



City of Donald

Design Standards Update



Design Standards Update

June 2021

PREPARED FOR

City of Donald

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Donald, OR 97020

PREPARED BY

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ABBREVIATIONS

Abbreviation	Definition
AASHTO	American Association of State Highway and Transportation Officials
AC	Asphaltic Concrete
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Applicant	The person applying for a permit from the City's Public Works Department for a public or private improvement to which these Standards apply.
APWA	American Public Works Association
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWWA	American Water Works Association
Bicycle Facilities	A general term denoting improvements and provisions that accommodate or encourage bicycling, including parking facilities, maps, signs, pathways, bike lanes, widened sidewalks, bikeways, and shared roadways designated for bicycle use.
Bicycle Lane	Also known as "Bike Lane". A portion of a roadway, which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.
Bicycle Path	Also known as "Bike Path" or "Off-Street Pathway". A paved pathway physically separated from motorized vehicular traffic by an open space or barrier within independent Right Of Way (ROW).
Bicycle Route	Also known as "Bike Route". A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number, or as designated on a bicycle map, brochure, or guidebook.
Bikeway	Any road, path or way specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.
BMP	Best Management Practice according to Oregon DEQ Construction Stormwater Best Management Practices Manual 1200-C NPDES General Permit
CAD	Computer Aided Design
CARV	Combination Air Release Valve
City	City of Donald including all staff and departments as applicable
City Engineer	Oregon licensed Professional Engineer on city staff or under contract by the City to perform engineering design reviews or his/her designated representative.
Contractor	Person listed on the Construction Site/ROW Permit application as the party performing construction of the permitted work.
County	Marion County
CTS	Copper Tube Size
Design Engineer	Oregon licensed Professional Engineer responsible for preparation of the construction plans to be reviewed and approved by the City Engineer. The Design Engineer shall be competent and experienced to practice in the specific disciplines of engineering. The Design Engineer may be asked to provide references and a list of representative projects that he/she has completed.
Detention Facility	A stormwater facility that reduces the peak flow of stormwater runoff (but not the total volume) to the downstream system in a controlled manner.
Developer	The owner and/or their agents or Contractors responsible for a given project.
DEQ	Oregon Department of Environmental Quality

Abbreviation	Definition
Director	Director of Public Works or their designee
Driveway	A public or private way, located outside of ROW, which affords the principle means of providing access to a property.
DSL	Oregon Department of State Lands
DWG	Binary drawing file format used by CAD software design programs such as AutoCAD ®
Engineer	Engineer doing the project design
Engineers Cost Estimate	A unit price estimate of probable construction costs prepared and stamped by an Oregon licensed Professional Engineer competent and experienced in preparing construction cost estimates.
Engineering Standard(s)	City of Donald Design Standard(s) or Standard(s)
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESC	Erosion and Sediment Control
FHWA	U.S. Department of Transportation Federal Highway Administration
Final Acceptance	City Engineer's written acceptance of public facilities constructed by others
Final Approved Plans	Complete set of construction plans approved and signed by the City Engineer
fps	foot per second
Gate	Movable barrier designed and constructed to prohibit or limit motor vehicle access from a public street to private property.
gpm	gallon per minute
GPS	Global Positioning System
HDPE	High-Density Polyethylene
IE	Invert Elevation
Intersection	Refers to the area jointed by two (2) or more roads intersecting. For approaches of a continuous street at an acute curve or some other angle point with different street names.
IPS	Iron Pipe Size
LID	Low Impact Development
LOS	Level of Service Classification as defined by Transportation Research Board Highway Capacity Manual, AASHTO Geometric Design of Highways and Streets
LPSS	Low Pressure Sanitary Sewer Mains
Manager	City Manager
Multi-Use Trail	A pathway designated for pedestrian or bicycle use
MUTCD	Manual on Uniform Traffic Control Devices
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service (formerly Soil Conservation Service)
OAR	Oregon Administrative Rules
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OFC	Oregon Fire Code
OHA	Oregon Health Authority
O&M	Operations and Maintenance
ORS	Oregon Revised Statutes

Abbreviation	Definition
OS & Y	Outside Stem and Yoke
OSHA	Occupational Safety and Health Administration
ORSC	Oregon Residential Specialty Code
OSSC	Oregon Structural Specialty Code
Parking Lot	Paved surfaces on private property intended for the movement and storage of six (6) or more vehicles.
PE	Oregon Licensed Professional Engineer
Private Utilities	Any utilities not owned by the City of Donald
PROWAG	U.S. Access Board Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way
PUD	Planned Urban Development
PVC	Polyvinyl Chloride
Record Drawings	Complete set of plans incorporating all changes made to the Final Approved Plans during construction
RE	Resident Engineer—Oregon Licensed Professional Engineer responsible for project oversight during construction
Retention Facility	A stormwater facility that reduces the volume of stormwater runoff to the downstream system by means of evaporation, plant transpiration, or infiltration into the soil
ROW	Right-Of-Way or Rights-Of-Way
SBUH	Santa Barbara Urban Hydrograph
Shy Distance	The distance from the edge of the traveled way beyond which a roadside object will not be perceived as an immediate hazard by the typical driver to the extent that the driver will change the vehicle's placement or speed.
Sidewalk	The portion of a street designed for preferential use by pedestrians.
Significant Tree	Tree with a diameter at breast height equal to or greater than six inches (6").
Standard Drawings	The latest edition of the City of Donald's Standard Drawings for Public Works Construction.
STEG	Septic Tank Effluent Gravity
STEP	Septic Tank Effluent Pump
Street	A public or private way, which affords the principal means of access to abutting property.
Structure	That which is built or constructed. A structure may contain one or more buildings separated by fire rated construction elements in accordance with prevailing codes. Retaining walls, sound walls, and fences including their footings are considered structures.
TAL	Traffic Assessment Letter
TIA	Traffic Impact Analysis
UGB	Urban Growth Boundary
UL	Underwriters Laboratory
USACE	United States Army Corp of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Services
Wetlands	Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Identification and delineation of jurisdictional wetlands and wetland boundaries shall be done by a qualified biologist using applicable State and Federal guidelines.

1. INTRODUCTION

1.1 PURPOSE

1. The purpose of the City of Donald Design Standards is to provide a consistent process for the design and construction for both public and private improvements under the jurisdiction of the City of Donald (City). These Design Standards apply to proposed work within the City and Urban Growth Boundary (UGB), and to extensions of City-owned utilities outside the City limits and UGB.
2. These Standards are intended to provide technical guidance to those responsible for designing and reviewing engineered sites and facilities for public and private improvements. These Standards do not cover all possible situations. The user is assumed to have the necessary training and practical experience in the application of civil engineering principles to implement the methodologies described herein. Any exception to these Standards will be made at the sole discretion of the City Engineer on a case-by-case basis and require sufficient justification prior to approval.

1.2 CONFLICT

1. Except where these Engineering Standards provide otherwise, design, construction, materials, and testing shall conform to the appropriate standards of the most current edition of the following publications:
 - a. Marion County Public Works Engineering Standards
 - b. Oregon Department of Transportation (ODOT)/American Public Works Association (APWA) Oregon Standard Specifications for Construction
 - c. American Water Works Association (AWWA) Standards
 - d. Oregon Health Authority (OHA) Regulations
 - e. Oregon Department of Environmental Quality (DEQ) Sewer Design Criteria, Oregon Administrative Rules
 - f. AASHTO Policy on Geometric Design of Highways and Streets (AASHTO)
 - g. U.S. Department of Transportation Federal Highway Administration Manual of Uniform Traffic Control Devices (MUTCD)
 - h. Oregon Temporary Traffic Control Handbook
 - i. Oregon Structural Specialty Code (OSSC)
 - j. Oregon Residential Specialty Code (ORSC)
 - k. U.S. Department of Justice ADA Standards for Accessible Design (ADAAG)
 - l. U.S. Access Board Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)
 - m. Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing

- n. Supplement to the 2013 Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements To Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing
2. In case of conflicts between the text of these Engineering Standards, Standard Drawings, and other standards, the more stringent as determined by the City Engineer shall apply. Acceptable materials shall be as outlined in these Engineering Standards. When conflicts between these Engineering Standards and Oregon State Building Codes occur within private properties the governing State Building Code shall apply.

1.3 CLARIFICATION OF FINAL AUTHORITY

1. Requests for clarification of these Standards shall be directed, in writing, to:
Alonso Limones
Public Works Director
City of Donald
PO Box 388
10710 Main St NE
Donald, OR 97020
Phone: 503-678-1411
2. The City Engineer shall have final authority on all questions that may arise regarding the interpretation of these Standards.

1.4 ENGINEERING STANDARDS REVISIONS

1. Questions or suggestions should be addressed to the Director of Public Works (see email address above). It is anticipated that these Standards will be updated from time to time. The City will provide updates to those who have requested they receive revisions. However, it shall be the applicant's responsibility to make sure they are using the most current version. This document and revisions shall be available for download from the City's Public Works website: <https://www.donaldoregon.gov/public-works>

1.5 NON-ENFORCEMENT

1. Non-enforcement of any requirement in these Standards by the City shall not construe a waiver of that requirement, nor shall it affect the enforceability of that requirement or of the remainder of the City of Donald Design Standards.

2. DEVELOPMENT PROCESS

2.1 PLANNING REVIEW

1. Reviews by the City are required for all development projects under the jurisdiction of the City which involve the subdivision or partition of land, re-plats, plat vacations, lot line adjustments, construction or reconstruction of any building, change of use, or multi-family or group residential construction. Most planning reviews include some level of engineering review.
1. All public improvements shall be designed with the intent to serve all developable areas. Infrastructure shall be sized to serve the local development as well as the surrounding area anticipated to be developed in the future. All infrastructure improvements shall be extended to the boundaries of each development to permit extension of each system. The City may also require oversizing the infrastructure to serve future users, with the additional cost funded by a System Development Charge credit.
2. Public improvements are conditioned through the development review process, City ordinances and other policies adopted by the City. No public street improvements or utility construction shall commence prior to City approval of the construction plans. Designs submitted for approval shall be stamped by a Registered Professional Engineer licensed to practice in the State of Oregon.
3. Submittal requirements consist of design plans, grading plans, erosion control plans and other information as required for street or utility construction, including paving, curbs and sidewalks, sanitary sewer, water, storm drainage and all private utilities. Developers shall be responsible for preparation of plans and specifications to comply with all conditions of approval from the City and the requirements of these Public Works Design Standards, unless otherwise approved by the Public Works Director.
4. Developers shall be responsible to coordinate with City staff and all utility providers prior to preparation of preliminary design drawings. The Developer is responsible to secure approval from all utility providers prior to submittal of preliminary plans and specifications to the City.
5. Final acceptance will be given by the City and the 12-month warranty period shall begin only upon completion of all work including punch list items, and submittal of all required documents.

2.2 ENGINEERING REVIEW

1. Engineering reviews by the City Engineer are generally required for all projects under the jurisdiction of the City that involve the
 - a. Construction of public facilities
 - b. Work within the public ROW
 - c. Construction of private facilities discharging to public facilities
 - d. Construction of facilities, including grading, that may have an impact on stormwater runoff or downstream water quality
 - e. Dedication of public ROW

- f. Construction and removal of retaining walls or structures located within or impacting the ROW
 - g. Demolition of significant surfaces or structures located within or impacting the ROW
 - h. Placement or removal of trees in ROW
 - i. Repaving existing public and commercial parking lots.
2. Upon completion of the detailed review by the City, the City will return one (1) set of plans with “Red Line” comments. After the Developer has completed all revisions, one revised plan set and the original “Red Line” plans shall be returned to the City for construction approval. The plans shall have a provision for the City to sign upon final approval. Only signed plans shall be reproduced and distributed for construction.

2.3 AGENCY APPROVALS

1. The developer shall be responsible for obtaining all approvals from Oregon Department of Environmental Quality, Oregon Health Authority, Marion County Building Department, Marion County Public Works Department, and any other applicable agencies prior to final approval.

2.4 DESIGN EXCEPTION PROCESS

1. These Standards are not intended to limit the creativeness and ingenuity, nor substitute for the competent work of the Developer. However, these Standards are intended to provide uniformity in the design and construction of safe public facilities in a manner allowing economical future maintenance. Therefore, any proposed exception to these standards is expected to provide a better or at least comparable result, in every way consistent with sound engineering practices as determined by the City Engineer.
2. Any proposed design exception should be discussed with the City Engineer prior to the plan submittal, followed by a written request with sufficient justification why the exception should be approved at the time of plan submittal. All approved design exceptions will be clearly listed on the cover sheet of the Final Approved Plans. It will be the applicant’s responsibility to build the project consistent with the Standards unless specifically noted as a design exception on the cover sheet of the Final Approved Plans.

2.5 AS-BUILT DRAWINGS AND ACCEPTANCE

1. Following completion of construction, the Developer shall submit one hard copy set of as- built drawings, one electronic set of PDF drawings to the City and one AutoCAD drawing of the composite street and utility plan. As-built drawings shall describe any and all revisions to the previously approved construction plans.

3. DETAILED ENGINEERING PLAN REVIEW SUBMITTAL REQUIREMENTS

3.1 SURVEY

1. All designs shall be based on a complete topographic survey including surface and subsurface features, existing utilities, and all property line information on the City's coordinate system (Appendix D). Temporary benchmarks and elevations shall be shown on the plans. Record information on existing utilities and street improvements may be available from the City. Although, when available, this information can be used to assist in determining capacity constraints during conceptual design, all record information must be field verified through design surveys. Surveys must extend beyond the site boundary an adequate distance to determine grading and any other potential impacts to surrounding properties with an absolute minimum of 50 feet.

3.2 SUBMITTAL AND FORMAT REQUIREMENTS

3.2.1 Submittal Requirements

1. All plan submittals subsequent to the mandatory pre-submittal conference shall be made directly to the City of Donald

Plan packages can be hand-delivered or mailed to:

Attn: City Engineer
10710 Main St. NE PO Box 388
Donald, OR 97020

2. All documents must be submitted in hard copy and electronic format via removable storage device (i.e. thumb-drive or current equivalent). The only acceptable file type for documents is PDF, except for as-built Computer Aided Design (CAD) files, which shall be submitted in DWG format. Email or file sharing submission of electronic files may be allowed, as approved by the City Engineer.

3.2.2 Project Cost Estimate

1. Provide a project cost estimate for all public improvement projects and when requested by the City Engineer.
2. Developer's estimated project cost (in unit prices) for all proposed infrastructure.
 - a. All estimates shall be based on current labor, material, and equipment costs. Public works improvement projects shall incorporate prevailing wage labor rates as published by the Oregon Bureau of Labor and Industries.

- b. Cost estimates shall conform with Class 1 Estimates as described by the Association for the Advancement of Cost Engineering International in Recommended Practice #18R-97, latest edition.

3. General Requirements

- a. Provide two (2) copies of the Developer's Project Cost Estimate (in unit prices) for all proposed infrastructure on 8.5"x11" paper or 11"x17" paper as appropriate or electronic PDF file.
- b. Whenever possible use ODOT standard bid items to describe the work to be performed for public improvements projects.
- c. All cost estimate items shall be described with limits of work clearly described and defined on the plans or within the plan specifications.
- d. A contingency of no less than 10% shall be added to the cost estimate.
- e. Any changes in the project scope that are deemed significant by the City Engineer shall be reflected in a revised and updated Developer's Cost Estimates.

3.2.3 List of Changes

- 1. Provide two (2) copies of the List of Changes to the plans and responses to questions resulting from the previous review by the City Engineer on an 8.5"x11" paper or electronic PDF file.

3.2.4 Stormwater Management Plan

- 1. A site-specific Stormwater Management Plan prepared by a Professional Engineer licensed in the state of Oregon must be submitted for each development project requiring a detailed engineering plan review. At a minimum, the plan must include
 - a. A single complete electronic PDF file or four (4) bound copies of the Stormwater Management Plan on 8.5"x11" paper. Any required 11"x17" sheets shall be Z-folded into this bound document.
 - b. Stormwater management calculations (Section 9).
 - c. Drainage area maps (to scale) showing entire contributory area(s) and clearly delineating all calculated sub-areas and time of concentration routes.
 - d. Documentation of all assumptions.
 - e. Adequate detail to allow confirmation that calculations meet design criteria in these Engineering Standards.

3.2.5 General Construction Drawing Requirements

- 1. Submit four (4) sets of construction drawings on 11"x17" sheets in bound sets, or combined electronic PDF file.
- 2. Drawings shall be reproducible in black and white. Color, shading, and grayscales are allowed provided that they are clearly legible when printed or reproduced in black and white.
- 3. Each drawing shall have a title block aligned on the right hand side, or bottom, of the page and contain the seal of the responsible Design Engineer, names of the project, the engineering firm, the owner, the sheet title, and the sheet number.
- 4. The description and date of all revisions to the plans shall be shown on each sheet affected and shall be approved and dated by a Registered Professional Engineer as evidenced by signature.
- 5. Plan scales shall be 1" = 1' V, 1" = 10' H; 1" = 2' V, 1" = 20' H; 1" = 4' V, 1" = 40' H; or 1" = 5' V, 1" = 50' H for all drawings except details.
- 6. Text on full size sheets shall not be less than 0.1" using all capital lettering. Fonts shall be clearly legible and easily reproducible at half size when reduced.

7. Vicinity Maps shall be located on the first sheet of all plans and shall show the location of the project with respect to the nearest major street intersection.
8. A north arrow shall be shown on each plan view sheet of the plans and adjacent to any other drawing which is not oriented the same as other drawings on the sheet.
9. Area Hatches shall be reproducible in black and white and shall be clearly identified by Legend.
10. Line types shall be distinct and reproducible in black and white. When line types are not self-identified provide a clear Legend that describes each significant feature being represented by the line.
11. CAD Record Drawing files reflecting as-built conditions shall be submitted in DWG format prior to final acceptance.

3.2.6 Minimum Sheet Requirements

1. The construction drawing submittal shall address all design criteria included or referenced in these Standards and shall include the following sheets as applicable:
 - a. Cover Sheet:
 - i. Project name, Owner, Developer, Surveyor, and Design Engineer with contact information for each, Vicinity Map, Legend, Standard Notes as listed below, Sheet Index, Signature Blocks for Utility Owners, and City Engineer.
 - ii. Owner and Developer's name, address and phone number.
 - iii. All potential conflicts with private utilities must be addressed prior to submission of the final (100%) plan submittal. The applicant must verify plan submission requirements for each private utility according to their specific franchise agreements with the City of Donald. Final plan submittal shall include completed signature blocks for all private utilities. The Developer shall be responsible for coordinating with all non-city-owned utilities to resolve conflicts and obtain signatures. Provide full name, position, and current contact information for each utility provider and the City Engineer including daytime phone number. Provide signature and date block for each signatory.
 - iv. The following "Standard Notes" shall be included on the Cover Sheet of all projects:
 - A. All materials and workmanship shall be in accordance with the City of Donald Design Standards, the ODOT/APWA Oregon Standard Specifications for Construction, and the American Water Works Association Standard Specifications. In case of conflicts, the City's Engineering Standards shall apply unless specifically listed as a Design Exception on this Drawing.
 - B. All late-season AC (Asphaltic Concrete) paving (placed after October 15th and before April 1st), shall be held to the same performance criteria as all other paving. If for any reason there is aggregate separation, a rough finished surface, or other non-acceptable final product and the City Engineer determines that it is not in the best interest of the City to reject the work and have it removed and reconstructed, the City Engineer may require an asphalt seal coat or other remediation on the entire surface or portions thereof.
 - C. Design Exceptions: all Design Exceptions shall be listed below this note.
 - b. Standard Roadway Section(s) and General Notes:
 - i. Project specific applicable standard roadway, sidewalk, and other significant surface sections and general notes. Drawings shall be at a scale appropriate to show the level of complexity. Sections shall be clearly defined according to their locations on the site plans.

c. Existing Conditions Plans:

- i. Show all existing streets, utilities, appurtenances, streetscape elements, street markings, contours, control devices, signals, lighting, storm drainage, survey control, ROW and property lines, easements, jurisdictional overlays (i.e. zoning, city limits, and UGB, etc.), curbs, walks, ramps, driveways, retaining wall, bridges, structures and natural features including wetlands, floodways, floodplains, all significant trees and their drip lines.

d. Phasing Plan (if Necessary):

- i. Projects which include multiple phases shall provide a phasing plan, clearly indicating the areas and type of work to be performed in each phase.

e. Demolitions Plan (If Necessary):

- i. Clearly indicate existing conditions to be removed, relocated, and abandoned in .

f. Site Plans:

- i. Site plans shall be submitted for all private development and public improvement projects. A composite site plan is acceptable for small projects such as a single family home or commercial building. Large area developments, such as multi-lot sub-divisions, will require multiple site plans. At a minimum the site plans shall show the following:
 - ii. Survey control and datums
 - iii. Property lines and rights-of-way
 - iv. Existing and proposed easements
 - v. Flood Hazard Area boundaries obtained from Federal Emergency Management Agency Flood Insurance Rate Maps
 - vi. Ordinary High Water Levels for creeks, rivers, and other surface water bodies
 - vii. Delineated wetland boundaries.
 - viii. Trees with trunk diameters in excess of 6-inches with drip lines and species indicated
 - ix. Existing and proposed buildings with dimensions showing setbacks to adjacent properties and rights-way
 - x. All existing and proposed streets
 - xi. Existing and proposed sidewalks and pedestrian paths including ADA ramps
 - xii. Existing and proposed parking including ADA spaces. Note parking spaces for each building served.
 - xiii. Existing utility locations and estimate of depth. Pot holing is required for any proposed work within ten feet of buried high voltage electric, gas, and petroleum lines, or at the discretion of the City Engineer. Contact Public Works Department minimum of 10 business days prior to pot holing.
 - xiv. Proposed utilities including public water and sewer lines, septic tanks, and private utilities
 - xv. Landscaping including proposed trees and plant inventory
 - xvi. Surface treatments. Note total pervious and impervious areas.
 - xvii. Streetscape elements and frontage improvements
 - xviii. Street markings
 - xix. Roadway, sidewalk, and site lighting
 - xx. Storm drainage features including storm lines, manholes, catch basins, control structures, ditches, culverts, swales, and infiltration facilities

g. Grading, Erosion, and Sediment Control Plan:

- i. A Grading, Erosion, and Sediment Control Plan drawing must be submitted for all developments requiring a detailed engineering plan review. At a minimum, the drawing shall show
 - A. The general notes required by Section 6.3 2 Grading, Erosion, and Sediment Control Design Criteria.
 - B. Existing and proposed contours at a maximum of two-foot (2') intervals (1' for sites with an average land slope less than 5%) extending a minimum of 50 feet beyond the boundaries of the site.
 - C. Intersection grading plans that clearly show direction of flow and elevations at all curb lines including curb returns, ditch lines, crowns, flow lines, walks, paths, and ramps adjacent to the intersection. Clearly indicate Americans with Disabilities Act (ADA) compliant grading when services are required.
 - D. Grading limits including tops of banks and toes of slopes.
 - E. Break lines.
 - F. Location of all existing and proposed structures including buildings and retaining walls.
 - G. Finished floor and slab elevations for buildings and at-grade structures.
 - H. Rim elevations of drainage structures.
 - I. All natural features including wetlands, floodways, floodplains, significant trees and their drip lines, and dense vegetation. Clearly indicate all protective measures.
 - J. All existing and proposed drainage systems and Erosion and Sediment Control (ESC) measures including swales & channels (both permanent and temporary). Clearly define type and location of each ESC BMP utilized when appropriate. See Oregon DEQ Construction Stormwater Best Management Practices (BMPs) Manual for the 1200-C NPDES General Permit.
 - K. At a minimum, drainage arrows depicting the proposed direction of flow for all individual lots including those lots not graded as part of the initial construction.
- h. Plan & Profile Sheets for Streets, Sidewalks, Curbs, Gutters, Ditches, Stormwater Systems, Sanitary Sewers, Private Utilities, Retaining Walls, Structures in the ROW, and Water Systems:
 - i. These sheets shall contain all information necessary for staking and construction of these items including
 - A. General
 - ROW, property, tract, and easement lines (existing and proposed). Right-of-way centerline stationing with offsets shall be used for all improvements.
 - Centerline stationing of all intersecting streets.
 - All existing and proposed improvements including utilities, water courses, wells, railroads, culverts, ditches, etc. with street centerline and offset stationing. Include all features within 100 feet of the proposed improvements, with legend.
 - Location and description of existing survey monuments, including but not limited to, property corners, section corners, quarter corners and donation land claim corners.
 - Subdivision, Development or Project name, lot numbers, street names.
 - Existing aboveground and underground utilities and significant trees and their drip lines. Show existing utility profiles with grades. Indicate invert elevations of all pipes and drainage structures.
 - Location of existing and proposed buildings, walls, structures, wells, septic tanks, fuel tanks, and any other buried structures.
 - Clearly designate existing conditions to be demolished or to remain.
 - Match lines with sheet and station number references.

- Location and description of existing survey monuments.
- Pot holing may be required to establish elevations of the City's existing utilities. Contact Public Works Department prior to pot holing.
- Streets, Retaining Walls, Stormwater Plan, and Profiles
- Horizontal alignment, vertical alignment, and curve data of street centerlines and face of curb flowlines or edge of pavement where curbs are not required. Stationing shall be given at a minimum of 50 foot intervals along tangents and 25 feet at face of curb returns.
- All tie-ins to existing streets and stormwater facilities.
- Super-elevations and cross-slope transitions; show all rate of change profiles.
- Curb return profiles. Flowline of curb elevations shall be given at quarter-delta and 25 foot (max) stations in plan view.
- In profile view, show existing ground elevations along roadway centerline and, if necessary, along ROW or other applicable offsets.
- Profiles of Cul-de-sacs shall show elevations along the flowline of all curbs or street edges, at a minimum of 25 foot intervals. Clearly indicate low or high spots within the cul-de-sac.
- Intersection grading plans that indicate spot elevations at all crowns, low points, transitions, and radius points along face of curb radii.
- For stub streets that may be extended in the future, the vertical alignment shall be designed for at least 300 feet beyond the present scope of construction.
- Driveway locations and dimensions. Clearly identify all ramp and wing transitions.
- Retaining wall locations. Show wall types, heights, widths, lengths, offsets, and depths. Show all footings. Show beginning and ends of all walls. Show top and bottom of walls on profiles. Clearly indicate subdrainage systems including outlet locations. Indicate utility passage or minimum separations required between walls and utilities.
- Retaining wall finishes, patterns, and joint locations.
- Sidewalk (existing and proposed) locations including ramps, landings and transitions and their relationship to driveways, planter strips, and approaches.
- Limits of overlay work if any.
- Location of all low points of street grades and curb returns.
- Grading limits.
- Plan and profile views showing location, stationing, size, and material of all existing and proposed mains and service lines for storm drainage.
- All existing and proposed stormwater structures including upstream and downstream systems as required to show conditions affecting the design. Include invert and top elevations, slopes, materials, and bedding.
- All existing and proposed utility crossings shall be shown in profile. Clearly label all utility conflicts (note: if a private utility has not been located vertically, the horizontal location of the crossing shall be shown on the profile at minimum).
- All sanitary and water lines in "background" line style on plan and profiles so that conflicts can be clearly seen.
- Federal Emergency Management Agency designated Flood Hazard Areas
- Wetland areas and water quality buffer strips.
- Guardrails, where required, including all end treatments.
- Profiles for ditch and creek flowlines shall extend a minimum of 200 feet beyond the project and include cross sections at 50 foot intervals, unless otherwise directed by the City Engineer.
- Station and elevation of all high and low points of streets and curb returns.
- Centerline grade and elevations of existing streets for a distance of at least one hundred fifty (150) feet each way at intersections with proposed streets and each end beyond the limits of construction.

B. Sanitary Sewer & Water Plan and Profiles

- All existing and proposed sanitary sewer and water structures and appurtenances including upstream and downstream systems as required to show conditions affecting the design. Include invert and top elevations, slopes, and materials.
- Combination air valves, isolation valves, and blow-off valve locations
- Plan and profile views showing location, stationing, size, and material of all existing and proposed mains and service lines for sanitary sewer, and water.
- Locations and sizes of existing and proposed septic tanks.
- In profile view, show existing ground elevations along roadway centerline and, if necessary, along ROW or utility centerline when located outside of roadway.
- All tie-ins to existing sanitary and water systems.
- All existing and proposed utility crossings shall be shown in profile. Clearly label all utility conflicts (note: if a private utility has not been located vertically, the horizontal location of the crossing shall be shown on the profile with a note indicating the elevation is unknown).
- All stormwater lines in “background” line type on plan and profiles so that conflicts can be clearly seen.

C. Private Utility Plan

- Location of all proposed private utilities including power, phone, gas, cable, etc. not owned by the City
- Cross section showing these facilities in relation to the street
- In general and for all new developments, private utilities shall be installed in public utility easements when public utility easements are required as part of the approved development.

D. Signing, Pavement Marking, and Lighting Plan

- Location of all proposed street signs, pavement marking, street lights, and traffic signals including conduit and other related items.
- Street signs shall be tabulated with size, type, colors, and MUTCD sign codes clearly indicated on the plans.
- Pavement markings shall be clearly described using MUTCD designations with color, widths, types, and sizes as pertinent.
- Lighting shall be clearly identified.
- Roadway lighting shall conform to the requirements of Section 11.3.

i. Cross Sections:

- i. Cross sections shall be clearly defined according to their locations on the site plans.
- ii. Cross sections shall be labeled sequentially by station, not to exceed 50 foot increments.
- iii. Throughout intersections, or other specific locations, cross section station intervals shall be as necessary to show all details.

j. Details:

- i. Include all project specific, special, and applicable details. Detail drawings shall be at a scale appropriate to show the level of complexity.

4. FEES, BONDS, SCHEDULING AND TRAFFIC CONTROL

4.1 FEES

1. All new construction requires plan review and approval prior to any construction, and periodic City inspection during construction. To cover the costs incurred by the City that are directly related to a specific development the City will charge a fee set by resolution.
2. The cost for all public improvements shall be borne by the Developer, including any off-site improvements required, subject to the credit provisions of the System Development Charge methodologies.

4.2 PERFORMANCE AND WARRANTY BOND

1. The developer/contractor/owner will be required to furnish a performance bond or other comparable security, and proof of insurance, for any work completed within the existing rights-of-way. The amount of the bond shall be as required in the Donald Development Code, as equal to at least 110% of the estimated cost of the public works construction, as approved by the City Engineer. This bond shall remain in effect until acceptance of the construction by the City.
2. Following acceptance of the construction, the developer/contractor/owner will also be required to furnish a warranty bond or other security that will remain in-place for the one- year warranty period for all work within new or existing public right of ways. The warranty bond shall cover all work within the existing right of ways and all work completed in new right of ways dedicated to the City upon recording of plats.
3. The warranty bond or security shall be in the amount of 5% of the cost of the public works improvements, as approved by the City Engineer. A warranty inspection shall be completed in the 11th month after completion and final acceptance and release of security will be made after all warranty items have been corrected.

4.3 SCHEDULING AND TRAFFIC CONTROL

1. Right-of-way permits, with a traffic control plan, are required for any City and/or County projects that impact the roadways and must be approved prior to commencing the construction. Marion County Public Works Department should be contacted directly for County roads, like Butteville Road, Main Street or Donald Road. All construction shall be scheduled with the City and/or County prior to the start of work in accordance with the permit.
2. All public right of ways subject to pedestrian and vehicular traffic where construction is to occur shall be provided with signing, barricades and flaggers as required during any construction that could impact public use. All traffic control shall conform to the “Manual on Uniform Traffic Control Devices (MUTCD), latest edition”.

3. Construction shall be managed to keep a single lane of traffic open at all times and both lanes open to traffic at the end of each work day. The closure of any street or road (with detouring of traffic around the closure) will only be considered on a case by case basis where maintenance of a single lane of traffic is not a viable option. Closure will only be granted by the City in writing after formal request for approval of a detailed detour plan and schedule of construction. The contractor shall be responsible to inform the police, sheriff, fire district, school district, postmaster, railroad, garbage collection service and any other impacted agencies.
4. Note: Kinder Morgan should be contacted for any work near the high pressurized petroleum line that runs parallel to the railroad. Kinder Morgan can be contacted at 1100 W Town and Country Road, Orange, California 92868, phone: 714-560-4400.

5. GENERAL DESIGN CRITERIA

5.1 GENERAL DESIGN GUIDELINES

All public improvements shall be designed as a logical part of the development of the surrounding area. Conveyance and distribution pipes (storm drains, sanitary sewers, and water mains) and street improvements shall be designed and constructed to provide adequate capacity of public facilities to, at a minimum, be able to accommodate the entire area the facilities will ultimately serve. Additional studies may be required by the City Engineer. All utilities and street improvements shall be extended, at a minimum, along the entire frontage of the property or through the entire property to the far boundary of the site to provide for future extensions to the adjoining properties. All facility requirements shall be consistent with the most current edition of the City's Water Master Plan, Wastewater Facilities Plan, Stormwater Master Plan, and future Planning documents.

5.2 CITY UTILITY EASEMENTS

1. General

- a. In general, all city utilities shall be placed within public ROW. In the extreme condition where a utility cannot be placed in a public ROW, a Design Exception is required for all city utilities on private property.
- b. If, at the discretion of the City Engineer, a Design Exception is granted on private property, all city utilities on private property shall be located in easements. The easement shall be a minimum of 15 feet wide and there shall be a minimum of seven and a half feet (7.5') from center of utility to edge of easement. When minimum setbacks or separations cannot be achieved within 15 foot wide easements, wider easements may be required. Septic tank easements shall extend at least 3-feet from all sides of the tank.
- c. In no circumstance may any structure (i.e. buildings, sheds, fences, patios, eaves, retaining walls) or natural feature be built or placed within an easement.
- d. Easements shall be recorded prior to Final Acceptance.

2. Access Roads

- a. An all-weather access road shall be constructed for all city utilities located outside of the ROW. The all-weather access road shall be a minimum of 15 feet wide with a minimum of six inches (6") of aggregate base or such depth as required to support an AASHTO WB-40 truck. Larger design vehicles may be required. Provide sufficient width for vehicle turn radii at all turns. An AASHTO vehicle turning radius study may be required (Swept Path Analysis). The access road shall be shaped to promote drainage and shall not cause ponding of stormwater. Drainage ditches, catch basins, and cross culverts may be required; these may increase minimum required easement sizes.
- b. Access roads with grades over 12% shall require a Design Exception. Maximum grades shall be limited by the service vehicles utilizing them as approved by the City Engineer.

- c. Access roads that connect to paved streets with curbs shall be installed with ADA compliant concrete driveway approaches and be hard surfaced for a minimum of 20 feet behind the back edge of driveway approaches. Runoff water from access roads shall not be allowed to run onto the streets they connect to.
- d. Access roads serving stormwater ponds, pump stations, treatment structures, or other significant City operated facilities shall be hard surfaced with sufficient width to allow adequate access as determined by the City Engineer.

6. GRADING, EROSION, AND SEDIMENT CONTROL DESIGN CRITERIA

6.1 ESTABLISHING SITE GRADES AND ELEVATIONS

1. Undisturbed existing condition elevations and grades shall be based on site conditions existing prior to any site work being done.
2. Elevation Datum shall be tied to City Aerial Mapping Elevation Control. See Appendix D: Survey Control.
3. In general, existing elevations and grades shall be established by a licensed Professional Land Surveyor (PLS). LiDAR may be available from County/State of Oregon and may be suitable for use by designers for preliminary design when allowed by the City Engineer.

6.2 GRADING REQUIREMENTS

1. Finished cut and/or fill slopes shall not exceed a two foot (2') horizontal to one foot (1') vertical slope (2:1) without site specific geotechnical engineering or an engineering geology study (or both). The study, signed and sealed by the appropriate registered professional, must state that the site soils have been investigated and that a steeper slope will be stable. All recommendations of the report must be adhered to in the site design and construction in order for the City Engineer to consider allowing the Design Exception.
2. All fills shall be placed in 6-12 inch lifts and compacted to accepted Engineering Standards sufficient to support the structure(s) intended.
3. Any proposed fills on an existing slope shall be constructed by benching the existing slope and placing the fill from the bottom to the top of slope. Consult with a qualified Geotechnical Engineer to determine the specific details required for the site conditions.
4. The limits of construction shown shall allow for sufficient room for the Contractor to construct the cuts and fills along the perimeter of the site while not encroaching on adjacent properties or a temporary construction agreement shall be obtained from the adjacent property owner.
5. Temporary cuts and fills may need geotechnical engineering reports when directed by the City Engineer.
6. Shoring plans may be required when proposed grading appears to affect adjacent properties or structures, as directed by the City Engineer. Shoring plans shall be prepared by qualified Professional Civil or Geotechnical Engineers licensed in Oregon.

6.3 EROSION AND SEDIMENT CONTROL REQUIREMENTS

1. Current ESC BMPs shall be utilized for all earth disturbing activities. Refer to the most current version of the Oregon DEQ Construction Stormwater Best Management Practices Manual for the 1200-C NPDES General Permit for a detailed description of BMPs, selection, and implementation of the appropriate measures for ESC. All critical areas and waters of the State shall be protected according to agency requirements.
2. Adequate erosion and pollution control facilities shall be installed in conjunction with construction projects. Developments greater than 1 acre in size shall be required to obtain an NPDES 1200-C erosion control permit from the Department of Environmental Quality.

6.3.1 Minimum Requirements

At a minimum, all plans shall address the following items:

1. All clearing limits (limits of construction) shall be flagged prior to initial clearing.
2. Construction timing and phasing such that it minimizes the potential for erosion.
3. Stabilized construction entrance(s), which will be the sole means of ingress and egress from the site, will be constructed prior to initiating construction.
4. Wheel washing areas may be required at construction entrances as determined by the City Engineer.
5. All stockpiles and staging areas shall be stabilized such that no material erodes into the adjoining street or property.
6. Slope stabilization measures (for all slopes 3:1 and steeper) shall be initiated within seven (7) calendar days after earthmoving activities have temporarily or permanently ceased in that portion of the site.
7. Sediment Control measures (silt fence, wattles, ESC matting, inlet protection, sediment traps, and basins etc.) for both temporary and permanent conditions as required for the individual site are clearly shown and are consistent with the guidelines in the State of Oregon DEQ BMPs or Stormwater Discharges Associated with Construction Activities manual.
 - a. Inlet protection measures will be consistent with State of Oregon DEQ BMPs for Stormwater Discharges Associated with Construction Activities manual for the specific site conditions.
 - b. Calculations for sizing of structural controls such as sediment traps and basins will be required and included in the Drainage Report.
 - c. Verification that other measures such as ESC matting are being used appropriately may also be required.
8. Establishment of all permanent cover through hydro-seeding or other appropriate means shall be clearly shown. On steep slopes, natural fiber ESC mats will be required. Mats shall have a minimum life expectancy of two (2) years. See Appendix F for seed mix requirements.
9. It shall be the responsibility of the Contractor (and ultimately the applicant) to ensure that all sediment controls are being maintained throughout construction.

6.3.2 ESC General Notes

The following notes shall be printed on the plans. For projects requiring a 1200-C Permit, additional notes are required as specifically indicated on the permit.

1. The ESC measures shown on the plan should be used as a guideline only; ESC measures may need to be added or altered depending on construction methods, staging, site conditions, weather, and scheduling.

2. The Contractor is responsible for control of sediment transport within project limits during construction and until the site is permanently stabilized. If an installed ESC system does not adequately contain sediment on site, then the ESC measures must be field adjusted by the Contractor as necessary for expected storm events to ensure that sediment laden water does not leave the site.
3. The implementation of the Erosion and Sediment Control Plan and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the Contractor until all construction is complete and approved, and vegetation is established.
4. The ESC facilities shall be inspected by the Contractor and maintained as necessary to ensure their continued functioning.
5. The Contractor shall seed and mulch all cut and fill slopes, and all disturbed ground areas. The Contractor shall be responsible for the seeded areas until vegetation upon them is established. Any additional seeding necessary to establish vegetation shall be done by the Contractor. On steep slopes, natural fiber ESC mats are required. Mats shall have a minimum life expectancy of two (2) years.
6. The Contractor is solely responsible for protection of all adjacent properties and downstream facilities from erosion and siltation during the course of the work. Any damage resulting from such erosion and siltation shall be corrected at the sole expense of the Contractor.
7. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to ensure that all paved areas are kept clean for the duration of the project.
8. In areas subject to surface and air movement of dust, one or more of the following preventative measures shall be taken for dust control:
 - a. Minimize the period of soil exposure through the use of temporary ground cover and other temporary stabilization practices (i.e. plastic, gravel, etc.)
 - b. Sprinkle the site with water until the surface is wet, repeat as needed
 - c. Spray exposed soils with an approved dust palliative (note: used oil is prohibited as a palliative).
9. Prior to any site excavation, all existing and newly constructed storm drainage inlets shall be protected as shown in the details to prevent sediment from entering the storm drainage system prior to permanent stabilization of all disturbed areas. Clean the filter as necessary to maintain drainage. Provide approved traffic control devices as necessary to protect the erosion control methods. Remove filter and clean catch basins following completion of all sitework.
10. At no time shall more than 12 inches of sediment be allowed to accumulate within a sediment trap or protected catch basin. All catch basins and conveyance lines shall be cleaned prior to paving. The cleaning operation shall not flush sediment laden water into the downstream system.
11. Install silt fences or approved wattle dams at the toe of all fill slopes before construction starts. Remove all silt when it becomes greater than 12 inches at the silt fence. Remove all silt and silt fences after completion of the project, and after vegetation has been permanently established.

7. ROADWAY DESIGN CRITERIA

7.1 GENERAL REQUIREMENTS

1. All street design and construction shall comply with the current edition of the ODOT/APWA Oregon Standard Specifications for Construction, as modified herein, unless otherwise approved by the Public Works Director. Design calculations performed and stamped by a Civil Engineer registered in the State of Oregon shall be included with all plans submitted.
2. Marion County standards shall govern for work between the face-of-curb for County owned roads.

7.1.1 Public Street Improvements

1. Depending on the level of development, half-street or full-street improvements along the property frontage or beyond may be required. In general, larger developments proposing new streets or the use of existing partially improved streets will require full street improvements, as determined by the City Engineer.
 - a. Half-street improvements are defined as a complete new or replacement street section and improvements from the ROW line adjacent and fronting the proposed project area to the centerline of the road.
 - b. Half-street plus ten improvements are defined as a complete new or replacement street section and improvements from the ROW line adjacent and fronting the proposed project area to the centerline of the road plus a minimum ten foot (10') travel lane beyond the centerline, as defined by the City Engineer.
 - c. Required street improvements may be reduced or eliminated by design exception on existing improved roads when allowed by the City Engineer.
 - d. Street Improvements shall be extended a minimum of 25 feet beyond the limits of the project when transitions to existing conditions are necessary, as directed by the City Engineer.
 - e. When proposed developments will utilize public streets for ingress and egress that have sections which are not fully developed, the applicant may be required to fully build out unimproved off-site sections of said streets, as directed by the City Engineer.
 - f. When proposed developments will utilize public streets for ingress and egress which are dead end streets 400 feet (or longer) without an adequate public turnaround, an approved public turnaround shall be provided at the end of the road, or as approved by the City Engineer.

7.1.2 ADA Curb Ramp Upgrade Requirements

1. ADA upgrades are required for all public or public-serving projects located within a public ROW or public serving easement involving new construction, reconstruction or resurfacing of streets, curbs, sidewalks, and ramps for

- a. Any project that extends from intersection to intersection. This includes normal four-way intersections, mid-block intersections, and T-intersections on the opposite side of the street.
 - b. Any project that spans from edge to edge of a street, (i.e. curb to curb, curb to edge of pavement, etc.) involves sidewalks, or pedestrian access routes, with an exception allowed for an exempted utility trench surface repair.
 - c. Any project that spans from edge to edge of a street, (i.e. curb to curb, curb to edge of pavement, etc.) involves sidewalks, or pedestrian access routes, with an exception allowed for an exempted utility trench surface repair.
2. When construction, reconstruction, or resurfacing affects a crosswalk route (marked or not marked), even if it is not the full roadway width, curb ramps must be provided at both ends of the crosswalk route and be adequate to provide barrier free access along the pedestrian access route. The project scope of work shall not be structured to avoid ADA obligations that require curb ramps when resurfacing a roadway (i.e. resurfacing only between crosswalks in an attempt to circumvent ADA obligations shall not be allowed).
- a. Typically, two curb ramps must be provided at each street corner. Curb ramps must be wholly contained within the pedestrian street crossings served and provide an unimpeded, straight, pedestrian access route. When installation of curb ramps is required, the construction of additional curb ramps on the opposite side of the street(s) may be required, as well to providing adequate pedestrian access routing.
 - b. For alterations of existing non-compliant ramps, where existing physical constraints prevent two curb ramps from being installed at a street corner, a single diagonal curb ramp may be permitted at the corner, as directed by the City Engineer.
 - c. All new or upgraded curb ramps shall be directionally oriented in the best manner possible to provide clear and straight pedestrian access routes to the curb ramp on the opposite side of the street. When no ramp is present on the opposite side of the street, the curb ramp shall be directed towards the best possible location of a future ramp.
 - d. When no existing pedestrian services are present on the opposite side of a crosswalk route, (this may occur at intersections and mid-block crossing routes) curb ramps may, at the discretion of the City Engineer, be omitted. However, when existing services are present, upgraded ADA compliant curb ramps shall be required. All new or upgraded curb ramps shall be directionally oriented in the best manner possible to provide clear and straight pedestrian access routes to the curb ramp on the opposite side of the street. When no ramp is present on the opposite side of the street, the curb ramp shall be directed towards the best possible location of a future ramp.

3. Resurfacing activities that specifically require full ADA upgrade compliance:

Overlays	Thin lift overlays	Reconstruction
Cape Seals	Concrete Rehab	In place asphalt recycling
Widening	Open-graded surfacing	Micro-surfacing
Resurfacing at	Grind & Replacement of asphalt	
Crosswalks		

4. Maintenance activities that specifically do not require ADA upgrade compliance:

Painting	Striping	Crack Filling/Sealing
Surface Sealing	Chip Seals	Slurry Sealing
Fog Seals	Scrub Scaling	Joint Repairs/Scaling
Dowel Bar Retrofit	Spot Sealing	Diamond Grinding
		(No Overlay)

5. Exempted utility trench surface repair: Single utility trench surface repair that does not meet the conditions of item one (1) does not require ADA upgrade compliance if the utility trench work is limited to a portion of the pavement, even including a portion of a crosswalk. Repaving necessary to cover the single utility trench is considered maintenance and will not require simultaneous installation or upgrading of curb ramps.
 - a. If the utility work impacts the curb at a pedestrian street crossing where no curb ramp exists, the work affecting the curb falls within the definition of “alteration”, a curb ramp must be constructed rather than simply replacing the curb.
 - b. Utility trenching that requires patch repairs six feet (6') or greater, that disturb half (or more) of a vehicle travel lane, or that contain more than one (1) utility that disturbs crosswalk route areas are required to provide ADA upgrades to all curb ramps served by the crosswalk(s) that have been disturbed.

7.2 STRUCTURAL SECTION

7.2.1 General Structural Requirements

1. The minimum street section (thickness of base and wearing surface) shall conform to the section as shown in the Standard Drawings (Appendix H). Site-specific pavement designs may be required by the City Engineer for proposed roadways under conditions such as the following:
 - a. Unusually high traffic volumes or percentage of trucks are anticipated
 - b. Oversized or overloaded trucks are expected on a regular basis
 - c. Site soils are unusually poor for the area
 - d. Construction is staged such that the roadway will receive traffic prior to placing the final lift of asphalt pavement
 - e. Requirements imposed by other governing jurisdictions (i.e. Marion County, ODOT, etc.).
2. Local Streets
 - a. Must comply with Standard Drawings (Appendix H)
 - b. Subgrade Geotextile Fabric
 - c. Minimum Subgrade Modulus 2000 pounds per square foot
3. Collector Streets
 - a. Must comply with Marion County Standards
4. Geotextile fabric
 - a. Shall be non-woven polypropylene; Tencate Mirafi 180N, Propex 801 US Fabrics US 205NW, or equal.

7.3 HORIZONTAL AND VERTICAL GEOMETRICS

7.3.1 General

1. Conform to the latest edition of AASHTO Policy on Geometric Design of Highways and Streets. All streets shall have type 'C' curbs. Curb height shall be a full 6" in height and be even with the roadway centerline elevation. All curb returns and sidewalks shall be designed to be ADA accessible in accordance with the current Public Right of Way Accessibility Guidelines (PROWAG).

2. All developments shall provide a 12' Public Utility Easement on all lots fronting onto a public right of way.

7.3.2 Street Classifications

1. Core Area Local Streets include the following:
 - a. Oak Street, from Butteville Road to the Railroad
 - b. Main Street, from Butteville Road to the Railroad
 - c. Crisell, Feller & Williams Street, from Oak to Cone Street
2. Refer to City of Donald ODOT map in Appendix B for Marion County roadways. Marion County Roadways include the following:
 - a. Donald Road
 - b. Main Street
 - c. Butteville Road
 - d. Cone Street
 - e. Matthieu Street

7.3.3 Minimum Paved Widths

1. Minimum paved widths and ROW shall follow Table 7-1.

Table 7-1. Minimum Paved Widths and Right-Of-Way

SERVICE AREA	MIN PAVED WIDTH	'C' CURB	SIDEWALK	ROW WIDTH
BASIC COLLECTOR*	34'	6" each side	5' curb tight	68 feet
LIMITED COLLECTOR*	38'	6" each side	5' curb tight	64 feet
CORE AREA LOCAL	40' curb to curb with 8' parking	6" each side	6' curb tight	60 feet
RURAL LOCAL STREET	34' curb to curb with 7' Parking	6" each side	5' curb tight	50 feet
CUL-DE-SAC (over 150')	Curb Radius: 48'	6" each side	5' curb tight	54' Radius
CUL-DE-SAC (under 150')	Curb Radius: 30'	6" each side	5' curb tight	36' Radius
PRIVATE STREET	Min 20 feet	No curbs	No sidewalks	NA

* Refer to County standards for Marion County roadways (7.3.2.2)

7.3.4 Design Speeds

1. Design speeds shall be posted speed plus 10 mph. All other design speeds shall defer to Table 7-2.
2. Design speeds shall be the following for each street type:

Table 7-2. Design Speeds

Street Type	Speed (mile/hour)
Local Streets	25
Minor Collector	35
Major Collector	35

7.3.5 Horizontal Curve

1. Centerline radii shall not be less than the following
 - a. Arterials 700 feet
 - b. Collectors 500 feet
 - c. Local Roads 100 feet

2. Centerline radii smaller than the City minimum centerline radii shall be per AASHTO standards and shall be approved by the City Engineer.
3. There shall be a minimum 100-foot tangent section between reverse horizontal curves on arterial and collector streets.
4. Centerline alignment of improvements shall be parallel and aligned over the centerline of the ROW.

7.3.6 Intersection Layout

1. Street intersections shall be as near to right angles (90°) as possible except where site constraints require a lesser angle, but in no case shall the acute angle be less than 75°. The ROW line along the acute angle shall have a minimum corner radius of 20 feet.
2. There shall be a minimum 50 feet of tangent from the centerline of the intersection to the beginning of a horizontal curve.
3. Local streets intersecting with a collector or greater functional classification street or streets intended to be posted with a stop sign shall provide a minimum landing length of 50 feet from the intersecting edge of pavement at an average grade of 2% or less shall be provided at all new intersection approaches.
4. At street intersections, the crown of the major (higher classification) street shall continue through the intersection. The roadway section of the minor street will flatten to match the major street at the curb line or quarter panel.
5. Curb radii at intersections shall be as shown in Table 7-3 for the various classifications.

Table 7-3. Curb Radii at Intersections

	Curb radius
Curbed Collector to Collector (See Marion County Standards for County curb radii at intersections)	R = 30 feet
Local Streets	R = 20 feet

6. Streets shall have at least 25 feet of tangent adjacent to the right-of-way intersection unless topography requires a lesser distance. Intersections which are not at right angles shall have a minimum corner radius of 20 feet along the right-of-way lines of the acute angle. Right-of-way lines at intersection with arterial streets shall have a corner radius of not less than 20 feet.
7. ROW lines at intersections with arterial streets shall have a minimum corner radius of 20 feet.
8. The width of ROW beyond the curb line shall not be reduced by the turning radius of the roadway.
9. Additional ROW may be required at intersections to facilitate the construction of ADA compliant curb ramps and sidewalks within the public ROW.
10. Intersection spacing (offsets) shall be determined by Table 7-4. These standards apply for offsets to intersections on the opposite side of the street as well as on the same side of the street, unless otherwise proven to be allowable by a Traffic Impact Analysis (TIA) or as approved by the City Engineer.

Table 7-4. City of Donald Access Management Spacing Standards^{a, b}

Street Classification	Spacing Between Public Streets (Min.)	Minimum Spacing Between Driveways and Other Driveways or Public Streets ^c
Minor Arterial Street	660 feet	300 feet
Collector Street	220 feet	100 feet
Local Street	200 feet	22 feet

a Exceptions may be made by the City Engineer

b Measured centerline to centerline

c Private access to arterial roadways shall only be granted through a requested variance of access spacing standards when access to a lower classification facility is not feasible.

11. Local street driveway spacing shall be 34 feet between adjacent edge of driveway throats. Minimum distance for local street driveways from an intersection shall be 28 feet from the end of the curb return to the nearest edge of driveway throat(s).

7.3.7 Grades

1. All grades exceeding 6% shall require a Design Exception. In no case shall grades exceed the following
 - a. Collectors 6%
 - b. All other roads 12%
2. Grades in excess of 12% must be approved by the City Engineer on an individual basis.
3. Minimum slope for drainage control at the gutter line for all streets is 0.5%, with 1% preferred. In all cases where less than 1% is used, a Design Exception shall be required.
4. Street grades, intersections and super elevation transitions shall be designed to not allow concentrations of stormwater to flow over the pavement.

7.3.8 Vertical Curves

1. The minimum vertical curve length for crest and sag curves shall be as determined by the AASHTO formulas in the, "Policy on Geometric Design of Highways and Streets (latest edition)" for the design speed and condition.
2. The minimum vertical curve length for crest and sag curves shall be as determined by the AASHTO formulas in the "Policy on Geometric Design of Highways and Streets (latest edition)" for the design speed and condition.
3. Vertical Curves are required for any change in grade of 1% or greater.

Table 7-5. “K” Values

“K” Values				
S (MPH)	Safe Stopping Distance (feet)	Crest	SAG	
			Headlight Control	Street lights
15	80	3	10	-
20	115	7	17	-
25	155	12	26	13
30	200	19	37	20
35	250	29	49	28
40	305	44	64	35
45	360	61	79	46
50	425	84	96	55
55	495	114	115	68
60	570	151	136	80

Ref. AASHTO A Policy on Geometric Design of Highways and Streets (latest edition)

4. Notes

- S = Design Speed in MPH
- Use 25 MPH speed unless otherwise directed
- Use Headlight Control K values for sags not designed for street light
- Use Street Light Control values when street lights have been designed to allow decreased K values. Submit street lighting profile showing locations of 25 foot tall lights and angle of lighting spread at street level (Assume 60 degree Zenith angle from lamp unless otherwise allowed). Profiles must indicate minimum Safe Stopping Distance based on design speed for roadway classification and posted speeds.

7.3.9 Taper and Flared Roadways

- For travel lane shifts, the taper lengths shall conform to the following per the MUTCD manual:
 - Speeds under 45 mph $L = WS^2/60$
 - Speeds over 45 mph $L = WS$
 - Where
 - L = length of taper (feet)
 - W = width of taper (feet)
 - S = design speed (mph)
- For addition of a right turn lane and/or left turn lane, a 15:1 approach taper shall be used, $L = 15W$, unless a site specific constraint requires a shorter taper for storage reasons. Appropriate reverse curves per AASHTO recommendations may be allowed as an alternative.
- Turn lane minimum widths shall be 14 feet, which includes a two foot (2') minimum Shy Distance. Unless otherwise shown in the City's TSP.

7.3.10 Cross-slopes and Superelevation

- All new streets shall be crowned with a cross-slopes per Table 7-6.

Table 7-6. Cross-Slopes

	Street Cross Slope (%)
Minimum	2
Maximum	6

2. Developments on existing shed street sections may be allowed, as directed by the City Engineer, and shall have a minimum slope of 2%.
3. All cross-slope transitions (i.e. intersection approaches) shall be clearly shown on the roadway profile and shall be designed in accordance with AASHTO recommendations per the design speed. The plans shall specifically address any stormwater drainage issues created by the transitions.
4. Intersection and cul-de-sac spot elevation plans will be required.

7.3.11 Curb Returns

1. At the intersection of two (2) local streets, the minimum allowable curb radius shall be 20 feet, measured from the radius point to face of curb. For the intersection of a local street with any collector or arterial, the minimum radius shall be 25 feet. On all other intersections, the minimum allowable radius shall be 30 feet.
2. Radii of 40 feet or more shall be provided where commercial trucks and buses turn frequently. Radii of 40 feet or more shall be designed to fit the paths of appropriate design vehicles.
3. The City Engineer may require a Swept Path Analysis at intersections or driveway approaches that accommodate commercial trucks, buses, emergency vehicles, or delivery traffic.
4. All curb return geometrics, both horizontal and vertical, shall be shown on the plans. Elevations given at quarter (1/4) points may be sufficient to show the grades. All high and low points shall be shown.
5. Where pedestrian access ramps are required, show all grading, layout, orientation, warning devices, and transitions along the curb necessary to meet ADA requirements.

7.3.12 Sight Distance

1. In accordance with AASHTO Policy on Geometric Design of Highways and Streets:
 - a. All streets shall meet adequate Stopping Sight Distance
 - b. All collectors and arterials shall meet adequate Intersection Sight Distance
 - c. Provide sight distance triangles for all intersection and driveway approaches (both approach and departure) unless otherwise waived by the City Engineer in writing.

7.3.13 Parking Lot Design

1. Parking lot design shall conform to the current version of The Dimensions of Parking by the Urban Land Institute and the National Parking Association, Donald City Standards, or other design criteria as approved by the City Engineer.
2. A Construction Site/ROW Permit is required prior to reconstructing existing parking lots in order to bring them up to current stormwater and landscaping standards.
3. Sight distance requirements and vision clearance at intersections shall conform to the ODOT Geometric design requirements

7.3.14 Curbs, Sidewalks, and Driveways

1. Follow the requirements of ODOT/APWA Standard Specification for Construction Section 00759 Miscellaneous Portland Cement Concrete Structures, as modified herein. Commercial Concrete shall follow the requirements of ODOT/APWA Standard Specification for Construction sections 00440 as modified herein.
2. In order to comply with ADA regulations, the City has adopted a policy dictating that sidewalks, including intervening driveway approaches, be completed in full by the developer. Federal law prohibits partially completed sidewalks. Damage incurred during the course of construction must be repaired prior to final acceptance. The applicant shall be required to install ADA compliant access ramps and the sidewalk portion of the driveway approach as part of the infrastructure improvements. The applicant may be required to install off-site ADA compliant access ramps to accommodate ADA requirements (i.e. across the street, block to block, etc.).
3. Finish all flat work with a light broom finish and minimum 1-1/2" tool against all joints. The surface of flat work shall be scored at nominal 5 foot spacing to provide a contraction joint. Curbs shall have contraction joints nominally spaced at 15 foot on center.
4. Furnish and install a minimum of two 3-inch ABS or PVC pipe weep holes to each lot.
5. Driveways:
 - a. All driveways shall conform to the standard details in Appendix H. Driveways drops, excluding wings, shall be a maximum of 36 feet for all land uses.
 - b. Private Driveways: Turnarounds for private driveways shall conform to the current edition of the Marion County Fire Code Applications Guide.

7.3.15 Street Sections

1. For all proposed streets, the location of all utilities (both public and private) shall be shown in concept during the planning stages for conceptual agreement by the City Engineer prior to the development of construction drawings.
2. When public utility easements are required, utilities must be shown.

7.3.16 Cul-De-Sacs and Eyebrows

1. Cul-de-sacs and eyebrows shall be allowed only on local streets.
2. Cul-de-sacs shall not be more than four hundred (400) feet in length, except where no other alternatives are available for access. The length of a cul-de-sac shall be measured along the projection of the face of curb of the nearest through traffic intersecting street to the farthest point of the cul-de-sac right-of-way.
3. For cul-de-sacs longer than 150 feet from the face of curb, the minimum radius for a cul-de-sac bulb right of way shall be 54 feet with a minimum curb radius of 48 feet to provide turnaround space for fire protection vehicles. For cul-de-sacs less than 150 feet from the face of curb, the curb radius may be reduced to a minimum of 30 foot with a right of way radius of 36 feet.
4. The minimum curb radius for transitions into cul-de-sac bulbs shall be twenty- eight (28) feet minimum, and the right-of-way radius shall be sufficient to maintain the same right-of-way to curb spacing as in the adjacent portion of the road.

7.3.17 Parking

1. Parking plans shall be in accordance with the latest AASHTO guidelines:

Table 7-7. Parking Geometry

Parameter	Dimensions
Standard Stall	9'-0" x 19'-0"
Compact Stall	8'-6" x 15'-0"
Standard Isle Width	24'-0"

7.3.18 Aggregate Base

1. Follow the requirements of ODOT/APWA Standard Specification for Construction sections 00641 Aggregate Subbase, Base, and Shoulders, as modified herein. Aggregate base shall consist of dense graded crushed rock conforming to ODOT/APWA section 02630 and the Standard Details in Appendix H. Base rock shall be compacted to a minimum of 95% of AASHTO T-180 (ASTM D1557).
2. Subbase shall be prepared in accordance with Section 00330 compacted to a minimum of 95% of AASHTO T-180 (ASTM D1557) to a depth of 1 foot and including all embankments regardless of depth.
3. The City will be responsible for the cost of the proctor and all passing test costs. Any work showing noncompliance with test standards shall be repaired or replaced and retested at the Developer's expense until in compliance with specified standards.

7.3.19 Asphalt Concrete Pavement (AC Paving)

1. ACP shall meet the requirements of ODOT Standard Specifications Section 00744 – Asphalt Concrete and the following conditions:
 - a. All AC paving, regardless of the time of year the paving is placed, shall be held to the same performance criteria. If for any reason there is aggregate separation, a rough finished surface, or other non-acceptable final product, the City Engineer may determine that it is in the best interest of the City to reject the work and have it removed and reconstructed. Alternatively, the City Engineer may require an asphalt seal coat or other remediation on the entire surface or portions thereof.
 - b. In no case shall the ratio of asphalt lift thickness to maximum aggregate size be greater than five (5) or less than three (3).
 - c. Asphalt tack shall be required along edges, curbs, saw cuts, and between layers of ACP. Removal of all tack overspray and trackings shall be required. Failure to remove unwanted tack properly may require removal and replacement of damaged surfaces at the applicant's expense.
 - d. The maximum aggregate size in the final lift of AC paving shall be less than three-quarter inch (3/4").
 - e. Asphalt concrete pavement and asphalt tack performance criteria shall be provided to the City Engineer prior to placement.
 - f. Compaction of both asphalt and base rock shall conform to the Standard Drawing, "Street Detail".
 - g. Manholes, valve boxes, monument boxes, etc. shall be recessed a quarter to half inch (1/4"-1/2") below the finished grade of pavement in all streets. Failure to adjust to the specified tolerances will be grounds for rejection of the asphalt paving at the sole discretion of the City Engineer.
 - h. Minimum surface temperature for laying asphalt pavement is 40 degrees. At surface temperatures under 50 degrees the first lift of asphalt must be compacted within 15 minutes of application, and the maximum thickness of the first lift is 1-1/2".
 - i. Minimum wet density of 145 PCF.
 - j. Follow the requirements of ODOT/APWA Standard Specification for Construction Section 00744 for small quantity and miscellaneous ACP, and Section 00745 for street construction ACP, as modified herein. Material shall be 1/2" ACP, level 2, with PG 64-22 asphaltic cement.
 - k. Pave only after Engineer approves base. Paving shall be placed in two lifts; the initial lift of 2 inches will be placed at the time the development is completed. The final lift of 2 inches will be placed

approximately eleven months later, near the end of the one year warranty period. Prior to placing the second lift, the surface shall be cleaned, and a tack coat shall be applied as specified.

- l. All existing pavement edges to be joined with new pavement shall be saw cut such that the cut remains straight and vertical without breakouts at the time of joining the new pavement. Thoroughly seal and sand the saw cut edge with asphaltic cement.
- m. Asphalt concrete expansion: The density of asphalt concrete as determined by ODOT TM 305 or AASHTO T 209 shall be at least 91 percent of the maximum density for the base lift and 92 percent for top lift.
- n. The City will be responsible for all passing test costs. Any work showing noncompliance with test standards shall be repaired or replaced and retested at Developer's expense until in compliance with specified standards.

7.3.20 Utility Trench Patching

1. Four inches (4") minimum compact ACP required over trench patch areas per City trench patch standards is required for all Utility Trench patching within existing paved area located within the ROW. However, match depths when existing asphalt is greater than four inches (4"). Lift thickness shall be not greater than two inches (2") unless allowed by the City Engineer.
2. Any damaged asphalt caused during construction will trigger two inch (2") deep minimum grind and replacement, no spot patching will be allowed. Areas of damaged surface to be determined by the City Engineer. If large portions of the street have been damaged (i.e. settlement or significant cracking), remove and replace all damaged areas marked by the City Engineer (replace full depth of asphalt and base materials as required).
3. For all utility trenches parallel to the street with final street cuts within two feet (2') of the gutter/road edge, replace asphalt to the edge of gutter/road per minimum City Standards.
4. Pavement Grind and Replacement (Section 7.3.21) and ADA Curb Ramp Upgrade Requirements (Section 7.1.2) apply for utility trenching activities when directed by the City Engineer.

7.3.21 Pavement Grind and Replacement

1. The applicant shall grind and replace pavement with a minimum of two inches (2") of asphalt overlay under the following circumstances:
 - a. If utility street cuts are ten feet (10') or less apart, grind and replace the entire extents between street cuts.
 - b. If, in the opinion of the City Engineer, a significant portion of the street along the frontage has been disturbed by utility street cuts, the applicant shall grind and replace
 - i. The areas marked, or
 - ii. Half street along the frontage, or
 - iii. Half street plus ten feet (10') along the frontage, or
 - iv. The entire street along the frontage, as directed by the City Engineer.
2. If the total existing asphalt depth is three inches (3") or less, in areas requiring grind and replacement, an entire asphalt replacement of these areas will be required (minimum of four inches of depth plus base rock material if existing base is not adequate). Subgrade improvements may be required, as directed by the City Engineer.
3. For all utility trenches parallel to the street with final street cuts within three feet (3') of the gutter/road edge, replace asphalt to the edge of gutter/road.

4. When grind and replacement is required, complete ADA curb ramp reconstruction/replacement may be required per Section 7.1.2.

7.3.22 Permanent Traffic Safety Guards and Fencing

1. Permanent traffic safety devices such as guardrails and pedestrian safety guards shall be required where conditions warrant such devices, as determined by the City Engineer.
 - a. Vehicular Guardrails shall meet the conditions of the ODOT Standard Specifications, Part 00800 – Permanent Traffic Safety and Guidance Devices.
 - b. Pedestrian guards and fencing shall be required along sidewalks, walls, ramps, or stairways in locations where there is more than 30 inches of vertical elevation drop adjacent to the traveled path and when directed by the City Engineer.
 - i. Fall guards shall be no less than 42 inches above walking surfaces. Fall guards shall be rust resistant steel structures capable of resisting a 200-pound horizontal point load at any location. Fall guards shall be constructed with at least one horizontal mid-bar.
 - ii. Protective fencing shall be no less than 60 inches tall. Fencing shall be as specified by the City Engineer.

