:01:13
Operator:	KS
Sample:	R11-014-17
Resident Engineer:	66-66.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:29:04 PM
End Date:	9/8/2011
End Time:	3:30:17 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-318

Test Results

Specimen Gage Length:	5.5900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	12281 lbf
Compressive Strength:	2737 psi

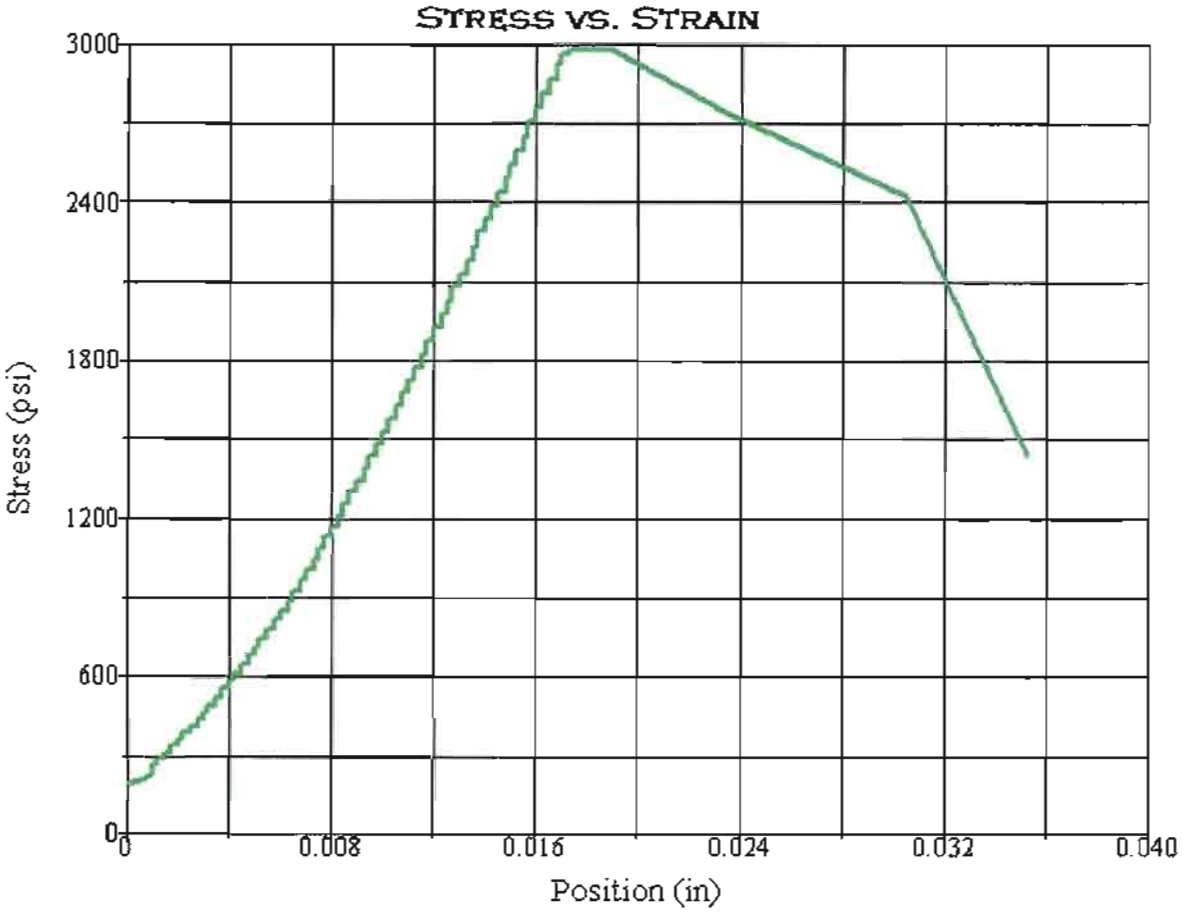


Test Summary

Counter:	1527
Elapsed Time:	00:00:56
Operator:	KS
Sample:	R11-014-17A
Resident Engineer:	68.9-70.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:33:35 PM
End Date:	9/8/2011
End Time:	3:34:31 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-319

Test Results

Specimen Gage Length:	5.4200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10193 lbf
Compressive Strength:	2253 psi



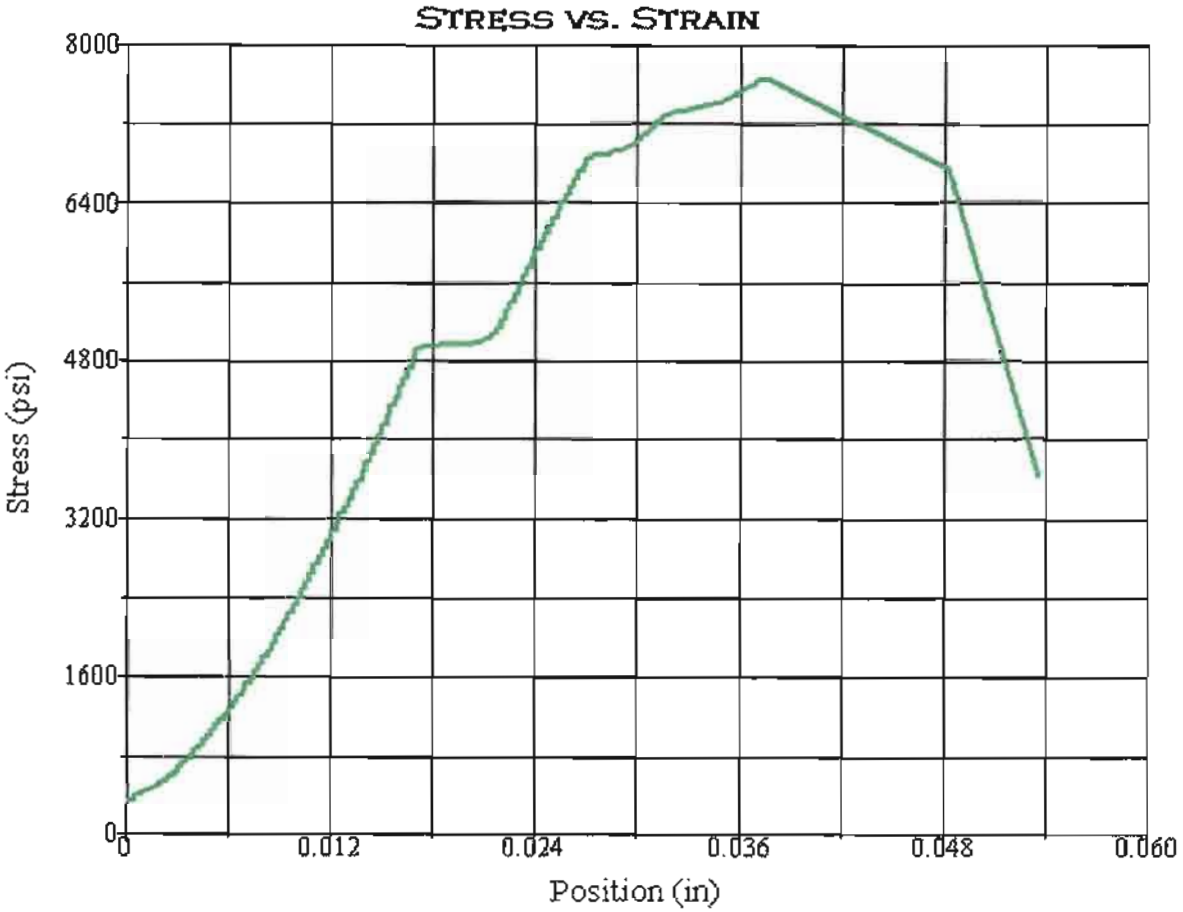
Test Summary

Counter:	1528
Elapsed Time:	00:01:19
Operator:	KS
Sample:	R11-014-19
Resident Engineer:	76-76.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:37:18 PM
End Date:	9/8/2011
End Time:	3:38:37 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-320

L/D 2.2

Test Results

Specimen Gage Length:	4.4300 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	13362 lbf
Compressive Strength:	2978 psi

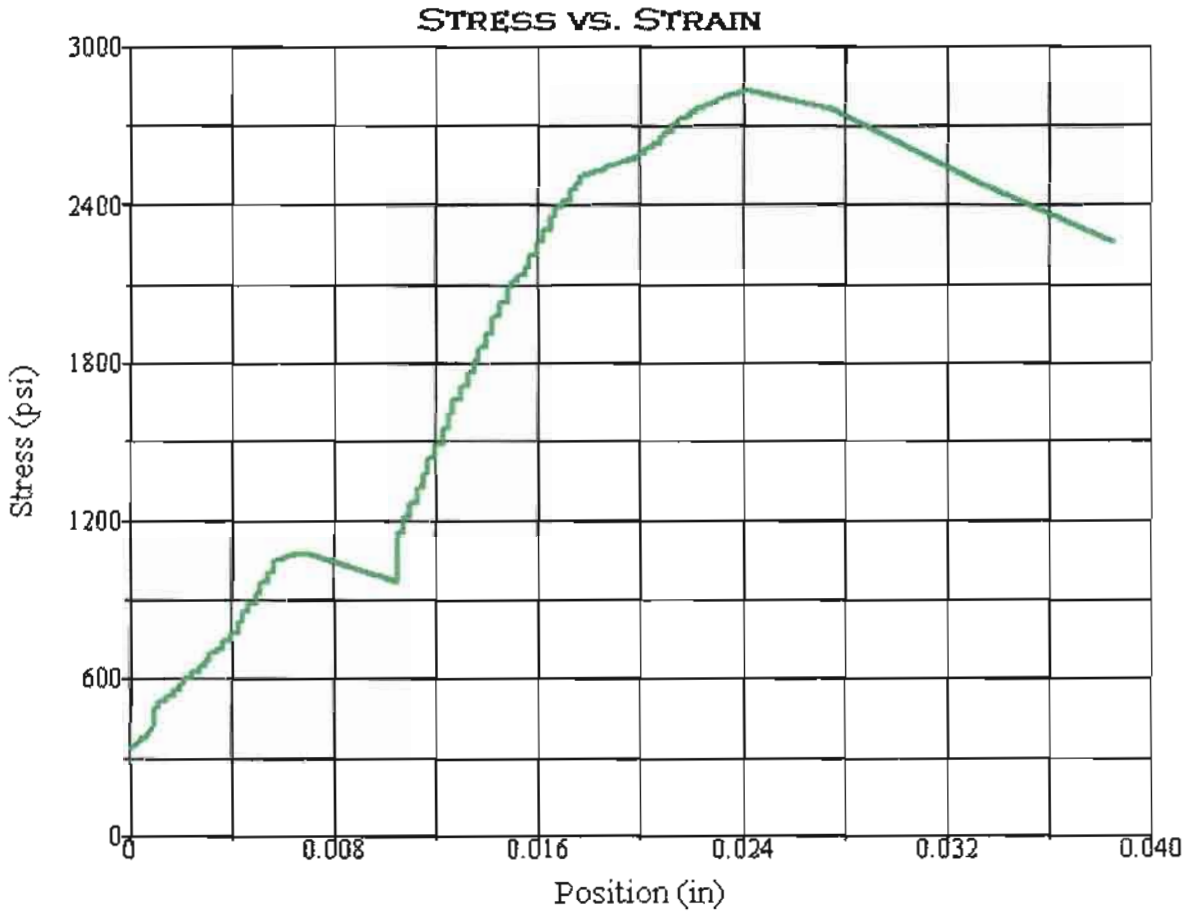


Test Summary

Counter:	1529
Elapsed Time:	00:03:29
Operator:	KS
Sample:	R11-015-05
Resident Engineer:	18.8-19.9'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:42:43 PM
End Date:	9/8/2011
End Time:	3:46:12 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-323

Test Results

Specimen Gage Length:	4.5400 in
Diameter:	1.8800 in
Area:	2.7759 in²
Maximum Load:	21241 lbf
Compressive Strength:	7652 psi



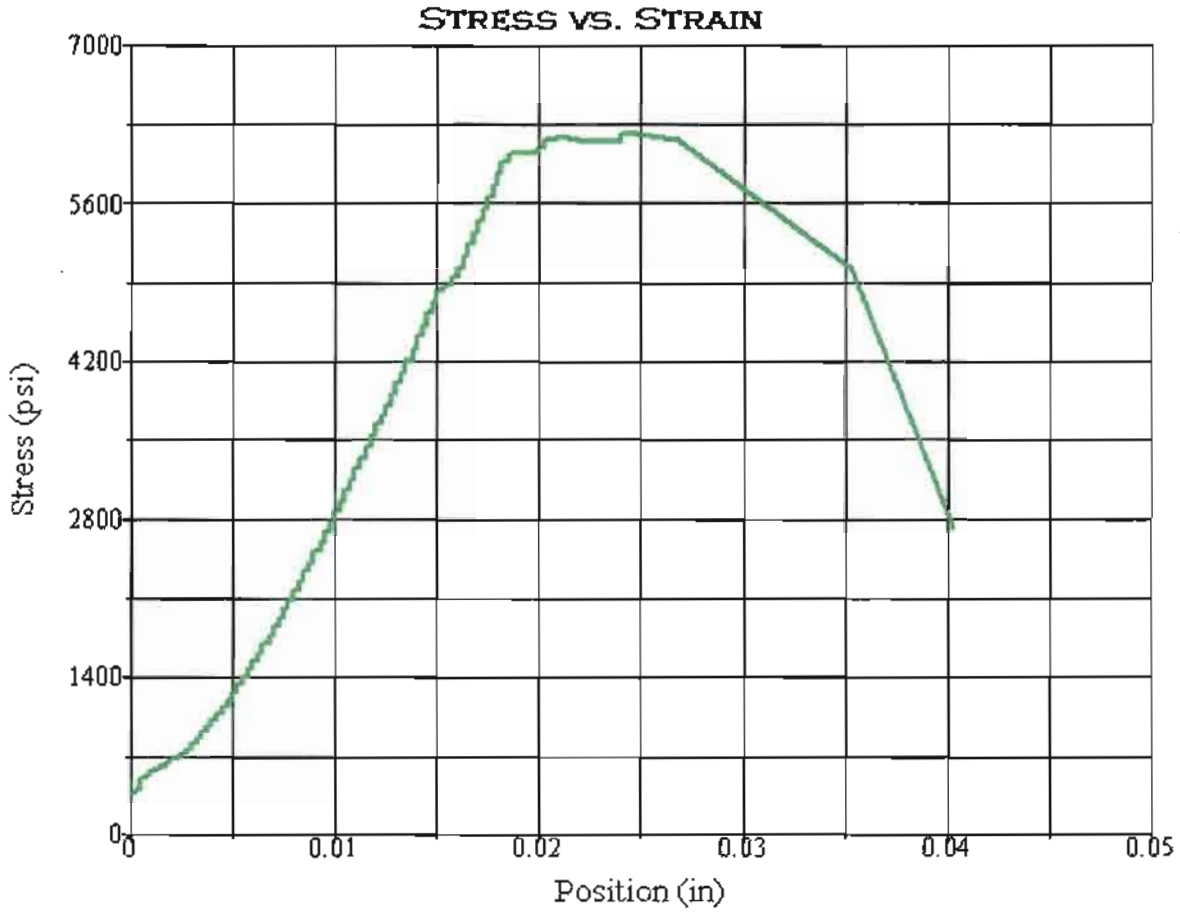
Test Summary

Counter:	1530
Elapsed Time:	00:01:09
Operator:	KS
Sample:	R11-015-06
Resident Engineer:	21-21.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:50:22 PM
End Date:	9/8/2011
End Time:	3:51:31 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-324

RATIO: L/D<2

Test Results

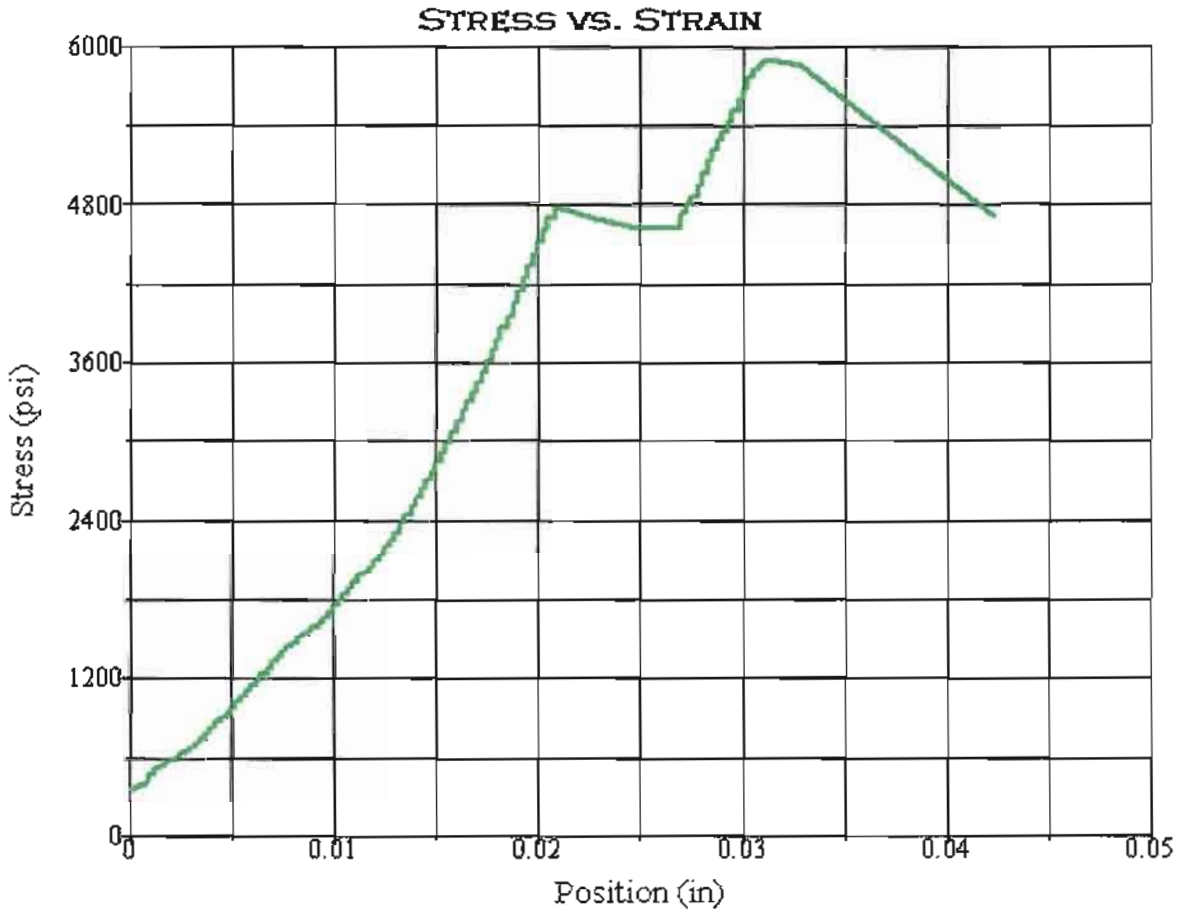
Specimen Gage Length:	3.1900 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	7783 lbf
Compressive Strength:	2834 psi



Test Summary	
Counter:	1531
Elapsed Time:	00:02:44
Operator:	KS
Sample:	R11-015-07
Resident Engineer:	26-26.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:56:14 PM
End Date:	9/8/2011
End Time:	3:58:58 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-325

RATIO: L/D<2

Test Results	
Specimen Gage Length:	3.6400 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	17054 lbf
Compressive Strength:	6209 psi



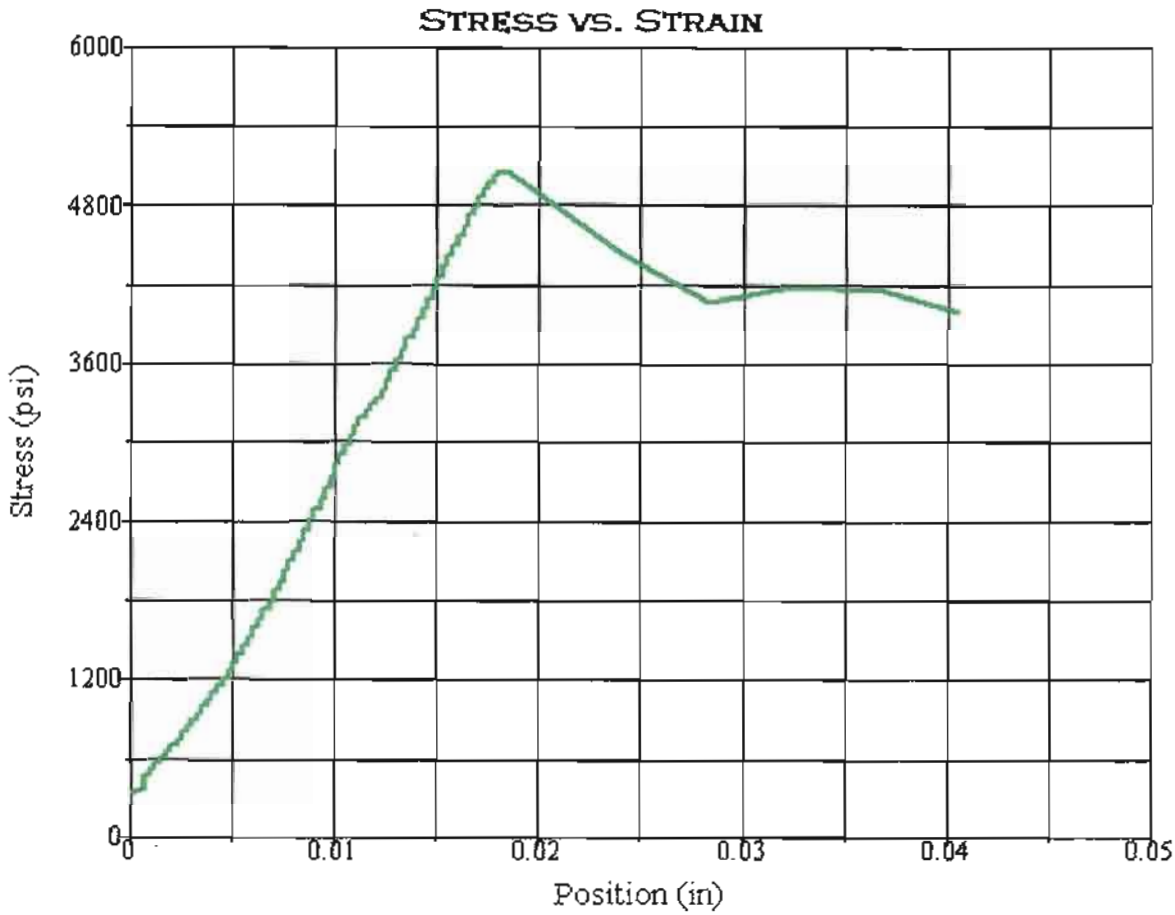
Test Summary

Counter:	1532
Elapsed Time:	00:02:35
Operator:	KS
Sample:	R11-015-09
Resident Engineer:	36.8-37'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	4:02:43 PM
End Date:	9/8/2011
End Time:	4:05:18 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-327

RATIO: L/D<2

Test Results

Specimen Gage Length:	3.3100 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	16207 lbf
Compressive Strength:	5901 psi

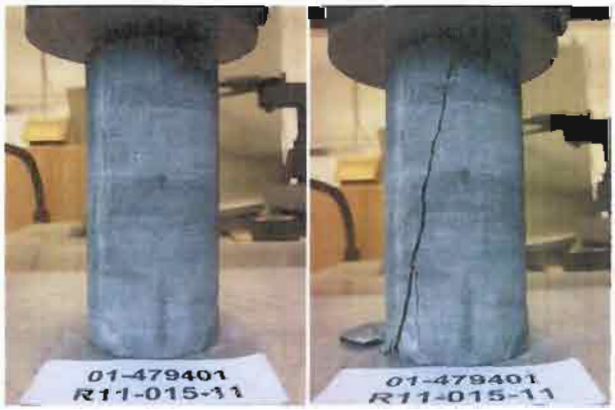


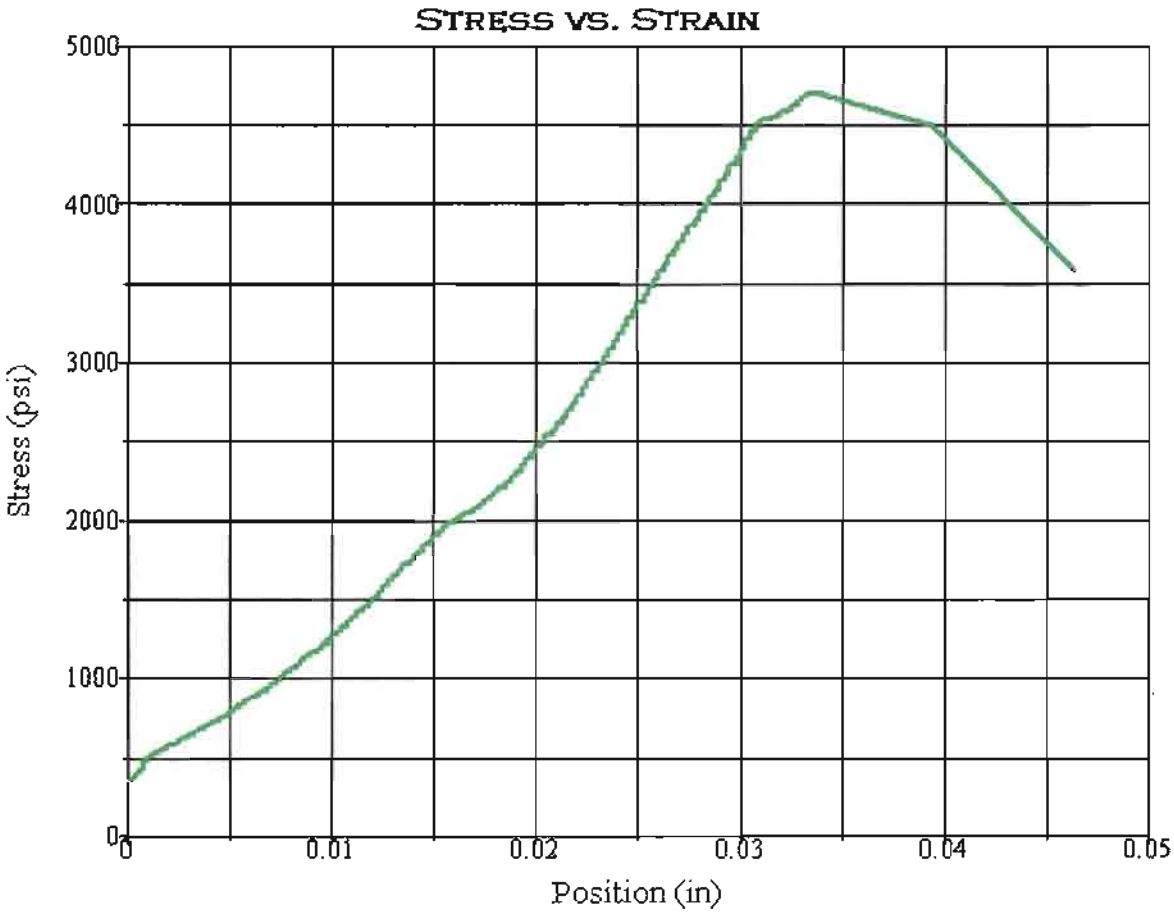
Test Summary

Counter:	1533
Elapsed Time:	00:02:12
Operator:	KS
Sample:	R11-015-11
Resident Engineer:	41-41.6'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	4:08:20 PM
End Date:	9/8/2011
End Time:	4:10:32 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-328

Test Results

Specimen Gage Length:	3.8900 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	13875 lbf
Compressive Strength:	5052 psi





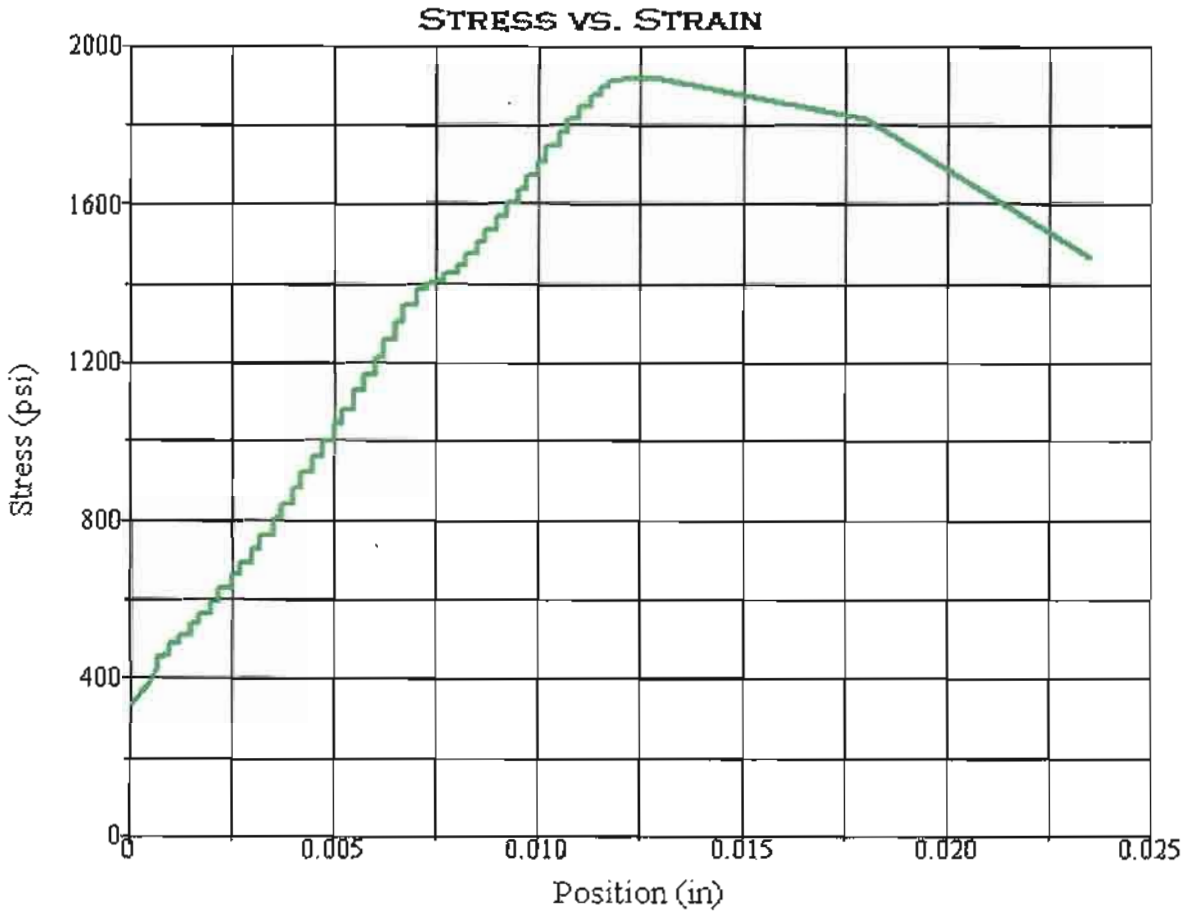
Test Summary

Counter:	1534
Elapsed Time:	00:02:01
Operator:	KS
Sample:	R11-015-11A
Resident Engineer:	44-44.6'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	4:14:24 PM
End Date:	9/8/2011
End Time:	4:16:25 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-329

RATIO: L/D<2

Test Results

Specimen Gage Length:	3.6200 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	12931 lbf
Compressive Strength:	4708 psi

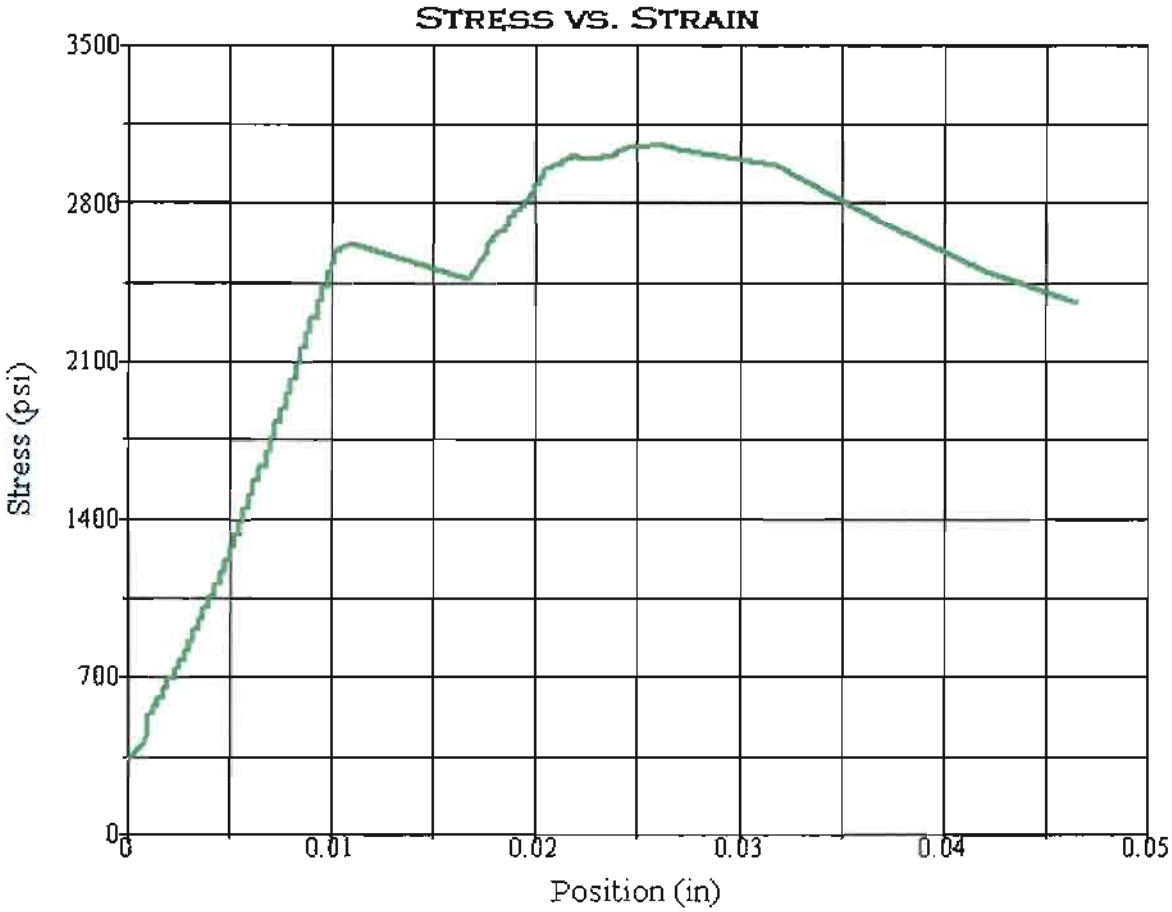


Test Summary

Counter:	1548
Elapsed Time:	00:00:43
Operator:	KS
Sample:	R11-015-13
Resident Engineer:	54-55'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test for Soil lab
Start Date:	9/9/2011
Start Time:	2:22:40 PM
End Date:	9/9/2011
End Time:	2:23:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-330

Test Results

Specimen Gage Length:	4.4900 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	5259 lbf
Compressive Strength:	1915 psi

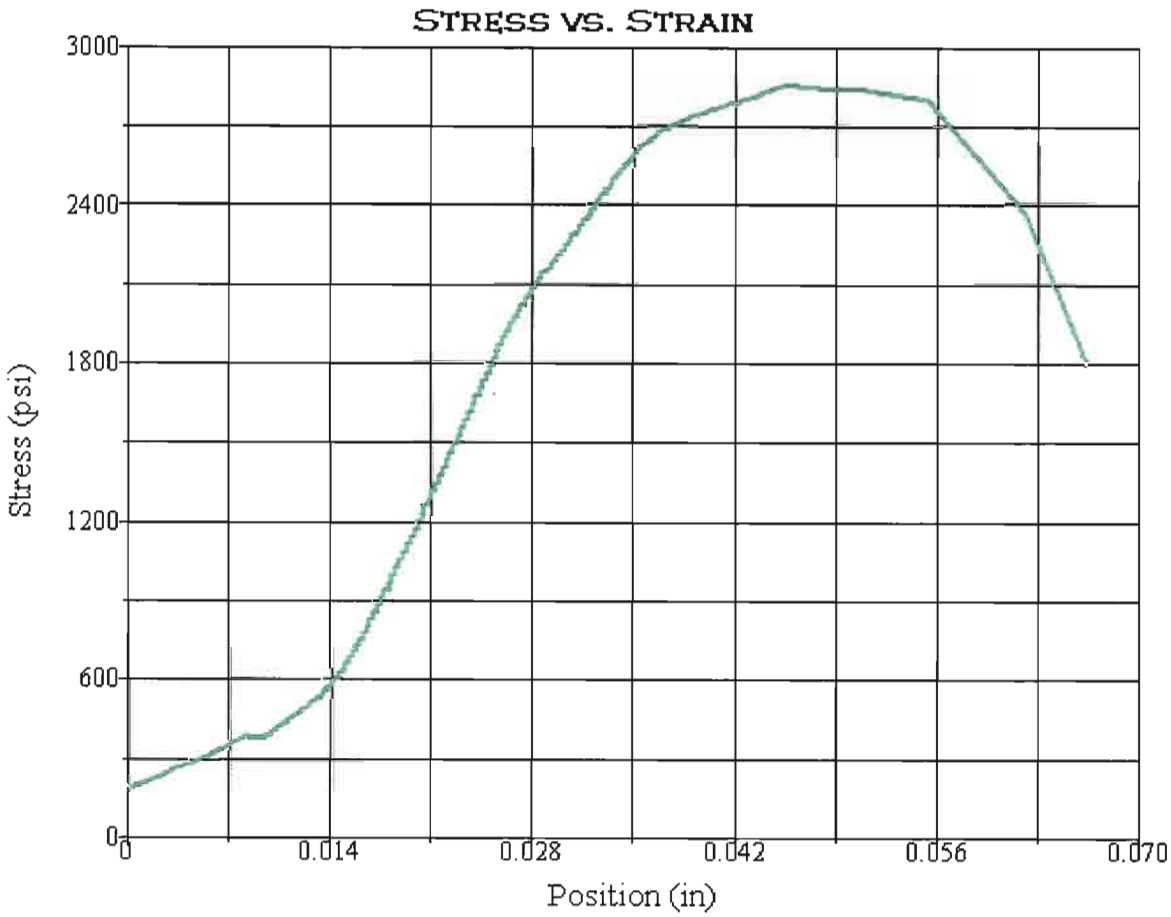


Test Summary

Counter:	1549
Elapsed Time:	00:01:14
Operator:	KS
Sample:	R11-015-15
Resident Engineer:	59-59.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test for Soil lab
Start Date:	9/9/2011
Start Time:	2:27:40 PM
End Date:	9/9/2011
End Time:	2:28:54 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-331

Test Results

Specimen Gage Length:	4.0200 in
Diameter:	1.8600 in
Area:	2.7172 in²
Maximum Load:	8322 lbf
Compressive Strength:	3063 psi

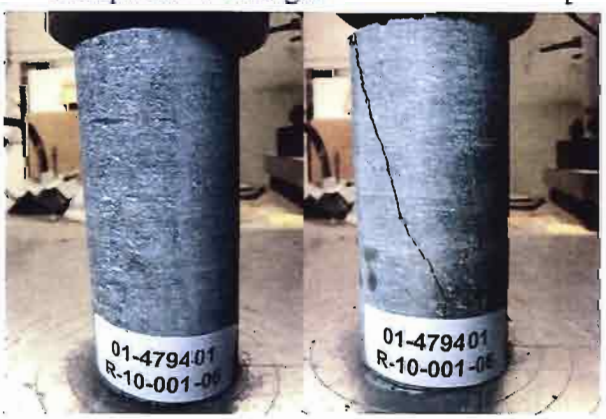


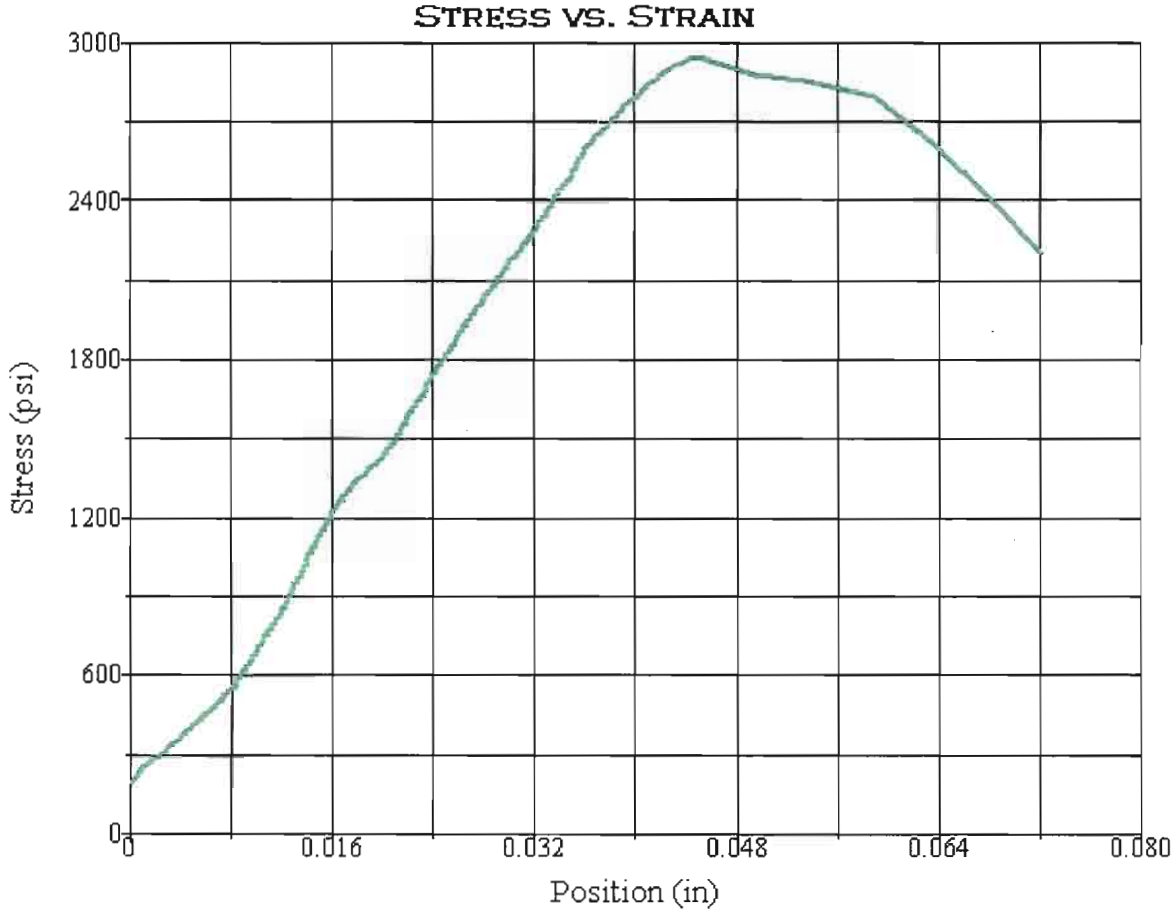
Test Summary

Counter:	924
Elapsed Time:	00:01:16
Operator:	AZM
Sample:	R-10-001-06
Resident Engineer:	
Ticket:	GL# 11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	12:37:02 PM
End Date:	3/18/2011
End Time:	12:38:18 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-006

Test Results

Specimen Gage Length:	5.0000 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	12790 lbf
Compressive Strength:	2851 psi



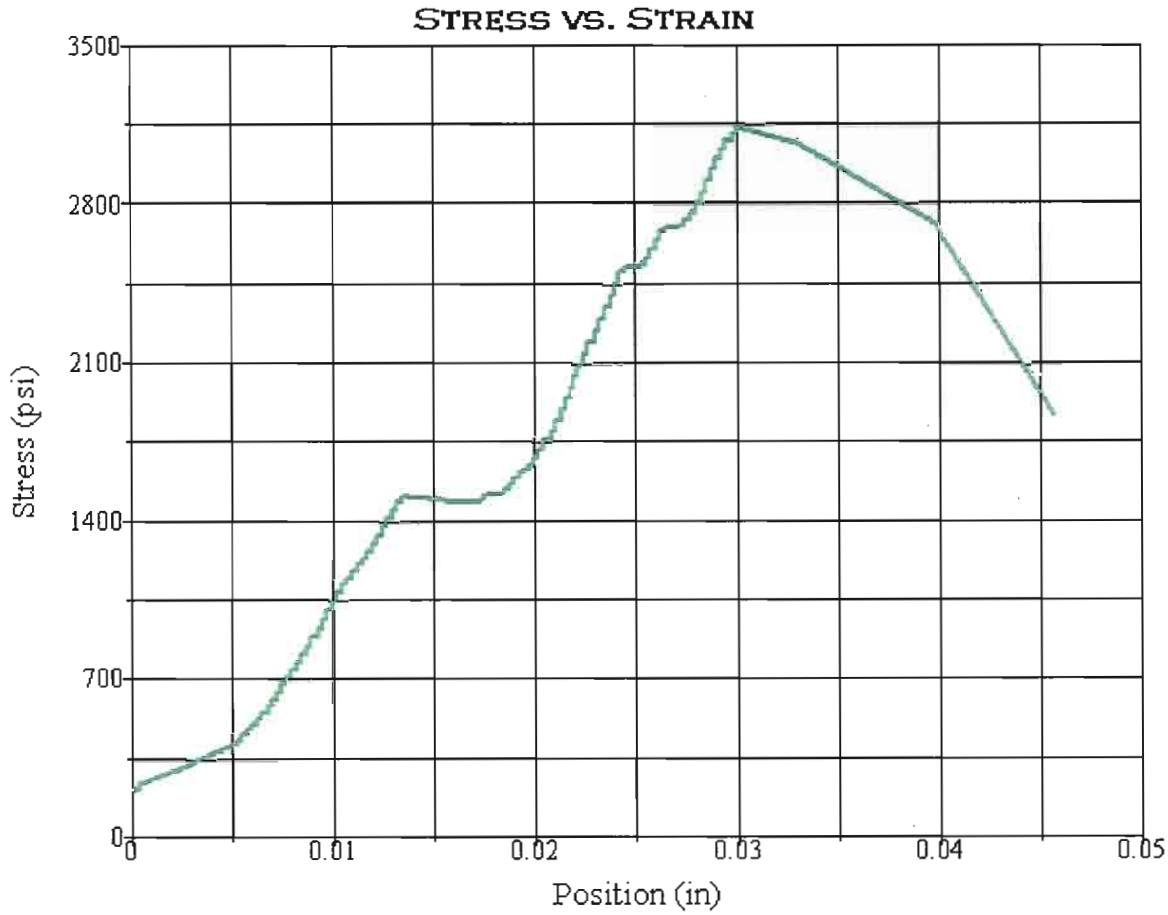


Test Summary

Counter:	925
Elapsed Time:	00:01:19
Operator:	AZM
Sample:	R-10-001-07
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	12:44:23 PM
End Date:	3/18/2011
End Time:	12:45:42 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-007

Test Results

Specimen Gage Length:	2.6700 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	13190 lbf
Compressive Strength:	2940 psi

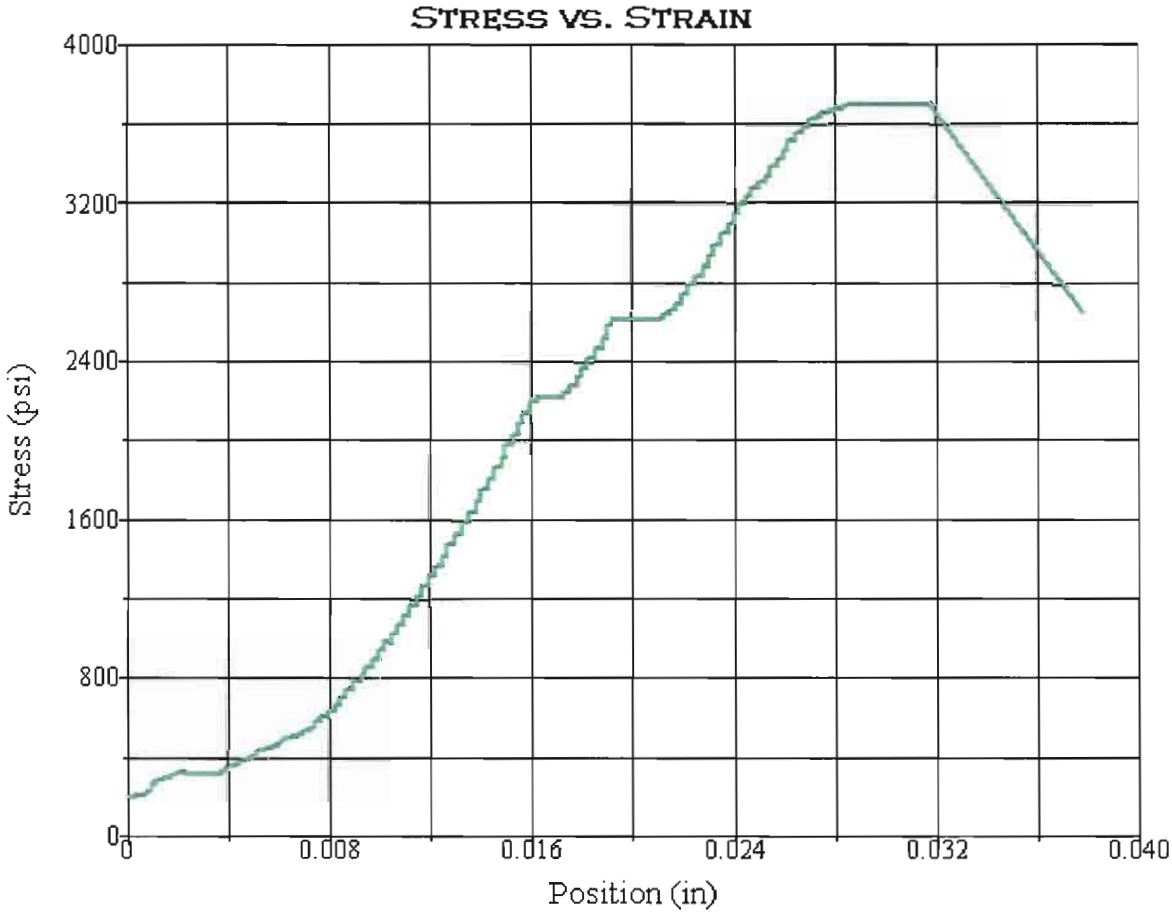


Test Summary

Counter:	926
Elapsed Time:	00:01:23
Operator:	AZM
Sample:	R-10-001-08
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	12:52:47 PM
End Date:	3/18/2011
End Time:	12:54:10 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-008

Test Results

Specimen Gage Length:	4.7400 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	14075 lbf
Compressive Strength:	3137 psi

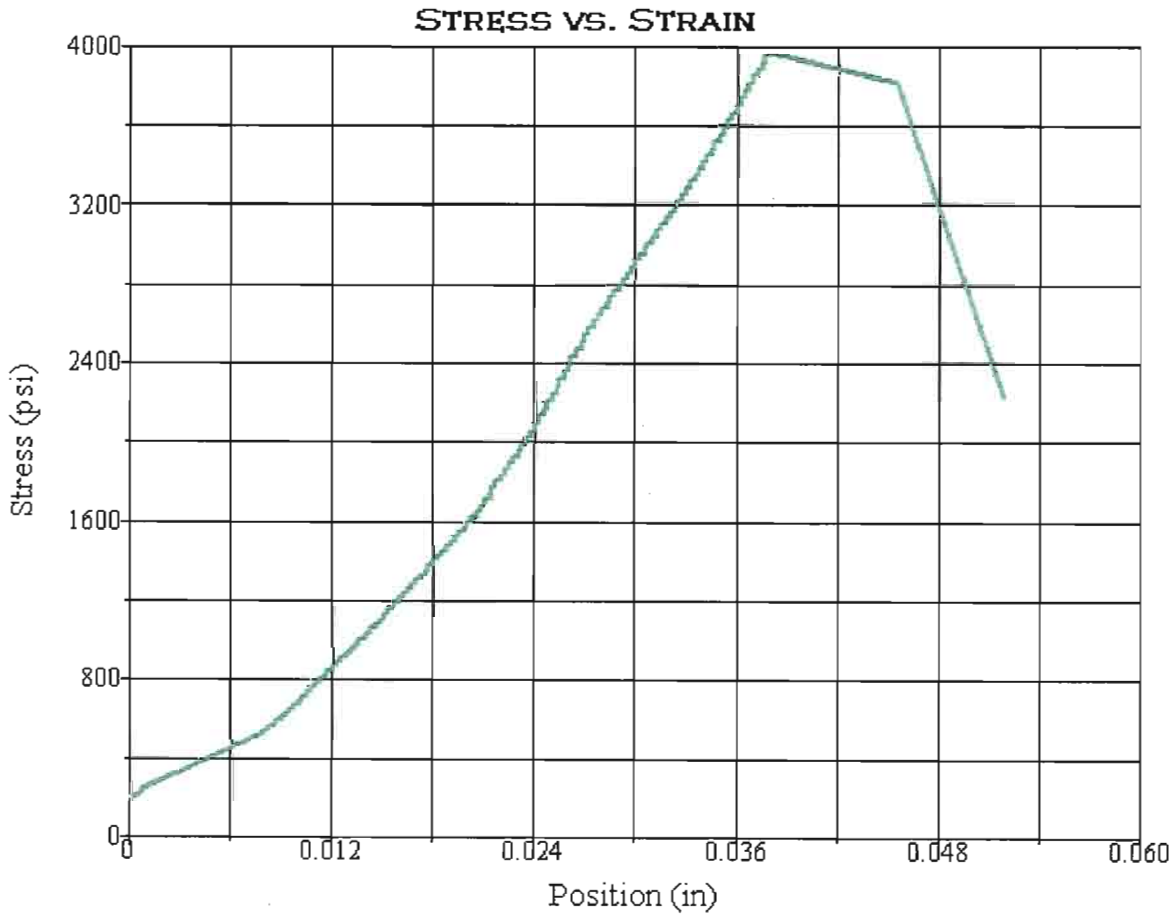


Test Summary

Counter:	927
Elapsed Time:	00:01:39
Operator:	AZM
Sample:	R-10-001-15
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	1:00:41 PM
End Date:	3/18/2011
End Time:	1:02:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-012

Test Results

Specimen Gage Length:	3.5800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	16604 lbf
Compressive Strength:	3701 psi

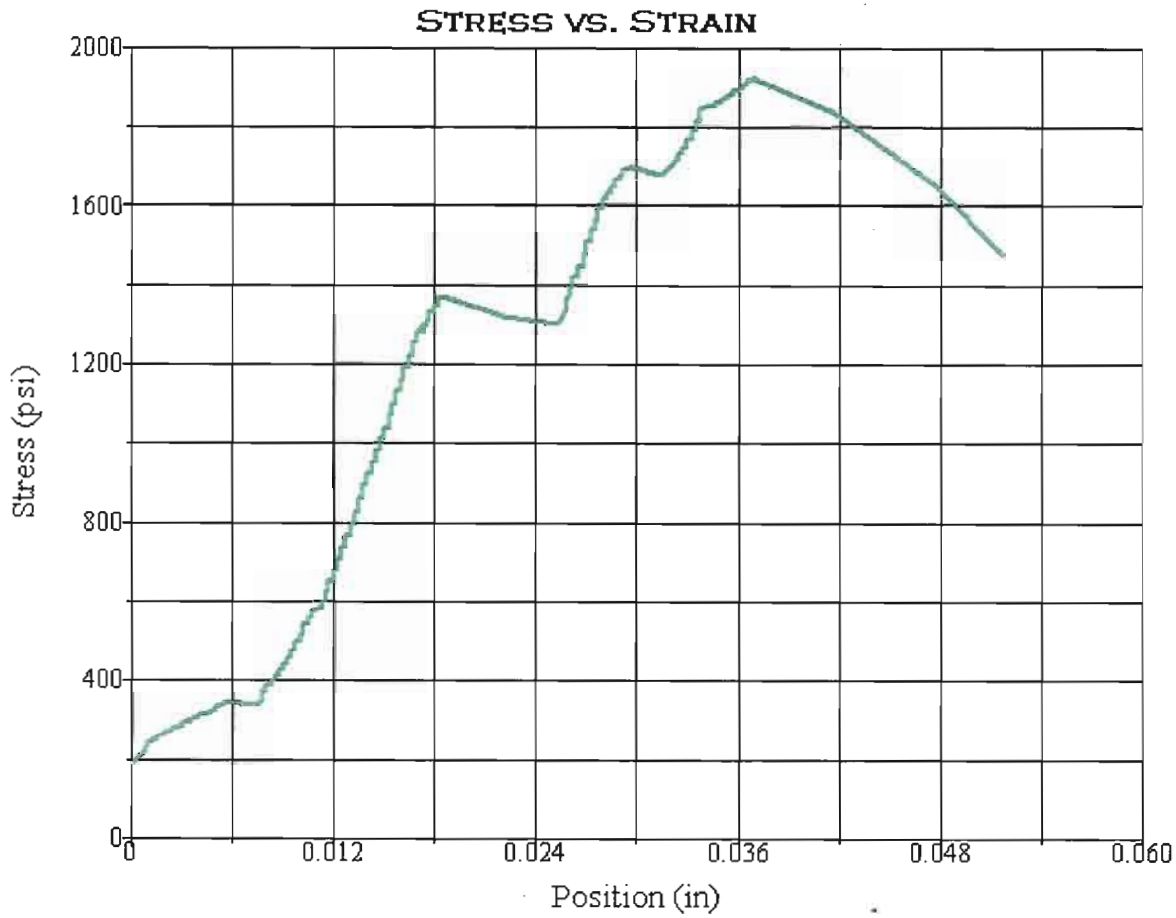


Test Summary

Counter:	928
Elapsed Time:	00:01:47
Operator:	AZM
Sample:	R-10-001-16A
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	1:08:15 PM
End Date:	3/18/2011
End Time:	1:10:02 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-014

Test Results

Specimen Gage Length:	5.4000 in
Diameter:	2.3700 in
Area:	4.4115 in²
Maximum Load:	17457 lbf
Compressive Strength:	3957 psi

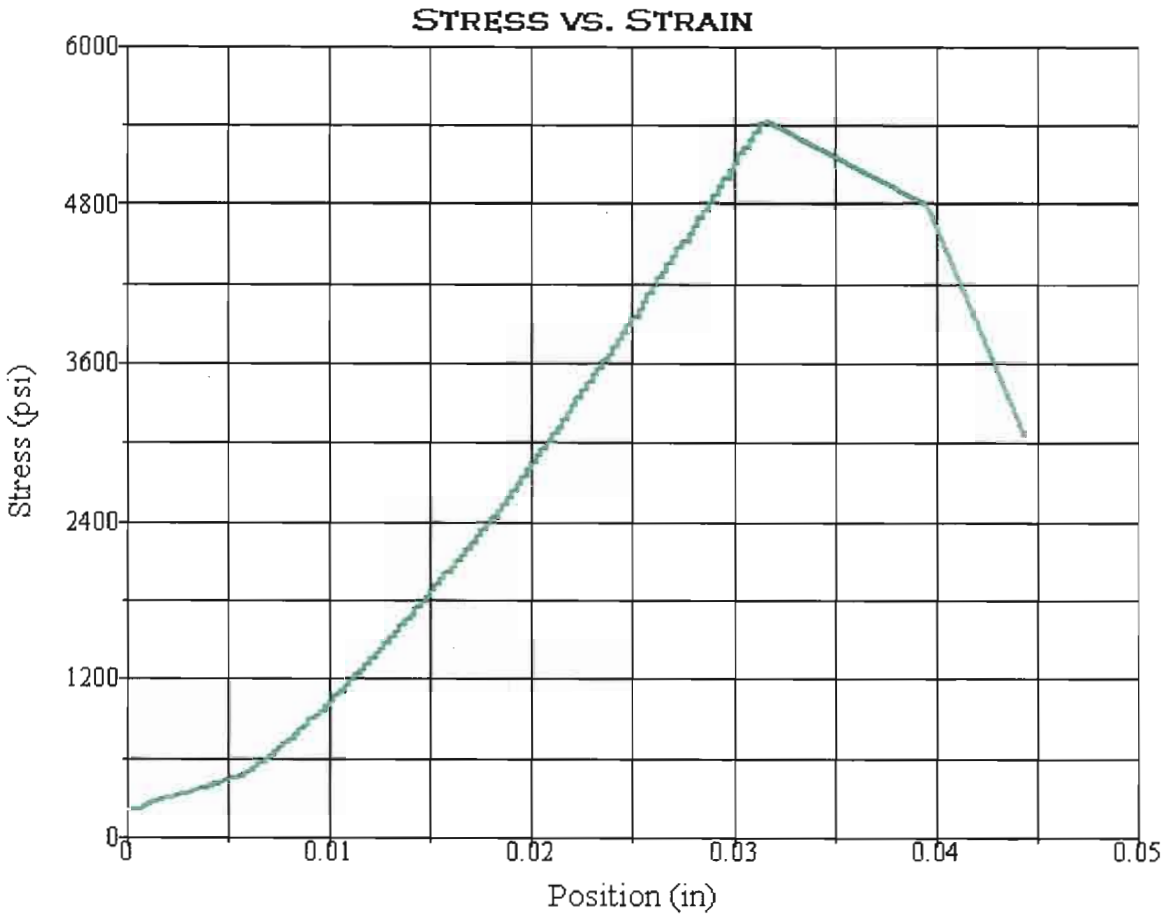


Test Summary

Counter:	929
Elapsed Time:	00:00:49
Operator:	AZM
Sample:	R-10-001-17
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	3:46:17 PM
End Date:	3/18/2011
End Time:	3:47:06 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-15

Test Results

Specimen Gage Length:	2.9400 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	8618 lbf
Compressive Strength:	1921 psi

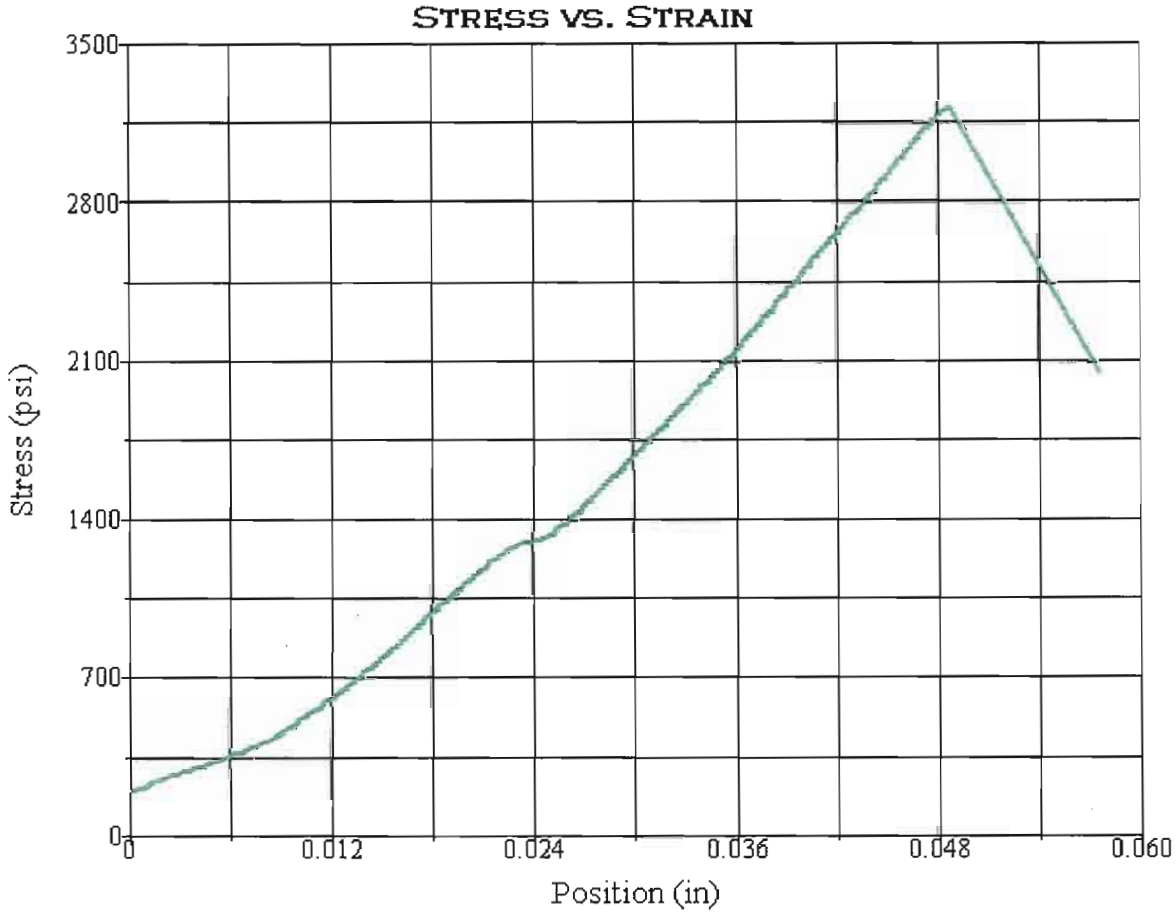


Test Summary

Counter:	931
Elapsed Time:	00:02:28
Operator:	AZM
Sample:	R-10-001-18
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	07-181604
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:07:38 PM
End Date:	3/18/2011
End Time:	4:10:06 PM
Workstation:	D1K00YB1
Tested By:	AZM
Test	Q11-016

Test Results

Specimen Gage Length:	5.6100 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	24317 lbf
Compressive Strength:	5420 psi

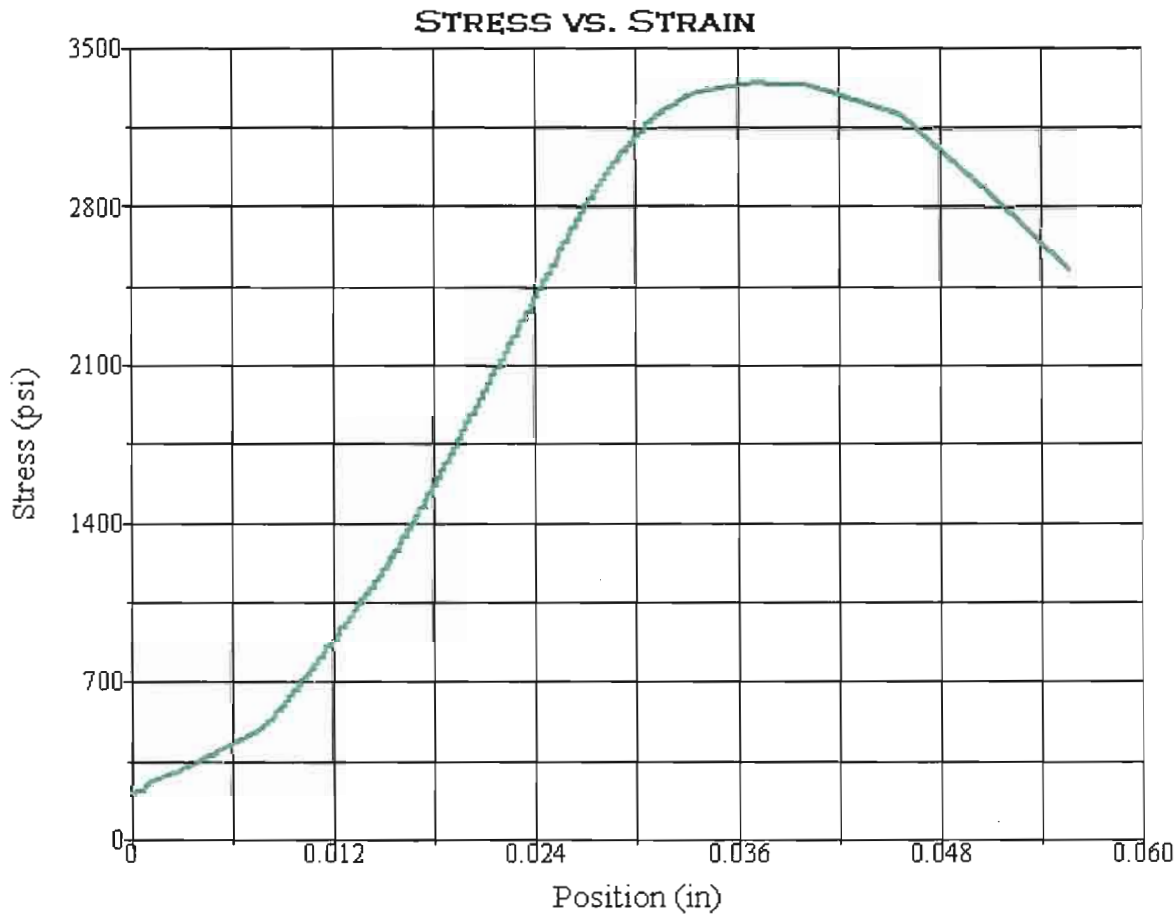


Test Summary

Counter:	932
Elapsed Time:	00:01:25
Operator:	AZM
Sample:	R-10-001-19
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:17:13 PM
End Date:	3/18/2011
End Time:	4:18:38 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-017

Test Results

Specimen Gage Length:	5.4900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	14412 lbf
Compressive Strength:	3212 psi

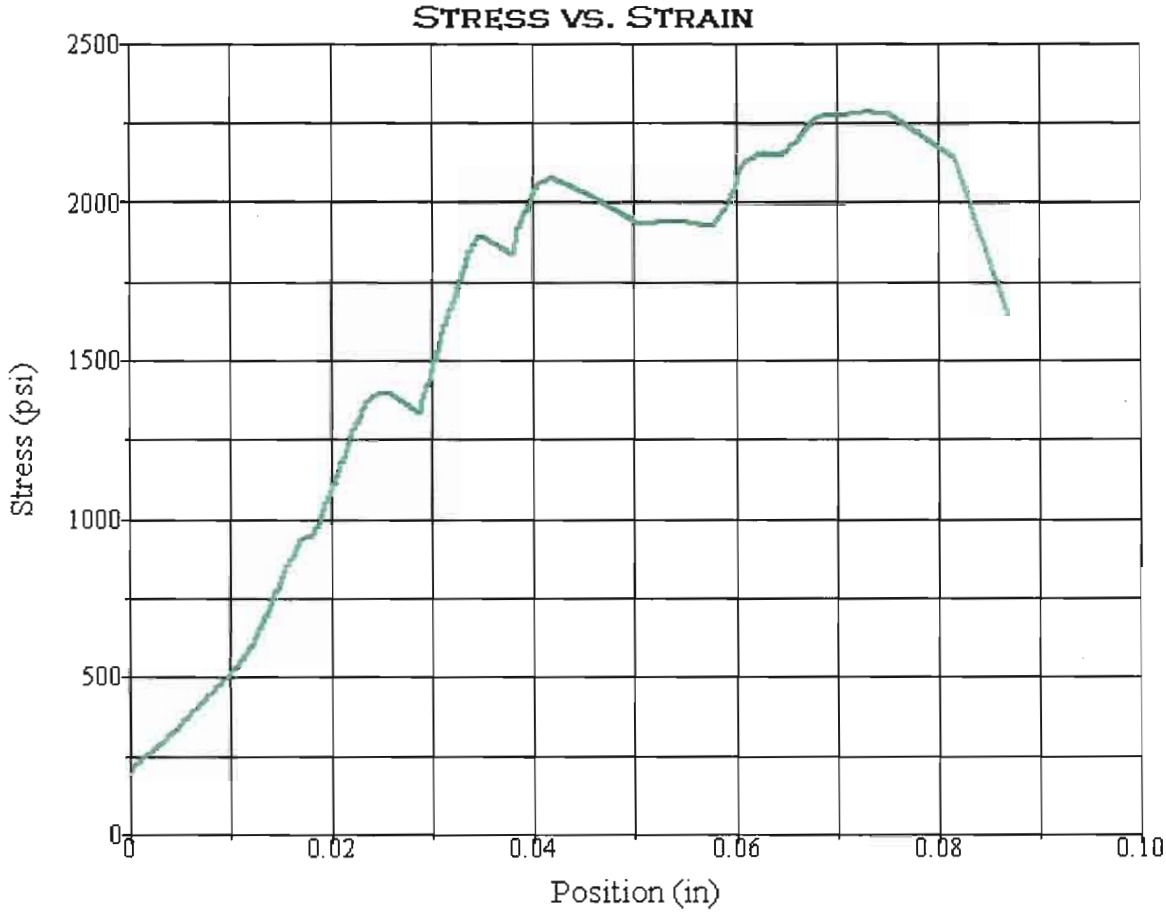


Test Summary

Counter:	930
Elapsed Time:	00:01:29
Operator:	AZM
Sample:	R-10-001-20
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	3:56:21 PM
End Date:	3/18/2011
End Time:	3:57:50 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-018

Test Results

Specimen Gage Length:	3.6500 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	15022 lbf
Compressive Strength:	3348 psi

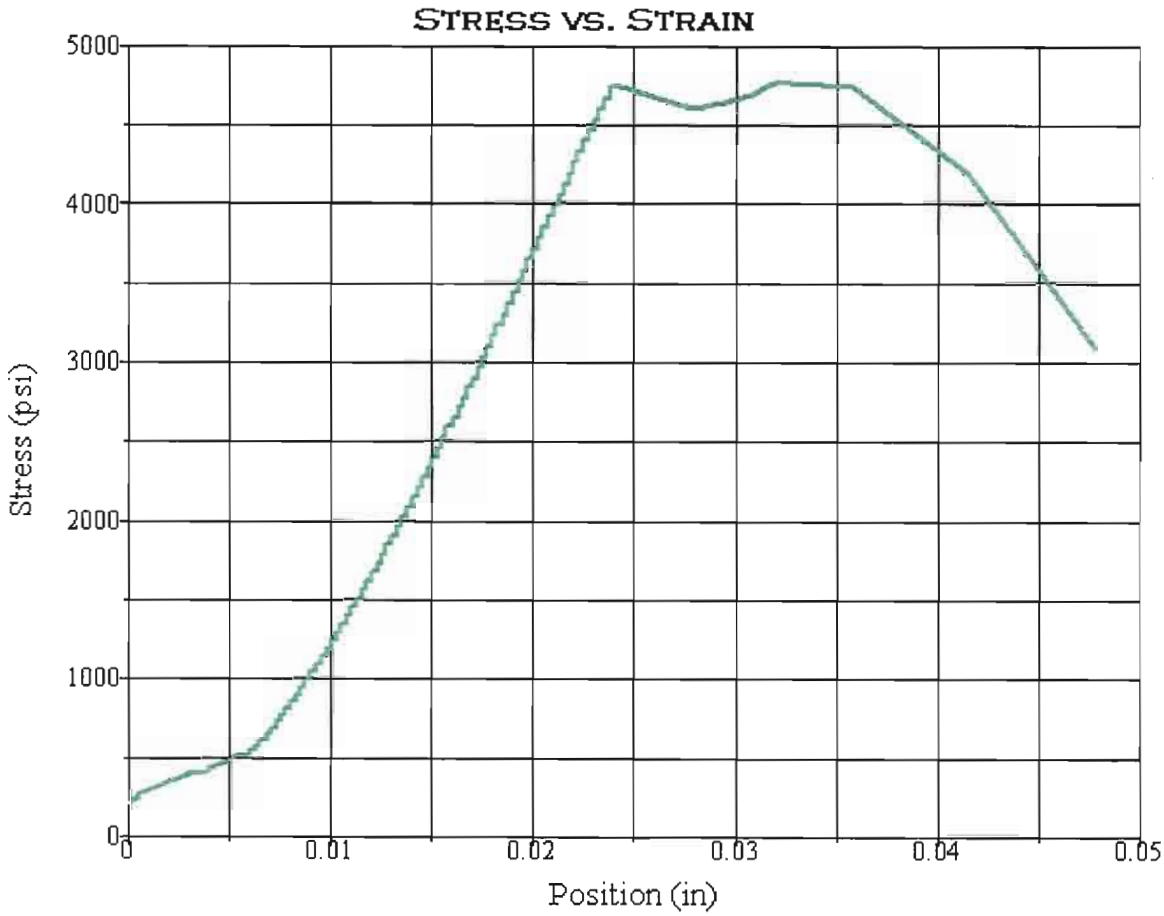


Test Summary

Counter:	933
Elapsed Time:	00:01:00
Operator:	AZM
Sample:	R-10-001- 20A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:27:00 PM
End Date:	3/18/2011
End Time:	4:28:00 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-019

Test Results

Specimen Gage Length:	4.7900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	10263 lbf
Compressive Strength:	2288 psi

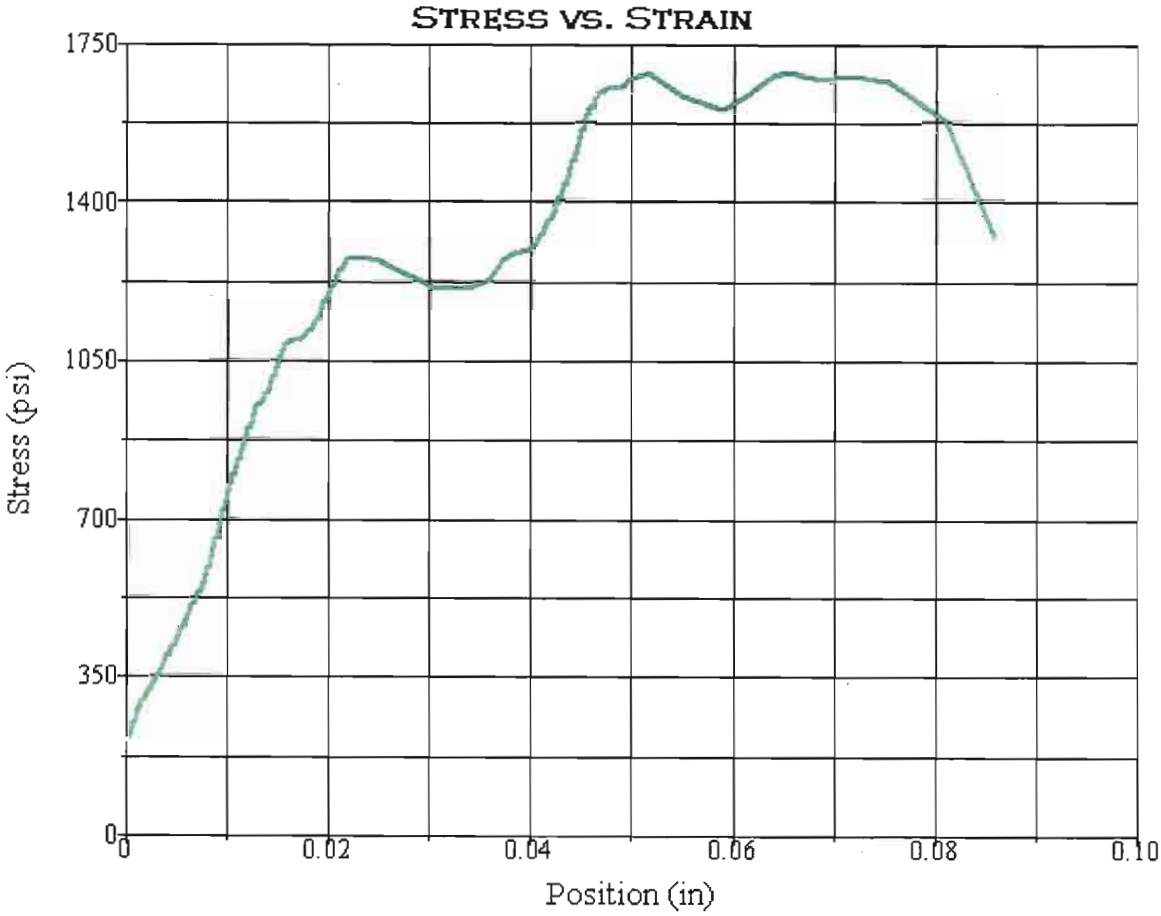


Test Summary

Counter:	934
Elapsed Time:	00:02:10
Operator:	AZM
Sample:	R-10-001-21
Resident Engineer:	
Ticket:	GL # 11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:34:37 PM
End Date:	3/18/2011
End Time:	4:36:47 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-20

Test Results

Specimen Gage Length:	4.4800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21565 lbf
Compressive Strength:	4767 psi

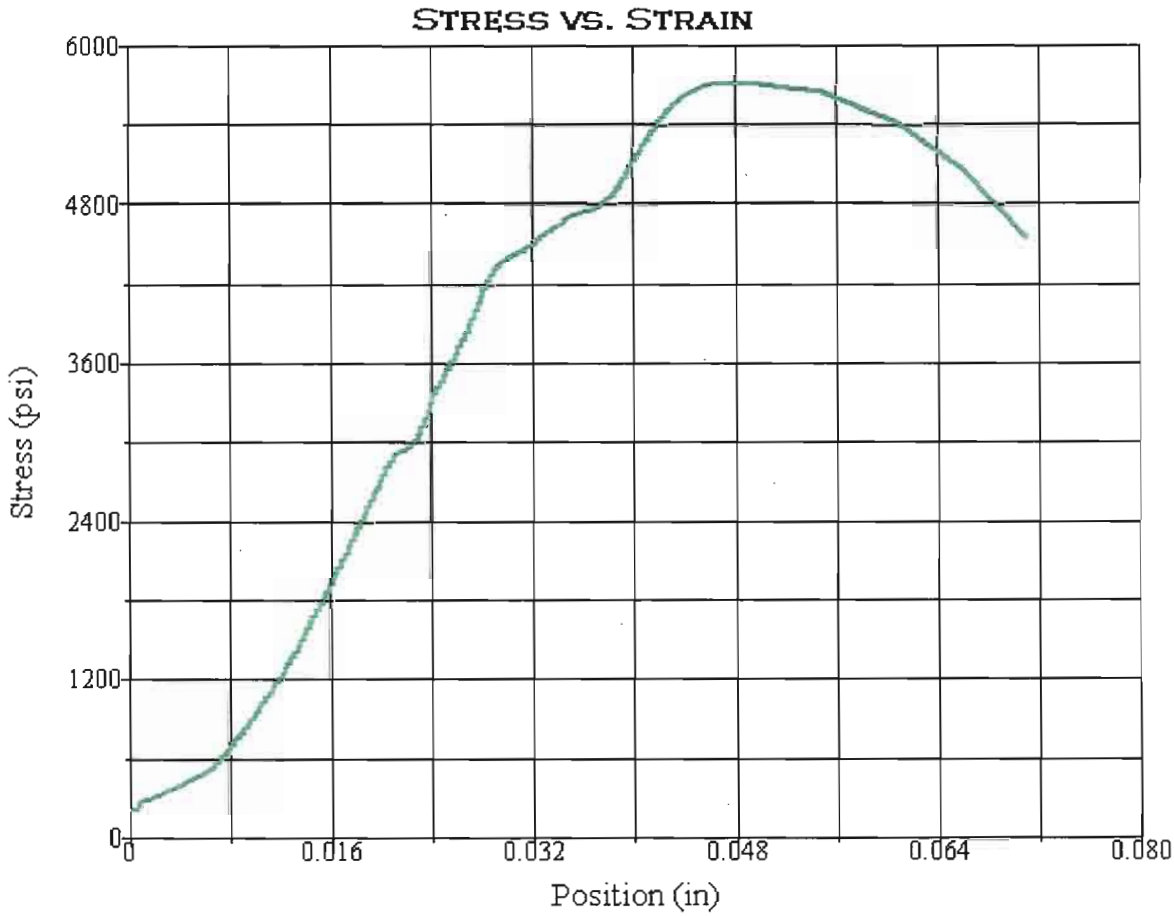


Test Summary

Counter:	935
Elapsed Time:	00:00:43
Operator:	AZM
Sample:	R-10-001-21A
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:42:41 PM
End Date:	3/18/2011
End Time:	4:43:24 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-021

Test Results

Specimen Gage Length:	2.9700 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	7548 lbf
Compressive Strength:	1682 psi

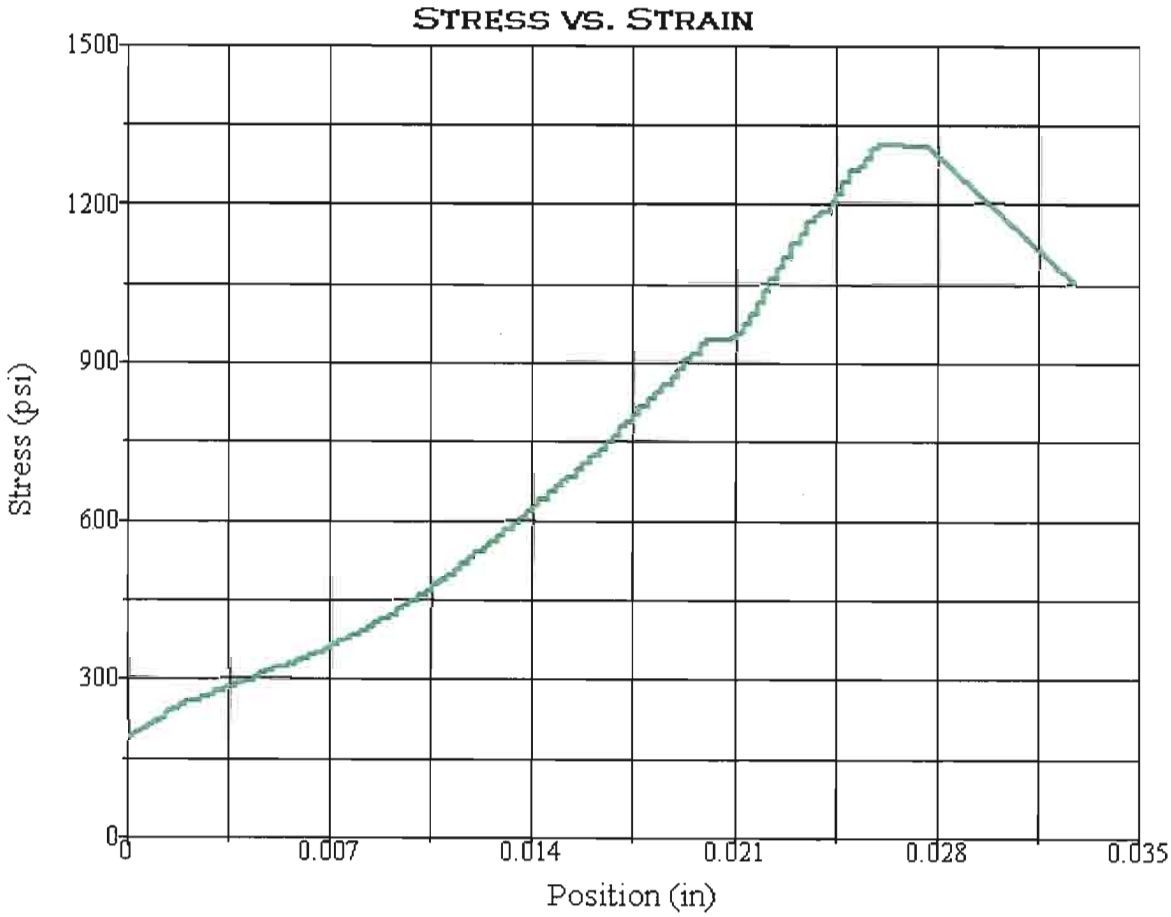


Test Summary

Counter:	936
Elapsed Time:	00:02:37
Operator:	AZM
Sample:	R-10-001-24
Resident Engineer:	
GL #	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/18/2011
Start Time:	4:50:40 PM
End Date:	3/18/2011
End Time:	4:53:17 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-023

Test Results

Specimen Gage Length:	2.7700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25840 lbf
Compressive Strength:	5712 psi

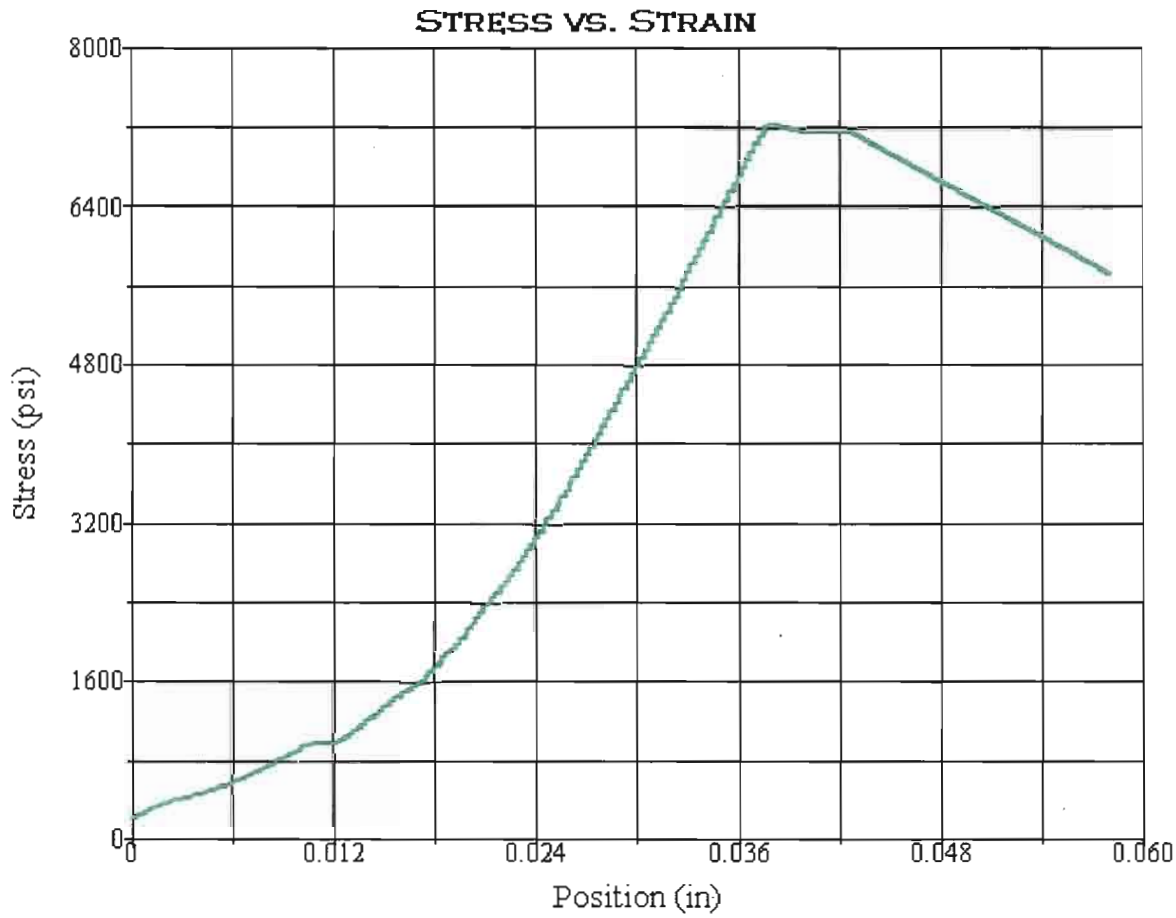


Test Summary

Counter:	939
Elapsed Time:	00:00:31
Operator:	AZM
Sample:	R10-002-013A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:24:39 PM
End Date:	3/24/2011
End Time:	2:25:10 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-032

Test Results

Specimen Gage Length:	4.9500 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	5844 lbf
Compressive Strength:	1314 psi

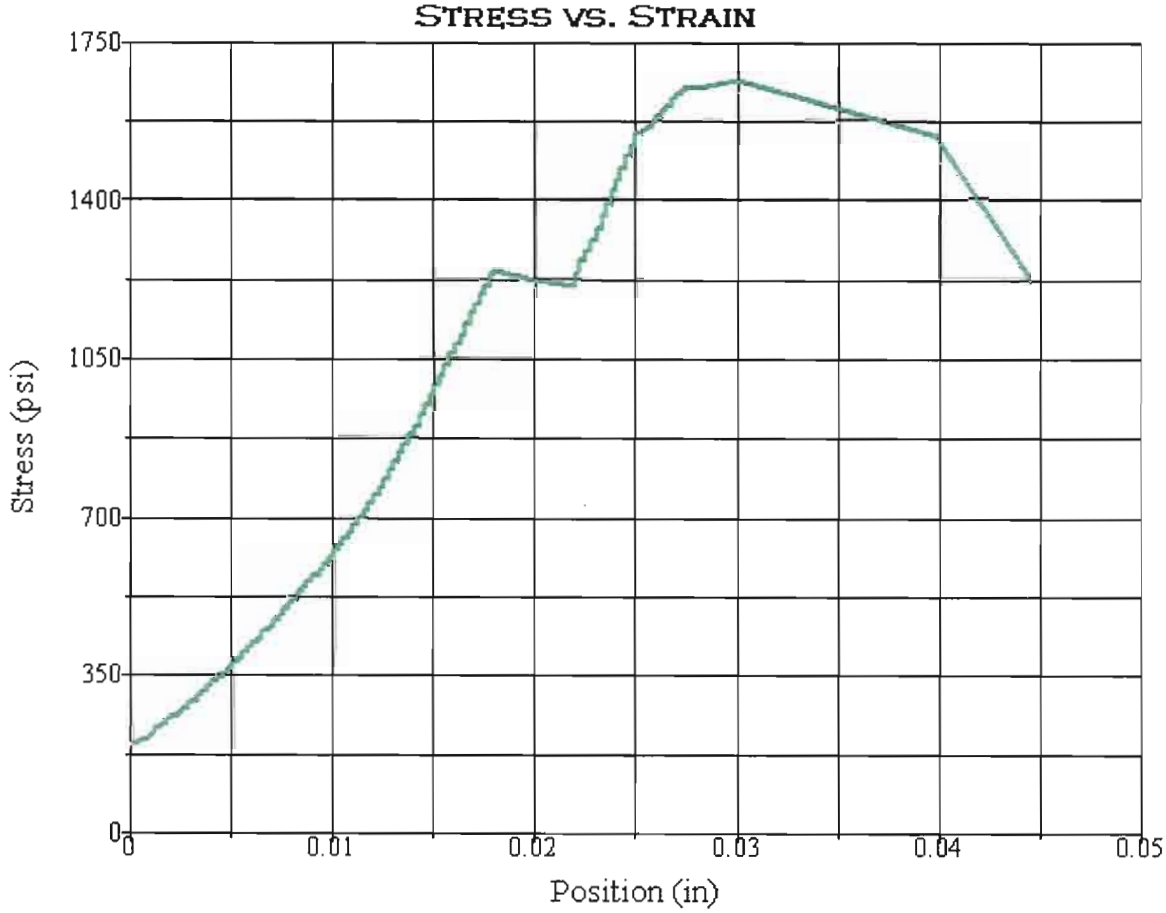


Test Summary

Counter:	940
Elapsed Time:	00:03:18
Operator:	AZM
Sample:	R10-002-17
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:39:54 PM
End Date:	3/24/2011
End Time:	2:43:12 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-034

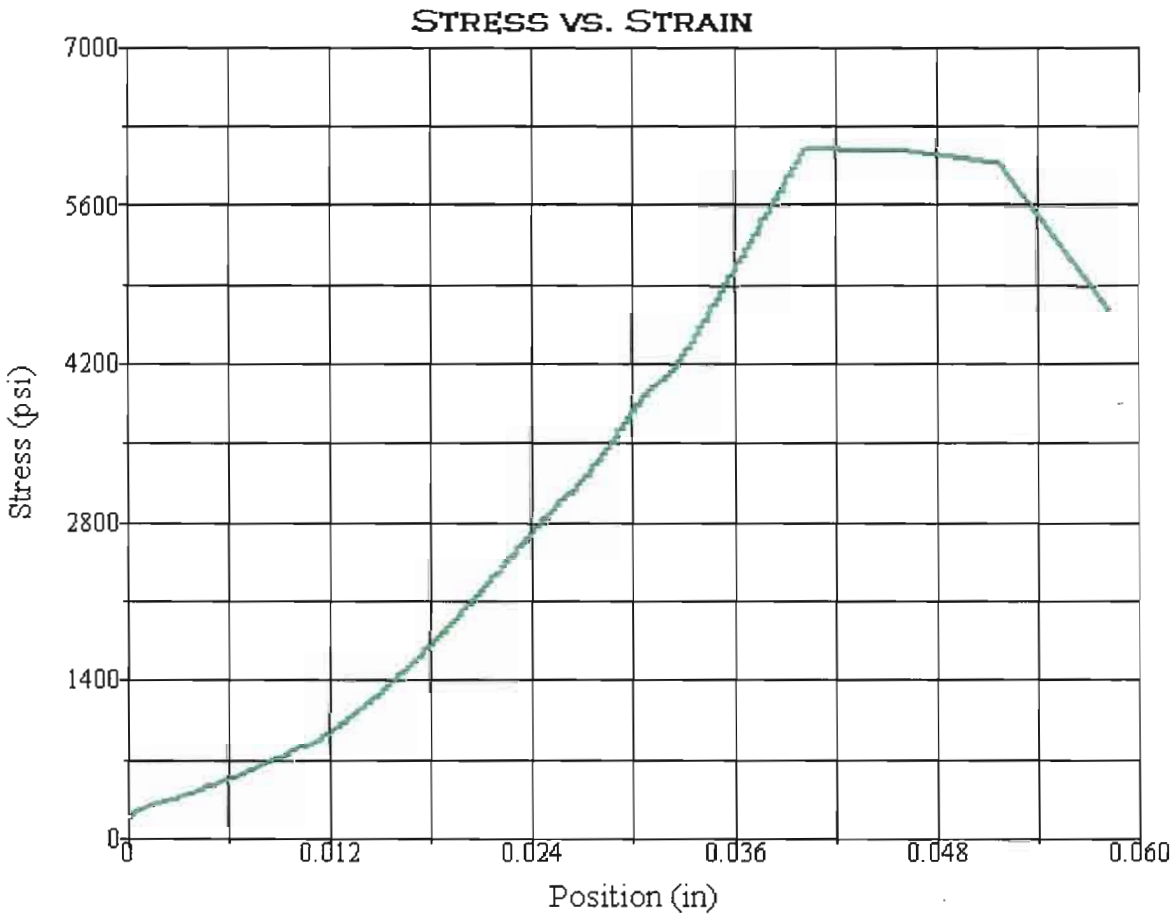
Test Results

Specimen Gage Length:	5.2800 in
Diameter:	2.3700 in
Area:	4.4115 in²
Maximum Load:	31863 lbf
Compressive Strength:	7223 psi



Test Summary	
Counter:	941
Elapsed Time:	00:00:42
Operator:	AZM
Sample:	R10-002-19
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:52:16 PM
End Date:	3/24/2011
End Time:	2:52:58 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-035

Test Results	
Specimen Gage Length:	5.6900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	7435 lbf
Compressive Strength:	1657 psi

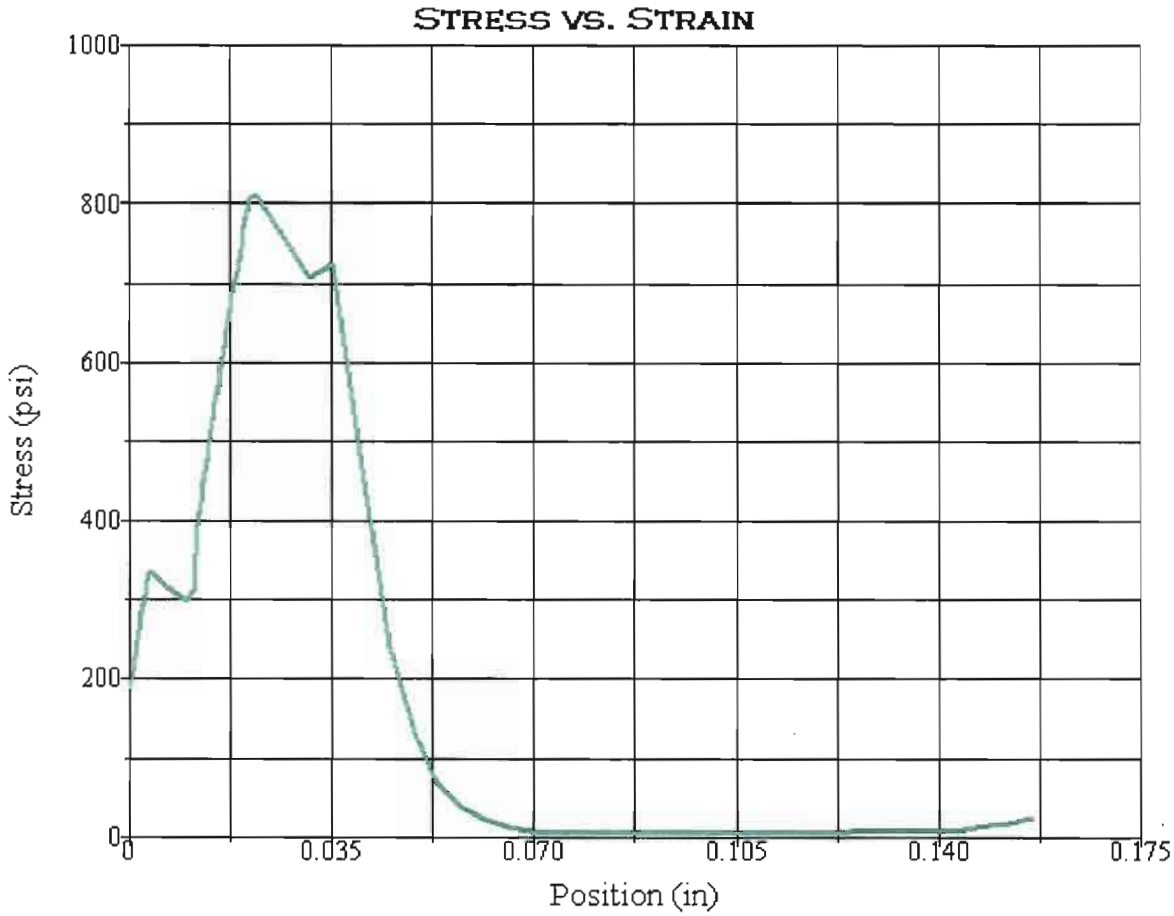


Test Summary

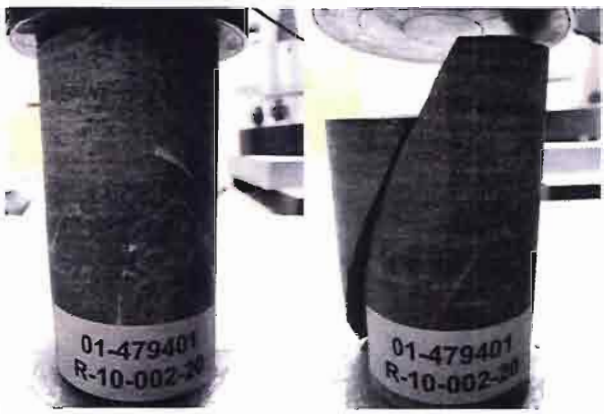
Counter:	942
Elapsed Time:	00:02:49
Operator:	AZM
Sample:	R10-002-19A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	2:59:08 PM
End Date:	3/24/2011
End Time:	3:01:57 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-036

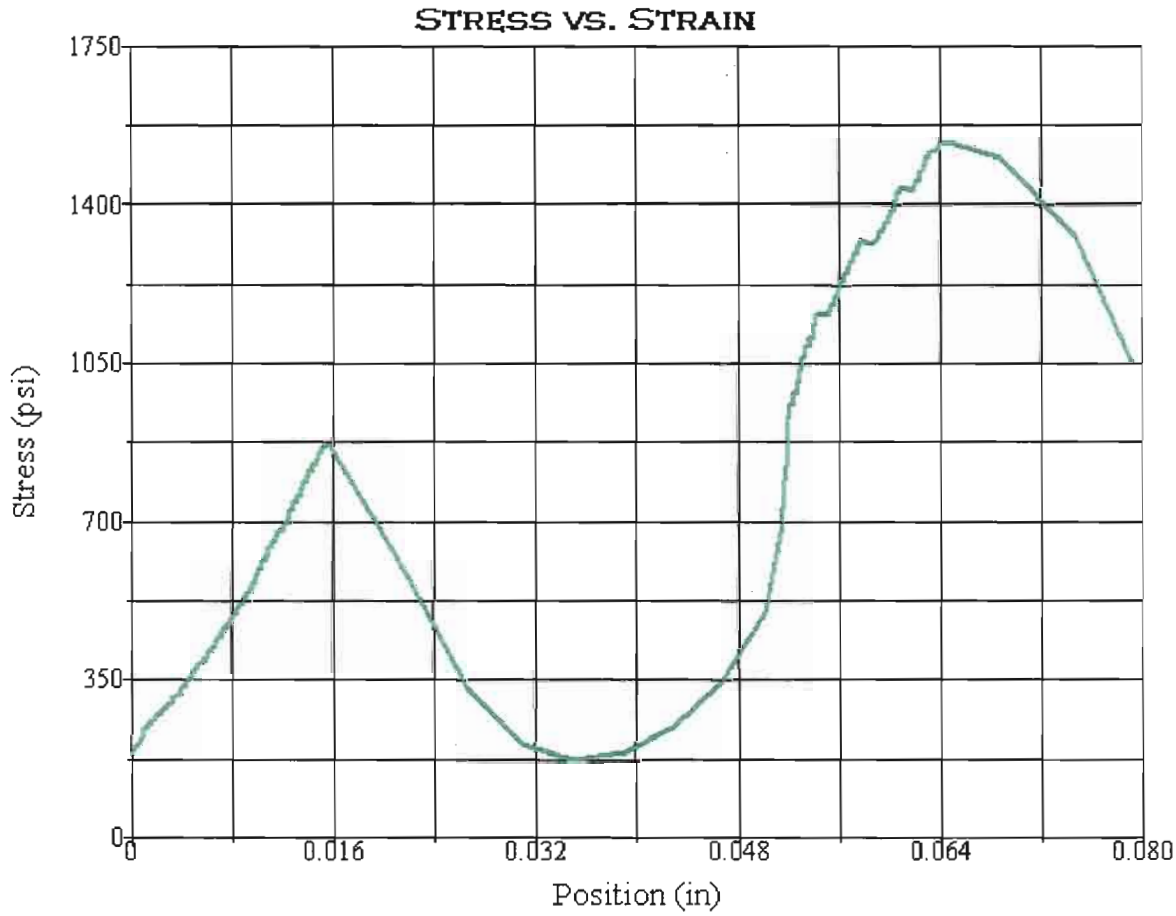
Test Results

Specimen Gage Length:	3.6100 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	27459 lbf
Compressive Strength:	6121 psi



