Perry City Corporation

Public Work Standards
for
Development, Design, & Construction

September 2021

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PUBLIC WORKS STANDARDS

FOR DEVELOPMENT, DESIGN,

AND CONSTRUCTION

for

PERRY CITY

SUBMITTED & RECOMMENDED:

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APPENDICES

SECTION 1 GENERAL

1.01 Ordinances Govern

Nothing in this document shall be construed to be contrary to Perry City Ordinances. Should a conflict exist between this document and the Ordinances, the Ordinances shall govern.

1.02 Conformance with Federal, State, and Local Laws

Nothing in this document shall relieve the Developer, Engineer, or Contractor from abiding by all Federal, State, and local laws.

1.03 Definitions

A. Chapter – When "Chapter" is written, it shall be as if "Perry City Ordinance, Chapter" is written.

B. Contractor – The individual, firm, co-partnership, or corporation, and his, their, or its heirs, executors, administrators, successors, and assigns, or the lawful agent of any such individual firm, partnership, covenanter, or corporation, or his, their, or its surety under the contract bond, constituting one of the principals to the contract and undertaking to perform the Work.

C. Drawings – The City-approved construction drawings, the Perry City Public Works Standard Drawings, and/or the Manual of Standard Drawings, as applicable.

D. Developer – The person or company sponsoring construction of the improvements.

E. Development – The subject subdivision, minor subdivision, or building.

F. Improvements – See "Work."

G. Improvement Plans – See "Drawings."

H. Inspector – The authorized representative of the City or City Engineer assigned to make all necessary inspections of the Work performed or being performed, or of materials furnished or being furnished by the Contractor.

I. Standards – When "Standards" is written, it shall be as if "Perry City Public Works Standards for Development, Design, and Construction" is written.

J. Title 14 – When "Title 14" is written, it shall be as if "Perry City Ordinance, Title 14" is written.

K. Work – All types of work necessary to provide safe access and utility service to and within proposed subdivision or site, including, but not limited to, site grading, utility installation, and street construction. Work includes all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and

equipment into such construction; and may include related services such as testing, start-up, and commissioning.[1]

L. Additional Definitions - See also "Title 14 – Subdivisions" of the Perry City Ordinances.

1. Where definition conflicts arise between City Ordinance and this document, the definitions in this document shall take precedence when in reference to this document.

1.04 Acronyms

A. BMP – Best Management Practice

B. CFP – Capital Facilities Plan

C. DDW – Division of Drinking Water

D. DWQ – Division of Water Quality

E. DWRi – Division of Water Rights

F. FEMA – Federal Emergency Management Agency

G. HOA – Homeowners' Association

H. LID – Low Impact Development

I. PC – Perry City

J. PVC – Polyvinylchloride Pipe

K. RCP – Reinforced Concrete Pipe

L. UAC – Utah Administrative Code

M. UDEQ – Utah Department of Environmental Quality

N. UDOT – Utah Department of Transportation

O. UPDES – Utah Pollutant Discharge Elimination System

P. UPRR – Union Pacific Railroad

Q. USACE – United States Army Corps of Engineers

R. UTA – Utah Transit Authority

1.05 Exception to the Public Works Standards

A. When a Developer believes that meeting a specific requirement contained within the current edition of the Standards is technically infeasible, Developer may make application to the Director of Public Works or his Designee for an exception to the Standards. This application shall include technical reasoning for the proposed exception along with a proposed solution. The Director shall assess whether the request meets the goals and requirement of the Standards without unduly jeopardizing the public's interest. Upon

[1] From EJCDC© C-700, Standard General Conditions of the Construction Contract.

review of the application, the Director may grant or deny the exception to the Standards. If the request is denied by the Director, the applicant may appeal to the City's Hearing Officer for a final determination.

SECTION 2 DEVELOPMENT STANDARDS

2.01 Approval Procedure

See Title 14 – Subdivisions of the Perry City Ordinances for details.

2.02 Developer Responsibilities

A. Required Improvements and Guarantees – see Title 14 – Subdivisions of Perry City Ordinances.

B. Construct infrastructure in accordance with current City Master Plans: City Circulation Plan; Water, Sewer, and Storm Drain Capital Facilities Plans; Trails Master Plan, and other applicable adopted Planning documents.

C. Permits and Approvals

1. Developer is responsible for obtaining all necessary permits and approvals for the construction of the Improvements. Copies of all applications and approved permits shall be submitted to the City. Agencies/permits that may be required include, but are not limited to:

    a. DDW Plan Approval (pre-construction)

    b. DDW Operating Permit (post-construction)

    c. UPDES NOI and NOT

    d. DWRi Stream Alteration

    e. DWRi Dam Safety

    f. EPA 404 Wetlands

    g. FEMA LOMA and/or LOMR

    h. UDOT

    i. Others as applicable

D. Improvements

E. The required improvements shall include:

    a. All street improvements in front of all lots along all dedicated streets to a connection with existing improvements of the same kind and to the boundary(ies) of the subdivision (excluding through remnant or remainder parcels).

    b. All street, storm drain lines, water lines, sewer lines, and any other buried utility lines and conduits shall be installed to the boundary lines of the subdivision where reasonably expected to extend as determined by the City Engineer and based on anticipated future development and the City's capital facilities plans and/or master

plans. Design must provide for future extension to adjacent development and be compatible with the contour of the ground.

2. Upsizing based on CFPs – The Developer will be required to construct/install infrastructure sized in accordance with the City's currently adopted CFPs. The City will be responsible for paying difference in cost between the master planned infrastructure size and the minimum infrastructure size required within the boundaries of the development.
3. Seal Coat Direct Cost – Developer shall pay the City directly for the cost as determined by the City Engineer to be sufficient for the installation of the seal coat. The Seal Coat shall be installed by the City.
4. Street Signage Escrow– Developer shall include in the financial guarantee monies sufficient for the installation of the street signage.
5. Streetlight Direct Cost – Developer shall pay Rocky Mountain Power directly for the cost of the streetlight.
6. Temporary Turnaround Escrow – See Section 3.05.I of this document.
7. Materials and Construction Testing Escrow – Developer shall escrow for all materials and construction testing. Testing will be performed by one of the City's selected testing agencies. Developer/contractor is responsible for all coordination. See Section 4.03.I for more information.
8. Survey and Mapping of New Improvements – Developer shall directly pay 1% of the approved Engineer's total cost estimate for surveying and mapping related to the development.

2.03 Subdivision Standards

A. The general standards for subdivision layout and development are found in Title 14 – Subdivisions.

B. See also Section 3 – Design Standards and Section 4 – Construction Standards of this document.

2.04 Geotechnical Investigation

A. A geotechnical investigation should be conducted for the following:

1. All new subdivisions with more than two (2) lots;
2. All commercial subdivisions and sites;
3. Any subdivision that includes public infrastructure improvements;
4. Any development in the Sensitive Lands zone; and
5. Upon request of the City Engineer.

B. The geotechnical investigation should be complete in nature, and its findings shall be summarized in a Geotechnical Report. The Geotechnical Report shall be signed and sealed by a licensed Professional Engineer with expertise in the field of geotechnical engineering.

C. See Appendix B for requirements regarding the Geotechnical Report, including minimum testing requirements and design parameters.

SECTION 3 DESIGN STANDARDS

3.01 Required Improvements

A. See Title 14 for information on the required improvements.

B. See also Section 5 – Standard Specifications and Section 6 – Standard Drawings, Plans, and Details of this document for additional information.

3.02 Improvement Plans

A. Complete and detailed, and signed and sealed (in accordance with Utah Code 58-22-602) construction plans and drawings of improvements shall be submitted to the City for the review by the City Engineer prior to receiving final plat approval and prior to commencing construction. No construction, including dirt work, shall begin until plans have been checked and approved by the City Engineer, and final approval is granted by the City's Land Use Authority. Clearing and grubbing is allowed upon approval by Director of Public Works or his designee.

B. The following instructions are for the purpose of standardizing the preparation of drawings to obtain uniformity in appearance, clarity, size, and style. The plans and designs shall meet the standards defined in the specifications and drawings hereinafter outlined. The minimum information required on the drawings for improvements is as follows:

C. All drawings and/or prints shall be clear and legible and conform to industry standard engineering and drafting practices.

D. Drawings shall be legible and to a common scale (when printed on 11"x 17" paper, scale shall be between 1" = 40' and 1" = 60').

E. Both plan view and centerline profile must be shown. On subdivisions along steep cross slopes, profiles for each side of the street may be required to be shown.

F. Plan and profiles shall indicate design and/or existing grades a minimum of 200 feet beyond the limits of the proposed project.

G. All wet utilities (water, sewer, storm drain, secondary, irrigation) shall be shown in plan and profiles views.

H. 20' easement for any City utility not in the right-of-way.

I. Each set of plans shall be accompanied by a separate sheet of details for special structures which are to be constructed and are not covered by the City Standards. All structures shall be designed in accordance with the minimum Perry City Standards and approved by the City Engineer.

J. Separate drawings of elements of the Perry City Standards shall not be required to be redrawn and submitted with the construction drawings unless specific deviations from the standards are requested for approval; however, the construction drawings shall refer to the specific items of the Standards that are to be incorporated into the Work.

K. The plan and profile construction plans shall be submitted in portable document format ("pdf"). Upon approval, the developer's engineer shall provide the City Engineer with electronic files of the final plat and improvement plans in AutoCAD or other City Engineer approved format. A hard copy of the approved construction plans bearing the signature of the City Engineer shall be kept available at the construction site. Prior to final acceptance by the City, the developer, developer's representative, contractor, or project engineer shall submit to the City Engineer a set of "as built" drawings for permanent City file record.

3.03 Sanitary Sewer Design

A. All design shall be in accordance with Utah Administrative Code R317.

B. Changes in pipe size shall occur in a manhole. Match 0.8 depth point of sewer lines. (UAC R317-3-2-H)

C. 4' minimum cover.

D. Drops are required for all flowline elevation differences in excess of two (2) feet.

E. Pipe shall be as follows:

F. 4-inch through 15-inch – ASTM D3034, SDR 35, green

G. 18-inch and greater – ASTM F679, green

H. Force mains' pressure class shall be specified by design engineer and shall be adequate for pressure in the main being designed.

I. All terminating sewer mains shall end with a city standard manhole.

J. Service lateral connection shall not be allowed in sewer manholes.

K. All sewer shall be gravity. Lift stations are not permitted.

L. Collection lines shall be located in public rights-of-way or private road rights-of-way. Collection lines shall not be located on private property (easements) without the express written permission from the City. If such case is granted, easement shall be a minimum width of 20 feet and shall be dedicated to Perry City.

M. All sanitary sewer systems shall be public and shall connect to a public sewer line. Private sanitary sewer systems may be permitted on singularly owned property provided they discharge directly to a public sewer system and obtain the express written permission from the City.

N. Sewer mains shall not exceed 8% without approval of City Engineer.

3.04 Water Design

A. All design shall be in accordance with Utah Administrative Code R309.

B. Pipe shall be as follows:

C. 4-inch through 24-inch – AWWA C900 DR 18, blue

D. Upon approval: 4-inch through 12-inch – Ductile Iron, pressure class 350

E. Upon approval: 14-inch and greater – Ductile Iron, pressure class 250

F. Upon approval: HDPE, ductile iron pipe size, DR 11 or 9, as specified by City Engineer

G. Material type shall be designated to specific locations based on soil conditions and system pressure ratings.

H. Valves are required on all branches of tees and crosses. On unbroken lengths of water line, valves are required:

I. At 800 foot (maximum) spacing in residential areas, and

J. At 500 foot (maximum) spacing in commercial and industrial areas.

K. Gate valves are required up to and including 12" diameter. Butterfly valves are allowed on mains 14" or greater.

L. Air/vacuum valves shall be provided at all high points; however, lines shall be designed as such to minimize high points when feasible.

M. At dead end lines, including temporary dead ends, provide fire hydrant at termination point.

N. Where a water line crosses surface water, designer/engineer shall contact the DDW and the City prior to final design.

O. All fire lines shall meet Public Works Standards but shall remain privately owned and maintained. Neptune meters are required. Contact City Public Works Director for meter model information and installation and testing requirements.

P. Water lines may be curved, with a minimum radius of twice the manufacturer's minimum radius.

Size	Manufacturer	City
8"	200'	400'
10"	250'	500'
12"	300'	600'
14" +	Not Permitted	Note Permitted

A reduction in the radii may be granted with the following requirements:

Q. No service connections are reasonably anticipated along the curvature, and

R. With the express and written approval by both the City Engineer and the Public Works Director.

S. Fire hydrants

1. Fire hydrants are to be installed in locations as required by the fire code and approved by the Fire Marshal and City Engineer, with a maximum spacing of 500 feet (as approved by the Fire Marshall).

2. Fire hydrants shall not be located within 10 feet of any sanitary sewer line or manhole.
3. A three (3) foot radius clear space shall be provided around all fire hydrants. No above ground features or driveways are permitted in the clear space.
4. Collection lines shall be located in public rights-of-way or private road rights-of-way. Collection lines shall not be located on private property (easements) without the express written permission from the City. If such case is granted, easement shall be a minimum width of 20 feet and shall be dedicated to Perry City.

3.05 Secondary Water Design

A. Secondary water design shall be in accordance with Secondary Water Service Provider's Standards.

3.06 Street/Road Design

A. Streets shall be designed in accordance with these Standards, standard engineering practices, and AASHTO and MUTCD guidelines.

B. Plans should show horizontal and vertical curve information, including radii, k-values, points of curvature, intersection, inflection, and tangency, etc.

C. Local (residential) streets shall have not less than 333' radius curves[2] unless specifically approved by the City Engineer.

D. No changes of grade in excess of 1.5% shall be permitted without a vertical curve.

E. Sight triangles shall be shown as per the City Code.

F. Horizontal points of curvature shall not be located closer than 150' from the center of an intersection.

G. Intersections

1. Roadway centerlines shall intersect at 90 degrees. Where a 90 degree angle is not feasible, the intersection angle may be reduced to as low as 80 degrees with the City Engineer's concurrence. In no case shall the angle be less than 80 degrees.
2. Residential intersections shall be no closer than 160-ft to one another, as measured from centerline to centerline.

H. Cul-de-sacs

1. Length of cul-de-sac shall not exceed 650 feet as shown in the Standard Drawings.

I. Pavement/Pavement Section

1. Developments

a. Pavement section shall be designed by the developer's geotechnical engineer and included in the Geotechnical Report submitted to the City. See Appendix B of this

[2] AASHTO A Policy on Geometric Design of Highways and Streets (2011); Table 3-13b.

document for Geotechnical Report Minimum Requirements, including testing requirements and design parameters.

2. City Projects

    a. Pavement section shall be included in the Project plans.

3. See sheet CS-02 for pavement notes.

J. Temporary Turnarounds

1. When turnaround cannot be constructed outside of subdivision, it shall be located on a portion of the subdivision lots (as needed) with the developer placing in escrow an amount of money sufficient to complete the street improvements to the subdivision boundary. These funds will be used at such time the street is extended.
2. The lot(s) on which the turnaround is constructed shall be restricted as follows:
3. Platted as an "R" (restricted) lot.
4. This lot cannot be sold or building permits issued until the road is extended beyond the subdivision boundary, complete with curb, gutter, and sidewalk.
5. Drainage onto adjacent property must be by written approval (easement) of adjacent property owner.
6. Maximum slope of 4%, all directions.
7. When a temporary turnaround is required at the end of a road where the road and the extension of the road are parts of an approved phased development, in lieu of constructing a paved temporary turnaround in accordance with the Standard Drawings:
8. When extension of the road is expected to begin construction within 12 months of conditional acceptance of the road and associated temporary turnaround, Developer may construct 12-inch thick untreated base course temporary turnaround (dimensions per the Standard Plans) and place in escrow the cost of the asphalt paving. Escrow will be released to developer upon approval of subsequent phase.
9. If construction of the extension of the road has not begun within 12 months of conditional acceptance of the road and associated temporary turnaround, City may, at its discretion, utilize the monies in escrow to pave the temporary turnaround.

K. UDOT

1. Roadway intersections with UDOT-controlled streets shall be in accordance with UDOT standards. A copy of the approved UDOT Access and/or Encroachment Permit(s) shall be submitted to the City.

L. Street Lights

1. Spacing shall be 400' maximum and at every intersection.
2. Conduit shall be installed by Developer.

M. Parking and Parking Lot Access (City Roads Only)

1. Entrances and exits for parking facilities shall be designed to reduce traffic congestion on public streets and minimize conflicts with neighboring uses. The principles of access management should be used to evaluate and determine adequacy of the ingress and egress to the parking facilities.

2. Single Family or Two-Family Dwellings:

   a. Approach width shall be a minimum of 10', maximum 36' (measured at the property line).

   b. Combined width of all approaches serving a lot shall not exceed 50% of the lot frontage.

   c. Number of approaches permitted:

      (i) Typical Lot: 2

      (ii) Corner or Double Frontage Lot: 3

   d. Minimum 12' between each (measured at the property line).

   e. No approaches permitted on corner lots within the clear view areas, per City Ordinance.

   f. No approaches permitted closer than 5' to the side or rear property line (measured at the property line).

3. All Other Uses:

Future Right-of-Way Width	Max Curb Cut Width	Minimum Access Radius	Separation from Corners*	Separation from Side/Rear Property Lines**	Number of Curb Cuts Allowed
<66'	36'	5'	100'	20'	1 per 150' of road frontage
66' – 79'	40'	5'	120'	20'	1 per 200' of road frontage
80' +	50'	5'	140'	20'	1 per 350' of road frontage

*Measurement made from the point of intersecting curb lines to near edge or driveway.

**Exception for separation requirement if a shared access is proposed under Shared Access in this Standard.

4. Modification to the Standard. The Director of Public Works or his Designee may modify the standards in the table above if sufficient proof is provided through a traffic study that the modification will be necessary for traffic movement. The maximum driveway width shall be 50 feet.

5. Shared Access. To reduce and limit the number of points of access along City streets, shared access between adjoining parcels is strongly encouraged. The Director of Public Works or his Designee or Planning Commission, whichever is applicable, may require a shared access as a condition of project approval. When a shared access is used the adjacent property owners shall:

    a. Record a cross easement for the approach, signed by both adjacent property owners and the City, allowing both adjacent property owners equal and unrestricted access to the approach.

    b. The shared access shall be adequately separated to allow individual maintenance and repair.

6. Delay Agreements. The Director of Public Works may enter into a recorded agreement with a property owner to defer the construction of improvements to a future date. The improvements shall be constructed within 5 years of the date of the agreement. In cases where the City will be undertaking similar improvements to the same street, and such improvements have been scheduled, a longer period than 5 years may be approved by the Director of Public Works. Improvement security may be required as a part of the delay agreement.

7. Essential Service Facilities. The Director of Public Works and Planning Commission shall determine the appropriate arrangement of approaches for essential service facilities during the approval process.

3.07 Storm Drain and Drainage Design

See Appendix A for Storm Drain and Drainage Design Standards.

A. Low Impact Development – See Appendix A

B. 80th Percentile Storm Retention – See Appendix A

SECTION 4 CONSTRUCTION STANDARDS

4.01 General

A. General Conditions

1. Permit/License: When the work is in progress, Contractor shall have at the work site a copy of the permit and his contractor's license number.

2. Private Access: Temporary all-weather roadways, driveways, walks, and rights-of-way for vehicles and pedestrians shall be constructed and continuously maintained where required.

3. Street Excavation in Winter: Excavation of City streets during the winter months (herein defined as November 15 to April 1) will be allowed only if the work is a new service connection, required maintenance or emergency, or otherwise approved by the Public Works Department. Permanent patching of City streets excavated in the winter may be delayed until April 1 with the following provisions: Within five (5) working days from the completion of the excavation, the permittee provides/maintains a 1-1/2" thick temporary winter asphalt surface until such time as the permanent asphalt surface is installed; the permittee shall provide/maintain a temporary untreated base course surface until such time as the temporary winter asphalt surface is installed. These provisions apply regardless of whether the permittee or City crews are performing the permanent resurfacing.

4. Street Excavation in Summer: Excavation of City streets during the summer months is herein defined as April 1 to November 15. Permanent hot asphalt patching of City streets in the summer shall be within five (5) days from the completion of the excavation. The permittee shall provide/maintain a temporary untreated base course surface until such time as the permanent hot asphalt patch surface is installed.

5. Existing Utilities: The contractor shall use extreme caution to avoid a conflict, contact, or damage to existing utilities, such as power lines, sewer lines, storm drains, streetlights, telephone lines, cable television lines, water lines, gas lines, poles, or other appurtenances during the course of construction of this project. Any such conflict, contact, or damage shall be immediately communicated to said utility company and the Public Works Department. All projects shall be “Blue Staked” prior to construction.

6. Preconstruction Pictures: The permittee shall secure pictures of the conditions of the existing public way improvements such as curbing, sidewalk, landscaping, asphalt surfaces, etc. In the event that public way improvements are damaged and no pictures were taken, the Public Works Department will assume the correction of the damage is the responsibility of the permittee.

B. Licensing

1. Contractor (including all sub-contractors) must be properly licensed with the State of Utah. The acceptable licenses shall be in accordance with UAC R156-55a-201.

2. Exceptions: A license shall not be required by the City when the permittee is a public utility company. (Subcontractors for utility companies shall have a valid contractor's license.)

C. Permits

Developer/Contractor is responsible for obtaining all necessary permits for the construction of the Improvements prior to commencement of said Improvements. Agencies/permits required may include, but are not limited to:

1. City Excavation

a. Perry City's Department of Public Works issues permits to control any excavation and construction operations in the public right-of-way. All contractors, sub-contractors, and utility companies proposing to construct, repair, or replace any facility within the public right-of-way shall contact the Perry City Public Works Department and complete all permit requirements prior to commencing proposed work.

b. Duration and Extensions – Subject to the Public Works Department's approval, permits which expire may be extended by paying a permit extension fee. The length of the extension determined by the permittee shall be subject to the approval of the Public Works Department.

c. Emergency Work

(i) Maintenance of pipelines or facilities in the public way may proceed without a permit when emergency circumstances demand the work be done immediately provided a permit could not reasonably and practicably have been obtained beforehand.

(ii) In the event that emergency work is commenced on or within any public way of the City, the Public Works Department shall be notified within one-half hour when the work commences or as soon as possible from the time the work is commenced. Contact shall be made to the City's "on call" personnel. If emergency work is commenced during off business hours, the Public Works Department will be notified within one (1) hour of the start of work on the first regular business day of which City offices are open after such work commences, and, at the discretion of the Public Works Department, a permit may be issued which shall be retroactive to the date when the work was begun. Before commencing the emergency work, all necessary safety precautions for the protection of the public and the direction and control of traffic shall be taken.

None of the provisions of these regulations are waived for emergency situations except for the prior permit requirement.

d. Enforcement: Violators of these regulations of working within the Public Way shall be subject to the provisions of the applicable Perry City Ordinances.

e. No Fee Permits: The Public Works Department reserves the right to issue "no fee permits" for work in the public way when the following conditions are met:

   (i) When utility companies are doing excavation work and such work is required in conjunction with a City Public Works Department project and the work is required to be accomplished prior to the execution of the Public Works Department contract.

   (ii) When the City Public Works Department is repairing or maintaining public way facilities such as curbs, gutters, cross drains, storm drains, traffic facilities, driveway, sidewalk, etc., and such work requires excavation.

f. Permit Waivers: Working within the public way without a permit is not permissible unless the permit is waived by the Public Works Department. Waivers may be granted by the Public Works Department when any of the following conditions occur.

   (i) When routine maintenance work which is being done by City, State, or utility personnel does not involve excavations in the City's public way, i.e. crack sealing, street resurfacing and repair, snow plowing, sanding, sweeping, garbage collection, storm drain cleaning, leaves pickup, above grade work, etc.

   (ii) When a permittee allows other contractors or utility companies to perform work in the permitted trench limits.

   (iii) When utilities shall be relocated or adjusted in conjunction with a City Public Works Department sponsored project provided the utility work is being accomplished within one (1) week of the time the City or its contractor is scheduled to begin construction at that location and provided the work is coordinated and approved by the City's Public Works Department.

g. Revocation of No Fee Permits and Permit Waivers: "Permit Waivers" and "No Fee Permits" shall be revoked by the Public Works Department if the work is found to be defective or requires action or supplemental inspection by the Public Works Department. In the revocation proceedings, the Public Works Department shall serve written notice which defines the problems encountered and the time (at least one day) the permittee has to correct the problem. If the work is not satisfactorily completed within the time specified, the "Permit Waiver" or the "No Fee Permit" shall be revoked. The permittee shall be required to secure a Fee Permit before proceeding to complete the work.

h. Completion by City, Liability for Costs: If the work is unduly delayed by the permittee, or if the public interests so demand, the Public Works Department shall have authority to complete the permit work. The Public Works Department shall do the work only after written notice has been given to the permittee, and the permittee fails to respond to the Public Works Department's request. The actual cost of such work incurred by the City including a fifteen percent (15%) overhead charge shall be paid by the permittee.

2. USACE/DWRi Stream Alteration – Stream Alteration
3. UPDES
4. Dam Safety (DWRi)
5. UPRR Railroad Encroachment
6. UTA Encroachment
7. UDOT
8. Box Elder County Surveyor's Monument

D. Excavation Operations

1. Blue Stakes: Before commencing excavation operations, the permittee shall call "Blue Stakes" at 1-800-662-4111 or 811.

E. Traffic Control Devices: Traffic control devices such as construction signs, barricades, and cones must be in place before excavation begins.

F. Protection of Paved Surfaces: In order to avoid unnecessary damage to paved surfaces, backhoes, outriggers, tracked equipment, or any other construction equipment that may prove damaging to asphalt shall use rubber cleats or paving pads when operating on or crossing said surfaces.

G. Open Trench Limits: Open trenches will be limited to one block at a time or 660 feet, whichever is less.

H. Public Road Closure: No public roads shall be closed without prior written approval from Perry City Corporation. In the event of a planned road closure, Contractor shall notify the City, Public Works Department, Fire Department, emergency services dispatch, US Postal Service, Box Elder School District, and Utah Transit Authority (UTA) a minimum of 24 hours prior to the closure. In the case of an emergency, the above listed agencies will soon be notified at the soonest possible time.

I. Sidewalk Closure: When it is permitted to close the sidewalk, flashing barricades and "Sidewalk Closed" signs must be placed on the sidewalk immediately adjacent to the work area. "Sidewalk Closed Ahead, Cross Here" signs must be placed at the closest adjacent sidewalks, intersections, or alternate routes to warn pedestrians of the closing so they may safely access the alternate route.

J. Environmental Controls

1. Dust and Debris: The permittee or contractor shall keep dust and debris controlled at the work site at all times. If necessary, a container shall be provided for debris and dusty areas shall be wet down. The permittee or contractor shall be responsible for the cleanup of mud or debris from public roads deposited by vehicles or construction equipment exiting the work site. The City reserves the right to shut down the work or issue a citation if dust is not controlled.

2. Noise: The permittee or contractor shall keep neighborhood free of noise nuisance in accordance with the Noise Ordinance.

3. Cleanup: The permittee or contractor shall remove all equipment, material, barricades, and similar items from the right-of-way. Areas used for storage of excavated material will be smoothed and returned to their original contour. Vacuum sweeping or hand sweeping shall be required when the City determines cleaning equipment is ineffective.

K. Storm Water: All Contractors working within the boundaries of Perry City shall conform to all requirements and regulations as outlined by the Perry City Storm Water Management Plan. Copies of the plan are available in the Perry City Offices.

L. Fencing and Signs

1. Fencing and barricade equipment shall conform to MUTCD standards. Fencing shall also conform to the following:

2. No advertisements shall be placed on barricades or construction signs.

3. Fencing and associated signs shall be removed and areas where signs are placed shall be restored to the pre-construction condition following construction.

4. Fencing (6' chain-link panels) shall be placed around all excavation pits adjoining pedestrian accesses traveled by the public. No construction activity (excavations, etc.) which may be of any risk to public safety shall remain unattended overnight.

4.02 Pre-Construction Conference

A. The preconstruction conference shall not be held until the City Engineer has approved and signed the construction plans.

B. A preconstruction conference shall be held before any excavation or other work is begun in the subdivision or Project. The meeting will include:

1. City Engineer

2. Developer or Project Manager

3. Subdivision or Project Engineer

4. All contractors and subcontractors involved with installing the subdivision or project improvements.

5. Representatives of affected Perry City Departments
6. Representatives of local utility companies as may be required by Perry City.

C. Items pertaining to the construction and inspection of the subdivision or Project improvements will be discussed.

4.03 Construction

A. Specifications

1. Contractor shall be responsible for constructing all improvements in accordance with the Technical Specifications, per Section 5 of this document.
2. Deviations from such shall be reviewed and authorized by the City Engineer on a case-by-case basis.

B. Plans and Details

1. Contractor shall be responsible for constructing all improvements in accordance with the Drawings, Plans, and Details, per Section 6 of this document.
2. Deviations from such shall be reviewed and authorized by the City Engineer on a case-by-case basis.

C. Sequence/Timing

1. All underground utility work shall be completed prior to placement and compaction of the roadway base course. Utilities, including service lines, not installed prior to roadway construction shall be bored as approved by the Director of Public Works.
2. All concrete collars shall be installed within fourteen (14) days of asphalt placement.

D. Inspection

1. All construction work involving the installation of improvements in the subdivision or project shall be subject to inspection by the City. It shall be the responsibility of the person responsible for construction to insure that inspections take place where and when required. Certain types of construction shall have continuous inspection, while others may have only periodic inspections.

E. Requests for Inspections

1. Requests for inspections shall be made to the Public Works Department by the person responsible for the construction.
2. Requests for inspection on work requiring continuous inspection shall be made three (3) working days prior to the commencing of the work.
3. Notice shall also be given one (1) day in advance of the starting of work requiring periodic inspection, unless specific approval is given otherwise by the City.

F. Continuous inspection

1. May be required on (but not limited to) the following types of work:
    a. Laying of street surfacing
    b. Placing of concrete for curb and gutter, sidewalks, and other structures
    c. Laying of sewer pipe, irrigation pipe, drainage pipe, water mains, water service laterals and testing.
2. On construction requiring continuous inspection, no work shall be done except in the presence or by permission of the City Engineer or authorized city representative.

G. Periodic inspections
    1. Shall be required on (but not limited to) the following types of work:
        a. Street grading and gravel base
        b. Excavations for curb and gutter and sidewalks
        c. Excavations for structures
        d. Trenches for laying pipe
        e. Forms for curb and gutter, sidewalks and structures

H. Substantial and Final Completion Inspections
    1. A substantial completion inspection shall be requested by the Contractor and made by the City Engineer or authorized representative after all construction work is completed. Any faulty or defective work shall be corrected by the persons responsible for the work within a period of thirty (30) days of the date of the City Engineer's or authorized representative's Punchlist defining the faulty or defective work.
    2. A final completion inspection shall be requested by the Contractor and made by the City Engineer or authorized representative after all faulty and defective work has been corrected.

I. Testing
    1. Development Projects
        a. Developer/Contractor shall select, hire, and pay a City-approved qualified testing firm.
        b. Developer/Contractor shall be responsible for all testing in accordance with the Technical Specifications per Section 5 of this document.
        c. Testing reports shall be submitted to City weekly for review. Areas with failed tests shall be corrected and retested.
        d. Failure to have improvements tested as they are constructed may be cause for work stoppage or rejection by City.

e. City has the option to conduct independent testing at their discretion.

2. City Projects

a. Developer/Contractor shall select, hire, and pay a City-approved qualified testing firm.

b. Developer/Contractor shall be responsible for all testing in accordance with the Technical Specifications per Section 5 of this document.

c. Testing reports shall be submitted to City weekly for review. Areas with failed tests shall be corrected and retested.

d. Failure to have improvements tested as they are constructed may be cause for work stoppage or rejection by City.

e. City has the option to conduct independent testing at their discretion.

J. Safety

1. Contractor is solely responsible for jobsite safety.

2. Contractor shall comply with all local, state, and federal rules and regulations regarding jobsite safety.

3. City and/or its authorized representatives shall have the authority to shut down a job when unsafe working conditions are found.

4.04 Miscellaneous

A. Enforcement

1. Violators of the regulations as set forth in the Perry City Standards for work in the Public Way shall be subject to the provisions as set forth in the current City Code.

B. Guarantees

1. City's Protective Liability Insurance: The permittee shall indemnify and hold the City harmless from and against any and all liability, damages, claims, demands, costs and expenses of whatsoever nature, including court costs and counsel fees, arising from or growing out of any injury to or death of any person or persons, whomsoever, or for loss of or damage to any property whatsoever, (including loss or damage to the tools, plant, or equipment of the permittee) resulting directly or indirectly from the carrying on of the work herein specified, and to that end shall purchase on the City's behalf, City's Protective Liability Insurance with limits of $1 million for injury to or death of one person, and $1 million for one accident; and Property Damage Liability Insurance with limits of $1 million for each accident and $1 million aggregate.

2. Bonding: Bonding as required by Perry City Code, Ordinance, and current rate structure.

SECTION 5 TECHNICAL SPECIFICATIONS

5.01 Technical Specifications for Perry City

A. Adoption of Divisions 01 through 34 of the Manual of Standard Specifications, as published by Utah LTAP Center, Utah State University, Logan, Utah, current edition, with all published amendments. (Commonly known as the *APWA Specifications*)

B. Modifications and Additions to Manual of Standard Specifications (see Appendix C)

5.02 Order of Precedence

A. Approved project-specific specifications (when applicable)

B. Modifications and Additions to Manual of Standard Specifications

C. Manual of Standard Specifications, current edition, with all published amendments

SECTION 6 STANDARD DRAWINGS, PLANS, AND DETAILS

6.01 Standard Drawings, Plans, and Details for Perry City

A. Perry City Standard Drawings, current edition (See Appendix D)

B. Adoption of Manual of Standard Plans, published by Utah LTAP Center, Utah State University, Logan, Utah, current edition, with all published amendments. (Commonly known as the *APWA Plans*)

6.02 Order of Precedence

A. Approved project-specific drawings and details (when applicable)

B. Perry City Standard Drawings, current edition

C. Manual of Standard Plans, current edition, with all published amendments, when not covered by one of the aforementioned items

APPENDIX A – STORM DRAIN AND DRAINAGE DESIGN GUIDELINES

APPENDIX A

STORM DRAIN AND DRAINAGE DESIGN STANDARDS

TABLE OF CONTENTS

A1. General Provisions

A. This document represents the reporting, design, and construction standards for private and public design and construction as it relates to storm drainage within the City.

B. A Storm Water Report is required for all new development and redevelopment projects.

C. Implementation of LID measures and 80th percentile storm retention does not reduce or eliminate the requirement for detention/retention as contained in this document.

A2. Definitions and Acronyms

The following terms shall be defined as follows in this document relating to storm water:

A. 80th Percentile Storm – The rainfall event whose precipitation total is greater than or equal to 80 percent of all storm events over a given period of record.

B. Best Management Practices (BMPs) – Construction practices and control measures necessary to protect against pollution generated by construction sites.

C. Common Plan of Development – "Common plan of development or sale" means one plan for development or sale, separate parts of which are related by any announcement, piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, plat, blueprint, contract, permit application, zoning request, computer design, etc.), physical demarcation (including contracts) that identify the scope of the project. A plan may still be a common plan of development or sale even if it is taking place in separate stages or phases, is planned in combination with other construction activities, or is implemented by different owners or operators.[1] Common plans of development may be residential, commercial, or industrial in nature.

D. Detention Basin –A water storage pond designed to store a volume of water that reduces the post-development peak runoff of a storm to the pre-development runoff rate or other rate as defined by the governing body. This is accomplished by the use of an outlet which controls the rate of flow out of the pond into the receiving storm drain or water body. Detention ponds contain an inlet, outlet, and spillway; the inlet and outlet may be one and the same. The detention basin is intended to drain the storm water within a period of time to make the volume available for the next storm event.

E. Development – Any man-made change to unimproved land, including but not limited to site preparation, excavation, filling, grading, paving, and construction of buildings or other structures.

F. Disturb – To alter the physical condition, natural terrain or vegetation of land by clearing, grubbing, grading, excavating, filling, building or other construction activity.

G. Drain Inlet – A point of entry into a sump, storm water basin, or storm drain system.

[1] General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s); State of Utah Department of Environmental Quality, Division of Water Quality; November 20, 2016

H. Drinking Water Source Protection Zone – Zones determined by geo-hydrology designed to protect groundwater aquifers of a well in a culinary water system.

I. DWQ – Acronym for Division of Water Quality, a division of the UDEQ.

J. Freeboard – The vertical distance between the emergency spillway and the top of the basin embankment.

K. General Permit for discharges from MS4 (Permit) – Authorization for a municipal separate storm sewer system to discharge storm water into waters of the United States.

L. Hardscape – Generally impervious areas, typically streets, sidewalks, driveways, parking areas, and roofs.

M. Infiltration – The movement of water through the soil surface and into the soil;[2] the movement of water downward from the ground surface through the upper soil.[3]

N. Infiltration Rate – The rate at which water actually enters the soils during a storm.[2]

O. Infiltration System (storm water) – A system which is designed to return storm water runoff into an underground aquifer.

1. Bioretention facilities, rain gardens, and tree boxes that are designed to slow down and hold storm water runoff for biological treatment and use by vegetative uptake are not considered to be infiltration systems if they are isolated from groundwater. Groundwater isolation may be achieved with impermeable liners or an underdrain that does not discharge into a dug, bored, drilled or driven well, improved sinkhole or other subsurface fluid distribution system.

2. The discharge of storm water piping below grade for the purpose of infiltration is considered a Class V injection well facility.

P. Injection Well, Class V – As defined in Utah Administrative Code R317-7-2:

1. A bored, drilled, or driven shaft whose depth is greater than its largest surface dimension, OR

2. A dug hole whose depth is greater than its largest surface dimension, OR

3. An improved sinkhole, OR

4. A subsurface fluid distribution system.

Q. Low Impact Development (LID) – An approach to land development (or re-development) that works with nature to more closely mimic pre-development hydrologic functions, reduces or minimizes the quantity of storm water runoff, and protects or improves water quality in receiving water bodies.

[2] Linsley/Franzini/Freyberg/Tchobanglous. (1992). *Water Resources Engineering and Environmental Engineering.* New York: McGraw-Hill Inc.

[3] Lindeburg. (2003). *Civil Engineering Reference Manual.* Belmont, CA: Professional Publications, Inc.

R. LID Analysis and Report – A written analysis of a development or redevelopment site that (1) identifies appropriate methods to reduce storm water runoff, (2) identifies the pollutants to target for each drainage area, and (3) selects appropriate structural controls to implement on the site.

S. Municipal Separate Storm Sewer System (MS4) – The storm water conveyance system owned by the City which includes streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains. For a full definition, see UAC 317-8.

T. Outlet – The discharge mechanism of a detention basin, typically a pipe containing a head gate or orifice to control the release of water out of the basin.

U. Percolation – The movement of water through the subsurface soil layers, usually continuing downward to the groundwater table,[3] measured by a Standard Percolation Test in units of minutes per inch.

V. Pollutant – Chemicals, sediment, trash, disease-carrying organisms, and other contaminants picked up by storm water which is conveyed into rivers, streams, and other water bodies.

W. Redevelopment – Alteration of a property that change the footprint of a site or building.

X. Retention Basin –A water storage pond designed to store the runoff volume of a storm and dispose of water through percolation, infiltration, and evaporation within a period of time to make the volume available for the next storm event. A retention basin contains an inlet and spillway, but no structural outlet. Retention is not CIV Injection Well.

Y. Softscape – Generally pervious areas, such as native vegetation and landscaped areas.

Z. Spillway, Emergency – A storm drain basin feature that controls and guides storm water as it spills over the basin's embankment.

AA. Spillway, Internal – A storm drain basin feature that allows excess water to leave the basin through discharge piping which is set at an elevation below the emergency spillway.

BB. Storm Drain System – The system of conveyances (including but not limited to catch basins, detention basins, retention basins, infiltration galleries, curbs, gutters, ditches, cross drains, roads, man-made channels, sumps, pipes, etc.) owned and operated by the City, which is designed and used for collecting and/or conveying storm water.

CC. Storm Water Pollution Prevention Plan (SWPPP) – A written plan that evaluates and minimizes the impact of pollutants on storm water through the use of control measures and activities that target pollution sources. A SWPPP template can be found on the UDEQ Water Quality website.

DD. Storm Water Report – A written analysis of a development or redevelopment site that estimates the volume and rate of storm water runoff generated by the proposed improvements. The report details rationale and calculations for establishing the sizes of storm water piping and storage facilities in compliance with this document. This Report shall also contain the calculations for determining the 80th Percentile Storm volume and

methods evaluated and selected to manage the rainfall on-site.

1. This Report may be combined with the LID Analysis and Report.

EE. Storm Water Runoff – Precipitation that is not intercepted or otherwise captured at a site which eventually enters into natural water bodies such as rivers, streams, and lakes.

FF. Subsurface Fluid Distribution System – An assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. (i.e. infiltration galleries, underground retention)

GG. UAC – Acronym for Utah Administrative Code.

HH. UDEQ – Acronym for Utah Department of Environmental Quality.

A3. Rainfall Hydrology

A. All storm drain system components shall be designed to accommodate the 100-year storm event, unless otherwise stated.

B. Storm Specifications

1. Local storm drain piping shall be designed for the 10-year storm, where the street or other aboveground conveyance will carry the difference to the 100-year storm.

2. Storm drain piping connecting two (2) streets through private property shall be designed for the 100-yr storm.

3. Local detention basins, including all piping into the basin from the nearest point of entry, shall be designed to accommodate the 10-year storm event.

4. Local retention basins, including all piping into the basin from the nearest point of entry, shall be designed to accommodate the 100-year, 2 hour storm.

5. Regional detention basins, including all piping into the basin from the nearest point of entry, shall be designed to accommodate the 100-year storm event.

6. The storm duration used for the sizing of basins shall be based upon the worst case scenario.

7. See Exhibits 1 and 2 for rainfall data.

C. Hydrologic Methodology

1. Parameters

a. For residential subdivisions:

i. Hardscape – Proposed streets and sidewalk areas plus the estimated hardscape areas determined by using a recent subdivision with similarly sized lots.

ii. Softscape – The remaining area of the subdivision not hardscape.

b. For commercial subdivisions:

i. Hardscape – Proposed street and sidewalk area plus 85% of lot area

ii. Softscape – 15% of lot area

2. Developments less than 20 acres

a. The Rational Method may be used. A computer model may also be used. See paragraph 3 for more information.

b. Rainfall Intensity – When using the Rational Method, use the rainfall intensity table provided in Exhibit 1 of this document.

c. Runoff Coefficients – The following C-values shall be used when using the Rational Method:

i. Hardscape – 0.80

ii. Softscape (open space, landscaping) – 0.25 or lower, depending on soil and slope.

iii. Values from published sources may be used when pre-approved by the City Engineer.

3. Developments larger than 20 acres

a. A City Engineer-approved computer model shall be used.

b. Rainfall Pattern and Depth – The following rainfall pattern shall be used. This pattern is based on the Farmer-Fletcher Distribution. This pattern is for a 1-inch unit storm and must be multiplied by rainfall depth for storms of other magnitudes, as provided in Exhibit 2.

Farmer-Fletcher Distribution

Unit Storm

Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)	Time (Min.)	Depth (inches)
1	0	11	0.004	21	0.033	31	0.052	41	0.012	51	0.005
2	0	12	0.005	22	0.034	32	0.045	42	0.011	52	0.005
3	0.002	13	0.008	23	0.035	33	0.04	43	0.01	53	0.004
4	0.002	14	0.009	24	0.038	34	0.035	44	0.009	54	0.004
5	0.002	15	0.009	25	0.039	35	0.03	45	0.009	55	0.004
6	0.002	16	0.013	26	0.045	36	0.022	46	0.008	56	0.003
7	0.002	17	0.017	27	0.052	37	0.02	47	0.006	57	0.003
8	0.002	18	0.02	28	0.054	38	0.018	48	0.006	58	0.002
9	0.003	19	0.024	29	0.054	39	0.016	49	0.005	59	0.002
10	0.003	20	0.029	30	0.054	40	0.014	50	0.005	60	0.001

A4. Storm Drain System

A. Independent System

1. Storm waters shall not be conveyed in irrigation ditches.
2. Irrigation waters shall not be conveyed in storm drain systems.

B. Groundwater

1. Where adverse groundwater conditions exist, the City may allow the installation of a subsurface land drain system. Laterals may be installed to each lot for clear groundwater only (surface water may be permitted only upon approval from the City Engineer). Subsurface lines shall be installed with a slope adequate for proper drainage. A backflow control device may be required at the confluence of the land drain system and storm drain system, as determined by the City Engineer.

C. Piping

1. Storm Drain Lines
   a. All storm drain lines considered part of the City's storm drain system shall be reinforced concrete pipe (RCP), of appropriate class.
   b. Minimum size for storm drain mains shall be 15-inch diameter.
   c. Public storm drain pipes shall not be curved.

d. See section A3 for sizing requirements.

2. Land Drain Lines

a. All land drains shall be RCP or PVC.

b. Minimum size for land drain mains shall be 8-inch diameter.

c. Minimum size for land drain laterals shall be 4-inch diameter.

3. Pipe specifications are included in the Section 5 of the Public Standards.

D. Access – Storm drain lines shall have cleanout boxes, inlets, or manholes installed at all changes in grade or alignment, with a maximum distance of 400 feet between accesses. Structures shall be installed in accordance with the Technical Specifications and Standard Drawings.

E. Sumps

1. Sumps are not allowed in the City's storm drain system, except as approved by the City Engineer on a case-by-case basis.

2. Sumps shall not be permitted within zones 1, 2, or 3 of any Drinking Water Source Protection Zone of any drinking water source.

3. Class V Injection Well permitting is required.

F. Grates

1. Grates shall be provided at all entrances/exits of the storm drain system, and on the upstream end of all culverts greater than 50-ft in length.

2. Grates shall be provided on catch basins, junction boxes, control structures, etc.

3. Bar spacing shall be designed for location, function, and safety. (Generally, bar spacing should not exceed three (3) inches.)

A5. Detention and Retention Basins

A. When Required

1. Storm drainage basins are required for all development; however, residential developments less than one (1) acre are not required to have detention or retention, except as when determined by the City Engineer.

2. In an effort to increase the City's ability to more easily manage storm events, Regional Detention Basins shall be constructed wherever possible, as shown in the City's Storm Water Master Plan.

3. As shown in the City's Storm Water Master Plan, Developer may be required to participate in the construction of a new regional detention basin or the upgrading of an existing detention basin that is designated as a regional detention basin in lieu of onsite

detention within the proposed development, if the development is located within a regional detention basin's drainage subbasin.

B. Basin Property, Easement, and Access

1. Public Basins – Public basins shall be located on a separate parcel dedicated to the City with frontage along a public roadway. The developer shall provide the City permanent access to any public basin.

2. Private Basin – Private basins serving multiple lots shall be located on a separate parcel, owned by the home-or land-owners association. Private basins serving a single lot shall be located within the lot. The City shall be provided an easement to, around, and across the basin for emergency access, operation, and/or repair for a private basin.

3. Access – Each basin shall be constructed with sufficient, all-weather, drivable access to all structures from a public street. A turnaround area shall be provided at the termination of the access road.

C. Maintenance and Ownership

Actual ownership and responsibility shall be specifically defined in the Owner's Dedication, Certificates, Development Agreements, or by Deed.

1. New Residential and Commercial Subdivisions – Local basins shall be constructed by the developer and privately owned and maintained, unless otherwise approved.

2. Local Public Basins – Local basins deemed as public shall be approved during the development application process and shall be constructed by the developer. Following conditional acceptance of the construction, the operation and maintenance shall be conveyed to the City.

3. Regional Basins – Regional basins shall be owned and maintained by the City, constructed according to the criteria herein, and approved of the City Engineer.

4. Private Basins

a. Single Lots (Residential and Commercial) – Private basins shall be owned and maintained by the property owner.

b. Multiple Lots – Private basins shall be owned and maintained by a Homeowners' or Business Owners' Association.

c. For all private basins, Developer is required to enter into a Long-Term Storm Water Maintenance Agreement with the City.

D. Access

1. Adequate access for basin maintenance equipment shall be provided for both public and privately-owned basins via a public or private street, or utility easement.

E. Basin Volume

1. All basin designs and calculations shall be included in the Storm Water Report and submitted to and reviewed by the City Engineer for approval.
2. Volume shall be measured to the internal spillway (overflow) elevation.
3. Volume in pipes, ditches, or roadside swales shall not be considered in the volume calculation for detention and retention basins.
4. Storage of water shall not be allowed in parking lots (above ground).
5. Volume may be reduced by the amount of LID retention provided.

F. Allowable Discharge Design

1. See Section A3.B for storm specifications.
2. Discharge shall not exceed the lesser of:
   a. Pre-development runoff with pre-development, meaning the condition of the land prior to settlement, or
   b. The discharge rate determined by using the standard rate of 0.1 cubic feet per second per total acre.

   Show all calculations or provide spreadsheet or program file.
3. Calculations shall be based on the total acreage of the development draining to the basin.
4. Pass-through of offsite drainage through the development must be considered and will be allowed.

G. Underground Storage – Underground storage will be considered on a case-by-case basis. See also paragraph J of this section.

H. Detention and Retention Basin Elements

1. Depth – Basins should not exceed five (5) feet in depth as determined from its lowest point to the overflow or spillway, unless it is completely fenced and secured from trespassing, or as otherwise approved by the City.
2. Side slopes – Side slopes shall not be steeper than 4:1 (horizontal to vertical).
3. Bottom Slope – The basin floor shall be designed so as to prevent the permanent ponding of water. The slope of the floor of the basin shall not be less than 1% to provide drainage of water to the outlet grate and prevent prolonged wet, soggy, or unstable soil conditions. The preferred minimum slope is 2%.
4. Freeboard – At least one (1) foot of freeboard is required (berm above the high water mark).

5. Spillways
    a. The spillway shall be designed to carry the 200-year storm flow minus the 100-year storm flow which is handled by the outlet control structure.
    b. Spillways shall introduce flows back into the pipe or stream downstream of the outlet control.
    c. Spillways shall include a maintained swale and drainage easement to a safe location.
    d. The spillway shall be designed to prevent erosion.
    e. All spillways shall be designed to protect adjacent embankments, nearby structures, and surrounding properties.
6. Ground Covers – The surface area of the basin shall be sodded. A minimum of four (4) inches of topsoil must be installed prior to sod placement. A sprinkler irrigation system is also required for all grassed basins. Developer/contractor is responsible for establishing vegetation.
7. Embankment (Fill) Construction – If a raised embankment is constructed for a basin (constructed with granular materials), it shall be provided with a minimum of 6-inches of clay cover on the inside of the berm to prevent water passage through the soil.
8. Excavation (Cut) Construction – If the basin is constructed primarily by excavation, then it may be necessary to provide an impermeable liner (for detention basins) and land drain system when constructed in the proximity of basements or other below grade structures as determined by the geotechnical investigation.
9. Multi-Use Basins – Basins may be designed as multi-use facilities when appropriate precautions are incorporated into the design. If amenities such as pavilions, playground equipment, volleyball courts, etc. are to be constructed within the water detention area of a basin, they shall be designed appropriately. Structures shall be designed for saturated soil conditions and bearing capacities are to be reduced accordingly. Restrooms shall not be located in areas of inundation. Inlet and outlet structures should be located as far as possible from all facilities. No wood chips or floatable objects may be used in the area that will be inundated. Where applicable, the design shall follow Geotech recommendations for basin lining.
10. Fencing – A conveniently-located access gate, appropriately sized for entrance by maintenance vehicles and equipment, shall be provided for fenced basins. Fencing should not be located at the top of the basin embankment where maintenance equipment, vehicles, and personnel need access. Fencing shall be 6-ft tall chain link in accordance with these Public Works Standards and shall conform to City Zoning Requirements.

I. Detention Basins

1. Percolation – No reduction due to percolation for detention basins volumes shall be permitted.
2. Outlet Control
    a. Private detention basins may have a calculated fixed orifice plate mounted on the outlet of the basin.
    b. Public detention basins shall have movable, screw-type head gates set at the calculated opening height with a stop block required to carry the maximum allowable discharge.
3. Low Flow Piping – The inlet and outlet structures may be located in different areas of the basin, requiring a buried pipe to convey any base flows that enter and exit the basin. (Cross gutters and surface flows are prohibited.) The minimum pipe size and material for the low flow pipe shall be 15-inch RCP or as otherwise specified by the City Engineer.
4. Oil/Sediment Separators
    a. Sizing and design of oil/sediment separators shall be reviewed by the City Engineer and City Personnel prior to installation.
        i. Manufacturer's recommendations for sizing must be followed with calculations submitted to the City.
        ii. Consideration must be given to frequency and ease of maintenance of the structure
        iii. Separator may either be installed upstream or downstream of detention basin, appropriately size for such location.
    b. Any site dealing with large parking lots or particularly dirty parking lots such as auto repair and maintenance will be required to have an oil separator
    c. Private basins shall have contracts in place with a local sewer company to periodically clean the Separator (at least annually).

J. Retention Basins

1. Retention basins must be specifically approved by the City Engineer.
2. Retention basins shall not be permitted within zones 1, 2, or 3 of any Drinking Water Source Protection Zone of any drinking water source.
3. An approved oil/sediment separator shall be installed upstream of retention basin.
4. Retention Basin Criteria – Retention basins, in lieu of detention, may be permitted if the following conditions apply:
    a. The distance between the nearest City storm drain and the boundary of the development is greater than:

i. For residential development: 500 feet or 50 feet times the number of lots in the entire development (whichever is greater);

ii. For commercial development: 20 feet times the number of parking stalls on the site;

b. The basin is not located within a Hazardous Area (such as a steep slope) or some other sensitive area (such as a Drinking Water Source Protection Zone).

c. Site is topographically incapable of draining to the City system.

d. Recommendation by the City Engineer.

5. Percolation Rate for Retention Basins

a. A percolation test shall be performed by a licensed tester. The percolation test shall be performed at the elevation of the proposed grade of the bottom of the retention basin.

b. Due to degradation of soils ability to percolate over time, only 80% of the percolation rate shall be used in the calculations for the retention basins.

6. Retention basins shall be designed to completely drain within 48 hours of the primary storm event.

K. Subsurface Fluid Distribution Systems

1. See Paragraph I for requirements related to Percolation Rate for Retention Basins.

2. A Class V injection well permit is required, where applicable.

3. An approved oil/sediment separator (or other water quality measure) shall be installed upstream of subsurface fluid distribution system.

4. Subsurface Fluid Distribution Systems are not allowed for storm water disposal if located in Zone 1 or 2 of a drinking water source. They may be allowed in Zone 3 or 4 of a drinking water source if they are equipped with appropriate pretreatment and approved by the City Engineer.

5. Examples of Subsurface Fluid Distribution Systems include but are not limited to: ADS StormTech® systems, ACF Environmental R-Tanks® and similar; perforated pipe infiltration galleries, etc.

A6. Water Quality

A. Long-term Best Management Practices (BMPs) shall be used to maintain, to the maximum extent practical, the quality of the water to the pre-developed condition.

B. Construction BMPs shall be implemented per the City's Storm Water Management Plan.

A7. 80th Percentile Storm Retention

A. All new development and redevelopment projects equal to or greater than one (1) acre, or projects that are less than one (1) acre that are part of a larger common plan of development or sale, shall be required to manage rainfall on-site, and prevent the off-site discharge of the precipitation from all rainfall events less than or equal to the 80th percentile rainfall event [storm]. This objective must be accomplished by the use of practices that are designed, constructed, and maintained to infiltrate, evapotranspire, and/or harvest and reuse rainwater. If meeting this retention standard is technically infeasible, a rationale shall be provided on a case by case basis for the use of alternative design criteria. The project must document and quantify that infiltration, evapotranspiration, and rainwater harvesting have been used to the maximum extent technically feasible and that full employment of these controls are infeasible due to site constraints.[3] A Storm Water Quality Report (State template or similar) shall be submitted for the project.

B. In Perry City, the 80th percentile storm has been determined to be 0.54 inches of depth.

C. The intent is to manage water as close as possible to the point at which it falls.

D. Calculations and implementation rationale must be contained in the Storm Water Report.

E. LID measures should be implemented to meet the 80th Percentile Storm requirements.

F. Implementation of this retention standard does not reduce or eliminate the requirement for detention/retention basins as described in Section A5.

A8. Low Impact Development

All new development and redevelopment projects equal to or greater than one (1) acre, or projects that are less than one (1) acre that are part of a larger common plan of development or sale, shall be required to evaluate and implement Low Impact Development (LID) approaches to infiltrate, evapotranspire, and/or harvest and use storm water from the site to protect water quality.[4] See Exhibit 3 for a Summary of Allowable LID BMPs.

A. Structural controls may include green infrastructure practices such as:

1. Rainwater harvesting (e.g. rain barrels)
2. Rain gardens
3. Permeable pavement or pavers (not permitted on public streets)
4. Vegetated swales
5. Preservation of vegetation (non-disturbance)
6. Others as approved by the City Engineer

[4] Adapted from General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s); State of Utah Department of Environmental Quality, Division of Water Quality; November 20, 2016.

B. LID approaches must be evaluated and detailed in a LID Analysis and Report, which shall be submitted to and approved by the City Engineer.

C. If an LID approach cannot be utilized, the Applicant must document an explanation of the reasons preventing this approach and the rationale for the *chosen alternative controls* on a case-by-case basis for each project.[3]

D. The Hydrodynamic Separator shall be sized to treat the flows from the two-year storm event with the storm duration resulting in the maximum detention.