7.4 RETAINING WALL AND STRUCTURE REQUIREMENTS

7.4.1 References

1. Walls, structures, and their foundations shall be designed according to the latest Oregon Structural Specialty Code (OSSC) Chapter 16 – Structural Design and Chapter 18 – Soils and Foundations.

7.4.2 General Design Conditions

1. Walls and structures must be designed and stamped by the Design Engineer. A stamped report clearly indicating design considerations is required for submission to the City or its Agents by the applicant.
2. All portions of walls and structures, including their foundations and drainage systems, must be constructed within the ROW unless
 - a. A permanent wall easement is obtained with private properties
 - b. The structure is part of an approved driveway or pedestrian access bridge (special conditions apply for this situation)
 - c. A written agreement is made between governmental agencies for shared structures.
3. All retaining walls supporting property outside of the ROW must be designed to support existing conditions, slopes, and soil types plus known anticipated conditions.
4. All walls supporting streets, bridges, abutments, sidewalks, or public improvements shall be design for anticipated live and dead loadings plus 250 per square feet surcharge loadings.
5. All Driveway Bridge structures must meet current seismic loading requirements as required by the OSSC.
6. When portions of walls or structures will be located below the 100-year flood elevation of a stream or within a flood-plain, design according to FHA HEC 18 Evaluating Scour at Bridges publication FHWA-HIF-12-003 or latest edition.

8. WATER SYSTEM DESIGN AND CONSTRUCTION STANDARDS

8.1 GENERAL WATER SYSTEM DESIGN REQUIREMENTS

1. Water system design shall conform to all Oregon Health Authority Requirements. Contractor/Developer/Owner shall secure OHA approval prior to construction. Construction shall conform to the current edition of the ODOT/APWA Oregon Standard Specifications for Construction, as modified herein, unless otherwise approved by the Public Works Director.
2. Design calculations performed and stamped by a Civil Engineer registered in the State of Oregon shall be included with all plan submittals.
3. All materials in contact with potable water shall conform to ANSI/NSF Standard 61, Drinking Water System Components – Health Effects, or equivalent.

8.2 PIPE SIZING AND SYSTEM CAPACITY

1. Pipe sizing shall be as shown in the Water Master Plan or as required to provide peak domestic demand with fire flow for existing, planned, and future development. Capacity and flow calculations may be required which meet the Oregon Department of Human Services, Oregon Drinking Water Services, and Donald Water Master Plan standards for specific sites. The applicant shall meet with the City Engineer early in the process to discuss connection to the City's existing water system and determine if there are any existing system problems that would need to be addressed in order to provide adequate capacity to the proposed development.
2. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use and shall be approved by the City Engineer.
3. Mainlines on private property and in the public right-of-way shall be size for minimum fire flow and peak hourly demand.

8.2.1 Pressure

1. All water mains shall be designed to maintain a minimum pressure of 20 psi at ground level for maximum day demand system flows, plus fire demand at any location in the City. Higher residual pressures may be required in areas of multi-story buildings. Normal working pressures in the system shall be approximately 60-70 psi.

8.2.2 Distribution Pipes

1. Minimum distribution pipe size is eight inches (8").
2. All main lines in the public ROW shall be approved by the City Engineer

3. When public water lines are not located in public ROW a minimum 15' easement centered on the water line shall be provided.

8.2.3 Fire Flows

1. All distribution systems shall be designed to provide the minimum fire flow as defined in this Section with modifications that may be required by the City Engineer and Fire Chief.
2. Fire Flows shall meet or exceed the recommended fire flow per the Oregon Fire Code and the Aurora Fire District. Unless otherwise directed, fire flows shall meet the following requirements:
 - a. One- and two-family dwellings, group R-3 and R-4 buildings and townhouses
 - i. A minimum fire flow of 1,000 gallons per minute (gpm) for a minimum of 2 hours duration is required for residential areas.
 - b. Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses depending on Fire-Flow area and whether a sprinkler system is equipped:
 - i. A minimum fire flow of 1,500 gpm for a 2-hour duration is required for commercial areas.
 - ii. A minimum fire flow of 2,500 gpm for a 2-hour duration is required for the Donald Industrial Park
3. Fire flows shall be approved by the City Engineer and Aurora Fire Marshall.

8.2.4 Pipe Looping Requirements

1. Distribution piping shall be looped. When looping is not feasible, a design exception is required. If allowed, dead end lines shall be extended to the property boundary for future extension/looping with adequate easement and access, as directed by the City Engineer. In most cases, a fire hydrant shall be placed at the end of dead end lines for flushing and maintenance. Fire hydrants placed at dead end lines shall meet requirements of Section 8.2.1. In rare cases, a blow off assembly may be approved through a design exception.
2. Dead end mains equipped with a hydrant shall be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed.

8.2.5 Design velocities

1. Pipeline velocities shall not exceed eight feet per second (8 feet per second (fps)) under peak hourly demand flows. Pipes designed for higher velocities shall require special evaluation and/or materials and shall only be approved through Design Exception.

8.2.6 Service Pipes

1. Provide at least one water service per tax lot.
2. Developer shall provide calculations to estimate the peak hourly demand of the service connection for all proposed construction other than single family residences. Estimates shall be based on verifiable sources including the latest edition of the Uniform Plumbing Code with Oregon amendments, Donald Water Master Plan, and Oregon Health Authority. Industrial water demand estimates shall be based on comparable industries within the region.
3. Single family residential service lines shall be a minimum one inch (1"). No splices shall be allowed in service lines. All other services shall be sized appropriately by the applicant for the intended use and in

accordance with the latest edition of the Uniform Plumbing Code with Oregon amendments. See Standard Drawing (Appendix H) When this section and the Standard Drawing conflict, the Standard Drawing shall govern.

8.2.7 Pipe Identification

1. All potable water mains shall be identifiable as follows:
 - a. All pipes shall be installed with detectable, blue, six-inch (6") wide marking tape one foot (1') above the crown of the pipe along its entire length. The marking tape shall be marked with the phrase "Potable Water" every five feet (5'), or as approved by the City Engineer.
 - b. Water pipes shall be installed with a toning wire along their entire length, terminated in the top of valve boxes, meter boxes, and fire hydrants, accessible from ground level. The toning wire shall be size 12 AWG Solid Copper with blue insulation suitable for direct burial. Any splices in the toning wire shall be made using King Innovations DryConn DBSR direct bury gel caps with strain relief, or approved equal. See the Standard Drawings (Appendix H) for toning wire termination practices.
 - c. PVC potable water pipe shall be blue in color.

8.3 MATERIALS

8.3.1 Distribution Pipes

1. All piping four inches (4") and larger shall be C-900/C-905, pressure class 235, DR 18 PVC colored blue throughout the entire composition of the pipe. Pressure class of pipe shall exceed the anticipated operating pressures by a minimum of 50 psi. Pipe dimensions shall conform to Iron Pipe Sizing (IPS) standards. Consult with the City Engineer regarding operating pressures within the existing system. Under certain conditions, ductile iron pipe may be required by the City Engineer.

8.3.2 Service Pipes

1. Service lines shall be minimum 1" copper tube size cross linked polyethylene per AWWA C-904, SDR 9, blue PEX A. All street crossings shall be bored, jacked or installed by horizontal directional drill HDD.
 - a. Open cut installations may be considered on a case-by-case basis.

8.4 CONNECTIONS, FITTINGS, AND METERS

8.4.1 Mains

1. All connections and fittings shall meet the requirements of NSF 61. Fittings shall be ductile iron and shall meet the requirements of AWWA C110 or AWWA C153 and shall have a minimum working pressure rating of 350 psi. Joints shall meet the requirements of AWWA C111. Fittings shall be cement mortar lined and seal coated, meeting the requirements of AWWA C104. Gaskets for flat faced or raised faced flanges shall be an eighth inch (1/8") thick neoprene having a Durometer reading of 60, \pm 5. The type, material, and identification mark for bolts and nuts shall be provided.
 - a. Compact ductile iron mechanical joint fittings are required unless otherwise approved by the City Engineer.
 - b. Pipeline shall utilize mechanical thrust restraint at all locations where thrust is developed in accordance with Section 8.5.4.
 - c. Connections to existing main lines shall have thrust blocks.

8.4.2 Service Pipes and Meters

2. PEX A pipe fittings shall be brass or stainless steel CTS Mueller 110 compression fitting on service pipes. Push type and press type fittings will not be allowed. All service pipe materials shall meet the requirements of ASTM B88 and NSF 61.
3. A double check backflow preventer shall be installed at every service per the Standard Drawings. The City Engineer may require a reduced pressure principal backflow preventer at commercial or industrial services depending on the level of protection required.
4. Service saddles shall be AWWA taper thread made of epoxy coated ductile iron with stainless steel straps, washers, and nuts per ODOT/APWA 02490.20. Provide Romac Industries, Inc., Bothell, WA, Model 202 BS for C900 pipe and 202N-H for HDPE pipe, or equal.
5. Corporation stops and angle meter stops shall comply with AWWA C-800 and have taper inlets, and packed compression outlets, per ODOT/APWA 02490.30. All brass shall be lead free, Ford, Mueller, or equal.
6. Meter boxes for meter and backflow preventer shall be 11" x 18" reinforced fiberglass plastic with polymer concrete lids, Armorcast Products Company, Model A6000485TAFRP with A6000484T cover as provided by Oldcastle Infrastructure in Wilsonville, OR, or approved equal.
7. The design and material requirements for all commercial or residential services greater than 1" shall be as approved by Public Works Department on a case by case basis.
1. The City will provide and install all meters, tandem connection, backflow prevention and tailpieces. See the Standard Drawings (Appendix H) for the appropriate meter boxes to be installed by the City.

8.5 INSTALLATION

1. Follow the requirements of ODOT/APWA Standard Specification for Construction Section 00405 Drainage and Sewers for trench construction, and Section 01140 Potable Water Pipe and Fittings, as modified herein.

8.5.1 Cover

1. Minimum cover is 36 inches from finished grade to top of pipe. Maximum Cover is 48 inches unless allowed by Design Exception.

8.5.2 Separation

1. Water mains shall be located at least 2-feet from existing or proposed buried utilities other than sanitary sewer lines.
2. See Section 10.4.2 for water and sanitary sewer line separation requirements.
3. Water mains shall be located 1-foot behind existing or proposed sidewalks, on property side.

8.5.3 Backfill and Compaction

1. Pipe bedding, pipe zone material, and trench backfill shall be an approved granular material three-fourths inch (3/4") minus crushed rock. Provide native backfill outside of traveled roadways or sidewalks. Provide 3/4" - 0" crushed rock backfill under travel surfaces and sidewalks. Sand backfill is not allowed. Compact all materials as follows:

Table 8-1. Water Pipe Backfill and Compaction

Material	Specification
Pipe Bedding & Pipe Zone	90% of ASTM D1557 (AASHTO T-180)
Native Backfill	90% of ASTM D1557 (AASHTO T-180)
Granular Backfill	95% of ASTM D1557 (AASHTO T-180)

- Contractor to determine the type of equipment and method to achieve the required compaction. Each lift shall be compacted to a minimum of 95 percent of the maximum density as determined by the AASHTO T-180 test method.
- Settlement of the finished surface within the warranty period shall be considered to be a result of improper compaction and shall be promptly repaired by the Contractor at no expense to the owner.

8.5.4 Thrust Restraint

- All fittings shall have mechanical thrust restraint in accordance with the Tables in Appendix H.
- Thrust restraints shall be required at all tees, flanges, caps, bends, offsets, plugs, dead-ends, hydrants, blow-off locations, as well as all other appurtenances which are subject to unbalanced thrust per OAR Section 333-061.
- All pipelines shall have mechanical thrust restraint, where thrust is developed, capable of restraining a minimum line pressure of 150 psi.
- Blocking shall be 3,000 psi concrete poured in place. Concrete blocking shall be placed against solid undisturbed earth at the sides and bottom of the trench excavation and shall be shaped so as not to obstruct access to the joints of the pipe or fittings. Thrust blocking shall be poured against undisturbed earth in accordance with the Tables in Appendix H. The allowable design soil bearing strength may be reduced based on the findings of any site specific geotechnical investigations or poor soil conditions are observed in the field.
- Pipe and fittings in contact with thrust or saddle blocks shall be wrapped in eight (8) mil polyethylene.
- For unbalanced forces in the vertical direction use mechanical joint restraint and effective length design.
- Mechanical joint restraints shall use EBBA Iron series 2000 Megalug mechanical joint thrust restraint or approved equal. Contractor to restrain the minimum required pipe length with EBBA Iron series 1500, 1600, or 2800 bell restraint harness or approved equal unless otherwise specified.
- Submit pipe restraint info prior to purchase. For non-standard thrusting conditions or non-standard thrusts not shown on the plans, submit plans and calculations signed and stamped by a State of Oregon Licensed Professional Engineer.

8.6 VALVES

8.6.1 Isolation Valves

- Follow the requirements of ODOT Standard Specification for Construction Section 02480 – Potable Water Valve Materials as modified herein.
- Gate Valves:

- a. All isolation valves ten inches (10") or less in diameter shall be ductile iron, resilient wedge gate valves rated for a working pressure of 200 psi, bubble/seal tight at a differential pressure of 250 PSI and shall be counter-clockwise (left) opening.
 - b. Provide gate valves that meet the requirements of AWWA C515.
 - c. Provide a two inch (2") square nut to conform to AWWA C504 on all buried valves.
 - d. Gate valves shall be equipped with an O-ring stuffing box.
 - e. Gate valves shall be M&H, Kennedy, Clow or equal.
3. All valves 12 inches or larger in diameter shall be actuator equipped, counter-clockwise (left) opening, ductile iron, butterfly valves rated for a minimum working pressure of 250 psi and bubble/seal tight at a differential pressure of 250 psi, unless otherwise specified.
 - a. Provide butterfly valves that are rubber seated and meet the requirements of AWWA C504, Class 150B.
 - b. Shaft seals shall be standard O-ring seals, designed for replacement under line pressure.
 - c. Provide valve operators of the traveling nut or worm gear type and that are sealed, gasketed, and permanently lubricated for buried service. Construct valve operators to the standard of the valve manufacturer to withstand all anticipated operating torques, and design to resist submergence in groundwater.
 - d. Provide butterfly valves that are resilient seat and are equipped with an O-ring stuffing box.
4. All buried valves shall have non-rising stems.
5. Valves located in vaults shall have rising stems or position indicators.
6. Use a ductile iron swivel tee, or equivalent, to ensure the operational nut and valve box is perpendicular to the road surface.

8.6.2 Valve Locations

1. Valves shall be located as follows:
 - a. Maximum 600 foot spacing along mains
 - b. In fire hydrant line at hydrant locations (locate next to main)
 - c. At pipe intersections, one valve per branch (Appendix H).

8.6.3 Valve Boxes and Extensions

1. Valve boxes shall be Model VB910 cast iron valve box with cast iron cover marked "WATER" as manufactured by Olympic Foundry, Portland, OR, 503.281.3381, or equal. Valve box extensions shall conform to ASTM D3034, SDR 35.
2. Valve stem extensions shall have a 2 inch square operating nut and self-centering rockplate support. Valves with an operating nut more than 3 feet below grade shall have a valve stem extension to raise the operating nut to within 3 feet of the ground surface.

8.7 FIRE HYDRANTS

8.7.1 Acceptable Fire Hydrants

1. Follow the requirements of ODOT/APWA Standard Specification for Construction Section 01160 Hydrants and Appurtenances, as modified herein.

2. Fire hydrants shall be Waterous 5-1/4" Pacer Traffic (Model WB67) as manufactured by American Flow Control, Birmingham, AL, or equal and shall meet the requirements of ANSI/AWWA C502 configured with the following ports:
 - a. One (1) five and a quarter inch (5 1/4") pumper with a four and a half inch (4 1/2") bronze steamer port with Storz adapter with cap.
 - b. Two (2) two and a half inch (2 1/2") brass hose nozzles with cast iron caps.
 - c. All City owned fire hydrants shall be painted Yellow and all privately owned fire hydrants shall be painted Red.
 - d. Fire Hydrants shall be furnished with a fire hydrant gate valve in conjunction with hydrant meter when requested by the City.

8.7.2 Fire Hydrant Location

1. Install approved new fire hydrant(s) per the following:
 - a. Per the requirements of the Aurora Fire District.
 - b. Fire hydrants shall be installed to ensure all properties are within 250 feet of the nearest hydrant.
 - c. The applicant shall be responsible for obtaining approval from the City Engineer and Aurora Fire Marshall for the location of all proposed fire hydrants.
 - d. For some developments, more than one (1) fire hydrant may be necessary to produce the required fire flow, as directed by the City Engineer and Aurora Fire Marshall.
 - e. Plans and Specifications shall be prepared and stamped by a Civil Engineer registered in the State of Oregon.

8.7.3 Fire Hydrant Sizing

1. Line size from main to fire hydrant shall be six inches (6").

8.8 COMBINATION AIR RELEASE AND AIR/VACUUM VALVES

8.8.1 Location

1. Mains shall be designed to eliminate high points. If high points are unavoidable, properly sized Combination Air Release and Air/Vacuum Valves (CARV) shall be installed in a vault at the apex. CARVs shall be Val-Matic 202C, APCO 145C, or approved equal.

8.8.2 Venting

1. All CARVs shall vent to the outside of the vault. Vents shall be designed with a down turned elbow and an insect screen. Vents shall terminate a minimum of two feet (2') above finish grade or two feet (2') above the reasonable local flood surface elevation, whichever is greater. See City Standard Drawings (Appendix H).

8.9 CROSS-CONNECTION PREVENTION

8.9.1 General

1. Cross-connection prevention shall be required in accordance with the City's cross-connection ordinance and OAR 333-061 on backflow and cross-connection prevention. See Appendix E for the Cross-Connection Control Program.

2. All irrigation meters shall have approved backflow prevention devices inspected annually by a State Certified Backflow Technician with a report sent to the City of Donald Public Works Department.
3. See Appendix H for reduced pressure backflow assembly details.

8.9.2 Location

1. All water service meter and backflow prevention assemblies shall be located in the ROW.

8.9.3 Ownership

1. All water service connections will be equipped with a backflow prevention device paid for by the developer/property owner and shall be maintained by the City.

8.10 DISINFECTION

8.10.1 Protection of Pipes and Appurtenances

1. All pipe, pipe fittings, valving, and associated appurtenances when delivered to the work site, shall be placed in a suitable storage area with the consideration to effect maximum protection from any sources of contamination. Pipe stored at the work site should never be stored in a manner that surface water pooling could occur allowing any portion of the piping, fittings, valving or other appurtenances to become partially or wholly flooded with extraneous water sources. Pipe, pipe fittings, valving and associated appurtenances to be stored at the job site for more than 24-hours shall be suitably protected from animals and/or rodents from entering the interior of same. If in the judgment of the Public Works Superintendent any pipe, pipe fittings, valving, and associated appurtenances are found to be so contaminated, the contractor shall not use such facilities until proper flushing and/or disinfection has been afforded same and approved by the Public Works Superintendent for use.

8.10.2 Flushing

1. Prior to disinfection, flush all foreign matter from the pipeline using only potable water. Provide hoses, temporary pipes, ditches, and other suitable conveyance as required to dispose of the flushing water without damage to adjacent properties, or the environment. Flushing velocities shall be at least two and a half feet per second (2.5 fps). For large diameter pipe where it is impractical or impossible to flush the pipe at two and a half feet per second (2.5 fps) velocity, clean the pipeline in place from the inside by brushing and sweeping, then flush the line at a lower velocity. Contaminated pipe fittings, valving, and other related facilities shall be properly cleaned and flushed prior to project use.

8.10.3 Chlorination

1. Following completion of new facilities and repairs to existing facilities, those portions of the facilities which will be in contact with the water delivered to users shall be disinfected with chlorine before they are placed into service. Disinfection shall conform to the most recent version of AWWA C651 and OAR section 333-061-0050 as hereinafter modified or expanded, and the requirements of any governing agency having jurisdiction.
2. All waterlines shall be pressure tested in accordance with AWWA C-605 standards.

8.10.4 Dechlorination

1. Appropriate disposal and/or dechlorination of flushed water during blowoff is the responsibility of the Contractor. The chlorine concentration in flushed water shall not exceed 0.1 mg/L. Under no circumstances shall water be discharged in such a manner as to cause erosion.

8.10.5 Bacteria Test

1. Testing for coliforms is required for all new water lines and any existing water lines that are in service but lose pressure for any reason (i.e. drained for connection or broken) per OAR 333-061-0050 and AWWA C651-5. This will require a minimum of two (2) testing periods, 24-hours apart before the water line can be placed back into service.
2. The City of Donald will complete bacteriological testing. The Contractor shall notify the City at least 24 hours in advance of requiring a bacteriological test.

8.11 TESTING REQUIREMENTS:

8.11.1 General

1. All testing shall conform to the requirements of Section 12.2, the ODOT/APWA Oregon Standard Specifications for Construction, applicable AWWA Specifications, and OAR 333-061-0050. When conflict exists, the most stringent shall apply. The City Engineer shall have the final authority for accepting or rejecting test results. Failure of an initial test is required to be brought to the attention of the City Engineer immediately and a re-test shall not occur without the City Engineer's presence, or their written approval to proceed in their absence.
2. The Contractor shall pay all costs for testing.

9. STORMWATER MANAGEMENT DESIGN CRITERIA AND CONSTRUCTION STANDARDS

9.1 GENERAL

9.1.1 Applicability

1. A Stormwater Management Plan is required when one or more of the following criteria apply for all proposals related to development and redevelopment:
 - a. Excavation and/or imported fill (borrow) exceeds 250 cubic yards.
 - b. 3,000 square feet or more of new impervious surface that individually or in combination replace 3,000 square feet, or more, of existing pervious surface.
 - i. Impervious surfaces are defined as a surface that prohibits water from soaking into the ground. Examples include but are not limited to roofs, concrete, asphalt, pavers, compacted gravel, compacted clay, plastic liners, and clogged landscape fabric.
 - c. A combination of 6,000 square feet, or more, of impervious area will be added and/or reconstructed (i.e. 4,000 square foot of existing building reconstructed with the addition of a new 2,000 square foot parking lot, structure, or other impervious surface OR reconstruction of 6,000 square feet, or more, of existing impervious surface). A parking lot is considered to be “reconstructed” only when the base material, or a portion of the base material, is removed, replaced, or added. The removal and replacement of asphalt or asphalt overlays is not considered reconstruction.
 - d. Stormwater infrastructure will be constructed and dedicated to the City.
 - e. Private stormwater infrastructure will be constructed.
 - f. The site will be converted to a facility that will potentially affect downstream water quality.
 - g. Any activity increasing runoff, equal to or greater than 0.05 cubic feet per second, over pre-developed conditions (i.e. tree removal, vegetation removal, soil compaction, etc.)
2. This criteria does not apply to single family homes or duplexes within existing sub-divisions that have approved stormwater plans which mitigate the stormwater runoff created from lot development, unless the approved subdivision stormwater plan included individual lot on-site stormwater management such as detention, retention, or other BMPs. This criteria is applicable for private stormwater infrastructure as it pertains to the quantity and quality of stormwater runoff leaving the site.

9.1.2 Other Agency Reviews

1. Other agencies may require drainage review. The policies in this manual shall not relieve the Owner from complying with the requirements of any federal, state, or local authority with jurisdiction over a development (e.g. ODOT, Oregon DEQ, Oregon DSL, USACE, ODFW, USFWS, and Marion County).

9.1.3 Minimum Criteria

1. Recognizing that the field of stormwater management, both regulatory and design, is continually evolving in an effort to provide more effective long-term solutions to managing stormwater; the above stated standards are intended to set the minimum criteria which must be met, but are in no way intended to limit the ingenuity and creativity of either the applicant or Design Engineer for a specific site.

9.2 STORMWATER MANAGEMENT PLAN

9.2.1 General

1. As part of the Planning Application submittal, a planning-level concept for the development's storm drainage system and BMPs is required.
2. A preliminary Stormwater Management Plan is required as part of the Engineering pre-submittal process.
3. A final Stormwater Management Plan is required at the time of Detailed Engineering Plan submittal.

9.2.2 Minimum Criteria

1. A Stormwater Management Plan is required to be prepared by the Design Engineer and shall include the following:
 - a. Project Overview: Briefly describing the nature and goals of the project with a vicinity map showing the location of the project site.
 - b. Existing Conditions Summary: Including a topographic map and narrative describing existing drainage patterns of the site, surrounding areas, and upstream contributing areas. The map shall cover all areas presently draining to the site as well as adjoining and downstream areas that may be impacted by the development. The map shall indicate total site acreage, existing land use, drainage courses, flow direction, drainage basins, any existing development and/or drainage facilities, and information regarding areas such as wetlands that may require additional permits.
 - c. Proposed Improvements Summary: Shall include a map and narrative showing proposed improvements as relevant to the stormwater management plan. Include drawings as needed to show proposed topography, drainage arrows, structures and impervious areas, existing and proposed drainage infrastructure, and other BMPs. Include all required infiltration testing per Appendix G.
 - d. Operation and Maintenance (O&M) Plan: Shall describe the maintenance requirements and who will be responsible for operation and maintenance of all proposed stormwater facilities. See Section 9.9 for an exhaustive list of requirements.
 - e. Level of Detail: Detail included in the Stormwater Management Plan will vary greatly depending on the complexity of the site. The information shall be presented in a clear and concise format commensurate to the complexity of the site and sufficient to convey to the reviewer that the proposed design concept is feasible and will meet City standards if designed and constructed appropriately. It is in the discretion of the City Engineer, or his/her designee, to determine whether the proposed stormwater management design adequately addresses the following questions or if criteria additional to that in this section is required to provide safe and effective mitigation measures for the concentration of natural rainwater resulting from the proposed development. The following types of questions shall be addressed
 - i. Are additional permits required?
 - ii. Where will the flows discharge?
 - iii. Are all off-site flows addressed?
 - iv. Is detention required? If so, how will this be addressed?

- v. How will the proposed plan protect water quality?
- vi. Is ESC a significant concern? If so, how will this be addressed?
- vii. Will any of the proposed facilities be maintenance intensive? If so, how will this be addressed?

9.3 DETERMINATION OF DESIGN FLOWS (HYDROLOGIC ANALYSIS METHODS)

9.3.1 Engineering Requirements

1. Stormwater management must be designed by a licensed engineer. Modeling can be used to size BMPs and predict how facilities will respond to and manage stormwater.
2. All stormwater runoff shall be conveyed to a storm sewer or natural drainage channel. Piped and open channel storm drainage systems shall be reviewed to confirm they have adequate capacity to carry necessary flow without overflowing or causing damage to public property or welfare. In the absence of any available stormwater conveyance system, stormwater shall be disposed of on-site by infiltration through dry well, infiltration trench or similar.

9.3.2 Hydrologic Design Criteria for Facilities

1. Stormwater management shall be provided for flow control to ensure the following:
 - a. The capacity of the receiving conveyance facility is not exceeded.
 - b. The potential for stream bank and channel erosion is not increased.
 - c. Does not cause flooding for any storm event up to and including the 100-year, 24-hour event
 - d. Post-development peak flow must be less than or equal to the Pre-development peak flows for all storm events up the 25-year, 24-hour event
2. Due to the continuous nature of City storms, facilities should drain the volume of the design storm in 30 hours or less or per BMP design criteria.
3. All storm drainage facilities shall be designed to pass a 10-year, 24-hour storm event without surcharge and demonstrate that a 25-year 24-hour storm event may surcharge but will not cause any property damage, or ponding in public streets or adjacent properties.
4. Design each BMP with required overflow (discussed in BMP sections).
5. Infiltration testing is performed and submitted to the City Engineer per Appendix G.
6. Designs are approved by the City Engineer.
7. Applicants may discharge their runoff into off-site stormwater facilities that have capacity or retain or detain flows on-site with an approved infiltration facility.
8. Flow control is also required for development in areas where the downstream capacity of an open or closed stormwater system is not sufficient to convey the post development flows.
9. Modeled with approved methods described in Section 9.3.3.

9.3.3 Modeling Methods

1. Design Storms
 - a. United States Department of Agriculture (USDA) NRCS Urban Hydrology for Small Watersheds Technical Release 55 (TR55) shall be used for developing Runoff Curve Numbers (CN), but CN values listed in TR55 for various residential lot sizes shall not be used. Designers must supply the

anticipated maximum impervious areas that will be developed for each lot/parcel. Runoff from impervious areas such as streets, sidewalks, and roofs shall be calculated independently of pervious areas. The separate impervious and pervious hydrographs shall be combined to calculate the runoff at a particular location and to size stormwater management facilities. In no case shall curve numbers with a difference of more than ten (10) be averaged together. The following rainfall intensities from the ODOT Zone 7 24-hour Intensity-Duration-Frequency curves shall apply:

Table 9-1. ODOT Zone 7 24-hour Rainfall Intensities

Year	Rainfall intensity (inch/year)
5	2.5
10	3.0
25	3.5
50	4.0
100	5.0

- b. The purpose of stormwater quality is to reduce runoff pollution and mitigate the volume, duration, time of concentration and rate of stormwater runoff from development by targeting the capture and treatment of up to the 95th percentile of the annual average rainfall. The 95th percentile rainfall event is the event whose precipitation total is greater than or equal to 95 percent of all storm events over a given period of record. The 95th percentile rainfall event is the measured precipitation depth accumulated over a 24-hour period that ranks as the 95th percentile rainfall depth based on the range of daily event occurrences during a 10 to 30-year period. Precipitation records were retrieved from NOAA using data from station “GHCND:USW00094281” located at the Aurora State Airport over the dates 04/03/1998 to 3/14/2021.
 - i. **The 95th percentile rainfall event is 1.0-inches in 24-hours for the City of Donald.**
- c. Another parameter of a design storm is how the given amount of precipitation is distributed over the duration of the storm (temporal distribution). A hyetograph illustrates the typical temporal distribution of a storm. The hyetograph shape is theoretical and is based on historical data collection and extrapolation. The Natural Resource Conservation Service (NRCS) has developed region-specific hyetographs for the State of Oregon. For the City of Donald, the NRCS recommends the use of a Type 1A distribution. The 25-year storm hyetograph is illustrated in Figure 9-1.

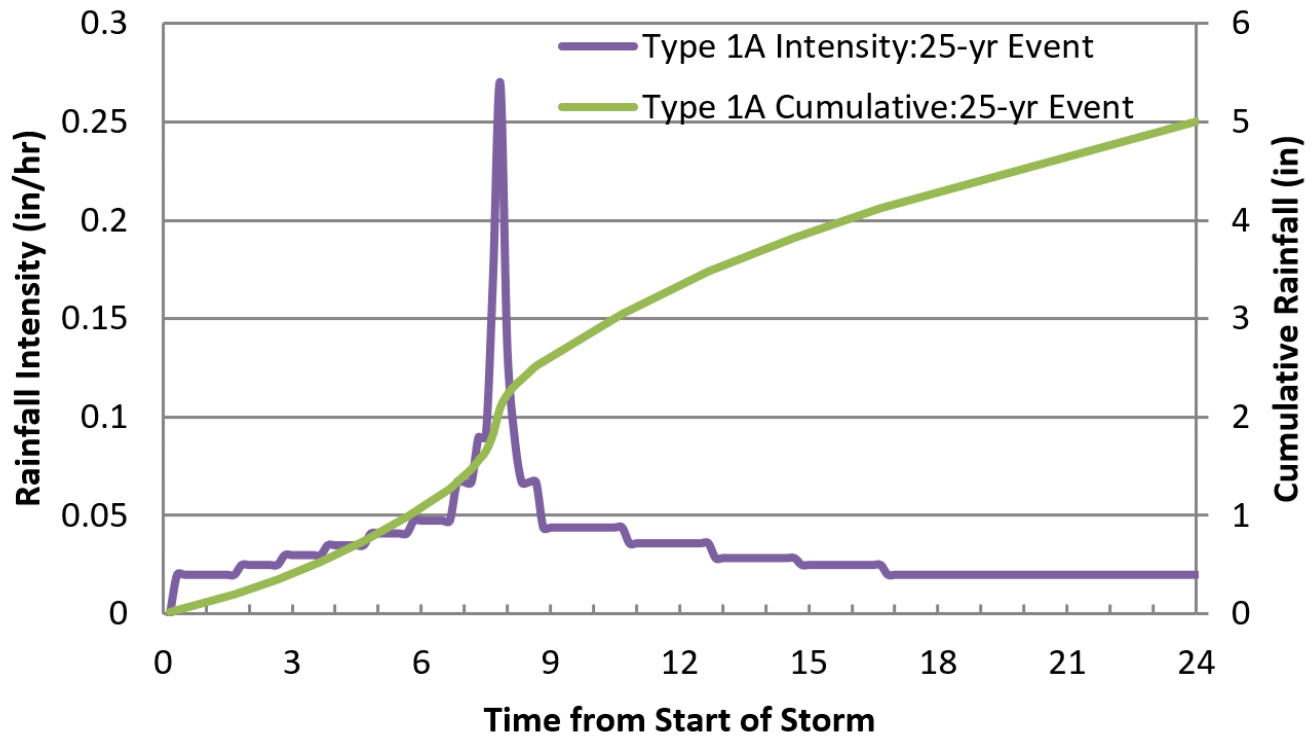


Figure 9-1. Type 1A, 25-year Storm Hyetograph

2. Santa Barbara Urban Hydrograph

- a. The Santa Barbara Urban Hydrograph (SBUH) method may be applied to small, medium, and large projects. It is a recommended method for completing the analysis necessary for designing flow control facilities.
- b. The Natural Resource Conservation Service “Urban Hydrology for Small Watersheds” TR55 method may be applied to small, medium, and large projects. This is also one of the recommended methods for completing hydrologic analyses necessary for designing flow control facilities.
- c. The Santa Barbara Urban Hydrograph (SBUH) method was developed by the Santa Barbara County Flood Control and Water Conservation District to determine a runoff hydrograph for an urbanized area. It is a simpler method than some other approaches, as it computes a hydrograph directly without going through intermediate steps (i.e., a unit hydrograph) to determine the runoff hydrograph.
- d. The SBUH method is a popular method for calculating runoff since it can be done with a spreadsheet or by hand relatively easily. The SBUH method is the method approved by the City for determining runoff when doing flow control calculations.
- e. Elements of the SBUH Method
 - i. The SBUH method depends on several variables:
 - Pervious (A_p) and impervious (A_{imp}) land areas
 - Time of concentration (T_c) calculations
 - Runoff curve numbers (CN) applicable to the site
 - Design storm

- ii. These elements shall all be presented as part of the submittal process for review by staff. In addition, maps showing the pre-development and post-development conditions shall be presented to help in the review.
- f. Land Area
 - i. The total area, including the pervious and impervious areas within a drainage basin, shall be quantified in order to evaluate critical contributing areas and the resulting site runoff. Each area within a basin shall be analyzed separately and their hydrographs combined to determine the total basin hydrograph. Areas shall be selected to represent homogenous land use/development units.
- g. Time of Concentration
 - i. Time of concentration, T_c , is the time for a theoretical drop of water to travel from the furthest point in the drainage basin to the facility being designed. (In this case, T_c is derived by calculating the overland flow time of concentration and the channelized flow time of concentration.) T_c depends on several factors, including ground slope, ground roughness, and distance of flow. The following formula for determining T_c is:
 - $T_c = T_{t1} + T_{t2} \dots + T_{tm}$
 - ii. Travel time (T_t) is the ratio of flow length to flow velocity:
 - $T_t = \frac{L}{60V}$
 - iii. For sheet flow of less than 300 feet, use Manning's kinematic solution to compute T_t :
 - $T_t = \frac{0.42(nL)^{0.8}}{(P_2)^{0.5}S^{0.4}}$
 - iv. Shallow concentrated flow for slopes less than 0.005 ft/ft:
 - $V = 16.1345(s)^{0.5}$ [*Unpaved surfaces*]
 - $V = 20.3282(s)^{0.5}$ [*Paved surfaces*]
 - v. Where
 - T_t = travel time (minutes)
 - T_c = total time of concentration, (minutes) (minimum $T_c = 5$ minutes)
 - n = Manning's roughness coefficient¹
 - L = flow length (feet)
 - V = average velocity (ft/s)
 - P_2 = 2-year, 24-hour rainfall depth (inch) (refer to Intensity-Duration-Frequency table)
 - s = slope of hydraulic grade line (land slope ft/ft)
- h. Runoff Curve Numbers
 - i. Runoff curve numbers were developed by the Natural Resources Conservation Service (NRCS) after studying the runoff characteristics of various types of land. Curve numbers (CN) were

¹ Urban Hydrology for Small Watersheds. (1986). *United States Department of Agriculture Natural Resources Conservation Service Conservation Engineering Division.*

- developed to reduce diverse characteristics such as soil type, land usage, and vegetation into a single variable for doing runoff calculations.
- ii. (Refer to the TR-55 “Urban Hydrology for Small Watersheds” Tables 2-2a through Table 2-2d for a list of Curve Numbers)
3. Rational Method
 - a. The Rational Method may be used for hydrologic modeling by a licensed engineer with approval from the City Engineer.
 - b. Rational Method is for sizing of conveyance systems only where attenuation effects of existing storage are ignored.
 - c. The Rational Method is:
 - i. $Q = C_f C i A$
 - ii. Where:
 - Q = Peak flow in cubic feet per second
 - C_f = Runoff coefficient adjustment factor to account for reduction of infiltration and other losses during high intensity storms
 - C = Runoff coefficient to reflect the ratio of rainfall to surface runoff
 - i = Rainfall intensity in inches per hour
 - A = Drainage area in acres
 - d. Rational Method runoff coefficients shall be determined from the table in the *ODOT Hydraulics Manual*.
 4. Computer Modeling
 - a. Software can be used to perform hydrologic modeling. A list of City of Donald approved computer models are:
 - i. AutoCAD Civil 3D - Hydraflow extensions
 - ii. The US Army Corps of Engineers “Hydrologic Modeling System” (HEC-RES)
 - iii. The Environmental Protection Agency’s Storm Water Management Model (EPA-SWMM)
 - iv. Other software approved by City Engineer on a case by case basis.

9.4 SIZING OF SYSTEM COMPONENTS (HYDRAULIC ANALYSIS METHODS)

9.4.1 General

1. Where a site presently receives flow from upstream properties, the site shall be designed to provide for conveyance of these same flows through the site in a manner consistent with these Engineering Standards while preserving existing streams and channels in their existing condition wherever possible.
2. The design shall minimize existing site disturbances, maintain areas of existing sheet flow discharge, minimize the creation of new impervious surfaces, and lengthen the post-development time of concentration wherever feasible.
3. The applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge without causing erosion, sedimentation, flooding, or other harm. If conveyance facilities do not exist, existing sheet flow shall not be concentrated and discharged onto adjacent property. If flows are concentrated, they must be redistributed over the downstream area to emulate the existing down gradient runoff hydrograph.

4. Sizing of all conveyance systems within County jurisdiction shall conform to Marion County criteria.
5. All portions of the stormwater system intended to meet quantity and quality controls shall be constructed separately from the City's conveyance system (i.e. utilizing the City's conveyance pipes for detention is not acceptable).

9.4.2 Outlets

1. Appropriate Discharge Location: All surface and stormwater runoff from a site must discharge directly into the City storm drainage system or other approved discharge location. The applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge without causing erosion, sedimentation, flooding, or other harm. If the downstream system does not have sufficient capacity to handle the flows or increased volume from the site, the applicant will not be allowed to connect to the system without the necessary improvements to relieve the documented problems or prove that the proposed improvements will not worsen the existing conditions (note: increasing volume to downstream systems will likely result in increased duration of flooding even if peak flows are not increased). In general, stormwater runoff shall not be diverted from one drainage basin to another. If this is proposed for any reason, the applicant must document the ability of the downstream system to safely convey the additional flows at basin build-out conditions without causing erosion, sedimentation, flooding, surcharging within two feet (2') of finished grade, or other public safety concerns within the system.
2. Outlet Protection: The receiving channel at the outlet shall be protected from erosion. A rock lining, as specified in Table 9-2, is generally acceptable.

Table 9-2. Outlet Protection

Design Flow Discharge Velocity (fps)	Required Protection (Minimum Dimensions)			
	Type (ODOT/AWA Specs)	Thickness (feet)	Width (feet)	Length (feet)
0-5	Riprap Class 50	1	Diameter +6 ft	
>5-10	Riprap Class 100	2	Diameter +6 ft Or 3x Diameter (whichever is greater)	12 ft Or 3x Diameter (whichever is greater)
>10	Site specific design by Design Engineer and approved by the City Engineer			

3. Outlet protection shall also meet the following requirements:
 - a. The rock lining shall have a minimum height equal to the pipe crown + 1 foot.
 - b. Filter blanket or geotextile shall be placed under all rip rap.
 - c. Engineered energy dissipaters including stilling basins, drop pools, etc. are required for design flow velocities exceeding 20 fps.
 - d. Design reference shall be included on the plan submittal for all design flow velocities exceeding ten feet per second (10 fps).

9.4.3 Catch Basin & Inlet Sizing/Spacing

1. Inlets shall be designed for the 10-year storm and shall be spaced such that
 - a. The maximum encroachment of runoff on the roadway pavement shall not exceed one half of the traveled lane during the design storm.
 - b. Bypass flow shall be limited to a maximum of 30 percent.

- c. Runoff greater than 0.5 cubic feet per second does not flow across intersections (i.e. catch basins placed just before the beginning of the curb radius).
- d. Inlets must be placed at all low points in streets, at intersections, at points where changes in the street configuration will direct flow across the street and at intervals on continuous grades that will limit contributing street length to a maximum of 400 feet.
- e. In limited cases, inlets may be used as junction structures (pipes 18 inches in diameter and less) as approved by the City Engineer through Design Exception.
- f. Inlets shall be connected to the stormwater system using a wye, tee, or manhole. In general, connections shall be perpendicular to the stormwater mainline.
- g. Design is in accordance with methodology described in the ODOT Hydraulics Manual.
- h. Water from all low areas must be collected and conveyed to the storm drainage system. Quantity of gutter flow is determined using the Rational Method. Inlet design flows shall exceed gutter flow.

9.4.4 Pipes

1. Local collector pipes shall be designed to convey the 10-year storm event by gravity flow. Additionally, pipes receiving flows from sumps (low points) on collectors shall be designed to convey the 25-year storm event by gravity flow. Arterial pipes shall be designed to convey the 25-year storm event by gravity flow. In addition, mainline stormwater sewers that receive runoff from ditches or streams should be designed for the 25-year storm event. More stringent criteria may be required by other agencies with jurisdiction on a given project.
2. A backwater and/or hydraulic grade line analysis may be required for a proposed or existing pipe system if tailwater conditions could potentially affect the ability of the system to carry the design flows. In the case of a system where private service lines are connected to the storm pipe network, calculations must show that the 100-year storm will not back up in the pipes to the point of connection at the building, otherwise, a backflow prevention or overflow device must be provided.
3. The minimum design velocity for storm drainage conduits shall be 3.0 fps

9.4.5 Channels

1. All channels shall be designed for the 25-year storm with 0.5-foot freeboard. These channels will also be required to contain the 100-year storm when overtopping of the channel could result in flooding of any structures or excessive damage to private property.
2. Sizing of channels shall be in accordance with the design methodology described in the ODOT Hydraulics Manual.
3. Channels shall be designed to provide required conveyance capacity while minimizing erosion and allowing for aesthetics and preservation of riparian habitat.
4. All channels shall be designed to be stable with flexible linings such as vegetation, riprap, temporary matting, etc. Reference the Federal Highway Administration Design of Roadside channels with Flexible Linings for design methodology. Table 9-3 summarizes acceptable channel types based on design flow velocities.

Table 9-3. Channel Types Based on Design Flow Velocities

Velocity at Design Flow (fps)	Channel type	Min. Height above Design Water Surface	Maximum Side Slopes
0-5	Vegetative Lining	6 inches	3:1
>5-8	Riprap or Bioengineered Lining	1 foot	2:1
>8-12	Riprap	2 feet	2:1
>12-20	Site specific design by qualified Engineer and approved by the City Engineer		

5. If the design velocity of a channel to be vegetated by seeding exceeds two feet per second (2 fps), a temporary channel liner (ESC matting) is required before the channel can be used to convey stormwater.

9.4.6 Culverts

1. Roadway culverts shall be designed to carry the 25-year storm unless more stringent criteria are required by other governing jurisdictions.
2. For new culverts up to 18 inches in diameter, the maximum allowable design storm headwater (measured from the inlet invert) shall not exceed two (2) times the pipe diameter and shall not overtop the road, driveway, or parking lot surface.
3. For larger culverts, the maximum allowable design storm headwater shall be a minimum of one foot (1') below the road, driveway, or parking lot surface. Structural analysis of embankment may be required.
4. Culvert design shall be in accordance with the design methodology described in the ODOT Hydraulics Manual. The Federal Highway Administration's Hydraulic Design of Highway Culverts is also a good reference.

9.4.7 Overflow Route

1. Plans must show that an overflow route exists for the 100-year storm allowing for a one foot (1') freeboard below building finished floors.

9.5 WATER QUANTITY CONTROLS (DETENTION)

9.5.1 General

1. Water quantity control is required for all developments, new or existing, that add over 500 square feet of impervious surface area or for redevelopment projects with a combination of 1,000 square feet, or more, of new and/or redeveloped impervious area. Developments requiring water quantity control will require construction of detention or retention to limit runoff at the downstream discharge of the site to a rate per Section 9.3.2. Pre-development conditions for redevelopment is the naturally vegetated land cover and contour (i.e. shape and slope) that would historically have been on a site prior to any construction.
2. If an acceptable channel or stormwater facility downstream does not exist, the applicant shall be required, as a condition of approval, to build conveyance infrastructure to an approved stormwater conveyance facility. If the cost of building such infrastructure is considered disproportionate to the project cost and the Design Engineer can satisfactorily demonstrate to the City Engineer that the site layout, grades, and stormwater design will mitigate the potential for damage to properties immediately downstream of the development, the concentrated mitigated flows may be evenly re-dispersed over the original area where the existing runoff sheet flowed from the property. In addition to the 2, 10 and 25-year design storms, these systems shall be designed to mitigate the 100-year design storm. Furthermore, the 2-year design storm flows shall be limited to half of the pre-development 2-year flows.

3. Detention/retention facilities shall adequately show all necessary elevations, including water surface level of the design storm events on the control structure.

9.5.2 Downstream Capacity

1. For sites not otherwise required to provide water quantity controls as outlined above, water quantity controls may be required if, in the opinion of the City Engineer, the downstream pipe or drainage course does not have sufficient capacity to convey the design storm. In lieu of providing water quantity controls, the applicant may elect to increase the downstream capacity.

9.5.3 Post-Development Runoff

1. For all sites regardless of size, limiting increases in post-development runoff is encouraged. Landscaping, landscape planters, vegetative filters, vegetated swales, porous pavement, and eco-roofs are examples of the types of systems that reduce runoff while also improving water quality. A good reference for the appropriate application of these types of systems is the City of Portland Bureau of Environmental Services Stormwater Management Manual.

9.5.4 Roof Drains

1. Roof drains shall not be piped directly to the public or private stormwater conveyance systems unless site conditions warrant. Properly designed retention systems or splash blocks are preferred. It will be the applicant's responsibility to confirm that DEQ's Underground Injection Control requirements are met.

9.5.5 Additional Quantity Control Requirements

1. The City Engineer may impose additional requirements for sites where existing downstream erosion or flooding problems may be aggravated due to increased total runoff volume. The additional measures may include but are not limited to
 - a. Additional detention to further control peak flows (e.g. applicant may be required to over-detain to match the capacity available in the downstream system).
 - b. Retention of stormwater rather than detention or a combined detention/retention system to limit discharge to less than pre-development volumes.
 - c. Upsizing of downstream pipes to address the problem.
 - d. When there are small pre-development flows, increasing the time of concentration and use of surface infiltration facilities, where appropriate, are encouraged to decrease the post-development peak flow.

9.5.6 Control Structures

1. All control structures shall be designed to accommodate the 100-year design storm.
2. All detention or retention systems shall have a separate emergency overflow structure designed to safely convey the 100-year design storm in case of clogging of the primary control structure. Appropriate screening devices shall be provided for all outlets with clogging potential.
3. The minimum orifice size shall be two inches (2") for quantity control facilities serving open ponds. Buried detention facilities with filters protecting control structures shall have an orifice not smaller than one inch (1").
4. All control structures shall be designed so that the orifices can be easily accessed and cleaned during storm events.

9.5.7 Acceptable Systems

1. **Ponds:** Ponds are the most desirable alternative for detention facilities for water quality benefits, relative ease of inspection, and access for maintenance. All ponds shall
 - a. For ponds used to achieve both water quantity and quality standards, maximize the flow length from inlet to outlet with a minimum length to width ratio of 2:1. Should site conditions necessitate short circuiting, additional water quality features may be required.
 - b. Have an emergency overflow capable of discharging the 100-year storm, assuming the primary discharge is clogged.
 - c. Provide a minimum of one-foot (1') freeboard above the design storm to the emergency overflow and one foot (1') freeboard between the emergency overflow and the top of berm.
 - d. Have sufficient depth such that the maximum design water surface in the pond is below the invert of the pond inlet pipe. If this is not feasible, a backwater analysis will be required to show that the pond backwater does not adversely impact the operation of the upstream storm drain system.
 - e. Have maximum interior slopes of 3:1 and be seeded with mixes that are water tolerant and require minimal mowing, or do not need to be mowed. If the slopes are intended to be mowed, the interior slopes shall not exceed 4:1.
 - f. Have maximum exterior slopes of 2:1 unless they will be mowed, in which case they shall be 4:1 max.
 - g. Construction requirements for pond berm embankments addressing compaction, keys, lifts, etc. shall be clearly noted on the plans. The Owner will be responsible for addressing all slope stability issues and involving a qualified Geotechnical Engineer as necessary.
 - h. If the pond berm is to accommodate vehicular access, the top of the berm shall be designed to be 15 feet wide and designed for traffic loads. If the pond berm will not accommodate vehicular access, the minimum top width of the pond berm shall be three feet (3') in width.
 - i. Have an access road to the pond for maintenance. Access roads shall meet the conditions of Section 5.2.2 unless otherwise allowed by the City Engineer. Additionally, an access road shall be constructed allowing maintenance equipment to access the bottom of the pond. In lieu of an access road to the bottom of the pond, the pond side slope adjacent to the access road may be designed at a 4:1 grade to allow maintenance equipment to access the bottom of the pond.
 - j. Provide a minimum of five feet (5') or half (1/2) the berm height, whichever is greater, between toe of berm and adjacent property lines.
 - k. Include fencing unless waived by the City Engineer.
 - l. Be designed to avoid standing water unless designed as a constructed wetland or wet pond.
 - m. Be lined if necessary to protect downstream properties.
2. **Underground Pipes and Vaults:** Underground detention pipes and vaults, although a more efficient use of land, provide less water quality benefit. The Design Engineer shall include adequate provisions for cleaning, accessing, and maintaining the buried facility and its flow control mechanisms. The design shall include methods for preventing or minimizing sediment and debris from entering the buried facility such as pretreatment devices and filtering mechanisms.
3. **Private Parking Lot Ponding:** The following guidelines shall apply for parking lots used for detention volume:
 - a. The depth of the detained water cannot exceed half foot (1/2') at any location.
 - b. The minimum gradient of the parking lot area subject to ponding shall be 2%.
 - c. The emergency overflow path shall not create a hazard.
 - d. Fire lanes used for emergency equipment shall be free from standing water.
 - e. The parking lot shall remain functional during the design event (i.e. pedestrian pathways to parked vehicles).

- f. ADA designated routes and parking stalls shall be free of standing water.
- 4. **Retention Systems:** Retention systems are an acceptable alternate to detention and can provide both water quantity and quality improvements when properly designed and constructed. These systems are only appropriate in specific conditions where the soils infiltrate well and the potential for groundwater contamination has been properly addressed. A report from a qualified geotechnical professional is required to confirm the site's suitability for the proposed systems. All retention facilities must comply with the Oregon DEQ Underground Injection Control Rules and be approved by the City Engineer.
 - a. The minimum infiltration rate for concentrated flows is 0.5 inch/hour.
 - b. The minimum infiltration rate for rain on events is 0.3 inch/hour.
 - c. Retention/Detention ponds shall be designed to drain within 48 hours of the design storm event.

9.6 WATER QUALITY CONTROLS

1. Recognizing that the regulatory controls for non-point source pollution are steadily increasing, the following criteria are established as minimum measures and are expected to be updated on a regular basis. Water quality treatment is required for all sites that add or reconstruct over 1,000 square feet of pollution generating impervious surface area. Water quality treatment is not required for infiltration systems receiving roof runoff. Water quality treatment shall be required, as determined by the City Engineer, for all existing commercial parking areas when the development applies for a Building Permit or repaves the parking lot.

9.6.1 Design Criteria

1. **The 95th percentile rainfall event is 1.0-inches in 24-hours for the City of Donald.**
2. The water quality volume and runoff rates are calculated using all pollution generating surfaces, existing and new.
3. All water quality facilities shall be designed to bypass or convey the larger storm events.
4. Vegetation/plantings within the water quality facilities shall be appropriate for the intended use (i.e. water tolerant, dense stand of vegetation, etc.). The construction plans will specify all plants and seed mixes and all installation requirements. Several current seed mixes and appropriate uses are included in Appendix F. Consultation with a landscape designer or biologist is recommended and may be required by the City Engineer depending on the proposed facility.

9.6.2 Acceptable Systems

1. The following systems are the most common acceptable facilities. Other types of facilities shall be approved on a case by case basis. Incorporation of BMPs in the site design and the use of 'natural' systems (i.e. vegetated swales, vegetative filters, etc.) incorporating bio-filtration is preferred. Additional stormwater treatment measures (i.e. oil separation, etc.) shall be required for sites converted to a use that is a potentially significant source of pollution.
 - a. **Extended Dry Pond:**
 - i. The water quality storm shall be released over a minimum of 48-hours.
 - ii. The water quality storm shall be routed through the pond to size the pond and outflow controls or the following simplified approach may be used:
 - Use total effective runoff volume (V) of the water quality storm to determine the water quality storage requirements.

- The water surface at the top of the water quality storage volume is used to determine the effective head, “H”, to be used in solving for the required orifice size or other outlet control. The water quality storage outflow rate in cubic feet per second is $Q = V/(48)(60)(60)$, where V is in cubic feet.
 - If this simplified approach is used for combined facilities, water quality and quantity controls, the water quality volume shall be assumed full prior to routing of the water quantity storm.
 - When the primary orifice is required to be less than two inches (2”) to meet the water quality criteria of this section, the secondary outlet shall be a weir or other non-clogging outlet control.
 - See additional criteria for Ponds in the Water Quantity Control section.
- b. Vegetated Swale:
- i. Hydraulic residence time = 9 minutes (preferred), 5 minutes (minimum)
 - ii. Maximum Design Depth = 0.5 foot
 - iii. Manning’s “n” value = 0.24 (appropriate vegetation must be used)
 - iv. Maximum velocity = 2 fps
 - v. Minimum length = 100 feet
 - vi. Minimum slope = 0.5%
 - vii. Minimum bottom width = 4 feet
 - viii. Maximum side slope = 4:1 (within treatment depth)
 - ix. Include flow spreader where pipe enters swale and at 50-foot intervals
- c. Vegetated Filter Strips:
- i. Maximum length of impervious area flowing towards the filter is 60 feet.
 - ii. Minimum length of filter in the direction of flow is 15 feet.
 - iii. Width of filter shall be the same as the tributary area.
 - iv. Maximum filter slope = 10%
 - v. Filter slopes greater than 5% require check dams at five foot (5’) intervals.
 - vi. Check dams, when required, shall be 3-5 inches high, constructed of durable, non-toxic material and run the full length of the vegetated filter.
 - vii. Flow spreaders may be required at the entrance to the vegetated filter, depending on site conditions.
 - viii. Filters shall be maintained with complete vegetative covering and shall be kept free of sediment build-up.
 - ix. All vegetated filter strips shall drain to an approved stormwater conveyance/disposal system.

9.6.3 Alternative Water Quality Treatment Methods

1. All alternative water quality treatment systems must be approved by the City Engineer. To be considered for approval, the proposed alternative treatment system must meet the following minimum requirements:
 - a. The basic treatment goal of the water quality treatment facilities is to remove 80% of total suspended solids for an influent concentration range of 100 mg/L to 200 mg/L. For influent concentration less than 100 mg/L, the effluent goal is 20 mg/L total suspended solids. For influent concentrations higher than 200 mg/L, enhanced treatment at a higher level than 80% removal may be required. Proprietary water quality treatment methods approved for basic treatment are those listed in Washington State Department of Ecology’s list of Stormwater Treatment Technologies Approved through the Treatment Assessment Protocol Program (TAPE) and Chemical Treatment Assessment Protocol Program process.

- b. Calculations showing the pollutant removal capability of the structure for the specific site shall be required.
- c. An operation and maintenance manual shall be provided for all water quality structures.
- d. In general, Water Quality Maintenance contracts with qualified providers will be required for the approval of priority systems.

9.7 STORMWATER PIPING

9.7.1 Minimum Pipes Sizes

- | | |
|------------------------------------|-----------|
| 1. Mains and Culverts: | 12 inches |
| 2. Laterals (catch basin to main): | 8 inches |

9.7.2 Pipe Materials

1. Service laterals shall be white PVC, SDR 35 pipe meeting ASTM D3034.
2. Mains shall be PVC, SDR 35 pipe meeting ASTM D3034 for pipes 10-15 inches and ASTM F679 for larger pipes with gasketed bell end, or other approved materials.
3. Acceptable materials for culverts may include HDPE, ADS N-12 (or equal), concrete, or ductile iron pipe. Water-tight joints required.
4. It shall be the responsibility of the Design Engineer to specify the appropriate pipe for the design conditions (soil, depth, buoyancy, and design loadings).

9.7.3 Pipe Identification

1. All stormwater mains shall be identifiable as follows
 - a. All pipes shall be installed with detectable, green, six-inch (6") wide marking tape one foot (1') above the crown of the pipe along its entire length. The marking tape shall be marked with the phrase "Storm Sewer" every five feet (5'), or as approved by the City Engineer.
 - b. Stormwater pipes shall be installed with a toning wire along their entire length, terminated underneath the manhole frame, and accessible from ground level. The toning wire shall be size 12 AWG Solid Cooper with green insulation suitable for direct burial. Any splices in the toning wire shall be made using King Innovations DryConn DBSR direct bury gel caps with strain relief, or approved equal. See the Standard Drawings (Appendix H) for toning wire termination practices.

9.7.4 Minimum Cover

1. Mains and Laterals: Three feet (3') except at catch basins, refer to standard detail
2. Culverts: Two feet (2') preferred, depth of pavement section minimum*
3. *Note: All proposed culverts shall be designed to meet traffic loadings (AASHTO H-20) based on the cover provided and the material used.

9.7.5 Trench Excavation, Bedding, and Backfill

1. Pipe bedding and pipe zone material shall be 3/4" - 0" crushed rock. Provide native backfill outside of traveled roadways or sidewalks. Provide 3/4" - 0" crushed rock backfill under travel surfaces and sidewalks. Compact all materials as follows:

Table 9-4. Stormwater Pipe Compaction and Backfill

Material	Specification
Pipe Bedding & Pipe Zone	90% of ASTM D1557 (AASHTO T-180)
Native Backfill	90% of ASTM D1557 (AASHTO T-180)
Granular Backfill	95% of ASTM D1557 (AASHTO T-180)

9.7.6 Minimum Slopes

1. Mains and Laterals: Minimum desirable slopes for mains and laterals are 1%. In all cases where less than 1% is used, a Design Exception is required.
2. HDPE & ADS N-12 Pipe: Absolute minimum slope is 1%. Use alternate pipe material if minimum slope cannot be achieved, as directed by the City Engineer.

9.7.7 Steep Slopes

1. Pipes on slopes steeper than 20% must be properly anchored.

9.7.8 Decreasing Pipe Size

1. Downstream decrease in pipe size is not a recommended practice and will only be allowed as a Design Exception.

9.7.9 Trash Racks/Grates

1. Trash racks or grates are required for all inlet and outlet ends of pipes 18 inches and larger, accessible by the public. Trash racks and grates shall be designed to be accessible and easily cleared of debris.

9.8 CATCH BASINS AND MANHOLES

1. In general, stormwater mains shall be constructed between stormwater manholes. Stormwater mains shall not be constructed running parallel underneath curb and gutter and shall be a minimum of three feet from outer diameter of the pipe to the edge of the gutter.
2. Catch basins shall collect runoff from the gutter and discharge to the stormwater main via tees, wyes, or manholes. Configurations other than the aforementioned shall require a Design Exception.

9.8.1 Junction Structures

1. Manholes shall be required at all changes in horizontal or vertical alignment, changes in pipe size, and at all pipe intersections. Wyes and tees are allowed where catch basin laterals connect to the storm main. If a Design Exception is granted for the use of catch basins as a junction, the following conditions must be met:
 - a. Pipe diameters are 18 inches and smaller
 - b. Pipe cover is less than 48 inches in depth
 - c. Pipe cover is greater than 36 inches in depth.

9.8.2 Maximum Manhole Spacing

1. Maximum spacing is 500 feet.

9.8.3 Private Lateral Connections to Manholes

1. Private lateral connections to manholes will not be allowed. Storm sewer services (laterals) shall be connected directly to the catch basins or the public main and not to publicly owned manholes.

9.8.4 Manhole Floor Elevation

1. The manhole floor elevation shall be no lower than 18 inches below the invert elevation of the outlet pipe. Sumps in manholes are generally not required. When hydraulic efficiency is required, manholes serving mains shall be channelized to reduce entrance and exit losses within the manhole.

9.8.5 Catch Basin and Manhole Sizing

1. Catch basin and manhole sizing shall be determined by pipe size and orientation at the junction structure. A plan view of the junction structure, drawn to scale, will be required when angles of approach and clearance between pipes is a concern. The integrity of the structure to support the design loadings shall not be compromised. The minimum manhole diameter shall be 48 inches. Minimum distance between hole penetrations into catch basins or manholes shall be per the manufacturer's minimum recommendations. Manhole sections shall not have hole penetrations within eight inches (8") of the edge of the top or bottom of the section.

9.8.6 Maximum Catch Basin Depth

1. Maximum depth of catch basins shall be five and a half feet (5'-6") to lowest invert unless otherwise approved by the City Engineer. The maximum cover over pipes entering and leaving catch basins shall be 48 inches. Use stormwater manholes for pipes requiring more than 48 inches of cover.

9.8.7 Sumps

1. All newly installed catch basins shall have an 18 inch minimum depth sump below the invert out. If a sump is provided in a storm manhole, the manhole shall have an 18 inch maximum sump below the invert out. Sumps in manholes are generally not required.

9.8.8 Invert Elevations

1. The drop from the highest inlet invert to the outlet invert shall not exceed 24 inches in catch basins or manholes. If the drop between pipe invert elevations exceed 24 inches, an outside drop structure is required. The minimum drop from the lowest invert in, to the invert out shall be 0.2 feet for manholes or catch basins used as junction structures.

9.8.9 Crown Elevations

1. Match crown elevations of different diameter pipes at catch basins and manhole penetrations unless otherwise allowed by City Engineer.

9.8.10 Field Verification

1. The Contractor shall be required to field verify all existing invert elevations prior to making connections to existing structures or constructing new manholes over existing pipes. Deviations in elevation or alignment from those shown on the Final Approved Plans shall be immediately reported to the City Engineer. Any required changes to the plan must be approved through the City Engineer.

9.8.11 Manhole Steps

1. Steps shall not be allowed in manholes.

9.9 PROVISIONS FOR MAINTENANCE AND OPERATION

9.9.1 Public O&M Responsibility

1. The City will provide operation and maintenance on all publicly owned facilities.

9.9.2 Private O&M Responsibility

1. Storm drainage facilities to be managed by the person(s) responsible (i.e. the owner/developer/their successors or assigned) include but are not limited to:
 - a. A storm drainage facility not located on City owned property, City ROW, or City easement
 - b. A private parking lot storm drain
 - c. Any roof, footing, or area drain
 - d. A storm drainage facilities not designed and constructed for use by the general public
 - e. An open drainage way
 - f. Access drive culverts in the public ROW or on private property
 - g. A detention, retention, or treatment system, in the construction of which the City did not financially participate
 - h. All private Low Impact Development (LID) facilities that are a part of the development approval.
2. Any person(s) responsible shall keep open drainage ways on property which they possess or control cleared of debris and vegetation as required.
3. Any person(s) responsible for non-public stormwater facilities shall enter into a Private Stormwater Maintenance Agreement with the City, and maintain such facilities so as to prevent flooding or damage to other property not possessed or controlled by the person(s) responsible and to prevent injury to any person or property not owned or controlled by the person(s) responsible. The Private Stormwater Maintenance Agreement shall be recorded in the deed records of Marion County, Oregon for each individual lot/unit. This agreement shall run with the title to the land. This agreement will be in place prior to final plat approval.
4. Any person responsible shall not alter a detention, retention, or treatment system from its original properly functioning condition or intended design without prior written approval of the City Engineer.
5. Private parking lots and private streets must be swept or cleaned at least semi-annually. Prior to the sweeping or cleaning, bio-filter bags must be installed to prevent pollution during the maintenance effort from entering the City's storm drainage system and impacting downstream water quality. The property owner or manager must certify every year through a cleaning contractor that the inspections and cleanings have been completed.
6. The person(s) responsible shall provide the City up to date contact information within 10 days of any changes.
7. The person(s) responsible shall bear all costs, expenses, and risks arising out of or in any way relating to the operation, maintenance, and repair of the private stormwater facility.

9.9.3 Access (Public Facilities)

1. Public ingress/egress easements shall be provided for all public stormwater facilities which require maintenance. Public ingress/egress easement shall be a minimum of 20 feet wide and shall have an all-weather access road as described in Section 5.2. Easements shall be recorded prior to Final Acceptance.
2. Subsurface utilities crossing private property shall have a minimum easement width of 15 feet.

9.9.4 Access (Private Facilities)

1. A 20 foot wide exclusive, perpetual, access easement, benefiting the City of Donald is required for all private stormwater facilities. Easements shall have an all-weather access road as described in Section 5.2. Easements shall be recorded prior to Final Acceptance.
2. This easement gives the City and its authorized agents and employees the right, but not the obligation, of immediate entry to maintain access to the private stormwater facility to inspect, repair, or maintain the private stormwater facility in the event the person(s) responsible (i.e. owner/developer/their successors or assigned) fail to operate, maintain, and repair the private stormwater facility in a timely manner, as required. If upon inspection by the City, the private stormwater facility is not being properly operated, maintained, or repaired, the City shall make the necessary repairs and all expenses for those repairs or maintenance shall be paid by the person(s) responsible. The City is under no obligation to maintain or repair private stormwater facilities.

9.9.5 Operations and Maintenance Manual

1. As part of the Final Plan Submittal, the Design Engineer shall submit an O&M manual that includes
 - a. O&M Drawing/Map: Detailing which portions of the proposed storm sewer system will be dedicated to the City, which will remain in private ownership, and easements (if any) that will be provided (with map narrative if necessary).
 - b. O&M Narrative: Describing the required maintenance criteria (frequency of inspection, description of maintenance practices, etc.) for all water quality and quantity systems, and who will be responsible for maintenance of these facilities once the project is completed.
 - c. Proprietary Systems: Provide proof of maintenance agreements and provide yearly proof of inspections unless otherwise approved by the City Engineer.
1. Hydrologic soil groups shall be determined from the Soil Conservation Service Soil Survey of Marion County or as determined by a soils report prepared by a qualified Professional Engineer, geologist, or soils scientist.

