

Coal Combustion Residual Landfill Annual Inspection Report

Boardman Generating Facility

Prepared by: Mathew Quigley, P.E.

January 2016



Portland General Electric

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Introduction

This Coal Combustion Residual (CCR) Initial Annual Inspection Report fulfills the requirements of 40 CFR §257.84(b)(2) for a qualified professional engineer to prepare a report following each annual inspection. The report must address any changes in geometry of the structure since the previous annual inspection; the approximate volume of CCR contained in the unit at the time of the annual inspection; any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and any other changes which may have affected the stability or operation of the CCR unit since the previous annual inspection.

Field Observations

An annual inspection of the Boardman Generating Facility CCR landfill was conducted by Mathew Quigley, P.E., on December 8th, 2015. Site conditions were partly cloudy and cold with moderate wind. Precipitation had fallen on the landfill site in the days prior to the inspection. An inspection was conducted of the landfill perimeter roads, perimeter ditches, ash disposal area, and stormwater retention area. Inspections consisted of visual observations only; no other metrics are available in the field for review. Reference Appendix A for photos taken during the inspection.

The CCR landfill was observed to contain fly ash, economizer ash, and bottom ash. The fly and economizer ashes occupy approximately 80 percent of the landfill area, with the bottom ash occupying approximately 20 percent along the southern edge of the area. All ash was observed to be relatively compacted and wetted from watering operations and previous precipitation. Ash disposal activities were underway during the time of this inspection thereby generating some loose ash that had not yet been wetted. The perimeter roadway serving as impoundment of the landfill appears to be in acceptable condition. The landfill stormwater retention area located at the western side of the landfill appears to be in acceptable condition and fit for continued use.

The following deficiencies requiring corrective action were noted;

- Where vehicles access the landfill site at its northeast and southwest corners, there is no ability to capture and convey stormwater into perimeter ditches leading to the stormwater retention area. Instead flows can exit the landfill site.
- Some erosion of bottom ash piles has created irregular ditch profiles along the southern edge of the landfill.
- Brush has built up in some ditches.
- Some recessions in the landfill appear to exist which may allow ponding of stormwater.

Evaluation of Monitoring Methods

PGE implements a weekly visual inspection of the CCR landfill by trained PGE staff present at the Boardman Generating Facility. The weekly inspection logs are designed to itemize key areas to be reviewed and easily list deficiencies noted.

As part of this annual inspection, previous weekly inspection logs available for 2015 have been reviewed. For 2015, the most notable observation made was the presence of juniper trees growing in the exterior of the roadway embankment along the perimeter of the landfill. These trees do not appear to pose a hazard to the integrity of the landfill impoundment but could be cleared for improved visibility of the roadway embankment. Removal of the trees is at the discretion of the plant management.

The weekly visual inspection form and inspection process is sufficient for proper monitoring of the CCR landfill pursuant to 40 CFR §257.84.

Corrective Actions

The following corrective actions need to be undertaken by PGE in 2016.

- Grading at entrances to the landfill at the northeast and southwest corners of the landfill should be adjusted to create embankments which can be traversed by site traffic while preventing egress of stormwater from the site. Ditches leading to these locations will need to be directed to culverts under the embankments.
- Ditches along the southern edge of the landfill should be reestablished to correct irregularities caused by bottom ash washing into the ditches. Bottom ash pile slopes should be grades to mitigate further erosion into ditches.
- Brush within ditches around the landfill site should be removed.
- Ash disposal should be concentrated at observed recessions in the landfill to prevent ponding of stormwater.

CCR Quantities

Appendix B contains figures of the CCR landfill depicting the previous and current topography of the landfill as recorded on October 8th, 2015. The previous survey of the landfill topography was completed in May of 2013. From May 2013 to October 2015, approximately 104,176 cubic yards of material have been deposited on the landfill. Original landfill site topography data from 1980 is incomplete but has been approximated to estimate that around 582,000 cubic yards of deposited material are present within the landfill. The aerial extents of the landfill have not increased. Ash disposition has generally increased the surface elevation of the landfill in the southeast quarter and in a few locations along the southern side.

PGE intends to conduct ongoing annual topographic surveys of the landfill to monitor any changes in geometry of the landfill.

Certification

This report is prepared by Mathew Quigley, a Civil Engineer in Portland General Electric's Power Supply Engineering Services (PSES). Licensed as a Professional Engineer in 2014, Mathew has over 5 years of civil engineering experience and has provided civil engineering support of PGE's CCR landfill at the Boardman Generating Facility since 2011.



