# Annual Progress Report for 2012

## MONITORING THE EFFECTIVENESS AND VALIDATING RESPONSE TO THE ROAD RELATED MITIGATION PRACTICES IMPLEMENTED ON THE PIKES PEAK HIGHWAY

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Pikes Peak, Colorado. Photo by Josh VonLoh, METI Inc.

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# Executive Summary

## Monitoring the Effectiveness and Validating Response to the Road Related Mitigation Practices Implemented on the Pikes Peak Highway

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This is the tenth report documenting the annual monitoring efforts on the Pikes Peak Highway as part of the Settlement Agreement between the Sierra Club and the United States Department of Agriculture, Forest Service in Sierra Club v. Veneman, Civil Action No. 98-M-662 (D. Colo.), (U.S. Department of Justice 2002). The original monitoring plan and subsequent amendments call for effectiveness monitoring, designed to determine how well the mitigation practices implemented contribute to meeting their objectives; and validation monitoring, designed to determine how the mitigation practices affect the riparian, wetland, and aquatic systems within the area of influence of the Pikes Peak Highway (USDA Forest Service 2002 and 2003).

Effectiveness monitoring for the Pikes Peak Highway is focused on the 14-mile-long, 300-foot-wide highway corridor (150-feet each side of the highway centerline), starting at mile marker seven and continuing to the summit. The only resurfacing treatment used on the highway for mitigation purposes was asphalt paving. In 2012, the highway crew completed construction of two sediment ponds in Basin 7 (Glen Cove, Ski, and North Fork of Crystal Creek Watersheds) and removed five breached rock weirs in the switchbacks (Basin 3: Severy and Ski Creek Watersheds; and Basin 4: Upper Ski and French Creek Watersheds) and replaced them with cutoff walls with riprap aprons below. Re-vegetation work included hydro mulching approximately one acre in Basin 1 (Ski and Lower North Fork of Crystal Creek Watersheds). Planned activities for next season include construction of a RediRock wall in Basin 3 and revegetating approximately one acre once construction of the wall has been completed. Repair of the breached rock weir 234RW in the switchbacks (corner just above Elk Park in Basin 3) remains in the design stage. Although planned construction will begin in 2013, the exact scope has not yet been determined. In addition, a total of 62 tons of gravel were hauled to repair washouts in the switchbacks (Basins 3 and 4) and 36 tons of gravel were hauled to mile marker 19 to repair washouts. A total of 36 tons of gravel were removed from the rock weirs (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager).

Precipitation measurements from the three electronic rain gauges (Onset Computer Corp.) and the NRCS Snotel site, located at Glen Cove indicated that precipitation was below average for 2012. In addition to the electronic rain gauges, standard non-recording rain gauges (All-Weather) were installed at each monitoring site as called for in the 2010 Annual Report. Although the tipping buckets for all electronic rain gauges were recalibrated prior to the 2012 field season, the logger on the electronic rain gauge 077RG malfunctioned part way through the season and did not record data from August 27 through September 9, 2012. The battery in the logger was replaced, tested, and the logger launched successfully on September 10, 2012. In addition, electronic rain gauges 075RG and 076RG, and standard rain gauge 076RG were tampered with (vandalized) several times throughout the season.

Silt fences were not exposed to high runoff and erosion activities, allowing time for the field crew to complete site visits every two weeks on 56 sites. The upper fence at cut slope site 059CS in Basin 7 was removed in 2012 due to limited access, and small diameter trees and boulders preventing fence material from being reliably fastened. The upper fences at five fill slope sites (048FS, 052FS, 055FS, 083FS, and 086FS) in Basin 7 were damaged during highway construction in 2011. As a result, the upper fences were removed from the sampling in 2012 and not replaced, and the lower fences continued to be monitored. Silt fences from 13 cut slope, 28 fill slope, and 15 rock weir sites were monitored in 2012. In addition, two of the fill slope silt fences were breached during the 2012 field season. All silt fence sites were visited every two weeks, sediment volume measured, and silt fences evaluated for repair or replacement.

Six of the original 20 drainage ditches selected for monitoring were surveyed in 2012. Fourteen of the original sites have been paved or lined with shotcrete since monitoring began including nine drainage ditches in Basin 7 that were treated in 2011. This eliminates the need for further monitoring unless visual inspection provides evidence of failure, in which case cross sections will be re-established to document change. The six drainage ditches located in Basins 1 and 2 are lined with erosion control fabric and will continue to be surveyed annually.

Conditions allowed all 118 conveyance channels to be monitored in 2012, including two new conveyance channel monitoring sites (263CC and 265CC). Conveyance channel 212CC, which was lined with rip rap in 2011, was also surveyed as there was evidence that treatment was failing. Four conveyance channels (024CC, 114CC, 115CC, and 118CC) which were previously monitored through observation and photographs only were surveyed. Conveyance channels 099CC, 108CC, 111CC, 113CC, and 119CC were not surveyed due to the exposure of large boulders and the general instability of the slope following past rock weir failure. The field crew monitored these sites by recording observations in the field notes and using photo monitoring to document changes in conveyance channel geometry. Conveyance channels 099CC, 111CC, 118CC, and 119CC below rock weirs in the switchbacks (Basins 3 and 4) were disturbed by the highway crew during removal of existing rock weirs and construction of cutoff walls with riprap aprons below. If conditions allow, these four conveyance channels will be surveyed in 2013 to establish a baseline survey post construction.

Thirty-six sediment traps were monitored in 2012, including 29 rock weirs and seven sediment ponds. Twenty-three sites were surveyed at least twice to monitor their effectiveness in trapping sediment from winter and summer runoff. The rock weirs were surveyed and sediment volume was measured in the silt fences located down slope of the rock weirs (15 rock weirs have associated silt fences). Of the 36 sites, 23 demonstrated some degree of failure, where water and sediment were seen piping under or through the rock weir, the rock weir was overtopped, or the rock weir was breached. Some of the rock weirs are full of sediment rendering them ineffective, resulting in an inability of the field crew to effectively evaluate these structures. Rock weirs 234RW, 236RW, 238RW, and 243RW (Basins 3 and 4) were not surveyed due to breaching of the rock weirs in 2010. The field crew monitored these sites by recording observations in the field notes and using photo monitoring to document changes.

The primary focus of the validation monitoring is to address the condition of the riparian wetland and aquatic systems along the Pikes Peak Highway. Surveys were completed on all streams

(Boehmer, East Fork of Beaver, Glen Cove, North Catamount, North Fork of Crystal, Oil, South Catamount, Ski, Severy, and West Fork of Beaver Creek). In the past, stream channel surveys have included planview surveys, profile surveys, cross section surveys, thalweg surveys, bankfull surveys, bank erosion surveys, vegetation surveys, pebble counts, and grab samples. In 2012, stream channel surveys included only cross section surveys, thalweg surveys, vegetation surveys, pebble counts, and grab samples.

Numerous grab samples were collected from the cut slope and fill slope silt fences, the rock weirs and their associated silt fences, and from the stream bars throughout the 2012 field season. A subset of these was selected to be analyzed in the laboratory for particle size distribution. The balance of samples will be analyzed only if the variability in the particle size distribution of the subset of samples chosen for initial analysis warrants additional analysis. Laboratory analyses for the 2012 field season have been completed on the stream bar grab samples and a summary of particle size distributions and graphs are presented in this report. Because laboratory analyses for the cut and fill slope silt fences, and the rock weirs and their associated silt fences were not completed at the time of this report, they will be included in the 2013 Annual Report. Comparing the distribution of material captured in traps near the highway to sediment deposits (bars) in the streams will validate response to highway mitigation practices.

Included with the full report is a data DVD containing all survey data (field and post processing) plus digital photographs (recommended viewing) for all sites for the 2012 field season. The annual reports and data may also be accessed from:

http://www.fs.fed.us/emc/rig/pikespeak/index.shtml

## INTRODUCTION

The proposed actions presented in the Pikes Peak Highway Drainage, Erosion and Sediment Control Plan Environmental Assessment (Hydrosphere Resource Consultants 1999) were designed to achieve the following goals:

- Stabilize road surface materials, cut slopes, and fill slopes
- Reduce runoff velocities and dissipate erosive energy
- Collect runoff in armored ditches and conveyance channels
- Reduce erosion and sediment deposition in drainage channels
- Retain sediment in traps and ponds to reduce downstream sedimentation

In May 2001, a monitoring plan was approved as part of the Settlement Agreement between the Sierra Club and the United States Department of Agriculture, Forest Service in Sierra Club v. Venneman, Civil Action No. 98-M-662 (D. Colo.), (U.S. Department of Justice 2002). The monitoring plan outlines appropriate procedures for monitoring and documenting the effectiveness of mitigation practices in achieving the above desired goals (USDA Forest Service 2002). The monitoring effort, which includes implementation monitoring, effectiveness monitoring, and validation monitoring, began in 2003 and ends in 2017.

Implementation monitoring verifies that mitigation practices are properly implemented. Staffs from both the city of Colorado Springs and the U.S. Forest Service are responsible for this aspect of the monitoring program. Because all parties assume that mitigation practices will be properly implemented, successes or failures in design or implementation will be addressed in the annual monitoring reports only to the extent that they impact subsequent monitoring.

Effectiveness monitoring is intended to document whether or not the properly implemented mitigation practice is effective in achieving the desired goal(s) or purpose(s) for that practice. Effectiveness monitoring for the Pikes Peak Highway is focused on the 14-mile-long, 300-foot-wide highway corridor (150-feet each side of the highway centerline), starting at mile marker seven and continuing to the summit, and is intended to document how effective the mitigation practices are in reducing erosion and sedimentation from features such as the road surface, cut and fill slopes, drainage ditches and conveyance channels. Precipitation is also monitored to provide an index to the amount and erosive energy of rainfall events. Effectiveness monitoring is the cornerstone of the monitoring effort described in this report.

An equally critical component in the monitoring program is validation monitoring, which is intended to document the degree to which the properly implemented and effective mitigation practices ultimately influence the resource of concern. In this report, validation monitoring addresses the condition of the riparian, wetland, and aquatic systems adjacent to the Pikes Peak Highway and attempts to provide data to validate that discharge management and reductions in sedimentation from the highway do in fact result in improvements in the channel and riparian environment below.

Subsequent changes in the proposed action plan for road mitigation (Burke 2002) required amendment of the approved monitoring plan (USDA Forest Service 2003). Initially, a variety of highway surface stabilization practices were proposed for road mitigation. Those were reduced to a single surfacing procedure, asphalt paving, eliminating the need for a monitoring design that incorporated multiple surface treatments. Rock weirs to detain the water and sediment exiting the highway corridor from all events up to the magnitude of the design storm are completed or under construction in selected locations. By design, sediment should settle out in the rock weir, where it can be measured directly, while water percolates through a porous berm. The addition of rock weirs eliminated the need to sample sediment concentrations in pond inflow and outflow as well as measure material trapped in the pond as originally stated in the monitoring plan. Additional revisions in the mitigation design concentrate road drainage from very long segments or reaches (as long as two miles) of both pavement and ditch line into fewer diversion points and conveyance channels, reducing the number of diversions off the highway and the number of proposed sampling sites.

The entire highway has been paved with asphalt, rather than surfaced using a variety of treatments, which should significantly reduce or eliminate the potential for continued surface erosion to occur from the road surface. Erosion rates from the gravel portion of the highway were monitored as called for in the approved monitoring plan, but since paving of the entire highway was completed in 2011, it is assumed that erosion from the road surface has been reduced to zero. As noted above, sediment pond design has been altered but monitoring will still focus on quantifying total sediment exported in the discharge water and the effectiveness of the mitigation practices in reducing that export. This report includes a brief description of the current monitoring protocol for each metric of concern and documents any changes in the monitoring protocol that may have occurred since the previous annual report.

The U.S. Forest Service oversees monitoring of the streams draining the basins below the highway to validate that discharge management and reductions in sedimentation from the highway result in improvements in the channel and riparian environment. A suite of tributaries in the Pikes Peak Watershed has been identified as either impacted or non-impacted by the presence and maintenance of the Pikes Peak Highway. North Catamount, South Catamount, Glen Cove, Oil, and Boehmer Creeks represent non-impacted streams. Ski, Severy, East Fork of Beaver, North Fork of Crystal, and West Fork of Beaver Creeks are all considered stream systems impacted by the highway. Depending on the magnitude of the reduction in the amount of sediment delivered to the stream system and changes in discharge amount and energy, it may be possible to document changes in channel morphology and riparian condition that occur as a consequence of highway management.

In 2012, the highway crew completed construction of sediment ponds 262RW and 264RW in Basin 7 (Glen Cove, Ski, and North Fork of Crystal Creek Watersheds) and removed five breached rock weirs (236RW, 238RW, 240RW, 242RW, and 243RW) in the switchbacks (Basin 3: Severy and Ski Creek Watersheds; and Basin 4: Upper Ski and French Creek Watersheds) and replaced them with cutoff walls with riprap aprons below. Re-vegetation work included hydro mulching approximately one acre in Basin 1 (Ski and Lower North Fork of Crystal Creek Watersheds). Planned activities for next season include construction of a RediRock wall in Basin 3 and revegetating approximately one acre once construction of the wall has been completed. Repair of the breached rock weir 234RW in the switchbacks (corner just above Elk Park in Basin 3) remains in the design stage. Although planned construction will begin in 2013, the exact scope has not yet been determined. In addition, a total of 62 tons of gravel were hauled to repair washouts in the switchbacks (Basins 3 and 4) and 36 tons of gravel were hauled to mile marker 19 to repair washouts. A total of 36 tons of gravel were removed from the rock weirs (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager).

## Site Location and Identification

A 15-year study requires that monitoring sites be uniquely identified and periodically relocated. Each precipitation gauge, cut slope and fill slope, road reach, drainage ditch and conveyance channel, rock weir and sediment pond, and stream channel reach monitored as part of this study has been uniquely identified and located. Each site is marked as a waypoint in a geographic information system (GIS) platform with attributes for latitude, longitude, and altitude, as well as a unique code, to distinguish it in the field. The coding convention used for the effectiveness monitoring sites is a five-character alpha-numeric code comprised of a three-digit feature number followed by a two-letter feature identifier (e.g., for site 001FS where 001 is the feature number and FS identifies the feature, a fill slope). The validation monitoring sites also use a five-character coding convention in which four letters identify the stream name and the last digit identifies the stream reach (e.g., OILC1 = Oil Creek, Reach 1).

Every feature being monitored has at least three benchmarks or control points used to locate the feature and obtain repeated, spatially similar, three-dimensional surveys, as appropriate. The benchmarks or control points are monumented by 2.5-foot lengths of 0.5-inch rebar pounded into the ground and topped with plastic yellow caps. Aluminum nursery tags wired to the rebar identify the individual benchmarks or control points (e.g., CP01). Every feature surveyed has at least three points with which to register the survey, although some features in close proximity may share control points.

In 2012, two new sediment pond (262RW and 264RW) and two new conveyance channel (263CC and 265CC) monitoring sites were established. Site names, locations, and feature descriptions can be found in Appendix A. Note that Appendix A provides a complete list of all waypoints established since the project began in 2003; not all of the sites listed were sampled during the 2012 monitoring season. A USGS topographic map that documents the location of each monitoring site is presented in Appendix B.

# OBJECTIVE

The objective of this report is to document the data collected and progress made in the effectiveness and validation monitoring of the mitigation practices implemented on the Pikes Peak Highway during the 2012 field season. Each annual report beginning in 2007 follows a consistent format that provides a description of the protocol used to monitor each metric of concern as defined by the monitoring plan or its amendment, and a summary of the data collected for that particular year. It should be realized that, by design, not all metrics or sampling locations will be monitored every year. As a result, some reports will contain site data not presented in other reports. A full data set from all years is available in the data archive. It should also be noted that it was not the intent of the settlement agreement to include analysis of the data beyond a quality assurance and quality control assessment of the monitoring effort. Therefore the annual report will state the intended purpose for collecting the data and present the data in a format useful for subsequent analysis.

# EFFECTIVENESS MONITORING

The road mitigation practices implemented by the City of Colorado Springs are intended to control erosion and manage the erosive energy of surface water discharge from the Pikes Peak Highway. Effectiveness monitoring consists of documenting the impact that various mitigation practices have on the erosion and sedimentation processes that occur within the road corridor. Erosion rates and sediment volumes are primarily indexed using a combination of survey techniques and sediment traps (silt fences, rock weirs and sediment ponds). Grab samples of sediment and water are analyzed to document particle size distributions of deposited material and sediment concentration in discharge water leaving the site. Precipitation is also monitored to provide an index to the amount and erosive energy of rainfall events.

The following sections describe the metrics being monitored and the data collected in order to document the effectiveness of mitigation. The standard protocol for identifying and numbering the various sample sites is presented up front, followed by a description of the monitoring sites and metrics.

## Precipitation

Three tipping bucket rain gauges (Onset Computer Corp.) equipped with event data loggers (HOBO) were installed at the beginning of the field season to index precipitation over the elevational range of the monitored portion of the highway. Although precipitation is not a response variable, it is a significant causal variable in evaluating the effectiveness of mitigation. Rain gauge 075RG is located just uphill from the Halfway Picnic Area near mile marker 10 at an elevation of 10,109 feet. This is at the upper end of Basin 2 (North Fork of Crystal and Ski Creek Watersheds), in the subalpine zone. Rain gauge 076RG is located near the Elk Park Trailhead (No. 652) at the boundary between the subalpine and the alpine zones at 11,810 feet elevation. Rain gauge 077RG is located near the Devil's Playground and well into the alpine area at 13,069 feet elevation. Rain gauges installed for this study operate from early May, or as soon as the field crew starts for the season, until late September or early October when the crew finishes for the year. Data loggers record a date-time stamp for each tip of the rain gauge bucket (1 tip = 0.01 inches) from which volume, duration, and intensity (or rate) of each rainfall event can be determined.

In 2012, the three tipping bucket rain gauges were installed by May 1. In addition, to avoid loss of data should a tipping bucket rain gauge fail, a standard, non-recording rain gauge (All-Weather) was also installed as called for in the 2010 Annual Report. The standard rain gauges provide a second index of precipitation amount for the sampling interval.

Total seasonal precipitation (May 1 – October 2, 2012) for the three monitoring sites for both the electronic and standard rain gauges is listed in Table 1. Although the tipping buckets for all electronic rain gauges were recalibrated prior to the 2012 field season, the logger on the electronic rain gauge 077RG malfunctioned part way through the season and did not record data from August 27 through September 9, 2012. The battery in the logger was replaced, tested, and the logger launched successfully on September 10, 2012. Precipitation in the standard rain gauge 077RG for that period measured .47 inches. In addition, electronic rain gauges 075RG and 076RG were tampered with (vandalized) several times throughout the season. Precipitation in the standard rain gauges 075RG and 076RG measured 2.69 inches and .65 inches respectively for that period. On July 2, 2012, standard rain gauge 076RG was found broken off the post. Precipitation in the electronic rain gauge 076RG measured .17 inches on July 2, 2012. Where appropriate total precipitation for the rain gauges was adjusted (Table 1).

In 2012, seasonal totals varied between the three sites with the mid-elevation receiving the most precipitation (Figure 1). Daily and periodic precipitation is presented in Appendix C and the basic rain gauge data (date-time stamp) is presented on the data DVD accompanying the report.

Table 1. Location, measured and adjusted precipitation accumulation, and dates of operation for electronic and standard rain gauges on Pikes Peak, 2012.

| Gauge ID | Latitude (hddd˚mm.mmm) | Longitude (hddd˚mm.mmm) | Altitude (ft) | Total Precipitation Electronic (in) | | Total Precipitation Standard (in) | | Dates of Operation 2012 |
|---|---|---|---|---|---|---|---|---|
| | | | | Measured | Adjusted | Measured | Adjusted | |
| 075RG | N38 53.797 | W105 03.890 | 10,109 | 7.41† | 10.10 | 10.94 | 10.94 | 5/1 –10/2 |
| 076RG | N38 52.582 | W105 03.970 | 11,810 | 10.33† | 10.98 | 11.95∞ | 12.12 | 5/1 –10/2 |
| 077RG | N38 51.783 | W105 03.999 | 13,069 | 8.30∞ | 8.77 | 8.68 | 8.68 | 5/1 –10/2 |

*† Indicates inaccurate measurement due to disturbance of the rain gauge.*
*∞ Indicates missing data due to equipment malfunction and/or damage to the rain gauge.*

In addition to the three sites established as part of this study, a Natural Resources Conservation Service (NRCS) Snotel site located at Glen Cove, between rain gauges 075RG and 076RG at an elevation of 11,469 feet, has precipitation data available for the entire year. Data for the NRCS Snotel site can be accessed from:

http://www.wcc.nrcs.usda.gov/snotel/snotel.pl?sitenum=1057&state=co

## Highway Surface Stabilization

Historically, thousands of cubic yards of gravel material had been added to the Pikes Peak Highway road surface annually as part of the continuing maintenance program. Most of this material has since migrated elsewhere; either washed down the ditch line during snowmelt or following rainfall events or cast over the side onto the fill slope and the hillside below during road grading procedures. This material has been perceived to be the primary source for the sediment deposited in the streams (Chavez et al. 1993). The primary emphasis in the road mitigation practices was to reduce the volume of material available to be eroded (supply) and to manage the discharge water (energy) to reduce sediment transport. Initially a variety of alternate surfacing options were proposed.

As noted earlier, and as documented in amendments to the monitoring plan, the design of the monitoring protocol, appropriate for estimating road erosion, was significantly modified to reflect changes to the road bed stabilization practices implemented on the highway. The entire highway has been paved with asphalt, rather than surfaced using a variety of treatments, which

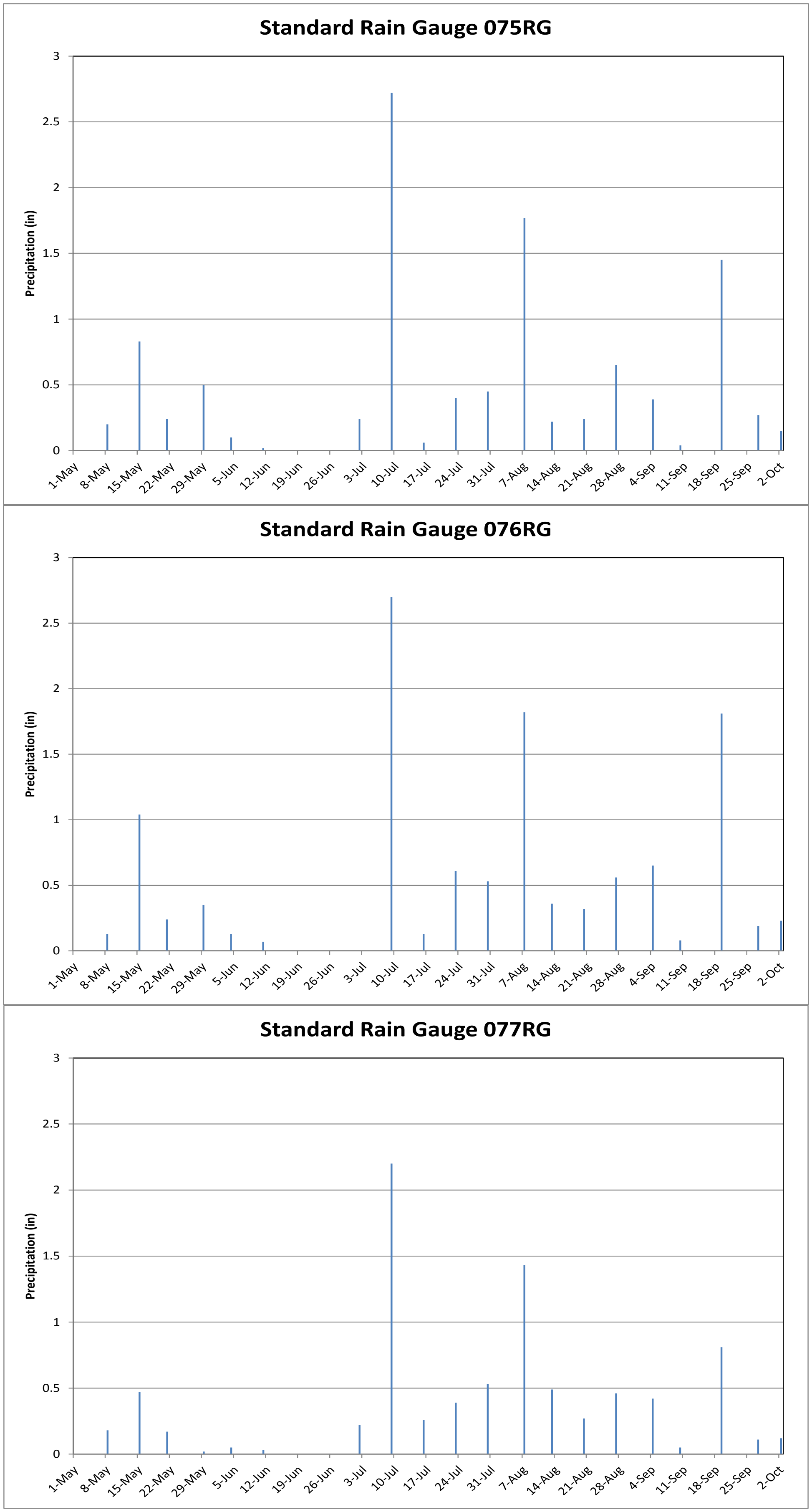


Figure 1. Precipitation by measurement date for the three standard rain gauges on Pikes Peak, 2012.

should significantly reduce or eliminate the potential for continued surface erosion to occur from the road surface. Prior to 2011, erosion rates from the gravel portion of the highway were monitored as called for in the approved monitoring plan, but since paving of the entire highway was completed in 2011, it is assumed that erosion from the paved road surface is zero.

As a surrogate for estimating actual erosion rates, road surface elevation for selected road reaches prior to paving was monitored over time to document erosion rates, or changes in the volume of material stored on untreated road segments. Uniform road reaches were selected with survey cross sections permanently established at five intervals along each selected road reach (i.e., approximately one cross section per 20 meters of road). The road cross sections were periodically surveyed to provide the basis for estimating the degree of erosion or deposition occurring in the road reach they represent. Individual road cross sections were monumented using a 2.5-foot piece of rebar driven into the road surface at the upper edge of the fill slope. In addition, permanently monumented baseline elevation points (benchmarks) were established for each road reach and were used as references for each cross section. Monitoring consisted of surveying the surface elevation of the road cross sections, relative to the benchmark for the road reach.

Either the average elevation of the cross section, or the survey transect, can be compared for different surveys to determine changes in the volume of material stored, or changes in surface configuration that may have occurred between measures. Averaging the response for the five cross sections and multiplying that by the area of the road reach (estimated as average length times average width) yields an estimate of the change in the volume of material stored on the road reach during the interval between measurements.

Road surface data were not gathered during the 2012 monitoring season. The highway crew completed the last three miles of paving on the Pikes Peak Highway in 2011 eliminating the need for further monitoring of the road reaches.

## Stabilizing Cut and Fill Slopes

Erosion from cut and fill slopes along the highway may provide a continuous source of sediment to wetland, riparian, and aquatic systems. It is expected that highway mitigation practices will reduce sediment movement from these slopes in two ways. First, stabilizing the road bed through paving should also stabilize the angle of repose of adjacent cut and fill slopes, eliminating the constant adjustments that occur in the angle of repose of those slopes following changes to the plane of the road bed. Second, paving has eliminated the need for the continual addition of road base material, the primary source of material that had eroded onto fill slopes and hillsides. Effectiveness will be estimated by comparing changes in the amount and timing of sediment trapped in silt fences at the base of the cut and fill slopes following paving.

A 30-foot silt fence placed at the base of the slope of interest is used to trap sediment. Periodic measurements of the volume of material trapped behind the fence (i.e., after spring snowmelt and again after each large rainfall event) provide an index of the amount of material being eroded from the slope above the fence. Each silt fence is routinely visited to ensure timely measurement and maintenance. Should the silt fence fill to the point of reduced efficiency or fail during the period between measurements, the fence is either repaired, replaced, cleaned out, or relocated to a new monitoring site. Initially (2003 and 2004), the volume trapped was determined from surveys of the surface behind the fence before and after the sediment was removed. Since then, the volume of trapped sediment behind the silt fence has been estimated by removing the accumulated material and measuring the amount removed by placing it in graduated containers for a measure of total volume. A sub-sample of the material removed is collected for laboratory analysis to determine total weight per unit volume and particle size distribution.

On cut slopes, erosion is monitored using two silt fences per site: one is placed across the base of the cut slope just above the ditch line to capture the sediment coming off the cut slope (lower fence); a second is placed on the upper edge of the cut slope to intercept and trap the sediment delivered to the cut slope from the undisturbed hill slope above (upper fence). This partitioning allows separation of the contribution of the cut slope to the road or ditch line from that of the undisturbed hill slope above. The latter measurement also provides an index of natural erosion rates. The contributing area of the lower fence is represented by a rectangle above the fence that spans the width of the fence and extends to just below the upper fence at the toe of the undisturbed slope. The contributing area of the upper fence is more difficult to define and depends on the topographic features of the hill slope above. Contributing area for both lower and upper fences has been determined and measured for all cut slope monitoring sites. Currently, 22 cut slope silt fences have been installed at 13 sites. Initially, they were proportionally divided between the treated (paved) and untreated portions of the highway. The sampling design included cut slopes located in road segments that were treated at differing times, ensuring a wide range in the variability of conditions sampled both before and after highway mitigation. Paving of the entire highway was completed in 2011 resulting in all portions of the highway being treated.

Cut slope silt fences were not exposed to high runoff and erosion activity in 2012. As a result, the field crew completed site visits every two weeks on 22 silt fences (13 sites). The upper fence at cut slope site 059CS in Basin 7 was removed in 2012 due to limited access, and small diameter trees and boulders preventing fence material from being reliably fastened. Notes were taken in the field to document the condition of the silt fence during each site visit. In the *SiteSummary.xls file* on the data DVD, site visit and survey dates are annotated with the condition of the silt fence, any repairs or replacements that were done to maintain the silt fence, and an indication if the fence was breached prior to the survey date. The sediment volume for each cut slope silt fence was recorded in the *SiteSummary.xls file* if there was sediment removed from the cut slope silt fence. It can be assumed that there was zero sediment removed on all other silt fence site visits. A summary of cut slope site visits, and sediment removed from cut slope silt fences for the 2012 monitoring season are presented in Appendix D. All cut slope data and photographs for the 2012 season are available on the accompanying data DVD.

A similar design has been implemented for monitoring the effectiveness of mitigation practices intended to minimize erosion from fill slopes. The design includes the use of two silt fences per site: one is placed at the base of the fill slope to trap what originates from the fill slope (upper fence); a second is placed at the base of the hill slope on which the fill slope resides or at the boundary of the 150-foot corridor associated with the road right-of-way, whichever is the shorter distance (lower fence). The second lower fence is offset from the first fence and presumably not influenced by the upper fence. This design allows for trapping the eroded material in the upper fence as it leaves the fill slope as well as estimating the sediment being delivered off-site or down slope as indexed by the lower fence. Material trapped in the lower fence includes natural erosion from the slope below the fill slope as well as material contributed from the fill slope and transported downslope to the boundary of the corridor. In this way, not only will the on-site effectiveness of the mitigation practice as it effects fill slope erosion be evaluated, but an estimate of the amount of eroded material from the fill slope that is attenuated downslope will also be obtained. The contributing area of the upper fill slope fence spans the width of the fence and extends upslope to the edge of the road bed. The contributing area of the lower fence is defined by the width of the lower fence and the distance to the upper fence. However, like the fences above cut slopes, the actual contributing area of the lower fence is influenced by the topographic features of the hill slope. Contributing area for both the lower and upper fences has been determined and measured for all fill slope monitoring sites. Currently, 49 fill slope silt fences have been installed at 28 sites. Again, the sites were initially distributed between treated and untreated sections of the highway. Paving of the entire highway was completed in 2011 resulting in all sections of the highway being treated. Estimating the volume of material trapped behind the fill slope silt fences is accomplished in the same manner as that for the cut slope fences.

As with the cut slope silt fences, accumulation in the fill slope silt fences did not exhibit high runoff and erosion activity in 2012, allowing time for the field crew to complete site visits every two weeks on 49 silt fences (28 sites). The upper fences at five fill slope sites (048FS, 052FS, 055FS, 083FS, and 086FS) in Basin 7 were damaged during highway construction in 2011. As a result, the upper fences were removed from the sampling in 2012 and not replaced, and the lower fences continued to be monitored. In addition, two of the 49 fill slope silt fences were breached during the 2012 field season. Notes were taken in the field to document the condition of the silt fence during each site visit. In the *SiteSummary.xls file* on the data DVD, site visit and survey dates are annotated with the condition of the silt fence, any repairs or replacements that were done to maintain the silt fence, and an indication if the fence was breached prior to the survey date. The sediment volume for the fill slope silt fences was recorded in the *SiteSummary.xls file* only if there was sediment removed from the fill slope silt fence. It can be assumed that there was zero sediment removed on all other silt fence site visits. A summary of fill slope site visits and sediment removed from fill slope silt fences for the 2012 monitoring season can be found in Appendix E. All fill slope data and photographs for 2012 are available on the accompanying data DVD.

Numerous grab samples were collected from material trapped in the cut slope and fill slope silt fences throughout the 2012 field season. A subset of these was selected to be analyzed in the laboratory for particle size distribution. The balance of samples will be analyzed only if the variability in the particle size distribution of the subset of samples chosen for initial analysis warrants additional analysis. Because laboratory analyses for the cut and fill slope silt fence grab samples were not completed at the time of this report, they will be included in the 2013 Annual Report. Laboratory analyses for the 2011 grab samples have been completed and a summary of particle size distributions and graphs are presented in Appendix F and on the accompanying data DVD.

Initially, the monitoring plan anticipated taking measurements of the accumulation behind all silt fences two to three times per year. The actual number of measurements taken is dependent on many factors including; winter snowpack, soil moisture, number and size of rainfall events, and availability of crew members to clean out silt fences while completing other tasks. Estimates of human induced erosion and sediment delivery (from cut slope, fill slope, and silt fences located down slope near the streamside or boundary of the 150-foot corridor), can be compared with estimates of "natural movement" estimated from what is trapped in the silt fencing placed above cut slopes for periods before and after mitigation to determine the effectiveness of the practice and other best management practices (BMPs) intended to reduce human induced erosion.

Using silt fences to monitor sediment transport has proven to be difficult where silt fences cross rock surfaces—frequent breaching and fence failure have occurred over the course of the study. Silt fences fail most frequently where fence material cannot be reliably fastened to rock surfaces, particularly at the base of cut slopes at higher elevations. As a corrective measure, the sampling protocol was revised for three cut slope monitoring sites (102CS, 123CS, and 141CS) that cross rock surfaces. The lower cut slope silt fences on each of these sites were replaced with two permanent survey cross sections (labeled A and B), one established at the vegetation line just below the upper fence and a second established 1/3 of the distance between the top of the cut slope and the road. The cross sections are the same length as the original fence and are monumented with rebar at each end. Monitoring consists of surveying the surface elevation, relative to the benchmark, of the cut slope cross section. The silt fence at the top of the cut slope has been maintained at all three sites. This procedural change is intended to provide a qualitative estimate of cut slope erosion in situations where a quantitative estimate is not feasible.

Cross section graphs for the three surveyed cut slope monitoring sites that correspond to the survey dates presented in Table 2 can be found in Appendix G. Photographs and survey data for all sites are available on the accompanying data DVD.

Table 2. Management practices implemented below cut slope monitoring sites, and cut slope monitoring site survey dates on Pikes Peak, 2012.

| Site ID | Basin # | Watershed | Management Practice | Survey Dates | |
|---|---|---|---|---|---|
| 102CS | 6 | WBVR | Asphalt Road, Shotcrete Ditch | 6/06/2012 | 9/10/2012 |
| 123CS | 6 | WBVR | Asphalt Road, Shotcrete Ditch | 6/06/2012 | 9/10/2012 |
| 141CS | 6 | WBVR | Asphalt Road, Shotcrete Ditch | 6/06/2012 | 9/10/2012 |

## Armoring Drainage Channels

Drainage channels, which include both the drainage ditches along roads and the conveyance channels below culverts, were to be lined (armored) with riprap or concrete to control further erosion and deposition of sediment as mitigation progressed. However, instead of armoring roadside drainage ditches, all reaches except those meeting the criteria stated in the latest U.S. Forest Service Design Review (Burke 2002) are or will be lined with shotcrete, lined with erosion control fabric, or left untreated.

Effectiveness monitoring consists of sampling the fabric-lined and unlined drainage ditches, establishing cross sections in the channels to be periodically surveyed, so that measured changes in cross sectional area could be used to determine if erosion or deposition was reduced or increased in armored channels relative to unarmored channels. Once drainage ditches were paved or lined with shotcrete, they were no longer surveyed. If visual inspection provides evidence of failure in the pavement or shotcrete, cross sections will be re-established and surveys completed to document change.

Conveyance channels are those features that drain water away from the road system to the streams below. For the most part, they are not physically treated or stabilized as part of the road mitigation effort, but road management practices may greatly alter the amount of discharge and sediment delivered to the conveyance channels. The monitoring technique is similar for both ditches and conveyance channels, but the sample size differs.

**Drainage Ditches**

Most of the drainage ditches selected for monitoring were aligned with the road reaches previously selected for monitoring. Additional drainage ditches were selected independently of the road reaches, as needed, to complete the desired road slope/contributing area/armoring material matrix. As with the road surface erosion transects, five cross sectional transects per segment of drainage channel (lined, not lined) were established (labeled A–E except for site 188DD, which has eight cross sections labeled A–H). For each cross section, a reference pin was located at the base of the cut slope on the inside of the ditch; a second pin was located on the edge of the road surface, if possible. Asphalt nails were used in the paved road surfaces to mark the end point if road conditions prohibited installation of rebar. The effectiveness of the lining methods in reducing erosion and deposition can be determined by obtaining cross section information at control sites for several years prior to treatment. This information will be useful in the future as new drainage ditch segments are lined.

Six of the original 20 drainage ditches selected for monitoring were surveyed in 2012. Fourteen of the original sites have been paved or lined with shotcrete since monitoring began including nine drainage ditches in Basin 7 that were treated in 2011. This eliminates the need for further monitoring unless visual inspection provides evidence of failure, in which case cross sections will be re-established and surveys completed to document change. The six drainage ditches located in Basins 1 and 2 are lined with erosion control fabric and will continue to be surveyed annually. Drainage ditch survey cross sections that correspond to the survey dates presented in Table 3 can be found in Appendix H. Drainage ditch survey data and photographs for 2012 are available on the accompanying data DVD.

Table 3. Drainage ditches surveyed including description of road treatments above drainage ditches, treatments for drainage ditches, and drainage ditch survey dates on Pikes Peak, 2012.

| Site ID | Basin # | Watershed | Road Treatment | Ditch Treatment | Survey Date |
|---|---|---|---|---|---|
| 005DD | 1 | Lower SKIC | Asphalt | Erosion Control Fabric | 8/1/2012 |
| 010DD | 1 | Lower SKIC | Asphalt | Erosion Control Fabric | 8/22/2012 |
| 182DD | 2 | SKIC | Asphalt | Erosion Control Fabric | 5/24/2012 |
| 188DD | 2 | NCRY | Asphalt | Erosion Control Fabric with Straw Logs | 7/11/2012 |
| 195DD | 2 | SKIC | Asphalt | Erosion Control Fabric | 8/22/2012 |
| 205DD | 2 | SKIC | Asphalt | Erosion Control Fabric | 7/11/2012 |

## Conveyance Channels

Monitoring the effectiveness of mitigation practices on conveyance channels also represents a critical component in the monitoring program. Many of these channels have eroded into gullies and have contributed to the sediment load in the adjacent wetland, riparian, and aquatic systems. From mile marker seven to the summit, 115 conveyance channels were identified and surveyed during the first three years of monitoring. Two additional channels were identified and surveyed in 2009 and four additional channels were identified and surveyed in 2011. Two conveyance channels were eliminated during construction of sediment ponds in Basin 5 (Boehmer and East Fork of Beaver Creek Watersheds) and Basin 6 (East and West Fork of Beaver Creek Watersheds). Conveyance channel 014CC was originally identified as a monitoring site, but was never surveyed. Conveyance channel 015CC located above sediment pond 199RW was lined with shotcrete in 2003 and conveyance channel 212CC was lined with rip rap in 2011, eliminating the need for further monitoring unless visual inspection provides evidence of failure, in which case cross sections will be re-established and surveys completed to document change. In 2012, two additional sites (263CC and 265CC) were established in the channels below the new sediments ponds (262RW and 264RW).

It is not always possible to survey all 118 conveyance channels every year. Instead, as many conveyance channels as possible are surveyed each year. The fixed sub-sample of 13 conveyance channels that were measured specifically to compare paved (7) and un-paved (6) road sections have all been paved and will continue to be surveyed annually, with the assumption that erosion, or changes in storage, from the paved segments will be zero. Conveyance channels located below the rock weirs are surveyed annually. If the rock weirs fail (as has been observed), changes in conveyance channel geometry may occur. Effectiveness of the rock weir can be evaluated in part by comparing the erosion rate in the conveyance channels located or initiated below the rock weirs with erosion rates observed in other conveyance channels located in proximity to treated and untreated road segments. Every conveyance channel is surveyed using a series of three cross sections located within the 150-foot boundary of the highway corridor (labeled A–C except for site 53CC, which has four cross sections labeled A–D and site 232CC, which has five cross sections labeled A–E).

Conditions allowed all 118 conveyance channels to be monitored in 2012, including two new conveyance channel monitoring sites (263CC and 265CC) (Table 4). Conveyance channel 212CC, which was lined with rip rap in 2011, was also surveyed as there was evidence that treatment was failing. Four conveyance channels (024CC, 114CC, 115CC, and 118CC) which were previously monitored through observation and photographs only were surveyed. Conveyance channels 099CC, 108CC, 111CC, 113CC, and 119CC were not surveyed due to the exposure of large boulders and the general instability of the slope following past rock weir failure. The field crew monitored these sites by recording observations in the field notes and using photo monitoring to document changes in conveyance channel geometry. Conveyance channels 099CC, 111CC, 118CC, and 119CC below rock weirs in the switchbacks (Basins 3 and 4) were disturbed by the highway crew during removal of existing rock weirs and construction of cutoff walls with riprap aprons below. If conditions allow, these four conveyance channels will be surveyed in 2013 to establish a baseline survey post construction.

Table 4. Road and drainage ditch treatments associated with conveyance channels, treatments applied to conveyance channels, and conveyance channel survey dates on Pikes Peak, 2012.

| Site ID | Basin # | Watershed | Road Treatment | Ditch Treatment | Channel Treatment | Survey Date |
|---|---|---|---|---|---|---|
| 004CC | 1 | NCRY | Asphalt | Fabric Ditch | Rock Apron | 7/09/2012 |
| 012CC | 2 | SCAT | Asphalt | Fabric Ditch | Rock Weir | 5/14/2012 |
| 013CC | 2 | SCAT | Asphalt | Fabric Ditch | Rock Weir | 7/17/2012 |
| 016CC | 2 | NCRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 6/21/2012 |
| 017CC | 2 | NCRY | Asphalt | Fabric Ditch | Culvert Plugged | 7/30/2012 |
| 018CC | 2 | NCRY | Asphalt | Shotcrete Ditch | Untreated | 6/5/2012 |
| 019CC | 2 | SCAT | Asphalt | Fabric Ditch | Culvert Plugged | 7/31/2012 |
| 020CC | 2 | NCRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 7/31/2012 |
| 021CC | 2 | NCRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 7/9/2012 |
| 022CC | 2 | NCRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 6/6/2012 |
| 023CC | 2 | NCRY | Asphalt | | Culvert Plugged | 7/30/2012 |
| 024CC | 2 | SCAT | Asphalt | Shotcrete Ditch | Culvert Plugged | 7/31/2012 |
| 025CC | 2 | SCAT | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/27/2012 |
| 026CC | 2 | NCRY | Asphalt | Fabric Ditch | Culvert Plugged | 8/27/2012 |
| 027CC | 2 | SCAT | Asphalt | | Culvert Plugged | 8/28/2012 |
| 028CC | 2 | NCRY | Asphalt | | Culvert Plugged | 8/1/2012 |
| 029CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 7/26/2012 |
| 030CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 7/18/2012 |
| 031CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 5/30/2012 |
| 032CC | 2 | SKIC | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/15/2012 |
| 033CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Apron | 8/14/2012 |
| 034CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 6/5/2012 |
| 035CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Rip Rap | 5/15/2012 |
| 036CC | 7 | NCRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 7/9/2012 |
| 037CC | 7 | NCRY | Asphalt | Shotcrete Ditch | Culvert | 7/31/2012 |
| 038CC | 7 | NCRY | Asphalt | Shotcrete Ditch | Culvert | 7/5/2012 |
| 040CC | 1 | NCRY | Asphalt, Asphalt Curb | Fabric Ditch | Straw Logs | 7/2/2012 |
| 053CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Rip Rap | 7/4/2012 |
| 054CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/13/2012 |
| 058CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Culvert | 6/6/2012 |
| 063CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 5/29/2012 |
| 064CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/13/2012 |
| 065CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/13/2012 |
| 066CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/23/2012 |
| 067CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/23/2012 |
| 068CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/1/2012 |
| 069CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/23/2012 |
| 070CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 7/18/2012 |
| 081CC | 7 | GLEN | Asphalt | Shotcrete Ditch | Culvert Plugged | 5/22/2012 |
| 084CC | 7 | GLEN | Asphalt | Shotcrete Ditch | Culvert Plugged | 5/22/2012 |
| 089CC | 3 | SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 6/12/2012 |
| 091CC | 3 | SKIC | Asphalt | | Culvert Plugged | 7/4/2012 |
| 094CC | 3 | SKIC | Asphalt | | Culvert Plugged | 6/18/2012 |
| 095CC | 3 | SKIC | Asphalt | | Culvert Plugged | 7/11/2012 |
| 096CC | 3 | SKIC | Asphalt | | Culvert Plugged | 7/11/2012 |
| 097CC | 3 | SKIC | Asphalt | Shotcrete Ditch | Culvert Plugged | 6/18/2012 |
| 099CC | 3 | SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 7/5/2012 |
| 100CC | 3 | SVRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/1/2012 |

| Site ID | Basin # | Watershed | Road Treatment | Ditch Treatment | Channel Treatment | Survey Date |
|---|---|---|---|---|---|---|
| 104CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 8/15/2012 |
| 106CC | 3 | SVRY | Asphalt | Shotcrete Ditch | Rock Weir | 8/21/2012 |
| 108CC | 3 | FRENCH | Asphalt | Shotcrete Ditch | Rock Weir | 7/5/2012 |
| 109CC | 3 | SVRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/14/2012 |
| 110CC | 3 | SVRY | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/21/2012 |
| 111CC | 3 | SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 7/5/2012 |
| 112CC | 3 | FRENCH | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/15/2012 |
| 113CC | 3 | SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 8/15/2012 |
| 114CC | 4 | FRENCH | Asphalt | Shotcrete Ditch | Rock Weir | 7/17/2012 |
| 115CC | 4 | FRENCH | Asphalt | Shotcrete Ditch | Untreated | 8/14/2012 |
| 116CC | 4 | SKIC | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/1/2012 |
| 117CC | 4 | SKIC | Asphalt | Shotcrete Ditch | Culvert Plugged | 8/1/2012 |
| 118CC | 4 | SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 7/3/2012 |
| 119CC | 4 | GLEN | Asphalt | Shotcrete Ditch | Rock Weir | 7/17/2012 |
| 120CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Sediment Pond | 6/19/2012 |
| 121CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 8/8/2012 |
| 122CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 8/8/2012 |
| 125CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 6/19/2012 |
| 126CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 8/21/2012 |
| 127CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 7/18/2012<br>8/14/2012 |
| 129CC | 6 | EBVR | Asphalt | Shotcrete Ditch | Untreated | 7/18/2012 |
| 130CC | 6 | EBVR | Asphalt | Shotcrete Ditch | Culvert Plugged | 6/19/2012 |
| 132CC | 6 | EBVR | Asphalt | Shotcrete Ditch | Untreated | 6/19/2012 |
| 133CC | 6 | EBVR | Asphalt | Shotcrete Ditch | Untreated | 8/15/2012 |
| 135CC | 5 | BHMR | Asphalt | Shotcrete Ditch | Untreated | 8/8/2012 |
| 136CC | 5 | BHMR | Asphalt | Shotcrete Ditch | Untreated | 8/21/2012 |
| 137CC | 5 | BHMR | Asphalt | Shotcrete Ditch | Untreated | 8/14/2012 |
| 138CC | 5 | BHMR | Asphalt | Shotcrete Ditch | Untreated | 7/18/2012 |
| 139CC | 6 | EBVR | Asphalt | Shotcrete Ditch | Rock Apron, Dissipaters | 7/2/2012 |
| 140CC | 6 | EBVR | Asphalt | Shotcrete Ditch | Untreated | 6/18/2012 |
| 175CC | 1 | NCRY | Asphalt, Asphalt Curb | | Rock Apron | 5/31/2012 |
| 184CC | 2 | SKIC | Asphalt, Shotcrete Ditch | Shotcrete Ditch | Sediment Pond | 6/20//2012 |
| 189CC | 2 | NCRY | Asphalt | | Rock Apron, Dissipaters | 8/13/2012 |
| 190CC | 2 | NCRY | Asphalt | | Rock Apron, Dissipaters | 8/13/2012 |
| 191CC | 2 | NCRY | Asphalt | | Rock Apron, Dissipaters | 8/22/2012 |
| 206CC | 2 | NCRY | Asphalt, Asphalt Curb | Fabric Ditch | Untreated | 8/27/2012 |
| 207CC | 6 | WBVR | Asphalt | Shotcrete Ditch | Untreated | 6/19/2012 |
| 208CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/13/2012 |
| 209CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Untreated | 8/15/2012 |
| 210CC | 2 | SKIC | Asphalt | Fabric Ditch | Untreated | 7/30/2012 |
| 211CC | 2 | SKIC | Asphalt | Fabric Ditch | Untreated | 5/30/2012 |
| 212CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Rip Rap | 8/28/2012 |
| 213CC | 6 | FRENCH | Asphalt | Shotcrete Ditch | Untreated | 6/6/2012 |
| 214CC | 5 | BHMR | Asphalt | Shotcrete Ditch | Untreated | 7/26/2012 |

| Site ID | Basin # | Watershed | Road Treatment | Ditch Treatment | Channel Treatment | Survey Date |
|---|---|---|---|---|---|---|
| 215CC | 5 | BHMR | Asphalt | Shotcrete Ditch | Untreated | 8/14/2012 |
| 216CC | 1 | Lower NCRY | Asphalt, Asphalt Curb | Asphalt Ditch | Rock Weir | 7/11/2012 |
| 217CC | 1 | Lower NCRY | Asphalt, Asphalt Curb | Asphalt Ditch | Rock Weir | 7/10/2012 |
| 218CC | 1 | Lower SKIC | Asphalt | Untreated Ditch | Rock Weir | 6/12/2012 |
| 219CC | 1 | Lower SKIC | Asphalt | Shotcrete Ditch | Rock Weir | 5/23/2012 |
| 220CC | 1 | Lower SKIC | Asphalt | Fabric Ditch | Rock Weir | 5/31/2012 |
| 221CC | 1 | Lower NCRY | Asphalt | Shotcrete Ditch | Rock Weir | 5/31/2012 |
| 222CC | 1 | Lower NCRY | Asphalt | Shotcrete Ditch | Rock Weir | 5/31/2012 |
| 223CC | 1 | Lower SKIC | Asphalt | Fabric Ditch | Rock Weir | 7/10/2012 |
| 224CC | 2 | NCRY | Asphalt | Asphalt Ditch | Rock Weir | 6/12/2012 |
| 225CC | 2 | SKIC | Asphalt | Fabric Ditch | Rock Weir | 8/8/2012 |
| 226CC | 2 | NCRY | Asphalt, Asphalt Curb | Fabric Ditch | Rock Weir | 8/22/2012 |
| 227CC | 2 | NCRY | Asphalt, Asphalt Curb | Asphalt Ditch | Rock Weir | 6/20/2012 |
| 228CC | 2 | SKIC | Asphalt | Fabric Ditch | Rock Weir | 7/17/2012 |
| 229CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 7/26/2012 |
| 230CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 6/5/2012 |
| 231CC | 2 | NCRY | Asphalt | Fabric Ditch | Rock Weir | 6/5/2012 |
| 232CC | 7 | GLEN | Asphalt | Shotcrete Ditch | Untreated | 7/4/2012 |
| 235CC | 3 | SVRY | Asphalt | Shotcrete Ditch | Rock Weir | 5/30/2012 |
| 244CC | 2 | NCRY | Asphalt | Shotcrete Ditch | Untreated | 7/30/2012 |
| 245CC | 2 | NCRY | Asphalt | Asphalt Ditch | Untreated | 6/12/2012 |
| 246CC | 5 | EBVR | Asphalt | Asphalt Ditch | Sediment Pond | 6/18/2012 |
| 247CC | 6 | WBVR | Asphalt | Asphalt Ditch | Sediment Pond | 6/18/2012 |
| 251CC | 7 | NCRY | Asphalt | Shotcrete Ditch | Sediment Pond | 6/21/2012 |
| 253CC | 7 | SKIC | Asphalt, | Shotcrete Ditch | Sediment Pond | 5/30/2012 |
| 263CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Sediment Pond | 6/21/2012 |
| 265CC | 7 | SKIC | Asphalt | Shotcrete Ditch | Sediment Pond | 8/29/2012 |

Cross sections for the conveyance channels listed in Table 4 are presented in Appendix I. At first glance, graphs of the conveyance channel cross sections presented in Appendix I may appear counter intuitive, as the low point in the cross section may be at the right or left end pin. This presentation is not an error. Not all conveyance channels were formed as a result of natural drainage processes. Many were formed as the result of road related discharges and the flow path is across the slope rather than downslope, thus causing rills to form across the slope. Conveyance channel survey data and photographs for 2012 are available on the accompanying data DVD.

## Sediment Traps (Sediment Ponds and Rock Weirs)

The original mitigation plan called for building sediment ponds designed to trap sediment while allowing water to exit as a stream. Initially, the proposed monitoring consisted of periodic pond surveys to index sediment accumulation as well as measurement of the suspended sediment concentrations in discharge entering and exiting the pond. The combination of sediment accumulation in the pond plus the sediment exiting the pond in the outflow was intended to provide an estimate of total sediment transport. In accordance with the revised mitigation design, rock weirs capable of detaining all the water and sediment discharged from the road segment for events up to the design storm are being constructed. The current monitoring strategy assumes that the rock weirs detain all discharge long enough for the sediment to settle out, while the water percolates out of the rock weir through the porous berm. Measuring sediment accumulation in the rock weir will index total sediment movement. In the event the rock weir does not detain all the storm discharge delivered to it (actual discharge exceeds the design discharge or the rock weirs fail to function properly), silt fences have been installed on the downhill side of the rock weirs to trap sediment carried in surface discharge passing over or through the berm. A silt fence is preferred over grab samples of discharge because any overflow or through flow that occurs is most likely to be diffused and not concentrated. Also, using a silt fence provides a measure of total transport. The measurement protocol for these silt fences is the same as that employed for the cut and fill slope silt fences.

The field procedure for monitoring sediment accumulation in the rock weirs was modified in 2008 to simplify both instrument requirements for the survey and software requirements for subsequent data reduction and analysis as well as to allow for a more consistent comparison of volumetric change from survey to survey. A fixed area was defined and monumented within each rock weir to be surveyed each time, and compared from survey to survey or year to year. Prior to 2008, the area surveyed within each rock weir had not been predefined. Although the criteria for selecting the area to be surveyed within each rock weir was well defined in the survey protocol, the area actually surveyed as well as the number and distribution of survey points within that area were not necessarily consistent from one survey to the next. Much was left to the discretion of the field crew. As part of each survey (spring, fall, and as needed during the summer), the field crew would identify areas of sediment accumulation within the rock weirs and, although virtually all of the rock weir area was surveyed, sampling points were concentrated in the vicinity of the areas of deposition and more widely spaced over the balance of the rock weir area. The survey capabilities of the Trimble Robotics Total Station, which is used for all surveying on the Pikes Peak Project, records the geospatially correct location of survey points for virtually any survey pattern, so utilizing a variable sampling scheme did not create a problem. In order to compensate for the variable distribution of survey points, an AutoCAD package was used to develop a 0.5-foot Digital Terrain Model (DTM) for the surface of the sediment pond based on the survey points. This provided a very high resolution description of the topographic variability in the survey data collected in the vicinity of active deposition without requiring similar resolution (and sample size) in areas perceived to have had little or no activity. This DTM could then be intersected with the DTM for earlier or subsequent surveys to obtain an estimate of volumetric change between surveys. The procedure called for any non-overlapping areas to be clipped from either survey as needed, and resulted in two overlapping surfaces of equal size. The volumetric difference between the two intersected surfaces represented the estimate of the volumetric change in sediment accumulation that occurred in the rock weir during the interval between surveys. Although valid, it became apparent that this protocol had several drawbacks specific to this study that included: 1) dependence on the Trimble Robotics Total Station, 2) risk of inconsistent survey data, and 3) dependence on an AutoCAD package and associated technical skills that may or may not be available in the future.

First, the choice of survey tools was limited to automated systems such as the Trimble Robotics Total Station, limiting alternative instrument choices while requiring a specific level of technical expertise in the field crew. Second, because the area to be surveyed within each rock weir had not been predefined, the perimeter of the DTM's for individual surveys were not necessarily identical when intersected. Therefore, the clipping process that became necessary introduced the risk of inconsistent or lost information. Fortunately, the field crew leader was the same for each year of monitoring up to 2007 so disparities in survey areas are in fact minimal. Lastly, the protocol required the use of an AutoCAD package to develop and intersect the three dimensional surfaces used to estimate sediment accumulation. This required software and technical skills not readily available within the project, requiring that the data reduction be outsourced to other consultants.

In 2008 the field procedures for surveying the rock weirs were modified. First, each rock weir was visited and the perimeter of the critical portion of the sediment accumulating pond was identified and monumented with rebar. These monumented locations were then referenced to the three benchmark locations (control points) already established for each rock weir. An attempt was made to define the area to be surveyed in rectangular form, but sometimes five or six sides were needed to most efficiently define the perimeter of the area of interest. In every case, the area selected for a given rock weir encompassed all the areas surveyed prior to 2008. It should be noted that all unstable areas identified to be within the rock weir were also included in the survey area to ensure that migration of material from one location within the rock weir to another were balanced out in the survey and not construed to be additions or losses in accumulation between surveys. Because the permanent survey area defined for each rock weir encompasses the area of every previous survey, no loss of historic data occurred as a result of the change in procedure.

After the survey perimeter was defined, one side was arbitrarily selected as the baseline for the survey. Depending on the size and shape of the rock weir area of interest, a rectangular survey grid system was established that originates from the baseline, and uniformly and consistently covers the rock weir area. Survey lines initiate from the baseline at uniform intervals, and cross the rock weir perpendicular to the baseline, and extend to the opposite boundary line. Survey points along each line are also uniformly spaced. The spacing of both survey lines and survey points on a survey line vary with rock weir size. An example schematic for rock weir 008RW is shown in Figure 2. Lines located perpendicular to the baseline and survey points along the line resulted in a 1 X 1, 1 X 2, 2 X 1, 2 X 2, or comparable survey grid depending on the area and shape of the rock weir. The objective was to locate several hundred survey points, uniformly distributed in each rock weir that would be revisited at each survey. This approach has several advantages over the original survey protocol. First, surveying using a fixed grid system allows obtaining a simple estimate of elevation of the rock weir area relative to the control points for each survey. Following this protocol is not particularly instrument specific, nor is data reduction as software or skill dependent as the initial protocol. Second, because the area to be surveyed is fixed, repeated measures allow for a more uniform comparison of volumetric change from survey to survey and surveys are not biased by field crew changes or interpretations.

Changing the survey protocol may result in some loss of resolution (sampling intensity) in the areas of most active accumulation. However, because the current rock weir area is fixed and the same approximate points are surveyed each time, that loss should be minimal and offset by greater consistency from survey to survey. Changing the field procedure does not preclude the

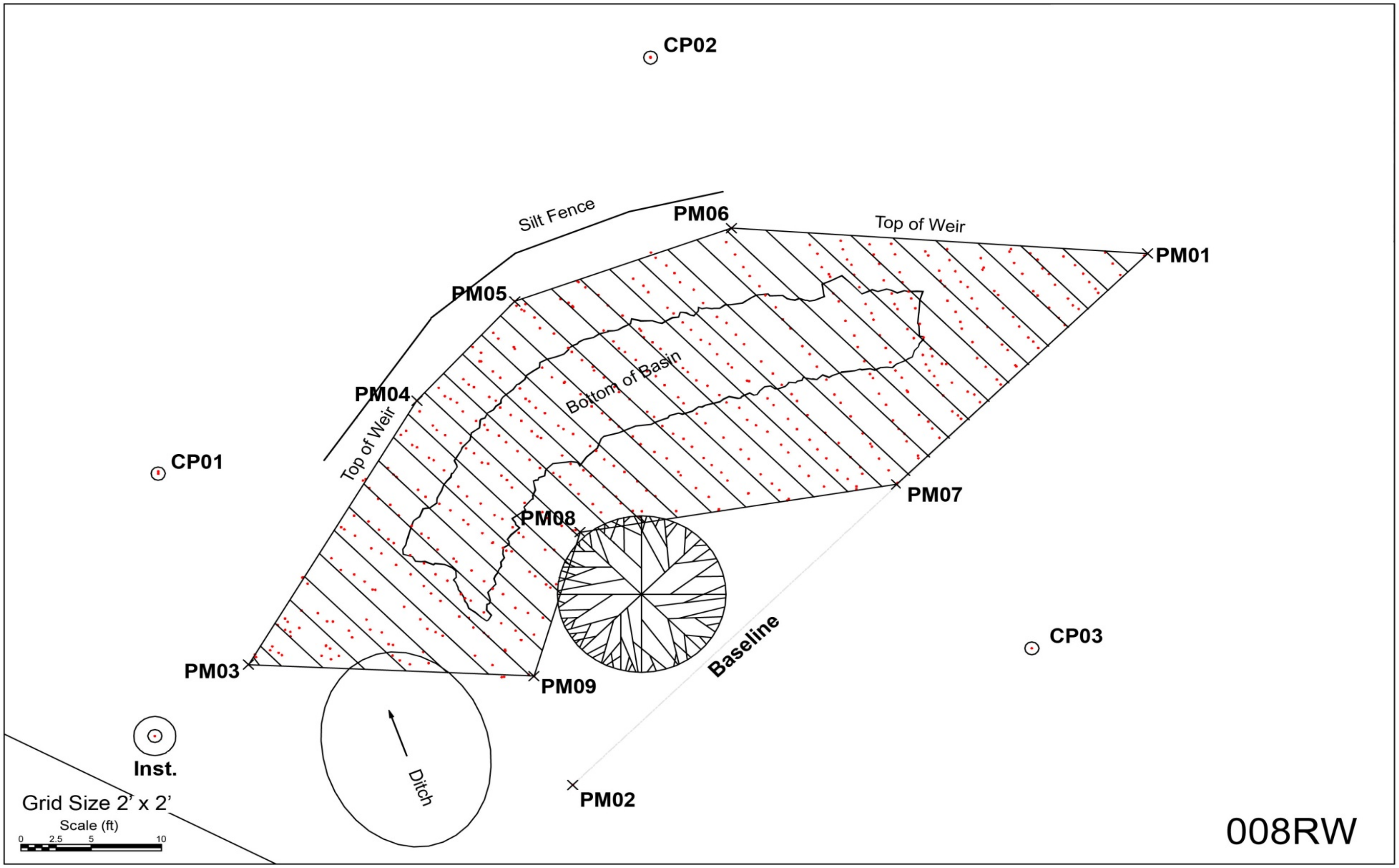


Figure 2. Schematic map of rock weir 008RW defining a fixed area, baseline, perimeter points and survey grid on Pikes Peak, 2008.

use of AutoCAD packages for data analysis. However, if an AutoCAD package is not used to process the data, the average elevation of the rock weir surface can be obtained by determining the average elevation of the survey points. The volumetric change between any two surveys can be estimated by multiplying the difference in the average geo-referenced elevations for the two surveys by the area of the rock weir.

Presented in the 2009 and 2010 Annual Reports, as part of the process of changing a protocol, several quality control and quality assurance checks were implemented as a means of better defining errors that might be associated with the survey procedure. The concerns were; 1) whether or not the initial survey grid system selected for each rock weir was adequate to define the average elevation of the surface, 2) whether or not observed discrepancies in the total number of points observed in the successive surveys of the same pond were significant, and 3) whether or not measurement error associated with defining the reference elevation used for the feature of interest caused a significant error.

As noted in earlier reports, there is an additional error in the surveys of the rock weirs (and all other surveys as well) that is associated with defining the reference benchmarks for each feature. The benchmarks are used to orient the Trimble Robotics Total Station as to the elevation and the geospatial location of the feature being surveyed. Field experience in the use of the Total Station indicates that the measurement error in defining the reference elevation for the feature of interest, based on the use of three benchmarks, is 0.01 feet or less.

As with the road surface erosion transects, four sediment ponds (199RW, 237RW, 256RW, and 264RW) are surveyed using a series of cross sections (labeled A–C except for site 256RW, which has four cross sections labeled A–D and site 199RW, which has five cross sections labeled A–E) to estimate volumetric changes in sediment accumulation. Three sediment ponds (258RW, 260RW, and 262RW) are monitored by recording observations in the field notes and using photo monitoring to document changes. In those few cases where there is a defined inflow and outflow to a pond, water samples to estimate trap efficiency can be grab sampled from the inlet and outlet of the ponds as originally planned. Surveys of the sediment traps should be completed after spring snowmelt and again after significant rainfall events, perhaps a total of four times per year. In addition, surveys taken before and after rock weir cleaning can be used to estimate the total volume or amount of material removed and this cumulative estimate can be used to verify appropriateness of the incremental surveys.

As noted above, any conveyance channels that appear to be present below the rock weirs are monitored. If the rock weirs fail, as some did in 2012, any changes in the conveyance channel geometry that may result will be documented. If the rock weirs are effective in reducing the erosive energy of the discharge, the reduction in erosion in the conveyance channels can be documented by comparing response in channels draining treated and untreated road segments.

In 2012, the highway crew completed construction of sediment ponds 262RW and 264RW in Basin 7 and removed five breached rock weirs (236RW, 238RW, 240RW, 242RW, and 243RW) in the switchbacks (Basins 3 and 4) and replaced them with cutoff walls with riprap aprons below. Repair of the breached rock weir 234RW in the switchbacks (corner just above Elk Park in Basin 3) is in the design stage. Although planned construction will begin in 2013, the exact scope has not yet been determined (personal communication with Jack Glavan, City of Colorado Springs, Capital Projects Manager). Thirty-six sediment traps were monitored in 2012, including 29 rock weirs and seven sediment ponds. Twenty-three sites were surveyed at least twice to monitor their effectiveness in trapping sediment from winter and summer runoff. Rock weir 250RW was surveyed and a cross section was established on the cut slope above the rock weir. The rock weirs were surveyed and sediment volume was measured in the silt fences located down slope of the rock weirs (15 rock weirs have associated silt fences). Twenty-two of the 29 rock weir sites and one of the sediment ponds (237RW) demonstrated some degree of failure, where water and sediment were seen piping under or through the rock weir, the rock weir was overtopped, or the rock weir was breached. Some of the rock weirs are full of sediment rendering them ineffective, resulting in an inability of the field crew to effectively evaluate these structures. Rock weirs 234RW, 236RW, 238RW, and 243RW (Basins 3 and 4) were not surveyed because failure in 2010 rendered them ineffective. The field crew monitored these sites by recording observations in the field notes and using photo monitoring to document changes. As noted earlier for silt fences on the cut and fill slopes, the data from the breached rock weirs or sediment fences below rock weirs may under estimate total sediment production. Survey dates for the rock weirs and sediment ponds are presented in Table 5. A summary of rock weir silt fence site visits, and sediment accumulation in rock weir silt fences and the rock weirs for the 2012 monitoring season, as well as rock weir and sediment pond cross sections from 2012 are presented in Appendix J.

The average elevations for the rock weir surfaces were obtained by determining the average elevation of the survey points. The volumetric change between the two surveys was then estimated by multiplying the difference in the average geo-referenced elevations for the two surveys by the area of the rock weir (Appendix J). As noted earlier, the negative values imply a decrease in estimate of sediment accumulation between two surveys. Sediment trap data and photographs for 2012 are available on the accompanying data DVD.

Grab samples of the sediment retained in both the rock weirs and silt fences below the weirs were collected each time the weirs were surveyed or the fences cleaned. As noted earlier, a subset of these grab samples was selected for analysis of particle size distribution. The balance of samples will be analyzed only if the variability in the particle size distribution of the subset of samples chosen for initial analysis warrants additional analysis. In addition, water samples to determine suspended sediment were collected from the inflow and outflow of the major sediment ponds 199RW and 237RW. Because laboratory analyses for the rock weir silt fence grab samples were not completed at the time of this report, they will be included in the 2013 Annual Report. Laboratory analyses for the 2011 grab samples have been completed and a summary of particle size distributions and graphs are presented in Appendix K and on the accompanying data DVD. Laboratory analyses on the suspended sediment samples for the 2012 field season are presented in Appendix L and on the accompanying data DVD.

Table 5. Management practices implemented above sediment traps, and sediment trap survey dates on Pikes Peak, 2012.

| Site ID | Basin # | Watershed | Management Practice | Survey Dates | |
|---|---|---|---|---|---|
| 002RW | 1 | Lower SKIC | Untreated Ditch | 6/12/2012 | 8/29/2012 |
| 003RW | 1 | Lower SKIC | Shotcrete Ditch | 6/12/2012 | 8/29/2012 |
| 006RW | 1 | Lower SKIC | Fabric Ditch | 5/15/2012 | |
| 008RW | 1 | Lower NCRY | Shotcrete Ditch | 5/30/2012 | |
| 009RA | 1 | Lower SKIC | Fabric Ditch | 5/18/2012 | 9/24/2012 |
| 152RW | 2 | SKIC | Fabric Ditch | 5/24/2012 | 10/2/2012 |
| 153RW | 2 | SKIC | Fabric Ditch | 5/14/2012 | 9/13/2012 |
| 161RW | 2 | NCRY | Asphalt Curb and Ditch | 5/14/2012 | 9/13/2012 |
| 162RW | 2 | NCRY | Asphalt Ditch | 5/14/2012 | 9/24/2012 |
| 176RW | 2 | NCRY | Fabric Ditch | 6/11/2012 | 10/2/2012 |
| 178RW | 2 | NCRY | Fabric Ditch | 6/11/2012 | 10/2/2012 |
| 179RW | 2 | NCRY | Fabric Ditch | 6/12/2012 | 9/19/2012 |
| 180RW | 2 | NCRY | Fabric Ditch | 6/5/2012 | 9/19/2012 |
| 181RW | 2 | NCRY | Fabric Ditch | 6/5/2012 | 10/2/2012 |
| 199RW | 2 | SKIC | Shotcrete Ditch | 6/20/2012 | 9/13/2012 |
| 200RW | 1 | Lower NCRY | Asphalt Curb and Ditch | 6/20/2012 | 8/29/2012 |
| 201RW | 2 | NCRY | Asphalt Curb and Ditch | 6/11/2012 | 8/22/2012 |
| 202RW | 2 | SKIC | Asphalt Ditch | 6/11/2012 | |
| 233RW | 3 | SKIC | Shotcrete Ditch | 6/11/2012 | 8/28/2012 |
| 237RW | 3 | SKIC | Shotcrete Ditch | 5/23/2012 | 8/28/2012 |
| 239RW | 3 | FRENCH | Shotcrete Ditch | 7/5/2012 | 8/27/2012 |
| 240RW *†* | 3 | SKIC | Shotcrete Ditch | 7/5/2012 | 8/27/2012 |
| 241RW | 4 | FRENCH | Shotcrete Ditch | 7/17/2012 | 8/27/2012 |
| 242RW *†* | 4 | SKIC | Shotcrete Ditch | 7/4/2012 | 8/29/2012 |
| 250RW | 7 | NCRY | Shotcrete Ditch | 5/29/2012 | 9/19/2012 |
| 252RW | 7 | SKIC | Shotcrete Ditch | 5/23/2012 | |
| 254RW | 7 | SKIC | Shotcrete Ditch | 5/29/2012 | 8/22/2012 |
| 256RW | 6 | WBVR | Shotcrete Ditch | 7/3/2012 | |
| 264RW | 7 | SKIC | Shotcrete Ditch | 8/29/2012 | |
| *† Rock weirs removed in 2012 and replaced with cutoff wall and riprap apron below.* | | | | | |

## VALIDATION MONITORING

Validating the effect of road restoration practices on aquatic, wetland, and riparian conditions is more difficult than determining the effectiveness of mitigation practices in reducing erosion and sedimentation at specific locations on site or close to the highway. On-site response to the mitigation practices should be direct, dramatic, and occur in real time. Off-site response, such as in the stream channels, is likely to be more diffused, less dramatic, cumulative in nature, and subject to changes in condition elsewhere in the watershed, all of which make validation of response to mitigation difficult. The watersheds of concern have been subject to road related impacts for more than 80 years. Any road-related degradation in the channel systems is the aggregate result of long-term, road-related discharge and sediment pulses. The interruption of those pulses as a result of road mitigation practices may be too subtle to be detectable in the near term, therefore creating a challenge in selecting the most appropriate indicator metric.

The scale chosen for validation monitoring is that of the stream channel reach. Within each stream reach selected, channel morphology, bed and bank particle size distribution, bank erosion, and vegetation diversity is monitored and characterized. A suite of tributaries in the Pikes Peak Watershed were identified as either impacted or non-impacted by the presence of the Pikes Peak Highway (Chavez et al. 1993). North Catamount, South Catamount, Glen Cove, Oil, and Boehmer Creeks represent non-impacted streams. Ski, Severy, East Fork of Beaver, North Fork of Crystal, and West Fork of Beaver Creeks are all considered stream systems impacted by the highway. Study reaches have been selected in each of the 10 streams, and periodic monitoring will be conducted in each stream reach for the entire 15-year study period. Oil Creek has only one monitored stream reach because the upper portion of the stream is on private land and not accessible. Glen Cove Creek has only one stream reach because it is a small tributary of South Catamount Creek, which has three stream reaches. All other streams have two stream reaches. Because response can be expected to be gradual, it is not necessary that all streams be measured every year; however, annual measurement is completed if time permits.

The monitoring assumption is that stream channel adjustments that might occur in the impacted stream reaches following road mitigation practices will not occur on either the reference stream reaches (those not influenced by the highway ) or in the impacted streams draining the portions of highway that have not received mitigation. However, this does not imply that differences that may have existed at the start of the monitoring program between the five reference and the five impacted stream systems were the consequence of road-related impacts. Rather, any long-term trends in convergence or divergence in the comparison of conditions in the impacted and the control stream reaches following road mitigation will be evaluated as potential indicators of stream channel response to highway mitigation practices.

The techniques proposed by Harrelson et al. (1994) were used to establish the stream channel reference sites. Selected stream reaches are at least 100 meters in length and contain several meander lengths or riffle-pool-riffle complexes. In 2005, two additional reaches were established in response to the diversion wall built on Ski Creek to divert all alpine runoff into Glen Cove Creek. Glen Cove Creek is a tributary to South Catamount Creek, and enters upstream from the two reference stream reaches on South Catamount Creek. The diversion on

Ski Creek increased discharge into both Glen Cove and South Catamount Creeks and additional monitoring seemed warranted.

## Stream Channel Cross Sections

Five channel cross sections have been located and permanently referenced in each of the stream reaches, following the selection and installation criteria in Harrelson et al. (1994). The purpose for the cross sections is to document changes in channel cross sectional geometry that may occur over time. Five cross sections in a 100-meter stream reach should be adequate to provide an indication of change in channel cross section geometry, should it occur naturally or as the consequence of mitigation. In addition to the cross sections, longitudinal surveys of the channel thalweg through the stream reach are conducted to document surface water and thalweg slope and location (Harrelson et al. 1994). Over time, changes in geometry such as width to depth ratios in the cross sections, thalweg elevation and location in the floodplain, longitudinal profile, or channel gradient may reflect a response to road mitigation impacts on sediment supply or discharge energy when compared to responses in the control reaches. If possible, cross sections are surveyed each fall so that changes in channel geometry can be documented on an annual basis. Because it can be expected that channel responses to the road mitigation practices will not be as robust as other metrics, it is not critical that each stream be surveyed each year.

Surveys were completed on all streams (Boehmer, East Fork of Beaver, Glen Cove, North Catamount, North Fork of Crystal, Oil, South Catamount, Ski, Severy, and West Fork of Beaver Creek). After 2012, Oil Creek will no longer be surveyed as the water level has increased as a result of an active beaver dam. Monitoring will consist of observation and photograph monitoring only until water levels return to normal. Stream channel cross sections from the 2012 monitoring season can be found in Appendix M. Stream channel cross section and thalweg survey data for 2012 are available on the accompanying data DVD.

## Bank Erosion

Bank erosion is being documented primarily through the channel cross section surveys. If the channel is actively down cutting or migrating laterally, the change is an index to bank erosion. Additional bed and bank features are also displayed in a map of the stream reach (Harrelson et al., 1994) and through the use of permanent photo points. In each stream reach, measuring and comparing the lengths of bank that are stable versus lengths of bank that are actively eroding also provides an index of the proportion of eroding banks. If the stream reach contains areas of significant bank erosion, bank pins will be installed to measure the lateral rate of erosion. Installation of such pins is only warranted if erosion appears to be active and severe in certain locations within the stream reach or if the onset of bank erosion begins to occur during the monitoring period. Over the long-term, the five cross sections located within a 100-meter stream reach should index channel and bank stability by documenting changes in channel geometry and location. Secondary measures such as thalweg surveys and bank erosion monitoring should help document any further change.

In 2012, measurements specific to bank erosion consisted of channel cross section surveys, thalweg surveys, and photographic documentation. Visual indications were that bank erosion was not significant enough to warrant installation of bank pins to measure the lateral rate of erosion.

## Particle Size Distribution

Assuming that road mitigation practices are effective in reducing discharge energy and sediment delivery to the channel system, and that no offsetting responses occur, the percentage of fine particles in the stream channel bed can be expected to decrease over time. A greater percentage of the stream bed is likely to be composed of larger particles as the fine particles are winnowed out and not replaced. This assumes that the resulting flow regime is adequate to carry the sediment supply, as a severe reduction in flow without a reduction in available sediment could cause aggradation. The composition of the sediment trapped behind silt fences, and deposited in rock weirs and in bars on the stream reaches is assessed through the collection of grab samples and analyzed in the laboratory for particle size distribution. Comparing the particle size distribution in material captured in traps near the highway with sediment deposits (bars) in the streams and pebble counts taken in the stream channel should validate response to highway mitigation practices.

### Pebble Counts

Pebble counts in each stream reach are conducted during each survey using the Bevenger and King Pebble Count Procedure (Bevenger and King, 1995). The procedure calls for a zigzag sampling pattern that passes through the stream reach, crossing from bank to bank. Three-hundred particles are sampled in each survey and one survey per field season is completed in each of the stream reaches. To help support this aspect of the validation monitoring, the particle size distribution of the material caught in silt fences and in the rock weir sediment traps is available for comparison to the bed material in the streams.

Stream pebble counts were completed on Boehmer, East Fork of Beaver, Glen Cove, North Catamount, North Fork of Crystal, South Catamount, Ski, Severy and West Fork of Beaver Creeks. A stream pebble count was not completed on Oil Creek as the stream reach is now a beaver pond. A summary of the stream channel particle size distribution from the pebble counts is presented in Table 6. Stream pebble count particle size distribution graphs from the 2012 monitoring season can be found in Appendix N and on the accompanying data DVD.

### Grab Samples

Sediment grab samples were collected from bars on all streams. Comparing the distribution of material captured in traps near the highway to sediment deposits (bars) in the streams might be useful in validating response to highway mitigation practices. Laboratory analyses for the 2012 grab samples have been completed and a summary of stream channel particle size distributions and graphs for 2012 are presented in Appendix O and on the accompanying data DVD.

Table 6. Summary of particle size distribution of pebble counts in stream channels on Pikes Peak, 2012.

| Site Name | Site ID | Date | Particle Size Distribution | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | D15 | D35 | D50 | D84 | D95 | D100 |
| Boehmer Creek Reach 1 | BHMR1 | 9/17/2012 | 0.542 | 2.890 | 6.067 | 23.131 | 79.842 | 265.0 |
| Boehmer Creek Reach 2 | BHMR2 | 9/17/2012 | 0.613 | 7.040 | 12.711 | 61.870 | 128.000 | 275.0 |
| East Fork Beaver Creek Reach 1 | EBVR1 | 9/18/2012 | 2.504 | 6.051 | 9.360 | 32.000 | 138.812 | 500.0 |
| East Fork Beaver Creek Reach 2 | EBVR2 | 9/18/2012 | 1.587 | 4.779 | 8.000 | 18.431 | 26.597 | 46.0 |
| Glen Cove Reach 1 | GLEN1 | 9/24/2012 | 2.362 | 8.832 | 13.609 | 48.000 | 121.477 | 263.0 |
| North Catamount Creek Reach 1 | NCAT1 | 9/10/2012 | 0.139 | 1.400 | 3.232 | 8.205 | 12.625 | 16.0 |
| North Catamount Creek Reach 2 | NCAT2 | 9/27/2012 | 0.857 | 2.828 | 5.533 | 12.863 | 19.424 | 26.0 |
| North Fork Crystal Creek Reach 1 | NCRY1 | 9/6/2012 | 0.174 | 1.137 | 3.077 | 11.132 | 23.399 | 50.0 |
| North Fork Crystal Creek Reach 2 | NCRY2 | 9/6/2012 | 0.682 | 2.497 | 4.598 | 12.792 | 20.172 | 55.0 |
| Oil Creek Reach 1† | OILC1 | 9/25/2012 | | | | | | |
| South Catamount Creek Reach 1∞ | SCAT1 | 9/11/2012 | 0.581 | 4.826 | 9.220 | 27.119 | 47.612 | 74.0 |
| South Catamount Creek Reach 2 | SCAT2 | 9/24/2012 | 2.116 | 5.829 | 9.533 | 28.195 | 96.000 | 334.0 |
| South Catamount Creek Reach 3 | SCAT3 | 9/24/2012 | 2.061 | 4.686 | 7.040 | 16.233 | 29.779 | 313.0 |
| Ski Creek Reach 1 | SKIC1 | 9/11/2012 | 0.740 | 4.319 | 6.838 | 16.507 | 34.237 | 91.0 |
| Ski Creek Reach 2 | SKIC2 | 9/6/2012 | 0.610 | 2.562 | 5.519 | 24.879 | 73.262 | 160.0 |
| Severy Creek Reach 1 | SVRY1 | 9/20/2012 | 0.081 | 0.117 | 1.219 | 7.748 | 16.000 | 90.0 |
| Severy Creek Reach 2 | SVRY2 | 9/20/2012 | 2.378 | 9.666 | 15.452 | 43.506 | 83.864 | 166.0 |
| West Fork Beaver Creek Reach 1 | WBVR1 | 10/1/2012 | 1.203 | 6.355 | 14.224 | 62.185 | 124.968 | 275.0 |
| West Fork Beaver Creek Reach 2 | WBVR2 | 10/1/2012 | 0.923 | 5.684 | 12.129 | 44.432 | 94.164 | 190.0 |

*† Pebble count not completed on Oil Creek Reach 1 as stream reach is now a beaver pond*
*∞ Only 288 pebbles collected for pebble count*

## Vegetation

Vegetation photo points established at the top of the left and right banks (facing downstream) at each cross section have been monumented and are intended to document changes in vegetation type, density, and percent cover over time as riparian and wetland areas recover (Hall 2002). Vegetation is grouped into general categories of moss, grass, sedge, forb, or shrub to document vegetation presence. Percent cover is estimated for the top of bank area 1.5-feet on either side of the center line of the cross section. This monitoring is not intended to determine the degree of departure that current conditions might reflect relative to a reference value. Monitoring will document the evolution or transition that occurs as the disturbed streams respond to the effects of road mitigation and will allow for comparison of any trends to those that occur in the control stream reaches.

The riparian vegetation summary from the 2012 monitoring season is presented in Appendix P. Vegetation data and photographs from 2012 are available on the accompanying data DVD.

# SUMMARY

The 2012 monitoring season was extremely successful.  A total of 204 sites were monitored during the 2012 field season, many of which were visited more than once.  Precipitation measurements from the rain gauges and the NRCS Snotel site, located at Glen Cove indicated that precipitation was below average for 2012 allowing more time for routine monitoring and maintenance.

The field crew was able to visit the 56 silt fence sites every two weeks.  The upper fences at the base of five fill slope sites in Basin 7 (Glen Cove, Ski, and North Fork of Crystal Creek Watersheds) were damaged during highway construction in 2011.  As a result, these fences were removed from the sampling in 2012, but the lower fences continued to be monitored.

Six of the original 20 drainage ditches selected for monitoring were surveyed in 2012.  Fourteen of the original 20 sites have been paved or lined with shotcrete.  This eliminated the need for further monitoring unless visual inspection provides evidence of failure, in which case cross sections will be re-established and surveys completed to document change.  The six drainage ditches in Basins 1 (Ski and Lower North Fork of Crystal Creek Watersheds) and 2 (North Fork of Crystal and Ski Creek Watersheds) are lined with erosion control fabric and will continue to be surveyed annually.

Conditions allowed all 118 conveyance channels to be monitored during the 2012 field season; some had not been surveyed since the start of the monitoring.  Conveyance channel 212CC, which was lined with rip rap in 2011 was surveyed as there was evidence that treatment was failing.  Monitoring the effectiveness of mitigation practices on conveyance channels represents a critical component in the monitoring program.  Some of these channels have eroded into gullies and may have contributed to the sediment load in the adjacent wetland, riparian, and aquatic systems.

Thirty-six sediment traps were monitored in 2012; 29 rock weirs and seven sediment ponds.  Of the 36 sites, 23 demonstrated some degree of failure.  Some of the rock weirs are full of sediment rendering them ineffective, resulting in an inability of the field crew to evaluate these structures.

The entire highway has been paved since the onset of the project in 2003.  In 2012, the highway crew completed construction of sediment ponds 262RW and 264RW in Basin 7 and removed five breached rock weirs (236RW, 238RW, 240RW, 242RW, and 243RW) in the switchbacks (Basin 3: Severy and Ski Creek Watersheds; and Basin 4: Upper Ski and French Creek Watersheds) and replaced them with cutoff walls with riprap aprons below.  Although paving has been completed, construction and stabilization activities will continue in 2013 and possibly longer.

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# Appendix A

# Site Locations for Effectiveness and Validation Monitoring

# 2012

## Site Locations for Effectiveness and Validation Monitoring on Pikes Peak, 2012†

| Site ID | Latitude (hddd°mm.mmm) | Longitude (hddd°mm.mmm) | Altitude (ft) | Feature Description |
|---|---|---|---|---|
| 001FS | N38 55.211 | W105 02.238 | 9410 | Fill Slope |
| 002RW | N38 55.224 | W105 02.264 | 9410 | Rock Weir/Apron |
| 003RW | N38 55.200 | W105 02.258 | 9416 | Rock Weir/Apron |
| 004CC | N38 55.132 | W105 02.278 | 9431 | Conveyance Channel |
| 005DD | N38 55.087 | W105 02.415 | 9447 | Drainage Ditch |
| 006RW | N38 55.109 | W105 02.482 | 9415 | Rock Weir/Apron |
| 007FS | N38 55.094 | W105 02.520 | 9414 | Fill Slope |
| 008RW | N38 55.075 | W105 02.554 | 9417 | Rock Weir/Apron |
| 009RA | N38 55.046 | W105 02.655 | 9443 | Rock Weir/Apron |
| 010DD | N38 54.907 | W105 02.734 | 9457 | Drainage Ditch |
| 011CS | N38 54.909 | W105 02.730 | 9459 | Cut Slope |
| 012CC | N38 54.748 | W105 03.060 | 9528 | Conveyance Channel |
| 013CC | N38 54.730 | W105 03.068 | 9525 | Conveyance Channel |
| 015CC | N38 54.603 | W105 03.174 | 9547 | Conveyance Channel |
| 016CC | N38 54.602 | W105 03.111 | 9525 | Conveyance Channel |
| 017CC | N38 54.510 | W105 03.246 | 9565 | Conveyance Channel |
| 018CC | N38 54.472 | W105 03.298 | 9576 | Conveyance Channel |
| 019CC | N38 54.457 | W105 03.384 | 9599 | Conveyance Channel |
| 020CC | N38 54.345 | W105 03.383 | 9637 | Conveyance Channel |
| 021CC | N38 54.299 | W105 03.461 | 9668 | Conveyance Channel |
| 022CC | N38 54.288 | W105 03.552 | 9692 | Conveyance Channel |
| 023CC | N38 54.272 | W105 03.583 | 9701 | Conveyance Channel |
| 024CC | N38 54.289 | W105 03.638 | 9715 | Conveyance Channel |
| 025CC | N38 54.258 | W105 03.697 | 9744 | Conveyance Channel |
| 026CC | N38 54.232 | W105 03.643 | 9752 | Conveyance Channel |
| 027CC | N38 54.183 | W105 03.652 | 9771 | Conveyance Channel |
| 028CC | N38 54.149 | W105 03.714 | 9818 | Conveyance Channel |
| 029CC | N38 54.145 | W105 03.816 | 9856 | Conveyance Channel |
| 030CC | N38 54.134 | W105 03.828 | 9855 | Conveyance Channel |
| 031CC | N38 54.130 | W105 03.829 | 9861 | Conveyance Channel |
| 032CC | N38 54.159 | W105 03.836 | 9858 | Conveyance Channel |
| 033CC | N38 54.106 | W105 03.854 | 9886 | Conveyance Channel |
| 034CC | N38 54.037 | W105 03.896 | 9940 | Conveyance Channel |
| 035CC | N38 53.909 | W105 04.000 | 10060 | Conveyance Channel |
| 036CC | N38 53.866 | W105 03.875 | 10126 | Conveyance Channel |
| 037CC | N38 53.821 | W105 03.855 | 10217 | Conveyance Channel |
| 038CC | N38 53.759 | W105 03.787 | 10254 | Conveyance Channel |
| 039FS | N38 54.910 | W105 02.812 | 9455 | Fill Slope |
| 040CC | N38 54.914 | W105 02.789 | 9464 | Conveyance Channel |
| 041CP | N38 53.807 | W105 03.893 | 10072 | Road Survey Control Point |
| 042DD | N38 53.719 | W105 03.746 | 10161 | Drainage Ditch |
| 043FS | N38 53.726 | W105 03.764 | 10180 | Fill Slope |
| 044RX | N38 53.726 | W105 03.763 | 10183 | Road Cross Section |
| 045CS | N38 53.657 | W105 03.868 | 10266 | Cut Slope |

| Site ID | Latitude (hddd°mm.mmm) | Longitude (hddd°mm.mmm) | Altitude (ft) | Feature Description |
|---|---|---|---|---|
| 046DD | N38 53.658 | W105 03.868 | 10268 | Drainage Ditch |
| 047RX | N38 53.658 | W105 03.868 | 10268 | Road Cross Section |
| 048FS | N38 53.651 | W105 03.880 | 10275 | Fill Slope |
| 049CS | N38 53.592 | W105 04.020 | 10406 | Cut Slope |
| 050RX | N38 53.593 | W105 04.020 | 10404 | Road Cross Section |
| 051DD | N38 53.593 | W105 04.021 | 10397 | Drainage Ditch |
| 052FS | N38 53.593 | W105 04.021 | 10401 | Fill Slope |
| 053CC | N38 53.560 | W105 04.127 | 10478 | Conveyance Channel |
| 054CC | N38 53.579 | W105 04.148 | 10448 | Conveyance Channel |
| 055FS | N38 53.612 | W105 04.095 | 10445 | Fill Slope |
| 056RX | N38 53.614 | W105 04.096 | 10442 | Road Cross Section |
| 057DD | N38 53.613 | W105 04.095 | 10445 | Drainage Ditch |
| 058CC | N38 53.513 | W105 04.057 | 10512 | Conveyance Channel |
| 059CS | N38 53.353 | W105 04.222 | 10697 | Cut Slope |
| 060RX | N38 53.354 | W105 04.219 | 10691 | Road Cross Section |
| 061DD | N38 53.221 | W105 04.381 | 10808 | Drainage Ditch |
| 062RX | N38 53.216 | W105 04.381 | 10805 | Road Cross Section |
| 063CC | N38 53.223 | W105 04.394 | 10803 | Conveyance Channel |
| 064CC | N38 53.448 | W105 04.155 | 10634 | Conveyance Channel |
| 065CC | N38 53.382 | W105 04.192 | 10679 | Conveyance Channel |
| 066CC | N38 53.336 | W105 04.243 | 10701 | Conveyance Channel |
| 067CC | N38 53.297 | W105 04.299 | 10736 | Conveyance Channel |
| 068CC | N38 53.251 | W105 04.305 | 10841 | Conveyance Channel |
| 069CC | N38 53.019 | W105 04.287 | 10989 | Conveyance Channel |
| 070CC | N38 52.956 | W105 04.276 | 11028 | Conveyance Channel |
| 071DD | N38 52.972 | W105 04.285 | 11017 | Drainage Ditch |
| 072RX | N38 52.972 | W105 04.285 | 11015 | Road Cross Section |
| 073ST | N38 52.879 | W105 04.311 | 11062 | Sediment Trap |
| 074FS | N38 52.927 | W105 04.272 | 11053 | Fill Slope |
| 075RG | N38 53.797 | W105 03.890 | 10109 | Precipitation Gauge |
| 076RG | N38 52.582 | W105 03.970 | 11810 | Precipitation Gauge |
| 077RG | N38 51.783 | W105 03.999 | 13069 | Precipitation Gauge |
| 078CS | N38 53.331 | W105 04.275 | 10478 | Cut Slope |
| 079FS | N38 52.882 | W105 04.382 | 11254 | Fill Slope |
| 080DD | N38 52.865 | W105 04.391 | 11256 | Drainage Ditch |
| 081CC | N38 52.943 | W105 04.415 | 11194 | Conveyance Channel |
| 082DD | N38 52.787 | W105 04.376 | 11284 | Drainage Ditch |
| 083FS | N38 52.777 | W105 04.362 | 11288 | Fill Slope |
| 084CC | N38 52.796 | W105 04.471 | 11360 | Conveyance Channel |
| 085DD | N38 52.786 | W105 04.410 | 11313 | Drainage Ditch |
| 086FS | N38 52.602 | W105 04.390 | 11447 | Fill Slope |
| 087CS | N38 52.435 | W105 04.432 | 11542 | Cut Slope |
| 088FS | N38 52.388 | W105 04.549 | 11590 | Fill Slope |
| 089CC | N38 52.391 | W105 04.555 | 11580 | Conveyance Channel |
| 090CS | N38 52.366 | W105 04.540 | 11604 | Cut Slope |
| 091CC | N38 52.402 | W105 04.414 | 11643 | Conveyance Channel |

| Site ID | Latitude (hddd°mm.mmm) | Longitude (hddd°mm.mmm) | Altitude (ft) | Feature Description |
|---|---|---|---|---|
| 092DD | N38 52.432 | W105 04.204 | 11781 | Drainage Ditch |
| 093FS | N38 52.399 | W105 04.401 | 11642 | Fill Slope |
| 094CC | N38 52.540 | W105 04.069 | 11873 | Conveyance Channel |
| 095CC | N38 52.452 | W105 04.205 | 11787 | Conveyance Channel |
| 096CC | N38 52.379 | W105 04.217 | 11746 | Conveyance Channel |
| 097CC | N38 52.381 | W105 04.310 | 11678 | Conveyance Channel |
| 098FS | N38 52.265 | W105 03.995 | 12242 | Fill Slope |
| 099CC | N38 52.131 | W105 04.046 | 12319 | Conveyance Channel |
| 100CC | N38 52.133 | W105 03.936 | 12353 | Conveyance Channel |
| 101FS | N38 52.097 | W105 03.875 | 12390 | Fill Slope |
| 102CS | N38 51.641 | W105 04.063 | 12963 | Cut Slope |
| 103FS | N38 51.491 | W105 04.021 | 12950 | Fill Slope |
| 104CC | N38 51.444 | W105 03.894 | 12923 | Conveyance Channel |
| 105FS | N38 51.062 | W105 03.694 | 13083 | Fill Slope |
| 106CC | N38 52.082 | W105 03.858 | 12251 | Conveyance Channel |
| 107DD | N38 52.044 | W105 03.824 | 12312 | Drainage Ditch |
| 108CC | N38 51.994 | W105 03.769 | 12362 | Conveyance Channel |
| 109CC | N38 52.027 | W105 03.825 | 12393 | Conveyance Channel |
| 110CC | N38 52.062 | W105 03.914 | 12448 | Conveyance Channel |
| 111CC | N38 52.051 | W105 03.992 | 12511 | Conveyance Channel |
| 112CC | N38 52.049 | W105 03.933 | 12531 | Conveyance Channel |
| 113CC | N38 52.002 | W105 03.873 | 12577 | Conveyance Channel |
| 114CC | N38 51.956 | W105 03.840 | 12601 | Conveyance Channel |
| 115CC | N38 51.977 | W105 03.995 | 12692 | Conveyance Channel |
| 116CC | N38 51.940 | W105 04.080 | 12736 | Conveyance Channel |
| 117CC | N38 51.925 | W105 04.141 | 12777 | Conveyance Channel |
| 118CC | N38 51.912 | W105 04.177 | 12797 | Conveyance Channel |
| 119CC | N38 51.914 | W105 04.032 | 12850 | Conveyance Channel |
| 120CC | N38 51.823 | W105 04.090 | 12876 | Conveyance Channel |
| 121CC | N38 51.439 | W105 03.804 | 12877 | Conveyance Channel |
| 122CC | N38 51.347 | W105 03.789 | 12920 | Conveyance Channel |
| 123CS | N38 51.361 | W105 03.782 | 12920 | Cut Slope |
| 124FS | N38 51.362 | W105 03.788 | 12931 | Fill Slope |
| 125CC | N38 51.238 | W105 03.806 | 12986 | Conveyance Channel |
| 126CC | N38 51.158 | W105 03.789 | 13031 | Conveyance Channel |
| 127CC | N38 51.032 | W105 03.697 | 13064 | Conveyance Channel |
| 128FS | N38 50.930 | W105 03.732 | 13072 | Fill Slope |
| 129CC | N38 50.897 | W105 03.662 | 13068 | Conveyance Channel |
| 130CC | N38 50.900 | W105 03.177 | 13183 | Conveyance Channel |
| 131CC | N38 50.940 | W105 03.382 | 13088 | Conveyance Channel |
| 132CC | N38 50.840 | W105 03.274 | 13217 | Conveyance Channel |
| 133CC | N38 50.768 | W105 03.213 | 13282 | Conveyance Channel |
| 134CC | N38 50.671 | W105 03.035 | 13401 | Conveyance Channel |
| 135CC | N38 50.285 | W105 02.872 | 13677 | Conveyance Channel |
| 136CC | N38 50.299 | W105 02.931 | 13624 | Conveyance Channel |
| 137CC | N38 50.260 | W105 02.755 | 13733 | Conveyance Channel |

| Site ID | Latitude (hddd°mm.mmm) | Longitude (hddd°mm.mmm) | Altitude (ft) | Feature Description |
|---|---|---|---|---|
| 138CC | N38 50.221 | W105 02.605 | 13805 | Conveyance Channel |
| 139CC | N38 50.774 | W105 03.110 | 13370 | Conveyance Channel |
| 140CC | N38 50.730 | W105 03.195 | 13327 | Conveyance Channel |
| 141CS | N38 51.043 | W105 03.690 | 13103 | Cut Slope |
| 152RW | N38 54.912 | W105 02.837 | 9444 | Rock Weir/Apron |
| 153RW | N38 54.741 | W105 03.066 | 9457 | Rock Weir/Apron |
| 154RX | N38 52.040 | W105 03.817 | 12112 | Road Cross Section |
| 155DD | N38 51.245 | W105 03.803 | 12917 | Drainage Ditch |
| 156RX | N38 51.244 | W105 03.799 | 12922 | Road Cross Section |
| 157DD | N38 51.074 | W105 03.684 | 13100 | Drainage Ditch |
| 158RX | N38 51.074 | W105 03.683 | 13099 | Road Cross Section |
| 159DD | N38 51.610 | W105 04.072 | 13091 | Drainage Ditch |
| 160RX | N38 51.611 | W105 04.072 | 13066 | Road Cross Section |
| 161RW | N38 54.720 | W105 03.055 | 9516 | Rock Weir/Apron |
| 162RW | N38 54.887 | W105 02.854 | 9518 | Rock Weir/Apron |
| 163RA | N38 54.665 | W105 03.115 | 9528 | Rock Weir/Apron |
| 175CC | N38 55.104 | W105 02.532 | 9437 | Conveyance Channel |
| 176RW | N38 54.146 | W105 03.795 | 9838 | Rock Weir |
| 177FS | N38 55.302 | W105 02.224 | 9323 | Fill Slope |
| 178RW | N38 54.142 | W105 03.821 | 9839 | Rock Weir |
| 179RW | N38 54.127 | W105 03.852 | 9851 | Rock Weir |
| 180RW | N38 54.055 | W105 03.903 | 9906 | Rock Weir |
| 181RW | N38 54.025 | W105 03.918 | 9919 | Rock Weir |
| 182DD | N38 54.895 | W105 02.860 | 9430 | Drainage Ditch |
| 183FS | N38 54.675 | W105 03.109 | 9453 | Fill Slope |
| 184CC | N38 54.708 | W105 03.363 | 9308 | Conveyance Channel |
| 185CS | N38 54.536 | W105 03.246 | 9532 | Cut Slope |
| 186FS | N38 54.524 | W105 03.242 | 9538 | Fill Slope |
| 187FS | N38 54.281 | W105 03.658 | 9711 | Fill Slope |
| 188DD | N38 54.075 | W105 03.892 | 9894 | Drainage Ditch |
| 189CC | N38 54.073 | W105 03.886 | 9887 | Conveyance Channel |
| 190CC | N38 54.095 | W105 03.869 | 9871 | Conveyance Channel |
| 191CC | N38 54.117 | W105 03.854 | 9855 | Conveyance Channel |
| 192CS | N38 54.183 | W105 03.677 | 9786 | Cut Slope |
| 193FS | N38 54.821 | W105 02.983 | 9507 | Fill Slope |
| 194FS | N38 54.811 | W105 03.004 | 9506 | Fill Slope |
| 195DD | N38 54.827 | W105 02.983 | 9505 | Drainage Ditch |
| 196FS | N38 54.872 | W105 02.900 | 9497 | Fill Slope |
| 197CS | N38 54.364 | W105 03.383 | 9640 | Cut Slope |
| 198FS | N38 54.497 | W105 03.254 | 9560 | Fill Slope |
| 199RW | N38 54.688 | W105 03.389 | 9326 | Sediment Pond |
| 200RW | N38 55.261 | W105 02.246 | 9418 | Rock Weir |
| 201RW | N38 54.805 | W105 03.021 | 9522 | Rock Weir |
| 202RW | N38 54.619 | W105 03.132 | 9450 | Rock Weir |
| 203FS | N38 54.603 | W105 03.139 | 9517 | Fill Slope |
| 204FS | N38 54.273 | W105 03.572 | 9707 | Fill Slope |

| Site ID | Latitude (hddd°mm.mmm) | Longitude (hddd°mm.mmm) | Altitude (ft) | Feature Description |
|---|---|---|---|---|
| 205DD | N38 54.022 | W105 03.927 | 9983 | Drainage Ditch |
| 206CC | N38 54.689 | W105 03.097 | 9506 | Conveyance Channel |
| 207CC | N38 51.664 | W105 04.062 | 12962 | Conveyance Channel |
| 208CC | N38 52.754 | W105 04.445 | 11172 | Conveyance Channel |
| 209CC | N38 52.647 | W105 04.411 | 11365 | Conveyance Channel |
| 210CC | N38 54.059 | W105 03.916 | 9849 | Conveyance Channel |
| 211CC | N38 54.130 | W105 03.844 | 9853 | Conveyance Channel |
| 212CC | N38 53.149 | W105 04.311 | 10893 | Conveyance Channel |
| 213CC | N38 50.964 | W105 03.391 | 13046 | Conveyance Channel |
| 214CC | N38 50.234 | W105 02.661 | 13198 | Conveyance Channel |
| 215CC | N38 50.356 | W105 02.792 | 13375 | Conveyance Channel |
| 216CC | N38 55.263 | W105 02.236 | 9289 | Conveyance Channel |
| 217CC | N38 55.255 | W105 02.232 | 9284 | Conveyance Channel |
| 218CC | N38 55.226 | W105 02.268 | 9359 | Conveyance Channel |
| 219CC | N38 55.202 | W105 02.262 | 9371 | Conveyance Channel |
| 220CC | N38 55.108 | W105 02.482 | 9411 | Conveyance Channel |
| 221CC | N38 55.107 | W105 02.482 | 9305 | Conveyance Channel |
| 222CC | N38 55.070 | W105 02.554 | 9319 | Conveyance Channel |
| 223CC | N38 55.048 | W105 02.657 | 9394 | Conveyance Channel |
| 224CC | N38 54.878 | W105 02.852 | 9493 | Conveyance Channel |
| 225CC | N38 54.917 | W105 02.840 | 9441 | Conveyance Channel |
| 226CC | N38 54.796 | W105 03.010 | 9431 | Conveyance Channel |
| 227CC | N38 54.706 | W105 03.053 | 9480 | Conveyance Channel |
| 228CC | N38 54.746 | W105 03.078 | 9431 | Conveyance Channel |
| 229CC | N38 54.140 | W105 03.788 | 9774 | Conveyance Channel |
| 230CC | N38 54.028 | W105 03.912 | 9902 | Conveyance Channel |
| 231CC | N38 54.050 | W105 03.908 | 9910 | Conveyance Channel |
| 232CC | N38 52.583 | W105 04.557 | 11399 | Conveyance Channel |
| 233RW | N38 52.383 | W105 04.560 | 11074 | Rock Weir |
| 234RW | N38 52.502 | W105 03.924 | 11915 | Rock Weir |
| 235CC | N38 52.504 | W105 03.920 | 11928 | Conveyance Channel |
| 236RW | N38 52.185 | W105 04.066 | 12177 | Rock Weir |
| 237RW | N38 52.398 | W105 04.393 | 11219 | Sediment Pond |
| 238RW | N38 52.131 | W105 04.048 | 12340 | Rock Weir |
| 239RW | N38 52.008 | W105 03.774 | 12517 | Rock Weir |
| 240RW | N38 52.048 | W105 03.990 | 12644 | Rock Weir |
| 241RW | N38 51.976 | W105 03.834 | 12686 | Rock Weir |
| 242RW | N38 51.903 | W105 04.176 | 12851 | Rock Weir |
| 243RW | N38 51.919 | W105 04.043 | 12900 | Rock Weir |
| 244CC | N38 54.487 | W105 03.232 | 9569 | Conveyance Channel |
| 245CC | N38 54.872 | W105 02.900 | 9497 | Conveyance Channel |
| 246CC | N38 50.709 | W105 03.090 | 13423 | Conveyance Channel |
| 247CC | N38 50.709 | W105 03.499 | 13080 | Conveyance Channel |
| 250RW | N38 53.724 | W105 03.710 | 10232 | Rock Weir |
| 251CC | N38 53.723 | W105 03.712 | 10229 | Conveyance Channel |
| 252RW | N38 53.456 | W105 03.998 | 10598 | Rock Weir |

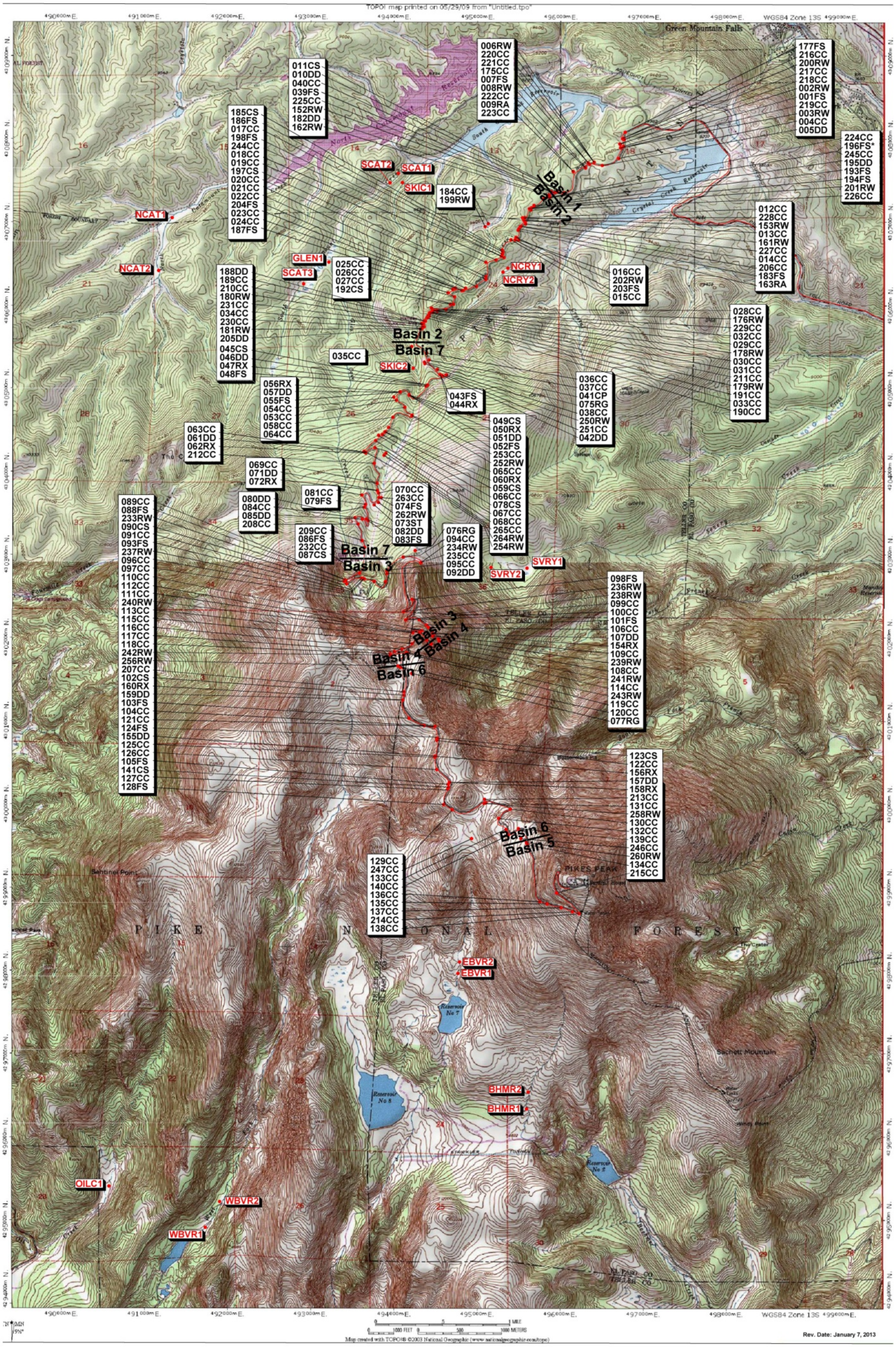
| Site ID | Latitude (hddd°mm.mmm) | Longitude (hddd°mm.mmm) | Altitude (ft) | Feature Description |
|---|---|---|---|---|
| 253CC | N38 53.462 | W105 03.998 | 10582 | Conveyance Channel |
| 254RW | N38 53.226 | W105 04.396 | 10836 | Rock Weir |
| 256RW | N38 51.832 | W105 04.112 | 12923 | Sediment Pond |
| 258RW | N38 50.938 | W105 03.394 | 13091 | Sediment Pond |
| 260RW | N38 50.682 | W105 03.043 | 13415 | Sediment Pond |
| 262RW | N38 52.890 | W105 04.297 | 11086 | Sediment Pond |
| 263CC | N38 52.919 | W105 04.258 | 11056 | Conveyance Channel |
| 264RW | N38 53.201 | W105 04.228 | 10864 | Sediment Pond |
| 265CC | N38 53.209 | W105 04.206 | 10843 | Conveyance Channel |
| BHMR1 | N38 48.951 | W105 03.040 | 11885 | Boehmer Creek 1 |
| BHMR2 | N38 49.061 | W105 03.027 | 11995 | Boehmer Creek 2 |
| EBVR1 | N38 49.832 | W105 03.612 | 12156 | East Fork Beaver Creek 1 |
| EBVR2 | N38 49.907 | W105 03.598 | 12190 | East Fork Beaver Creek 2 |
| GLEN1 | N38 54.457 | W105 04.690 | 9519 | Glen Cove Creek 1 |
| NCAT1 | N38 54.746 | W105 05.994 | 9415 | North Catamount Creek 1 |
| NCAT2 | N38 54.402 | W105 06.106 | 9519 | North Catamount Creek 2 |
| NCRY1∞ | N38 54.418 | W105 03.199 | 9453 | North Fork Crystal Creek 1 & 2 |
| OILC1 | N38 48.449 | W105 06.511 | 10505 | Oil Creek 1 |
| SCAT1 | N38 55.035 | W105 04.112 | 9368 | South Catamount Creek 1 |
| SCAT2 | N38 54.974 | W105 04.181 | 9345 | South Catamount Creek 2 |
| SCAT3 | N38 54.316 | W105 04.899 | 9412 | South Catamount Creek 3 |
| SKIC1 | N38 54.975 | W105 04.078 | 9418 | Ski Creek 1 |
| SKIC2 | N38 53.767 | W105 03.987 | 10035 | Ski Creek 2 |
| SVRY1 | N38 52.467 | W105 03.039 | 10732 | Severy Creek 1 |
| SVRY2 | N38 52.472 | W105 03.339 | 10926 | Severy Creek 2 |
| WBVR1 | N38 48.181 | W105 05.710 | 10726 | West Fork Beaver Creek 1 |
| WBVR2 | N38 48.349 | W105 05.591 | 10698 | West Fork Beaver Creek 2 |
| *† Not all sites were sampled during the 2012 field season.<br>∞ North Fork Crystal Creek Reach 2 (NCRY2) is located 200ft upstream from NCRY1.* | | | | |

# Appendix B

# USGS Topographic Map

# Site Locations for Effectiveness and Validation Monitoring

# 2012



TOPO! map printed on 05/29/09 from "Untitled.tpo"
WGS84 Zone 13S
Green Mountain Falls
011CS
010DD
040CC
039FS
225CC
152RW
182DD
162RW
006RW
220CC
221CC
175CC
007FS
008RW
222CC
009RA
223CC
177FS
216CC
200RW
217CC
218CC
002RW
001FS
219CC
003RW
004CC
005DD
224CC
196FS*
245CC
195DD
193FS
194FS
201RW
226CC
185CS
186FS
017CC
198FS
244CC
018CC
019CC
197CS
020CC
021CC
022CC
204FS
023CC
024CC
187FS
SCAT2
SCAT1
SKIC1
184CC
199RW
Basin 1
Basin 2
NCAT1
012CC
228CC
153RW
013CC
161RW
227CC
014CC
206CC
183FS
163RA
GLEN1
SCAT3
025CC
026CC
027CC
192CS
NCRY1
NCRY2
016CC
202RW
203FS
015CC
NCAT2
188DD
189CC
210CC
180RW
231CC
034CC
230CC
181RW
205DD
045CS
046DD
047RX
048FS
Basin 2
Basin 7
035CC
SKIC2
028CC
176RW
229CC
032CC
029CC
178RW
030CC
031CC
211CC
179RW
191CC
033CC
190CC
056RX
057DD
055FS
054CC
053CC
058CC
064CC
043FS
044RX
036CC
037CC
041CP
075RG
038CC
250RW
251CC
042DD
063CC
061DD
062RX
212CC
049CS
050RX
051DD
052FS
253CC
252RW
065CC
060RX
059CS
066CC
078CS
067CC
068CC
265CC
264RW
254RW
069CC
071DD
072RX
081CC
079FS
070CC
263CC
074FS
262RW
073ST
082DD
083FS
080DD
084CC
085DD
208CC
089CC
088FS
233RW
090CS
091CC
093FS
237RW
096CC
097CC
110CC
112CC
111CC
240RW
113CC
115CC
116CC
117CC
118CC
242RW
256RW
207CC
102CS
160RX
159DD
103FS
104CC
121CC
124FS
155DD
125CC
126CC
105FS
141CS
127CC
128FS
209CC
086FS
232CC
087CS
Basin 7
Basin 3
076RG
094CC
234RW
235CC
095CC
092DD
SVRY1
SVRY2
098FS
236RW
238RW
099CC
100CC
101FS
106CC
107DD
154RX
109CC
239RW
108CC
241RW
114CC
243RW
119CC
120CC
077RG
Basin 3
Basin 4
Basin 4
Basin 6
123CS
122CC
156RX
157DD
158RX
213CC
131CC
258RW
130CC
132CC
139CC
246CC
260RW
134CC
215CC
Basin 6
Basin 5
PIKES PEAK
129CC
247CC
133CC
140CC
136CC
135CC
137CC
214CC
138CC
Sentinel Point
P I K E
N A T I O N A L
F O R E S T
EBVR2
EBVR1
Reservoir No 7
Sachett Mountain
BHMR2
BHMR1
Reservoir No 8
Reservoir No 5
OILC1
WBVR2
WBVR1
Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)
Rev. Date: January 7, 2013

# Appendix C

# Daily Precipitation
# and
# Periodic Precipitation

# 2012

## Daily Precipitation for Electronic Rain Gauges on Pikes Peak, 2012

| Date | 075RG† (Altitude 10,109') Precipitation (in) | 076RG† (Altitude 11,810') Precipitation (in) | 077RG∞ (Altitude 13,069') Precipitation (in) |
|---|---|---|---|
| 5/1/2012 | 0 | 0 | 0 |
| 5/2/2012 | 0 | 0 | 0 |
| 5/3/2012 | 0 | 0 | 0 |
| 5/4/2012 | 0 | 0 | 0 |
| 5/5/2012 | 0 | 0 | 0 |
| 5/6/2012 | 0 | 0 | 0 |
| 5/7/2012 | 0.26 | 0 | 0.25 |
| 5/8/2012 | 0.25 | 0.45 | 0.09 |
| 5/9/2012 | 0 | 0.01 | 0 |
| 5/10/2012 | 0 | 0 | 0 |
| 5/11/2012 | 0 | 0 | 0 |
| 5/12/2012 | 0.19 | 0.19 | 0.09 |
| 5/13/2012 | 0.05 | 0.09 | 0.07 |
| 5/14/2012 | 0.27 | 0.39 | 0.23 |
| 5/15/2012 | 0 | 0 | 0.01 |
| 5/16/2012 | 0 | 0 | 0 |
| 5/17/2012 | 0 | 0 | 0 |
| 5/18/2012 | 0 | 0 | 0 |
| 5/19/2012 | 0.18 | 0.11 | 0.03 |
| 5/20/2012 | 0 | 0.02 | 0.02 |
| 5/21/2012 | 0 | 0.01 | 0 |
| 5/22/2012 | 0 | 0 | 0 |
| 5/23/2012 | 0.22 | 0.18 | 0 |
| 5/24/2012 | 0.28 | 0.12 | 0.02 |
| 5/25/2012 | 0 | 0 | 0 |
| 5/26/2012 | 0 | 0 | 0 |
| 5/27/2012 | 0 | 0 | 0 |
| 5/28/2012 | 0 | 0 | 0 |
| 5/29/2012 | 0 | 0 | 0 |
| 5/30/2012 | 0 | 0 | 0 |
| 5/31/2012 | 0 | 0 | 0 |
| 6/1/2012 | 0.01 | 0.01 | 0 |
| 6/2/2012 | 0.07 | 0.07 | 0.02 |
| 6/3/2012 | 0 | 0 | 0 |
| 6/4/2012 | 0 | 0.01 | 0 |
| 6/5/2012 | 0 | 0 | 0 |
| 6/6/2012 | 0 | 0 | 0 |
| 6/7/2012 | 0 | 0 | 0 |
| 6/8/2012 | 0.02 | 0.02 | 0.02 |
| 6/9/2012 | 0 | 0 | 0 |
| 6/10/2012 | 0 | 0 | 0 |
| 6/11/2012 | 0 | 0 | 0 |
| 6/12/2012 | 0 | 0 | 0 |
| 6/13/2012 | 0 | 0 | 0 |

| Date | 075RG† (Altitude 10,109') Precipitation (in) | 076RG† (Altitude 11,810') Precipitation (in) | 077RG∞ (Altitude 13,069') Precipitation (in) |
|---|---|---|---|
| 6/14/2012 | 0 | 0 | 0 |
| 6/15/2012 | 0 | 0 | 0 |
| 6/16/2012 | 0 | 0 | 0 |
| 6/17/2012 | 0 | 0 | 0 |
| 6/18/2012 | 0 | 0 | 0 |
| 6/19/2012 | 0 | 0.02 | 0 |
| 6/20/2012 | 0 | 0 | 0 |
| 6/21/2012 | 0 | 0 | 0 |
| 6/22/2012 | 0 | 0 | 0 |
| 6/23/2012 | 0 | 0 | 0 |
| 6/24/2012 | 0 | 0 | 0 |
| 6/25/2012 | 0 | 0 | 0 |
| 6/26/2012 | 0 | 0 | 0 |
| 6/27/2012 | 0.17 | 0.08 | 0.10 |
| 6/28/2012 | 0.05 | 0.07 | 0.11 |
| 6/29/2012 | 0 | 0 | 0.01 |
| 6/30/2012 | 0 | 0 | 0 |
| 7/1/2012 | 0 | 0 | 0 |
| 7/2/2012 | 0.01 | 0.10 | 0.16 |
| 7/3/2012 | 0.68 | 0.91 | 0.65 |
| 7/4/2012 | 0 | 0.01 | 0 |
| 7/5/2012 | 0 | 0 | 0 |
| 7/6/2012 | 0.48 | 0.46 | 0.46 |
| 7/7/2012 | 0.14 | 0.16 | 0.22 |
| 7/8/2012 | 0.72 | 0.75 | 0.70 |
| 7/9/2012 | 0.12 | 0.08 | 0.09 |
| 7/10/2012 | 0 | 0 | 0.01 |
| 7/11/2012 | 0 | 0 | 0 |
| 7/12/2012 | 0.05 | 0.10 | 0.23 |
| 7/13/2012 | 0 | 0 | 0 |
| 7/14/2012 | 0 | 0 | 0 |
| 7/15/2012 | 0 | 0 | 0 |
| 7/16/2012 | 0.01† | 0.30 | 0.17 |
| 7/17/2012 | 0† | 0.13 | 0.12 |
| 7/18/2012 | 0† | 0.08 | 0.08 |
| 7/19/2012 | 0† | 0 | 0 |
| 7/20/2012 | 0† | 0 | 0 |
| 7/21/2012 | 0† | 0 | 0.02 |
| 7/22/2012 | 0† | 0 | 0 |
| 7/23/2012 | 0† | 0.01 | 0.02 |
| 7/24/2012 | 0† | 0 | 0 |
| 7/25/2012 | 0† | 0.06 | 0.10 |
| 7/26/2012 | 0† | 0 | 0 |
| 7/27/2012 | 0† | 0.04 | 0.06 |
| 7/28/2012 | 0† | 0.25 | 0.27 |
| 7/29/2012 | 0† | 0.04 | 0.04 |

| Date | 075RG† (Altitude 10,109’) Precipitation (in) | 076RG† (Altitude 11,810’) Precipitation (in) | 077RG∞ (Altitude 13,069’) Precipitation (in) |
|---|---|---|---|
| 7/30/2012 | 0.79 | 0.78 | 0.82 |
| 7/31/2012 | 0.42 | 0.42 | 0.34 |
| 8/1/2012 | 0.21 | 0.21 | 0.10 |
| 8/2/2012 | 0.34 | 0.34 | 0.32 |
| 8/3/2012 | 0 | 0 | 0 |
| 8/4/2012 | 0 | 0 | 0 |
| 8/5/2012 | 0 | 0 | 0 |
| 8/6/2012 | 0 | 0 | 0 |
| 8/7/2012 | 0.02 | 0.03 | 0.02 |
| 8/8/2012 | 0 | 0 | 0 |
| 8/9/2012 | 0.10 | 0.21 | 0.23 |
| 8/10/2012 | 0 | 0 | 0.16 |
| 8/11/2012 | 0.05 | 0.03 | 0 |
| 8/12/2012 | 0.01 | 0.02 | 0.07 |
| 8/13/2012 | 0.01 | 0.07 | 0.05 |
| 8/14/2012 | 0 | 0 | 0 |
| 8/15/2012 | 0 | 0 | 0 |
| 8/16/2012 | 0.18 | 0.18 | 0.19 |
| 8/17/2012 | 0 | 0 | 0 |
| 8/18/2012 | 0 | 0 | 0 |
| 8/19/2012 | 0 | 0 | 0 |
| 8/20/2012 | 0 | 0 | 0 |
| 8/21/2012 | 0 | 0 | 0 |
| 8/22/2012 | 0.09 | 0.08 | 0.08 |
| 8/23/2012 | 0.32 | 0.33 | 0.27 |
| 8/24/2012 | 0 | 0 | 0.05 |
| 8/25/2012 | 0.14 | 0.06 | 0.04 |
| 8/26/2012 | 0 | 0 | 0 |
| 8/27/2012 | 0.01 | 0.01† | Missing |
| 8/28/2012 | 0 | 0.01† | Missing |
| 8/29/2012 | 0.03† | 0† | Missing |
| 8/30/2012 | 0† | 0† | Missing |
| 8/31/2012 | 0† | 0† | Missing |
| 9/1/2012 | 0† | 0† | Missing |
| 9/2/2012 | 0† | 0.10† | Missing |
| 9/3/2012 | 0† | 0.34† | Missing |
| 9/4/2012 | 0.02† | 0.01 | Missing |
| 9/5/2012 | 0 | 0 | Missing |
| 9/6/2012 | 0 | 0 | Missing |
| 9/7/2012 | 0.04 | 0.05 | Missing |
| 9/8/2012 | 0 | 0 | Missing |
| 9/9/2012 | 0 | 0 | Missing |
| 9/10/2012 | 0.03† | 0 | 0.02 |
| 9/11/2012 | 0† | 0.06 | 0.03 |
| 9/12/2012 | 0† | 0.84 | 0.42 |
| 9/13/2012 | 0† | 0.43 | 0.25 |

| Date | 075RG† (Altitude 10,109') Precipitation (in) | 076RG† (Altitude 11,810') Precipitation (in) | 077RG∞ (Altitude 13,069') Precipitation (in) |
|---|---|---|---|
| 9/14/2012 | 0† | 0 | 0.1 |
| 9/15/2012 | 0.01† | 0 | 0 |
| 9/16/2012 | 0† | 0 | 0 |
| 9/17/2012 | 0† | 0.09 | 0.07 |
| 9/18/2012 | 0† | 0.01 | 0.02 |
| 9/19/2012 | 0.03† | 0 | 0 |
| 9/20/2012 | 0 | 0 | 0 |
| 9/21/2012 | 0 | 0 | 0 |
| 9/22/2012 | 0 | 0 | 0 |
| 9/23/2012 | 0 | 0 | 0 |
| 9/24/2012 | 0 | 0 | 0 |
| 9/25/2012 | 0.16 | 0.05 | 0 |
| 9/26/2012 | 0.05 | 0.10 | 0.09 |
| 9/27/2012 | 0.11 | 0.11 | 0.05 |
| 9/28/2012 | 0 | 0.01 | 0.02 |
| 9/29/2012 | 0.01 | 0 | 0 |
| 9/30/2012 | 0 | 0.01 | 0.02 |
| 10/1/2012 | 0 | 0 | 0 |
| 10/2/2012 | 0 | 0.01 | 0 |
| **Total** | **7.41†** | **10.33†** | **8.3∞** |

*† Indicates inaccurate measurement due to disturbance of the rain gauge.*
*∞ Indicates missing data due to equipment malfunction.*

## Periodic Precipitation for Standard Rain Gauges on Pikes Peak, 2012

| Date | 075RG (Altitude 10,109’) Precipitation (in) | 076RG∞ (Altitude 11,810’) Precipitation (in) | 077RG (Altitude 13,069’) Precipitation (in) |
|---|---|---|---|
| 5/8/2012 | 0.20 | 0.13 | 0.18 |
| 5/15/2012 | 0.83 | 1.04 | 0.47 |
| 5/21/2012 | 0.24 | 0.24 | 0.17 |
| 5/29/2012 | 0.50 | 0.35 | 0.02 |
| 6/4/2012 | 0.10 | 0.13 | 0.05 |
| 6/11/2012 | 0.02 | 0.07 | 0.03 |
| 6/19/2012 | 0 | 0 | 0 |
| 7/2/2012 | 0.24 | Missing | 0.22 |
| 7/9/2012 | 2.72 | 2.7 | 2.20 |
| 7/16/2012 | 0.06 | 0.13 | 0.26 |
| 7/23/2012 | 0.40 | 0.61 | 0.39 |
| 7/30/2012 | 0.45 | 0.53 | 0.53 |
| 8/7/2012 | 1.77 | 1.82 | 1.43 |
| 8/13/2012 | 0.22 | 0.36 | 0.49 |
| 8/20/2012 | 0.24 | 0.32 | 0.27 |
| 8/27/2012 | 0.65 | 0.56 | 0.46 |
| 9/4/2012 | 0.39 | 0.65 | 0.42 |
| 9/10/2012 | 0.04 | 0.08 | 0.05 |
| 9/19/2012 | 1.45 | 1.81 | 0.81 |
| 9/27/2012 | 0.27 | 0.19 | 0.11 |
| 10/2/2012 | 0.15 | 0.23 | 0.12 |
| **Total** | **10.94** | **11.95∞** | **8.68** |
| *∞ Indicates missing data due to damage to the rain gauge.* | | | |

# Appendix D

# Cut Slope

# Site Visit Dates
# and
# Sediment Accumulation

# 2012

## Site Visit Dates of Cut Slope Silt Fences on Pikes Peak, 2012

| Site ID | Cut Slope Site Visit Dates 2012 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5/3 | 5/4 | 5/8 | 5/21 | 6/4 | 6/6 | 6/18 | 7/2 | 7/16 | 7/17 | 7/30 | 8/7 | 8/20 | 9/4 | 9/10 | 10/2 |
| 011CS | X | | X | X | X | | X | X | X | | X | X | X | X | | X |
| 045CS | X | X | | X | X | | X | X | X | | X | X | X | X | | X |
| 049CS | X | X | | X | X | | X | X | X | | X | X | X | X | | X |
| 059CS | X | X | | X | X | | X | X | X | | X | X | X | X | | X |
| 078CS | | X | | X | X | | X | X | X | | X | X | X | X | | X |
| 087CS | X | X | | X | X | | X | X | X | | X | X | X | X | | X |
| 090CS | X | | | X | X | | X | X | X | | X | X | X | X | | X |
| 102CS | X | | | X | X | X | X | X | X | | X | X | X | X | X | X |
| 123CS | X | | | X | X | X | X | X | X | | X | X | X | X | X | X |
| 141CS | X | | | X | X | X | X | X | X | | X | X | X | X | X | X |
| 185CS | X | | | X | X | | X | X | X | X | X | X | X | X | | X |
| 192CS | X | X | | X | X | | | X | X | | X | X | X | X | | X |
| 197CS | X | X | | X | X | | X | X | X | | X | X | X | X | | X |

## Sediment Accumulation in Cut Slope Silt Fences on Pikes Peak, 2012

| Site ID | Location | Date | Volume ($ft^3$) | Grab Sample |
|---|---|---|---|---|
| 011CS | Lower Fence | 5/3/12 | 0.40 | Yes |
| 011CS | Upper Fence | 5/3/12 | 0.07 | Yes |
| 185CS | Lower Fence | 5/3/12 | 0.13 | Yes |
| 045CS | Lower Fence | 5/4/12 | 0.07 | Yes |
| 049CS | Lower Fence | 5/4/12 | 0.27 | Yes |
| 059CS | Lower Fence | 5/4/12 | 0.07 | Yes† |
| 078CS | Lower Fence | 5/4/12 | 0.27 | Yes |
| 078CS | Upper Fence | 5/4/12 | 0.07 | Yes |
| 087CS | Lower Fence | 5/4/12 | 0.67 | Yes |
| 192CS | Lower Fence | 5/4/12 | 1.60 | Yes† |
| 192CS | Upper Fence | 5/4/12 | 0.07 | Yes† |
| 197CS | Lower Fence | 5/4/12 | 0.13 | Yes |
| 197CS | Upper Fence | 5/4/12 | 0.60 | Yes |
| 192CS | Lower Fence | 5/21/12 | 0.60 | Yes |
| 011CS | Lower Fence | 6/4/12 | 0.50 | Yes |
| 049CS | Lower Fence | 6/4/12 | 0.27 | Yes |
| 123CS | Upper Fence | 6/4/12 | 0.60 | Yes |
| 141CS | Upper Fence | 6/4/12 | 1.34 | Yes |
| 090CS | Lower Fence | 6/18/12 | 0.20 | Yes |
| 049CS | Lower Fence | 7/2/12 | 0.20 | Yes |
| 192CS | Lower Fence | 7/2/12 | 0.33 | Yes |
| 197CS | Lower Fence | 7/2/12 | 0.33 | Yes |
| 059CS | Lower Fence | 7/16/12 | 0.33 | Yes |
| 078CS | Lower Fence | 7/16/12 | 0.27 | Yes |
| 087CS | Lower Fence | 7/16/12 | 0.53 | Yes |
| 087CS | Upper Fence | 7/16/12 | 0.27 | Yes |
| 090CS | Lower Fence | 7/16/12 | 0.07 | Yes† |
| 141CS | Upper Fence | 7/16/12 | 0.13 | Yes |
| 192CS | Lower Fence | 7/16/12 | 0.53 | Yes |
| 185CS | Lower Fence | 7/17/12 | 0.13 | Yes |
| 185CS | Upper Fence | 7/17/12 | 0.07 | Yes |
| 011CS | Lower Fence | 7/30/12 | 0.07 | Yes† |
| 011CS | Upper Fence | 7/30/12 | 0.07 | Yes† |
| 049CS | Lower Fence | 7/30/12 | 0.20 | Yes |
| 192CS | Lower Fence | 7/30/12 | 0.27 | Yes |
| 197CS | Lower Fence | 7/30/12 | 0.87 | Yes |
| 197CS | Upper Fence | 7/30/12 | 0.33 | Yes |
| 045CS | Lower Fence | 8/7/12 | 0.20 | Yes |

| Site ID | Location | Date | Volume ($ft^3$) | Grab Sample |
|---|---|---|---|---|
| 087CS | Lower Fence | 8/7/12 | 0.47 | Yes |
| 185CS | Lower Fence | 8/7/12 | 0.13 | Yes |
| 185CS | Upper Fence | 8/7/12 | 0.13 | Yes |
| 011CS | Lower Fence | 8/20/12 | 0.87 | Yes |
| 011CS | Upper Fence | 8/20/12 | 0.07 | Yes |
| 087CS | Upper Fence | 8/20/12 | 0.33 | Yes |
| 141CS | Upper Fence | 8/20/12 | 0.07 | Yes† |
| 192CS | Lower Fence | 8/20/12 | 1.54 | Yes |
| 197CS | Lower Fence | 8/20/12 | 0.87 | Yes |
| 197CS | Upper Fence | 8/20/12 | 0.27 | Yes |
| 049CS | Lower Fence | 9/4/12 | 0.13 | Yes† |
| 049CS | Upper Fence | 9/4/12 | 0.07 | Yes† |
| 078CS | Lower Fence | 9/4/12 | 0.20 | Yes |
| 087CS | Lower Fence | 9/4/12 | 0.07 | Yes |
| 087CS | Upper Fence | 9/4/12 | 0.07 | Yes |
| 123CS | Upper Fence | 9/4/12 | 0.13 | Yes† |
| 192CS | Lower Fence | 9/4/12 | 1.54 | Yes |

*† Grab samples selected for lab analysis.*

# Appendix E

# Fill Slope

## Site Visit Dates
## and
## Sediment Accumulation

## 2012

## Site Visit Dates of Fill Slope Silt Fences on Pikes Peak, 2012

| Site ID | Fill Slope Site Visit Dates 2012 | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5/3 | 5/4 | 5/8 | 5/9 | 5/21 | 6/4 | 6/6 | 6/13 | 6/18 | 6/21 | 7/2 | 7/16 | 7/17 | 7/30 | 8/7 | 8/20 | 9/4 | 10/2 |
| 001FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 007FS | X | | X | | X | X | | | X | | X | X | | X | X | X | X | X |
| 039FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 043FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 048FS | | X | | X | X | X | | | X | | X | X | | X | X | X | X | X |
| 052FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 055FS | X | | | | X | X | X | | X | | X | X | | X | X | X | X | X |
| 074FS | X | | | | X | X | | | X | X | X | X | | X | X | X | X | X |
| 079FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 083FS | | X | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 086FS | | X | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 088FS | X | | | | X | | X | | X | | X | X | | X | X | X | X | X |
| 093FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 098FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 101FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 103FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 105FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 124FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 128FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 177FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 183FS | X | | | X | X | X | | | X | | X | X | | X | X | X | X | X |
| 186FS | X | | | | X | | | X | X | | X | X | | X | X | X | X | X |
| 187FS | X | | | | X | X | | | X | | X | X | X | X | X | X | X | X |
| 193FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 194FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 198FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 203FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |
| 204FS | X | | | | X | X | | | X | | X | X | | X | X | X | X | X |

## Sediment Accumulation in Fill Slope Silt Fences on Pikes Peak, 2012

| Site ID | Location | Date | Volume ($ft^3$) | Grab Sample |
|---|---|---|---|---|
| 001FS | Upper Fence | 5/3/12 | 0.74 | Yes |
| 007FS | Upper Fence | 5/3/12 | 0.07 | Yes |
| 039FS | Upper Fence | 5/3/12 | 0.27 | Yes |
| 043FS | Upper Fence | 5/3/12 | 0.67 | Yes |
| 052FS | Lower Fence | 5/3/12 | 0.07 | Yes |
| 177FS | Upper Fence | 5/3/12 | 0.27 | Yes† |
| 183FS | Upper Fence | 5/3/12 | 0.27 | Yes |
| 186FS | Upper Fence | 5/3/12 | 0.33 | Yes |
| 186FS | Lower Fence | 5/3/12 | 0.27 | Yes |
| 187FS | Upper Fence | 5/3/12 | 0.40 | Yes |
| 193FS | Upper Fence | 5/3/12 | 0.80 | Yes† |
| 194FS | Upper Fence | 5/3/12 | 0.40 | Yes |
| 198FS | Upper Fence | 5/3/12 | 0.60 | Yes |
| 203FS | Upper Fence | 5/3/12 | 0.20 | Yes |
| 204FS | Upper Fence | 5/3/12 | 0.27 | Yes |
| 048FS | Lower Fence | 5/4/12 | 0.33 | Yes |
| 079FS | Upper Fence | 5/21/02 | 6.82 | Yes† |
| 093FS | Upper Fence | 5/21/02 | 0.87 | Yes† |
| 098FS | Upper Fence | 5/21/02 | 3.34 | Yes |
| 193FS | Upper Fence | 5/21/02 | 0.74 | Yes |
| 001FS | Upper Fence | 6/4/12 | 0.20 | Yes† |
| 043FS | Upper Fence | 6/4/12 | 0.60 | Yes† |
| 083FS | Lower Fence | 6/4/12 | 0.87 | Yes |
| 101FS | Upper Fence | 6/4/12 | 0.93 | Yes† |
| 101FS | Lower Fence | 6/4/12 | 2.54 | Yes† |
| 105FS | Lower Fence | 6/4/12 | 2.67 | Yes |
| 128FS | Upper Fence | 6/4/12 | 0.27 | Yes† |
| 128FS | Lower Fence | 6/4/12 | 0.20 | Yes† |
| 186FS | Upper Fence | 6/4/12 | 0.27 | Yes |
| 186FS | Lower Fence | 6/4/12 | 0.40 | Yes |
| 204FS | Upper Fence | 6/4/12 | 0.53 | Yes† |
| 204FS | Lower Fence | 6/4/12 | 0.07 | Yes† |
| 088FS | Lower Fence | 6/18/12 | 0.74 | Yes |
| 098FS | Upper Fence | 6/18/12 | 1.14 | Yes |
| 052FS | Lower Fence | 7/2/12 | 0.20 | Yes |
| 093FS | Upper Fence | 7/2/12 | 0.33 | Yes |
| 204FS | Upper Fence | 7/2/12 | 0.40 | Yes |
| 001FS | Upper Fence | 7/16/12 | 1.07 | Yes |

| Site ID | Location | Date | Volume ($ft^3$) | Grab Sample |
|---|---|---|---|---|
| 074FS | Upper Fence | 7/16/12 | 10.70 | Yes† |
| 083FS | Lower Fence | 7/16/12 | 0.33 | Yes |
| 093FS | Upper Fence | 7/16/12 | 0.13 | Yes |
| 093FS | Lower Fence | 7/16/12 | 0.07 | Yes |
| 098FS | Upper Fence | 7/16/12 | 0.47 | Yes† |
| 101FS | Upper Fence | 7/16/12 | 1.40 | Yes |
| 101FS | Lower Fence | 7/16/12 | 0.33 | Yes |
| 128FS | Upper Fence | 7/16/12 | 0.13 | Yes |
| 186FS | Upper Fence | 7/17/12 | 0.33 | Yes† |
| 187FS | Upper Fence | 7/17/12 | 1.34 | Yes |
| 001FS | Upper Fence | 7/30/12 | 0.20 | Yes |
| 124FS | Lower Fence | 7/30/12 | 0.20 | Yes† |
| 177FS | Upper Fence | 7/30/12 | 0.27 | Yes |
| 177FS | Lower Fence | 7/30/12 | 0.27 | Yes |
| 194FS | Upper Fence | 7/30/12 | 0.20 | Yes |
| 198FS | Upper Fence | 7/30/12 | 0.53 | Yes |
| 203FS | Upper Fence | 7/30/12 | 0.47 | Yes |
| 043FS | Upper Fence | 8/7/12 | 1.00 | Yes |
| 079FS | Upper Fence | 8/7/12 | 2.41 | Yes |
| 083FS | Lower Fence | 8/7/12 | 0.20 | Yes† |
| 088FS | Lower Fence | 8/7/12 | 0.20 | Yes† |
| 093FS | Upper Fence | 8/7/12 | 0.40 | Yes |
| 098FS | Upper Fence | 8/7/12 | 0.47 | Yes |
| 101FS | Upper Fence | 8/7/12 | 14.04 | Yes |
| 101FS | Lower Fence | 8/7/12 | 0.33 | Yes |
| 186FS | Upper Fence | 8/7/12 | 4.21 | Yes |
| 186FS | Lower Fence | 8/7/12 | 0.87 | Yes |
| 001FS | Upper Fence | 8/20/12 | 2.41 | Yes |
| 101FS | Upper Fence | 8/20/12 | 1.00 | Yes |
| 101FS | Lower Fence | 8/20/12 | 0.20 | Yes |
| 183FS | Upper Fence | 8/20/12 | 1.34 | Yes |
| 187FS | Upper Fence | 8/20/12 | 2.61 | Yes† |
| 193FS | Upper Fence | 8/20/12 | 1.60 | Yes |
| 198FS | Upper Fence | 8/20/12 | 0.67 | Yes |
| 203FS | Upper Fence | 8/20/12 | 1.14 | Yes |
| 001FS | Upper Fence | 9/4/12 | 0.33 | Yes† |
| 043FS | Upper Fence | 9/4/12 | 0.27 | Yes |
| 055FS | Lower Fence | 9/4/12 | 0.07 | Yes |
| 074FS | Upper Fence | 9/4/12 | 1.07 | Yes |

| Site ID | Location | Date | Volume ($ft^3$) | Grab Sample |
|---|---|---|---|---|
| 083FS | Lower Fence | 9/4/12 | 0.07 | Yes |
| 086FS | Lower Fence | 9/4/12 | 1.14 | Yes† |
| 093FS | Upper Fence | 9/4/12 | 0.40 | Yes† |
| 098FS | Upper Fence | 9/4/12 | 0.33 | Yes |
| 103FS | Upper Fence | 9/4/12 | 0.27 | Yes† |
| 186FS | Upper Fence | 9/4/12 | 0.33 | Yes |
| 194FS | Upper Fence | 9/4/12 | 0.74 | Yes† |
| 204FS | Upper Fence | 9/4/12 | 2.07 | Yes |
| *† Grab samples selected for lab analysis.* | | | | |