EXHIBIT 1 – NOAA POINT PRECIPITATION FREQUENCY ESTIMATES – INTENSITY

NOAA Atlas 14, Volume 1, Version 5 BRIGHAM CITY
Station ID: 42-0924
Location name: Brigham City, Utah, USA*
Latitude: 41.4833°, Longitude: -112.0333°
Elevation:
Elevation (station metadata): 4344 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.129** (0.113-0.149)	**0.163** (0.144-0.189)	**0.223** (0.195-0.257)	**0.279** (0.241-0.321)	**0.366** (0.310-0.425)	**0.447** (0.368-0.523)	**0.543** (0.434-0.642)	**0.655** (0.506-0.789)	**0.837** (0.612-1.03)	**1.00** (0.702-1.27)
10-min	**0.196** (0.171-0.226)	**0.249** (0.219-0.288)	**0.340** (0.297-0.392)	**0.424** (0.367-0.489)	**0.558** (0.472-0.647)	**0.681** (0.561-0.796)	**0.826** (0.661-0.977)	**0.998** (0.770-1.20)	**1.27** (0.932-1.58)	**1.53** (1.07-1.93)
15-min	**0.243** (0.212-0.280)	**0.308** (0.272-0.356)	**0.421** (0.368-0.485)	**0.526** (0.455-0.606)	**0.691** (0.586-0.803)	**0.844** (0.695-0.987)	**1.02** (0.820-1.21)	**1.24** (0.955-1.49)	**1.58** (1.16-1.95)	**1.89** (1.32-2.40)
30-min	**0.327** (0.286-0.377)	**0.415** (0.365-0.480)	**0.568** (0.495-0.654)	**0.708** (0.612-0.816)	**0.931** (0.789-1.08)	**1.14** (0.936-1.33)	**1.38** (1.10-1.63)	**1.67** (1.29-2.00)	**2.13** (1.56-2.63)	**2.55** (1.78-3.23)
60-min	**0.405** (0.354-0.467)	**0.514** (0.452-0.594)	**0.702** (0.613-0.809)	**0.877** (0.758-1.01)	**1.15** (0.976-1.34)	**1.41** (1.16-1.65)	**1.71** (1.37-2.02)	**2.06** (1.59-2.48)	**2.63** (1.93-3.25)	**3.16** (2.21-3.99)
2-hr	**0.527** (0.471-0.597)	**0.661** (0.588-0.748)	**0.860** (0.761-0.972)	**1.05** (0.915-1.19)	**1.35** (1.15-1.54)	**1.62** (1.36-1.87)	**1.95** (1.58-2.27)	**2.33** (1.83-2.77)	**2.94** (2.18-3.59)	**3.50** (2.49-4.38)
3-hr	**0.613** (0.554-0.689)	**0.760** (0.688-0.855)	**0.958** (0.861-1.08)	**1.14** (1.02-1.29)	**1.43** (1.26-1.63)	**1.70** (1.46-1.94)	**2.02** (1.69-2.34)	**2.40** (1.94-2.82)	**3.00** (2.32-3.64)	**3.56** (2.64-4.40)
6-hr	**0.831** (0.761-0.912)	**1.02** (0.932-1.13)	**1.25** (1.14-1.38)	**1.45** (1.31-1.61)	**1.76** (1.57-1.96)	**2.01** (1.77-2.26)	**2.30** (1.99-2.61)	**2.63** (2.23-3.02)	**3.25** (2.66-3.81)	**3.80** (3.02-4.55)
12-hr	**1.07** (0.985-1.18)	**1.32** (1.21-1.45)	**1.60** (1.46-1.76)	**1.85** (1.68-2.04)	**2.22** (1.99-2.46)	**2.52** (2.23-2.81)	**2.84** (2.47-3.21)	**3.19** (2.72-3.65)	**3.72** (3.08-4.35)	**4.16** (3.36-4.95)
24-hr	**1.36** (1.25-1.48)	**1.67** (1.54-1.82)	**2.03** (1.87-2.21)	**2.33** (2.15-2.53)	**2.75** (2.52-2.98)	**3.08** (2.81-3.34)	**3.43** (3.11-3.72)	**3.78** (3.41-4.11)	**4.27** (3.81-4.66)	**4.65** (4.13-5.09)
2-day	**1.58** (1.46-1.72)	**1.94** (1.79-2.11)	**2.34** (2.16-2.55)	**2.68** (2.46-2.91)	**3.15** (2.88-3.42)	**3.52** (3.22-3.83)	**3.91** (3.55-4.24)	**4.31** (3.89-4.68)	**4.86** (4.34-5.29)	**5.29** (4.68-5.77)
3-day	**1.73** (1.60-1.89)	**2.13** (1.96-2.33)	**2.58** (2.37-2.81)	**2.95** (2.71-3.22)	**3.48** (3.18-3.78)	**3.89** (3.55-4.24)	**4.32** (3.91-4.70)	**4.76** (4.29-5.19)	**5.38** (4.79-5.88)	**5.85** (5.16-6.41)
4-day	**1.89** (1.74-2.07)	**2.33** (2.14-2.55)	**2.82** (2.59-3.08)	**3.23** (2.97-3.53)	**3.80** (3.48-4.14)	**4.26** (3.88-4.65)	**4.73** (4.28-5.16)	**5.22** (4.68-5.70)	**5.89** (5.24-6.46)	**6.42** (5.65-7.06)
7-day	**2.28** (2.10-2.50)	**2.82** (2.60-3.09)	**3.42** (3.14-3.74)	**3.91** (3.59-4.28)	**4.61** (4.21-5.03)	**5.14** (4.69-5.62)	**5.70** (5.17-6.23)	**6.28** (5.65-6.87)	**7.05** (6.30-7.73)	**7.66** (6.79-8.41)
10-day	**2.58** (2.38-2.80)	**3.18** (2.94-3.47)	**3.85** (3.56-4.19)	**4.40** (4.07-4.79)	**5.15** (4.74-5.60)	**5.72** (5.24-6.21)	**6.31** (5.76-6.86)	**6.90** (6.26-7.50)	**7.70** (6.93-8.38)	**8.31** (7.42-9.07)
20-day	**3.35** (3.11-3.62)	**4.14** (3.84-4.47)	**4.96** (4.61-5.34)	**5.61** (5.20-6.03)	**6.45** (5.97-6.93)	**7.08** (6.53-7.60)	**7.69** (7.08-8.27)	**8.29** (7.61-8.93)	**9.07** (8.28-9.80)	**9.64** (8.76-10.4)
30-day	**4.07** (3.81-4.39)	**5.01** (4.68-5.40)	**5.99** (5.60-6.45)	**6.77** (6.32-7.28)	**7.78** (7.26-8.37)	**8.54** (7.94-9.19)	**9.30** (8.62-10.0)	**10.0** (9.26-10.8)	**11.0** (10.1-11.9)	**11.7** (10.7-12.7)
45-day	**5.09** (4.75-5.46)	**6.25** (5.84-6.72)	**7.41** (6.92-7.93)	**8.30** (7.75-8.88)	**9.44** (8.80-10.1)	**10.3** (9.55-10.9)	**11.1** (10.3-11.8)	**11.8** (11.0-12.7)	**12.8** (11.8-13.7)	**13.5** (12.4-14.5)
60-day	**6.00** (5.59-6.44)	**7.36** (6.86-7.91)	**8.66** (8.07-9.28)	**9.64** (8.99-10.3)	**10.9** (10.1-11.6)	**11.7** (10.9-12.6)	**12.6** (11.7-13.5)	**13.4** (12.4-14.4)	**14.3** (13.2-15.4)	**15.0** (13.8-16.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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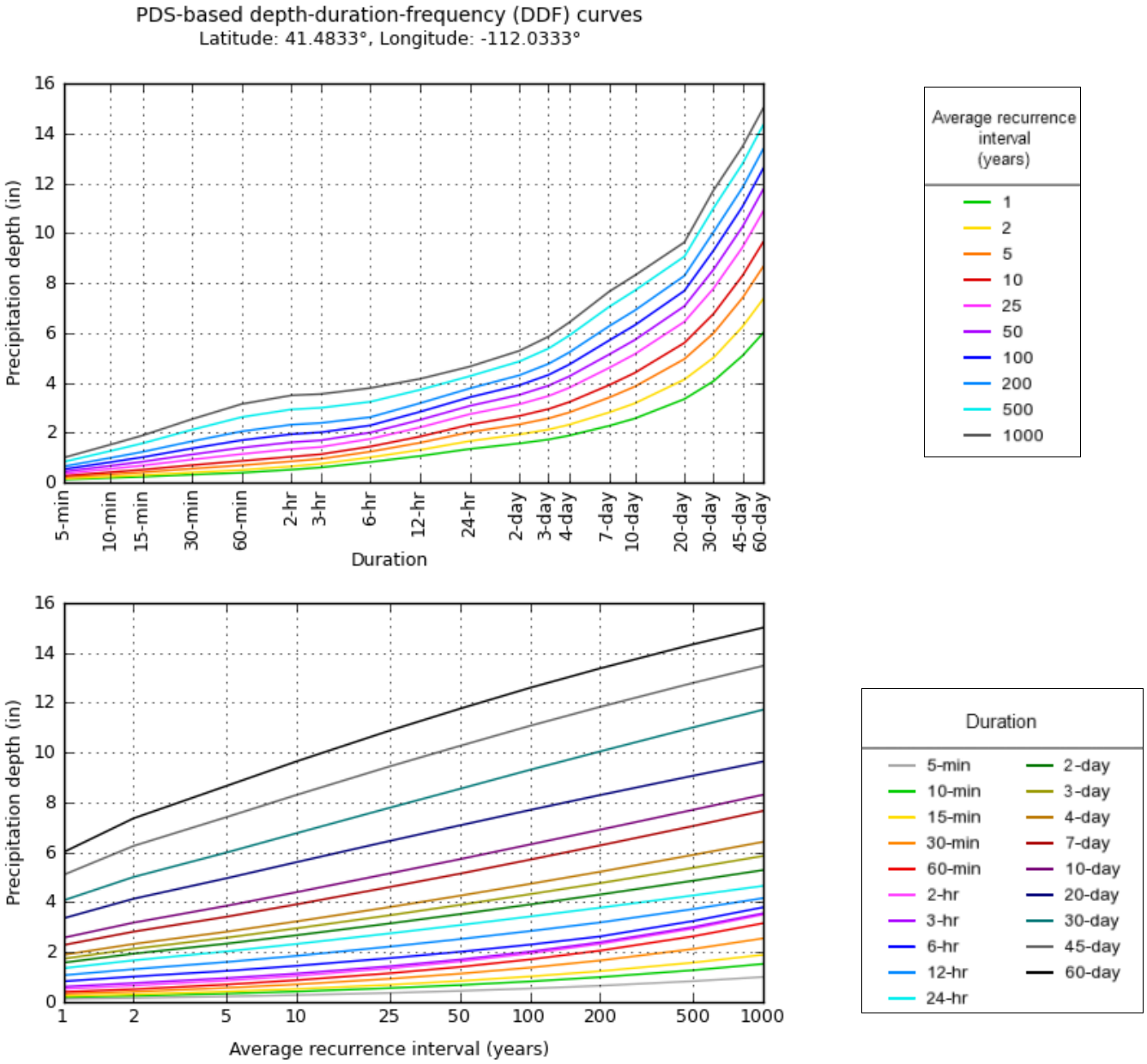
PF graphical



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Wed May 5 17:38:22 2021

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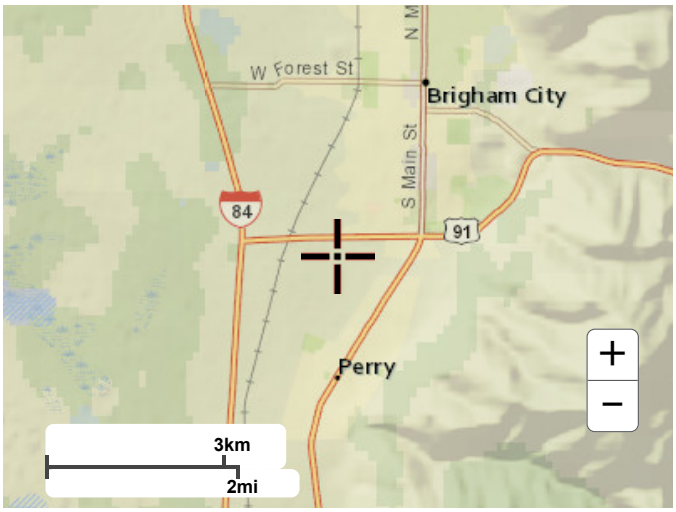
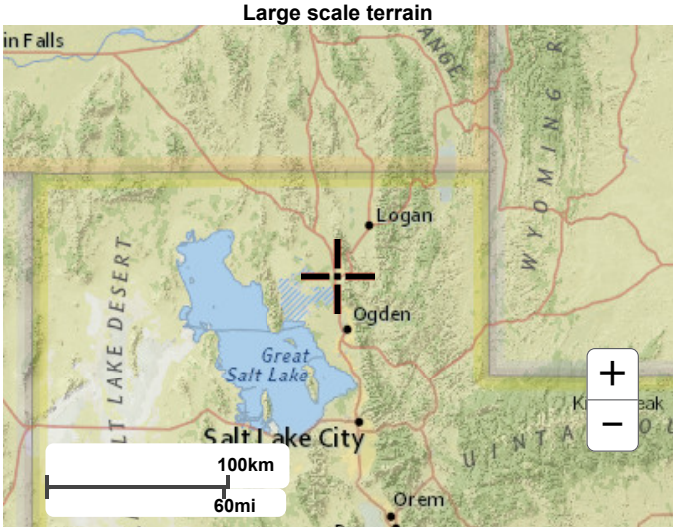
Maps & aerials

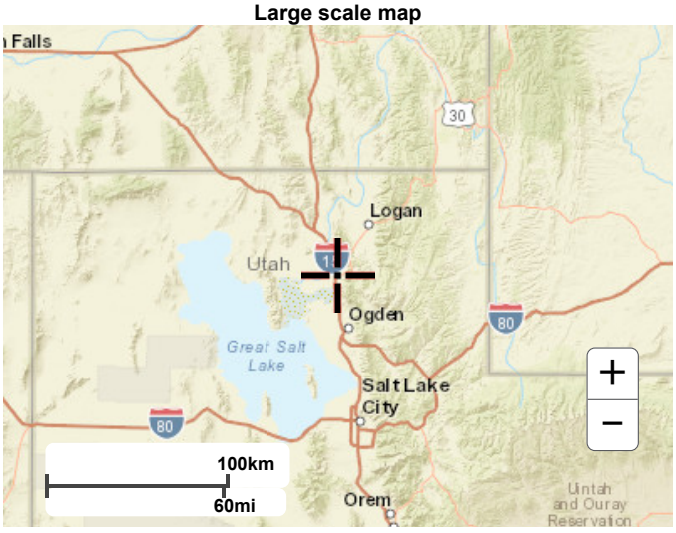
Small scale terrain



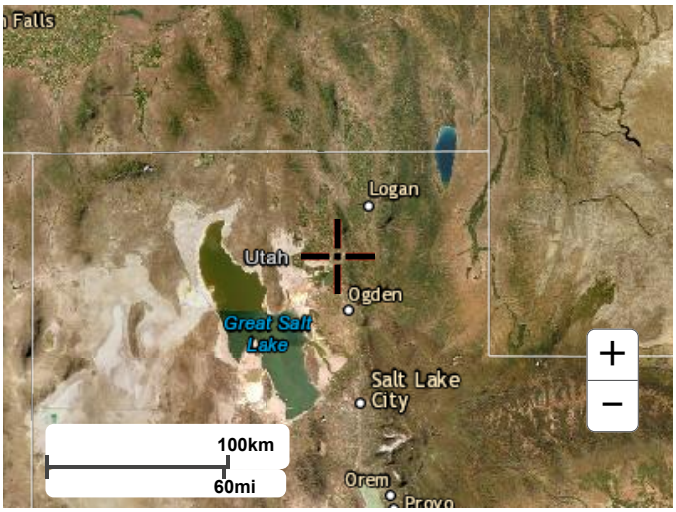
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

EXHIBIT 2 – NOAA POINT PRECIPITATION FREQUENCY ESTIMATES – DEPTH

NOAA Atlas 14, Volume 1, Version 5
Location name: Brigham City, Utah, USA*
Latitude: 41.4675°, Longitude: -112.0209°
Elevation: 4498.56 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.70** (1.50-1.97)	**2.16** (1.91-2.50)	**2.95** (2.57-3.38)	**3.66** (3.17-4.20)	**4.78** (4.06-5.52)	**5.80** (4.79-6.77)	**7.01** (5.63-8.27)	**8.44** (6.53-10.1)	**10.7** (7.88-13.3)	**12.9** (9.02-16.3)
10-min	**1.30** (1.14-1.49)	**1.64** (1.45-1.90)	**2.24** (1.96-2.57)	**2.78** (2.41-3.19)	**3.63** (3.09-4.20)	**4.42** (3.64-5.15)	**5.33** (4.28-6.29)	**6.42** (4.97-7.72)	**8.17** (6.00-10.1)	**9.80** (6.86-12.4)
15-min	**1.07** (0.940-1.23)	**1.36** (1.20-1.57)	**1.85** (1.62-2.12)	**2.30** (1.99-2.64)	**3.00** (2.55-3.47)	**3.65** (3.01-4.26)	**4.40** (3.54-5.20)	**5.30** (4.11-6.38)	**6.76** (4.96-8.35)	**8.10** (5.67-10.3)
30-min	**0.722** (0.632-0.830)	**0.916** (0.808-1.06)	**1.25** (1.09-1.43)	**1.55** (1.34-1.78)	**2.02** (1.72-2.34)	**2.46** (2.03-2.86)	**2.97** (2.38-3.50)	**3.57** (2.77-4.29)	**4.55** (3.34-5.62)	**5.46** (3.82-6.92)
60-min	**0.447** (0.392-0.514)	**0.567** (0.500-0.653)	**0.771** (0.674-0.886)	**0.957** (0.830-1.10)	**1.25** (1.06-1.45)	**1.52** (1.25-1.77)	**1.84** (1.47-2.17)	**2.21** (1.71-2.66)	**2.81** (2.07-3.48)	**3.38** (2.36-4.28)
2-hr	**0.292** (0.260-0.330)	**0.366** (0.326-0.414)	**0.474** (0.420-0.536)	**0.574** (0.503-0.652)	**0.737** (0.632-0.841)	**0.886** (0.744-1.02)	**1.06** (0.864-1.23)	**1.26** (0.996-1.50)	**1.59** (1.19-1.95)	**1.90** (1.35-2.38)
3-hr	**0.226** (0.204-0.253)	**0.280** (0.254-0.314)	**0.352** (0.316-0.394)	**0.418** (0.373-0.470)	**0.524** (0.460-0.592)	**0.620** (0.533-0.707)	**0.736** (0.617-0.851)	**0.870** (0.707-1.02)	**1.09** (0.844-1.32)	**1.29** (0.959-1.59)
6-hr	**0.156** (0.143-0.171)	**0.192** (0.175-0.211)	**0.233** (0.212-0.257)	**0.270** (0.244-0.299)	**0.326** (0.291-0.362)	**0.373** (0.328-0.417)	**0.425** (0.368-0.481)	**0.485** (0.411-0.556)	**0.597** (0.490-0.699)	**0.697** (0.556-0.833)
12-hr	**0.102** (0.093-0.112)	**0.125** (0.115-0.137)	**0.151** (0.138-0.167)	**0.175** (0.158-0.192)	**0.209** (0.187-0.232)	**0.238** (0.210-0.266)	**0.268** (0.233-0.303)	**0.301** (0.256-0.344)	**0.350** (0.290-0.410)	**0.391** (0.316-0.465)
24-hr	**0.069** (0.064-0.076)	**0.086** (0.078-0.094)	**0.104** (0.095-0.114)	**0.120** (0.109-0.131)	**0.141** (0.128-0.155)	**0.158** (0.143-0.173)	**0.176** (0.158-0.193)	**0.194** (0.174-0.214)	**0.220** (0.194-0.242)	**0.240** (0.210-0.265)
2-day	**0.041** (0.037-0.045)	**0.050** (0.046-0.056)	**0.061** (0.056-0.067)	**0.070** (0.064-0.078)	**0.083** (0.075-0.091)	**0.093** (0.084-0.103)	**0.104** (0.093-0.114)	**0.115** (0.102-0.127)	**0.130** (0.115-0.144)	**0.143** (0.124-0.158)
3-day	**0.031** (0.028-0.034)	**0.038** (0.034-0.042)	**0.046** (0.042-0.051)	**0.053** (0.048-0.059)	**0.063** (0.057-0.069)	**0.071** (0.063-0.078)	**0.079** (0.070-0.087)	**0.087** (0.077-0.096)	**0.099** (0.087-0.110)	**0.108** (0.094-0.120)
4-day	**0.025** (0.023-0.028)	**0.031** (0.029-0.035)	**0.038** (0.035-0.042)	**0.044** (0.040-0.049)	**0.053** (0.047-0.058)	**0.059** (0.053-0.065)	**0.066** (0.059-0.073)	**0.073** (0.065-0.081)	**0.083** (0.073-0.093)	**0.091** (0.079-0.102)
7-day	**0.018** (0.016-0.020)	**0.022** (0.020-0.025)	**0.027** (0.025-0.030)	**0.031** (0.028-0.035)	**0.037** (0.034-0.041)	**0.042** (0.038-0.047)	**0.047** (0.042-0.052)	**0.052** (0.046-0.058)	**0.059** (0.051-0.066)	**0.064** (0.056-0.072)
10-day	**0.014** (0.013-0.016)	**0.018** (0.016-0.020)	**0.022** (0.020-0.024)	**0.025** (0.023-0.027)	**0.029** (0.027-0.032)	**0.033** (0.029-0.036)	**0.036** (0.032-0.040)	**0.040** (0.035-0.044)	**0.045** (0.039-0.050)	**0.049** (0.043-0.054)
20-day	**0.009** (0.009-0.010)	**0.012** (0.011-0.013)	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.018** (0.017-0.020)	**0.020** (0.018-0.022)	**0.022** (0.020-0.024)	**0.024** (0.022-0.026)	**0.026** (0.024-0.029)	**0.028** (0.025-0.031)
30-day	**0.008** (0.007-0.008)	**0.010** (0.009-0.010)	**0.011** (0.011-0.012)	**0.013** (0.012-0.014)	**0.015** (0.014-0.016)	**0.016** (0.015-0.018)	**0.018** (0.016-0.020)	**0.020** (0.018-0.021)	**0.022** (0.019-0.024)	**0.023** (0.021-0.025)
45-day	**0.006** (0.006-0.007)	**0.008** (0.007-0.009)	**0.009** (0.009-0.010)	**0.011** (0.010-0.012)	**0.012** (0.011-0.013)	**0.013** (0.012-0.015)	**0.015** (0.013-0.016)	**0.016** (0.014-0.017)	**0.017** (0.015-0.019)	**0.018** (0.016-0.020)
60-day	**0.006** (0.005-0.006)	**0.007** (0.006-0.008)	**0.008** (0.008-0.009)	**0.009** (0.009-0.010)	**0.011** (0.010-0.011)	**0.011** (0.010-0.012)	**0.012** (0.011-0.013)	**0.013** (0.012-0.014)	**0.014** (0.013-0.016)	**0.015** (0.014-0.017)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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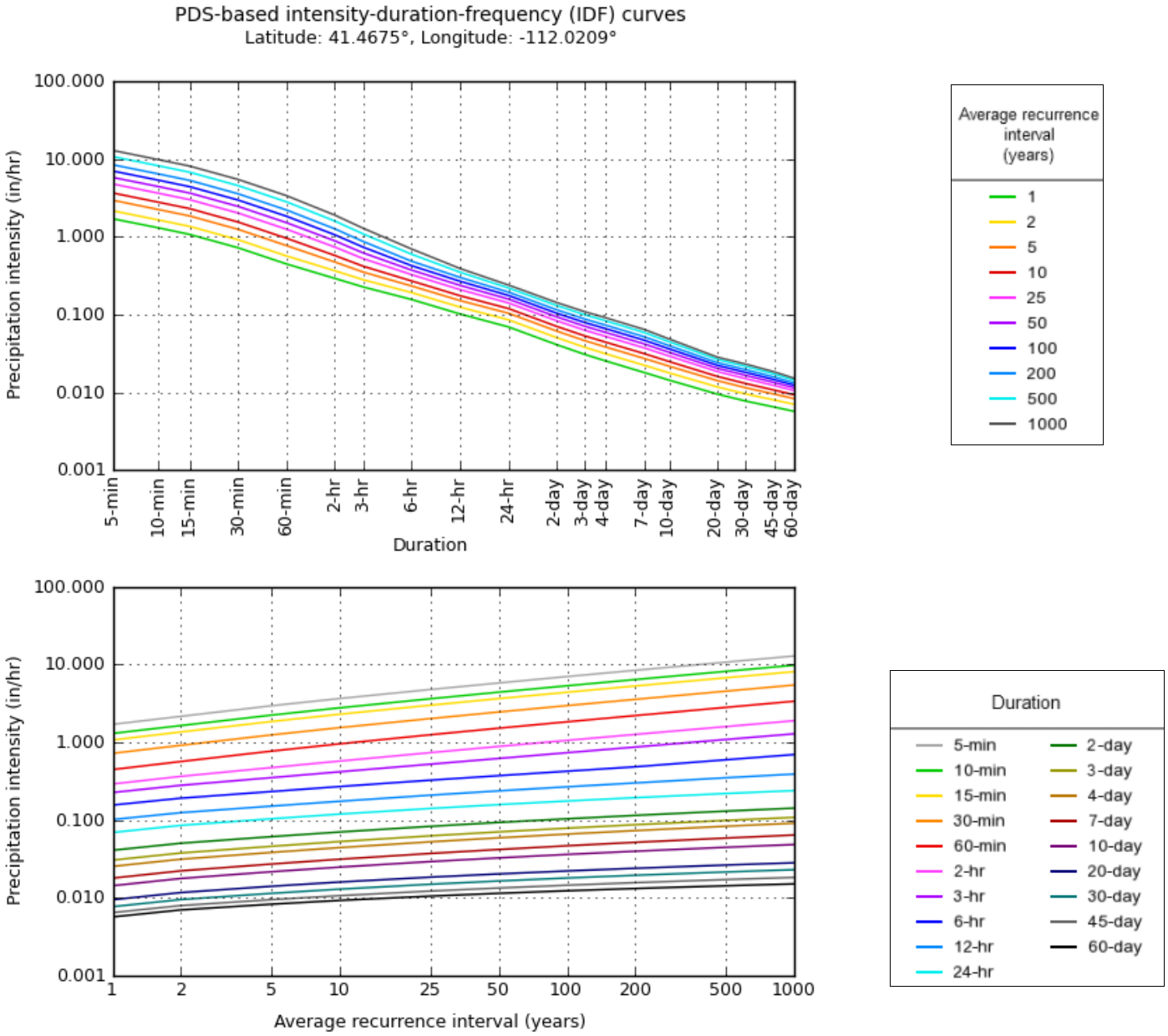
PF graphical



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Created (GMT): Wed May 5 17:41:21 2021

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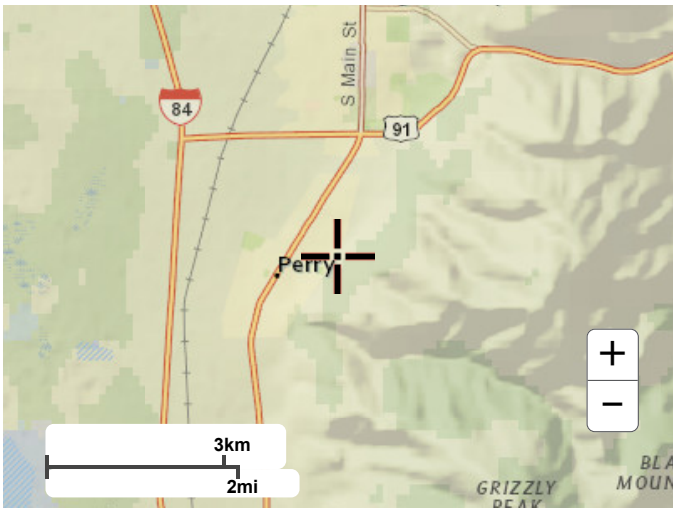
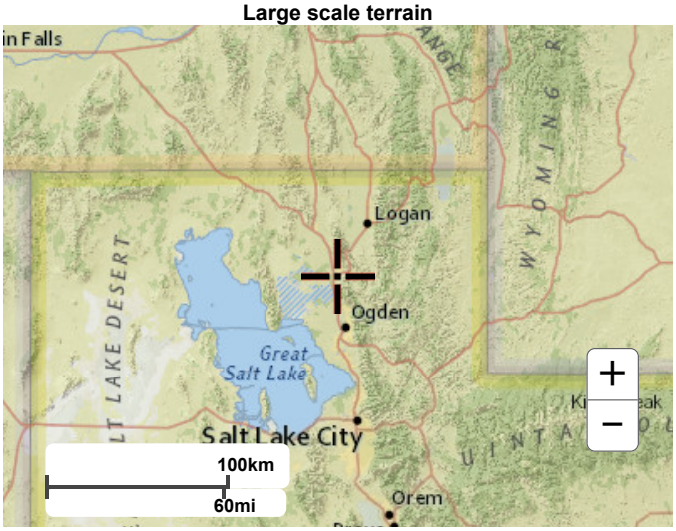
Maps & aerials

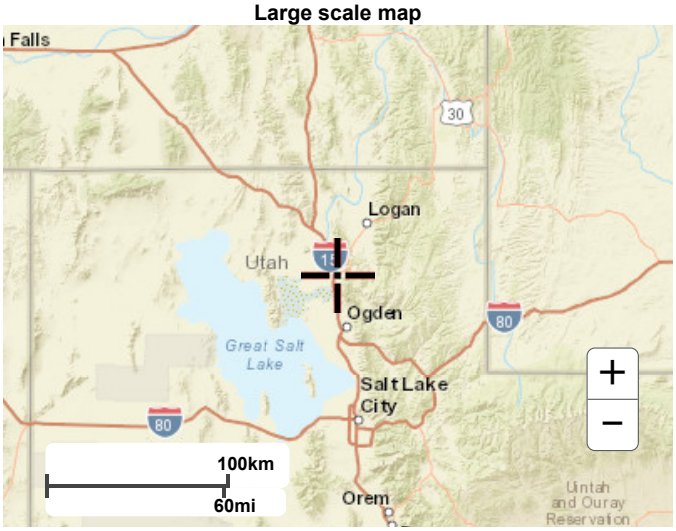
Small scale terrain



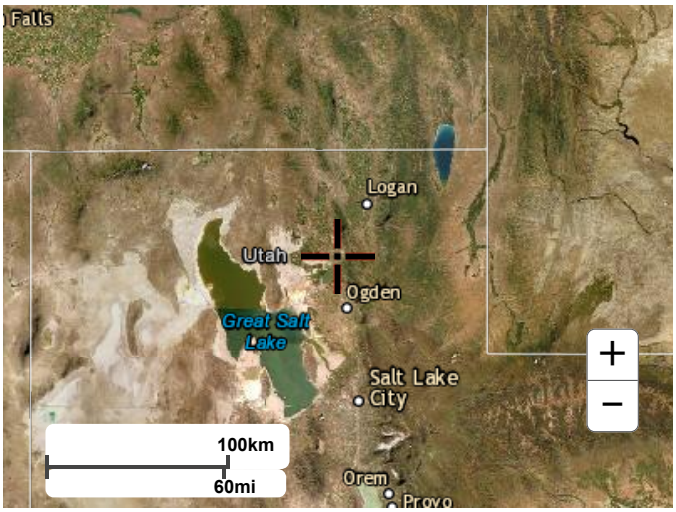
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

EXHIBIT 3 – SUMMARY OF ALLOWABLE LID BMPs

Summary of Allowable LID BMPs
from *A Guide to Low Impact Development within Utah*

https://deq.utah.gov/water-quality/low-impact-development

				Primary Functions				Where Permitted				
LID BMP Category	LID BMP Type	Fact Sheet ID	Removal Effectiveness[1]	Bioretention	Volume Retention	Biofiltration	Maintenance Effort	Residential - Public Roads	Residential - Private Roads	Residential - Multi-family	Commercial	Industrial
Bioretention	Rain Garden	BR-1	high	yes	yes	yes	low-med	yes	yes	yes	yes	yes
	Bioretention Cell	BR-2	high	yes	yes	yes	low-med	no[2]	no[2]	no[2]	no[2]	no[2]
	Bioswale	BR-3	medium	yes	some	yes	low	no[2]	no[2]	no[2]	no[2]	no[2]
	Vegetated Strip	BR-4	med-high	yes	some	yes	low	yes	yes	yes	yes	yes
	Tree Box Filter	BR-5	med-high	yes	varies	yes	medium	no[2]	no[2]	no[2]	no[2]	no[2]
	Green Roof	BR-6	med-high	yes	yes	yes	med-high	no[2]	no[2]	no[2]	yes	yes
Pervious Surfaces	Pervious Surfaces	PS-1	high	yes	yes	some	low-med	no[2]	no[2]	yes	yes	yes
Infiltration Devices[5]	Infiltration Basin[3]	ID-1	high	yes	yes	yes	low	yes	yes	yes	yes	yes
	Infiltration Trench	ID-2	high	yes	yes	some	low	yes	yes	yes	yes	yes
	Dry Well[3,4]	ID-3	high	yes	yes	no	low-med	yes	yes	yes	yes	no[2]
	Underground Infiltration Gallery[3,4]	ID-4	high	yes	yes	no	low-med	no[2]	no[2]	yes	yes	yes
Harvest and Reuse	Harvest and Reuse	HR-1	varies	varies	yes	varies	low	no[2]	no[2]	no[2]	yes	yes

Notes

[1] Sediment, Nutrients, Metals, Bacteria, Oil/Grease

[2] Individual homes are encouraged to utilitize BMP, but it will not count towards LID and retention requirement for development.

[3] Requires pre-treatment

[4] Requires UIC Class V injection well permit from State of Utah

[5] Other factors (e.g. drinking water source protection zone, contaminated groundwater, etc.) may limit use.

Nearby examples:

Vegetated Strip - 2025 W/2075 W 500 S, Marriott-Slaterville

Bioretention Cell - Grant Ave, 20th to 24th, Ogden

Bioretention Cell - Union Grill, Grant Ave at 24th, Ogden

APPENDIX B – GEOTECHNICAL INVESTIGATION REPORT MINIMUM REQUIREMENTS

APPENDIX B

GEOTECHNICAL INVESTIGATION REPORT MINIMUM REQUIREMENTS

B1. General Provisions

A. All reports shall include the Minimum Testing Requirements and use the Design Parameters as detailed below.

B. All reports shall be signed and sealed by a registered Professional Engineer licensed in Utah.

B2. Report Contents

A. Geotechnical Investigation Report submitted to Perry City shall generally include the following contents, as applicable.

CONTENTS

6.7 Utility Trenches
6.8 Re-use of Excavated Soil Materials
7.0 Foundations
7.1 Foundation Recommendations
7.2 Installation Requirements
7.3 Estimated Settlement
7.4 Lateral Resistance
8.0 Static and Seismic Lateral Earth Pressures (Active, Moderately Yielding, At-Rest, and Passive Conditions)
9.0 Floor Slabs
10.0 Drainage Recommendations
10.1 Surface
10.2 Subsurface
10.3 Foundation Drains/Subdrains
11.0 Pavement Section
11.1 (See Section B4)
11.2 Exterior Concrete Flatwork
12.0 Retaining Walls (Required for all retaining walls taller than 4 feet, when used)
12.1 Surface and Subsurface Drainage
12.2 Internal and Global Stability (Static and Seismic Loading)
12.3 Dimensions and Elevations
12.4 Settlements
12.5 Construction Inspection
13.0 Slope Stability (Required for slopes greater than 25%)
14.0 References
Tables
Figures
A. Project Location/Site Map
B. Boring/Test Pit Locations
C. Boring/Test Pit Logs
D. Key to Symbols for Boring/Test Pit Logs
Appendices, as needed

B3. Minimum Testing Requirements

A. Borings (B) and Test Pits (TP), either known as a "hole"
1. Total: Minimum 1 hole per 2 acres, rounded up
a. Example: 5.5 acre site: 5.5÷2 = 2.75, round up to 3 holes
2. Roadway: 1 hole + 1 hole per 500 lf of roadway (rounded up, along centerline alignment) (counts towards Total)
a. Example: 10.5 acre subdivision with 1,850 lf of roadway centerline
i. Roadway: 1 + (1,850÷500) = 4.7, round up to 5 holes
ii. Total, minimum: 10.5÷2 = 5.25, round up to 6 holes

iii. Therefore, 6 total holes are required for subdivision, with 5 of the holes being along the roadway alignment.

3. Commercial sites: 1 hole + 1 hole per 5,000 square feet (rounded up) for buildings
   a. Example: 13,500 sf building: 1 + (13,500÷5,000) = 3.7, round up to 4 holes
4. Additional borings or test pits as may be required for a representative sampling of the site, as determined by the geotechnical engineer.

B4. Minimum Design Parameters for Pavement

A. Local/Residential
   1. 75,000 ESALS
   2. 205 ESALS day
   3. 20-yr design life
   4. 3% growth factor

B. Cul-de-Sac
   1. 50,000 ESALS
   2. 137 ESALS/day
   3. 20-yr design life
   4. 3% growth factor

C. Minor Collector (as shown on the City's Master Street Map)
   1. 300,000 ESALS
   2. 322 ESALS/day
   3. 20-yr design life
   4. 3% growth factor

D. Major Collector / Minor Arterial
   1. Contact City for traffic requirements

APPENDIX C – MODIFICATIONS AND ADDITIONS TO MANUAL OF STANDARD SPECIFICATIONS

APPENDIX C

MODIFICATIONS AND ADDITIONS TO THE *2017 MANUAL OF STANDARD SPECIFICATIONS*

as published by:
Utah LTAP Center
Utah State University
Logan Utah
2017

TABLE OF CONTENTS

SECTION 03 20 00 M
CONCRETE REINFORCING (MODIFIED)

PART 3 EXECUTION

3.1 **PLACING**

Add paragraphs F and G as follows:

F. No steel shall extend from or be visible on any finished surface.

G. All steel shall have a minimum of 1.5-inches of concrete cover.

SECTION 03 30 04 M
CONCRETE (Modified)

PART 2 PRODUCTS

2.5 **MIX DESIGN**

Replace paragraph A with the following:

A. **Class:** : When not specified in the plans or project specification, use the following table to select the class of concrete required for the application:

Class	Application
5,000	Reinforced Structural Concrete
4,000	Sidewalks, curb, gutter, cross gutters, waterways, pavements, and unreinforced footings and foundations
3,000	Thrust blocks
2,000	Anchors, mass concrete

SECTION 03 30 10 M
CONCRETE PLACEMENT (Modified)

PART 3 EXECUTION

3.2 PREPARATION

Add paragraph F as follows:

F. No concrete shall be placed until the surfaces have been inspected and approved by the City Engineer or City Inspector.

Add Section 22 13 29 Sanitary Sewerage Pumps

SECTION 22 13 29
SANITARY SEWERAGE PUMPS

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. Pumps shall be capable of handling raw, unscreened sewerage. Pump shall be automatically connected to the discharge connection elbow when lowered into place and shall be easily removed for inspection or service. Pump, its appurtenances, and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.

1.2 SECTION INCLUDES

A. Submersible sewerage pump with controls and components.

B. Coordinate installation with work of separate trades.

1.3 RELATED WORK

A. Section 33 32 19 – Sanitary Sewerage Pump Stations

1.4 REFERENCES

A. IPC-2012 International Plumbing Code

B. National Electrical Manufacturers Association (NEMA)

C. National Fire Protection Association (NFPA)

D. Underwriters' Laboratories, Inc. (UL)

1.5 SUBMITTALS

A. Substitutions: Section 01 25 00.

B. Shop Drawings: Section 01 33 00 for pumps, electrical connections, and controls.

C. Pump Curves: Certified pump performance characteristics with pump and system operating point plotted. Include net positive suction head (NPSH) curve.

D. Motor and Cable Insulation Test: For moisture content or insulation defects.

E. Certified copies of all the factory and construction site test data sheets and reports.

F. Pump manufacturer's certificate that installation is correct and the pump(s) function properly relative to flow, speed, vibration, and amperage draw.

G. Complete operating and maintenance manuals including wiring diagrams, technical data sheets and information for ordering replaceable parts:

1. Include complete list indicating all components of the systems.

2. Include complete diagrams of the internal wiring for each item of equipment.

3. Diagrams shall have their terminals identified to facilitate installation, operation, and maintenance.

1.6 **HANDLING AND STORAGE**

A. Protect against damage and dirt during shipping and storage.

1.7 **PUMP WARRANTY**

A. The pump manufacturer shall warrant the units being supplied to the owner against defects in workmanship and material for a minimum period of five (5) years or 10,000 hours under the Municipal Wastewater-Permanent Installation Warranty Policy under normal use, operation, and service. The warranty shall be in printed form and apply to all similar units.

1.8 **LOCAL PUMP SERVICE FACILITY**

A. At the time of bidding, there shall be a fully accredited service facility within 100 miles of the project site having factory trained technicians and a full stock of repair parts for a complete overhaul of the proposed pumps.

1.9 **EXPERIENCE**

A. The pump manufacturer shall have a minimum of 1,000 units of similar type pumps, installed and operating for no less than five (5) years in the United States.

PART 2 PRODUCTS

2.1 **MAJOR PUMP COMPONENTS**

A. Gray case iron, Class 30 casing, with smooth surfaces devoid of blow holes and other irregularities.

B. Stainless steel exposed bolts and nuts, Section 05 05 23.

C. Waterproof exterior. Manufacturer select exterior spray with PVC epoxy primer chloric rubber paint finish.

2.2 **CASTING**

A. Each pump casting shall be constructed of fine-grained cast iron. The casting shall be designed for a minimum working pressure of 50 psig and hydrostatically tested to 1½ times the working pressure.

2.3 MECHANICAL SEAL

A. Each pump shall be provided with a mechanical seal system running in an oil reservoir having separate, constantly hydrodynamically lubricated lapped seal faces. The lower seal unit shall contain one stationary and one positively driven rotating tungsten-carbide ring. The upper seal shall contain one stationary tungsten-carbide ring and one positively driven carbon ring. The seal system shall not rely upon the pumped media for lubrication.

2.4 **DISCHARGE CONNECTION ELBOW**

A. Installed in the wet well.

B. Make connection of pump to discharge connection elbow automatic when pump is lowered into place in a simple downward motion.

C. Provide sliding guide bracket and guide bar(s) as part of the discharge connection elbow.

D. Guarantee sealing of the discharge interface.

2.5 **MATING SURFACES**

A. Seal all mating surfaces. Do not use secondary sealing compounds, gaskets, grease, or other devices.

2.6 **CABLE ENTRY**

A. Watertight and submersible seal for cable entry into pump.

B. Isolate cable entry junction chamber and motor from each other so foreign material entering through the pump top (if any) shall not have access to the motor.

C. Do not use epoxies, silicones, or other secondary sealing systems.

2.7 **PUMP MOTOR**

A. Squirrel-cage, induction, shell type design, housed in an air-filled, watertight chamber, NEMA Design B type with stator winding and stator leads insulated against moisture and temperatures less than 311 deg F.

B. Design for continuous duty, capable of sustaining a minimum of 10 starts per hour.

C. Capable of continuous operation at totally, partially, or non-submerged conditions.

2.8 **JUNCTION CHAMBER**

A. Junction chamber to contain the terminal board.

B. Connection Between Cable and Stator Leads: Perfectly leak-proof.

2.9 **COOLING SYSTEM**

A. Provide an adequately designed cooling system for the pump(s).

B. Provide provision for external cooling and flushing.

2.10 **THERMAL SENSORS**

A. Use thermal sensors to monitor stator temperatures that are wired to the control panel.

2.11 **PUMP SHAFT SEAL**

A. Carbon steel, C 1036, shaft completely isolated from the pumped liquid by a mechanical rotating shaft seal system. Seals require neither maintenance nor adjustment, which can be easily inspected and replaced.

B. Do not use a pressure differential consisting of a single or double spring action between upper and lower sealing units to offset external pressure and to affect shaft sealing.

C. Use oil as seal lubricant. Provide drain and inspection plug, with a positive anti-leak seal that is easily accessible from the outside.

2.12 **SHAFT BEARINGS**

A. Permanently lubricated bearings capable of five (5) years continuous operation.

B. Use bearings capable of operating for short periods of time with the discharge valve closed.

2.13 **IMPELLER**

A. One piece, cast iron, statically and dynamically balanced, double shrouded, non-clogging design having a long thrulet without acute turns capable of handling solids, fibrous materials, heavy sludge, and other similar materials, and capable of passing 2-inch solids.

B. Fit the impeller and the shaft by sliding and using a key to lock.

2.14 **VOLUTE**

A. Designed with smooth fluid passages large enough at all points to pass any size solid which can pass through the impeller.

B. Install a wear ring system to provide efficient sealing between the volute and impeller.

2.15 **PUMP MOTOR CABLE**

A. Use pump motor cable suitable for submersible pump application. Conform cable sizing to NEC specifications for pump motors.

B. Seal pump cable end with a high-quality protective covering to make it impervious to moisture or water seepage before electrical installation.

C. Provide 1 foot extra length of cable for each 50 feet of depth.

D. Provide 10 feet of extra cable beyond surface plate.

E. Provide corrosion resistant shield where cable passes pump volute.

2.16 **LEAK DETECTION**

A. Manufacturers requiring moisture detention devices for warranty shall supply a lockout device with a manual reset in the control panel.

2.17 **ACCESS FRAME, GUIDES AND DOOR**

A. Provide access frame to the discharge connection elbows complete with hinges and flush locking mechanism, upper guide holder and level sensor(s) cable holder. Provide frame with sliding nut rails to attach the accessories required. Lower guide bar holder(s) shall be integral with the discharge connection elbow.

B. Provide guide bars of the size necessary to lift and lower the pump(s) without bending, binding, or vibration. Do not support any portion of the weight of the pump of the guide bars.

C. Provide surface plate with adequate rigidity to support the system, but with sufficient openings to allow free access to cable, vent, and water.

D. Access doors of skid proof design.

E. All components galvanized or zinc coated, Section 05 05 10.

2.18 **CONDUIT SYSTEMS**

A. Section 26 05 33.

B. Do not use flexible conduit.

2.19 **CONTROL PANEL**

A. Solid state logic circuitry operational in temperature range of -40 deg F and +120 deg F and waterproof, designed for outdoor use, lockable and containing line voltage pump power circuit and lower voltage pilot control circuit or approved equivalent. The pilot control circuit takes power from the same terminal board. Perform the following functions:

1. Start and stop pumps at required water levels.
2. Alternate the sequence of starting via manual or automatic selection.
3. Start progressively more pumps if water level in sump continues to rise.
4. Instant disconnect from power source in the event of major electrical fault.

B. Equip the panel with all protective devices for motors as disconnects, relays, hand-auto-off switches designed for three phase 480/277 volt power system to control the pumps via the operation of the liquid sensors.

C. On/off pump running lights in the control panel for each pump.

D. Adjustable thermostat heater.

2.20 **TIMERS**

A. Provide timers such that the operating time of each pump can be continuously monitored. Fit each timer with a reset capability to restart timing cycle.

PART 3 EXECUTION

3.1 **INSTALLATION**

A. Check impeller, motor rating, and electrical connections for compliance with manufacturer's recommendations.

B. Secure pumps as indicated and per the manufacturer's recommendations.

3.2 **PUMP TESTING AND START-UP**

A. Qualified millwright to check, align, and certify pumps before start-up.

B. Before submergence, run the pump dry to establish correct rotation and mechanical integrity.

C. Run the pump for a minimum of 30 minutes submerged, under six (6) feet of water minimum. Retest motor and cable insulation.

D. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

E. System Testing: Run a complete operating test of the pumps and associated equipment after installed in the field:

1. Dry Test: Turn on the power to all equipment. With the pump station dry, activate the number 1 pump liquid level sensor. Then activate the number two (2) pump and the number three (3) pump liquid level sensors, etc. Check the "pumps running" lights on the control panel to see that they are operating properly. Deactivate all sensors. Pump

systems should turn off and the number 1 pump should switch to become the lag pump with the number two (2) pump becoming the lead pump, etc. Repeat the above process to verify that the pumps have transferred the lead.

2. Wet Test: Provide a source of water adequate for this test. Conduct this test identically to the Dry Test. All equipment must pass these tests. Repair or replace any equipment failing to operate properly at no additional cost to OWNER.

F. Start-up: Instruct OWNER's personnel, Section 01 78 23.

END OF SECTION

SECTION 31 23 16 M
EXCAVATION (Modified)

PART 3 EXECUTION

3.3 GENERAL EXCAVATION REQUIREMENT

Add paragraph I as follows:

I. Excavation for pipelines under existing curb and gutter, concrete slabs, or sidewalks shall be open cut. In no case shall tunneling be allowed. At the option of the City Engineer, jacking under permanent facilities may be allowed based on his/her direction.

Add Section 31 23 20 Fill

SECTION 31 23 20
FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-structural fill materials.

B. Non-structural placement and compaction.

1.2 REFERENCEs

A. **ASTM Standards**

D 698	Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).
D 1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).
D 2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. When requested by ENGINEER, submit laboratory dry density and optimum laboratory moisture content for each type of fill to be used.

1.4 QUALITY ASSURANCE

A. Do not change material sources without ENGINEER's knowledge.

B. Reject material that does not comply with the requirements specified in this Section.

1.5 STORAGE

A. Safely stockpile materials.

B. Separate differing fill materials, prevent mixing, and maintain optimum moisture content of materials.

1.6 SITE CONDITIONS

A. Do not place, spread, or roll any fill material over material that is damaged by water. Remove and replace damaged material at no additional cost to OWNER.

B. Control erosion. Keep area free of trash and debris. Repair settled, eroded, and rutted areas.

C. Reshape and compact damaged structural section to required density.

1.7 ACCEPTANCE

A. General: Native material may be wasted if there is no additional cost to substitute material acceptable to ENGINEER.

B. Lift thickness: One test per Lot.

C. Compaction: One test per Lot. Verify density using nuclear tests, ASTM D 2922. Compaction and Lot sizes as follows:

1. Compact to 92% Standard Proctor
2. One Lot = 1500 square feet per lift

1.8 **WARRANTY**

A. Repair settlement damage at no additional cost to OWNER.

PART 2 PRODUCTS

2.1 **FILL MATERIALS**

A. Material shall be free from sod, grass, trash, rocks larger than four (4) inches in diameter, and all other material unsuitable for construction of compacted fills.

2.2 **WATER**

A. Make arrangements for sources of water during construction and make arrangements for delivery of water to site.

B. Comply with local Laws and Regulations at no additional cost to OWNER when securing water from water utility company.

PART 3 EXECUTION

3.1 **PREPARATION**

A. Implement the traffic control plan requirements, Section 01 55 26.

B. Verify material meets maximum size requirements.

C. If ground water is in the intended fill zone, dewater.

3.2 **PROTECTION**

A. Protect existing trees, shrubs, lawns, structures, fences, roads, sidewalks, paving, curb and gutter and other features.

B. Protect above or below grade utilities. Contact utility companies to repair utility damage. Pay all cost of repairs.

C. Avoid displacement of and damage to existing installations while compacting or operating equipment.

D. Do not use compaction equipment adjacent to walls or retaining walls that may cause wall to become over-stressed or moved from alignment.

E. Restore any damaged structure to its original strength and condition.

3.3 **LAYOUT**

A. Identify required line, levels, contours, and datum.

B. Stake and flag locations of underground utilities.

C. Upon discovery of unknown utility or concealed conditions, notify ENGINEER.

D. Maintain all benchmarks, control monuments and stakes, whether newly established by surveyor or previously existing. Protect from damage and dislocation.

E. If discrepancy is found between Contract Documents and site, ENGINEER shall make such minor adjustments in the Work as necessary to accomplish the intent of Contract Documents without increasing the Cost of the Work to CONTRACTOR or OWNER.

3.4 **SUBGRADE**

A. Protect Subgrade from desiccation, flooding, and freezing.

B. Before placing fill over Subgrade, get ENGINEER's inspection of subgrade surface preparations.

C. If Subgrade is not readily compactable get ENGINEER’s permission to stabilize the subgrade.

3.5 **TOLERANCES**

A. Compaction: Ninety-two (92) percent minimum relative to a standard proctor density, Section 31 23 26.

B. Lift Thickness (before compaction):

1. Eight (8) inches when using riding compaction equipment.

2. Six (6) inches when using handheld compaction equipment.

3.6 **CLEANING**

A. Remove stockpiles from site. Grade site surface to prevent free standing surface water.

B. Leave borrow areas clean and neat.

END OF SECTION

SECTION 31 41 00 M
SHORING (Modified)

PART 1 GENERAL

1.2 **PRICE – MEASUREMENT AND PAYMENT**

A. In Trenching, Shoring:

Revise subparagraph 1 to read as follows:

1. A two (2) part Protective System is required if each Side of the Trench is to be shored. The use of a Trench Box shall be classified as one Protective System.

1.4 **DESIGN OF PROTECTIVE SYSTEMS**

Add paragraphs C and D as follows:

C. Trenches five (5) feet deep or greater require a protective system unless the excavation is made entirely in stable rock. If less than five (5) feet deep, a competent person may determine that a protective system is not required.

D. Trenches 20 feet deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer in accordance with 1926.652(b) and (c).

1.5 **SUBMITTALS**

Revise paragraph A to read as follows:

A. Submit a Protective System plan:

1. When excavation is over twenty (20) feet deep, or
2. When requested by ENGINEER.

Add Article 1.6 as follows:

1.6 **REFERENCES**

A. 29 CFR Part 1910 – Occupational Safety and Health Standards

B. 29 CFR Part 1926 Subpart P – Excavations

PART 3 EXECUTION

3.4 INSPECTIONS

Add paragraph C as follows:

C. OWNER and/or ENGINEER may order an immediate work stoppage if working conditions are thought to be unsafe. Work may resume only after proper safety precautions are implemented.

SECTION 32 01 06 M
STREET NAME SIGNS (Modified)

PART 1 GENERAL

1.2 **REFERENCES**

Add paragraph C as follows:

C. **Perry City Public Works Standard Drawings**

SECTION 32 01 13.64 M
CHIP SEAL (Modified)

PART 1 GENERAL

1.2 **REFERENCES**

A. **ASTM Standards:**

Add the following to paragraph A:

C 29 Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate

C 330 Standard Specification for Lightweight Aggregates for Structural Concrete

Rename Article 1.5 as follows:

1.5 **WEATHER AND CONDITIONS**

A. Temperature

Add subparagraph 4 as follows:

4. Do not place if forecasted temperature is expected to drop below 40 deg F within 72 hours of placement.

B. Moisture and Wind:

Add subparagraph 1 as follows:

1. Do not place chip seal coat if surface moisture is present.

PART 2 PRODUCTS

2.1 **ASPHALT BINDER**

Revise paragraph B to read as follows:

A. Emulsified Asphalt: CRS-2P or LMCRS-2, Section 32 12 03. Use any of the following additives to match aggregate particle charge, weather conditions, and mix design:

(Subparagraphs 1-5 remain unchanged.)

Replace Article 2.2 with the following:

2.2 **COVER AGGREGATE**

A. Material

1. Standard Chip: Use 100% crusher processed virgin aggregate consisting of natural stone, gravel, or slag meeting the requirements of Table 1 for Standard Chip Seal Coat.

2. Lightweight Chip: Use 100% crusher-processed rotary-kiln lightweight expanded shale chips meeting the requirements of Table 1 for Lightweight Chip Seal Coat. (Utelite or approved equal).

Table 1 – Physical Properties of Cover Materials					
	Standard	**Standard Chip**		**Lightweight Chip**	
	ASTM	**Min**	**Max**	**Min**	**Max**
Dry-unit weight (rodded), lb/ft^3	C 29	--	100	--	60
Wear (hardness or toughness), percent	C 131	--	30	--	30
Angularity (2 fractured or angular faces), percent	D 5821	60	--	--	--
Soundness (weight loss), percent	C 88	--	12	--	10
Polishing, BPN	D 3319	30	--	31	--
Flats or elongates (1:3 ratio), percent	D 4791	--	10	--	--
Friable particles, percent	C 142	--	3	--	2
NOTES a) Wear of aggregate retained on No. 8 sieve. b) Soundness for combined coarse and fine aggregate measured using five (5) cycles Na_2SO_4.					

B. Gradation: Analyzed on a dry weight and percent passing basis. Meet the gradation limits in Table 2.

Table 2 – Master Grading Bands for Cover Materials					
		Percent Passing			
	Test Method	**Standard Chip**		**Lightweight Chip**	
Sieve	**ASTM**	**Grade A (UDOT Type I)**	**Grade C (UDOT Type II)**	**Type A**	**Type C (UDOT Lightweight)**
1/2”	C 136	100	98-100	100	90-100
3/8”		85-100	69-91	80-100	55-80
No. 4		0-20	0-11	5-40	0-5
No. 8		0-5	0-6	0-20	0-3
No. 16		-	-	0-10	-
No. 200	C 117	0-1	0-1.5	-	0-1

Replace Article 2.3 with the following:

2.3 **FOG SEAL/FLUSH COAT**

A. Material: Use cationic emulsified asphalt grade CSS-1h, Section 32 12 03.

Add Article 2.4 as follows:

2.4 **MIX DESIGN**

A. Select type and grade of emulsified asphalt, ASTM D 3628.

B. Determine application rates based on evaluation of road conditions and per manufacturer’s recommendation. Submit mix design for approval by Engineer.

C. Application rates should be in the following ranges, unless otherwise approved by Engineer.

1. Emulsion: Use Table 3.

Table 3 – Emulsion Application Rate		
	Application Rate (gal/sy)	
Emulsion	**Standard Chip**	**Lightweight Chip**
CRS-2P	0.37-0.44	0.32 – 0.35
LMCRS-2	0.37-0.44	0.32 – 0.35

2. Cover Material: Use Table 4.

Table 4 – Cover Material Application Rate			
	Unit Weight (lbs/ft^3)	**Application Rate (lbs/sy)**	
Lightweight Chip		**Type A**	**Type C**
	45 – 50	9.6	11.8
	50 – 55	10.6	13.1
	55 – 60	11.6	14.3
Standard Chip		**Grades A & C**	
	60-65	17.0	
	65-70	18.4	
	70-75	19.8	
	75-80	20.7	
	80-85	22.1	
	85-90	23.5	
	90-95	24.9	
	95-100	25.8	

3. Fog Seal/Flush Coat: Use 0.10 – 0.12 gal/sy at a 2:1 dilution rate.

PART 3 EXECUTION

3.2 PREPARATION

Add paragraph F as follows:

F. Cover manholes, valves boxes, storm drain inlets, and other service utility features before placing any chip seal coat.

3.4 APPLICATION

Revise paragraph A to read as follows:

A. Asphalt Emulsion: Keep viscosity between 50 and 100 centistokes during application, ASTM D 2170. Keep temperature to a minimum of 145 deg F.

Revise Article 3.6 to read as follows:

3.6 **FOG SEAL/FLUSH COAT**

A. Apply within 24 hours of placing chips.

B. Keep viscosity between 50 and 100 centistokes, during application, ASTM D 2170.

C. See also Section 32 01 13.50.

SECTION 32 01 90 M
MAINTENANCE OF PLANTING (Modified)

PART 1 GENERAL

1.2 **GRASS MAINTENANCE**

Add the following sentence immediately following the end of paragraph A:

Contractor shall mow the lawn until the end of the date of Substantial Completion. The number of mowing to be provided by the Contractor shall be determined by the growth pattern of the lawn. There shall be no minimum number of mowing set forth, only that the health and vitality of the lawn shall be maintained. At no time shall the height of the lawn exceed 4½".

SECTION 32 12 05 M
BITUMINOUS CONCRETE (MODIFIED)

1.2 **REFERENCES**

Add the following paragraph to Article 1.2:

A. **Utah Department of Transportation (UDOT)**

Quality Management Plan 514 Hot-Mix Asphalt

1.3 **DEFINITIONS**

Add the following paragraph to Article 1.3:

H. **Road Class**

Class I: Includes maintenance mixes, bike paths, and residential driveways. (ESAL < 10^4 per year)

Class II: Includes non-industrial parking lots, local and residential streets, and low volume (minor) collectors. (ESAL between 10^4 and 10^6 per year)

Class III: Includes high volume (major) collectors, arterials, and industrial parking lots (primary load from 3-axle or greater vehicles). (ESAL > 10^6 per year)

1.4 **SUBMITTALS**

A. **General:**

Add the following subparagraph:

4. Submit plant certification documentation (see 3.1.A)

B. **Quality Assurance:**

Revise subparagraph 3 to read as follows:

1. Testing Report: Submit Quality Control data to the Engineer within one (1) working day after completion of each day of paving.

Add the following subparagraph:

2. Plant Production Report: Submit daily plant productions records to the Engineer within one (1) working day after completion of each day of paving and prior to the start of the next paving day. Report shall include the following information:
    a. Plant Location
    b. Production Date and Times
    c. Mix Designation
    d. Total Mix Tonnage
    e. Virgin Aggregate Tonnage

f. Virgin Asphalt Tonnage

g. RAP Aggregate Tonnage

h. Lime or Evotherm Tonnage

i. Water Tonnage

Revise Section 2.3 to read as follows:

2.3 **ADDITIVES**

A. Mineral Filler: None

B. Recycle Agent: None

C. Anti-strip Agent: 1% Lime Slurry or Evotherm equivalent, minimum, meeting the HWT requirements for Superpave mixes

D. RAP or ROSP (By weight or binder, whichever is lesser): Allowed up to 15%

1. Free of detrimental quantities of deleterious materials
2. No change in specified binder grade
3. Determine RAP binder content by chemical extraction

2.4 **MIX DESIGN**

Replace paragraph A with the following:

A. Project Specific Requirements:

1. Less than 3-inch depth

a. Option 1 – Superpave

i. Mix Designator (Compaction Effort): 75 gyrations (75 N_d)

ii. Binder Grade: PG 58-28

iii. Master Grading Band: SP ½

b. Option 2 – Marshall

i. Mix Designator (Compaction Effort): 50 blow

ii. Binder Grade: PG 58-28

iii. Master Grading Band: DM ½

2. 3-inch and greater depth

a. Superpave

i. Mix Designator (Compaction Effort): 75 gyrations (75 N_d)

ii. Binder Grade: PG 58-28

iii. Master Grading Band: SP ½

Add paragraph C1 as follows:

C1. Aggregate Gradation – Thin Overlay: See Table 5A. The Target Gradation Curve for the specified aggregate grade must lie within the Master Grading Band limits. The target grading band limits for the Target Grading Curve are the appropriate grading limits for pay factor 1.00 in Table 2. The target grading band limits are allowed to extend outside of the Master Grading Band limits.

Table 5A - Master Grading Band Limits – Thin Overlay		
Sieve	**ASTM**	**Percent Passing**
1 inch	C 136	-
3/4 inch		-
1/2 inch		-
3/8 inch		100
No. 4		75-87
No. 8		45-55
No. 16		29-37
No. 50		13-19
No. 200	C 117	5.5-8.5

3.1 CONSTRUCTION EQUIPMENT

Revise paragraph A to read as follows:

A. Mixing Plant: ASTM D995. Use a UDOT Quality Management Plan 514 certified asphalt mixing plant. Provide:

1. Positive means to determine the moisture content of aggregate.
2. Positive means to sample all material components.
3. Sensors to measure the temperature of the mix at discharge.
4. Ability to maintain discharge temperature of mix.
5. Capability of maintaining plus or minus five (5) percent tolerance on component percentages in final mix.
6. Oil Sand Introduction System: Do not burn off the light oils in Bitumen Binder (oil sand).

SECTION 32 12 13.13 M
TACK COAT (Modified)

PART 3 EXECUTION

3.3 **APPLICATION**

B. Application Rate: Typically as follows:

1. Emulsions, 0.05 to 0.15 gallons per square yard.

Add subparagraph a as follows:

a. For Thin Overlays, 0.12 to 0.15 gallons per square yard.

SECTION 32 12 16.13 M
PLANT-MIX BITUMINOUS PAVING (Modified)

PART 3 EXECUTION

3.8 **TOLERANCES**

A. Compaction: Target is 94 percent of ASTM D2041 (Rice density) plus or minus two (2) percent.

Add subparagraph 1 as follows:

1. Compaction – Thin Overlay – Target is 92.5 percent of ASTM D2041 (Rice density) plus or minus two (2) percent.

SECTION 32 16 13 M
DRIVEWAY, SIDEWALK, CURB, GUTTER (Modified)

PART 3 EXECUTION

3.9 **CONTRACTION JOINTS**

B. Curb, Gutter, Waterway:

Revise subparagraph 1 to read as follows:

1. Place joints at intervals not exceeding 10 feet.

3.5 **EXPANSION JOINTS**

B. Sidewalks:

Add subparagraph 5 as follows:

5. Place expansion joints wherever new sidewalk adjoins existing sidewalks, driveways, or aprons.

C. Curb, Gutter, Waterway:

Add subparagraph 4 as follows:

3. Place expansion joint where new curb and gutter adjoins existing curb and gutter.

SECTION 32 31 13 M
CHAIN LINK FENCES AND GATES (Modified)

PART 2 PRODUCTS

2.6 POSTS, CAPS, RAILS, COUPLINGS

A. Posts, Frames, Stiffeners, Rails: ASTM F 1043:

Revise applicable rows of Table 1 to read as follows:

Top Rail	1-5/8” pipe

PART 3 EXECUTION

3.6 INSTALLATION OF FENCE FABRIC

Revise paragraph A to read as follows:

A. Place fence fabric on roadway side of posts unless otherwise specified. Place fabric approximately 1 inch above the grounds. Maintain a straight grade between posts by excavating ground high points and filling depressions with soil.

SECTION 32 31 16 M
WELDED WIRE FENCES AND GATES (Modified)

PART 1 GENERAL

1.2 **REFERNCES**

Add paragraph D as follows:

D. UDOT Standard Drawing

FG 2A Right of Way Fence and Gates (Metal Post)

FG 2B Right of Way Fence and Gates (Metal Post)

PART 3 EXECUTION

3.2 **INSTALLATION**

Add paragraph N as follows:

N. Install per UDOT Standard Drawings FG 2A and FG 2B.

Add Section 32 31 23 Poly(Vinyl Chloride)(PVC) Fences and Gates

SECTION 32 31 23
POLY(VINYL CHLORIDE)(PVC) FENCES AND GATES

PART 4 GENERAL

1.10 **SECTION INCLUDES**

A. PVC fencing, posts, gates, and appurtenances.

1.11 **REFERNCES**

A. **ASTM Standards:**

D 1784	Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
F 626	Fence Fittings
F 964	Rigid Poly(Vinyl Chloride)(PVC) Exterior Profiles Used for Fencing and Railing
F 1999	Installation of Rigid Poly(Vinyl Chloride)(PVC) Fence Systems

1.12 **SUBMITTALS**

A. Drawings: Indicate plan layout, grid, size and spacing of components, accessories, fittings, anchorage, and post section.

B. Data: Submit manufacturer's installation instructions and procedures, including details of fence and gate installation.

C. Submit sample of fence fabric and typical accessories.

PART 2 PRODUCTS

2.1 **GENERAL**

A. Products from other qualified manufacturers having a minimum of 5 years' experience manufacturing PVC fencing will be acceptable by the architect as equal, if approved in writing, ten days prior to bidding, and if they meet the following specifications for design, size, and fabrication. PVC Profiles, lineals, and extrusions used as components must "meet or exceed" the minimum performance guidelines laid out in ASTM 964.

2.2 **PVC FENCE**

A. Pickets, rails, and posts fabricated from PVC extrusion. The PVC extrusions shall comply with ASTM D 1784, Class 14344B and have the following characteristics:

Specific Gravity (+/- 0.02)	1.4
Using 0.125 specimen Izod impact ft. lbs./in. notch	23.0
Tensile strength, psi	6,910
Tensile modulus, psi	336,000
Flexural yield strength, psi	10,104
Flexural modulus, psi	385,000
DTUL at 264 psi	67˚C

B. All fence parts made from PVC shall have a minimum thickness of 0.17 in except where specified otherwise.

2.3 **POST CAPS**

A. Molded, one piece.

B. Cross Section: Match post or gate upright cross section.

C. Thickness: 0.095" minimum.

D. Configuration: Flat or four-sided as required for installation to top of posts and gate.

2.4 **ACCESSORIES**

A. Standard gate brace, screw caps, rail end reinforcers, and other accessories as required.

2.5 **MISCELLANEOUS MATERIALS**

A. Stiffener Chemicals: Galvanized steel structural channel. Configure channels for concealed installation within PVC rails with pre-drilled holes for drainage. Aluminum extruded channel available upon request.

1. Cross Section: 3.00" x 3.00" x 1.500" hourglass shape to grip picket.

2. Thickness: 0.040 Gauge (minimum)

B. Fasteners and Anchorage: Stainless Steel. All fasteners to be concealed or colored heads to match. Provide sizes as recommended by fence manufacturer.

C. PVC Cement: As recommended by fence manufacturer.

2.6 **GATE HARDWARE AND ACCESSORIES**

A. General: Provide hardware and accessories for each gate according to the following requirements.

B. Hinges: Size and material to suit gate size, non-lift-off type, self-closing, glass filled nylon with stainless steel adjuster plate, offset to permit 120 degree gate opening. Provide one pair of hinges for each gate.

1. Stainless Steel, painted with carbo zinc base.

2. Finish: Pre-painted, 2 coats "Polane."

3. Color: Black Gravity Latch or dual access gravity latch.

C. Latch: Manufacturers' standard self-latching, thumb latch, pre-finished steel, or stainless-steel gravity latch. Provide one latch per gate.

1. Finish: Match gate hinge finish.

D. Hardware: Stainless Steel. Provide sizes as recommended by fence manufacturer.

1. Finish: Match gate hinge finish.

2.7 **CONCRETE**

A. Use Class 3000 concrete. Section 03 30 04.

2.8 **REINFORCING FOR FILLED POSTS**

A. Steel Reinforcing:

1. Steel Reinforcing Bars: ASTM A 615. Grade 60. Deformed (#4 or ½").

2. Install 2 bars for each corner or gate post as specified in the drawings.

PART 3 EXECUTION

3.1 **PREPARATION**

A. Locate and preserve utilities, Section 31 23 16.

B. Excavation, Section 31 23 16.

C. Review to ASTM F 567 and CLFMI products manual for chain link fence installation.

D. Protect roots and branches of trees and plants to remain.

E. Limit amount of clearing and grading along fence line to permit proper installation.

3.2 **LAYOUT OF WORK**

A. Accurately locate and stake locations and points necessary for installation of fence and gates.

B. General arrangements and location of fence and gates are indicated. Install except for minor changes required by unforeseen conflicts with work of other trades.

3.3 **INSTALLATION – GENERAL**

A. Install fence in compliance with manufacturer's written instructions.

B. PVC components shall be carefully handled and stored to avoid contact with abrasive surfaces.

C. Install components in sequence as recommended by fence manufacturer.

D. Install fencing as indicated on the drawings provided.

E. Variations from the installation indicated must be approved.

F. Variations from the fence and gate installation indicated and all costs for removal and replacement will be the responsibility of the CONTRACTOR.

3.4 INSTALLATION OF POSTS

A. Excavation

1. Drill or hand-excavate (using post hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
2. If not indicated on drawings, excavate holes for each post to a minimum diameter of 12 inches.
3. Unless otherwise indicated, excavate hole depths not less than 30 inches or to frost line.