Expires 12/31/2016

Prepared by: *Mathew Quigley*
Mathew Quigley, P.E.
Civil Engineer

Date: *01/17/2016*

Appendix A: Inspection Photos



CCR landfill at northeast corner, viewing southwest. Entrance to northeast side of landfill.



CCR landfill at northeast cornering, viewing south. Entrance to northeast side of landfill.



CCR landfill at west side, viewing east. Stormwater retention area.



CCR landfill at north side, viewing south. Ash truck depositing fly or economizer ash.



CCR landfill at southwest corner, viewing east. South perimeter ditch.



CCR landfill at south side, viewing west. South perimeter ditch.

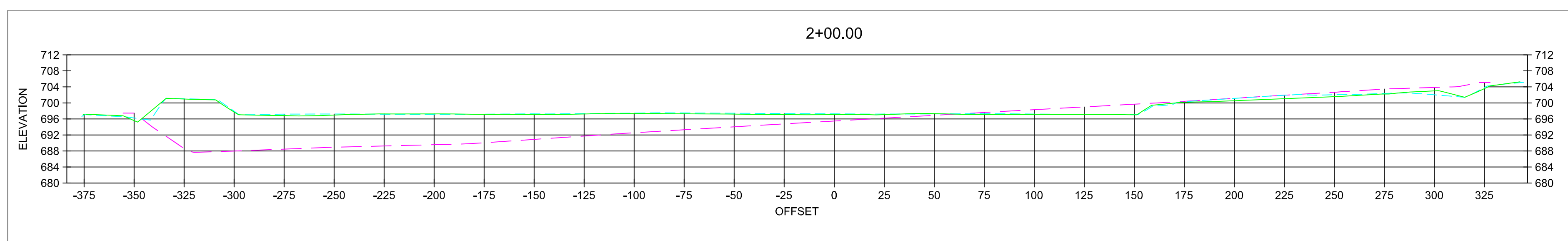
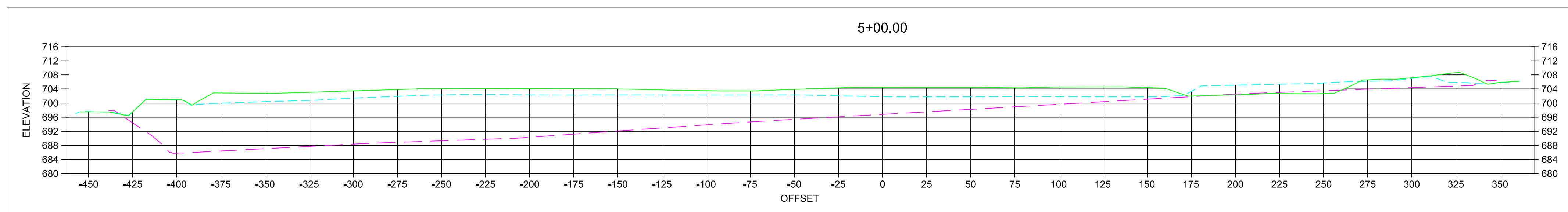
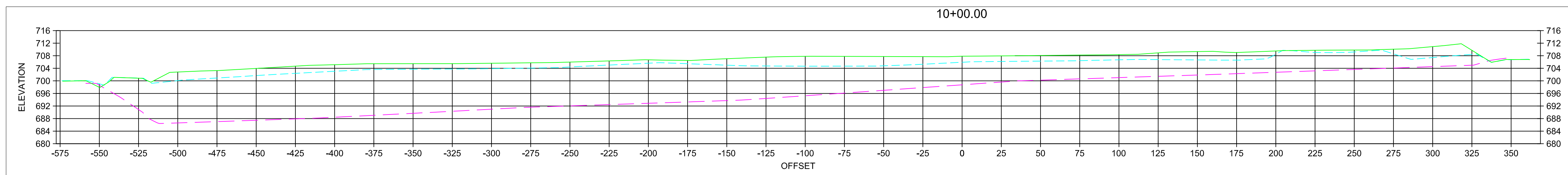
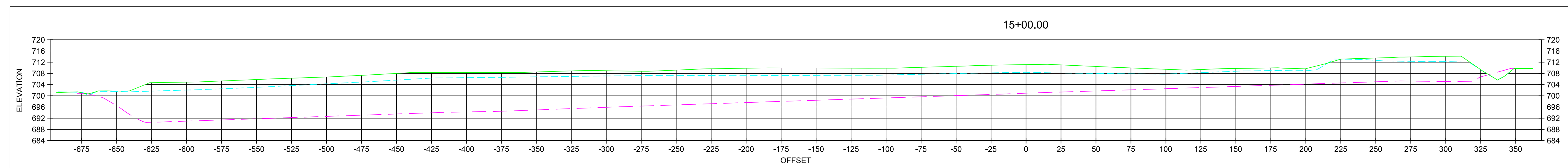
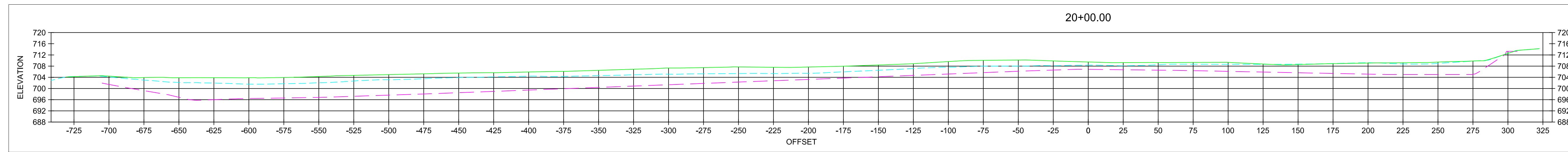