9.10 CONSTRUCTION REQUIREMENTS

1. Follow the requirements of ODOT/APWA Standard Specification for Construction Section 00405 Drainage and Sewers for trench construction, and Section 00445 Sanitary, Storm, Culvert, Siphon, and Irrigation Pipe, and as modified herein

10. SANITARY SEWER SYSTEM

10.1 GENERAL

In 1981 the City of Donald completed the facilities planning process which resulted in selecting a Septic Tank Effluent Pumping (STEP) system with lagoon treatment and land irrigation process. The system was initially constructed in 1983 and currently includes three lagoons, and approximately four miles of pressurized collection system with HDPE public force mains sized from 3" to 6" in diameter.

1. The STEP systems are maintained by the City and are repaired by City staff on an as-needed basis. All residential services are inspected on a five-year schedule, and commercial/industrial on a three-year schedule.
2. The Low Pressure Sanitary Sewer Mains (LPSS) shall be designed in accordance with accepted standards, such as the E/One Pressure Sewer System Design Manual or Water Environment Federation Manual of Practice FD-12, Second Edition.
3. Individual services shall include corporation stops at the public force main connection, curb stop valves and check valves at the property line, and check valves and shut off valves near the pumps. Refer to Appendix H for Standard Drawings.
4. All pumping systems shall be designed by a qualified Professional Engineer licensed by the State of Oregon, who is experienced and proficient in the design of pumping systems. Pumping systems shall mean any system delivering sewage to the City's collection system using means other than gravity. This may include but is not limited to pump stations, low pressure sewer system, effluent pump system, vacuum systems, and individual grinder pumps and discharge lines, etc.

10.2 APPROVING JURISDICTIONS

In conjunction with report preparation, the Design Engineer shall identify and work with the City of Donald and all other permitting agencies that have jurisdiction or authority over the work as required to gain the necessary reviews, approvals, and permits. Where requirements conflict, the highest standard shall be held. Agencies which may have permitting authority for a particular project are:

1. Department of Environmental Quality (predesign report and plan review, approval to construct, review of draft and final O&M manual, approval to operate, and NPDES 1200C Erosion Control Permit)
2. Municipal and Marion county building and construction permits, roads and street permits, floodplain development permits, and conditional use/zone change
3. Division of State Lands (wetlands and creek or river crossing permits)
4. U. S. Army Corps of Engineers (wetlands and creek or river construction)

5. United States Fish and Wildlife Service, Oregon Department of Fish and Wildlife, and National Marine Fisheries Service (wetlands, creek or river crossings, and other permits)
6. Oregon Department of Transportation Highway Division (permit to work within State highway ROW)
7. Any affected railroads (crossings, access easements, and other permits of entry)

10.3 FLOW CALCULATIONS

1. Accepted flow design practice must be employed.
2. The manning's coefficient value ("n") to be used in calculating gravity sewage flows is 0.013.
3. For force mains, analyze the hydraulics for pipe in both new and old condition. Hazen-Williams "C" values for pipe in old condition shall be 120 for plastic pipe, 100 for iron or steel pipe, and 110 for cement mortar lined ductile iron.

10.4 LOW PRESSURE SANITARY SEWER (LPSS) SYSTEM

10.4.1 Pipe Sizing and System Capacity

Pipe sizing shall be as shown in the Wastewater Facilities Plan or as required to provide capacity for the ultimate flow (existing, planned, and future development) for the contributing basin. Systems shall be reviewed to confirm they have adequate capacity to carry necessary flow without overflowing or causing damage to public property or welfare.

1. All services shall be Septic Tank Effluent Pump (STEP) design. Alternative Septic Tank Effluent Gravity (STEG) with required municipal pumping station may be approved on a case by case basis.
2. Minimum pipeline velocities for septic tank effluent shall be a maximum of 6 feet per second.
3. STEP collection systems pipelines shall be sized according to the number of STEP pumps on the common force main according to Table 10-1.

Table 10-1. STEP Collection Systems Pipelines Sizing

Nominal Pipe Diameter (inch)	Flowrate at a 6 ft/s velocity (gpm)	STEP Pumps Total
2	60	<18
2.5	92	<80
3	132	<146
4	236	<377
6	530	<1004

10.4.2 Collection System Pipe

1. Trench minimum Cover
 - a. Minimum cover on all public sanitary sewer pipes shall be 48".
2. Horizontal and vertical separation
 - a. The horizontal separation between water lines paralleling a sewer line shall be 10 feet. Separation may be reduced to 5 feet clear if the invert of the water line is 18" above the crown of the sewer line.

- b. In situations where a water line and a sewer main or sewer lateral cross, the separation between the two shall be as follows:
 - i. The bottom of the water line shall be 18 inches or more above the top of the sewer line and one full length of the water line shall be centered at the crossing.
 - ii. The water service shall be installed with no joints within 10 feet of the sanitary sewer.
 - iii. Where there is less than 18 inches of clearance, the sewer line shall be exposed for 10 feet on each side of the waterline crossing and inspected. If any defects are apparent, the sanitary sewer line shall be replaced with a minimum of one 20-foot length of HDPE pipe centered on the waterline crossing.
 - iv. Horizontal separation of 3 feet with all other utilities is required.
- 3. Location
 - a. When public sanitary sewer lines are not located in public rights-of-way a minimum 15' easement shall be provided centered on the pipe.
- 4. Pipe Specifications
 - a. High Density Polyethylene Pipe (HDPE) for force mains shall be of engineered PE 4710 resin conforming to ASTM D3350 with cell classification of 445574C/E. High density polyethylene pipe (HDPE) shall meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) for Ductile Iron Pipe Size outside diameters. Sanitary sewer force mains shall be rated for minimum 100 psi, with standard dimension ratio (SDR) of 21
 - b. STEP sanitary sewer service lines shall be 1 1/2" green cross linked polyethylene (PEX A or PEX B) or may be schedule 40 PVC complying with ASTM D1785. STEG sanitary sewer gravity service lines shall be minimum 6" PVC conforming to the requirements of ASTM D3034.
 - c. STEG sanitary sewer service lines shall be a minimum 6" diameter and gravity main lines shall be a minimum of 8" diameter ASTM 3034. The municipal pumping station shall be as approved by the Public Works Department on a case by case basis.
 - d. All public pipelines shall have a green 14 gauge insulated copper toning wire placed in the trench and connected to all appurtenances.
 - e. Provide fusion saddles to connect services to polyethylene pipe.
- 5. Connection
 - a. Provide fusion saddles to connect services to polyethylene pipe.
- 6. Tracing Wire
 - a. All public pipelines shall have a green 14 gauge insulated copper toning wire placed in the trench and connected to all appurtenances.
- 7. The LPSS force mains shall have pressure cleanouts installed at all branches, and at intervals not to exceed 1,000 feet.
- 8. The terminal ends of all branch lateral mains shall be equipped with a flushing style cleanout.

10.4.3 Trench Excavation, Bedding, and Backfill

- 1. Pipe bedding and pipe zone material shall be 3/4" - 0" crushed rock. Provide native backfill outside of traveled roadways or sidewalks. Provide 3/4" - 0" crushed rock backfill under travel surfaces and sidewalks. Compact all materials as follows:

Table 10-2. Sewer Pipe Compaction and Backfill

Material	Specification
Pipe Bedding & Pipe Zone	90% of ASTM D1557 (AASHTO T-180)
Native Backfill	90% of ASTM D1557 (AASHTO T-180)
Granular Backfill	95% of ASTM D1557 (AASHTO T-180)

10.4.4 Septic Tanks

1. A 3-foot easement shall be provided on all sides of residential and commercial septic tanks for City access.
2. The City will furnish and install the septic tank and connection to the main line.
3. Residential Septic Tanks
 - a. Residential Septic Tanks shall conform to Standard Detail SS-003.
4. Commercial Septic Tanks
 - a. Commercial Septic Tank designs shall be approved by the City Engineer.
 - b. Septic tanks should be sized for two times the average daily flow per OAR 340-071-0220 (3) (B). The average daily flow must be calculated from Table 2 of OAR 340-071-0800.

10.5 AIR RELEASE VALVES

1. Air release valves shall be a 2-inch wastewater combination air valve model 48A, manufactured by Val-Matic Valve and Manufacturing Corporation, Elmhurst, IL, USA or approved equal. The valve shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512. Air release assembly shall be located outside of any traffic loads inside a vault with isolation valves and vents per manufacturer's recommendation.
2. Sanitary sewer air release valves shall be installed at relative high points along the lines or at intervals not to exceed 2,500 feet. Air Relief Valves shall be installed at all high points along force mains.

10.6 CONSTRUCTION REQUIREMENTS

1. Follow the requirements of ODOT/APWA Standard Specification for Construction Section 00405 Drainage and Sewers for trench construction, Section 00445 Sanitary, Storm, Culvert, Siphon, and Irrigation Pipe, and Section 01140 for force main construction as modified herein, unless otherwise approved by the Public Works Director.

10.6.1 Testing

1. Testing of sanitary sewer force mains shall comply with the waterline hydrostatic testing requirements in ODOT/APWA Section 01140.51, at 100 psi test pressure. All testing shall be paid by the Developer.

10.7 THRUST RESTRAINT

1. Concrete thrust blocking will only be permitted when connecting to existing lines with unknown thrust restraint design.

11. SIGNING, PAVEMENT MARKING, AND ROADWAY LIGHTING

11.1 STREET SIGNS

11.1.1 General

1. All street signs shall be provided by the applicant's Contractor and installed by the City. All costs for this work shall be reimbursed by the applicant.
 - a. All signs shall meet the standards of the current version of the MUTCD and applicable state or local laws.
 - b. All sign bases shall meet the requirements of the ODOT standard specification and the City.
 - c. The applicant must coordinate all sign installations with the Public Works Department. Provide five (5) business days notice.

11.1.2 Signage Plan

1. A temporary Traffic Control Plan shall be submitted to the City prior to any work. Plans must be approved by the City Engineer.
2. Permanent Signage Plans shall be submitted to the City for review and acceptance.

11.2 PAVEMENT MARKING

11.2.1 Locations

1. Longitudinal pavement marking shall be required on arterial and collector streets only, shall be in accordance with the latest MUTCD Manual, and approved by the City Engineer.
2. Exceptions: Parking stalls, stop bars, cross walks, sharrows, bike lanes, or other pavement markings as directed by the City Engineer will be required as appropriate on local streets.

11.2.2 Materials

1. White longitudinal paint shall be Ennis ORW-21-M-4.
2. Yellow longitudinal paint shall be Ennis ORY-21-M-1.
3. Paint shall include reflectivity per AASHTO M247-Type 1, one and a half (1 1/2) pounds of beads per gallon of paint.
4. Transverse pavement markings, legends, and bars shall be PREMARK thermoplastic; heavy duty intersection grade by Ennis-Flint, Type B-HS.

11.2.3 ADA Markings

1. Barrier free ADA curb ramps are to be provided with yellow composite cast in place truncated dome panels meeting current ADA requirements. Panels using adhesive or caulking to adhere to the surface of the concrete are not acceptable. See the Standard Drawings (Appendix H) for ADA curb ramp details.
 - a. ADA truncated domes shall be yellow, cast in place, Armor-Tile Vitrified Polymer Composite, or equal.

11.3 ROADWAY LIGHTING

1. Street lighting is an important element in street design. Lighting adds a visual connection to streets and provides for the safe movement of pedestrians, bicycles, and vehicles.
1. All development shall provide street lighting to conform to the latest guidelines from the Illumination Engineers Society for full cutoff pedestrian scale lighting. with a guideline average 6 lux illuminance and uniformity coefficient of 6. Lighting fixtures and poles shall be as approved by the Public Works Department.

11.3.1 Standard Street Lights

1. Standard streetlights shall be provided at all intersections, mid-block, and at a maximum spacing of 300 foot.
2. In residential areas, “flat glass”, or an approved alternate, shall be used so that the light is directed downward resulting in a dark sky effect.
3. Heads shall be cobra LED cobra style.
4. Bulbs shall be LED 50-75 Watt with color temperature of 3000 Kelvin or approved alternative.
5. Lights shall be shielded to minimize skyglow
6. Light poles shall be anchor base, 25 feet tall galvanized metal poles, as recommended by the local power company.
7. Base shall be recommended by the pole manufacture.

11.3.2 Coordination

1. The applicant shall coordinate with the local utility owner (PGE) for installation requirements and utility connections.

11.3.3 Responsibility

1. The applicant shall be responsible for all costs associated with this work. Classic lights include monthly electrical charges for the operation of the lights.

12. CONSTRUCTION STANDARDS

12.1 CONSTRUCTION RESPONSIBILITIES

1. The following construction requirements apply to all projects that require a Detailed Engineering Plan Review (Section 3).

12.1.1 Resident Engineer's Responsibilities

1. All public improvements shall be inspected by the Resident Engineer (RE), or a qualified individual under the supervision of the RE. The RE shall not have any pecuniary interest in the project or development, other than that as a professional service provider. The applicant shall have the RE designated prior to the pre-construction meeting where the RE's attendance is mandatory. All costs associated with the RE's work and testing shall be paid by the applicant. The RE's minimum responsibilities include.
2. The RE shall maintain a project log book which contains at least the following information:
 - a. Job number and name of Engineer and designers
 - b. Date and time of site visits
 - c. Weather conditions, including temperature
 - d. Description of construction activities with dated and documented photographs of work in progress
 - e. Statements of directions to change plans, specifications, stop work, reject materials, or other work quality actions
 - f. Public Agency contacts which result in plan changes or other significant actions
 - g. Perceived problems and actions taken
 - h. General remarks
 - i. Final inspections
 - j. Record of all testing.
 - k. Compliance of supplied materials with specified materials.
3. The RE shall have a copy of the Final Approved Plans and Specifications on-site at all times.
4. The RE shall obtain written approval from the City Engineer for all proposed changes to the Construction Site/ROW Permit, plans, or specifications prior to implementing any change. All changes shall be documented on the Records Drawings. The RE shall provide copies of all changes to the City, Contractor, and applicant.
5. The RE shall review all materials prior to installation for conformance with the Standards or specific Design Exceptions as shown in the Final Approved Plans.
6. The RE shall observe construction activities for compliance with the Final Approved Plans and Specifications. Prior to Final Acceptance, the RE shall provide the City Engineer a certification letter stating that the project was constructed in conformance with the Final Approved Plans and Specifications, based on what he/she has observed.

7. The RE shall observe all required testing and shall provide copies of all results to the City Engineer in a format readily useable by the City. See Appendix C.
8. The RE shall confirm pre-paving approval is issued prior to paving operations.
9. The RE shall have the project log book available for review by the City Engineer upon request at all times throughout construction.
10. Prior to Final Acceptance, the RE shall stamp the project log book, or an exact copy, and file with the City Engineer.
11. The RE shall provide Record Drawings to the City.

12.1.2 City's Responsibilities

1. The City's activities and responsibilities are limited to the following
 - a. General monitoring of work progress.
 - b. Observation of performance testing as determined at the pre-construction meeting.
 - c. Issuance of pre-paving approval.
 - d. Pre-paving approval will not be issued until underground utilities, retaining walls, or structures located within or impacting ROW have been observed and tested to the City Engineer's satisfaction.
 - e. Continuity testing of tracer wires and confirmation of proper attachment to structures and boxes.
 - f. Approval of any plan changes during construction.
 - g. Issuance of stop work orders. The City will promptly notify the RE of any stop work order.
 - h. Operation of City owned valves (water or pressure sewer), or new valves directly connected to the City system for the purpose of filling, disinfection (for water only), and pressure testing newly constructed lines.
 - i. Representatives of both the City and the Contractor shall be present when collecting water samples for bacteria testing of potable water systems. The Contractor shall have the option of collecting potable water samples or requesting the City to collect the samples. The City will deliver the potable water samples to a certified laboratory for bacteria testing. Samples will be taken Monday through Thursday, excluding holidays, between the hours of seven (7) AM and noon. 48-hour notice is required to schedule City personnel for any on-site work.
 - j. Any work requiring a temporary water outage to any customer will require public notification. The Contractor shall provide the City with a minimum of four (4) business days advance notice for such operations, so that the City can provide 48-hours' notice to the affected customer(s).
 - k. Participation in final inspection for acceptance of improvements.
2. The City's construction observation is not an inspection or validation of the contractual obligations between the Contractor and the applicant, nor does it constitute Final Acceptance of any work.

12.1.3 Contractor's Responsibilities

1. The Contractor's minimum responsibilities include
 - a. The Contractor shall perform or oversee all permitted work. Substitutions of Contractors will not be allowed without prior pre-qualification and written approval by the City Engineer.
 - b. The Contractor shall have a copy of the Final Approved Plans, specifications, and Construction Site/ROW Permit on the job site at all times.
 - c. The Contractor is responsible for observing the safety of the work and all persons and property coming into contact with the work. The Contractor shall conduct his/her work in such a manner as to comply with all the requirements prescribed by OSHA. The City Inspector's role is not one of supervision or safety management, but is one of observation only. Nothing contained in this section or

elsewhere in these standards shall be interpreted to obligate the City to act in any situation, nor shift the Owner's responsibility for safety compliance to the City. No responsibility for the safety of the work or for construction means, methods, techniques, sequences, or procedures shall be attached to the City by virtue of its action or inaction under this section.

12.2 CONSTRUCTION TESTING REQUIREMENTS

12.2.1 General

1. For all projects requiring a Detailed Engineering Plan Review (Section 3), the applicant shall be responsible for meeting, providing, and passing to the City Engineer's satisfaction the following standards, notifications, documentation, and tests.

12.2.2 Testing Standards

1. Test according to City of Donald Testing Standards.

12.2.3 Testing Notification

1. The City Engineer will provide a list of the tests, which the City will observe, to the Contractor at the pre-construction meeting. The Contractor shall notify the City Engineer a minimum of two (2) business days, prior to these tests.

12.2.4 Testing Documentation

1. Testing documentation shall be prepared and retained by the RE for all tests. Copies of the testing documentation will be required to be submitted to the City Engineer as part of the construction log book, prior to Final Acceptance.

12.2.5 Required Testing for Streets

1. Street, retaining walls, and sidewalk grading. Clearly mark elevations and alignments of all crowns, transitions, turnpikes, valleys, hips, quarter-crowns, and footings prior to placement of walls, bases, and pavements.
2. Curb and gutter staking and/or string line inspection. String lines shall be clearly laid out to allow RE to verify flowline alignment and elevations without horizontal offset.
3. Subgrade compaction testing or proof rolls.
4. Base rock compaction testing and depths.
5. AC Pavement placement observation and density testing.
6. ADA compliance for curb ramps, crosswalks, sidewalks, landings, tactile, visual, or auditory warning elements of required services. Use ODOT curb ramp inspection forms. Inspectors shall be ODOT certified curb ramp inspectors. Smart tool levels shall be per ODOT regulations for curb ramp inspection use. The 24-inch smart tool level shall be Model #92379. The six-inch (6") smart tool level shall be Model #92346.
7. Proper spacing and performance of all required street lighting and streetscape appurtenances or features.

12.2.6 Required Testing for Storm Sewers

1. Backfill compaction testing
2. Mandrel testing of mainlines
3. Video inspection of mainlines (or services when specified during the pre-construction meeting)
4. City observation and tracer wire testing prior to paving.
5. Leak testing manholes, catch basins, and other drainage structures

12.2.7 Required Testing for Water Distribution System

1. Backfill compaction testing.
2. Pressure Test. All potable water mains shall be tested at 150% of static pressure or 150 psi, whichever is greater, in accordance with AWWA and APWA Standard Specifications. Most stringent to apply. The City shall be notified two (2) business days in advance for filling and flushing.
3. Disinfection.
4. Observe proper operation of all appurtenances and valves.
5. City observation and tracer wire testing prior to paving.

12.2.8 Required Testing for Sanitary Sewer Force Mains (4-inch or Larger)

1. Backfill compaction testing.
2. Pressure Test.
3. Observe proper operation of all appurtenances and valves.
4. City observation and tracer wire testing prior to paving.
5. Pressure laterals tested to Oregon Plumbing Specialty Code Standards.

12.2.9 Required Testing for Low Pressure Sanitary Sewer Mains (LPSS)

1. Backfill compaction testing.
2. Pressure Test.
3. Observe proper operation of all appurtenances and valves.
4. City observation and tracer wire testing prior to paving.
5. Pressure laterals tested to Oregon Plumbing Specialty Code Standards.

12.3 WORK WITHIN CITY ROW

12.3.1 General

1. All work within ROW shall conform to the requirements of Section 7.
2. All existing survey monuments within the limits of work shall be protected during construction. If monuments must be relocated and/or replaced to complete the work, the monument(s) shall be relocated and/or replaced by an Oregon licensed Professional Land Surveyor.

3. All existing utilities shall be located using the Oregon Utility Notification Center. Call 811 or (1-800-332-2344) prior to the commencement of any work.
4. Care shall be taken during construction to protect all existing utilities from damage. If relocation of utilities is required, the applicant shall be responsible for all coordination with the Utility Owner and any costs not borne by the Utility Owner. The plans shall clearly show protection and/or relocation of any facilities within or adjacent to the public ROW.
5. Upon completion of all work within ROW, all areas affected by construction shall be restored to the same or better condition as they were prior to the start of work.
6. No surplus or excavated materials will be stored or allowed to remain within ROW at the end of each work day, unless specifically approved by the City Engineer in writing.

12.3.2 Maintenance of Traffic during Construction

1. Access to private driveways shall be maintained during construction. Any temporary closures required for phasing of construction shall be coordinated directly with the affected property owners.
2. Access to fire hydrants shall be provided at all times.
3. Temporary traffic control measures and devices (i.e. barricades, lights, warning signs, flaggers, etc.) shall be in accordance with the Oregon Department of Transportation's Temporary Traffic Control Handbook and the MUTCD.
4. A Traffic Control Plan is required for all work in or on all public ROW. A copy of the Traffic Control Plan to be implemented during construction shall be submitted to the City Engineer for approval no less than ten (10) business days prior to start of work. Work shall not commence prior to the approval of the Traffic Control Plan.

12.3.3 Street Openings and Excavations

1. All excavation will be open cuts from the surface. Directional drilling, boring, or other means, will be permitted by Design Exception only.
2. All excavations shall conform to Occupational Safety and Health Association, OSHA, regulations.
3. No excavation shall be left open and unattended at any time, including the end of a work day. Traffic Rated steel plates may be allowed with prior approval by the City Engineer, or within the approved TCP, and shall be prevented from sliding or otherwise moving under traffic loadings. Use asphalt transitions at all steel plate edges where traffic is present to prevent abrupt edging. "Steel Plate Ahead" signs are required.
4. No opening or excavation in any street shall extend beyond the centerline before being backfilled and the surface restored or temporarily surfaced. One lane of traffic to remain open at all times, unless approved in advance by the City Engineer or specifically approved in the TCP.
5. No more than 150 feet of trench, measured longitudinally, shall be opened at any one time, except by written approval of the City Engineer.
6. Rock excavation, where drilling and blasting is required, shall comply with the current version of Chapter 56 of the Oregon Fire Code (OFC). The applicant will be required to obtain blasting permits from the Fire Chief.
7. All pavement cuts, backfilling, and resurfacing shall be in conformance with the City's most recent Standard Drawings (Appendix H).

12.3.4 Required Notices and City Observation

1. The Contractor shall provide a minimum two (2) business days advance notice to the City Engineer prior to the start of any work, excavation, backfilling, and surface restoration work. Notice may be by phone or email. The applicant's RE will observe each of these operations where applicable. When a Sketch Plan is required, the City Engineer shall observe these operations. The City Engineer will not accept any work that is not observed and verified by the RE when a RE is required by these Standards.
2. If the work will affect the use of properties abutting or adjoining the project, the applicant shall notify the affected property owners and/or tenants. The Contractor shall notify these same owners and provide written proof of notification to the City Engineer a minimum of 48-hours in advance of the work.
3. Owners/residents shall be given a minimum of two (2) business days notice of any scheduled interruptions to their utility services. The Contractor shall notify the City Engineer a minimum of four (4) business days prior to any scheduled service interruption. The Contractor shall not give such notice to the City Engineer until all acceptance testing required for the service interruption has passed successfully.
4. If the work to be done will affect other subsurface utilities, the applicant shall notify the utility owners and provide written proof of notification to the City Engineer a minimum of 48-hours prior to start of work.

12.3.5 Additional Requirements

1. The City Engineer may have additional requirements depending on the size, nature, and location of the work. Such requirements may include but shall not be limited to
 - a. Limitations on the time of the year in which the work may be performed.
 - b. Designation of routes upon which the materials may be transported.
 - c. More extensive public notice requirements are required when construction may impact the traveling public. Anticipate seven (7) to ten (10) day notification period following approval of the TCP.
 - d. Regulations as to the use of streets in the course of the work.
 - e. Restrictions as to the size and type of equipment used.
 - f. Noise restrictions.
 - g. Boring, Tunneling, or Micro Tunneling of utilities (examples: pavement moratoriums and or prohibitions of interference with traffic).
 - h. Pre-construction video of the project site.

12.4 LIMITATIONS AND CONDITIONS ON USE OF THE CITY ROW

12.4.1 Use of the Public ROW

1. Private structures and facilities located in the public ROW will only be allowed through the City's temporary use permit process. An annual fee, set by the City Council, shall be assessed to these facilities. Any use of the public ROW, including the placement of temporary or permanent facilities, utilities, poles, equipment, or other fixtures, shall be subject to the following requirements and limitations:
 - a. All equipment located within the public ROW shall be located such that it meets ADA requirements and does not obstruct, impede, or hinder usual pedestrian or vehicular travel.
 - b. No temporary or permanent fixtures shall be placed in the public ROW that obstruct vehicle traffic lanes or reduce the usable width of the sidewalk to less than four feet (4').
 - c. Temporary or permanent fixtures that obstruct or eliminate one (1) or more on-street parking spaces may be allowed under special circumstances where there is a net benefit to the public, such as

dedication of on-street parking spaces to permanent, protected bicycle parking, public outdoor seating, etc.

- d. The City's goal is to reduce the number of poles in its ROW over time. Therefore, to the maximum extent possible, new facilities shall be co-located with other utilities at existing pole locations. This may take the form of mounting facilities on existing poles or replacing existing poles with new poles capable of supporting multiple facilities.
- e. The City's goal is for all utilities with overhead wires to be placed underground. In light of that goal, to the maximum possible, all new and replacement poles and facilities shall be designed to receive power for underground facilities.
- f. All carrier equipment shall be removed and relocated at no cost to the City if the City decides to underground the utility in the future. Equipment must be removed in a period of time that does not delay the removal of the utility pole or lines.
- g. In general, poles shall be neutral dark colors designed to blend in with the surroundings. If an existing pole is being replaced that is of a style, material, and color of other poles in the immediate vicinity, such as lights at an intersection, the proposed replacement pole shall match the other remaining poles. If the proposed facility is to be mounted on an existing pole, to the maximum extent possible, the proposed facility shall blend in and/or match the style, color, and material of the existing pole. Proposed pole colors, materials, and coatings shall be reviewed and approved by the City Engineer.
- h. Junction boxes, transformers, auxiliary, or ancillary equipment in support of the function the facility shall not be mounted on the sides of existing poles, new, or replacement poles. These items shall be mounted internally in the pole or in a buried vault next to the pole. Conduits shall not be mounted on the exterior sides of the pole but should be run internally. Notwithstanding franchise agreements, exterior conduits will only be allowed through a Design Exception granted by the City Engineer.
- i. No new temporary or permanent fixtures or facilities shall be allowed in the public ROW without an Engineer's certification that the fixture or facility does not pose an unsafe obstruction in the traffic clear area or safety hazard to vehicles that might leave the travel lane.
- j. New street lights and fixtures proposed for replacement poles or new poles shall conform to the City's applicable lighting codes and standards.
- k. No temporary or permanent fixtures, or other facilities in the public ROW, shall be taller than 35 feet, including new structures or extensions to existing utility or light poles. The City Engineer may grant taller fixtures as a Design Exception if in the Engineer's opinion the proposal is warranted, benefits the public, and does not create undue safety issues, or is aesthetically detrimental to the surrounding area.
- l. Proposed new and replacement poles shall be designed to minimize their diameter and foot print to the maximum extent feasible.
- m. Prior to application submittal, the pole owner shall ensure the supporting pole/street light is appropriately sized and has sufficient strength to accommodate the additional small cell equipment loads.
- n. All installations shall meet or exceed all applicable structural standards, clearance standards, and provisions of the latest National Electrical Safety Code, or applicable City standards/codes; in case of conflict, the most stringent requirements shall prevail.

12.4.2 Additional Conditions for Use of the Public ROW

- 1. Use of the public ROW may include reasonable conditions designed to protect the long-term function, safety and structural integrity of the ROW, aesthetic quality of the ROW (especially Main Street), protection of existing utilities within the ROW, and near-by affected private property including, but not limited to the following:

- a. Traffic safety measures, flaggers, warning signs, lights, and any other measures deemed necessary to protect public safety, including limits to time of day or season to limit impacts on pedestrians, vehicular access in the school zone, time-sensitive commerce during harvest, etc.
- b. Reconstruction, rehabilitation, reinforcement, and/or repair of any physical element or support structure of, in or near the public ROW that may be affected or need to be altered to accommodate the use.
- c. Measures necessary to maintain proper operation and integrity of utilities within the ROW before, during, and after the applicant's use of the ROW.
- d. The posting of a financial guarantee, in a form approved by the City Attorney in an amount approved by the City Engineer, sufficient to reconstruct, rehabilitate, or repair any physical element or support structure in or near the public ROW following the use.
- e. Indemnification of the City of Donald for any claim arising from property damage, injury, or death resulting from any activity by the permittee or placement of any fixtures or facilities in the public ROW.
- f. The temporary movement, or permanent removal or relocation, of poles, utility lines, or other existing structures or facilities within or near the public ROW that may be affected by the proposed use.
- g. A reduction in the size, profile, or other visible aspect of any facility or fixture in the public ROW to preserve the aesthetic views or design standards of City streets.
- h. Any other condition or requirement deemed reasonably necessary to protect the long-term function, safety, structural integrity or aesthetic quality of the ROW, utilities within the ROW, or the traveling public.

12.5 RESTORATION AND CLEANUP

12.5.1 Site Restoration and Cleanup

1. The Contractor shall keep the premises clean and orderly at all times during the work and shall leave the project free of rubbish or excess materials of any kind upon completion of the work. During construction, the Contractor shall stockpile excavated materials so as not to damage the adjacent lawns, grassed areas, gardens, shrubbery, trees, or fences, regardless of the ownership of these areas. All excavated materials shall be removed from these areas, and these surfaces shall be left in a condition equivalent to their original condition and free from all rocks, gravel, boulders, or other foreign material. Stockpiling of construction materials shall not be allowed on existing public ROW without prior written consent from the agency owning the ROW.
2. All existing storm systems adjacent to the project area shall be cleaned and flushed with a vacuum truck and/or sewer jetter, and original drainage restored. Sediment, rock, and other debris shall be collected and disposed of in a proper manner. In no case shall debris be flushed down a storm or sanitary sewer for disposal. All damaged/impaired storm facilities, irrigation, house drainage pipes, drain tiles, sewer laterals, and culverts shall be repaired expeditiously.
3. All areas disturbed by the Contractor's operations inside dedicated ROW or easements shall be restored to original or better condition. Areas outside of the easements or ROW, which are disturbed by the Contractor's operations, shall be restored to their original or better condition in a method acceptable to the property owner. The Contractor shall obtain a written release from such property owners for any claims of injury or property damage prior to final acceptance of the work by the City.
4. All site cleanup efforts shall be conducted during normal working hours. Adjust work schedule to allow for adequate clean up. Cleanup materials must be removed from the work site to an approved location unless otherwise allowed by the City Engineer, in writing.

12.5.2 Street Cleanup

1. The Contractor shall clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation, unless it poses an ESC threat. If any spilled material poses an ESC threat, it shall be cleaned immediately. The Contractor shall follow the City's ESC procedures. Cleanup materials must be removed from the street to an approved location unless otherwise allowed by the City Engineer, in writing.
2. As soon as practical after completion of all paving and gravel shoulder resurfacing, the Contractor shall remove all dirt, mud, rock, gravel, and other foreign material from the paved surface and storm drainage system.
3. All street cleanup efforts shall be conducted during normal working hours. Adjust work schedule to allow for adequate clean up.

12.5.3 Stream and Creek Crossings

1. The Contractor shall comply with all provisions of the permits required by the Oregon Department of Fish and Wildlife (ODFW), National Marine Fisheries Service (NMFS), the United States Army Corp of Engineers (USACE), Oregon Department of State Lands (DSL), Oregon Department of Environmental Quality.
2. Before any work may be performed in any body of water, the method of operation and the schedule of such work shall be approved in writing by all Agencies with authority over the water body being crossed or otherwise disturbed.
3. Structures located within the 100-year flood elevation shall be designed according to State and Federal guidelines, when approved.

A. DOCUMENTS AND FORMS

IMPROVEMENT AGREEMENT

NON-REMONSTRANCE AGREEMENT

SATISFACTION OF IMPROVEMENT AGREEMENT

DEDICATION - PUBLIC ROADWAY

PUBLIC UTILITY EASEMENT

APPLICATION FOR WATER CREDIT FORM

AFTER RECORDING RETURN TO:

City Manager
City of Donald
P.O. Box 388
Donald, OR 97020-0388

**UNTIL A CHANGE IS MADE
SEND ALL TAX STATEMENTS TO:**

Same

IMPROVEMENT AGREEMENT

This Agreement, made and entered, into this _____ day of _____ by and between the CITY OF DONALD, an Oregon municipal corporation, hereinafter called the **CITY**, and _____, hereinafter called the **DEVELOPER**.

WHEREAS, on _____, 20____, the Hearings Officer granted conditional approval to the tentative plat of the _____, (Planning File No. _____); and

WHEREAS, certain conditions were imposed on the **DEVELOPER** as part of the approval of the Subdivision; and

WHEREAS, the **DEVELOPER** is constructing Public Improvements for a _____ lot Subdivision along the _____; and

WHEREAS, on _____, the City Engineer approved construction plans according to the Donald Design and Construction Standards, consistent with the conditions contained within the Hearings Officer's approval; and

WHEREAS, the **DEVELOPER** wishes to plat and develop the _____ Subdivision, the boundary of which is described as follows:

SEE ATTACHMENT "A"

NOW, THEREFORE, the **DEVELOPER** and the **CITY** agree to the following conditions for the development of this Subdivision to-wit:

1. The **DEVELOPER** shall complete or cause to be completed the improvements as detailed on the approved construction plans and according to the specifications and standards on file in the office of the Donald Public Works Director.
2. The **DEVELOPER** shall cause his engineer to provide all surveying services necessary to stake the project prior to construction and to prepare and furnish to the City as-built drawings within thirty (30) days following completion of the project. All such work shall be in conformance with Donald Design and Construction Standards (Latest Edition).
3. The **DEVELOPER** shall complete required improvements in Six (6) months, or cause them to be completed within Eighteen (18) months of the date of this Agreement. Upon written request of the Developer, however, this Agreement may be extended for an additional period of Eighteen (18) months.
4. The **DEVELOPER** shall, after satisfactorily completing conditions 1 through 3, submit a maintenance bond or other written evidence in a form approved by the City Attorney and Public Works Director, valued at a minimum amount of five percent (5%) of the estimated public improvement construction costs, and guaranteeing the completed project construction for a period of one (1) year from final acceptance.
5. It is agreed between the **CITY** and the **DEVELOPER** that all building permits for any structures within the development will be not be issued until all of the required improvements have been constructed and all conditions of approval have been met by the **DEVELOPER** and accepted by the **CITY**.
6. The parties hereto agree that should any suit or action be filed to enforce the terms of this Agreement or the breach thereof, the losing party agrees to pay the prevailing party's reasonable attorney fees in an amount to be set by the court, including costs, disbursements and any such attorney fees, costs or disbursements associated with any appeal there from.

In witness whereof, the said **CITY** has caused this agreement to be signed for the City of Donald, Oregon, and the **DEVELOPER** has caused this Agreement to be signed and sealed the same as the date and year first written above.

CITY OF DONALD, an
Oregon Municipal Corporation

By: _____
City Manager

By: _____
Public Works Director

STATE OF OREGON)
) SS
County of _____)

This instrument was acknowledged before me on _____, by the City Manager and Public Works Director.

NOTARY PUBLIC FOR OREGON
My Commission Expires:_____

By: _____
DEVELOPER

STATE OF OREGON)
) SS
County of _____)

This instrument was acknowledged before me on _____,
By _____.

NOTARY PUBLIC FOR OREGON
My Commission Expires:_____

AFTER RECORDING RETURN TO:

City Manager
City of Donald
P.O. Box 388
Donald, OR 97020-0388

SEND ALL TAX STATEMENTS TO:

Same

Map No: _____
Tax Lot(s): _____
Planning No: _____

**RESTRICTIVE COVENANT AND
NON-REMONSTRANCE AGREEMENT**

The undersigned legal owners of the property described below (the "Property") hereby waive any and all right to remonstrate against any focal improvement project benefitting the subject property by the City of Donald (City) and assessing the cost to benefited properties pursuant to the City's capital improvement regulations in effect at the time of such improvement. This non-remonstrance agreement is executed in consideration of not being required by the City to make the above-mentioned improvements at this time as a condition of land use approval of the _____

City of Donald Planning File No. _____

For the purpose of this Covenant:

"Sanitary Sewer Improvements" includes pipelines or conduits and all other structures, devices, appurtenances and facilities used in collecting or conducting waste to an ultimate point for treatment or disposal.

"Storm Sewer Improvements" includes pipelines, swales, detention or retention devices or conduits and all other structures, devices, appurtenances and facilities used in collecting or conducting storm water flow to an ultimate point for treatment or disposal.

"Water Improvements" includes pipelines, conduits, meters, hydrants and all other structures, devices, appurtenances and facilities used in collecting, treating or conveying drinking water from a source of supply to water consumers and other water users.

"Street Improvements" includes streets, sidewalks, curbs, gutters, street lighting and all other structures, devices, appurtenances, facilities and improvements used to serve cars, bicycles, pedestrians and other modes of transportation and conveyance.

"Right to remonstrate against the formation of an LID" refers solely to a property owner's right under the City Charter and Code to be counted as part of an extraordinary majority of property owners that can, in certain circumstances, suspend proceedings on the formation of an LID. The waiver of this right herein does not limit or otherwise restrict the ability of a property owner bound by this covenant to appear at any of the required public hearings and testify regarding the formation of the LID, whether the boundaries include all benefited property, the equity of the assessment formula, the scope and nature of the project or of the final assessment, or any other issue regarding the LID.

City Manager
City of Donald
P.O. Box 388
Donald, OR 97020-0388

Same

Know all men by these presents that the City of Donald, Oregon, declares the conditions and obligations set forth in that certain improvement agreement with _____, for the _____, (Planning Files No. _____) dated the _____ day of _____, 20____, made and executed by the Public Works Director and recorded in _____, Deed Records of Marion County, have been fully satisfied and discharged.

Public Works Director
City of Donald, Oregon

This instrument was acknowledged before me on _____, 20__, by _____, as the Public Works Director of the City of Donald, Oregon.

NOTARY PUBLIC FOR OREGON
My Commission Expires: _____

AFTER RECORDING

RETURN TO:

City Manager
City of Donald
P.O. Box 388
Donald, OR 97020-0388

UNTIL A CHANGE IS MADE

SEND ALL TAX STATEMENTS TO:

Same

DEDICATION - PUBLIC ROADWAY

KNOW ALL MEN BY THESE PRESENT, that _____,
hereinafter called the Grantor, in consideration of other valuable consideration, receipt of which is hereby
acknowledged by Grantor, does hereby dedicate to the use of the public forever, for public roadway,
sidewalk, and utility purposes, all the certain land described as follows:

SEE ATTACHMENT "A"

The Grantor covenants and warrants to the City of Donald, its successors and assigns, that he/she/they is/are
lawfully seized in fee simple of the above described premises, free from all encumbrances and that Grantor
will warrant and forever defend the said premises and every part and parcel thereof against the lawful claims
and demands of all persons whomsoever.

**1. THE GRANTOR MAKES THE FOLLOWING REPRESENTATIONS CONCERNING
THE DEDICATION AREA:**

1.1 Disclosure of Environmental Conditions. After reasonable inquiry and to the best of
the Grantor's knowledge, Grantor has disclosed all results of any report, investigation, survey, or
assessment regarding environmental condition of the Easement Area.

1.2 Disclosure of Underground Storage Tanks. After reasonable inquiry and to the best of
the Grantor's knowledge, Grantor has disclosed whether there are underground storage tanks, as defined
at ORS 466.706(20), on or under the Easement Area.

1.3 Defined Terms. For purposes of the Easement, (a) "reasonable inquiry" shall mean
inquiry of Grantor's managers or agents with property management or environmental management
responsibility of the dedicated area and review of Grantor's records and (b) "knowledge" shall mean the
current actual knowledge of such managers.

2. ALLOCATION OF LIABILITY. It is understood and agreed that this conveyance is not
intended to alter the liability of the parties for any release of hazardous substances as defined in any

federal, state or local law onto or from the Easement Area.

3. INDEMNIFICATION

To the extent allowed under Oregon Law, Grantor agrees to defend, indemnify, and hold harmless the City for all claims, liabilities, actions, damages, injuries, costs, loss, demands, actions, suits or expenses (including attorney fees and costs: incidental to the investigation and defense thereof, arising out of the acts or omissions of, or the use or occupancy of, the Easement Area by the Grantor, its agents or employees, or resulting from the presence or release of hazardous substances onto or from the Easement Area prior to the Effective Date of the Easement. This indemnity shall not apply to the release of hazardous substances on to or from the Easement Area caused by the officers, agents or employees of the City or third parties not acting under the authority or control of Grantor.

4. EFFECTIVE DATE

The Easement shall be effective as of the date it is signed by all parties.

5. DURATION

The Easement shall remain in effect perpetually; however, it shall terminate automatically in the event that the City of Donald vacates the Easement Area, in which case the City shall execute a recordable document evidencing such termination.

IN WITNESS WHEREOF, the parties have caused this instrument to be executed the date and year written below.

STATE OF OREGON)
) SS
County of _____)

This instrument was acknowledged before me on _____, 20____, by _____
_____.

NOTARY PUBLIC FOR OREGON
My Commission Expires: _____

ACCEPTED: _____, City Manager

AFTER RECORDING

RETURN TO:

City Manager
City of Donald
P.O. Box 388
Donald, Oregon 97020-0388

PUBLIC UTILITY EASEMENT

For consideration of this conveyance, the receipt of which is hereby acknowledged by the Grantor, the undersigned, _____,

Grantor(s) do hereby grant to the City of Donald, Marion County, Oregon, a municipal corporation, referred to herein as City a permanent, non-exclusive easement to construct, reconstruct, operate and maintain City utilities, including water, sanitary sewer, and other public utilities, and all necessary related facilities under and along the following described area:

Ex A - Legal Description here:
Ex B – Sketch for Legal Description

Collectively, the "Easement Area"

TO HAVE AND TO HOLD said easement unto said City, its successors and assigns.

The permanent easement shall include the right, privilege, and authority of City and other public utility providers to excavate for, and to construct, install, lay, operate, maintain and remove underground pipelines and/or cables with all appurtenances incident thereto or necessary thereafter, for the purpose of supplying public utility service under and across the said premises, together with the right of City and other public utility providers to place, install, maintain, inspect, add to the number of and relocate pipelines and/or cables and necessary appurtenances and make excavations therefore from time to time, in, under and through the above described premises within said right-of-way, and to cut and remove from said right-of-way any trees and other obstructions which may endanger the safety or interfere with the use of said pipelines and/or cables or appurtenances attached to or connection therewith; and the right of ingress and egress to and over said above described premises at any and all times for the purpose of patrolling the pipelines and/or cables, or repairing, renewing or adding to the number of pipelines and/or cables and appurtenances and for doing anything necessary, useful or convenient for the enjoyment of the easement hereby granted.

Upon completion of the construction, and any maintenance of the easement area, the CITY shall restore the surface of the property to its original condition and shall indemnify and hold the GRANTOR harmless against any and all loss, cost, or damage arising out of the exercise of the rights granted herein. No trees, permanent structures or improvements shall be placed or constructed on the easement by the Grantor or the Grantor's heirs, assigns or successors in interest without the written permission of the City.

Grantor hereby covenants to and with the CITY, and CITY'S successors in interest and assigns that

GRANTOR is lawfully seized in fee simple of the Easement Area, free from all encumbrances except:

_____ and that GRANTOR and their heirs and personal representatives shall warrant and forever defend the said premises and every part thereof to the CITY, its successors in interest and assigns against the lawful claims and demands of all persons claiming by, through or under the GRANTOR.

In construing this deed and where the context so requires, the singular includes the plural and all grammatical changes shall be implied to make the provisions hereof apply equally to corporations and to individuals.

IN WITNESS THEREOF, Grantors have executed this Public Utility Easement as of this _____ day of _____ 20____.

Grantor(s)

By: _____

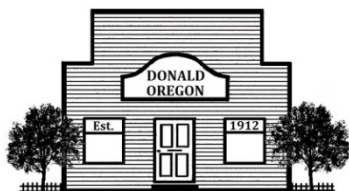
Print Name: _____

STATE OF OREGON)
) SS
County of _____)

This instrument was acknowledged before me on _____, 20____, by _____.

NOTARY PUBLIC FOR OREGON
My Commission Expires: _____

ACCEPTED: _____ City Manager



CITY OF DONALD

10710 Main Street N.E. • P.O. Box 388 • Donald, OR 97020-0388

Phone 503-678-5543 • Fax 503-678-2750

www.donaldoregon.gov

Emergency pager for Water and Sewer: 503-301-6479

APPLICATION FOR WATER CREDIT

Customer Name:	Account Number:
Date of repair:	
Street Address:	
Mailing Address:	
City, State, Zip:	
Phone Number:	Cell Number:

How to apply for water credit

1. Fix problem and save the receipts from repair
2. Bring copy of receipt with completed application to City Hall
3. Director of Public Works will test and inspect water repair to ensure that the leak is fixed. He may then authorize a credit.
4. If approved, the credit will be applied to the next month's bill. Credit may be given once per calendar year.

Credit is based on the previous year's same month usage amount. Every 1,000 gallons of overage will be charged at \$2.00.

OFFICE USE ONLY

Date Work Order Entered Sprbrk:	Staff Initials:
Date Reviewed by PW director:	Staff Initials:

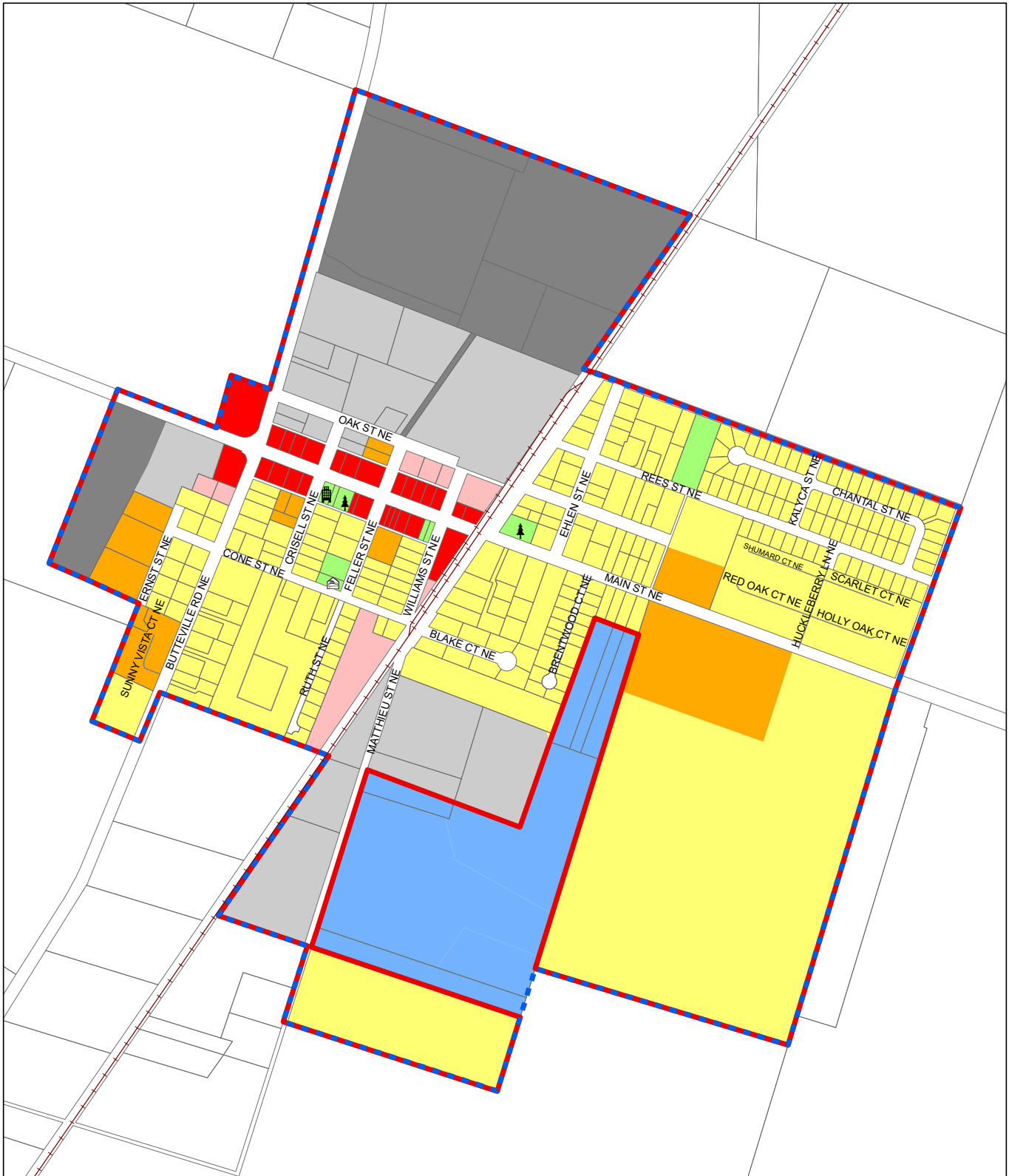
Applicant's Signature: _____

Date: _____

Public Works hours are Monday through Friday 7 am to 3 pm. After hour rates apply outside of these times.

B. MAPS

Zoning Designations City of Donald, 2020



Legend

- Railroads
- Private Roads
- UGB
- City Limits
- Taxlots

Points of Interest

- City Hall
- Fire Hall
- Park

Zoning

- DMU (Downtown Mixed Use)
- R7 (Single-Family Residential)
- RM (Multi-Family Residential)
- C (Commercial)
- I (Industrial)
- EI (Employment Industrial)
- P (Public)
- UT-20 (Urban Transition- 20 Acre)

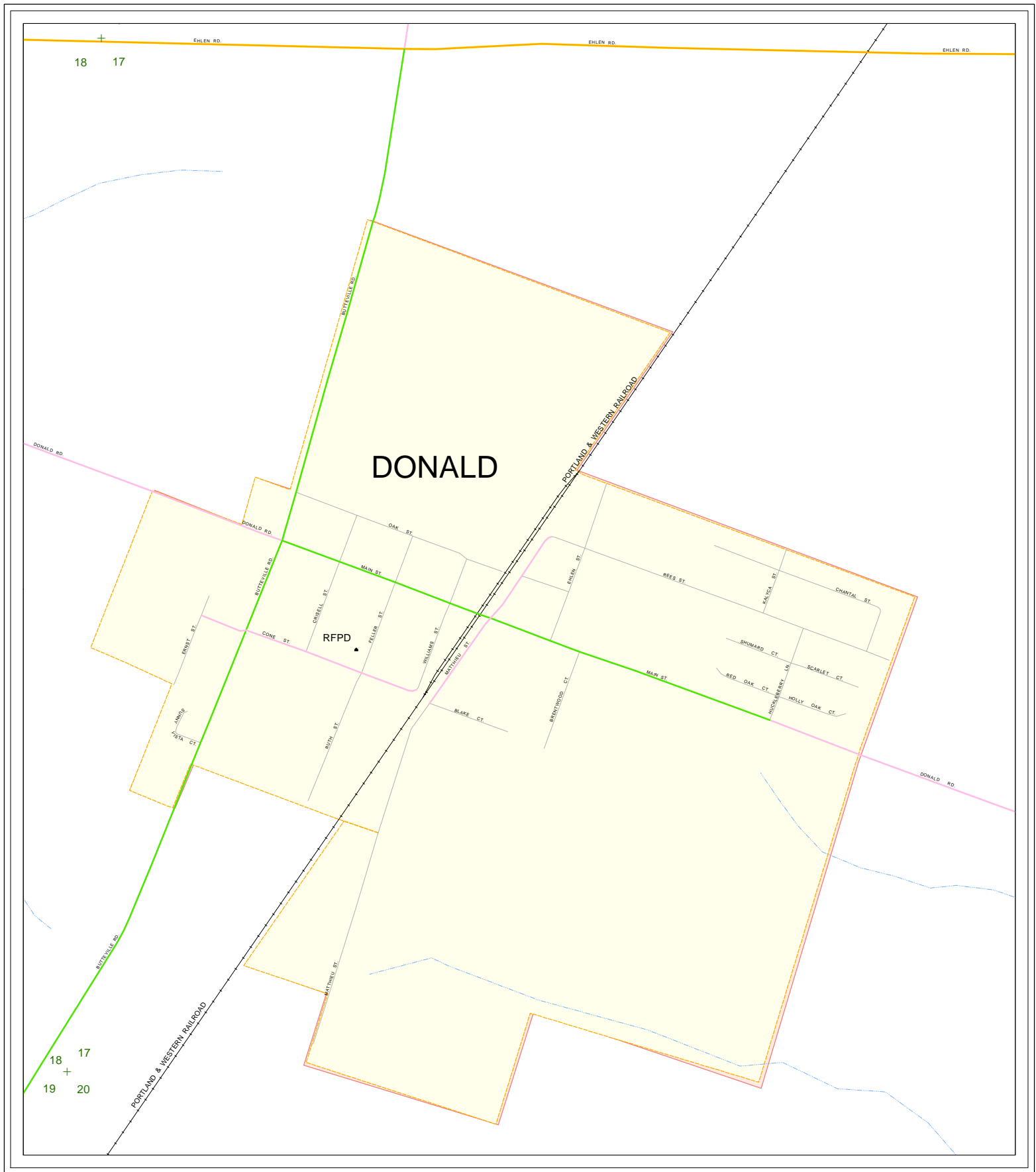


500 250 0 500 Feet



Map Date	9/22/20
Author	LH
Approved By	Holly Byram
Ordinance	177-2020
r:/city/Donald/DonaldZoneMap2020.mxd	





LEGEND

FOR FURTHER FUNCTIONAL CLASSIFICATION INFORMATION, CONTACT ODOT REGION OFFICE.

	INTERSTATE		STATE HIGHWAY
	PRINCIPAL ARTERIAL		MAJOR COLLECTOR
	MINOR COLLECTOR		LOCAL ROAD
	INTERSTATE - US ROUTE - ORE. ROUTE		CITY LIMIT
	NATIONAL HIGHWAY SYSTEM ROUTE		URBAN GROWTH BOUNDARY
	RAILROAD - AMTRAK PASSENGER STATION		GRAVEL PIT - QUARRY - ODOT STOCKPILE
	ODOT MAINTENANCE STATION		

Published by

PREPARED DIGITALLY BY THE
OREGON DEPARTMENT OF TRANSPORTATION
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Donald
POPULATION 990

T. 4 S. R. 1 W. W.M.

SCALE

0 200 400 800 Feet

0 60 120 240 Meters

"This product is for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Users of this product should review and consult the primary data sources to determine the usability of the information. Conclusions drawn from this information are the responsibility of the user."

OREGON TRANSPORTATION MAP

Showing Federal Functional Classification of Roads
City of

DONALD

MARION COUNTY
2020 Edition

PARK & RIDE
AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

INTERBUS
AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

AMTRAK
AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

PORT
AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

AIRPORT
AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

COMM. AIR
AVAILABLE TRANSPORTATION SERVICES SHOWN WITH YELLOW BACKGROUND

C. CONSTRUCTION TESTING CHECKLIST

Appendix C. City Checklist – Testing & Inspection Documentation

Project: _____

Contractor: _____

Resident Engineer: _____

1. This checklist and accompanying documentation shall be stamped by the Resident Engineer and shall be submitted to the City Engineer prior to Final Acceptance.
2. Is the following documentation included?

	YES	NO	NA
<u>Streets</u>			
1) Compaction testing/proof rolls for subgrade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Compaction testing for base rock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Curb string line inspection documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) City staff clearance to Pave	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Compaction testing for AC Paving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Sidewalk ADA compliance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) ADA Curb Ramp Inspection Forms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Continued)	YES	NO	NA
<u>Force Mains and LPSS Systems</u>			
1) Backfill compaction testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Pressure test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Observe operation of appurtenances and valves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Tracer wire testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Pressure laterals tested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Continued)	YES	NO	NA
<u>Storm Sewers</u>			
1) Compaction testing for backfill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Mandrel testing of mainlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Video inspection of mainlines (inc. video)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Tracer wire testing approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Water Distribution System</u>			
1) Compaction testing for backfill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Pressure Test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Disinfection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Copy of transmittal to DHS with final plan review form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Tracer wire testing approval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D. SURVEY CONTROL

Appendix D. Survey Control

All projects under the jurisdiction of the City of Donald shall be prepared in the State Plane Coordinate System, North Zone, for the State of Oregon, NAD 83 (2011) Datum (using international feet). The National Geodetic Survey, “A 106”, shall be used as the primary control monument, using an elevation of 198.57 feet for this point (published North American Vertical Datum 88, NAVD 88).

E. CROSS CONNECTION CONTROL PROGRAM

41-00259

CITY OF DONALD

CROSS CONNECTION ORDINANCE NO. 89

AN ORDINANCE PROVIDING FOR A CROSS CONNECTION CONTROL PROGRAM AND REPEALING ORDINANCE NO. 82.

Pursuant to Chapter 333, Division 61, of the Oregon Administrative Rules, it is the responsibility of the City of Donald to protect its drinking water by instituting and enforcing a cross connection control program. NOW, THEREFORE, THE CITY OF DONALD ORDAINS AS FOLLOWS:

A cross connection control program for the City of Donald is hereby provided.

Contents:

- 1:01 Definitions
- 1:02 Purpose
- 1:03 Cross Connections Regulated
- 1:04 Backflow Prevention Assembly Requirements
- 1:05 Installation Requirements
- 1:06 Access to Premises
- 1:07 Annual Testing and Repairs
- 1:08 Costs of Compliance
- 1:09 Termination of Service
- 1:10 Constitutionality and Saving Clause
- 1:11 Effective Date

1:01 DEFINITIONS

- (1) "Approved backflow prevention assembly" or "backflow assembly" or "assembly" means an assembly to counteract back pressures or prevent back siphonage. This assembly must appear on the list of approved assemblies issued by the Oregon State Health Division.
- (2) "Auxiliary supply" means any water source or system other than the public water system, that may be available in the building or on the premises.
- (3) "Backflow" means the flow in the direction opposite to the normal flow or the introduction of any foreign liquids, gases, or substances into the water system of the City's water.
- (4) "Boresight" or "boresight to daylight" means providing adequate drainage for backflow prevention assemblies installed in vaults through the use of an unobstructed drain pipe.

- (5) "City" or "The City" shall mean the City of Donald.
- (6) "Contamination" means the entry into or presence in a public water supply system of any substance which may be deleterious to health and/or quality of the water.
- (7) "Cross connection" means any physical arrangement where a public water system is connected, directly or indirectly, with any other non-drinkable water system or auxiliary system, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated water, sewage, or other liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross connections.
- (8) "Degree of hazard" means the low or high hazard classification that shall be attached to all actual or potential cross connections.
- (9) "Director" means the director of public works of the City of Donald, or authorized agent.
- (10) "Double check valve backflow prevention assembly" or "double check assembly" or "double check" means an assembly which consists of two independently operating check valves which are spring-loaded or weighted. The assembly comes complete with a gate valve on each side of the checks, as well as test cocks to test the checks for tightness.
- (11) "Health hazard" means an actual or potential threat of contamination of a physical or toxic nature to the public potable water system or the consumer's potable water system that would be a danger to health.
- (12) "High hazard" means the classification assigned to an actual or potential cross connection that potentially could allow a substance that may cause illness or death to backflow into the potable water supply.
- (13) "Low hazard" means the classification assigned to an actual or potential cross connection that potentially could allow a substance that may be objectionable, but not hazardous to one's health, to backflow into the potable water supply.
- (14) "Plumbing hazard" means an internal or plumbing-type cross connection in a consumer's potable water system that may be either a pollutional or a contamination-type hazard. This includes, but is not limited to, cross connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn sprinkling systems. Plumbing-type cross connections can be located in many types of structures including homes, apartment houses, hotels and commercial or industrial establishments.

- (15) "Point of use isolation" means the appropriate backflow prevention within the consumer's water system at the point at which the actual or potential cross connection exists.
- (16) "Pollutional hazard" means an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.
- (17) "Potable water supply" means any system of water supply intended or used for human consumption or other domestic use.
- (18) "Premises" or "premise" means any piece of property to which water is provided including all improvements, mobile structures and structures located on it.
- (19) "Premise isolation" means the appropriate backflow prevention at the service connection between the public water system and the water user.
- (20) "Reduced pressure principle backflow prevention assembly" or "reduced pressure principle assembly" or "RP assembly" shall mean an assembly containing two independently acting approved check valves together with a hydraulically-operated, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The assembly shall include properly located test cocks and tightly closing shut off valves at the end of the assembly.
- (21) "System hazard" means an actual or potential threat of severe danger to the physical properties of the public or consumer's potable water system or of a pollution or contamination which would have a detrimental effect on the quality of the potable water in the system.
- (22) "Thermal expansion" means heated water that does not have the space to expand.

1:02 PURPOSE

The purpose of this ordinance is to protect the water supply of the City of Donald from contamination or pollution due to any existing or potential cross connections.

1:03 CROSS CONNECTIONS REGULATED

No cross connections shall be created, installed, used or maintained within the territory served by the City of Donald, except in accordance with this ordinance.

1:04 BACKFLOW PREVENTION ASSEMBLY REQUIREMENTS

- (1) A cross connection inspector employed by or contracted with the City shall carry out inspections and surveys of each property and will require an assembly commensurate with the degree of hazard to be installed at the service connection.
- (2) The minimum protection of an approved double check valve assembly must be installed at every service connection served by the City.
- (3) The property owner is responsible for all cross connection control within the premises.
- (4) The property owner is responsible for providing adequate protection against thermal expansion.
- (5) Any mobile unit or apparatus which uses city water or water from any premise within the City of Donald's system shall first obtain a permit from the City and comply with all restrictions and fees.
- (6) The use of any type of chemical spray attachment connected to the premise plumbing, including garden hose fertilizers and pesticide applicators, is prohibited within the City of Donald water system.
- (7) The use of any type of radiator flush kits attached to the premise plumbing is prohibited within the City of Donald water system.

1:05 INSTALLATION REQUIREMENTS

To ensure proper operation and accessibility of all backflow prevention assemblies, the following requirements shall apply to the installation of these assemblies.

- (1) No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. If installed in a vault or basement, adequate drainage shall be provided.
- (2) Assemblies must be installed immediately downstream of the water meter, before any branch in the line. Alternate locations must be approved in writing by the City prior to installation.
- (3) The assembly must be protected by the property owner from freezing and other severe weather conditions.
- (4) All backflow prevention assemblies shall be of a type and model approved by the State

of Oregon Health Division and the City.

- (5) Only assemblies specifically approved by The Oregon Health Division for vertical installation may be installed vertically.
- (6) The assembly shall be readily accessible with adequate room for maintenance and testing. Assemblies 2" and smaller shall have at least 6" clearance on all sides of the assembly. All assemblies larger than 2" shall have a minimum clearance of 12" on the back side, 24" on the test cock side, 12" below the assembly and 36" above the assembly. "Y" pattern double check valve assemblies shall be installed so that the checks are horizontal and the test cocks face upward.
- (7) If written permission is granted to install the backflow assembly inside of the building, the assembly must be readily accessible during regular working hours of 6:00 a.m. to 6:00 p.m., Monday through Friday.
- (8) An assembly installed inside of the premises and installed 5' above the floor, must be equipped with a rigidly and permanently installed scaffolding acceptable to the City. This installation must also meet the requirements set out by the U.S. Occupational Safety and Health Administration and the State of Oregon Occupational Safety and Health Codes.
- (9) RP assemblies may be installed in a vault only if relief valve discharge can be drained to daylight through a "boresight" type drain. The drain shall be of adequate capacity to carry the full rated flow of the assembly and shall be screened on both ends.
- (10) An approved air gap shall be located at the relief valve orifice. This air gap shall be at least twice the inside diameter of the incoming supply line as measured vertically above the top rim of the drain and in no case less than 1".
- (11) Upon completion of installation of any additional assemblies within the premises, the City must be notified and all assemblies must be inspected and tested, as required in section 1:07. All backflow assemblies must be registered with the City. Registration shall consist of date of installation, make, model, size, serial number of the backflow assembly, location, and initial test report.
- (12) Any water pressure drop caused by the installation of a backflow assembly is not the responsibility of the City.
- (13) All new construction must install an approved assembly at the service connection. The type of assembly shall be commensurate with the degree of hazard as determined by a certified inspector. If the use of the property has not been determined, an RP assembly must be installed.

1:06 ACCESS TO PREMISES

Authorized employees of the City, with proper identification, shall have access during the hours of 6:00 a.m. to 6:00 p.m. to all parts of a premise and within the building to which water is supplied. However, if any water user refuses access to a premise or to the interior of a structure during these hours for inspection by a cross connection specialist appointed by the City, a reduced pressure principle assembly must be installed at the service connection to that premise.

1:07 ANNUAL TESTING AND REPAIRS

All backflow assemblies installed within the territory served by the City shall be tested immediately upon installation and at least annually thereafter by a state certified tester employed by or contracted with the City to perform required tests. All such assemblies found not functioning properly shall be promptly repaired or replaced at the expense of the property owner. If any such assembly is not promptly repaired or replaced, the City may deny or discontinue water to the premise. The City may set fees to cover the cost of this service.

1:08 COSTS OF COMPLIANCE

All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the financial responsibility of the property owner.

1:09 TERMINATION OF SERVICE

Failure on the part of any customer to discontinue the use of all cross connections and to physically separate cross connections is sufficient cause for the immediate discontinuance of public water service to the premises. (OAR chapter 333-61-070, section 1)

1:10 CONSTITUTIONALITY AND SAVING CLAUSE

That if any provision, section, sentence, clause or phrase of this Ordinance, or the application of same to any person or set of circumstances are for any reason held to be unconstitutional, void, invalid, or for any reason unenforceable, the validity of the remaining portions of this Ordinance or its application to other persons or circumstances shall not be affected thereby, it being the intent of the City Council of the City of Donald in adopting, and the Mayor in approving this Ordinance that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality or invalidity of any other portion, provision, or regulation.