B. Posts

1. Install posts in one piece, plumb and in line. Space as noted in the drawings. Enlarge excavation as required to provide clearance indicated between post and side of excavation.
2. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations.
    a. Unless otherwise indicated, terminate top of concrete footings 3 inches below adjacent grade and trowel to a crown to shed water.
    b. Secure posts in position for manufacturer's recommendations until concrete sets.
    c. After installation of rails and unless otherwise indicated, install reinforcing in posts in opposing corners of post as shown and fill end and gate posts with concrete to level as indicated. Concrete fill shall completely cover the reinforcing steel and gate hardware fasteners. Consolidate the concrete by striking the post face with a rubber mallet, carefully tamping around the exposed post bottom.
    d. Install post caps. Use #8 screws, nylon washers and snap caps.
    e. Remove concrete splatters from PVC fence materials with care to avoid scratching.

3.5 INSTALLATION OF RAILS

A. Top and Bottom Rails

1. Install rails in one piece into routed hole fabricated into posts to receive top and bottom rails, and middle where necessary. Except at sloping terrain, install rails level.
    a. Prior to installation of rails into posts, insert concealed steel channel stiffeners in top rail, where necessary. Bottom rails shall include minimum 2-¼" drainage holes.
    b. At posts to receive concrete fill, tape rail ends to prevent seepage when filling post with concrete.

B. Middle Rails:

1. Where necessary, install middle rails in one piece into routed hole in posts with larger holes facing down. Except at sloping terrain, install middle rails level. Secure mid rail to pickets with 2-#8 x 1-1/2" screws evenly spaced.
    a. At posts to receive concrete fill, tape rail ends to prevent seepage when filling post with concrete.

3.6 INSTALLATION OF FENCE FABRIC/PICKETS

A. Pickets: Install pickets in one piece as per manufacturer recommendations. Install pickets plumb.

3.7 INSTALLATION ON SLOPING TERRAIN

A. At sloping terrain rails may be racked (sloped) or stepped to comply with manufacturer's recommendations.

3.8 INSTALLATION OF GATES

A. Prior to installation of rails into posts, apply PVC cement into sockets per manufacturer's recommendations. Bottom rail shall include minimum 2-¼" drainage holes.

B. Assemble gate prior to fence installation to accurately locate hinge and latch post. Align gate horizontal rails with fence horizontal rails.

C. Install gates plumb, level, and secure for full opening without interference according to manufacturer's instructions.

D. Gate Latch Installation. Install gate latch according to manufacturer's instructions.

E. Allow minimum 72 hours to let concrete set-up before opening gates.

END OF SECTION

SECTION 32 84 23 M
UNDERGROUND IRRIGATION SYSTEMS (Modified)

PART 1 GENERAL

1.1 SECTION INCLUDES

Add paragraphs B and C as follows:

B. Underground irrigation system for private systems only.

C. This section shall not be used for irrigation or secondary water distribution systems.

SECTION 32 92 00 M
TURF AND GRASS (Modified)

PART 2 GENERAL

1.3 **SUBMITTALS**

Add paragraph C as follows:

C. Submit seed mix.

PART 2 PRODUCTS

2.1 **SEED**

Add paragraphs D and E as follows:

D. Seed Mix:

Seed No.	Botanical Name	Common Name	% by Weight
1	Agropyron cristatum 'Fairway'	Fairway Crested Wheatgrass	15
2	Agropyron riparium 'Sodar'	Streambank Wheatgrass	20
3	Bromus inermis 'Manchar'	Smooth Brome	32
4	Fescue rubra 'Fortress'	Red Fescue	25
5	Poa compressa 'Reuben's'	Reuben's Canadian Bluegrass	6
6	Trifolium repens	White Dutch Cover	2

E. The seed mixture shall meet the minimum tested requirements of A.N.A. The seed shall be the current year's crop, guaranteed by the supplier as follows:

1. 80% Germination Rate, 28 pounds per bushel or equivalent.
2. 72% Purity and 80% pure live seed.
3. No more than 2% inert matter.
4. No noxious weeds and no more than 0.1% weed seed.

2.4 ACCESSORIES

Replace paragraph A with the following:

A. Commercial fertilizer shall be a mixed commercial fertilizer, O-F-241C, type 1, grade 16-16-8, level B with guaranteed chemical analysis of contents marked on the containers.

PART 3 EXECUTION

3.3 **FERTILIZING**

Revise paragraph A to read as follows:

A. Apply fertilizer at a rate of 6 pounds per 1,000 square feet or as required by soil analysis.

3.4 **SEEDING**

Revise paragraph A to read as follows:

B. Apply seed at a rate of eight (8) pounds per 1,000 square feet evenly in two (2) intersecting directions. Rake in lightly.

Add Section 33 05 12 Conductive Tracer Wire for Pipe Installation

SECTION 33 05 12
CONDUCTIVE TRACER WIRE FOR PIPE INSTALLATION

PART 1 GENERAL

1.1 SUMMARY

This section covers the requirements for installation of a conductive tracer wire with underground pipe.

1.2 SYSTEM DESCRIPTION

Install electrically continuous tracer wire with access points as described herein to be used for locating pipe with an electronic pipe locator after installation.

PART 2 PRODUCTS

2.1 Tracer wire shall be fourteen (14) gauge minimum solid copper with thermoplastic insulation recommended for direct burial. Wire connectors shall be 3M DBR, or approved equal, and shall be watertight and provide electrical continuity.

PART 3 EXECUTION

3.1 ERECTION / INSTALLATION / APPLICATION AND/OR CONSTRUCTION

A. General: Tracer wire shall be installed in the same trench and inside bored holes and casing with pipe during pipe installation. It shall be secured to the pipe as required to insure that the wire remains adjacent to the pipe. The tracer wire shall be securely bonded together at all wire joints with an approved watertight connector to provide electrical continuity, and it shall be accessible at all new water valve boxes, water meter boxes, fire hydrants, sewer manholes, and sewer cleanouts as applicable to the utility line being installed.

B. Manholes: The wire shall be installed from the exterior of the manhole to the interior by installing the wire underneath the manhole frame.

3.2 TESTING

CONTRACTOR shall perform a continuity test on all tracer wire in the presence of ENGINEER or ENGINEER's representative. Testing shall be performed prior to road construction.

3.3 REPAIR / RESTORATION

If the tracer wire is found to be not continuous after testing, CONTRACTOR shall repair or replace the failed segment of the wire.

END OF SECTION

SECTION 33 05 25 M
PAVEMENT RESTORATION (Modified)

PART 1 GENERAL

1.2 REFERENCES

Replace paragraph A with the following:

A. **Perry City Public Works Standard Drawings**

PART 2 PRODUCTS

2.2 ASPHALT PAVEMENT

Revise paragraph A to read as follows:

A. Permanent Warm Weather Asphalt Concrete: Section 32 12 05 M unless indicated otherwise.

Revise paragraph C to read as follows:

C. Pavement Sealing:

1. Crack Seal: Section 32 01 17
2. Chip Seal: Section 32 01 13.64 and 32 01 13.64 M.
3. Fog Seal: Section 32 01 13.50.

PART 3 EXECUTION

3.5 ASPHALT PAVEMENT f

Revise paragraphs A and B to read as follows:

A. Follow Perry City Public Works Standard Drawings.

B. Match existing pavement thickness or 4-inches minimum, whichever is greater.

SECTION 33 08 00 M
COMMISSIONING OF WATER UTILITIES (Modified)

PART 3 EXECUTION

3.5 **INFILTRATION TEST**

Revise paragraph A to read as follows:

A. General: 150 gallons per inch diameter per mile per day. If the ground water table is less than two (2) feet above the crown of the pipe, the infiltration test is not required.

Revise Article 3.6 in its entirety to read as follows:

3.6 **EXFILTRATION TEST**

A. Non-Pressurized System:

1. General: Air test or hydrostatic test is CONTRACTOR's choice.
2. Air Test:
   a. Plastic Pipe: ASTM F 1417.
      (i) For pipe up to 30 inches diameter, pressure drop is 0.5 psi.
      (ii) For pipe larger than 30 inches diameter, isolated joint test is 3.5 psi maximum pressure drop is 1.0 psi in 5 seconds.
   b. Concrete Pipe:
      (i) ASTM C 1214 for concrete pipe 4" to 24" diameter.
      (ii) ASTM C 1103 for concrete pipe 27" and larger.
3. Hydrostatic Test: Provide air release taps at pipeline's highest elevations and expel all air before the test. Insert permanent plugs after test has been completed.
   a. Plastic Pipe: ASTM F 2497.
   b. Concrete Pipe: ASTM C 497. Abide by Section 3 and Section 16 in the ASTM standard and applicable recommendations of manufacturer.

B. Pressurized System:

1. Pressure Test: All newly laid pipe segments and their valves, unless otherwise specified, shall be subjected to a hydrostatic pressure test of 225 psi or 50 psi above working pressure, whichever is higher. The hydrostatic pressure test shall be conducted after the pipe segments have been partially backfilled.
2. Duration of Pressure Test: The duration of each hydrostatic pressure test shall be at least two (2) hours.
3. Test Procedure: Each pipe segment shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. Testing against closed valves will be allowed. The pump, pipe connection, and all necessary apparatus including gauges

and meters shall be furnished by the CONTRACTOR. CONTRACTOR shall provide all labor and equipment necessary to perform the test.

4. Expelling Air Before Test: Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, air release mechanisms shall be installed, if necessary, at points of highest elevation, and afterwards tightly capped.

5. Examination Under Pressure: All pipes, fittings, valves, hydrants, joints, and other hardware will be subject to examination under pressure during the hydrostatic test. Any defective pipes, fittings, hydrants, valves, or other hardware discovered in consequence of this pressure test shall be removed and replaced by the CONTRACTOR with sound material, at no expense to the OWNER, and the test shall be repeated until the ENGINEER is satisfied.

6. No piping installation will be acceptable until the leakage is less than the amount allowed by industry standards for the type of pipe material being tested. Or, if no standard prevails, than the number of gallons per hour is determined by the formula:

$$Q = \frac{LD\sqrt{P}}{148{,}000}$$

Where: Q = allowable leakage, gallons per hour

L = length of pipe under test, feet

D = diameter of pipe, inches

P = average test pressure, psig

SECTION 33 11 00 M
WATER DISTRIBUTION AND TRANSMISSION (Modified)

PART 1 GENERAL

1.1 SECTION INCLUDES

Revise paragraph A to read as follows:

A. Installation of a pressurized water pipe system, excluding a secondary water system. Refer to Section 33 17 00 if the system is a secondary water system.

1.2 REFERENCES

Revise paragraph B to read as follows:

B. **Perry City Public Works Standard Drawings**

Add the following to paragraph C. AWWA Standards:

C105	Polyethylene Encasement for Ductile Iron Pipe Systems
C110	Ductile-Iron and Gray-Iron Fittings
C111	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
C223	Fabricated Steel and Stainless Steel Tapping Sleeves
M14	AWWA Recommended Practice for Backflow Prevention and Cross-Connection Control

Add paragraphs F and G as follows:

F. ANSI/NSF Standards:

61	Drinking Water System Components – Health Effects

G. Utah Administrative Code

R309	Drinking Water

1.3 PERFORMANCE REQUIREMENTS

Replace paragraph A with the following:

A. Depth of Cover:

1. Minimum as indicated on the drawings. If minimum cannot be achieved, contact ENGINEER.
2. Maximum of 72 inches unless indicated on the plans or approved by ENGINEER.

1.5 SITE CONDITIONS

Revise paragraph D to read as follows:

D. Do not operate <u>any</u> water valve until its owner and water company's permission is secured.

PART 2 PRODUCTS

2.1 PIPES AND FITTINGS

Revise paragraph A to read as follows:

A. Provide piping materials and factory fabricated piping products of sizes, types, pressure ratings, and capacities indicated. Use only NSF 61 approved products in drinking water systems. All such products shall be appropriately stamped with the NSF logo.

Add paragraphs E and F as follows:

E. Mechanical Joint Fittings: Ductile iron, Class 250

F. Flanged Fittings: Ductile iron, Class 250

2.3 VALVE BOX

Revise paragraph A to read as follows:

A. Buried Valves in Traffic Areas: Cast iron two (2) piece slip sleeve type, 5-1/4 inch shaft, with a drop lid, rated for HS-20 loading.

Add Articles 2.9 and 2.10 as follows:

2.9 TAPPING SLEEVE AND VALVE

A. AWWA C223.

B. Sleeve shall be full circumferential seat with all stainless-steel tapping sleeve.

C. Flanged outlet with flanged by MJ valve.

2.10 FIRE SPRINKLER/SUPRESSION LINES

A. Lines:

1. Ductile iron, Class 51, or as approved in writing by OWNER or ENGINEER.
2. Meet all specifications for main lines.

B. Valve:

1. All fire lines shall be equipped with an isolation gate valve located at the main line.

PART 2 EXECUTION

3.3 LAYOUT

Replace paragraph B with the following:

B. The Utah Division of Drinking Water must grant an exception where a potable water line crosses under a sanitary sewer line.

3.4 INSTALLATION – PIPE AND FITTING

A. General:

Add subparagraphs 3 through 7 as follows:

3. Encase all buried ductile iron valves, fitting, connections, and specialties in minimum 8 mil. polyethylene sheets in accordance with AWWA C105.
4. Waterline shall be laid and maintained to lines and grades established by the drawings, with fittings and valves at the required locations. Deviations as approved in writing by OWNER or ENGINEER.
5. Lay water lines on a continuous grade to avoid high points except as shown on the plans.
6. Cut edges and rough ends shall be ground smooth. Bevel end for push-on connections.
7. Do not drop pipe or fittings into trench.

Add paragraph I as follows:

I. Tie-Ins:

1. All tie-ins shall be made dry and not on a day proceeding a weekend or holiday.
2. OWNER requires 48-hours' notice for water turn-off.
3. At least 24-hours prior to a service disruption, CONTRACTOR shall notify all affected water users.
4. Where shutting down a line is not feasible as determine by OWNER or ENGINEER, CONTRACTOR shall make a wet tap using a tapping sleeve and valve.

3.5 INSTALLATION – CONCRETE THRUST BLOCK

Revise paragraph A to read as follows:

A. Perry City Public Works Standard Drawings.

3.8 INSTALLATION – TAPS

Revise paragraph A to read as follows:

A. Perry City Public Works Standard Drawings.

3.9 **INSTALLATION – SERVICE LINE**

Revise paragraph C to read as follows:

C. Meter Box: Perry City Public Works Standard Drawings.

Add paragraph D as follows:

D. New Water Service Line

1. 1" Service

a. All laterals must be of one continuous copper tube between the corp stop and the meter box. No joints or copper to copper connectors are allowed.

2. 1.5" and 2" Services

a. All solder joints shall be 95-5 solder or better, or Mueller compression fittings.

3.10 **INSTALLATION – WATERMAIN LOOP (SYPHON)**

Revise paragraph A to read as follows:

A. Perry City Public Works Standard Drawings.

3.12 **BACKFILLING**

B. Trenches: Section 33 05 20:

Revise subparagraphs 1 and 2 to read as follows:

1. Pipe zone backfill, Perry City Public Works Standard Drawings.
2. Trench backfill, Perry City Public Works Standard Drawings.

3.13 **SURFACING RESTORATION**

A. Roadway Trenches and Patches: Section 33 05 25:

Revise subparagraphs 1 and 2 to read as follows:

1. Asphalt concrete patch, Perry City Public Works Standard Drawings.
2. Concrete pavement patch, contact OWNER for instructions.

Add Article 3.14 as follows:

3.14 **FIRE SPRINKLER/SUPPRESSION LINES**

A. Notify OWNER 48 hours prior to installation.

B. Unless written authorization is given by OWNER, no services shall be connected to the fire sprinkler/suppression lines.

C. Location: As approved by OWNER.

SECTION 33 12 16 M
WATER VALVES (Modified)

PART 1 GENERAL

1.2 REFERENCES

Modify the fourth (4th) item in paragraph A to read as follows:

C509 Resilient-Seated Gate Valves for Water Supply Service

Add paragraph B as follows:

B. **Perry City Public Works Standard Drawings**

PART 2 PRODUCTS

2.1 VALVES – GENERAL

A. Underground:

Add subparagraph 3 as follows:

3. Valves over five (5) feet in depth shall have a valve nut extension stem.

2.2 GATE VALVES

Add paragraph D as follows:

D. Model: Mueller A-2361, Clow 2639

Add Article 2.10 as follows:

2.10 AIR/VACUUM RELIEF VALVES

A. Operation: Relieve air build-up and/or allow intrusion of air to prevent vacuum conditions within pipe.

B. Location: Valve and vent placement location as approved by OWNER or ENGINEER.

C. Connection: Service saddle.

PART 3 EXECUTION

3.1 INSTALLATION

Add paragraphs D, E, and F as follows:

D. Prior to installation, inspect valves for direction of opening, freedom of operation, tightness of pressure-containing bolting, and cleanliness of valve ports and seating surfaces.

E. Examine all valves for damage or defects immediately prior to installation.

F. Mark and hold defective materials for inspection by OWNER or ENGINEER. Replace rejected materials.

SECTION 33 12 19 M
HYDRANTS (Modified)

PART 1 GENERAL

1.2 **REFERENCES**

Revise paragraph A to read as follows:

A. **Perry City Public Works Standard Drawings**

PART 2 PRODUCTS

2.1 **DRY-BARREL FIRE HYDRANT**

Add paragraph C as follows:

C. Model: Mueller Super Centurion, Clow Medallion.

2.2 **VALVES**

Revise paragraph A to read as follows:

C. Gate Valve: Section 33 12 16.

2.3 **ACCESSORIES**

Revise paragraph D to read as follows:

D. Valve Box, Valve Vault: Section 33 11 00.

PART 3 EXECUTION

3.2 **INSTALLATION**

Revise paragraph A to read as follows:

C. Install hydrant according to Perry City Public Works Standard Drawings and AWWA M17.

Revise paragraph H to read as follows:

H. Install thrust block according to Perry City Public Works Standard Drawings.

SECTION 33 12 33 M
WATER METER (Modified)

PART 1 GENERAL

1.2 **REFERENCES**

Add paragraph B as follows:

E. Perry City Public Works Standard Drawings.

PART 2 PRODUCTS

2.2 **METERS FOR SERVICE PIPING**

Revise paragraph A to read as follows:

F. OWNER shall supply and set all 1" meters. All other meters supplied and set by CONTRACTOR.

2.3 **SERVICE LINE, VALVES, AND FITTINGS**

Revise paragraph A to read as follows:

A. Service Pipe: Smooth wall polyethylene, Section 33 05 06.

Revise paragraph B to read as follows:

B. Service Valves and Fittings:

1. AWWA C800.
2. 1-Inch Service Laterals – Brass corporation stops with CC thread.
3. 1.5-Inch and 2-Inch Service Laterals – Copper or brass screw-type fittings (ball valves, strainers, nipples, tees, bends, etc.).
4. 3-Inch and 4-Inch Service Laterals
    a. Ductile iron pipe.
    b. Cast iron, flanged valves and fittings.
5. Greater than 4-Inch – Coordinate with and obtain approval from OWNER and ENGINEER.

Replace Article 2.4 with the following:

2.4 **METER BOXES**

A. See Perry City Public Works Standard Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

Revise paragraph D to read as follows:

D. OWNER Supplied Meters: Installed by OWNER unless indicated otherwise.

Add paragraphs E and F as follows:

E. Install one solid piece of copper pipe from main to meter.

F. Install service laterals with 48-inches of cover, minimum.

SECTION 33 13 00 M
DISINFECTION (Modified)

PART 1 GENERAL

1.2 REFERENCES

Revise paragraph B to read as follows:

B. Utah Administrative Code

R309 Drinking Water

Add paragraph C as follows:

C. NSF/ANSI Standards:

60 Drinking Water Treatment Chemicals – Health Effects

1.4 **SUBMITTALS**

Delete paragraphs B, C, and D in their entirety.

Add Article 1.8 as follows:

1.8 **WORK PERFORMED BY OWNER**

A. OWNER will perform bacteriological and high chlorine sampling and testing. CONTRACTOR shall provide all other work associated with this Section.

PART 2 PRODUCTS

2.1 **DISINFECTANT**

Add paragraph E as follows:

E. All products shall comply with NSF/ANSI 60.

PART 3 EXECUTION

3.1 **PREPARATION**

Add paragraphs C and D as follows:

C. Notify OWNER at least 72 hours prior to any flushing or disinfecting.

D. Install temporary connections for flushing water lines after disinfection. After the satisfactory completion of the flushing work, remove and plug the temporary connection.

3.2 **DISINFECTION OF WATER LINES**

Revise paragraph D to read as follows:

D. Coordinate with OWNER to collect a bacteriological water sample at end of line to be tested. If sample fails bacteriological test, flush system and retest. Continue flushing and retesting until sample passes test.

Revise paragraph G to read as follows:

G. After a passing bacteriological test sample is obtained, let the system relax for 24 hours. Flush and coordinate with OWNER to collect a subsequent bacteriological sample for testing. If the subsequent test passes, then water line is acceptable.

3.5 **FIELD QUALITY CONTROL**

A. Bacteriological Test:

Revise subparagraphs 1 and 2 to read as follows:

1. Coordinate with OWNER to collect samples for testing no sooner than 16 hours after system flushing.
2. OWNER will have water samples analyzed per State of Utah requirements.

Add Article 3.6 as follows:

3.6 **SPECIAL PROCEDURE FOR TAPPING SLEEVES**

A. Before a tapping sleeve is installed, the exterior of the main to be tapped shall be thoroughly cleaned, and the interior surface of the sleeve shall be lightly dusted with calcium hypochlorite powder.

Add Section 33 32 19 Sanitary Sewerage Pump Stations

SECTION 33 32 19
SANITARY SEWERAGE PUMP STATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Precast wet well, valve vault, and accessories.

B. Pump discharge piping from pumps to five (5) feet outside of valve vault where it will be connected to force main.

1.2 REFERENCES

A. Drawings (Project-Specific)

B. Perry City Public Works Standard Drawings

C. Section 22 13 29 – Sanitary Sewerage Pumps

D. Division 26 – Electrical

1.3 SUBMITTALS

A. Shop Drawings for precast wet well and valve vault based on structure/layout shown on the Drawings. Submittals shall include the following:

1. Precast design, including calculations and drawings, sealed by a Professional Engineer licensed to practice in the State of Utah.
2. Drawings shall provide general layout, member thickness, and reinforcement layout.
3. Concrete mix design.
4. Joint sealing and pipe passage details.
5. Setting instructions.
6. Fabrication schedule and plant operations contact name and phone number.

B. Shop Drawings for Generator

C. Shop Drawings for Accessories: Provide cutsheets for hatches, valves, and gauges.

1.4 DESIGN REQUIREMENTS

A. Precast Wet Well and Valve Vault

1. Precast top slab and wall panels shall be designed for AASHTO Classification H-20 traffic loading.
2. Precast wall panels shall be designed to withstand soil and water pressure on full height of outside wall of the structure with no water in the structure.
3. Cast-in-place base slab of wet well shall be designed using a factor of safety of 1.5 against buoyancy. Top steel shall handle net uplift pressures.

4. Precast base slab of valve vault shall be designed using a factor of safety of 1.5 against buoyancy. Top steel shall handle net uplift pressures.

1.5 **QUALITY ASSURANCE**

A. Precast wet well and valve vault:

1. Qualifications: The precaster shall be PCI-certified; design shall be sealed by a Professional Engineer licensed to practice in the State of Utah.

2. Inspections: City reserves the right to inspect the precasting facility prior to and during fabrication, and to collect samples of materials during the fabrication process for testing. Manufacturer shall accommodate facility inspection and sample collection.

PART 2 PRODUCTS

2.1 **WET WELL**

A. Walls:

1. Precast reinforced concrete sections; comply with ASTM C478; inside diameter to be as shown on the Drawings.

2. Joints: Tongue and groove with o-ring gaskets; comply with ASTM C443.

3. Preformed Bituminous Sealant: Federal Specification SS-S-210A and AASHTO M-198B.

B. Top and Bottom Slab:

1. Top Slab:

a. Precast; comply with ASTM C478.

b. Openings as shown on the Drawings.

c. Thickness; minimum 8-inches.

2. Bottom slab:

a. Cast-in-place.

b. Sized to counteract buoyancy forces.

3. Cast-in-place concrete; Sections 03 20 00, 03 30 04, 03 30 10.

4. Precast concrete; Section 03 40 00.

5. Concrete fill; Section 03 30 04.

2.2 **VALVE VAULT**

A. Walls, Top and Bottom Slabs:

1. Precast reinforced concrete sections.

2. Top slab thickness; minimum 8-inches.

3. Precast concrete; Section 03 40 00.

4. Reinforcing steel meeting ASTM A615 or A616, certified Grade 60.

5. Welded wire fabric conforming to ASTM A185.

6. Poured and vibrated and constructed using steel forms.
7. Wall joints to be sealed water-tight with gasket and polyurethane sealant.
8. Wall penetrations for drain piping field-cored.

2.3 GENERATOR

A. An auxiliary power generator is required in an open-air enclosure adjacent to the pump station control building (See Standard Details).

1. Generator size shall be sized based on the size and design of the pumps and the sewer lift station complete. Each site shall be a case by case design as reviewed by the Public Works Director.

B. Generator Requirements:

1. Natural Gas Operation – connection to natural gas distribution system
2. Weather Proof Enclosure
3. Automatic Start/Automatic Power Transfer Switches
4. Exercise Timers - shall be connected to the control panel and run/load the unit 15-30 minutes each week or as determined by the Public Works Director.
5. Startup and Training
6. Engine Cooler/Heater
7. All applicable connections and parts

C. Submit all applicable manufacturer information to City for review and approval.

2.4 ACCESSORIES

A. Hatches (wet well and valve vault):

1. Manufacturers:
   a. Halliday Products, Inc., The Bilco Company, or approved equal.
2. Load Rating: AASHTO H-20 wheel loading, 16,000 lb. wheel load.
3. Frame:
   a. Material: Extruded aluminum sections shaped to serve as a continuous drainage gutter with a 1-1/2 inch drain coupling.
   b. Anchors: Continuous anchor flange.
4. Cover:
   a. Material: 1/4 inch mill finish aluminum diamond plate, reinforced with stiffening ribs.
   b. Hinges: 316 stainless steel; butt type with compression spring operators enclosed in telescopic tubes.
   c. Hold Open Arm: 316 stainless steel; automatically locks door at 90 degree position; provide vinyl grip handle to release door for closing.
   d. No separate wrench required to open.

5. Hardware and Fasteners: 316 stainless steel.
6. Accessories: Provide one recessed lock box padlock arrangement for each door supplied. The recessed lock box shall have an independently hinged cover for access to the padlock. Owner will provide padlock upon acceptance of the pump station.
7. Finishes:
    a. Bituminous Coating for Surface Which Will Contact Concrete: SSPC Paint 12, solvent- type bituminous mastic, normally free of sulfur, compounded for 15 mil dry film thickness per coat.

B. Pump Discharge Pipe Supports:
1. Type 316 stainless steel.
2. Pipe supports shall be designed and located to adequately and rigidly support the piping, brace against thrusts, anchor the piping between expansion couplings, brace against uplift, and maintain the piping in proper alignment and to proper grade.
3. All piping shall be assumed to be full of water. All design shall conform to the requirements of "Pipe Hangers and Supports – Materials and Design." SP-58, Manufacturer's Standardization Society of Valve and Fittings Industry.

C. Valve Vault Drain:
1. Pipe: 4-inch ASTM D3034 SDR 35 pipe, or as shown on the plans.
2. Flap Valve: Provide flap valve to prevent sewer gases from wet well from entering valve vault.

D. Liquid Level Sensors:
1. Milltronics Hydoranger 200 with an XPS-10 Ultrasonic Transducer or approved equal. Sensor to monitor the water elevations for the high level alarm, lag pump turn on, lead pump turn on, and pump off.
2. One (1) High Level Alarm Redundancy Anchor Scientific P20NO liquid level sensor with 20 feet of electrical cable, each with mounting bracket to 1-inch pipe. Level sensors shall be a non-floating, displacement type. Level sensors shall be rated for operation at milliwatt levels.

2.5 **PUMP DISCHARGE PIPING**

A. Ductile Iron Pipe and Fittings:
1. Pipe: Designed in accordance with AWWA C150; manufactured in accordance with AWWA C151; thickness Class 53; furnished in minimum nominal 18 foot laying lengths.
2. Fittings: AWWA C110 or C153; sleeves to be long mechanical joint type.
3. Exterior Coating: Bituminous material outside.
4. Interior Lining: AWWA C104 cement mortar with seal coat.
5. Buried Joints: AWWA C111, rubber gasket, push-on or mechanical type.
6. Exposed Joints: Flanged Type; comply with AWWA C115 Appendix A, and ANSI B16.1, Class 125; bolts and nuts zinc plated.

2.6 VALVES

A. Plug Valves (2½ to 12-inch):

1. Manufacturer: Henry Pratt Ballcentric, or approved equal.
2. Valve flanges shall be ANSI B16.1, Class 125.
3. Non-lubricated, eccentric cast iron plug (ASTM A126, Class B) with resilient plug facings, (Neoprene or BunaN) cast iron body (ASTM A126, Class B.
4. Valve shall be equipped with a gear actuator and a handwheel, minimum 12-inch diameter.
5. Valves shall be open with a quarter turn counterclockwise, looking down at valve stem.
6. Valves shall provide drip-tight shutoff in either direction up to 175 psi.
7. Valve Gear Actuators, if needed, shall be totally enclosed wormgear type, oil or grease lubricated and sealed for watertightness, with self-lubricating bronze or 316 stainless steel sleeve bearings, thrust bearings, built-in adjustable opening and closing stops and valve position indicators. Each actuator shall be sized to require not more than 300 inch pounds of torque in the input shaft to seat and unseat the valve plugs at the pressure drops specified herein. Note: Hand wheel force shall not exceed 25-pounds to turn.

B. Ball Check Valves:

1. Manufacturer: Flomatic 408, or approved equal.
2. Meeting AWWA C508
3. Designed to be fully automatic in operation and specifically suited to serve where solids, fibers or highly viscous materials.
4. Ball check valves will have one moving part, the ball, which moves automatically out of the path of flow, providing an unobstructed smooth flow through the valve body. Upon discontinuation of flow the ball automatically rolls back to the closed position, providing a positive seal against back pressure or backflow

C. Air Release Valve, when shown:

1. Manufacturer: Val Matic Model 49A, or approved equal.
2. Single chamber body enclosing a series of control floats to regulate the passage of air between the pipeline and the atmosphere.

2.7 PRESSURE GAGES

A. When specified, the following shall be installed on the pump discharge pipe in the location as indicated on the Drawings.

1. Pressure Gauge; Manufacturer – Type 1279 Dura gauge Pressure Gauge Model No: 45-1279-SS-04L-XLL-0/200 psi by ASHCROFT or equal, with stainless steel case. Pressure gage shall be able to operate in the pressure range of 0 psi – 200 psi. Install pressure gauge mounted directly above the pressure diaphragm seal.
2. Pressure Diaphragm Seal – Type 200 Series Welded or Bonded Diaphragm Seal by ASHCROFT and 316 SS Case or Equal. Pressure diaphragm seal shall be able to operate in the pressure range of 0 psi – 200 psi.

3. Pressure Gage Shut Off Valve – 1-inch Apollo 316 stainless steel ball valve, Model 76-10501, or equal. Ball valve shall be able to operate in the pressure range of 0 psi – 200 psi. Install service ball valve between the process piping and the pressure assembly.

2.8 **CONTROLS**

A. "ABS" QCII control panel with option package "B." For each pump motor, there shall be included: a combination circuit breaker/overload with manual reset for protection against current overloads, short-circuit protection, and disconnect for all phases; across-the-line magnetic contact; hand/off/automatic pump operations selector switch; intrinsically safe solid state duplex pump controller with an automatic solid state alternator for two pumps (providing alternating operation of pumps under normal conditions, or in case of high level, allowing both pumps to operate simultaneously) and high level alarm function.

B. The following additional options shall be included with the panel:

1. NEMA 4X Gasketed, lockable enclosure
2. High Level Alarm light - panel mounted
3. Condensation heater
4. Running time meter(s)
5. Pump run light(s)
6. Secondary Lightening arrester
7. 3 Phase Power Monitor Phase protection
8. Automatic Telephone Dialer, Raco Verbatim 8-channel:
    a. Pump called for but fails to run alarm output
    b. Power Failure
    c. High wet well level
    d. Loss of echo failure
    e. Low level alarm
9. Manual Emergency/Normal Power Transfer Switch with Generator Receptacle

PART 3 EXECUTION

3.1 **GENERAL**

A. Install materials and equipment in accordance with manufacturer's instructions.

B. Excavate and backfill; see Sections 31 23 16 and 31 05 13 as applicable, and the following:

1. Provide 12 inch thick foundation of #3 sewer rock under bottom slabs.

3.2 **WET WELL AND VALVE VAULT**

A. Install base with top surface level and install walls level and plumb.

B. Provide grout in wet well and in valve vault sloping to drain.

3.3 **HATCHES**

A. Coat all surfaces of hatch which will come in contact with concrete with bituminous coating.

B. Install hatch plumb and level in cast-in-place slab, free from distortion or defects, and at the elevation indicated.

C. Install drain piping in valve vault unit from frame to sump; see Paragraph 3.4 for drain piping.

D. Install hatches for proper access to equipment, ladders, etc.

3.4 **VALVE VAULT DRAIN PIPING**

A. Route piping in orderly manner and maintain gradient.

B. Install piping to conserve space and not interfere with use of space.

C. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Incorporate provisions for expansion, contraction, and supports as recommended by the pipe manufacturer. Provide adapters, connectors, and fittings for connecting to other types of pipe, fittings, and drains.

3.5 **PUMP DISCHARGE PIPING**

A. Buried: See Section 33 11 00.

B. Exposed:

1. Tighten flanged joints with all bolts taking equal stress.

2. Install wall openings and supports at proper elevation.

3.6 **VALVES**

A. Install valves plumb and level, free from distortion and strain.

B. Install valves at proper horizontal location and elevation.

C. Tighten flanged joints with all bolts taking equal stress.

D. Install plug valves with valve seat location on pump discharge side.

E. Install check valves in accordance with manufacturer’s recommendations.

F. Install air release valve assemblies in accordance with manufacturer’s recommendations and as shown on the Drawings.

3.7 **PRESSURE GAGES**

A. Install pressure gages in accordance with manufacturer’s recommendations, when shown on the Drawings.

3.8 **FIRE EXTINGUISHERS**

A. Install in the locations shown on the Drawings.

3.9 **FIELD QUALITY CONTROL**

A. Provide complete functional testing of all operating equipment.

B. Pump Discharge Piping:

1. Pressure and leakage test, and completion of tests: see Section 33 08 00.

END OF SECTION

APPENDIX D – PERRY CITY PUBLIC WORKS STANDARD DRAWINGS

PERRY CITY CORPORATION

PUBLIC WORKS STANDARD DRAWINGS

SUBMITTED & RECOMMENDED

REGISTERED PROFESSIONAL ENGINEER
09/01/2021
No. 5149637
Brett Marsden Jones
State of Utah

Brett M Jones

BRETT M. JONES, P.E. — SEAL
CITY ENGINEER

APPROVAL

DocuSigned by:
Robert Barnhill
ROBERT BARNHILL — 9/23/2021 — DATE
CITY ADMINISTRATOR

DocuSigned by:
Tyler Wagstaff
TYLER WAGSTAFF — 9/23/2021 — DATE
DIRECTOR OF PUBLIC WORKS

DocuSigned by:
kevin Jeppsen
KEVIN JEPPSEN — 9/23/2001 — DATE
CITY MAYOR

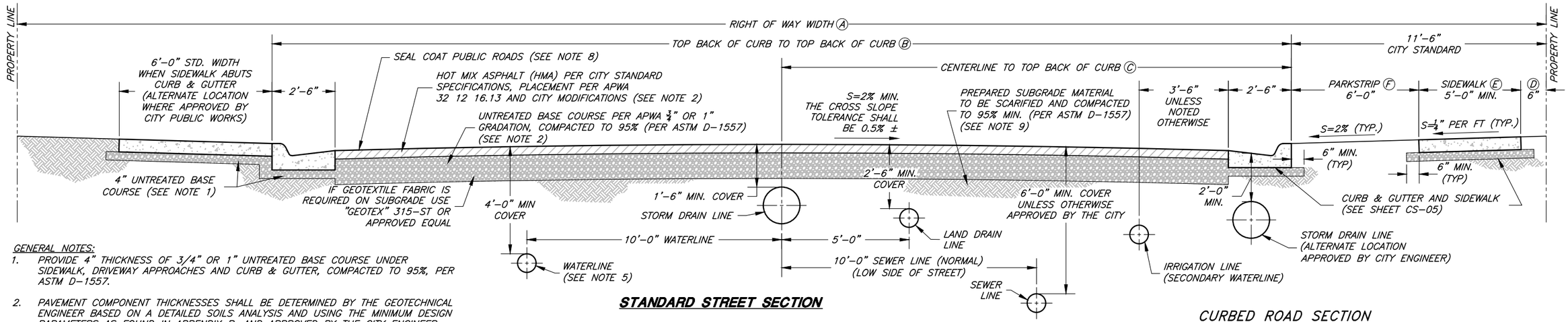
PERRY
EST. 1853

3RD EDITION

SEPTEMBER 2021

JONES & ASSOCIATES
CONSULTING ENGINEERS

Index of Drawings



STANDARD STREET SECTION

GENERAL NOTES:

1. PROVIDE 4" THICKNESS OF 3/4" OR 1" UNTREATED BASE COURSE UNDER SIDEWALK, DRIVEWAY APPROACHES AND CURB & GUTTER, COMPACTED TO 95%, PER ASTM D-1557.
2. PAVEMENT COMPONENT THICKNESSES SHALL BE DETERMINED BY THE GEOTECHNICAL ENGINEER BASED ON A DETAILED SOILS ANALYSIS AND USING THE MINIMUM DESIGN PARAMETERS AS FOUND IN APPENDIX B, AND APPROVED BY THE CITY ENGINEER. THE ABSOLUTE MINIMUM PAVEMENT SECTION IS 3-INCH THICK HMA WITH 8-INCH UTBC. IF NO GEOTECHNICAL REPORT IS AVAILABLE (EMERGENCY SITUATION, ETC.), 4-INCH THICK HMA WITH 6-INCH THICK UTBC AND 8-INCH THICK GRANULAR BORROW SUBGRADE MATERIAL SHALL BE USED.
3. ALL ROAD CUTS SHALL BE PATCHED PER CS-04.
4. CURB & GUTTER AND SIDEWALKS SHALL BE CONSTRUCTED USING FIBER REINFORCED CONCRETE AND IN COMPLIANCE WITH PERRY CITY TECHNICAL SPECIFICATIONS AND THESE DRAWINGS.
5. ALL CULINARY WATER MAINS AND SERVICES MUST MAINTAIN A MINIMUM SEPARATION FROM ALL SEWER MAINS AND LATERALS OF 10'-0" HORIZONTAL AND 18" VERTICAL IN ACCORDANCE WITH THE STATE OF UTAH DIVISION OF DRINKING WATER RULES SECTION R309-550-7

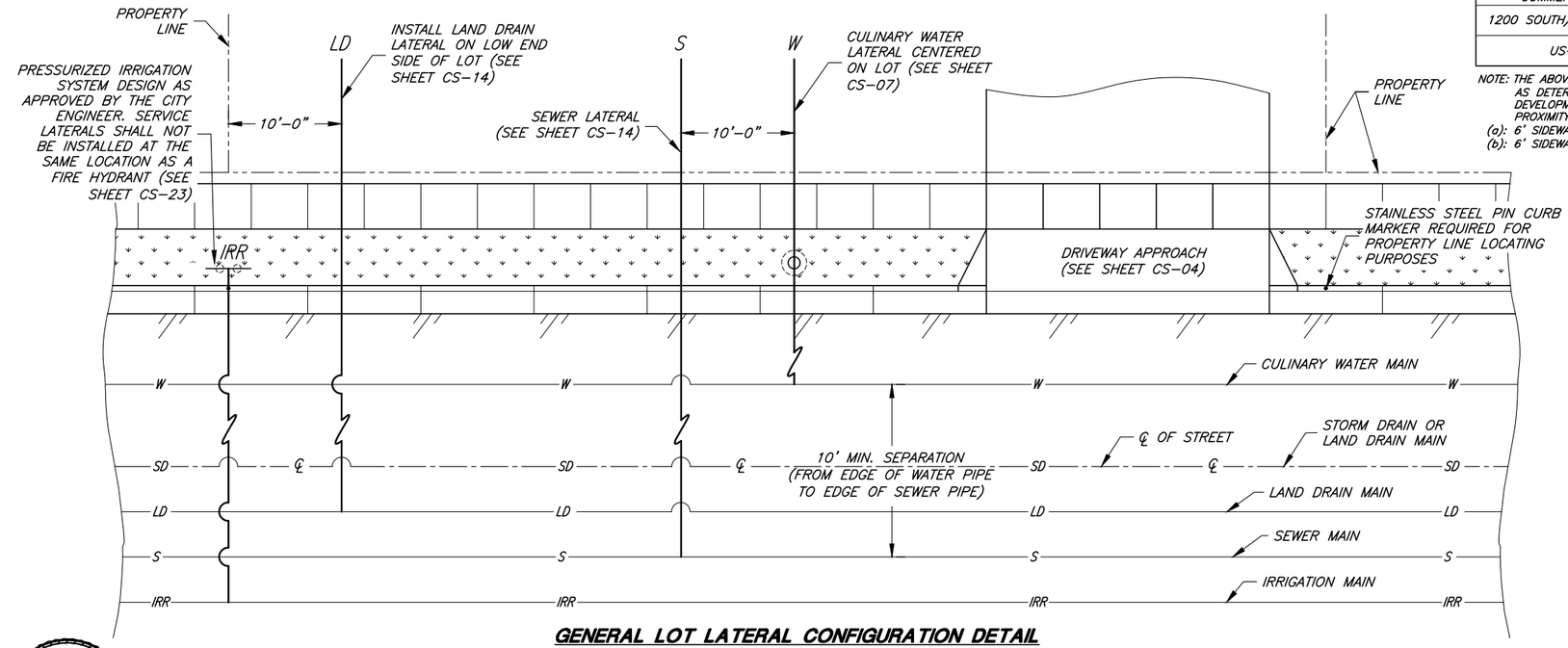
GENERAL NOTES CONT.:

6. THE 5'-0" SIDEWALK SHOWN ABOVE IS TO BE CONSIDERED THE "CITY STANDARD." OTHER LOCATIONS AND TYPES OF SIDEWALK AS REQUESTED BY THE DEVELOPER MUST BE APPROVED BY THE CITY. IF SIDEWALK IS LOCATED AGAINST THE TBC, IT MUST BE A MINIMUM OF 6 FEET IN WIDTH.
7. NATURAL GAS TYPICALLY LOCATED IN THE PARKSTRIP, POWER AND COMMUNICATION LINES TYPICALLY LOCATED BEHIND PROPERTY LINES OR IN LOT EASEMENTS.
8. "SEAL COAT" CONSISTS OF THE FOLLOWING:
   a. CHIP SEAL PER APWA 32 01 13.64 AND CITY MODIFICATIONS, AND
   b. FOG SEAL PER APWA 32 01 13.50 AND CITY MODIFICATIONS.
9. IMPORTED FILL UNDER ROADWAY SHALL BE GRANULAR BORROW, 3" MAX.
10. PARK STRIP TO CURB CROSS-SLOPE – VARIANCE FROM 2% AS APPROVED BY THE CITY ENGINEER OR PERRY CITY REPRESENTATIVE.

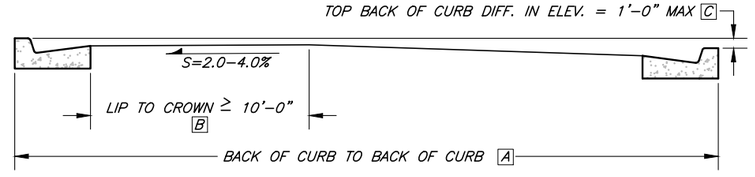
CURBED ROAD SECTION

STREET DESIGNATION	R.O.W. WIDTH (A)	T.B.C. TO T.B.C. (B)	℄ TO T.B.C. (C)	℄ TO SIDEWALK (C)	SIDEWALK (E)	PARKSTRIP (F)
MINOR	50'	28'	14'	0"	5'	6'
MINOR ON-STREET PARKING	50'	40'	20'	0"	5'	0'
STANDARD RESIDENTIAL	60'	37'	18'-6"	6"	5'	6'
COLLECTOR	66'	43'	21'-6"	6"	5'	6'
1200 WEST (TRAIL AREA)	66'	40'	20'	1'	6' (a)	0' (a)
1200 WEST (2250 SOUTH TO 1500 SOUTH)	90'	67'	33'-6"	1'	6' (b)	0' (b)
1200 WEST (1500 SOUTH TO BRIGHAM CITY)	106'	89'	44'-6"	1'	7'-6"	0'
MADDOX LANE & COMMERCE WAY	80'	66'	33'	1'	6'	0'
1200 SOUTH/1425 SOUTH	66'	46'	23'	4'	6'	0'
US-89	PER UDOT'S STANDARDS AND SPECIFICATIONS					

NOTE: THE ABOVE AND ALTERNATIVE ROAD SECTIONS REQUIRED ARE ESTABLISHED BY THE CITY'S CURRENT CIRCULATION PLAN AND SHALL BE AS DETERMINED/APPROVED BY THE CITY ENGINEER & PLANNING COMMISSION BASED UPON ZONING, GENERAL PLAN, SIZE OF DEVELOPMENT, ESTIMATED TRAFFIC VOLUME, & AMOUNT OF OPEN SPACE ASSOCIATED WITH DEVELOPMENTS, AS WELL AS THEIR PROXIMITY TO HIGH VOLUME ROADS OR COMMERCIAL ZONING.
(a): 6' SIDEWALK AGAINST TBC ON EAST SIDE OF ROADWAY. 10' TRAIL AND 8' PARKSTRIP ON WEST SIDE.
(b): 6' SIDEWALK AGAINST TBC ON EAST SIDE OF ROADWAY. 10' TRAIL AND 5' PARKSTRIP ON WEST SIDE.



GENERAL LOT LATERAL CONFIGURATION DETAIL



CROWN NOTES:

A. MAXIMUM DIFFERENCE IN ELEVATION BETWEEN CURBS ON OPPOSITE SIDES OF THE STREET SHALL NOT EXCEED 1'-0" AS SHOWN IN DETAIL AND TABLE.
B. ON ARTERIAL STREETS AND CERTAIN STREETS APPROVED BY THE CITY COUNCIL, THE CITY ENGINEER WILL PROVIDE A PAVEMENT DESIGN. LOCATION OF SIDEWALK AND CURB & GUTTER MAY VARY ON INDIVIDUAL ARTERIAL STREETS PER DIRECTION OF THE CITY ENGINEER.
C. ALL OTHER PROPOSED STREET CROSS SECTIONS SHALL BE AS APPROVED BY THE CITY ENGINEER.

CROWN LOCATION TABLE		
A	B	C
40'-0"	17'-6"	0'-0"
40'-0"	12'-0"	0'-6"
40'-0"	10'-0"	1'-0"
46'-0"	20'-6"	0'-0"
46'-0"	10'-6"	0'-6"
46'-0"	10'-6"	1'-0"
CUL-DE-SAC		1'-0" MAX.

CROWN LOCATION FOR VARIOUS CROSS SLOPES

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED
PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

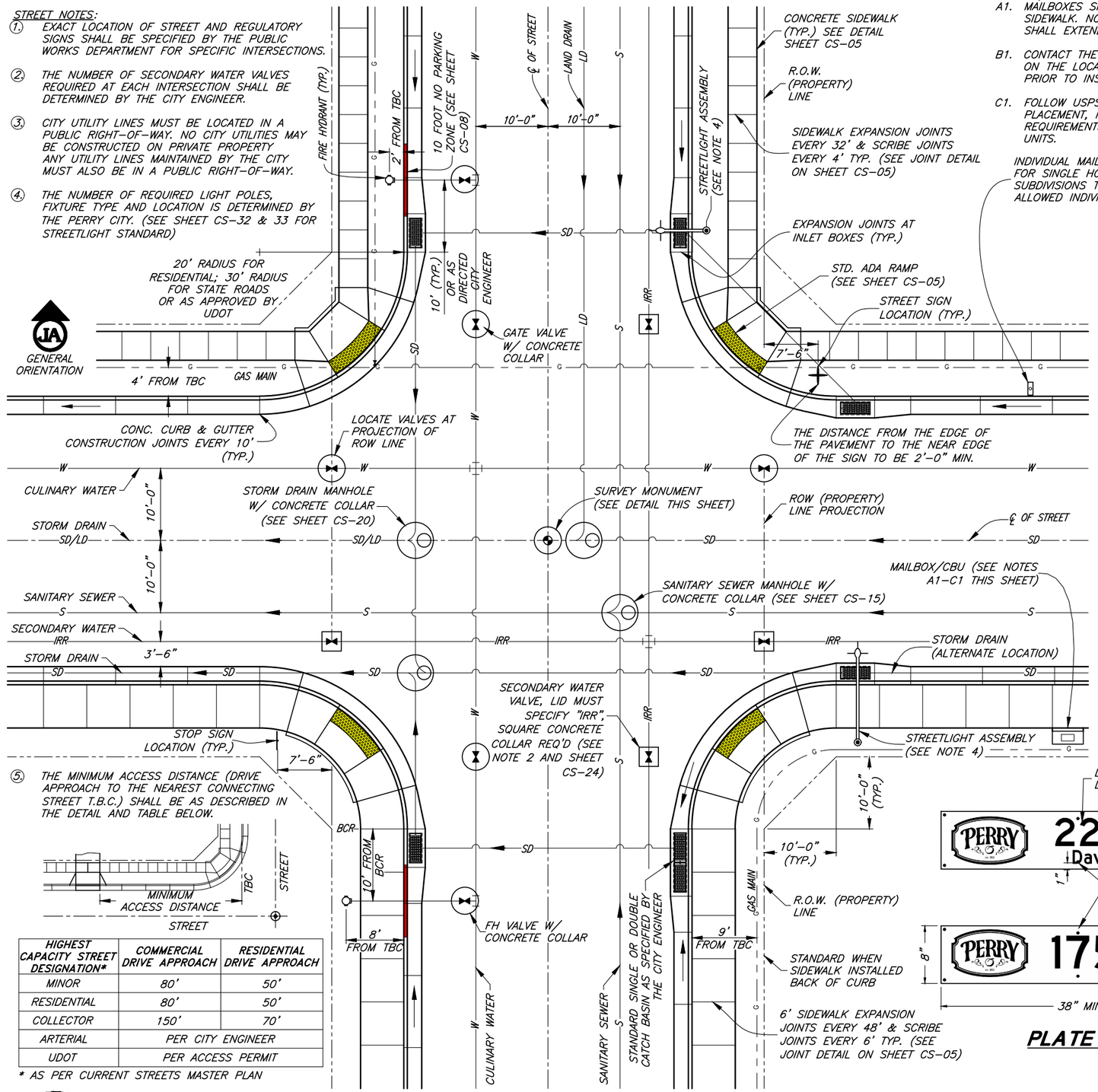
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
PUBLIC ROADS - TYPICAL STREET SECTIONS & UTILITY LATERAL CONFIGURATION DETAILS

SHEET: CS-02
OF 1 SHEETS
0

STREET NOTES:

1. EXACT LOCATION OF STREET AND REGULATORY SIGNS SHALL BE SPECIFIED BY THE PUBLIC WORKS DEPARTMENT FOR SPECIFIC INTERSECTIONS.
2. THE NUMBER OF SECONDARY WATER VALVES REQUIRED AT EACH INTERSECTION SHALL BE DETERMINED BY THE CITY ENGINEER.
3. CITY UTILITY LINES MUST BE LOCATED IN A PUBLIC RIGHT-OF-WAY. NO CITY UTILITIES MAY BE CONSTRUCTED ON PRIVATE PROPERTY ANY UTILITY LINES MAINTAINED BY THE CITY MUST ALSO BE IN A PUBLIC RIGHT-OF-WAY.
4. THE NUMBER OF REQUIRED LIGHT POLES, FIXTURE TYPE AND LOCATION IS DETERMINED BY THE PERRY CITY. (SEE SHEET CS-32 & 33 FOR STREETLIGHT STANDARD)



5. THE MINIMUM ACCESS DISTANCE (DRIVE APPROACH TO THE NEAREST CONNECTING STREET T.B.C.) SHALL BE AS DESCRIBED IN THE DETAIL AND TABLE BELOW.

HIGHEST CAPACITY STREET DESIGNATION*	COMMERCIAL DRIVE APPROACH	RESIDENTIAL DRIVE APPROACH
MINOR	80'	50'
RESIDENTIAL	80'	50'
COLLECTOR	150'	70'
ARTERIAL	PER CITY ENGINEER	
UDOT	PER ACCESS PERMIT	

* AS PER CURRENT STREETS MASTER PLAN

MAILBOX/CBU NOTES:

A1. MAILBOXES SHALL NOT BE PLACED IN THE SIDEWALK. NO MAILBOX OR CBU BOX EDGES SHALL EXTEND PAST THE TBC.

B1. CONTACT THE LOCAL POSTMASTER FOR APPROVAL ON THE LOCATION OF THE MAILBOX OR CBU PRIOR TO INSTALLATION.

C1. FOLLOW USPS GUIDELINES & POLICIES FOR THE PLACEMENT, INSTALLATION, AND ACCESS REQUIREMENTS FOR ALL MAILBOX AND CBU UNITS.

INDIVIDUAL MAILBOXES ALLOWED ONLY FOR SINGLE HOMES BEING BUILT IN SUBDIVISIONS THAT WERE PREVIOUSLY ALLOWED INDIVIDUAL BOXES

STREET SIGN NOTES:

A. SIGNS SHALL BE FURNISHED & INSTALLED BY THE DEVELOPER AT LOCATIONS DESIGNATED BY THE CITY. INSTALLATION SHALL BE IN ACCORDANCE WITH CURRENT "MUTCD" STANDARDS.

B. STREET SIGN BACKGROUND SHALL BE REGULATORY BLUE (STATE ROADS SHALL BE GREEN), BOTH STREET AND TRAFFIC SIGNS SHALL BE AT THE VERY LEAST HIGH INTENSITY REFLECTIVE SHEETING (9FP-85 TYPE IIIA)

C. LEGEND SHALL BE WHITE LETTERS (FONT: HIGHWAY C), HIGH INTENSITY REFLECTIVE SHEETING (9FP-85 IIIA)

D. SIGN BLANK SHALL BE 6081-T6 HEAT TREATED HIGH TENSILE DEGREASED ALUMINUM W/ ALODINE 1200 FINISH-THICKNESS SHALL BE 0.08"

E. EACH SIGN SHALL CONSIST OF TWO PLATES RIVETED TOGETHER & MOUNTED AS SHOWN

F. SIGNS ON PRIVATE ROADS SHALL MEET ALL SPECIFICATIONS FOR STANDARD SIGNS. (PRIVATE SIGNS WILL NOT BE MAINTAINED BY THE CITY.)

G. ALL STREETS WITH NAMES MUST ALSO SHOW LOCATIONS COORDINATE DESIGNATION

H. CONTACT CITY PRIOR TO MAKING SIGNS TO VERIFY PROPER NAMES AND COORDINATES

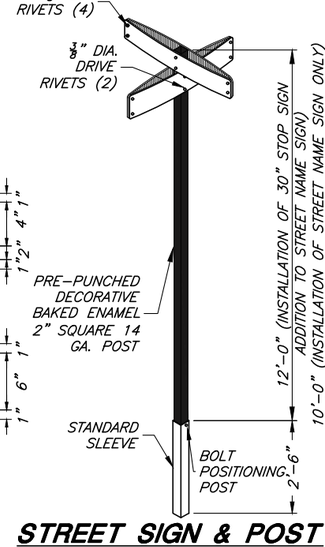


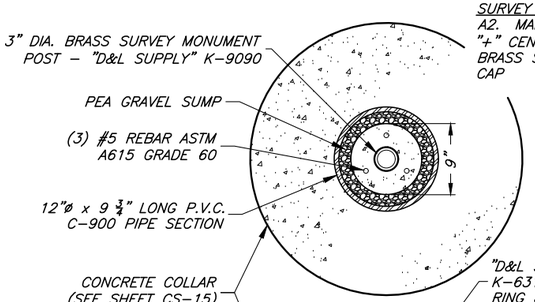
PLATE DETAIL

STREET SIGN & POST

STREET / TRAFFIC SIGN & POST

SURVEY MONUMENT NOTES:

A2. MARK POINT WITH AN "+" CENTER PUNCH ON BRASS SURVEY MONUMENT CAP



SURVEY MONUMENT DETAIL

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
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JA JONES & ASSOCIATES
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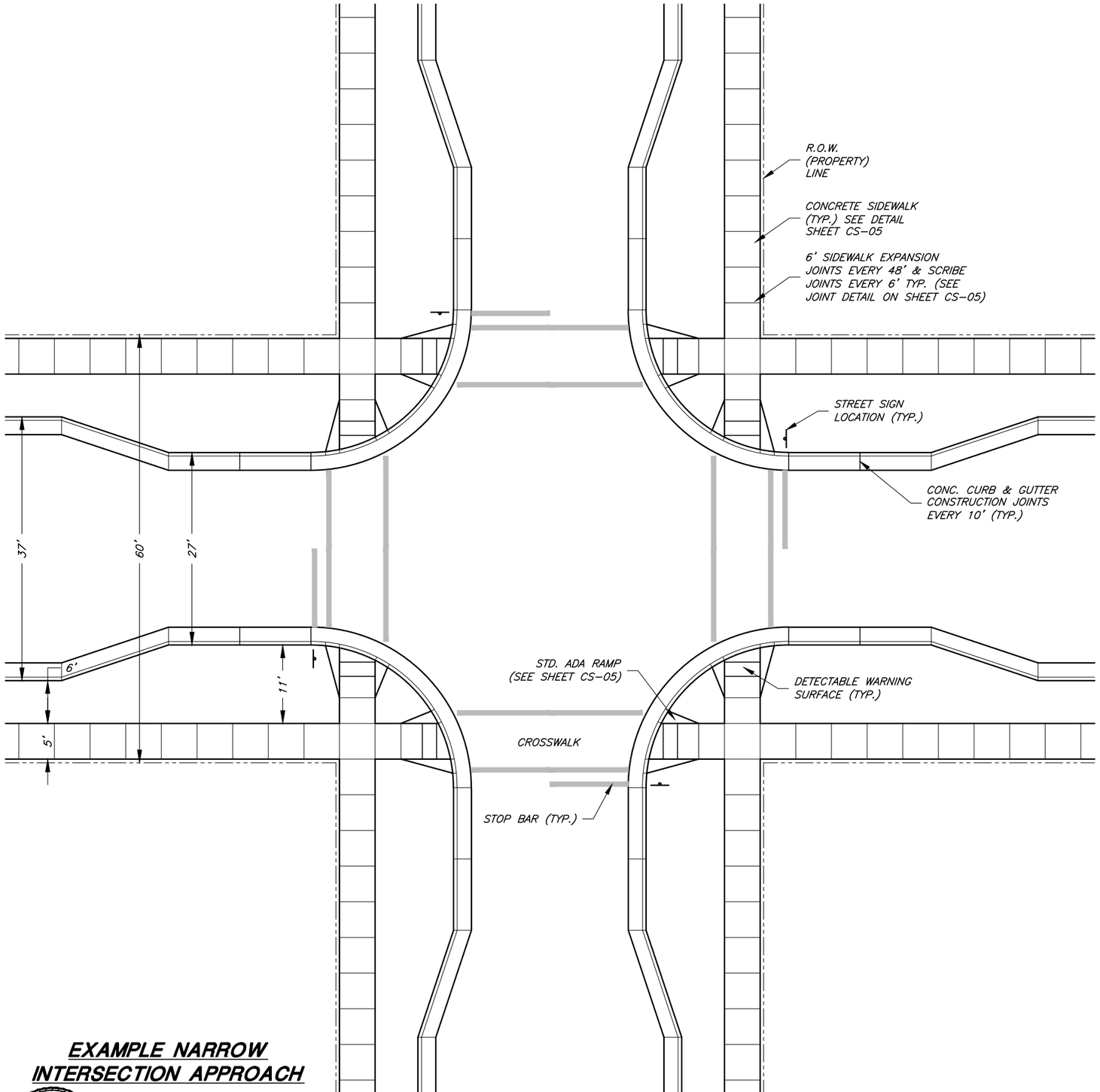
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

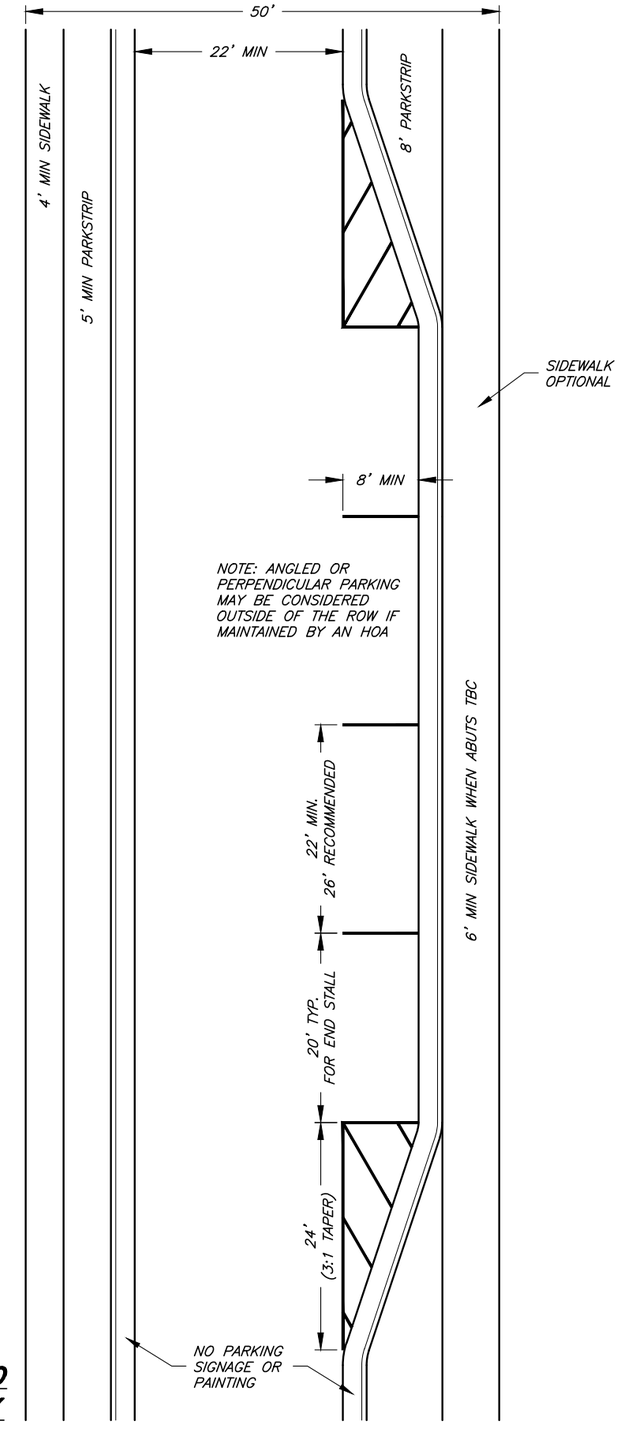
PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

PUBLIC ROADS - TYPICAL INTERSECTION & STREET DETAILS

SHEET: CS-03
OF 1 SHEETS
0



EXAMPLE NARROW INTERSECTION APPROACH



EXAMPLE LOW HARD SURFACE ROADWAY

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
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JA JONES & ASSOCIATES
CONSULTING ENGINEERS
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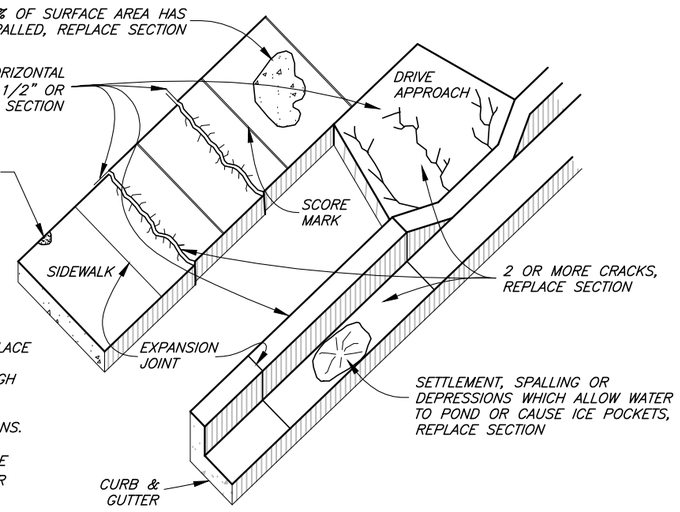
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
PUBLIC ROADS EXAMPLES - NARROW APPROACH INTERSECTION & LOW HARD SURFACE ROADWAY

SHEET: CS-03A
OF 1 SHEETS
0



CONCRETE REPLACEMENT NOTES:

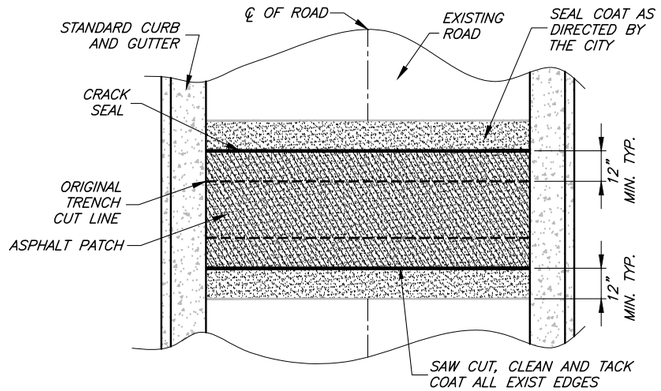
A. REPLACEMENT IS REQUIRED IF ANY COMPONENT HAS ONE OR MORE OF THE CONDITIONS SHOWN ABOVE.