CCR landfill at west side, viewing northeast. Stormwater retention area impoundment.



CCR landfill south side, viewing north. Water truck conditioning deposited fly or economizer ash.

Appendix B: Supporting Drawings/Figures



- ORIGINAL CONTOURS AS DEPICTED FROM PGE DRAWING D-7400, DATED JAN. 25 1980
- EXISTING CONTOURS AS OF MAY, 2013
- EXISTING CONTOURS AS OF OCTOBER, 2015

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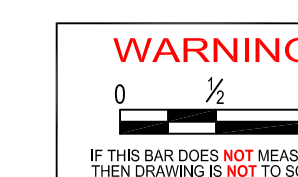
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121 SW SALMON ST. PORTLAND, OR 97204

**BOARDMAN PLANT
OCTOBER 2015 ASH PILE
TOPOGRAPHIC SURVEY
QUANTITY COMPARISON TO 2013
CROSS SECTIONS**

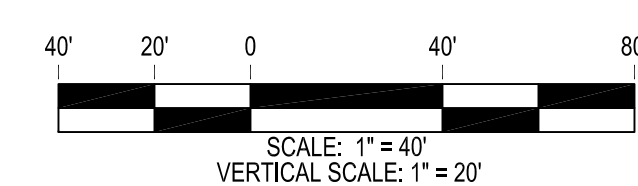
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VOLUME REPORT:

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2013 SURFACE VS 2015 SURFACE	1	1	1,889,444	2,697	106,873	104,176 FILL
1980 BASE SURFACE VS 2015 SURFACE	1	1	1,801,814	3,011	585,217	582,206 FILL