Test Summary		Test Results	
Counter:	0	Specimen Gage Length:	4.3600 in
Elapsed Time:	00:00:20	Diameter:	2.3900 in
Operator:	AZM	Area:	4.4863 in²
Sample:	R10-002-20	Maximum Load:	3629 lbf
Resident Engineer:		Compressive Strength:	809 psi
GL#	11-012		
E.A. NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	3/24/2011		
Start Time:	3:08:53 PM		
End Date:	3/24/2011		
End Time:	3:09:13 PM		
Workstation:	D1K00YB1		
Tested By:	AZM		
Lab Test	Q11-037		



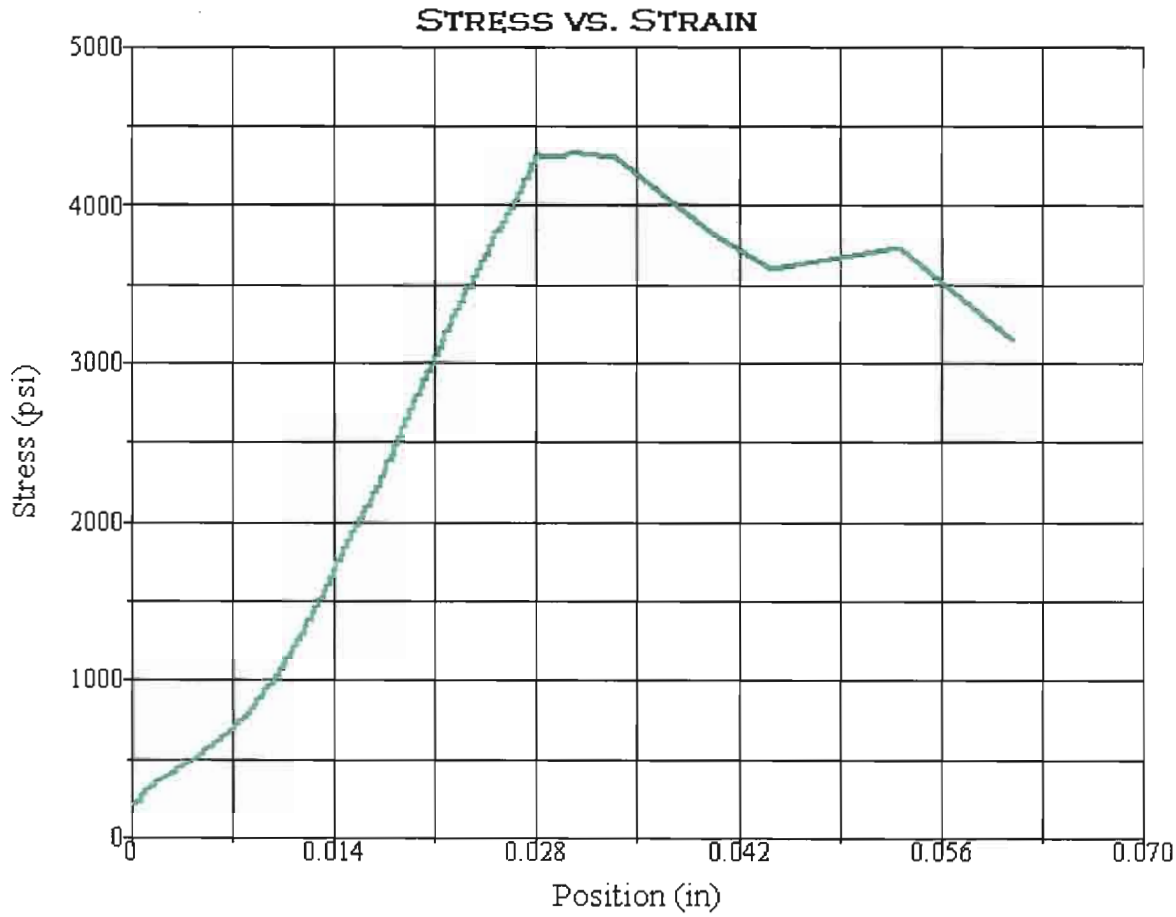


Test Summary

Counter:	944
Elapsed Time:	00:00:38
Operator:	AZM
Sample:	R10-002-21
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:22:29 PM
End Date:	3/24/2011
End Time:	3:23:07 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-038

Test Results

Specimen Gage Length:	4.5000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6969 lbf
Compressive Strength:	1540 psi

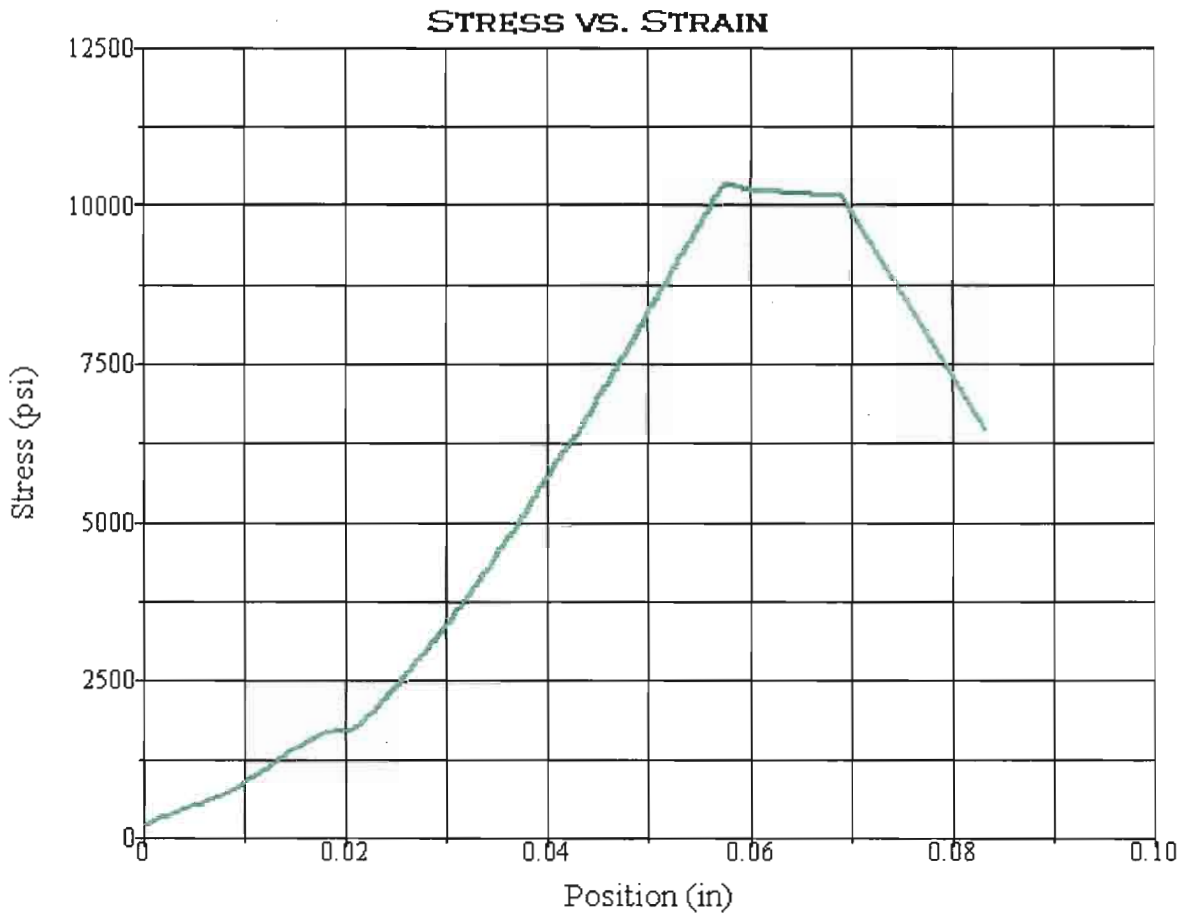


Test Summary

Counter:	945
Elapsed Time:	00:01:56
Operator:	AZM
Sample:	R10-002-21A
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:27:24 PM
End Date:	3/24/2011
End Time:	3:29:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-039

Test Results

Specimen Gage Length:	3.6000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	19587 lbf
Compressive Strength:	4330 psi

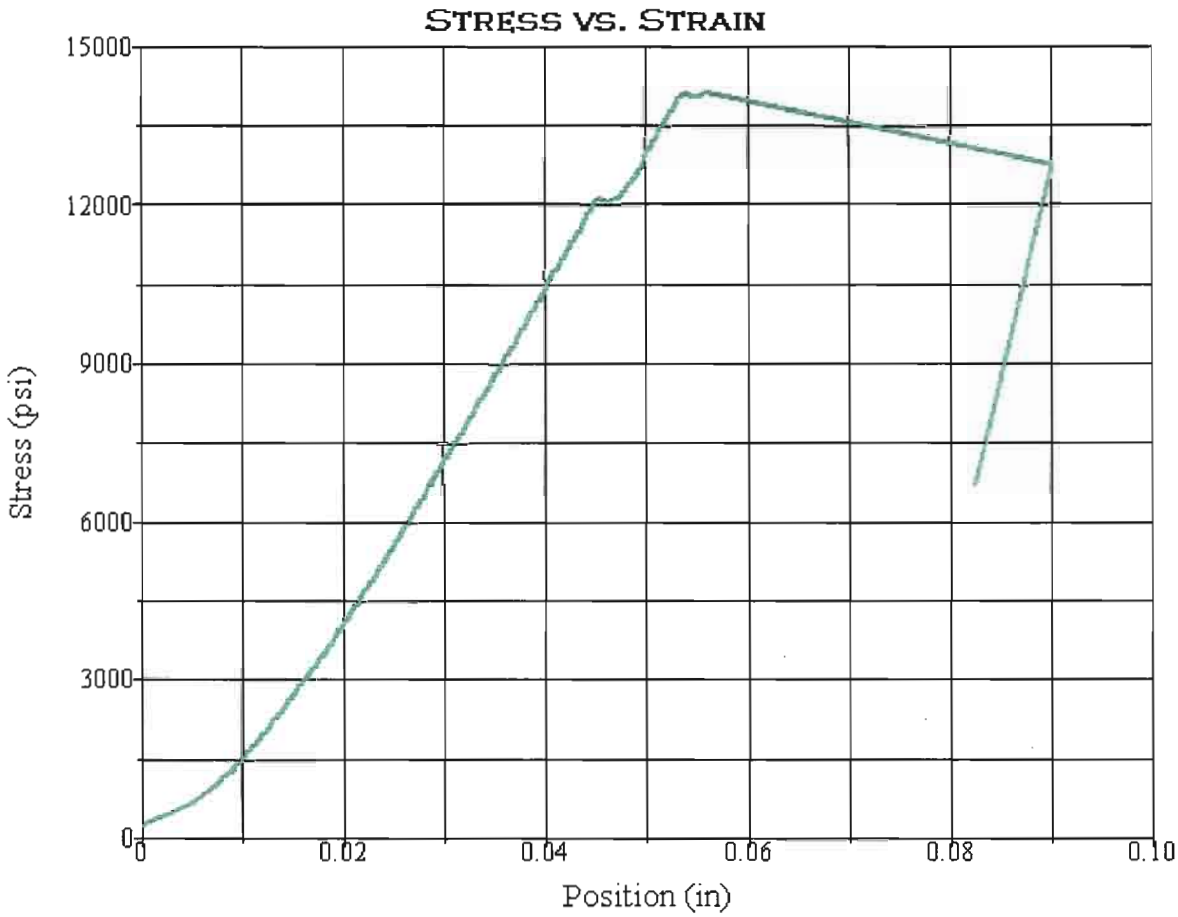


Test Summary

Counter:	946
Elapsed Time:	00:04:49
Operator:	AZM
Sample:	R10-002-23
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:33:23 PM
End Date:	3/24/2011
End Time:	3:38:12 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-040

Test Results

Specimen Gage Length:	5.0800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	46501 lbf
Compressive Strength:	10365 psi

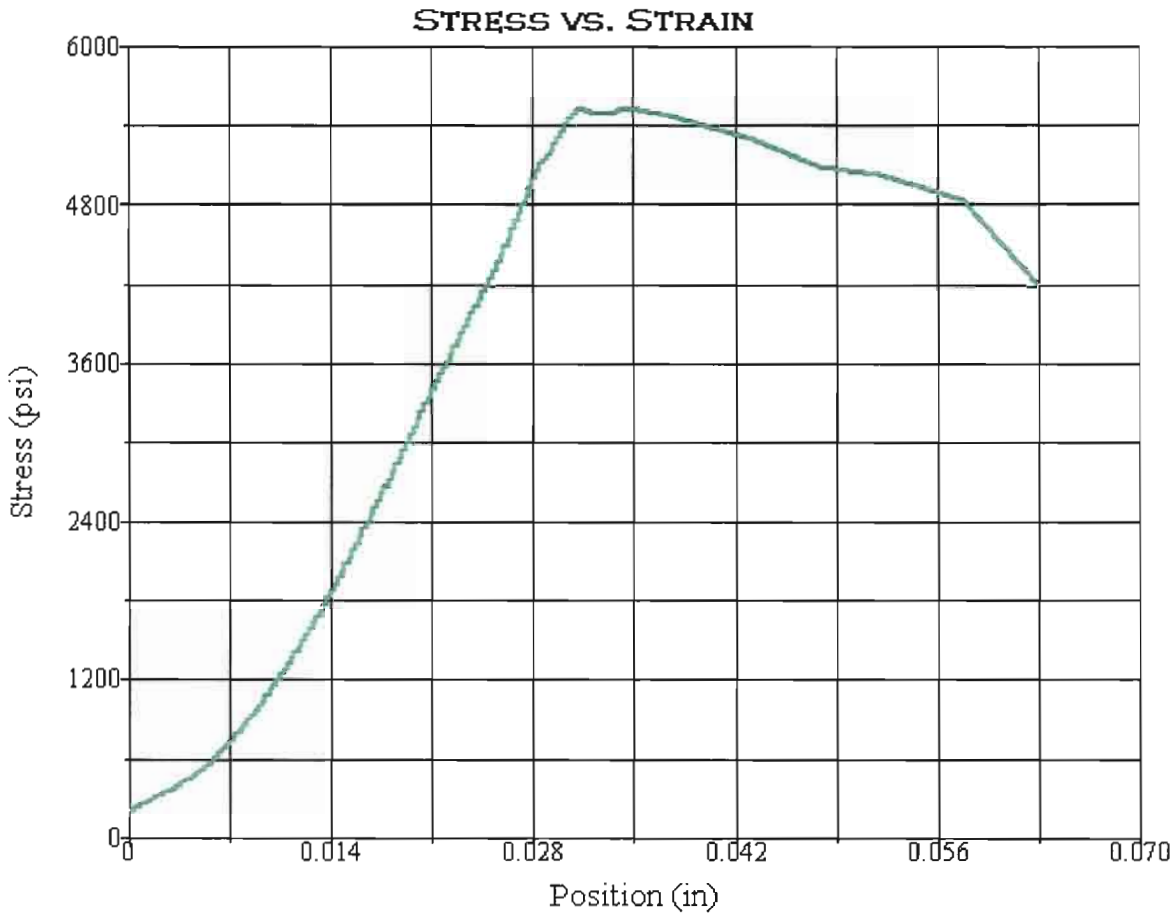


Test Summary

Counter:	947
Elapsed Time:	00:06:36
Operator:	AZM
Sample:	R10-002-25
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:42:57 PM
End Date:	3/24/2011
End Time:	3:49:33 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-041

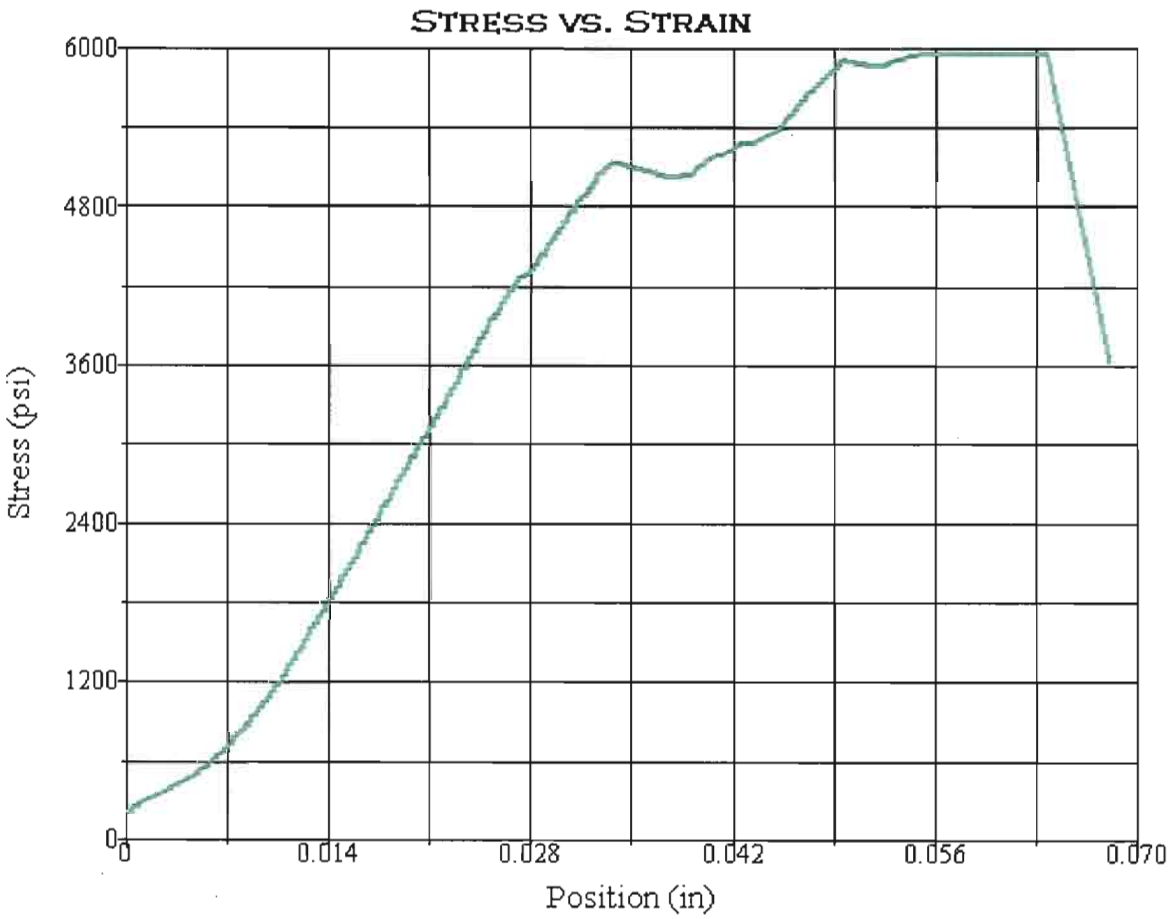
Test Results

Specimen Gage Length:	5.2600 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	63448 lbf
Compressive Strength:	14143 psi



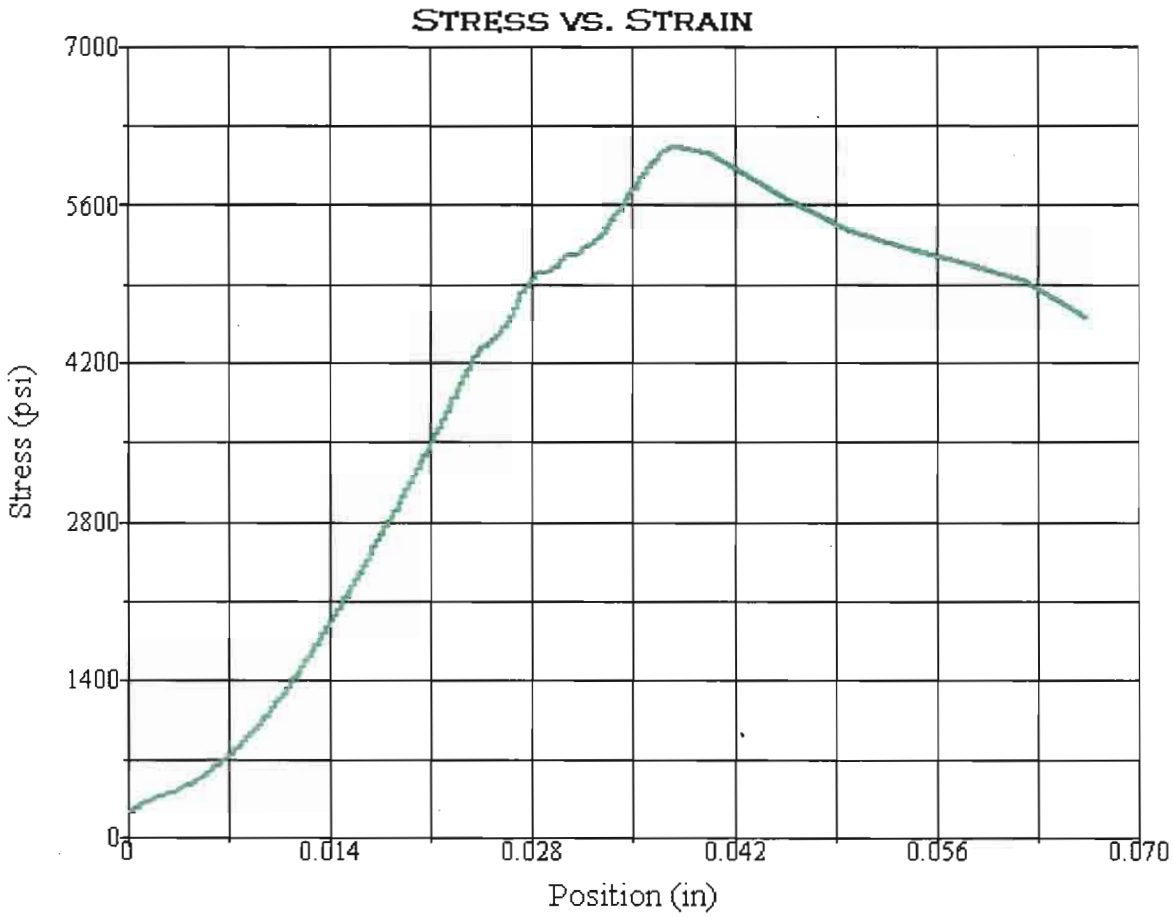
Test Summary	
Counter:	948
Elapsed Time:	00:02:32
Operator:	AZM
Sample:	R-10-002-26
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:54:10 PM
End Date:	3/24/2011
End Time:	3:56:42 PM
Workstation:	D1K00YB1
Tested By:	AZM
LabTest	Q11-042

Test Results	
Specimen Gage Length:	5.2500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25019 lbf
Compressive Strength:	5530 psi



Test Summary	
Counter:	949
Elapsed Time:	00:02:43
Operator:	AZM
Sample:	R10-002-28
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	3:59:45 PM
End Date:	3/24/2011
End Time:	4:02:28 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-043

Test Results	
Specimen Gage Length:	5.4200 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	26704 lbf
Compressive Strength:	5952 psi

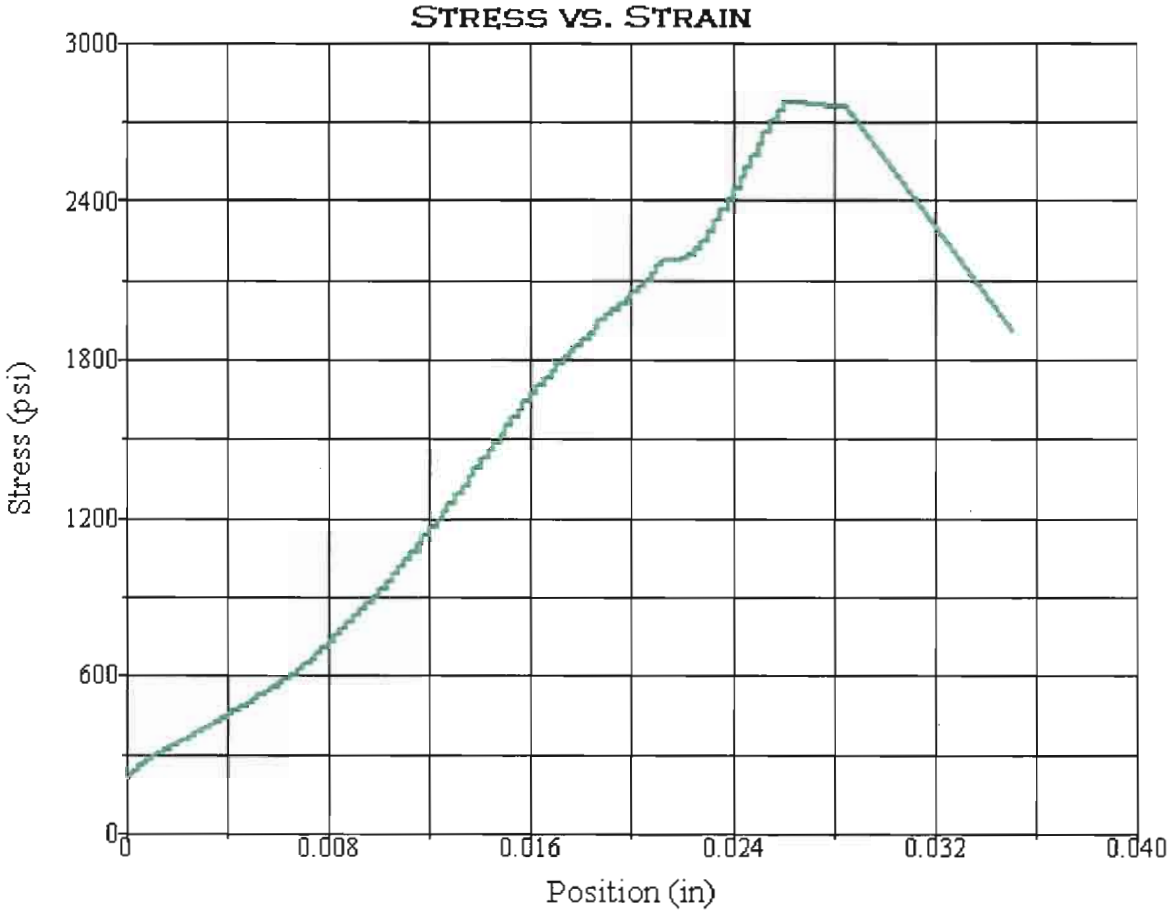


Test Summary

Counter:	950
Elapsed Time:	00:02:48
Operator:	AZM
Sample:	R10-003-05
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:05:48 PM
End Date:	3/24/2011
End Time:	4:08:36 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-044

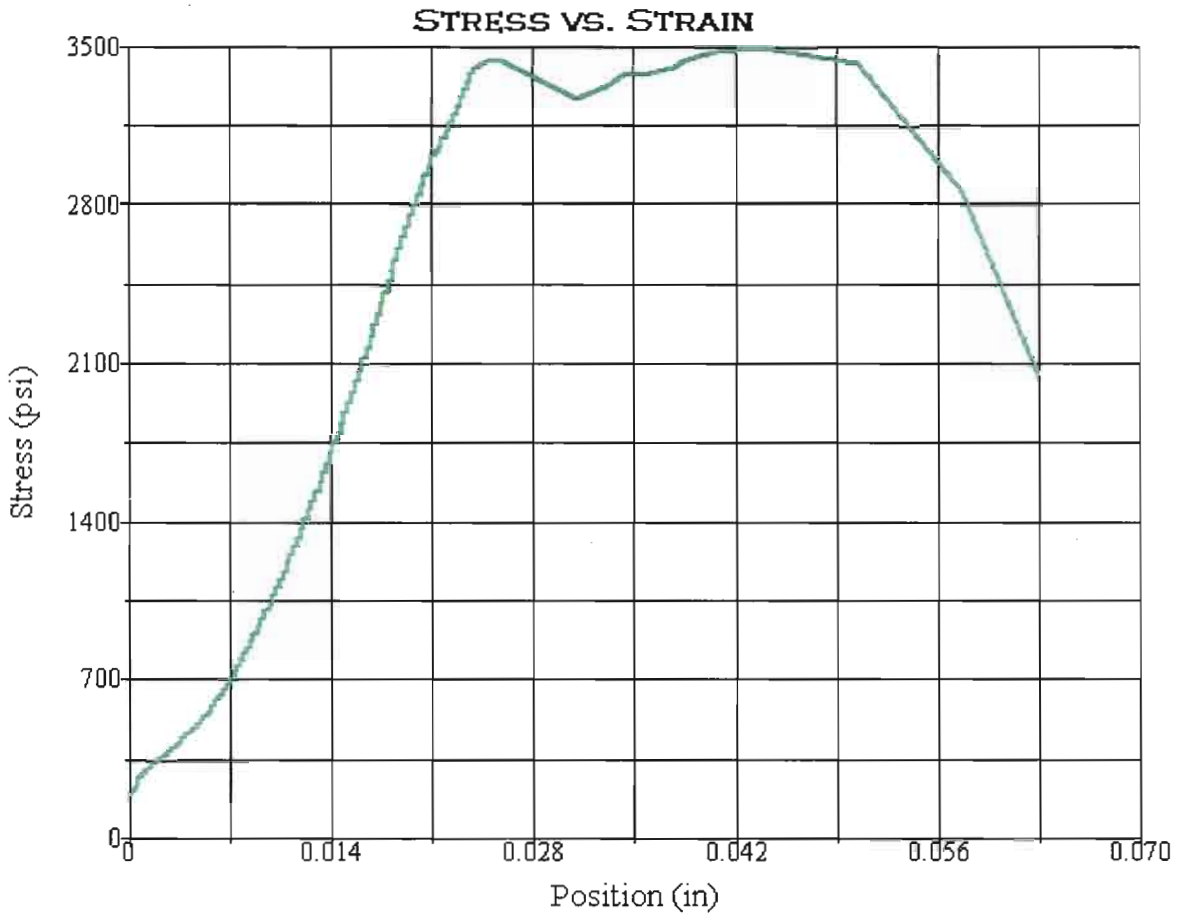
Test Results

Specimen Gage Length:	3.5200 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	27461 lbf
Compressive Strength:	6121 psi

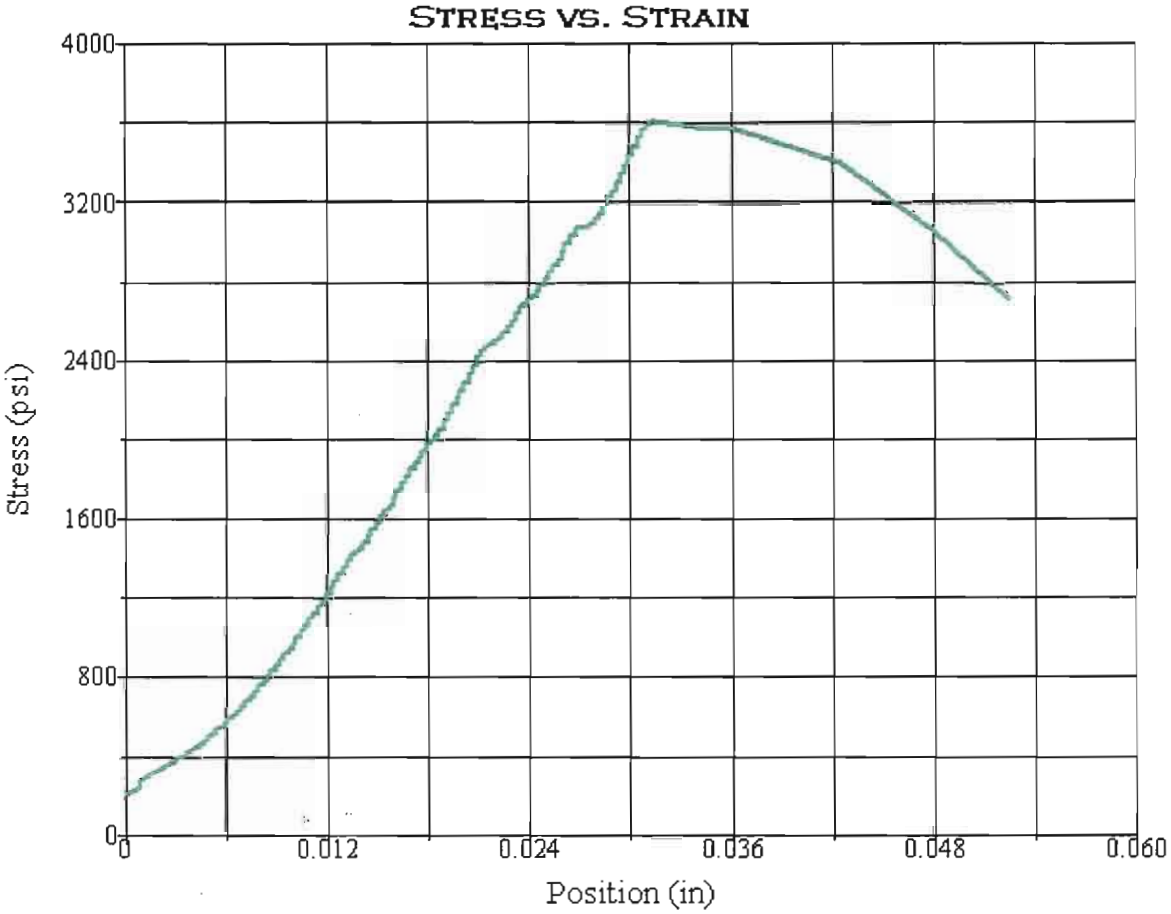


Test Summary	
Counter:	951
Elapsed Time:	00:01:12
Operator:	AZM
Sample:	R-10-003-06
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:11:57 PM
End Date:	3/24/2011
End Time:	4:13:09 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-045

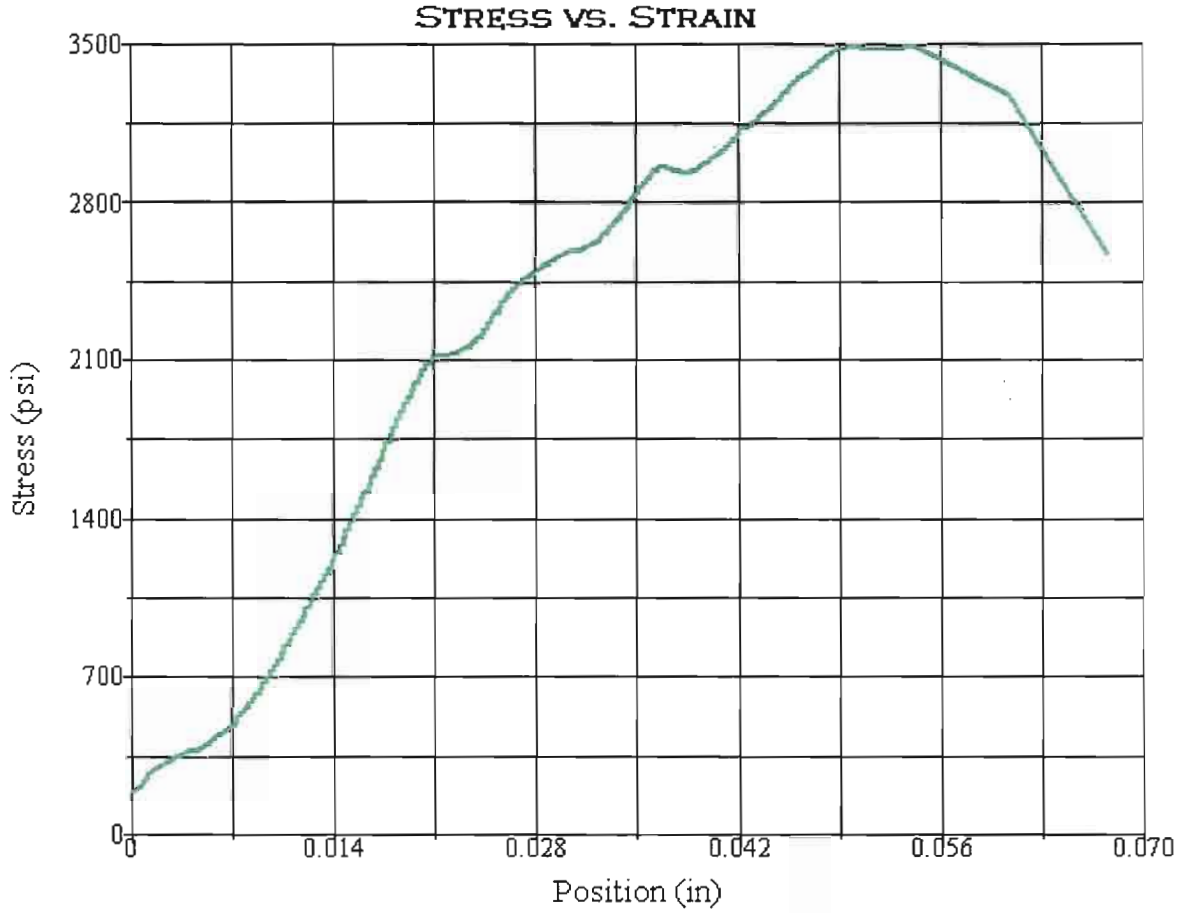
Test Results	
Specimen Gage Length:	5.0800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12570 lbf
Compressive Strength:	2779 psi



Test Summary		Test Results	
Counter:	952	Specimen Gage Length:	5.6400 in
Elapsed Time:	00:01:33	Diameter:	2.4000 in
Operator:	AZM	Area:	4.5239 in²
Sample:	R10-003-07	Maximum Load:	15809 lbf
Resident Engineer:		Compressive Strength:	3495 psi
GL#	11-012		
E.A. NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	3/24/2011		
Start Time:	4:15:30 PM		
End Date:	3/24/2011		
End Time:	4:17:03 PM		
Workstation:	D1K00YB1		
Tested By:	AZM		
Lab Test	Q11-046		



Test Summary		Test Results	
Counter:	953	Specimen Gage Length:	2.4000 in
Elapsed Time:	00:01:37	Diameter:	2.4000 in
Operator:	AZM	Area:	4.5239 in²
Sample:	R10-003-09	Maximum Load:	16348 lbf
Resident Engineer:		Compressive Strength:	3614 psi
GL#	11-012		
E.A. NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	3/24/2011		
Start Time:	4:20:19 PM		
End Date:	3/24/2011		
End Time:	4:21:56 PM		
Workstation:	D1K00YB1		
Tested By:	AZM		
LabTest	Q11-047		

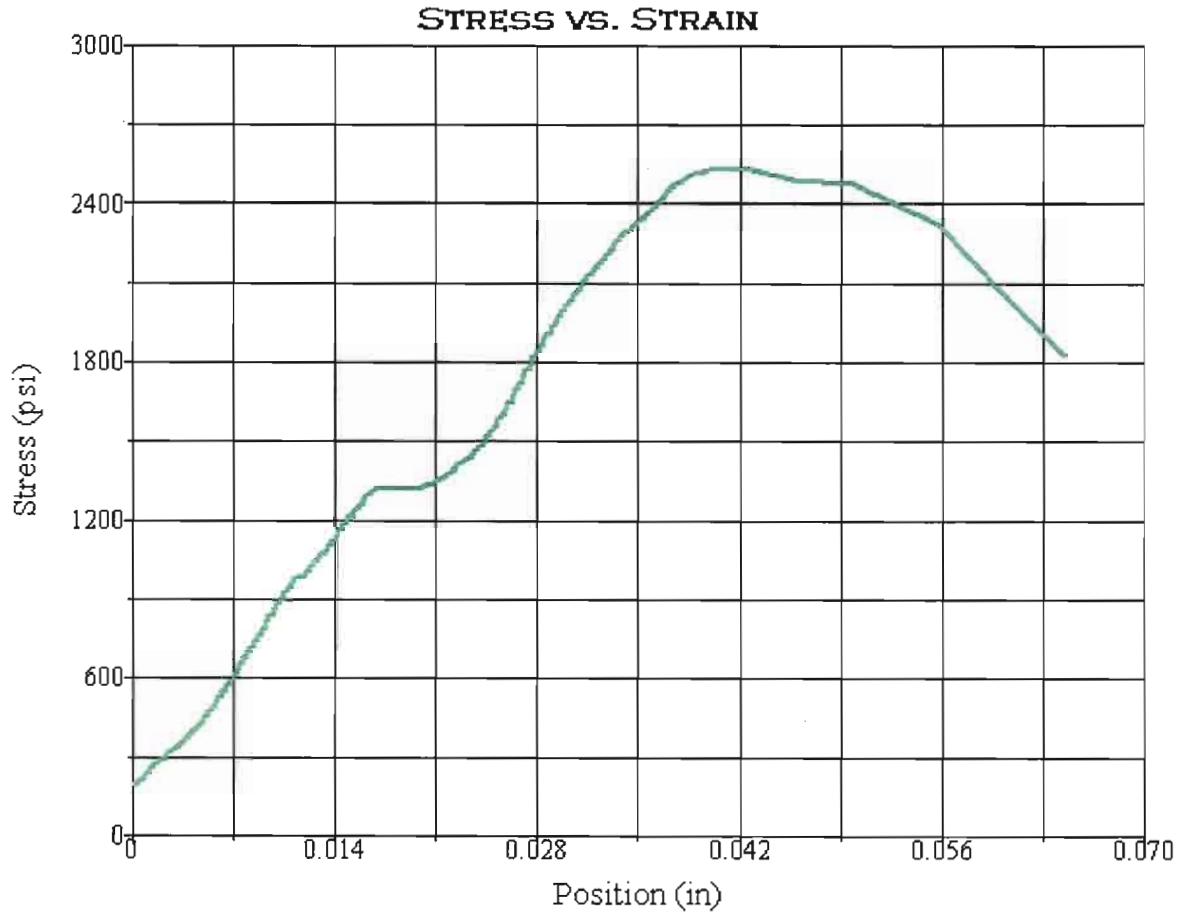


Test Summary

Counter:	954
Elapsed Time:	00:01:33
Operator:	AZM
Sample:	R11-003-11
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:25:38 PM
End Date:	3/24/2011
End Time:	4:27:11 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-049

Test Results

Specimen Gage Length:	4.0600 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	15671 lbf
Compressive Strength:	3493 psi

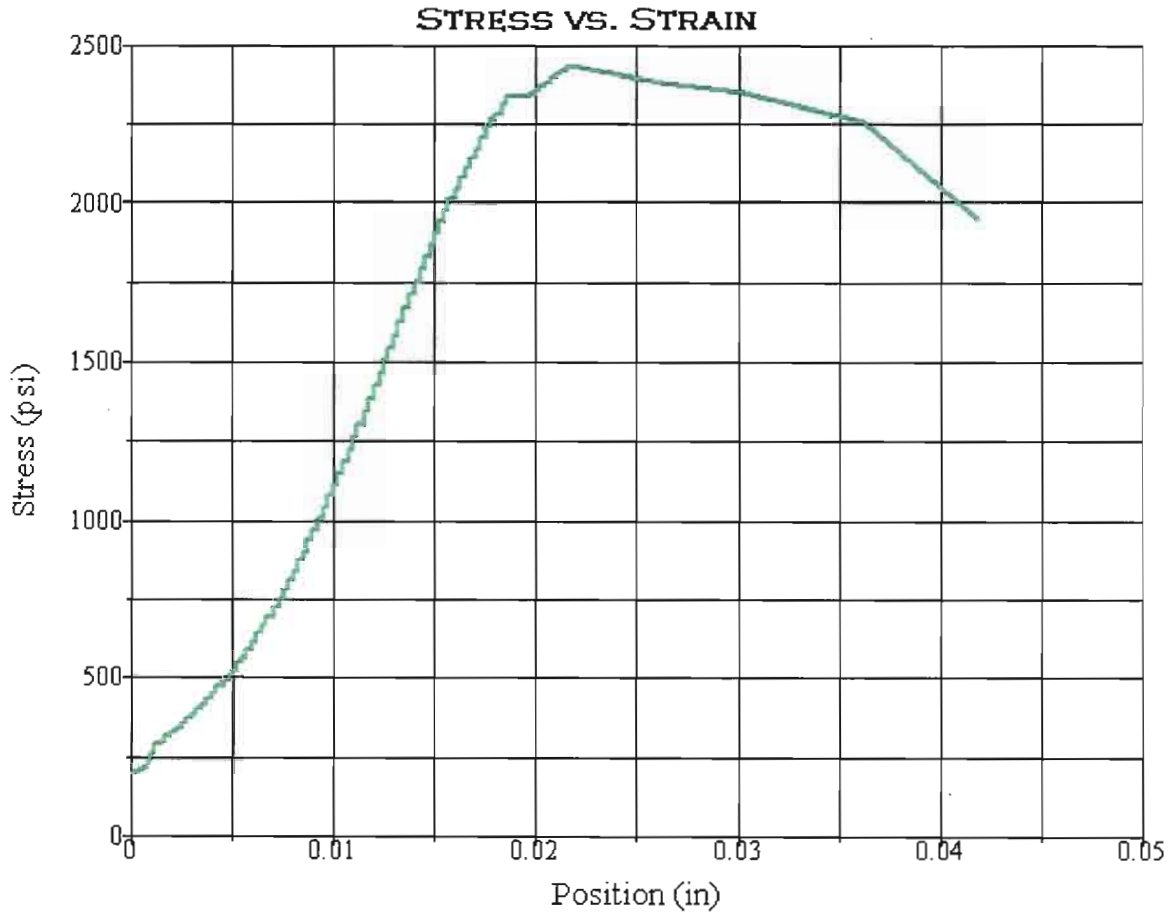


Test Summary

Counter:	955
Elapsed Time:	00:01:07
Operator:	AZM
Sample:	R10-003-13
Resident Engineer:	
GL#	11-012
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:33:08 PM
End Date:	3/24/2011
End Time:	4:34:15 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-051

Test Results

Specimen Gage Length:	3.4800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	11365 lbf
Compressive Strength:	2533 psi

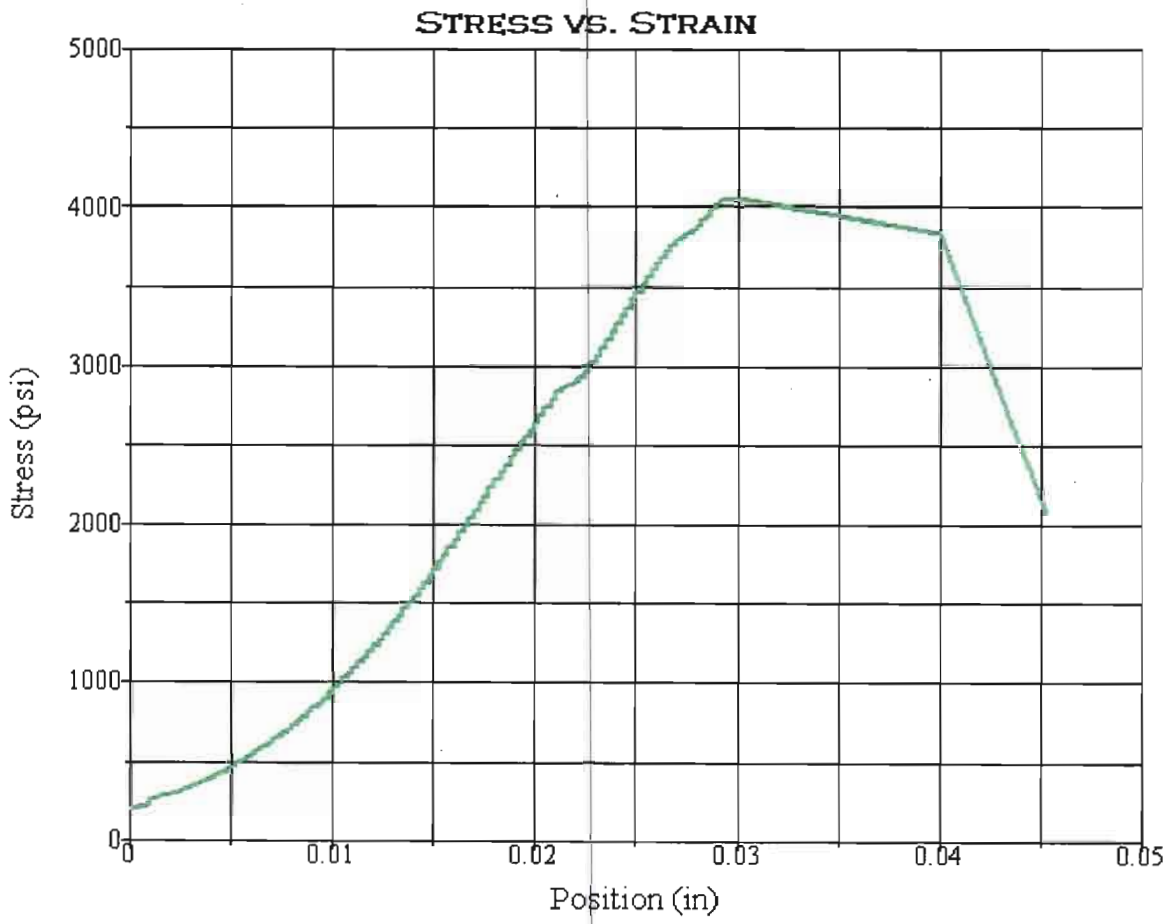


Test Summary

Counter:	956
Elapsed Time:	00:01:02
Operator:	AZM
Sample:	R10-003-15
Resident Engineer:	
GL#	11-012
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	3/24/2011
Start Time:	4:36:59 PM
End Date:	3/24/2011
End Time:	4:38:01 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab Test	Q11-053

Test Results

Specimen Gage Length:	5.4500 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	10917 lbf
Compressive Strength:	2433 psi

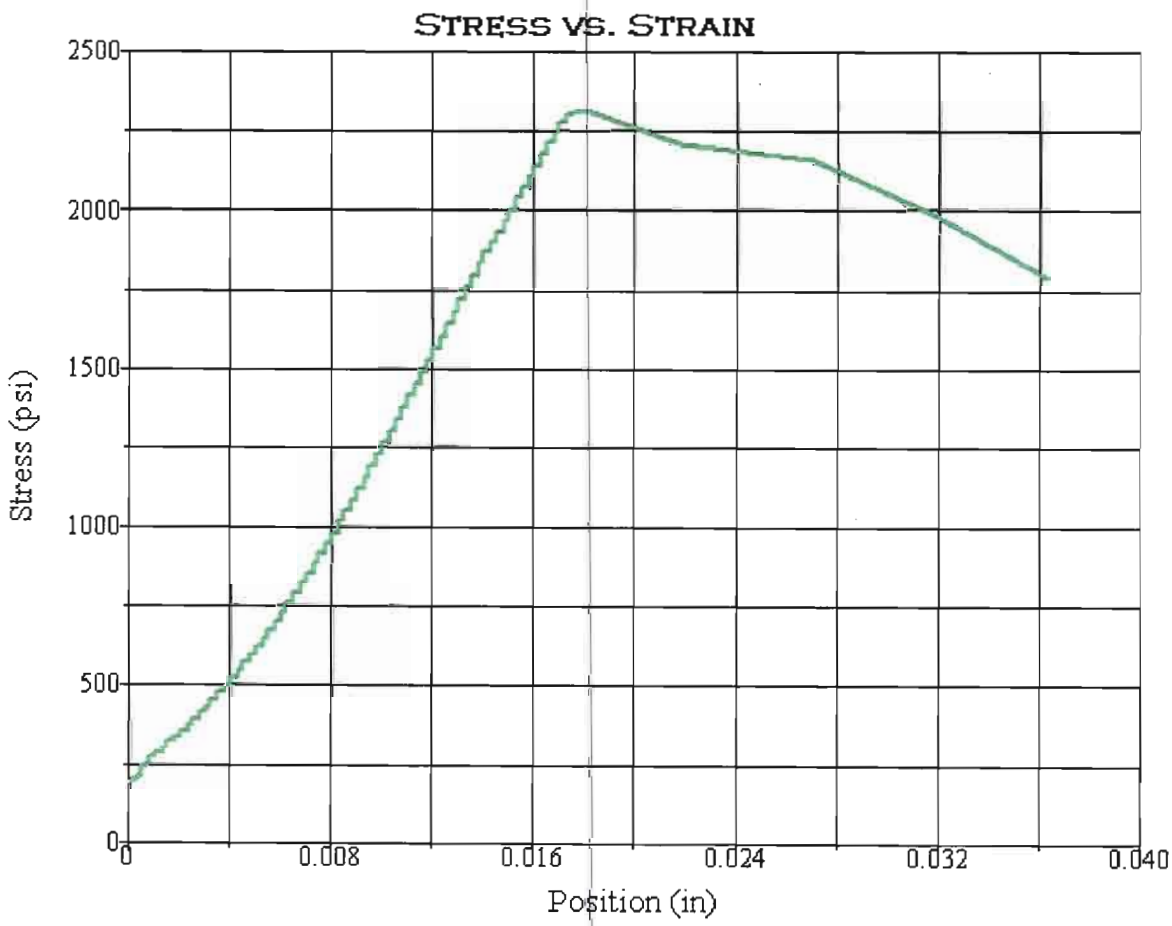


Test Summary

Counter:	1310
Elapsed Time:	00:01:49
Operator:	AZM
Sample:	R-11-004-12
Resident Engineer:	
Ticket:	GL # 11-057
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	11:31:56 AM
End Date:	7/14/2011
End Time:	11:33:45 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-160

Test Results

Specimen Gage Length:	4.9700 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	18492 lbf
Compressive Strength:	4054 psi



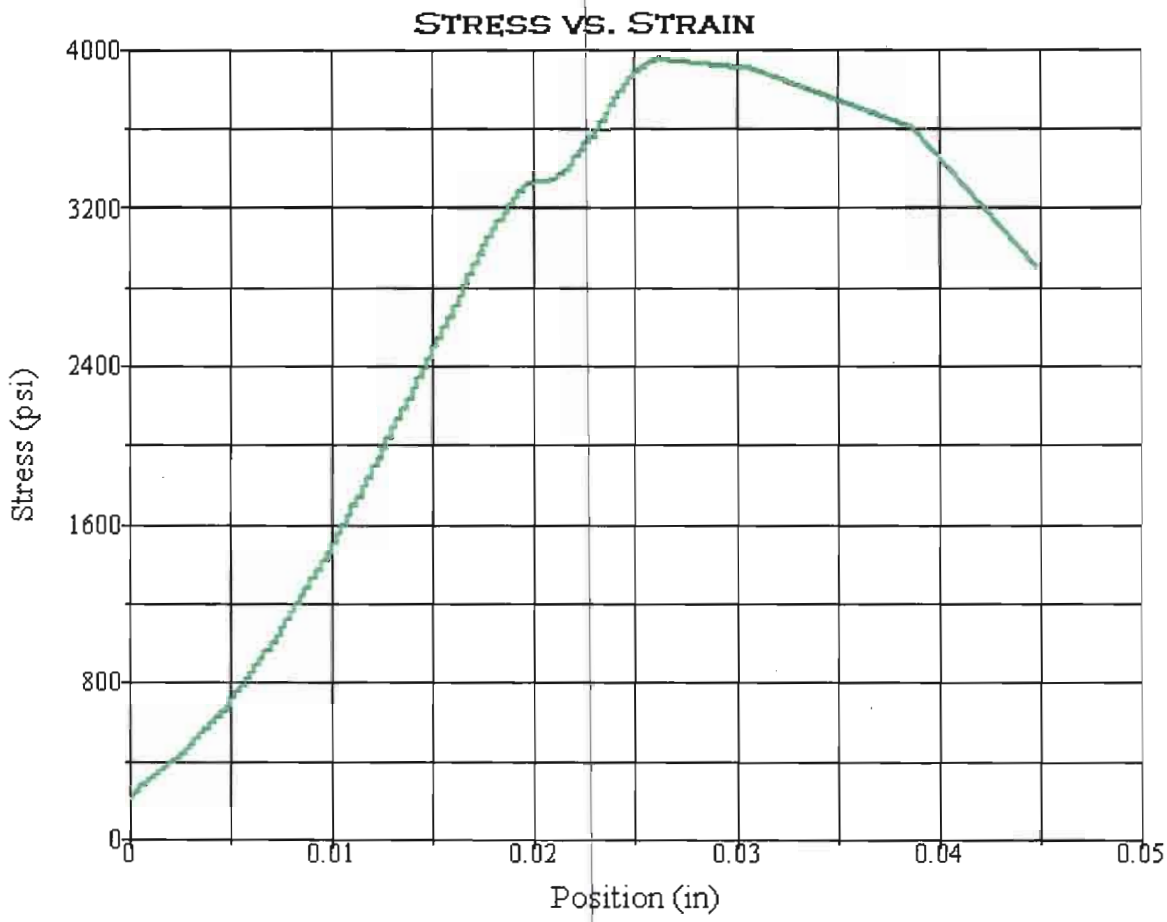
Test Summary

Counter:	1311
Elapsed Time:	00:01:00
Operator:	AZM
Sample:	R-11-004-13
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	11:41:18 AM
End Date:	7/14/2011
End Time:	11:42:18 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-161
NOTE:	L/D<2

SAMPLE FELL APART WHILE PREPARING

Test Results

Specimen Gage Length:	3.7100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10442 lbf
Compressive Strength:	2308 psi

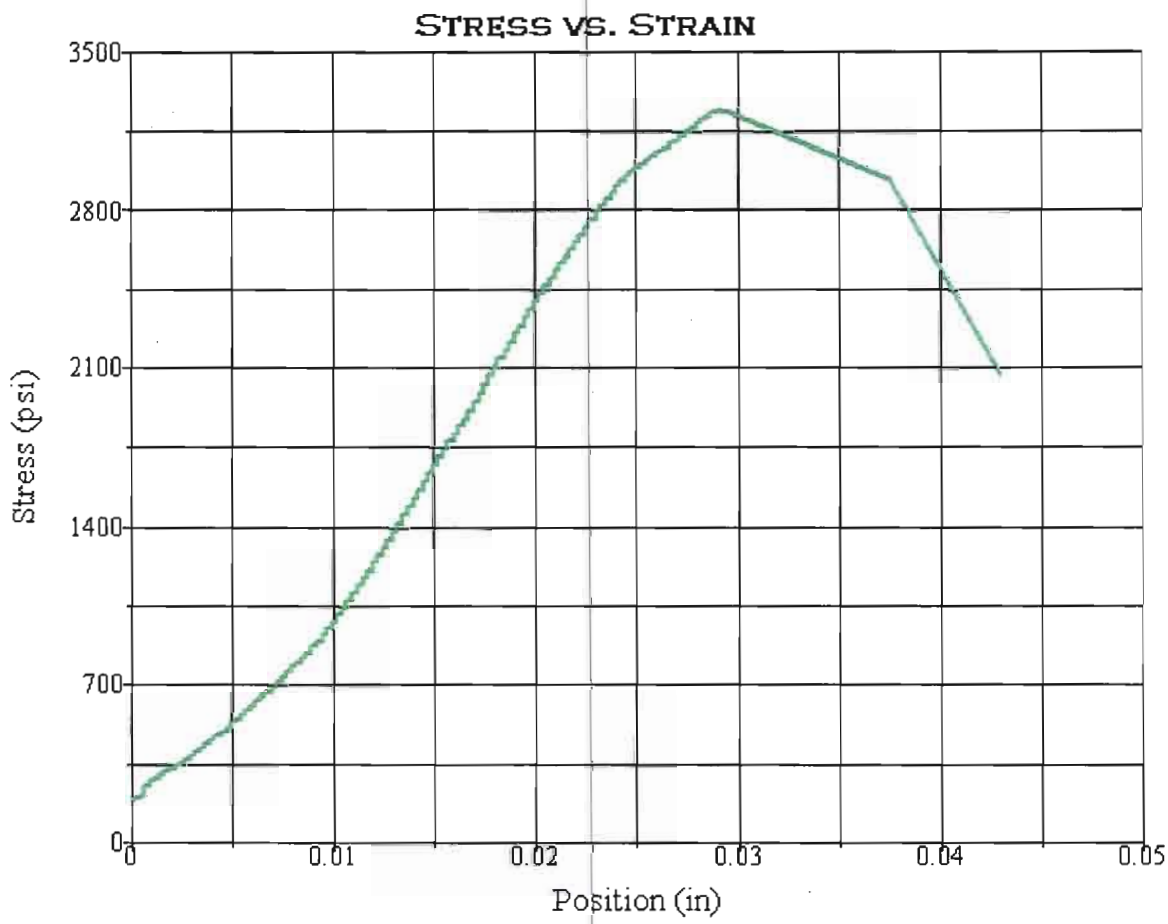


Test Summary

Counter:	1312
Elapsed Time:	00:01:46
Operator:	AZM
Sample:	R-11-004-14
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	11:49:23 AM
End Date:	7/14/2011
End Time:	11:51:09 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-162
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.3800 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	17602 lbf
Compressive Strength:	3957 psi

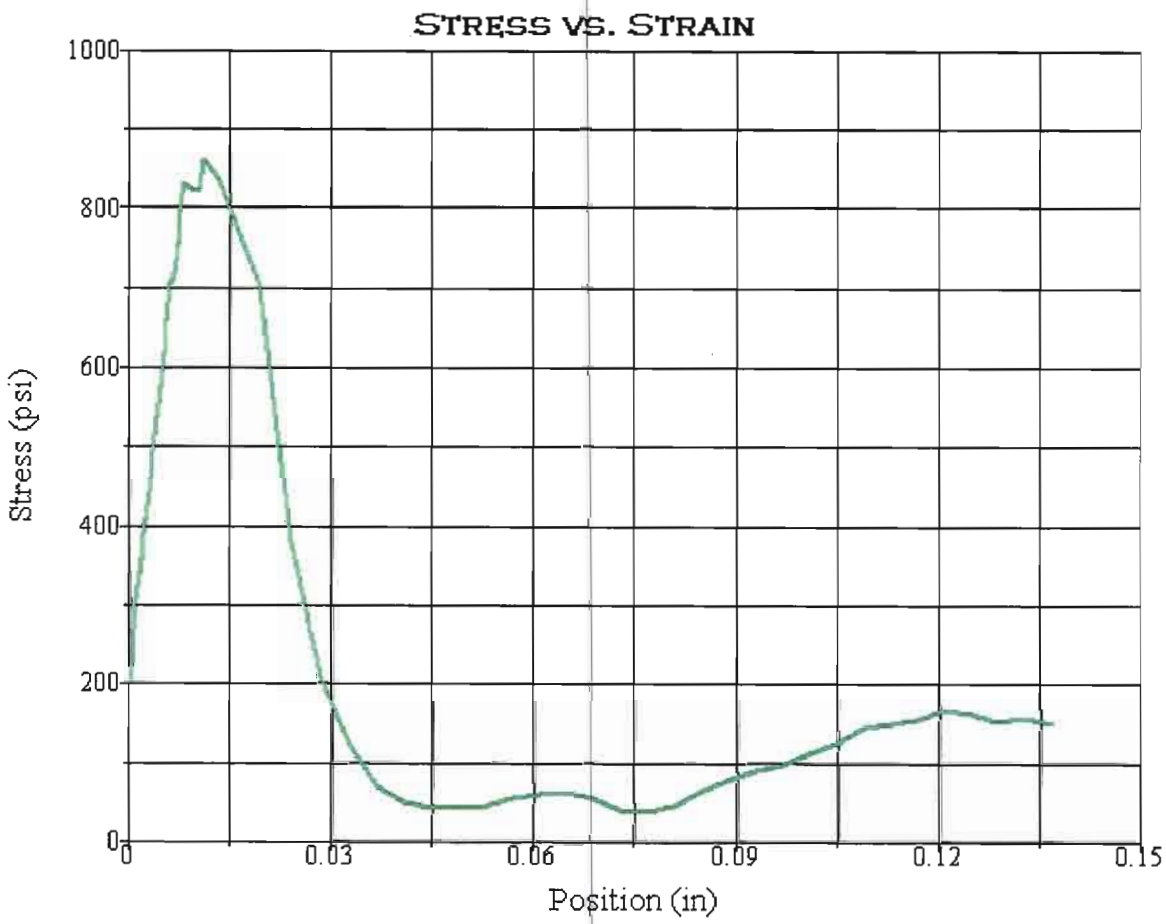


Test Summary

Counter:	1313
Elapsed Time:	00:01:26
Operator:	AZM
Sample:	R-11-004-15
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	12:00:00 PM
End Date:	7/14/2011
End Time:	12:01:26 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-163
NOTE:	L/D< 2

Test Results

Specimen Gage Length:	3.8900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	14688 lbf
Compressive Strength:	3247 psi

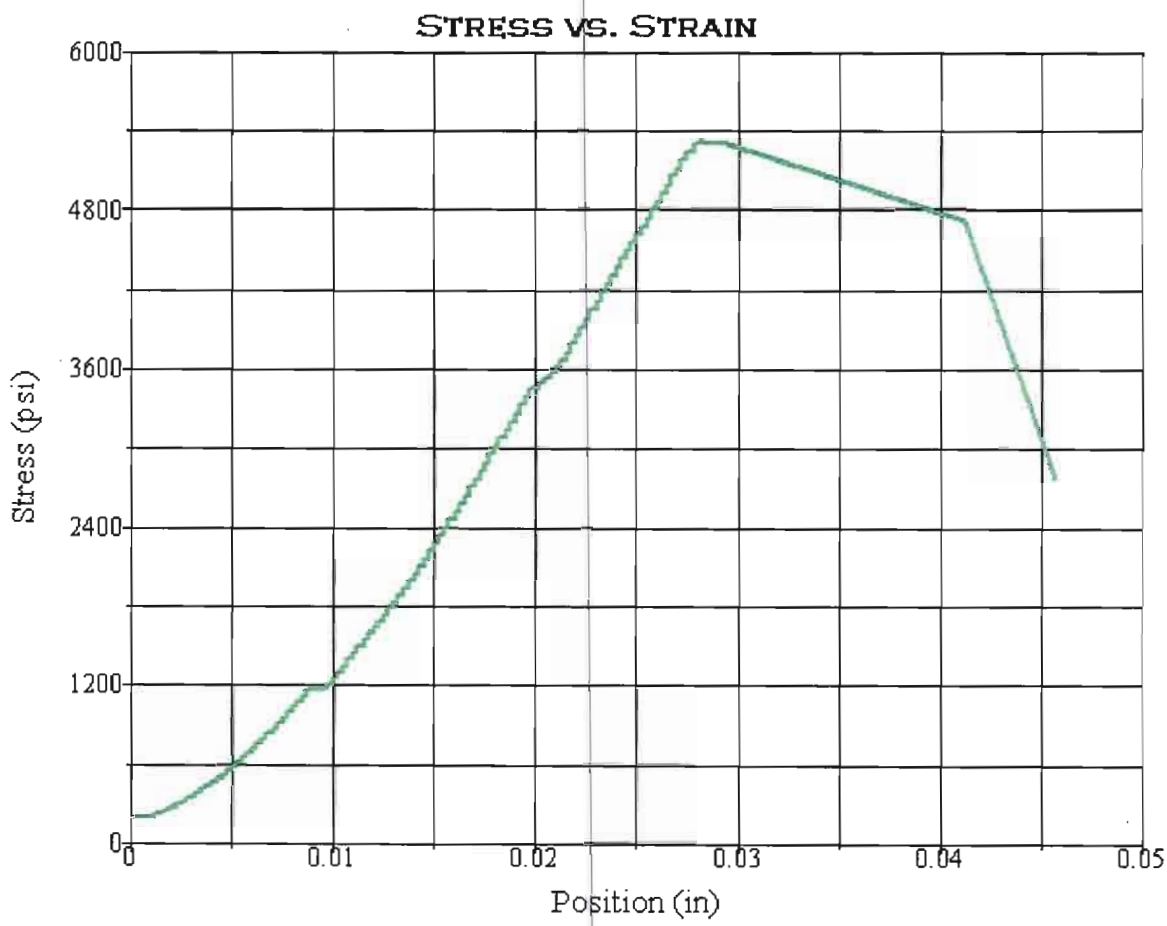


Test Summary

Counter:	0
Elapsed Time:	00:00:20
Operator:	AZM
Sample:	R-11-005-06
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	1:46:45 PM
End Date:	7/14/2011
End Time:	1:47:05 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-165

Test Results

Specimen Gage Length:	5.2700 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	3926 lbf
Compressive Strength:	861 psi

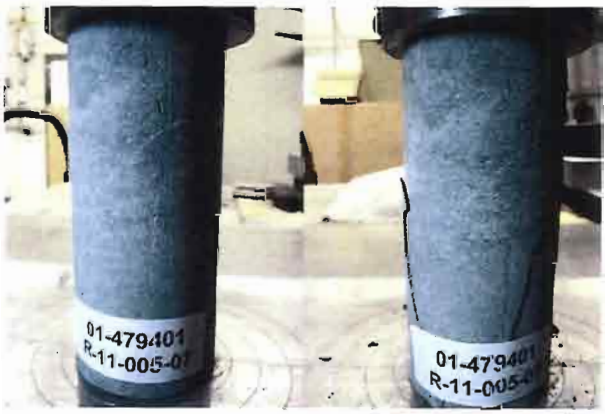


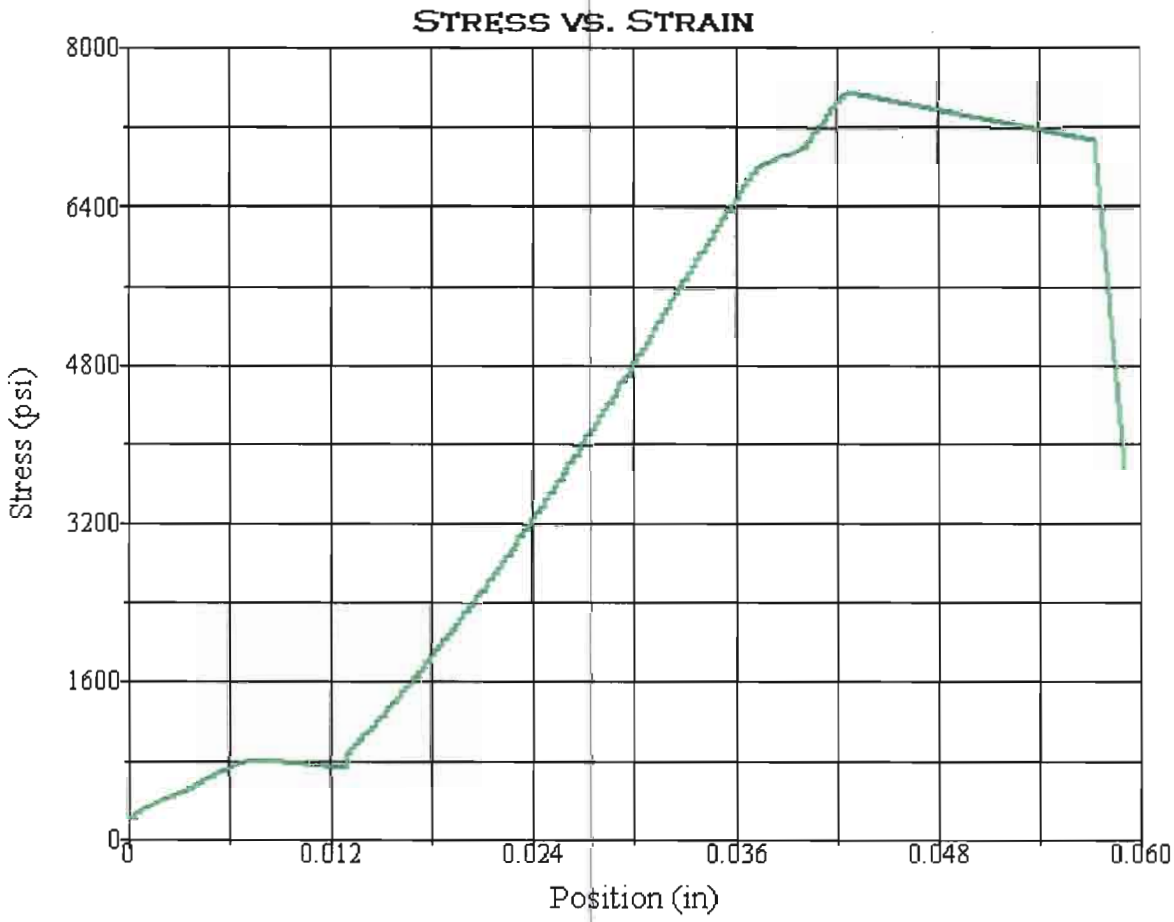
Test Summary

Counter:	1315
Elapsed Time:	00:02:27
Operator:	AZM
Sample:	R-11-005-07
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	1:52:53 PM
End Date:	7/14/2011
End Time:	1:55:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-166

Test Results

Specimen Gage Length:	5.3600 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	24217 lbf
Compressive Strength:	5309 psi



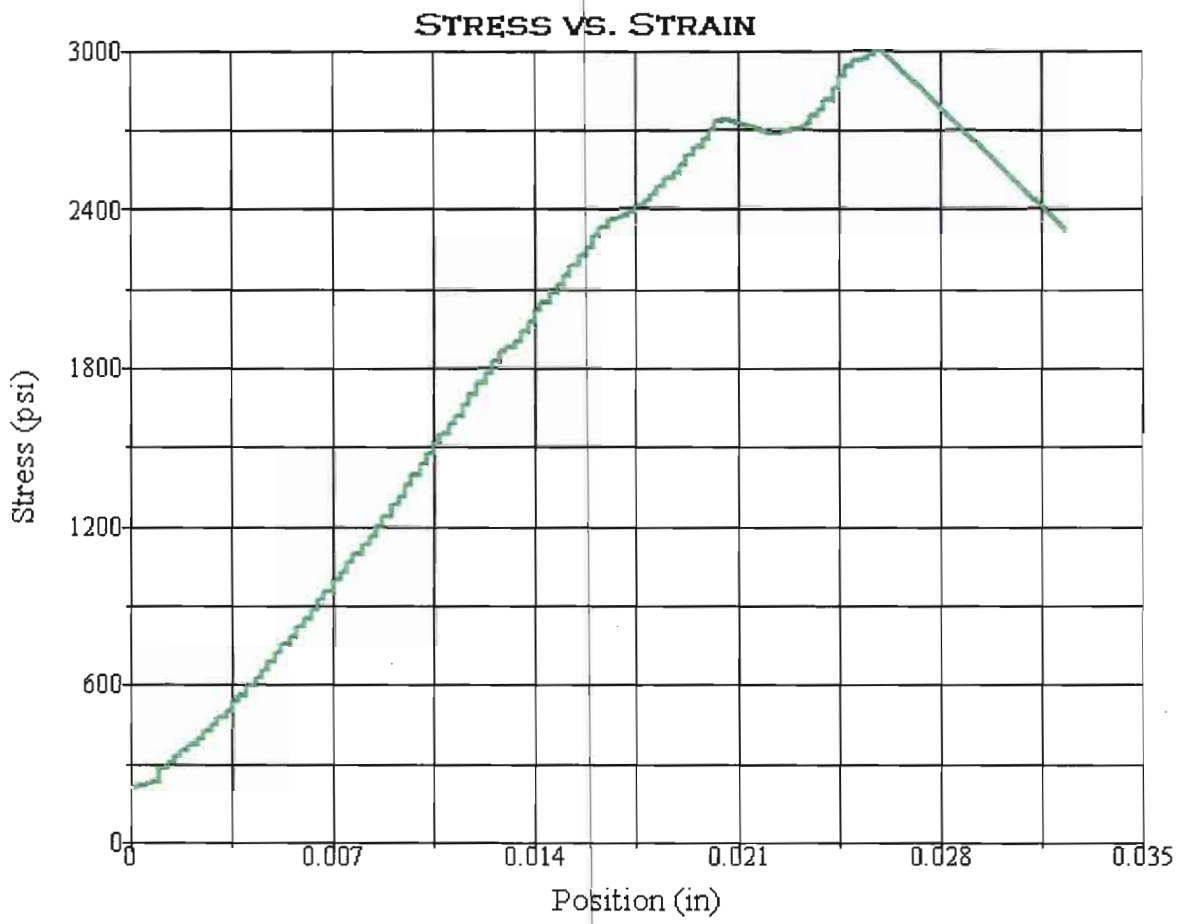


Test Summary

Counter:	1316
Elapsed Time:	00:03:28
Operator:	AZM
Sample:	R-11-005-09
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	2:08:42 PM
End Date:	7/14/2011
End Time:	2:12:10 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-167

Test Results

Specimen Gage Length:	5.3000 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	34442 lbf
Compressive Strength:	7550 psi

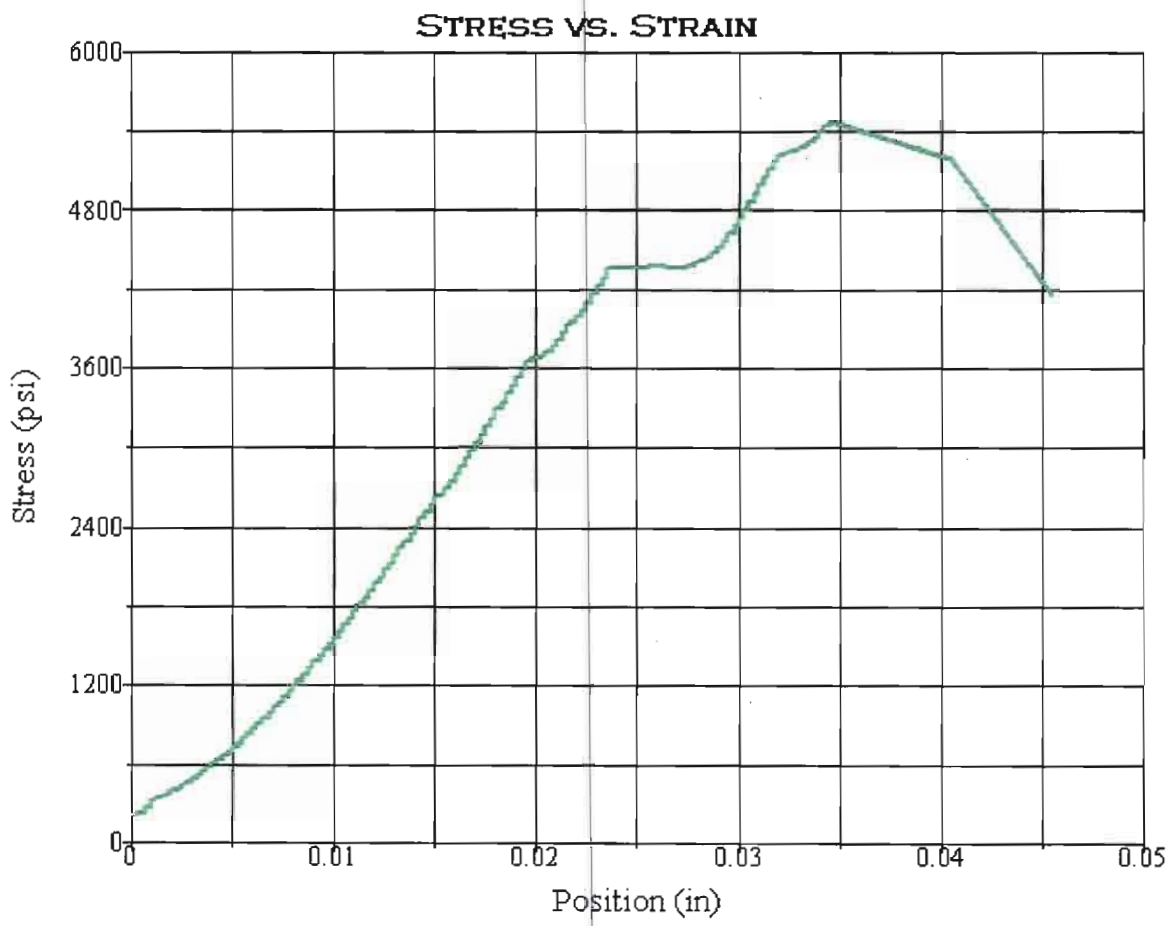


Test Summary

Counter:	1317
Elapsed Time:	00:01:18
Operator:	AZM
Sample:	R-11-005-10
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	2:21:03 PM
End Date:	7/14/2011
End Time:	2:22:21 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-168

Test Results

Specimen Gage Length:	5.5500 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	13665 lbf
Compressive Strength:	2996 psi

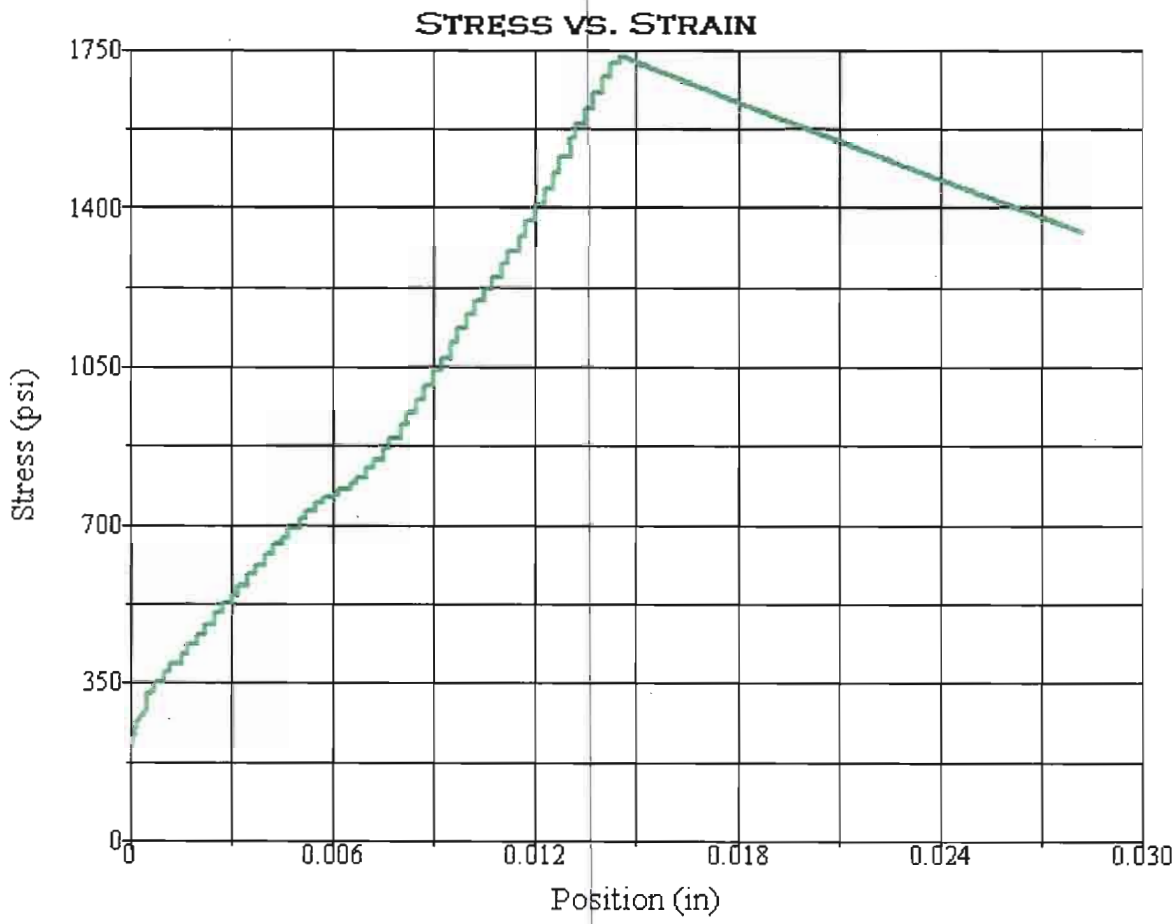


Test Summary

Counter:	1318
Elapsed Time:	00:02:28
Operator:	AZM
Sample:	R-11-005-11
Resident Engineer:	
Ticket:	GL # 11-057
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	2:32:21 PM
End Date:	7/14/2011
End Time:	2:34:49 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-169

Test Results

Specimen Gage Length:	5.5700 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	24938 lbf
Compressive Strength:	5467 psi

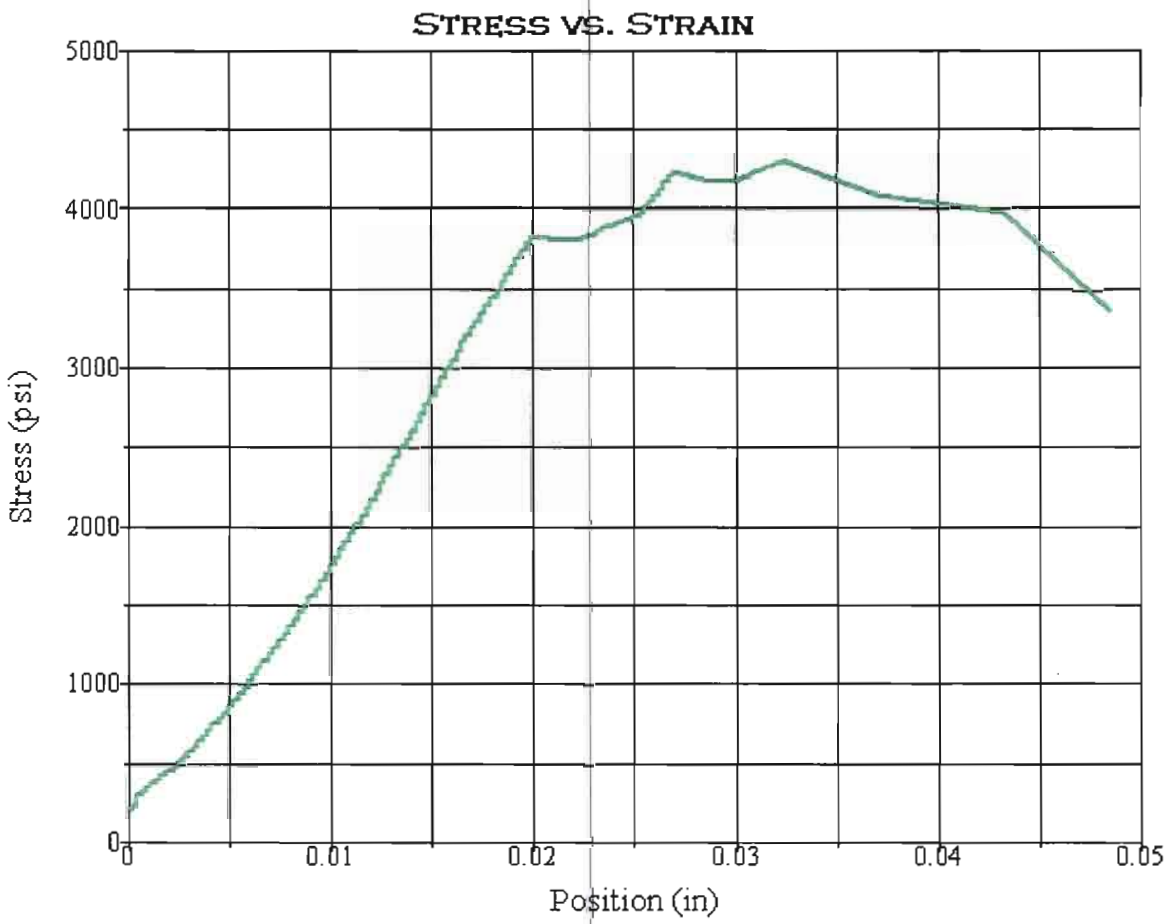


Test Summary

Counter:	1319
Elapsed Time:	00:00:41
Operator:	AZM
Sample:	R-11-005-15
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/14/2011
Start Time:	3:57:39 PM
End Date:	7/14/2011
End Time:	3:58:20 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-170
NOTE:	L/D<2

Test Results

Specimen Gage Length:	3.9400 in
Diameter:	2.4100 in
Area:	4.5617 in²
Maximum Load:	7909 lbf
Compressive Strength:	1734 psi

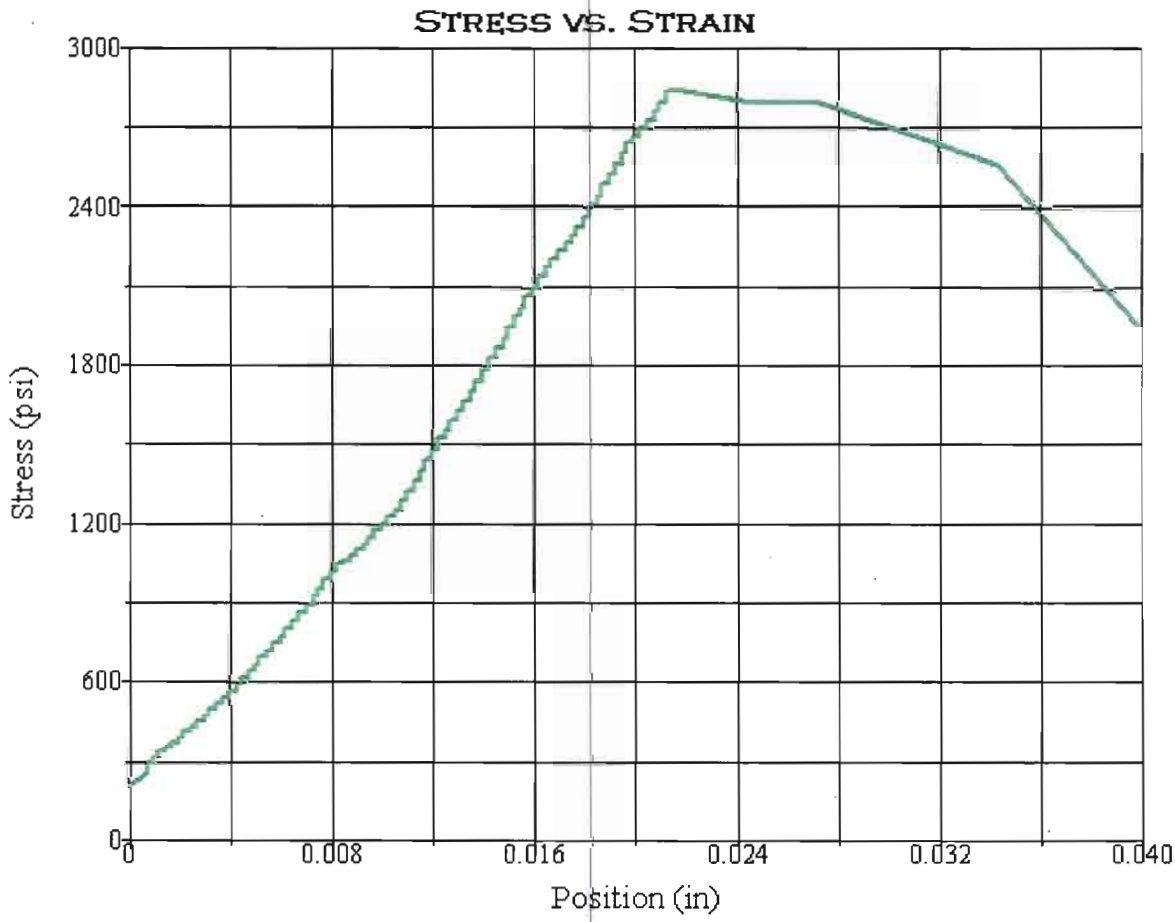


Test Summary

Counter:	1320
Elapsed Time:	00:01:55
Operator:	AZM
Sample:	R-11-005-21
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	11:12:53 AM
End Date:	7/18/2011
End Time:	11:14:48 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-171

Test Results

Specimen Gage Length:	5.4700 in
Diameter:	2.4300 in
Area:	4.6377 in²
Maximum Load:	19941 lbf
Compressive Strength:	4300 psi

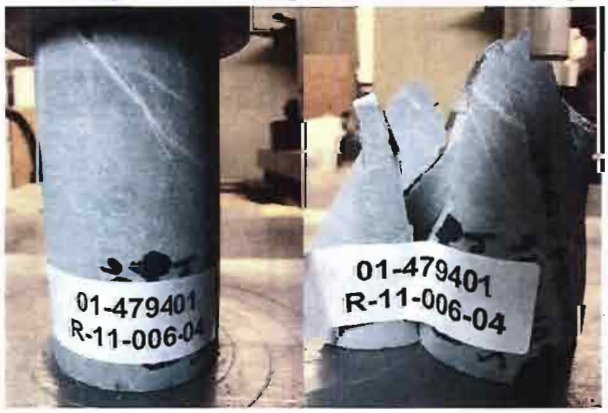


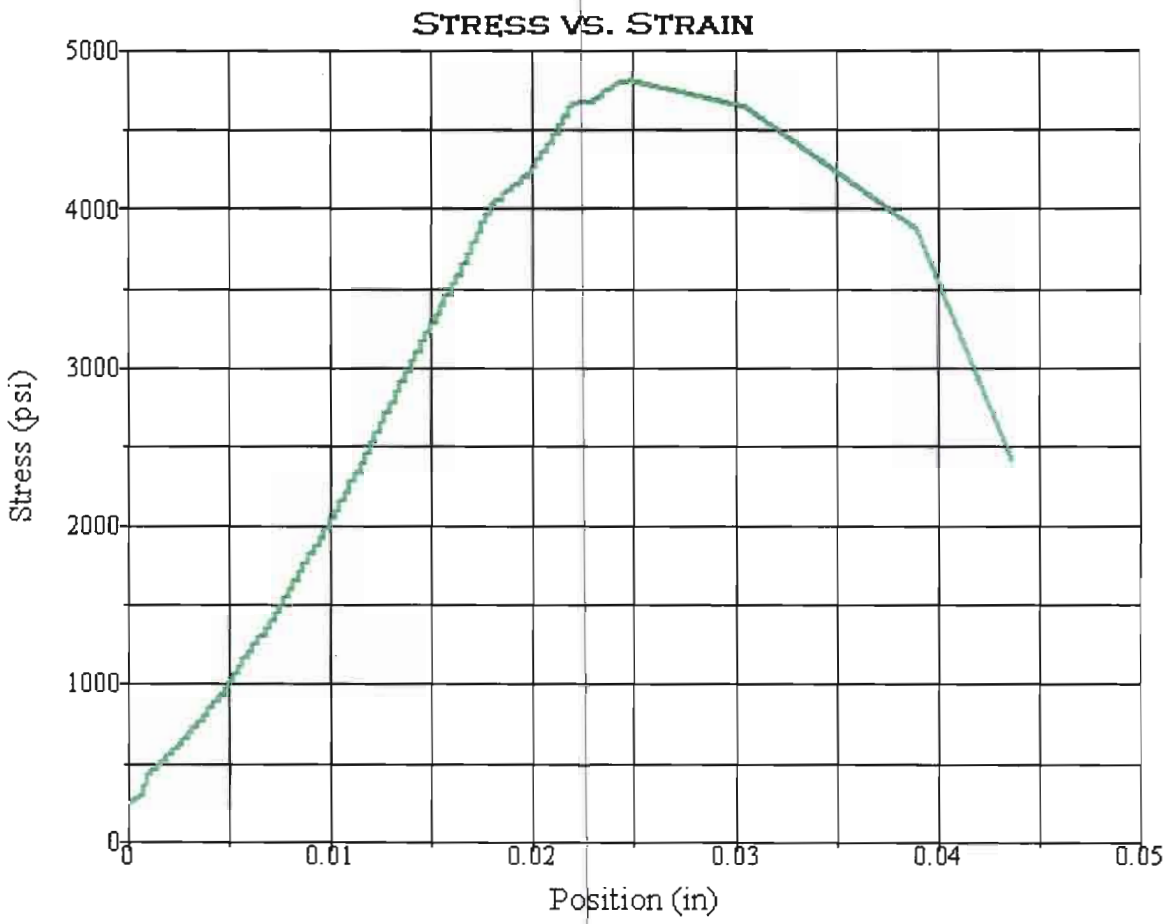
Test Summary

Counter:	1321
Elapsed Time:	00:01:15
Operator:	AZM
Sample:	R-11-006-04
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	11:23:23 AM
End Date:	7/18/2011
End Time:	11:24:38 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-172
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.1300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12897 lbf
Compressive Strength:	2851 psi



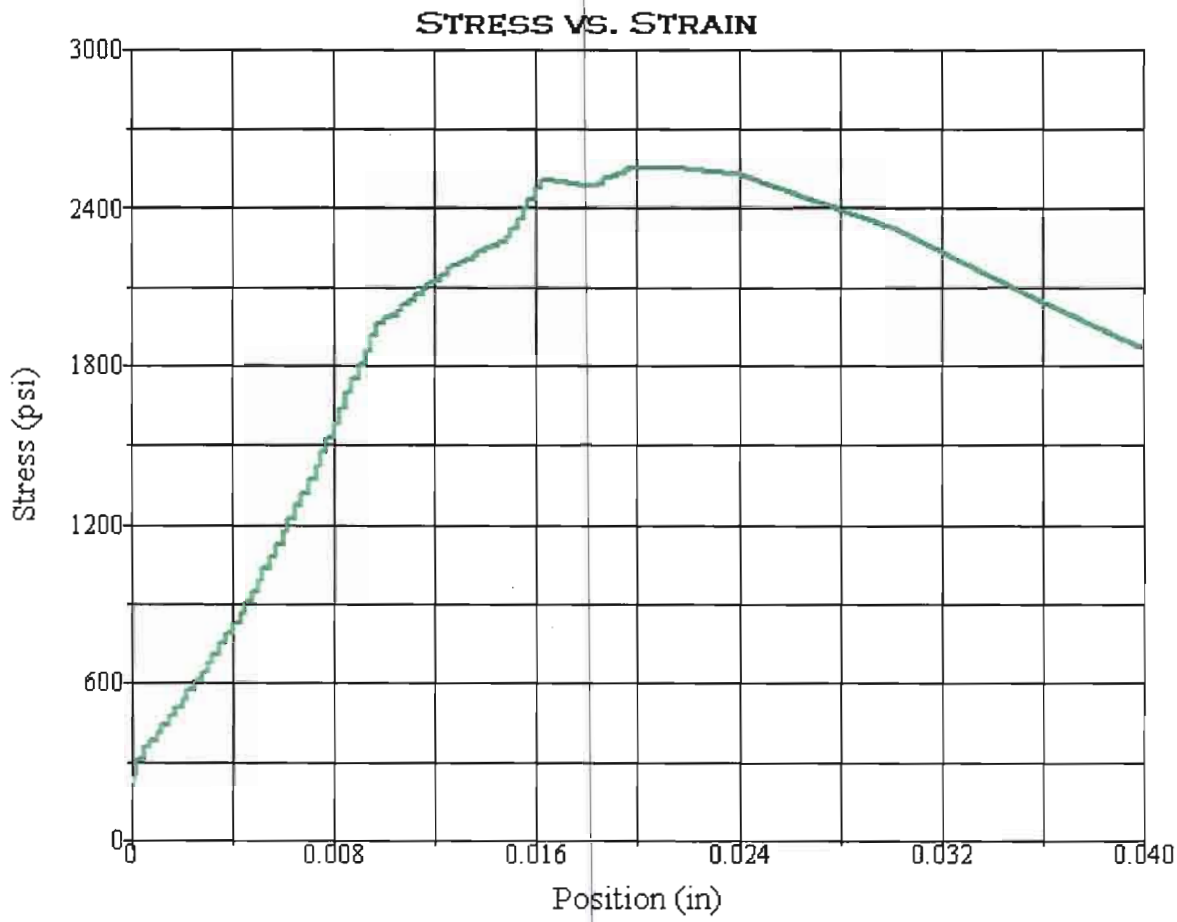


Test Summary

Counter:	1322
Elapsed Time:	00:02:07
Operator:	AZM
Sample:	R-11-006-08
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	11:44:58 AM
End Date:	7/18/2011
End Time:	11:47:05 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-174

Test Results

Specimen Gage Length:	5.6600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21755 lbf
Compressive Strength:	4809 psi

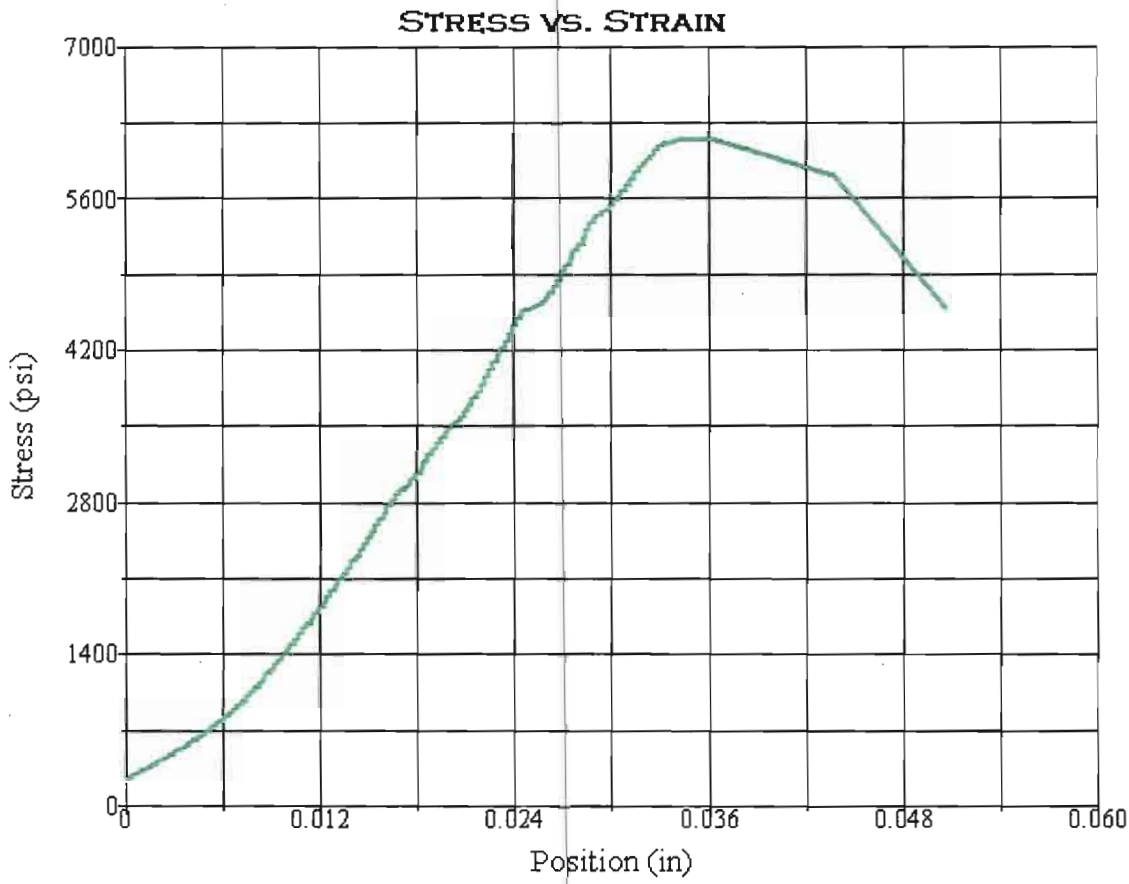


Test Summary

Counter:	1323
Elapsed Time:	00:01:04
Operator:	AZM
Sample:	R-11-006-08A
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	12:07:49 PM
End Date:	7/18/2011
End Time:	12:08:53 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-175

Test Results

Specimen Gage Length:	5.5500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11566 lbf
Compressive Strength:	2557 psi