B. ANY TIME CONCRETE IS CUT TO REPLACE A DEFECTIVE COMPONENT, THE CUT SHOULD EXTEND COMPLETELY THROUGH THE PIECE BEING REPLACED.

C. CURB & GUTTER MIN. 10'–0" SECTIONS.

D. A "CHIP" IS CONCRETE EDGE DAMAGE THAT IS DEEPER THAN ¼" AND LARGER THAN 2" DIA.

DEFECTIVE CONCRETE REPLACEMENT CRITERIA

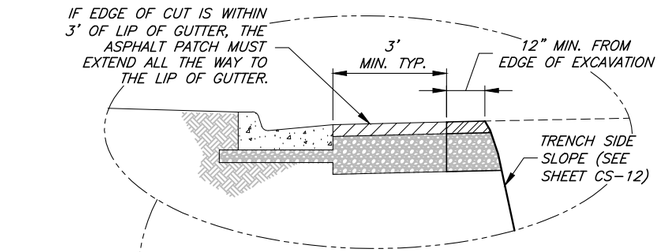


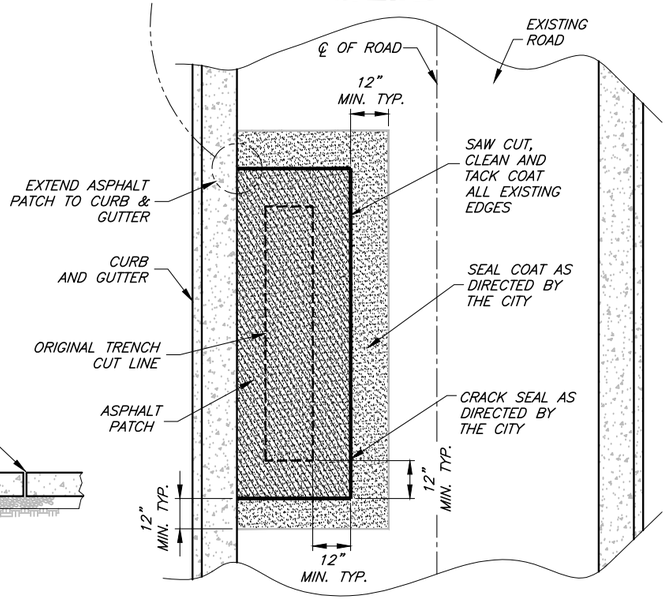
TYPICAL HORIZONTAL ASPHALT PATCH PLAN

ASPHALT PATCH NOTES:

A1. ON ANY ROAD PAVED OR OVERLAYED WITHIN THE LAST 10 YEARS, THE PATCH MUST BE COMPLETED PER APWA PLAN 255 (BITUMINOUS PAVEMENT T–PATCH).

A2. NO ANGLED ASPHALT PATCHING ALLOWED.





TYPICAL PARALLEL ASPHALT PATCH PLAN

DRIVEWAY APPROACH NOTES:

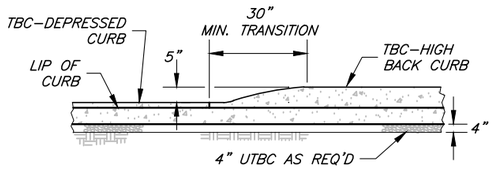
1. IN NEW SUBDIVISIONS WHERE FUTURE DRIVEWAY LOCATIONS ARE UNKNOWN, THE DRIVEWAY APPROACH SHALL BE MADE BY SAW CUTTING THE BACK OF THE EXISTING CURB TO THE REQUIRED DRIVEWAY WIDTH. ALL SAW CUTTING SHALL BE ACCOMPLISHED BY A CITY APPROVED LICENSED CONTRACTOR.

2. SCORE SIDEWALK ½" OF SIDEWALK THICKNESS AT EACH 4'–0" OR 6'–0" SECTION. EXPANSION JOINTS AT EACH 32'–0" (4'–0" SIDEWALK) OR 48'–0" (6'–0" SIDEWALK), PROVIDE ADDITIONAL CONTRACTION JOINTS ON OVERSIZED DRIVEWAYS AT 5'–0" MAX. SPACING

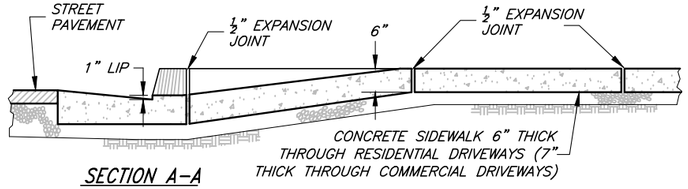
3. FOR EACH SINGLE FAMILY OR TWO–FAMILY DWELLINGS, NOT MORE THAN TWO (2) APPROACHES SHALL BE ALLOWED, EXCEPT CORNER AND DOUBLE FRONTAGE LOTS, WHICH SHALL BE ALLOWED (3) APPROACHES. SEPARATION BETWEEN APPROACHES SHALL HAVE MINIMUM SEPARATION OF TWELVE (12) FEET MEASURED AT THE PROPERTY LINE

4. THE COMBINED WIDTH OF ALL APPROACHES SERVING A LOT SHALL NOT EXCEED FIFTY (50) PERCENT OF THE LOT FRONTAGE.

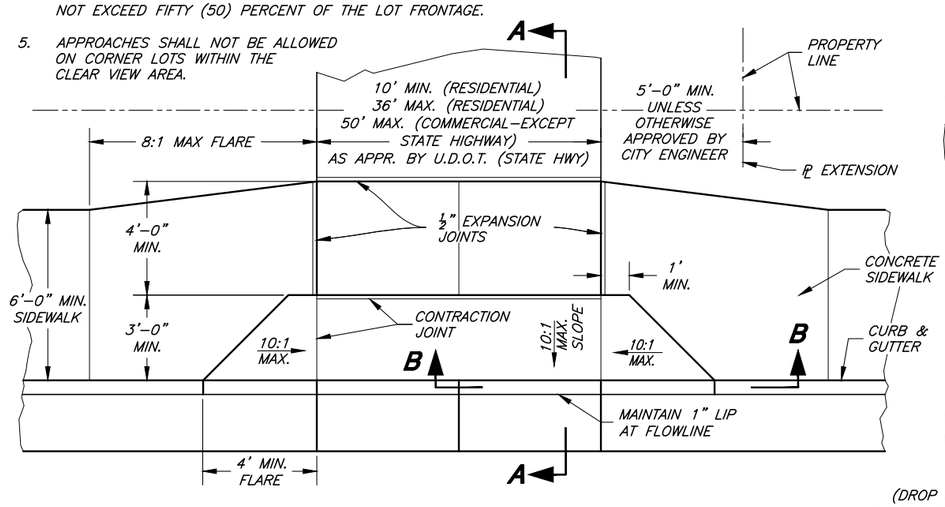
5. APPROACHES SHALL NOT BE ALLOWED ON CORNER LOTS WITHIN THE CLEAR VIEW AREA.



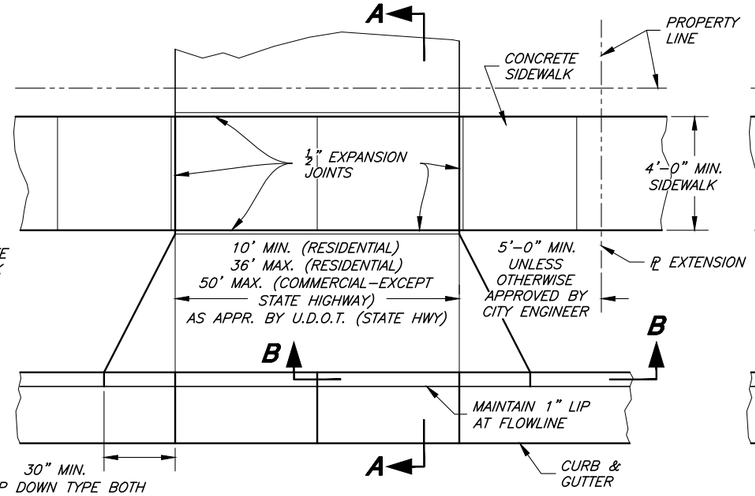
SECTION B–B



SECTION A–A

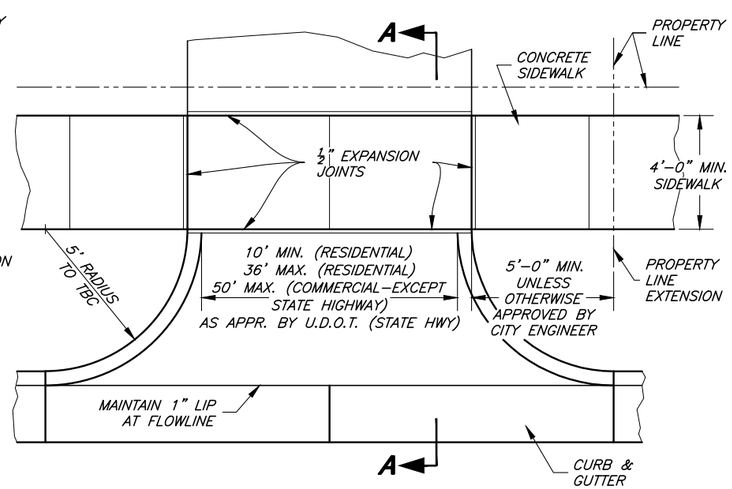


DRIVEWAY APPROACH W/ ADJACENT SIDEWALK



DRIVEWAY APPROACH W/ PARKSTRIP

DROP DOWN STYLE (CITY STANDARD)



CURB RADIUS STYLE DRIVEWAY APPROACH

(FOR REPLACEMENTS ONLY – NO NEW CONSTRUCTION)

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

CITY ENGINEER — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

SCALE: N.T.S.

DESIGNED ____ DRAWN ____ CHECKED ____

JA JONES & ASSOCIATES — CONSULTING ENGINEERS — 6080 Fashion Point Drive, South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY — PUBLIC WORKS

PERRY CITY CORPORATION

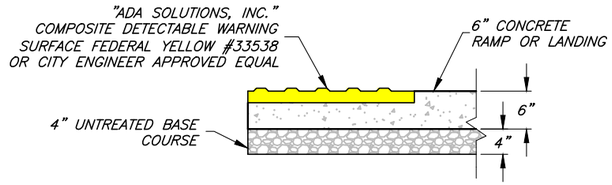
PUBLIC WORKS STANDARDS

PUBLIC ROADS - TYPICAL DRIVE APPROACH, ASPHALT PATCH & DEFECTIVE CONCRETE REPLACEMENT DETAILS

SHEET: CS-04 OF 1 SHEETS 0

DETECTABLE WARNING SURFACE NOTES:

1. LOCATE THE DETECTABLE WARNING SURFACE SO THE OUTSIDE CORNER NEAREST THE STREET IS WITHIN 1 INCH OF THE BACK OF CURB (TBC). PROVIDE 2-FOOT MINIMUM DEPTH.
2. PROVIDE DETECTABLE WARNING SURFACE FOR FULL WIDTH OF CURB CUT.
3. THE DETECTABLE WARNING SURFACE DOMES SHALL BE ORIENTED SUCH THAT THE ROWS ARE PARALLEL WITH THE DIRECTION OF PEDESTRIAN TRAVEL TO THE RAMP ON THE OPPOSITE SIDE OF THE STREET.
4. THE STANDARD COLOR FOR THE DETECTABLE WARNING SURFACE SHALL BE RED OR PRE-APPROVED CONTRASTING COLOR. WHEN THE EXISTING SIDEWALK COLOR IS NOT STANDARD CONCRETE, THE COLOR OF THE DETECTABLE WARNING SURFACE SHALL BE DETERMINED BY THE CITY ENGINEER OR AUTHORIZED REPRESENTATIVE.
5. WHEN A DETECTABLE WARNING SURFACE DOME IS CUT, THE REMAINING PORTION OF THE DOME SHALL BE BEVELED TO A MAXIMUM SLOPE OF 1:2.



DETECTABLE WARNING SURFACE DETAIL

ADA RAMP NOTES:

A. WHERE DESIGNATED BY THE CITY, ALTERNATE UDOT OR APWA RAMP DESIGNS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE CITY PUBLIC WORKS DEPARTMENT. SUBMIT ENGINEERED CONSTRUCTION PLANS TO CITY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.

B. SITE CONDITIONS WILL VARY. CONFIGURATION OF RAMP, LANDING, AND TRANSITION MAY BE CHANGED, BUT THEY MUST MEET DIMENSIONS AND SLOPES AS SHOWN IN THE MOST RECENT EDITION OF THE U.D.O.T. STANDARDS & SPECIFICATIONS (SHEETS PA1 THROUGH PA5). THE USE OF FLARES, CURB WALLS, ETC. ARE AT THE DISCRETION OF THE ENGINEER.

C. LOCATE CURB CUT WITHIN CROSSWALK.

D. RAMP GRADE BREAK MUST BE PERPENDICULAR TO THE RUNNING SLOPE.

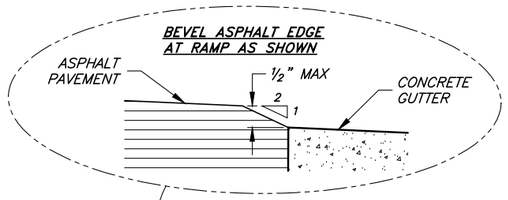
E. A 5'x5' PASSING AREA MUST BE PROVIDED AT A MINIMUM SPACING OF 200' WHEN NO OTHER FEATURES MEET ADA PASSING ZONE REQUIREMENTS.

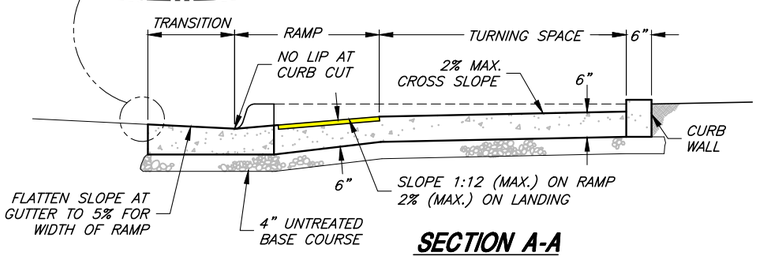
SLOPE TABLE			
	ITEM	MAX RUNNING SLOPE*	MAX. CROSS SLOPE*
(T)	TURNING SPACE [2]	2% (1V:48H)	2% (1V:48H)
(R)	RAMP	8.3% (1V:12H)	2% (1V:48H)
(S)	SIDEWALK	5% (1:20) [1]	2% (1V:48H)
(F1)	TRAVERSABLE SURFACE	10% (1V:10H)	--
(F2)	NON-TRAVERSABLE SURFACE	25% (1V:4H)	--
(B)	BLENDED TRANSITION	5% (1V:20H) 2% MIN.	2% (1V:48H)

* RUNNING SLOPE IS IN THE DIRECTION OF PEDESTRIAN TRAVEL. CROSS SLOPE IS PERPENDICULAR TO PEDESTRIAN TRAVEL.

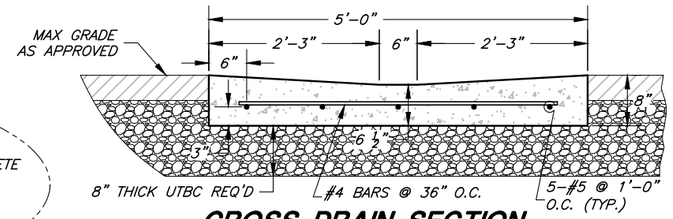
[1] 5% MAX OR NATURAL SLOPE OF LAND

[2] NOT TO EXCEED 2% IN ANY DIRECTION





SECTION A-A



CROSS DRAIN SECTION

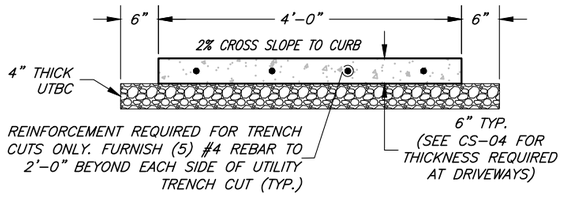
(FOR REPLACEMENTS ONLY - NO NEW CONSTRUCTION)

CURB & GUTTER NOTES:

A1. WHEN REPLACING CURB DUE TO CONSTRUCTION ACTIVITY, NEW CURB MUST EXTEND 5' MIN. PAST TRENCH ON EACH SIDE.

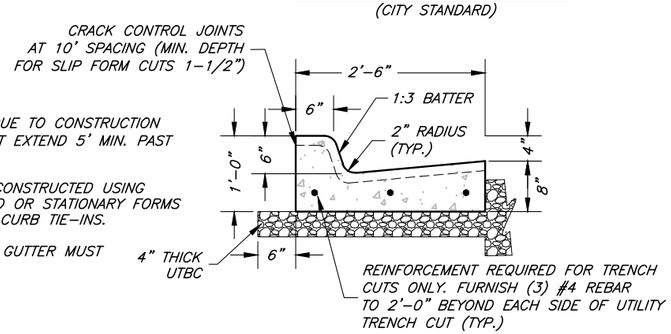
B1. CONCRETE CURB TO BE CONSTRUCTED USING SLIPFORMS, HAND FORMED OR STATIONARY FORMS ARE ONLY ALLOWED FOR CURB TIE-INS.

C1. THE SLOPE FOR CURB & GUTTER MUST BE A MINIMUM OF 0.5%.



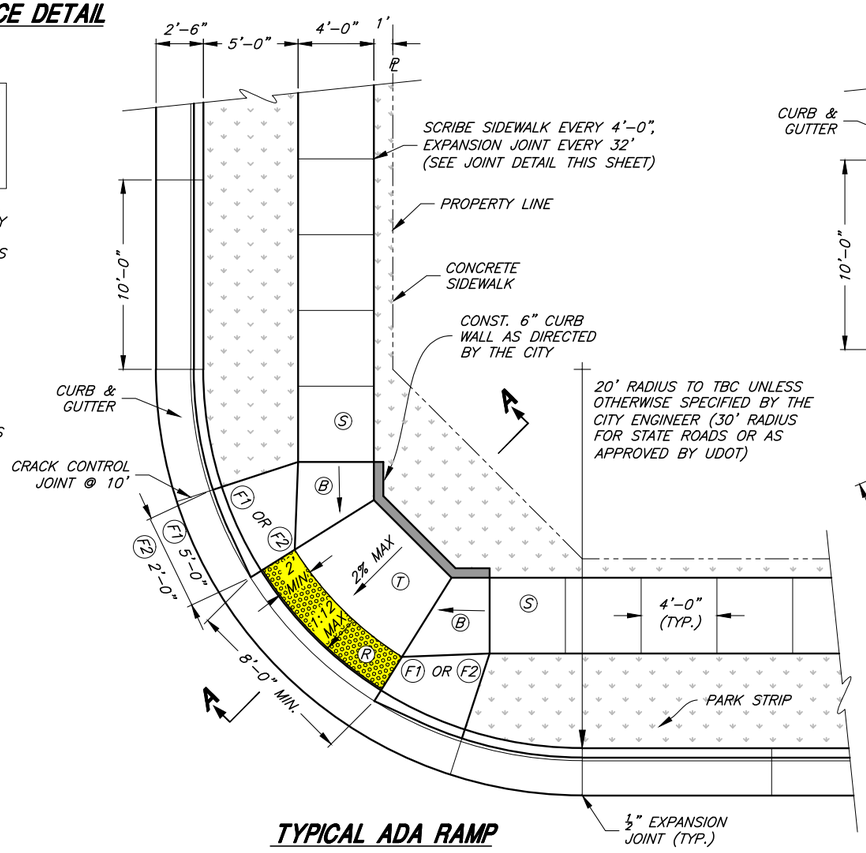
SIDEWALK SECTION

(CITY STANDARD)

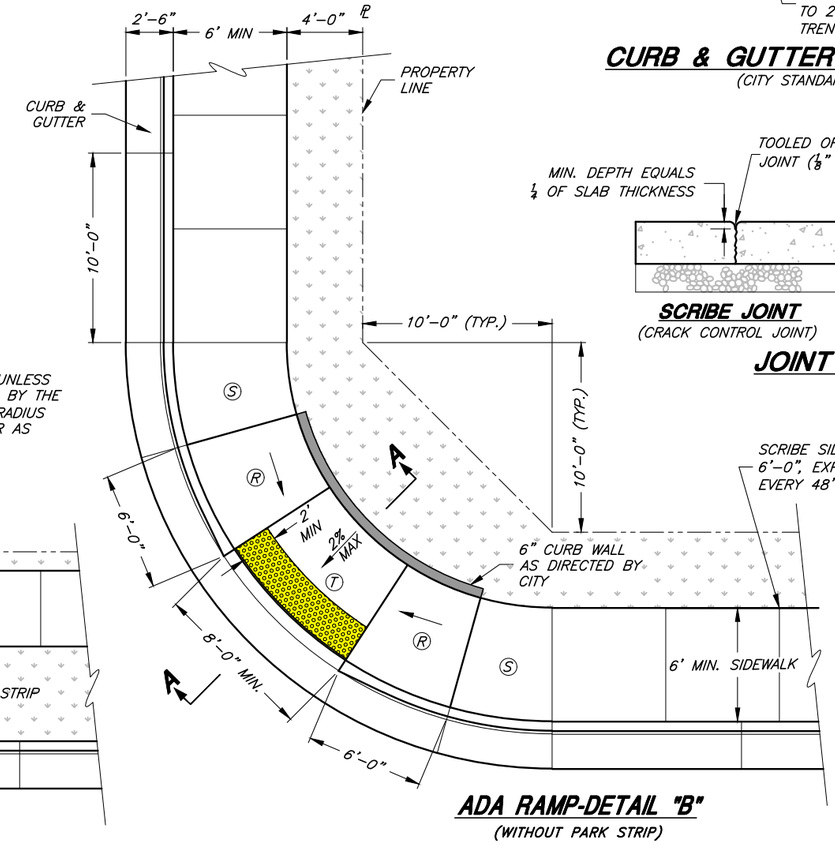


CURB & GUTTER SECTION

(CITY STANDARD)



TYPICAL ADA RAMP



ADA RAMP-DETAIL "B"

(WITHOUT PARK STRIP)

SCRIBE JOINT (CRACK CONTROL JOINT)

EXPANSION JOINT

JOINT DETAIL

GENERAL NOTES:

A2. INSTALLATION TOLERANCES ON CURB & GUTTER AND SIDEWALK PER APWA 32 16 13, 3.7.

B2. AS-BUILT SURVEY MAY BE REQUIRED TO VERIFY COMPLIANCE WITH TOLERANCES.

C2. GRINDING OF CONCRETE, TO MEET TOLERANCES, WILL NOT BE ALLOWED.

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

CITY ENGINEER — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

SCALE: N.T.S.

DESIGNED ____ DRAWN ____ CHECKED ____

JA JONES & ASSOCIATES — CONSULTING ENGINEERS — 6080 Fashion Point Drive, South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION

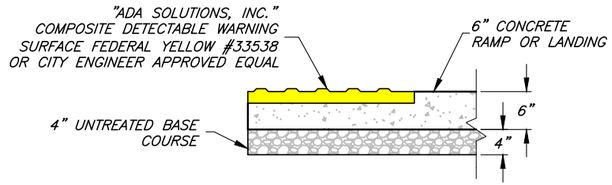
PUBLIC WORKS STANDARDS

PUBLIC ROADS - TYPICAL ADA RAMP, SIDEWALK CURB & GUTTER, AND CONCRETE JOINT DETAILS

SHEET: CS-05 — OF 1 SHEETS — 0

DETECTABLE WARNING SURFACE NOTES:

1. LOCATE THE DETECTABLE WARNING SURFACE SO THE OUTSIDE CORNER NEAREST THE STREET IS WITHIN 1 INCH OF THE BACK OF CURB (TBC). PROVIDE 2-FOOT MINIMUM DEPTH.
2. PROVIDE DETECTABLE WARNING SURFACE FOR FULL WIDTH OF CURB CUT.
3. THE DETECTABLE WARNING SURFACE DOMES SHALL BE ORIENTED SUCH THAT THE ROWS ARE PARALLEL WITH THE DIRECTION OF PEDESTRIAN TRAVEL TO THE RAMP ON THE OPPOSITE SIDE OF THE STREET.
4. THE STANDARD COLOR FOR THE DETECTABLE WARNING SURFACE SHALL BE RED OR PRE-APPROVED CONTRASTING COLOR. WHEN THE EXISTING SIDEWALK COLOR IS NOT STANDARD CONCRETE, THE COLOR OF THE DETECTABLE WARNING SURFACE SHALL BE DETERMINED BY THE CITY ENGINEER OR AUTHORIZED REPRESENTATIVE.
5. WHEN A DETECTABLE WARNING SURFACE DOME IS CUT, THE REMAINING PORTION OF THE DOME SHALL BE BEVELED TO A MAXIMUM SLOPE OF 1:2.



DETECTABLE WARNING SURFACE DETAIL

ADA RAMP NOTES:

A. WHERE DESIGNATED BY THE CITY, ALTERNATE UDOT OR APWA RAMP DESIGNS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE CITY PUBLIC WORKS DEPARTMENT. SUBMIT ENGINEERED CONSTRUCTION PLANS TO CITY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.

B. SITE CONDITIONS WILL VARY. CONFIGURATION OF RAMP, LANDING, AND TRANSITION MAY BE CHANGED, BUT THEY MUST MEET DIMENSIONS AND SLOPES AS SHOWN IN THE MOST RECENT EDITION OF THE U.D.O.T. STANDARDS & SPECIFICATIONS (SHEETS PA1 THROUGH PA5). THE USE OF FLARES, CURB WALLS, ETC. ARE AT THE DISCRETION OF THE ENGINEER.

C. LOCATE CURB CUT WITHIN CROSSWALK.

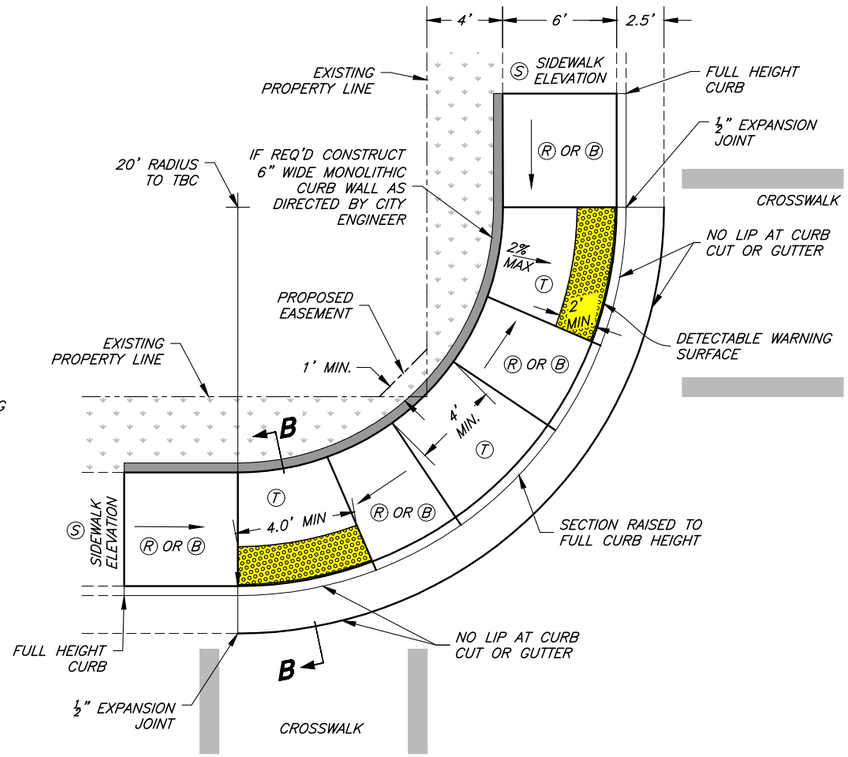
D. RAMP GRADE BREAK MUST BE PERPENDICULAR TO THE RUNNING SLOPE.

SLOPE TABLE			
	ITEM	MAX RUNNING SLOPE*	MAX. CROSS SLOPE*
Ⓣ	TURNING SPACE [2]	2% (1V:48H)	2% (1V:48H)
Ⓡ	RAMP	8.3% (1V:12H)	2% (1V:48H)
Ⓢ	SIDEWALK	5% (1:20) [1]	2% (1V:48H)
F1	TRAVERSABLE SURFACE	10% (1V:10H)	--
F2	NON-TRAVERSABLE SURFACE	25% (1V:4H)	--
Ⓑ	BLENDED TRANSITION	5% (1V:20H) 2% MIN.	2% (1V:48H)

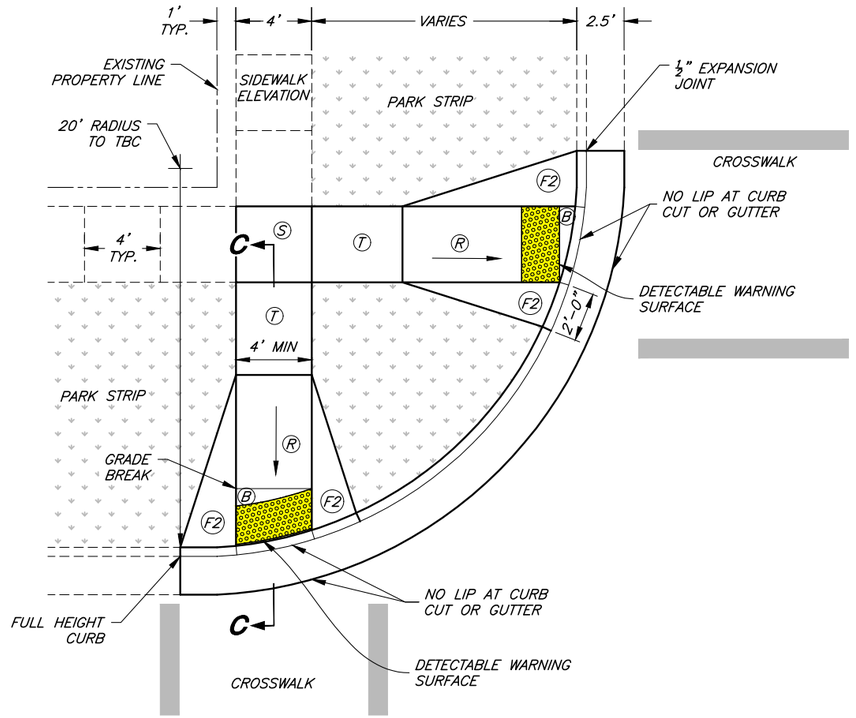
* RUNNING SLOPE IS IN THE DIRECTION OF PEDESTRIAN TRAVEL. CROSS SLOPE IS PERPENDICULAR TO PEDESTRIAN TRAVEL.

[1] 5% MAX OR NATURAL SLOPE OF LAND

[2] NOT TO EXCEED 2% IN ANY DIRECTION



DOUBLE ADA RAMP
(NO PARK STRIP)



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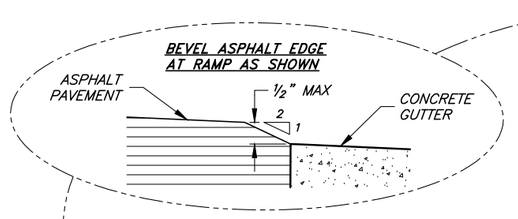
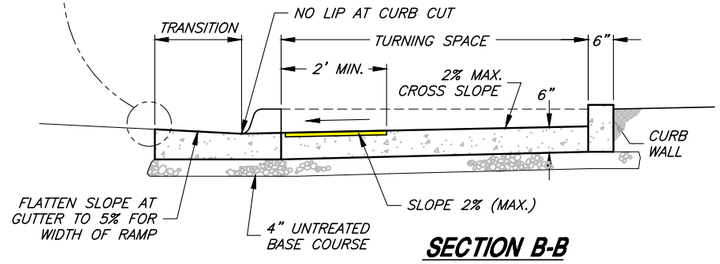
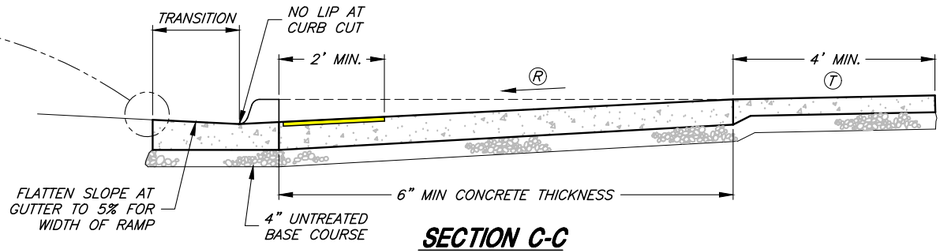




SECTION B-B



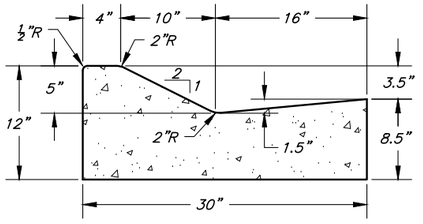
SECTION C-C

GENERAL NOTES:

A2. INSTALLATION TOLERANCES ON CURB & GUTTER AND SIDEWALK PER APWA 32 16 13, 3.7.

B2. AS-BUILT SURVEY MAY BE REQUIRED TO VERIFY COMPLIANCE WITH TOLERANCES.

C2. GRINDING OF CONCRETE, TO MEET TOLERANCES, WILL NOT BE ALLOWED.



ROLL CURB & GUTTER SECTION
WHERE APPROVED BY PUBLIC WORKS DEPARTMENT

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

CITY ENGINEER — 09/01/2021 DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 DATE

SCALE: N.T.S.

DESIGNED ____ DRAWN ____ CHECKED ____

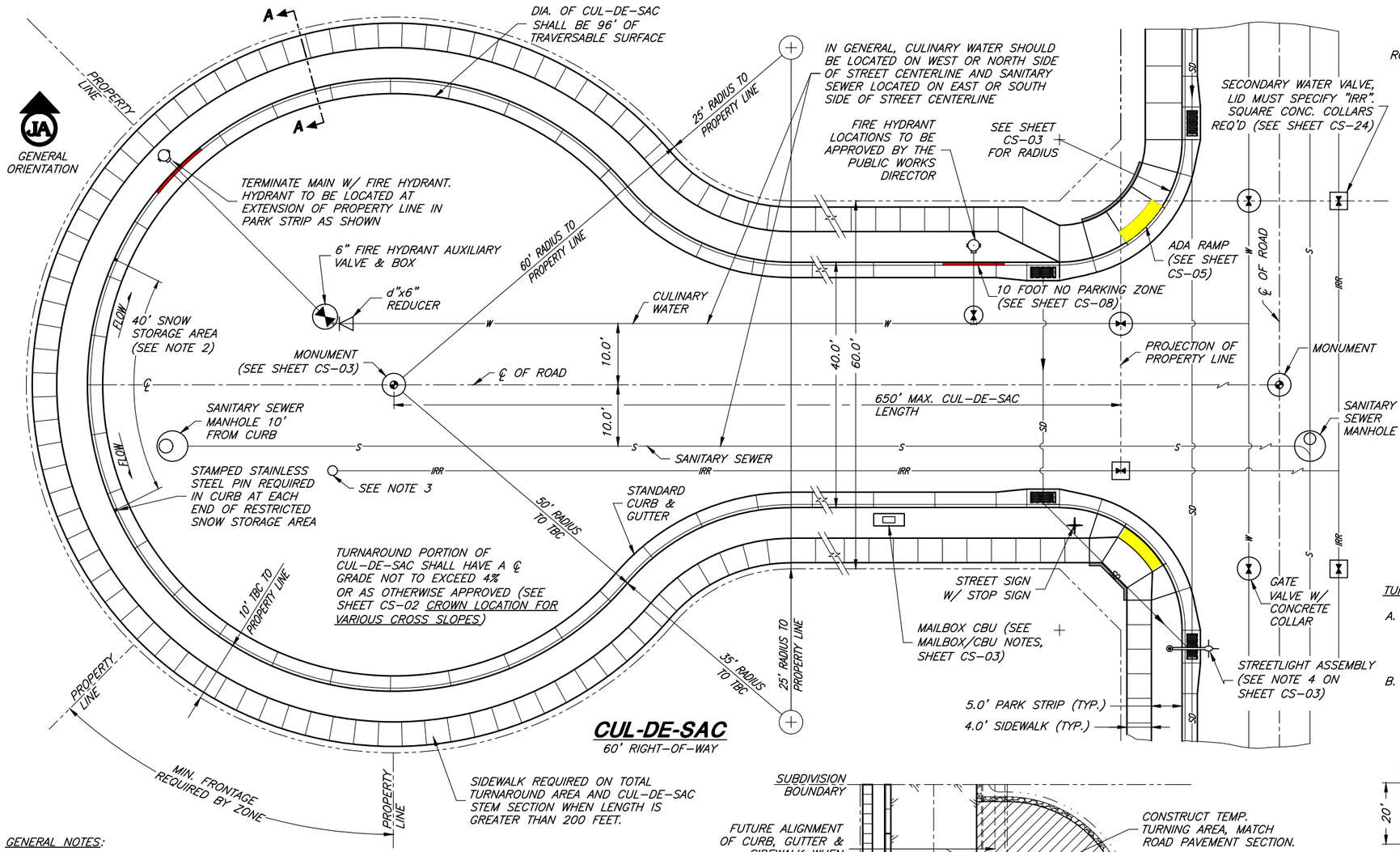
JA JONES & ASSOCIATES CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

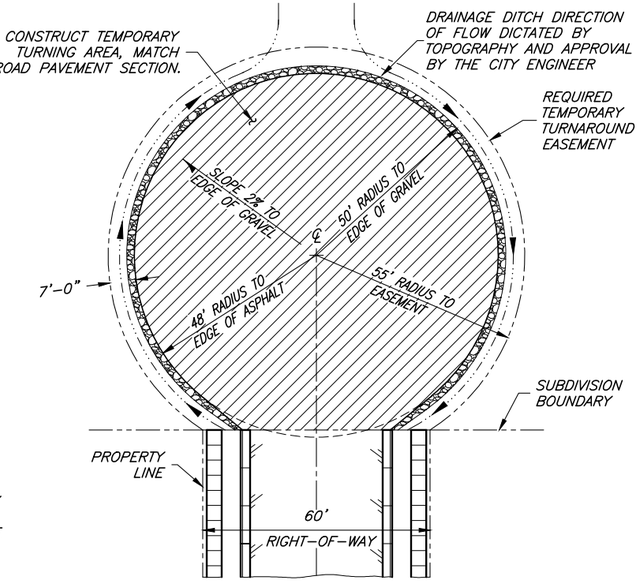
PUBLIC ROADS - ALTERNATE ADA RAMP AND ROLL CURB & GUTTER DETAILS

SHEET: CS-05A
OF 1 SHEETS
0



CUL-DE-SAC

60' RIGHT-OF-WAY



CITY STANDARD TEMPORARY TURNAROUND

(FOR OUTSIDE OF SUBDIVISION BOUNDARY AND TO BE MAINTAINED BY PROPERTY OR EASEMENT OWNER)

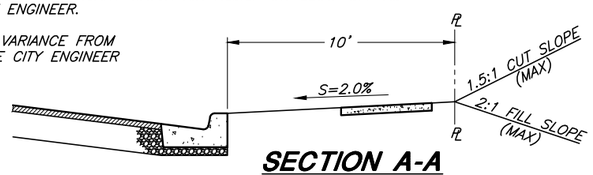
TURNAROUND NOTES:

A. THE DRAINAGE DITCH SHALL HAVE A 4 HORZ. TO 1 VERT. (4:1) SIDE SLOPE FROM THE EDGE OF GRAVEL TO THE FLOW LINE OF DITCH.

B. DRAINAGE DITCH MUST HAVE A MIN. GRADE OF 0.5%

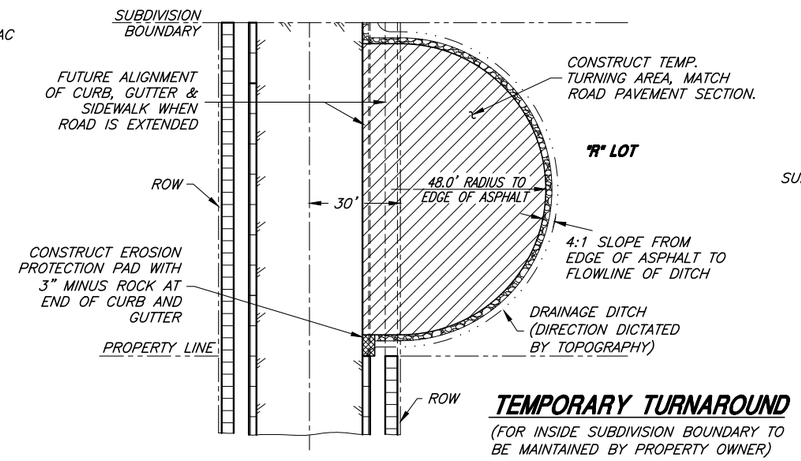
GENERAL NOTES:

1. THE CIRCULAR CUL-DE-SAC LAYOUT ON THIS SHEET IS TO BE CONSIDERED AS THE CITY STANDARD DESIGN. OTHER ALTERNATE DESIGNS MAY BE CONSIDERED AS APPROVED BY THE CITY ENGINEER.
2. NO DRIVEWAYS, FIRE HYDRANTS, OR MAIL BOXES ARE PERMITTED WITHIN THE SNOW STORAGE AREA. THE SNOW STORAGE AREA SHALL BE SHOWN ON THE IMPROVEMENT AND/OR CONSTRUCTION PLANS PRIOR TO SUBDIVISION AND/OR CUL-DE-SAC APPROVAL.
3. DEVELOPER SHALL PROVIDE A SECONDARY WATER AIR RELIEF OR BLOW-OFF AS DETERMINED BY THE CITY ENGINEER.
4. SIDEWALK CROSS-SLOPE VARIANCE FROM 2% AS APPROVED BY THE CITY ENGINEER



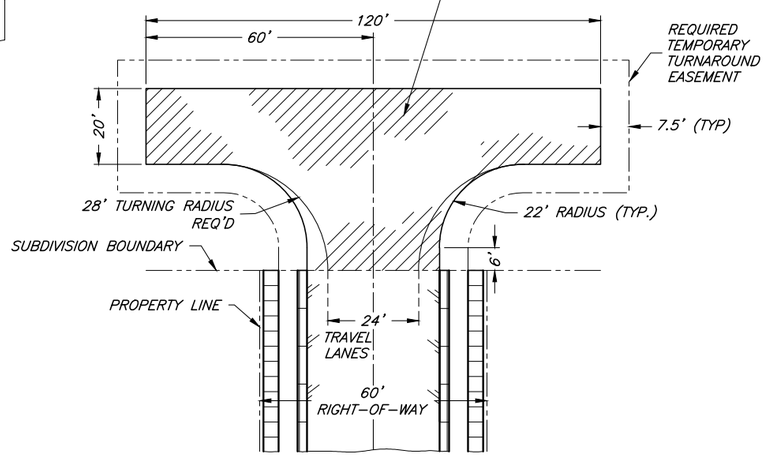
SECTION A-A

REQUIRED GRADING BETWEEN TBC AND PROPERTY LINE



TEMPORARY TURNAROUND

(FOR INSIDE SUBDIVISION BOUNDARY TO BE MAINTAINED BY PROPERTY OWNER)



ALTERNATE TEMPORARY TURNAROUND

120' HAMMERHEAD DETAIL

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED
PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

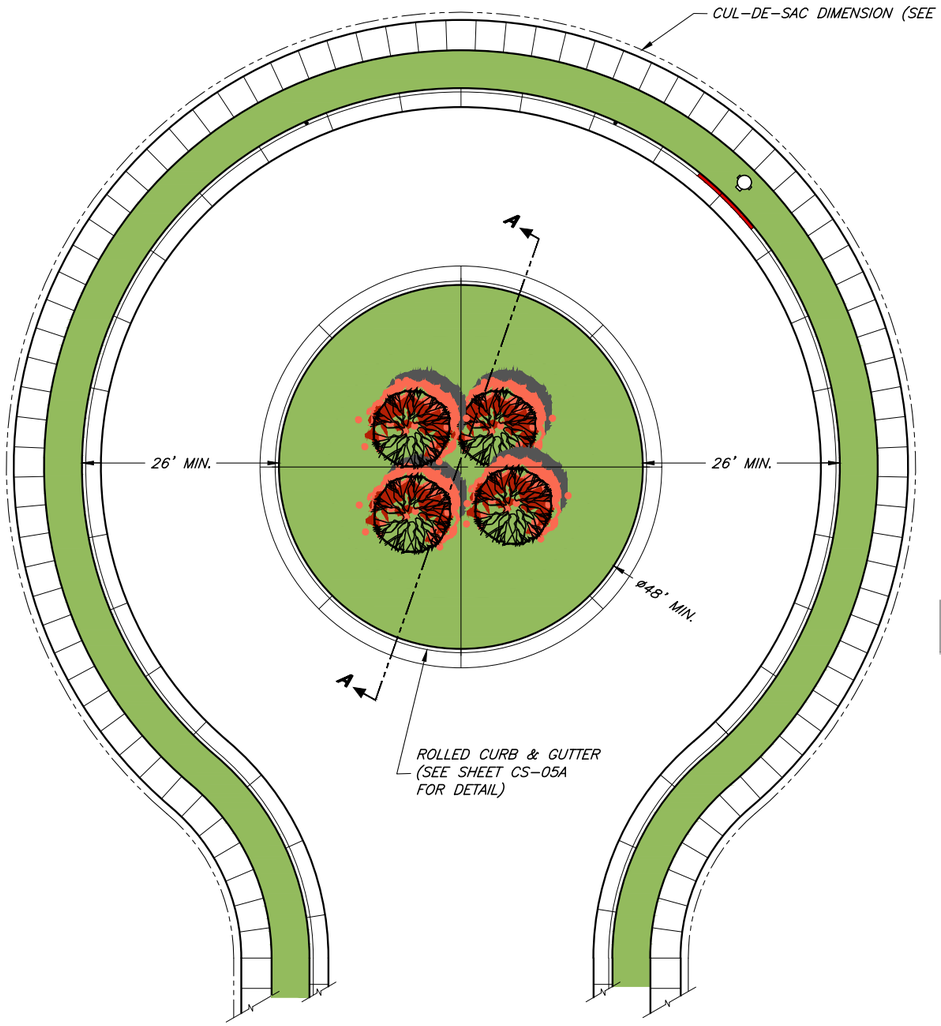
JA JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

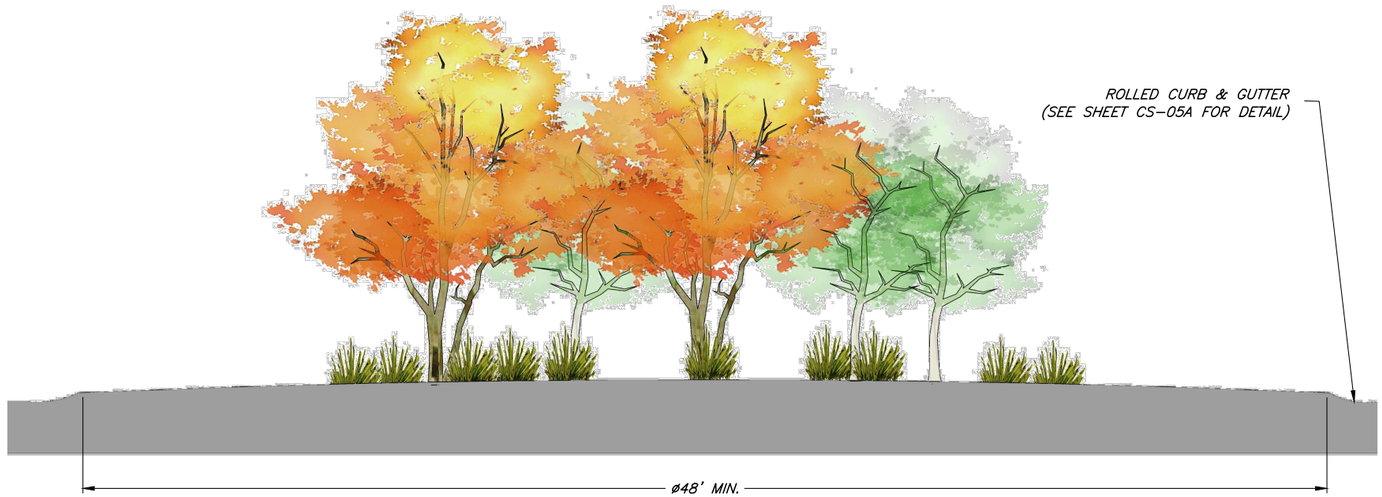
PUBLIC ROADS - CUL-DE-SAC & TEMPORARY TURNAROUND DETAILS

SHEET: CS-06
OF 1 SHEETS
0



CUL-DE-SAC ISLAND

30' DIA. ISLAND



SECTION A-A

ENLARGED ISLAND DETAIL

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

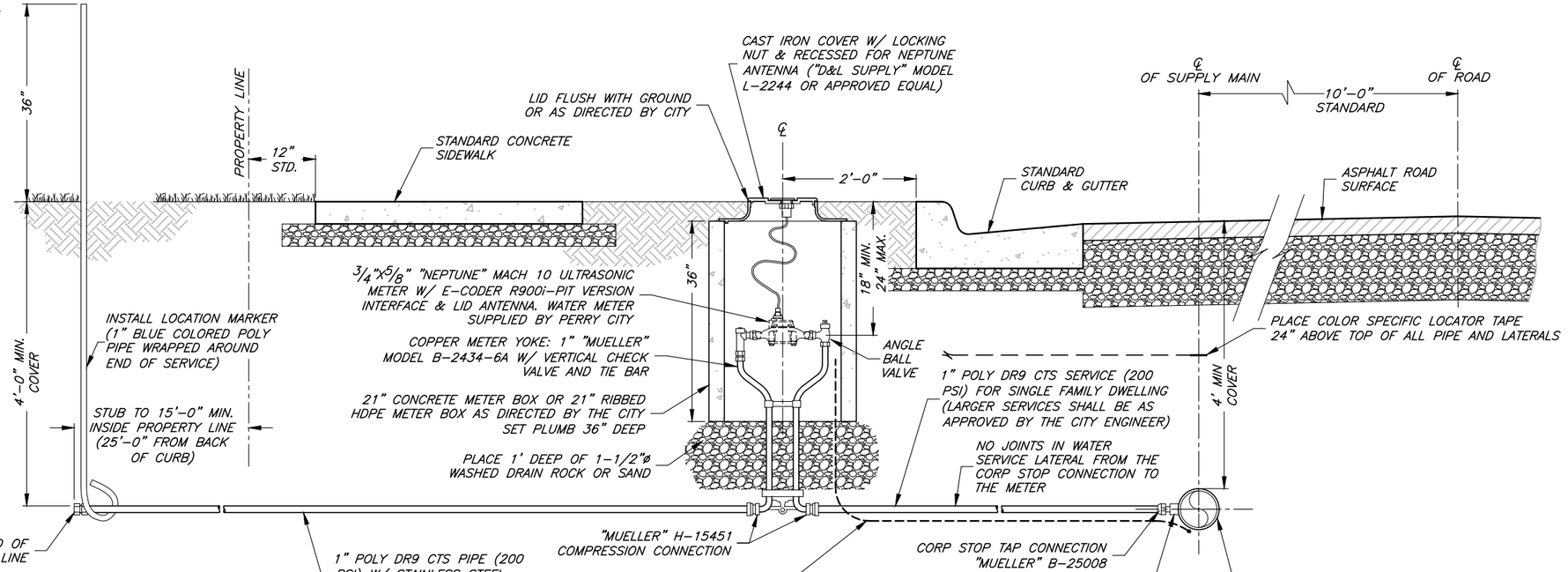
PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
PUBLIC ROADS - LANDSCAPE CUL-DE-SAC AND DETAILS

SHEET: CS-06A
OF 1 SHEETS
0

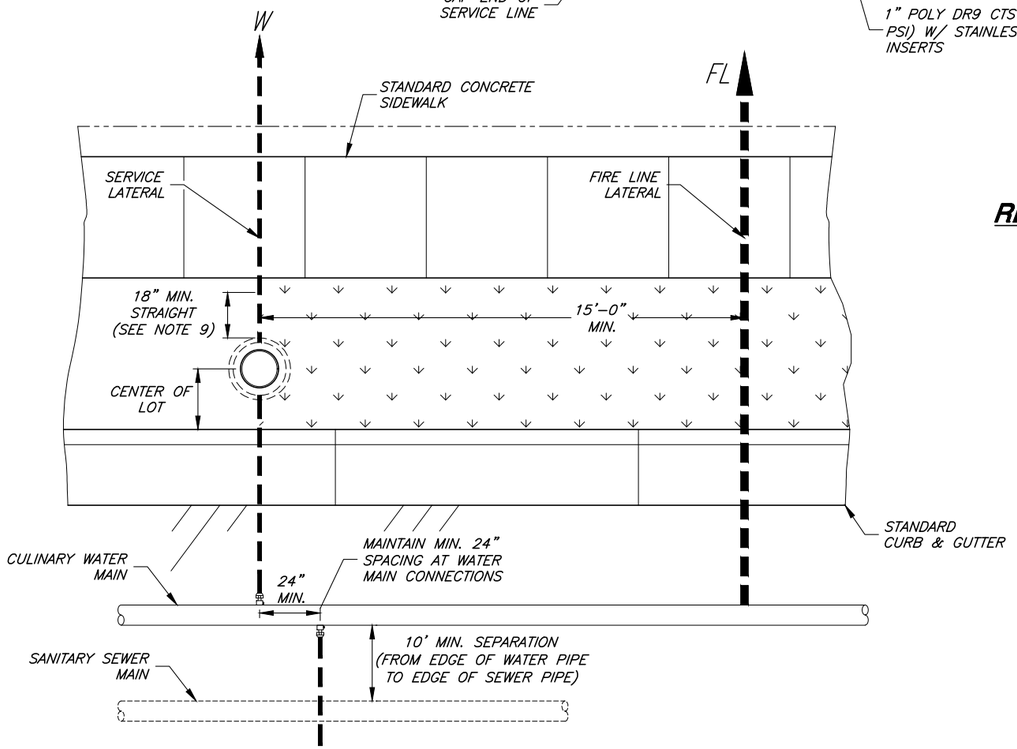
GENERAL NOTES:

1. ALL FITTINGS SHALL BE "MUELLER" COMPRESSION TYPE UNLESS OTHERWISE NOTED.
2. "BLUE" BOLTS AND NUTS ARE REQUIRED BY THE CITY.
3. ALL SUPPLIES, LABOR, MACHINERY, ETC. WILL BE SUPPLIED BY THE CONTRACTOR. PERRY CITY WILL SUPPLY AND SET THE METER ON ALL 1" CONNECTIONS. THE CONTRACTOR SHALL SUPPLY METERS FOR CONNECTIONS GREATER THAN 1" (SEE SHEET CS-10).
4. ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THESE DRAWINGS ARE "CITY STANDARDS." OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE PUBLIC WORKS DIRECTOR.
5. CULINARY WATER METERS SHALL NOT BE LOCATED WITHIN THE DRIVEWAY AREA. IF A DRIVEWAY IS PLACED OVER AN EXISTING METER, THE "ENTIRE" SERVICE LINE, CORP STOP, AND METER SHALL BE RELOCATED AT THE OWNER'S EXPENSE.
6. INSPECTION OF ALL WATER LINE INSTALLATIONS WILL BE DONE BY THE PUBLIC WORKS DIRECTOR, WITH A 48 HOUR MINIMUM NOTICE REQUIRED PRIOR TO START OF WORK.
7. THE USE OF "FORD" METER SETTER, CORPORATION STOPS, AND COMPRESSION FITTINGS IS ACCEPTED BY THE CITY.
8. SERVICE LINES ARE TO BE TAPPED LEVEL (HORIZONTAL)
9. WHEN MOVING A SERVICE, A MIN. OF 18 INCHES OF STRAIGHT PIPE OUT OF THE SETTER AND/OR CORPORATION STOP IS REQUIRED BEFORE THE GOOSENECK UNLESS OTHERWISE APPROVED BY THE PUBLIC WORKS DIRECTOR.
10. SERVICE METER SHALL BE CENTER OF LOT, NO EXCEPTIONS



RESIDENTIAL WATER SERVICE AND METER

CITY STANDARD



STANDARD WATER METER LOCATION

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
CULINARY WATER - RESIDENTIAL WATER SERVICE DETAILS

SHEET: CS-07
OF 1 SHEETS
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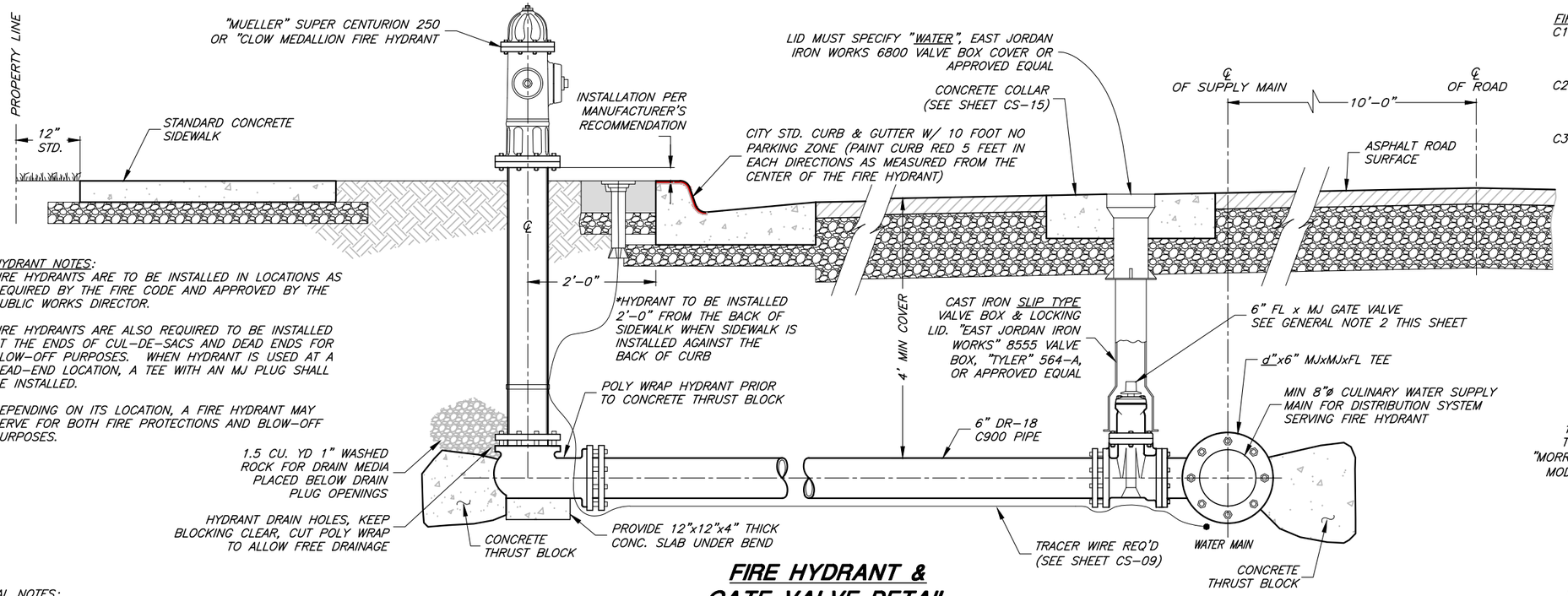


FIRE HYDRANT & GATE VALVE DETAIL

FIRE HYDRANT NOTES:

B1. FIRE HYDRANTS ARE TO BE INSTALLED IN LOCATIONS AS REQUIRED BY THE FIRE CODE AND APPROVED BY THE PUBLIC WORKS DIRECTOR.

B2. FIRE HYDRANTS ARE ALSO REQUIRED TO BE INSTALLED AT THE ENDS OF CUL-DE-SACS AND DEAD ENDS FOR BLOW-OFF PURPOSES. WHEN HYDRANT IS USED AT A DEAD-END LOCATION, A TEE WITH AN MJ PLUG SHALL BE INSTALLED.

B3. DEPENDING ON ITS LOCATION, A FIRE HYDRANT MAY SERVE FOR BOTH FIRE PROTECTIONS AND BLOW-OFF PURPOSES.

FIRE LINE NOTES:

C1. NO WATER SERVICE OR FIRE LINES TO BUILDINGS ARE PERMITTED TO CONNECT TO AUXILIARY LINES SERVICING FIRE HYDRANTS.

C2. COMMERCIAL FIRE LINES FROM THE MAIN TO BUILDING SHALL BE SEPARATE LINES AND NOT PART OF THE WATER SERVICE LATERAL.

C3. FIRE LINES ARE TO BE MAINTAINED BY THE PROPERTY OWNER UP TO THE VALVE AT THE MAIN. THE CITY SHALL OWN AND MAINTAIN THE VALVE AT THE MAIN.

GENERAL NOTES:

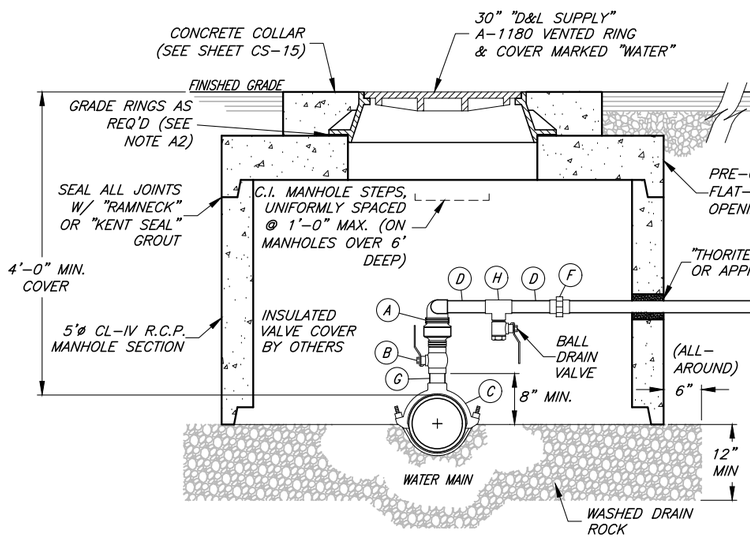
1. "BLUE" BOLTS AND NUTS ARE REQUIRED BY THE CITY.
2. ALL WATER MAIN AND HYDRANT GATE VALVES TO BE AWWA C509 RESILIENT WEDGE "MUELLER" A-2361 OR "CLOW" 2639 VALVES (ANY CHIPS IN THE VALVE FACTORY COATING DUE TO SHIPPING/INSTALLATION MUST BE REPAIRED USING AN APPROVED EPOXY COATING)
3. VALVES OVER 6' FEET DEEP REQUIRE A NUT EXTENSION.
4. ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THESE DRAWINGS ARE "CITY STANDARDS." OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE PUBLIC WORKS DIRECTOR.
5. PIPES, JOINTS, FITTINGS, VALVES, & FIRE HYDRANTS SHALL CONFORM TO ANSI / NSF 61.
6. FIRE HYDRANTS SHALL NOT BE LOCATED WITHIN 10 FEET OF A SANITARY SEWER OR WITHIN 10 FEET OF STORM DRAIN WHERE POSSIBLE.
7. ALL WATER SYSTEM MATERIALS SHALL BE NEW (DISCOLORED PIPE OR PIPE MATERIALS STOCKPILED LONGER THAN 1 YEAR WILL NOT BE ACCEPTED BY THE PUBLIC WORKS DIRECTOR); USED MATERIALS ARE NOT ALLOWED.

