GEOTECHNICAL STUDIES

FOR

ROSEBURG WATER STORAGE RESERVOIR

ROSEBURG, OREGON

Prepared for

OBEC CONSULTING ENGINEERS

Springfield, Oregon

REGISTERED PROFESSIONAL
ENGINEER
6199
OREGON
JULY 12, 1968
W. L. SCHROEDER

Prepared by

WILLAMETTE GEOTECHNICAL, INC.

September 1979

WILLAMETTE GEOTECHNICAL, INC.

SOILS AND FOUNDATION ENGINEERS
974 N.W. CIRCLE BOULEVARD • CORVALLIS, OREGON 97330 • (503) 757-0037

12 September 1979

OBEC Consulting Engineers
P.O. Box 72
Springfield, OR 97477

ATTENTION: Mr. Lou Pierce, P.E.

Project C-243
Roseburg Water Storage Reservoir

Dear Mr. Pierce:

Enclosed is our report summarizing the results of our investigation for the proposed four million gallon water storage reservoir in Roseburg, Oregon. A description of our subsurface exploration, a summary of laboratory test results, and recommendations for site excavation and foundation design are contained herein. Test pit and borehole logs are appendicized at the end of this report.

It has been a pleasure assisting you with this phase of the project, and we look forward to working with you on the final design.

Please contact us if you have any questions.

Sincerely,

WILLAMETTE GEOTECHNICAL, INC.

W.L. Schroeder, P.E.

James K. Maitland

Enclosure

slb

GEOTECHNICAL STUDIES

FOR

ROSEBURG WATER STORAGE RESERVOIR

ROSEBURG, OREGON

BACKGROUND

The City of Roseburg plans to build a four million gallon reservoir on a hilltop near the Umpqua River to provide additional water storage capacity. OBEC Consulting Engineers, Springfield, Oregon, in a joint venture with Willamette Geotechnical, Inc. Corvallis and BHW Engineering and Surveying, Roseburg, were selected to provide the engineering services associated with the project. Willamette Geotechnical, Inc. was to provide the required geotechnical consulting services. This report summarizes the results of our investigation and provides recommendations for foundation excavation and foundation design and construction.

Purpose and Scope

The purposes of the present study were to:

1. Define conditions beneath the reservoir site for purposes of design analysis.
2. Assess the overall stability of the existing slopes.
3. Provide subsurface information for excavation contractors who bid on the work.
4. Provide recommendations concerning geotechnical aspects of the reservoir design.

The scope of work was outlined in our proposal dated 19 June 1979.[1] Proposed work included core drilling, limited laboratory testing, engineering analysis and report preparation. Our report was to include recommendations for structure foundation design, excavation slopes, fill slopes and an assessment of the influence of work on the stability of slopes at the site. Our work was authorized verbally by Mr. Ed Olsen at a meeting with OBEC and City of Roseburg staff on 31 July 1979.

Specifically excluded from the present scope of work were services associated with the construction phase of the project. Field observation, field testing and general consultation required during construction will be provided by Willamette Geotechnical, Inc. on an as-needed basis under separate contract.

We presently anticipate, and have recommended herein, that we will be present during foundation excavation to verify assumed subsurface conditions. Significant variations in subsurface conditions from those anticipated may require changes in the configuration of the set-back and cut slopes. We do not foresee the need for extensive field testing during construction, since the reservoir will be placed entirely on a cut. The scope of field testing and observation related to disposal of excavated materials is presently unknown, since it would depend on the intended use of that fill.

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[1]Proposal to OBEC Consulting Engineers, Springfield, Oregon, prepared by Willamette Geotechnical, Inc., dated 19 June 1979.

Project Description and Location

The proposed four million gallon water storage reservoir will consist of a circular structure approximately 200 feet in diameter. We understand that design will allow for the options of either a steel or concrete structure.

The new facility is to be located north and west of three existing reservoirs at the end of Bellview Court between Stephens Street and the Umpqua River on a hilltop in Roseburg (see Figure 1). The new structure will require a cut up to 38 feet deep in the hillside.

Development of Information

Information contained herein was developed in part from review of available literature and geologic maps, site reconnaissance, subsurface exploration, including shallow test pits and deeper boreholes, limited laboratory testing and engineering analysis.

SUMMARY FINDINGS

Our current findings are summarized below:

1. The area proposed for the new reservoir is underlain by rock at depths ranging from two to three feet below shallow surface soils. Two principal rock formations underlie the site: a sedimentary unit (alternating beds of weathered mudstone and sandstone) and, at depth, a dense, hard basalt.
2. The bulk of the foundation excavation for a reservoir with a base elevation of about 690 will involve removal of weathered sedimentary rock. It is our present opinion that most of this rock will be rippable using a D-9 tractor-ripper combination.

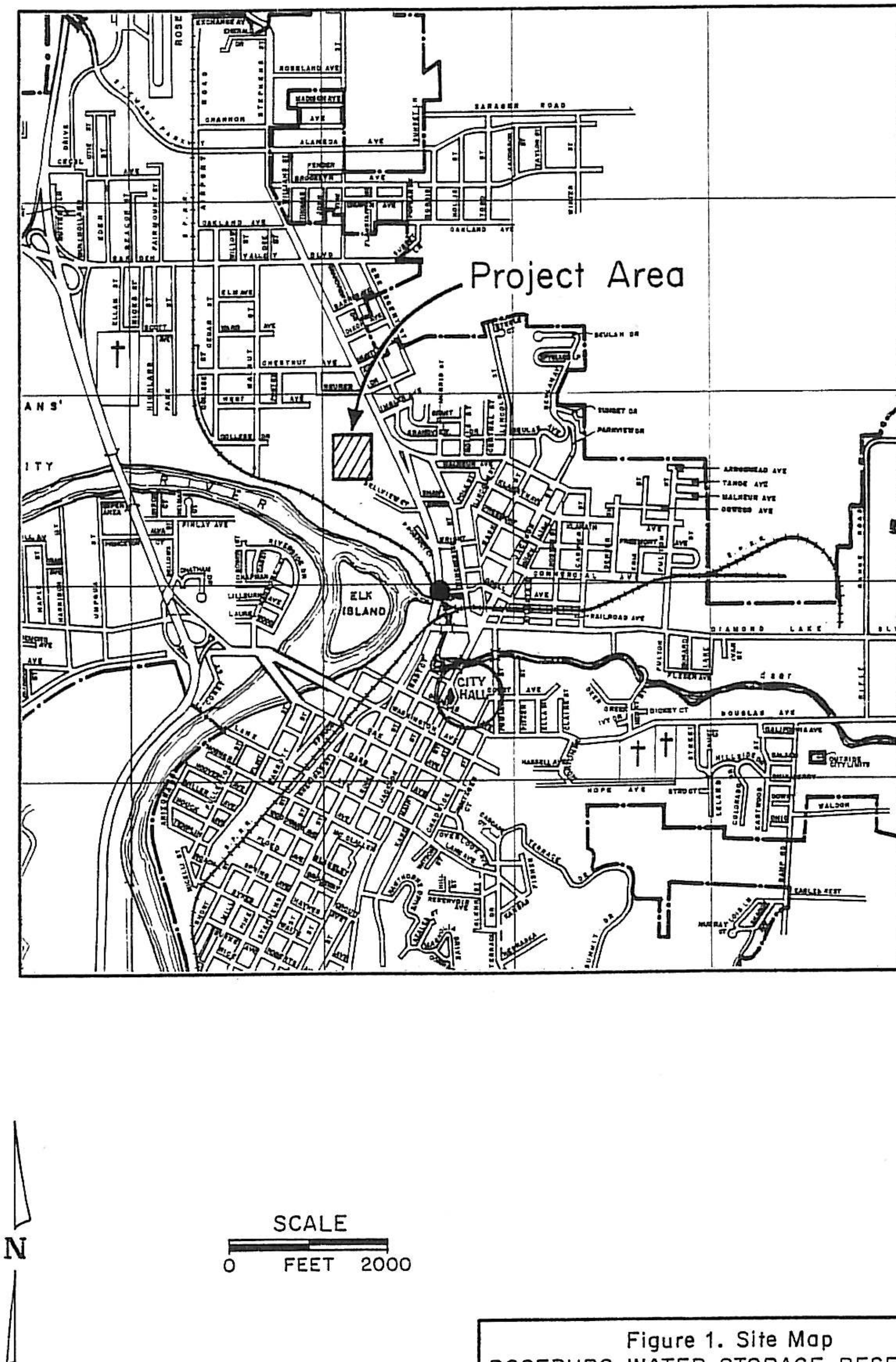

Figure 1. Site Map
ROSEBURG WATER STORAGE RESERVOIR
Roseburg, Oregon

3. We do not anticipate that foundation excavation will require blasting, although excavation may be slow in places due to the presence of seams of well-indurated sandstone or isolated sills, dikes or intrusions of basalt.
4. Nearly all of the rock removed from the foundation area will not be suitable for use as fill under the reservoir or for use as base course rock for access roads.
5. We believe that the risk of slides on natural or excavation slopes within the area adjacent to the proposed reservoir is relatively low.
6. Foundation settlements due to anticipated dead and live loads are expected not to exceed one inch. It is anticipated that the angular distortion due to differential settlement between the center and edge of the reservoir will not exceed 0.0008.

SUMMARY RECOMMENDATIONS

Our summary recommendations for planning, design and construction of an approximately 200 foot diameter, four million gallon reservoir are outlined below. A more detailed discussion of each item is found in subsequent sections.

Reservoir Location

1. The reservoir should be located entirely on a cut, approximately above elevation 690.
2. Figure 2 should be used as a guide for locating the reservoir. The reservoir may be moved uphill (to the southwest) if additional separation from existing steel reservoirs is required.

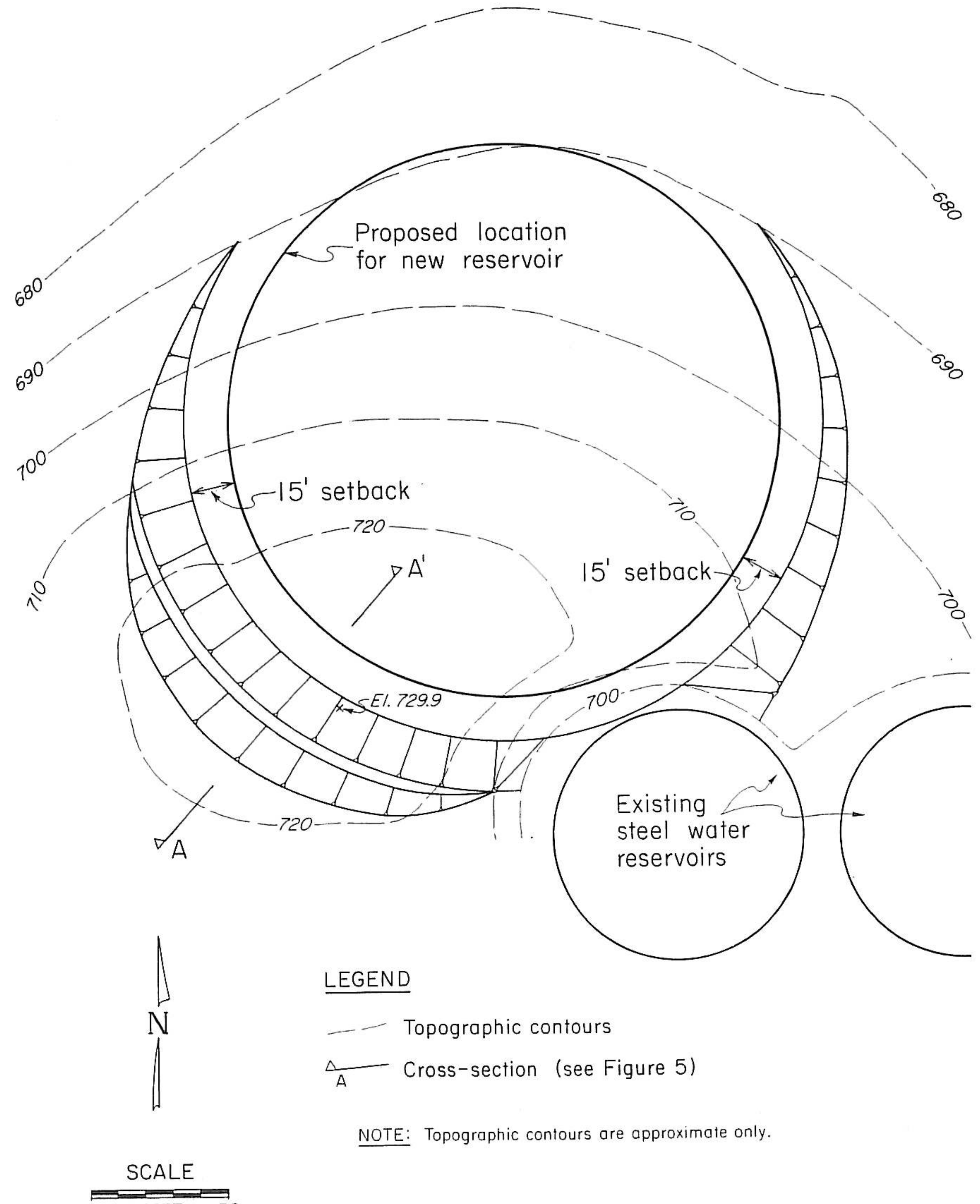

Figure 2. Proposed Location of New Reservoir
ROSEBURG WATER STORAGE RESERVOIR
Roseburg, Oregon

Foundation Excavation

1. Cut slopes in sedimentary rock should not exceed 1:1. Weathered, highly fractured basalt may be cut at 1/2:1 and dense, massive intact basalt may be cut vertically.
2. A five foot wide terrace should be provided along the cut slope at El. 710, to intercept falling or sloughing material.
3. The toe of the cut slopes should be set back a minimum of 15 feet from the edge of the reservoir foundation.
4. The rock between the existing western-most steel tank and the new reservoir should be terraced at El. 700, or lower if required by the cut slopes. We should confirm or alter the final configuration of cut slopes and terracing once the rock is exposed during excavation.
5. The upper approximately two feet of plastic surface soil should be removed from within the proposed construction area as soon as possible to facilitate site work during the wet season.

Disposal of Excavated Material

1. Excavated material could potentially be disposed of in two areas: the abandoned quarry to the northwest of the proposed reservoir or a relatively steep swale below elevation 570, directly west of the reservoir area. The method of placing the waste material will depend on the anticipated use of the filled ground. If the quarry area is to be subsequently developed, the fill should be placed in a manner suitable for anticipated structures. The site

would have to be stripped of vegetation prior to placement of any fill, and the fill should be placed and compacted in relatively thin lifts.

If the swale is to be used as a disposal site, the fill should be placed in a manner which will not create a slide hazard. A berm of good quality rock would have to be constructed at the base of the swale to retain the fill and provisions be made to drain the fill.

We should be retained to develop guidelines for fill disposal after the disposal site has been selected and the intended use of the site has been determined.

2. Excavated sedimentary rock and deeply weathered basalt should not be used as base course rock for access roads. Since essentially all of the rock encountered in our exploration is unsuitable for this use, the plans for the project should be based on the assumption that disposal of all rock from excavations will be required.

Foundation Design

1. All footings should be designed with an allowable bearing pressure of 3000 psf. We should review the design of footings for large column loads which may require foundations in the interior of a concrete reservoir. The magnitude of anticipated interior column loads is not presently known.
2. All footings should have a minimum width of two feet and should be placed on undisturbed rock. Footings should not be placed on fill unless approved or specified by us.

3. The base of the reservoir may be placed directly on undisturbed rock which has been cut to a uniform surface and cleaned. Alternatively, the rock surface may be excavated to near grade and a leveling course of 3/4-inch minus, well-graded sound, crushed rock may be placed to a maximum depth of six inches. The crushed rock should be compacted to 95 percent of maximum dry density, according to ASTM D-698.

Design Review and Field Observation

1. We should be retained to review all plans and specifications related to excavation, foundation preparation and footing design prior to advertisement for bids.
2. One of our representatives should be present periodically during the foundation excavation and preparation portion of the site work to observe any major variations in subsurface conditions from those presently anticipated. We presently believe that the elevation and nature of the contact between the basalt and the overlying sedimentary rock may vary within the reservoir area. The angle of cut slopes and the elevation of terraces could possibly require change to minimize removal of competent rock or accommodate poor quality material. The need for such changes can only be evaluated by direct examination of subsurface materials as excavation proceeds.
3. If the contractor proposes blasting during excavation we should be retained to evaluate the need for that blasting and its potential influence on structures and geologic features in the vicinity.

DEVELOPMENT OF RECOMMENDATIONS

FIELD STUDIES

Site Reconnaissance and Subsurface Exploration

Our reconnaissance included a traverse of the proposed construction site, the abandoned quarry, and the hillside below (north and east of) the existing reservoirs. The purpose of the reconnaissance was to map any evidence of slope instability, outcrops of bedrock, or concentrations of subsurface seepage.

Eight relatively shallow test pits were excavated within or adjacent to the new reservoir site on 6 August 1979 using a tractor-mounted backhoe. Bedrock was encountered in all test pits. Samples of surface soils and the underlying rock were retained for laboratory testing and identification. Test pit logs are summarized in APPENDIX A. The locations of the test pits are shown in Figure 3.

The shallow test pit exploration was supplemented by three deeper exploratory boreholes. The borings were made using a Mobile B-61 hydraulic rotary drill rig. The surface soils and weathered rock were drilled to a depth of 8.5 feet using a four inch rotary bit and sampled using a standard split-spoon sampler. The remainder of the rock was cored using a two-inch diameter, NX core barrel with a split barrel liner. All rock cores were retained for identification and laboratory testing, and are available in our offices for inspection. All drilling was continuously inspected by one of our representatives.

Boring logs are summarized in APPENDIX B. Locations of the boreholes are shown in Figure 3.

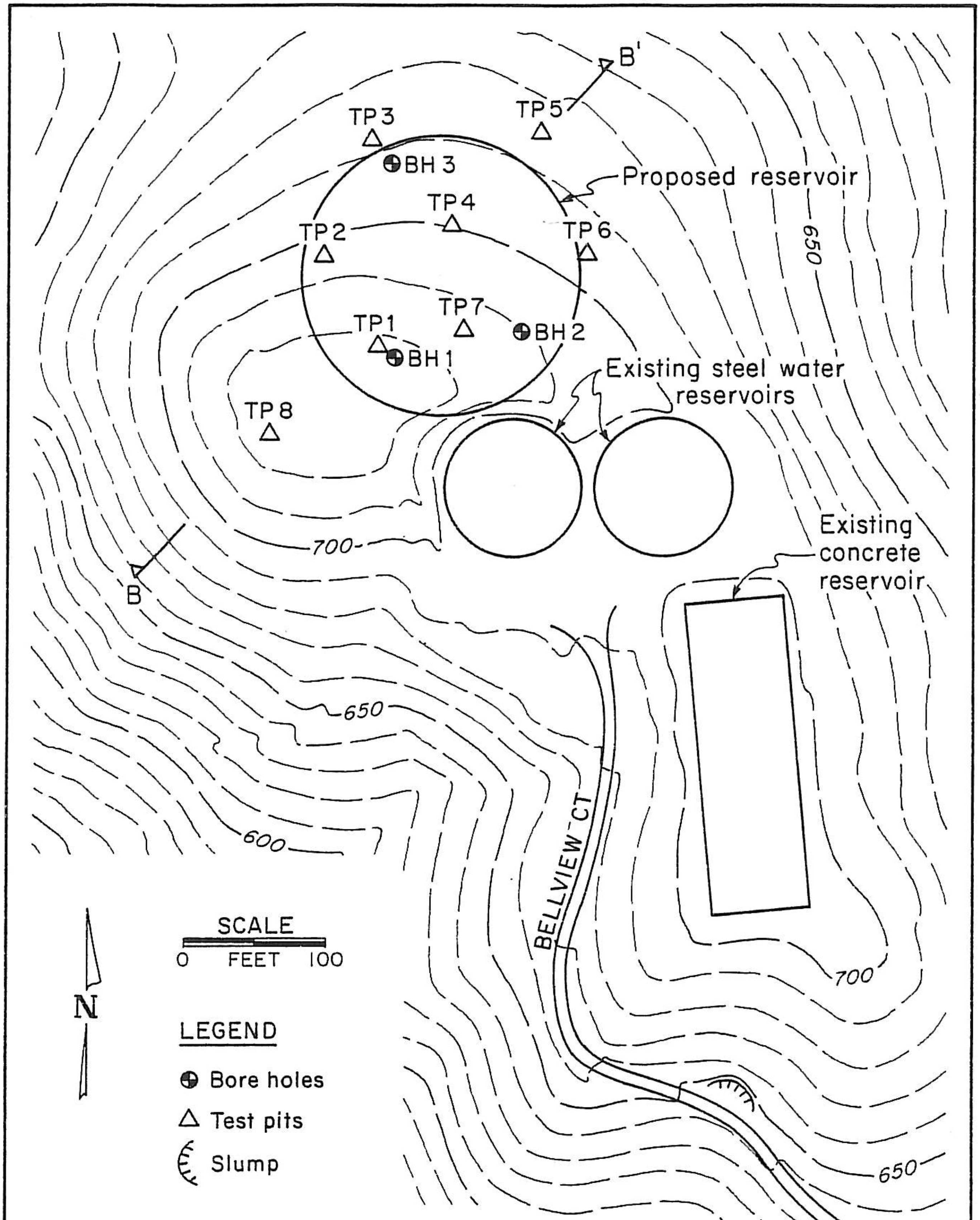

Figure 3. Location of Test Pits and Boreholes
ROSEBURG WATER STORAGE RESERVOIR
Roseburg, Oregon

Topography and Site Drainage

The proposed reservoir is to be located near the top of an isolated hill near downtown Roseburg, adjacent to the Umpqua River. The approximately 200-foot diameter site has been tentatively located on the east and north-facing portion of the hillside between elevation contours El. 724 and El. 884. The orthophoto map provided by the city[2] indicates that the highest point on the hilltop is at El. 729.9.

The slope of the ground within the reservoir site is approximately 12 to 17 degrees. Below the reservoir the terrain slopes from 21 to 30 degrees, below contour El. 670. Two circular steel reservoirs and a rectangular concrete reservoir are located on the southern hillside on a cut bench.

The new reservoir site is near a hilltop. There is little evidence of concentrated runoff. Soil and rock core samples were moist to a depth of about 33.5 feet but no groundwater or subsurface seepage was encountered in the test pits or boreholes. No evidence of groundwater or subsurface seepage was found in core samples of the underlying basalts taken from Boreholes 1 and 2.

Evidence of surface runoff or springs was found in only two locations adjacent to the reservoir site: west of the existing concrete reservoir (at an overflow drain) and at the top of a draw at El. 580 south of the abandoned quarry.

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[2]Orthophoto-contour map of Roseburg Proper, City of Roseburg, Douglas County, Oregon, 1"-200' scale, drawing No. 19-23.

Site Geology

The general area within the vicinity of the proposed reservoir has been mapped by Baldwin (1) as part of the Roseburg Formation of probable Eocene age. The formation has also been called the Umpqua Formation (4) and is referred to as such herein. This unit in the Roseburg area is characterized in the literature as very fine grained to aphanitic, dark grey to black, pillow basalt with intercalated lenses and beds of conglomerates, greywackes, siltstones, and mudstones. The sedimentary formation is very thinly bedded and the entire unit rarely exceeds a total thickness of 50 feet. The beds are very local in extent and pinch out rapidly.[3] Steeply dipping and overturned beds are also common (5).