# Appendix F

# Cut and Fill Slope

# Particle Size Distribution Summary
# and
# Graphs

2011

**Summary of Cut Slope Particle Size Distribution from Sieve Analysis of Grab Samples on Pikes Peak, 2011**

| | | | Particle Size Distribution–Grab Samples 2011 | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Site Name** | **ID** | **Date** | **D15** | **D35** | **D50** | **D84** | **D95** | **D100** |
| Pikes Peak Highway - Cut Slope | 011CS Lower Fence | 5/7/2011 | 0.230 | 1.724 | 3.410 | 9.649 | 13.873 | 20.0 |
| Pikes Peak Highway - Cut Slope | 011CS Upper Fence | 5/7/2011 | 0.013 | 0.070 | 0.242 | 2.284 | 4.311 | 13.0 |
| Pikes Peak Highway - Cut Slope | 045CS Upper Fence | 5/31/2011 | 0.010 | 0.037 | 0.097 | 1.109 | 3.694 | 7.0 |
| Pikes Peak Highway - Cut Slope | 049CS Lower Fence | 8/8/2011 | 0.020 | 0.174 | 0.725 | 5.508 | 10.605 | 19.0 |
| Pikes Peak Highway - Cut Slope | 078CS Lower Fence | 8/8/2011 | 0.024 | 0.260 | 0.625 | 1.991 | 3.945 | 10.0 |
| Pikes Peak Highway - Cut Slope | 087CS Lower Fence | 8/8/2011 | 0.113 | 1.081 | 1.923 | 8.051 | 33.573 | 39.0 |
| Pikes Peak Highway - Cut Slope | 087CS Upper Fence | 8/8/2011 | 0.014 | 0.075 | 0.265 | 2.968 | 5.644 | 13.0 |
| Pikes Peak Highway - Cut Slope | 090CS Lower Fence | 6/13/2011 | 0.054 | 0.739 | 1.509 | 5.243 | 7.935 | 21.0 |
| Pikes Peak Highway - Cut Slope | 102CS Upper Fence | 6/13/2011 | 0.628 | 1.480 | 2.382 | 6.334 | 10.344 | 15.0 |
| Pikes Peak Highway - Cut Slope | 141CS Upper Fence | 7/6/2011 | 0.212 | 1.104 | 1.689 | 3.983 | 6.533 | 11.0 |
| Pikes Peak Highway - Cut Slope | 192CS Lower Fence | 8/8/2011 | 0.099 | 1.176 | 2.278 | 5.765 | 9.863 | 15.0 |
| Pikes Peak Highway - Cut Slope | 197CS Lower Fence | 5/7/2011 | 0.131 | 1.450 | 2.996 | 8.575 | 14.362 | 20.0 |
| Pikes Peak Highway - Cut Slope | 197CS Upper Fence | 5/7/2011 | 0.066 | 1.018 | 2.462 | 7.512 | 12.466 | 20.0 |

## Summary of Fill Slope Particle Size Distribution from Sieve Analysis of Grab Samples on Pikes Peak, 2011

| | | | Particle Size Distribution–Grab Samples 2011 | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Site Name** | **ID** | **Date** | **D15** | **D35** | **D50** | **D84** | **D95** | **D100** |
| Pikes Peak Highway - Fill Slope | 001FS Upper Fence | 8/8/2011 | 0.057 | 0.749 | 1.385 | 4.213 | 7.136 | 15.0 |
| Pikes Peak Highway - Fill Slope | 039FS Upper Fence | 5/9/2011 | 0.149 | 1.164 | 2.235 | 6.805 | 11.359 | 20.0 |
| Pikes Peak Highway - Fill Slope | 039FS Lower Fence | 5/9/2011 | 0.596 | 1.475 | 2.364 | 5.641 | 9.100 | 19.0 |
| Pikes Peak Highway - Fill Slope | 043FS Upper Fence | 9/20/2011 | 0.331 | 1.552 | 3.644 | 24.421 | 28.132 | 30.0 |
| Pikes Peak Highway - Fill Slope | 074FS Upper Fence | 5/10/2011 | 0.167 | 1.059 | 1.862 | 6.678 | 12.174 | 28.0 |
| Pikes Peak Highway - Fill Slope | 074FS Lower Fence | 5/10/2011 | 0.013 | 0.062 | 0.202 | 0.952 | 1.779 | 7.0 |
| Pikes Peak Highway - Fill Slope | 079FS Upper Fence | 7/11/2011 | 0.040 | 0.567 | 0.959 | 4.323 | 10.241 | 23.0 |
| Pikes Peak Highway - Fill Slope | 083FS Upper Fence | 6/13/2011 | 0.064 | 0.783 | 1.473 | 5.356 | 11.455 | 18.0 |
| Pikes Peak Highway - Fill Slope | 083FS Lower Fence | 6/13/2011 | 0.088 | 0.987 | 1.719 | 4.593 | 7.147 | 13.0 |
| Pikes Peak Highway - Fill Slope | 086FS Upper Fence | 8/8/2011 | 0.205 | 1.060 | 1.816 | 6.751 | 17.185 | 25.0 |
| Pikes Peak Highway - Fill Slope | 086FS Lower Fence | 8/8/2011 | 1.490 | 3.449 | 4.992 | 12.551 | 25.559 | 34.0 |
| Pikes Peak Highway - Fill Slope | 093FS Upper Fence | 7/11/2011 | 1.145 | 6.301 | 17.113 | 45.594 | 47.235 | 48.0 |
| Pikes Peak Highway - Fill Slope | 098FS Upper Fence | 5/31/2011 | 1.490 | 3.449 | 4.992 | 12.551 | 25.559 | 34.0 |
| Pikes Peak Highway - Fill Slope | 101FS Upper Fence | 8/29/2011 | 0.963 | 2.509 | 3.714 | 7.941 | 13.094 | 19.0 |
| Pikes Peak Highway - Fill Slope | 101FS Lower Fence | 8/29/2011 | 0.533 | 1.837 | 4.042 | 18.408 | 33.269 | 35.0 |
| Pikes Peak Highway - Fill Slope | 124FS Lower Fence | 6/13/2011 | 0.708 | 1.835 | 2.828 | 6.922 | 10.883 | 20.0 |
| Pikes Peak Highway - Fill Slope | 177FS Upper Fence | 7/11/2011 | 0.632 | 1.495 | 2.583 | 6.745 | 11.175 | 15.0 |
| Pikes Peak Highway - Fill Slope | 186FS Lower Fence | 7/11/2011 | 0.097 | 0.854 | 1.446 | 4.473 | 7.593 | 15.0 |
| Pikes Peak Highway - Fill Slope | 186FS Upper Fence | 7/11/2011 | 0.052 | 0.695 | 1.327 | 4.586 | 7.227 | 10.0 |
| Pikes Peak Highway - Fill Slope | 187FS Upper Fence | 9/20/2011 | 0.161 | 1.076 | 1.945 | 5.223 | 7.883 | 18.0 |
| Pikes Peak Highway - Fill Slope | 198FS Upper Fence | 5/7/2011 | 0.042 | 0.657 | 1.426 | 4.953 | 8.595 | 18.0 |
| Pikes Peak Highway - Fill Slope | 203FS Upper Fence | 8/8/2011 | 0.053 | 0.718 | 1.363 | 4.278 | 7.040 | 14.0 |

**Sieve Analysis Worksheet**

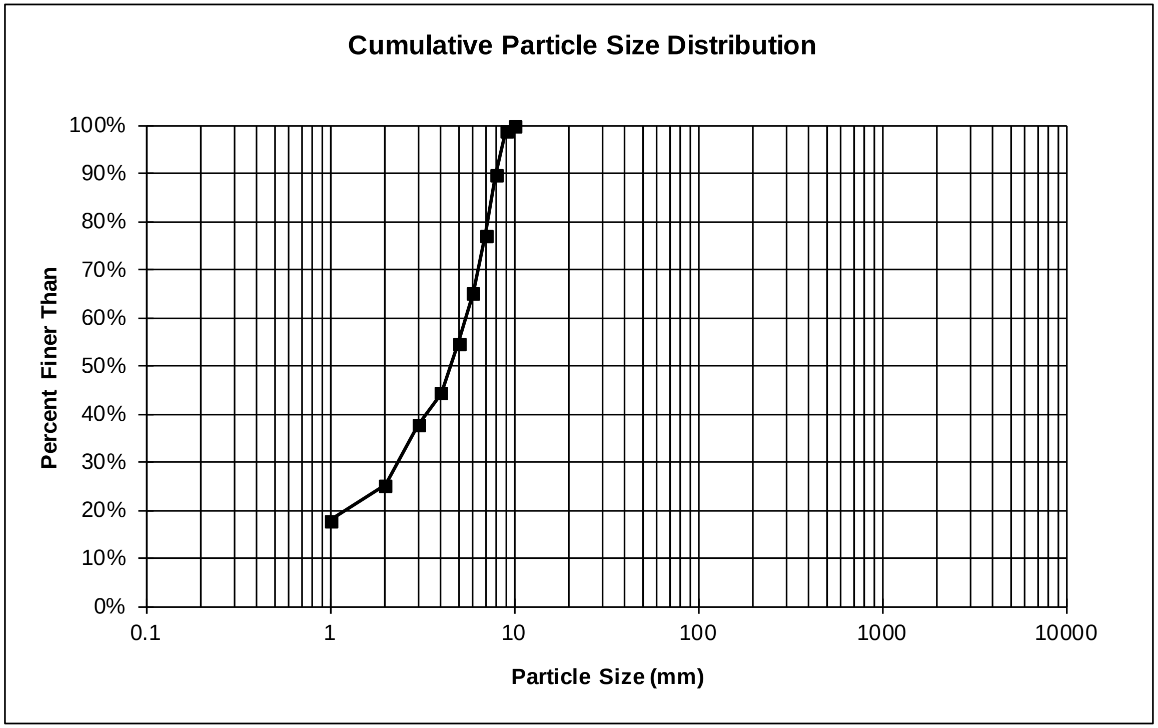
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 168.00 | 17.8% | |
| 0.5 | 69.50 | 7.4% | 17.8% |
| 1.0 | 117.00 | 12.4% | 25.2% |
| 2.0 | 62.30 | 6.6% | 37.7% |
| 2.8 | 97.30 | 10.3% | 44.3% |
| 4.0 | 99.50 | 10.6% | 54.6% |
| 5.6 | 111.30 | 11.8% | 65.2% |
| 8.0 | 118.00 | 12.5% | 77.0% |
| 11.2 | 85.40 | 9.1% | 89.6% |
| 16.0 | 12.90 | 1.4% | 98.6% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 941.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 011CS Lower Fence
DATE: 5/7/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.230 | 1.724 | 3.410 | 9.649 | 13.873 | 20.0 |



**Sieve Analysis Worksheet**

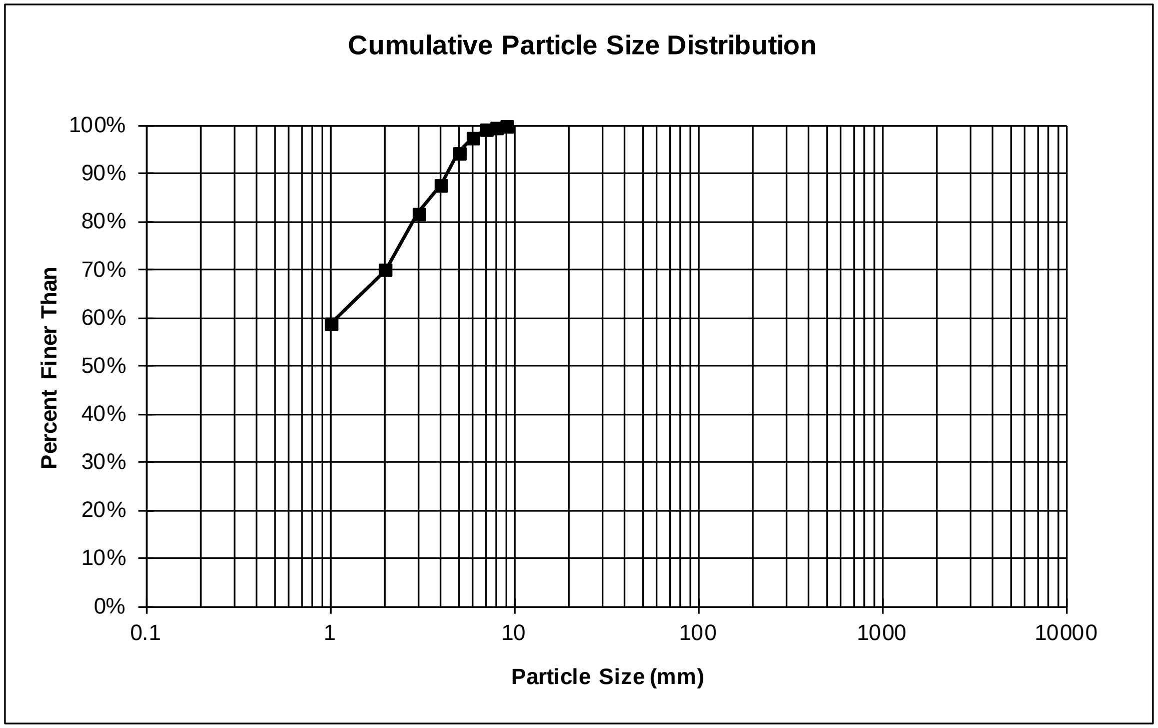
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 451.00 | 58.8% | |
| 0.5 | 85.50 | 11.1% | 58.8% |
| 1.0 | 89.90 | 11.7% | 69.9% |
| 2.0 | 46.40 | 6.0% | 81.6% |
| 2.8 | 51.00 | 6.6% | 87.7% |
| 4.0 | 23.90 | 3.1% | 94.3% |
| 5.6 | 12.00 | 1.6% | 97.4% |
| 8.0 | 4.70 | 0.6% | 99.0% |
| 11.2 | 3.10 | 0.4% | 99.6% |
| 13.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 767.50 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 011CS Upper Fence
DATE: 5/7/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.013 | 0.070 | 0.242 | 2.284 | 4.311 | 13.0 |



**Sieve Analysis Worksheet**

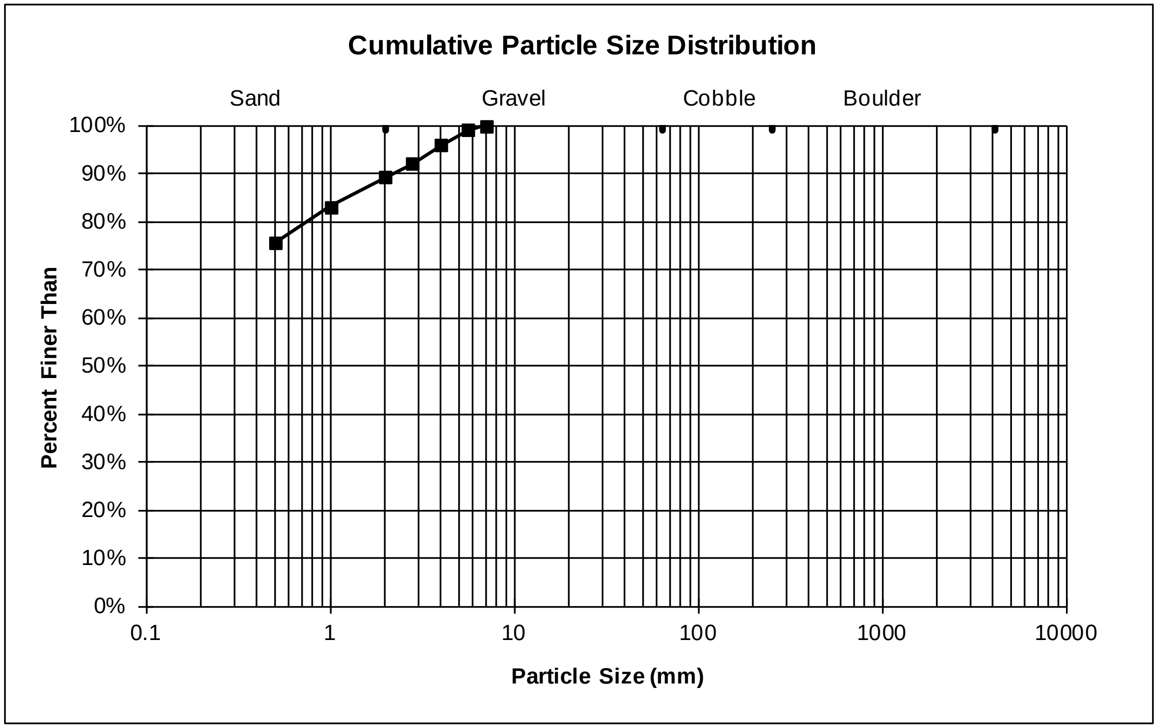
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 684.10 | 75.6% | |
| 0.5 | 68.10 | 7.5% | 75.6% |
| 1.0 | 55.70 | 6.2% | 83.1% |
| 2.0 | 25.90 | 2.9% | 89.2% |
| 2.8 | 33.90 | 3.7% | 92.1% |
| 4.0 | 28.50 | 3.1% | 95.8% |
| 5.6 | 9.20 | 1.0% | 99.0% |
| 7.0 | * | | 100.0% |
| 11.2 | | | - |
| 16.0 | | | |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 905.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 045CS Upper Fence
DATE: 5/31/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.010 | 0.037 | 0.097 | 1.109 | 3.694 | 7.0 |



**Sieve Analysis Worksheet**

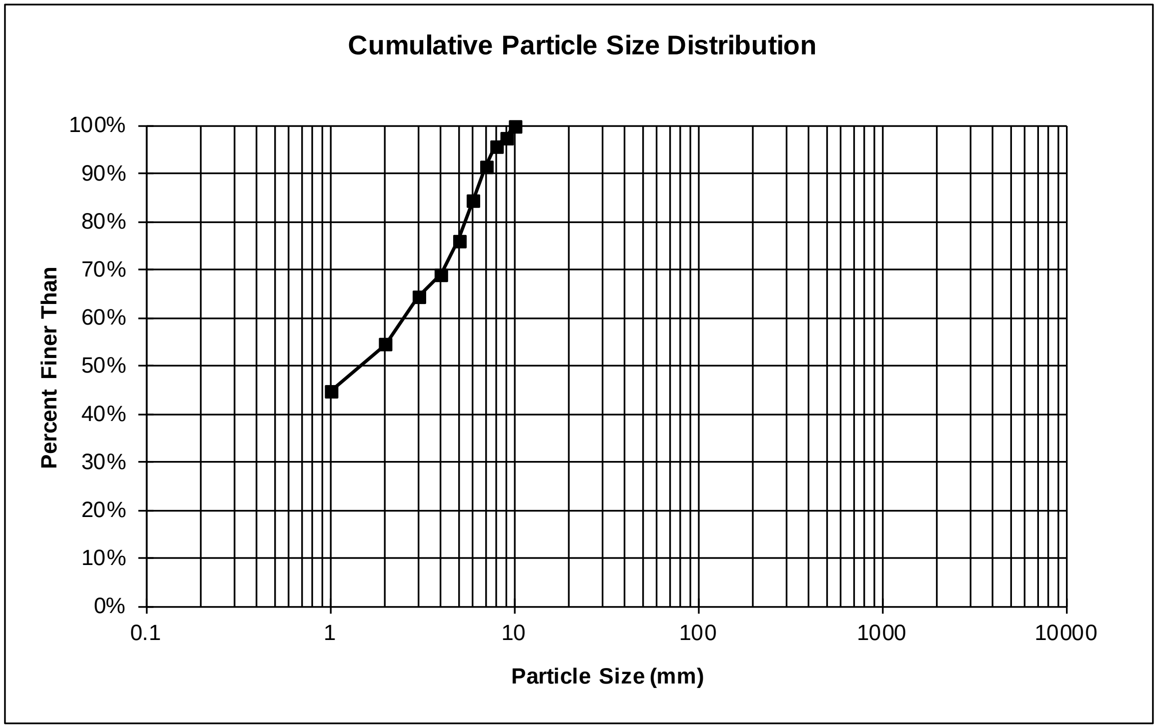
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 355.90 | 44.7% | |
| 0.5 | 78.10 | 9.8% | 44.7% |
| 1.0 | 77.30 | 9.7% | 54.6% |
| 2.0 | 37.80 | 4.8% | 64.3% |
| 2.8 | 55.60 | 7.0% | 69.0% |
| 4.0 | 66.90 | 8.4% | 76.0% |
| 5.6 | 54.90 | 6.9% | 84.4% |
| 8.0 | 35.00 | 4.4% | 91.3% |
| 11.2 | 12.20 | 1.5% | 95.7% |
| 16.0 | 21.90 | 2.8% | 97.2% |
| 19.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 795.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 049CS Lower Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.020 | 0.174 | 0.725 | 5.508 | 10.605 | 19.0 |



**Sieve Analysis Worksheet**

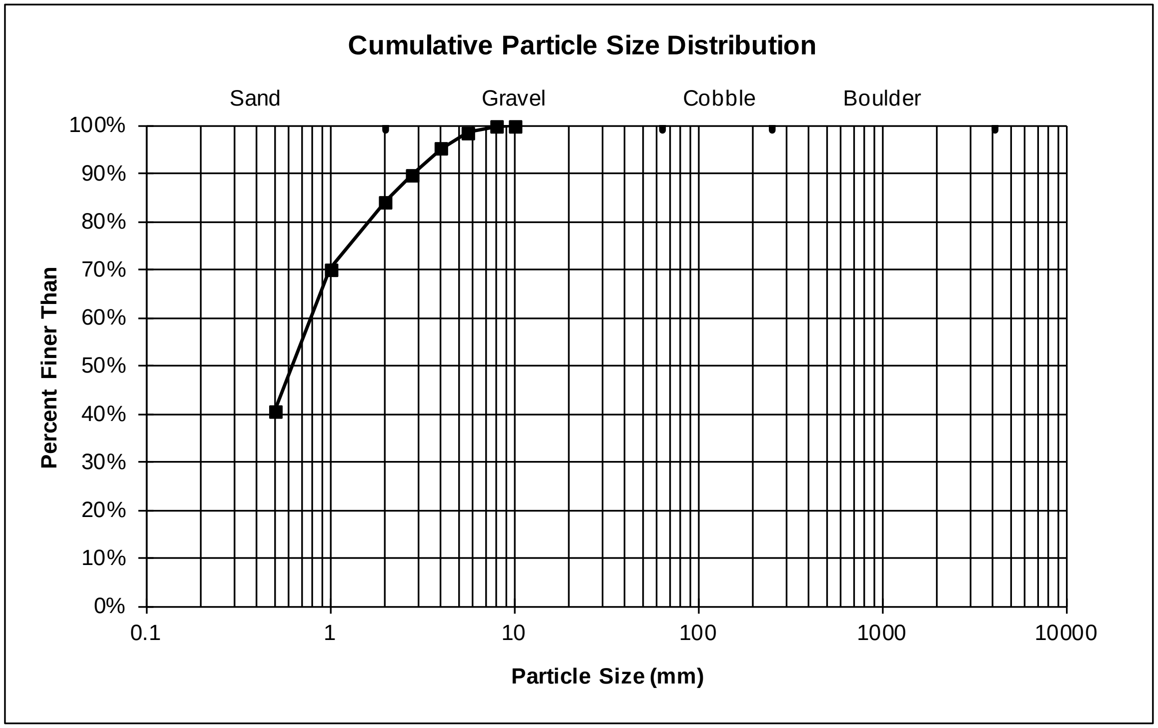
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 404.70 | 40.4% | |
| 0.5 | 296.90 | 29.7% | 40.4% |
| 1.0 | 140.10 | 14.0% | 70.1% |
| 2.0 | 55.70 | 5.6% | 84.1% |
| 2.8 | 55.60 | 5.6% | 89.7% |
| 4.0 | 32.90 | 3.3% | 95.2% |
| 5.6 | 13.20 | 1.3% | 98.5% |
| 8.0 | 1.80 | 0.2% | 99.8% |
| 10.0 | * | | 100.0% |
| 16.0 | | | - |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1000.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 078CS Lower Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.024 | 0.260 | 0.625 | 1.991 | 3.945 | 10.0 |



**Sieve Analysis Worksheet**

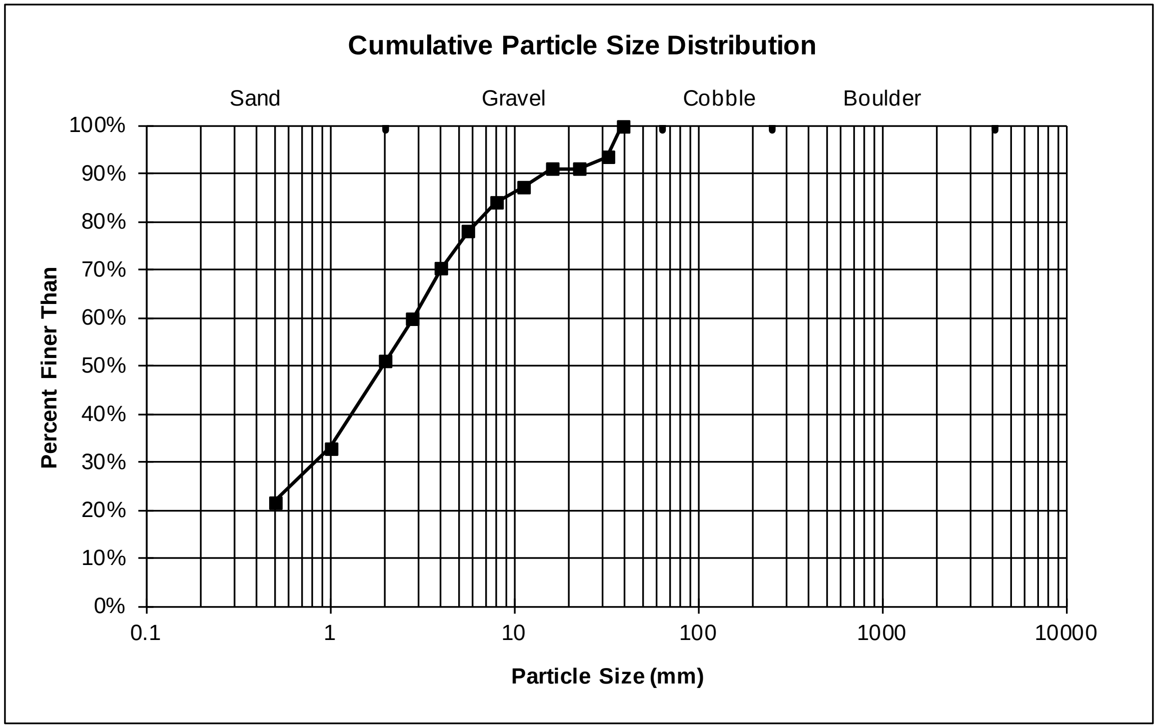
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 230.70 | 21.6% | |
| 0.5 | 120.80 | 11.3% | 21.6% |
| 1.0 | 192.70 | 18.1% | 33.0% |
| 2.0 | 92.50 | 8.7% | 51.0% |
| 2.8 | 111.90 | 10.5% | 59.7% |
| 4.0 | 82.80 | 7.8% | 70.2% |
| 5.6 | 63.80 | 6.0% | 78.0% |
| 8.0 | 34.70 | 3.3% | 83.9% |
| 11.2 | 40.10 | 3.8% | 87.2% |
| 16.0 | 0.00 | 0.0% | 91.0% |
| 22.4 | 26.10 | 2.4% | 91.0% |
| 32.0 | 70.40 | 6.6% | 93.4% |
| 39.0 | * | | 100.0% |
| 64.0 | | | - |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1066.50 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 087CS Lower Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.113 | 1.081 | 1.923 | 8.051 | 33.573 | 39.0 |



**Sieve Analysis Worksheet**

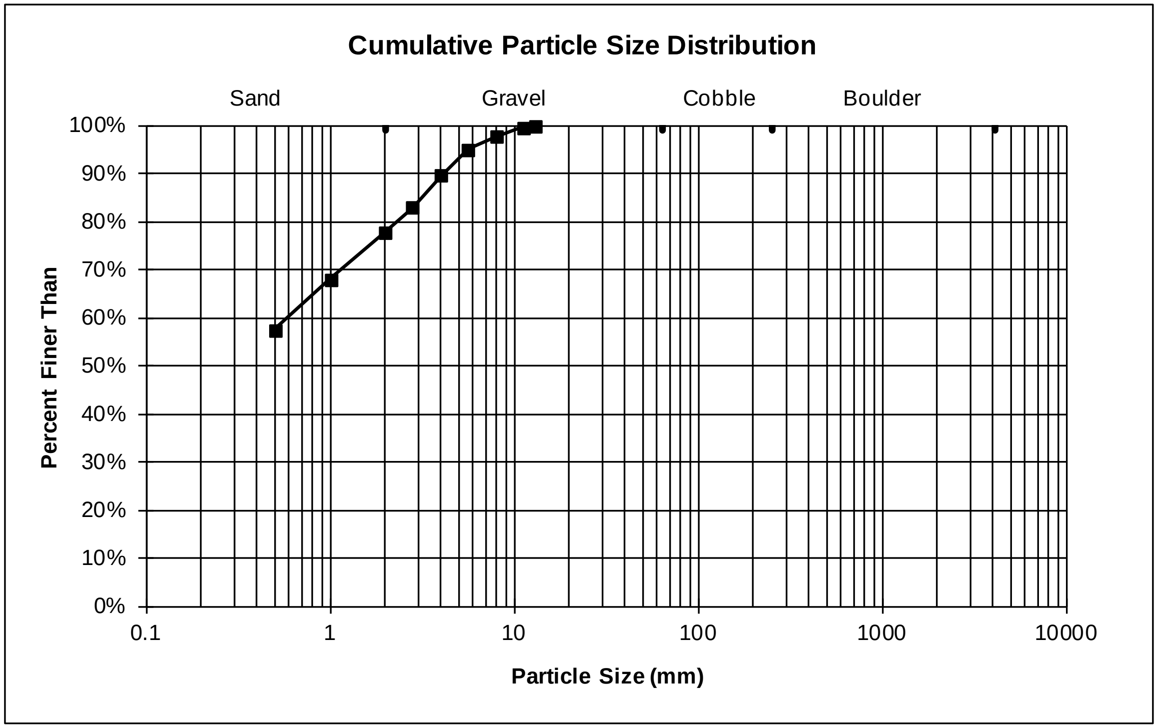
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 510.50 | 57.5% | |
| 0.5 | 93.10 | 10.5% | 57.5% |
| 1.0 | 87.50 | 9.9% | 68.0% |
| 2.0 | 44.90 | 5.1% | 77.9% |
| 2.8 | 58.10 | 6.5% | 82.9% |
| 4.0 | 48.50 | 5.5% | 89.5% |
| 5.6 | 24.10 | 2.7% | 94.9% |
| 8.0 | 16.70 | 1.9% | 97.7% |
| 11.2 | 4.10 | 0.5% | 99.5% |
| 13.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 887.50 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 087CS Upper Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.014 | 0.075 | 0.265 | 2.968 | 5.644 | 13.0 |



**Sieve Analysis Worksheet**

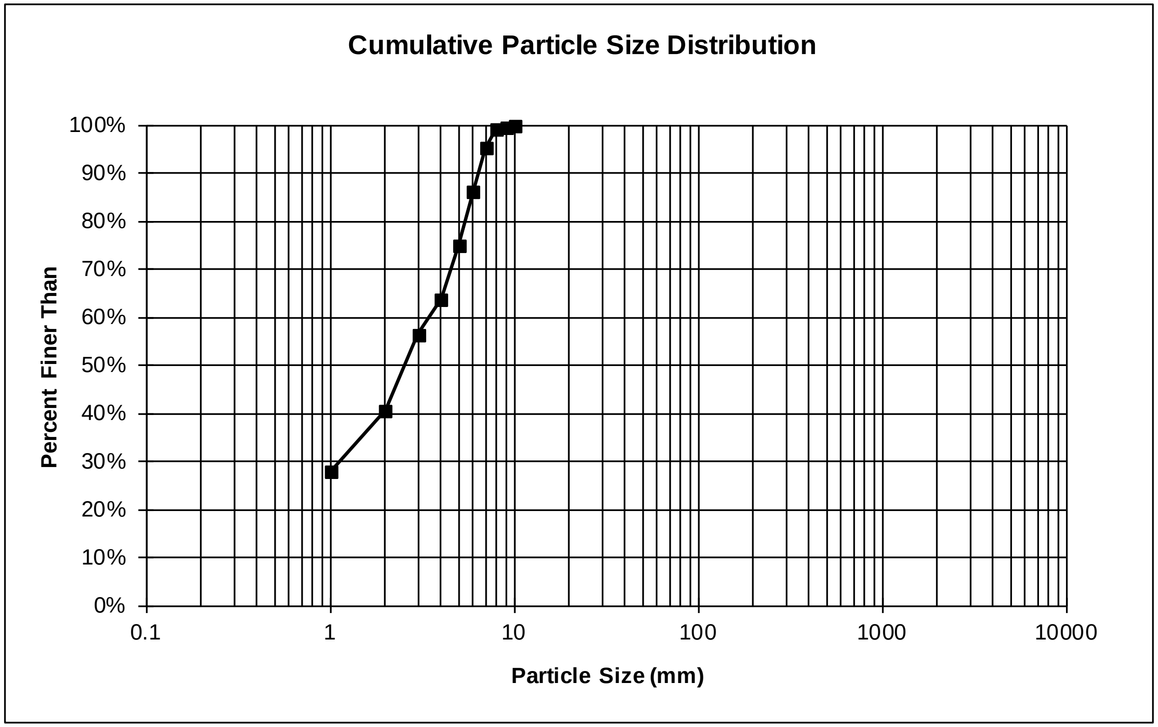
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 231.60 | 27.8% | |
| 0.5 | 107.10 | 12.8% | 27.8% |
| 1.0 | 131.90 | 15.8% | 40.6% |
| 2.0 | 61.30 | 7.4% | 56.4% |
| 2.8 | 92.40 | 11.1% | 63.8% |
| 4.0 | 94.80 | 11.4% | 74.9% |
| 5.6 | 74.90 | 9.0% | 86.2% |
| 8.0 | 31.80 | 3.8% | 95.2% |
| 11.2 | 3.50 | 0.4% | 99.0% |
| 16.0 | 4.70 | 0.6% | 99.4% |
| 21.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 834.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 090CS Lower Fence
DATE: 6/13/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.054 | 0.739 | 1.509 | 5.243 | 7.935 | 21.0 |



**Sieve Analysis Worksheet**

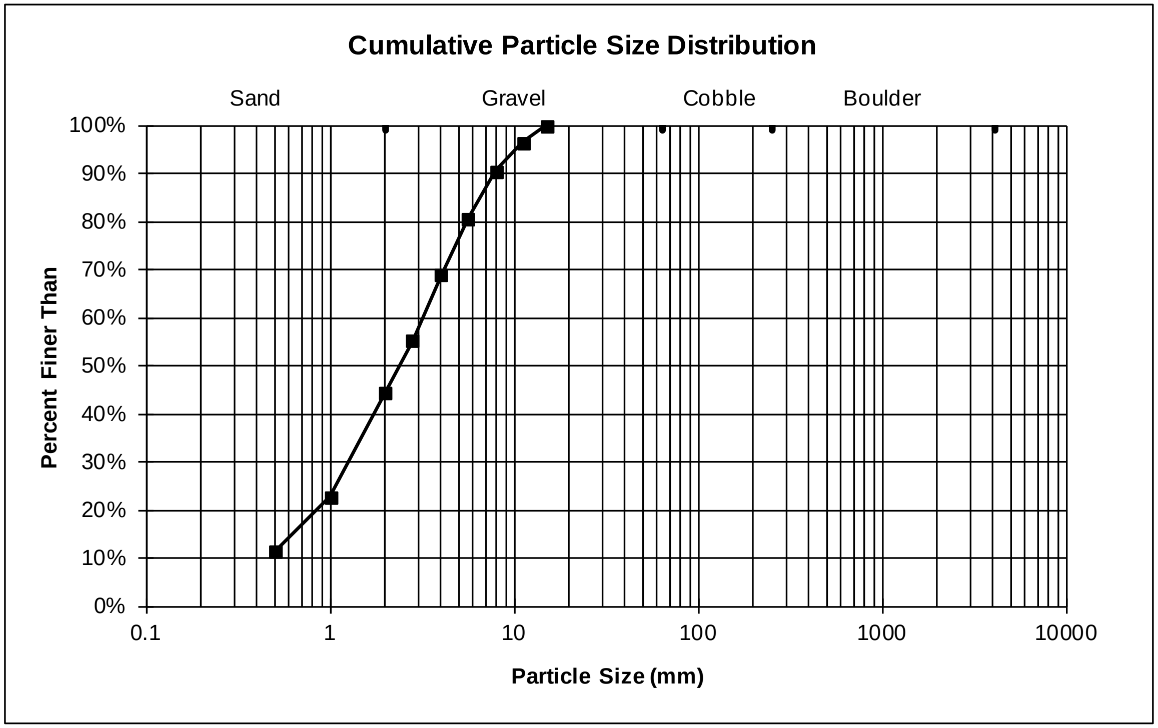
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 86.50 | 11.3% | |
| 0.5 | 87.60 | 11.4% | 11.3% |
| 1.0 | 167.90 | 21.8% | 22.6% |
| 2.0 | 81.60 | 10.6% | 44.5% |
| 2.8 | 106.20 | 13.8% | 55.1% |
| 4.0 | 89.90 | 11.7% | 68.9% |
| 5.6 | 75.60 | 9.8% | 80.6% |
| 8.0 | 45.90 | 6.0% | 90.4% |
| 11.2 | 27.60 | 3.6% | 96.4% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 768.80 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 102CS Upper Fence
DATE: 6/13/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.628 | 1.480 | 2.382 | 6.334 | 10.344 | 15.0 |



**Sieve Analysis Worksheet**

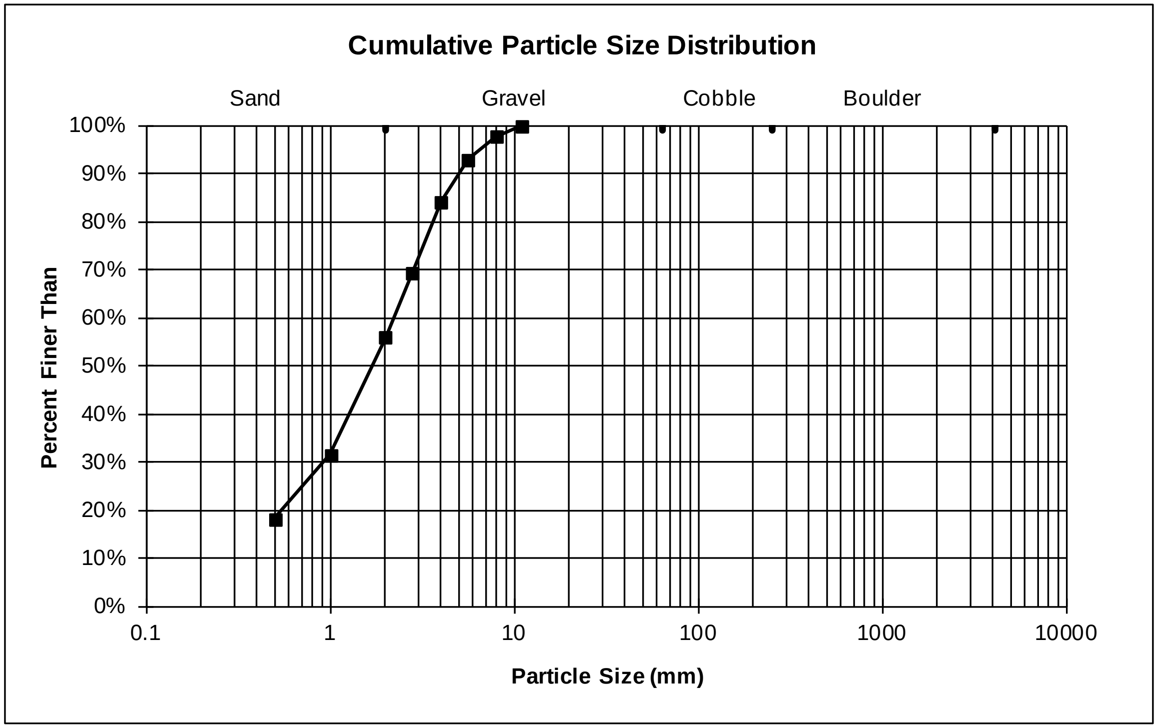
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 178.10 | 18.2% | |
| 0.5 | 129.80 | 13.3% | 18.2% |
| 1.0 | 238.90 | 24.4% | 31.5% |
| 2.0 | 132.00 | 13.5% | 56.0% |
| 2.8 | 143.80 | 14.7% | 69.5% |
| 4.0 | 85.70 | 8.8% | 84.2% |
| 5.6 | 46.60 | 4.8% | 92.9% |
| 8.0 | 22.40 | 2.3% | 97.7% |
| 11.0 | * | | 100.0% |
| 16.0 | | | - |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 977.30 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 141CS Upper Fence
DATE: 7/6/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.212 | 1.104 | 1.689 | 3.983 | 6.533 | 11.0 |



**Sieve Analysis Worksheet**

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

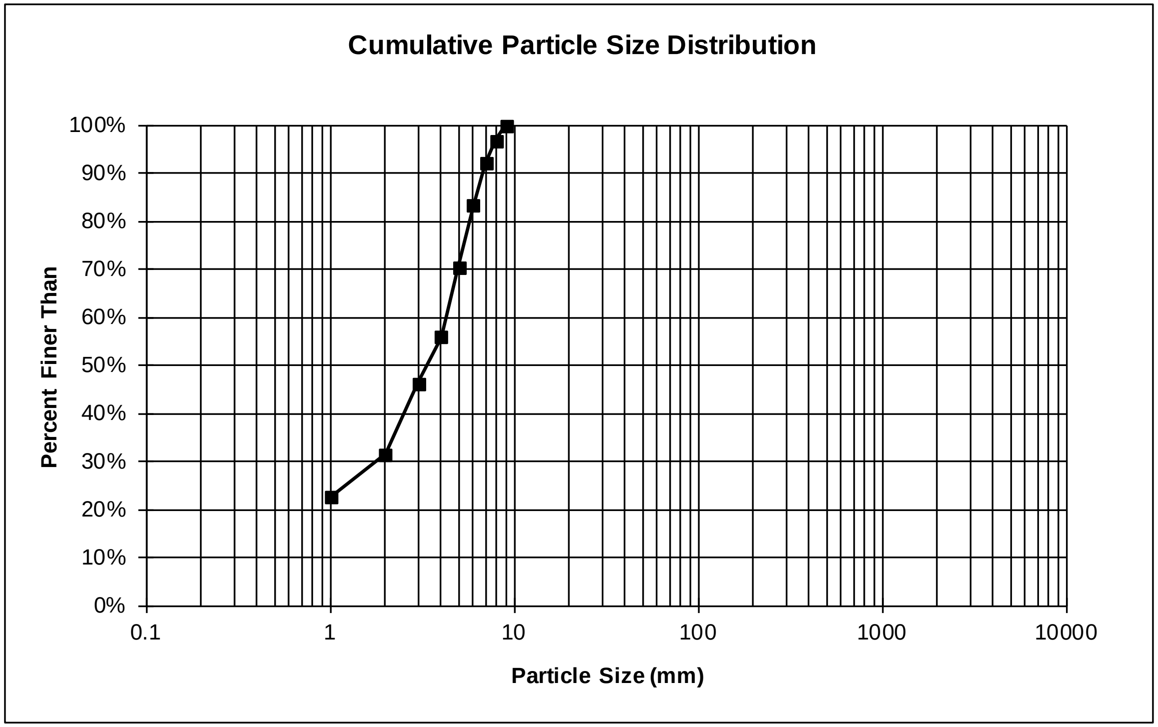
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 215.00 | 22.5% | |
| 0.5 | 86.60 | 9.1% | 22.5% |
| 1.0 | 140.20 | 14.7% | 31.6% |
| 2.0 | 92.50 | 9.7% | 46.3% |
| 2.8 | 138.30 | 14.5% | 55.9% |
| 4.0 | 123.00 | 12.9% | 70.4% |
| 5.6 | 83.10 | 8.7% | 83.3% |
| 8.0 | 46.20 | 4.8% | 92.0% |
| 11.2 | 30.30 | 3.2% | 96.8% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 955.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 192CS Lower Fence
DATE: 8/8/2011
CREW: Derengowski, VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.099 | 1.176 | 2.278 | 5.765 | 9.863 | 15.0 |



**Sieve Analysis Worksheet**

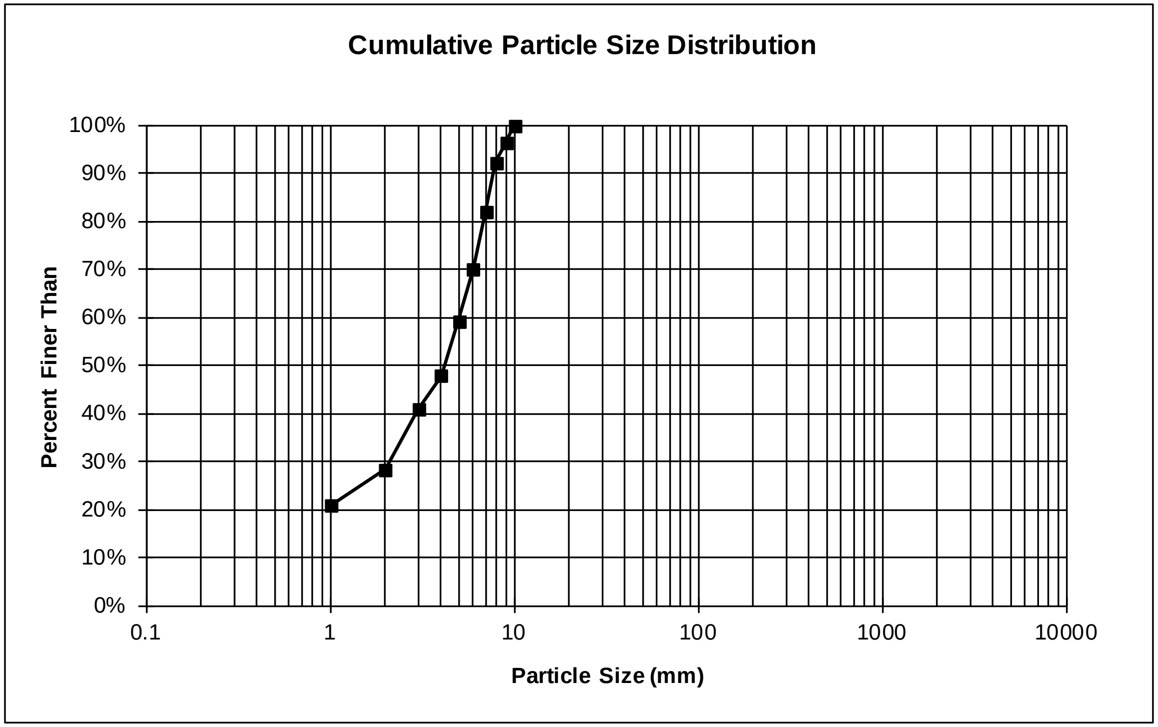
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 188.80 | 20.7% | |
| 0.5 | 69.50 | 7.6% | 20.7% |
| 1.0 | 112.50 | 12.4% | 28.4% |
| 2.0 | 64.80 | 7.1% | 40.7% |
| 2.8 | 103.50 | 11.4% | 47.8% |
| 4.0 | 99.00 | 10.9% | 59.2% |
| 5.6 | 107.20 | 11.8% | 70.1% |
| 8.0 | 94.20 | 10.3% | 81.9% |
| 11.2 | 36.40 | 4.0% | 92.2% |
| 16.0 | 34.50 | 3.8% | 96.2% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 910.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 197CS Lower Fence
DATE: 5/7/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.131 | 1.450 | 2.996 | 8.575 | 14.362 | 20.0 |



**Sieve Analysis Worksheet**

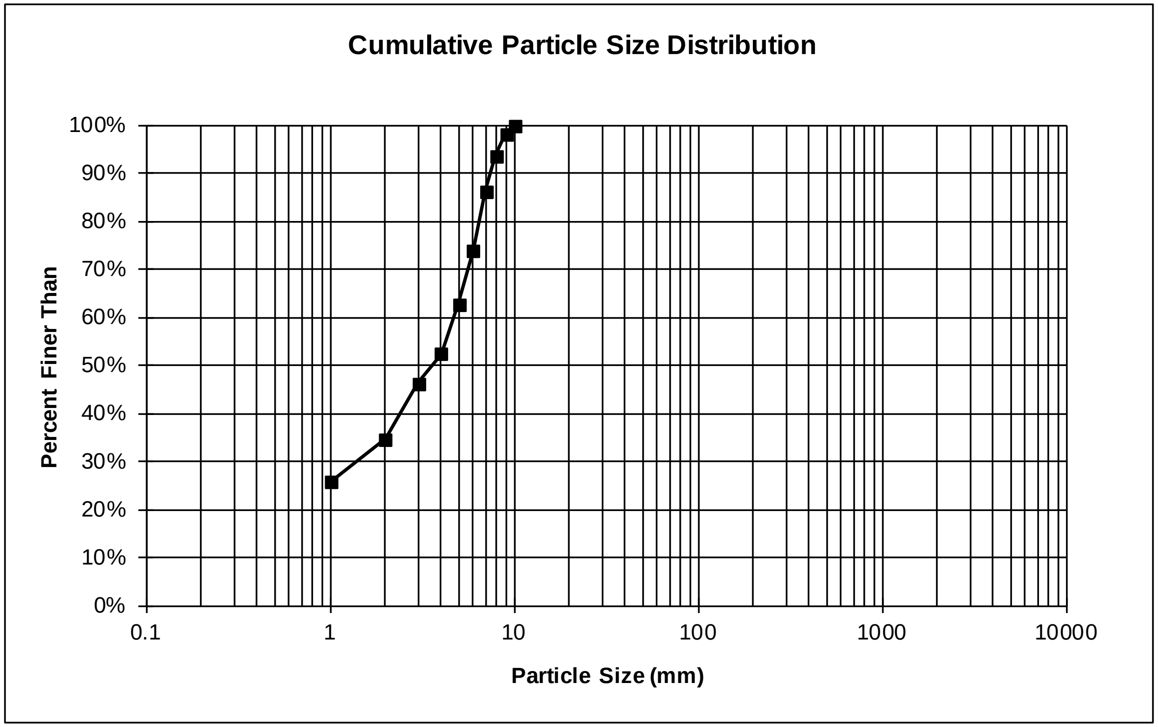
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 231.40 | 25.8% | |
| 0.5 | 80.40 | 8.9% | 25.8% |
| 1.0 | 103.80 | 11.6% | 34.7% |
| 2.0 | 54.60 | 6.1% | 46.2% |
| 2.8 | 93.60 | 10.4% | 52.3% |
| 4.0 | 100.50 | 11.2% | 62.7% |
| 5.6 | 109.90 | 12.2% | 73.9% |
| 8.0 | 67.10 | 7.5% | 86.2% |
| 11.2 | 41.20 | 4.6% | 93.6% |
| 16.0 | 16.10 | 1.8% | 98.2% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 898.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Cut Slope
ID NUMBER: 197CS Upper Fence
DATE: 5/7/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.066 | 1.018 | 2.462 | 7.512 | 12.466 | 20.0 |



**Sieve Analysis Worksheet**

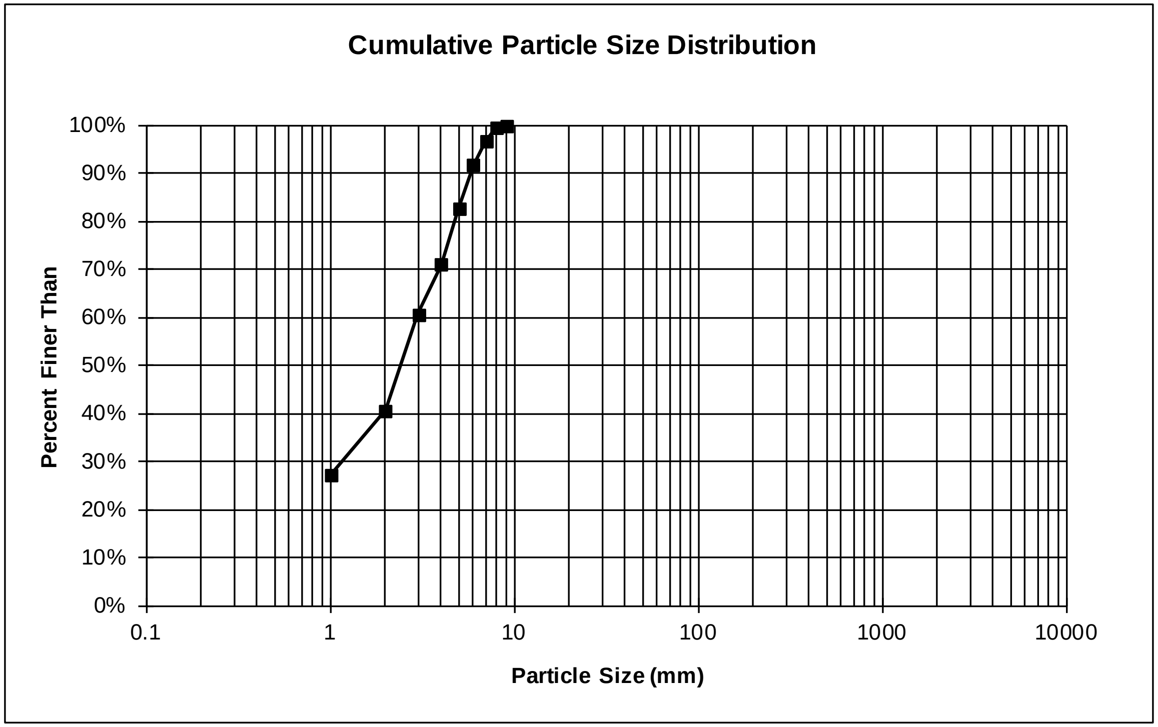
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 286.00 | 27.1% | |
| 0.5 | 142.40 | 13.5% | 27.1% |
| 1.0 | 210.20 | 19.9% | 40.6% |
| 2.0 | 109.80 | 10.4% | 60.6% |
| 2.8 | 122.70 | 11.6% | 71.0% |
| 4.0 | 95.00 | 9.0% | 82.6% |
| 5.6 | 52.50 | 5.0% | 91.6% |
| 8.0 | 30.30 | 2.9% | 96.6% |
| 11.2 | 5.60 | 0.5% | 99.5% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1054.50 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 001FS Upper Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.057 | 0.749 | 1.385 | 4.213 | 7.136 | 15.0 |



**Sieve Analysis Worksheet**

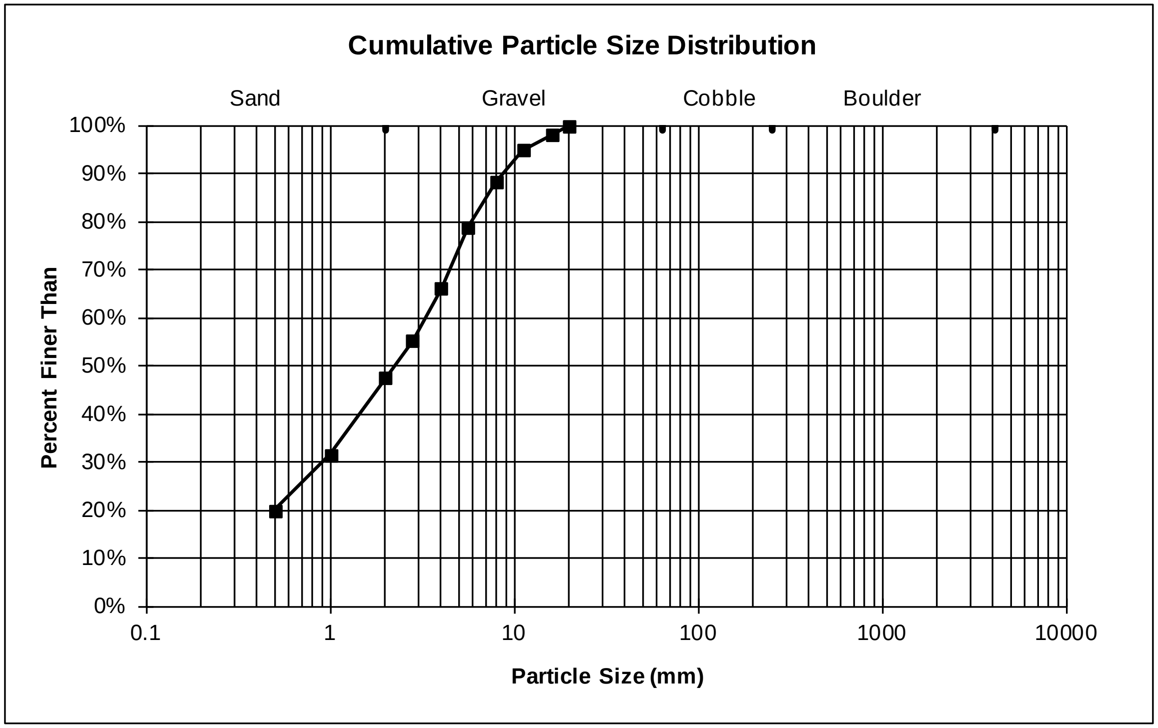
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 209.20 | 20.0% | |
| 0.5 | 120.40 | 11.5% | 20.0% |
| 1.0 | 167.30 | 16.0% | 31.5% |
| 2.0 | 79.60 | 7.6% | 47.5% |
| 2.8 | 114.80 | 11.0% | 55.1% |
| 4.0 | 134.40 | 12.8% | 66.1% |
| 5.6 | 97.50 | 9.3% | 78.9% |
| 8.0 | 69.60 | 6.7% | 88.2% |
| 11.2 | 32.40 | 3.1% | 94.9% |
| 16.0 | 21.20 | 2.0% | 98.0% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1046.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 039FS Upper Fence
DATE: 5/9/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.149** | **1.164** | **2.235** | **6.805** | **11.359** | **20.0** |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 70.40 | 12.2% | |
| 0.5 | 62.70 | 10.9% | 12.2% |
| 1.0 | 122.00 | 21.2% | 23.1% |
| 2.0 | 65.90 | 11.4% | 44.3% |
| 2.8 | 88.80 | 15.4% | 55.8% |
| 4.0 | 72.70 | 12.6% | 71.2% |
| 5.6 | 53.20 | 9.2% | 83.8% |
| 8.0 | 29.30 | 5.1% | 93.1% |
| 11.2 | 0.00 | 0.0% | 98.1% |
| 16.0 | 10.70 | 1.9% | 98.1% |
| 19.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 575.70 | | |

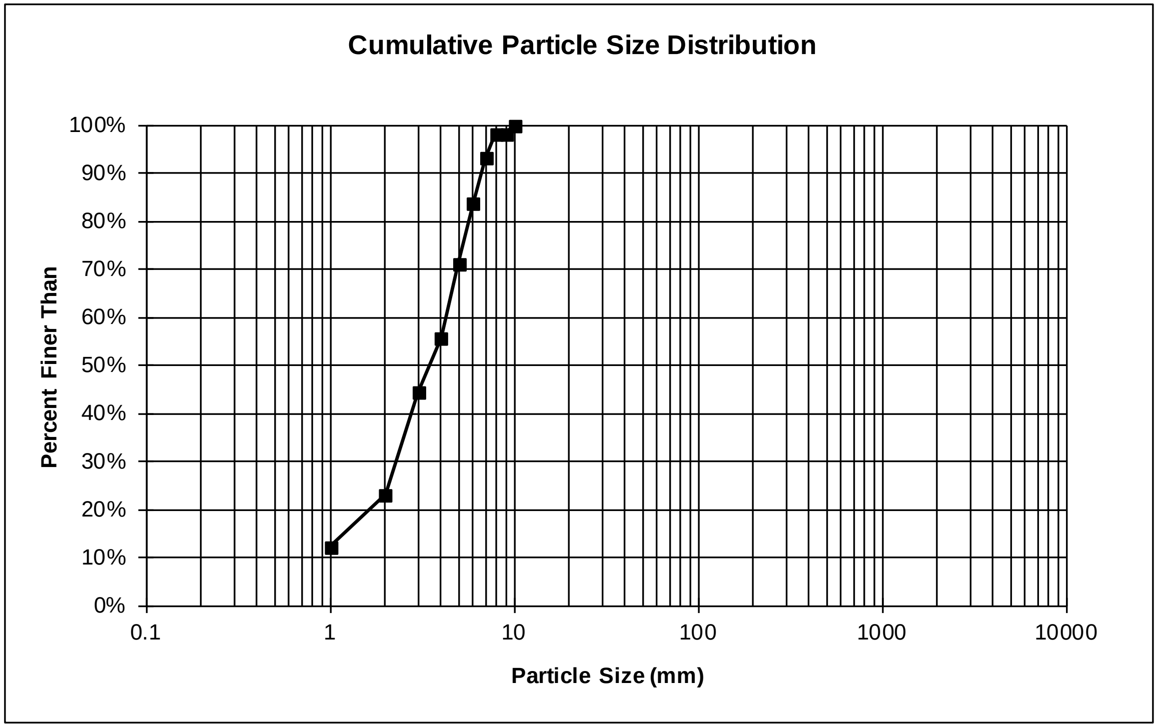
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 039FS Lower Fence
DATE: 5/9/2011
CREW: VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.596 | 1.475 | 2.364 | 5.641 | 9.100 | 19.0 |



**Sieve Analysis Worksheet**

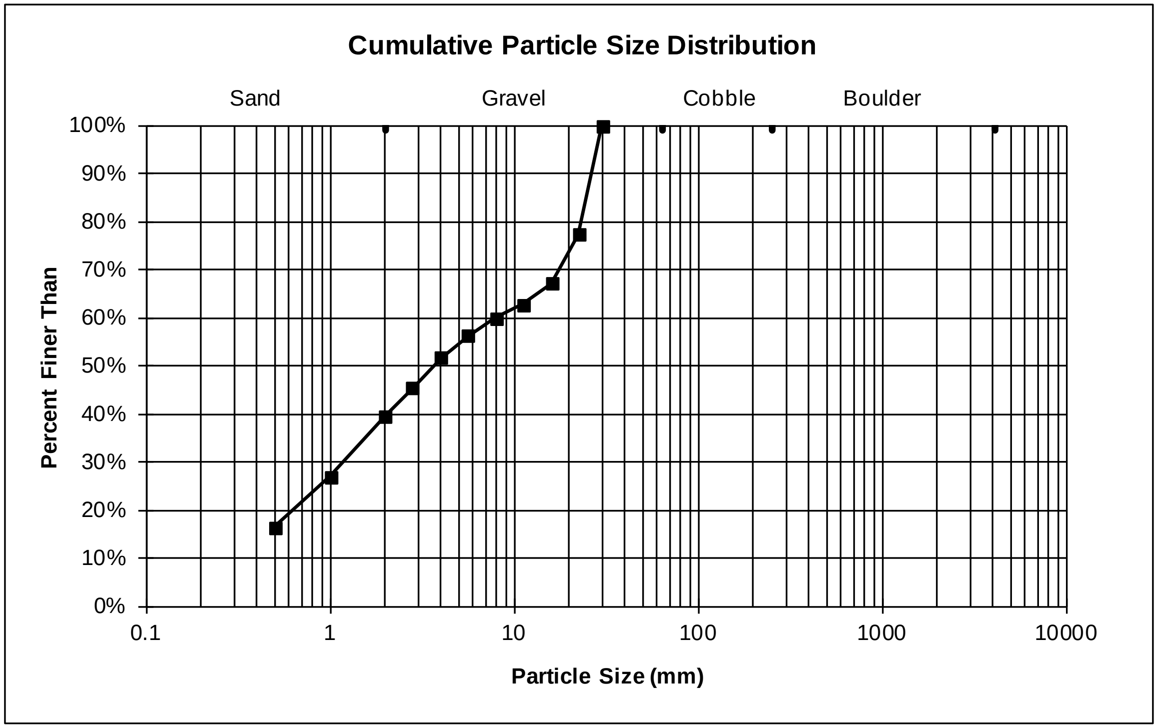
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 139.90 | 16.4% | |
| 0.5 | 90.20 | 10.6% | 16.4% |
| 1.0 | 108.20 | 12.7% | 27.0% |
| 2.0 | 49.00 | 5.7% | 39.6% |
| 2.8 | 53.40 | 6.3% | 45.4% |
| 4.0 | 38.80 | 4.5% | 51.6% |
| 5.6 | 32.40 | 3.8% | 56.2% |
| 8.0 | 22.90 | 2.7% | 60.0% |
| 11.2 | 37.20 | 4.4% | 62.7% |
| 16.0 | 87.60 | 10.3% | 67.0% |
| 22.4 | 193.90 | 22.7% | 77.3% |
| 30.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 853.50 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 043FS Upper Fence
DATE: 9/20/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.331 | 1.552 | 3.644 | 24.421 | 28.132 | 30.0 |



**Sieve Analysis Worksheet**

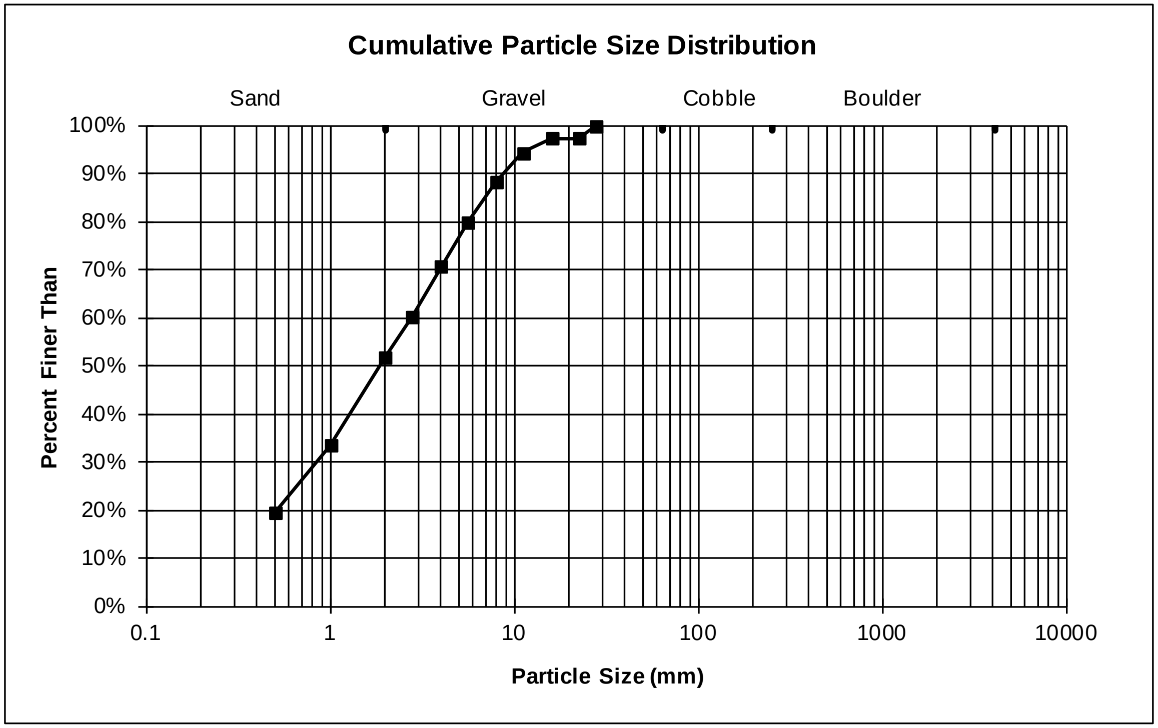
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 162.90 | 19.4% | |
| 0.5 | 118.50 | 14.1% | 19.4% |
| 1.0 | 155.10 | 18.4% | 33.5% |
| 2.0 | 70.00 | 8.3% | 51.9% |
| 2.8 | 87.40 | 10.4% | 60.2% |
| 4.0 | 78.80 | 9.4% | 70.6% |
| 5.6 | 68.20 | 8.1% | 80.0% |
| 8.0 | 51.90 | 6.2% | 88.1% |
| 11.2 | 25.90 | 3.1% | 94.3% |
| 16.0 | 0.00 | 0.0% | 97.4% |
| 22.4 | 22.20 | 2.6% | 97.4% |
| 28.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 840.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 074FS Upper Fence
DATE: 5/10/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.167 | 1.059 | 1.862 | 6.678 | 12.174 | 28.0 |



**Sieve Analysis Worksheet**

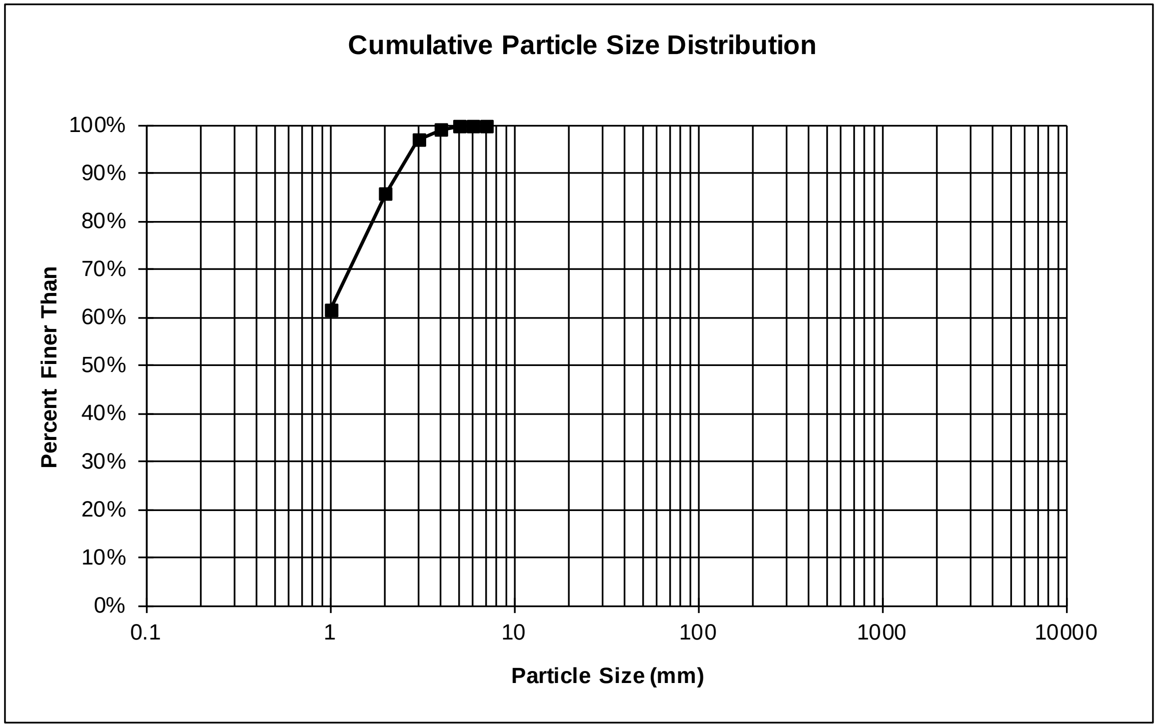
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 400.80 | 61.5% | |
| 0.5 | 158.30 | 24.3% | 61.5% |
| 1.0 | 72.80 | 11.2% | 85.7% |
| 2.0 | 13.60 | 2.1% | 96.9% |
| 2.8 | 4.60 | 0.7% | 99.0% |
| 4.0 | 1.20 | 0.2% | 99.7% |
| 5.6 | 0.90 | 0.1% | 99.9% |
| 7.0 | * | | 100.0% |
| 11.2 | | | - |
| 16.0 | | | |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 652.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 074FS Lower Fence
DATE: 5/10/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.013** | **0.062** | **0.202** | **0.952** | **1.779** | **7.0** |



**Sieve Analysis Worksheet**

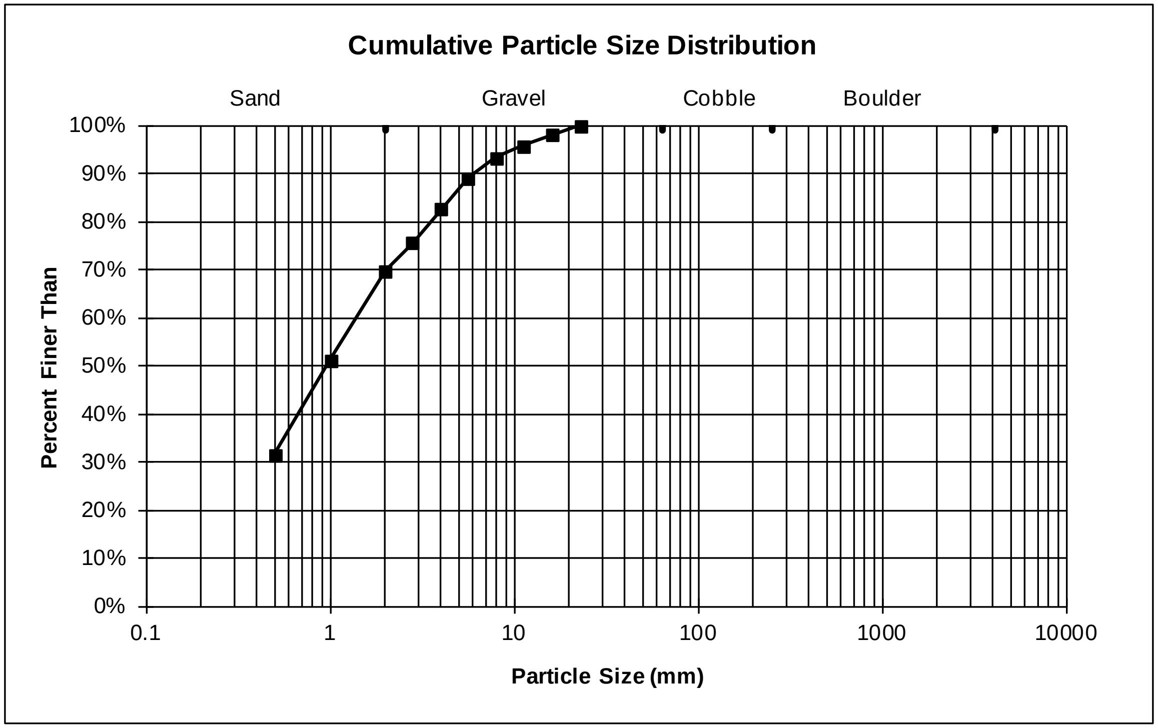
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 228.70 | 31.4% | |
| 0.5 | 143.90 | 19.8% | 31.4% |
| 1.0 | 135.10 | 18.6% | 51.2% |
| 2.0 | 42.20 | 5.8% | 69.7% |
| 2.8 | 50.50 | 6.9% | 75.5% |
| 4.0 | 47.80 | 6.6% | 82.5% |
| 5.6 | 30.90 | 4.2% | 89.1% |
| 8.0 | 16.90 | 2.3% | 93.3% |
| 11.2 | 17.50 | 2.4% | 95.6% |
| 16.0 | 14.40 | 2.0% | 98.0% |
| 23.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 727.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 079FS Upper Fence
DATE: 7/11/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.040 | 0.567 | 0.959 | 4.323 | 10.241 | 23.0 |



**Sieve Analysis Worksheet**

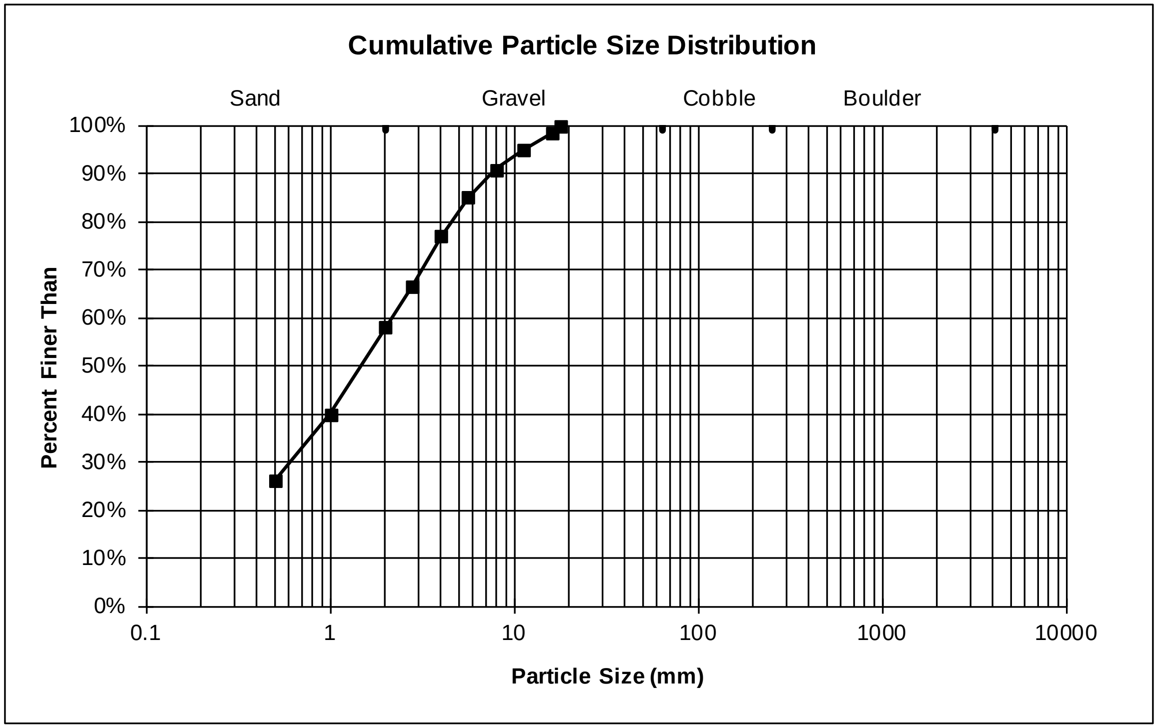
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 256.80 | 26.0% | |
| 0.5 | 137.70 | 13.9% | 26.0% |
| 1.0 | 178.00 | 18.0% | 39.9% |
| 2.0 | 85.60 | 8.7% | 57.9% |
| 2.8 | 102.40 | 10.4% | 66.6% |
| 4.0 | 80.00 | 8.1% | 77.0% |
| 5.6 | 55.70 | 5.6% | 85.1% |
| 8.0 | 40.20 | 4.1% | 90.7% |
| 11.2 | 34.90 | 3.5% | 94.8% |
| 16.0 | 16.70 | 1.7% | 98.3% |
| 18.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 988.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 083FS Upper Fence
DATE: 6/13/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.064 | 0.783 | 1.473 | 5.356 | 11.455 | 18.0 |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 236.90 | 23.3% | |
| 0.5 | 120.50 | 11.9% | 23.3% |
| 1.0 | 192.00 | 18.9% | 35.2% |
| 2.0 | 112.00 | 11.0% | 54.1% |
| 2.8 | 146.20 | 14.4% | 65.2% |
| 4.0 | 109.20 | 10.8% | 79.6% |
| 5.6 | 69.10 | 6.8% | 90.3% |
| 8.0 | 21.40 | 2.1% | 97.2% |
| 11.2 | 7.50 | 0.7% | 99.3% |
| 13.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1014.80 | | |

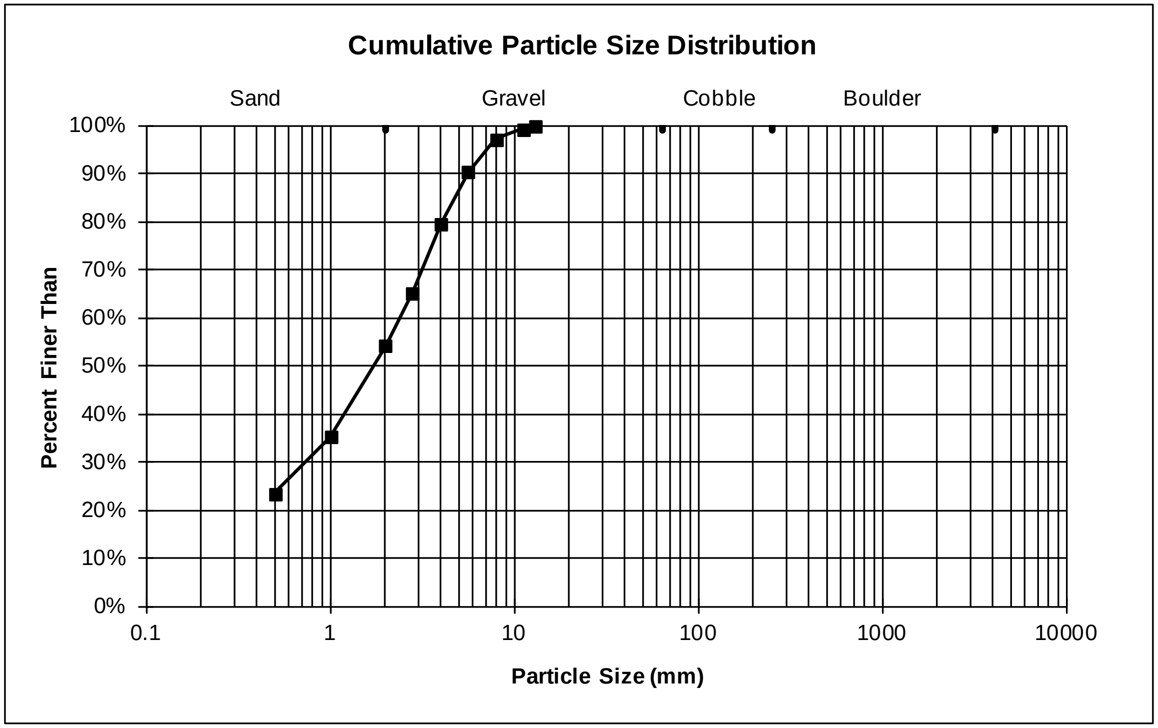
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 083FS Lower Fence
DATE: 6/13/2011
CREW: Derengowski, VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.088 | 0.987 | 1.719 | 4.593 | 7.147 | 13.0 |



**Sieve Analysis Worksheet**

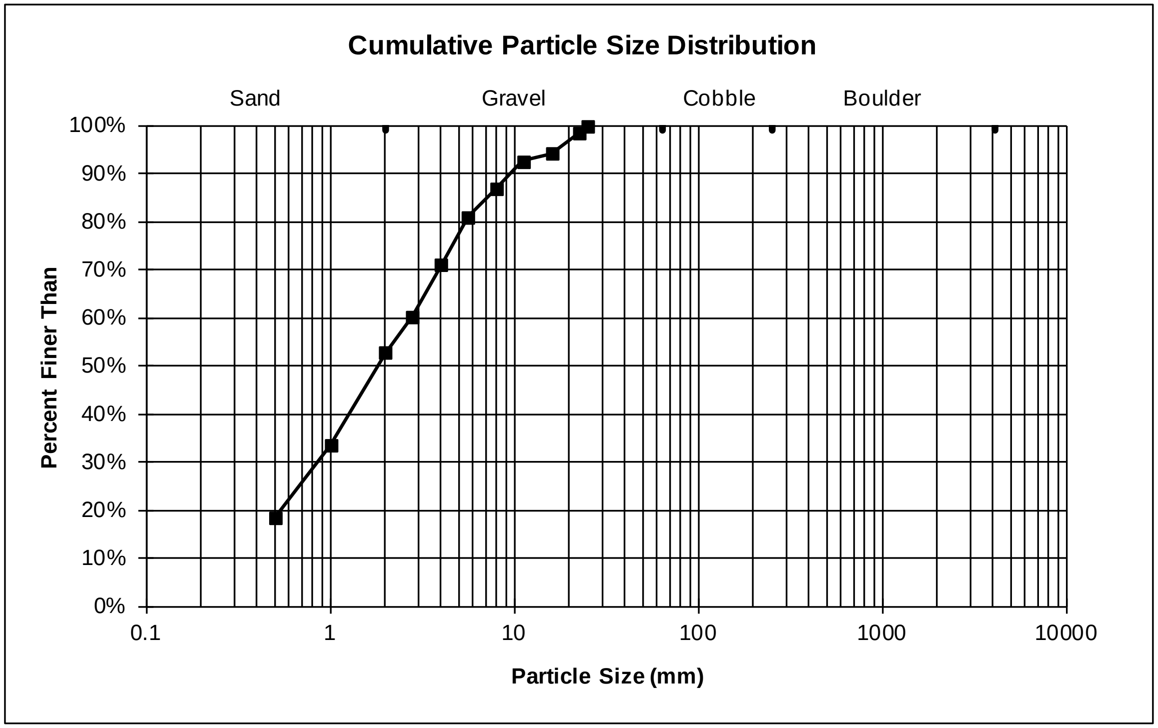
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 200.50 | 18.4% | |
| 0.5 | 163.40 | 15.0% | 18.4% |
| 1.0 | 210.70 | 19.3% | 33.4% |
| 2.0 | 83.20 | 7.6% | 52.7% |
| 2.8 | 115.30 | 10.6% | 60.3% |
| 4.0 | 109.30 | 10.0% | 70.9% |
| 5.6 | 64.30 | 5.9% | 80.9% |
| 8.0 | 62.10 | 5.7% | 86.8% |
| 11.2 | 17.50 | 1.6% | 92.5% |
| 16.0 | 46.00 | 4.2% | 94.1% |
| 22.4 | 18.30 | 1.7% | 98.3% |
| 25.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1090.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 086FS Upper Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.205 | 1.060 | 1.816 | 6.751 | 17.185 | 25.0 |



**Sieve Analysis Worksheet**

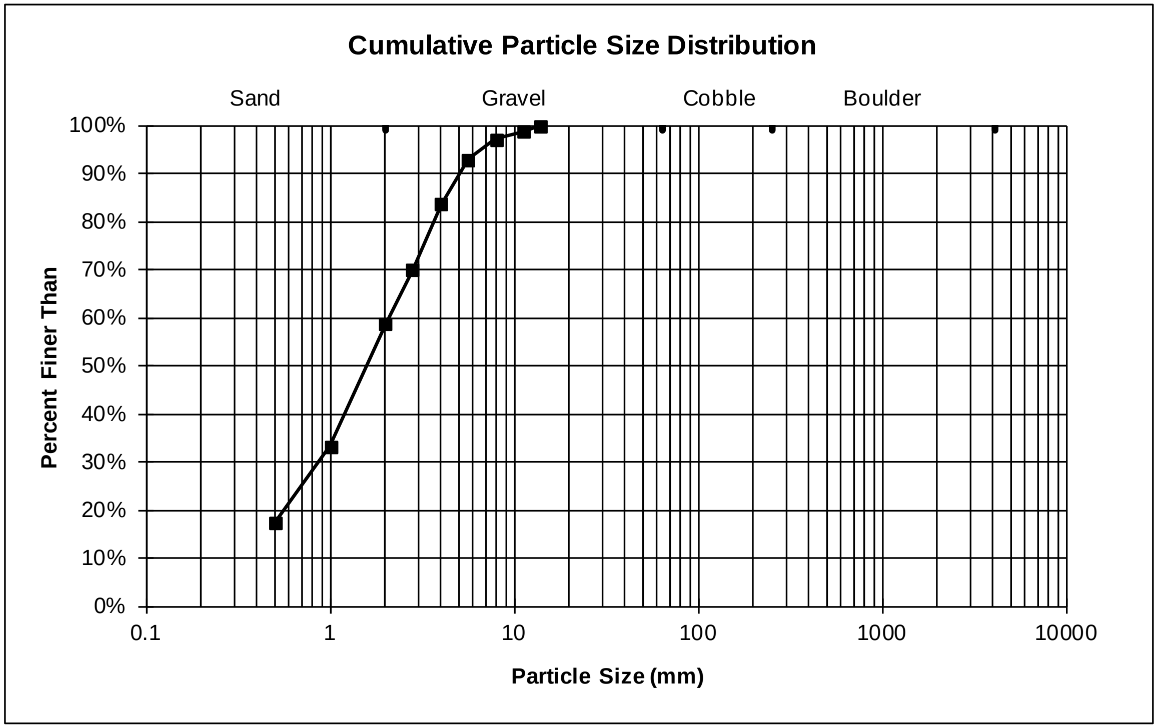
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 155.70 | 17.4% | |
| 0.5 | 142.20 | 15.9% | 17.4% |
| 1.0 | 228.00 | 25.4% | 33.2% |
| 2.0 | 101.00 | 11.3% | 58.6% |
| 2.8 | 122.40 | 13.6% | 69.9% |
| 4.0 | 83.60 | 9.3% | 83.5% |
| 5.6 | 37.90 | 4.2% | 92.9% |
| 8.0 | 14.80 | 1.7% | 97.1% |
| 11.2 | 11.30 | 1.3% | 98.7% |
| 14.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 896.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 086FS Lower Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.258** | **1.050** | **1.580** | **4.066** | **6.706** | **14.0** |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 77.40 | 8.5% | |
| 0.5 | 47.00 | 5.2% | 8.5% |
| 1.0 | 59.40 | 6.6% | 13.7% |
| 2.0 | 31.20 | 3.4% | 20.3% |
| 2.8 | 43.30 | 4.8% | 23.7% |
| 4.0 | 46.90 | 5.2% | 28.5% |
| 5.6 | 36.50 | 4.0% | 33.7% |
| 8.0 | 38.90 | 4.3% | 37.7% |
| 11.2 | 59.50 | 6.6% | 42.0% |
| 16.0 | 65.80 | 7.3% | 48.5% |
| 22.4 | 140.60 | 15.5% | 55.8% |
| 32.0 | 78.00 | 8.6% | 71.3% |
| 45.0 | 182.00 | 20.1% | 79.9% |
| 48.0 | * | | 100.0% |
| 90 | | | - |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 906.50 | | |

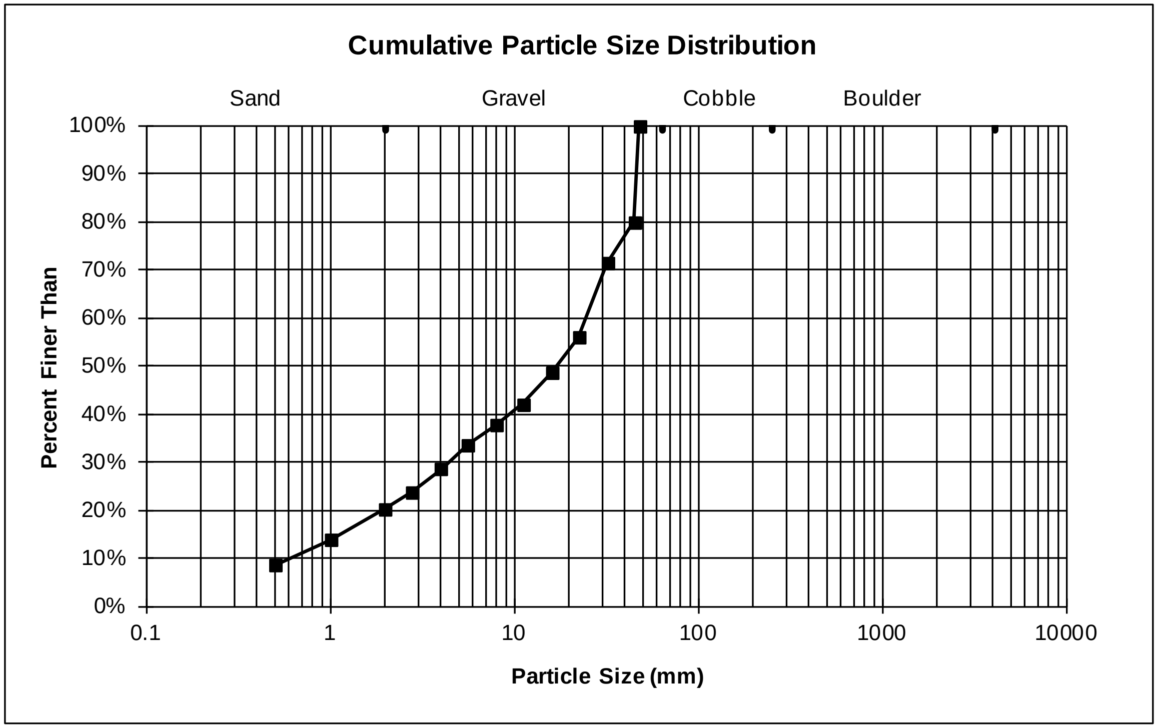
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 093FS Upper Fence
DATE: 7/11/2011
CREW: Derengowski, VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 1.145 | 6.301 | 17.113 | 45.594 | 47.235 | 48.0 |



**Sieve Analysis Worksheet**

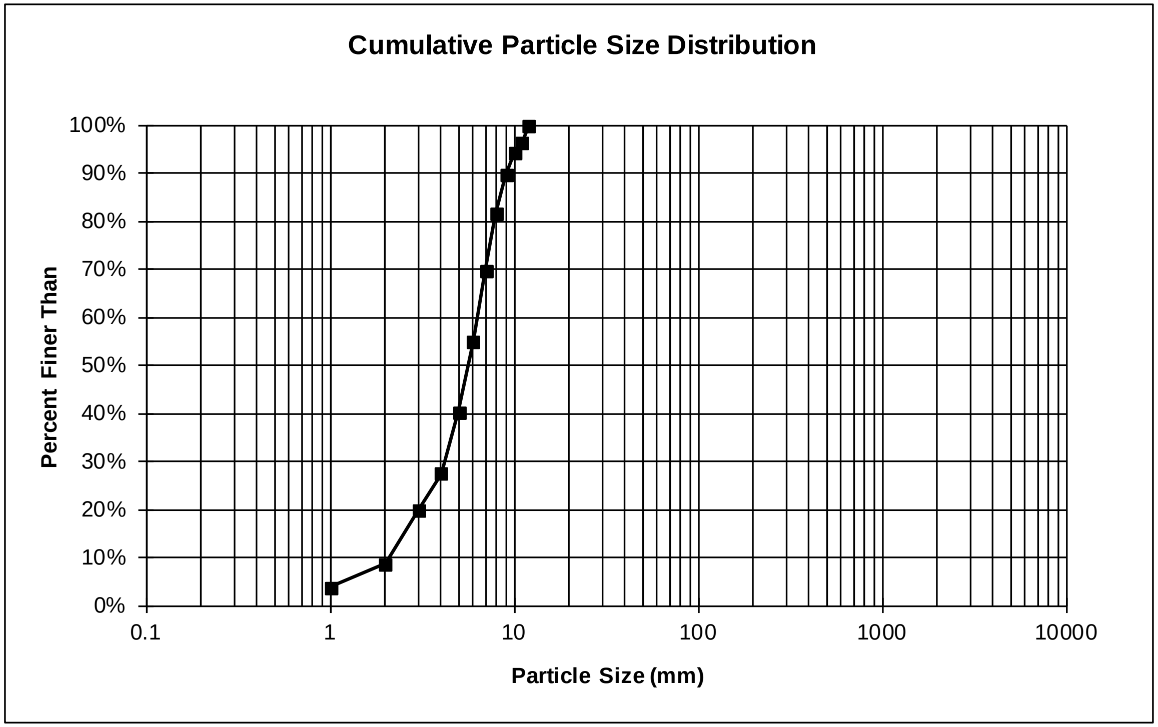
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 40.10 | 3.8% | |
| 0.5 | 50.10 | 4.8% | 3.8% |
| 1.0 | 115.10 | 11.0% | 8.7% |
| 2.0 | 81.90 | 7.9% | 19.7% |
| 2.8 | 133.10 | 12.8% | 27.5% |
| 4.0 | 153.50 | 14.7% | 40.3% |
| 5.6 | 154.00 | 14.8% | 55.0% |
| 8.0 | 121.00 | 11.6% | 69.8% |
| 11.2 | 84.80 | 8.1% | 81.4% |
| 16.0 | 48.20 | 4.6% | 89.5% |
| 22.4 | 23.70 | 2.3% | 94.2% |
| 32.0 | 37.20 | 3.6% | 96.4% |
| 34.0 | * | | 100.0% |
| 64.0 | | | - |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1042.70 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 098FS Upper Fence
DATE: 5/31/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 1.490 | 3.449 | 4.992 | 12.551 | 25.559 | 34.0 |



**Sieve Analysis Worksheet**

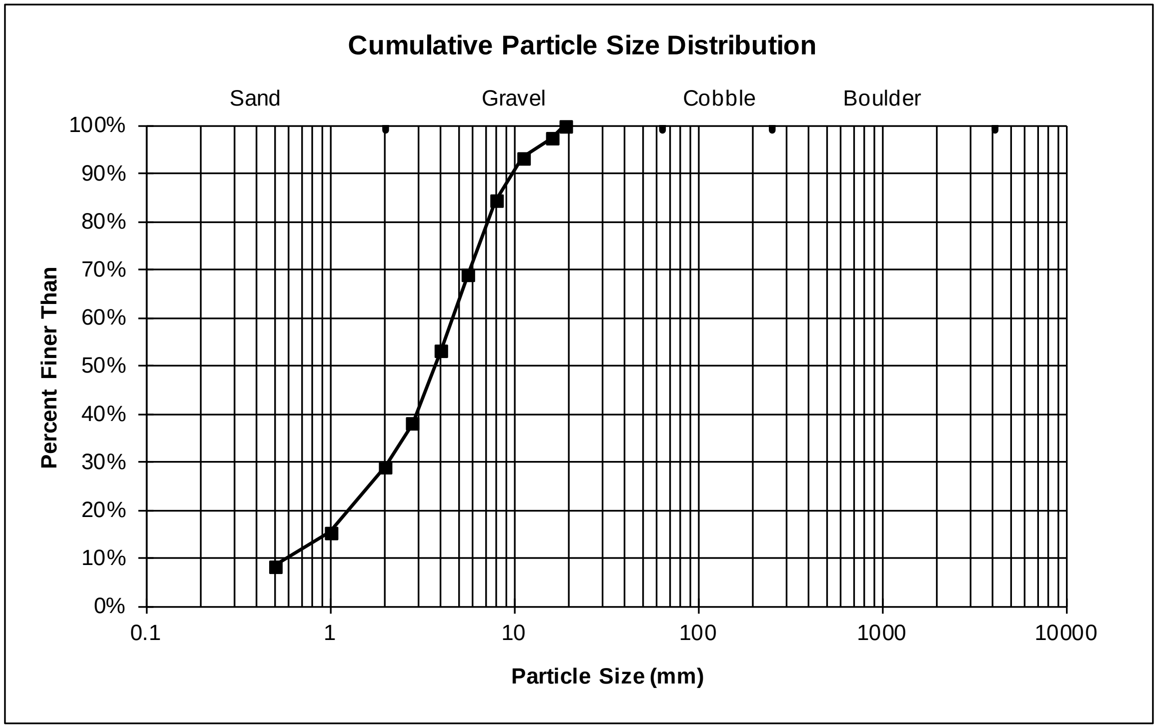
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 57.90 | 8.4% | |
| 0.5 | 48.30 | 7.0% | 8.4% |
| 1.0 | 93.90 | 13.6% | 15.4% |
| 2.0 | 61.80 | 8.9% | 29.0% |
| 2.8 | 105.30 | 15.2% | 37.9% |
| 4.0 | 109.40 | 15.8% | 53.2% |
| 5.6 | 105.70 | 15.3% | 69.0% |
| 8.0 | 61.90 | 9.0% | 84.3% |
| 11.2 | 27.10 | 3.9% | 93.3% |
| 16.0 | 19.30 | 2.8% | 97.2% |
| 19.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 690.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 101FS Upper Fence
DATE: 8/29/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.963 | 2.509 | 3.714 | 7.941 | 13.094 | 19.0 |



**Sieve Analysis Worksheet**

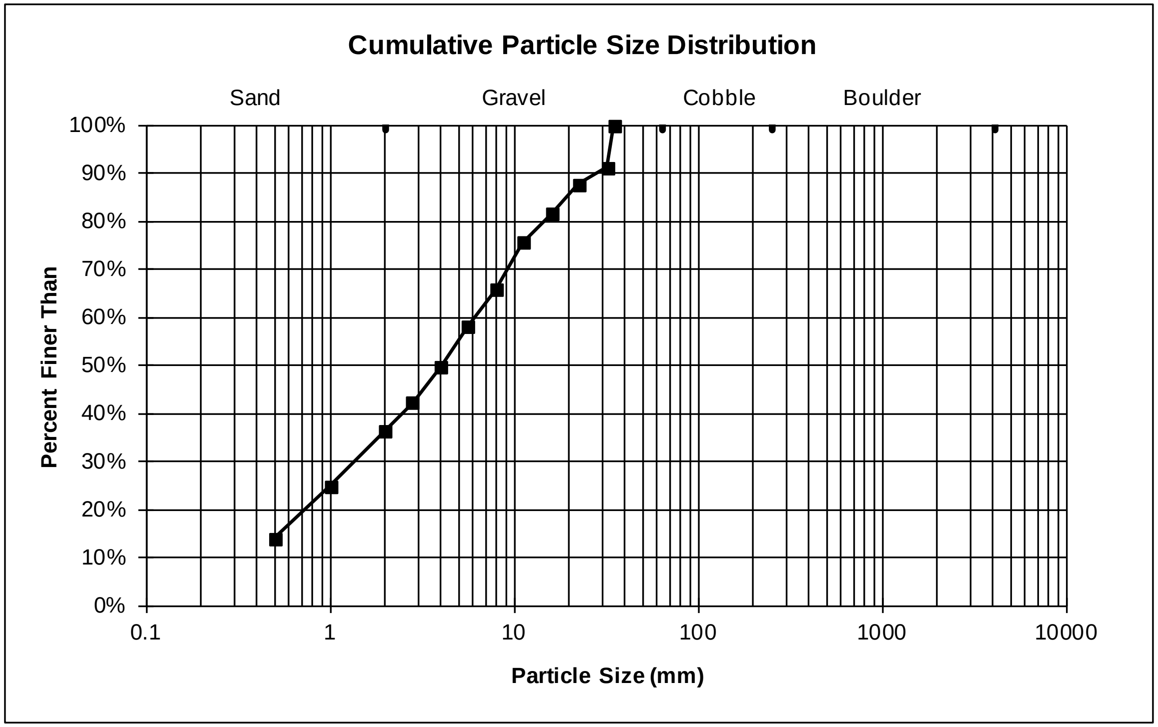
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 95.70 | 14.0% | |
| 0.5 | 73.30 | 10.7% | 14.0% |
| 1.0 | 79.70 | 11.7% | 24.8% |
| 2.0 | 39.30 | 5.8% | 36.4% |
| 2.8 | 51.50 | 7.5% | 42.2% |
| 4.0 | 57.40 | 8.4% | 49.7% |
| 5.6 | 51.80 | 7.6% | 58.1% |
| 8.0 | 66.70 | 9.8% | 65.7% |
| 11.2 | 40.40 | 5.9% | 75.5% |
| 16.0 | 42.20 | 6.2% | 81.4% |
| 22.4 | 24.30 | 3.6% | 87.6% |
| 32.0 | 60.30 | 8.8% | 91.2% |
| 35.0 | * | | 100.0% |
| 64.0 | | | - |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 682.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 101FS Lower Fence
DATE: 8/29/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.533 | 1.837 | 4.042 | 18.408 | 33.269 | 35.0 |



**Sieve Analysis Worksheet**

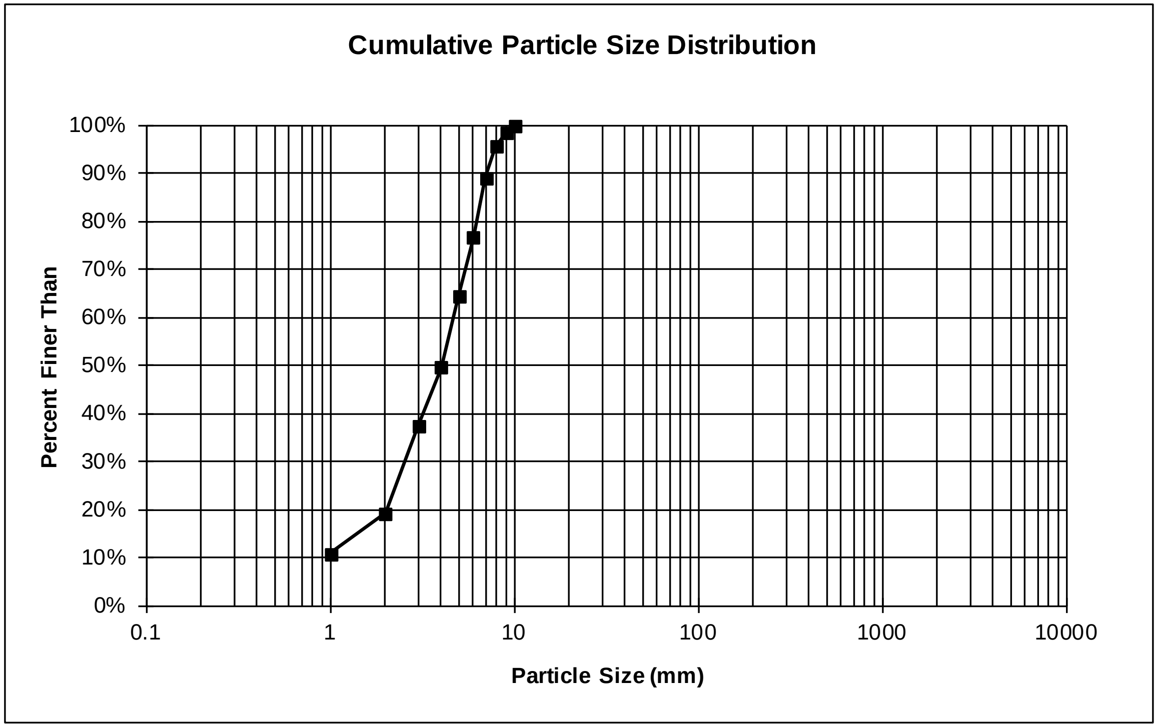
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 74.20 | 10.7% | |
| 0.5 | 59.30 | 8.6% | 10.7% |
| 1.0 | 124.60 | 18.0% | 19.3% |
| 2.0 | 85.60 | 12.4% | 37.2% |
| 2.8 | 101.90 | 14.7% | 49.6% |
| 4.0 | 85.50 | 12.3% | 64.3% |
| 5.6 | 86.00 | 12.4% | 76.6% |
| 8.0 | 45.20 | 6.5% | 89.0% |
| 11.2 | 18.90 | 2.7% | 95.6% |
| 16.0 | 11.90 | 1.7% | 98.3% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 693.10 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 124FS Lower Fence
DATE: 6/13/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.708 | 1.835 | 2.828 | 6.922 | 10.883 | 20.0 |



**Sieve Analysis Worksheet**

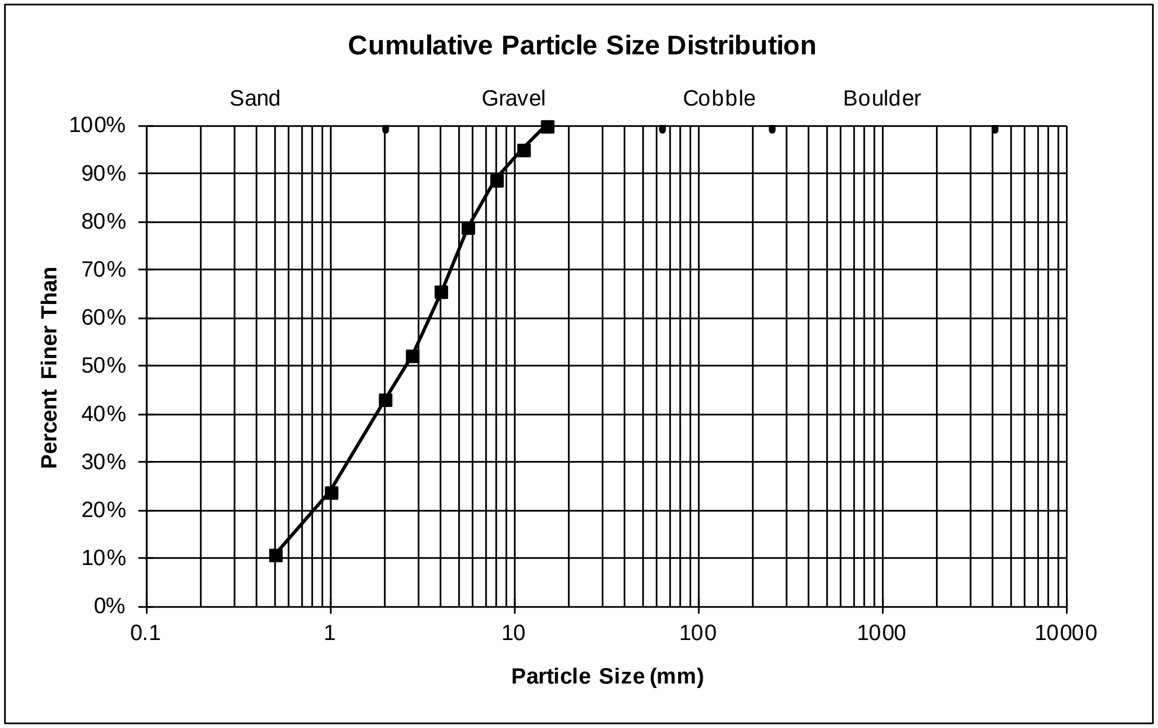
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 105.40 | 10.5% | |
| 0.5 | 132.40 | 13.2% | 10.5% |
| 1.0 | 193.70 | 19.4% | 23.8% |
| 2.0 | 90.40 | 9.0% | 43.1% |
| 2.8 | 131.20 | 13.1% | 52.2% |
| 4.0 | 136.60 | 13.7% | 65.3% |
| 5.6 | 97.10 | 9.7% | 78.9% |
| 8.0 | 64.00 | 6.4% | 88.6% |
| 11.2 | 49.60 | 5.0% | 95.0% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1000.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 177FS Upper Fence
DATE: 7/11/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.632 | 1.495 | 2.583 | 6.745 | 11.175 | 15.0 |



**Sieve Analysis Worksheet**

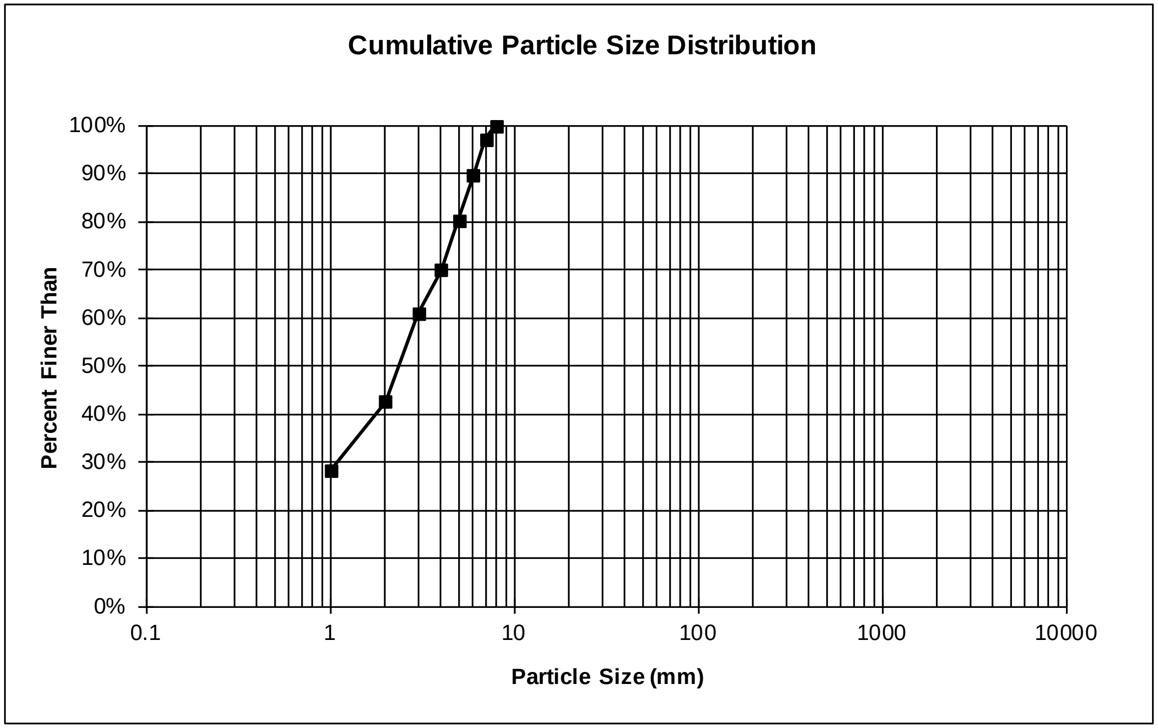
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 163.60 | 28.2% | |
| 0.5 | 83.20 | 14.3% | 28.2% |
| 1.0 | 106.30 | 18.3% | 42.5% |
| 2.0 | 52.80 | 9.1% | 60.8% |
| 2.8 | 59.60 | 10.3% | 69.9% |
| 4.0 | 54.20 | 9.3% | 80.2% |
| 5.6 | 44.30 | 7.6% | 89.5% |
| 8.0 | 16.40 | 2.8% | 97.2% |
| 10.0 | * | | 100.0% |
| 16.0 | | | - |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 580.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 186FS Upper Fence
DATE: 7/11/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.052 | 0.695 | 1.327 | 4.586 | 7.227 | 10.0 |



**Sieve Analysis Worksheet**

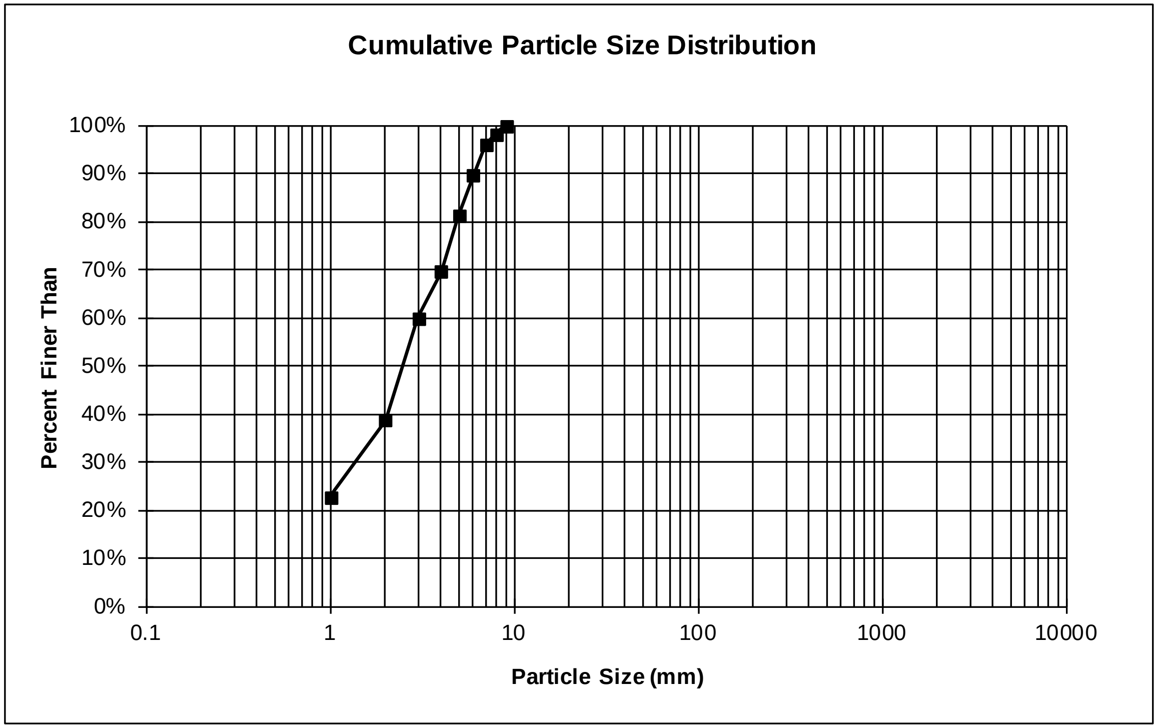
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 140.90 | 22.7% | |
| 0.5 | 99.00 | 15.9% | 22.7% |
| 1.0 | 132.80 | 21.4% | 38.6% |
| 2.0 | 59.80 | 9.6% | 60.0% |
| 2.8 | 72.00 | 11.6% | 69.6% |
| 4.0 | 52.10 | 8.4% | 81.2% |
| 5.6 | 39.30 | 6.3% | 89.6% |
| 8.0 | 13.60 | 2.2% | 95.9% |
| 11.2 | 11.70 | 1.9% | 98.1% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 621.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 186FS Lower Fence
DATE: 7/11/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.097 | 0.854 | 1.446 | 4.473 | 7.593 | 15.0 |



**Sieve Analysis Worksheet**

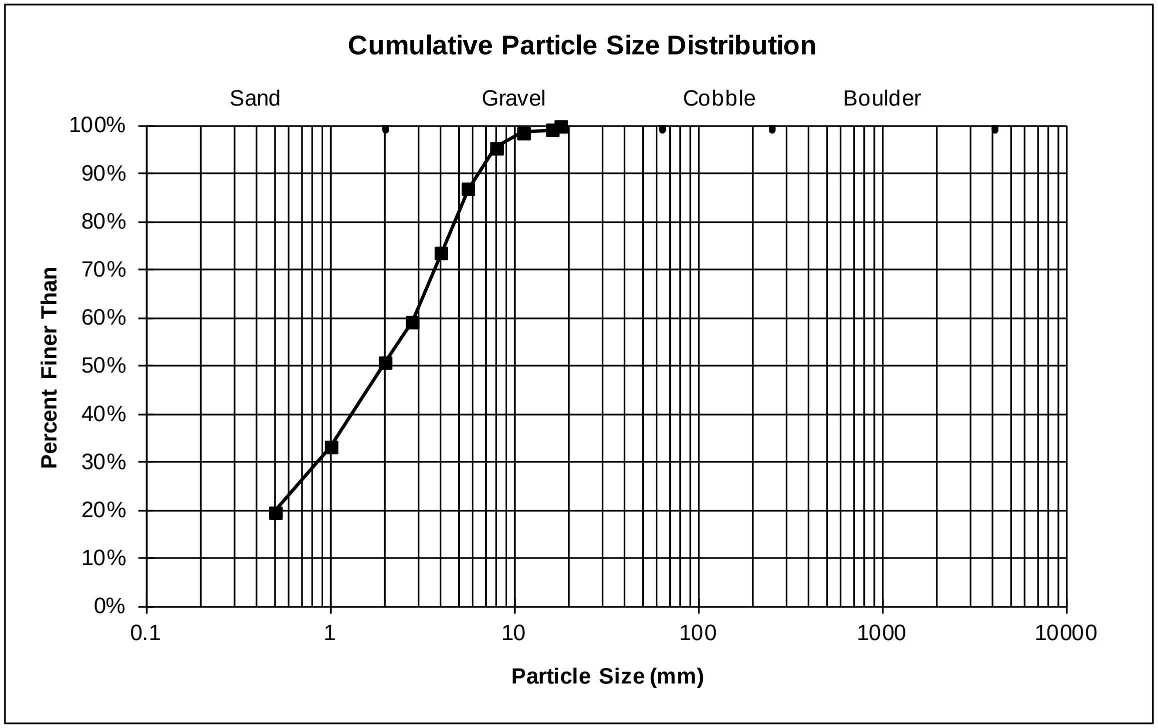
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 234.40 | 19.6% | |
| 0.5 | 162.30 | 13.6% | 19.6% |
| 1.0 | 210.30 | 17.6% | 33.1% |
| 2.0 | 101.70 | 8.5% | 50.7% |
| 2.8 | 169.20 | 14.1% | 59.2% |
| 4.0 | 161.00 | 13.4% | 73.3% |
| 5.6 | 102.60 | 8.6% | 86.8% |
| 8.0 | 37.10 | 3.1% | 95.4% |
| 11.2 | 6.50 | 0.5% | 98.5% |
| 16.0 | 12.00 | 1.0% | 99.0% |
| 18.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1197.10 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 187FS Upper Fence
DATE: 9/20/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.161 | 1.076 | 1.945 | 5.223 | 7.883 | 18.0 |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 321.20 | 30.5% | |
| 0.5 | 119.10 | 11.3% | 30.5% |
| 1.0 | 167.30 | 15.9% | 41.9% |
| 2.0 | 99.20 | 9.4% | 57.8% |
| 2.8 | 117.60 | 11.2% | 67.2% |
| 4.0 | 93.30 | 8.9% | 78.4% |
| 5.6 | 73.40 | 7.0% | 87.2% |
| 8.0 | 38.90 | 3.7% | 94.2% |
| 11.2 | 15.30 | 1.5% | 97.9% |
| 16.0 | 6.70 | 0.6% | 99.4% |
| 18.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1052.00 | | |

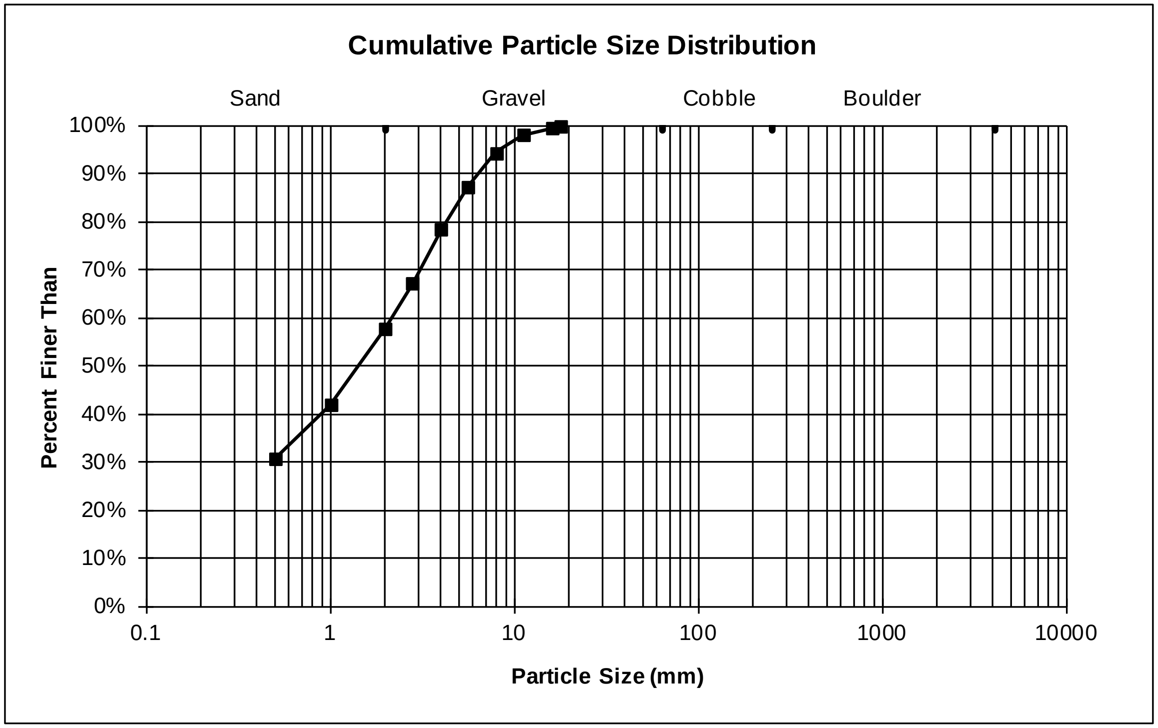
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 198FS Upper Fence
DATE: 5/7/2011
CREW: VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.042 | 0.657 | 1.426 | 4.953 | 8.595 | 18.0 |



**Sieve Analysis Worksheet**

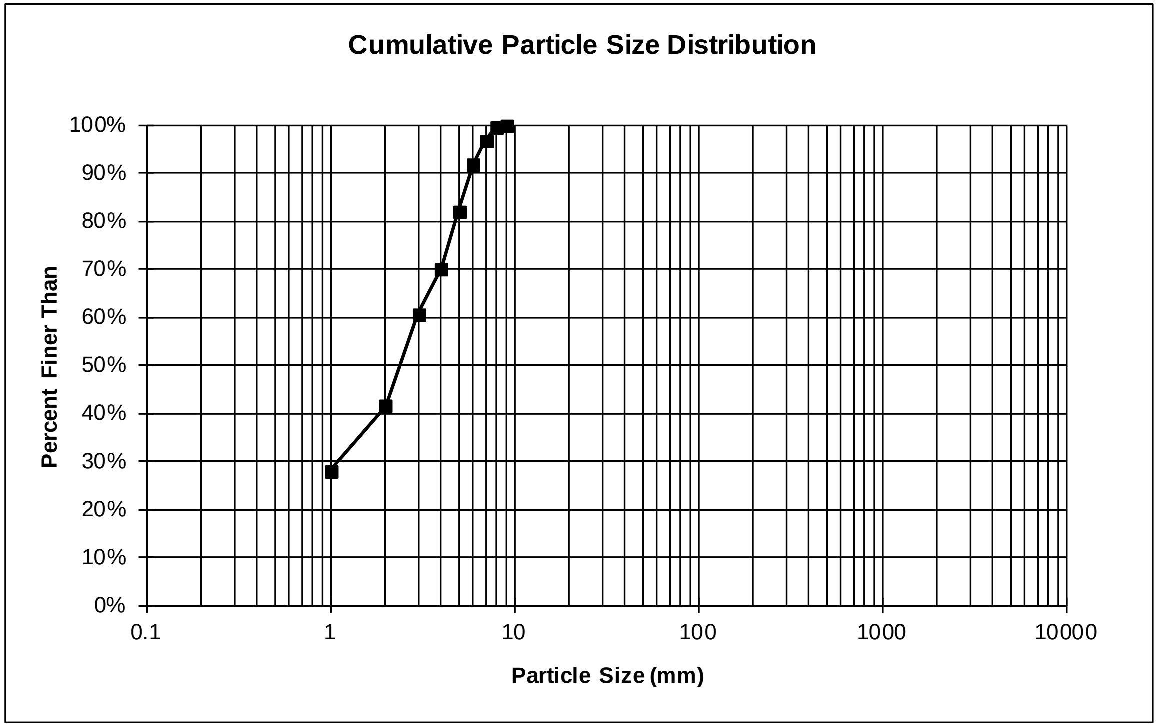
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 258.90 | 27.9% | |
| 0.5 | 125.50 | 13.5% | 27.9% |
| 1.0 | 176.50 | 19.0% | 41.5% |
| 2.0 | 88.10 | 9.5% | 60.5% |
| 2.8 | 111.30 | 12.0% | 70.0% |
| 4.0 | 90.40 | 9.8% | 82.1% |
| 5.6 | 46.10 | 5.0% | 91.8% |
| 8.0 | 24.20 | 2.6% | 96.8% |
| 11.2 | 5.60 | 0.6% | 99.4% |
| 14.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 926.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Fill Slope
ID NUMBER: 203FS Upper Fence
DATE: 8/8/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.053 | 0.718 | 1.363 | 4.278 | 7.040 | 14.0 |

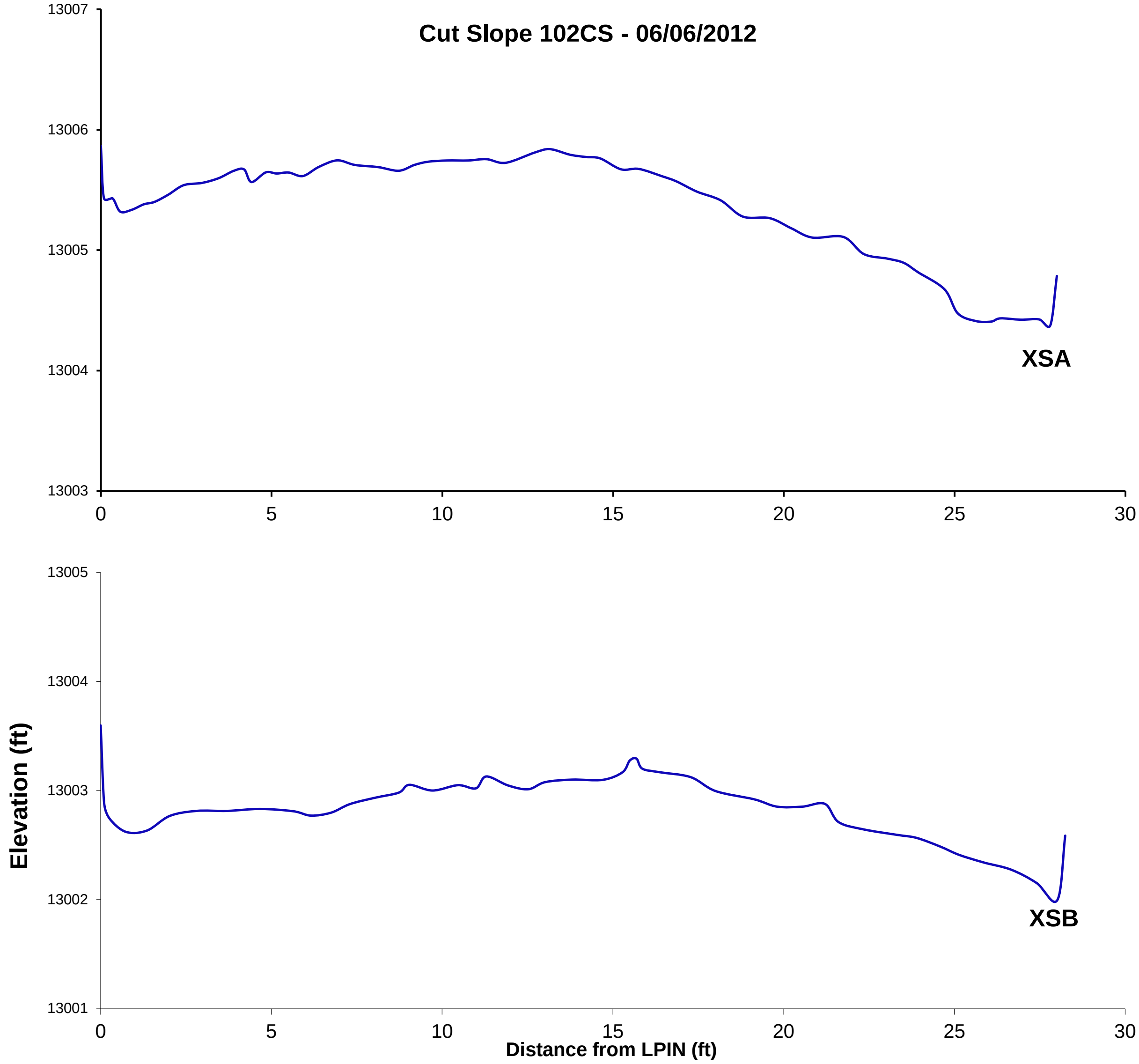


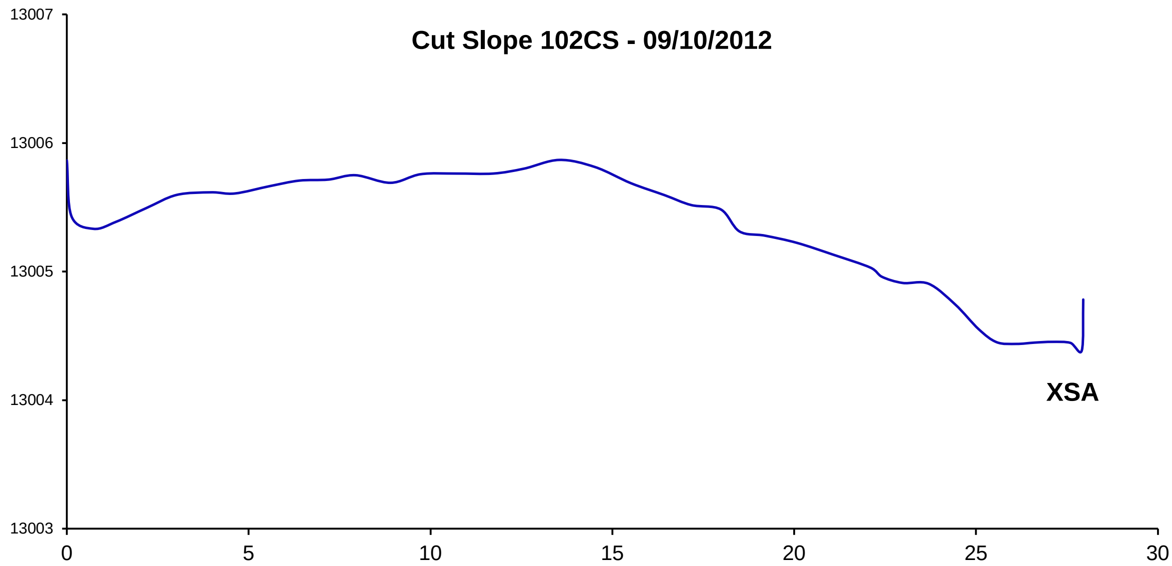
# Appendix G

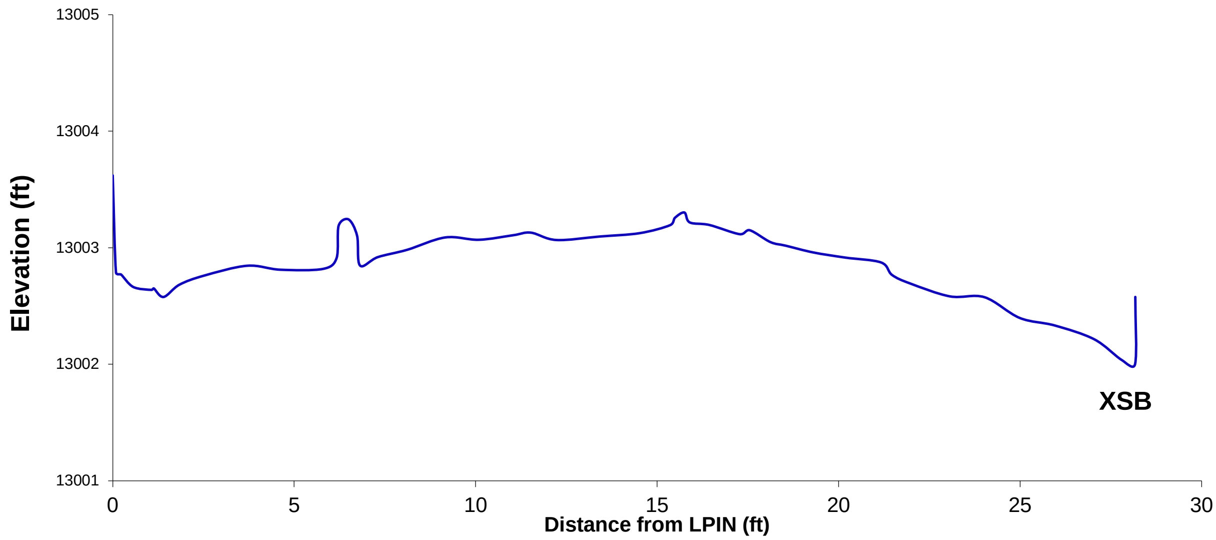
# Cut Slope

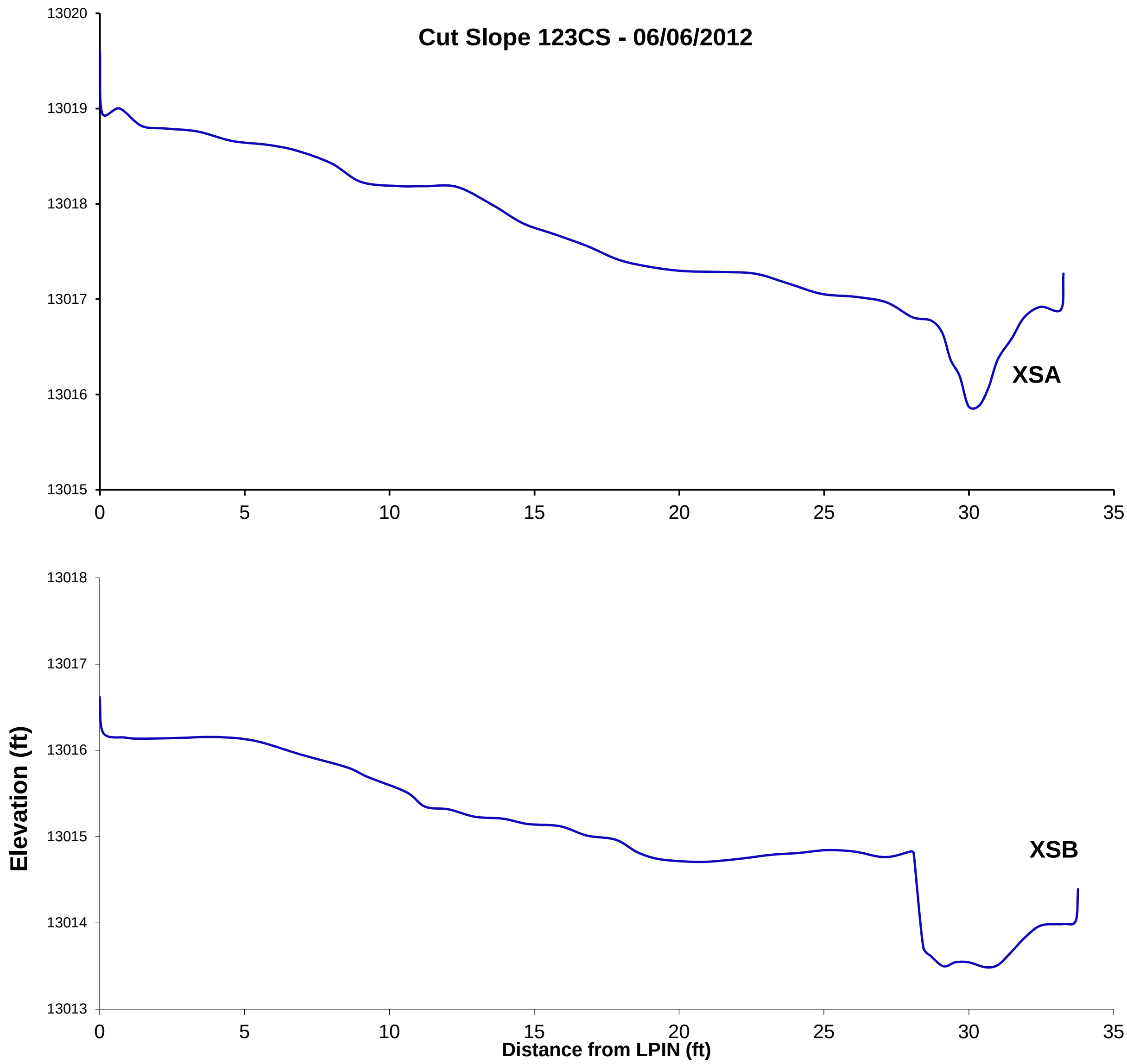
# Cross Section Graphs

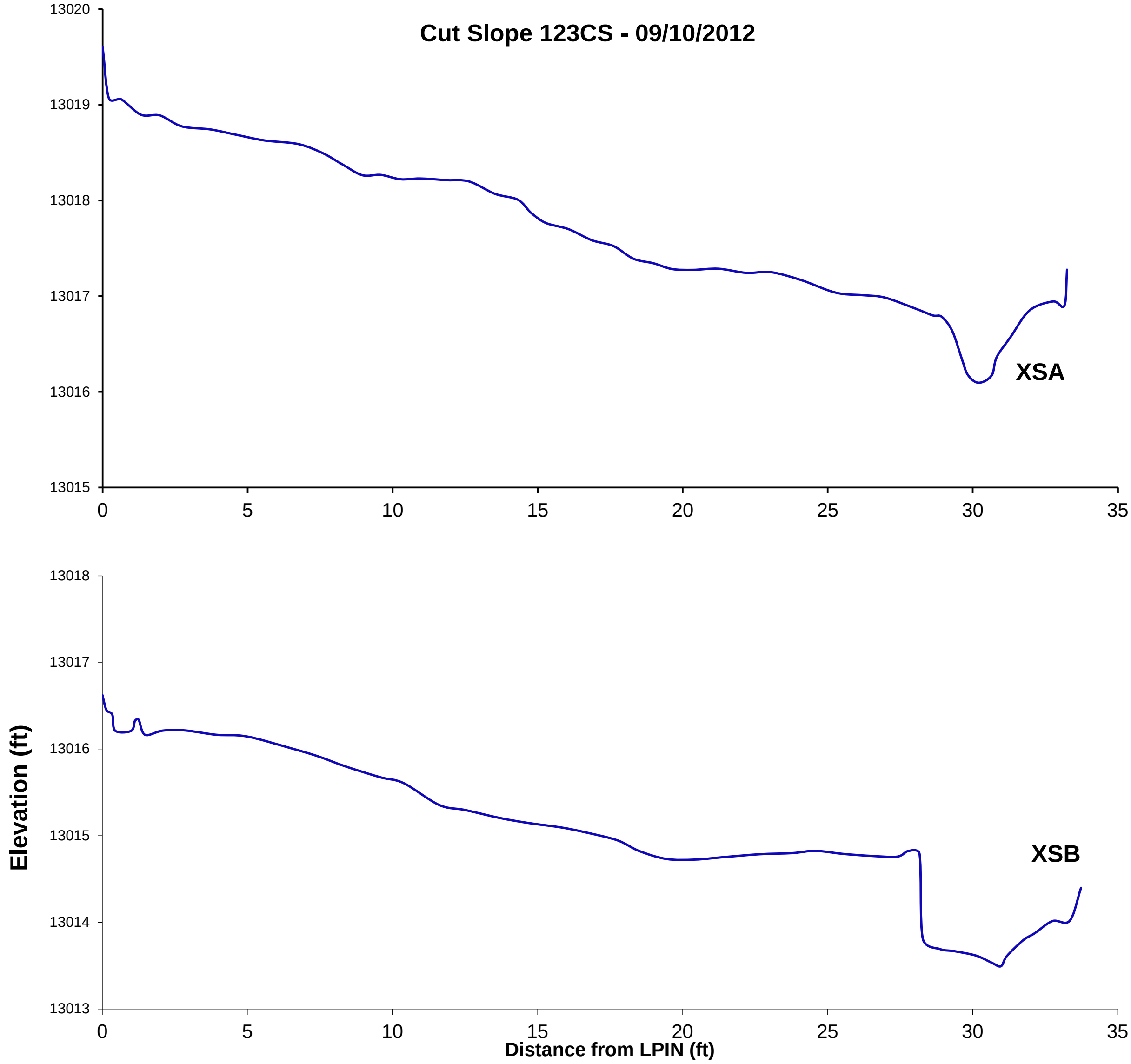
# 2012

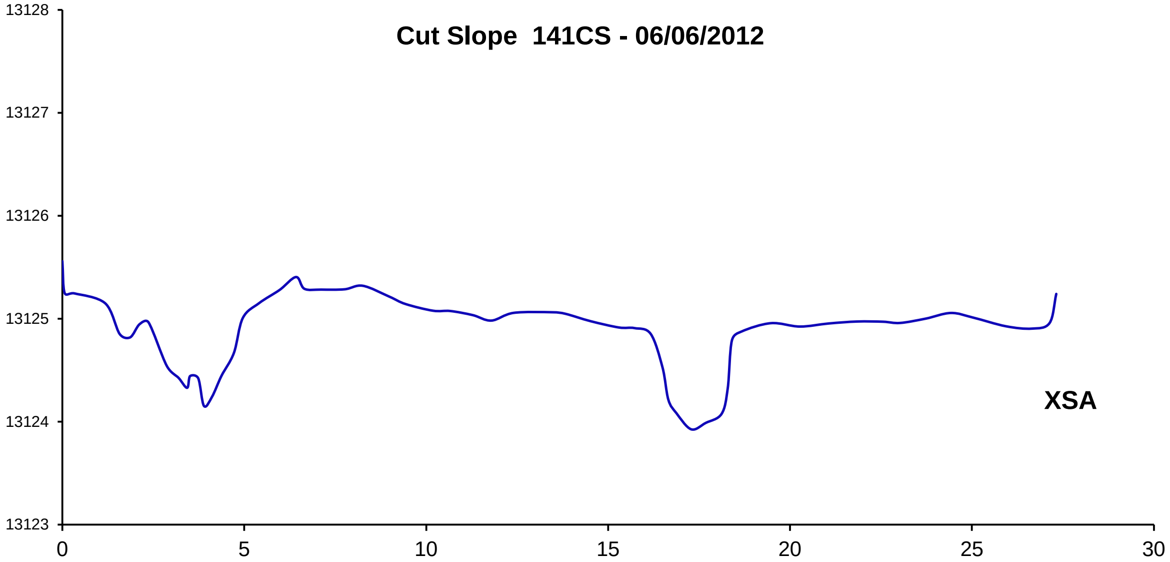

Cut Slope 102CS - 06/06/2012
13007
13006
13005
13004
13003
0
5
10
15
20
25
30
XSA
13005
13004
13003
13002
13001
Elevation (ft)
XSB
Distance from LPIN (ft)