AIR/VACUUM RELIEF STATION NOTES:

A1. THE USE OF AN "APCO" 145C HEAVY-DUTY COMBINATION AIR VAC IS ACCEPTED WHEN APPROVED BY THE CITY. UPSIZE VENT PIPE, AIR VENT AND FITTINGS (ITEMS D, E, F. H AND I) TO 2" DIA. AND GALVANIZED STEEL WHEN USING ALTERNATE VALVES.

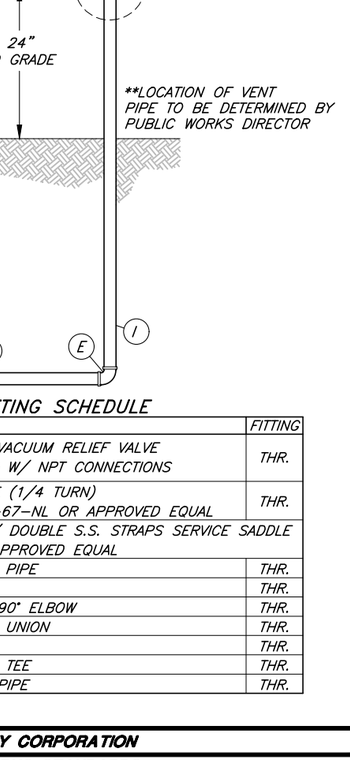
A2. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE.

A3. A DECORATIVE AIR VENT COVER W/ A TAMPER RESISTANT CAP MAY BE USED, WHEN APPROVED BY THE PUBLIC WORKS DIRECTOR. THIS IS A CASE SPECIFIC ITEM AND THE DESIGN MUST BE SUBMITTED AND APPROVED BY THE CITY PRIOR TO INSTALLATION.



AIR/VACUUM RELIEF STATION

(BURIED WATER MAIN APPLICATION)



PIPE & FITTING SCHEDULE

NO.	DESCRIPTION	FITTING
A	2" COMBINATION AIR-VACUUM RELIEF VALVE "A.R.I." MODEL D-040 W/ NPT CONNECTIONS	THR.
B	2" BRASS BALL VALVE (1/4 TURN) "FORD" B11-xxx-HB-67-NL OR APPROVED EQUAL	THR.
C	2" NYLON COATED W/ DOUBLE S.S. STRAPS SERVICE SADDLE "ROMAC" 202NS OR APPROVED EQUAL	
D	1 1/2" SCH. 80 PVC PIPE	THR.
Da	1 1/2" POLY PIPE	THR.
E	1 1/2" GALV. STEEL 90° ELBOW	THR.
F	1 1/2" SCH. 80 PVC UNION	THR.
G	2" BRASS PIPE	THR.
H	1 1/2" SCH. 80 PVC TEE	THR.
I	1 1/2" GALV. STEEL PIPE	THR.

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

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PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
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6080 Fashion Point Drive
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PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

CULINARY WATER - FIRE HYDRANT, GATE VALVE, AND AIR/VACUUM RELIEF STATION DETAILS

SHEET: CS-08
OF 1 SHEETS
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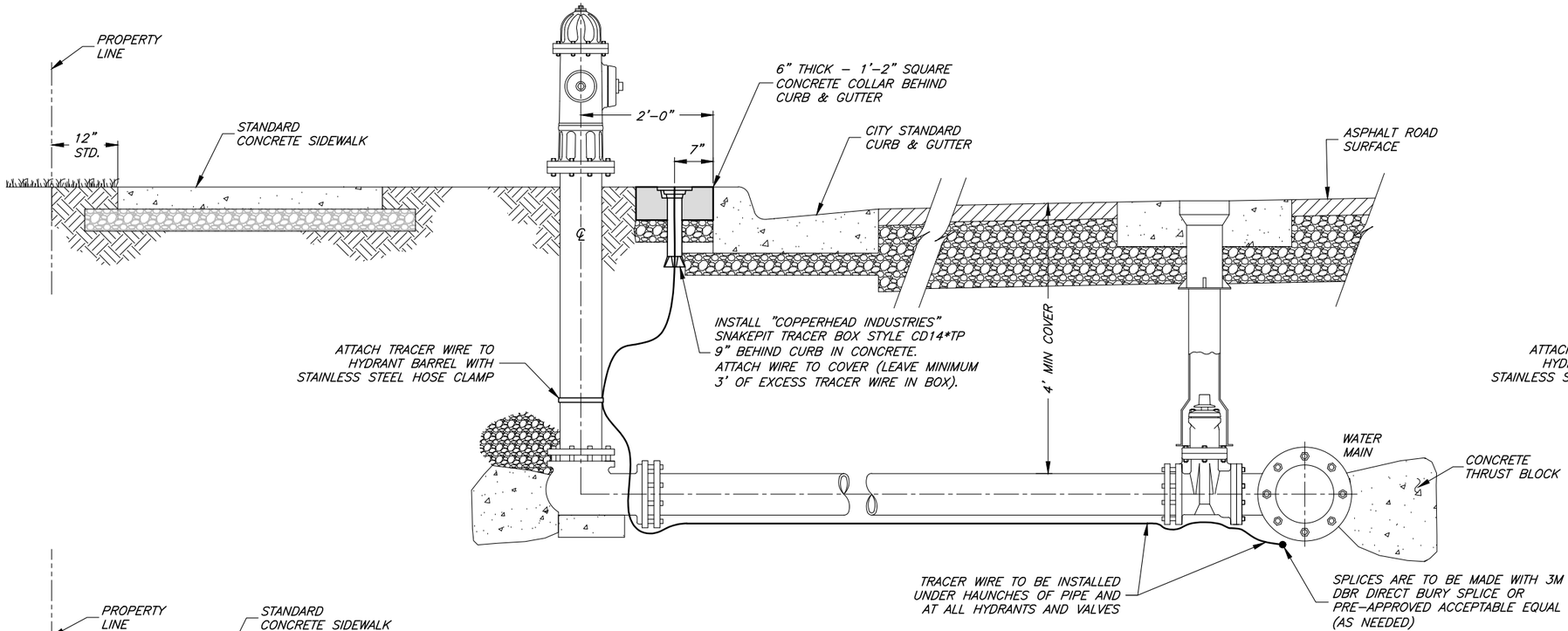
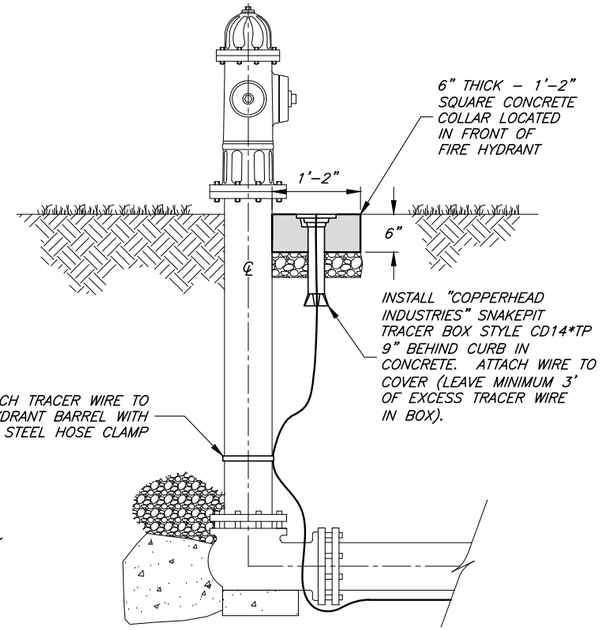
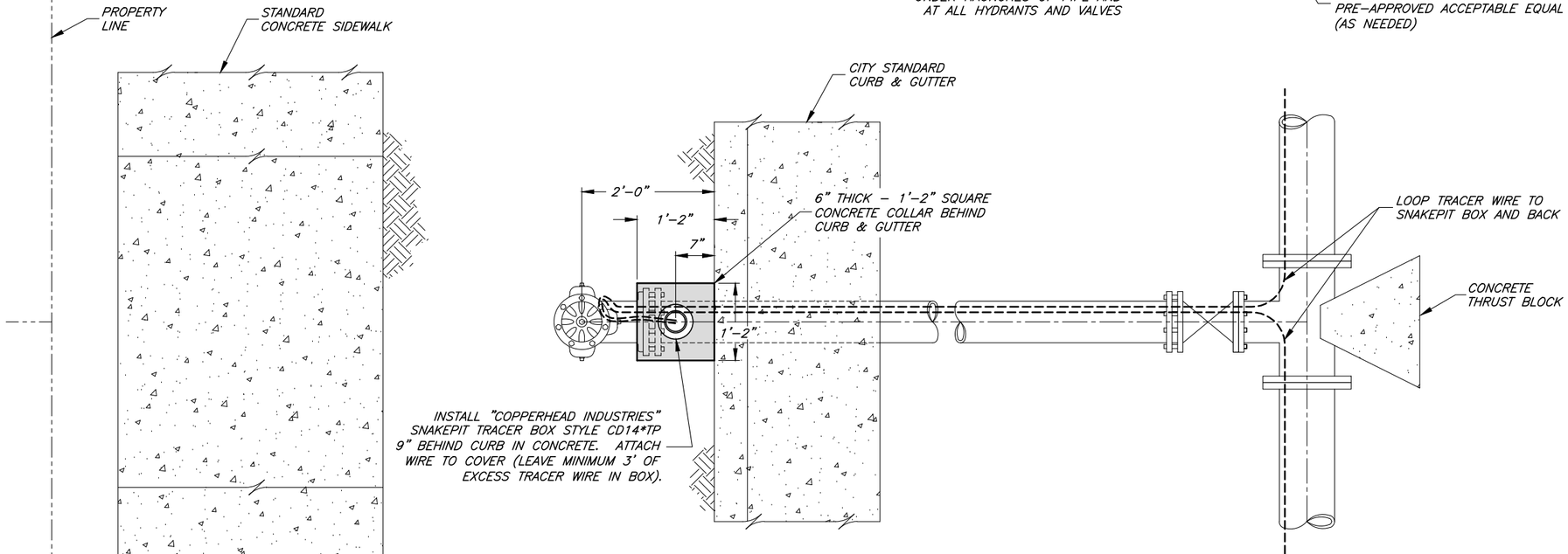




ALTERNATE TRACER WIRE INSTALLATION

WHERE APPROVED BY THE PUBLIC WORKS DIRECTOR ON STREET SECTIONS WITH NO CURB & GUTTER



TRACER WIRE INSTALLATION

CITY STANDARD STREET SECTION (CURB & GUTTER)

NOTES:

1. ALL WATERLINES SHALL HAVE A MINIMUM 14 GA. INSULATED TRACER WIRE INSTALLED UNDER THE HAUNCHES OF THE PIPE PRIOR TO BACKFILLING.
2. TRACER WIRES SHALL TERMINATE AT ALL FIRE HYDRANTS. AT SERVICE SADDLES AND TAPPING SLEEVES, THE TRACER WIRE SHALL NOT BE ALLOWED TO BE PLACED BETWEEN THE SADDLE AND THE PIPE. A GROUNDING ROD SHALL BE INSTALLED AT ALL TRACER SYSTEM TERMINAL POINTS.
3. TRACER WIRE SHALL BE COPPER WIRE WITH BLUE INSULATION RATED FOR DIRECT BURIAL. ALL WIRE CONNECTORS SHALL BE 3M DBR DIRECT BURY SPLICE OR PRE-APPROVED ACCEPTABLE EQUAL AND SHALL BE WATERTIGHT TO PROVIDE ELECTRICAL CONTINUITY.
4. ALL TRACER WIRE SHALL BE TESTED FOR CONTINUITY IN THE PRESENCE OF THE PUBLIC WORKS INSPECTOR PRIOR TO ASPHALT PLACEMENT. ANY TRACER WIRE FOUND NOT TO BE CONTINUOUS AFTER TESTING SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR PRIOR TO ASPHALT PLACEMENT.

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED
PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
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PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
CULINARY WATER - TRACER WIRE INSTALLATION DETAILS

SHEET: CS-09
OF 1 SHEETS
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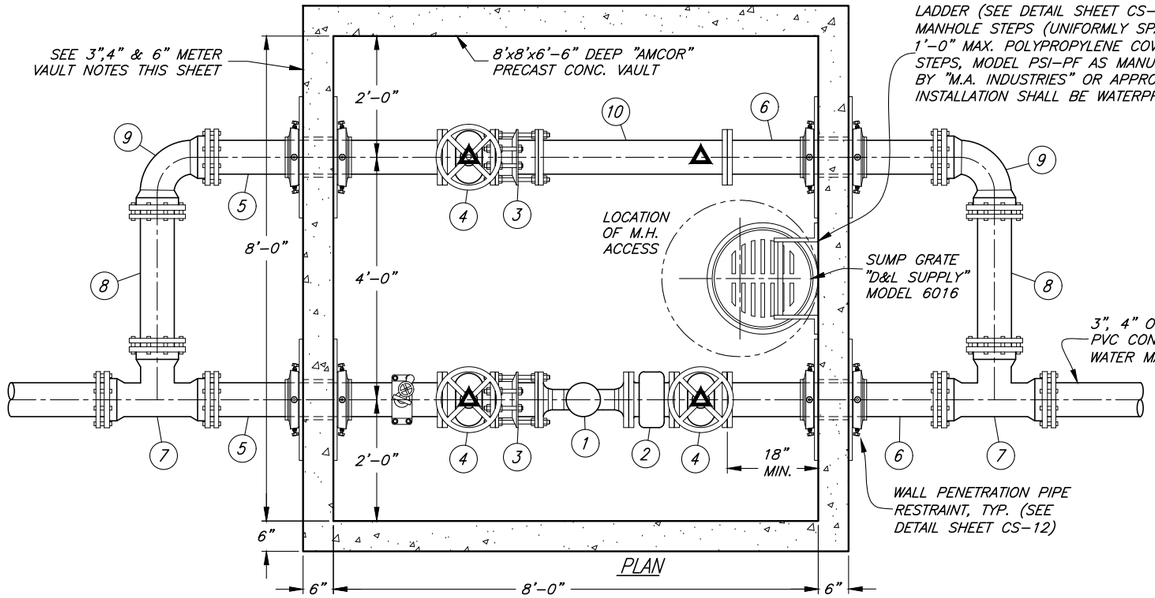
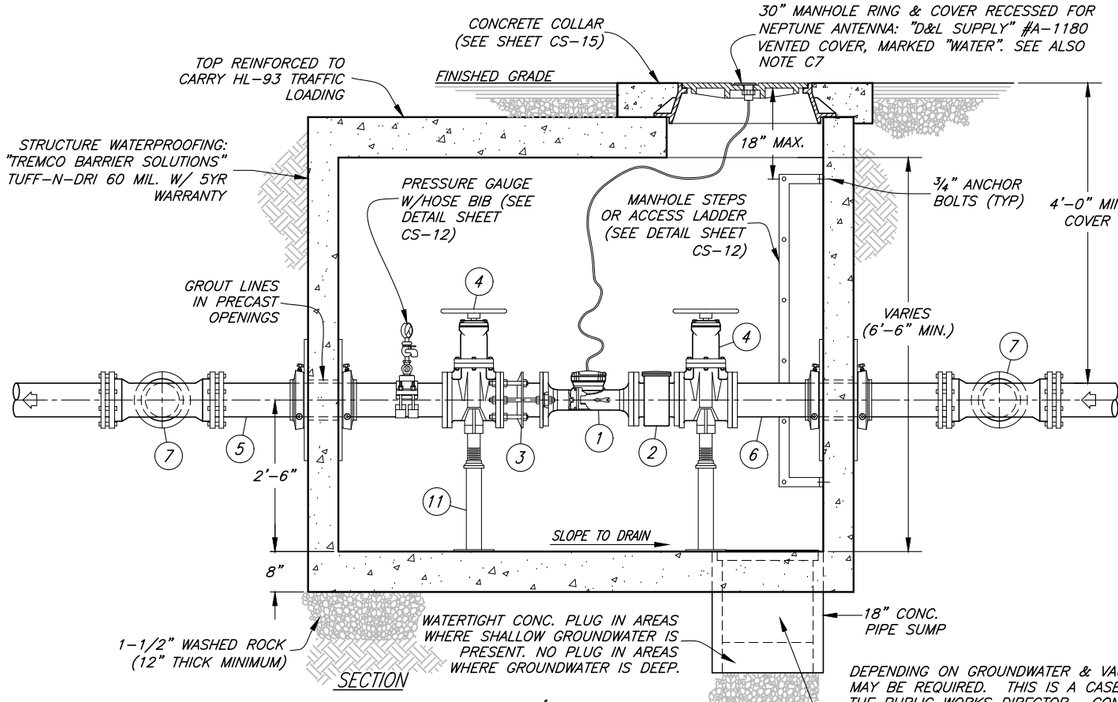




3", 4" & 6" WATER METER STATION

DEPENDING ON GROUNDWATER & VAULT DRAINAGE, A SUMP PUMP MAY BE REQUIRED. THIS IS A CASE BY CASE ITEM DETERMINED BY THE PUBLIC WORKS DIRECTOR. CONDUIT FOR DRAINLINE & POWER SOURCE SHALL BE REQUIRED. WHERE POWER SOURCE IS UNAVAILABLE, SUMP PUMPS SHALL BE SOLAR POWERED. DRAIN PIPE SHALL BE PIPED INTO MUNICIPAL STORM DRAIN SYSTEM.

3", 4" & 6" METER VAULT NOTES:

A1. ALL FITTINGS OUTSIDE OF THE VAULT ARE TO BE DUCTILE IRON MJ WITH THRUST RESTRAINT RETAINER GLANDS ("ROMAC", MJRG, OR APPROVED EQUAL)

A2. PENETRATION WALLS NEED TO BE ADEQUATELY DESIGNED STRUCTURALLY FOR ANTICIPATED THRUST.

A3. THE PRECAST VAULT MANUFACTURER IS RESPONSIBLE FOR DESIGN RELATED TO TRAFFIC LOADING AND THRUST. VERIFICATION OF PROPER DESIGN MUST BE PROVIDED TO THE CITY BY THE DEVELOPER, CONTRACTOR, OR PROPERTY OWNER AS THE CASE MAY BE.

A4. ALL FITTINGS SHALL BE AWWA C-110 WITH 125 LB. FLANGES. ALL PIPING SHALL BE DUCTILE IRON PIPE CLASS 350 P.S.I. MIN.

A5. ALL WALL PIPE PENETRATIONS AND JOINTS SHALL BE SEALED TO PREVENT WATER INFILTRATION. USE "LINK-SEAL" ON CAST-IN-PLACE VAULTS. PRECAST VAULTS SEAL AS DIRECTED BY PUBLIC WORKS DIRECTOR. APPROVED PRODUCTS ARE:
(a) "PRIME RESIN"- PRIMEFLEX 900XLV
(b) "MANUS PRODUCTS"- MANUS BOND 75AM

A6. A "NEPTUNE" OR "BADGER" ULTRASONIC METER WITH 4-20MA OUTPUT AND STRAINER IS AN ACCEPTED ALTERNATIVE TO THE CITY STANDARD. LENGTHEN CONC. VAULT TO COMPLY WITH THE UP AND DOWNSTREAM METER INSTALLATION REQUIREMENTS.

A7. ALL METERS TO BE COMPATIBLE WITH "NEPTUNE" E-CODER) R900i PIT VERSION INTERFACE AND EQUIPPED W/ LID ANTENNA

GENERAL NOTES:

C1. PROPERTY OWNER OR CONTRACTOR SHALL PAY FOR ALL COSTS OF INSTALLATION INCLUDING ALL MATERIALS, ALL EXCAVATION AND FILL, ASPHALT REPLACEMENT AND WATER MAIN CONNECTION.

C2. INSPECTION OF ALL WATER LINE INSTALLATIONS WILL BE DONE BY THE PUBLIC WORKS DIRECTOR, WITH A 48 HOUR MINIMUM NOTICE REQUIRED PRIOR TO START OF WORK.

C3. IF APPLICABLE, A CITY EXCAVATION PERMIT MUST BE REQUESTED AND APPROVED PRIOR TO START OF WORK.

C4. "BLUE" BOLTS AND NUTS ARE REQUIRED BY THE CITY.

C5. CONTRACTOR TO SUPPLY ALL METERS 1 1/2" OR LARGER.

C6. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE OR STRUCTURE.

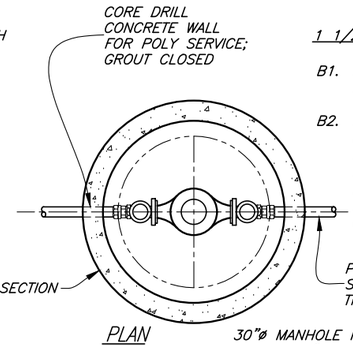
C7. ALL RADIO-READ ANTENNAS ARE TO BE INSTALLED ABOVE THE ACCESS LID, RECESSED INTO THE MANHOLE OR METER PIT COVER.

C8. ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THESE DRAWINGS ARE "CITY STANDARDS." OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE PUBLIC WORKS DIRECTOR.

PIPE & FITTING SCHEDULE

NO.	DESCRIPTION (3", 4" & 6" METER STA.)	JOINT TYPE	3" LINE	4" LINE	6" LINE
1	"MASTER METER" OCTAVE ULTRASONIC METER (SEE NOTE A6 AND A7)	FL	3"	4"	6"
2	LEAD-FREE BRONZE STRAINER	FL	3"	4"	6"
3	"ROMAC" DJ400 DISMANTLING JOINT (2)	FL	3"	4"	6"
4	"MUELLER" RESILIENT WEDGE GATE VALVE W/ HANDWHEEL (3)	FL	3" A-2362	4" A-2361	6" A-2361
5	D.I. NIPPLE PIECE (2)	FLxPE	3"	4"	6"
6	D.I. NIPPLE PIECE (2)	FLxPE	3"	4"	6"
7	D.I. TEE (2)	MJ	3"x3"x3"	4"x4"x4"	6"x6"x6"
8	D.I. PIPE SECTION (2)	PE	3"	4"	6"
9	D.I. 90° ELBOW (2)	MJ	3"	4"	6"
10	D.I. SPOOL PIECE	FL	3"	4"	6"
11	"CLOW" F-1608 OR "ANVIL" #264 GALV. PIPE SUPPORT W/ 3" COMPANION FLANGE & VARIABLE HEIGHT 3" NIPPLE (4 EA REQD.)				△ SYMBOL

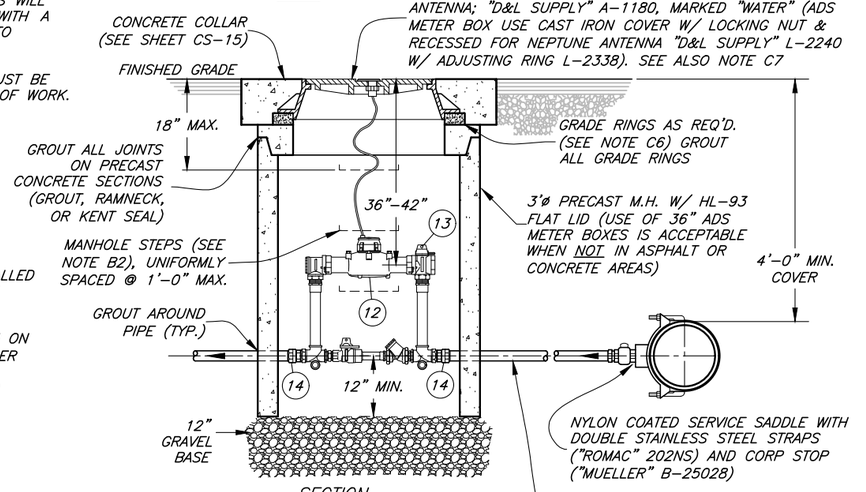
NO.	DESCRIPTION (1 1/2" & 2" METER STA.)	JOINT TYPE	1 1/2" LINE	2" LINE
12	"NEPTUNE" MACH 10 ULTRASONIC METER W/ E-CODER) R900i PIT VERSION INTERFACE & EQUIPPED W/ LID ANTENNA	OVAL FL	1 1/2"	2"
13	"MUELLER" B-2423-2 METER YOKE (18" HEIGHT) OR APPROVED EQUIVALENT	--	1 1/2"	2"
14	"MUELLER" 110 COMPRESSION CONNECTION COUPLING OR APPROVED EQUIVALENT	--	1 1/2"	2"



1 1/2" & 2" METER NOTES:

B1. 1 1/2" SERVICE LINE-13" METER
2" SERVICE LINE-17" METER

B2. MANHOLE STEPS (FOR MANHOLES OVER 6' DEEP) UNIFORMLY SPACED (1'-0" MAX.) POLYPROPYLENE COVERED STEEL STEPS, MODEL PSI-PF AS MANUFACTURED BY "M.A. INDUSTRIES" OR APPROVED EQUAL - INSTALLATION OF STEPS SHALL BE WATERPROOF.



1 1/2" & 2" WATER METER STATION

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES — CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY — PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

CULINARY WATER - STANDARD WATER METER STATIONS

SHEET: CS-10
OF 1 SHEETS
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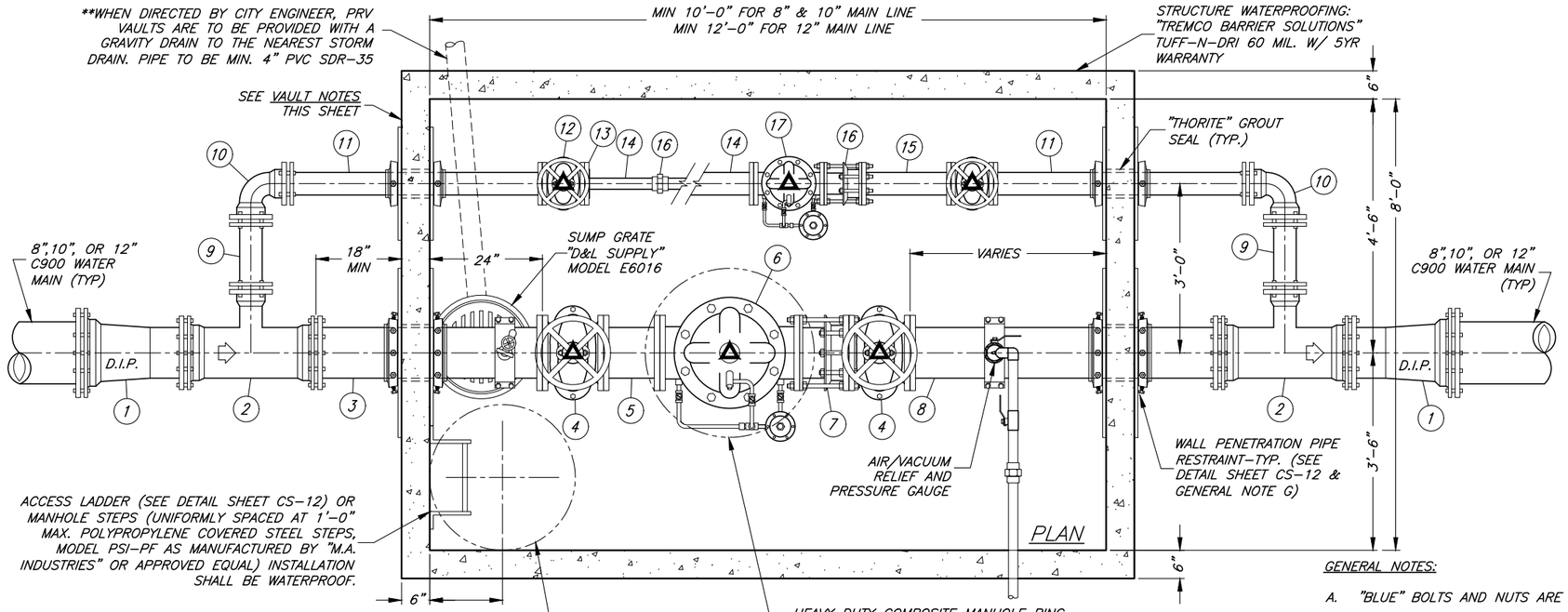

PIPE & FITTING SCHEDULE

NO.	DESCRIPTION	JOINT TYPE	8" LINE	10" LINE	12" LINE
1	D.I. REDUCER (2)	MJ	8"x6"	10"x8"	12"x10"
2	D.I. REDUCING TEE (2)	MJ	6"x6"x4"	8"x8"x4"	10"x10"x4"
3	D.I. NIPPLE PIECE	FLxPE	6"	8"	10"
4	"MUELLER" A-2361 GATE VALVE W/ HANDWHEEL (2)	FL	6"	8"	10"
5	12" D.I. SPOOL PIECE	FL	6"	8"	10"
6	"CLA-VAL" 90-01 PRESSURE REDUCTION VALVE	FL	6"	8"	10"
7	"ROMAC" DJ400 DISMANTLING JOINT	FL	6"	8"	10"
8	D.I. NIPPLE PIECE	FLxPE	6"	8"	10"
9	D.I. PIPE SECTION	PE	4"	4"	4"
10	D.I. 90° ELBOW (2)	MJ	4"	4"	4"
11	D.I. NIPPLE PIECE	FLxPE	4"	4"	4"
12	"MUELLER" A-2361 GATE VALVE W/ HANDWHEEL (2)	FL	4"	4"	4"
13	BLIND FLANGE W/ THREADED CONNECTION (2)	FLxTHR.	4"x2 1/2"	--	--
14	D.I. SPOOL PIECE	FL	--	4"	4"
	GALVANIZED PIPE	THR.	2 1/2"	--	--
15	D.I. SPOOL PIECE	FL	--	4"	4"
	GALVANIZED PIPE	THR.	2 1/2"	--	--
16	"ROMAC" DJ400 DISMANTLING JOINT	FL	--	4"	4"
	GALVANIZED UNION	THR.	2 1/2"	--	--
17	"CLA-VAL" 90-01 PRESSURE REDUCTION VALVE	FL	--	4"	4"
		THR.	2 1/2"	--	--
18	"CLOW" F-1608 OR "ANVIL" #264 GALV. PIPE SUPPORT W/ 3" COMPANION FLANGE & VARIABLE HEIGHT 3" NIPPLE (6 EA REQD.)				△ SYMBOL

GENERAL NOTES:

A. "BLUE" BOLTS AND NUTS ARE REQUIRED BY THE CITY.

B. ALL FITTINGS OUTSIDE OF THE VAULT ARE TO BE DUCTILE IRON MJ WITH THRUST RESTRAINT RETAINER GLANDS ("ROMAC", MJRG, OR APPROVED EQUAL)

C. STRUCTURE, PIPING & VALVE SIZES FOR P.R.V. STATIONS ON LINE SIZES GREATER THAN 12" SHALL BE SPECIFIED BY THE CITY ENGINEER.

D. ALL SPECIFIED BRANDS OF MATERIALS SHOWN ON THESE DRAWINGS ARE "CITY STANDARDS." OTHER EQUIVALENT BRANDS MAY BE USED WITH THE PRIOR APPROVAL OF THE CITY ENGINEER AND THE CITY WATER DIVISION.

E. WHEN AN AIR/VACUUM RELIEF IS NOT NEEDED A PRESSURE GAUGE IS STILL REQUIRED ON THE DOWNSTREAM SIDE OF THE PRV.

F. NO MORE THAN 12" OF GRADE RINGS TO ALLOWED ON ANY MANHOLE OR STRUCTURE.

GENERAL NOTES CONT.:

G. ALL WALL PIPE PENETRATIONS AND JOINTS SHALL BE SEALED TO PREVENT WATER INFILTRATION. USE "LINK-SEAL" ON CAST-IN-PLACE VAULTS. PRECAST VAULTS SEAL AS DIRECTED BY PUBLIC WORKS DIRECTOR. APPROVED PRODUCTS ARE:
(a) "PRIME RESIN"- PRIMEFLEX 900XLV
(b) "MANUS PRODUCTS"- MANUS BOND 75AM

PRV GENERAL SPECIFICATIONS:

A1. PRV TO BE CLA-VAL #90-01 YBCSKC
A2. 150 # FLANGED FOR 250 PSI WORKING PRESSURE, 300# FLANGED IF GREATER THAN 250 PSI
A3. DUCTILE IRON BODY GLOBE PATTERN
A4. EPOXY LINED AND COATED
A5. STAINLESS STEEL INTERNAL TRIM
A6. BRONZE PILOT CONTROLS
A7. STAINLESS STEEL TUBES & FITTINGS
A8. SPRING RANGES FOR PRESSURE REDUCING PILOT
A9. X101 VALVE POSITION INDICATOR
A10. CK2 ISOLATION BALL VALVES (STAINLESS)
A11. CV FLOW CONTROL (OPENING)

COATING NOTES:

B1. THE P.R.V. VALVE SHALL INCLUDE FACTORY INSTALLED INTERIOR EPOXY COATING.

B2. ALL NEW AND EXISTING PIPING, VALVES, FITTINGS, METERS, ETC, INSIDE THE VAULT SHALL BE EPOXY PAINTED BLUE.

B3. METAL SURFACES TO BE PAINTED SHALL BE PRIMED AND THEN PAINTED W/ TWO COATS OF BLUE EPOXY PAINT.

VAULT NOTES:

C1. PRE-PLUMBED PRV VAULTS ARE THE PREFERRED OPTION FOR INSTALLATION. THE USE AND LOCATION OF A PRE-PLUMBED PRV VAULT SHALL BE AS DIRECTED BY THE CITY ENGINEER FOLLOWING REVIEW OF CURRENT SITE CONDITIONS.

C2. WHERE APPLICABLE, PRESSURE RELIEF VALVE ASSEMBLY MAY BE REQUIRED. THIS IS A CASE BY CASE ITEM DETERMINED BY THE PUBLIC WORKS DIRECTOR (PRV VAULT WILL NEED TO BE LENGTHENED TO ACCOMMODATE SUCH VALVE).

C3. PRECAST CONCRETE STRUCTURE CAN BE REPLACED WITH CAST-IN-PLACE CONCRETE VAULT. SUBMIT ENGINEERED CONSTRUCTION PLANS WITH REBAR DETAILS TO CITY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.

C4. PENETRATION WALLS NEED TO BE ADEQUATELY DESIGNED STRUCTURALLY FOR ANTICIPATED THRUST.

C5. THE PRECAST VAULT MANUFACTURER IS RESPONSIBLE FOR DESIGN RELATED TO HL-93 TRAFFIC LOADING AND THRUST. VERIFICATION OF PROPER DESIGN MUST BE PROVIDED TO THE CITY BY THE DEVELOPER, CONTRACTOR, OR PROPERTY OWNER AS THE CASE MAY BE.

C6. THE DEPTH OF COVER OVER THE UPSTREAM AND DOWNSTREAM PIPES MUST BE ADJUSTED TO MATCH THE DEPTH OF THE LINE THROUGH THE VAULT FOR A SUFFICIENT DISTANCE OUTSIDE THE VAULT TO AVOID ANY HIGH POINT IN THE LINE OUTSIDE THE VAULT. ANY OTHER OPTION MUST BE APPROVED BY THE CITY ENGINEER PRIOR TO CONSTRUCTION.

PRESSURE REDUCTION STATION

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED
PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
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JA JONES & ASSOCIATES
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6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
CULINARY WATER - PRESSURE REDUCTION STATION

SHEET: CS-11
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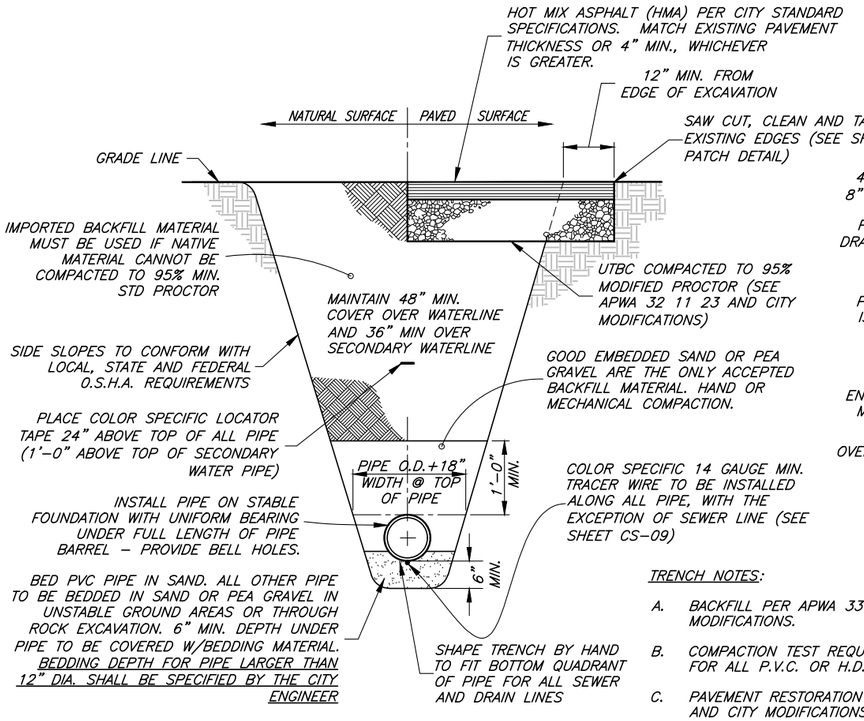
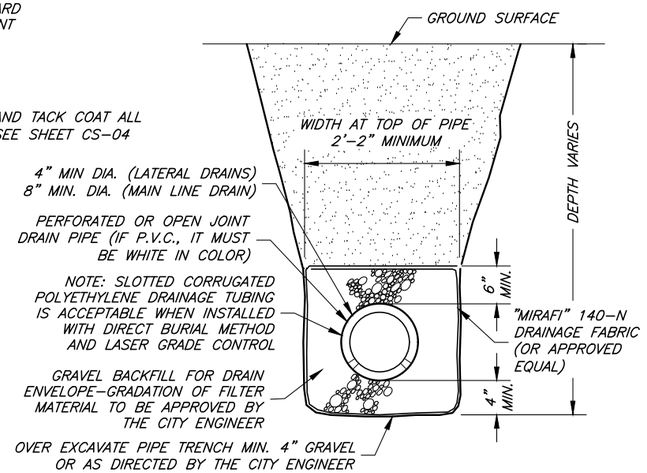


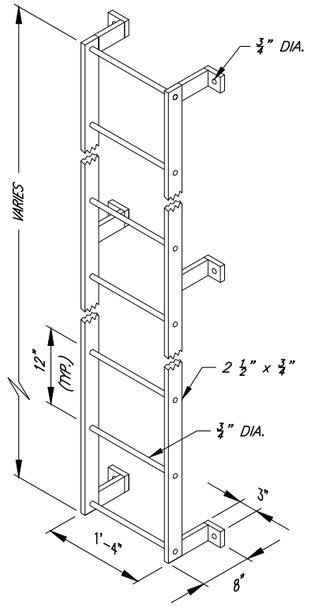
TYPICAL TRENCH SECTION

(WATER, IRRIGATION, SEWER, STORM DRAIN, AND LAND DRAIN)



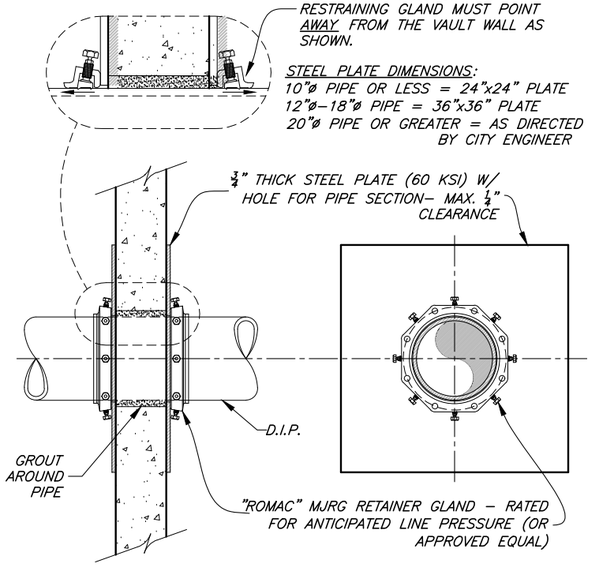
OPEN JOINT LAND DRAIN

USE ONLY UPON APPROVAL FROM THE CITY ENGINEER



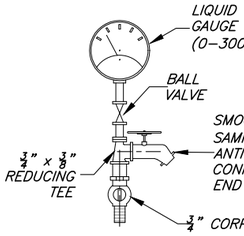
LADDER DETAIL

HOT DIP GALVANIZE AFTER FABRICATION



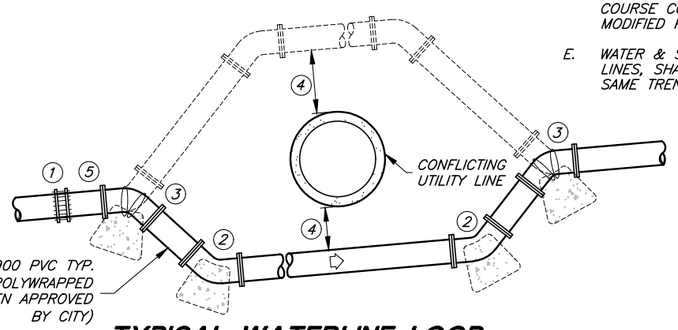
WALL PENETRATION DETAIL

FOR PRECAST VAULT (TYP)



PRESSURE GAUGE

W/SAMPLING FAUCET DETAIL



TYPICAL WATERLINE LOOP

1. TRANSITION COUPLING; "ROMAC" ALPHA, "ROMAC" MACRO, OR APPROVED EQUAL
2. MJ 45° BEND W/RETAINER GLANDS
3. CONSTRUCT THRUST BLOCKS AT EACH 45° BEND W/(3) #6 REBAR SECURING BLOCK TO FITTING (EPOXY COATING)
4. MINIMUM OF 12" COVER BETWEEN THE WATERLINE AND CONFLICTING UTILITY LINE TO BE CROSSED, EXCEPT LOOPS INVOLVING SEWER MAINS WHERE A MINIMUM OF 18" VERTICAL COVER **ABOVE** THE SEWER MAIN IS REQUIRED. EXCEPTIONS MUST BE APPROVED BY THE UTAH DIVISION OF DRINKING WATER (DDW).
5. AN AIR/VACUUM RELIEF VALVE MAY BE REQUIRED ON A CASE BY CASE BASIS AS DIRECTED BY THE PUBLIC WORKS DIRECTOR.

TRENCH NOTES:

A. BACKFILL PER APWA 33 05 20 AND CITY MODIFICATIONS.

B. COMPACTION TEST REQUIRED AT SPRING-LINE FOR ALL P.V.C. OR H.D.P.E. PIPES.

C. PAVEMENT RESTORATION PER APWA 33 05 25 AND CITY MODIFICATIONS.

D. GRAVEL SURFACED AREAS, SUCH AS ROADS AND SHOULDERS, PARKING AREAS, AND UNPAVED DRIVEWAYS, SHALL BE REPAIRED WITH 8" THICK (MIN.) 1" UNTREATED BASE COURSE COMPACTED TO 95% MODIFIED PROCTOR.

E. WATER & SEWER LINES, INCLUDING SERVICE LINES, SHALL NOT BE INSTALLED IN THE SAME TRENCH.

PIPE RESTRAINT

A1. FOR NOMINAL PIPE DIAMETERS 8" AND GREATER, ALL BENDS, CROSSES, TEES, REDUCERS, AND VALVES SHALL BE INSTALLED WITH RESTRAINING JOINTS ("MEGA-LUG", "ALPHA" OR APPROVED EQUAL).

A2. DESIGN SHALL ALSO BE REQUIRED TO ENSURE ADEQUATE RESTRAINT FOR PIPING JOINTS NEAR FITTINGS BASED ON PIPE DIAMETER AND PIPE PRESSURE.

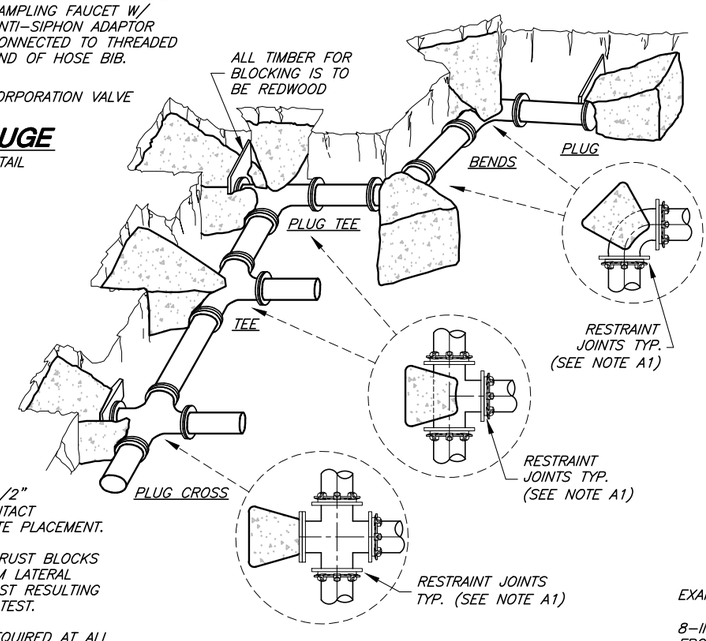
THRUST BLOCKING NOTES:

B1. CONCRETE SHALL NOT BE PLACED WITHIN 1-1/2" OF JOINTS AND BOLTS. COVER ALL METAL CONTACT AREAS WITH A POLY WRAP PRIOR TO CONCRETE PLACEMENT.

B2. IN THE ABSENCE OF A SOILS REPORT, ALL THRUST BLOCKS SHALL BE SIZED ON THE BASIS OF A MAXIMUM LATERAL BEARING VALUE FOR 2000 P.S.F. AND A THRUST RESULTING FROM 200% OF THE WATER LINE STATIC LINE TEST.

B3. THRUST BLOCKS AND RESTRAINT JOINT ARE REQUIRED AT ALL BENDS OF 22-1/2° OR MORE. 11-1/4° BENDS SHALL HAVE RETAINER GLANDS.

B4. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.



TYPICAL RETAINER GLANDS & THRUST BLOCKING

THRUST PER PSI OF WATER PRESSURE AT VARIOUS FITTINGS

PIPE SIZE (IN.)	DEAD END OR TEE (LB.)	90° ELBOW (LB.)	45° ELBOW (LB.)	22-1/2° ELBOW (LB.)
4	19	27	15	7
6	39	55	30	15
8	67	94	51	26
10	109	154	84	43
12	155	218	119	61
14	210	296	161	82
16	272	383	209	106
18	351	494	269	137
20	434	611	333	169
24	623	878	487	244
30	947	1,332	722	377
36	1,356	1,905	1,032	542

NOTES:

C1. IN USING THE ABOVE TABLE, USE THE MAXIMUM INTERNAL PRESSURE ANTICIPATED (I.E. HYDROSTATIC TEST PRESSURE, POSSIBLE SURGE PRESSURE DUE TO PUMP SHUT OFF, ETC.).

C2. SEE SOILS REPORT FOR BEARING STRENGTH OF SOIL. IN THE ABSENCE OF A SOILS REPORT, AN AVERAGE SOIL (SPADABLE MEDIUM CLAY) CAN BE ASSUMED TO HAVE A BEARING STRENGTH OF 2000 P.S.F.

EXAMPLE:

8-INCH 90° ELBOW, PRESSURE 200 LB./SQ. IN.
FROM TABLE: THRUST = 94 X 200 = 18,800 LB.
ASSUME BEARING STRENGTH = 2.000 LB./SQ. FT.

18,8000 / 2,000 = 9.4 SQ. FT. AREA OF BEARING REQUIRED FOR THRUST BLOCK

REGISTERED PROFESSIONAL ENGINEER
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Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
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PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

CULINARY WATER - THRUST BLOCK, WATERLINE LOOP, PIPE TRENCH, & MISC. VAULT DETAILS

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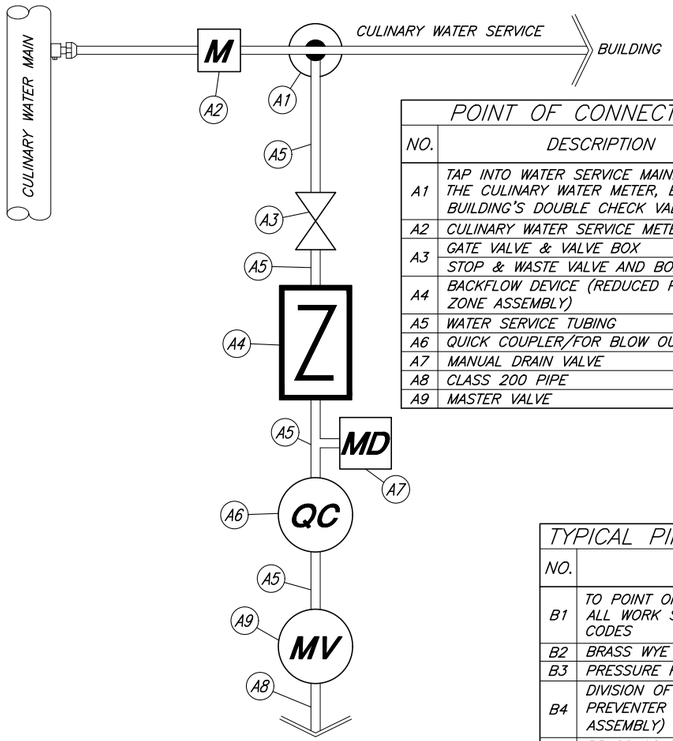


TYPICAL POINT OF CONNECTION SCHEMATIC DIAGRAM

NOT TO SCALE

POINT OF CONNECTION	
NO.	DESCRIPTION
A1	TAP INTO WATER SERVICE MAINLINE, AFTER THE CULINARY WATER METER, BEFORE BUILDING'S DOUBLE CHECK VALVE
A2	CULINARY WATER SERVICE METER
A3	GATE VALVE & VALVE BOX
	STOP & WASTE VALVE AND BOX
A4	BACKFLOW DEVICE (REDUCED PRESSURE ZONE ASSEMBLY)
A5	WATER SERVICE TUBING
A6	QUICK COUPLER/FOR BLOW OUT
A7	MANUAL DRAIN VALVE
A8	CLASS 200 PIPE
A9	MASTER VALVE

REDUCED PRESSURE ASSEMBLY (RP) NOTES:

C1. WHERE REQUIRED OR WHEN DIRECTED BY THE PUBLIC WORKS DIRECTOR, AN RP ASSEMBLY SHALL BE INSTALLED WHEN A SECONDARY SERVICE IS CONNECTED TO THE CULINARY WATER SYSTEM.

C2. THE RP ASSEMBLY SHALL BE INSTALLED IN A HORIZONTAL POSITION ONLY.

C3. RP ASSEMBLIES SHALL NOT BE INSTALLED IN A PIT.

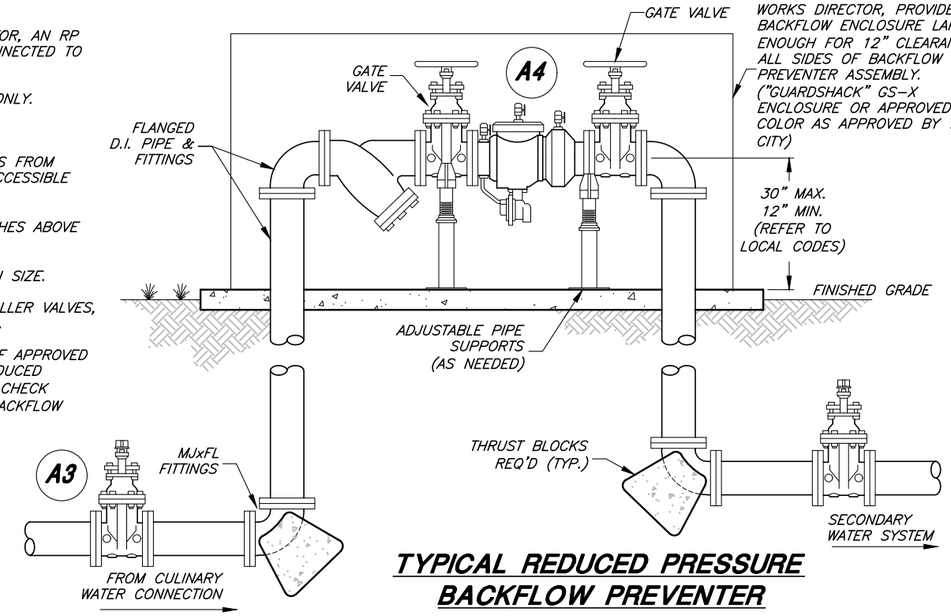
C4. THE BODY OF THE RP ASSEMBLY SHALL BE A MINIMUM OF 12 INCHES FROM ANY WALLS, CEILINGS, OR ENCUMBRANCES AND SHALL BE READILY ACCESSIBLE FOR TESTING, REPAIR AND/OR MAINTENANCE.

C5. THE BOTTOM OF THE RP ASSEMBLY SHALL BE A MINIMUM OF 12 INCHES ABOVE THE GROUND FLOOR.

C6. RP VALVE ASSEMBLY AND PIPES TO MATCH SECONDARY LATERAL/MAIN SIZE.

C7. THE BACKFLOW PREVENTER SHALL BE BRONZE FOR 6-INCH AND SMALLER VALVES, AND EPOXY COATED DUCTILE IRON FOR 8-INCH AND LARGER VALVES.

C8. BACKFLOW PREVENTION DEVICES SHALL BE SELECTED FROM A LIST OF APPROVED DEVICES SET FORTH BY THE UTAH DIVISION OF DRINKING WATER. REDUCED PRESSURE ASSEMBLIES (RP) AND CITY ENGINEER APPROVED DOUBLE CHECK VALVE ASSEMBLIES (DCA) WILL BE THE ONLY ACCEPTED STYLES OF BACKFLOW PREVENTION DEVICES.



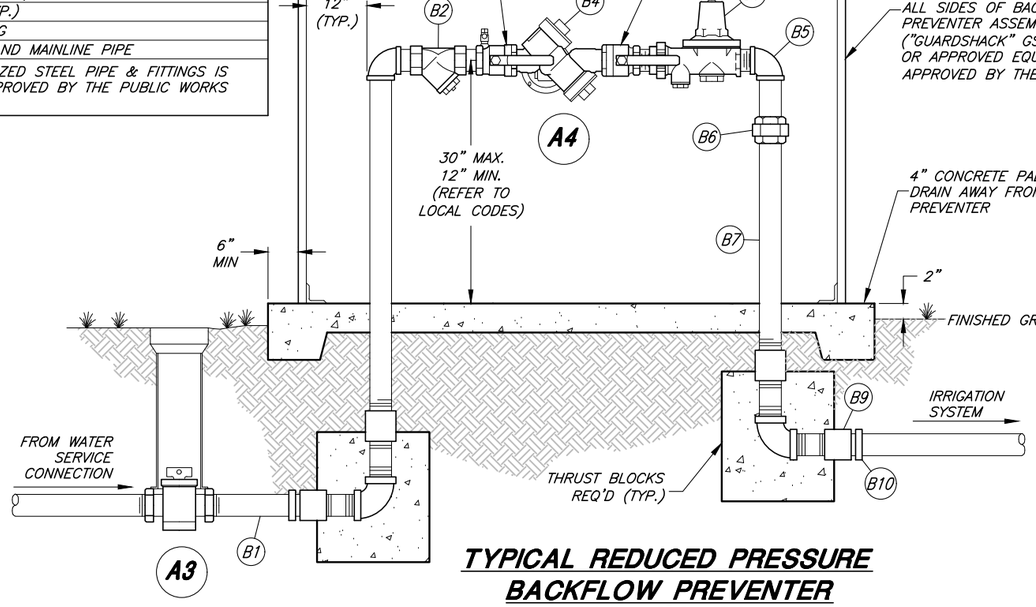
TYPICAL REDUCED PRESSURE BACKFLOW PREVENTER

4" AND LARGER DIAMETER

TYPICAL PIPE & FITTING SCHEDULE	
NO.	DESCRIPTION
B1	TO POINT OF CONNECTION - ADAPT AS NECESSARY. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES
B2	BRASS WYE STRAINER W/ 60 MESH SCREEN
B3	PRESSURE REDUCING VALVE (AS REQUIRED)
B4	DIVISION OF DRINKING WATER APPROVED BACKFLOW PREVENTER UNIT (REDUCED PRESSURE ZONE ASSEMBLY)
B5	BRASS 90 DEGREE ELBOW (TYP.)
B6	BRASS UNION (TYP.)
B7	BRASS PIPE (TYP.)
B9	BRASS COUPLING
B10	PIPE ADAPTER AND MAINLINE PIPE
THE USE OF GALVANIZED STEEL PIPE & FITTINGS IS ACCEPTED WHEN APPROVED BY THE PUBLIC WORKS DIRECTOR	

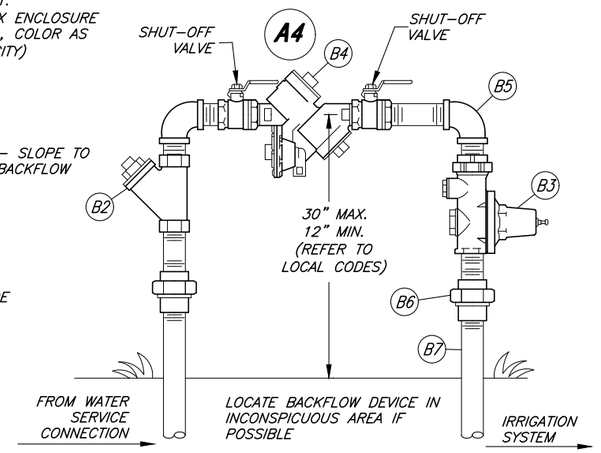
GENERAL NOTES:

1. DESIGN, CONSTRUCTION, AND INSTALLATION SHALL BE DONE ACCORDING TO AND COMPLY WITH ALL CURRENT ADOPTED BUILDING AND PLUMBING CODES, AND TO MANUFACTURERS WRITTEN INSTRUCTIONS AND RECOMMENDATIONS.
2. ALL TESTING, MAINTENANCE, AND/OR REPAIR SHALL BE PERFORMED BY A STATE CERTIFIED BACKFLOW ASSEMBLY TECHNICIAN.
3. THE ASSEMBLY MUST BE THOROUGHLY DRAINED AND WINTERIZED EACH WINTER.
4. THE RP ASSEMBLY SHALL BE PROTECTED FROM FREEZING AND VANDALISM WHERE APPLICABLE.
5. ABOVE GROUND FITTINGS TO BE EPOXY PAINTED BLUE ON THE CULINARY SIDE AND PURPLE ON THE SECONDARY SIDE.
6. PROVIDE BOLLARDS OR OTHER PROTECTION IF AND AS DIRECTED BY THE CITY.
7. RP ASSEMBLY DESIGN AND CONSTRUCTION DETAILS/DRAWINGS TO BE SUBMITTED TO THE CITY ENGINEER AND THE PUBLIC WORKS DIRECTOR FOR APPROVAL PRIOR TO INSTALLATION.
8. LOCATION OF BACKFLOW ASSEMBLY SHALL BE APPROVED BY THE PUBLIC WORKS DIRECTOR PRIOR TO INSTALLATION.
9. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE TESTED WITHIN 10 DAYS OF INITIAL USE BY A LICENSED BACKFLOW DEVICE TESTER.
10. ALL BACKFLOW PREVENTION ASSEMBLIES ARE TO BE TESTED ANNUALLY BY A CERTIFIED TESTER AND REPAIRS OR MAINTENANCE COMPLETED AS NEEDED. ANNUALLY SUBMIT TEST RESULTS TO THE PUBLIC WORKS DIRECTOR.



TYPICAL REDUCED PRESSURE BACKFLOW PREVENTER

LESS THAN 3" DIAMETER



ALTERNATE REDUCED PRESSURE BACKFLOW PREVENTER

OPTIONAL ALTERNATE FOR RESIDENTIAL CONNECTIONS AND COMMERCIAL DEVELOPMENTS LESS THAN ONE ACRE

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

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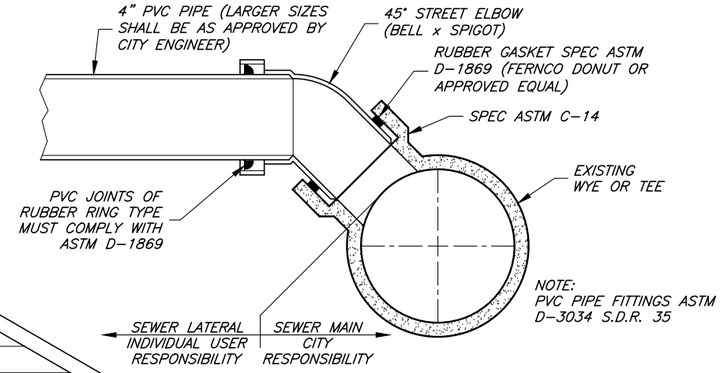
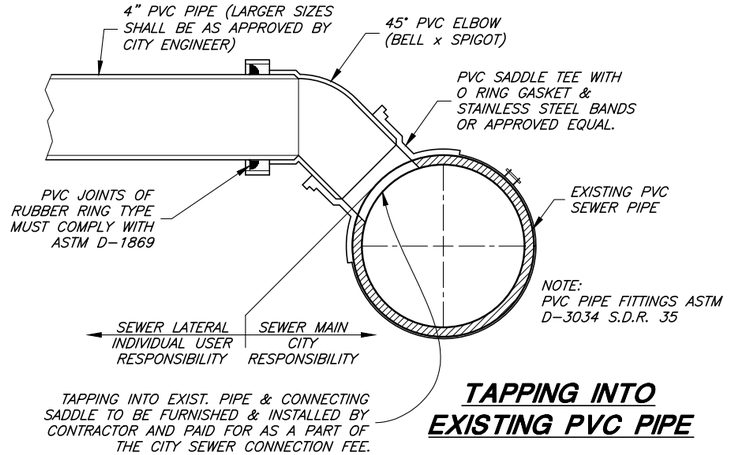
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
CULINARY WATER - REDUCE PRESSURE (RP) BACKFLOW PREVENTION ASSEMBLY

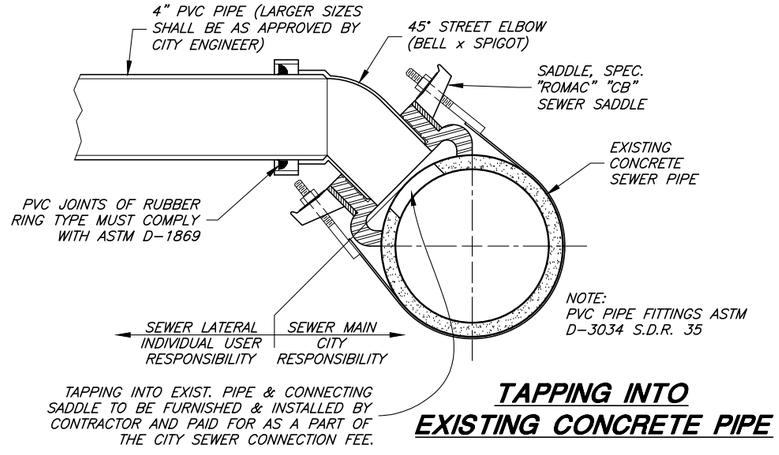
SHEET: CS-13
OF 1 SHEETS
0



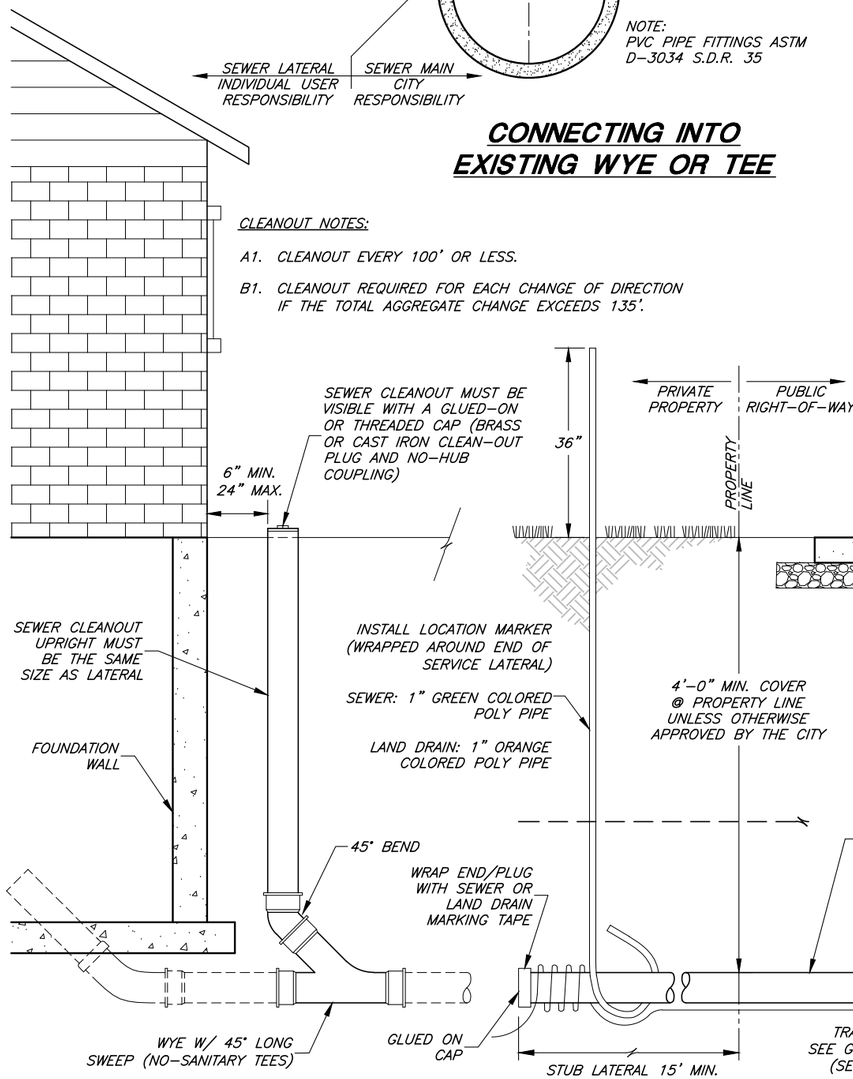
CONNECTING INTO EXISTING WYE OR TEE



TAPPING INTO EXISTING PVC PIPE



TAPPING INTO EXISTING CONCRETE PIPE



TYPICAL SEWER LATERAL HOME CONNECTION WITH CLEANOUT

TYPICAL SEWER / LAND DRAIN LATERALS CONNECTION

GENERAL NOTES:

1. ALL SANITARY SEWER LATERAL CONNECTIONS ON SEWER MAINS IN NEW SUBDIVISIONS SHALL BE MADE WITH IN LINE PRE-FORMED WYES OR TEES UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. FLOWLINE ELEVATION OF LATERALS SHALL EQUAL THE INSIDE TOP OF PIPE ON MAINLINE AT THE CONNECTING POINT (THE LATERAL TAP SHALL BE IN THE TOP QUARTER OF THE SEWER MAIN LINE PREFERABLY IN THE 10:00 OR 2:00 POSITION).