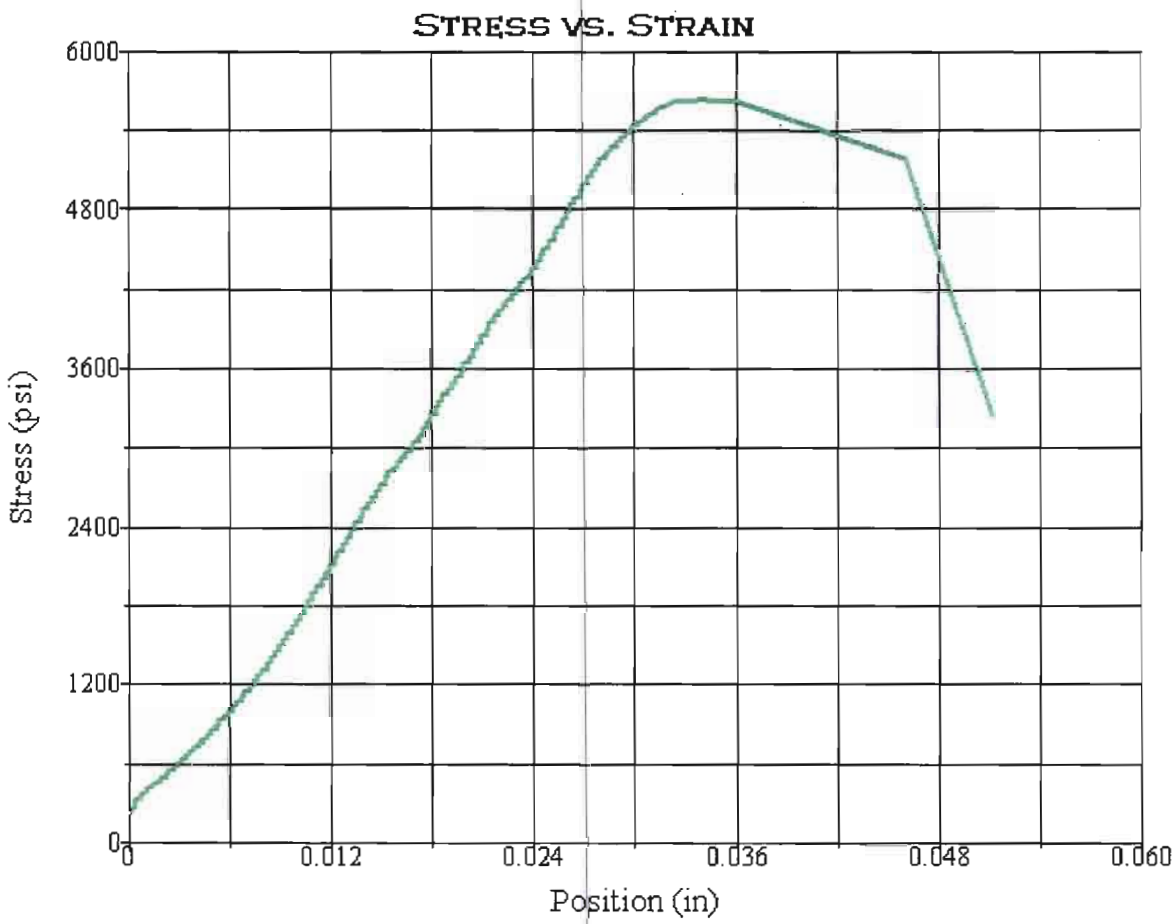


Test Summary

Counter:	1327
Elapsed Time:	00:02:48
Operator:	AZM
Sample:	R-11-006-09A
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:10:56 PM
End Date:	7/18/2011
End Time:	2:13:44 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-177
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.1200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	27837 lbf
Compressive Strength:	6153 psi

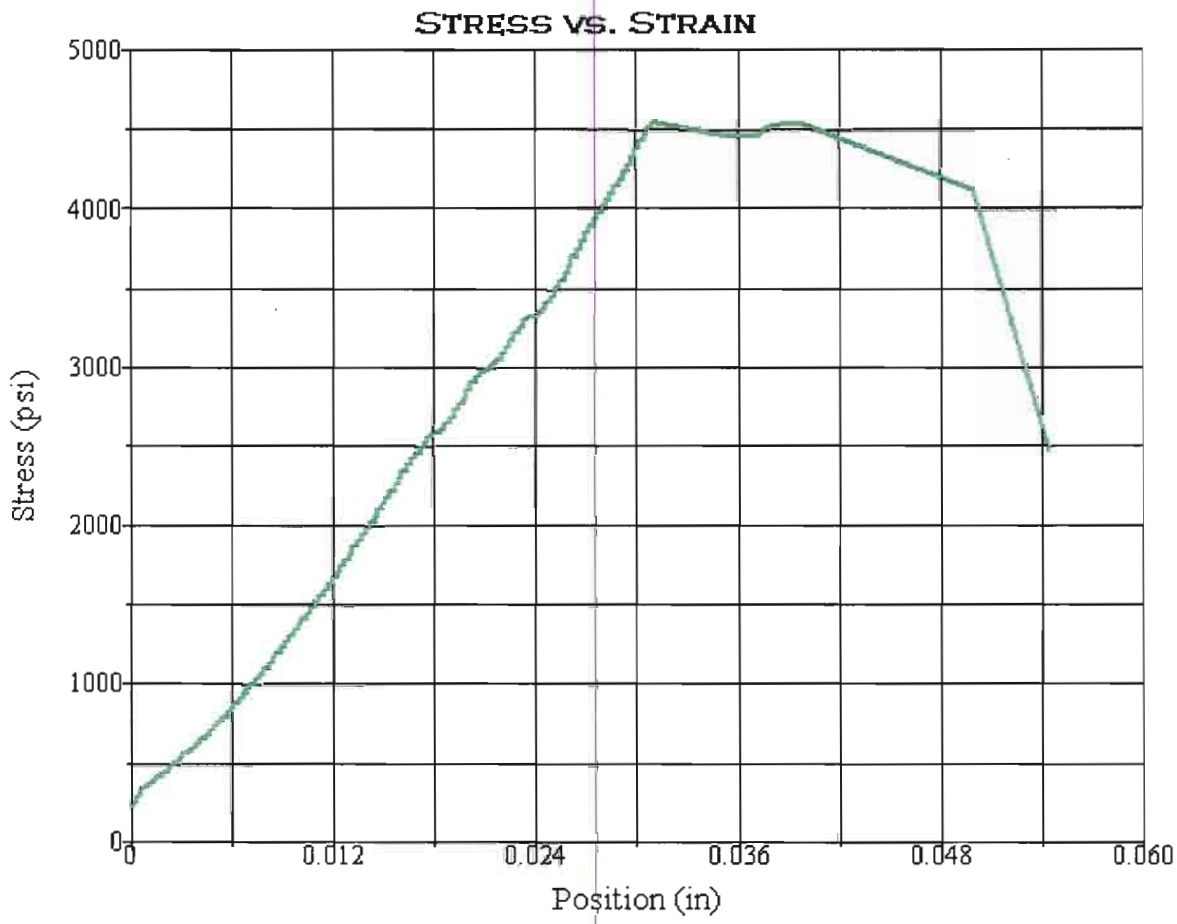


Test Summary

Counter:	1328
Elapsed Time:	00:02:32
Operator:	AZM
Sample:	R-11-006-10
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:20:15 PM
End Date:	7/18/2011
End Time:	2:22:47 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-178
NOTE:	L/D<2

Test Results

Specimen Gage Length:	4.6500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25475 lbf
Compressive Strength:	5631 psi

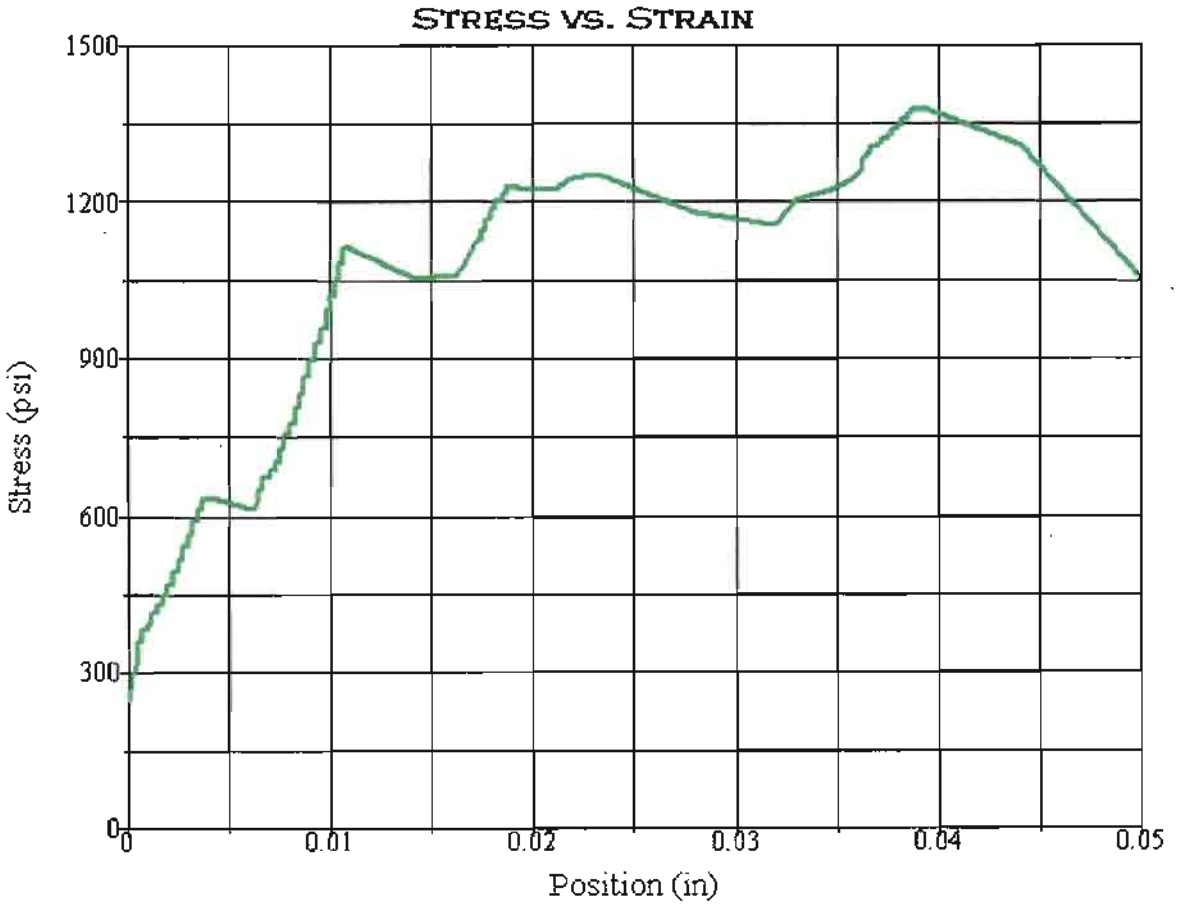


Test Summary

Counter:	1330
Elapsed Time:	00:02:01
Operator:	AZM
Sample:	R-11-006-12
Resident Engineer:	
Ticket:	GL # 11-057
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	7/18/2011
Start Time:	2:46:31 PM
End Date:	7/18/2011
End Time:	2:48:32 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-180

Test Results

Specimen Gage Length:	5.5300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	20598 lbf
Compressive Strength:	4553 psi

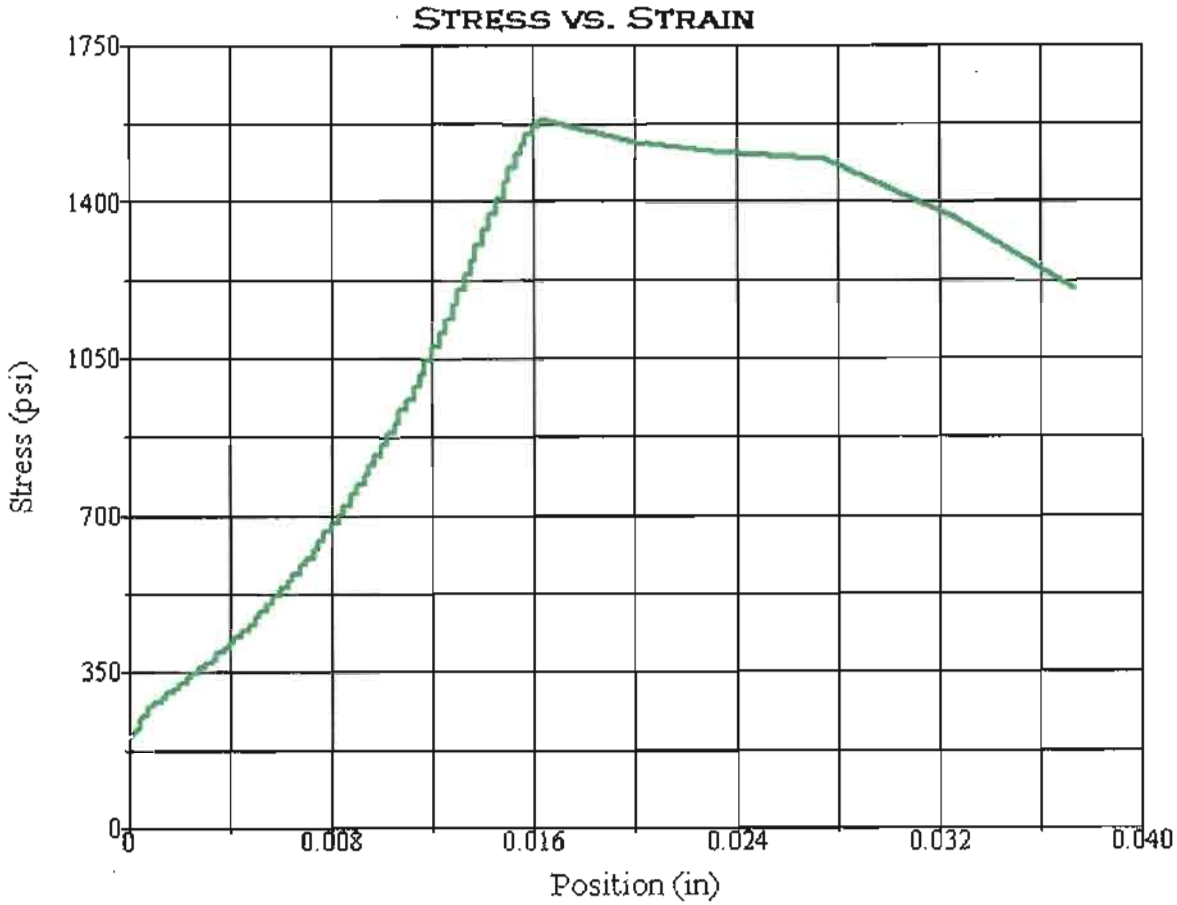


Test Summary

Counter:	1437
Elapsed Time:	00:00:30
Operator:	AZM
Sample:	R11-007-06
Resident Engineer:	
Ticket:	GL# 11-067
E.A.NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:02:20 PM
End Date:	8/22/2011
End Time:	3:02:50 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-245
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.3500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6244 lbf
Compressive Strength:	1380 psi

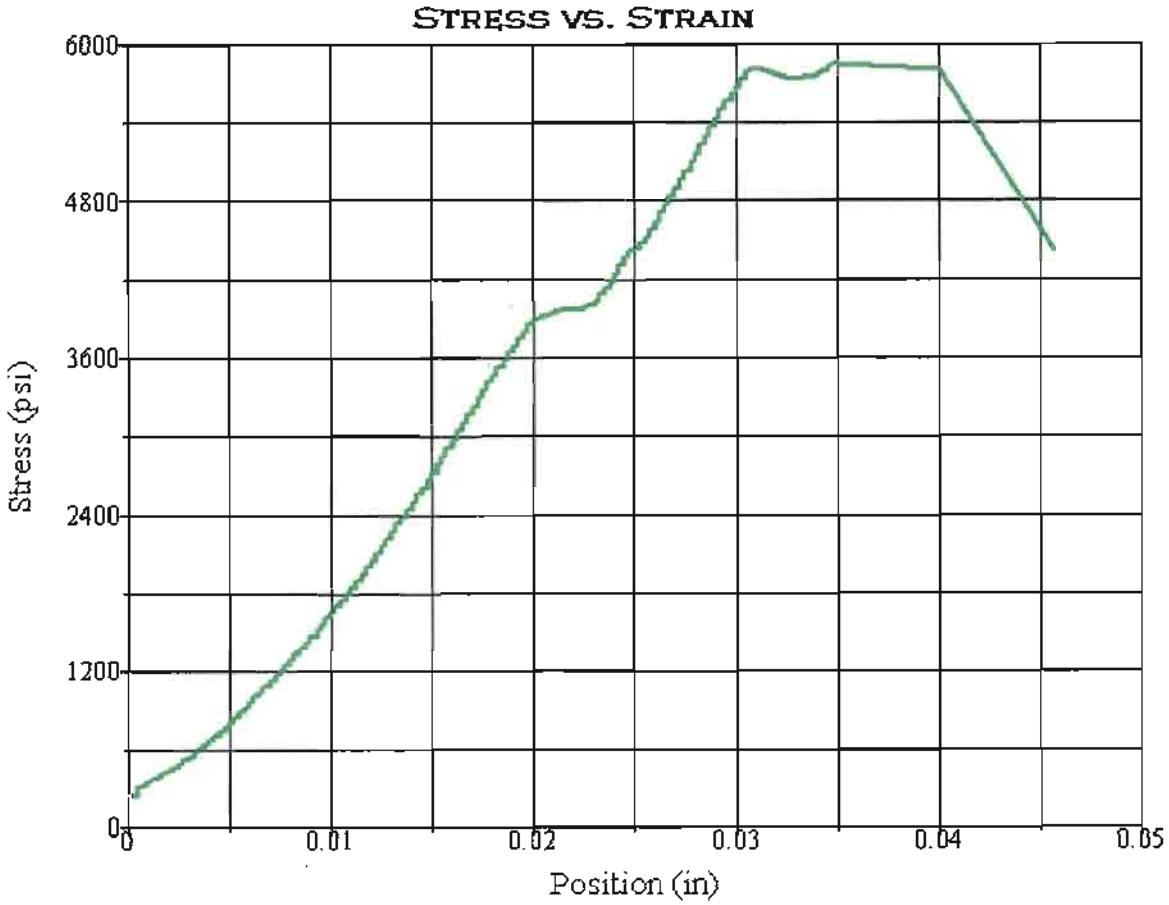


Test Summary

Counter:	1438
Elapsed Time:	00:00:39
Operator:	AZM
Sample:	R11-007-07A
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:15:45 PM
End Date:	8/22/2011
End Time:	3:16:24 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-246
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.0000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	7167 lbf
Compressive Strength:	1584 psi

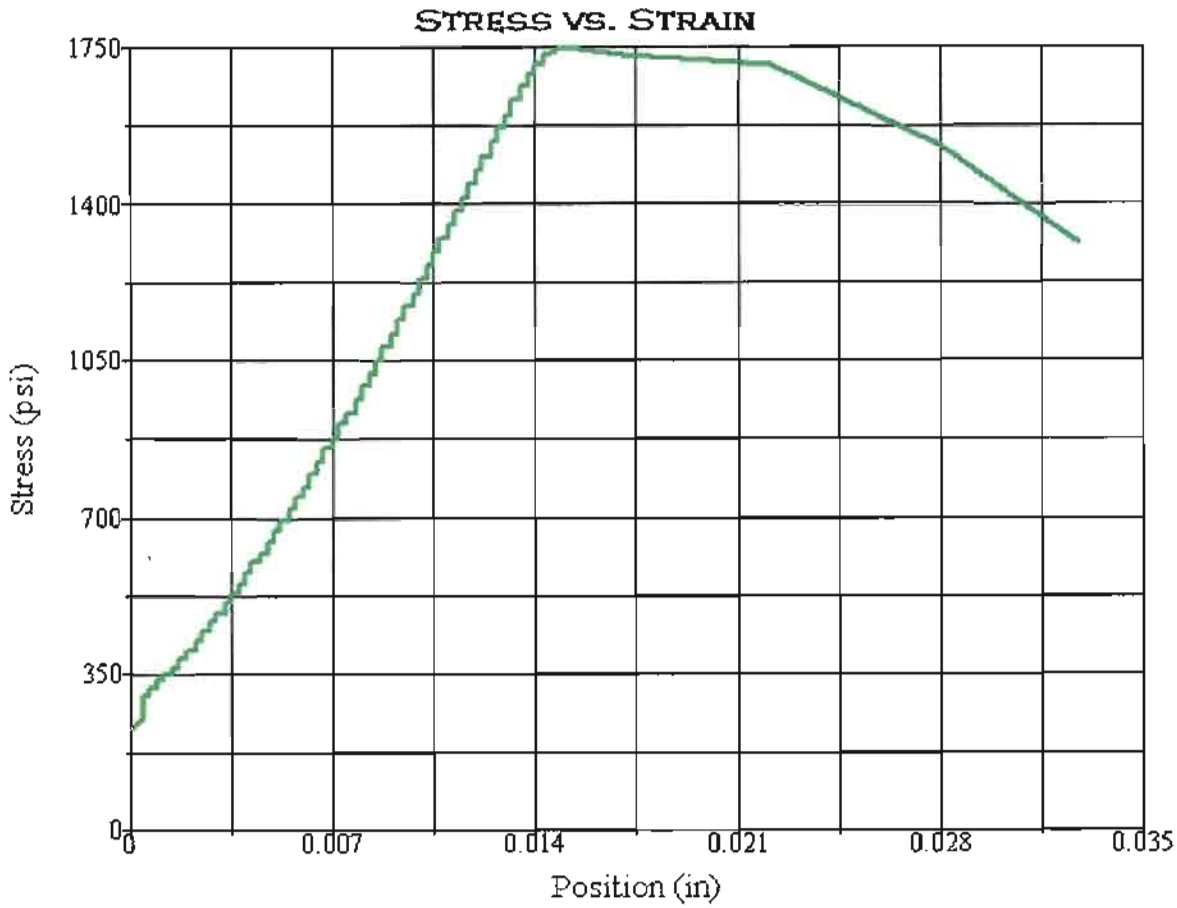


Test Summary

Counter:	1439
Elapsed Time:	00:02:39
Operator:	AZM
Sample:	R11-008-03
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:21:16 PM
End Date:	8/22/2011
End Time:	3:23:55 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-247
RATIO	L/D<2

Test Results

Specimen Gage Length:	3.4900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	26448 lbf
Compressive Strength:	5846 psi

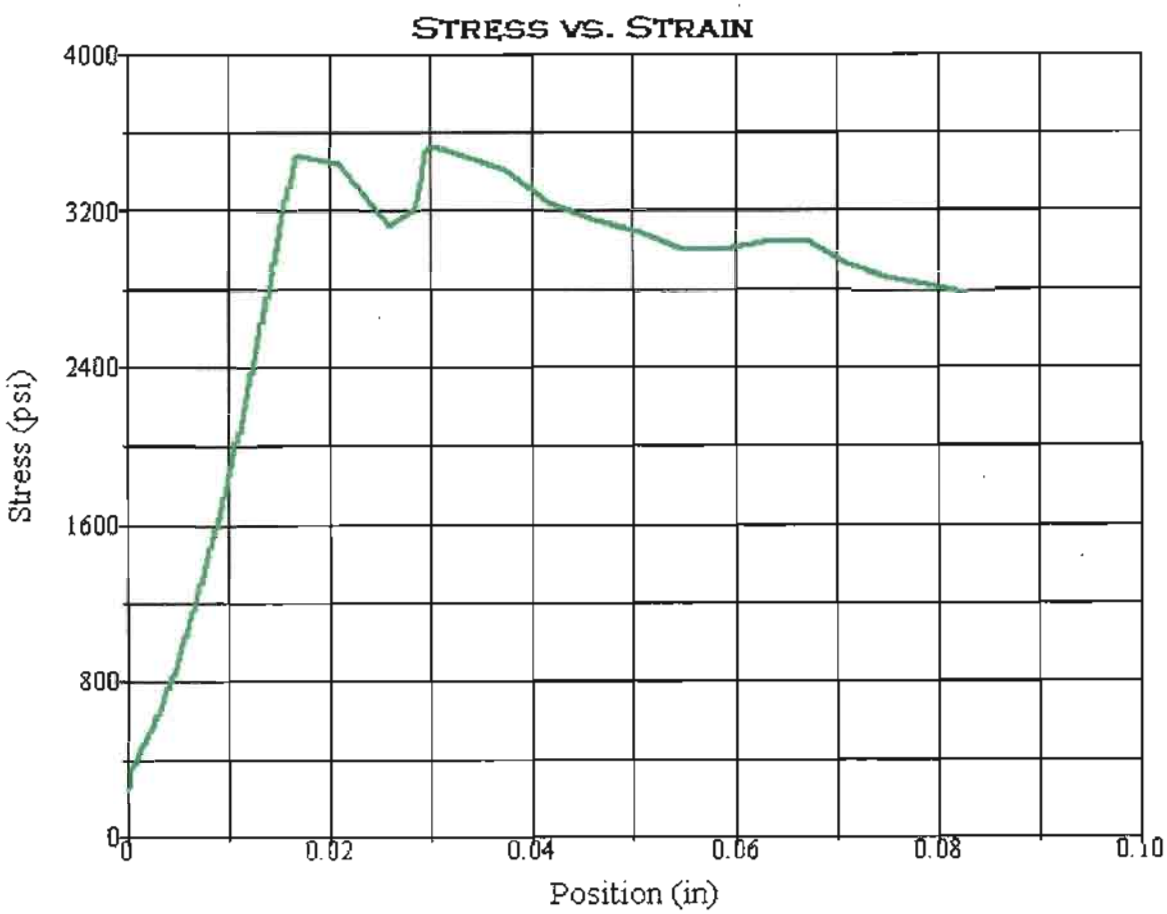


Test Summary

Counter:	1440
Elapsed Time:	00:00:43
Operator:	AZM
Sample:	R11-008-04
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:30:58 PM
End Date:	8/22/2011
End Time:	3:31:41 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-249
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.6900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	7892 lbf
Compressive Strength:	1745 psi



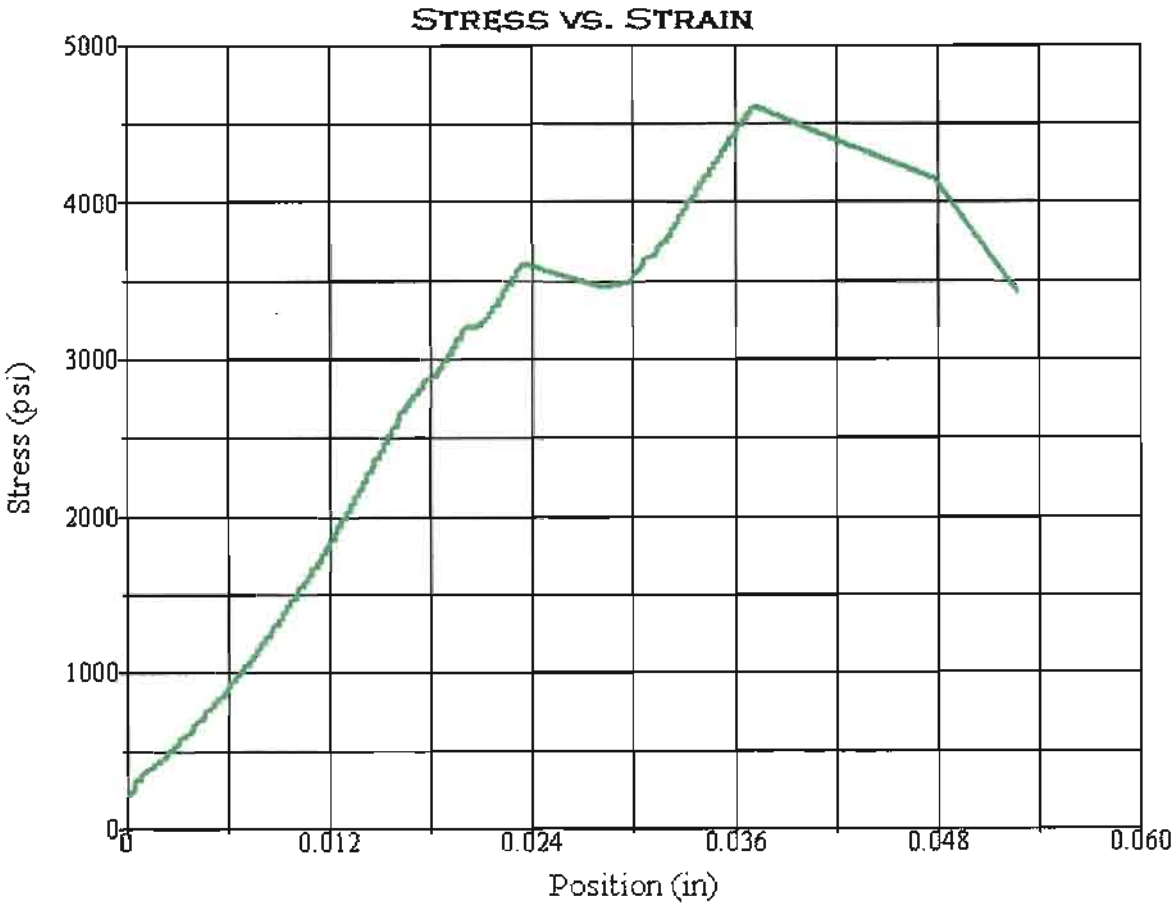
Test Summary

Counter:	1441
Elapsed Time:	00:01:33
Operator:	AZM
Sample:	R11-008-05
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:39:34 PM
End Date:	8/22/2011
End Time:	3:41:07 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-250

RATIO:

Test Results

Specimen Gage Length:	4.9200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	15960 lbf
Compressive Strength:	3528 psi

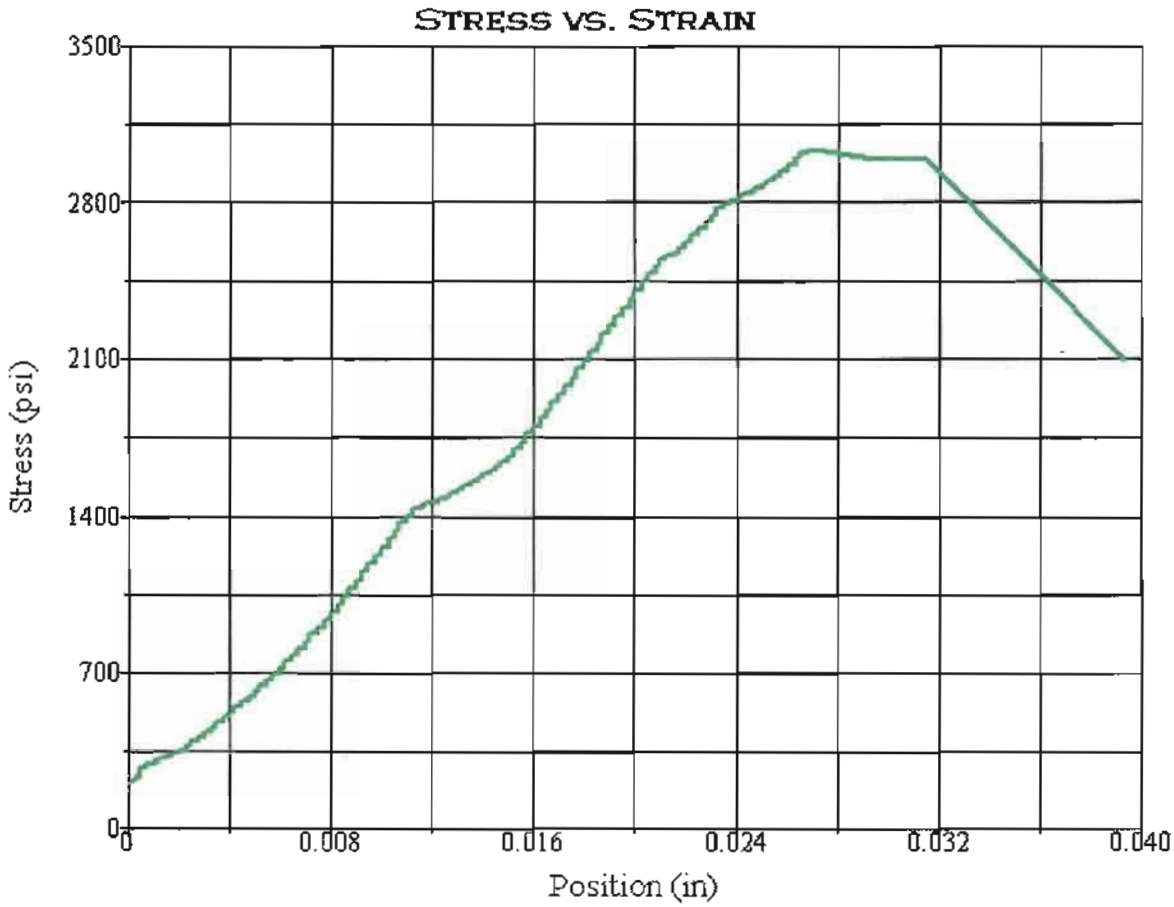


Test Summary

Counter:	1442
Elapsed Time:	00:02:03
Operator:	AZM
Sample:	R11-008-06
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:47:11 PM
End Date:	8/22/2011
End Time:	3:49:14 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-251
RATIO:	L/D<2

Test Results

Specimen Gage Length:	4.5600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	20855 lbf
Compressive Strength:	4610 psi

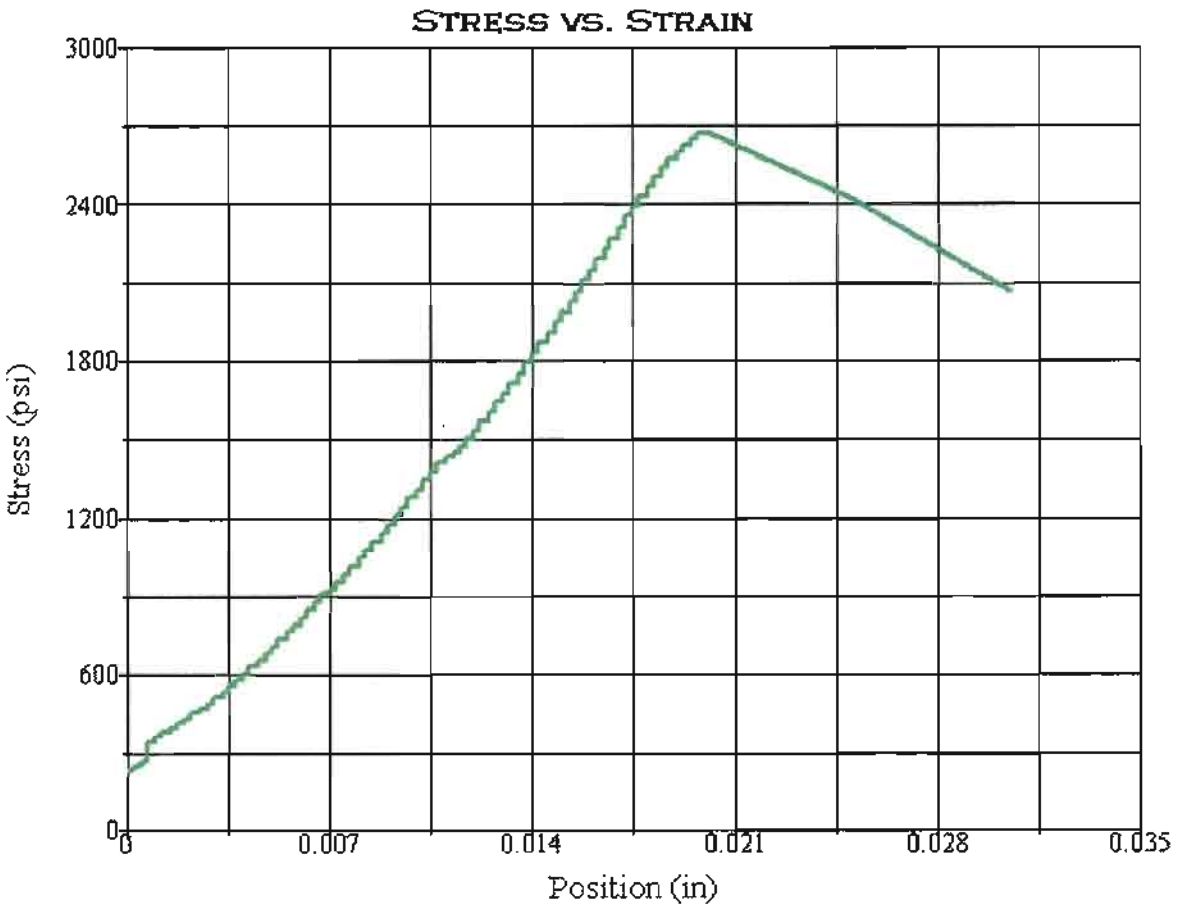


Test Summary

Counter:	1443
Elapsed Time:	00:01:20
Operator:	AZM
Sample:	R11-008-07
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	3:54:53 PM
End Date:	8/22/2011
End Time:	3:56:13 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-252

Test Results

Specimen Gage Length:	5.3500 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	13610 lbf
Compressive Strength:	3034 psi

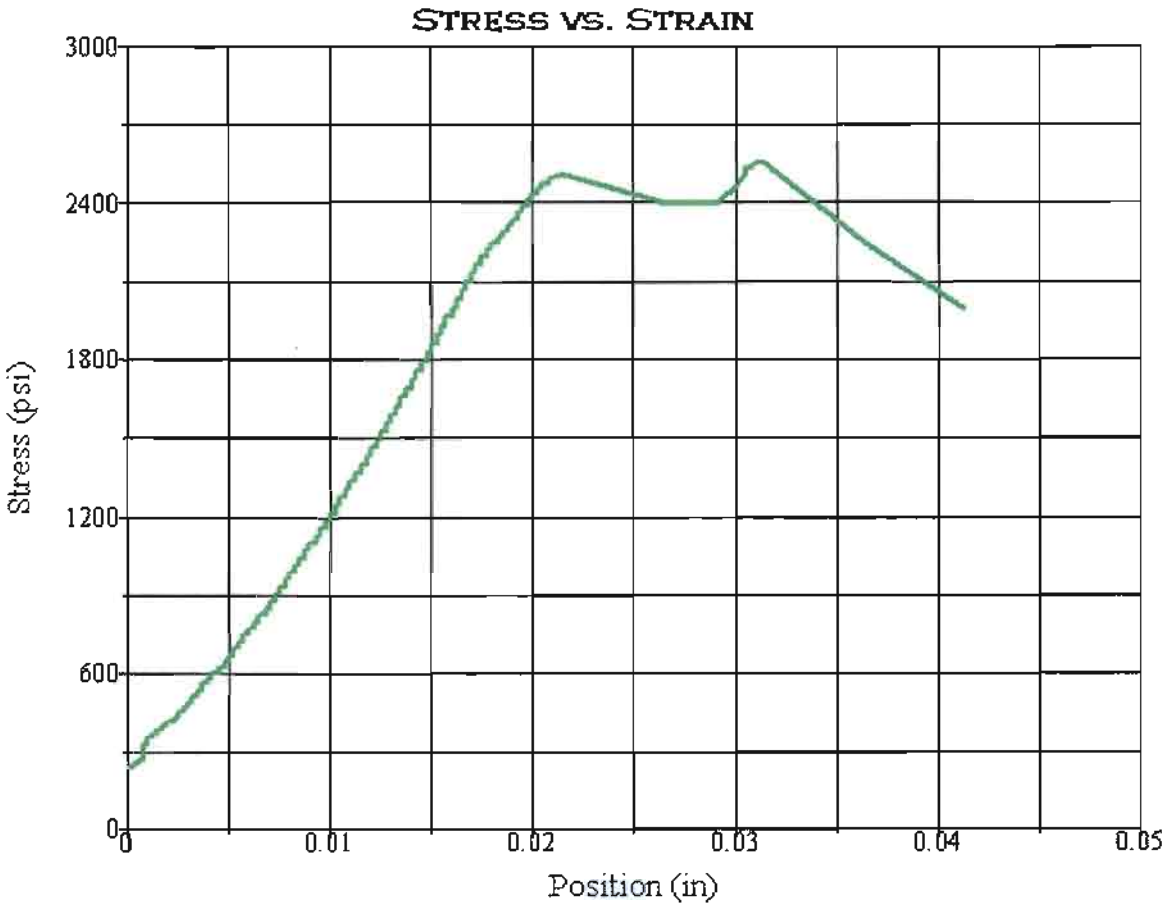


Test Summary

Counter:	1444
Elapsed Time:	00:01:07
Operator:	AZM
Sample:	R11-008-08
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:03:59 PM
End Date:	8/22/2011
End Time:	4:05:06 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-253

Test Results

Specimen Gage Length:	4.8800 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	11900 lbf
Compressive Strength:	2675 psi

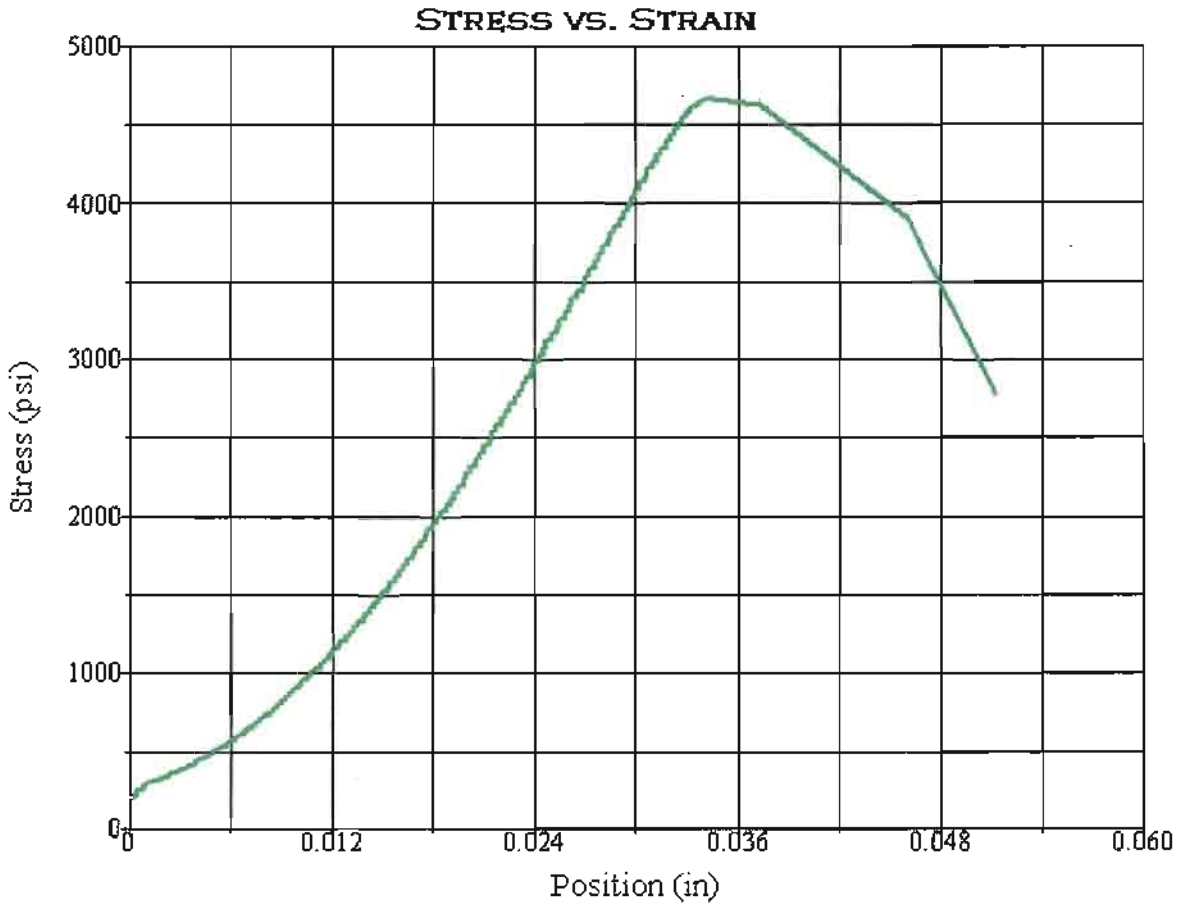


Test Summary

Counter:	1445
Elapsed Time:	00:01:04
Operator:	AZM
Sample:	R11-008-09
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:11:28 PM
End Date:	8/22/2011
End Time:	4:12:32 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-254

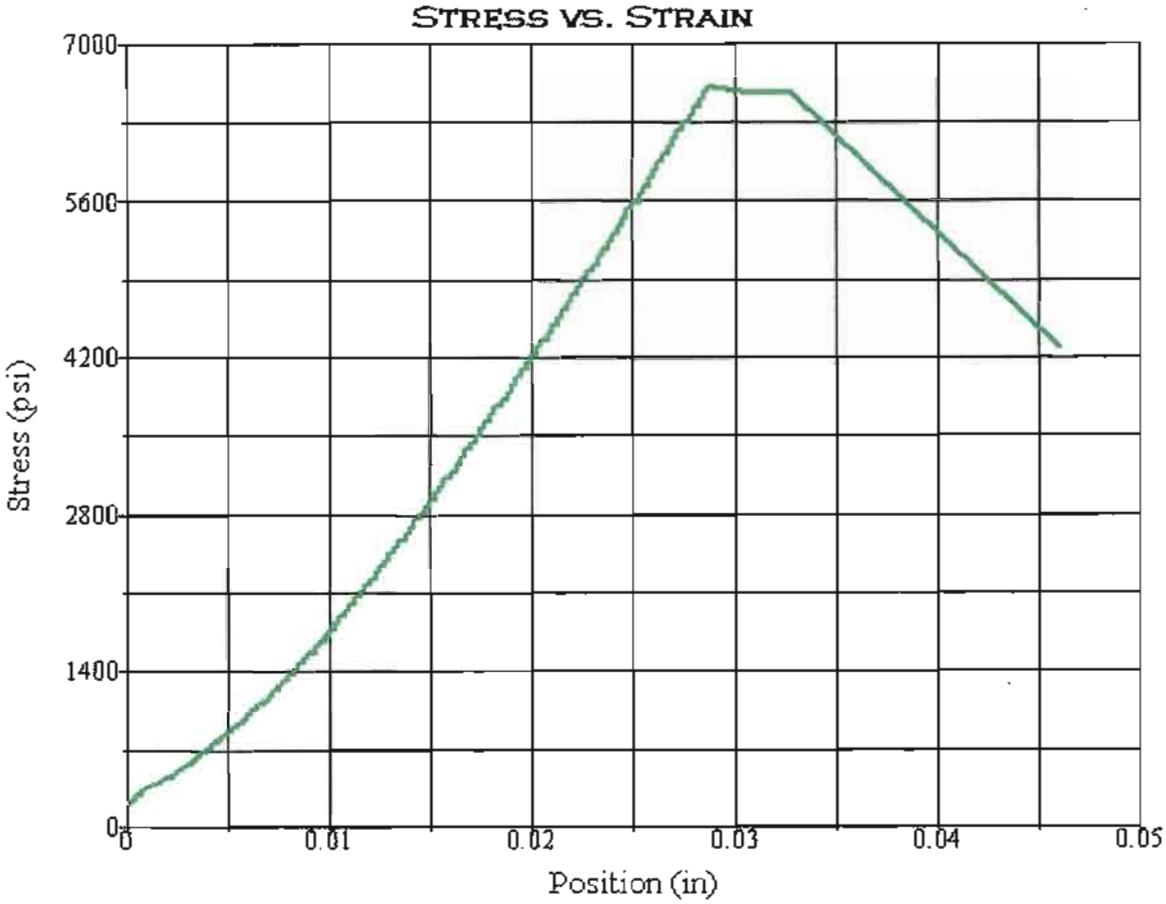
Test Results

Specimen Gage Length:	4.9700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11578 lbf
Compressive Strength:	2559 psi



Test Summary	
Counter:	1446
Elapsed Time:	00:02:06
Operator:	AZM
Sample:	R11-008-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:18:47 PM
End Date:	8/22/2011
End Time:	4:20:53 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-255

Test Results	
Specimen Gage Length:	4.9600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21067 lbf
Compressive Strength:	4657 psi

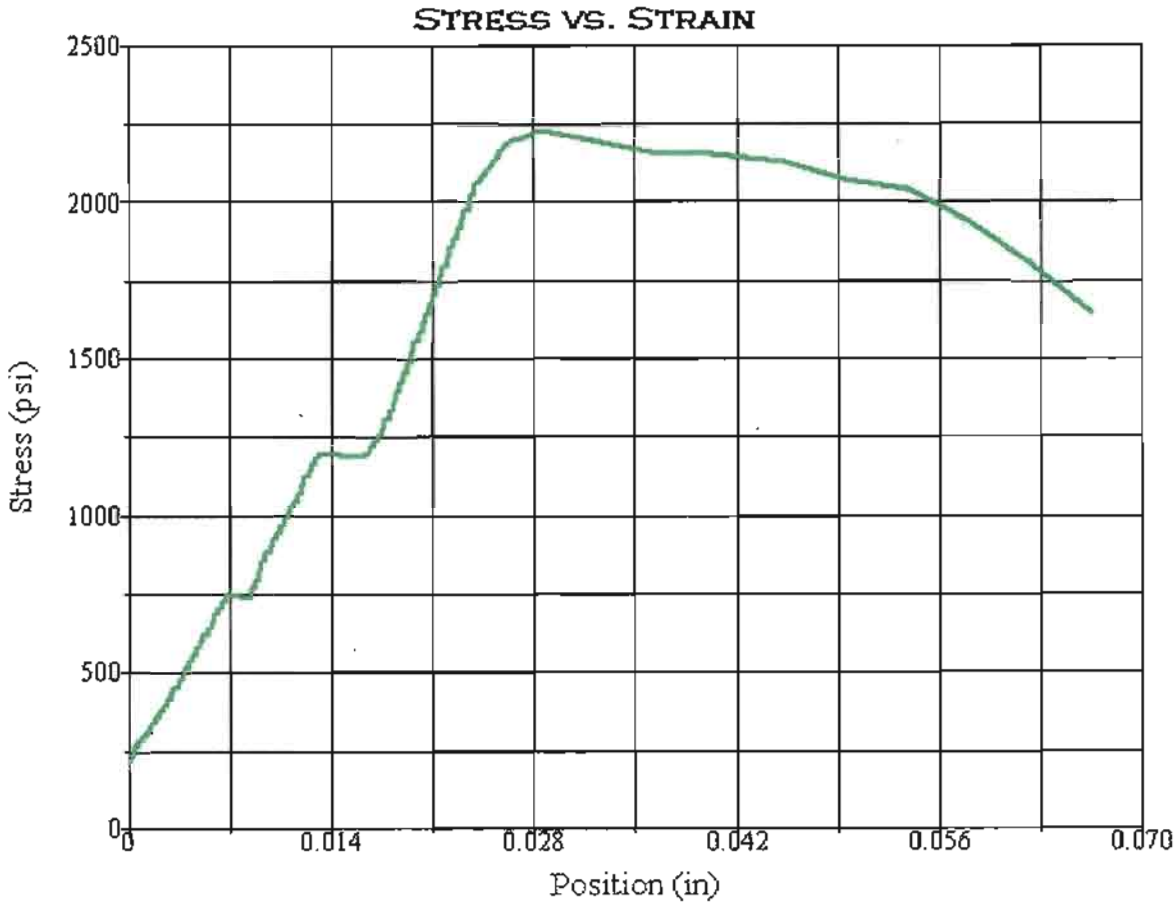


Test Summary

Counter:	1447
Elapsed Time:	00:03:01
Operator:	AZM
Sample:	R11-008-12
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:30:39 PM
End Date:	8/22/2011
End Time:	4:33:40 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-256

Test Results

Specimen Gage Length:	5.0700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	29944 lbf
Compressive Strength:	6619 psi

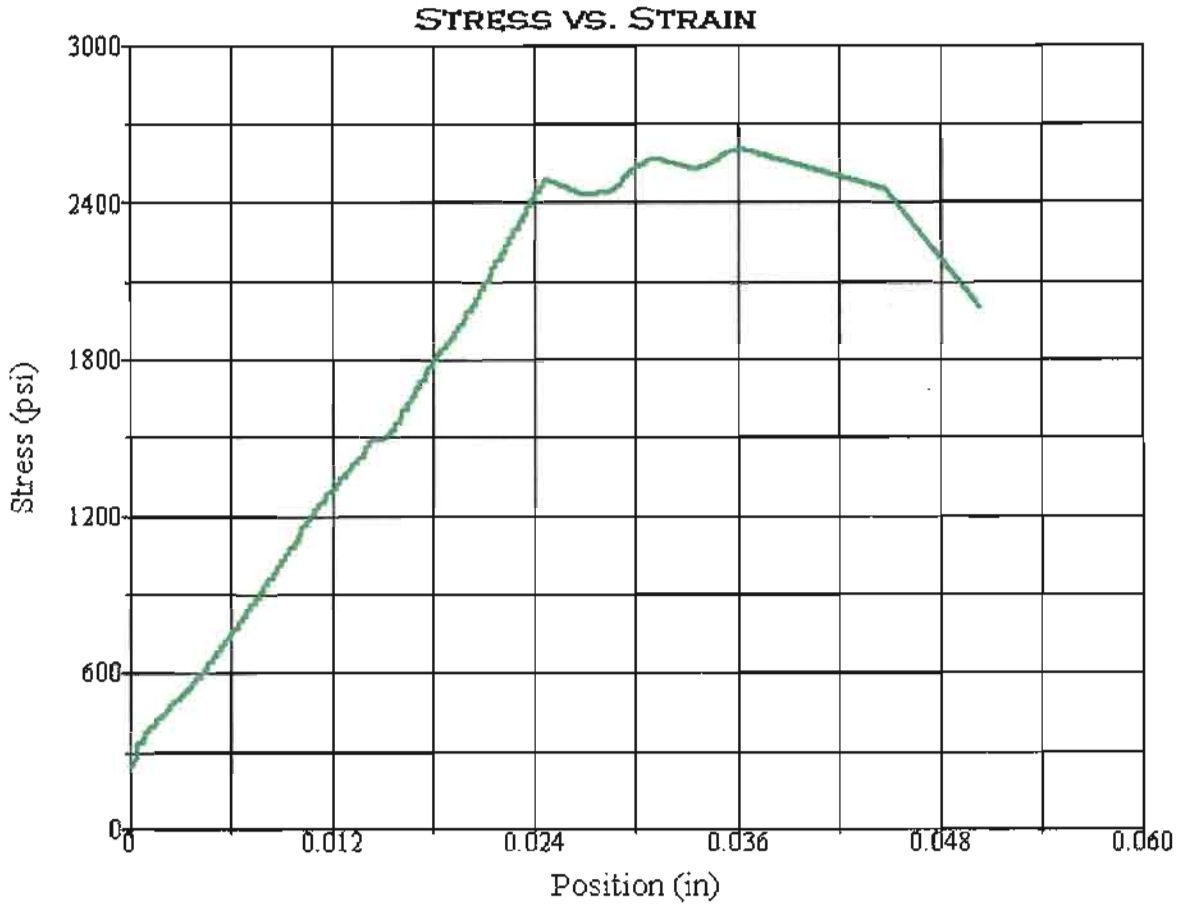


Test Summary

Counter:	1448
Elapsed Time:	00:00:58
Operator:	AZM
Sample:	R11-008-14
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	4:55:47 PM
End Date:	8/22/2011
End Time:	4:56:45 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-257
RATIO:	L/D<2

Test Results

Specimen Gage Length:	3.9100 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	9910 lbf
Compressive Strength:	2228 psi

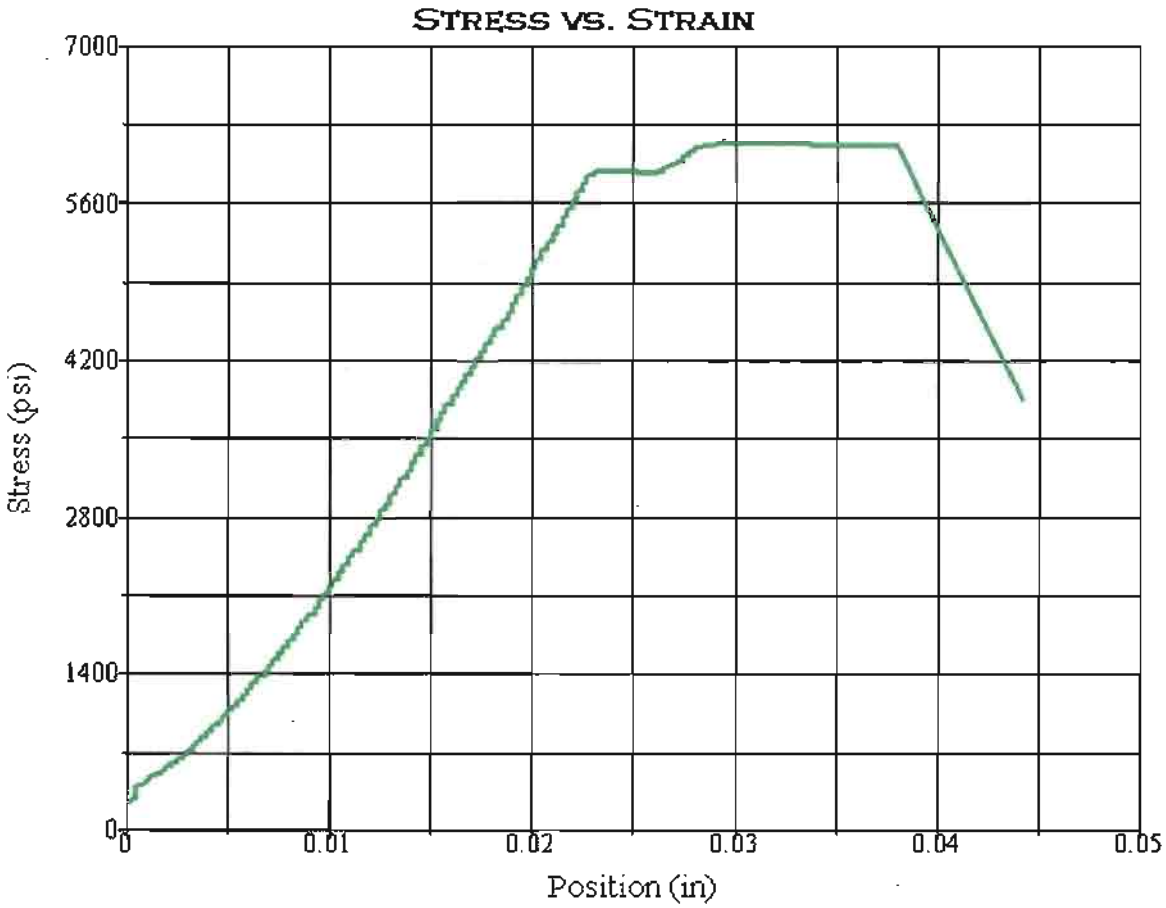


Test Summary

Counter:	1449
Elapsed Time:	00:01:06
Operator:	AZM
Sample:	R11-008-15
Resident Engineer:	
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	5:02:49 PM
End Date:	8/22/2011
End Time:	5:03:55 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-258
RATIO:	L/D<2

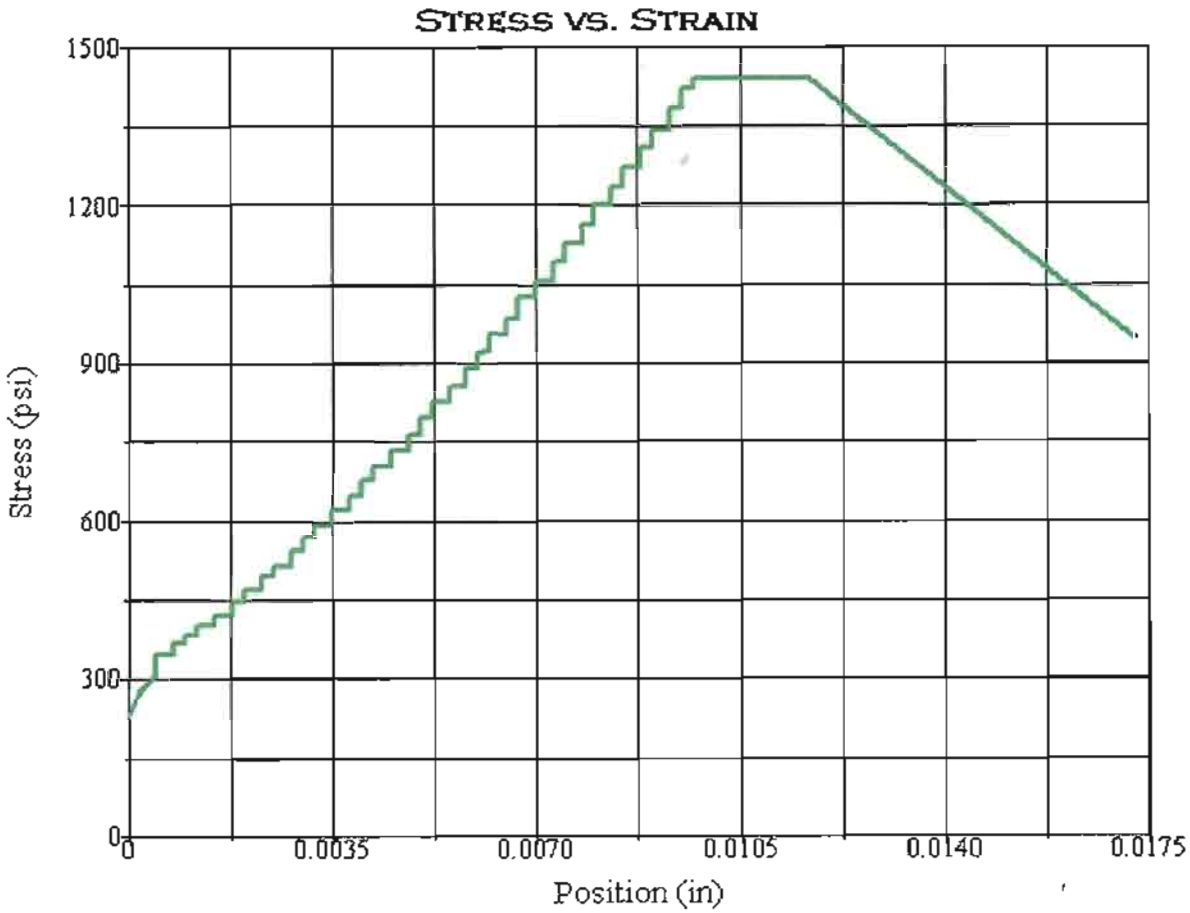
Test Results

Specimen Gage Length:	4.1900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	11696 lbf
Compressive Strength:	2607 psi



Test Summary	
Counter:	1450
Elapsed Time:	00:02:45
Operator:	AZM
Sample:	R11-008-15A
Resident Engineer:	
Ticket:	GL# 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/22/2011
Start Time:	5:09:08 PM
End Date:	8/22/2011
End Time:	5:11:53 PM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-259

Test Results	
Specimen Gage Length:	5.0000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	27786 lbf
Compressive Strength:	6142 psi

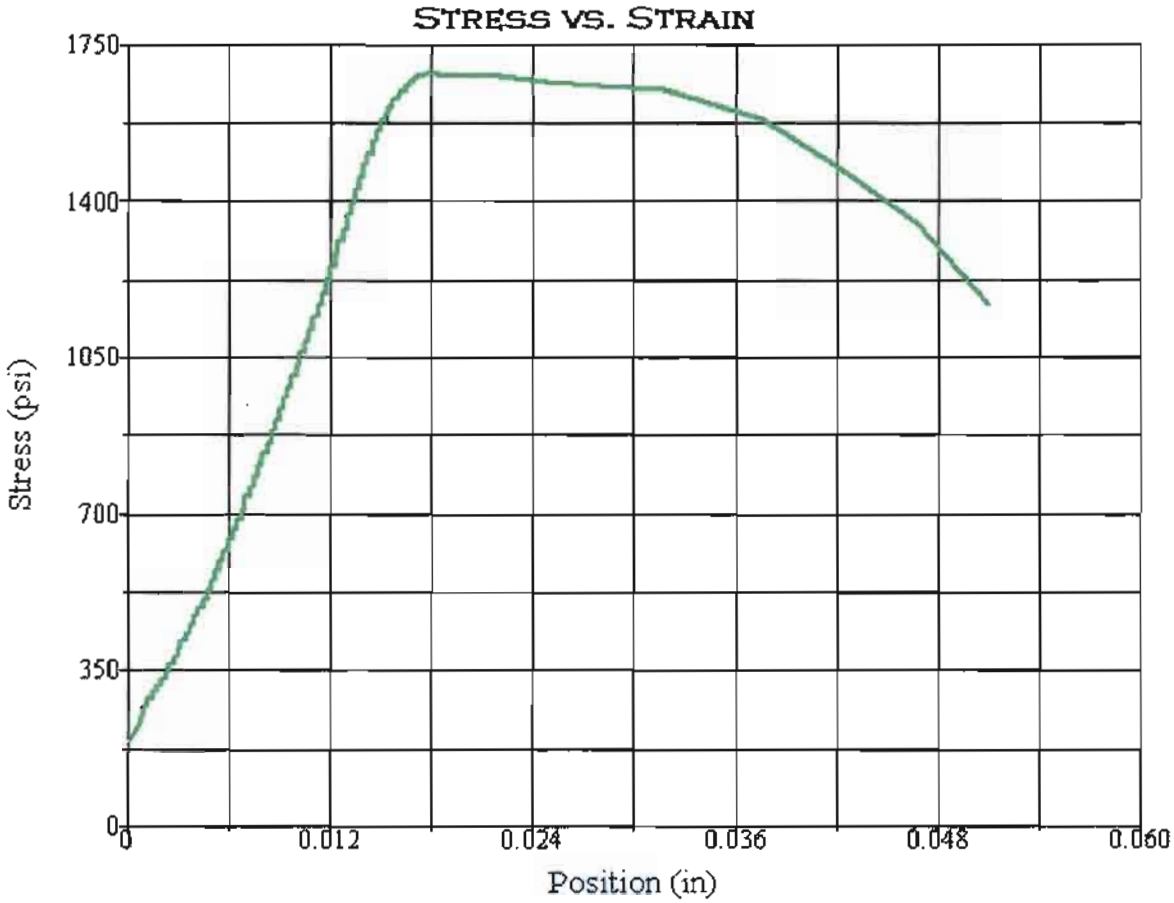


Test Summary

Counter:	1451
Elapsed Time:	00:00:32
Operator:	AZM
Sample:	R11-008-18
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:16:10 PM
End Date:	8/24/2011
End Time:	2:16:42 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-260

Test Results

Specimen Gage Length:	4.7000 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	6454 lbf
Compressive Strength:	1439 psi

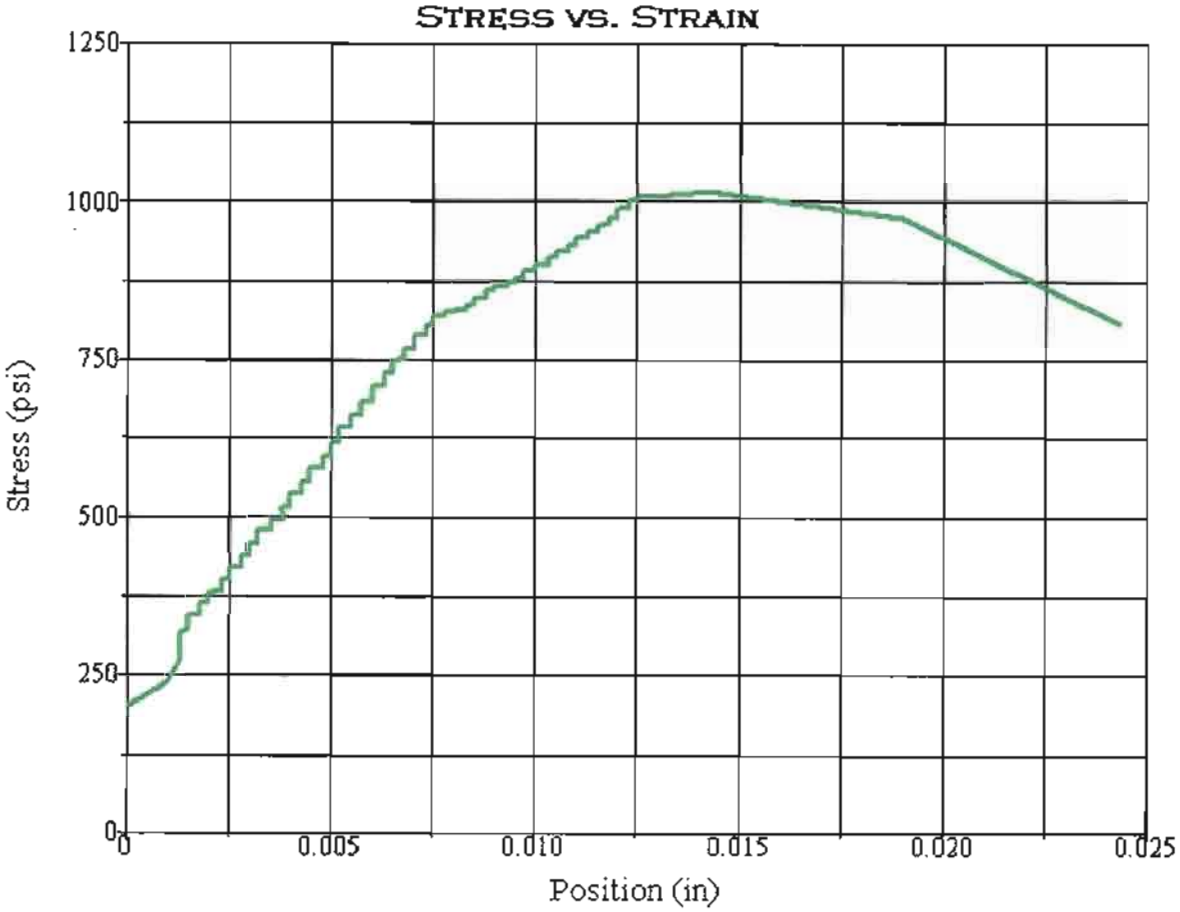


Test Summary

Counter:	1452
Elapsed Time:	00:00:43
Operator:	AZM
Sample:	R11-008-18A
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:28:15 PM
End Date:	8/24/2011
End Time:	2:28:58 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-161

Test Results

Specimen Gage Length:	3.7800 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	7556 lbf
Compressive Strength:	1684 psi

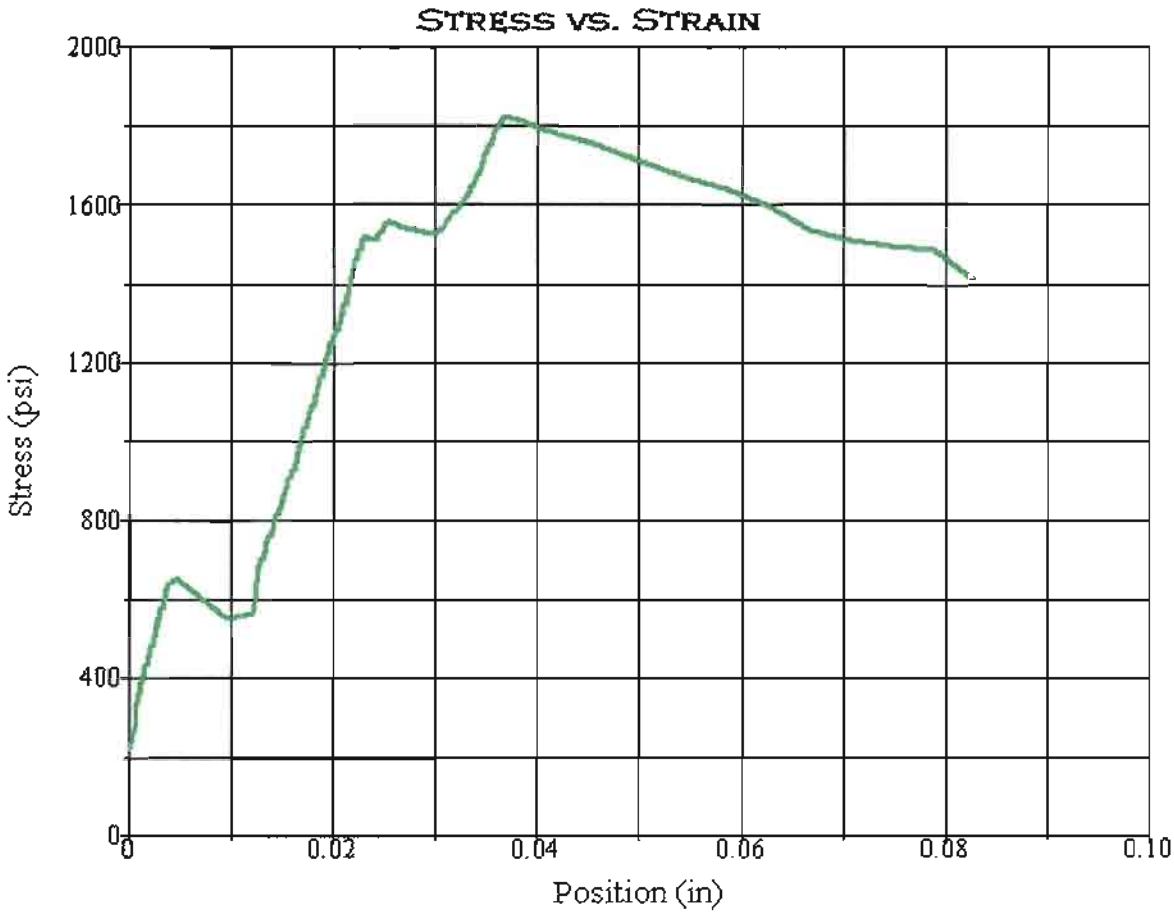


Test Summary

Counter:	1453
Elapsed Time:	00:00:21
Operator:	AZM
Sample:	R11-009-04
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:34:27 PM
End Date:	8/24/2011
End Time:	2:34:48 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-162

Test Results

Specimen Gage Length:	4.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	4585 lbf
Compressive Strength:	1014 psi

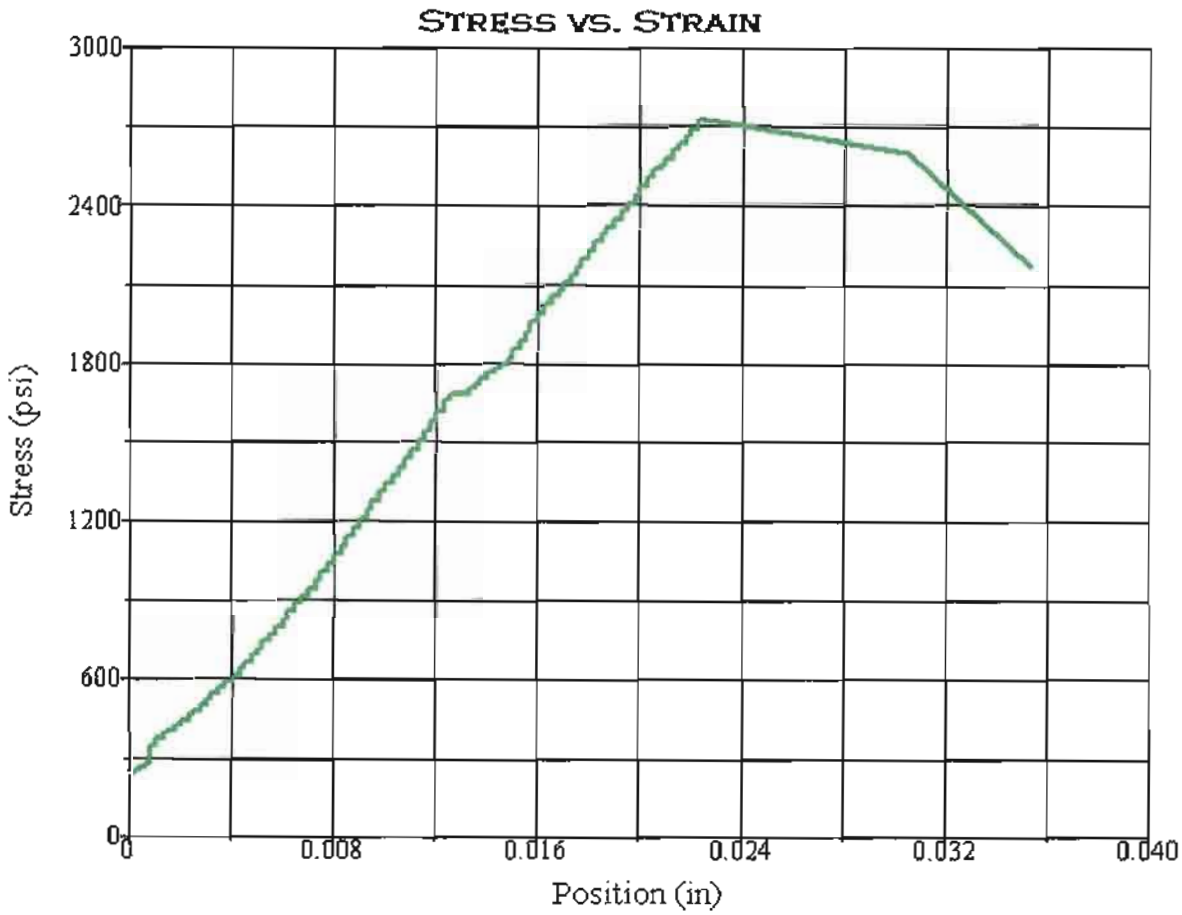


Test Summary

Counter:	1454
Elapsed Time:	00:00:45
Operator:	AZM
Sample:	R11-009-05
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	2:48:31 PM
End Date:	8/24/2011
End Time:	2:49:16 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-263

Test Results

Specimen Gage Length:	3.5000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	8248 lbf
Compressive Strength:	1823 psi

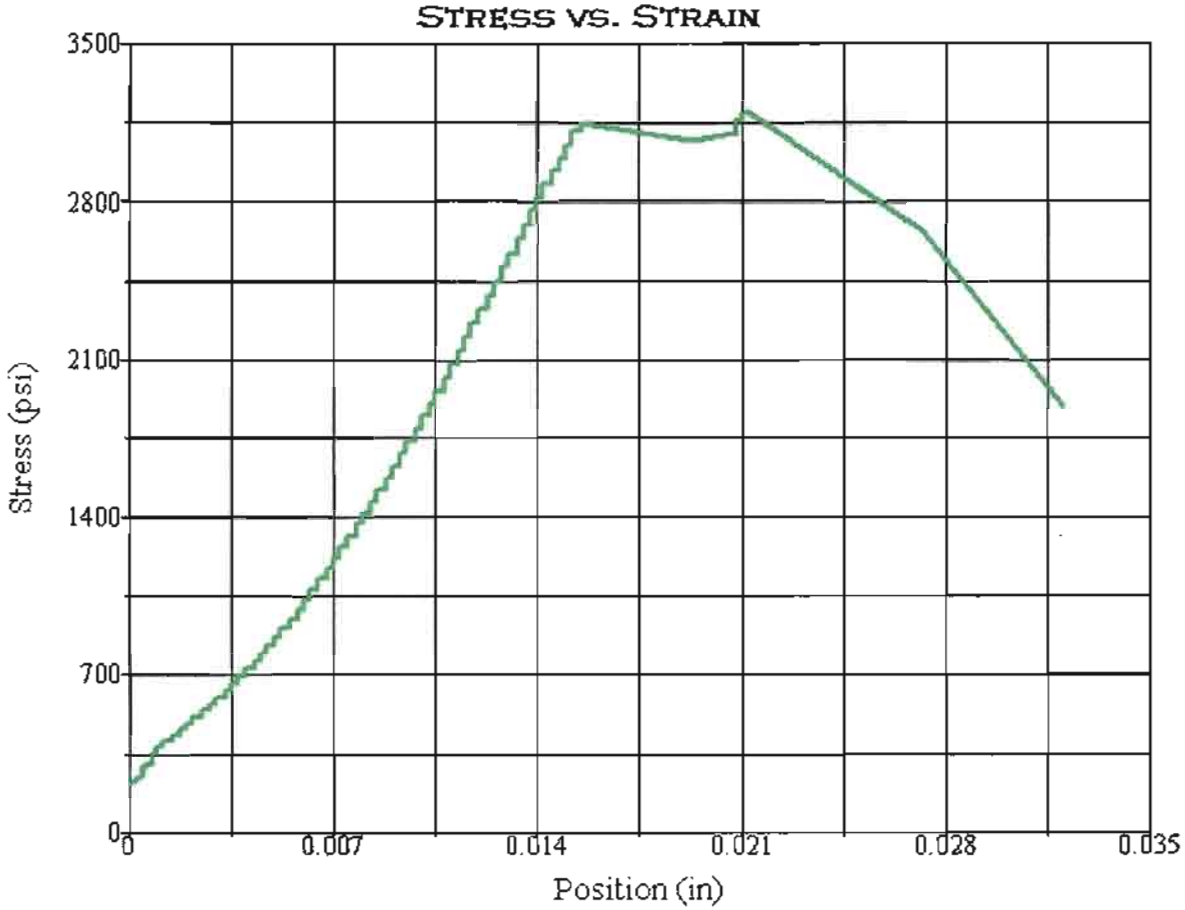


Test Summary

Counter:	1455
Elapsed Time:	00:01:09
Operator:	AZM
Sample:	R11-009-05A
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:11:47 PM
End Date:	8/24/2011
End Time:	3:12:56 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-264

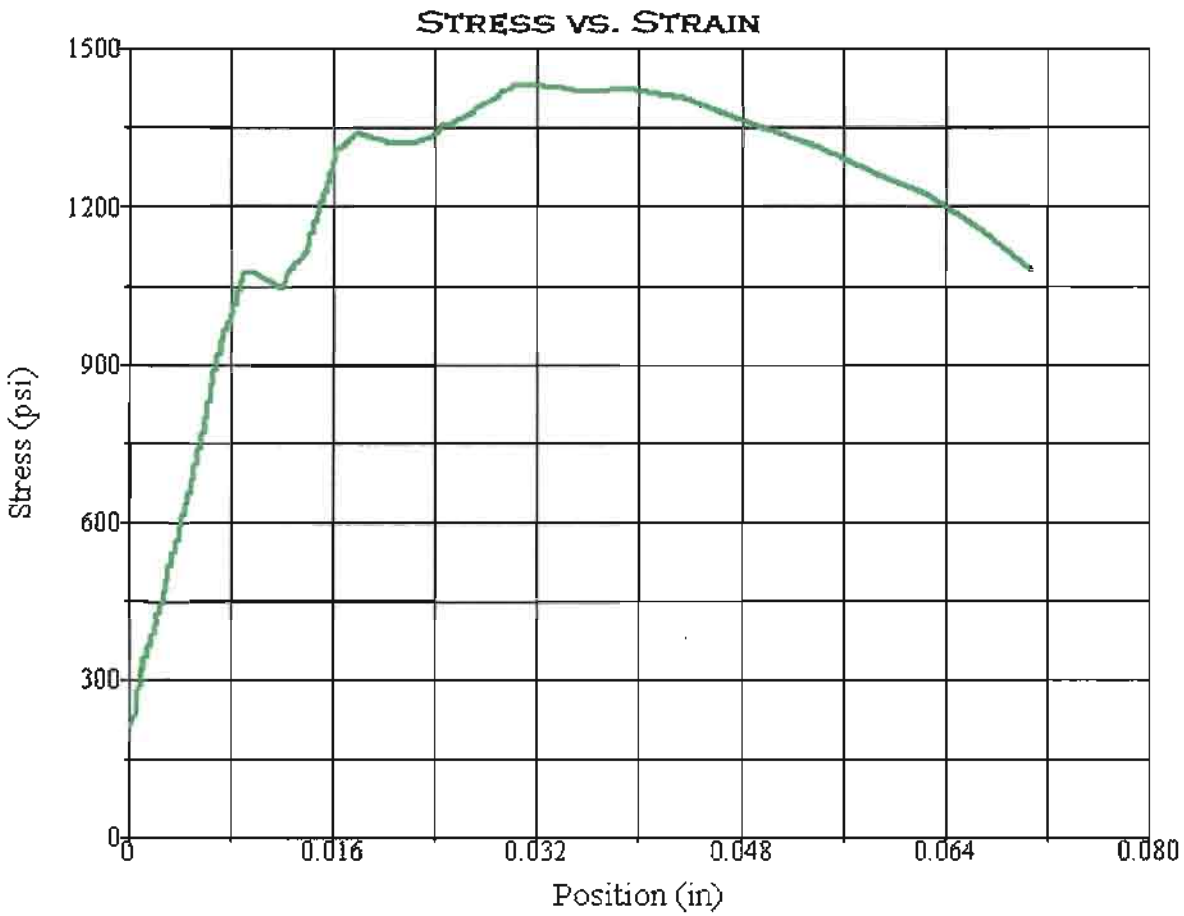
Test Results

Specimen Gage Length:	3.3900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12314 lbf
Compressive Strength:	2722 psi



Test Summary	
Counter:	1456
Elapsed Time:	00:01:23
Operator:	AZM
Sample:	R11-009-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:18:00 PM
End Date:	8/24/2011
End Time:	3:19:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-266

Test Results	
Specimen Gage Length:	4.9800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	14456 lbf
Compressive Strength:	3195 psi

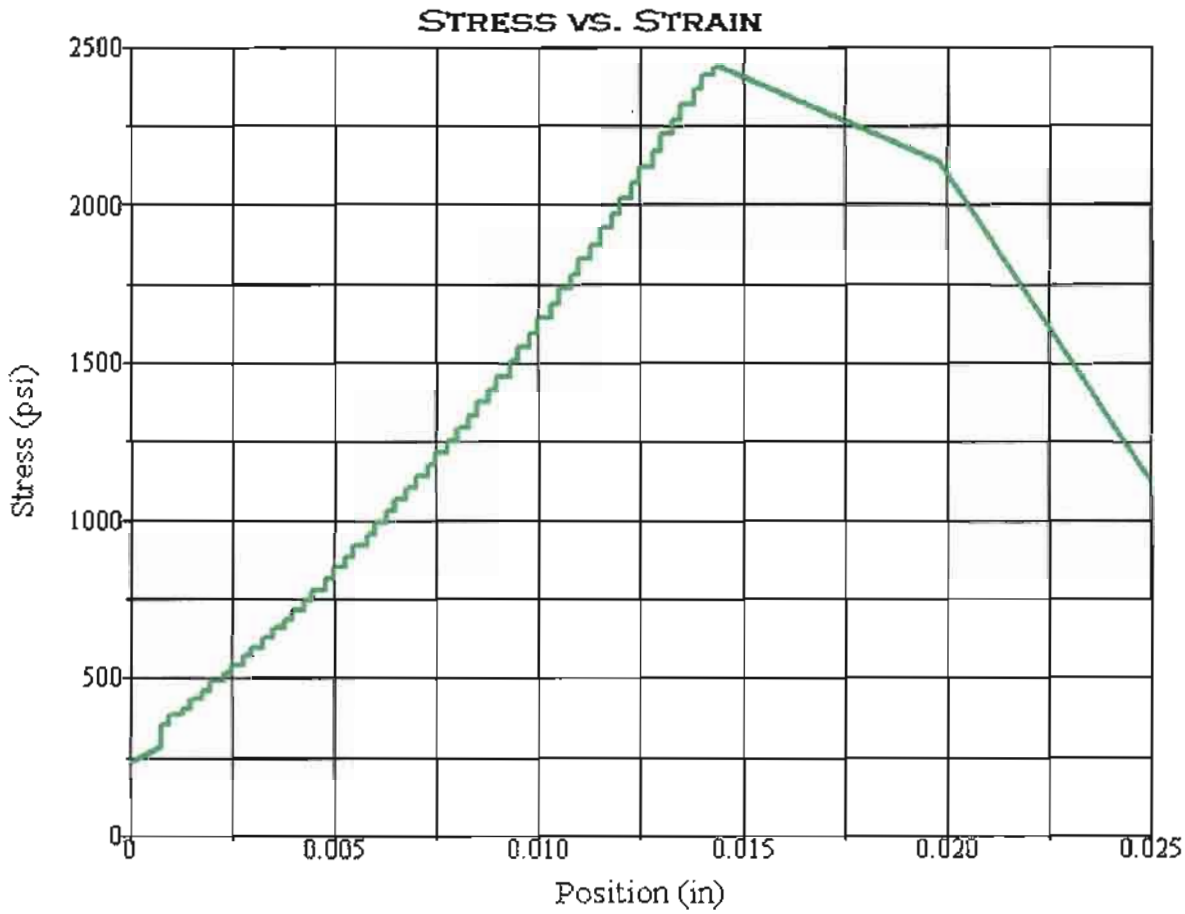


Test Summary

Counter:	1457
Elapsed Time:	00:00:34
Operator:	AZM
Sample:	R11-009-12
Resident Engineer:	RATIO: L/D<2
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:29:51 PM
End Date:	8/24/2011
End Time:	3:30:25 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-267

Test Results

Specimen Gage Length:	3.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6467 lbf
Compressive Strength:	1430 psi

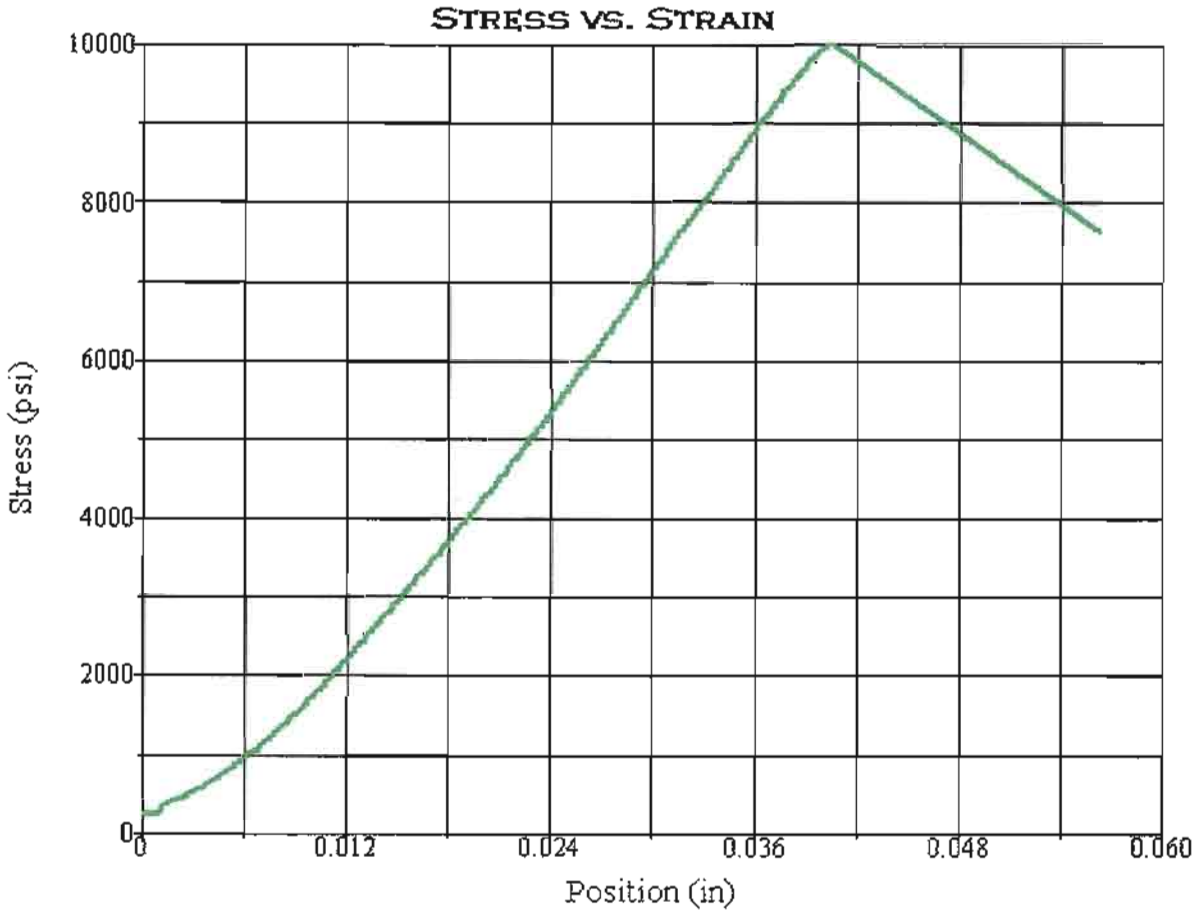


Test Summary

Counter:	1458
Elapsed Time:	00:01:00
Operator:	AZM
Sample:	R11-009-13
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:37:28 PM
End Date:	8/24/2011
End Time:	3:38:28 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-268

Test Results

Specimen Gage Length:	5.3500 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11031 lbf
Compressive Strength:	2438 psi

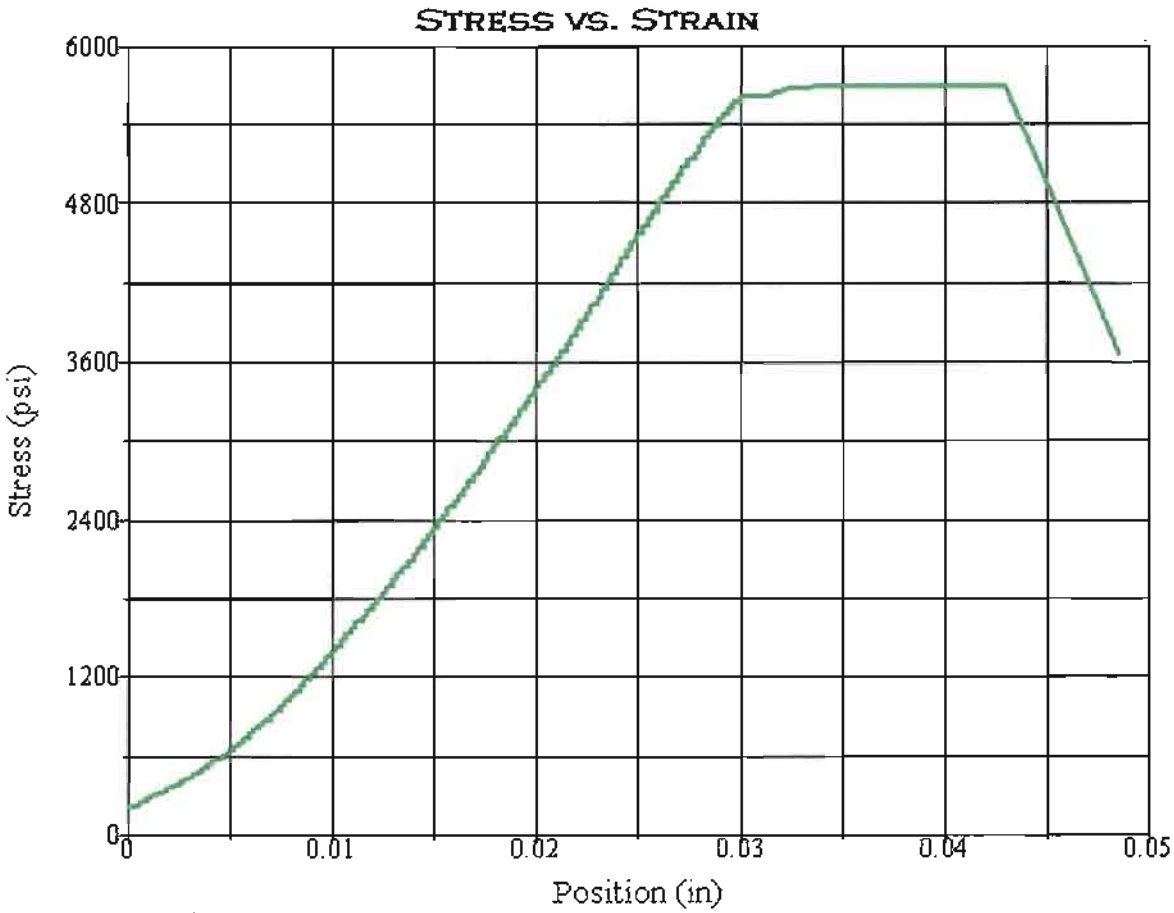


Test Summary

Counter:	1459
Elapsed Time:	00:04:36
Operator:	AZM
Sample:	R11-009-14
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:45:04 PM
End Date:	8/24/2011
End Time:	3:49:40 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-269

Test Results

Specimen Gage Length:	4.6800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	45209 lbf
Compressive Strength:	9993 psi

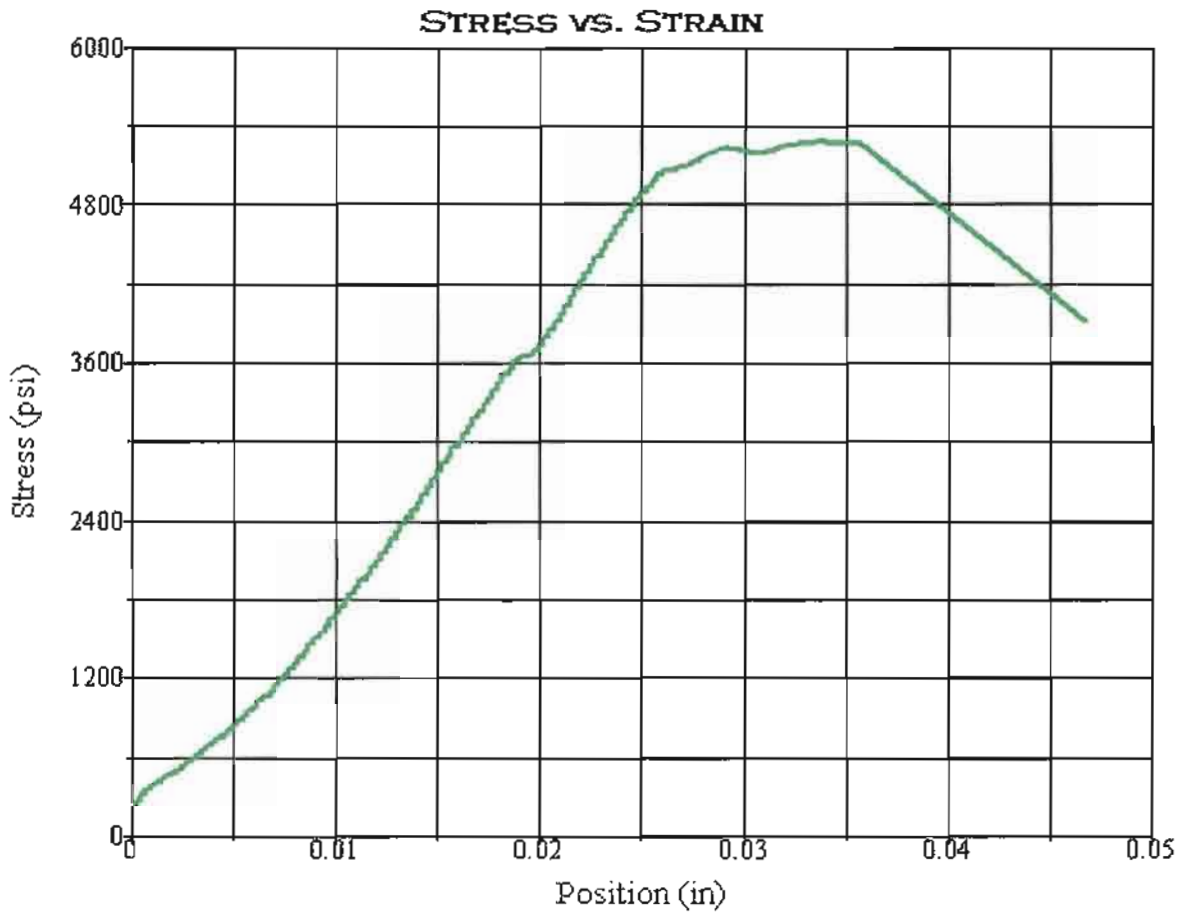


Test Summary

Counter:	1460
Elapsed Time:	00:02:36
Operator:	AZM
Sample:	R11-009-16
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	3:56:39 PM
End Date:	8/24/2011
End Time:	3:59:15 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-270

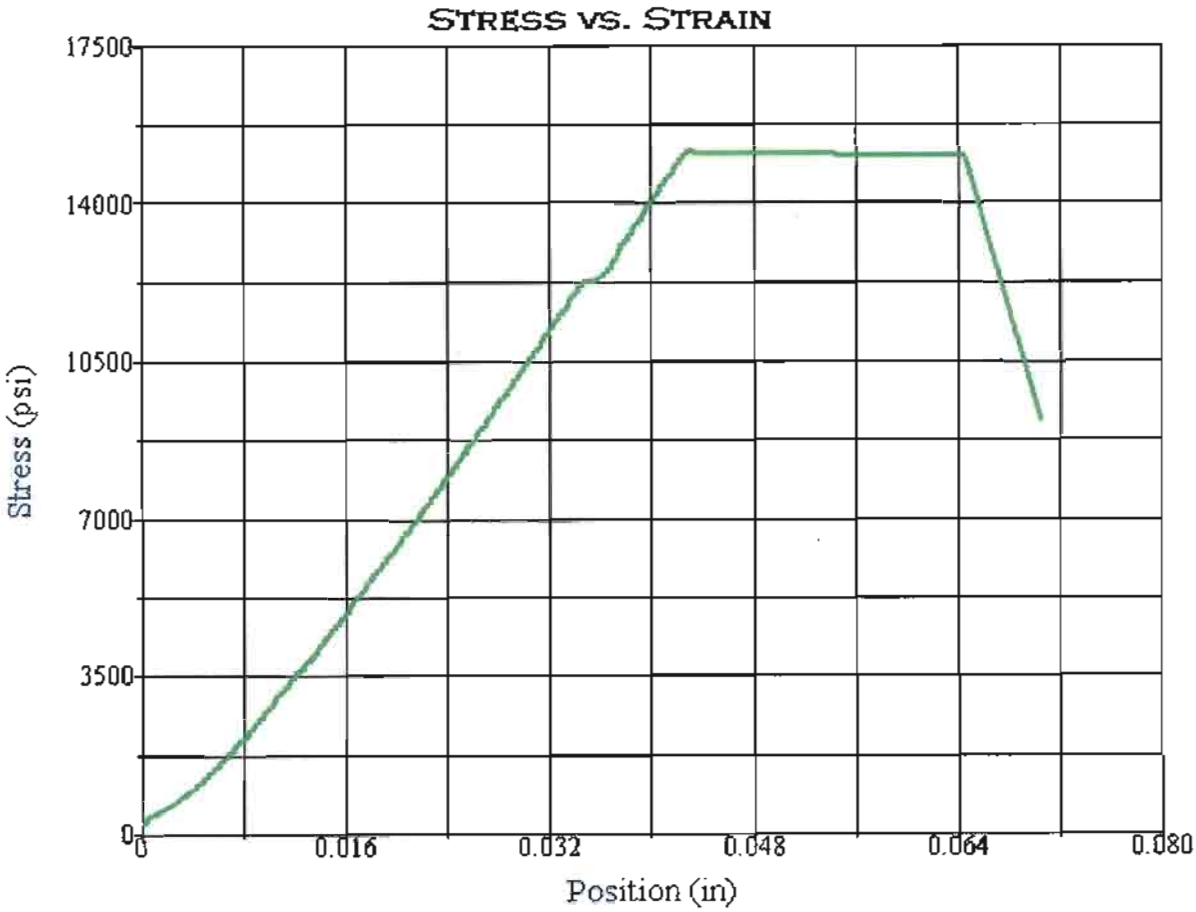
Test Results

Specimen Gage Length:	4.8000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	25737 lbf
Compressive Strength:	5689 psi



Test Summary	
Counter:	1461
Elapsed Time:	00:02:22
Operator:	AZM
Sample:	R11-009-18
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/24/2011
Start Time:	4:05:10 PM
End Date:	8/24/2011
End Time:	4:07:32 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-271

Test Results	
Specimen Gage Length:	5.6300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	23860 lbf
Compressive Strength:	5274 psi

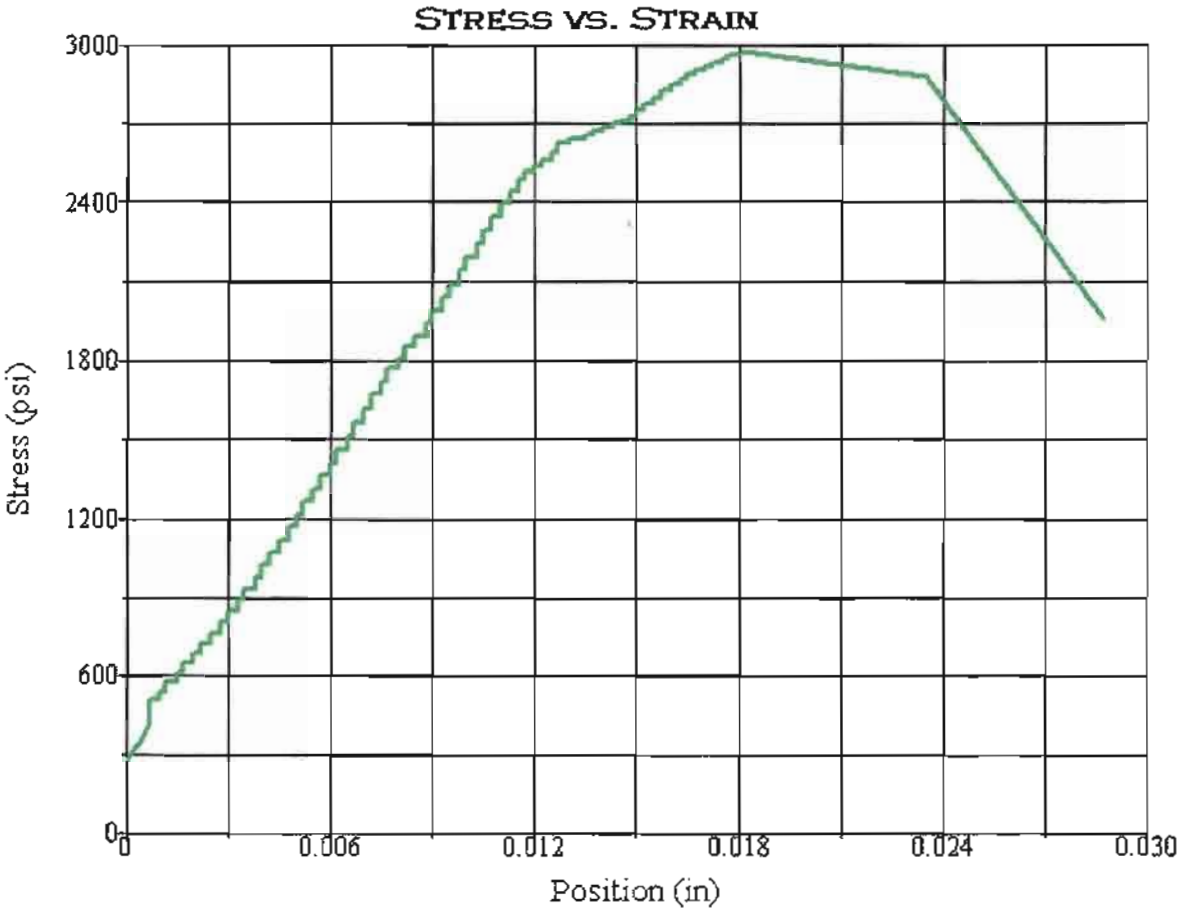


Test Summary

Counter:	1462
Elapsed Time:	00:07:05
Operator:	AZM
Sample:	R11-010-01
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	1:35:28 PM
End Date:	8/25/2011
End Time:	1:42:33 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-272