Cut Slope 102CS - 09/10/2012
13007
13006
13005
13004
13003
0
5
10
15
20
25
30
XSA

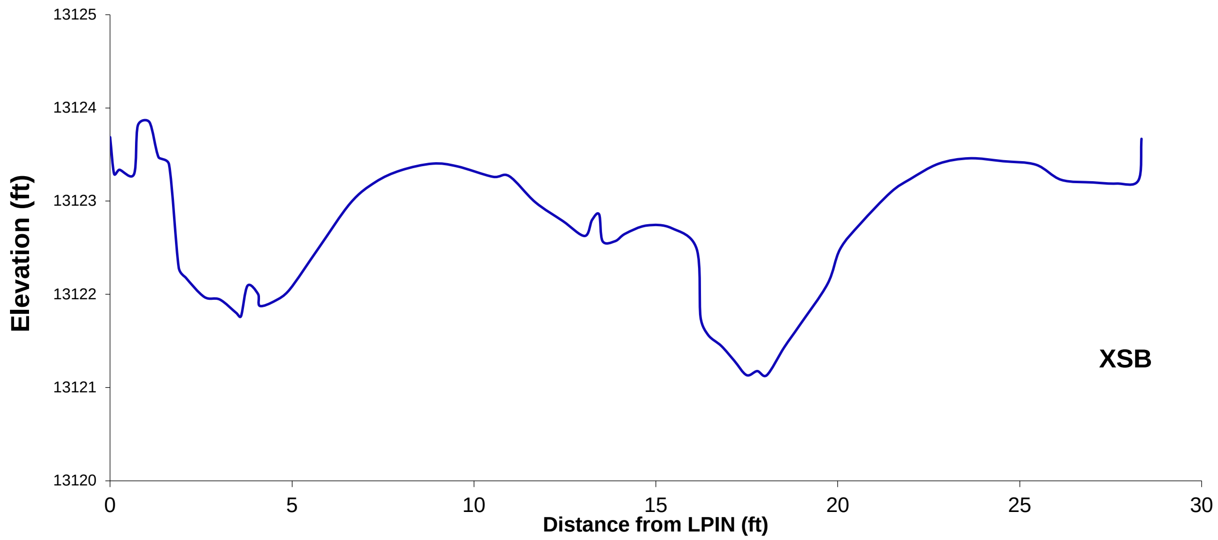

Elevation (ft)
13005
13004
13003
13002
13001
0
5
10
15
20
25
30
Distance from LPIN (ft)
XSB


Cut Slope 123CS - 06/06/2012
XSA
XSB
Elevation (ft)
Distance from LPIN (ft)
13020
13019
13018
13017
13016
13015
13014
13013
0
5
10
15
20
25
30
35

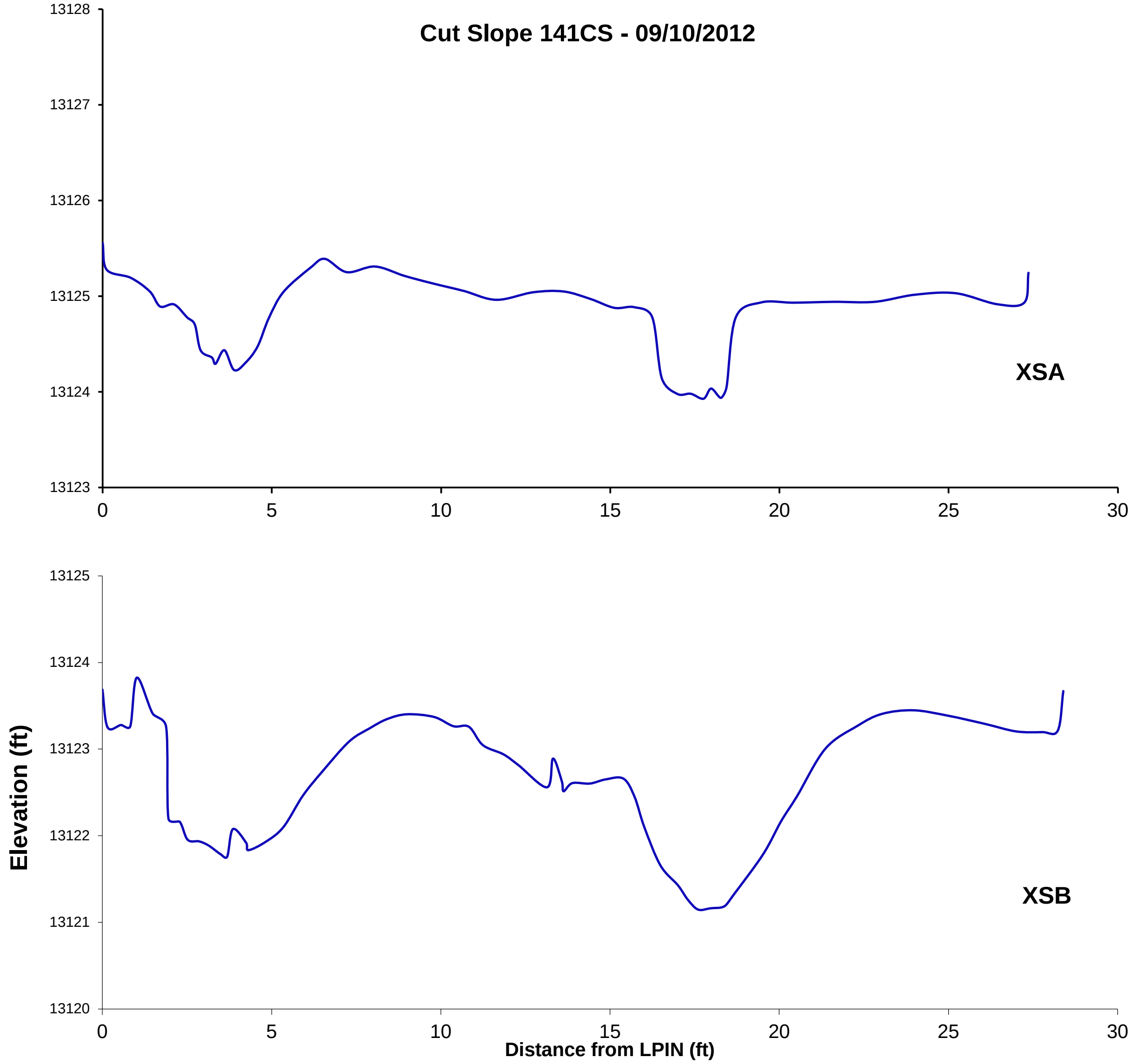

Cut Slope 123CS - 09/10/2012
XSA
XSB
Elevation (ft)
Distance from LPIN (ft)
13020
13019
13018
13017
13016
13015
13014
13013
0
5
10
15
20
25
30
35



Cut Slope 141CS - 06/06/2012
XSA
13128
13127
13126
13125
13124
13123
0
5
10
15
20
25
30

Elevation (ft)
XSB
13125
13124
13123
13122
13121
13120
0
5
10
15
20
25
30
Distance from LPIN (ft)

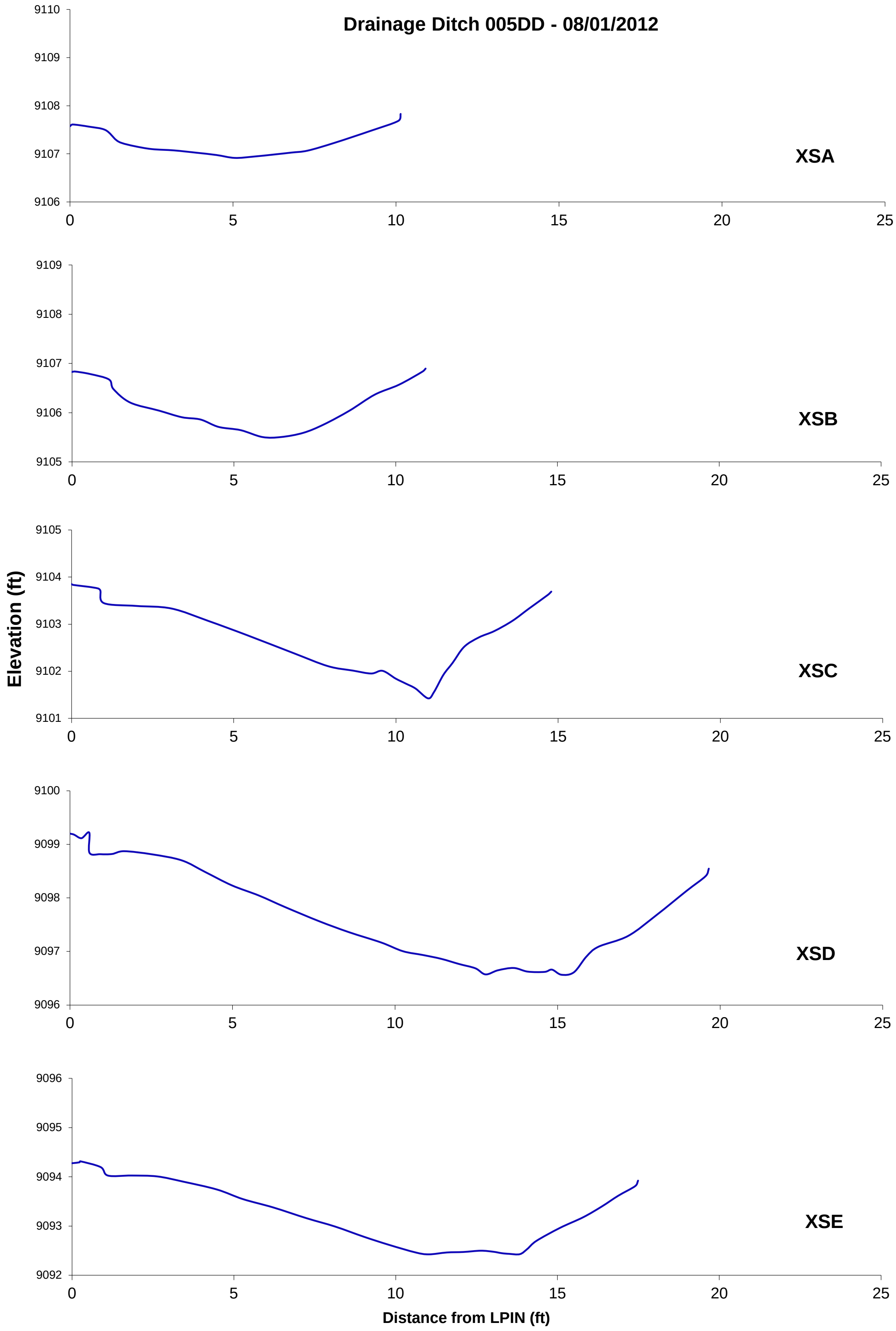

Cut Slope 141CS - 09/10/2012
13128
13127
13126
13125
13124
13123
0
5
10
15
20
25
30
XSA
13125
13124
13123
13122
13121
13120
XSB
Elevation (ft)
Distance from LPIN (ft)

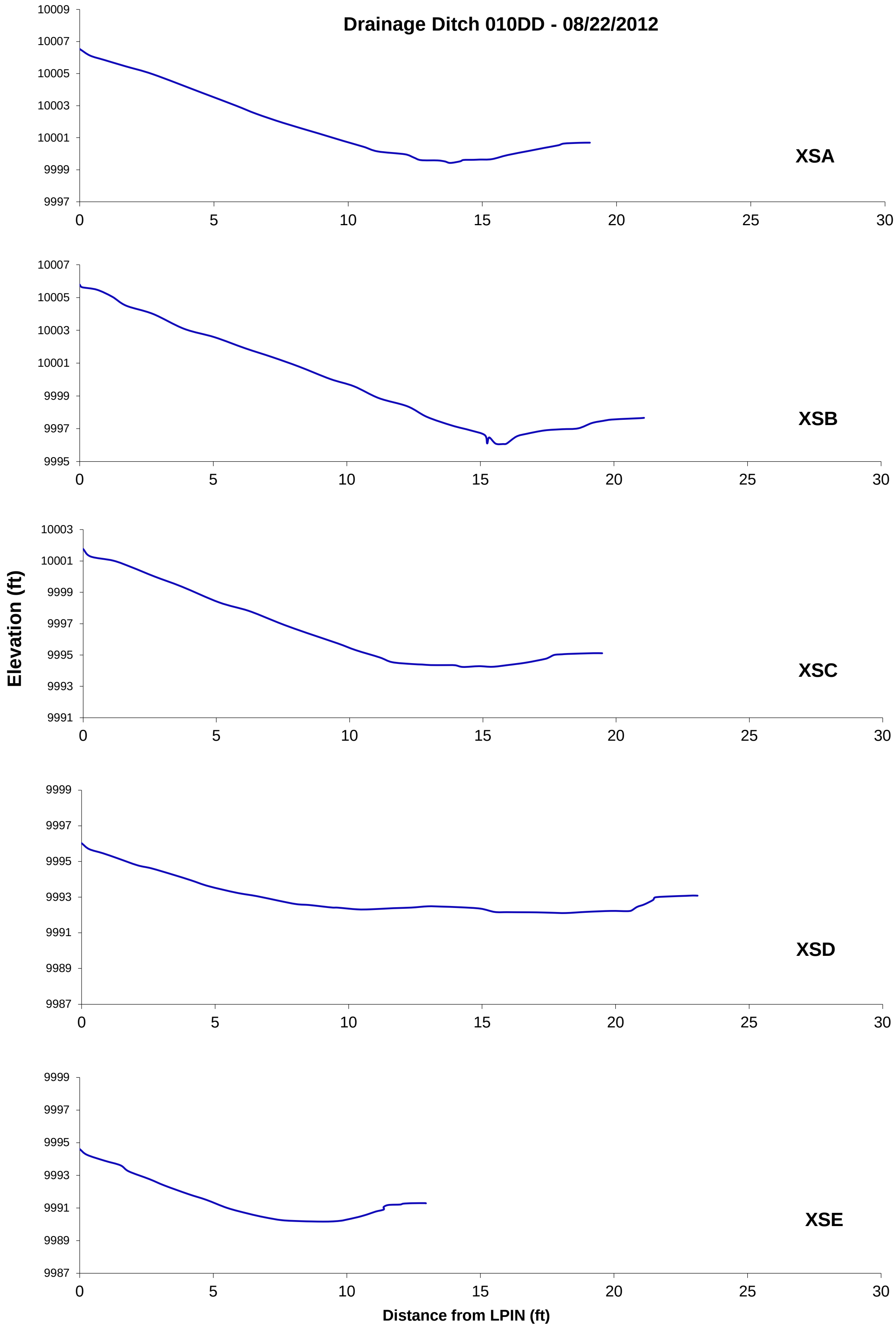
# Appendix H

# Drainage Ditch

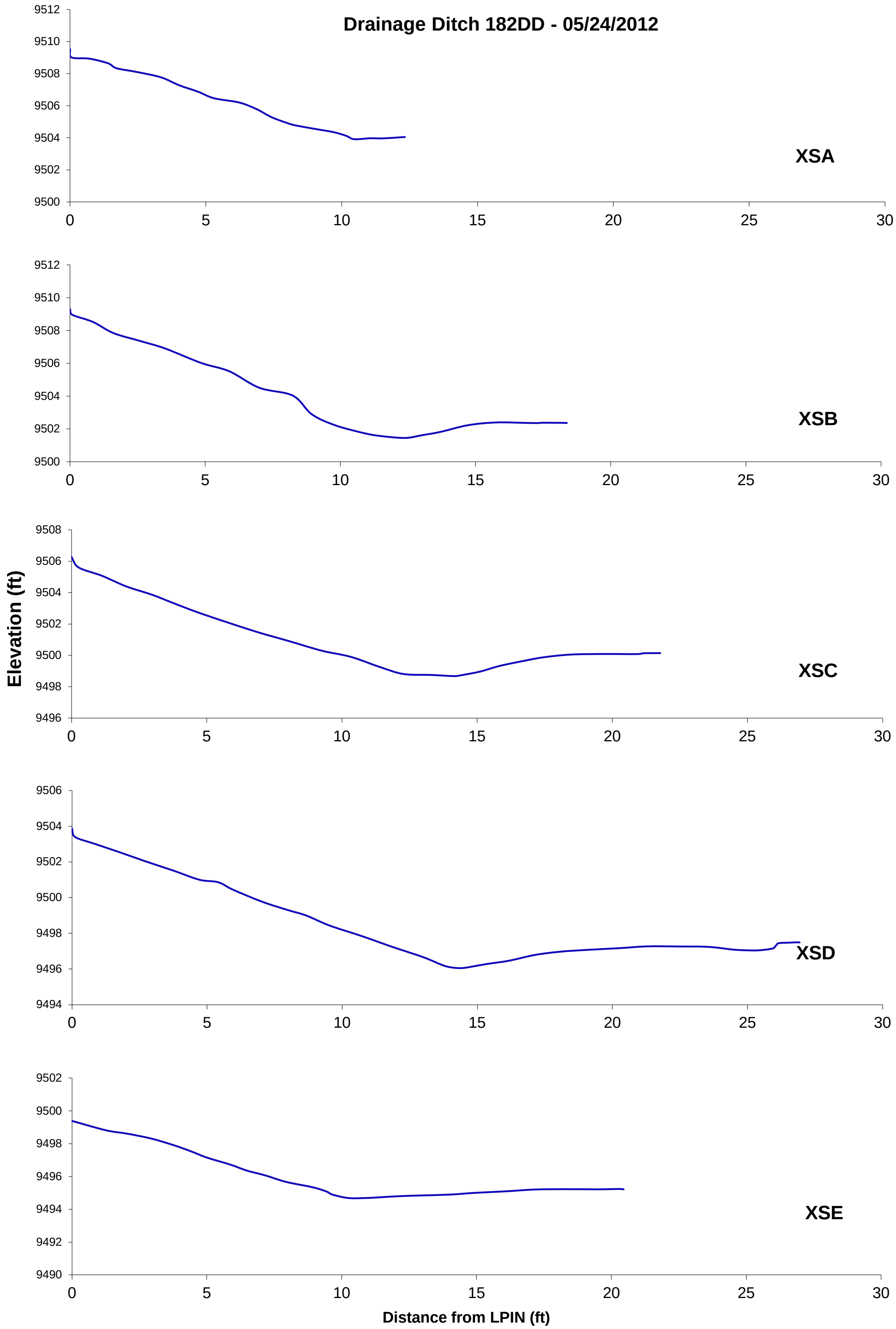
# Cross Section Graphs

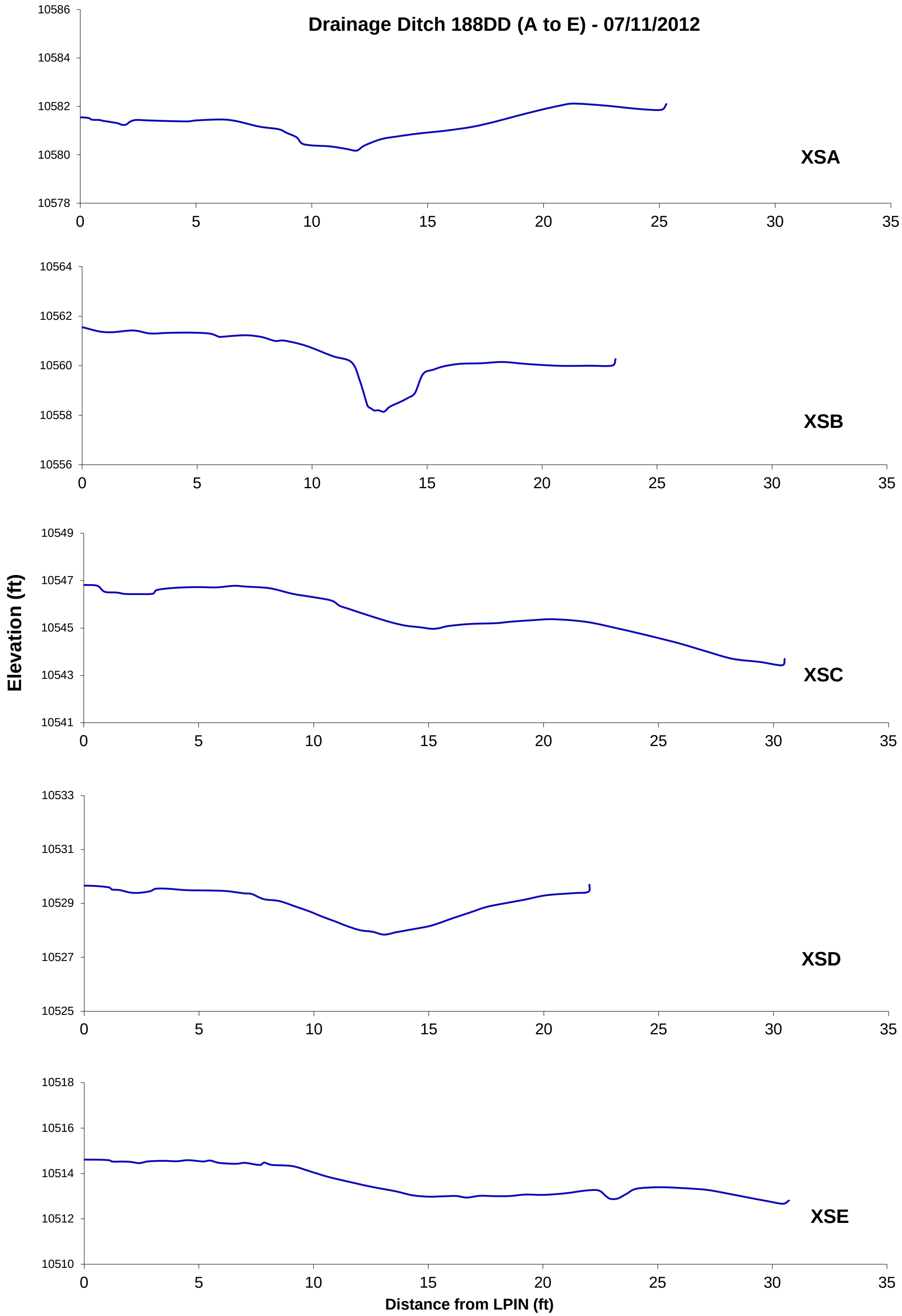
# 2012

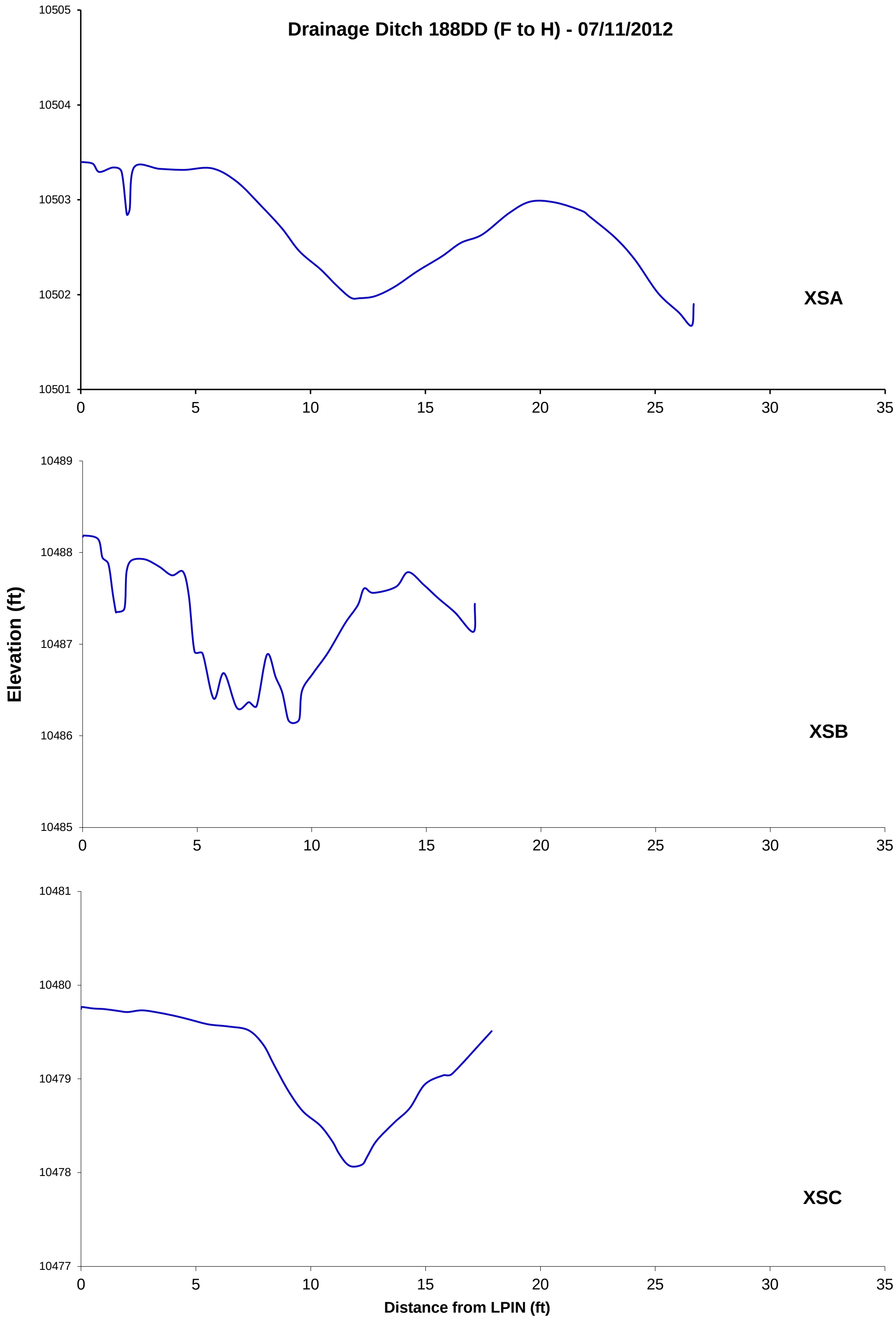

Drainage Ditch 005DD - 08/01/2012
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9110
9109
9108
9107
9106
9105
9104
9103
9102
9101
9100
9099
9098
9097
9096
9095
9094
9093
9092
0
5
10
15
20
25



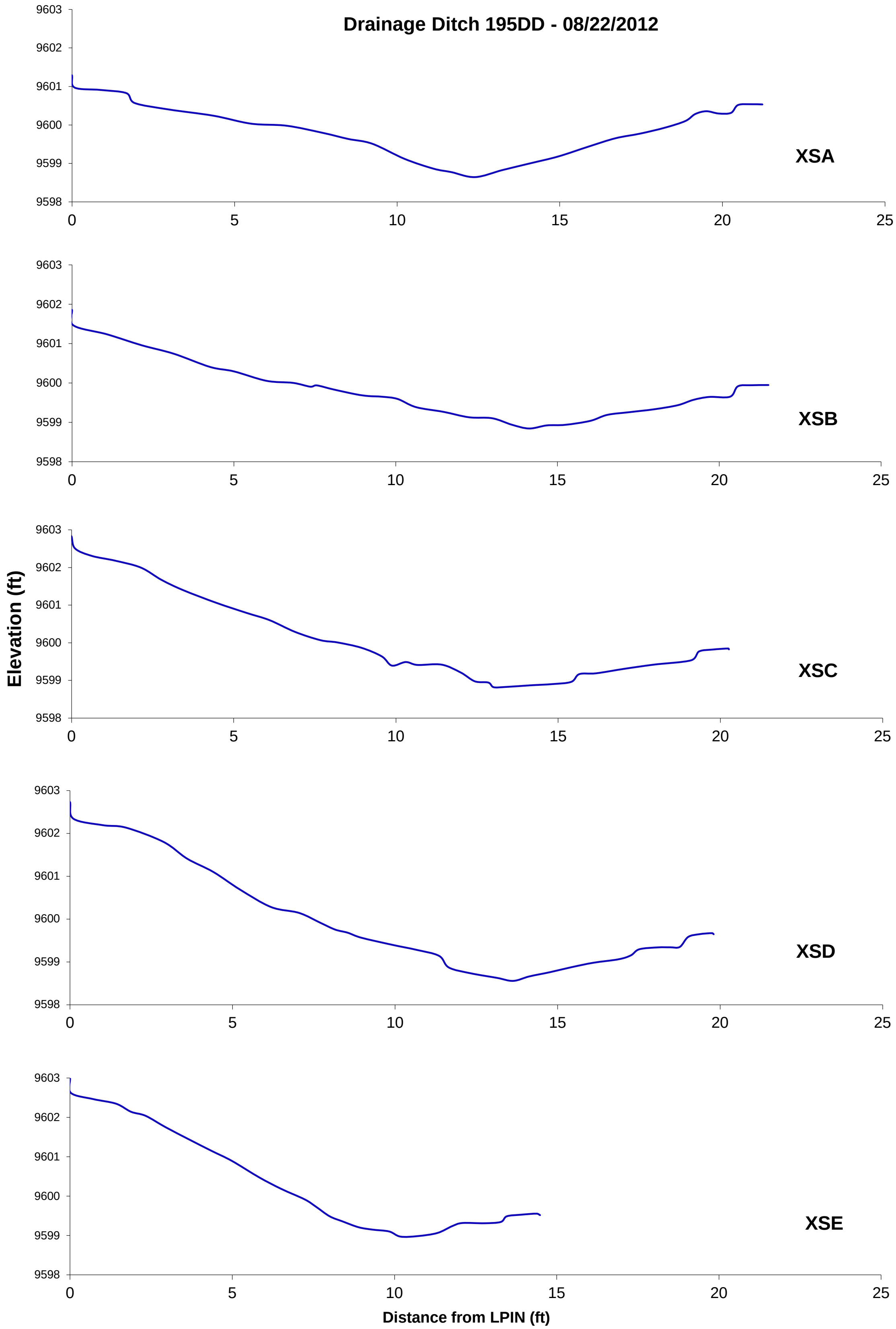
Drainage Ditch 010DD - 08/22/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
10009
10007
10005
10003
10001
9999
9997
9995
9993
9991
9989
9987
0
5
10
15
20
25
30

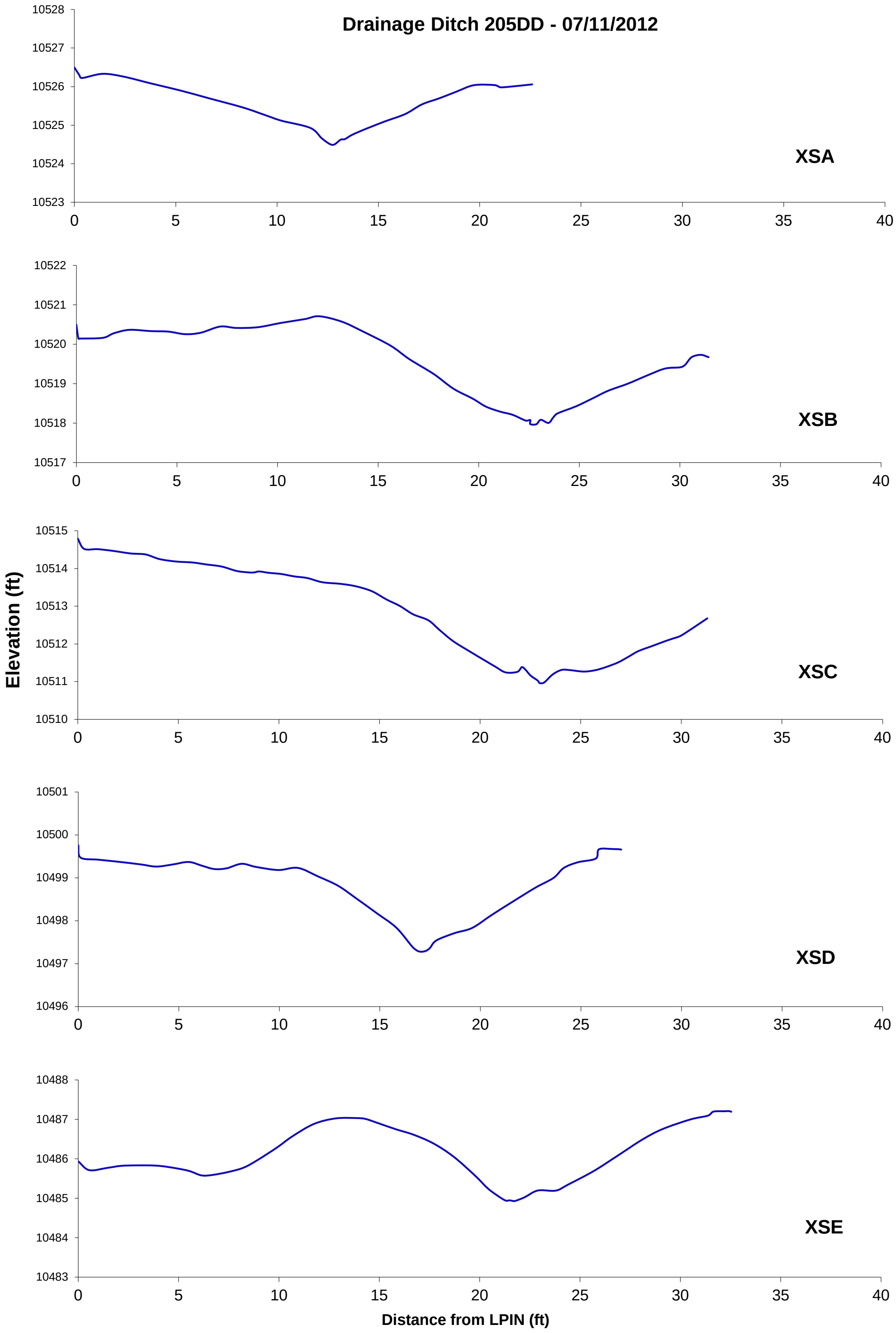

Drainage Ditch 182DD - 05/24/2012
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9512
9510
9508
9506
9504
9502
9500
9498
9496
9494
9492
9490
0
5
10
15
20
25
30


Drainage Ditch 188DD (A to E) - 07/11/2012
Elevation (ft)
XSA
XSB
XSC
XSD
XSE
Distance from LPIN (ft)



Drainage Ditch 188DD (F to H) - 07/11/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
10505
10504
10503
10502
10501
10489
10488
10487
10486
10485
10481
10480
10479
10478
10477
0
5
10
15
20
25
30
35


Drainage Ditch 195DD - 08/22/2012
Elevation (ft)
XSA
XSB
XSC
XSD
XSE
9603
9602
9601
9600
9599
9598
0
5
10
15
20
25
Distance from LPIN (ft)



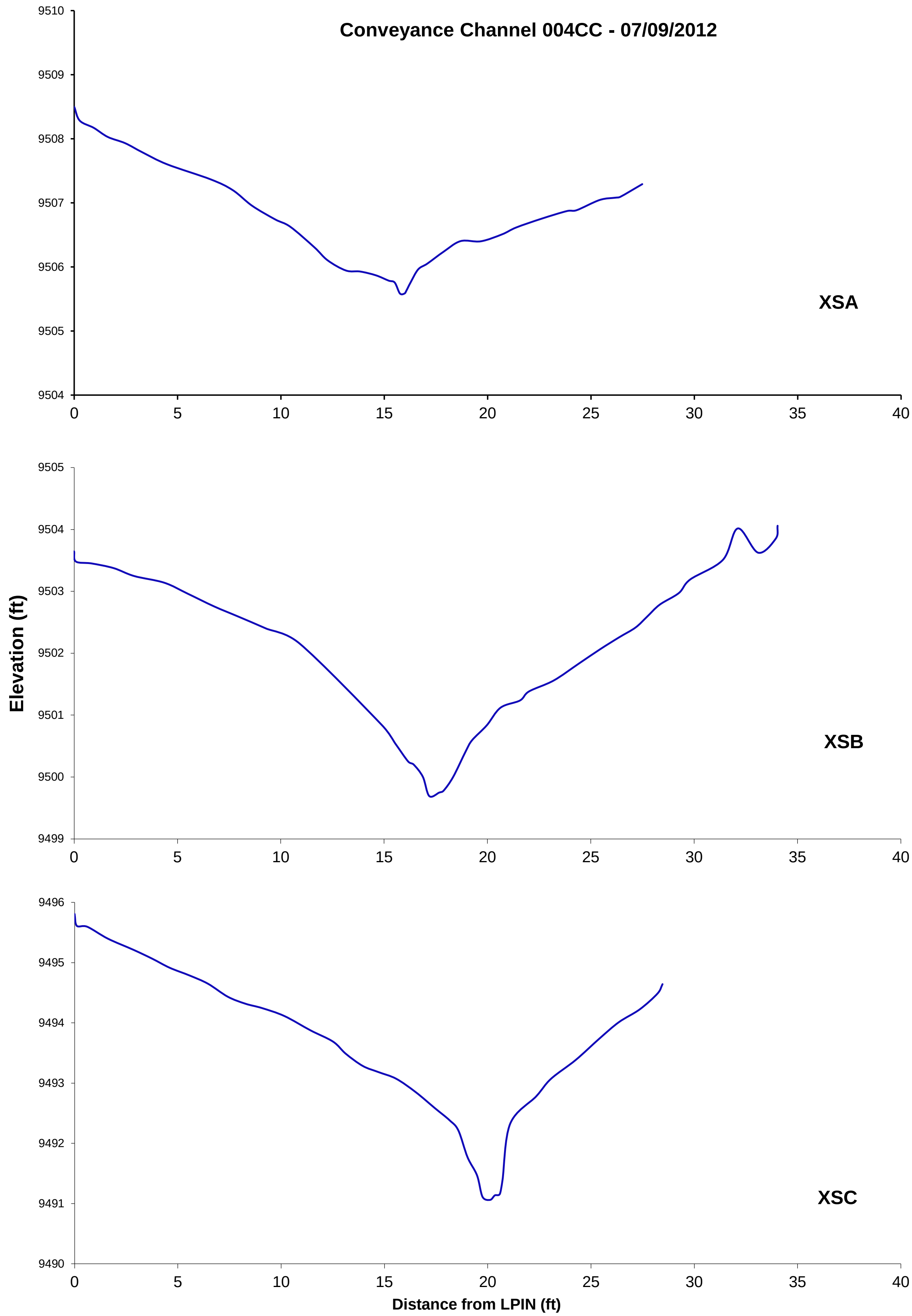
Drainage Ditch 205DD - 07/11/2012
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
10528
10527
10526
10525
10524
10523
10522
10521
10520
10519
10518
10517
10515
10514
10513
10512
10511
10510
10501
10500
10499
10498
10497
10496
10488
10487
10486
10485
10484
10483
0
5
10
15
20
25
30
35
40

# Appendix I

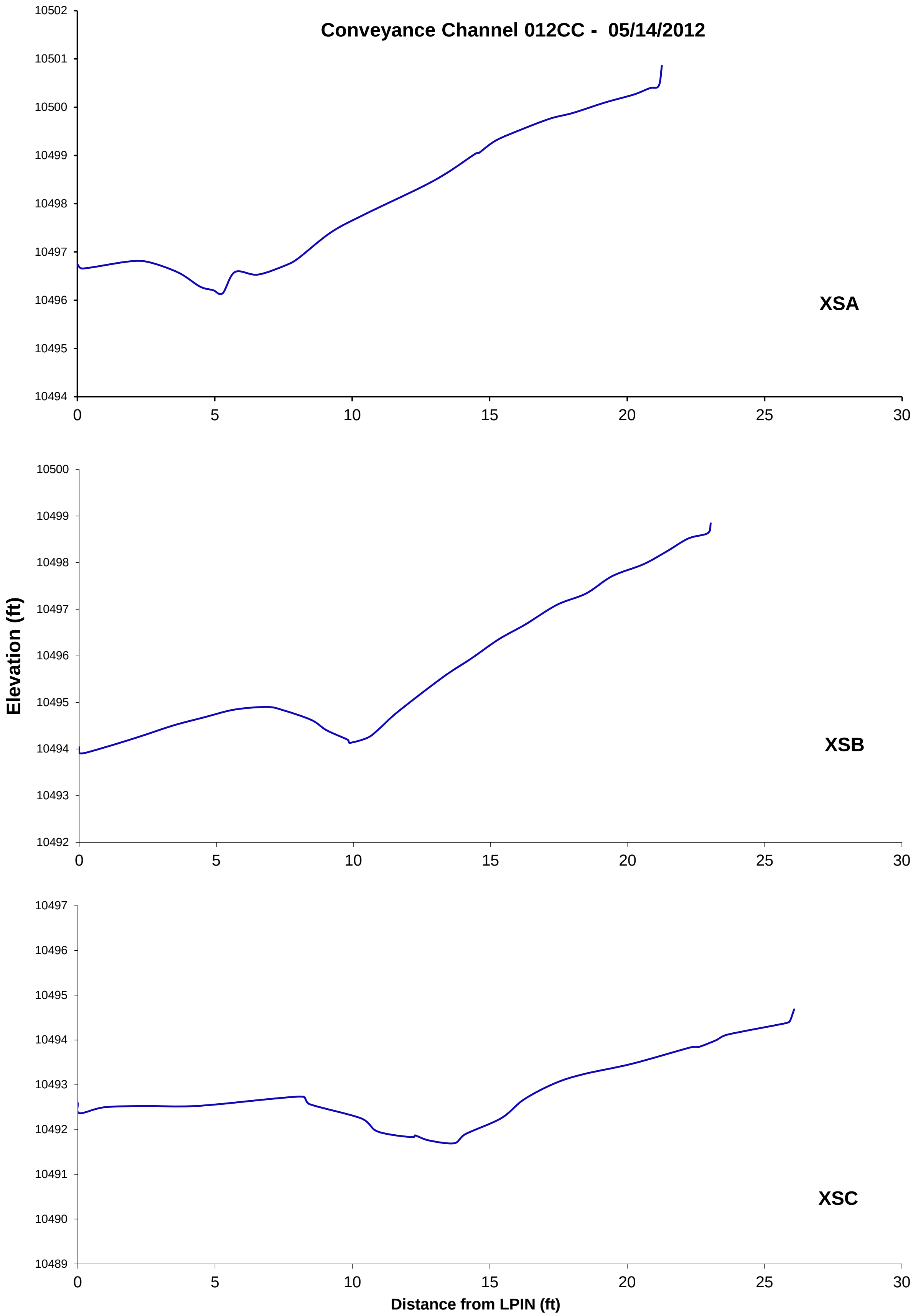
# Conveyance Channel

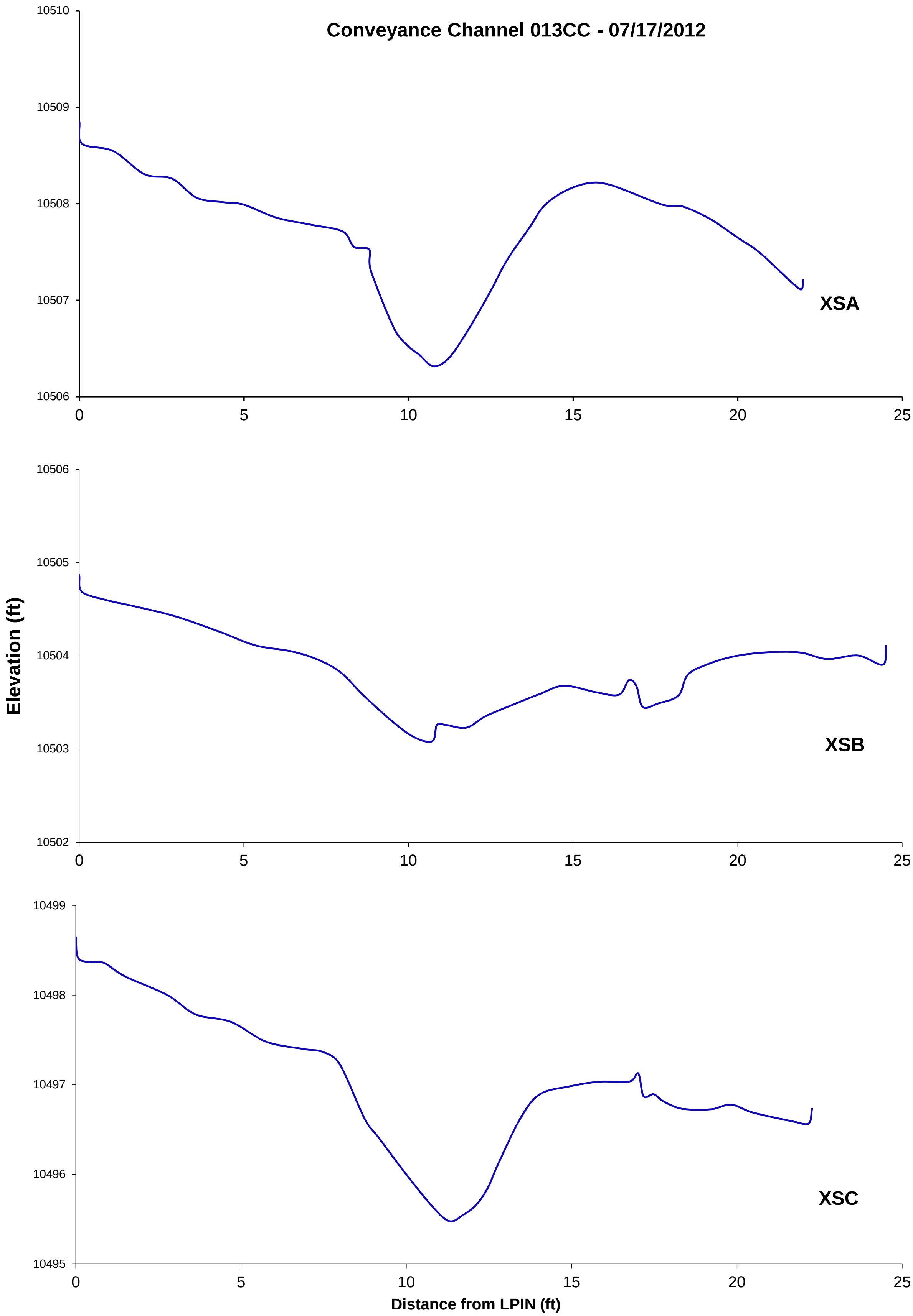
# Cross Section Graphs

# 2012

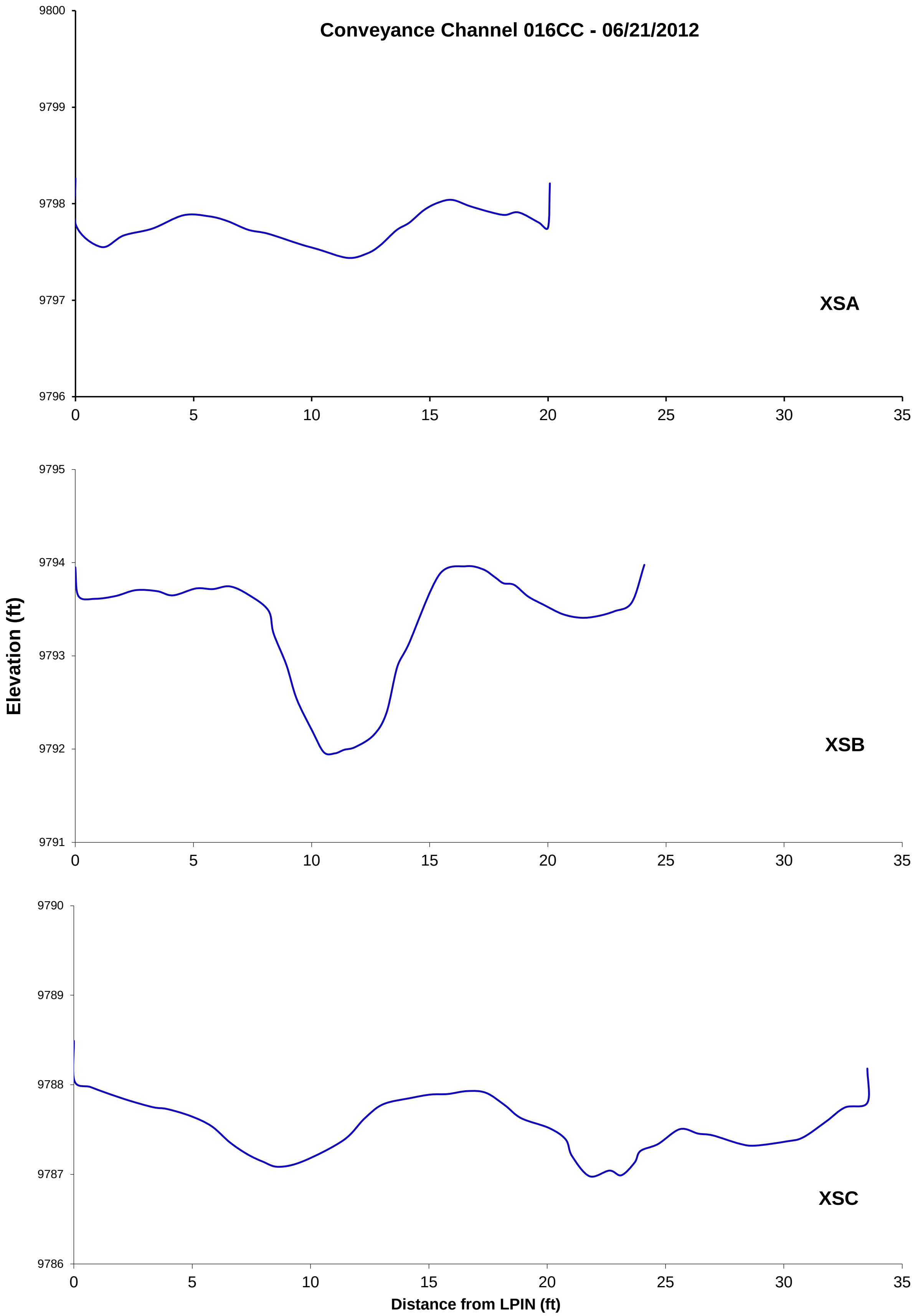


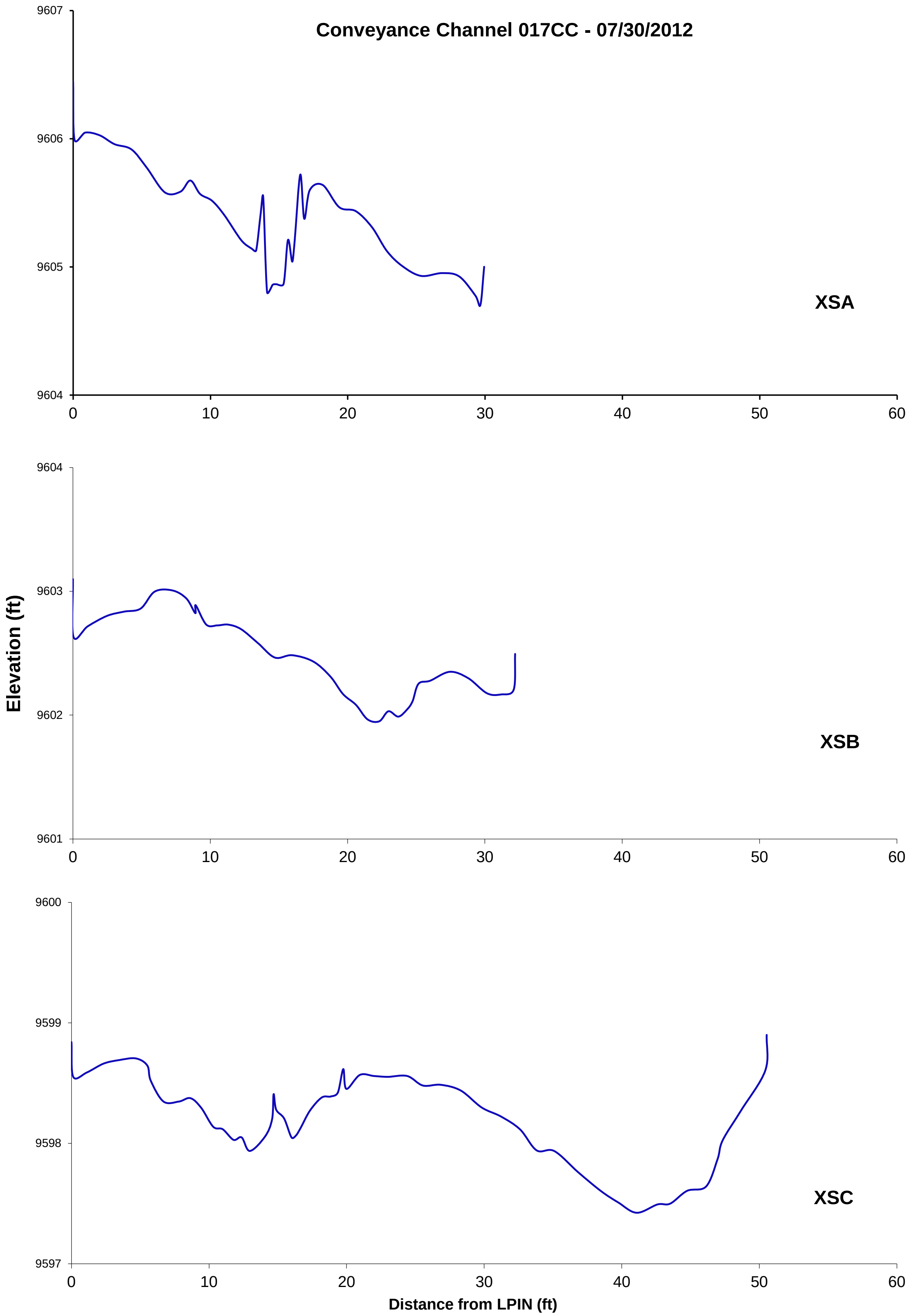
Conveyance Channel 004CC - 07/09/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9510
9509
9508
9507
9506
9505
9504
9503
9502
9501
9500
9499
9496
9495
9494
9493
9492
9491
9490
0
5
10
15
20
25
30
35
40


Conveyance Channel 012CC - 05/14/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10502
10501
10500
10499
10498
10497
10496
10495
10494
10493
10492
10491
10490
10489
0
5
10
15
20
25
30

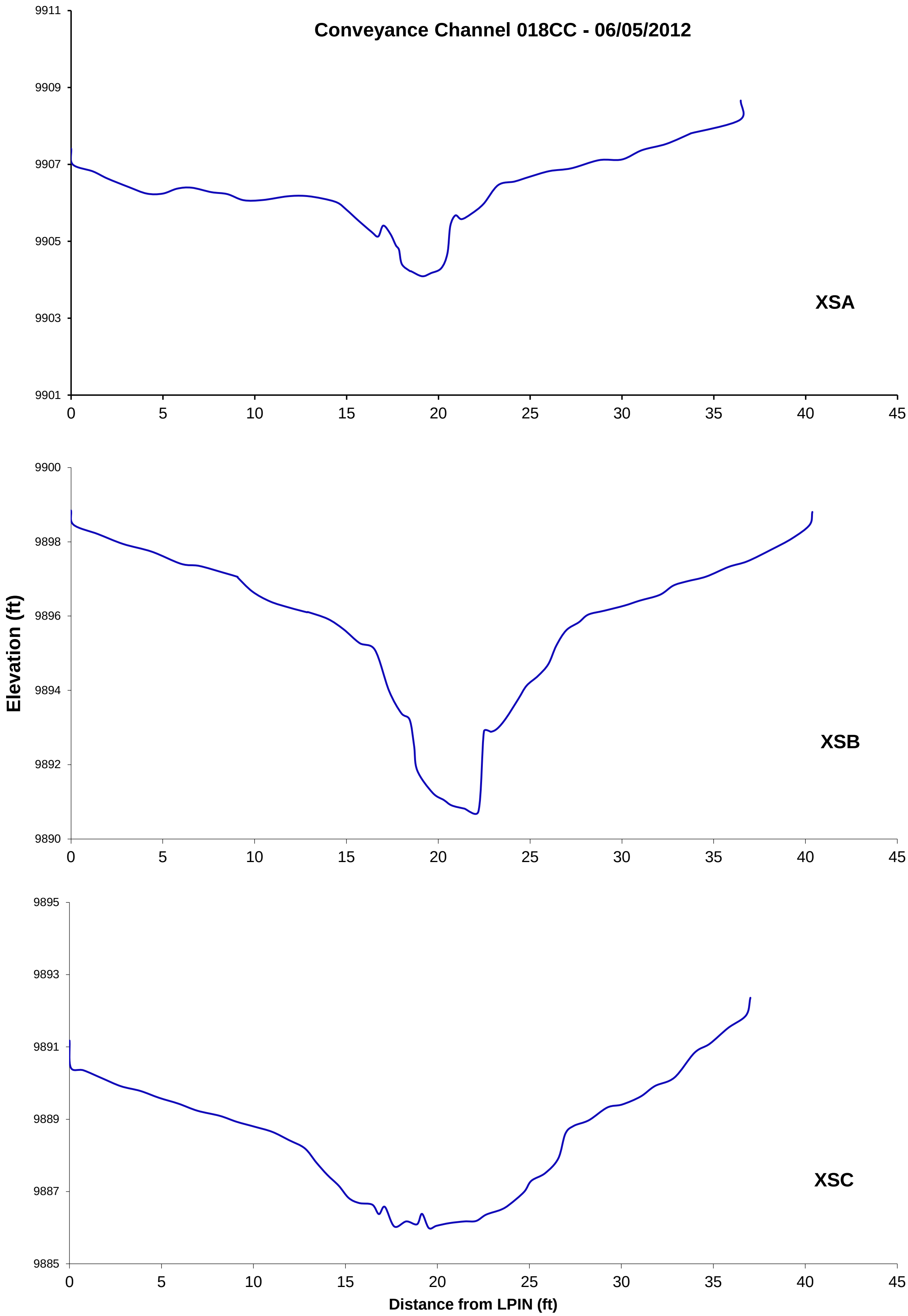


Conveyance Channel 013CC - 07/17/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10510
10509
10508
10507
10506
10505
10504
10503
10502
10499
10498
10497
10496
10495
0
5
10
15
20
25

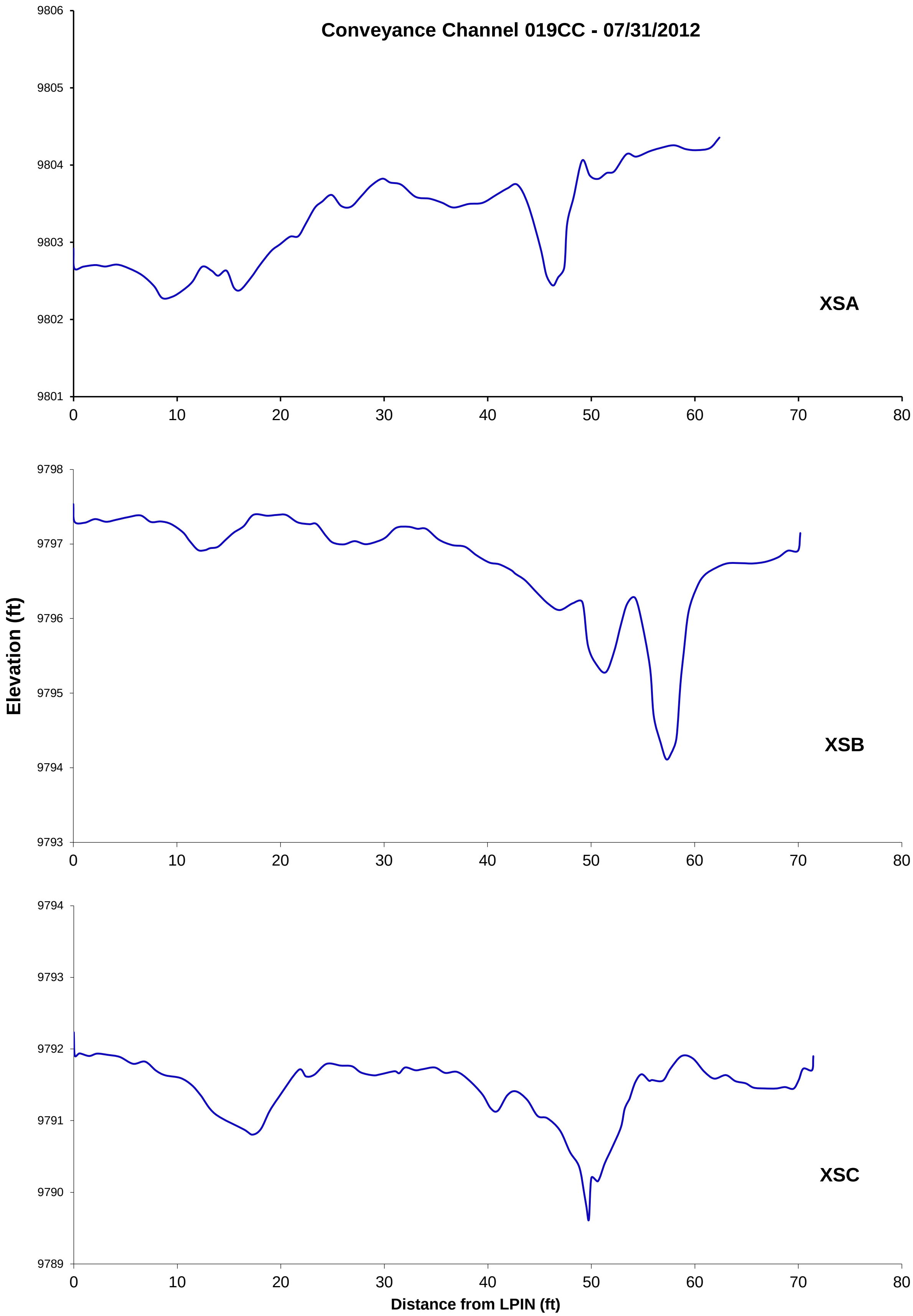

Conveyance Channel 016CC - 06/21/2012
Elevation (ft)
9800
9799
9798
9797
9796
XSA
9795
9794
9793
9792
9791
XSB
9790
9789
9788
9787
9786
XSC
0
5
10
15
20
25
30
35
Distance from LPIN (ft)

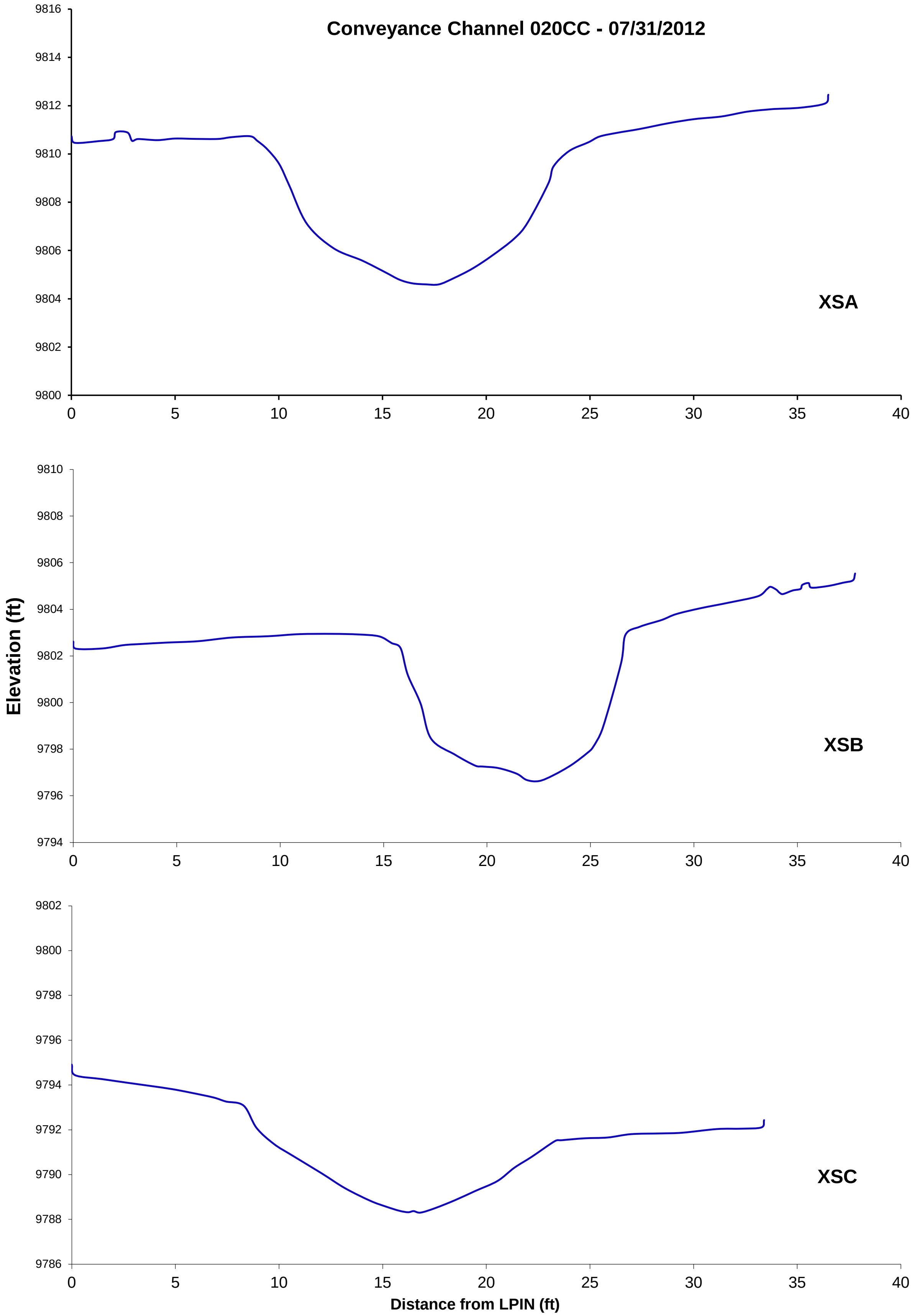


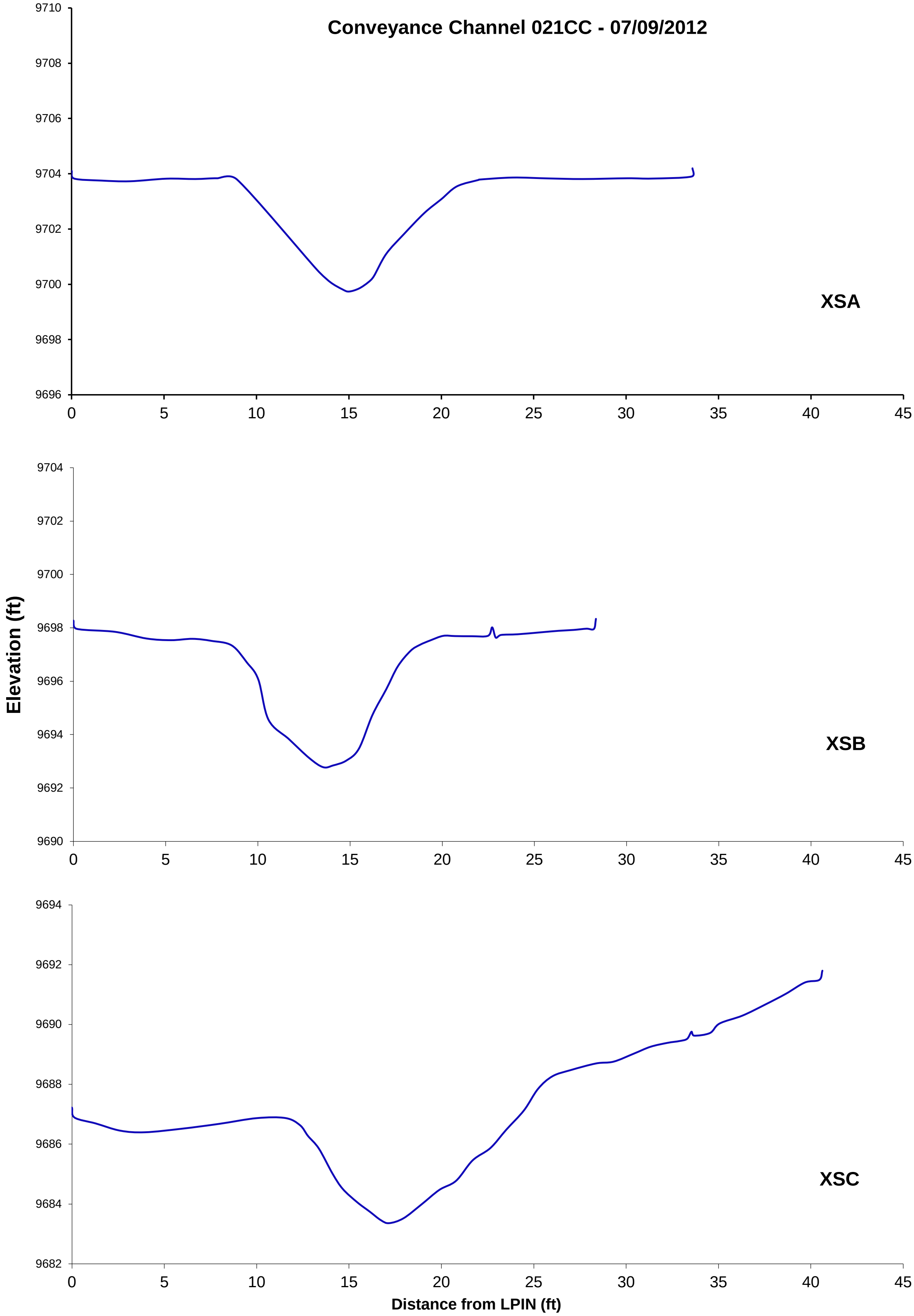
Conveyance Channel 017CC - 07/30/2012
9607
9606
9605
9604
0
10
20
30
40
50
60
XSA
9604
9603
9602
9601
XSB
9600
9599
9598
9597
XSC
Elevation (ft)
Distance from LPIN (ft)



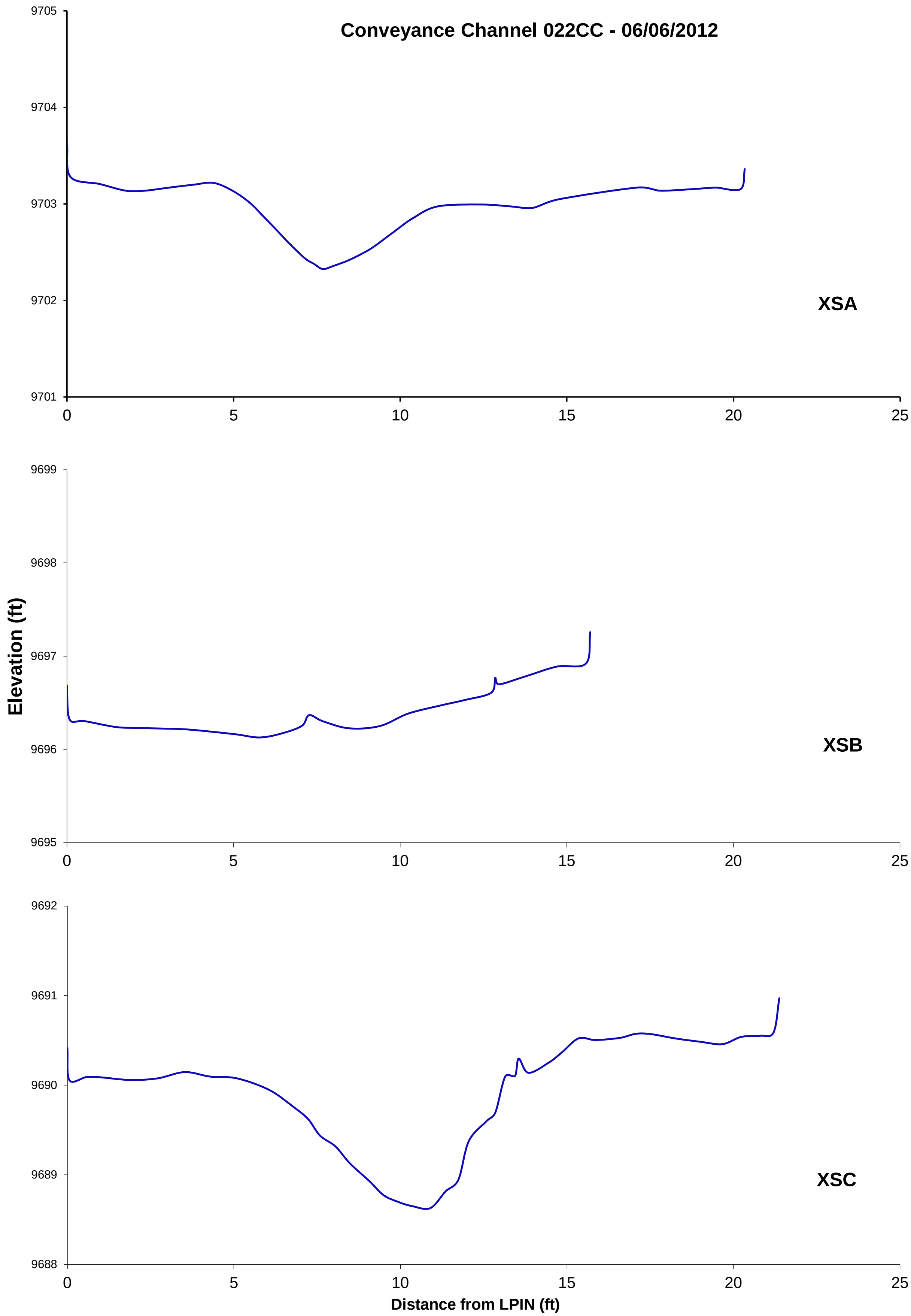
Conveyance Channel 018CC - 06/05/2012
Elevation (ft)
9911
9909
9907
9905
9903
9901
XSA
9900
9898
9896
9894
9892
9890
XSB
9895
9893
9891
9889
9887
9885
XSC
0
5
10
15
20
25
30
35
40
45
Distance from LPIN (ft)

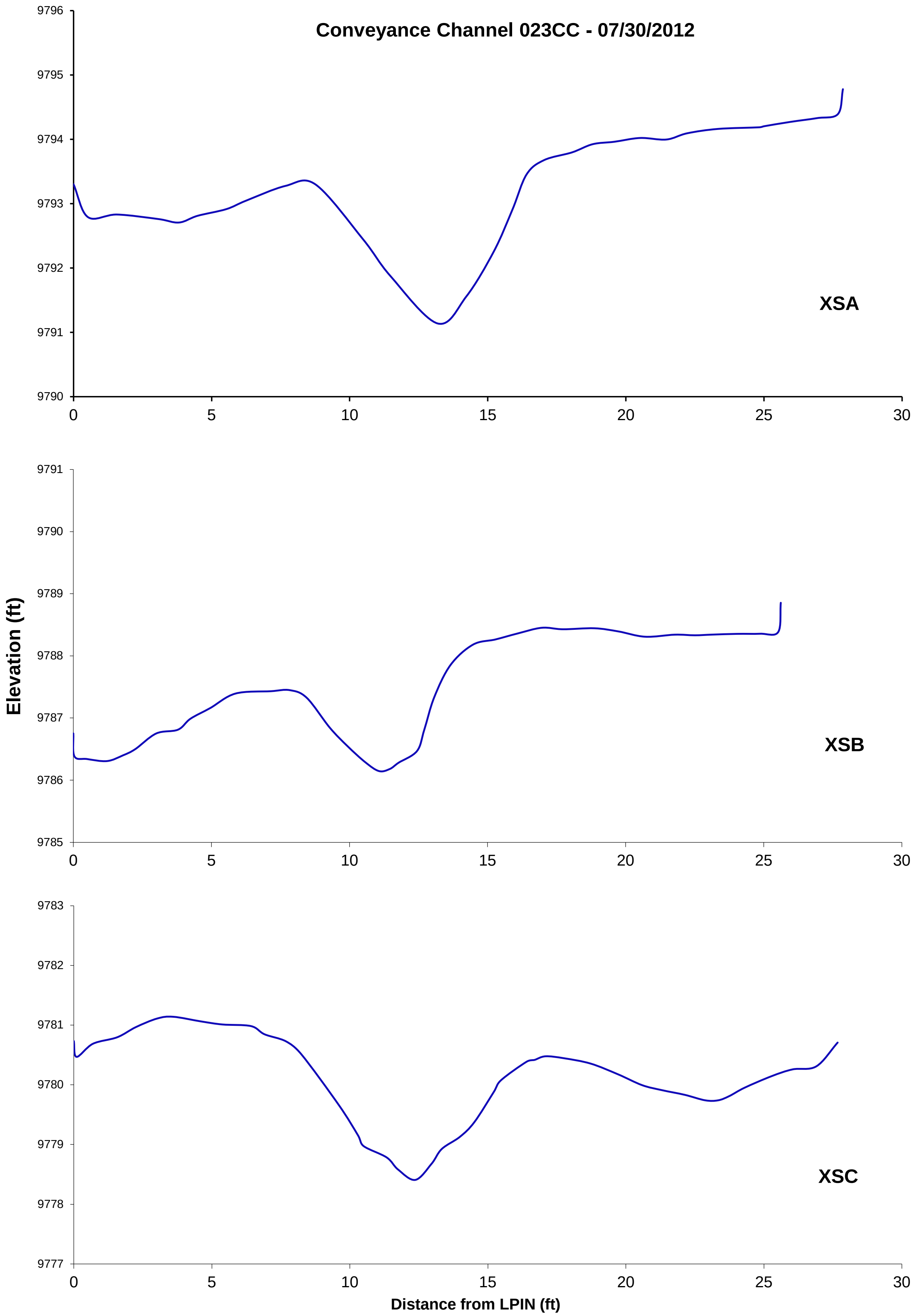

Conveyance Channel 019CC - 07/31/2012
Elevation (ft)
9806
9805
9804
9803
9802
9801
XSA
9798
9797
9796
9795
9794
9793
XSB
9794
9793
9792
9791
9790
9789
XSC
0
10
20
30
40
50
60
70
80
Distance from LPIN (ft)


Conveyance Channel 020CC - 07/31/2012
XSA
9816
9814
9812
9810
9808
9806
9804
9802
9800
0 5 10 15 20 25 30 35 40
XSB
9810
9808
9806
9804
9802
9800
9798
9796
9794
0 5 10 15 20 25 30 35 40
XSC
9802
9800
9798
9796
9794
9792
9790
9788
9786
0 5 10 15 20 25 30 35 40
Elevation (ft)
Distance from LPIN (ft)

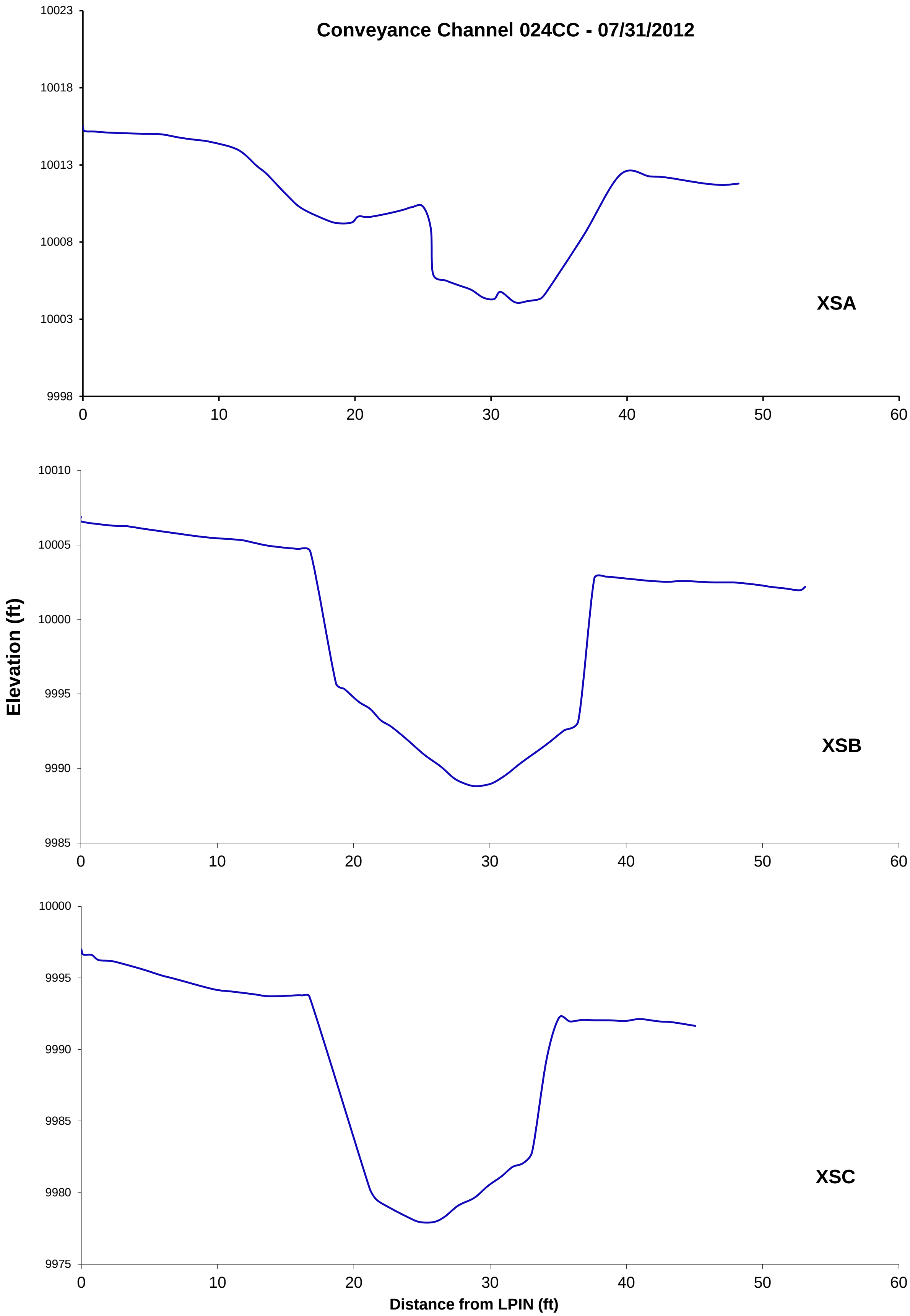


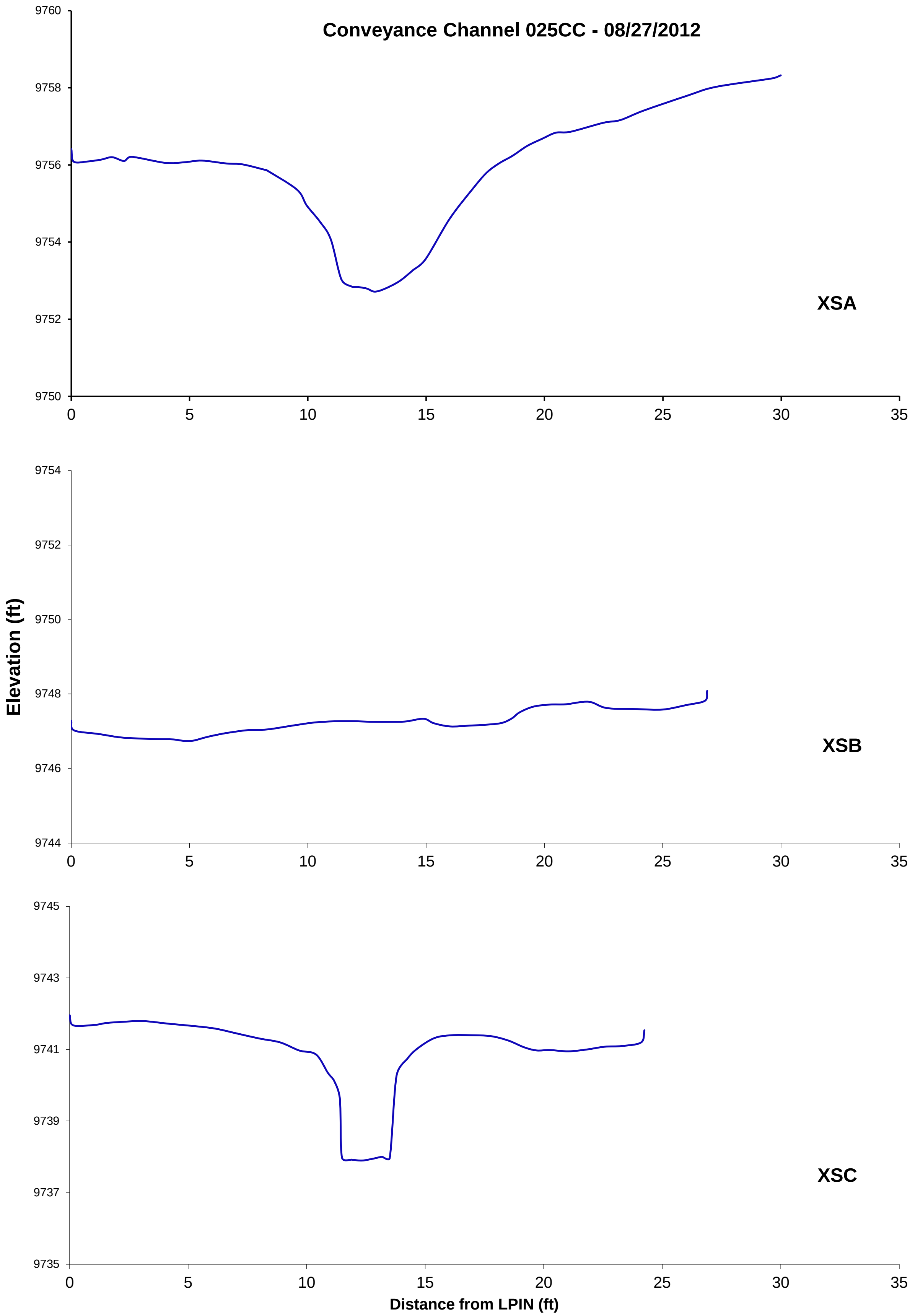
Conveyance Channel 021CC - 07/09/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9710
9708
9706
9704
9702
9700
9698
9696
9694
9692
9690
9688
9686
9684
9682
0
5
10
15
20
25
30
35
40
45


Conveyance Channel 022CC - 06/06/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9705
9704
9703
9702
9701
9699
9698
9697
9696
9695
9692
9691
9690
9689
9688
0
5
10
15
20
25

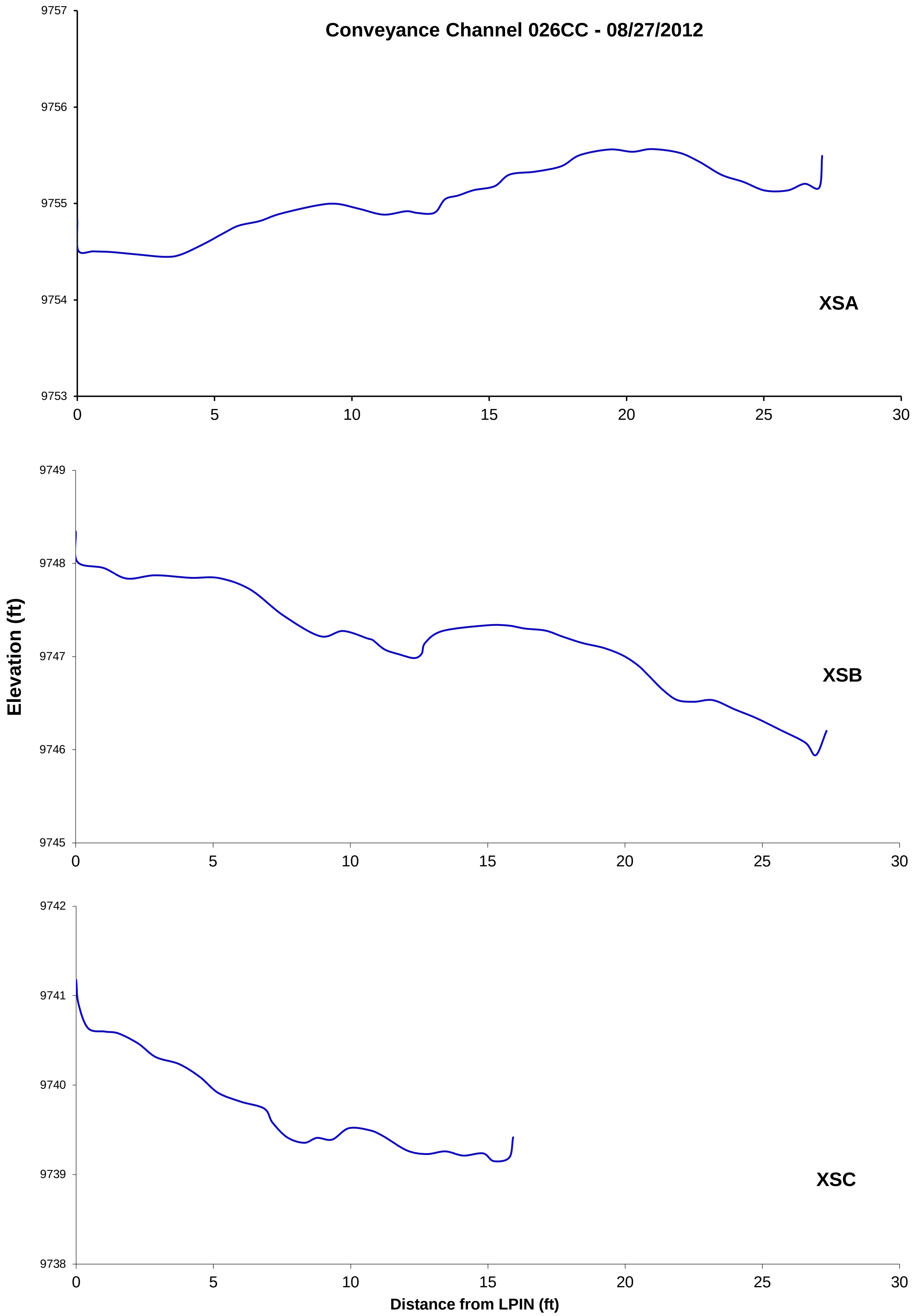


Conveyance Channel 023CC - 07/30/2012
Elevation (ft)
9796
9795
9794
9793
9792
9791
9790
XSA
9791
9790
9789
9788
9787
9786
9785
XSB
9783
9782
9781
9780
9779
9778
9777
XSC
0
5
10
15
20
25
30
Distance from LPIN (ft)

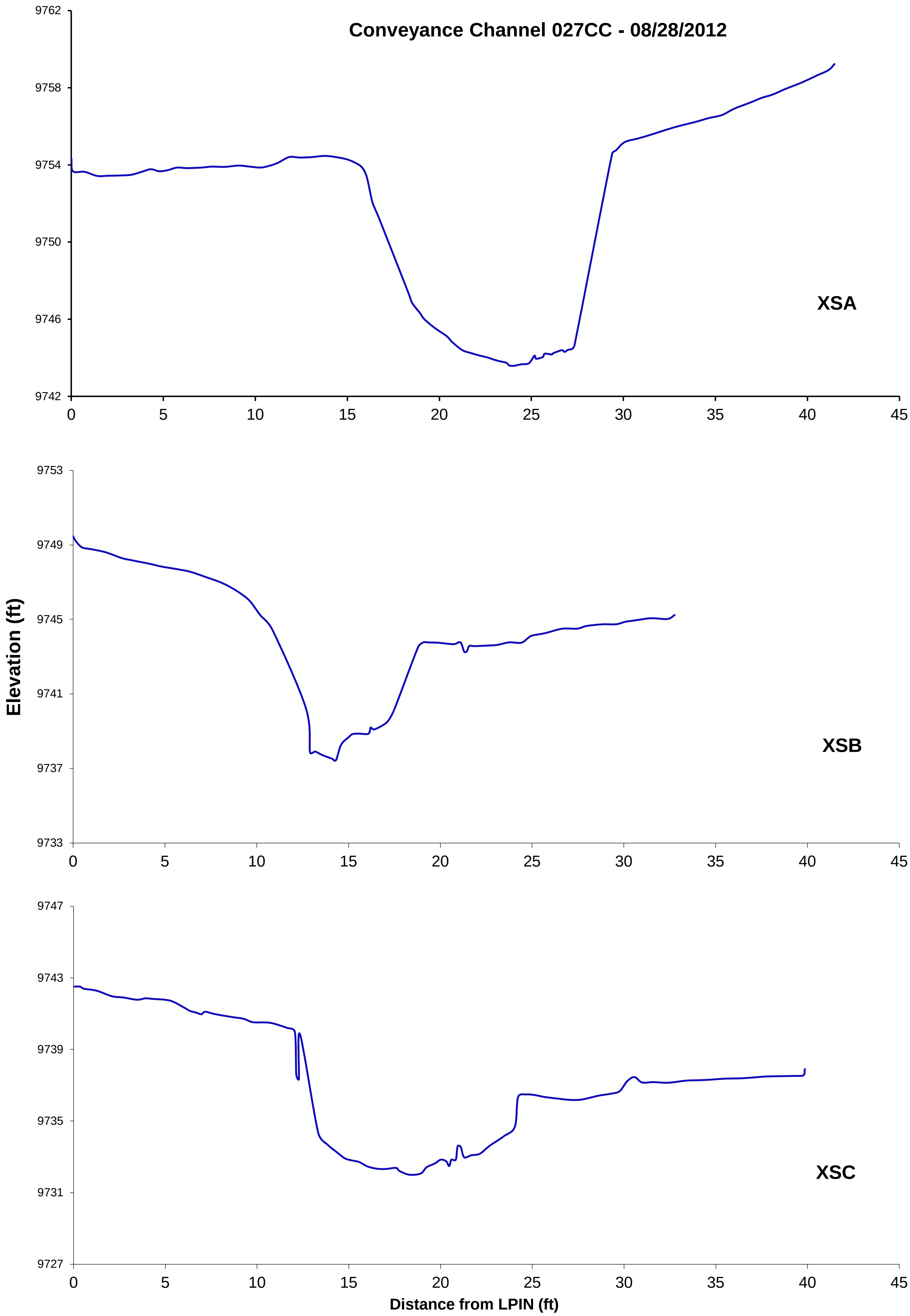

Conveyance Channel 024CC - 07/31/2012
10023
10018
10013
10008
10003
9998
0
10
20
30
40
50
60
XSA
10010
10005
10000
9995
9990
9985
XSB
10000
9995
9990
9985
9980
9975
XSC
Elevation (ft)
Distance from LPIN (ft)

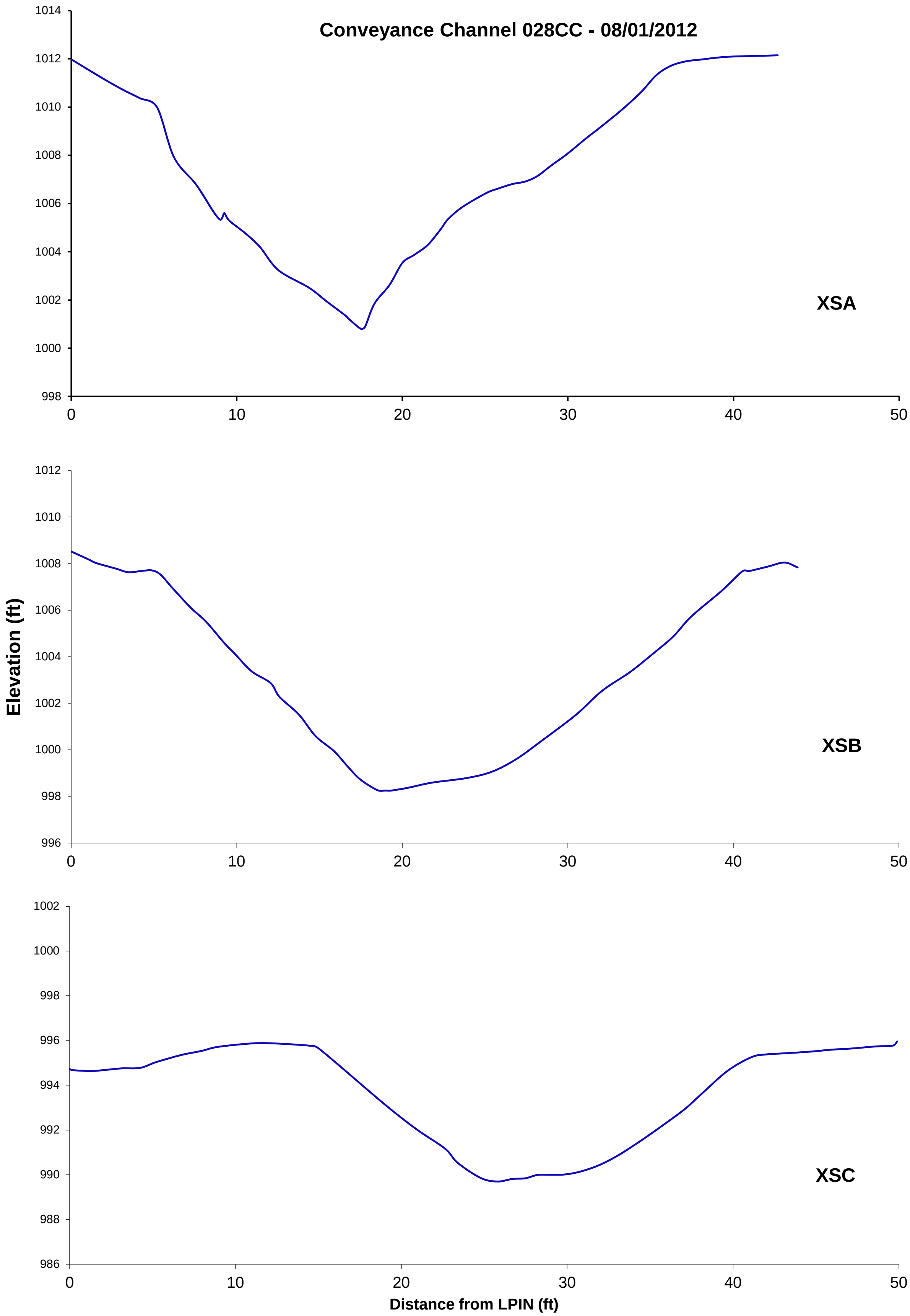


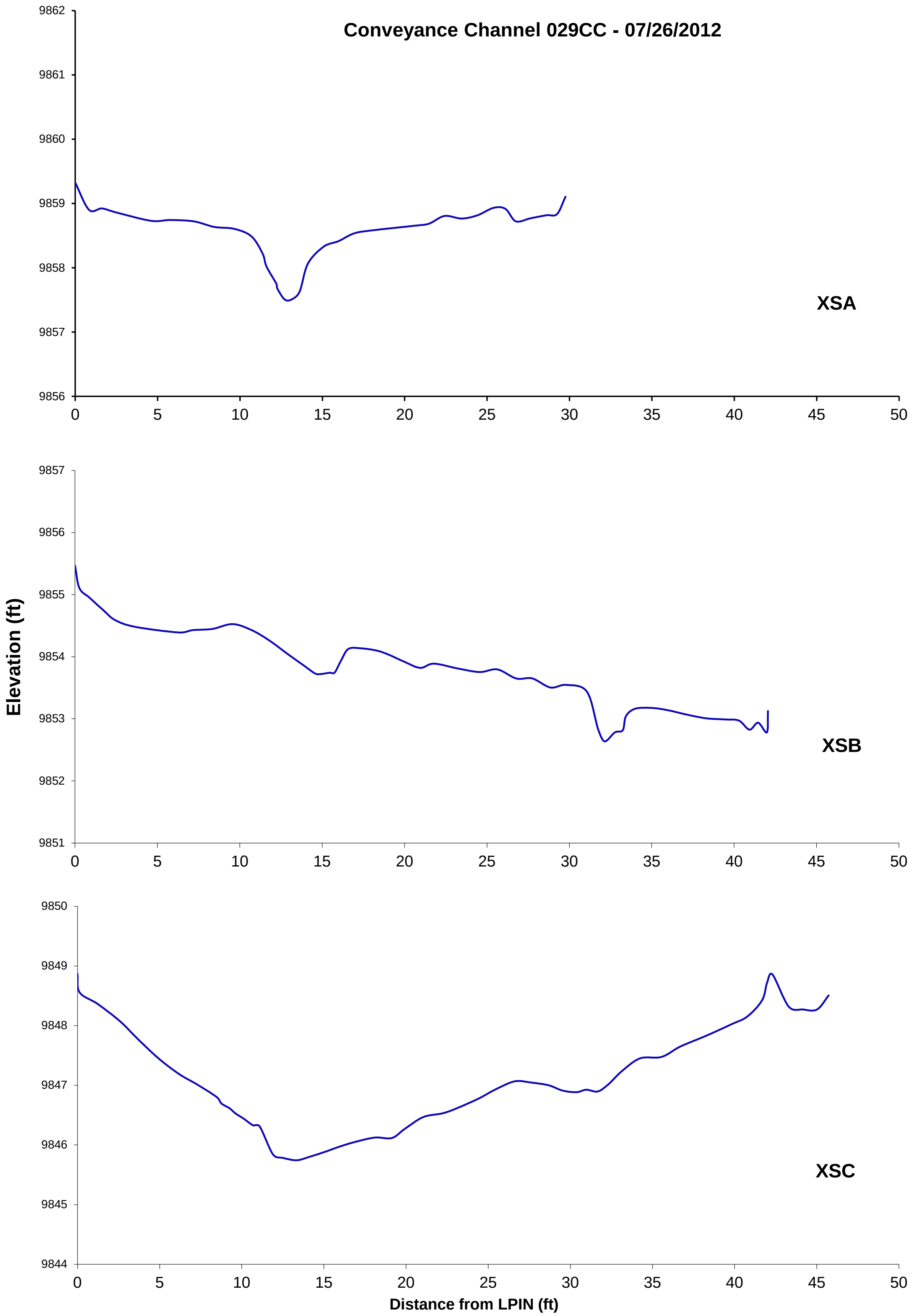
Conveyance Channel 025CC - 08/27/2012
Elevation (ft)
9760
9758
9756
9754
9752
9750
0
5
10
15
20
25
30
35
XSA
9754
9752
9750
9748
9746
9744
0
5
10
15
20
25
30
35
XSB
9745
9743
9741
9739
9737
9735
0
5
10
15
20
25
30
35
XSC
Distance from LPIN (ft)

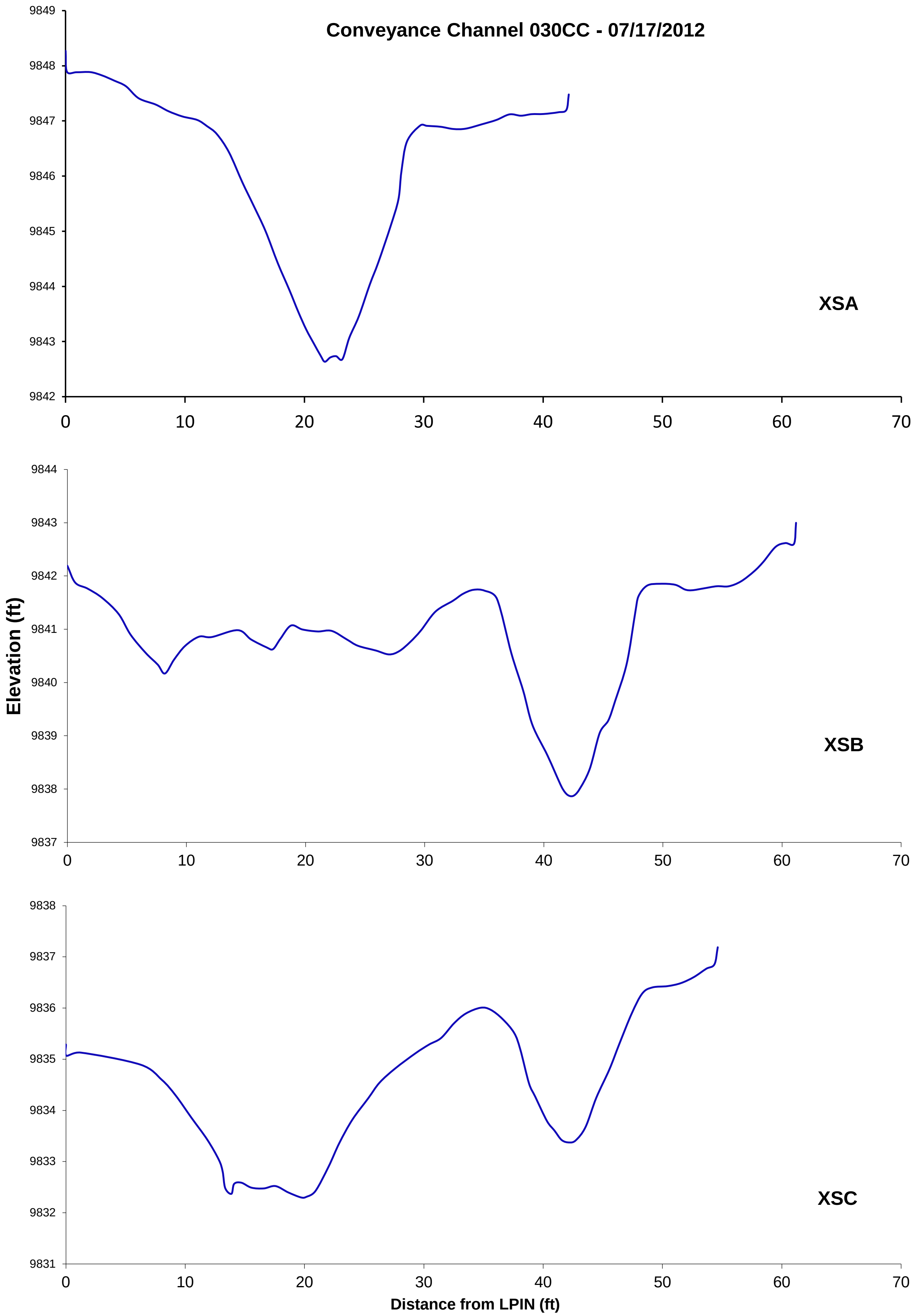


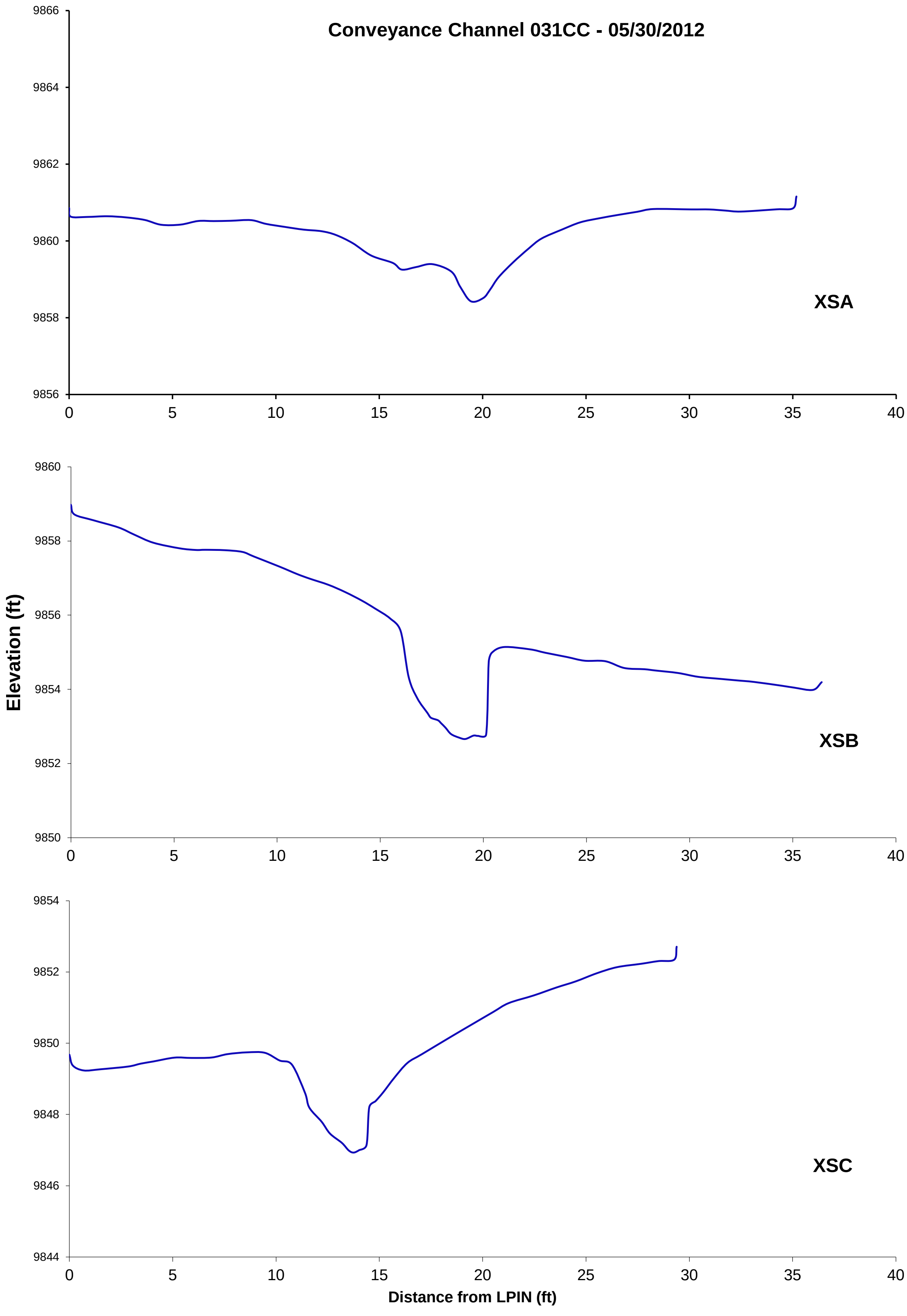
Conveyance Channel 026CC - 08/27/2012
Elevation (ft)
9757
9756
9755
9754
9753
0
5
10
15
20
25
30
XSA
9749
9748
9747
9746
9745
XSB
9742
9741
9740
9739
9738
XSC
Distance from LPIN (ft)

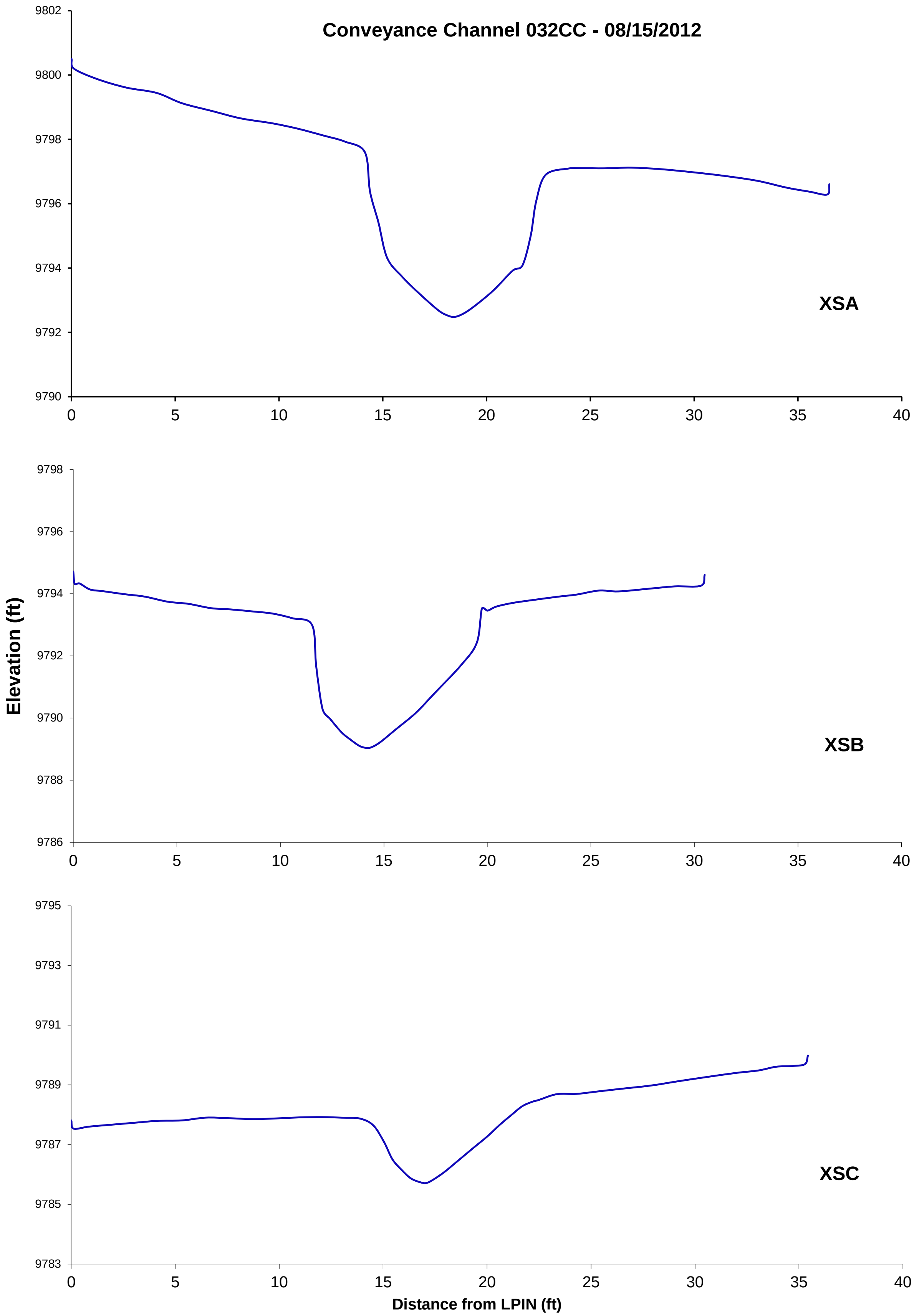

Conveyance Channel 027CC - 08/28/2012
Elevation (ft)
9762
9758
9754
9750
9746
9742
0 5 10 15 20 25 30 35 40 45
XSA
9753
9749
9745
9741
9737
9733
0 5 10 15 20 25 30 35 40 45
XSB
9747
9743
9739
9735
9731
9727
0 5 10 15 20 25 30 35 40 45
XSC
Distance from LPIN (ft)

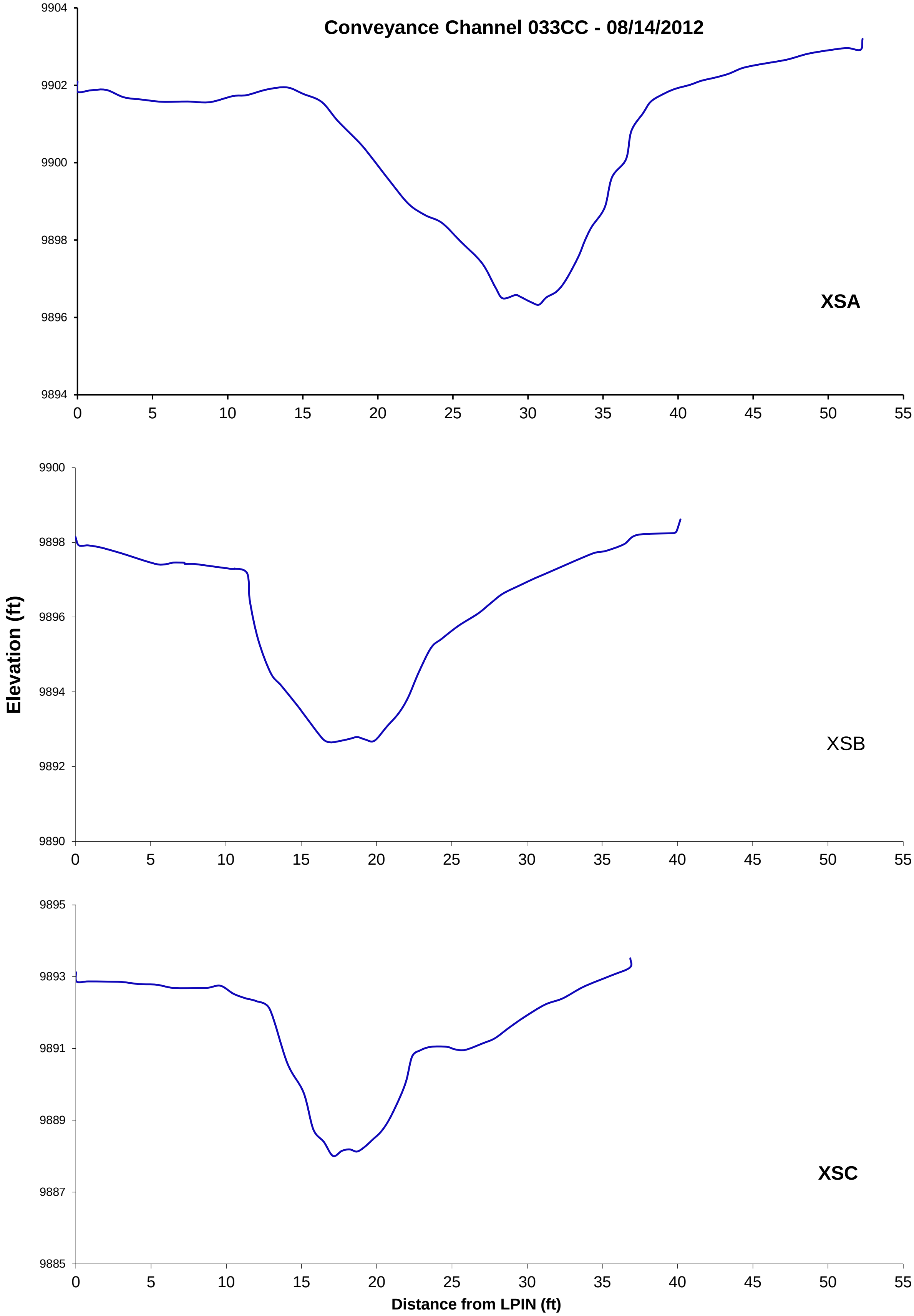

Conveyance Channel 028CC - 08/01/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
1014
1012
1010
1008
1006
1004
1002
1000
998
996
994
992
990
988
986
0
10
20
30
40
50

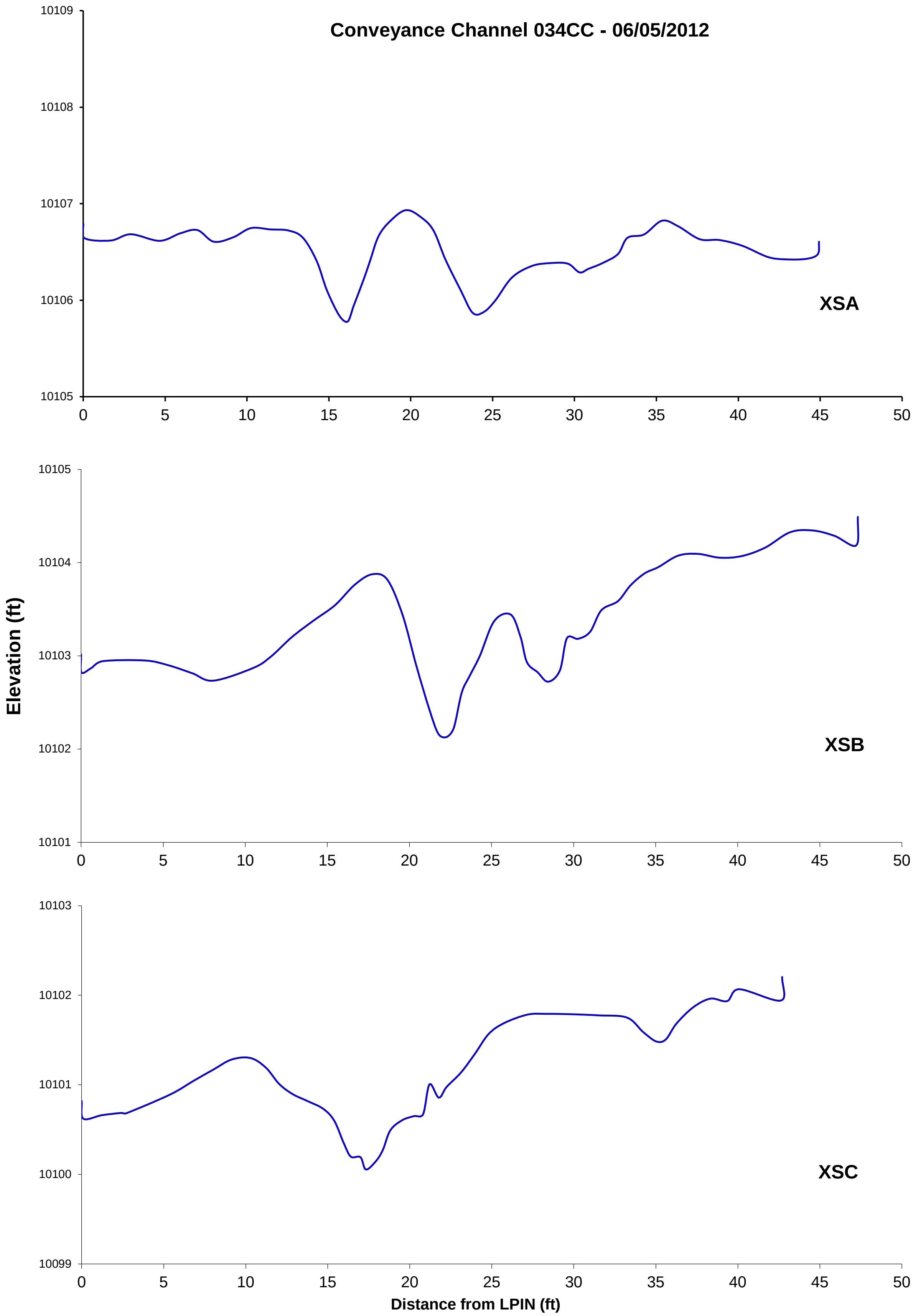

Conveyance Channel 029CC - 07/26/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9862
9861
9860
9859
9858
9857
9856
9857
9856
9855
9854
9853
9852
9851
9850
9849
9848
9847
9846
9845
9844
0
5
10
15
20
25
30
35
40
45
50


Conveyance Channel 030CC - 07/17/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9849
9848
9847
9846
9845
9844
9843
9842
9841
9840
9839
9838
9837
9836
9835
9834
9833
9832
9831
0
10
20
30
40
50
60
70

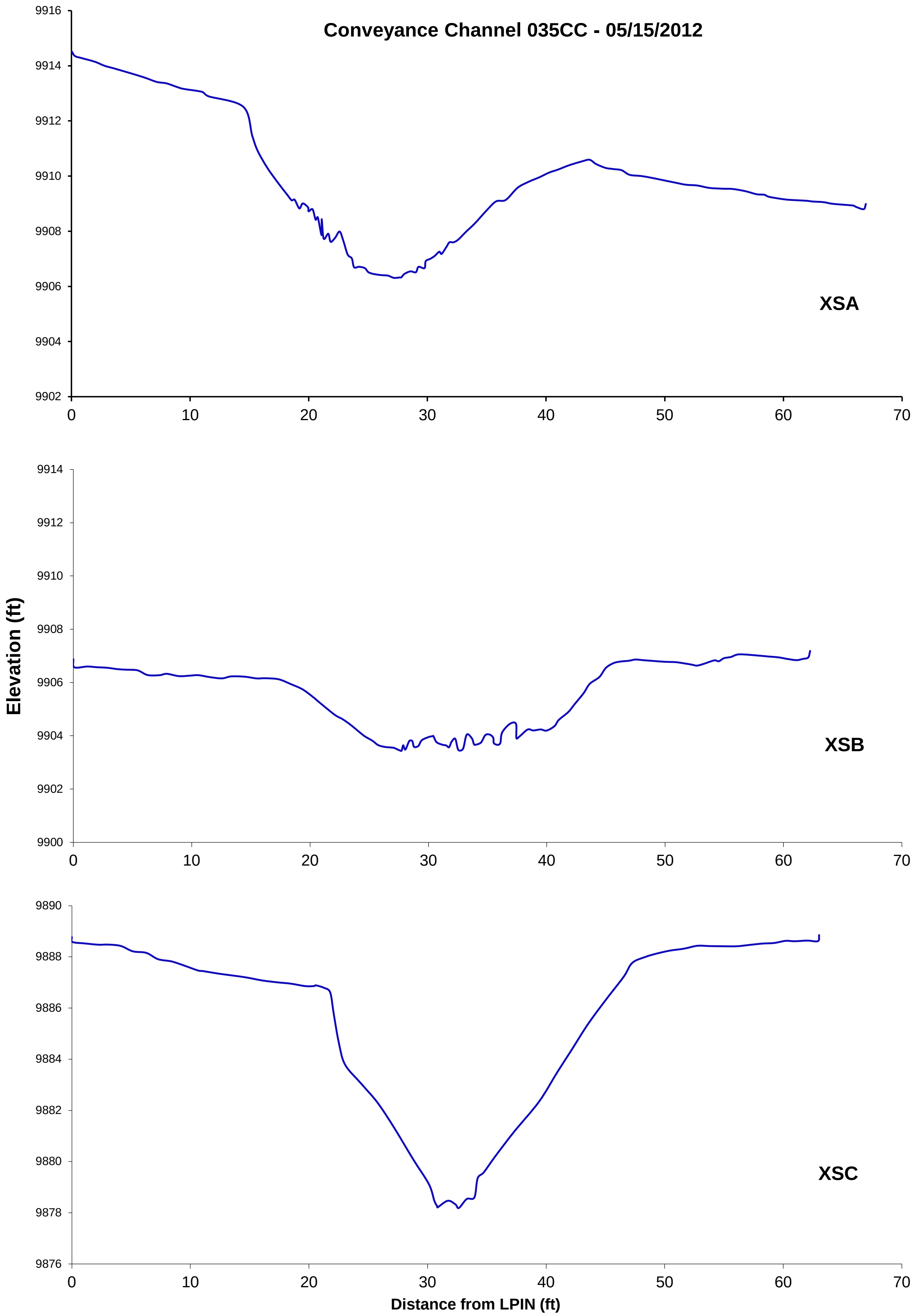

Conveyance Channel 031CC - 05/30/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9866
9864
9862
9860
9858
9856
9854
9852
9850
9848
9846
9844
0
5
10
15
20
25
30
35
40

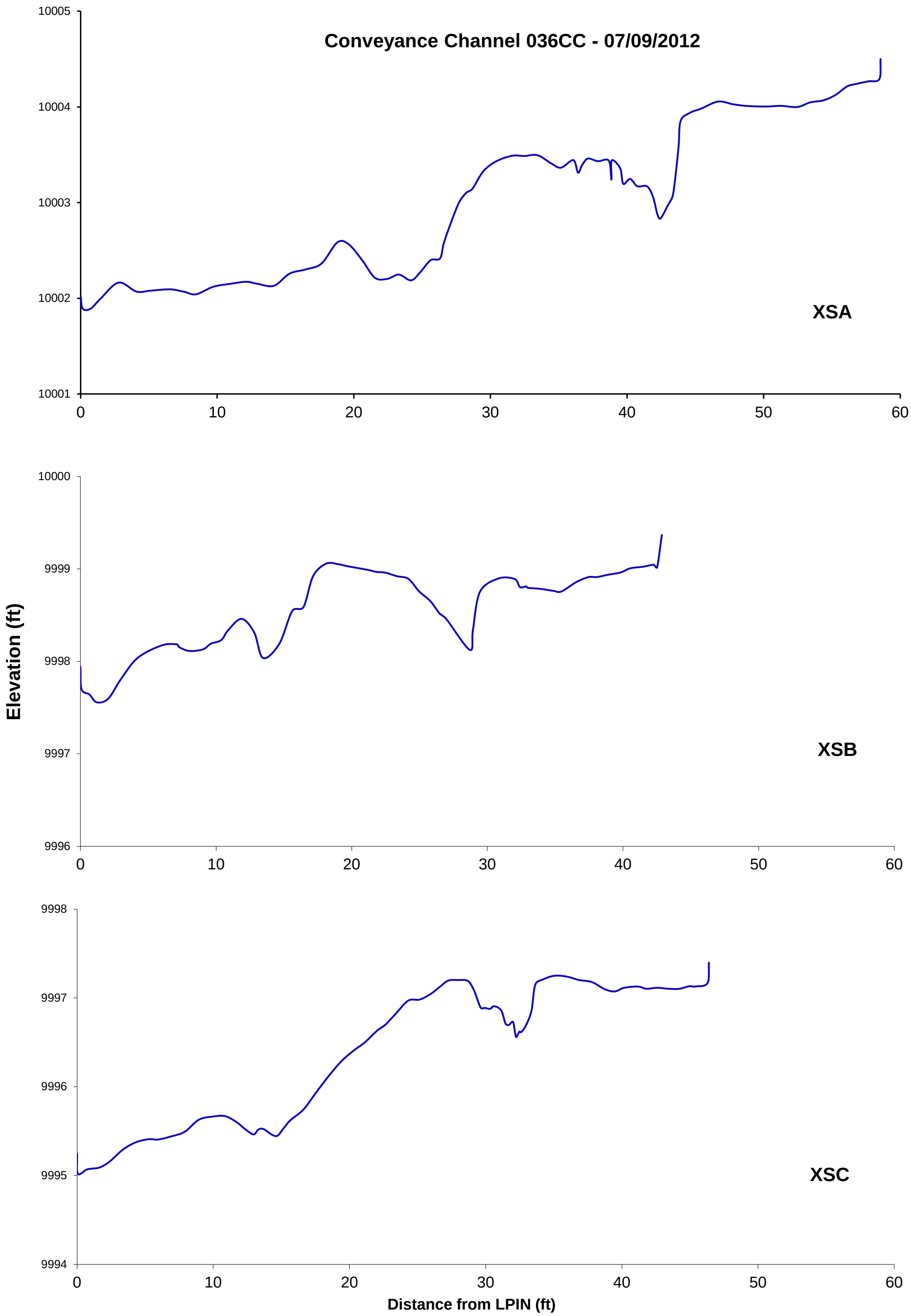

Conveyance Channel 032CC - 08/15/2012
9802
9800
9798
9796
9794
9792
9790
0
5
10
15
20
25
30
35
40
XSA
9798
9796
9794
9792
9790
9788
9786
XSB
9795
9793
9791
9789
9787
9785
9783
XSC
Elevation (ft)
Distance from LPIN (ft)

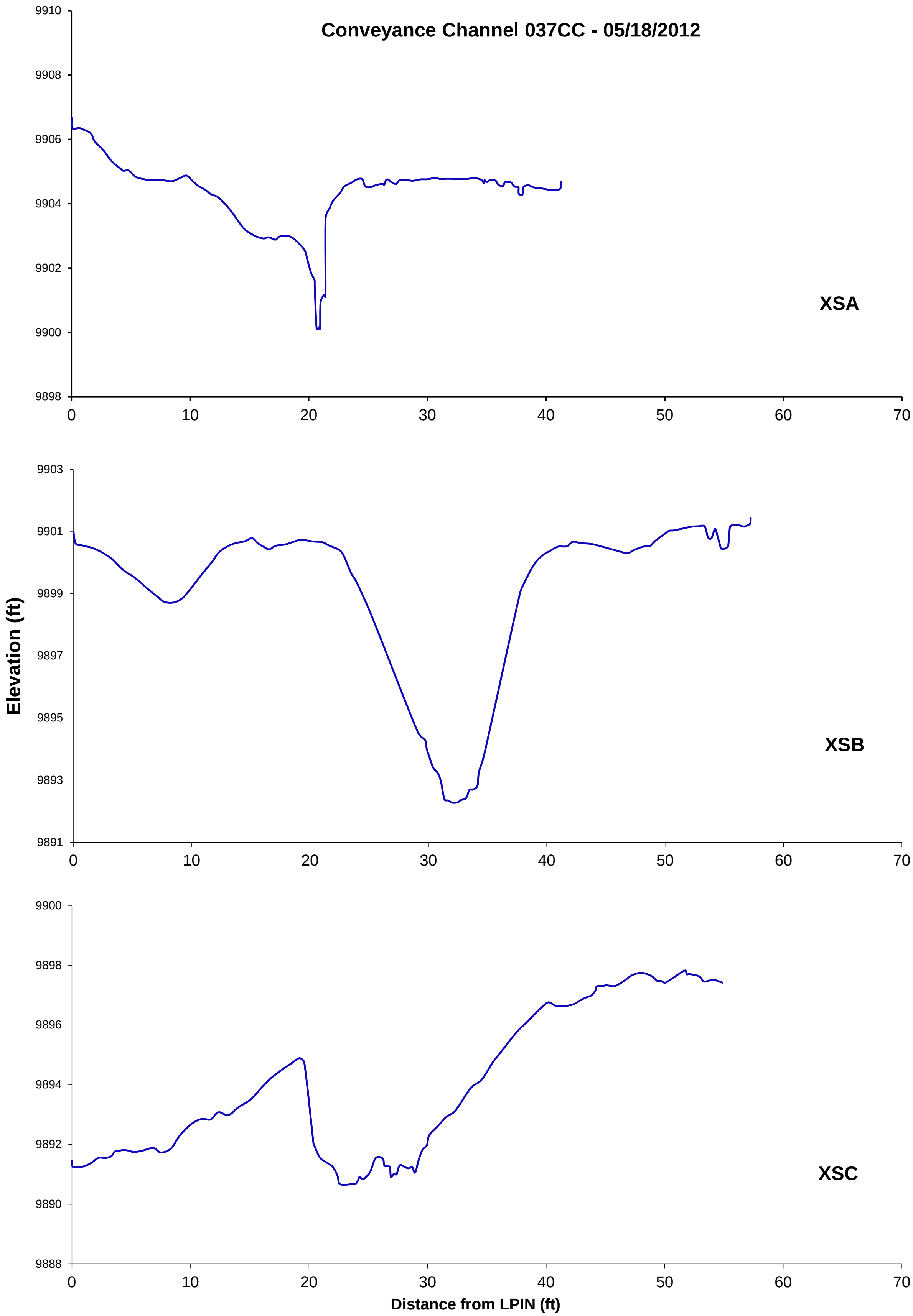

Conveyance Channel 033CC - 08/14/2012
Elevation (ft)
XSA
9904
9902
9900
9898
9896
9894
XSB
9900
9898
9896
9894
9892
9890
XSC
9895
9893
9891
9889
9887
9885
0
5
10
15
20
25
30
35
40
45
50
55
Distance from LPIN (ft)