GENERAL NOTES CONT.:

3. SANITARY SEWER SERVICE LATERAL CONNECTIONS SHALL NOT BE ALLOWED IN SEWER MANHOLES.
4. SANITARY SEWER MAINS AND LATERALS SHALL BE "GREEN" IN COLOR. LAND DRAIN MAINS AND LATERALS SHALL BE SCHEDULE 40 "WHITE" IN COLOR. IRRIGATION PIPES SHALL BE "PURPLE" IN COLOR. PREVIOUS YEARS PIPE COLORS MAY VARY THROUGHOUT THE CITY. **CONTRACTOR TO VERIFY EXISTING PIPE PRIOR TO MAKING ANY CONNECTION.**
5. INSERTA TEE PRODUCT IS **NOT** **ALLOWED BY THE CITY.**
6. ALL CLEANOUTS SHALL BE MARKED AND FITTED WITH A BRASS PLUG OR METAL LID FOR LOCATION PURPOSES.
7. ALL CULINARY WATER MAINS AND SERVICES MUST MAINTAIN A MINIMUM SEPARATION ABOVE ALL SEWER MAINS AND LATERALS OF 18" VERTICAL AND 10'-0" HORIZONTAL IN ACCORDANCE WITH THE STATE OF UTAH DIVISION OF DRINKING WATER (DDW) RULES SECTION R309-550-7. EXCEPTIONS MUST BE APPROVED BY DDW.
8. ALL SANITARY SEWER LINES SHALL BE INSPECTED BY MEANS OF VIDEO CAMERA WHEN CONSTRUCTED.
9. DOWNSTREAM LAND DRAIN CONNECTION TO AN EXISTING STORM DRAIN SYSTEM IS REQUIRED.
10. TRACER WIRE SHALL BE INSTALLED ON ALL LAND DRAIN LATERALS.
11. THE LOCATION OF THE SEWER LATERAL MUST BE DOCUMENTED AND SUBMITTED TO THE CITY ON SCALED AS-BUILT DRAWINGS.
12. REQUESTS FOR INSPECTION ON WORK SHALL BE GIVEN 24 HOURS IN ADVANCE OF THE WORK STARTING.
13. IT SHALL BE THE RESPONSIBILITY OF THE PERSON RESPONSIBLE FOR CONSTRUCTION TO ENSURE THAT INSPECTIONS TAKE PLACE WHERE AND WHEN REQUIRED.
14. IT SHALL BE THE RESPONSIBILITY OF THE PERSON RESPONSIBLE FOR CONSTRUCTION TO FOLLOW THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION CONSTRUCTION STANDARDS FOR EXCAVATIONS.
15. A CUT PERMIT FROM PERRY CITY CORPORATION MUST BE ON JOB SITE ANYTIME WORK IS IN THE PUBLIC RIGHT-OF-WAY.

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED
PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

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DRAWN
CHECKED

JA JONES & ASSOCIATES CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
SANITARY SEWER - SEWER / LAND DRAIN LATERAL & MAIN LINE CONNECTION DETAILS

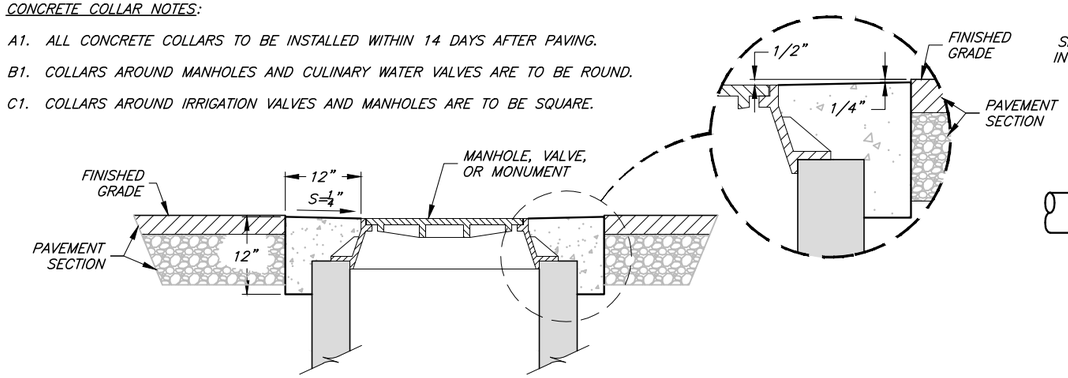
SHEET: CS-14
OF 1 SHEETS
0

CONCRETE COLLAR NOTES:

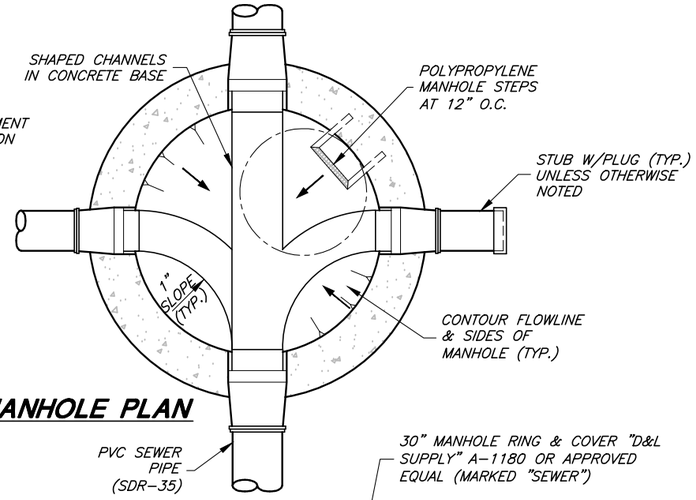
A1. ALL CONCRETE COLLARS TO BE INSTALLED WITHIN 14 DAYS AFTER PAVING.

B1. COLLARS AROUND MANHOLES AND CULINARY WATER VALVES ARE TO BE ROUND.

C1. COLLARS AROUND IRRIGATION VALVES AND MANHOLES ARE TO BE SQUARE.



CONCRETE COLLAR DETAIL



MANHOLE PLAN

GENERAL NOTES:

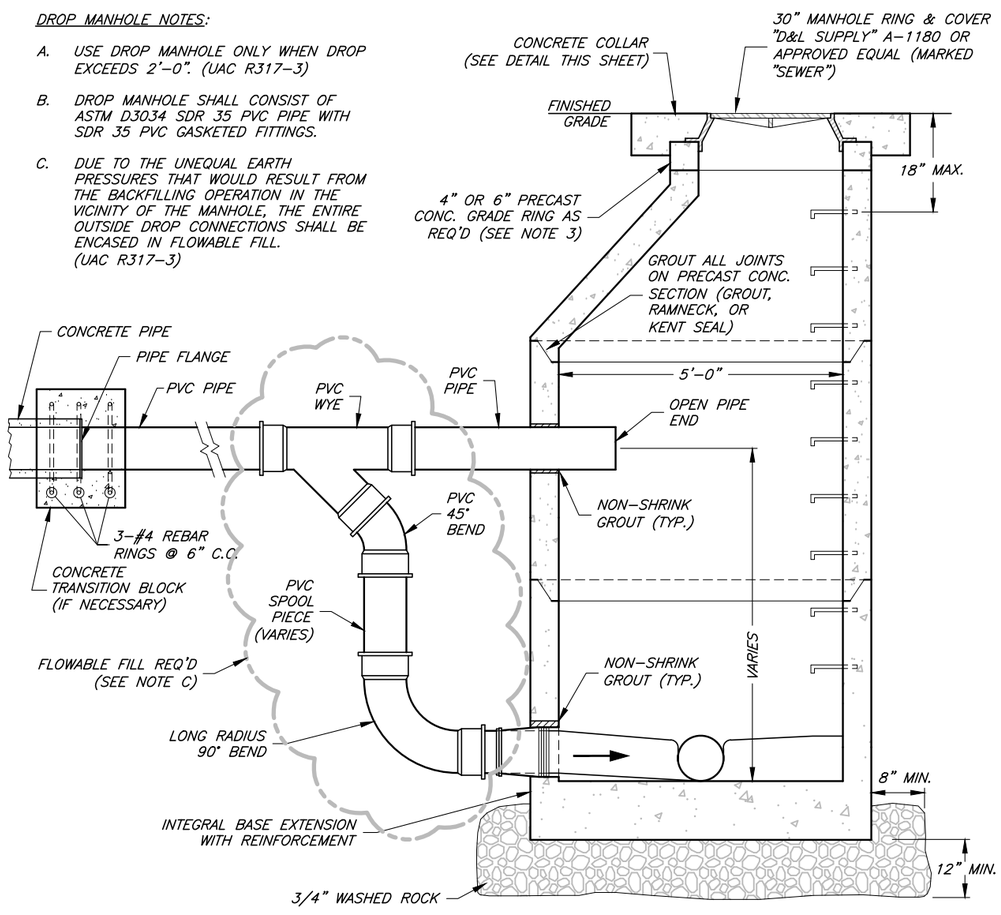
1. SECURE INVERTS IN ALL MANHOLES DURING CONSTRUCTION SO AS TO PREVENT GRAVEL AND OTHER DEBRIS FROM COLLECTING INSIDE.
2. A LARGER DIAMETER MANHOLE MAY BE REQUIRED BY THE DESIGN ENGINEER AFTER EVALUATION OF THE NUMBER, SIZE, AND ANGLE OF THE PIPES THAT CONNECT TO THE MANHOLE.
3. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE.
4. ALL TERMINATING SEWER & LAND DRAIN MAINS SHALL END WITH A CITY STANDARD MANHOLE.
5. SERVICE LATERAL CONNECTIONS SHALL NOT BE ALLOWED IN SEWER MANHOLES.
6. ALL SANITARY SEWER LINES SHALL BE INSPECTED BY MEANS OF VIDEO CAMERA AND AIR TESTED WHEN CONSTRUCTED. SEE APWA 33 08 00 AND CITY MODIFICATIONS FOR MORE INFORMATION.
7. WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE INCOMING SEWER AND MANHOLE INVERT IS LESS THAN 24 INCHES, THE INVERT SHOULD BE FILLETED.
8. FLAT MANHOLE RINGS & COVERS (SLAB CONSTRUCTION) ARE NOT ALLOWED ON ANY MANHOLE CONE SECTION.

DROP MANHOLE NOTES:

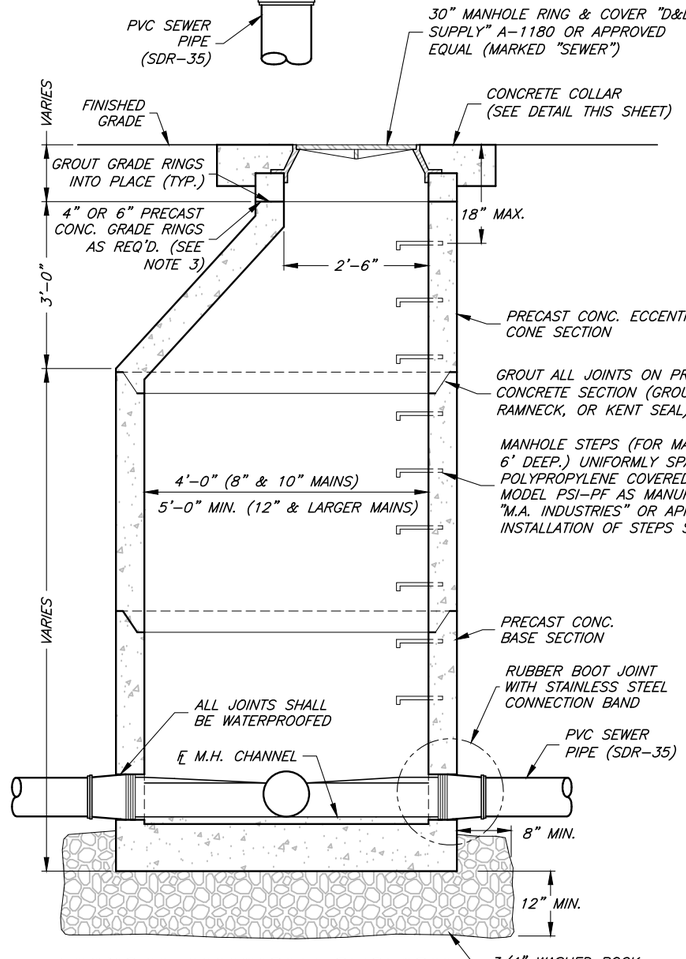
A. USE DROP MANHOLE ONLY WHEN DROP EXCEEDS 2'-0". (UAC R317-3)

B. DROP MANHOLE SHALL CONSIST OF ASTM D3034 SDR 35 PVC PIPE WITH SDR 35 PVC GASKETED FITTINGS.

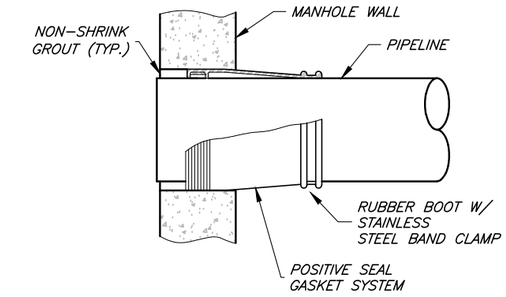
C. DUE TO THE UNEQUAL EARTH PRESSURES THAT WOULD RESULT FROM THE BACKFILLING OPERATION IN THE VICINITY OF THE MANHOLE, THE ENTIRE OUTSIDE DROP CONNECTIONS SHALL BE ENCASED IN FLOWABLE FILL. (UAC R317-3)



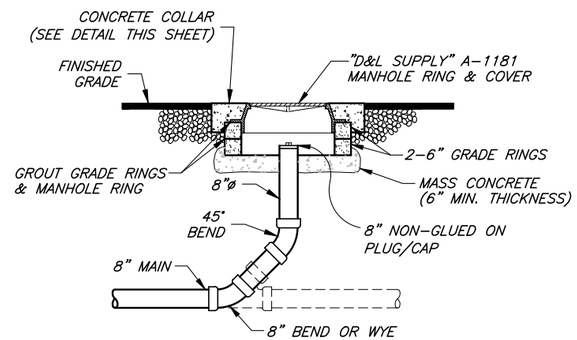
TYPICAL DROP MANHOLE SECTION



TYPICAL MANHOLE SECTION



RUBBER BOOT DETAIL



DRAIN/SEWER MAINLINE CLEANOUT

TEMPORARY (USE ONLY UPON APPROVAL FROM THE CITY ENGINEER)

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

CITY ENGINEER — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

SCALE: N.T.S.

DESIGNED

DRAWN

CHECKED

JA JONES & ASSOCIATES — CONSULTING ENGINEERS — 6080 Fashion Point Drive, South Ogden, Utah 84403 www.jonescivil.com

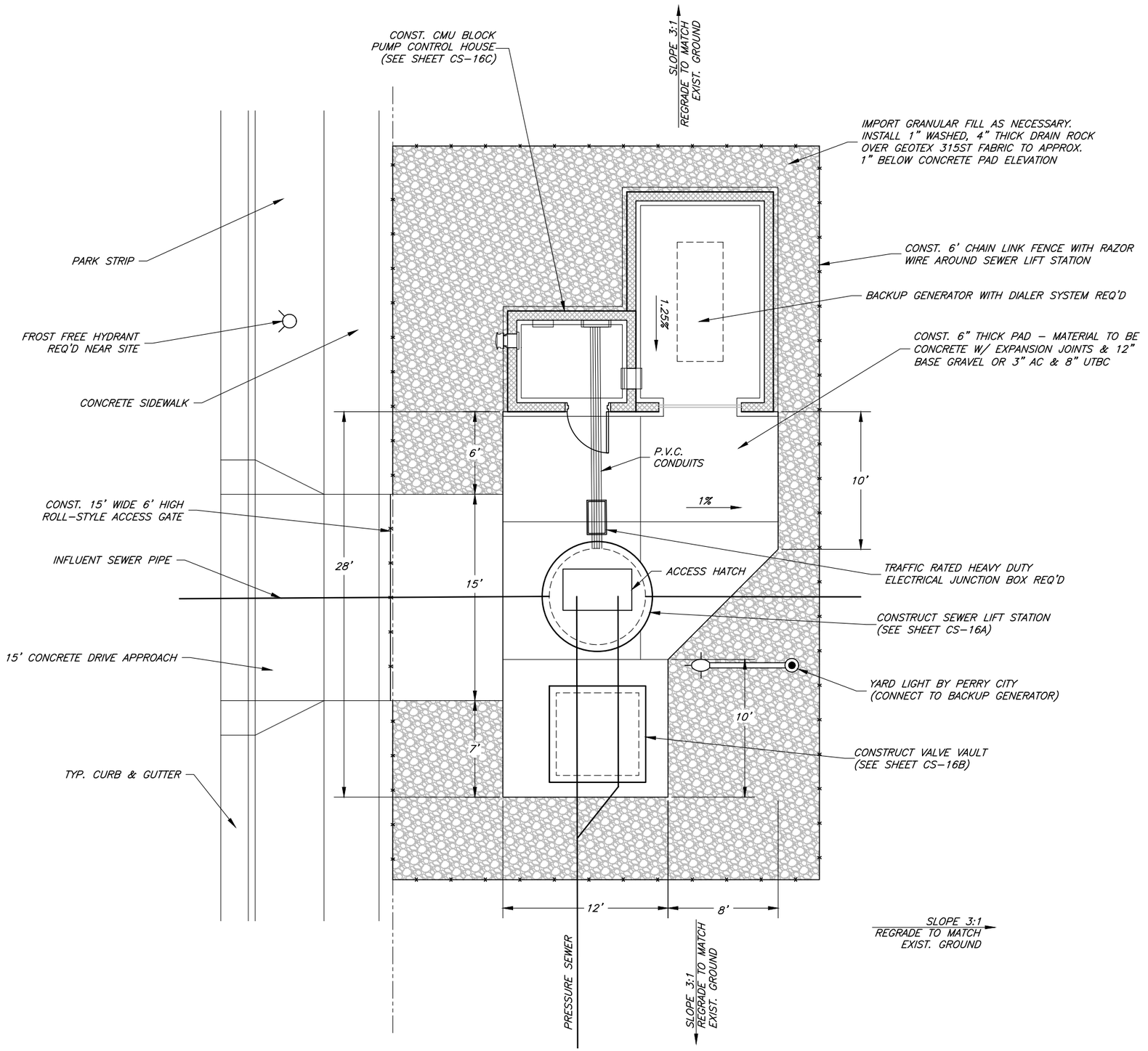
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION

PUBLIC WORKS STANDARDS

SANITARY SEWER - TYPICAL MANHOLES & DETAILS

SHEET: CS-15 — OF 1 SHEETS — 0



REGISTERED PROFESSIONAL ENGINEER
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PERRY CITY PUBLIC WORKS

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PUBLIC WORKS STANDARDS

SANITARY SEWER - TYPICAL LIFT STATION SITE PLAN

SHEET: CS-16 OF 1 SHEETS
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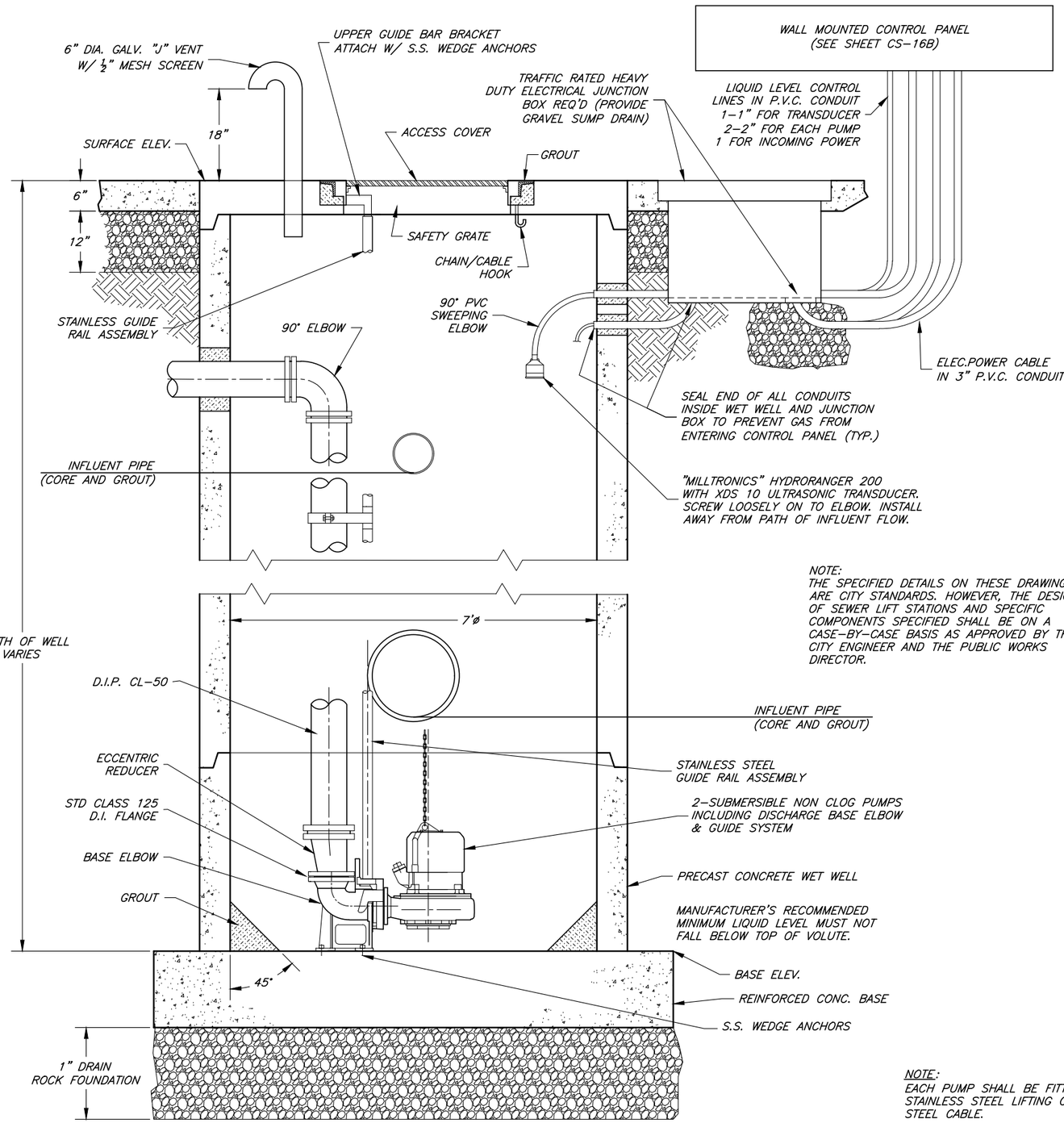
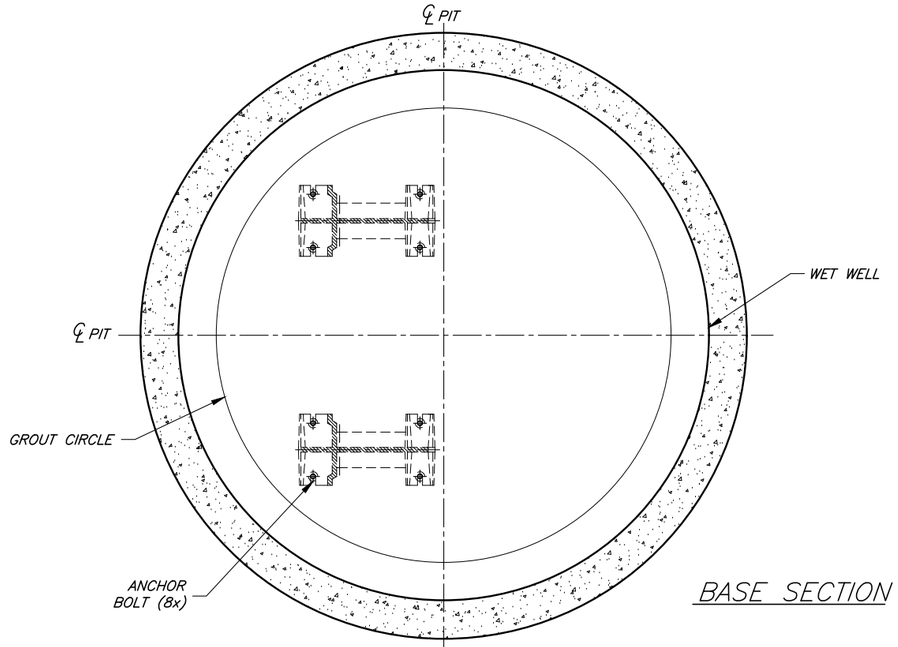
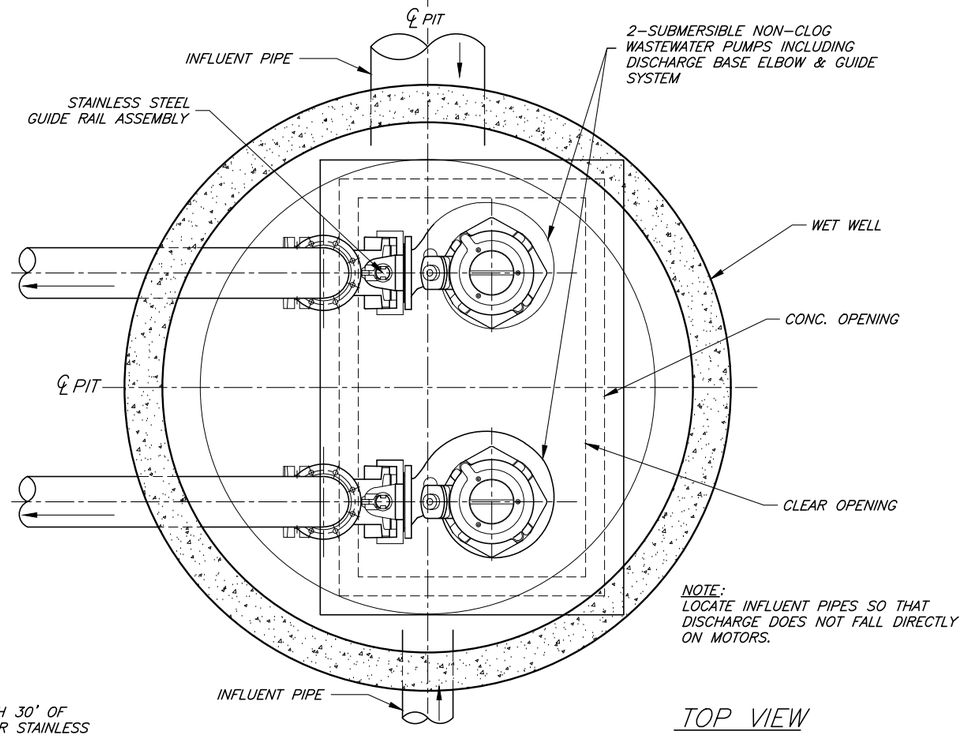


NOTE:
THE SPECIFIED DETAILS ON THESE DRAWINGS ARE CITY STANDARDS. HOWEVER, THE DESIGN OF SEWER LIFT STATIONS AND SPECIFIC COMPONENTS SPECIFIED SHALL BE ON A CASE-BY-CASE BASIS AS APPROVED BY THE CITY ENGINEER AND THE PUBLIC WORKS DIRECTOR.



BASE SECTION



NOTE:
LOCATE INFLUENT PIPES SO THAT DISCHARGE DOES NOT FALL DIRECTLY ON MOTORS.

TOP VIEW

NOTE:
EACH PUMP SHALL BE FITTED WITH 30' OF STAINLESS STEEL LIFTING CHAIN OR STAINLESS STEEL CABLE.

REGISTERED PROFESSIONAL ENGINEER
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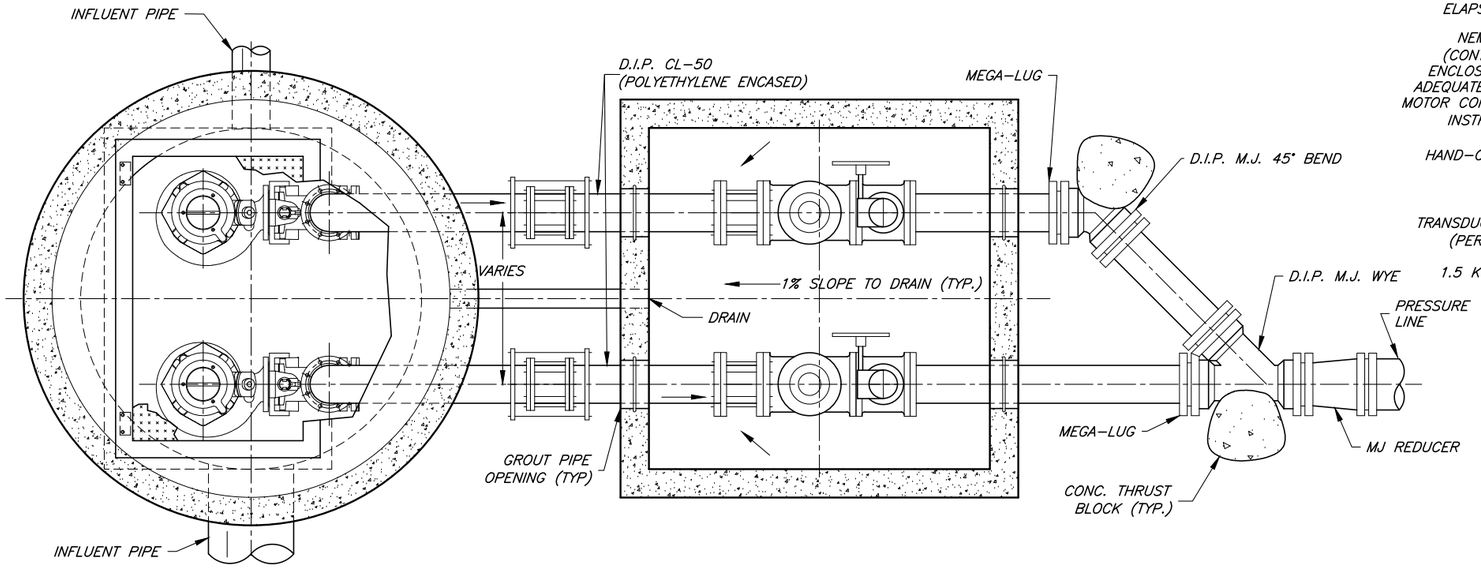
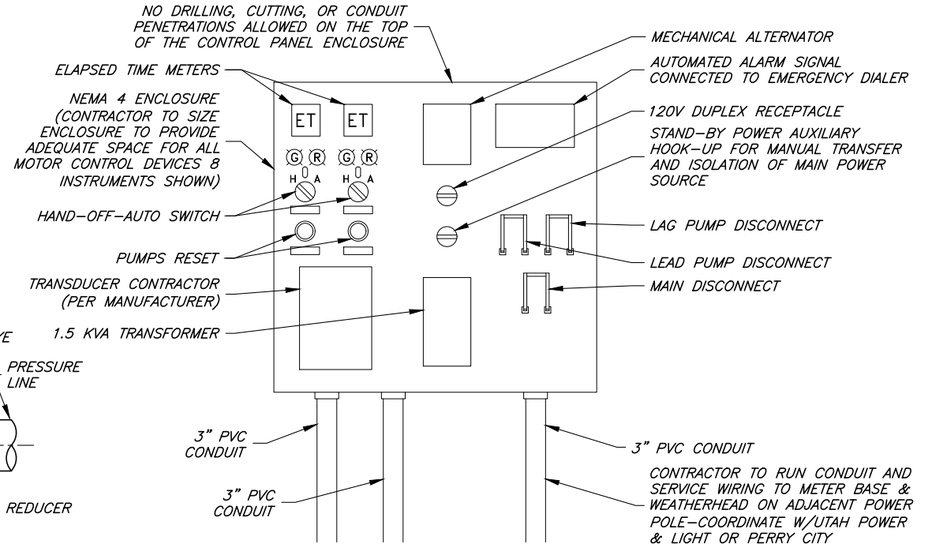
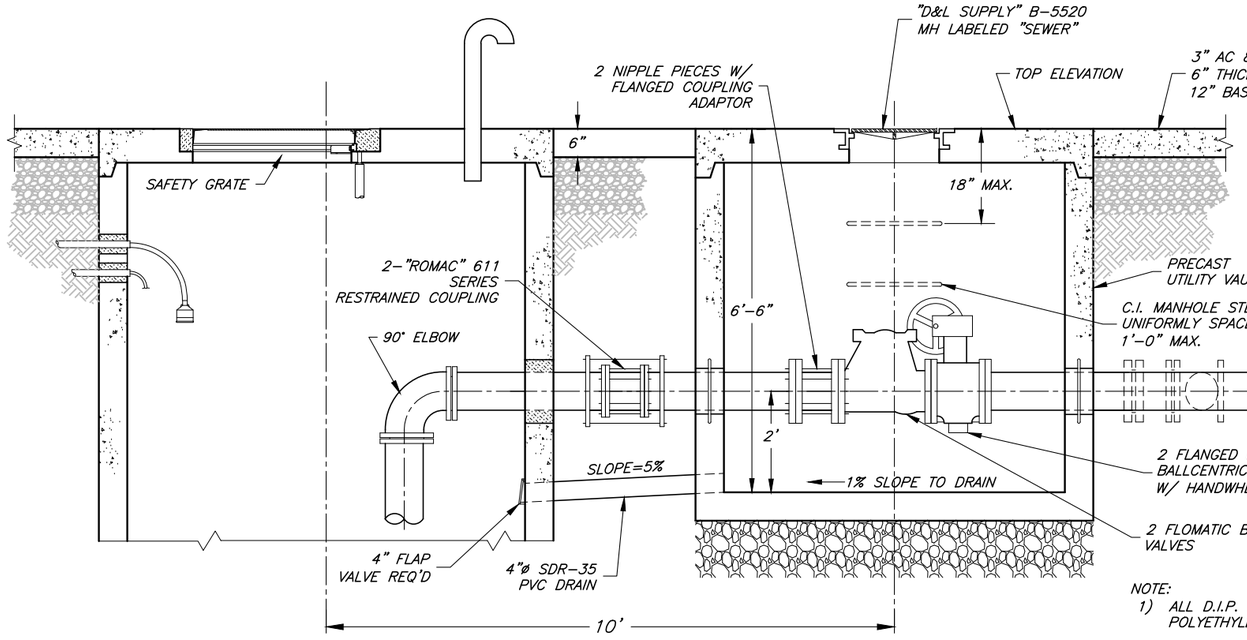
SANITARY SEWER - TYPICAL LIFT STATION

SHEET: CS-16A
OF 1 SHEETS
0





PUMP CONTROL PANEL



VALVE VAULT

NOTE:
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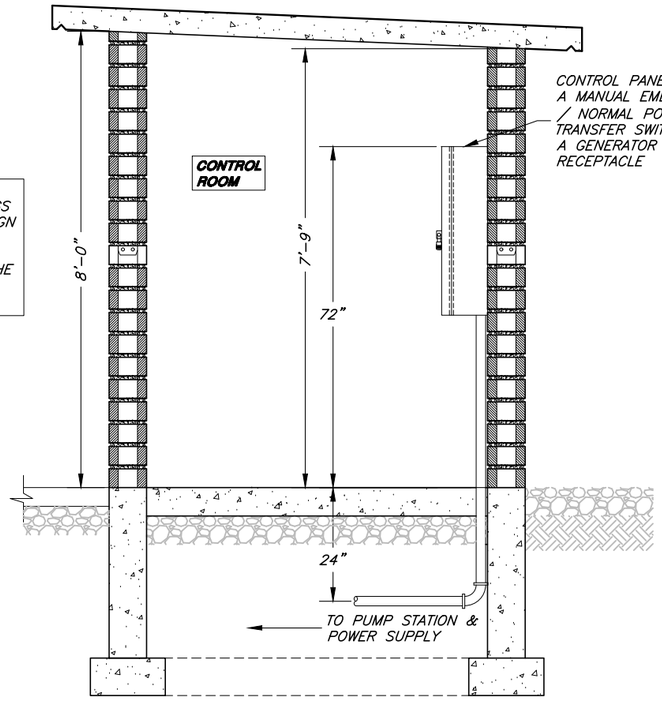
NOTE:
1) ALL D.I.P. IN CONTACT W/EARTH IS TO BE POLYETHYLENE ENCASED.

2) 14 GAUGE TRACER WIRE REQUIRED ON PRESSURE LINE EVERY 400-500 FT W/ ACCESS BOX INSTALLED.



PANEL WALL

CONTRACTOR SHALL PROVIDE 3/4" BARE COPPER GROUNDING ROD & I/O BARE COPPER GROUNDING CONDUCTOR FOR CONTINUOUS GROUND.

REGISTERED PROFESSIONAL ENGINEER
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State of Utah

Brett M. Jones
CITY ENGINEER
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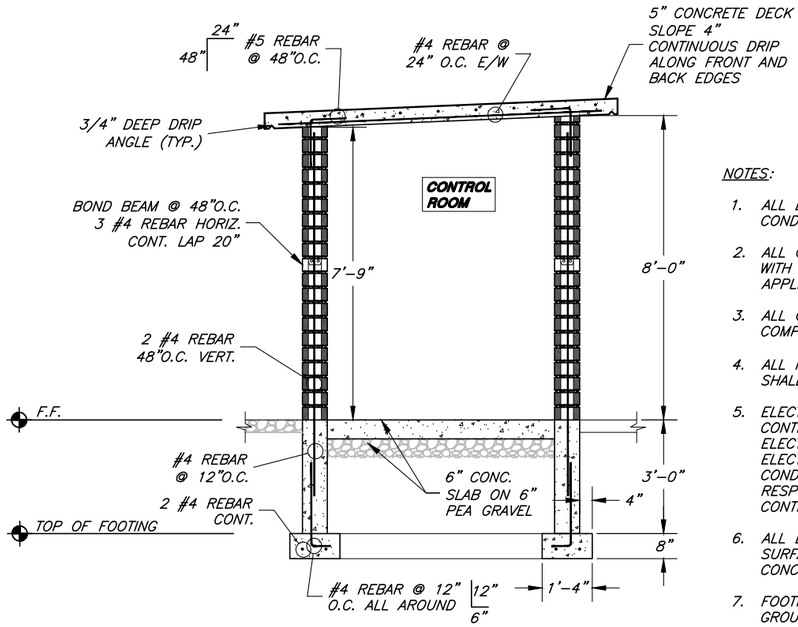
PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
SANITARY SEWER - LIFT STATION VALVE VAULT & CONTROL PANEL

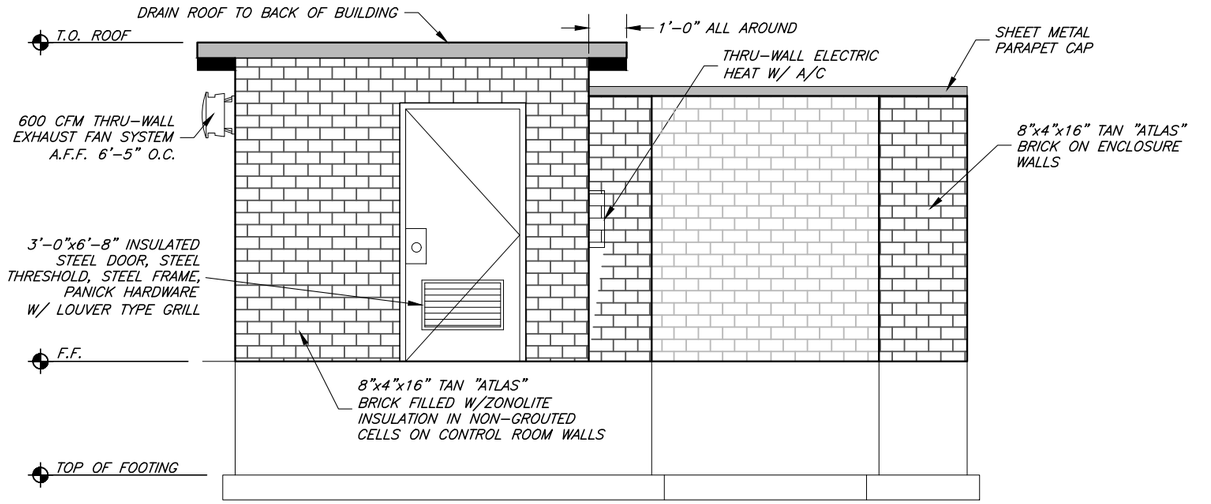
SHEET: CS-16B
OF 1 SHEETS
0



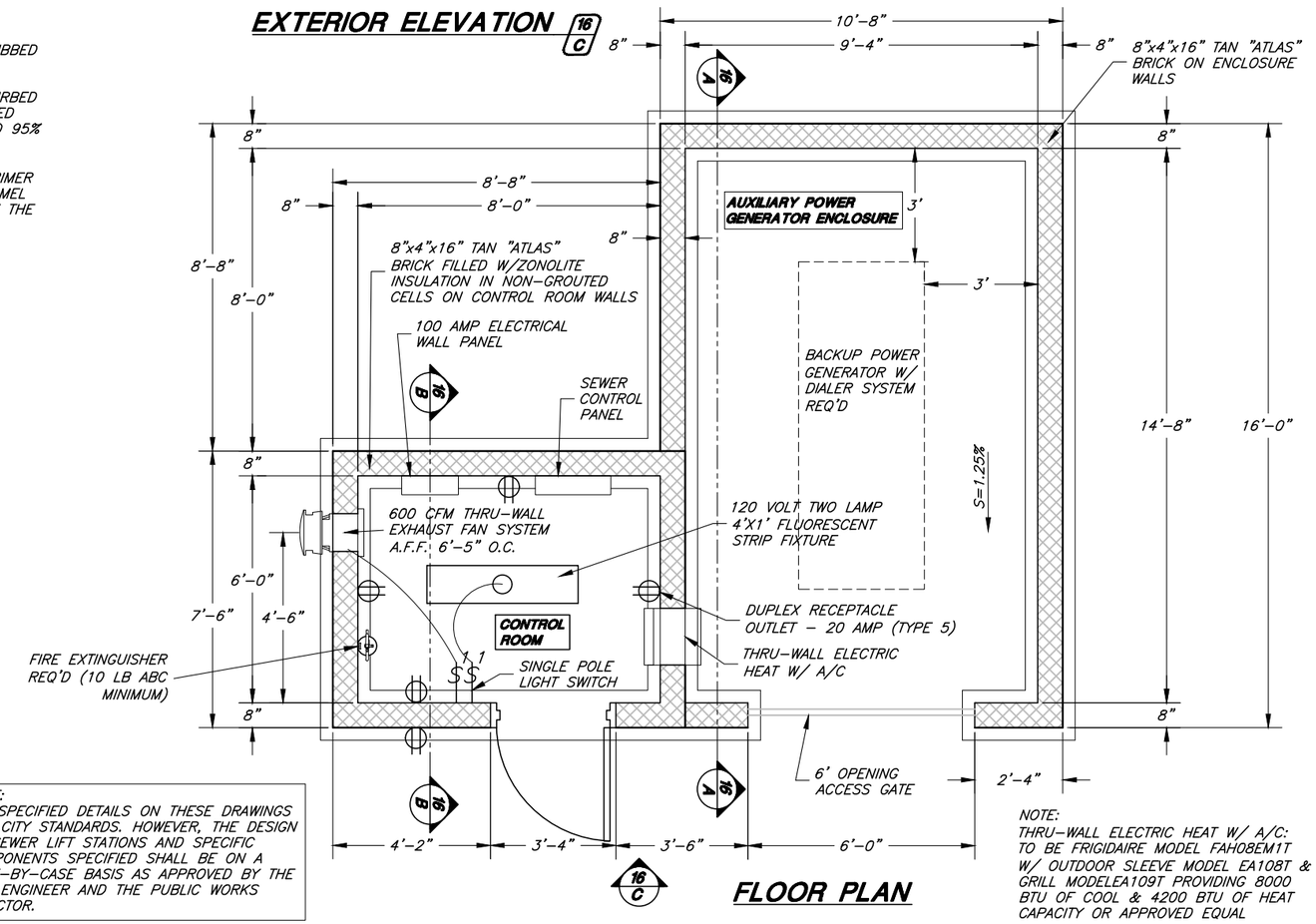
BUILDING SECTION 16/B

NOTES:

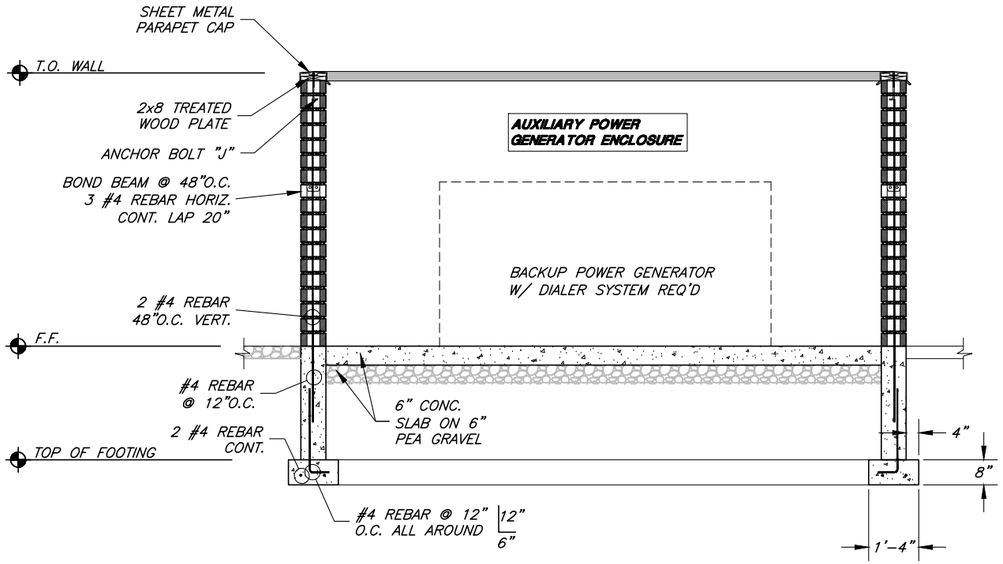
1. ALL ELECTRICAL WIRING TO BE ENCLOSED IN CONDUIT.
2. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH 2006 I.B.C. AND AND OTHER APPLICABLE CODES.
3. ALL CONCRETE SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.
4. ALL REINFORCED BARS #4 OR GREATER SHALL BE GRADE 60.
5. ELECTRICAL SYSTEM BY OTHERS. GENERAL CONTRACTOR TO COORDINATE LOCATION OF ELECTRICAL APPURTENANCES WITH ELECTRICAL CONTRACTOR. TRENCHING, CONDUIT, AND BACKFILLING IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
6. ALL EXPOSED CONCRETE EXTERIOR SURFACES SHALL HAVE A HAND RUBBED CONCRETE FINISH.
7. FOOTINGS SHALL REST ON UNDISTURBED GROUND OR SHALL SIT ON IMPORTED GRANULAR BACKFILL COMPACTED TO 95% MAX. DRY DENSITY.
8. DOOR SHALL BE PAINTED W/ 1 PRIMER COAT AND 2 FINISH COATS OF ENAMEL PAINT. COLOR TO BE SPECIFIED BY THE PUBLIC WORKS DIRECTOR.



EXTERIOR ELEVATION 16/C



FLOOR PLAN



BUILDING SECTION 16/A

NOTE:
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NOTE:
THRU-WALL ELECTRIC HEAT W/ A/C: TO BE FRIGIDAIRE MODEL FAH08EM1T W/ OUTDOOR SLEEVE MODEL EA108T & GRILL MODELEA109T PROVIDING 8000 BTU OF COOL & 4200 BTU OF HEAT CAPACITY OR APPROVED EQUAL

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
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PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

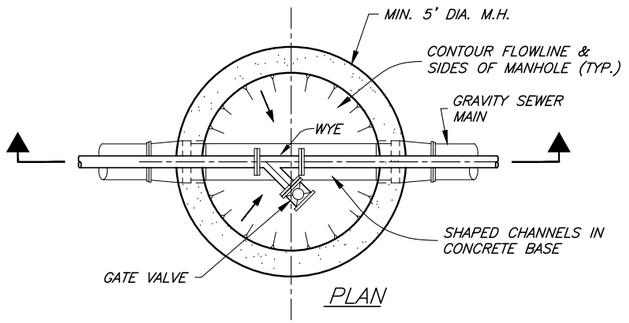
SANITARY SEWER - TYPICAL LIFT STATION CONTROL BUILDING

SHEET: CS-16C
OF 1 SHEETS
0

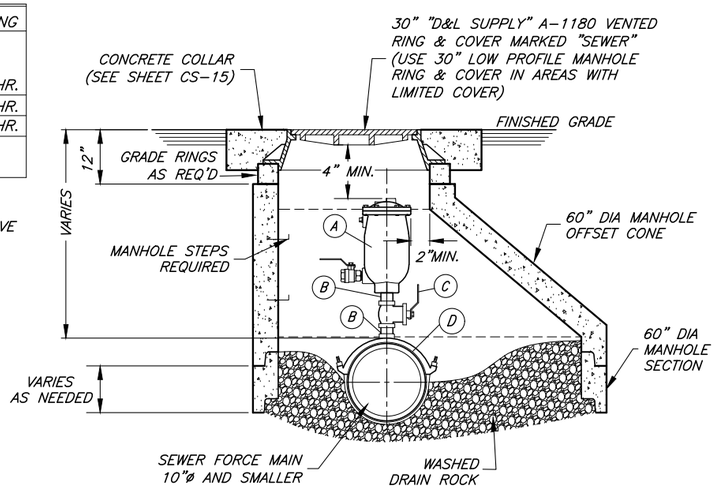
PIPE & FITTING SCHEDULE

NO.	DESCRIPTION	FITTING
A	2" WASTEWATER AIR RELEASE VALVE "VAL MATIC" MODEL # 49A W/ OPTIONAL VACUUM CHECK ON THE OUTLET	THR.
B	2" BRASS PIPE	THR.
C	2" BALL VALVE (1/4 TURN 200 PSI MIN.)	THR.
D	2" NYLON COATED SERVICE SADDLE W/ STAINLESS STEEL STRAPS "ROMAC" MODEL # 202NS	

NOTES:
1. WHERE SEWAGE WATER QUALITY IS ADEQUATE AS DICTATED BY THE CITY ENGINEER, AN A.R.I. D040 OR APPROVED EQUAL VALVE MAY BE SPECIFIED.

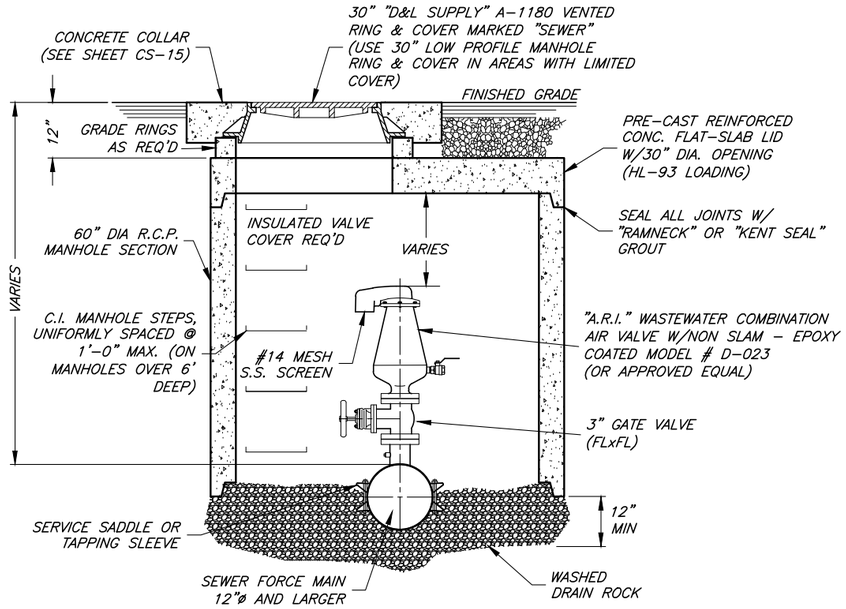


PLAN



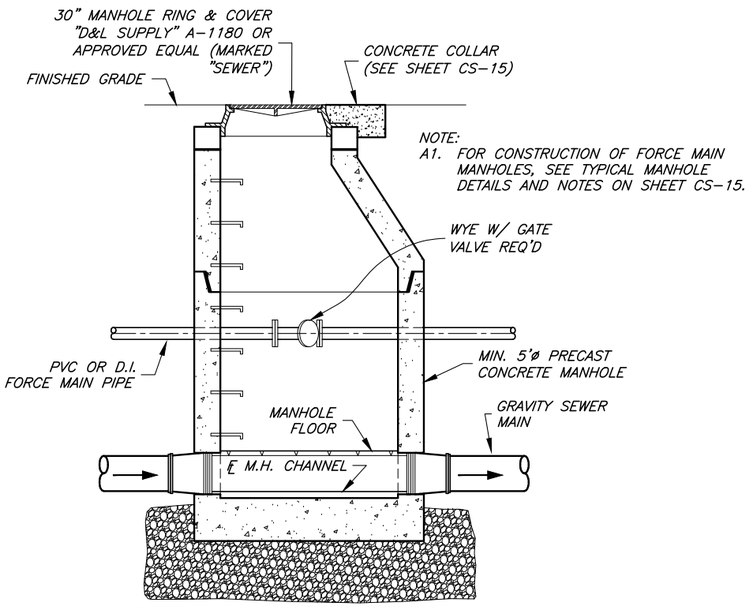
TYPICAL 2" WASTEWATER AIR RELEASE VALVE STATION

10"ø MAINS AND UNDER



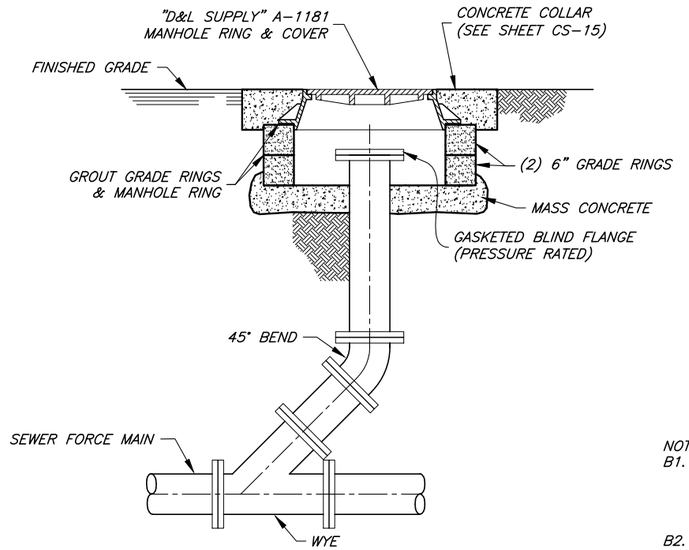
TYPICAL 3" WASTEWATER AIR/VACUUM RELIEF STATION

12"ø MAINS AND LARGER



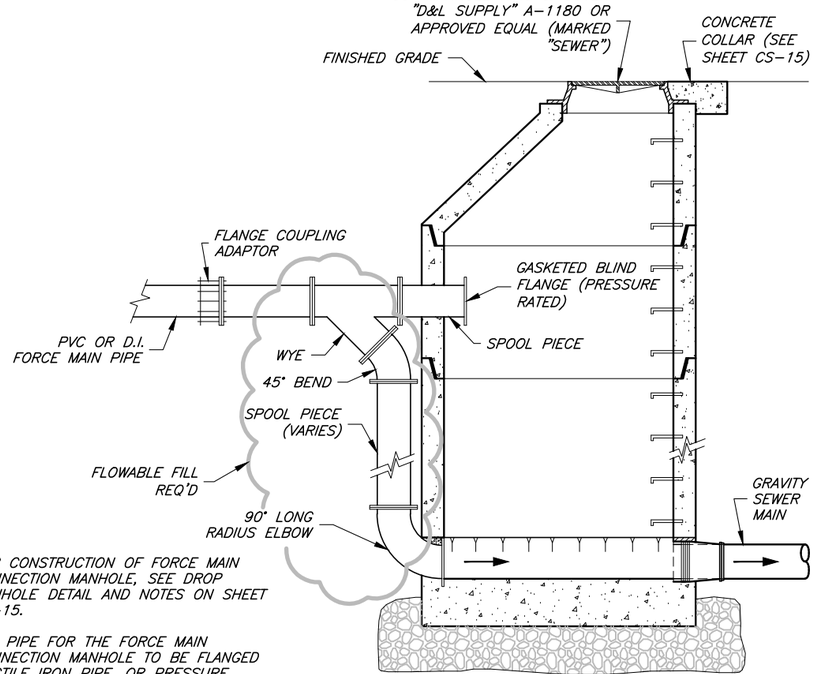
FORCE MAIN CLEANOUT MANHOLE

WHERE SPECIFIED BY THE WASTEWATER TREATMENT DIVISION



STANDARD SEWER FORCE MAIN CLEANOUT

4"ø TO 12"ø MAINS



NOTES:
B1. FOR CONSTRUCTION OF FORCE MAIN CONNECTION MANHOLE, SEE DROP MANHOLE DETAIL AND NOTES ON SHEET CS-15.

B2. ALL PIPE FOR THE FORCE MAIN CONNECTION MANHOLE TO BE FLANGED DUCTILE IRON PIPE, OR PRESSURE RATED PVC AS SPECIFIED BY A LICENSED PROFESSIONAL ENGINEER.

FORCE MAIN CONNECTION MANHOLE

FORCE MAIN CONNECTION TO GRAVITY SEWER SYSTEM

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

Brett M. Jones
CITY ENGINEER
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PERRY CITY — PUBLIC WORKS

PERRY CITY CORPORATION
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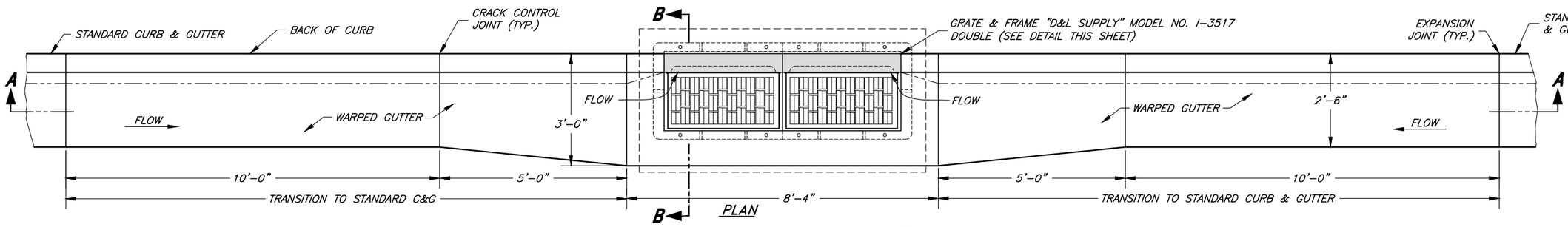
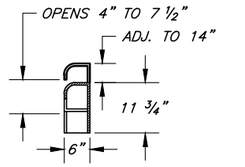
SANITARY SEWER - FORCE MAIN DETAILS

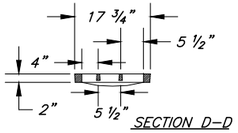
SHEET: CS-17
OF 1 SHEETS
0



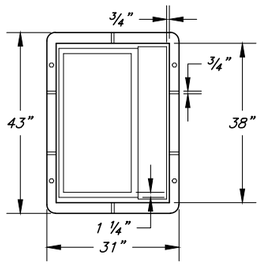
DOUBLE HOODED CATCH BASIN



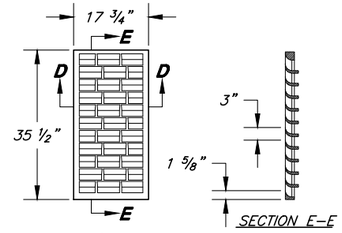
CURB HOOD (SIDE VIEW)



SECTION D-D

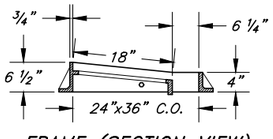


FRAME (TOP VIEW)

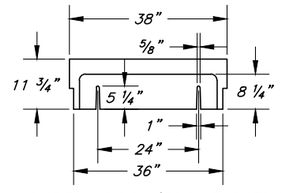


GRATE (TOP VIEW)

SECTION E-E



FRAME (SECTION VIEW)



CURB HOOD (FRONT VIEW)

FRAME, REINFORCED CURB HOOD, AND TYPE "L" GRATE

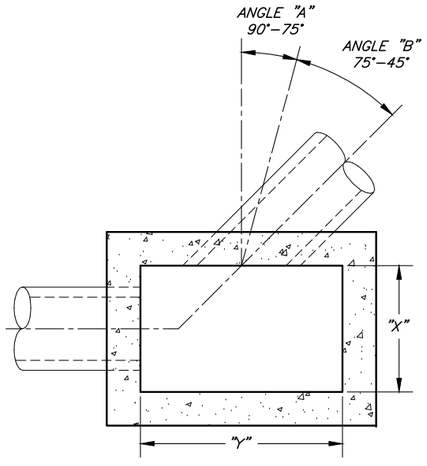
"D&L SUPPLY" I-3517

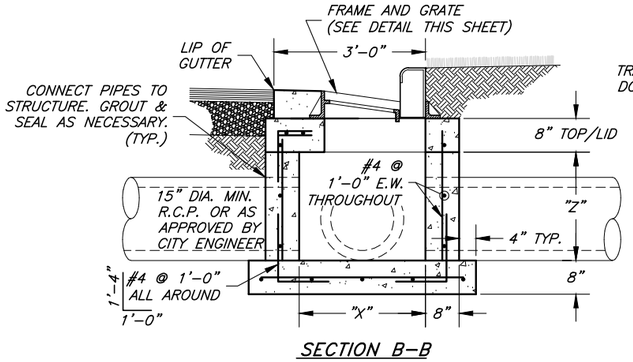
GENERAL NOTES:

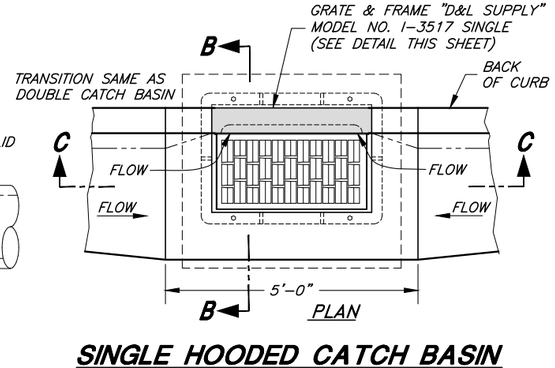
1. ALL CATCH BASIN BOX SIZES REFLECT DIMENSIONS FOR THE MINIMUM 15"ø PIPE SIZE. BOX DIMENSIONS MUST INCREASE PROPORTIONALLY TO ACCOMMODATE LARGER PIPE SIZES.
2. DEPTH MAY VARY FROM 6" TO 10" AS DIRECTED BY THE CITY ENGINEER.
3. CAST-IN-PLACE CONCRETE CATCH BASINS CAN BE REPLACED WITH PRECAST CONCRETE CATCH BASINS WITH HL-93 DECK LOADING AND COMPARABLE SIZE.
4. ALL BOXES SHALL BE FORMED ON THE INSIDE AND OUTSIDE OF THE BOX AND INSPECTED BY THE CITY PRIOR TO THE PLACING OF CONCRETE.
5. DOUBLE CATCH BASINS WILL BE REQUIRED IN LOCATIONS SPECIFIED BY THE CITY ENGINEER (TYPICALLY IN LOW SPOTS OR WHERE ADDITIONAL INLET CAPACITY IS NEEDED).
6. STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
7. ALTERNATE STRUCTURE (E.G. COMBO BOXES) MAY BE USED WITH APPROVAL OF THE CITY ENGINEER. STRUCTURES SHALL FOLLOW APWA STANDARD PLANS AND BE A COMMON SIZE.