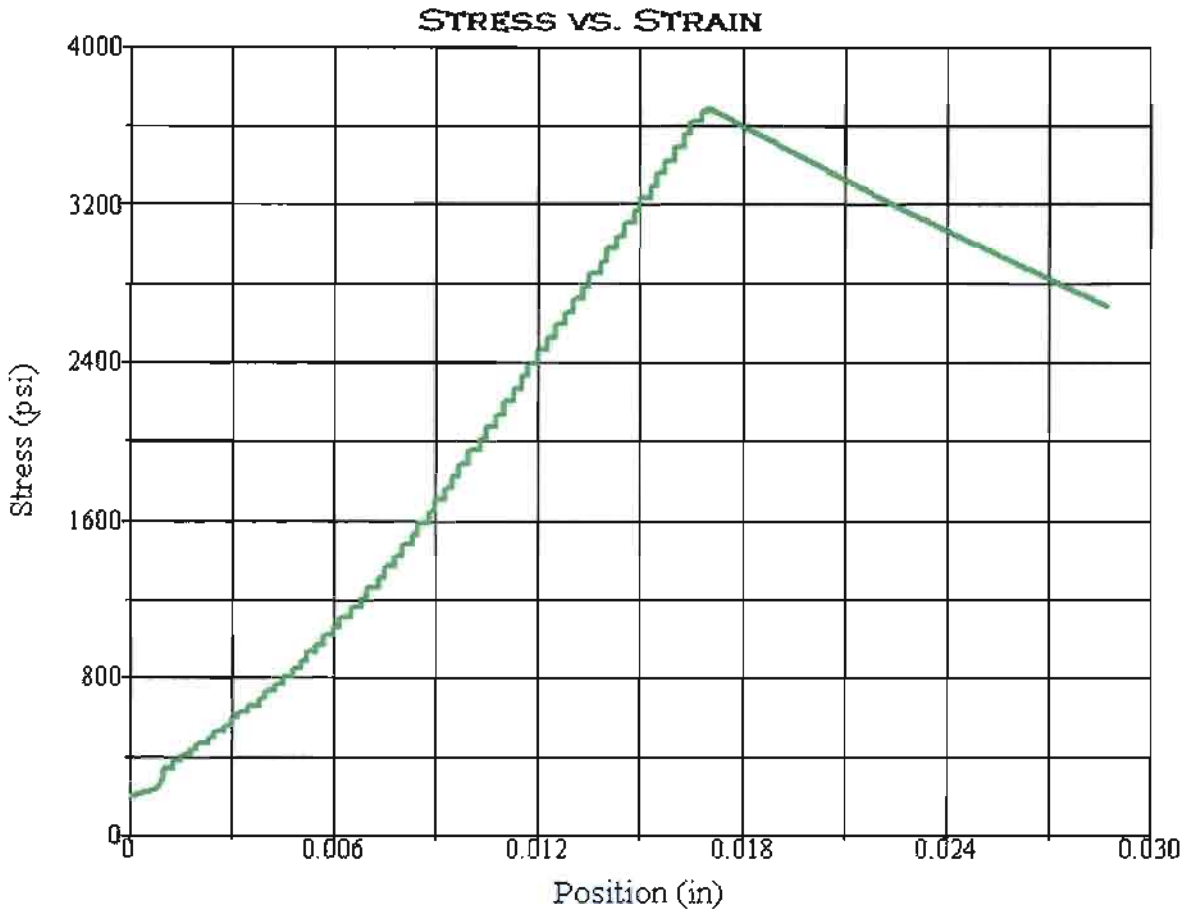
Test Results

Specimen Gage Length:	4.8600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	68741 lbf
Compressive Strength:	15195 psi



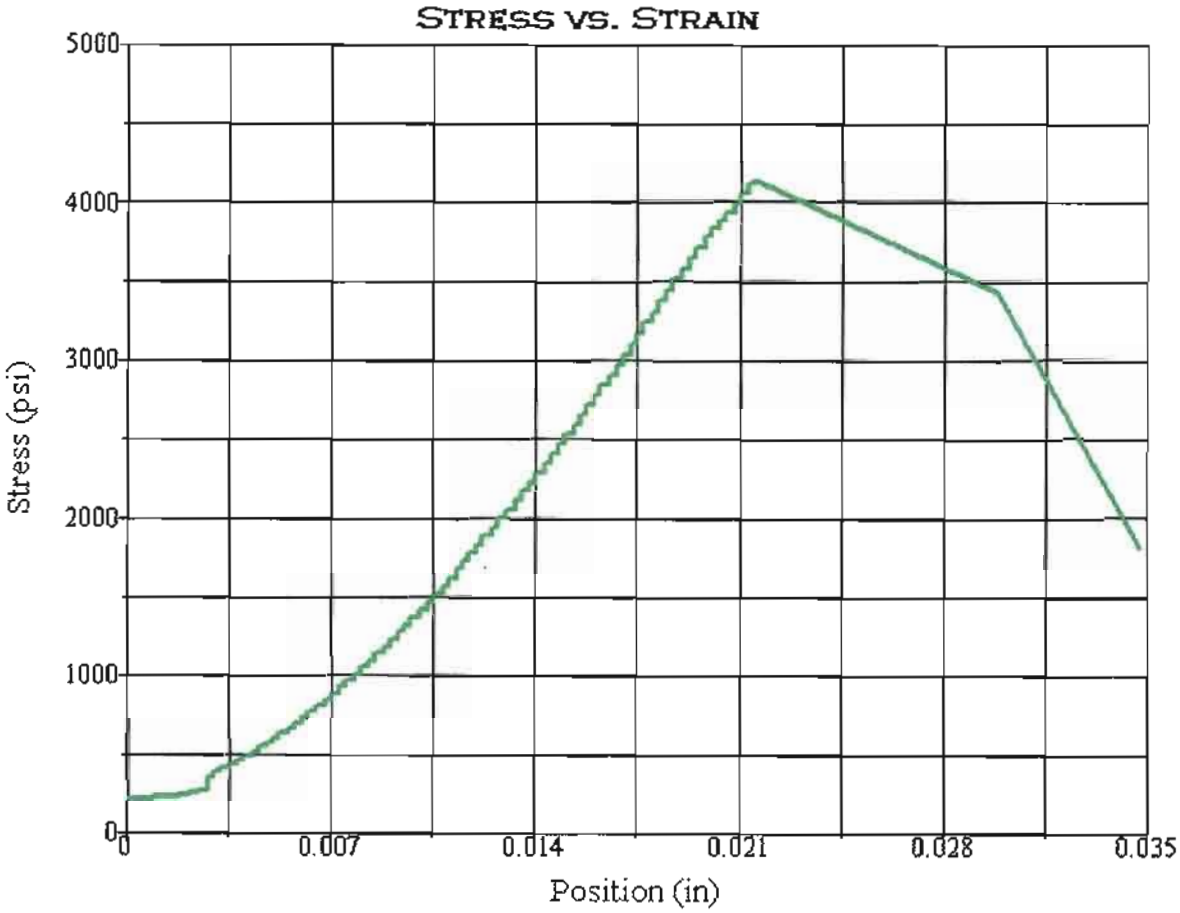
Test Summary	
Counter:	1463
Elapsed Time:	00:01:12
Operator:	AZM
Sample:	R11-010-05
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	1:48:49 PM
End Date:	8/25/2011
End Time:	1:50:01 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-273

Test Results	
Specimen Gage Length:	4.5800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	13428 lbf
Compressive Strength:	2968 psi



Test Summary	
Counter:	1464
Elapsed Time:	00:01:37
Operator:	AZM
Sample:	R11-010-06
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	2:00:04 PM
End Date:	8/25/2011
End Time:	2:01:41 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-275

Test Results	
Specimen Gage Length:	5.2800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	16704 lbf
Compressive Strength:	3692 psi

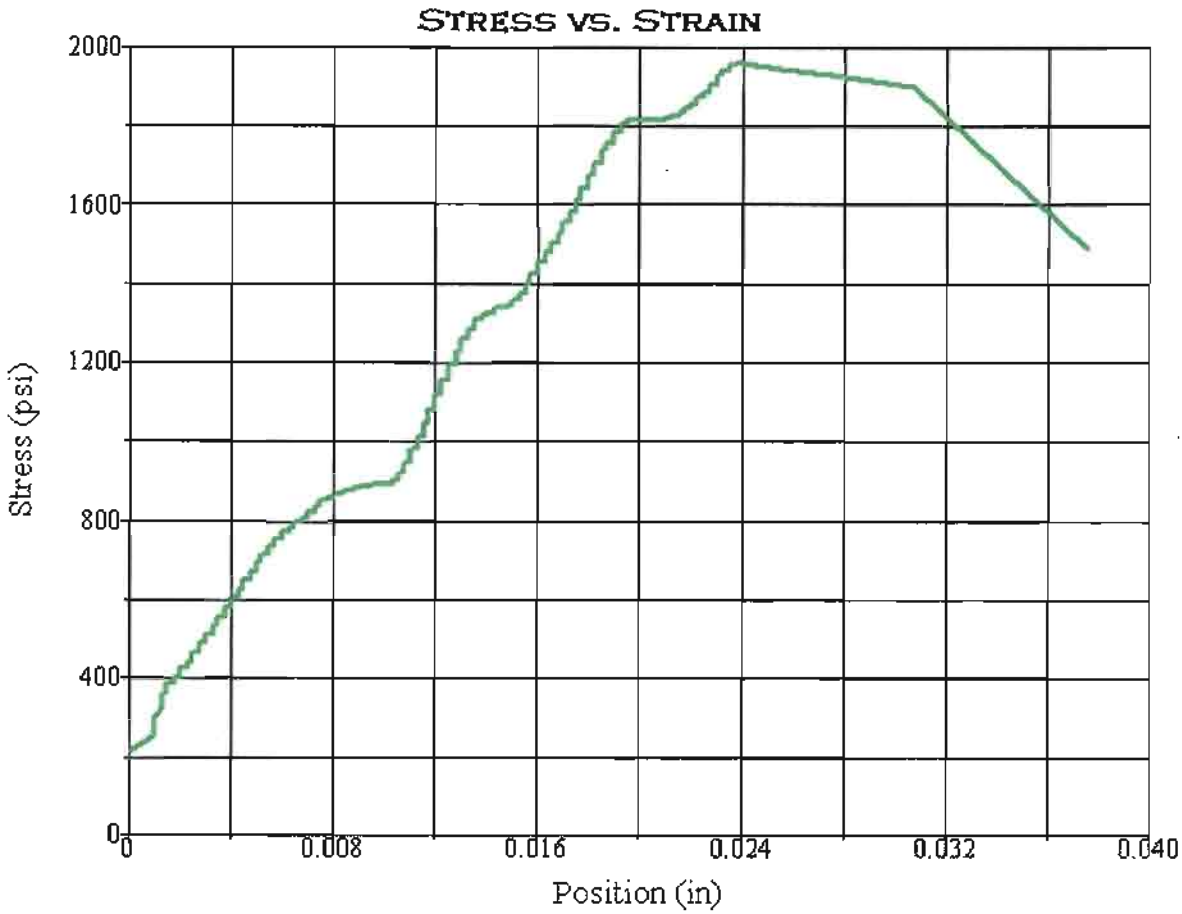


Test Summary

Counter:	1465
Elapsed Time:	00:01:50
Operator:	AZM
Sample:	R11-010-07
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	2:08:33 PM
End Date:	8/25/2011
End Time:	2:10:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-276

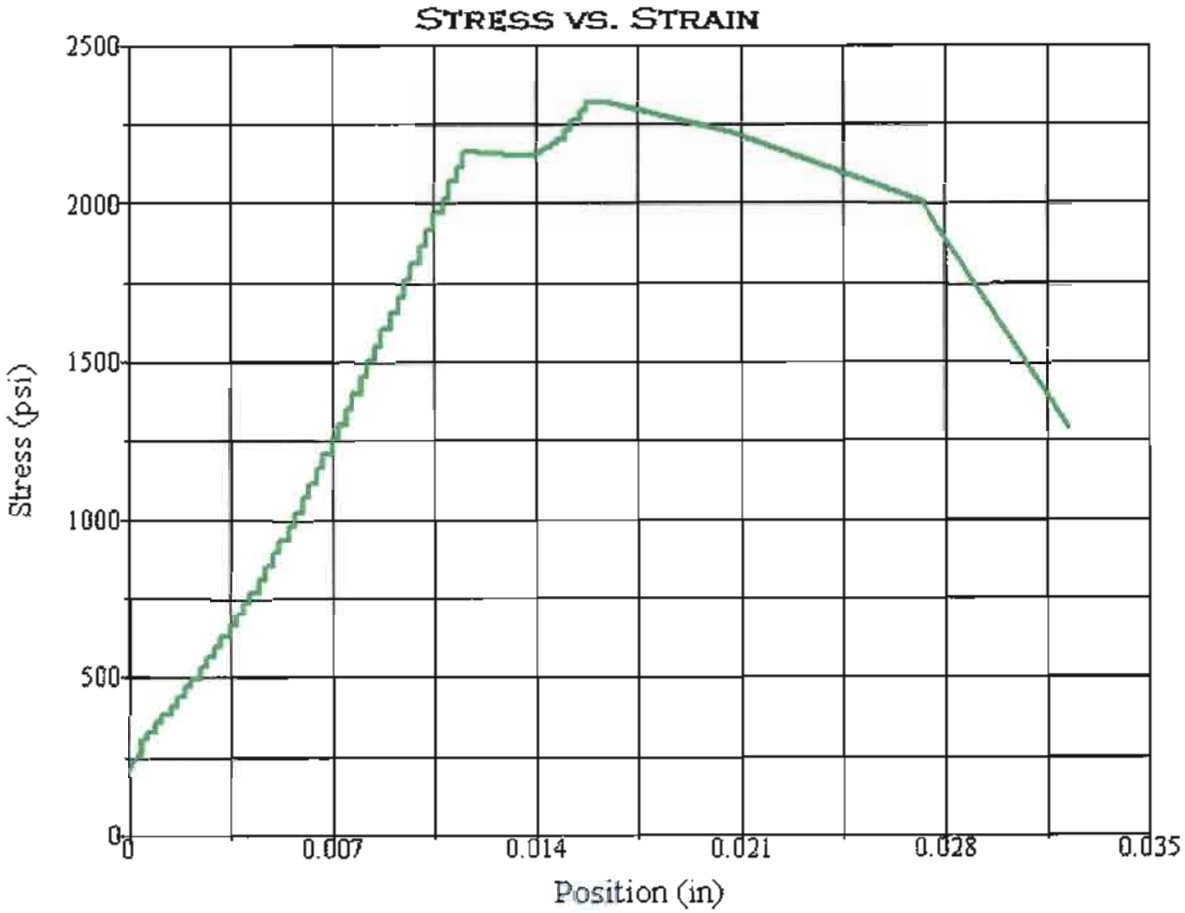
Test Results

Specimen Gage Length:	5.1100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	18754 lbf
Compressive Strength:	4146 psi



Test Summary	
Counter:	1466
Elapsed Time:	00:00:47
Operator:	AZM
Sample:	R11-010-07A
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	2:15:40 PM
End Date:	8/25/2011
End Time:	2:16:27 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-277

Test Results	
Specimen Gage Length:	4.3900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	8859 lbf
Compressive Strength:	1958 psi

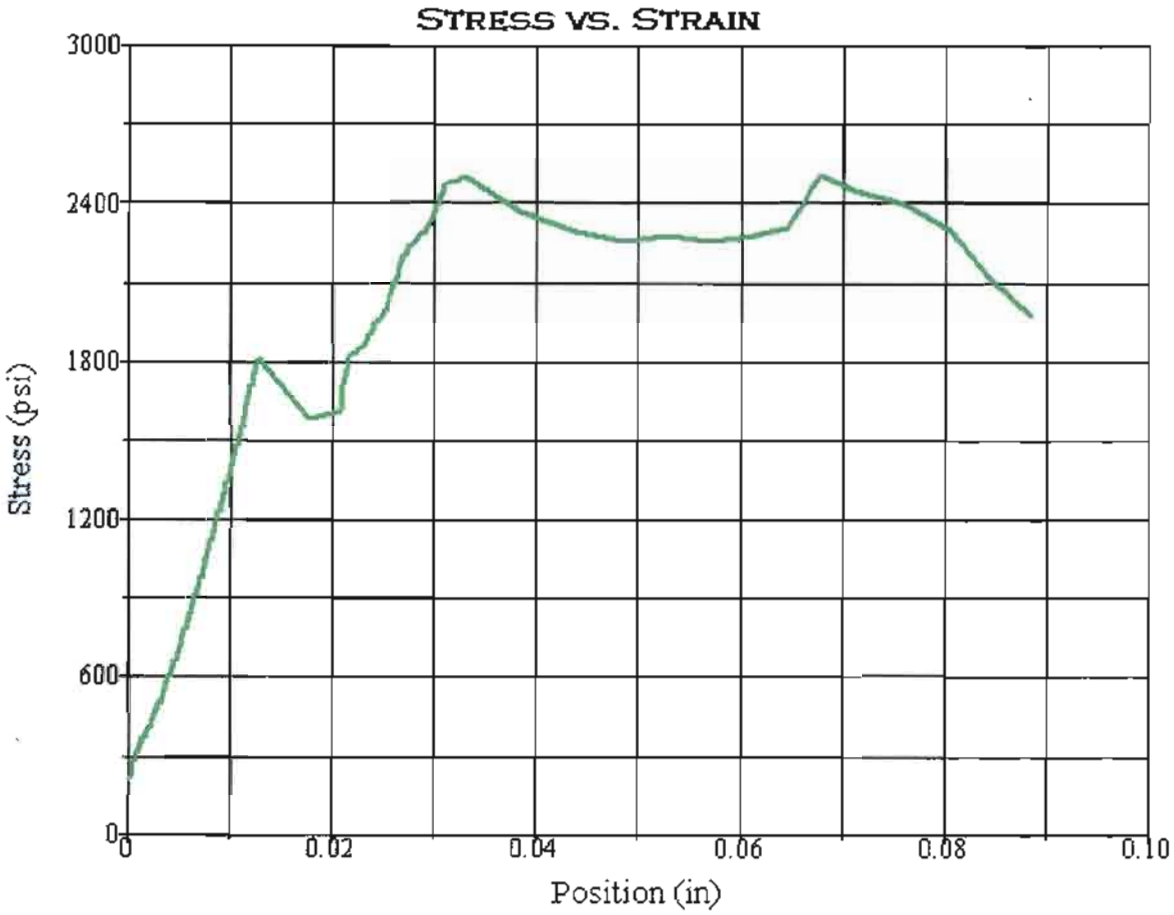


Test Summary

Counter:	1467
Elapsed Time:	00:00:59
Operator:	AZM
Sample:	R11-010-09
Resident Engineer:	
Ticket:	GL3 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:28:37 PM
End Date:	8/25/2011
End Time:	3:29:36 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-278

Test Results

Specimen Gage Length:	4.9300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10504 lbf
Compressive Strength:	2322 psi

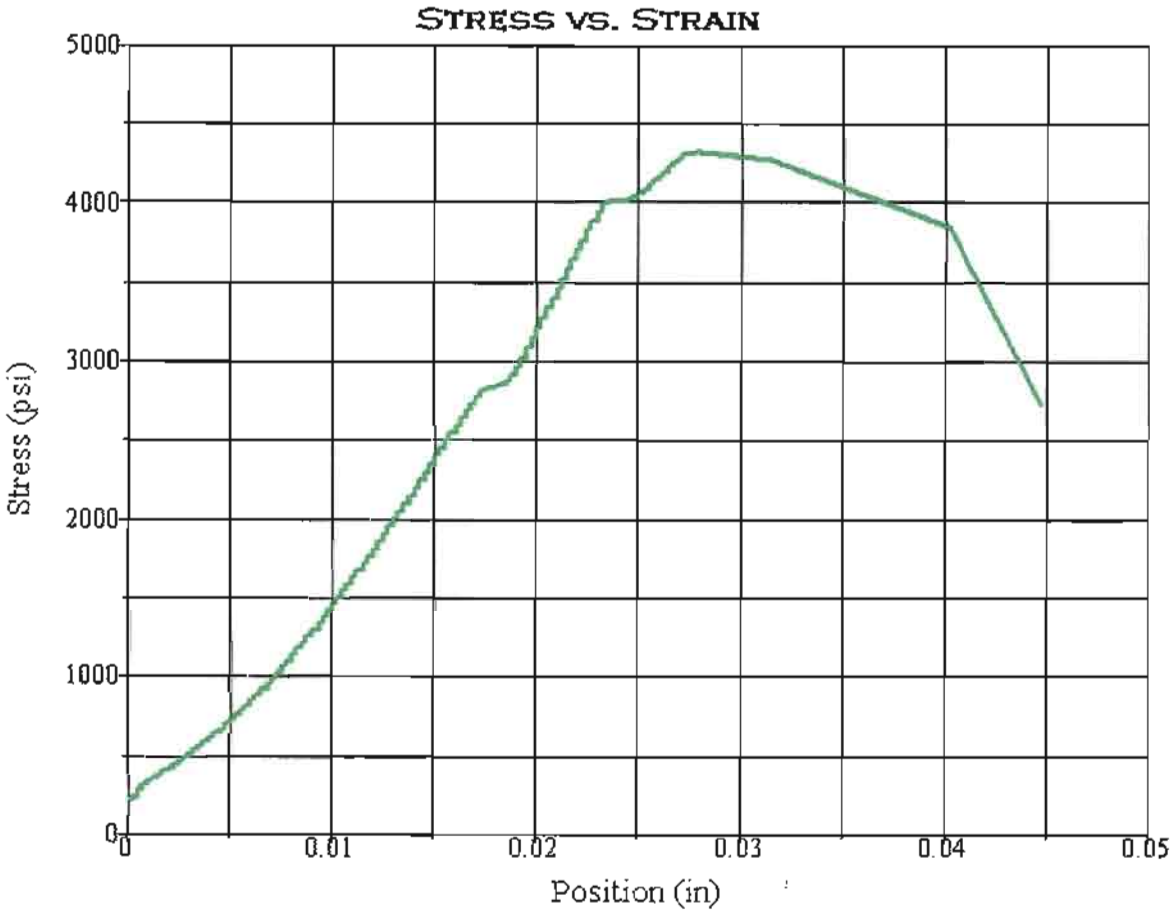


Test Summary

Counter:	1468
Elapsed Time:	00:01:06
Operator:	AZM
Sample:	R11-010-14
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:34:50 PM
End Date:	8/25/2011
End Time:	3:35:56 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-281

Test Results

Specimen Gage Length:	3.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	11323 lbf
Compressive Strength:	2503 psi

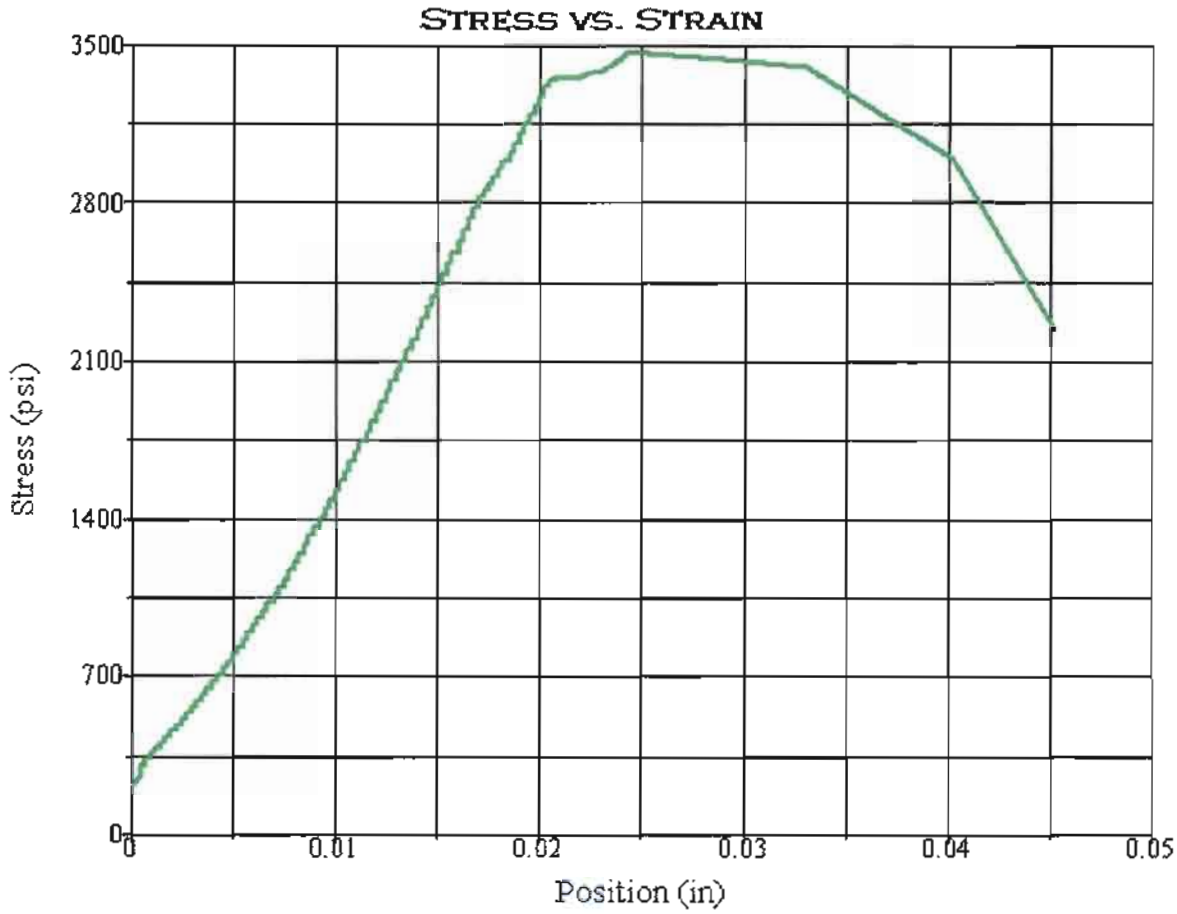


Test Summary

Counter:	1469
Elapsed Time:	00:01:55
Operator:	AZM
Sample:	R11-010-15
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:42:11 PM
End Date:	8/25/2011
End Time:	3:44:06 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-282

Test Results

Specimen Gage Length:	5.3000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	19496 lbf
Compressive Strength:	4310 psi

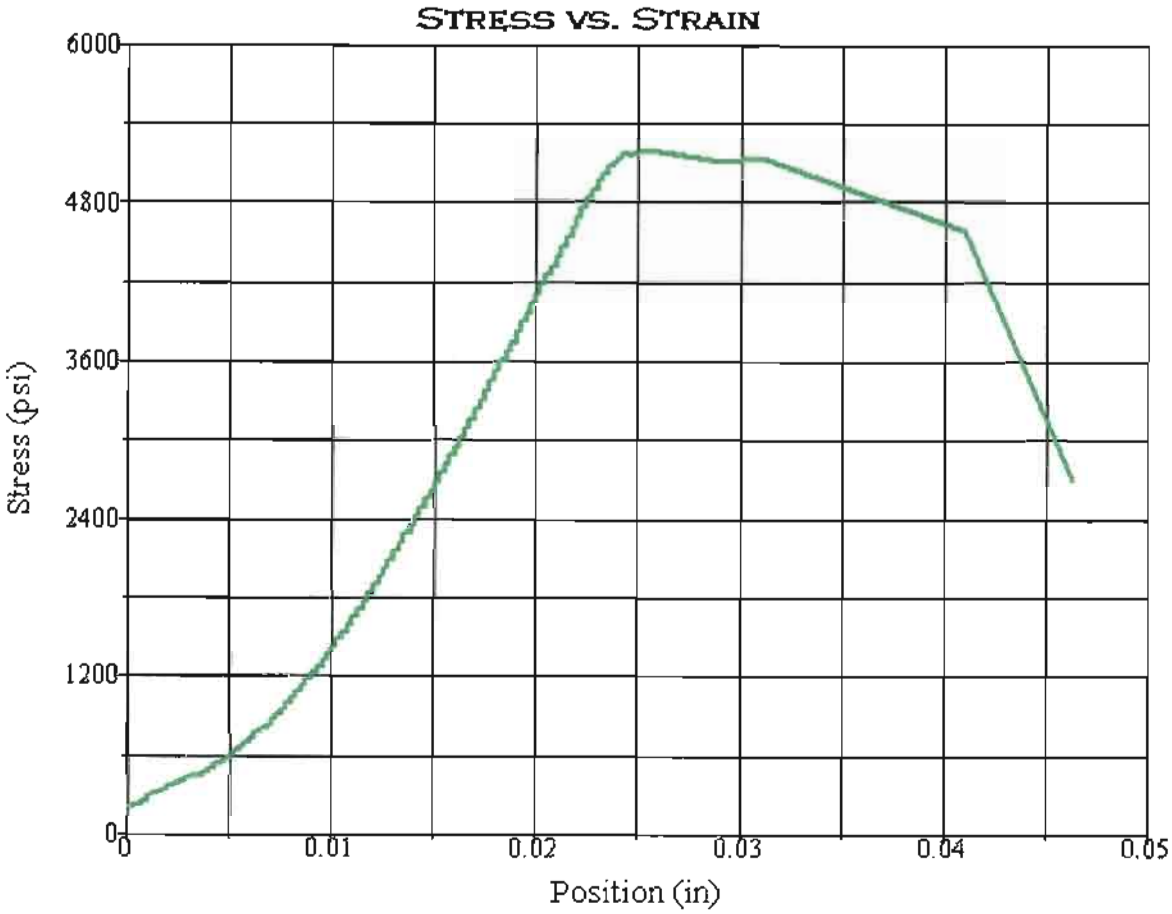


Test Summary

Counter:	1470
Elapsed Time:	00:01:31
Operator:	AZM
Sample:	R11-010-16
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:51:57 PM
End Date:	8/25/2011
End Time:	3:53:28 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-283

Test Results

Specimen Gage Length:	4.9800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	15701 lbf
Compressive Strength:	3471 psi

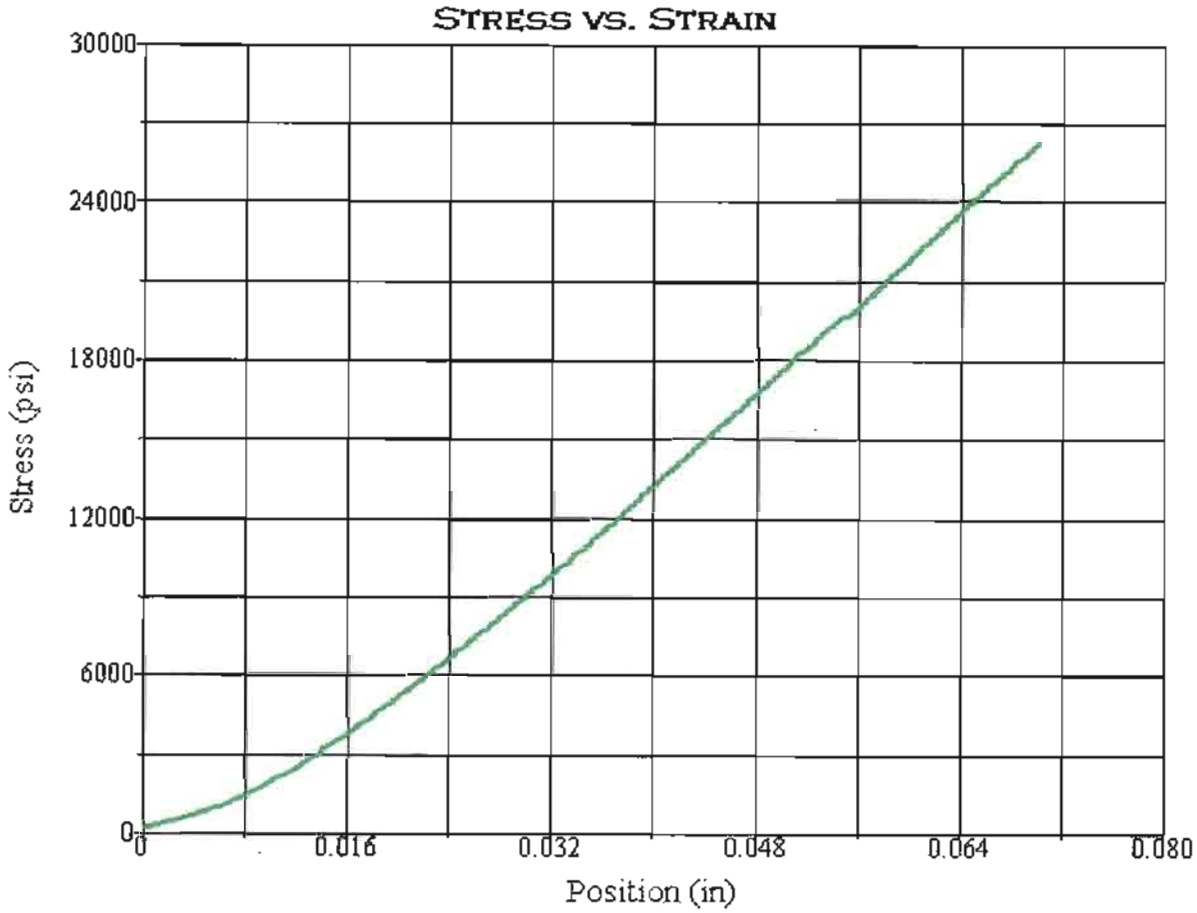


Test Summary

Counter:	1471
Elapsed Time:	00:02:21
Operator:	AZM
Sample:	R11-010-17
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	3:58:22 PM
End Date:	8/25/2011
End Time:	4:00:43 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-284

Test Results

Specimen Gage Length:	4.0200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	23439 lbf
Compressive Strength:	5181 psi



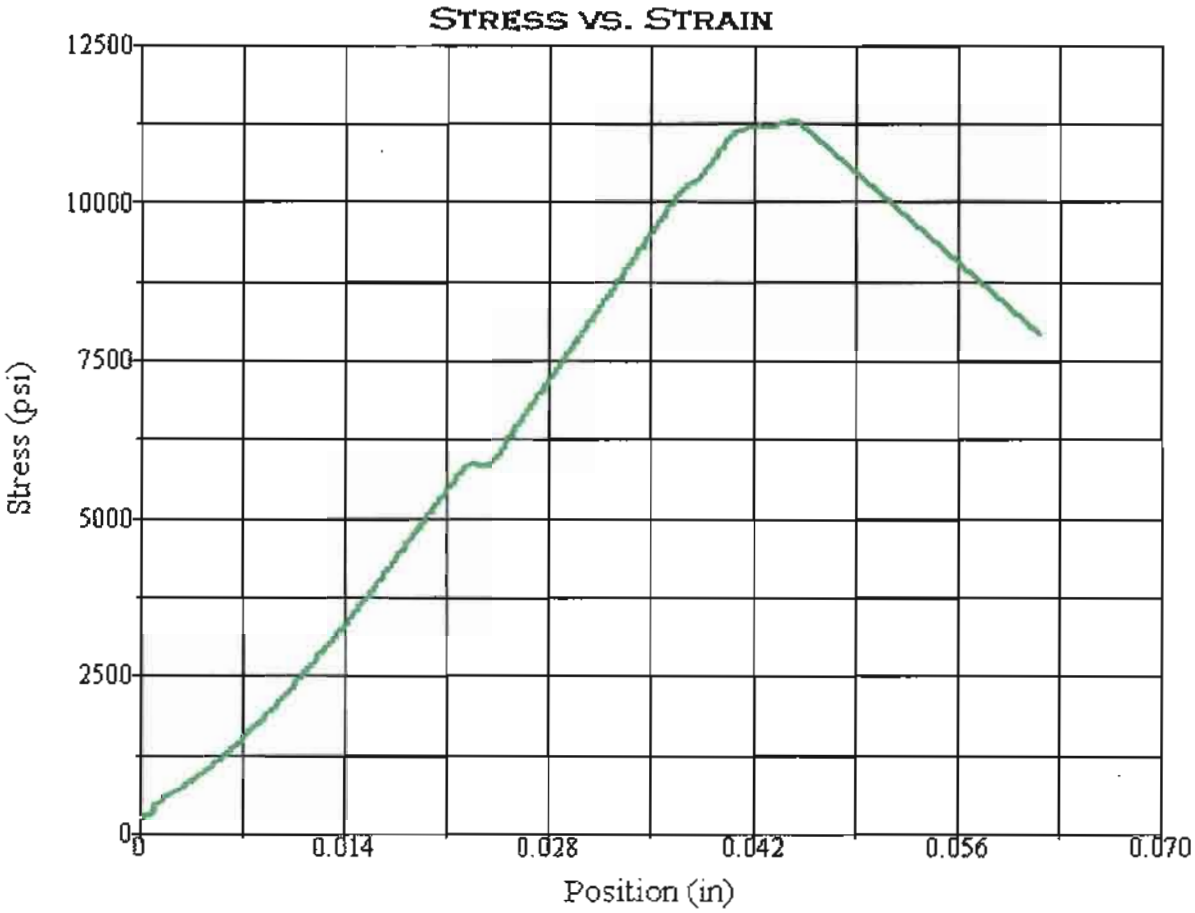
Test Summary

Counter:	1472
Elapsed Time:	00:12:21
Operator:	AZM
Sample:	R11-011-02
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/25/2011
Start Time:	4:05:12 PM
End Date:	8/25/2011
End Time:	4:17:33 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-285

Test Results

Specimen Gage Length:	3.4300 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	118608 lbf
Compressive Strength:	26218 psi

*Test stopped - reached limit of machine

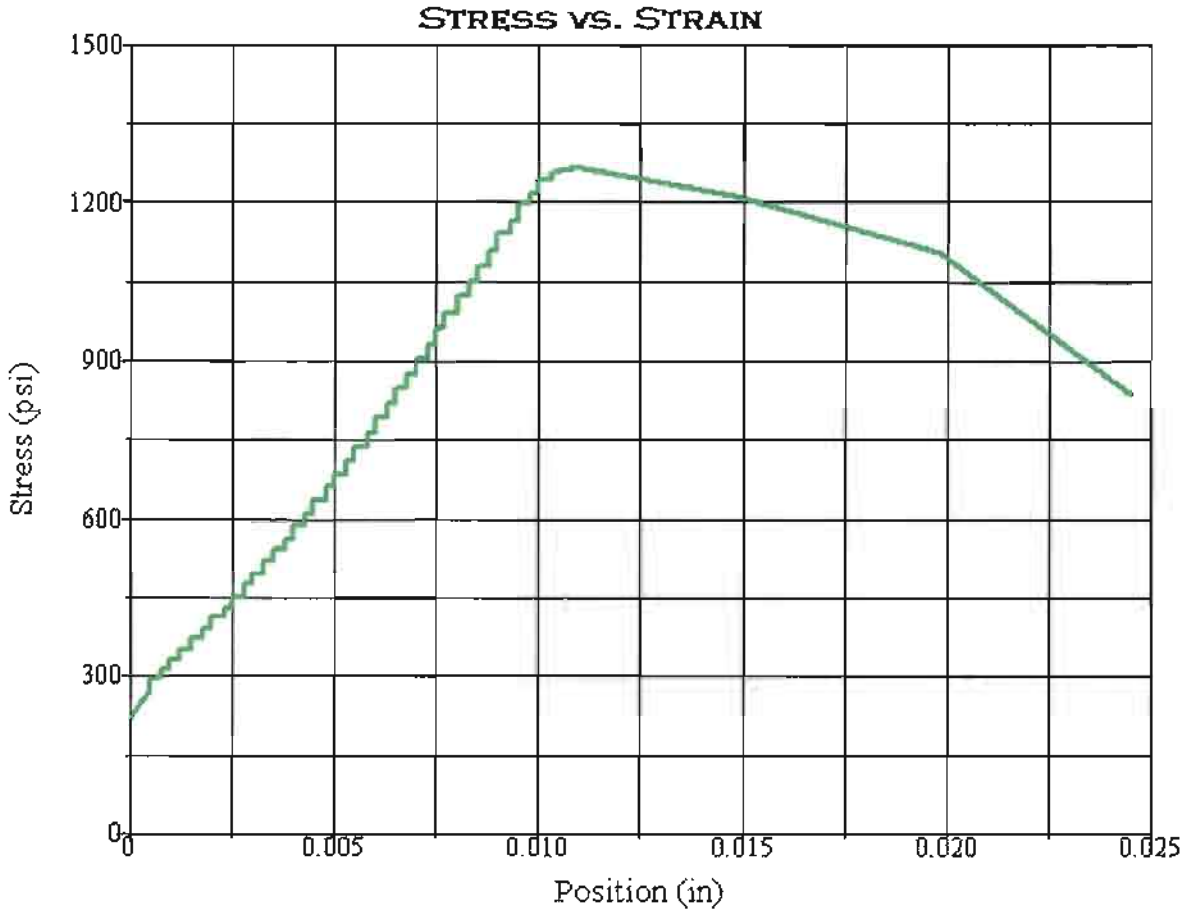


Test Summary

Counter:	1473
Elapsed Time:	00:05:10
Operator:	AMZ
Sample:	R11-011-04
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/26/2011
Start Time:	10:01:04 AM
End Date:	8/26/2011
End Time:	10:06:14 AM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-286

Test Results

Specimen Gage Length:	5.3100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	51046 lbf
Compressive Strength:	11284 psi

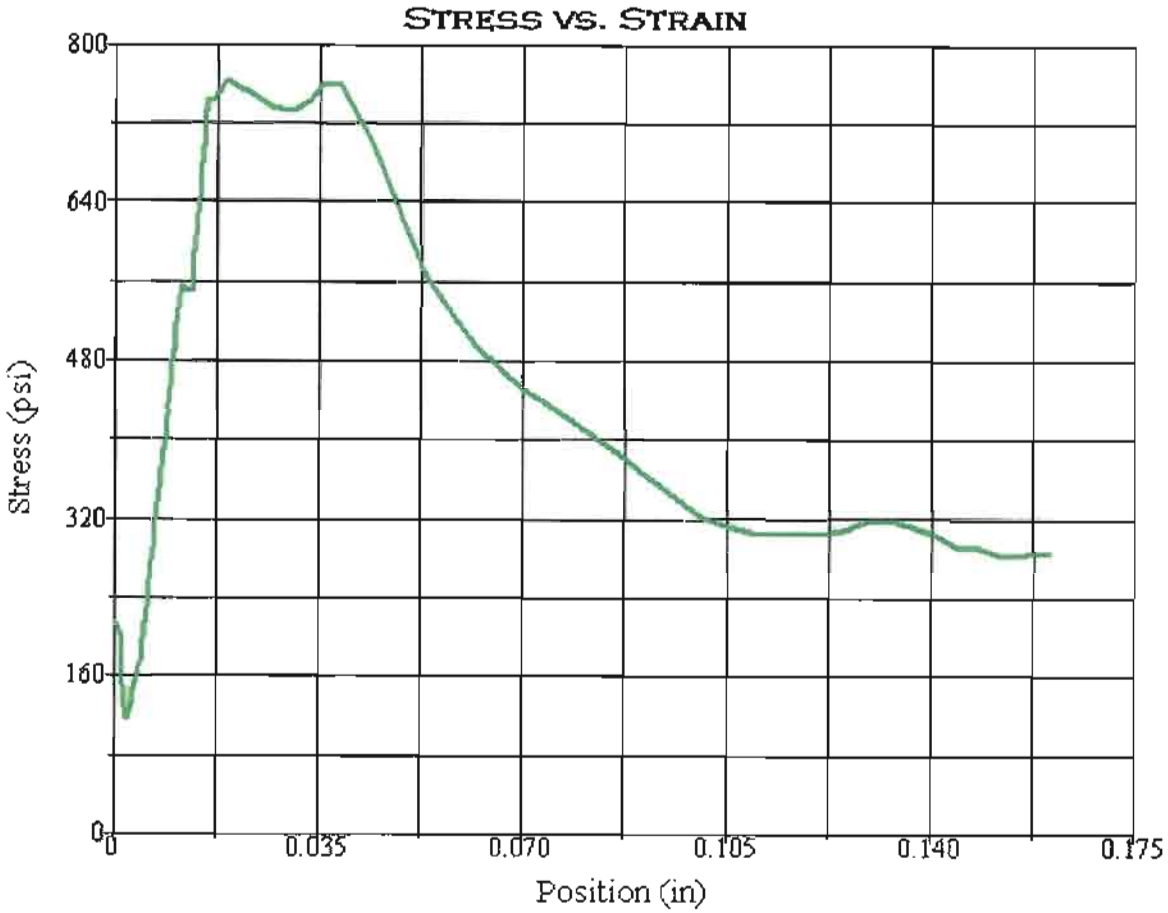


Test Summary

Counter:	1474
Elapsed Time:	00:00:29
Operator:	AZM
Sample:	R11-011-06
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/26/2011
Start Time:	10:15:56 AM
End Date:	8/26/2011
End Time:	10:16:25 AM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-288

Test Results

Specimen Gage Length:	5.6900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	5734 lbf
Compressive Strength:	1267 psi

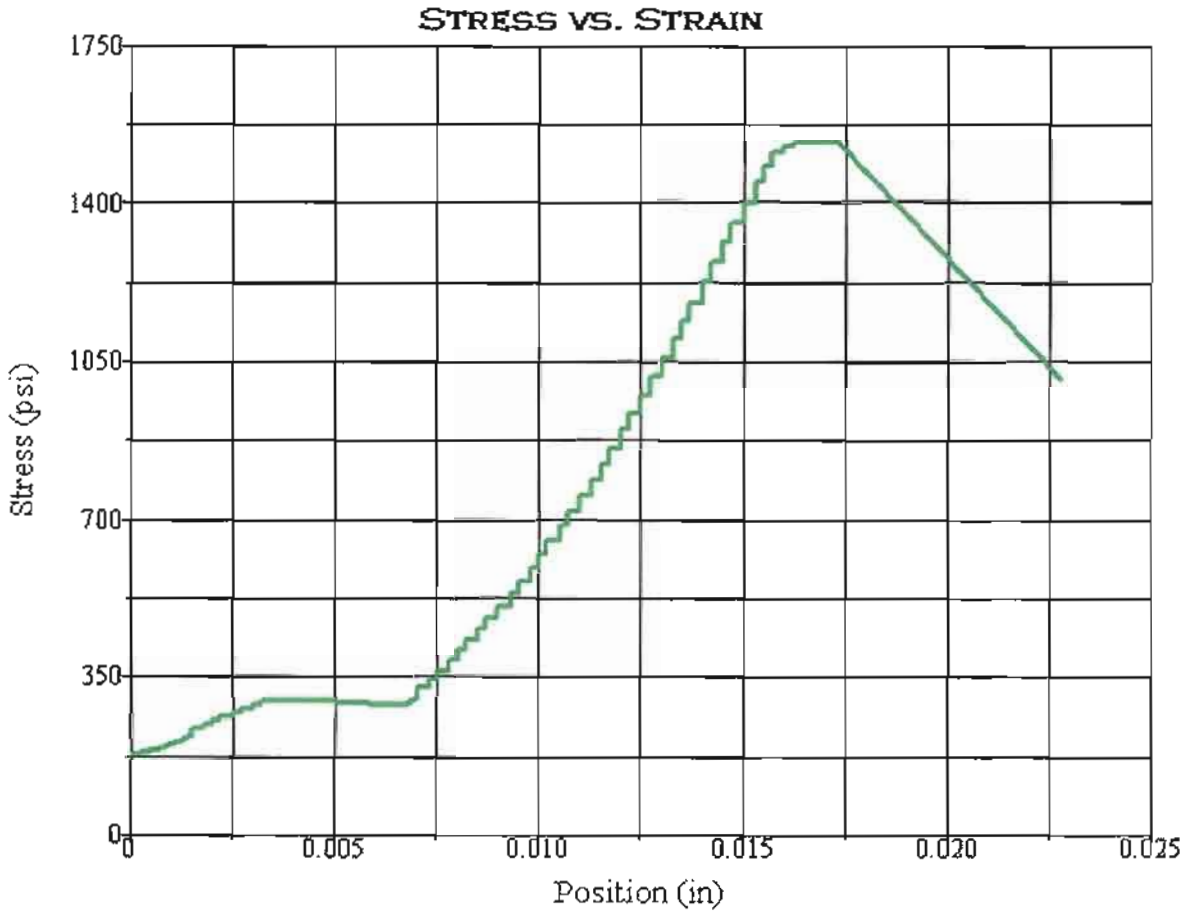


Test Summary

Counter:	1475
Elapsed Time:	00:00:23
Operator:	AZM
Sample:	R11-011-07
RATIO:	L/D< 2
Ticket:	GL # 11-067
E.A. NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/26/2011
Start Time:	10:23:06 AM
End Date:	8/26/2011
End Time:	10:23:29 AM
Workstation:	D1K00YB1
Tested By:	AZM
Lab:	Q11-289

Test Results

Specimen Gage Length:	4.6700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	3449 lbf
Compressive Strength:	762 psi

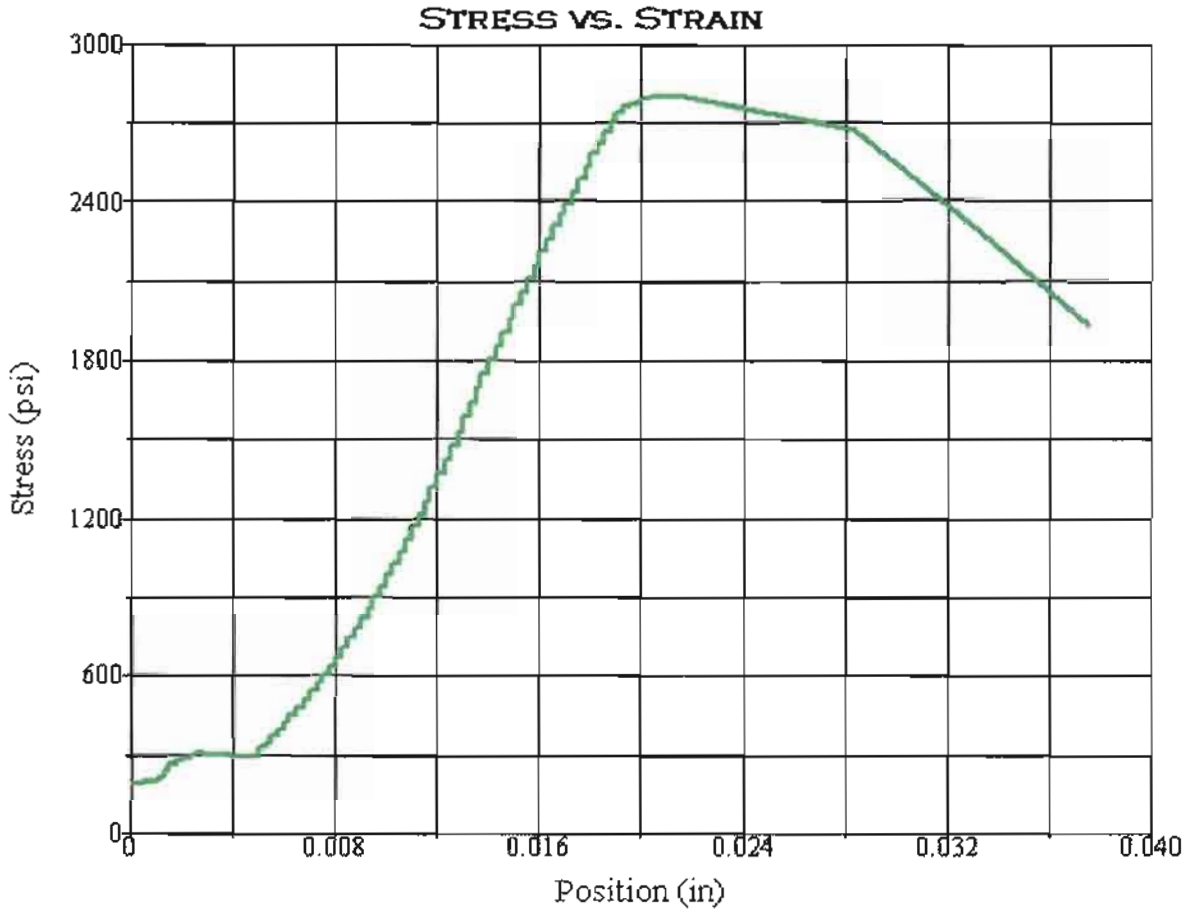


Test Summary

Counter:	1502
Elapsed Time:	00:00:37
Operator:	AZM
Sample:	R11-011-07A
RATIO:	L/D<2
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	11:56:56 AM
End Date:	8/31/2011
End Time:	11:57:33 AM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-290

Test Results

Specimen Gage Length:	2.9900 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	6936 lbf
Compressive Strength:	1533 psi

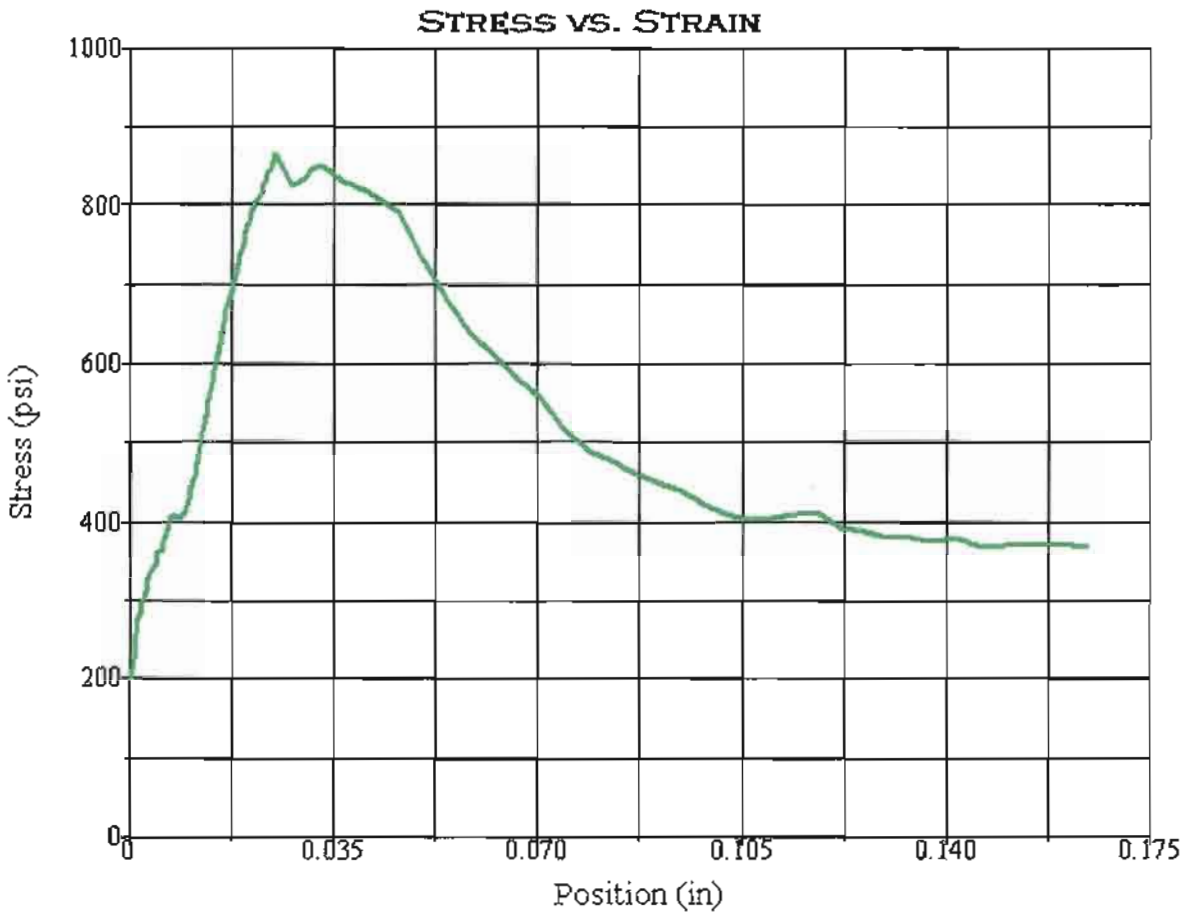


Test Summary

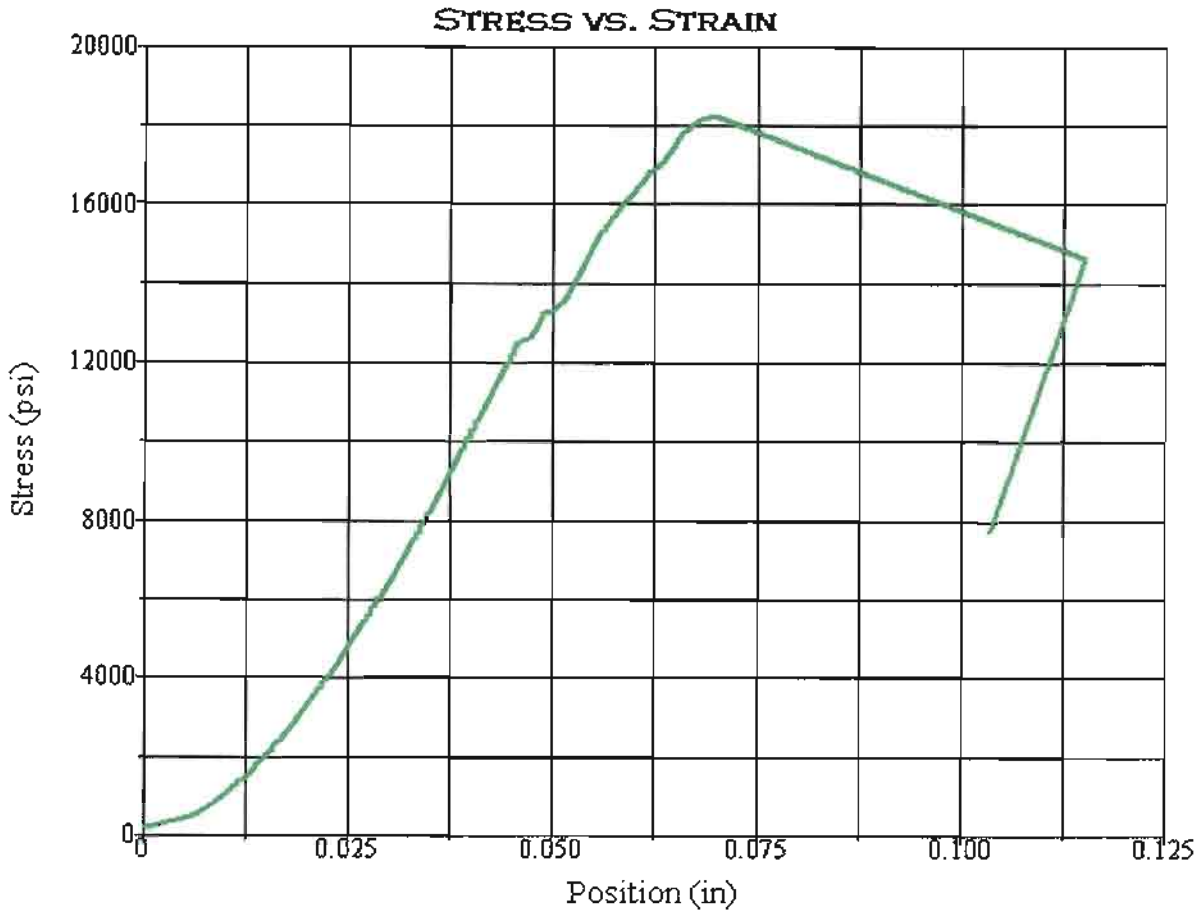
Counter:	1503
Elapsed Time:	00:01:14
Operator:	AZM
Sample:	R11-011-10
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	12:04:25 PM
End Date:	8/31/2011
End Time:	12:05:39 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-291

Test Results

Specimen Gage Length:	4.9100 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	12673 lbf
Compressive Strength:	2801 psi



Test Summary		Test Results	
Counter:	0	Specimen Gage Length:	3.0100 in
Elapsed Time:	00:00:21	Diameter:	2.4000 in
Operator:	AZM	Area:	4.5239 in²
Sample:	R11-011-10A	Maximum Load:	3907 lbf
	RATIO: L/D<2	Compressive Strength:	864 psi
Resident Engineer:			
Ticket:	GL # 11-067		
E.A./CONTRACT NUMBER:	01-479401		
Procedure Name:	Cores test		
Start Date:	8/31/2011		
Start Time:	12:10:33 PM		
End Date:	8/31/2011		
End Time:	12:10:54 PM		
Workstation:	D1K00YB1		
Tested By:	concrete		
Lab:	Q11-293		

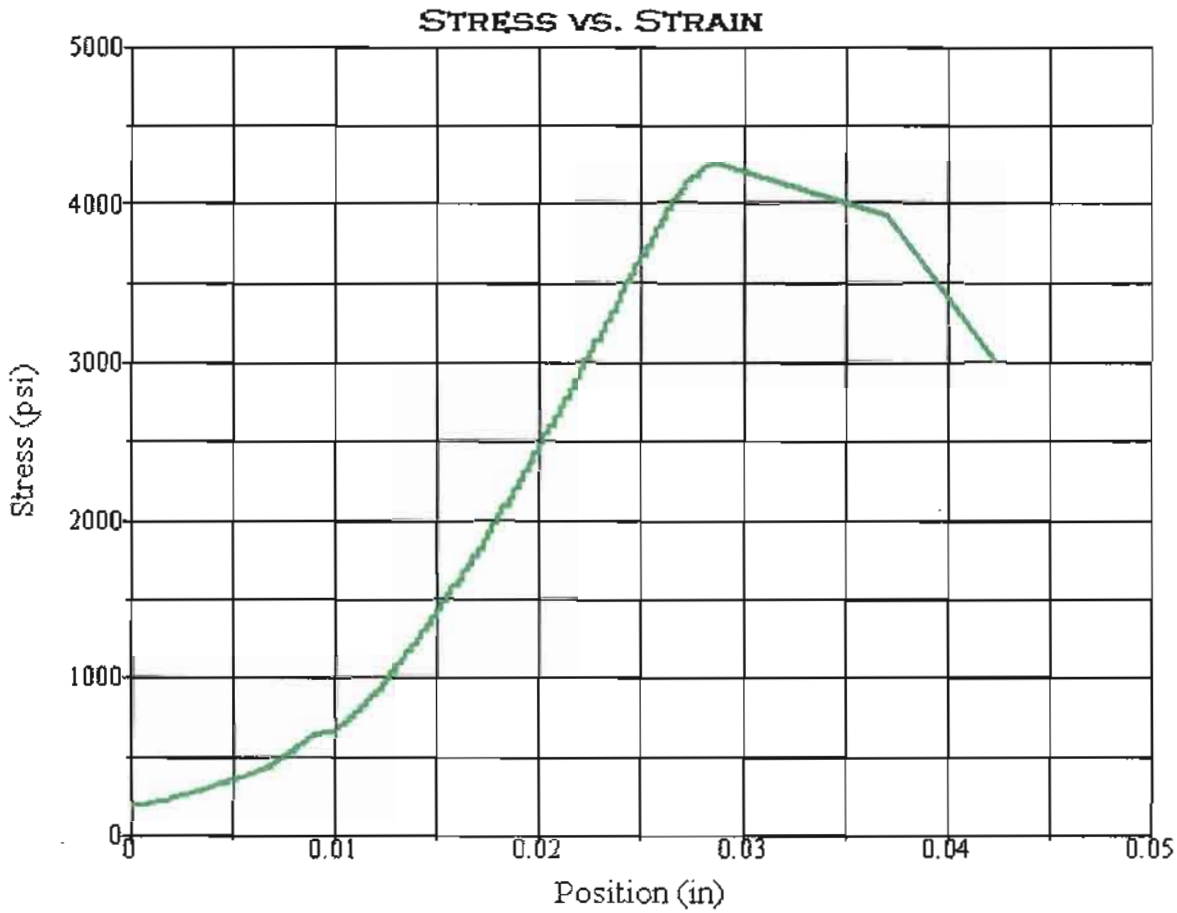


Test Summary

Counter:	1505
Elapsed Time:	00:08:35
Operator:	AZM
Sample:	R11-012-04
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	12:17:05 PM
End Date:	8/31/2011
End Time:	12:25:40 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-295

Test Results

Specimen Gage Length:	3.6000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	82418 lbf
Compressive Strength:	18218 psi

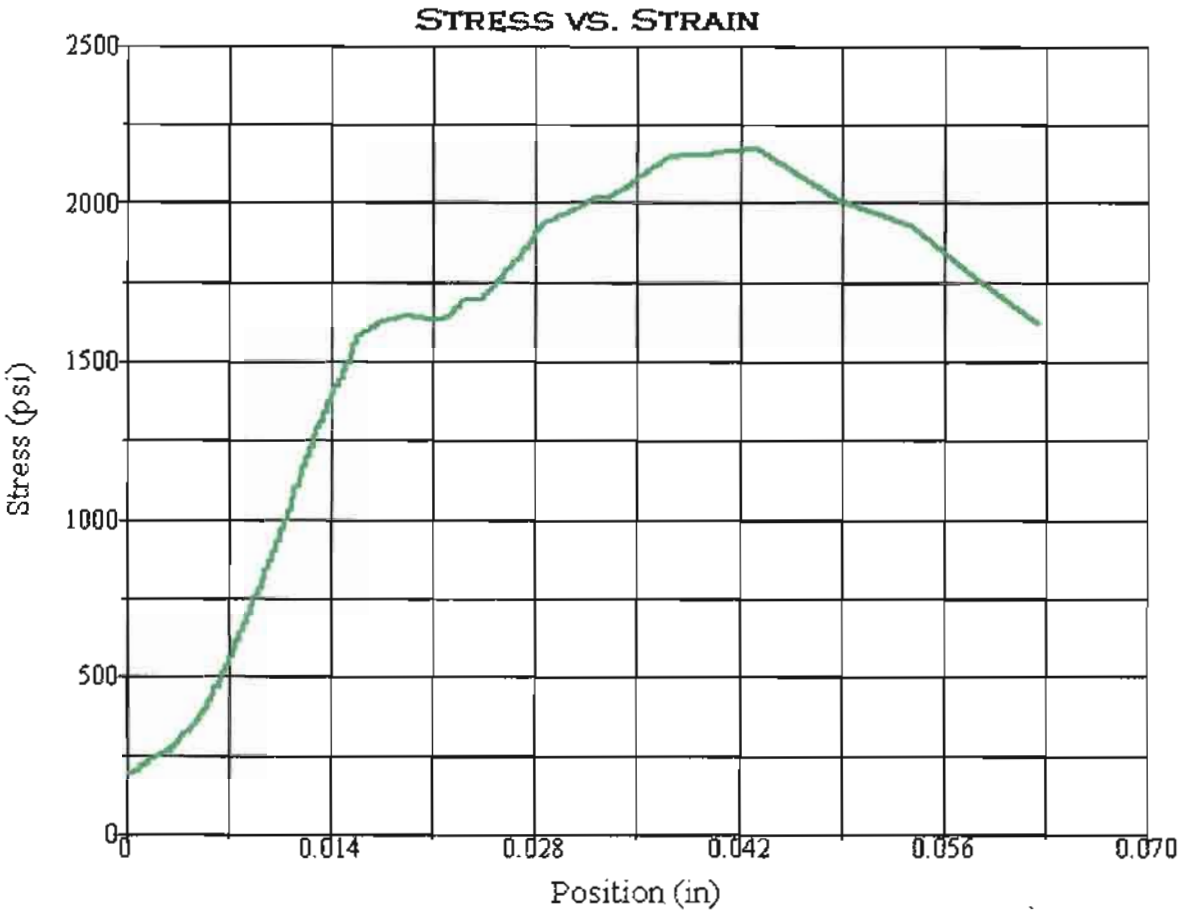


Test Summary

Counter:	1506
Elapsed Time:	00:01:56
Operator:	AZM
Sample:	R11-012-08
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	1:14:13 PM
End Date:	8/31/2011
End Time:	1:16:09 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-296

Test Results

Specimen Gage Length:	2.8000 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	19188 lbf
Compressive Strength:	4241 psi

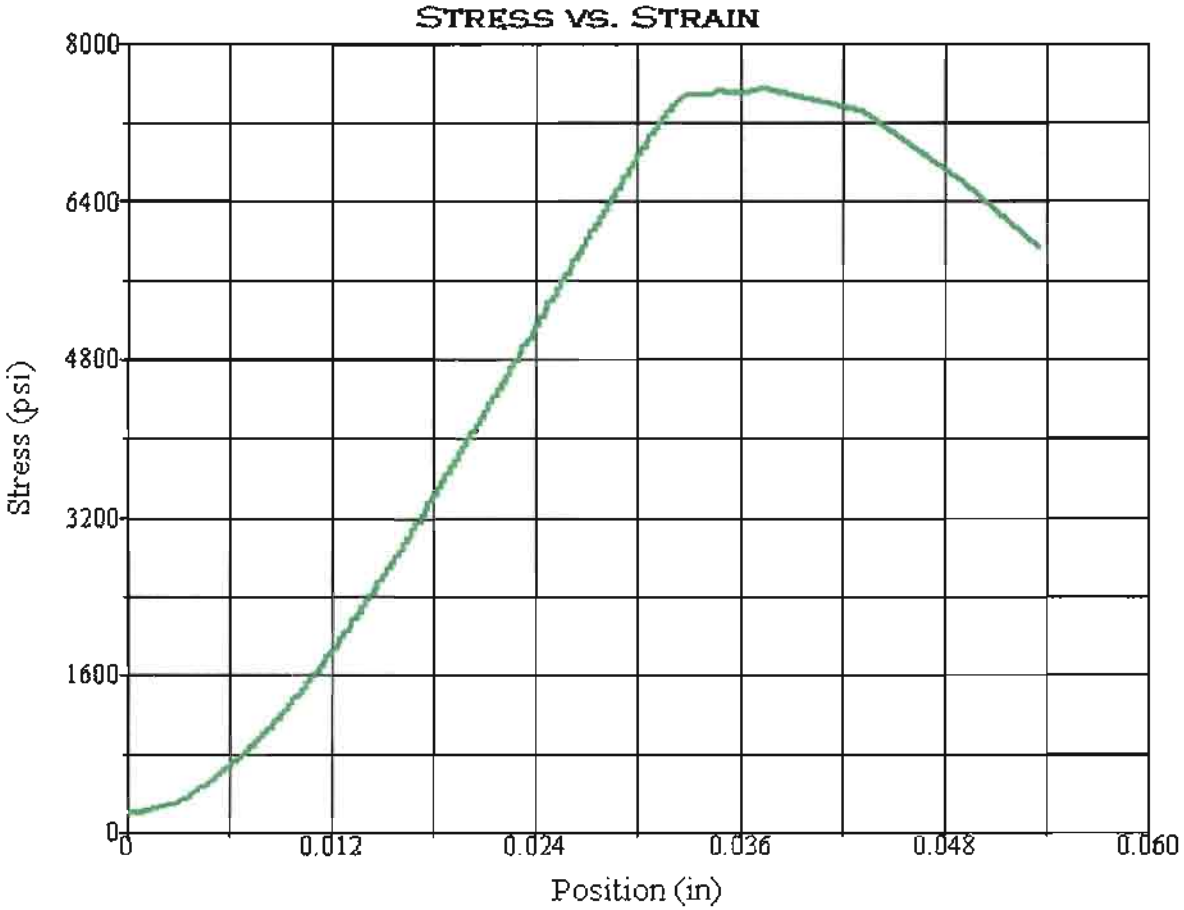


Test Summary

Counter:	1507
Elapsed Time:	00:00:57
Operator:	AZM
Sample:	R11-012-09
	RATIO: L/D<2
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	1:30:43 PM
End Date:	8/31/2011
End Time:	1:31:40 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-297

Test Results

Specimen Gage Length:	3.4800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	9818 lbf
Compressive Strength:	2170 psi

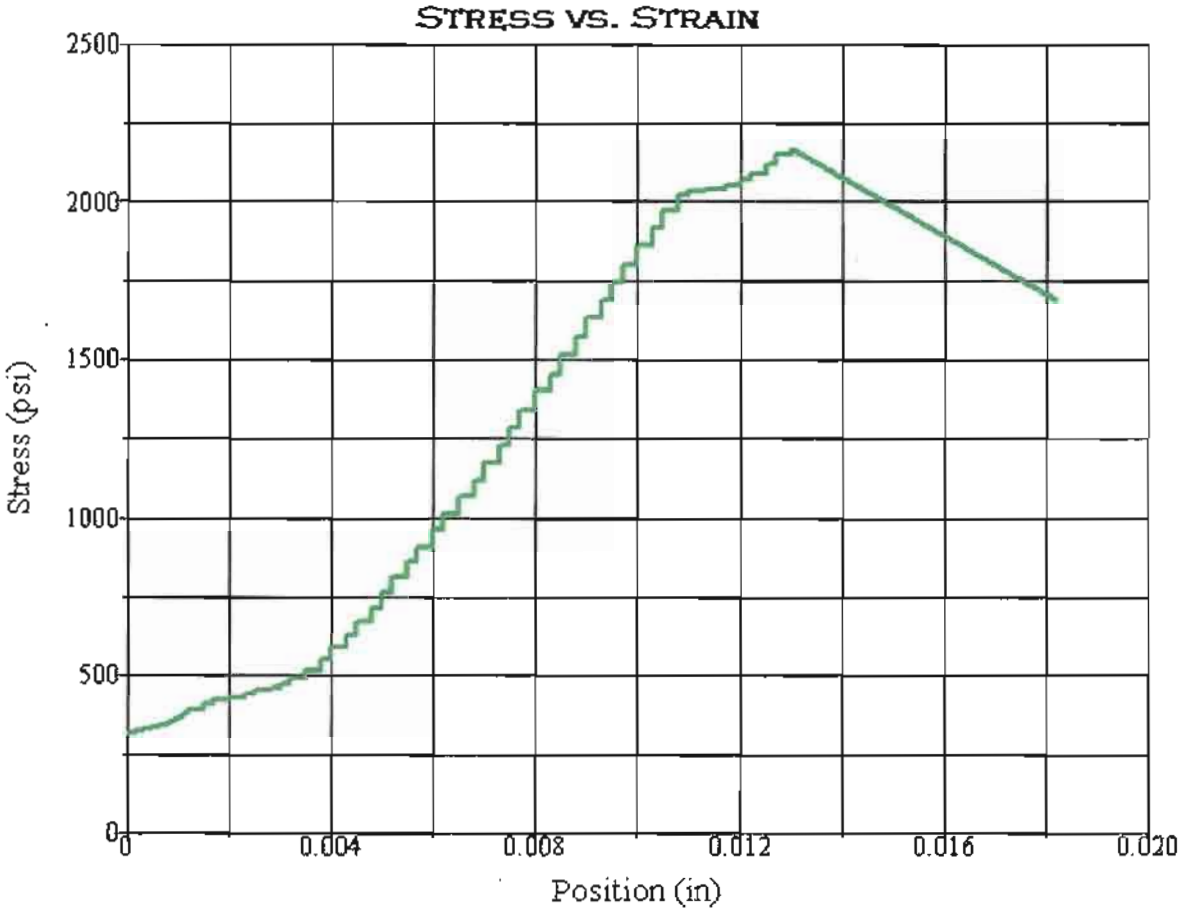


Test Summary

Counter:	1508
Elapsed Time:	00:03:29
Operator:	AZM
Sample:	R11-012-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:10:30 PM
End Date:	8/31/2011
End Time:	8:13:59 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-298

Test Results

Specimen Gage Length:	5.0600 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	34072 lbf
Compressive Strength:	7532 psi

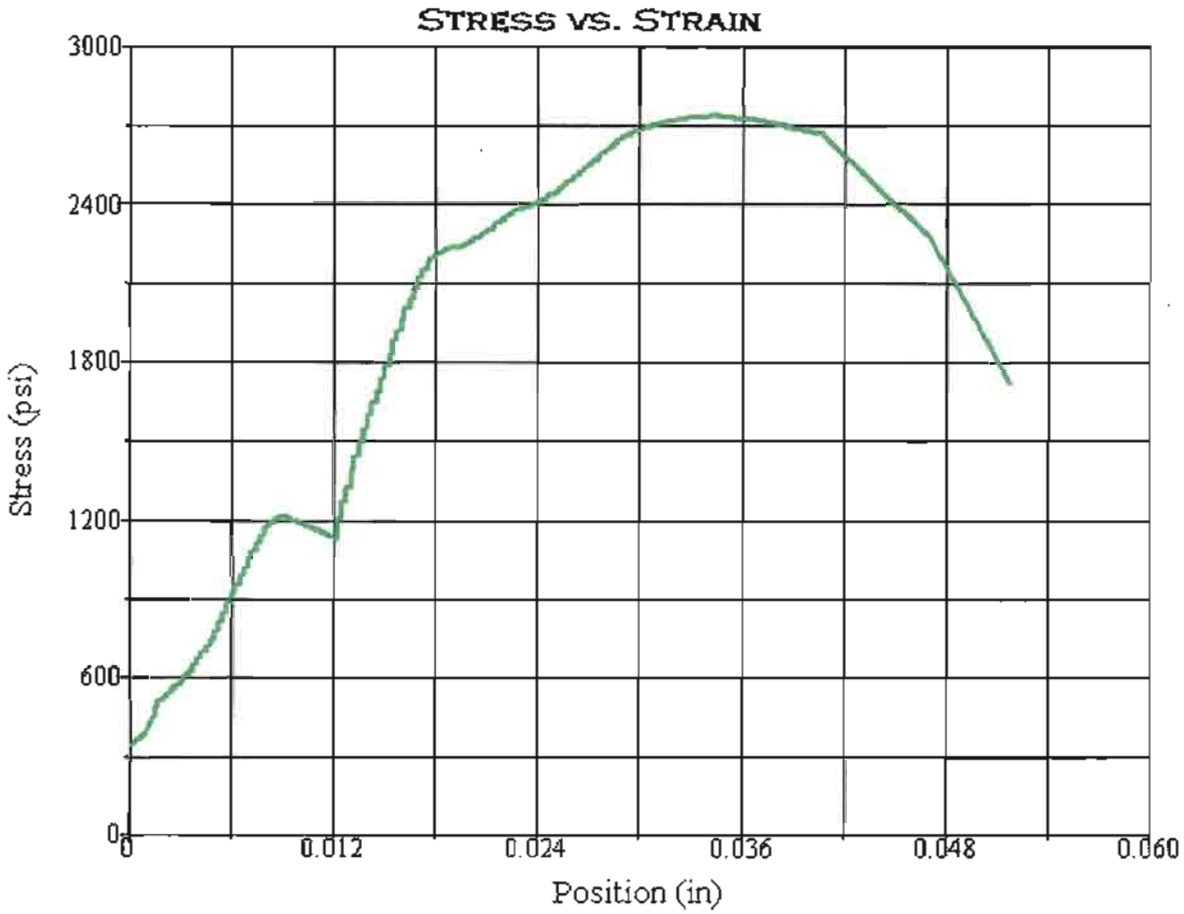


Test Summary

Counter:	1509
Elapsed Time:	00:00:51
Operator:	AZM
Sample:	R11-013-04
Resident Engineer:	
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:19:11 PM
End Date:	8/31/2011
End Time:	8:20:02 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-299

Test Results

Specimen Gage Length:	3.8200 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	5960 lbf
Compressive Strength:	2170 psi

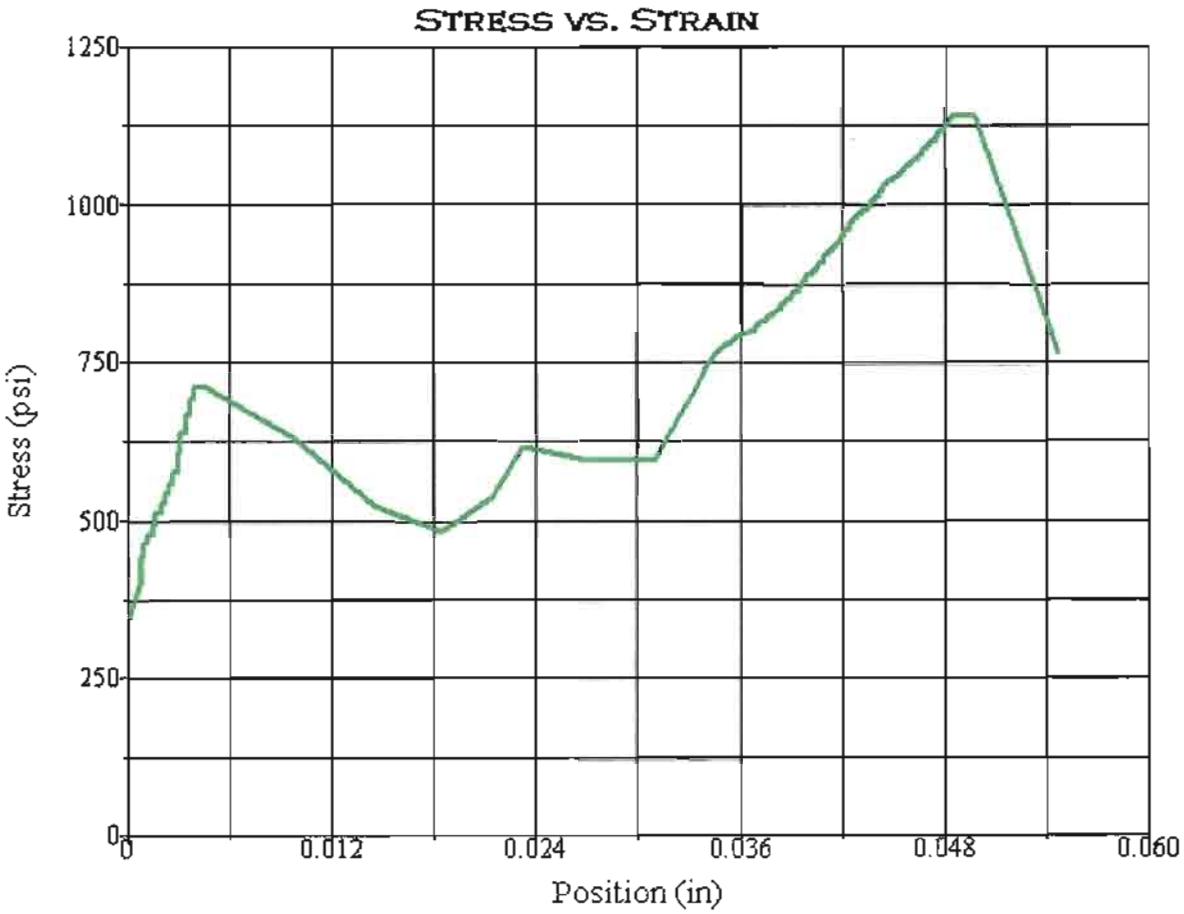


Test Summary

Counter:	1510
Elapsed Time:	00:01:06
Operator:	AZM
Sample:	R11-013-07
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:24:09 PM
End Date:	8/31/2011
End Time:	8:25:15 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-301

Test Results

Specimen Gage Length:	4.4000 in
Diameter:	1.8800 in
Area:	2.7759 in²
Maximum Load:	7594 lbf
Compressive Strength:	2736 psi

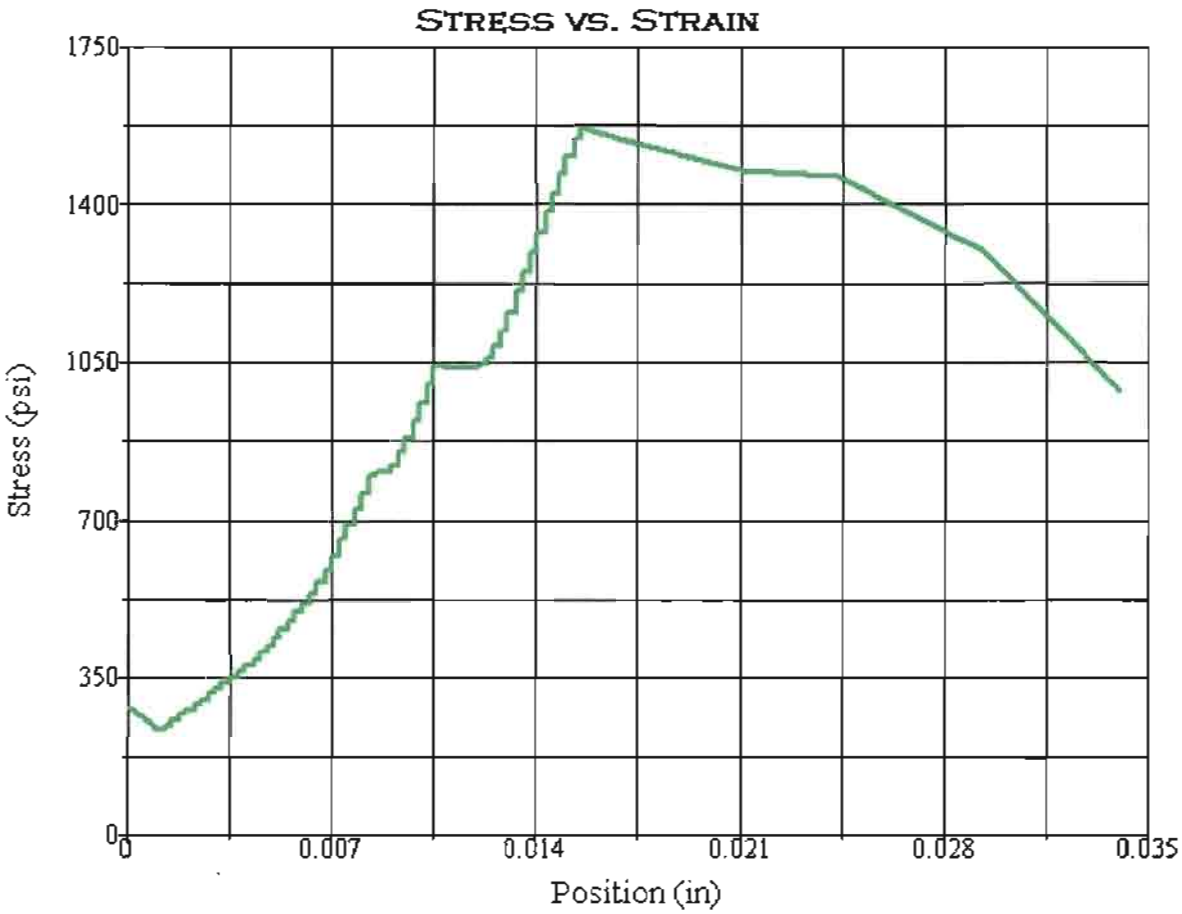


Test Summary

Counter:	1511
Elapsed Time:	00:00:21
Operator:	AZM
Sample:	R11-013-09
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	8/31/2011
Start Time:	8:29:20 PM
End Date:	8/31/2011
End Time:	8:29:41 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-302

Test Results

Specimen Gage Length:	4.4300 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	3136 lbf
Compressive Strength:	1142 psi

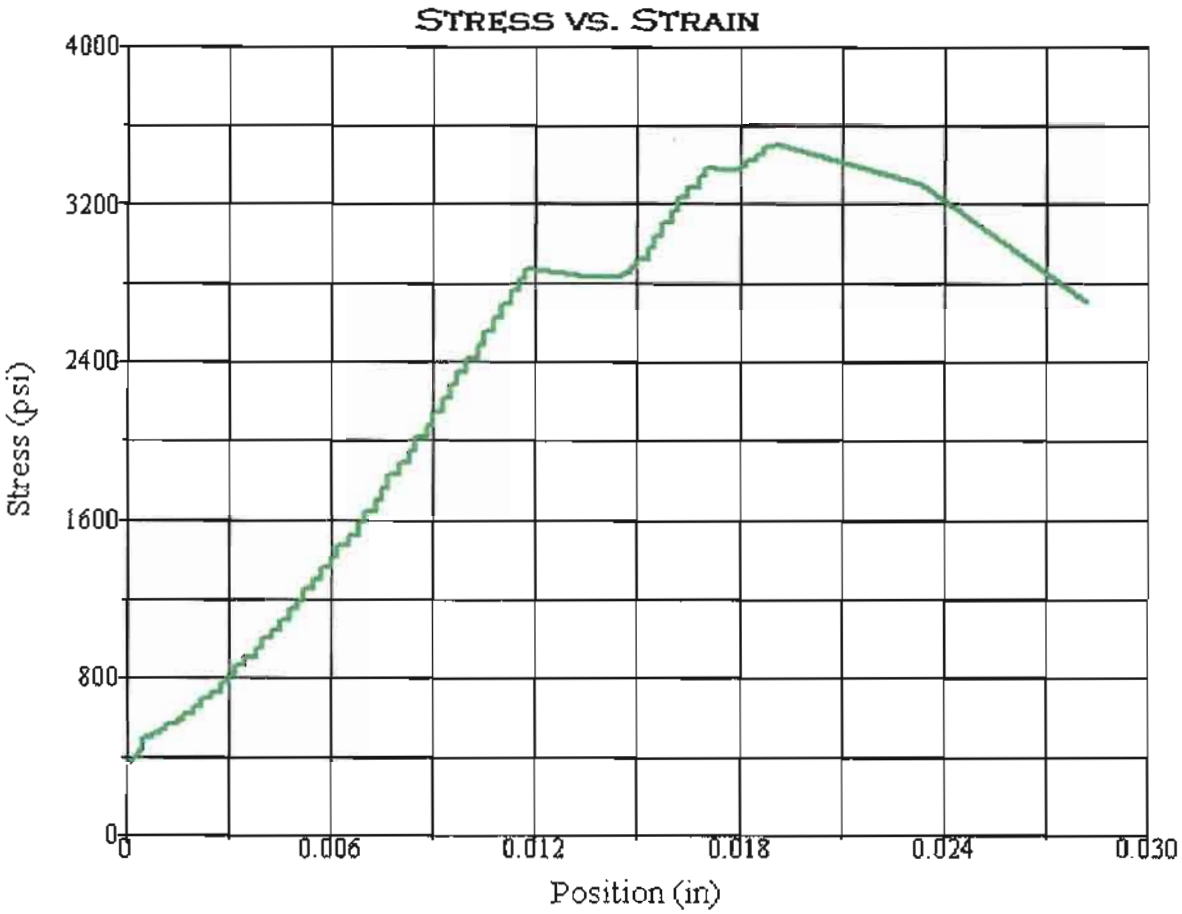


Test Summary

Counter:	1512
Elapsed Time:	00:00:40
Operator:	AZM
Sample:	R11-013-11
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:11:27 PM
End Date:	9/1/2011
End Time:	3:12:07 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-303

Test Results

Specimen Gage Length:	3.8000 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	4312 lbf
Compressive Strength:	1570 psi

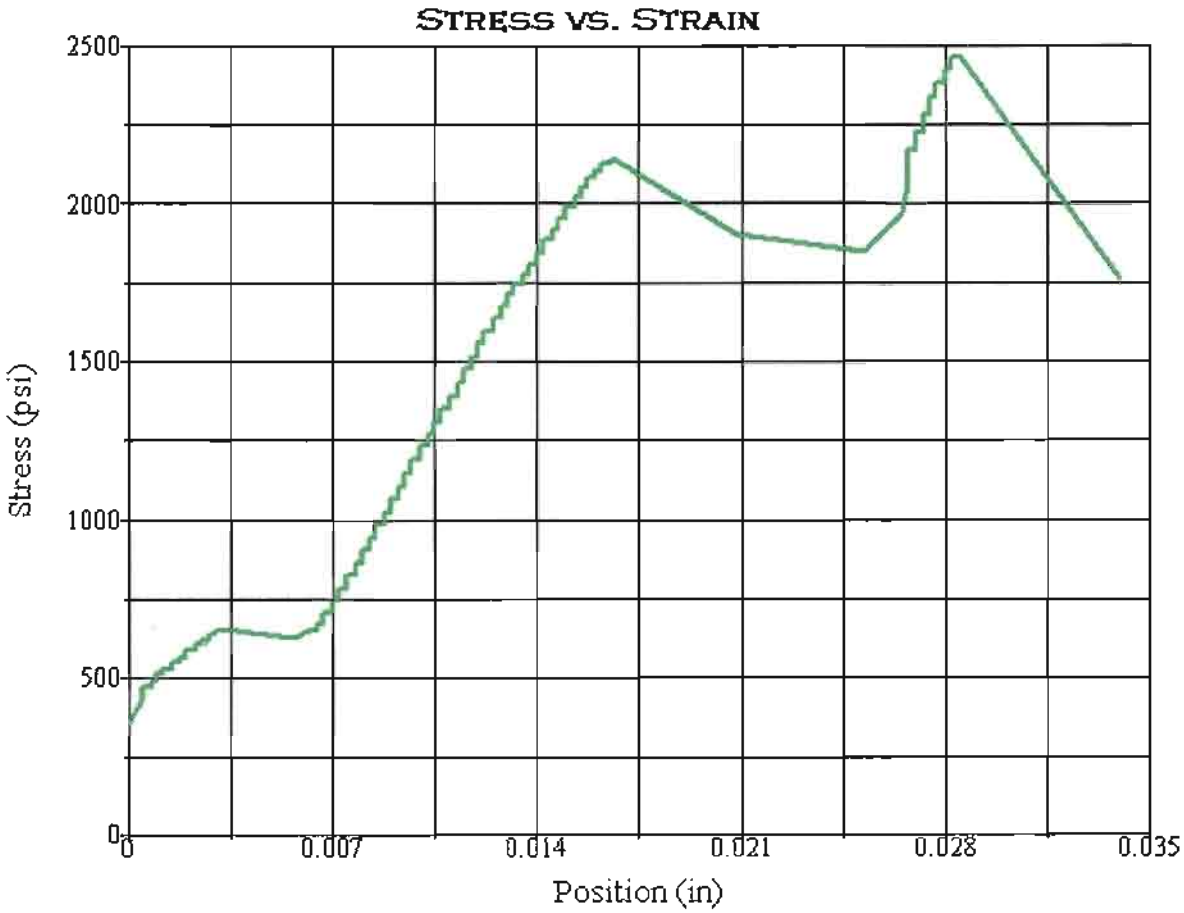


Test Summary

Counter:	1513
Elapsed Time:	00:01:28
Operator:	AZM
Sample:	R11-013-12
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:18:37 PM
End Date:	9/1/2011
End Time:	3:20:05 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-304

Test Results

Specimen Gage Length:	4.5300 in
Diameter:	1.8600 in
Area:	2.7172 in²
Maximum Load:	9521 lbf
Compressive Strength:	3504 psi

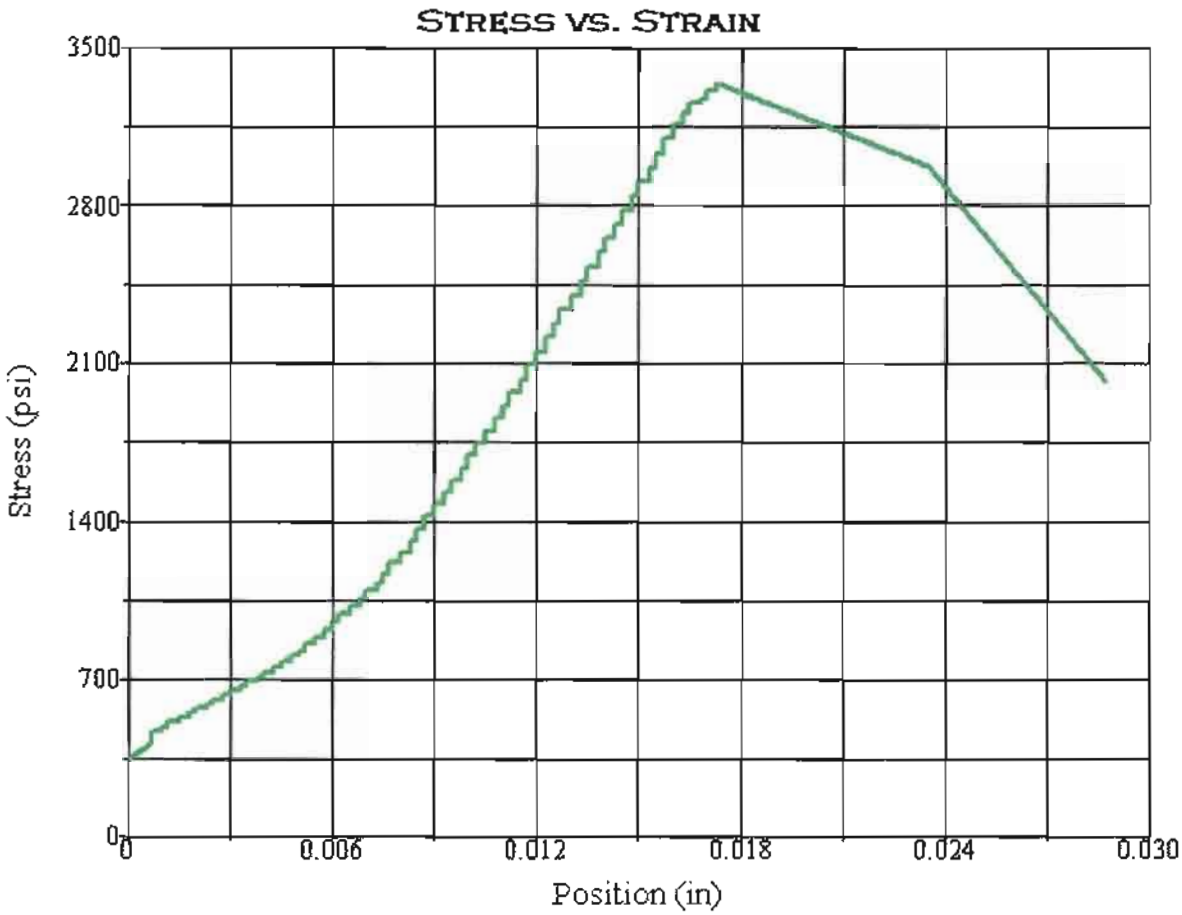


Test Summary

Counter:	1514
Elapsed Time:	00:00:58
Operator:	AMZ
Sample:	R11-013-13
Resident Engineer:	
Ticket:	GL # 11- 067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:27:02 PM
End Date:	9/1/2011
End Time:	3:28:00 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-305

Test Results

Specimen Gage Length:	4.4400 in
Diameter:	1.8800 in
Area:	2.7759 in²
Maximum Load:	6846 lbf
Compressive Strength:	2466 psi

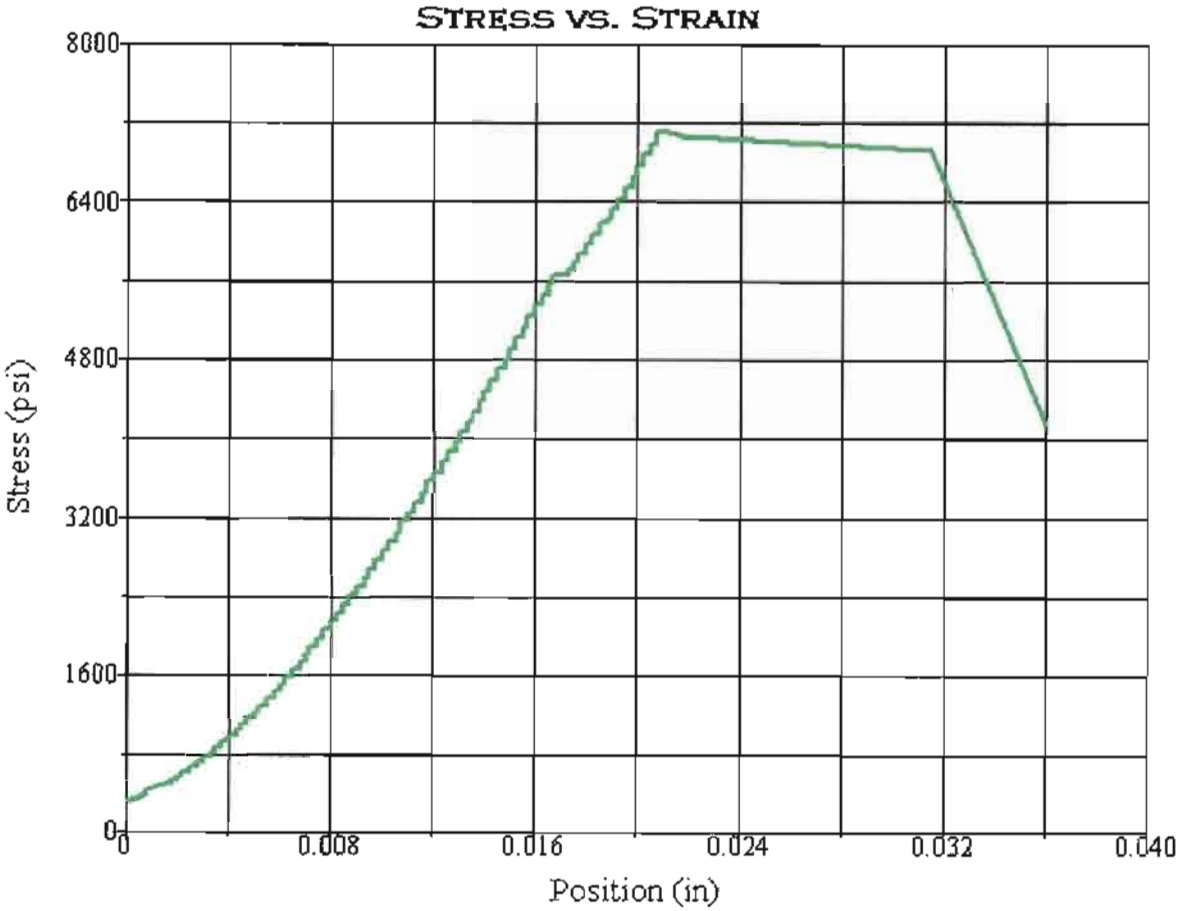


Test Summary

Counter:	1515
Elapsed Time:	00:01:23
Operator:	AZM
Sample:	R11-013-14
Resident Engineer:	
Ticket:	GL # 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/1/2011
Start Time:	3:37:58 PM
End Date:	9/1/2011
End Time:	3:39:21 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-306

Test Results

Specimen Gage Length:	3.9700 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	9180 lbf
Compressive Strength:	3342 psi