Site reconnaissance confirmed the presence of dark pillow basalt with intercalated moderately to steeply dipping sedimentary lenses and layers of laminated to thinly bedded brown to dark grey mudstones, siltstones and silty sandstones. The unit is exposed immediately northwest of the western steel water storage reservoir and east of the ridge top. Coring near the hilltop and along the hillside confirm the presence of a pocket of sedimentary rock up to about 40 feet thick overlying a presumably continuous basalt formation.

All bedrock at the site is generally covered by a residual-colluvial, brown to black plastic soil, one to three feet thick.

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[3]The description of local geological formations was developed by Douglas C. Shank, a registered engineering geologist in the State of Oregon, based on a site reconnaissance and examination of rock core samples.

LABORATORY TESTING

Laboratory testing was relatively limited since, with the exception of a thin mantle of soil, the material underlying the proposed reservoir consists of rock.

One set of Atterberg limits was run on a sample of the surface soils (Sample J-1-1 from Test Pit 1). Test results indicated liquid and plastic limits of 65 and 23, respectively. The surface soils would be classified as a highly plastic clay (CH), according to the Unified Soil Classification System (USCS). The classification is consistent with the shrinkage cracks in the soil surface observed in our reconnaissance.

Five unconfined compression tests were run on specimens trimmed from rock cores. The majority of the rock cores, with the exception of the basalt, were very friable and fractured. The number of intact segments of core suitable for testing was very limited.

Table 1 summarizes results of the unconfined compression testing.

Table 1. Unconfined Compression Test Data

Sample Number	Sample Location	Depth (feet)	Sample Diameter(in.)	Sample Length(in.)	Unconfined Compressive Strength, q_u (tsf)
C-2-5	BH-2	22.5-23.0	1.83	2.35	2.62
C-2-6	BH-2	25 -25.5	1.90	2.98	1.75
C-2-6	BH-2	26.5-27.0	1.89	2.91	1.15
C-2-6	BH-2	28 -28.5	1.89	2.52	1.33
C-3-3	BH-3	10-10.5	1.88	2.35	8.74 (min.)

The dimensions of the samples tested varied because of the difficulty of trimming the specimens. The unconfined compressive strengths of Sample C-3-3 exceeded the capacity of the testing equipment. An unconfined compressive strength of at least 8.74 tsf was recorded for that sample.

Subsurface Conditions

Information concerning subsurface conditions within the proposed reservoir site was compiled from observations in eight test pits, three boreholes, and nearby cut slopes.

Results of the subsurface exploration indicate that the site is underlain by a very thin mantle of soil which is in turn underlain by sedimentary rock, and basalt.

The surface soils consisted of up to three feet of brown to black, dry, stiff to very stiff plastic clay (CH).

The underlying sedimentary rock consisted of alternating thin layers of yellow-tan to blue-grey mudstone and sandstone. The mudstone quality ranged from deeply weathered (with a soil-like texture) to very hard and well-indurated. The sandstones were indurated to weathered and highly fractured. Almost all rock cores obtained from the sedimentary rock had a rock quality designation (RQD) of zero (see subsequent discussion).

A blue-grey dense, hard basalt was encountered at a depth of 33.5 feet in Boreholes 1 and 2, underlying the sedimentary formation. This corresponds to an elevation of the basalt surface of 690.9 and 678.4 in Boreholes 1 and 2, respectively. We have assumed that the basalt underlies the Borehole 3 area at a depth of about 38 feet, or at an elevation of 654 based on the average thicknesses of the sedimentary formation observed in the other two boreholes.

Rock cores of the basalt indicated a RQD ranging from 0.75 to 1.0.

Weathered basalt was also noted in a cut west of an existing steel reservoir. The top of the weathered basalt was at approximately El. 708. Weathered sedimentary rock is exposed along the same cut to the north of the existing reservoirs.

It appears from the observations from test pits, boreholes and rock outcrops that the contact between the upper sedimentary rock and the underlying basalt slopes generally to the north and northwest. The upper surface of both rock types approximately parallels the existing ground surface. For example, both the ground surface and the underlying basalt slope about eight degrees between BH-1 and BH-2. The ground surface slopes 13 degrees between BH-1 and BH-3, while the surface of the basalt slopes about 15 degrees.

DISCUSSION OF FINDINGS

Foundation Excavation

Figure 4 shows subsurface conditions interpreted from borings along an axis through the new construction area shown in Figure 3. It is emphasized that actual conditions may differ substantially from this interpreted profile, as it is based on actual observations at the boring locations only.

A Rock Quality Designation (RQD) was assigned to core samples obtained from the boreholes (see boring logs in APPENDIX B). Rock Quality Designation is a method for classifying rock that is based on the degree or amount of jointing or fracturing. The RQD, based on the quality of rock core samples recovered, is defined below (2):

$$RQD = \frac{\text{Sum of lengths of intact pieces of core greater than 4 inches long}}{\text{Length of core advance}}$$

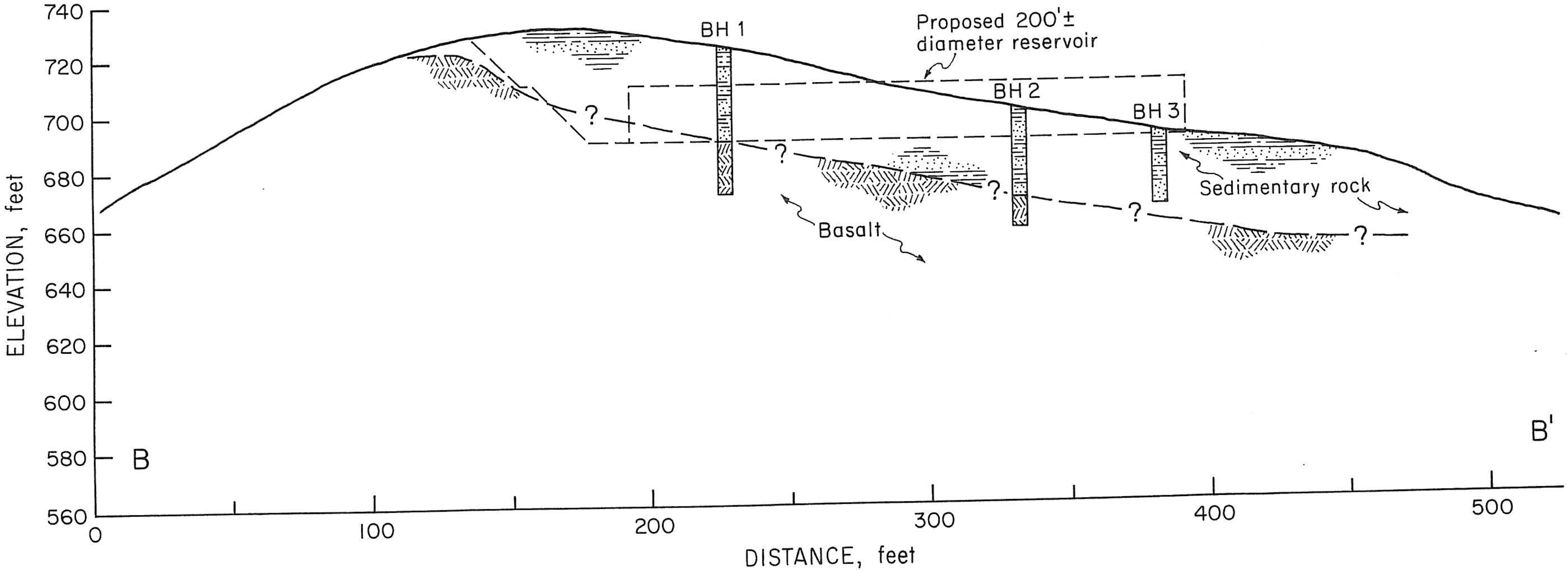

Figure 4. Idealized Subsurface Profile
ROSEBURG WATER STORAGE RESERVOIR
Roseburg, Oregon

Typical descriptions of rock quality associated with RQD are summarized in Table 2.

Table 2. Rock Quality Designation

RQD	Description of Rock Quality
< 0.25	very poor
0.25-0.50	poor
0.50-0.75	fair
0.75-0.90	good
> 0.90	excellent

It is apparent that the rock quality of the sandstone and mudstone encountered at the site would range from very poor to poor based on the RQD of those materials (see boring logs). Core samples of the sedimentary rock formation indicate that the rock is generally deeply weathered and fractured. The formation consists of alternating thin beds of steeply dipping mudstone and sandstone. When desiccated the rock fractures along these bedding planes. The actual orientation of the bedding planes of insitu rock could not be determined but it is assumed, based on observations in exposed cuts, that the dip generally follows the slope of the existing ground surface in the reservoir area.

The quality of the underlying basalt is significantly better than for the sedimentary rock. The RQD for the dense, hard basalt ranged from 0.75 to 1.00 indicating a good to excellent quality material.

We have concluded from our subsurface exploration and examination of rock core samples that the bulk of the excavation will be in the sedimentary rock and that blasting will not be required to remove this material. We anticipate that the rock is sufficiently weathered and jointed to be ripped by a large dozer-ripper combination. This formation was excavated with a tractor-mounted backhoe, although excavation was rather slow in some locations. In general the nature of the on-site sedimentary rock favors ripping. The sloping bedding planes and frequent seams of weathered, friable mudstone are likely to expedite excavation.

Occasional seams of well-indurated sandstone three to five feet thick similar to those occurring of Borehole 1 (23.5 to 28.5 feet) and Borehole 3 (8.5 to 13.5 feet), will be more difficult to excavate. These zones of harder rock are expected to be intercalated with seams of more friable, weathered rock which should facilitate removal.

The basalt formation is composed of dense, competent rock and is generally not rippable in our,opinion. The surface of the basalt, however, is expected to lie below El. 690, i.e. beneath the base of the proposed reservoir. Occasional boulders, sills or dikes of basalt may, however, be present on site within the proposed excavation, in particular at the southwestern (uphill) portion of the construction area. We do not anticipate that outcropping of basalt will be extensive within the construction area, and suggest that we evaluate the nature and extent of such formation encountered during construction prior to any blasting by the contractor. It is likely that some basalt will be encounted at the southern edge of the proposed reservoir, during excavation of the cutslope and setback between the western-most tank and the new structure.

We have estimated that placement of the reservoir at the proposed location will require approximately 22,000 cubic yards of soil and rock excavation.[4] Approximately 55 to 60 percent of this total is due to excavation under the reservoir structure. The remainder represents excavation of the 15 foot recommended setback and the cutslopes.

Bearing Capacity and Settlement Analysis

It is usual for analysis of foundations bearing on rock to assume that adequate bearing capacity will be available to carry any load from the usual types of structures. Typically, one obtains an unconfined compressive strength for correlations with RQD and applies a fairly conservative factor of safety (on the order of 5 to 10) to account for fractures, joints or voids in the foundation rock to obtain a recommended bearing pressure. It has also been suggested that allowable bearing pressures equivalent to 20 to 30 percent of the unconfined compressive strength of the intact rock be used (2).

Limited laboratory test data is available for on-site rock. Unconfined compression tests were only run on rock core specimens which were sufficiently weathered and altered to permit trimming. The first four unconfined compressive strengths shown in Table 1 represent strengths of weathered mudstone. The unconfined compressive strength of the core specimen of indurated sandstone which could be trimmed exceeded the capacity of the test equipment.

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[4]The estimate of excavation volumes is based on interpreted topographic contours and is approximate only. It should not be used for estimates of construction costs.

It was conservatively assumed that the strength of the mudstone governed the bearing capacity of the foundation material. An allowable bearing capacity of approximately 3000 psf was estimated using an average shear strength of 1.72 ksf for rock and with no consideration of settlement requirements.

Foundation settlements were estimated for anticipated dead and live reservoir loads. A 200 foot diameter steel or concrete reservoir and a 17 foot water storage height were assumed for the analysis. Total dead and live loads of 2400 and 2800 lbs per linear foot of reservoir perimeter were estimated for footings for steel and concrete structure walls, respectively.

It was assumed that foundation settlements would be due solely to elastic distortion of the mudstone and sandstone formation. Distortion of the underlying basalt formation was disregarded. Elastic settlements were estimated using the expression (3):

$$S = C_d \, p \, B \, \frac{(1-u^2)}{E}$$

where: S = settlement
C_d = influence value
p = bearing pressure
B = width of loaded area
u = Poisson's ratio for rock
E = modulus of elasticity.

An average modulus of elasticity of 285 ksf (1980 psi), based on the average of tangents to the stress strain curves obtained in the laboratory, was used in our analysis. The thickness of the potentially compressible rock was assumed to range from one foot on the south to 36 feet on the north side of the excavation. With these assumptions, we have estimated that water loads (about 1060 psf) from the reservoir will cause a maximum settlement of 0.66 inches at the edge (wall) of the reservoir. A maximum settlement of 0.40 inches was estimated at the center of the reservoir due to water loads. We have further estimated that perimeter foundation loads will cause an additional 0.17 to 0.20 inches of settlement. Total maximum settlements of the walls of 0.83 and 0.86 inches were, therefore, estimated for steel and concrete structures respectively.

Settlements are expected to be minimal along the south and southwestern portions of the reservoir where the basalt will lie very close to the excavated surface. Excavation of rock in that area is expected to unload the foundation by about 4200 psf. Settlements should be greatest and approach the maximum predicted value along the north and northeast portions of the reservoir wall where the basalt is deeper and the excavation minimal.

Estimated differential settlements on the order of one inch across the radius of the reservoir (about 100 feet) represent an angular distortion (difference in settlement between points divided by distance between them) of about 0.0008. The usual practice is to limit this distortion to 1/150 to 1/180 (0.006 to 0.007). Angular distortions due anticipated differential settlements are, therefore, well below the usual acceptable criterion.

Column footings designed using an allowable bearing pressure of 3000 psf should experience relatively modest settlements. Because column loads and proposed footing sites were unknown at the time of this writing, we should review the proposed final design to verify that actual settlements do not exceed acceptable values.

Cut Slopes

Excavation for slopes behind the proposed reservoir will probably lie almost entirely within sedimentary rock units. A maximum cut height of approximately 40 feet is anticipated.

Our slope stability analysis, based on laboratory unconfined compressive strengths and an assumed 40 foot high cut, indicated that cut slopes should not exceed 1:1 slopes. Massive, intact basalt if encountered at the base of the excavation, however, may be cut vertically. Fractured, weathered basalt should be cut at 1/2:1 slopes.

Figure 5 shows an anticipated excavation profile across the reservoir. We have suggested that a 5 foot wide terrace be cut at El. 710 (approximately mid slope height for a 40 foot cut). Examination of rock cores suggests that, when exposed to weather and upon desiccation, the surface of the cut slopes will likely ravel and run, in a manner similar to the rock exposed behind the existing steel reservoirs. The proposed terrace would intercept loose talus derived from the upper slopes and reduce maintenance requirements.

We also have suggested, in consultation with Mr. Bill Hall, a 15 foot minimum set-back from the toe of the cut slope to the edge of the reservoir. The set-back would permit maintenance of and access to the reservoir, and help protect the reservoir against falling rock or talus.

Excavation of the set-back and cut slopes between the new reservoir and the existing western-most water storage tank will result in removal of most of the material between the two structures. Any remaining rock between the old and new structures could be cut to about El. 700 or removed entirely.

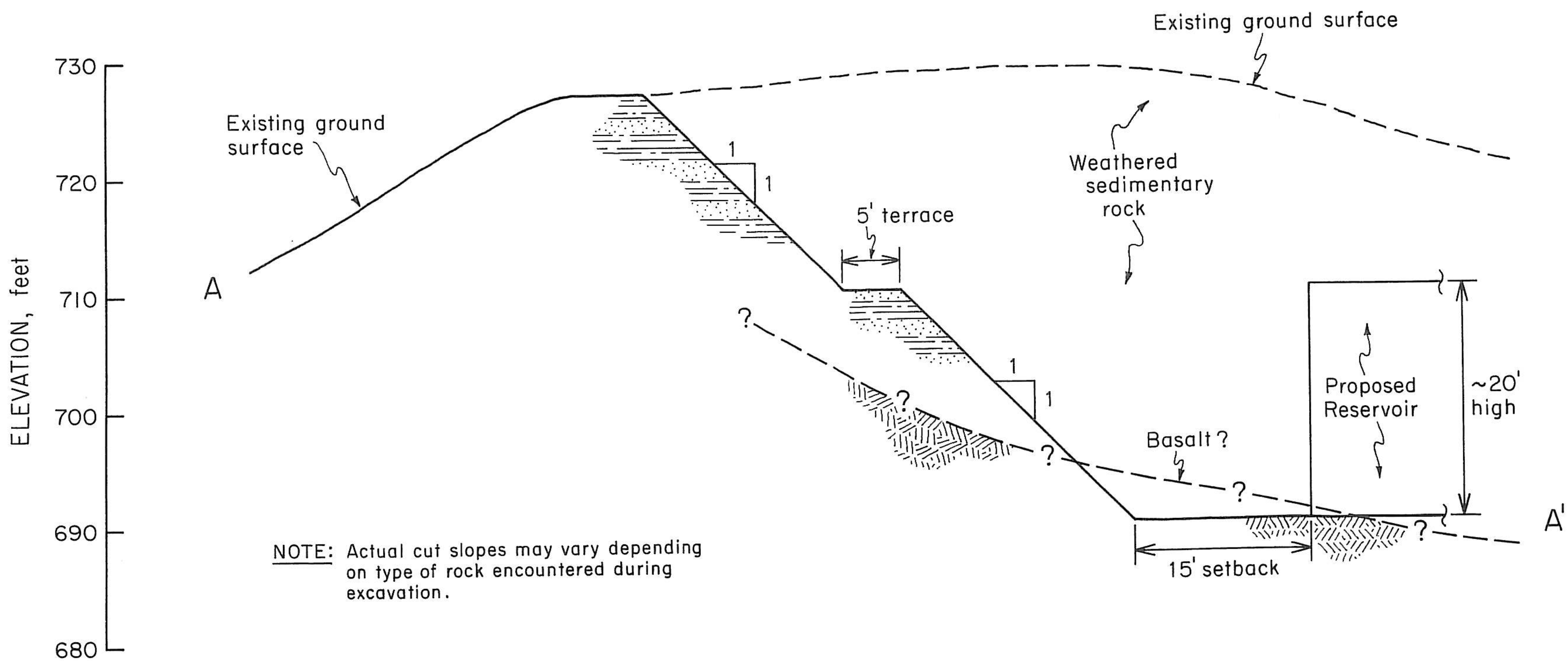


Figure 5. Typical Cut Slopes and Setback
ROSEBURG WATER STORAGE RESERVOIR
Roseburg, Oregon

It is possible that some basalt may be encountered at the toe of the cut slopes. It may be possible to use a vertical cut at the toe and thereby reduce excavation volume, while maintaining the required set-back. Field observation of rock during foundation excavation will be required for changes in cut slopes. Such changes would, of course, only be of practical value if the slope toe is exposed before excavation of the slope begins. Whether this is possible and, if fast, safe, depends on the excavation method chosen by the contractor.

General Slope Stability

No evidence of slope instability was noted during field reconnaissance of the reservoir site and adjacent area. A small slump was noted at a cut slope on Bellview Court south of the existing rectangular concrete reservoir between contour El. 650 and El. 640. This slump is an isolated, fairly shallow feature.

The ground slopes between 8 and 17 degrees within the proposed reservoir area. The hillside to the north and west of the reservoir area slopes from about 14 to 20 degrees. The hillside to the south and east slopes from 30 to over 40 degrees.

The surface of the basalt which underlies the new reservoir slopes from about 8 to 15 degrees, approximately parallel to the existing ground surface. The stability of the ground underlying the proposed reservoir was analyzed using an assumed reservoir base elevation of 690 and an average uniform slope of the basalt of 12 degrees. The actual surface of the basalt may be fairly uneven. Our analysis indicated a factor of safety of about two against slope failure due to the reservoir loads.

In reality, approximately twice as much weight will be removed during foundation excavation as will be added by construction of the reservoir. The hillside stability should, therefore, not be influenced by the reservoir loads in any significant way.

REFERENCES

1. Baldwin, E.M., 1974, Eocene Stratigraphy of Southwest Oregon, Oregon Department of Geology and Mineral Industry Bulletin 83, 40 pp.

2. Bowles, J., 1977, Foundation Analysis and Design, McGraw-Hill Book Co., 750 pp., (2nd. edition).

3. Foundation Engineering Handbook, 1975, Van Nostrand Reinhold Co., H.F. Winterkorn and H.Y. Fang (eds.), 751 pp.

4. Geologic Map of Oregon West of the 121st Meridian, prepared by F.G. Wells, U.S.G.S., Miscellaneous Geologic Investigations, Map I-325, scale 1:500,000, 1961.

5. Noor-ul-Hag, Zubair, 1975, The Geology of the Northwest Quarter of Roseburg Quadrangle, Douglas County, Oregon, University of Oregon Master's Thesis, 75 pp., unpub.

APPENDICES

APPENDIX A:

TEST PIT LOGS

SYMBOL KEY
FOR
BORING AND TEST PIT LOGS

DISTINCTION BETWEEN FIELD LOGS AND FINAL LOGS

A field log is prepared for each boring or test pit by our field representative. The log contains information concerning the boring or pit excavation methods, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations of ground water. It also contains the field representative's interpretation of the soil conditions between samples. Therefore, these field logs contain both factual and interpretive information. Copies are on file in our office. The final logs presented in this report represent our interpretation of the contents of the field logs, and the results of the laboratory examinations and tests of the field samples. We must emphasize that our recommendations are based on the contents of the final logs and the information contained therein and not on the field logs.

VARIATION IN SOILS BETWEEN TEST PITS AND BORINGS

The final log and related information depict subsurface conditions only at the specific location and on the date indicated. Soil conditions at other locations or on other dates may differ from conditions occuring at this location.

TRANSITION BETWEEN SOIL OR ROCK TYPES

The lines designating the interface between soil or rock materials on the final log and on soil or geological profiles presented in the report body are determined by interpolation and are therefore approximations. The transition between the materials may be abrupt or gradual. Only at boring or test pit locations should profiles be considered as reasonably accurate and then only to the degree implied by the notes thereon.

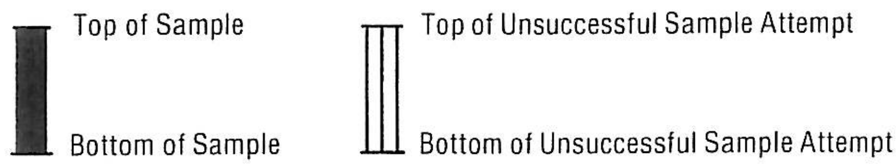
SAMPLE NUMBERS

SH - 3 - 4

- 4 — Sample Number
- 3 — Boring or Pit Number
- SH — Sample Type

SS - Standard Penetration Test Sample
SH - Thin-walled Shelby Tube Sample
J - Jar or Bag Sample
C - Core Sample

SAMPLING LOCATION

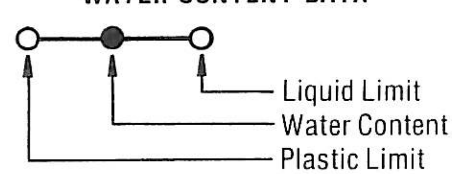


UNIFIED SOIL CLASSIFICATION SYMBOLS

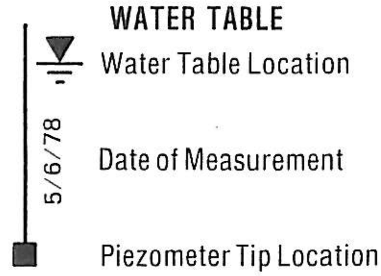
G - Gravel
S - Sand
M - Silt
C - Clay
Pt - Peat

W - Well Graded
P - Poorly Graded
L - Low Plasticity
H - High Plasticity
O - Organic

WATER CONTENT DATA



WATER TABLE



TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 1

DATE 6 August 1979

GROUND ELEVATION 724.4

COMMENTS:

Soil and rock easily excavated by backhoe to a depth of 4 ft. Difficult excavation below 4 ft. Individual rock fragments are hard, indurated but formation may have fractures or seams of weathered material.