1.11 EFFECTIVE DATE

Inasmuch as this ordinance is necessary for the immediate preservation of the public health, peace and safety of Donald, an emergency is hereby declared to exist, and this ordinance shall be in full force and effect from and after its passage by the Donald City Council and approval by the Mayor.

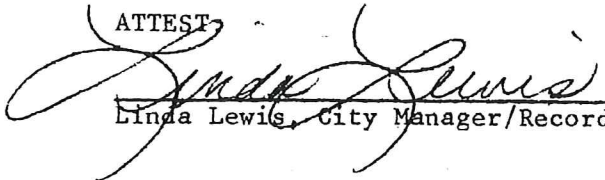
Read first in full at a regular meeting of the Donald City Council on November 3, 1994, and read in full a second time at a regular meeting of the Council on November 3, 1994, and enacted by the following votes:

6 Ayes

0 Nays


David L. Wheat, Mayor

ATTEST


Linda Lewis, City Manager/Recorder

F. SEED MIXES

Appendix F. Seed Mixes

1.1 GENERAL REQUIREMENTS

1. In general, when ground surfaces have been disturbed, the applicant will be required to apply Hydroseeding, Fertilizing, Hydromulching and Tackifiers according to the requirements of the ODOT Standard Specification Section 01030.43 for Permanent (West of Cascades) and Temporary Seeding and according to Section 01030.48. Follow One-Step Operation unless otherwise directed by the City Engineer.
2. For all Hydroseeding operations the following apply:
 - a. Apply a green dye tracer as a visual application aid.
 - b. On slopes steeper than 2H:1V double the rate of tackifier to be applied.
 - c. Apply hydroseeding only during the approved seeding dates.

1.2 HYDROSEED MIXTURE SCHEDULE

1. Apply according to the requirements of ODOT Standard Specification Section 01030.13 for areas of sun and partial shade. Provide Oregon Certified Weed Free grass-seed blends or mixes, proportioned by weight, as follows:

Proportion %	Name Common (Latin)	Min. % Germ	Min. % Pure Seed	Max. % Weed Seed
50	Kentucky Bluegrass (Poa Pratensis)	80	85	0.00
30	Chewings Red Fescue (Festuca Rubra Variety)	85	98	0.00
10	Perennial Rye Grass (Lolium Perenne)	90	98	0.00
10	Redtop (Agrostis Alba)	85	92	0.00

2. See Alternate Approved Seed Mixes below for other approved seed mixes.

1.3 HYDROSEED APPLICATION RATES

1. Permanent Seeding Pure Live Seed Rate: 4 #/1000 sf
2. Temporary Seeding Pure Live Seed Rate: 1 #/1000 sf

1.4 FERTILIZER

1. Use standard commercial grade fertilizer according to ODOT Standard Specification Section 01030.14 for West of the Cascades applications. Adhere to Statewide Near Water Application requirements when applying within 50 feet of open water.

1.5 MULCH

1. Apply Hydromulch materials made of cellulose, wood, or straw fiber according to ODOT Standard Specification Section 01030.15 and ODOT Section 01030.48 according to the following rates:
 - a. On slopes flatter than 2H:1V 50 #/1000 sf
 - b. On slopes 2H:1V or steeper 100 #/1000 sf

1.6 ASPHALTIC EMULSION TACKIFIER

1. Use liquid stabilizer asphalt emulsion, ASTM 977, Grade SS-1, nontoxic and free from plant growth or germination-inhibitors, unless otherwise approved by the City Engineer. Apply according to ODOT Standard Specification Section 01030.16 and ODOT Section 01030.48. Dilute emulsion with water at a rate of 1-part emulsion to 30 parts water unless manufacturer recommends a greater rate of application for the conditions of use.

1.7 ALTERNATE APPROVED SEED MIXES

1. The following are low maintenance seed mixes. These mixes are generally suited for the City of Donald climate and the suggested uses. At a minimum, the Design Engineer shall contact the supplier to confirm that the seed mix is appropriate for the intended use. When appropriate and when allowed by the City Engineer, alternate seed mixes may be used. Mulch, Fertilizers, and Tackifiers shall be used with these seed mixes applied according ODOT Standard Specification Section 01030 and 01040.
 - a. Eco Seed Mixture
 - i. Recommended for very low maintenance natural grassed areas. No mowing required, although 1-2 times per year optimal. No irrigation required.
 - 45% Hard Fescue
 - 44% Chewings Fescue
 - 5% Crimson Clover
 - 3% Yarrow
 - 2% English Daisy
 - 1% Alyssum
 - Pure Live Seed Rate:
 - 3-5 #/1000 sf
 - b. Traditional Fine Fescue Mixture
 - i. Optimal as low maintenance natural cover or managed lawn. Mow 2 times per year minimum for natural setting, or mow regularly and irrigate for optimal performance.
 - 40% Hard Fescue
 - 40% Chewings Fescue
 - 10% Blue Fescue
 - 10% Strong Creeping Red Fescue
 - Pure Live Seed Rate:
 - 4-6 #/1000 sf High Maintenance Turf
 - 1-3#/1000 sf Native/Naturalized Grass Areas
 - c. PTC Bio Swale Mixture

- i. Recommended for bio swales and riparian zones (transition between continuously wet and drier upland areas). No mowing required, although 2 times per year optimal.
 - 30% SR 1019 Creeping Bentgrass
 - 30% Poa trivialis
 - 10% Fawn Tail Fescue
 - 10% White Clover
 - 10% SR 2100 Kentucky Bluegrass
 - 5% Highland Bentgrass
 - 5% SR 3200 Dwarf Blue Fescue
 - Pure Live Seed Rate:
 - 2.1 #/1000 sf
- d. Wet Soil Mixture
 - i. For continuously wet areas.
 - 30% Poa trivialis
 - 20% Creeping Bentgrass
 - 20% Perennial Rye
 - 20% Colonial Bentgrass
 - 10% Timothy
 - Pure Live Seed Rate:
 - 1.5 #/1000 sf

1.8 SEED MIXES NOT APPLIED USING HYDROSEEDING OR HYDROMULCHING

- 1. Hand Spread or Mechanically Spread dry seed, fertilizer, dry mulch, and tacking applications shall comply with ODOT Standard Specifications 01030.48 (b) and related requirements.

G. INFILTRATION TESTING

Appendix G. Infiltration Testing

1.1 GENERAL REQUIREMENTS

1. To properly size and locate stormwater management facilities, it is necessary to characterize soil infiltration conditions at the location of the proposed facility. Projects adding <6,000 sf of impervious area may utilize assumed soil infiltration rates based on soil type with approval by the City Engineer. Projects that will be adding >6,000 sf of impervious area shall perform an infiltration test to ensure that the assumptions used in developing the sizing factors are appropriate for site conditions (e.g. soil infiltration rates, in inches per hour, assumed for soil types are A=4 in/hr, B=2 in/hr, C=0.5 in/hr, d=0.1 in/hr).
2. All projects must evaluate existing site conditions and determine the infiltration rate prior to facility design. An infiltration test is also required for sites trying to demonstrate that on-site infiltration is infeasible.

1.2 INFILTRATION TEST REQUIREMENTS

1. Testing must be conducted or overseen by a qualified Professional Engineer, Registered Geologist, or Certified Engineering Geologist licensed in the State of Oregon.
2. The depth of the test must correspond to the facility depth. If a confining layer, or soil with a greater percentage of fines, is observed during the subsurface investigation to be within four feet (4') of the bottom of the planned infiltration system, the testing should be conducted within that confining layer. Based on DEQ requirements, the boring log must be contained to a depth adequate to show separation between the bottom of the infiltration facility and the seasonal high groundwater level. (The boring depth will vary, based on facility depth).
3. Tests must be performed in the immediate vicinity of the proposed facility. Exceptions can be made to the test location provided the qualified professional can support that the strata are consistent from the proposed facility to the test location, and approved through the Design Exception process by the City Engineer. The test must be conducted in the 24 months prior to the date the plans were submitted for review.
4. There are three infiltration testing methods that can be used to determine design infiltration rate:
 - a. Open pit falling head
 - b. Encased falling head
 - c. Double-ring infiltrometer
5. The qualified professional who will be performing the infiltration test must exercise judgement in the selection of the infiltration test method. Where satisfactory data from adjacent areas using an approved infiltration testing method is available that demonstrates infiltration testing is not necessary, the infiltration testing requirement may be waived by the City Engineer. A recommendation for forgoing infiltration testing must be submitted in a report which includes supporting data and is stamped and signed by the project geotechnical engineer or project geologist.

1.3 MINIMUM NUMBER OF REQUIRED TESTS

1. At least one (1) infiltration test is required for any potential location where a stormwater facility will be sited.

2. Additional tests shall be required for every 3,000 sf of project area.
3. Additional tests shall be required for every 100 lf of infiltration facility.
4. No more than five tests are required per development (at the discretion of the qualified professional assessing the site, as well as the City Engineer).
5. Tests performed for a proposed land division can be used at the building permit state as long as the results of the test are submitted with the separate applications and were conducted within 24 months prior to the date the plans were submitted for review.
6. Where multiple types of facilities are used, it is likely that multiple tests will be necessary, since an infiltration test can test only a single location. It is required to conduct an infiltration test at each stratum used. The City Engineer may require additional testing. If additional testing is required during plan review, the applicant must provide 24-hours notice to the City and specify the time and location that the test will take place.

1.4 FACTORS OF SAFETY

1. For all of the testing methods described in this section, a minimum allowable factor of safety of 2 shall be applied to field obtained infiltration rates for use in stormwater design. To obtain the infiltration rate used in design, divide the infiltration rate measured in the field by the factor of safety. The factor of safety used in design should be chosen by collaboration between the geotechnical engineer or geologist overseeing the infiltration testing and the civil engineer designing the stormwater management system. Determination of the factor of safety should include consideration of project specific conditions such as soil variability, testing methods, consequences of system failure, complexity of proposed construction, etc.

1.5 OPEN PIT FALLING HEAD PROCEDURE INSTRUCTIONS

1. The open pit falling head procedure is performed in an open excavation and therefore is a test of the combination of vertical and lateral infiltration.
 - a. Excavate a hole with bottom dimensions of approximately 2 feet wide by 2 feet deep into the native soil to the elevation of the proposed facility bottom. The test can be conducted in a machine-excavated pit or a hand-dug pit. If smooth auguring tools or a smooth excavation bucket are used, scratch the sides and bottom of the hole with a sharp pointed instrument, and remove the loose material from the bottom of the test hole.
 - b. Fill the hole with clean water a minimum of 12 inches and maintain this depth of water for at least 4 hours (or overnight if clay soils are present) to pre-saturate the native material.
 - c. Determine how the water level will be accurately measured. The measurement should be made with reference to a fixed point. A lath placed in the test pit prior to filling or a sturdy beam across the top of the pit are convenient reference points. The tester and excavator should conduct all testing in accordance with OSHA regulations.
 - d. After the pre-saturation period required in step 2, refill the hole with water to 12 inches and record the draw-down time. Alternative water head heights may be used for testing provided the pre-saturation height is adjusted accordingly and the water head height used in infiltration testing is no more than 50 percent of water head height in the proposed stormwater system during the design storm event. Measure the water level to the nearest 0.01 foot (1/8 inch) at 10-minute intervals for a total period of 1 hour (or 20 minute intervals for 2 hours in slower draining soils) or until all the water is drained. In faster draining soils (sands and gravels), it may be necessary to shorten the measurement interval to

- e. obtain a well-defined infiltration rate curve. Constant head test may be substituted for falling head tests at the discretion of the professional overseeing the infiltration testing.
- f. Repeat the infiltration test until the change in measured infiltration rate between two successive trials is no more than 10 percent. The trial should be discontinued if the infiltration rate between successive trials increases. At least three trials must be conducted. After each trial, the water level must be readjusted to the 12 inch level. Enter results into the Test Data Form.
- g. The average infiltration rate over the last trial should be used to calculate the design infiltration rate without a factor of safety applied. Alternatively, the infiltration rate measured over the range of water head applicable to the project stormwater system design may be used at the discretion of the professional overseeing the testing. The final rate must be reported in inches per hour.
- h. Upon completion of the testing, the excavation must be backfilled.
- i. For very rapidly-draining soils, it may not be possible to maintain a water head above the bottom of the test pit. If the infiltration rate meets or exceeds the flow of water into the test pit, conduct a test in the following manner:
 - i. Approximate the area over which the water is infiltrating.
 - ii. Using a water meter, bucket, or other device, measure the rate of water discharging into the test pit.
 - iii. Calculate the infiltration rate by dividing the rate of discharge (cubic inches per hour) by the area over which it is infiltrating (square inches).
 - iv. Note that a maximum infiltration rate of 20 inches per hour can be used in stormwater system design.

1.6 ENCASED FALLING HEAD PROCEDURE INSTRUCTIONS

1. The encased falling head procedure is performed with a six inch (6") casing that is embedded approximately six inches (6") into the native soil. The goal of this field test is to evaluate the vertical infiltration rate through a six inch (6") plug of soil, without allowing any lateral infiltration. The test is not appropriate in gravelly soils or in other soils where a good seal with the casing cannot be established.
 - a. Embed a solid six inch (6") diameter casing into the native soil at the elevation of the proposed facility bottom. Ensure the embedment provides a good seal around the pipe casing so that percolation will be limited to the six inch (6") plug of material within the casing. This method can also be used when testing within hollow stem augers, provided the driller and tester are reasonably certain that a good seal has been achieved between the soil and auger.
 - b. Fill the pipe with clean water a minimum of 12 inches above the soil to be tested and maintain this depth for at least 4 hours (or overnight if clay soils are present) to pre-saturate the native material. Any soil that sloughed into the hole during the soaking period must be removed. In sandy soils with little or no clay or silt, soaking is not necessary. If after filling the hole twice with 12 inches of water, the water seeps completely away in less than 10 minutes, the test can proceed immediately.
 - c. To conduct the first trial of the test, fill the pipe to approximately 12 inches above the soil and measure the water level to the nearest 0.01 foot (1/8 in). Alternative water head heights may be used for testing provided the pre-saturation height is adjusted accordingly and the water head height used in infiltration testing is 50 percent or less than the water head height in the proposed stormwater system during the design storm event. The level should be measured with a tape or other device with reference to a fixed point. The top of the pipe is often a convenient reference point. Record the exact time.
 - d. Measure the water level to the nearest 0.01 foot (1/8 in) at 10 minute intervals for a total period of 1 hour (or 20 minute intervals for 2 hours in slower soils) or until all the water has drained. In faster draining soils (sands and gravels), it may be necessary to shorten the measurement interval in order to

obtain a well-defined infiltration rate curve. Constant head test may be substituted for falling head tests at the discretion of the professional overseeing the infiltration testing and approved by the City Engineer. Successive trials should be run until the percent change in measured infiltration rate between two successive trials is minimal. The trial should be discontinued if the infiltration rate between successive trials increases. At least three (3) trials must be conducted. After each trial, the water level is readjusted to the 12 inch level. Enter results into the Test Data Form.

- e. The average infiltration rate over the last trial should be used to calculate the un-factored infiltration rate. Alternatively, the infiltration rate measured over the range of water head applicable to the project stormwater system design may be used at the discretion of the professional overseeing the testing, as approved by the City Engineer. The final rate must be reported in inches per hour.
- f. Upon completion of testing, the casing must be pulled, and the test pit backfilled.

1.7 DOUBLE RING INFILTROMETER TEST

1. The double-ring infiltrometer test procedure shall be performed in accordance with ASTM-3385-94. The test is performed within two concentric casings embedded and sealed to the native soils. The outer ring maintains a volume of water to diminish the potential of lateral infiltration through the center casing. The volume of water added to the center ring to maintain a static water level is used to calculate the infiltration rate. The double-ring infiltrometer is appropriate only in soils where an adequate seal can be established.

1.8 DOUBLE RING INFILTROMETER TEST

1. The Infiltration Test Report must be attached to the project's Stormwater Management Report. The following information must be included in the infiltration Testing Report:
 - a. Statement of project understanding (proposed stormwater system).
 - b. Name, contact information, professional license information and qualifications of the person conducting the infiltration test.
 - c. Summary of subsurface conditions encountered, including soil textures and the depth that they were found.
 - d. Summary of pre-saturation timing.
 - e. Summary of infiltration testing including location and number of tests and testing method used. Discussion of how the tests were performed (i.e. pipe type or diameter or test pit dimensions).
 - f. Infiltration testing results in inches per hour for each interval as well as the average of the entire testing period.
 - g. Recommended design infiltration rate.
 - h. Groundwater observations within exploration and an estimate of the depth to seasonal high groundwater.
 - i. Site plan showing location of infiltration tests.
 - j. Boring or test pit logs, Boring or test pit logs will be required when an applicant's proposal relies on the presence of specific subsurface strata that allows infiltration. The logs must include an associated soil classification consistent with ASTM D2488-00, Standard Practice for Classification for Description and Identification of Soils (Visual-Manual Procedure). The logs must also include any additional pertinent subsurface information, such as soil moisture conditions, depth and description of undocumented or engineered fill, soil color and mottling conditions, soil stiffness or density, and approximate depth of contact between soil types.
 - k. A summary of the entire Infiltration Test.

City of Donald - Infiltration Test Data Form

Location:		Date:	Test Hole Number:		
Depth to Bottom of Hole:		Dimension of Hole:	Test Method:		
Tester's Name:					
Tester's Company:					
Tester's Contact Number:					
Depth (feet)		Soil Texture			
Pre-saturation Start Time:					
Pre-saturation End Time:					
Time	Time Interval (minutes)	Measurement (feet)	Drop in Water Level (feet)	Infiltration Rate (inches/hour)	Remarks
Average Infiltration Rate =					
Factor of Safety =					(Minimum of 2)
Design Infiltration Rate =					

H. STANDARD DRAWINGS

GENERAL

ROADWAY

WATER

DRAINAGE

SANITARY SEWER

SHEET INDEX			
SHT #	SHEET TITLE	SHT #	SHEET TITLE
ROADWAY		W-008	WATER METER VAULT BYPASS VALVE LOCK
R-001	STREET DETAIL	W-009	STANDARD BLOWOFF DETAIL
R-002	STREET CUT DETAIL	W-010	HYDRANT ASSEMBLY
R-003	TRENCH BACKFILL, BEDDING, PIPE ZONE & MULTIPLE INSTALLATIONS	W-011	MINIMUM REQUIRED RESTRAINED LENGTH
R-004	STANDARD CURB DETAIL	W-012	THRUST BLOCKING
R-005	SEPARATED SIDEWALK	W-013	STRADDLE BLOCK FOR 12" AND SMALLER PIPE
R-006	CURBSIDE SIDEWALK	W-014	COMBINATION AIR RELEASE AIR VACUUM VALVE ASSEMBLY (2" AND SMALLER)
R-007	DRIVEWAY DETAIL (OPTIONS A & B) 1 OF 5	W-015	TYPICAL WATER VALVE LOCATIONS (MINIMUM)
R-007	DRIVEWAY DETAIL (OPTION C) 2 OF 5	W-016	2" AND SMALLER REDUCED PRESSURE BACKFLOW ASSEMBLY
R-007	DRIVEWAY DETAIL (OPTIONS D & E) 3 OF 5	W-017	3" REDUCED PRESSURE ASSEMBLY
R-007	DRIVEWAY DETAIL (OPTION F) 4 OF 5	W-018	4" REDUCED PRESSURE ASSEMBLY
R-007	DRIVEWAY DETAIL (OPTION G) 5 OF 5		
R-008	CURB RAMP PLACEMENT OPTION A, SMALL RADII 1 OF 2	DRAINAGE	
R-008	CURB RAMP PLACEMENT OPTIONS B & C, SMALL RADII 2 OF 2	D-001	STANDARD CATCH BASIN, FRAME, AND GRATE 1 OF 2
R-009	CURB RAMP PLACEMENT OPTION G, LARGE RADII 1 OF 3	D-001	STANDARD CATCH BASIN, FRAME, AND GRATE 2 OF 2
R-009	CURB RAMP PLACEMENT OPTION H, LARGE RADII 2 OF 3	D-002	GUTTER TRANSITION AT INLET
R-009	CURB RAMP PLACEMENT OPTION I, LARGE RADII 3 OF 3	D-003	DITCH INLET-TYPE D 1 OF 2
R-010	CURB RAMP CROSSING 1 OF 2	D-003	DITCH INLET-TYPE D 2 OF 2
R-010	CURB RAMP CROSSING 2 OF 2	D-004	STANDARD STORM MANHOLE
R-011	CURB RAMP & TURNING SPACE END OF SIDEWALK 1 OF 3	D-005	STORM PRE-TREATMENT MANHOLE
R-011	CURB RAMP & TURNING SPACE END OF SIDEWALK 2 OF 3	D-006	MANHOLE DETAILS
R-011	CURB RAMP & TURNING SPACE END OF SIDEWALK 3 OF 3	D-007	MANHOLE COVERS & FRAMES 1 OF 3
R-012	CURB RAMP DETAILS 1 OF 2	D-007	MANHOLE COVERS & FRAMES 2 OF 3
R-012	CURB RAMP DETAILS 2 OF 2	D-007	MANHOLE COVERS & FRAMES 3 OF 3
R-013	DETECTABLE WARNING SURFACE DETAILS 1 OF 3	D-008	PIPE TO MANHOLE CONNECTION 1 OF 2
R-013	DETECTABLE WARNING SURFACE DETAILS 2 OF 3	D-008	PIPE TO MANHOLE CONNECTION 2 OF 2
R-013	DETECTABLE WARNING SURFACE DETAILS 3 OF 3	D-009	PIPE TO STRUCTURE CONNECTIONS 1 OF 2
R-014	MIN. CURB RAMP DETAILS 1 OF 2	D-009	PIPE TO STRUCTURE CONNECTIONS 2 OF 2
R-014	MIN. CURB RAMP DETAILS 2 OF 2	D-010	OUTSIDE DROP MANHOLE 1 OF 2
R-015	MIN. CURB RAMP DETAILS INSTRUCTIONS	D-010	OUTSIDE DROP MANHOLE 2 OF 2
R-016	SIDEWALK OBSTRUCTIONS	D-011	SAMPLING MANHOLE
WATER		SEWER	
W-001	TYPICAL WATER METER LOCATION	SS-001	STANDARD SANITARY SEWER MANHOLE
W-002	WATER VALVE BOX DETAIL	SS-002	SAMPLING MANHOLE
W-003	1" WATER SERVICE DETAIL	SS-003	RESIDENTIAL SEPTIC TANK INSTALLATION
W-004	1-1/2" AND 2" METER SET W/1" HIGH BYPASS (HDPE SERVICE LINE)	SS-004	PIPE TO MANHOLE CONNECTION 1 OF 2
W-005	TAPPING REQUIREMENTS, 1-1/2" AND LARGER SERVICE (HDPE SERVICE LINE)	SS-004	PIPE TO MANHOLE CONNECTION 2 OF 2
W-006	3" DOMESTIC WATER METER	SS-005	PIPE TO STRUCTURE CONNECTIONS 1 OF 2
W-007	4" DOMESTIC WATER METER	SS-005	PIPE TO STRUCTURE CONNECTIONS 2 OF 2



CITY OF
DONALD
P.O BOX 388
DONALD, OR
97020

SHEET INDEX

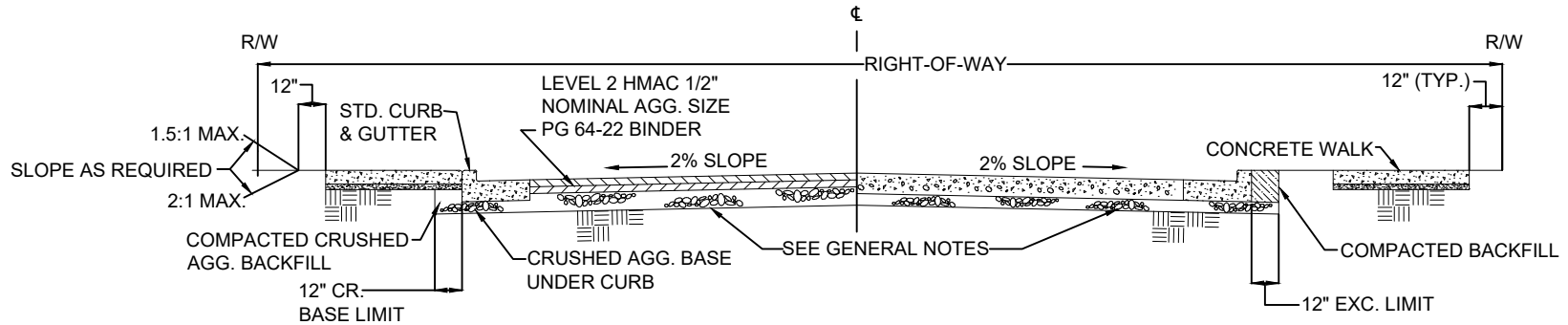
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

G-001

Bar Measures 1 inch



GENERAL NOTES FOR ALL DETAILS:

1. BASE ROCK SHALL BE 1 1/2"-0" CRUSHED AGGREGATE 8" COMPACTED DEPTH @ A MINIMUM OF 95% AASHTO T-180
2. FINISH COURSE SHALL BE 3/4"-0" CRUSHED AGGREGATE 2" COMPACTED DEPTH @ A MINIMUM OF 95% AASHTO T-180
3. ASPHALT PAVEMENT SHALL BE 4" MINIMUM COMPACTED DEPTH PLACED IN TWO (2) 2" LIFTS, FIRST LIFT @ A MINIMUM OF 91% OF RICE DENSITY AND SECOND LIFT @ A MINIMUM OF 92% OF RICE DENSITY.



CITY OF
DONALD
P.O BOX 388
DONALD, OR
97020

STREET DETAIL

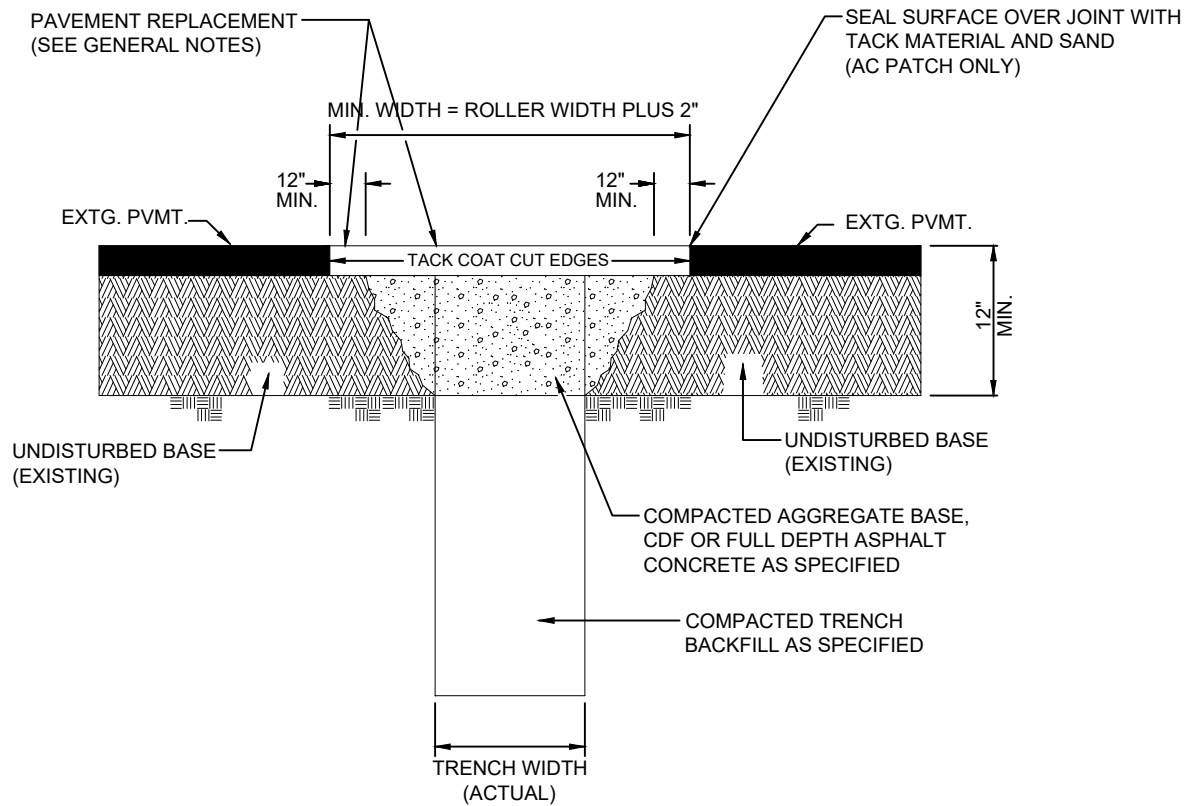
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

R-001

Bar Measures 1 inch



GENERAL NOTES FOR ALL DETAILS:

1. ALL EXISTING AC OR PCC PAVEMENT SHALL BE SAWCUT PRIOR TO REPAVING.
2. CONCRETE PAVEMENT SHALL BE REPLACED WITH CONCRETE TO A MINIMUM THICKNESS OF 6" OR TO THE THICKNESS OF REMOVED PAVEMENT, WHICHEVER IS GREATER.
3. PLACE AC MIX MINIMUM THICKNESS OF 4" OR THE THICKNESS OF THE REMOVED PAVEMENT, WHICHEVER IS GREATER. COMPACT AS SPECIFIED.



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STREET CUT DETAIL

PROJ: 200-166682-20001

DATE: 6/3/2021

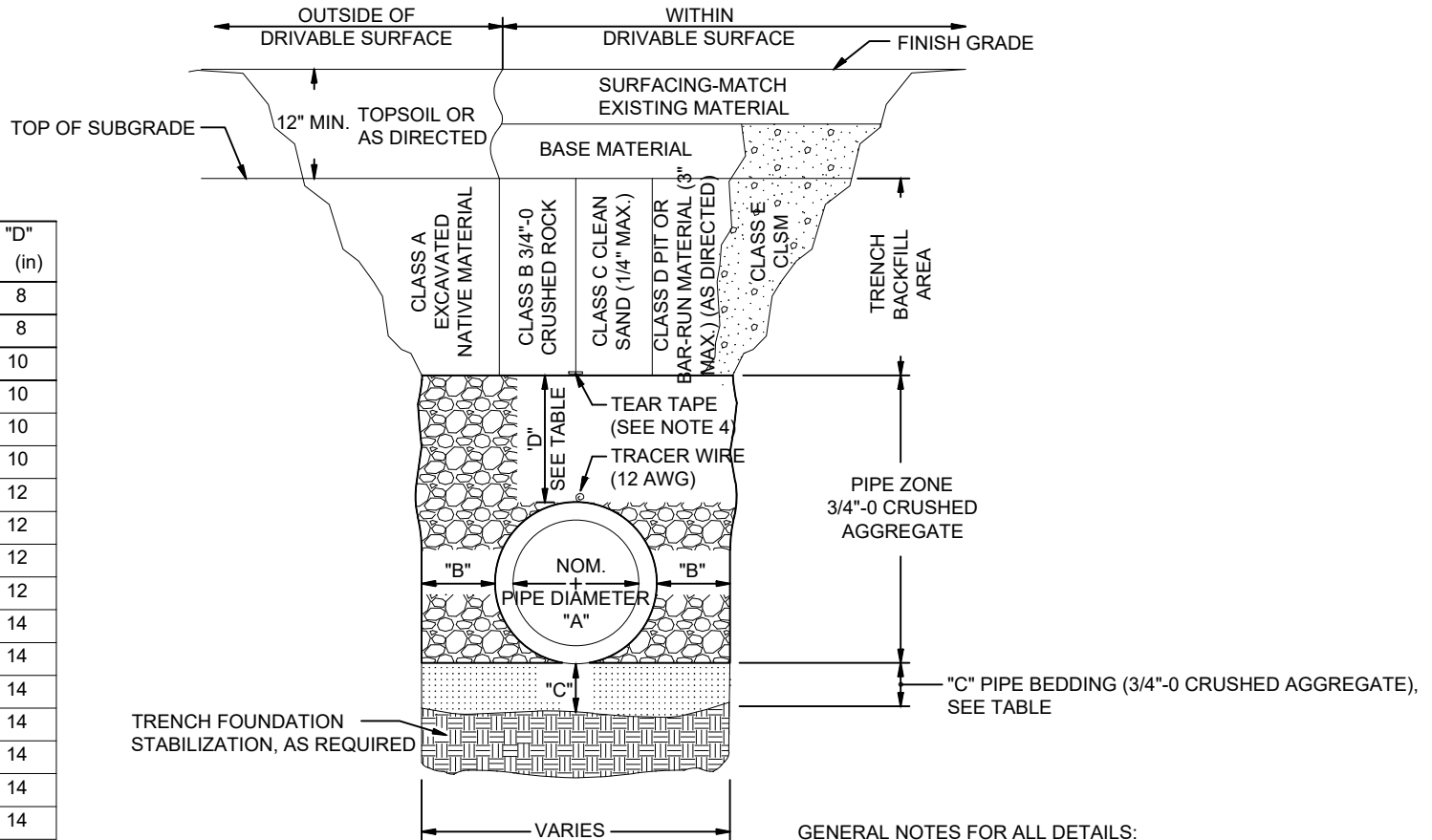
DESN: MCH

R-002

Bar Measures 1 inch

TABLE

"A" (in)	"B" (in)	"C" (in)	"D" (in)
4	10	4	8
6	10	4	8
8	10	6	10
10	10	6	10
12	12	6	10
15	12	6	10
18	16	6	12
21	16	6	12
24	18	6	12
30	18	6	12
36	24	6	14
42	24	6	14
48	24	6	14
54	24	6	14
60	24	6	14
66	24	6	14
72	24	6	14



MULTIPLE INSTALLATIONS

DIAMETER	MIN. SPACE BETWEEN PIPES
UP TO 48"	24"
48" TO 72"	ONE HALF (1/2) DIA. OF PIPE

GENERAL NOTES FOR ALL DETAILS:

1. SURFACING OF PAVED AREAS SHALL COMPLY WITH STREET CUT STANDARD DRAWING OR MARION COUNTY STREET DRAWING WHEN APPLICABLE.
2. FOR PIPE INSTALLATION IN IMBANKMENT AREAS WHERE THE TRENCH METHOD WILL NOT BE USED AND THE PIPE IS \geq 36" IN DIAMETER, INCREASE DIMENSION "B" TO NOMINAL PIPE DIAMETER.
3. PIPES OVER 72" DIAMETER ARE STRUCTURES, AND ARE NOT APPLICABLE TO THIS DRAWING.
4. DETECTABLE, COLOR CODED, 6" WIDE MARKING TAPE.



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TRENCH BACKFILL, BEDDING,
PIPE ZONE & MULTIPLE INSTALLATIONS

PROJ: 200-166682-20001

DATE: 6/3/2021

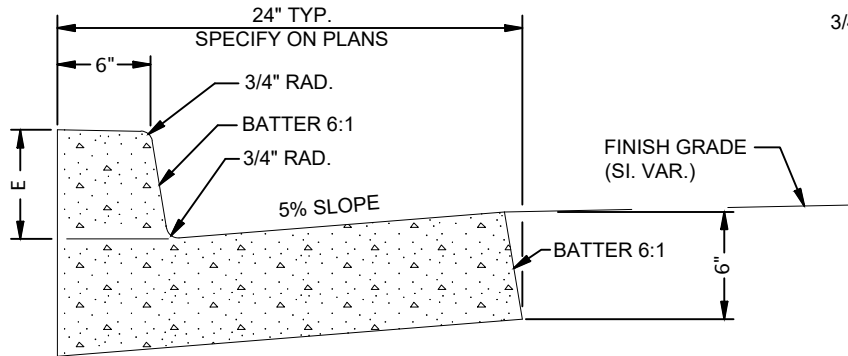
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R-003

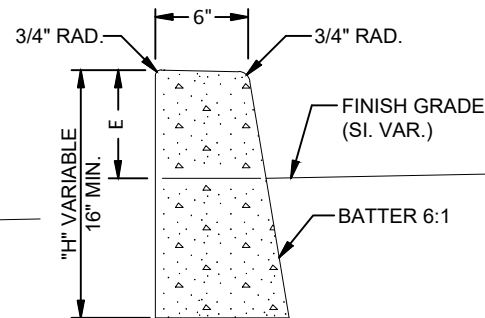
Bar Measures 1 inch

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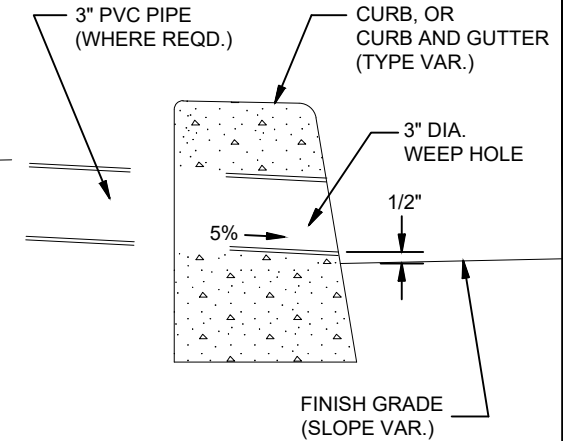
STANDARD CURB AND GUTTER



STANDARD CURB



WEEP HOLE DETAIL



NOTES FOR ALL DETAILS:

1. CURB EXPOSURE "E" 6" TO 9", AS MEASURED VERTICALLY FROM FLOWLINE TO HIGHEST POINT ON CURB. VARY AS SHOWN ON PLANS OR AS DIRECTED. CITY STANDARD "E" = 6".
2. CONSTRUCTION EXPANSION JOINTS AT 200' MAXIMUM SPACING, AND AT POINTS OF TANGENCY, AND AT ENDS OF EACH DRIVEWAY.
3. CONSTRUCTION CONTRACTION JOINTS AT 15' MAXIMUM SPACING, AND AT ENDS OF EACH INLET AND CURB RAMP.
4. TRANSITIONS SHALL BE USED TO CONNECT CURBS OF DIFFERENT EXPOSURES "E". ("E" IS THE TOTAL VERTICAL DIMENSIONS OF THOSE CURB SURFACES HAVING A SLOPE OF 1:1 OR STEEPER). MINIMUM DESIRABLE TRANSITION LENGTH SHALL BE 20' FOR EACH 1" DIFFERENCE IN "E".
5. TOP OF ALL CURBS SHALL SLOPE TOWARD THE ROADWAY AT 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE), UNLESS OTHERWISE SHOWN, OR AS DIRECTED.
6. DIMENSIONS ARE NOMINAL, VARY TO CONFORM WITH CURB MACHINE APPROVE BY THE ENGINEER
7. DIMENSIONS ADJACENT TO RADII ARE MEASURED TO THE POINT OF INTERSECTION OF CURB SURFACES.
8. CURB AND GUTTER IS REQUIRED AT CURB RAMPS.
9. WEEP HOLES ARE ALLOWED BY DESIGN EXCEPTION ONLY.
10. A CONTRACTION JOINT SHALL BE PLACED ALONG AND OVER WEEP HOLE THROUGH THE CURB AND THROUGH THE SIDEWALK WHEN APPROVED.
11. WHEN SIDEWALKS ARE CONSTRUCTED, EXTEND 3" PIPE TO BACK OF SIDEWALK AND INSTALL COUPLING AT ALL WEEP HOLES.
12. BASE COURSE UNDER CURB AND GUTTER SHALL BE 8-INCH MIN. COMPACTED DEPTH OF 1-1/2" MINUS CRUSHED ROCK AND SHALL EXTEND AT LEAST 1'-0" BEYOND THE FRONT AND BACK OF THE CURB AND GUTTER. COMPACT TO 95% AASHTO T-180.

GUTTER PAN NOTES:

1. SLOPE 4.0% MAX. AT CURB RAMPS. (MAX. 5.0% FINISHED SURFACE SLOPE).
2. VARY SLOPE AS REQUIRED FOR DRAINAGE.
3. VARY WHERE SHOWN ON PLANS, AND ALLOWED BY CITY.



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STANDARD CURB DETAIL

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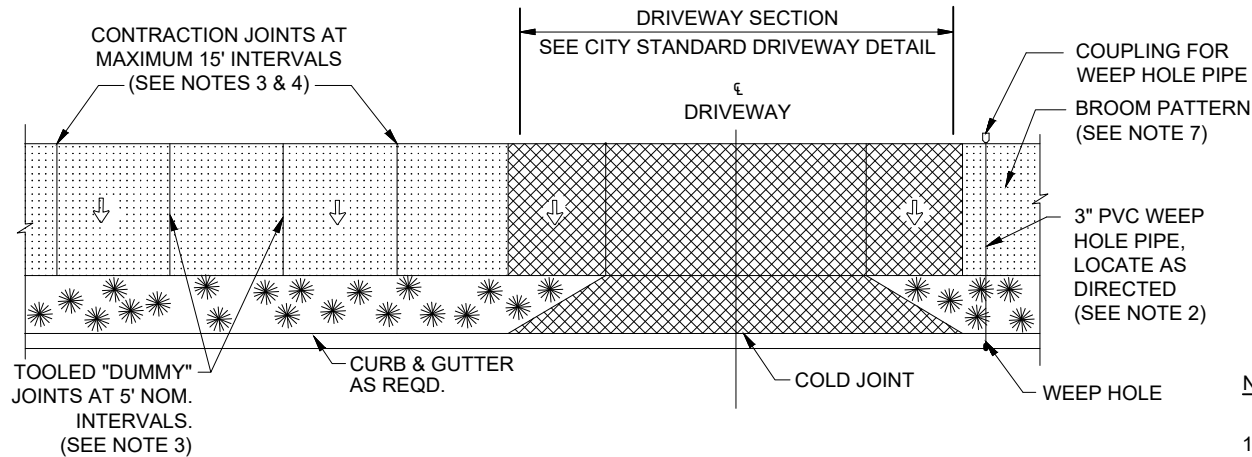
DESN: MCH

R-004

Bar Measures 1 inch

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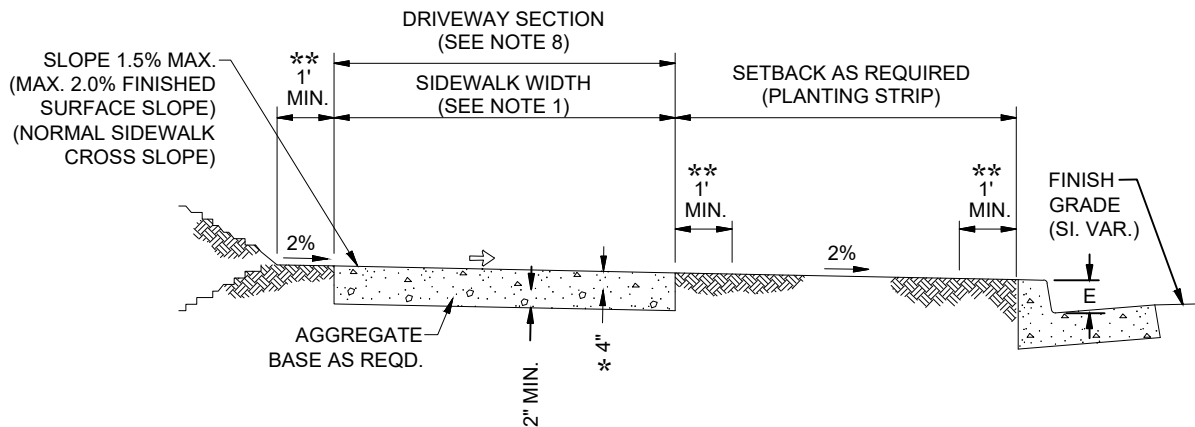
TYPICAL PLAN VIEW - SEPARATED SIDEWALK



NOTES FOR ALL DETAILS:

1. CURB TYPE AND SIDEWALK WIDTH AS SHOWN ON PLANS OR AS DIRECTED. ON SIDEWALKS 8' AND WIDER, PROVIDE A LONGITUDINAL JOINT AT THE MIDPOINT.
2. INSTALL 3" PVC WEEP HOLE PIPES IN SIDEWALKS WHERE SHOWN ON PLANS. PLACE CONTRACTION JOINT OVER TOP OF PIPE. SEE CITY STANDARD FOR WEEP HOLE DETAIL.
3. CONST. EXPANSION JOINTS 200' MAXIMUM SPACING, AND AT POINTS OF TANGENCY
4. CONST. CONTRACTION JOINTS AT 15' MAXIMUM SPACING, AND AT ENDS OF EACH DRIVEWAY AND CURB RAMP.
5. FOR CURB DETAILS, SEE CITY STANDARD CURB DETAIL.
6. FOR DRIVEWAY DETAILS NOT SHOWN, SEE CITY STANDARD DRIVEWAY DETAIL.
7. FINISH SHALL BE MEDIUM BROOM WITH NO SHINE MARKS.
8. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.

TYPICAL SEPARATED SIDEWALK CROSS SECTION



- * MIN. 4" OR AS SPECIFIED IN PLANS. A THICKNESS 6" OR GREATER IF SIDEWALK IS INTENDED AS PORTION OF A DRIVEWAY OR MOUNTABLE CURB IS USED.
- ** PROVIDE COMPACTED BACKFILL ADJACENT TO CURB AND SIDEWALK (1.5' ON DOWN SLOPES 4:1 AND GREATER
- E = CURB EXPOSURE (SEE NOTE 5)

↓ SLOPE 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE) (NORMAL SIDEWALK CROSS SLOPE)



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SEPARATED SIDEWALK

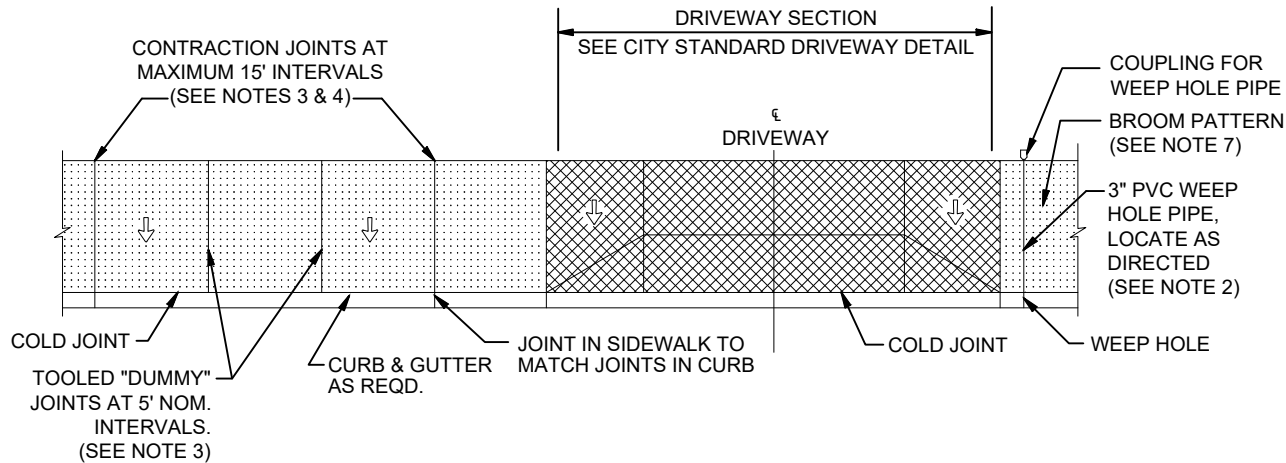
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R-005

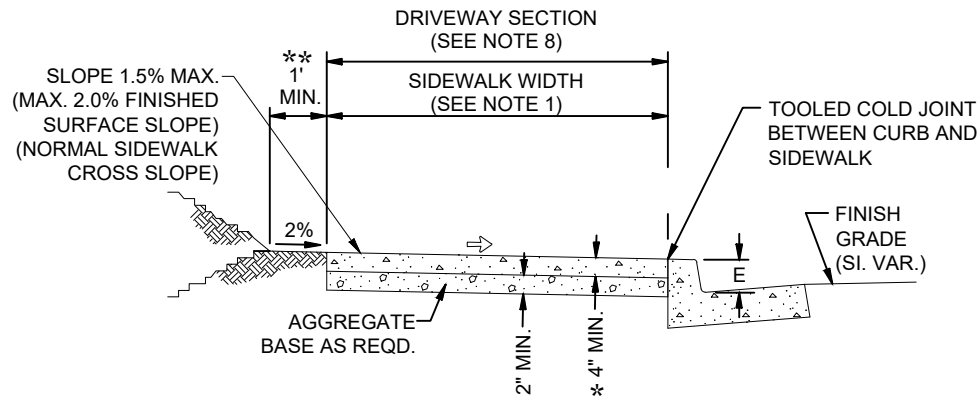
Bar Measures 1 inch

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TYPICAL PLAN VIEW - CURBSIDE SIDEWALK



TYPICAL CURB SIDEWALK CROSS SECTION



* MIN. 4" OR AS SPECIFIED IN PLANS. A THICKNESS 6" OR GREATER IF SIDEWALK IS INTENDED AS PORTION OF A DRIVEWAY OR MOUNTABLE CURB IS USED.

** PROVIDE COMPACTED BACKFILL ADJACENT TO CURB AND SIDEWALK (1.5' ON DOWN SLOPES 4:1 AND GREATER

E = CURB EXPOSURE (SEE NOTE 5)

↓ SLOPE 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE) (NORMAL SIDEWALK CROSS SLOPE)



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CURBSIDE SIDEWALK

PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

R-006

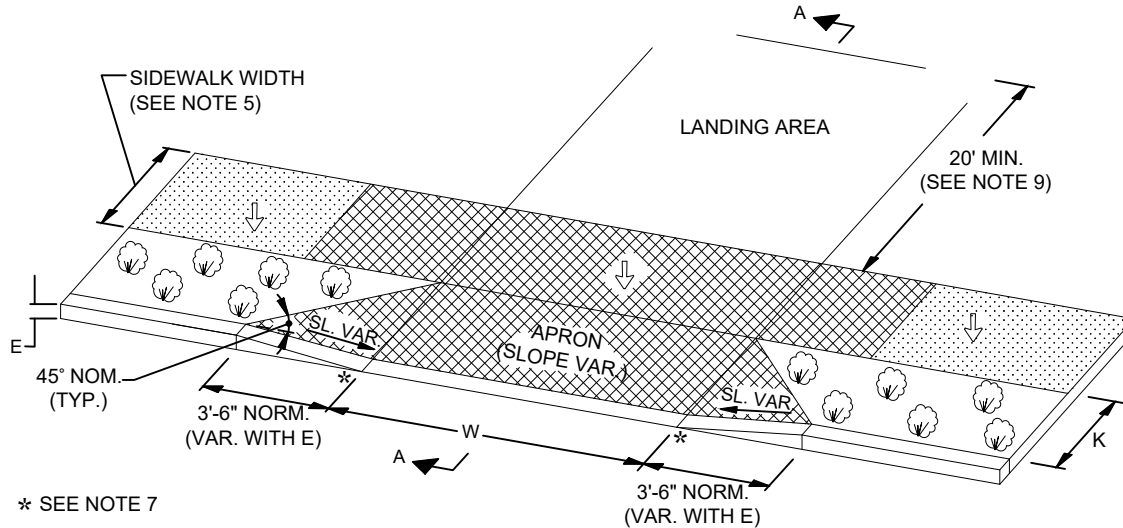
Bar Measures 1 inch

NOTES FOR ALL DETAILS:

1. CURB TYPE AND SIDEWALK WIDTH (5' MINIMUM) AS SHOWN ON PLANS OR AS DIRECTED. ON SIDEWALKS 8' AND WIDER, PROVIDE A LONGITUDINAL JOINT AT THE MIDPOINT.
2. INSTALL 3" PVC WEEP HOLE PIPES IN SIDEWALKS WHERE SHOWN ON PLANS. PLACE CONTRACTION JOINT OVER TOP OF PIPE. SEE CITY STANDARD FOR WEEP HOLE DETAIL.
3. CONST. EXPANSION JOINTS 200' MAXIMUM SPACING, AND AT POINTS OF TANGENCY.
4. CONST. CONTRACTION JOINTS AT 15' MAXIMUM SPACING, AND AT ENDS OF EACH DRIVEWAY AND CURB RAMP.
5. FOR CURB DETAILS, SEE CITY STANDARD CURB DETAIL.
6. FOR DRIVEWAY DETAILS NOT SHOWN, SEE CITY STANDARD DRIVEWAY DETAIL.
7. FINISH SHALL BE MEDIUM BROOM WITH NO SHINE MARKS.
8. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.

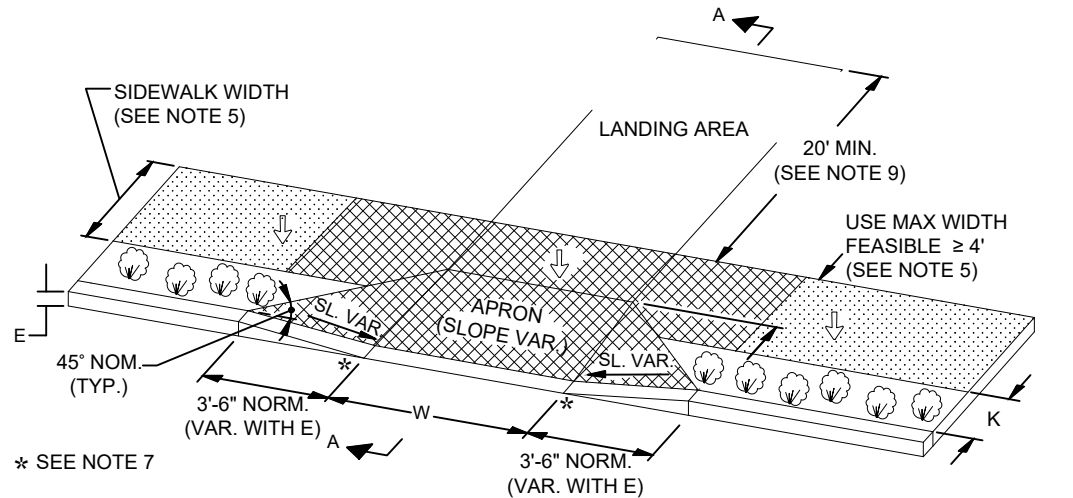
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OPTION A: TYPICAL SEPARATED SIDEWALK DRIVEWAY





* SEE NOTE 7


OPTION B: DRIVEWAY ENCROACHES INTO SIDEWALK



* SEE NOTE 7

 SIDEWALK

 DRIVEWAY PAY LIMIT (SEE PROJECT PLAN FOR DETAILS NOT SHOWN)

 SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED
SURFACE SLOPE)
(NORMAL SIDEWALK CROSS
SLOPE)

W WIDTH OF DRIVEWAY (VARIES)

E CURB EXPOSURE

K BUFFER STRIP WIDTH (5' MIN.)



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DRIVEWAY DETAIL
(OPTIONS A & B)
1 OF 5

NOTES FOR ALL DETAILS:

1. DETAILS ARE BASED ON ODOT STANDARDS.
3. THE FOLLOWING DIMENSIONS ARE AS SHOWN ON PLANS, OR AS DIRECTED: DRIVEWAY WIDTH, DRIVEWAY SLOPE, SIDEWALK WIDTH, BUFFER STRIP WIDTH, CURB EXPOSURE, DRIVEWAY LIP EXPOSURE, LANDING AREA LENGTH AND WIDTH. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.
4. CURB, GUTTER, AND SIDEWALK TYPES VARY, SEE PLANS. SEE CITY STANDARD DRAWINGS FOR CURB & SIDEWALK DETAILS.
5. A GREATER THAN OR EQUAL TO 4' UNOBSTRUCTED CLEAR PASSAGE WITH SLOPE 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE) IS REQUIRED BEHIND DRIVEWAY APRON.
6. WHERE EXISTING DRIVEWAY IS IN GOOD CONDITION, AND MEETS SLOPE REQUIREMENTS, CONSTRUCT ONLY AS MUCH AS REQUIRED FOR SATISFACTORY CONNECTION WITH NEW WORK.
7. CHECK THE GUTTER FLOW DEPTH AT DRIVEWAY LOCATION TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK AT DRIVEWAY. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OF DRIVEWAY OR PERFORM OTHER APPROVED DESIGN MITIGATION.
8. TOOLED JOINTS ARE REQUIRED AT ALL DRIVEWAY SLOPE BREAK LINES.
9. 20' MIN. OF THE DRIVEWAY BEHIND THE SIDEWALK SHOULD BE SURFACED TO PREVENT TRACKING OF GRAVEL ONTO THE SIDEWALK. DESIGN EXCEPTION REQUIRED FOR LESS.
10. FINISH SHALL BE MEDIUM BROOM, WITH NO SHINE MARKS.
11. MAXIMUM 6" SQUARE WIRE PLACED ON 3" DOBE BLOCKS IS REQUIRED IN COMMERCIAL DRIVEWAYS.
12. AGGREGATE BASES UNDER PRIVATE AND PUBLIC DRIVEWAYS (INCLUDING WINGS AND TRANSITIONS SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
 - A) BASE COURSE SHALL BE 8-INCH MIN COMPACTED DEPTH OF 1-1/2" MINUS CRUSHED ROCK COMPACTED TO 95% AASHTO T-180.
 - B) FINISH COURSE SHALL BE 2-INCH MIN COMPACTED DEPTH OF 3/4" MINUS CRUSHED ROCK COMPACTED TO 95% AASHTO T-180.

PROJ: 200-166682-20001

DATE: 6/3/2021

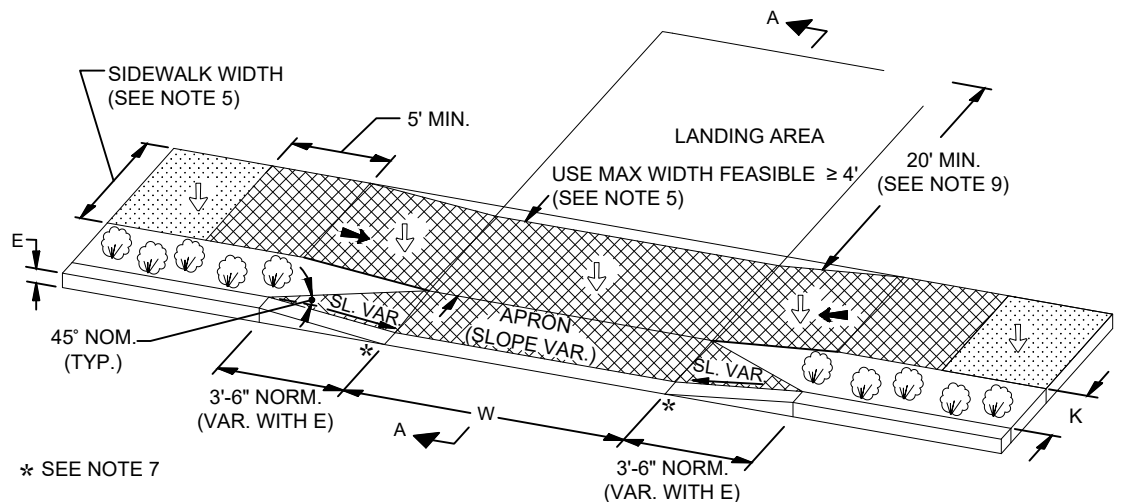
DESN: MCH

R-007

Bar Measures 1 inch

SECTION A-A

OPTION C: LOWERED SIDEWALK



* SEE NOTE 7

* SEE NOTE 7

DRIVEWAY LIP
EXPOSURE 3/4" MAX.

FINISH
GRADE
SLOPE VAR.
(2.0% NORMAL)

LOWERED CURB & GUTTER
THROUGH APRON

CURB TYPE VAR.
(SEE NOTE 4)

GUTTER LINE

SLOPE LESS THAN
6% DESIRABLE
(12% MAX.)

DRIVEWAY
PAY LIMIT

GRADE
BREAK

**

$\geq 4'$

(SEE NOTE 5)

THROUGH
SIDEWALK

THROUGH
BUFFER STRIP

SLOPE 1.5% MAX
(MAX 2.0% FINISHED SURFACE SLOPE)
NORMAL SIDEWALK CROSS SLOPE)

P.C. CONCRETE DRIVEWAY,
6" MIN. THICKNESS AS
SHOWN, OR AS DIRECTED.

ZONE TO MATCH EX. DRIVEWAY
LENGTH VARIES
(SEE NOTE 6)

20' MIN. LANDING AREA

SLOPE +/- 2% NORM.
(+/- 5% MAX.)

12% MAX. CHANGE
IN SLOPE @ 10'
INTERVALS (SAG)

+14% MAX.
-6% MAX.

8% MAX. CHANGE
IN SLOPE @ 10'
INTERVALS (CREST)

** OPTION B ALLOWS THIS GRADE BREAK
TO OCCUR WITHIN SIDEWALK AREA.
(SEE NOTE 5)

GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

W WIDTH OF DRIVEWAY (VARIES)

K BUFFER STRIP WIDTH (5' MIN.)