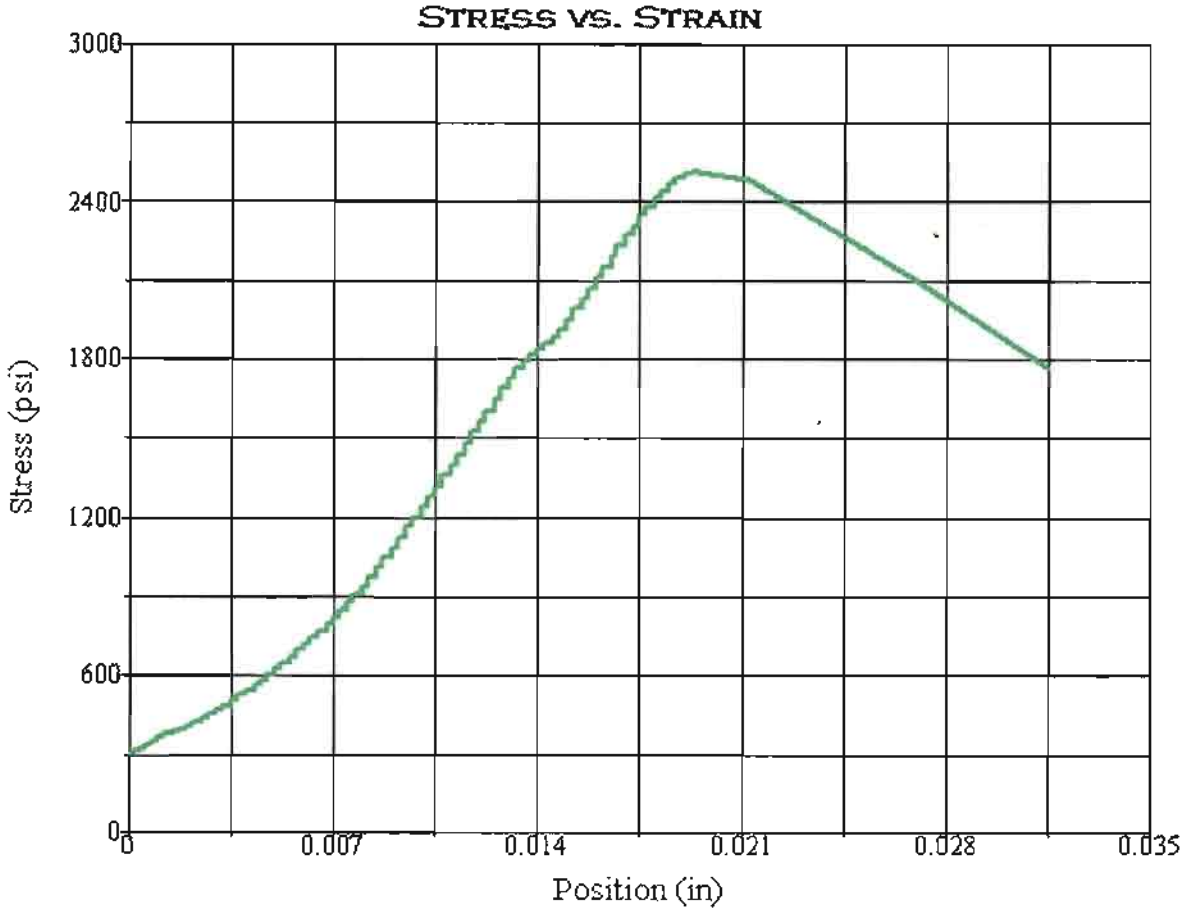


Test Summary

Counter:	1516
Elapsed Time:	00:03:13
Operator:	KS
Sample:	R11-013-16
Resident Engineer:	55-55.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	07-181604
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:25:04 PM
End Date:	9/8/2011
End Time:	2:28:17 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-307

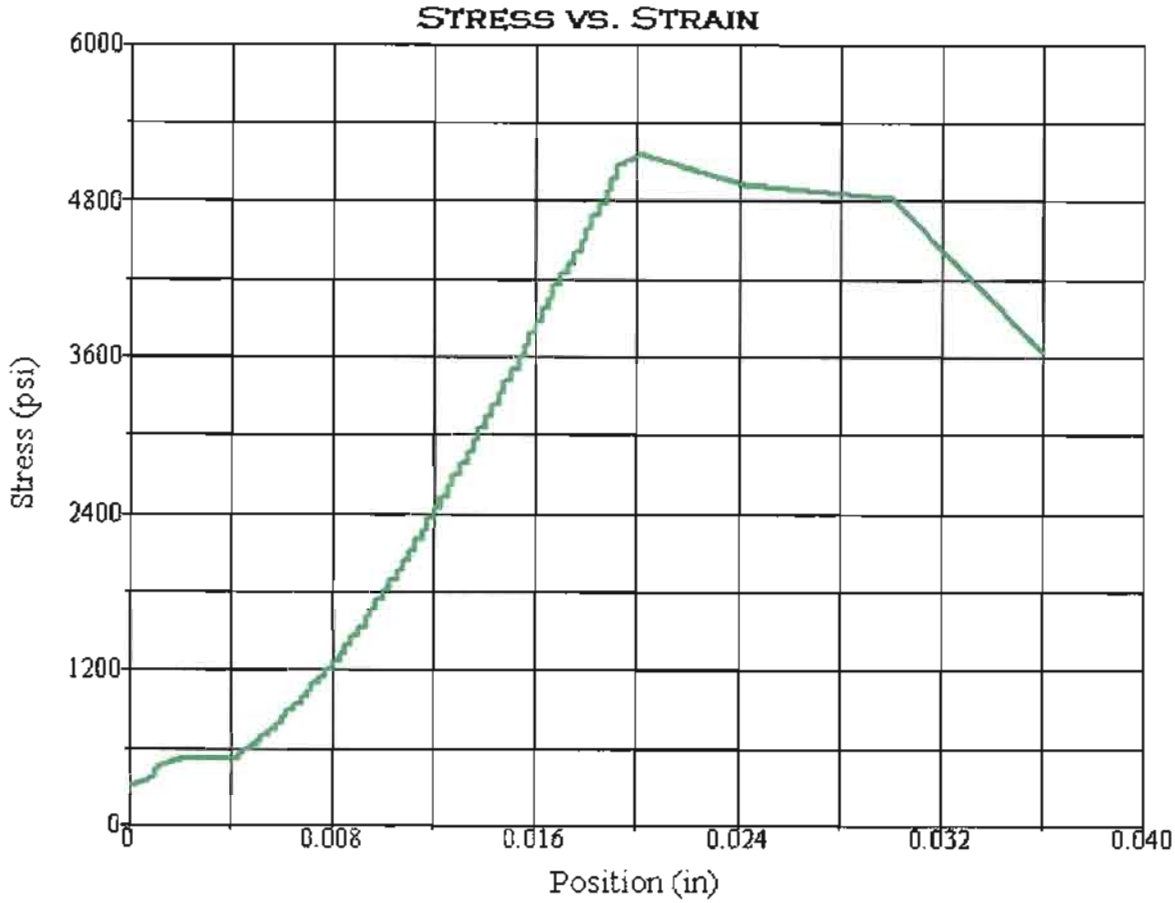
Test Results

Specimen Gage Length:	4.4500 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	19548 lbf
Compressive Strength:	7117 psi



Test Summary	
Counter:	1517
Elapsed Time:	00:01:02
Operator:	KS
Sample:	R11-013-17
Resident Engineer:	61-61.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:37:35 PM
End Date:	9/8/2011
End Time:	2:38:37 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-308

Test Results	
Specimen Gage Length:	4.4800 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	6904 lbf
Compressive Strength:	2514 psi

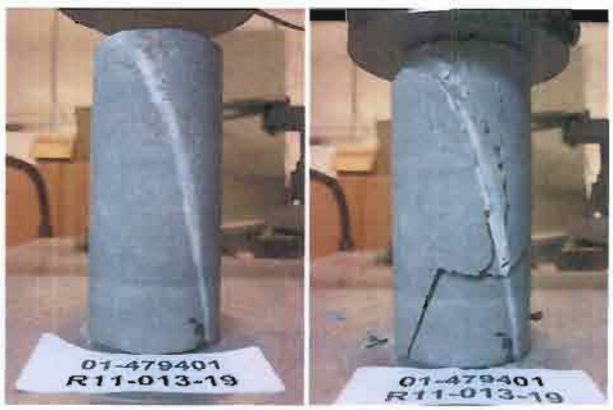


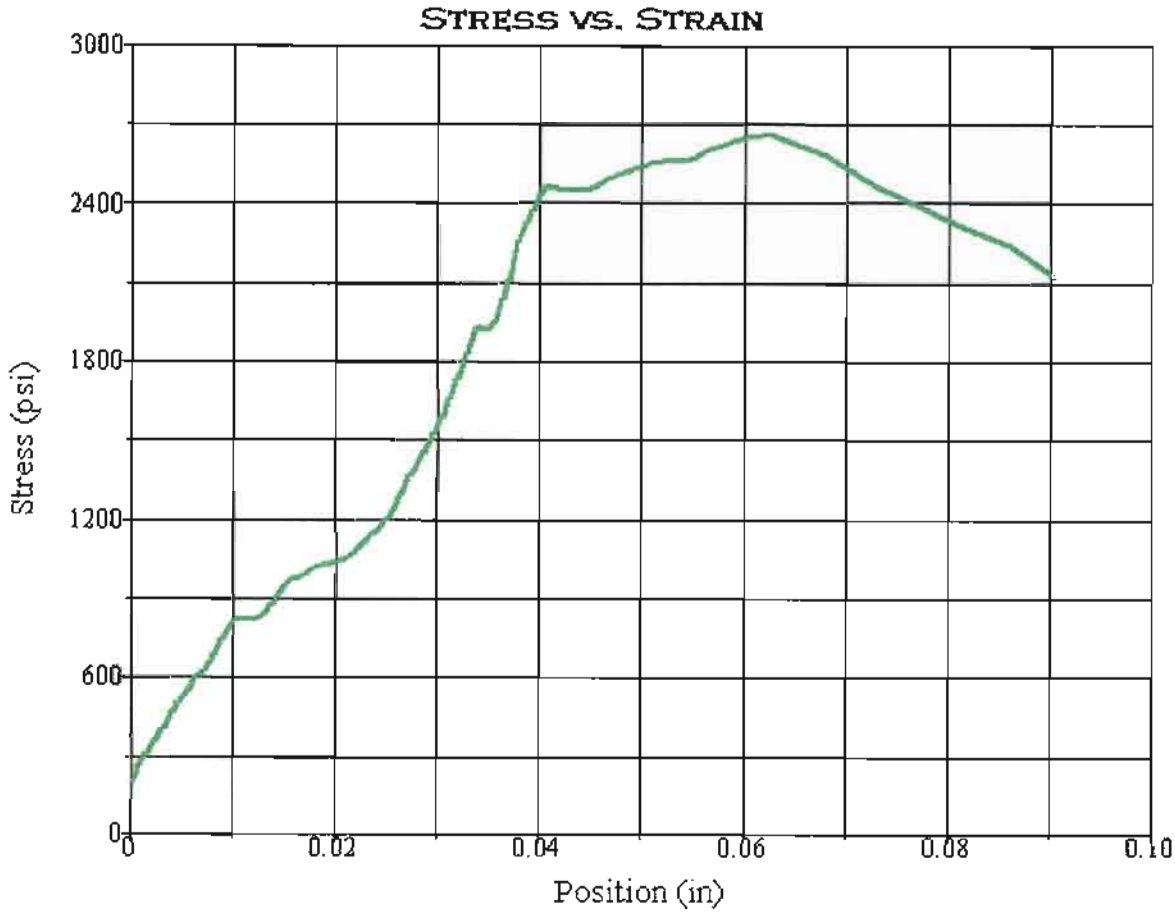
Test Summary

Counter:	1518
Elapsed Time:	00:02:16
Operator:	KS
Sample:	R11-013-19
Resident Engineer:	69.5-70'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:43:07 PM
End Date:	9/8/2011
End Time:	2:45:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-309

Test Results

Specimen Gage Length:	4.0200 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	14154 lbf
Compressive Strength:	5153 psi





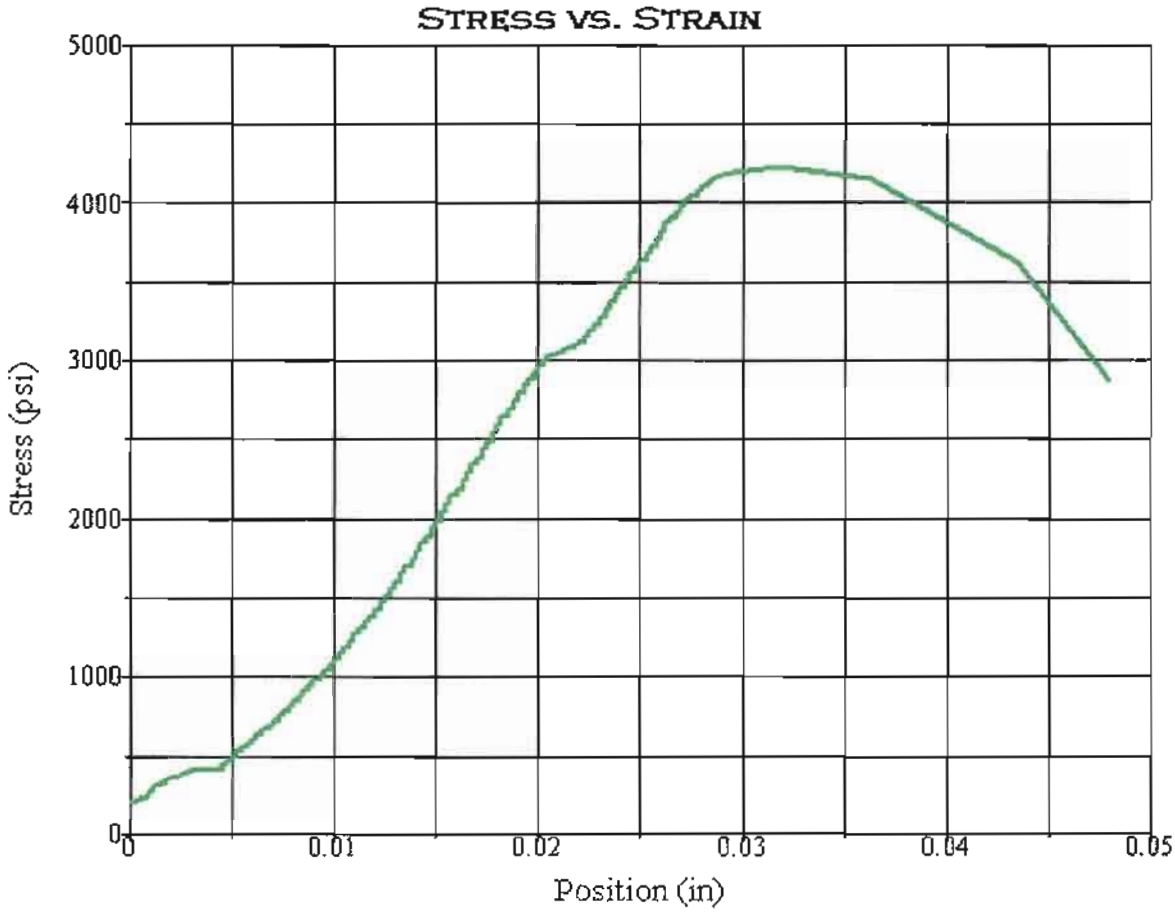
Test Summary

Counter:	1519
Elapsed Time:	00:01:10
Operator:	KS
Sample:	R11-014-08
Resident Engineer:	20.3-20.6'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:53:14 PM
End Date:	9/8/2011
End Time:	2:54:24 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-310

RATIO: L/D<2

Test Results

Specimen Gage Length:	2.7200 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	11805 lbf
Compressive Strength:	2654 psi



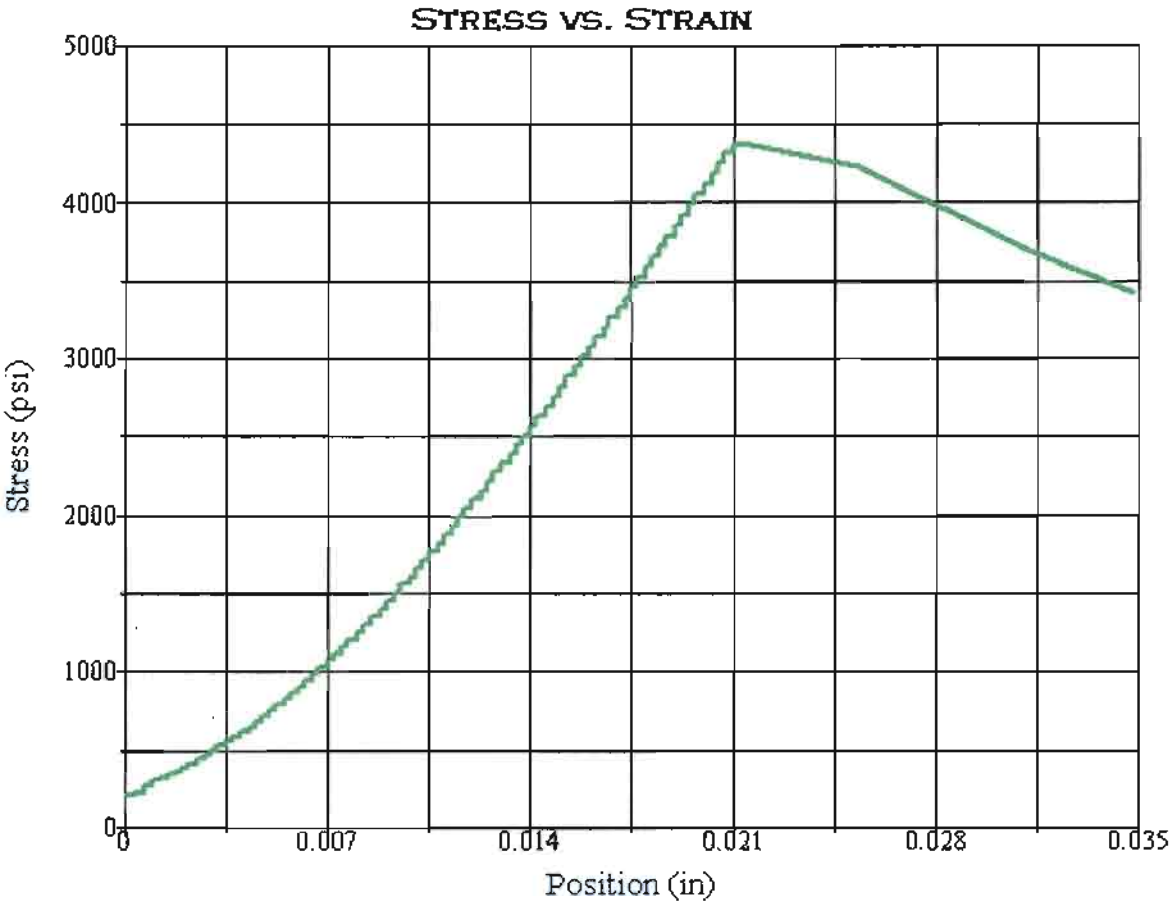
Test Summary

Counter:	1520
Elapsed Time:	00:01:53
Operator:	KS
Sample:	R11-014-09
Resident Engineer:	25-26'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	2:58:49 PM
End Date:	9/8/2011
End Time:	3:00:42 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-311

RATIO: L/D<2

Test Results

Specimen Gage Length:	4.3500 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	18734 lbf
Compressive Strength:	4211 psi



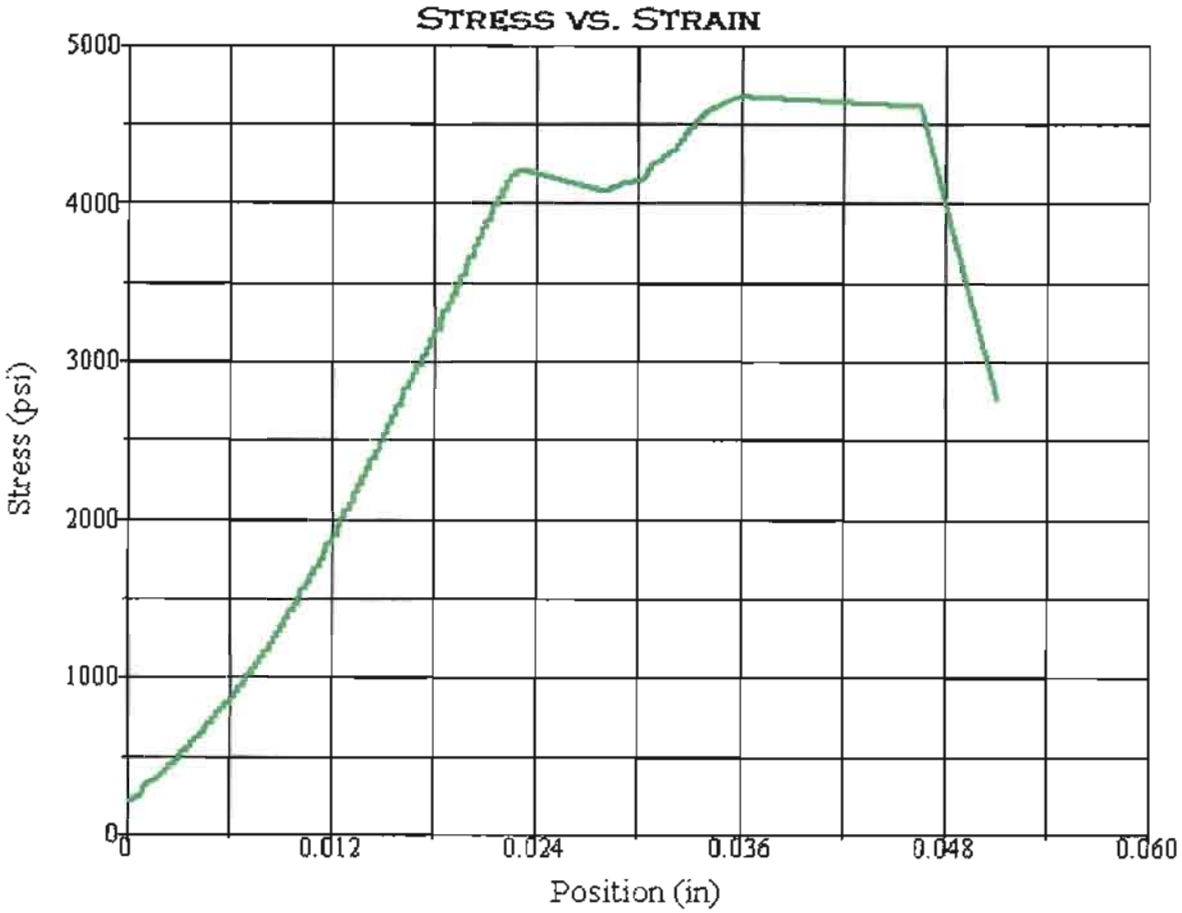
Test Summary

Counter:	1521
Elapsed Time:	00:01:58
Operator:	KS
Sample:	R11-014-12
Resident Engineer:	43-43.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:05:29 PM
End Date:	9/8/2011
End Time:	3:07:27 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-313

RATIO: L/D<2

Test Results

Specimen Gage Length:	4.3800 in
Diameter:	2.3800 in
Area:	4.4488 in²
Maximum Load:	19442 lbf
Compressive Strength:	4370 psi

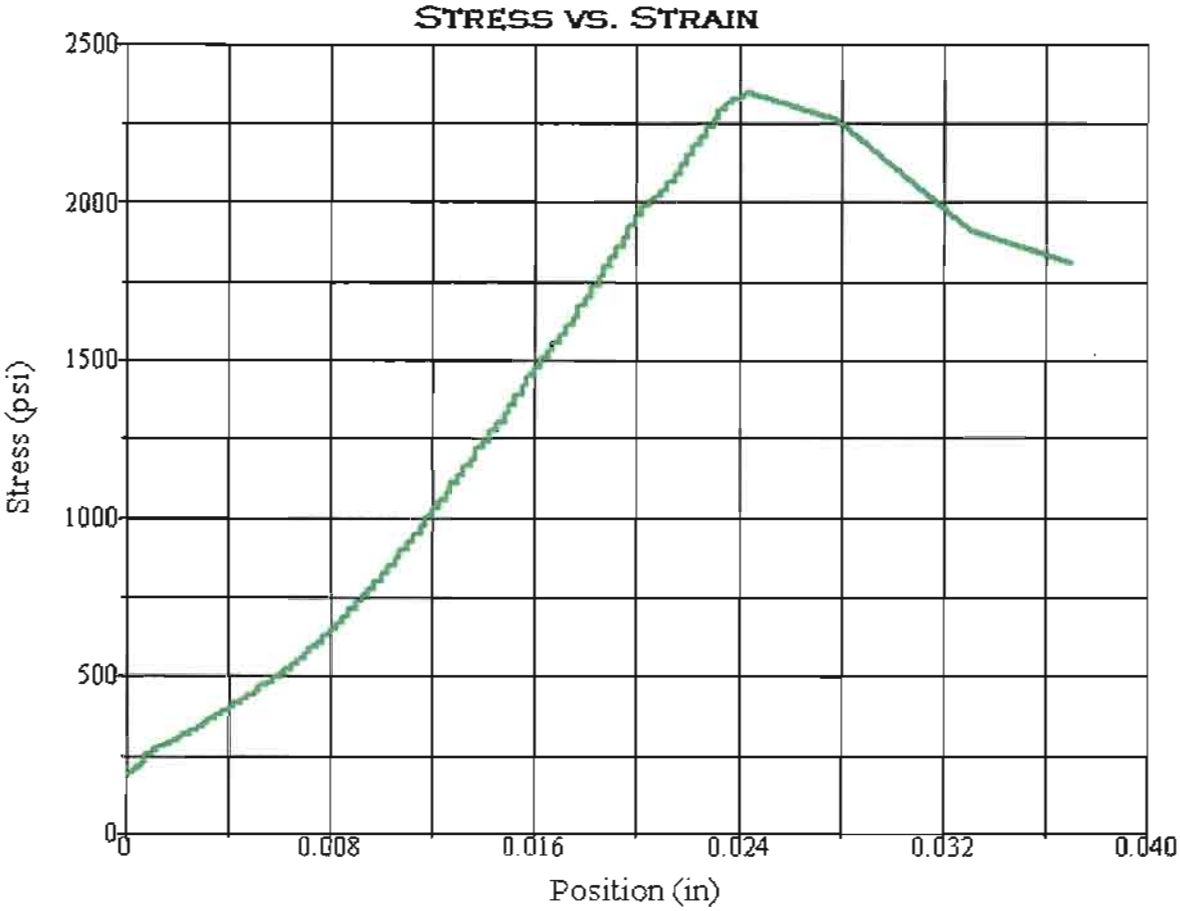


Test Summary

Counter:	1522
Elapsed Time:	00:02:05
Operator:	KS
Sample:	R11-014-13
Resident Engineer:	46.5-47.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:10:21 PM
End Date:	9/8/2011
End Time:	3:12:26 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-314

Test Results

Specimen Gage Length:	5.5800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	21160 lbf
Compressive Strength:	4677 psi

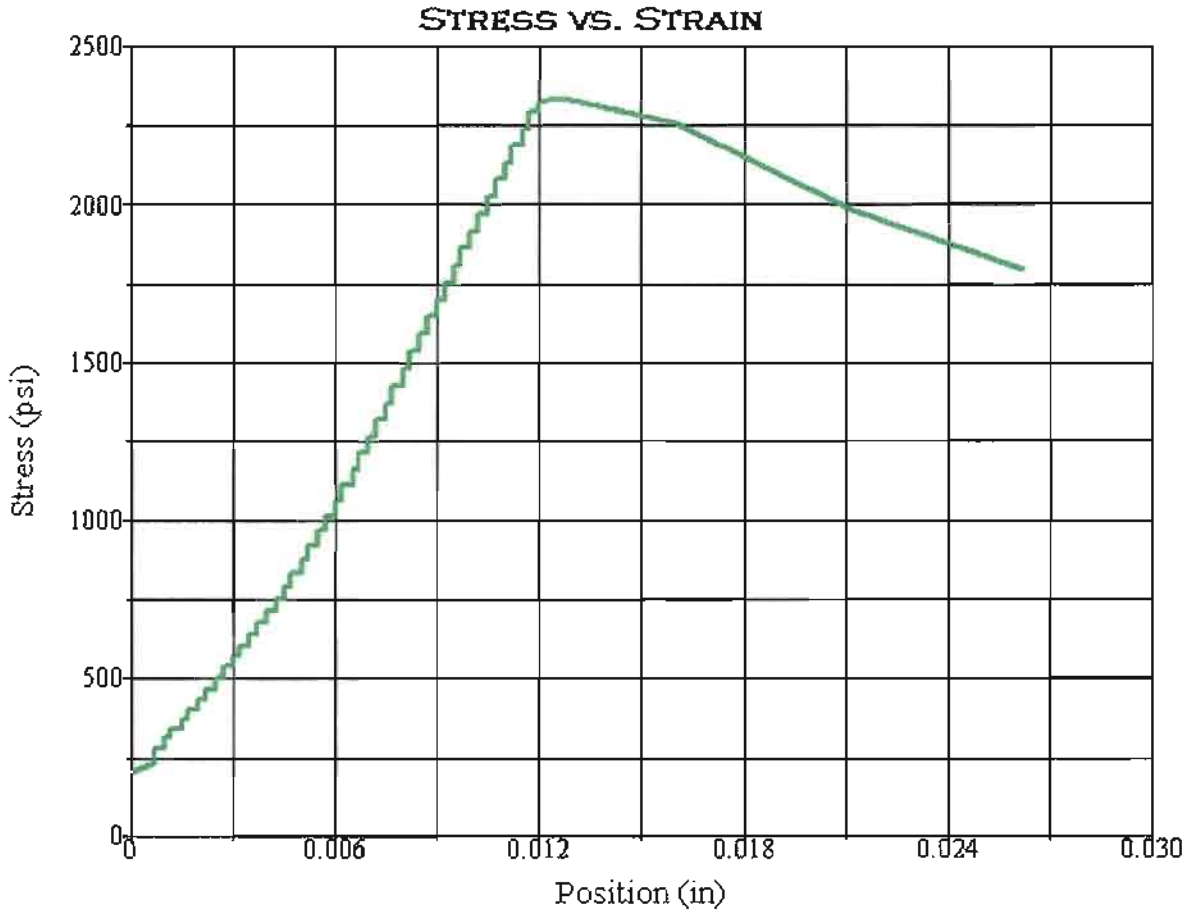


Test Summary

Counter:	1523
Elapsed Time:	00:01:01
Operator:	KS
Sample:	R11-014-15
Resident Engineer:	55-55.8'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:16:14 PM
End Date:	9/8/2011
End Time:	3:17:15 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-315

Test Results

Specimen Gage Length:	5.4700 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10596 lbf
Compressive Strength:	2342 psi

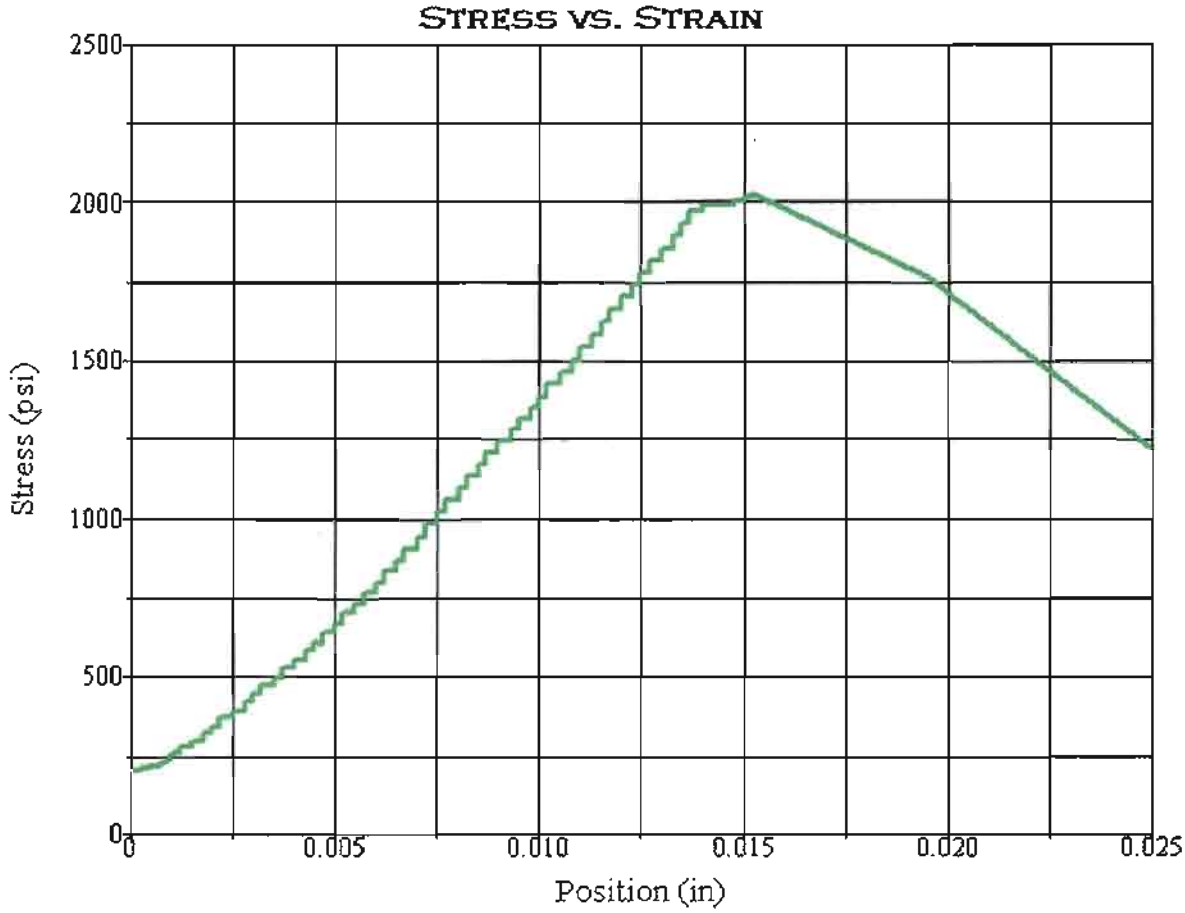


Test Summary

Counter:	1524
Elapsed Time:	00:01:00
Operator:	KS
Sample:	R11-014-15A
Resident Engineer:	57-57.8'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:20:45 PM
End Date:	9/8/2011
End Time:	3:21:45 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-316

Test Results

Specimen Gage Length:	5.5800 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10562 lbf
Compressive Strength:	2335 psi

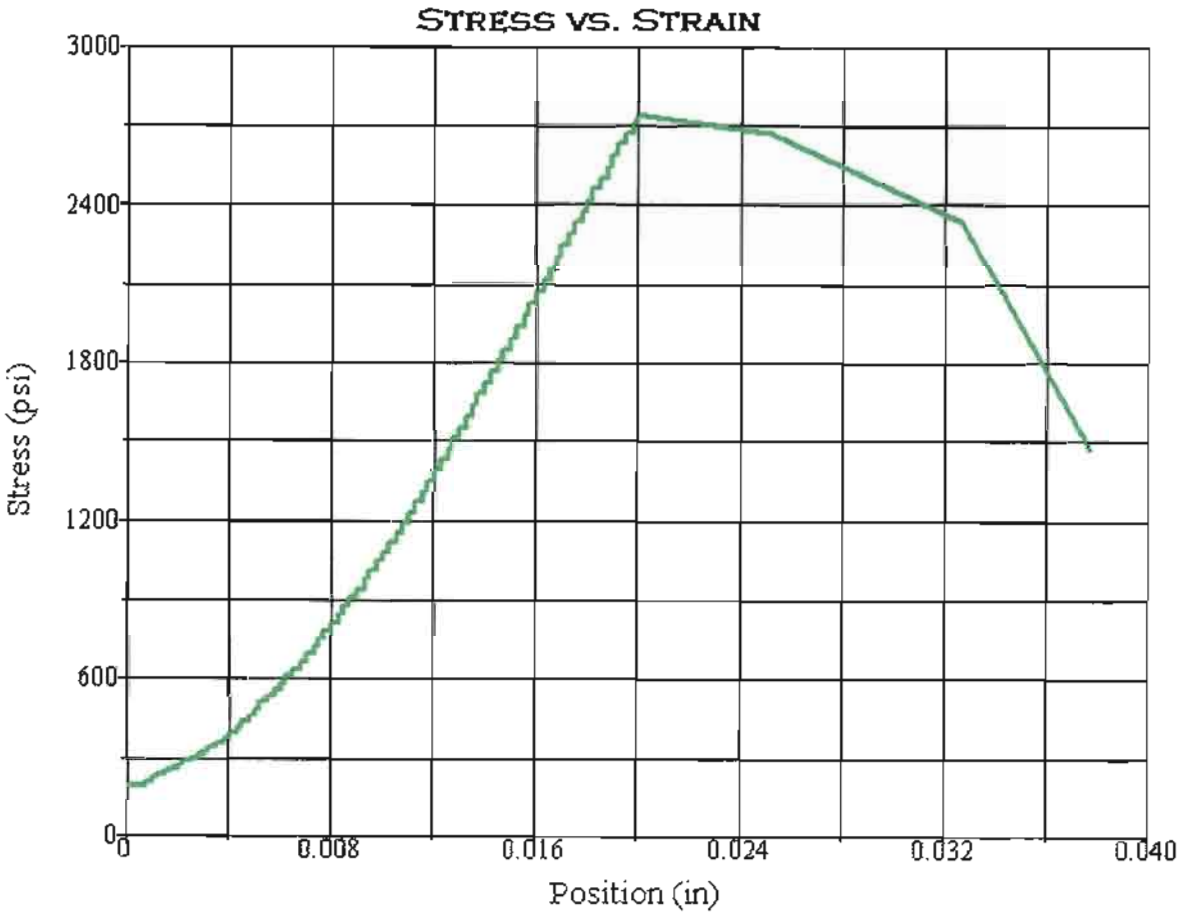


Test Summary

Counter:	1525
Elapsed Time:	00:00:51
Operator:	KS
Sample:	R11-014-16
Resident Engineer:	61.5-62'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:25:17 PM
End Date:	9/8/2011
End Time:	3:26:08 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-317

Test Results

Specimen Gage Length:	5.5200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	9157 lbf
Compressive Strength:	2024 psi

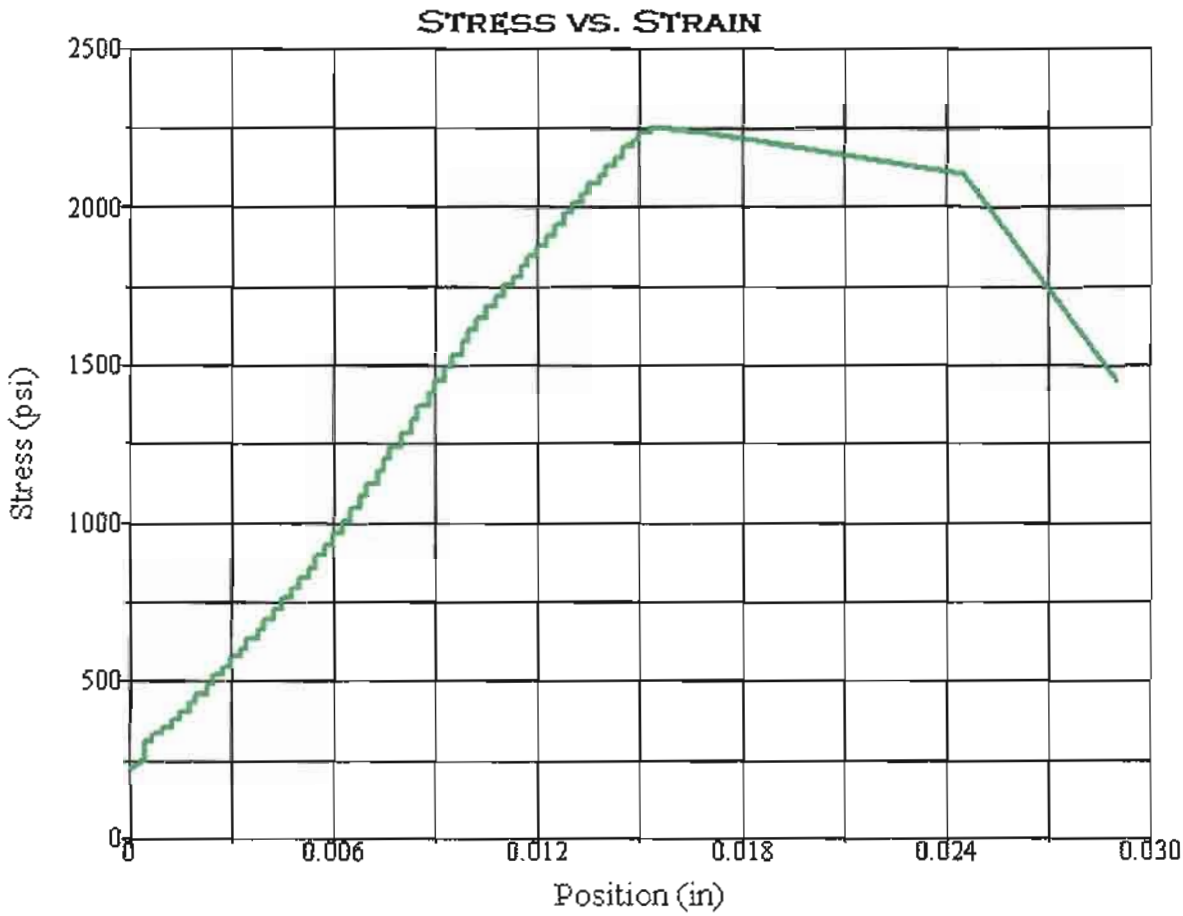


Test Summary

Counter:	1526
Elapsed Time:	00:01:13
Operator:	KS
Sample:	R11-014-17
Resident Engineer:	66-66.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:29:04 PM
End Date:	9/8/2011
End Time:	3:30:17 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-318

Test Results

Specimen Gage Length:	5.5900 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	12281 lbf
Compressive Strength:	2737 psi

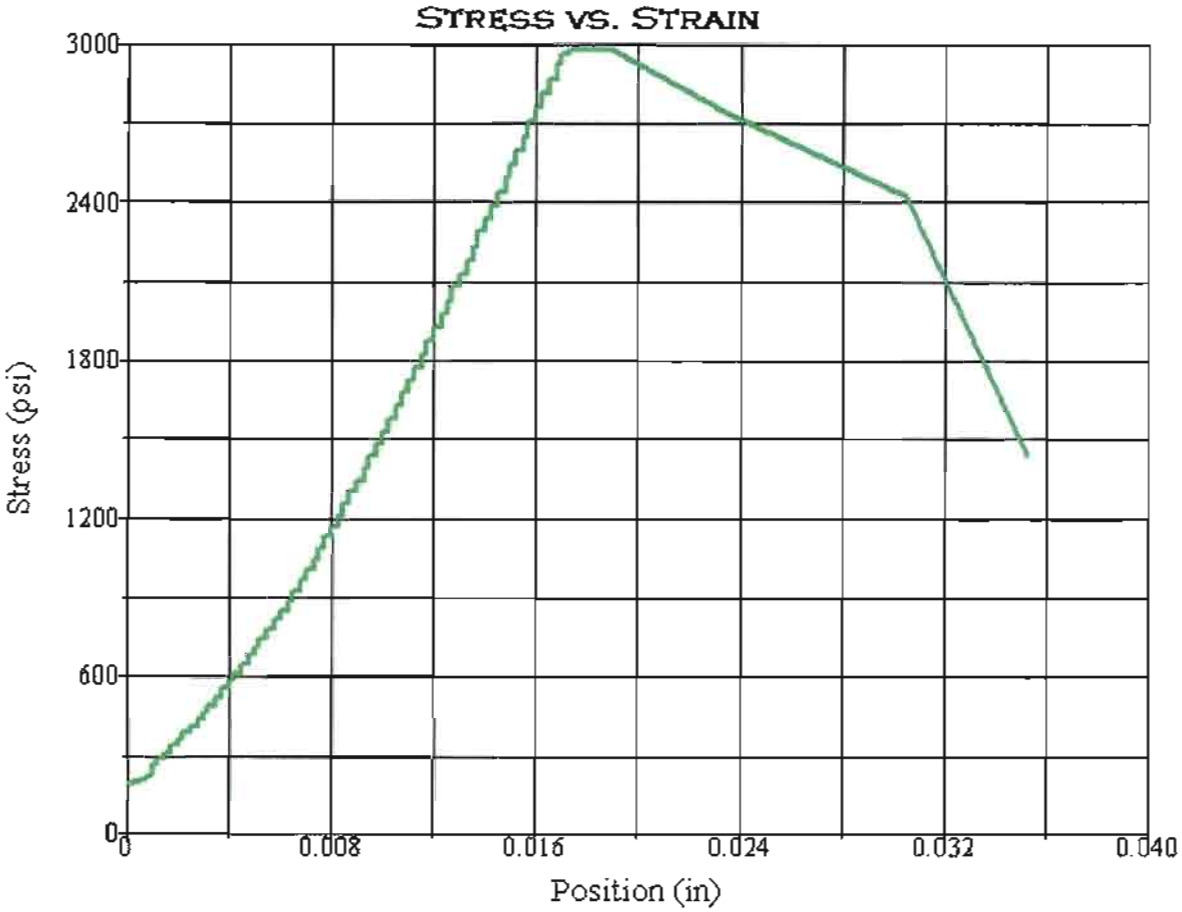


Test Summary

Counter:	1527
Elapsed Time:	00:00:56
Operator:	KS
Sample:	R11-014-17A
Resident Engineer:	68.9-70.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:33:35 PM
End Date:	9/8/2011
End Time:	3:34:31 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-319

Test Results

Specimen Gage Length:	5.4200 in
Diameter:	2.4000 in
Area:	4.5239 in²
Maximum Load:	10193 lbf
Compressive Strength:	2253 psi



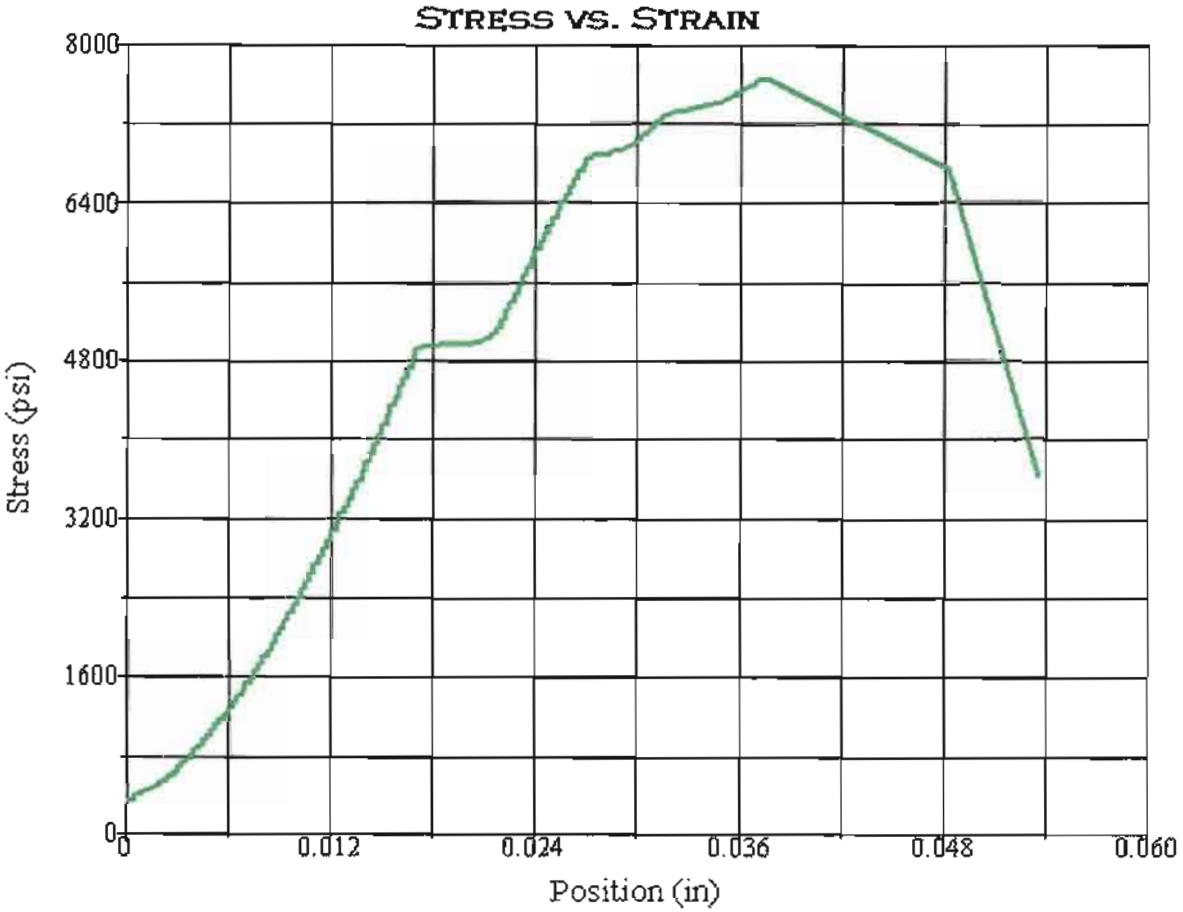
Test Summary

Counter:	1528
Elapsed Time:	00:01:19
Operator:	KS
Sample:	R11-014-19
Resident Engineer:	76-76.5'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:37:18 PM
End Date:	9/8/2011
End Time:	3:38:37 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-320

L/D 2.2

Test Results

Specimen Gage Length:	4.4300 in
Diameter:	2.3900 in
Area:	4.4863 in²
Maximum Load:	13362 lbf
Compressive Strength:	2978 psi

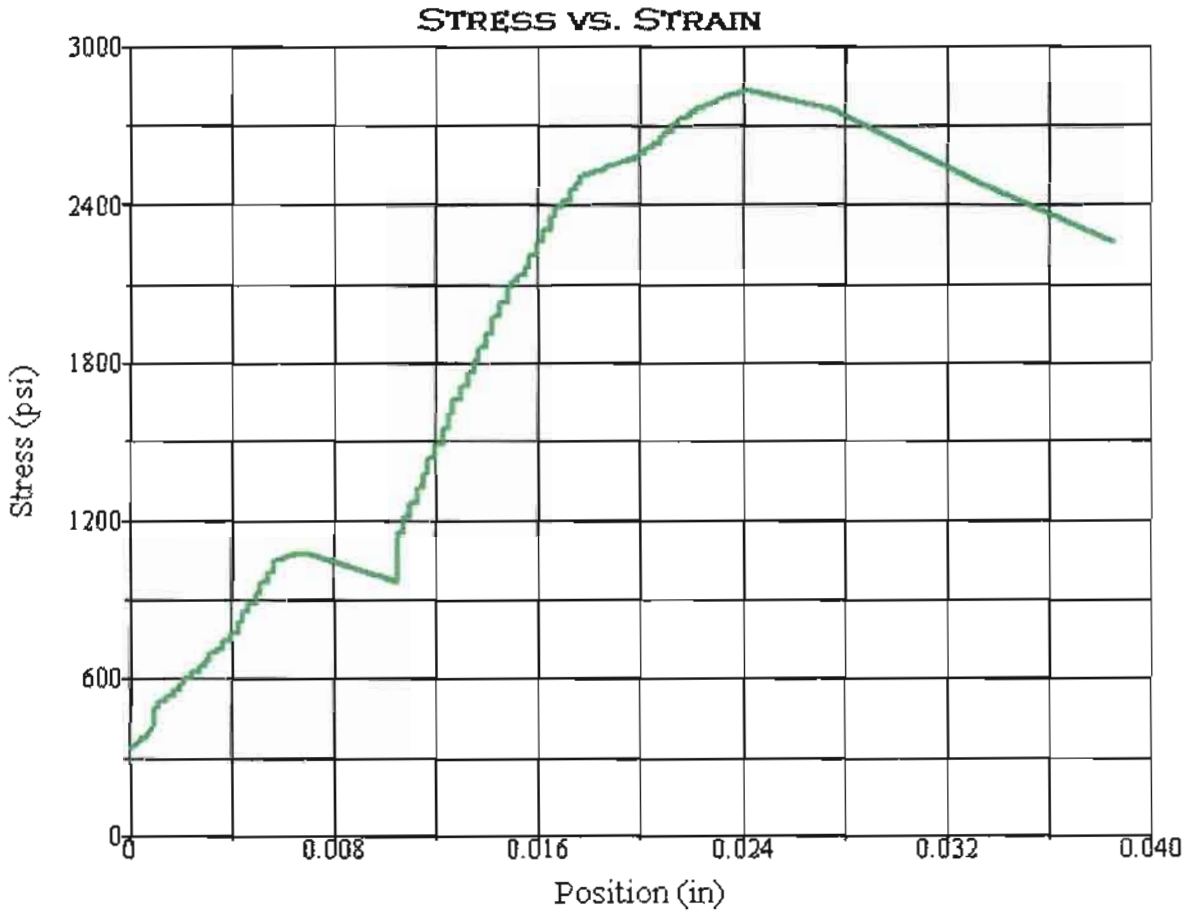


Test Summary

Counter:	1529
Elapsed Time:	00:03:29
Operator:	KS
Sample:	R11-015-05
Resident Engineer:	18.8-19.9'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:42:43 PM
End Date:	9/8/2011
End Time:	3:46:12 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-323

Test Results

Specimen Gage Length:	4.5400 in
Diameter:	1.8800 in
Area:	2.7759 in²
Maximum Load:	21241 lbf
Compressive Strength:	7652 psi



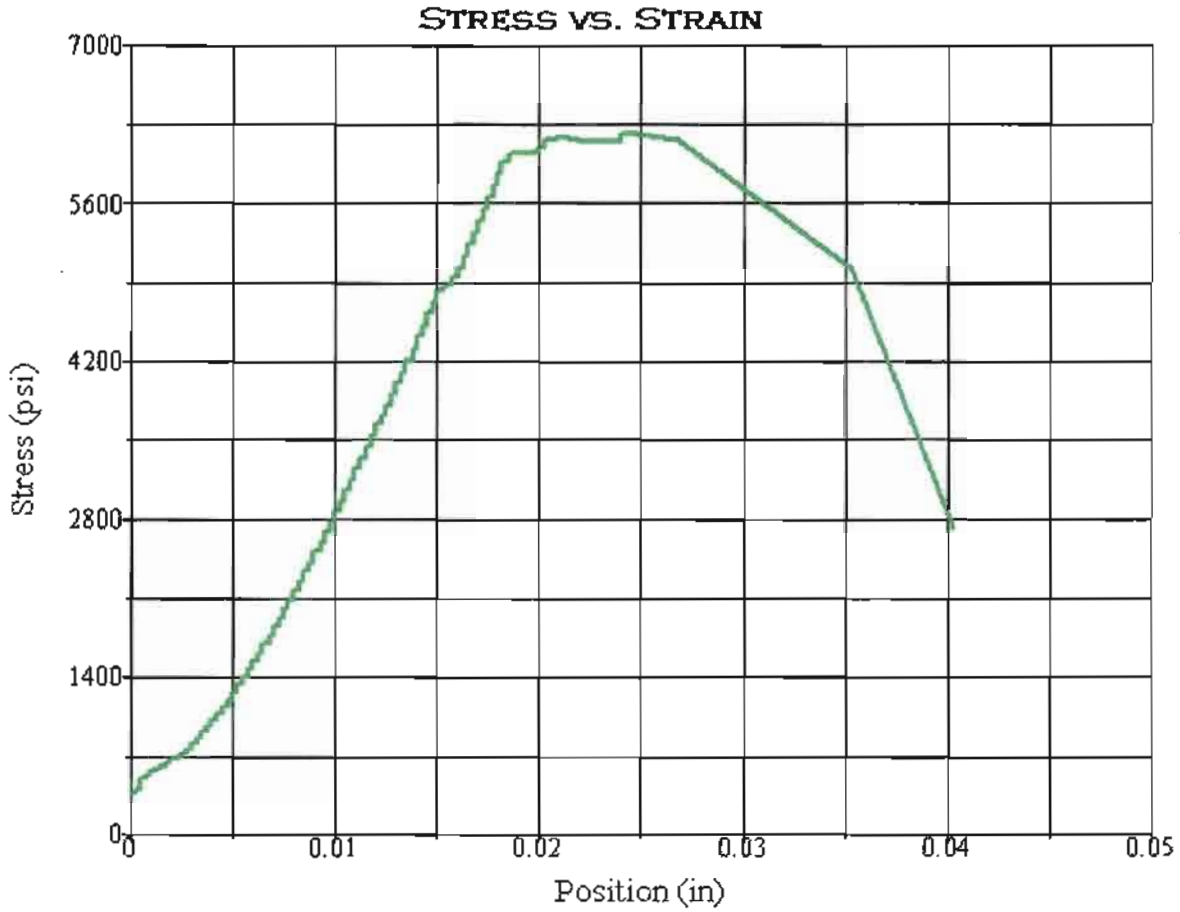
Test Summary

Counter:	1530
Elapsed Time:	00:01:09
Operator:	KS
Sample:	R11-015-06
Resident Engineer:	21-21.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:50:22 PM
End Date:	9/8/2011
End Time:	3:51:31 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-324

RATIO: L/D<2

Test Results

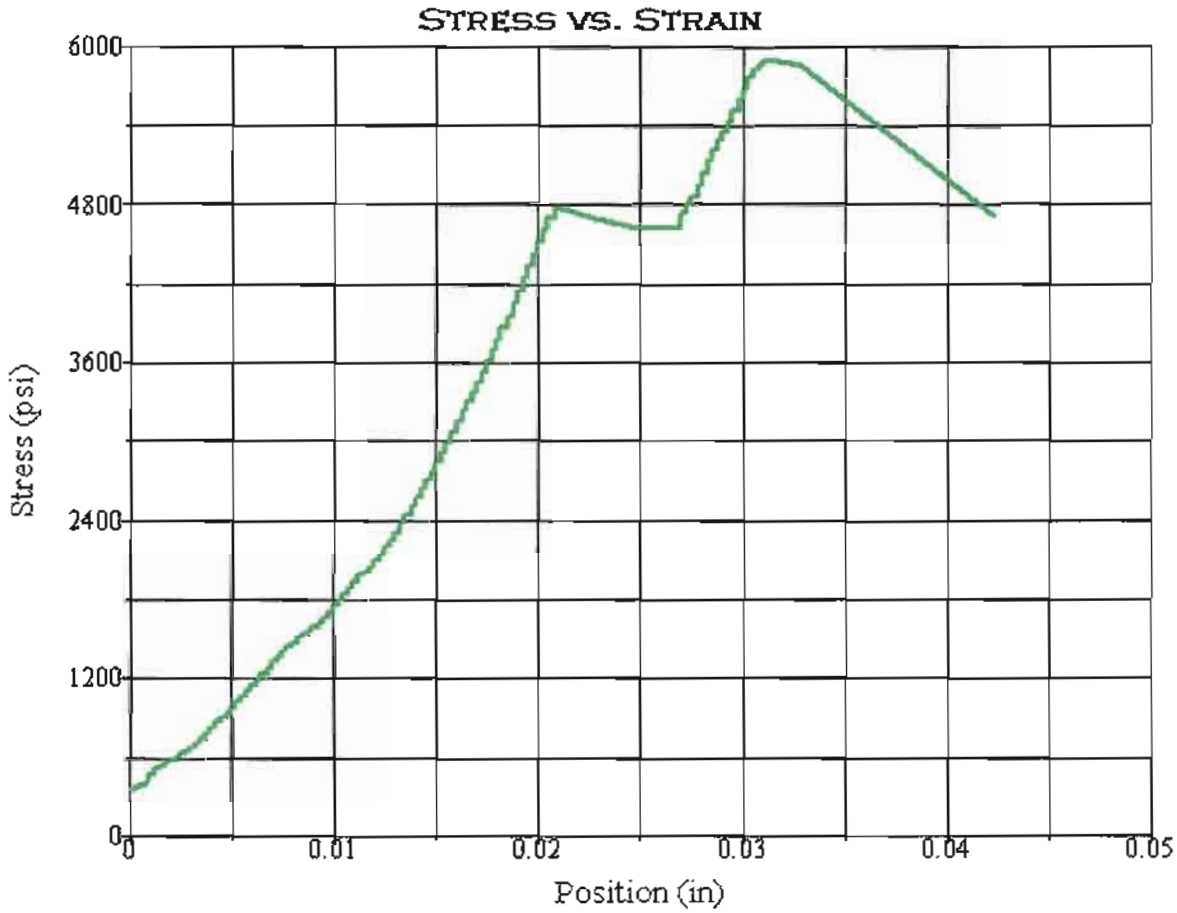
Specimen Gage Length:	3.1900 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	7783 lbf
Compressive Strength:	2834 psi



Test Summary	
Counter:	1531
Elapsed Time:	00:02:44
Operator:	KS
Sample:	R11-015-07
Resident Engineer:	26-26.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	3:56:14 PM
End Date:	9/8/2011
End Time:	3:58:58 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-325

RATIO: L/D<2

Test Results	
Specimen Gage Length:	3.6400 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	17054 lbf
Compressive Strength:	6209 psi



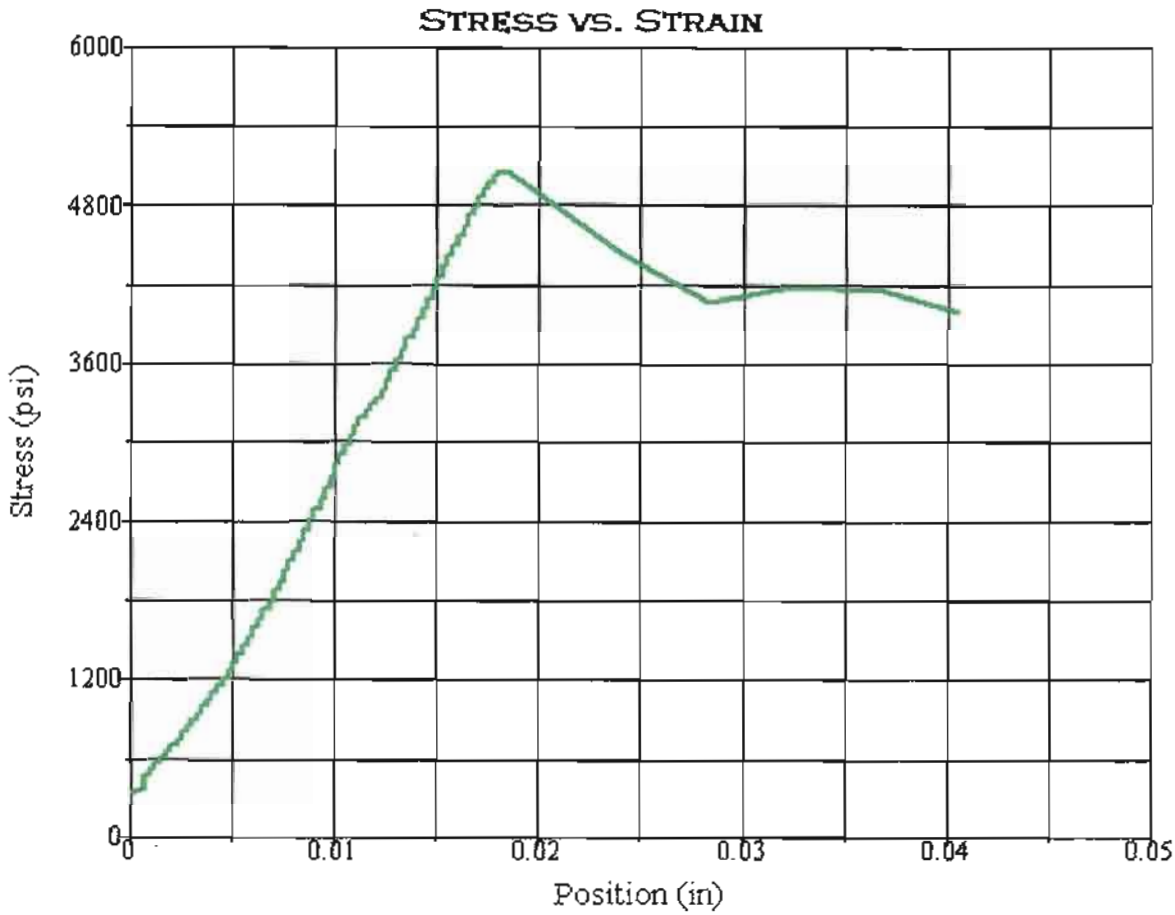
Test Summary

Counter:	1532
Elapsed Time:	00:02:35
Operator:	KS
Sample:	R11-015-09
Resident Engineer:	36.8-37'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	4:02:43 PM
End Date:	9/8/2011
End Time:	4:05:18 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-327

RATIO: L/D<2

Test Results

Specimen Gage Length:	3.3100 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	16207 lbf
Compressive Strength:	5901 psi

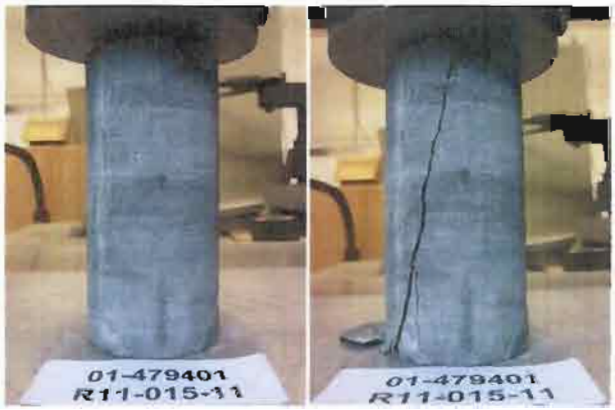


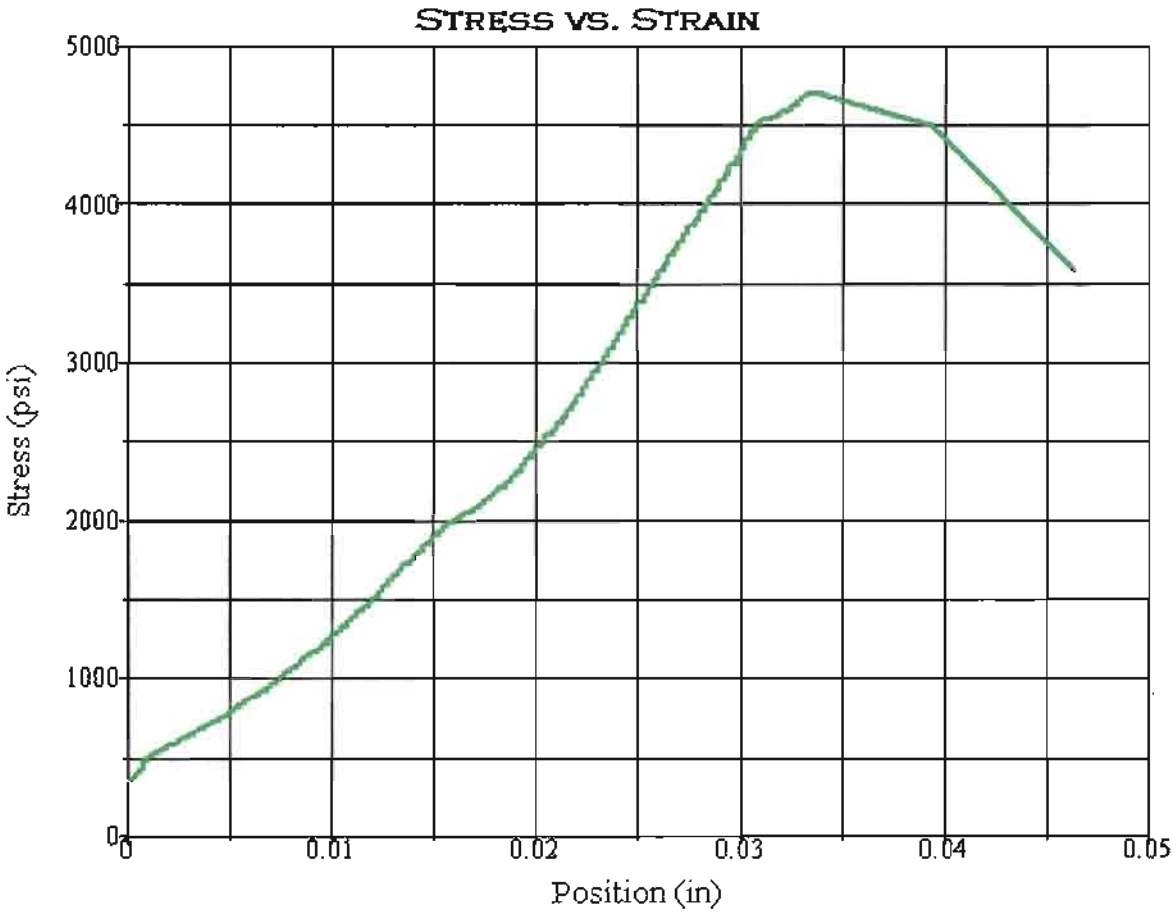
Test Summary

Counter:	1533
Elapsed Time:	00:02:12
Operator:	KS
Sample:	R11-015-11
Resident Engineer:	41-41.6'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	4:08:20 PM
End Date:	9/8/2011
End Time:	4:10:32 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-328

Test Results

Specimen Gage Length:	3.8900 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	13875 lbf
Compressive Strength:	5052 psi





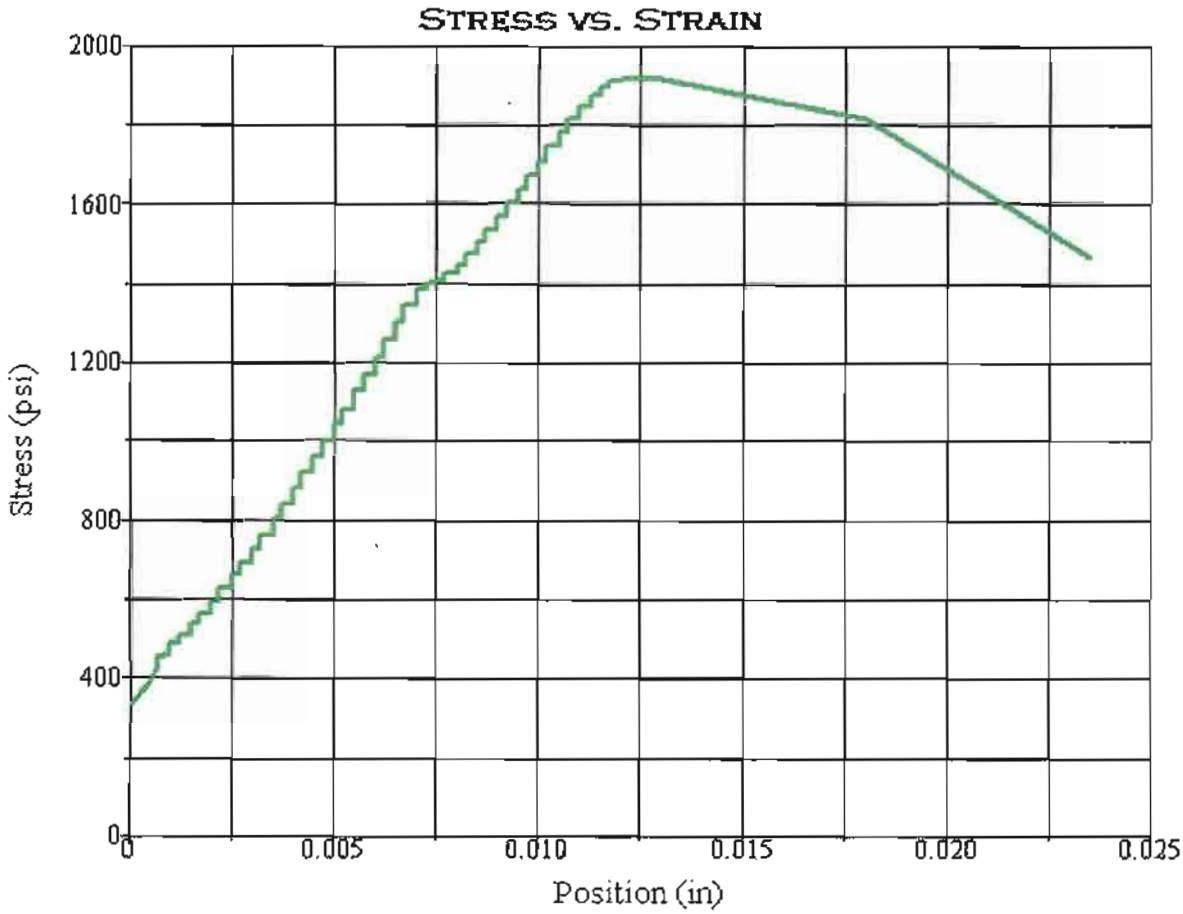
Test Summary

Counter:	1534
Elapsed Time:	00:02:01
Operator:	KS
Sample:	R11-015-11A
Resident Engineer:	44-44.6'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test
Start Date:	9/8/2011
Start Time:	4:14:24 PM
End Date:	9/8/2011
End Time:	4:16:25 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-329

RATIO: L/D<2

Test Results

Specimen Gage Length:	3.6200 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	12931 lbf
Compressive Strength:	4708 psi

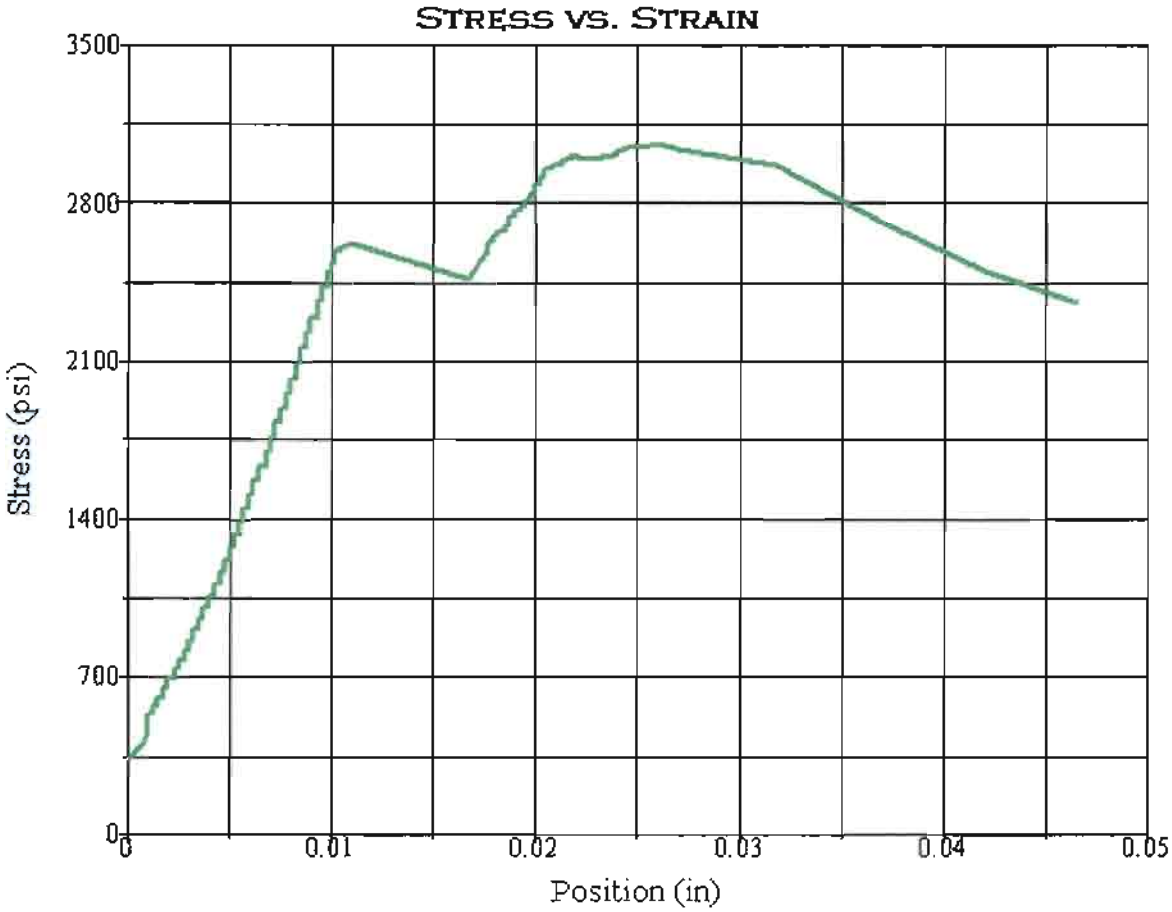


Test Summary

Counter:	1548
Elapsed Time:	00:00:43
Operator:	KS
Sample:	R11-015-13
Resident Engineer:	54-55'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test for Soil lab
Start Date:	9/9/2011
Start Time:	2:22:40 PM
End Date:	9/9/2011
End Time:	2:23:23 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-330

Test Results

Specimen Gage Length:	4.4900 in
Diameter:	1.8700 in
Area:	2.7465 in²
Maximum Load:	5259 lbf
Compressive Strength:	1915 psi



Test Summary

Counter:	1549
Elapsed Time:	00:01:14
Operator:	KS
Sample:	R11-015-15
Resident Engineer:	59-59.4'
Ticket:	GL# 11-067
E.A./CONTRACT NUMBER:	01-479401
Procedure Name:	Cores test for Soil lab
Start Date:	9/9/2011
Start Time:	2:27:40 PM
End Date:	9/9/2011
End Time:	2:28:54 PM
Workstation:	D1K00YB1
Tested By:	concrete
Lab:	Q11-331

Test Results

Specimen Gage Length:	4.0200 in
Diameter:	1.8600 in
Area:	2.7172 in²
Maximum Load:	8322 lbf
Compressive Strength:	3063 psi

<Rudy_C_Lopez@dot.ca.gov
>
12/30/2010 01:52 PM

To <Jacqueline_A_Martin@dot.ca.gov>
cc
bcc
Subject Corrosion Test Summary Report - Soil, EA 01-479401, PIN 0100000371 (Corr. #s CR100785, CR100786 & CR100804)

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion And Structural Concrete Field Investigation Branch
Report Date: 12/30/2010
Reported By: Lopez, Rudy

TEST SUMMARY REPORT - Soil/Water

Bridge Name: **MIDDLE FORK SMITH RIVER**
Bridge Number: **01-0015**
EA No.: **01-479401**
EFIS No.: **0100000371**
Dist/Co/Rte/PM or KP: **01 / DN / 199 / 24.0**

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity[1] (ohm-cm)	pH[2]	Chloride Content[3] (ppm)	Sulfate Content[4] (ppm)
C701626	MIDDLE FORK SMITH RIVER BRIDGE	SOIL	0-5.0 FT/R-10-001, SAMPLE #1	4255	8.15		
C701627	MIDDLE FORK SMITH RIVER BRIDGE	SOIL	0-5.0 FT/R-10-002, SAMPLE #1	6210	8.11		
C701628	MIDDLE FORK SMITH RIVER BRIDGE	SOIL	0-5.5 FT/R-10-003, SAMPLE #1	5980	7.62		

This site is not corrosive to foundation elements (see note below for MSE wall backfill).

Note: For MSE wall structure backfill material, minimum resisitivity must be 2000 ohm-cm or greater,
pH must be between 5.5 and 10.0, chloride content must not be greater than 250 ppm, and sulfate content must not be greater than 500 ppm

[1,2]CTM 643, [3]CTM 422, [4]CTM 417

<Rudy_C_Lopez@dot.ca.gov>
08/08/2011 11:21 AM

To <Jacqueline_A_Martin@dot.ca.gov>
cc
bcc
Subject Corrosion Test Summary Report - EA: 01-479401, PID 0100000371 (Corr. #s CR110362-CR110364)

Division of Engineering Services
Materials Engineering and Testing Services
Corrosion And Structural Concrete Field Investigation Branch
Report Date: 8/8/2011
Reported By: Lopez, Rudy

TEST SUMMARY REPORT - Soil/Water

Bridge Name: **MIDDLE FORK SMITH RIVER**
Bridge Number: **01-0016**
EA No.: **01-479401**
EFIS No.: **0100000371**
Dist/Co/Rte/PM or KP: **01 / DN / 199 / 24.0**

SIC Number (TL101)	Sample Location	Sample Type	Sample Depth	Minimum Resistivity[1] (ohm-cm)	pH[2]	Chloride Content[3] (ppm)	Sulfate Content[4] (ppm)
C701629	MIDDLE FORK SMITH RIVER	SOIL	0.0 TO 3.0 FT / BORE R-11-004	2395	7.67		
C701630	MIDDLE FORK SMITH RIVER	SOIL	0.0 TO 5.0 FT / BORE R-11-007	6056	7.70		
C701631	MIDDLE FORK SMITH RIVER	SOIL	0.0 TO 5.0 FT / BORE R-11-012	42840	6.36		

This site is not corrosive to foundation elements (see note below for MSE wall backfill).

Note: For MSE wall structure backfill material, minimum resisitivity must be 2000 ohm-cm or greater,
pH must be between 5.5 and 10.0, chloride content must not be greater than 250 ppm, and sulfate content must not be greater than 500 ppm.

[1,2]CTM 643, [3]CTM 422, [4]CTM 417

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: JEFF SIMS
BRANCH CHIEF
Design Branch 1
Office of Bridge Design North
Division of Engineering Service

Attn: Kevin Harper
Project Engineer

Date: February 13, 2013

File: 01-DN-199- PM 24.11
North Retaining Wall
EA 01-479401
EFIS 0100000371

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report (FR) for the "North Retaining Wall"

INTRODUCTION

As requested, the Office of Geotechnical Design-North (OGDN) has prepared this Foundation Report (FR) for the proposed "North Retaining Wall" to be located northerly of the proposed viaduct/arch bridge for the Middle Fork Smith River Bridge Replacement project at PM 24.11, in northern Del Norte County, California.

SCOPE OF WORK/ PROJECT DESCRIPTION/

The North Retaining Wall is proposed as part of the "Location 2" portion of the Patrick Creek Narrows project. At Location 2, the Patrick Creek Narrows project proposes to construct the North Retaining Wall and four other structures associated with the Middle Fork Smith River Bridge Replacement MFSRB(R). A separate, primary FR is being provided for the four other structures and presents geological/geotechnical background and findings pertinent to the entire Locations 2 project site. Hence, this FR is intended as a supplement to the primary MFSRB(R) FR, with the contents limited to a site conditions summary, foundation recommendations and construction considerations for the North Retaining Wall.

The design of the proposed North Retaining Wall will be based on the 2010 Standard Plan B3-1, as presented on the "Retaining Wall Type 1 (Mod) - North Retaining Wall" sheet (dated October 9, 2012). The proposed North Retaining Wall is to be located north of the Middle Fork Smith River Bridge replacement structure (Br. No. 01-0080), approximately 20 feet right of the centerline ("B" Line) of Route 199 between Stations 510+58.2 and 512+25.9 (total length of 175 feet). The Design Height ("H") is to vary by stepping from 6 feet on the ends to a maximum height of 10 feet in the center area. The "North Retaining Wall - Foundation Plan" (dated October 9, 2012) indicates the proposed bottom footing elevation of the wall to be 951.3 feet;

The foundation elevations provided in this report are based on the NAVD 88 (vertical datum) and the horizontal coordinates are based on the NAD83 (horizontal datum). Based on the provided location of the proposed retaining wall foundation footprint, it is anticipated that the "Load Case II" (2H:1V "unlimited" backslope) will be applied for the wall design selection.

Our Office has evaluated the site conditions and geology based on a review of the geologic literature and mapping, and based on observations and data collected during site visits and subsurface investigations performed during October 2010, May 2011 and June 2011.

SUMMARY OF SITE CONDITIONS

Based on topography contours provided on the Foundation Plan, the existing ground surface behind the proposed retaining wall stem slopes upwards at a slope varying from approximately 2.25H:1V on the north end, and gradually becoming steeper to 1.5H:1V on the southerly end. The provided topography data appeared consistent with ground surface conditions observed during site visits. As discussed in the primary MFSRB(R) FR, borings performed in the general vicinity of the North Retaining Wall, included RC-11-011 through RC-11-015; these borings encountered alluvium-like materials overlying the top of formational rock estimated to be at elevations between roughly 940 to 945 feet; suggesting a terraced alluvial deposit condition. The alluvium encountered is generally described as (but not limited to) a mixture of cobbles, sandy silt, and poorly-graded gravel with silt and sand; the LOTBs should be referred to for more detailed descriptions. As noted in the MFSRB(R) FR, formational rock outcrops appeared absent on the ground surface adjacent, easterly of the roadway, for a distance of roughly 200 feet north of the existing bridge. Based on observed site conditions, it is anticipated that the bedding in formational rock underlying the alluvium materials will be favorable in respect to bearing support and potential lateral loading of the proposed wall.

FOUNDATION RECOMMENDATIONS

Based on the subsurface investigation, the spread footing is anticipated to be founded partially upon formational rock and partially upon soil (with cobbles and boulders). To reduce the potential for excessive differential settlement, sub-excavation of materials beneath the footing is recommended to a minimum of 3 feet below the BOF. The sub-excavated area should extend laterally beyond the toe (towards the centerline of Route 199 "B" Line) for a minimum of 2 feet beyond the foundation footprint. To minimize excavation into the back-slope direction, sub-excavation at the heel of the wall may terminate at the foundation footprint line; however, it is essential that accurate survey control be maintained during staking of the sub-excavated area. The sub-excavation should be backfilled with concrete backfill according to Section 19-3.02G of the 2010 Standard Specifications to bring the excavation to grade. If the foundation support materials are prepared as recommended above, the net bearing stress demand (for a permissible settlement of ½ inch), and the gross uniform bearing stress demands provided on the Retaining Wall Type 1 (Mod) sheet (dated October 9, 2012) will be met. The demand criteria is met based on the corresponding effective footing widths (B') provided on the Retaining Wall Type 1 (Mod) sheet, and on the BOF elevation shown on the Foundation Plan (dated October 9, 2012).

In respect to lateral loading of the wall, based on the anticipated site conditions, the application of the 2010 Standard Plan B3-1 "Case II" Design Loading Case and effective design soil parameters ($\phi = 34^o$ and $\gamma = 120$ pcf) is acceptable for the project construction.

If any revisions to the wall configuration occurs (such as revising the loading conditions, wall height, bottom of footing elevations, etc.), OGDN should be contacted and allowed to provide supplemental recommendations if needed.

Construction Considerations

1. Based on the subsurface investigation, excavation for the proposed wall foundation and recommended sub-excavation, the Contractor should anticipate having to excavate the formational rock materials, in addition to very hard cobbles and boulders materials.

2. Prior to set-up of the concrete backfill, the top surface of the concrete backfill shall be provided with a roughened surface (such as by scarifying with a steel trowel) to maintain effective development of the concrete-to-soil frictional resistance.

The foundation recommendations included in this Foundation Report are based on project information provided by District 1 Design and the Office of Bridge Design North, Design Branch 1. Any questions regarding the these recommendations should be directed to the attention of Jacqueline A Martin (916) 227-1051 or Mark Hagy (916) 227-1077 at Geotechnical Services, Office of Geotechnical Design-North.

JACQUELINE A MARTIN, P.G.
Engineering Geologist
Office of Geotechnical Design-North

MARK HAGY, P.E., G.E.
Transportation Engineer
Office of Geotechnical Design-North

cc: OGDN
DPM – Kevin Church
PLE – Eskinder Taddese
Reid Buell

State of California
Department of Transportation

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: JEFF SIMS
Structure Design Branch 1
Office of Bridge Design North

Date: March 1, 2012

File: 01-DN-199-PM 20.5
EA: 01-479401
EFIS ID: 0100000371

Attn: Kevin Harper

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH
BRANCH B

Subject: Foundation Report Retaining Wall at PM 20.5

1.0 Project Description

This Foundation Report has been prepared to summarize the results of the geotechnical investigation and provide foundation recommendations for the proposed retaining wall on Route 199 at PM 20.5 in Del Norte County (Vicinity Map, Figure 1). This section of DN 199 is being widened and realigned to accommodate Surface Transportation Assistance Act (STAA) trucks.

This section of State Route 199 has tight radius curves and negligible shoulders that do not allow longer STAA trucks to negotiate the turns without off-tracking into the adjacent lane. The proposed roadway realignment and widening will allow STAA trucks to safely navigate this section of the highway. The project will also enhance safety by improving sight distance and superelevation.

The proposed wall has a maximum wall height (to finish grade) of 5 feet. The proposed wall layout line (provided by District Design on 9-26-2011) is shown on the layout sheet (Site Plan, Figure 2).

2.0 Scope of Work

The recommendations contained in this report are based on geotechnical borings, laboratory testing of soil samples, geotechnical calculations using data obtained from the subsurface investigation and laboratory testing. Subsurface conditions were evaluated only at the boring

locations and may deviate elsewhere within the project limits. The elevations reported are with respect to Mean Sea Level (MSL).

3.0 Pertinent Reports and Investigations

The following documents were reviewed in preparation of this report:

Project Plans

Existing and Proposed Plan Views of Proposed Project, dated September 26, 2011.

Typical Cross Sections of Proposed Project Plans, dated September 26, 2011.

State of California, Department of Transportation (Caltrans)

Preliminary Geotechnical Report, 01 DN 199 PM 20.5/25.7, EA: 01-479400, April 15, 2009.

Caltrans Draft Project Study Report, June 2010, 01-DN-197, PM 3.2/4.5 and 01-DN-199, PM 20.5/26.5

Caltrans Corrosion Guidelines, September 2003, Version 1.0

Caltrans Bridge Design Specifications Section 5, 8/2004

Caltrans Bridge Design Specifications Section 4, 11/2003

Caltrans Soil and Rock Logging, Classification, and Presentation Manual, 2010 Edition.

Literature

Wagner, D.L., and Saucedo, G.J., 1987, Geologic map of the Weed quadrangle, California, 1:250,000: California Division of Mines and Geology, Regional Geologic Map 4A, scale 1:250,000.

4.0 Field Investigation and Laboratory Testing Program

Three mud rotary borings, designated RC-11-001 through RC-11-003, were drilled at this site in June 2011. The approximate locations of the borings are shown on Figure 2. The boreholes were advanced using a truck mounted Acker MPCA 750 drill rig using a 94-mm HXB casing with a

diamond impregnated core bit. Soil and rock samples were logged in accordance to the Caltrans Soil and Rock Logging, Classification, and Presentation Manual 2010 Edition. A summary of the borings is provided in Table 1.

TABLE 1 – BORING DATA SUMMARY

Borehole I.D.	Date Completed	Approx. "A" Line Station	Offset (1)	Depth of Boring (ft)	Approx. Surface Elev. (ft)	Depth to Bedrock (ft)
RC-11-001	06-06-11	22+00	6 feet right	37	738	23
RC-11-002	06-07-11	20+50	6 feet right	26.5	738	Not encountered
RC-11-003	06-07-11	21+25	6 feet right	26.5	738	Not encountered

(1) Approximate distance from proposed highway centerline, facing in direction of increasing stationing.

One soil sample from boring RC-11-003 was tested for pH and Resistivity (CA Test Method No. 643), at the Caltrans' Materials and Geotechnical Laboratory in Eureka, California.
The laboratory test results are attached in Appendix A.

5.0 Regional and Site Geology

The project site is located within the Klamath Mountains Geomorphic Province. The regional rock units underlying the project site are members of the Jurassic Josephine Ophiolite. The Josephine Ophiolite is a tectonically disrupted and thrusted complex consisting of ultramafic rocks, mafic rocks, volcanic rocks, and other minor amounts of other rocks of ophiolitic affinity.

The project site is underlain by the ultramafic member of the Josephine Ophiolite. The ultramafic rocks consist of partially to completely serpentinized peridotite, and locally can include mafic rocks (Project Geologic Map, Figure 3).

Two rock types were encountered in the borings. Peridotite (ultramafic rock) was encountered in Boring RC-11-001 at approximately 23 feet below the road surface. Fragments of slate (metamorphic rock) were detected in Boring RC-11-003 at approximately 33 feet below the road surface.

6.0 Subsurface Conditions

A subsurface profile along the proposed wall layout line is shown on Figure 4. Below the roadway base, the borings encountered approximately 16.5 to 21 feet of fill composed of loose to dense well-graded graded gravel with silt and sand (GW-GM), well-graded sand and gravel (SW-SM), and cobbles and boulders. The hard, cobbles and boulders were composed of Peridotite, Serpentinized Peridotite, Serpentinite and Gabbro. The size of the cobbles ranged from 3-inches to 12-inches. The boulders ranged from 12-inches to 24-inches in size. A zone of poorly compacted material where voids exist locally was encountered in all borings. The depths to this zone were between 13 to 18.5 feet in RC-11-001, 13 to 15 feet in RC-11-002 and 8 to 15 feet in RC-11-003 (approximate elevations ranging from 727 to 731 feet). The elevation of the lowest part of this zone roughly corresponded to the elevation of the top of the rock armored bank (Figure 2). The dense to very dense material under the fill was interpreted to be colluvium. The colluvium was similar in composition to the fill. Peridotite was encountered at 23 feet in Boring RC-11-001. The Peridotite is massive, dark bluish gray, moderately weathered to fresh, hard, intensely to moderately fractured. Borings RC-11-002 and RC-11-003 were terminated in the colluvium layer.

The typical cross section is shown on Figure 5.

Logs of Test Borings (LOTBs) will be provided at a future date to be included in the plans.

7.0 Groundwater Conditions

The design groundwater surface elevation is 732 feet as shown on Figures 4 and 5.

8.0 Corrosion Evaluation

The Department considers a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. Soils are not tested for chloride and sulfate concentrations if the minimum resistivity is greater than 1,000 ohm-cm.

Corrosion analyses were conducted on a soil sample from borehole RC-11-003 at a depth interval of 5 to 6.5 feet. The pH level of the sample was 6.78 and the minimum resistivity level was 5,900 ohm-cm.

Based on the Caltrans Corrosion Guidelines (2003 version 1.0) and laboratory test results, the site may be considered non-corrosive to steel and concrete.

9.0 Recommended Wall Design Parameters

The approximate wall layout line is shown on Figure 2 and the subsurface geology along the wall layout line is shown on Figure 4. The proposed wall has a maximum wall height (to finish grade) of 5 feet.

Lateral forces determined from earth pressure theory using the soil parameters provided in Table 2 control the design loading, and are recommended for the wall design per Caltrans Bridge Design Specifications (BDS) Chapter 5.

TABLE 2 – DESIGN PARAMETERS

LAYER	APPROXIMATE THICKNESS (ft)[1]	TOTAL UNIT WEIGHT (pcf)[2]	ANGLE OF INTERNAL FRICTION (degrees)[2]	COHESION (c, psf)	COEFFICIENT OF ACTIVE EARTH PRESSURE K_a[3]	COEFFICIENT OF PASSIVE EARTH PRESSURE K_p[4]
(1) FILL	22	110	30	0	0.31	0.76
(2) COLLUVIUM	6.5[5]	125	35	0	0.25	1.27

Notes: 1 – At proposed wall layout line (refer to Figure 5)
2 – Based on correlations with field penetration test data and soil type.
3– Ka based on Coulomb method of analysis in accordance with BDS, section 5.5.5.7.
4– Kp based on log spiral method of analysis.
5– Minimum thickness

The ultimate bearing capacity (q_{ult}) was calculated to be 595 psf. Effective stress methods of analysis was used to determine the bearing capacity factors for the fill in accordance with BDS, section 4.4.7.1.1.4.

The recommended design groundwater surface elevation is 732 feet.

10.0 Construction Considerations

Difficult drilling is expected due to the presence of cobbles and boulders in the subsurface.

Caving conditions may be encountered during drilling for the CIDH piles due to the presence of voids, loose material, and cobbles and gravels encountered in the fill. Temporary casing, drilling under slurry or placement of slurry cement or concrete backfill and re-drilling may be required to control caving and should be performed in conformance with the provisions in Section 49-4.03 "Drilled Holes," of the Standard Specifications. There is also the potential for the loss of concrete and grout into voids. To prevent grout loss a controlling measure such as the use of a "grout sock" is recommended.

Groundwater will likely be encountered in the pile boreholes. Pile installations may require dewatering or the placement of concrete and grout under water. If water is present and the holes are not dewatered, displacement of the water by means of a closed system using a concrete pump or tremie tube to place concrete and grout at the bottom of the holes will be required in conformance with the provisions in Section 51-1.10 "Concrete Deposited Under Water," of the Standard Specifications.

Samples from the project site have been shown to contain significant levels of naturally occurring asbestos. Naturally occurring asbestos may be encountered in the subsurface. The Contractor will have to conform to the Special Provisions that pertain to naturally occurring asbestos.

Project Information

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. None

Data and information included in the Information Handout provided to the bidders and Contractors are:

A. Foundation Report for Retaining wall at DN 199 PM 25.5, dated March 1, 2012

Data and information available for inspection at the District Office:

A. None

If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these foundation recommendations are still applicable.

If you have any questions or require further assistance, please contact June James at (707) 441-4692 or Charlie Narwold at (707) 445-6036.

Report by:

REGISTERED PROFESSIONAL ENGINEER
MARIETTA J JAMES
No. 55009
CIVIL
STATE OF CALIFORNIA

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M. JUNE JAMES
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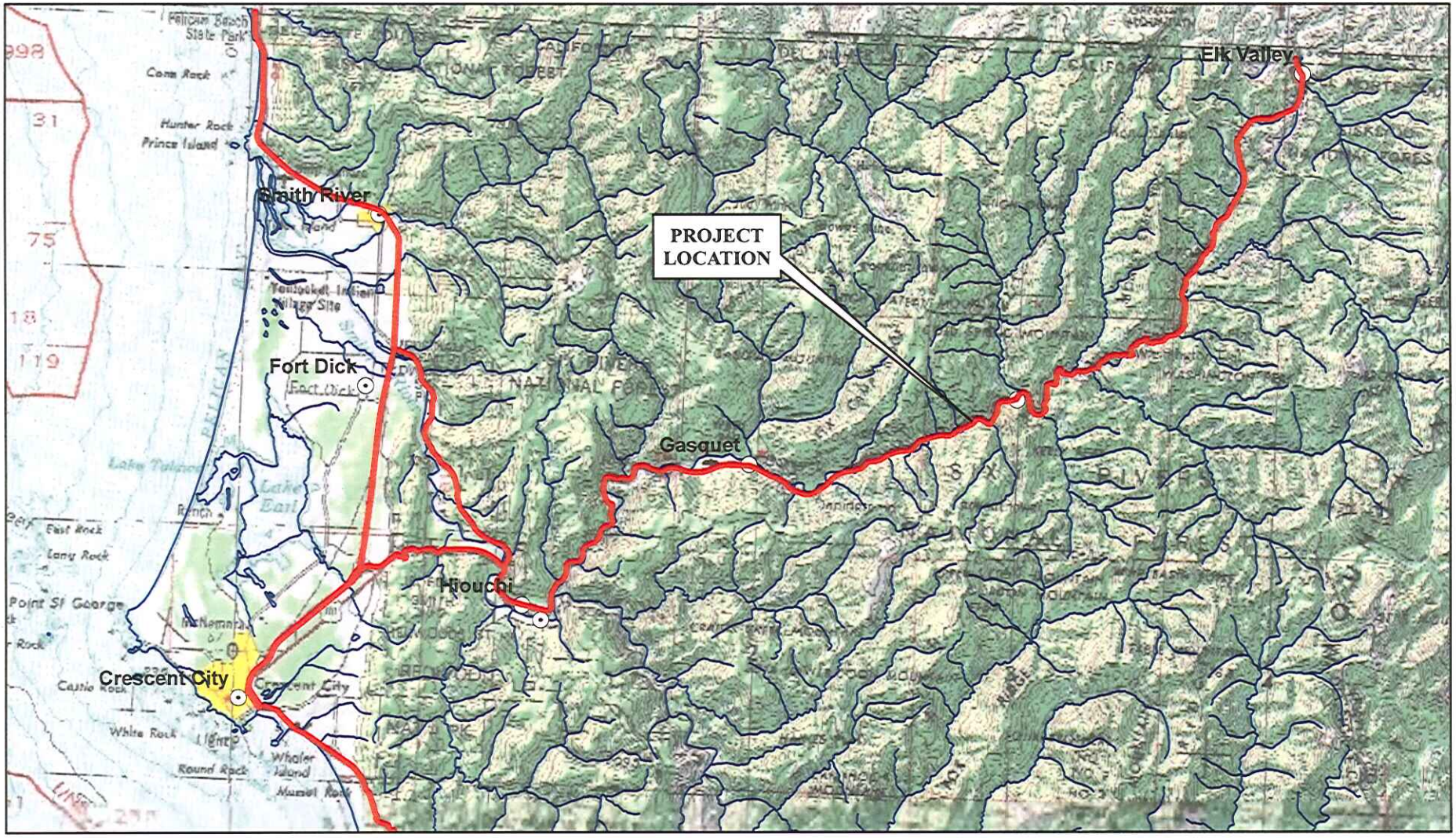
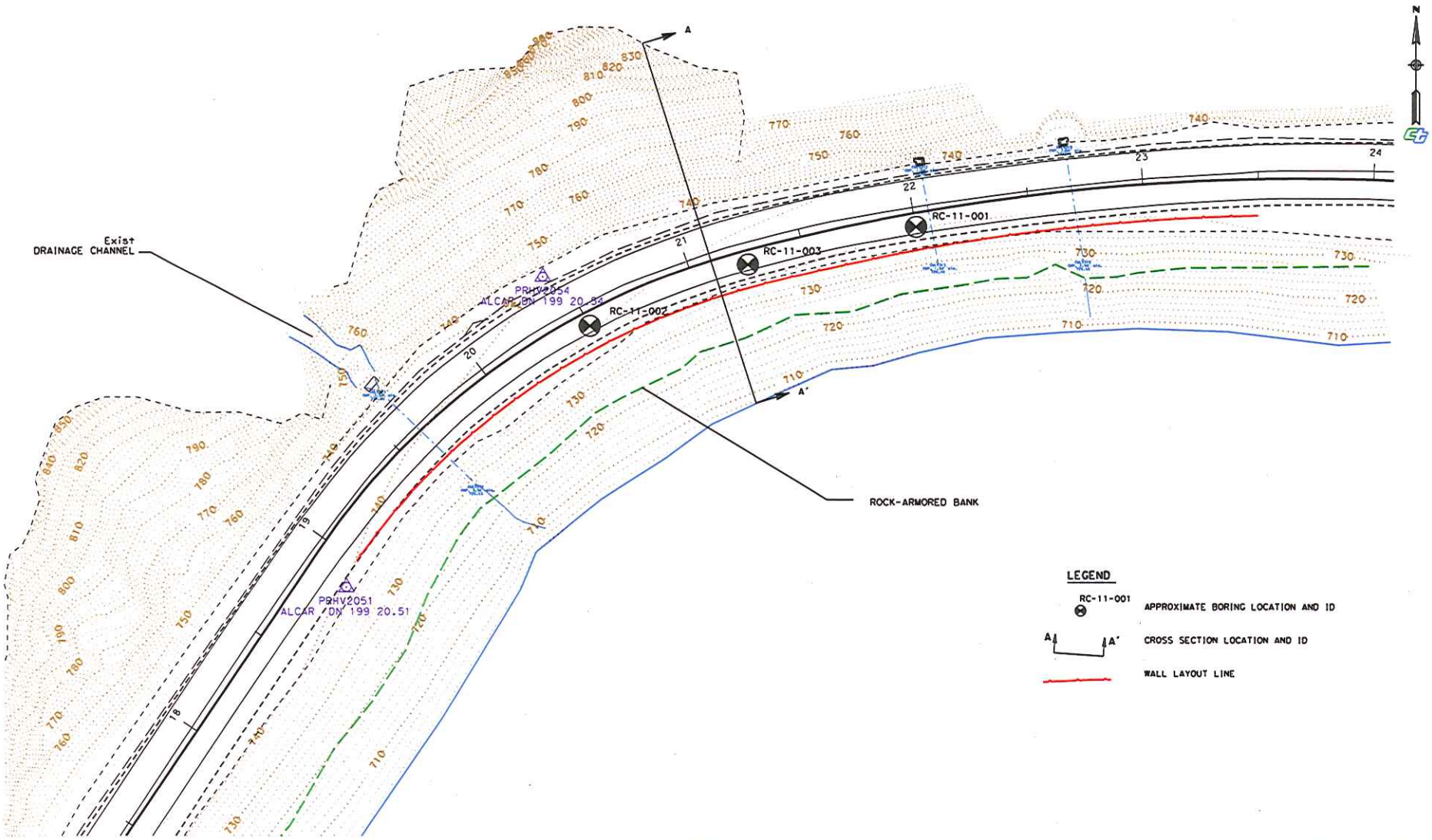
Appendix A – Summary of Laboratory Test Data

C:

RBibbens (E-copy)
GS File Room (email gs_file_room@dot.ca.gov)
Structure Construction RE Pending File (email RE_pending_file@dot.ca.gov)
Project Manager



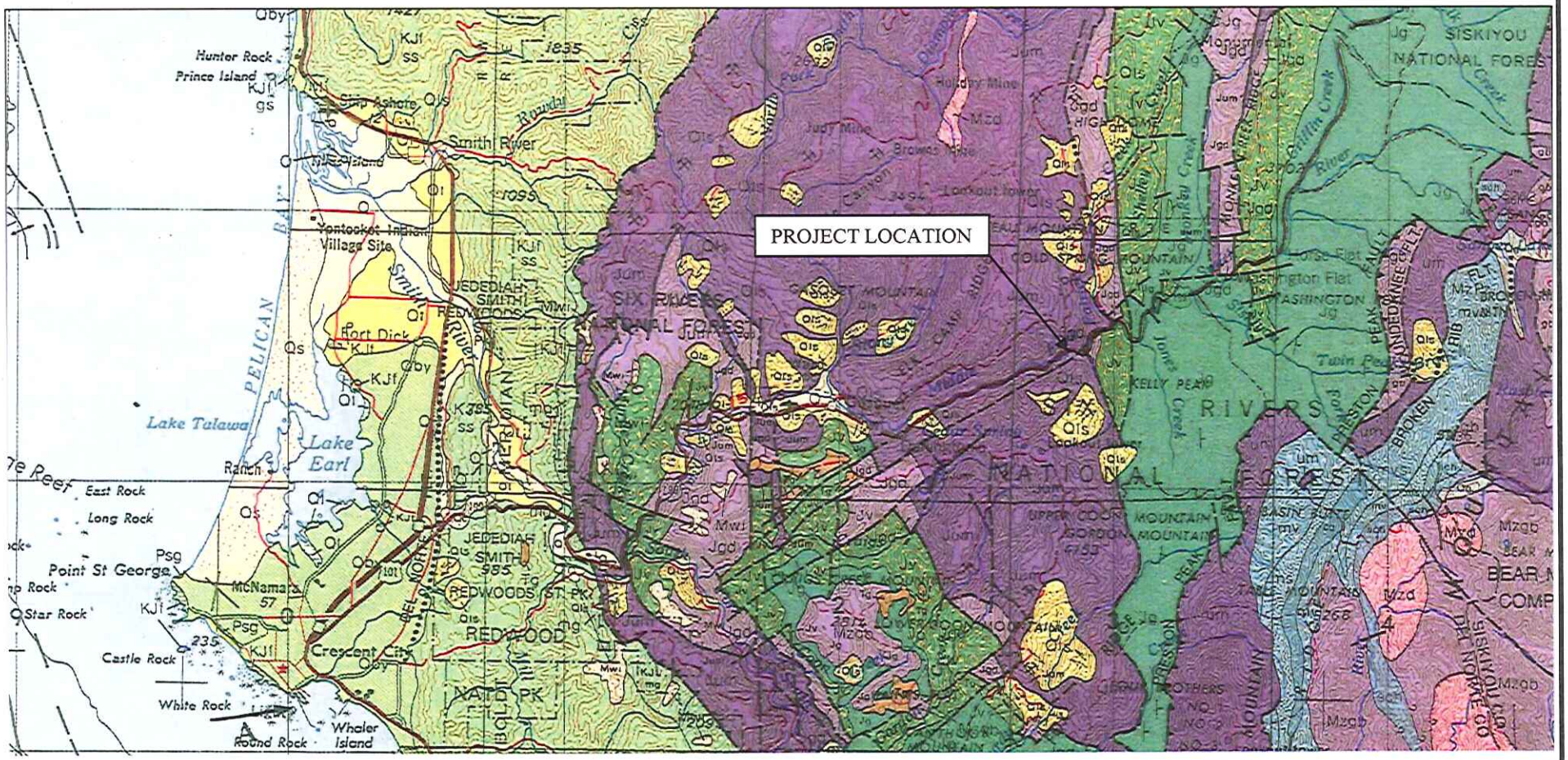
Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design North Branch B	EFIS: 0100000371 DATE: JANUARY 2012	VICINITY MAP
	FOUNDATION REPORT RETAINING WALL AT PM 20.5	FIGURE 1



REFERENCE DRAWING DATED SEPTEMBER 26, 2011

Department of Transportation
Division of Engineering Services
Office of Geotechnical Design North
Branch B

EFIS ID: 0100000172	SITE PLAN
DATE: JANUARY 20112	
FOUNDATION REPORT RETAINING WALL AT PM 20.5	FIGURE 2

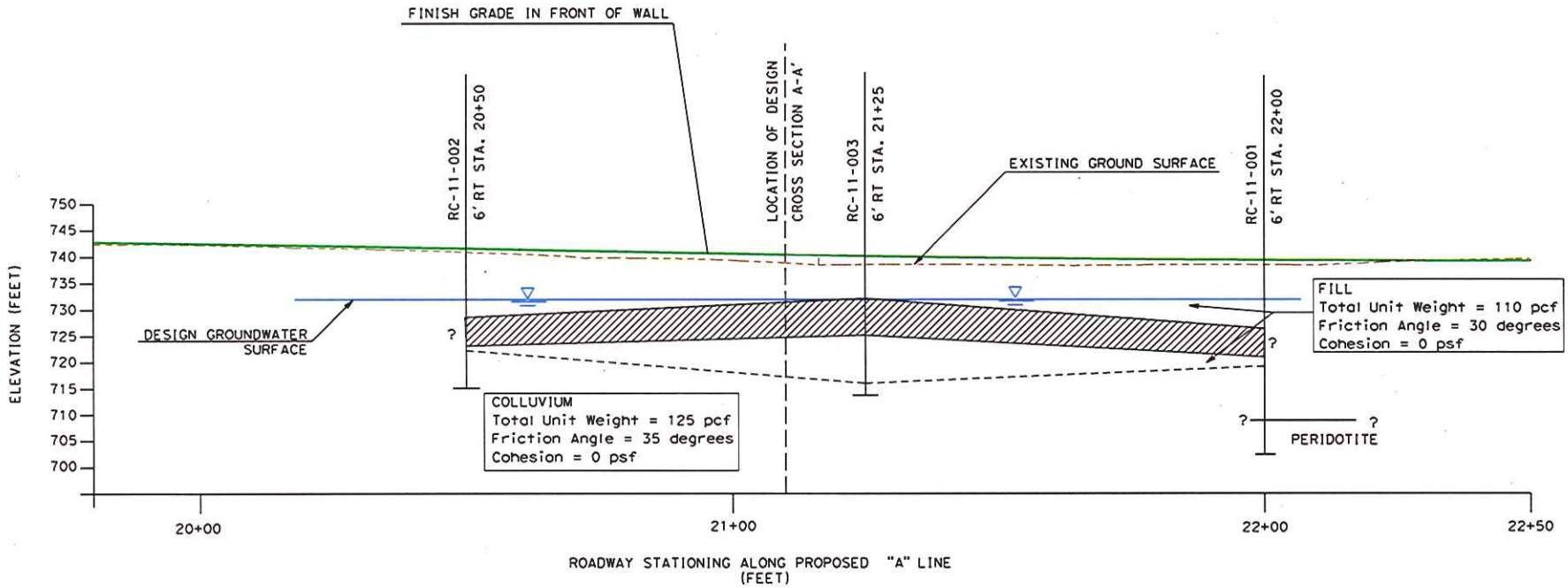


SCALE : 1:250,000

Reference: Wagner, D. L. and Saucedo, G.J. "Geologic Map of the Weed Quadrangle, California" 1987

- Jg — Galice Formation *(Marine; slate, metagraywacke, and greenstone)*
- Jv — Volcanic rocks *(Pillow lava and breccia)*
- Jgd — Gabbro, diorite, and related rocks
- Jum — Ultramafic rocks—partially to completely serpentinized

Caltrans Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design North Branch B	EFIS ID: 0100000371 Date: January 2012	PROJECT GEOLOGIC MAP
	FOUNDATION REPORT RETAINING WALL AT PM 20.5	Figure 3



EXPLANATION

GEOLOGIC CONTACT (DASHED WHERE APPROXIMATE)

ZONE OF POORLY COMPACTED MATERIAL AND VOIDS

NOTES:

DEPTHS TO THE GEOLOGIC CONTACTS ARE PROJECTED TO THE PROPOSED WALL LAYOUT LINE.