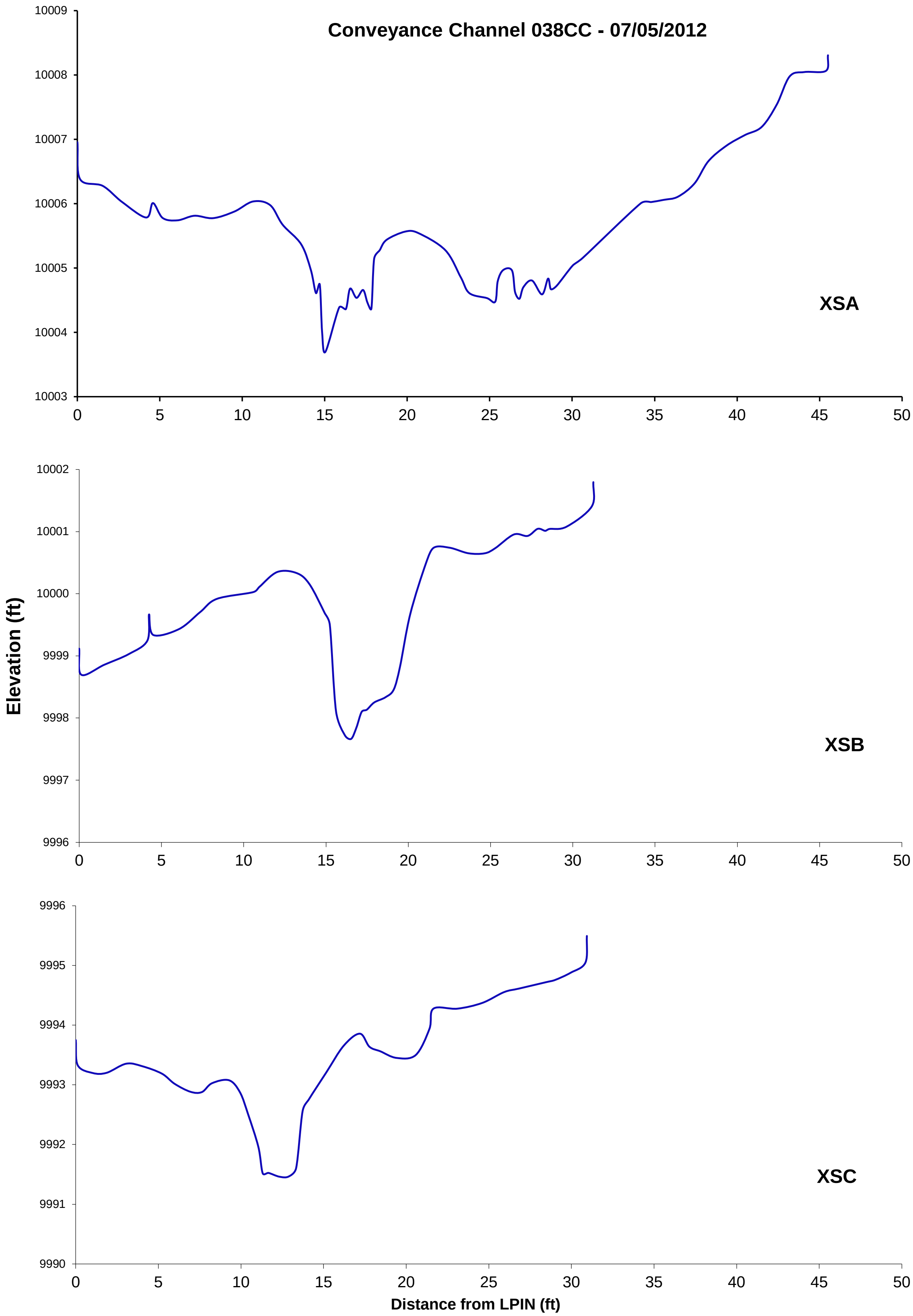


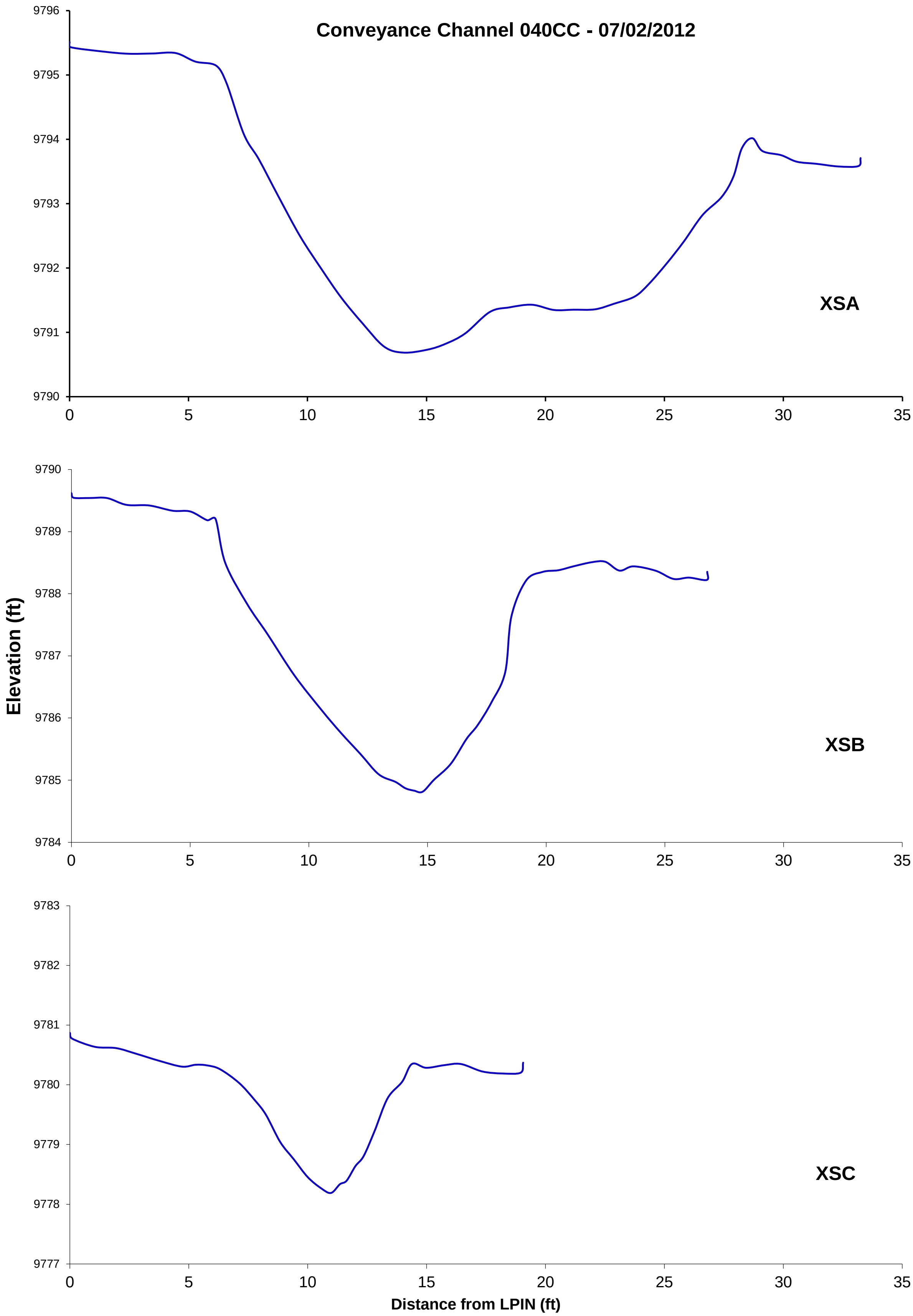
Conveyance Channel 034CC - 06/05/2012
Elevation (ft)
10109
10108
10107
10106
10105
XSA
10105
10104
10103
10102
10101
XSB
10103
10102
10101
10100
10099
XSC
0
5
10
15
20
25
30
35
40
45
50
Distance from LPIN (ft)

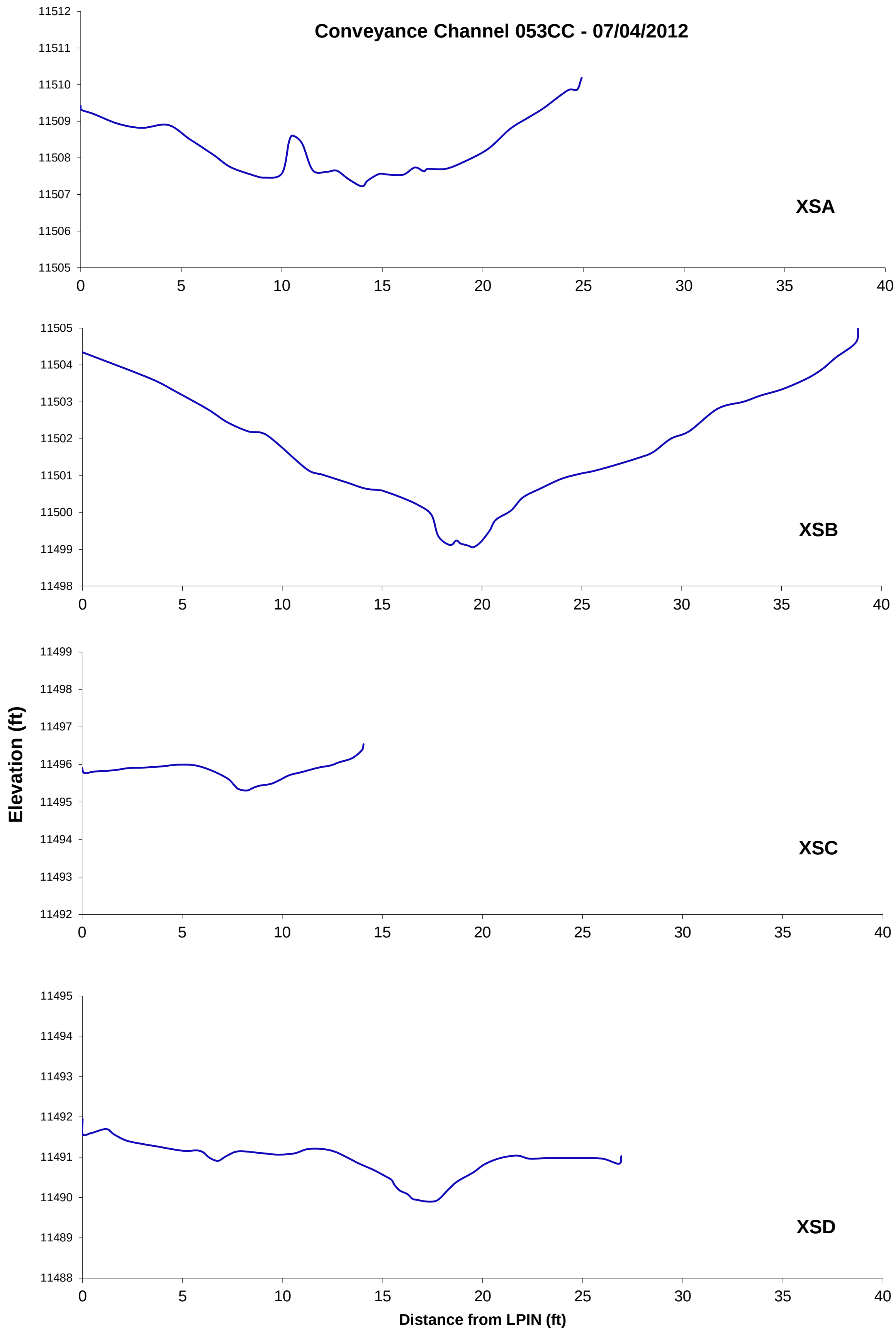

Conveyance Channel 035CC - 05/15/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9916
9914
9912
9910
9908
9906
9904
9902
9900
9890
9888
9886
9884
9882
9880
9878
9876
0
10
20
30
40
50
60
70


Conveyance Channel 036CC - 07/09/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
10005
10004
10003
10002
10001
10000
9999
9998
9997
9996
9998
9997
9996
9995
9994
0
10
20
30
40
50
60

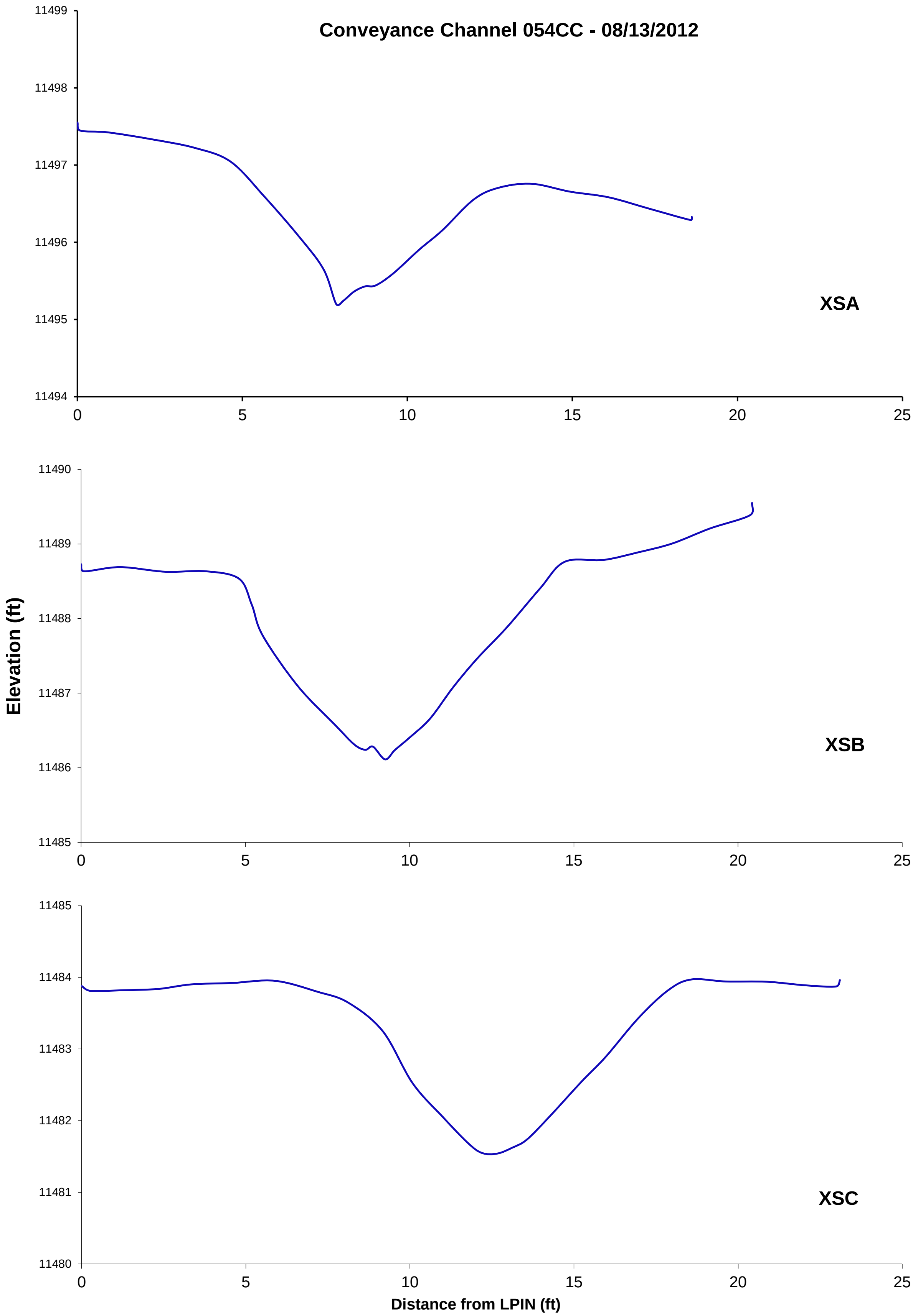

Conveyance Channel 037CC - 05/18/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9910
9908
9906
9904
9902
9900
9898
9903
9901
9899
9897
9895
9893
9891
9900
9898
9896
9894
9892
9890
9888
0
10
20
30
40
50
60
70

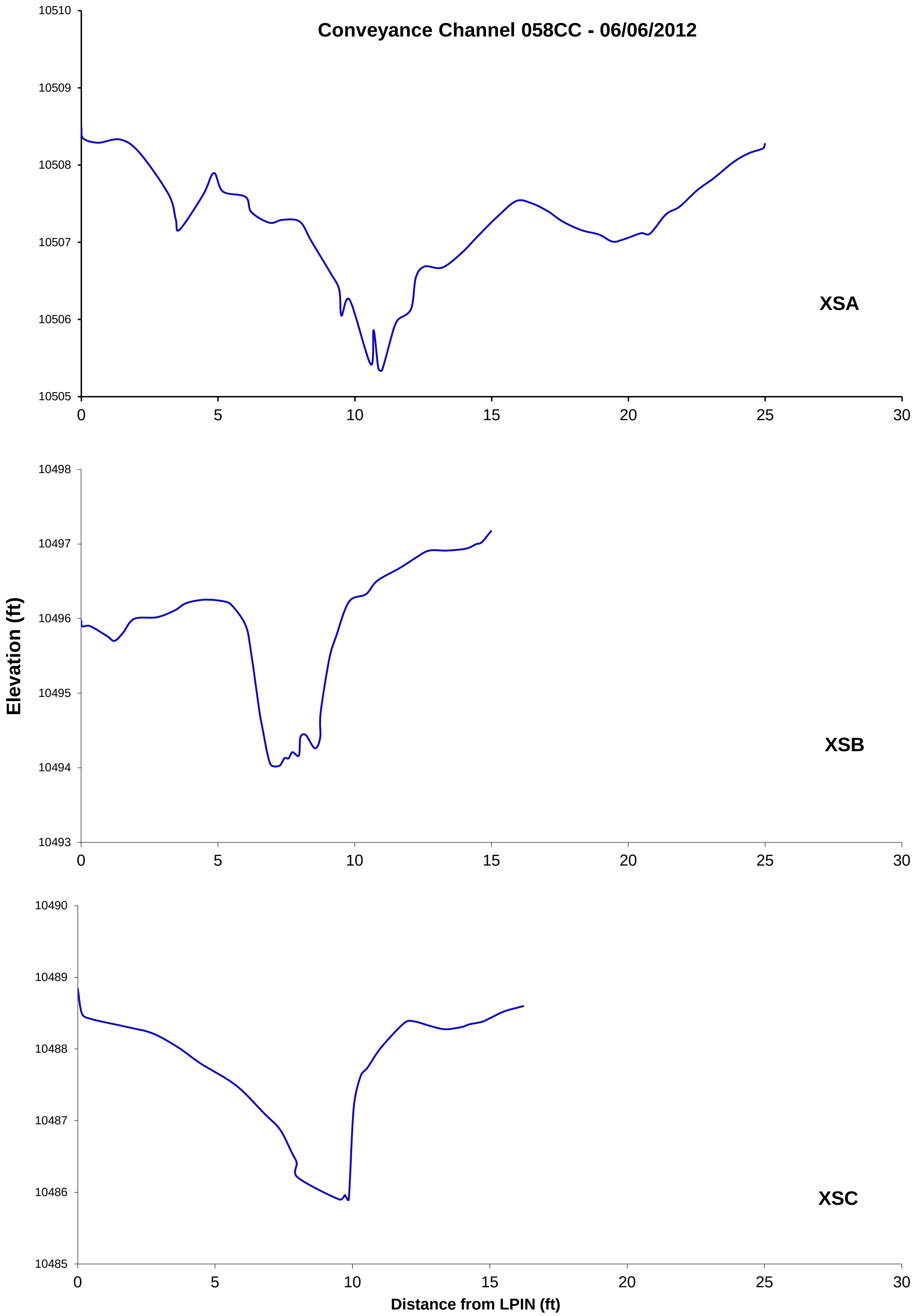

Conveyance Channel 038CC - 07/05/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10009
10008
10007
10006
10005
10004
10003
10002
10001
10000
9999
9998
9997
9996
9995
9994
9993
9992
9991
9990
0
5
10
15
20
25
30
35
40
45
50

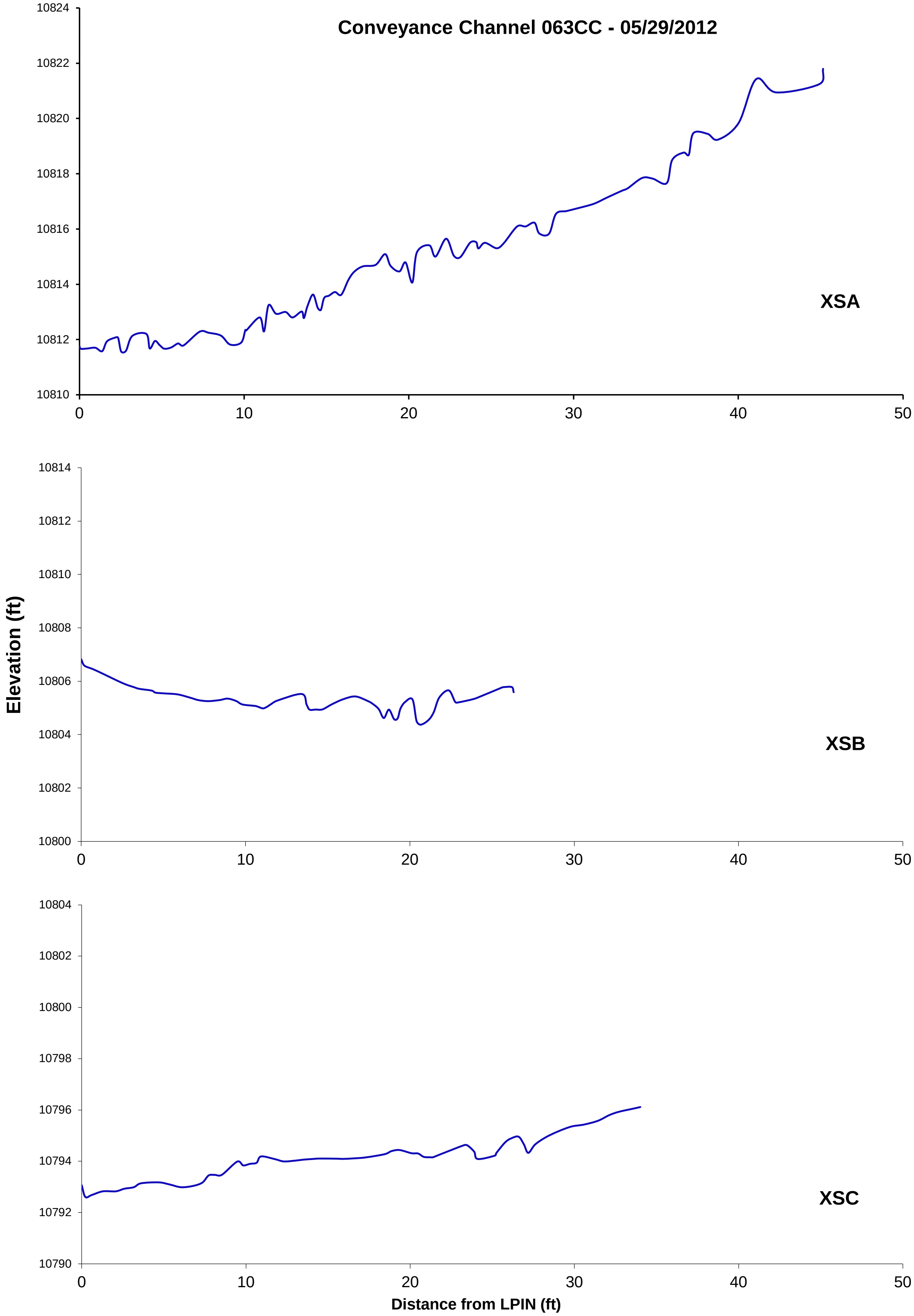

Conveyance Channel 040CC - 07/02/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)



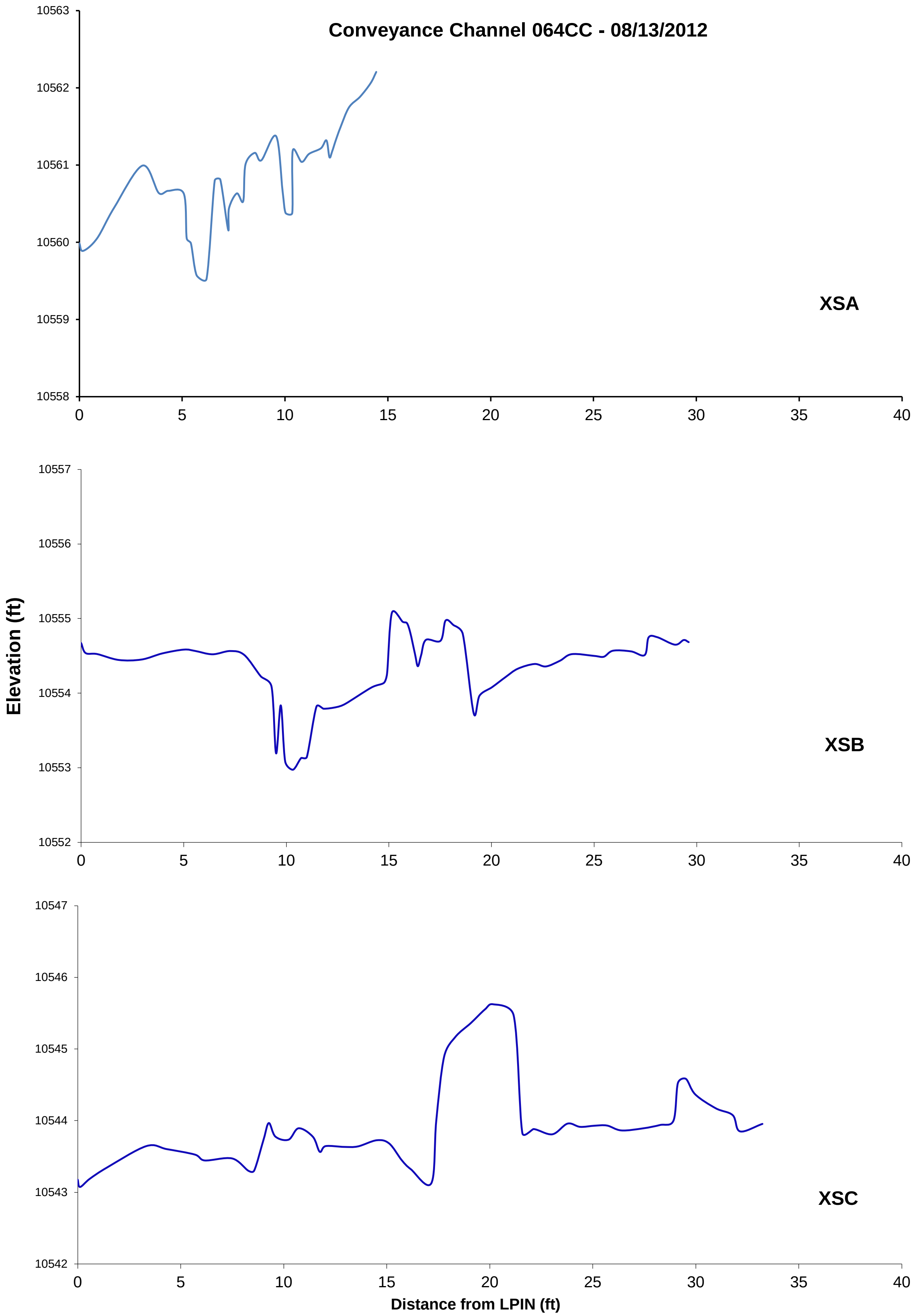
Conveyance Channel 053CC - 07/04/2012
XSA
XSB
XSC
XSD
Elevation (ft)
Distance from LPIN (ft)


Conveyance Channel 054CC - 08/13/2012
Elevation (ft)
11499
11498
11497
11496
11495
11494
0
5
10
15
20
25
XSA
11490
11489
11488
11487
11486
11485
XSB
11485
11484
11483
11482
11481
11480
XSC
Distance from LPIN (ft)

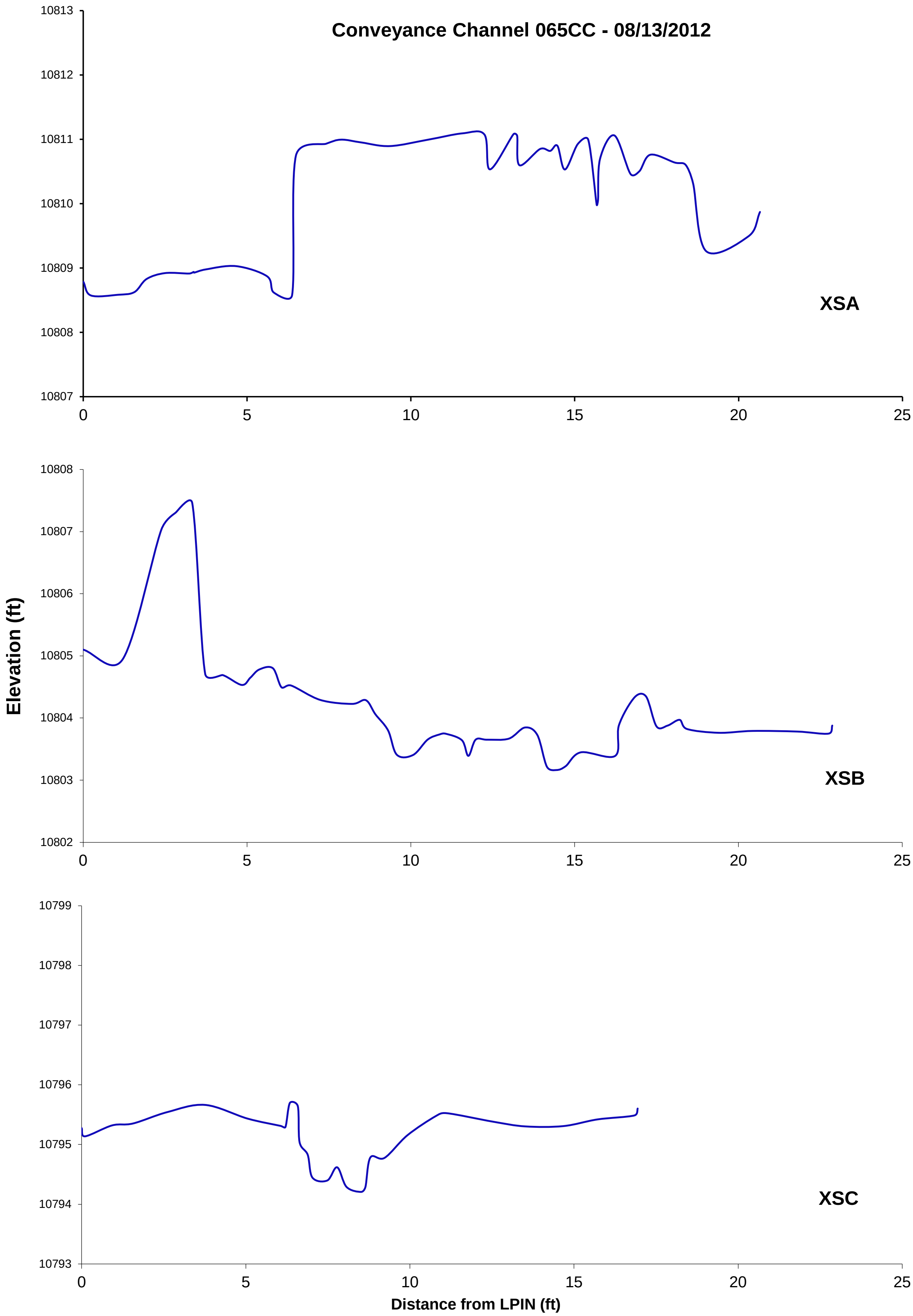

Conveyance Channel 058CC - 06/06/2012
10510
10509
10508
10507
10506
10505
0
5
10
15
20
25
30
XSA
10498
10497
10496
10495
10494
10493
XSB
Elevation (ft)
10490
10489
10488
10487
10486
10485
XSC
Distance from LPIN (ft)



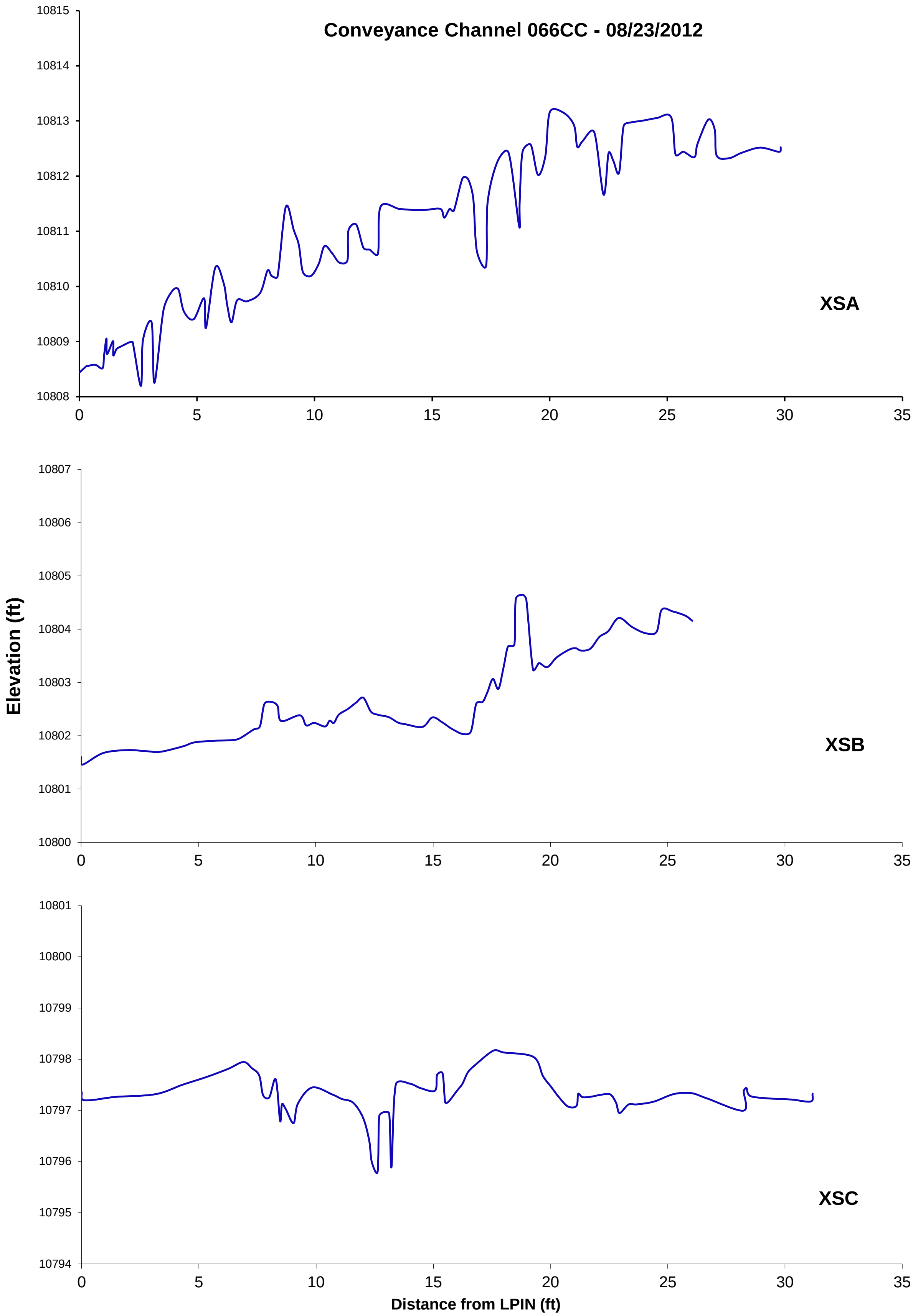
Conveyance Channel 063CC - 05/29/2012
10824
10822
10820
10818
10816
10814
10812
10810
0
10
20
30
40
50
XSA
10814
10812
10810
10808
10806
10804
10802
10800
XSB
10804
10802
10800
10798
10796
10794
10792
10790
XSC
Elevation (ft)
Distance from LPIN (ft)

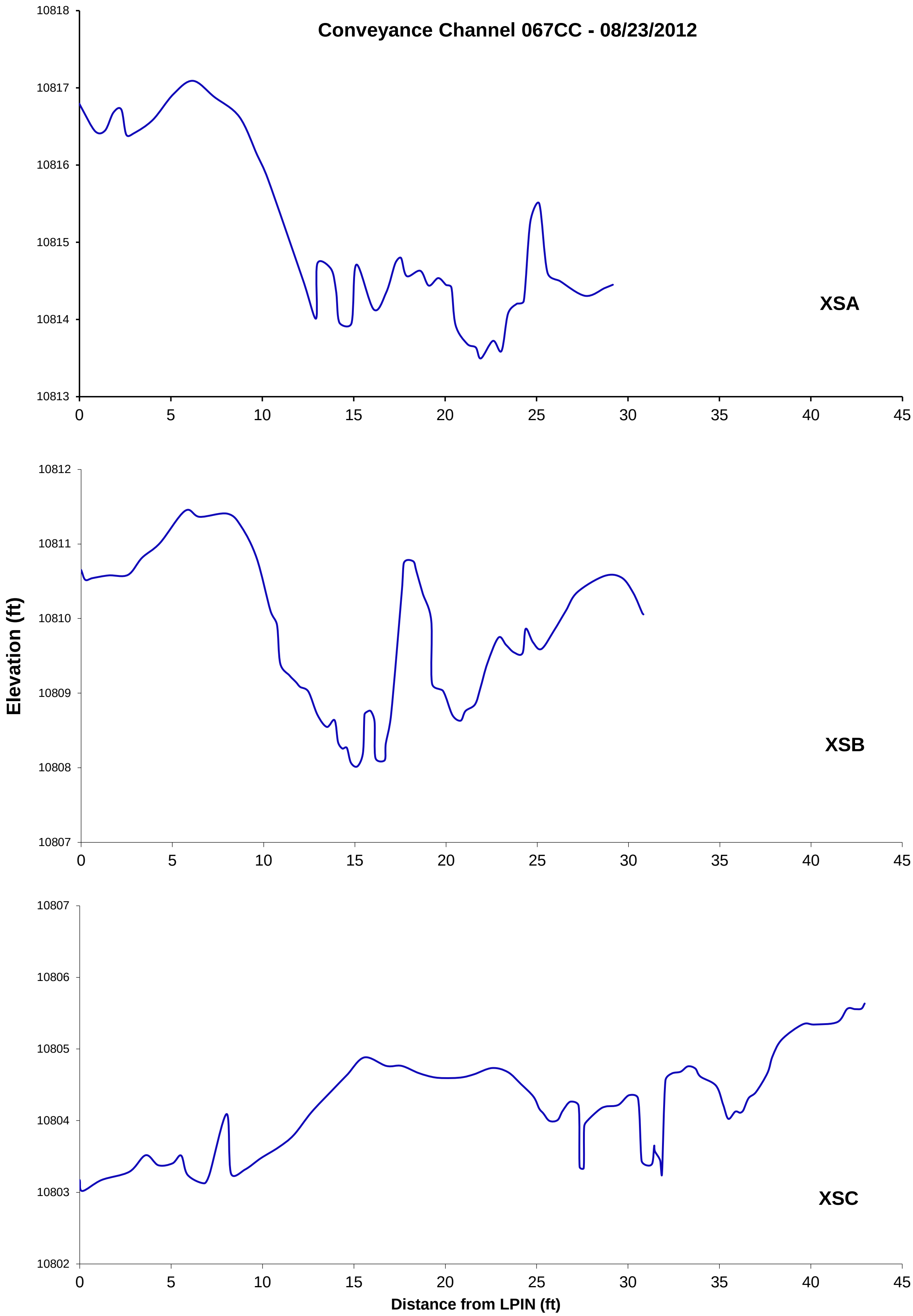


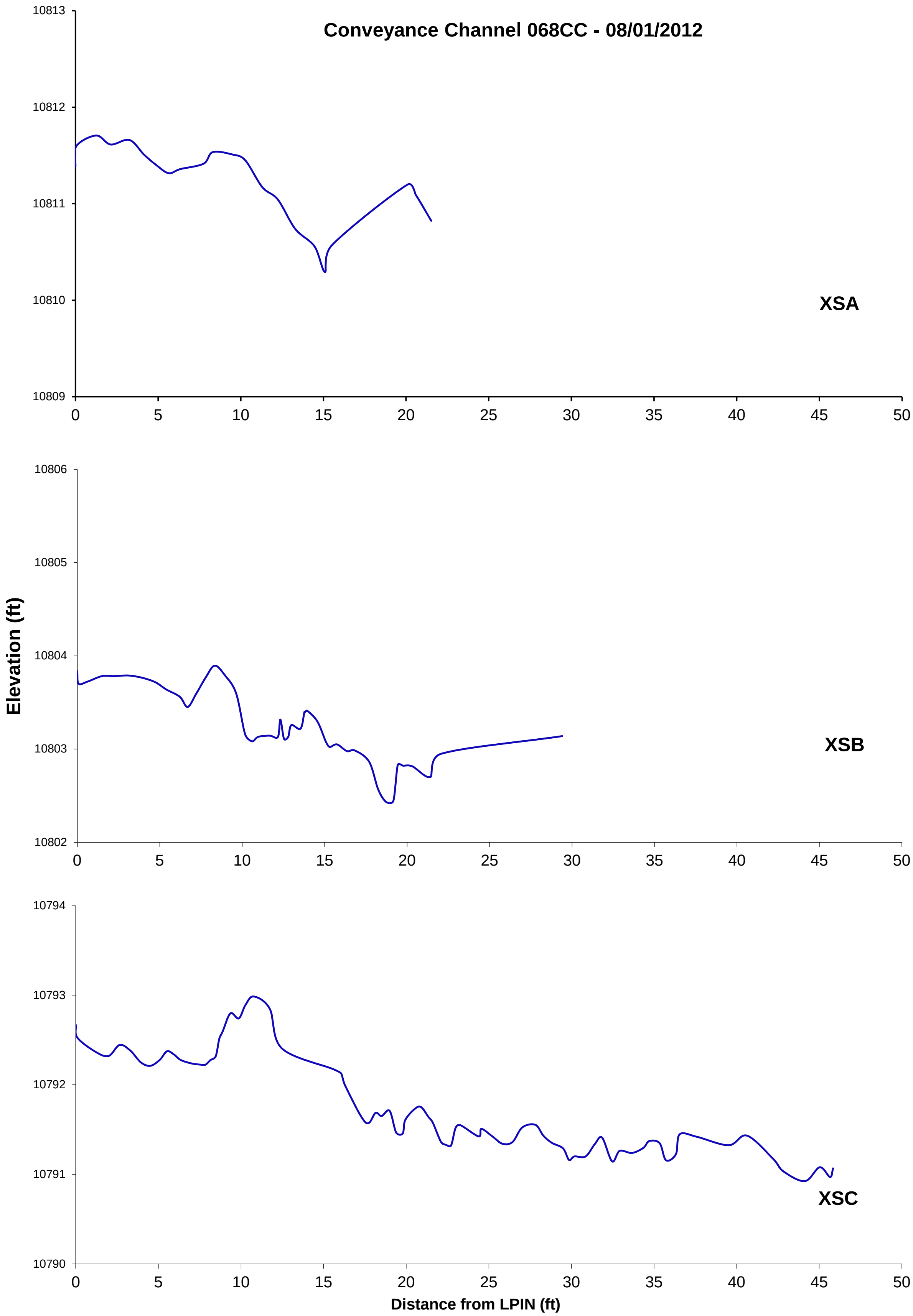
Conveyance Channel 064CC - 08/13/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10563
10562
10561
10560
10559
10558
10557
10556
10555
10554
10553
10552
10547
10546
10545
10544
10543
10542
0
5
10
15
20
25
30
35
40



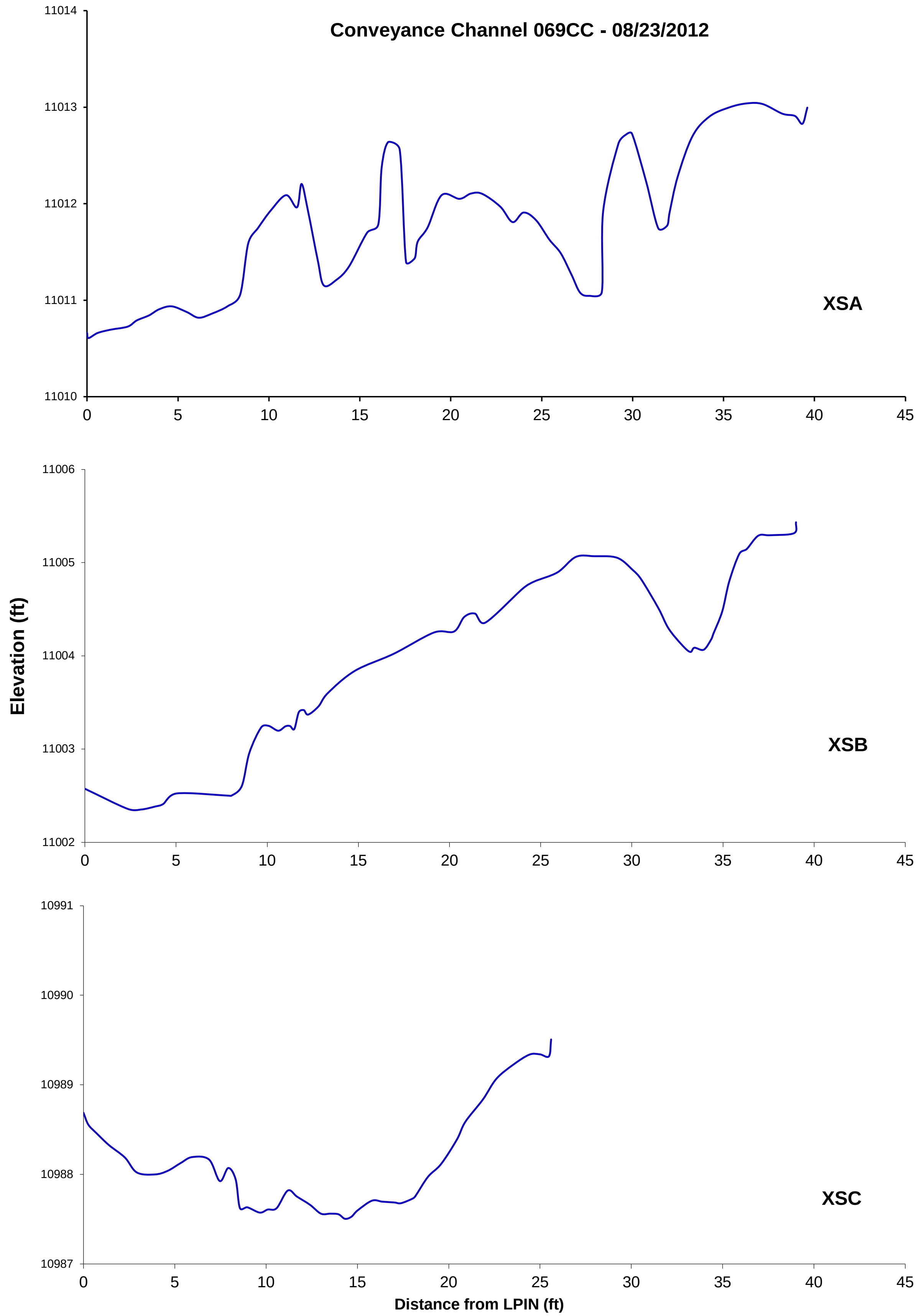
Conveyance Channel 065CC - 08/13/2012
Elevation (ft)
10813
10812
10811
10810
10809
10808
10807
0
5
10
15
20
25
XSA
10808
10807
10806
10805
10804
10803
10802
0
5
10
15
20
25
XSB
10799
10798
10797
10796
10795
10794
10793
0
5
10
15
20
25
XSC
Distance from LPIN (ft)

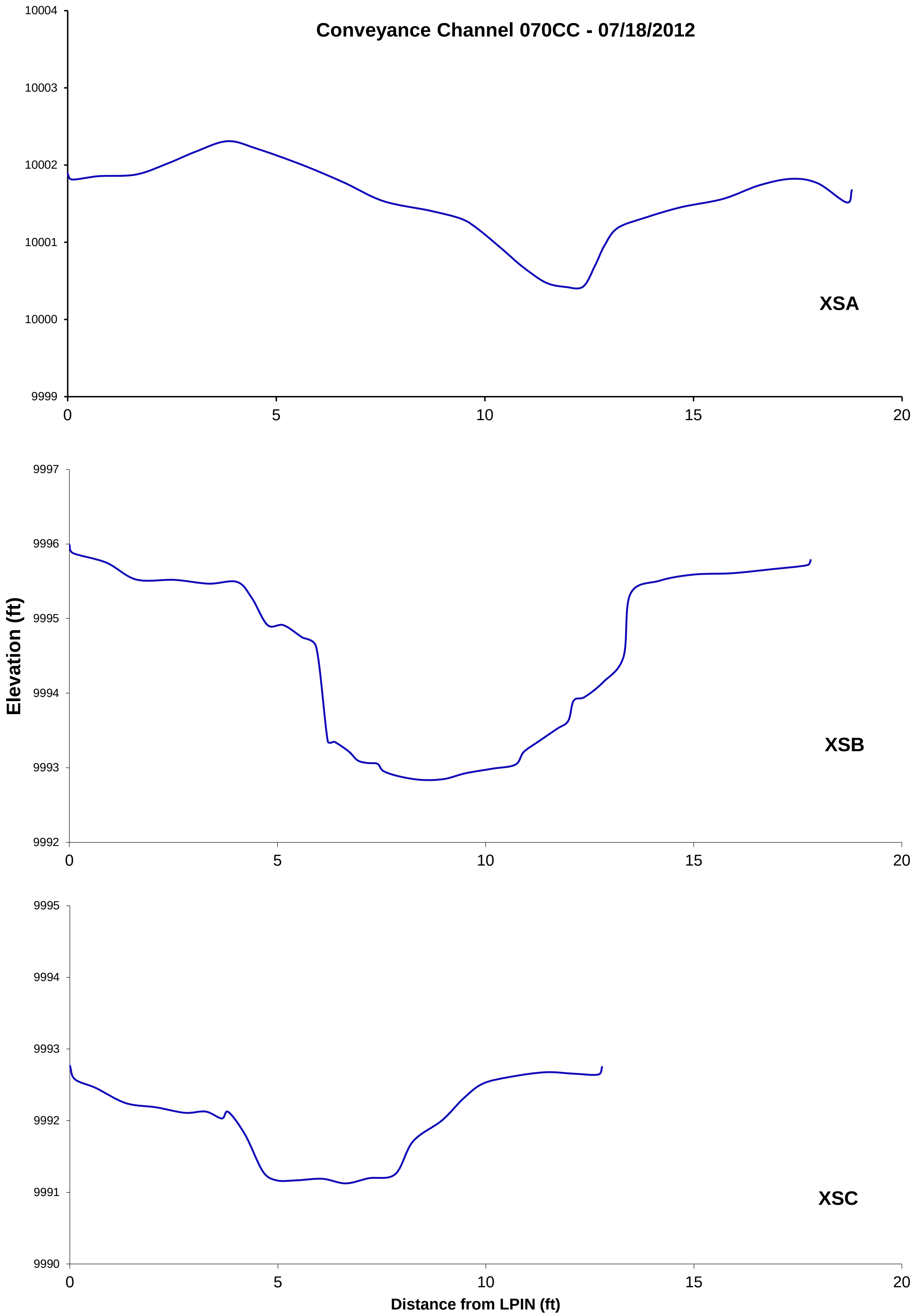

Conveyance Channel 066CC - 08/23/2012
10815
10814
10813
10812
10811
10810
10809
10808
0
5
10
15
20
25
30
35
XSA
10807
10806
10805
10804
10803
10802
10801
10800
XSB
Elevation (ft)
10801
10800
10799
10798
10797
10796
10795
10794
XSC
Distance from LPIN (ft)

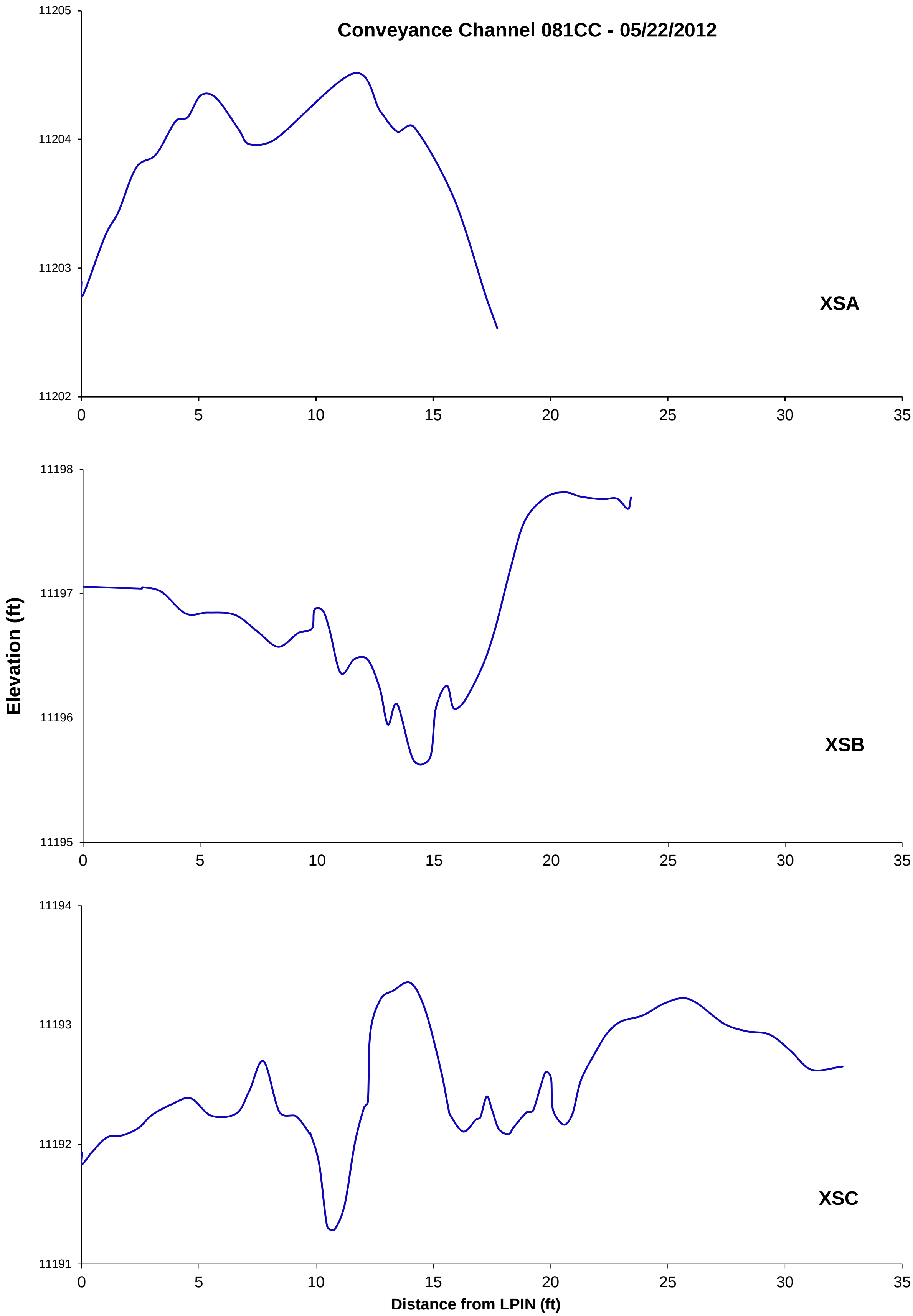

Conveyance Channel 067CC - 08/23/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10818
10817
10816
10815
10814
10813
10812
10811
10810
10809
10808
10807
10806
10805
10804
10803
10802
0
5
10
15
20
25
30
35
40
45

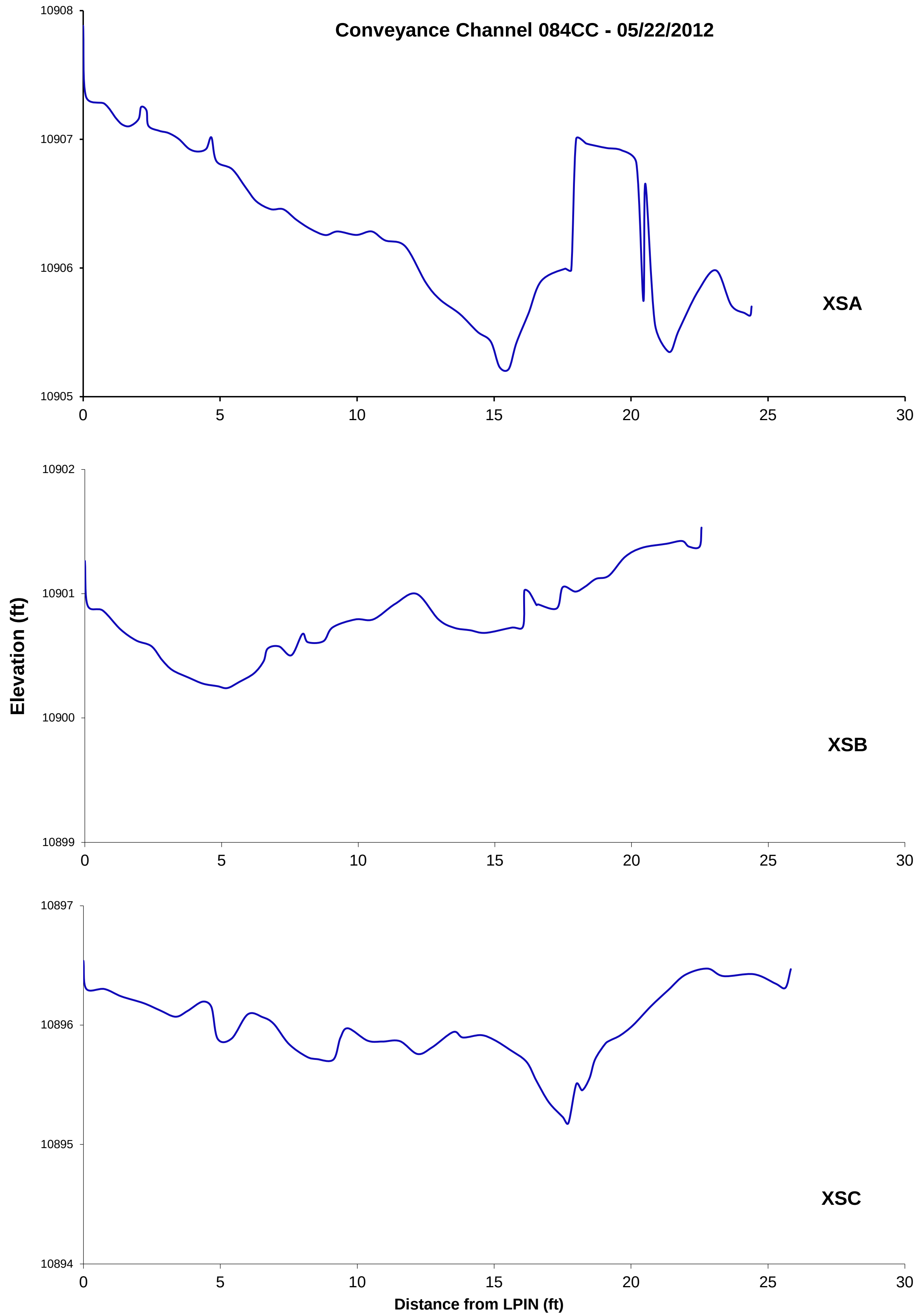


Conveyance Channel 068CC - 08/01/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10813
10812
10811
10810
10809
10806
10805
10804
10803
10802
10794
10793
10792
10791
10790
0
5
10
15
20
25
30
35
40
45
50

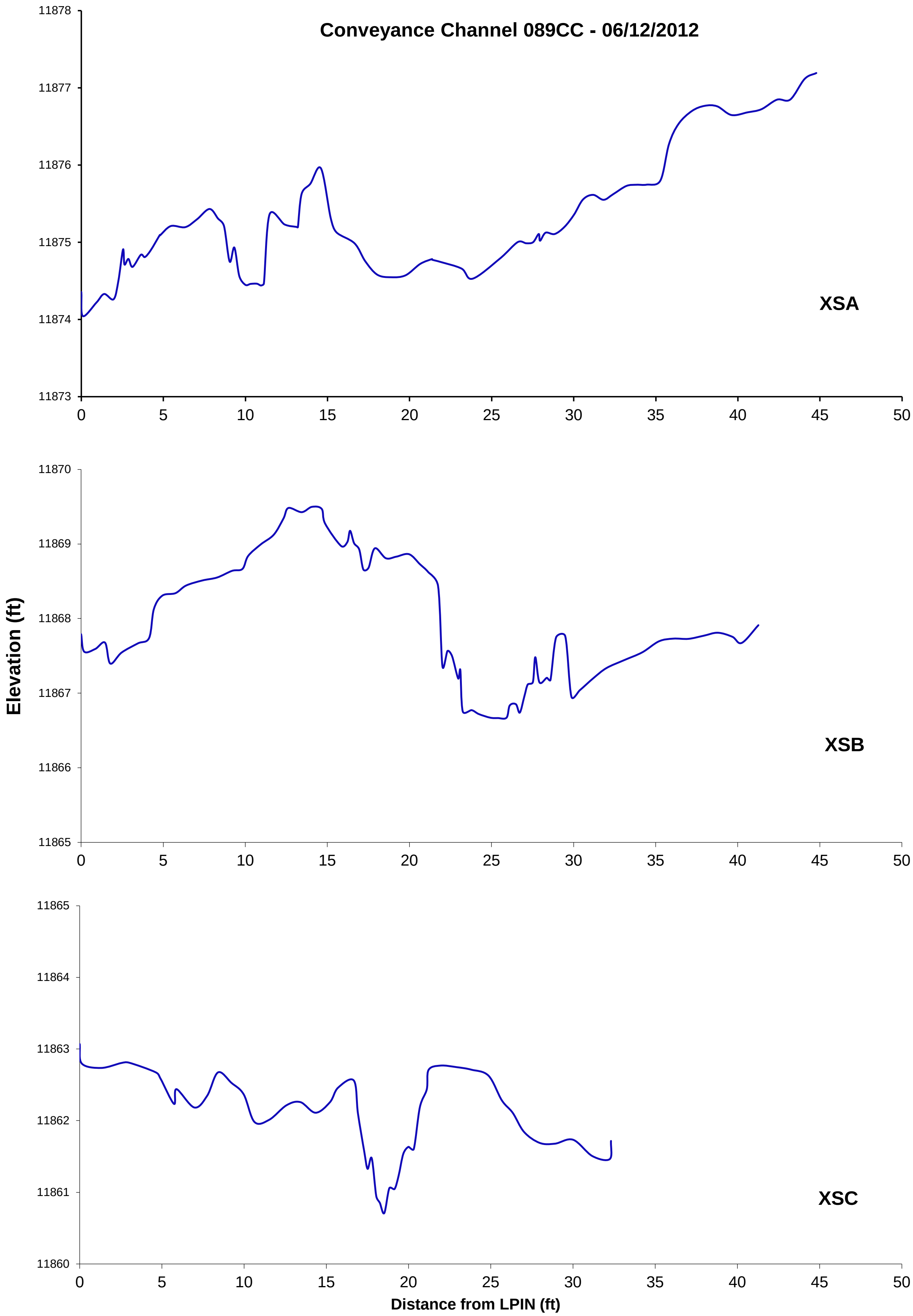

Conveyance Channel 069CC - 08/23/2012
Elevation (ft)
11014
11013
11012
11011
11010
0
5
10
15
20
25
30
35
40
45
XSA
11006
11005
11004
11003
11002
XSB
10991
10990
10989
10988
10987
XSC
Distance from LPIN (ft)

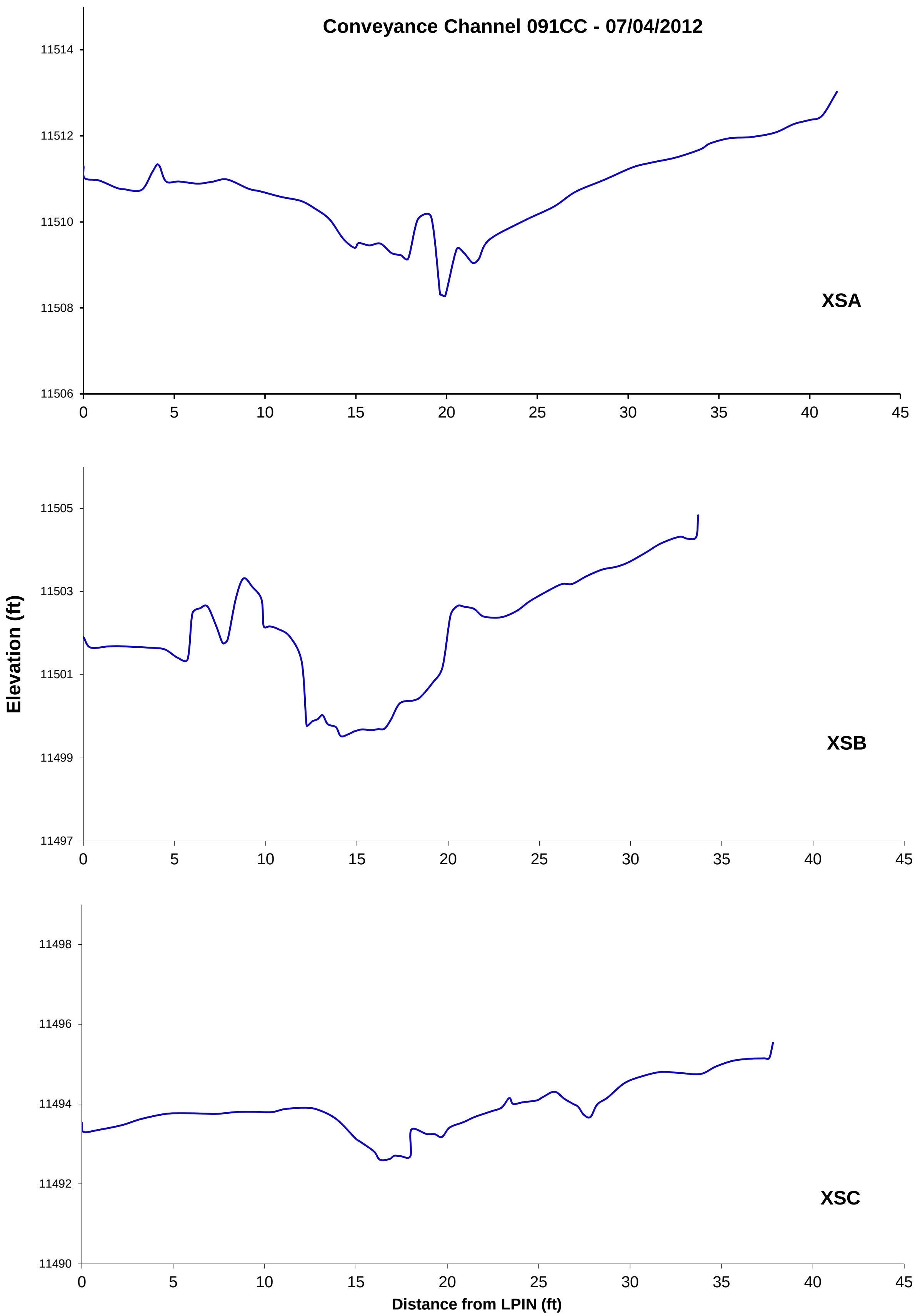

Conveyance Channel 070CC - 07/18/2012
Elevation (ft)
10004
10003
10002
10001
10000
9999
0
5
10
15
20
XSA
9997
9996
9995
9994
9993
9992
XSB
9995
9994
9993
9992
9991
9990
XSC
Distance from LPIN (ft)


Conveyance Channel 081CC - 05/22/2012
Elevation (ft)
XSA
11205
11204
11203
11202
XSB
11198
11197
11196
11195
XSC
11194
11193
11192
11191
0
5
10
15
20
25
30
35
Distance from LPIN (ft)

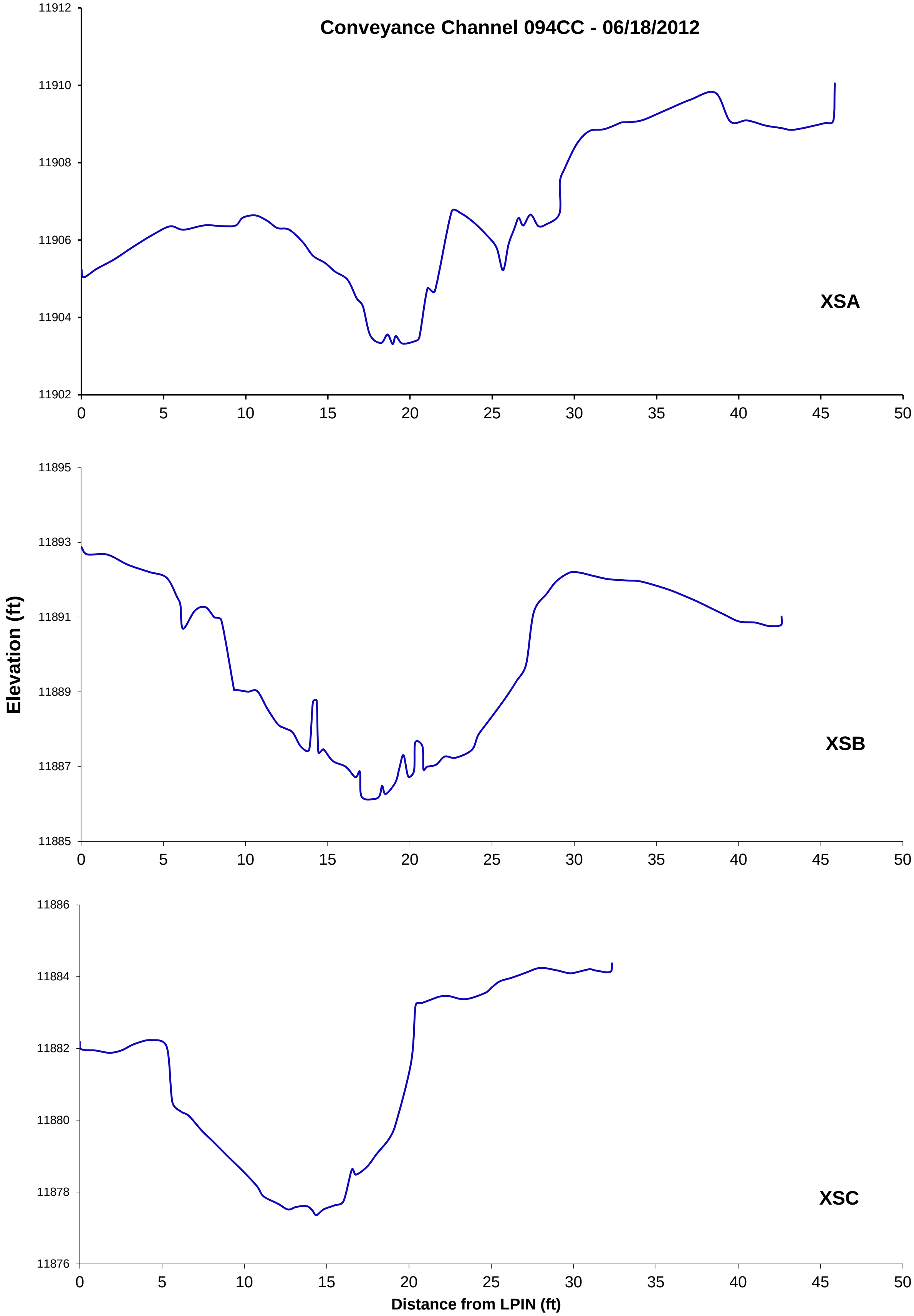


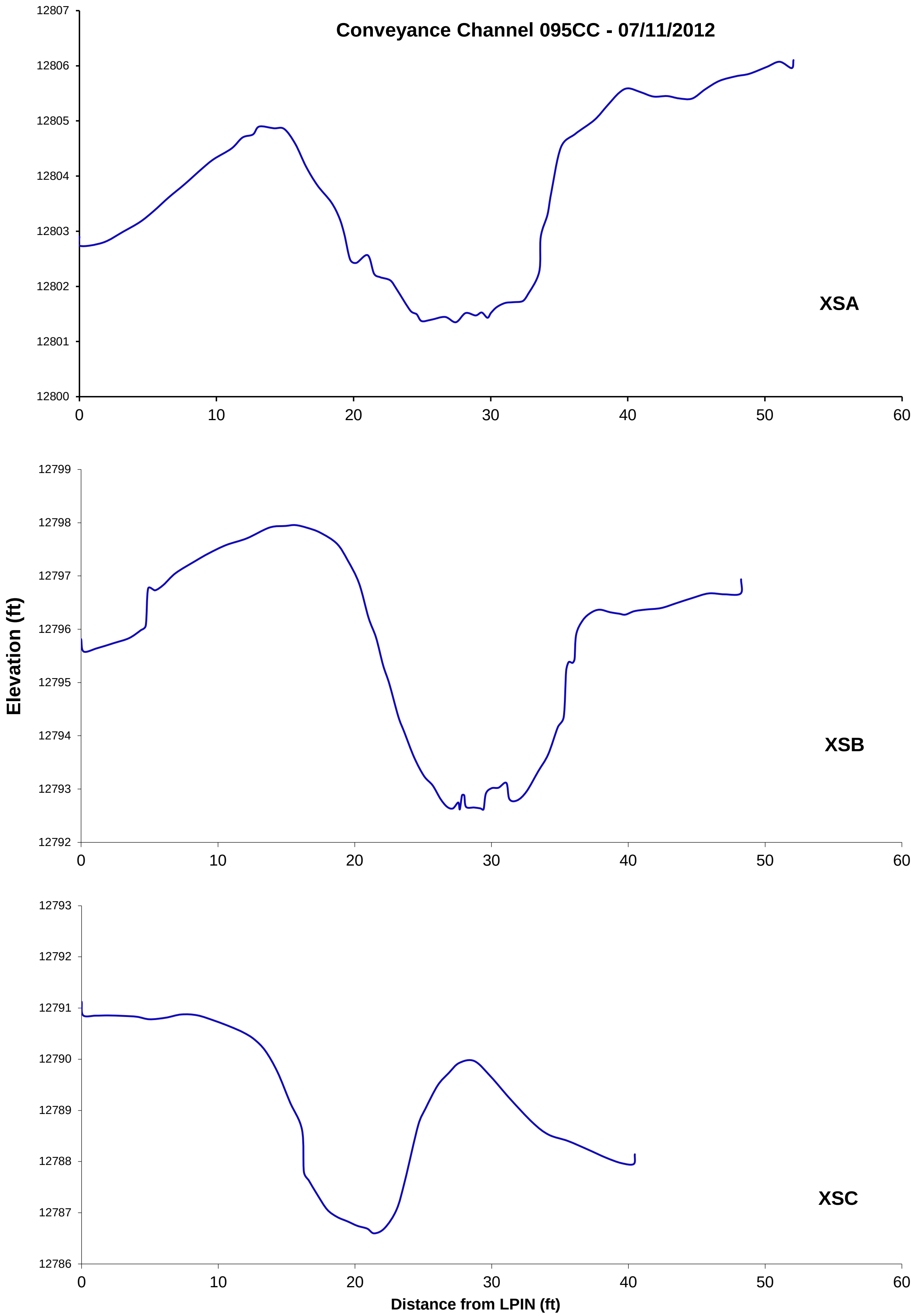
Conveyance Channel 084CC - 05/22/2012
10908
10907
10906
10905
0
5
10
15
20
25
30
XSA
10902
10901
10900
10899
XSB
Elevation (ft)
10897
10896
10895
10894
XSC
Distance from LPIN (ft)


Conveyance Channel 089CC - 06/12/2012
Elevation (ft)
11878
11877
11876
11875
11874
11873
0 5 10 15 20 25 30 35 40 45 50
XSA
11870
11869
11868
11867
11866
11865
0 5 10 15 20 25 30 35 40 45 50
XSB
11865
11864
11863
11862
11861
11860
0 5 10 15 20 25 30 35 40 45 50
XSC
Distance from LPIN (ft)

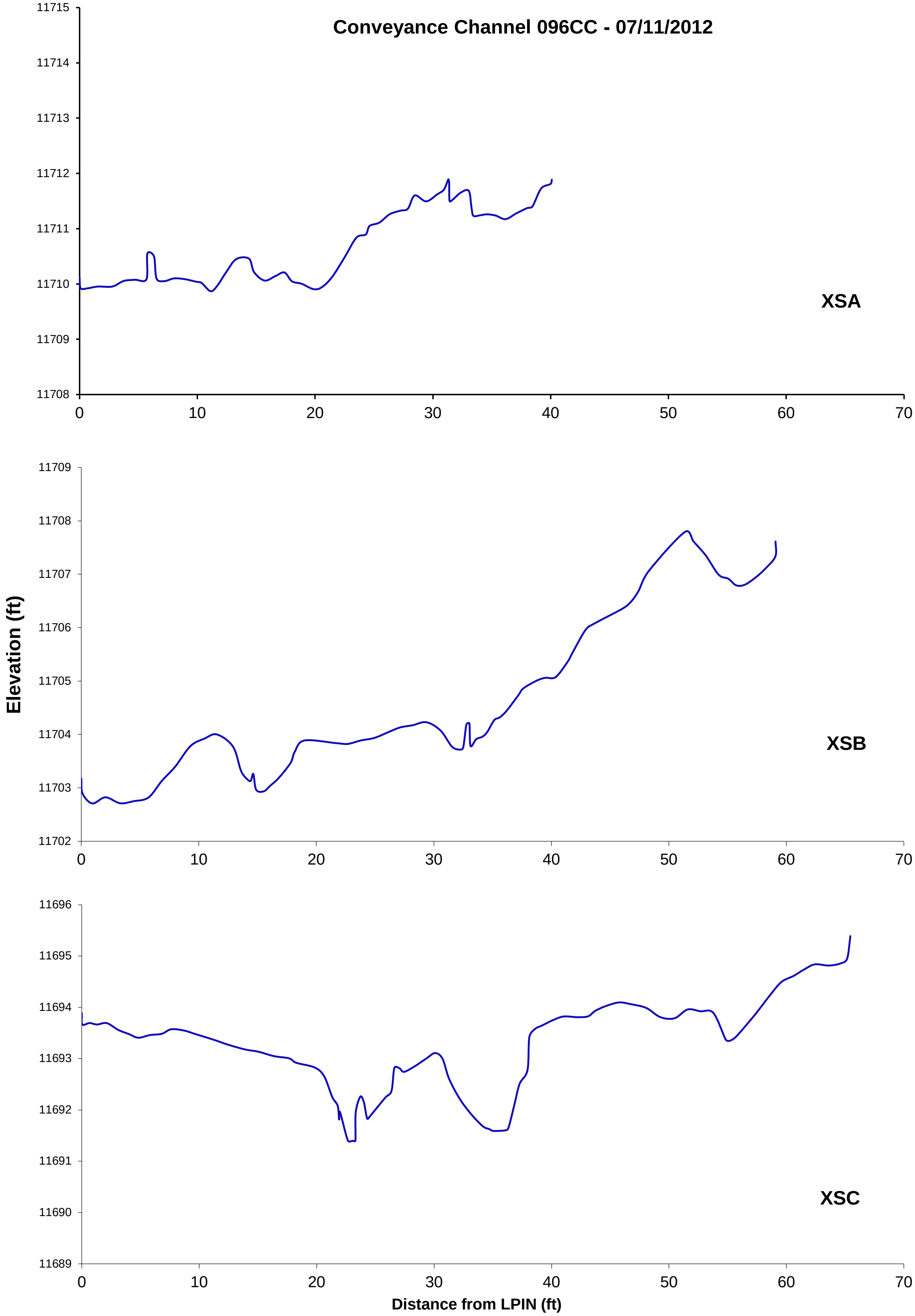


Conveyance Channel 091CC - 07/04/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
11514
11512
11510
11508
11506
11505
11503
11501
11499
11497
11498
11496
11494
11492
11490
0
5
10
15
20
25
30
35
40
45

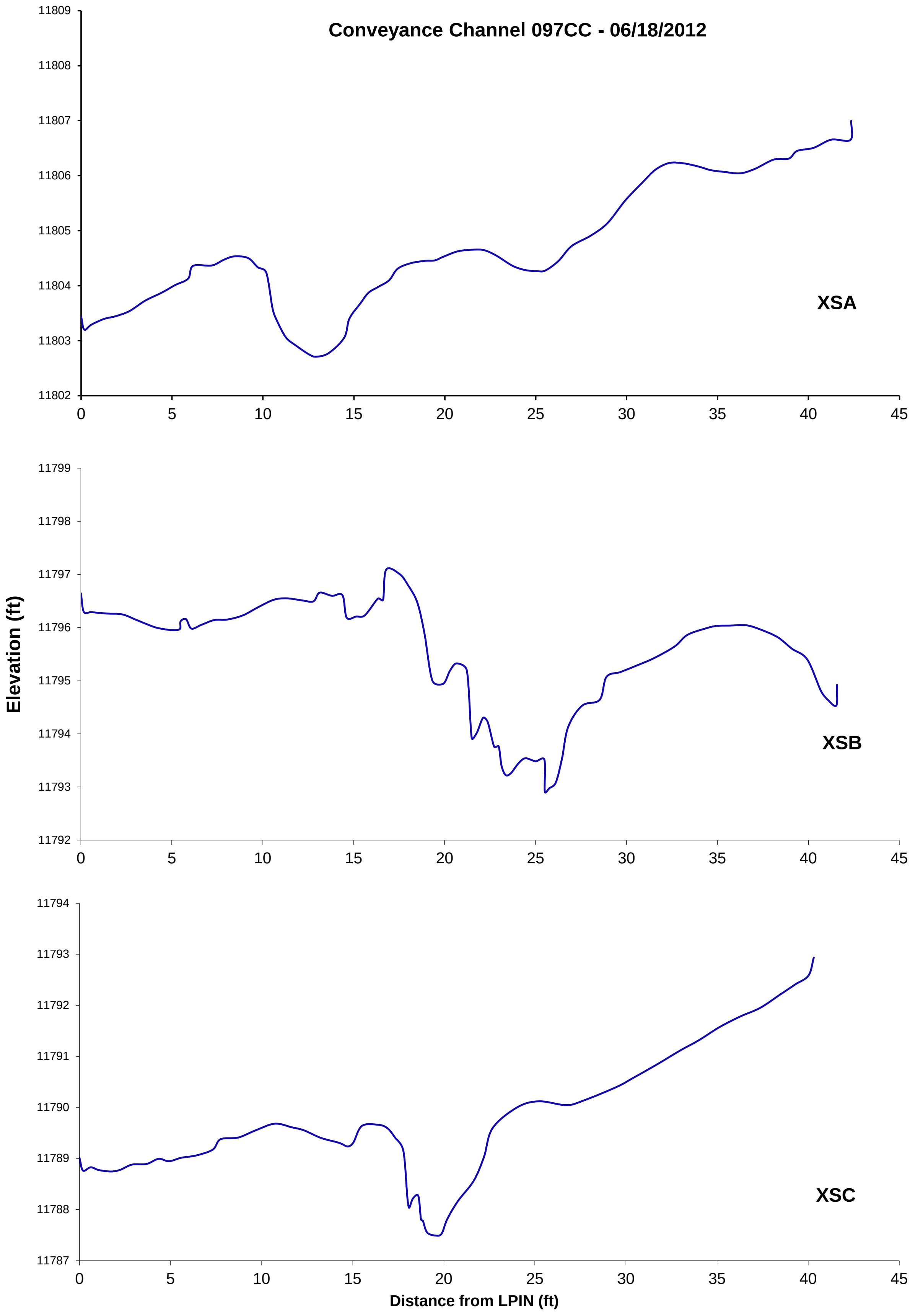

Conveyance Channel 094CC - 06/18/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
11912
11910
11908
11906
11904
11902
11895
11893
11891
11889
11887
11885
11886
11884
11882
11880
11878
11876
0
5
10
15
20
25
30
35
40
45
50



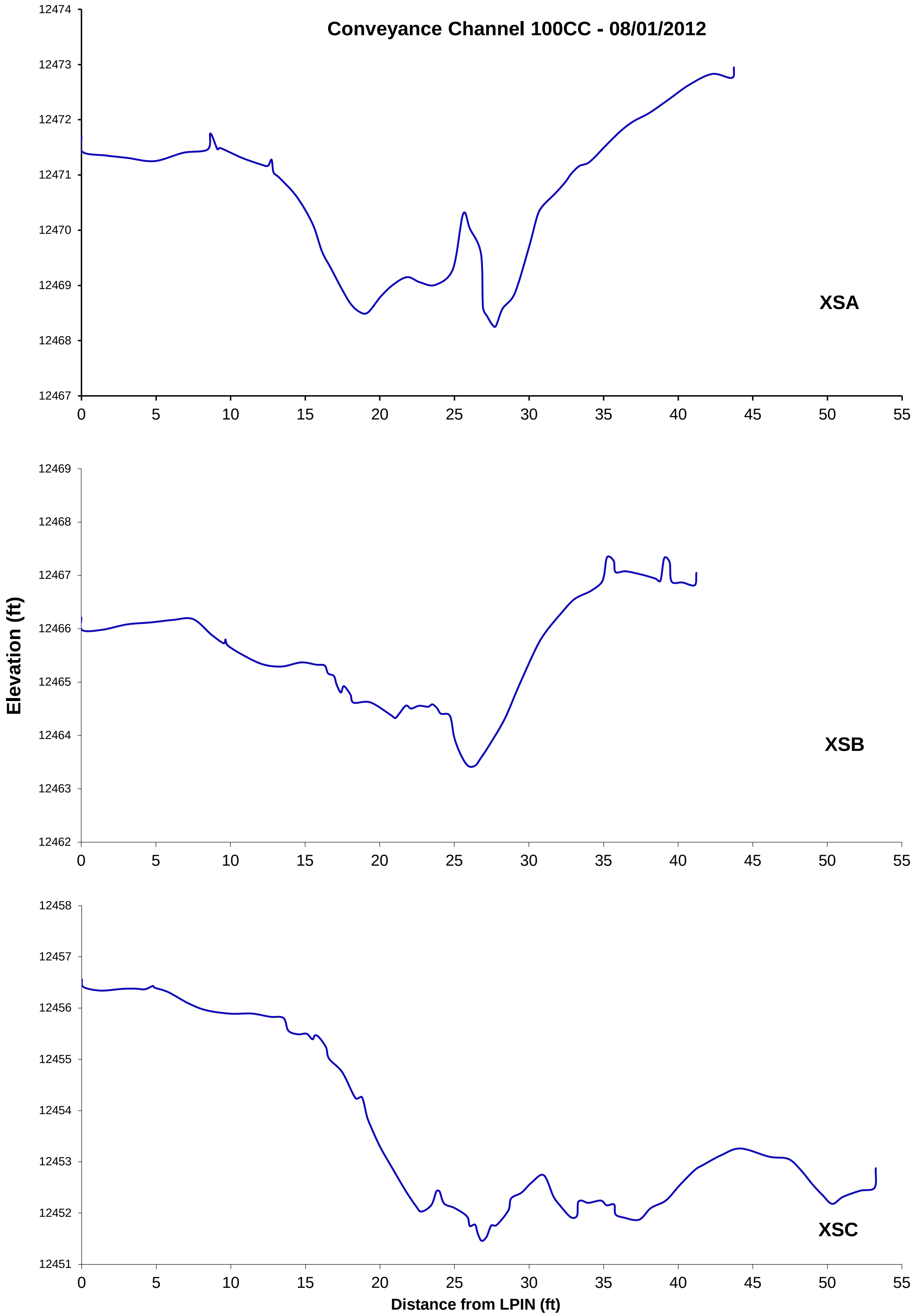
Conveyance Channel 095CC - 07/11/2012
Elevation (ft)
12807
12806
12805
12804
12803
12802
12801
12800
XSA
12799
12798
12797
12796
12795
12794
12793
12792
XSB
12793
12792
12791
12790
12789
12788
12787
12786
XSC
0
10
20
30
40
50
60
Distance from LPIN (ft)

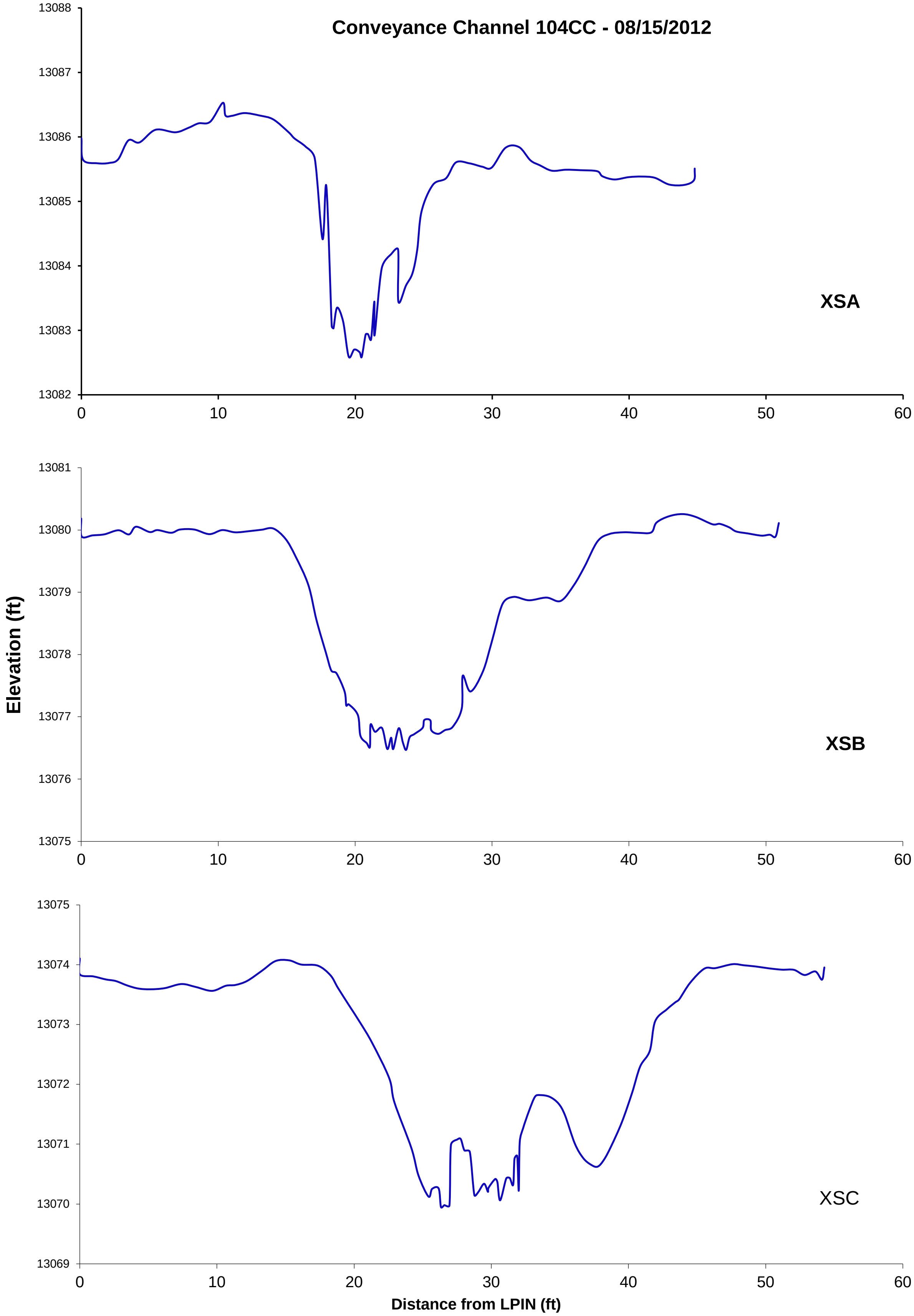


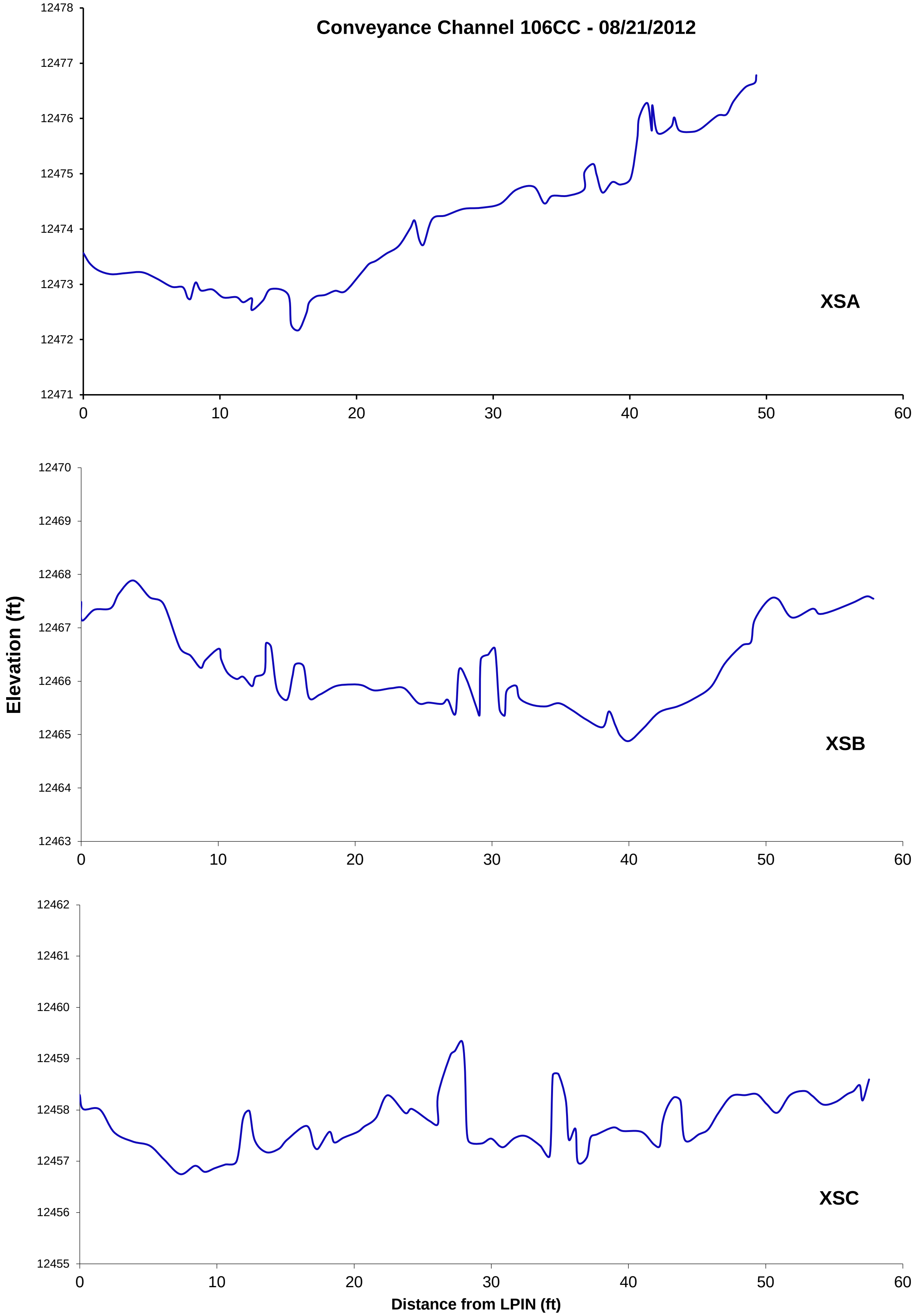
Conveyance Channel 096CC - 07/11/2012
Elevation (ft)
11715
11714
11713
11712
11711
11710
11709
11708
0
10
20
30
40
50
60
70
XSA
11709
11708
11707
11706
11705
11704
11703
11702
XSB
11696
11695
11694
11693
11692
11691
11690
11689
XSC
Distance from LPIN (ft)

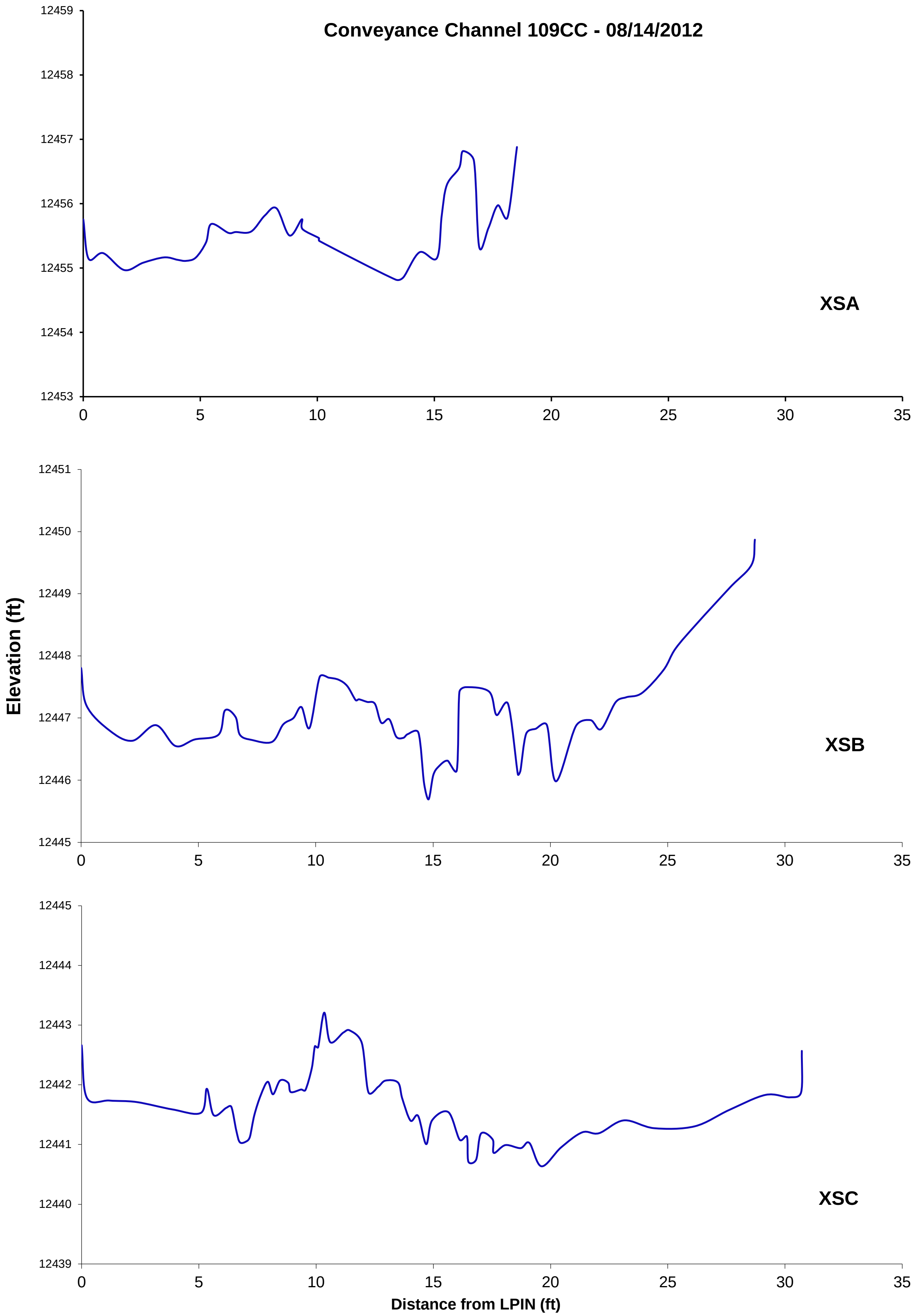


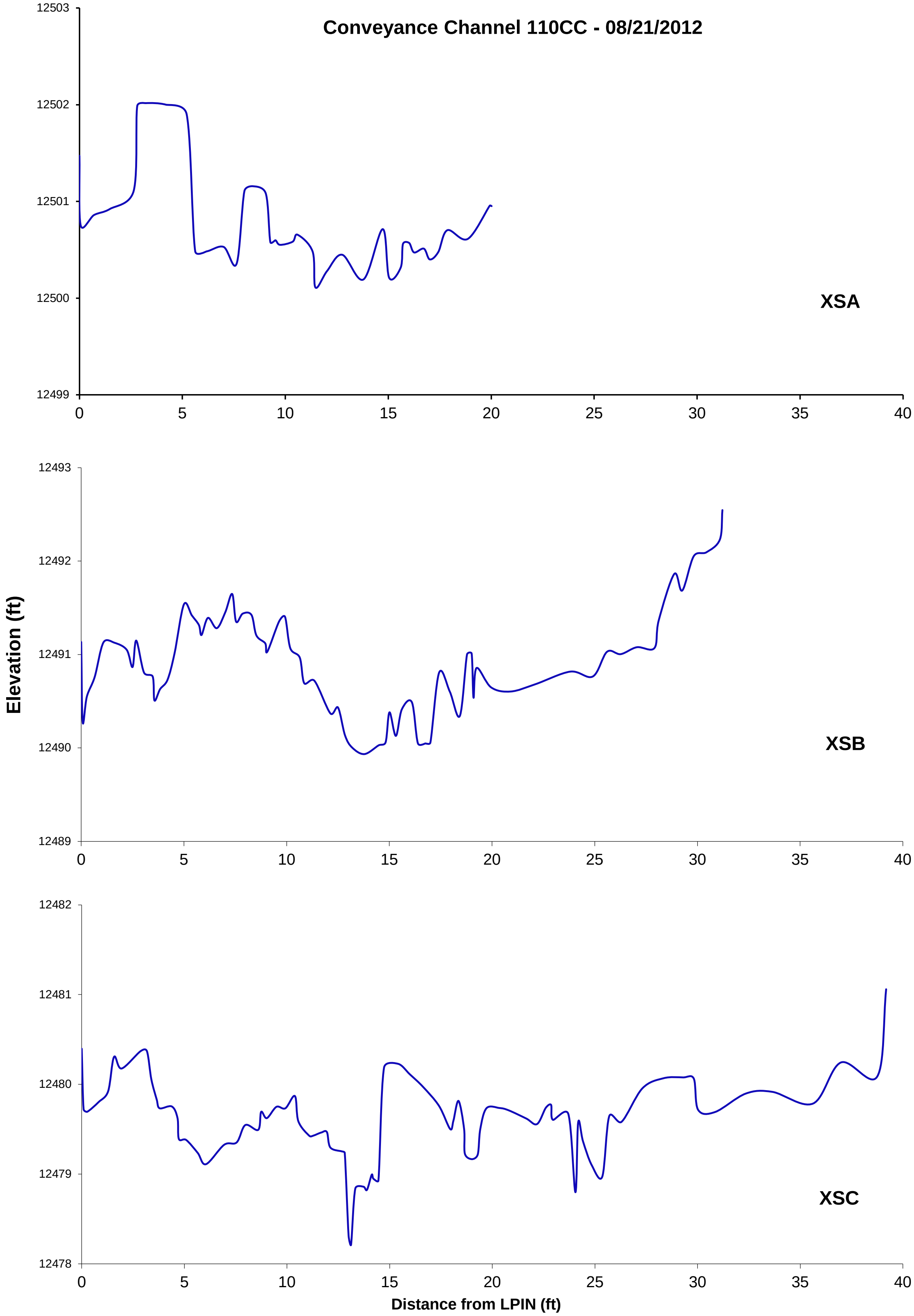
Conveyance Channel 097CC - 06/18/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

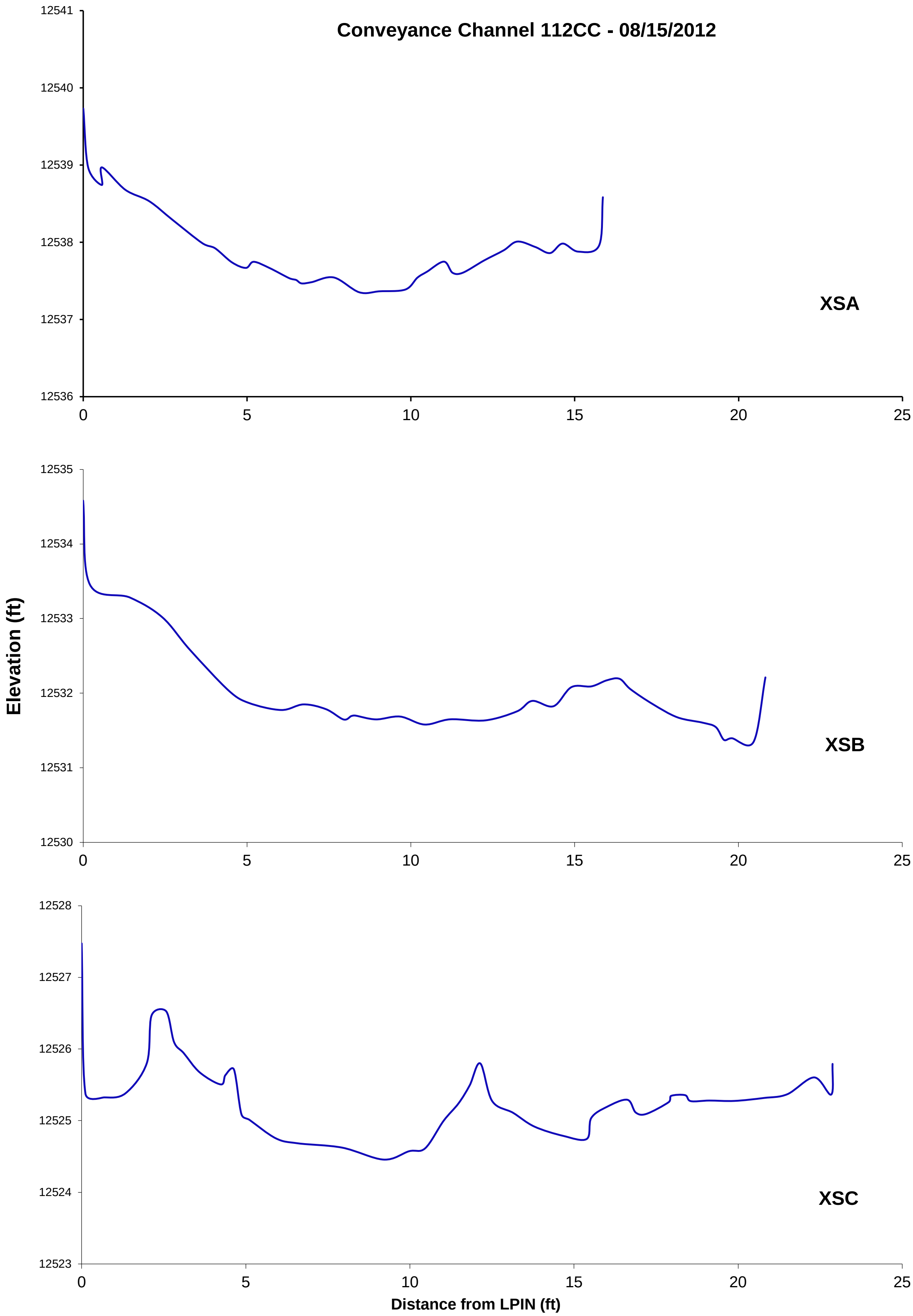

Conveyance Channel 100CC - 08/01/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)

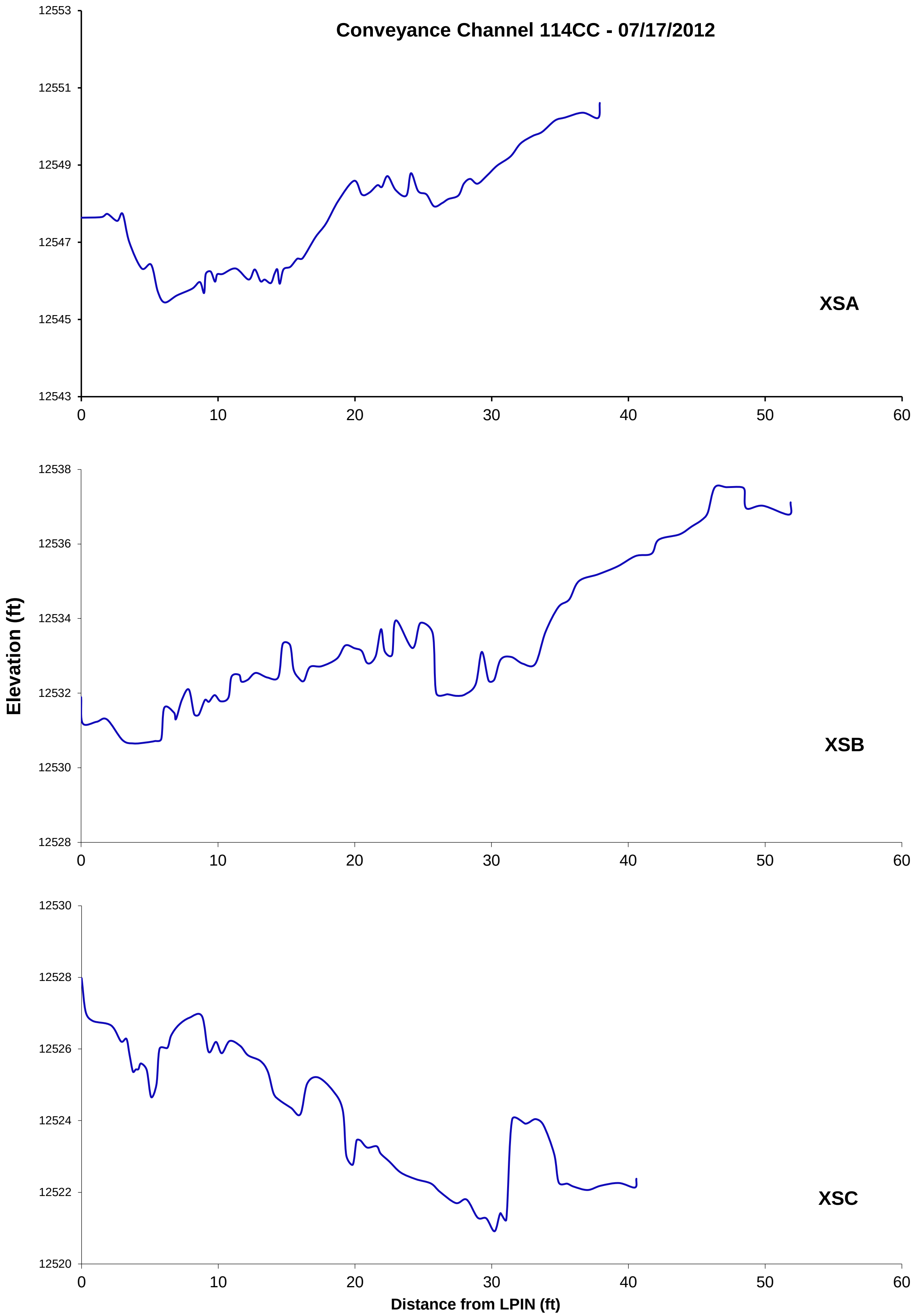

Conveyance Channel 104CC - 08/15/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13088
13087
13086
13085
13084
13083
13082
13081
13080
13079
13078
13077
13076
13075
13074
13073
13072
13071
13070
13069
0
10
20
30
40
50
60

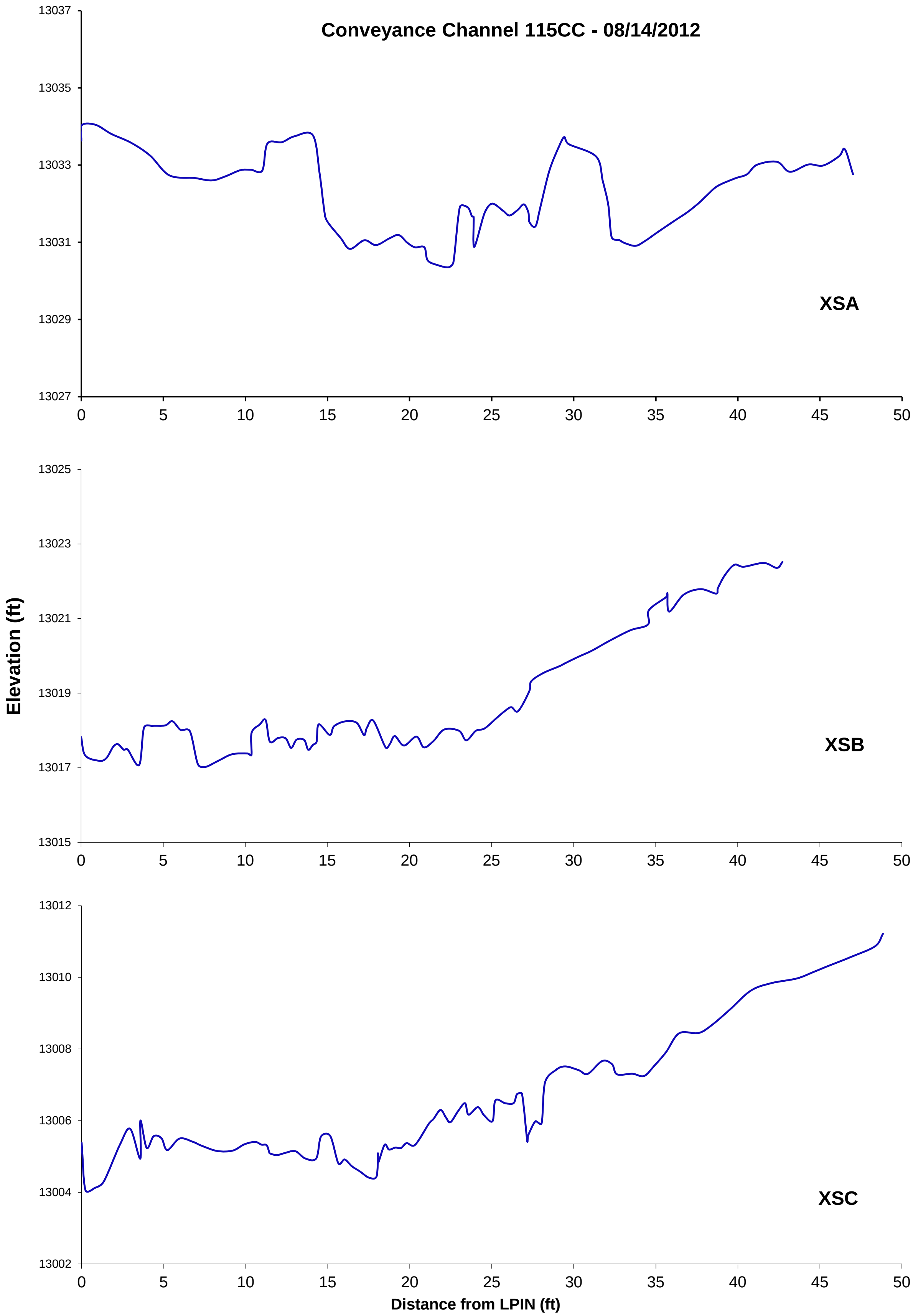

Conveyance Channel 106CC - 08/21/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12478
12477
12476
12475
12474
12473
12472
12471
12470
12469
12468
12467
12466
12465
12464
12463
12462
12461
12460
12459
12458
12457
12456
12455
0
10
20
30
40
50
60

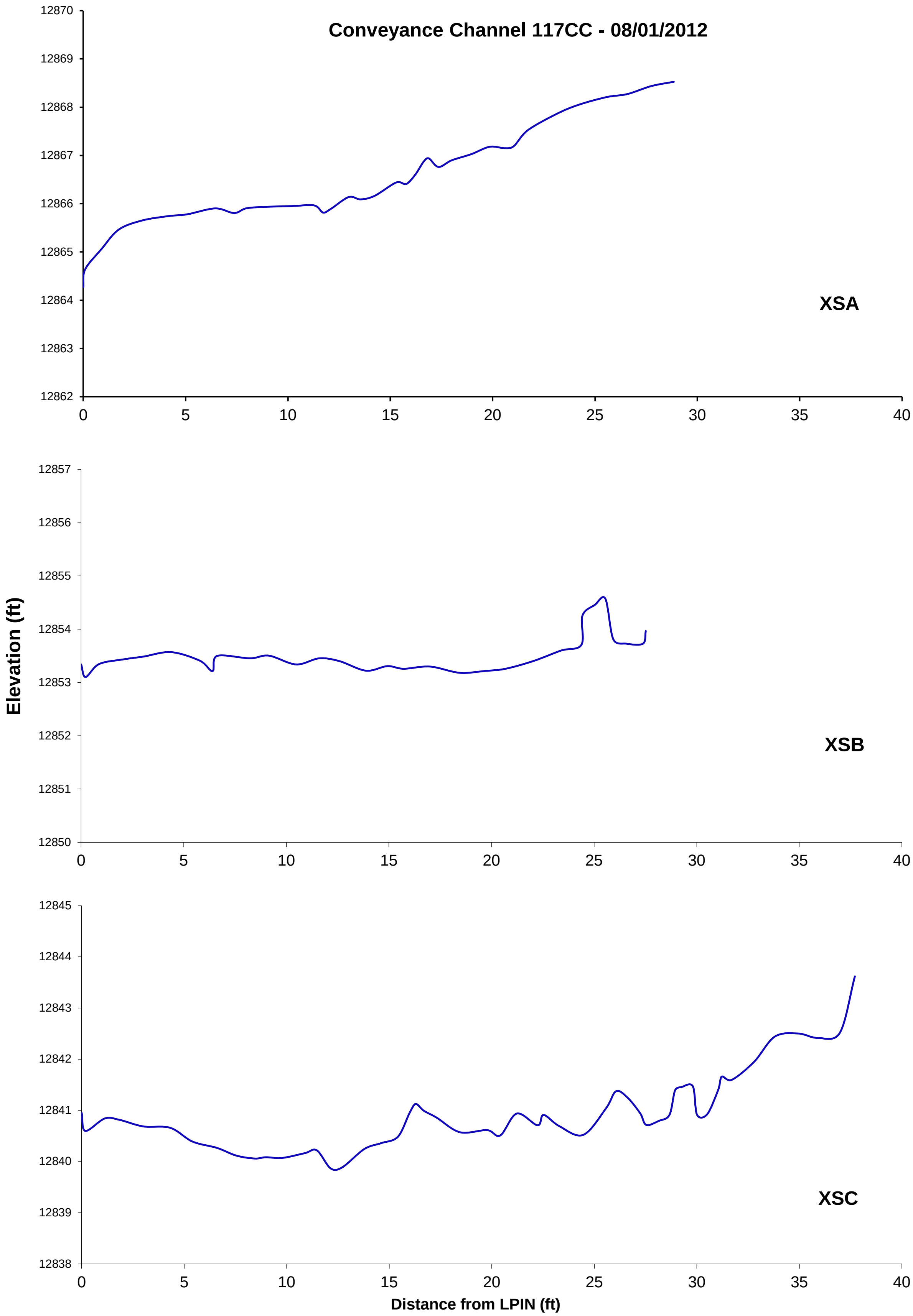

Conveyance Channel 109CC - 08/14/2012
Elevation (ft)
12459
12458
12457
12456
12455
12454
12453
XSA
0 5 10 15 20 25 30 35
12451
12450
12449
12448
12447
12446
12445
XSB
0 5 10 15 20 25 30 35
12445
12444
12443
12442
12441
12440
12439
XSC
0 5 10 15 20 25 30 35
Distance from LPIN (ft)


Conveyance Channel 110CC - 08/21/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12503
12502
12501
12500
12499
12493
12492
12491
12490
12489
12482
12481
12480
12479
12478
0
5
10
15
20
25
30
35
40

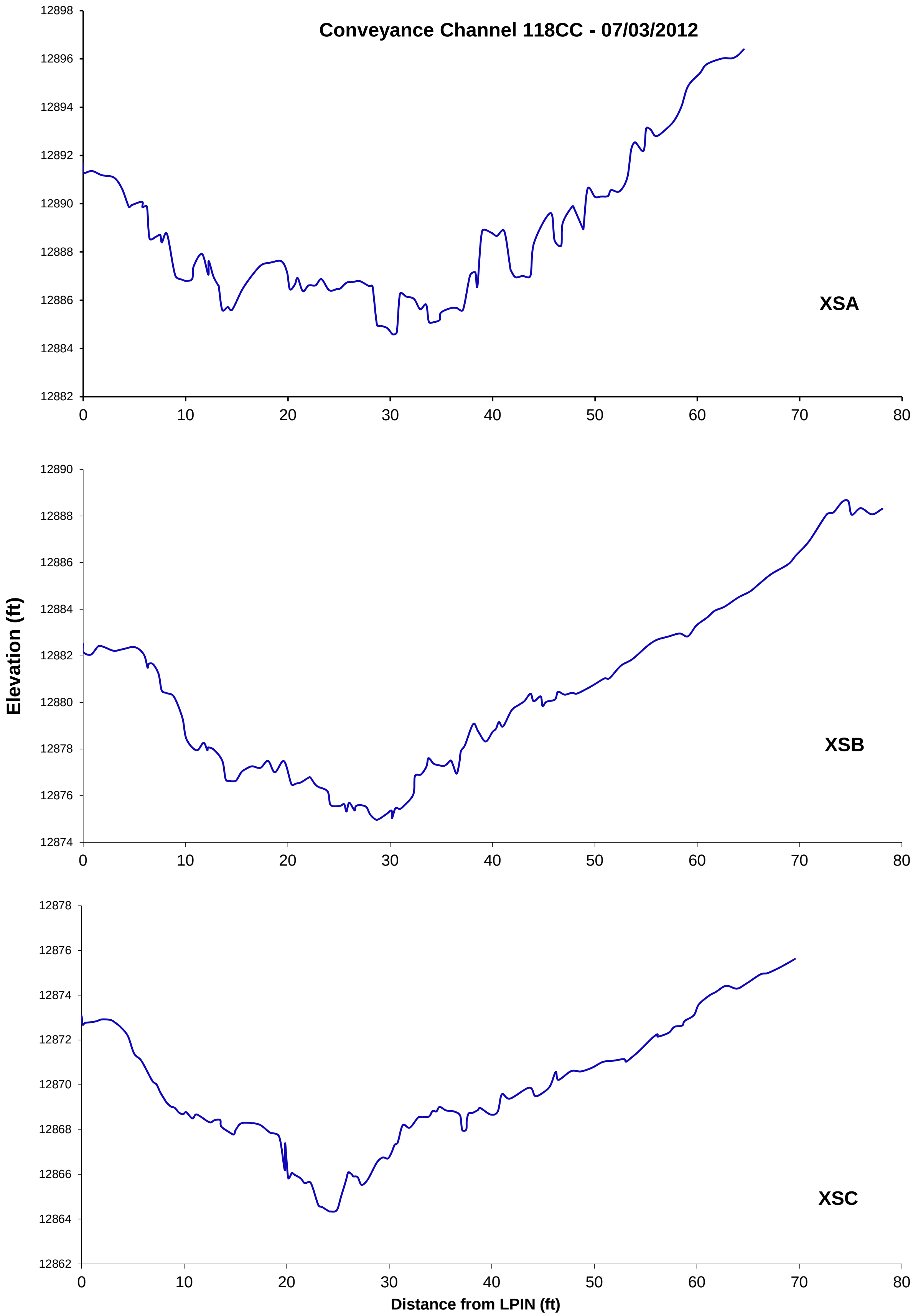

Conveyance Channel 112CC - 08/15/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12541
12540
12539
12538
12537
12536
12535
12534
12533
12532
12531
12530
12528
12527
12526
12525
12524
12523
0
5
10
15
20
25

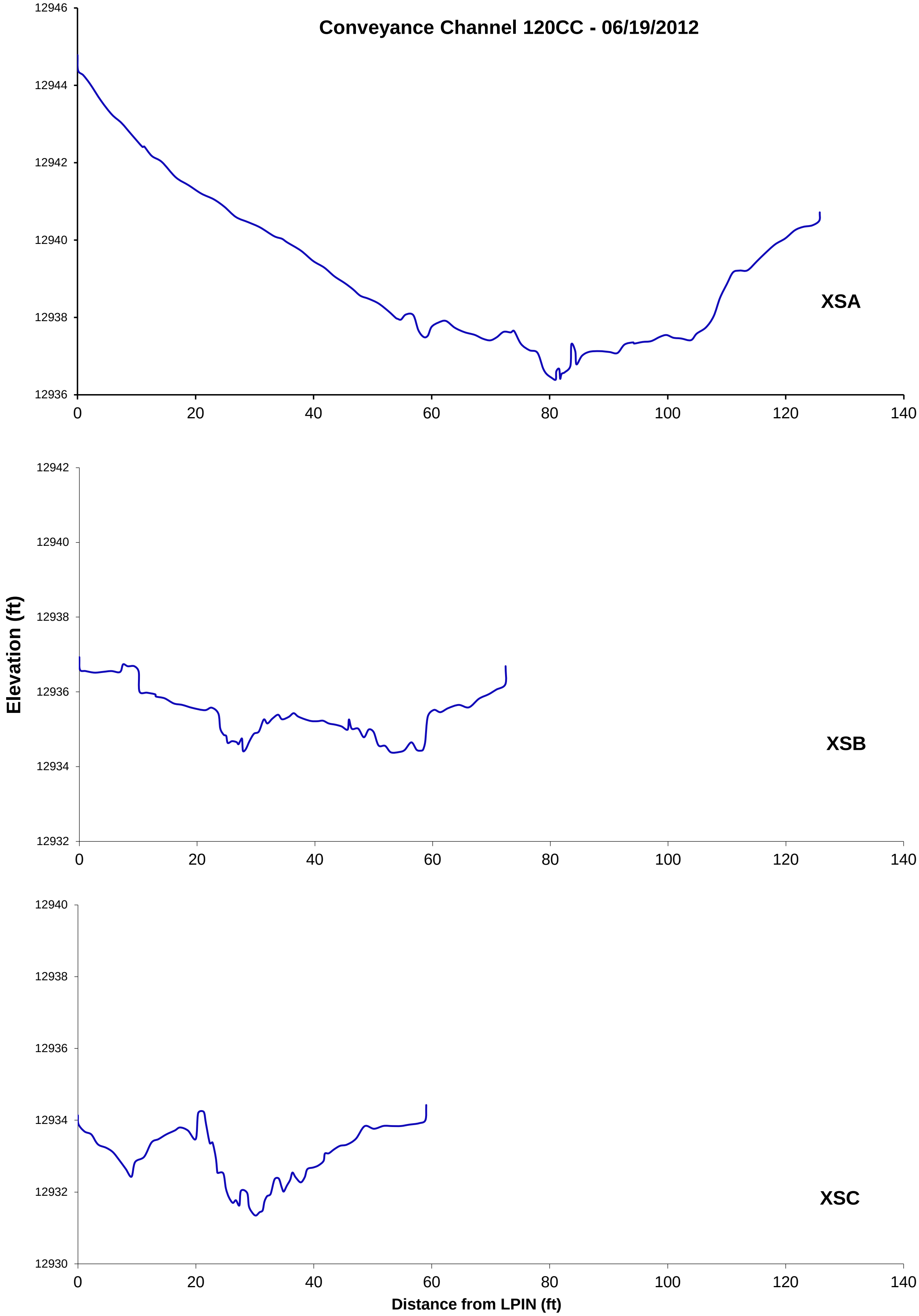

Conveyance Channel 114CC - 07/17/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12553
12551
12549
12547
12545
12543
12538
12536
12534
12532
12530
12528
12530
12528
12526
12524
12522
12520
0
10
20
30
40
50
60

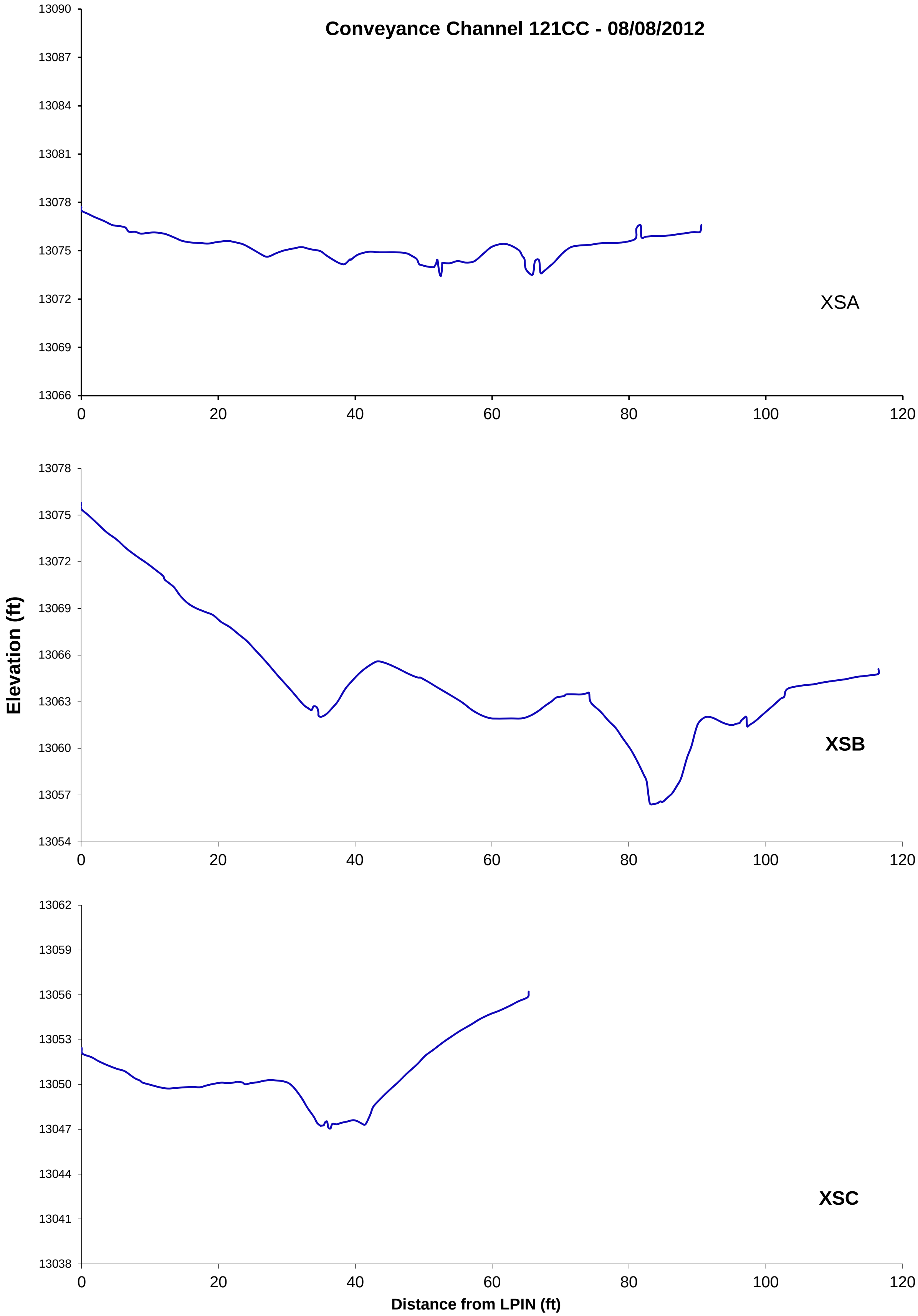

Conveyance Channel 115CC - 08/14/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13037
13035
13033
13031
13029
13027
13025
13023
13021
13019
13017
13015
13012
13010
13008
13006
13004
13002
0
5
10
15
20
25
30
35
40
45
50

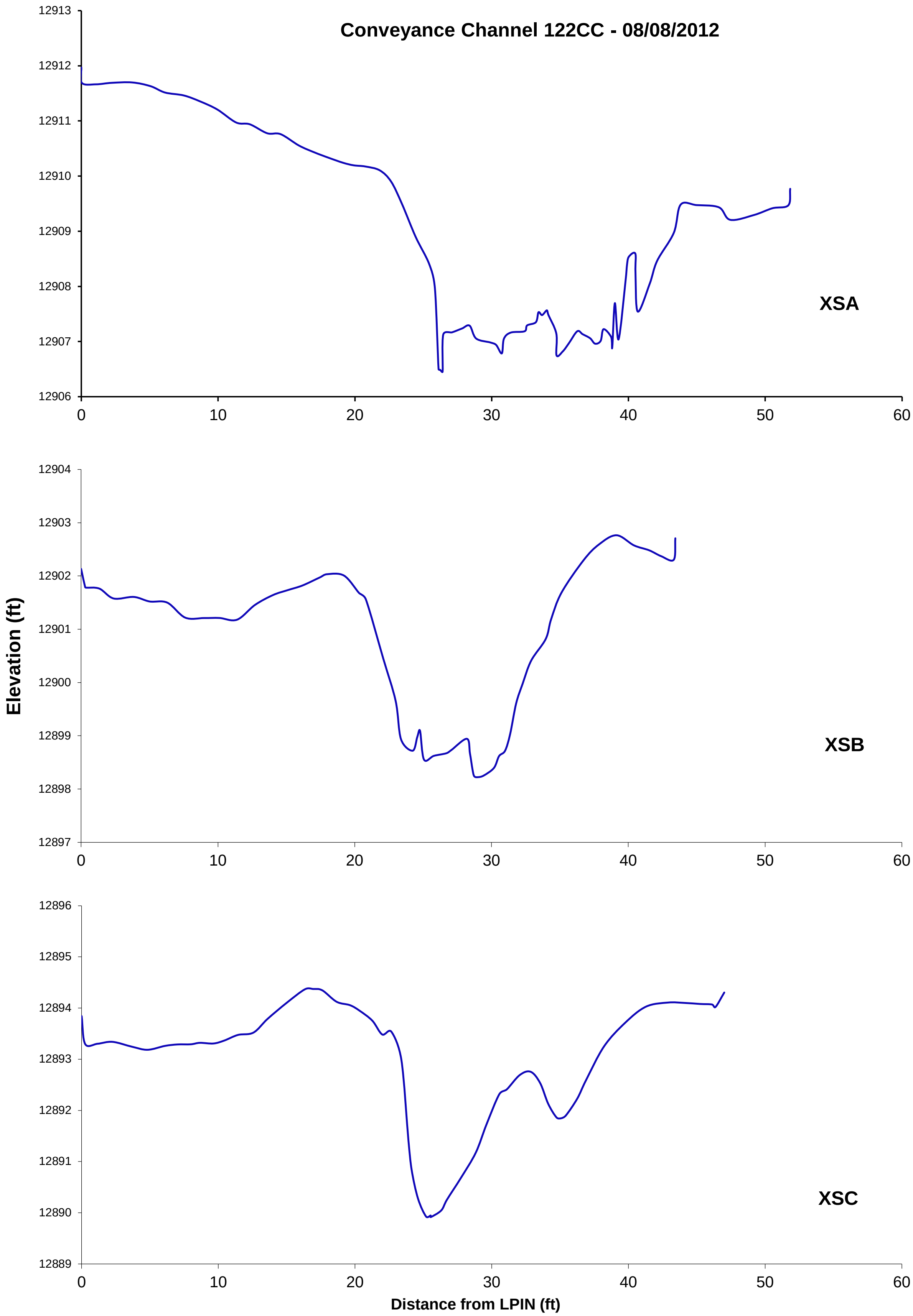


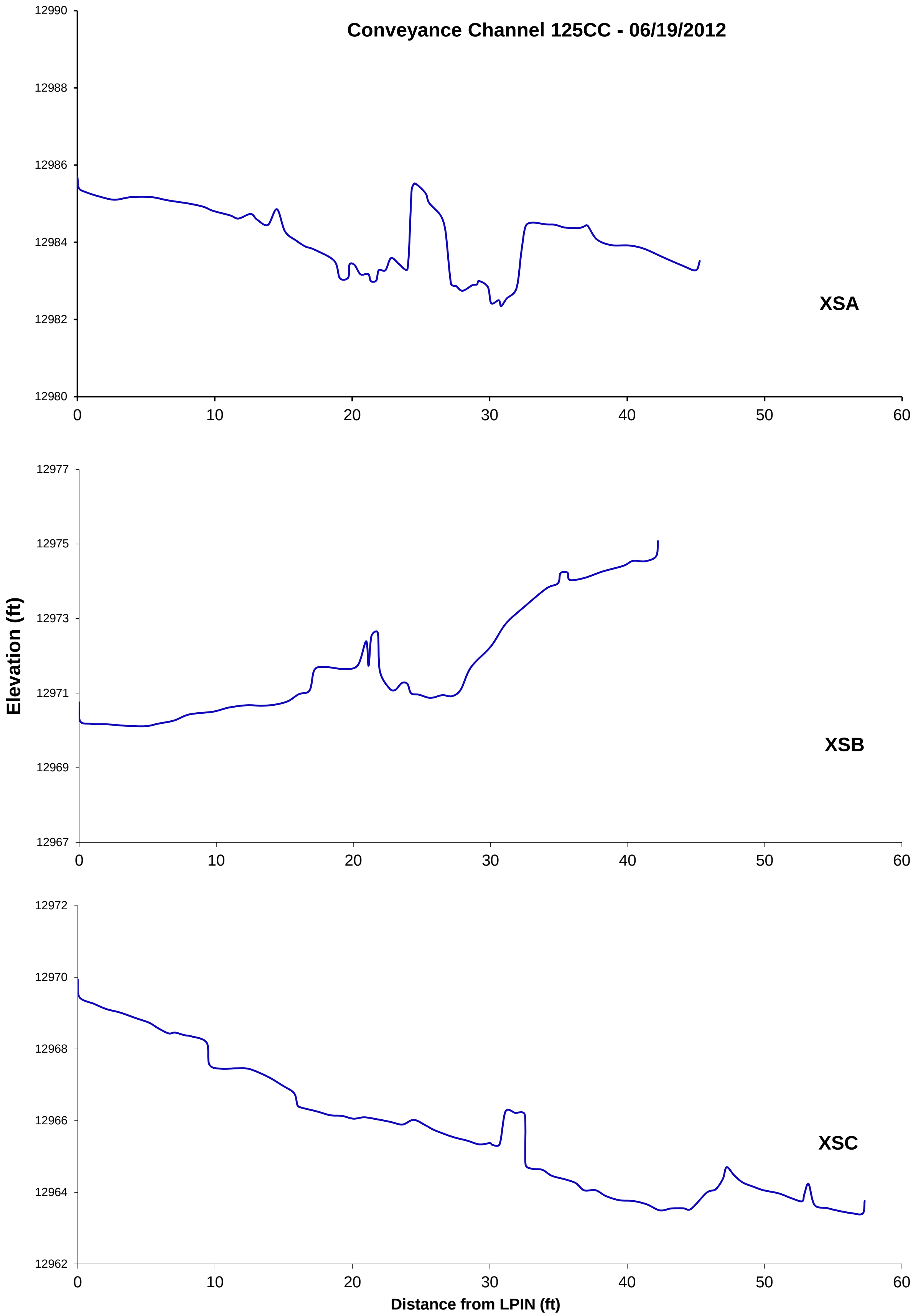
Conveyance Channel 117CC - 08/01/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12870
12869
12868
12867
12866
12865
12864
12863
12862
12857
12856
12855
12854
12853
12852
12851
12850
12845
12844
12843
12842
12841
12840
12839
12838
0
5
10
15
20
25
30
35
40


Conveyance Channel 118CC - 07/03/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
12898
12896
12894
12892
12890
12888
12886
12884
12882
12880
12878
12876
12874
12872
12870
12868
12866
12864
12862
0
10
20
30
40
50
60
70
80

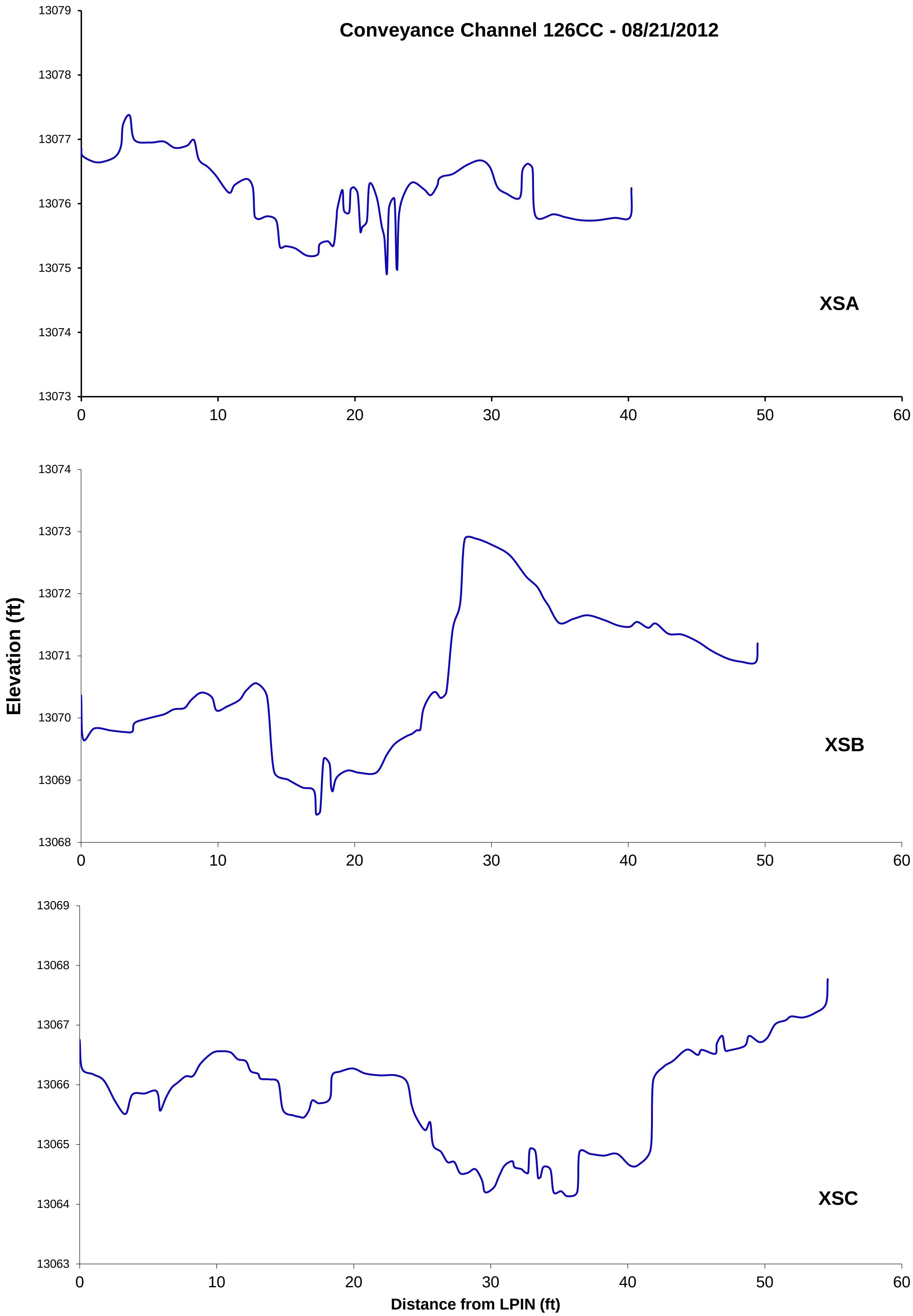

Conveyance Channel 120CC - 06/19/2012
XSA
12946
12944
12942
12940
12938
12936
0
20
40
60
80
100
120
140
Elevation (ft)
XSB
12942
12940
12938
12936
12934
12932
XSC
12940
12938
12936
12934
12932
12930
Distance from LPIN (ft)