SAMPLE DATA				WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL				
	J-1-1	■	CH				Dark brown to black, stiff to very stiff plastic clay.
5							Weathered, friable sandstone and mudstone mixed with sandy soil. Grades into tan, indurated sandstone at 4 ft.
10							
15							

TEST PIT NUMBER 2

DATE 6 August 1979

GROUND ELEVATION 706.3

COMMENTS:

Excavation difficult with backhoe at 4 ft. depth.

SAMPLE DATA				WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL				
			CH				Black, very stiff plastic clay.
		■					Weathered, friable basalt.
5	J-2-1						
10							
15							

TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 3

DATE 6 August 1979

GROUND ELEVATION 688.2

COMMENTS:

Rock is friable and rippable to at least 5 ft.

SAMPLE DATA				WATER TABLE	SYMBOL	C.TSF	SOIL AND ROCK DESCRIPTION
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL				
0			CH				Black stiff plastic clay.
	J-3-1						Variable mixture of weathered rock and surface soil.
5							Alternating layers of tan cemented sandstone and olive-grey mudstone
10							
15							

TEST PIT NUMBER 4

DATE 6 August 1979

GROUND ELEVATION 700

COMMENTS:

Rock could be excavated with a backhoe to 8 ft., but excavation increasingly difficult with depth. Rock excavated from bottom of test pit came up in platy fragments.

SAMPLE DATA				WATER TABLE	SYMBOL	C.TSF	SOIL AND ROCK DESCRIPTION
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL				
0			CH				Brown, stiff plastic clay.
							Tan, friable, weathered mudstone with sandy soil in seams.
5	J-4-1						Olive-grey mudstone with layers of tan cemented sandstone
	J-4-2						
10							
15							

TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 5

DATE 6 August 1979

GROUND ELEVATION 687.1

COMMENTS:

Basalt may be an isolated dike, sill or intrusion

DEPTH, FEET	NUMBER (Sample Data)	LOCATION (Sample Data)	CLASS SYMBOL (Sample Data)	WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
0–2			CH				Brown to black, stiff, plastic clay.
2–3.5	J-5-1, J-5-2						Dense, weathered basalt.
5							
10							
15							

TEST PIT NUMBER 6

DATE 6 August 1979

GROUND ELEVATION 698.1

COMMENTS:

Excavation very difficult at 2.5 ft.

DEPTH, FEET	NUMBER (Sample Data)	LOCATION (Sample Data)	CLASS SYMBOL (Sample Data)	WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
0–2.5	J-6-1		CH				Brown, stiff clay with many roots grading to yellow sandy soil.
2.5							Olive-grey, indurated sandstone.
5							
10							
15							

TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 7

DATE 6 August 1979

GROUND ELEVATION 717.7

COMMENTS:

Rock is rippable to at least 7 ft.

SAMPLE DATA							
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
			CH				Brown stiff plastic clay.
							Yellow to tan residual sandy soil.
5	J-7-1						Olive-grey friable mudstone with layers of cemented sandstone.
10							
15							

TEST PIT NUMBER 8

DATE 6 August 1979

GROUND ELEVATION 722.7

COMMENTS:

Excavation gets more difficult with depth but rock is rippable to at least 6 ft.

SAMPLE DATA							
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
			CH				Brown stiff plastic clay.
							Dense to friable, weathered basalt. Fractured throughout.
5	J-8-1						
10							
15							

APPENDIX B:

BORING LOGS

BORING LOG

PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 1

DATE OF BORING: 15 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 724.4

DEPTH, FEET	SAMPLE NUMBER	CLASS SYMBOL	STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT (▲) / WATER CONTENT, % (●) (0–50–100)	SOIL AND ROCK DESCRIPTION AND COMMENTS
		CH		Brown plastic clay.
5	SS-1-1		(50/6") ▲	Yellow to tan weathered sandstone. Rock is partially decomposed to sand. Sandstone becomes more indurated with depth.
	SS-1-2		(50/5") ▲	
10	C-1-3			Recovery ratio = 62% Rock Quality Designation (RQD) = 0.18
15	C-1-4			Alternating layers of tan indurated sandstone and dark grey to tan, weathered, friable mudstone (beds usually ¼ to ½ inch thick) Recovery ratio = 97% RQD = 0.20
20	C-1-5			Recovery ratio = 17% RQD = 0
25	C-1-6			Blue-grey, alternating layers of indurated sandstone and indurated to deeply weathered, friable mudstone. Recovery ratio = 73% RQD = 0.13
30	C-1-7			Blue-grey, weathered, friable mudstone with occassional seam of indurated sandstone. Recovery ratio = 68% RQD = 0
35				Blue-grey dense, hard basalt.

BORING LOG

PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 1 (Cont'd)

DATE OF BORING: 15 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 724.4

SAMPLE DATA: DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0 – 50 – 100)	WATER TABLE	SYMBOL	SOIL AND ROCK DESCRIPTION AND COMMENTS
35	C-1-8						Recovery ratio = 100% RQD = 0.75 Blue-grey, dense, hard basalt.
40	C-1-9						Recovery ratio = 100% RQD = 0.88 Blue-grey, dense, hard basalt.
45	C-1-10						Recovery ratio = 100% RQD = 0.95
50	C-1-11						Recovery ratio = 100% RQD = 0.95 Grey to green, dense hard basalt. Slower coring, rock likely harder.
55							
60							
65							
70							

BORING LOG

PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 2

DATE OF BORING: 16 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 711.9

SAMPLE DATA: DEPTH, FEET	NUMBER	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0–50–100)	SOIL AND ROCK DESCRIPTION AND COMMENTS
0–8	SS-2-1	(50/6") ▲	Olive grey weathered, indurated to friable mudstone with seams or layers of indurated sandstone.
8–17	SS-2-2	(50/5½") ▲	Olive-grey indurated mudstone with occasional seams of indurated sandstone.
10	C-2-3		Recovery ratio = 87% RQD = 0.30
15	C-2-4		Recovery ratio = 55% RQD = 0
17–34			Alternating layers of olive-grey to tan indurated to friable mudstone and hard, indurated sandstone.
20	C-2-5		Recovery ratio = 100% RQD = 0.30
25	C-2-6		Recovery ratio = 100% RQD = 0.17
30	C-2-7		Recovery ratio = 88% RQD = 0.28
35			Dark grey to blue-grey basalt.

BORING LOG

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243 BORING NUMBER 2 (Cont'd)

DATE OF BORING 16 Autust 1979

GROUND ELEVATION AT BORING WHEN DRILLED 711.9

SAMPLE DATA: DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0 50 100)	WATER TABLE	SYMBOL	SOIL AND ROCK DESCRIPTION AND COMMENTS
35	C-2-8						Recovery ratio = 100% RQD = 0.85 Dark grey, dense, hard basalt. Same as that encountered in BH-1.
40	C-2-9						Recovery ratio = 100% RQD = 1.0
45							
50							

BORING LOG

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243 **BORING NUMBER** 3

DATE OF BORING 16 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED 692.4

SAMPLE DATA: NUMBER	CLASS SYMBOL	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0 – 50 – 100)
SS-3-1	SC	(50/5½") ▲
SS-3-2	SM	(50/6") ▲
C-3-3		
C-3-4		
C-3-5		
C-3-6		

DEPTH, FEET: 5, 10, 15, 20, 25, 30, 35

SOIL AND ROCK DESCRIPTION AND COMMENTS

Tan to yellow weathered sandstone with little cementation. Material has texture of sandy soil to about 8 ft.

Yellow partially indurated, friable sandstone. Degree of induration increases with depth.

Recovery ratio = 65%
RQD = 0.13

Tan to rust indurated sandstone. Fractured throughout.

Recovery ratio = 80%
RQD = 0.17

Recovery ratio = 100%
RQD = 0

Recovery ratio = 88%
RQD = 0

Dark grey to olive-grey, alternating layers of indurated to deeply weathered mudstone and indurated sandstone.

TEST PIT

and

BORING LOGS

APPENDIX A

SYMBOL KEY
FOR
BORING AND TEST PIT LOGS

DISTINCTION BETWEEN FIELD LOGS AND FINAL LOGS

A field log is prepared for each boring or test pit by our field representative. The log contains information concerning the boring or pit excavation methods, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations of ground water. It also contains the field representative's interpretation of the soil conditions between samples. Therefore, these field logs contain both factual and interpretive information. Copies are on file in our office. The final logs presented in this report represent our interpretation of the contents of the field logs, and the results of the laboratory examinations and tests of the field samples. We must emphasize that our recommendations are based on the contents of the final logs and the information contained therein and not on the field logs.

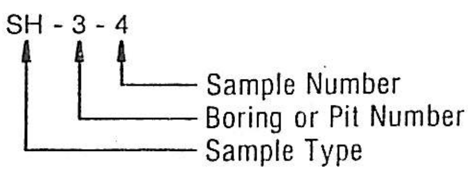
VARIATION IN SOILS BETWEEN TEST PITS AND BORINGS

The final log and related information depict subsurface conditions only at the specific location and on the date indicated. Soil conditions at other locations or on other dates may differ from conditions occuring at this location.

TRANSITION BETWEEN SOIL OR ROCK TYPES

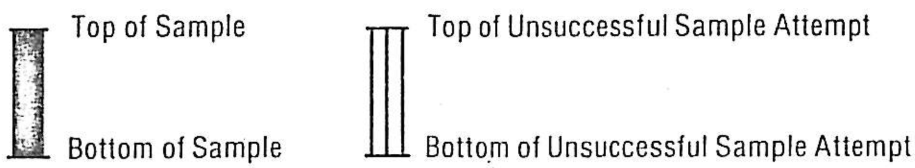
The lines designating the interface between soil or rock materials on the final log and on soil or geological profiles presented in the report body are determined by interpolation and are therefore approximations. The transition between the materials may be abrupt or gradual. Only at boring or test pit locations should profiles be considered as reasonably accurate and then only to the degree implied by the notes thereon.

SAMPLE NUMBERS



SS - Standard Penetration Test Sample
SH - Thin-walled Shelby Tube Sample
J - Jar or Bag Sample
C - Core Sample

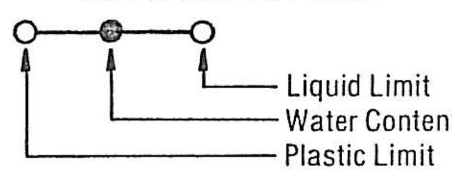
SAMPLING LOCATION



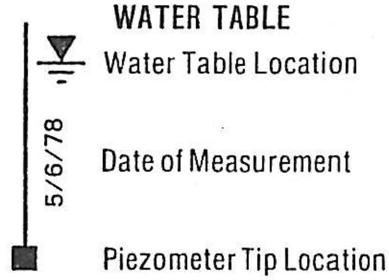
UNIFIED SOIL CLASSIFICATION SYMBOLS

G - Gravel	W - Well Graded
S - Sand	P - Poorly Graded
M - Silt	L - Low Plasticity
C - Clay	H - High Plasticity
Pt - Peat	O - Organic

WATER CONTENT DATA



WATER TABLE



TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 1

DATE 6 August 1979

GROUND ELEVATION 724.4

COMMENTS:

Soil and rock easily excavated by backhoe to a depth of 4 ft. Difficult excavation below 4 ft. Individual rock fragments are hard, indurated but formation may have fractures or seams of weathered material.

SAMPLE DATA				WATER TABLE	SYMBOL	C.TSF	SOIL AND ROCK DESCRIPTION
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL				
	J-1-1		CH				Dark brown to black, stiff to very stiff plastic clay.
5							Weathered, friable sandstone and mudstone mixed with sandy soil. Grades into tan, indurated sandstone at 4 ft.
10							
15							

TEST PIT NUMBER 2

DATE 6 August 1979

GROUND ELEVATION 706.3

COMMENTS:

Excavation difficult with backhoe at 4 ft. depth.

SAMPLE DATA				WATER TABLE	SYMBOL	C.TSF	SOIL AND ROCK DESCRIPTION
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL				
			CH				Black, very stiff plastic clay.
							Weathered, friable basalt.
5	J-2-1						
10							
15							

TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 3

DATE 6 August 1979

GROUND ELEVATION 688.2

COMMENTS:

Rock is friable and rippable to at least 5 ft.

SAMPLE DATA: DEPTH, FEET	SAMPLE DATA: NUMBER	SAMPLE DATA: LOCATION	SAMPLE DATA: CLASS SYMBOL	WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
			CH				Black stiff plastic clay.
	J-3-1						Variable mixture of weathered rock and surface soil.
5							Alternating layers of tan cemented sandstone and olive-grey mudstone
10							
15							

TEST PIT NUMBER 4

DATE 6 August 1979

GROUND ELEVATION 700

COMMENTS:

Rock could be excavated with a backhoe to 8 ft., but excavation increasingly difficult with depth. Rock excavated from bottom of test pit came up in platy fragments.

SAMPLE DATA: DEPTH, FEET	SAMPLE DATA: NUMBER	SAMPLE DATA: LOCATION	SAMPLE DATA: CLASS SYMBOL	WATER TABLE	SYMBOL	C,TSF	SOIL AND ROCK DESCRIPTION
			CH				Brown, stiff plastic clay.
							Tan, friable, weathered mudstone with sandy soil in seams.
5	J-4-1						
	J-4-2						Olive-grey mudstone with layers of tan cemented sandstone
10							
15							

TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 5

DATE 6 August 1979

GROUND ELEVATION 687.1

COMMENTS:

Basalt may be an isolated dike, sill or intrusion

SAMPLE DATA							
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	WATER TABLE	SYMBOL	C.TSF	SOIL AND ROCK DESCRIPTION
			CH				Brown to black, stiff, plastic clay.
	J-5-1 J-5-2						Dense, weathered basalt.
5							
10							
15							

TEST PIT NUMBER 6

DATE 6 August 1979

GROUND ELEVATION 698.1

COMMENTS:

Excavation very difficult at 2.5 ft.

SAMPLE DATA							
DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	WATER TABLE	SYMBOL	C.TSF	SOIL AND ROCK DESCRIPTION
			CH				Brown, stiff clay with many roots grading to yellow sandy soil.
	J-6-1						Olive-grey, indurated sandstone.
5							
10							
15							

TEST PIT LOGS

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243

TEST PIT NUMBER 7

DATE 6 August 1979

GROUND ELEVATION 717.7

COMMENTS:

Rock is rippable to at least 7 ft.

Sample Data: Depth, Feet	Sample Data: Number	Sample Data: Location	Sample Data: Class Symbol	Water Table	Symbol	C.TSF	Soil and Rock Description
0			CH				Brown stiff plastic clay.
							Yellow to tan residual sandy soil.
5	J-7-1	(approx. 6.5 ft)					Olive-grey friable mudstone with layers of cemented sandstone.
10							
15							

TEST PIT NUMBER 8

DATE 6 August 1979

GROUND ELEVATION 722.7

COMMENTS:

Excavation gets more difficult with depth but rock is rippable to at least 6 ft.

Sample Data: Depth, Feet	Sample Data: Number	Sample Data: Location	Sample Data: Class Symbol	Water Table	Symbol	C.TSF	Soil and Rock Description
0			CH				Brown stiff plastic clay.
							Dense to friable, weathered basalt. Fractured throughout.
5	J-8-1	(approx. 6 ft)					
10							
15							

BORING LOG

PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 1

DATE OF BORING: 15 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 724.4

Depth, feet	Sample Number	Class Symbol	Standard Penetration Resistance, N, Blows/Foot	Soil and Rock Description and Comments
0 – ~2		CH		Brown plastic clay.
~2 – ~12.5	SS-1-1		(50/6")	Yellow to tan weathered sandstone. Rock is partially decomposed to sand. Sandstone becomes more indurated with depth.
	SS-1-2		(50/5")	
	C-1-3			Recovery ratio = 62% Rock Quality Designation (RQD) = 0.18
~12.5 – ~22.5	C-1-4			Alternating layers of tan indurated sandstone and dark grey to tan, weathered, friable mudstone (beds usually ¼ to ½ inch thick) Recovery ratio = 97% RQD = 0.20
	C-1-5			Recovery ratio = 17% RQD = 0
~22.5 – ~33.7	C-1-6			Blue-grey, alternating layers of indurated sandstone and indurated to deeply weathered, friable mudstone. Recovery ratio = 73% RQD = 0.13
	C-1-7			Blue-grey, weathered, friable mudstone with occassional seam of indurated sandstone. Recovery ratio = 68% RQD = 0
~33.7 – 35				Blue-grey dense, hard basalt.

WATER CONTENT, % (scale 0 – 50 – 100)

BORING LOG

PROJECT NAME City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER C-243 BORING NUMBER 1 (Cont'd)

DATE OF BORING 15 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED 724.4

SAMPLE DATA: DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT; ● WATER CONTENT, % (0 – 50 – 100)	WATER TABLE	SYMBOL	SOIL AND ROCK DESCRIPTION AND COMMENTS
35	C-1-8						Recovery ratio = 100% RQD = 0.75 Blue-grey, dense, hard basalt.
40	C-1-9						Recovery ratio = 100% RQD = 0.88 Blue-grey, dense, hard basalt.
45	C-1-10						Recovery ratio = 100% RQD = 0.95
50	C-1-11						Recovery ratio = 100% RQD = 0.95 Grey to green, dense hard basalt. Slower coring, rock likely harder.
55							
60							
65							
70							

BORING LOG

PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 2

DATE OF BORING: 16 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 711.9

SAMPLE DATA: DEPTH, FEET	NUMBER	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0–50–100)	SOIL AND ROCK DESCRIPTION AND COMMENTS
	SS-2-1	(50/6")	Olive grey weathered, indurated to friable mudstone with seams or layers of indurated sandstone.
5			
	SS-2-2	(50/5½")	
10	C-2-3		Olive-grey indurated mudstone with occasional seams of indurated sandstone. Recovery ratio = 87% RQD = 0.30
15	C-2-4		Recovery ratio = 55% RQD = 0
20	C-2-5		Alternating layers of olive-grey to tan indurated to friable mudstone and hard, indurated sandstone. Recovery ratio = 100% RQD = 0.30
25	C-2-6		Recovery ratio = 100% RQD = 0.17
30	C-2-7		Recovery ratio = 88% RQD = 0.28
35			Dark grey to blue-grey basalt.

BORING LOG

PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 2 (Cont'd)

DATE OF BORING: 16 Autust 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 711.9

SAMPLE DATA: DEPTH, FEET	NUMBER	LOCATION	CLASS SYMBOL	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0 – 50 – 100)	WATER TABLE	SYMBOL	SOIL AND ROCK DESCRIPTION AND COMMENTS
35	C-2-8						Recovery ratio = 100% RQD = 0.85 Dark grey, dense, hard basalt. Same as that encountered in BH-1
40	C-2-9						Recovery ratio = 100% RQD = 1.0
45							
50							

BORING LOG

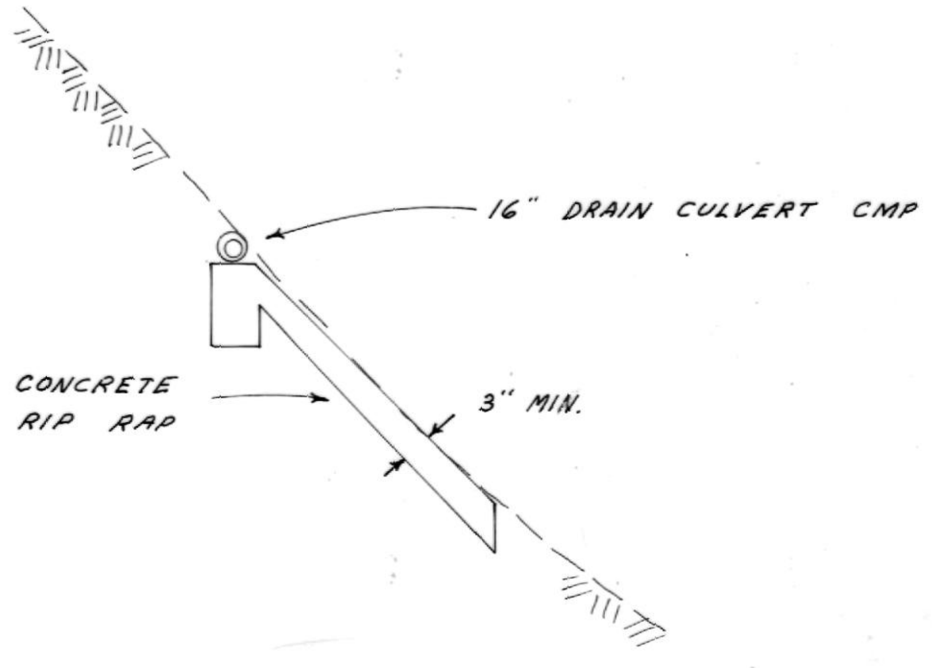
PROJECT NAME: City of Roseburg Water Storage Reservoir, Roseburg, Oregon