E CURB EXPOSURE

← SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED
SURFACE SLOPE)

▨ SIDEWALK

▨ DRIVEWAY PAY LIMIT (SEE PROJECT
PLAN FOR DETAILS NOT SHOWN)

← SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)



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DRIVEWAY DETAIL
(OPTION C)
2 OF 5

PROJ: 200-166682-20001

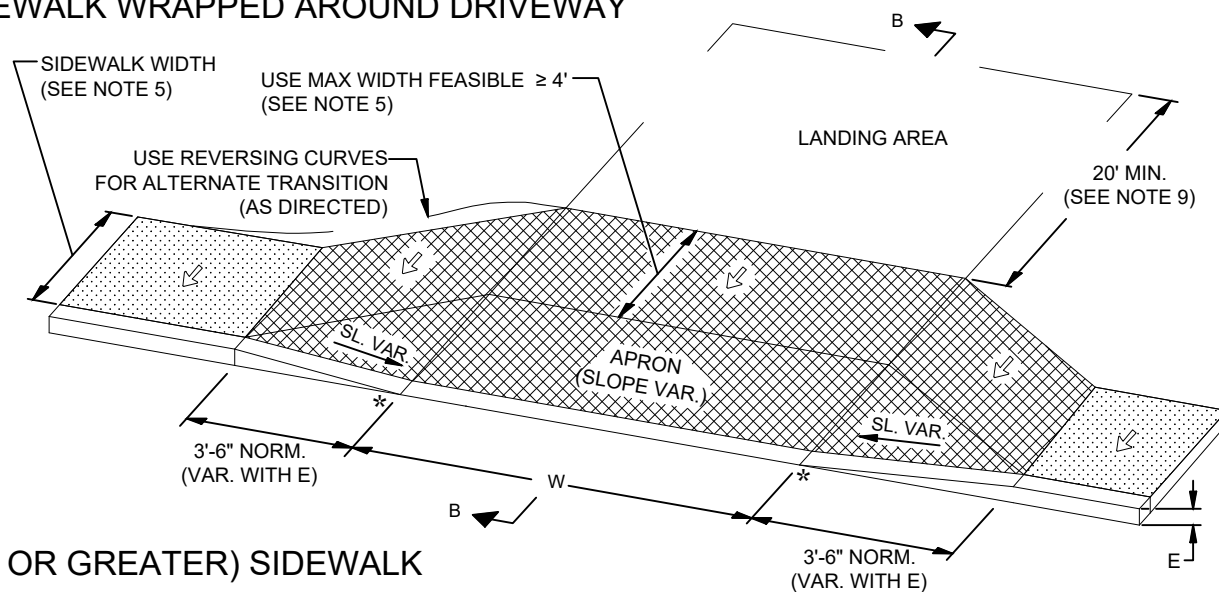
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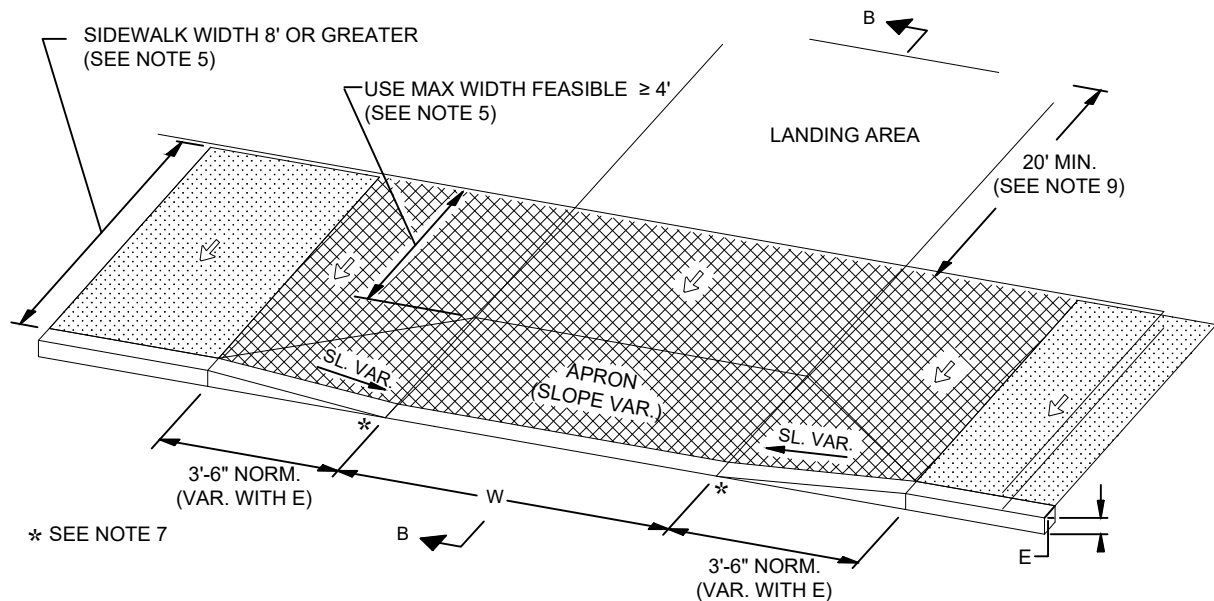
R-007

Bar Measures 1 inch

OPTION D: SIDEWALK WRAPPED AROUND DRIVEWAY



OPTION E: DRIVEWAY IN WIDE (8' OR GREATER) SIDEWALK




GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

W WIDTH OF DRIVEWAY (VARIES)

E CURB EXPOSURE

 SIDEWALK

 DRIVEWAY PAY LIMIT (SEE PROJECT PLAN FOR DETAILS NOT SHOWN)

← SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)



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DRIVEWAY DETAIL
(OPTIONS D & E)
3 OF 5

PROJ: 200-166682-20001

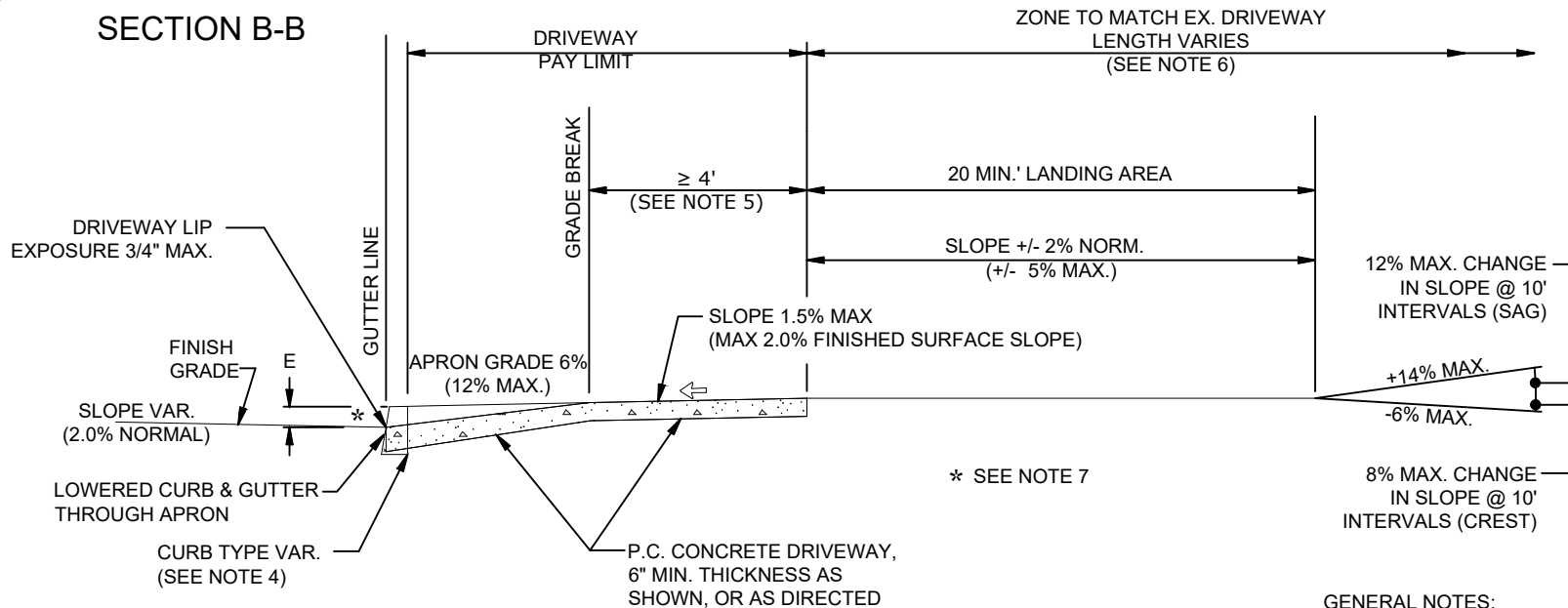
DATE: 6/3/2021

DESN: MCH

R-007

Bar Measures 1 inch

SECTION B-B

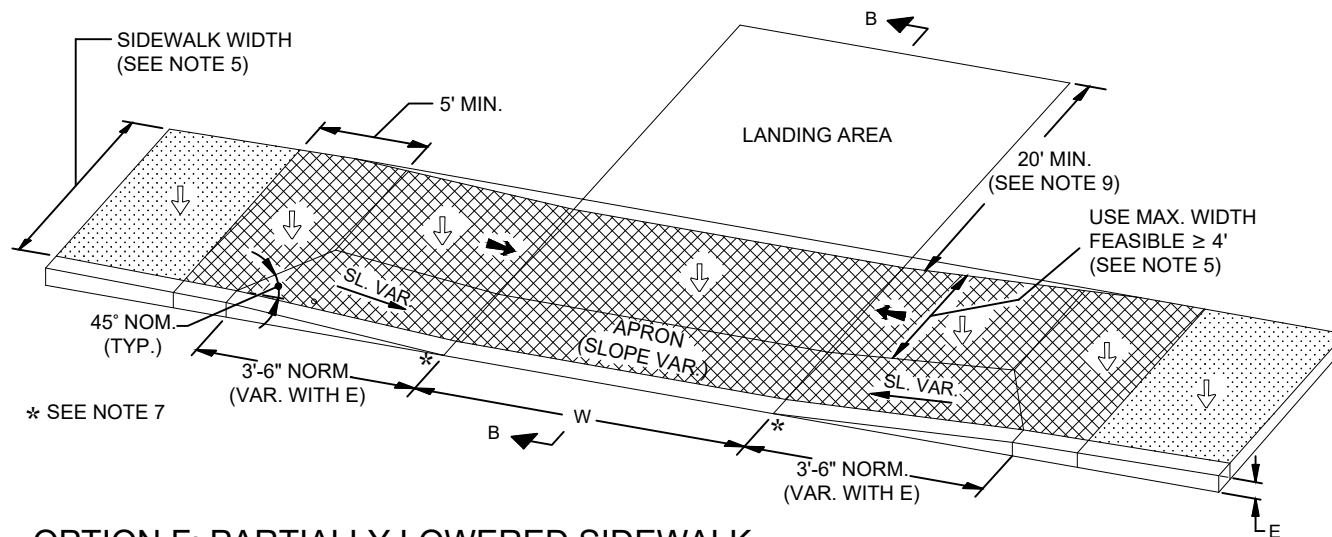


GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

- W WIDTH OF DRIVEWAY
- K BUFFER STRIP WIDTH (5' NORMAL, 3' MIN.)
- E CURB EXPOSURE
- ← SLOPE 7.5% MAX. (MAX. 8.3% FINISHED SURFACE SLOPE)

- SIDEWALK
- DRIVEWAY PAY LIMIT (SEE PROJECT PLAN FOR DETAILS NOT SHOWN)
- ← SLOPE 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE) (NORMAL SIDEWALK CROSS SLOPE)



OPTION F: PARTIALLY LOWERED SIDEWALK



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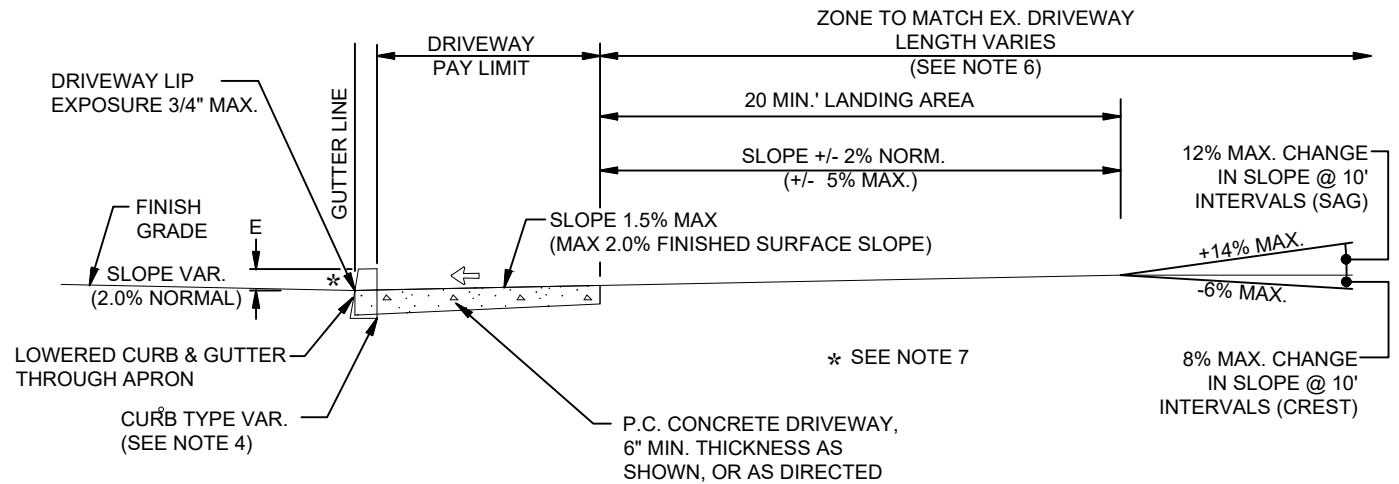
DRIVEWAY DETAIL
(OPTION F)
4 OF 5

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

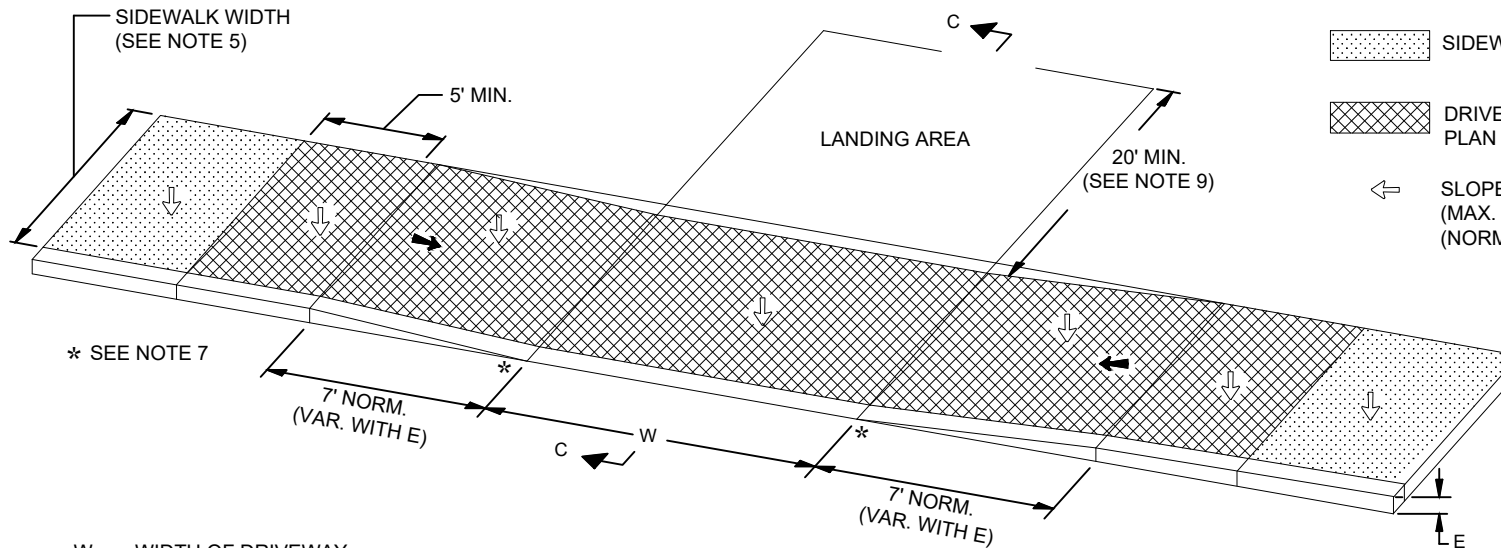
R-007

Bar Measures 1 inch

SECTION C-C



OPTION G: FULLY LOWERED SIDEWALK



GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

- SIDEWALK**
- DRIVEWAY PAY LIMIT (SEE PROJECT PLAN FOR DETAILS NOT SHOWN)**
- SLOPE 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE) (NORMAL SIDEWALK CROSS SLOPE)**

W WIDTH OF DRIVEWAY

E CURB EXPOSURE

SLOPE 7.5% MAX. (MAX. 8.3% FINISHED SURFACE SLOPE)



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DRIVEWAY DETAIL
(OPTION G)
5 OF 5

PROJ: 200-166682-20001

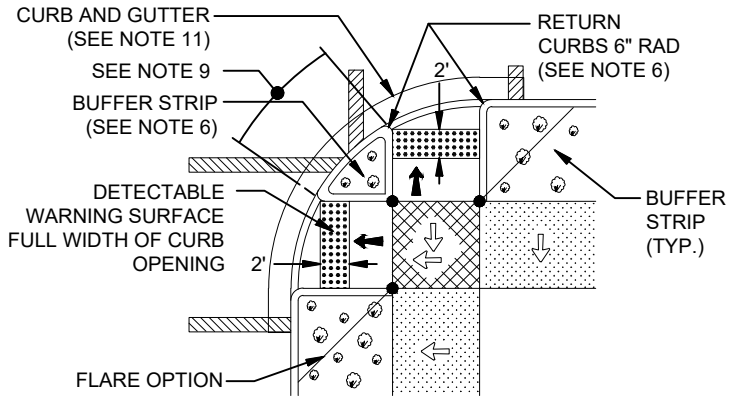
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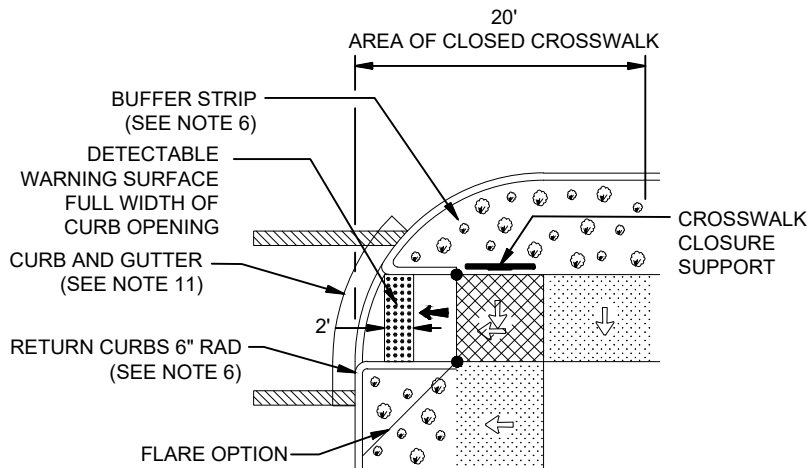
R-007

Bar Measures 1 inch





OPTION A



OPTION A (WITH CROSSWALK CLOSURE)
CURB RAMPS WITH LANDSCAPED BUFFER STRIP



1. CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
2. TOOLED JOINTS ARE REQUIRED AT ALL CURB RAMP SLOPE BREAK LINES.
3. CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
4. PLACE DETECTABLE WARNING SURFACE AT THE BACK OF CURB FOR A MINIMUM OF 2' AT CURB RAMP THAT IS ADJACENT TO TRAFFIC. FOR DETAILS NOT SHOWN, SEE STD. DWG. DETECTABLE WARNING SURFACE.
5. CHECK THE GUTTER FLOW DEPTH TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OR PERFORM OTHER APPROVED DESIGN MITIGATION.
6. RETURN CURB MAY BE PROVIDED IN LIEU OF FLARED SLOPE IF PROTECTED FROM TRAVERSE BY LANDSCAPING OR FIXED BARRIER. RETURN CURB SHALL NOT REDUCE WIDTH OF APPROACHING SIDEWALK.
7. FOR THE PURPOSE OF THIS DRAWING, A CURB RAMP IS CONSIDERED "PERPENDICULAR" IF THE ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE CURB RAMP AND A LINE TANGENT TO THE CURB AT THE CURB RAMP CENTER IS 75° TO 90°.
8. CURB RAMPS FOR PATHS INTERSECTING A ROADWAY SHOULD BE FULL WIDTH OF PATH, EXCLUDING FLARES. WHEN A CURB RAMP IS USED TO PROVIDE BICYCLE ACCESS FROM A ROADWAY TO A SIDEWALK, THE CURB RAMP SHOULD BE 8' WIDE.
9. WHEN 2 CURB RAMPS ARE IMMEDIATELY ADJACENT. THE CURB EXPOSURE (E) BETWEEN THE ADJACENT SIDE FLARES MAY RANGE BETWEEN 3" AND FULL DESIGN EXPOSURE.
10. GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES.
11. CURB AND GUTTER IS REQUIRED AT CURB RAMPS.

	MARKED OR INTENDED CROSSING LOCATION
	SIDEWALK
	TURNING SPACE. MIN. LEVEL AREA 4.5' X 4.5' (4' X 4' MIN. FINISHED SURFACE). WHEN CONSTRAINED 4.5' X 5.5' (4' X 5' MIN. FINISHED SURFACE WITH LONGER DIMENSIONS IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSE OF THIS APPLICATION, A MAX. 2.0% FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.
	DETECTABLE WARNING SURFACE

SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

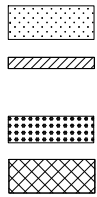
ZERO CURB EXPOSURE



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CURB RAMP PLACEMENT
OPTION A, SMALL RADII
1 OF 2

R-008



SIDEWALK

MARKED OR INTENDED CROSSING LOCATION

DETECTABLE WARNING SURFACE

TURNING SPACE. MIN. LEVEL AREA 4.5' X 4.5' (4' X 4' MIN. FINISHED SURFACE). WHEN CONSTRAINED 4.5' X 5.5' (4' X 5' MIN. FINISHED SURFACE WITH LONGER DIMENSIONS IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSE OF THIS APPLICATION, A MAX. 2.0% FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.

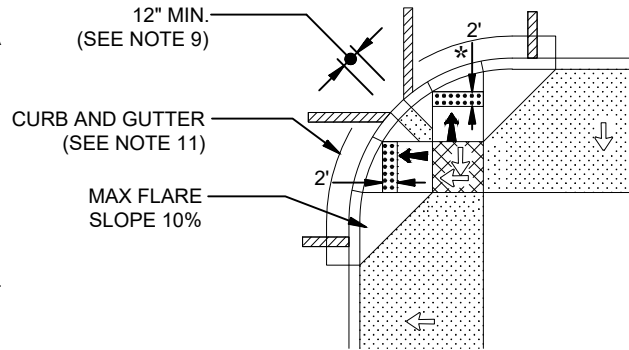


SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

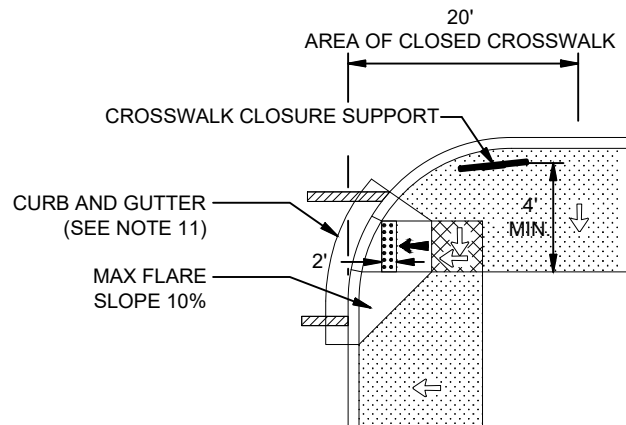


SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

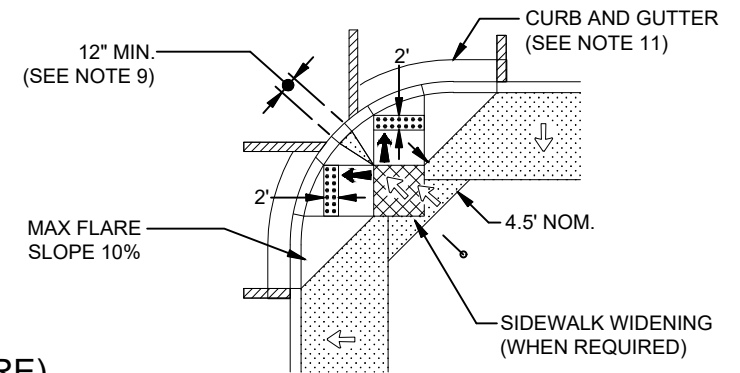
OPTION B CURB RAMPS FOR WIDE SIDEWALKS



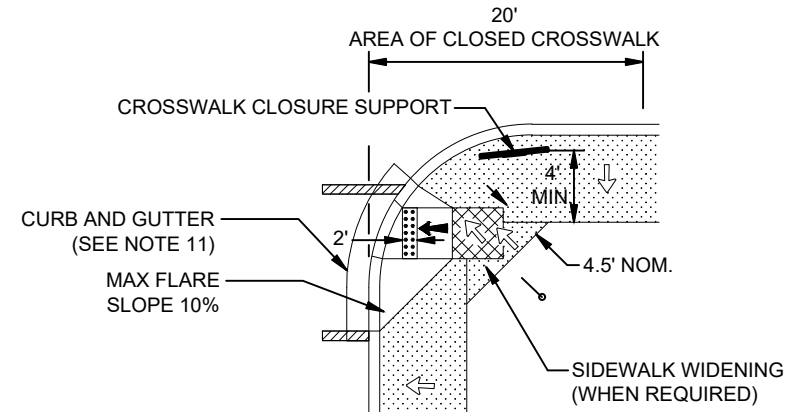
OPTION B (WITH CROSSWALK CLOSURE) CURB RAMP FOR WIDE SIDEWALKS



OPTION C CURB RAMPS FOR NARROW SIDEWALKS



OPTION C (WITH CROSSWALK CLOSURE) CURB RAMPS FOR NARROW SIDEWALKS



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**CURB RAMP PLACEMENT
OPTIONS B & C, SMALL RADII
2 OF 2**

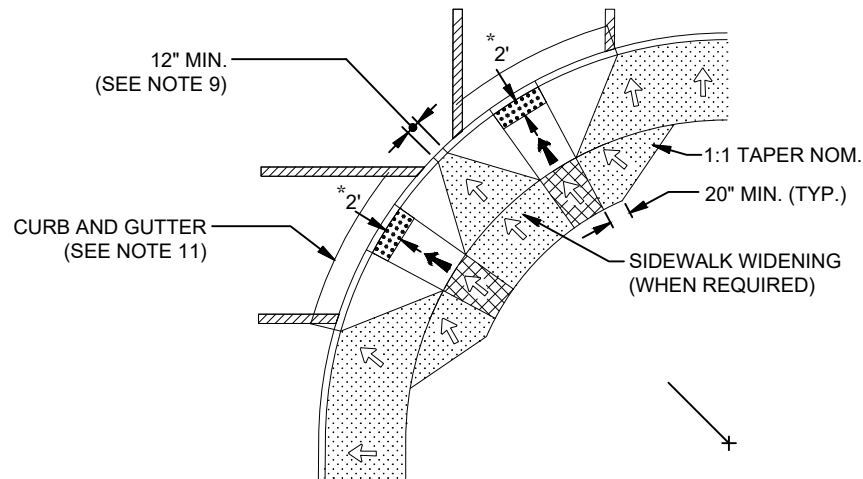
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DATE: 6/3/2021
DESN: MCH

R-008

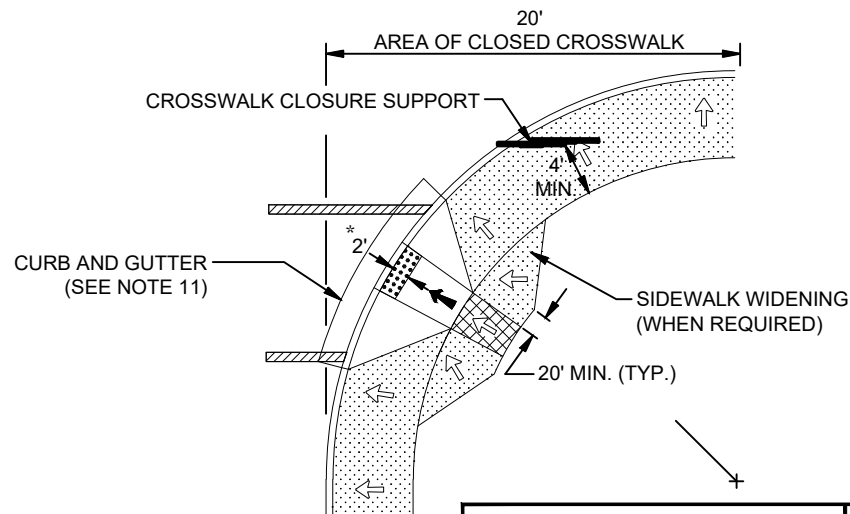
Bar Measures 1 inch

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OPTION G CURB RAMPS FOR NARROW SIDEWALKS



OPTION G (WITH CROSSWALK CLOSURE) CURB RAMPS FOR NARROW SIDEWALKS (CURB RAMP WIDTH 4' MIN.)



NOTES FOR ALL DETAILS:

1. CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
2. TOOLED JOINTS ARE REQUIRED AT ALL CURB RAMP SLOPE BREAK LINES.
3. CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
4. PLACE DETECTABLE WARNING SURFACE AT THE BACK OF CURB FOR A MINIMUM OF 2' AT CURB RAMP THAT IS ADJACENT TO TRAFFIC. FOR DETAILS NOT SHOWN, SEE STD. DWG. DETECTABLE WARNING SURFACE.
5. CHECK THE GUTTER FLOW DEPTH TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OR PERFORM OTHER APPROVED DESIGN MITIGATION.
6. RETURN CURB MAY BE PROVIDED IN LIEU OF FLARED SLOPE IF PROTECTED FROM TRAVERSE BY LANDSCAPING OR FIXED BARRIER. RETURN CURB SHALL NOT REDUCE WIDTH OF APPROACHING SIDEWALK.
7. FOR THE PURPOSE OF THIS DRAWING, A CURB RAMP IS CONSIDERED "PERPENDICULAR" IF THE ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE CURB RAMP AND A LINE TANGENT TO THE CURB AT THE CURB RAMP CENTER IS 75° TO 90°.
8. CURB RAMPS FOR PATHS INTERSECTING A ROADWAY SHOULD BE FULL WIDTH OF PATH, EXCLUDING FLARES. WHEN A CURB RAMP IS USED TO PROVIDE BICYCLE ACCESS FROM A ROADWAY TO A SIDEWALK, THE CURB RAMP SHOULD BE 8' WIDE.
9. WHEN 2 CURB RAMPS ARE IMMEDIATELY ADJACENT. THE CURB EXPOSURE (E) BETWEEN THE ADJACENT SIDE FLARES MAY RANGE BETWEEN 3" AND FULL DESIGN EXPOSURE.
10. GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES.
11. CURB AND GUTTER IS REQUIRED AT CURB RAMPS.

- MARKED OR INTENDED CROSSING LOCATION
- SIDEWALK
- TURNING SPACE. MIN. LEVEL AREA 4' X 4'. 4' X 5' WHEN CONSTRAINED (WITH LONGER DIMENSIONS IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSE OF THIS APPLICATION, A MAX. 2.0% FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.
- TRUNCATED DOME DETECTABLE WARNING SURFACE

- SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)
- SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)
- SEE NOTE 4



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CURB RAMP PLACEMENT
OPTION G, LARGE RADII
1 OF 3

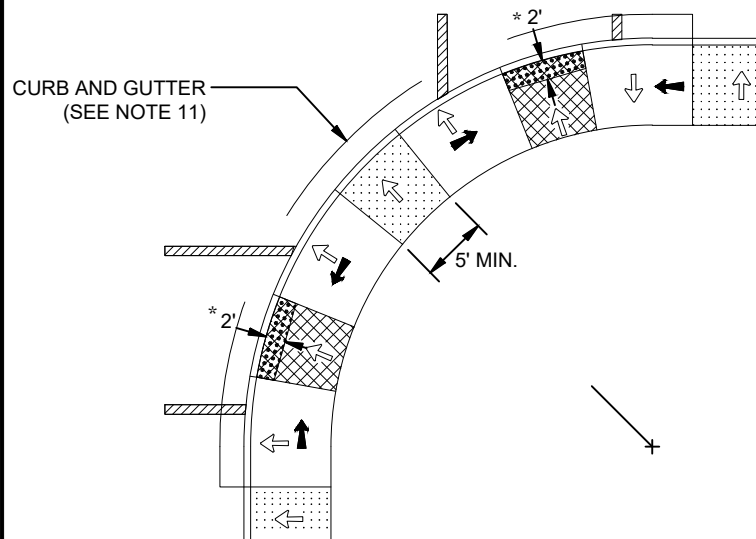
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R-009

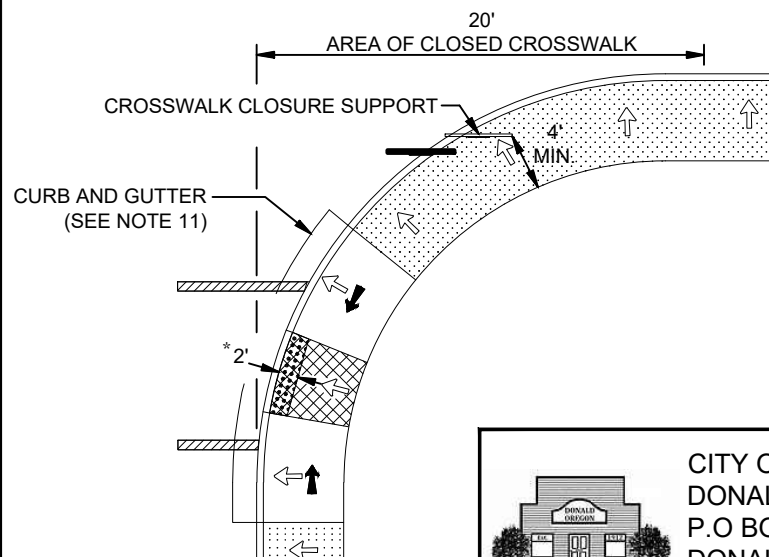
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OPTION H CURB RAMPS FOR NARROW SIDEWALKS



OPTION H (WITH CROSSWALK CLOSURE) CURB RAMPS FOR NARROW SIDEWALKS



* SEE NOTE 4

NOTES FOR ALL DETAILS:

1. CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
2. TOOLED JOINTS ARE REQUIRED AT ALL CURB RAMP SLOPE BREAK LINES.
3. CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
4. PLACE DETECTABLE WARNING SURFACE AT THE BACK OF CURB FOR A MINIMUM OF 2' AT CURB RAMP THAT IS ADJACENT TO TRAFFIC. FOR DETAILS NOT SHOWN, SEE STD. DWG. DETECTABLE WARNING SURFACE.
5. CHECK THE GUTTER FLOW DEPTH TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OR PERFORM OTHER APPROVED DESIGN MITIGATION.
6. RETURN CURB MAY BE PROVIDED IN LIEU OF FLARED SLOPE IF PROTECTED FROM TRAVERSE BY LANDSCAPING OR FIXED BARRIER. RETURN CURB SHALL NOT REDUCE WIDTH OF APPROACHING SIDEWALK.
7. FOR THE PURPOSE OF THIS DRAWING, A CURB RAMP IS CONSIDERED "PERPENDICULAR" IF THE ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE CURB RAMP AND A LINE TANGENT TO THE CURB AT THE CURB RAMP CENTER IS 75° TO 90°.
8. CURB RAMPs FOR PATHS INTERSECTING A ROADWAY SHOULD BE FULL WIDTH OF PATH, EXCLUDING FLARES. WHEN A CURB RAMP IS USED TO PROVIDE BICYCLE ACCESS FROM A ROADWAY TO A SIDEWALK, THE CURB RAMP SHOULD BE 8' WIDE.
9. WHEN 2 CURB RAMPs ARE IMMEDIATELY ADJACENT. THE CURB EXPOSURE (E) BETWEEN THE ADJACENT SIDE FLARES MAY RANGE BETWEEN 3" AND FULL DESIGN EXPOSURE.
10. GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES.
11. CURB AND GUTTER IS REQUIRED AT CURB RAMPs.

- MARKED OR INTENDED CROSSING LOCATION
- SIDEWALK
- TURNING SPACE. MIN. LEVEL AREA 4' X 4'. 4' X 5' WHEN CONSTRAINED (WITH LONGER DIMENSIONS IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSE OF THIS APPLICATION, A MAX. 2.0% FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.
- TRUNCATED DOME DETECTABLE WARNING SURFACE

- SLOPE 1.5% MAX. (MAX. 2.0% FINISHED SURFACE SLOPE) (NORMAL SIDEWALK CROSS SLOPE)
- SLOPE 7.5% MAX. (MAX. 8.3% FINISHED SURFACE SLOPE)



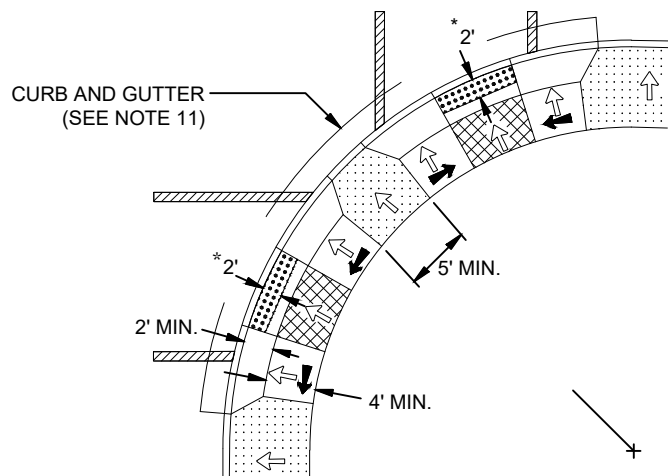
CITY OF
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CURB RAMP PLACEMENT
OPTION H, LARGE RADII
2 OF 3

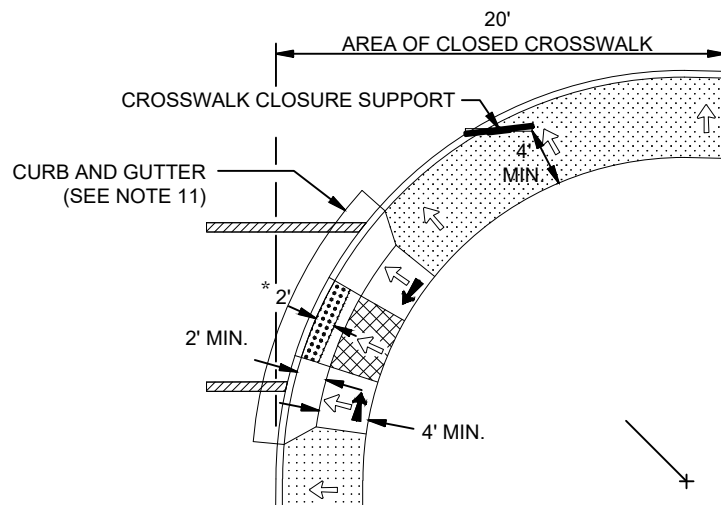
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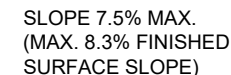
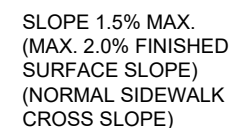
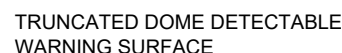
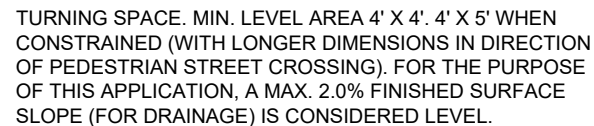
Bar Measures 1 inch



OPTION I (WITH CROSSWALK CLOSURE) CURB RAMPS FOR WIDE SIDEWALKS



1. CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
2. TOOLED JOINTS ARE REQUIRED AT ALL CURB RAMP SLOPE BREAK LINES.
3. CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
4. PLACE DETECTABLE WARNING SURFACE AT THE BACK OF CURB FOR A MINIMUM OF 2' AT CURB RAMP THAT IS ADJACENT TO TRAFFIC. FOR DETAILS NOT SHOWN, SEE STD. DWG. DETECTABLE WARNING SURFACE.
5. CHECK THE GUTTER FLOW DEPTH TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OR PERFORM OTHER APPROVED DESIGN MITIGATION.
6. RETURN CURB MAY BE PROVIDED IN LIEU OF FLARED SLOPE IF PROTECTED FROM TRAVERSE BY LANDSCAPING OR FIXED BARRIER. RETURN CURB SHALL NOT REDUCE WIDTH OF APPROACHING SIDEWALK.
7. FOR THE PURPOSE OF THIS DRAWING, A CURB RAMP IS CONSIDERED "PERPENDICULAR" IF THE ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE CURB RAMP AND A LINE TANGENT TO THE CURB AT THE CURB RAMP CENTER IS 75° TO 90°.
8. CURB RAMPS FOR PATHS INTERSECTING A ROADWAY SHOULD BE FULL WIDTH OF PATH, EXCLUDING FLARES. WHEN A CURB RAMP IS USED TO PROVIDE BICYCLE ACCESS FROM A ROADWAY TO A SIDEWALK, THE CURB RAMP SHOULD BE 8' WIDE.
9. WHEN 2 CURB RAMPS ARE IMMEDIATELY ADJACENT. THE CURB EXPOSURE (E) BETWEEN THE ADJACENT SIDE FLARES MAY RANGE BETWEEN 3" AND FULL DESIGN EXPOSURE.
10. GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES.
11. CURB AND GUTTER IS REQUIRED AT CURB RAMPS.



* SEE NOTE 4



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CURB RAMP PLACEMENT
OPTION I, LARGE RADII
3 OF 3

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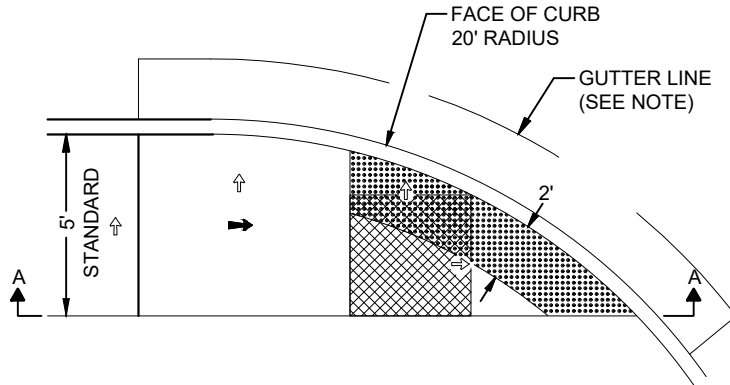
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DESN: MCH

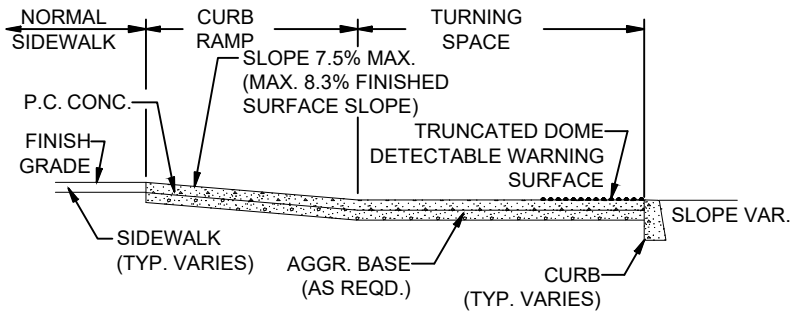
R-009

20' CURB RADIUS

PLAN

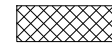


SECTION A-A

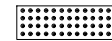


NOTES FOR ALL DETAILS:

1. CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
2. SITE CONDITIONS NORMALLY REQUIRE A PROJECT SPECIFIC DESIGN WHICH CONSIDERS DESIGN VEHICLE TURNING MOVEMENTS, BICYCLE AND PEDESTRIAN CROSSING NEEDS, CURB ALIGNMENT, CURB EXPOSURE, GRADES, DRAINAGE, RIGHT-OF-WAY, STREET FURNITURE, ETC.
3. CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
4. P.C. CONCRETE SIDEWALK, CURB RAMP, AND TURNING SPACE MINIMUM THICKNESS IS 4".
5. ABOVE GRAPHICS ARE BASED ON SIDEWALK WITH STANDARD CURB (6" TOP, 6" EXPOSURE). CURB RADIUS IS MEASURED AT TOP FACE OF CURB.
6. CURB AND GUTTER IS REQUIRED AT CURB RAMPS.



TURNING SPACE. MIN. LEVEL AREA 4'X4'.
4'X5' WHEN CONSTRAINED (WITH LONGER DIMENSION IN
DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE
PURPOSES OF THIS APPLICATION, A MAX. 2.05 FINISHED
SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.



DETECTABLE WARNING SURFACE



SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)



SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)



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CURB RAMP CROSSING
1 OF 2

PROJ: 200-166682-20001

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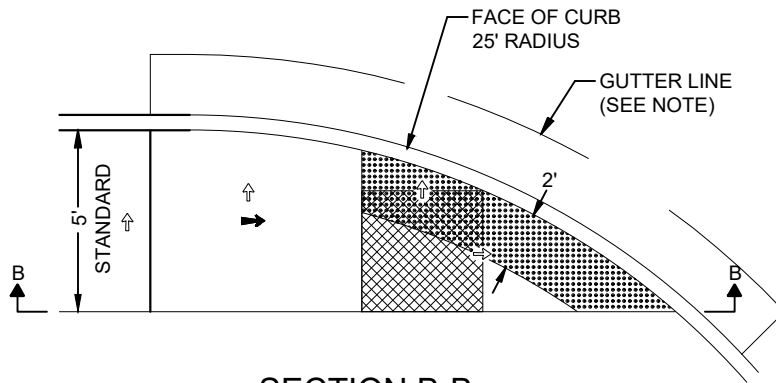
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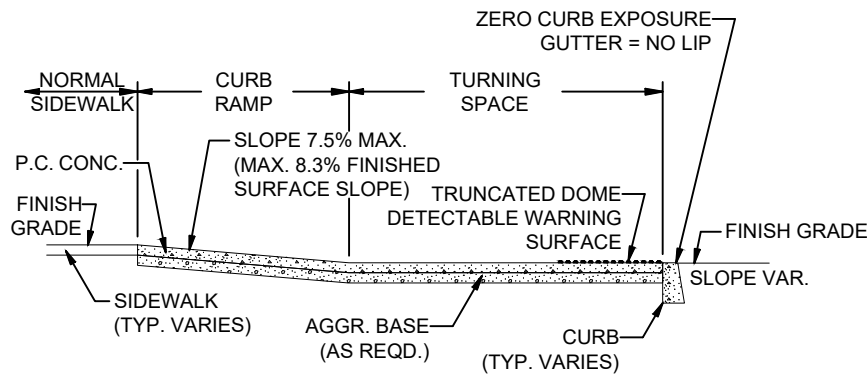
Bar Measures 1 inch

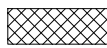
25' CURB RADIUS

PLAN



SECTION B-B



 TURNING SPACE. MIN. LEVEL AREA 4'X4'. 4'X5' WHEN CONSTRAINED (WITH LONGER DIMENSION IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSES OF THIS APPLICATION, A MAX. 2.05 FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.

 DETECTABLE WARNING SURFACE

← SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

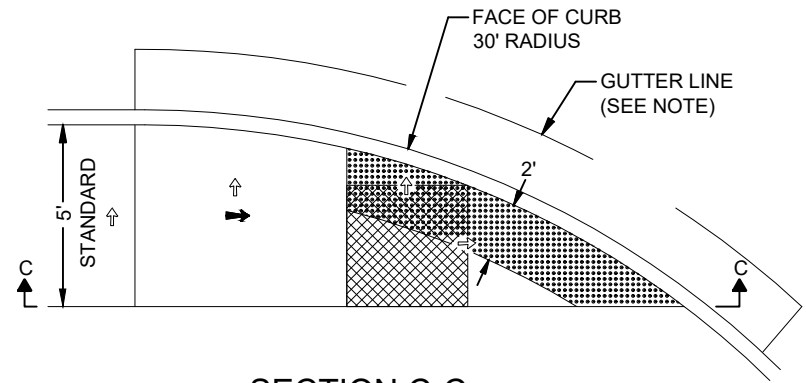
← SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)



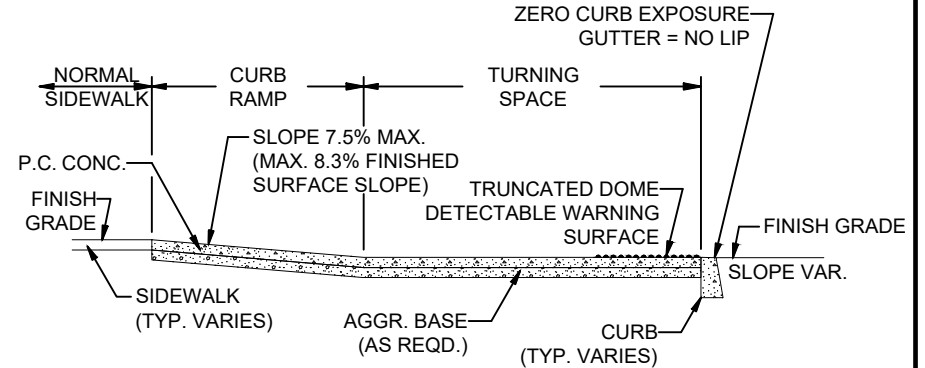
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30' CURB RADIUS

PLAN



SECTION C-C



GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

CURB RAMP CROSSING
2 OF 2

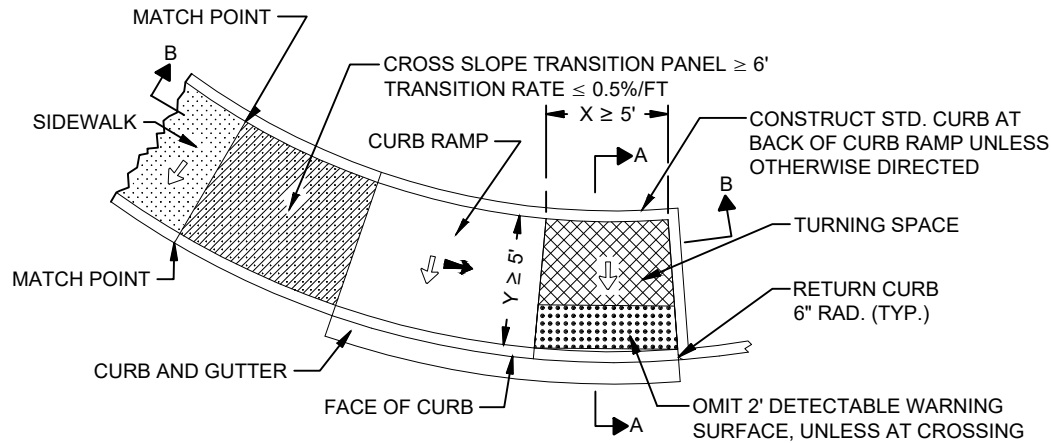
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R-010

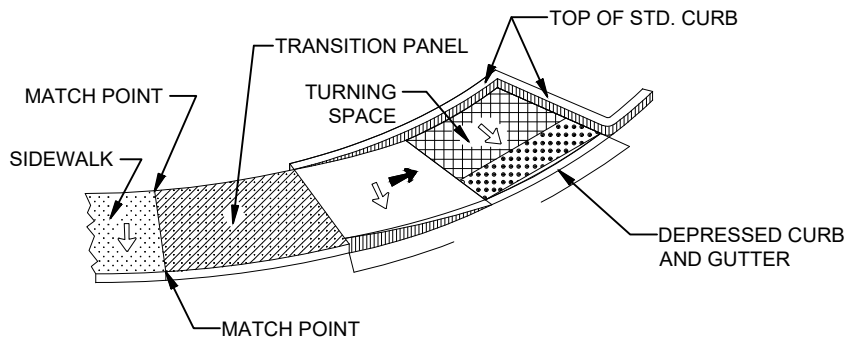
Bar Measures 1 inch

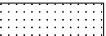



CURBED OPTION (END OF SIDEWALK)

PLAN



ISOMETRIC VIEW



-  SIDEWALK
-  TRANSITION PANEL
-  TURNING SPACE. MIN. 5'X5'
-  DETECTABLE WARNING SURFACE

↔ SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

↔ COUNTER SLOPE
5% MAX. ASCENDING OR DESCENDING,
SLOPE AS REQUIRED FOR DRAINAGE

← SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

NOTES FOR ALL DETAILS:

- CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
- TOOLED JOINTS ARE REQUIRED AT ALL CURB RAMP SLOPE BREAK LINES.
- CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
- CHECK THE GUTTER FLOW DEPTH TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OR PERFORM OTHER APPROVED DESIGN MITIGATION.
- WHEN A SHARED USE PATH TERMINATES, THE CURB RAMP SHALL BE THE FULL WIDTH OF THE PATH AND GENERALLY USE TAPER OR SHOULDER OPTION. IF CURBED OPTION IS USED, THE TURNING SPACE X-DIMENSION SHOULD BE MIN. 8' WIDE TO ENABLE BICYCLES TO RIDE FROM RAMP TO SHOULDER.
- GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.
- ALL END OF SIDEWALK OPTIONS CAN BE USED FOR CURVED OR TANGENT ROADWAY SECTIONS.
- WHEN THE SLOPE OF THE TRANSITION AREA IS GREATER THAN 5.0%, A 4'X5' LANDING SPACE WITH MAX. 1.5% SLOPE IS REQUIRED AT THE TOP OF THE RAMP. SEE SECTION C-C.
- CURB AND GUTTER IS REQUIRED AT CURB RAMP.
- SEE PROJECT PLANS FOR DETAILS NOT SHOWN.



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CURB RAMP & TURNING SPACE
END OF SIDEWALK
1 OF 3

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DESN: MCH

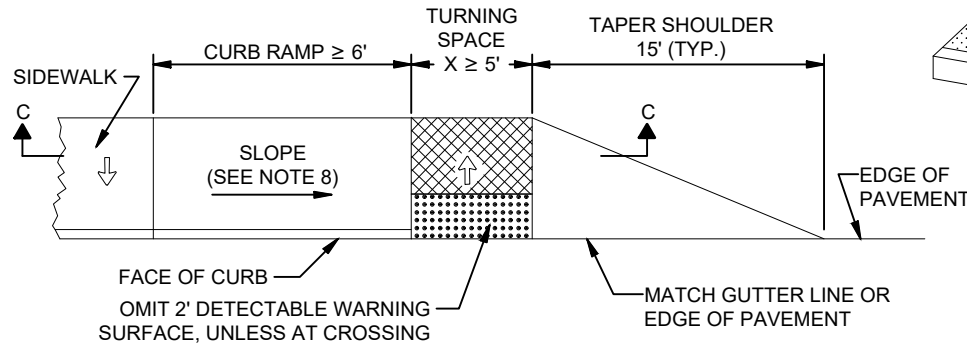
R-011

Bar Measures 1 inch

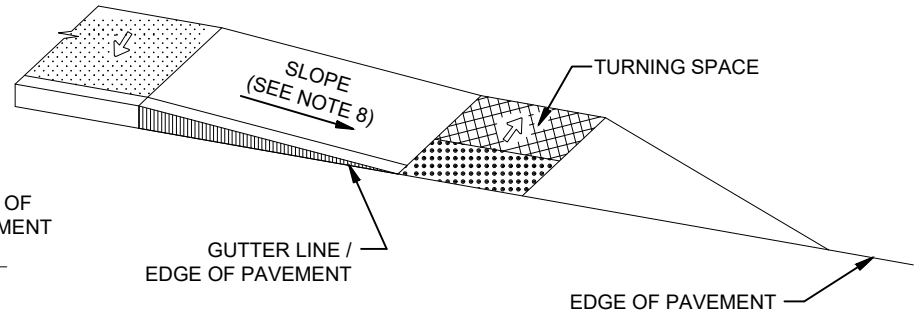
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TAPER OPTION (END OF SIDEWALK)

PLAN

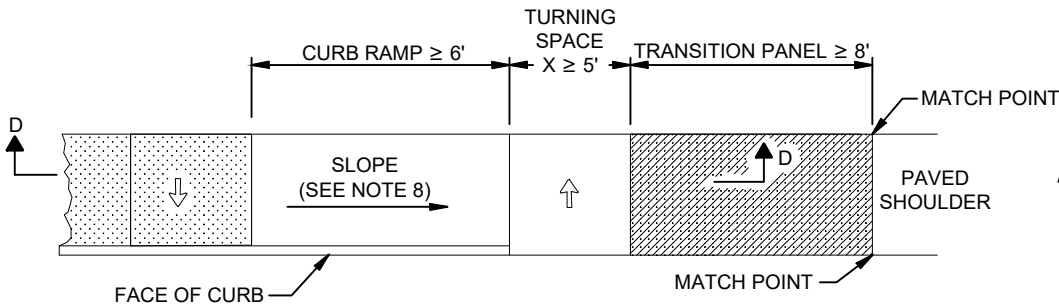


ISOMETRIC VIEW

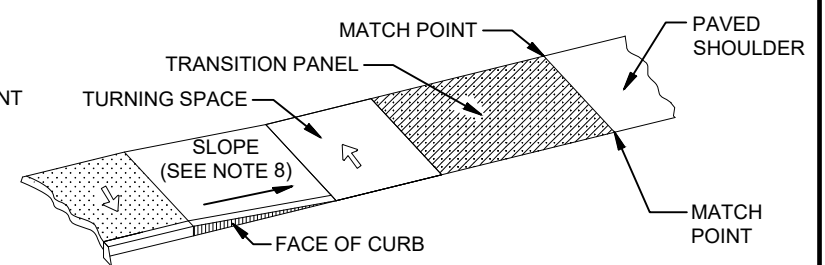


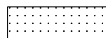
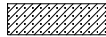


SHOULDER OPTION (END OF SIDEWALK)

PLAN



ISOMETRIC VIEW



-  SIDEWALK
-  TRANSITION PANEL
-  TURNING SPACE. MIN. 5'X5'
-  DETECTABLE WARNING SURFACE

↔ SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

↔ SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

↔ COUNTER SLOPE
5% MAX. ASCENDING OR DESCENDING,
SLOPE AS REQUIRED FOR DRAINAGE



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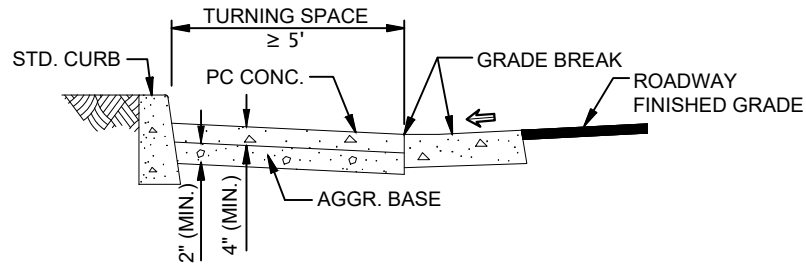
CURB RAMP & TURNING SPACE
END OF SIDEWALK
2 OF 3

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

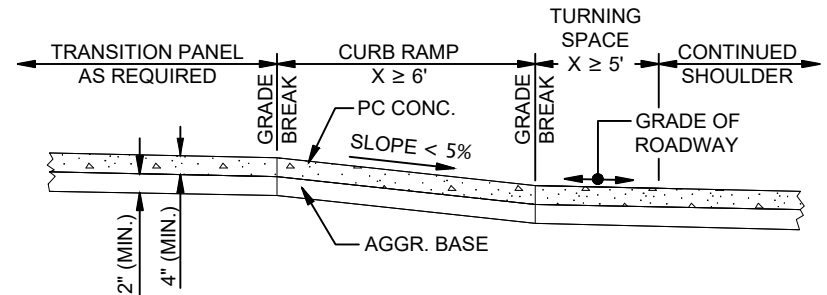
R-011

Bar Measures 1 inch

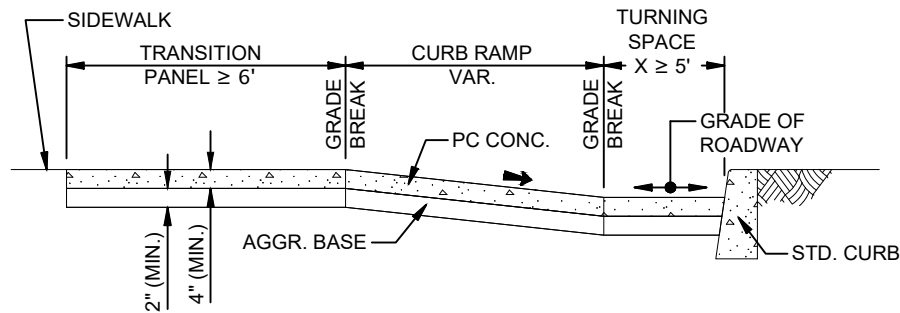
SECTION A-A



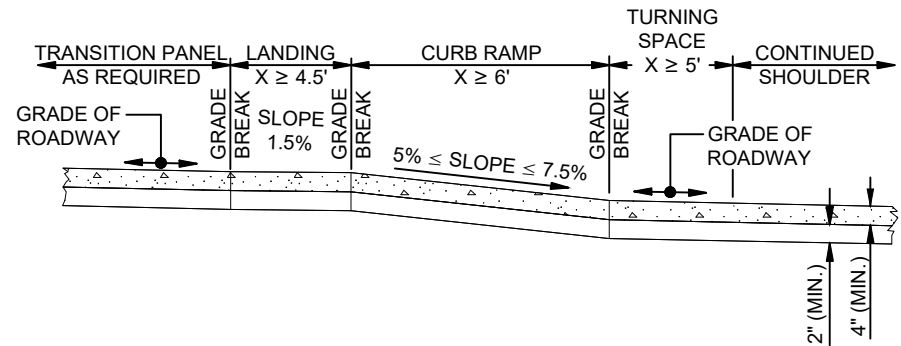
SECTION C-C

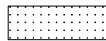





SECTION B-B



SECTION C-C



-  SIDEWALK
-  TRANSITION PANEL
-  TURNING SPACE. MIN. 5'X5'
-  DETECTABLE WARNING SURFACE

← SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

← SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

← COUNTER SLOPE
5% MAX. ASCENDING OR DESCENDING,
SLOPE AS REQUIRED FOR DRAINAGE



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CURB RAMP & TURNING SPACE
END OF SIDEWALK
3 OF 3

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DATE: 6/3/2021
DESN: MCH

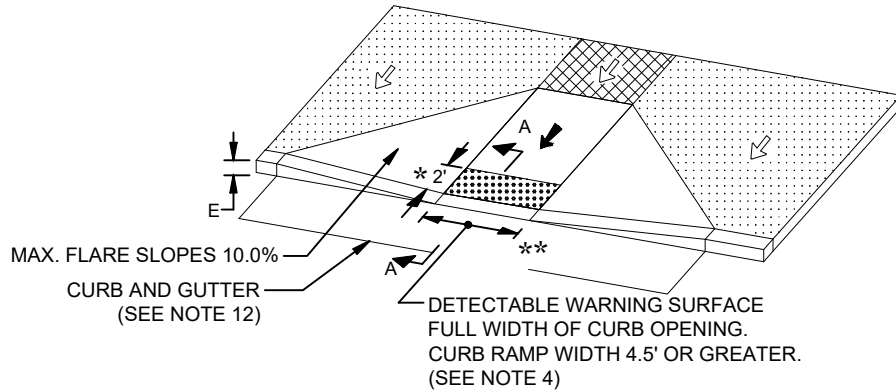
R-011

Bar Measures 1 inch

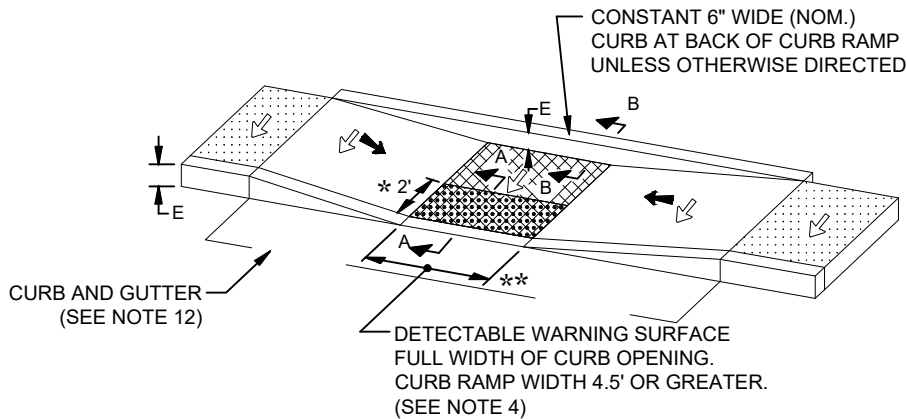
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PERPENDICULAR CURB RAMP DETAIL

USE "PARALLEL CURB RAMP DETAIL" OR "COMBINATION CURB RAMP DETAIL" WHEN REQD. TURNING SPACE CANNOT BE OBTAINED



PARALLEL CURB RAMP DETAIL



TURNING SPACE. MIN. LEVEL AREA 4'X4' 4'X5' WHEN CONSTRAINED (WITH LONGER DIMENSIONS IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSES OF THIS APPLICATION, A MAX. 2.0% FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.



TRUNCATED DOME DETECTABLE WARNING SURFACE



SIDEWALK



CITY OF
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P.O BOX 388
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97020

NOTES FOR ALL DETAILS:

1. CURB RAMP DETAILS ARE BASED ON ODOT STANDARDS.
2. TOOLED JOINTS ARE REQUIRED AT ALL CURB RAMP SLOPE BREAK LINES.
3. CURB RAMP SLOPES SHOWN ARE RELATIVE TO THE TRUE LEVEL HORIZON (ZERO BUBBLE).
4. PLACE DETECTABLE WARNING SURFACE AT THE BACK OF CURB FOR A DEPTH OF 2' AT CURB RAMP THAT IS ADJACENT TO TRAFFIC. FOR DETAILS NOT SHOWN, SEE DETECTABLE WARNING SURFACE STD. DWG.
5. GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMP RUNS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.
6. RETURN CURB MAY BE PROVIDED IN LIEU OF FLARED SLOPE ONLY IF PROTECTED FROM TRAVERSE BY LANDSCAPING OR FIXED BARRIER. RETURN CURB SHALL NOT REDUCE WIDTH OF APPROACHING SIDEWALK.
7. FOR THE PURPOSE OF THIS DRAWING, A CURB RAMP IS CONSIDERED "PERPENDICULAR" IF THE ANGLE BETWEEN THE LONGITUDINAL AXIS OF THE CURB RAMP AND A LINE TANGENT TO THE CURB AT THE CURB RAMP CENTER IS 75° TO 90°.
8. CURB RAMP FOR PATHS INTERSECTING A ROADWAY SHOULD BE FULL WIDTH OF PATH, EXCLUDING FLARES. WHEN A CURB RAMP IS USED TO PROVIDE BICYCLE ACCESS FROM A ROADWAY TO A SIDEWALK, THE CURB RAMP SHOULD BE 8' WIDE.
9. CHECK THE GUTTER FLOW DEPTH AT CURB RAMP LOCATIONS TO ASSURE THAT THE DESIGN FLOOD DOES NOT OVERTOP THE BACK OF SIDEWALK AT CURB RAMP. IF OVERTOPPING OCCURS PLACE AN INLET AT UPSTREAM SIDE OF CURB RAMP OR PERFORM OTHER APPROVED DESIGN MITIGATION.
11. SITE CONDITIONS NORMALLY REQUIRE A PROJECT SPECIFIC DESIGN. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.
12. CURB AND GUTTER IS REQUIRED AT CURB RAMP.



SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

* SEE NOTE 4

** SEE NOTE 9



SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

CURB RAMP DETAILS
1 OF 2

PROJ: 200-166682-20001

DATE: 6/3/2021

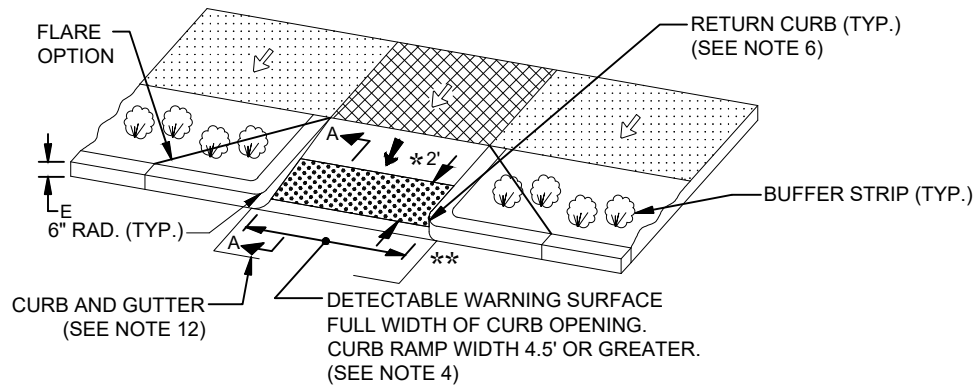
DESN: MCH

R-012

Bar Measures 1 inch

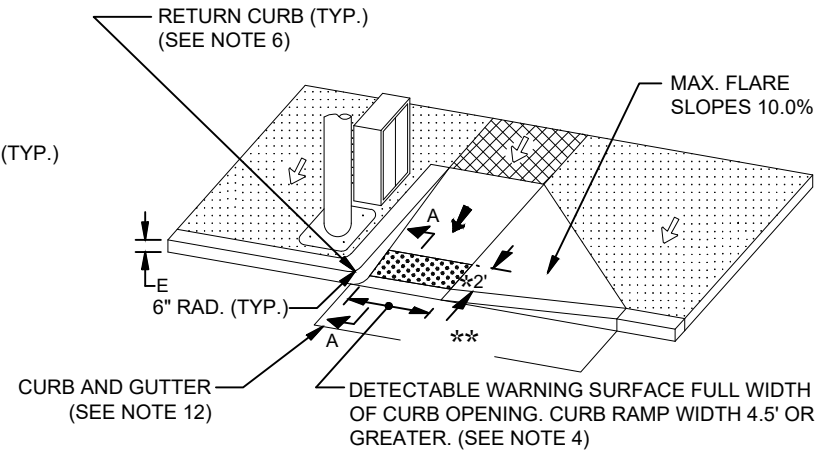
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PERPENDICULAR CURB RAMP DETAIL (THROUGH BUFFER STRIP)

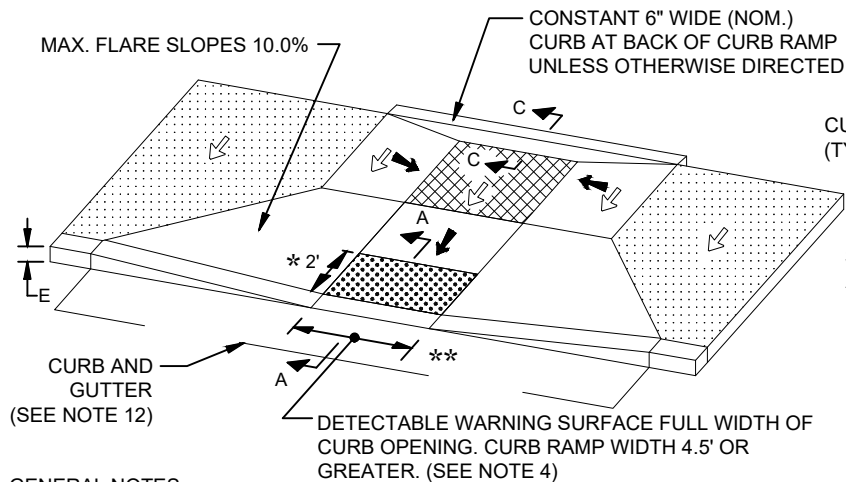


PERPENDICULAR CURB RAMP DETAIL (WITH SINGLE FLARE)

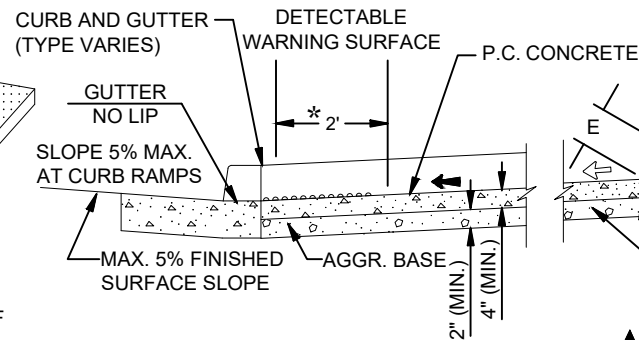
USE "PARALLEL CURB RAMP DETAIL" OR "COMBINATION CURB RAMP DETAIL" WHEN REQD. TURNING SPACE CANNOT BE OBTAINED



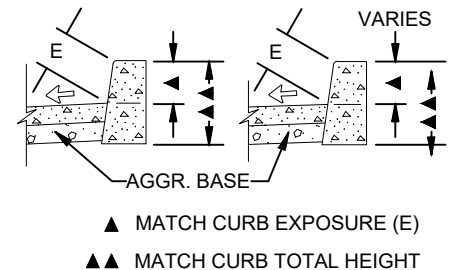
COMBINATION CURB RAMP DETAIL



SECTION A-A



SECTION B-B SECTION C-C



GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

↖ SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

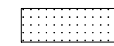
↖ SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

* SEE NOTE 4

** SEE NOTE 9



TURNING SPACE. MIN. LEVEL AREA 4'X4'
4'X5' WHEN CONSTRAINED (WITH LONGER DIMENSIONS IN
DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE
PURPOSES OF THIS APPLICATION, A MAX. 2.0% FINISHED
SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.