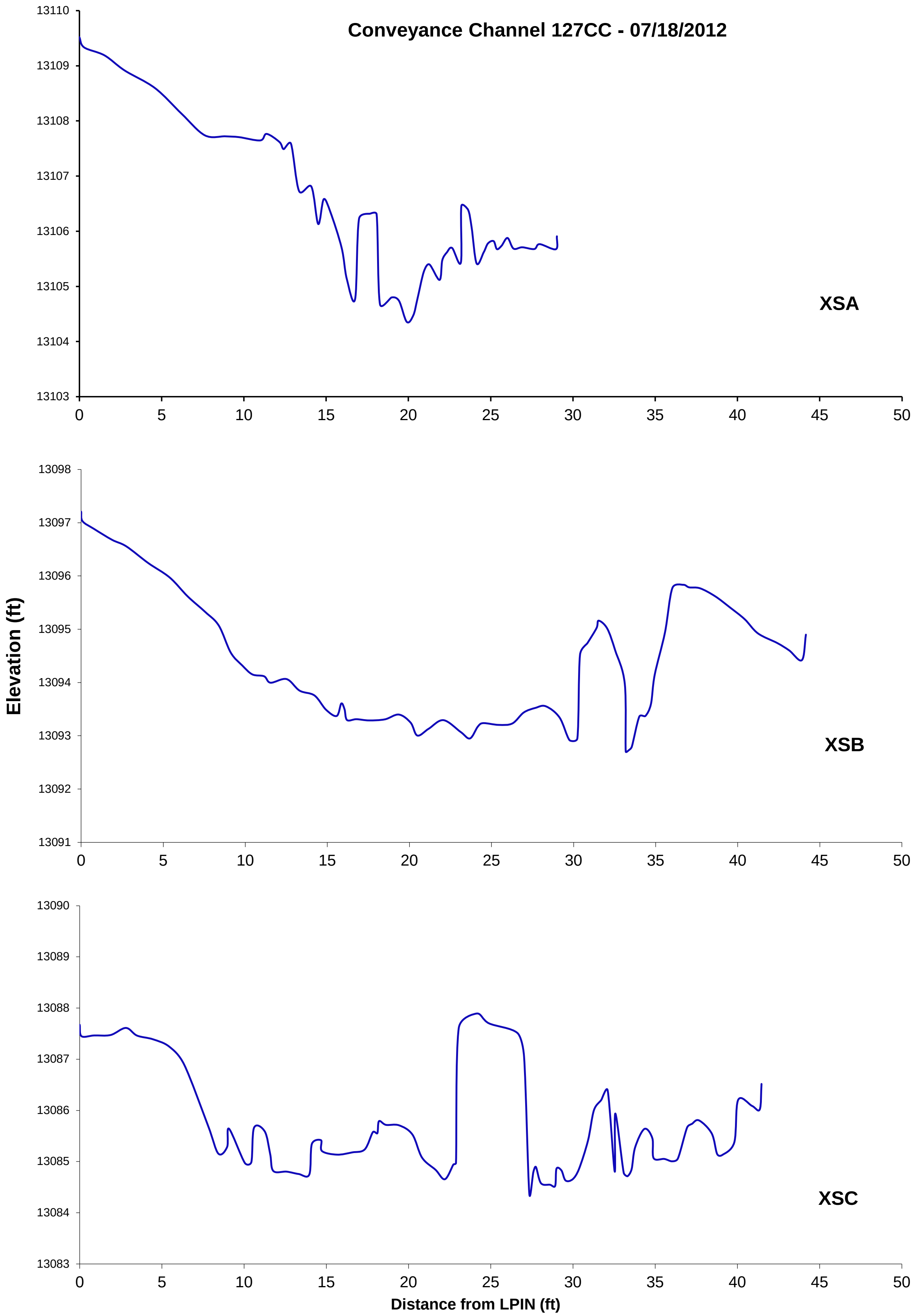

Conveyance Channel 121CC - 08/08/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
13090
13087
13084
13081
13078
13075
13072
13069
13066
13063
13060
13057
13054
13062
13059
13056
13053
13050
13047
13044
13041
13038
0
20
40
60
80
100
120

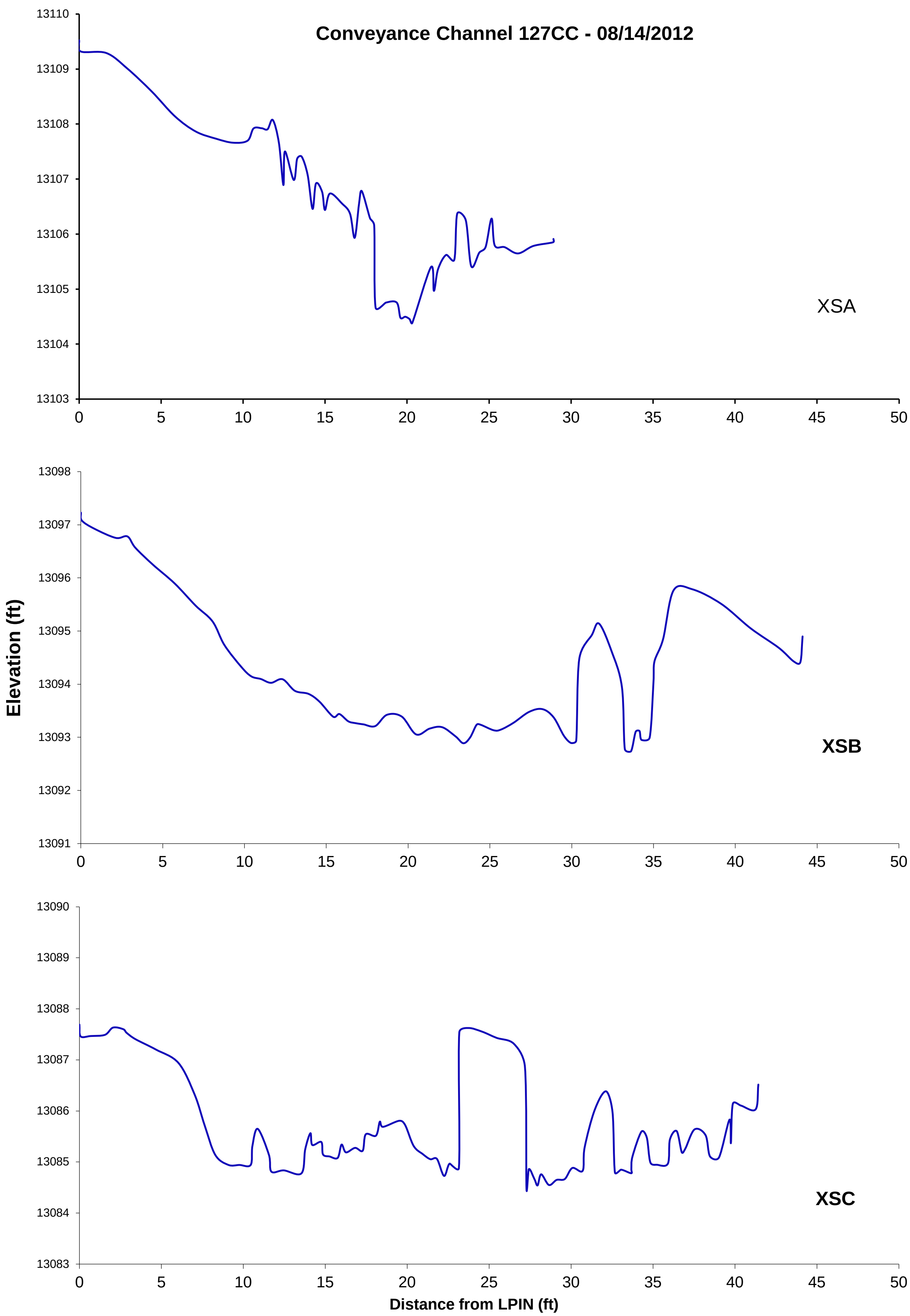

Conveyance Channel 122CC - 08/08/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12913
12912
12911
12910
12909
12908
12907
12906
12904
12903
12902
12901
12900
12899
12898
12897
12896
12895
12894
12893
12892
12891
12890
12889
0
10
20
30
40
50
60

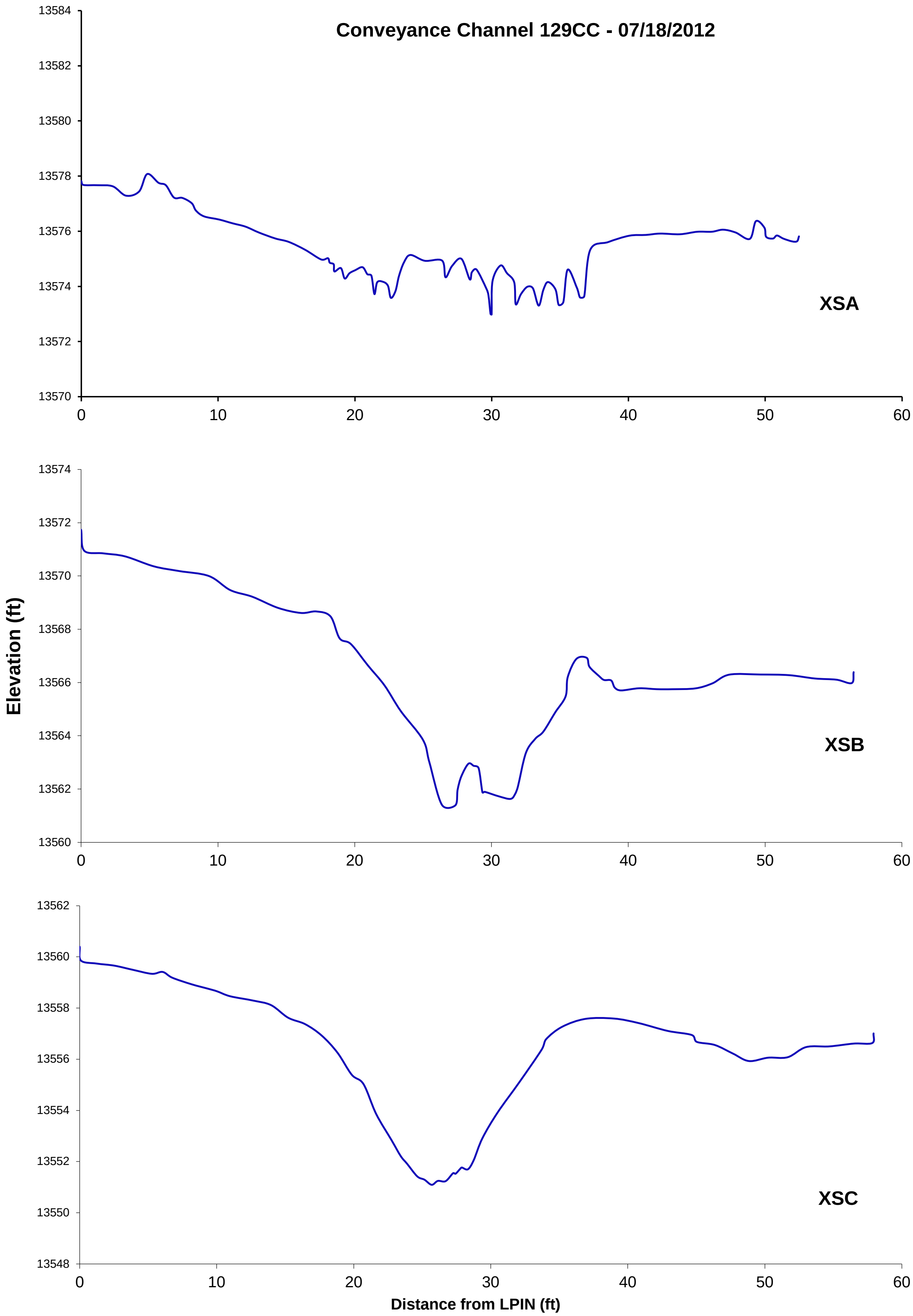


Conveyance Channel 125CC - 06/19/2012
12990
12988
12986
12984
12982
12980
0
10
20
30
40
50
60
XSA
12977
12975
12973
12971
12969
12967
0
10
20
30
40
50
60
XSB
Elevation (ft)
12972
12970
12968
12966
12964
12962
0
10
20
30
40
50
60
XSC
Distance from LPIN (ft)

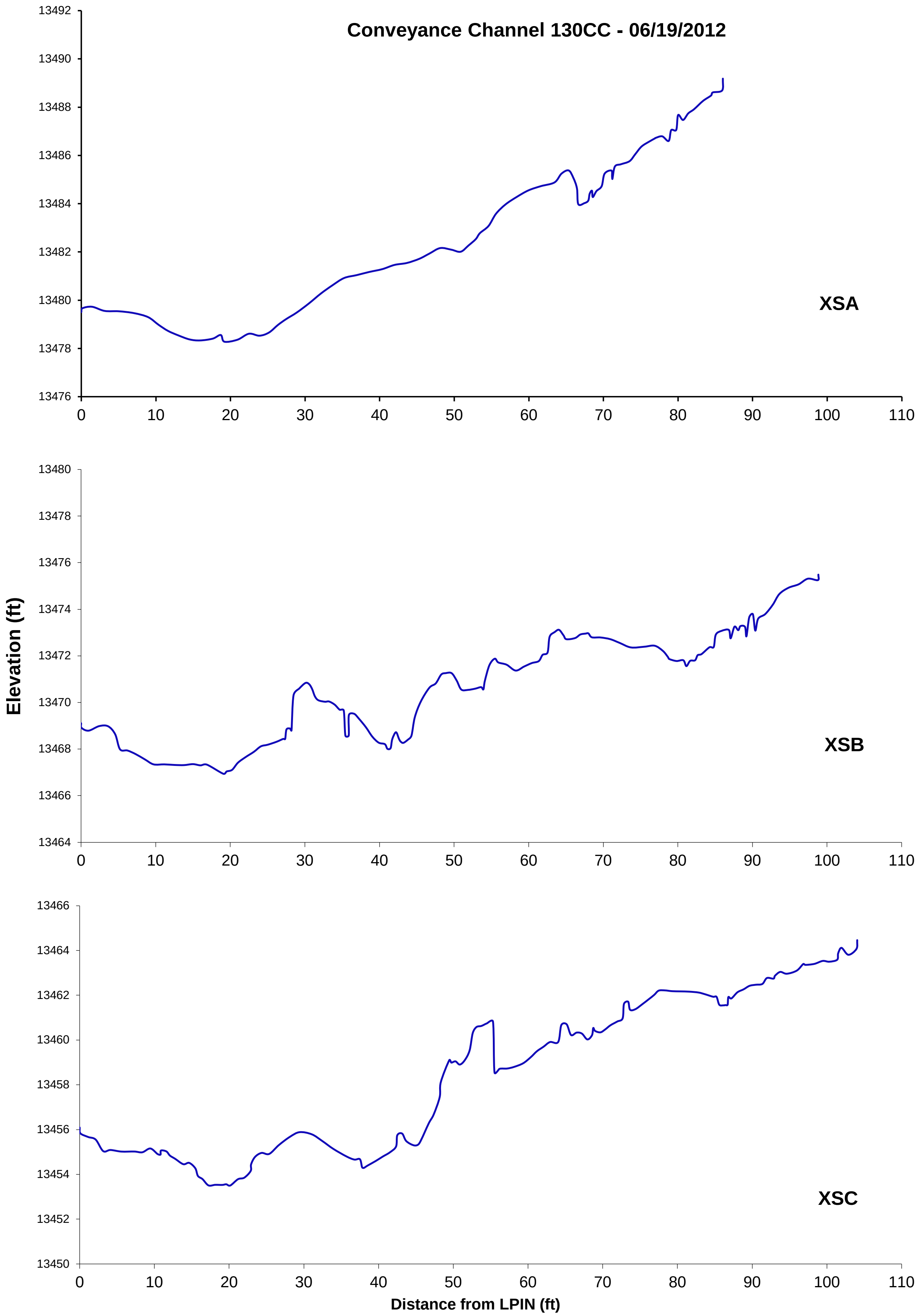

Conveyance Channel 126CC - 08/21/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13079
13078
13077
13076
13075
13074
13073
13072
13071
13070
13069
13068
13067
13066
13065
13064
13063
0
10
20
30
40
50
60


Conveyance Channel 127CC - 07/18/2012
13110
13109
13108
13107
13106
13105
13104
13103
0
5
10
15
20
25
30
35
40
45
50
XSA
Elevation (ft)
13098
13097
13096
13095
13094
13093
13092
13091
XSB
13090
13089
13088
13087
13086
13085
13084
13083
XSC
Distance from LPIN (ft)

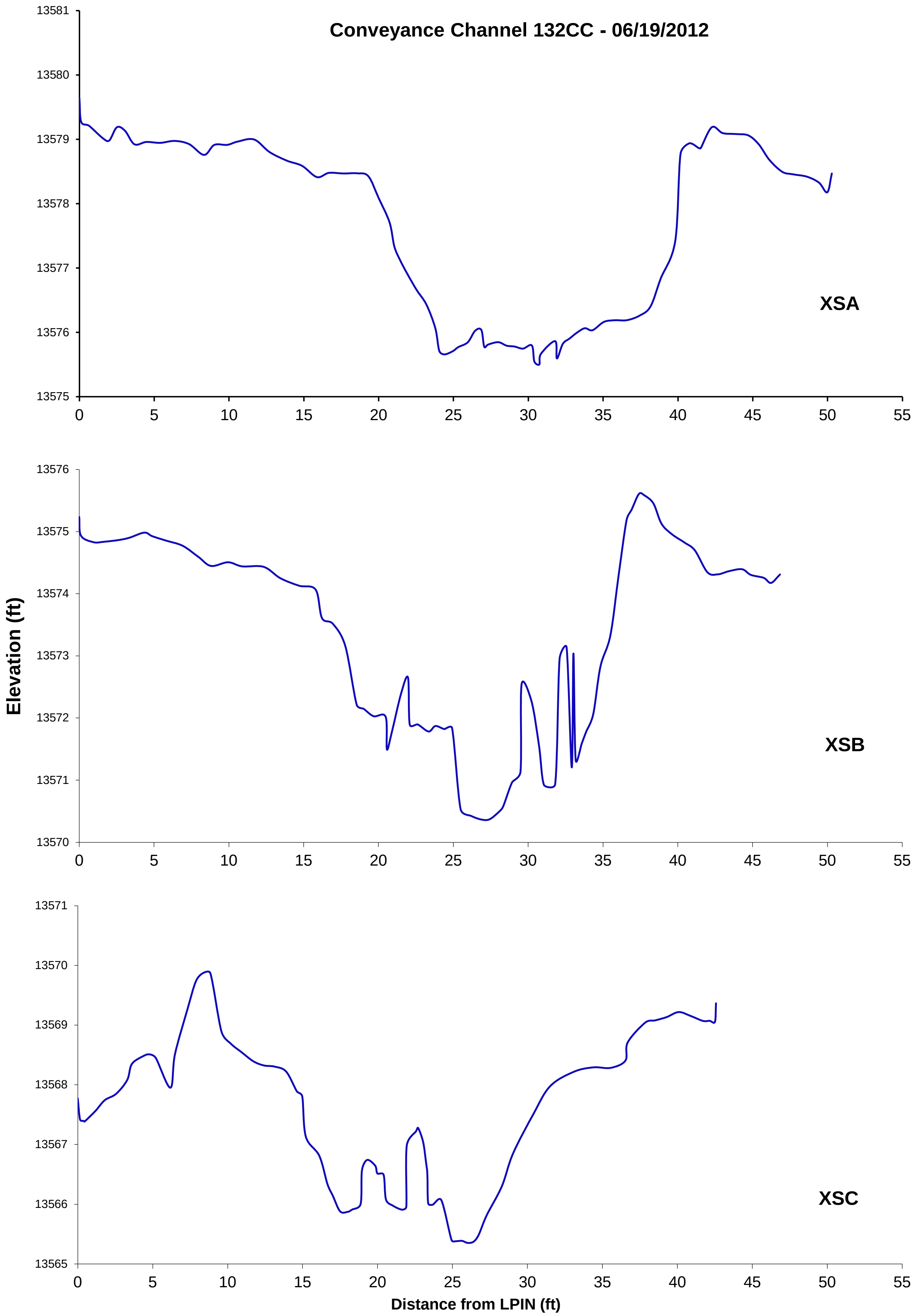

Conveyance Channel 127CC - 08/14/2012
Elevation (ft)
XSA
XSB
XSC
13110
13109
13108
13107
13106
13105
13104
13103
13098
13097
13096
13095
13094
13093
13092
13091
13090
13089
13088
13087
13086
13085
13084
13083
0
5
10
15
20
25
30
35
40
45
50
Distance from LPIN (ft)



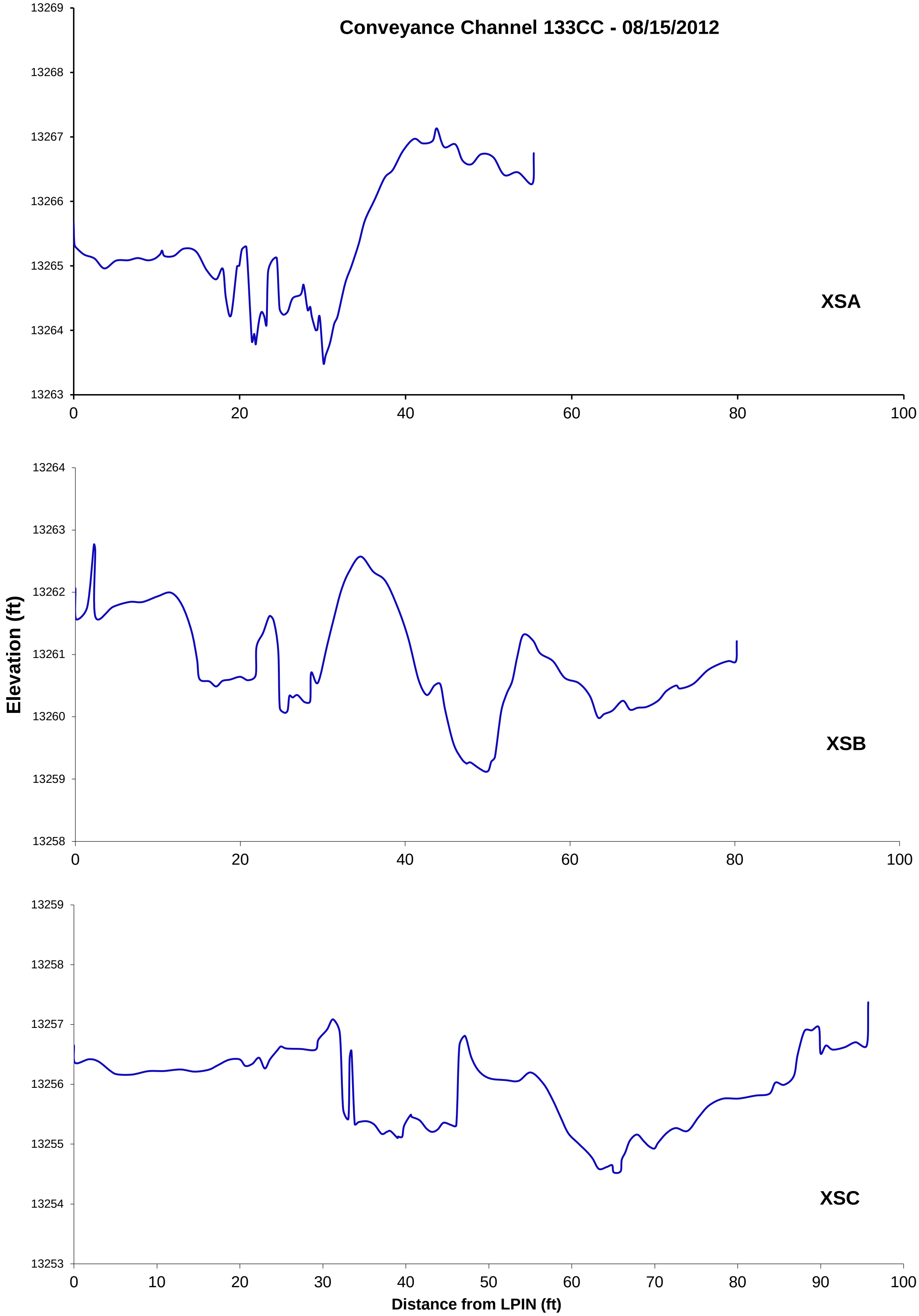
Conveyance Channel 129CC - 07/18/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13584
13582
13580
13578
13576
13574
13572
13570
13568
13566
13564
13562
13560
13558
13556
13554
13552
13550
13548
0
10
20
30
40
50
60

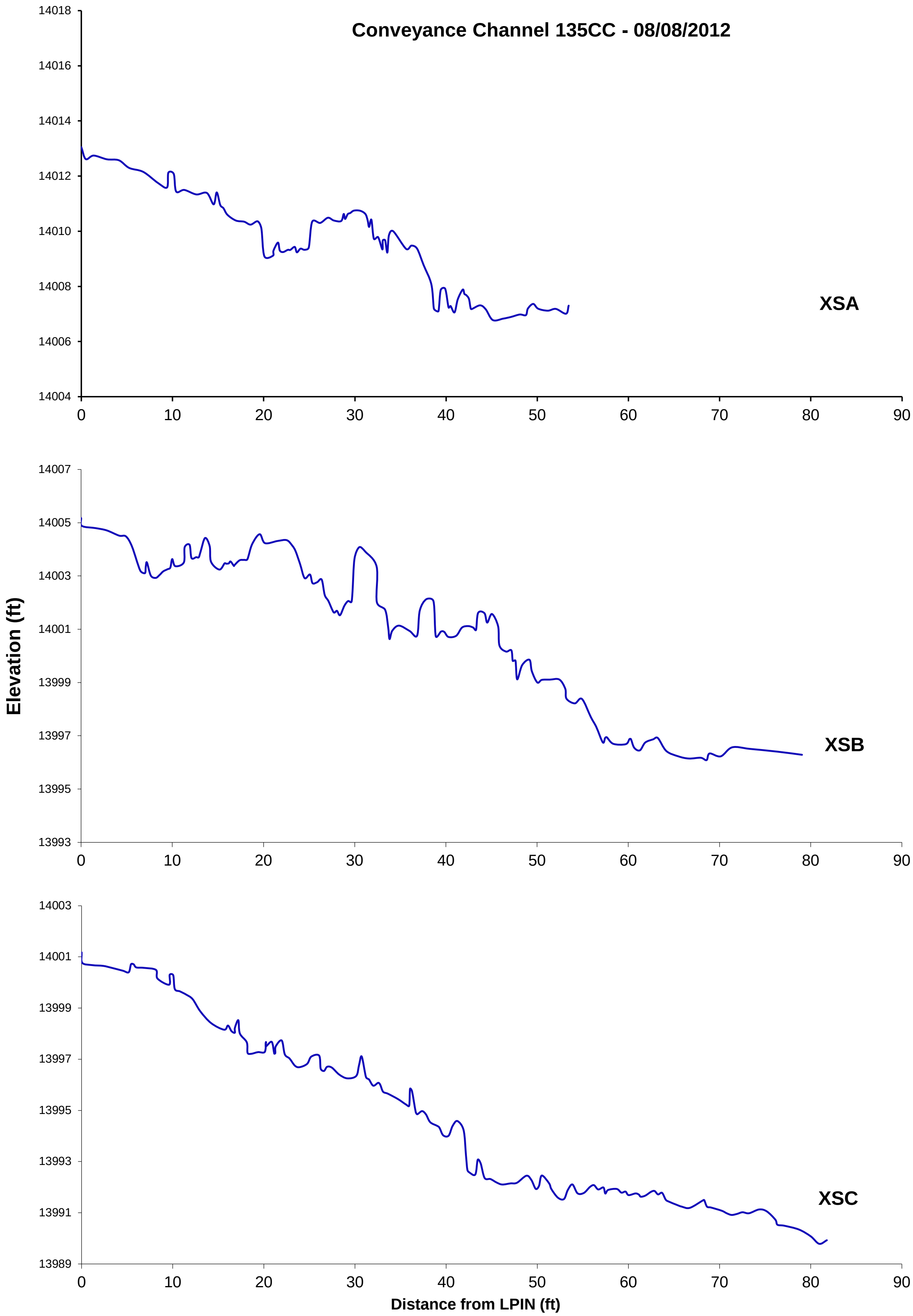


Conveyance Channel 130CC - 06/19/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13492
13490
13488
13486
13484
13482
13480
13478
13476
13474
13472
13470
13468
13466
13464
13462
13460
13458
13456
13454
13452
13450
0
10
20
30
40
50
60
70
80
90
100
110

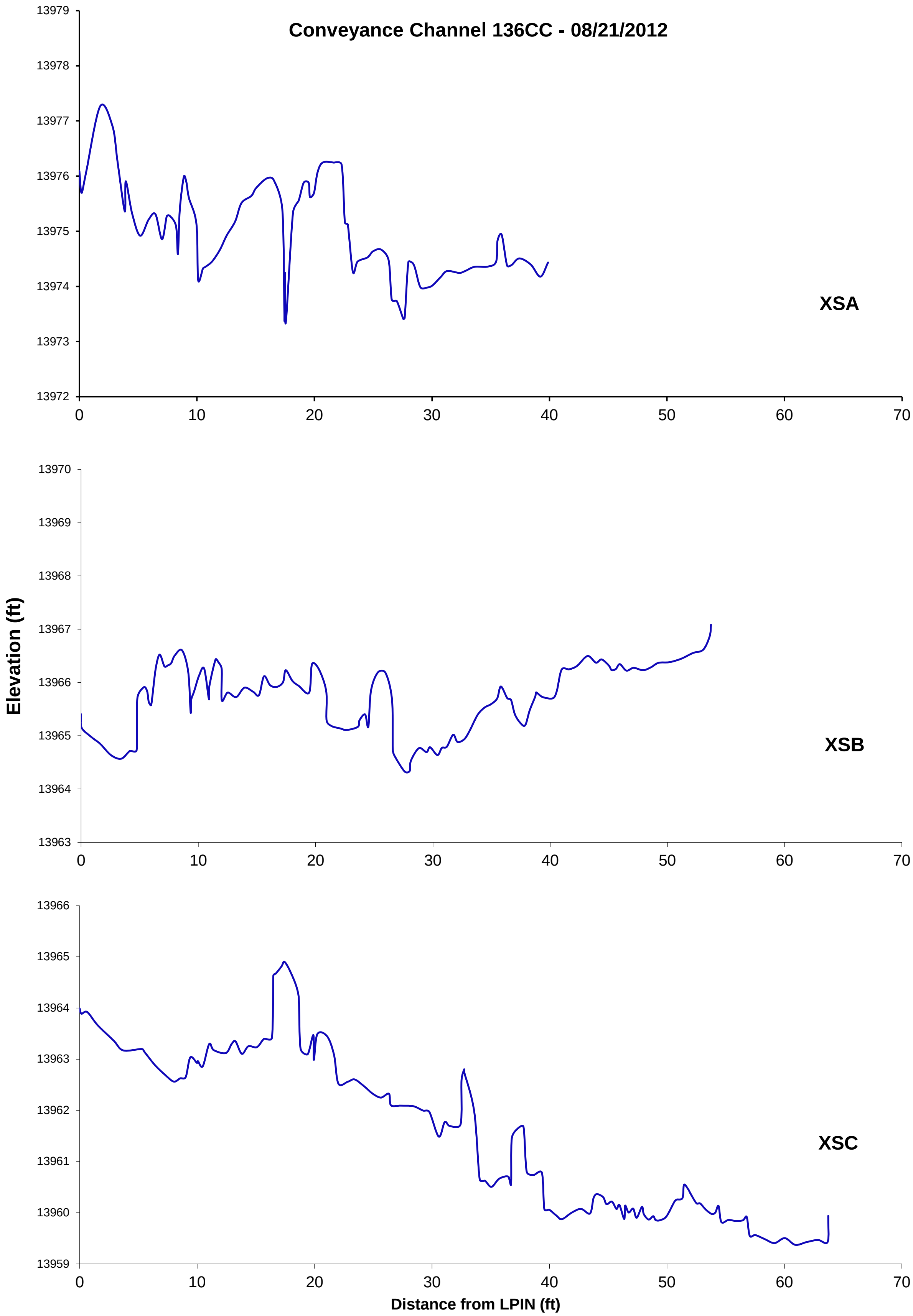


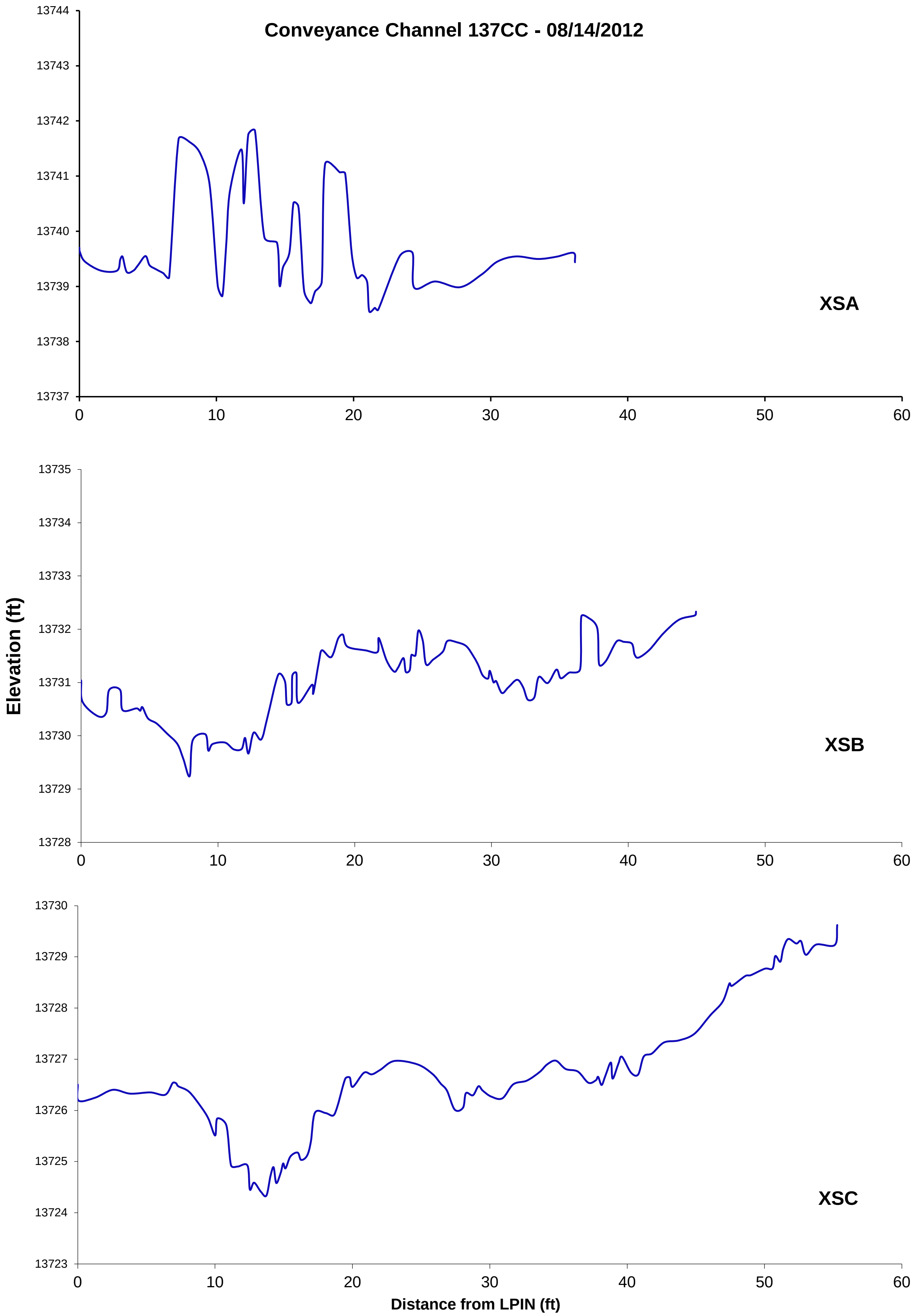
Conveyance Channel 132CC - 06/19/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
13581
13580
13579
13578
13577
13576
13575
13574
13573
13572
13571
13570
13569
13568
13567
13566
13565
0
5
10
15
20
25
30
35
40
45
50
55

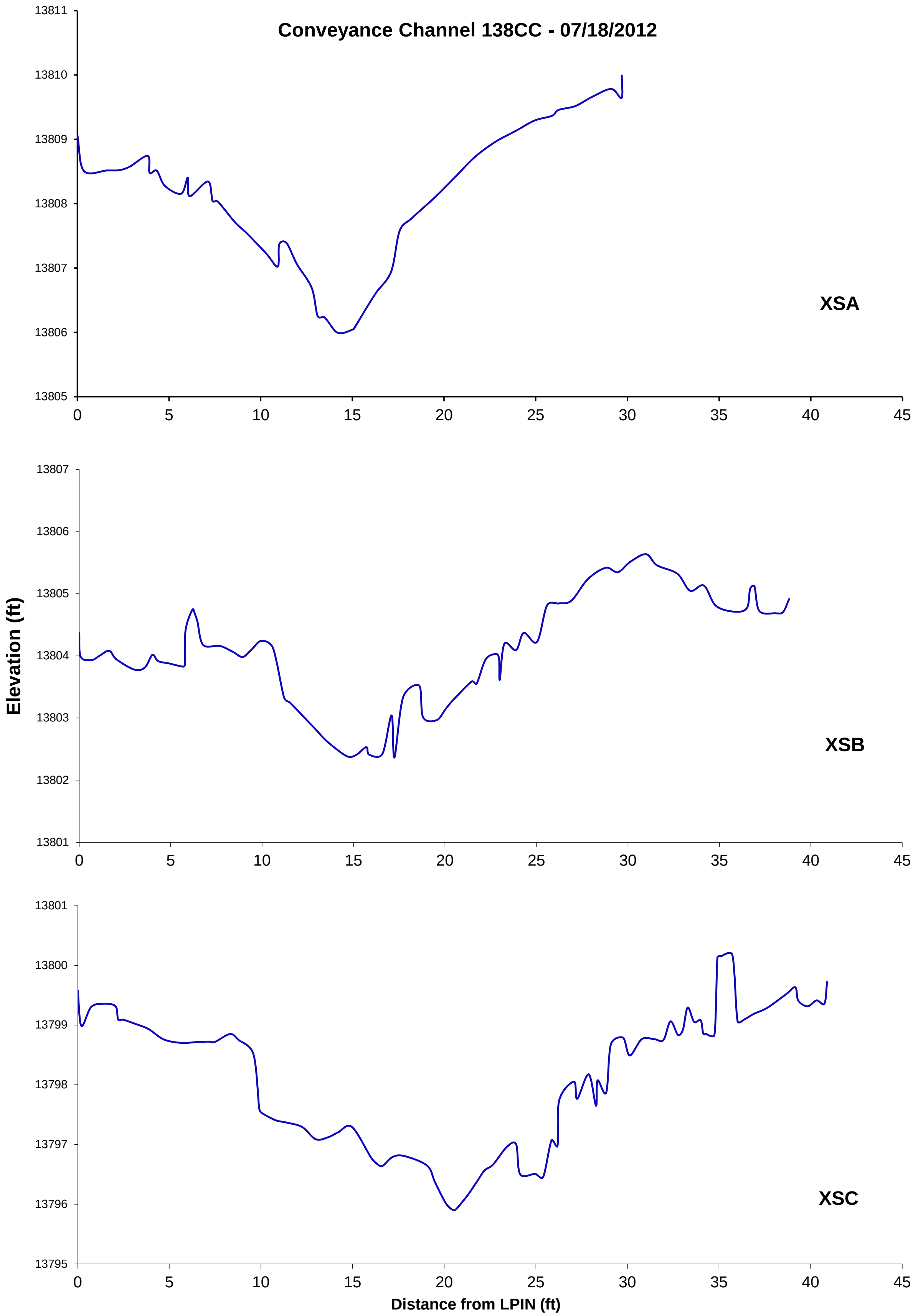

Conveyance Channel 133CC - 08/15/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13269
13268
13267
13266
13265
13264
13263
13262
13261
13260
13259
13258
13257
13256
13255
13254
13253
0
10
20
30
40
50
60
70
80
90
100



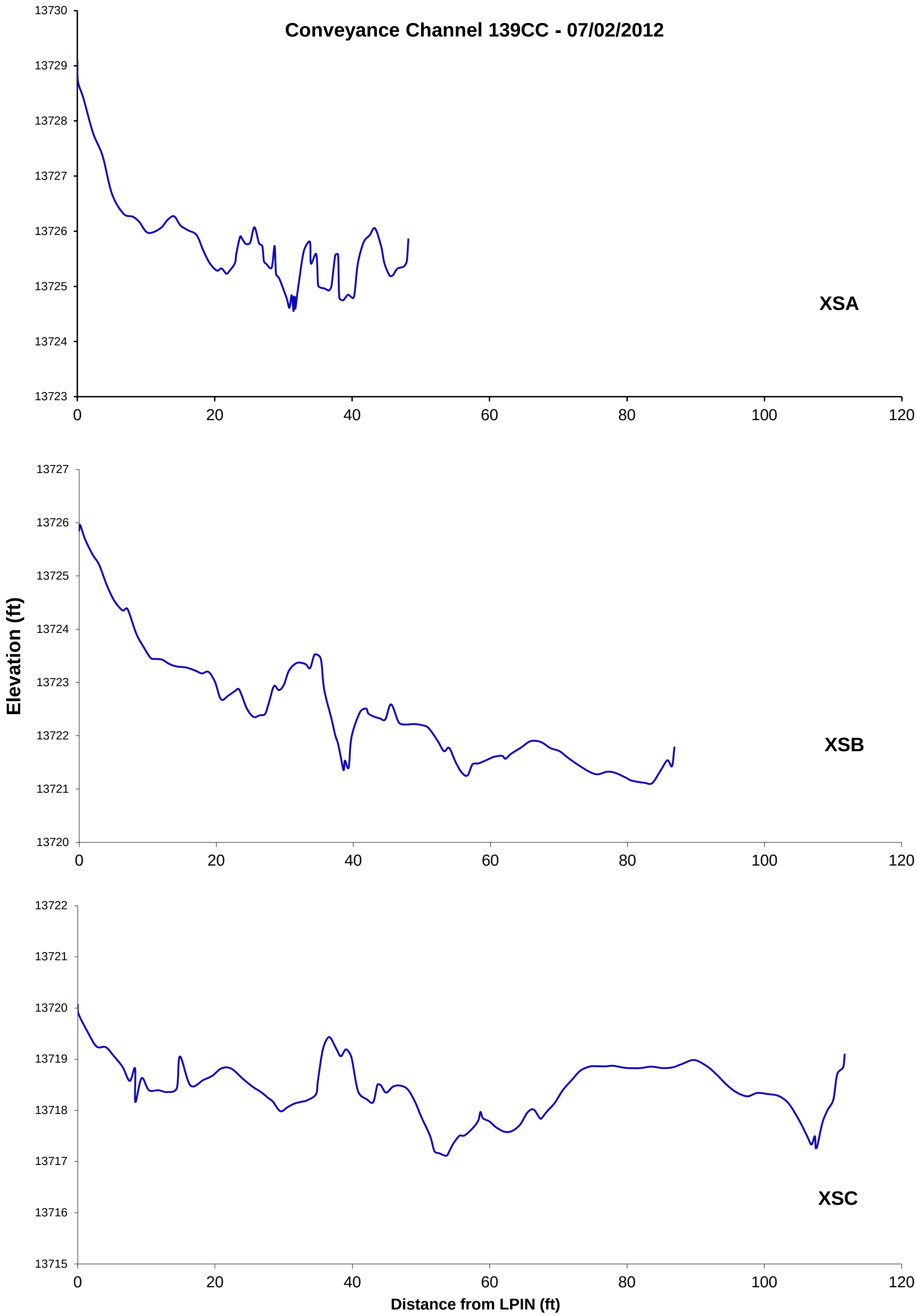
Conveyance Channel 135CC - 08/08/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
14018
14016
14014
14012
14010
14008
14006
14004
14007
14005
14003
14001
13999
13997
13995
13993
14003
14001
13999
13997
13995
13993
13991
13989
0
10
20
30
40
50
60
70
80
90

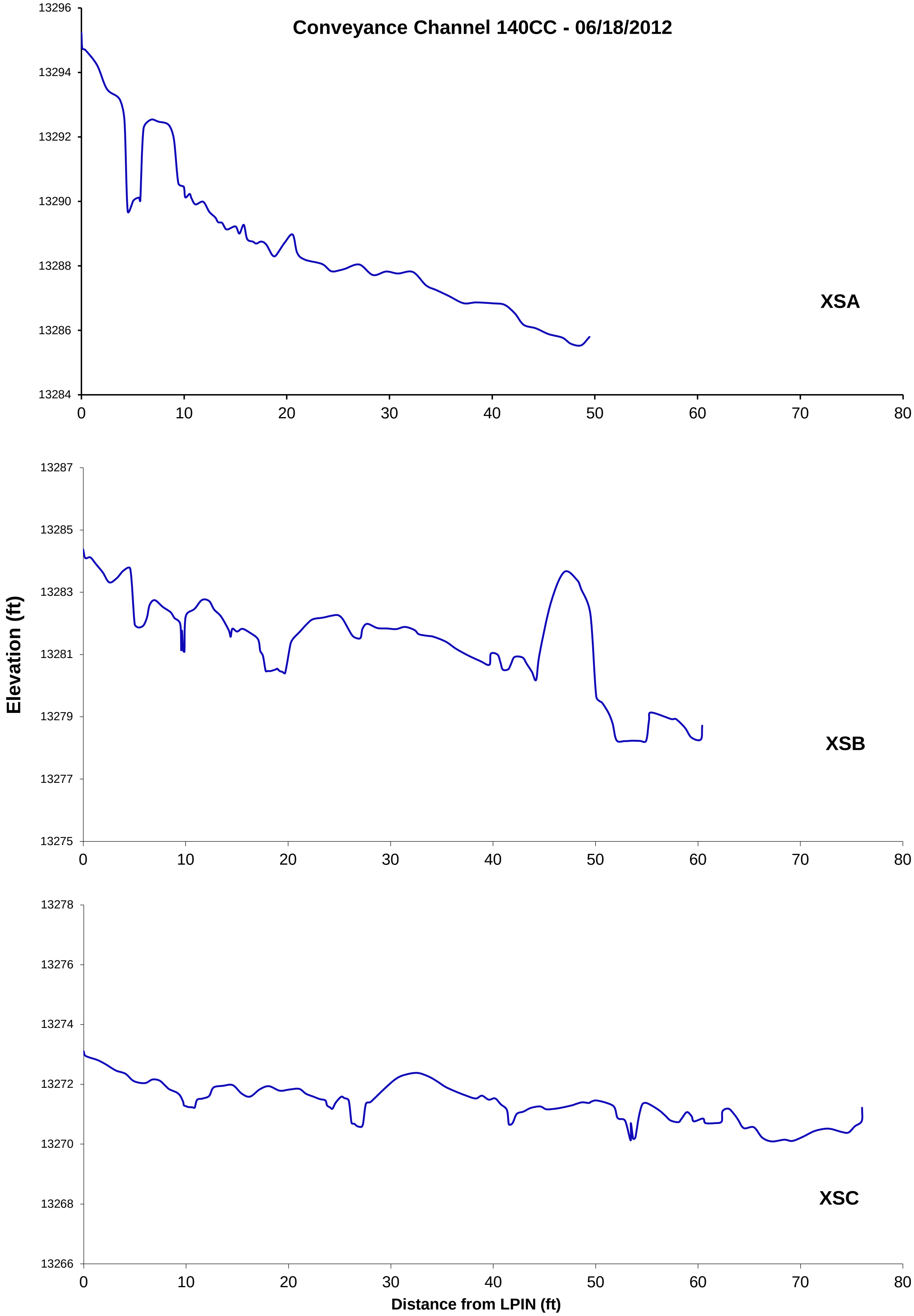

Conveyance Channel 136CC - 08/21/2012
Elevation (ft)
XSA
13979
13978
13977
13976
13975
13974
13973
13972
0
10
20
30
40
50
60
70
XSB
13970
13969
13968
13967
13966
13965
13964
13963
0
10
20
30
40
50
60
70
XSC
13966
13965
13964
13963
13962
13961
13960
13959
0
10
20
30
40
50
60
70
Distance from LPIN (ft)

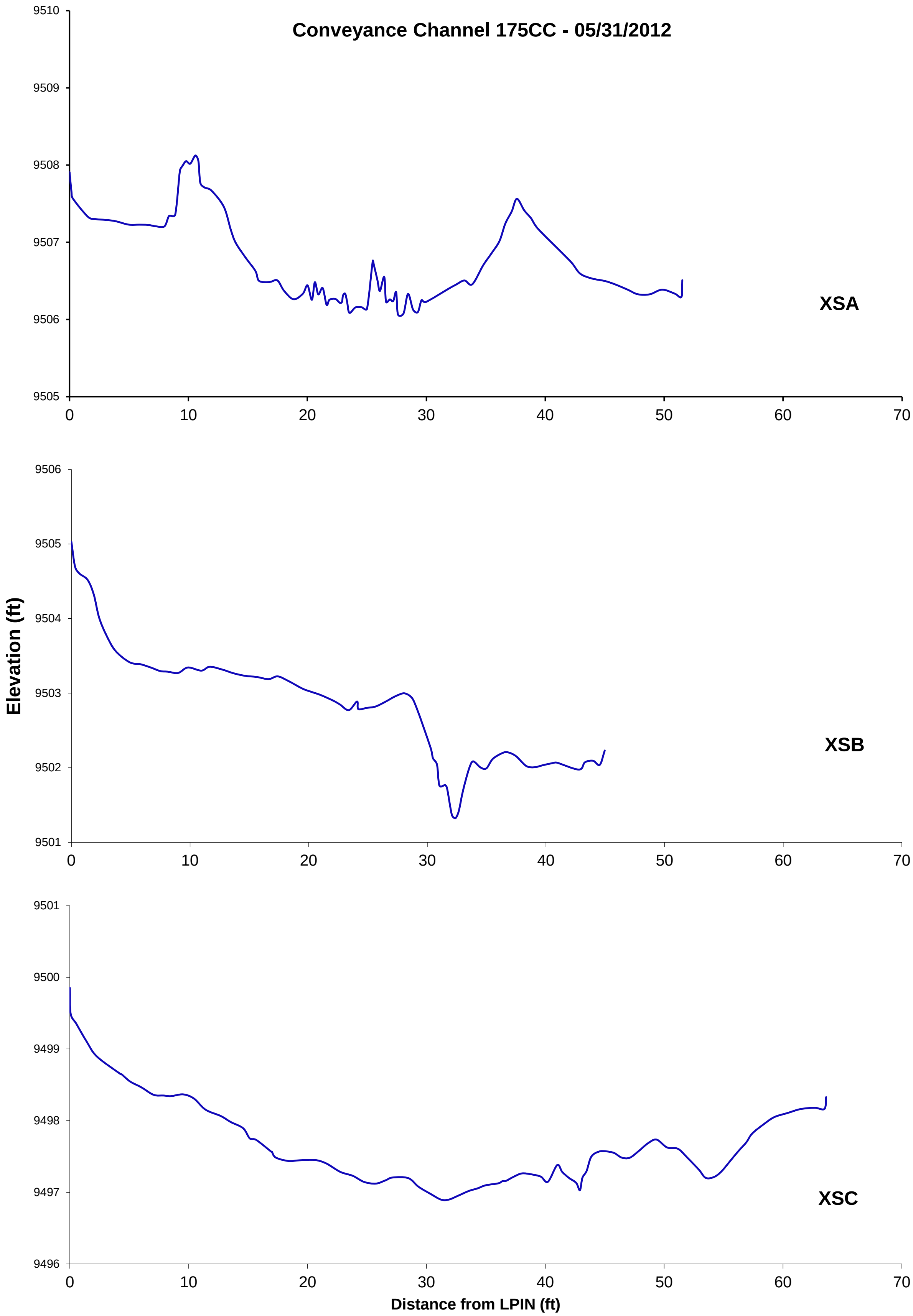

Conveyance Channel 137CC - 08/14/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
13744
13743
13742
13741
13740
13739
13738
13737
13735
13734
13733
13732
13731
13730
13729
13728
13727
13726
13725
13724
13723
0
10
20
30
40
50
60



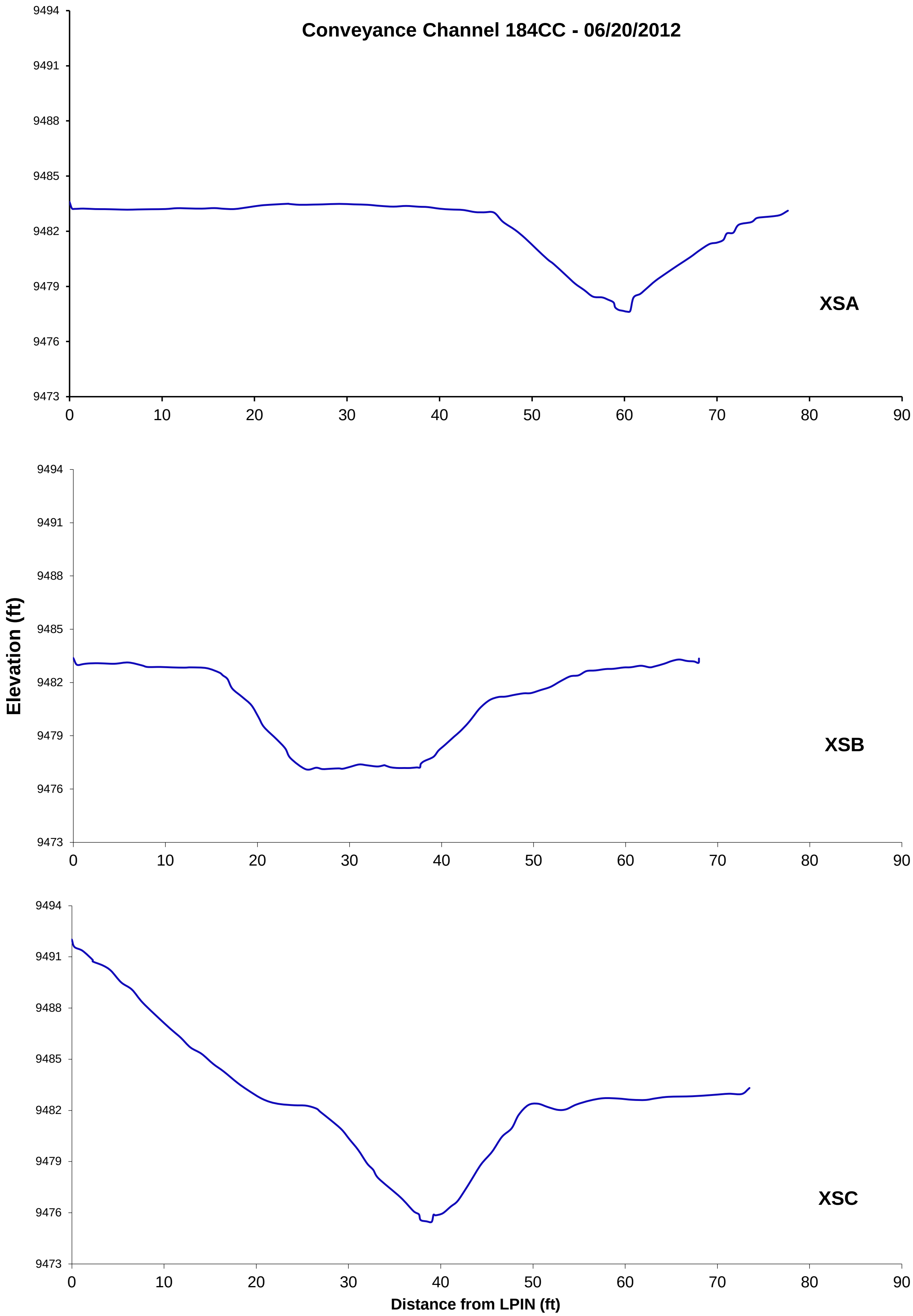
Conveyance Channel 138CC - 07/18/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

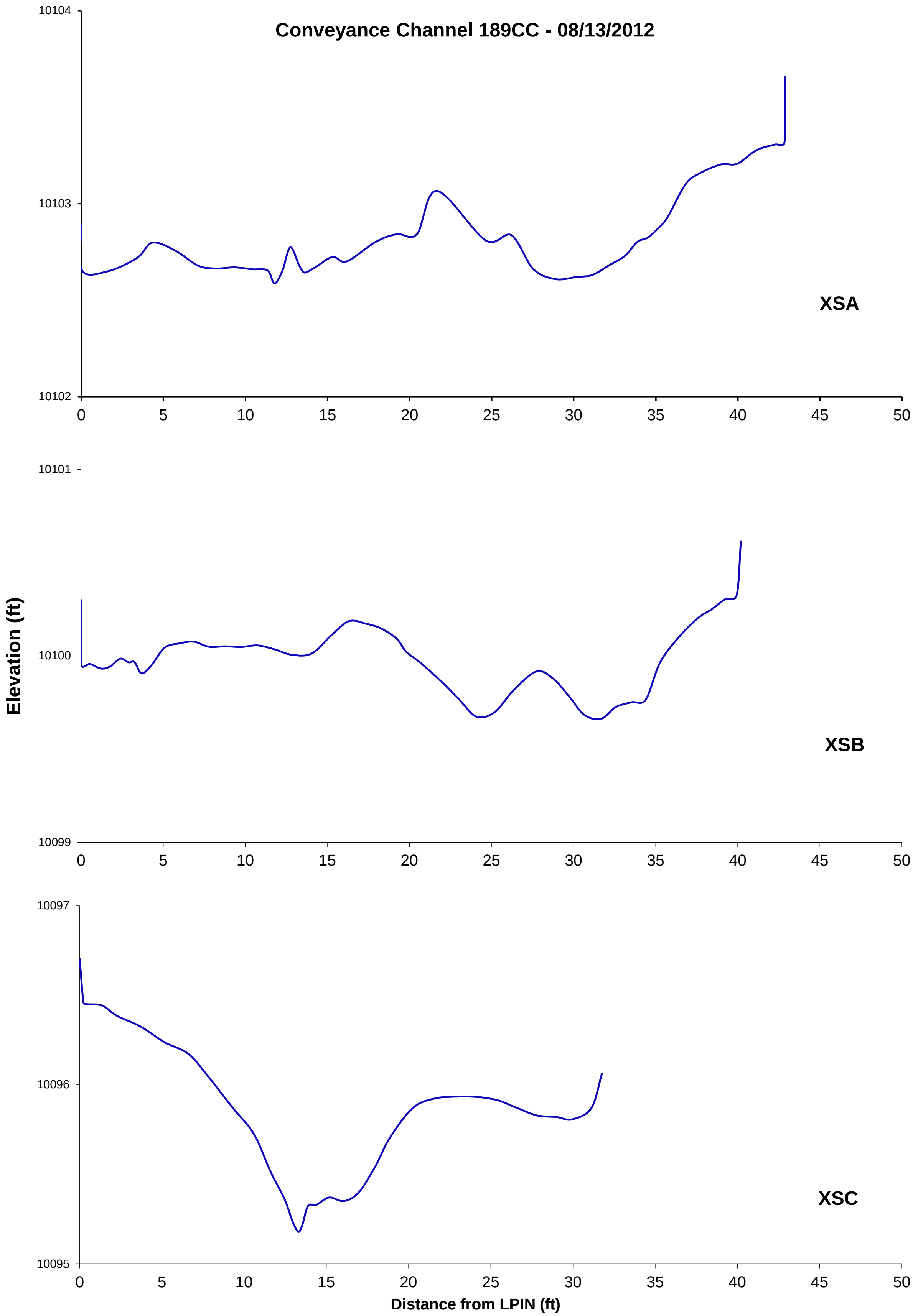

Conveyance Channel 139CC - 07/02/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13730
13729
13728
13727
13726
13725
13724
13723
13727
13726
13725
13724
13723
13722
13721
13720
13722
13721
13720
13719
13718
13717
13716
13715
0
20
40
60
80
100
120

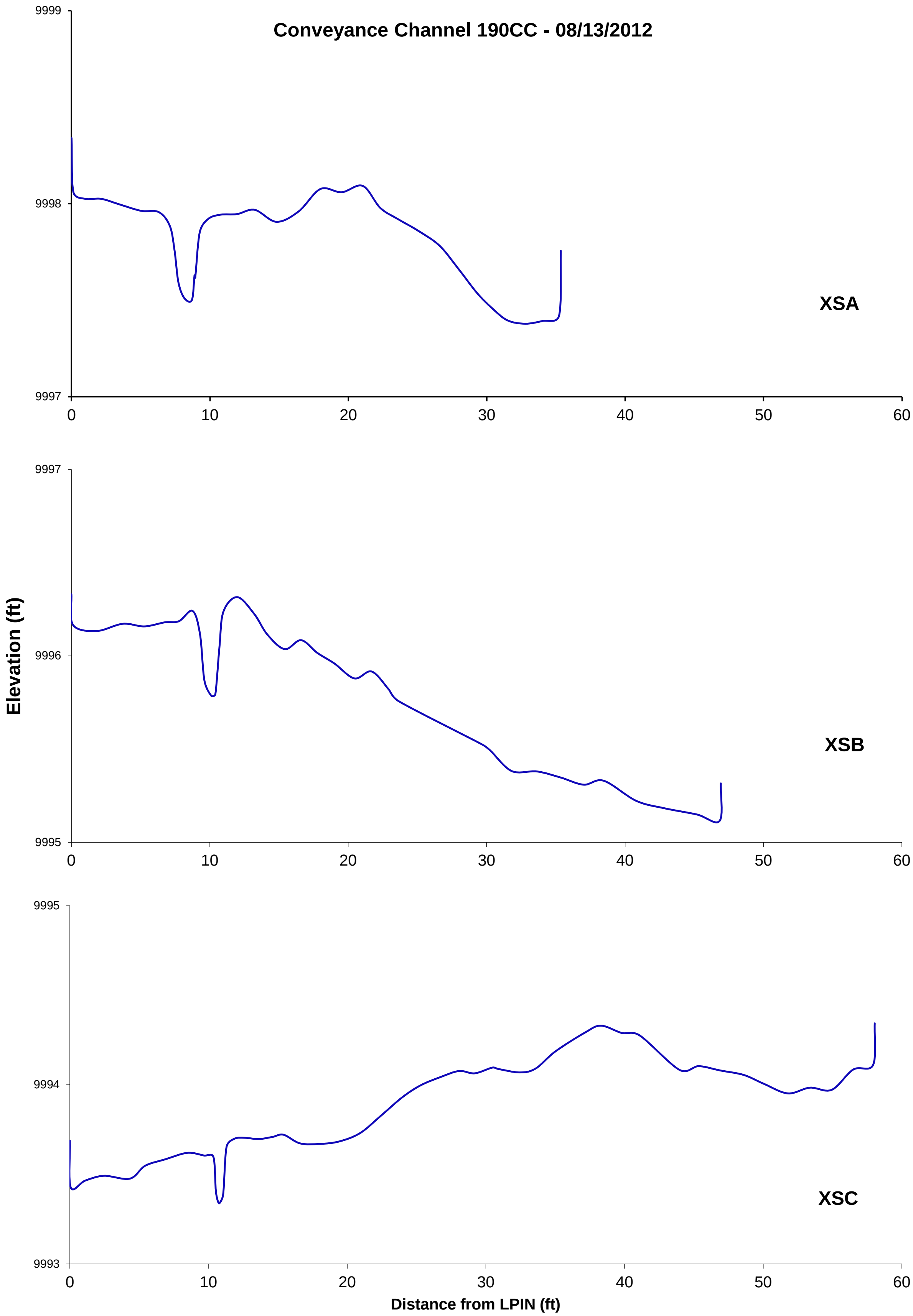

Conveyance Channel 140CC - 06/18/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13296
13294
13292
13290
13288
13286
13284
13287
13285
13283
13281
13279
13277
13275
13278
13276
13274
13272
13270
13268
13266
0
10
20
30
40
50
60
70
80



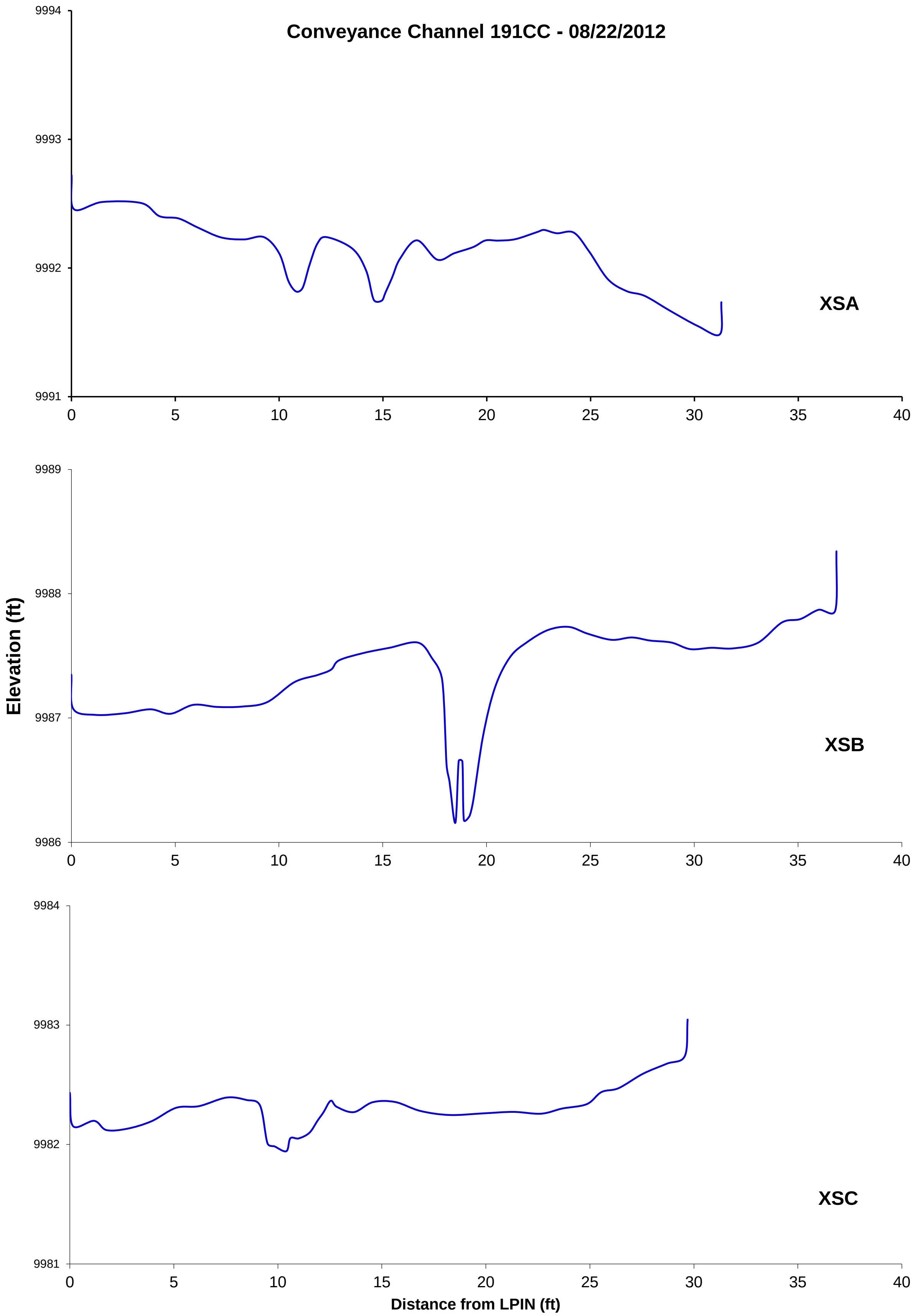
Conveyance Channel 175CC - 05/31/2012
Elevation (ft)
XSA
9510
9509
9508
9507
9506
9505
0
10
20
30
40
50
60
70
XSB
9506
9505
9504
9503
9502
9501
0
10
20
30
40
50
60
70
XSC
9501
9500
9499
9498
9497
9496
0
10
20
30
40
50
60
70
Distance from LPIN (ft)

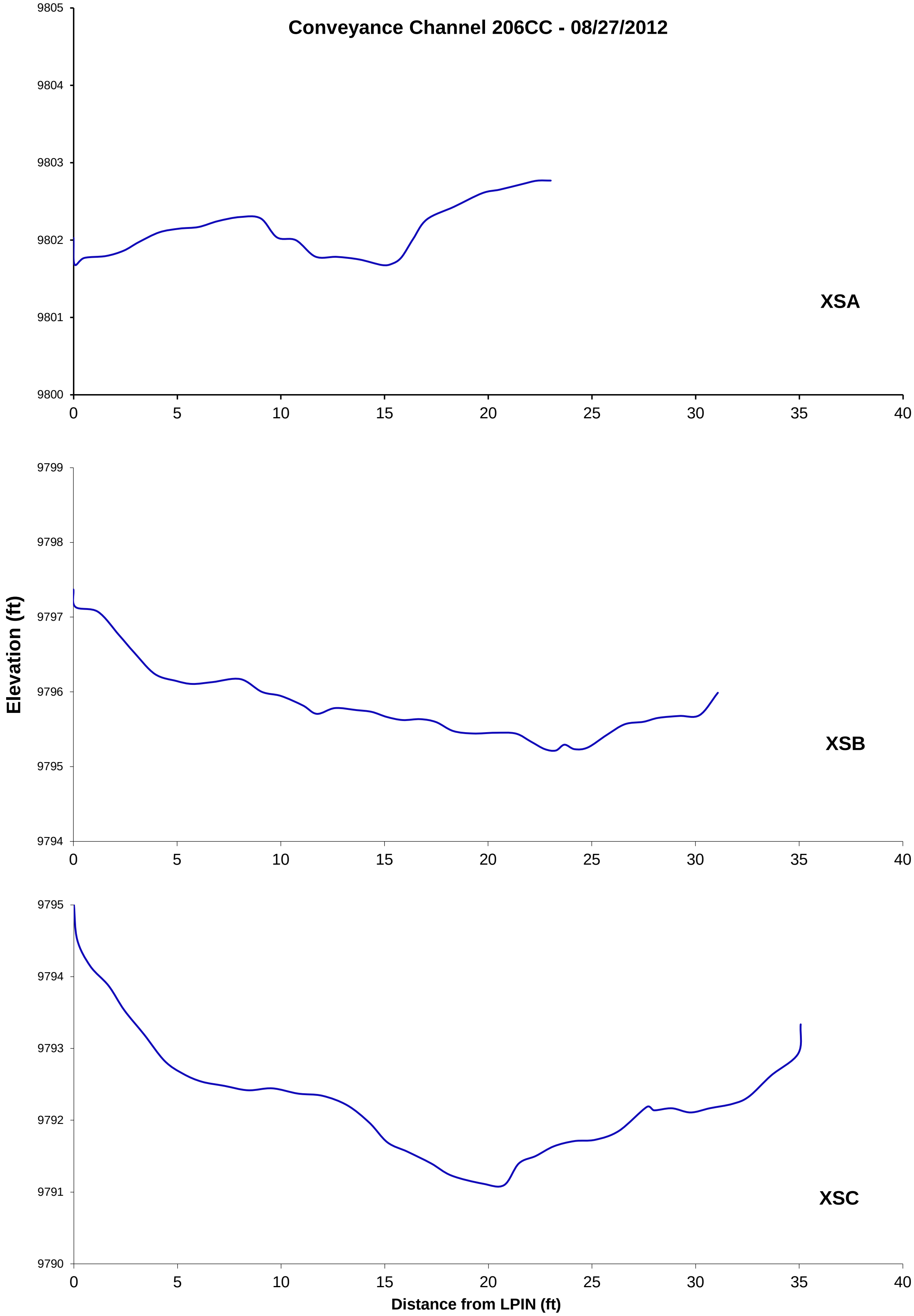

Conveyance Channel 184CC - 06/20/2012
9494
9491
9488
9485
9482
9479
9476
9473
0
10
20
30
40
50
60
70
80
90
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

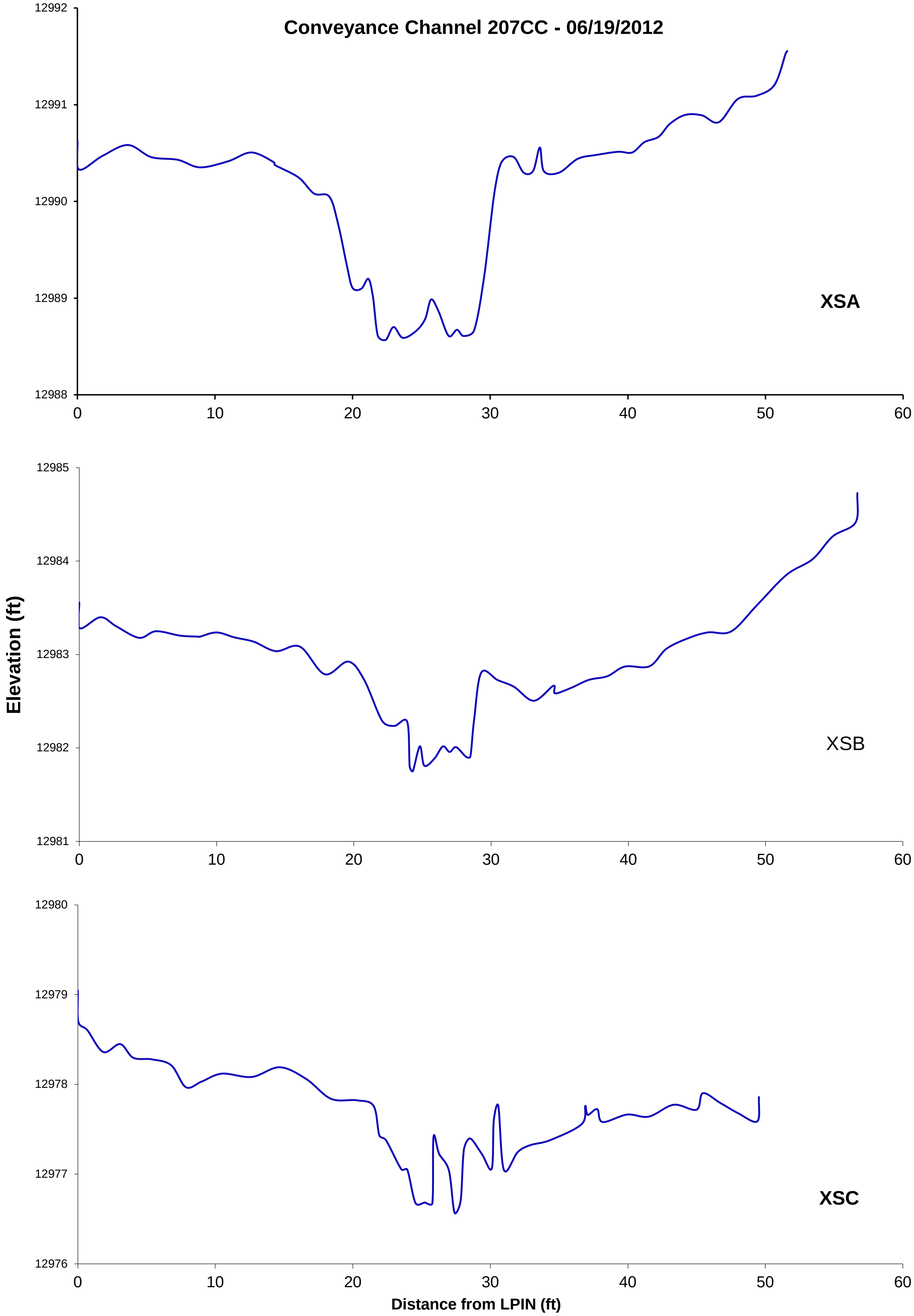

Conveyance Channel 189CC - 08/13/2012
10104
10103
10102
XSA
0
5
10
15
20
25
30
35
40
45
50
10101
10100
10099
XSB
0
5
10
15
20
25
30
35
40
45
50
Elevation (ft)
10097
10096
10095
XSC
0
5
10
15
20
25
30
35
40
45
50
Distance from LPIN (ft)



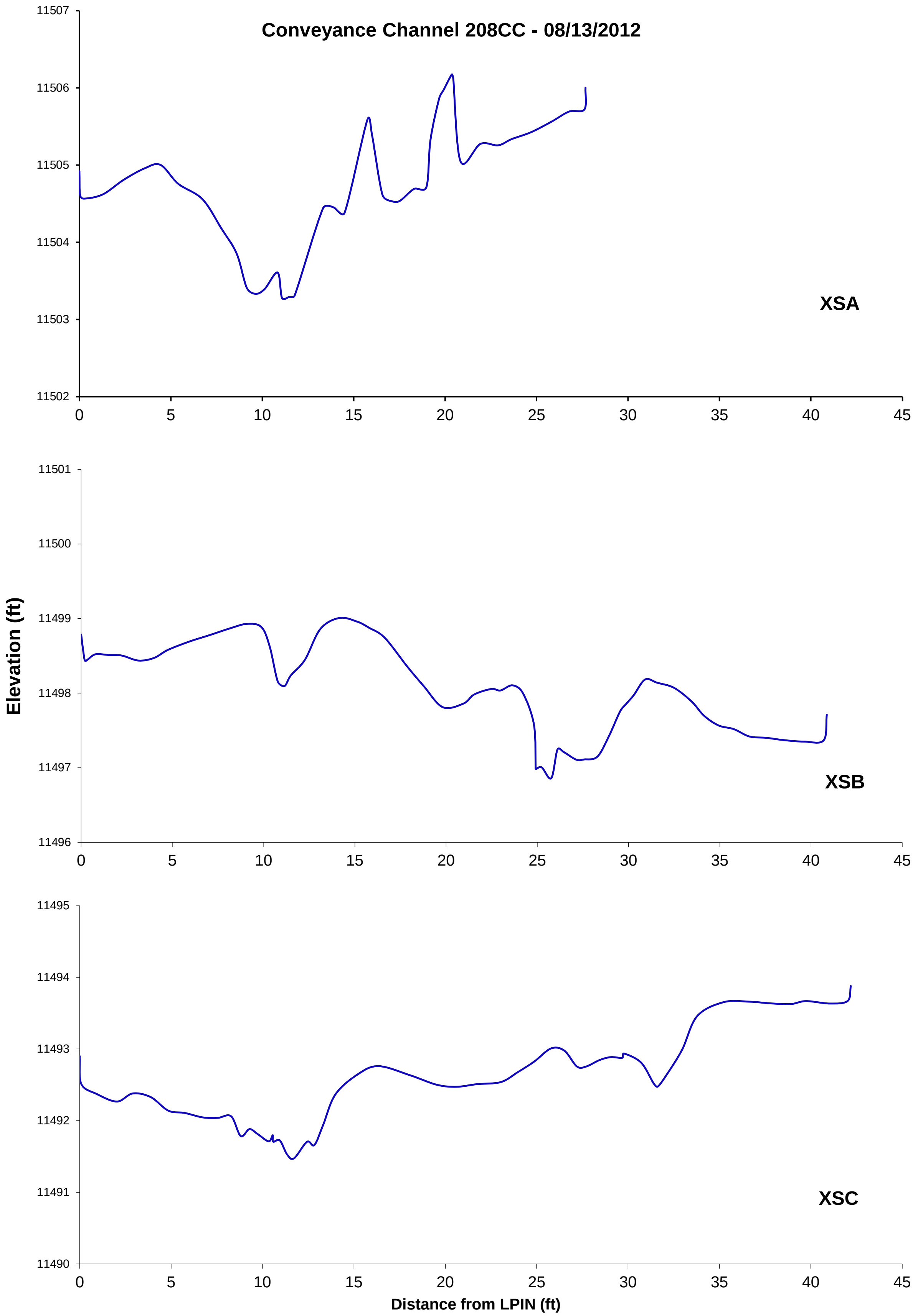
Conveyance Channel 190CC - 08/13/2012
9999
9998
9997
0
10
20
30
40
50
60
XSA
9997
9996
9995
XSB
9995
9994
9993
XSC
Elevation (ft)
Distance from LPIN (ft)


Conveyance Channel 191CC - 08/22/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9994
9993
9992
9991
9989
9988
9987
9986
9984
9983
9982
9981
0
5
10
15
20
25
30
35
40

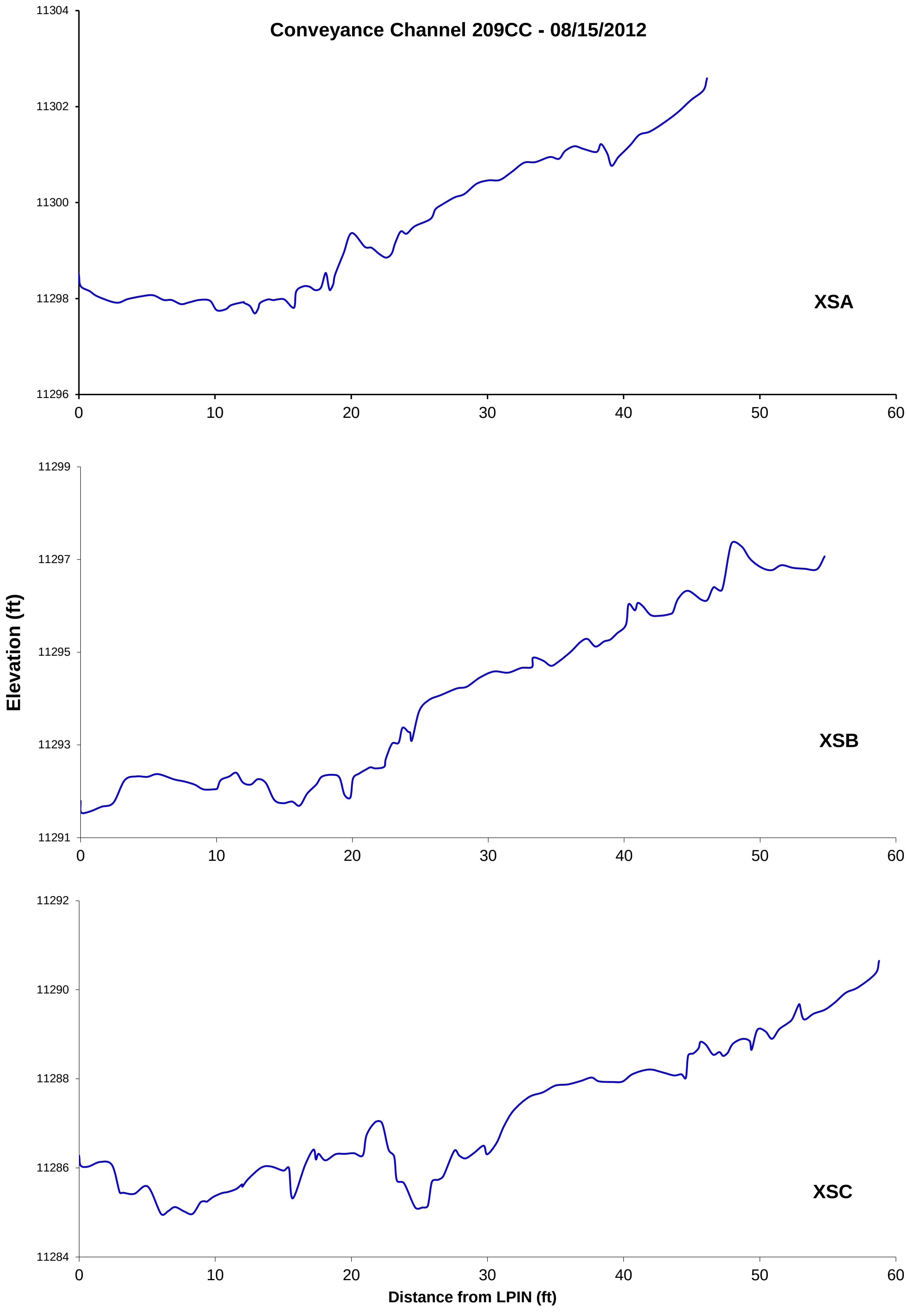

Conveyance Channel 206CC - 08/27/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9805
9804
9803
9802
9801
9800
9799
9798
9797
9796
9795
9794
9793
9792
9791
9790
0
5
10
15
20
25
30
35
40

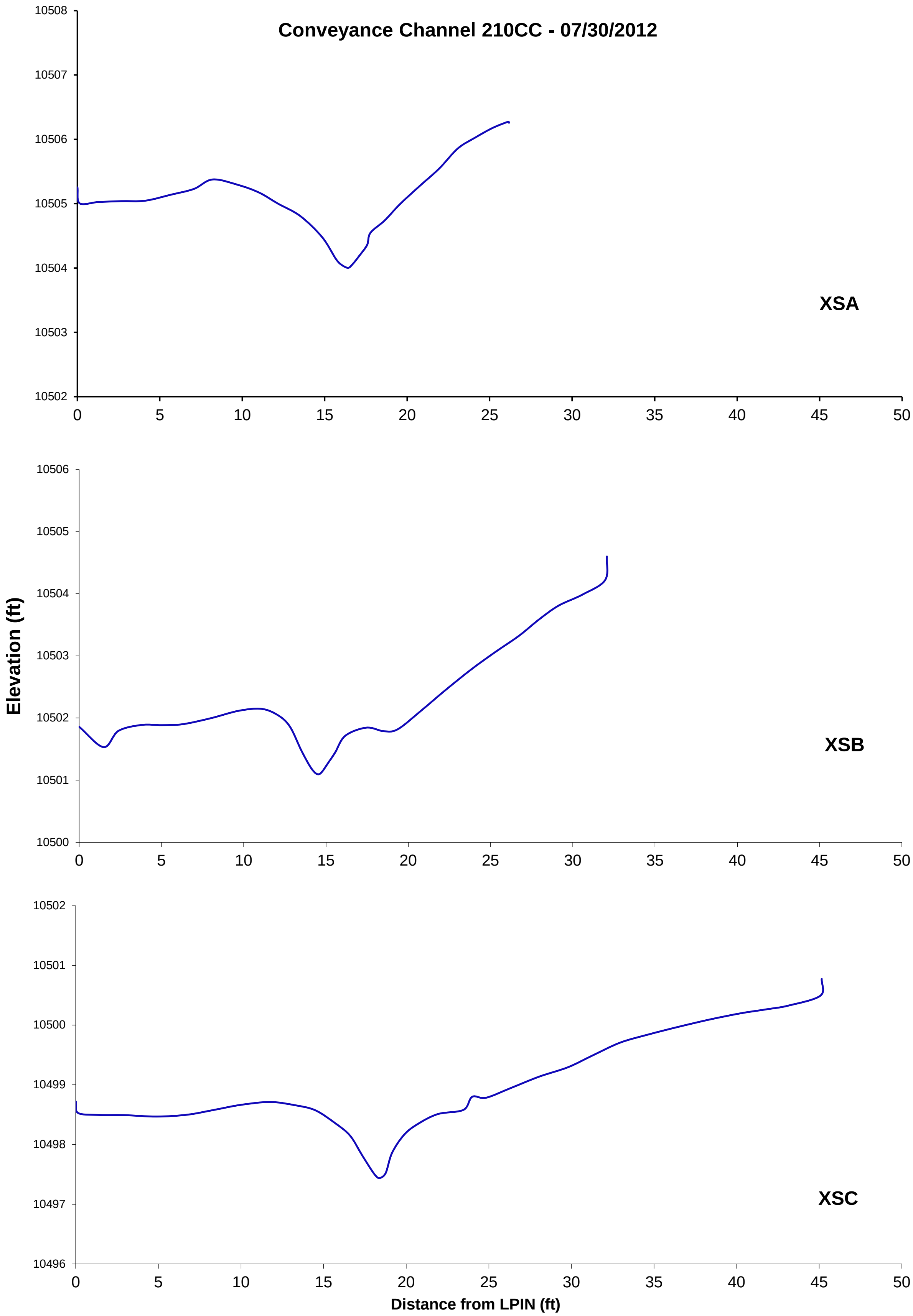


Conveyance Channel 207CC - 06/19/2012
12992
12991
12990
12989
12988
0
10
20
30
40
50
60
XSA
Elevation (ft)
12985
12984
12983
12982
12981
XSB
12980
12979
12978
12977
12976
XSC
Distance from LPIN (ft)

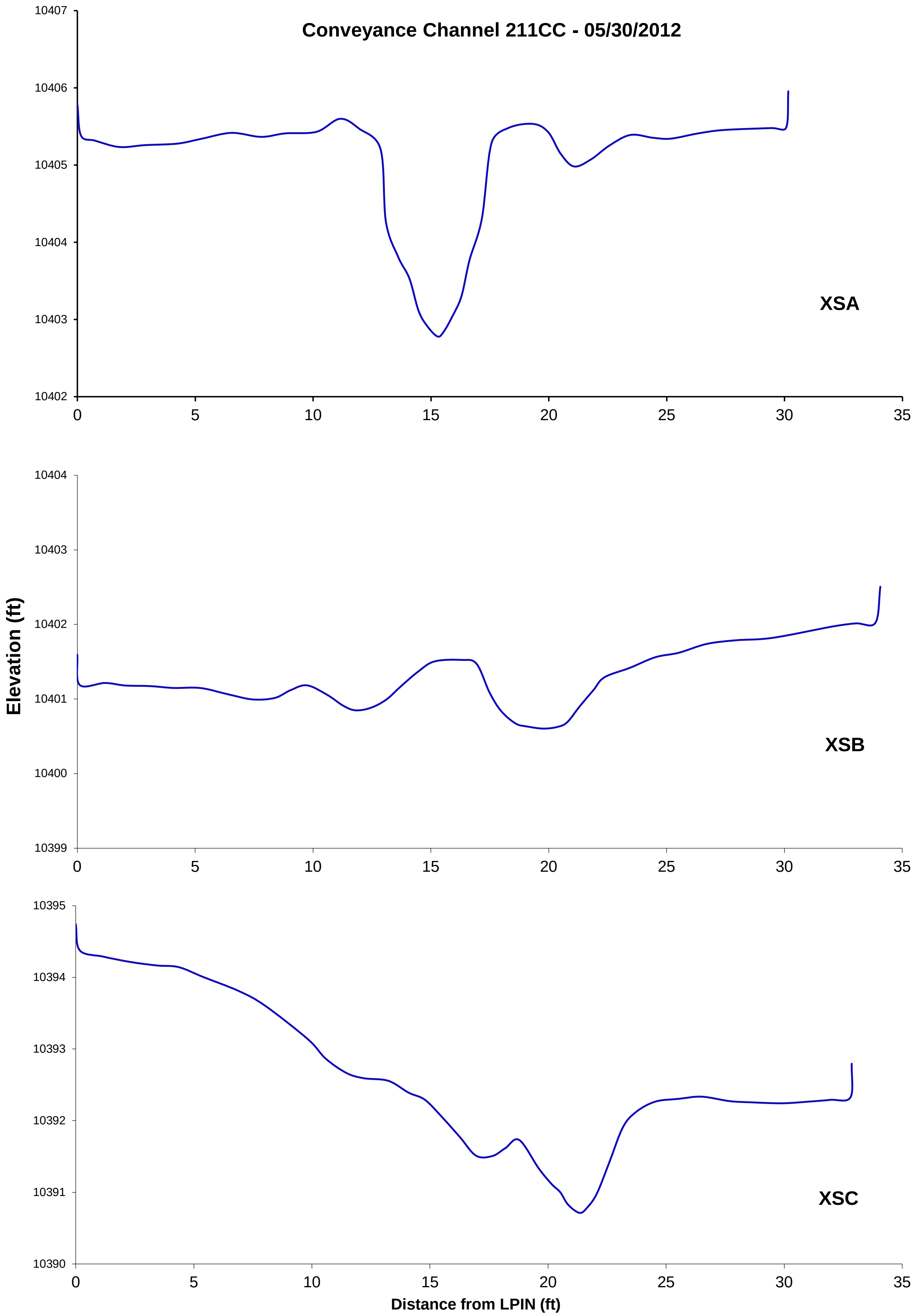


Conveyance Channel 208CC - 08/13/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

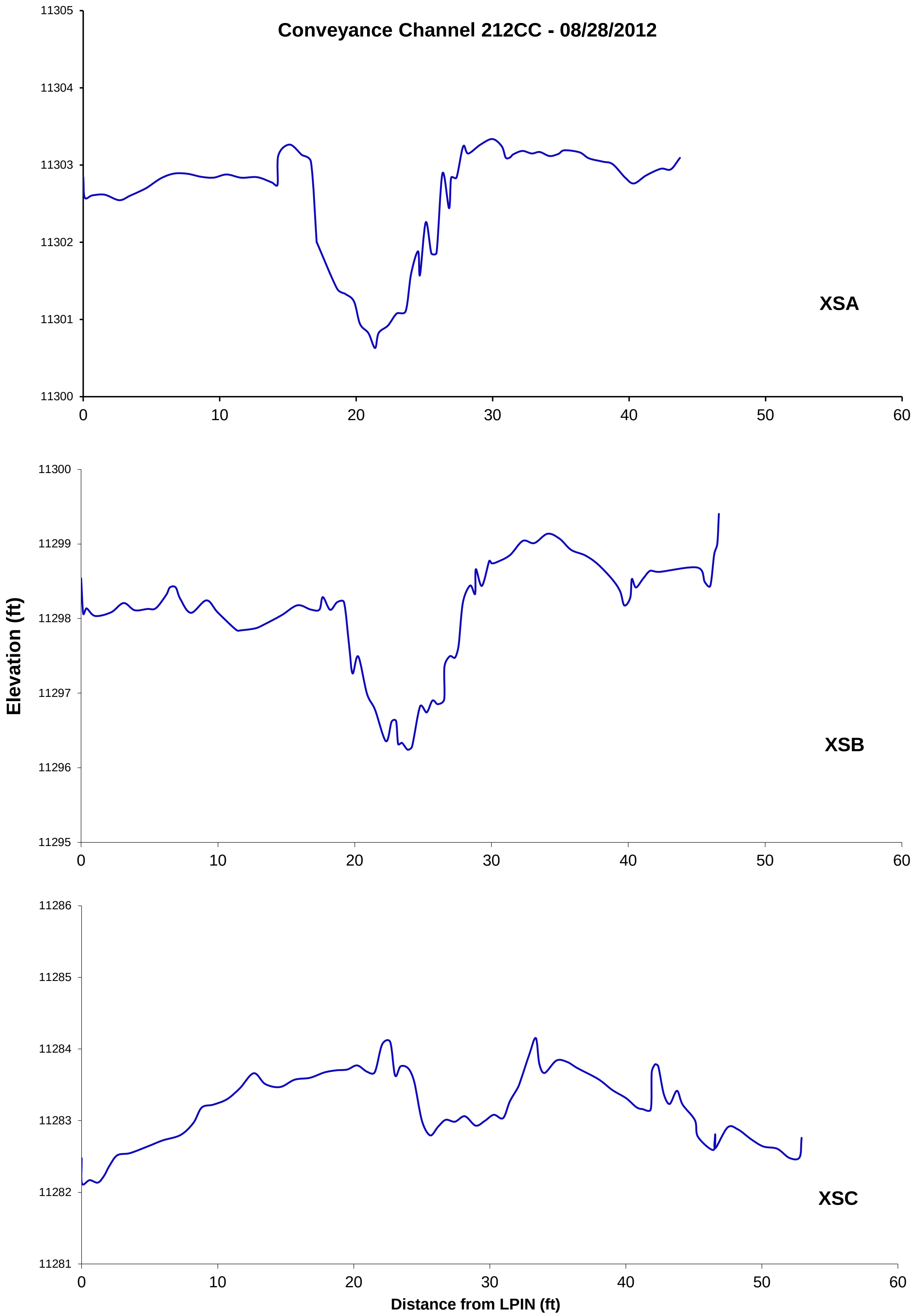

Conveyance Channel 209CC - 08/15/2012
Elevation (ft)
XSA
11304
11302
11300
11298
11296
0
10
20
30
40
50
60
XSB
11299
11297
11295
11293
11291
0
10
20
30
40
50
60
XSC
11292
11290
11288
11286
11284
0
10
20
30
40
50
60
Distance from LPIN (ft)

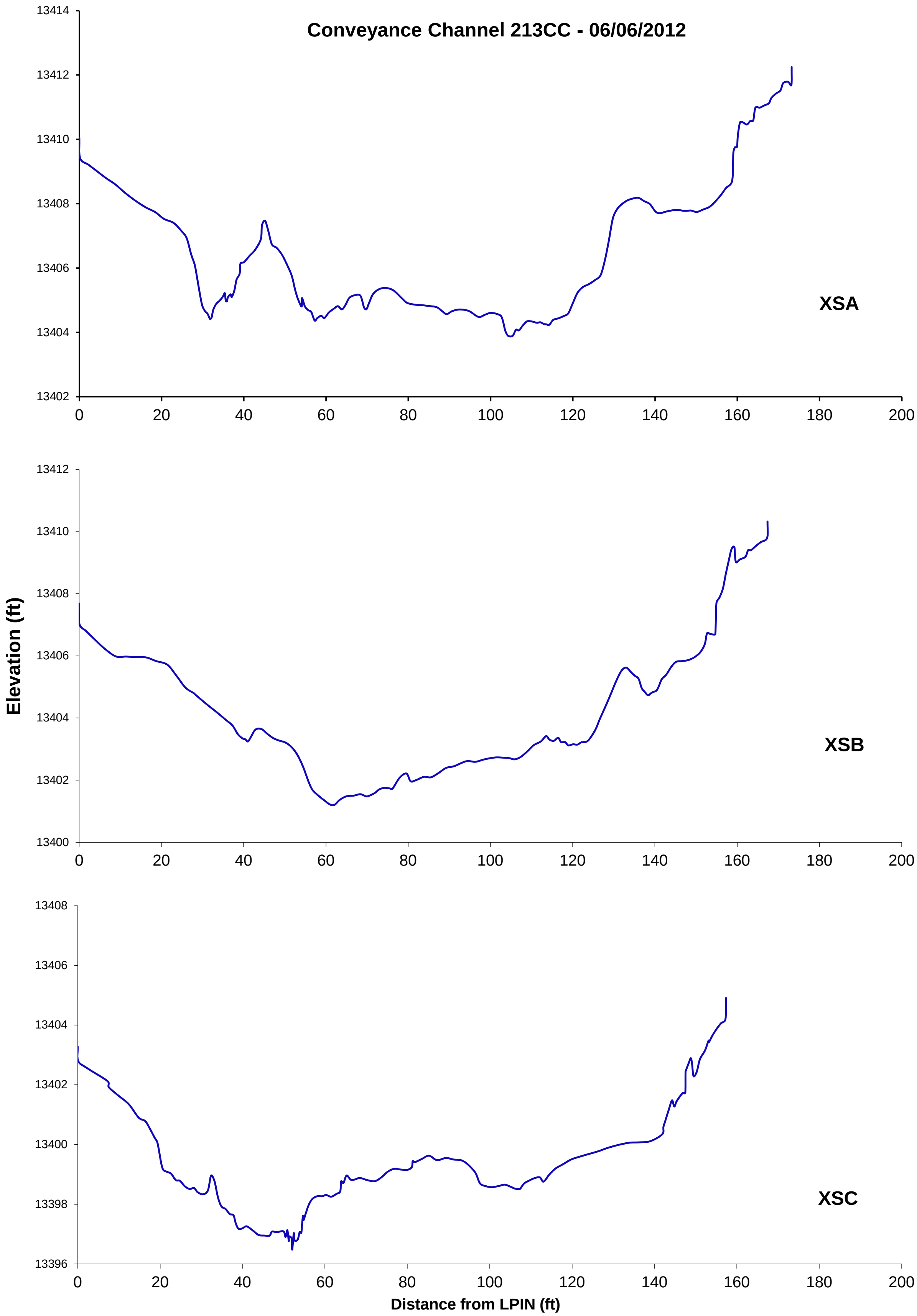


Conveyance Channel 210CC - 07/30/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10508
10507
10506
10505
10504
10503
10502
10501
10500
10499
10498
10497
10496
0
5
10
15
20
25
30
35
40
45
50

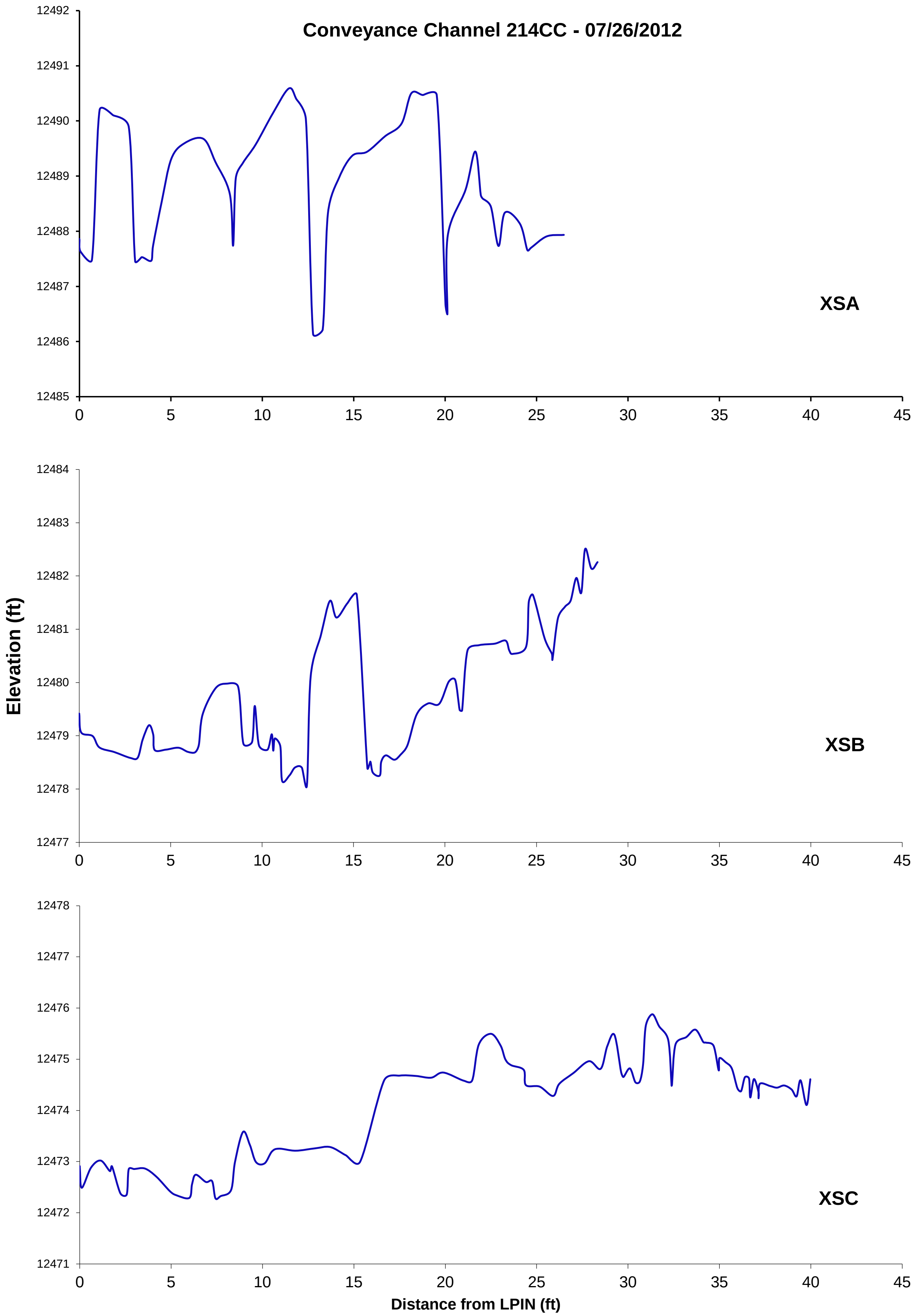


Conveyance Channel 211CC - 05/30/2012
10407
10406
10405
10404
10403
10402
0
5
10
15
20
25
30
35
XSA
Elevation (ft)
10404
10403
10402
10401
10400
10399
XSB
10395
10394
10393
10392
10391
10390
XSC
Distance from LPIN (ft)

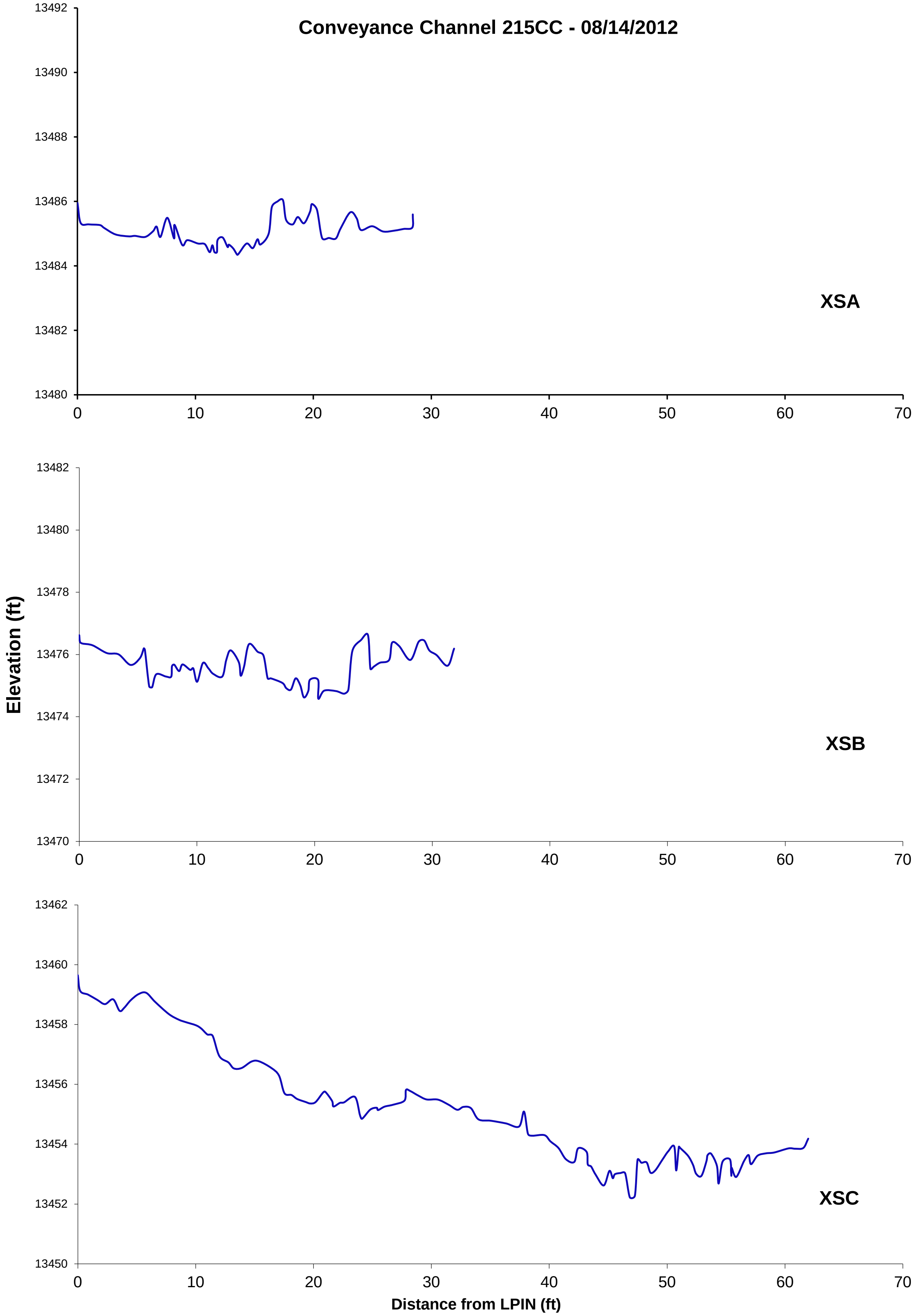

Conveyance Channel 212CC - 08/28/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
11305
11304
11303
11302
11301
11300
11299
11298
11297
11296
11295
11286
11285
11284
11283
11282
11281
0
10
20
30
40
50
60



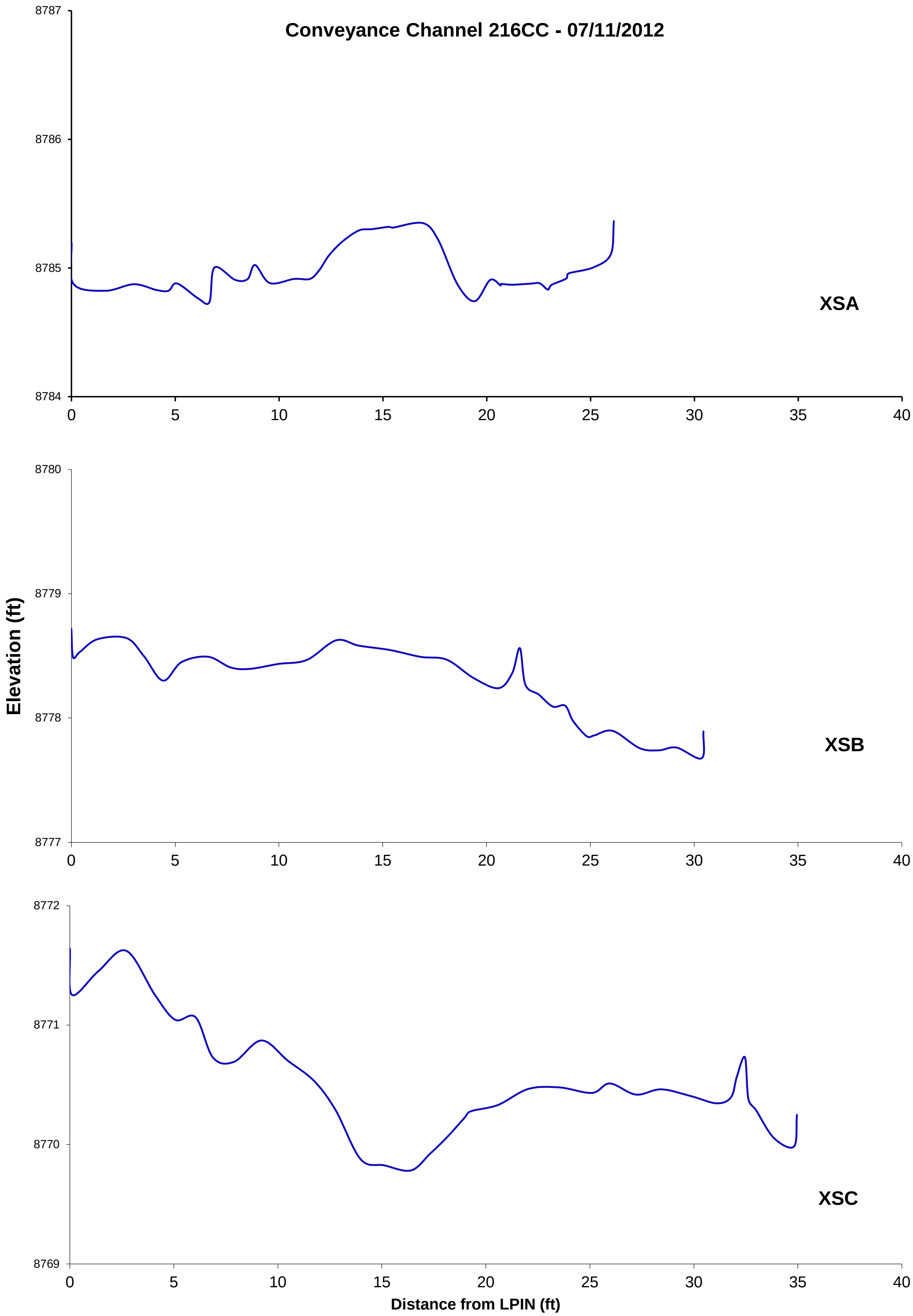
Conveyance Channel 213CC - 06/06/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
13414
13412
13410
13408
13406
13404
13402
13400
13398
13396
0
20
40
60
80
100
120
140
160
180
200



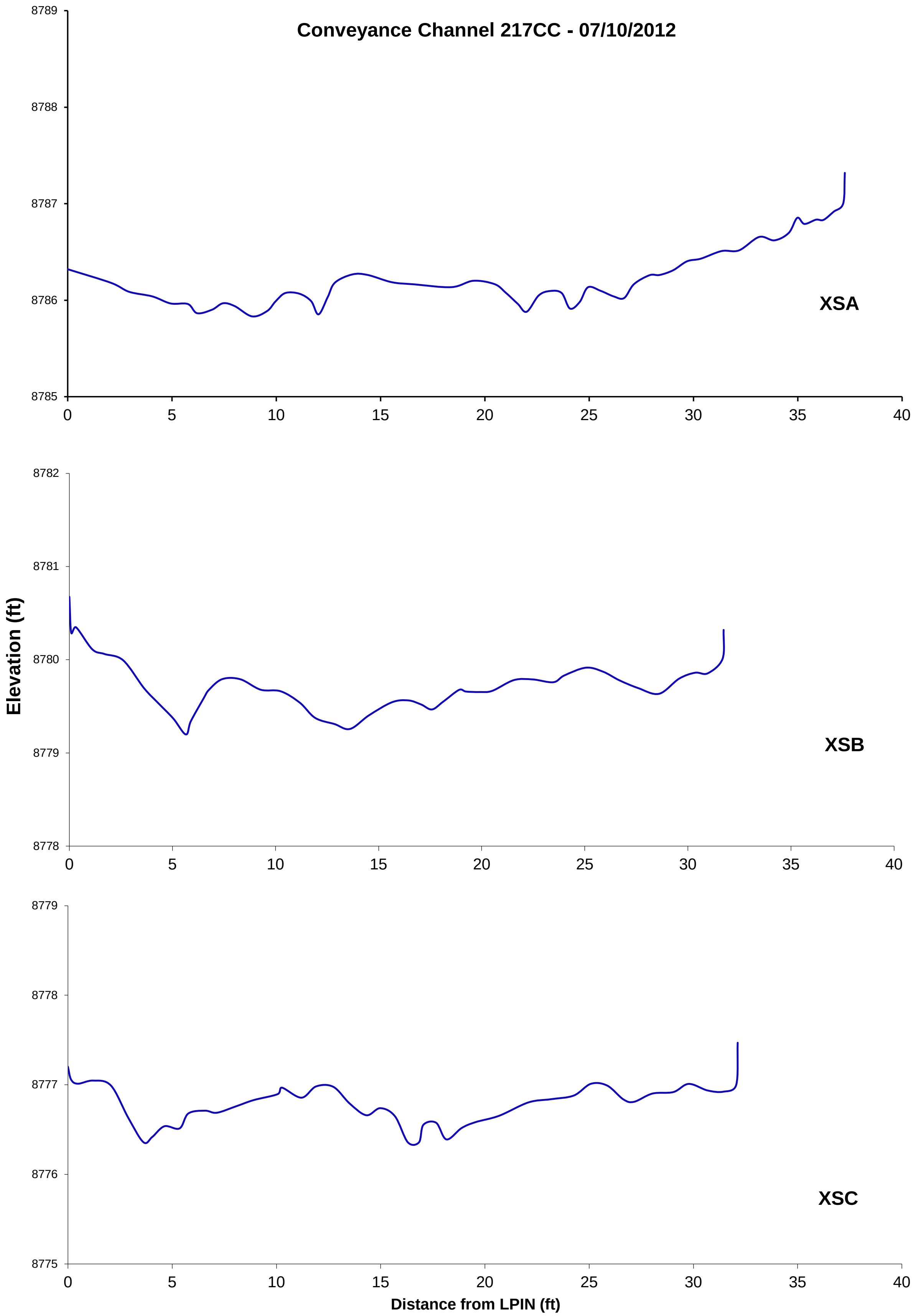
Conveyance Channel 214CC - 07/26/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)

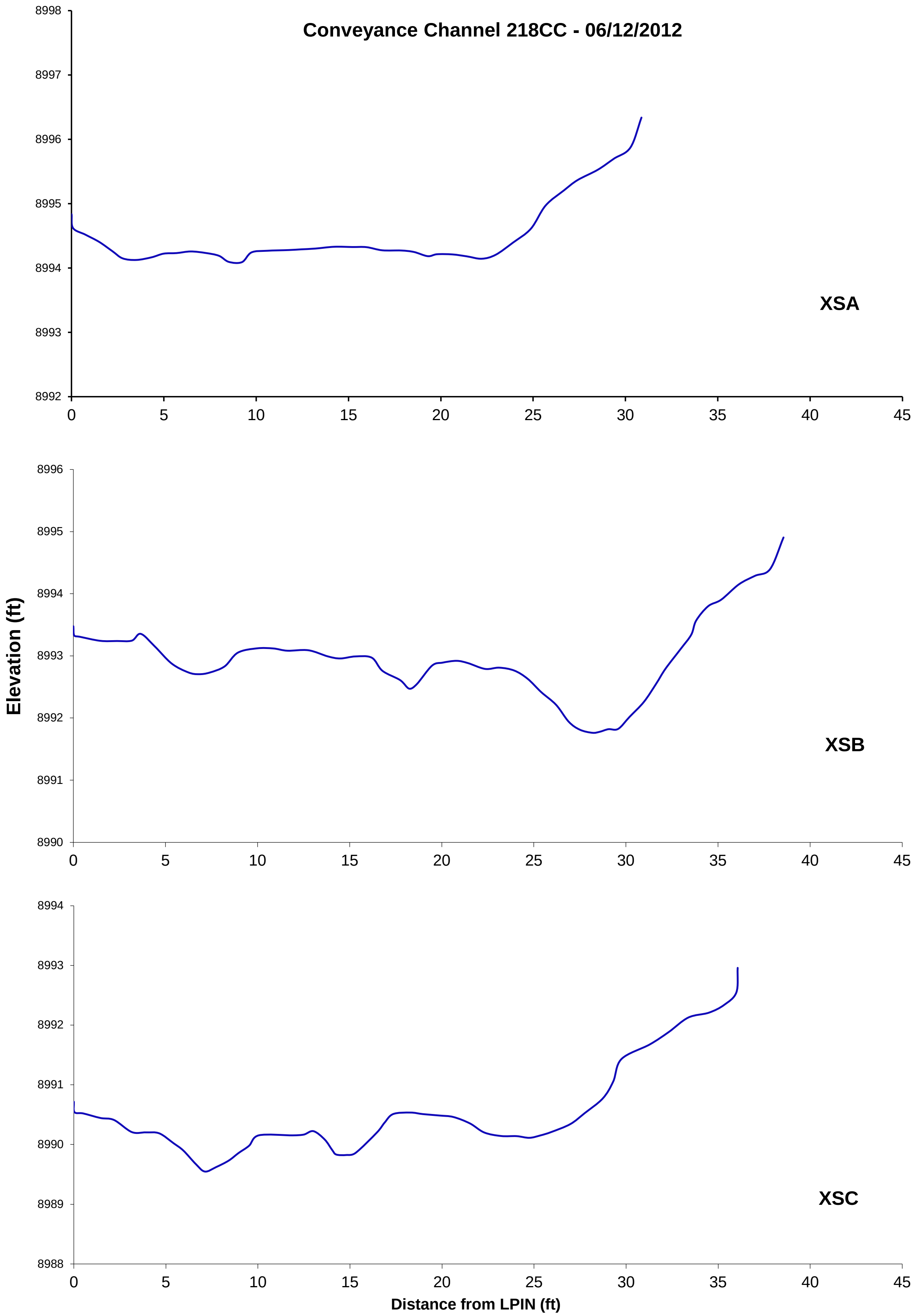


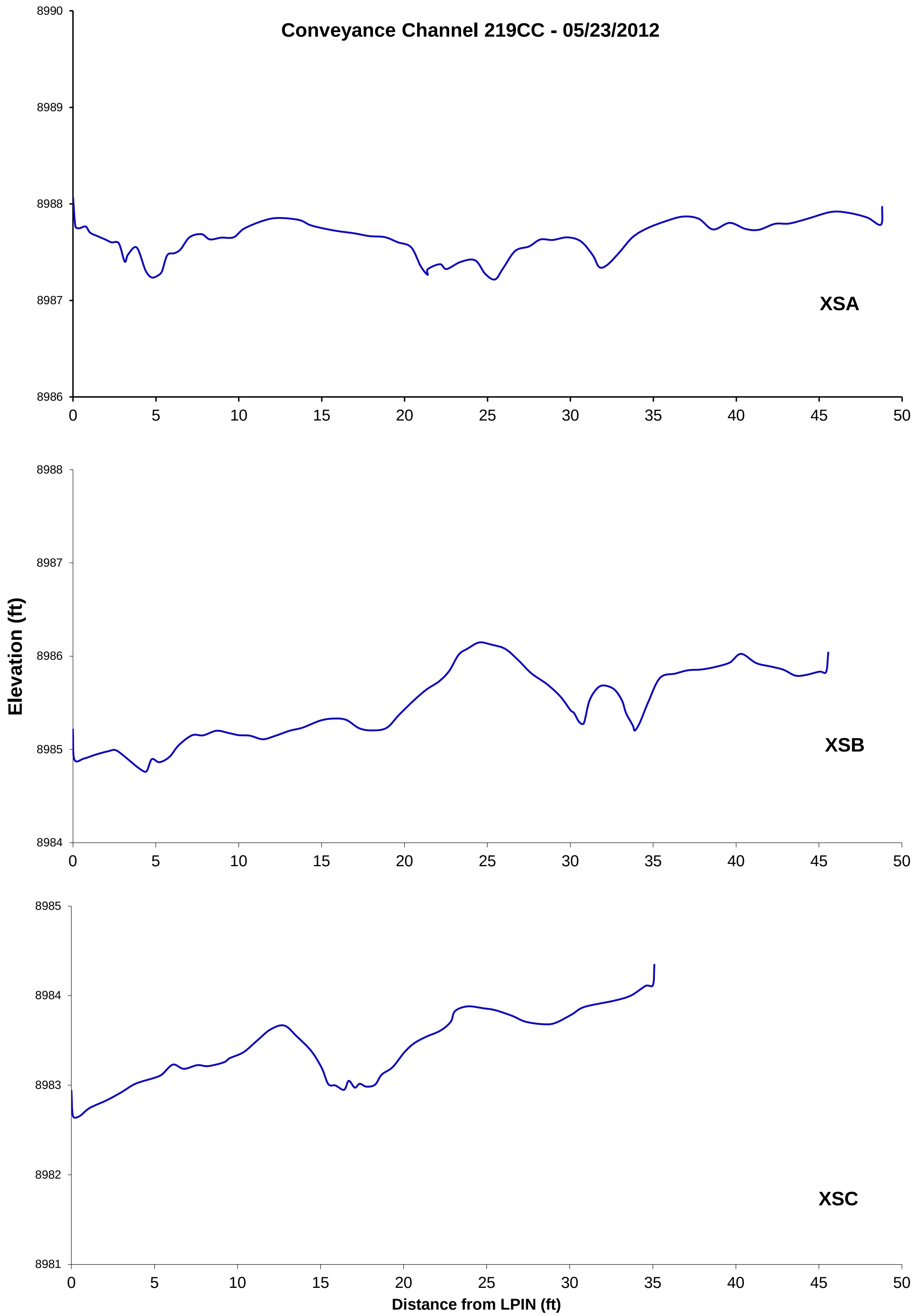
Conveyance Channel 215CC - 08/14/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)

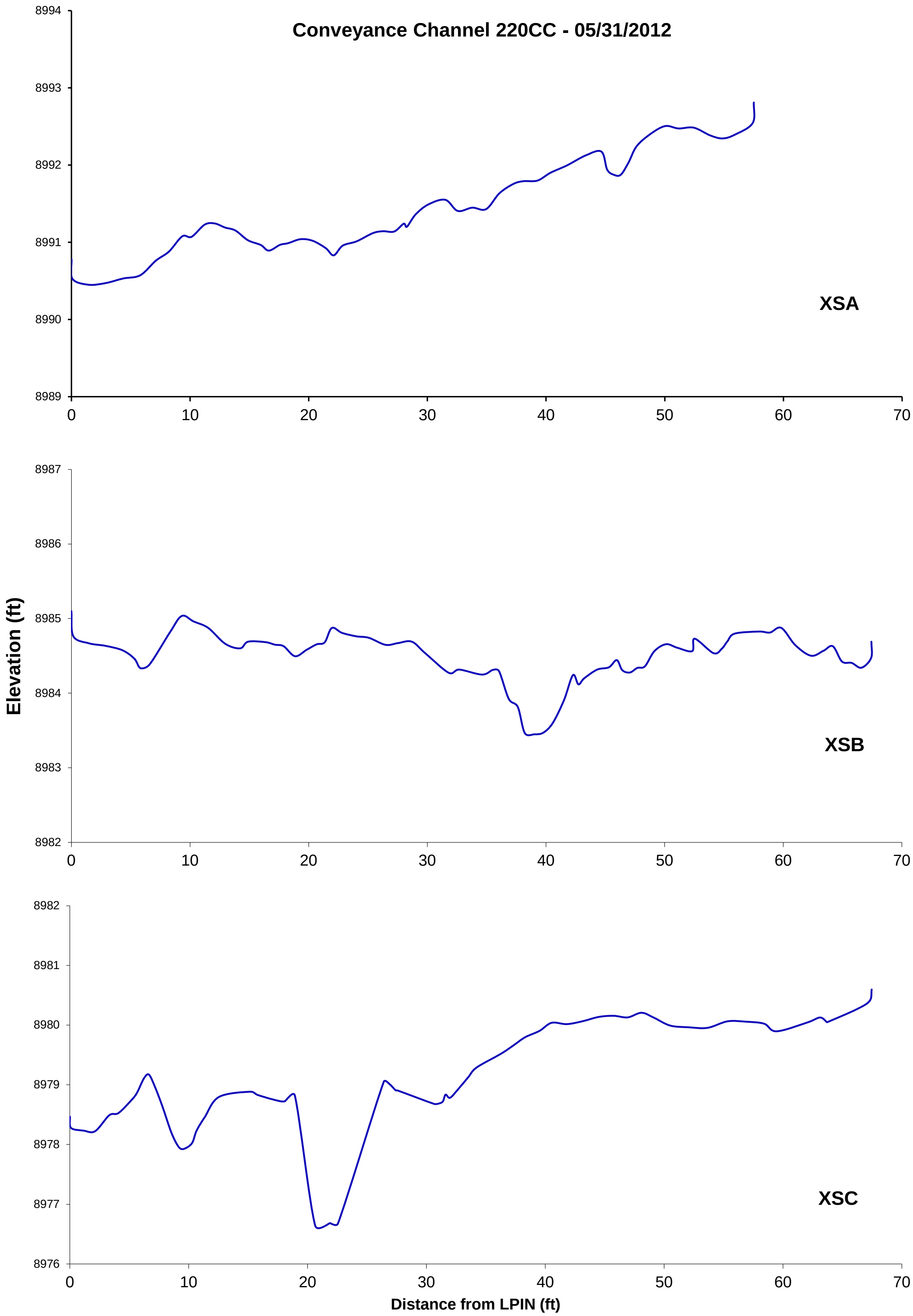


Conveyance Channel 216CC - 07/11/2012
8787
8786
8785
8784
XSA
0
5
10
15
20
25
30
35
40
8780
8779
8778
8777
XSB
Elevation (ft)
8772
8771
8770
8769
XSC
Distance from LPIN (ft)

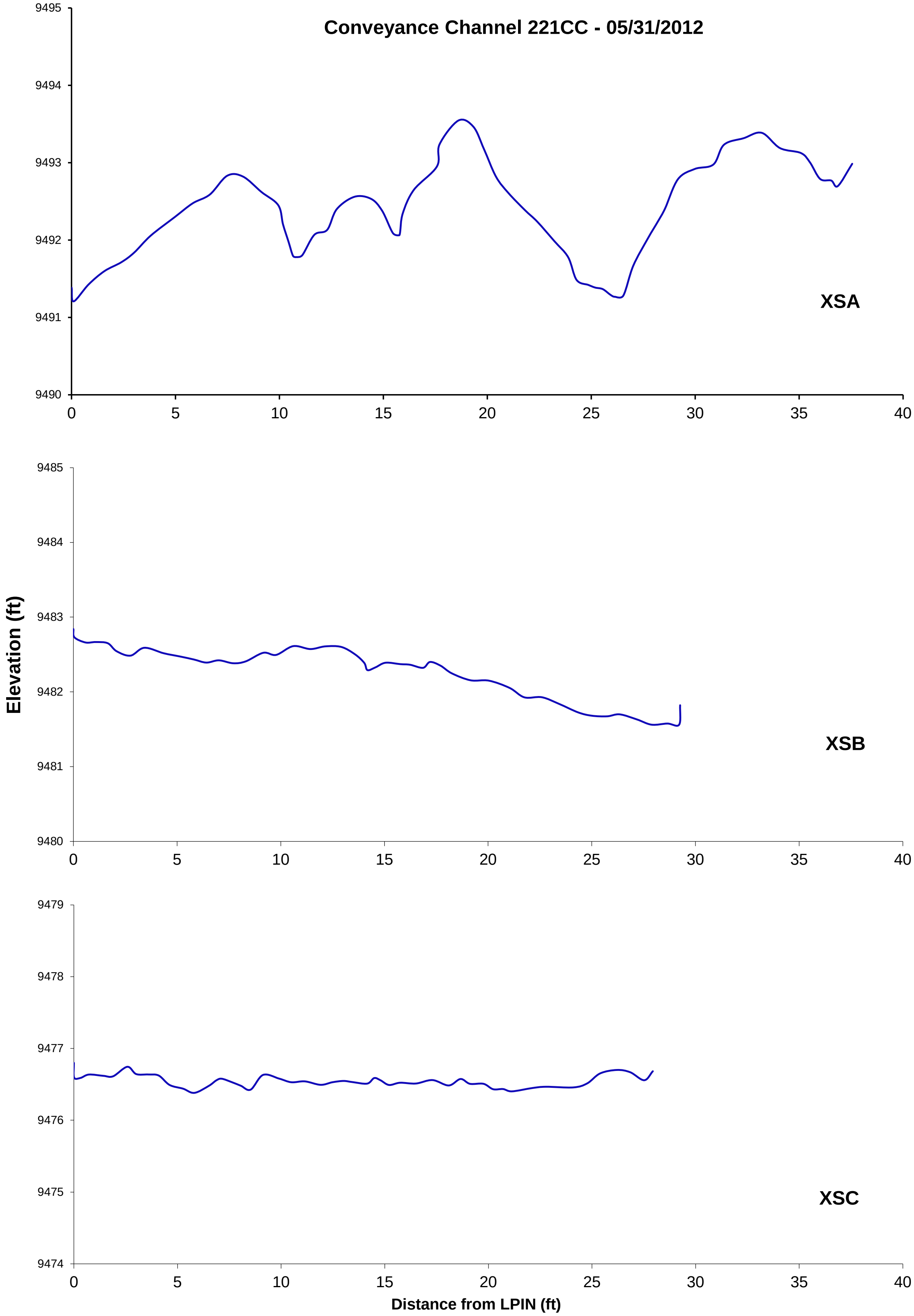

Conveyance Channel 217CC - 07/10/2012
Elevation (ft)
XSA
8789
8788
8787
8786
8785
0
5
10
15
20
25
30
35
40
XSB
8782
8781
8780
8779
8778
0
5
10
15
20
25
30
35
40
XSC
8779
8778
8777
8776
8775
0
5
10
15
20
25
30
35
40
Distance from LPIN (ft)


Conveyance Channel 218CC - 06/12/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
8998
8997
8996
8995
8994
8993
8992
8991
8990
8989
8988
0
5
10
15
20
25
30
35
40
45

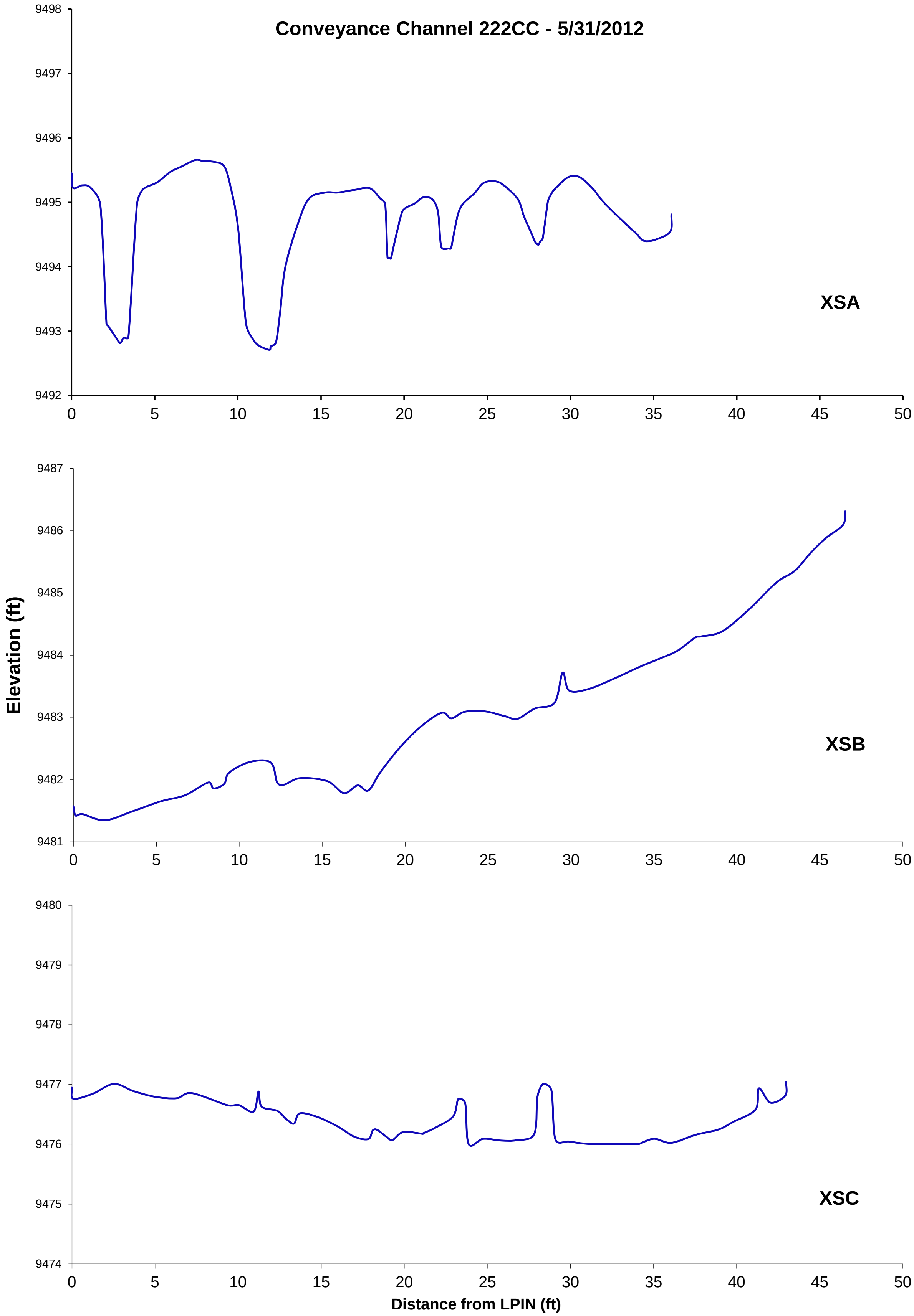

Conveyance Channel 219CC - 05/23/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
8990
8989
8988
8987
8986
8985
8984
8983
8982
8981
0
5
10
15
20
25
30
35
40
45
50



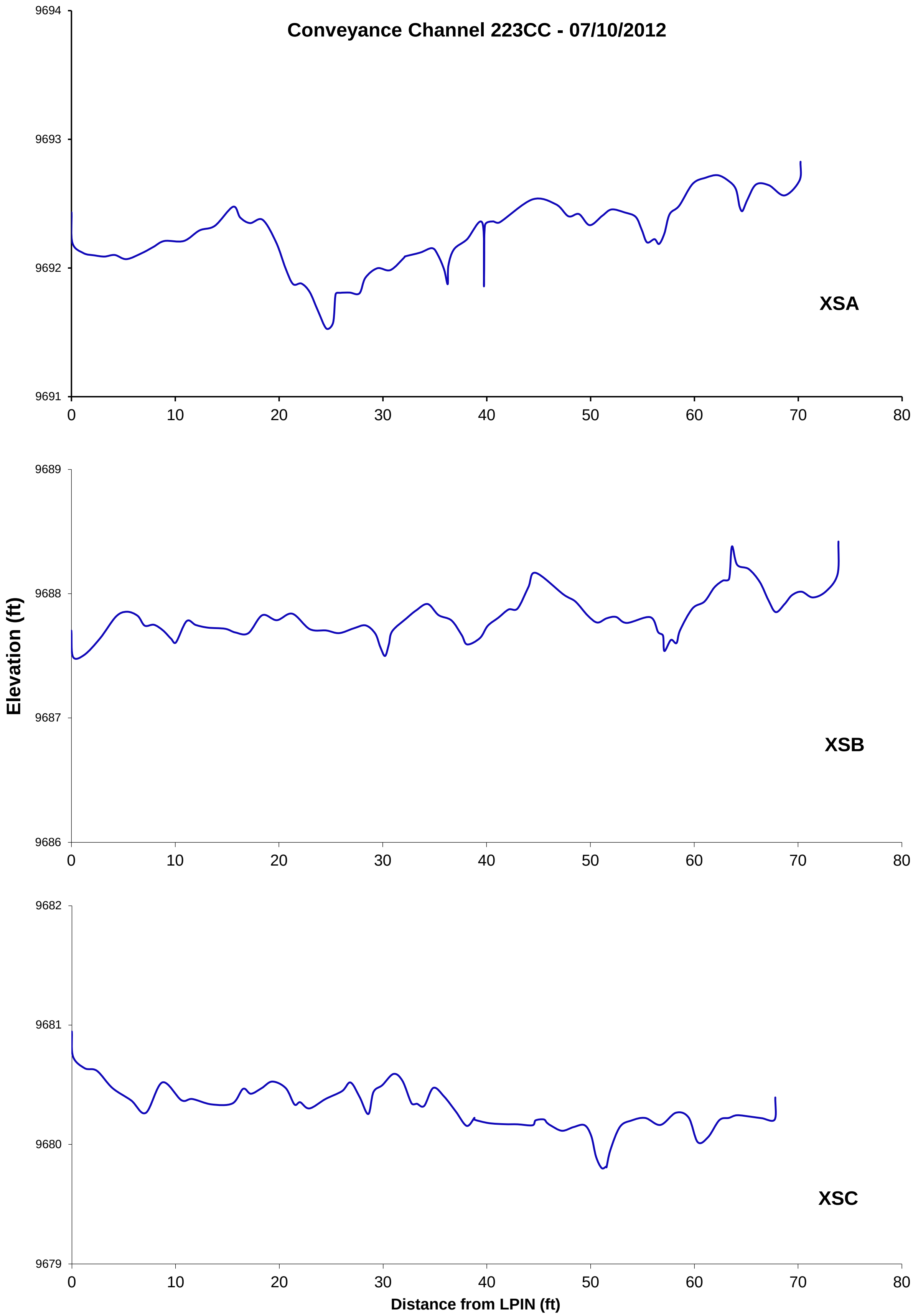
Conveyance Channel 220CC - 05/31/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)

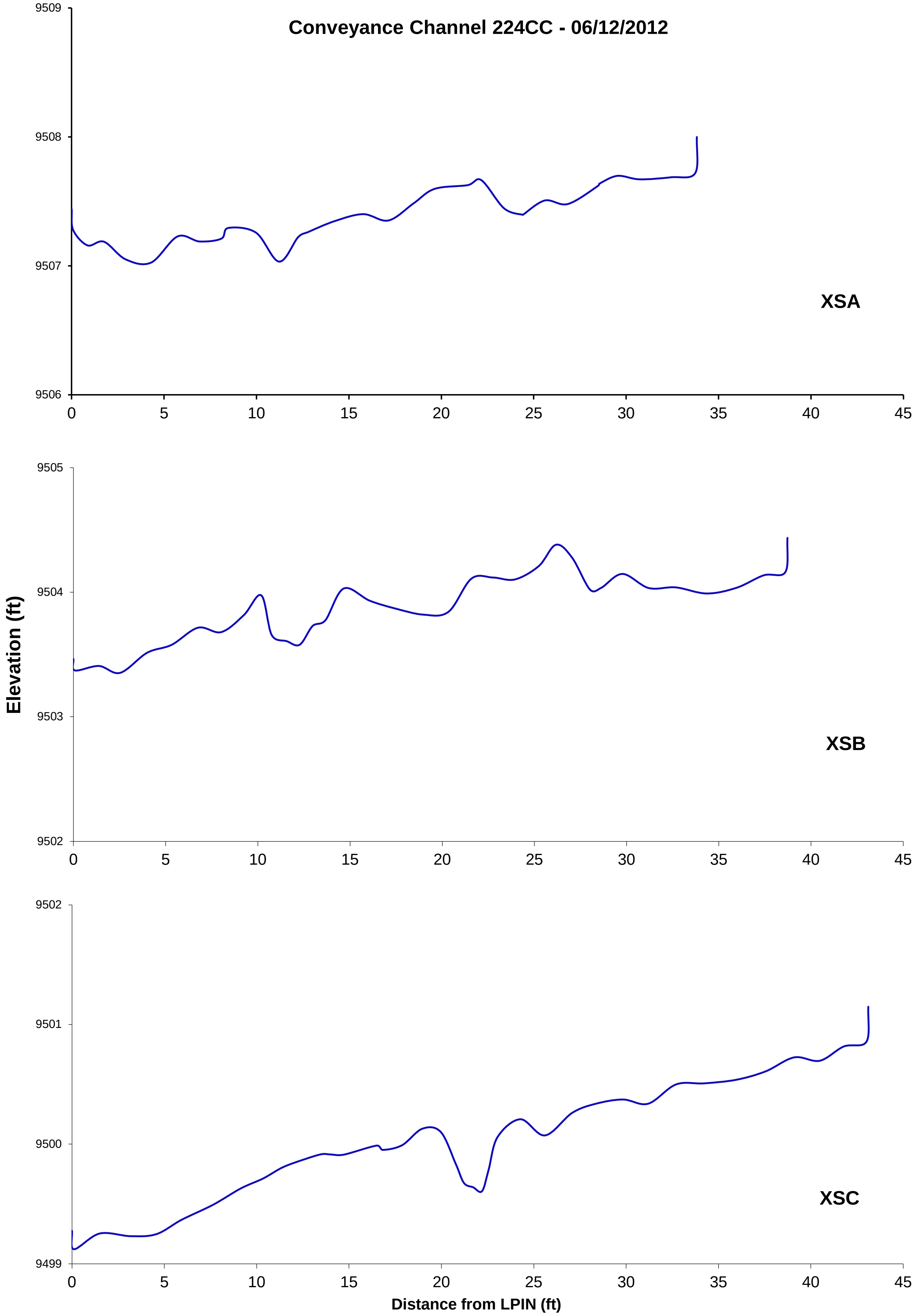


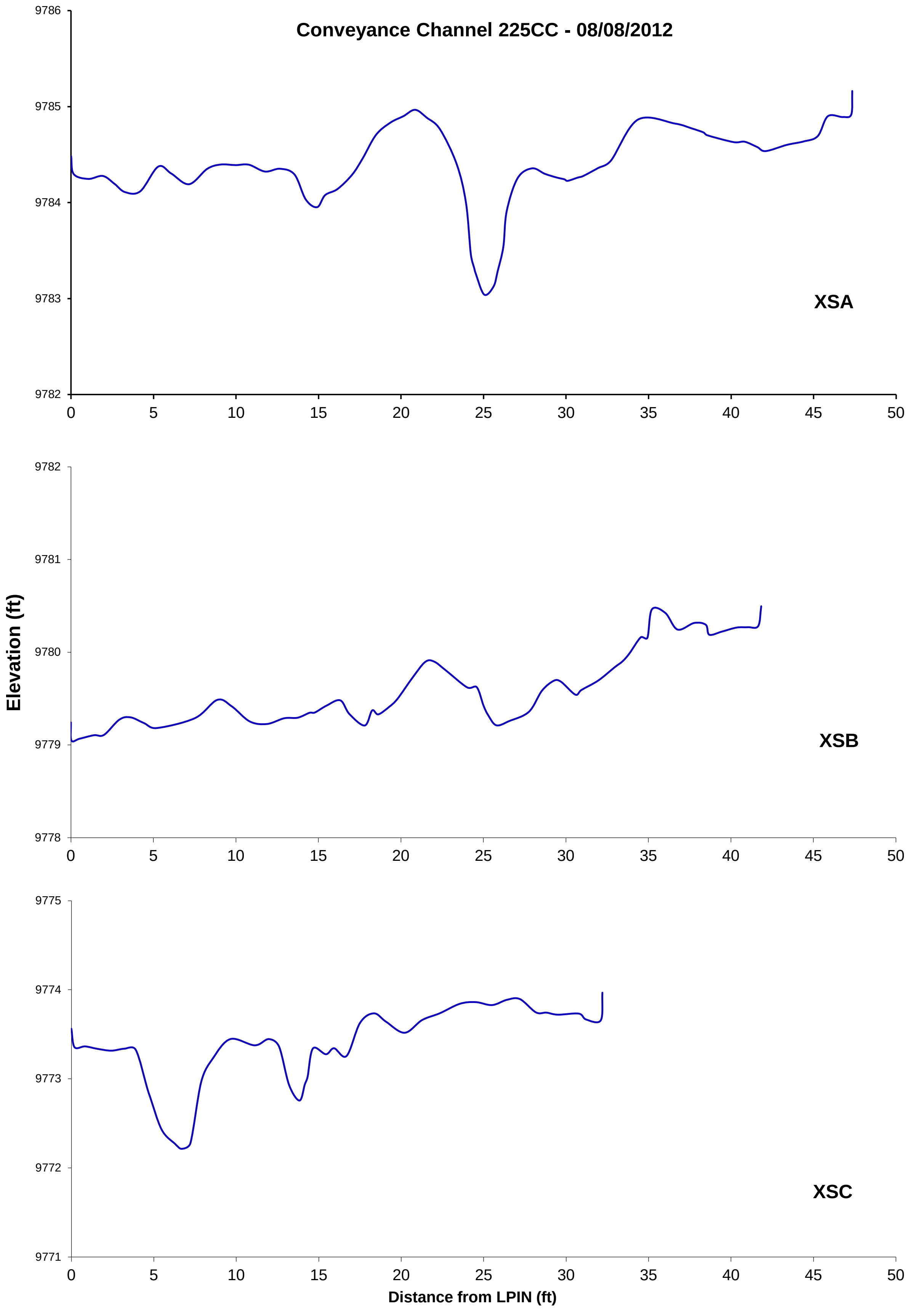
Conveyance Channel 221CC - 05/31/2012
Elevation (ft)
9495
9494
9493
9492
9491
9490
XSA
9485
9484
9483
9482
9481
9480
XSB
9479
9478
9477
9476
9475
9474
XSC
0
5
10
15
20
25
30
35
40
Distance from LPIN (ft)