REFERENCE DESIGN DRAWING DATED 09/26/2011

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North
Branch B

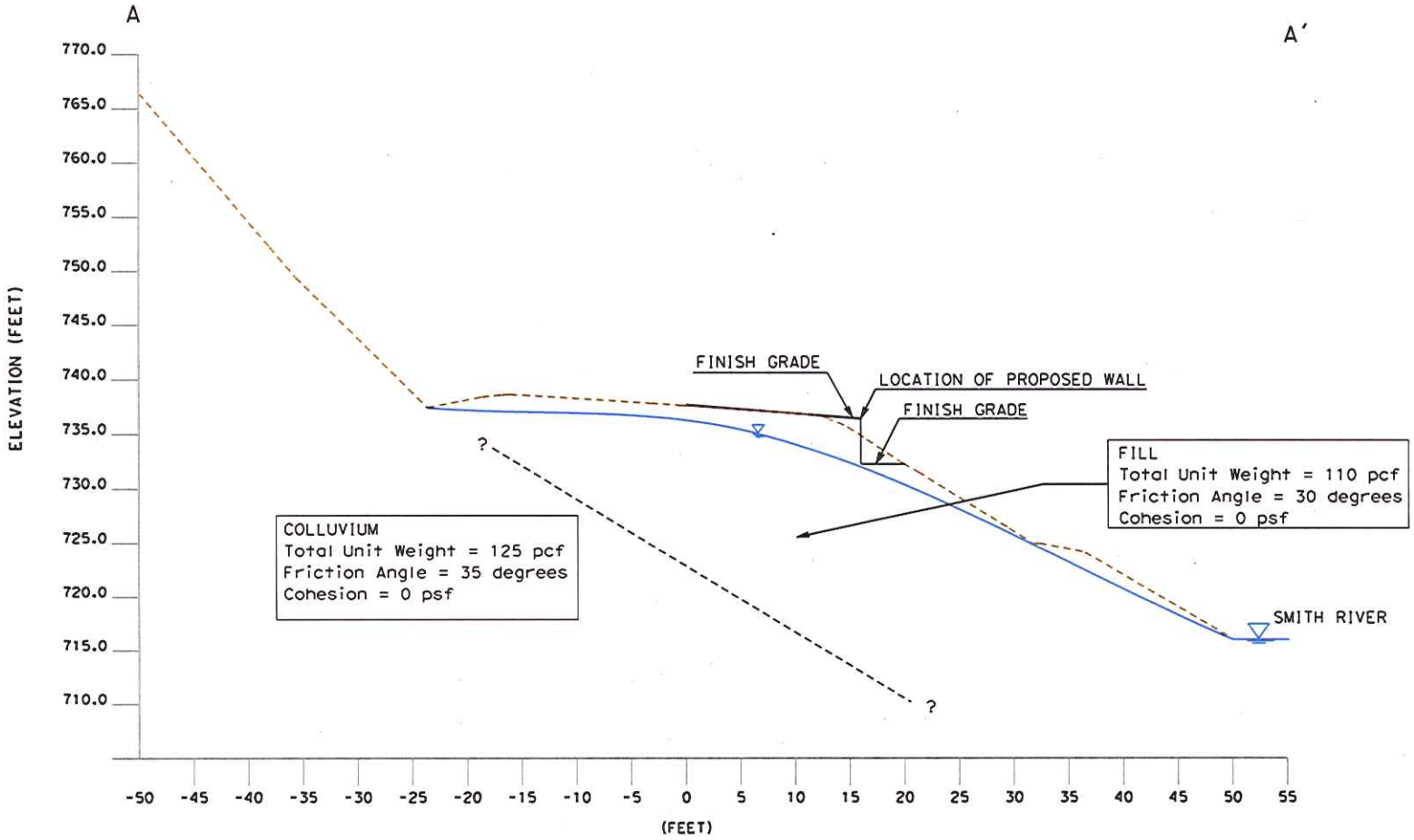
EFIS ID: 0100000371

DATE: JANUARY 2012

SUBSURFACE GEOLOGY ALONG WALL LAYOUT LINE

FOUNDATION REPORT
RETAINING WALL AT PM 20.5

FIGURE 4



EXPLANATION

GEOLOGIC CONTACT (DASHED WHEN APPROXIMATE)

GROUNDWATER SURFACE ASSUMED FOR DESIGN

REFERENCE DRAWING DATE: SEPTEMBER 26, 2011

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EFIS ID: 0100000371

DATE: JANUARY 2012

TYPICAL CROSS SECTION

FOUNDATION REPORT
RETAINING WALL AT PM 20.5

FIGURE 5

APPENDIX A

01-DN-199- PM 20.5
EA: 01-479401 EFIS ID: 0100000371

SUMMARY OF LABORATORY TEST RESULTS

CORROSION TEST SUMMARY

Boring ID	Depth (ft, bgs)	Min.Resistivity (ohms)	pH
RC-11-003	5' - 6.5'	5,900	6.78

State of California
Department of Transportation

Business, Transportation and Housing Agency

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: JEFF SIMMS
Structure Design Branch 1
Office of Bridge Design North

Date: February 20, 2013

File: 01-DN-199-PM 20.5/25.7
EA: 01-479401
EFIS ID: 0100000371

Attn: Kevin Harper

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH
BRANCH B

Subject: Foundation Report Addendum for Retaining Wall at PM 20.5

In response to a request from Structure Design Branch 1, the Foundation Report for the Retaining wall at DN 199 PM 20.5, dated January 19, 2012 should be modified with the following recommendations.

The references to Sections 49-4.03 and 51-1.10 of the Standard Specifications on page 6 are deleted.

The reference and the excerpt of Standard Special Provisions S5-280 on page 6 shall be replaced with the following:

Standard Specifications (SP) 2-1.06B, "Supplemental Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening.

The Information Handouts available for the Bidders are the:

"*Foundation Report, Retaining Wall at PM 20.5, dated January 12, 2012"*

"Foundation Report Addendum for Retaining Wall at PM 20.5, dated February 20, 2013"

This may be viewed at the Bidders' Exchange Web site.

Rock cores may be viewed by sending a request to Coreroom@dot.ca.gov.

If you have any questions or require further assistance, please contact June James at (707) 441-4692 or Charlie Narwold at (707) 445-6036.

M. JUNE JAMES
Transportation Engineer
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Office of Geotechnical Design North
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C:

RBibbens (E-copy)
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Structure Construction RE Pending File (email RE_pending_file@dot.ca.gov)
Project Manager

State of California
Department of Transportation

Business, Transportation and Housing Agency

Memorandum

Flex your power!
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To: JEFF SIMS
Structure Design Branch 1
Structure Design Branch 1
Office of Bridge Design North

Date: March 1, 2012

File: 01-DN-199-PM 25.5
EA: 01-479401
EFIS ID: 0100000371

Attn: Kevin Harper

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH
BRANCH B

Subject: Foundation Report Retaining Wall at PM 25.5

1.0 Project Description

This Foundation Report has been prepared to summarize the results of the geotechnical investigation and provide foundation recommendations for the proposed soldier pile wall on Route 199 at PM 25.5 in Del Norte County (Vicinity Map, Figure 1). This section of DN 199 is being widened and realigned to accommodate Surface Transportation Assistance Act (STAA) trucks.

This section of State Route 199 has tight radius curves and negligible shoulders that do not allow longer STAA trucks to negotiate the turns without off-tracking into the adjacent lane. The proposed roadway realignment and widening will allow STAA trucks to safely navigate this section of the highway. The project will also enhance safety by improving sight distance and superelevation.

The proposed soldier pile wall is approximately 211 feet in length with a maximum wall height (to finish grade) of 11 feet. The wall layout line (provided by District Design on 9-07-2011) is shown on the layout sheet (Site Plan, Figure 2).

2.0 Scope of Work

The recommendations contained in this report are based on geotechnical borings, laboratory testing of soil samples, geotechnical calculations using data obtained from the subsurface investigation and laboratory testing. Subsurface conditions were evaluated only at the boring

locations and may deviate elsewhere within the project limits. The elevations reported are with respect to Mean Sea Level (MSL).

3.0 Pertinent Reports and Investigations

The following documents were reviewed in preparation of this report:

Project Plans

Existing and Proposed Plan Views of Proposed Project, dated September 7, 2011.

Typical Cross Sections of Proposed Project Plans, dated September 7, 2011.

State of California, Department of Transportation (Caltrans)

Preliminary Geotechnical Report, 01 DN 199 PM 20.5/25.7, EA: 01-479400, April 15, 2009.

Draft Project Study Report Caltrans June 2010 01-DN-197, PM 3.2/4.5 and 01-DN-199, PM 20.5/26.5

Caltrans Corrosion Guidelines, September 2003, Version 1.0

Caltrans Bridge Design Specifications Section 5, 8/2004

Caltrans Soil and Rock Logging, Classification, and Presentation Manual, 2010 Edition.

Literature

Wagner, D.L., and Saucedo, G.J., 1987, Geologic map of the Weed quadrangle, California:, 1:250,000: California Division of Mines and Geology, Regional Geologic Map 4A, scale 1:250,000.

4.0 Field Investigation and Laboratory Testing Program

Five mud rotary borings, designated RC-09-001 through RC-09-005, were drilled at this site in June 2011. The approximate locations of the borings are shown on Figure 2. The boreholes were advanced using a truck mounted Acker MPCA 750 drill rig using a 94-mm HXB casing with a diamond impregnated core bit. Soil and rock samples were logged in accordance to the Caltrans Soil and Rock Logging, Classification, and Presentation Manual 2010 Edition. A summary of the borings is provided in Table 1.

TABLE 1 – BORING DATA SUMMARY

Borehole I.D.	Date Completed	Approx. "C" Line Station	Offset (1)	Depth of Boring (ft)	Approx. Surface Elev. (ft)	Depth to Bedrock (ft)
RC-11-001	06-08-11	511+61	3 feet right	79	1068	35
RC-11-002	06-14-11	513+21	9 feet right	55	1075	27
RC-11-003	06-15-11	512+23	3 feet left	45.5	1070	33
RC-11-004	06-15-11	511+17	3 feet right	26.5	1064	17
RC-1I-005	06-16-11	511+63	30 feet left	49.8	1069	17.5

(1) Approximate distance from proposed highway centerline ("C" Line), facing in direction of increasing stationing.

Laboratory testing of selected soil samples obtained from the borings was performed in the Caltrans' Materials and Geotechnical Laboratory in Sacramento, California. The testing was performed to classify soils using ASTM Unified Soil Classification System (USCS) and determine the engineering properties of the soil. Tests performed included:

Mechanical analyses (ASTM D422)
Atterberg Limits tests (ASTM D4318)
Corrosivity Test (pH and Resistivity) (CA Test Method No. 643)

The laboratory test results are attached in Appendix A.

5.0 Regional and Site Geology

The site lies within the Coast Ranges geomorphic province. Based on the Geologic Map of the Weed Quadrangle, California, (D.L. Wagner and G. J. Saucedo, 1987) the site is located within the western Jurassic belt which includes the Galice Formation (Project Geologic Map, Figure 3). The Galice Formation generally consists of slate, metagraywacke, and greenstone.

There is no evidence of global instability within the wall limits. Shallow seated debris slides are visible on the existing cut slopes between Stations 512+80 to 513+65. Currently these slides are non-active.

6.0 Subsurface Conditions

The borings encountered approximately 20 to 47 feet of mostly coarse grained soils interpreted to be fill. These soils were composed of poorly graded gravel with silt (GP), silty sand with gravel (GM), silty clayey gravel with sand (GC_GM) and poorly graded sand with gravel (SP). Boring RC-11-003 encountered a layer of silty gravel (GM) at 5 feet and silty sand (SM) to a depth of 18 feet.

Underlying the soils is metamorphic rock. The rock consists of slate and phyllite, typically slightly weathered to fresh, hard and very intensely fractured. The phyllite encountered in boring RC-11-002 contained moderately hard to soft zones. The fractures in borings RC-11-002 through RC-11-004 were wet at depths of 10 feet and 8 feet below ground surface respectively.

Figure 4 shows the critical cross section at the assumed maximum wall height at approximate Station 512+20 and Figure 5 shows a subsurface profile along the wall layout line.

Logs of Test Borings (LOTBs) will be provided at a future date to be included in the plans.

7.0 Groundwater Conditions

The design groundwater surface elevation is 1058 feet as shown on Figures 4 and 5.

8.0 Corrosion Evaluation

The Department considers a site to be corrosive to foundation elements if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. Soils are not tested for chloride and sulfate concentrations if the minimum resistivity is greater than 1,000 ohm-cm.

Corrosion analyses were conducted on a soil sample from borehole RC-11-002 at a depth interval of 5 to 10 feet. The pH level of the sample was 6.67 and the minimum resistivity level was 4,000 ohm-cm.

Based on the Caltrans Corrosion Guidelines (2003 version 1.0) and laboratory test results, the site may be considered non-corrosive to steel and concrete.

9.0 Recommended Wall Design Parameters

The approximate wall layout line is shown on Figure 2 and the subsurface geology along the wall layout line is shown on Figure 5. The proposed wall is approximately 211 feet in length with a maximum height of 11 feet.

Lateral forces determined from earth pressure theory using the soil and rock parameters provided in Table 2 control the design loading, and are recommended for the wall design per Caltrans Bridge Design Specifications (BDS) Chapter 5.

TABLE 2 – DESIGN PARAMETERS

LAYER	APPROXIMATE THICKNESS (ft)[1]	TOTAL UNIT WEIGHT (pcf)[2]	ANGLE OF INTERNAL FRICTION (degrees)[2]	COHESION (c, psf)	COEFFICIENT OF ACTIVE EARTH PRESSURE K_a[3]	COEFFICIENT OF PASSIVE EARTH PRESSURE K_p[4]
(1) Fill	48	120	34	0	0.28	1.21
(2) Metamorphic Rock	31[5]	140	35	1,000	NA[6]	NA[6]

Notes: 1 – At wall layout line (refer to Figure 5)
2 – Based on correlations with field penetration test data and soil type.
3– Ka based on Coulomb method of analysis in accordance with BDS, section 5.5.5.7.
4– Kp based on log spiral method of analysis.
5– Minimum thickness
6– Assuming piles will be tipped in the Fill.

The recommended design groundwater surface elevation is 1058 feet.

Steel HP piling placed in structural concrete and timber lagging is recommended.

We recommend that the finished grade provide a berm in front of the wall face at least 4 feet wide and a design grade at least 2 feet below finished grade (both measured from the face of the wall) per the BDS Section 5.7.6. Shims should be placed between the timber lagging. A filter fabric should be placed at the back of the wall between the structure backfill and the timber lagging.

10.0 Construction Considerations

Caving conditions may be encountered during drilling for the piles due to the granular nature of the soils encountered, and the very intensely fractured nature of the rock. Temporary casing, drilling under slurry or placement of slurry cement or concrete backfill and re-drilling may be required to control caving and should be performed in conformance with the provisions in Section 49-4.03 "Drilled Holes," of the Standard Specifications. There is also the potential for the loss of concrete and grout into voids. To prevent grout loss a controlling measure such as the use of a "grout sock" is recommended.

Groundwater will likely be encountered in the pile boreholes. Pile installations may require dewatering or the placement of concrete and grout under water. If water is present and the holes are not dewatered, displacement of the water by means of a closed system using a concrete pump or tremie tube to place concrete and grout at the bottom of the holes will be required in conformance with the provisions in Section 51-1.10 "Concrete Deposited Under Water," of the Standard Specifications.

There are no overhead and underground utilities in the proposed wall construction area.

Project Information

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:
A. None

Data and information included in the Information Handout provided to the bidders and Contractors are:
A. Foundation Report for Retaining wall at DN 199 PM 25.5, dated March 1, 2012

Data and information available for inspection at the District Office:
A. None

Data and information available for inspection at the Eureka Annex:
A. Rock Cores

If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these foundation recommendations are still applicable.

If you have any questions or require further assistance, please contact June James at (707) 441-4692 or Charlie Narwold at (707) 445-6036.

Report by:

REGISTERED PROFESSIONAL ENGINEER
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No. 55009
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STATE OF CALIFORNIA

CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design North
Branch B

List of Figures:

Figure 1 – Vicinity Map
Figure 2 – Site Plan
Figure 3 - Project Geologic Map
Figure 4 – Typical Cross Section
Figure 5 – Subsurface Geology Along Wall Layout Line

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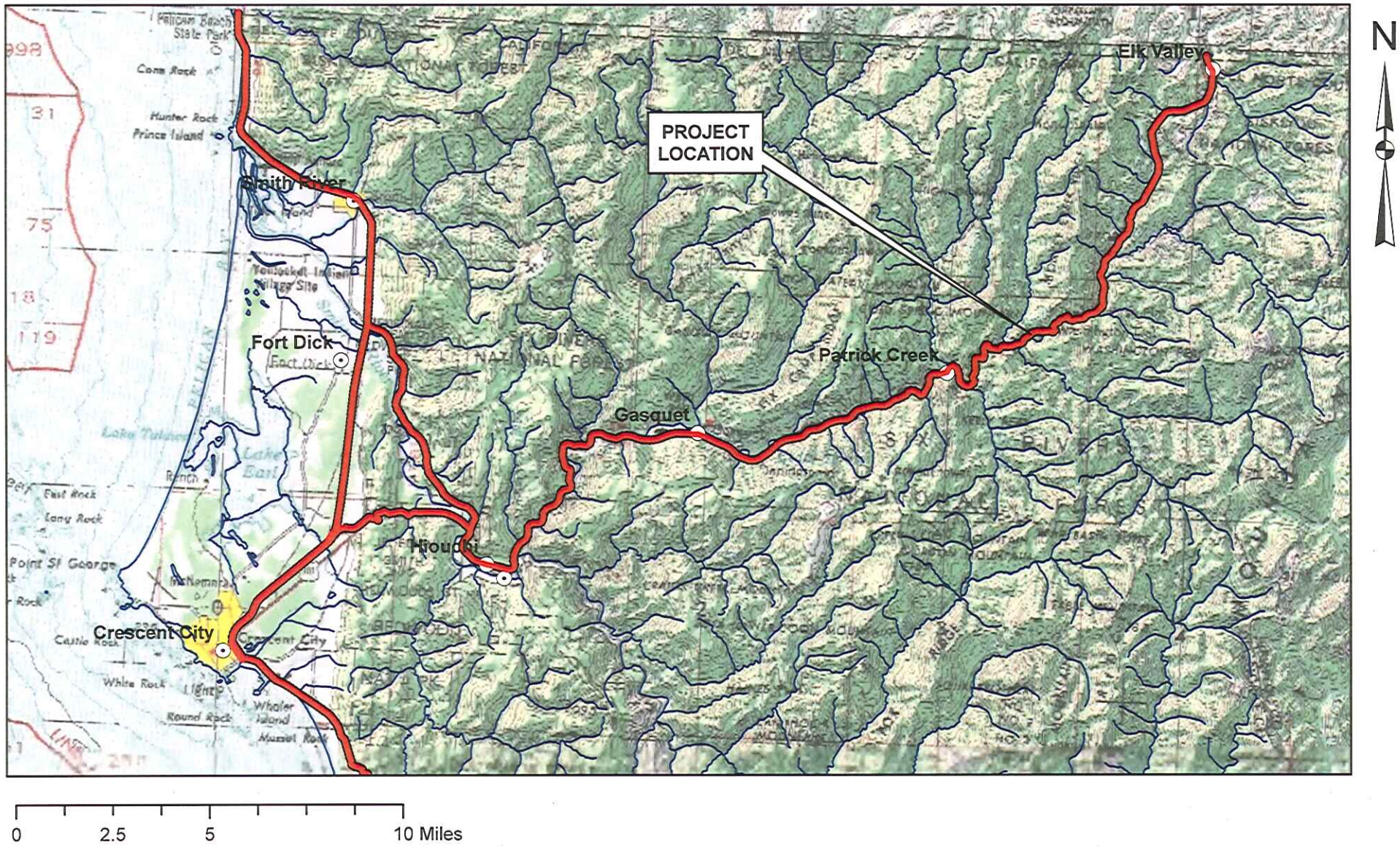
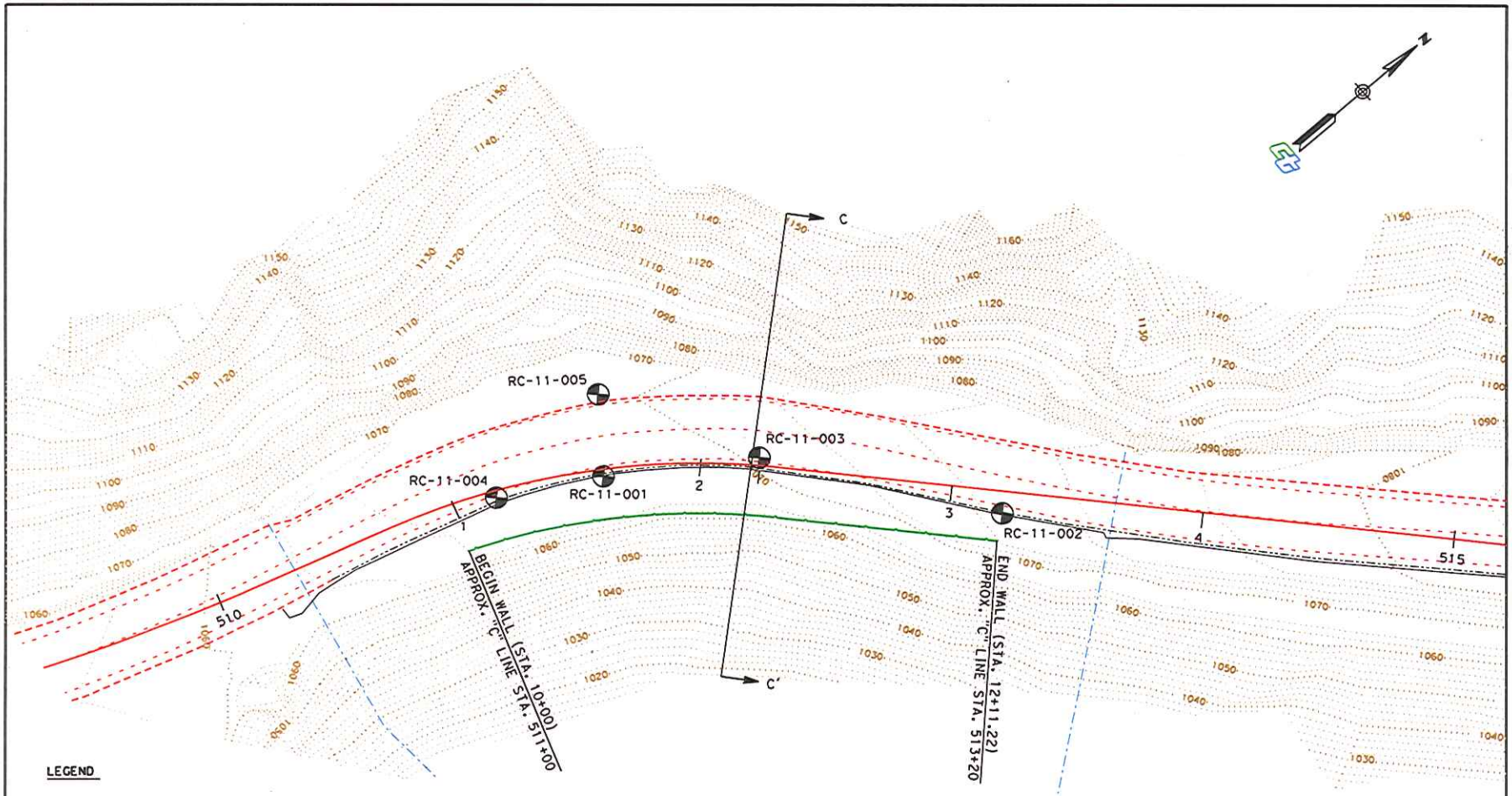


Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design North Branch B	EFIS: 0100000371 DATE: JANUARY 2012	VICINITY MAP
	FOUNDATION REPORT RETAINING WALL AT PM 25.5	FIGURE 1



LEGEND

RC-09-001 APPROXIMATE BORING LOCATION AND ID

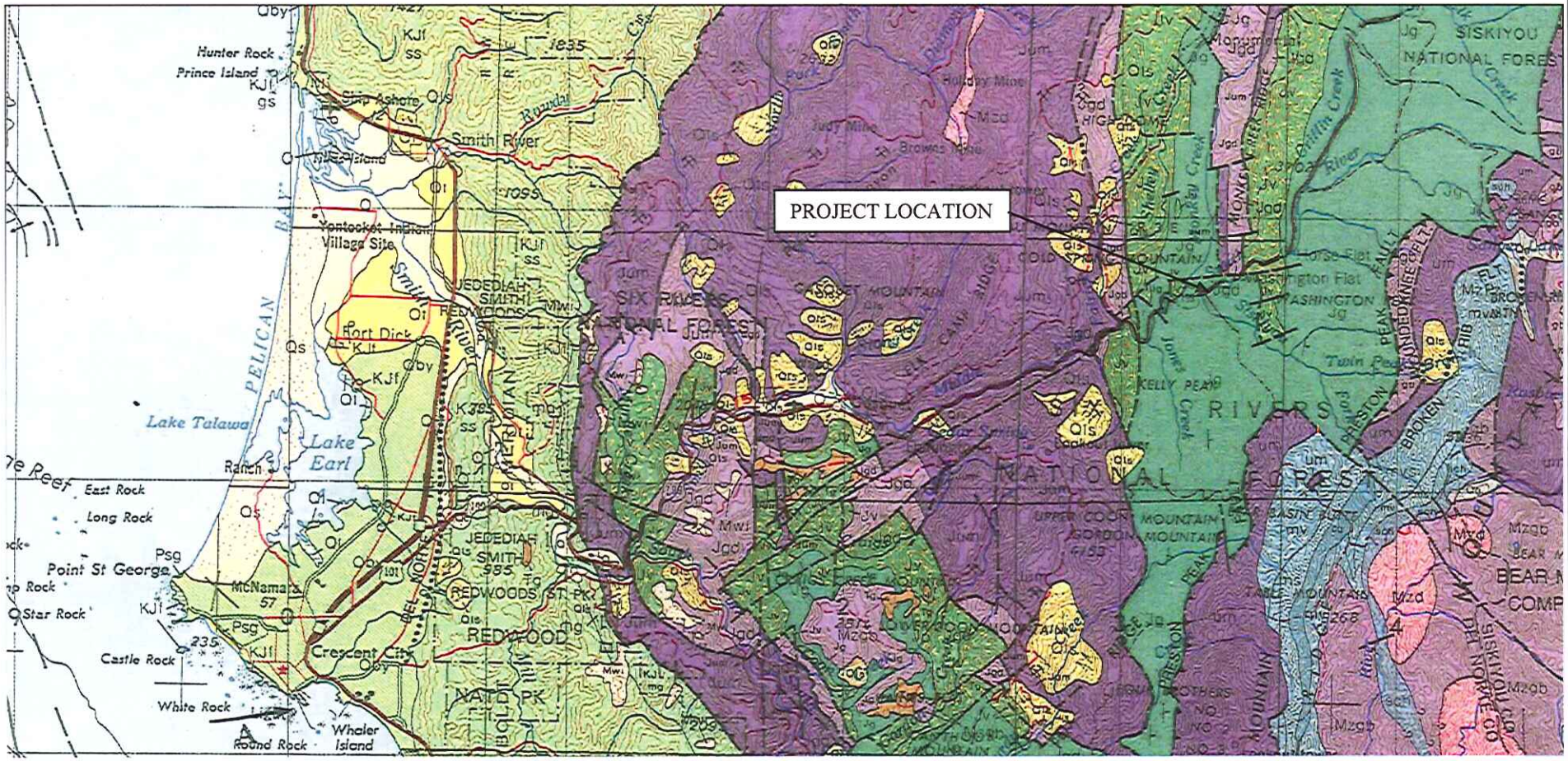
C C' CROSS SECTION LOCATION AND ID

WALL LAYOUT LINE

REFERENCE DRAWING DATED SEPTEMBER 7, 2011

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North
Branch B

EFIS: 0100000371	SITE PLAN
DATE: JANUARY 2012	
FOUNDATION REPORT FOR RETAINING WALL AT PM 25.5	FIGURE 2



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Reference: Wagner, D. L. and Saucedo, G.J. "Geologic Map of the Weed Quadrangle, California" 1987

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Caltrans

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North
Branch B

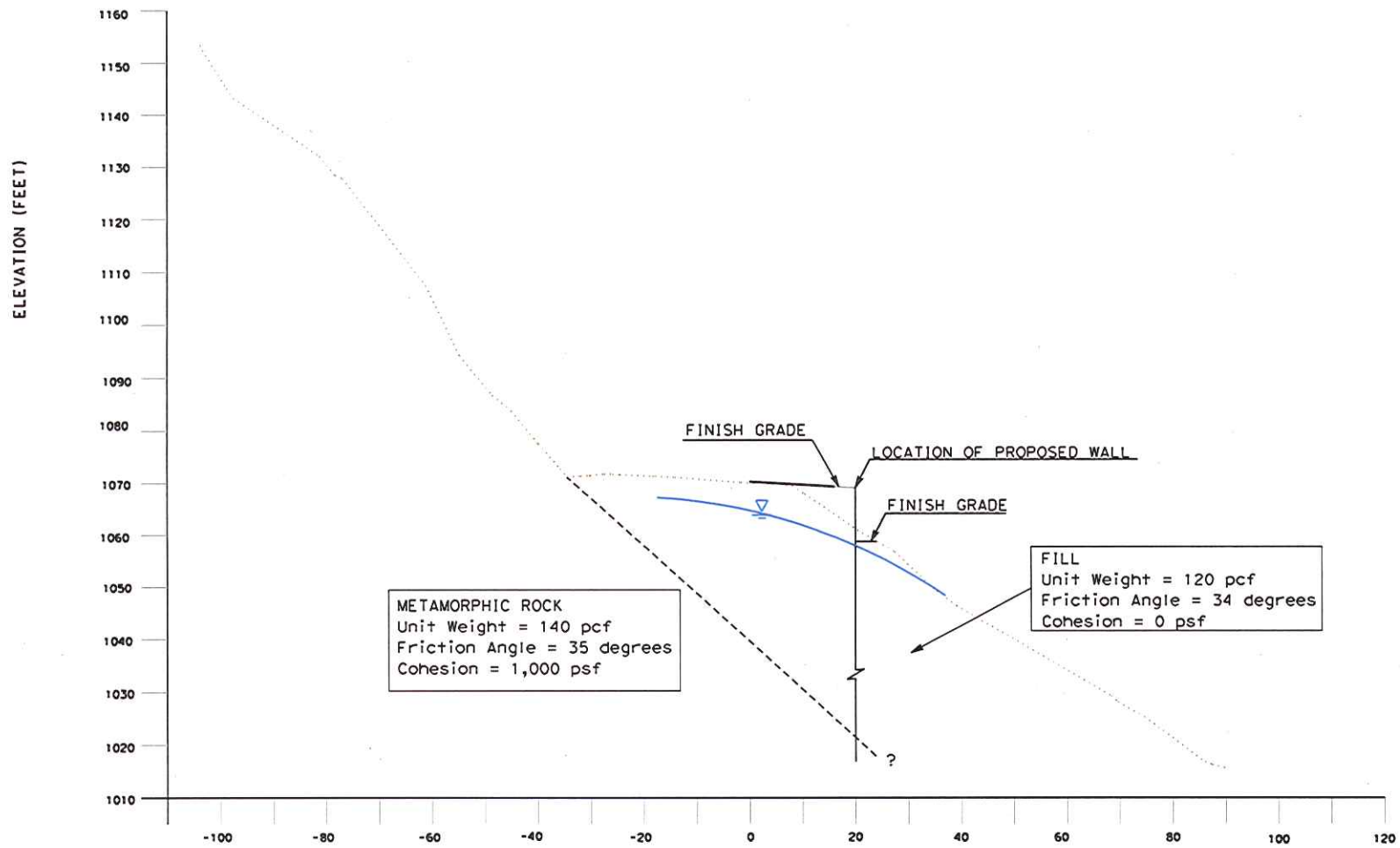
EFIS: 0100000371

Date: January 2012

PROJECT GEOLOGIC MAP

FOUNDATION REPORT
RETAINING WALL AT PM 25.5

Figure 3



EXPLANATION

GEOLOGIC CONTACT (DASHED WHEN APPROXIMATE)

GROUNDWATER SURFACE ASSUMED FOR DESIGN

REFERENCE DRAWING DATE: SEPTEMBER 7, 2011

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

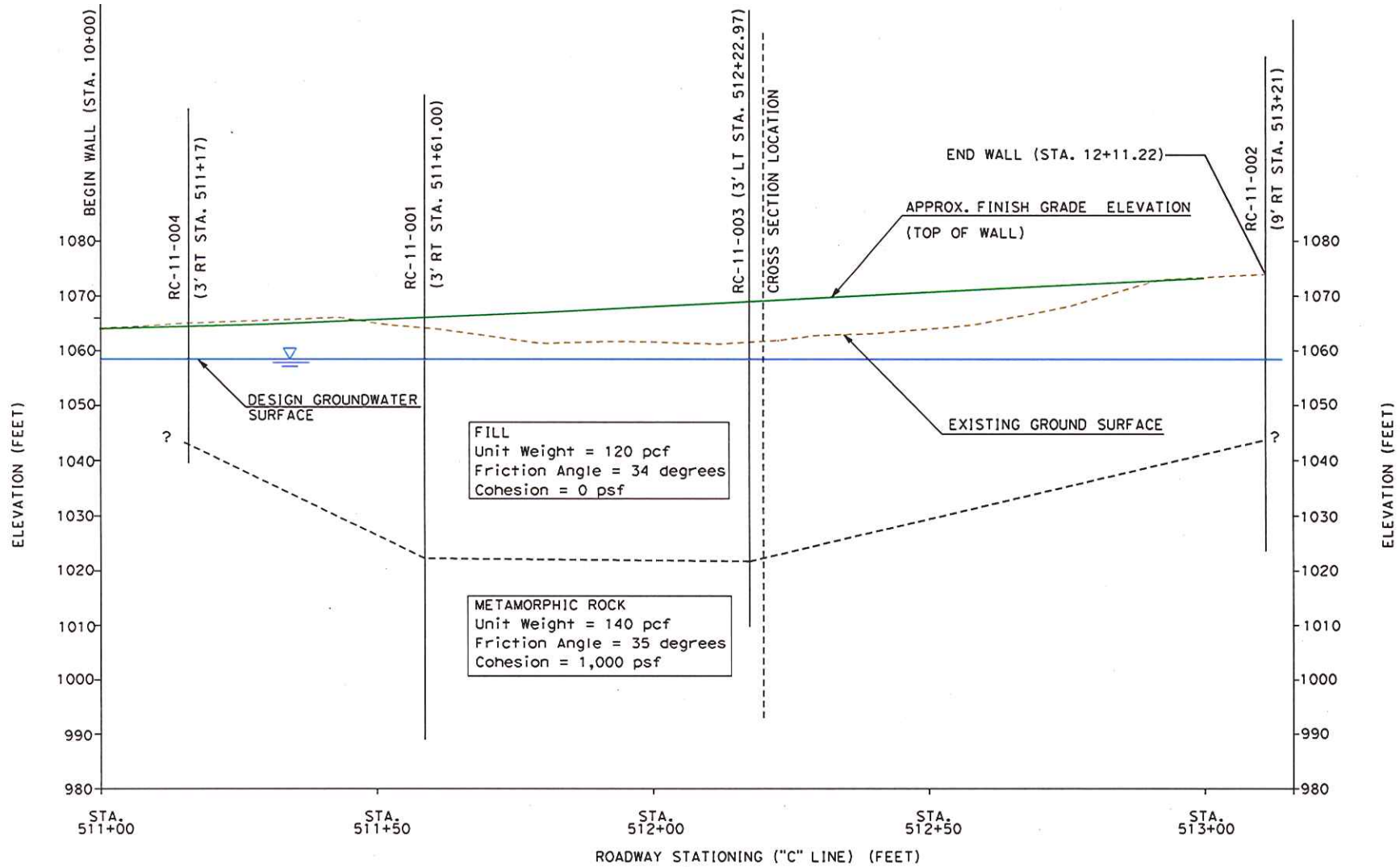
EA: 01-00000371

DATE: JANUARY 2012

TYPICAL CROSS SECTION

FOUNDATION REPORT
RETAINING WALL AT PM 25.5

FIGURE 4



EXPLANATION

Geologic Contact (dashed where approximate)

NOTES:
Depths to the geologic contacts are projected.
Reference drawing date: 09/07/2011

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North
Branch B

EFIS ID: 0100000371
DATE: JANUARY 2012

SUBSURFACE GEOLOGY ALONG WALL LAYOUT LINE

FOUNDATION REPORT
RETAINING WALL AT PM 25.5

FIGURE 5

APPENDIX A

01-DN-199- PM 25.5
EA: 01-4794010901 EFIS ID: 0100000371

SUMMARY OF LABORATORY TEST RESULTS

GRAIN SIZE ANAYLYSIS

Boring ID	Depth (ft, bgs)	USCS	Description	ASTM Atterberg Limits		
				LL	PL	PI
RC-11-001	10' - 15'	SM	Silty Sand with Gravel	16	13	3
RC-11-002	6 ' - 10'	GC-GM	Silty, Clayey Gravel with Sand	19	15	4

CORROSION TEST SUMMARY

Boring ID	Depth (ft, bgs)	Min.Resistivity (ohms)	pH
RC-11-002	5' - 10'	4,000	6.67

State of California
Department of Transportation

Business, Transportation and Housing Agency

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Flex your power!
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To: JEFF SIMMS
Structure Design Branch 1
Office of Bridge Design North

Date: February 20, 2013

File: 01-DN-199-PM 20.5/25.7
EA: 01-479401
EFIS ID: 0100000371

Attn: Kevin Harper

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH
BRANCH B

Subject: Foundation Report Addendum for Retaining Wall at PM 25.5

In response to a request from Structure Design Branch 1, the Foundation Report for the Retaining wall at DN 199 PM 250.5, dated January 19, 2012 should be modified with the following recommendations.

The references to Sections 49-4.03 and 51-1.10 of the Standard Specifications on page 6 are deleted.

The reference and the excerpt of Standard Special Provisions S5-280 on page 6 shall be replaced with the following:

Standard Specifications (SP) 2-1.06B, "Supplemental Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening.

The Information Handouts available for the Bidders are the:

"*Foundation Report, Retaining Wall at PM 25.5, dated January 19, 2012"*

"Foundation Report Addendum for Retaining Wall at PM 25.5, dated February 20, 2013"

This may be viewed at the Bidders' Exchange Web site.

Rock cores may be viewed by sending a request to Coreroom@dot.ca.gov.

If you have any questions or require further assistance, please contact June James at (707) 441-4692 or Charlie Narwold at (707) 445-6036.

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CHARLIE NARWOLD
Senior Engineering Geologist
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GS File Room (email gs_file_room@dot.ca.gov)
Structure Construction RE Pending File (email RE_pending_file@dot.ca.gov)
Project Manager

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: LENA ASHLEY
BRANCH CHIEF
North Region Design Branch E-3

Date: February 21, 2013

File: 01-DN-199-PM 23.92/24.26
EA 01-479401
EFIS 0100000371
Realignment/Widening

Attn: Todd Lark
Project Engineer

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Cutslope Recommendations

Introduction

This report, prepared by the Office of Geotechnical Design-North (OGDN), provides geotechnical recommendations for the proposed cut and double twisted wire mesh drapery at Location 2 on the Patrick Creek Narrows Project. Location 2 is located on Route 199 between PM 23.92 and 24.62, in Del Norte County, California (Figure 1).

Project Description/Scope of Work

The purpose of the Patrick Creek Narrows Project is to upgrade State Route 199 to accommodate Surface Transportation Assistance Act (STAA) approved trucks. This section of State Route 199 has tight radius curves and negligible shoulders that do not allow longer STAA trucks to negotiate turns without off-tracking into the adjacent lane. The project proposes to realign and widen State Route 199 at 3 locations: Location 1 (PM 20.5), Location 2 (PM 24.0), and Location 3 (PM 25.6). The proposed improvements will enhance safety by improving site distances and superelevations, and widen the highway to provide room for off-tracking. Realignment and widening of the highway at Location 2 includes replacing Middle Fork Smith River Bridge (Br. No. 01-0015).

The recommendations contained in this report are based on a review of geologic literature and mapping, review aerial photographs, field mapping, and the results of a seismic refraction survey.

Regional/Site Geology

The project is located in the Western Klamath Terrane within the Klamath Mountains geomorphic province. Based on mapping by Irwin (1994) and Wagner and Saucedo (1987) the project site is underlain by the Late Jurrassic Galice Formation which mainly consists of mildly slaty to phyllitic argillite, greywacke, stretched-pebble conglomerate and greenstone (Figure 2).

The site is located in steep mountainous terrane along the Middle Fork Smith River. The existing cuts have slopes that range from approximately 45 to 80 degrees. The native slopes above the existing cuts have slopes that range from approximately 30 to 45 degrees.

The existing cut between Station 500+40 and approximately 504+80 exposes predominantly metamorphosed graywacke sandstone interbedded with slate (Figure 3). The strike of the bedding ranges between 302° and 360°. The dip of the beds range between 36° and 57°. The metagraywacke and slate exposed in the existing cut is typically moderately to intensely weathered, moderately hard to hard, and intensely fractured to very intensely fractured. From Station 504+80 to Station 507+00 the slope consists mainly of alluvium composed of poorly graded sand and gravel with rounded and subrounded cobbles and boulders, overlying rock.

Subsurface Conditions

No borings were drilled within the limits of the proposed cut. Three vertical mud rotary borings (RC-10-003, RC-11-004 and RC-11-005) were drilled in the roadway east of the proposed cut in order to characterize the subsurface conditions for the proposed structures. The boring locations and logs are shown on the Log of Test Borings (LOTBs).

Laboratory Testing

Laboratory testing was performed on selected samples of the subsurface materials as part of the subsurface investigation for the proposed structures. Strength testing on selected rock samples consisted of unconfined compression strength tests (ASTM D 7012) and point load index tests (ASTM D 5731). The results of the point load and unconfined compression strength tests are reported on the Log of Test Borings (LOTBs).

Groundwater

No springs or seeps were observed on the existing slopes within the limits of the proposed cut.

Groundwater elevations were measured in borings RC-10-003 and RC-11-004 during the field investigation for the proposed structures and are reported on the Log of Test Borings (LOTBs).

Seismic Refraction Survey

Two seismic refraction lines were surveyed as part of the field investigation for the proposed cut. The approximate locations of the seismic refraction survey lines are shown in Figure 4. The velocity profiles for Seismic Refraction Line 1 and Seismic Refraction Line 2 are shown in

Figure 5 and Figure 6, respectively. The following table summarizes the results of the seismic refraction surveys.

Line No.	Layer	Average Thickness (ft)	Velocity (ft/s)	Rippability[1]
Line 1	1	9.2	1000	ER
Line 1	2	NA	11400	NR
Line 2	1	6.8	1500	ER
Line 2	2	NA	6860	NR

[1]ER-Easily Ripped, MD-Moderately Difficult, DR-Difficult Ripping, NR-Not Rippable, NA-Not applicable

Layer 1 is interpreted to be alluvium and Layer 2 is interpreted to be rock. The difference in the seismic velocity for Layer 2 between Line 1 and Line 2 is attributed to the rock being anisotropic. The orientation of Line 1 is parallel to the strike of the bedding and Line 2 is perpendicular to strike. The differences in velocity are due to the rock having properties that differ according to the direction of measurement.

Ripping ability is based on unpublished Caltrans data for a Caterpillar D9 series bulldozer with a single-tooth ripper. The velocities and corresponding rippability is as follows:

Velocity (ft/s)	Rippability
<3445	Easily Ripped
3445-4921	Moderately Difficult
4921-6562	Difficult Ripping
>6562	Not Rippable

Different excavation equipment may experience different results. Penetrating efficacy of the ripping tooth is often more important in predicting ripping success that seismic velocity alone.

The seismic velocities indicate the rock is not rippable. However, based on the fracture density observed in the existing cut and reported on the LOTBs for borings RC-10-003, RC-11-004 and RC-11-005, it is anticipated that the majority of the rock within the limits of the proposed cut will be rippable. The rock exposed in the existing cut and encountered in borings RC-10-003, RC-11-004 and RC-11-005 is predominantly intensely or very intensely fractured.

Recommendations

A slope ratio of 0.5(H):1(V) is recommended for the proposed cut between Station 500+40 and Station 504+80. A slope ratio of 0.75(H):1(V) is recommended for the proposed cut between Station 504+80 and Station 507+00. Between Station 501+05 and Station 506+90 the cutslope should be covered by a double twisted wire mesh drapery. The drapery should extend 10 feet beyond the **proposed** top of cut from 501+05 to 502+60 and from 504+25 to 506+90. Between

Station 502+60 and Station 504+25 the drapery should extend 10 feet beyond the top of the **existing** cut. The double twisted wire mesh drapery should terminate 4 feet above the toe of the proposed cut. Refer to the Standard Special Provisions and Project Plans for details regarding the proposed double twisted wire mesh drapery.

Construction Considerations

Based on the degree of fracturing observed in the existing cut and reported on the LOTBs for borings RC-10-003, RC-11-004 and RC-11-005, it is anticipated that the majority of the rock within the limits of the proposed cut will be rippable. We anticipate zones requiring the use of pneumatic hammers, hydraulic splitters or other rock excavation techniques will be encountered within the limits of the proposed cut. Based on field mapping, the rock within the limits of the proposed cut between Station 500+40 and Station 501+10 is moderately to slightly fractured and may require blasting for excavation.

If rock that cannot be ripped is encountered within the limits of the proposed cut requiring the use of pneumatic hammers, hydraulic splitters or other rock excavation techniques, removal of the rock will be performed in accordance with Standard Special Provision 19-4 Rock Excavation. If blasting is required, all blasting will be performed in accordance with Standard Special Provision 19-4 Rock Excavation (Controlled Blasting).

If you have any questions or require further assistance, please call Charlie Narwold at (707) 445-6036.

CN

CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design - North
Branch B

Attachments:

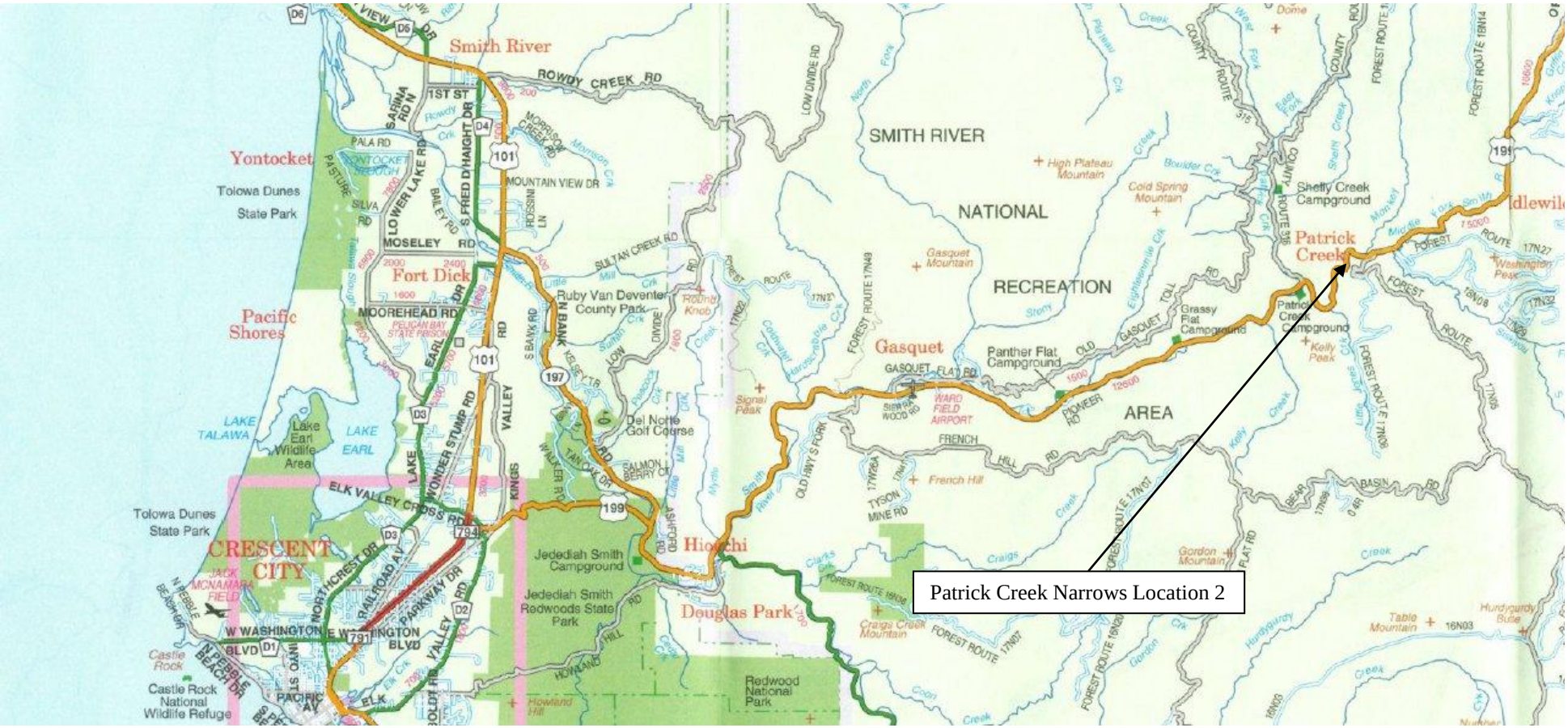
Figure 1 –Vicinity Map
Figure 2 –Geologic Map
Figure 3 –Photo of Existing Cutslope
Figure 4 –Plan Map
Figure 5 –Seismic Refraction Line 1 Velocity Profile
Figure 6 –Seismic Refraction Line 2 Velocity Profile

c: OGDN Project Folder
GS File Room
Construction RE Pending File
Project Manager

References

Irwin, W.P., 1994, Geologic map of the Klamath Mountains, California and Oregon: U.S. Geological Survey Miscellaneous Investigations Series Map I-2148, scale 1:500,000.

Wagner, D.L. and Saucedo, G. L., 1987, Geologic Map of California the Weed quadrangle, California, 1:250,000: California Division of Mines and Geology (California Geological Survey), Regional Geologic Map Series, Map No. 4A.



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Branch B

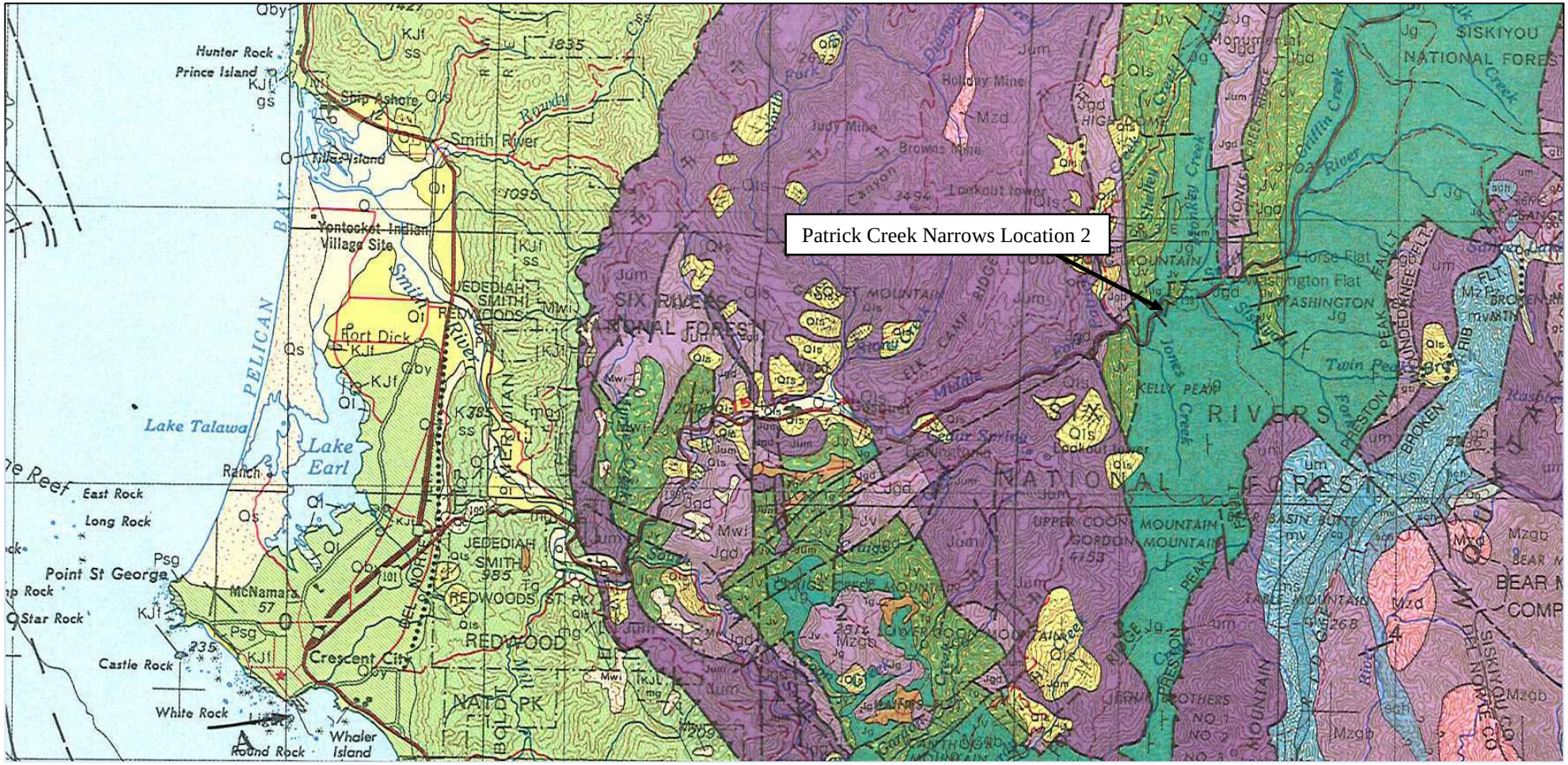
EFIS ID: 0100000371

Date: February 2013

Vicinity Map

01-DN-199 PM 23.92/24.26

Figure 1



SCALE : 1:250,000

Reference: Wagner, D. L. and Saucedo, G.J. "Geologic Map of the Weed Quadrangle, California" 1987

- Jg — Galice Formation *(Marine; slate, metagraywacke, and greenstone)*
- Jv — Volcanic rocks *(Pillow lava and breccia)*
- Jgd — Gabbro, diorite, and related rocks
- Jum — Ultramafic rocks—partially to completely serpentinized

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EFIS ID: 0100000371	Geologic Map
Date: February 2013	
01-DN-199 PM 23.92/24.26	Figure 2

Photo of existing cutslope between approximately Station 502+75 and Station 503+75.

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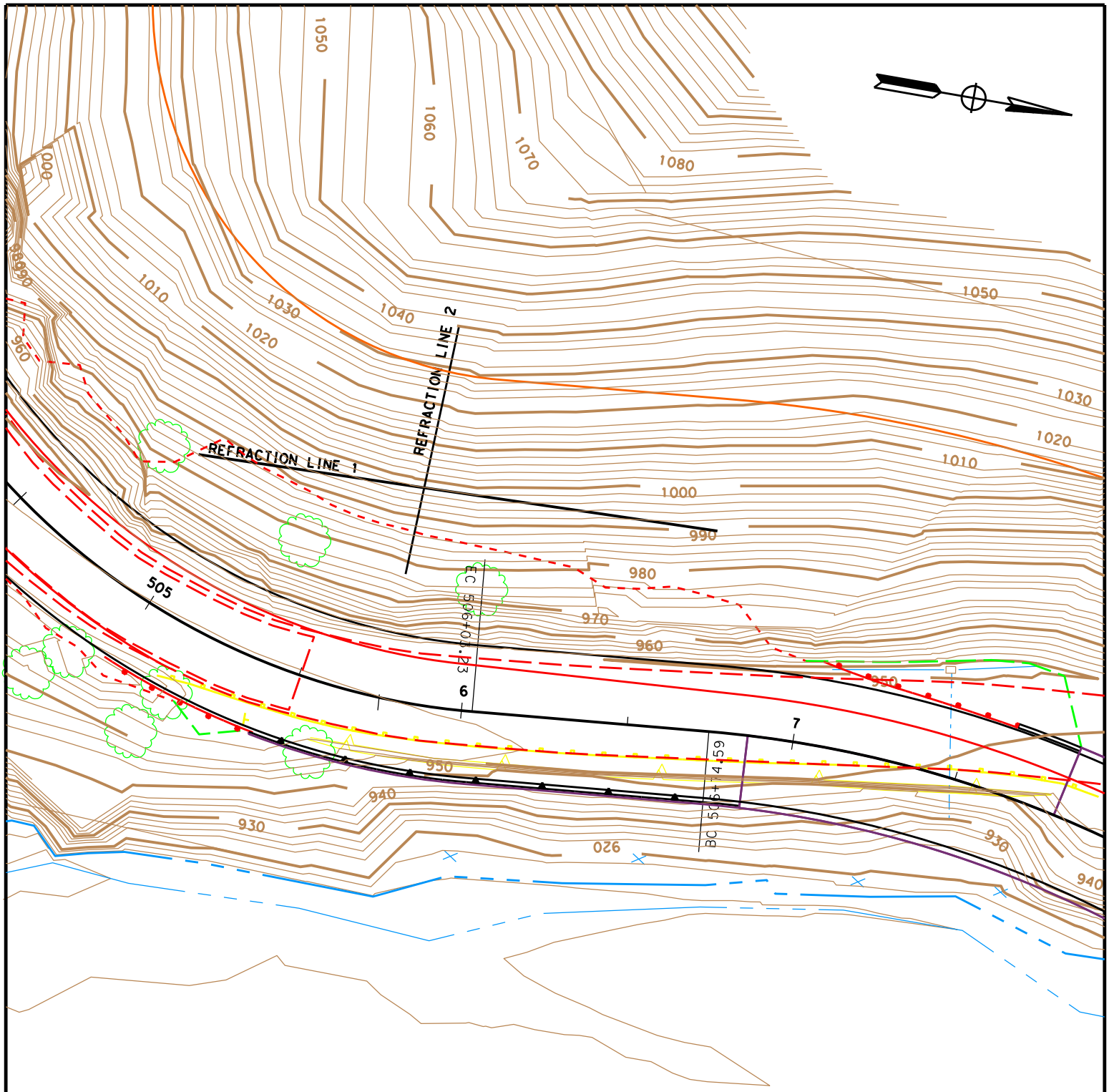
Date: February 2013

Photo of Existing Cutslope

01-DN-199 PM 23.92/24.26

Figure 3



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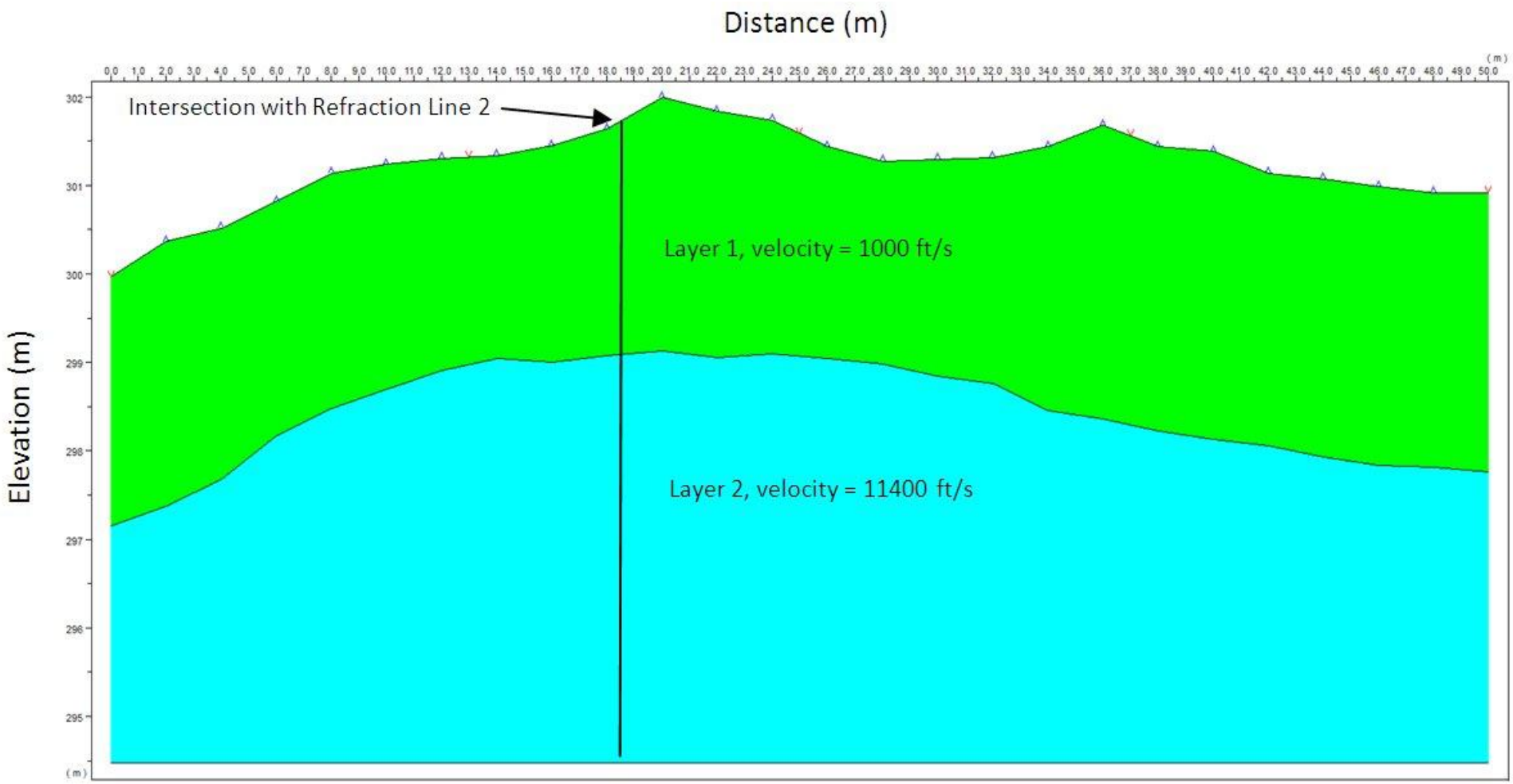
DATE: FEBRUARY 2013

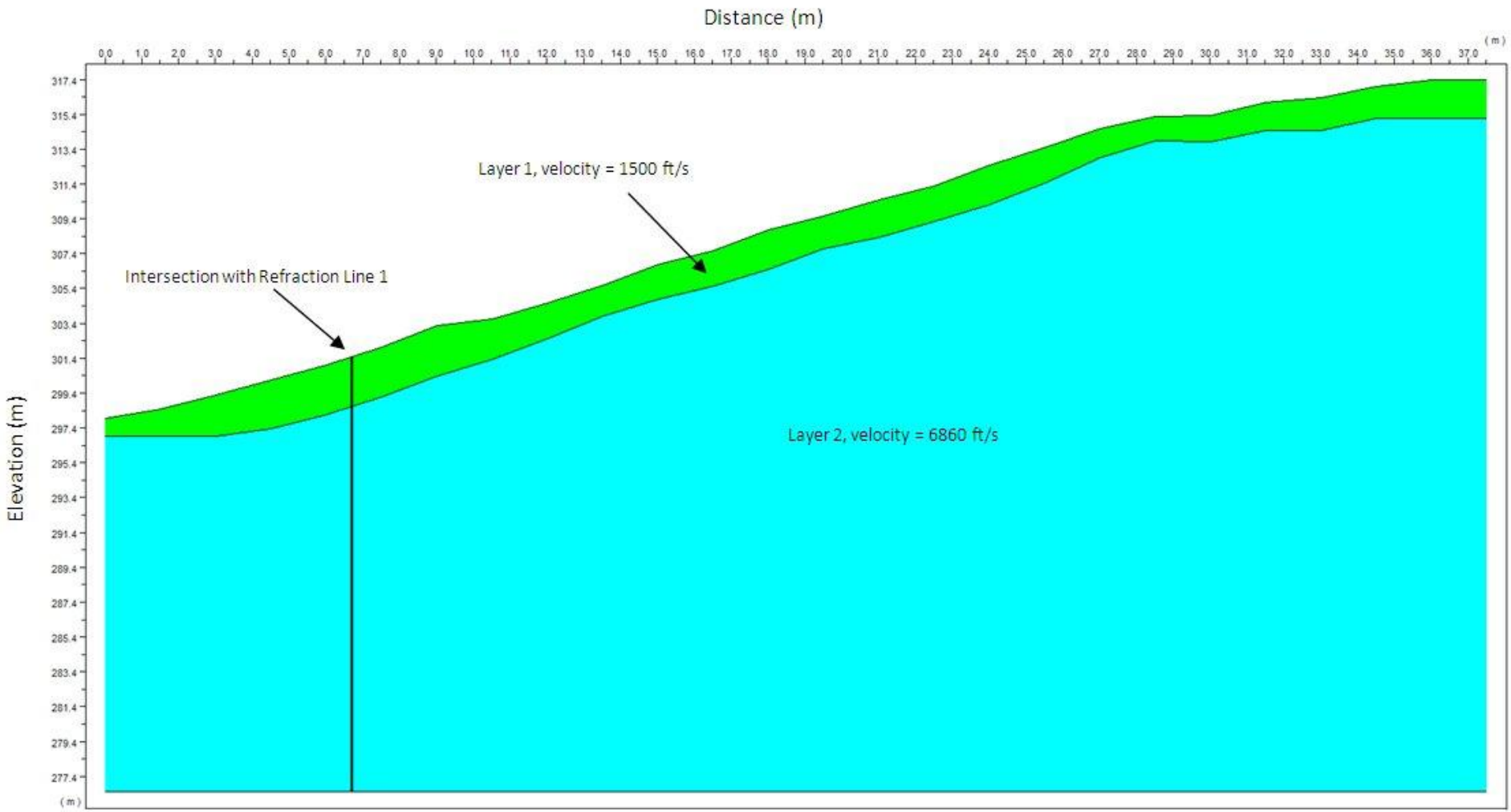
PLAN MAP

01-DN-199-PM 23.9/24.26

FIGURE 4



Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design North Branch B	EFIS ID: 0100000371 Date: February 2013	Seismic Refraction Line 1 Velocity Profile
	01-DN-199 PM 23.92/24.26	Figure 5



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EFIS ID: 0100000371

Date: February 2013

Seismic Refraction Line 2 Velocity Profile

01-DN-199 PM 23.92/24.26

Figure 6

Enclosure 1. 2011 NSO Survey Protocol – 2012 Revision

PROTOCOL FOR SURVEYING PROPOSED MANAGEMENT ACTIVITIES THAT MAY IMPACT NORTHERN SPOTTED OWLS

Endorsed by the
U.S. Fish and Wildlife Service

February 2, 2011

Revised January 9, 2012

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PROTOCOL FOR SURVEYING PROPOSED MANAGEMENT ACTIVITIES THAT MAY IMPACT NORTHERN SPOTTED OWLS
(2011 Protocol)

1.0 INTRODUCTION

The U.S. Fish and Wildlife Service (Service) developed this 2011 NSO Survey Protocol (2011 Protocol) to promote consistent and scientifically rigorous procedures to survey for northern spotted owls (*Strix occidentalis caurina*; spotted owl) in areas where management activities may remove or modify spotted owl nesting, roosting or foraging habitat (excluding areas defined as dispersal habitat). This protocol should also be applied to activities that disrupt essential breeding activities and to activities that may injure or otherwise harm spotted owl other than through habitat modification (e.g., noise disturbance, smoke from prescribed fire). This 2011 version of the survey protocol builds upon the 1992 Protocol and incorporates changes made to the Draft 2010 Protocol.

In recent years, research on spotted owls provided insights that raised concerns regarding the effectiveness of surveys, particularly those which do not result in spotted owl detections. Specifically, the invasion of the Pacific Northwest by the barred owl (*Strix varia*), an aggressive and potentially significant competitor of the spotted owl, has resulted in a suppression effect on spotted owl response rates (Olson et al. 2005, Crozier et al. 2006). Therefore, survey results that do not account for barred owl effects on spotted owl detection rates may provide false or insufficient information about spotted owl presence in the survey area, and lead to forest management activities that may impact spotted owls and be in conflict with the Endangered Species Act.

To address this concern, the Service and cooperators (see list below) conducted analyses of historical survey data during 2009 and 2010, leading to estimates of detection rates for spotted owls that account for the effects of barred owl presence. Information utilized to generate the detection rates came from long-term spotted owl demography studies (Anthony et al. 2006, Olson et al 2005, Dugger et al. 2009, Bailey et al. 2009, Kroll et al. 2010) and spotted owl site and timber-harvest related surveys on private industrial forest lands in Oregon and California (Kroll et al. 2009). These detection rates, along with data on spotted owl site colonization and extinction probabilities, and empirical analysis of spotted owl site occupancy (Olson et al. 2005, Dugger et al. 2009, Kroll et al. 2010a), were utilized in developing this protocol. These analyses provided strong evidence that the 2-year, 3-visits-per-year requirement, as described in the 1992 protocol, was no longer sufficient to provide a reasonable likelihood of detecting territorial spotted owls where barred owls occur. Lastly, to improve the efficiency and practicality of this protocol, the professional opinion of researchers, survey practitioners, and regulators were integrated into this product.

Use of the 2011 Protocol should serve two primary purposes: (1) provide a methodology that results in adequate coverage and assessment of an area for the presence of spotted owls, and (2) ensure a high probability of locating resident spotted owls and identifying owl territories that may be affected by a proposed management activity, thereby minimizing the potential for

unauthorized incidental take. While this protocol utilizes the best available information for conducting project-level surveys, the protocol is not designed to monitor yearly trends of spotted owls or for many other research applications.

This protocol should be implemented across the northern spotted owl's range. However, in some areas local conditions, particularly when supported by appropriate data, may warrant deviations from this protocol. These deviations may occur through mutual cooperation between the landowner or their representative and the appropriate regulatory agency. Spotted owl surveys that are conducted as part of demographic long-term monitoring programs (see areas described in Forsman et al. 2011) can be considered reasonable alternatives to implementation of this protocol.

This document describes the methodology for surveying for spotted owls. It is the Service's expectation that practitioners should read and fully understand the details of the 2011 Protocol as described herein. The development of the Protocol has benefitted from data analysis, input, and reviews by the interagency Barred Owl Work Group (organizations listed below), established pursuant to 16 U.S.C. 1533(f)(2) to assist in implementing recovery plan actions.

Bureau of Land Management
California Department of Fish and Game
Green Diamond Resource Company
Hancock Forest Management
National Audubon Society, Seattle Chapter
National Council for Air and Stream Improvement
Oregon Department of Fish and Wildlife
Oregon Department of Forestry
Oregon State University
Plum Creek Timber Company
Raedeke Associates, Inc.
The Campbell Group
U.S. Fish and Wildlife Service
U.S. Forest Service
Washington Department of Fish and Wildlife
Weyerhaeuser Company

2.0 COORDINATION AND SHARING OF INFORMATION

Spotted owl survey crews, consultants, and their clients are strongly encouraged to coordinate with others doing similar surveys in nearby areas, during all phases of the survey effort. Appropriate coordination involves:

- pre-season planning, including coordination of commitments by adjacent land managers on the areas to be surveyed by each party in the event that multiple parties are working in the same landscape; this limits unnecessary calling of owls and is a cost-savings for landowners;

- immediate communication of results, positive or negative, that may affect other land managers or regulatory actions; and
- exchange of post-survey season information summaries.

Common inefficiencies, such as overlapping or excessive known spotted owl site visits by more than one survey group, can be avoided through coordinated pre-planning. It is also advisable to inform adjacent land managers of all surveys near their ownership because new survey results may affect their management activities.

To enhance coordination efforts, the Service, through its local field offices, will participate in and, if needed, initiate pre-survey coordination meetings. The purpose of the meetings will be to:

- allow representatives from land management agencies and organizations conducting surveys to share information on the approximate extent of planned survey areas,
- look for ways to reduce potential survey overlap to avoid and minimize harassment of spotted owls,
- discuss opportunities for sharing information throughout the field season,
- provide discussion opportunities related to implementation of the survey protocol, and
- share information on techniques used in surveying spotted owls that will enhance the likelihood of obtaining responses.

The Service *strongly recommends* entities or their representatives conducting spotted owl surveys attend these coordination meetings. Local meeting coordinators should distribute information related to these meetings prior to the breeding season to federal, state, tribal and private landowner organizations. The Service also recommends that both federal and non-federal entities conducting spotted owl surveys provide frequent updates of new data to the state and federal agencies responsible for maintaining spotted owl databases as the information informs evaluation of potential impacts to spotted owls from forest management practices. In addition, the Service recommends that barred owl data also be reported to appropriate state and federal database managers.

3.0 ESTABLISHING THE AREA TO BE SURVEYED

Prior to doing any field survey, the appropriate area to be surveyed should be identified from maps, aerial photos, GIS, or other resources.

3.1 Identifying the Project Area

The first step in conducting surveys for spotted owls is to identify the *PROJECT AREA*[1]. This area includes all lands delineated for the proposed project that may be subject to activities potentially impacting spotted owls through habitat modification, direct injury, noise disturbance, or any other means. For the purposes of this protocol, the project area is the polygon (or multiple polygons) that forms the footprint of the proposed project. Examples of project areas include timber harvest units, prescribed fire areas, disposal sites, road rights-of-way, etc. (Figure 1.).

3.2 Delineating the Survey Area

Once the project area is determined, the *SURVEY AREA* can be established and mapped. The survey area is defined as the area extending one provincial median annual home range radius from the perimeter of the project area for projects that will remove or modify nesting, roosting, or foraging habitat (see Section 9.0 for guidelines for disturbance-only projects). Table 1 indicates appropriate home range radii to use for projects within each physiographic Province. Figure 1 provides a hypothetical example of a survey area established around a multi-unit project area, based on a provincial home range radius area established surrounding the multiple project units.

Table 1. Provincial survey radius to apply when determining the survey area around proposed projects that may impact northern spotted owls, by Physiographic Province[2].

Physiographic Province	Provincial Survey Radius (mi.)
Olympic Peninsula	2.7
Washington Cascades	1.8
Oregon Coast Ranges	1.5
Oregon Klamath	1.3
Oregon Cascades	1.2
California Klamath	1.3
California Cascades	1.3
California Coast Range (Douglas-fir/mixed conifer zone	1.3
California Coast Range (redwood zone)[3]	0.7

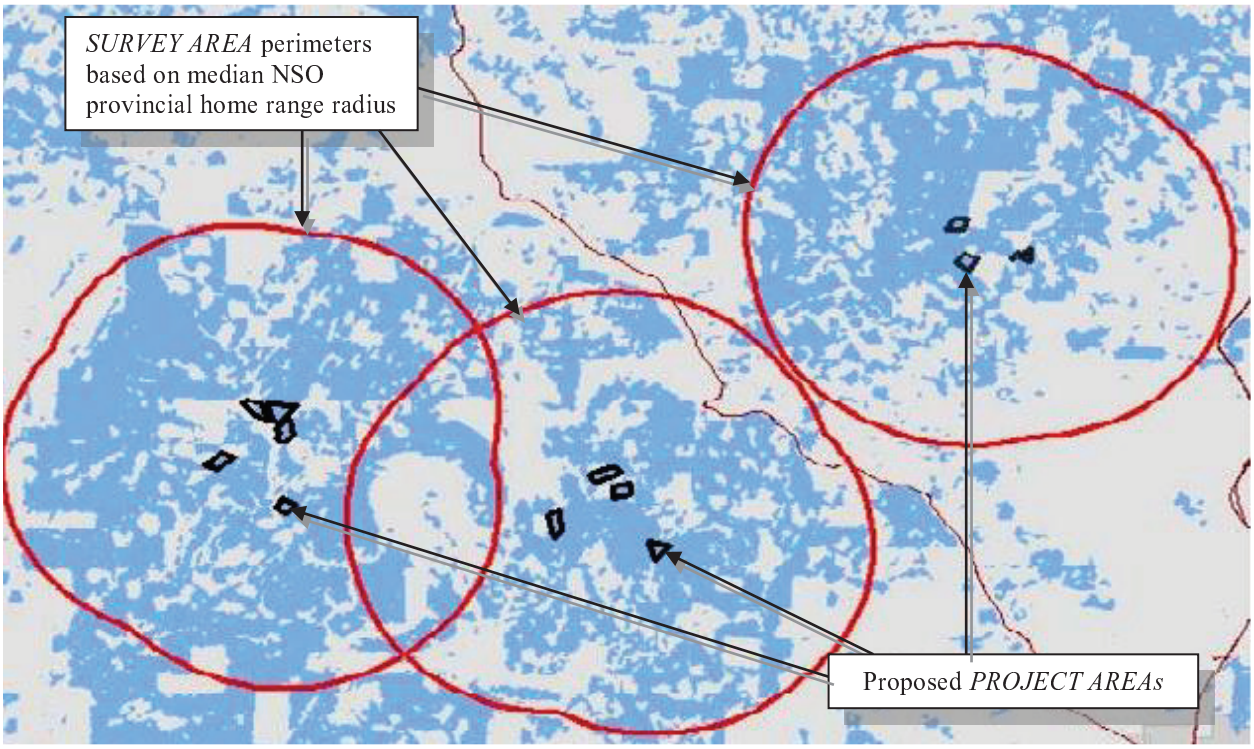
3.3 Habitat to Survey

For the purposes of this protocol, the *HABITAT TO SURVEY* includes any habitat within the survey area where protocol surveys may elicit a response from a resident owl or pair of owls (i.e., nesting, roosting, or foraging habitat). The survey effort need not include stands typically characterized as spotted owl dispersal habitat that does not normally function as nesting, roosting, or foraging habitat for territorial spotted owls. Descriptions of spotted owl habitat specific to various regions may be available from state wildlife or forestry agencies, or

[1] Terms specific to this document appear in *ITALIC CAPITALS* in their first use, and are defined in the Glossary of Terms (Appendix 1). These terms appear in normal font in subsequent use in this document.
[2] Appendix 7 provides a map of the Physiographic Provinces.
[3] The Arcata Fish and Wildlife Office will provide further guidance delineating the "redwood zone"

local Service Field Offices[4]. Habitat descriptions can also be found in these references: Thomas et al. 1990, Courtney et al. 2004, USDI Draft Revised 2010 Northern Spotted Owl Recovery Plan. Regulatory definitions may be of use where appropriate (e.g., definitions within state forest practices regulations; however, recognize that in some areas the Service does not support definitions of habitat used in current state forest practice regulations.) Surveyors should seek out this information from the appropriate regulatory agency prior to implementing surveys.

Figure 1. Hypothetical landscape with spotted owl habitat (darker color) and proposed project areas (project footprint) with the provincial median survey radius indicated by the three larger circular polygons.



4.0 SURVEY PERIOD

The *SURVEY PERIOD* is the time during which survey visits should occur to be counted toward meeting criteria for complete surveys (defined fully in section 11.0). For purposes of this protocol, the following survey periods are prescribed:

1. The *general* survey period throughout the range of the northern spotted owl is specified as March 15 through August 31. Forsman et al. (1984) indicate that courtship behavior

[4] Appendix 2 provides contact information for Fish and Wildlife Service Field Offices within the range of the northern spotted owl.

usually begins in February or March, with the timing of nesting and fledging varying upon elevation and latitude. April 1 coincides with incubation in most areas (exceptions addressed below). Appendix 3 provides a generalized spotted owl breeding chronology.

2. In the Oregon and California Coast Ranges, local information suggests that spotted owls defend established territories as early as March 1. Therefore, in the Oregon Coast Range Province and California Coast Range Province, the survey period can be initiated on March 1, and survey conducted at that time (and otherwise consistent with this protocol) may be counted toward a complete survey. Please recognize that determinations for nesting and non-nesting status are to be conducted during specific periods of the survey season (Section 17.0). To maximize efficiency, occupancy and nesting status surveys should coincide.

3. Specific to the western Washington Cascades, the fledgling period can extend to September 15. Here, local information has shown that spotted owls return to their established territories later and defend their territory well into September (D. Herter pers. comm. and unpublished data October 2009; R. Pearson pers. comm. and unpublished data, November 2009). Therefore, within the Western Washington Cascades Province, surveys may continue as late as September 15 and count toward meeting a complete survey.

There may be cases where positive responses occur outside the above survey periods. These responses may provide important information, but will require closer evaluation to determine if the responses represent core use areas. Surveys outside the above dates do not count towards the number of visits required for completing the year's survey without seeking concurrence from the Service.

5.0 GENERAL SURVEY DESIGN

The intent of any survey is to obtain complete coverage of spotted owl habitat within the survey area, and in a manner in which spotted owls will be able to hear the surveyor and the surveyor will be able to hear responding owl vocalizations.

5.1 Calling Routes

Establish calling stations and survey routes to achieve complete coverage of all habitat within the survey area. Spacing of calling stations can be determined by the topography and acoustical characteristics (e.g., background noise such as creeks) of the area; stations are typically spaced between 0.25 and 0.5 mile apart. Surveyors should take advantage of prominent points within the survey area when establishing calling stations. Use of prominent points should not be at the cost of not being able to hear distant responding owls. Tips on placing call stations to maximize acoustical coverage can be found on the Service's website (http://www.fws.gov/species/nso).

5.2 Known Spotted Owl Sites

Where *KNOWN SPOTTED OWL SITES* exist within the survey area, surveys should be initiated at the *ACTIVITY CENTER* (see section 8.0). Once the occupancy and/or

reproductive status (per your management need) for the year is determined, spotted owl habitat within a 0.5 mile radius of the site center can be excluded from further surveying for the remainder of the season. Adjustments beyond the 0.5 mile area can be made to avoid unnecessary or excessive calling of spotted owls depending on topography. Rationale for this type of exception should be provided on field survey forms.

5.3 Survey Procedures

Both nighttime and daytime surveys are recommended. Research data indicate that nighttime calling remains an efficient way of detecting spotted owls. In addition, some recent research data along with professional opinion by research personnel suggest that strategic daytime surveys are also an effective way for locating spotted owls. Thus, this protocol advises the use of both under certain situations, as described in "Daytime Stand Searches" (see section 13.0) below. Three types of surveys are accepted: spot calling, continuous walking and calling, and leapfrog surveys. Each is described below. Spot calling is the recommended method. Whatever method you use, be sure you cover all spotted owl habitat within the survey area.

5.3.1 Nighttime Spot Calling

Set up a series of fixed calling points approximately 0.25 to 0.5 mile apart or as needed to account for local acoustical conditions, along road, trails and/or transects. When possible, pick prominent points which allow coverage of large areas. Spend at least 10 minutes at each point. Topography with prominent features (e.g., high ridges, road landings situated above large drainages, etc.) may lend itself to more effective coverage. Whatever the topographic situation, be sure that you have sufficient overlap in calling coverage from point to point, whereby you are able to hear responding owls and that all spotted owl habitat within the entire survey area is adequately covered.

5.3.2 Continuous Walking Surveys

Continuous walking surveys occur during the night or day and are utilized when nighttime spot calling from roads or trails cannot be accomplished. Walk the designated route playing the electronic caller and pause at prominent points and at regular intervals throughout the area to conduct informal stations that are at least 3 minutes in duration.

5.3.3 Leapfrog Surveys (Nighttime)

If two people are involved, you may use a leapfrog method along roads (see Forsman 1983).

5.4 Survey Components

Regardless of the procedures used above, implementation of the following components will meet the objectives of the protocol.

5.4.1 Qualifications of Crew Leaders and Surveyors

Information regarding the qualifications, training, and experience of surveyors and crew leaders is presented in Appendix 4.

5.4.2 Digital Wildlife Callers

As of 2011, the Service advises use of high quality digital callers with well recorded spotted owl calls, and **strongly discourages** human mimicking of spotted owls calls. Increasing evidence suggests that use of human mimicking calls has a lower response rate than do quality digital devices, resulting in territorial spotted owls not being detected despite a complete protocol survey. The use of the digital caller ensures more consistent and equitable calling methods. The amplified sound generally should be about as loud as a spotted owl, but must be audible to the distance of 0.25 – 0.5 mile depending on topography. While playing calls and listening for a response, surveyors must be stationed outside their vehicle. In areas of high densities of spotted owls (e.g., California coastal areas), over-amplification may confound survey results by eliciting simultaneous responses from spotted owls representing multiple territories.

1. ***Digital Callers.*** As policy, the Service cannot recommend or endorse a specific company or device for digital callers. Surveyors are encouraged to use digital callers with quality speakers and digital recordings of high fidelity, as these devices and recordings are more likely to elicit a spotted owl response. Quality devices may also prove to be cost-effective, by reducing the number of survey visits to detect spotted owls, as well as being more durable in typical field conditions. The Service encourages surveyors to seek out others in the surveying business for suggested devices.

2. ***Bionic Ears.*** Hearing enabling devices such as "bionic ears" should not be used, as these devices generally only "listen" in one direction and may impeded determining response locations.

5.4.3 Spotted Owl Calling Procedures

1. ***Calling Methods and Sequencing.*** Start the caller and let it run for 3-4 complete calls, listen for 1 to 2 minutes, then play another set of calls. A recommended call sequence includes: standard 4-note hoot, barking calls, contact whistle both normal and agitated, and agitated call (also referred to as the monkey call). Use both male and female examples of all these calls as available but use of calls from both sexes is best. Recorded spotted owl calls can be downloaded from the following website: www.fws.gov/species/nso. These same calls may come with commercial calling devices.

2. ***Call Variation.*** When conducting the daytime stand searches or activity center searches, use a variety of calls, with some emphasis on the female whistle. Do not broadcast loudly and do not use agitated or barking calls near a potentially active nest – this could agitate the female more than necessary or draw females off the nest.

3. ***Varying Call Patterns Between Visits.*** If several visits to the area have used the same set of spotted owl calls, the surveyor should consider switching to a different set of calls/recordings of a different individual that had not been used previously at the site or survey area (http://www.fws.gov/species/nso). This "new" spotted owl may elicit a stronger reaction (e.g., because it is considered a "stranger" rather than

a known "neighbor") from a resident but relatively non-vocal spotted owl. It is recommended that surveyors always hold in reserve such calls until late in the survey, as they may be more effective at eliciting a response if the owl has become habituated to the calls earlier in the season. **Optional:** If spotted owls have not been detected in visits 1-4, use barred owl calls for five minutes following the 10-minute calling period on visits 5 and 6. Please note these efforts on your field forms.

4. ***Duration of Calling Effort.*** Continue this process for at least 10 minutes at each calling station. **Discontinue calling once a spotted owl responds.** Allow the spotted owl to respond and listen for the remainder of the 10 minutes to determine if there is more than one spotted owl. See section 14.0 RECORDING DATA for recommendations on recording data and triangulation procedure. Prompt triangulation should occur soon after the first owl starts responding.

5. ***Daily Timing of Surveys.*** Conduct night surveys between official apparent sunset and sunrise (see the NOAA website for area and times: http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html).
   Be sure not to call the same section of a survey route at the same time on each survey effort, that is, vary the time you start and the section of the route from which you start.

6. ***Acceptable Weather Conditions.*** Do not survey under inclement weather conditions, such as high wind speed (e.g. > 15 mph), rain, heavy fog, or at high noise levels which would prevent hearing of responses (e.g., stream noise, continuous tree drip after a rain event, machine noise, etc.). If weather conditions or noise levels are in doubt, be conservative. Consider placing call stations away from streams to reduce noise interference. Surveys conducted under marginal conditions will reduce quality of the overall survey effort. Negative results collected under inclement weather conditions may not be adequate for evaluating spotted owl presence/absence. Generally, surveys should be conducted under conditions described as a gentle breeze (wind speed 8-11 mph, or less. Under such conditions, flags may extend, and leaves move. As wind levels reach >12mph (small branches move, dust begins to blow) conditions are not acceptable as background sound level substantially reduces ability of the owl to hear the caller, and vice versa. For additional information, see: http://www.unc.edu/~rowlett/units/scales/beaufort.html.

7. ***Systematically survey all spotted owl habitat*** within each survey area until an owl responds or if no response is heard, until the recommended number of survey visits have been completed.

8. ***Characterize and document behavioral observations.*** Make note of agitated calls, continuous responses, movement (toward or away the calling stations), or situations such as when one response is received and the owl is quiet thereafter. Recording

this type of information may assist with the identification of activity centers.

5.5 Complete Visits

The objective of a complete visit is to conduct a thorough survey of the entire area in one field outing; however, in some cases this may not be possible. A complete visit may be a combination of day and night surveys and may include a daytime *FOLLOW-UP* OUTING. If reasonable effort was made to cover the survey area in one outing, but this was not accomplished, then the remaining unsurveyed area should be surveyed as soon as possible but within 7 days for the entire survey area. To reduce the chance of spotted owls moving between portions of the Survey Area and not being detected, complete the visit on consecutive days as much as possible. The entire area should be covered within 7 days to be considered one complete visit.

1. ***Subdividing Survey Areas.*** If the project area is too large to be surveyed in 7 days, it should be divided into smaller areas based on habitat distribution, topography, road networks, and/or drainages. Survey areas need to be small enough to be completely surveyed within the specified time period.

2. ***Daytime Follow-up to a Spotted Owl or Unidentified Strix.*** If a surveyor detects a spotted owl or unidentified *Strix* species (including owls that fly-in without calling) at night and conducts a daytime follow-up, the combination of the night outing and the daytime follow-up would be counted toward one complete visit. If a surveyor does not obtain a response during a survey, a daytime follow-up would not be necessary. In that case, the night outing alone would be considered as one complete visit provided all remaining spotted owl habitat within the Survey Area has been called (See section 6.0 for Follow-up visits).

3. ***Temporal Spacing of Visits.*** Complete visits must be spaced at least 7 calendar days apart. For example, assume a complete visit ends May 1. Using a proper 7 day spacing, the next possible visit date would be begun on May 8.

4. ***Three Visits by June 30.*** At least 3 of the complete visits should be conducted before 30 June; this includes at least one visit in April, one in May and one in June. Ideally, the survey effort should be spread out over the entire survey season. Concentrating surveys too early or late in the survey season may result in inaccurate conclusions for the survey area.
5. ***Documenting Unavoidable Operational Conditions.*** Where survey seasons or individual visits are restricted due to snow, landslides, mandatory road closure, or other unavoidable operational and access conditions, the survey period may be adjusted to accommodate such restrictions; documentation should be provided to explain the causes of the modified survey period.

6. ***Safety and Night Surveys.*** Surveys may be conducted during the day where there are no roads or foot trails to traverse at night, or where there are other safety concerns. Documentation should be provided for specific safety concerns as to why night surveys could not be conducted. Note: while the protocol provides some flexibility to

account for field conditions, it is recommended that adequacy of survey effort be discussed with the appropriate regulatory office.

7. ***Number of Complete Visits.*** To meet the objectives of this protocol, 2-year surveys with 6 complete visits per year are required to determine the presence or absence of spotted owls.

5.6 Additional Visits

If a single spotted owl responds, and after 6 complete visits resident status has not been determined, then up to 2 additional visits may be necessary in that year. Additional visits are visits conducted beyond six complete visits and are conducted only in the general area of the response (a 0.5-mile radius around the detection location). If resident status is determined at any point during the additional visits, no more visits to that particular site are required that year.

For additional visits, maintain the standards (timing, temporal spacing of visits, weather condition limitations, etc.) outlined elsewhere in this document. If additional visits cannot be completed prior to the end of the survey season (while still maintaining intervals required between visits), they may be conducted as soon as necessary to stay within the normal survey season, or up to as late as September 30.

If the last response occurs on:

- Visits 1 through 4 - no additional visits are required
- Visit 5 - conduct 1 additional visit
- Visit 6 - conduct 2 additional visits

6.0 FOLLOW-UP OUTINGS

The objective of the daytime follow-up outing is to locate spotted owls by conducting an intensive daytime search of spotted owl habitat within the general vicinity (approximately a 0.5-mile radius) of the response location that prompted the follow-up. Daytime locations are very important in determining key nesting and roosting sites, which in turn provides more precise information for management. All spotted owl and barred owl detections should be recorded to the Township, Range, Section, 1/4 and 1/16, and appropriate UTM datum when possible. Daytime follow-up surveys consist of both active calling with a digital device and visual searching.

A review of aerial photos is suggested to assist surveyors in identifying the available habitat in which to focus a search. *Searches should start as close as possible to the owl's mapped response.* Surveys may begin from the road closest to the response area. If owls do not respond to vocalizations given from road survey stations nearest the detection, surveyors should conduct daytime stand searches throughout the 0.5 mile area around the detection. This may take several hours, depending on the terrain. *Do not conduct your follow-up entirely from the road* – spotted owls may be using a patch of habitat at a distance from the road and may not respond unless surveyors are close in proximity. Observers should watch for owls approaching without responding and other evidence of occupancy, such as pellets, whitewash, and molted feathers.

Pellets, whitewash, or feathers alone may not be sufficient to document spotted owl presence or residency. Mobbing jays and other birds may alert the observer to the presence of a spotted owl or other *Strix* species. The follow-up should be completed as soon as possible after presence was detected, as owls are more apt to be located near the previous night's location. A daytime follow-up is the second part of a complete visit if a spotted owl is detected. The follow-up route must be delineated on a map and accompanying outing form and should include the start, end, and total survey time.

Do not hoot any more than is necessary; hoot only as much as needed to identify *Strix* species and determine status. Excessive surveyor vocalization may modify spotted owl behavior and stimulate them to move around more than is typical and possibly increase their risk of predation. Excessive calling near a nest site may cause harassment by bringing the female off the nest. Limit the use of calling, in particular higher stress calls, when calling near a known nest site. Soft contact whistles and "mouse squeaks" sometimes works to elicit responses near nests.

7.0 WHEN BARRED OWLS or *STRIX* UNKNOWN SPECIES ARE DETECTED

Because barred owls now completely overlap the distribution of northern spotted owls in Oregon and Washington and substantially overlap the species in California, and have reduced detection rates (response behavior) of spotted owls, it is important to properly ascertain the species of *Strix* owls detected, either visually or auditory, during the survey.

7.1 When Barred Owls Are Detected

If a barred owl is heard or seen:

1. Continue to call for spotted owls for the entire 10-minute period, or until a spotted owl responds,

2. If a spotted owl responds and the barred owl is in close proximity and/or acting aggressively toward the responding spotted owl, **discontinue calling at that station immediately**. Continue to listen at that station for at least the entire 10-minute period so that any spotted owl or additional barred owl responses will be heard and recorded. Complete the rest of the survey beyond hearing distance to continue calling the route (generally at least 0.5 mi.). This guidance applies to other owls and raptors *that may be acting aggressively toward (or represent a capable predator of) spotted owls*.

7.2 When *Strix* Unknown Species Are Detected

If a *Strix* Unknown Species is heard or seen:

1. Continue to call using spotted owl calls for the entire 10-minute duration, or until the spotted owl or barred owl identification is confirmed.

2. Wait silently for 5 additional minutes after the 10-minute calling period while listening and watching for owls.

3. If the unidentified *Strix* owl detections cannot be identified to species by spending extra time at the station where it was originally detected, a follow-up should be

conducted to increase the probability of identifying which species is present.

4. If follow ups are unsuccessful in establishing the species identity of the owl, additional visits should be conducted. The same procedures as used to determine resident status should be used; up to two additional visits should be conducted (see section 5.6 Additional Visits).

5. If all parameters of the protocol are met and the *Strix* species detection is either attributed to a barred owl or remains uncertain, do not "guess" on the species determinations without reasonably confident visual or audio information; simply record the species as Strix unknown. All field observations need to be well documented so that all information associated with the survey can be taken into consideration during technical assistance or consultations with the state and federal regulatory agencies.

8.0 ACTIVITY CENTER SEARCHES WITHIN SURVEY AREA[5]

Objective: *To search habitat and locate spotted owls in known core areas used in previous years for nesting and roosting.*

A minimum of one daytime stand search "Activity Center Search" is to be completed for each activity center within the survey area, each year, as a component of the 2-year survey. This is important because spotted owls commonly utilize the same, or nearby nest and roost stands year after year and searching the activity center and core use area during the day may increase the likelihood of detecting a spotted owl. Research has shown that this is still the case for some spotted owls even with barred owls present.

Use aerial photographs and delineate stands of spotted owl habitat with the likelihood of containing nesting and roosting owls within 0.5 mile of the activity center to focus a thorough visual and auditory search of the identified stands. Similar to follow-up surveys, these searches may take up to several hours to thoroughly search the habitat. In conducting these surveys, the broadcast calling will be at a lower volume than used for nighttime station calling (approximating the volume of an actual spotted owl hoot). Avoid the heat of the day to increase the chances of finding spotted owls. During the daytime search, be sure to look for incidental signs of whitewash, pellets, and feathers indicating potential presence of spotted owls. Also, keep your eyes to the forest canopy because owls may fly in to the surveyor without responding. Investigate jays or other birds giving scolding calls because they often mob roosting owls.

These daytime searches to known spotted owl sites ("Activity Center Search") should be conducted as part of the initial visit to the survey area (generally late March or early April), prior to the initiation of nighttime routes. If it is possible to locate resident spotted owls without doing station visits, time and effort may be saved because portions of the survey area within hearing distance of that known spotted owl site (generally 0.5-mile radius) can be omitted from surveys to avoid unnecessarily interacting with those owls. If the pair or resident single is located, record the location and go to Section 17, Determining Reproductive Success, if

[5] Please see Glossary (Appendix 1) for definitions of "known/historical" sites.

this level of information is needed.

This search area may be included as part a complete visit if the daytime search is conducted during the seven days required for a complete visit (Ex: if daytime stand search occurs within the 0.5 mile area on visit one, nighttime calling of that same habitat will not be necessary for that visit). Please note that on subsequent visits, nighttime calling of this 0.5 mile circle should be included in the overall survey area for the remainder of the complete visits if owls were not detected during the Activity Center Search.

IF Activity Center Searches are being conducted to locate NSOs adjacent to project activities and determine nesting status for projects operating in the breeding season of years 3 and 4, follow methodology for determining nesting status (this may include more than one visit).