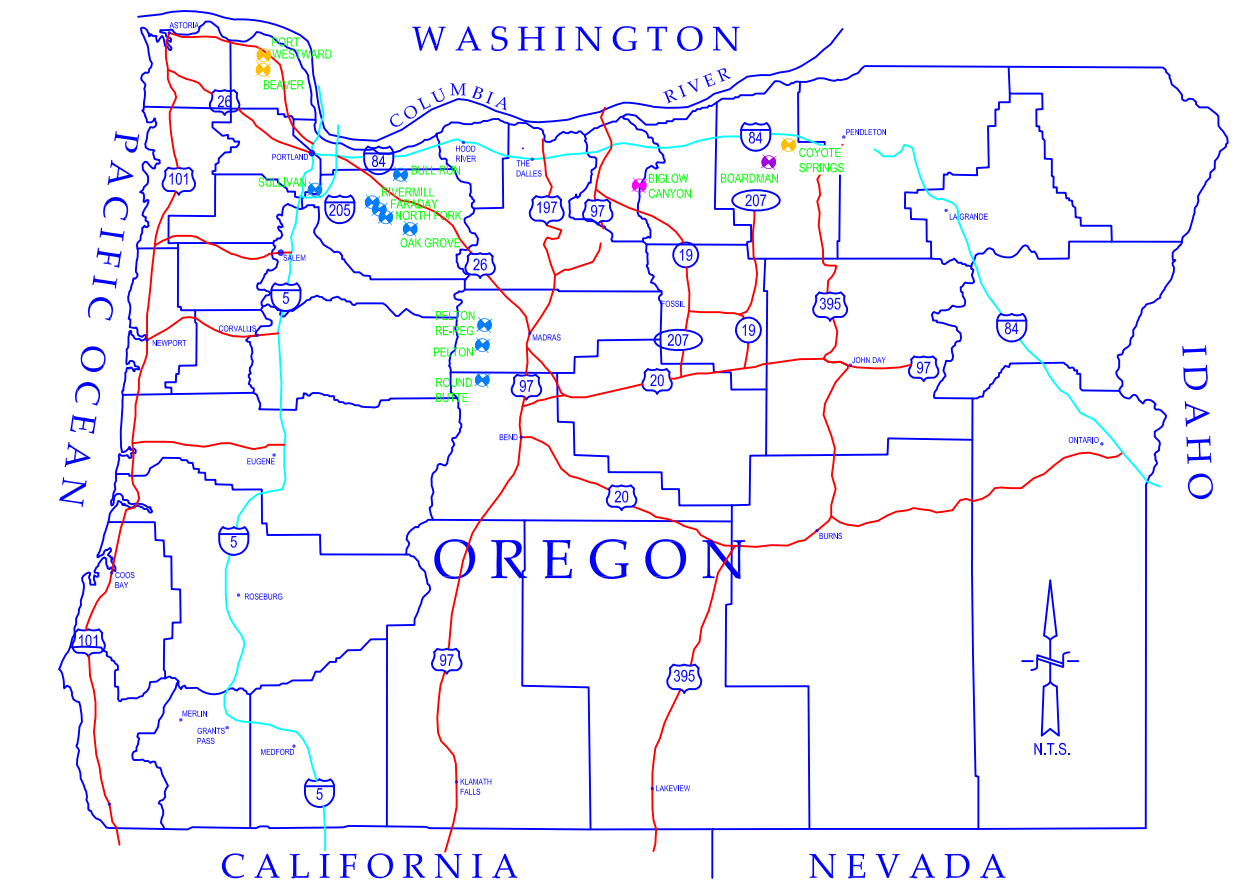
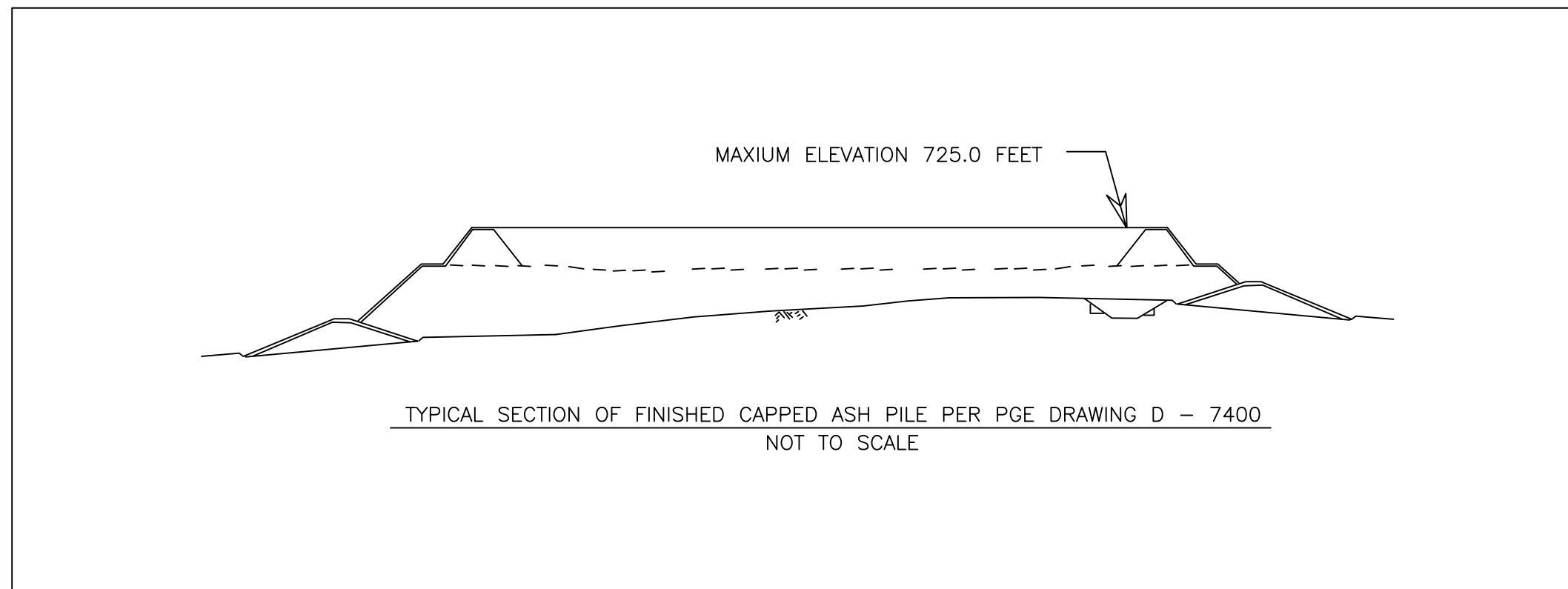