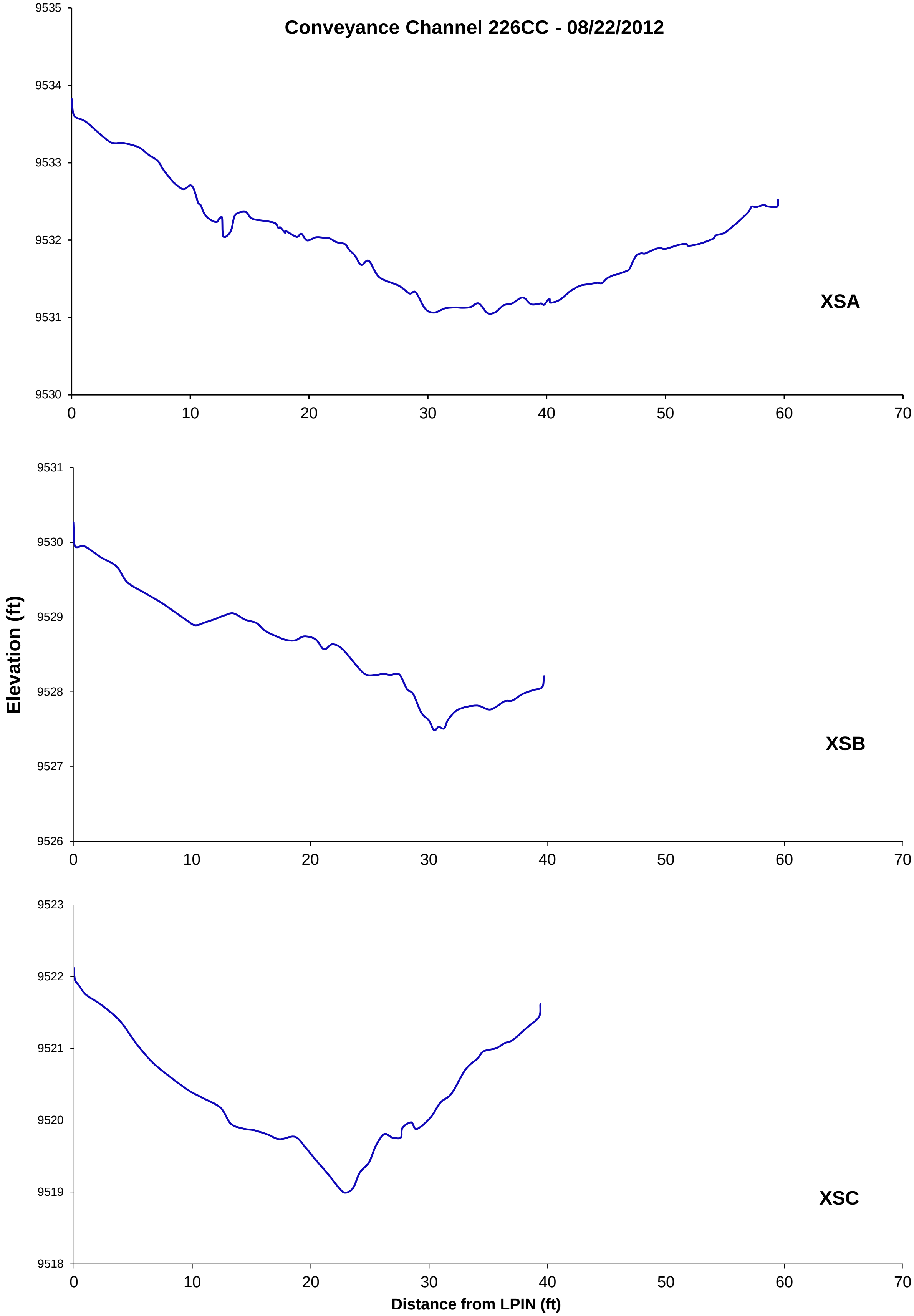


Conveyance Channel 222CC - 5/31/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9498
9497
9496
9495
9494
9493
9492
9487
9486
9485
9484
9483
9482
9481
9480
9479
9478
9477
9476
9475
9474
0
5
10
15
20
25
30
35
40
45
50

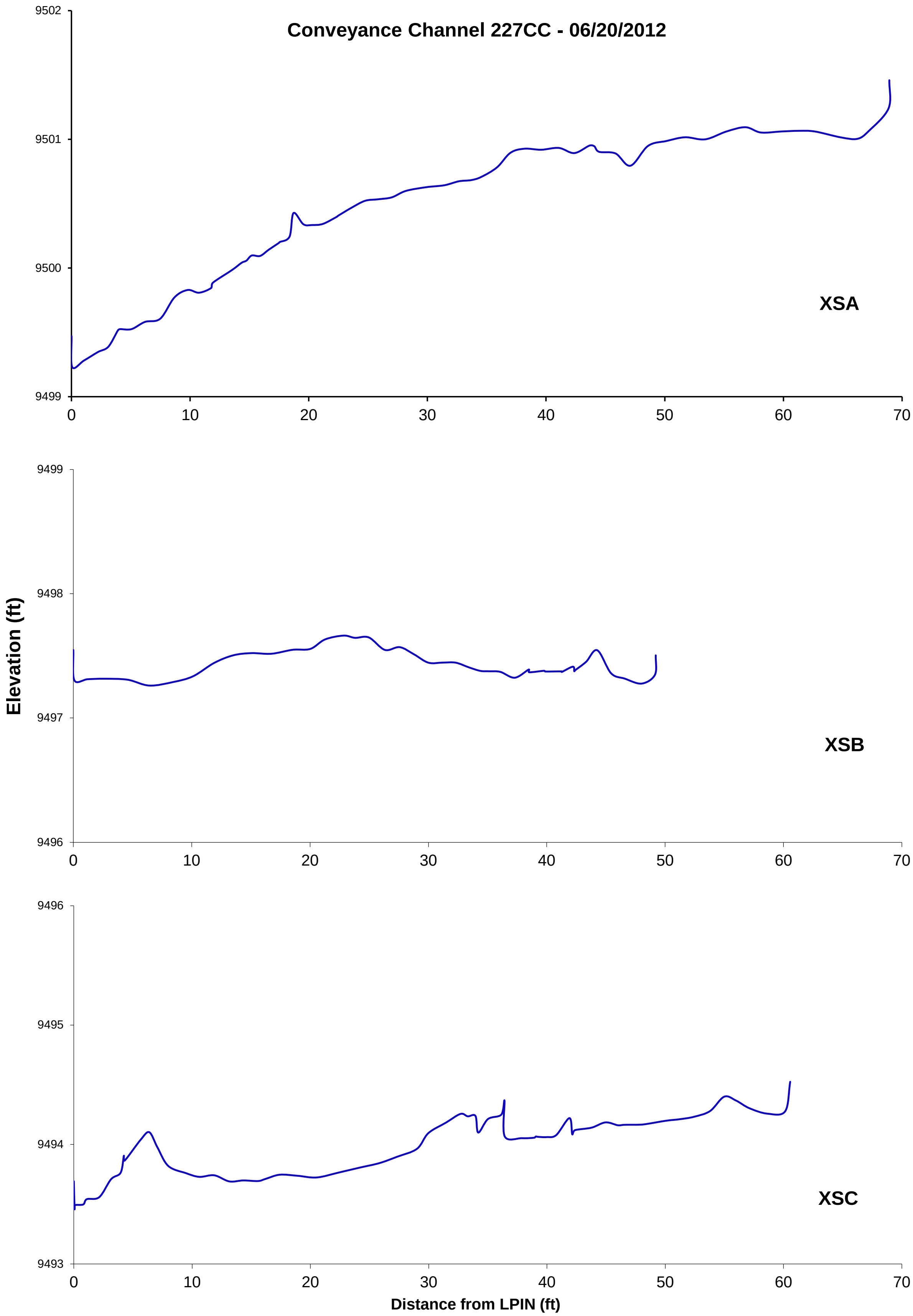

Conveyance Channel 223CC - 07/10/2012
9694
9693
9692
9691
XSA
9689
9688
9687
9686
XSB
9682
9681
9680
9679
XSC
0
10
20
30
40
50
60
70
80
Elevation (ft)
Distance from LPIN (ft)

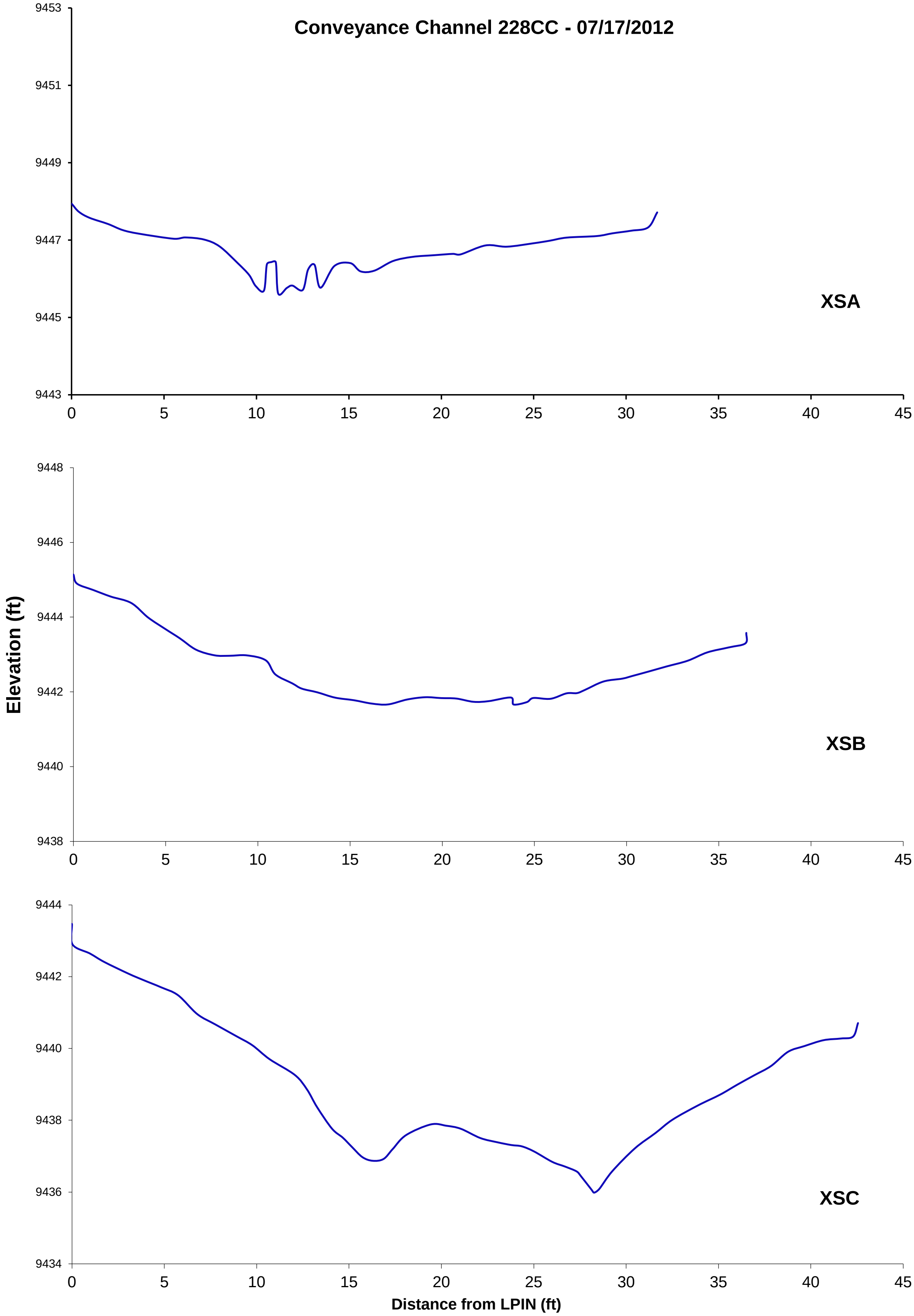

Conveyance Channel 224CC - 06/12/2012
9509
9508
9507
9506
XSA
0
5
10
15
20
25
30
35
40
45
9505
9504
9503
9502
XSB
Elevation (ft)
9502
9501
9500
9499
XSC
Distance from LPIN (ft)

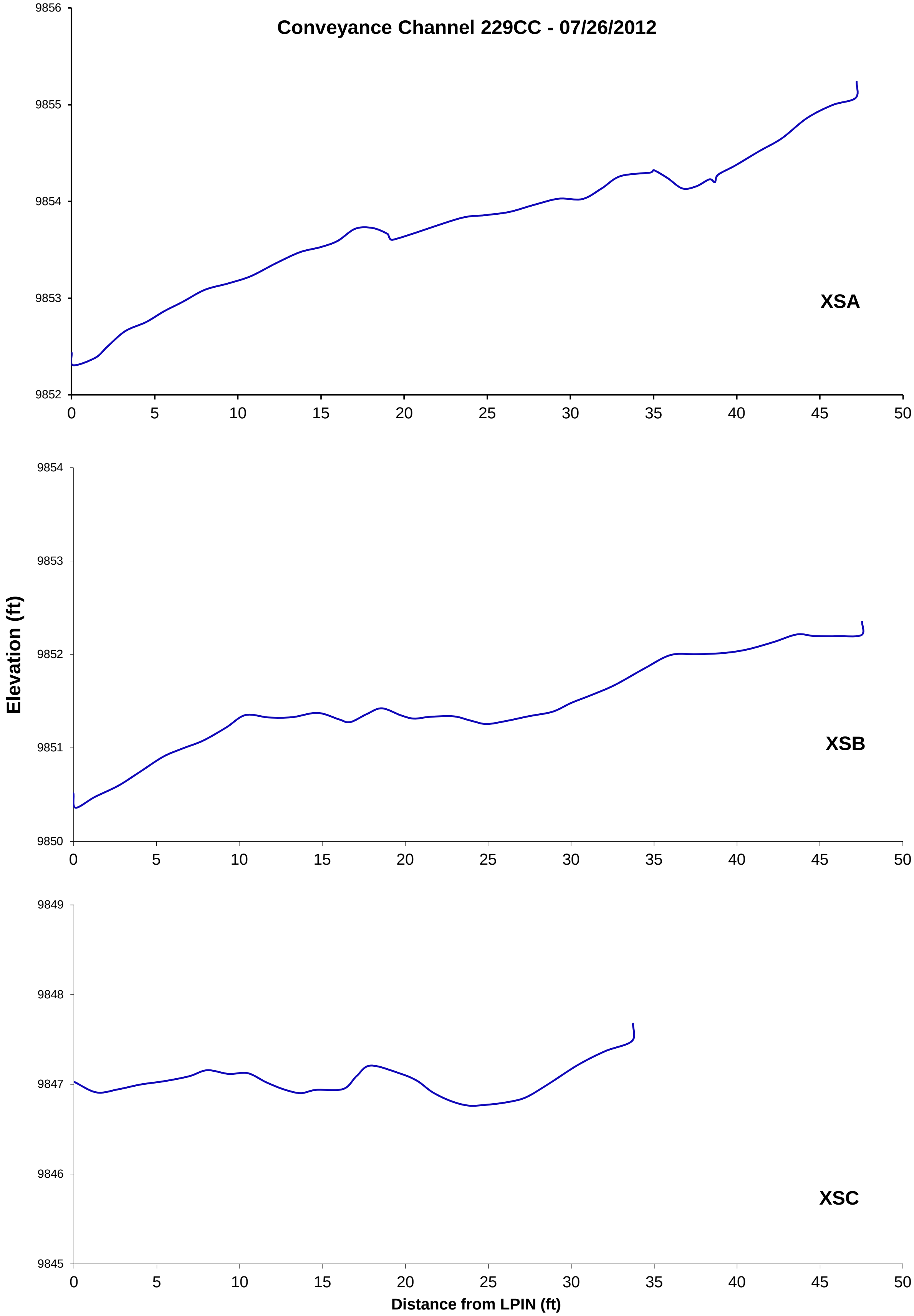

Conveyance Channel 225CC - 08/08/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9786
9785
9784
9783
9782
9781
9780
9779
9778
9775
9774
9773
9772
9771
0
5
10
15
20
25
30
35
40
45
50

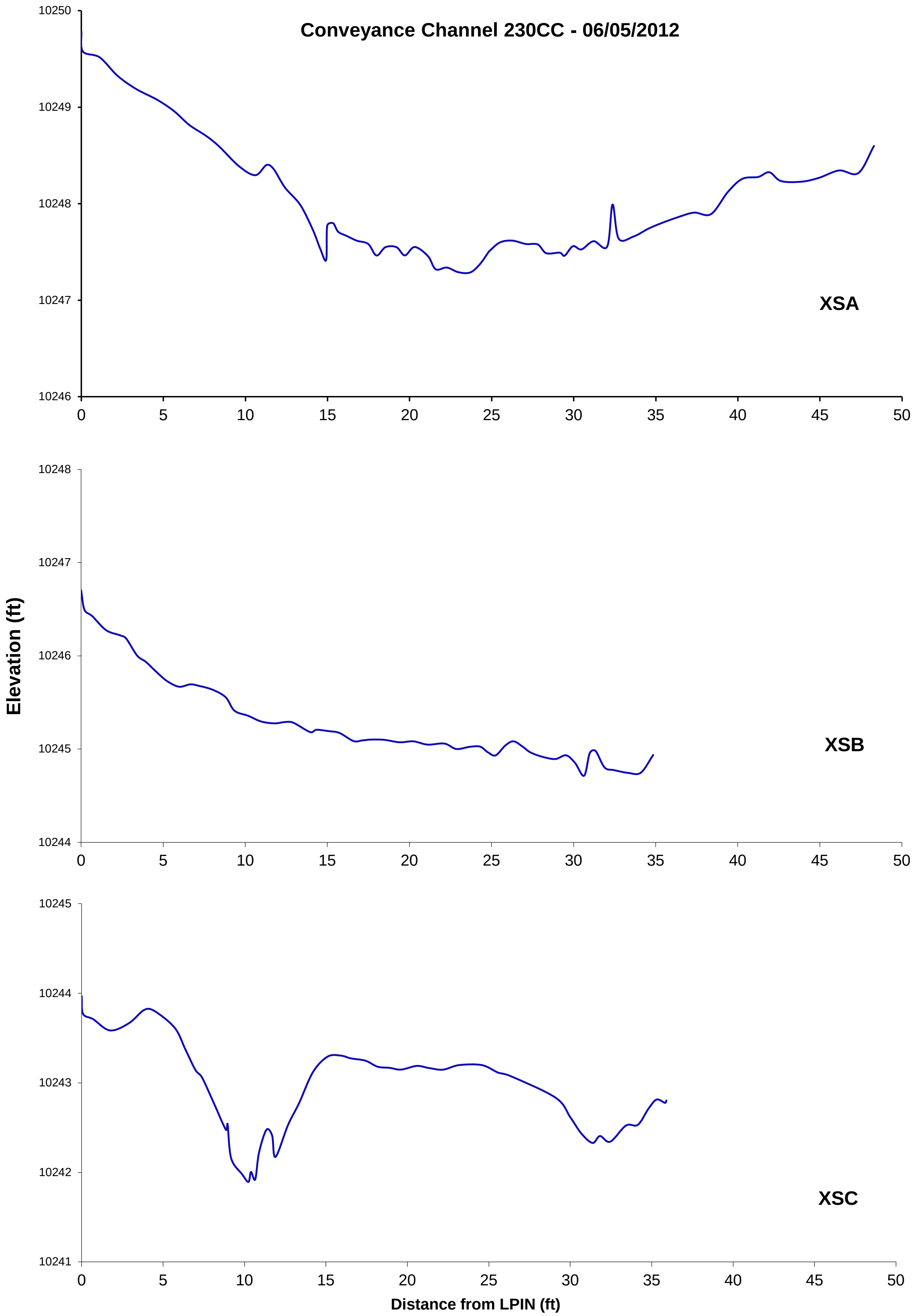


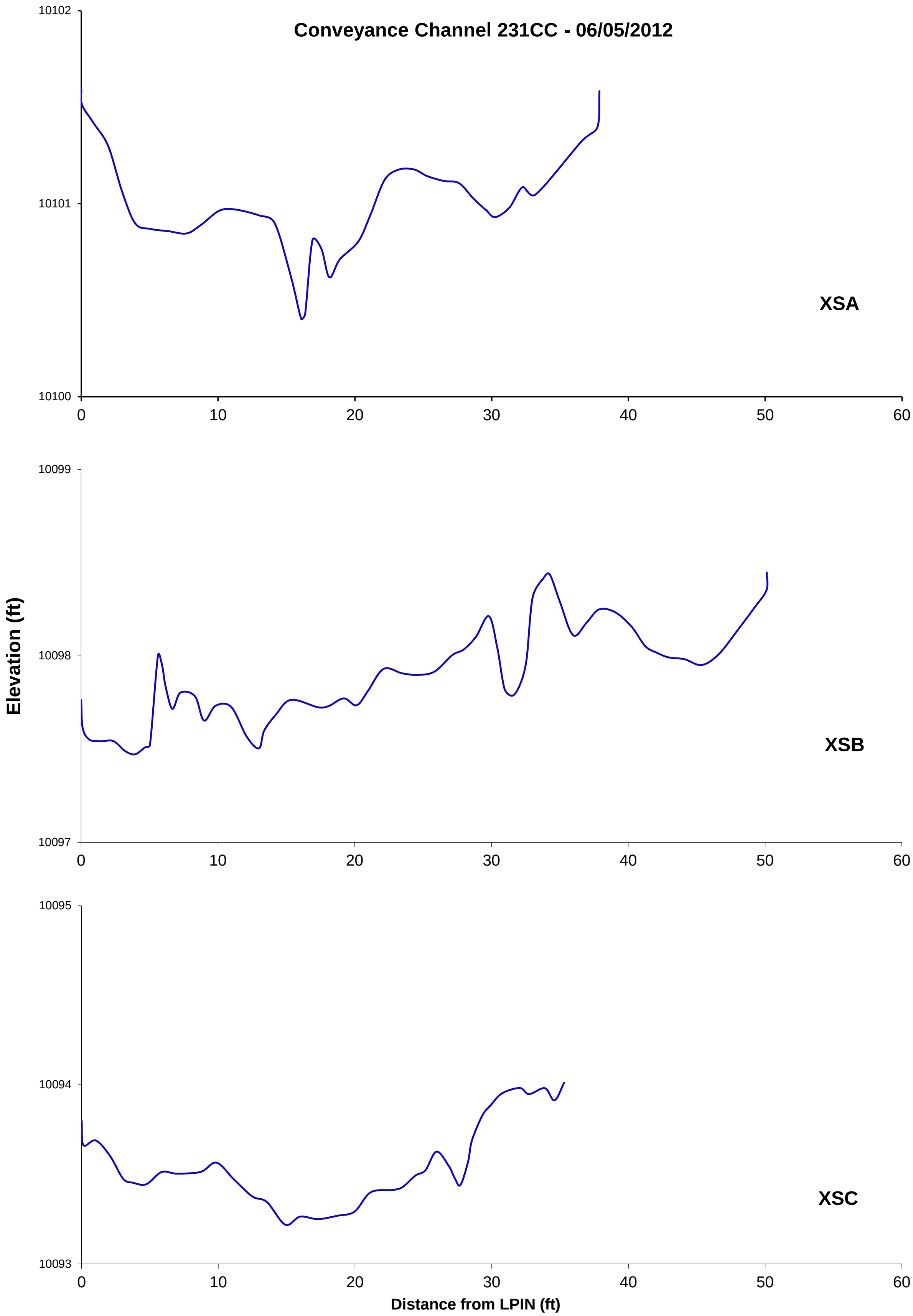
Conveyance Channel 226CC - 08/22/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
9535
9534
9533
9532
9531
9530
9529
9528
9527
9526
9523
9522
9521
9520
9519
9518
0
10
20
30
40
50
60
70


Conveyance Channel 227CC - 06/20/2012
Elevation (ft)
9502
9501
9500
9499
0
10
20
30
40
50
60
70
XSA
9499
9498
9497
9496
XSB
9496
9495
9494
9493
XSC
Distance from LPIN (ft)

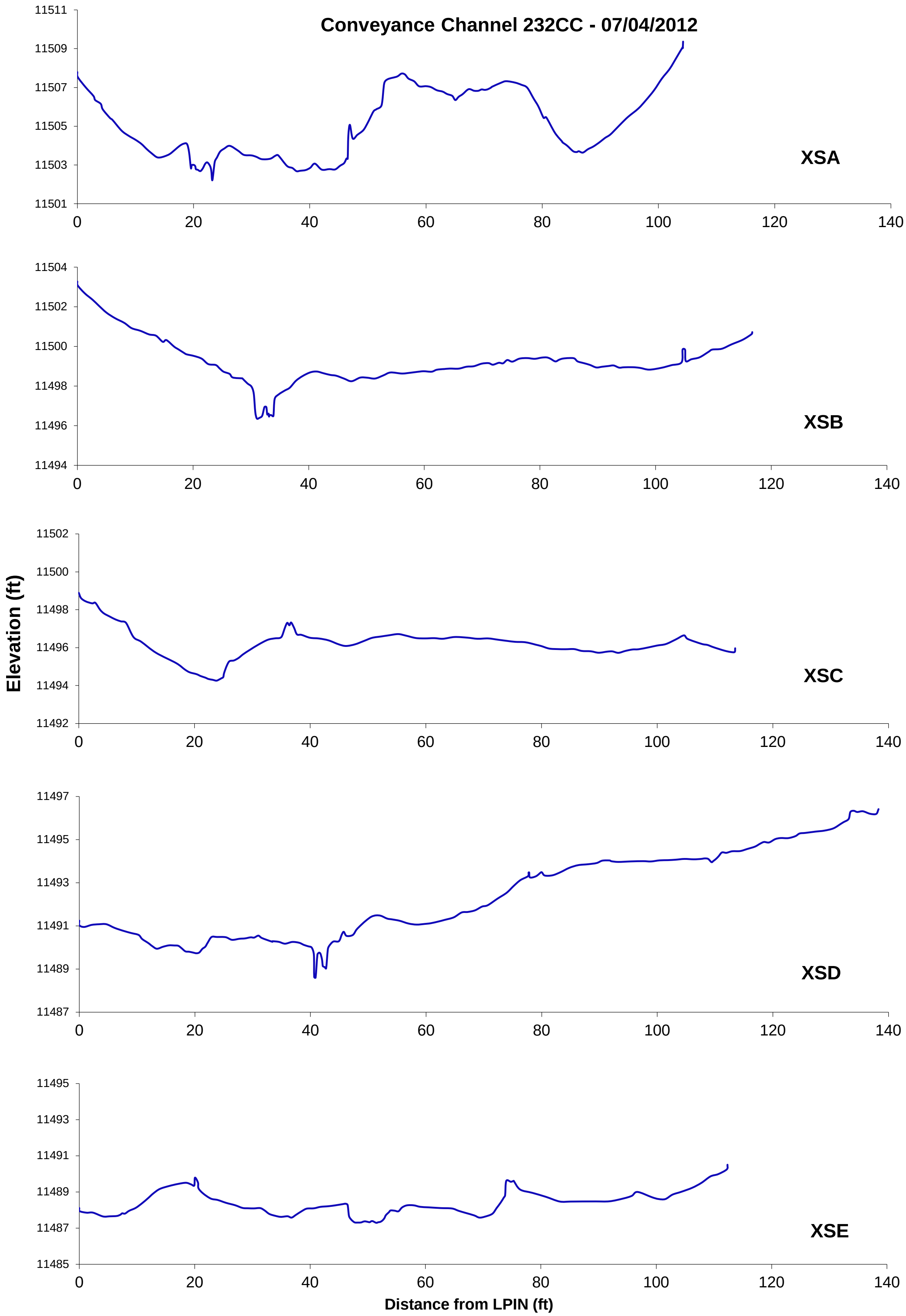

Conveyance Channel 228CC - 07/17/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
9453
9451
9449
9447
9445
9443
9448
9446
9444
9442
9440
9438
9444
9442
9440
9438
9436
9434
0
5
10
15
20
25
30
35
40
45

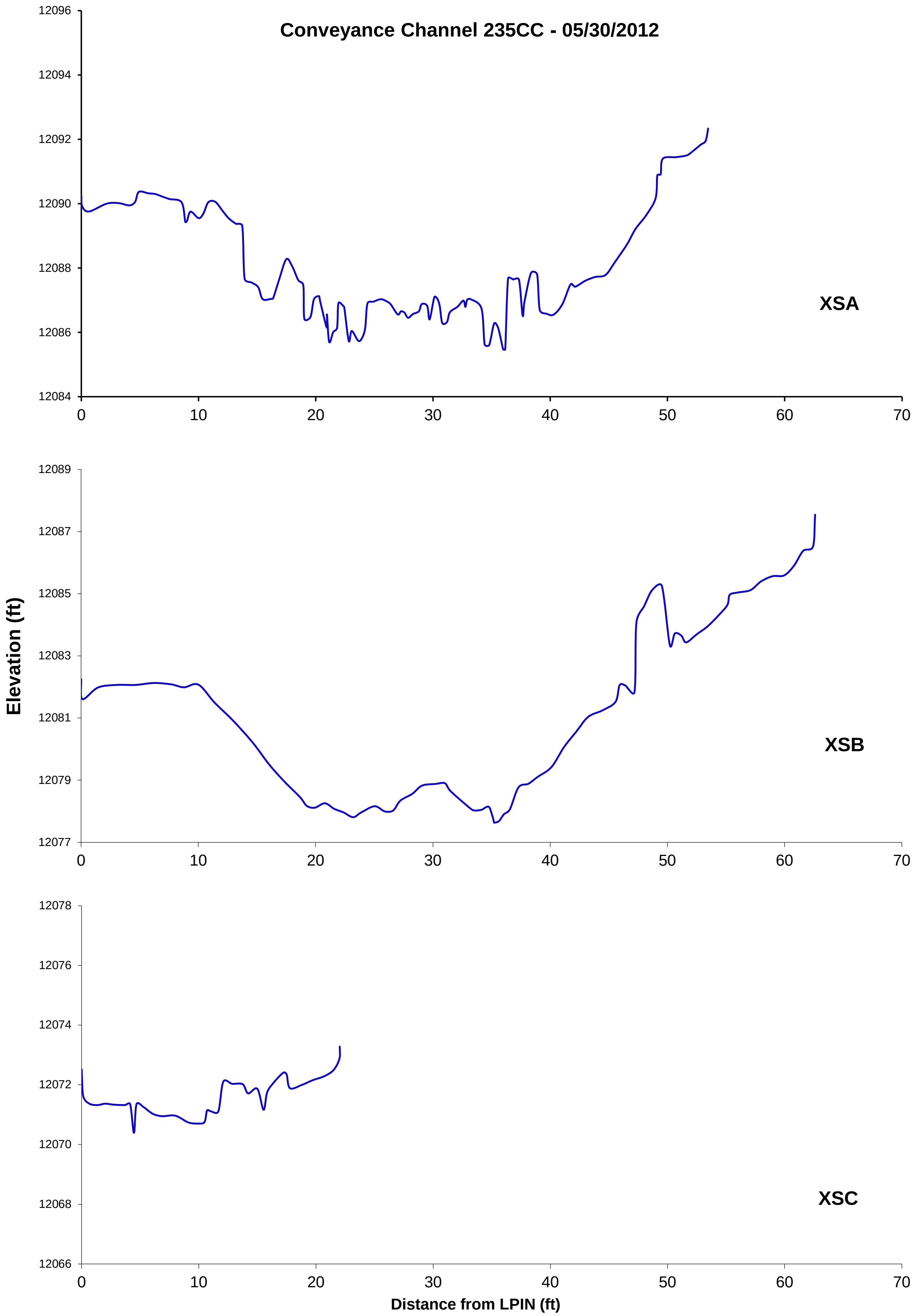

Conveyance Channel 229CC - 07/26/2012
Elevation (ft)
9856
9855
9854
9853
9852
XSA
9854
9853
9852
9851
9850
XSB
9849
9848
9847
9846
9845
XSC
0
5
10
15
20
25
30
35
40
45
50
Distance from LPIN (ft)

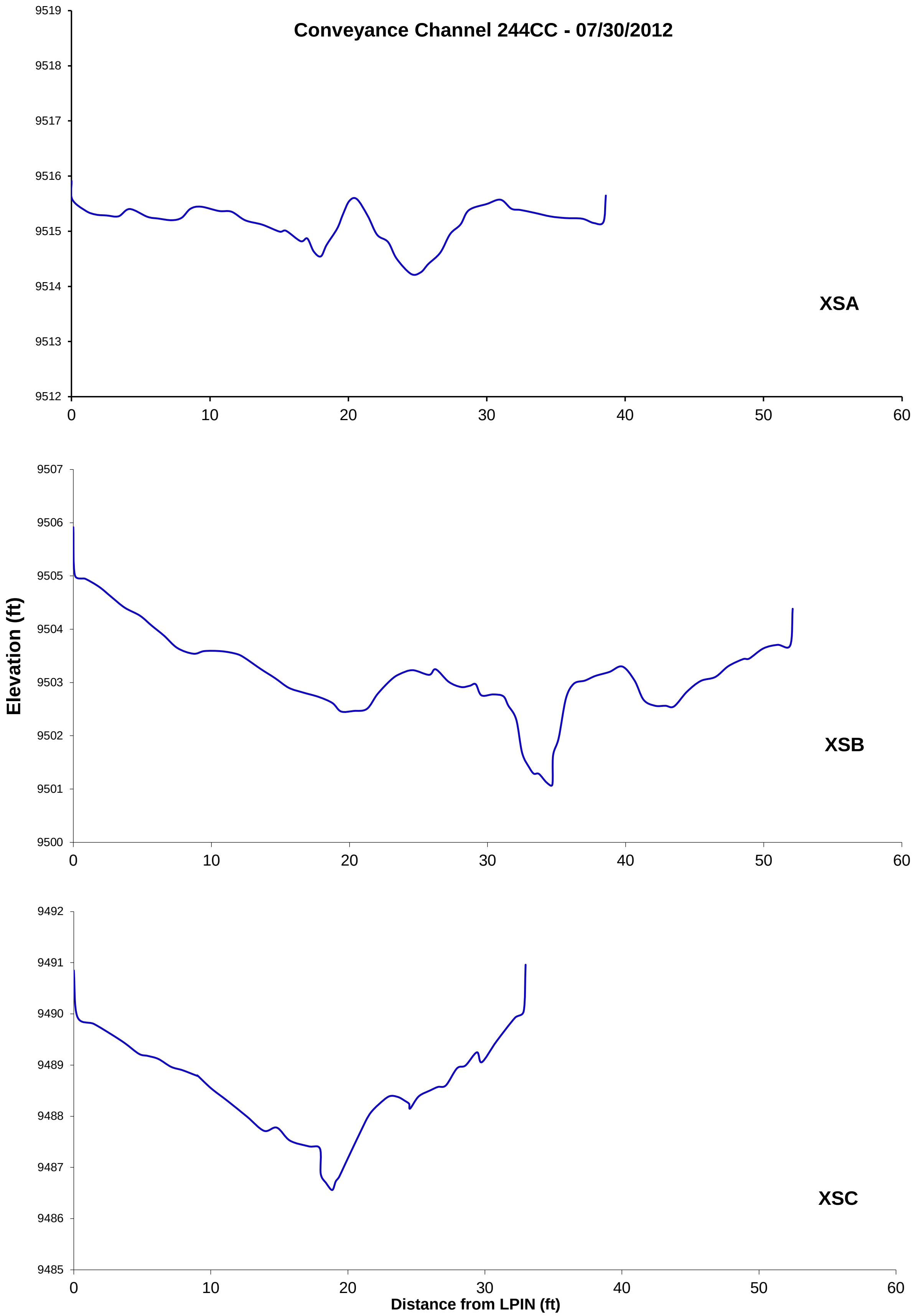

Conveyance Channel 230CC - 06/05/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10250
10249
10248
10247
10246
10245
10244
10243
10242
10241
0
5
10
15
20
25
30
35
40
45
50

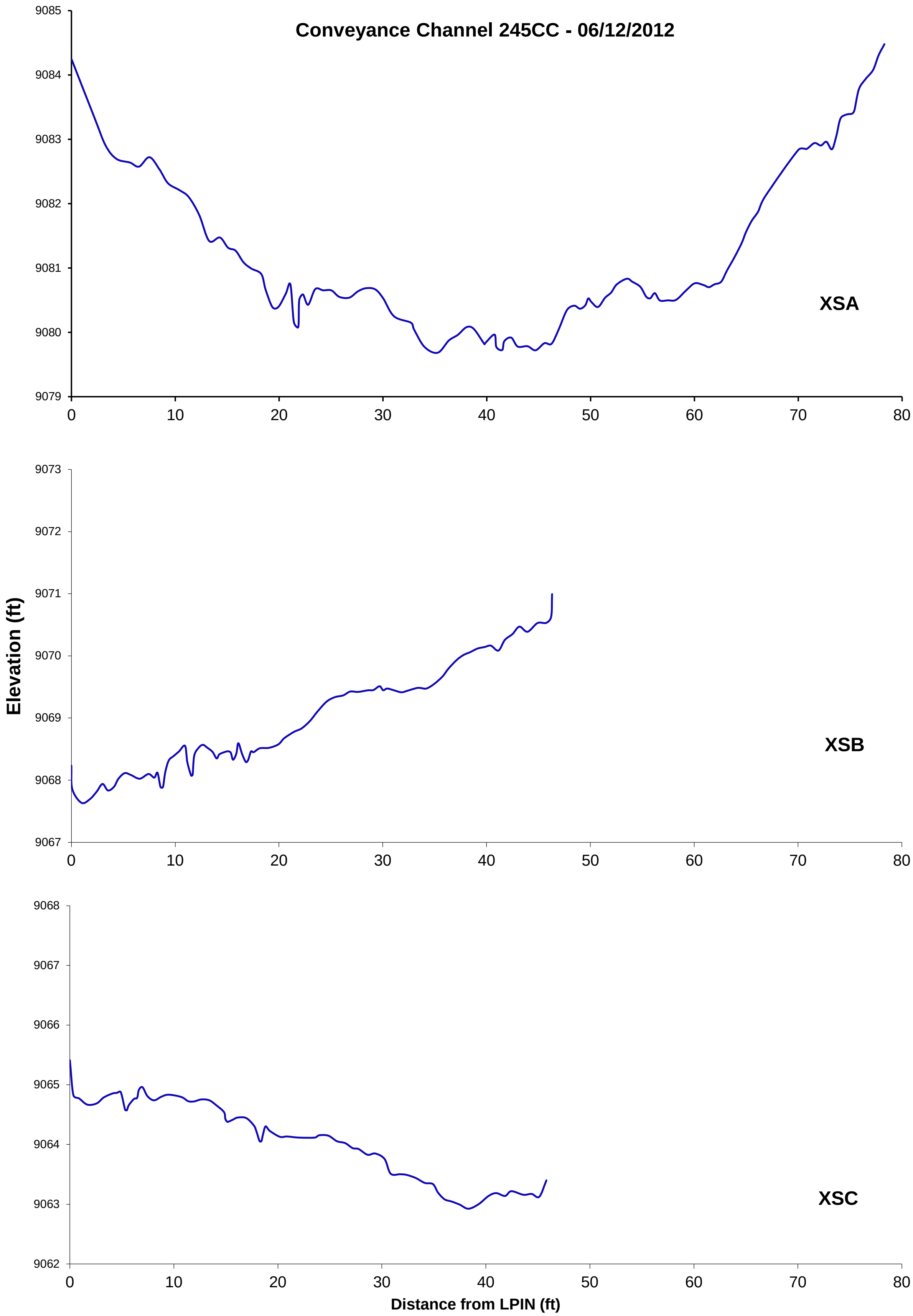


Conveyance Channel 231CC - 06/05/2012
10102
10101
10100
XSA
0
10
20
30
40
50
60
Elevation (ft)
10099
10098
10097
XSB
10095
10094
10093
XSC
Distance from LPIN (ft)

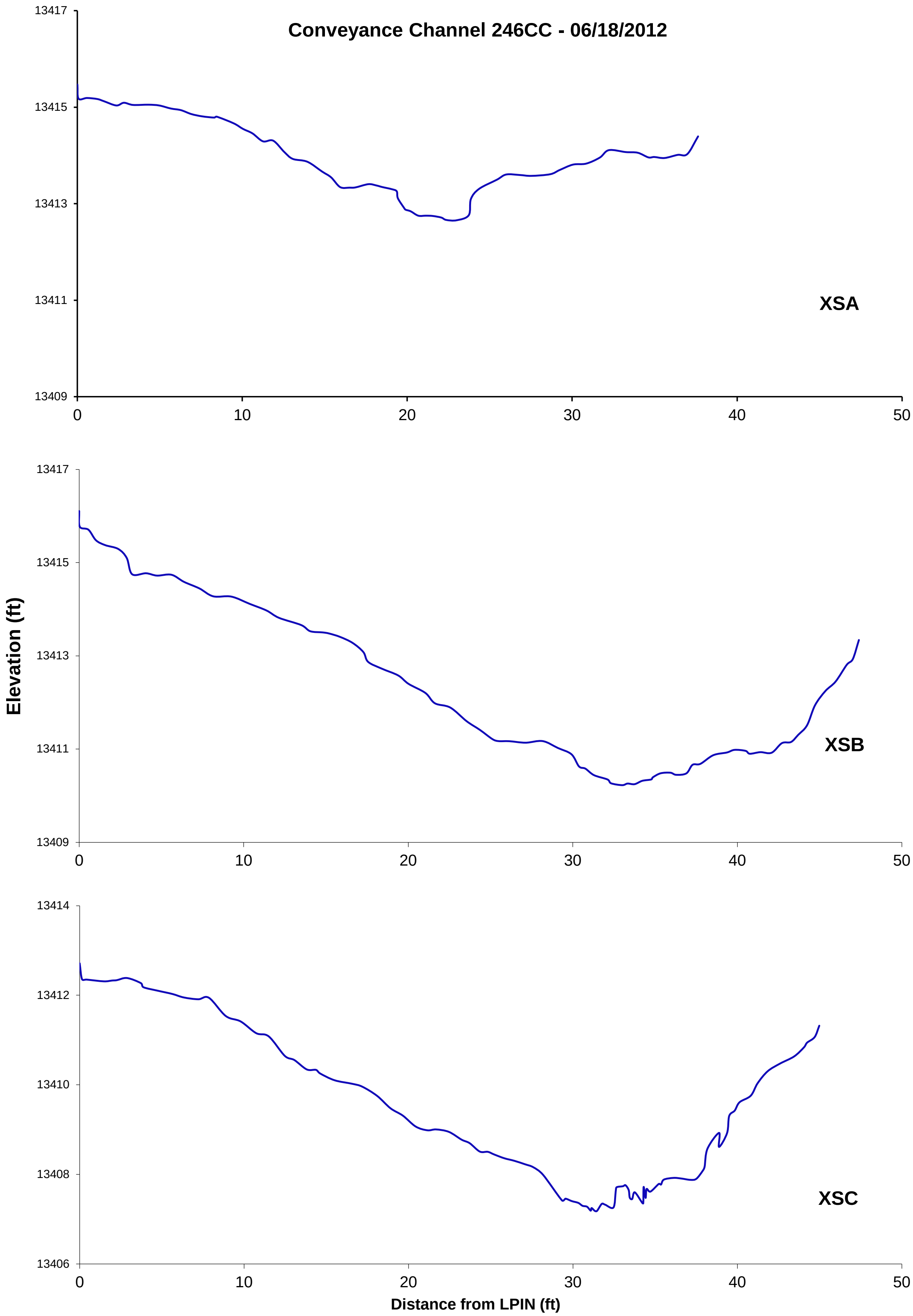

Conveyance Channel 232CC - 07/04/2012
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
11511
11509
11507
11505
11503
11501
11504
11502
11500
11498
11496
11494
11502
11500
11498
11496
11494
11492
11497
11495
11493
11491
11489
11487
11495
11493
11491
11489
11487
11485
0
20
40
60
80
100
120
140


Conveyance Channel 235CC - 05/30/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
12096
12094
12092
12090
12088
12086
12084
12089
12087
12085
12083
12081
12079
12077
12078
12076
12074
12072
12070
12068
12066
0
10
20
30
40
50
60
70

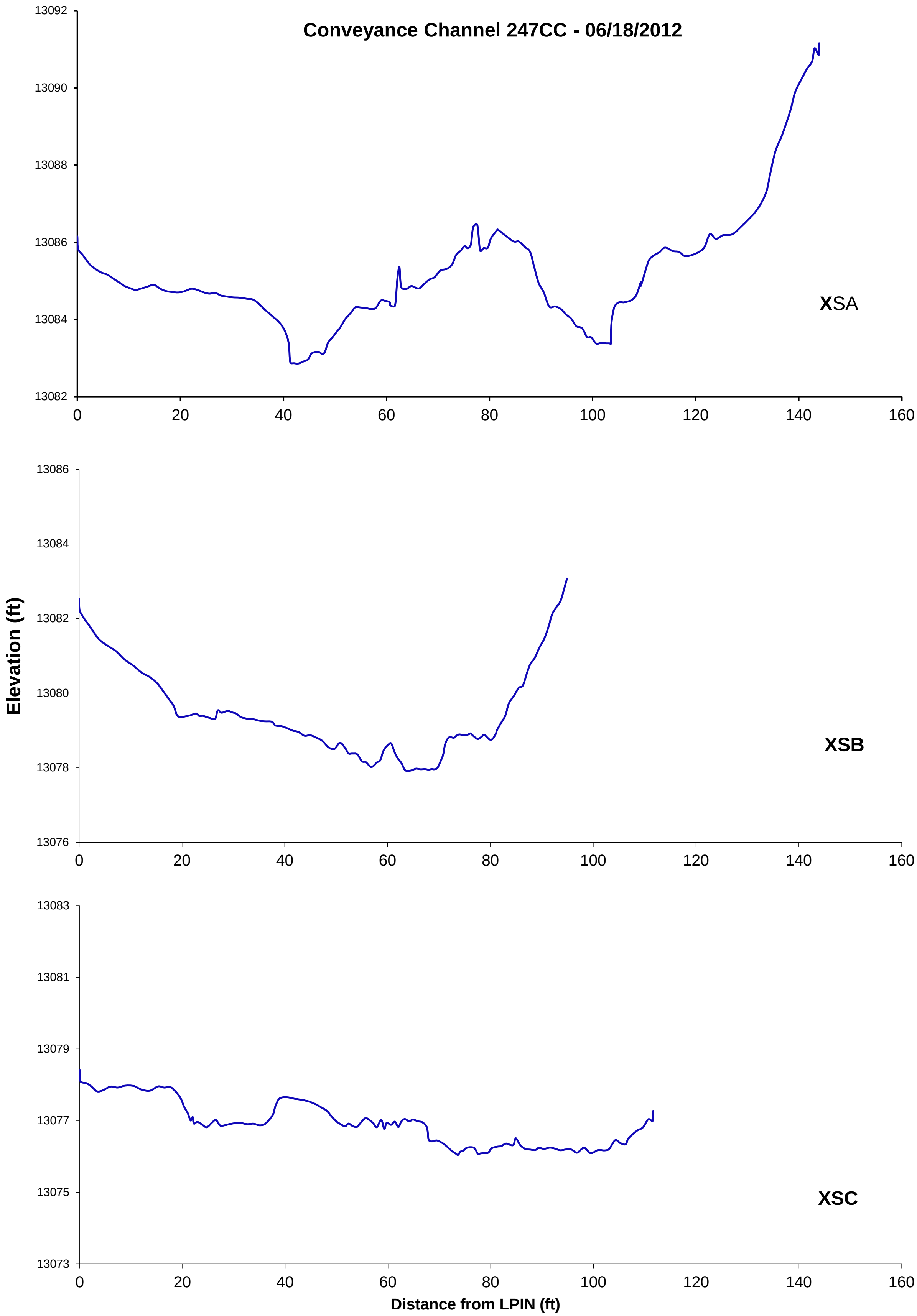

Conveyance Channel 244CC - 07/30/2012
XSA
9519
9518
9517
9516
9515
9514
9513
9512
0
10
20
30
40
50
60
Elevation (ft)
XSB
9507
9506
9505
9504
9503
9502
9501
9500
0
10
20
30
40
50
60
XSC
9492
9491
9490
9489
9488
9487
9486
9485
0
10
20
30
40
50
60
Distance from LPIN (ft)



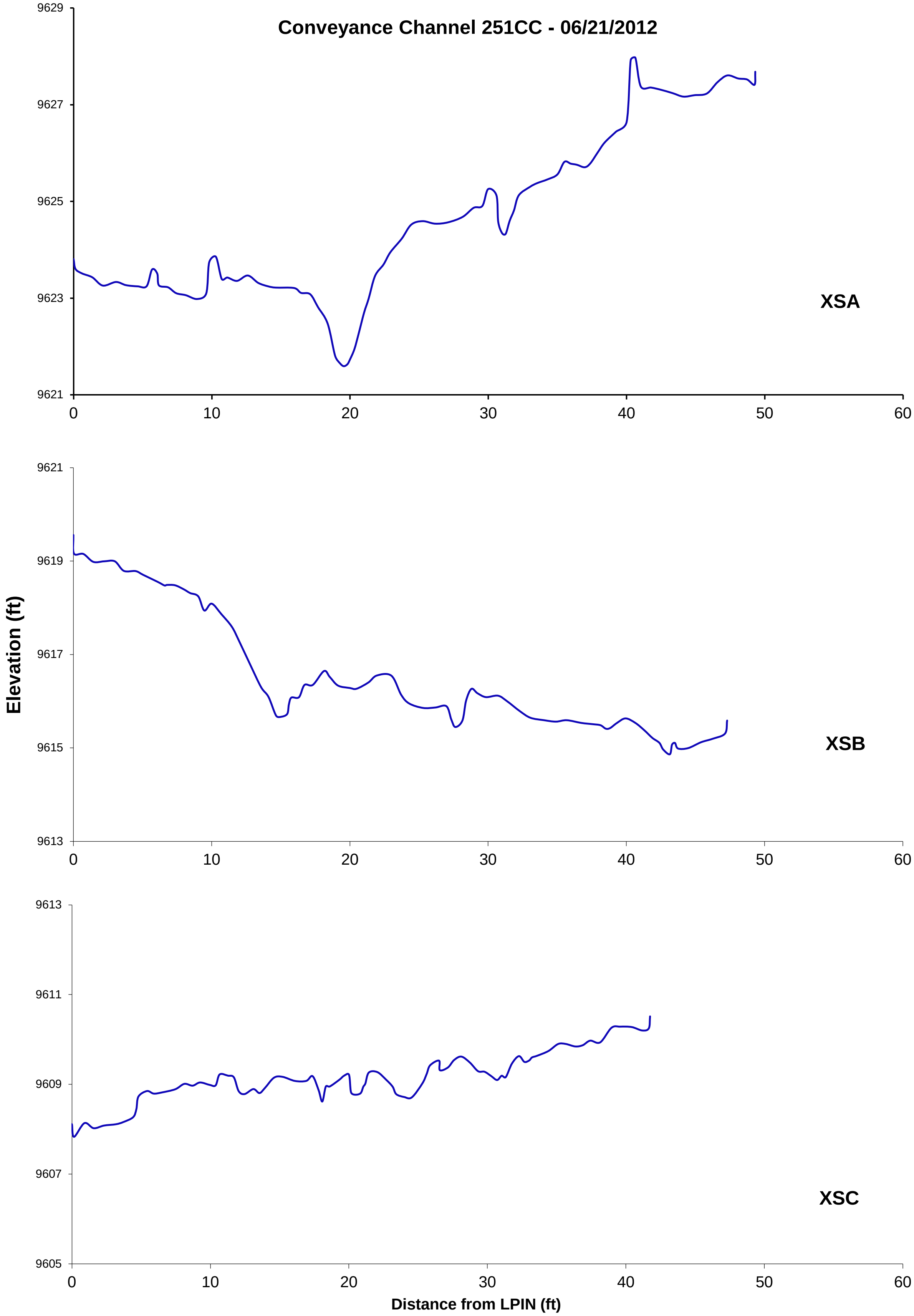
Conveyance Channel 245CC - 06/12/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9085
9084
9083
9082
9081
9080
9079
9073
9072
9071
9070
9069
9068
9067
9068
9067
9066
9065
9064
9063
9062
0
10
20
30
40
50
60
70
80



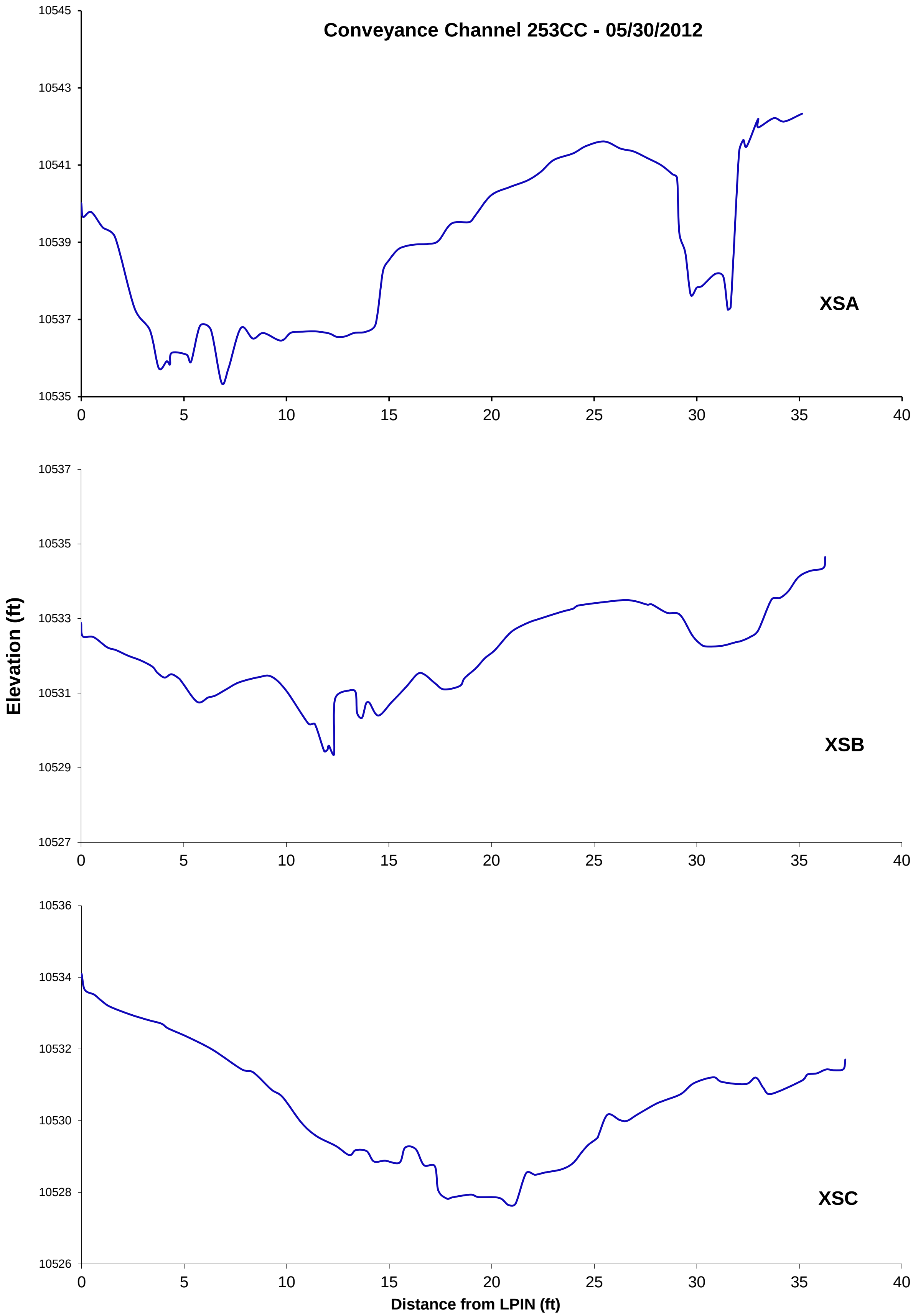
Conveyance Channel 246CC - 06/18/2012
Elevation (ft)
XSA
XSB
XSC
13417
13415
13413
13411
13409
13414
13412
13410
13408
13406
0
10
20
30
40
50
Distance from LPIN (ft)

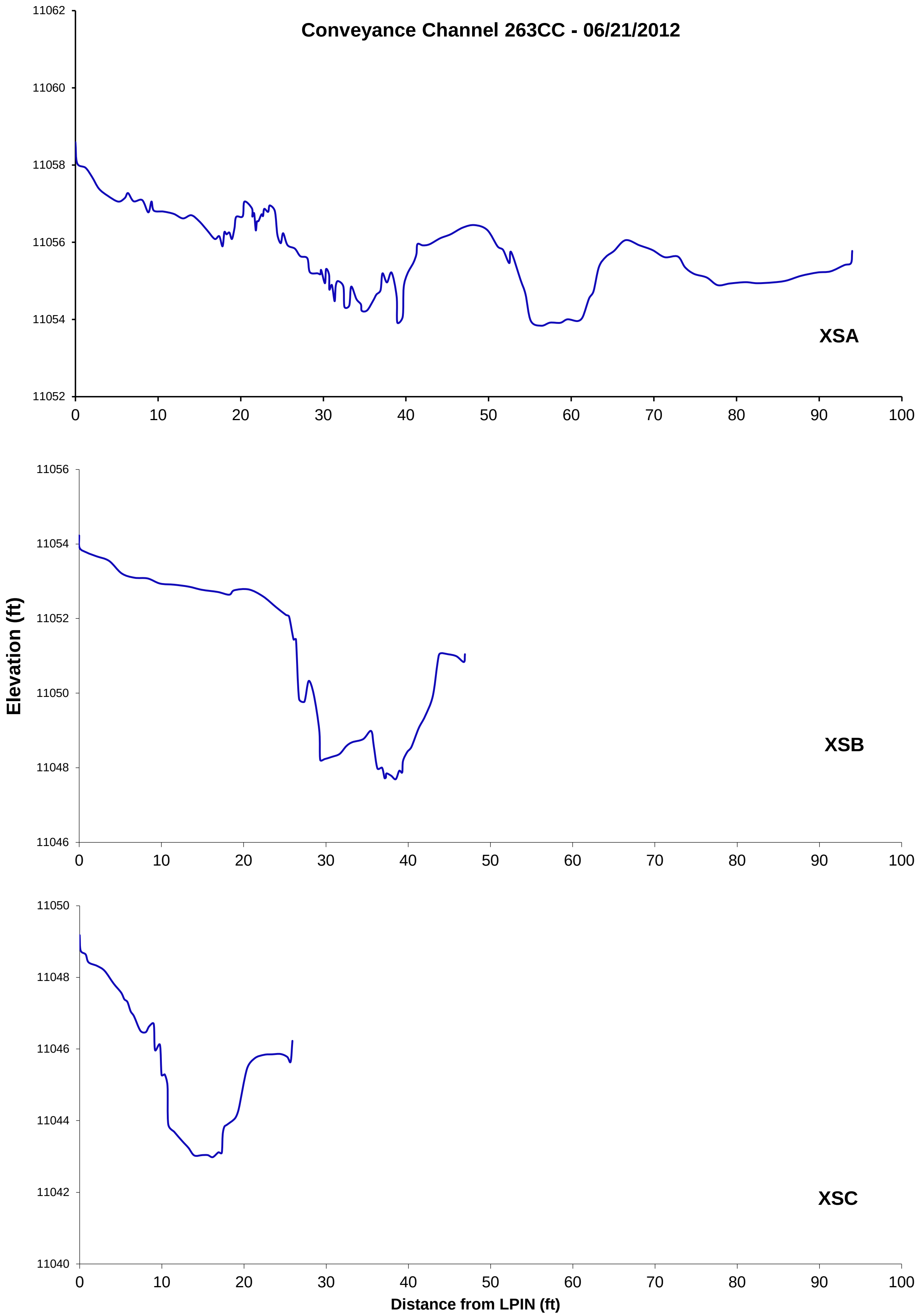


Conveyance Channel 247CC - 06/18/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)

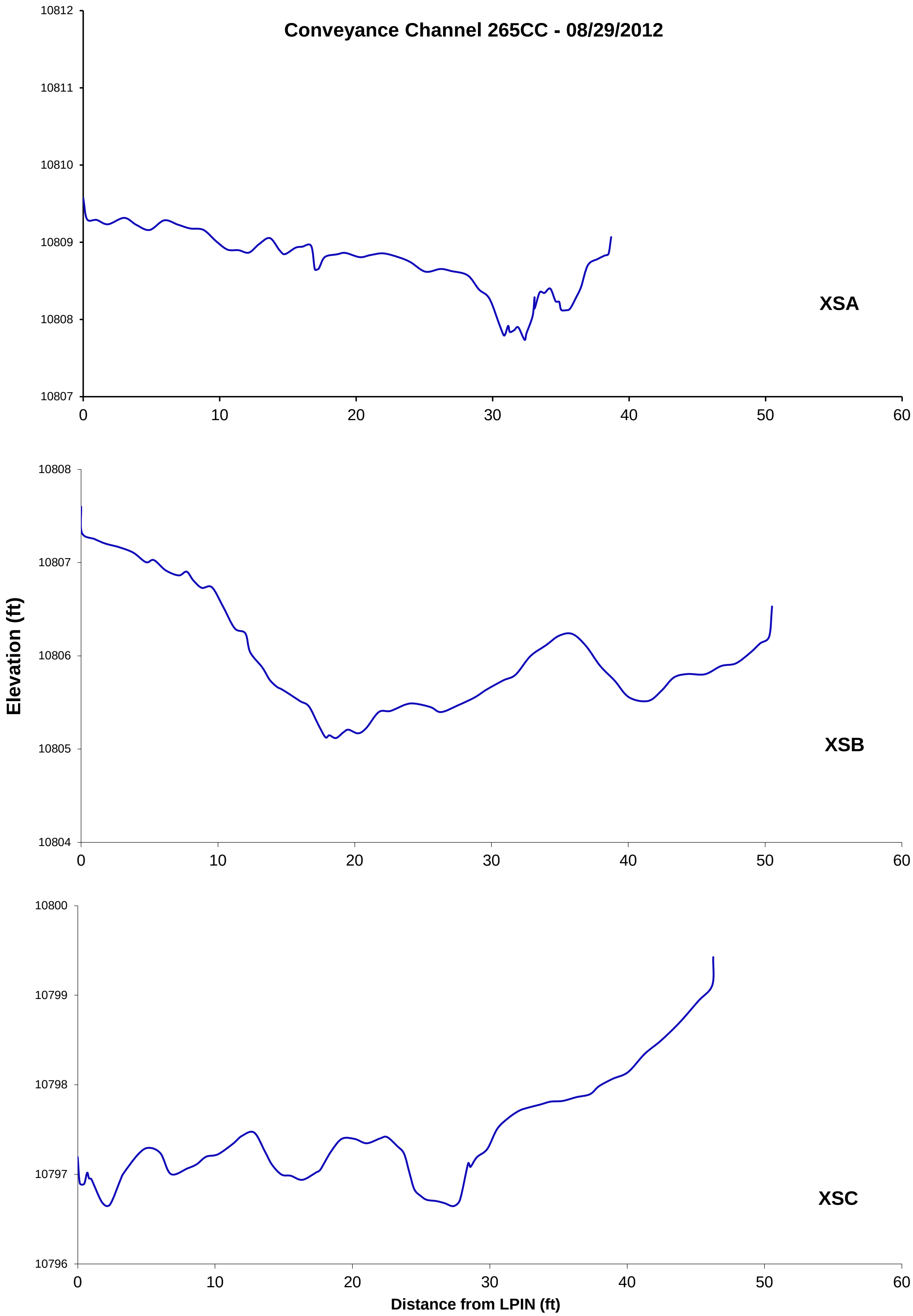


Conveyance Channel 251CC - 06/21/2012
Elevation (ft)
XSA
XSB
XSC
Distance from LPIN (ft)
9629
9627
9625
9623
9621
9619
9617
9615
9613
9611
9609
9607
9605
0
10
20
30
40
50
60


Conveyance Channel 253CC - 05/30/2012
Elevation (ft)
10545
10543
10541
10539
10537
10535
0
5
10
15
20
25
30
35
40
XSA
10537
10535
10533
10531
10529
10527
XSB
10536
10534
10532
10530
10528
10526
XSC
Distance from LPIN (ft)



Conveyance Channel 263CC - 06/21/2012
Elevation (ft)
11062
11060
11058
11056
11054
11052
0
10
20
30
40
50
60
70
80
90
100
XSA
11056
11054
11052
11050
11048
11046
XSB
11050
11048
11046
11044
11042
11040
XSC
Distance from LPIN (ft)



Conveyance Channel 265CC - 08/29/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10812
10811
10810
10809
10808
10807
10806
10805
10804
10800
10799
10798
10797
10796
0
10
20
30
40
50
60

# Appendix J

# Rock Weir and Sediment Pond

## Site Visit Dates
## Sediment Accumulation
## and
## Cross Section Graphs

## 2012

# Site Visit Dates of Rock Weir Silt Fences on Pikes Peak, 2012

| Site ID | Site Visit Dates of Rock Weir Silt Fences on Pikes Peak, 2012 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5/3 | 5/9 | 5/14 | 5/15 | 5/18 | 5/21 | 5/30 | 6/4 | 6/5 | 6/11 | 6/12 | 6/18 | 6/20 | 7/2 | 7/3 | 7/16 | 7/17 | 7/30 | 7/31 | 8/7 | 8/20 | 8/22 | 8/23 | 8/29 | 9/4 | 9/13 | 9/19 | 9/24 | 10/2 |
| 002RW | X | | | | | X | | X | | | X | X | | X | | X | | X | | X | X | | | X | X | | | | X |
| 003RW | X | | | | | X | | X | | | X | X | | X | | X | | X | | X | X | | | X | X | | | | X |
| 006RW | X | | | X | | X | | X | | | | X | | X | | X | X | X | X | X | X | | | | X | | | | X |
| 008RW | X | | | | | X | X | X | | | | X | | X | | X | | X | | X | X | | | | X | | | | X |
| 009RA | X | | | | X | X | | X | | | | X | | X | | X | | X | | X | X | | | | X | | | X | |
| 161RW | X | | X | | | X | | X | | | | X | | X | | X | | X | | X | X | | | | X | X | | | |
| 162RW | X | | X | | | X | | X | | | | X | | X | | X | | X | | X | X | | | | X | | | X | |
| 176RW | X | | | | | X | | X | | X | | X | | X | | X | | X | | X | X | | | | X | | | | X |
| 178RW | X | | | | | X | | X | | X | | X | | X | | X | | X | | X | X | | | | X | | | | X |
| 179RW | X | | | | | X | | X | | | X | X | | X | | X | | X | | X | X | | | | X | | X | | |
| 180RW | X | X | | | | X | | X | X | | | X | | X | | X | | X | X | X | X | | X | | X | | X | | |
| 181RW | X | X | | | | X | | X | X | | | X | | X | X | X | | X | X | X | X | | X | | X | | | | X |
| 200RW | X | | | | | X | | X | | | | X | X | X | | X | | X | | X | X | | | X | X | | | | |
| 201RW | X | | | | | X | | X | | X | | X | | X | | X | | X | | X | X | X | | | X | | | | |
| 202RW | X | | | | | X | | X | | X | | X | | X | | X | | X | X | X | X | | | | X | | | | X |

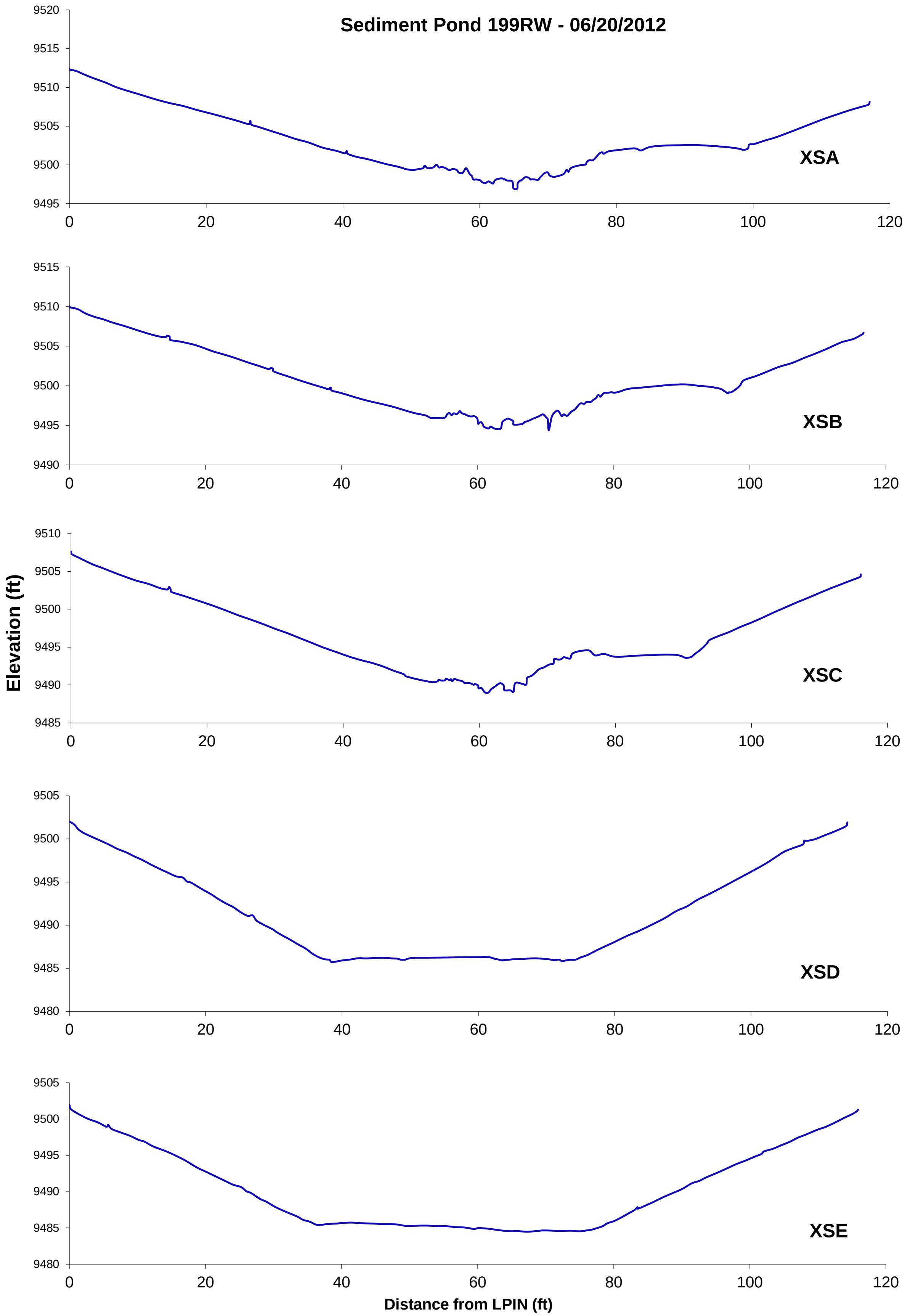
## Sediment Accumulation in Rock Weir Silt Fences on Pikes Peak, 2012

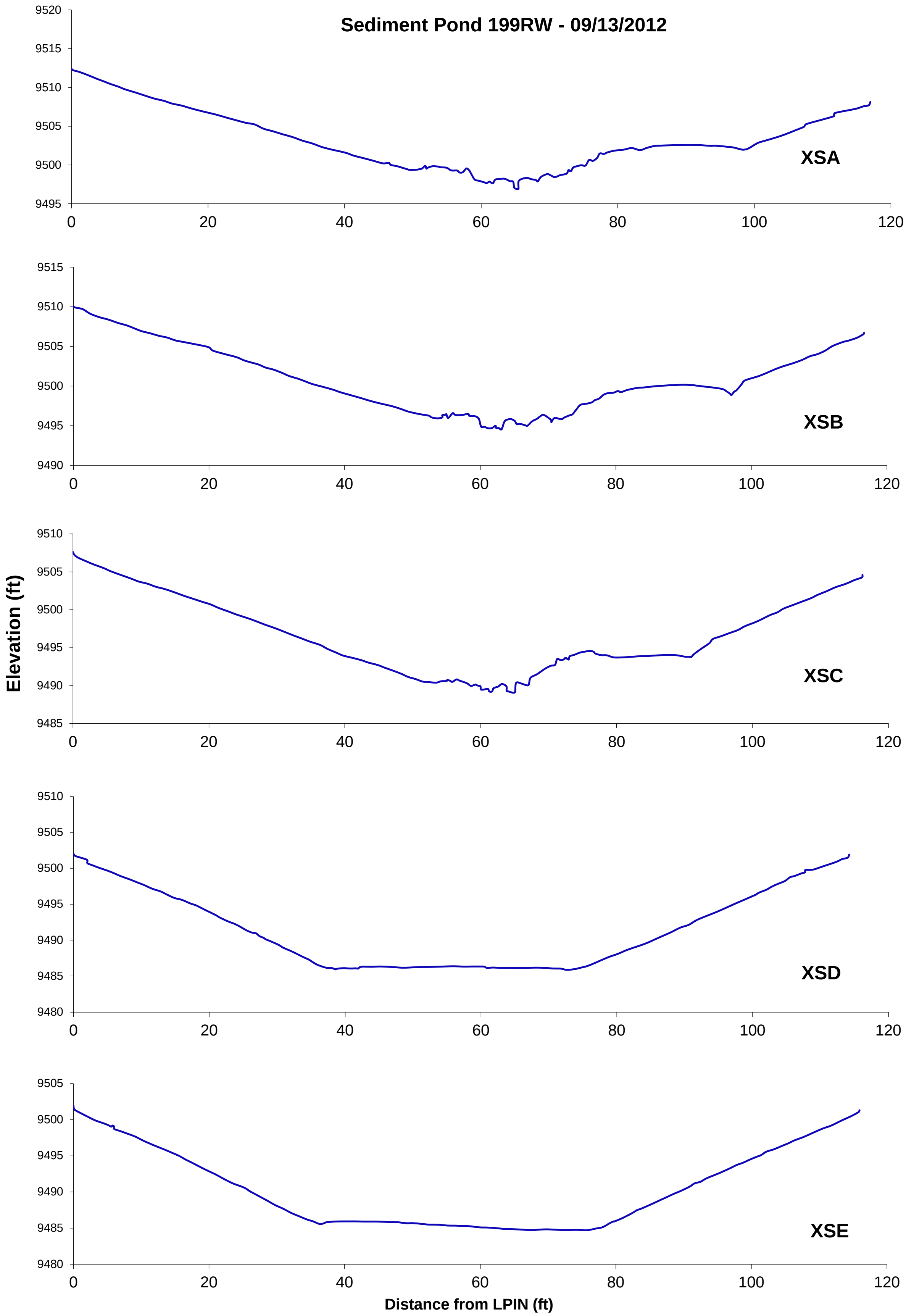
| Site ID | Location | Date | Volume ($ft^3$) | Grab Sample |
|---|---|---|---|---|
| 002RW | Silt Fence | 5/3/12 | 0.07 | Yes |
| 009RA | Silt Fence | 5/3/12 | 0.07 | Yes |
| 162RW | Silt Fence | 5/3/12 | 0.07 | Yes |
| 178RW | Silt Fence | 5/3/12 | 0.07 | Yes |
| 180RW | Silt Fence | 5/3/12 | 0.13 | Yes |
| 180RW | Silt Fence | 5/9/12 | 0.20 | Yes† |
| 181RW | Silt Fence | 5/9/12 | 0.27 | Yes |
| 178RW | Silt Fence | 6/11/12 | 0.07 | Yes |
| 201RW | Silt Fence | 6/11/12 | 0.07 | Yes |
| 180RW | Silt Fence | 7/2/12 | 0.27 | Yes |
| 180RW | Silt Fence | 7/16/12 | 0.67 | Yes |
| 181RW | Silt Fence | 7/16/12 | 0.47 | Yes |
| 006RW | Silt Fence | 7/17/12 | 0.07 | Yes |
| 162RW | Silt Fence | 7/30/12 | 0.13 | Yes |
| 181RW | Silt Fence | 7/30/12 | 0.13 | Yes |
| 180RW | Silt Fence | 8/7/12 | 1.14 | Yes |
| 181RW | Silt Fence | 8/7/12 | 0.20 | Yes |
| 002RW | Silt Fence | 8/20/12 | 0.07 | Yes |
| 008RW | Silt Fence | 8/20/12 | 0.07 | Yes† |
| 176RW | Silt Fence | 8/20/12 | 0.13 | Yes† |
| 180RW | Silt Fence | 8/20/12 | 0.20 | Yes |
| 181RW | Silt Fence | 8/20/12 | 0.13 | Yes |
| 202RW | Silt Fence | 8/20/12 | 0.27 | Yes |
| 162RW | Silt Fence | 9/4/12 | 0.20 | Yes |
| 180RW | Silt Fence | 9/19/12 | 0.74 | Yes |

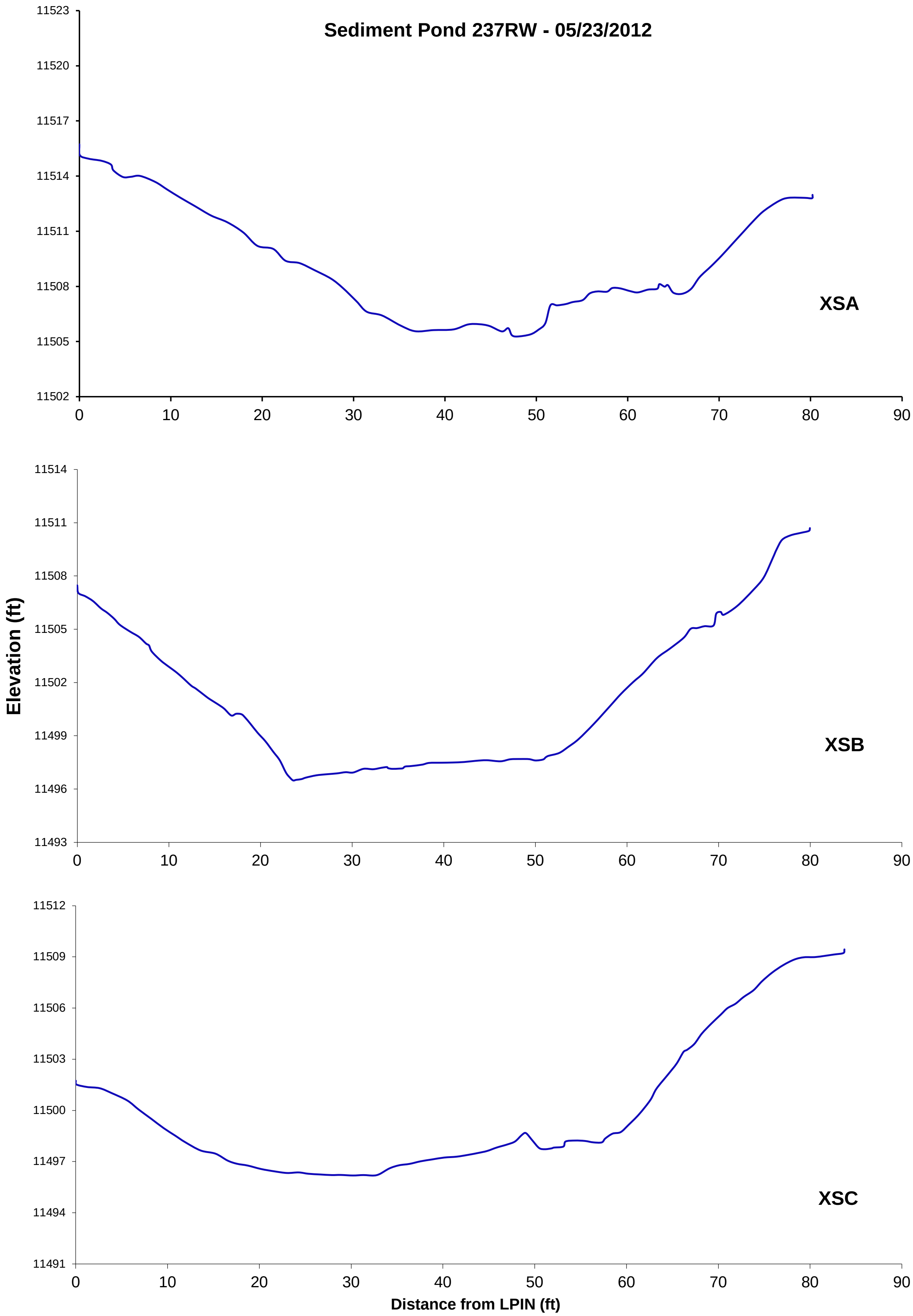
*† Grab samples selected for lab analysis.*

## Rock Weir Sediment Accumulation Values on Pikes Peak, 2012

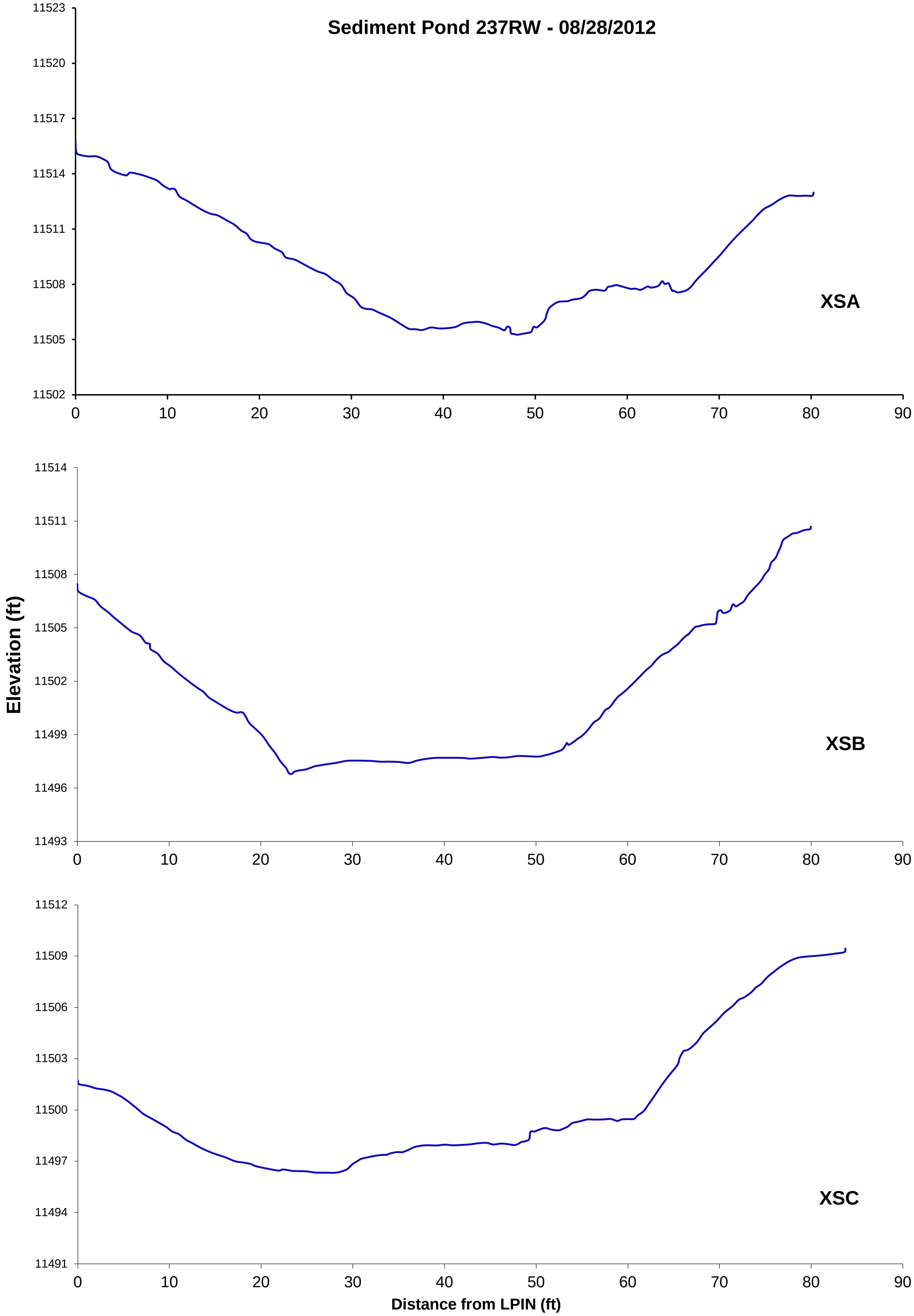
| Site ID | Area (sq ft) | Survey1 | | Survey 2 | | | |
|---|---|---|---|---|---|---|---|
| | | Date | Average Elevation (ft) | Date | Average Elevation (ft) | Elevation Change (ft) | Volume Change ($ft^3$) |
| 002RW | 1679 | 6/12/12 | 8997.97 | 8/29/12 | 8998.15 | 0.18 | 302.22 |
| 003RW | 521 | 6/12/12 | 8991.24 | 8/29/12 | 8991.22 | -0.02 | -10.42 |
| 006RW | 798 | 5/15/12 | 8997.13 | | | | |
| 008RW | 1044 | 5/30/12 | 9499.04 | | | | |
| 009RA | 905 | 5/18/12 | 9695.85 | 9/24/12 | 9695.80 | -0.05 | -45.25 |
| 152RW | 817 | 5/24/12 | 9791.92 | 10/2/12 | 9791.91 | -0.01 | -8.17 |
| 153RW | 1568 | 5/14/12 | 9523.40 | 9/13/12 | 9523.37 | -0.03 | -47.04 |
| 161RW | 263 | 5/14/12 | 9504.93 | 9/13/12 | 9504.95 | 0.02 | 5.26 |
| 162RW | 130 | 5/15/12 | 9512.13 | 9/24/12 | 9512.17 | 0.04 | 5.20 |
| 176RW | 372 | 6/11/12 | 10193.88 | 10/2/12 | 10193.88 | 0.00 | 0.00 |
| 178RW | 377 | 6/11/12 | 10202.28 | 10/2/12 | 10202.43 | 0.15 | 56.55 |
| 179RW | 792 | 6/12/12 | 10214.70 | 9/19/12 | 10214.58 | -0.12 | -95.04 |
| 180RW | 542 | 6/5/12 | 10235.28 | 9/19/12 | 10235.48 | 0.20 | 108.40 |
| 181RW | 1299 | 6/5/12 | 10252.91 | 10/2/12 | 10252.78 | -0.13 | -168.87 |
| 200RW | 412 | 6/20/12 | 9194.72 | 8/29/12 | 9194.59 | -0.13 | -53.56 |
| 201RW | 183 | 6/11/12 | 9588.53 | 8/22/12 | 9588.51 | -0.02 | -3.66 |
| 202RW | 179 | 6/11/12 | 9690.58 | | | | |
| 233RW | 359 | 6/11/12 | 11902.26 | 8/28/12 | 11902.42 | 0.16 | 57.44 |
| 239RW | 381 | 7/5/12 | 12799.08 | 8/27/12 | 12799.08 | 0.00 | 0.00 |
| 240RW | 634 | 7/5/12 | 12897.39 | 8/27/12 | 12897.43 | 0.04 | 25.36 |
| 241RW | 1015 | 7/17/12 | 12551.64 | 8/27/12 | 12551.54 | -0.10 | -101.50 |
| 242RW | 1170 | 7/4/12 | 12901.48 | 8/29/12 | 12901.55 | 0.07 | 83.48 |
| 250RW | 598 | 5/29/12 | 10117.20 | 9/19/12 | 10117.21 | 0.01 | 5.98 |
| 252RW | 448 | 5/23/12 | 10524.89 | | | | |

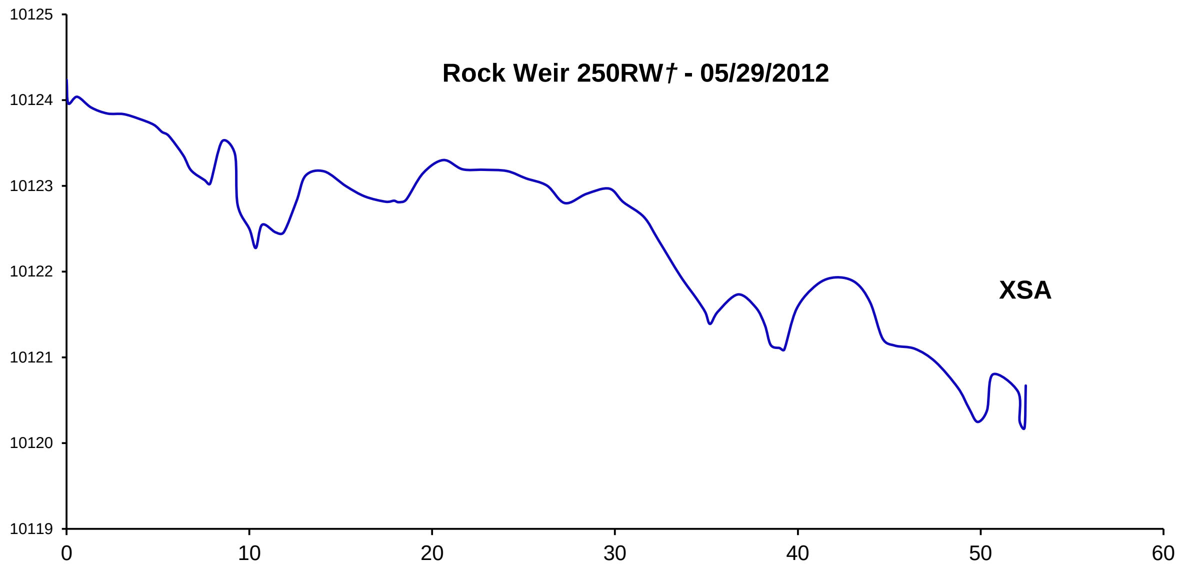

Sediment Pond 199RW - 06/20/2012
Elevation (ft)
XSA
XSB
XSC
XSD
XSE
Distance from LPIN (ft)
9520
9515
9510
9505
9500
9495
9490
9485
9480
0
20
40
60
80
100
120

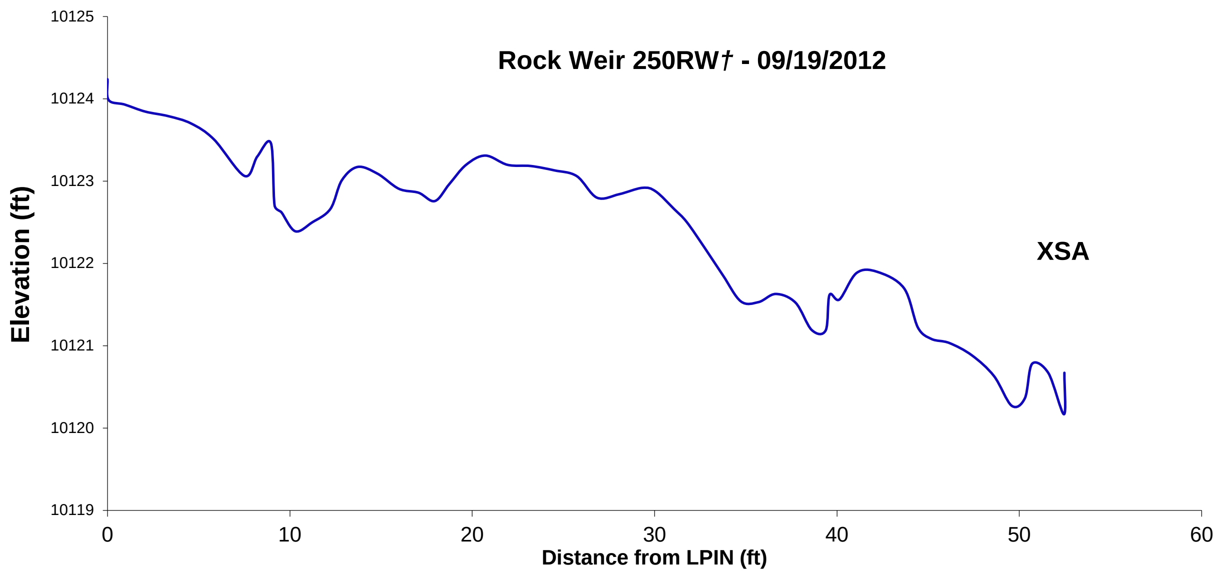

Sediment Pond 199RW - 09/13/2012
XSA
XSB
XSC
XSD
XSE
Elevation (ft)
Distance from LPIN (ft)
9520
9515
9510
9505
9500
9495
9490
9485
9480
0
20
40
60
80
100
120



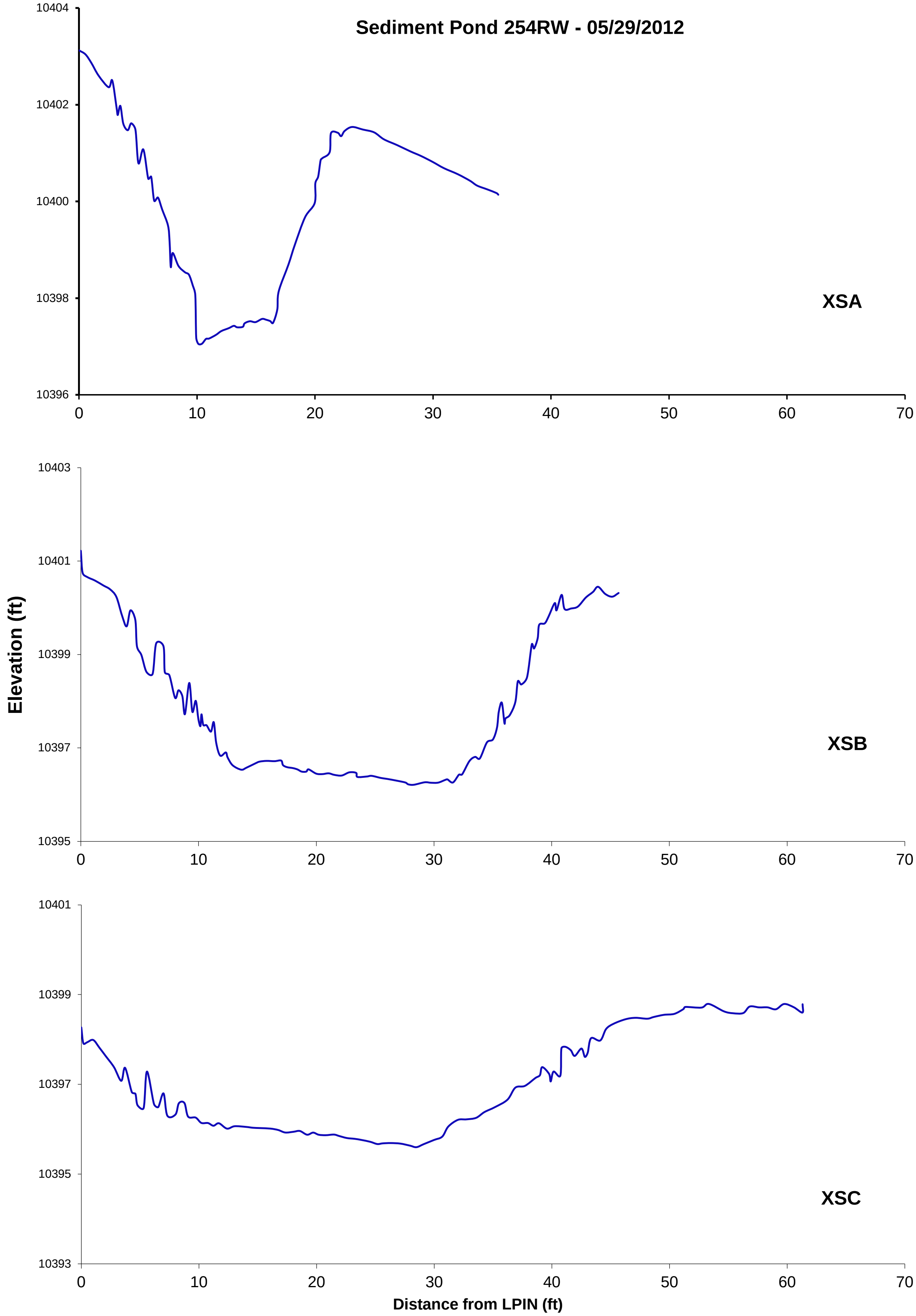
Sediment Pond 237RW - 05/23/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
11523
11520
11517
11514
11511
11508
11505
11502
11499
11496
11493
11512
11509
11506
11503
11500
11497
11494
11491
0
10
20
30
40
50
60
70
80
90

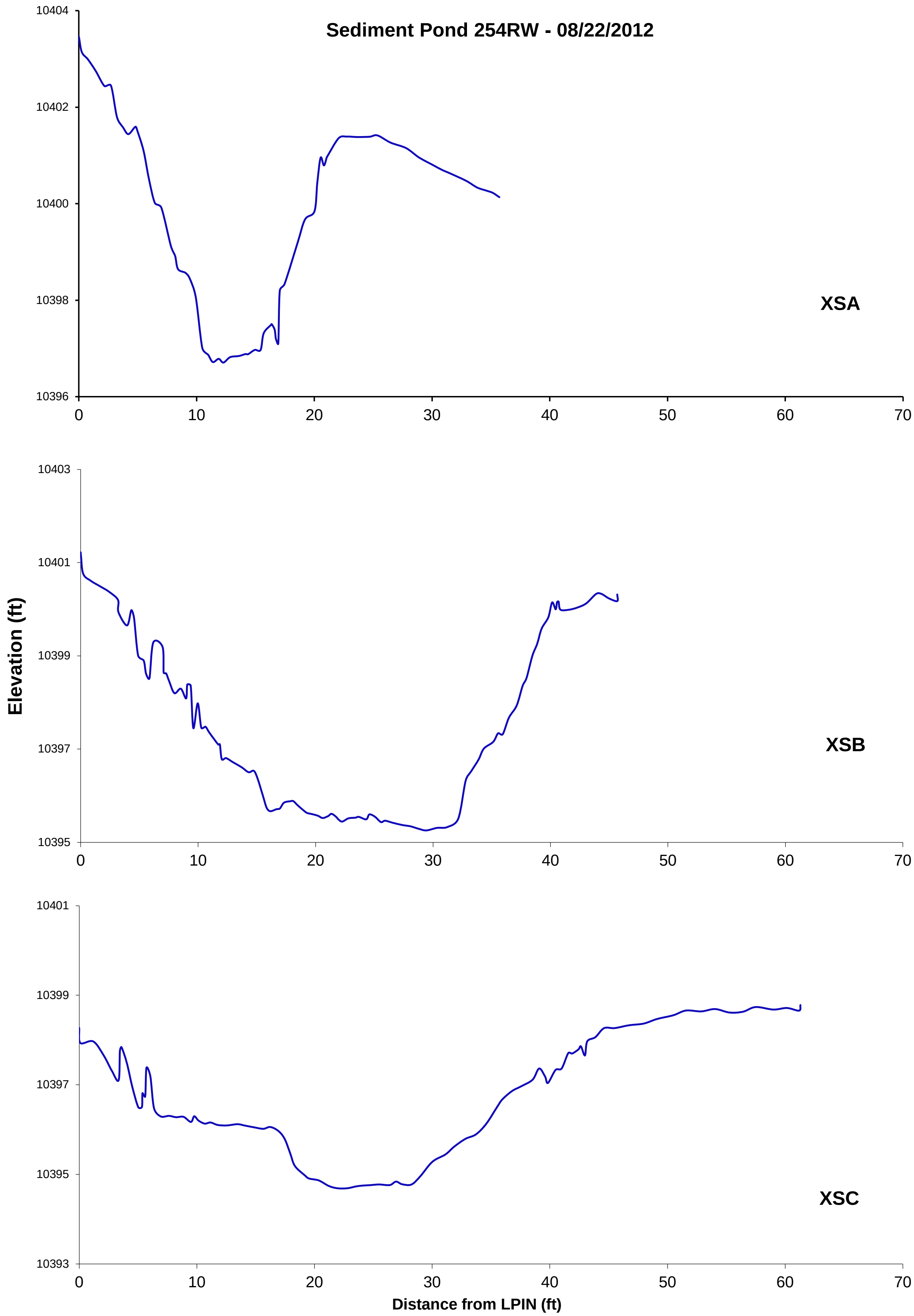

Sediment Pond 237RW - 08/28/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
11523
11520
11517
11514
11511
11508
11505
11502
11499
11496
11493
11512
11509
11506
11503
11500
11497
11494
11491
0
10
20
30
40
50
60
70
80
90

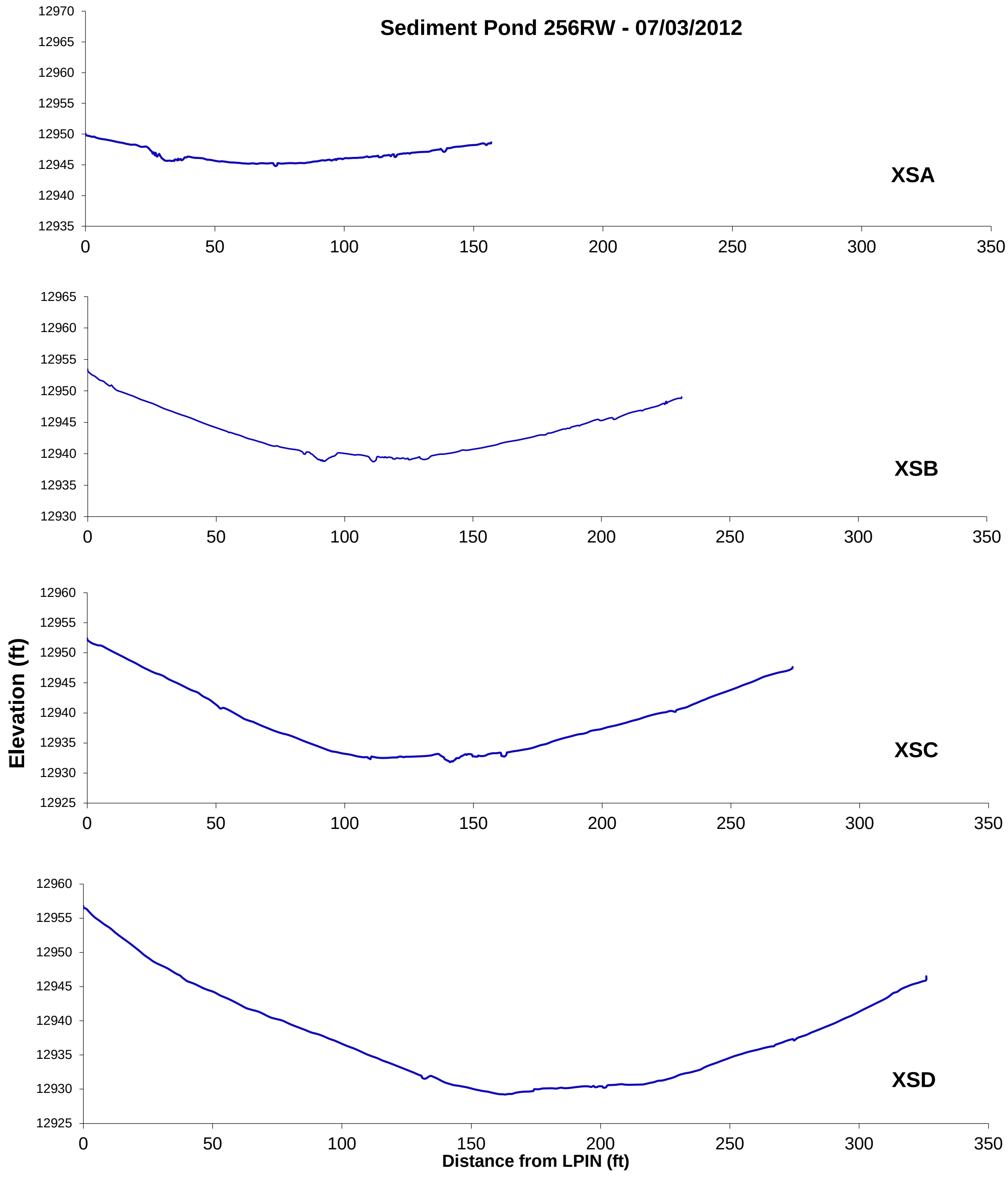


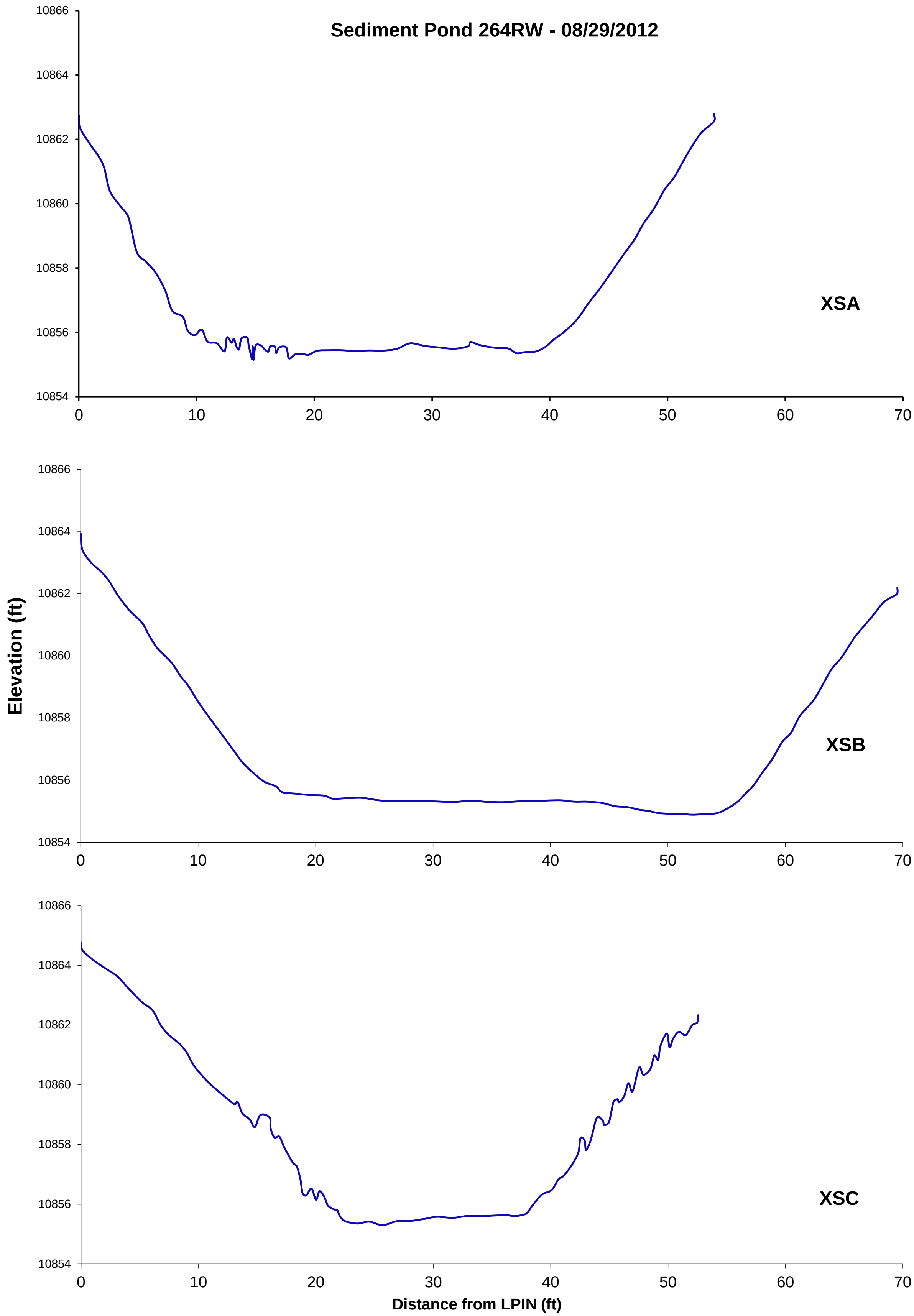

*†Cross section placed on cut slope above rock weir*


Sediment Pond 254RW - 05/29/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10404
10402
10400
10398
10396
10403
10401
10399
10397
10395
10393
0
10
20
30
40
50
60
70


Sediment Pond 254RW - 08/22/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10404
10402
10400
10398
10396
10403
10401
10399
10397
10395
10393
0
10
20
30
40
50
60
70



Sediment Pond 256RW - 07/03/2012
XSA
XSB
XSC
XSD
Elevation (ft)
Distance from LPIN (ft)


Sediment Pond 264RW - 08/29/2012
XSA
XSB
XSC
Elevation (ft)
Distance from LPIN (ft)
10866
10864
10862
10860
10858
10856
10854
0
10
20
30
40
50
60
70

# Appendix K

# Rock Weir and Sediment Pond

# Particle Size Distribution Summary
# and
# Graphs

# 2011

**Summary of Rock Weir and Silt Fence Particle Size Distribution from Sieve Analysis of Grab Samples on Pikes Peak, 2011**

| | | | Particle Size Distribution–Grab Samples 2011 | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Site Name** | **ID** | **Date** | **D15** | **D35** | **D50** | **D84** | **D95** | **D100** |
| Pikes Peak Highway - Rock Weir | 002RW Silt Fence | 7/11/2011 | 0.010 | 0.037 | 0.095 | 0.811 | 1.624 | 10.0 |
| Pikes Peak Highway - Rock Weir | 003RW Rock Weir | 8/31/2011 | 0.284 | 1.301 | 2.382 | 6.994 | 11.489 | 20.0 |
| Pikes Peak Highway - Rock Weir | 153RW Rock Weir | 6/2/2011 | 0.439 | 1.408 | 2.381 | 6.702 | 11.756 | 19.0 |
| Pikes Peak Highway - Rock Weir | 161RW Rock Weir | 5/18/2011 | 0.107 | 1.041 | 1.844 | 5.273 | 9.975 | 15.0 |
| Pikes Peak Highway - Rock Weir | 161RW Silt Fence | 5/18/2011 | 0.590 | 1.707 | 3.165 | 9.540 | 24.270 | 31.0 |
| Pikes Peak Highway - Rock Weir | 178RW Rock Weir | 9/21/2011 | 0.138 | 1.111 | 2.101 | 6.547 | 11.075 | 19.0 |
| Pikes Peak Highway - Rock Weir | 180RW Silt Fence | 7/25/2011 | 0.027 | 0.348 | 0.653 | 1.604 | 2.744 | 10.0 |
| Pikes Peak Highway - Rock Weir | 181RW Silt Fence | 8/29/2011 | 0.085 | 1.233 | 2.627 | 6.959 | 12.278 | 18.0 |
| Pikes Peak Highway - Rock Weir | 199RW Sed Pond | 6/6/2011 | 0.057 | 0.762 | 1.431 | 4.549 | 7.539 | 20.0 |
| Pikes Peak Highway - Rock Weir | 200RW Rock Weir | 5/31/2011 | 0.075 | 0.778 | 1.446 | 6.469 | 12.521 | 22.0 |
| Pikes Peak Highway - Rock Weir | 200RW Silt Fence | 5/31/2011 | 0.682 | 3.202 | 7.487 | 25.883 | 27.988 | 29.0 |
| Pikes Peak Highway - Rock Weir | 200RW Rock Weir | 9/7/2011 | 0.313 | 1.253 | 2.379 | 7.566 | 13.796 | 23.0 |
| Pikes Peak Highway - Rock Weir | 200RW Silt Fence | 9/7/2011 | 1.291 | 4.188 | 9.277 | 37.006 | 42.332 | 33.0 |
| Pikes Peak Highway - Rock Weir | 233RW Rock Weir | 9/1/2011 | 0.026 | 0.328 | 0.743 | 2.610 | 6.024 | 12.0 |
| Pikes Peak Highway - Rock Weir | 237RW Sed Pond | 6/6/2011 | 0.377 | 1.683 | 3.117 | 8.326 | 13.400 | 24.0 |
| Pikes Peak Highway - Rock Weir | 239RW Rock Weir | 6/30/2011 | 0.111 | 0.867 | 1.493 | 5.919 | 10.288 | 15.0 |
| Pikes Peak Highway - Rock Weir | 240RW Rock Weir | 6/30/2011 | 0.143 | 2.493 | 4.404 | 10.359 | 14.585 | 21.0 |
| Pikes Peak Highway - Rock Weir | 242RW Rock Weir | 6/30/2011 | 0.032 | 0.520 | 1.224 | 5.710 | 11.852 | 25.0 |

**Sieve Analysis Worksheet**

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

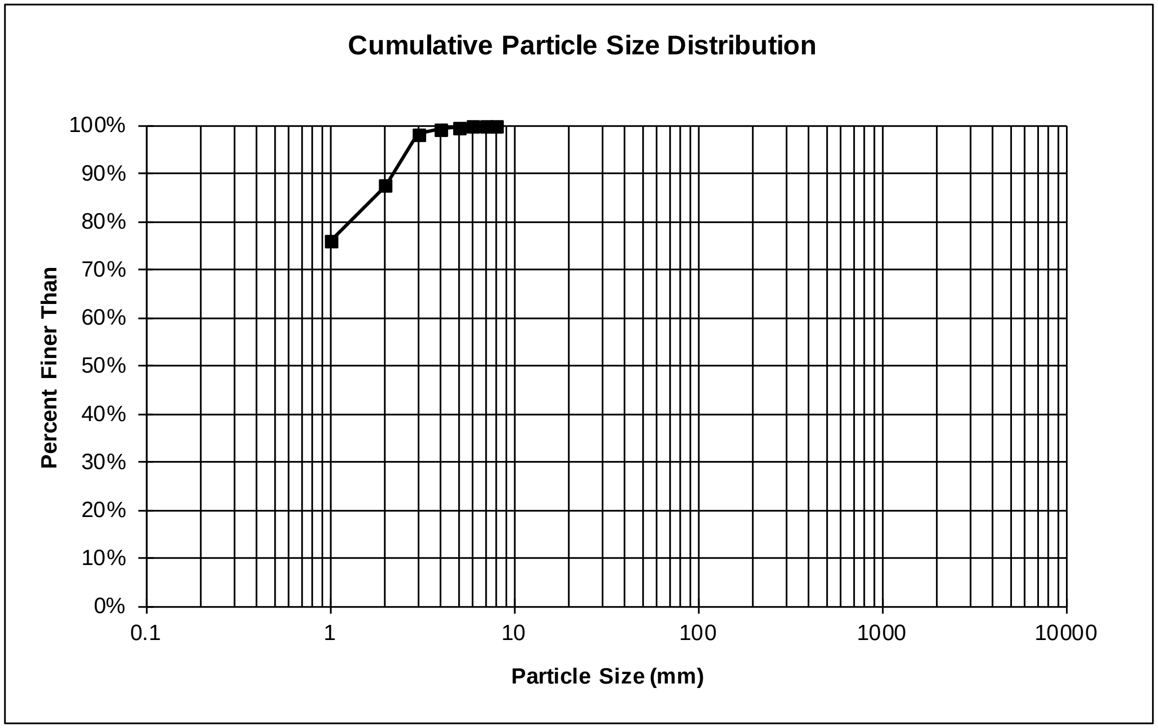
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 514.20 | 75.9% | |
| 0.5 | 78.40 | 11.6% | 75.9% |
| 1.0 | 72.70 | 10.7% | 87.5% |
| 2.0 | 6.20 | 0.9% | 98.2% |
| 2.8 | 2.40 | 0.4% | 99.1% |
| 4.0 | 1.90 | 0.3% | 99.5% |
| 5.6 | 0.20 | 0.0% | 99.8% |
| 8.0 | 1.30 | 0.2% | 99.8% |
| 10.0 | * | | 100.0% |
| 16.0 | | | - |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 677.30 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 002RW Silt Fence
DATE: 7/11/2011
CREW: Derengowski, VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.010 | 0.037 | 0.095 | 0.811 | 1.624 | 10.0 |



**Sieve Analysis Worksheet**

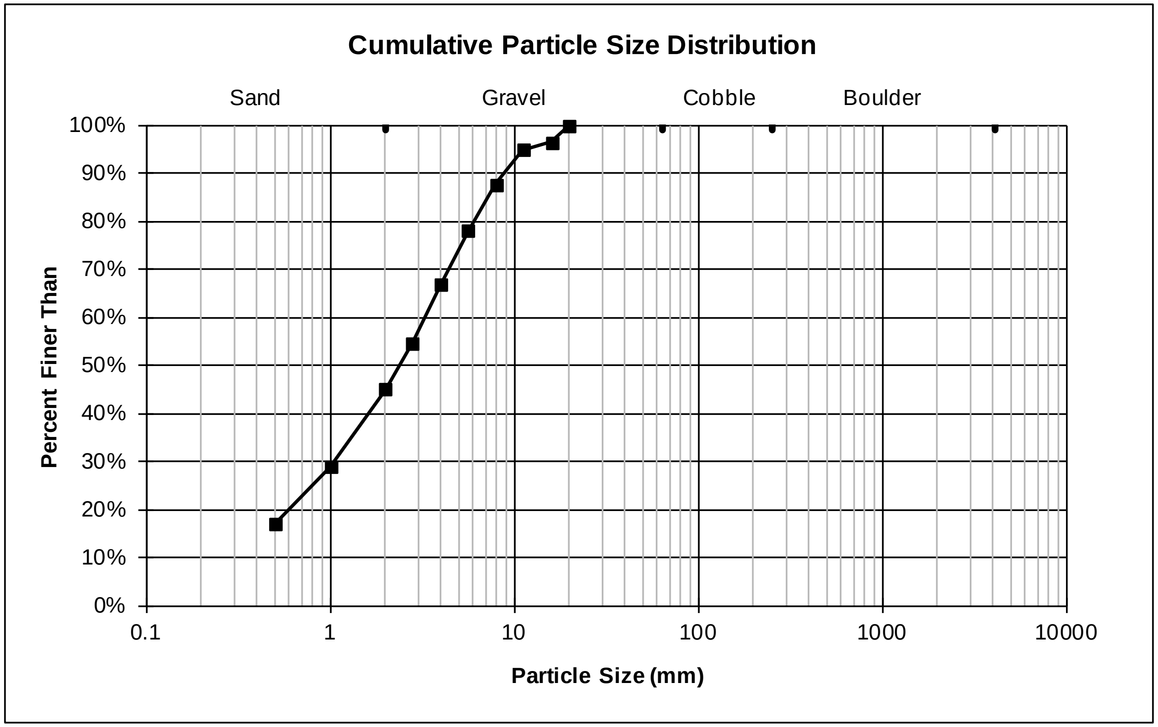
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 111.70 | 17.0% | |
| 0.5 | 78.30 | 11.9% | 17.0% |
| 1.0 | 106.20 | 16.1% | 28.9% |
| 2.0 | 63.10 | 9.6% | 45.0% |
| 2.8 | 81.00 | 12.3% | 54.6% |
| 4.0 | 73.10 | 11.1% | 66.9% |
| 5.6 | 63.10 | 9.6% | 78.0% |
| 8.0 | 47.90 | 7.3% | 87.6% |
| 11.2 | 9.80 | 1.5% | 94.9% |
| 16.0 | 23.80 | 3.6% | 96.4% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 658.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 003RW Rock Weir
DATE: 8/31/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.284** | **1.301** | **2.382** | **6.994** | **11.489** | **20.0** |



**Sieve Analysis Worksheet**

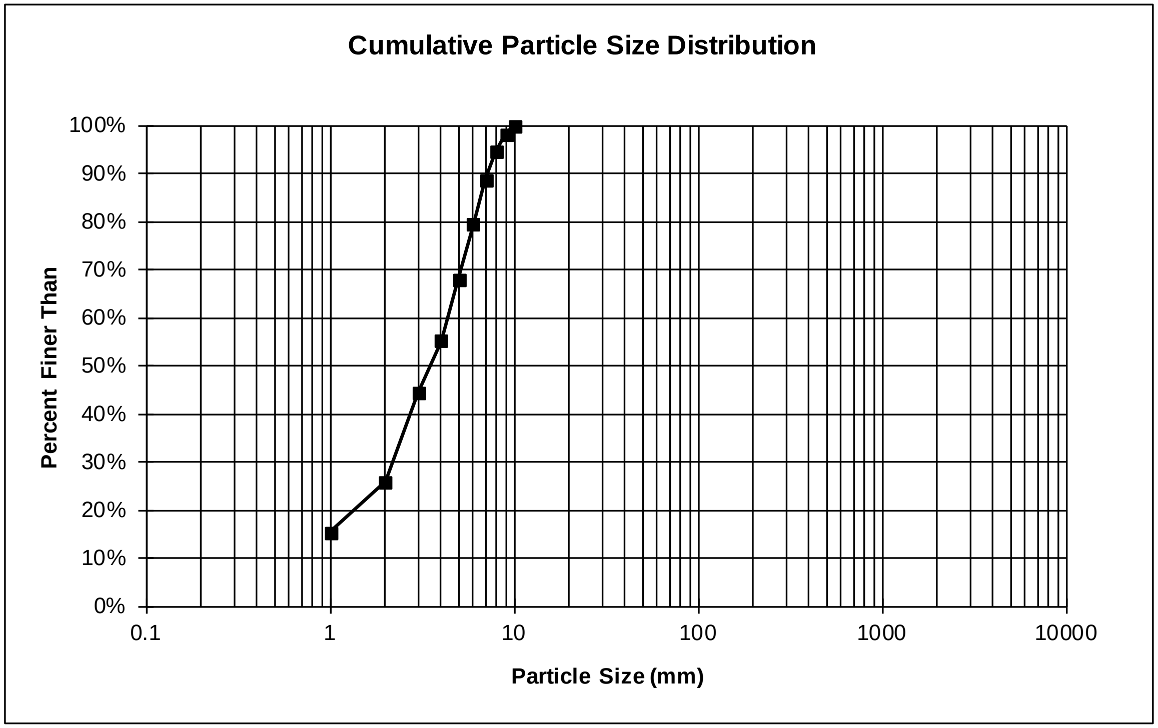
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 116.80 | 15.4% | |
| 0.5 | 79.10 | 10.4% | 15.4% |
| 1.0 | 140.30 | 18.5% | 25.9% |
| 2.0 | 82.30 | 10.9% | 44.4% |
| 2.8 | 96.10 | 12.7% | 55.2% |
| 4.0 | 86.40 | 11.4% | 67.9% |
| 5.6 | 70.60 | 9.3% | 79.3% |
| 8.0 | 44.60 | 5.9% | 88.6% |
| 11.2 | 27.30 | 3.6% | 94.5% |
| 16.0 | 14.30 | 1.9% | 98.1% |
| 19.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 757.80 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 153RW Rock Weir
DATE: 6/2/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.439 | 1.408 | 2.381 | 6.702 | 11.756 | 19.0 |



**Sieve Analysis Worksheet**

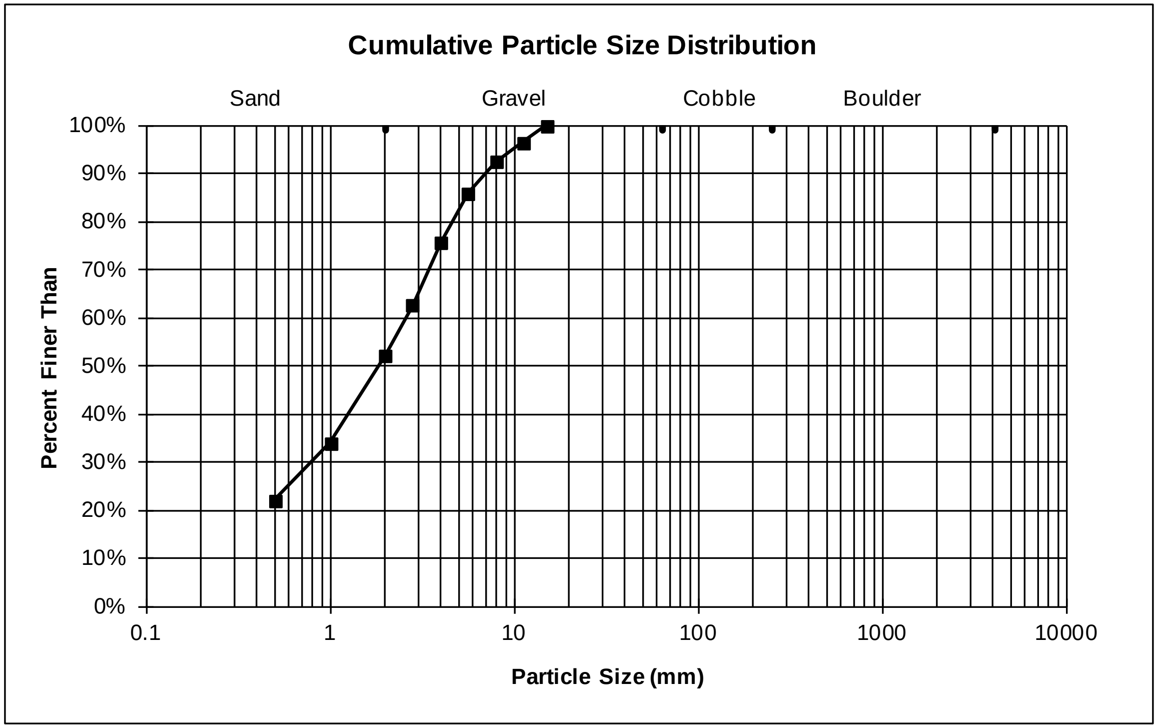
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 184.10 | 22.0% | |
| 0.5 | 100.30 | 12.0% | 22.0% |
| 1.0 | 152.50 | 18.2% | 33.9% |
| 2.0 | 86.70 | 10.3% | 52.1% |
| 2.8 | 110.10 | 13.1% | 62.5% |
| 4.0 | 85.50 | 10.2% | 75.6% |
| 5.6 | 54.60 | 6.5% | 85.8% |
| 8.0 | 34.00 | 4.1% | 92.3% |
| 11.2 | 30.20 | 3.6% | 96.4% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 838.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 161RW Rock Weir
DATE: 5/18/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.107 | 1.041 | 1.844 | 5.273 | 9.975 | 15.0 |



**Sieve Analysis Worksheet**

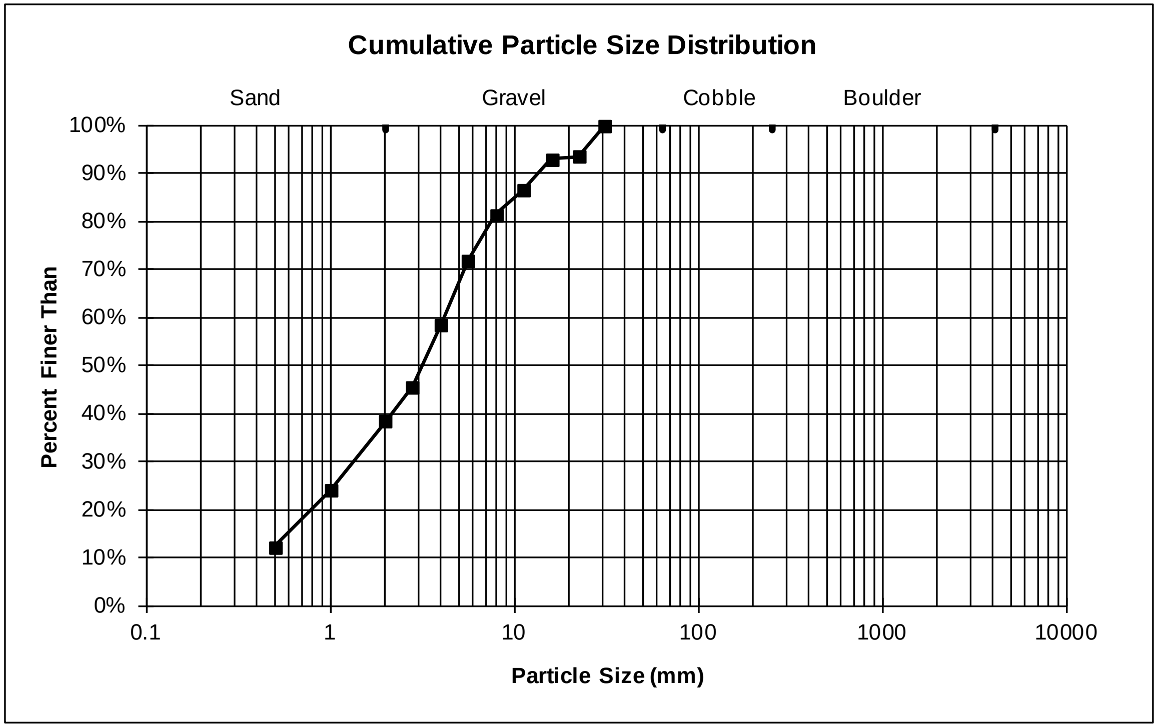
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 125.40 | 12.2% | |
| 0.5 | 119.90 | 11.7% | 12.2% |
| 1.0 | 148.20 | 14.4% | 23.9% |
| 2.0 | 74.60 | 7.3% | 38.3% |
| 2.8 | 132.60 | 12.9% | 45.6% |
| 4.0 | 137.40 | 13.4% | 58.5% |
| 5.6 | 97.50 | 9.5% | 71.8% |
| 8.0 | 52.40 | 5.1% | 81.3% |
| 11.2 | 67.20 | 6.5% | 86.4% |
| 16.0 | 4.00 | 0.4% | 93.0% |
| 22.4 | 68.20 | 6.6% | 93.4% |
| 31.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1027.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway
ID NUMBER: 161RW Silt Fence
DATE: 5/18/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.590** | **1.707** | **3.165** | **9.540** | **24.270** | **31.0** |



**Sieve Analysis Worksheet**

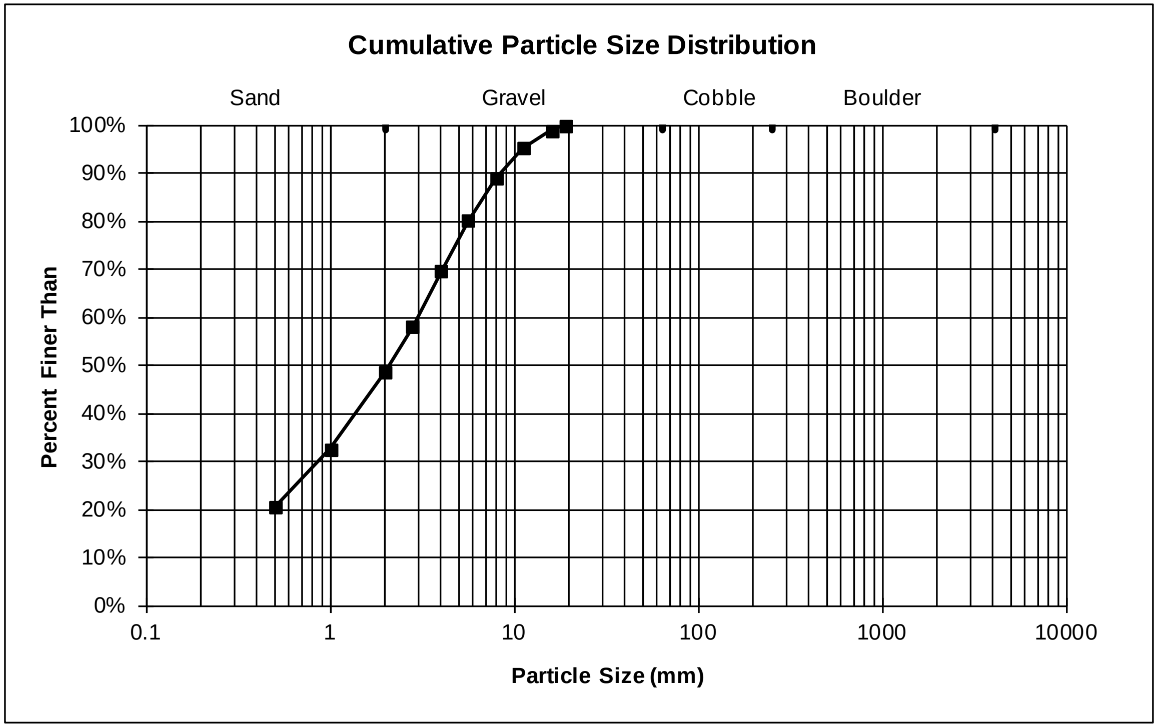
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 125.60 | 20.4% | |
| 0.5 | 74.90 | 12.2% | 20.4% |
| 1.0 | 98.90 | 16.1% | 32.6% |
| 2.0 | 57.70 | 9.4% | 48.6% |
| 2.8 | 71.20 | 11.6% | 58.0% |
| 4.0 | 65.20 | 10.6% | 69.6% |
| 5.6 | 54.10 | 8.8% | 80.2% |
| 8.0 | 38.60 | 6.3% | 88.9% |
| 11.2 | 22.50 | 3.7% | 95.2% |
| 16.0 | 7.00 | 1.1% | 98.9% |
| 19.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 615.70 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 178RW Rock Weir
DATE: 9/21/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.138 | 1.111 | 2.101 | 6.547 | 11.075 | 19.0 |



**Sieve Analysis Worksheet**

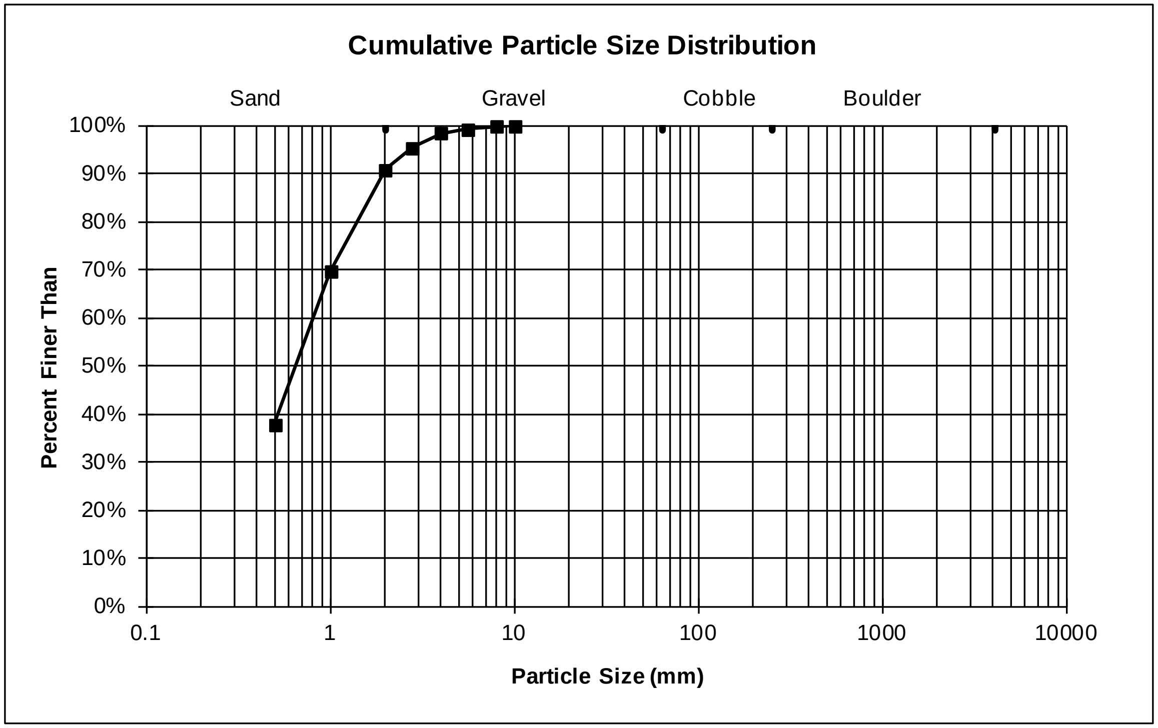
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 336.90 | 37.8% | |
| 0.5 | 282.10 | 31.7% | 37.8% |
| 1.0 | 189.30 | 21.3% | 69.5% |
| 2.0 | 40.20 | 4.5% | 90.8% |
| 2.8 | 26.50 | 3.0% | 95.3% |
| 4.0 | 8.80 | 1.0% | 98.2% |
| 5.6 | 4.40 | 0.5% | 99.2% |
| 8.0 | 2.40 | 0.3% | 99.7% |
| 10.0 | * | | 100.0% |
| 16.0 | | | - |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 890.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 180RW Silt Fence
DATE: 7/25/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.027 | 0.348 | 0.653 | 1.604 | 2.744 | 10.0 |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 167.80 | 23.6% | |
| 0.5 | 53.50 | 7.5% | 23.6% |
| 1.0 | 89.70 | 12.6% | 31.2% |
| 2.0 | 54.20 | 7.6% | 43.8% |
| 2.8 | 100.70 | 14.2% | 51.5% |
| 4.0 | 88.80 | 12.5% | 65.6% |
| 5.6 | 68.20 | 9.6% | 78.1% |
| 8.0 | 43.50 | 6.1% | 87.8% |
| 11.2 | 30.70 | 4.3% | 93.9% |
| 16.0 | 12.70 | 1.8% | 98.2% |
| 18.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 709.80 | | |