SIDEWALK



TRUNCATED DOME DETECTABLE
WARNING SURFACE



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CURB RAMP DETAILS
2 OF 2

PROJ: 200-166682-20001

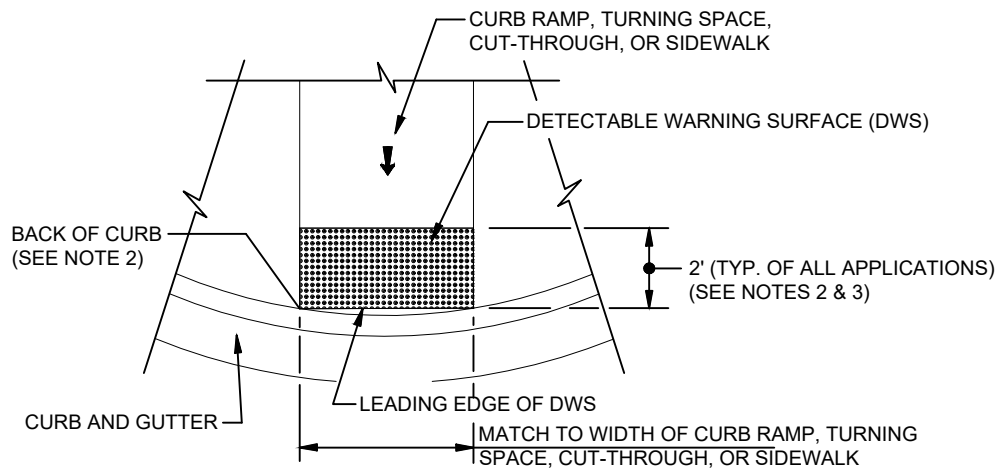
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DESN: MCH

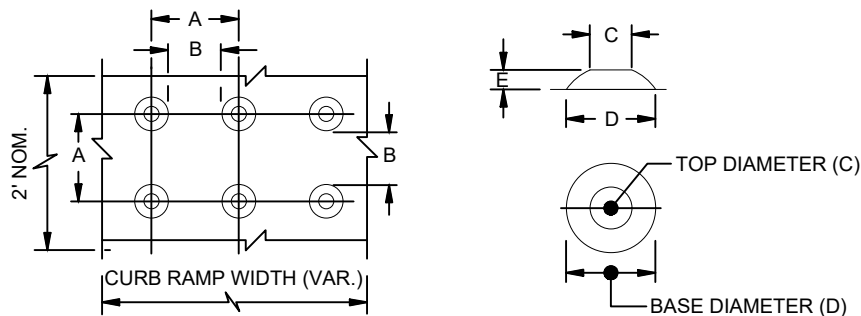
R-012

Bar Measures 1 inch

DETECTABLE WARNING SURFACE DETAIL



TRUNCATED DOME DETAILS



	A	B	C	D	E
MIN.	1.60"	0.65"	0.45"	0.90"	0.20"
MAX.	2.40"	0.65"	0.91"	1.40"	0.20"



SIDEWALK



DETECTABLE WARNING SURFACE



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DETECTABLE WARNING
SURFACE DETAILS
1 OF 3

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

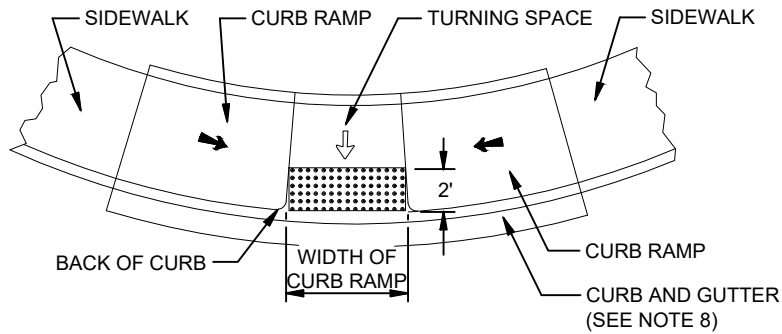
R-013

Bar Measures 1 inch

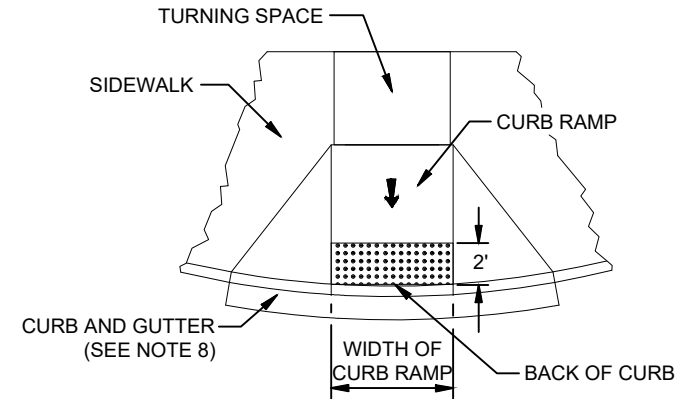
NOTES FOR ALL DETAILS:

- DETECTABLE WARNING SURFACE DETAILS & LOCATIONS ARE BASED ON ODOT STANDARDS.
 - THE DETECTABLE WARNING SURFACE SHALL EXTEND THE FULL WIDTH OF THE CURB RAMP, OR OTHER ROADWAY ENTRANCE AS APPLICABLE. A GAP OF UP TO 2" ON EACH SIDE OF THE DETECTABLE WARNING SURFACE IS PERMITTED (MEASURED AT THE LEADING CORNERS OF THE DETECTABLE WARNING SURFACE PANEL).
 - DETECTABLE WARNING SURFACE SHALL BE PLACED AT THE BACK OF CURB A MIN. DEPTH OF 2' AT CURB RAMPS THAT ARE ADJACENT TO TRAFFIC. DETECTABLE WARNING SURFACE MAY BE RADIAL OR RECTANGULAR, BUT MUST COMPLY WITH THE TRUNCATED DOME SIZE AND SPACING STANDARDS. DETECTABLE WARNING SURFACE MAY BE CUT TO MEET NECESSARY SHAPE AS SHOWN IN PLANS. COLOR TO BE SAFETY YELLOW IF NO COLOR IS SPECIFIED IN CONSTRUCTION NOTE.
 - DETECTABLE WARNING SURFACE SHALL BE USED IN THE FOLLOWING LOCATIONS:
A) CURB RAMPS B) CROSSING ISLANDS C) RAIL CROSSINGS
 - DETECTABLE WARNING SURFACE SHALL NOT BE USED IN THE FOLLOWING LOCATIONS:
A) END OF SIDEWALK TRANSITIONS THAT ARE NOT A CROSSWALK
B) DRIVEWAYS, UNLESS CONSTRUCTED WITH CURB RETURN
C) PARKING LOTS
 - GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. GRADE BREAKS SHALL NOT BE PERMITTED ON THE SURFACE OF RAMP RUNS AND TURNING SPACES. SURFACE SLOPES THAT MEET AT GRADE BREAKS SHALL BE FLUSH.
 - DETECTABLE WARNING SURFACES SHALL BE SEPARATED BY A 2 FT. MIN. LENGTH OF WALKWAY WITHOUT DETECTABLE WARNINGS. WHERE NO CURB IS PRESENT, THE DETECTABLE WARNING SURFACE SHALL BE PLACED AT THE EDGE OF ROADWAY.
 - DETECTABLE WARNING SURFACE PLACEMENT FOR PERPENDICULAR RAMPS VARY AS SHOWN.
 - CURB AND GUTTER IS REQUIRED AT CURB RAMPS.
- ↖ SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)
- ← SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)

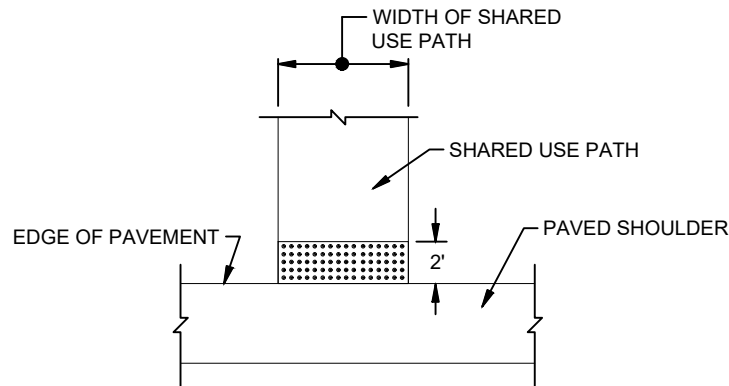
PARALLEL CURB RAMP



PERPENDICULAR CURB RAMP



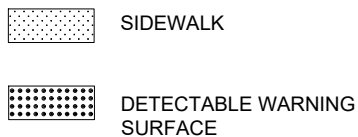
SHARED-USE PATH CONNECTION



GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

- ← SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)
- SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)



DETECTABLE WARNING
SURFACE DETAILS
2 OF 3

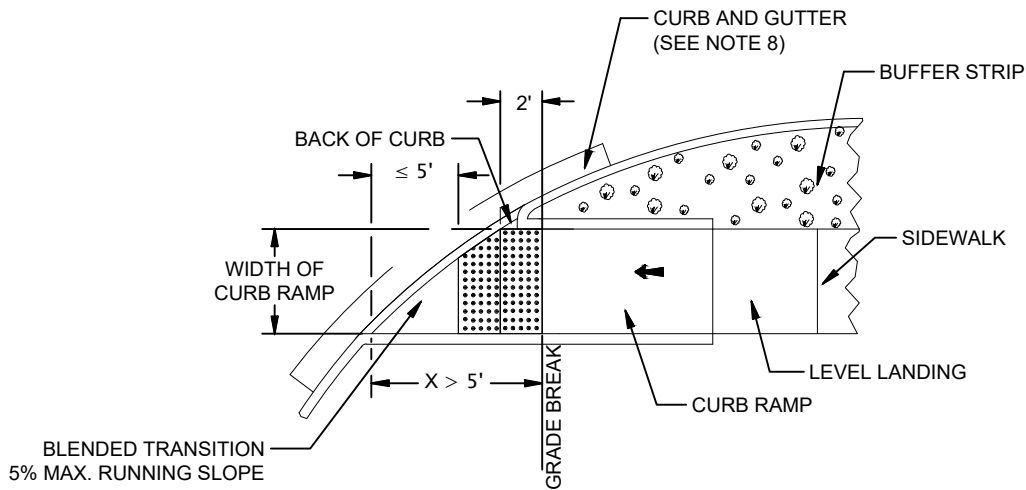
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DATE: 6/3/2021
DESN: MCH

R-013

Bar Measures 1 inch

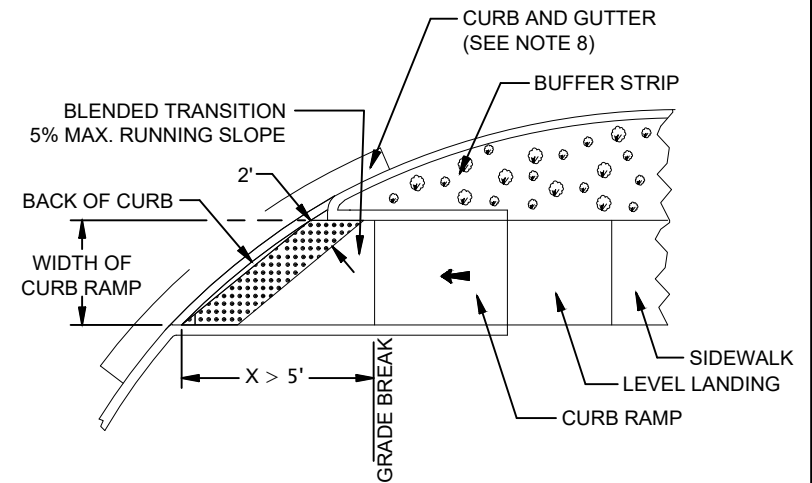
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CURB RAMP CROSSING GRADE BREAK > 5 FT. FROM BACK OF CURB (OPTION 1)



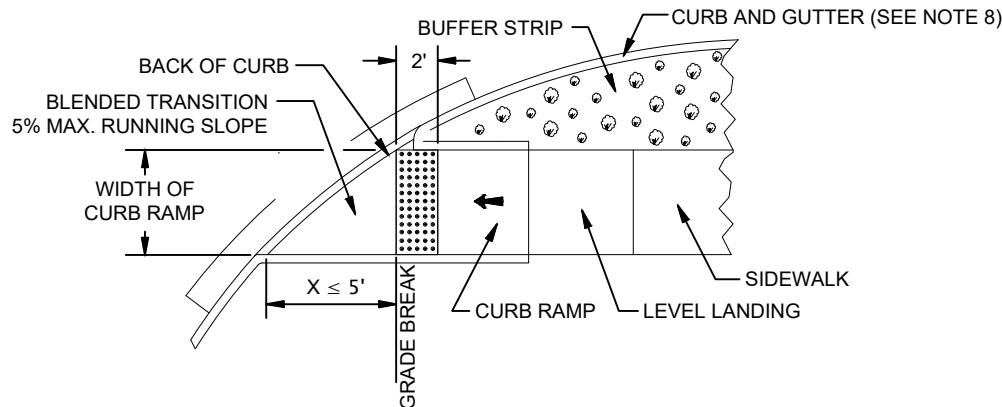
NOTE: DETECTABLE WARNING SURFACE SHALL BE PLACED IN AREA FROM CURB RAMP GRADE BREAK TO WITHIN 5' OF CURB

CURB RAMP CROSSING GRADE BREAK > 5 FT. FROM BACK OF CURB



NOTE: DETECTABLE WARNING SURFACE SHALL BE PLACED IN THE LOWER 2' OF THE BLENDED TRANSITION THAT IS ADJACENT TO TRAFFIC.

CURB RAMP CROSSING GRADE BREAK ≤ 5 FT. FROM BACK OF CURB



NOTE: DETECTABLE WARNING SURFACE SHALL BE PLACED ON THE BOTTOM OF THE CURB RAMP DIRECTLY ABOVE THE GRADE BREAK

GENERAL NOTES:

1. NOTES FOR ALL DETAILS FOUND ON SHEET 1.

↔ SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)

← SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)



SIDEWALK



DETECTABLE WARNING SURFACE



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DETECTABLE WARNING
SURFACE DETAILS
3 OF 3

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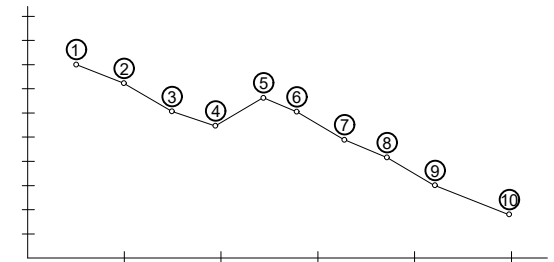
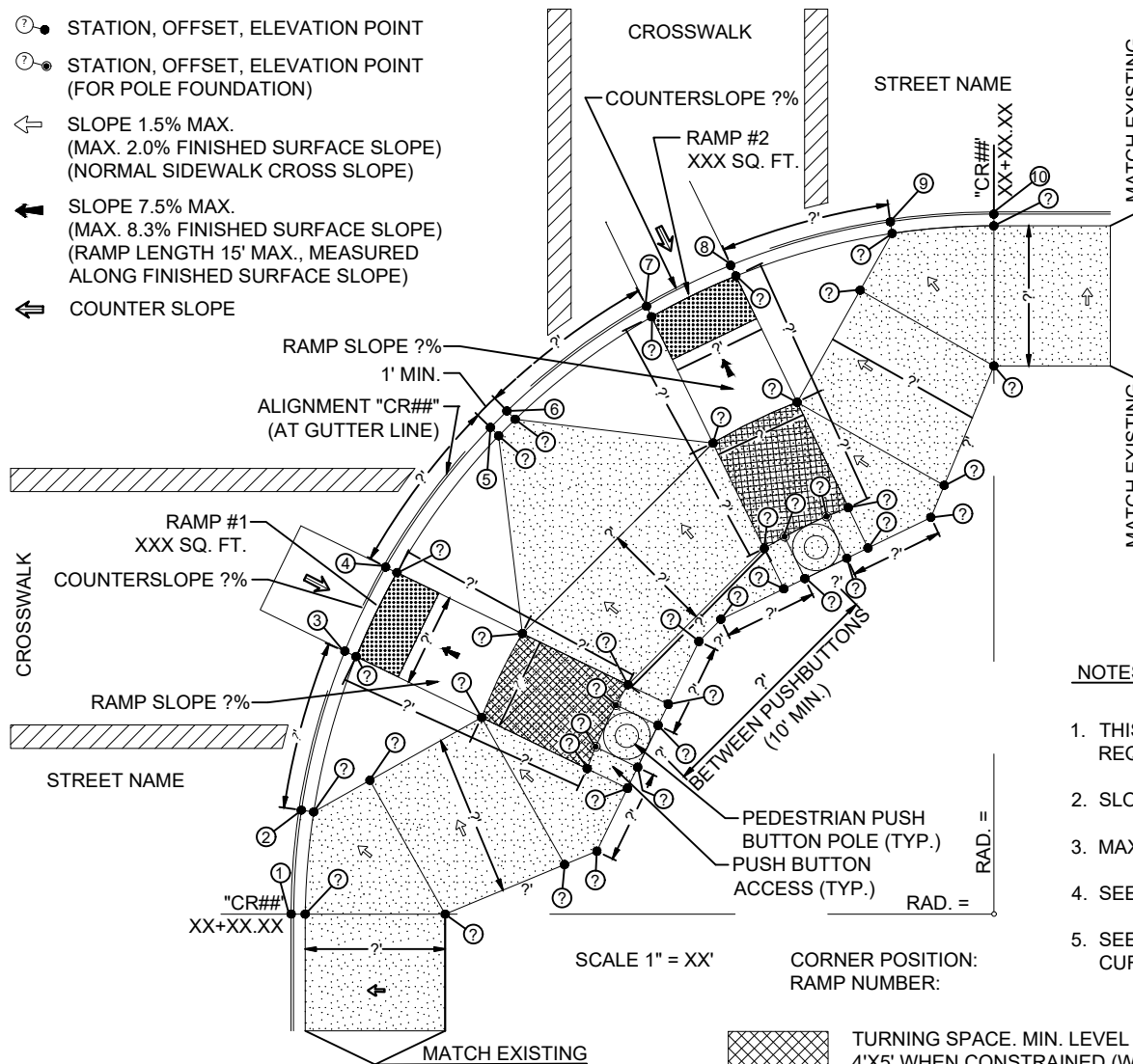
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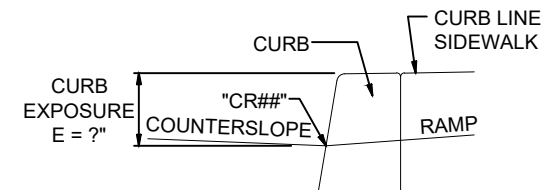
R-013

Bar Measures 1 inch

- ① ● STATION, OFFSET, ELEVATION POINT
- ② ● STATION, OFFSET, ELEVATION POINT (FOR POLE FOUNDATION)
- ↖ SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)
- ↗ SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)
(RAMP LENGTH 15' MAX., MEASURED
ALONG FINISHED SURFACE SLOPE)
- ↖ COUNTER SLOPE



PROFILE



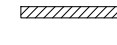
CURB DETAIL

NOTES FOR ALL DETAILS:

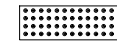
1. THIS DRAWING IS INTENDED AS A GUIDE. MODIFY FOR PROJECT REQUIREMENTS.
2. SLOPES HOLD OVER ELEVATIONS.
3. MAX. CROSS SLOPE CHANGE ON RAMP 0.5% PER FOOT.
4. SEE STANDARD DRAWINGS FOR DETAILS NOT SHOWN.
5. SEE SHEETxxx FOR CURB DETAIL (USE OTHER DETAIL SHEETS WHEN CURB DETAIL IS SAME).



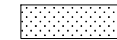
TURNING SPACE. MIN. LEVEL AREA 4'X4'.
4'X5' WHEN CONSTRAINED (WITH LONGER DIMENSION
IN DIRECTION OF PEDESTRIAN STREET CROSSING).
FOR THE PURPOSES OF THIS APPLICATION, A MAX.
2.05 FINISHED SURFACE SLOPE (FOR DRAINAGE) IS
CONSIDERED LEVEL.



MARKED OR INTENDED
CROSSING LOCATION



DETECTABLE WARNING
SURFACE



SIDEWALK



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MIN. CURB RAMP DETAILS
1 OF 2

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DESN: MCH

R-014

Bar Measures 1 inch

RAMP	ITEM	VALUES	
		RAMP 1	RAMP 2
RAMP RUN 1	RUNNING SLOPE		
	CROSS SLOPE		
	GUTTER FLOW SLOPE		
	COUNTER SLOPE		
	RAMP LENGTH		
RAMP RUN 2	RUNNING SLOPE		
	CROSS SLOPE		
	RAMP LENGTH		
RAMP RUN 3	RUNNING SLOPE		
	CROSS SLOPE		
	RAMP LENGTH		
TURNING SPACE	WIDTH X		
	LENGTH Y		
	SLOPE X		
	SLOPE Y		

LOCATION	"CR##" STATION	GUTTER ELEV
①	?	?
②	?	?
③	?	?
④	?	?
⑤	?	?
⑥	?	?
⑦	?	?
⑧	?	?
⑨	?	?
⑩	?	?

LOCATION	STATION	OFFSET	ELEVATION
①			
②			
③			
④			
⑤			
⑥			
⑦			
⑧			
⑨			
⑩			

GENERAL NOTES:

- NOTES FOR ALL DETAILS FOUND ON SHEET 1.



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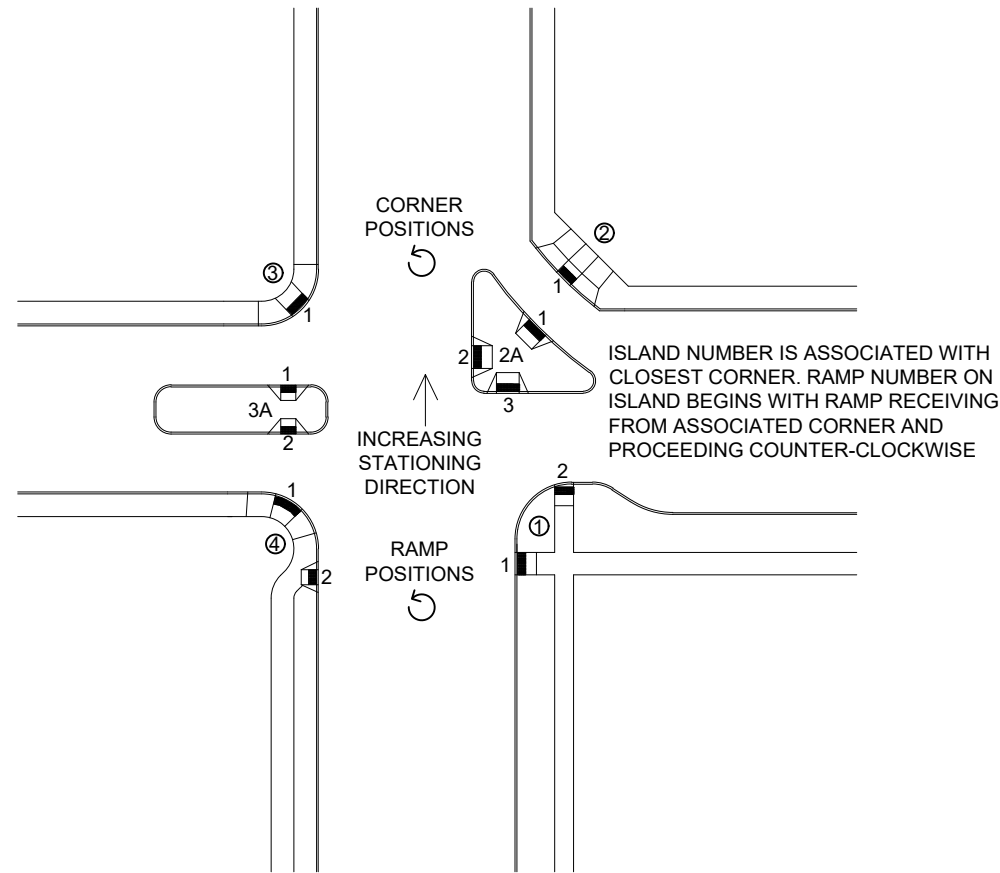
MIN. CURB RAMP DETAILS
2 OF 2

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DATE: 6/3/2021
DESN: MCH

R-014

Bar Measures 1 inch

CORNER POSITION AND RAMP POSITION DIAGRAM (RAMP WIDTH 4' MIN.)



- DETECTABLE WARNING SURFACE
- MARKED OR INTENDED CROSSING LOCATION
- SIDEWALK

TURNING SPACE. MIN. LEVEL AREA 4.5' X 4.5' (4' X 4' MIN. FINISHED SURFACE). WHEN CONSTRAINED 4.5' X 5.5' (4' X 5' MIN. FINISHED SURFACE WITH LONGER DIMENSIONS IN DIRECTION OF PEDESTRIAN STREET CROSSING). FOR THE PURPOSE OF THIS APPLICATION, A MAX. 2.0% FINISHED SURFACE SLOPE (FOR DRAINAGE) IS CONSIDERED LEVEL.

- SLOPE 1.5% MAX.
(MAX. 2.0% FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)
- SLOPE 7.5% MAX.
(MAX. 8.3% FINISHED SURFACE SLOPE)
- ZERO CURB EXPOSURE



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NOTES FOR ALL DETAILS:

1. THESE ITEMS REPRESENT THE MINIMUM INFORMATION REQUIRED ON CURB RAMP DETAILS.
2. CORNER POSITION IS BASED ON TRAVELING IN THE INCREASING STATIONING DIRECTION, BEGINNING WITH THE FIRST CORNER ON THE RIGHT AND PROCEEDING COUNTER-CLOCKWISE AROUND THE INTERSECTION, NUMBERING CONSECUTIVE 1 THROUGH THE END OF CORNERS. AN "A" IS ADDED TO THE NUMBER FOR AN ISLAND. FOR EXAMPLE AN ISLAND BETWEEN CORNER POSITIONS 1 AND 2 AND IS CLOSER TO CORNER 2 HAS A CORNER POSITION NUMBER 2A (SEE CORNER POSITION AND RAMP POSITION DIAGRAM).
3. RAMP POSITION IS A NUMBER GIVEN TO EACH RAMP BEGINNING WITH CORNER POSITION 1 AND THE FIRST RAMP ENCOUNTERED IN THE INCREASING STATIONING DIRECTION AND PROCEEDS COUNTER-CLOCKWISE AROUND THE CORNER. PROCEED FOLLOWING THE PEDESTRIAN ROUTE AND IN CORNER POSITION NUMBER ORDER (SEE CORNER POSITION AND RAMP POSITION DIAGRAM). WHEN MORE THAN ONE RAMP IS SHOWN, LABEL THE RAMPS.
4. ALIGNMENT LOCATED AT GUTTER.
5. NAME ALIGNMENT "CR##". NUMBER CONSECUTIVE THROUGH THE PROJECT LENGTH, ONE ALIGNMENT PER CORNER.
6. IF EXISTING RAMPS AND SIDEWALK ELEVATIONS ARE RAISED OR LOWERED, ELECTRICAL JUNCTION BOXES AND CONDUIT SYSTEMS WILL REQUIRE ADJUSTMENT WHICH MAY REQUIRE ADDITIONAL CONCRETE WORK. SHOW ALL EXISTING JUNCTION BOX LOCATIONS WITH ELEVATIONS. ADJUSTMENT OF THE JUNCTION BOXES CONDUIT SYSTEM IS GENERALLY EASIER WHEN THE EXISTING ELEVATIONS ARE RAISED.
7. LOCATION OF SIGNAL POLE, PEDESTRIAN POLE, AND PUSHBUTTON NEED TO BE SHOWN. A 10" MAX. REACH IS REQUIRED TO THE PEDESTRIAN PUSHBUTTON. ADDITIONAL CONCRETE MAY NEED TO BE ADDED TO PROVIDE ACCESS TO THE PEDESTRIAN PUSH BUTTON. USE THE WHEELCHAIR DESIGN VEHICLE TO VERIFY ACCESS TO THE PEDESTRIAN PUSH BUTTON AS SHOWN IN THE SIGNAL DESIGN MANUAL.
8. SUGGEST USE OF EXCEL AND AXIOM TO CREATE THE POINT TABLE.
9. ADD CORNER POSITION DATA.
10. SCALES ARE 1"=5' FOR SIGNALIZED INTERSECTIONS (1 CORNER PER SHEET), AND 1"=10' FOR NON-SIGNALIZED INTERSECTIONS (2 CORNERS PER SHEET). (NOTE: LARGE RADIUS CORNERS MAY REQUIRE DIFFERENT SCALE TO FIT ON SHEET).
11. ADDITIONAL TABLES MAY BE ADDED FOR CLARITY, IF REQUIRED. DATA FLAGS SHOWING STATION OFFSET, ELEVATION MAY BE USED INSTEAD OF A TABLE.
12. ADDITIONAL DATA FLAGS MAY BE ADDED FOR CLARITY, IF REQUIRED.
13. ELEVATIONS SHOWN AT A MINIMUM AT FRONT AND BACK OF RAMP, FRONT AND BACK OF WINGS, HORIZONTAL BREAKS ALONG BACK OF SIDEWALK.
14. LABEL SIDEWALK WIDTH.
15. WHEN SIGNALS ARE PRESENT ON CORNERS WITH SIDEWALK RAMPS, COORDINATION BETWEEN THE SIGNAL DESIGNER AND THE ROADWAY DESIGNER IS REQUIRED.
16. SHOW UTILITIES AND CONFLICTS.
17. SHOW SCALE OF DETAIL.

MIN. CURB RAMP DETAILS INSTRUCTIONS

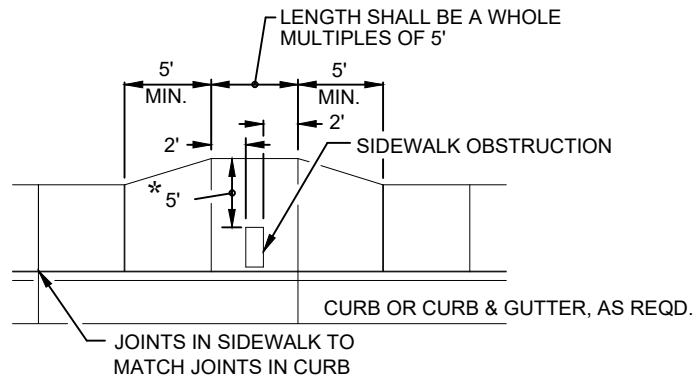
PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

R-015

Bar Measures 1 inch

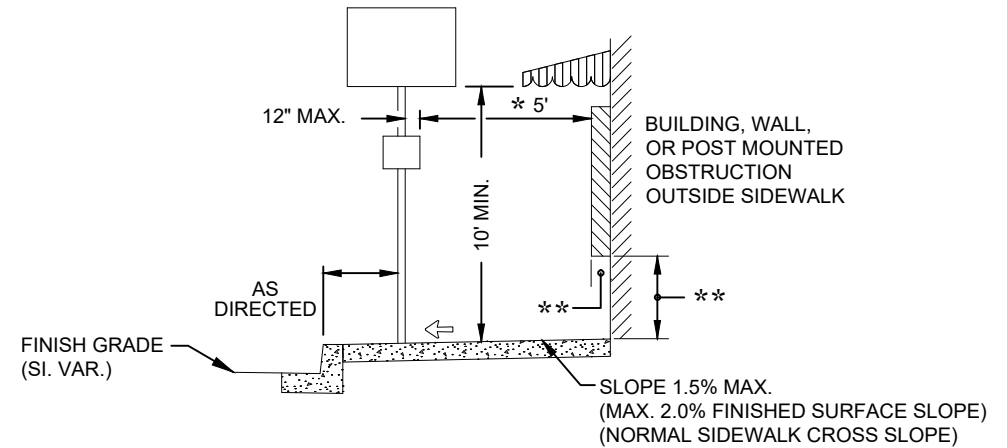
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REQUIRED SIDEWALK WIDENING AROUND OBSTRUCTIONS



* WHEN SITE CONSTRAINTS PROHIBIT A 5' PASSAGE, THE ENGINEER MAY DIRECT THIS TO BE REDUCED, BUT NO LESS THAN 4'.

CLEAR CIRCULATION PATH



** OBJECTS WITH BASE BELOW 2' - 4" MAY PROTRUDE ANY DISTANCE AS LONG AS THE 5' CIRCULATION PATH IS MAINTAINED. WHEN AN OBJECT WITH A BASE HIGHER THAN 2' - 4" PROTRUDES FURTHER THAN 4" PROVIDE A CURB BELOW PROTRUSION TO DELINEATE EDGE.

GENERAL NOTES FOR ALL DETAILS:

1. INCLUDE ADDITIONAL PAVED 2' CLEARANCE TO VERTICAL FACES HIGHER THAN 5' SUCH AS RETAINING WALLS, SOUND WALLS, FENCES, AND BUILDINGS.
2. CURB TYPE AND SIDEWALK WIDTH AS SHOWN OR AS DIRECTED. ON SIDEWALKS 8' AND WIDER, PROVIDE A LONGITUDINAL JOINT AT THE MIDPOINT.
3. INSTALL 3" PVC WEEP HOLE PIPES IN SIDEWALKS WHERE SHOWN ON PLANS, AND WHEN ALLOWED BY DESIGN EXCEPTION. PLACE CONTRACTION JOINT OVER THE TOP OF THE PIPE. SEE CITY STANDARD FOR WEEP HOLE DETAIL.
4. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.

↓
SLOPE 1.5% MAX. (MAX. 2.0%
FINISHED SURFACE SLOPE)
(NORMAL SIDEWALK CROSS SLOPE)



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SIDEWALK OBSTRUCTIONS

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DATE: 6/3/2021

DESN: MCH

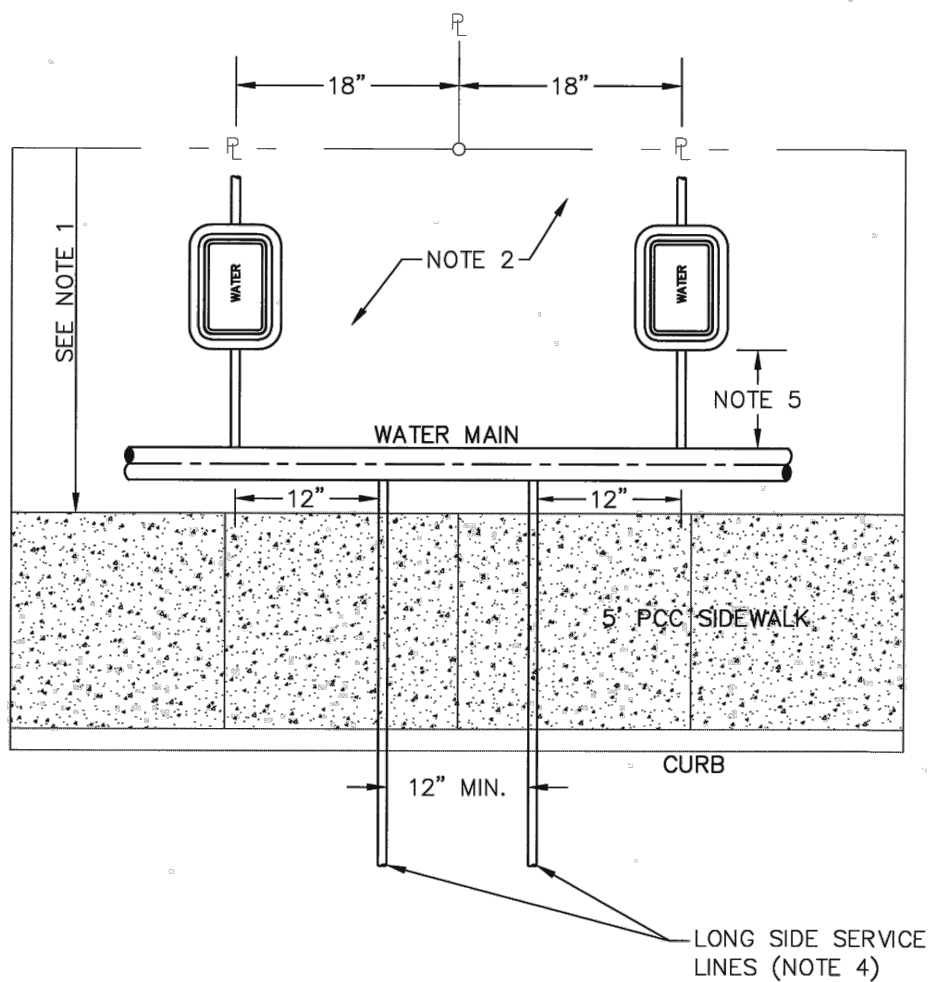
R-016

Bar Measures 1 inch

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GENERAL NOTES:

1. NORMALLY 2.5' FOR LOCAL STREETS.
2. AREA BETWEEN METERS TO REMAIN CLEAR TO PERMIT INSTALLATION OF STREET LIGHT POLES.
3. WATER MAIN LOCATION MAY VARY.
4. TAP LONG SIDE SERVICE BETWEEN SHORT SIDE SERVICES AS SHOWN.
5. SET METER BOX AS CLOSE TO BACK OF WALK AS PRACTICAL.
6. SEE STANDARD DRAWING W-003 FOR SERVICE DETAILS.



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TYPICAL WATER METER LOCATION

PROJ: 200-166682-20001

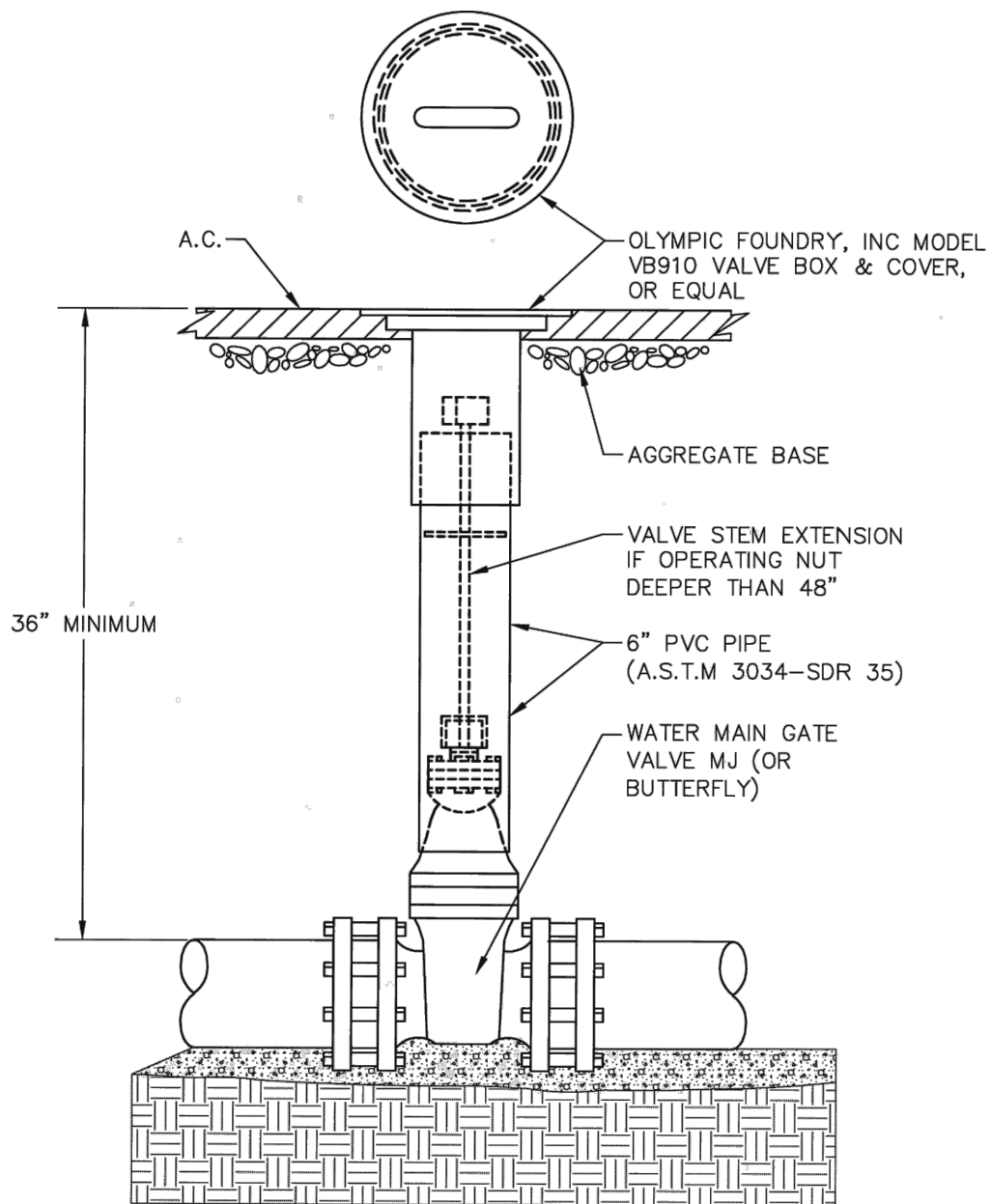
DATE: 6/3/2021

DESN: MCH

W-001

Bar Measures 1 inch

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WATER VALVE BOX DETAIL

PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

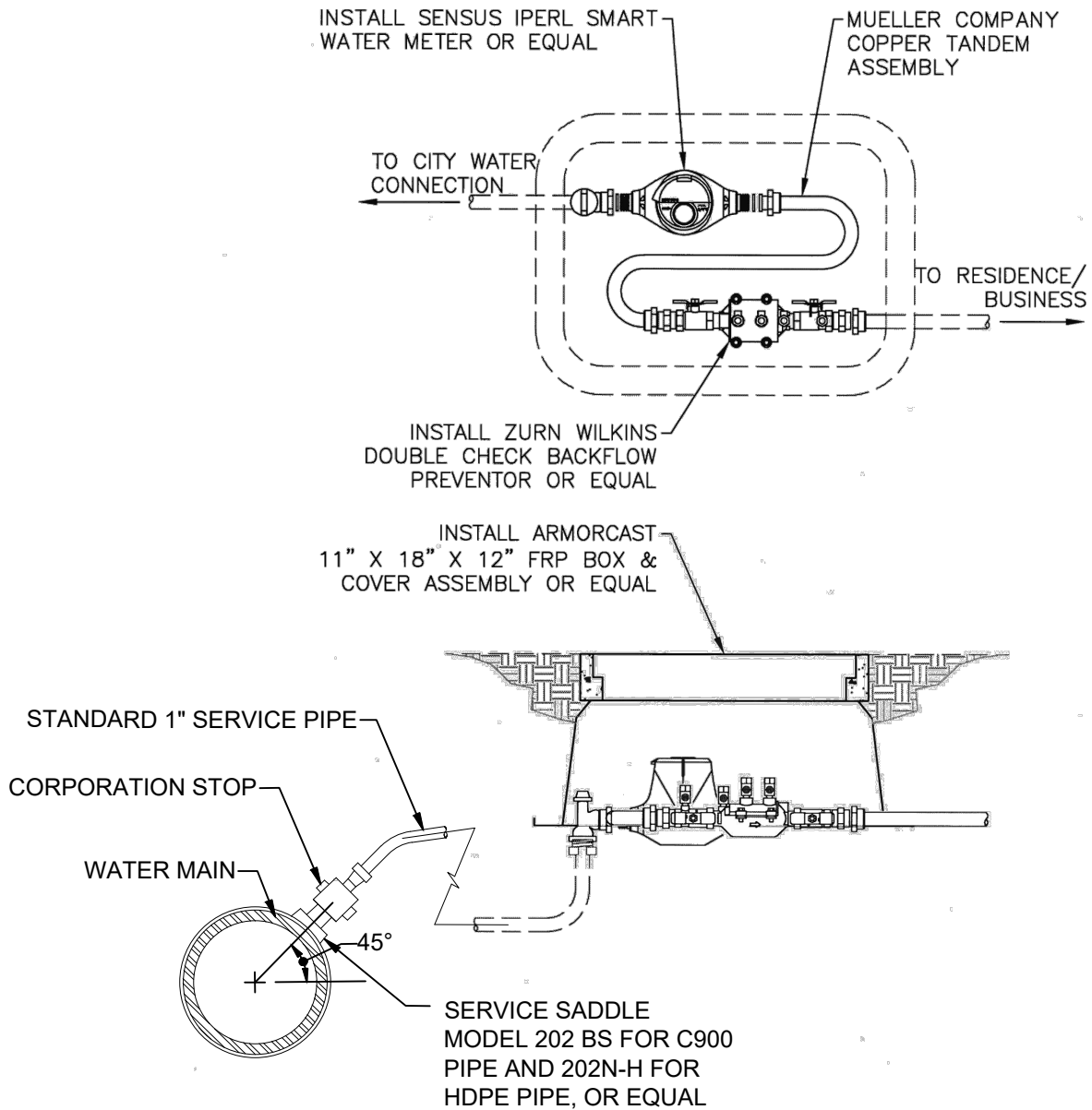
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Bar Measures 1 inch

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NOTES:

1. METER, BACKFLOW PREVENTER AND TAIL PIECE SUPPLIED AND INSTALLED BY CITY.



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1" WATER SERVICE DETAIL

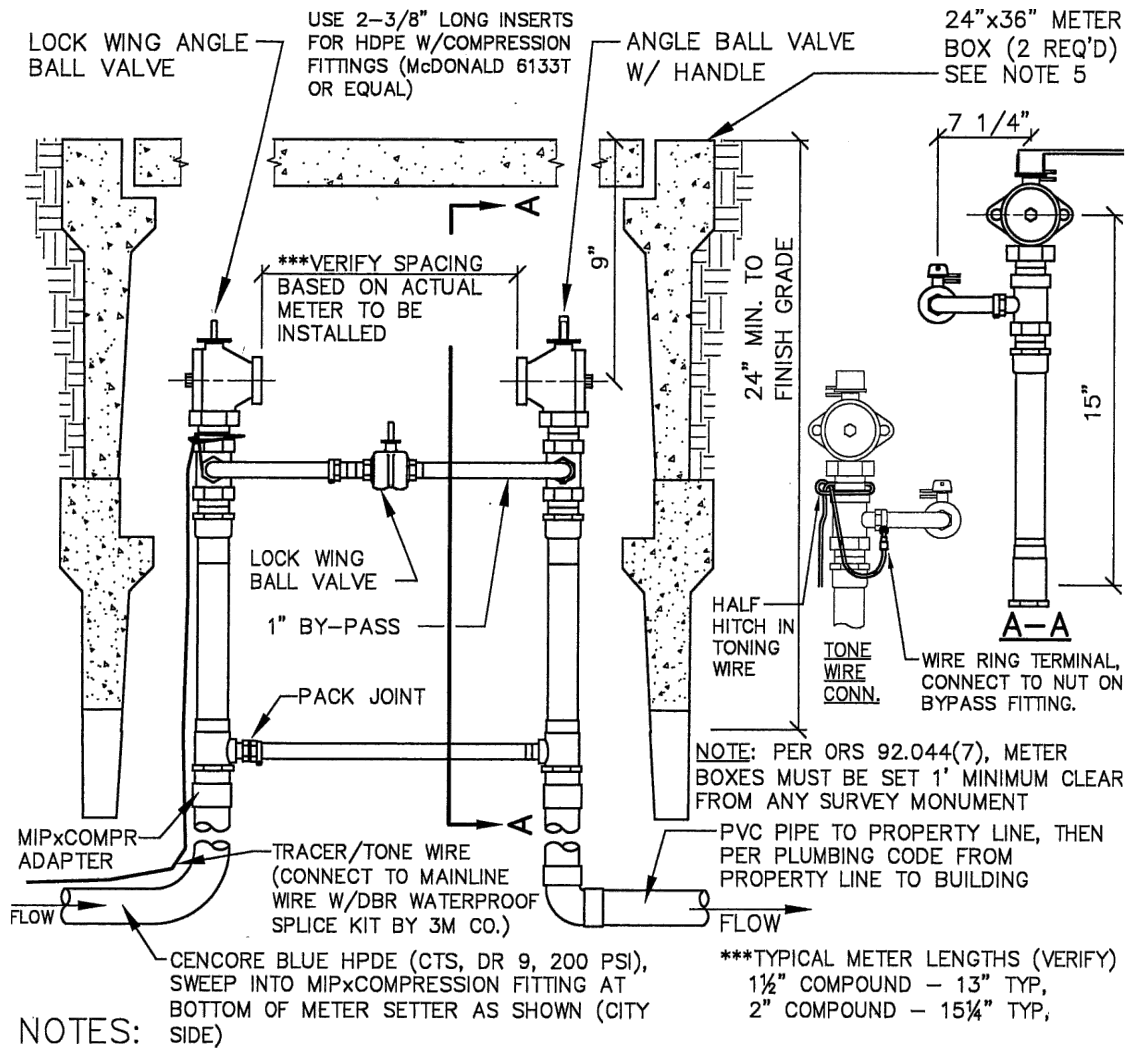
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-003

Bar Measures 1 inch



NOTES:

- METERSET TO BE FORD 80 SERIES COPPERSETTER, #VBB86-15HB-11-66 (1 1/2") OR #VBB87-15HB-11-77 (2") WITH RAISED LOCKING BYPASS OR APPROVED EQUAL.
- SUBSTITUTES FOR MATERIALS SHOWN SHALL BE APPROVED BY PUBLIC WORKS DIRECTOR.
- ALL PIPE AND BACKFILL ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 92% OPTIMUM DENSITY PER AASHTO T-180.
- SET FRONT OF METER BOX 3-INCHES BEHIND SIDEWALK LOCATION. NO METERS ON PRIVATE PROPERTY WITHOUT A RECORDED EASEMENT.
- METER BOX SHALL BE CENTERED OVER THE COMPLETED METER ASSEMBLY. ARMORCAST POLYMER CONCRETE METER BOX WITHOUT MOUSE HOLES (24"x36") -A6001974PCX12 W/A6001975T LID
- COPPERSETTER, METER BOX, & ALL FITTINGS PROVIDED BY CONTRACTOR. CONTRACTOR TO VERIFY DIMENSIONS & CLEARANCE BASED ON ACTUAL METER TO BE PROVIDED BY THE CITY. WATER METER INSTALLED BY CONTRACTOR UNDER CITY INSPECTION & APPROVAL.
- SEE DETAIL W-005 FOR TAPPING REQUIREMENTS.
- THREADED FEMALE PVC FITTINGS ARE NOT ALLOWED.**
- FAR SIDE COMMERCIAL SERVICES SHALL BE INSTALLED IN A 4" MIN DIA SCHED 40 PVC SLEEVE WHICH BEGINS 2' FROM MAIN AND EXTENDS TO BACK OF FAR SIDE SIDEWALK.



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1-1/2" AND 2" METER SET W/1"
HIGH BYPASS (HDPE SERVICE LINE)

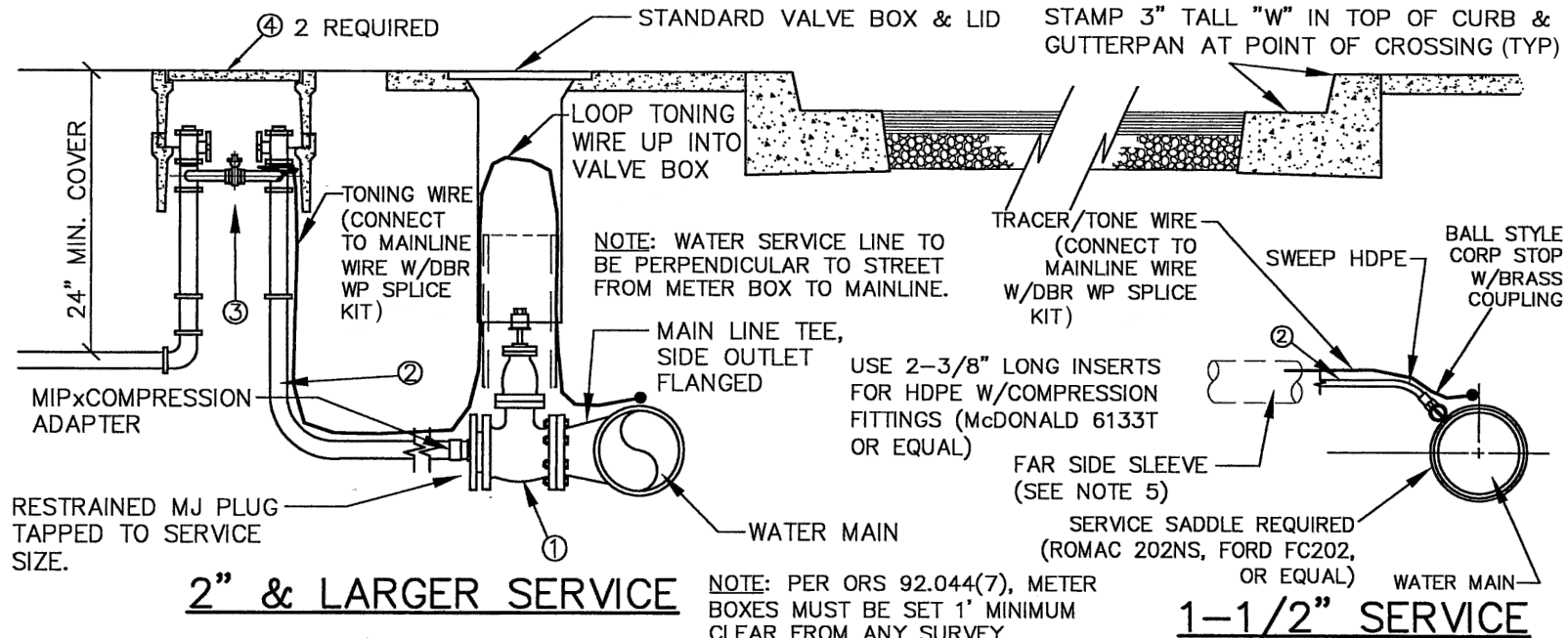
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-004

Bar Measures 1 inch



MATERIALS

- ① FLG X MJ RESILIENT WEDGE GATE VALVE PER AWWA C-509. 4" DIA. OR SERVICE SIZE, WHICHEVER IS LARGER. EPOXY COATED PER AWWA C-550.
- ② CENCORE BLUE HDPE (CTS, DR 9, 200 PSI) W/OUT JOINTS PER DETAIL W-004 (30" MIN COVER TO METER). **FEMALE THREADED PVC FITTINGS ARE NOT ALLOWED.**
- ③ METER STOP ASSEMBLY W/BYPASS PER PUBLIC WORKS REQUIREMENTS. SEE DETAIL W-004 FOR 1-1/2" & 2" SERVICES.
- ④ METER BOX FOR 1-1/2" AND 2" SHALL BE PER DETAIL W-004 WITHOUT MOUSE HOLES. USE TRAFFIC RATED VERSION OF BOX/LID. METER VAULT FOR LARGER SERVICE SHALL BE PER PUBLIC WORKS REQUIREMENTS.

NOTES

1. SUBSTITUTES FOR ANY MATERIAL SHOWN SHALL BE APPROVED BY THE CITY ENGINEER.
2. ALL PIPE AND STRUCTURE ZONES SHALL BE BACKFILLED USING 3/4" MINUS GRANULAR MATERIAL AND COMPACTED TO 95% MAX DENSITY AS DETERMINED BY ASHTO T-180.
3. METER BOX SHALL BE CENTERED OVER THE COMPLETED METER AND FITTING ASSEMBLY.
4. CUSTOMER SHALL INSTALL AN APPROVED BACKFLOW PREVENTION DEVICE ON PRIVATE PROPERTY IMMEDIATELY DOWNSTREAM OF WATER METER IF REQUIRED BY PUBLIC WORKS.
5. FAR SIDE COMMERCIAL SERVICES SHALL BE INSTALLED IN A 4" MIN DIA SCHED 40 PVC SLEEVE WHICH BEGINS 2' FROM MAIN AND EXTENDS TO BACK OF FAR SIDE SIDEWALK.



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TAPPING REQUIREMENTS, 1-1/2" AND
LARGER SERVICE (HDPE SERVICE LINE)

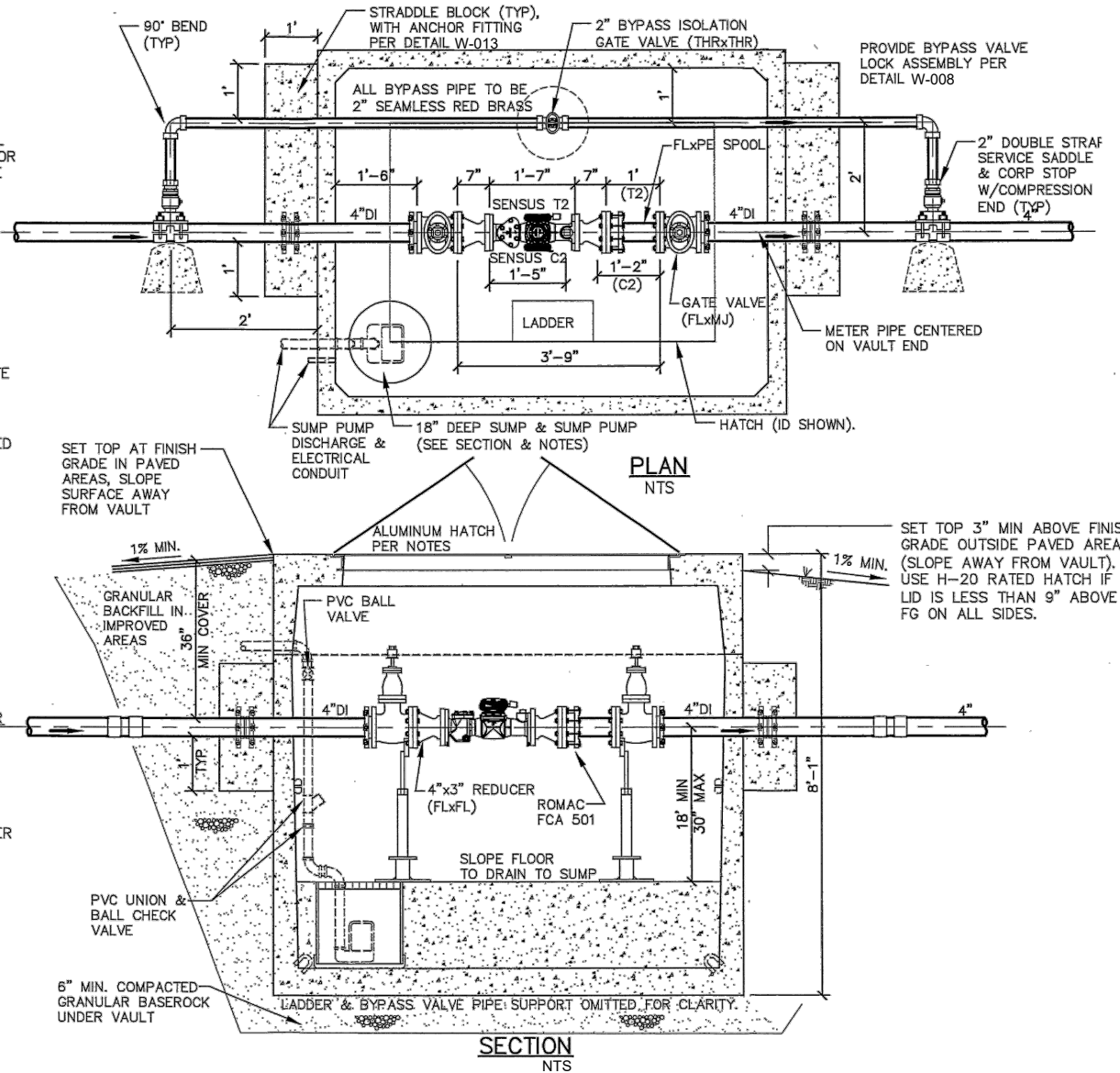
PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

W-005

Bar Measures 1 inch

NOTES:

- METER VAULT & PIPING SHALL CONFORM TO REQUIREMENTS OF ALL PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
- METER VAULT SHALL BE PLACED WITHIN RIGHT-OF-WAY UNLESS OTHERWISE APPROVED (RECORDED EASEMENT TO THE CITY REQUIRED FOR ANY METER ON PRIVATE PROPERTY).
- ALL MATERIALS (EXCEPT THE METER) SHALL BE FURNISHED & INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL INSTALL A TEMPORARY SPACER SPOOL BETWEEN METER ISOLATION VALVES FOR TESTING. THE TEMPORARY SPOOL SHALL MATCH THE LENGTH OF THE ACTUAL METER TO BE PROVIDED BY THE CITY.
- PIPING INSIDE VAULT & THROUGH WALLS TO BE CL 52 DUCTILE IRON, EXCEPT AS OTHERWISE SHOWN.
- METER WILL BE SUPPLIED BY THE CITY, BUT SHALL BE INSTALLED (AFTER PRESSURE & OTHER TESTING OF METER VAULT PIPING) BY THE CONTRACTOR UNDER CITY INSPECTION AND APPROVAL (MOUNT RADIOS READ SENSOR ON HINGE SIDE OF ACCESS HATCH AT CITY APPROVED LOCATION).
- ISOLATION VALVES IN METER VAULT SHALL BE NON-RISING STEM GATE VALVE (EPOXY COATED) WITH 2-INCH SQUARE OPERATING NUT.
- ALL MJ CONNECTIONS (INCLUDING BYPASS LINE FITTINGS) SHALL BE ASSEMBLED WITH RETAINER GLANDS (EBBA MEGA-LUGS OR APPROVED EQUAL).
- ALL PIPE OPENINGS SHALL BE CORE DRILLED (REGARDLESS OF PRESENCE OF 'KNOCKOUTS'), AND SEALED WATERTIGHT WITH NON-SHRINK GROUT.
- PIPE SUPPORTS SHALL BE GALVANIZED STANDON S89 OR APPROVED EQUAL AT EACH ISOLATION AND BYPASS VALVE.
- METER VAULT TO BE UTILITY VAULT 687-WA OR APPROVED EQUAL, CONFORMING WITH ASTM C-857. PROVIDE ALUMINUM ANGLE FRAME HATCH (48"x 72" MIN) BY SYRACUSE CASTINGS WEST OR APPROVED EQUAL (HATCH COVER TOP TO BE SAND BLASTED NON-SLIP).
 - TO BE 300 PSF PEDESTRIAN RATED WHERE LID IS SET MIN. OF 9" ABOVE GRADE.
 - TO BE H-20 RATED IF LID IS LESS THAN 9" ABOVE GRADE, OR IF LOCATED IN TRAFFIC AREA.
- METER VAULT SHALL BE PROVIDED WITH AN OSHA APPROVED GALVANIZED STEEL LADDER AND ALUMINUM LADDER SAFETY EXTENSION. ATTACH TO VAULT WITH STAINLESS STEEL BOLTS.
- CONTRACTOR TO INSTALL SUMP PUMP (5 GPM MIN) WITH 120V POWER SUPPLY, ALONG WITH PRIVATE POWER SOURCE. SUMP PUMP POWER SHALL CONFORM WITH NEC REQUIREMENTS AND BE INSTALLED IN SCHEDULE 40 CONDUIT.
- SUMP PUMP DISCHARGE PIPE SHALL BE 2-INCH SCHEDULE 40 PVC, PROVIDED WITH UNION (FOR PUMP REMOVAL), CHECK VALVE AND ISOLATION BALL VALVE. CONNECT DISCHARGE TO GRAVITY STORM DRAIN OR CURB WEEP HOLE (AT LOCATION APPROVED BY PUBLIC WORKS).
- SUMP TO BE 18" ROUND PVC OR CONCRETE PIPE. PROVIDE FRP SUMP GRATE WITH CUTOUT FOR DISCHARGE PIPING (GRATE TO BE REMOVABLE WITHOUT DISASSEMBLING DISCHARGE PIPING).



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3" DOMESTIC WATER METER

PROJ: 200-166682-20001

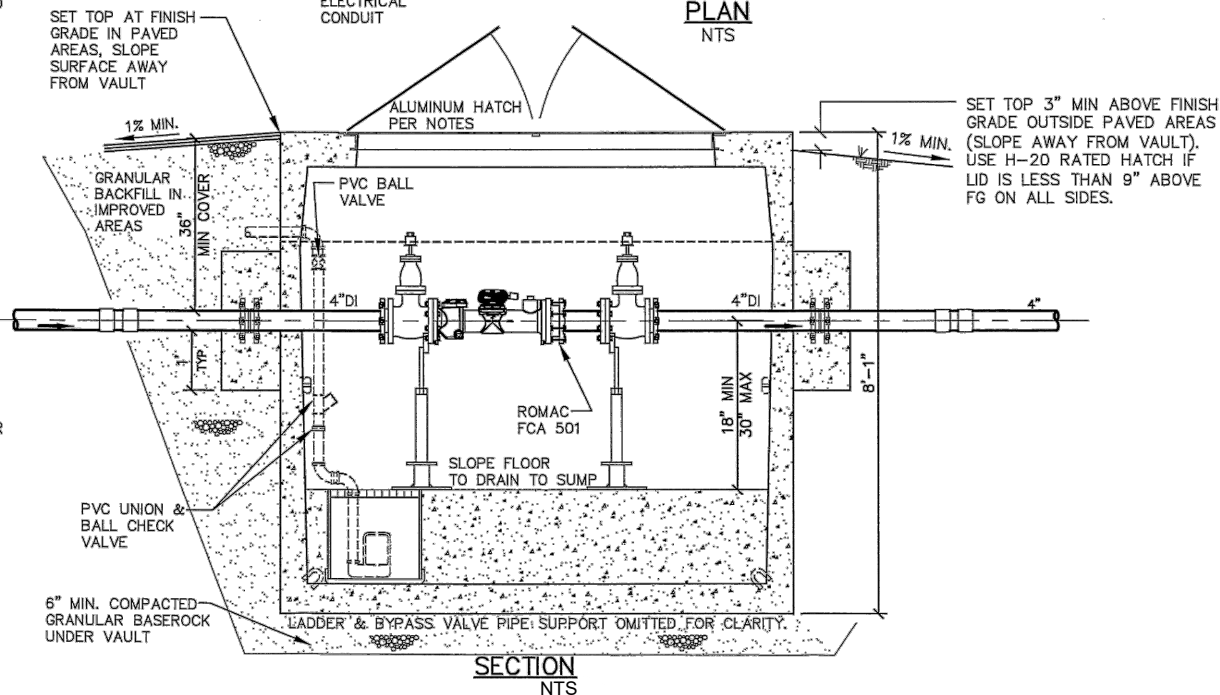
DATE: 6/3/2021

DESN: MCH

W-006

Bar Measures 1 inch

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4" DOMESTIC WATER METER

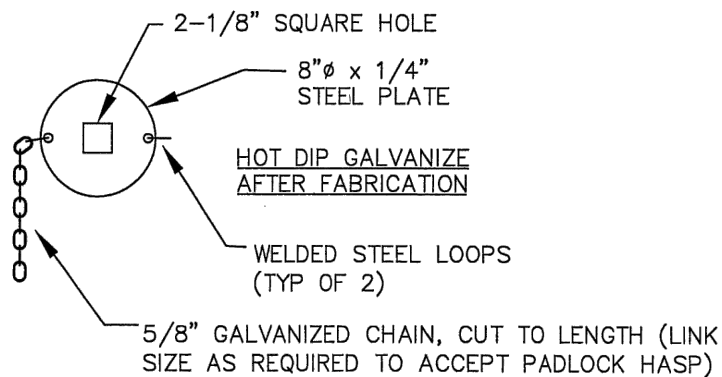
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DATE: 6/3/2021

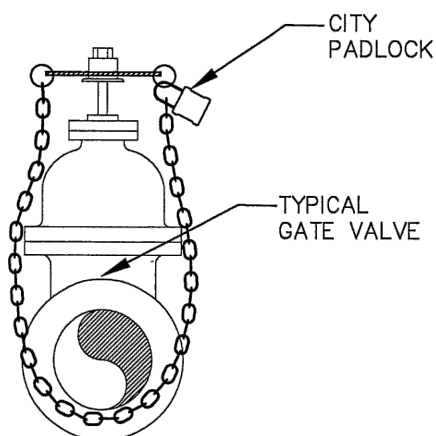
DESN: MCH

W-007

Bar Measures 1 inch



TOP VIEW



SIDE VIEW

NOTES:

1. UNLESS OTHERWISE REQUIRED BY PUBLIC WORKS, PROVIDE ONE LOCK ASSEMBLY PER VAULT.
2. VALVE LOCK ASSEMBLY TO BE HOT DIP GALVANIZED AFTER FABRICATION.