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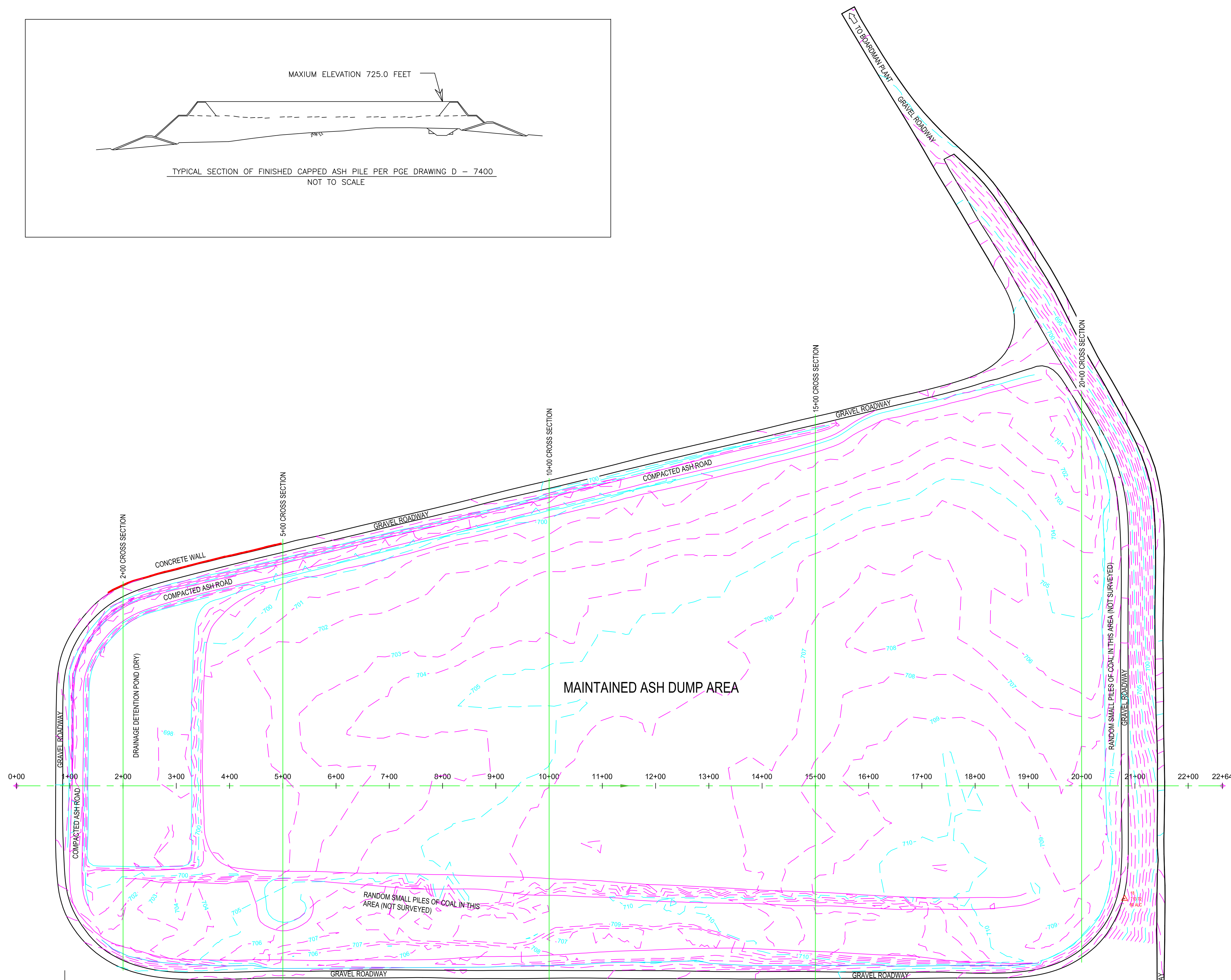