PROJECT NUMBER: C-243 BORING NUMBER: 3

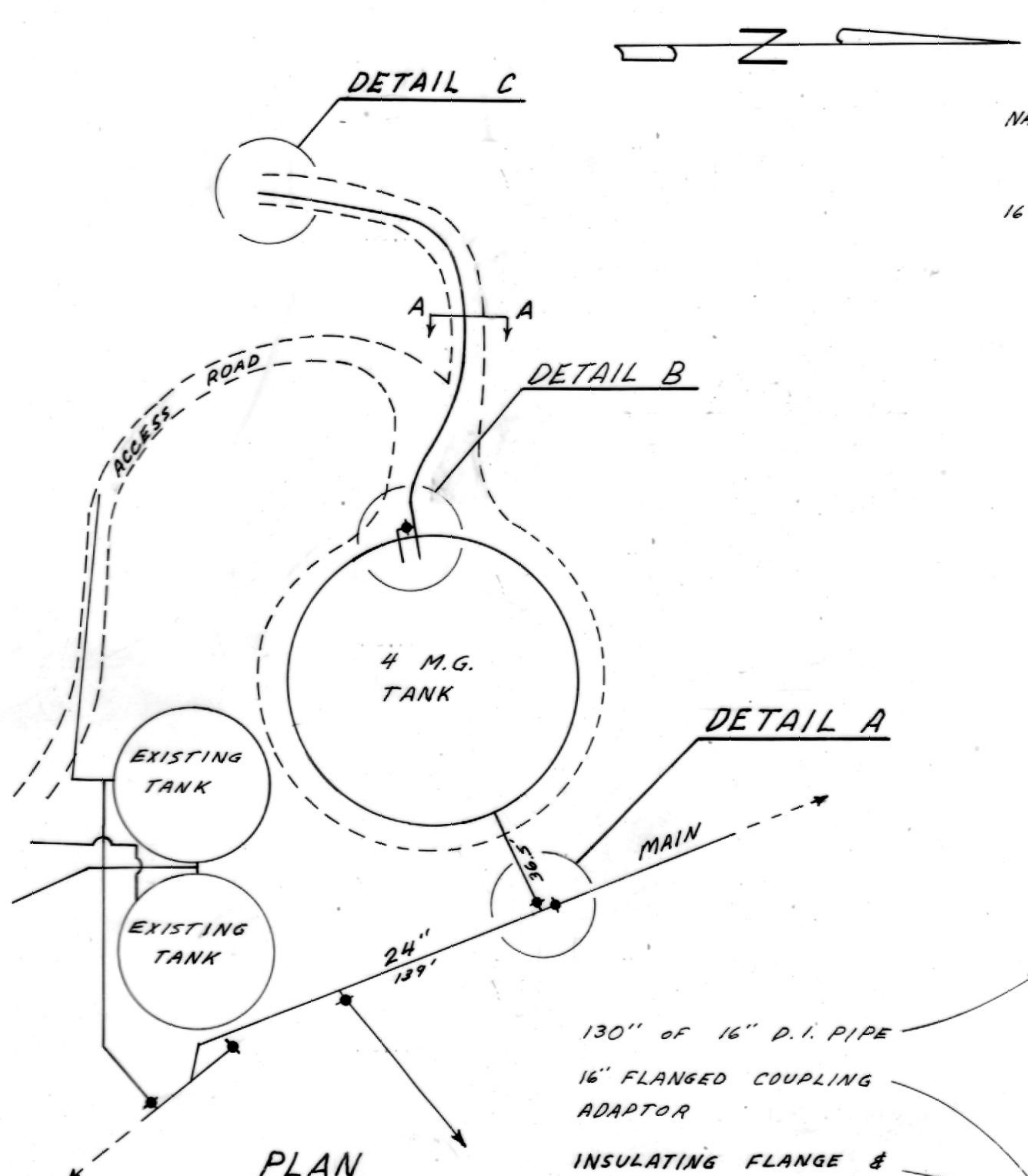
DATE OF BORING: 16 August 1979

GROUND ELEVATION AT BORING WHEN DRILLED: 692.4

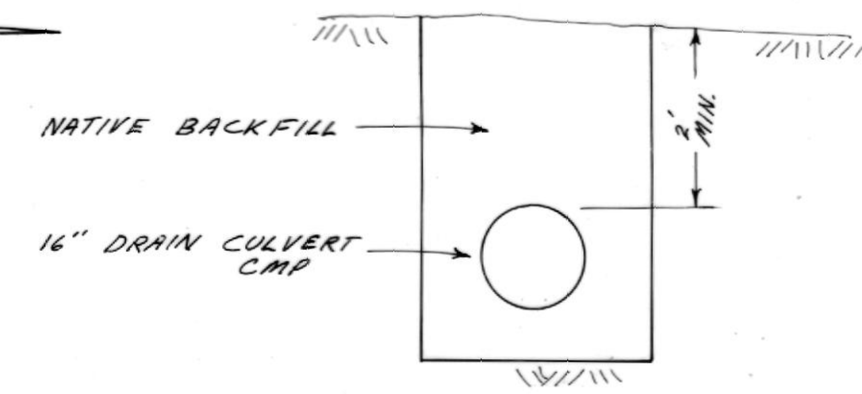
SAMPLE DATA: DEPTH, FEET	NUMBER	CLASS SYMBOL	▲ STANDARD PENETRATION RESISTANCE, N, BLOWS/FOOT / ● WATER CONTENT, % (0 – 50 – 100)	SOIL AND ROCK DESCRIPTION AND COMMENTS
0–5	SS-3-1	SC	(50/5½")	Tan to yellow weathered sandstone with little cementation. Material has texture of sandy soil to about 8 ft.
5–10	SS-3-2	SM	(50/6")	Yellow partially indurated, friable sandstone. Degree of induration increases with depth.
10	C-3-3			Recovery ratio = 65% RQD = 0.13
15	C-3-4			Tan to rust indurated sandstone. Fractured throughout. Recovery ratio = 80% RQD = 0.17
20	C-3-5			Recovery ratio = 100% RQD = 0
25	C-3-6			Recovery ratio = 88% RQD = 0 Dark grey to olive-grey, alternating layers of indurated to deeply weathered mudstone and indurated sandstone.
30				
35				



DETAIL C
N.T.S.



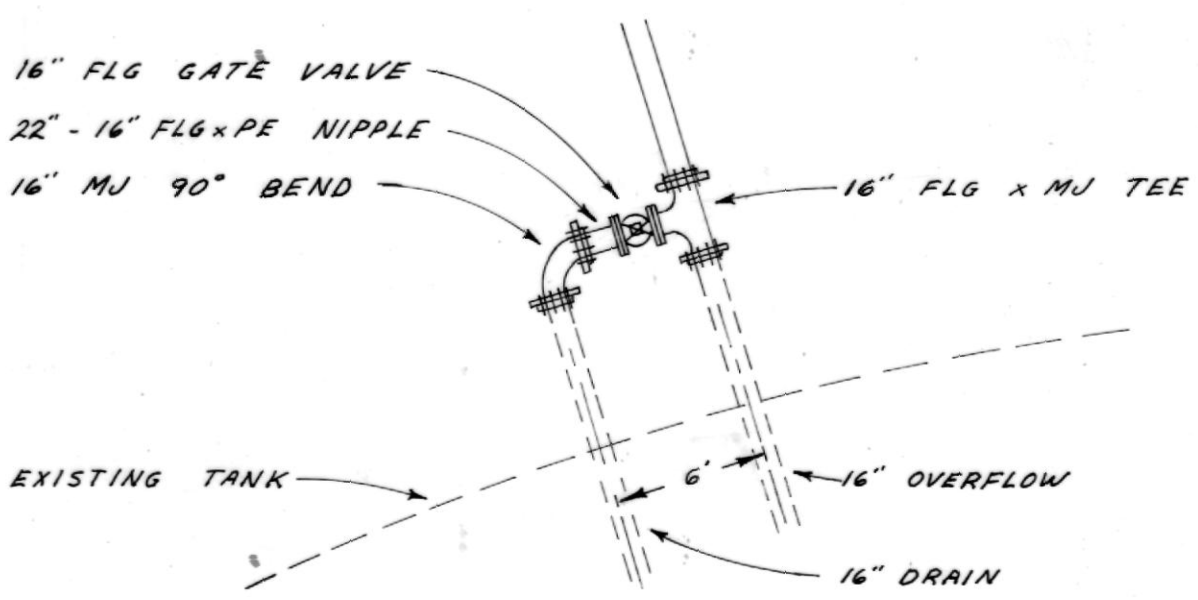
PLAN
N.T.S.



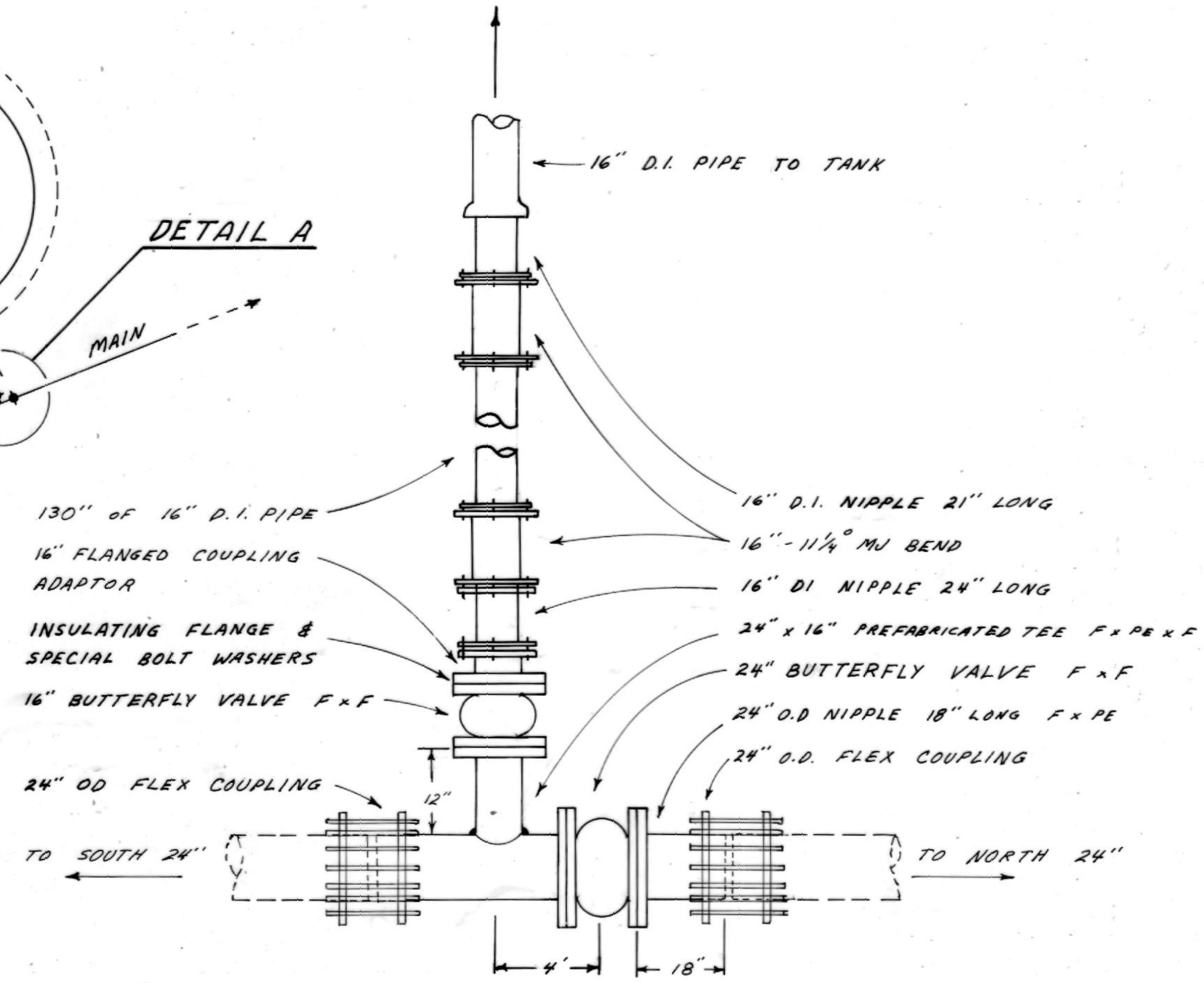
SECTION A-A

MATERIAL

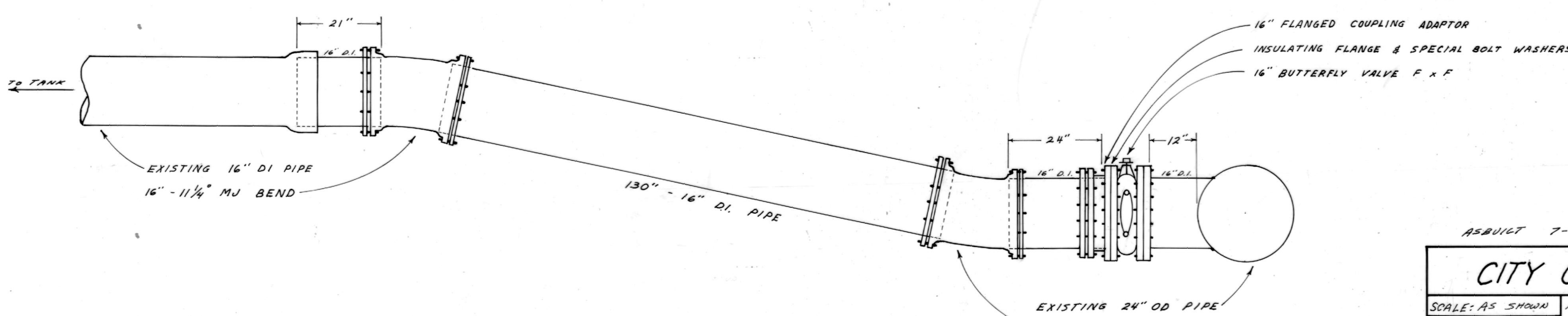
18' - 16" D.I. PIPE
350' - 16" CMP
2 - 16" - 11¼° MJ BEND
1 - 16" - FLANGED COUPLING ADPT.
1 - 16" BUTTERFLY VALVE F×F
1 - 16" GATE VALVE F×F
1 - 16" - 90° MJ BEND
1 - 16" FLG × MJ TEE
1 - 16" × 22" LONG FLG × PE NIP.
1 - 16" INSULATING FLANGE WASHER SET
1 - 24" BUTTERFLY VALVE F×F
2 - 24" OD FLEX COUPLING
1 - 24"×16" PREFABRICATED TEE F×PE×F
1 - 24" OD NIPPLE 18" LONG F×PE
2 - VALVE BOX LID
8' - VALVE BOX PIPE



DETAIL B
N.T.S.



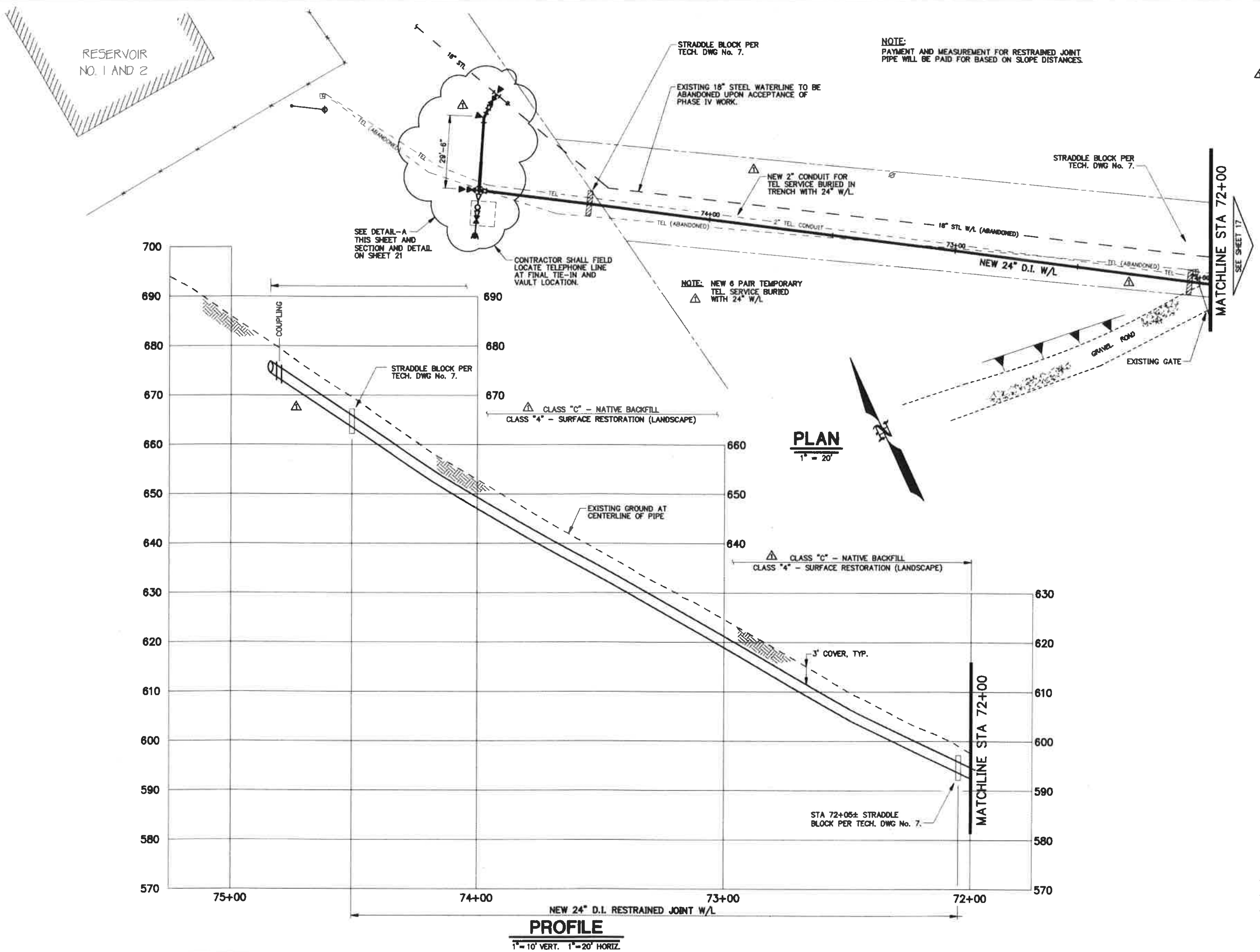
DETAIL A PLAN VIEW
N.T.S.



DETAIL A PROFILE VIEW
SCALE: 1" = 20"

ASBUILT 7-1-81 MDR

CITY OF ROSEBURG		
SCALE: AS SHOWN	APPROVED: EW	DRAWN: MDR
DATE: 9-30-80		REVISED:
4 M.G. WATER TANK PIPING		
WATER DEPARTMENT		PROJECT NO. 79-36C

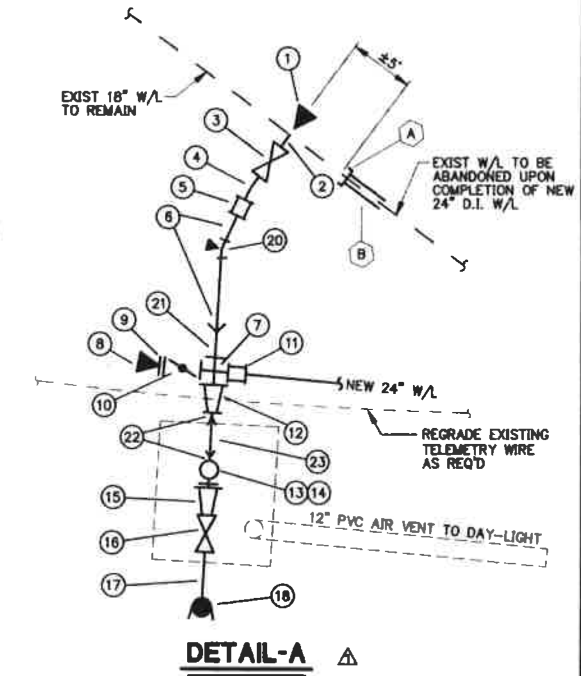


NOTE: PAYMENT AND MEASUREMENT FOR RESTRAINED JOINT PIPE WILL BE PAID FOR BASED ON SLOPE DISTANCES.

NOTE: CONTRACTOR SHALL ABANDON EXISTING WATERLINE BETWEEN TIE-IN AT STA 74+60 AND THE INTERSECTION OF WRIGHT ST. AND LINCOLN AVE. UPON ACCEPTANCE OF NEW 24" WATERLINE.

(A) FIELD WELDED END CAP ½" PLATE

(B) NO CONC. BLOCK USED. IRON MECHANICAL RESTRAINT WELDED TO END CAP AND EXISTING STL. W/L.



DETAIL-A
N.T.S.

1. THRUST BLOCK - SIZED FOR 50 PSI TEST PRESSURE 5.1 SQ.FT. BEARING AREA
2. 18"x18" SIZE ON SIZE WELDED WET TAP FLANGED TEE
3. 18" FLGxFLG GV FOR WET TAP W/VALVE BOX AND LID
4. 18" 11¼° FLGxFLG BEND. CONTRACTOR SHALL FIELD VERIFY EXISTING W/L ALIGNMENT TO DETERMINE IF BEND IS NEEDED.
5. 18" STEEL FLANGED COUPLING ADAPTER ROMAC MODEL FC400 OR APPROVED EQUAL.
6. 18" PE SPOOL - LENGTH AS REQ'D
7. 24"x18" FLG CROSS
8. THRUST BLOCK - 9.0 SQ.FS. BEARING AREA
9. 24" BLIND FLG
10. 24" FLGxFLG BUTTERFLY VALVE W/VALVE BOX AND LID
11. 24" STEEL FLANGED COUPLING ADAPTER ROMAC MODEL FC400 OR APPROVED EQUAL.
12. 18"x8" FLGxFLG REDUCER
13. 8"x8" FLGxFLG TEE
14. 8" AIR AND VACUUM VALVE W/ISOLATING BUTTERFLY VALVE, APCO MODEL NO. 1108 OR APPROVED EQUAL.
15. 8"x6" FLGxFLG REDUCER
16. 6" FLGxMJ RESILIENT SEAT GATE VALVE IN VAULT
17. 6" PE SPOOL WITH TIE RODS
18. FIRE HYDRANT
19. THRUST BLOCK - 2 SQ.FT. BEARING AREA
20. 18" 22½° MJ BEND
21. 18" FLGxMJ COUPLING
22. 8" FJGxMJ COUPLING
23. 8" PE SPOOL WITH TIE RODS

DATE	NO.	REVISION	BY
10/94	△	DRAWING OF RECORD	JDE

DCL: JDE | FILENAME: 1376D18
DRN: MAH | SCALE: AS SHOWN | DATE: JAN '94
CK: RCG | APPROVED: [signature]