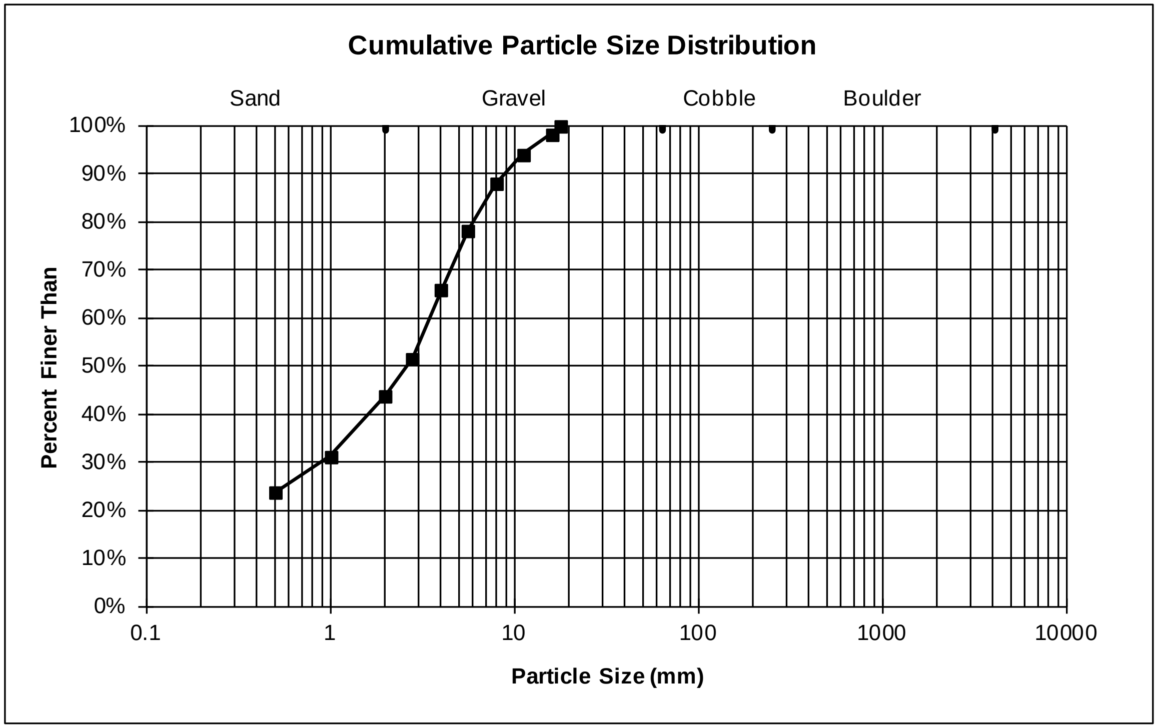
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 181RW Silt Fence
DATE: 8/29/2011
CREW: VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.085 | 1.233 | 2.627 | 6.959 | 12.278 | 18.0 |



**Sieve Analysis Worksheet**

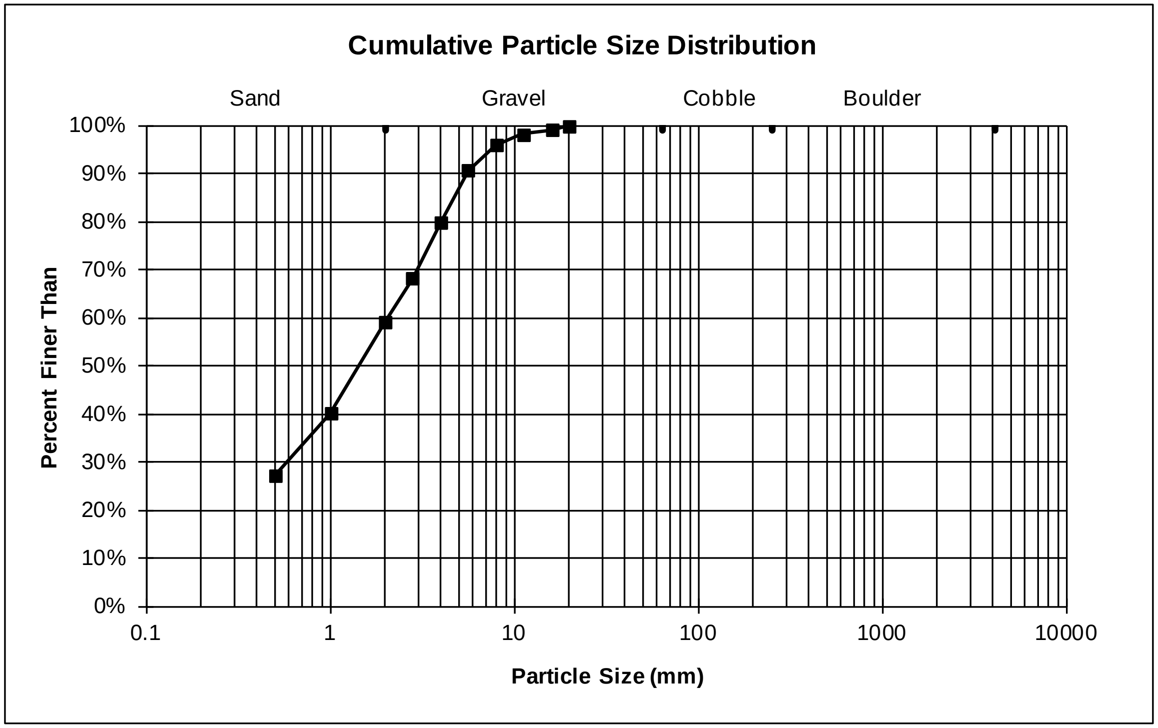
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 271.50 | 27.1% | |
| 0.5 | 129.70 | 13.0% | 27.1% |
| 1.0 | 192.30 | 19.2% | 40.1% |
| 2.0 | 89.20 | 8.9% | 59.3% |
| 2.8 | 117.60 | 11.7% | 68.2% |
| 4.0 | 106.50 | 10.6% | 79.9% |
| 5.6 | 53.20 | 5.3% | 90.6% |
| 8.0 | 22.50 | 2.2% | 95.9% |
| 11.2 | 8.30 | 0.8% | 98.1% |
| 16.0 | 10.40 | 1.0% | 99.0% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1001.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Sediment Pond
ID NUMBER: 199RW Sediment Pond
DATE: 6/6/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.057 | 0.762 | 1.431 | 4.549 | 7.539 | 20.0 |



**Sieve Analysis Worksheet**

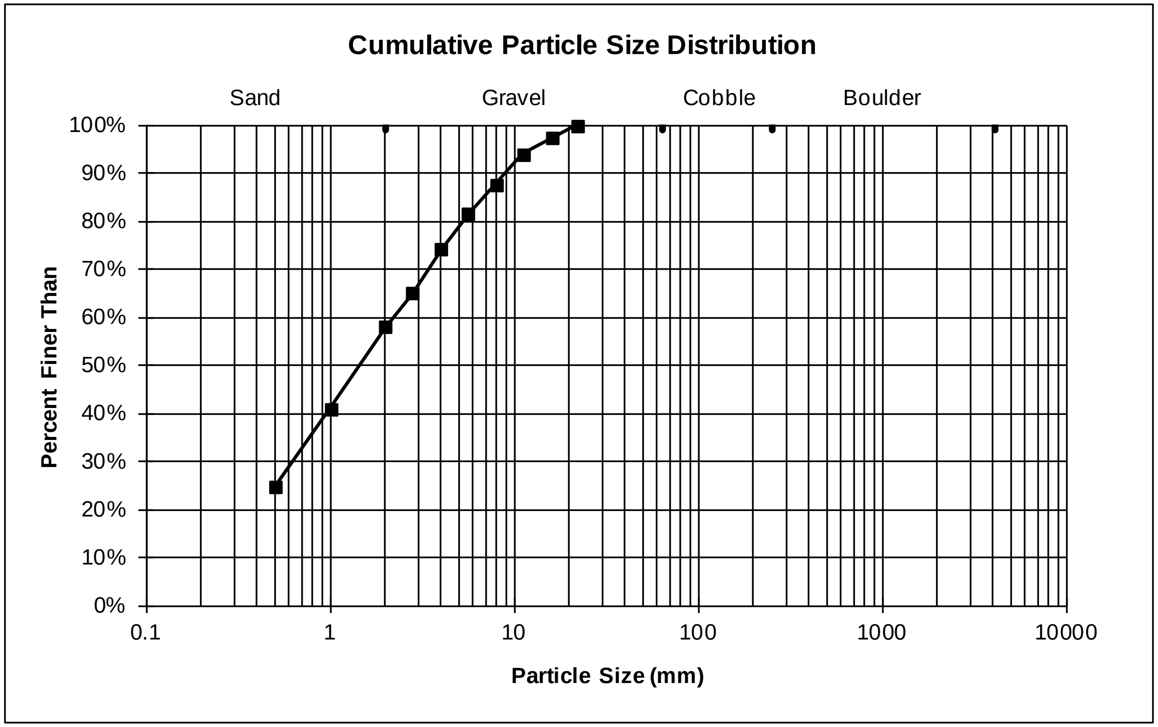
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 199.80 | 24.6% | |
| 0.5 | 131.90 | 16.3% | 24.6% |
| 1.0 | 138.50 | 17.1% | 40.9% |
| 2.0 | 57.40 | 7.1% | 58.0% |
| 2.8 | 73.00 | 9.0% | 65.1% |
| 4.0 | 60.90 | 7.5% | 74.1% |
| 5.6 | 48.60 | 6.0% | 81.6% |
| 8.0 | 52.00 | 6.4% | 87.6% |
| 11.2 | 26.40 | 3.3% | 94.0% |
| 16.0 | 22.40 | 2.8% | 97.2% |
| 22.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 810.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 200RW Rock Weir
DATE: 5/31/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.075 | 0.778 | 1.446 | 6.469 | 12.521 | 22.0 |



**Sieve Analysis Worksheet**

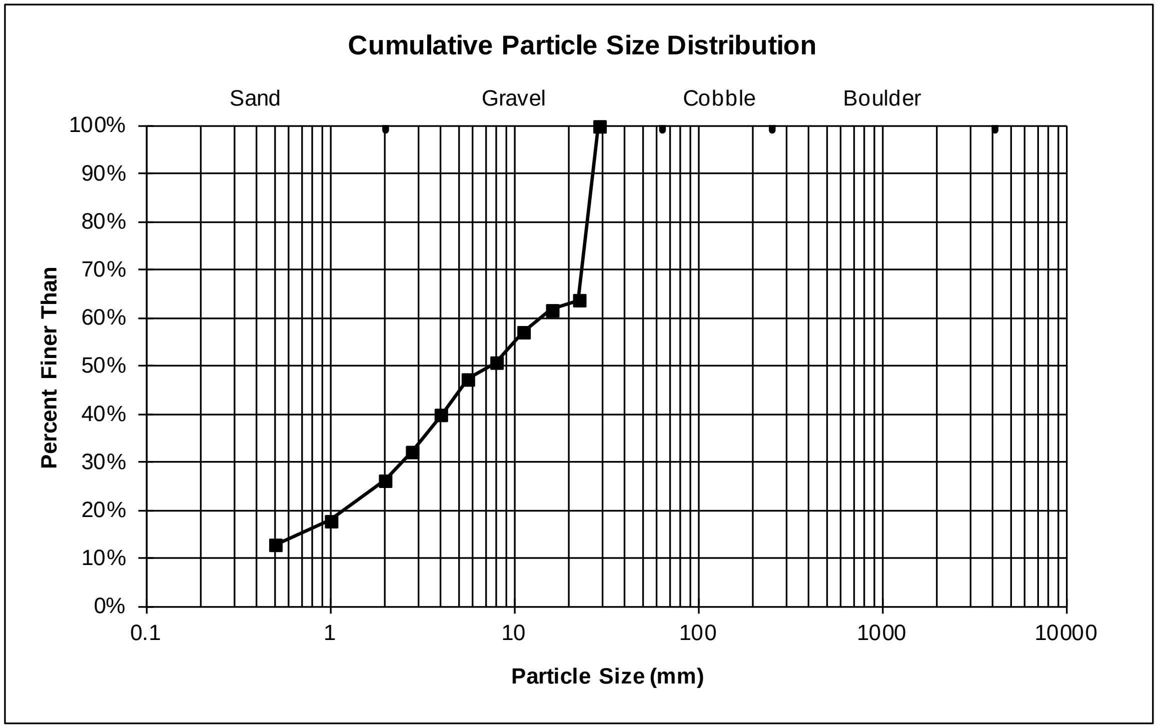
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 68.10 | 12.7% | |
| 0.5 | 28.10 | 5.2% | 12.7% |
| 1.0 | 44.50 | 8.3% | 17.9% |
| 2.0 | 32.10 | 6.0% | 26.2% |
| 2.8 | 41.00 | 7.6% | 32.1% |
| 4.0 | 40.20 | 7.5% | 39.8% |
| 5.6 | 18.30 | 3.4% | 47.2% |
| 8.0 | 33.40 | 6.2% | 50.6% |
| 11.2 | 25.70 | 4.8% | 56.8% |
| 16.0 | 11.00 | 2.0% | 61.6% |
| 22.4 | 195.40 | 36.3% | 63.7% |
| 29.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 537.80 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 200RW Silt Fence
DATE: 5/31/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.682 | 3.202 | 7.487 | 25.883 | 27.988 | 29.0 |



**Sieve Analysis Worksheet**

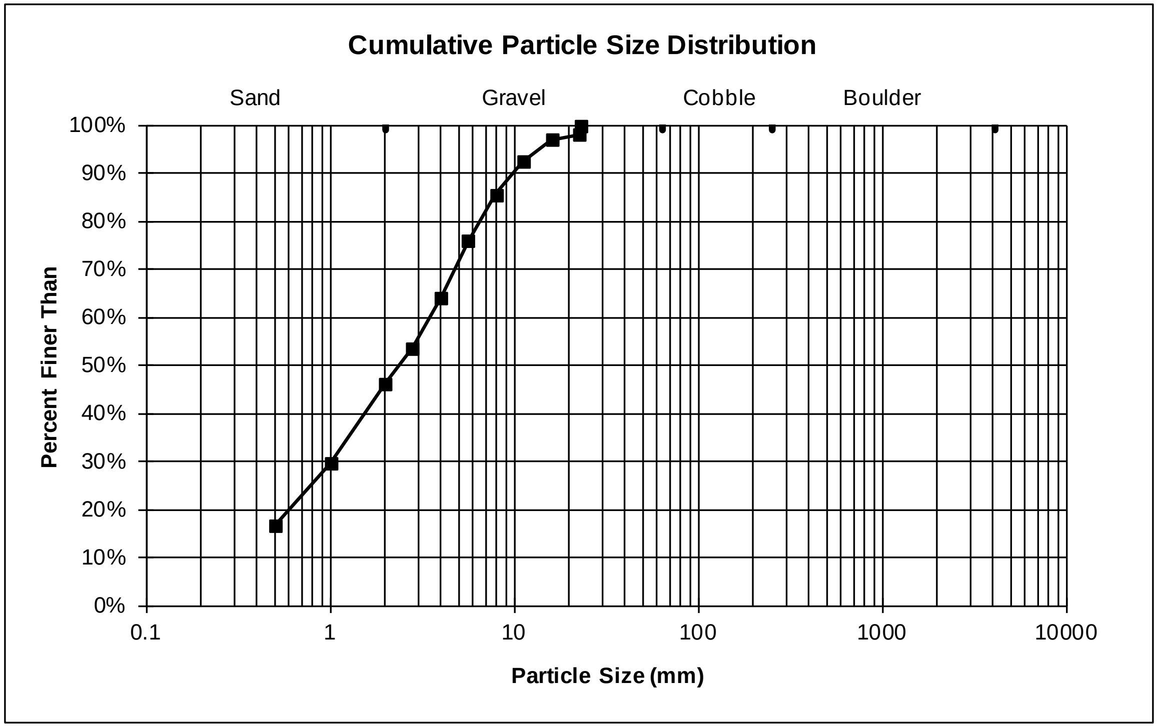
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 139.70 | 16.6% | |
| 0.5 | 109.20 | 13.0% | 16.6% |
| 1.0 | 140.30 | 16.7% | 29.6% |
| 2.0 | 61.10 | 7.3% | 46.3% |
| 2.8 | 89.50 | 10.6% | 53.5% |
| 4.0 | 98.90 | 11.8% | 64.2% |
| 5.6 | 80.70 | 9.6% | 75.9% |
| 8.0 | 57.60 | 6.8% | 85.5% |
| 11.2 | 38.20 | 4.5% | 92.3% |
| 16.0 | 8.90 | 1.1% | 96.9% |
| 22.4 | 17.30 | 2.1% | 97.9% |
| 23.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 841.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 200RW - Rock Weir
DATE: 9/7/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.313 | 1.253 | 2.379 | 7.566 | 13.796 | 23.0 |



**Sieve Analysis Worksheet**

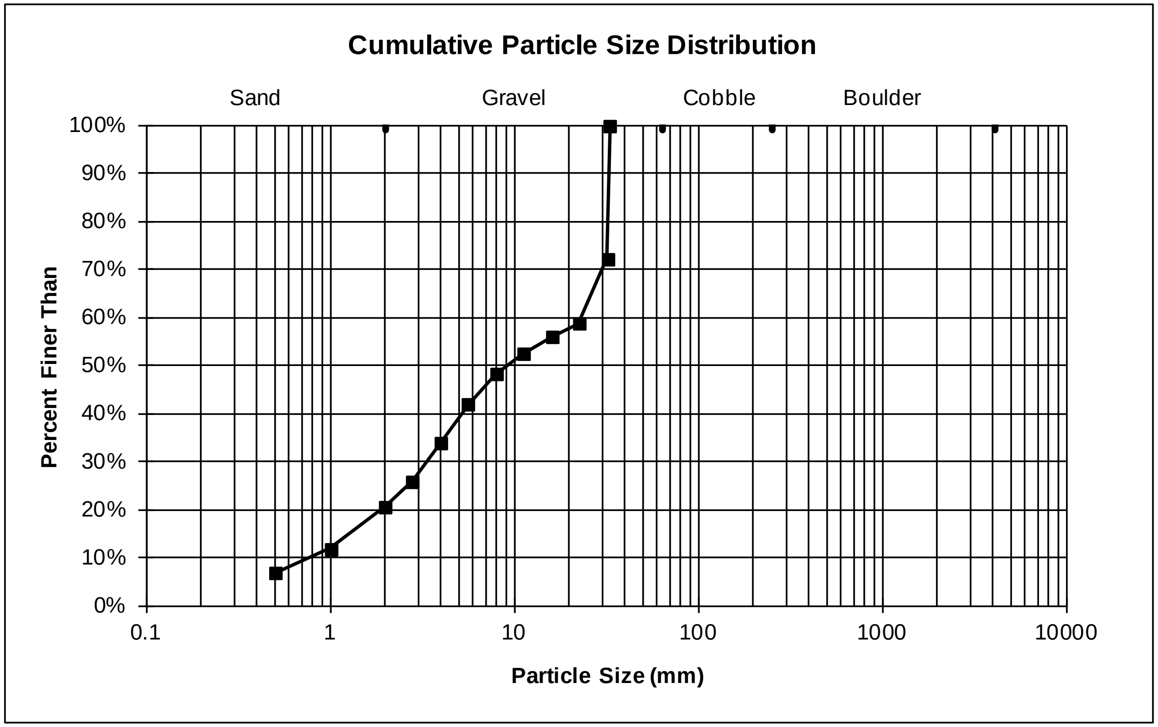
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 47.30 | 6.8% | |
| 0.5 | 34.60 | 5.0% | 6.8% |
| 1.0 | 61.10 | 8.8% | 11.8% |
| 2.0 | 37.20 | 5.3% | 20.5% |
| 2.8 | 55.80 | 8.0% | 25.9% |
| 4.0 | 55.40 | 8.0% | 33.9% |
| 5.6 | 43.30 | 6.2% | 41.9% |
| 8.0 | 30.10 | 4.3% | 48.1% |
| 11.2 | 23.50 | 3.4% | 52.4% |
| 16.0 | 19.80 | 2.8% | 55.8% |
| 22.4 | 93.70 | 13.5% | 58.6% |
| 32.0 | 194.10 | 27.9% | 72.1% |
| 33.0 | * | | 100.0% |
| 64.0 | | | - |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 695.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 200RW Silt Fence
DATE: 9/7/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 1.291 | 4.188 | 9.277 | 32.423 | 32.818 | 33.0 |



**Sieve Analysis Worksheet**

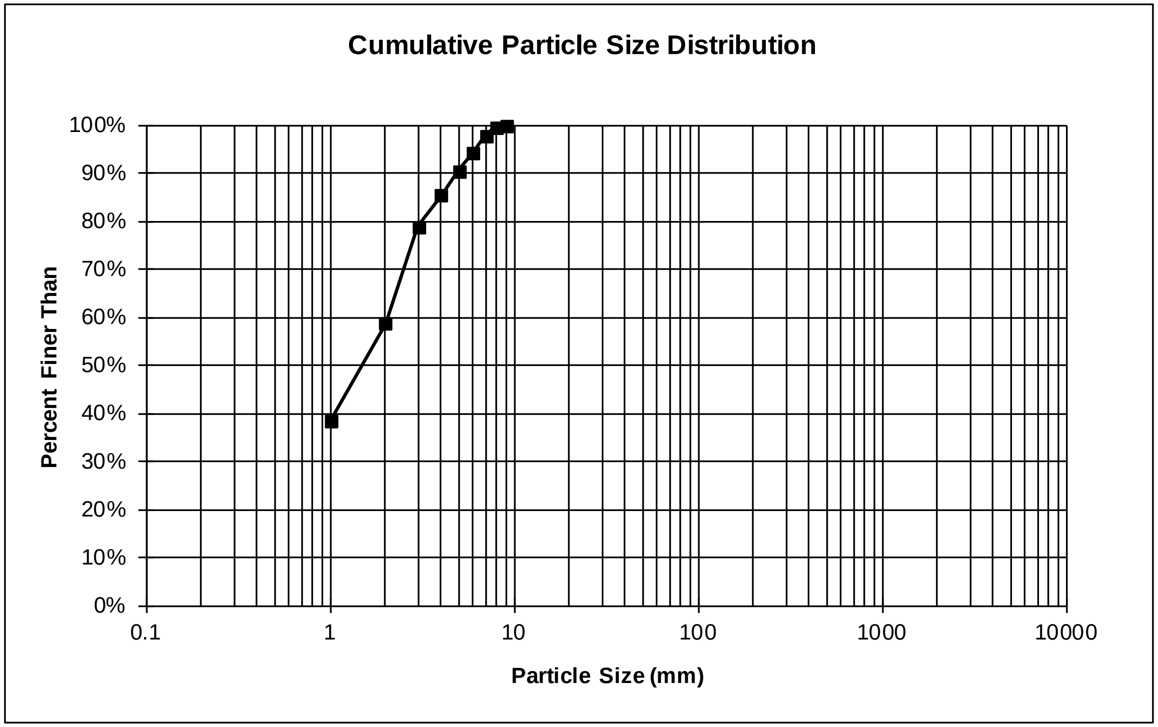
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 212.80 | 38.3% | |
| 0.5 | 113.30 | 20.4% | 38.3% |
| 1.0 | 111.30 | 20.1% | 58.7% |
| 2.0 | 36.50 | 6.6% | 78.8% |
| 2.8 | 28.30 | 5.1% | 85.4% |
| 4.0 | 21.20 | 3.8% | 90.5% |
| 5.6 | 19.30 | 3.5% | 94.3% |
| 8.0 | 10.10 | 1.8% | 97.8% |
| 11.2 | 2.30 | 0.4% | 99.6% |
| 12.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 555.10 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 233RW Rock Weir
DATE: 9/1/2011
CREW: VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.026 | 0.328 | 0.743 | 2.610 | 6.024 | 12.0 |



**Sieve Analysis Worksheet**

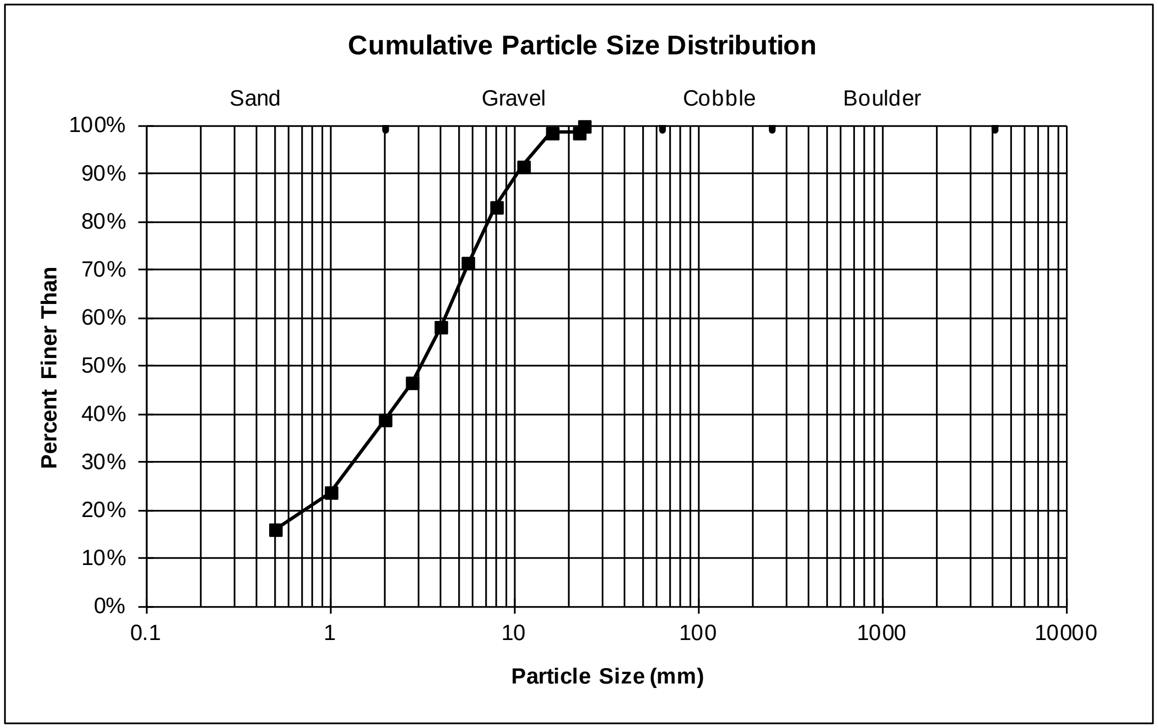
**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 142.60 | 15.9% | |
| 0.5 | 68.20 | 7.6% | 15.9% |
| 1.0 | 136.70 | 15.3% | 23.5% |
| 2.0 | 69.10 | 7.7% | 38.8% |
| 2.8 | 103.90 | 11.6% | 46.5% |
| 4.0 | 118.50 | 13.2% | 58.1% |
| 5.6 | 104.20 | 11.6% | 71.3% |
| 8.0 | 76.60 | 8.6% | 83.0% |
| 11.2 | 61.70 | 6.9% | 91.5% |
| 16.0 | 0.00 | 0.0% | 98.4% |
| 22.4 | 14.10 | 1.6% | 98.4% |
| 24.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 895.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Sediment Pond
ID NUMBER: 237RW Sediment Pond
DATE: 6/6/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.377 | 1.683 | 3.117 | 8.326 | 13.400 | 24.0 |



**Sieve Analysis Worksheet**

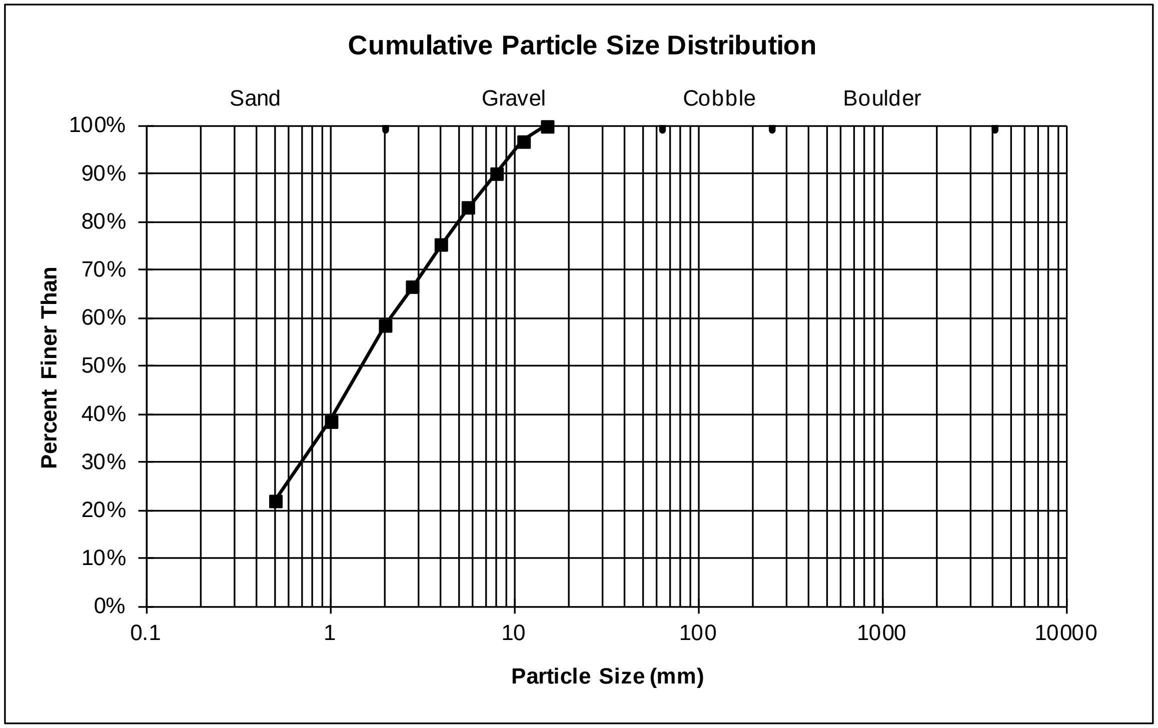
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 227.50 | 21.8% | |
| 0.5 | 174.40 | 16.7% | 21.8% |
| 1.0 | 209.00 | 20.0% | 38.4% |
| 2.0 | 83.60 | 8.0% | 58.4% |
| 2.8 | 90.40 | 8.6% | 66.4% |
| 4.0 | 81.80 | 7.8% | 75.1% |
| 5.6 | 73.10 | 7.0% | 82.9% |
| 8.0 | 71.20 | 6.8% | 89.9% |
| 11.2 | 34.30 | 3.3% | 96.7% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1045.30 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 239RW Rock Weir
DATE: 6/30/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.111** | **0.867** | **1.493** | **5.919** | **10.288** | **15.0** |



**Sieve Analysis Worksheet**

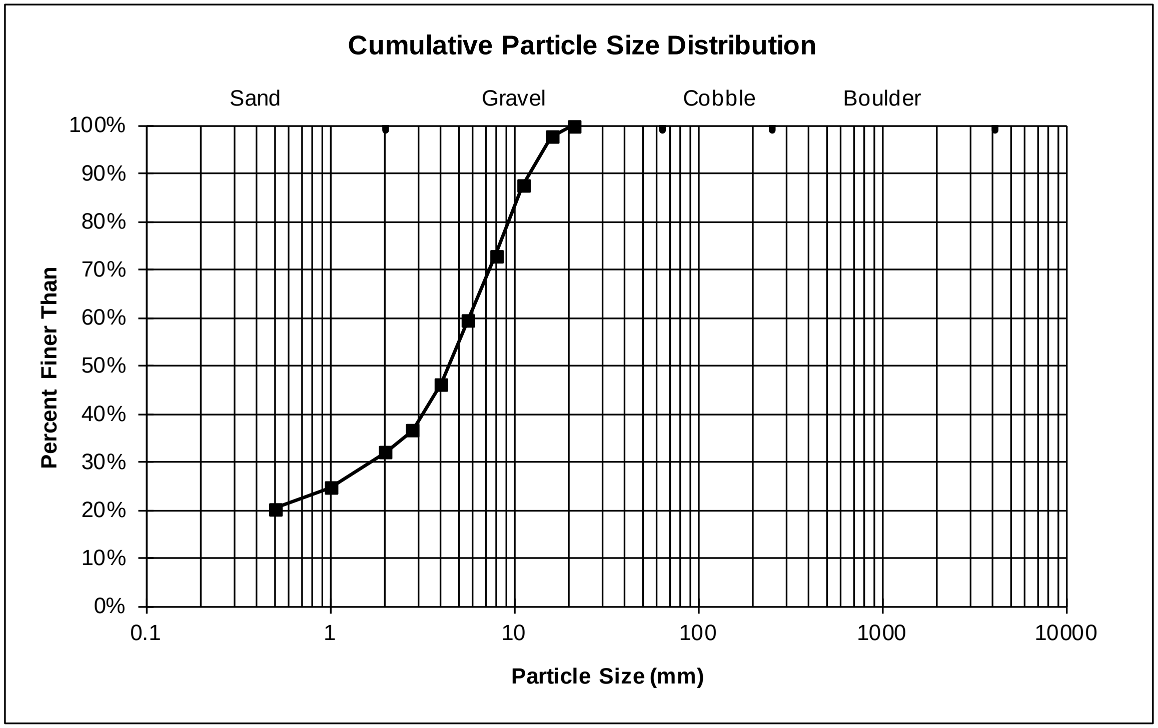
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 145.90 | 20.2% | |
| 0.5 | 32.20 | 4.5% | 20.2% |
| 1.0 | 52.50 | 7.3% | 24.7% |
| 2.0 | 33.70 | 4.7% | 31.9% |
| 2.8 | 68.80 | 9.5% | 36.6% |
| 4.0 | 97.50 | 13.5% | 46.1% |
| 5.6 | 95.00 | 13.2% | 59.6% |
| 8.0 | 105.20 | 14.6% | 72.8% |
| 11.2 | 74.30 | 10.3% | 87.4% |
| 16.0 | 16.80 | 2.3% | 97.7% |
| 21.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 721.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 240RW Rock Weir
DATE: 6/30/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.143 | 2.493 | 4.404 | 10.359 | 14.585 | 21.0 |



**Sieve Analysis Worksheet**

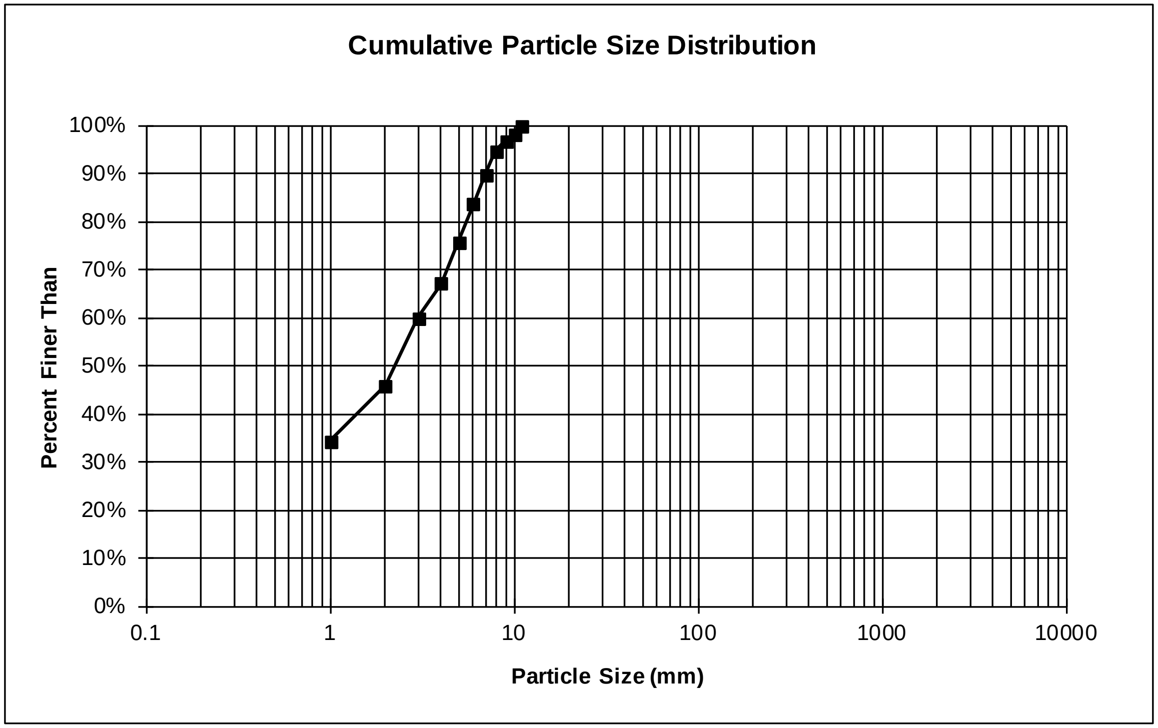
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 308.60 | 34.3% | |
| 0.5 | 104.10 | 11.6% | 34.3% |
| 1.0 | 125.40 | 14.0% | 45.9% |
| 2.0 | 65.10 | 7.2% | 59.9% |
| 2.8 | 77.20 | 8.6% | 67.1% |
| 4.0 | 71.50 | 8.0% | 75.7% |
| 5.6 | 53.80 | 6.0% | 83.7% |
| 8.0 | 45.10 | 5.0% | 89.7% |
| 11.2 | 18.10 | 2.0% | 94.7% |
| 16.0 | 12.30 | 1.4% | 96.7% |
| 22.4 | 17.40 | 1.9% | 98.1% |
| 25.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 898.60 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Grab Sample of 2011 Sediment Accumulation

SITE NAME: Pike's Peak Highway - Rock Weir
ID NUMBER: 242RW Rock Weir
DATE: 6/30/2011
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.032 | 0.520 | 1.224 | 5.710 | 11.852 | 25.0 |



# Appendix L

# Sediment Pond

# Suspended Sediment Data

# 2012

## Summary of Sediment Pond Suspended Sediment Analysis of Grab Samples on Pikes Peak, 2012

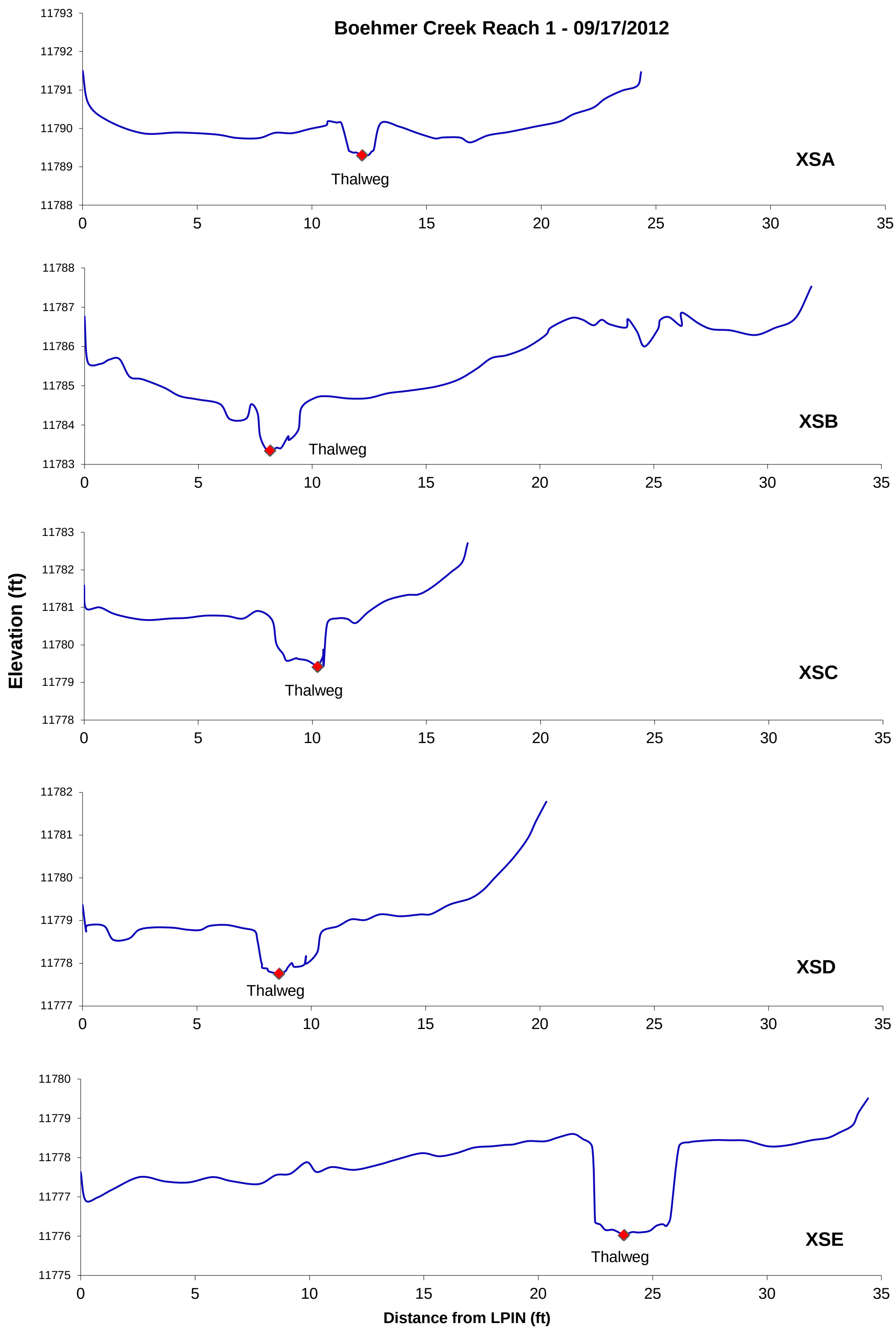
| Site ID | Date | Tin + Filter Initial (g) | Tin +Filter Final (g) | Bottle Initial (g) | Bottle Final (g) | Weight Sample (g) | Weight Solids (g) | Solids (mg/l) |
|---|---|---|---|---|---|---|---|---|
| 199RW Entrance Culvert | 05/24/12 | 1.0905 | 1.0978 | 1129.3 | 107.5 | 1021.8 | 0.0073 | 7.1 |
| 199RW Above Sed Pond | 05/24/12 | 1.1010 | 1.1073 | 1093.8 | 106.8 | 987.0 | 0.0063 | 6.4 |
| 199RW Exit Culvert | 05/24/12 | 1.0806 | 1.0877 | 1119.7 | 103.0 | 1016.7 | 0.0071 | 7.0 |
| 199RW Entrance Culvert | 07/02/12 | 1.0730 | 1.0880 | 1142.0 | 92.3 | 1049.7 | 0.0150 | 14.3 |
| 199RW Above Sed Pond | 07/02/12 | 1.0881 | 1.1519 | 1113.8 | 107.3 | 1006.5 | 0.0638 | 63.4 |
| 199RW Exit Culvert | 07/02/12 | 1.0644 | 1.0673 | 1121.4 | 106.0 | 1015.4 | 0.0029 | 2.9 |
| 199RW Entrance Culvert | 07/03/12 | 1.0747 | 1.4790 | 1100.3 | 107.2 | 993.1 | 0.4043 | 407.1 |
| 199RW Above Sed Pond | 07/03/12 | 1.0729 | 1.5159 | 996.1 | 106.3 | 889.8 | 0.4430 | 497.9 |
| 199RW Exit Culvert | 07/03/12 | 1.0834 | 1.7137 | 1105.3 | 106.7 | 998.6 | 0.6303 | 631.2 |
| 199RW Entrance Culvert | 08/01/12 | 1.0824 | 1.3708 | 1139.8 | 105.4 | 1034.4 | 0.2884 | 278.8 |
| 199RW Above Sed Pond | 08/01/12 | 1.0862 | 1.5381 | 1100.1 | 92.2 | 1007.9 | 0.4519 | 448.4 |
| 199RW Exit Culvert | 08/01/12 | 1.0964 | 1.1020 | 1127.3 | 103.4 | 1023.9 | 0.0056 | 5.5 |
| 199RW Entrance Culvert | 08/23/12 | 1.0797 | 1.8650 | 1094.4 | 108.5 | 985.9 | 0.7853 | 796.5 |
| 199RW Above Sed Pond | 08/23/12 | 1.0850 | 1.1903 | 1084.5 | 109.1 | 975.4 | 0.1053 | 108.0 |
| 199RW Exit Culvert | 08/23/12 | 1.0805 | 1.1638 | 1076.0 | 107.5 | 968.5 | 0.0833 | 86.0 |
| 199RW Entrance Culvert | 09/27/12 | 1.0892 | 1.2118 | 1096.0 | 111.4 | 984.6 | 0.1226 | 124.5 |
| 199RW Above Sed Pond | 09/27/12 | 1.0766 | 1.1236 | 1113.4 | 109.4 | 1004.0 | 0.0470 | 46.8 |
| 199RW Exit Culvert | 09/27/12 | 1.1005 | 1.3240 | 1086.4 | 110.0 | 976.4 | 0.2235 | 228.9 |
| 237RW Entrance Culvert | 07/16/12 | 1.0712 | 2.8869 | 1054.2 | 106.1 | 948.1 | 1.8157 | 1915.1 |
| 237RW Exit Culvert | 07/16/12 | 1.0771 | 1.1683 | 1112.3 | 102.9 | 1009.4 | 0.0912 | 90.4 |
| 237RW Entrance Culvert | 08/01/12 | 1.0997 | 3.2873 | 1118.9 | 93.0 | 1025.9 | 2.1876 | 2132.4 |
| 237RW Exit Culvert | 08/01/12 | 1.0709 | 1.2065 | 1130.1 | 108.8 | 1021.3 | 0.1356 | 132.8 |
| 237RW Entrance Culvert | 08/13/12 | 1.0931 | 1.2055 | 1121.3 | 106.2 | 1015.1 | 0.1124 | 110.7 |
| 237RW Exit Culvert | 08/13/12 | 1.1053 | 1.1396 | 1101.4 | 104.4 | 997.0 | 0.0343 | 34.4 |
| 237RW Entrance Culvert | 08/23/12 | 1.0940 | 9.0943 | 1100.8 | 108.6 | 992.2 | 8.0003 | 8063.2 |
| 237RW Exit Culvert | 08/23/12 | 1.0904 | 1.1175 | 1122.2 | 108.3 | 1013.9 | 0.0271 | 26.7 |

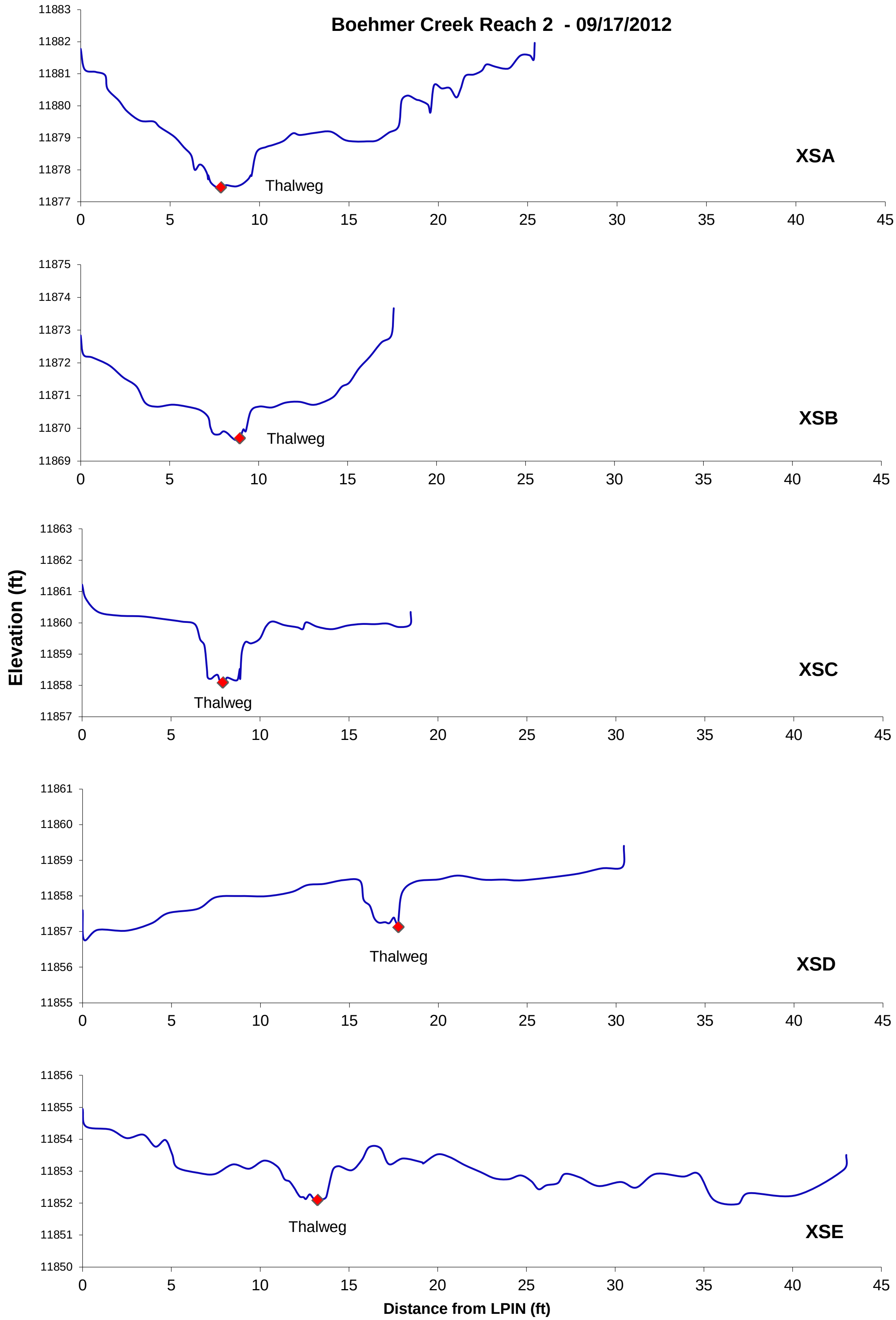
# Appendix M

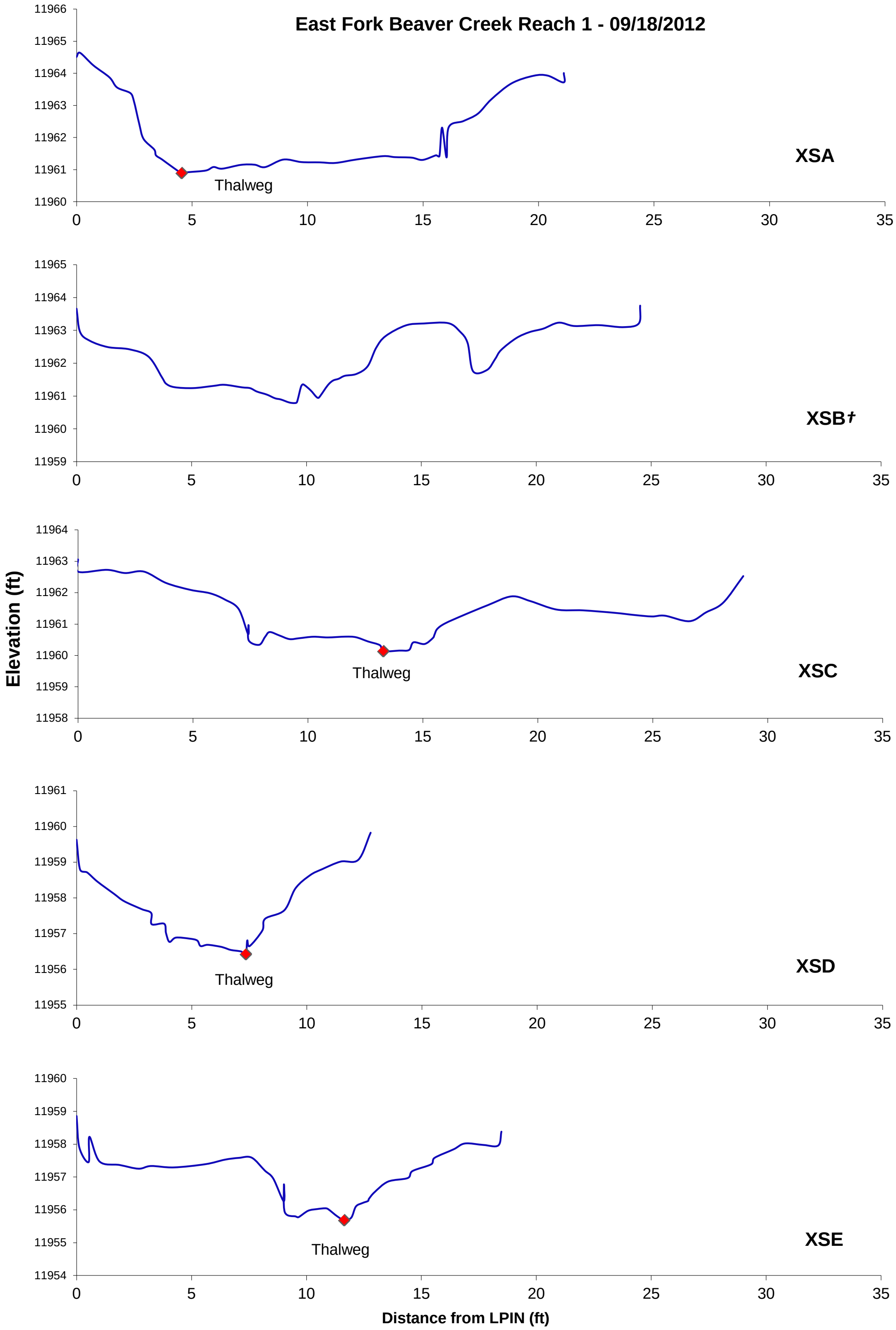
# Stream Channel

# Cross Section Graphs

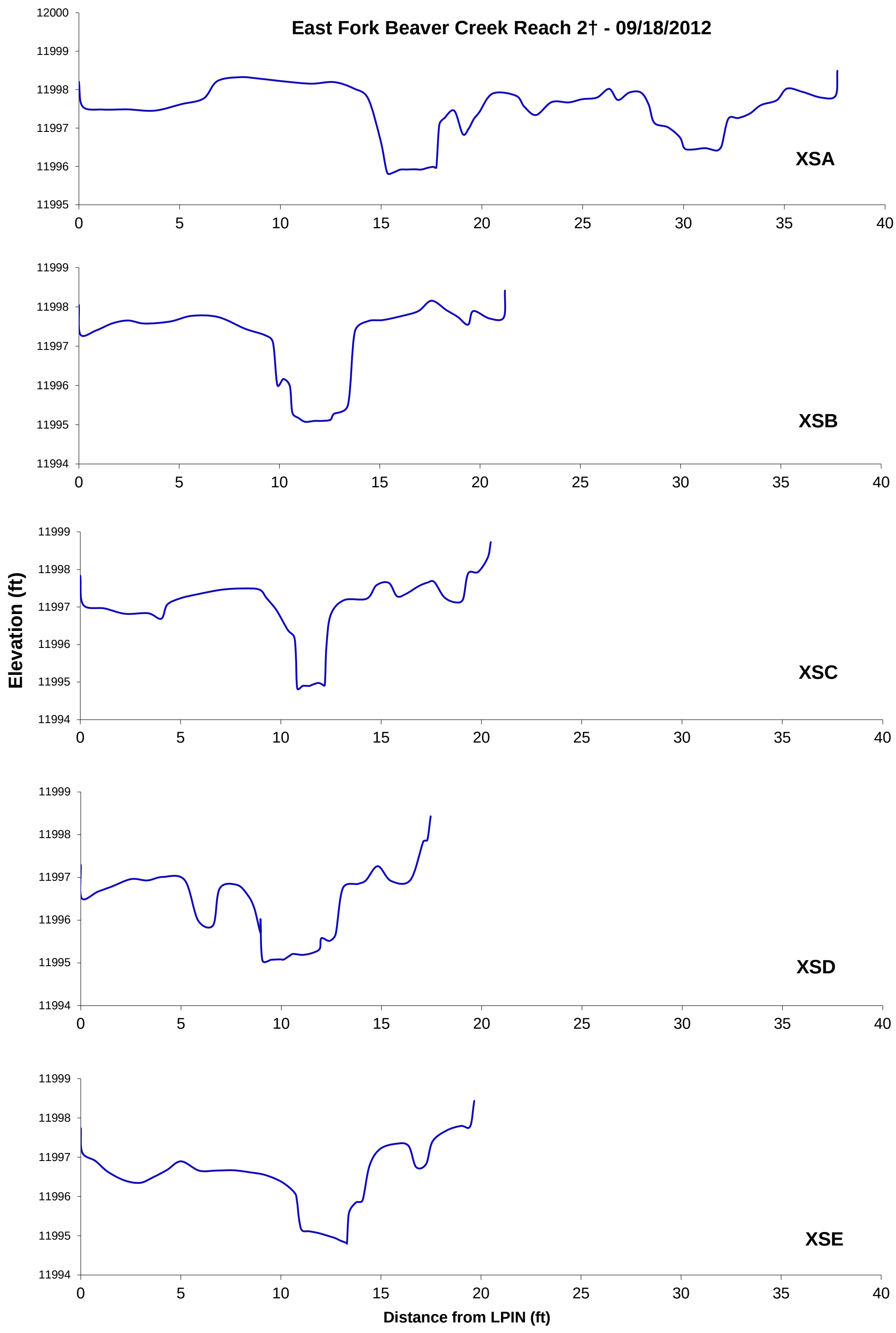
# 2012


Boehmer Creek Reach 1 - 09/17/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
Thalweg
11793
11792
11791
11790
11789
11788
11787
11786
11785
11784
11783
11782
11781
11780
11779
11778
11777
11776
11775
0
5
10
15
20
25
30
35

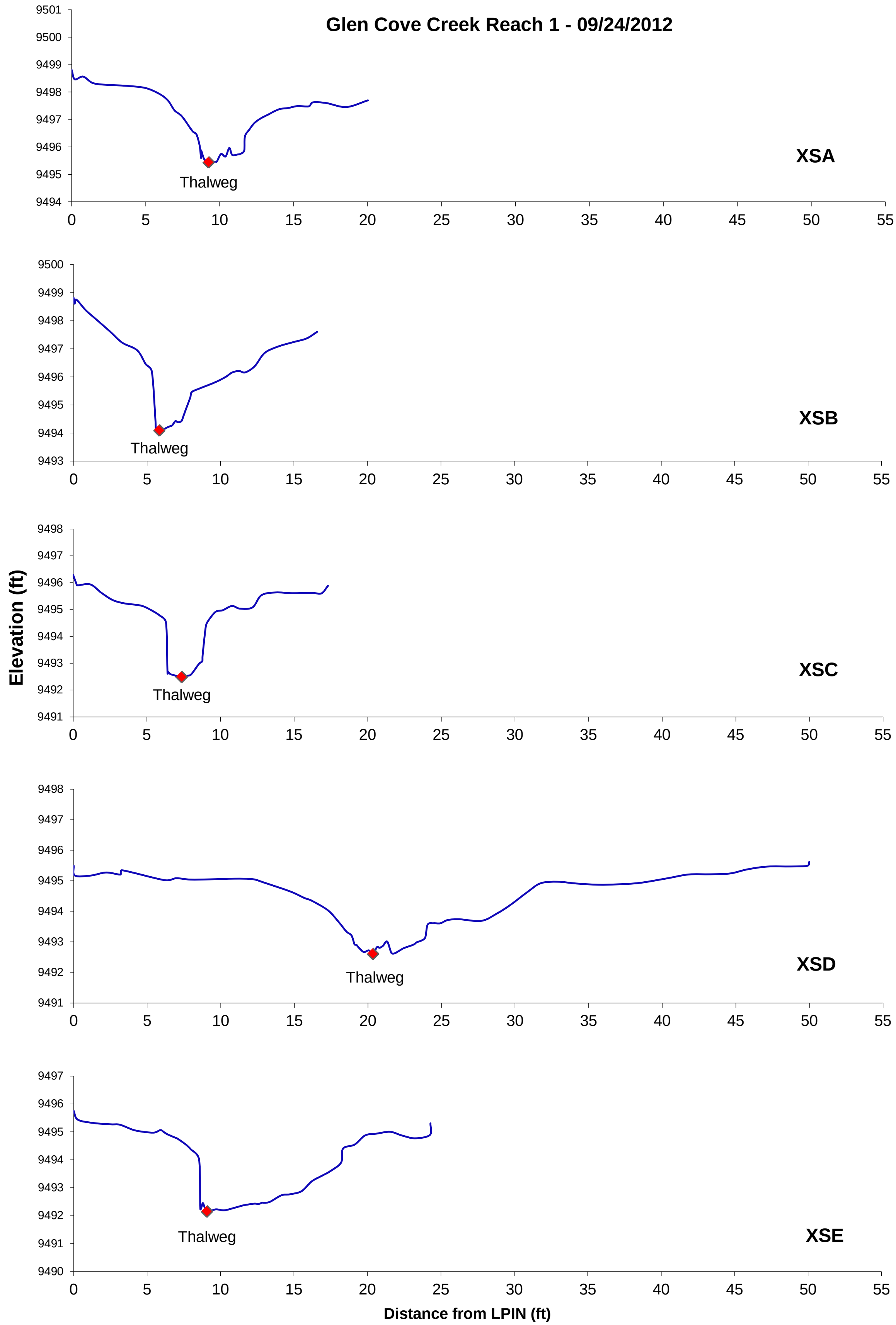

Boehmer Creek Reach 2 - 09/17/2012
XSA
Thalweg
XSB
Thalweg
XSC
Thalweg
XSD
Thalweg
XSE
Thalweg
Elevation (ft)
Distance from LPIN (ft)



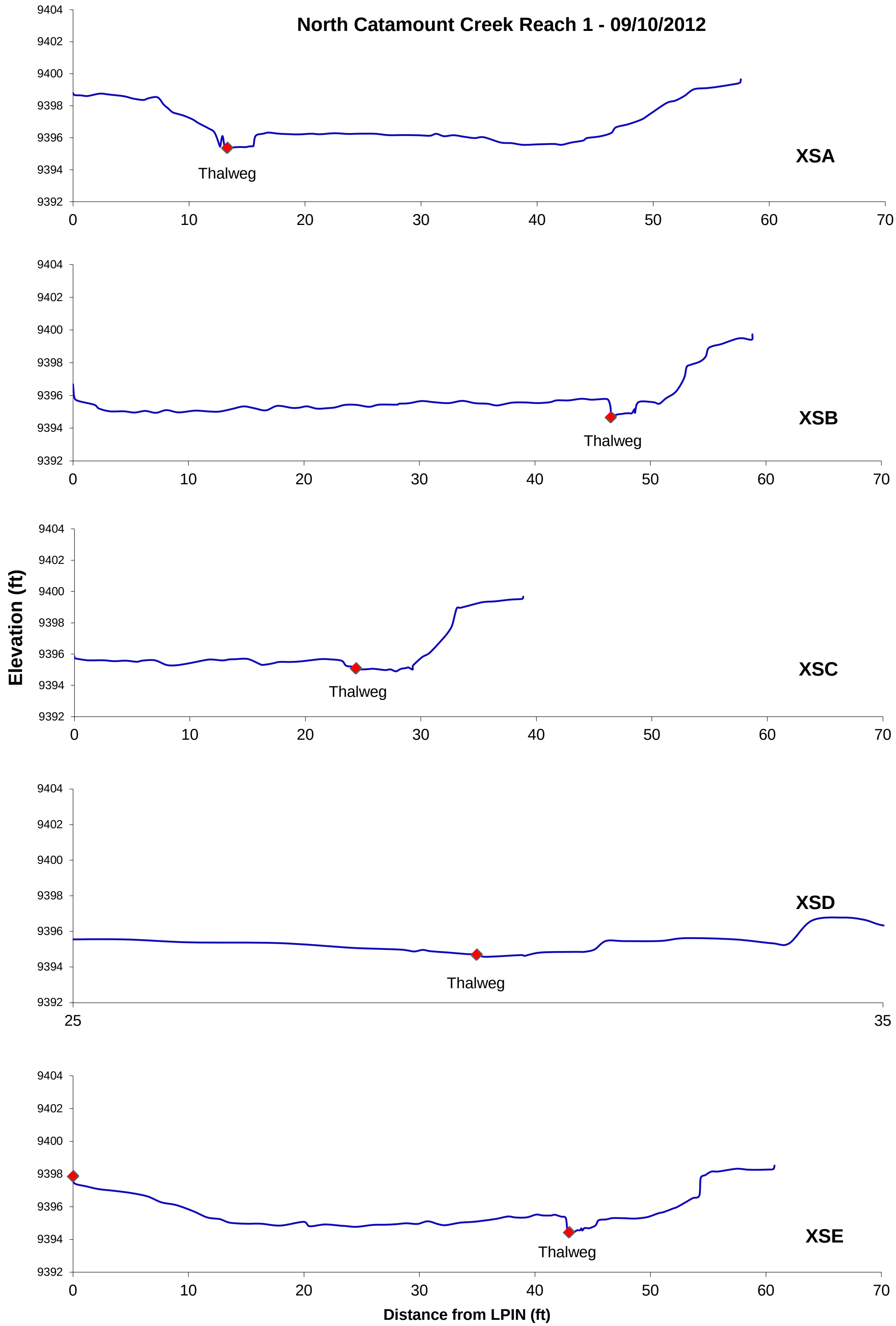

*†Thalweg not marked as wetted perimeter not identified.*

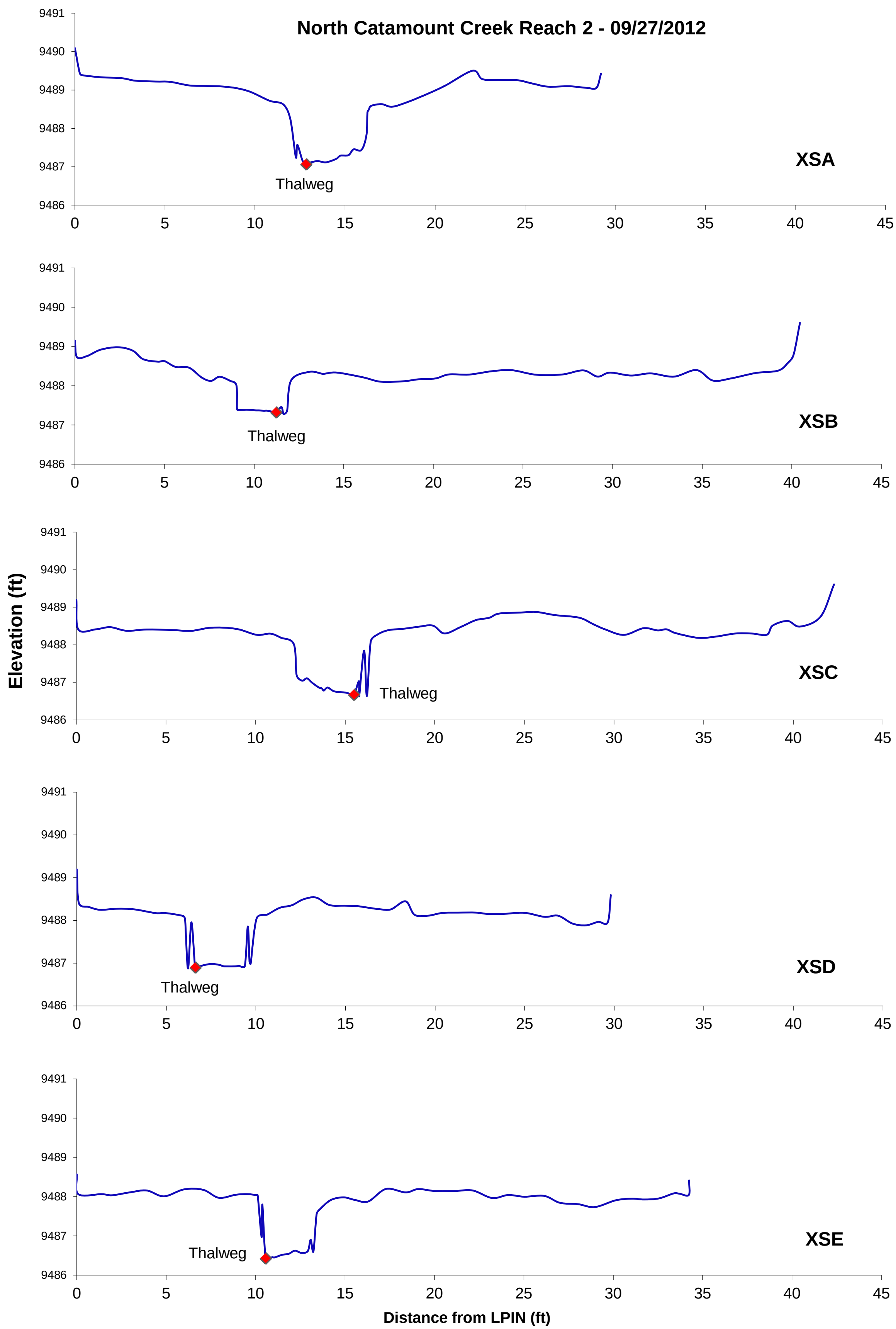


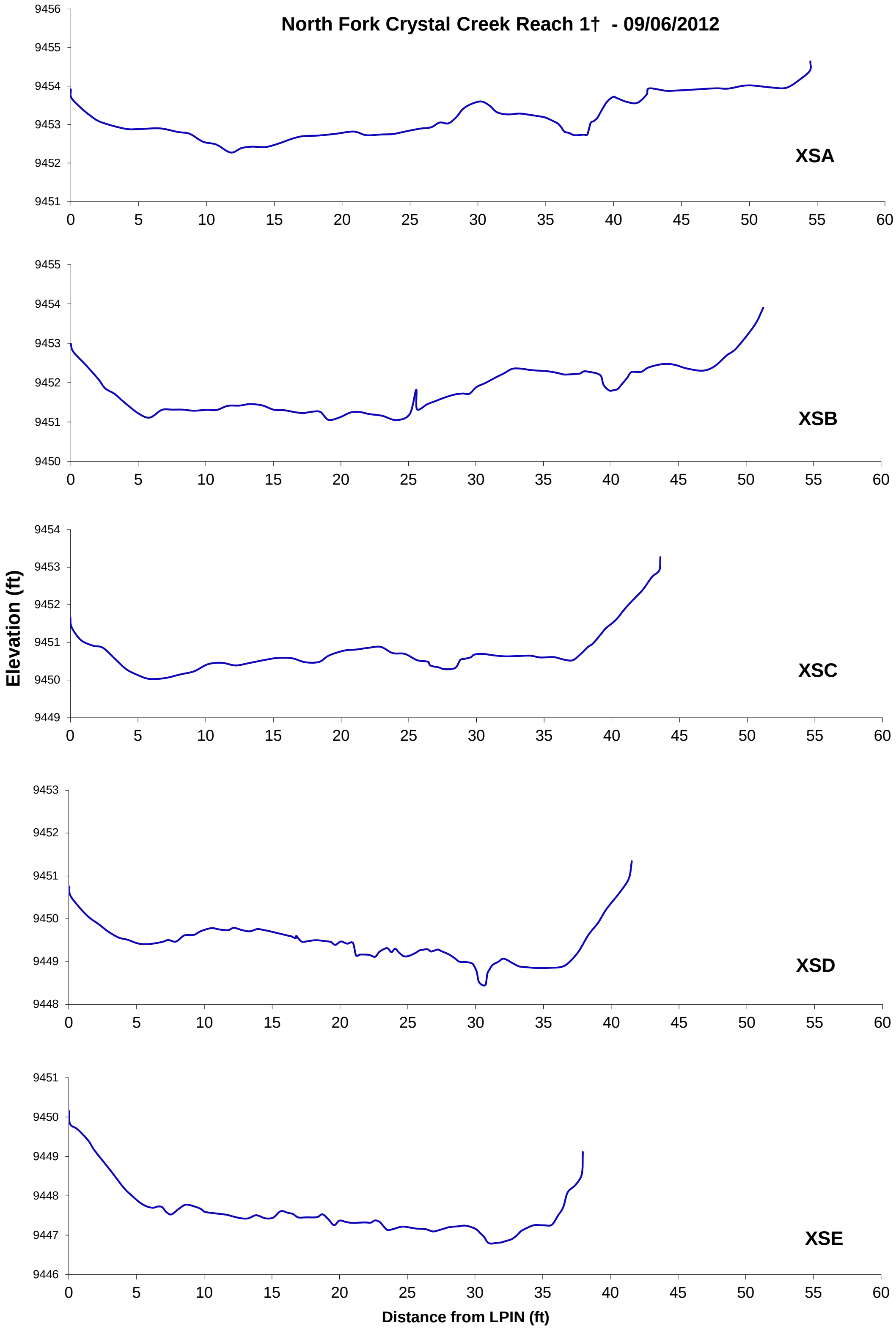

*†Thalweg not marked as wetted perimeter not identified.*



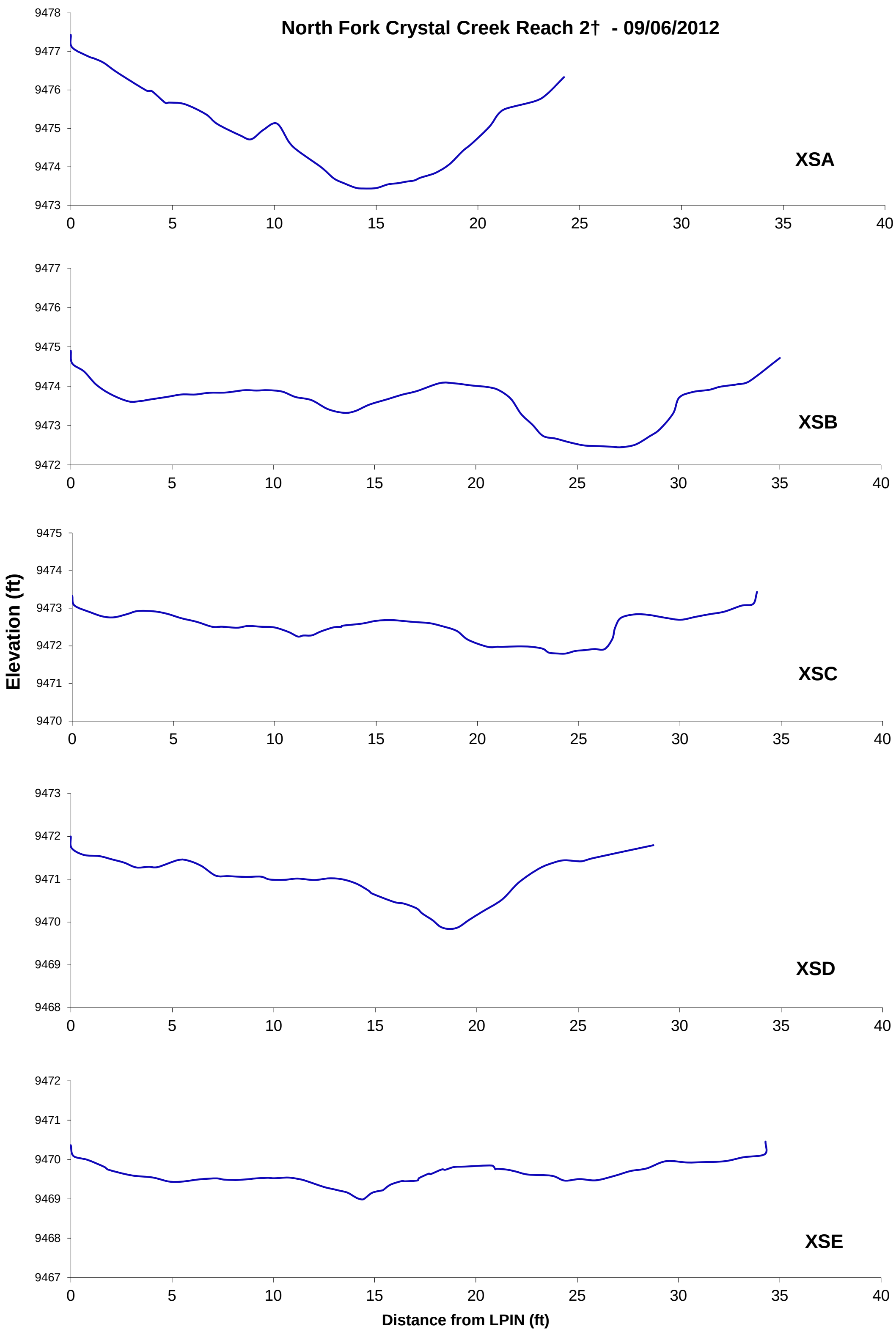
Glen Cove Creek Reach 1 - 09/24/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
Thalweg


North Catamount Creek Reach 1 - 09/10/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
Thalweg
9404
9402
9400
9398
9396
9394
9392
0
10
20
30
40
50
60
70
25
35

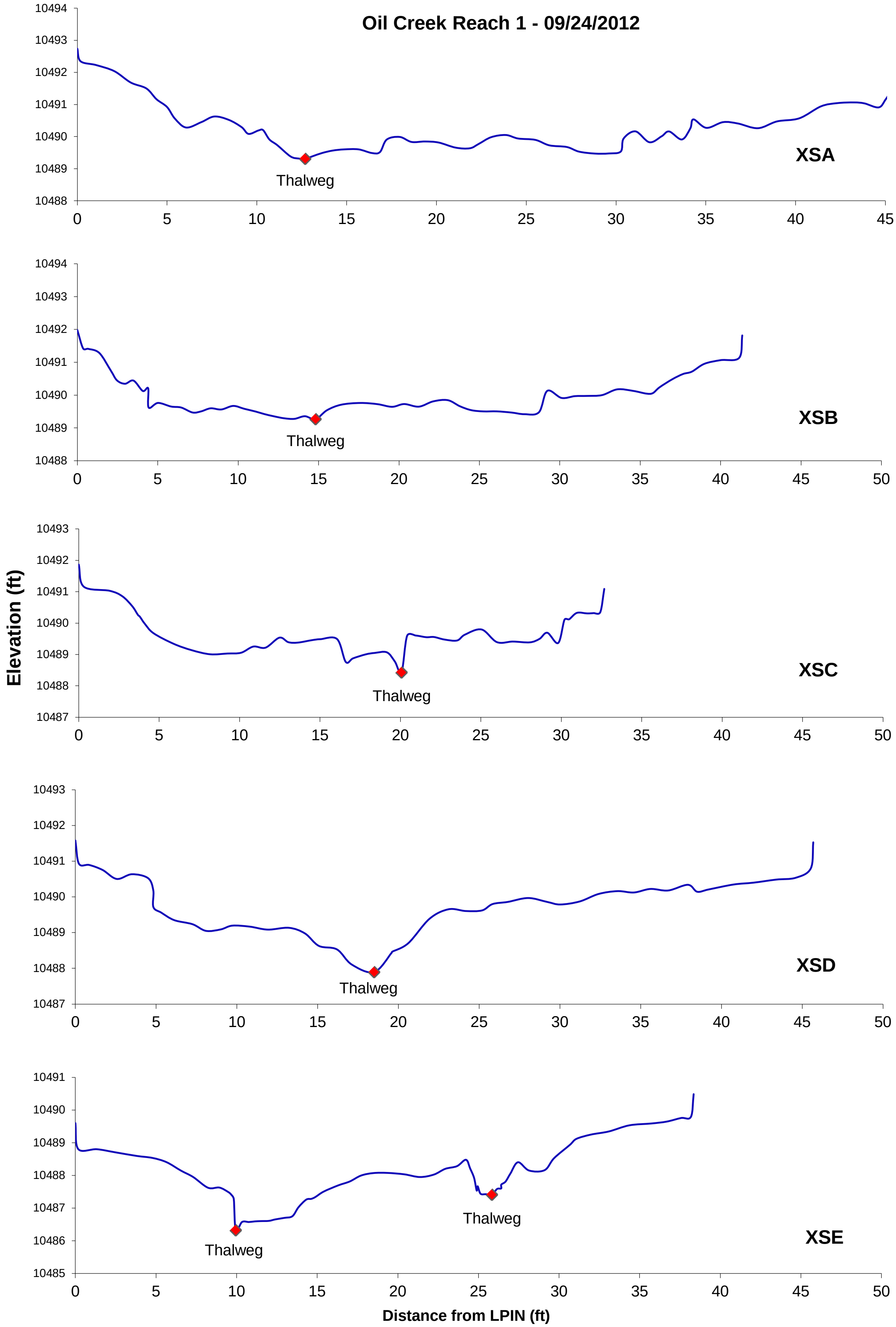

North Catamount Creek Reach 2 - 09/27/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
Thalweg
9491
9490
9489
9488
9487
9486
0
5
10
15
20
25
30
35
40
45

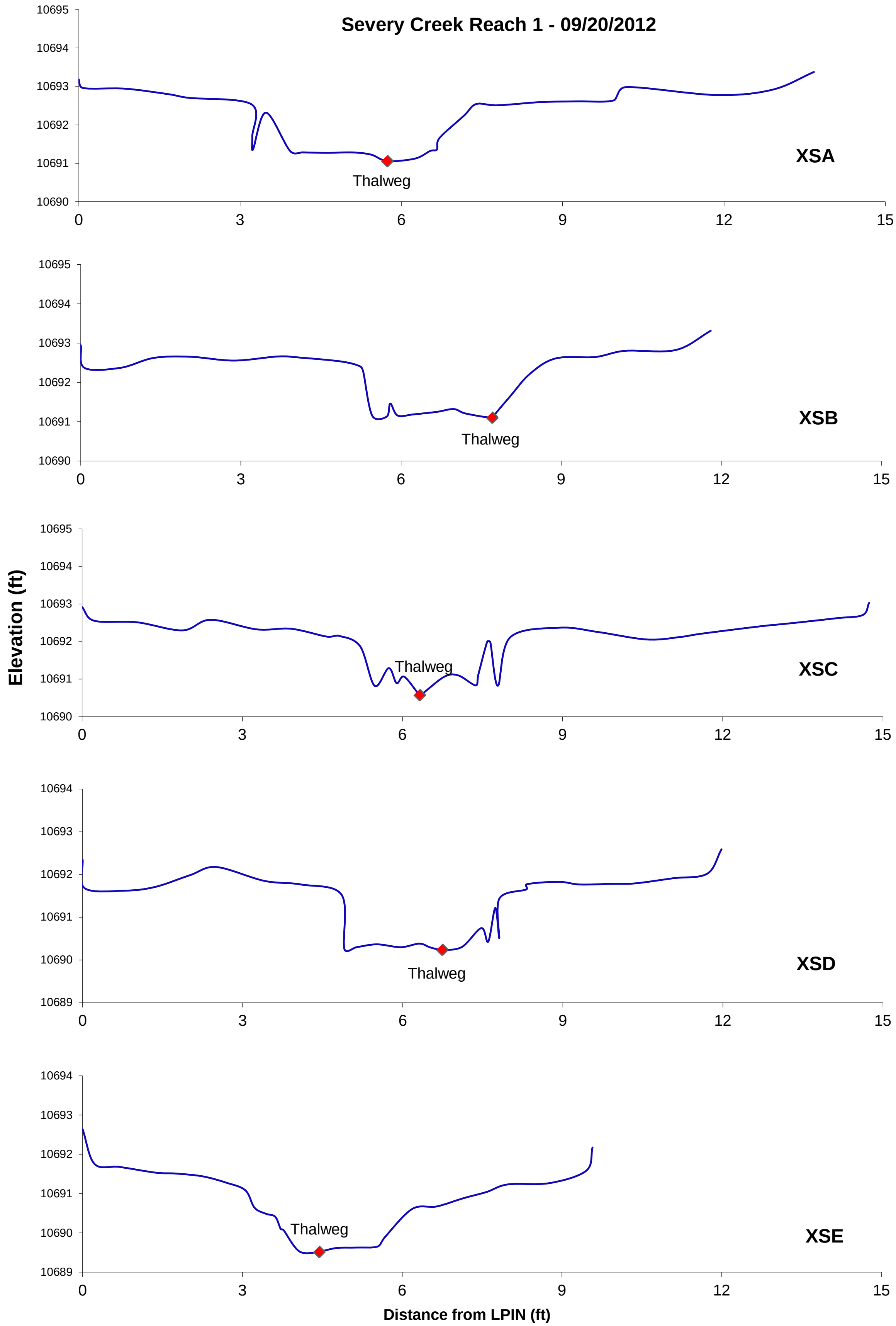


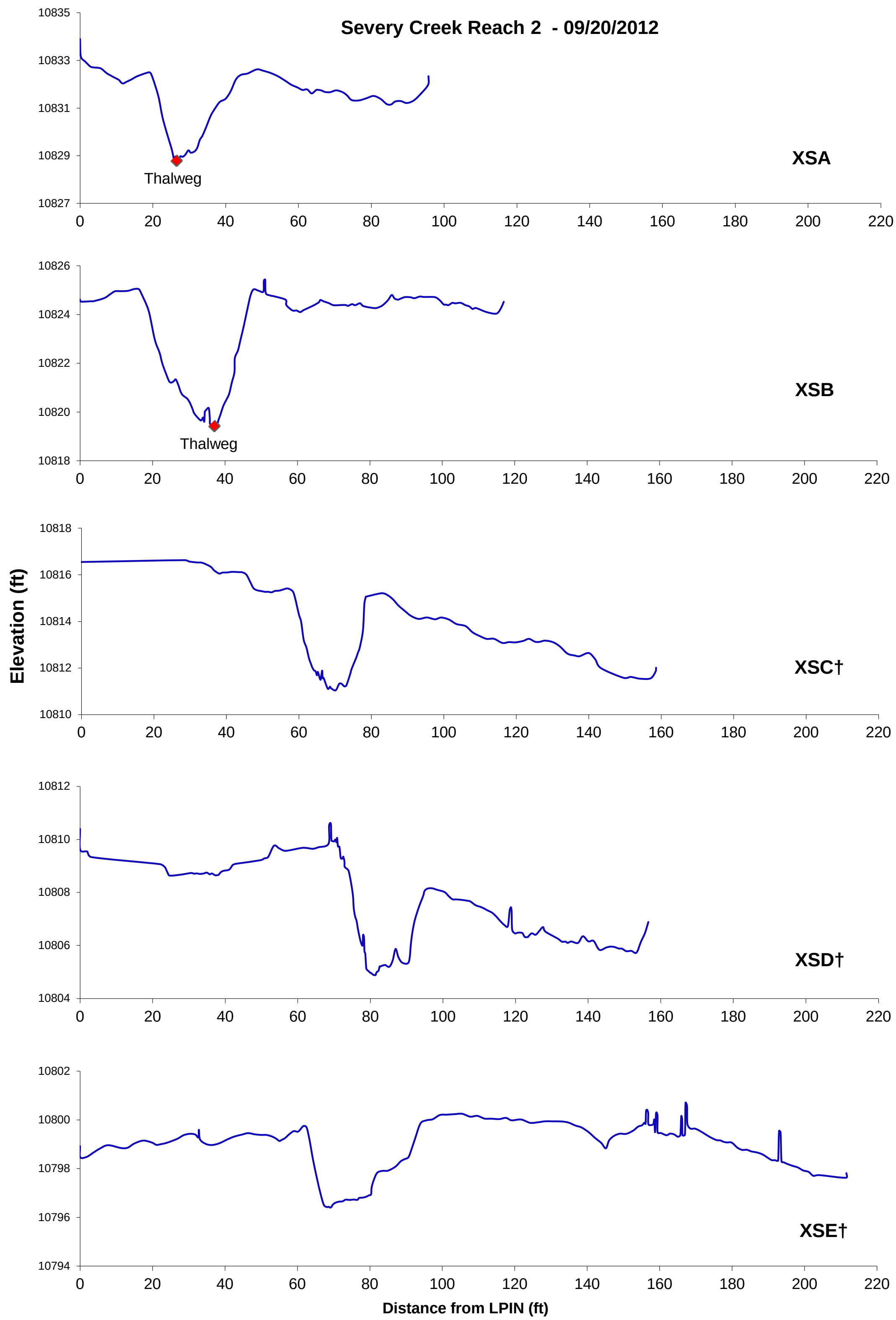

*†Thalweg not marked as wetted perimeter not identified.*



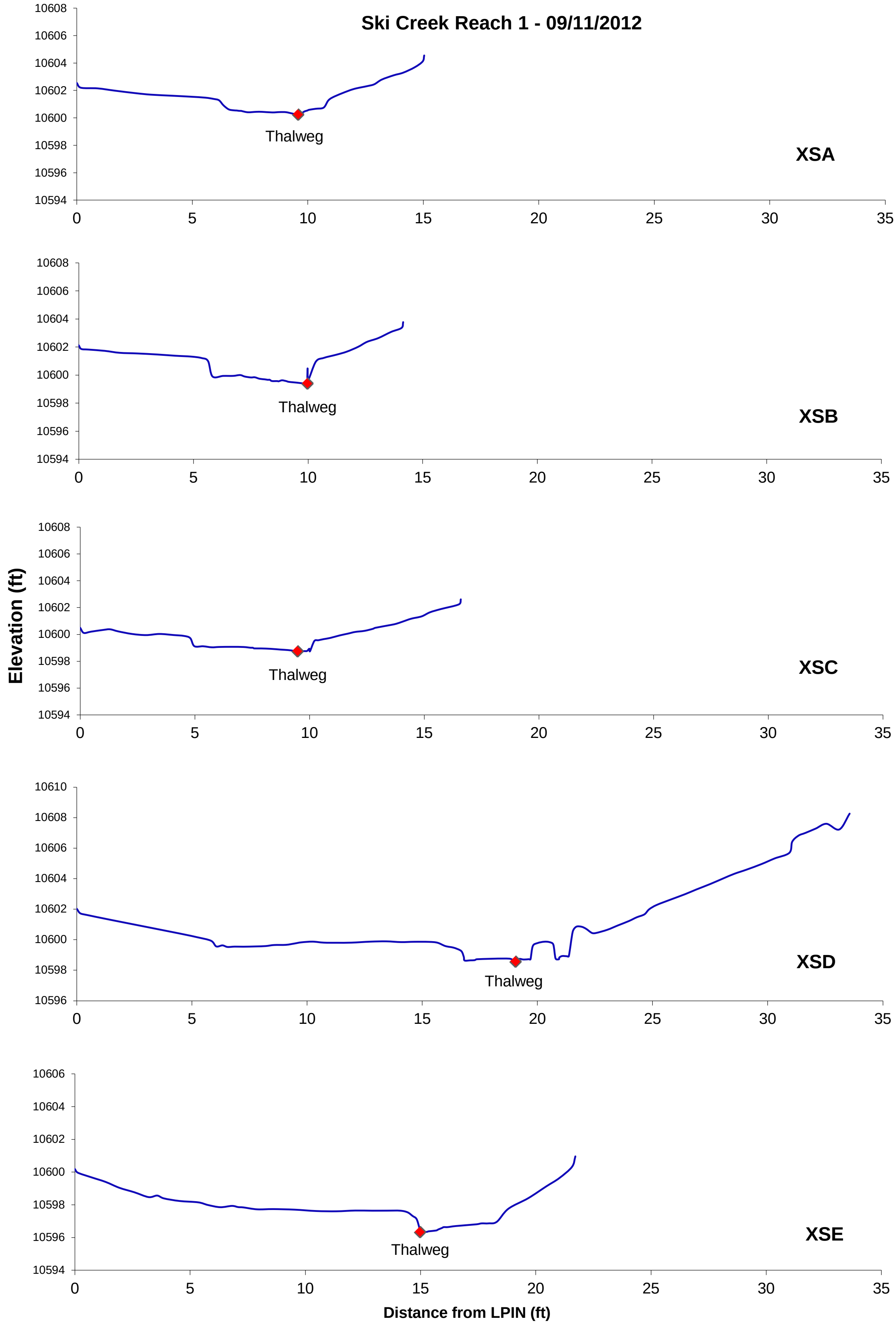

*†Thalweg not marked as wetted perimeter not identified.*

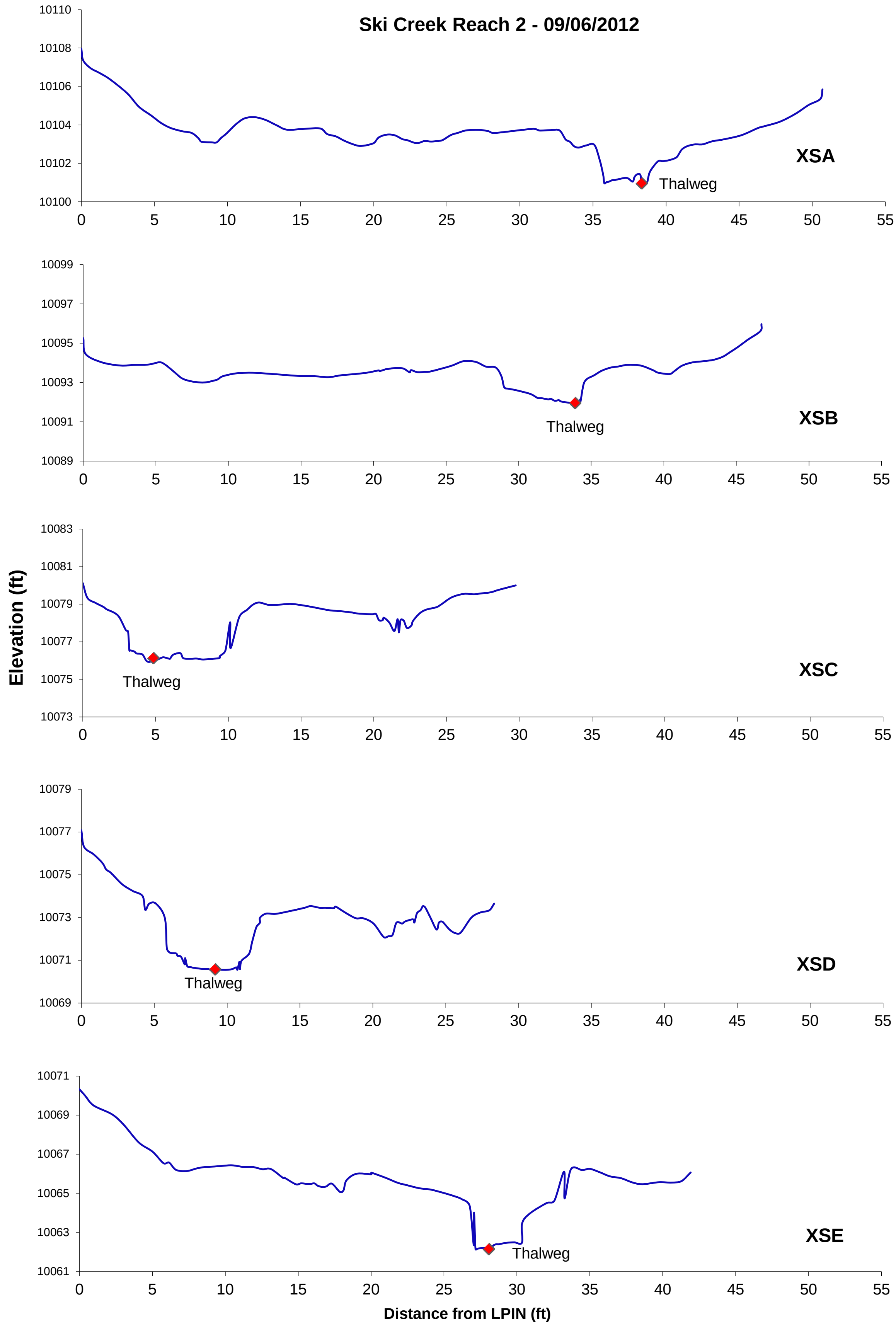

Oil Creek Reach 1 - 09/24/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
Thalweg

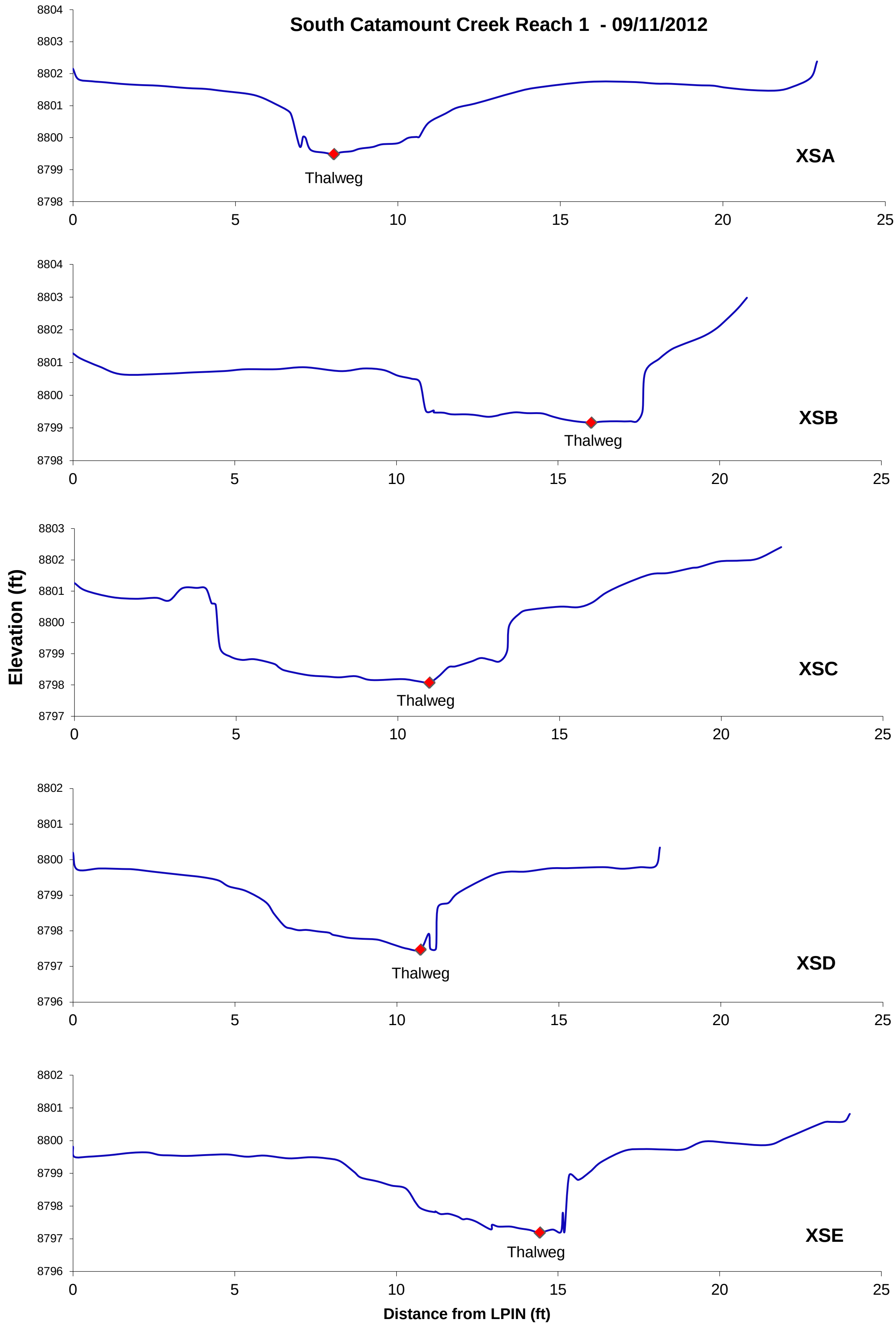

Severy Creek Reach 1 - 09/20/2012
Elevation (ft)
Distance from LPIN (ft)
XSA
XSB
XSC
XSD
XSE
Thalweg
10695
10694
10693
10692
10691
10690
10689
0
3
6
9
12
15

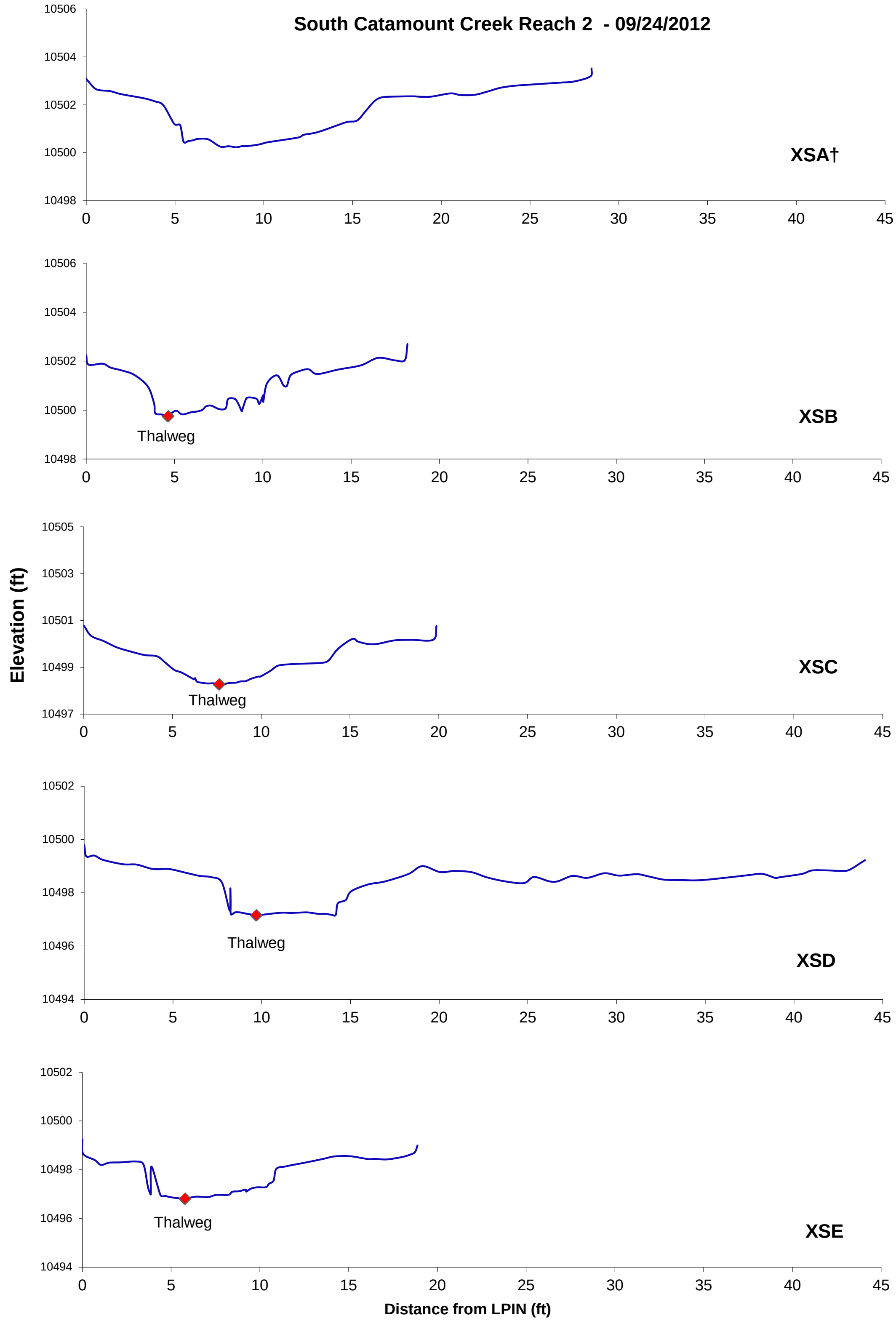



*†Thalweg not marked as wetted perimeter not identified.*

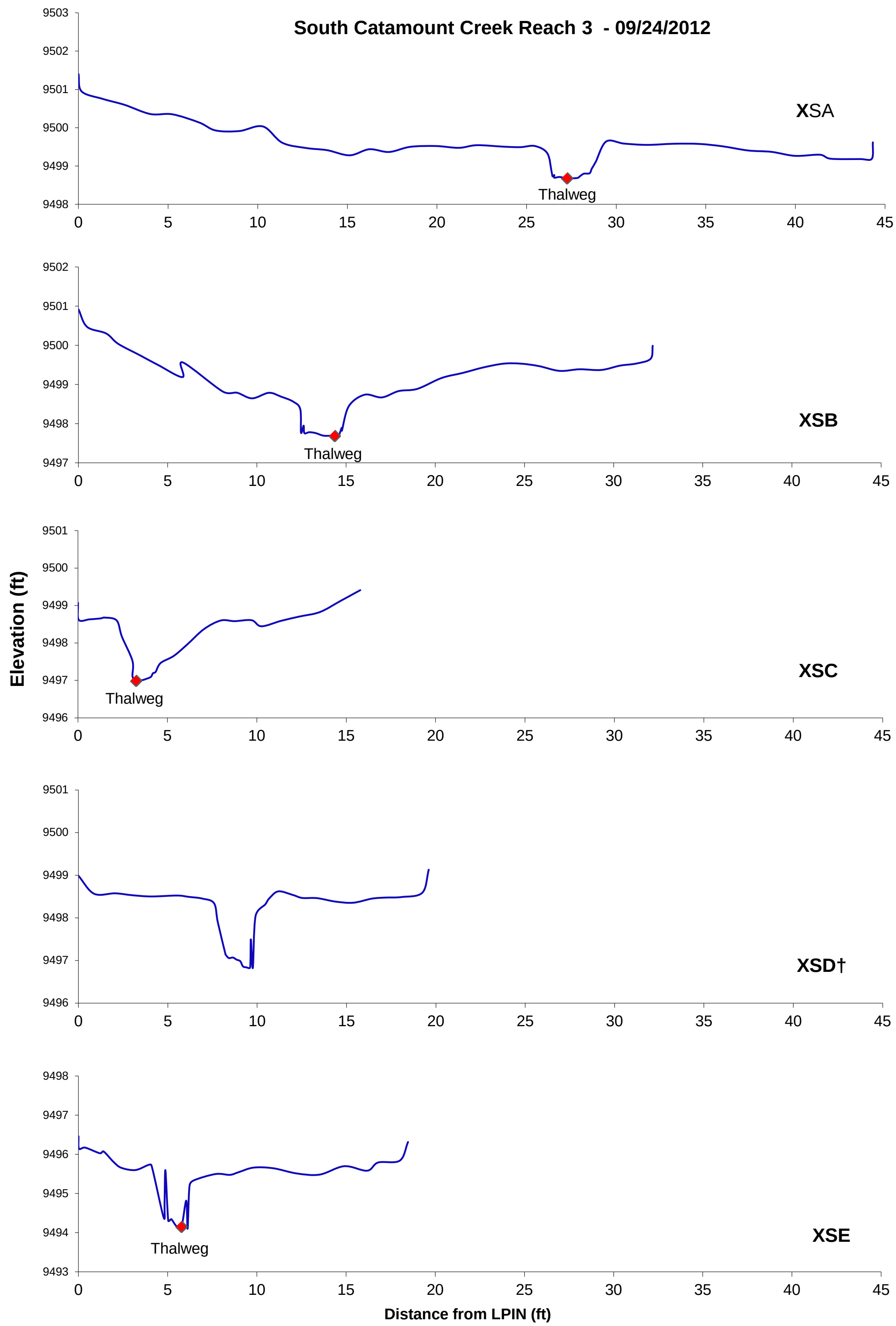

Ski Creek Reach 1 - 09/11/2012
Elevation (ft)
Distance from LPIN (ft)
Thalweg
XSA
XSB
XSC
XSD
XSE
10594
10596
10598
10600
10602
10604
10606
10608
10610
0
5
10
15
20
25
30
35


Ski Creek Reach 2 - 09/06/2012
XSA
XSB
XSC
XSD
XSE
Thalweg
Elevation (ft)
Distance from LPIN (ft)

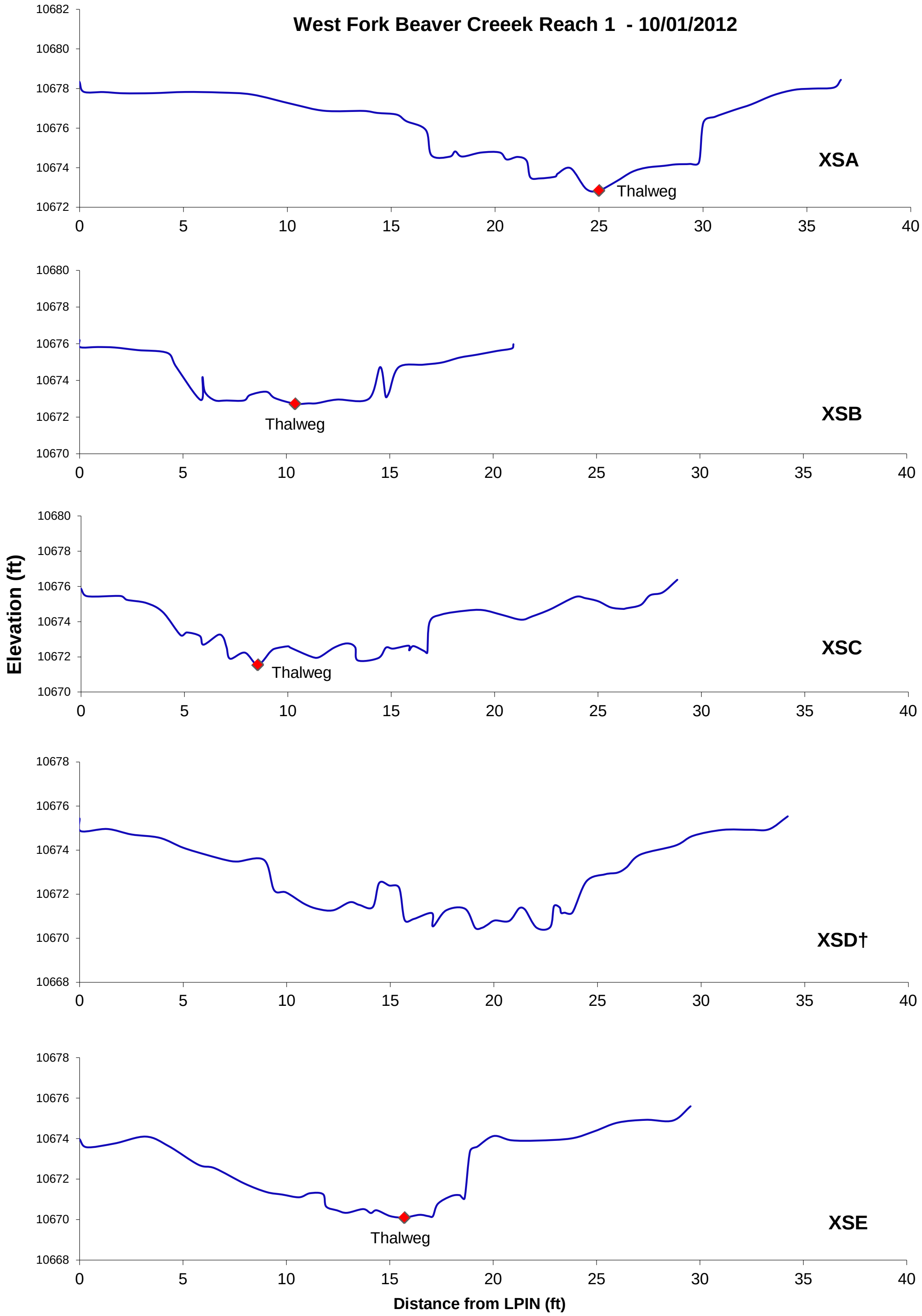

South Catamount Creek Reach 1 - 09/11/2012
XSA
Thalweg
XSB
Thalweg
XSC
Thalweg
XSD
Thalweg
XSE
Thalweg
Elevation (ft)
Distance from LPIN (ft)



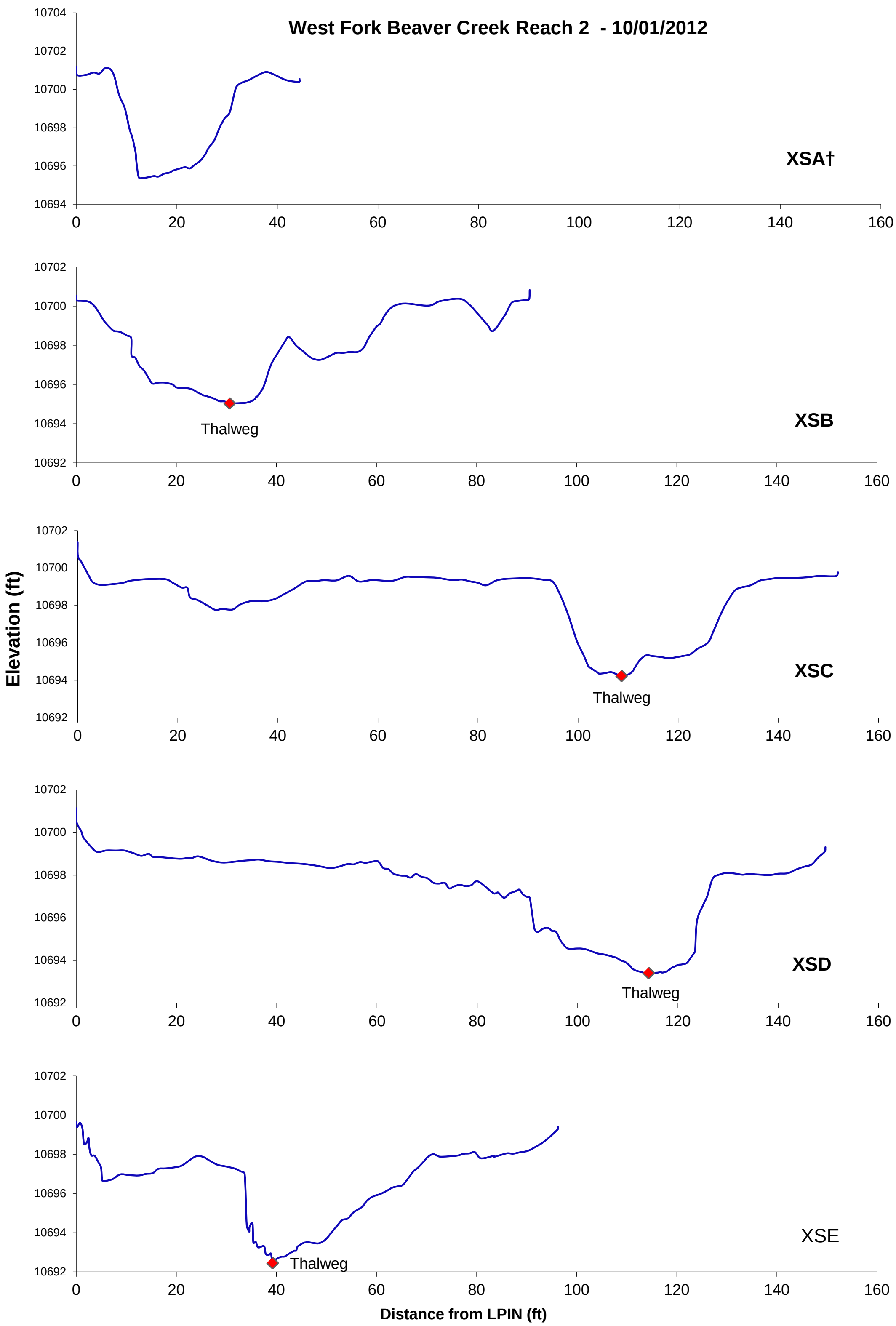

*†Thalweg not marked as wetted perimeter not identified.*




*†Thalweg not marked as wetted perimeter not identified.*




*†Thalweg not marked as wetted perimeter not identified*




*†Thalweg not marked as wetted perimeter not identified.*

# Appendix N

# Stream Pebble Count

# Particle Size Distribution Graphs

# 2012

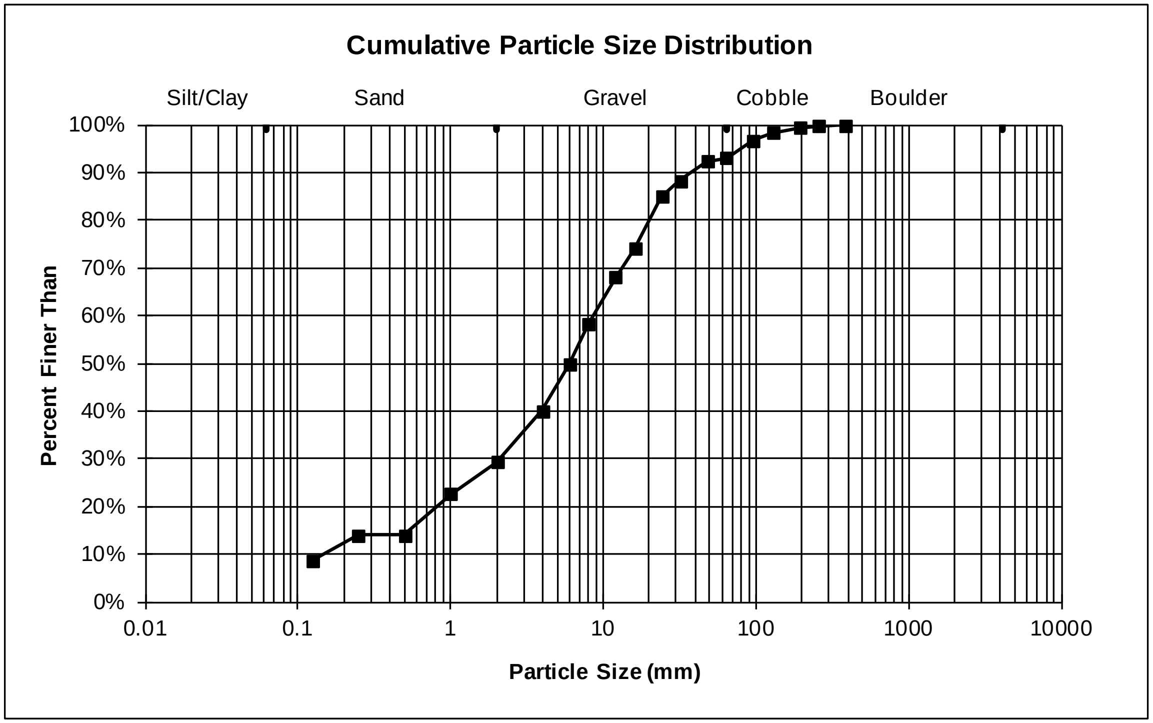
**Pebble Count Worksheet**

**COMMENTS:** ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 26 | 8.7% | |
| 0.062 - 0.125 | 0 | 0.0% | 9% |
| 0.125 - 0.25 | 16 | 5.3% | 14% |
| 0.25 - .5 | 0 | 0.0% | 14% |
| 0.5 - 1.0 | 26 | 8.7% | 23% |
| 1 - 2 | 20 | 6.7% | 29% |
| 2 - 4 | 32 | 10.7% | 40% |
| 4 - 6 | 29 | 9.7% | 50% |
| 6 - 8 | 26 | 8.7% | 58% |
| 8 - 12 | 29 | 9.7% | 68% |
| 12 - 16 | 18 | 6.0% | 74% |
| 16 - 24 | 33 | 11.0% | 85% |
| 24 - 32 | 10 | 3.3% | 88% |
| 32 - 48 | 12 | 4.0% | 92% |
| 48 - 64 | 2 | 0.7% | 93% |
| 64 - 96 | 11 | 3.7% | 97% |
| 96 - 128 | 5 | 1.7% | 98% |
| 128 - 192 | 3 | 1.0% | 99% |
| 192 - 256 | 1 | 0.3% | 100% |
| 256 - 384 | 1 | 0.3% | 100% |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - Boehmer Creek Reach 1
ID NUMBER: BHMR1
DATE: 9/17/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.542 | 2.890 | 6.067 | 23.131 | 79.842 | 265.0 |



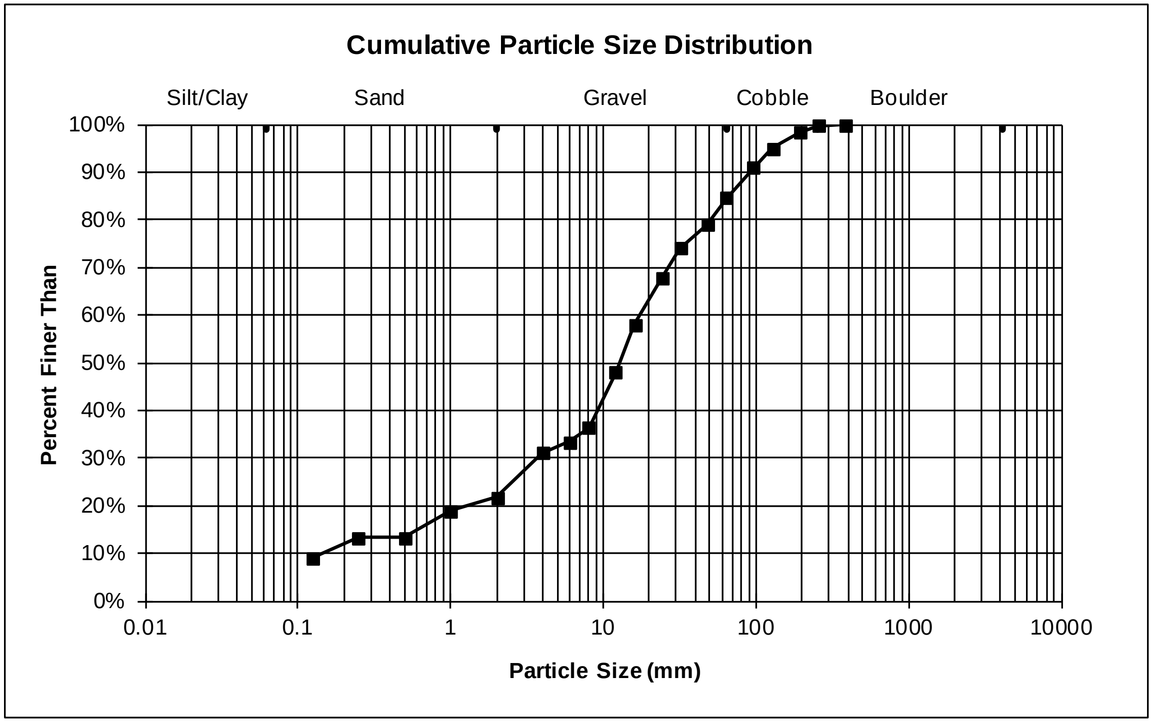
**Pebble Count Worksheet**

**COMMENTS:** Second reach 500 ft upstream of ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 27 | 9.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 9% |
| 0.125 - 0.25 | 13 | 4.3% | 13% |
| 0.25 - .5 | 0 | 0.0% | 13% |
| 0.5 - 1.0 | 17 | 5.7% | 19% |
| 1 - 2 | 8 | 2.7% | 22% |
| 2 - 4 | 28 | 9.3% | 31% |
| 4 - 6 | 7 | 2.3% | 33% |
| 6 - 8 | 9 | 3.0% | 36% |
| 8 - 12 | 35 | 11.7% | 48% |
| 12 - 16 | 30 | 10.0% | 58% |
| 16 - 24 | 29 | 9.7% | 68% |
| 24 - 32 | 19 | 6.3% | 74% |
| 32 - 48 | 15 | 5.0% | 79% |
| 48 - 64 | 17 | 5.7% | 85% |
| 64 - 96 | 19 | 6.3% | 91% |
| 96 - 128 | 12 | 4.0% | 95% |
| 128 - 192 | 10 | 3.3% | 98% |
| 192 - 256 | 4 | 1.3% | 100% |
| 256 - 384 | 1 | 0.3% | 100% |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - Boehmer Creek Reach 2
ID NUMBER: BHMR2
DATE: 9/17/2012
CREW: VonLoh, Willis

| **Particle Size Distribution (mm)** | **D15** | **D35** | **D50** | **D84** | **D95** | **Lpart** |
|---|---|---|---|---|---|---|
| | **0.613** | **7.040** | **12.711** | **61.870** | **128.000** | **275.0** |



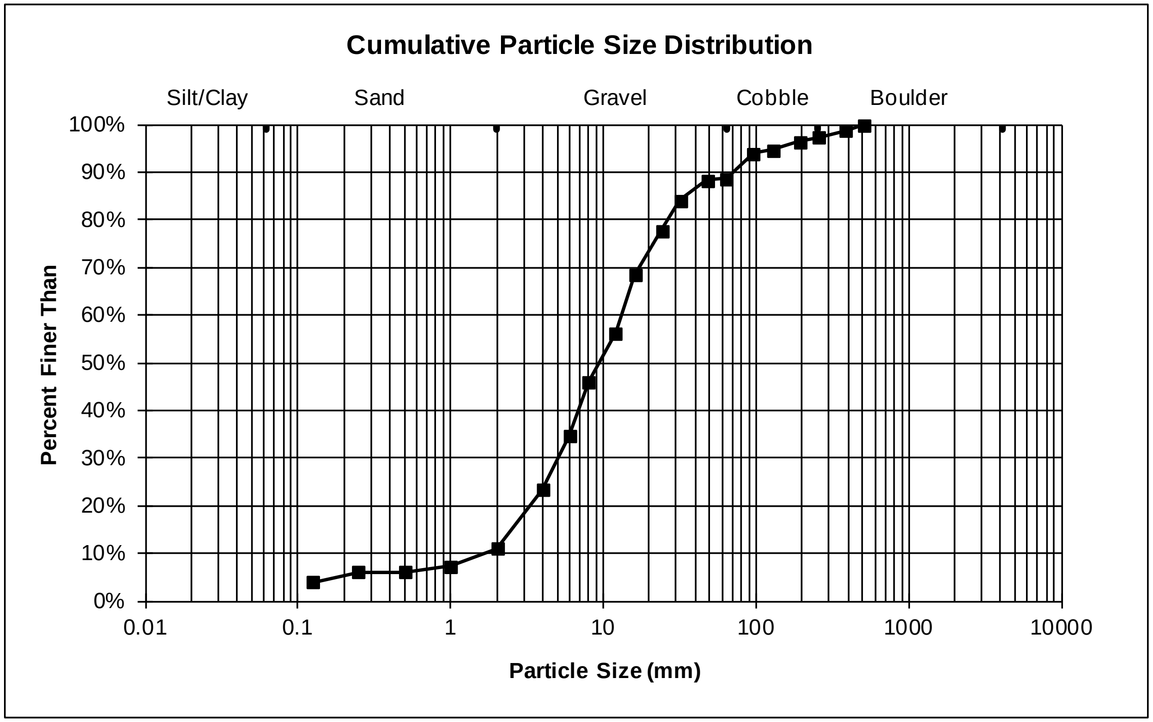
**Pebble Count Worksheet**

**COMMENTS:** ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 12 | 4.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 4% |
| 0.125 - 0.25 | 6 | 2.0% | 6% |
| 0.25 - .5 | 0 | 0.0% | 6% |
| 0.5 - 1.0 | 4 | 1.3% | 7% |
| 1 - 2 | 11 | 3.7% | 11% |
| 2 - 4 | 37 | 12.3% | 23% |
| 4 - 6 | 34 | 11.3% | 35% |
| 6 - 8 | 34 | 11.3% | 46% |
| 8 - 12 | 31 | 10.3% | 56% |
| 12 - 16 | 36 | 12.0% | 68% |
| 16 - 24 | 28 | 9.3% | 78% |
| 24 - 32 | 19 | 6.3% | 84% |
| 32 - 48 | 13 | 4.3% | 88% |
| 48 - 64 | 1 | 0.3% | 89% |
| 64 - 96 | 16 | 5.3% | 94% |
| 96 - 128 | 2 | 0.7% | 95% |
| 128 - 192 | 5 | 1.7% | 96% |
| 192 - 256 | 3 | 1.0% | 97% |
| 256 - 384 | 4 | 1.3% | 99% |
| 384 - 512 | 4 | 1.3% | 100% |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - East Fork Beaver Creek Reach 1
ID NUMBER: EBVR1
DATE: 9/18/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **2.504** | **6.051** | **9.360** | **32.000** | **138.812** | **500.0** |



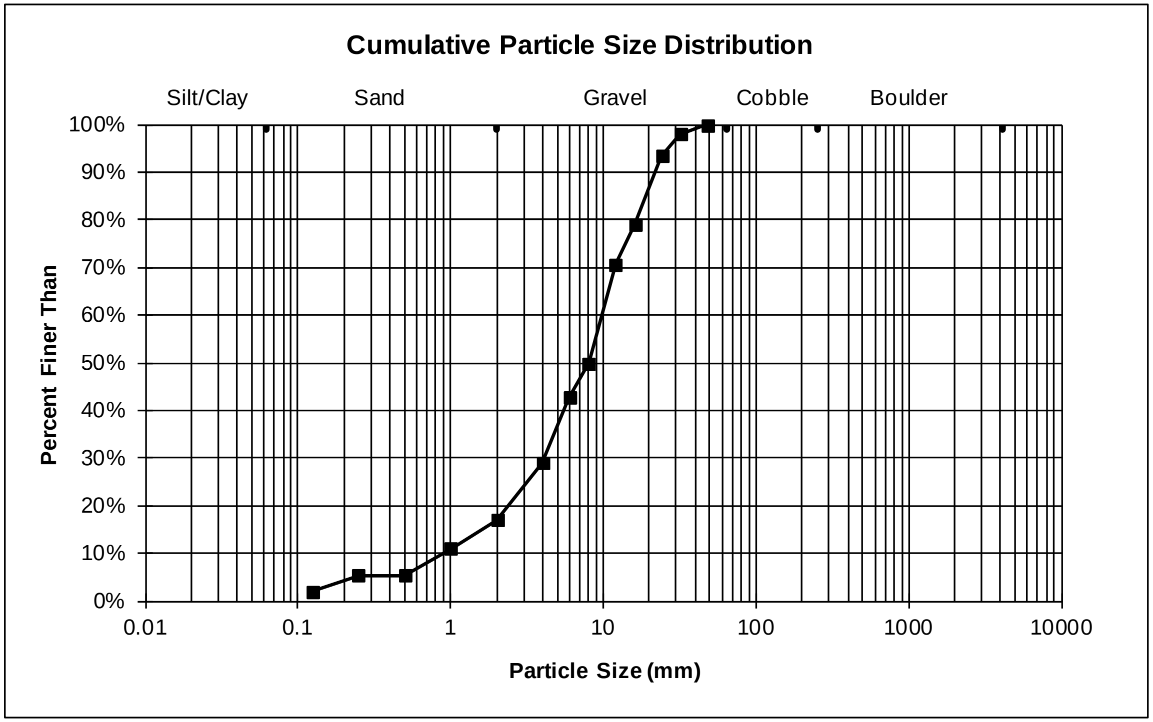
**Pebble Count Worksheet**

**COMMENTS:** Second reach 500 ft of ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 6 | 2.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 2% |
| 0.125 - 0.25 | 10 | 3.3% | 5% |
| 0.25 - .5 | 0 | 0.0% | 5% |
| 0.5 - 1.0 | 17 | 5.7% | 11% |
| 1 - 2 | 18 | 6.0% | 17% |
| 2 - 4 | 36 | 12.0% | 29% |
| 4 - 6 | 41 | 13.7% | 43% |
| 6 - 8 | 22 | 7.3% | 50% |
| 8 - 12 | 62 | 20.7% | 71% |
| 12 - 16 | 25 | 8.3% | 79% |
| 16 - 24 | 43 | 14.3% | 93% |
| 24 - 32 | 14 | 4.7% | 98% |
| 32 - 48 | 6 | 2.0% | 100% |
| 48 - 64 | | | |
| 64 - 96 | | | |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - East Fork Beaver Creek Reach 2
ID NUMBER: EBVR2
DATE: 9/18/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 1.587 | 4.779 | 8.000 | 18.431 | 26.597 | 46.0 |



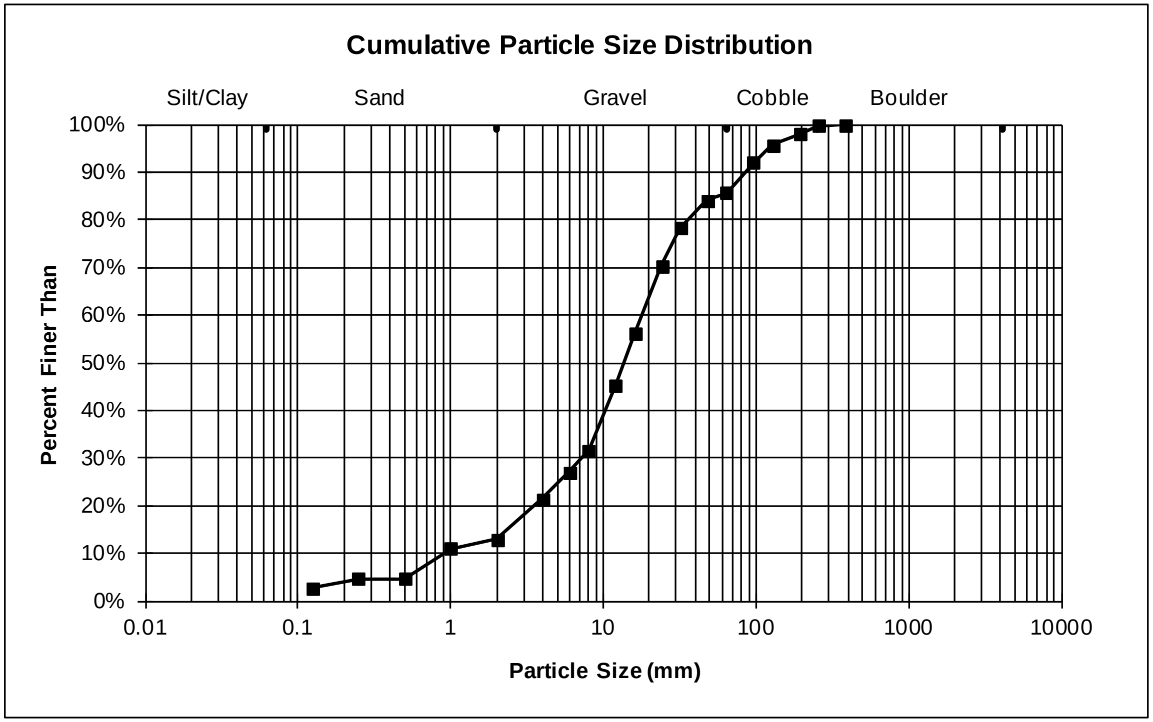
**Pebble Count Worksheet**

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 8 | 2.7% | |
| 0.062 - 0.125 | 0 | 0.0% | 3% |
| 0.125 - 0.25 | 6 | 2.0% | 5% |
| 0.25 - .5 | 0 | 0.0% | 5% |
| 0.5 - 1.0 | 19 | 6.3% | 11% |
| 1 - 2 | 6 | 2.0% | 13% |
| 2 - 4 | 25 | 8.3% | 21% |
| 4 - 6 | 17 | 5.7% | 27% |
| 6 - 8 | 14 | 4.7% | 32% |
| 8 - 12 | 41 | 13.7% | 45% |
| 12 - 16 | 32 | 10.7% | 56% |
| 16 - 24 | 43 | 14.3% | 70% |
| 24 - 32 | 24 | 8.0% | 78% |
| 32 - 48 | 17 | 5.7% | 84% |
| 48 - 64 | 5 | 1.7% | 86% |
| 64 - 96 | 19 | 6.3% | 92% |
| 96 - 128 | 11 | 3.7% | 96% |
| 128 - 192 | 7 | 2.3% | 98% |
| 192 - 256 | 5 | 1.7% | 100% |
| 256 - 384 | 1 | 0.3% | 100% |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

**COMMENTS:** Reach established upstream from confluence with South Catamount Creek because of the transbasin diversion installed in Ski Creek

STREAM NAME: Pikes Peak Highway - Glen Cove Creek Reach 1
ID NUMBER: GLEN1
DATE: 9/24/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 2.362 | 8.832 | 13.609 | 48.000 | 121.477 | 263.0 |



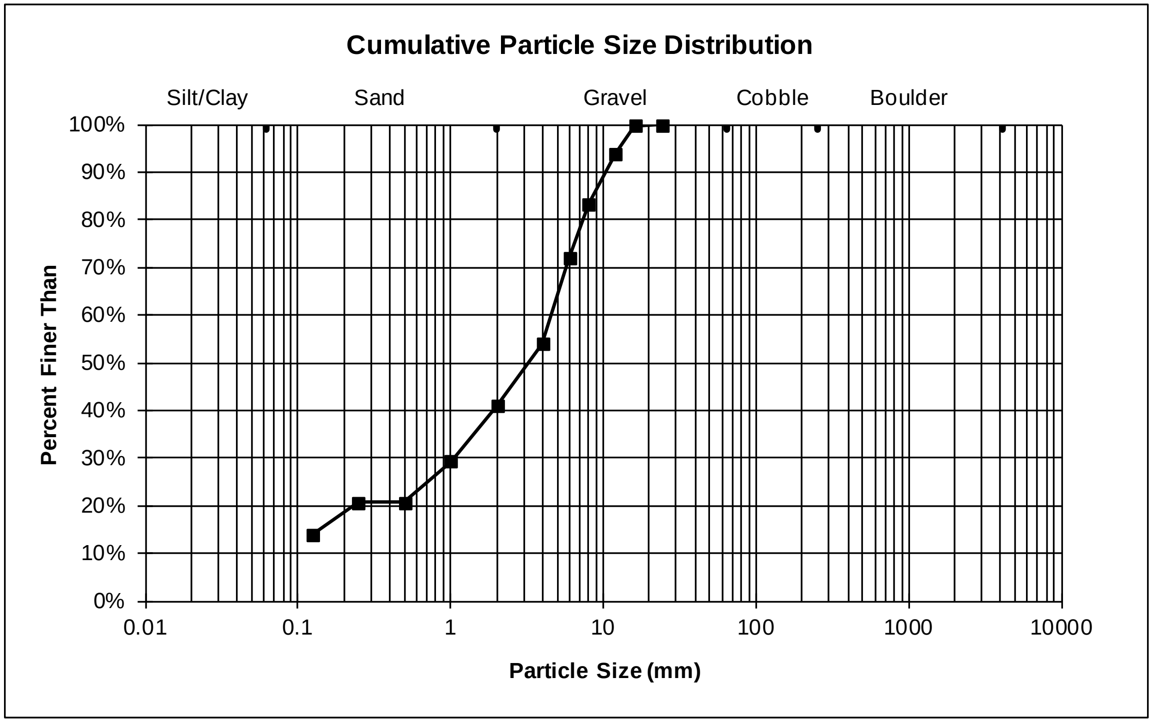
**Pebble Count Worksheet**

**COMMENTS:** ERO Study Site

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 42 | 14.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 14% |
| 0.125 - 0.25 | 20 | 6.7% | 21% |
| 0.25 - .5 | 0 | 0.0% | 21% |
| 0.5 - 1.0 | 26 | 8.7% | 29% |
| 1 - 2 | 35 | 11.7% | 41% |
| 2 - 4 | 39 | 13.0% | 54% |
| 4 - 6 | 54 | 18.0% | 72% |
| 6 - 8 | 34 | 11.3% | 83% |
| 8 - 12 | 32 | 10.7% | 94% |
| 12 - 16 | 17 | 5.7% | 100% |
| 16 - 24 | 1 | 0.3% | 100% |
| 24 - 32 | | | |
| 32 - 48 | | | |
| 48 - 64 | | | |
| 64 - 96 | | | |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - North Catamount Creek Reach 1
ID NUMBER: NCAT1
DATE: 9/10/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.139** | **1.400** | **3.232** | **8.205** | **12.625** | **16.0** |



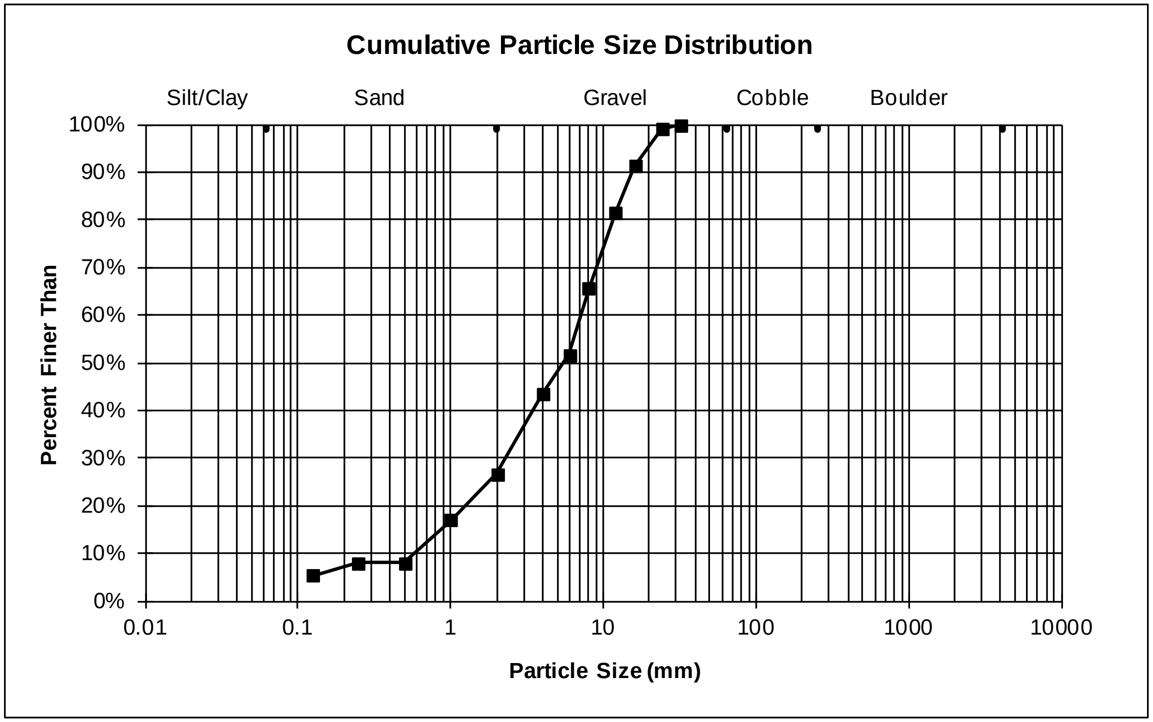
**Pebble Count Worksheet**

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 16 | 5.3% | |
| 0.062 - 0.125 | 0 | 0.0% | 5% |
| 0.125 - 0.25 | 8 | 2.7% | 8% |
| 0.25 - .5 | 0 | 0.0% | 8% |
| 0.5 - 1.0 | 27 | 9.0% | 17% |
| 1 - 2 | 29 | 9.7% | 27% |
| 2 - 4 | 50 | 16.7% | 43% |
| 4 - 6 | 25 | 8.3% | 52% |
| 6 - 8 | 42 | 14.0% | 66% |
| 8 - 12 | 48 | 16.0% | 82% |
| 12 - 16 | 29 | 9.7% | 91% |
| 16 - 24 | 23 | 7.7% | 99% |
| 24 - 32 | 3 | 1.0% | 100% |
| 32 - 48 | | | |
| 48 - 64 | | | |
| 64 - 96 | | | |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

**COMMENTS:** Second reach 0.5 miles upstream from ERO Study Site

STREAM NAME: Pikes Peak Highway - North Catamount Creek Reach 2
ID NUMBER: NCAT2
DATE: 9/27/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.857 | 2.828 | 5.533 | 12.863 | 19.424 | 26.0 |