NOTES:

1. THE PURPOSE OF THIS SURVEY IS TO SHOW THE BASIC OUTLINE OF THE ASH DISPOSAL AREA JUST SOUTH OF THE BOARDMAN COAL PLANT.
2. COORDINATE BASIS IS LOCAL PGE COAL YARD PLANT COORDINATE SYSTEM. RTK GPS METHODS WERE USED TO GATHER THE SURVEY INFORMATION USING THIS LOCAL CALIBRATION.
2. LOCAL ELEVATIONS ARE BASED ON PGE PLANT DATUM.
3. THE DATE OF THE FIELD WORK IS OCTOBER 8, 2015.



OREGON STATE LOCATION MAP
SCALE: N.T.S.



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 - - - - - = CONTOUR MINOR EXISTING
 - ▲ = CONTROL POINT

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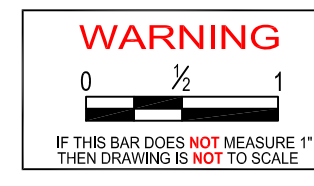
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 DRAWN BY: JOSH EWEY DESIGN ENGR.: MATHEW OUGLEY ENGR. MGR.: SID HILLIER
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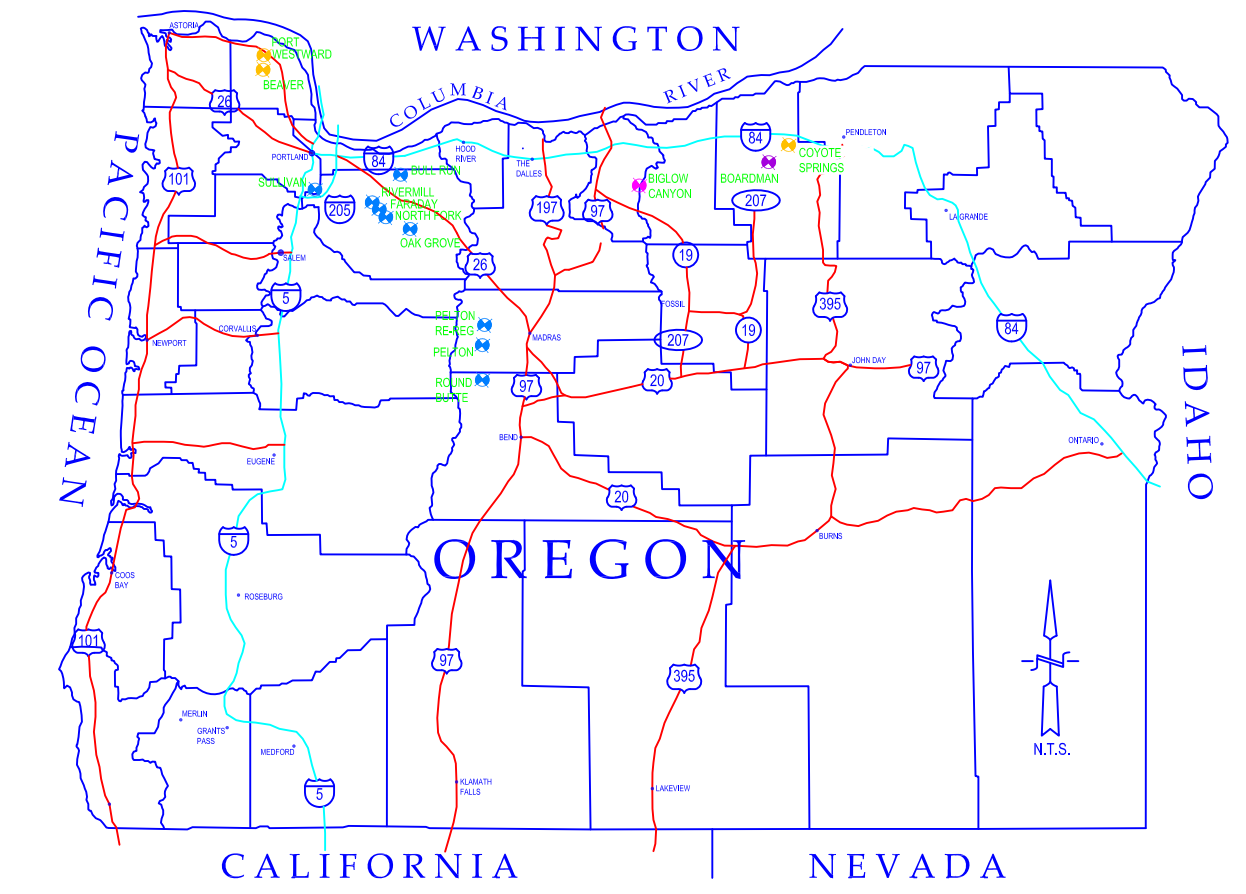
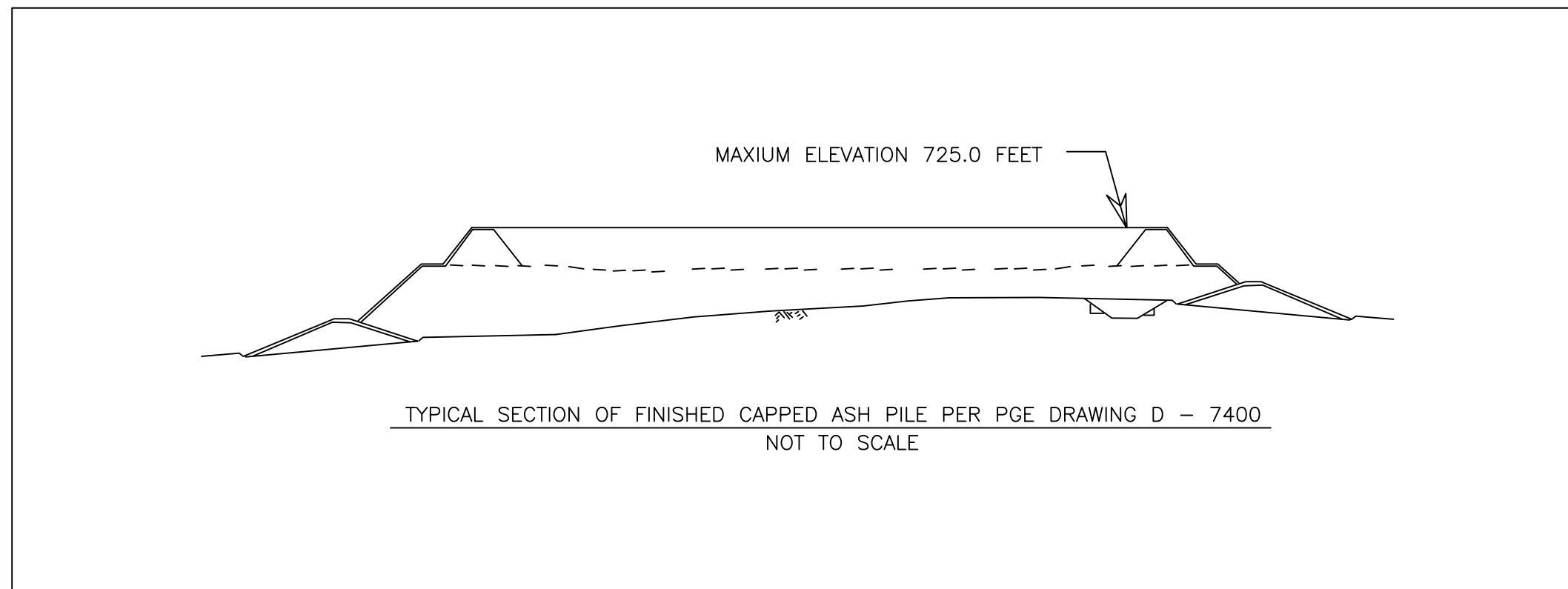
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BOARDMAN PLANT
MAY 2013 ASH PILE
TOPOGRAPHIC SURVEY
PLAN VIEW