9.0 SURVEYS FOR DISTURBANCE-ONLY PROJECTS

Activities that do not modify spotted owl habitat but will result in disturbance to spotted owls usually represent short-term effects compared to the long-term effects of habitat modification, especially when such projects are limited to one season. Therefore, a one-year six visit survey can apply to smoke or noise-disturbance only actions. Six visits that cover all spotted owl habitat within 0.25 mile from the project area will be effective until the beginning of the following breeding season. If operations are not completed by year two, three spot check survey visits each year should occur in years two and three OR project proponents can choose to utilize the 2-year, six visit survey protocol. Field forms should indicate that these are disturbance-only projects.

10.0 SPOT CHECK SURVEYS

With the invasion of the barred owl, spotted owls have shown increasing tendency to move from established, activity centers and establish, or attempt to establish, alternate activity centers or core use areas to avoid agonistic encounters with barred owls. Spotted owls establish activity centers in stands that have not previously been documented more frequently than typically occurred prior to the barred owl invasion. Because of this movement, there is an increased risk that spotted owls may establish activity centers and core use areas within or near project areas subsequent to completion of protocol surveys. If gone undetected, spotted owls at these new site centers are at risk of direct harm, injury, or harassment from project activities that result in direct physical modification (e.g., tree felling, prescribed fire, cable yarding, helicopter downdraft, etc.) or biological modification (e.g., noise exceeding ambient conditions).

The 2-year, 6-visits per year, surveys establish a reasonably high likelihood of detecting spotted owls in occupied activity centers within the survey area. However, the Service believes it prudent that project proponents to do *SPOT CHECK SURVEYS* of the project area and immediate vicinity (i.e., within 0.25 mile) prior to conducting activities in years 3 and 4. Spot checks are prescribed to detect spotted owls that may have moved into the project area subsequent to completion of general surveys. A new site center could be established in the project area by (a) known territorial individuals within the survey area; (b) undetected spotted owls from known sites within the survey area; or (c) dispersing juveniles, floaters, or territorial

spotted owls displaced from outside the survey area. These factors, plus the history of barred owl detections in the survey area, are taken into account when determining the need for spot checks. Spot checks are intended to supplement the general project-level surveys and avoid the potential direct take of spotted owls from project implementation.

Adjustments to project timing or other project modifications may be required under some circumstances where spotted owls initiate breeding activities within or immediately adjacent to a project area (See 10.3 below).

10.1 Design of Spot Check Surveys

Spot check surveys include the following components:

1. Spot checks supplement the full 2-year, 6 visits-per-year protocol surveys and are conducted during years 3 and/or 4 of the survey cycle.

2. Spot check surveys will cover all spotted owl habitat within the project footprint and within 0.25 mile of the project footprint (hereafter referred to as the *SPOT CHECK AREA*).

3. Spot check surveys consist of three nighttime surveys spaced a minimum of 7 days apart.

4. Spot checks may begin on the appropriate Survey Period date for the physiographic province (see section 4.0), and should be completed prior to or concurrent with project activities (see conditions described in10.2.2. below) on or before April 15, or as soon as feasible during the early portion of the breeding season (See Appendix 4) if there are conditions of limited accessibility, such as due to snow or seasonal road closures. If spot checks cannot be completed by April 15, reasons for delayed completion should be documented in the survey record.

5. Should the project continue into the year 4 breeding season, spot checks should be repeated, with similar consideration of spotted owl nesting status and consideration of take avoidance measures.

6. Any detection of spotted owls during a spot check survey should be followed up as soon as possible, but not later than 7 days after the nighttime detection, by a daytime follow-up visit to confirm the location and status of detected owls.

10.2 Circumstances Establishing the Need for Spot Checks.

Not all projects need spot check surveys. The surveyor should apply the circumstance that best describes actual history of known spotted owl sites and survey data for the project and survey area, as described below. Figure 2 provides a flow chart to assist in determining cases where spot checks are needed.

10.2.1 Circumstances Precluding the Need to Conduct Spot Check Surveys

For project areas meeting ***ALL*** of the following conditions, the likelihood of territorial

spotted owls occupying the project area is discountable. The action may occur in years 3 and 4 without additional surveys.

1. No resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected during protocol survey visits, including any additional visits, in the survey area (i.e., survey area not occupied by a territorial pair or single detected during year 1 and/or year 2 surveys); and

2. No activity centers are known to occur in the survey area; and

3. No barred owls are detected in the survey area during protocol surveys or are otherwise known to occur in the survey area; and

4. All spotted owl habitat within the survey area has been **completely** covered during protocol surveys (i.e. there is no habitat that was omitted due to inaccessibility, landowner restrictions, incomplete surveys, or other constraints).

10.2.2 Situations Where Spot Checks Are Necessary

The following bullets describe situations when spot check surveys **are** necessary. The project proponent should complete spot checks and schedule/implement projects as appropriate:

1. If no resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area (project footprint plus one home range for projects that will modify habitat; 0.25 mile footprint for disturbance-only surveys) during year 1 or 2 of protocol surveys, and no known spotted owl sites are known from the survey area, BUT barred owls are known to occur within the survey area (through project surveys or other scientifically credible methods), spot checks are necessary. In this case, projects may be initiated during the breeding season (or continue if ongoing) concurrent with spot checks.

2. If no resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area during year 1 or 2 protocol surveys, but known spotted owl sites are known to occur in the survey area, spot checks are necessary. In this case, projects may be initiated during the breeding season (or continue if ongoing) concurrent with spot checks.

3. If no resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area during year 1 or 2 protocol surveys, and no known spotted owl sites are known to occur in the survey area, BUT portions of spotted owl habitat within the survey area is unsurveyed during protocol surveys due to inaccessibility, landowner restrictions, or other constraints, spot checks are necessary. Under these circumstances, spot checks must be completed prior to operations occurring after February 1.

4. If resident single owls, territorial owl pairs, or pairs/two owls of unknown status are detected within the survey area during years 1 and/or 2 protocol surveys, spot checks are necessary. Under these circumstances, spot checks must be completed prior to operations occurring after February 1.

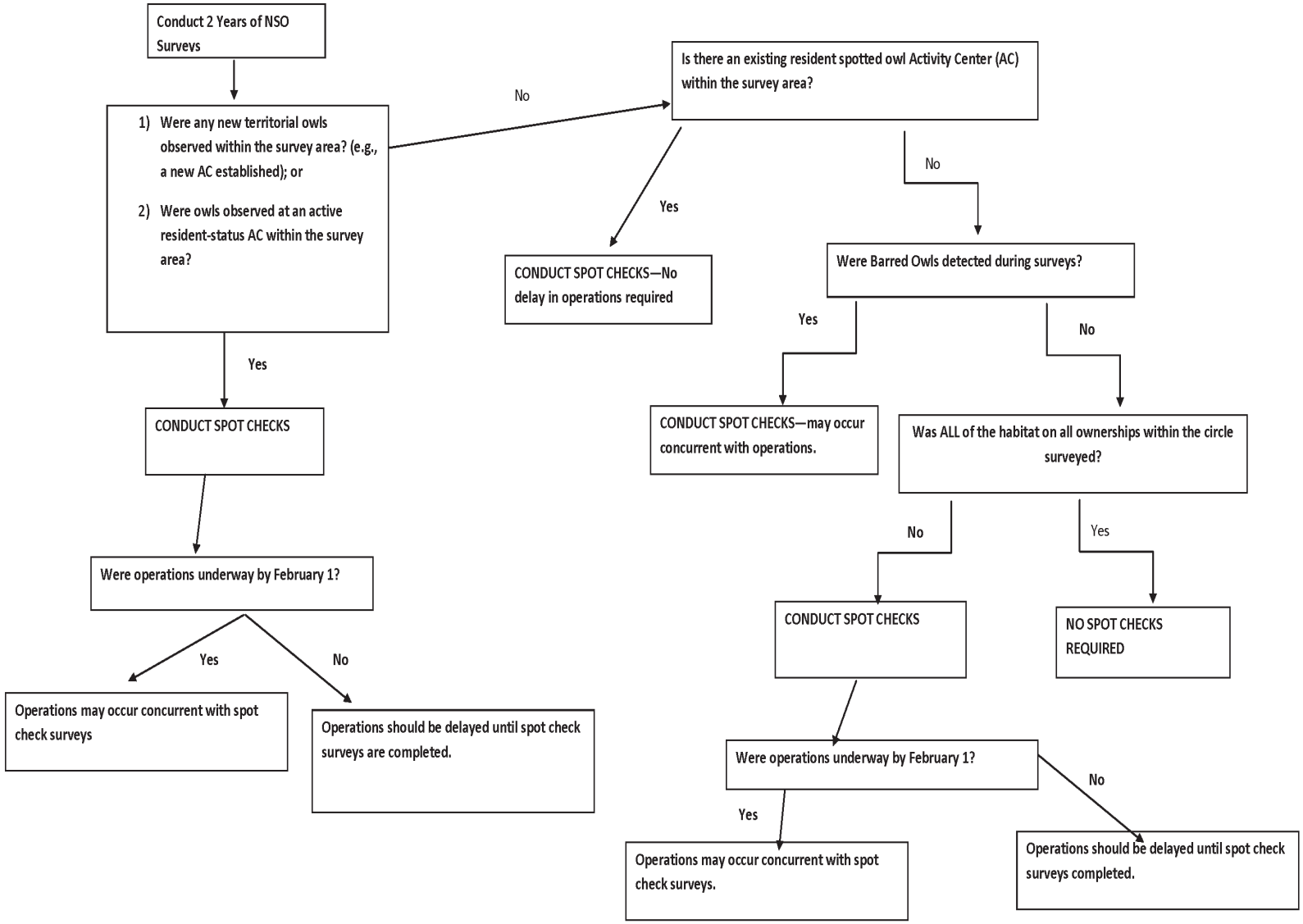
10.3 If Spotted Owls Are Detected in the Spot Check Area

If spotted owls are detected in the spot check area, ALL ongoing operations that have a likelihood of direct harm to a spotted owl and/or creating above-ambient noise shall be postponed. Conduct follow-up outings to determine location and pair/nesting status, as described in Section 16.0-17.0 of this document. Location data should be reviewed by the appropriate regulatory office to ensure that appropriate protection measures that avoid incidental take are implemented.

10.4 If Spotted Owls Are Not Detected in the Spot Check Area

If spotted owls are not detected, the project may continue through that breeding season. Should the project continue into the following breeding season, spot checks should be repeated.

Figure 2. Flow Chart to determine when spot check surveys are required.



11.0 COMPLETE SURVEY

A COMPLETE SURVEY includes:

- Two years of six visits per year, including activity center searches, and, if appropriate;
- Spot Checks and activity center searches, as described in section 10.0 and 8.0 respectively.

12.0 DURATION AND EXPIRATION OF SURVEYS

Based on the data analyzed and professional opinion, 2-year surveys are expected to provide more accurate results for a survey area because of annual variation in occupancy and detection probabilities between years across most of the range of the spotted owl. As described above, two years of spot checks may be necessary in years 3 and 4 depending on the results of two years of survey. If spot checks have not been completed, full protocol surveys are recommended beginning in year 5. If spot checks have been completed in years 3 and 4, technical assistance with appropriate regulatory agency will be required to evaluate scope of remaining harvest and appropriate survey needs in year 5 for remaining harvest areas.

13.0 DAYTIME STAND SEARCHES (OPTIONAL)

Objective: *To search habitats most likely to contain roosting or nesting spotted owls.* Optional daytime stand searches are intended to provide an extra level of assurance that non-responsive spotted owls are not residing in a project area by searching nesting/roosting habitat within the project area using methodologies used for follow-up surveys. Examples of situations when daytime stands searches might be warranted include projects near known activity centers without recent verified owl use, projects near activity centers that have been taken over by barred owls, or project areas proposed in high-quality nesting or roosting habitat.

14.0 RECORDING DATA

For each visit, whether results are positive or negative, record the following information on the survey form:

- Brief description of survey route, with accompanying topographic map of route.
- Survey start and stop time at stations (total amount of time spent calling) and total time of survey if calling between stations.
- Weather conditions (including estimated wind speed and precipitation). Note stop and restart times if weather during your survey momentarily exceeds recommended conditions.
- Clearly document areas of overlap on survey area maps indicating years of surveys for each area.

If raptors are detected during a survey, all sightings or responses by spotted owls, barred owls, spotted-barred owl hybrids, great horned owls, northern goshawks, or any other large raptor species should be recorded. The presence of barred owls, great horned owls, goshawks, or other large raptors may affect spotted owl responses.

Note on map and on data form (both should have survey date recorded):

- Compass bearing and approximate distance to spotted owl or other raptor;
- Sex and age if known (adult and subadult spotted owls cannot be distinguished based solely on vocals);
- Time of first response;
- Type of detection (e.g., audio, visual or both). For multiple or moving owls, map and list information and number of each response or observation. This will allow for more accurate determination of activity centers.

Estimate and indicate on a map the bird's original and final location. One method is to triangulate on the location from which the owl's call originated, taking compass bearings from 2-3 identifiable positions (e.g., at road junctions; or record GPS coordinates at each triangulation point) along the road or trail. Make sure compass bearings are taken in as short a time-frame as possible and recorded on the survey form. Do not force the spotted owl to call again if bearings cannot be completed before the spotted owl stops calling. Simply use the best compass bearing(s) you have. The intent of the triangulation and mapping is to provide a means to find the location in a subsequent survey effort (e.g., follow-up; see below). Triangulation efforts should begin soon after the owl's first response.

Once a spotted owl responds at night, discontinue calling at the station, but keep listening for the remainder of the station visit; consider listening for a few minutes beyond the 10 minutes to ascertain if other owls are present. Once the station visit at which the detection was obtained has been completed, continue to survey the remainder of the survey route. However, to avoid 'leading' a spotted owl across the survey area through continued calling nearby, we recommend that once an owl responds, the surveyor should go to other parts of the survey route and complete the rest of the survey visit, omitting the area within 0.5 mile around the detection location. If that is not practical, survey only the remaining points that are *beyond hearing distance of the responding bird*. The range of hearing distance is generally any distance beyond a ridge or about 0.5 mile straight-line distance from the owl. Completing the route will provide an opportunity to detect other owls that may be present.

If no response is heard, proceed to the next calling point. Continue until the survey area is completely covered.

If a spotted owl (or an unidentified *Strix* owl) is detected during the survey, return to the area during the day as soon as possible (preferably within 48 hours) and conduct a follow-up outing to verify status as needed, unless reproductive status has already been determined. Diurnal surveys should be interrupted to accomplish the follow-up immediately after the detection.

15.0 MOUSING

The purpose of mousing is to determine if spotted owls are nesting and reproducing. By offering one or more mice to spotted owls, their nesting status can be determined based on the behavior of the adult. Mousing will also be used to locate nests (and brooding females) by inducing the male to lead the surveyor to the nest tree and, later in the nesting season, can be used to locate and count young recently out of the nest. Mousing consists of the following steps.

1. Locate one or both members of a pair during the day and offer to them at least two mice or other small prey items.

2. Once the owl(s) take prey, or are found with natural prey, record the 'fate' of each prey item (e.g., eaten, cached, given to female or young) along with the sex of the owl that captured the prey. The fate of the prey is used to classify nesting status.

3. If the owl eats the prey item, continue to offer additional prey items until the owl caches the prey, sits on it for an extended period of time (30-60 minutes), refuses to take additional prey, or carries the prey away. If the bird flies with the prey, follow and try to determine the final disposition of the prey. For more details on mousing procedures, see Forsman (1983) Methods and Materials for Locating and Studying Spotted Owls. USDA Forest Service, Gen. Tech Rept. PNW-162.

4. Field personnel should make a concerted effort to get the owl(s) to take mice. Be creative in placing a mouse where the owl can easily see and capture it and offer mice to the mate of an owl that has refused mice on that visit. A long pole or stick can be used to place mice higher in a tree where an owl may more likely take it.

The known spotted owl site will be classified as nesting, non-nesting, or unknown nesting status (see section17. Determining Nesting & Reproductive Status) based on your observations.

16.0. DETERMINING ACTIVITY CENTER STATUS

Depending on the use for which the survey data will be applied, determining the occupancy/reproductive status of sites may be necessary. This section provides guidance on the appropriate techniques to collect necessary information, and in correctly interpreting that information, to make the relevant determination. Verify the activity center status according to the following definitions (status visits can be day or night). The definitions may be somewhat different from the status definitions outlined in the density/demography survey guidelines, due to the different objectives of the guidelines for surveying proposed management activities.

16.1 Determining Resident/Territorial Spotted Owl Pairs or Singles

The following subsections for determining if an activity center is occupied by a territorial pair, and pair with status unknown, a resident single, or status unknown.

16.1.1 Territorial Pair Status.

Any one of the following criteria establishes *TERRITORIAL PAIR* status:

1. A male and female are heard and/or observed (either initially or through their movement) in close proximity (< ¼ mile apart) to each other on the same visit; or
2. A male takes a mouse to a female (see "mousing" clarification under section 15.0 or REPRODUCTIVE SUCCESS SURVEYS 17.5); or
3. A female is detected (seen or heard) on a nest; or
4. One or both adults are observed with young; or
5. Young identifiable based on plumage characteristics observed late in the season by knowledgeable surveyors or young identifiable based on molecular data.

16.1.2 Two Birds/Pair Status Unknown.
The presence or response of 2 birds of the opposite sex where pair status cannot be determined and where at least 1 of the owls meets the resident single requirements establishes *TWO BIRDS, PAIR STATUS UNKNOWN*.

16.1.3 Resident Single Status
RESIDENT SINGLE STATUS is established by any one of the following criteria:

1. The presence or response of a single owl within the same general area on 3 or more occasions within the breeding season, with no response by an owl of the opposite sex after a complete survey; or
2. Multiple responses over several years (e.g., 2 responses in year 1 and 1 response in year 2) from the same general area.

A resident single may represent a succession of single owls of either sex within the same general area in a single or multiple years. Determining if the responses occur within the same general area should be based on topography and the location of any other owls known for the surrounding area. This should be determined by the wildlife biologist for the particular area.

16.1.4 Status Unknown
STATUS UNKNOWN is the appropriate determination, following a complete survey, whenever the response of a male and/or female does not meet any of the above site status definitions.

17.0 DETERMINING NESTING & REPRODUCTIVE STATUS

Reproductive surveys are usually conducted to determine if breeding season restrictions intended to protect nesting owls can be lifted.

Reproduction surveys include two stages: nesting status and reproductive success. The following is the recommended protocol for determining reproductive status of spotted owls. Reproduction surveys may provide information on nest tree locations which provide the most relevant management (activity) center locations.

17.1 Nesting Status Surveys
Nesting Status Surveys should be done whenever it is necessary to determine if spotted owl may be nesting. The following criteria determine appropriate timing and procedures for

conducting such surveys:

1. Conduct nesting status surveys between 1 April and 1 June. The start date is based on nest initiation dates. If local data suggests a different date for nest initiation, adjust the start date accordingly. Young identified after 1 June would still confirm nesting.

2. Spread the surveys throughout the months of April and May. Avoid collecting all nesting status surveys early in the breeding season.

3. Use a standard "mousing" procedure as described above to determine nesting status. However, do not mouse birds any more than is necessary to determine nesting status. Stimulating the owl to move around excessively during the day, may increase their risk of predation. Similarly, excessive calling near a nest site may cause harassment and endanger eggs or young by bringing the female off the nest. Also, do not cause owls to unnecessarily become more habituated to humans by using more mice than necessary.

4. Two observations, at least one week apart, are required to determine nesting status if the first observation occurs before 1 May. This is necessary because the owls may show signs of initiating nesting early in the season without actually laying eggs and their behavior could easily be mistaken for nesting behavior. After 1 May, a single observation is sufficient.

17.2 Determining Nesting Status

Nesting is confirmed if, on 2 visits before 1 May, or 1 visit after 1 May, any of the following conditions are observed:

1. The female is detected (seen) on the nest; or

2. Either member of a pair carries natural or observer-provided prey to the nest; or

3. A female possesses a brood patch when examined in hand during mid-April to mid-June (only one observation is required). Dates may vary with the particular areas. Be careful not to confuse the normal small area of bare skin (i.e., apteria) on the abdomen with the much larger brood patch. A fully developed brood patch covers most of the lower abdomen, extending to the base of the wings. Describe the brood patch on the field form. including length, width, color, and texture of the skin, and any evidence of regenerating feathers around the edge (NOTE - while a scientific research permit is not required by the Service for calling spotted owls, any capture or handling of spotted owls requires such a permit); or

4. Young identifiable as spotted owls or young detected in the presence of one or both adults.

17.3 Non-Nesting Status

The activity center is classified as non-nesting if any of the following are observed. Again,

except for brood patch information, two observations are required during the nest survey period (April 1-June 1), with at least 3 weeks separating these observations to ensure that late nesting attempts are not missed. The second observation should occur after 1 May. Because nesting attempts may fail before surveys are conducted, the non-nesting status includes owls that did not attempt to nest as well as those that have failed. Non-nesting is inferred if any of the following conditions is met:

1. The female is observed roosting and away from the nest for at least 60 minutes on two occasions, more than 3 weeks apart between 1 April and 1 May. (Be aware that nesting females with large nestlings often roost outside the nest during warm weather. If in doubt, be sure to schedule one or more visits in mid-June to check for fledglings);

2. The female does not possess a brood patch when examined in-hand between mid-April and mid-June; or

3. Prey is offered to 1 or both members of the pair and they cache the prey, sit with prey for an extended period of time (60 minutes), or refuse to take additional prey beyond the minimum of 2 prey items. To be considered a valid nesting survey, an owl must take at least 2 prey items.

Surveys where the bird(s) leaves the area with prey and it is not possible to determine the fate of the prey do not count toward the required 2 visits because nesting status could not be classified. Some spotted owls may be reluctant to take prey at all. If in doubt, be sure to schedule 1 or more visits in mid-June to check for fledglings.

17.4 Nesting Status Unknown

If nesting status is not determined before 1 June, it is not possible to classify the owls as non-nesting using the criteria listed above.

1. If owls are found after 1 June, without young, nesting status is unknown.

2. If no owls are found after 1 June (at those sites where owls were present prior to 1 June), nesting status is unknown.

17.5 Reproductive Success Surveys (Number of Young Fledged)

Once a pair is classified as nesting, conduct reproductive success surveys after the time the young leave the nest (fledge), usually from late May to late June depending on latitude or elevation. If local fledging times are available you may adjust the dates accordingly. The following methods should be adopted to detect fledged young.

1. Schedule at least 2 visits to the site to locate and count fledged young, timing the visits so that the fledged young are observed as soon after leaving the nest as possible to avoid missing young that may be lost to predation later in the season.

2. Attempt to locate fledged young. Use visual searches and/or mousing of adults. If young are present, the adults should take at least some of the prey to the young. The

sight of an adult with prey will usually stimulate the young to beg, revealing their number and location.

3. If the birds take at least 2 prey items and eventually cache, sit with, or refuse further prey without ever taking prey to fledged young; on at least 2 occasions, separated by at least 3 days, 0 young are recorded.

To determine the true number of fledged young, do the following:

4. On the first reproductive success visit, count the number of fledged young seen or heard.

5. Conduct a minimum of 1 additional visit, 3 to 10 days after the first fledged young is seen. This is necessary because it is possible to miss some owlets on a single visit.

6. If no response is elicited on a minimum of 2 visits, separated by at least 1 week during the fledging period, then classify the production of young as unknown.

7. If young are counted on 1 visit but a second visit is not conducted, or find no owls were found on the second visit, classify the number of young as 1+ or 2+ etc., based on the results of the initial visit.

8. Opportunistic mousing late in the season (after July 30) may be useful for providing supplemental information about site productivity.

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Appendix 1. Glossary of Terms

Many of these terms have a long history and various meanings in regard to spotted owl biology and management. This glossary defines the context in which they are used in this document.

Abandoned Activity Centers: Activity centers that have been determined through appropriate analyses with state or federal agencies, as no longer likely to be supporting territorial owls due to habitat changes and/or long-term surveys with negative responses. Synonymous with abandoned historical spotted owl site.

Activity Center: Spotted owls have been characterized as central-place foragers, where individuals forage over a wide area and subsequently return to a nest or roost location that is often centrally-located within the home range (Rosenberg and McKelvey 1999). Activity centers are a location or point representing 'the best of' detections" such as nest stands, stands used by roosting pairs or territorial singles, or concentrated nighttime detections. Activity centers are within the core use area and are represented by this central location.

Activity Center Search: Stand searches of any known or historical core use areas that are within the survey area perimeter. (See Section 8.0 for specific guidance on methods to conduct these searches).

Additional Visits: Supplemental visits needed to locate and determine spotted owl pair status or reproductive status. May also be necessary to determine species of unknown Strix owl responses.

Adult: A northern spotted owl $\geq$ 2 years old.

Breeding Season: The time period from 1 February through 31 August that includes courtships, nesting, nestling and fledgling dependency periods. This time period may vary by geographic locale.

Calling Route: An established route within a survey area where recorded calls of northern spotted owls are used to elicit a response.

Calling Stations: Point locations used to conduct surveys, distributed throughout an area so as to attain complete coverage of spotted owl habitat within the survey area.

Complete Coverage: Complete coverage of suitable owl habitat is obtained when the calling stations have been located within a survey area so that a northern spotted owl anywhere in the survey area would be able to hear surveyors and vice-versa.

Complete Visit: A complete visit occurs when all calling stations or calling routes within a survey area have been called with the seven day period, including daytime follow-up surveys for all spotted owl responses. See Section 5.5 for specifics.

Complete Survey: Complete coverage of suitable habitat throughout the survey area that

consists of two years of six visits per year, including activity center searches, and, if appropriate, spot checks and additional activity center searches in years 3 and 4, as described in section 10.0 and 8.0 respectively.

Core Use Area: An area of concentrated use within a home range that receives disproportionally high use (Bingham and Noon 1993), and commonly includes nest sites, roost sites, and foraging areas close to the activity center. Core use areas vary geographically, and in relation to habitat conditions. This is a biological definition of core use area and is not the same as a 70-acre core as defined by the Oregon Forest Practices Act nor is it equivalent to the 100acre LSRs referred to as NSO cores on federal lands.

Daytime Stand Searches: Optional. *The objective is to search habitats most likely to contain roosting or nesting spotted owls.* A daytime stand search should cover nesting/roosting habitat within the project area.

Dispersal Habitat: Juvenile owls often must disperse through a range of forest types prior to finding habitat on which to establish a territory. These forest types include nesting, roosting, and foraging habitat in addition to other forest stand types that provide minimum diameter and canopy closure of trees. Definition of this habitat type vary by physiographic province.

Fledgling: Young of the year that are off of the nest.

Follow-up Outing: Follow-ups are conducted with an intensive search of spotted owl habitat within the general vicinity (approximately a 0.5-mile radius) of the response location -that prompted the follow-up. (See Section 6.0 for recommended methodology for conducting these searches).

Foraging Habitat: Foraging habitat is defined as habitat that provides foraging opportunities for spotted owls, but without the structure to support nesting and roosting (USFWS 1992*b*). Owls often forage in forest conditions that meet the definition of nesting/roosting habitat, but also use a broader range of forest types for foraging. This definition identifies habitat that functions as foraging habitat, but does not meet requirements for nesting /roosting

Habitat-capable area: Forests below the elevation limits of occupancy by territorial spotted owls that are capable of growing and sustaining structural (Davis and Lint 2005:30) and ecological conditions of spotted owl habitat.

Habitat Modification: Activities that occur in spotted owl nesting, roosting, or foraging habitat that reduce the canopy or other elements of spotted owl habitat at the stand-level. Wildlife biologists with the appropriate federal and state agencies may be able to provide technical assistance assessing these types of effects.

Historical Site: Spotted owl sites that contained territorial spotted owls in the past. For the purposes of this protocol, these spotted owl sites are considered a subset of known spotted owl sites (see glossary below).

Home Range: The area in which a spotted owl conducts its activities during a defined period of time (USFWS 1992b) that provides important habitat elements for nesting, roosting, and foraging. Home range sizes vary generally increase from south to north and vary in relation to habitat conditions and prey availability and composition

Juvenile: A northern spotted owl is considered as juvenile age class in the first 5 months after hatching. Juveniles 1 to 3 months old are very white with downy plumage over all of the body or evident on breast and head; at 4 to 5 months old, juvenile begin losing downing plumage.

Known Spotted Owl Site: Includes both owl sites found during the current survey period and owl sites identified in previous years ('historical site). Known spotted owl sites include both the activity center and the area surrounding concentrations of 'the best of' detections such as nest stands, stands used by roosting pairs or territorial singles, or areas of concentrated nighttime detections.

Mousing: Mousing describes the act of offering prey items to spotted owls. The purpose of mousing spotted owls is to determine pair status and/or reproductive status. A male spotted owl may take a prey item to an unseen female; likewise, adult owls may take prey items to unseen young.

Nest: Northern spotted owls use broken-topped trees, old raptor nests, witches brooms, cliff ledges, mistletoe brooms, and tree cavities for nests. A spotted owl must be observed using the structure or have mice taken to a nesting female positively identified in the structure to designate a nest tree.

Nesting and Roosting Habitat: Habitat that provides nesting and roosting opportunities for spotted owls. Important stand elements may include high canopy closure, a multi-layered, multi-species canopy with large overstory trees and a presence of broken-topped trees or other nesting platforms (*e.g.,* mistletoe clumps (USFWS 1992*b*). The appearance and structure of these forests will vary across the range of the spotted owl, particularly in the dry-forest provinces.

Nestling: A young owl that is still in the nest.

Northern Spotted Owl (*Strix occidentals caurina*): One of three subspecies of spotted owl that ranges from southern British Columbia, Canada, through western Washington and Oregon, and into northwestern California. Listed as a threatened species by the U.S. Fish and Wildlife Service.

Physiographic Province: a geographic area having a similar set of biophysical characteristics and processes because of the effects of climate and geology that result in patterns of soils and broad-scale plant communities. Habitat patterns, wildlife distributions, and historical land use patterns may differ significantly from adjacent provinces.

Project Area: The polygon that forms the perimeter (footprint) of the proposed project. (Refer to Section 3.1 for specifics on determining the polygon).

Provincial: This is a qualifying term used with home range and core use area to reflect the fact that both vary in size according to latitude, amount of available habitat, prey availability, and forest structure and composition. Typically, home range and core use area sizes increase from south to north, and decrease as amount of high quality habitat available to owls increases.

Roost: Typically a tree used by a spotted owl for extended daytime rest periods. A roost site consists of the roost itself and the immediate vicinity. Roost areas are identified by observations of spotted owls, and/or the presence of pellets, white-wash and other evidence.

Spot Check Area: All suitable spotted owl habitat within the project area, plus suitable spotted owl habitat within 0.25 mile of the perimeter of the project area.

Spot Check Surveys: Conducted in years 3 and 4, consisting of 3 nighttime surveys spaced a minimum of 7 days apart, covering the spot check area (see section 10.0).

Spotted Owl Habitat: For purposes of surveying, spotted owl habitat is any habitat (i.e., nesting, roosting or foraging quality) where you may expect to elicit a response from a resident owl or pair of owls. This does not include younger or more open stands typically characterized as spotted owl dispersal habitat. Descriptions of spotted owl habitat for the various areas may be available from state wildlife and forestry agencies, or through technical assistance with local Service Field Offices (Appendix 3). Habitat descriptions can also be found in these references: Thomas et al. 1990, Courtney et al. 2004, USDI 2008. Regulatory definitions should be used where appropriate (e.g., definitions embedded within state forest practices regulations).

Subadult: A spotted owl in the first or second years of life. Identified by characteristic tail feathers with white tips tapering to sharp points (i.e., triangular shape). For more information on identifying subadult spotted owls, please see Moen et. al. 1991.

Survey Area: All suitable spotted owl habitat within one spotted owl provincial median home range radius from the perimeter of the proposed project area should be surveyed for projects that will modify spotted owl nesting, roosting, or foraging habitat. Table 1 provides appropriate survey area radius values, by physiographic province. (See Section 3.2 for additional specific guidance). For disturbance-only projects that will not modify habitat but will result in disturbance to spotted owls (short-term effects compared to the long-term effects of habitat modification), surveys should be conducted within 0.25 miles of the project area (see Section 9.0 for specific guidance).

Survey Period: All surveys of proposed project areas must take place between March 15 and August 31, with some exceptions. (See Section 4.0 for specifics related to province differences and weather related exceptions).

Appendix 2: U.S. Fish & Wildlife Service Field Office Contact Information.

U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825-1846. Telephone: 916-414-6000.

U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata, CA 95521-5582. Telephone: 707-822-7201.

U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office, 10950 Tyler Road, Red Bluff, CA 96080. Telephone: 530-527-3043.

U.S. Fish and Wildlife Service, Yreka Fish and Wildlife Office, 1829 South Oregon Street, Yreka, CA 96097. Telephone: 530-842-5763.

U.S. Fish and Wildlife Service, Klamath Falls Office, 1936 California Ave, Klamath Falls, OR 97601. Telephone: 541 885-2525

U.S. Fish and Wildlife Service, Roseburg Field Office, 2900 NW Stewart Parkway, Roseburg, OR 97471. Telephone: 541-957-3470.

U.S. Fish and Wildlife Service, Bend Field Office, 20310 Empire Avenue, Suite A100, Bend, OR 97701. Telephone: 541-383-7146.

U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, 2600 SE 98th Avenue, Suite 100, Portland, OR 97266. Telephone: 503-231-6179.

U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 510 Desmond Drive, SE, Suite 102, Lacey, WA 98503. Telephone: 360-753-9440.

U.S. Fish and Wildlife Service, Central Washington Field Office, 215 Melody Lane, Suite 119, Wenatchee, WA 98801. Telephone: 509-665-3508.

Appendix 3. Generalized Northern Spotted owl Breeding Season Chronology[6].

Prelaying												
Laying												
Incubation												
Nestling												
Fledgling												
Initial dispersal												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Prelaying Stage (duration variable)
Beginning about a week before laying, the female spends most of her time near the nest. Because the prelaying stage has no clearly definable beginning, we have arbitrarily designated the first several weeks prior to laying of the first age as the prelaying stage.

Laying Stage (1-6 days; Forsman et al. 1984)
When egg laying begins, the female spotted owl typically spends almost all of her time in the nest, her mate provides nearly all of her food. Copulation continues on a daily basis throughout the egg-laying stage and for up to about 4 days after incubation begins.

Incubation Stage (30 plus or minus 2 day; Forsman et al. 1984)
Incubation begins shortly after laying of the first egg and is done solely by the female, who may leave the nest at night for up to 2 hours during the first couple of days of incubation. Thereafter, she only occasionally leaves the nest for periods of 10 to 20 minutes at night to regurgitate pellets, defecate, preen, or accept food from her mate.

Nestling Stage (normally 34-36 days; Forsman et al. 1984)
The female broods the new hatchlings almost continuously for 8-10 days, still depending on her mate to provide food for herself, and now for the young. By the time her young are 2-3 weeks old, the female begins to forage for increasingly longer periods at night, typically 1-4 hours. The male continues to bring food to the nest, but the female passes the food to the young. Most young observed by Forsman et al. (1984) fledged (left the nest) when 34-36 days old, occasionally moving off the nest to perch on nearby limbs for a few days before leaving the nest permanently. Occasionally young leave their nest earlier than normal. Because such young are less developed physically, they may spend more time on the ground than young that remain in the nest for the full nestling period. This may increase their mortality rate compared to that of later-fledged young.

[6] This information is intended to depict the generalized breeding chronology, recognizing slight variations in all stages may occur depending on individual owls, elevation, in-season weather conditions, and/or latitude.

Fledgling Stage (80-120 days; Forsman et al. 1984)
The fledgling stage covers the period after the young leave the nest until they become independent of their parents. Within about 3 days after fledging (assuming a normal nestling period of 34-36 days), most young can flutter or climb to elevated perches; usually in a week they can fly clumsily between trees. Within about 3 weeks after fledging, they can hold and tear meat from prey brought by their parents. Both parents regularly bring food to the fledgling and generally continue to do so until mid- to late September, apparently regardless of the age or capabilities of the young. Because of this, the fledgling stage may be relatively long or short, depending upon when a given nest was begun and on variations in the age of the young at fledging.

Appendix 4. Recommended Credentials and Qualifications for Crew Leaders and Surveyors.

RECOMMENDATIONS FOR SPOTTED OWL SURVEYORS CREDENTIALS and QUALIFICATIONS

Surveyor qualifications are provided as recommendations for evaluation of personnel that are proposed to be involved in spotted owl surveys. *These recommendations are advisory but highly encouraged.*

Crew Leader:

- Responsibilities: Supervises survey crew, data collection, prepares basic data summary, and coordinates with other surveyors. Additional responsibilities include supervision of: 1) survey route layout, and 2) determination of area coverage requirements.

- Minimum requirements:
    - Normal hearing abilities are requisite. A crew leader must be able to hear the owl(s) if they were calling (a hearing test is advised); AND
        - One year (one field season) of spotted owl survey experience, plus training in spotted owl survey techniques, including identifying the various calls of northern spotted owls, barred owls, and NSO-barred owl hybrids as attested to by letters of reference;
          -OR-
        - At least 2 field seasons conducting spotted owl calling surveys, preferably under the guidance of another biologist with experience in conducting successful spotted owl surveys.

Owl Caller or Surveyor:

- Responsibilities: conducts owl surveys and collects data.

- Minimum requirements:
    - Normal hearing abilities are requisite (a hearing test is advised). An owl caller must be able to hear the owl(s) if they were calling; AND
        - Training in spotted owl survey techniques, including identifying the various calls of northern spotted owls, barred owls, and NSO-barred owl hybrids as attested to by letters of reference;
          -OR-
        - At least one field season of spotted owl survey experience, preferably working closely with other biologists experienced in conducting successful spotted owl surveys.

Both Crew Leader and Owl Surveyor must have the physical ability to work in mountainous terrain and willingness to work during nighttime conditions. In some cases, Crews Leads and Surveyors may be asked to conduct both day and nighttime work. Orienting skills, including the use of map and compass is essential. Surveyor safety should be of primary importance.

Appendix 5. Suggested but Necessary Equipment to Conduct Surveys

- **Digital caller.** An example of this would be an MP3 player and a chip containing the spotted owl calls identified for use in this protocol (page XX).
- **Call recordings of other owl species.** This would include the range of barred owl calls along with other owl species from the Pacific Northwest. Surveyors should become familiar with the vocalizations of all of the owls they might hear. Part of this familiarization is to distinguish the difference between spotted owl and barred owl female contact calls or whistles. Identification of unknown calls should be attempted to in the field with the recorded calls on hand.
- **Binoculars.** Many times, spotted and barred owls fly in to surveyors and will not vocalize. The potential of identification increases with the use of binoculars with sufficient magnification.
- **Lighting.** Have a good flashlight to help with spotlighting and identification of individuals at night. Owls may perch for only a short time and having this lighting available will increase your chances of positive identification and save on subsequent survey effort. Have a good headlamp to assist with getting around. For safety, as well as to avoid wasted surveys, remember to carry spare, fully charged batteries in your vehicle.

Appendix 6: Template Field Data Collection Form

SITE VISIT FORM

SITE ID NUMBER: _____ SITE NAME_____STATE: _____

VISIT #: _____ OUTING #: _____ YEAR: _____ OUTING DATE: _____

LANDOWNER: _____ PHYSIOGRAPHIC PROVINCE_____

COMPLETE VISIT: (Y/N) _____OBSERVERS:_____

TYPE OF SURVEY: _ACS___SC___CC ___FO___RV_____AV_____OPP_____

ACS=Activity Center Search **SC**=Station Calling **CC**= Continuous Calling **FO**=Follow Up Outing **RV**=Reproductive Visit
AV=Additional Visit **OPP**=Opportunistic Siting

HISTORICAL SITE CENTER LOCATION (use if historical site center is being surveyed)
T_____R_____Sec_____1/4_____1/16_____ WEATHER:_____

OWLS DETECTED: (Y/N) _____

Station	Start	End	SPP	Obs Type[1]	Sex	Bearing/ Distance	T / R / Sec	¼	1/16	UTM East	UTM North

[1]**ObsType** = V=Visual A=Audio S=Sign

Field Data Form - Data Dictionary

Age – Age is verifiable only upon visual detections.
AD=Adult
IMM = Immature (adult plumage but white tipped tail feathers observed)
F1=young; all downy **F2** = young, partial adult/partial down feathers **F3** = Young of the year with almost all adult feathers; may see a few downy feathers sticking through
UNK=Age unknown

Detection Time – Record in military time

Location Name – Enter name of survey area (i.e., Jackson Timber Sale)

Master Site Number - Enter state-identified activity center number

Physiographic Province – e.g., CA or OR Klamath, OR Coast, WA Cascades, etc.

SEX – M= Male **F=**Female **Unk =** Unknown**.** Contact whistles can be made by male or female**.**

SPP – **NSO** = Northern spotted owl **BAOW** – Barred Owl

Appendix 7. Physiographic Provinces Within the Range of the Northern Spotted Owl

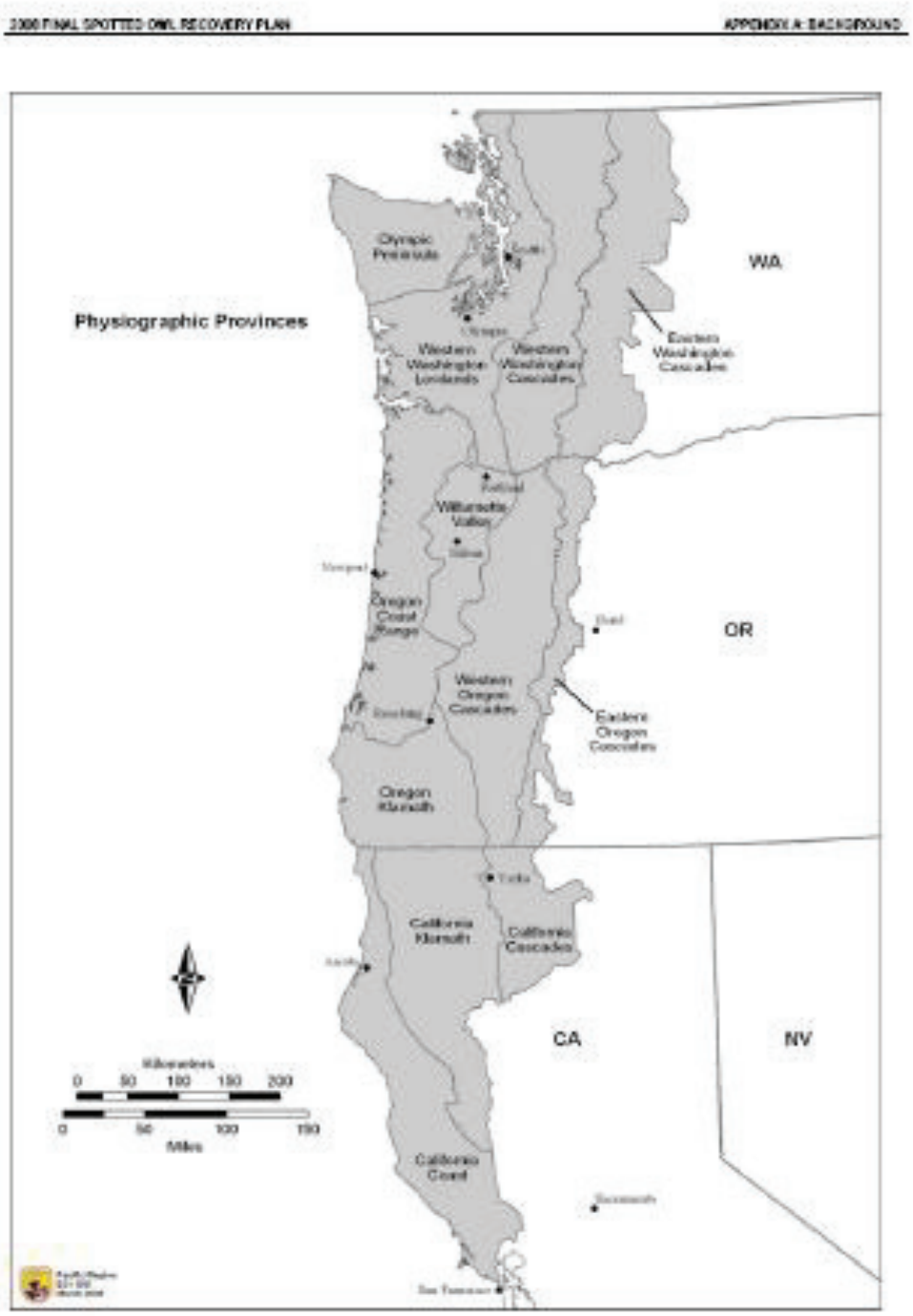

Figure A1. Physiographic Provinces in the range of the spotted owl in the United States.

Reference: 412098

Wildlife Pre-Construction Surveys for the Willits Bypass

Pre-Construction Nesting Bird Surveys Protocol and Protective Measures

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A. Table 1- Potential Bird Species in the Little Lake Valley

Abbreviations and Acronyms

CDFG	California Dept. of Fish & Game
CDFW	California Dept. of Fish and Wildlife
EIR	Environmental Impact Report
ESA	Environmentally Sensitive Area
FDJV	Flatiron DeSilva Gates Joint Venture
MBTA	Migratory Bird Treaty Act
NSO	Northern Spotted Owl
SHN	SHN Consulting Engineers & Geologists, Inc.
T&E	Threatened and Endangered Species
USFWS	U.S. Fish & Wildlife Service

Introduction

Pre-construction nesting bird surveys will be conducted for migratory birds and raptors within the construction footprint of the Willits Bypass project. The survey area for active bird nests will include areas where vegetation removal and disturbance is necessary. When an active nest of a protected species is detected, a "buffer" area (100 feet for non-raptors and 1,320 feet for raptors) will be designated until the nestlings have fledged. In addition, survey coverage will include a search of suitable nesting habitats within a buffer zone (100 feet for non-raptors and 1,320 feet for raptors) directly adjacent to project boundaries. Any active nest of a protected species detected within the project footprint or its adjacent buffer will receive a protective buffer radius around the nest tree as per consultation guidelines described in the **Measures Undertaken for Active Bird Nests** Section of this document. Nesting Bird Surveys will be conducted prior to the commencement and during project construction beginning February 2013.

Regulatory Setting and Monitoring Methodology

Regulations Protecting Nesting Birds

The Federal Migratory Bird Treaty Act (16 USC §703-711.), 50 CFR 10, and Fish & Game Code §3503, §3513, and §3800, protect migratory and nongame birds, their occupied nests, and their eggs. The Federal Endangered Species Act of 1973 (16 USC §1531, §1543) and California Endangered Species Act (Fish & Game Code §2050-§2115.5) prohibit the take of listed species and protect occupied and unoccupied nests of threatened and endangered bird species. The Bald Eagle Protection Act (16 USC §668) prohibits the destruction of bald and golden eagles occupied and unoccupied nests.

California Fish and Game Code 3503 - It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.

California Fish and Game Code 3513 - It is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act.

Environmental Permits Documents Required for the Project

CDFG 1602, Condition 2.8 - *To avoid disturbance to nesting white-tailed kites and other raptors, a qualified biologist shall conduct pre-construction field surveys during the courtship period (February) to identify nesting territories within ¼ mile of the Project alignment. If active nests are identified within ¼ mile of the alignment, a no-construction buffer will be established around the nest until the young have successfully fledged. No take of white-tailed kites or other raptors, including their nests, eggs, or young is authorized by this Agreement.*

USFWS, Biological Opinion Conservation Measure 6 - *Nesting or attempted nesting by migratory birds is anticipated to occur but is not limited to February 1 through September 15. Tree felling, as part of vegetation removal, shall be restricted to between September 16 and March 31 to the greatest extent feasible. Actual removal of down logs and vegetation is likely to occur outside of the primary rainy season.*

EIR (BIO-14) - *Migratory Bird Treaty Act: To comply with the provisions of the Migratory Bird Treaty Act, vegetation required for removal will be removed or trimmed during the fall and/or winter months, to the extent possible, to avoid impacts to nesting birds. If vegetation cannot be removed during the non-breeding season, Caltrans will arrange to have a qualified biologist conduct preconstruction surveys of impact areas to check for nesting activity of all bird species. If nesting activity is detected, Caltrans will, if possible, establish a*

buffer around the nest(s). The buffer width would be determined through consultation with USFWS and CDFG. The buffer will be maintained and construction activities will avoid nest sites until the biologist determines that the young have fledged or nesting activity has ceased.

The United States Department of the Interior, USFWS issued a policy guidance document (*The Migratory Bird Permit Memorandum, April 15, 2003)* to clarify the definition of 'take' relative to nests protected under the Migratory Bird Treaty Act .The document states that, *"The MBTA does not contain any prohibition that applies to the destruction of a migratory bird nest alone (without birds or eggs), provided that no possession occurs during the destruction."* By definition, this would allow for the removal of partially constructed or unoccupied nests.

Monitoring Methodology in the Project Footprint and 100 ft Buffer

For construction activities that occur during the bird nesting season (February 1 – September 15) a CDFW approved biologist will survey the anticipated construction work areas including a 100 foot buffer. Surveys will be conducted prior to any construction activity and within three calendar days of the commencement of such activity.

Prior to surveys, a comprehensive list of bird species with potential to nest in the area will be reviewed (see Table 1, Appendix A). This list identifies the specific and preferred habitats where nesting is generally expected to occur and categorized by the following nesting habitats: grassland (ground nesting), shrubland, tree, and structure (cavity).

Surveys will consist of walking transects as well as a Sit and Scope (survey station) component that will be spaced accordingly to allow complete visual coverage of all habitats including: open fields, barren areas, manmade structures (e.g., bridges), riparian corridors, wooded areas and brush dominated ground cover within, and adjacent to, the project area that could support nesting birds. Appropriate spacing will ultimately be determined by the biologist in the field, but the following guidelines will be implemented to ensure adequate coverage of habitats:

- 100-300 Feet for open grasslands
- 25-50 Feet for areas with dense brush or shrubs.
- <25 Feet as needed for a dense stand of trees or very dense vegetation

The biologist will spend 5-10 minutes at each survey station recording all birds seen and heard, including flyovers (flyovers should be noted as such).

When breeding or nesting activities are suspected or observed, the surveyor will spend additional time watching the activity (with the aid of binoculars when appropriate) to determine the status of the observed activity. The following behaviors are indicators that an active nest may be present:

1. Carrying material to build nests within the survey area
2. Copulations
3. Carrying food or feeding young
4. Carrying fecal sacks away from nest
5. Mate-feeding; repeated "bee-line" flying to likely nest site
6. Observation of nest
7. Observation of chicks
8. Females giving call or chip notes alerting their mate that they are off the nest
9. Auditory evidence of chicks

When conducting walking transects between survey stations an "Active Nest Search" component will be implemented and would consist of a thorough walk-through documented search of all vegetation including trees, shrubs, grasslands, down trees as well as standing snags for active

nests in the proposed disturbance area. This will also include actively searching for low-level, ground, cavity and tree nests in the vegetation proposed for disturbance. For example, cavity nesting "Active Nest Searches" would include searching/inspecting all relevant local features: barns and structures, suitable tree holes and cavities and may require an extension pole with mirror to make a determination. If any nests are discovered, it will quickly be determined whether they are actively being used or not. If there is inconclusive evidence to determine whether the nest is being actively utilized, it may be necessary to conduct additional surveys. Up to three additional survey events of the nest itself, up to 2 hours each, will be conducted to document the nest is not active.

The location of any confirmed active nest of a protected species will be included in the daily survey log and then flagged in the field. The survey log(s) and a map illustrating the location of the nest will be submitted to the Caltrans Resident Engineer and then sent to the CDFW staff for review. Daily survey logs will include:

1. Observer
2. Date of Survey
3. Survey Start and End times
4. Species observed
5. Weather conditions
6. Description of nests observed
7. Description of survey location
8. Description of vegetative habitat(s)
9. Map of survey station locations and active nest search routes
10. Description of the developmental stage of juvenile birds observed and the anticipated fledge date

The requirements of the pre-construction survey protocol consist of:

- Surveys shall be conducted no more than 3 days prior to vegetation clearing
- Survey areas will be defined by Construction Schedule and will be conducted prior to any ground disturbance, vegetation or tree removal activities that could result in take of migratory birds or raptors during the nesting season
- 3 surveys will be conducted to determine the presence of active nests within each designated construction area
- A survey within the boundaries of a designated area is defined as:
    1. Occurring one-half hour before sunrise and for up to four hours after sunrise
    2. Occurring within four hours before sunset and into the evening for a minimum of one-half hour for owls
    3. If a nest is located within the survey area, it will be surveyed up to three additional 2-hour surveys to determine whether it is being actively utilized
- Observation routes (or stations) will be placed in the best possible locations to hear or see bird activity
- Surveys will observe breeding behavior and activity of all bird species. Species that are anticipated to have some potential to occur within the survey area include those identified in Table 1, Appendix A.

Monitoring Methodology - Additional Raptor Surveys

Additional surveys for raptors will include the project foot print and a ¼ mile buffer, as deemed necessary by USFWS. This survey will be necessary to determine presence or absence of owl species and other raptors within the ¼ mile buffer.

Raptor Scan Surveys

Observation points for raptor scan surveys will be strategically placed at sites with an open view of the horizon including the project foot print and ¼ mile buffer, where habitat for breeding raptors has been identified. These surveys will include areas that are anticipated to receive impacts and the associated buffer. Surveys will be conducted in a manner to avoid entering private property unless permission has been granted by the property owner.

A species list will be generated during the surveys and will include mapped areas where raptors are observed landing in the project footprint and ¼ mile buffer.

Areas where raptors are observed landing within the project foot print and ¼ mile buffer, will require a follow-up stand search to determine if nests are present in the area.

Surveys shall not be conducted during periods of excessive or abnormal cold, heat, wind, rain, or other inclement weather that individually or collectively reduces the likelihood of detection.

All nests will be observed for occupation status and species use, active nests will be flagged and protected accordingly. Active nests are nests that contain eggs and or chicks that haven't fledged

Owl Species

- Audible (calls) surveys will be conducted in the later part of the evening surveys for non T&E listed species of owls, including:
    1. Northern Pygmy Owl
    2. Great Horned Owl
    3. Long-eared Owl
    4. Flammulated Owl
- All birds observed by the biologist(s) will be recorded each day.
- Surveys shall not be conducted during periods of excessive or abnormal cold, heat, wind, rain, or other inclement weather that individually or collectively reduce the likelihood of detection.
- All detections will be further investigated for occupation status and species use, active nests will be flagged and protected accordingly. Active nests are nests that contain eggs and or chicks that haven't fledged

Pre-construction Nesting Bird Survey Reporting and Nest Protection

All field data will be submitted to Caltrans in a timely manner. SHN will provide Flatiron a copy of all field data including: the survey maps, field notes, and observation forms used during preconstruction bird surveys. Flatiron will transmit these results to Caltrans. Caltrans will then forward by 1 p.m. the preceding day's field data to CDFW for review. In locations where all 3 protocol surveys have been completed and no nests were found, Flatiron DeSilva Gates Joint Venture may conduct vegetation or ground-disturbing activities beginning the following day unless CDFW responds to survey results before then.

In areas where nests are determined to be active by the above stated Monitoring Methodology, a Nest Protection Plan will be developed in consultation with the Department Environmental Liaison and CDFW. Nest Protection Plans will be submitted to CDFW for final approval.

Measures Undertaken for Active Bird Nests

A. The Department Environmental Liaison will be contacted within one business day of discovery of a nesting bird, as Caltrans may choose to initiate coordination with wildlife regulatory agencies, CDFW and/or USFWS.

B. If a bird is observed nesting within 100 feet (non-raptor) or 1,320 feet (raptor species) of the nearest (or projected) work site, the Biologist will prepare a Nest Protection Plan that will be reviewed by the Department Environmental Liaison and submitted to CDFW for view and approval.

C. During the development of the monitoring plan, the nesting area and buffer area will be avoided. An ESA will be implemented immediately for the nesting site. The ESA will include the active nesting site and an additional buffer of 100 feet for non-raptor species or 1,320 feet for raptors, unless otherwise determined by the CDFW that this buffer can be decreased or increased to adequately protect the active nest. The adequacy of buffer widths varies with species discovered and circumstances of the construction area.

D. The ESA will not be entered until:

1. Department Environmental Liaison has agreed to the monitoring plan or
2. The Biologist has determined that the juvenile birds have fully fledged and left the area or,
3. The nest has failed and the area has been resurveyed to verify the absence of bird species involved in any process of the breeding cycle.

E. Avoidance and minimization measures may be adjusted only after consultation with Department Environmental Liaison (for all protected species).

F. The Biologist will monitor the construction of all ESAs to ensure proper placement and buffer area inclusion.

G. The Biologist will survey the ESAs weekly to ensure the integrity of the structures and their effectiveness in keeping people, vehicles, or equipment out of the sensitive area.

H. Indications of significant disturbance to nesting birds that fall within the ESA may generate further consultation with the Department Environmental Liaison. On a case-by-case basis, the adequacy of buffer widths will be addressed with input from the Biologist. Buffer widths may be adjusted following consultation with the Department Environmental Liaison and/or CDFW/USFWS (for threatened or endangered species).

Construction Compliance Reporting

Prior to construction, all areas will be cleared and buffers will be in place to protect occupied nests, as required by the nest protection plan. Pre-construction nesting bird surveys will have been completed prior to the initiation of construction (see Preconstruction Nesting Bird Surveys Reporting and Nest Protection). Construction compliance reporting will be forwarded to the Department Environmental Liaison for review and to document compliance.

Reports will contain:

1. A list of dates during which monitoring activities were conducted.
2. Surveyors name(s), survey/monitoring date and time period, and areas surveyed/monitored.
3. A summary of construction activity in the survey/monitoring area.
4. A summary of all bird avoidance and impact minimization measures implemented at the site(s), if applicable.
5. The location and status of observed nests, as well as activities that indicate possible or probable nesting.
6. An account of any disturbance or incidental take of threatened/endangered species/species of special concern during construction (*take* applies to threatened/endangered species only).
7. A list of potential compliance issues and the resolution or status of each issue.

FDJV's Construction Personnel Responsibilities

A. Construction personnel will be required to attend training that specifies their responsibilities regarding avoidance and minimization measures required for sensitive bird species or any nesting bird prior to starting work on the project.

B. Should the contractor's workers encounter an active bird nest in the construction area, they are required to notify the Biologist, or Supervisor before any action is taken that might impact the bird. Construction will commence only after the adequate protection measures have been implemented and the Biologist has given permission for the resumption of work.

C. Construction personnel immediately will notify the Biologist if any injured bird species are encountered. The Department Environmental Liaison will notify other responsible agencies (USFWS and/or CDFW) as necessary if any injured bird species are encountered.

D. The Superintendent may inform construction personnel that work must be halted to address restrictions necessary to prevent impacts to nesting birds.

E. Construction personnel may not enter established ESAs for any reason.

Appendix A

Potential Bird Species in the Little Lake Valley

Table # 1 Potential Bird Species in the Little Lake Valley			
	Common Name	**Scientific Name**	**Preferred Nesting Habitat**
PBGR	Pied-billed grebe	*Podilymbus podiceps*	In or at margin of thick vegetation in lakes marshes
AMBI	American bittern	*Botaurus lentiginosus*	Above waterline in dense cattail and bulrush marshes
GBHE	Great blue heron	*Ardea herodias*	In a tree, snag, tall bush or marsh vegetation
GRHE	Green heron	*Butorides virescens*	In a tree or shrub very close to water
WODU	Wood duck	*Aix sponsa*	In a natural hollow, tree cavity or nest box, 30′ above the ground and near water
EGWT	Green-winged teal	*Anas crecca*	Well concealed in tall vegetation
MALL	Mallard	*Anas platyrhynchos*	Tall vegetation or under a bush, often near water
NOPI	Northern pintail	*Anas acuta*	Small depression in vegetation, usually near water
CITE	Cinnamon teal	*Anas cyanoptera*	Tall vegetation, occasionally far from water
EUWI	Eurasian wigeon	*Anas penelope*	In Europe and Asia
AMWI	American wigeon	*Anas americana*	On ground, far from water
RNDU	Ring-necked duck	*Aythya collaris*	Frequently over water on a hummock or shoreline
LESC	Lesser scaup	*Aythya affinis*	In tall, concealing vegetation, generally close to water, occasionally on an island
COGO	Common goldeneye	*Bucephala clangula*	In cavity at edge of water
BUFF	Bufflehead	*Bucephala albeola*	Usually in an abandoned woodpecker cavity, natural tree cavity or nest box near water
HOME	Hooded merganser	*Lophodytes cucullatus*	In forested regions of northwestern U.S.
COME	Common merganser	*Mergus merganser*	Often in tree cavity 15-20 ft. high; occasionally on the ground, under a bush or log, on a cliff ledge or in a large nest box
RUDU	Ruddy duck	*Oxyura jamaicensis*	In cattails, bulrushes or other emergent vegetation; occasionally on a muskrat lodge or a log

	Common Name	Scientific Name	Preferred Nesting Habitat
TUVU	Turkey vulture	*Cathartes aura*	Bare ground, among boulders, in hollow trees or on forest floor
OSPR	Osprey	*Pandion haliaetus*	Exsposed treetops, utility poles, transmission towers, beacons or pilings, 10-250 ft high. observed
WTKI	White-tailed kite	*Elanus leucurus*	In a tree, often an oak, well above the ground. observed
BAEA	Bald eagle	*Haliaeetus leucocephalus*	Usually in trees bordering lakes or large rivers. observed
NOHA	Northern harrier	*Circus cyaneus*	On the ground, often on a mound, usually in shrubs, cattails or tall vegetation. observed
SSHA	Sharp-shinned hawk	*Accipiter striatus*	Stick or twig nest is usually built each year, may remodel an abandoned crow nest. observed
COHA	Cooper's hawk	*Accipiter cooperii*	In the fork of a tree, often in outer branches
RSHA	Red-shouldered hawk	*Buteo lineatus*	Within the canopy of trees well above the ground
RTHA	Red-tailed hawk	*Buteo jamaicensis*	Usually in woodlands adjacent to open fields or shrublands; in a fork at the crown of a deciduous tree, or occasionally a coniferous tree or cliff
GOEA	Golden eagle	*Aquila chrysaetos*	On a cliff ledge or in a tall tree overlooking open hunting habitat
AMKE	American kestrel	*Falco sparverius*	In a natural cavity or an abandoned woodpecker cavity; may use old magpie or crow nest
MERL	Merlin	*Falco columbarius*	On cliff ledges and in cavities
PEFA	Peregrine falcon	*Falco peregrinus*	Usually on rocky cliffs or ridges; some use artificial nest sites on bridges and buildings. observed
PRFA	Prairie falcon	*Falco mexicanus*	On cliff ledge, in crevices or on rocky promontories; rarely in abandoned nests of other raptors or crows

	Common Name	Scientific Name	Preferred Nesting Habitat
RNEP	Ring-necked pheasant	*Phasianus colchicus*	On the ground; among grassor sparse vegetation or next to a log or other natural debris
WITU	Wild turkey	*Meleagris gallopavo*	On the ground; in open woods or along the edge of an opening
CAQU	California quail	*Callipepla california*	On the ground; under a brush pile, shrub, log or debris
VIRA	Virginia rail	*Rallus limicola*	Concealed in emergent marsh vegetation, usually suspended just over the water
SORA	Sora	*Porzana carolina*	Usually over water, but occasionally in a wet meadow; under concealing vegetation
AMCO	American coot	*Fulica americana*	In emergent marsh vegetation; floating nest
KILL	Killdeer	*Charadrius vocijerus*	Usually on any piece of open ground, including shorelines, beaches, fields, and lightly traveled gravel roads
SPSA	Spotted sandpiper	*Actitis macularia*	Beaches and gravel bars along shores freshwater streams, lakes, ponds, and estuaries; also along margins of wet meadows
COSN	Common snipe	*Gallinago gallinago*	Usually in dry grass, often under vegetation
MODO	Mourning dove	*Zenaida macroura*	In the fork of a shrub or tre, or occasionally on the ground
WESO	Western screech-owl	*Otus kennicottii*	In abandoned woodpecker cavity, magpie nest, nest box or natural cavity
GHOW	Great homed owl	*Bubo virginianus*	Usually in a tree; also on cliffs in the abandoned stick nest of a hawk, crow, raven, eagle, or heron
NOPO	Northern pygmy-owl	*Glaucidium gnoma*	In an abandoned woodpecker cavity or natural tree hollow
SPOW	Spotted owl	*Strix occidentalis*	On a shallow scrape of a treehollow, broken top, abandoned stick nestor cave or cliff crevice. observed
VASW	Vaux's swift	*Chaetura vauxi*	In a natural tree cavity, burned out hollow or broken-off top; uses chimneys widely

	Common Name	Scientific Name	Preferred Nesting Habitat
ANHU	Anna's hummingbird	*Calypte anna*	On a tree branch, or shrub, among vines or under sheltered eaves
RUHU	Rufous hummingbird	*Selasphorus rufus*	Saddled on a drooping conifer bough
ALHU	Allen's hummingbird	*Selasphorus sasin*	On a tree branch or shrub
BEKI	Belted kingfisher	*Ceryle alcyon*	In a cavity at the end of an earth burrow
ACWO	Acorn woodpecker	*Melanerpes formicivorus*	All members of the group help excavate a cavity in a dead tree or branch
RBSA	Red-breasted sapsucker	*Sphyrapicus ruber*	Excavates a cavity in a deciduous tree, where the heartwood has been softened by fungus
NUWO	Nuttall's woodpecker	*Picoides nuttalii*	In a cavity of live or dead tree, new cavity every year
DOWO	Downy woodpecker	*Picoides pubescens*	Pair excavates cavity in dying or decaying trunk or limb
HAWO	Hairy woodpecker	*Picoides villosus*	Pair excavates cavity in dying or decaying trunk or limb
NOFL	Northern flicker	*Colaptes auratus*	Pair excavates a cavity in a dead or dying decidous tree, may use nest box
PIWO	Pileated woodpecker	*Drycopus pileatus*	Pair excavates a cavity in a dead or dying tree-trunk
OSFL	Olive-sided flycatcher	*Contopus cooperi*	In a conifer; on a horizontal branch far from trunk
WEWP	Western wood-pewee	*Contopus sordidulus*	On a horizontal limb in a tree
WIFL	Willow flycatcher	*Empidonax traillii*	Small cup nest is built in a fork of a small shrub. migrant
DUFL	Dusky flycatcher	*Empidonax oberholseri*	In the fork of a small shrub
PSFL	Pacific-slope flycatcher	*Empidonax difficilis*	In a crevice, on a rocky stream-side ledge
BLPH	Black phoebe	*Sayornis nigricans*	On cliffs, bridges, buildings, and culverts
SAPH	Say's phoebe	*Sayornis saya*	In a niche on a cliff face or beneath an eave or bridge
ATFL	Ash-throated flycatcher	*Myiarchus cinerascens*	In a natural or artificial cavity
WEKI	Western kingbird	*Tyraimus verticalis*	On a branch near the trunk of a deciduous tree; frequently on barns or towers

	Common Name	Scientific Name	Preferred Nesting Habitat
TRES	Tree swallow	*Tachycineta bicolor*	In a tree cavity or nest box
VGSW	Violet-green swallow	*Tachycineta thalassina*	Semi-colonial at times; in a tree cavity, cliff crevice, nest box or a crack in a building
NRWS	Northern rough-winged swallow	*Stelgidopteryx serripennis*	In single pairs or occasionally in small colonies; at the end of a burrow lined with leaves and dry grass; sometimes reuses kingfisher and rodent burrows and other natural or artificial crevices
CLSW	Cliff swallow	*Hirundo pyrrhonota*	Colonial; under bridges and on cliffs, buildings and other similar sites
BARS	Barn swallow	*Hirundo rustica*	On a vertical or horizontal building structure under a suitable overhang; on a bridge or in a culvert or cave
STJA	Steller's jay	*Cyanocitta stelleri*	In the fork of a conifer;
WESJ	Scrub jay	*Aphelocoma californica*	In a small conifer or shrub;
AMCR	American crow	*Corvus brachyrhynchos*	In coniferous or deciduous trees
CORA	Common raven	*Corvus corax*	On steep cliffs, ledges, bluffs, power poles and tall conifers
CBCH	Chestnut-backed chickadee	*Parus rufescens*	Excavates a cavity in a soft, rotting tree-trunk or limb stub, or uses a natural cavity or abandoned woodpecker nest
PLTI	Plain titmouse	*Parus inornatus*	See Juniper T or Oak T
BUSH	Bushtit	*Psaltriparus minimus*	Pair builds a sock-like, hanging nest, woven with moss, lichens, cocoons, spider silk, fur and feathers
WBNU	White-breasted nuthatch	*Sitta carolinensis*	In a natural cavity or an abandoned woodpecker nest in a large deciduous tree
BRCR	Brown creeper	*Certhia americana*	Suspended under loose bark
BEWR	Bewick's wren	*Thryomanes bewickii*	Natural cavity; abandoned woodpecker nest; bird boxes
HOWR	House wren	*Troglodytes aedon*	Natural cavity, abandoned woodpecker nest; bird boxes, crevices
MAWR	Marsh wren	*Cistothorus palustris*	Globe-like nest is woven near water with cattails, tule, weeds & grass

	Common Name	Scientific Name	Preferred Nesting Habitat
GCKI	Golden-crowned kinglet	*Regulus satrapa*	Outer limbs of a conifer
RCKI	Ruby-crowned kinglet	*Regulus calendula*	Usually in a conifer
BGGN	Blue-gray gnatcatcher	*Polioptila caerulea*	On a limb or fork in a deciduous tree
WEBL	Western bluebird	*Sialia mexicana*	Abandoned woodpecker cavity, natural cavity or nest box
SWTH	Swainson's thrush	*Catharus ustulatus*	Usually in a shrub or small tree
HETH	Hermit thrush	*Catharus guttatus*	Small tree or shrub; occasionally on the ground
AMRO	American robin	*Turdus migratorius*	Coniferous or deciduous tree or shrub
WREN	Wrentit	*Chamaea fasciata*	Pair builds a compact, open cup of bark strips and spider webs
NOMO	Northern mockingbird	*Mimus polyglottos*	Small shrub or small tree
CEDW	Cedar waxwing	*Bombycilla cedrorum*	Coniferous or deciduous tree or shrub
EUST	European starling	*Sturnus vulgaris*	Abandoned woodpecker cavity, natural cavity, nest box or almost any other cavity
BHVI	Blue-headed vireo	*Vireo solitarius*	In a fork of small tree
HUVI	Hutton's vireo	*Vireo huttoni*	Well above the ground in the fork of an oak or conifer twig
WAVI	Warbling vireo	*Vireo gilvus*	In horizontal fork in deciduous tree or shrub
OCWA	Orange-crowned warbler	*Vermivora celata*	On the ground
NAWA	Nashville warbler	*Vermivora ruficapilla*	On the ground
YEWA	Yellow warbler	*Dendroica petechia*	Fork of deciduous tree or small shrub branch
YRWA	Yellow-rumped warbler	*Dendroica coronata*	In crotch or horizontal limb in conifer
BTYW	Black-throated gray warbler	*Dendroica nigrescens*	Usually in conifer, on a horizontal branch
TOWA	Townsend's warbler	*Dendroica townsendi*	From the mountains of Oregon and Northern Idaho to Alaska
HEWA	Hermit warbler	*Dendroica occidentalis*	Well away from trunk of high conifer branch
MGWA	MacGillivray's warbler	*Oporornis tolmiei*	Low trees or shrubs between vertical stems
COYE	Common yellowthroat	*Geothlypis trichas*	Low to the ground, in a small shrub or among reeds, cattails, bulrushes or other emergent vegetation

	Common Name	Scientific Name	Preferred Nesting Habitat
WIWA	Wilson's warbler	*Wilsonia pusilla*	On the ground, sunken into soft substrate, or in a low shrub or thicket
YBCH	Yellow-breasted chat	*Icteria virens*	Low in a shrub or small tree
WETA	Western tanager	*Piranga ludoviciana*	In a fork or on a horizontal branch of a conifer, placed well out from the trunk
BHGR	Black-headed grosbeak	*Pheucticus melanocephalus*	In a tall shrub or deciduous tree, often near water
BLGR	Blue grosbeak	*Passerina caerulea*	In a shrub or low tree
LAZB	Luzuli bunting	*Passerina amoena*	In an upright crotch low in a shrubby tangle
SPTO	Spotted towhee	*Pipilo maculatus*	On or near the ground
CATO	California towhee	*Pipilo crissalis*	Low to ground in shrub or tree
CHSP	Chipping sparrow	*Spizella passerina*	Low to mid level in a coniferous tree or oak
LASP	Lark sparrow	*Chondestes grammacus*	On the ground or in a low bush
GRSP	Grasshopper sparrow	*Ammodramus savannarum*	In a shallow depression on the ground, under dome of bent grass
FOSP	Fox sparrow	*Passerella iliaca*	On the ground or low in a shrub or small tree
SOSP	Song sparrow	*Melospiza melodia*	On the ground or in a shrub or small tree
LISP	Lincoln's sparrow	*Melospiza lincolnii*	On the ground
GCSP	Golden-crowned sparrow	*Zonotrichia atricapilla*	From British Columbia and western Alberta to Alaska
EWCS	White-crowned sparrow	*Zonotrichia leucophrys*	On the ground or in a shrub or small coniferous tree
DEJU	Dark-eyed junco	*Junco hyemalis*	On the ground, or low in a shrub or tree
RWBL	Red-winged blackbird	*Agelaius phoeniceus*	In cattails or shoreline weeds and bushes
WEME	Western meadowlark	*Sturnella neglecta*	On the ground
BRBL	Brewer's blackbird	*Euphagus cyanocephalus*	On the ground or in a shrub or tree
BHCO	Brown-headed cowbird	*Molothrus ater*	No nest is built
BAOR	Northern oriole	*Icterus galbula*	High in deciduous tree, suspended from near the end of a branch

	Common Name	Scientific Name	Preferred Nesting Habitat
PUFI	Purple finch	*Carpodacus purpureus*	On a horizontal branch far from the trunk
HOFI	House finch	*Carpodacus mexicanus*	In a cavity, building, dense foliage or abandoned bird nest
PISI	Pine siskin	*Carduelis pinus*	On an outer branch in a conifer
LEGO	Lesser goldfinch	*Carduelis psaltria*	On the outer portion of limb in small tree or shrub
AMGO	American goldfinch	*Carduelis tristis*	In fork in a shrub or dense bush
HOSP	House sparrow	*Passer domesticus*	In natural or artificial cavity

From: Heidsiek, Carol A SPN
To: Popham, Gail P@DOT
Subject: RE: DN 199 STAA NWP App Endangered Species Info (UNCLASSIFIED)
Date: Monday, June 03, 2013 1:53:38 PM

Classification: UNCLASSIFIED
Caveats: NONE

Hi Gail, just wanted to clarify the corrections we discussed to the letter #2010-00315. Our letter went out on 5/31 and does not have the following correction: impacts to waters of 0.023-acre are temporary and permanent, work under this permit covers Patrick Creek Narrows Locations 1-3 only, and the other future work will be covered under separate permits. You also clarified "grovel" should be "gravel" and the trucks are "longer than legal vehicles." Sorry this did not make it in the final letter. Take care, Carol

-----Original Message-----
From: Popham, Gail P@DOT [mailto:gail.popham@dot.ca.gov]
Sent: Thursday, May 30, 2013 2:42 PM
To: Heidsiek, Carol A SPN
Subject: DN 199 STAA NWP App Endangered Species Info

Carol,

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16th Floor
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF

MAY 31 2013

Regulatory Division

SUBJECT: File No. 2010-00315N

Ms. Sandra Rosas
Department of Transportation
District 1, P.O. Box 3700
Eureka, California 95502-3700

Dear Ms. Rosas:

This letter is in reference to your submittals dated May 2, 2012, February 25, 2013, and April 17, 2013, concerning Department of the Army (Corps) permit authorization to widen and realign State Route 197 and Highway 199 at several locations to accommodate Surface Transportation Assistance trucks. Work would occur along approximately 8 miles of State Route 197 (PM 3.50 through 4.47) and U.S. Highway 199 (PM 20.31 through 26.51) bordering the Smith River and Middle Fork of the Smith River, respectively, and near the Community of Hiouchi, in Del Norte County, California.

The project proposes to widen and realign the roadway at several locations to accommodate Surface Transportation Assistance trucks. These trucks are no longer legal vehicles and require a large turning radius. The proposed improvements would enhance safety, extend sight distances, and widen the highway to allow room for off-tracking of long vehicles. The four routes in the project area include: Patrick Creek Narrows, Locations 1& 2, Location 3, and Washington Curve on Route 199. Sites along Route 197 include Ruby 1 and Ruby 2.

Work within U.S. Army Corps of Engineers' (Corps) jurisdiction would include temporary impacts to non-wetland waters of the U.S. totaling about 0.023-acre.

Section 404 of the Clean Water Act (CWA) generally regulates the discharge of dredged or fill material below the plane of ordinary high water in non-tidal waters of the United States, below the high tide line in tidal waters of the United States, and within the lateral extent of wetlands adjacent to these waters.

Based on a review of the information you submitted, your project qualifies for authorization under Department of the Army Nationwide Permit (NWP) 14 (*Linear Transportation Projects*) (77 Fed. Reg. 10, February 21, 2012), pursuant to Section 404 of the Clean Water Act (33 U.S.C. § 1344). All work shall be completed in accordance with the plans and drawings entitled: "DN 197/199" (sheets 1-17), dated November 22, 2009. (Enclosure 1).

The project must be in compliance with the Terms and Conditions of the NWPs cited in Enclosure 2 and any Special Conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any Term or Condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps of Engineers (Corps). Upon completion of the project and all associated mitigation and monitoring requirements, you shall sign and return the statement cited in Enclosure 3, certifying all work complies with the Terms and Conditions of the NWPs. Project authorization under the NWPs does not obviate any requirement to obtain other Federal, State, or local approvals necessitated by law.

This verification will remain valid until March 17, 2017. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon an NWP will remain authorized provided the activity is completed within 12 months of the date of an NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). The Chief of Engineers will periodically review NWPs and their conditions and will decide to either modify, reissue, or revoke the permits. If an NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWPs. Changes to the NWPs would be announced by Public Notice posted on our website (http://www.spn.usace.army.mil/regulatory/index.html).

Project authorization will not be effective until you have obtained Section 401 water quality certification from the Regional Water Quality Control Board (RWQCB), North Coast Region. If the RWQCB fails to act on a valid request for certification within two (2) months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work. You shall comply with any condition of certification required by the RWQCB, and you shall consider any such conditions to be an integral part of the NWP authorization for the project.

To ensure compliance with this NWP authorization and to further minimize adverse impacts to water quality and other aquatic resources, including federally listed threatened and endangered species and designated critical and essential fish habitat, the project is subject to the following Special Conditions:

1. Best management practices will be implemented including installation of silt fences, straw bales, grovel bags, and fiber roles. Placement of these materials will control sediment discharge and minimize sediment release into receiving waters.

2. Fueling activities will occur in designated upland locations.

3. Excavated spoils will be controlled to ensure no sediment release into the stream.

4. Measures will be implemented to secure overwintering of exposed soils and prevent erosion. Temporary erosion control measures including mulching, seeding, and erosion control will be implemented.

5. The contractor will develop and implement best management practices/minimization measures (pages 2.3-23 through 2.3-27 of the Final Environmental Impact Report dated April 10, 2013, prepared by Caltrans), a water pollution control plan, and spill contingency measures.

6. No concrete washings or water from concrete will be allowed to flow into waterways. No concrete will be poured within flowing water in waterways. Waste management best management practices will be implemented.

7. The permittee shall submit site-specific plans/drawings for the in-kind restoration areas in accordance with the Corps' South Pacific Division map and drawing standards (Special Public Notice dated March 5, 2012). Drawings will include proposed contours and plant community composition. A five-year monitoring report will be submitted to the Corps' to ensure a 75% reestablishment success for these areas. In-kind restoration will occur as described in the Final Environmental Impact Report dated April 10, 2013, prepared by Caltrans.

8. The permittee shall restore all temporarily impacted areas to pre-construction contours. All disturbed areas shall be revegetated with pre-existing and/or native wetland vegetation as described in the Final Environmental Impact Report dated April 10, 2013, prepared by Caltrans.

9. Best management practices shall be fully implemented. No debris, sand, silt, trash, concrete or washings thereof, oil or other petroleum products or washings thereof, or other foreign materials shall be allowed to enter or be placed where it may be washed by rainfall or runoff into waters of the U.S. Upon project completion, any and all excess construction materials, debris, and/or other excess project materials shall be removed to an appropriate upland disposal site.

10. All minimization measures provided by NOAA in their concurrence letter dated March 15, 2012, shall be implemented.

11. This Corps permit does not authorize you to "take" an endangered species. In order to legally take a listed species, you must have a separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit or a Biological Opinion (BO) under ESA section 7 with "incidental take" provisions with which you must comply). The Fish and Wildlife Service (FWS) BO dated September 13, 2012, was previously provided to your staff and provides terms and conditions required to implement your project. Your authorization under this Corps permit is conditional upon your compliance with all of those terms and conditions. FWS is the appropriate agency to determine your compliance with the ESA.

12. Permit applications for future road segments within this same linear transportation corridor shall contain a justification demonstrating that the cumulative impacts of the proposed and previously authorized (i.e. this current project) project segments do not result in more than minimal impacts to the aquatic ecosystem. The permittee shall reference this project, including Corps file number, in the submittals.

You may refer any questions on this matter to Carol Heidsiek of our Regulatory staff by telephone at 707-443-0855. All correspondence should be addressed to the Regulatory Division, North Branch, Eureka Field Office, 601 Startare Drive, Box 14, Eureka, California 95501, referencing the file number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at our website: http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copies Furnished (w/o encls):

NOAA Fisheries, Arcata, CA
CA RWQCB, Santa Rosa, CA

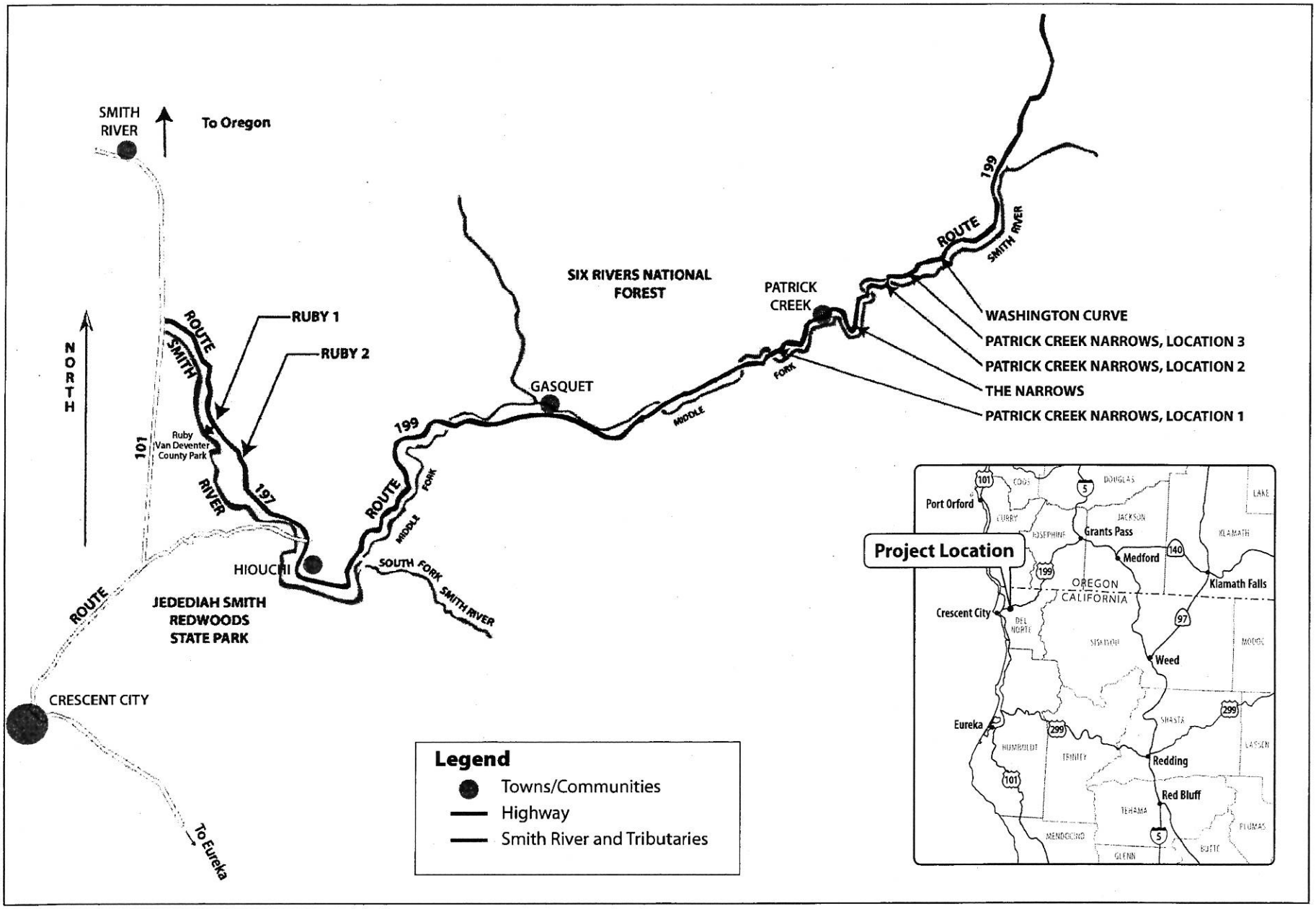
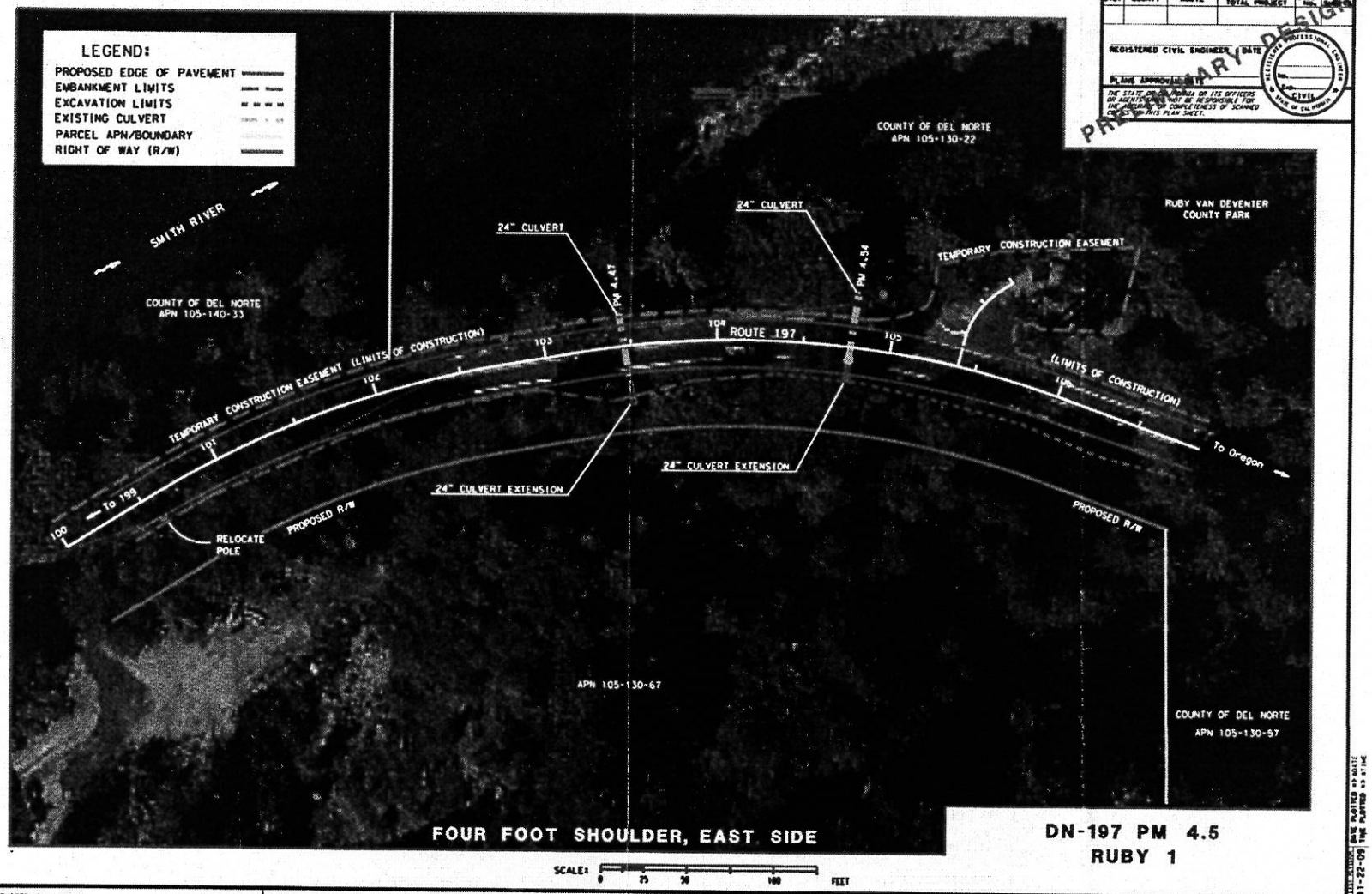


Figure 1-1
Project Vicinity and Location Map

DN197/199 Sheet 1 of 17
#2010-00315



Sheet 2 of 17
#2010-0031S
DN 197/199

Figure 1-3
Ruby 1

PRELIMINARY DESIGN

FOUR-FOOT SHOULDER ALTERNATIVE

DN-197 PM 3.2/4.0
RUBY 2

L1

SCALE: 0 50 100 150 200 250 FEET

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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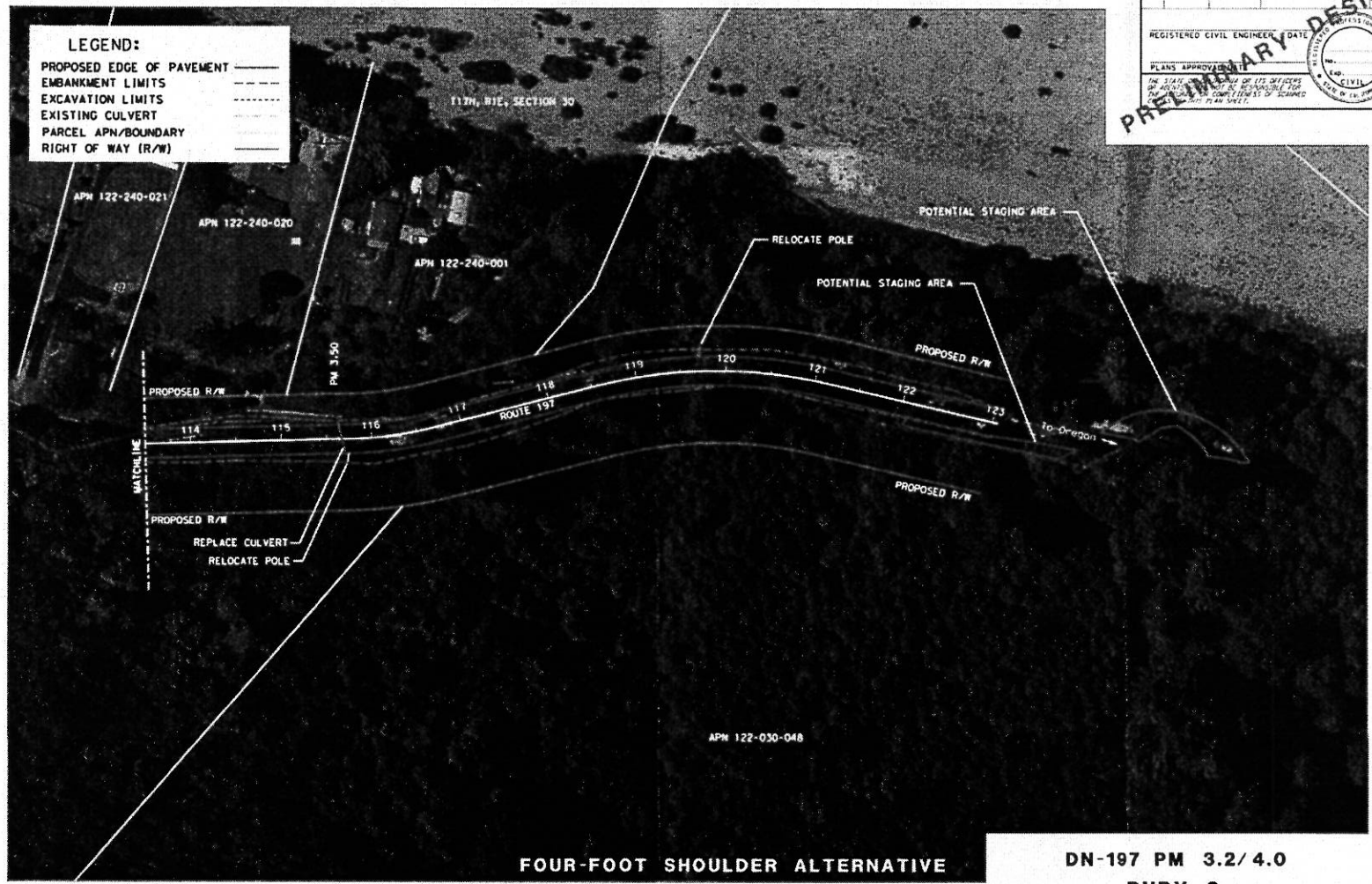
Figure 1-4a
Ruby 2, Four-Foot Shoulder

2010-00315
Sheet 3 of 17
DN 197/199



FOUR-FOOT SHOULDER ALTERNATIVE

SCALE: 0 50 100 150 200 250 FEET

DN-197 PM 3.2/4.0
RUBY 2

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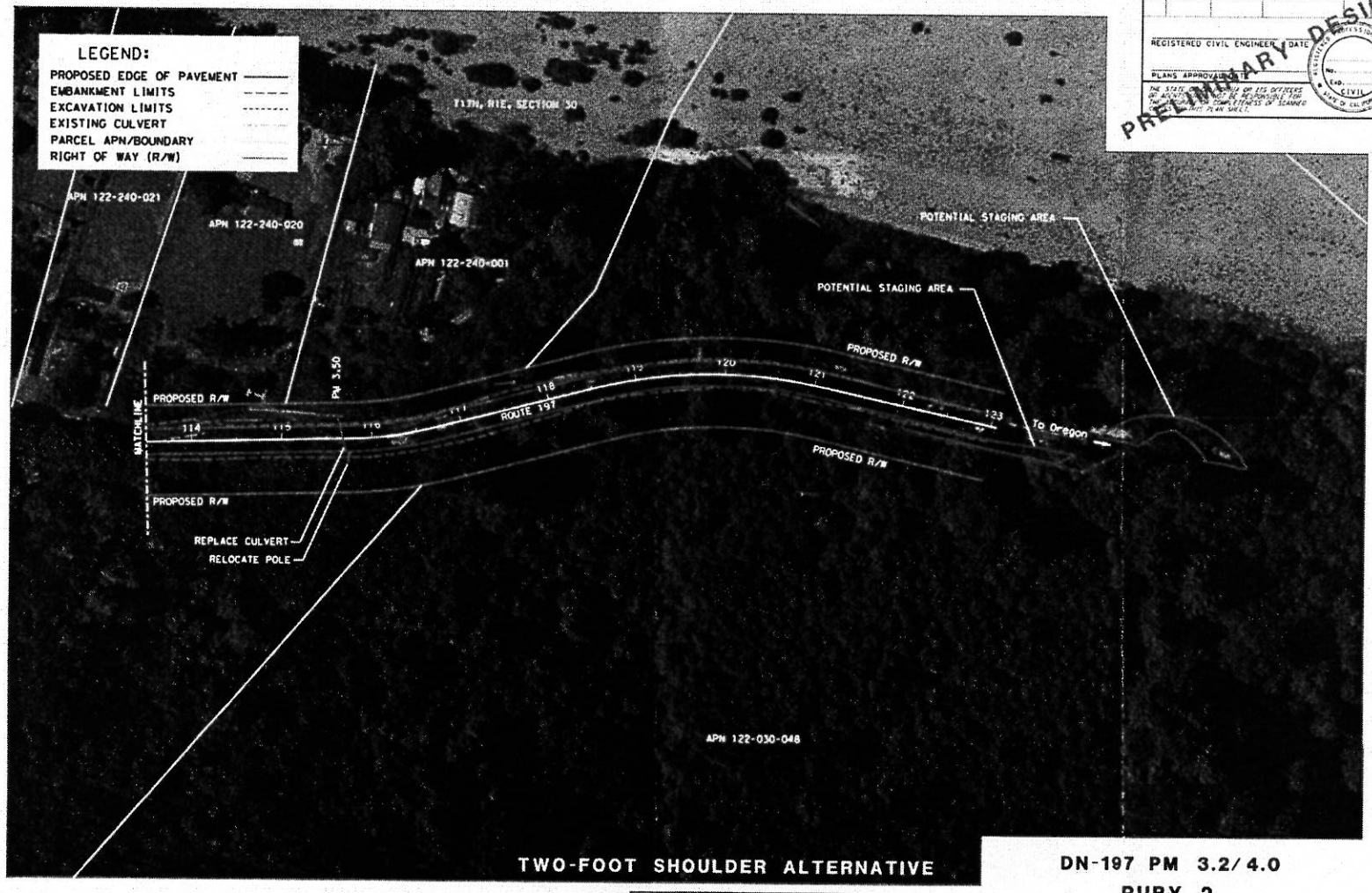
Sheet 4/17
DN 197/199
2010-0031S

Figure 1-4b
Ruby 2, Four-Foot Shoulders

Sheet 5/17
DN 197 /199
2010 - 00315

Figure 1-5a
Ruby 2, Two-Foot Shoulder



PRELIMINARY DESIGN

TWO-FOOT SHOULDER ALTERNATIVE

DN-197 PM 3.2/4.0

RUBY 2

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Sheet 6/17
DN 197/199
2010-00315

Figure 1-5b
Ruby 2, Two-Foot Shoulders

DN-197 PM 3.2/4.0
RUBY 2

L1

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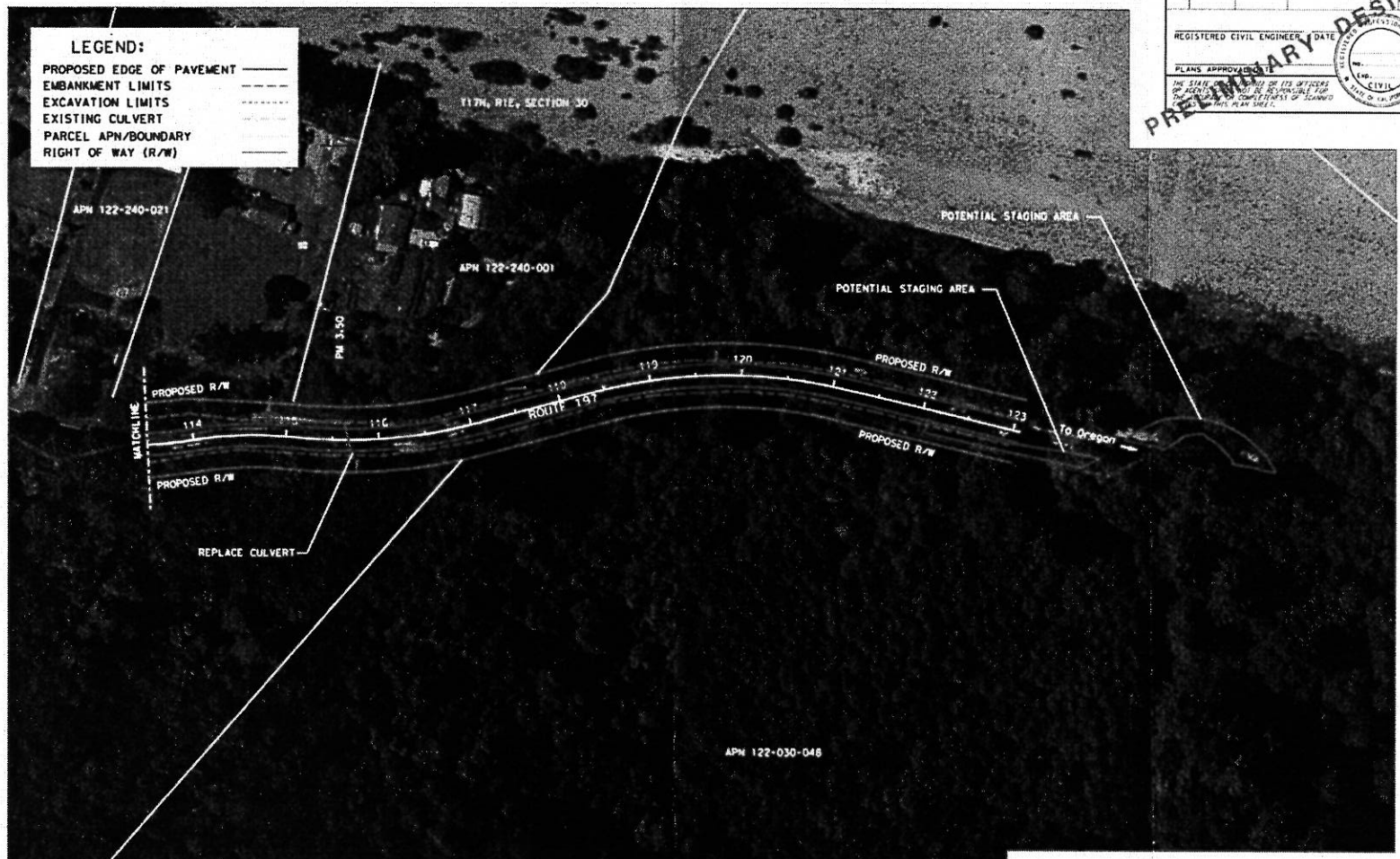
Sheet 7/17
PN 197/199
2010-00315

Figure 1-6a
Ruby 2, Two-Foot Widening in Spot Location



TWO-FOOT WIDENING IN SPOT LOCATIONS

DN-197 PM 3.2/4.0

RUBY 2

L2

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

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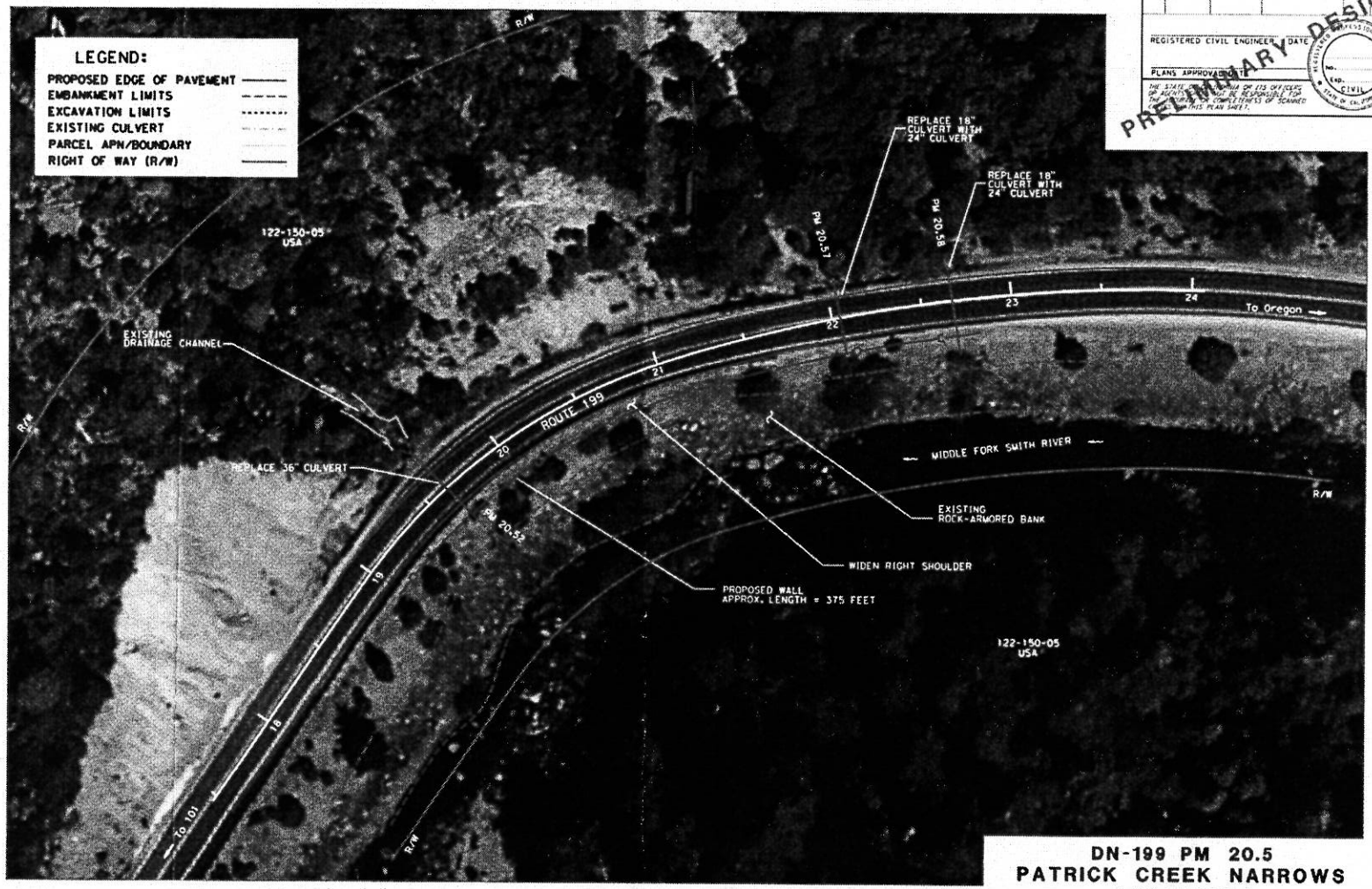
Sheet 8/17
DN 197/199
2010-00315