HOODED CATCH BASIN DIMENSION TABLE

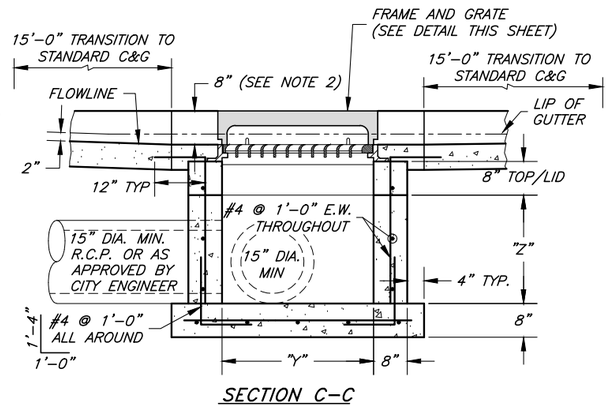
PIPE SIZE (IN.)	"X"	SINGLE CATCH BASIN "Y" (ANGLE A)	SINGLE CATCH BASIN "Y" (ANGLE B)	DOUBLE CATCH BASIN "Y" (ANGLE A)	DOUBLE CATCH BASIN "Y" (ANGLE B)	"Z" MIN.
15	2'-6"	3'-0"	3'-0"	6'-4"	6'-4"	2'-0"
18	2'-6"	3'-0"	4'-0"	6'-4"	6'-4"	2'-6"
21	4'-0"	4'-0"	4'-0"	6'-4"	6'-4"	3'-0"
24	4'-0"	4'-0"	5'-0"	6'-4"	6'-4"	3'-0"
30	4'-0"	4'-0"	6'-0"	6'-4"	6'-4"	3'-6"
36	4'-0"	5'-0"	6'-0"	6'-4"	6'-4"	4'-0"
42	6'-0"	6'-0"	7'-0"	6'-4"	8'-0"	5'-0"
48	6'-0"	6'-0"	8'-0"	6'-4"	8'-0"	5'-6"







SINGLE HOODED CATCH BASIN



REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

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PUBLIC WORKS DIRECTOR
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DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
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South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

STORM DRAIN - SINGLE AND DOUBLE CATCH BASIN DETAILS

SHEET: CS-18
OF 1 SHEETS
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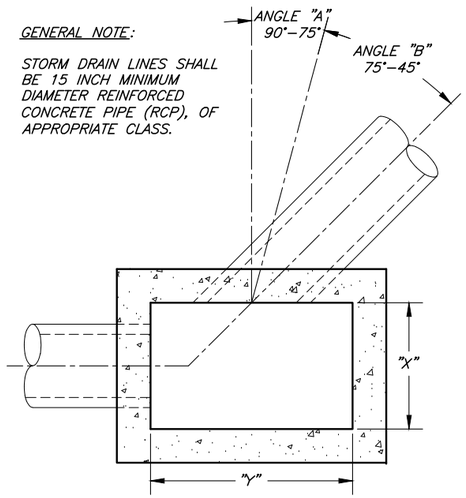
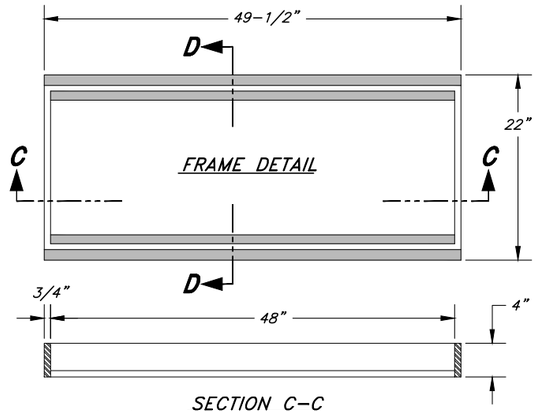
GENERAL NOTE:

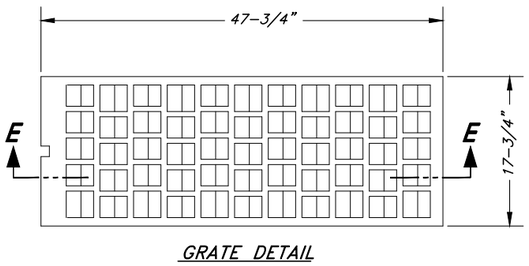
STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.



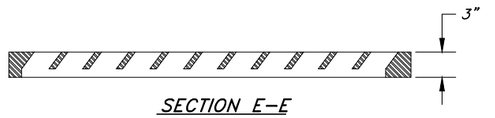
DRAINAGE DITCH INLET BOX DIMENSION TABLE				
PIPE SIZE (IN.)	"X"	INLET BOX "Y" (ANGLE A)	INLET BOX "Y" (ANGLE B)	"Z" MIN.
15	2'-6"	4'-0"	4'-0"	2'-0"
18	2'-6"	4'-0"	4'-0"	2'-6"
21	4'-0"	4'-0"	4'-0"	3'-0"
24	4'-0"	4'-0"	5'-0"	3'-0"
30	4'-0"	4'-0"	6'-0"	3'-6"
36	4'-0"	4'-0"	6'-0"	4'-0"
42	6'-0"	6'-0"	7'-0"	5'-0"
48	6'-0"	6'-0"	8'-0"	5'-6"



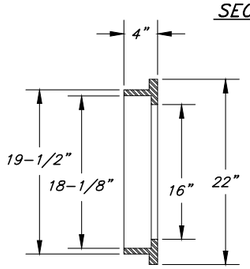
SECTION C-C



GRATE DETAIL



SECTION E-E



SECTION D-D

FRAME & GRATE DETAILS

FRAME AND GRATE NOTES:

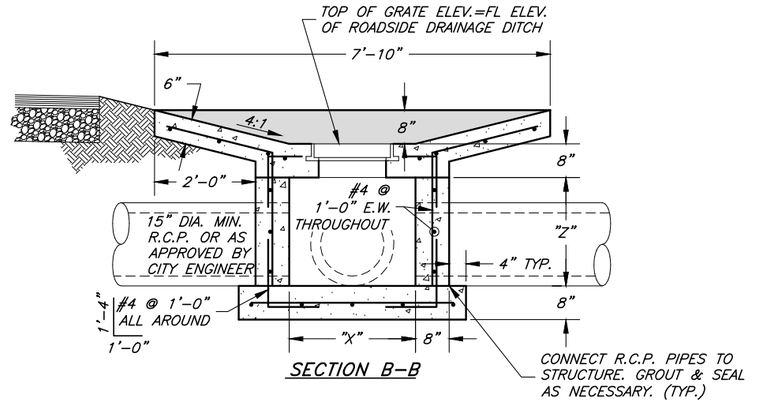
A1. GRATE AND FRAME SHALL BE AS MANUFACTURED BY "D&L SUPPLY" I-1803

B1. BICYCLE SAFE GRATE REQUIRED.

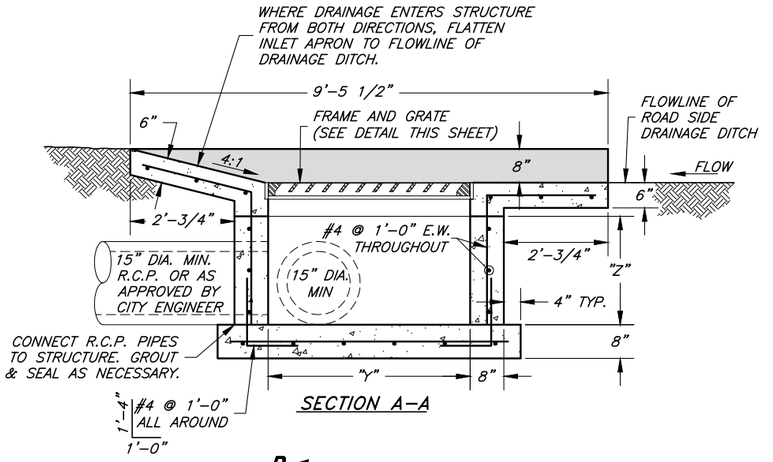
C1. "OR EQUAL" GRATES AND FRAMES WILL BE CONSIDERED AS APPROVED BY THE CITY ENGINEER.

INLET BOX NOTES:

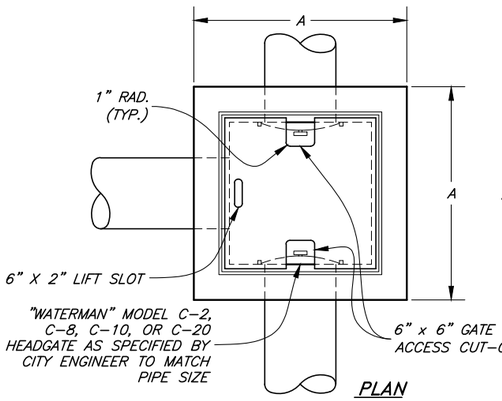
1. ALL BOX SIZES REFLECT DIMENSIONS FOR THE MINIMUM 15"ø PIPE SIZE. BOX DIMENSIONS MUST INCREASE PROPORTIONALLY TO ACCOMMODATE LARGER PIPE SIZES. (SEE TABLE THIS SHEET)
2. CAST-IN-PLACE CONCRETE STRUCTURES CAN BE REPLACED WITH PRECAST CONCRETE STRUCTURES WITH HL-93 DECK LOADING AND COMPARABLE SIZE.
3. ALL BOXES SHALL BE FORMED ON THE INSIDE AND OUTSIDE OF THE BOX AND INSPECTED BY THE CITY PRIOR TO THE PLACING OF CONCRETE.



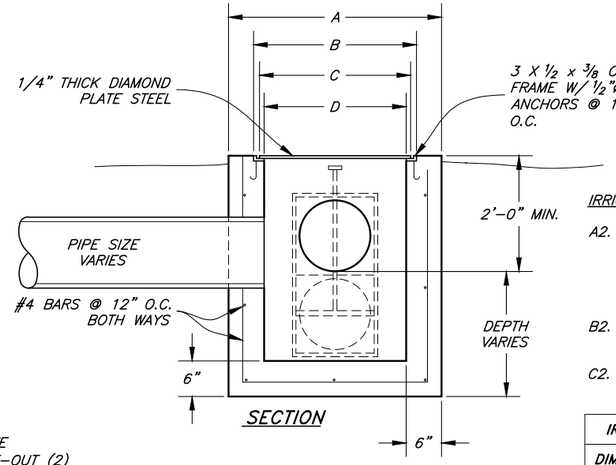
SECTION B-B



SECTION A-A



PLAN



SECTION

IRRIGATION BOX

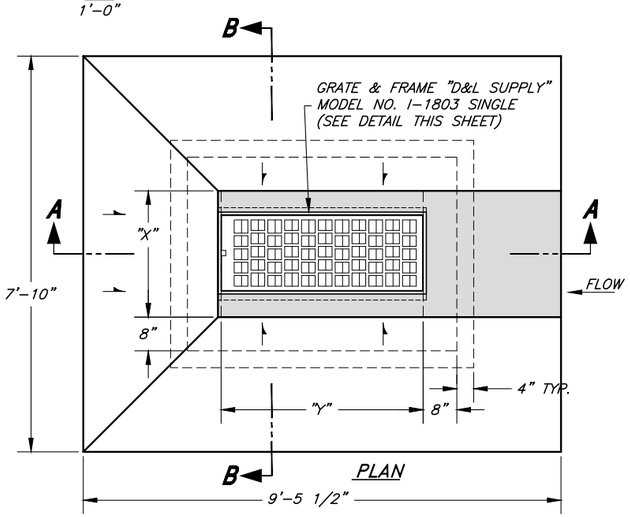
IRRIGATION BOX NOTES:

A2. A LARGER IRRIGATION BOX MAY BE REQUIRED BY THE DESIGN ENGINEER AFTER EVALUATION OF THE SIZE OF THE PIPES AND GATES TO BE ATTACHED OR CONNECTED TO THE STRUCTURE.

B2. PIPE MATERIALS & SIZE SHALL BE APPROVED BY IRRIGATION COMPANY.

C2. HORIZONTAL & VERTICAL ALIGNMENT TO BE APPROVED BY PERRY CITY .

IRRIGATION BOX DIMENSION TABLE		
DIMENSION	TYPE I	TYPE II
A	3'-0"	4'-0"
B	2'-1 1/2"	3'-1 1/2"
C	2'-1"	3'-1"
D	2'-0"	3'-0"



PLAN

DRAINAGE DITCH / PARKING LOT INLET BOX

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
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DATE

SCALE: N.T.S.

DESIGNED
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JA JONES & ASSOCIATES CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

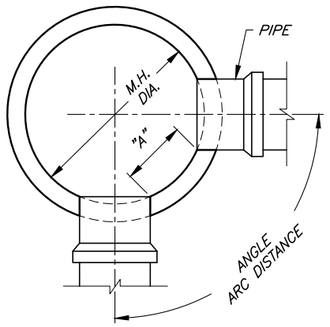
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
STORM DRAIN - DRAINAGE INLET BOX, GRATE AND FRAME, AND IRRIGATION BOX DETAILS

SHEET: CS-19
OF 1 SHEETS
0

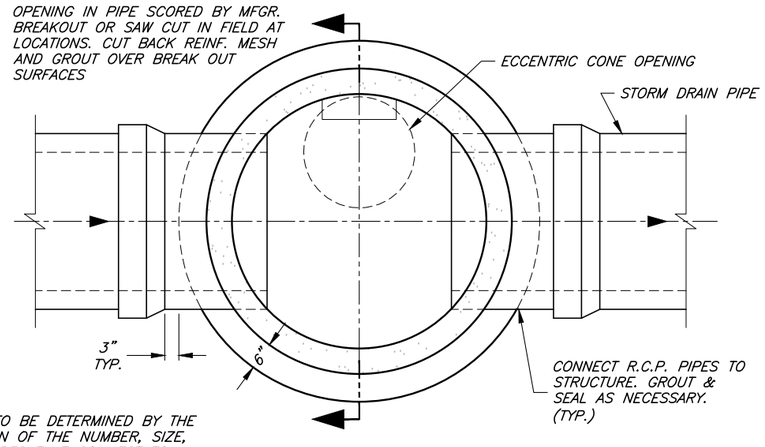
PIPE SIZES

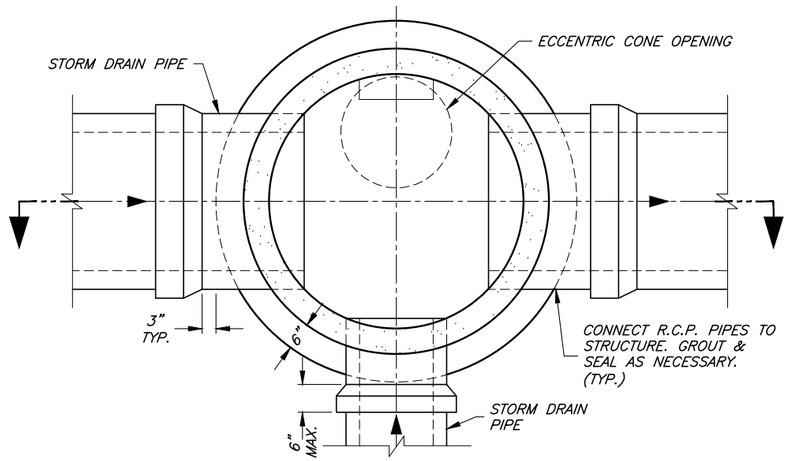
M.H. SIZE	IN-LINE M.H. 180°	JUNCTION MANHOLE (ANGLE / ARC DISTANCE)								
		90°	85°	80°	75°	70°	65°	60°	55°	50°	45°
4'ø M.H.	15"–24"	15"–18"	15"–18"	15"	15"	--	--	--	--	--	--
5'ø M.H.	27"–30"	21"–24"	21"–24"	18"–21"	18"–21"	15"–18"	15"–18"	15"	--	--	--
6'ø M.H.	36"–48"	27"–30"	27"–30"	24"–27"	24"	21"–24"	21"	18"	15"–18"	15"	--
7'ø M.H.	54"	36"	36"	30"	27"–30"	27"	24"	21"–24"	21"	18"	15"
8'ø M.H.	60"	42"	42"	36"	36"	30"	27"–30"	27"	24"	21"	18"



SIZING NOTES:

1. SUGGESTED "A" DISTANCE IS 6" OR GREATER FOR 48", 60" AND 72" DIAMETER MANHOLES
2. SUGGESTED "A" DISTANCE IS 8" OR GREATER FOR 84" AND 96" DIAMETER MANHOLES





GENERAL NOTES:

A. STORM DRAIN MANHOLE DIAMETER TO BE DETERMINED BY THE DESIGN ENGINEER AFTER EVALUATION OF THE NUMBER, SIZE, AND PIPE ENTRY ANGLE OF THE PIPES THAT CONNECT TO THE MANHOLE.

B. NO MORE THAN 12" OF GRADE RINGS TO BE ALLOWED ON ANY MANHOLE

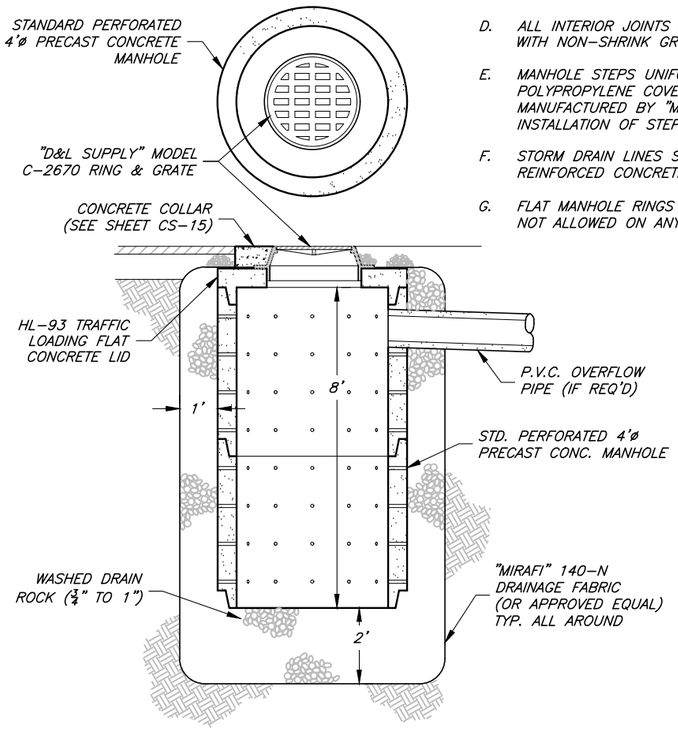
C. PLYWOOD COVERS SHALL BE USED AT MANHOLE FLOOR TO COVER FLOWLINE DURING CONSTRUCTION AND MAINTENANCE ACTIVITIES.

D. ALL INTERIOR JOINTS SHALL BE SMOOTH AND EVENLY GROUTED WITH NON-SHRINK GROUT MIX.

E. MANHOLE STEPS UNIFORMLY SPACED (1'-0" MAX.) POLYPROPYLENE COVERED STEEL STEPS, MODEL PSI-PF AS MANUFACTURED BY "M.A. INDUSTRIES" OR APPROVED EQUAL - INSTALLATION OF STEPS SHALL BE WATERPROOF.

F. STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.

G. FLAT MANHOLE RINGS & COVERS (SLAB CONSTRUCTION) ARE NOT ALLOWED ON ANY MANHOLE CONE SECTION.

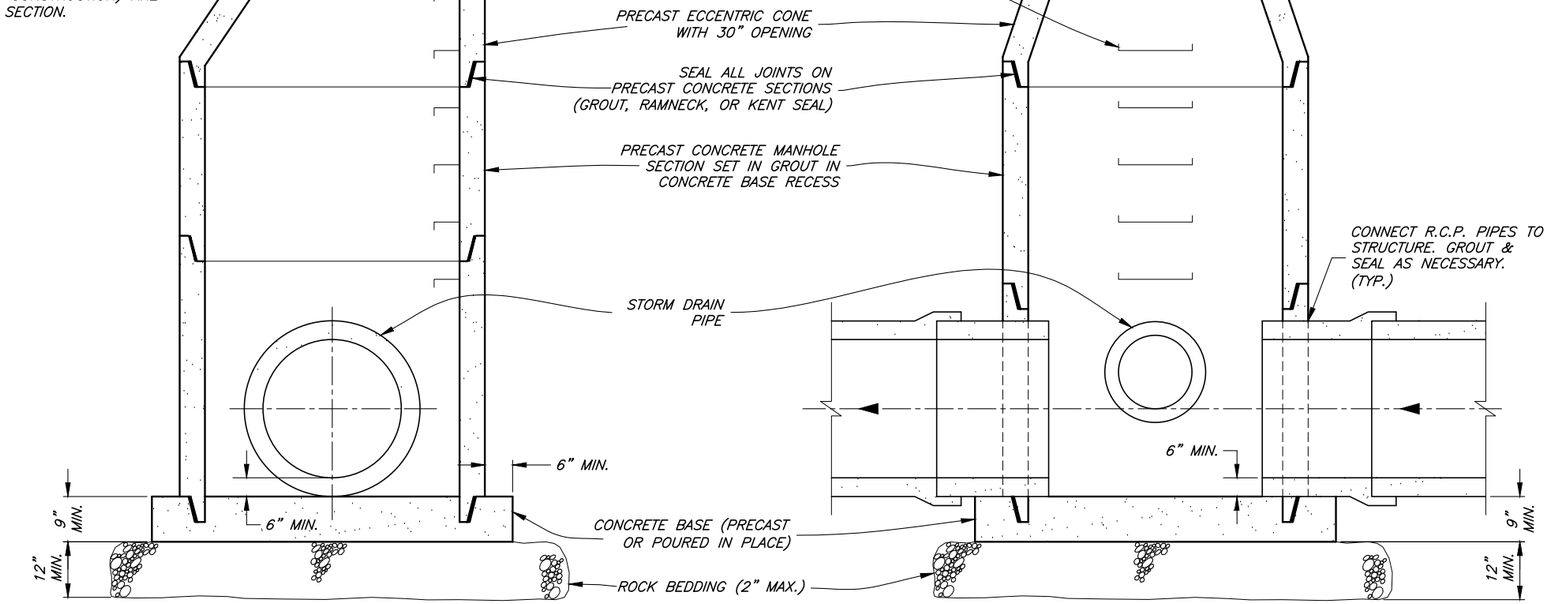


TYPICAL SUMP DETAIL

USE ONLY UPON APPROVAL FROM THE CITY ENGINEER

TYPICAL LINE MANHOLE

TYPICAL JUNCTION MANHOLE



REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

Brett M. Jones
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PERRY CITY — PUBLIC WORKS

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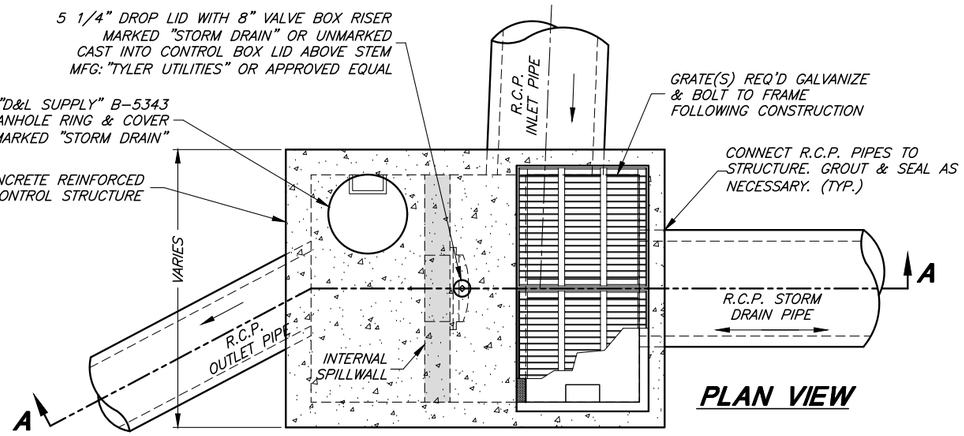
STORM DRAIN - TYPICAL MANHOLE AND SUMP DETAILS

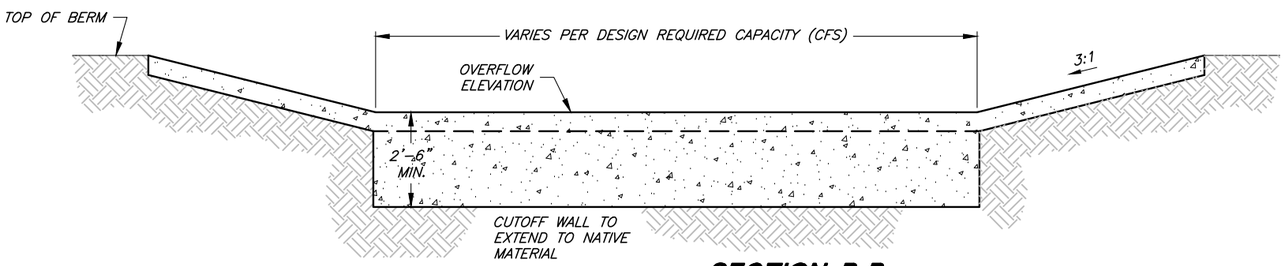
SHEET: CS-20
OF 1 SHEETS
0



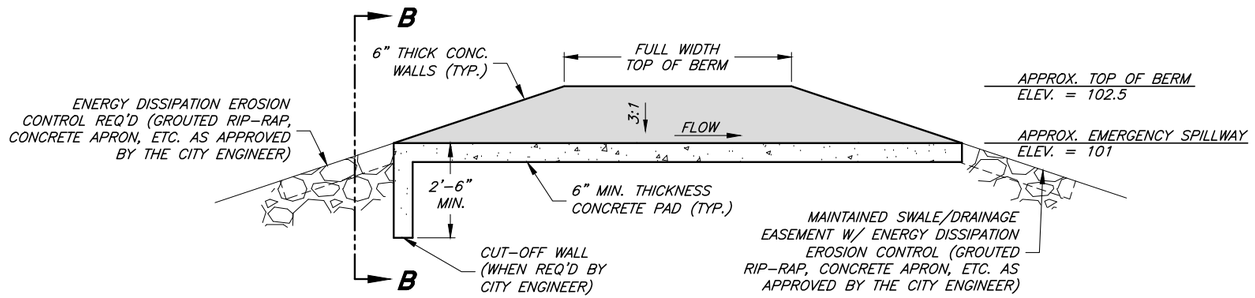
PLAN VIEW

DETENTION INLET/OUTLET CONTROL STRUCTURE

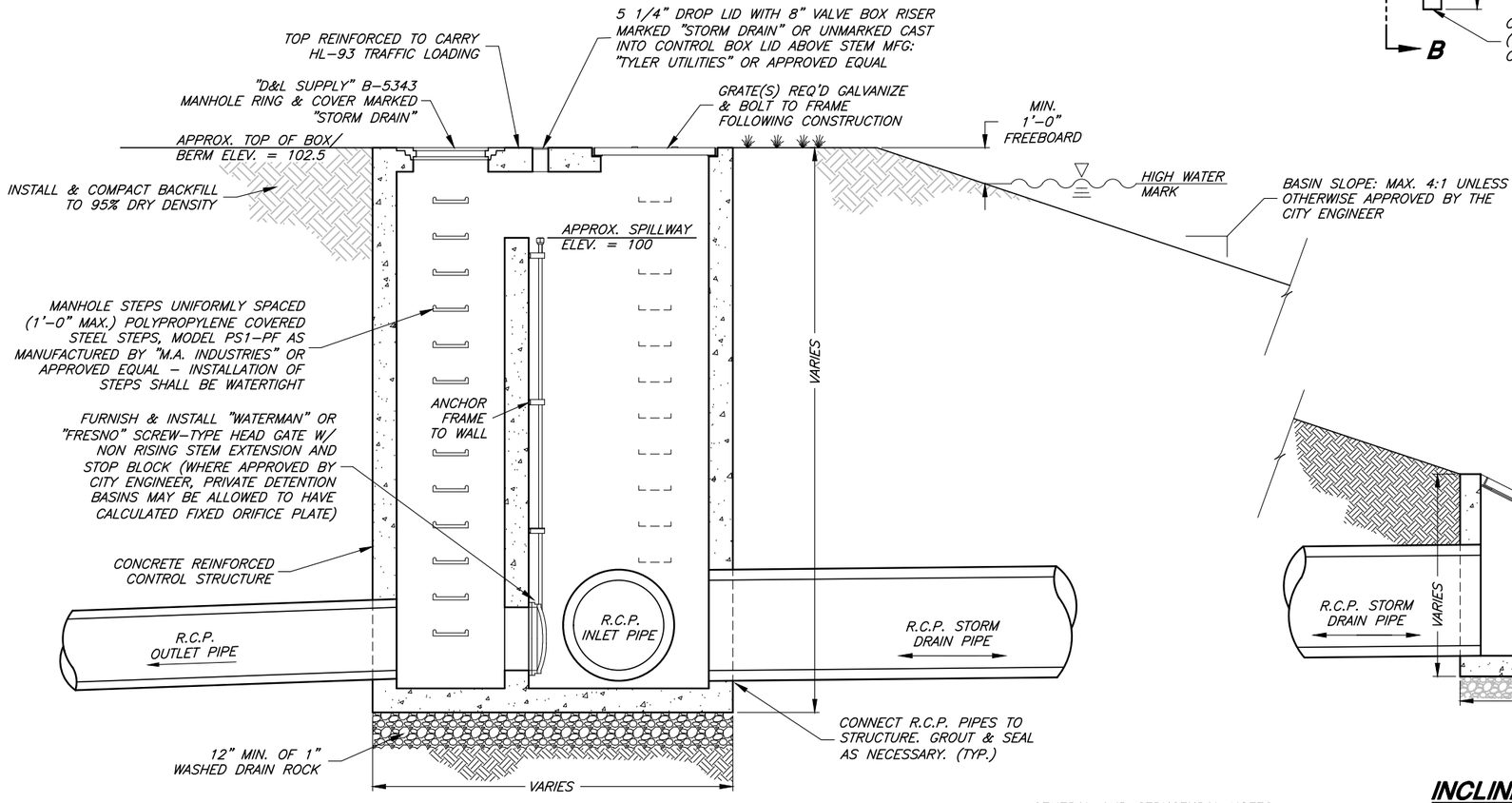
(PRECAST OR CAST-IN-PLACE)



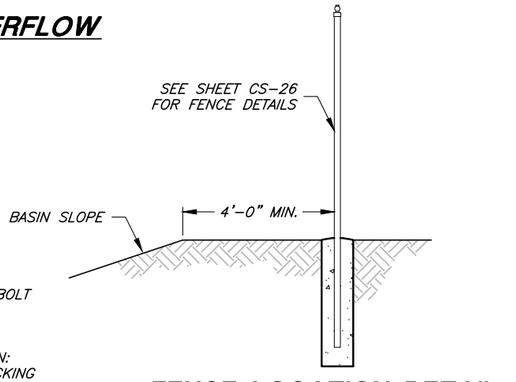
SECTION B-B



EMERGENCY OVERFLOW

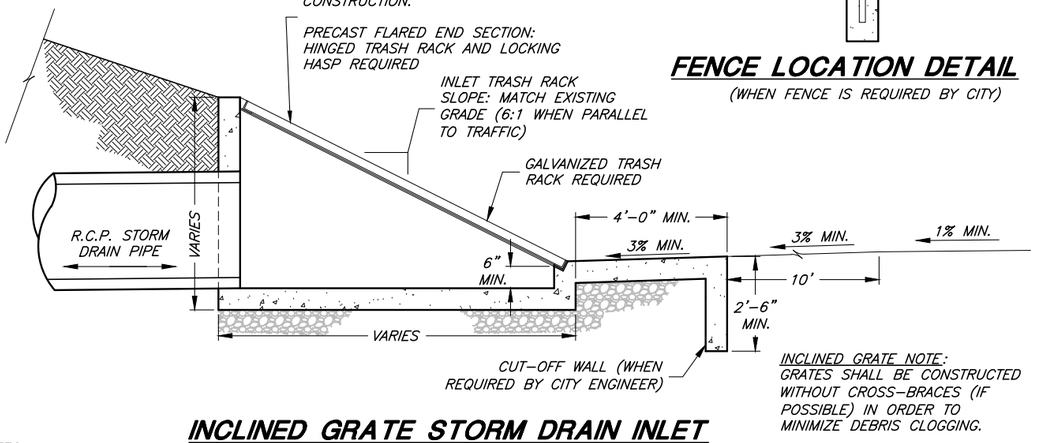


SECTION A-A



FENCE LOCATION DETAIL

(WHEN FENCE IS REQUIRED BY CITY)



INCLINED GRATE STORM DRAIN INLET

**INCLINED GRATES ARE REQ'D ON ALL PIPES/INLETS WHERE OPEN CHANNELS, DITCHES, OR PONDS DISCHARGE DIRECTLY INTO THE STORM DRAIN SYSTEM.

INCLINED GRATE NOTE: GRATES SHALL BE CONSTRUCTED WITHOUT CROSS-BRACES (IF POSSIBLE) IN ORDER TO MINIMIZE DEBRIS CLOGGING.

GENERAL AND STRUCTURAL NOTES: SEE SHEET CS-22

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

CITY ENGINEER — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

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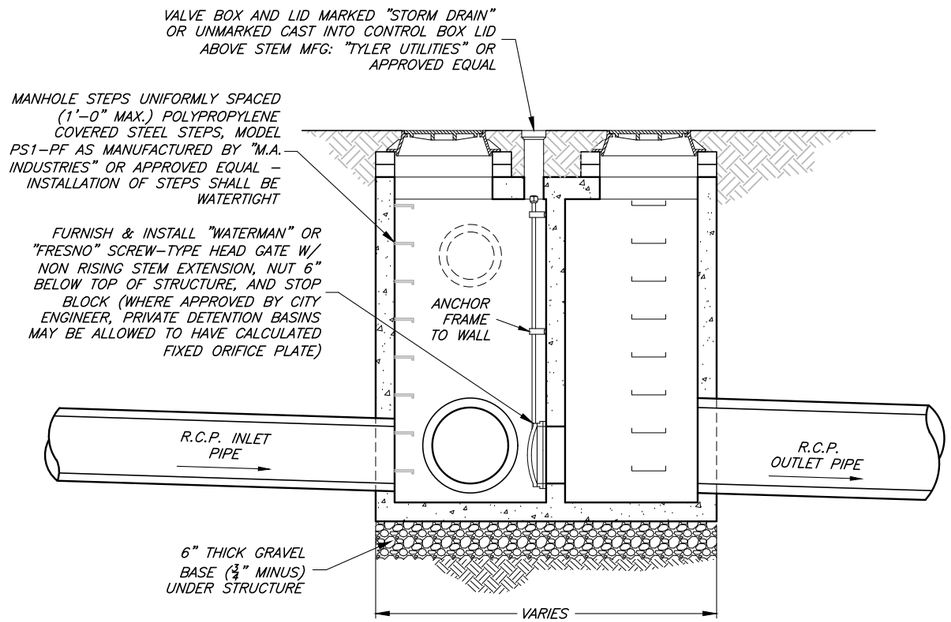
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

STORM DRAIN - LARGE DETENTION BASIN DETAILS

SHEET: CS-21
OF 1 SHEETS
0



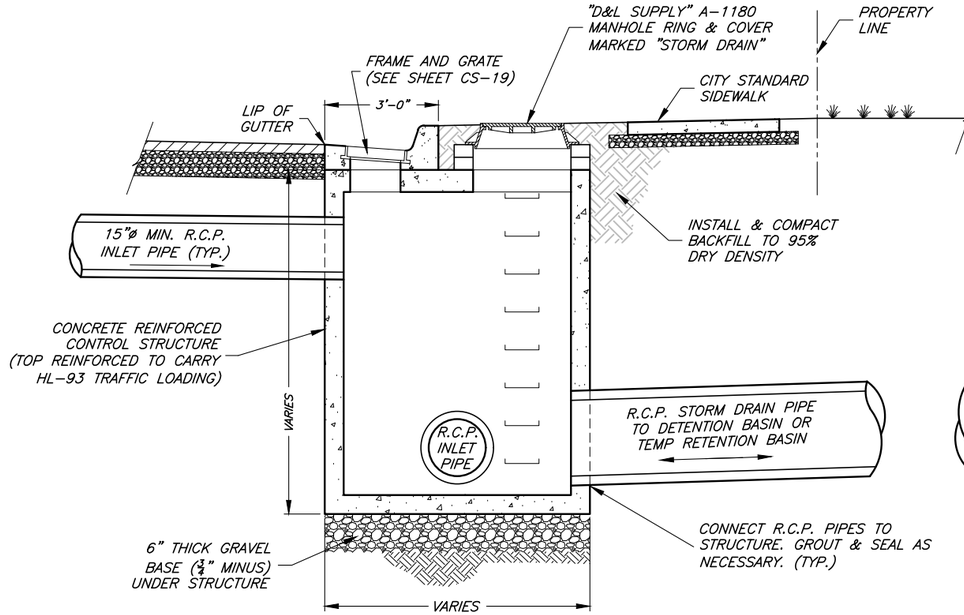
SECTION B-B

GENERAL NOTES:

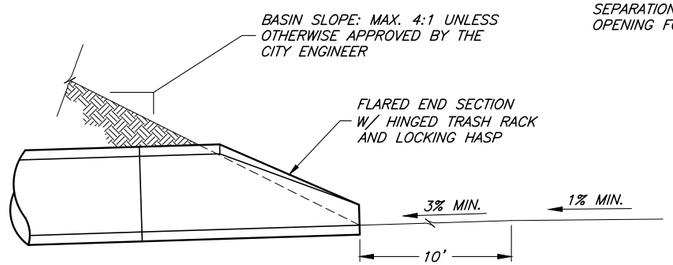
1. ALL BASINS REGARDLESS OF LOCAL OR REGIONAL SHALL BE DESIGNED TO ACCOMMODATE A 100 YEAR STORM EVENT.
2. A DAM SAFETY (UTAH DIVISION OF WATER RIGHTS) HAZARD PERMIT MAY BE REQUIRED.
3. STRUCTURE DESIGN AND FLOW CALCULATIONS MUST BE APPROVED BY CITY ENGINEER PRIOR TO CONSTRUCTION.
4. STORM DRAIN LINES SHALL BE 15 INCH MINIMUM DIAMETER REINFORCED CONCRETE PIPE (RCP), OF APPROPRIATE CLASS.
5. THE SURFACE AREA OF THE BASIN SHALL BE SODDED AND SHALL BE PROVIDED WITH AN AUTOMATED SPRINKLER SYSTEM APPROVED BY THE CITY ENGINEER.
6. GRATES SHALL BE REMOVABLE FOR MAINTENANCE PURPOSES
7. GRATES SHALL BE HOT DIPPED GALVANIZED WITH BARS AT MAXIMUM 3 INCH SPACING.
8. LOW FLOWS MUST BE PIPED CONTINUOUSLY TO THE CONTROL STRUCTURE. NO OPEN FLOW IS PERMITTED THROUGH THE BASIN.
9. INCLINED GRATES ARE REQUIRED ON ALL PIPES/INLETS WHERE OPEN CHANNELS, DITCHES, OR PONDS DISCHARGE DIRECTLY INTO THE STORM DRAIN SYSTEM.
10. AN INTERNAL SPILLWAY MAY BE CONSTRUCTED INSIDE THE STRUCTURE DEPENDING ON SITE CONDITIONS AND ELEVATIONS.
11. BASIN STRUCTURES ARE DETERMINED BY THE SIZE OF THE DETENTION BASIN OR AS REQUIRED BY THE CITY ENGINEER. (SEE SHEET CS-21 OR CS-22)
    a. SMALL DETENTION BASIN: LESS THAN OR EQUAL TO 1 ACRE FOOT
    b. LARGE DETENTION BASIN: GREATER THAN 1 ACRE FOOT

STRUCTURAL NOTES:

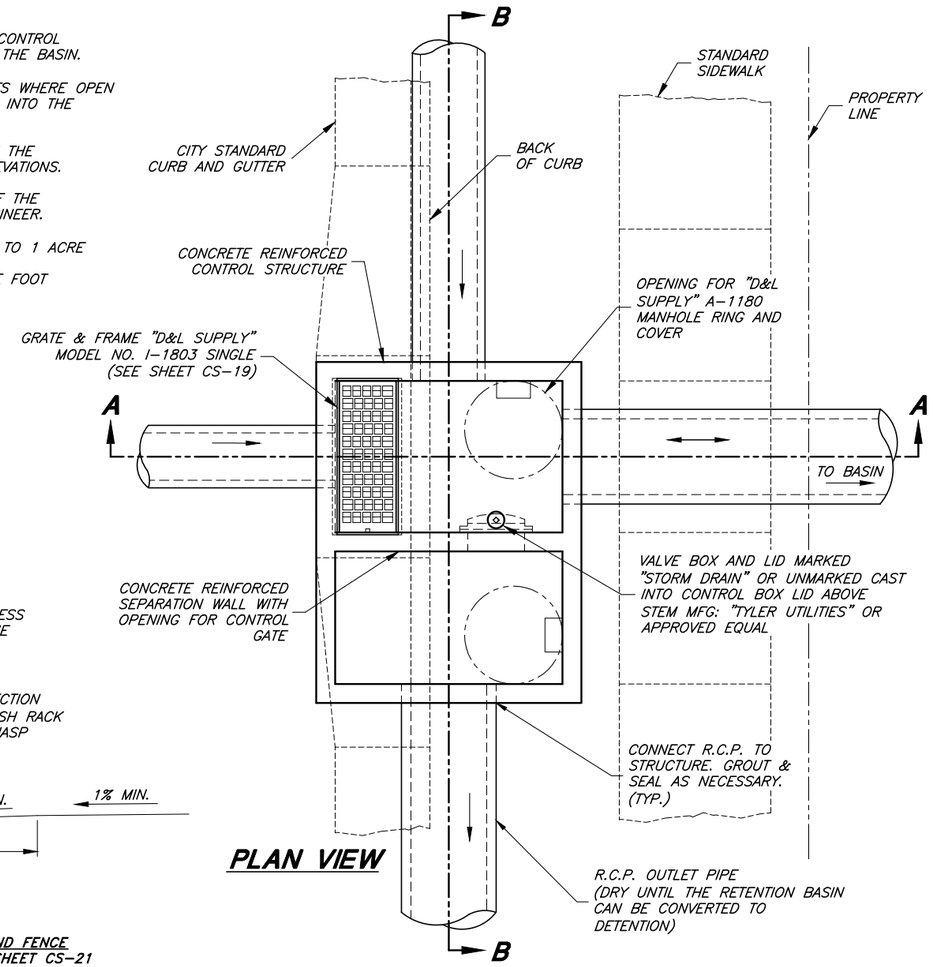
A. PRECAST CONCRETE STRUCTURE CAN BE REPLACED WITH CAST-IN-PLACE CONCRETE VAULT. SUBMIT ENGINEERED CONSTRUCTION PLANS WITH REBAR DETAILS TO CITY ENGINEER FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.
B. ADD REINFORCEMENT AROUND OPENINGS EQUAL TO REINFORCEMENT DISPLACED BY OPENING.
C. THE PRECAST VAULT MANUFACTURER IS RESPONSIBLE FOR DESIGN RELATED TO TRAFFIC LOADING AND THRUST. VERIFICATION OF PROPER DESIGN MUST BE PROVIDED TO THE CITY BY THE DEVELOPER, CONTRACTOR, OR PROPERTY OWNER AS THE CASE MAY BE.
D. REINFORCEMENT TO CONFORM WITH ASTM A 615 GRADE 60
E. CONCRETE SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 5,000 PSI
F. USE AN AIR-ENTRAINING AGENT ON ALL CONCRETE EXPOSED TO THE WEATHER.
G. HL-93 LOADING



SECTION A-A



EMERGENCY OVERFLOW AND FENCE LOCATION DETAIL : SEE SHEET CS-21



PLAN VIEW

INLET/OUTLET CONTROL STRUCTURE

(PRECAST OR CAST-IN-PLACE)

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

CITY ENGINEER — Brett M. Jones — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

SCALE: N.T.S.

DESIGNED _____
DRAWN _____
CHECKED _____

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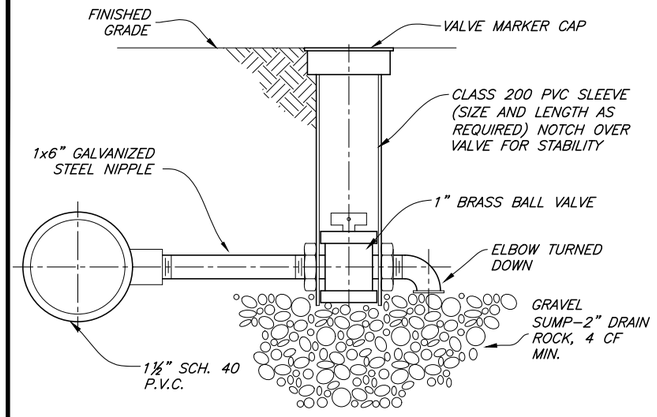
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY — PUBLIC WORKS

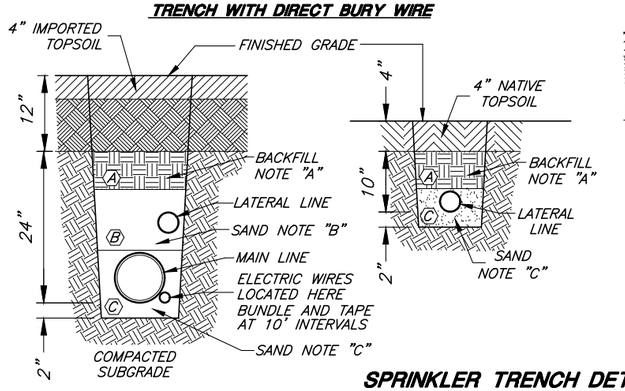
PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

STORM DRAIN - SMALL DETENTION BASIN DETAILS

SHEET: CS-22
OF 1 SHEETS
0

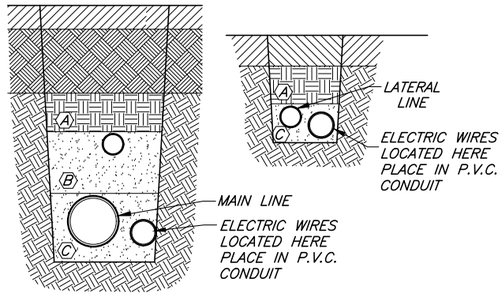


MANUAL DRAIN VALVE



TRENCH WITH DIRECT BURY WIRE

TRENCH WITH ELECTRICAL CONDUIT



TRENCH NOTES:

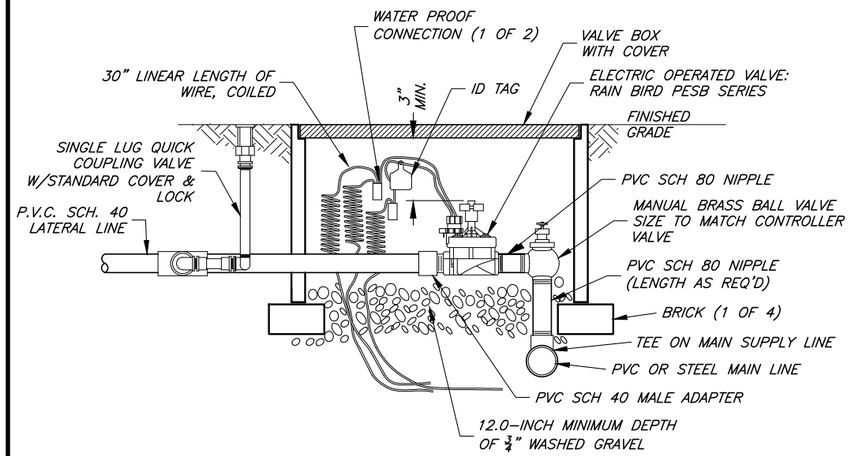
Ⓐ USE EXCAVATED TRENCH MATERIAL NOT TO EXCEED 2" DIA, ROCKS.

Ⓑ IN CASES WHERE LATERAL LINE IS INSTALLED IN MAINLINE TRENCH, USE SAND TO BACKFILL TRENCH SO THAT LATERAL LINE IS 14" BELOW FINISHED GRADE & COVERED W/ SAND.

Ⓒ USE SAND TO PROVIDE A 2" BED AND COVER ALL P.V.C. PIPES AND ELECTRICAL WIRES. IN CASES WHEN NATIVE MATERIAL IS NOT ACCEPTABLE AS BACKFILL.

GEN. NOTE:
LOCATE ALL TRENCHES 12" AWAY FROM BUILDINGS, SIDEWALKS, OR ANY HARD SURFACE. SETTLE ALL TRENCHES W/ WATER PRIOR TO FINE GRADING AND RAKING OF TOPSOIL. MAIN LINES RUNNING IN SAME TRENCH SHOULD BE SIDE BY SIDE WITH A MINIMUM DISTANCE OF 6" APART.

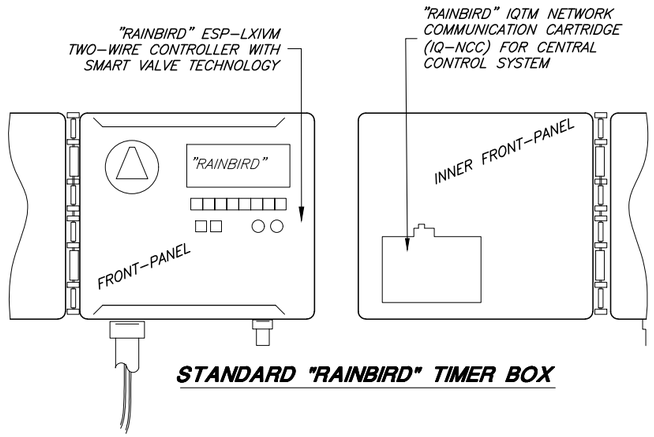
SPRINKLER TRENCH DETAILS



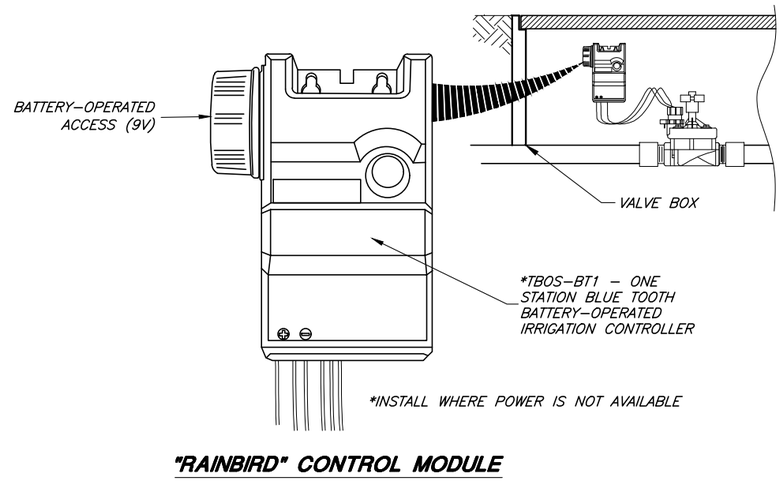
CONTROL VALVE STATION

SPRINKLER NOTES:

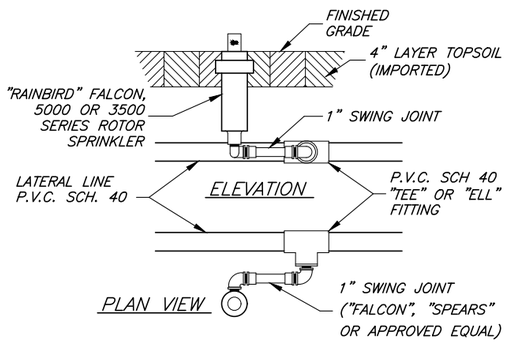
1. INSTALL ALL WIRING ACCORDING TO LOCAL CODES. ALL WIRES ABOVE FINISHED GRADE TO BE INSTALLED IN METAL CONDUITS.
2. SPACE SPRINKLER HEADS AT A MAXIMUM OF 95% OF COVERAGE DISTANCE.



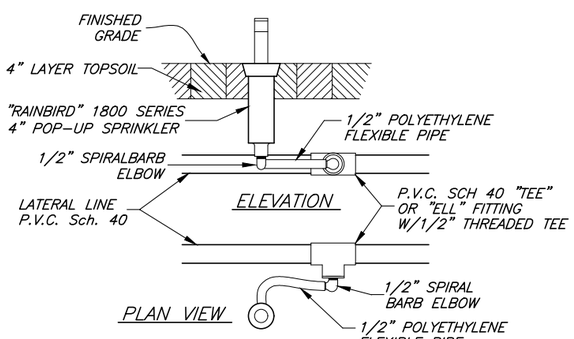
STANDARD "RAINBIRD" TIMER BOX



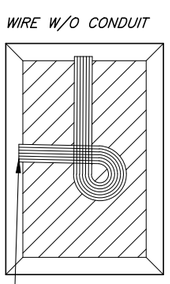
"RAINBIRD" CONTROL MODULE



ROTOR HEAD CONNECTION DETAIL



1800 SERIES HEAD CONNECTION DETAIL



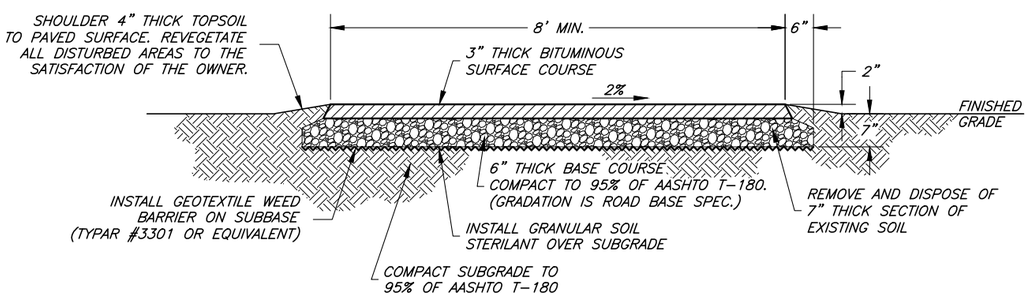
TRAIL NOTES:

A1. TRAILS SHOULD BE DESIGNED AND CONSTRUCTED AT GRADES LESS THAN 8% GRADE TO PROMOTE ACCESSIBLE USE.

B1. GRADE AVERAGES OF LESS THAN 6% WILL PROVIDE THE MOST USER FRIENDLY EXPERIENCE AND ARE PREFERRED.

C1. WHERE POSSIBLE A SLIGHT MEANDERING ALIGNMENT SHOULD BE USED.

D1. WHERE REQUIRED BENCHES SHOULD BE SPACED APPROXIMATELY EVERY ¼ MILE



8' ASPHALT TRAIL CROSS SECTION

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

CITY ENGINEER — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

SCALE: N.T.S.

DESIGNED ____ DRAWN ____ CHECKED ____

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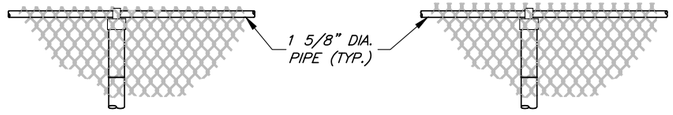
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION

PUBLIC WORKS STANDARDS

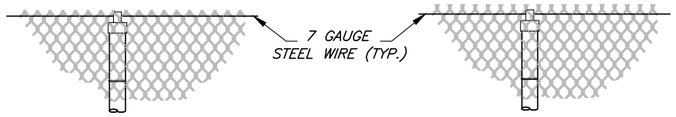
GENERAL - MUNICIPAL SPRINKLER IRRIGATION & TRAIL SECTION DETAILS

SHEET: CS-23 — OF 1 SHEETS — 0



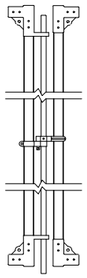
KNUCKLED SELVAGE
TYPE I

TWISTED & BARBED SELVAGE
TYPE II

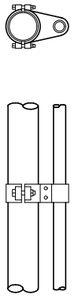


KNUCKLED SELVAGE
W/ TENSION WIRE
TYPE III

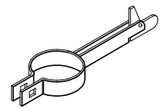
TWISTED & BARBED
SELVAGE W/ TENSION WIRE
TYPE IV



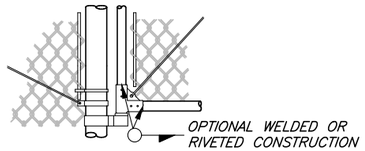
DROP ROD
ASSEMBLY



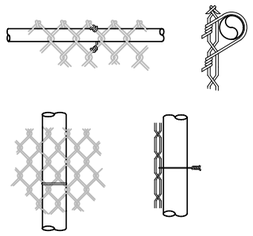
TOP GATE HINGE



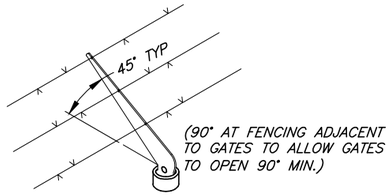
GATE KEEPER



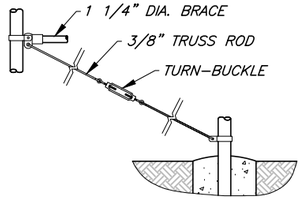
BOTTOM GATE HINGE
AND GATE DETAIL



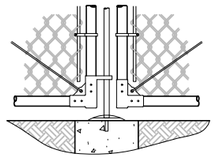
PIPE POST TIE



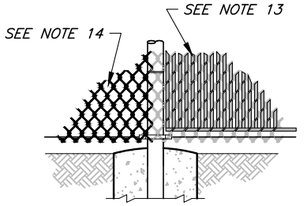
COMBINATION CAP AND
BARBED WIRE SUPPORTING ARM



BRACE & TRUSS CONNECTIONS



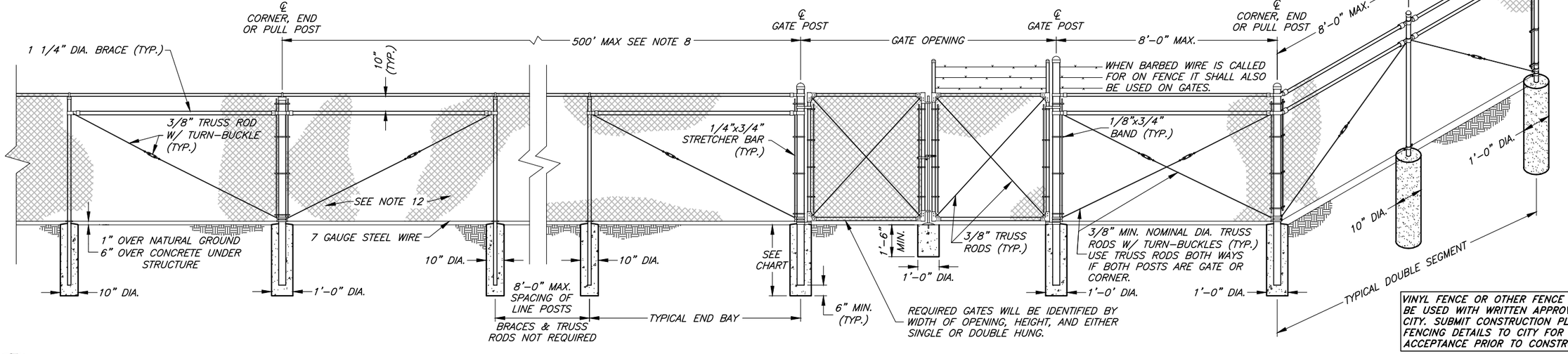
CENTER GATE STOP
AND GATE DETAIL



SLATS & VINYL
COATING DETAIL

HEIGHT	GATE OPENING	GATE POST	GATE FRAME
UNDER 6 FEET	SINGLE TO 6' OR DOUBLE TO 12'	2"	1"
	SINGLE OVER 6' TO 8' OR DOUBLE OVER 12' TO 16'	2 1/2"	1 1/2"
	SINGLE OVER 8' TO 12' OR DOUBLE 16' TO 24'	4"	
6 FEET AND OVER	SINGLE TO 6' OR DOUBLE TO 12'	3 1/2"	1 1/2"
	SINGLE OVER 6' TO 12' OR DOUBLE OVER 12' TO 24'	4"	
	SINGLE OVER 12' TO 18' OR DOUBLE OVER 24' TO 36'	6"	
	SINGLE OVER 18' OR DOUBLE OVER 36'	8"	

HEIGHT OF FABRIC	DEPTH OF POSTS	LENGTH OF END, CORNER OR PULL POST	LENGTH OF LINE POST	SIZE OF POSTS	
				END, CORNER, & PULL POSTS	LINE POST
				NOM. SIZE	NOM. SIZE
7'	3'	10'	9'-8"	2 1/2"	2"
6'	3'	9'	8'-8"	2 1/2"	2"
5'	3'	8'	7'-8"	2"	1 1/2"
4'	3'	6'	5'-8"	2"	1 1/2"
3'	3'	5'	4'-8"	2"	1 1/2"



GENERAL NOTES:

1. MATERIALS, CONSTRUCTION, AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH PROJECT STANDARD SPECIFICATIONS.
2. THE TYPE OF TOP SUPPORT IS SPECIFIED IN THE BIDDING SCHEDULE, TYPES I AND II TUBULAR RAIL, TYPES III AND IV TENSION WIRE.
3. BARB WIRE SHALL BE USED ONLY WHEN DESIGNATED ON THE PLANS OR IN THE SPECIFICATIONS.
4. TWISTED AND BARBED SELVAGE TOP AND BOTTOM SHALL BE USED ON FENCES 5-FEET HIGH OR GREATER.
5. KNUCKLED SELVAGE ON TOP AND TWISTED AND BARBED ON BOTTOM SHALL BE USED ON FENCES LESS THAN 5-FEET.
6. ALL STEEL PIPE MEMBERS SHALL CONFORM TO ASTM A53 HOT DIPPED ZINC COATED HIGH TENSILE STEEL PIPE.
7. POSTS SHALL BE SCHEDULE 40 PIPE.
8. LINE POSTS SHALL BE LOCATED AT EQUAL SPACING FOR EACH SEGMENT WITH A MAXIMUM SPACING AS FOLLOWS:

a.	TANGENT SECTIONS TO 500-FOOT RADIUS NOT MORE THAN 8-FEET.
b.	UNDER 500-FOOT RADIUS TO 200-FOOT RADIUS NOT MORE THAN 8-FEET.
c.	UNDER 200-FOOT RADIUS TO 100-FOOT RADIUS NOT MORE THAN 6-FEET.
d.	UNDER 100-FOOT RADIUS NOT MORE THAN 5-FEET.