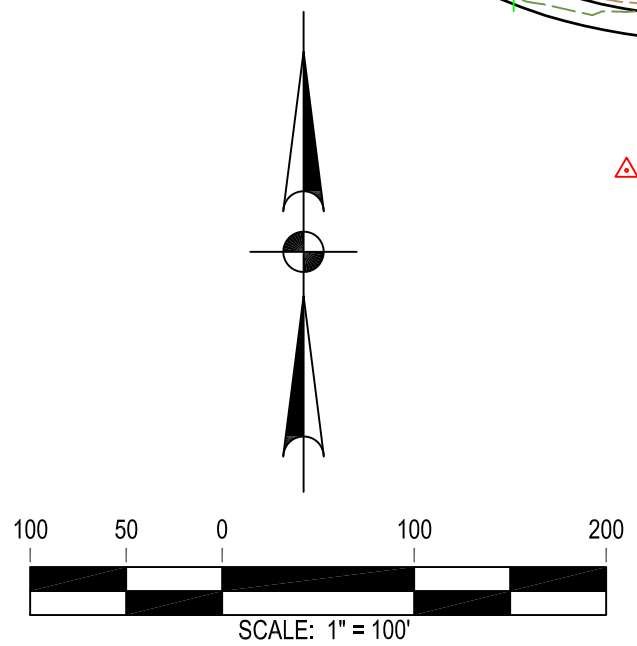
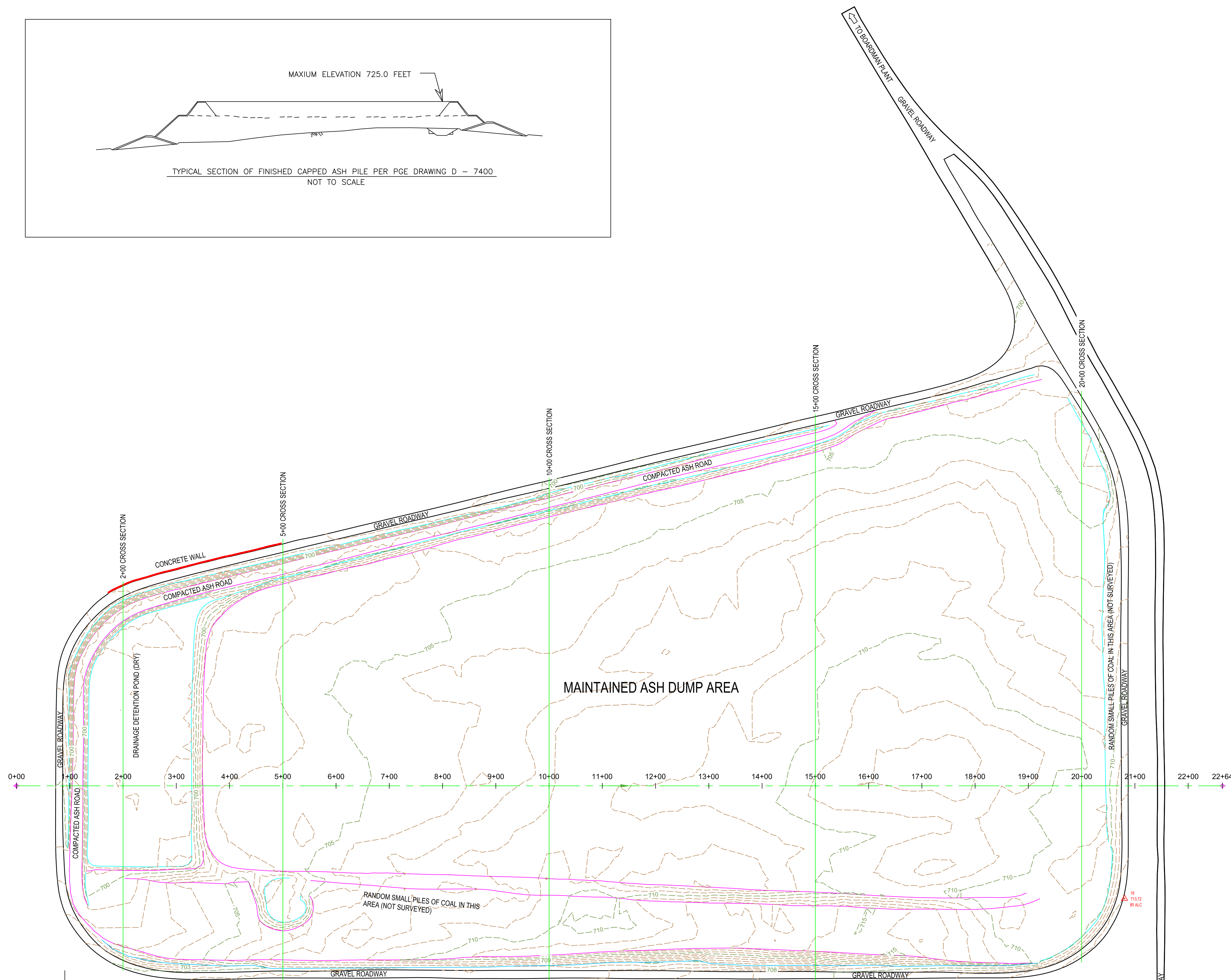


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PORTLAND GENERAL ELECTRIC CO. 121 SW SALMON ST. PORTLAND, OR 97204						



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