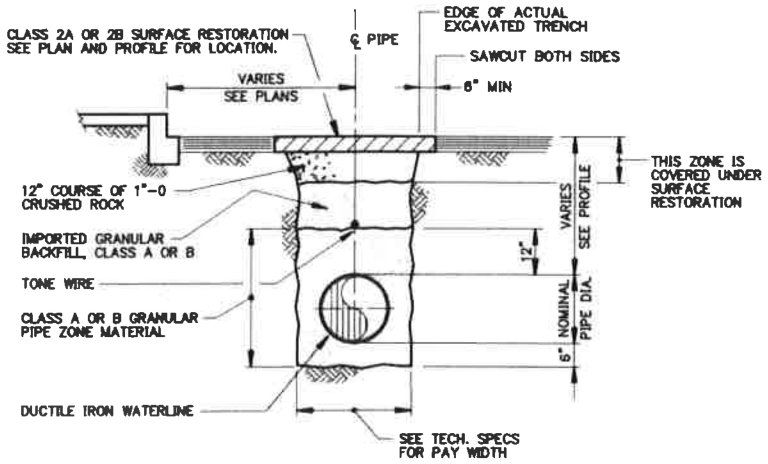
PROJECT: CITY OF ROSEBURG SOUTH END TRANSMISSION MAIN PROJECT PROJECT No. 93-13

SHEET TITLE: WATER MAIN PLAN AND PROFILE STA 72+00 TO STA 74+60

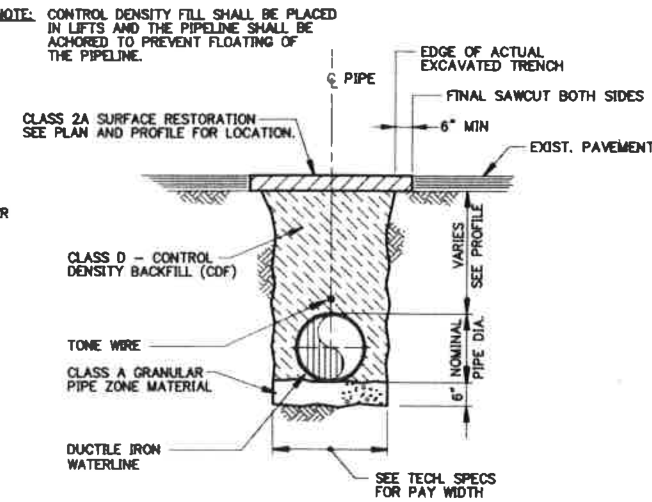
LEE ENGINEERING, INC. CONSULTING ENGINEERS OREGON CITY, OREGON

JOB NO. 1376
SHEET NO. 18 / 21

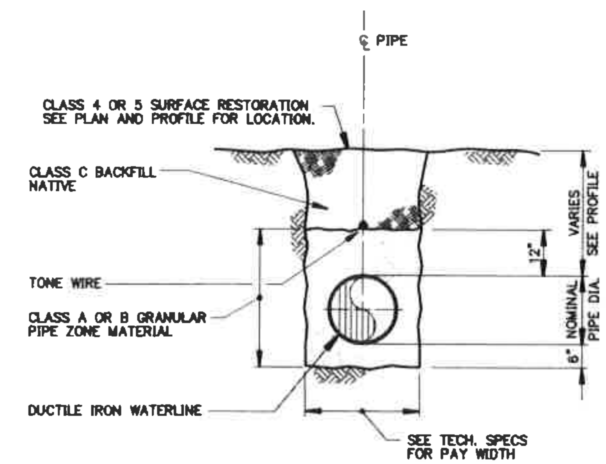
REGISTERED PROFESSIONAL ENGINEER 14,444 OREGON JULY 26, 1988 JOSEPH D. ESKEW



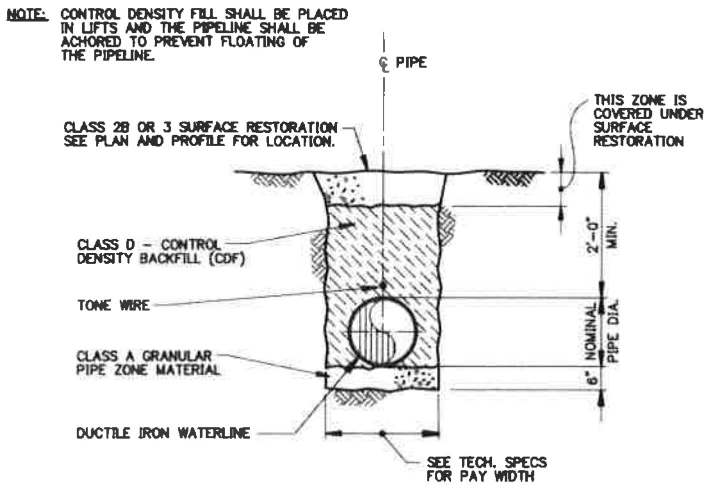
CITY STREETS



STATE HIGHWAY



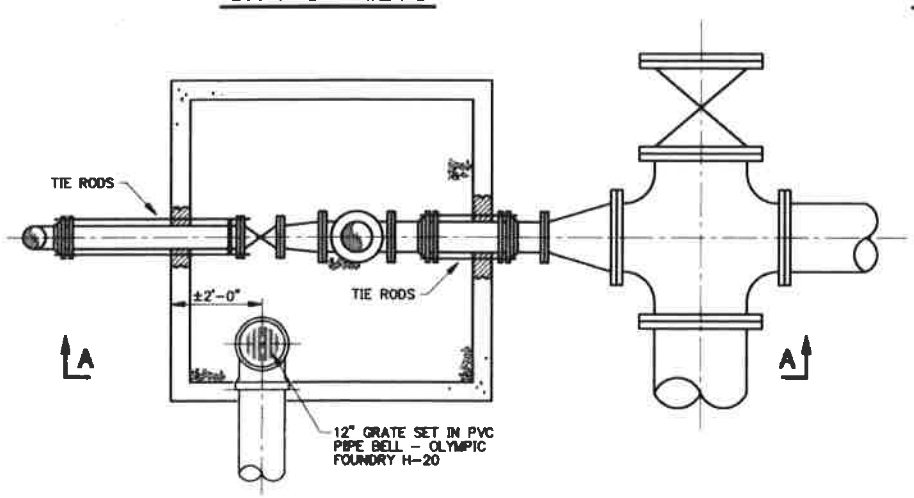
UNDEVELOPED AREAS

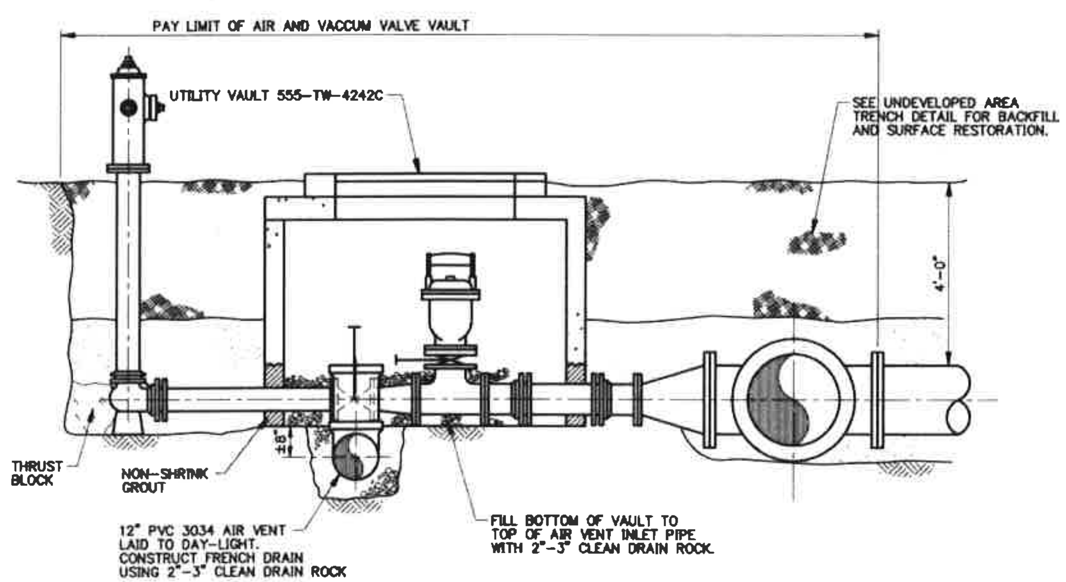


SHALLOW BURY

TYPICAL TRENCH DETAILS

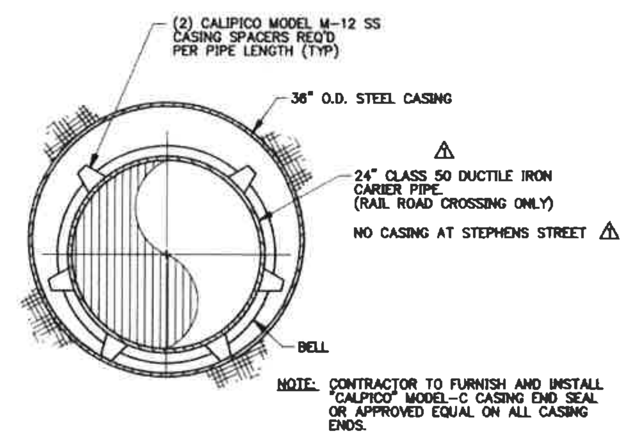
N.T.S.





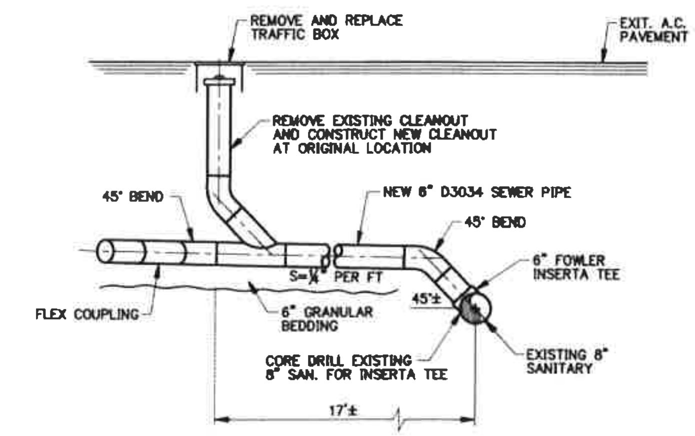
SECTION A-A ⚠

SCALE: 1/2"=1'-0"



BORE CASING DETAIL

N.T.S.



ODELL AVE. - 6" SANITARY REPLACEMENT DETAIL

N.T.S.

NOTES:

1) TRENCH BACKFILL AND SURFACE RESTORATION SHALL BE AS SHOWN IN TYPICAL TRENCH SECTIONS AND LOCATED AS SHOWN ON THE PLANS.
2) CONCRETE SIDEWALK, DRIVEWAY AND CURB REMOVAL SHALL BE LIMITED TO ONLY THAT NECESSARY TO COMPLETE THE REQUIRED WORK. SAWCUTS ARE REQUIRED FOR CONCRETE REMOVAL AND SHALL BE LOCATED AT THE CLOSEST AVAILABLE JOINT AS DIRECTED BY THE ENGINEER.
3) CONCRETE SIDEWALK, DRIVEWAY AND CURB SHALL MATCH THE ADJOINING CONCRETE VERTICALLY AND HORIZONTALLY.
4) SIDEWALKS SHALL BE 4" THICK MINIMUM.
5) DRIVEWAYS SHALL BE 6" THICK MINIMUM WITH 10GAx6"x6" WWF.
6) ALL CONCRETE SHALL BE 5-1/2 SACK MIX, 3000 PSI AT 28 DAYS WITH 6" MAXIMUM SLUMP.
7) CONCRETE FINISH SHALL, AS CLOSELY AS POSSIBLE, MATCH THE FINISH OF THE ADJOINING CONCRETE.
8) CONCRETE NOT INTENDED TO BE REMOVED AND IS DAMAGED DURING CONSTRUCTION SHALL BE SAWCUT AND REPLACED AT NO COST TO THE OWNER.
9) CURING OF CONCRETE SHALL, IN GENERAL, BE DONE BY SPRAYING WITH AN ACCEPTABLE TYPE OF NON-PIGMENTED CURING COMPOUND APPLIED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
10) CITY OF ROSEBURG PUBLIC WORKS DEPT. STANDARD DRAWINGS ARE HEREBY REFERENCED FOR MINIMUM REQUIREMENT.

DATE	NO.	REVISION	BY
10/94	⚠	DRAWING OF RECORD	JDE

DES. JDE · DRN. MAH · CH. JDE · FILENAME: 1376D21 · SCALE: AS SHOWN · DATE: JAN '94 · APPROVED: Robert C. [signature]

PROJECT: CITY OF ROSEBURG SOUTH END TRANSMISSION MAIN PROJECT PROJECT No. 93-13

SHEET TITLE: TYPICAL TRENCH AND MISC. DETAILS

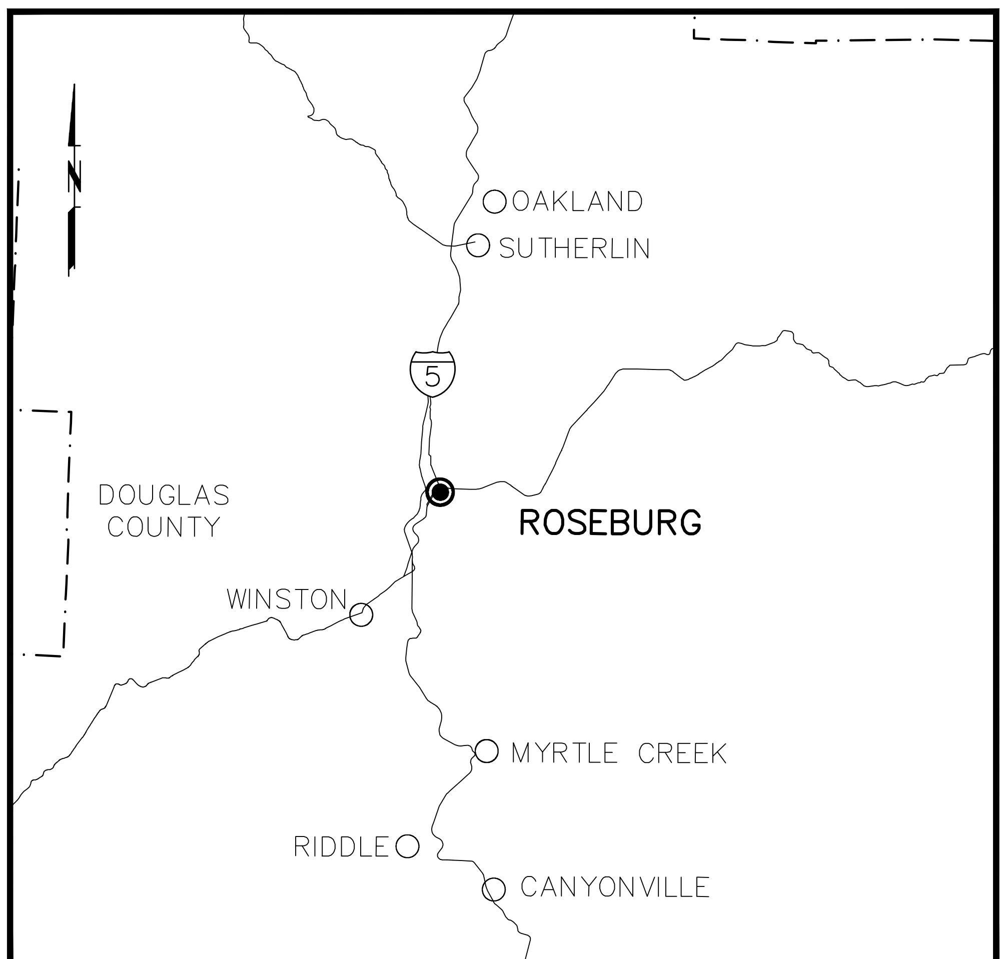
LEE ENGINEERING, INC. CONSULTING ENGINEERS OREGON CITY, OREGON

JOB NO. 1376 · SHEET NO. 21 / 21

REGISTERED PROFESSIONAL ENGINEER 14,444 OREGON JULY 26, 1989 JOSEPH D. ESKEW

PROJECT #14WA08
MAIN RESERVOIR
PIPING IMPROVEMENTS - PHASE I
CITY OF ROSEBURG, OREGON

VOLUME 2 OF 2 DRAWINGS
JULY 2014

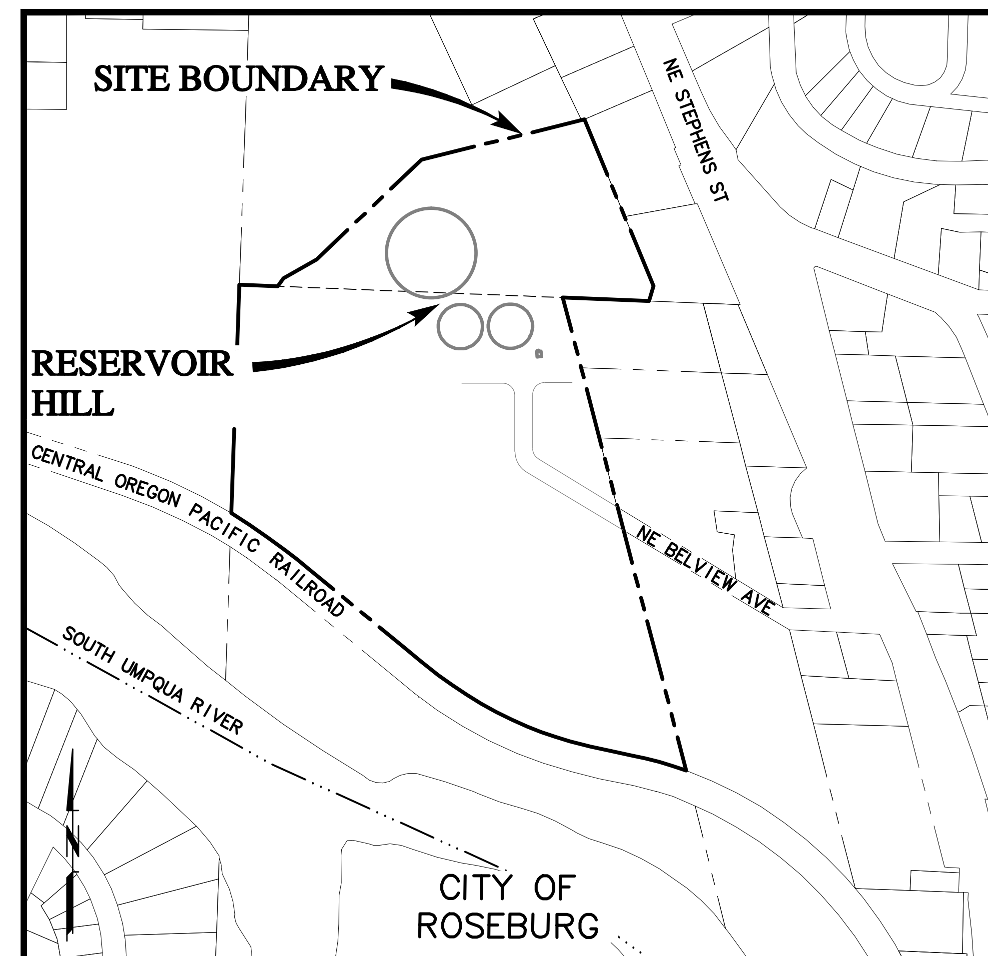


REGIONAL MAP
SCALE: 1"=25,000'

RECORD DRAWINGS

THIS DRAWING IS FOR RECORD PURPOSES ONLY, AND HAS BEEN PREPARED BASED IN PART ON INFORMATION PROVIDED BY OTHERS RELATIVE TO REPORTED CONSTRUCTED CONDITIONS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, MURRAY, SMITH & ASSOCIATES, INC. MAKES NO ASSURANCES, STATED OR IMPLIED, AS TO THE ACCURACY OF THIS DRAWING. THOSE RELYING ON THIS RECORD DRAWING FOR ANY PURPOSE ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY. CONTRACT MODIFICATION INFORMATION, FABRICATOR'S SHOP DRAWINGS AND OTHER PROJECT SUBMITTAL INFORMATION PROVIDED BY THE CONTRACTOR WHICH FURTHER CLARIFY DETAILS OF CONSTRUCTION MAY BE ON FILE. SEE ORIGINAL CONTRACT DRAWINGS FOR ENGINEER'S SEAL AND SIGNATURES.

VERSION 4.1 12-9-97



VICINITY MAP
SCALE: 1"=200'

MSA Murray, Smith & Associates, Inc.
Engineers/Planners
121 S.W. Salmon, Suite 900
Portland, Oregon 97204
PHONE 503-225-9010
FAX 503-225-9022

14-1551.204

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INDEX OF DRAWINGS

GENERAL

CIVIL

GENERAL NOTES

1. THE CONTRACTOR SHALL POTHOLE AND VERIFY LOCATIONS, ELEVATIONS, TYPES AND SIZES OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTING NEW PIPING FAR ENOUGH IN ADVANCE TO ALLOW NECESSARY ADJUSTMENTS IN GRADE AND SHALL NOTIFY ENGINEER OF NEED TO ADJUST PIPING INSTALLATION ACCORDINGLY. POTHOLING SHALL SUFFICIENTLY PRECEDE LAYING OF PIPE TO ALLOW REQUIRED ELEVATION ADJUSTMENTS TO BE ACCOMPLISHED WITHOUT REWORK. ELEVATION ADJUSTMENTS SHALL BE EXPECTED AND ARE INCIDENTAL TO THE WORK. DEFLECT PIPE AS REQUIRED AND WITHIN MANUFACTURER'S TOLERANCES TO AVOID EXISTING UTILITIES AND COMPLETE TIE-INS.

2. SEE SPECIFICATIONS FOR APPROVED TYPES OF PIPE RESTRAINT FOR PRESSURE PIPE.

3. SEE SPECIAL PROVISIONS OF SPECIFICATIONS FOR SPECIAL CONSTRUCTION SCHEDULING REQUIREMENTS.

4. ALL CONCRETE SHALL BE A MINIMUM OF 3000 PSI STRENGTH.

5. LOCATIONS OF EXISTING UTILITIES ARE BASED ON INFORMATION SUPPLIED BY THE UTILITIES AND SHALL BE CONSIDERED AS APPROXIMATE ONLY. AS REQUIRED BY STATE LAW, THE CONTRACTOR SHALL OBTAIN UTILITY LOCATES PRIOR TO COMMENCING CONSTRUCTION.

6. ALL PRESSURE PIPING SHALL BE TESTED UNDER A HYDROSTATIC TEST PRESSURE OF 150 PERCENT THE DESIGN PRESSURE, BUT NOT LESS THAN 150 PSI (± 5 PSI), MEASURED FROM THE LOWEST POINT ALONG THE TEST SECTION OR AS SHOWN ON THE PLANS. SEE SPECIFICATIONS.

7. ALL EXISTING FEATURES INCLUDING BUT NOT LIMITED TO ROADWAYS, STRUCTURES, LOTS, CURBS, SIDEWALKS, FENCES, WALLS, PLANTING, DITCHES, MAILBOXES, SIGNS, PIPING AND UTILITIES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO AS GOOD OR BETTER THAN EXISTING CONDITION AS DETERMINED BY THE OWNER. CONTRACTOR SHALL REPAIR ALL UTILITY SERVICES DAMAGED DURING CONSTRUCTION AND SUCH REPAIR SHALL BE CONSIDERED INCIDENTAL UNLESS PROVIDED FOR OTHERWISE IN THE SPECIFICATIONS.

8. CONTRACTOR SHALL NOT ENTER OR WORK WITHIN THE RAILROAD RIGHT-OF-WAY WITHOUT OBTAINING A RIGHT OF ENTRY PERMIT FROM CENTRAL OREGON PACIFIC RAILROAD (COPR). IF THE CONTRACTOR ELECTS TO ACCESS THE RAILROAD ROW, A RIGHT OF ENTRY APPLICATION SHALL BE SUBMITTED TO RAIL AMERICA, REAL ESTATE DEPARTMENT. ALL APPLICABLE FEES WILL BE PAID BY THE CONTRACTOR. CONTACT DONNA KILLINGSWORTH AT 904-999-5365 FOR ADDITIONAL INFORMATION.

9. DO NOT REMOVE TREES UNLESS THEY HAVE BEEN PREVIOUSLY IDENTIFIED ON THE PLANS OR IN THE FIELD FOR REMOVAL PER CITY.

10. FINAL LOCATIONS OF ALL NEW FACILITIES SHALL BE FIELD VERIFIED WITH ENGINEER PRIOR TO CONSTRUCTION.

11. PROVIDE "AS CONSTRUCTED" DRAWINGS TO THE ENGINEER INDICATING ALL CHANGES IN GRADE, ALIGNMENT, FITTINGS AND MATERIALS INSTALLED AND ANY OTHER UTILITIES OR OBSTACLES NOT SO INDICATED ON THESE PLANS.

12. AT THE END OF EACH WORK DAY ALL OPEN TRENCHES SHALL BE BACKFILLED OR COVERED TO THE SATISFACTION OF THE ENGINEER.

13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING CONSTRUCTION SURVEYS. PRIOR TO CONSTRUCTION, FIELD LAYOUT SHALL BE APPROVED BY ENGINEER. SEE CONTRACT DOCUMENTS FOR SURVEY REQUIREMENTS.