Figure 1-6b
Ruby 2, Two-Foot Widening in Spot Locations



DN-199 PM 20.5
PATRICK CREEK NARROWS
LOCATION 1

SCALE: 0 25 50 100 FEET

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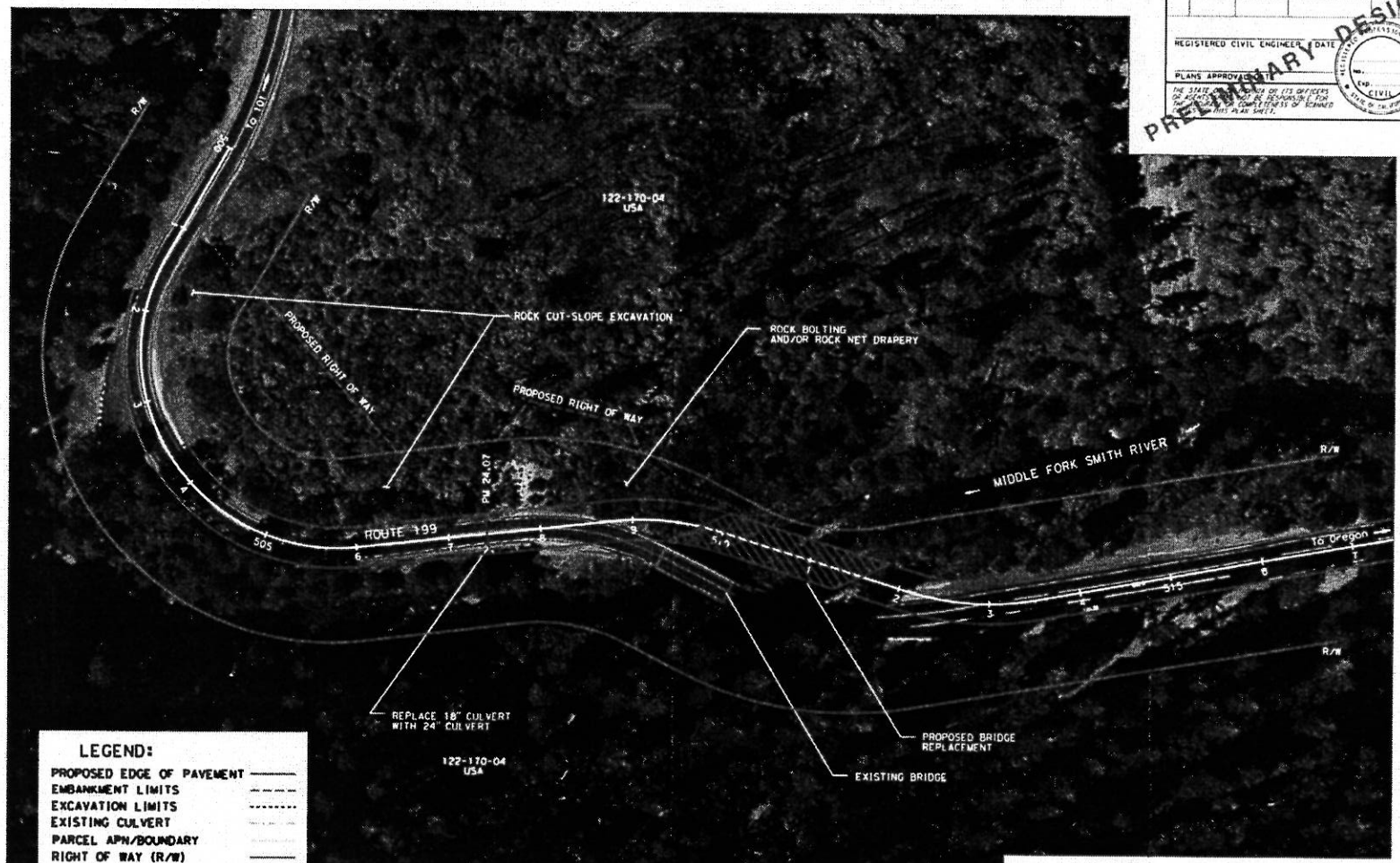
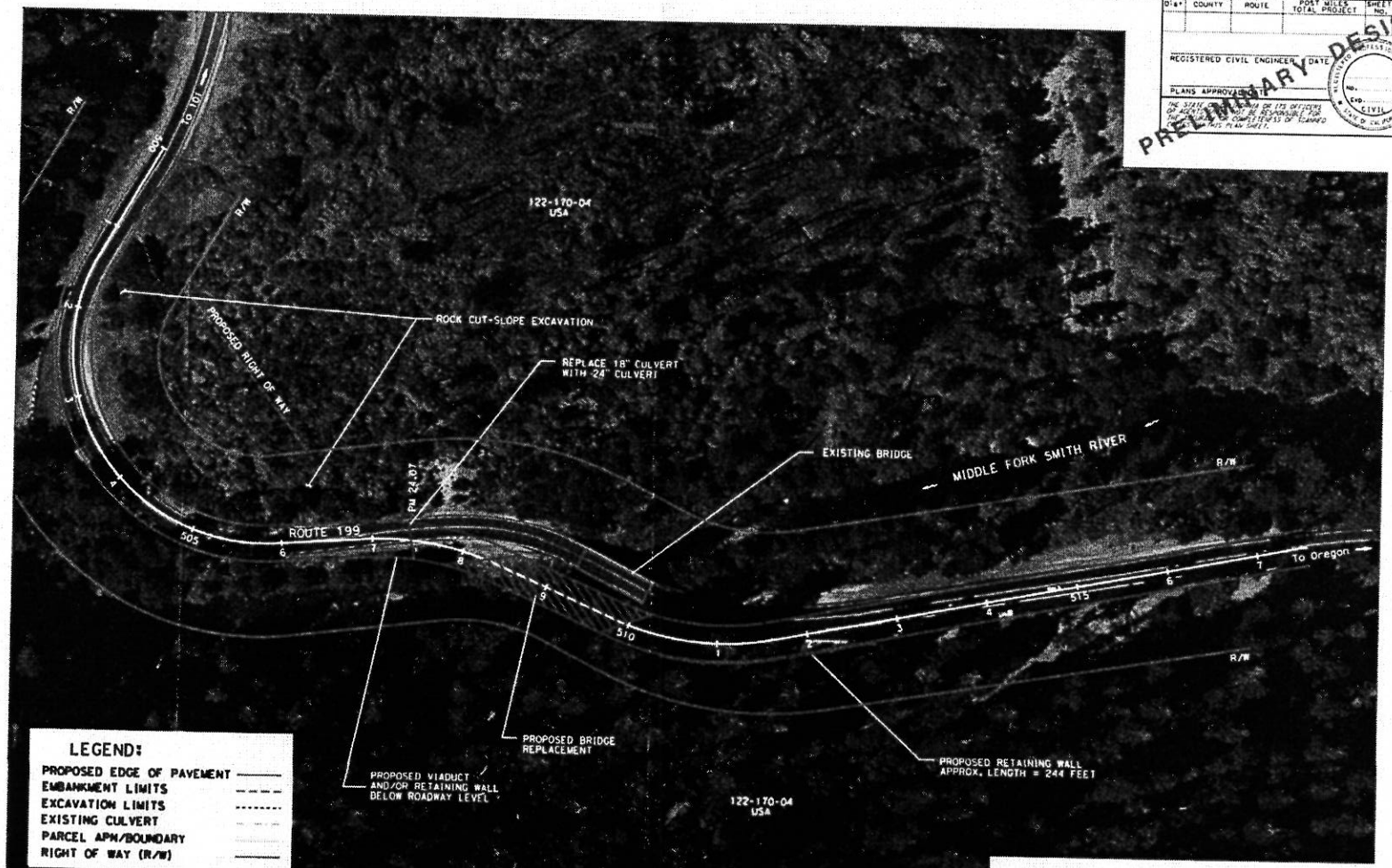
Sheet 9/17
DN 199/199
2010-00315

Figure 1-7
Patrick Creek Narrows Location 1



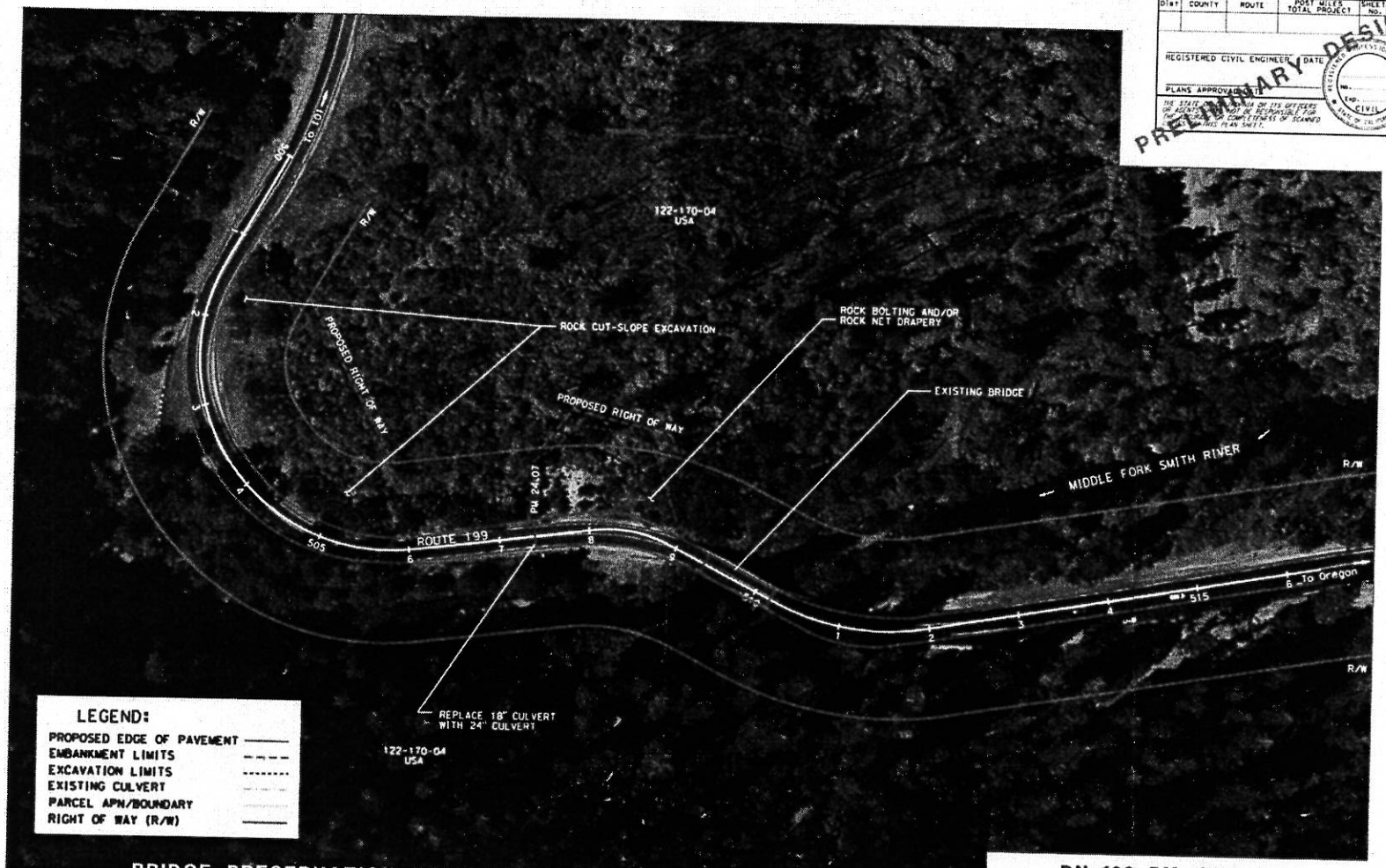
Sheet 10117
DN 199/199
2010-00315

Figure 1-8
Patrick Creek Narrows Location 2
Upstream Bridge Replacement



Sheet 11/17
DN 197/199
2010-00315

Figure 1-9
Patrick Creek Narrows Location 2
Downstream Bridge Replacement



BRIDGE PRESERVATION WITH UPSLOPE RETAINING WALL ALTERNATIVE

DN-199 PM 23.9/24.3
PATRICK CREEK NARROWS
LOCATION 2

SCALE: 0 50 100 150 200 250 FEET

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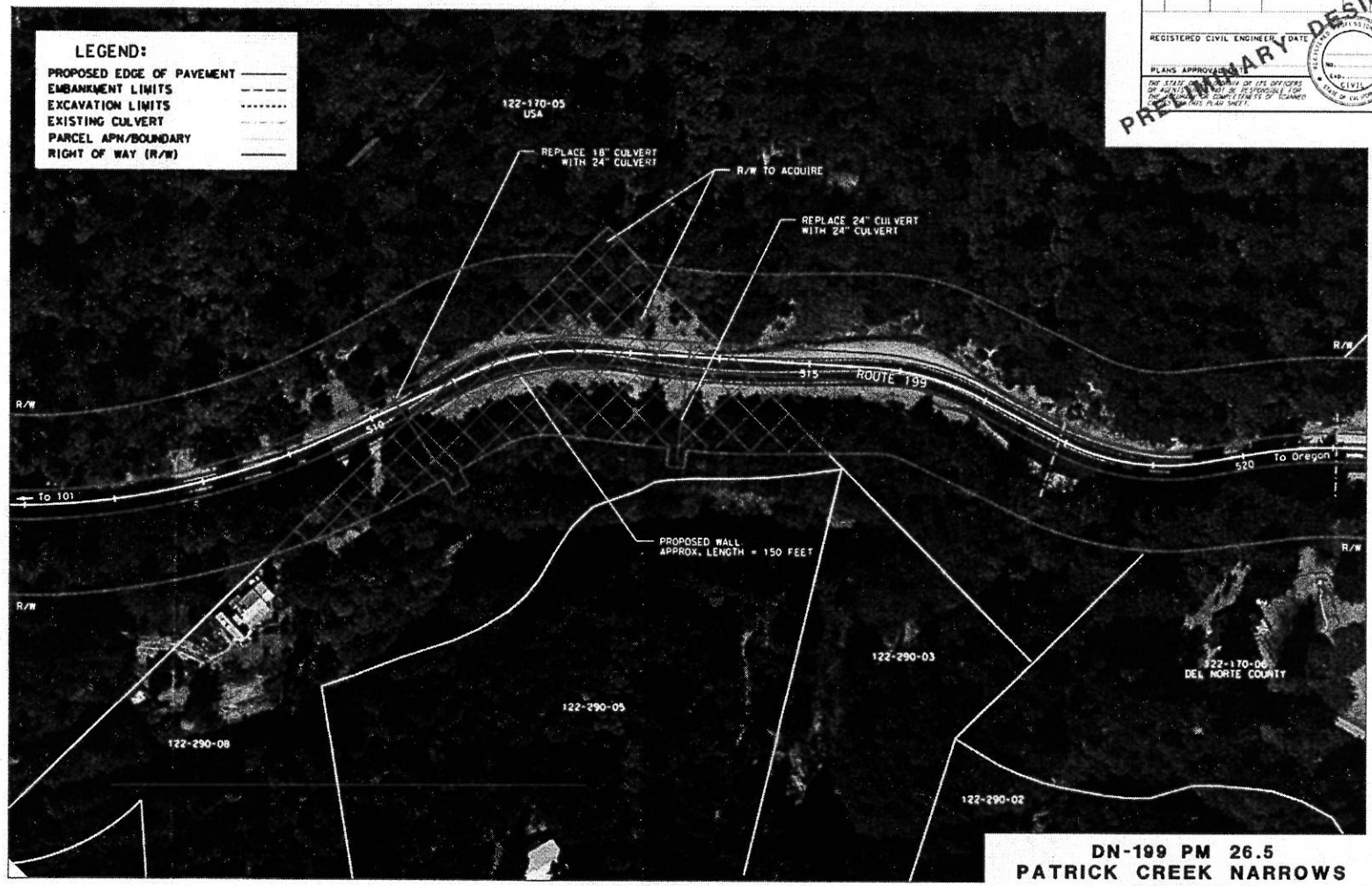
Sheet 12/17
DN 199/199
2010-00315

Figure 1-10
Patrick Creek Narrows Location 2
Bridge Preservation with Upslope Retaining Wall



PRELIMINARY DESIGN

DN-199 PM 26.5
PATRICK CREEK NARROWS
LOCATION 3

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Sheet 13/17
DN 197/199
2010-00315

Figure 1-11
Patrick Creek Narrows Location 3

ROCK SLOPE CUTTING

DN-199 PM 22.7/23.0
THE NARROWS

L1

SCALE: 0 25 50 100 FEET

PRELIMINARY DESIGN

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Sheet 14/17
DN 197/199
2010-00315

Figure 1-12a
The Narrows

ROCK SLOPE CUTTING

DN-199 PM 22.7/23.0
THE NARROWS

L2

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DN 197/199
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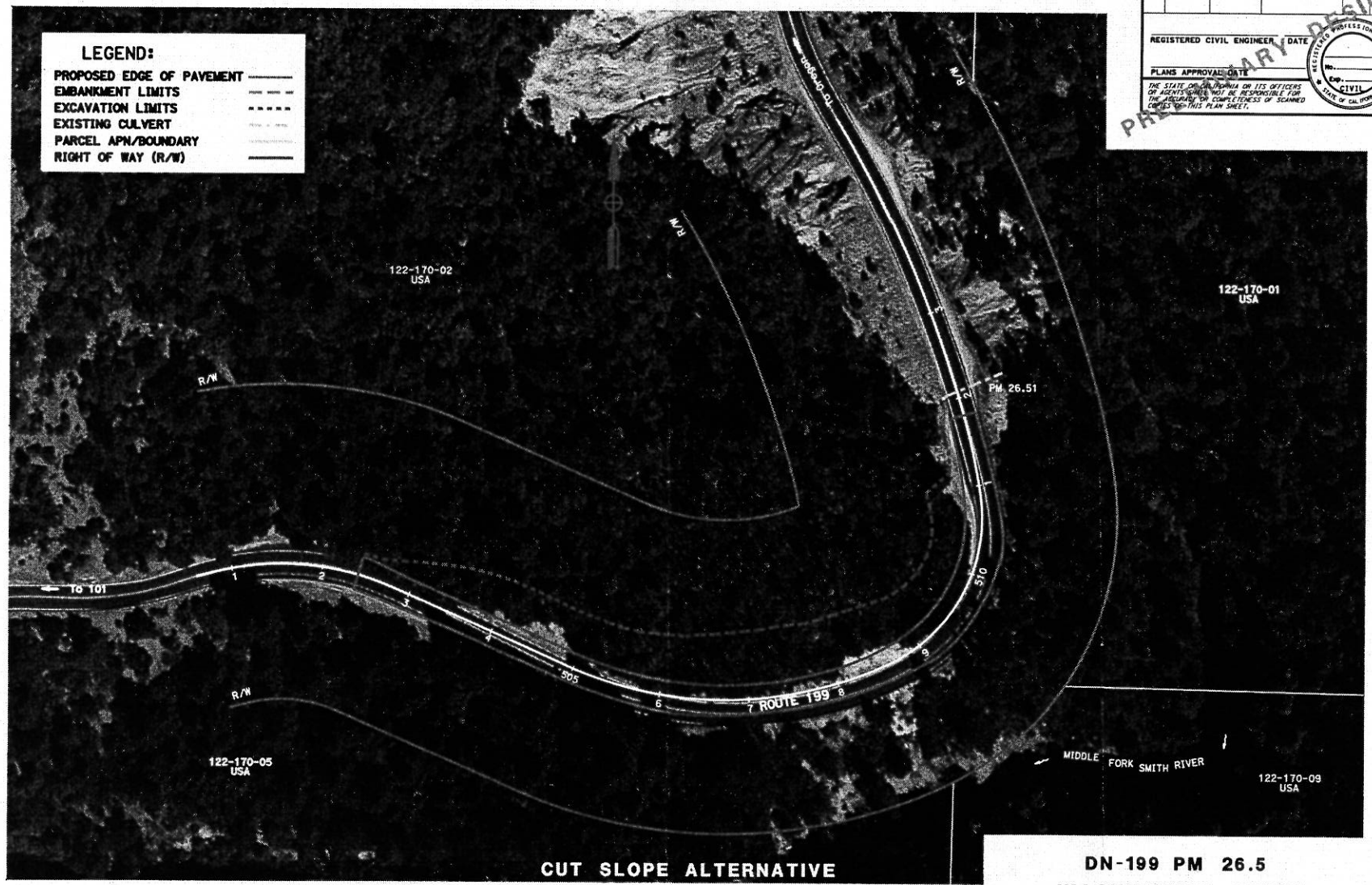
Figure 1-12
The Narrow



CUT SLOPE ALTERNATIVE

SCALE: 0 50 100 150 200 250 FEET

DN-199 PM 26.5
WASHINGTON CURVE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

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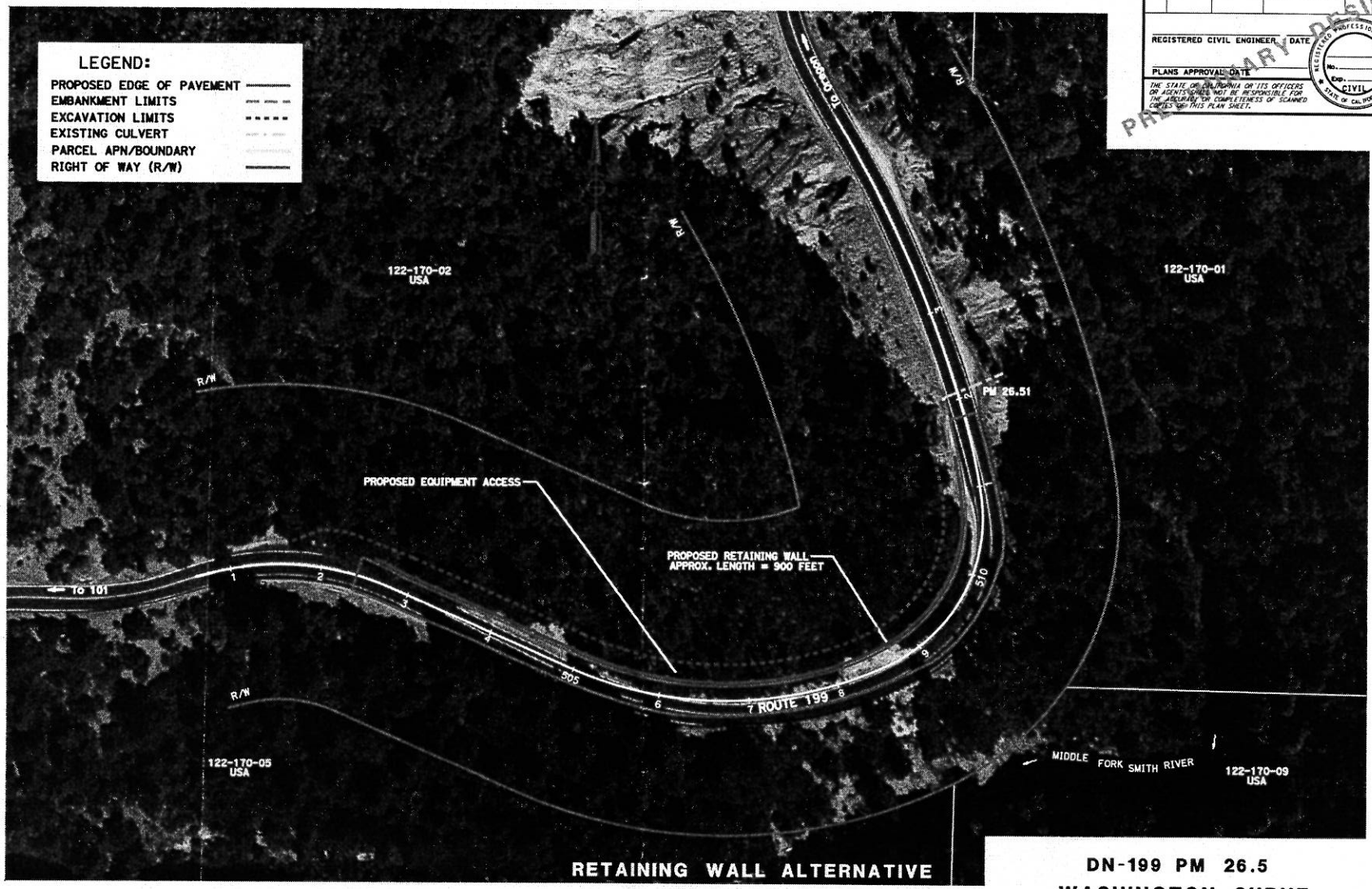
Sheet 16/17
DN 197/199
2010-00315

Figure 1-13
Washington Curve, Cut Slope



RETAINING WALL ALTERNATIVE

SCALE: 0 50 100 150 200 250 FEET

DN-199 PM 26.5
WASHINGTON CURVE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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CU 00000

EA 000000

Sheet 17/17
DN 97/199
2010-00315

Figure 1-14
Washington Curve, Retaining Wall

Nationwide Permit 14 - *Linear Transportation Projects*

Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project. This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate. This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 31.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Enclosure 1: Draft San Francisco District Regional Conditions

A. General Regional Conditions that apply to all NWPs in the Sacramento, San Francisco, and Los Angeles Districts:

1. When pre-construction notification (PCN) is required, the permittee shall notify the U.S. Army Corps of Engineers, San Francisco District (Corps) in accordance with General Condition 31 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a signed application form (ENG Form 4345) with an attachment providing information on compliance with all of the General and Regional Conditions. In addition, the PCN shall include:

    a. A written statement describing how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;

    b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the U.S. on the site. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and area (in acres) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the mean high water mark and high tide line, should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation. All drawings for activities located within the boundaries of the Los Angeles District shall comply with the September 15, 2010 Special Public Notice: *Map and Drawing Standards for the Los Angeles District Regulatory Division*, (available on the Los Angeles District Regulatory Division website at: www.spl.usace.army.mil/regulatory/); and

    c. Numbered and dated pre-project color photographs showing a representative sample of waters proposed to be impacted on the site, and all waters of the U.S. proposed to be avoided on and immediately adjacent to the activities site. The compass angle and position of each photograph shall be identified on the plan-view drawing(s) required in subpart b of this Regional Condition.

2. The permittee shall submit a PCN, in accordance with General Condition 31, For all activities located in areas designated as Essential Fish Habitat (EFH) by the Pacific Fishery Management Council (i.e., all tidally influenced areas - Federal Register dated March 12, 2007, 72 C.F.R. 11,092, in which case the PCN shall include an EFH assessment and extent of proposed impacts to EFH. Examples of EFH habitat assessments can be found at: http://www.swr.noaa.gov/efh.htm.

3. For activities in which the Corps designates another Federal agency as the lead for compliance with Section 7 of the Endangered Species Act (ESA) of 1973 as amended, 16 U.S.C. §§ 1531-1544, Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act (EFH), 16 U.S.C. § 1855(b)(4)(B) and/or Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended , 16 U.S.C. §§ 470-470h, the lead Federal agency shall provide all relevant documentation to the appropriate Corps demonstrating any previous consultation efforts, as it pertains to the Corps Regulatory permit area (for Section 7 and EFH compliance) and the Corps Regulatory area of potential effect (APE) (for Section 106 compliance). For activities requiring a PCN, this information shall be submitted with the PCN. If the Corps does not designate another Federal agency as the lead for ESA, EFH and/or NHPA, the Corps will initiate consultation for compliance, as appropriate.

4. For all activities in waters of the U.S. that are suitable habitat for Federally-listed fish species, the permittee shall design all road crossings to ensure that the passage and/or spawning of fish is not hindered. In these areas, the permittee shall employ bridge designs that span the stream or river, including pier- or pile-supported spans, or designs that use a bottomless arch culvert with a natural stream bed unless determined to be impracticable by the Corps.

5. The permittee shall complete the construction of any compensatory mitigation required by special condition(s) of the NWP verification before or concurrent with commencement of construction of the authorized activity, except when specifically determined to be impracticable by the Corps. When mitigation involves use of a mitigation bank or in-lieu fee program, the permittee shall submit proof of payment to the Corps prior to commencement of construction of the authorized activity.

6. Any requests to waive the 300 linear foot limitation for intermittent and ephemeral streams for NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51 and 52, or to waive the 500 linear foot limitation along the bank for NWP 13, must include the following:

    a. A narrative description of the stream. This should include known information on: volume and duration of flow; the approximate length, width, and depth of the waterbody and characteristics observed associated with an Ordinary High Water Mark (e.g. bed and bank, wrack line or scour marks); a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (i.e. wetland, non-wetland); surrounding land use; water quality; issues related to cumulative impacts in the watershed, and; any other relevant information;

    b. An analysis of the proposed impacts to the waterbody, in accordance with General Condition 31;

    c. Measures taken to avoid and minimize losses to waters of the U.S., including other methods of constructing the proposed activity(s); and

    d. A compensatory mitigation plan describing how the unavoidable losses are proposed to be offset, in accordance with 33 CFR 332.

B. General Regional Conditions that apply to all NWPs in the San Francisco District:

1. Notification to the Corps (in accordance with General Condition No. 31) is required for any activity permitted by NWP if it will take place in waters or wetlands of the U.S. that are within the **San Francisco Bay diked baylands** (see figure 1) (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map below the 5-foot contour line, National Geodetic Vertical Datum (NGVD) (see Nichols, D.R., and N. A. Wright. 1971. Preliminary map of historic margins of marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map)). The notification shall explain how avoidance and minimization of losses of waters or wetlands are taken into consideration to the maximum extent practicable (see General Condition 23).

2. Notification to the Corps (in accordance with General Condition No. 31) is required for any activity permitted by NWP if it will take place in waters or wetlands of the U.S. that are within the **Santa Rosa Plain** (see figure 2). The notification will explain how avoidance and minimization of losses of waters or wetlands are taken into consideration to the maximum extent practicable in accordance with General Condition No. 23.

3. Notification to the Corps (in accordance with General Condition No. 31), including a compensatory mitigation plan, habitat assessment, and extent of proposed-project impacts

to Eelgrass Beds are required for any activity permitted by NWP if it will take place within or adjacent to **Eelgrass Beds**.

C. Regional Conditions that apply to specific NWPs in the San Francisco District:

3. MAINTENANCE:

1. To the extent practicable, excavation equipment shall work from an upland site (e.g., from the top of the bank, the road bed of the bridge, or culverted road crossing) to minimize adding fill into waters of the U.S. If it is not practicable to work from an upland site, or if working from the upland site would cause more environmental damage than working in the stream channel, the excavation equipment can be located within the stream channel but it must minimize disturbance to the channel (other than the removal of accumulated sediments or debris). As part of the notification to the Corps (in accordance with General Condition No. 31), an explanation as to the need to place excavation equipment in waters of the U.S. is required, as well as a statement of any additional necessary fill (e.g., cofferdams, access road, fill below the OHW mark for a staging area, etc.).

2. If the activity is proposed in a special aquatic site, the notification to the Corps (in accordance with General Condition No. 31) shall include an explanation of why the special aquatic site cannot be avoided, and the measures to be taken to minimize impacts to the special aquatic site.

11. TEMPORARY RECREATIONAL STRUCTURES:

1. Notification to the Corps (in accordance with General Condition No. 31) is required if any temporary structures are proposed in wetlands or vegetated shallow water areas (e.g. in eelgrass beds). The notification shall include the type of habitat and areal extent affected by the structures.

12. UTILITY LINE ACTIVITIES:

1. Excess material removed from a trench, associated with utility line construction, shall be disposed of at an upland site away from any wetlands or other waters of the U.S. so as to prevent this material from being washed into aquatic areas.

2. This NWP permit does not authorize the construction of substation facilities. Utility line substations can usually be constructed in uplands.

13. BANK STABILIZATION:

1. Notification to the Corps (in accordance with General Condition No. 31) is required for all activities stabilizing greater than 300 linear feet of channel. Where the removal of wetland vegetation (including riparian wetland trees, shrubs and other plants) or submerged, rooted, aquatic plants over a cumulative area greater than 1/10 acre or 300 linear feet is proposed, the Corps shall be notified (in accordance with General Condition No. 31). The notification shall include the type of vegetation and extent (e.g., areal dimension or number of trees) of the proposed removal. The notification shall also address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity), and on adjacent property upstream and downstream of the activity.

2. This permit allows excavating a toe trench in waters of the U.S., and, if necessary, to use the material for backfill behind the stabilizing structure. Excess material is to be disposed of in a manner that will have only minimal impacts to the aquatic environment. The notification to the Corps (in accordance with General Condition No. 31) shall include location of the disposal site.

3. For man-made banks, roads, or levees damaged by storms or high flows, the one cubic yard per running foot limit is counted only for that additional fill which encroaches (extends) beyond the pre-flood or pre-storm shoreline condition of the waterway. It is not counted for

the fill that would be placed to reconstruct the original dimensions of the eroded, man-made shoreline.

4. For natural berms and banks, the one cubic yard per running foot limit applies to any added armoring.

5. To the maximum extent practicable, any new or additional bank stabilization must incorporate structures or modifications beneficial to fish and wildlife (e.g., soil bioengineering or biotechnical design, root wads, large woody debris, etc.). Where these structures or modifications are not used, the applicant shall demonstrate why they were not considered practicable.

14. LINEAR TRANSPORATION PROJECTS:

1. Notification to the Corps (in accordance with General Condition No. 30) is required for all projects filling greater than 300 linear feet of channel. For projects involving greater than 300 linear feet of bank stabilization, the project proponent shall address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity), and on adjacent property upstream and downstream of the activity.

2. This permit does not authorize construction of new airport runways and taxiways.

3. If this NWP has been used to authorize previous project segments within the same linear transportation project, justification must be provided demonstrating that the cumulative impacts of the proposed and previously authorized project segments do not result in more than minimal impacts to the aquatic system.

4. To the maximum extent practicable, any new or additional bank stabilization required for the crossing must incorporate structures or modifications beneficial to fish and wildlife (e.g., soil bioengineering or biotechnical design, root wads, large woody debris, etc.). Where these structures or modifications are not used, the applicant shall demonstrate why they were not considered practicable. Bottomless and embedded culverts are encouraged over traditional culvert stream crossings.

23. APPROVED CATEGORICAL EXCLUSIONS:

1. Use of this NWP requires notification to the Corps (in accordance with General Condition No. 31). The notification shall include the following:

   a. A copy of the Federal Categorical Exclusion (Cat/Ex) document signed by the appropriate federal agency. If the Cat/Ex is signed by a state or local agency representative instead of by a federal agency representative, then copies of all documentation authorizing alternative agency signature shall be provided.

   b. Written description of Corps authority (e.g., Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act.);

   c. a list of conditions described in the Cat/Ex and/or attachments outlining measures that must be taken prior to, during, or after project construction to minimize impacts to the aquatic environment;

   d. a copy of the jurisdictional delineation performed by qualified specialists showing the project limits and the location (delineated boundaries) of Corps jurisdiction within the overall project limits;

   e. map(s) showing the locations of potentially permanent and temporary project impacts to areas within Corps jurisdiction;

f. a clear and concise description of all project impacts including, but not necessarily limited to:
   1. quantification and description of permanent project impacts to areas within Corps jurisdiction,
   2. quantification and description of temporary impacts to areas within Corps jurisdiction, and
   3. linear extent of Corps jurisdiction affected by the project;

g. a general description of activities covered by the Cat/Ex that do not require Corps authorization but are connected or related to the activities in Corps jurisdiction;

h. a complete description of any proposed mitigation and/or restoration including, but not necessarily limited to, locations of any proposed planting, short- and long-term maintenance, proposed monitoring, success criteria and contingency plans;

i. written justification of how the project complies with the Nationwide Permit Program including less than minimal impact to the aquatic environment and compliance with the General Conditions.

j. For Federal Highway Administration (FHWA) Cat/Ex projects, the notification should describe how activities described in the Cat/Ex meet the description of the Cat/Ex project published in the August 28,1987 Federal Register part 771.117 (a)(b)(c) and (d) (Volume 52, No. 167) or any updated version published in the Federal Register.

2. Only activities specifically described in the Cat/Ex project description will be covered by the NWP 23 authorization. If other activities not described in the Cat/Ex project description will be performed (e.g., dewatering, slope protection, etc.), these activities must receive separate NWP authorizations.

3. Notification to the Corps (in accordance with General Condition 31) must include a copy of the signed Cat/Ex document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act (ESA), Essential Fish Habitat (EFH) under the Magnussen-Stevens Act, and Section 106 of the National Historic Preservation Act.

27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities

1. Notification to the Corps (in accordance with General Condition 31) must include documentation of a review of project impacts to demonstrate that at the conclusion of the work that the project would result in a net increase in aquatic function. Additionally, the documentation must include a review of project impacts on adjacent properties or structures and must also discuss cumulative impacts associated with the project.

29. Residential Developments:

1. When discharge of fill results in the replacement of wetlands or waters of the U.S. with impervious surfaces, to ensure that the authorized activity does not result in more than minimal degradation of water quality (in accordance with General Condition 25), the residential development shall incorporate low impact development concepts (e.g. native landscaping, bioretention and infiltration techniques, and constructed green spaces) to the extent practicable. A description of the low impact development concepts proposed in the project shall be included with the permit application. More information including low impact development concepts and definitions is available at the following website: http://www.epa.gov/owow/NPS/lid/.

2. Use of this NWP is prohibited within the San Francisco Bay diked baylands (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map (see figure 1) below the 5-foot

contour line, National Geodetic Vertical Datum (NGVD) (see Nichols, D.R., and N. A. Wright. 1971. Preliminary map of historic margins of marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map)).

33. TEMPORARY CONSTRUCTION, ACCESS, AND DEWATERING:

1. Access roads shall be designed to be the minimum width necessary and shall be designed to minimize changes to the hydraulic flow characteristics of the stream and degradation of water quality (in accordance with General Conditions 9 and 25). The following Best Management Practices (BMPs) shall be followed to the maximum extent practicable to ensure that flow and circulation patterns of waters are not impaired and adverse effects on the aquatic environment will be kept to a minimum:

   a. The road shall be properly stabilized and maintained during and following construction to prevent erosion.

   b. Construction of the road fill shall occur in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself.

2. Vegetative disturbance in the waters of the U.S. shall be kept to a minimum.

3. Borrow material shall be taken from upland sources whenever feasible.

4. Stream channelization is not authorized by this NWP.

35. MAINTENANCE DREDGING OF EXISTING BASINS:

1. Use of this NWP will require notification to the Corps (in accordance with General Condition No. 31). The notification information should be provided on the Consolidated Dredging-Dredged Material Reuse/Disposal Application. This application and instructions for its completion can be found on our web site at: http://www.spn.usace.army.mil/conops/applications.html. The information must include the location of the proposed upland disposal site. A jurisdictional delineation of the proposed upland disposal site prepared in accordance with the current method required by the Corps may also be required.

2. The U.S. Coast Guard will be notified by the permittee at least 14 days before dredging commences if the activity occurs in navigable waters of the U.S. (Section 10 waters).

3. The permittee will be required to provide the following information to the Corps:
   a. Dredge Operation Plan: Submit, for approval by this office, no earlier than 60 calendar days and no later than 20 calendar days before the proposed commencement of dredging, a plan which includes the following: **Corps file number,** a copy of the dredging contract or description of the work under which the contractor will do the permitted work; name and telephone numbers of the dredging contractor's representative on site; proposed dredging start and completion dates; quantity of material to be removed; dredging design depth and typical cross section including overdepth; and date of last dredging episode and design depth. The Dredge Operational Plan shall also provide the following information: The controls being established to insure that dredging operations occur within the limits defined by the basin or channel dimensions and typical channel section.

   b. Pre-Dredge Survey: Submit no earlier than 60 calendar days and no later than 20 calendar days before commencement of dredging, a survey with accuracy to one-tenth foot that delineates and labels the following: areas to be dredged with overdepth allowances; existing depths; estimated quantities to be dredged to the design depth; and

estimated quantities for overdepth dredging. **All surveys shall be signed by the permittee to certify their accuracy. Please include the Corps file number.**

c. Solid Debris Management Plan: Submit no earlier than 60 calendar days and no later than 20 calendar days before commencement of work, a plan which describes measures to ensure that solid debris generated during any dredging operation is retained and properly disposed in areas not under Corps jurisdiction. **At a minimum, the plan shall include the following: source and expected type of debris; debris retrieval method; Corps file number; disposal method and site; schedule of disposal operations; and debris containment method to be used, if floatable debris is involved. (Please note that failure to provide all of the information requested in a, b, and c above may result in delays to your project. When your Dredge Operation Plan has been approved, you will receive a written authorization to commence with your project.)**

d. Post-Dredge Survey: Submit, **within 30 days of the last disposal activity** ("last" is defined as that activity after which no further activity occurs for 15 calendar days), a survey with accuracy to one-tenth foot that delineates and labels the areas dredged and provides the dredged depths. **Also, include the Corps file number, actual dates of dredging commencement and completion, actual quantities dredged for the project to the design depth, and actual quantities of overdepth.** The permittee shall substantiate the total quantity dredged by including calculations used to determine the volume difference (in cubic yards) between the Pre- and Post-Dredge Surveys and **explain any variation in quantities greater than 15% beyond estimated quantities or dredging deeper than is permitted (design plus overdepth allowance). All surveys shall be accomplished by a licensed surveyor and signed by the permittee to certify their accuracy.** A copy of the post dredge survey should be sent to the National Ocean Service for chart updating:

NOAA/National Ocean Service,
Nautical Data Branch
N/CS26, SSMC3, Room 7230
1315 East-West Highway
Silver Spring, Maryland 20910-3282.

e. **The permittee or dredge contractor shall inform this office when: 1) a dredge episode actually commences, 2) when dredging is suspended (suspension is when the dredge contractor leaves the dredge site for more than 48 hours for reasons other than equipment maintenance), 3) when dredging is restarted, and 4) when dredging is complete. Each notification should include the Corps file number.** Details for submitting these notifications will be provided in the verification letter (to whom and how).

39. Commercial and Institutional Developments:

1. When discharge of fill results in the replacement of wetlands or waters of the U.S. with impervious surfaces, to ensure that the authorized activity does not result in more than minimal degradation of water quality (in accordance with General Condition 25), the commercial and institutional development shall incorporate low impact development concepts (e.g. native landscaping, bioretention and infiltration techniques, and constructed green spaces) to the extent practicable. A description of the low impact development concepts proposed in the project shall be included with the permit application. More information including low impact development concepts and definitions is available at the following website: http://www.epa.gov/owow/NPS/lid/.

2. Use of this NWP is prohibited within the San Francisco Bay diked baylands (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map (see figure 1) below the 5-foot

contour line, National Geodetic Vertical Datum (NGVD) (see Nichols, D.R., and N. A. Wright. 1971. Preliminary map of historic margins of marshland, San Francisco Bay, California. U.S. Geological Survey Open File Map)).

40. AGRICULTURAL ACTIVITIES:

1. This NWP does not authorize discharge of fill into the channel of a perennial or intermittent watercourse that could impede high flows. This limitation does not apply to watercourses that flow only when there is an irregular, extraordinary flood event.

41. RESHAPING EXISTING DRAINAGE DITCHES:

1. Compensatory mitigation may be required if the Corps determines there will be a detrimental impact to aquatic habitat.

2. Notification to the Corps (in accordance with General Condition 31) is required if the applicant proposes to re-grade, discharge, install channel lining, or redeposit fill material.

3. The notification to the Corps (in accordance with General Condition 31) shall include an explanation of the project's benefit to water quality and a statement demonstrating the need for the project.

42. RECREATIONAL FACILITIES:

1. If buildings are proposed to be built in waters of the United States, including wetlands, the applicant must demonstrate that there is no on-site practicable alternative that is less environmentally damaging as defined by the Section 404(b)(1) guidelines.

Figure 1: Map of Diked Baylands

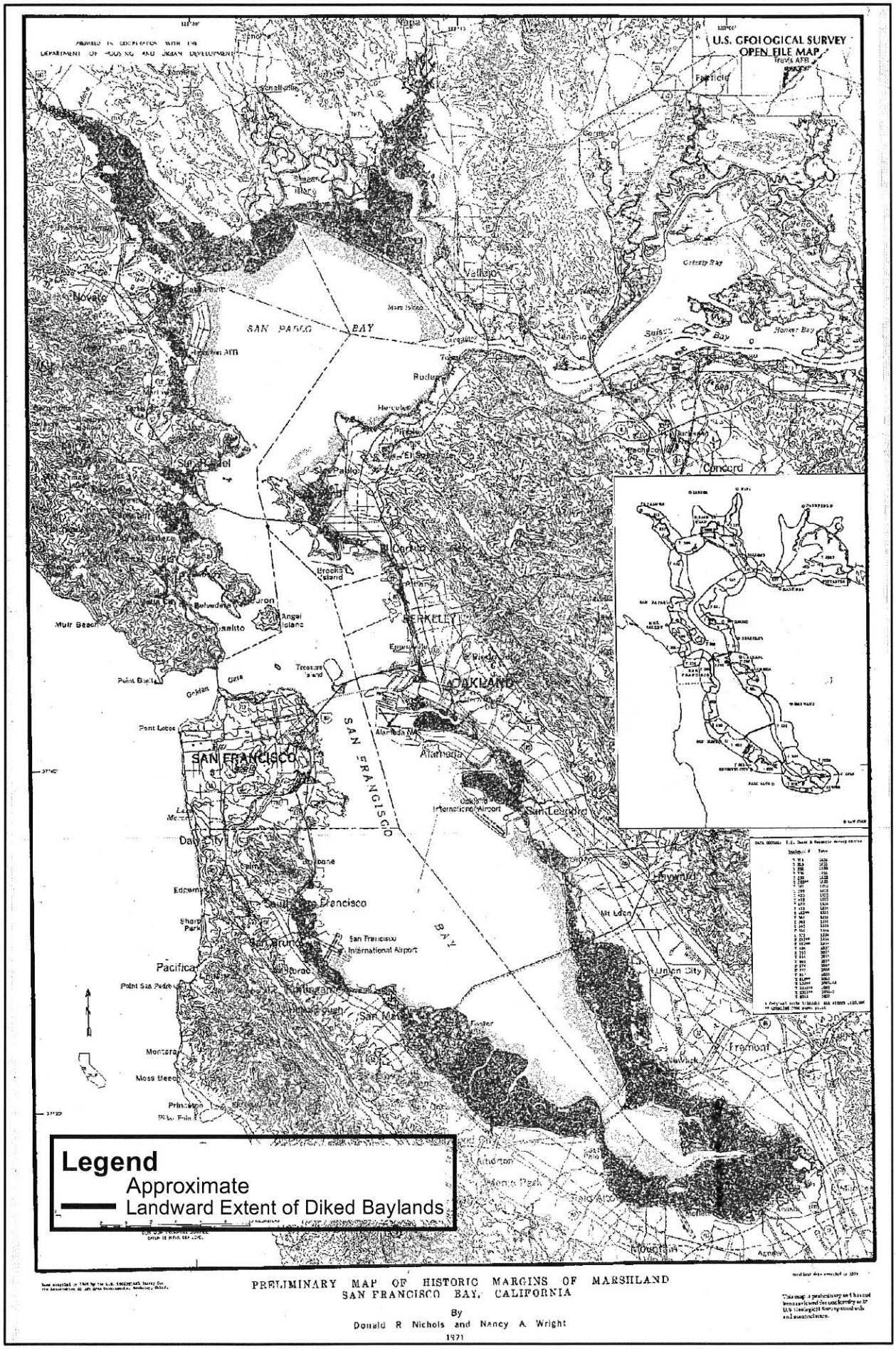
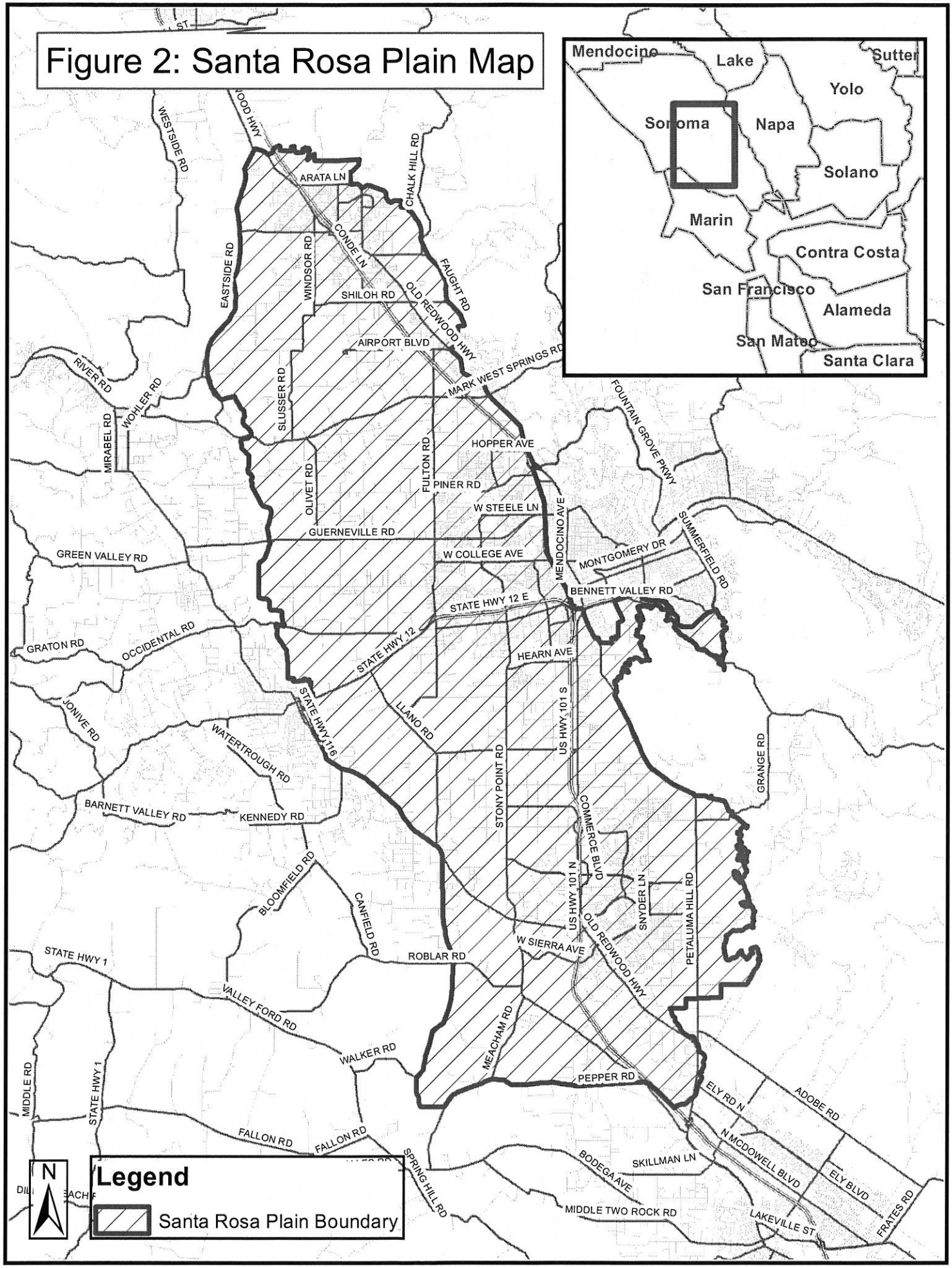


Figure 2: Santa Rosa Plain Map



Enclosure 3

Permittee: Caltrans

File Number: 2010-00315N

Certification of Compliance
for
Nationwide Permit

"I hereby certify that the work authorized by the above referenced File Number and all required mitigation have been completed in accordance with the terms and conditions of the Nationwide Permit."

_____ _____
PERMITTEE DATE

Return to:

Carol Heidsiek
U.S. Army Corps of Engineers
San Francisco District
Eureka Field Office, CESPN-R-N-EK
601 Startare Drive, Box 14
Eureka, California 95501

May 31, 2013

In the Matter of

Water Quality Certification

for the

California Department of Transportation
State Route 197/199, Safe STAA Access Project, Patrick Creek Narrows 1, 2, and 3
(Caltrans EA No. 01-479400)
WDID No. 1A13042WNDN
Caltrans EA No.: 01-479400

APPLICANT:	California Department of Transportation
RECEIVING WATER:	Smith River Middle Fork
HYDROLOGIC AREA:	Smith River Hydrologic Unit No. 103.00
COUNTY:	Del Norte
FILE NAME:	CDOT – Highway 199/197 Safe STAA Improvement Project Patrick Creek 1, 2, & 3

BY THE EXECUTIVE OFFICER:

1. On April 15, 2013, the North Coast Regional Water Quality Control Board (Regional Water Board) received an application from the California Department of Transportation (Caltrans) requesting Federal Clean Water Act (CWA) section 401, Water Quality Certification (certification) for activities related to the State Route 197/199 Safe Surface Transportation Assistance Act (STAA) Access Project, Patrick Creek Narrows 1, 2, and 3 (Project).

2. **Hydrologic Unit**: The proposed Project would cause disturbances to waters of the United States (U.S.) and waters of the State associated with the Smith River Hydrologic Unit No. 103.00 (Middle Fork Smith River Sub-Area 103.30).

3. **Public Notice:** The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858 on May 6, 2013, and posted information describing the project on the Regional Water Board's website. No comments were received.

4. **Project Description:** The proposed Project is located in Del Norte County on State Route 199 at three locations between approximate post miles (PM) 20.57 and 25.73. This project is referred to as "Patrick Creek Narrows" and is one of four projects within a larger project to improve safety conditions for large trucks and other vehicles on State Routes 197 and 199 through Del Norte County.

   Project activities would be performed at three discrete locations:

   - **Location 1**—post miles 20.57-20.62

     Work at this location includes:

     - Widening the roadway to accommodate two 12-foot-wide lanes and 4-foot–wide shoulders on either side of the road, reconstructing the existing drainage ditch adjacent the bank of the existing cut slope, and grinding the existing asphalt-concrete to match the new superelevation;
     - Constructing an approximately 190-foot-long, 5-foot-tall soldier pile retaining wall above the rock-armored bank of the Middle Fork Smith River between post-miles 20.54 and 20.57; and
     - Replacing three drainage systems at post-miles 20.57, 20.58, and 20.62. These drainage systems carry seasonal channel flow in non-fish-bearing streams. Work at these three drainage systems includes:
       - At post-mile 20.57, a new drainage inlet would be installed and an 18-inch diameter, 44-foot-long culvert would be replaced with a 24-inch, 48-foot long culvert;
       - At post-mile 20.58, a new drainage inlet would be installed and an 18-inch diameter, 50-foot-long culvert would be replaced with a 24-inch, 57-foot long culvert; and
       - At post-mile 20.62, a headwall would be removed, a flared end section would be installed, and a 24-inch diameter, 62-foot-long culvert would be replaced with a 24-inch, 64-foot long culvert.

   - **Location 2**—post miles 23.95-24.06

     Work at this location includes:

- Replacement of the existing concrete arch bridge over the Smith River Middle Fork. The existing bridge was constructed in 1925, is overly narrow at 24-feet in width, and has exceeded its design life. Construction of the bridge would require a sidehill viaduct approach downstream of the bridge and retaining wall;
- Widening the roadway to accommodate two 12-foot-wide lanes and 4-foot–wide shoulders on either side of the road. To accommodate widening at the westernmost extent of the project location, approximately 3,000 cubic yards would be excavated from the existing rock cut slope. Proposed excavation options include use of a hoe ram, rock splitter, or controlled blasting;
- Constructing an approximately 190-foot-long, 5-foot-tall soldier pile retaining wall above the rock-armored bank of the Smith River Middle Fork at post-mile 23.9; and
- Relocation the existing drainage system at post-mile 24.07 to post-mile 23.95 to accommodate a change in roadway elevation. A traction sand trap would be added at the inlet of the new culvert.

- **Location 3**—post miles 25.55-25.73

  Work at this location includes:

  - Widening the roadway to accommodate two 12-foot-wide lanes and 4 to 8-foot –wide shoulders on either side of the road. To accommodate widening, an approximately 180-foot-long drilled foundation soldier pile retaining wall is proposed. The wall excavation would be approximately 100 feet upslope from the Smith River Middle Fork bankfull elevation;
  - Installation of an open-graded asphalt concrete road overlay;
  - Placement of shoulder backing;
  - At PM 25.55, replacement of an existing headwall and 18-inch diameter by 54-foot corrugated steel pipe culvert with a new drainage inlet and 24-inch diameter by 53-foot long culvert;
  - At PM 25.55, installation of a traction sand trap;
  - At PM 25.55, replacement of an 18-inch by 82-foot-long downdrain with a 24-inch by 80-foot downdrain;
  - At PM 25.61, removal of the existing headwall and installation of a new drainage inlet to connect with the existing 18-inch culvert;

- At PM 25.69, removal of the existing headwall and 18-inch by 91-foot long corrugated steel culvert. Installation of a new drainage inlet, 24-inch by 91-foot-long culvert, and 84 square feet of riprap. The outlet is ten feet from the live channel of the Smith River Middle Fork; and
- Abandonment of the existing overside drain at PM 25.73.

5. **Construction Duration:** Work at location 1 is expected to last 90-100 working days during one construction season. Location 2 construction is expected to take 360 working days and three construction seasons. Construction of Location 3 activities would last approximately 50 to 70 working days during one construction season.

6. **Permanent Impacts:** Caltrans has determined that the proposed Project would result in approximately 0.01 acres of permanent impacts to jurisdictional waters. The proposed Project would also permanently impact approximately 0.15 acres of riparian vegetation.

7. **Temporary Impacts:** Caltrans has determined that the proposed Project would result in approximately 0.01 acres of temporary impacts to jurisdictional waters and approximately 0.02 acres of temporary impacts to riparian vegetation.

8. **Mitigation for Permanent Impacts**: On-site mitigation for permanent impacts to riparian vegetation would include establishing vegetation within the former footprint of the removed bridge approaches. Caltrans shall also ensure implementation of 10 years of invasive plant removal in the Smith River Middle Fork watershed, in agreement with the United States Forest Service.

9. **Mitigation for Temporary Impacts:** On-site mitigation for temporary impacts to riparian vegetation would include re-vegetating all disturbed riparian areas.

10. **Post-Construction Stormwater Treatment:** Project implementation at locations 1, 2, and 3 would result in approximately 0.49 acres (0.22, 0.22, and 0.05 acres from Locations 1, 2, and 3, respectively) of new and approximately 1.8 acres of replaced impervious surface area. Caltrans shall install three vegetated filter strips and two traction sand traps to treat stormwater runoff from 0.31 acres of impervious area. Below is a summary of the five treatment devices.

Treatment Type	Post-Mile(s), approximate	Northbound/Southbound	Length (linear feet)	Impervious Area Treated (acres)
Traction Sand Trap	23.95	southbound	--	1.06
Traction Sand Trap	25.55	southbound	--	
Vegetated Filter Strip	24.10-24.17	southbound	166	0.27
Vegetated Filter Strip	24.174-24.252	southbound	417	0.25
Vegetated Filter Strip	24.205-24.262	northbound	308	0.18
			total:	1.76

11. **Disturbed Soil Area**: Project implementation at locations 1, 2, and 3 would result in approximately 0.44 acres of disturbed soil area. Caltrans shall prepare a Stormwater Pollution Prevention Plan detailing Best Management Practices to control pollution from the Project area during construction. All disturbed areas within the Project area shall be appropriately stabilized and/or replanted with appropriate native vegetation.

12. **Utility Relocations:** Utility relocations are not needed for this project.

13. **Other Agency Actions:** Caltrans is seeking authorization from the U.S. Army Corps of Engineers to implement the project under Nationwide Permit No. 14 (*linear transportation projects*) pursuant to Clean Water Act, section 404. Caltrans applied for a 1602 Streambed Alteration Agreement with the California Department of Fish and Wildlife on February 2, 2013. Caltrans received a Biological Opinion (AFWO-10B0003-10F0090) from the U.S. Fish and Wildlife Service on September 13, 2012. Informal consultation with the National Marine Fisheries Service (NMFS) was completed in 2012. NMFS determined that the project may affect, but is not likely to adversely affect Southern Oregon and Northern California Coast coho salmon or their critical habitat.

14. **CEQA Compliance:** On April 9, 2013, Caltrans, acting as lead agency, certified an Environmental Impact Report for the proposed project in order to comply with the California Environmental Quality Act (CEQA) (State Clearing House No. 2008082128). The Regional Water Board has considered the environmental documentation, including any proposed changes, and incorporates any avoidance, minimization, and mitigation measures into the project as a condition of approval to avoid significant affects to the environment.

15. **Antidegradation Policy:** The federal antidegradation policy requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. This certification is consistent with applicable federal and State antidegradation policies, as it does not authorize the discharge of increased concentrations of pollutants or increased volumes of treated wastewater, and does not otherwise authorize degradation of the waters affected by this Project.

16. This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification," which requires compliance with all conditions of this certification.

Receiving Water:	Middle Fork Smith River in Smith River Hydrologic Unit No. 103.00	
Filled and/or Excavated Areas:	Permanent – jurisdictional waters	193 ft^2 (0.004 acres, 40 linear feet)
	Temporary – jurisdictional waters	572 ft^2 (0.013 acres, 408 linear feet)
	Permanent – riparian habitat	6,302 ft^2 (0.15 acres)
	Temporary – riparian habitat	850 ft^2 (0.02 acres)
Dredge Volume:	none	
Fill Volume:	Permanent – 30.4 cubic yards	
Mitigation proposed:	On-site: 0.2 acres of riparian revegetation, re-vegetation of disturbed riparian areas. Off-site: 10 years of Smith River Middle Fork watershed invasive plant removal in agreement with the United States Forest Service	
Latitude/Longitude:	41.8675 / -123.8349	

Accordingly, based on its independent review of the record, the Regional Water Board certifies that the State Route 197/199 STAA Access Project, Patrick Creek Narrows 1, 2, and 3 (WDID No. 1A13042WNDN), as described in the application will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that the Caltrans complies with the following terms and conditions:

All conditions of this certification apply to Caltrans (and all its employees) and all contractors (and their employees), sub-contractors (and their employees), and any other entity or agency that performs activities or work on the project (including the off-site mitigation lands) as related to this Water Quality Certification.

Monitoring and Reporting Conditions

1. In order to demonstrate compliance with receiving water limitations and water quality objectives surface water monitoring shall be conducted. When conducting surface water monitoring Caltrans shall establish discharge, upstream (background) and downstream monitoring locations to demonstrate compliance with applicable water quality objectives. The downstream location shall be no more than 100 feet from the discharge or Project activity location in State waters.

    i) Surface water monitoring shall be conducted whenever a Project activity is conducted within waters of the State (e.g., including but not limited to the installation, use or removal of stream diversions, pile installations, and cofferdams). Measurements and observations shall be collected from each sampling location four times daily.

Monitoring and Reporting Conditions (continued)

ii) Surface water monitoring shall be conducted immediately when any Project activity has mobilized sediment or other pollutants resulting in a discharge and/or has the potential to alter background conditions within waters of the State (including but not limited to storm water runoff, concrete discharges, leaks, and spills). The continuing frequency is contingent upon results of field measurements and applicable water quality objectives.

Surface water monitoring field measurements shall be taken for pH and turbidity. In addition, visual observations of each location shall be documented daily for each established monitoring location and monitoring event and include the estimate of flow, appearance of the discharge including color, floating or suspended matter or debris, appearance of the receiving water at the point of discharge (occurrence of erosion and scouring, turbidity, solids deposition, unusual aquatic growth, etc.), and observations about the receiving water, such as the presence of aquatic life. If a Project activity has reached a steady state and is stable, then Caltrans may request a temporary reprieve from this condition from the Regional Water Board until an activity or discharge triggers the monitoring again.

The above surface water monitoring requirements are not required if the water of the State is naturally dry (e.g., a dewatered channel is not naturally dry and would still be subject to surface water monitoring upstream and downstream of the diverted portion).

2. Whenever, as a result of Project activities (in-stream work or a discharge to receiving waters), downstream measurements exceed any water quality objective 100 feet downstream of the source(s) all necessary steps shall be taken to install, repair, and/or modify Best Management Practices (BMPs) to control the source(s). The frequency of surface water monitoring shall increase to hourly and shall continue until measurements demonstrate compliance with water quality objectives for each parameter listed below and measured levels are no longer increasing as a result of project activities. In addition, the overall distance from the source(s) to the downstream extent of the exceedence of water quality objectives shall be measured.

   Monitoring results shall be reported to appropriate Regional Water Board staff person by telephone within 24 hours of taking any measurements that exceed the limits detailed below (only report turbidity if it is higher than 20 NTU).

pH	<6.5 or >8.5 (any changes >0.5 units)
turbidity	20% above natural background

   Monitoring results and upstream and downstream pictures within the working and/or disturbed area and discharge location shall be taken and submitted to the appropriate Regional Water Board staff within 24 hours of the incident. All other monitoring data documenting compliance with water quality objectives shall be reported on a monthly basis and is due to the Regional Water Board by the 15th of the following month.

3. Post Storm Event Reports:

Monitoring and Reporting Conditions (continued)

- Once the project has begun ground-disturbing activities, and subsequent to a qualifying rain event that exceeds 0.5-inches of precipitation, Caltrans shall inspect the project within 24 hours and take photos of all discharge locations, and disturbed areas, including all excess materials disposal areas, in order to demonstrate that erosion control and revegetation measures are present and have been installed appropriately and are functioning effectively. A brief report containing these photos, corrective actions (if necessary), and any surface water monitoring results collected pursuant to this Order or the Construction General Permit (SWRCB Order 2009-009 DWQ) shall be submitted to the Regional Water Board within 10 days after the end of the qualifying rain event. Inspections are required daily during extended rain events. Once the project site is stable, in a steady state (channel- ground- or vegetation-disturbing activities have ceased), and has demonstrated sufficient and effective erosion and sediment control, Caltrans may request a reprieve from this condition from the Regional Water Board. At least one post-construction inspection is required to demonstrate sufficient and effective erosion and sediment control and compliance with the Basin Plan.

- Rain events are periods of precipitation that that are separated by more than 48-hours of dry weather. Rainfall amounts may be taken from on-site rain gauges, from the nearest California Data Exchange Center station (http://cdec.water.ca.gov), or by a custom method or station approved by Regional Water Board staff.

Project-Specific Conditions Requiring Reports

4. Caltrans shall submit, subject to review and concurrence by Regional Water Board staff, a dewatering and/or diversion plan that appropriately describes the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plans shall be submitted no later than 30 days prior to conducting the proposed activity and shall first be found acceptable by Water Board Staff before implementation of diversion and/or dewatering. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of Project activities.

5. Not later than June 30, 2014, Caltrans shall implement an interagency agreement with the United States Forest Service to allow for collaboration on a 10-year invasive weed control program in the Smith River Middle Fork watershed. Caltrans shall submit an invasive weed removal plan detailing the scope of invasive removal that shall be conducted as a result of Caltrans's efforts. The invasive removal plan shall include, but not be limited to:

    i) An inventory of the exact invasive plant removal locations and targeted weed species;

Project-Specific Conditions Requiring Reports (continued)

ii) Removal methodologies; and

iii) Monitoring and reporting measures.

Project construction shall be prohibited until this invasive removal plan has been submitted to, and found acceptable by Regional Water Board staff.

6. In-channel work, including removal of stream diversion structures, shall only be conducted between June 15 and October 15; extensions shall not be considered except in emergency situations.

7. Caltrans shall submit an on-site re-vegetation plan (Plan) to address on-site mitigation measures for permanent and temporary Project impacts to jurisdictional waters and riparian vegetation. The Plan shall include a planting plan, planting palette, implementation schedule, invasive species control plan, proposed success criteria, and a proposed reporting schedule to the Regional Water Board. Project construction shall be prohibited until the Plan has been found acceptable to Regional Water Board Staff.

8. The Regional Water Board shall be notified in writing (e-mail is acceptable) at least five working days prior to commencement of:

   i) Ground disturbing activities for each construction season; and

   ii) Water diversion installations.

Project-Specific Conditions

9. Caltrans shall install three compost-amended vegetated filter strips to treat roadway stormwater runoff from no less than 0.7 acres of impervious surface. The strips shall be installed consistent with the information in finding number 10 on page 4 of this certification. The strips shall be entered into the District's permanent stormwater treatment BMP database and monitored and maintained to ensure BMP infiltration efficacy.

   Caltrans shall also install two traction sand traps to treat roadway runoff from no less than 1.06 acres of impervious area. The traction sand traps shall be installed consistent with the information in finding number 10 on page 4 of this certification.

10. Gravel bags used below the Smith River Middle Fork top-of-bank shall meet the gravel specifications described below in condition number 10. Gravel bag fabric shall be non-woven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:

    i) Mass per unit area, grams per square meter, min ASTM Designation: D 5261 — 270;

    ii) Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632* 0.89;

Project-Specific Conditions (continued)

iii) Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM designation: D4355, xenon arc lamp method 70 or appropriate test method for specific polymer;

iv) Gravel bags shall be between 600 mm and 800 mm in length and between 400 mm and 500 mm in width; and

v) Yarn used in construction of the gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color. The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg and 22 kg in mass.

Caltrans shall first request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.

11. Gravel used below the Middle Fork Smith River top-of-bank shall:

i) Consist of mechanically-rounded and washed, and/or river run gravel obtained from a river or creek bed;

ii) Be clean, hard, sound, durable, uniform in quality, and free of disintegrated material, organic matter, and deleterious substances;

iii) Be composed entirely of particles that have no more than one fractured face;

iv) Have a cleanliness value of at least 85, using the Cleanness Value Test Method for California Test No. 227; and

v) Have a diameter no less than 0.75 inches in diameter, and no greater than four inches in diameter.

Standard Conditions

12. Herbicides and pesticides shall not be used within the Project. If Caltrans has a compelling case as to why herbicides and pesticides should be used, they may submit a request along with a BMP plan to Regional Water Board staff for review, consideration, and concurrence.

13. All activities and BMPs shall be implemented according to the submitted application materials (dated April 2013) and the findings and conditions of this certification.

14. All conditions required by this Order shall be included in the Contract Documents prepared by Caltrans for the contractor. In addition, Caltrans shall require compliance with all conditions included in this Order in the bid contract for this Project.

15. Construction BMPs shall be implemented in accordance with the Caltrans Construction Site Best Management Practice Manual (CCSBMPM) and all contractors

Standard Conditions (continued)

and subcontractors shall comply with the CCSBMPM. All BMPs shall be installed and used in accordance with the manufacturer's specifications. If Caltrans elects to install alternative BMPs for use on the Project, Caltrans shall first submit a proposal to Regional Water Board staff for review and acceptance.

16. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized by this certification. For example, no debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this certification or the Caltrans statewide stormwater permit (99-06-DWQ), shall not be allowed to enter into waters of the State.

    Except for temporary stockpiling of waste generated during demolition operations ("temporary" in this instance means generated and removed during the same working day), waste materials shall not be placed within 150 linear feet of waters of the State or where the materials may be washed by rainfall into waters of the State. Exceptions to the 150-foot limit may be granted on a case-by-case basis provided Caltrans first submits a proposal in writing that is found acceptable by Regional Water Board staff.

17. All project-generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When operations are complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the Special Provisions for the Project and/or the 2006 Standard Specification 7-1.13, *Disposal of Material Outside the Highway Right of Way*. Within 30 days of disposing of materials off-site Caltrans shall submit to the Regional Water Board the satisfactory evidence provided to the Caltrans Engineer by the Contractor referenced in Standard Specification 7-1.13. In accordance with State and Federal laws and regulations, Caltrans is liable and responsible for the proper disposal of waste generated by its Project.

18. Asphalt-concrete grindings shall not be placed in any location where it may, at any time, be directly exposed to storm or ground waters, except asphalt-concrete grinding may be re-used and incorporated into impervious asphalt mixes.

19. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State. At no time shall Caltrans use any vehicle or equipment which leaks any substance that may impact water quality.

20. Caltrans shall prioritize the use of wildlife-friendly biodegradable (not photo-

Standard Conditions (continued)

degradable) erosion control products wherever feasible. Caltrans shall not use or allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e., erosion control materials to be left in place for two years or after the completion date of the project). If Caltrans finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products.

21. Work in flowing or standing surface waters, unless otherwise proposed in the project description and approved by the Regional Water Board, is prohibited. If construction dewatering of groundwater is necessary, then Caltrans shall use a method of water disposal other than disposal to surface waters, such as land disposal. Groundwater disposed of to land shall not enter State waters. Alternatively, Caltrans may apply for coverage under the Low Threat Discharge Permit or an individual National Pollutant Discharge Elimination System (NPDES) Permit. If Caltrans applies for coverage under either of these permits, then discharge is prohibited until Caltrans has received notification of coverage under the respective permit.

22. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be prohibited within waters of the State. Fueling of individual equipment types within waters of the State may be authorized if Caltrans first prepares a fueling plan that:
    - i) Identifies the specific piece of machinery that may require fueling within waters of the State;
    - ii) Provides justification for the need to refuel within State waters. The justification shall describe why fueling outside of jurisdictional waters is infeasible; and
    - iii) Includes a narrative of specific BMPs that shall be employed to prevent and capture fuel releases.

    Fueling of equipment within waters of the State shall be prohibited until the fueling plan has been approved by Regional Water Board staff. The fueling plan may be submitted individually, included in the project Storm Water Pollution Prevention Plan (SWPPP), or submitted as a SWPPP amendment. If the fueling plan is included in the Notice of Intent package for coverage under the statewide construction general stormwater permit, then acceptance of the NOI does not constitute Regional Water Board staff acceptance of the fueling plan.

23. This Order does not authorize drafting of surface waters.

24. Caltrans shall provide a copy of this certification and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ (web link referenced below) to the contractor and all subcontractors conducting the work, and require that copies

Standard Conditions (continued)

remain in their possession at the work site. Caltrans shall be responsible for work conducted by its contractor or subcontractors.

25. The Resident Engineer (or appropriately authorized agent) shall hold water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on violation avoidance and violation reporting procedures. Meetings shall be held on-site unless an on-site meeting is impracticable and not needed to effectively communicate the details of permit compliance. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the project, shall be present at the meetings. Caltrans shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to Regional Water Board staff on request.

26. Caltrans shall implement appropriate BMPs to prevent the discharge of equipment fluids to the stream channel. The minimum requirements shall include: storing hazardous materials at least 150 linear feet outside of the stream banks; checking equipment for leaks and not using equipment with leaks; and pressure washing or steam cleaning equipment to remove fluid residue on any of its surfaces prior to its entering any stream channel. Fluids and waste by-products generated by equipment washing and cleaning shall not enter State waters.

27. If an unauthorized discharge to surface waters (including wetlands, rivers or streams) occurs, or any other threat to water quality arises as a result of Project implementation, the associated Project activities shall cease immediately until the threat to water quality is otherwise abated. If there is a discharge to State waters, the Regional Water Board shall be notified no more than 24 hours after the discharge occurs.

28. Caltrans and their contractor are not authorized to discharge wastewater (e.g., water that has contacted uncured concrete or cement, or asphalt) to surface waters, ground waters, or land. Wastewater may only be disposed of to a sanitary waste water collection system/facility (with authorization from the facility's owner or operator) or a properly-licensed disposal or reuse facility. If Caltrans or their contractor proposes an alternate disposal method, Caltrans or their contractor shall request authorization from the Regional Water Board. Plans to reuse or recycle wastewater first require written approval from Regional Water Board staff.

29. Concrete shall be excluded from surface water for a period of 30-days after it is poured/sprayed. During that time the concrete shall be kept moist and runoff from the concrete shall not be allowed to enter any water body. Commercial sealants may

Standard Conditions (continued)

be applied to the concrete surface where difficulty in excluding flow for a long period may occur. If sealant is used, water shall be excluded from the site until the sealant is cured. If groundwater comes into contact with fresh concrete, it shall be prevented from flowing towards surface water.

30. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill on-site shall be performed in accordance with all State and Federal policies and established guidelines and must be submitted to the Regional Water Board for review and concurrence.

31. The validity this certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 3833, and owed by the applicant. The Regional Water Board received $13,764 from Caltrans on April 15, 2013.

32. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to title 23, California Code of Regulations, section 3855, subdivision (b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

33. In the event of any violation or threatened violation of the conditions of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under applicable state or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties, process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification. In response to a suspected violation of any condition of this certification, the State Water Board may require the holder of any federal permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this certification, the Regional Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

34. This certification action is subject to modification or revocation upon administrative or judicial review; including review and amendment pursuant to Water Code section

Standard Conditions (continued)

13330 and title 23, California Code of Regulations, section 3867.

35. This certification is not transferable. In the event of any change in control of ownership of land presently owned or controlled by the Applicant, the Applicant shall notify the successor-in-interest of the existence of this certification by letter and shall forward a copy of the letter to the Regional Water Board. The successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of this certification to discharge dredged or fill material under this Order. The request must contain the following:
    i) requesting entity's full legal name;
    ii) the state of incorporation, if a corporation;
    iii) address and phone number of contact person; and
    iv) a description of any changes to the project or confirmation that the successor-in-interest intends to implement the project as described in this Order.

36. Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited, and all proposed revegetation, avoidance, minimization, and mitigation measures being completed, in strict compliance with Caltrans' project description and CEQA documentation, as approved herein, b) Caltrans shall construct the project in accordance with the project described in the application and the findings above, and c) compliance with all applicable water quality requirements and water quality control plans including the requirements of the Water Quality Control Plan for the North Coast Region (Basin Plan), and amendments thereto. Any change in the design or implementation of the project that would have a significant or material effect on the findings, conclusions, or conditions of this Order must be submitted to the Executive Officer of the Regional Water Board for prior review, consideration, and written concurrence. If the Regional Water Board is not notified of a significant alteration to the project, it will be considered a violation of this Order, and Caltrans may be subject to Regional Water Board enforcement actions.

37. The authorization of this certification for any dredge and fill activities expires on November 5, 2017. Conditions and monitoring requirements outlined in this Order are not subject to the expiration date outlined above, and remain in full effect and are enforceable.

Conditions 4-8 include requirements for information and reports. Any requirement for a report made as a condition to this certification is a formal requirement pursuant to California Water Code section 13267, and failure or refusal to provide, or falsification of such required report is subject to civil liability as described in California Water Code, Section 13268.

The Regional Water Board may add to or modify the conditions of this Order, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.

Please contact our staff Environmental Specialist/Caltrans liaison, Brendan Thompson at (707) 576-2699, or via e-mail, at Brendan.Thompson@waterboards.ca.gov, if you have any questions.

for Matthias St. John
Executive Officer

130531_BJT_ef_CDOT_Hwy197_PatrickNarrows_401Cert

Web link:	State Water Resources Control Board Order No. 2003-0017 -DWQ, General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification can be found at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf
Original to:	Mr. Kevin Church, Caltrans, District 1, 1656 Union Street, Eureka, CA 95501
Copy to:	Ms. Gail Popham, Caltrans, District 1, 1656 Union Street, Eureka, CA 95501
Electronic Copies to:	U.S. Army Corps of Engineers, Regulatory Functions - San Francisco District
	California Department of Fish and Wildlife

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
REGION 1 - NORTHERN
601 LOCUST STREET
REDDING, CALIFORNIA, 96001

STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2013-0059-R1
MIDDLE FORK SMITH RIVER AND UNNAMED TRIBUTARIES TO MIDDLE FORK SMITH RIVER

CALIFORNIA DEPARTMENT OF TRANSPORTATION
DEL NORTE COUNTY STAA PROJECT PCN 1, 2, AND 3
EA 01-479400; U.S. 199 PMS 20.5-20.9, 23.9-24.08, AND 25.5-25.6

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and the California Department of Transportation (Caltrans) (Permittee) as represented by Mr. Kevin Church.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) Section 1602, Permittee notified CDFW on February 27, 2013, that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC Section 1603, CDFW has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is situated on Middle Fork of Smith River and Unnamed tributaries to Middle Fork Smith River, tributary to Smith River, tributary to Pacific Ocean. The project is located in the County of Del Norte; State of California; Sections 10, 16 and 17, Township 17 North, Range 3 East, Humboldt Base and Meridian; Hurdygurdy Butte and Shelly Creek Ridge U.S. Geological Survey 7.5-minute quadrangles.

PROJECT DESCRIPTION

Caltrans is proposing to construct improvements at spot locations on State Route (SR) 197 and U.S. Route (U.S.) 199 in Del Norte County to be able to reclassify the routes as

part of the Surface Transportation Assistance Act (STAA) truck route network. This STAA improvement project is made up of five previously identified and separately proposed projects, referred to as Ruby 1, Ruby 2, Patrick Creek Narrows (PCN) at Locations 1, 2, and 3, the Narrows, and Washington Curve. This Agreement is limited to work proposed at the three PCN locations (PCN-1, PCN-2, and PCN-3), between Post Mile (PM) 20.5 and 25.7 on U.S. 199. The project will involve ground disturbance, areas of cut and fill, a bridge replacement, culvert replacement, blasting, vegetation removal and installation of five retaining walls.

At PCN-1 (PM 20.5-20.9) the existing roadway curves would be improved and the roadway would be widened to accommodate two 12-foot-wide lanes and 4-foot shoulders throughout the majority of the location, transitioning to 1- to 4-foot wide shoulders at both ends of the location. To accommodate the widening and broader roadway curves, an approximately 190-foot-long, 5-foot-tall retaining wall is proposed along the river side of the road above a portion of the existing steep rock-armored riverbank. A Type 80 concrete barrier modified with architectural treatment would be installed on top of the wall. An estimated 18 trees may be removed south of the roadway on the bank above the Middle Fork Smith River. Three culverts will be replaced: at PM 20.57 an 18-inch culvert will be replaced with a 24-inch culvert, at PM 20.58 an 18-inch culvert will be replaced with a 24-inch culvert, and at PM 20.62, a 24-inch culvert will be replaced with a new 24-inch culvert.

At PCN-2 (PM 23.9-24.08) the existing 11- to 12-foot lanes will be realigned and widened to 12 feet and the shoulders will be increased to a width of 8 feet, transitioning to 2- to 8-foot shoulders at both ends of the location. The existing concrete arch bridge with will be replaced with a new concrete arch bridge immediately downstream of the current bridge. The existing bridge will be removed after the new bridge is built; debris containment will be used during bridge removal. Although work is proposed within the ordinary high water mark (OHW), no instream work or water diversion is proposed for bridge replacement. Approximately 108 trees will be removed.

To accommodate road widening, approximately 3,000 cubic yards of rock excavation is required from the cut slope. Rock excavation would extend up approximately 40 feet above the highway; a hoe ram, rock splitter, and/or controlled blasting would be required to construct the rock cut slope. A cut slope of 0.5:1 to 0.75:1 is anticipated. Due to the fractured nature of the bedrock, anticipated rock fall following construction will be contained using a permanent rock-fall mitigation system consisting of wire mesh.

A retaining wall and sidehill viaduct approach would be constructed downstream of the new bridge. The retaining wall would extend for approximately 153 feet, and the viaduct would extend for approximately 95 feet and transition directly into the proposed new bridge. The retaining wall would vary in height from 10 to 20 feet and be supported along the bank of the Middle Fork Smith River. The sidehill viaduct, which would be founded on drilled piles, would support the northbound traffic lane over the bank of the Middle Fork Smith River. A new wall with aesthetic treatment, approximately 130 feet

long and up to 4 feet high, will be constructed on the outside of the curve at PM 23.9 to support construction of a modified Type 80 guardrail on top of the retaining wall. The existing 18-inch culvert at PM 24.07 will be removed and replaced by a new 24 inch culvert at PM 23.95 with a traction sand trap added to the outlet of the new culvert.

A third retaining wall that would reach approximately 10 feet high and 175 feet long is proposed on the northeast side of the bridge. A new 18-inch culvert would be placed at PM 24.17 to drain stormwater into a constructed bio-strip.

At PCN-3 (PM 25.5-25.6) the roadway will be widened toward the Middle Fork Smith River, and a new wall will be constructed on the riverside to support the wider roadway. The new wall will be approximately 180-foot-long and 15 feet high, and have architectural rock finish and a modified Type 80 guardrail. A drilled-pile cast-in-place foundation may be required. No trees are proposed for removal. At PM 25.55 an 18-inch culvert will be replaced with a 24-inch culvert, including a traction sand trap; the existing downdrain will be abandoned and a new 24-inch downdrain will be installed. At PM 25.69 the 18-inch culvert will be replaced with a 24-inch culvert, including a new headwall and rock slope protection approximately 6 feet by 14 feet at the culvert outlet.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: **Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), steelhead (*O. mykiss*), coastal cutthroat trout (*O. clarki clarki*)**, other non-game and game fishes, amphibians, reptiles, aquatic invertebrates, mammals, nesting resident and migratory birds, and other aquatic and riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include:

- direct and/or indirect mortality of fish, amphibians and other aquatic species;
- impede up- and/or down- stream migration of aquatic species;
- injury to downstream fish and benthic invertebrates and spawning and/or rearing habitats through sediment transport and deposition and/or spills of deleterious materials;
- changes in channel form and contour of bed, bank, or channel;
- changes in flow depth, width, or velocity;
- temporary increase of sediment and turbidity;
- temporary loss of riparian habitat;
- permanent loss of mature Douglas-fir trees
- potential mortality of nesting birds, eggs or young through vegetation removal and construction disturbance; and
- colonization by non-native and/or invasive plants.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons in responsible positions who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify CDFW if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, CDFW shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that CDFW personnel may enter the project site at any time to verify compliance with the Agreement.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and other aquatic species, Permittee shall implement each measure listed below.

2.1 Except where otherwise stipulated in this Agreement, all work shall be in accordance with Permittee's notification, including all maps, plans, photographs, drawings, and all other supporting documents submitted as part of the notification and received as of May 10, 2013. The Permittee shall use the mitigative features described in the notification and supporting documents, unless such features are modified by the provisions of this Agreement, in which case the activities shall be conducted as described in this Agreement.

PROJECT TIMING

Except for vegetation removal and work proposed below the OHW mark along the Middle Fork Smith River at PCN-2, all work within the bed, bank or channel shall be confined to the period June 1 to October 15 of any year in which this Agreement

is valid. At PCN-2, all work below the OHW is confined to June 15 – October 15, unless consultation with CDFW provides for a site-specific seasonal work period variance. Any variance approved shall also require the Permittee comply with Measures 2.3a) – 2.3d).

VEGETATION REMOVAL AND OTHER EARLY OR LATE SEASON WORK

2.2 Vegetation removal work, i.e., limbing, felling and removal or trees and shrubs from the work area, shall take place between September 15 and February 28 to avoid impacts to nesting birds. Fall and winter vegetation removal during the non-nesting season, and any other work proposed outside of a June 15 – October 15 work window, shall adhere to all measures in this Agreement and a) – d) below.

a) Prior to any work at a site outside June 15 – October 15, the Permittee shall stock-pile erosion control materials at the site. Erosion control materials shall be applied in sufficient quantity immediately upon completion of work and prior to the onset of precipitation capable of generating runoff with re-application as needed to avoid any visible increase in surface erosion or turbidity in any receiving streams.

b) Vegetation limbing and felling shall minimize soil disturbance using effective Best Management Practices (BMPs) such as hand-cutting. Removal of stumps and other ground-disturbing work shall only be performed when soils are sufficiently dry so that sediment is not discharged into streams.

c) The Permittee shall install erosion control measures within 24 hours of CDFW directing the Permittee to do so.

d) When a 7-day National Weather Service forecast of rain for Hiouchi at http://www.weather.gov includes a minimum of 5 consecutive days with any chance of precipitation, 3 consecutive days with a 30% or greater chance of precipitation, or 2 consecutive days of 50% or greater chance of precipitation, the Permittee shall refrain from undertaking further vegetation removal work prior to the rain event. Permittee shall not resume vegetation removal work until the soil surface is dry, defined as a surface which is no wetter than that found during normal dust abatement watering treatments, and treatment of vegetation does not cause deformation of the soil surface.

e) Once vegetation is trimmed or removed in compliance with Measure 2.3, frequent repeated hand-cutting of re-growth during the nesting season is permitted as needed to avoid re-growth that may attract nesting birds.

2.3 Removal of existing vegetation shall not exceed the minimum necessary to complete operations. Trees with a diameter at breast height (dbh) greater than 16 inches that must be cleared from the work area shall be made available to a

United States Forest Service (USFS)- and CDFW-approved entity for instream restoration and habitat improvement projects in the Middle Fork Smith River watershed. Whenever possible and safe to do so, smaller trees shall be removed with the root wads intact and attached to at least 20 feet of trunk. Larger trees shall be bucked into the longest lengths possible for transport.

2.4 Permittee shall deliver restoration trees to a designated storage/staging area within 50 miles of the Project area for use by the approved entity.

HABITAT AND SPECIES PROTECTION

2.5 The Permittee shall protect migratory birds, their occupied nests, and their eggs as specified by the Federal Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Title 50 Code of Federal Regulations part 10, and California Fish and Game Code (FGC) sections 3503 and 3513. Nesting or attempted nesting by migratory birds within the project area is anticipated to occur between, but not limited to, March 1 and August 15.

2.6 If Permittee proposes to remove vegetation or work in the nesting season (March 1 – Sept 15), the Permittee shall submit a migratory bird protection program (MBPP) to CDFW for review and approval at least 30 days prior to construction, including staging, clearing and grubbing. The MBPP shall show a list of bird species anticipated to nest in the area, a description of species life history to help focus survey design protocols; survey protocols that are designed and tailored specifically to detect the various species anticipated to nest in the area; the schedule of work; proposed nest buffer and nest prevention and protection measures; project activity disturbance monitoring; and a regular inspection, maintenance and reporting schedule.

2.7 If project work is proposed between March 1 and September 1, the Permittee shall conduct a database and ground-based nest search for new osprey nests to check the status of viable historic and active osprey nests within 0.5 miles of U.S. 199 PM markers 20.5 – 25.65 prior to operations each year. If osprey are found nesting in or within 0.5 miles of the project area at the time of construction, the Permittee shall consult with CDFW to determine if additional avoidance or minimization measures may be needed.

2.8 The Permittee shall follow all mitigation measures outlined in the Final Environmental Impact Report / Environmental Assessment and Section 4(f) Evaluation (FEIR/EA).

2.9 Prior to the initiation of construction work, the Permittee shall clearly delineate the limits of the work area, install Environmentally Sensitive Area (ESA) fencing, and install BMPs as appropriate. ESA fencing shall consist of temporary orange construction fence or other highly visible material that clearly delineates the limits of the work area.

2.10 ESAs shall be clearly shown on the Project plans and drawings. The Permittee shall restrict all Project activities to the designated work areas and shall maintain all fencing, stakes and flags until the completion of Project activities. The Permittee shall ensure that the contractor, subcontractors, and all personnel working on the Project are instructed on the purpose of the ESA fencing and understand the limits of the work area.

2.11 If sightings or den sites of ring-tailed cat (*Bassariscus astutus*), Pacific fisher (*Martes pennanti*), or marten (*Martes americana*) are encountered in the course of activities at project sites, the Permittee shall immediately notify and consult with CDFW to identify any measures that may be needed to avoid take or minimize adverse impacts to these species.

STREAM DIVERSION AND CONSTRUCTION DEWATERING

2.12 Except as described in this Agreement, all work within stream channels or on the banks shall be performed when streams are dry or at low flow. If water is present during construction, all work shall be performed in isolation from surface flow, or subsurface flow to the maximum extent feasible.

2.13 No fill material shall be placed within a stream except as specified in this Agreement. No work shall be conducted within the wetted channel of the Middle Fork Smith River.

2.14 Where flowing water is present during operations:

a) A temporary clear water diversion for permanent culvert work shall be constructed using cofferdams to divert stream flow and isolate and dewater the work site, and to catch any sediment-laden water and minimize sediment transport downstream. Cofferdams shall be constructed of non-polluting materials including sand bags, rock, K-rails, and/or plastic tarps. Mineral soil shall not be used in the construction of cofferdams.

b) The Permittee shall remove and relocate aquatic organisms from the stream channel as flows are shifted into the clear water diversion in order to minimize mortality due to stranding.

c) Flowing water shall be cleanly bypassed and/or prevented from entering the work area through pumping or gravity flow, and cleanly returned to the stream below the work area. Flow diversions shall be done in a manner that shall prevent pollution and/or siltation and provides flows to downstream reaches.

d) The Permittee shall remove any turbid water and loose sediment present in the work area prior to restoring water flow through the project site, and place them in a location where they cannot enter the Waters of the State. Turbid water

pumped from the work area may be used for construction purposes (compaction, dust abatement, etc.) or shall properly disposed of in an upland area where it will not drain to surface waters or wetlands. Once work is completed cofferdams shall be removed and stream flow restored.

2.15 The diversion shall be adequately sized to accommodate the full range of flows that may occur during the diversion period without overtopping into the work area and shall be adequately screened to prevent fish or wildlife entrapment or impingement. Screens shall meet NMFS/CDFW screening criteria.

2.16 Dewatering shall be done in a manner that prevents the discharge of material that could be deleterious to fish, plants or other aquatic life and maintains adequate flows to downstream reaches during all times natural flow would have supported aquatic life.

2.17 Material used for diversion berms and temporary access roads or work pads below the OHW mark shall consist of clean, pre-washed, uncrushed natural river rock. Gravel must be washed at least once and have a cleanliness value of 85 or higher (California Test No. 227). Particle size shall be graded with 95-100% passing a 1-inch screen, 75-85% passing a 3/4-inch screen, 25-50% passing a 1/2-inch screen, 10-20% passing a 1/4-inch screen and 0-5% passing a No. 8 screen. Gravel may be stockpiled near the work area, but mixing with any earthen material is prohibited.

2.18 Clean, washed gravel used for diversion berms, temporary access roads and work pads, may be left in the channel following construction provided it does not impede the movement of fish or other aquatic organisms or redirect stream flows.

EROSION AND SEDIMENT CONTROL

2.19 Adequate and effective erosion and siltation control measures shall be used at all times to prevent sediment or turbid or silt-laden water from entering streams. Where needed, the Permittee shall use native vegetation or other treatments including native slash, jute netting, straw wattles, and geotextiles to protect and stabilize soils. Geotextiles, fiber rolls, and other erosion control treatments shall not contain plastic mesh netting that can entrap or harm wildlife. Photodegradable synthetic products are not considered biodegradable.

2.20 Excepting rock slopes that shall have cable wire-mesh rock fall mitigation systems, all bare mineral soil exposed in conjunction with construction, deconstruction, maintenance or repair shall be treated for effective erosion prior to the onset of precipitation capable of generating run-off or the end of the yearly work period, whichever comes first. Erosion control measures shall include the proper installation and maintenance of approved BMPs and may include applications of seed, weed-free straw, compost, fiber, commercial fertilizer, stabilizing emulsion

and mulch, or combinations thereof. Non-vegetative methods such as jute mat, coir mat, wood chip mat, straw mat or wattle, straw mulch, native duff (leaves, needles, fine twigs, etc.), or lopped native slash may be used as erosion control to protect and stabilize soils. Straw mulching shall utilize at least 2 to 4 inches of clean straw (such as rice, barley, wheat) or weed-free straw. Seeding shall use regional native seed or non-native seed that is known not to persist or spread [e.g., barley (*Hordeum vulgare*), or wheat (*Triticum aestivum*)]. No known invasive grass seed such as annual or perennial ryegrass (*Lolium multiflorum or L. perenne*, which are now referred to as *Festuca perennis*), shall be used in erosion control or revegetation seed mixes.

2.21 Encroachments and associated structures, fills, and other exposed soils shall be armored as needed to protect fill, abutments, and the stream channel and banks from erosion. Structures and associated materials not designed to withstand high seasonal flows shall be removed to areas above the OHW mark before such flows occur or the end of the yearly work period, whichever comes first.

2.22 The Permittee shall provide site maintenance during the life of the Agreement and the life of the structures, including, but not limited to, re-applying erosion control to minimize surface erosion and ensuring drainage structures, streambeds and banks remain sufficiently functional, armored and/or stable.

2.23 Erosion control measures shall be monitored and maintained during and after each storm event. Modifications, repairs, and improvements to erosion control measures shall be made following each storm event to prevent sediment from entering surface waters or wetlands.

2.24 RSP and energy dissipation materials shall consist of clean rock, competent for the application, sized and properly installed to resist washout. RSP slopes shall be supported with competent boulders keyed into a footing trench with a depth sufficient to properly seat the footing course boulders and prevent instability. Excavation spoils shall not be side-cast into the channel nor is any manipulation of the substrate of the channel authorized herein unless expressly provided for in this Agreement.

2.25 The disturbed portions of any stream channel within the OHW mark of the stream shall be restored to as near their original condition as possible. Restoration shall include re-vegetation of areas stripped or exposed by project activities. Slash pack, rock, or other erosion protection suitable to CDFW shall be placed in areas where vegetation cannot reasonably be expected to become reestablished.

PERMANENT CULVERT REMOVAL AND REPLACEMENT

2.26 Permanent culverts at stream crossings shall be sized to pass the estimated 100-year flood flow, including debris and sediment loads, without overtopping or diverting. Culvert sizing factors shall include transportation of bedload, and the abundance and size of woody debris likely to be introduced to the stream upstream of the culvert crossing.

2.27 Permanent culverts and their outfall structures shall be aligned with the stream channel, as wide as or wider than the channel width, and shall be placed with the bottom set at or slightly below the natural streambed elevation to the maximum extent feasible. If permanent culverts cannot be set to grade, they shall have downspouts and/or energy dissipators below the outfall as needed to effectively control erosion. Downspouts shall be securely attached to the culvert and staked or otherwise anchored to the fill slope.

BRIDGE AND RETAINING WALL CONSTRUCTION

2.28 The bridge shall be sized to pass the 100-year intensity storm event and installed in accordance with submitted plans and diagrams.

2.29 No impact pile driving shall be used for bridge work or retaining walls. Blasting shall only occur during time frames as permitted in the USFWS Biological Opinion (USFWS BO).

2.30 Piles for bridge piers and retaining walls shall be installed using methods that avoid the use of an impact hammer adjacent to the stream.

2.31 Falsework, forms, supports or other temporary structures and construction materials shall not contact water of the Middle Fork Smith River, and shall be removed from the stream channel prior to October 15 unless written approval for a work period variance has been obtained from CDFW.

2.32 Groundwater and subsurface flow encountered during excavation for the bridge piles, piers, abutments or retaining walls shall be removed, to the maximum extent feasible, and placed in a tanker truck or settling basin or containment structure on stable soil outside of the channel. The settling basin shall not be allowed to drain to or be pumped to the stream until the stored water is less turbid than the stream flow into which it is released.

2.33 The Permittee shall install the necessary containment structures to control the placement of wet concrete and to prevent it from entering into the channel outside of those structures. No concrete shall be poured below the OHW flow line if the 14-day National weather forecast of rain at http://www.emc.ncep.noaa.gov/gmb/yzhu/html_pqpf/pqpf_us1.html indicates a chance of precipitation of 0.25 inch or greater in a 12-hour period.

2.34 At all times when the Permittee is pouring or working with wet concrete there shall be a designated monitor to inspect the containment structures and ensure that no concrete or other debris enters into the channel outside of those structures.

2.35 To prevent the release of materials that may be toxic to fish and other aquatic species, poured concrete at the Cast-In-Drilled-Hole (CIDH) piles for supports, piers, and retaining walls shall be isolated from surface water, and from subsurface water to the maximum extent feasible, and allowed to dry/cure for a minimum of 30 days. As an alternative, the Permittee shall monitor the pH of any water that has come into contact with the poured concrete. If this water has a pH of 9.0 or greater, the water shall be pumped to tanker truck or to a lined off-channel basin and allowed to evaporate or be transported to an appropriate facility for disposal. During the pH monitoring period, all water that has come in contact with poured concrete shall be isolated and not allowed to flow downslope or otherwise come in contact with fish and other aquatic resources. The water shall be retested until pH values become less than 9.0. Once this has been determined, the area no longer needs to be isolated. Results of pH monitoring shall be made available to CDFW upon request.

2.36 Water that has been in contact with uncured concrete shall be contained in a concrete washout facility, Baker tank, or other impervious container and shall not be discharged to surface or ground waters.

PETROLEUM, CHEMICAL AND OTHER POLLUTANTS

2.37 All construction-related materials and equipment shall be stored in designated staging areas outside of the floodplain.

2.38 No equipment or machinery shall be operated within any flowing stream. All machinery or heavy equipment that will be working in the stream bed, channel, and bank shall be cleaned of materials deleterious to aquatic life including oil, lubricants, coolants, hydraulic fluid, soil, and other debris. Cleaning of equipment shall take place outside of the stream bed, channel, and bank.

2.39 Refueling of machinery or heavy equipment, or adding or draining oil, lubricants, coolants, or hydraulic fluids shall not take place within stream bed, channel, and bank. All such fluids and containers shall be disposed of properly off-site. Heavy equipment used or stored within stream bed, channel, and bank shall use drip pans or other devices (i.e., absorbent blankets, sheet barriers or other materials) as needed to prevent soil and water contamination.

2.40 Any equipment or vehicles driven and/or operated within or adjacent to the stream channel shall be checked and maintained daily to prevent leaks of materials that could be deleterious to aquatic and terrestrial life or riparian habitat.

2.41 Stationary equipment such as motors, pumps, generators, and welders that contain deleterious materials, located adjacent to the stream channel shall be positioned over drip pans.

2.42 All construction activities performed in or near the stream shall have absorbent materials designated for spill containment and clean-up activities on-site for use in an accidental spill. In the event of a discharge, the Permittee shall immediately notify the California Emergency Management Agency State Warning Center at 1-800-852-7550 and immediately initiate clean-up activities. CDFW shall be notified by the Permittee within 24 hours and consulted regarding clean-up procedures.

2.43 Except as otherwise stipulated in this Agreement, no debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

3.1 Permittee shall implement an interagency agreement with the USFS to provide funding for a 10-year invasive weed control program in the Middle Fork Smith River watershed no later than 1 year after the date this Agreement is finalized. Details contained within the scope of work for the interagency agreement shall be brought forth in collaboration with CDFW and USFS (i.e., scope, nature, methodologies, monitoring and reporting measures).

4. Reporting Measures

Permittee shall meet each reporting requirement described below.

4.1 Permittee shall notify CDFW within the 7-day period preceding the beginning of work permitted by this Agreement. Information to be disclosed shall include Agreement number, and the anticipated start date. Subsequently, the Permittee shall notify CDFW no later than 7 days after the project is fully completed. Notification shall be faxed to CDFW at (707) 441-2021, Attn: JoAnn Dunn, Staff Environmental Scientist, or via e-mail at joann.dunn@wildlife.ca.gov.

CONTACT INFORMATION

Written communication that Permittee or CDFW submits to the other shall be delivered to the address below unless Permittee or CDFW specifies otherwise:

To Permittee:

Ms. Gail Popham
Caltrans
1656 Union St.
Eureka, CA 95501
Email: gail_popham@dot.ca.gov

To CDFW:

California Department of Fish and Wildlife
Northern Region
619 2nd Street
Eureka, CA 95501
Attn: Lake or Streambed Alteration Program
Notification #1600-2013-0059-R1
Fax: (707) 441-2021

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited

to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 *et seq*. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and Permittee. To request an amendment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in CDFW's current fee schedule (see Calif. Code Regs., Title 14, Section 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Calif. Code Regs., Title 14, Section 699.5).

EXTENSIONS

In accordance with FGC Section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Calif. Code Regs., Title 14, Section 699.5). CDFW shall process the extension request in accordance with FGC Section 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (FGC Section 1605(f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after Permittee's signature; 2) after CDFW complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC Section 711.4 filing fee listed at http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire **five years** from the effective date, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC Section 1605(a)(2) requires.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC Section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR CALIFORNIA DEPT. OF TRANSPORTATION

Kevin Church — June 14, 2013

Kevin Church
Project Manager

Date

FOR CALIFORNIA DEPT. OF FISH AND WILDLIFE

T. LABANCA — 6/14/13

FOR Curt Babcock
Environmental Program Manager

Date

Prepared by: JoAnn Dunn, Staff Environmental Scientist, May 16, 2013, rev. 6-13-13