9. TRUSS RODS AND BRACES SHALL NOT BE REQUIRED FOR FABRIC HEIGHT LESS THAN 5-FEET.
10. TENSION WIRE SHALL BE 7 GAUGE ZINC- OR ALUMINUM-COATED COIL SPRING STEEL TENSION WIRE.
11. ALL POSTS SHALL BE SET IN 3000 PSI CONCRETE AND SHALL BE TOPPED WITH BALL TYPE OR OTHER APPROVED ORNAMENT.
12. ALL FABRIC SHALL BE 2" GALVANIZED 9 GAUGE MESH.
13. VERTICAL SEMI-PRIVACY VINYL SLATS WITH BOTTOM-LOCKING SLAT, WHEN REQUIRED BY THE CITY. COLOR AS APPROVED BY THE CITY.
14. VINYL COATED CHAINLINK FENCING WHEN REQUIRED BY THE CITY. COLOR AS APPROVED BY THE CITY.
15. ALL FENCING SHALL CONFORM TO LOCATION AND HEIGHT LIMITATIONS AS STATED IN PERRY CITY FENCING ORDINANCE.

VINYL FENCE OR OTHER FENCE STYLES MAY BE USED WITH WRITTEN APPROVAL BY THE CITY. SUBMIT CONSTRUCTION PLANS AND FENCING DETAILS TO CITY FOR REVIEW AND ACCEPTANCE PRIOR TO CONSTRUCTION.

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED
PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

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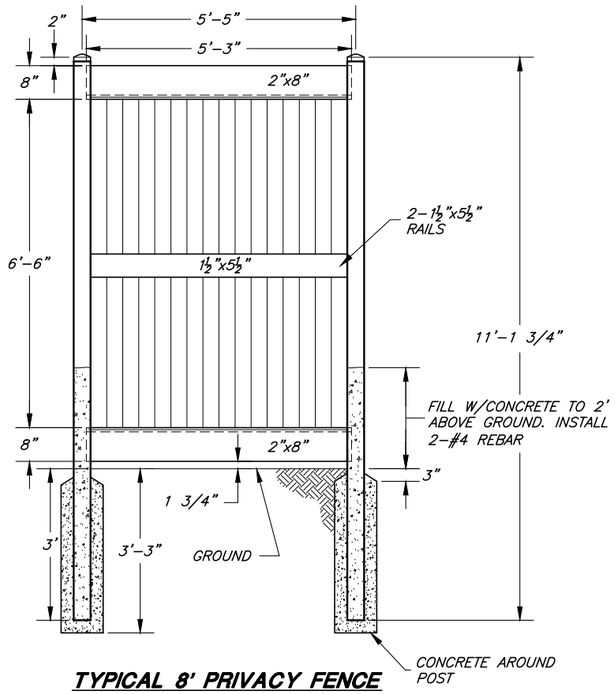
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

GENERAL - CHAIN LINK FENCE DETAILS

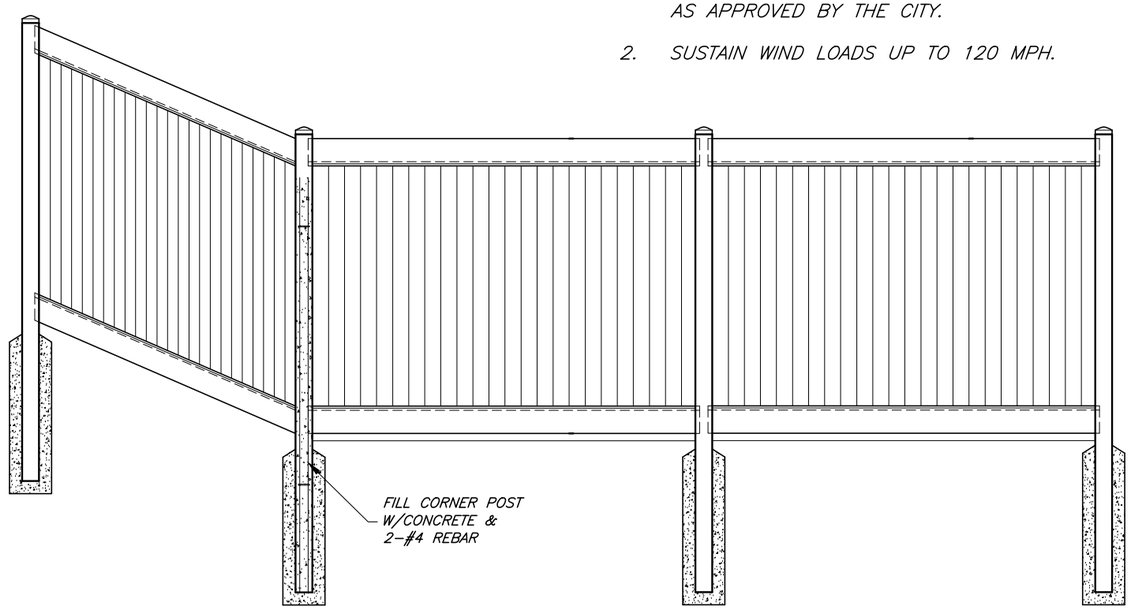
SHEET: CS-24
OF 1 SHEETS
0



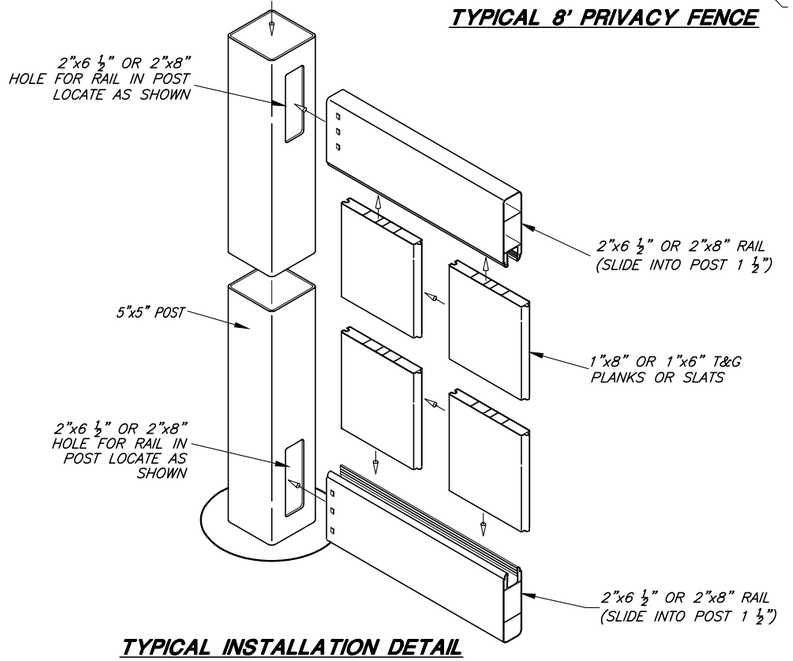
TYPICAL 8' PRIVACY FENCE

VINYL FENCE NOTES:

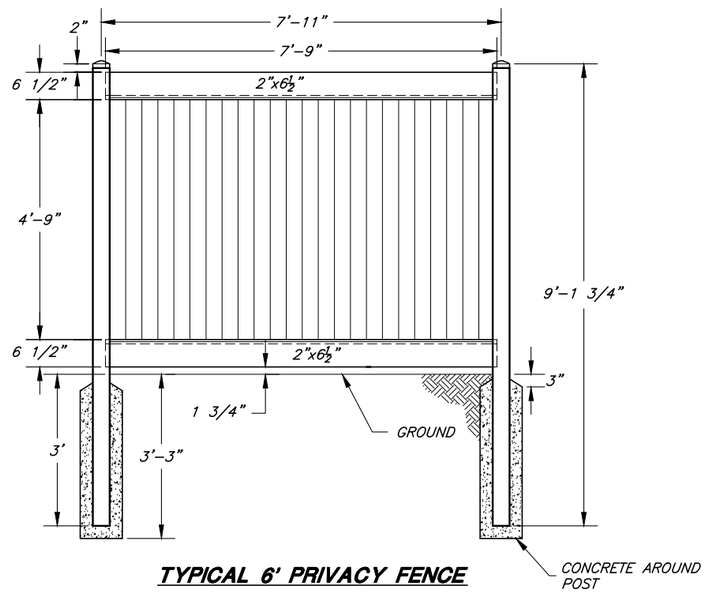
1. OTHER VINYL FENCE STYLES & DIMENSIONS AS APPROVED BY THE CITY.
2. SUSTAIN WIND LOADS UP TO 120 MPH.



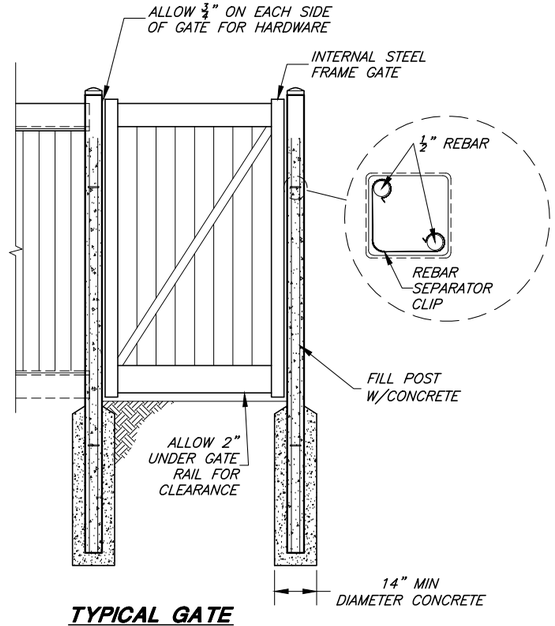
CORNER POST DETAIL



TYPICAL INSTALLATION DETAIL



TYPICAL 6' PRIVACY FENCE



TYPICAL GATE

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

CITY ENGINEER — 09/01/2021 DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

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PERRY CITY PUBLIC WORKS

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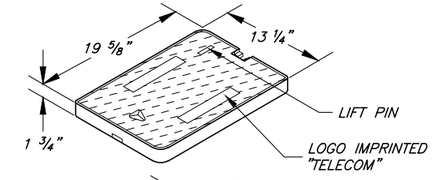
PUBLIC WORKS STANDARDS

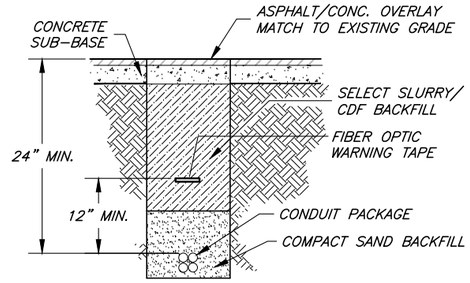
GENERAL - VINYL FENCE DETAILS

SHEET: CS-25 OF 1 SHEETS
0

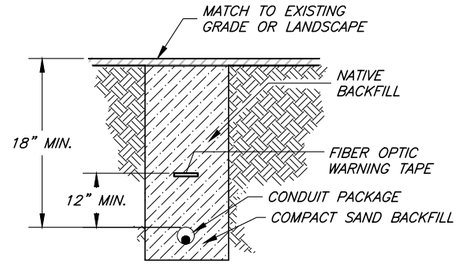


BASE OUTER DIMENSIONS: 20" X 26"
LOAD: STATIC, 2,500 LBS

TYPICAL FIBER OPTIC SERVICE BOX

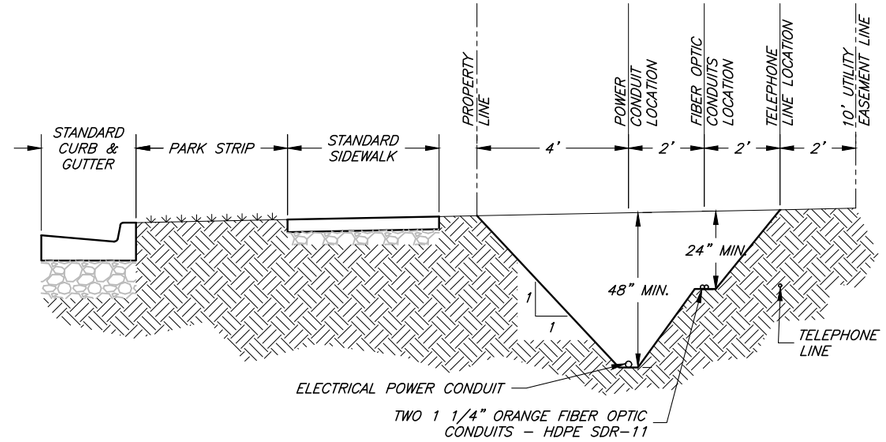


TYPICAL FIBER OPTIC TRENCH

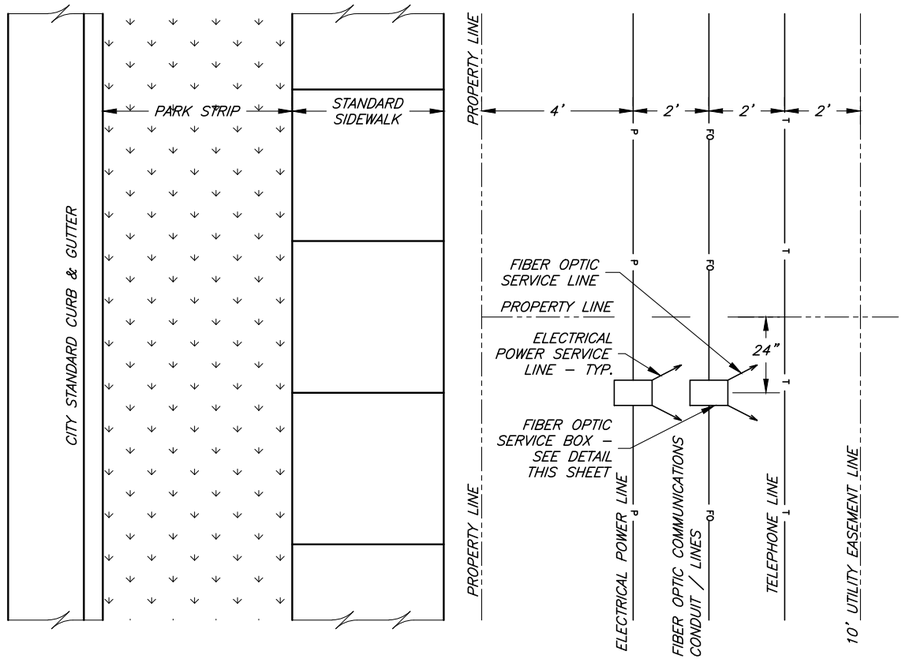


TYPICAL BUILDING/ SUBSCRIBER LATERAL

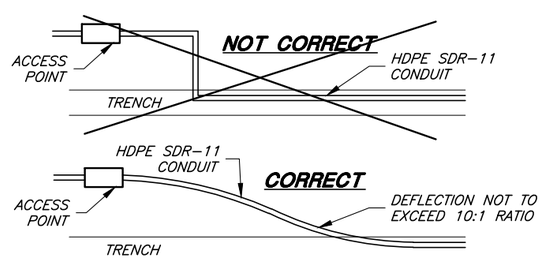
TYPICAL CONDUIT LOCATION NEAR EXISTING UTILITIES



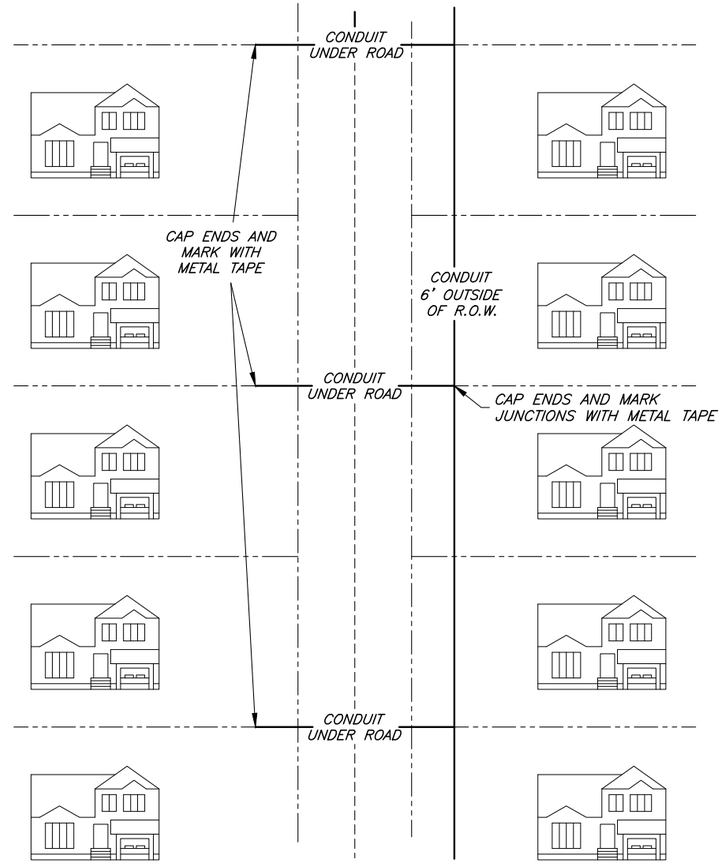
TYPICAL NEW UTILITY LOCATION TRENCH SECTION



TYPICAL FIBER OPTIC LINE LOCATION DETAIL



CONDUIT BENDS



TYPICAL STREET LAYOUT FOR CONDUIT PLACEMENT

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
DATE

APPROVED

PUBLIC WORKS DIRECTOR
09/01/2021
DATE

SCALE: N.T.S.

DESIGNED
DRAWN
CHECKED

JA JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
GENERAL - STANDARD FIBER OPTIC COMMUNICATION LINE DETAILS

SHEET: CS-26
OF 1 SHEETS
0

GREASE INTERCEPTOR NOTES:

1. CONCRETE: 28 DAY COMPRESSIVE STRENGTH f'c = 4500 psi
2. REBAR: ASTM A-615 GRADE 60
3. MESH: ASTM A-185 GRADE 65
4. DESIGN: ACI-318-83 BUILDING CODE ASTM C-857 "MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES"
5. LOADS: H-20 TRUCK WHEEL w/ 30% IMPACT PER AASHTO
6. FILL w/ CLEAN WATER PRIOR TO START-UP OF SYSTEM
7. CONTRACTOR TO SUPPLY & INSTALL ALL PIPING & SAMPLING TEES
8. GRAY WATER ONLY, BLACK WATER SHALL BE CARRIED BY SEPARATE SIDE SEWER

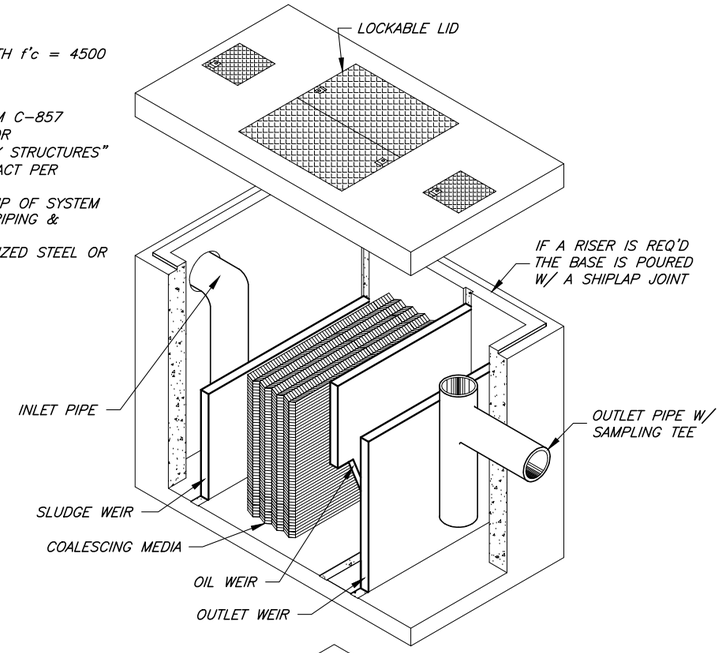
GREASE INTERCEPTOR DIMENSION TABLE							
GALLON CAPACITY	430	890	1375	1800	2175	2550	5000
DIM "A"	6'-0"	8'-0"	12'-0"	10'-0"	12'-0"	14'-0"	14'-0"
DIM "B"	4'-0"	6'-0"	6'-0"	8'-0"	8'-0"	8'-0"	8'-0"
WATER DEPTH DIM "C"	2'-8"	2'-8"	2'-8"	3'-2"	3'-2"	3'-2"	7'-2"
DIM "D"	2'-10"	2'-10"	2'-10"	3'-4"	3'-4"	3'-4"	7'-4"
DIM "E"	3'-6"	3'-6"	3'-6"	4'-0"	4'-0"	4'-0"	8'-0"
DIM "F"	3'-4"	3'-4"	3'-4"	3'-10"	3'-10"	3'-10"	7'-10"
WEIGHT	12,760	20,510	27,740	31,485	35,980	40,475	43,840

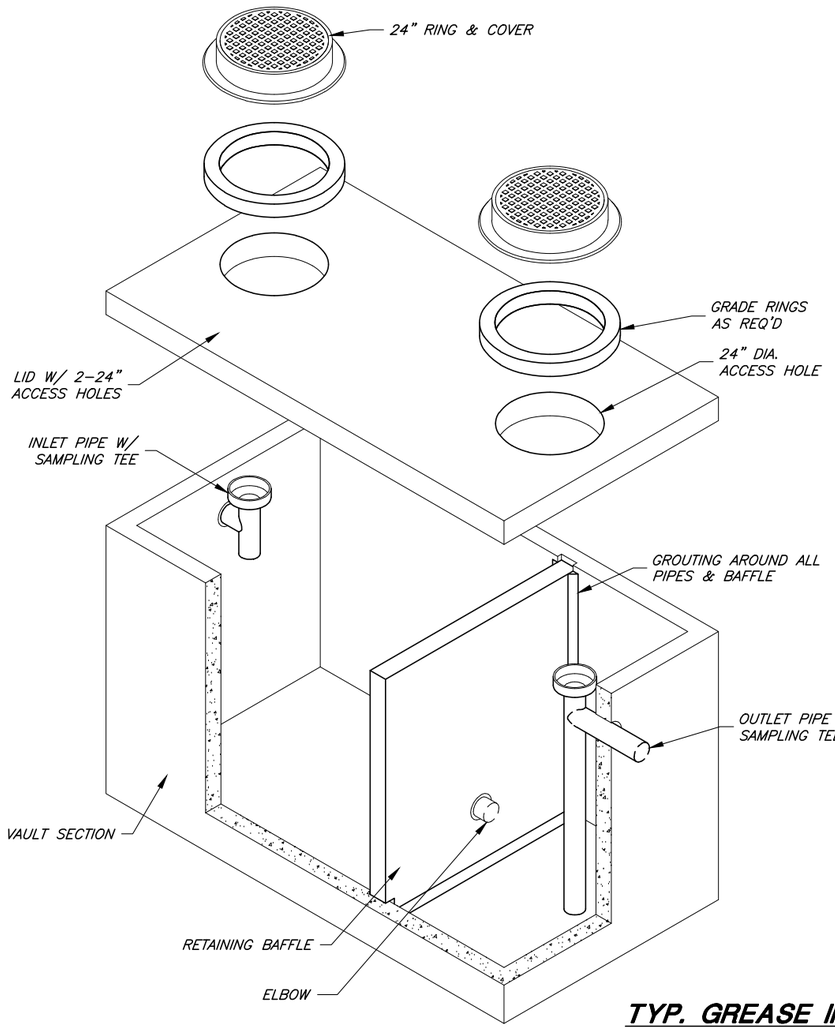
DESIGN CRITERIA: UNIFORM PLUMBING CODE - APPENDIX H

NUMBER OF MEALS PER PEAK HOURS x WASTE FLOW RATE x RETENTION TIME x STORAGE FACTOR = CAPACITY IN GALLONS

OIL/WATER SEPARATOR NOTES:

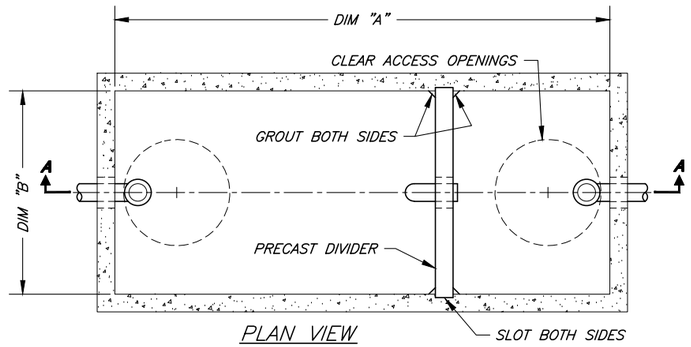
1. CONCRETE: 28 DAY COMPRESSIVE STRENGTH f'c = 4500 psi
2. REBAR: ASTM A-615 GRADE 60
3. MESH: ASTM A-185 GRADE 65
4. DESIGN: ACI-318-83 BUILDING CODE ASTM C-857 "MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES"
5. LOADS: H-20 TRUCK WHEEL w/ 30% IMPACT PER AASHTO
6. FILL w/ CLEAN WATER PRIOR TO START-UP OF SYSTEM
7. CONTRACTOR TO SUPPLY & INSTALL ALL PIPING & SAMPLING TEES
8. ALL BAFFLES/WEIR PLATES TO BE GALVANIZED STEEL OR CONCRETE.
9. WATER DEPTH = 4'-0"
10. GROUT AROUND ALL PIPES & BAFFLES



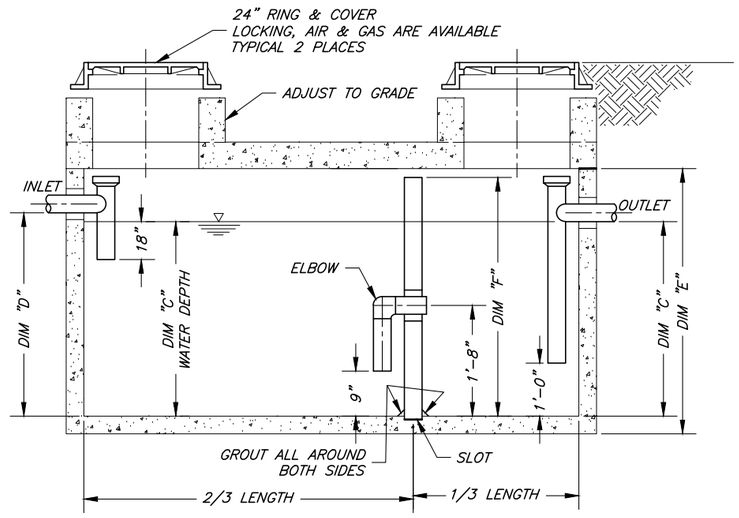


TYP. GREASE INTERCEPTOR

430 - 5,000 GALLON CAPACITIES

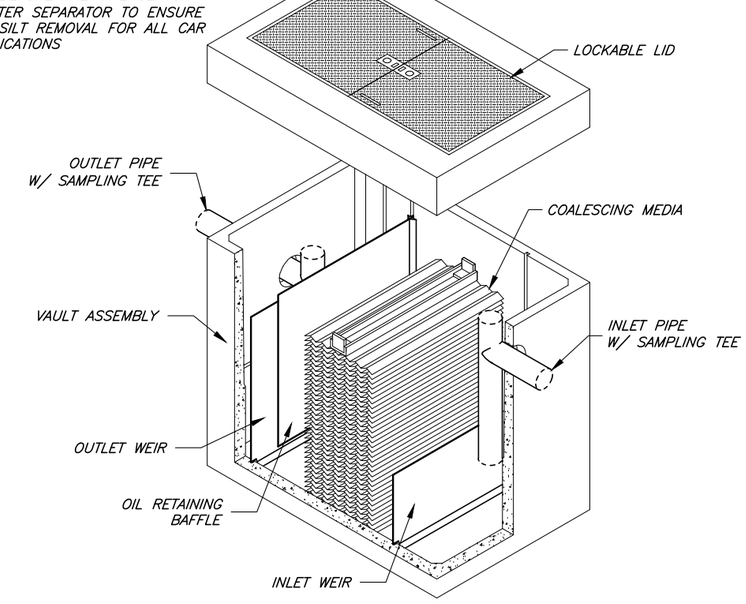


PLAN VIEW



SECTION VIEW A-A

NOTE:
A SILT TRAP/BASIN SHALL BE INSTALLED BEFORE THE INTERCEPTOR OR OIL/WATER SEPARATOR TO ENSURE EFFECTIVE SILT REMOVAL FOR ALL CAR WASH APPLICATIONS



GENERAL NOTE: ALL GREASE & OIL/WATER SEPARATORS ARE TO BE SIZED BY THE DEVELOPING ENGINEER AND TO BE REVIEWED AND GIVEN FINAL APPROVAL FROM THE PERRY CITY PUBLIC WORKS DEPARTMENT

TYP. OIL/WATER SEPARATORS

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
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PUBLIC WORKS DIRECTOR
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SCALE: N.T.S.

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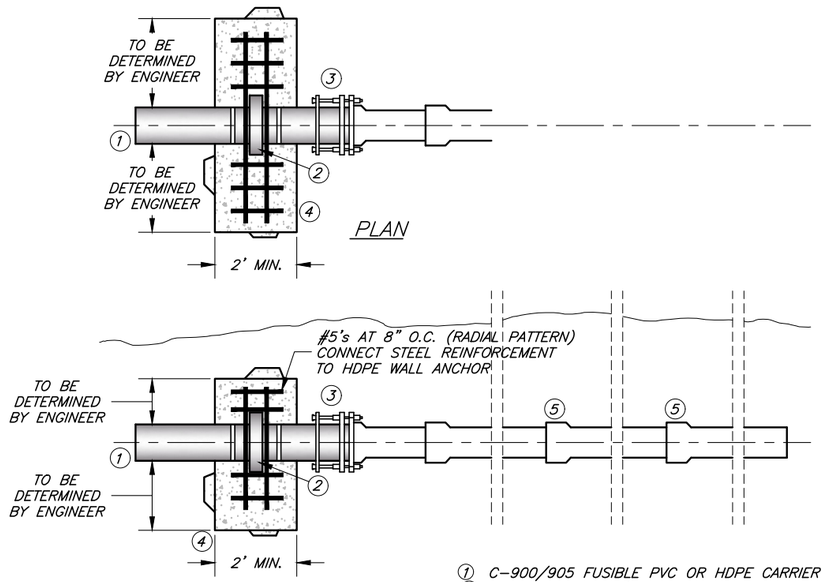
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

GENERAL - TYPICAL GREASE & OIL/WATER SEPARATORS

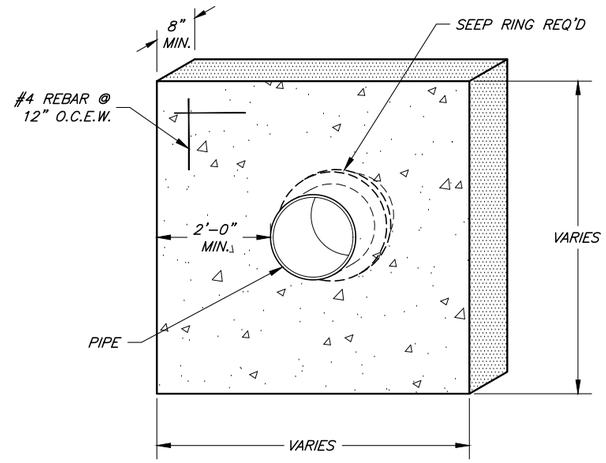
SHEET: CS-27
OF 1 SHEETS
0



TYPICAL THRUST RESTRAINT

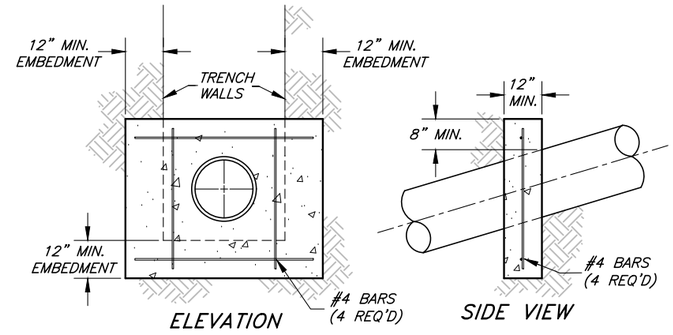
FOR DIRECTIONAL DRILLS AND CASING CARRIER PIPE

1. C-900/905 FUSIBLE PVC OR HDPE CARRIER PIPING
2. HDPE OR C-900/905 WALL ANCHOR
3. RESTRAINED JOINT CONNECTIONS ("MEGALUG" OR APPROVED EQUAL)
4. CONCRETE ANCHOR
5. STANDARD PIPE JOINT (E.G., BELL+SPIGOT CONNECTIONS)



CONCRETE CUTOFF WALL

NOTE: CUTOFF WALLS ARE TO BE INSTALLED CENTERED ON A PIPE JOINT



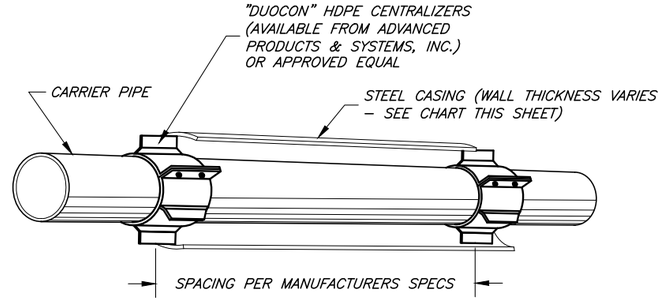
ANCHOR BLOCK

ANCHOR BLOCK NOTES:

A. PIPE ANCHOR BLOCKS SHALL BE INSTALLED ON ALL CULINARY WATER, STORM DRAIN, SANITARY SEWER, AND IRRIGATION WATER LINES WHERE SLOPE EXCEEDS 20%.

B. SPACING:

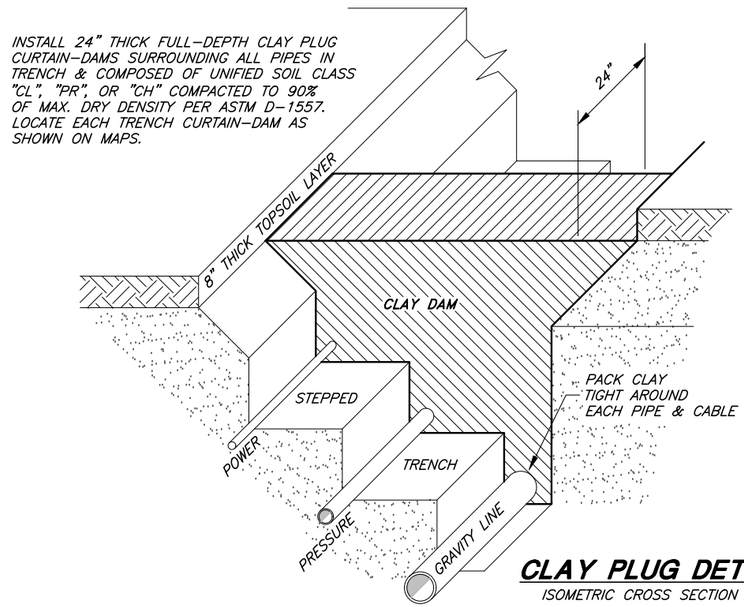
SLOPE	SPACING
20%-35%	36'
35%-50%	24'
50%+	16'



CENTERING GUIDE

WITH CASING CUT AWAY TO SHOW DETAIL (NTS)

STEEL CASING WALL THICKNESS CHART		
MINIMUM THICKNESS		DIAMETER OF CASING PIPE
.2500"	1/4"	12" OR LESS
.3125"	5/16"	OVER 12" - 18"
.3750"	3/8"	OVER 18" - 22"
.4375"	7/16"	OVER 22" - 28"
.5000"	1/2"	OVER 28" - 34"
.5625"	9/16"	OVER 34" - 42"
.6250"	5/8"	OVER 42" - 48"
OVER 48" MUST BE APPROVED BY CITY ENGINEER		

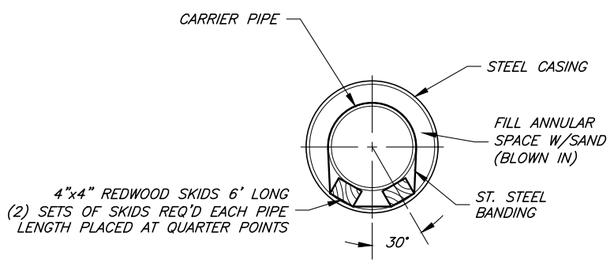


CLAY PLUG DETAIL

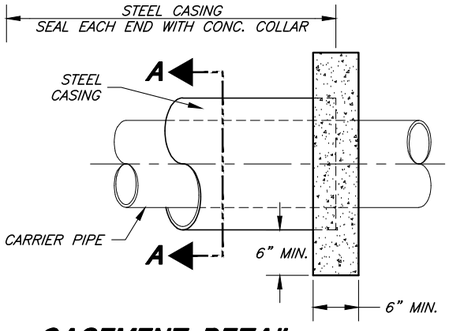
ISOMETRIC CROSS SECTION

CASEMENT DETAIL NOTES:

1. CARRIER PIPE TO BE SPECIFIED BY CITY ENGINEER.
2. CARRIER PIPE SHALL BE TESTED BEFORE FILLING CASING WITH SAND.
3. SKIDS SHALL BE SECURELY ATTACHED TO CARRIER PIPE WITH ST. STEEL BANDS. MINIMUM OF TWO BANDS PER SKID.
4. SKIDS SHALL BE NOTCHED TO RECEIVE STEEL BANDS.
5. SKIDS SHALL BE GREASED BEFORE CARRIER PIPE INSTALLATION.
6. SKIDS SHALL BE ROUNDED OR BEVELED ON LEADING EDGE.
7. AS AN ALTERNATE TO REDWOOD SKIDS, THE CONTRACTOR MAY USE PREFABRICATED PLASTIC CASING SKIDS ATTACHED AROUND THE CARRIER PIPE. (SEE CENTERING GUIDE DETAIL THIS SHEET)
8. CASING PIPE SHALL BE SMOOTH STEEL WITH MINIMUM YIELD STRENGTH = 35,000 P.S.I.
9. METHOD OF INSTALLATION OF CARRIER PIPE IN CASING SHALL BE AS RECOMMENDED BY CARRIER PIPE MANUFACTURER.



SECTION A-A



CASEMENT DETAIL

FOR PIPELINE BORE PROJECTS

REGISTERED PROFESSIONAL ENGINEER No. 5149637 Brett Marsden Jones State of Utah

Brett M. Jones
CITY ENGINEER
09/01/2021
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SCALE: N.T.S.

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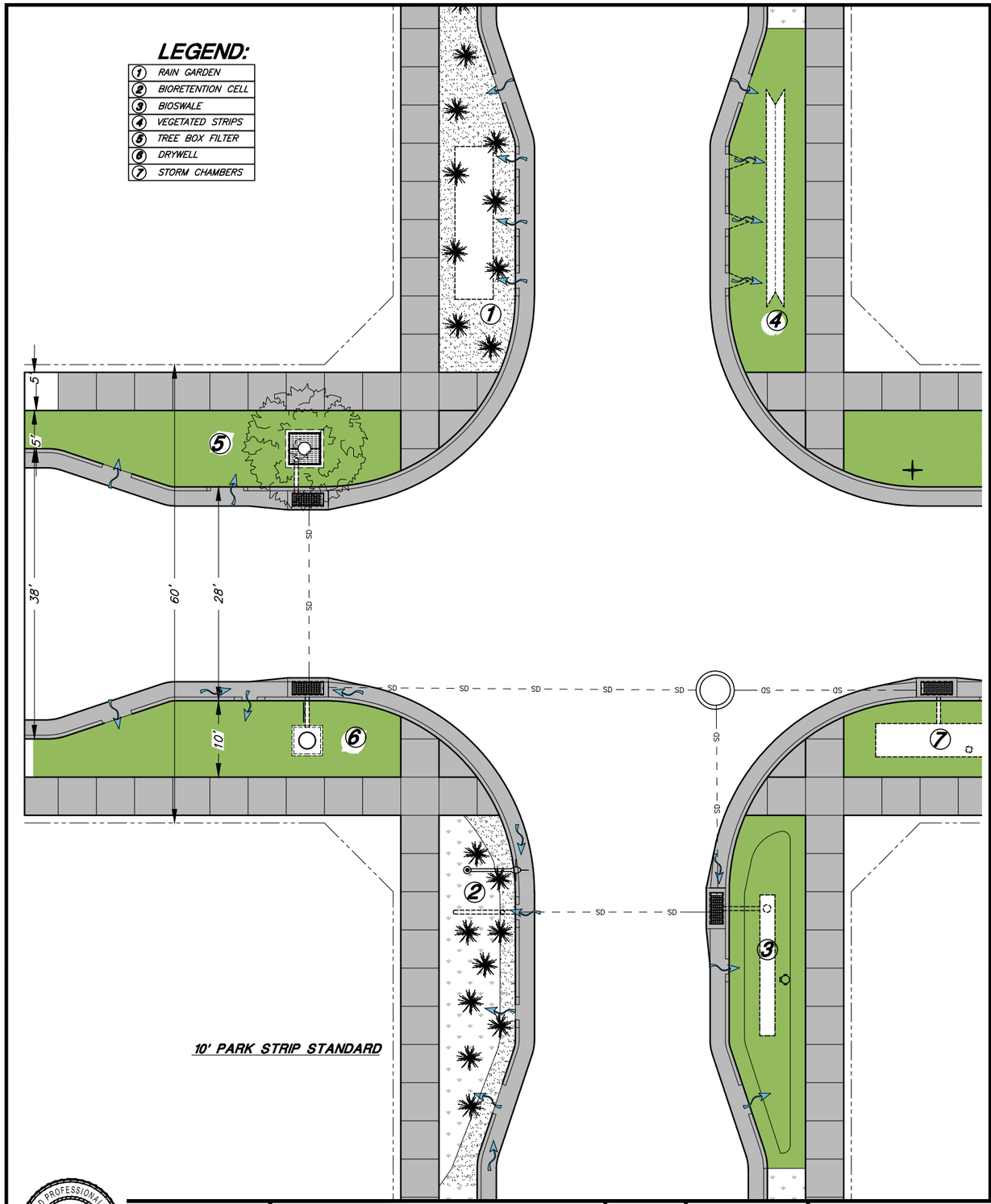
6080 Fashion Point Drive
South Ogden, Utah 84403 www.jonescivil.com

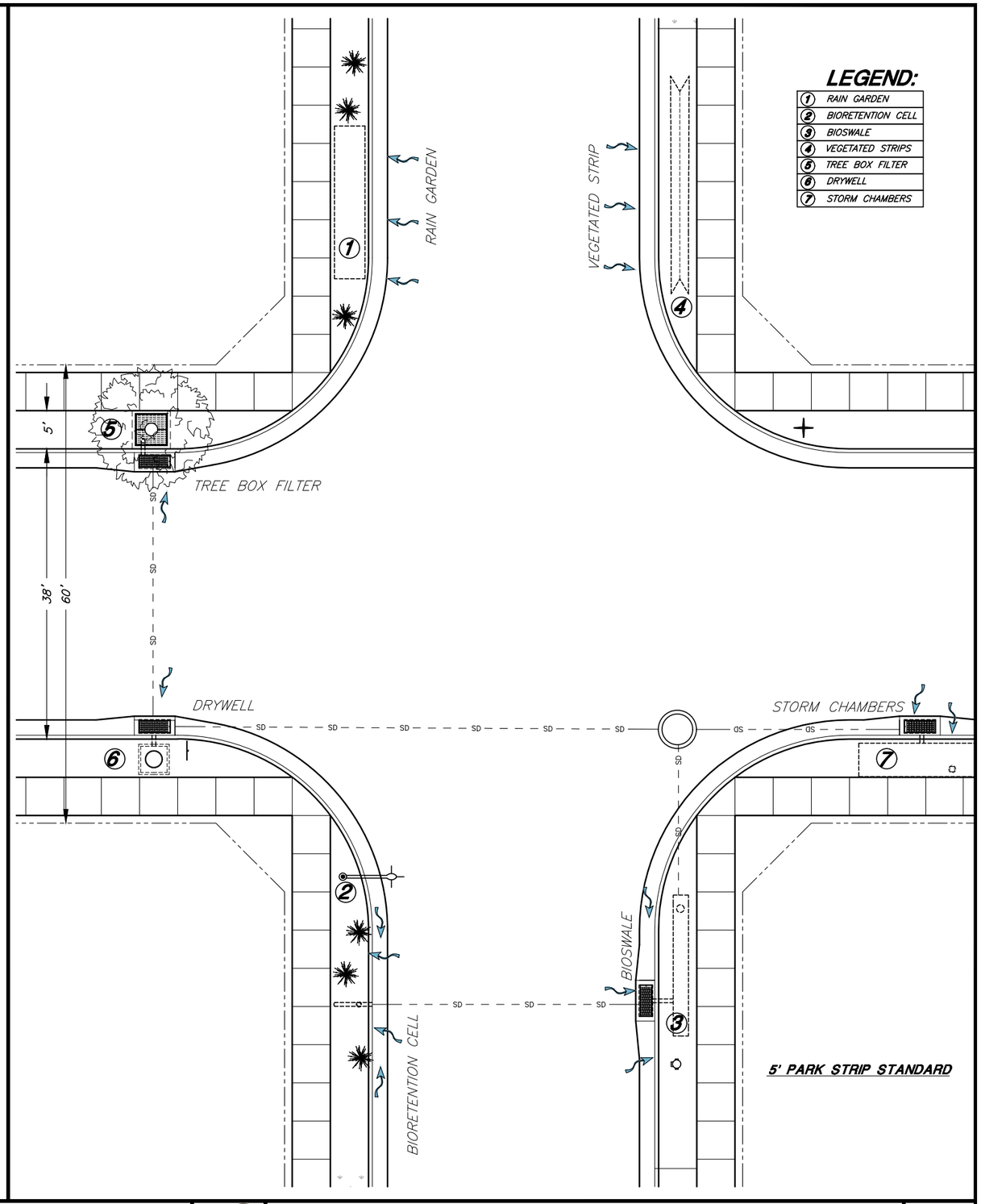
PERRY CITY PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

GENERAL - TYPICAL CLAY PLUG, ANCHOR BLOCK, CONCRETE CUTOFF WALL, AND PIPELINE CASING DETAILS

SHEET: CS-28
OF 1 SHEETS
0





No. 5149637
Brett Marsden Jones
REGISTERED PROFESSIONAL ENGINEER
State of Utah

Brett M. Jones
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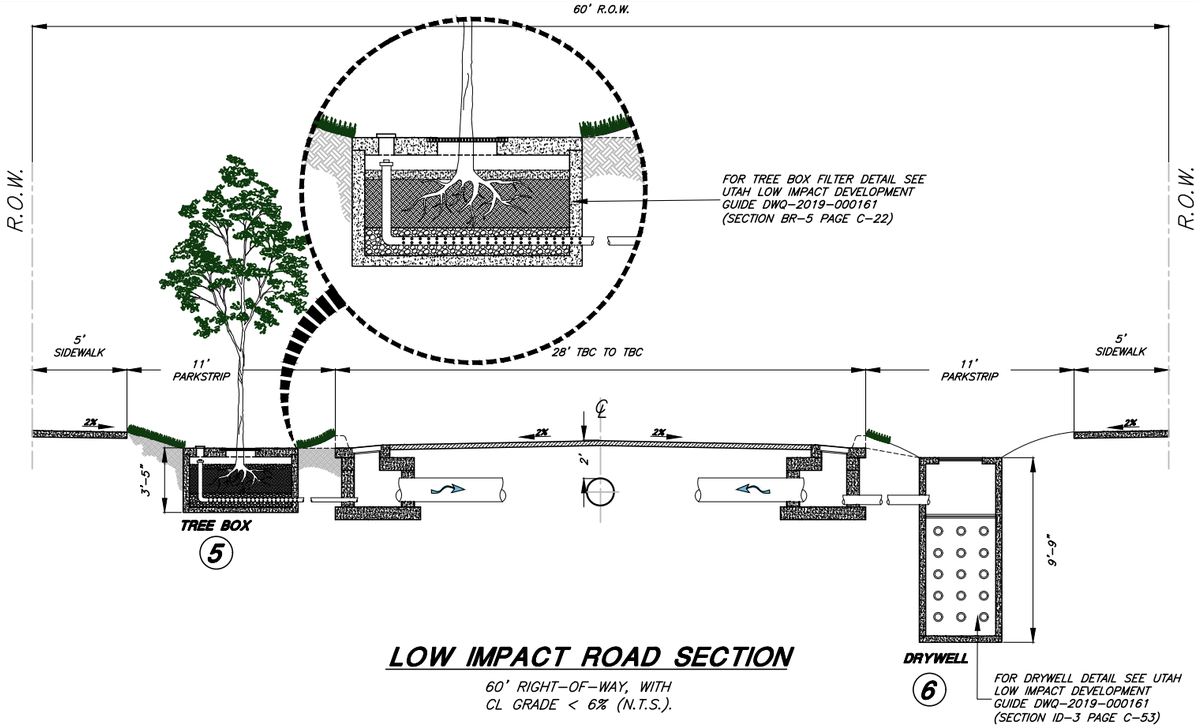
PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

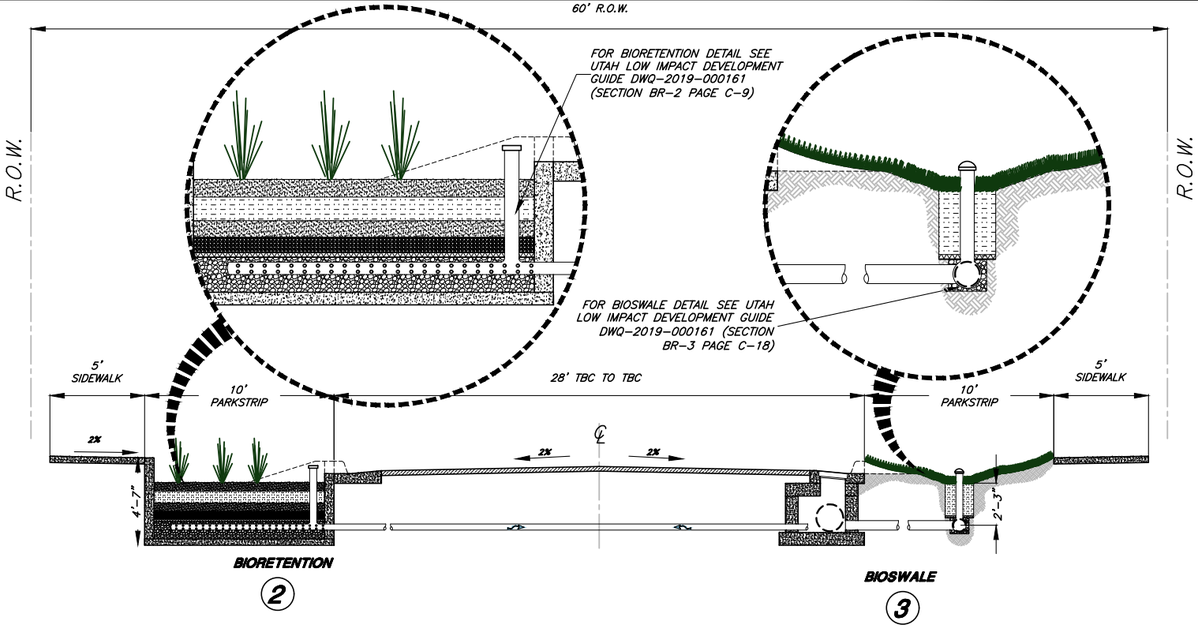
GENERAL - LID (LOW IMPACT DEVELOPMENT) EXAMPLES

SHEET: CS-29
OF 1 SHEETS
0



LOW IMPACT ROAD SECTION

60' RIGHT-OF-WAY, WITH
CL GRADE < 6% (N.T.S.).



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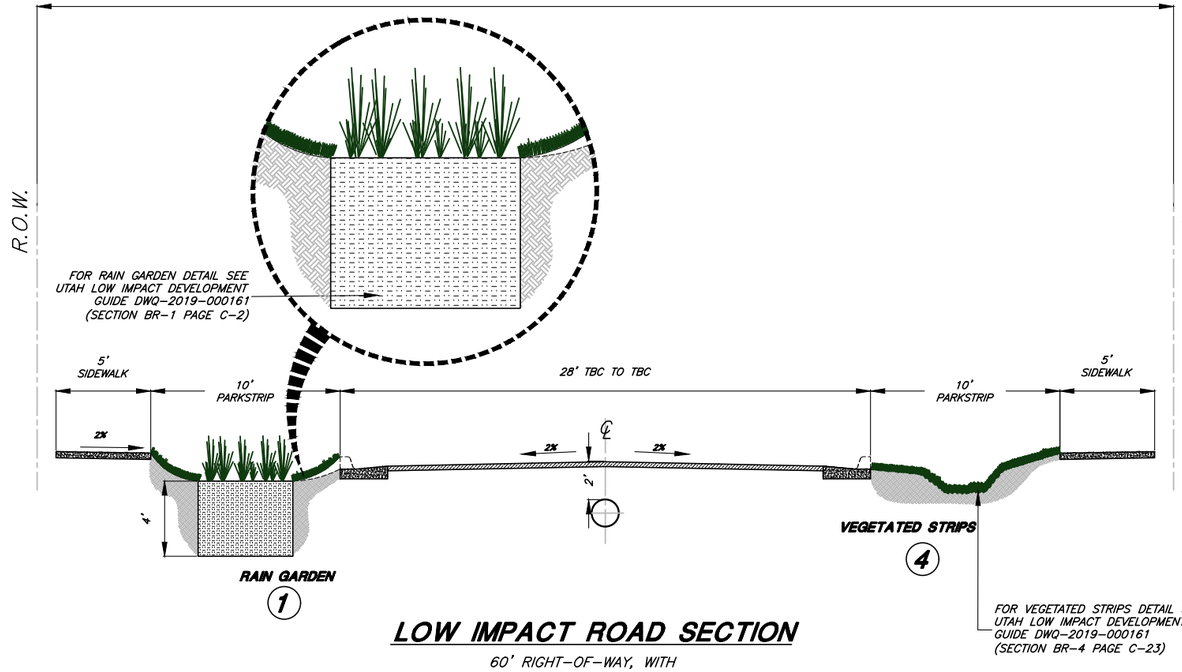
CL GRADE < 6% (N.T.S.).



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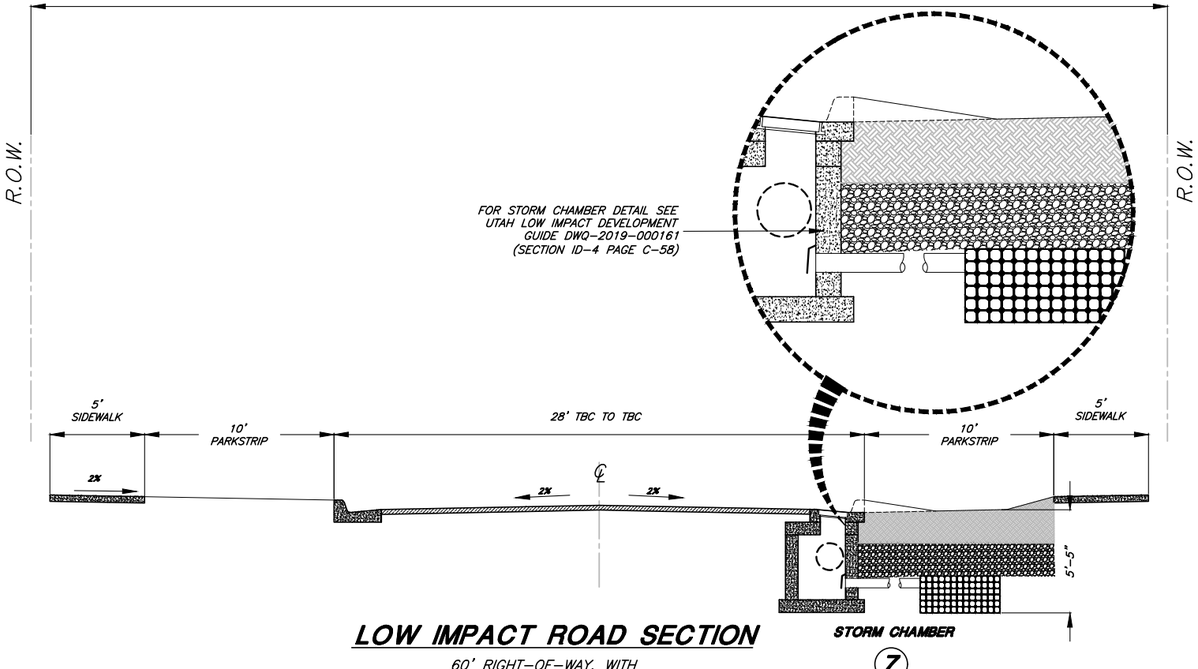

LOW IMPACT ROAD SECTION

60' RIGHT-OF-WAY, WITH
CL GRADE < 6% (N.T.S.).

REGISTERED PROFESSIONAL ENGINEER
No. 5149637
Brett Marsden Jones
State of Utah

CITY ENGINEER
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PERRY CITY
PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS

GENERAL - LID (LOW IMPACT DEVELOPMENT) EXAMPLES

SHEET: CS-30
OF 1 SHEETS
0

ATTENTION

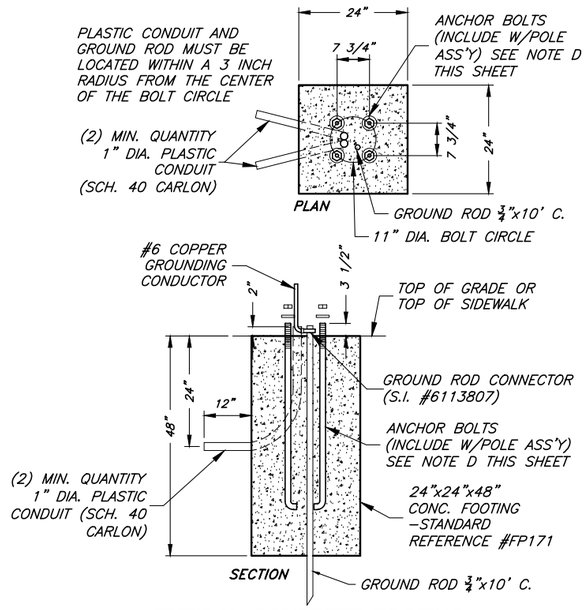
DEVELOPED/CONTRACTOR SHALL NOTIFY ROCKY MOUNTAIN POWER DESIGN OFFICE PRIOR TO LIGHTING INSTALLATION TO ARRANGE FOR POWER TO BE PROVIDED ON SITE, AS WELL AS APPROVAL OF LIGHTING UNIT LOCATIONS AND APPROVAL OF ACTUAL COMPONENT SELECTION.

ROCKY MOUNTAIN POWER
1-888-221-7070

ALL FINAL WORK AND MATERIALS TO BE APPROVED BY THE CITY AND THE CITY ENGINEER.

GENERAL NOTES:

1. THE DEVELOPER/CONTRACTOR MUST SUBMIT A WRITTEN REQUEST INCLUDING A MAP SHOWING THE LOCATION OF ALL STREET LIGHTS TO THE CITY. THE CITY WILL THEN SUBMIT A STREET LIGHT WORK ORDER TO ROCKY MOUNTAIN POWER.



TYPICAL CONCRETE FOOTING

STANDARD REFERENCE #FP171

THE FOOTING AS SPECIFIED ON THIS STANDARD IS DESIGNED FOR USE WITH THE STD. 11 GA. (OR 10 GA.) METAL STREET LIGHT POLES FOR MOUNTING HEIGHTS UP TO 32 FEET. IT SHOULD NOT BE APPLIED IN LOCATIONS WHICH REQUIRE A POLE OF HIGHER STRENGTH (SUCH AS A DEAD-END POLE, COMBINATION STREET LIGHT/TRAFFIC SIGNAL POLE, OR ETC.)

FOOTING NOTES:

A. FOOTINGS WILL GENERALLY BE INSTALLED BY A CONTRACTOR. FOOTINGS SHOULD BE LOCATED WITH THE VERTICAL ℄ 24" + BACK FROM THE EDGE OF CURB.
B. THE MANUFACTURER SHALL FURNISH (4) ANCHOR BOLTS, (1) GROUND ROD & PLASTIC CONDUITS FOR EACH FOOTING AS REQ'D.
C. NUMBER AND ORIENTATION OF THE PLASTIC CONDUITS ARE INFLUENCED BY THE UNDERGROUND CIRCUIT ROUTE AND SHOULD BE DETERMINED IN EACH LOCATION FOR THE MOST PRACTICAL SOLUTION.
D. ANCHOR BOLTS SHALL BE FURNISHED WITH 6" MIN. THREAD LENGTH AND SHALL BE HOT DIP GALV.

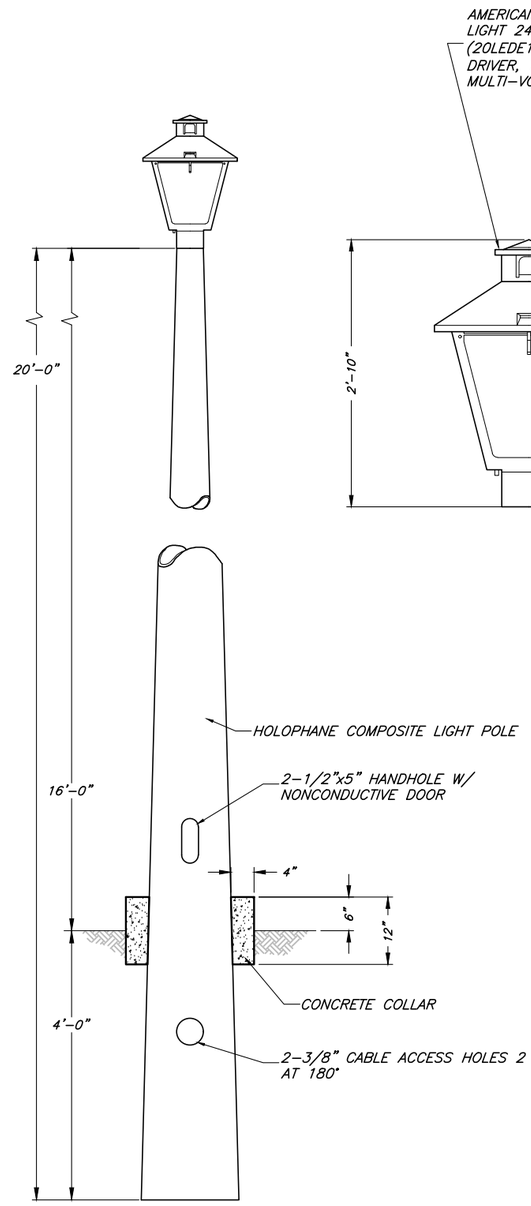
OR EQUAL PRODUCTS

OTHER LIGHT POLES AND LUMINAIRES CAN BE USED UPON APPROVAL OF THE PUBLIC WORKS DIRECTOR. OR EQUAL PRODUCTS SHOULD BE OF SIMILAR QUALITY AND DURABILITY. DIRECT BURY COMPOSITE LIGHT POLES HAVE NOT BEEN AS DURABLE AND THEREFORE ARE NOT EXPECTED TO BE USED.

SPACING AND LOCATION REQUIREMENTS

A. STREET LIGHTS MUST BE LOCATED AT ALL INTERSECTIONS, CORNERS, AND CUL-DE-SACS FOR ALL STREET TYPES AT LOCATIONS SHOWN ON APPROVED CONSTRUCTION PLANS.

B. STREET LIGHTS MUST BE SPACED AT A MAXIMUM 400 FOOT SPACING AND SHOULD ALTERNATE EACH SIDE OF THE STREET ON THE PROPERTY LINE AT LOCATIONS SHOWN ON APPROVED CONSTRUCTION PLANS.



CITY STANDARD RESIDENTIAL STREET LIGHT

REGISTERED PROFESSIONAL ENGINEER — No. 5149637 — Brett Marsden Jones — State of Utah

CITY ENGINEER — 09/01/2021 — DATE

APPROVED

PUBLIC WORKS DIRECTOR — 09/01/2021 — DATE

SCALE: N.T.S.

DESIGNED ____ DRAWN ____ CHECKED ____

JA JONES & ASSOCIATES — CONSULTING ENGINEERS — 6080 Fashion Point Drive, South Ogden, Utah 84403 www.jonescivil.com

PERRY CITY — PUBLIC WORKS

PERRY CITY CORPORATION
PUBLIC WORKS STANDARDS
DECORATIVE LIGHT EXAMPLES

SHEET: CS-31 OF 1 SHEETS 0