14. ATTENTION: OREGON LAW REQUIRES THE CONTRACTOR TO FOLLOW THE RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. THE CONTRACTOR MAY OBTAIN COPIES OF THE RULES BY CALLING THE UTILITY NOTIFICATION CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 1-800-332-2344).

15. CONTRACTOR SHALL PROVIDE ENGINEER WITH MINIMUM 24 HOURS NOTICE WHEN POTHOLING WILL BE COMPLETE. ENGINEER WILL BE ON SITE DURING POTHOLING TO COORDINATE WITH CONTRACTOR TO REVIEW UTILITY INVESTIGATIONS AND ASSIST CONTRACTOR IN MAKING APPROPRIATE ADJUSTMENTS FOR ANY ALIGNMENT CONFLICTS WHERE CONNECTING TO EXISTING UTILITIES.

16. CONTRACTOR SHALL SUPPORT AND PROTECT AS NECESSARY ANY PIPE OR CONDUIT EXPOSED AS PART OF THE NEW PIPE TRENCH EXCAVATION. CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES IN SERVICE AT ALL TIMES AND SHALL COORDINATE WITH RESPECTIVE UTILITY COMPANIES TO MAINTAIN AND PROTECT SERVICES.

17. THE CONTRACTOR SHALL CONSTRUCT THE WATER MAIN TO THE MINIMUM DEPTHS OF COVER INDICATED ON THE DRAWINGS FOLLOWING THE EXISTING GROUND CONTOURS. WHERE PIPING INVERTS ARE SHOWN ON THE PIPELINE PROFILES, THE PIPELINE SHALL BE CONSTRUCTED TO THOSE INVERTS WITH A UNIFORM SLOPE BETWEEN INVERTS, UNLESS OTHERWISE SPECIFIED.

18. CORROSION MONITORING FACILITIES SHALL BE INSTALLED ON THE DUCTILE IRON PIPE. JOINT BOND ALL DUCTILE IRON PIPE, VALVES AND FITTINGS BETWEEN ISOLATION JOINTS (INSULATED FLEXIBLE COUPLINGS OR INSULATED FLANGES) UNLESS NOTED OTHERWISE ON THE DRAWINGS. SEE SPECIFICATION SECTION 13989 FOR DETAILED REQUIREMENTS. SEE SHEET G-3 FOR CORROSION MONITORING LEGEND AND ABBREVIATIONS AND SHEETS C-10 AND C-11 FOR CORROSION MONITORING SYSTEM DETAILS.

19. NO CONNECTION TO EXISTING MAIN LINES WILL BE ALLOWED, EXCEPT BY MEANS OF AN APPROVED BACKFLOW PREVENTION DEVICE, PRIOR TO SATISFACTORY FLUSHING, TESTING, DISINFECTION, AND RECEIPT OF SATISFACTORY BACTERIOLOGICAL TESTS.

20. POLYETHELENE ENCASEMENT SHALL BE INSTALLED ON ALL BURIED DUCTILE IRON PIPES PER THE REQUIREMENTS OF AWWA C105.

21. CONTRACTOR'S WORK WILL BE ON STEEP TERRAIN IN REMOTE LOCATION DURING FIRE SEASON FOR SECTIONS OF THIS PROJECT. IT SHALL BE NOTED THAT IN THE EVENT OF A FIRE EMERGENCY, WATER WILL NOT BE READILY AVAILABLE TO THE CONRACTOR FROM THE EXISTING PIPING CONFIGURATION AT THE RESERVOIR SITE UNLESS SPECIAL PROVISIONS ARE COORDINATED WITH THE CITY AHEAD OF PROGRESS OF WORK. CONTRACTOR TO EXERCISE CAUTION AS NECESSARY.

EROSION CONTROL NOTES

1. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION/SEDIMENT CONTROL DURING CONSTRUCTION (ANY TIME OF YEAR) IN ACCORDANCE WITH DOUGLAS COUNTY, DEQ AND OTHER APPLICABLE AGENCY REQUIREMENTS. THE STANDARD CONSTRUCTION SPECIFICATIONS FOR THIS PROJECT AND THE EROSION CONTROL NOTES INCLUDED BELOW AND WITHIN THESE PLANS.

2. THE IMPLEMENTATION OF ANY REQUIRED EROSION/SEDIMENT CONTROL (ESC) PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.

3. INSTALL FILTER FENCE (SEDIMENT FENCE) ALONG BOUNDARY OF CLEARING AND OTHER AREAS AS REQUIRED.

4. ESC FACILITIES MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, WATERWAYS, ROADWAYS, OR VIOLATE APPLICABLE WATER QUALITY STANDARDS.

5. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN 24 HOURS FOLLOWING A STORM EVENT.

6. BIOFILTER BAGS SHALL BE PLACED AROUND INLETS AND ALONG DITCHES THROUGHOUT THE PROJECT TO FILTER SEDIMENT. BIOFILTER BAGS ARE TO BE CHECKED AND MAINTAINED DAILY AND REPLACED AS NEEDED.

7. ALL OFF-ROAD AREAS WITHIN THE PROJECT USED FOR CONSTRUCTION TRAFFIC SHALL BE PROTECTED WITH A GRAVEL CONSTRUCTION ENTRANCE AND WHEEL WASH AS NECESSARY TO KEEP ALL SEDIMENT OFF TRAVELED ROADWAYS. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT. SEE PLANS FOR GRAVEL CONSTRUCTION ENTRANCE.

8. UPON COMPLETION OF CONSTRUCTION AND AFTER VEGETATION/LANDSCAPING HAS BEEN ESTABLISHED, CONTRACTOR TO REMOVE SILT FENCING, BIOFILTER BAGS AND OTHER EROSION CONTROL MEASURES.

9. THE ESC FACILITIES SHOWN ON THESE PLANS ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND THE ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.

10. CONTRACTOR SHALL PROVIDE DUST CONTROL AS REQUIRED. SEE SPECIFICATIONS.

11. PERMANENT SEEDING SHALL BE PERFORMED NO LATER THAN OCTOBER 31.

SEDIMENT FENCE NOTES

12. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP AND BOTH ENDS SECURELY FASTENED TO THE POST.

13. THE FILTER FABRIC FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 8 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES.

14. WHEN STANDARD LENGTH FILTER FABRIC IS USED, A WIRE SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST 1 INCH LONG. TIE WIRE OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 4 INCHES AND SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE.

15. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 12 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.

16. WHEN EXTRA-STRENGTH FILTER FABRIC AND CLOSER POST SPACING ARE USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE, THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POSTS WITH ALL OTHER PROVISIONS OF THE ABOVE STANDARD NOTE FOR STANDARD STRENGTH FILTER FABRIC APPLYING.

17. SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

18. SEDIMENT FENCES SHALL BE INSPECTED BY CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

19. SEDIMENT FENCES SHALL BE INSTALLED AT THE TOE OF FILL SLIPES AND OTHER AREAS IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.

SURVEY CONTROL POINTS

NO.	NORTHING	EASTING	ELEVATION
CP1	578742.54	4162769.58	702.56
CP2	578699.92	4162520.95	694.98
CP4	578655.00	4162445.69	671.22
CP7	578713.47	4162641.15	698.15
CP11	578781.71	4162636.65	698.33

SURVEY CONTROL

SYSTEM: HARN(HPGN) OREGON STATE PLANE 1983,
ZONE: OREGON SOUTH ZONE
DATUM: NAD 1983
INTERNATIONAL FOOT

NO.	DATE	BY	REVISION
△	05/26/15	JRL	RECORD DRAWING

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JRL DESIGNED
JAT DRAWN
TPB CHECKED

RECORD DRAWING
SEE DISCLAIMER, SHEET 1.
VERSION 4.1
12-9-97

MSA Murray, Smith & Associates, Inc.
Engineers/Planners
121 S.W. Salmon, Suite 900 Portland, Oregon 97204
PHONE 503-225-9010 FAX 503-225-9022

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

INDEX OF DRAWINGS, GENERAL NOTES AND SURVEY CONTROL POINTS

PROJECT NO.: 14-1551 SCALE: AS SHOWN DATE: JULY 2014

SHEET G-2

G:\PDX_Projects\14\1551\CAD\Record Drawings\14-1551-OR-GR.dwg G-2 6/30/2015 11:41 AM RLF 20.0s (LMS Tech)

PIPE SYMBOLS

PLANT | SCHEMATIC

- WELDED JOINT
- FLANGED JOINT
- GROOVED END JOINT
- MECHANICAL JOINT
- PUSH-ON JOINT (RUBBER GASKET)
- FLANGED COUPLING ADAPTER
- DOUBLE BALL FLEXIBLE EXTENSION COUPLING
- FLEXIBLE COUPLING W/THRUST RING
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- LATERAL UP
- LATERAL DOWN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- UNION
- BLIND FLANGE
- CAP
- LONG SLEEVE
- FLEXIBLE JOINT
- CAPPED END OR PLUGGED END
- FITTING

VALVE SYMBOLS

PLANT | SCHEMATIC

- BUTTERFLY VALVE
- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- BALANCING VALVE
- DIAPHRAGM VALVE
- PLUG VALVE (TOP)
- PLUG VALVE (SIDE)
- 3-WAY PLUG VALVE
- SWING CHECK VALVE
- DOUBLE CHECK ASSEMBLY
- BALL SWING CHECK
- SILENT CHECK VALVE
- PRESSURE REDUCING VALVE
- ALTITUDE CONTROL VALVE
- SOLENOID VALVE
- RELIEF VALVE
- NEEDLE VALVE
- HOSE VALVE
- REDUCED PRESSURE BACKFLOW PREVENTER W/GATE VALVES
- HOSE BIBB

MISCELLANEOUS PIPING SYMBOLS

- STRAINER
- SIGHT GLASS
- PRESSURE GAUGE W/COCK
- PRESSURE SWITCH W/COCK
- METER

LEGEND AND ABBREVIATIONS FOR CORROSION MONITORING FACILITIES FOR DI PIPE

TEST STATION	⦿
TS	TEST STATION
IFC	INSULATED FLEXIBLE COUPLING
IFL	INSULATED FLANGE

PLAN AND PROFILE SYMBOLS

COMPACTED GRANULAR TRENCH BACKFILL (CLASS D) AND AC SURFACE RESTORATION	AC
COMPACTED NATIVE TRENCH BACKFILL (CLASS B)	N
COMPACTED GRANULAR TRENCH BACKFILL (CLASS D) -GRAVEL ROADWAYS	GR
COMPACTED GRANULAR TRENCH BACKFILL (CLASS D) AND NATIVE SURFACE RESTORATION	GRN
CHECK DAMS (AT 500' SPACING UNLESS NOTED OTHERWISE AND AS DIRECTED BY ENGINEER)	CD
1-½" GRAVEL OVERLAY (¾"-0") - FULL ROADWAY WIDTH (SEE SPEC SECTION 02505)	GRO
CONTROLLED LOW STRENGTH MATERIAL TRENCH BACKFILL AND AC SURFACE RESTORATION	CLSM

NOTE: SEE SHT C-7 FOR SPECIFIC BACKFILL AND SURFACE RESTORATION REQUIREMENTS.

TOPOGRAPHIC LEGEND

	EXISTING	PROPOSED
WATERLINE	10"W	24" W
ELECTRICITY	E	E
GAS	4"G	4"G
TELEPHONE/TELEMETRY	T	T
CABLE TELEVISION	CATV	CATV
SANITARY SEWER LINE	8"SS	8"SS
SANITARY SEWER FORCE MAIN	6"FM	6"FM
STORM DRAIN	8"SD	8"SD
CULVERT		18"D
ABANDON PIPE		
DRAINAGE DITCH		
FENCE		
CHAIN LINK FENCE		
TEMPORARY SILT FENCE		
GUARDRAIL		
ROCK WALL		
TREE/BUSH LINE		
CENTERLINE		
EASEMENT/PROPERTY LINE		
RIGHT-OF-WAY		
EDGE OF PAVEMENT/AC		
EDGE OF GRAVEL		
CURB		
SIDEWALK	S/W	S/W
STRUCTURE OR FACILITY		
CONTOUR MINOR		
CONTOUR MAJOR	426	426
MANHOLE		
CLEAN-OUT		
CATCH BASIN/FIELD INLET		
THRUST BLOCK		
VALVE		
AIR INJECTION ASSEMBLY		
BLOW-OFF ASSEMBLY		
AIR RELEASE ASSEMBLY		
FIRE HYDRANT ASSEMBLY		
WATER METER		
PULL BOX/JUNCTION BOX		
UTILITY POLE		
GUY WIRE		
LIGHT POST		
MAIL BOX		
SIGN		
BENCH MARK		
TREE DECIDUOUS		
TREE CONIFEROUS		
TREE TO BE REMOVED		
SURFACE ELEVATION	+ 426.00	**+ 426.00**

SECTION AND DETAIL DESIGNATIONS

SECTION DESIGNATIONS

A / 2 — SECTION LETTER DESIGNATION; SHEET WHERE SECTION IS SHOWN *

SECTION
SCALE:

A / 2 — SECTION LETTER DESIGNATION; SHEET FROM WHICH SECTION IS TAKEN *

DETAIL DESIGNATION

DETAIL
SCALE:

2 / 2 — DETAIL NUMBER; SHEET FROM WHICH DETAIL IS TAKEN *

* NOTE: IF PLAN AND SECTION FOR DETAIL CALL-OUT AND DETAIL ARE SHOWN ON THE SAME DRAWING, DRAWING NUMBER IS REPLACED WITH A DASH.

NO.	DATE	BY	REVISION
1 (triangle)	05/26/15	JRL	RECORD DRAWING

NOTICE: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JRL DESIGNED / JAT DRAWN / TPB CHECKED

RECORD DRAWING — SEE DISCLAIMER, SHEET 1. VERSION 4.1 12-9-97

MSA Murray, Smith & Associates, Inc. Engineers/Planners
121 S.W. Salmon, Suite 900 Portland, Oregon 97204 PHONE 503-225-9010 FAX 503-225-9022

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

SYMBOLS AND LEGEND

PROJECT NO.: 14-1551 | SCALE: AS SHOWN | DATE: JULY 2014

SHEET G-3

G:\PDX_Projects\14\1551\CAD\Record Drawings\14-1551-OR-GR.dwg G-3 6/30/2015 11:41 AM RLF 20.0s (LMS Tech)

@	AT
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY & TRANSPORTATION OFFICIALS
AB	ANCHOR BOLT
ABAN (D)	ABANDON (ED)
ABS	ACRYLONITRILE BUTADIENE STYRENE
ABV	ABOVE
AC	ASPHALTIC CONCRETE/ASBESTOS CEMENT
ACP	ASPHALTIC CONCRETE PAVING
ADJ	ADJUSTABLE
ADJC	ADJACENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHR	ANCHOR
AL	ALUMINUM
ALT	ALTERNATE
AMP	AMPERE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPROX	APPROXIMATE
APPVD	APPROVED
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ARCH	ARCHITECTURAL
ARV	AIR RELEASE VALVE
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASSN	ASSOCIATION
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
ATM	ATMOSPHERE
AUTO	AUTOMATIC
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE
AWWA	AMERICAN WATER WORKS ASSOCIATION
B&S	BELL & SPIGOT
BC	BOLT CIRCLE
BD	BOARD
BETW	BETWEEN
BF	BOTH FACE
BFD	BACKFLOW PREVENTION DEVICE
BFILL	BACK FILL
BFV	BUTTERFLY VALVE
BHP	BRAKE HORSEPOWER
BKGD	BACKGROUND
BLDG	BUILDING
BLK	BLOCK
BLVD	BOULEVARD
BM	BENCH MARK / BEAM
BO	BLOWOFF
BMP	BEST MANAGEMENT PRACTICE
BOC	BACK OF CURB
BS	BOTH SIDES
BSMT	BASEMENT
BTF	BOTTOM FACE
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE
BW	BOTH WAYS
C	CELSIUS
C TO C	CENTER TO CENTER
CARV	COMBINATION AIR RELEASE VALVE
CATV	CABLE TELEVISION
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CCW	COUNTER CLOCKWISE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHAN	CHANNEL
CHEM	CHEMICAL
CHFR	CHAMFER
CHKV	CHECK VALVE
CI	CAST IRON
CIP	CAST IRON PIPE
CIPC	CAST IN PLACE CONCRETE
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CL or ℄	CENTER LINE
CL2	CHLORINE
CLG	CEILING
CLJ	CONTROL JOINT
CLR	CLEAR
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CND	CONDUIT
CO	CLEANOUT
COL	COLUMN
COMB	COMBINATION
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS / CONTINUATION
CONTR	CONTRACT (OR)
COORD	COORDINATE
COP	COPPER
COPR	CENTRAL OREGON PACIFIC RAILROAD
CORP	CORPORATION
CORR	CORRUGATED
CP	CONTROL POINT
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
CR	CRUSHED ROCK
CS	COMBINED SEWER
CSP	CONCRETE SEWER PIPE
CT	COURT
CTR	CENTER
CU	CUBIC
CULV	CULVERT
CV	CONTROL VALVE
CW	CLOCKWISE / COLD WATER
CY	CUBIC YARDS
CYL	CYLINDER LOCK
D	DRAIN
DC	DIRECT CURRENT
DEFL	DEFLECTION
DET	DETAIL
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DIR	DIRECTION
DIST	DISTANCE
DN	DOWN
DR	DRIVE
DS	DOWNSPOUT
DWG	DRAWING
DWL	DOWEL
DWV	DRAIN WASTE AND VENT
DWY	DRIVEWAY
EA	EACH
ECC	ECCENTRIC
EF	EACH FACE
EL	ELEVATION
ELB	ELBOW
ELEC	ELECTRICAL
ENCL	ENCLOSURE
EOP	EDGE OF PAVEMENT
EQL	EQUAL
EQL SP	EQUALLY SPACED
EQUIP	EQUIPMENT
EW	EACH WAY
EXC	EXCAVATE
EXIST	EXISTING
EXIST GR	EXISTING GRADE
EXP	EXPANSION
EXP BT	EXPANSION BOLT
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
F	FAHRENHEIT
F TO F	FACE TO FACE
FAB	FABRICATE
FB	FLAT BAR
FCA	FLANGED COUPLING ADAPTER
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDN	FOUNDATION
FEXT	FIRE EXTINGUISHER
FF	FAR FACE
FGL	FIBERGLASS
FH	FIRE HYDRANT
FIN FL	FINISH FLOOR
FIN GR	FINISH GRADE
FIPT	FEMALE IRON PIPE THREAD
FITG	FITTING
FL	FLOOR LINE
FLEX	FLEXIBLE
FLG	FLANGE
FLL	FLOW LINE
FLR	FLOOR
FM	FORCE MAIN
FO	FIBER OPTIC
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET / FOOT
FTG	FOOTING
FPVC	FUSIBLE PVC
FUT	FUTURE
FXTR	FIXTURE
G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GROOVED COUPLING
GFA	GROOVED FLANGE ADAPTER
GI	GALVANIZED IRON
GIP	GALVANIZED IRON PIPE
GU	GRABSJOINT
GLV	GLOBE VALVE
GND	GROUND
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPS	GALLONS PER SECOND
GR	GRADE
GR LN	GRADE LINE
GRTG	GRATING
GV	GATE VALVE
GRVL	GRAVEL
GYP	GYPSUM
HB	HOSE BIBB
HC	HOLLOW CORE
HDD	HORIZONTAL DIRECTIONAL DRILL
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HGR	HANGER
HGT	HEIGHT
HH	HANDHOLD
HM	HOLLOW METAL
HNDRL	HAND RAIL
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HIGH PRESSURE / HORSEPOWER
HPG	HIGH PRESSURE GAS
HPT	HIGH POINT
HR	HOUR
HSB	HIGH STRENGTH BOLT
HV	HOSE VALVE
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HWL	HIGH WATER LINE
HWY	HIGHWAY
HYD	HYDRANT
HYDR	HYDRAULIC
I&C	INSTRUMENTATION & CONTROL
IAW	IN ACCORDANCE WITH
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IF	INSIDE FACE
IFC	INSULATED FLEXIBLE COUPLING
IFL	INSULATED FLANGE
IMPVT	IMPROVEMENT
IN	INCH
INCC	INCLUDE (D) (ING)
INFL	INFLUENT
INJ	INJECTION
INSTL	INSTALLATION / INSTALL
INSUL	INSULATION
INTER	INTERCEPTOR
INTR	INTERIOR
INV	INVERT
IP	IRON PIPE
IPT	IRON PIPE THREAD
IR	IRON ROD
IRRIG	IRRIGATION
JT	JOINT
JUNC	JUNCTION
KPL	KICK PLATE
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWY	KEYWAY
L	LENGTH OF CURVE
LAB	LABORATORY
LAV	LAVATORY
LB	POUND
LF	LINEAL FOOT
LIN	LINEAL / LINEAR
LN	LANE
LOC	LOCATION
LONG	LONGITUDINAL
LP	LOW PRESSURE
LPT	LOW POINT
LRG	LARGE
LS	LONG SLEEVE / LUMP SUM
LT	LEFT
LVL	LEVEL
LWL	LOW WATER LINE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MCP	MASTER CONTROL PANEL
MECH	MECHANICAL
MET	METAL
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM
MIPT	MALE IRON PIPE THREAD
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MON	MONUMENT / MONOLITHIC
MOT	MOTOR
MP	MILEPOST
MSL	MEAN SEA LEVEL
MTD	MOUNTED
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NF	NEAR FACE
NIC	NOT IN CONTRACT
NO / NO.	NORMALLY OPEN / NUMBER
NOM	NOMINAL
NORM	NORMAL
NRS	NON-RISING STEM
NTS	NOT TO SCALE
O TO O	OUT TO OUT
OC	ON CENTER
OD	OUTSIDE DIAMETER
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
OF	OVERFLOW / OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
ORIG	ORIGINAL
OVHD	OVERHEAD
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVE
PCVC	POINT OF CURVATURE ON VERTICAL CURVE
PE	PLAIN END
PERF	PERFORATED
PERM	PERMANENT
PERP	PERPENDICULAR
PG	PRESSURE GAUGE
PH	PIPE HANGER
PI	POINT OF INTERSECTION
PIVC	POINT OF INTERSECTION ON VERTICAL CURVE
PL or ℗	PROPERTY LINE / PLATE / PLASTIC
PLBG	PLUMBING
PNL	PANEL
POC	POINT OF CURVATURE
POLY	POLYETHYLENE
POT	POINT OF TANGENCY
PP	POWER POLE
PRC	POINT OF REVERSE CURVATURE
PRCST	PRECAST
PREP	PREPARATION
PRESS	PRESSURE
PRKG	PARKING
PROP	PROPERTY
PRV	PRESSURE REDUCING VALVE
PS	PUMP STATION
PSIG	POUNDS PER SQUARE INCH GAGE
PSL	PIPE SLEEVE
PSPT	PIPE SUPPORT
PT	POINT OF TANGENCY
PTVC	POINT OF TANGENCY ON VERTICAL CURVE
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
PWR	POWER
QTY	QUANTITY
RAD	RADIUS
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD / ROOF DRAIN
RDCR	REDUCER
REF	REFERENCE
REINF	REINFORCE (D) (ING) (MENT)
REQD	REQUIRED
RESTR	RESTRAINED
RFCA	RESTRAINED FLANGE COUPLING ADAPTOR
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
ROW or R/W	RIGHT OF WAY
RPBPD	REDUCED PRESSURE BACKFLOW PREVENTION DEVICE
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RST	REINFORCING STEEL
RT	RIGHT
SALV	SALVAGE
SAN	SANITARY
SC	SOLID CORE
SCHED	SCHEDULE
SD	STORM DRAIN
SDL	SADDLE
SDR	STANDARD DIMENSION RATIO
SECT	SECTION
SHLDR	SHOULDER
SHT	SHEET
SIM	SIMILAR
SLP	SLOPE
SLV	SLEEVE
SOLN	SOLUTION
SP	SOIL PIPE / SEWER PIPE
SPCL	SPECIAL
SPEC (S)	SPECIFICATION (S)
SPG	SPACING
SPL	SPOOL
SPRT	SUPPORT
SQ	SQUARE
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SQ YD	SQUARE YARD
SS	SANITARY SEWER
SST	STAINLESS STEEL
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRAIGHT
STRUCT	STRUCTURE / STRUCTURAL
SUBMG	SUBMERGED
SUCT	SUCTION
SV	SOLENOID VALVE
S/W	SIDEWALK
SWD	SIDEWATER DEPTH
SWGR	SWITCH GEAR
SYMM	SYMMETRICAL
SYS	SYSTEM
T or TEL	TELEPHONE
T&B	TOP & BOTTOM
TAN	TANGENCY
TB	THRUST BLOCK
TBM	TEMPORARY BENCH MARK
TC	TOP OF CONCRETE / TOP OF CURB
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE / TEMPORARY
T&G	TONGUE & GROOVE
THK	THICKNESS
THRD	THREAD(ED)
THRU	THROUGH
TP	TEST PIT/TOP OF PAVEMENT/TURNING POINT
TRANS	TRANSITION
TS	TEST STATION
TSP	TRI-SODIUM PHOSPHATE
TST	TOP OF STEEL
TW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UN	UNION
UON	UNLESS OTHERWISE NOTED
USGS	UNITED STATES GEOLOGIC SURVEY
V	VENT / VOLT
VAC	VACUUM
VB	VACUUM BREAKER
VBOX	VALVE BOX
VC	VERTICAL CURVE
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VCP	VITRIFIED CLAY PIPE
VTR	VENT THROUGH ROOF
W	WATER
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL
WD	WOOD
WF	WIDE FLANGE
WH	WALL HYDRANT
WHTR	WATER HEATER
WI	WROUGHT IRON
WM	WATER METER
WP	WORKING POINT / WATERPROOFING
WS	WATER SERVICE
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WT	WEIGHT
WTP	WATER TREATMENT PLANT
WTRT	WATERTIGHT
WWF	WELDED WIRE FABRIC
WWTF	WASTEWATER TREATMENT FACILITY
WWTP	WASTEWATER TREATMENT PLANT
X SECT	CROSS SECTION
XFMR	TRANSFORMER
YD	YARD DRAIN/YARD
YH	YARD HYDRANT
YR	YEAR
ZN	ZINC

NO.	DATE	BY	REVISION
1	05/26/15	JRL	RECORD DRAWING

NOTICE

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JRL DESIGNED
JAT DRAWN
TPB CHECKED

RECORD DRAWING

SEE DISCLAIMER, SHEET 1.