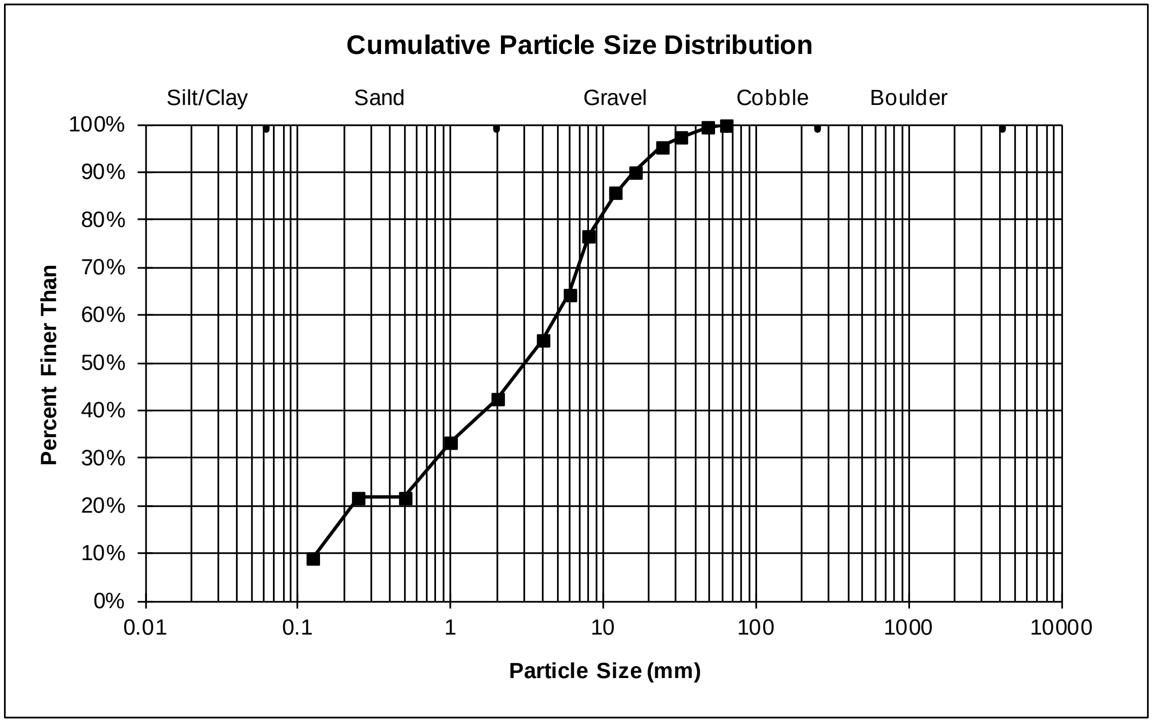
**Pebble Count Worksheet**

**COMMENTS:** ERO Study Site

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 27 | 9.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 9% |
| 0.125 - 0.25 | 38 | 12.7% | 22% |
| 0.25 - .5 | 0 | 0.0% | 22% |
| 0.5 - 1.0 | 35 | 11.7% | 33% |
| 1 - 2 | 27 | 9.0% | 42% |
| 2 - 4 | 37 | 12.3% | 55% |
| 4 - 6 | 29 | 9.7% | 64% |
| 6 - 8 | 37 | 12.3% | 77% |
| 8 - 12 | 27 | 9.0% | 86% |
| 12 - 16 | 13 | 4.3% | 90% |
| 16 - 24 | 16 | 5.3% | 95% |
| 24 - 32 | 6 | 2.0% | 97% |
| 32 - 48 | 6 | 2.0% | 99% |
| 48 - 64 | 2 | 0.7% | 100% |
| 64 - 96 | | | |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - North Fork Crystal Creek Reach 1
ID NUMBER: NCRY1
DATE: 9/6/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.174 | 1.137 | 3.077 | 11.132 | 23.399 | 50.0 |



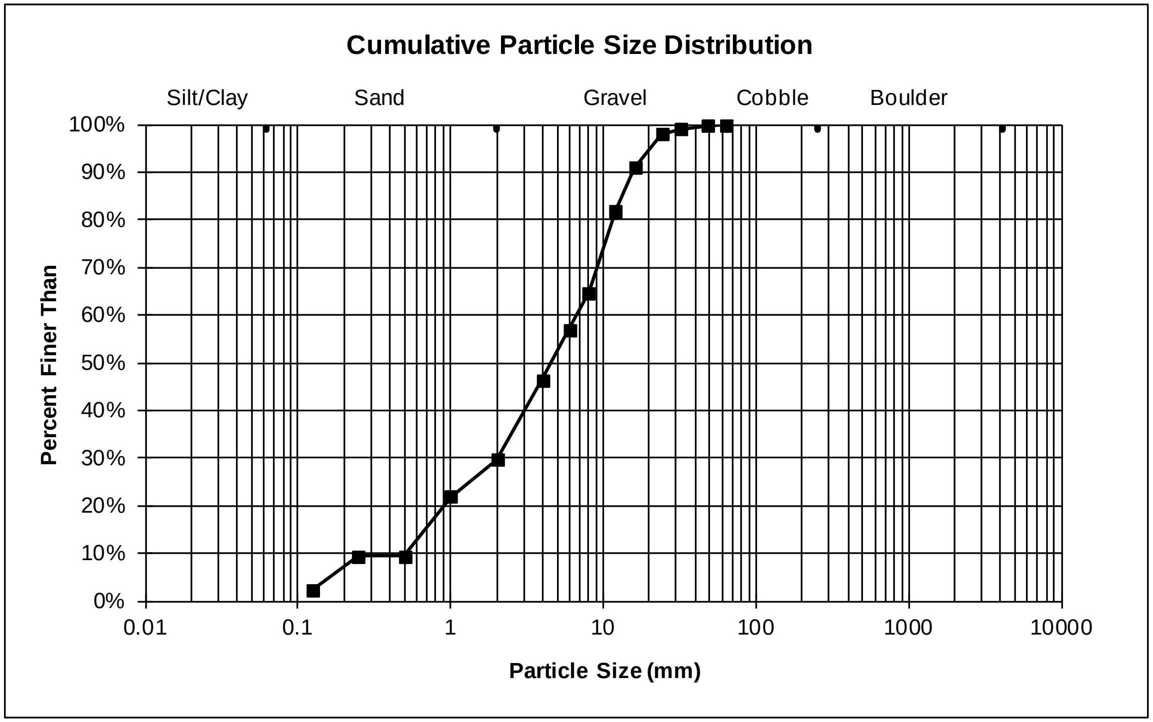
**Pebble Count Worksheet**

**COMMENTS:** Second reach 500 ft upstream from ERO Study Site

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 7 | 2.3% | |
| 0.062 - 0.125 | 0 | 0.0% | 2% |
| 0.125 - 0.25 | 21 | 7.0% | 9% |
| 0.25 - .5 | 0 | 0.0% | 9% |
| 0.5 - 1.0 | 38 | 12.7% | 22% |
| 1 - 2 | 23 | 7.7% | 30% |
| 2 - 4 | 50 | 16.7% | 46% |
| 4 - 6 | 32 | 10.7% | 57% |
| 6 - 8 | 23 | 7.7% | 65% |
| 8 - 12 | 52 | 17.3% | 82% |
| 12 - 16 | 27 | 9.0% | 91% |
| 16 - 24 | 21 | 7.0% | 98% |
| 24 - 32 | 3 | 1.0% | 99% |
| 32 - 48 | 2 | 0.7% | 100% |
| 48 - 64 | 1 | 0.3% | 100% |
| 64 - 96 | | | |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - North Fork Crystal Creek Reach 2
ID NUMBER: NCRY2
DATE: 9/6/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.682** | **2.497** | **4.598** | **12.792** | **20.172** | **55.0** |



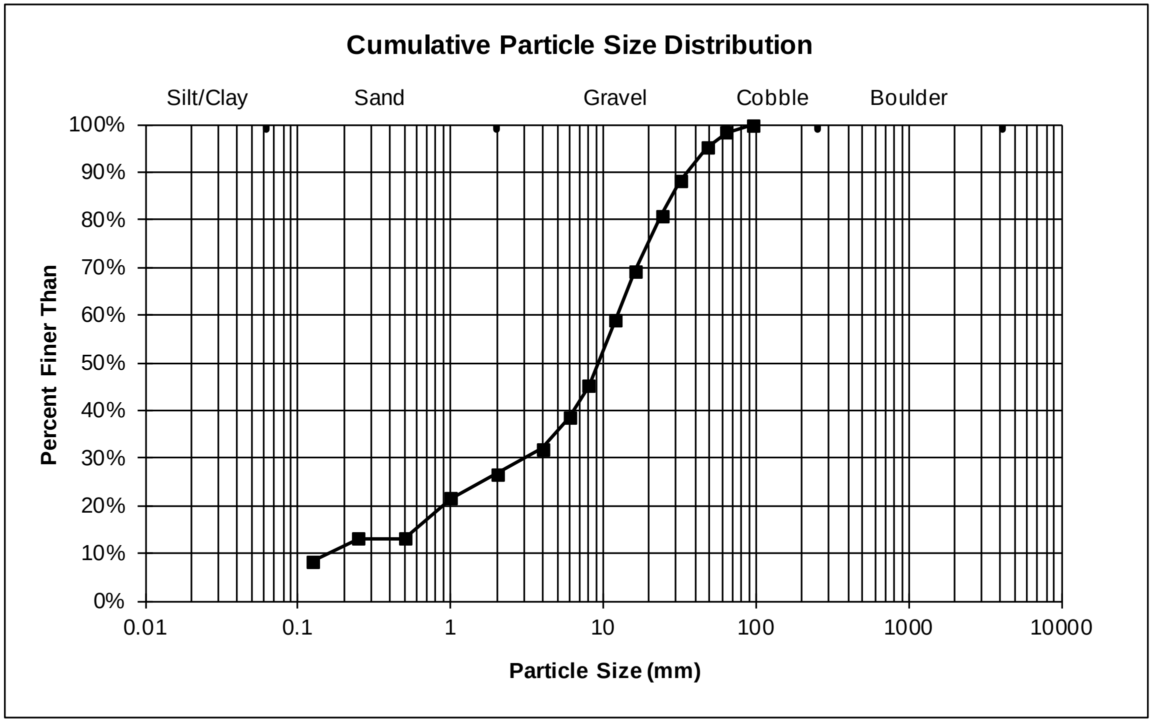
**Pebble Count Worksheet**

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 24 | 8.3% | |
| 0.062 - 0.125 | 0 | 0.0% | 8% |
| 0.125 - 0.25 | 14 | 4.9% | 13% |
| 0.25 - .5 | 0 | 0.0% | 13% |
| 0.5 - 1.0 | 24 | 8.3% | 22% |
| 1 - 2 | 15 | 5.2% | 27% |
| 2 - 4 | 15 | 5.2% | 32% |
| 4 - 6 | 19 | 6.6% | 39% |
| 6 - 8 | 19 | 6.6% | 45% |
| 8 - 12 | 40 | 13.9% | 59% |
| 12 - 16 | 29 | 10.1% | 69% |
| 16 - 24 | 34 | 11.8% | 81% |
| 24 - 32 | 21 | 7.3% | 88% |
| 32 - 48 | 20 | 6.9% | 95% |
| 48 - 64 | 9 | 3.1% | 98% |
| 64 - 96 | 5 | 1.7% | 100% |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 288.00 | | |

**COMMENTS:** ERO Study Site

STREAM NAME: Pikes Peak Highway - South Catamount Creek Reach 1
ID NUMBER: SCAT1
DATE: 9/11/2012
CREW: VonLoh, Willis

| **Particle Size Distribution (mm)** | **D15** | **D35** | **D50** | **D84** | **D95** | **Lpart** |
|---|---|---|---|---|---|---|
| | **0.581** | **4.826** | **9.220** | **27.119** | **47.612** | **74.0** |



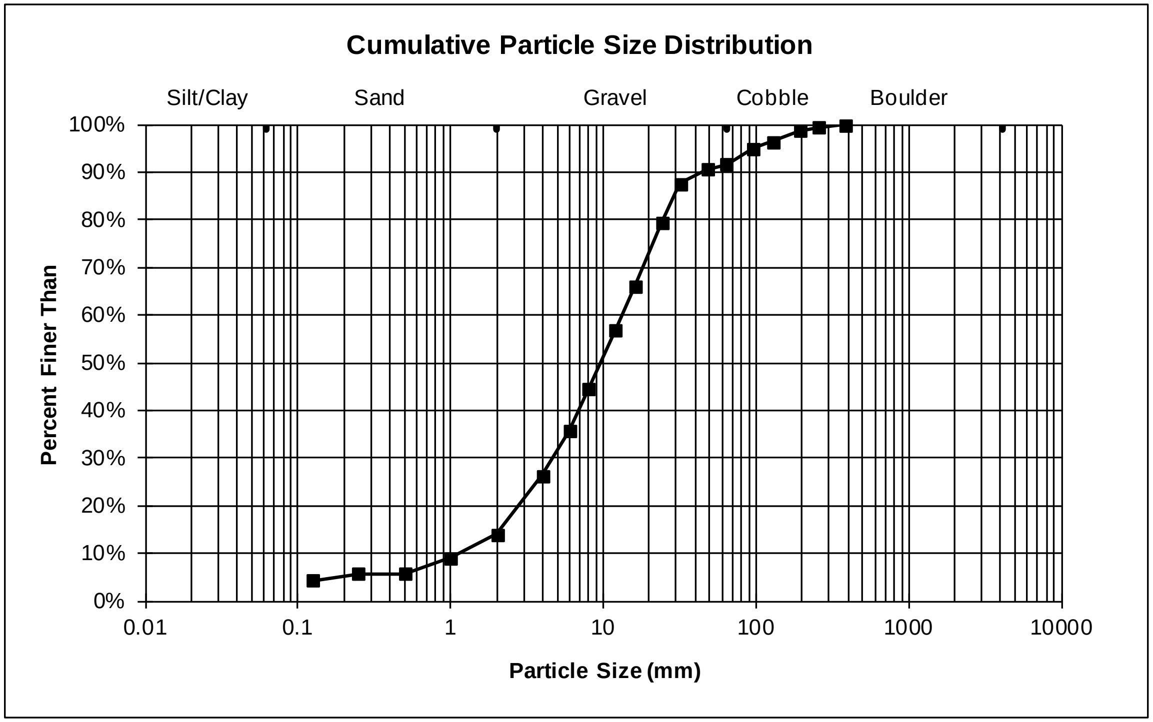
**Pebble Count Worksheet**

**COMMENTS:** Second reach 500 ft upstream from ERO Study Site

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 13 | 4.3% | |
| 0.062 - 0.125 | 0 | 0.0% | 4% |
| 0.125 - 0.25 | 4 | 1.3% | 6% |
| 0.25 - .5 | 0 | 0.0% | 6% |
| 0.5 - 1.0 | 10 | 3.3% | 9% |
| 1 - 2 | 15 | 5.0% | 14% |
| 2 - 4 | 37 | 12.3% | 26% |
| 4 - 6 | 28 | 9.3% | 36% |
| 6 - 8 | 27 | 9.0% | 45% |
| 8 - 12 | 37 | 12.3% | 57% |
| 12 - 16 | 27 | 9.0% | 66% |
| 16 - 24 | 40 | 13.3% | 79% |
| 24 - 32 | 25 | 8.3% | 88% |
| 32 - 48 | 9 | 3.0% | 91% |
| 48 - 64 | 3 | 1.0% | 92% |
| 64 - 96 | 10 | 3.3% | 95% |
| 96 - 128 | 4 | 1.3% | 96% |
| 128 - 192 | 7 | 2.3% | 99% |
| 192 - 256 | 2 | 0.7% | 99% |
| 256 - 384 | 2 | 0.7% | 100% |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - South Catamount Creek Reach 2
ID NUMBER: SCAT2
DATE: 9/24/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 2.116 | 5.829 | 9.533 | 28.195 | 96.000 | 334.0 |



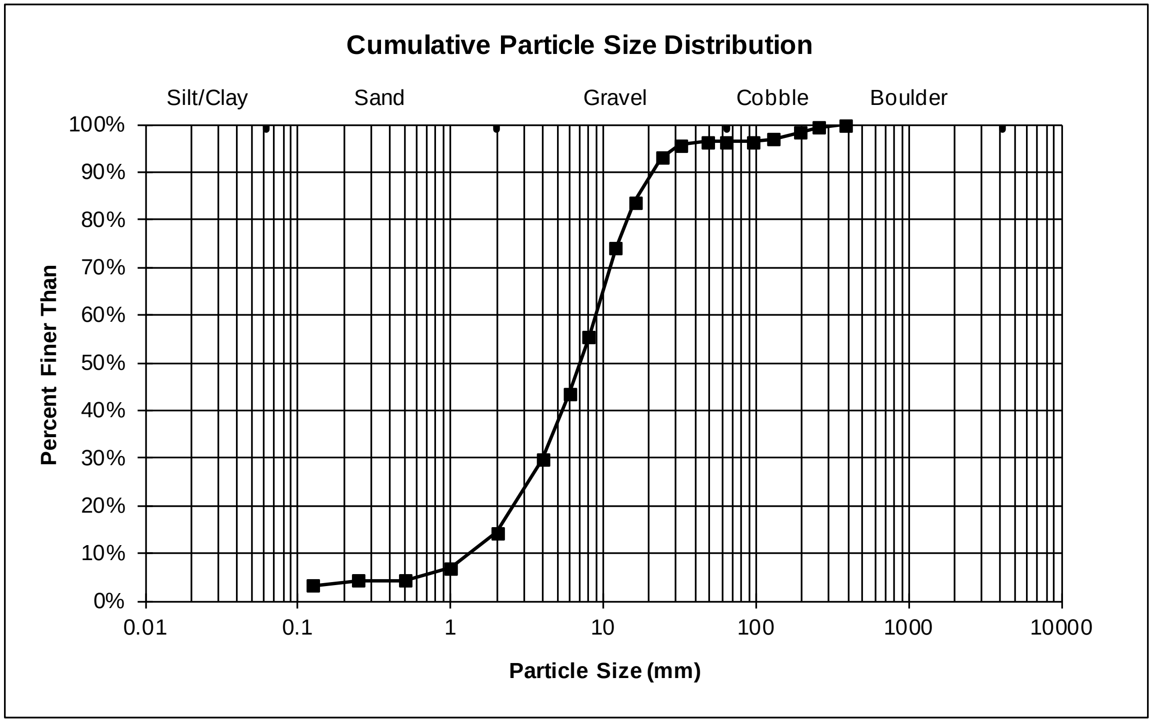
**Pebble Count Worksheet**

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 10 | 3.3% | |
| 0.062 - 0.125 | 0 | 0.0% | 3% |
| 0.125 - 0.25 | 3 | 1.0% | 4% |
| 0.25 - .5 | 0 | 0.0% | 4% |
| 0.5 - 1.0 | 8 | 2.7% | 7% |
| 1 - 2 | 22 | 7.3% | 14% |
| 2 - 4 | 46 | 15.3% | 30% |
| 4 - 6 | 41 | 13.7% | 43% |
| 6 - 8 | 36 | 12.0% | 55% |
| 8 - 12 | 56 | 18.7% | 74% |
| 12 - 16 | 29 | 9.7% | 84% |
| 16 - 24 | 28 | 9.3% | 93% |
| 24 - 32 | 8 | 2.7% | 96% |
| 32 - 48 | 2 | 0.7% | 96% |
| 48 - 64 | 0 | 0.0% | 96% |
| 64 - 96 | 0 | 0.0% | 96% |
| 96 - 128 | 2 | 0.7% | 97% |
| 128 - 192 | 4 | 1.3% | 98% |
| 192 - 256 | 3 | 1.0% | 99% |
| 256 - 384 | 2 | 0.7% | 100% |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

**COMMENTS:** Reach established upstream from confluence with Glen Cove Creek because of the transbasin diversion installed in Ski Creek

STREAM NAME: Pikes Peak Highway - South Catamount Creek Reach 3
ID NUMBER: SCAT3
DATE: 9/24/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 2.061 | 4.686 | 7.040 | 16.233 | 29.779 | 313.0 |



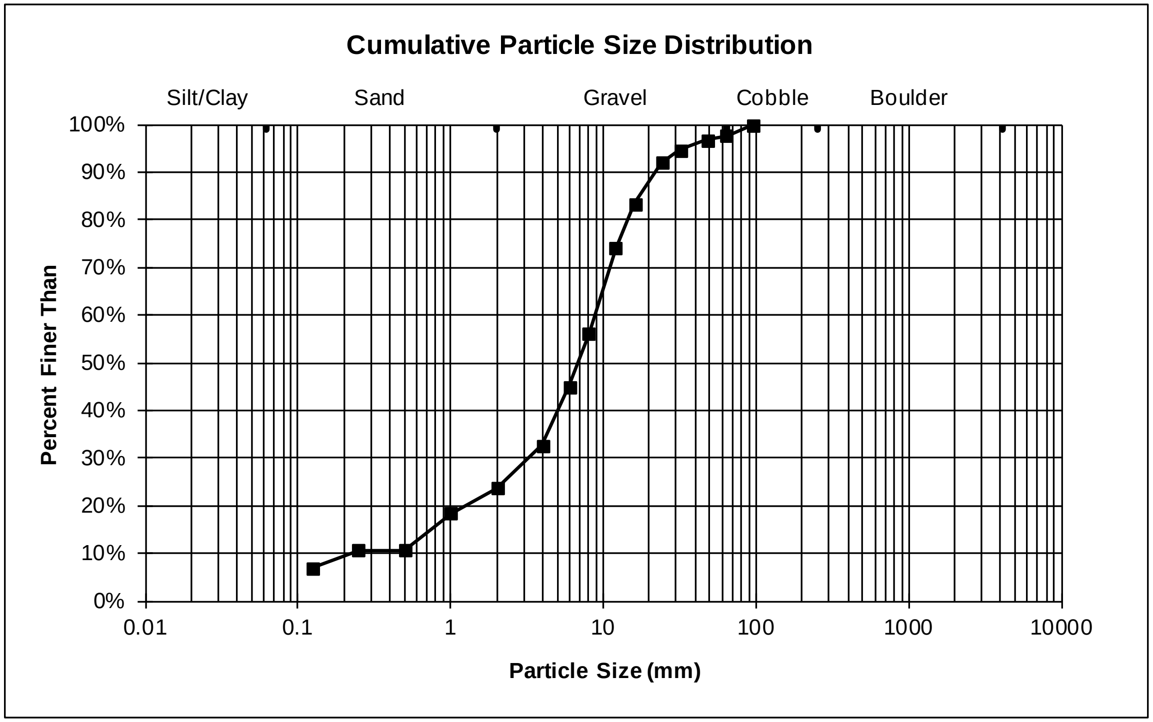
**Pebble Count Worksheet**

**COMMENTS:** About 0.2 miles upstream form ERO Study Site

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 21 | 7.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 7% |
| 0.125 - 0.25 | 11 | 3.7% | 11% |
| 0.25 - .5 | 0 | 0.0% | 11% |
| 0.5 - 1.0 | 23 | 7.7% | 18% |
| 1 - 2 | 16 | 5.3% | 24% |
| 2 - 4 | 27 | 9.0% | 33% |
| 4 - 6 | 37 | 12.3% | 45% |
| 6 - 8 | 33 | 11.0% | 56% |
| 8 - 12 | 54 | 18.0% | 74% |
| 12 - 16 | 28 | 9.3% | 83% |
| 16 - 24 | 26 | 8.7% | 92% |
| 24 - 32 | 8 | 2.7% | 95% |
| 32 - 48 | 6 | 2.0% | 97% |
| 48 - 64 | 3 | 1.0% | 98% |
| 64 - 96 | 7 | 2.3% | 100% |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - Ski Creek Reach 1
ID NUMBER: SKIC1
DATE: 9/11/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.740 | 4.319 | 6.838 | 16.507 | 34.237 | 91.0 |



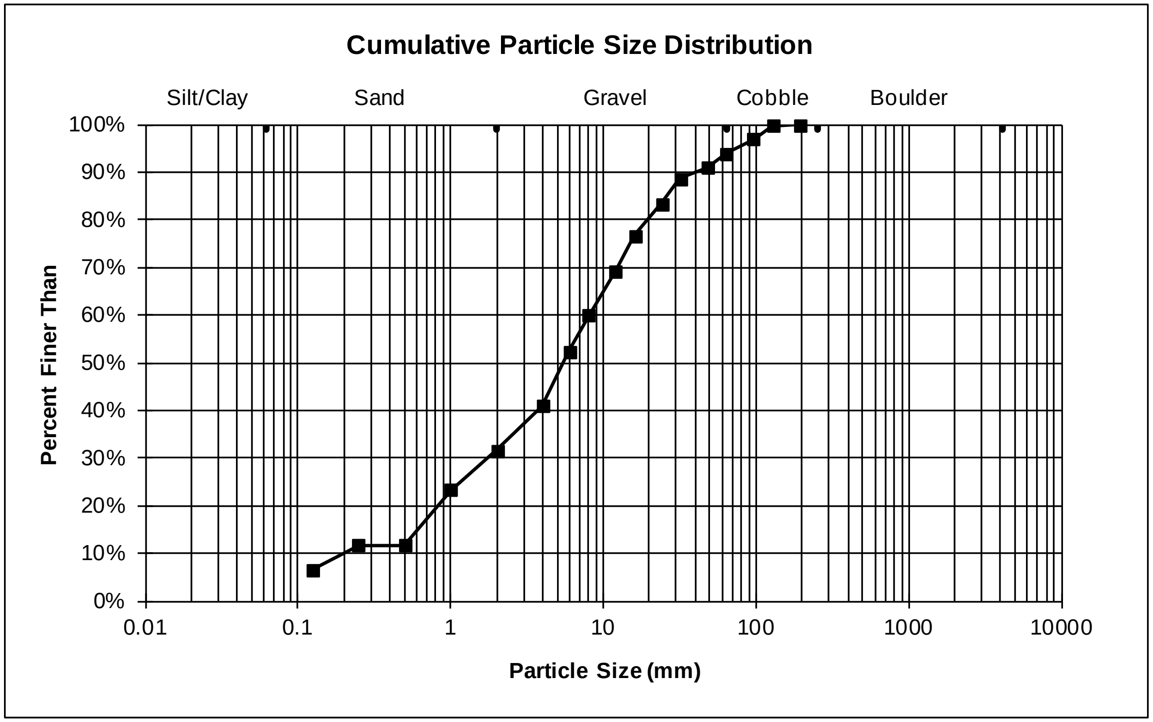
**Pebble Count Worksheet**

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 20 | 6.7% | |
| 0.062 - 0.125 | 0 | 0.0% | 7% |
| 0.125 - 0.25 | 15 | 5.0% | 12% |
| 0.25 - .5 | 0 | 0.0% | 12% |
| 0.5 - 1.0 | 35 | 11.7% | 23% |
| 1 - 2 | 25 | 8.3% | 32% |
| 2 - 4 | 28 | 9.3% | 41% |
| 4 - 6 | 34 | 11.3% | 52% |
| 6 - 8 | 23 | 7.7% | 60% |
| 8 - 12 | 28 | 9.3% | 69% |
| 12 - 16 | 22 | 7.3% | 77% |
| 16 - 24 | 20 | 6.7% | 83% |
| 24 - 32 | 16 | 5.3% | 89% |
| 32 - 48 | 7 | 2.3% | 91% |
| 48 - 64 | 9 | 3.0% | 94% |
| 64 - 96 | 9 | 3.0% | 97% |
| 96 - 128 | 8 | 2.7% | 100% |
| 128 - 192 | 1 | 0.3% | 100% |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

**COMMENTS:** Second reach near mile marker 10 on Pike's Peak Highway

STREAM NAME: Pikes Peak Highway - Ski Creek Reach 2
ID NUMBER: SKIC2
DATE: 9/6/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.610 | 2.562 | 5.519 | 24.879 | 73.262 | 160.0 |



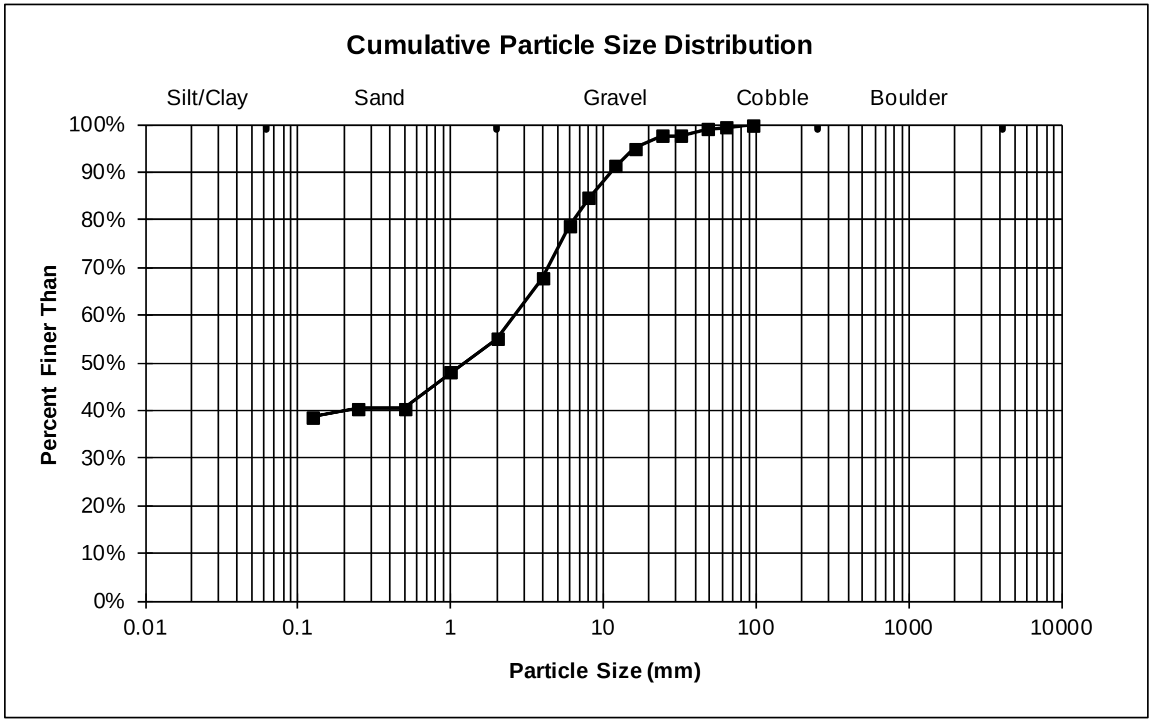
**Pebble Count Worksheet**

**COMMENTS:** ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 116 | 38.7% | |
| 0.062 - 0.125 | 0 | 0.0% | 39% |
| 0.125 - 0.25 | 5 | 1.7% | 40% |
| 0.25 - .5 | 0 | 0.0% | 40% |
| 0.5 - 1.0 | 23 | 7.7% | 48% |
| 1 - 2 | 21 | 7.0% | 55% |
| 2 - 4 | 38 | 12.7% | 68% |
| 4 - 6 | 33 | 11.0% | 79% |
| 6 - 8 | 18 | 6.0% | 85% |
| 8 - 12 | 20 | 6.7% | 91% |
| 12 - 16 | 11 | 3.7% | 95% |
| 16 - 24 | 8 | 2.7% | 98% |
| 24 - 32 | 0 | 0.0% | 98% |
| 32 - 48 | 4 | 1.3% | 99% |
| 48 - 64 | 1 | 0.3% | 99% |
| 64 - 96 | 2 | 0.7% | 100% |
| 96 - 128 | | | |
| 128 - 192 | | | |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - Severy Creek Reach 1
ID NUMBER: SVRY1
DATE: 9/20/2012
CREW: VonLoh, Willis, Cahalan, Rodman

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.081** | **0.117** | **1.219** | **7.748** | **16.000** | **90.0** |



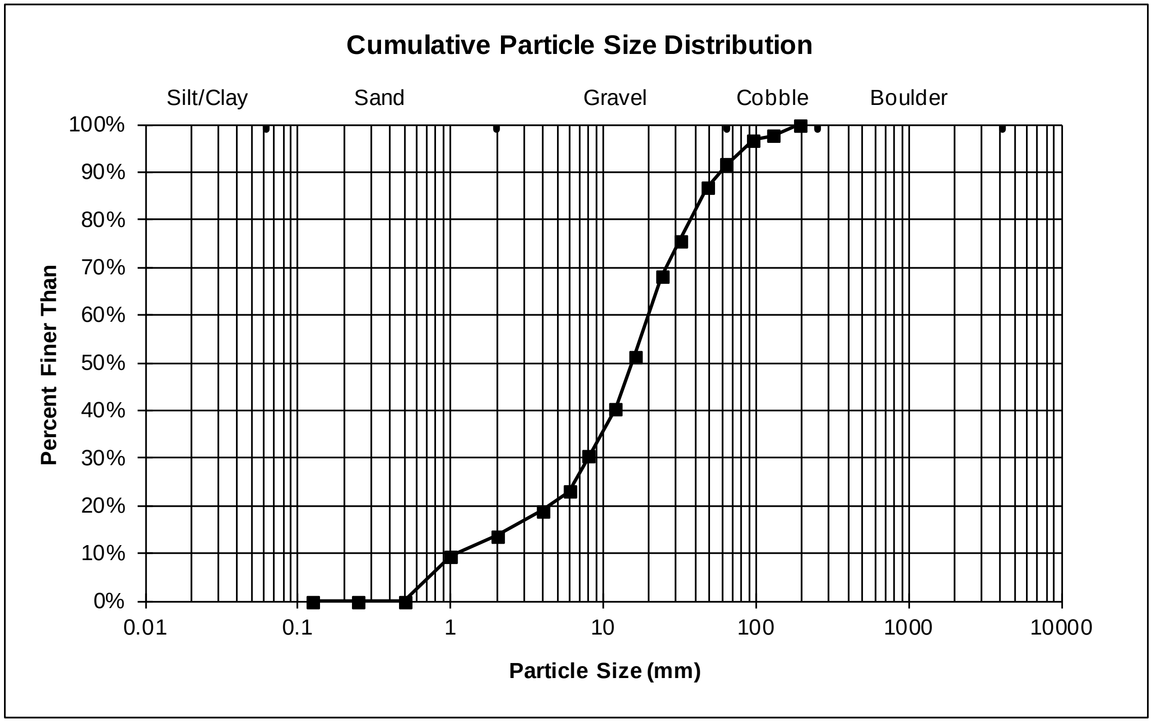
**Pebble Count Worksheet**

**COMMENTS:** Second reach 1000 ft upstream of ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 0 | 0.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 0% |
| 0.125 - 0.25 | 0 | 0.0% | 0% |
| 0.25 - .5 | 0 | 0.0% | 0% |
| 0.5 - 1.0 | 28 | 9.3% | 9% |
| 1 - 2 | 13 | 4.3% | 14% |
| 2 - 4 | 16 | 5.3% | 19% |
| 4 - 6 | 12 | 4.0% | 23% |
| 6 - 8 | 22 | 7.3% | 30% |
| 8 - 12 | 30 | 10.0% | 40% |
| 12 - 16 | 33 | 11.0% | 51% |
| 16 - 24 | 50 | 16.7% | 68% |
| 24 - 32 | 23 | 7.7% | 76% |
| 32 - 48 | 33 | 11.0% | 87% |
| 48 - 64 | 15 | 5.0% | 92% |
| 64 - 96 | 15 | 5.0% | 97% |
| 96 - 128 | 3 | 1.0% | 98% |
| 128 - 192 | 7 | 2.3% | 100% |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - Severy Creek Reach 2
ID NUMBER: SVRY2
DATE: 9/29/2012
CREW: VonLoh, Willis, Cahalan, Rodman

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 2.378 | 9.666 | 15.452 | 43.506 | 83.864 | 166.0 |



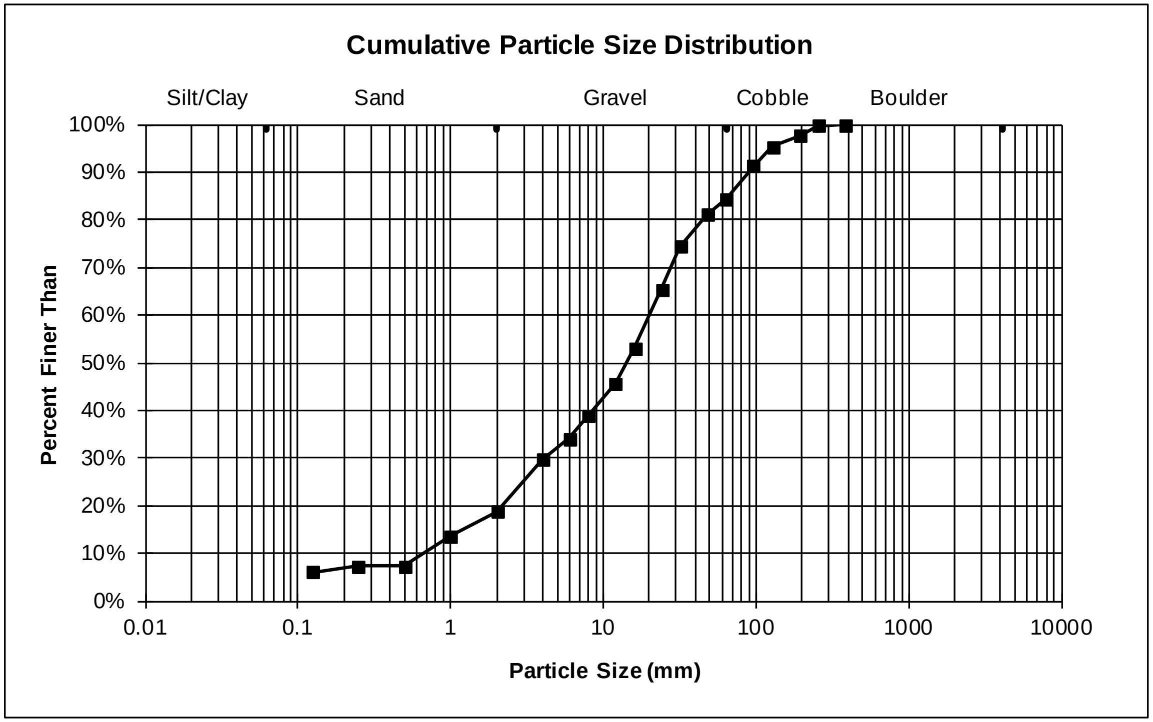
**Pebble Count Worksheet**

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 18 | 6.0% | |
| 0.062 - 0.125 | 0 | 0.0% | 6% |
| 0.125 - 0.25 | 4 | 1.3% | 7% |
| 0.25 - .5 | 0 | 0.0% | 7% |
| 0.5 - 1.0 | 19 | 6.3% | 14% |
| 1 - 2 | 15 | 5.0% | 19% |
| 2 - 4 | 33 | 11.0% | 30% |
| 4 - 6 | 13 | 4.3% | 34% |
| 6 - 8 | 15 | 5.0% | 39% |
| 8 - 12 | 20 | 6.7% | 46% |
| 12 - 16 | 22 | 7.3% | 53% |
| 16 - 24 | 37 | 12.3% | 65% |
| 24 - 32 | 27 | 9.0% | 74% |
| 32 - 48 | 20 | 6.7% | 81% |
| 48 - 64 | 10 | 3.3% | 84% |
| 64 - 96 | 21 | 7.0% | 91% |
| 96 - 128 | 12 | 4.0% | 95% |
| 128 - 192 | 7 | 2.3% | 98% |
| 192 - 256 | 6 | 2.0% | 100% |
| 256 - 384 | 1 | 0.3% | 100% |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

**COMMENTS:** Second reach 0.5 miles upstream of ERO Reach

STREAM NAME: Pikes Peak Highway - West Fork Beaver Creek Reach 2
ID NUMBER: WBVR1
DATE: 10/1/2012
CREW: VonLoh, Willis

| **Particle Size Distribution (mm)** | **D15** | **D35** | **D50** | **D84** | **D95** | **Lpart** |
|---|---|---|---|---|---|---|
| | **1.203** | **6.355** | **14.224** | **62.185** | **124.968** | **275.0** |



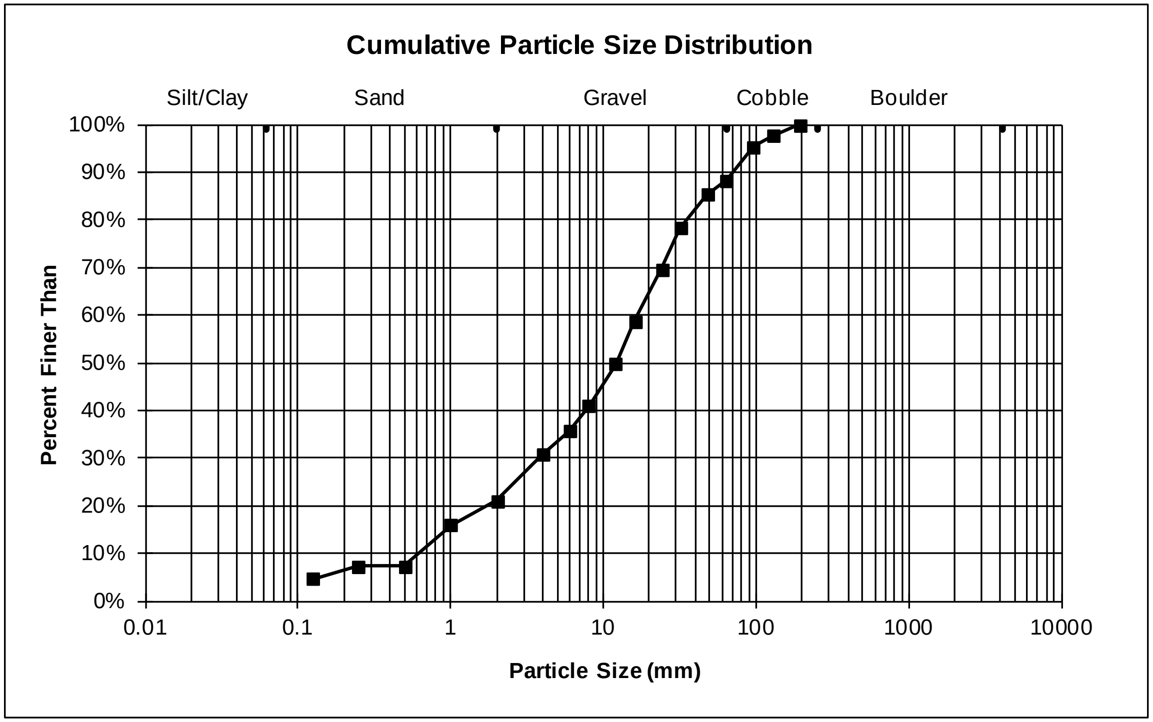
**Pebble Count Worksheet**

**COMMENTS:** Second reach 0.5 miles upstream of ERO Reach

| Particle Size (mm) | # in Size Class | % of Total | % Finer Than |
|---|---|---|---|
| <0.062 | 14 | 4.7% | |
| 0.062 - 0.125 | 0 | 0.0% | 5% |
| 0.125 - 0.25 | 8 | 2.7% | 7% |
| 0.25 - .5 | 0 | 0.0% | 7% |
| 0.5 - 1.0 | 26 | 8.7% | 16% |
| 1 - 2 | 15 | 5.0% | 21% |
| 2 - 4 | 29 | 9.7% | 31% |
| 4 - 6 | 15 | 5.0% | 36% |
| 6 - 8 | 16 | 5.3% | 41% |
| 8 - 12 | 26 | 8.7% | 50% |
| 12 - 16 | 27 | 9.0% | 59% |
| 16 - 24 | 33 | 11.0% | 70% |
| 24 - 32 | 26 | 8.7% | 78% |
| 32 - 48 | 21 | 7.0% | 85% |
| 48 - 64 | 9 | 3.0% | 88% |
| 64 - 96 | 21 | 7.0% | 95% |
| 96 - 128 | 7 | 2.3% | 98% |
| 128 - 192 | 7 | 2.3% | 100% |
| 192 - 256 | | | |
| 256 - 384 | | | |
| 384 - 512 | | | |
| 512 - 1024 | | | |
| 1024 - 2048 | | | |
| 2044 - 4096 | | | |
| Total | 300.00 | | |

STREAM NAME: Pikes Peak Highway - West Fork Beaver Creek Reach 2
ID NUMBER: WBVR2
DATE: 10/1/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.923** | **5.684** | **12.129** | **44.432** | **94.164** | **190.0** |



# Appendix O

# Stream Bar Sample

# Particle Size Distribution Summary
# and
# Graphs

# 2012

## Summary of Stream Channel Particle Size Distribution from Sieve Analysis of Bar Samples on Pikes Peak, 2012

| Site Name | Site ID | Date | Particle Size Distribution | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | D15 | D35 | D50 | D84 | D95 | D100 |
| Boehmer Creek Reach 1 | BHMR1 | 9/17/2012 | 0.018 | 0.140 | 0.538 | 1.935 | 5.236 | 15.0 |
| Boehmer Creek Reach 2 | BHMR2 | 9/17/2012 | 0.628 | 1.168 | 1.633 | 4.708 | 24.311 | 29.0 |
| East Fork Beaver Creek Reach 1 | EBVR1 | 9/18/2012 | 0.602 | 1.692 | 2.954 | 7.350 | 11.378 | 15.0 |
| East Fork Beaver Creek Reach 2 | EBVR2 | 9/18/2012 | 1.312 | 3.317 | 4.457 | 7.512 | 9.827 | 15.0 |
| Glen Cove Reach 1 | GLEN1 | 9/24/2012 | 0.595 | 1.549 | 2.707 | 8.503 | 12.487 | 20.0 |
| North Catamount Creek Reach 1 | NCAT1 | 9/10/2012 | 0.805 | 1.701 | 2.548 | 5.054 | 7.324 | 9.0 |
| North Catamount Creek Reach 2 | NCAT2 | 9/27/2012 | 0.799 | 2.475 | 3.781 | 8.613 | 12.339 | 19.0 |
| North Fork Crystal Creek Reach 1 | NCRY1 | 9/6/2012 | 0.805 | 1.701 | 2.548 | 5.054 | 7.324 | 9.0 |
| North Fork Crystal Creek Reach 2 | NCRY2 | 9/6/2012 | 0.106 | 0.888 | 1.463 | 4.455 | 8.818 | 14.0 |
| Oil Creek Reach 1 | OILC1 | 9/25/2012 | 0.017 | 0.124 | 0.528 | 3.797 | 8.523 | 20.0 |
| South Catamount Creek Reach 1 | SCAT1 | 9/11/2012 | 0.228 | 2.598 | 4.666 | 13.589 | 23.688 | 29.0 |
| South Catamount Creek Reach 2 | SCAT2 | 9/24/2012 | 1.173 | 3.176 | 4.813 | 9.452 | 16.237 | 26.0 |
| South Catamount Creek Reach 3 | SCAT3 | 9/24/2012 | 0.305 | 1.064 | 2.168 | 11.189 | 19.976 | 28.0 |
| Ski Creek Reach 1 | SKIC1 | 9/11/2012 | 0.437 | 1.768 | 3.565 | 9.785 | 15.503 | 21.0 |
| Ski Creek Reach 2 | SKIC2 | 9/6/2012 | 0.110 | 0.794 | 1.319 | 4.274 | 7.400 | 14.0 |
| Severy Creek Reach 1 | SVRY1 | 9/20/2012 | 0.030 | 0.471 | 0.998 | 3.398 | 5.503 | 12.0 |
| Severy Creek Reach 2 | SVRY2 | 9/20/2012 | 0.501 | 1.156 | 1.893 | 6.469 | 10.633 | 15.0 |
| West Fork Beaver Creek Reach 1 | WBVR1 | 10/1/2012 | 0.121 | 1.345 | 3.470 | 21.148 | 27.054 | 30.0 |
| West Fork Beaver Creek Reach 2 | WBVR2 | 10/1/2012 | 2.595 | 4.673 | 6.293 | 11.900 | 17.552 | 21.0 |

**Sieve Analysis Worksheet**

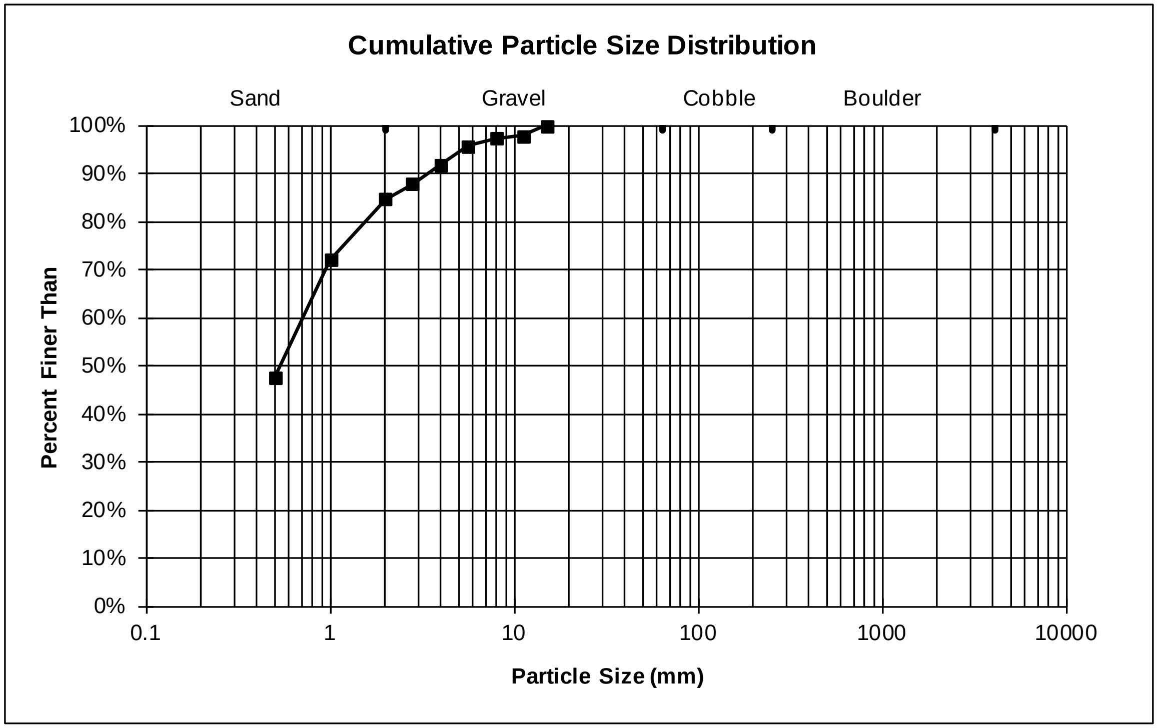
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 447.30 | 47.4% | |
| 0.5 | 231.20 | 24.5% | 47.4% |
| 1.0 | 119.50 | 12.7% | 71.9% |
| 2.0 | 30.40 | 3.2% | 84.6% |
| 2.8 | 38.60 | 4.1% | 87.8% |
| 4.0 | 36.30 | 3.8% | 91.9% |
| 5.6 | 14.10 | 1.5% | 95.8% |
| 8.0 | 4.60 | 0.5% | 97.3% |
| 11.2 | 21.20 | 2.2% | 97.8% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 943.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken downstream from Cross Section E

SITE NAME: Pikes Peak Highway - Boehmer Creek Reach 1
ID NUMBER: BHMR1
DATE: 9/17/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.018 | 0.140 | 0.538 | 1.935 | 5.236 | 15.0 |



**Sieve Analysis Worksheet**

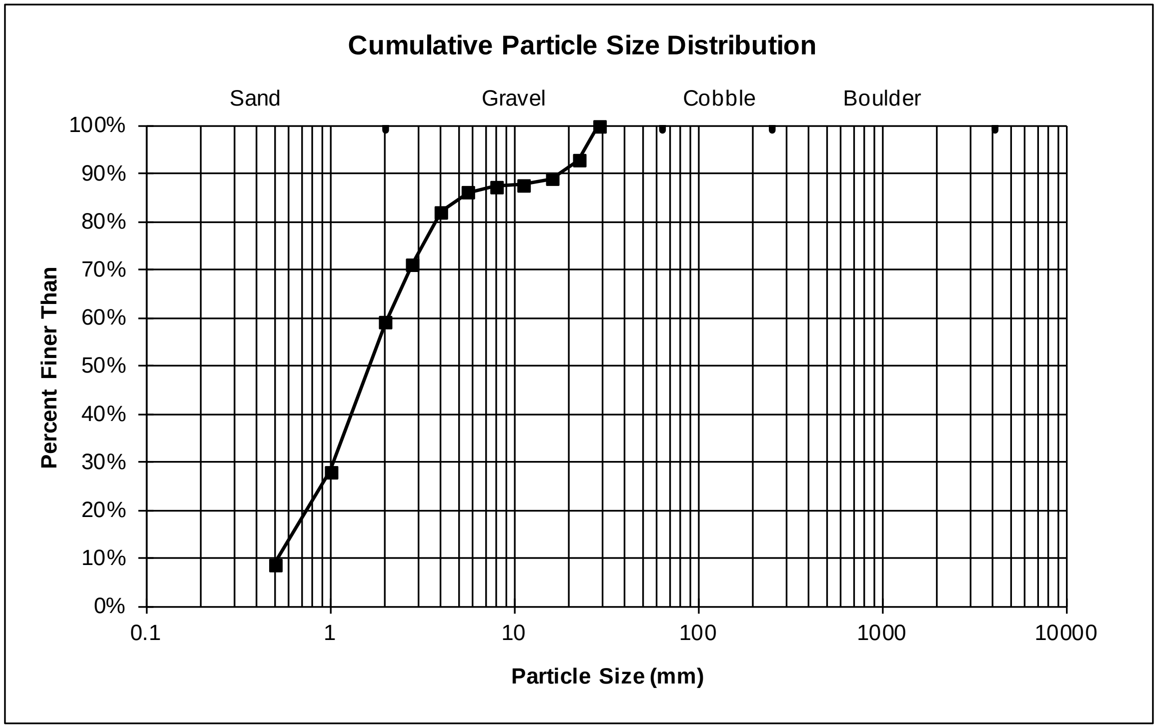
**COMMENTS:** Bar Sample taken 18' upstream from Cross Section B

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 49.10 | 8.6% | |
| 0.5 | 111.10 | 19.5% | 8.6% |
| 1.0 | 177.20 | 31.0% | 28.1% |
| 2.0 | 69.00 | 12.1% | 59.1% |
| 2.8 | 62.30 | 10.9% | 71.2% |
| 4.0 | 22.60 | 4.0% | 82.1% |
| 5.6 | 6.80 | 1.2% | 86.0% |
| 8.0 | 2.10 | 0.4% | 87.2% |
| 11.2 | 7.40 | 1.3% | 87.6% |
| 16.0 | 21.60 | 3.8% | 88.9% |
| 22.4 | 41.80 | 7.3% | 92.7% |
| 29.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 571.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pikes Peak Highway - Boehmer Creek Reach 2
ID NUMBER: BHMR2
DATE: 9/17/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.628 | 1.168 | 1.633 | 4.708 | 24.311 | 29.0 |



**Sieve Analysis Worksheet**

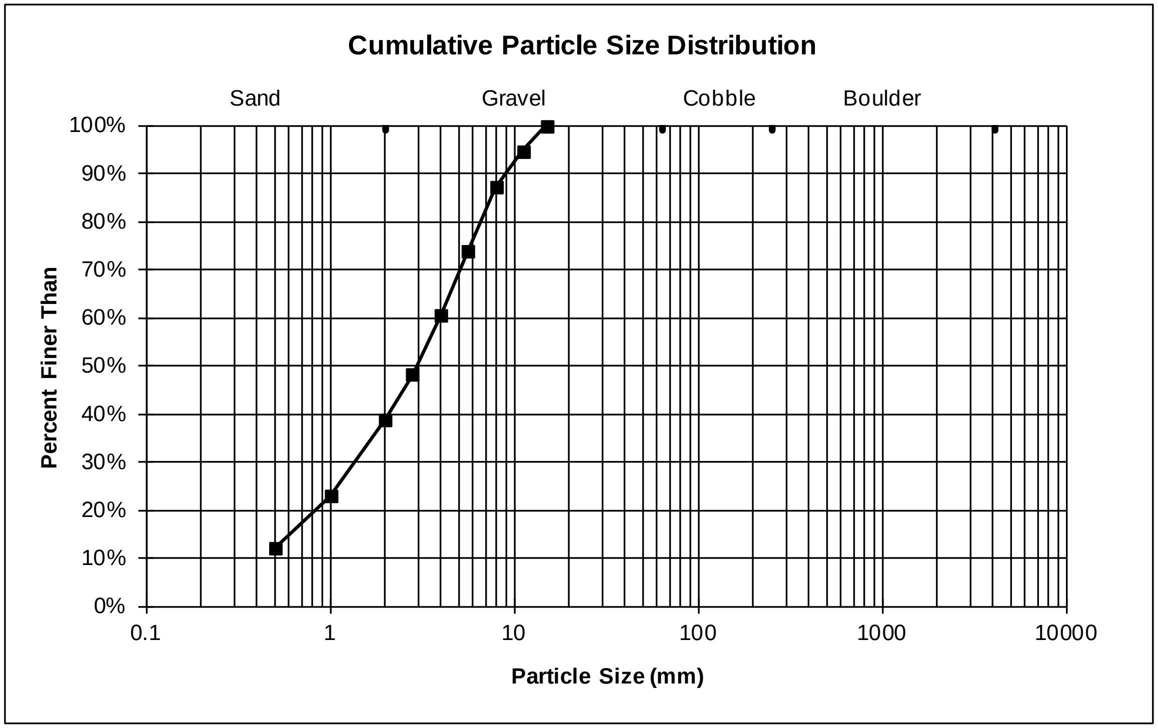
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 86.30 | 12.1% | |
| 0.5 | 77.00 | 10.8% | 12.1% |
| 1.0 | 113.80 | 16.0% | 22.9% |
| 2.0 | 66.20 | 9.3% | 38.8% |
| 2.8 | 88.90 | 12.5% | 48.1% |
| 4.0 | 94.70 | 13.3% | 60.6% |
| 5.6 | 94.80 | 13.3% | 73.9% |
| 8.0 | 53.90 | 7.6% | 87.2% |
| 11.2 | 37.70 | 5.3% | 94.7% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 713.30 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 2' downstream from Cross Section B right bank

SITE NAME: Pikes Peak Highway - East Fork Beaver Creek Reach 1
ID NUMBER: EBVR1
DATE: 9/18/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.602 | 1.692 | 2.954 | 7.350 | 11.378 | 15.0 |



**Sieve Analysis Worksheet**

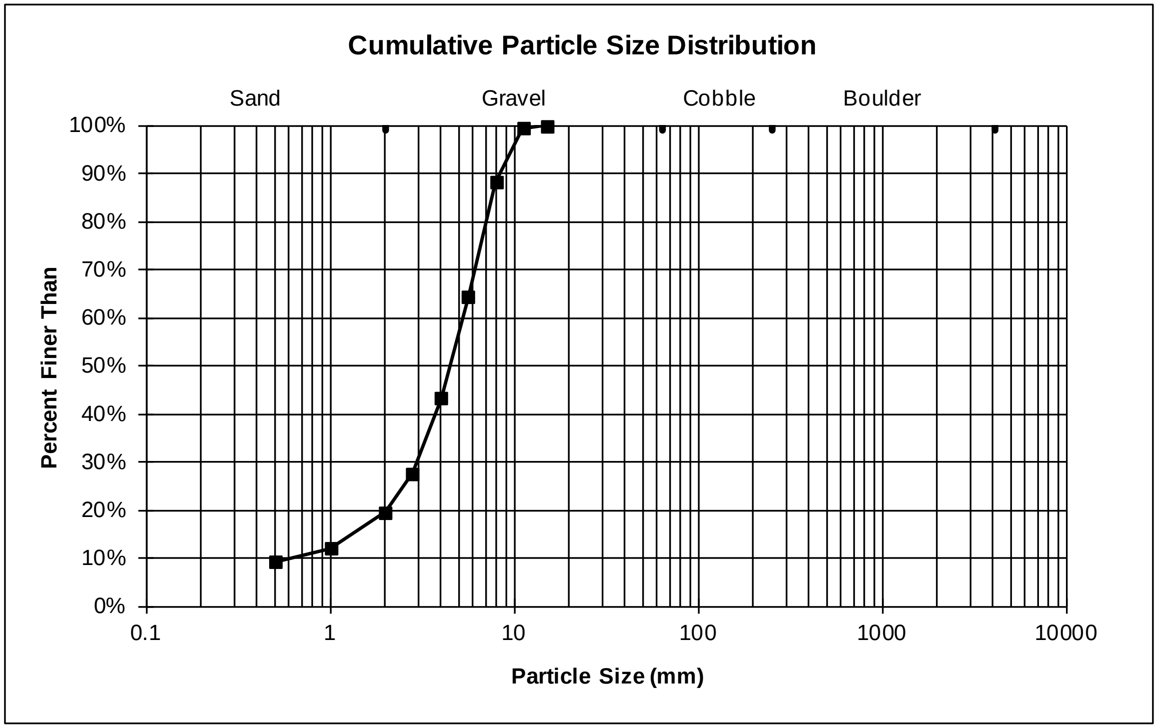
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 94.30 | 9.3% | |
| 0.5 | 27.90 | 2.7% | 9.3% |
| 1.0 | 76.70 | 7.6% | 12.0% |
| 2.0 | 80.90 | 8.0% | 19.6% |
| 2.8 | 158.90 | 15.7% | 27.6% |
| 4.0 | 214.10 | 21.1% | 43.2% |
| 5.6 | 242.60 | 23.9% | 64.3% |
| 8.0 | 112.60 | 11.1% | 88.2% |
| 11.2 | 7.00 | 0.7% | 99.3% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1015.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 6' upstream from Cross Section E

SITE NAME: Pikes Peak Highway - East Fork Beaver Creek Reach 2
ID NUMBER: EBVR2
DATE: 9/18/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 1.312 | 3.317 | 4.457 | 7.512 | 9.827 | 15.0 |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 124.30 | 12.1% | |
| 0.5 | 117.60 | 11.5% | 12.1% |
| 1.0 | 185.10 | 18.1% | 23.6% |
| 2.0 | 95.10 | 9.3% | 41.7% |
| 2.8 | 112.40 | 11.0% | 50.9% |
| 4.0 | 98.10 | 9.6% | 61.9% |
| 5.6 | 108.00 | 10.5% | 71.5% |
| 8.0 | 113.40 | 11.1% | 82.0% |
| 11.2 | 65.40 | 6.4% | 93.1% |
| 16.0 | 5.80 | 0.6% | 99.4% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1025.20 | | |

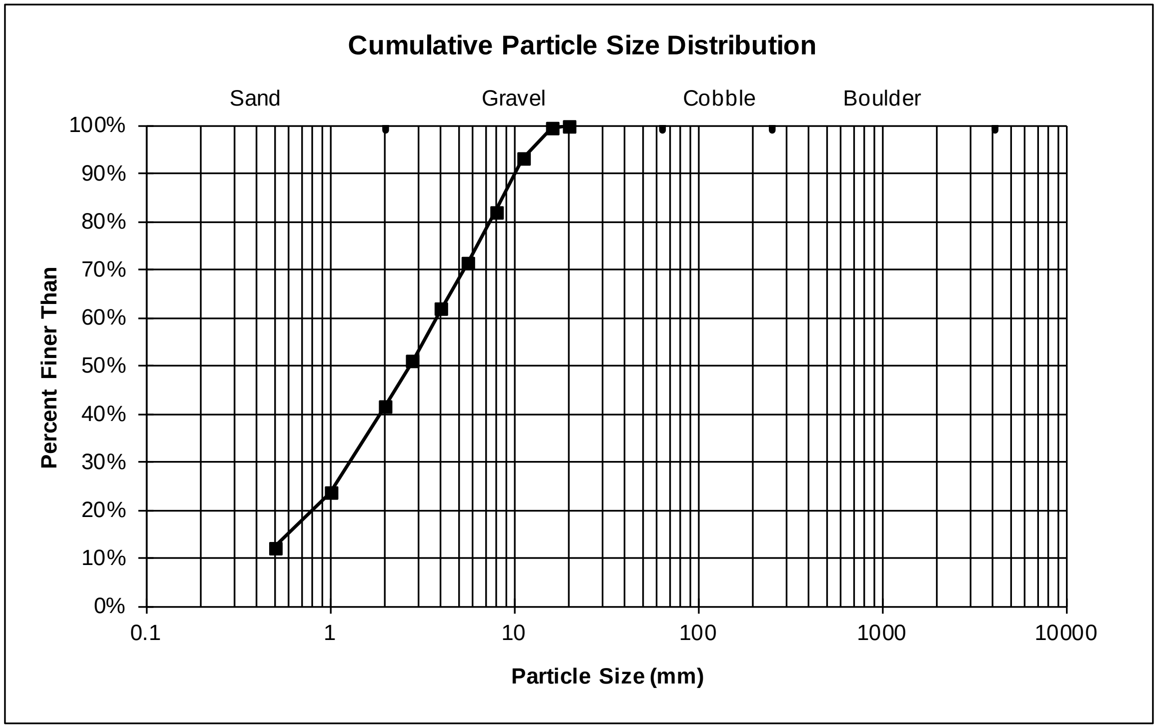
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken at Cross Section E

SITE NAME: Pikes Peak Highway - Glen Cove Creek Reach 1
ID NUMBER: GLEN1
DATE: 9/24/2012
CREW: Derengowski, VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.595 | 1.549 | 2.707 | 8.503 | 12.487 | 20.0 |



**Sieve Analysis Worksheet**

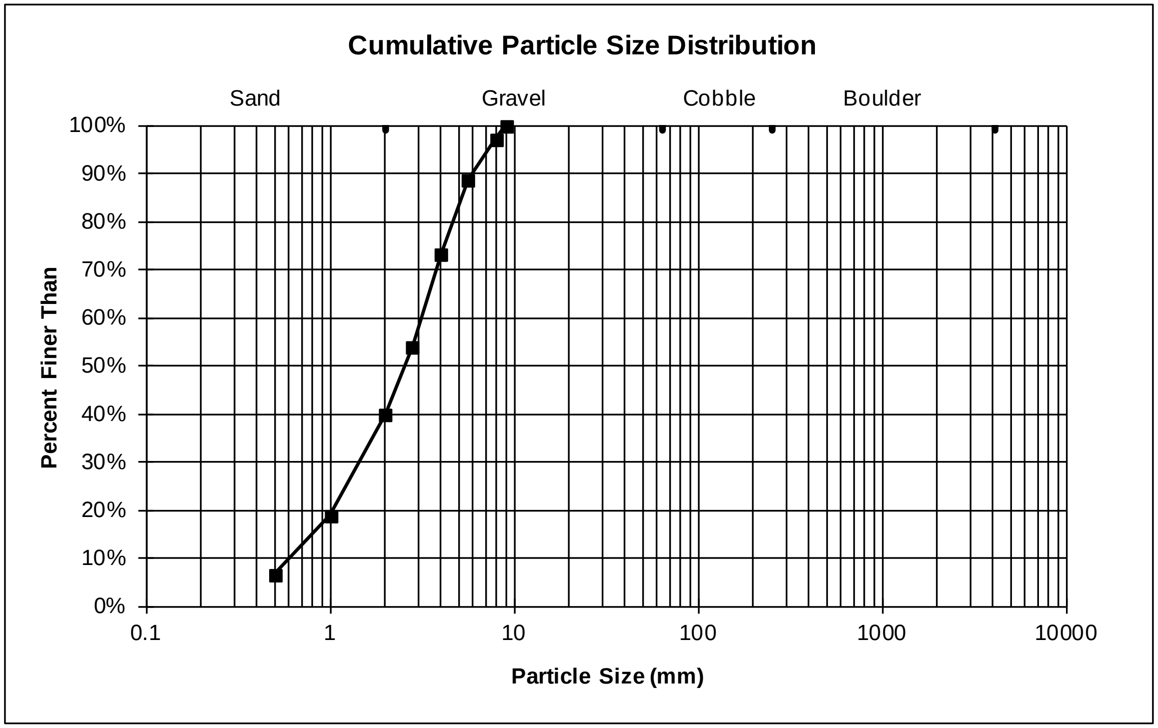
**COMMENTS:** Bar Sample taken beetwenn Cross Section B and C right bank

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 59.90 | 6.6% | |
| 0.5 | 110.90 | 12.2% | 6.6% |
| 1.0 | 191.50 | 21.1% | 18.8% |
| 2.0 | 126.90 | 14.0% | 39.9% |
| 2.8 | 175.50 | 19.3% | 53.9% |
| 4.0 | 140.30 | 15.5% | 73.3% |
| 5.6 | 75.80 | 8.4% | 88.7% |
| 8.0 | 26.60 | 2.9% | 97.1% |
| 9.0 | * | | 100.0% |
| 16.0 | | | - |
| 22.4 | | | |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 907.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pikes Peak Highway - North Catamount Creek Reach 1
ID NUMBER: NCAT1
DATE: 9/10/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.805 | 1.701 | 2.548 | 5.054 | 7.324 | 9.0 |



**Sieve Analysis Worksheet**

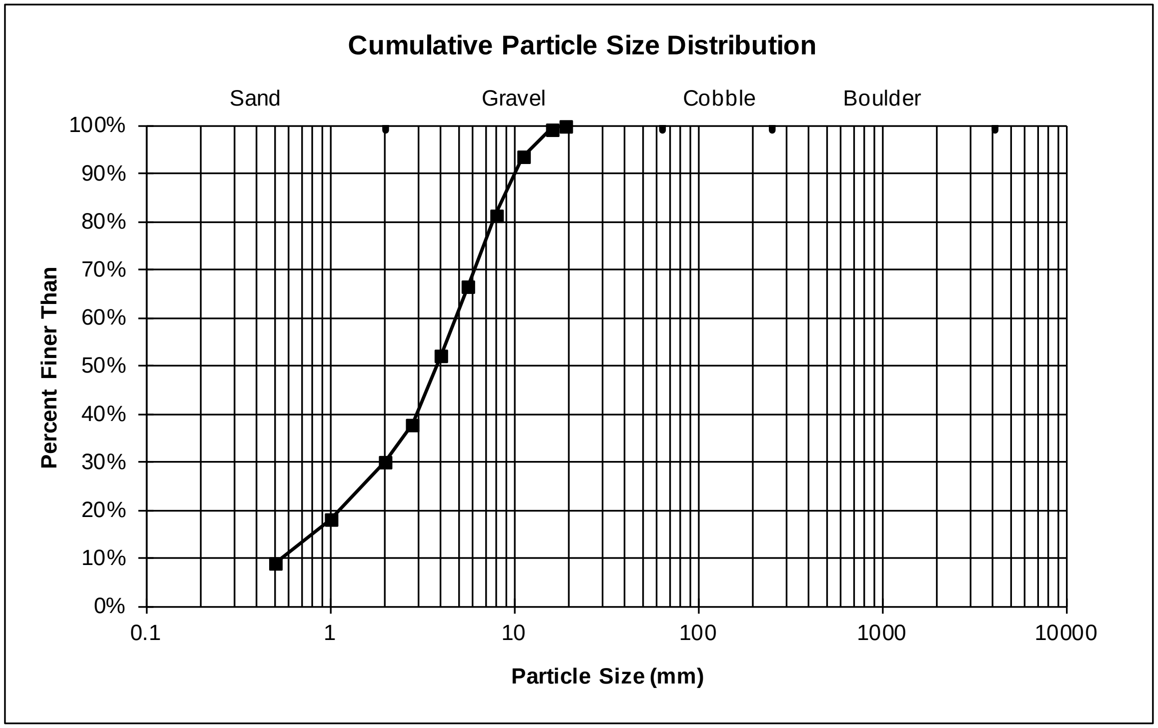
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 70.90 | 8.8% | |
| 0.5 | 73.90 | 9.2% | 8.8% |
| 1.0 | 97.40 | 12.1% | 18.0% |
| 2.0 | 63.00 | 7.8% | 30.1% |
| 2.8 | 116.10 | 14.4% | 37.9% |
| 4.0 | 115.80 | 14.4% | 52.3% |
| 5.6 | 118.50 | 14.7% | 66.6% |
| 8.0 | 97.30 | 12.1% | 81.4% |
| 11.2 | 46.80 | 5.8% | 93.4% |
| 16.0 | 6.20 | 0.8% | 99.2% |
| 19.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 805.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 3' downstream from Cross Section B

SITE NAME: Pikes Peak Highway - North Catamount Creek Reach 2
ID NUMBER: NCAT2
DATE: 9/27/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.799 | 2.475 | 3.781 | 8.613 | 12.339 | 19.0 |



**Sieve Analysis Worksheet**

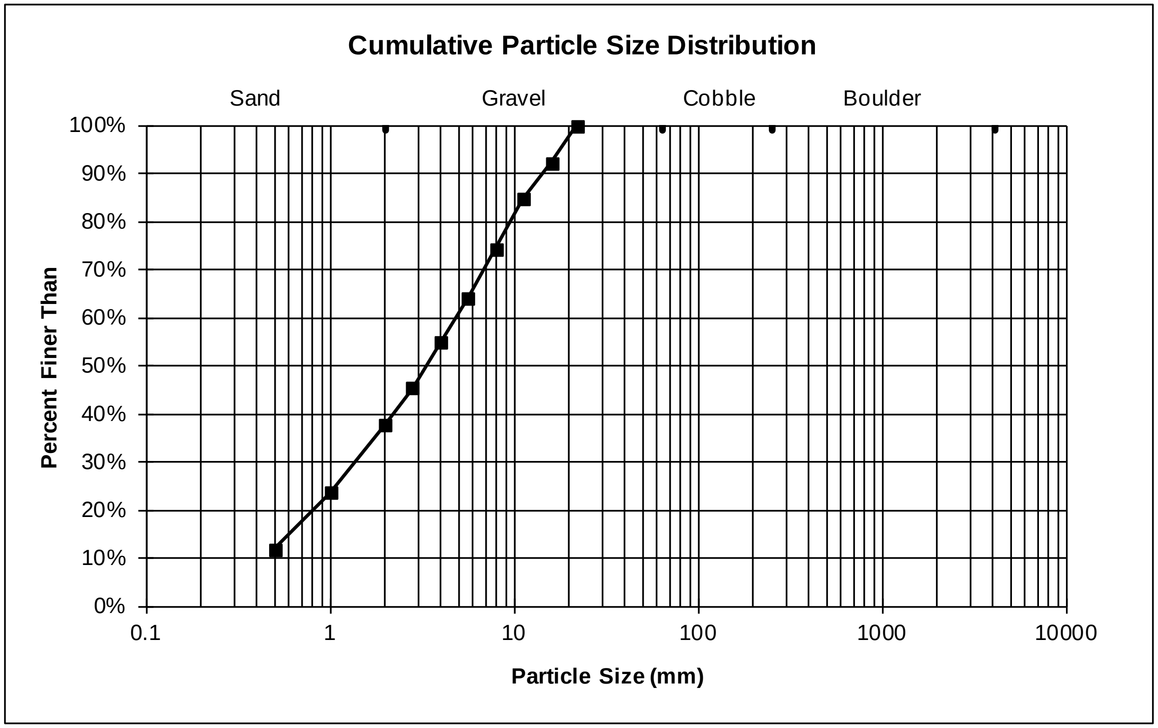
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 72.60 | 11.9% | |
| 0.5 | 71.20 | 11.7% | 11.9% |
| 1.0 | 87.60 | 14.3% | 23.5% |
| 2.0 | 45.30 | 7.4% | 37.9% |
| 2.8 | 59.00 | 9.7% | 45.3% |
| 4.0 | 56.30 | 9.2% | 55.0% |
| 5.6 | 62.10 | 10.2% | 64.2% |
| 8.0 | 62.70 | 10.3% | 74.3% |
| 11.2 | 45.90 | 7.5% | 84.6% |
| 16.0 | 48.10 | 7.9% | 92.1% |
| 22.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 610.80 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken at Cross Section A left bank

SITE NAME: Pikes Peak Highway - North Fork Crystal Creek Reach 1
ID NUMBER: NCRY1
DATE: 9/6/2012
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.602 | 1.740 | 3.330 | 10.978 | 17.973 | 22.0 |



**Sieve Analysis Worksheet**

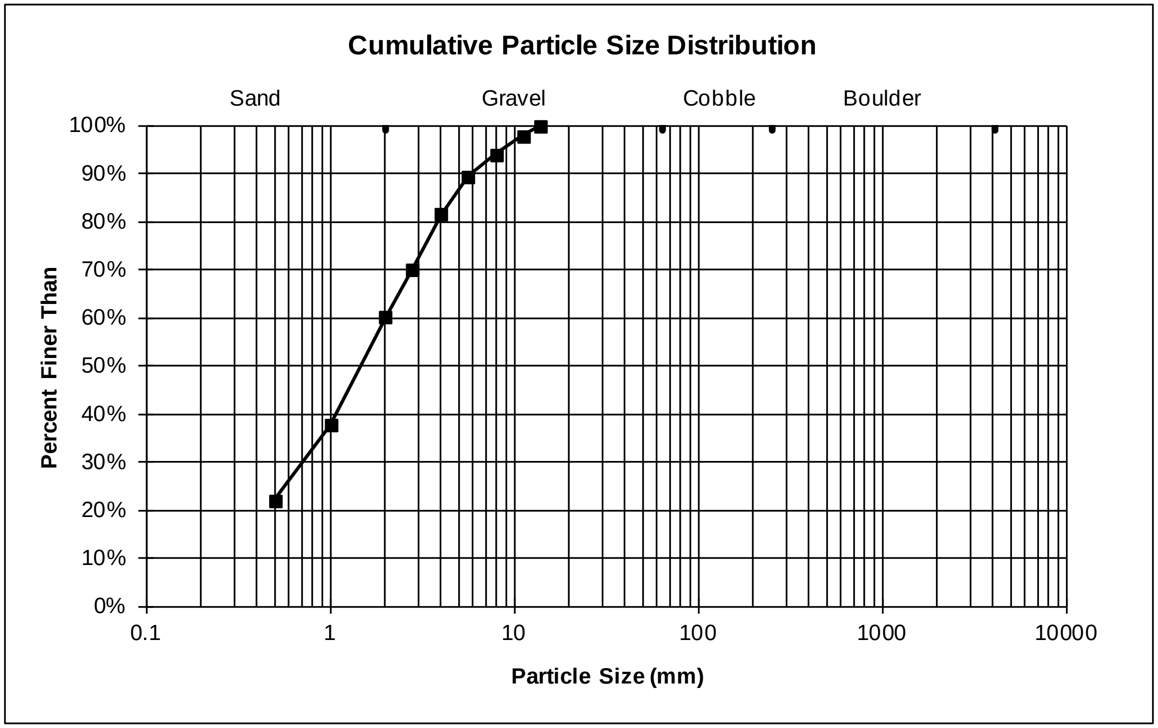
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 153.20 | 22.0% | |
| 0.5 | 109.00 | 15.7% | 22.0% |
| 1.0 | 156.10 | 22.4% | 37.7% |
| 2.0 | 69.00 | 9.9% | 60.1% |
| 2.8 | 79.50 | 11.4% | 70.0% |
| 4.0 | 55.20 | 7.9% | 81.5% |
| 5.6 | 31.20 | 4.5% | 89.4% |
| 8.0 | 27.00 | 3.9% | 93.9% |
| 11.2 | 15.60 | 2.2% | 97.8% |
| 14.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 695.80 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken upstream from Cross Section E

SITE NAME: Pikes Peak Highway - North Fork Crystal Creek Reach 2
ID NUMBER: NCRY2
DATE: 9/6/2012
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.106 | 0.888 | 1.463 | 4.455 | 8.818 | 14.0 |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 311.50 | 49.1% | |
| 0.5 | 70.90 | 11.2% | 49.1% |
| 1.0 | 75.80 | 12.0% | 60.3% |
| 2.0 | 37.80 | 6.0% | 72.2% |
| 2.8 | 43.10 | 6.8% | 78.2% |
| 4.0 | 37.90 | 6.0% | 85.0% |
| 5.6 | 22.20 | 3.5% | 91.0% |
| 8.0 | 18.00 | 2.8% | 94.5% |
| 11.2 | 9.10 | 1.4% | 97.3% |
| 16.0 | 8.00 | 1.3% | 98.7% |
| 20.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 634.30 | | |

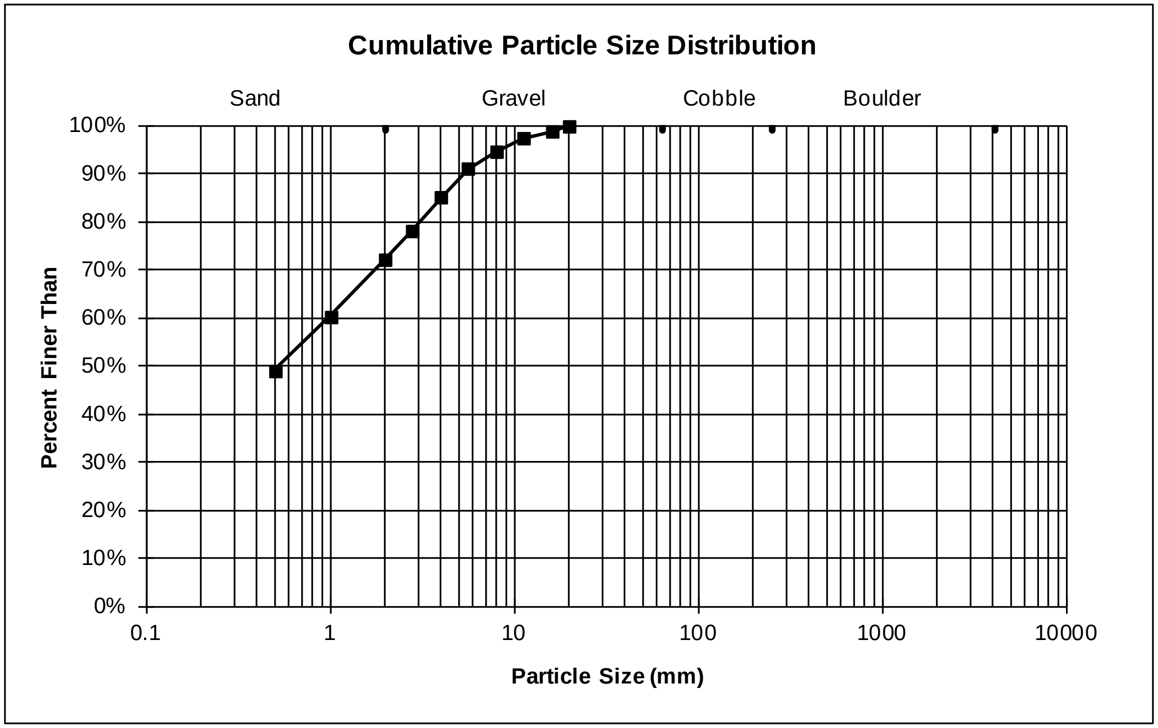
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 4" downstream from Cross Section A right bank

SITE NAME: Pikes Peak Highway - Oil Creek Reach 1
ID NUMBER: OILC1
DATE: 9/25/2012
CREW: VonLoh, Willis

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.017 | 0.124 | 0.528 | 3.797 | 8.523 | 20.0 |



**Sieve Analysis Worksheet**

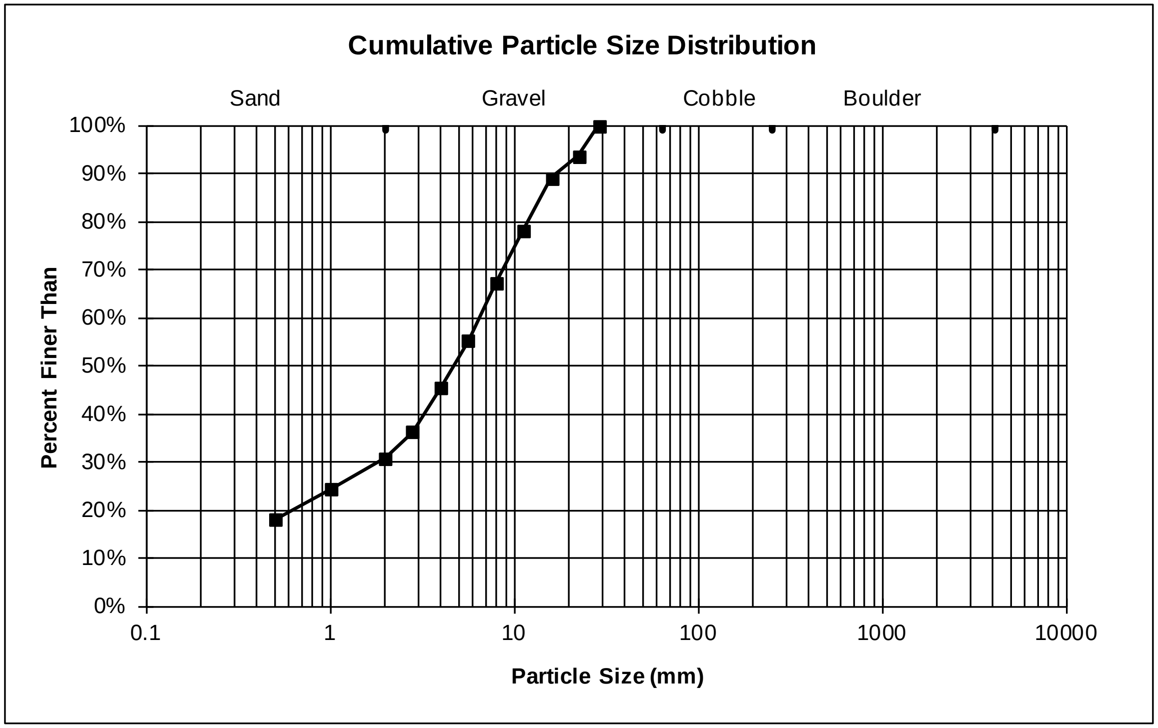
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 116.40 | 17.9% | |
| 0.5 | 41.80 | 6.4% | 17.9% |
| 1.0 | 42.50 | 6.5% | 24.3% |
| 2.0 | 34.60 | 5.3% | 30.9% |
| 2.8 | 61.10 | 9.4% | 36.2% |
| 4.0 | 62.80 | 9.7% | 45.6% |
| 5.6 | 77.00 | 11.8% | 55.2% |
| 8.0 | 70.80 | 10.9% | 67.1% |
| 11.2 | 72.40 | 11.1% | 78.0% |
| 16.0 | 29.40 | 4.5% | 89.1% |
| 22.4 | 41.50 | 6.4% | 93.6% |
| 29.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 650.30 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 3' upstream from Cross Section B

SITE NAME: Pikes Peak Highway - South Catamount Creek Reach 1
ID NUMBER: SCAT1
DATE: 9/11/2012
CREW: Derengowski, VonLoh

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.228** | **2.598** | **4.666** | **13.589** | **23.688** | **29.0** |



**Sieve Analysis Worksheet**

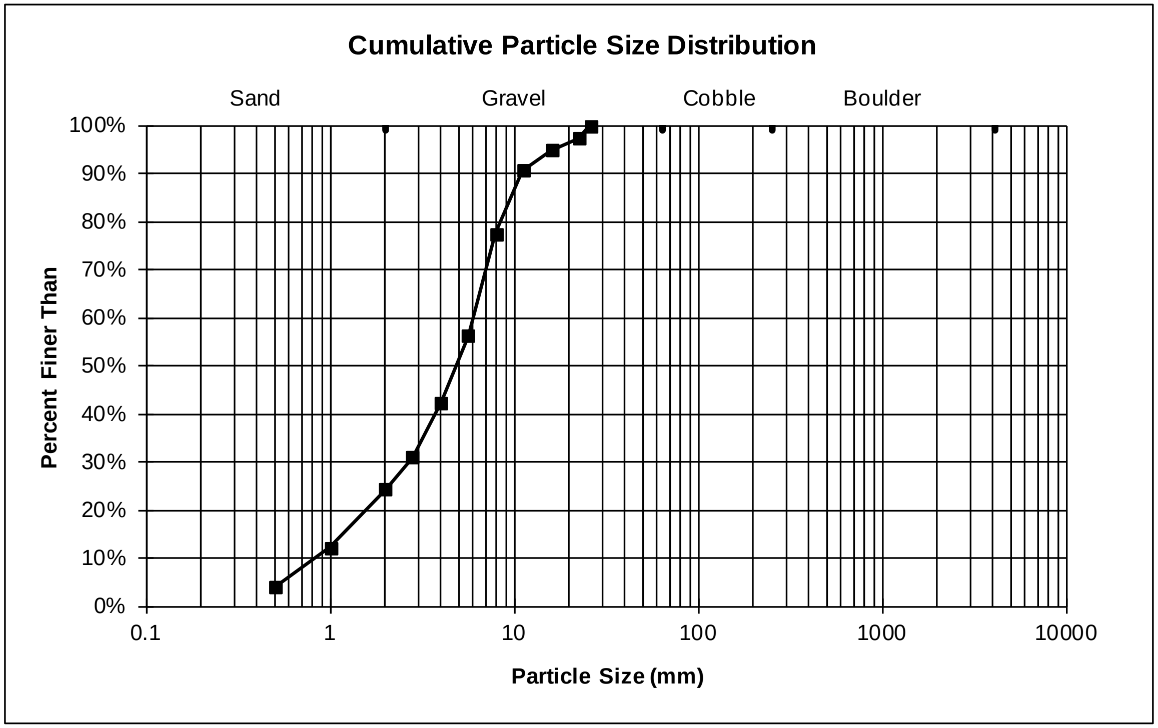
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 35.00 | 4.0% | |
| 0.5 | 71.50 | 8.2% | 4.0% |
| 1.0 | 105.30 | 12.1% | 12.2% |
| 2.0 | 58.40 | 6.7% | 24.3% |
| 2.8 | 98.70 | 11.3% | 31.0% |
| 4.0 | 121.60 | 14.0% | 42.3% |
| 5.6 | 185.20 | 21.3% | 56.3% |
| 8.0 | 113.70 | 13.0% | 77.5% |
| 11.2 | 37.60 | 4.3% | 90.6% |
| 16.0 | 21.20 | 2.4% | 94.9% |
| 22.4 | 23.30 | 2.7% | 97.3% |
| 26.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 871.50 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 10' upstream from Cross Section E left bank

SITE NAME: Pikes Peak Highway - South Catamount Creek Reach 2
ID NUMBER: SCAT2
DATE: 9/24/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 1.173 | 3.176 | 4.813 | 9.452 | 16.237 | 26.0 |



**Sieve Analysis Worksheet**

| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 173.40 | 16.7% | |
| 0.5 | 176.00 | 17.0% | 16.7% |
| 1.0 | 155.60 | 15.0% | 33.7% |
| 2.0 | 58.10 | 5.6% | 48.7% |
| 2.8 | 66.80 | 6.4% | 54.3% |
| 4.0 | 69.40 | 6.7% | 60.7% |
| 5.6 | 80.40 | 7.7% | 67.4% |
| 8.0 | 92.40 | 8.9% | 75.1% |
| 11.2 | 92.60 | 8.9% | 84.0% |
| 16.0 | 32.30 | 3.1% | 92.9% |
| 22.4 | 40.90 | 3.9% | 96.1% |
| 28.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1037.90 | | |

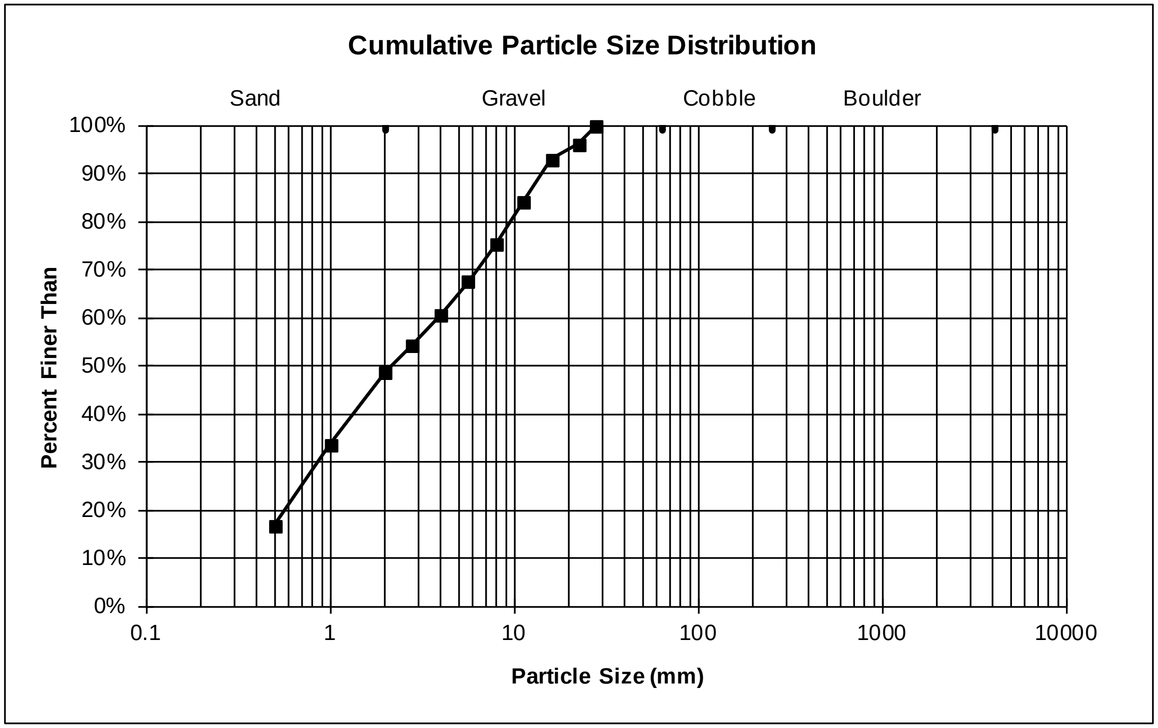
*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 10' downstream from Cross Section D right bank

SITE NAME: Pike's Peak Highway - South Catamount Creek Reach 3
ID NUMBER: SCAT3
DATE: 9/24/2012
CREW: Derengowski, VonLoh

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.305 | 1.064 | 2.168 | 11.189 | 19.976 | 28.0 |



**Sieve Analysis Worksheet**

**COMMENTS:** Bar Sample taken 10' downstream from Cross Section D

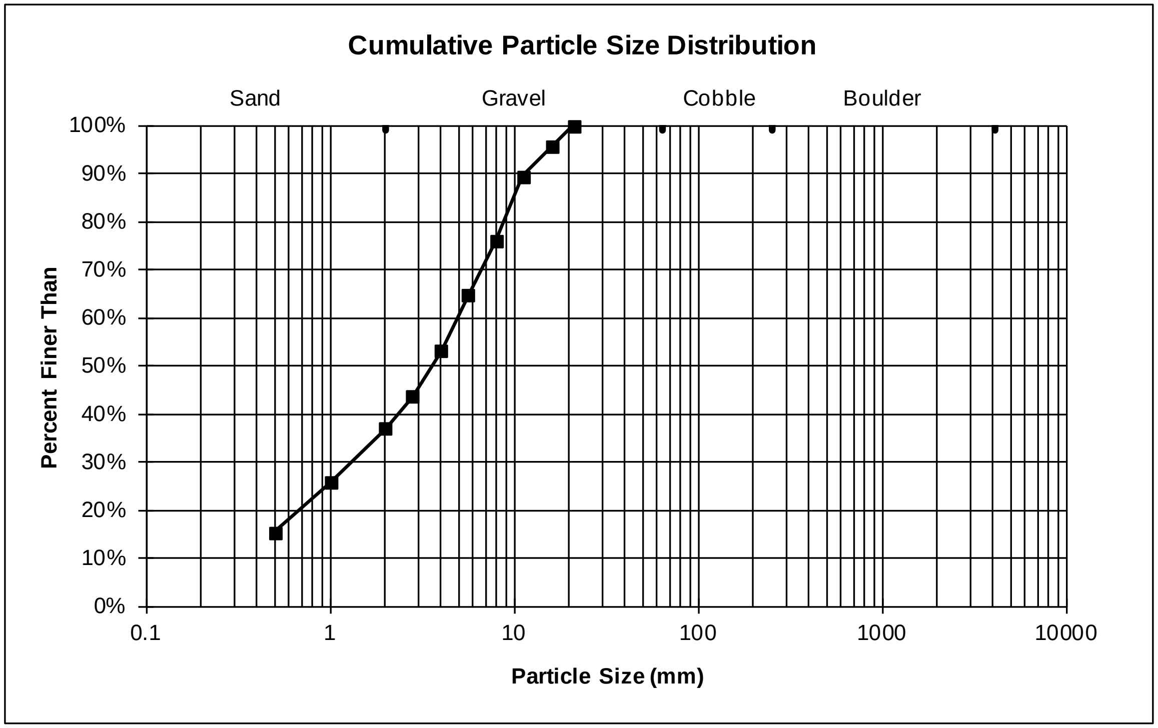
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 94.80 | 15.4% | |
| 0.5 | 63.10 | 10.3% | 15.4% |
| 1.0 | 69.50 | 11.3% | 25.7% |
| 2.0 | 40.60 | 6.6% | 37.0% |
| 2.8 | 57.90 | 9.4% | 43.6% |
| 4.0 | 70.80 | 11.5% | 53.0% |
| 5.6 | 69.60 | 11.3% | 64.6% |
| 8.0 | 83.20 | 13.5% | 75.9% |
| 11.2 | 37.50 | 6.1% | 89.4% |
| 16.0 | 27.40 | 4.5% | 95.5% |
| 21.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 614.40 | | |

*Measured value of the largest particle in the sample and not a sieve weight

SITE NAME: Pike's Peak Highway - Ski Creek Reach 1
ID NUMBER: SKIC1
DATE: 9/11/2012
CREW: VonLoh, Willis

**Particle Size Distribution (mm)**

| D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|
| 0.437 | 1.768 | 3.565 | 9.785 | 15.503 | 21.0 |



**Sieve Analysis Worksheet**

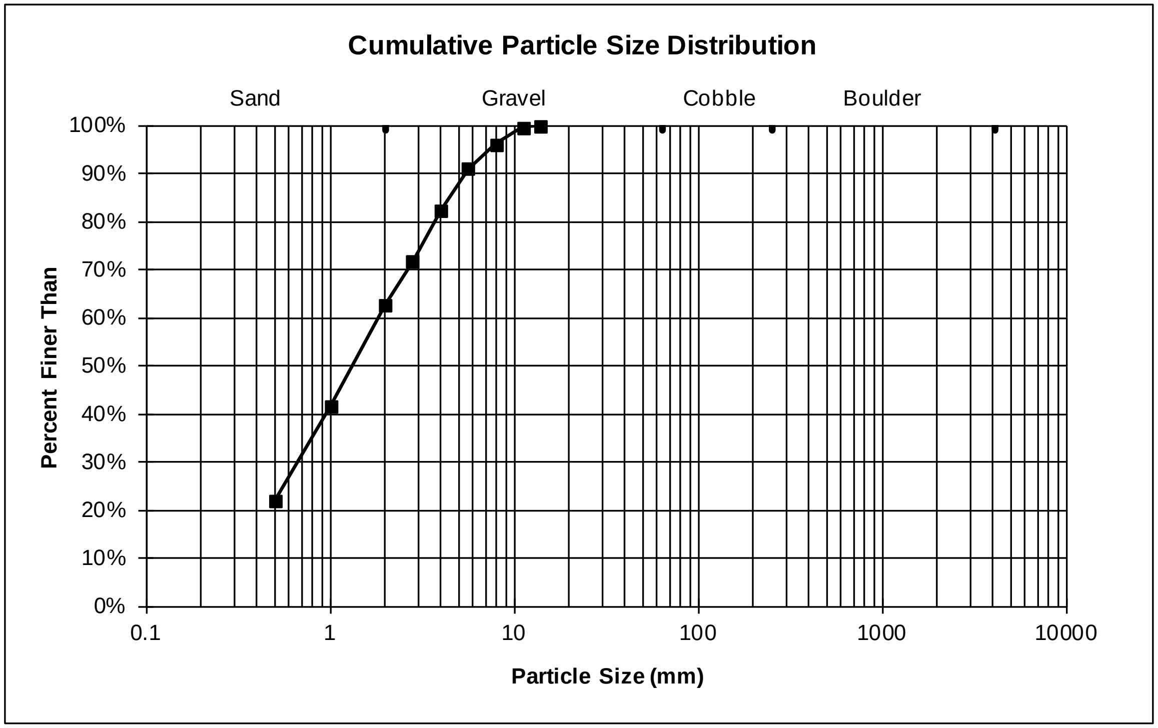
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 159.60 | 21.8% | |
| 0.5 | 144.70 | 19.8% | 21.8% |
| 1.0 | 154.30 | 21.1% | 41.6% |
| 2.0 | 66.50 | 9.1% | 62.7% |
| 2.8 | 77.20 | 10.5% | 71.7% |
| 4.0 | 63.80 | 8.7% | 82.3% |
| 5.6 | 37.50 | 5.1% | 91.0% |
| 8.0 | 24.70 | 3.4% | 96.1% |
| 11.2 | 3.70 | 0.5% | 99.5% |
| 14.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 732.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken 6' upstream from Cross Section A left bank

SITE NAME: Pikes Peak Highway - Ski Creek Reach 2
ID NUMBER: SKIC2
DATE: 9/6/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.110 | 0.794 | 1.319 | 4.274 | 7.400 | 14.0 |



**Sieve Analysis Worksheet**

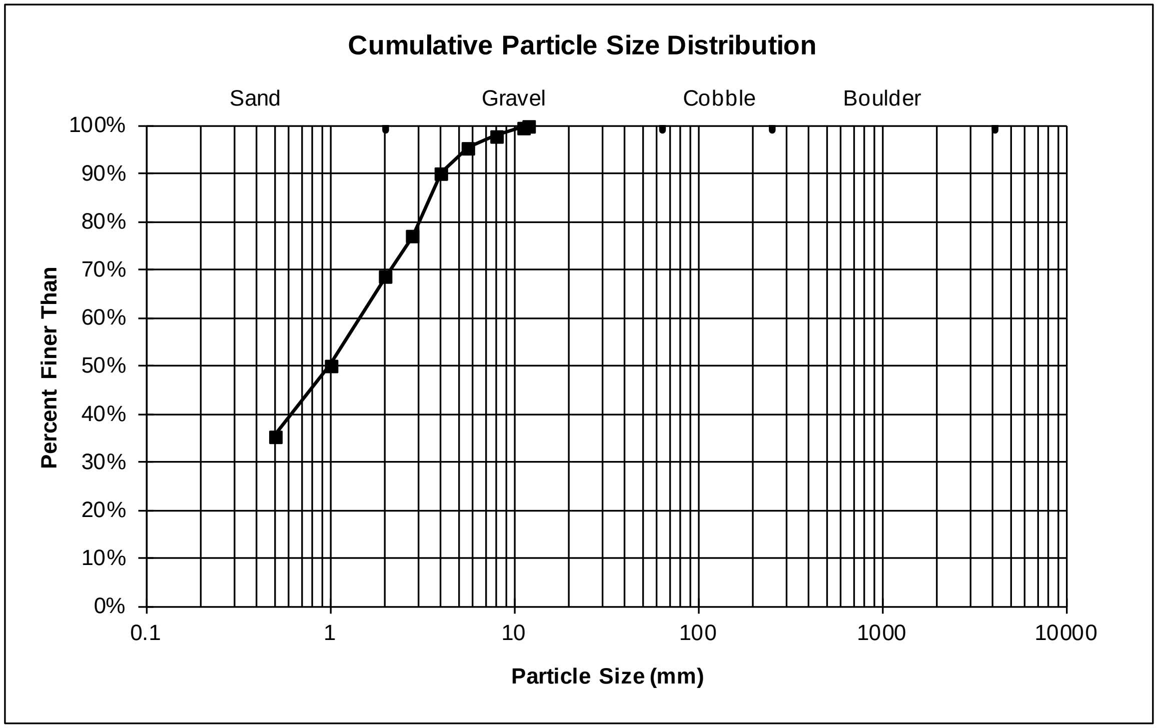
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 260.10 | 35.4% | |
| 0.5 | 107.20 | 14.6% | 35.4% |
| 1.0 | 135.90 | 18.5% | 50.0% |
| 2.0 | 60.90 | 8.3% | 68.6% |
| 2.8 | 96.60 | 13.2% | 76.9% |
| 4.0 | 38.60 | 5.3% | 90.0% |
| 5.6 | 18.50 | 2.5% | 95.3% |
| 8.0 | 13.30 | 1.8% | 97.8% |
| 11.2 | 2.90 | 0.4% | 99.6% |
| 12.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 734.00 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken at Cross Section A

SITE NAME: Pikes Peak Highway - Severy Creek Reach 1
ID NUMBER: SVRY1
DATE: 9/20/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.030 | 0.471 | 0.998 | 3.398 | 5.503 | 12.0 |



**Sieve Analysis Worksheet**

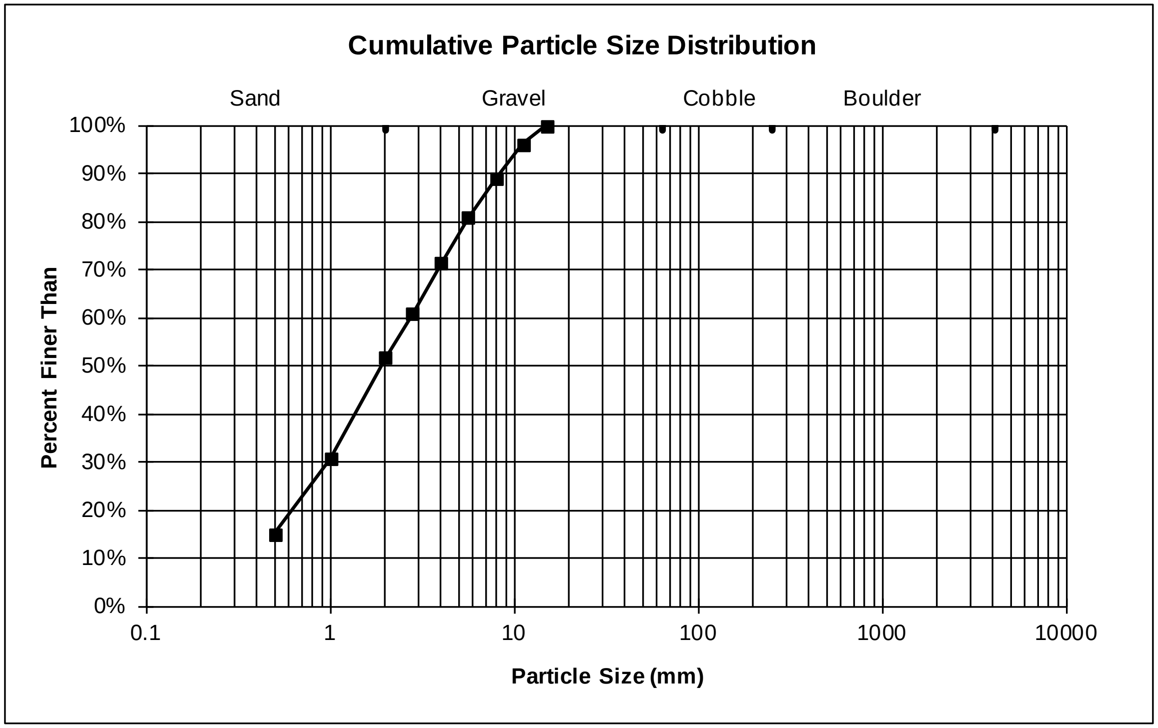
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 133.40 | 15.0% | |
| 0.5 | 139.10 | 15.6% | 15.0% |
| 1.0 | 187.80 | 21.1% | 30.6% |
| 2.0 | 81.00 | 9.1% | 51.7% |
| 2.8 | 94.70 | 10.6% | 60.8% |
| 4.0 | 83.10 | 9.3% | 71.4% |
| 5.6 | 72.30 | 8.1% | 80.7% |
| 8.0 | 65.00 | 7.3% | 88.8% |
| 11.2 | 34.50 | 3.9% | 96.1% |
| 15.0 | * | | 100.0% |
| 22.4 | | | - |
| 32.0 | | | |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 890.90 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken downstream from Cross Section E

SITE NAME: Pike's Peak Highway - Severy Creek Reach 2
ID NUMBER: SVRY2
DATE: 9/20/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **0.501** | **1.156** | **1.893** | **6.469** | **10.633** | **15.0** |



**Sieve Analysis Worksheet**

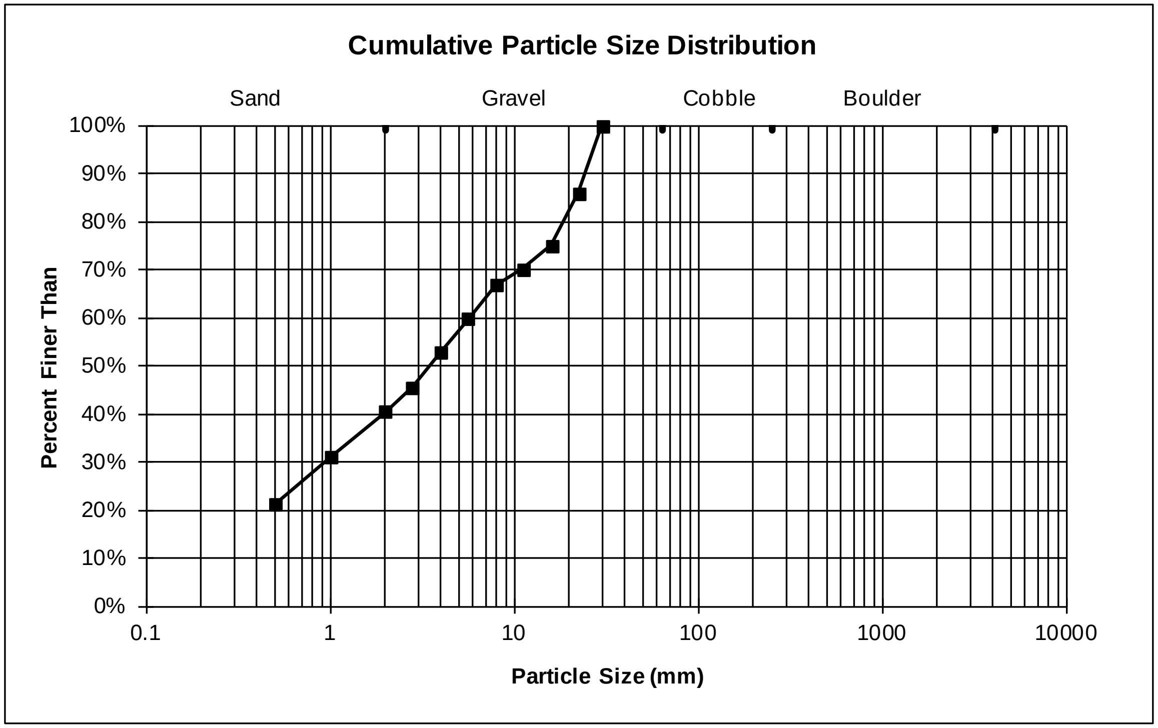
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 234.80 | 21.2% | |
| 0.5 | 107.80 | 9.7% | 21.2% |
| 1.0 | 104.70 | 9.5% | 31.0% |
| 2.0 | 57.40 | 5.2% | 40.4% |
| 2.8 | 80.90 | 7.3% | 45.6% |
| 4.0 | 75.20 | 6.8% | 52.9% |
| 5.6 | 78.70 | 7.1% | 59.7% |
| 8.0 | 37.00 | 3.3% | 66.8% |
| 11.2 | 52.90 | 4.8% | 70.2% |
| 16.0 | 120.90 | 10.9% | 74.9% |
| 22.4 | 156.40 | 14.1% | 85.9% |
| 30.0 | * | | 100.0% |
| 45.0 | | | - |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 1106.70 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken between Cross Section B and C left bank

SITE NAME: Pikes Peak Highway - West Fork Beaver Creek Reach 1
ID NUMBER: WBVR1
DATE: 10/1/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | 0.121 | 1.345 | 3.470 | 21.148 | 27.054 | 30.0 |



**Sieve Analysis Worksheet**

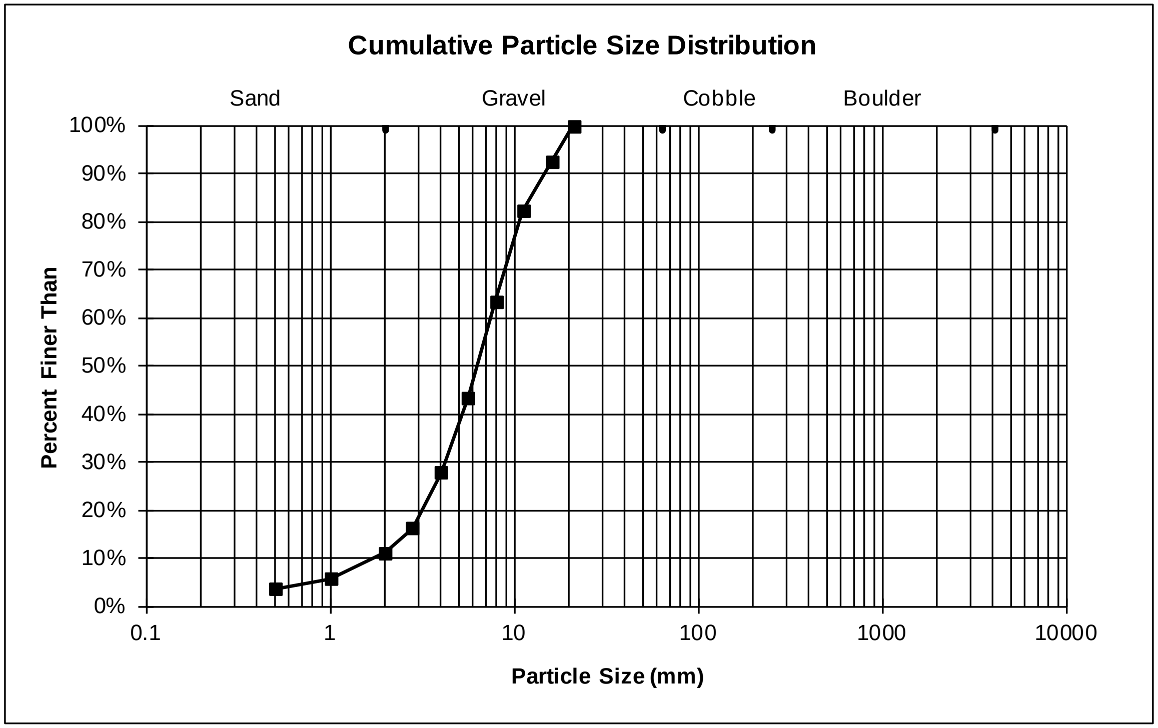
| Size Finer Than (mm) | Wt. on Sieve | % of Total | % Finer Than |
|---|---|---|---|
| Pan | 34.90 | 3.6% | |
| 0.5 | 20.60 | 2.1% | 3.6% |
| 1.0 | 51.90 | 5.4% | 5.7% |
| 2.0 | 48.90 | 5.1% | 11.1% |
| 2.8 | 112.30 | 11.6% | 16.1% |
| 4.0 | 152.10 | 15.7% | 27.7% |
| 5.6 | 193.90 | 20.0% | 43.5% |
| 8.0 | 182.00 | 18.8% | 63.5% |
| 11.2 | 98.20 | 10.1% | 82.3% |
| 16.0 | 73.40 | 7.6% | 92.4% |
| 21.0 | * | | 100.0% |
| 32.0 | | | - |
| 45.0 | | | |
| 64.0 | | | |
| 90 | | | |
| 128 | | | |
| 181 | | | |
| 256 | | | |
| 362 | | | |
| 512 | | | |
| 1024 | | | |
| 2048 | | | |
| 4096 | | | |
| Total | 968.20 | | |

*Measured value of the largest particle in the sample and not a sieve weight

**COMMENTS:** Bar Sample taken between Cross Section D and E

SITE NAME: Pikes Peak Highway - West Fork Beaver Creek Reach 2
ID NUMBER: WBVR2
DATE: 10/1/2012
CREW: VonLoh, Willis

| Particle Size Distribution (mm) | D15 | D35 | D50 | D84 | D95 | Lpart |
|---|---|---|---|---|---|---|
| | **2.595** | **4.673** | **6.293** | **11.900** | **17.552** | **21.0** |



# Appendix P

# Riparian Vegetation Summary

# 2012

## Riparian Vegetation Summary Pikes Peak, 2012

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| BHMR1 | 9/17/2012 | Olympus Stylus 400 | A (24.36) | Downstream from XSE | Left | 11.2 | 14.0 | 20 | Grass, Sedge, Forb |
| BHMR1 | | Olympus Stylus 400 | A | | Right | 13.4 | 10.5 | 20 | Grass, Sedge |
| BHMR1 | | Olympus Stylus 400 | B (31.95) | | Left | 6.5 | 10.8 | 15 | Grass, Sedge |
| BHMR1 | | Olympus Stylus 400 | B | | Right | 9.9 | 5.8 | 20 | Grass, Sedge |
| BHMR1 | | Olympus Stylus 400 | C (16.81) | | Left | 8.2 | 13.0 | 10 | Sedge, Forb |
| BHMR1 | | Olympus Stylus 400 | C | | Right | 11.8 | 7.5 | 15 | Sedge, Forb |
| BHMR1 | | Olympus Stylus 400 | D (20.28) | | Left | 7.4 | 11.0 | 25 | Grass, Sedge, Forb |
| BHMR1 | | Olympus Stylus 400 | D | | Right | 10.6 | 7.0 | 15 | Grass, Sedge |
| BHMR1 | | Olympus Stylus 400 | E (34.42) | | Left | 21.8 | 27.0 | 25 | Sedge |
| BHMR1 | | Olympus Stylus 400 | E | | Right | 27.6 | 22.5 | 15 | Grass, Sedge |
| BHMR2 | 9/17/2012 | Olympus Stylus 400 | A (25.43) | 18' upstream from XSB | Left | 6.0 | 11.0 | 15 | Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | A | | Right | 10.0 | 6.0 | 20 | Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | B (17.59) | | Left | 6.9 | 10.0 | 20 | Grass, Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | B | | Right | 10.0 | 6.0 | 20 | Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | C (18.46) | | Left | 6.0 | 10.0 | 10 | Sedge, Forb, Shrub |
| BHMR2 | | Olympus Stylus 400 | C | | Right | 9.4 | 6.0 | 15 | Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | D (30.44) | | Left | 15.5 | 19.0 | 25 | Grass, Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | D | | Right | 18.6 | 15.0 | 30 | Sedge |
| BHMR2 | | Olympus Stylus 400 | E (43.02) | | Left | 11.0 | 16.0 | 15 | Sedge, Forb |
| BHMR2 | | Olympus Stylus 400 | E | | Right | 14.7 | 11.5 | 20 | Sedge |
| EBVR1 | 9/18/2012 | Olympus Stylus 400 | A (20.70) | 2' downstream from XSB right bank | Left | 1.3 | 5.0 | 0 | Boulder |
| EBVR1 | | Olympus Stylus 400 | A | | Right | 17.1 | 13.6 | 5 | Moss, Sedge, Shrub |
| EBVR1 | | Olympus Stylus 400 | B (24.53) | | Left | 3.0 | 5.0 | 15 | Grass, Sedge |
| EBVR1 | | Olympus Stylus 400 | B | | Right | 13.5 | 9.0 | 35 | Grass, Sedge, Forb |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| EBVR1 | | Olympus Stylus 400 | C (29.05) | | Left | 6.8 | 11.0 | 30 | Grass, Sedge, Shrub |
| EBVR1 | | Olympus Stylus 400 | C | | Right | 17.0 | 12.0 | 15 | Grass, Shrub |
| EBVR1 | | Olympus Stylus 400 | D (12.77) | | Left | 3.5 | 6.0 | 45 | Moss, Grass, Forb |
| EBVR1 | | Olympus Stylus 400 | D | | Right | 9.0 | 5.0 | 35 | Moss, Forb, Shrub |
| EBVR1 | | Olympus Stylus 400 | E (18.48) | | Left | 8.3 | 11.0 | 35 | Moss, Sedge, Forb |
| EBVR1 | | Olympus Stylus 400 | E | | Right | 13.6 | 10.0 | 75 | Moss, Grass, Forb |
| EBVR2 | 9/18/2012 | Olympus Stylus 400 | A (37.63) | 6' upstream from XSE | Left | 14.3 | 19.0 | 30 | Sedge |
| EBVR2 | | Olympus Stylus 400 | A | | Right | 20.0 | 16.0 | 35 | Sedge |
| EBVR2 | | Olympus Stylus 400 | B (21.24) | | Left | 9.2 | 15.0 | 10 | Sedge |
| EBVR2 | | Olympus Stylus 400 | B | | Right | 14.3 | 11.0 | 15 | Grass, Sedge |
| EBVR2 | | Olympus Stylus 400 | C (20.46) | | Left | 9.2 | 13.0 | 20 | Moss, Forb, Sedge |
| EBVR2 | | Olympus Stylus 400 | C | | Right | 13.4 | 11.0 | 25 | Sedge |
| EBVR2 | | Olympus Stylus 400 | D (17.45) | | Left | 7.7 | 12.5 | 10 | Sedge |
| EBVR2 | | Olympus Stylus 400 | D | | Right | 13.2 | 10.0 | 10 | Grass, Sedge, Forb |
| EBVR2 | | Olympus Stylus 400 | E (19.66) | | Left | 9.8 | 14.0 | 20 | Sedge, Forb |
| EBVR2 | | Olympus Stylus 400 | E | | Right | 14.6 | 11.0 | 15 | Sedge |
| GLEN1 | 9/24/2012 | Olympus Stylus 400 | A (20.03) | At XSE right bank | Left | 9.0 | 12.0 | 10 | Sedge, Forb, Shrub |
| GLEN1 | | Olympus Stylus 400 | A | | Right | 13.0 | 8.5 | 60 | Moss, Sedge, Forb, Shrub |
| GLEN1 | | Olympus Stylus 400 | B(16.57) | | Left | 6.3 | 9.5 | 5 | Grass, Shrub |
| GLEN1 | | Olympus Stylus 400 | B | | Right | 9.0 | 5.7 | 10 | Grass, Sedge, Forb, shrub |
| GLEN1 | | Olympus Stylus 400 | C (17.31) | | Left | 5.9 | 9.9 | 10 | Sedge |
| GLEN1 | | Olympus Stylus 400 | C | | Right | 9.6 | 6.0 | 20 | Sedge, Forb |
| GLEN1 | | Olympus Stylus 400 | D (49.99) | | Left | 16.8 | 21.0 | 5 | Shrub |
| GLEN1 | | Olympus Stylus 400 | D | | Right | 29.0 | 27.2 | 5 | Shrub, Forb, Tree, Grass |
| GLEN1 | | Olympus Stylus 400 | E (24.29) | | Left | 8.0 | 15.5 | 15 | Sedge, Forb, Shrub |
| GLEN1 | | Olympus Stylus 400 | E | | Right | 19.7 | 12.0 | 20 | Grass, Forb, Shrub |
| NCAT1 | 9/10/2012 | Olympus Stylus 400 | A (57.53) | XSB <> XSC right bank | Left | 12.0 | 17.0 | 35 | Grass, Sedge, Forb |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| NCAT1 | | Olympus Stylus 400 | A | | Right | 16.5 | 12.0 | 45 | Sedge, Grass, Forb |
| NCAT1 | | Olympus Stylus 400 | B (58.83) | | Left | 46.0 | 50.0 | 35 | Sedge |
| NCAT1 | | Olympus Stylus 400 | B | | Right | 50.5 | 47.0 | 35 | Sedge |
| NCAT1 | | Olympus Stylus 400 | C (38.85) | | Left | 16.7 | 21.5 | 35 | Grass, Sedge, Forb, shrub |
| NCAT1 | | Olympus Stylus 400 | C | | Right | 30.3 | 26.0 | 25 | Grass, Sedge, Forb |
| NCAT1 | | Olympus Stylus 400 | D (44.77) | | Left | 28.7 | 30.0 | 35 | Sedge, Forb, Shrub |
| NCAT1 | | Olympus Stylus 400 | D | | Right | 32.5 | 29.3 | 45 | Sedge, Forb |
| NCAT1 | | Olympus Stylus 400 | E (60.78) | | Left | 42.8 | 47.0 | 25 | Grass, Sedge, Shrub |
| NCAT1 | | Olympus Stylus 400 | E | | Right | 45.5 | 41.0 | 30 | Grass, Sedge |
| NCAT2 | 9/27/2012 | Olympus Stylus 400 | A (29.17) | 3' downstream from XSB | Left | 12.0 | 16.5 | 45 | Grass, Sedge, Shrub |
| NCAT2 | | Olympus Stylus 400 | A | | Right | 16.2 | 12.0 | 34 | Grass, Sedge |
| NCAT2 | | Olympus Stylus 400 | B (40.59) | | Left | 8.8 | 13.0 | 30 | Grass, Sedge |
| NCAT2 | | Olympus Stylus 400 | B | | Right | 11.8 | 8.0 | 20 | Grass, Sedge |
| NCAT2 | | Olympus Stylus 400 | C (42.34) | | Left | 12.4 | 17.0 | 25 | Grass, Sedge |
| NCAT2 | | Olympus Stylus 400 | C | | Right | 16.4 | 11.5 | 30 | Grass, Sedge, Forb |
| NCAT2 | | Olympus Stylus 400 | D (29.78) | | Left | 6.0 | 10.5 | 35 | Grass, Sedge, Forb, shrub |
| NCAT2 | | Olympus Stylus 400 | D | | Right | 9.7 | 5.0 | 30 | Grass, Sedge, Forb |
| NCAT2 | | Olympus Stylus 400 | E (34.25) | | Left | 10.0 | 15.0 | 50 | Moss, Forb, Sedge, Shrub |
| NCAT2 | | Olympus Stylus 400 | E | | Right | 13.1 | 2.5 | 25 | Grass, Sedge |
| NCRY1 | 9/6/2012 | Olympus Stylus 400 | A (54.53) | At XSA left bank | Left | 35.5 | 39.0 | 15 | Grass, Sedge, Forb |
| NCRY1 | | Olympus Stylus 400 | A | | Right | 38.8 | 36.0 | 20 | Grass, Sedge, forb |
| NCRY1 | | Olympus Stylus 400 | B (51.31) | | Left | 38.8 | 42.0 | 15 | Sedge, Tree |
| NCRY1 | | Olympus Stylus 400 | B | | Right | 41.5 | 38.0 | 20 | Moss, Sedge, Shrub |
| NCRY1 | | Olympus Stylus 400 | C (43.61) | | Left | 26.3 | 29.0 | 80 | Moss, Grass, Forb, Tree |
| NCRY1 | | Olympus Stylus 400 | C | | Right | 28.7 | 25.0 | 60 | Moss, Sedge, Forb |
| NCRY1 | | Olympus Stylus 400 | D (41.53) | | Left | 29.6 | 32.8 | 15 | Sedge |
| NCRY1 | | Olympus Stylus 400 | D | | Right | 31.5 | 29.5 | 10 | Sedge, Shrub |
| NCRY1 | | Olympus Stylus 400 | E (37.98) | | Left | 30.0 | 33.7 | 45 | Sedge |
| NCRY1 | | Olympus Stylus 400 | E | | Right | 34.3 | 31.0 | 75 | Moss, Grass, Forb, Shrub |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| NCRY2 | 9/6/2012 | Olympus Stylus 400 | A (24.23) | Upstream from XSE | Left | 10.5 | 15.5 | 20 | Grass, Shrub |
| NCRY2 | | Olympus Stylus 400 | A | | Right | 20.6 | 15.0 | 10 | Moss, Grass, Forb |
| NCRY2 | | Olympus Stylus 400 | B (35.00) | | Left | 21.4 | 25.0 | 15 | Grass, Forb, Shrub |
| NCRY2 | | Olympus Stylus 400 | B | | Right | 30.5 | 26.0 | 10 | Moss, Forb, Shrub |
| NCRY2 | | Olympus Stylus 400 | C (33.82) | | Left | 19.3 | 24.0 | 30 | Grass, Shrub |
| NCRY2 | | Olympus Stylus 400 | C | | Right | 27.4 | 23.0 | 15 | Grass, Forb, Shrub |
| NCRY2 | | Olympus Stylus 400 | D (28.71) | | Left | 14.5 | 18.3 | 5 | Grass, Forb |
| NCRY2 | | Olympus Stylus 400 | D | | Right | 22.9 | 19.3 | 0 | Sediment |
| NCRY2 | | Olympus Stylus 400 | E (34.35) | | Left | 5.3 | 7.1 | 5 | Shrub |
| NCRY2 | | Olympus Stylus 400 | E | | Right | 18.4 | 15.6 | 50 | Moss |
| OILC1 | 9/25/2012 | Olympus Stylus 400 | A (48.75) | 4' downstream from XSA right bank | Left | 5.4 | 11.0 | 50 | Grass, Sedge, Forb, Shrub |
| OILC1 | | Olympus Stylus 400 | A | | Right | 37.0 | 33.0 | 40 | Sedge, Shrub |
| OILC1 | | Olympus Stylus 400 | B (41.34) | | Left | 3.5 | 6.0 | 35 | Sedge, Shrub |
| OILC1 | | Olympus Stylus 400 | B | | Right | 36.0 | 32.0 | 75 | Moss, Forb, Sedge, Shrub |
| OILC1 | | Olympus Stylus 400 | C (32.67) | | Left | 3.0 | 6.0 | 60 | Moss, Forb, Sedge, Shrub |
| OILC1 | | Olympus Stylus 400 | C | | Right | 31.0 | 26.0 | 55 | Sedge, Shrub |
| OILC1 | | Olympus Stylus 400 | D (45.68) | | Left | 3.5 | 6.0 | 60 | Sedge, Forb, Shrub |
| OILC1 | | Olympus Stylus 400 | D | | Right | 37.0 | 33.0 | 30 | Sedge |
| OILC1 | | Olympus Stylus 400 | E (38.35) | | Left | 8.9 | 12.0 | 25 | Sedge |
| OILC1 | | Olympus Stylus 400 | E | | Right | 26.6 | 21.0 | 30 | Sedge, Forb |
| SVRY1 | 9/20/2012 | Olympus Stylus 400 | A (13.70) | At XSA | Left | 2.0 | 7.0 | 35 | Moss, Grass, Sedge, Forb |
| SVRY1 | | Olympus Stylus 400 | A | | Right | 7.8 | 4.0 | 25 | Sedge |
| SVRY1 | | Olympus Stylus 400 | B (11.83) | | Left | 5.0 | 8.0 | 20 | Sedge |
| SVRY1 | | Olympus Stylus 400 | B | | Right | 5.0 | 5.0 | 25 | Sedge, Shrub |
| SVRY1 | | Olympus Stylus 400 | C (14.82) | | Left | 4.9 | 8.0 | 30 | Sedge |
| SVRY1 | | Olympus Stylus 400 | C | | Right | 7.8 | 5.0 | 20 | Sedge, Shrub |
| SVRY1 | | Olympus Stylus 400 | D (12.09) | | Left | 4.6 | 8.0 | 30 | Sedge, Shrub |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| SVRY1 | | Olympus Stylus 400 | D | | Right | 8.6 | 4.0 | 80 | Moss, Forb, Shrub |
| SVRY1 | | Olympus Stylus 400 | E (9.57) | | Left | 2.7 | 7.0 | 45 | Grass, Sedge |
| SVRY1 | | Olympus Stylus 400 | E | | Right | 6.6 | 4.0 | 80 | Moss, Sedge, Forb, Shrub |
| SVRY2 | 9/20/2012 | Olympus Stylus 400 | A (95.72) | Downstream from XSE | Left | 20.2 | 28.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | A | | Right | 37.0 | 32.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | B (116.96) | | Left | 29.5 | 35.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | B | | Right | 47.2 | 41.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | C (158.61) | | Left | 59.2 | 65.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | C | | Right | 79.5 | 73.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | D (156.58) | | Left | 74.8 | 79.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | D | | Right | 91.5 | 87.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | E (211.52) | | Left | 62.5 | 72.0 | 0 | Sediment |
| SVRY2 | | Olympus Stylus 400 | E | | Right | 81.0 | 71.0 | 0 | Sediment |
| SKIC1 | 9/11/2012 | Olympus Stylus 400 | A (15.04) | 10' downstream from XSD | Left | 6.2 | 8.0 | 20 | Moss, Grass, Forb |
| SKIC1 | | Olympus Stylus 400 | A | | Right | 11.1 | 8.5 | 40 | Lichen, Moss, Grass, Forb |
| SKIC1 | | Olympus Stylus 400 | B (14.15) | | Left | 4.9 | 7.0 | 5 | Moss, Forb |
| SKIC1 | | Olympus Stylus 400 | B | | Right | 10.5 | 7.5 | 5 | Forb, Tree |
| SKIC1 | | Olympus Stylus 400 | C (16.60) | | Left | 4.1 | 7.0 | 35 | Grass, Forb |
| SKIC1 | | Olympus Stylus 400 | C | | Right | 11.0 | 9.0 | 25 | Moss, Grass, Forb |
| SKIC1 | | Olympus Stylus 400 | D (33.57) | | Left | 16.0 | 19.5 | 60 | Moss, Grass, Forb, Shrub |
| SKIC1 | | Olympus Stylus 400 | D | | Right | 23.2 | 19.5 | 5 | Forb, Shrub |
| SKIC1 | | Olympus Stylus 400 | E (21.78) | | Left | 14.5 | 17.5 | 35 | Grass, Forb, Shrub |
| SKIC1 | | Olympus Stylus 400 | E | | Right | 19.2 | 15.0 | 55 | Moss, Grass, Forb, Tree |
| SKIC2 | 9/6/2012 | Olympus Stylus 400 | A (50.70) | 6' upstream from XSA left bank | Left | 32.8 | 36.0 | 20 | Moss, Grass, Forb, Shrub, Fungi |
| SKIC2 | | Olympus Stylus 400 | A | | Right | 40.7 | 35.0 | 35 | Moss, Grass, Forb, Tree |
| SKIC2 | | Olympus Stylus 400 | B (46.73) | | Left | 28.5 | 35.5 | 5 | Moss |
| SKIC2 | | Olympus Stylus 400 | B | | Right | 34.5 | 32.5 | 15 | Moss, Grass, Forb, Shrub |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| SKIC2 | | Olympus Stylus 400 | C (29.76) | | Left | 2.6 | 6.0 | 15 | Moss, Grass, Forb, Shrub |
| SKIC2 | | Olympus Stylus 400 | C | | Right | 10.6 | 7.0 | 5 | Moss, Forb |
| SKIC2 | | Olympus Stylus 400 | D (28.31) | | Left | 4.3 | 11.0 | 35 | Moss, Forb, Shrub |
| SKIC2 | | Olympus Stylus 400 | D | | Right | 12.5 | 8.0 | 5 | Grass, Forb |
| SKIC2 | | Olympus Stylus 400 | E (41.90) | | Left | 24.9 | 31.0 | 35 | Lichen, Moss, Grass, Forb |
| SKIC2 | | Olympus Stylus 400 | E | | Right | 31.1 | 26.0 | 5 | Moss, Grass |
| SCAT1 | 9/11/2012 | Olympus Stylus 400 | A (22.96) | 3' upstream from XSB | Left | 6.4 | 11.5 | 25 | Grass, Sedge, Forb |
| SCAT1 | | Olympus Stylus 400 | A | | Right | 11.2 | 8.9 | 75 | Moss, Grass, Sedge |
| SCAT1 | | Olympus Stylus 400 | B (20.83) | | Left | 10.5 | 14.0 | 80 | Moss, Grass, Forb |
| SCAT1 | | Olympus Stylus 400 | B | | Right | 18.3 | 14.0 | 20 | Moss, Grass, Sedge, Forb |
| SCAT1 | | Olympus Stylus 400 | C (21.86) | | Left | 4.0 | 10.0 | 10 | Grass, Sedge |
| SCAT1 | | Olympus Stylus 400 | C | | Right | 13.7 | 9.6 | 15 | Grass, Sedge |
| SCAT1 | | Olympus Stylus 400 | D (18.12) | | Left | 5.5 | 12.0 | 30 | Grass, Sedge, Forb |
| SCAT1 | | Olympus Stylus 400 | D | | Right | 11.7 | 6.0 | 75 | Moss, Grass, Sedge, Forb |
| SCAT1 | | Olympus Stylus 400 | E (24.02) | | Left | 10.0 | 16.0 | 30 | Grass, Sedge, Forb |
| SCAT1 | | Olympus Stylus 400 | E | | Right | 15.5 | 10.0 | 60 | Moss, Grass, Sedge |
| SCAT2 | 9/24/2012 | Olympus Stylus 400 | A (28.57) | 10' upstream from XSE left bank | Left | 3.9 | 9.0 | 5 | Grass, Sedge |
| SCAT2 | | Olympus Stylus 400 | A | | Right | 15.0 | 9.5 | 15 | Sedge |
| SCAT2 | | Olympus Stylus 400 | B (17.05) | | Left | 3.0 | 7.0 | 5 | Grass, Sedge |
| SCAT2 | | Olympus Stylus 400 | B | | Right | 11.3 | 7.0 | 25 | Moss, Sedge, Forb |
| SCAT2 | | Olympus Stylus 400 | C (19.81) | | Left | 4.0 | 6.0 | 30 | Moss, Sedge, Forb |
| SCAT2 | | Olympus Stylus 400 | C | | Right | 13.2 | 9.0 | 10 | Moss, Sedge, Forb |
| SCAT2 | | Olympus Stylus 400 | D (38.50) | | Left | 7.6 | 11.0 | 10 | Sedge, Forb |
| SCAT2 | | Olympus Stylus 400 | D | | Right | 15.4 | 12.7 | 25 | Moss, Grass, Sedge |
| SCAT2 | | Olympus Stylus 400 | E (18.95) | | Left | 3.3 | 7.0 | 15 | Sedge, Forb |
| SCAT2 | | Olympus Stylus 400 | E | | Right | 11.2 | 8.0 | 35 | Moss, Sedge, Forb |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| SCAT3 | 9/24/2012 | Olympus Stylus 400 | A (44.32) | 10' downstream from XSD right bank | Left | 26.0 | 29.4 | 15 | Grass, Sedge, Forb, Shrub |
| SCAT3 | | Olympus Stylus 400 | A | | Right | 29.2 | 25.2 | 35 | Moss, Sedge, Forb |
| SCAT3 | | Olympus Stylus 400 | B (32.19) | | Left | 12.1 | 16.0 | 5 | Sedge |
| SCAT3 | | Olympus Stylus 400 | B | | Right | 15.5 | 12.7 | 25 | Grass, Sedge |
| SCAT3 | | Olympus Stylus 400 | C (15.79) | | Left | 2.6 | 6.8 | 35 | Sedge |
| SCAT3 | | Olympus Stylus 400 | C | | Right | 6.2 | 3.1 | 25 | Moss, Sedge |
| SCAT3 | | Olympus Stylus 400 | D (19.60) | | Left | 8.0 | 11.6 | 25 | Sedge |
| SCAT3 | | Olympus Stylus 400 | D | | Right | 10.0 | 8.1 | 25 | Sedge |
| SCAT3 | | Olympus Stylus 400 | E (18.48) | | Left | 4.6 | 8.2 | 30 | Moss, Sedge, Forb |
| SCAT3 | | Olympus Stylus 400 | E | | Right | 6.5 | 3.8 | 10 | sedge, forb, shrub |
| WBVR1 | 10/1/2012 | Olympus Stylus 400 | A (36.64) | XSD <> XSE | Left | 15.9 | 20.0 | 15 | Grass, Sedge |
| WBVR1 | | Olympus Stylus 400 | A | | Right | 31.0 | 27.0 | 5 | Grass, Sedge |
| WBVR1 | | Olympus Stylus 400 | B (20.98) | | Left | 4.3 | 10.0 | 20 | Moss, Grass, Shrub |
| WBVR1 | | Olympus Stylus 400 | B | | Right | 15.5 | 11.0 | 10 | Grass, Sedge |
| WBVR1 | | Olympus Stylus 400 | C (28.83) | | Left | 3.8 | 9.0 | 70 | Moss, Grass, Sedge, Shrub |
| WBVR1 | | Olympus Stylus 400 | C | | Right | 17.0 | 11.0 | 25 | Sedge, Forb, Shrub |
| WBVR1 | | Olympus Stylus 400 | D (34.18) | | Left | 9.0 | 14.0 | 30 | Moss, Shrub |
| WBVR1 | | Olympus Stylus 400 | D | | Right | 25.0 | 20.0 | 15 | Sedge |
| WBVR1 | | Olympus Stylus 400 | E (29.56) | | Left | 6.0 | 12.0 | 60 | Moss, Forb, Shrub |
| WBVR1 | | Olympus Stylus 400 | E | | Right | 20.0 | 16.0 | 25 | Grass, Sedge |
| WBVR2 | 10/1/2012 | Olympus Stylus 400 | A (44.40) | XSB <> XSC left bank | Left | 7.5 | 16.0 | 40 | Moss, Shrub |
| WBVR2 | | Olympus Stylus 400 | A | | Right | 25.0 | 19.0 | 5 | Grass |
| WBVR2 | | Olympus Stylus 400 | B (90.60) | | Left | 14.0 | 21.0 | 5 | Grass, Shrub |
| WBVR2 | | Olympus Stylus 400 | B | | Right | 42.3 | 37.0 | 0 | Sediment |
| WBVR2 | | Olympus Stylus 400 | C (151.93) | | Left | 100.5 | 107.0 | 5 | Grass |
| WBVR2 | | Olympus Stylus 400 | C | | Right | 126.0 | 119.0 | 25 | Grass, Shrub |
| WBVR2 | | Olympus Stylus 400 | D (149.43) | | Left | 97.0 | 108.0 | 0 | Sediment |

| Site ID | Date | Camera | Cross Section and Pin to Pin Distance in (ft) | Bar Sample | Bank | Bank Distance from LPIN (ft) | Camera Distance from LPIN (ft) | Percent Cover | Comments |
|---|---|---|---|---|---|---|---|---|---|
| WBVR2 | | Olympus Stylus 400 | D | | Right | 127.5 | 123.0 | 0 | Sediment |
| WBVR2 | | Olympus Stylus 400 | E (96.25). | | Left | 32.2 | 38.0 | 40 | Moss, Grass, Shrub, Tree |
| WBVR2 | | Olympus Stylus 400 | E | | Right | 54.5 | 43.0 | 15 | Sedge, Forb, Shrub |