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WATER METER VAULT
BYPASS VALVE LOCK

PROJ: 200-166682-20001

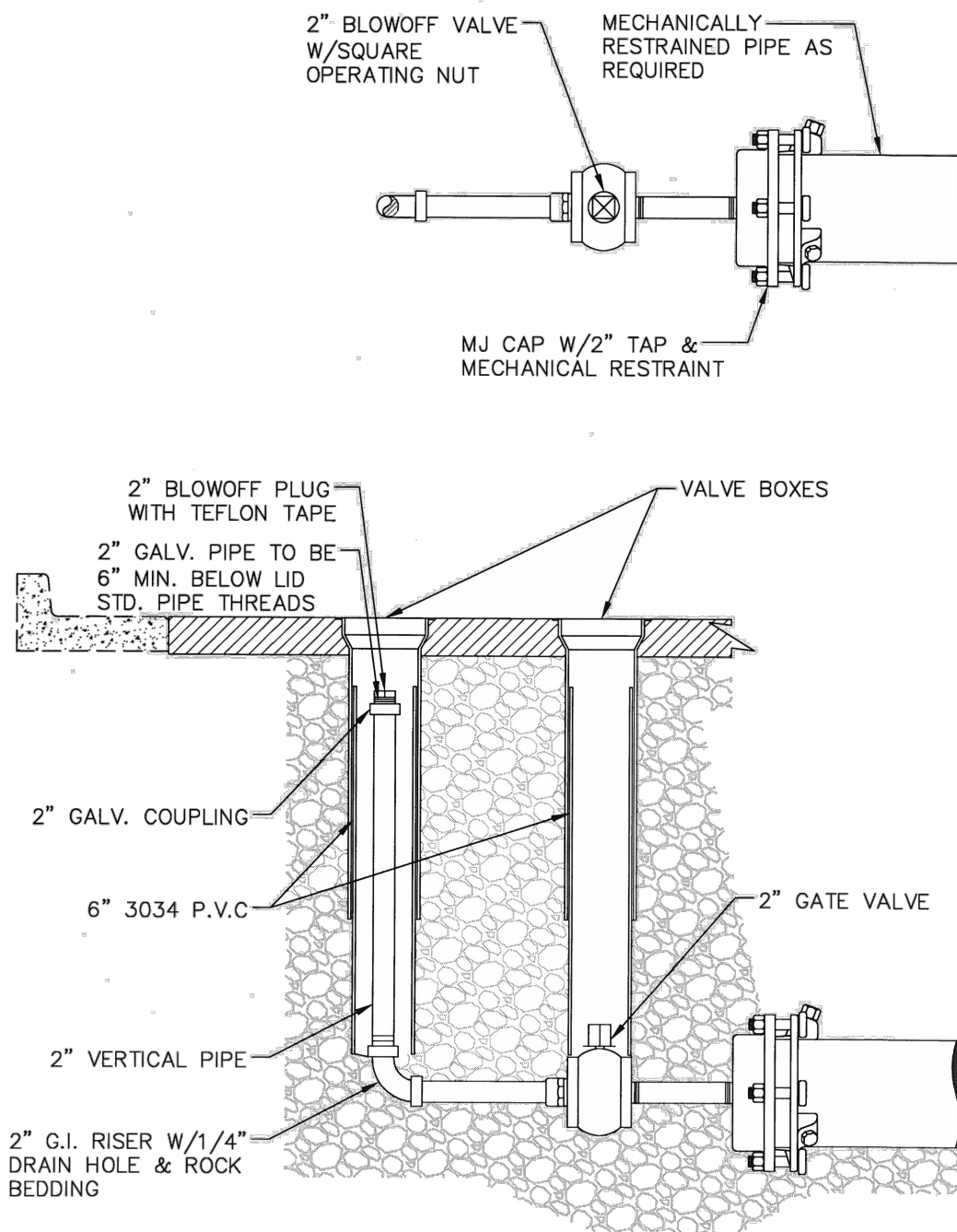
DATE: 6/3/2021

DESN: MCH

W-008

Bar Measures 1 inch

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STANDARD BLOWOFF DETAIL

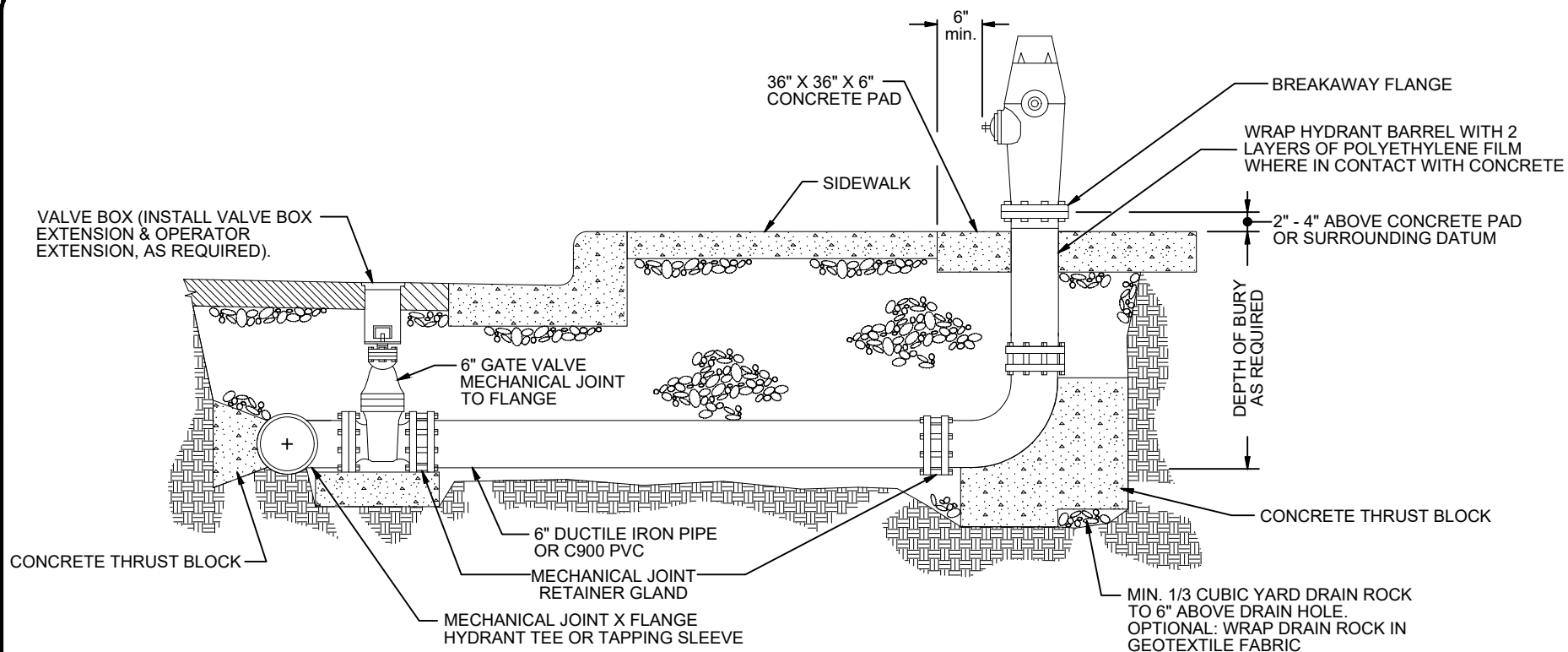
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-009

Bar Measures 1 inch



GENERAL NOTES:

- HYDRANTS ARE TO BE WATEROUS 5-1/4" PACER TRAFFIC MODEL WB67 AS MANUFACTURED BY AMERICAN FLOW OR EQUAL.
- ONE 5 1/4" PUMPER WITH A 4-1/2" BRONZE STEAMER PORT WITH STORZ ADAPTER WITH CAP. HYDRANT PUMPER PORT SHALL FACE DIRECTION OF ACCESS.
- TWO 2-1/2" BRASS HOSE NOZZLES WITH CAST IRON CAPS.
- WHEN PIPE IS SHORTER THAN 18', NO JOINTS ALLOWED. USE MECHANICAL JOINT RETAINER GLANDS.
- THERE SHALL BE A MINIMUM OF 18" HORIZONTAL CLEARANCE AROUND HYDRANT.
- WHEN PLACED ADJACENT TO CURB, HYDRANT PORT SHALL BE 24" FROM FACE OF CURB.
- CONCRETE THRUST BLOCKS SHALL BE CONSTRUCTED AS PER THRUST BLOCK STANDARD DRAWING. DO NOT BLOCK DRAIN HOLES.
- EXTENSIONS REQUIRED FOR HYDRANT SYSTEMS SHALL BE INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS.
- HYDRANTS SHALL BE PLACED TO PROVIDE A MINIMUM OF 5' CLEARANCE FROM DRIVEWAYS, POLES, AND OTHER OBSTRUCTIONS.
- SET HYDRANT PLUMB IN ALL DIRECTIONS.
- SEE PROJECT PLANS FOR DETAILS NOT SHOWN.



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HYDRANT ASSEMBLY

PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-010

Bar Measures 1 inch

MINIMUM REQUIRED RESTRAINED LENGTH (FEET) FOR PVC PIPE ON EACH SIDE OF THE FITTING

Test Pressure 150 psi, min 36" cover. Adjust accordingly for alternative test pressures.

Pipe Size	Sand/Silt (SM)					Sand/Clay (SC)				
	11-1/4°	22-1/2°	45°	90°	Valve/ Plug	11-1/4°	22-1/2°	45°	90°	Valve/ Plug
4	3	4	8	16	36	3	4	6	13	26
6	3	6	10	22	48	3	6	8	18	34
8	4	8	12	28	64	4	7	10	24	46
10	6	9	14	34	76	5	9	12	28	54
12	7	10	16	38	88	6	11	14	32	64

On all pipelines where joint locations are unknown, restraint must be developed with concrete thrust blocking. Thrust blocks shall be minimum 3,000 psi commercial concrete. Thrust blocking shall be poured against undisturbed earth in accordance with the following tables:

CONCRETE THRUST BLOCKING (HORIZONTAL)

		THRUST (T) AT FITTINGS IN LBS				
		A	B	C	D	E
PIPE DIA.	TABLE PRESSURE PSI	TEE & DEAD ENDS	90 DEG BEND	45 DEG BEND	22.5 DEG BEND	11.25 DEG BEND
4"	250	3140	4440	2405	1225	615
6"	250	7070	9995	5410	2760	1385
8"	250	12565	17770	9620	4905	2465
10"	250	19635	27770	15030	7660	3850
12"	250	28275	39985	21640	11030	5545
14"	250	38485	54425	29455	15015	7545
16"	250	50265	71085	38470	19615	9855

SOIL TYPE	SOIL BEARING CAPACITY (B) IN PSF
MUCK, PEAT, ECT.	0
SOFT CLAY	1000
SAND	2000
SAND AND GRAVEL	3000
SAND AND GRAVEL CEMENTED WITH CLAY	4000
HARD SHALE	10,000

CONCRETE BLOCKING FOR CONVEX VERTICAL BENDS

DIMENSION TABLE						
PIPE DIA. in.	TABLE PRESSURE PSI	BEND ANGLE (DEG)	CONCRETE VOLUME (cy)	CUBE SIZE (ft)	STIRRUP DIA. (in)	STIRRUP EMBMT. (in)
4"	250	11.25	0.21	1.8	5/8	17
		22.5	0.43	2.3		
		45	0.77	2.8		
6"	250	11.25	0.48	2.4	5/8	17
		22.5	0.95	3.0		
		45	1.79	3.6		
8"	250	11.25	0.86	2.9	5/8	17
		22.5	1.65	3.5		
		45	3.22	4.4		
10"	250	11.25	1.39	3.3	5/8	17
		22.5	2.62	4.1		
		45	4.97	4.1		
12"	250	11.25	1.94	3.7	5/8	17
		22.5	3.91	4.7		
		45	6.89	5.7		
14"	250	11.25	2.62	4.1	5/8	17
		22.5	5.26	5.2		
		45	9.70	6.4		
16"	250	11.25	3.44	4.5	5/8	17
		22.5	6.89	5.7		
		45	12.63	7.0		



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MINIMUM REQUIRED RESTRAINED LENGTH

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DESN: MCH

W-011

Bar Measures 1 inch

DETERMINATION OF THRUST BLOCK BEARING AREA:

WHEN THRUST BLOCK BEARING AREA IS NOT SPECIFIED ON THE PLANS OR DETERMINED BY THE ENGINEER, USE THE FOLLOWING PROCEDURE TO DETERMINE REQUIRED BEARING AREA.

1. DETERMINE THRUST (T) FOR TYPE OF FITTING OR JOINT AND SIZE OF PIPE FROM TABLE.
2. DETERMINE DESIGN (TEST) PRESSURE FROM STANDARD SPECIFICATIONS OF SPECIAL PROVISIONS.
3. DETERMINE TABLE PRESSURE FROM TABLE.
4. DETERMINE SOIL BEARING CAPACITY (B) OF SOIL FROM TABLE.
5. DETERMINE REQUIRED BEARING AREA (A) IN SQ. FT. AS FOLLOWS:

$$A = \left(\frac{T}{B} \right) \left(\frac{\text{DESIGN (TEST) PRESSURE}}{\text{TABLE PRESSURE}} \right)$$

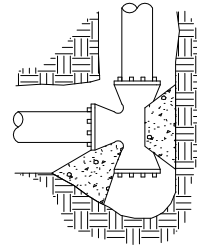
EXAMPLE: DESIGN (TEST) PRESSURE = 150 PSI
PIPE = 14"
FITTING = TEE
SOIL = SAND

FROM TABLE, T = 38485 LBS
FROM TABLE, B = 2000 PSF

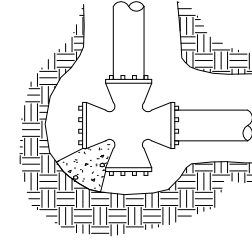
$$A = \left(\frac{38485}{2000} \right) \left(\frac{150}{250} \right) = 11.55 \text{ sq ft}$$

GENERAL NOTES:

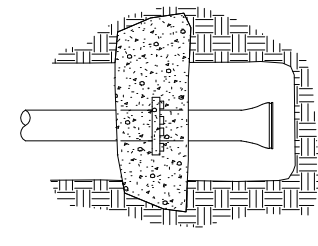
1. CONTRACTOR TO PROVIDE BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE.
2. DRIVE THRUST BY SAFE BEARING LOAD TO DETERMINE REQUIRED BEARING AREA (A IN SQ.FT.) OF CONCRETE TO DISTRIBUTE LOAD.
3. ADJUST BEARING AREAS (A) FOR OTHER PRESSURE CONDITIONS. (SEE "DETERMINATION OF THRUST BLOCK BEARING AREA" EQUATION).
4. POUR CONCRETE BLOCKING AGAINST UNDISTURBED EARTH.
5. ALL CONCRETE TO BE 3000 PSI MINIMUM.
6. WRAP PIPE AND/OR FITTINGS WITH 2 LAYERS OF POLYETHYLENE FILM WHERE IN CONTACT WITH CONCRETE.
7. KEEP CONCRETE CLEAR OF ALL JOINTS AND ACCESSORIES.
8. STIRRUPS SHALL BE DEFORMED GALVANIZED COLD ROLLED STEEL AASHTO M31 (ASTM A615), GRADE 420. COAT WITH COAL TAR EPOXY AFTER INSTALLATION.



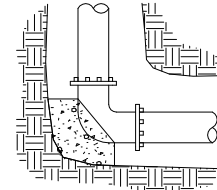
TEE



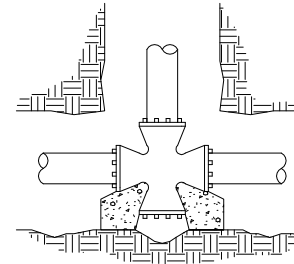
CROSS



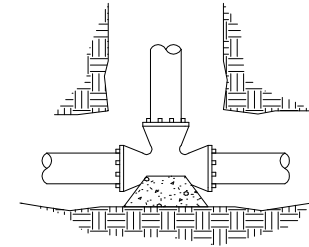
STRADDLE



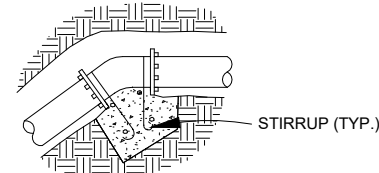
BEND



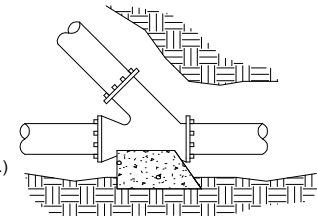
CROSS



TEE



CONVEX
VERTICAL BEND



WYE



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THRUST BLOCKING

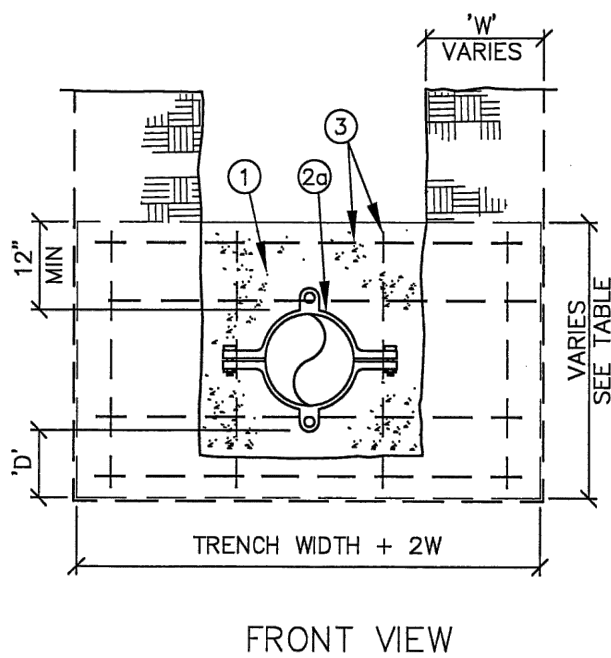
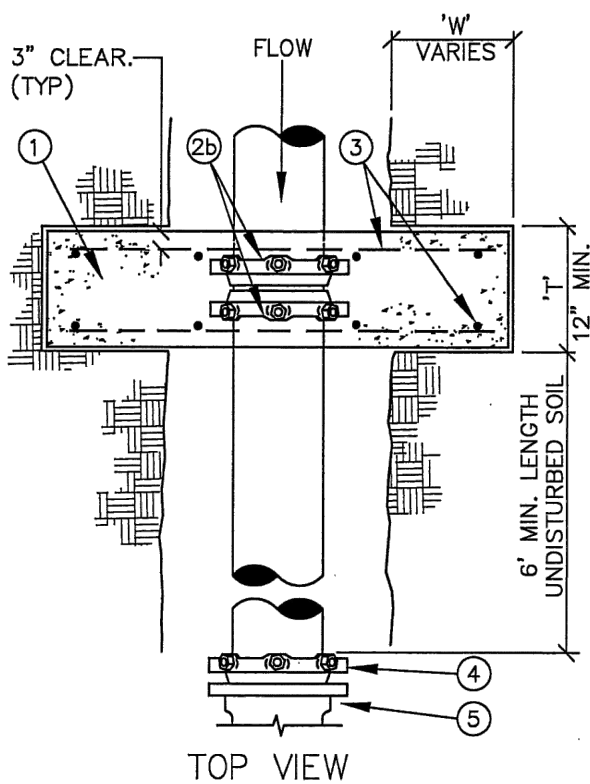
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-012

Bar Measures 1 inch



MATERIALS

- ① CONCRETE STRADDLE BLOCK.
- ② -EITHER (a) ONE SERRATED-LOCK STYLE SPLIT-RING RESTRAINT HARNESS (ROMAC 600 OR EQUAL), OR (b) TWO RETAINER GLAND WEDGE-STYLE RESTRAINTS, SET OPPOSED (EBBA MEGA-LUG OR EQUAL).
- **WEDGE STYLE RESTRAINTS SHALL BE WRAPPED WITH PLASTIC PRIOR TO CONCRETE PLACEMENT.**
- ③ #4 REBAR EA. WAY, 12" O.C.
- ④ RETAINER GLAND.
- ⑤ MJ FITTING, VALVE OR BLOWOFF.

PIPE SIZE	'W'	'D'	'T'
6"	12"	8"	12"
8"	16"	10"	12"
10"	20"	12"	12"
12"	24"	18"	18"
>12"	BY ENGINEER		

NOTES:

1. STRADDLE BLOCKS FOR >12" PIPE SHALL BE DESIGNED INDIVIDUALLY BY THE ENGINEER AND SHALL BE BASED ON THE FOLLOWING:
 - a.) 200 PSI WATER PRESSURE.
 - b.) SOIL BRG. CAPACITY, STEEL SIZE & SPACING BY THE ENGINEER.
2. BEARING AREA OF BLOCK SHALL BE AGAINST UNDISTURBED SOIL.
3. STRADDLE BLOCK SHALL HAVE A MINIMUM OF 18" COVER.
4. CONCRETE SHALL HAVE A MIN. 28 DAY STRENGTH OF 3300 PSI.



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STRADDLE BLOCK FOR
12" AND SMALLER PIPE

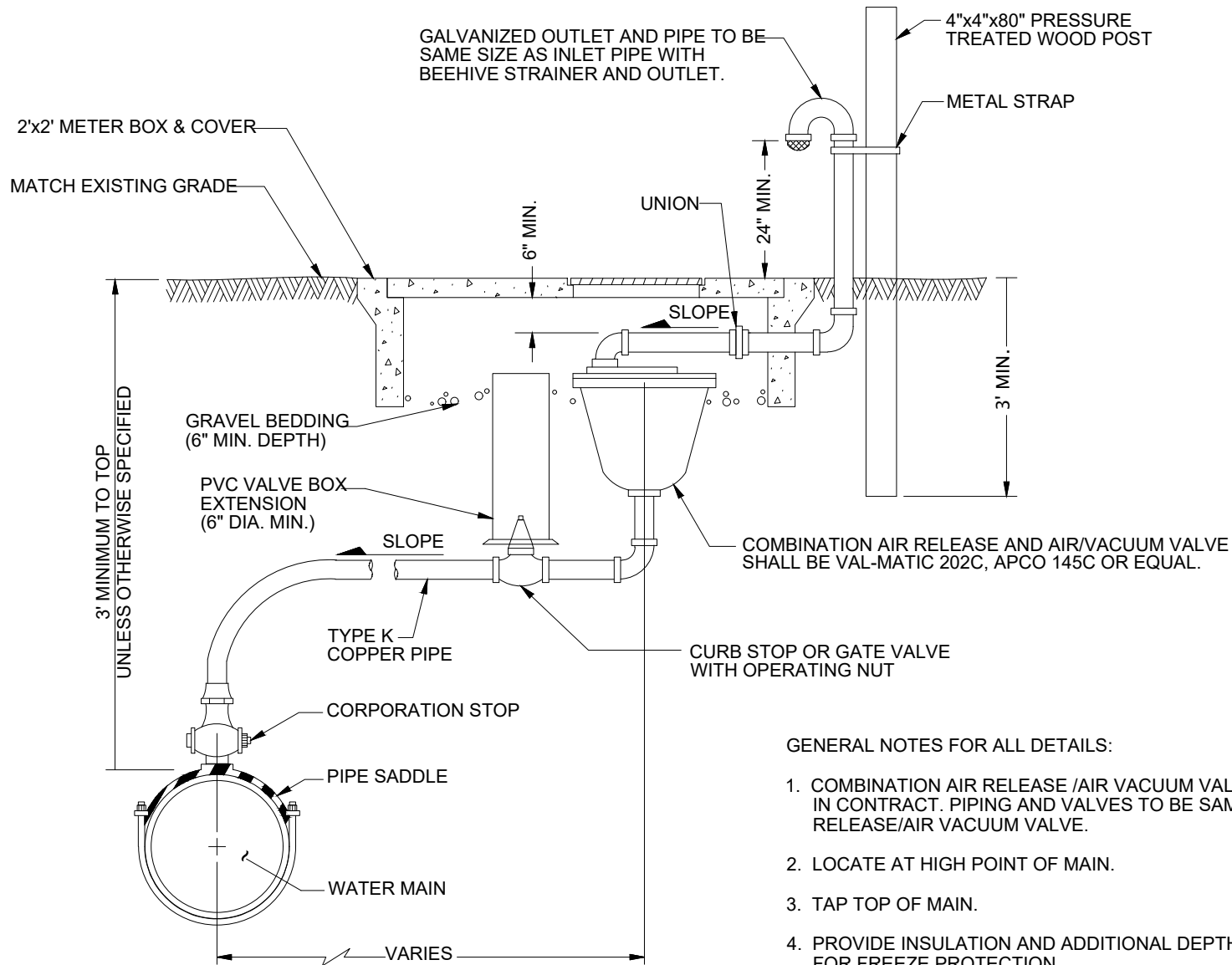
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-013

Bar Measures 1 inch



GENERAL NOTES FOR ALL DETAILS:

1. COMBINATION AIR RELEASE /AIR VACUUM VALVE SHALL BE SIZE SPECIFIED IN CONTRACT. PIPING AND VALVES TO BE SAME SIZE AS COMBINATION AIR RELEASE/AIR VACUUM VALVE.
2. LOCATE AT HIGH POINT OF MAIN.
3. TAP TOP OF MAIN.
4. PROVIDE INSULATION AND ADDITIONAL DEPTH WHEN SPECIFIED FOR FREEZE PROTECTION.
5. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.



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COMBINATION AIR RELEASE
AIR VACUUM VALVE ASSEMBLY
(2" AND SMALLER)

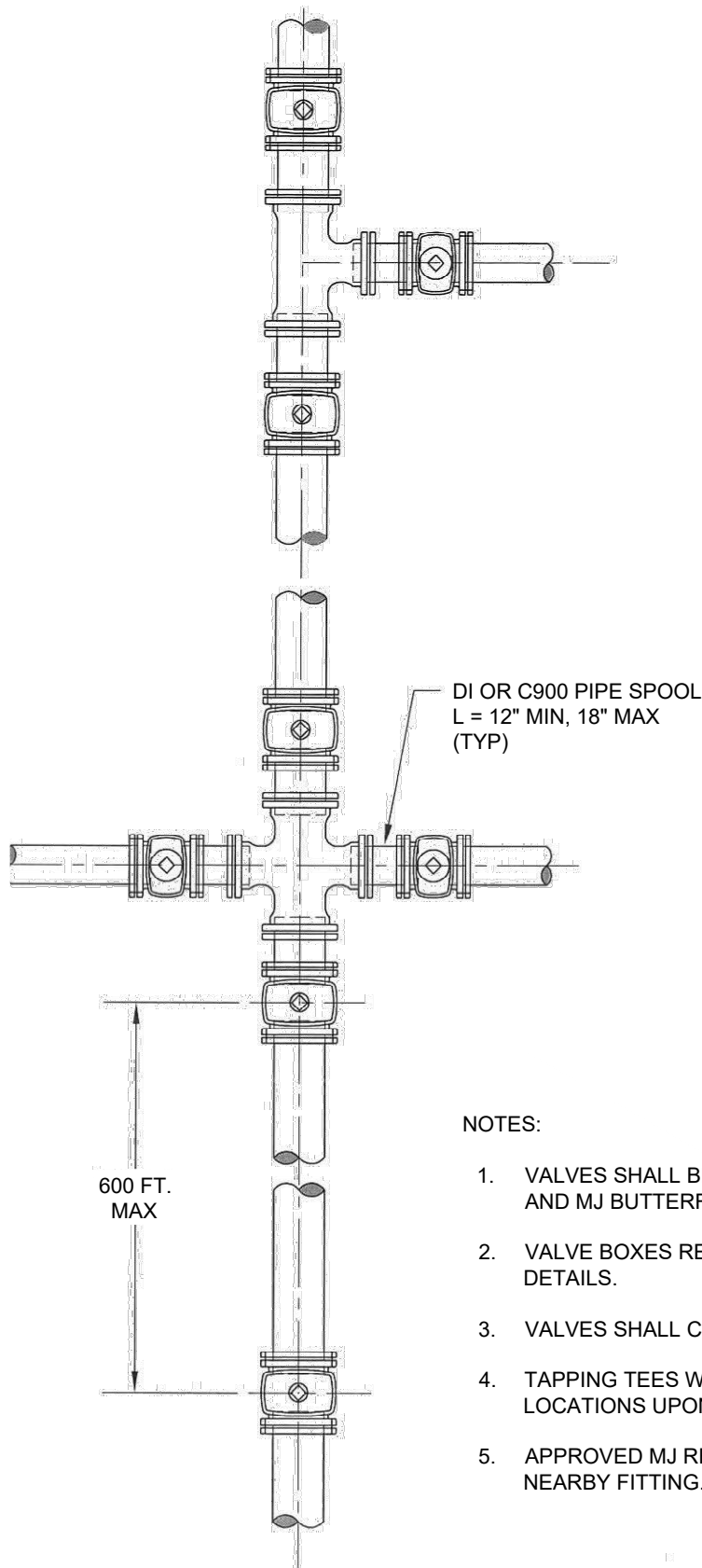
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-014

Bar Measures 1 inch



NOTES:

1. VALVES SHALL BE MJ GATE VALVES FOR 10" AND SMALLER AND MJ BUTTERFLY VALVES FOR 12" AND LARGER.
2. VALVE BOXES REQ'D AT EACH VALVE. SEE APPROPRIATE DETAILS.
3. VALVES SHALL CONFORM TO CITY STANDARDS.
4. TAPPING TEES WITH VALVE MAY BE USED AT SOME LOCATIONS UPON PRIOR APPROVAL.
5. APPROVED MJ RESTRAINT GLANDS REQ'D AT EACH VALVE AND NEARBY FITTING.



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TYPICAL WATER VALVE
LOCATIONS (MINIMUM)

PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-015

Bar Measures 1 inch

5/17/2021 7:46:10 AM - O:\PROJECTS\PORTLAND\166682-20001\DOCS\DESIGN STANDARDS UPDATE\CAD\SHEETFILES\W-016.DWG - LOWRY, MADILYN

PAD MOUNTED FIBERGLASS INSULATED ENCLOSURE W/HEATER, HOT BOX MODEL AS SHOWN ON TABLE (OR APPROVED EQUIVALENT). ANCHOR ENCLOSURE TO CONCRETE PAD PER MANUFACTURER'S REQUIREMENTS.

RPBA DIAMETER	HOT BOX MODEL
1"	HB1
1½"	HB1
2"	HB1.5

NOTE: VERIFY HB SIZE FOR OTHER MODEL RPBA DEVICES.

ELECTRICAL RECEPTICAL FOR HEAT TAPE (GFI). PROVIDE HEAT TAPE OR ENCLOSURE HEATER FOR ALL ABOVE GRADE PIPING. MOUNT RECEPTACLE 18" ABOVE SLAB ON TOP OF RIGID CONDUIT OR ON UNI-STRUT.

REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) MFR'D BY FEBCO, MODEL 825YA (OR APPROVED EQUAL)

DO NOT OBSTRUCT ENCLOSURE OPENINGS (TYP)

SCH 80 PVC PIPE, TYPICAL BOTH VERTICAL RISERS

12" MIN
TYP
(ALL WAYS)

12" MIN

4" CONCRETE PAD

SURFACE PER PLAN SLOPE TO DRAIN

3" PIPE SLEEVE FIELD LOCATE (TYP 2)

ELECTRICAL CONDUIT TO POWER SOURCE. COORDINATE AS REQ'D TO PROVIDE 120V POWER.

MIN. 2" COMPACTED GRANULAR BASE/ROCK

COMPACTED SUBGRADE

SCHEDULE 40 PVC FROM WATER SERVICE, SIZE AS SHOWN ON PLANS

SCHEDULE 40 PVC TO BUILDING. SIZE AS SHOWN ON PLANS

NOTES:

1. RPBA- REDUCED PRESSURE BACKFLOW ASSEMBLY.
2. RPBA & VAULT INSTALLATION SHALL MEET STATE OF OREGON, DEPARTMENT OF HUMAN RESOURCES, HEALTH DIVISION REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPBA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY.
4. RPBA & VAULT SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. VAULTS SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON HEIGHT OF REDUCED PRESSURE ASSEMBLY.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE BACKFLOW ASSEMBLY.
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. ALL CONCRETE SHALL HAVE 3,300 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
10. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
11. RPBA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.



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2" AND SMALLER REDUCED PRESSURE
BACKFLOW ASSEMBLY

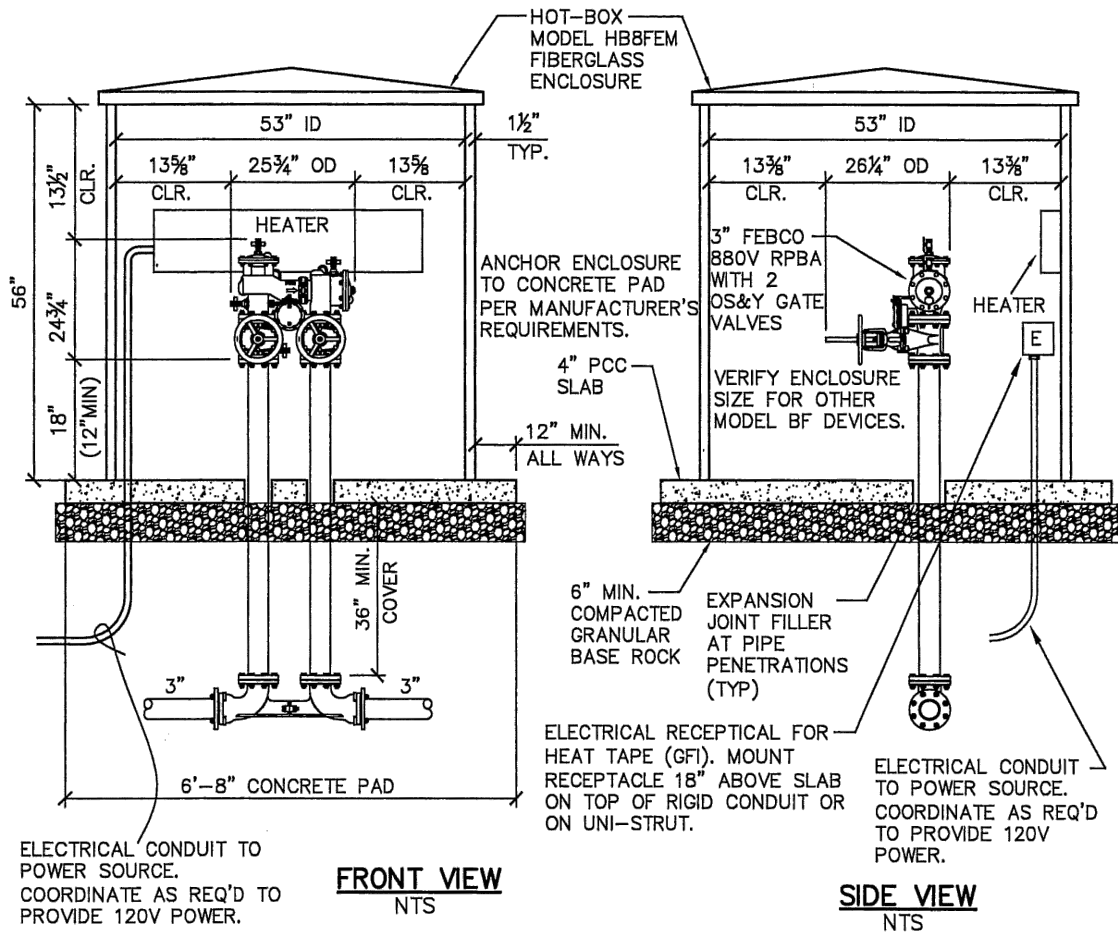
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

W-016

Bar Measures 1 inch



NOTES:

1. RPBA- REDUCED PRESSURE BACKFLOW ASSEMBLY.
2. RPBA & VAULT INSTALLATION SHALL MEET STATE OF OREGON, DEPARTMENT OF HUMAN RESOURCES, HEALTH DIVISION REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPBA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY.
4. RPBA & VAULT SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. VAULTS SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON HEIGHT OF REDUCED PRESSURE ASSEMBLY.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE BACKFLOW ASSEMBLY.
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. ALL CONCRETE SHALL HAVE 3,300 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
10. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
11. RPBA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.
12. FINISH GRADE TO SLOPE AWAY FROM VAULT AT MIN. SLOPE = 2%
13. ENCLOSURE SHALL HAVE A DRAIN TO DAYLIGHT SUFFICIENTLY SIZED FOR RPBA DISCHARGE. OUTLET SHALL BE SCREENED.



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3" REDUCED PRESSURE
ASSEMBLY

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DESN: MCH

W-017

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MODEL NO. HB4E AS
MANUFACTURED BY HOT BOX
(1-800-736-0238)
ANCHOR ENCLOSURE
TO CONCRETE PAD
PER MANUFACTURER'S
REQUIREMENTS.

NOTE: VERIFY VAULT SIZE
FOR OTHER MODEL BF DEVICES.

4" FEBCO 860 REDUCED
PRESSURE ASSEMBLY (OR
APPROVED EQUAL) WITH 2
OS&Y GATE VALVES (TYP)
90° VERT MJ BEND
W/MEGALUGS
(TYP EACH SIDE)

STANDON MODEL S89
FLANGE SUPPORT OR
APPROVED EQUAL (TYP).

6" MIN. COMPACTED
GRANULAR BASEROCK

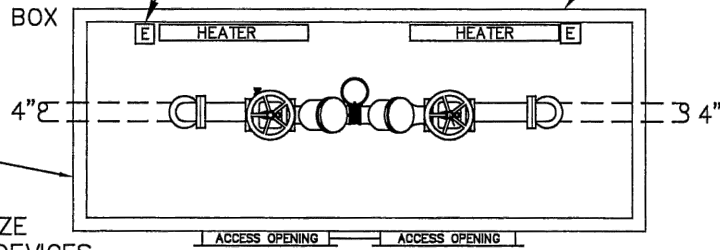
PROVIDE EXPANSION
JOINT FILLER AT PIPE
PENETRATIONS (TYP)

ELECTRICAL CONDUIT TO
POWER SOURCE.
COORDINATE AS REQ'D TO
PROVIDE 120V POWER.

NOTES:

1. RPA- REDUCED PRESSURE ASSEMBLY
2. RPA & VAULT INSTALLATION SHALL MEET STATE OF OREGON, DEPARTMENT OF HUMAN RESOURCES, HEALTH DIVISION REQUIREMENTS.
3. CONTRACTOR SHALL HAVE RPA TESTED AND CERTIFIED PRIOR TO APPROVAL BY THE CITY.
4. RPA & VAULT SHALL CONFORM TO REQUIREMENTS OF PUBLIC/PRIVATE AGENCIES HAVING JURISDICTION.
5. VAULTS SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL OTHER VAULTS OR STRUCTURES.
6. VERIFY ENCLOSURE DIMENSIONS ARE ADEQUATE FOR CLEARANCE BASED ON HEIGHT OF REDUCED PRESSURE ASSEMBLY.
7. ENCLOSURE SHALL BE CENTERED OVER THE COMPLETED REDUCED PRESSURE ASSEMBLY.
8. POWER SHALL BE INSTALLED IN SCHEDULE 40 RIGID CONDUIT PER NEC REQUIREMENTS.
9. 'E' INDICATES THE ELECTRICAL RECEPTACLE. IT SHALL BE MOUNTED A MIN. OF 18" ABOVE THE SLAB.

ELECTRICAL RECEPTICAL (GFI). MOUNT
RECEPTACLE 18" ABOVE SLAB.

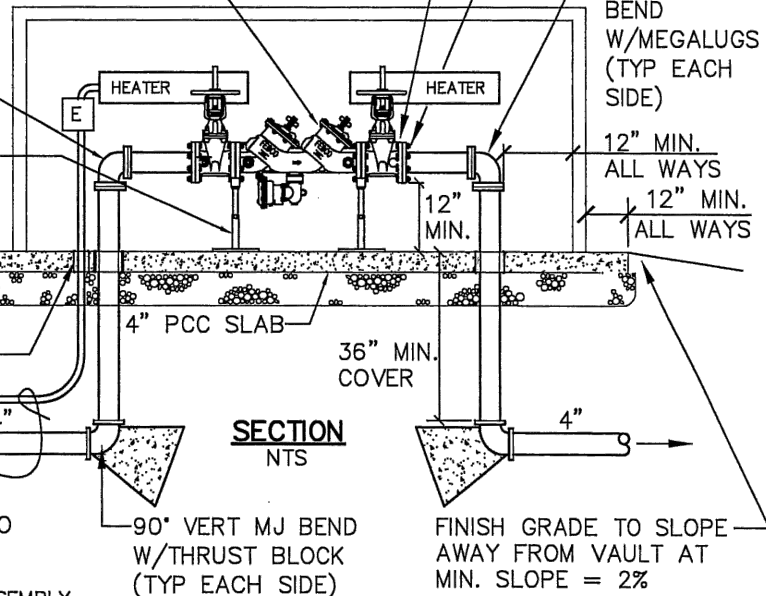


**PLAN
NTS**

OS&Y GATE VALVE (TYP)
MEGAFLANGE
(TYP EACH END)

90° VERT MJ
BEND
W/MEGALUGS
(TYP EACH
SIDE)

12" MIN.
ALL WAYS
12" MIN.
ALL WAYS



**SECTION
NTS**

FINISH GRADE TO SLOPE
AWAY FROM VAULT AT
MIN. SLOPE = 2%

10. ALL CONCRETE SHALL HAVE 3,300 PSI COMPRESSIVE STRENGTH @ 28 DAYS.
11. HOT BOX DRAINAGE OPENINGS SHALL NOT BE OBSTRUCTED BY GRADING OR PLANTINGS.
12. RPA SHALL BE INSTALLED A MIN. OF 12 INCHES ABOVE THE 100-YEAR FLOOD ELEVATION AS DETERMINED BY FEMA.



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4" REDUCED PRESSURE
ASSEMBLY

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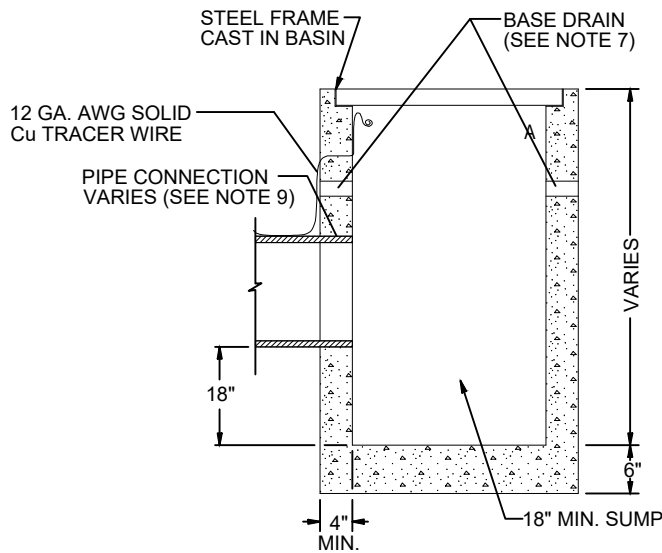
DATE: 6/3/2021

DESN: MCH

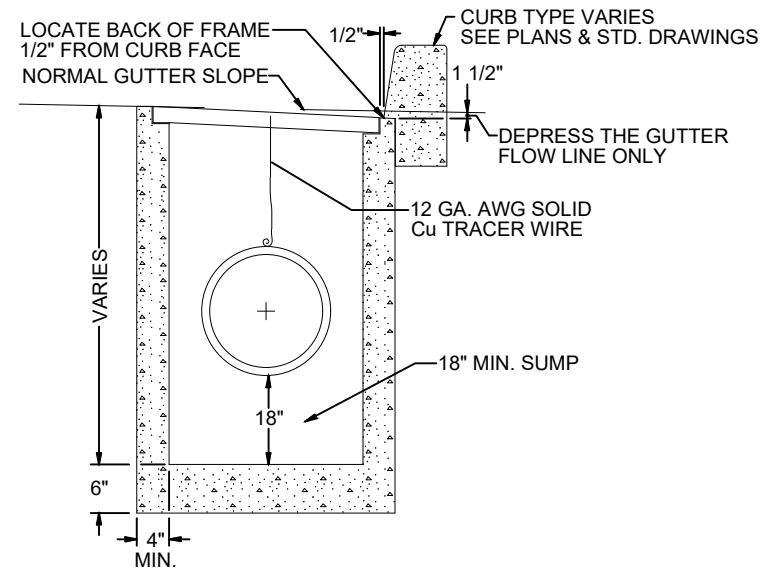
W-018

Bar Measures 1 inch

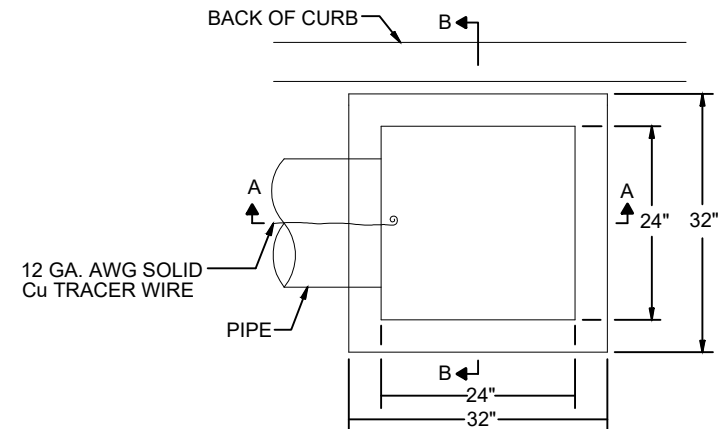
SECTION A-A



SECTION B-B



PLAN



NOTES FOR ALL DETAILS:

1. CATCH BASIN & GRATE SHALL MEET H20 LOADING.
2. ALL PRECAST CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
3. PRECAST WALLS SHALL BE A MINIMUM OF 4" THICK.
4. DEPRESS GUTTER FLOWLINE SEE DWG. CONCRETE INLET.
5. KNOCKOUTS ALLOWED FOR PRECAST OPTION.
6. IF DIRECTED, INSTALL 3" DIA. BASE DRAIN WITH FIELD INSTALLED MESH SCREEN FOR SUBGRADE DRAINAGE.
7. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL.
8. ALL PRECAST INLETS SHALL CONFORM TO REQUIREMENTS OF ASTM C913.
9. SEE STD. DWG. FOR PIPE TO STRUCTURE CONNECTIONS.
10. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.



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STANDARD CATCH BASIN,
FRAME, AND GRATE
1 OF 2

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DESN: MCH

D-001

Bar Measures 1 inch

Technical drawing of a window frame showing dimensions and callouts:

- Vertical dimension: 27 7/8"
- Horizontal dimension: 27 7/8"
- Callout: 1/4" X 1 1/4" X 12" IN MIDDLE OF 2 SIDES
- Callout: 1/4"
- Callout: 3/8"
- Horizontal dimension: 25 5/8"
- Horizontal dimension: 27 7/8"
- Callout: SEE DETAIL "A"

Technical drawing of a window assembly. The drawing shows a cross-section of a window frame and sash. Key dimensions and materials are labeled:

- 3/8" X 2 1/2" X 2" ANGLE**: Points to the top and side frame members.
- 27 7/8"**: Dimension for the width of the frame.
- 3/8"**: Dimension for the thickness of the frame member.
- 2 1/8"**: Dimension for the height of the frame member.
- 2 1/2"**: Dimension for the height of the sash member.
- 1/4" X 1 1/4" X 12" IN MIDDLE OF 2 SIDES**: Points to the sash member.
- 2"**: Dimension for the width of the sash member.
- 1/4"**: Dimension for the thickness of the sash member.

Technical drawing of a rectangular panel with dimensions and tolerances. The panel is divided into a grid of 4 rows and 8 columns of rectangular cells. The overall dimensions are 27 1/2" wide and 27 1/2" high. The drawing includes various tolerances and offsets:

- Top edge: 1 1/8" TYP. (twice), 1 3/16" (center), 1" (twice), 1 1/2" (right edge).
- Right edge: 5 1/4", 1", 5 1/2", 1", 5 1/2", 1", 5 1/4" (from top to bottom).
- Bottom edge: 1 17/32" (left edge), 19/32" (twice), 13 3/4" (twice), 27 1/2" (total width), 1 17/32" (right edge).
- Left edge: 1 17/32" (left edge).

Technical drawing of a rectangular plate. The overall height is 5". The overall width is 32". A central slot is cut into the plate, with a width of 2 1/8" and a depth of 27 7/8".

NOTES FOR ALL DETAILS:

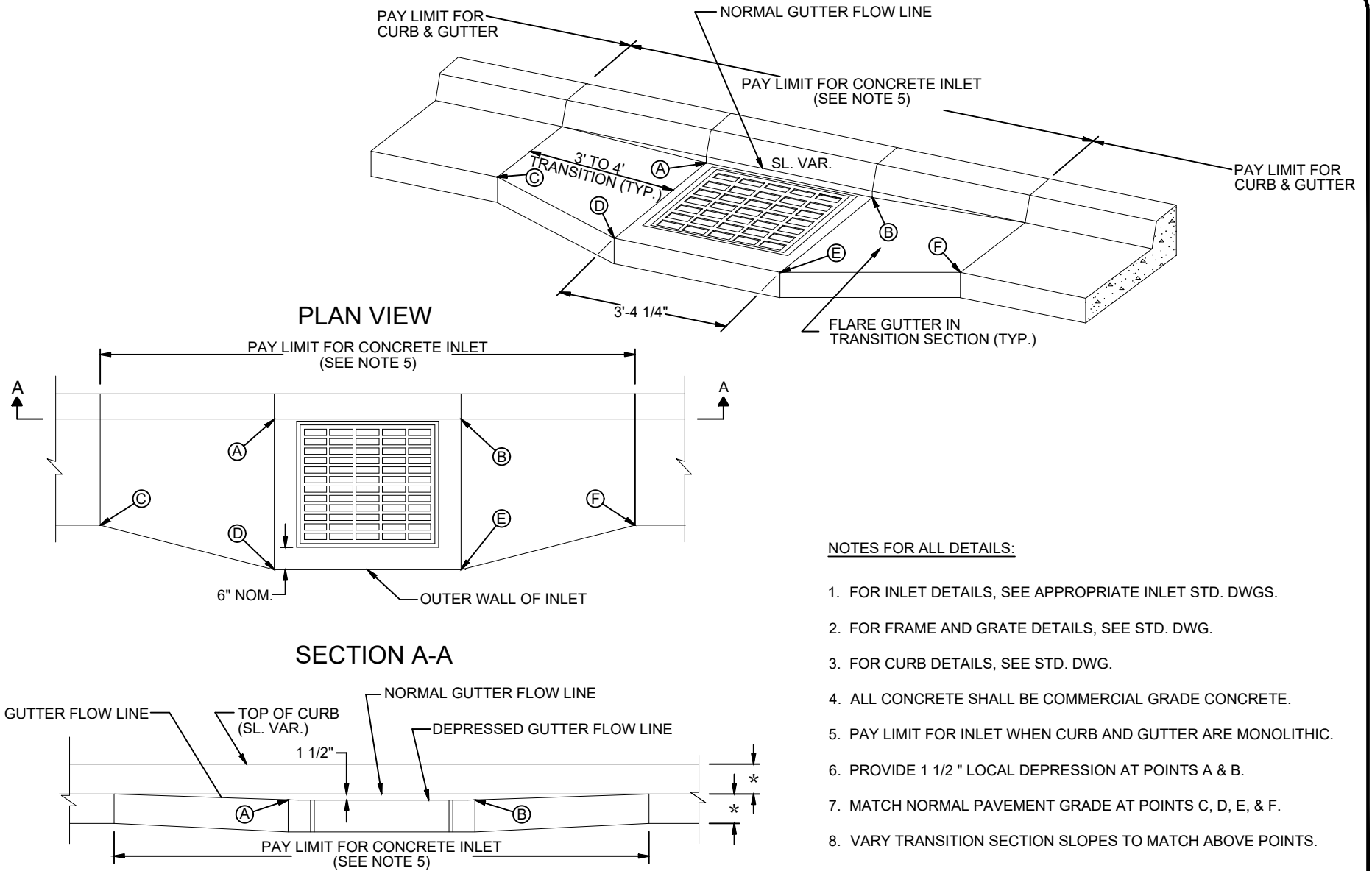
1. CATCH BASIN & GRATE SHALL MEET H20 LOADING.
2. ALL PRECAST CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
3. PRECAST WALLS SHALL BE A MINIMUM OF 4" THICK.
4. DEPRESS GUTTER FLOWLINE SEE DWG. CONCRETE INLET.
5. KNOCKOUTS ALLOWED FOR PRECAST OPTION.
6. IF DIRECTED, INSTALL 3" DIA. BASE DRAIN WITH FIELD INSTALLED MESH SCREEN FOR SUBGRADE DRAINAGE.
7. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL.
8. ALL PRECAST INLETS SHALL CONFORM TO REQUIREMENTS OF ASTM C913.
9. SEE STD. DWG. FOR PIPE TO STRUCTURE CONNECTIONS.
10. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.



STANDARD CATCH BASIN,
FRAME, AND GRATE
2 OF 2

PROJ: 200-166682-20001
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DESN: MCH

D-001



NOTES FOR ALL DETAILS:

1. FOR INLET DETAILS, SEE APPROPRIATE INLET STD. DWGS.
2. FOR FRAME AND GRATE DETAILS, SEE STD. DWG.
3. FOR CURB DETAILS, SEE STD. DWG.
4. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
5. PAY LIMIT FOR INLET WHEN CURB AND GUTTER ARE MONOLITHIC.
6. PROVIDE 1 1/2 " LOCAL DEPRESSION AT POINTS A & B.
7. MATCH NORMAL PAVEMENT GRADE AT POINTS C, D, E, & F.
8. VARY TRANSITION SECTION SLOPES TO MATCH ABOVE POINTS.

* VARIES, SEE NOTE 3



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GUTTER TRANSITION
AT INLET

PROJ: 200-166682-20001

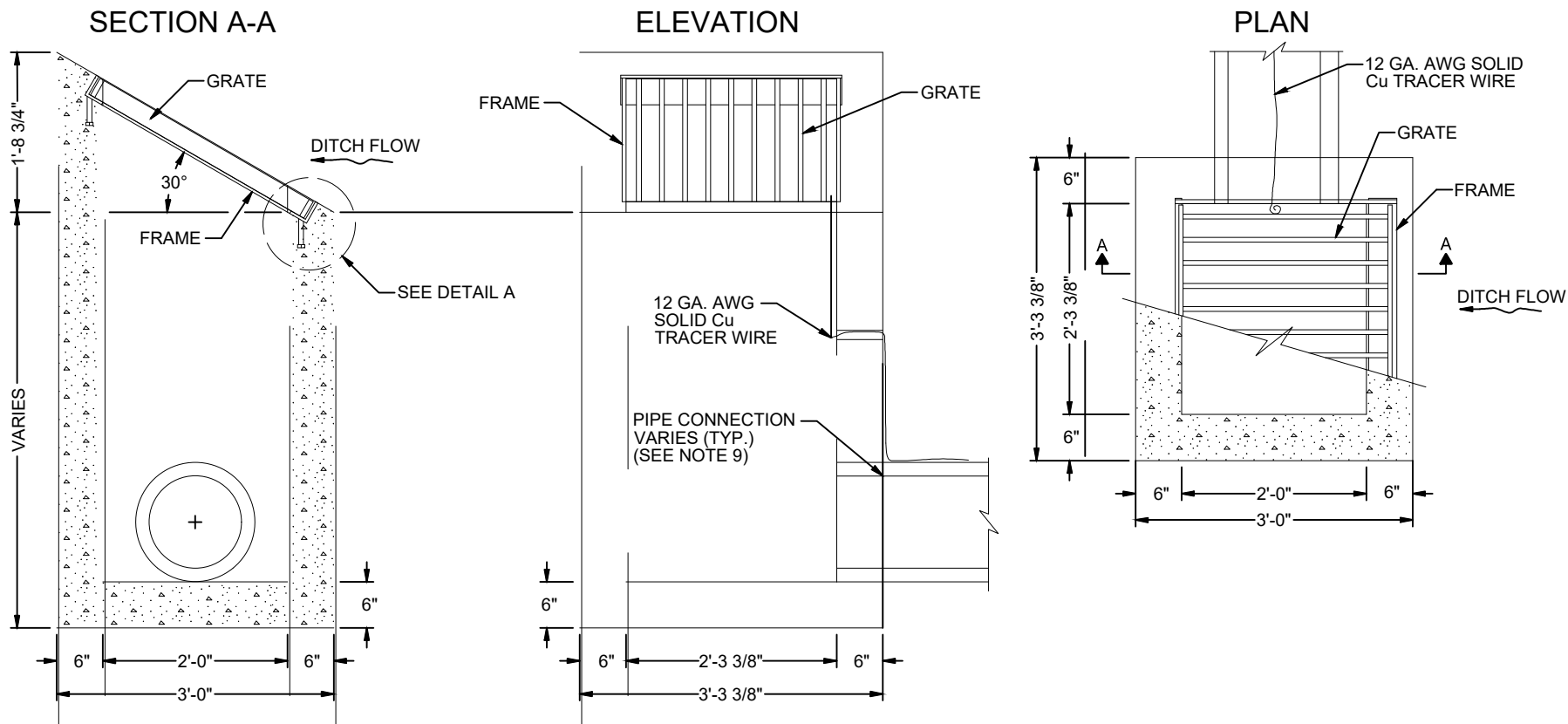
DATE: 6/3/2021

DESN: MCH

D-002

Bar Measures 1 inch

5/14/2021 2:00:37 PM - O:\PROJECTS\PORTLAND\166682\200-166682-20001\DOCS\DESIGN STANDARDS UPDATE\CAD\SHEETFILES\D-003 (1 OF 2).DWG - LOWRY, MADILYN



NOTES FOR ALL DETAILS:

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
2. FOR FRAME & GRATE DETAILS NOT SHOWN SEE STD. DWG. MODIFY ANCHOR BOLT ATTACHMENT TO FRAME AS SHOWN IN DETAIL A.
3. CATCH BASIN, FRAME, AND GRATES SHALL MEET H20 LOADING.
4. PROVIDE 18" SUMP, AS DIRECTED BY THE CITY ENGINEER.
5. 5/8" CROSS BARS SHALL BE FLUSH WITH THE GRATE SURFACE AND MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.
6. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL (2" MIN. CLEARANCE TO WALLS).
7. DO NOT USE IN LOCATIONS WHERE INLET CAN BE STRUCK BY AN ERRANT VEHICLE, OR PROVIDE SHIELDING OF INLET.
8. INLET BASE MAY BE CAST-IN-PLACE OR PRECAST. WHERE PRECAST INLET BASE IS USED AS AN ALTERNATE, A 4" COMPACTED LEVELING BED OF 3/4 "-0 CRUSHED AGGREGATE SHALL BE PROVIDED. ALL PRECAST INLETS SHALL CONFORM TO REQUIREMENTS OF ASTM C913.
9. SEE STD. DWG. FOR PIPE TO STRUCTURE CONNECTIONS.
10. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.



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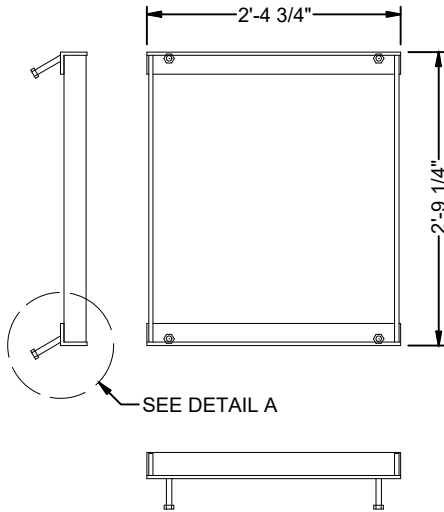
DITCH INLET-TYPE D
1 OF 2

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

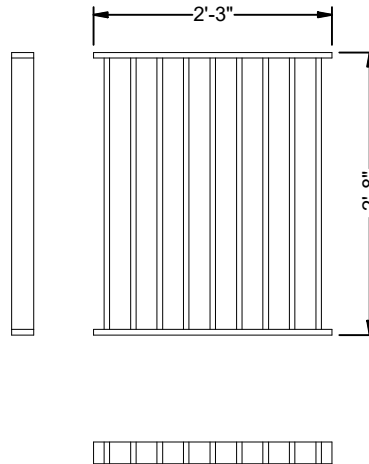
D-003

Bar Measures 1 inch

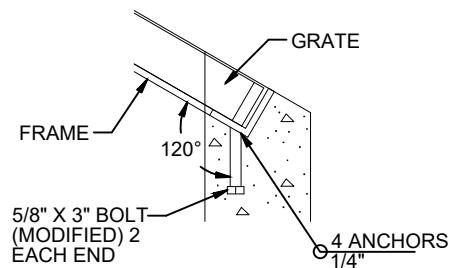
G-2 FRAME (SEE NOTE 2)



G-2 GRATE (TYPE 1) (SEE NOTE 2)



DETAIL A (ANCHOR BOLT DETAIL, SEE NOTE 2)



NOTES FOR ALL DETAILS:

1. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
2. FOR FRAME & GRATE DETAILS NOT SHOWN SEE STD. DWG. MODIFY ANCHOR BOLT ATTACHMENT TO FRAME AS SHOWN IN DETAIL A.
3. CATCH BASIN, FRAME, AND GRATES SHALL MEET H20 LOADING.
4. PROVIDE 18" SUMP, AS DIRECTED BY THE CITY ENGINEER.
5. 5/8" CROSS BARS SHALL BE FLUSH WITH THE GRATE SURFACE AND MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.
6. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL (2" MIN. CLEARANCE TO WALLS).
7. DO NOT USE IN LOCATIONS WHERE INLET CAN BE STRUCK BY AN ERRANT VEHICLE, OR PROVIDE SHIELDING OF INLET.
8. INLET BASE MAY BE CAST-IN-PLACE OR PRECAST. WHERE PRECAST INLET BASE IS USED AS AN ALTERNATE, A 4" COMPACTED LEVELING BED OF 3/4 "-0 CRUSHED AGGREGATE SHALL BE PROVIDED. ALL PRECAST INLETS SHALL CONFORM TO REQUIREMENTS OF ASTM C913.
9. SEE STD. DWG. FOR PIPE TO STRUCTURE CONNECTIONS.
10. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.



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DITCH INLET-TYPE D
2 OF 2

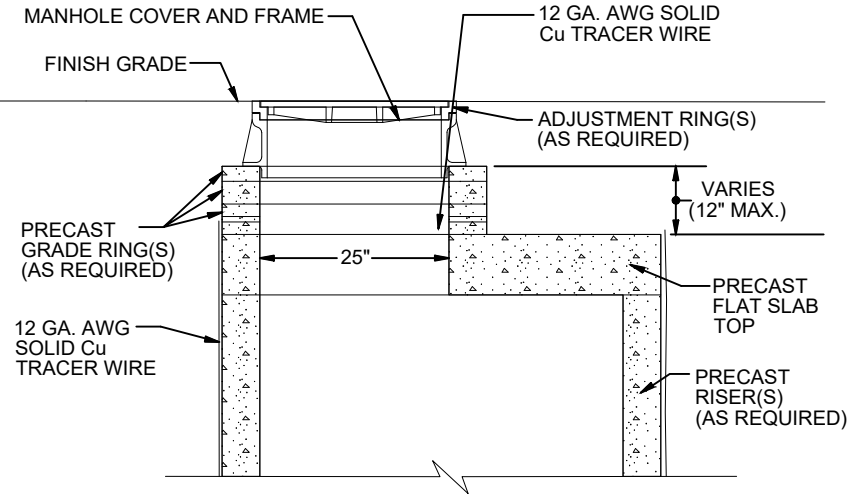
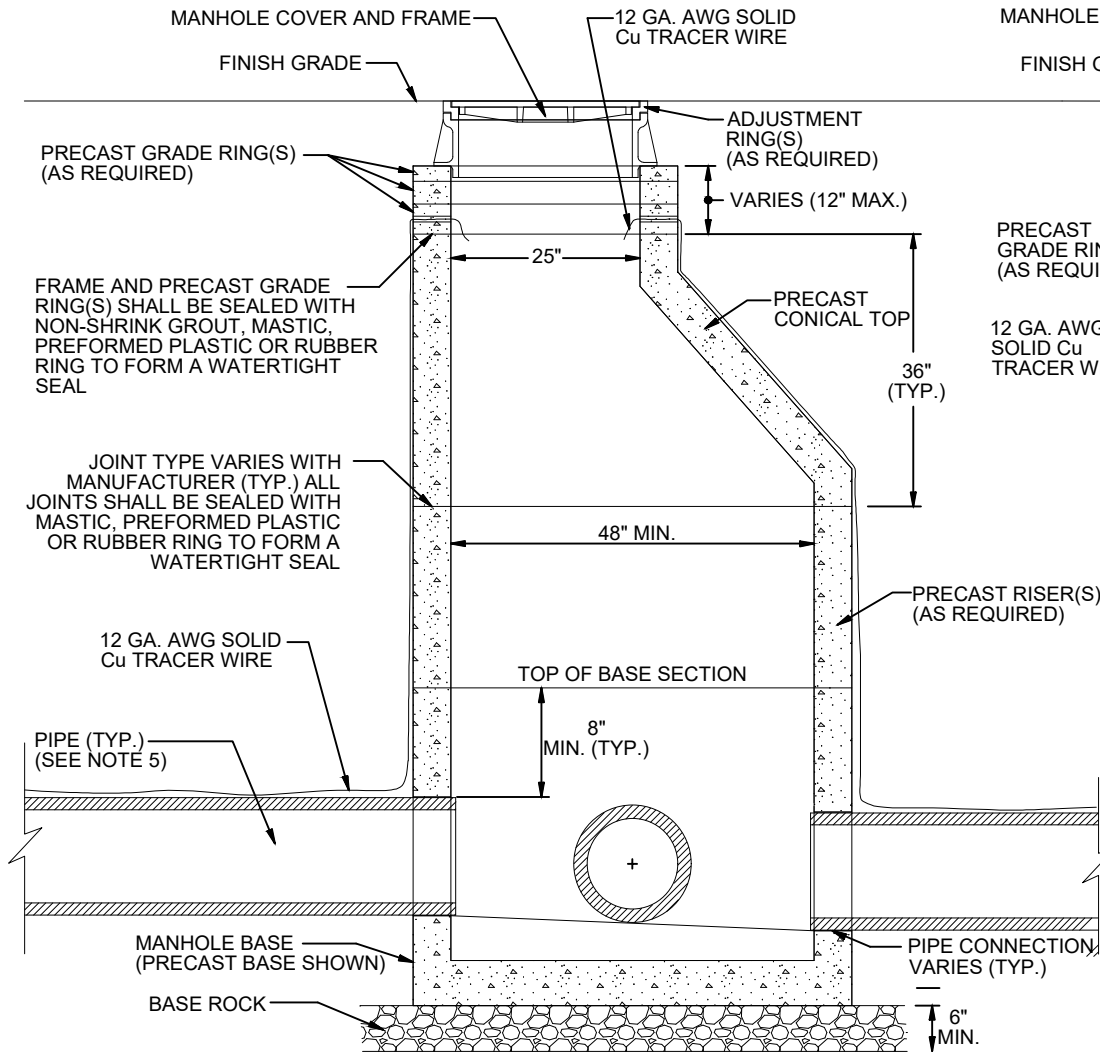
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

D-003

Bar Measures 1 inch



NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 48".
3. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
4. SEE STD. DWGS. FOR PIPE TO MANHOLE CONNECTIONS AND STANDARD MANHOLE DETAILS.
5. MAX. PIPE DIAMETER VARIES.
6. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
7. PAVED INVERT OR 24" MIN. SUMP MAY BE ALLOWED AT THE DISCRETION OF THE CITY ENGINEER.
8. STEPS WILL NOT BE ALLOWED IN MANHOLES.