VERSION 4.1 12-9-97

MSA Murray, Smith & Associates, Inc. Engineers/Planners
175 West B Street, Bldg K-2 Springfield, Oregon 97477 PHONE 541-741-2975 FAX 541-744-3875

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

ABBREVIATIONS

PROJECT NO.: 14-1551 SCALE: AS SHOWN DATE: JULY 2014

SHEET G-4

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CONSTRUCTION ACCESS NOTES:

1. ACCESS TO RESERVOIR SITE PROVIDED FROM NE BELVIEW AVENUE. RESTORE ACCESS POINT TO PRECONSTRUCTION CONDITIONS.

2. EXISTING RESERVOIR ACCESS ROAD IS UNPAVED. PROVIDE ADDITIONAL GRAVEL AS REQUIRED TO MAINTAIN DURING CONSTRUCTION AND RESTORE TO PRECONSTRUCTION CONDITIONS ONCE PIPELINE WORK HAS BEEN COMPLETED.

HDPE PIPE LAYOUT NOTES:

1. HDPE PIPE LAYOUT AREA SHALL BE USED FOR FUSING/STAGING OF HDPE PIPE. COORDINATE & SEQUENCE HDPE PIPE LAYOUT W/ SEDIMENT FENCING AS REQ'D TO PREVENT SEDIMENT FROM LEAVING THE SITE.

2. CONTRACTOR TO PROVIDE SUFFICIENT ROLLERS UNDER HDPE PIPING DURING FUSING/STAGING AND INSTALLATION TO KEEP PIPE SUSPENDED ABOVE THE GROUND SURFACE.

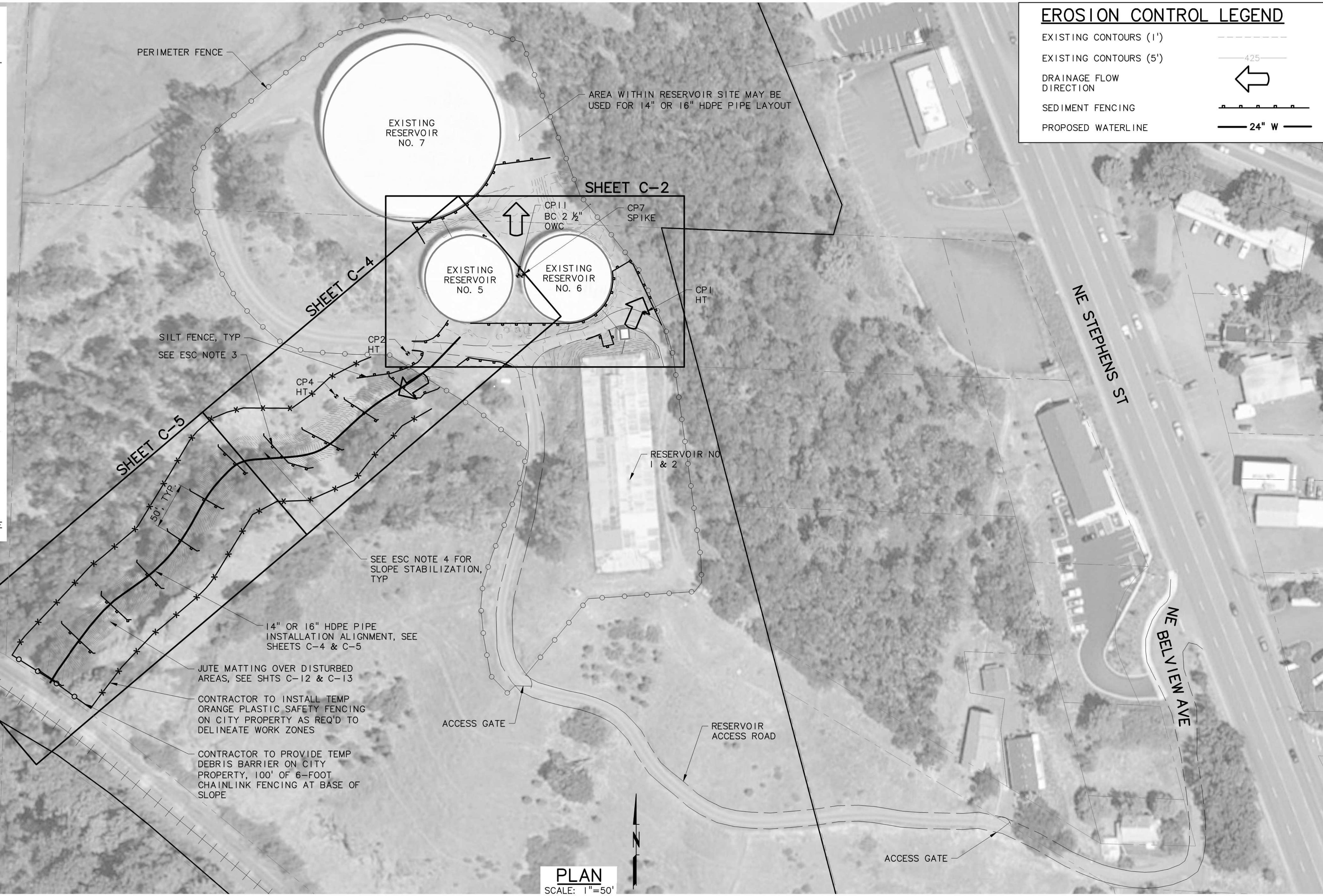
EROSION CONTROL (ESC) NOTES:

1. SEE SHEET G-2 FOR EROSION CONTROL NOTES.

2. SEE SHEET C-12 AND C-13 FOR EROSION CONTROL DETAILS.

3. PROVIDE SILT FENCING ACROSS STEEP SLOPE(S), 50' MAX SPACING, OR AS REQ'D TO PREVENT EROSION OF HILL.

4. AS A MINIMUM REQUIREMENT PROVIDE EROSION BLANKETS IN BETWEEN SILT FENCES OVER ALL DISTURBED STEEP SLOPE AREAS AFTER AREAS HAVE BEEN SEEDED. SEE DET 4, SHT C-12 AND DET 2, SHT C-13 FOR SEEDING AND SLOPE STABILIZATION, RESPECTIVELY.



PLAN
SCALE: 1"=50'

NO.	DATE	BY	REVISION
2	05/26/15	JRL	RECORD DRAWING
1	07/29/14	JRL	ADD. NO. 1 & STEEP SLOPE ESC REV'S

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JRL — DESIGNED
JAT — DRAWN
TPB — CHECKED

RECORD DRAWING
SEE DISCLAIMER, SHEET 1.
VERSION 4.1
12-9-97

MSA Murray, Smith & Associates, Inc.
Engineers/Planners
121 S.W. Salmon, Suite 900
Portland, Oregon 97204
PHONE 503-225-9010
FAX 503-225-9022

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

HDPE DISTRIBUTION MAIN LAYOUT AND EROSION AND SEDIMENT CONTROL PLANS

PROJECT NO.: 14-1551 | SCALE: AS SHOWN | DATE: JULY 2014

SHEET
C-1
5 of 18

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WATER PIPING SCHEDULE:

ALIGNMENT A

(A1) STA A1+00
BEGIN ALIGNMENT 'A'
REMOVE EXIST 30" STL BLIND FLG AND CONNECT TO EXIST BFV, FLG
FURNISH & INSTALL:
1-30" DI SPL, FLGxPE, W/IFL
1-TS
SEE SHTS C-10 & C-11 FOR CORROSION MONITORING DETAILS, TYP

△2 (A2) STA A1+03
FURNISH & INSTALL:
1-30" 90° BEND, MJ, ROLLED UP
1-2" BO ASSY,
SEE DET 3, SHT C-7

△2 (A3) STA A1+34
FURNISH & INSTALL:
1-30" 11¼° DI COMBINED BEND, MJ, ROLLED DOWN
1-30" FOSTER ADAPTER

(A4) STA A1+36
FURNISH & INSTALL:
1-30" 11¼° DI BEND, MJ, ROLLED AS REQ'D

(A5) STA A1+57
FURNISH & INSTALL:
1-30"x16" DI TEE, MJ

△2 (A6) STA A1+57, 5' RT
FURNISH & INSTALL:
1-16" 22½° DI COMBINED BEND, MJ, ROLLED UP
1-16" 22½° DI COMBINED BEND, MJ, ROLLED DOWN

△2 (A7) STA: A2+14
FURNISH & INSTALL
1-30"x16" DI TEE, MJ

△2 (A8) STA A2+14, 5' RT
FURNISH & INSTALL:
1-16" 22½° DI COMBINED BEND, MJ, ROLLED UP
1-16" 22½° DI COMBINED BEND, MJ, ROLLED DOWN

(A9) STA A2+18
FURNISH & INSTALL:
1-30" BFV, MJ

(A10) STA A2+21
FURNISH & INSTALL:
1-2" BO ASSY,
SEE DET 3, SHT C-7

ALIGNMENT B:

(B1) STA B1+00=STA C1+00
BEGIN ALIGNMENT 'B',
SEE SHTS C-4 & C-5 FOR ALIGNMENT 'C'

(B2) STA B1+04
FURNISH & INSTALL:
1-12" GV, MJ
1-12"x24" RDCR, MJ

(B3) STA B1+09
FURNISH & INSTALL:
1-24"x16" DI TEE, MJ

△2 (B4) STA B1+09, 3' LT
FURNISH & INSTALL:
1-16" 45° DI VERT BEND, MJ, UP

ALIGNMENT B CONT:

△2 (B5) STA B1+09, 6' LT (APPROX)
FURNISH & INSTALL:
1-16" 45° DI BEND, MJ, DOWN

△2 (B6) STA B1+09, 9' LT (APPROX)
FURNISH & INSTALL:
1-16" DI LS, MJ

△2 (B7) STA B1+09, 13' RT
CONNECT TO EXIST 16" BFV, FLG
FURNISH & INSTALL:
1-16" BFV, MJ
1-16" SPL, FLGxPE, W/ IFL
1-TS

(B8) STA B2+15
FURNISH & INSTALL:
1-24"x16" DI TEE, MJ

△2 (B9) STA B2+15, 9' LT
FURNSISH & INSTALL:
1-16" DI LS, MJ

△2 (B10) STA B2+15, 13' LT
CONNECT TO EXIST 16" BFV, FLG
FURNISH & INSTALL:
1-16" BFV, MJ
1-16" SPL, FLGxPE, W/ IFL
1-TS

△2 (B11) STA B2+19
FURNISH & INSTALL:
1-ARV ASSY, SEE DET 4, SHT C-9

△2 (B12) STA B2+32
FURNISH & INSTALL:
1-24" 22½° DI BEND, MJ

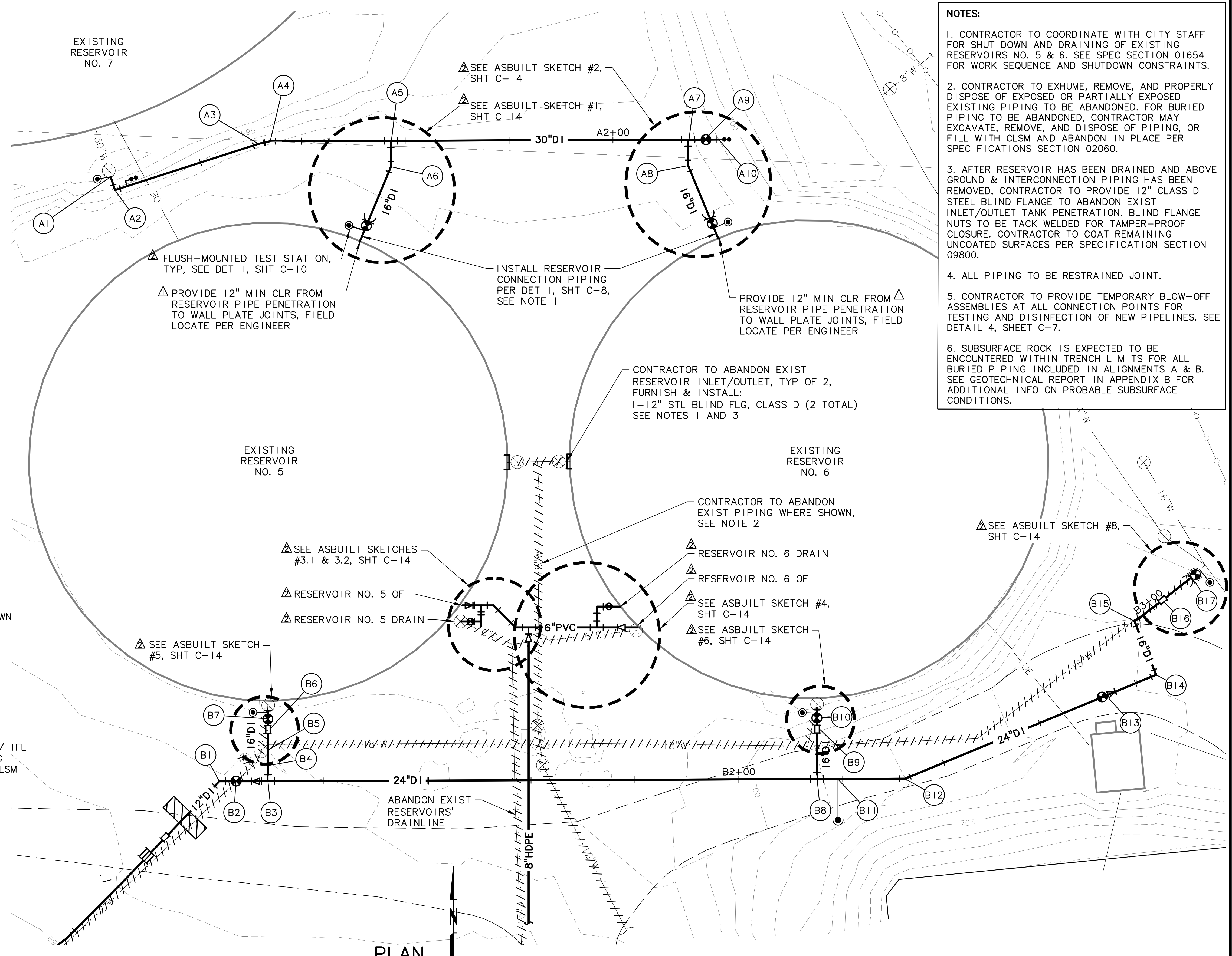
△2 (B13) STA B2+75
FURNISH & INSTALL:
1-24" BFV, MJ
1-24"x16" RDCR, MJ

△2 (B14) STA B2+84
FURNISH & INSTALL:
1-16" 90° DI BEND, MJ, ROLLED UP

△2 (B15) STA B2+96
FURNISH & INSTALL:
1-16" 90° DI BEND, MJ, ROLLED DOWN
1-16" 22½° DI BEND, MJ

△2 (B16) STA B3+03
FURNISH & INSTALL:
1-16" DI LS, MJ

△2 (B17) STA B3+12
FURNISH & INSTALL:
1-16" DI FLGxMJ ADAPTER
1-16" BFV, FLG
1-TS
CONNECT TO EXIST 16" STL FLG, W/ IFL
SEE APPENDICES FOR EXIST PIPING PLAN, ENCASE EXIST STL TEE W/ CLSM



PLAN
SCALE: 1"=10'

NOTES:

1. CONTRACTOR TO COORDINATE WITH CITY STAFF FOR SHUT DOWN AND DRAINING OF EXISTING RESERVOIRS NO. 5 & 6. SEE SPEC SECTION 01654 FOR WORK SEQUENCE AND SHUTDOWN CONSTRAINTS.

2. CONTRACTOR TO EXHUME, REMOVE, AND PROPERLY DISPOSE OF EXPOSED OR PARTIALLY EXPOSED EXISTING PIPING TO BE ABANDONED. FOR BURIED PIPING TO BE ABANDONED, CONTRACTOR MAY EXCAVATE, REMOVE, AND DISPOSE OF PIPING, OR FILL WITH CLSM AND ABANDON IN PLACE PER SPECIFICATIONS SECTION 02060.

3. AFTER RESERVOIR HAS BEEN DRAINED AND ABOVE GROUND & INTERCONNECTION PIPING HAS BEEN REMOVED, CONTRACTOR TO PROVIDE 12" CLASS D STEEL BLIND FLANGE TO ABANDON EXIST INLET/OUTLET TANK PENETRATION. BLIND FLANGE NUTS TO BE TACK WELDED FOR TAMPER-PROOF CLOSURE. CONTRACTOR TO COAT REMAINING UNCOATED SURFACES PER SPECIFICATION SECTION 09800.

4. ALL PIPING TO BE RESTRAINED JOINT.

5. CONTRACTOR TO PROVIDE TEMPORARY BLOW-OFF ASSEMBLIES AT ALL CONNECTION POINTS FOR TESTING AND DISINFECTION OF NEW PIPELINES. SEE DETAIL 4, SHEET C-7.

6. SUBSURFACE ROCK IS EXPECTED TO BE ENCOUNTERED WITHIN TRENCH LIMITS FOR ALL BURIED PIPING INCLUDED IN ALIGNMENTS A & B. SEE GEOTECHNICAL REPORT IN APPENDIX B FOR ADDITIONAL INFO ON PROBABLE SUBSURFACE CONDITIONS.

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NO.	DATE	BY	REVISION
△2	05/26/15	JRL	RECORD DRAWING
△1	07/30/14	JRL	ADDENDUM NO. 1

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JRL DESIGNED
JAT DRAWN
TPB CHECKED

RECORD DRAWING
SEE DISCLAIMER, SHEET 1.
VERSION 4.1
12-9-97

MSA Murray, Smith & Associates, Inc.
Engineers/Planners
121 S.W. Salmon, Suite 900
Portland, Oregon 97204
PHONE 503-225-9010
FAX 503-225-9022

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

RESERVOIR NOS. 5 AND 6 YARD PIPING PLAN

PROJECT NO.: 14-1551 | SCALE: AS SHOWN | DATE: JULY 2014

SHEET C-2

NOTES:

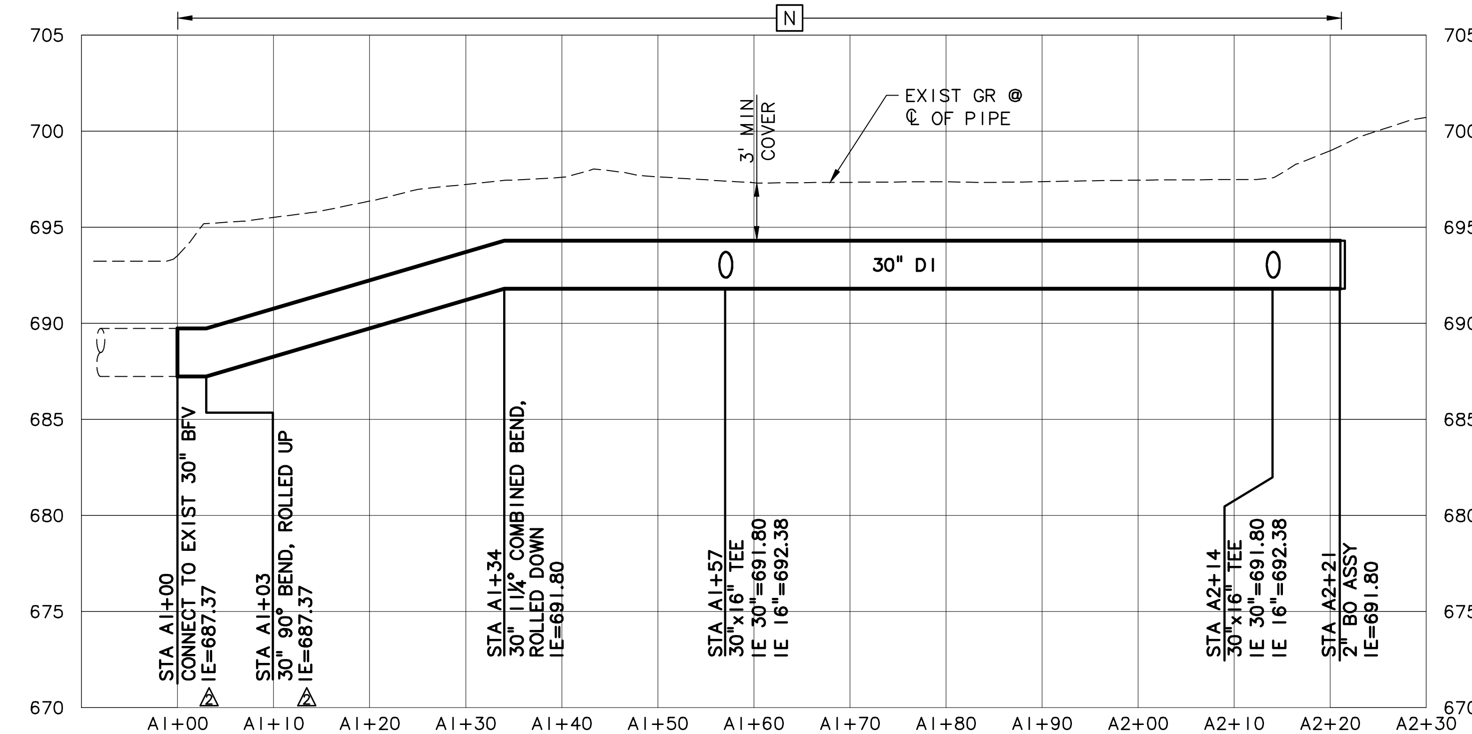
1. MINIMUM 36" COVER ON NEW RESERVOIR PIPING UNLESS OTHERWISE REQUIRED FOR CONNECTIONS TO EXISTING RESERVOIR SITE PIPING, AS APPROVED BY ENGINEER.

2. WHERE VERTICAL DEFLECTION NOT SPECIFIED, CONTRACTOR TO DEFLECT PIPE AS NECESSARY TO ACHIEVE PROFILE SHOWN. PIPE DEFLECTIONS LIMITED TO ONE-HALF MANUFACTURER'S RECOMMENDATIONS

3. CONTRACTOR TO POTHOLE VERIFY DEPTHS OF EXISTING CROSSINGS PRIOR TO BEGINNING PIPE INSTALLATION WORK.

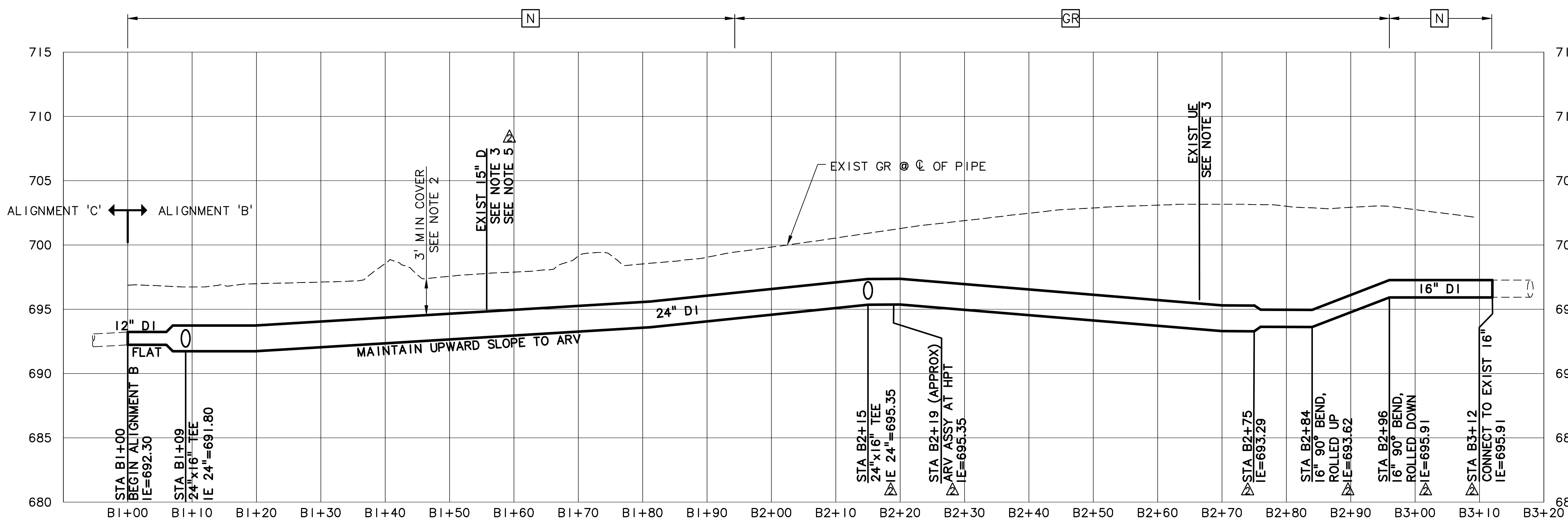
4. ALL PIPING TO BE RESTRAINED JOINT.

△2 5. EXISTING 15" DRAIN REMOVED AND REPLACED BY 8" HDPE DRAIN.



PROFILE – ALIGNMENT A

SCALE: 1"=10' HORIZ, 1"=5 VERT



PROFILE – ALIGNMENT B

SCALE: 1"=10' HORIZ, 1"=5 VERT

NO.	DATE	BY	REVISION
△2	05/26/15	JRL	RECORD DRAWING

NOTICE

0 ½ 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

JRL DESIGNED

JAT DRAWN

TPB CHECKED

RECORD DRAWING

SEE DISCLAIMER, SHEET 1.

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121 S.W. Salmon, Suite 900 Portland, Oregon 97204 PHONE 503-225-9010 FAX 503-225-9022

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

YARD PIPING PROFILES

PROJECT NO.: 14-1551 SCALE: AS SHOWN DATE: JULY 2014

SHEET C-3

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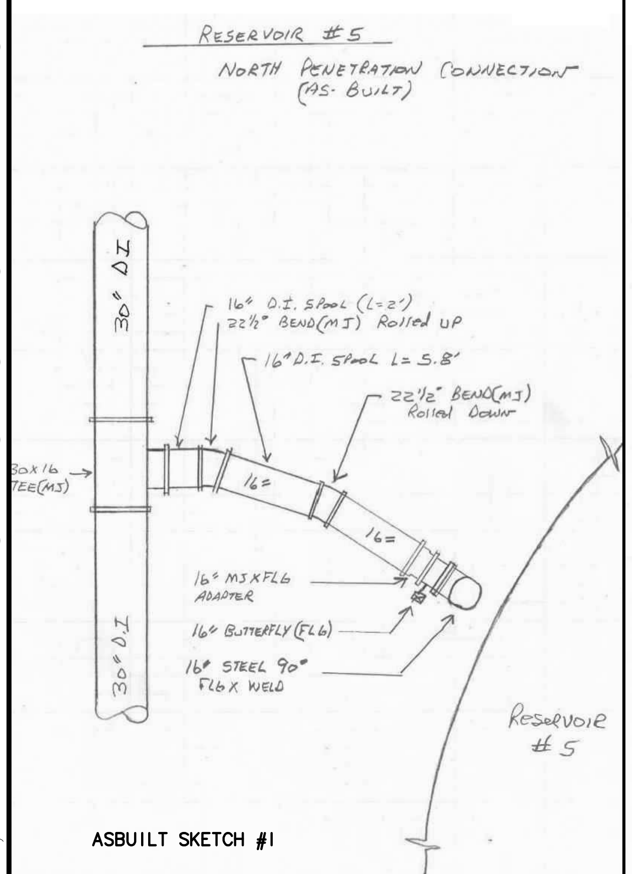
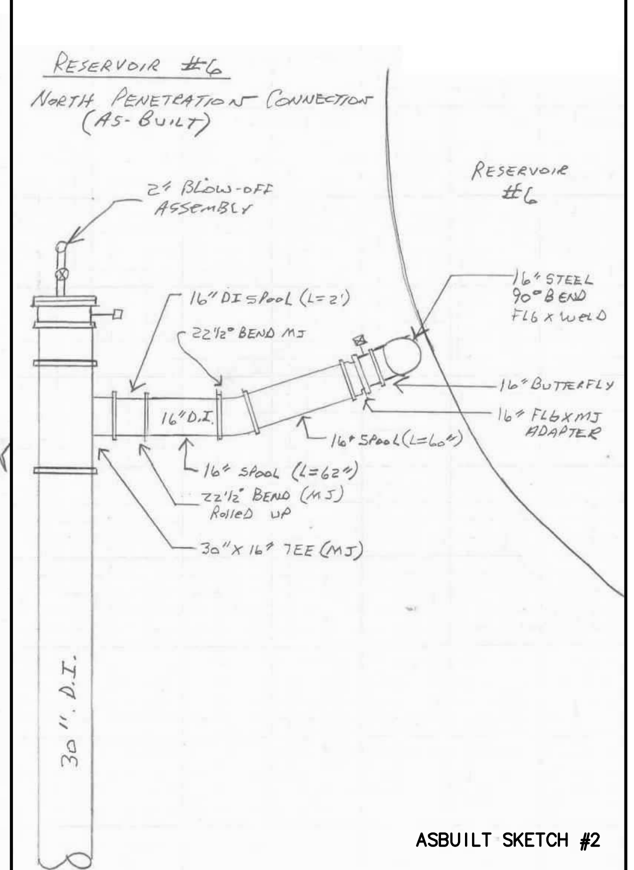
SKETCHES PROVIDED BY CITY



ASBUILT SKETCH #1



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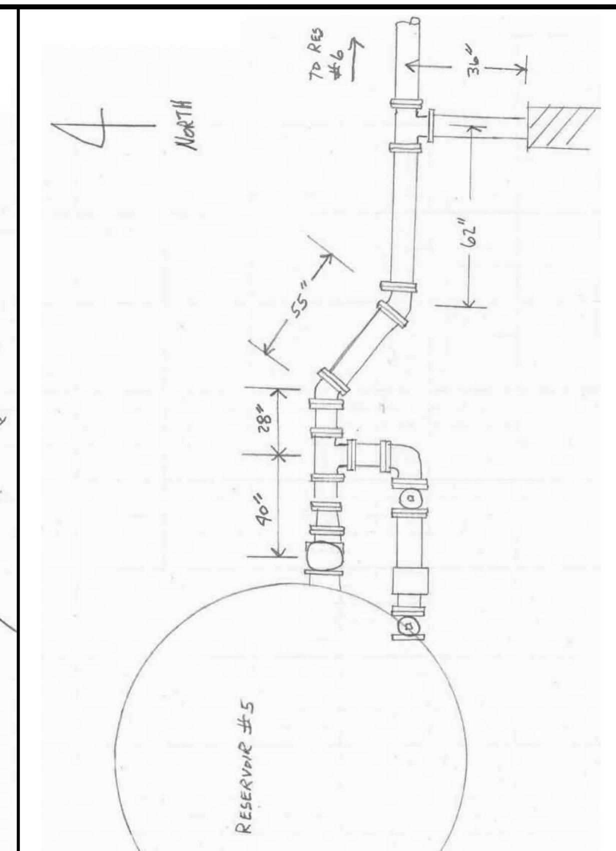

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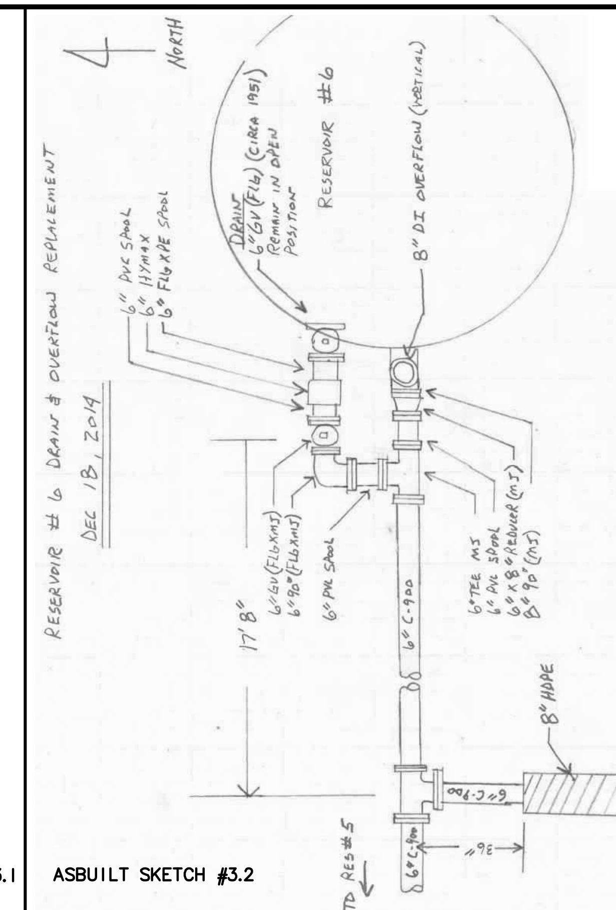
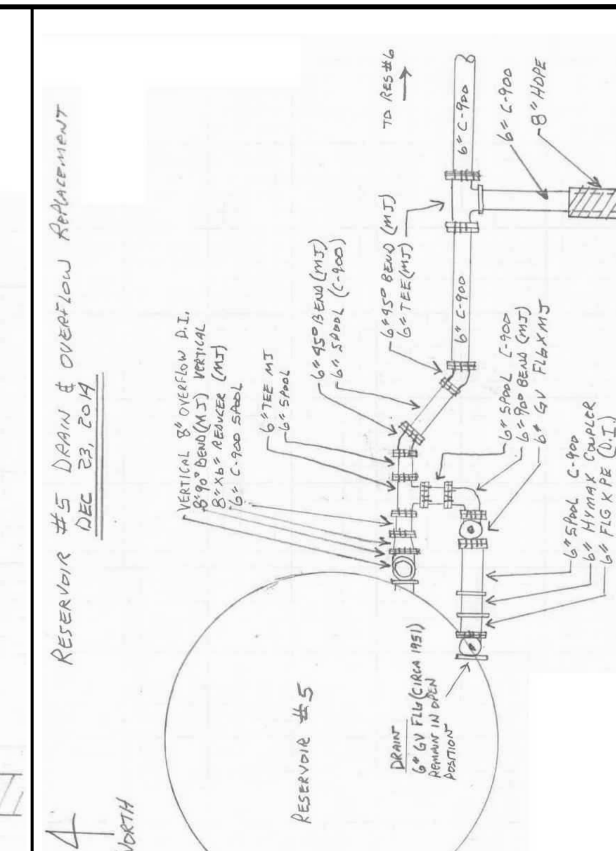


ASBUILT SKETCH #3.2



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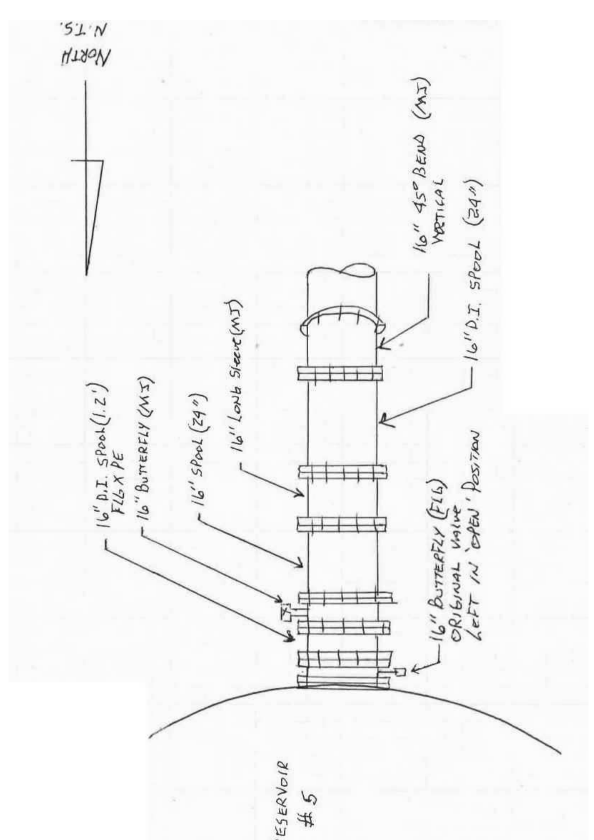

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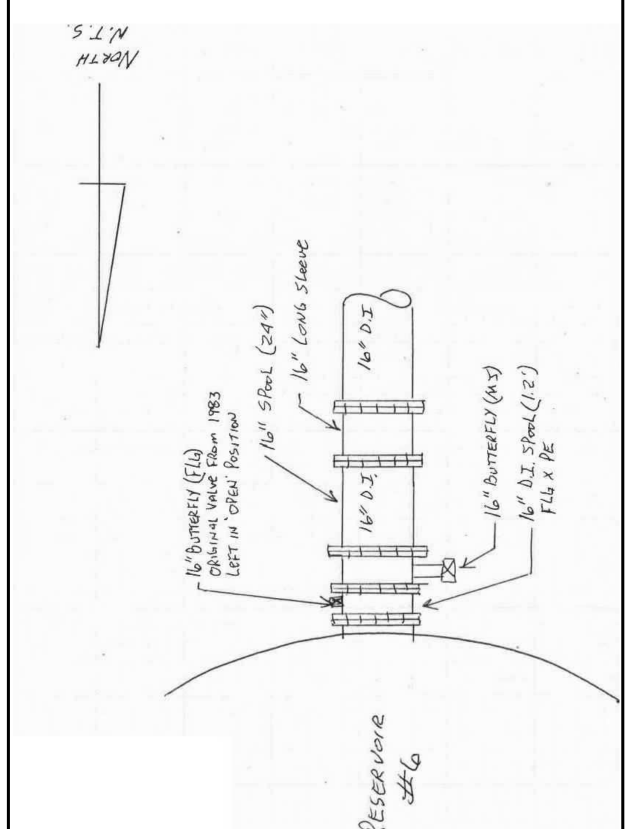

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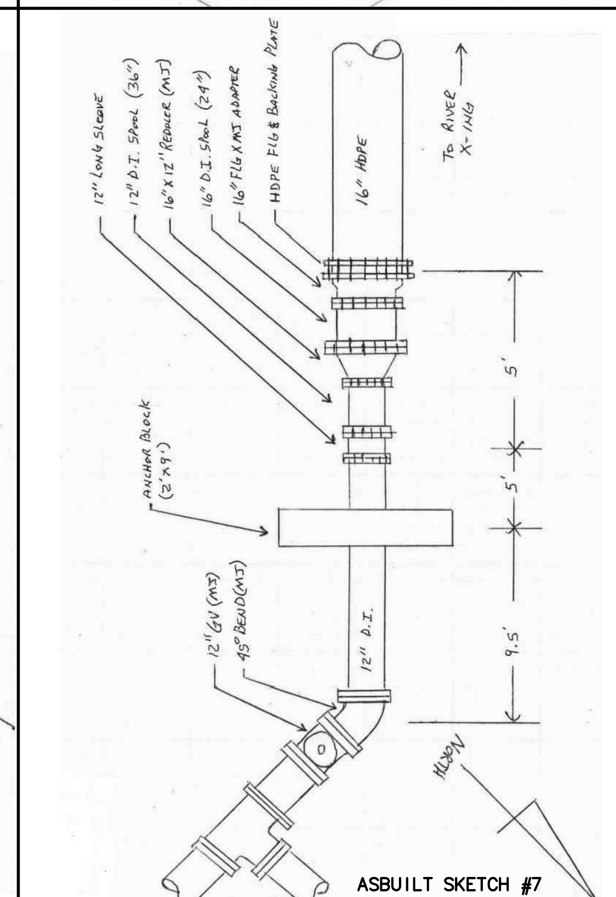
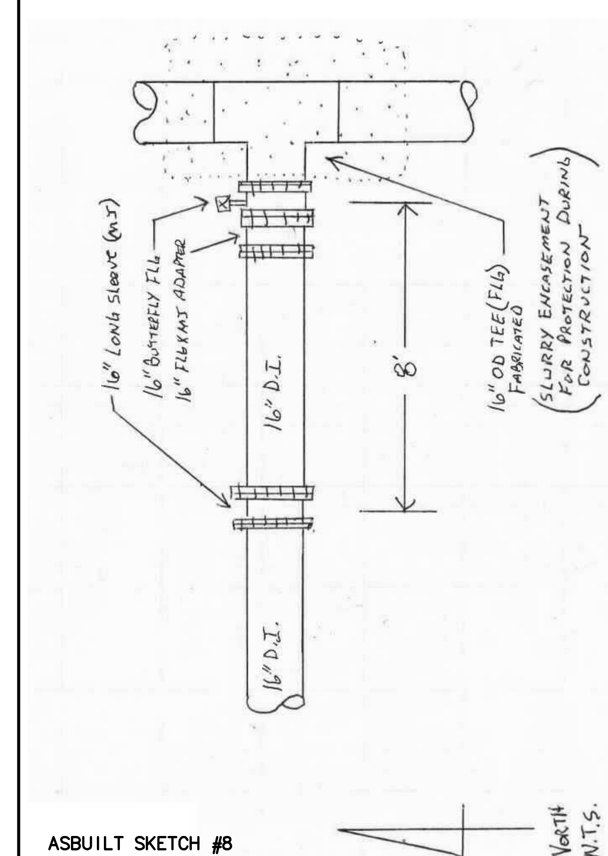
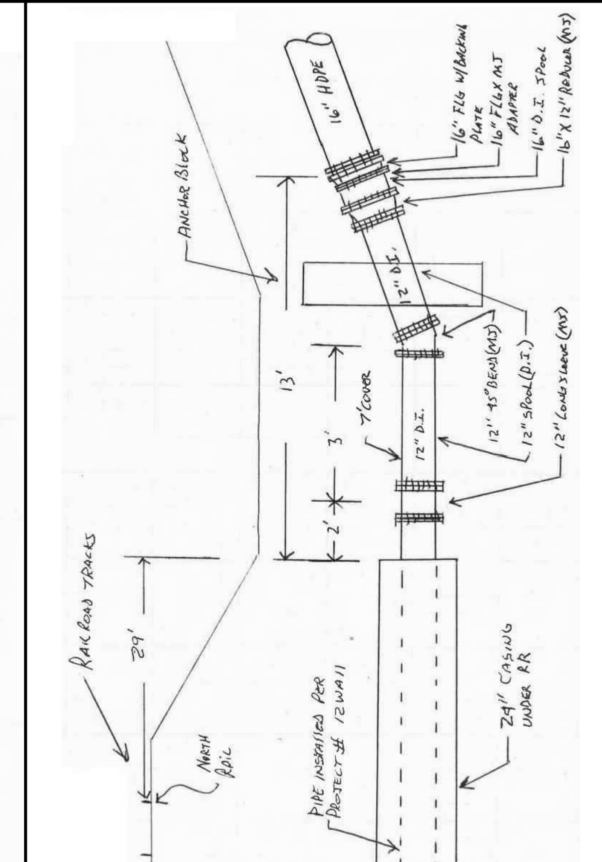


ASBUILT SKETCH #7



ASBUILT SKETCH #8



ASBUILT SKETCH #9

NO.	DATE	BY	REVISION
⚠	05/26/15	JRL	RECORD DRAWING

NOTICE
0 ½ 1
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N/A DESIGNED
DMA DRAWN
N/A CHECKED

RECORD DRAWING
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VERSION 4.1 12-9-97

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121 S.W. Salmon, Suite 900 Portland, Oregon 97204
PHONE 503-225-9010 FAX 503-225-9022

THE CITY OF ROSEBURG

CITY OF ROSEBURG MAIN RESERVOIR PIPING IMPROVEMENTS PHASE I

ASBUILT CONNECTION SKETCHES

PROJECT NO.: 14-1551 SCALE: AS SHOWN DATE: JUNE 2015

SHEET C-14

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Murray, Smith & Associates, Inc.
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