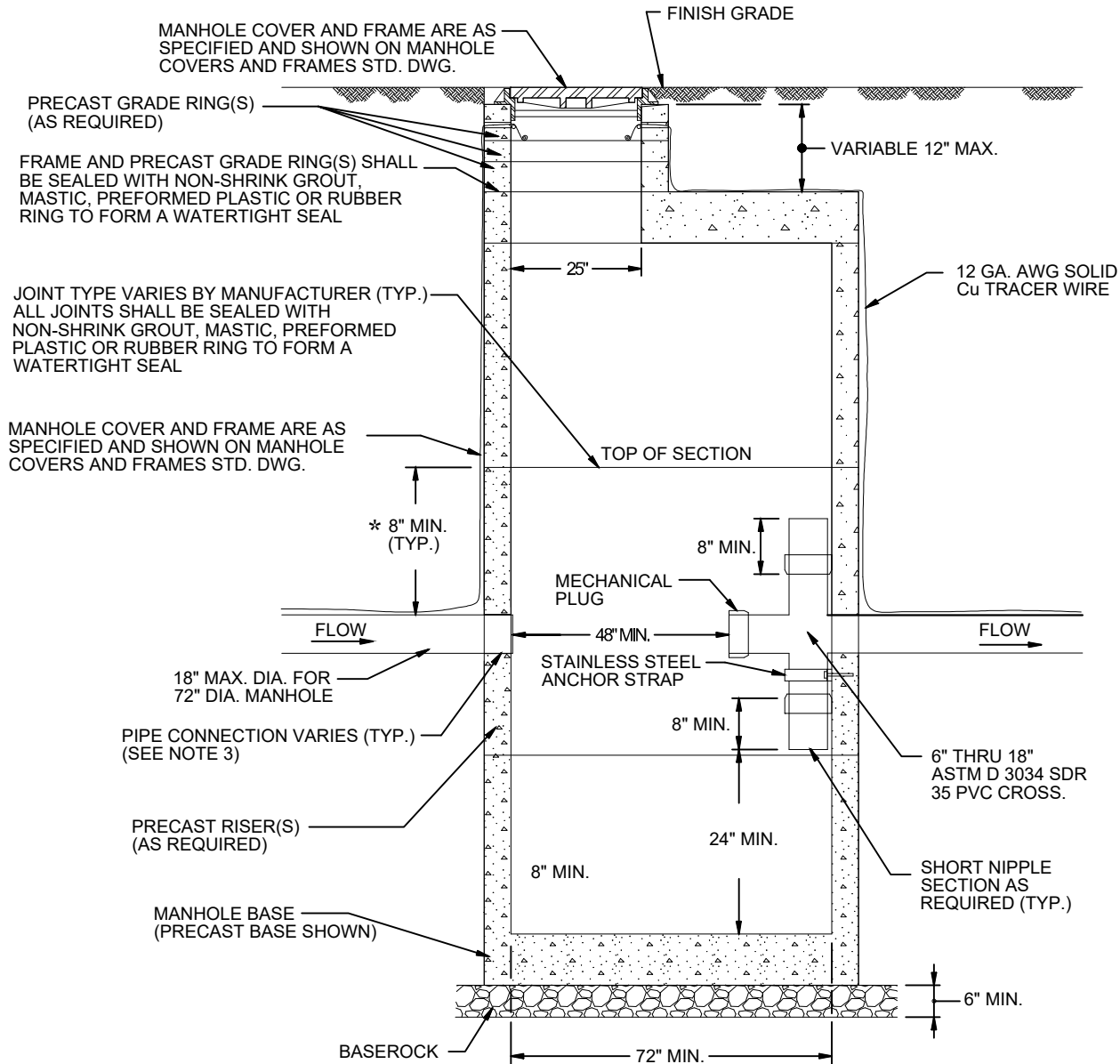
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STANDARD STORM MANHOLE

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

D-004

Bar Measures 1 inch



NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 72" MIN., MAX. PIPE DIAMETER 18".
3. MAX. PIPE DIAMETER VARIES WITH MANHOLE DIAMETER.
4. SEE STD. DWG. FOR PIPE TO MANHOLE CONNECTION.
5. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
6. STEPS WILL NOT BE ALLOWED IN MANHOLES.

* APPLIES TO ALL PENETRATIONS/HOLES UNLESS OTHERWISE APPROVED BY THE ENGINEER.



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STORM PRE-TREATMENT
MANHOLE

PROJ: 200-166682-20001

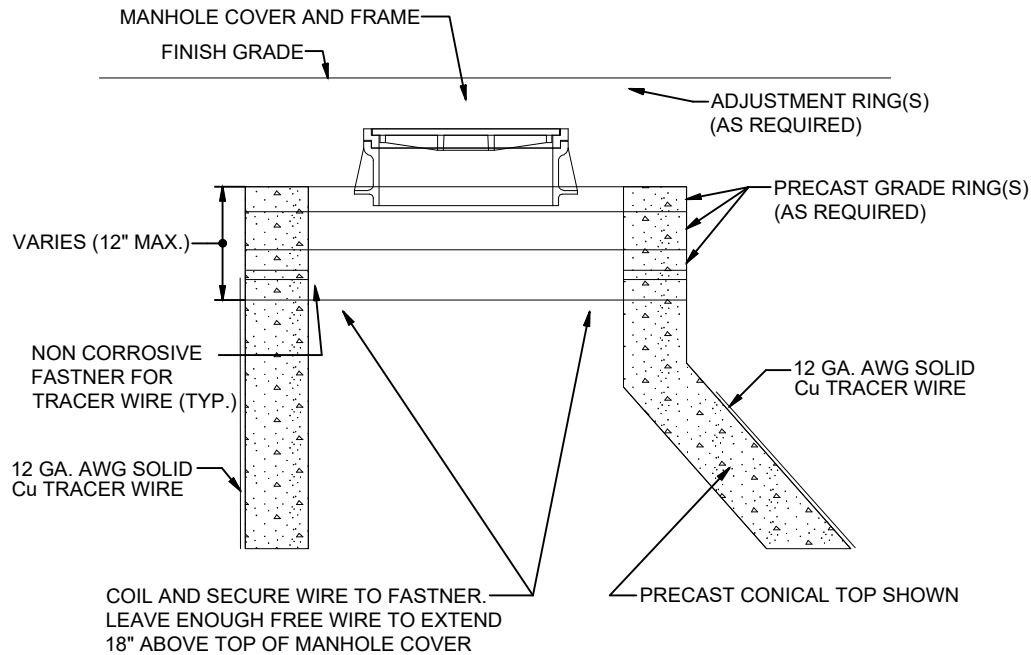
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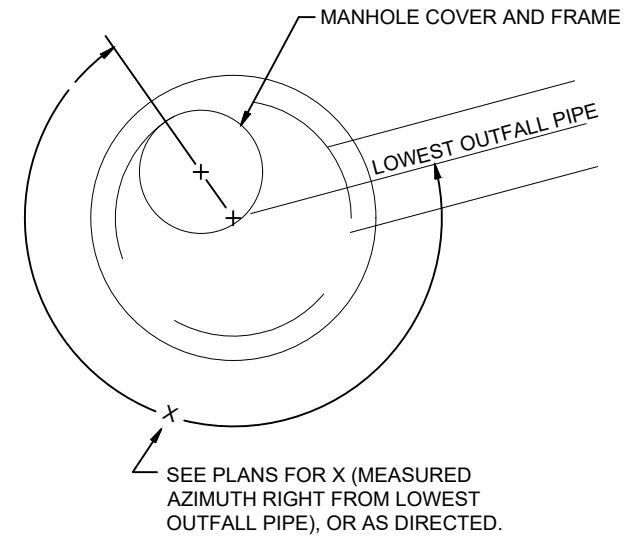
D-005

Bar Measures 1 inch

DETAIL "A" TRACER WIRE



DETAIL "C" PRECAST CONICAL TOP OR PRECAST FLAT SLAB TOP ORIENTATION



NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 48".
3. SEE STD. DWG. FOR PIPE TO MANHOLE CONNECTION AND MANHOLE COVERS AND FRAMES.
4. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE. PLACE TRACER WIRE DIRECTLY OVER PIPE CENTERLINE AND ON TOP OF THE PIPE.
5. SEE PROJECT PLANS FOR DETAILS NOT SHOWN.



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MANHOLE DETAILS

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DESN: MCH

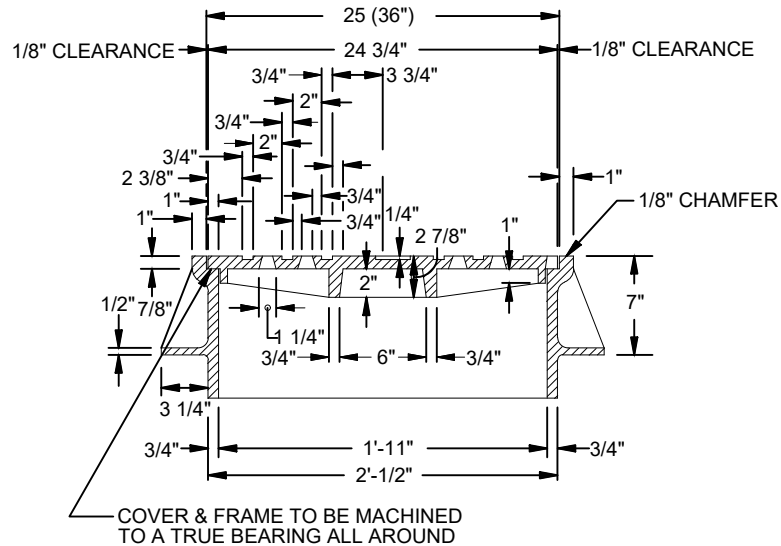
D-006

Bar Measures 1 inch

STANDARD MANHOLE COVER, FRAME, & GRATE

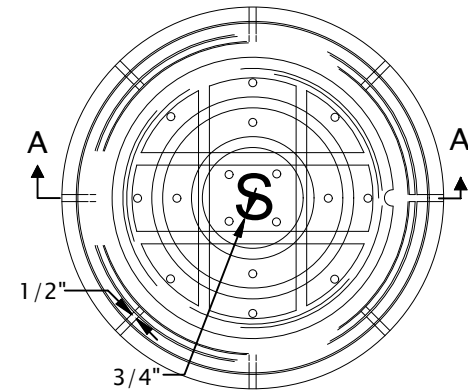
SECTION A-A

36" MIN. DIAMETER COVER IS REQUIRED FOR
MANHOLES WITH DEPTHS OF 20' OR GREATER.



PLAN

MANHOLE COVER & FRAME



NOTE:

COAT OUTSIDE OF FRAME WITH ASPHALT
WHERE FRAME IS TO BE PLACED IN CONCRETE
PAVEMENT, CONCRETE GUTTER, OR WALK.

NOTES FOR ALL DETAILS:

1. COVERS FOR SANITARY MANHOLES SHALL HAVE 2 HOLES MAXIMUM.
2. WATERTIGHT COVERS REQUIRED IF LOCATED WHERE COVER MAY BE SUBMERGED. (NO HOLES).
3. COVERS AND FRAMES SHALL BE STAMPED WITH MANUFACTURER'S INITIALS, HEAT NUMBER, AND POINT OF ORIGIN.
4. SEE STD. DWG. FOR MANHOLE DETAILS.



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MANHOLE COVERS
& FRAMES
1 OF 3

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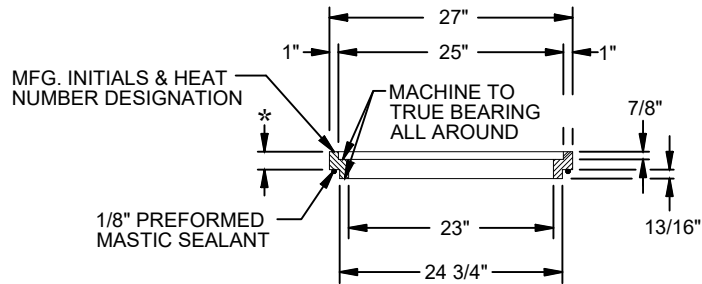
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D-007

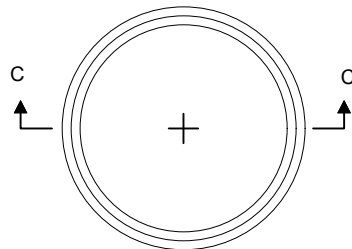
Bar Measures 1 inch

MANHOLE ADJUSTMENT RING FOR USE WITH STANDARD MANHOLE FRAME

* STD. DEPTHS 1 1/2", 2", 2 1/2", & 3". MATL. TO BE GREY CAST IRON ASTM A48, CLASS 35B. TOLERANCE ON NON-MACHINED SURFACES TO BE 0.06".



SECTION C-C

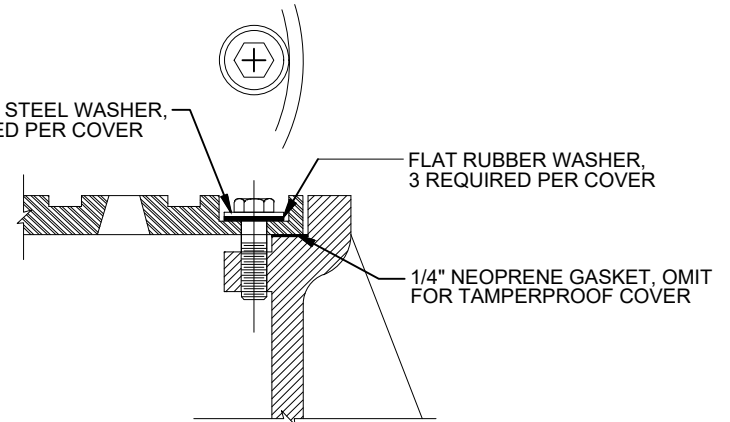


GENERAL NOTES:

- COVERS FOR SANITARY MANHOLES SHALL HAVE 2 HOLES MAXIMUM.
- WATERTIGHT COVERS REQUIRED IF LOCATED WHERE COVER MAY BE SUBMERGED. (NO HOLES).
- COVERS AND FRAMES SHALL BE STAMPED WITH MANUFACTURER'S INITIALS, HEAT NUMBER, AND POINT OF ORIGIN.

BOLT-DOWN DETAIL (FOR TAMPERPROOF AND WATERTIGHT)

1 1/4" O.D. STAINLESS STEEL WASHER,
1/8" THICK, 3 REQUIRED PER COVER



NOTE:

3 REQUIRED, EQUALLY SPACED, 1/2" X 1/2" PENTAGONAL OR HEXAGONAL HEAD, BRONZE OR STAINLESS STEEL.



CITY OF
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MANHOLE COVERS
& FRAMES
2 OF 3

PROJ: 200-166682-20001

DATE: 6/3/2021

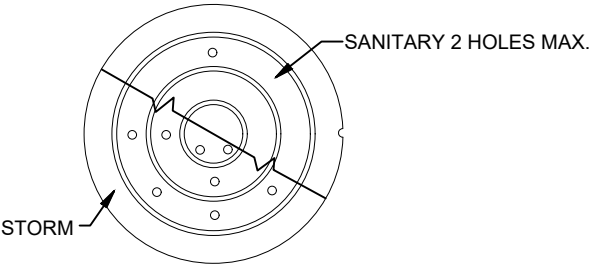
DESN: MCH

D-007

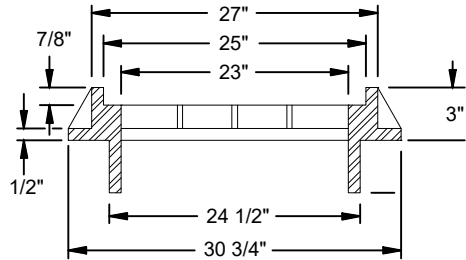
Bar Measures 1 inch

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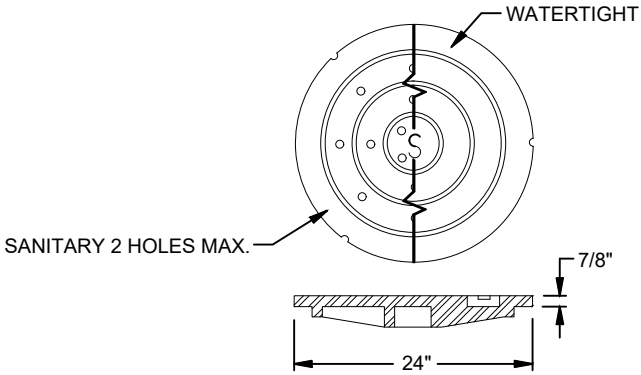
SUBURBAN MANHOLE COVER & FRAME



TO A TRUE BEARING



CAST IRON SUBURBAN FRAME
FOR USE ON LOCAL STREETS ONLY (SEE NOTE 5)



CAST IRON TAMPERPROOF & WATERTIGHT
(FRAMES AVAILABLE IN STANDARD OR SUBURBAN PATTERN)

GENERAL NOTES:

1. COVERS FOR SANITARY MANHOLES SHALL HAVE 2 HOLES MAXIMUM.
2. WATERTIGHT COVERS REQUIRED IF LOCATED WHERE COVER MAY BE SUBMERGED. (NO HOLES).
3. COVERS AND FRAMES SHALL BE STAMPED WITH MANUFACTURER'S INITIALS, HEAT NUMBER, AND POINT OF ORIGIN.
4. FOR USE ON LOCAL STREETS ONLY, WHEN ALLOWED THROUGH DESIGN EXCEPTION.



CITY OF
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97020

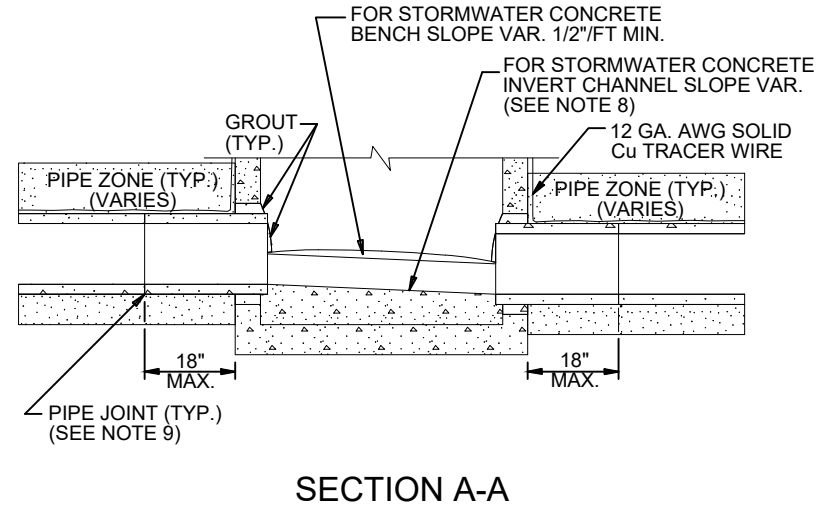
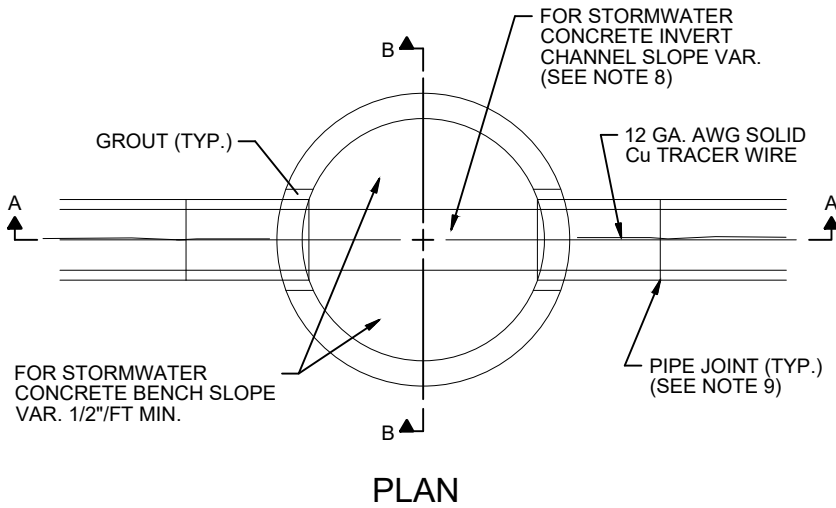
MANHOLE COVERS
& FRAMES
3 OF 3

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

D-007

Bar Measures 1 inch

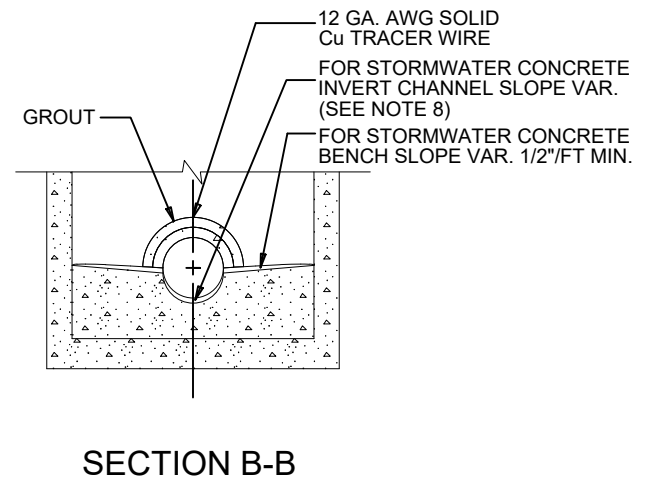
CONNECTION OF RIGID PIPE TO MANHOLE



SECTION A-A

NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. MANHOLE BASE SECTIONS MAY BE PRECAST OR CAST-IN-PLACE.
3. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
4. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
5. MAX. PIPE DIAMETER VARIES.
6. MINIMUM DISTANCE BETWEEN HOLE PENETRATIONS INTO MANHOLES SHALL BE PER THE MANUFACTURERS MINIMUM RECOMMENDATIONS.
7. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
8. INVERT CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE.
9. WHEN RIGID PIPE IS USED, THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKETED AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL. JOINT TYPE VARIES WITH MANUFACTURER.



SECTION B-B



CITY OF
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97020

PIPE TO MANHOLE
CONNECTION
1 OF 2

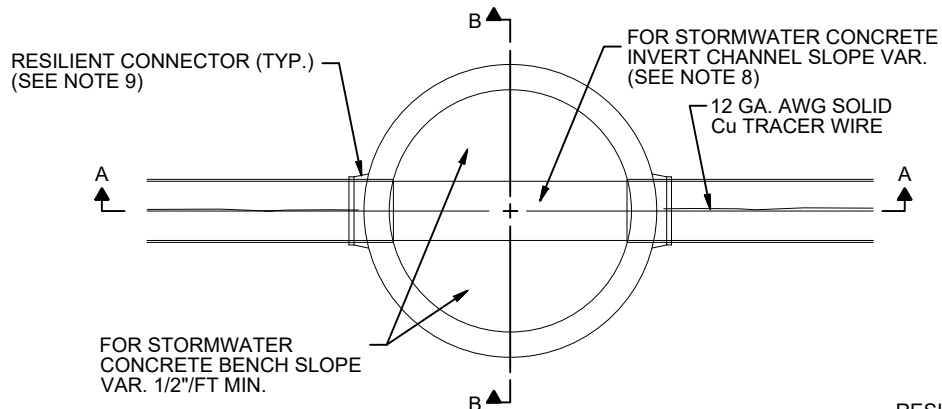
PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

D-008

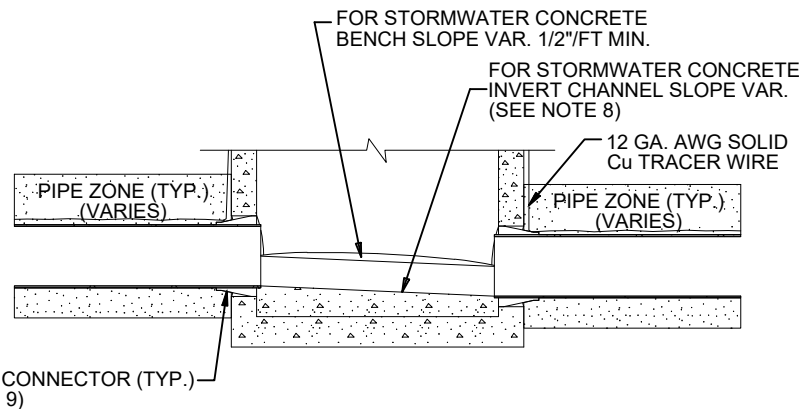
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CONNECTION OF FLEXIBLE PIPE TO MANHOLE



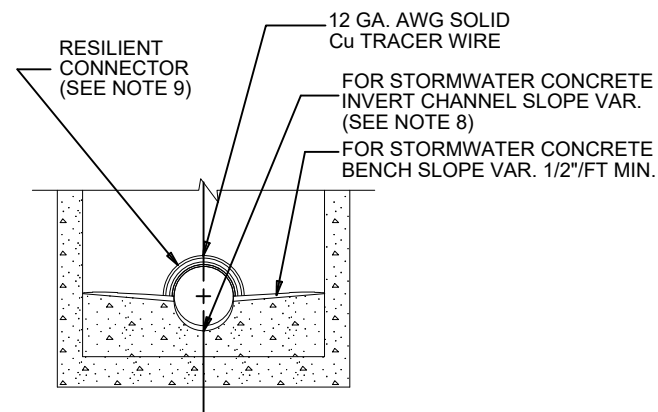
PLAN



SECTION A-A

NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. MANHOLE BASE SECTIONS MAY BE PRECAST OR CAST-IN-PLACE.
3. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
4. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
5. MAX. PIPE DIAMETER VARIES.
6. MINIMUM DISTANCE BETWEEN HOLE PENETRATIONS INTO MANHOLES SHALL BE PER THE MANUFACTURERS MINIMUM RECOMMENDATIONS.
7. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
8. INVERT CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE FOR ALL SANITARY MANHOLES.
9. WHEN FLEXIBLE PIPE IS USED, INSTALL RESILIENT CONNECTORS CONFORMING TO REQUIREMENTS OF ASTM C923 (I.E. KOR=N-SEAL BOOT).



SECTION B-B



CITY OF
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PIPE TO MANHOLE
CONNECTION
2 OF 2

PROJ: 200-166682-20001

DATE: 6/3/2021

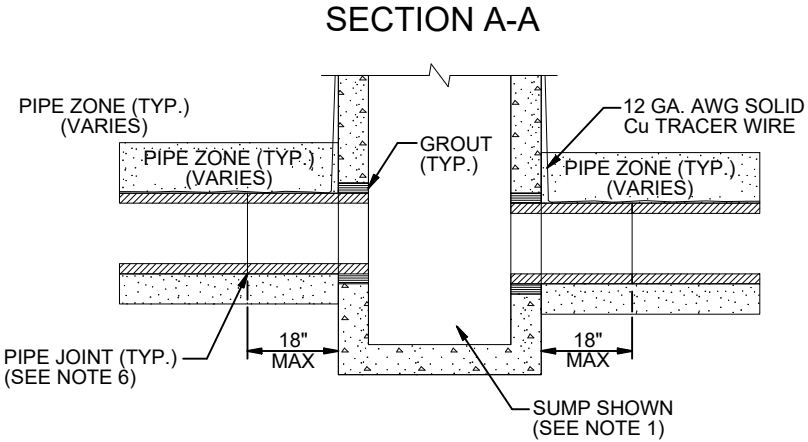
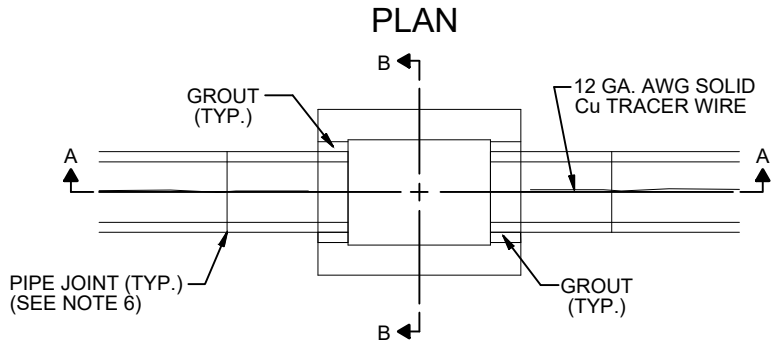
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D-008

Bar Measures 1 inch

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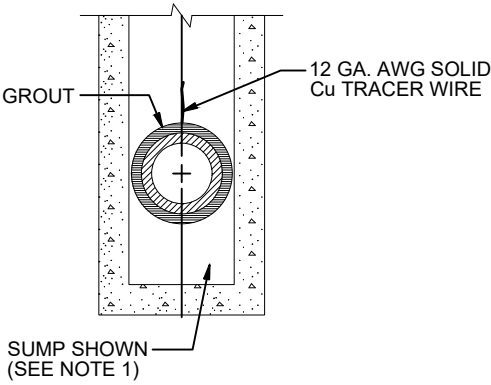
CONNECTION OF RIGID PIPE TO STRUCTURE




NOTES FOR ALL DETAILS:

- 1. SEE STD. DWG. FOR INLET DETAILS NOT SHOWN.
- 2. SEE APPROPRIATE STD. DWGS. OR SPECIAL PROJECT DETAILS FOR OTHER SIMILAR STRUCTURES.
- 3. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
- 4. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL.
- 5. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
- 6. WHEN RIGID PIPE IS USED, THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKET, AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL. JOINT TYPE VARIES WITH MANUFACTURER.
- 7. WHEN FLEXIBLE PIPE IS USED, INSTALL RESILIENT CONNECTORS CONFORMING TO REQUIREMENTS OF ASTM C923 (I.E. KOR-N-SEAL BOOT).

SECTION B-B



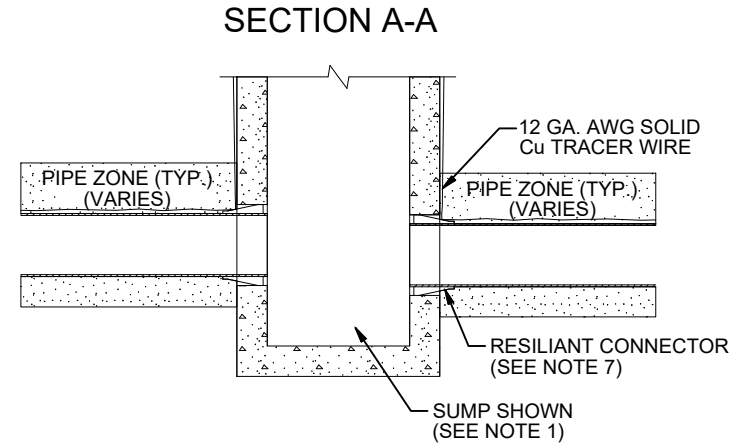
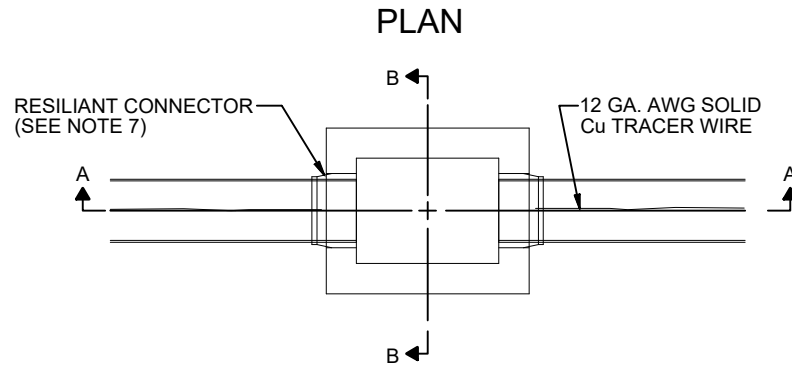
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			DESN: MCH
			D-009

Bar Measures 1 inch

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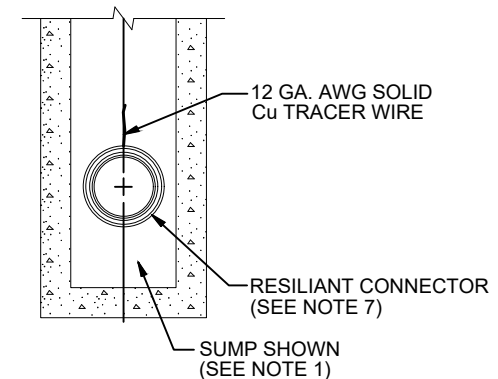
CONNECTION OF FLEXIBLE PIPE TO STRUCTURE



NOTES FOR ALL DETAILS:

1. SEE STD. DWG. FOR INLET DETAILS NOT SHOWN.
2. SEE APPROPRIATE STD. DWGS. OR SPECIAL PROJECT DETAILS FOR OTHER SIMILAR STRUCTURES.
3. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
4. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL.
5. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
6. WHEN RIGID PIPE IS USED, THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKET, AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL. JOINT TYPE VARIES WITH MANUFACTURER.
7. WHEN FLEXIBLE PIPE IS USED, INSTALL RESILIENT CONNECTORS CONFORMING TO REQUIREMENTS OF ASTM C923 (I.E. KOR-N-SEAL BOOT).

SECTION B-B



CITY OF
DONALD
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DONALD, OR
97020

PIPE TO STRUCTURE
CONNECTIONS
2 OF 2

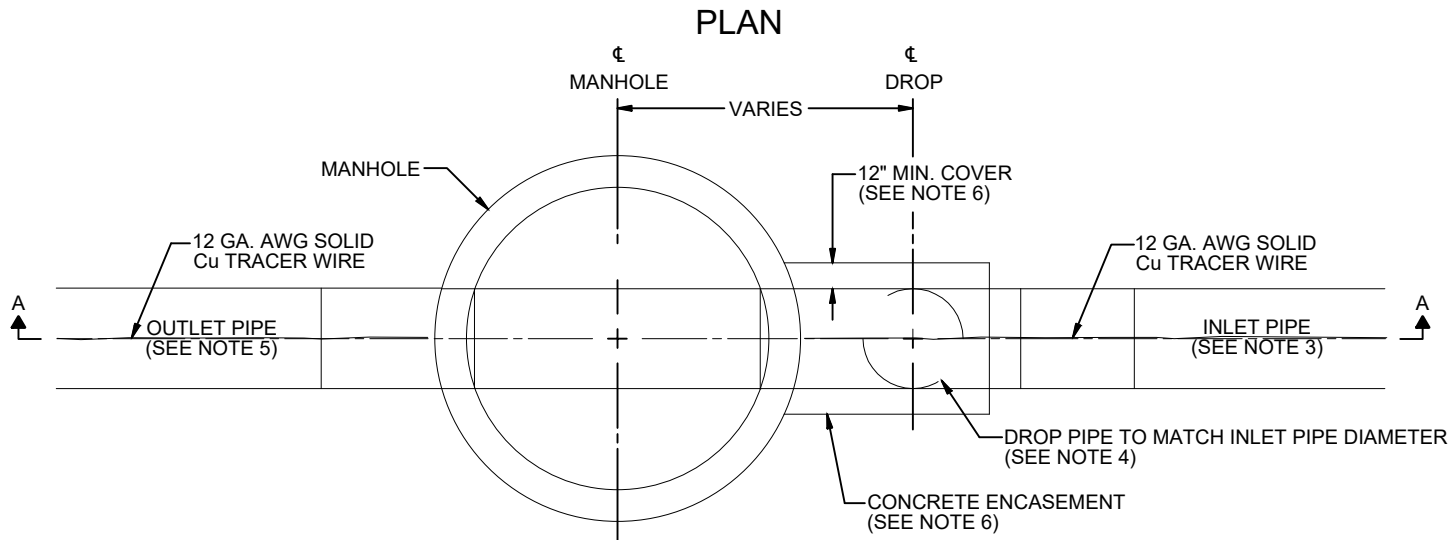
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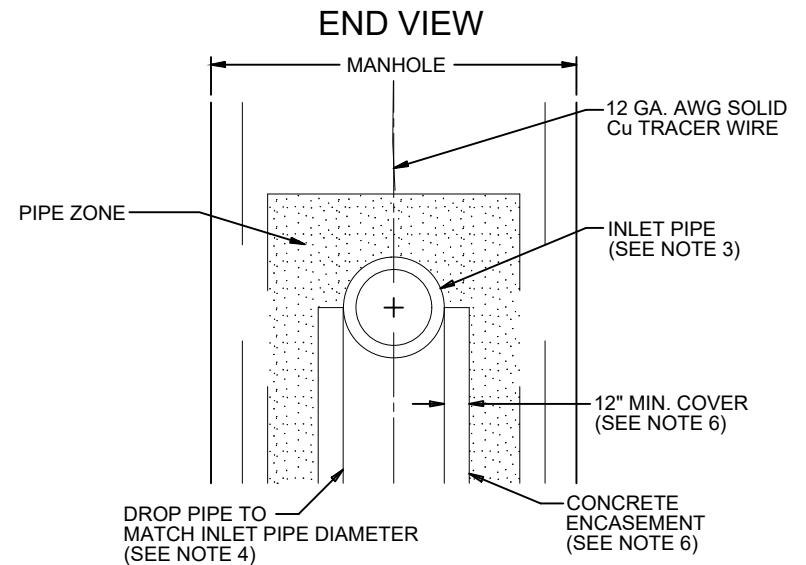
D-009

Bar Measures 1 inch



NOTES FOR ALL DETAILS:

1. SEE APPROPRIATE MANHOLE STD. DWGS. FOR DETAILS NOT SHOWN.
2. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS. ONLY 1 OUTSIDE DROP PIPE ALLOWED PER MANHOLE. SEE PROJECT PLANS FOR PIPE MATERIAL.
3. INLET PIPE MAY BE RIGID OR FLEXIBLE. THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKETED, AND UNRESTRAINED JOINT WITHIN 18" OF PIPE TEE, AS SHOWN. JOINT TYPE VARIES WITH MANUFACTURER.
4. DROP PIPE, TEE, AND ELBOW TO MATCH INLET PIPE DIAMETER.
5. RIGID PIPE CONNECTION SHOWN. OUTLET PIPE(S) MAY BE RIGID OR FLEXIBLE, SEE PROJECT PLANS. MAXIMUM OUTLET PIPE DIAMETER VARIES. SEE STD. DWG. FOR PIPE TO MANHOLE CONNECTIONS.
6. CONCRETE ENCASEMENT SHALL BE COMMERCIAL GRADE CONCRETE OR CDF. PROVIDE 12" MINIMUM COVER OVER OUTER MOST PARTS OF PIPE AND FITTINGS. EXTEND UP TO MID-POINT OF INLET PIPE.
7. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.



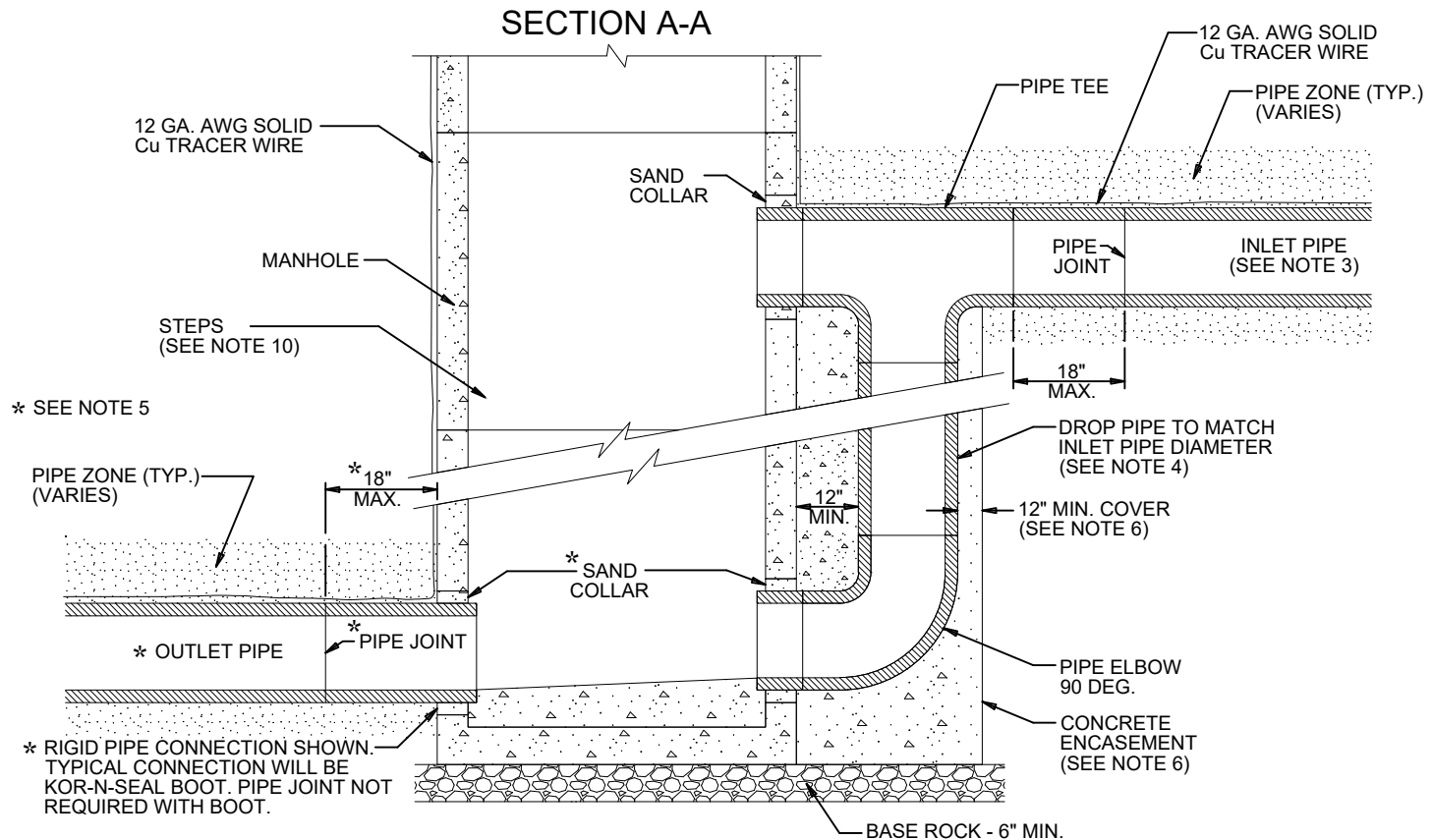
CITY OF
DONALD
P.O BOX 388
DONALD, OR
97020

OUTSIDE DROP MANHOLE
1 OF 2

PROJ: 200-166682-20001
DATE: 6/3/2021
DESN: MCH

D-010

Bar Measures 1 inch



NOTES FOR ALL DETAILS:

1. SEE APPROPRIATE MANHOLE STD. DWGS. FOR DETAILS NOT SHOWN.
2. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS. ONLY 1 OUTSIDE DROP PIPE ALLOWED PER MANHOLE. SEE PROJECT PLANS FOR PIPE MATERIAL.
3. INLET PIPE MAY BE RIGID OR FLEXIBLE. THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKETED, AND UNRESTRAINED JOINT WITHIN 18" OF PIPE TEE, AS SHOWN. JOINT TYPE VARIES WITH MANUFACTURER.
4. DROP PIPE, TEE, AND ELBOW TO MATCH INLET PIPE DIAMETER.
5. RIGID PIPE CONNECTION SHOWN. OUTLET PIPE(S) MAY BE RIGID OR FLEXIBLE, SEE PROJECT PLANS. MAXIMUM OUTLET PIPE DIAMETER VARIES. SEE STD. DWG. FOR PIPE TO MANHOLE CONNECTIONS.
6. CONCRETE ENCASEMENT SHALL BE COMMERCIAL GRADE CONCRETE OR CDF. PROVIDE 12" MINIMUM COVER OVER OUTER MOST PARTS OF PIPE AND FITTINGS. EXTEND UP TO MID-POINT OF INLET PIPE.
7. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.



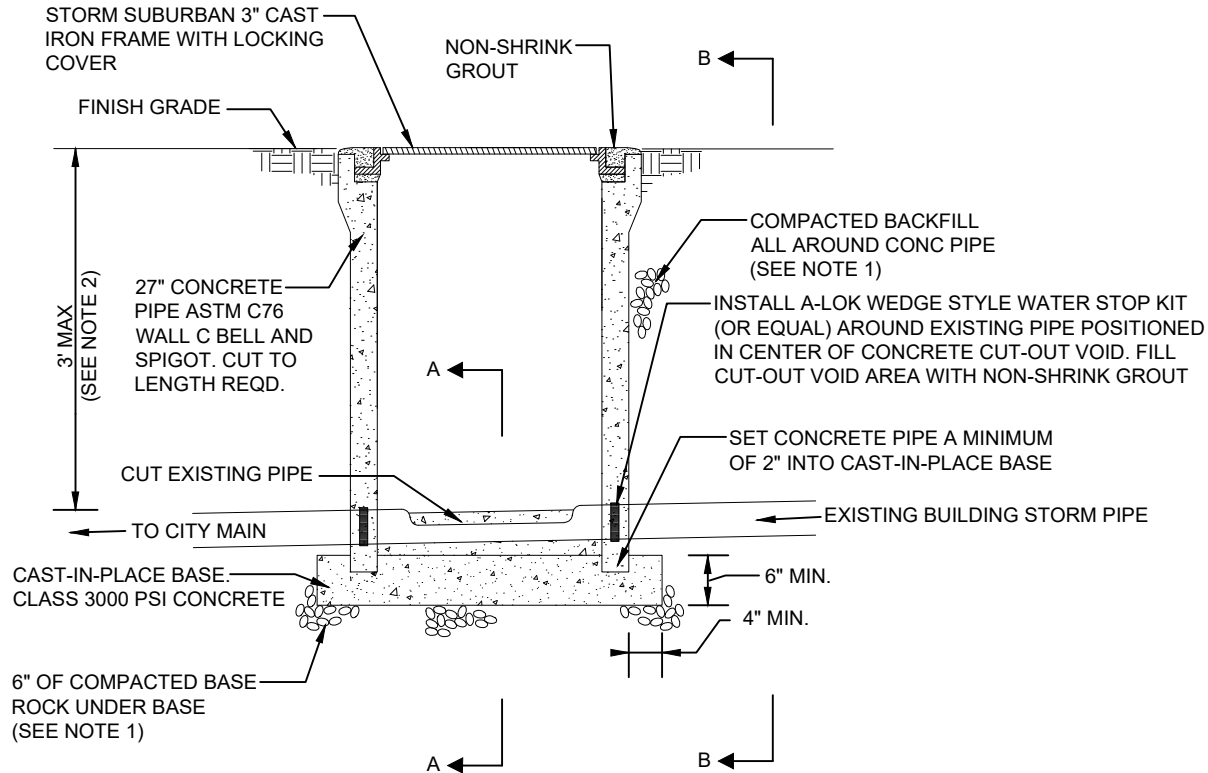
CITY OF
DONALD
P.O BOX 388
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97020

OUTSIDE DROP MANHOLE
2 OF 2

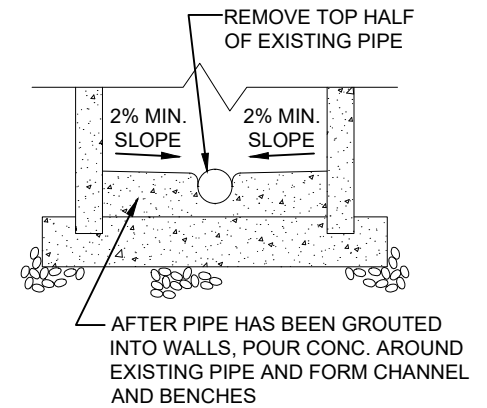
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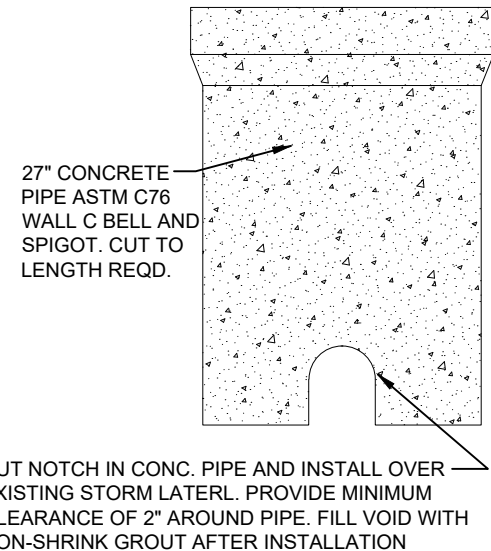
Bar Measures 1 inch



SECTION A-A



SECTION B-B



NOTES FOR ALL DETAILS:

1. COMPACT TO 95% OF MAX. DRY DENSITY AS PER AASHTO T-99 OR 90% T-180.
2. DEEPER LATERALS WILL REQUIRE LARGER ACCESS STRUCTURES.



CITY OF
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SAMPLING MANHOLE

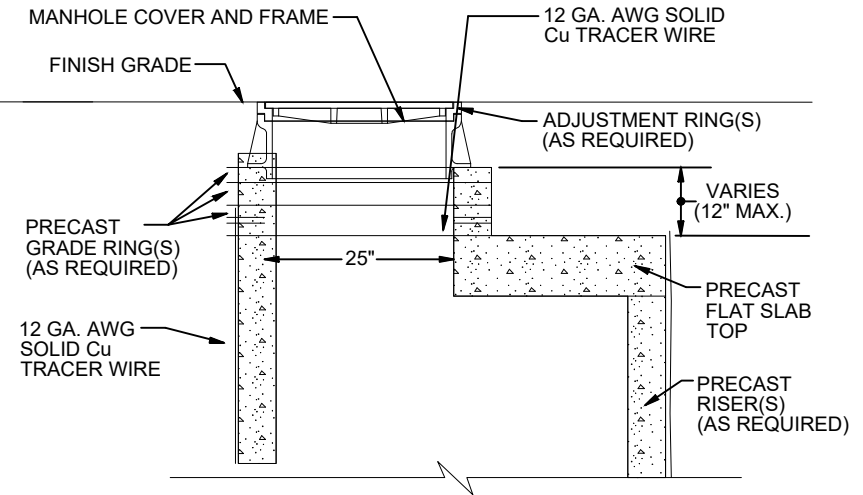
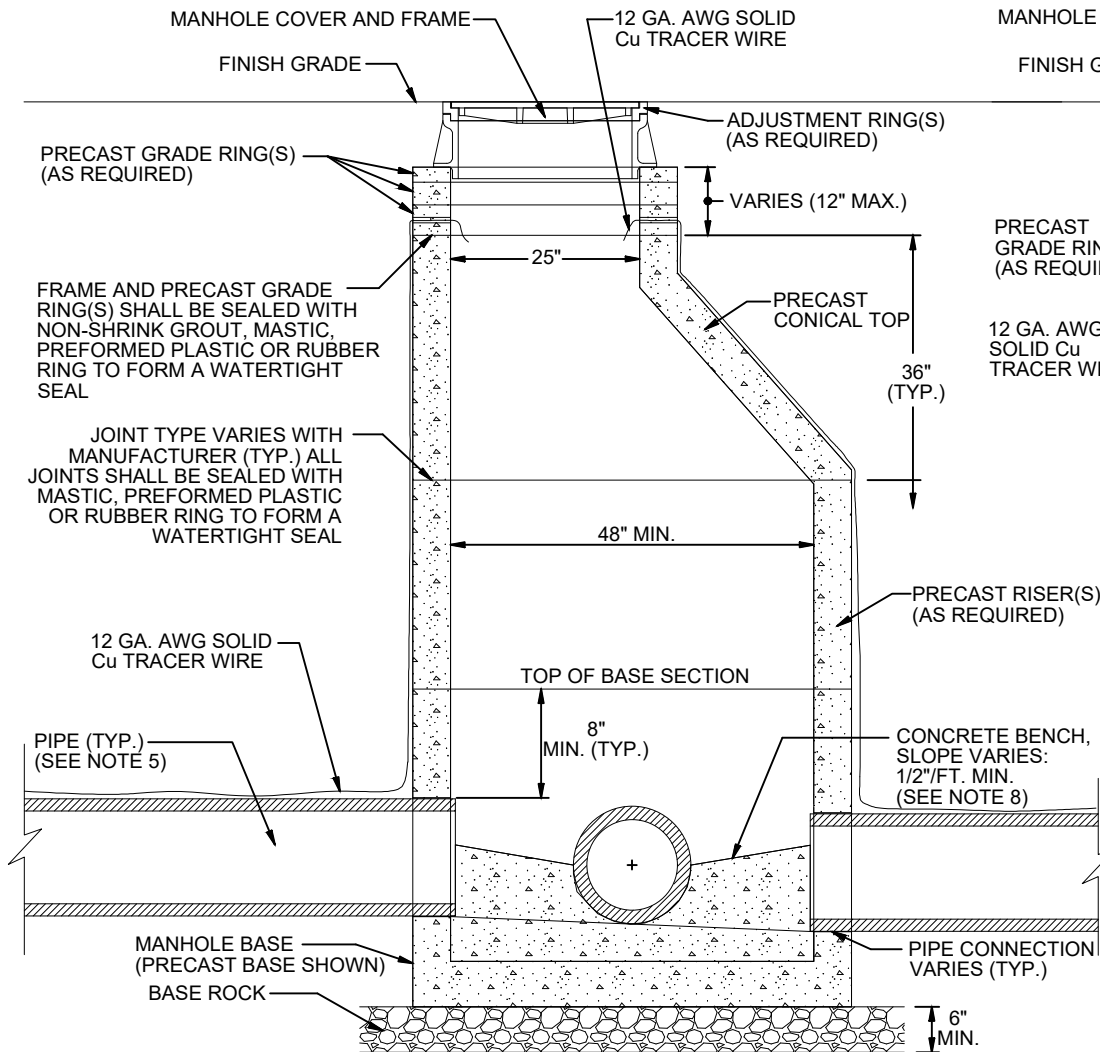
PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

D-011

Bar Measures 1 inch



NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 48".
3. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
4. SEE STD. DWGS. FOR PIPE TO MANHOLE CONNECTIONS AND STANDARD MANHOLE DETAILS.
5. MAX. PIPE DIAMETER VARIES.
6. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
7. THIS DETAIL LIMITED TO INTERIOR DROP OF 24".
8. CONCRETE INVERT AND BENCH SHALL HAVE A SMOOTH TROWEL FINISH.
9. STEPS WILL NOT BE ALLOWED IN MANHOLES.



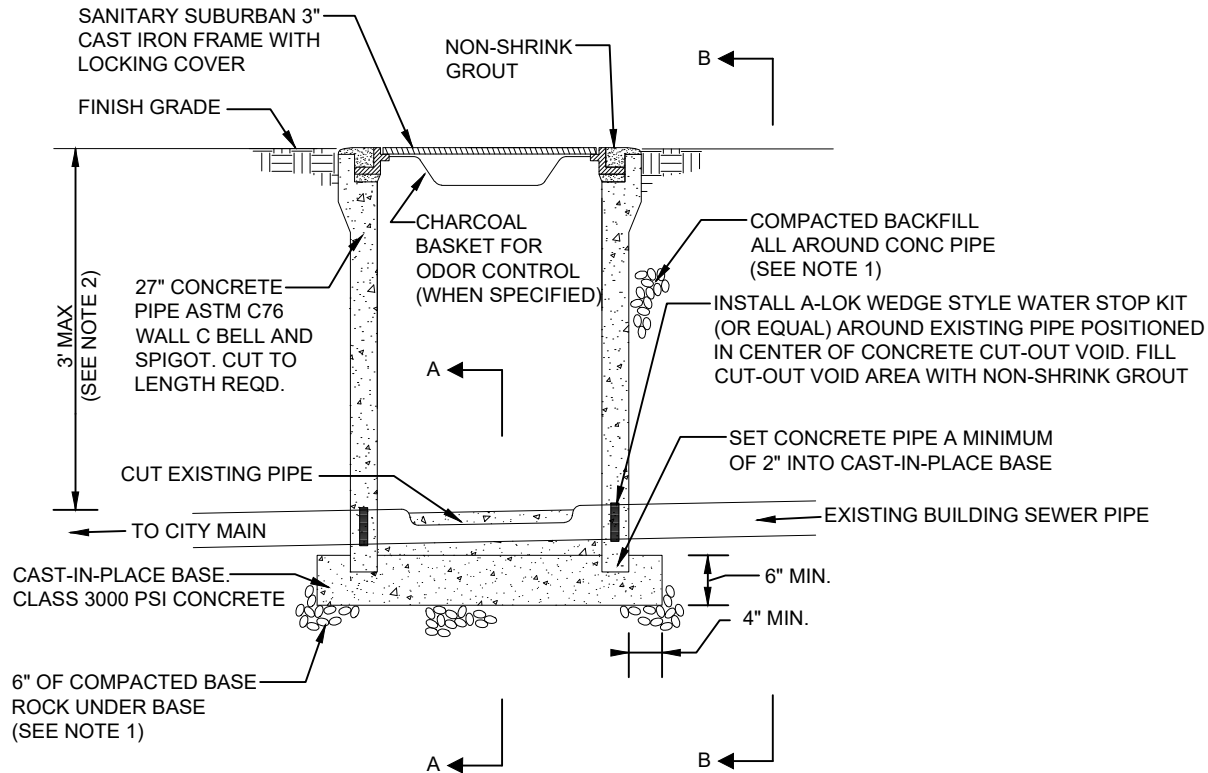
CITY OF
DONALD
P.O BOX 388
DONALD, OR
97020

STANDARD SANITARY
SEWER MANHOLE

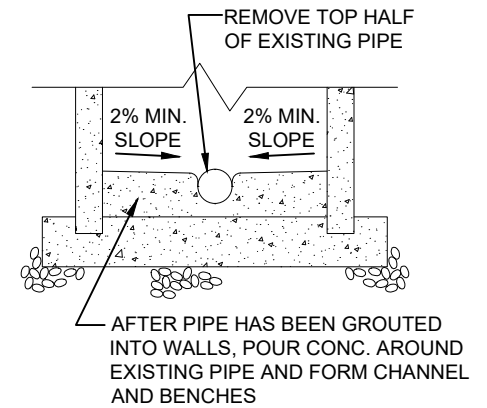
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DATE: 6/3/2021
DESN: MCH

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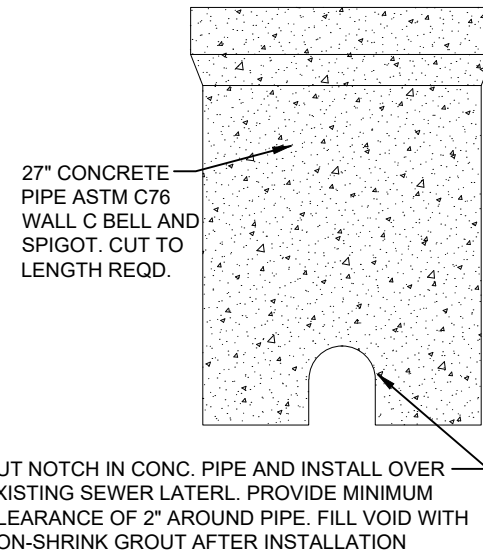
Bar Measures 1 inch



SECTION A-A



SECTION B-B



NOTES FOR ALL DETAILS:

1. COMPACT TO 95% OF MAX. DRY DENSITY AS PER AASHTO T-99 OR 90% T-180.
2. DEEPER LATERALS WILL REQUIRE LARGER ACCESS STRUCTURES.



CITY OF
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SAMPLING MANHOLE

PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

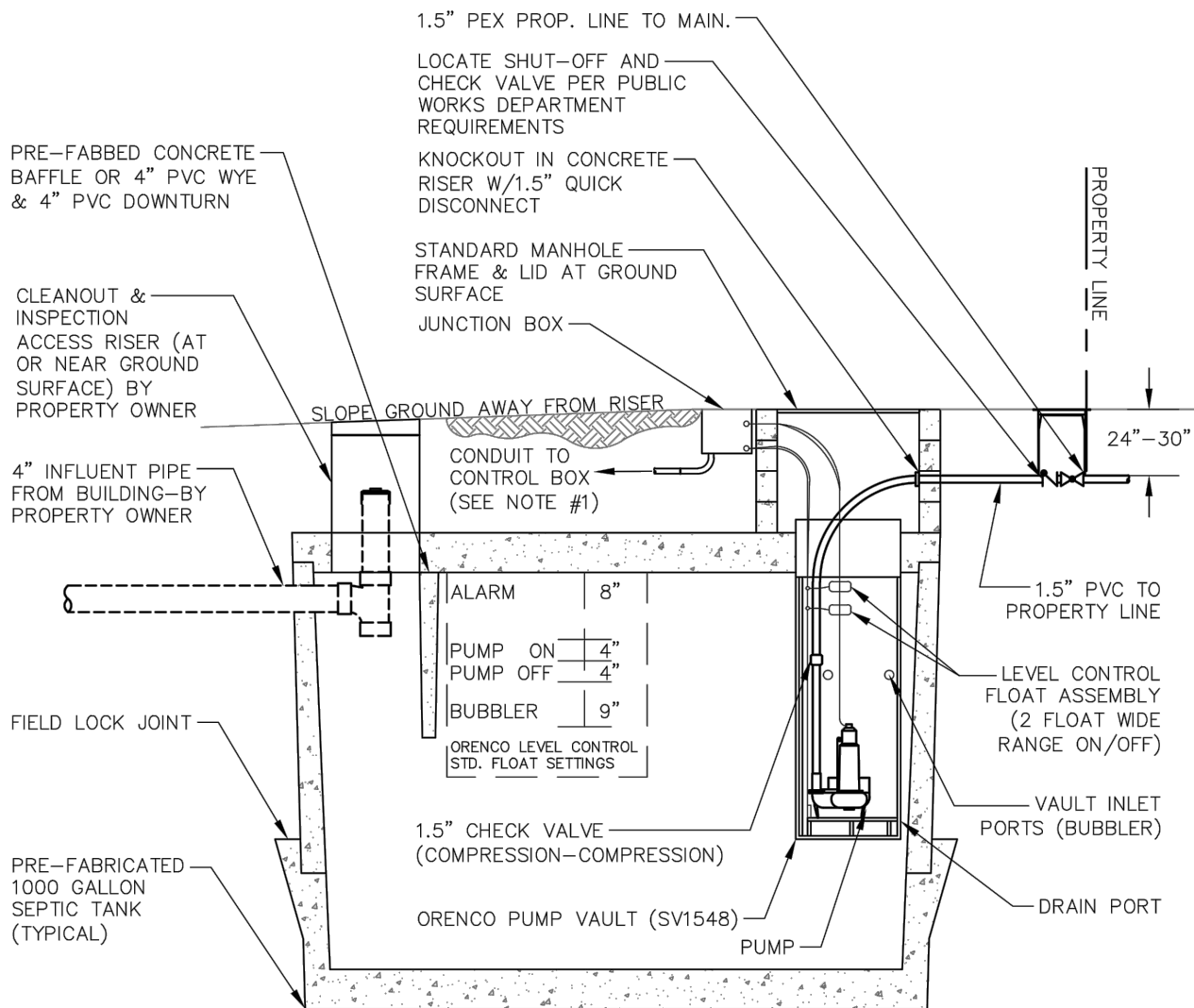
SS-002

Bar Measures 1 inch

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NOTES:

1. ORENCO CONTROL BOX WITH COUNTER ORENCO #51 CT (MOUNTED TO HOUSE WITH 15 AMP CKT. DEDICATED)
2. SEPTIC TANK MUST BE LOCATED TO HAVE A MAXIMUM OF 36" OF COVER.



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RESIDENTIAL SEPTIC TANK INSTALLATION

PROJ: 200-166682-20001

DATE: 6/3/2021

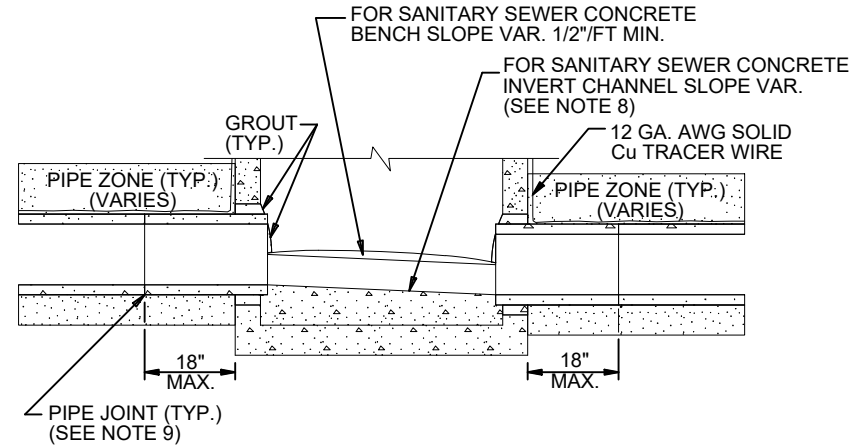
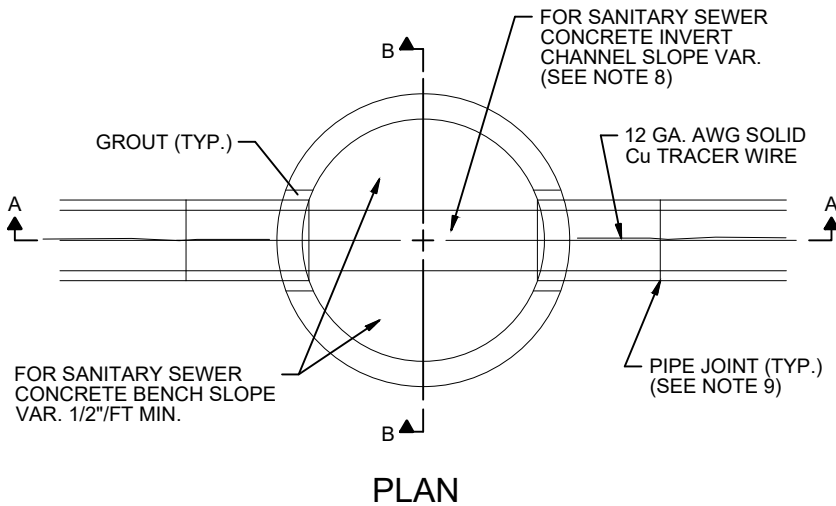
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Bar Measures 1 inch

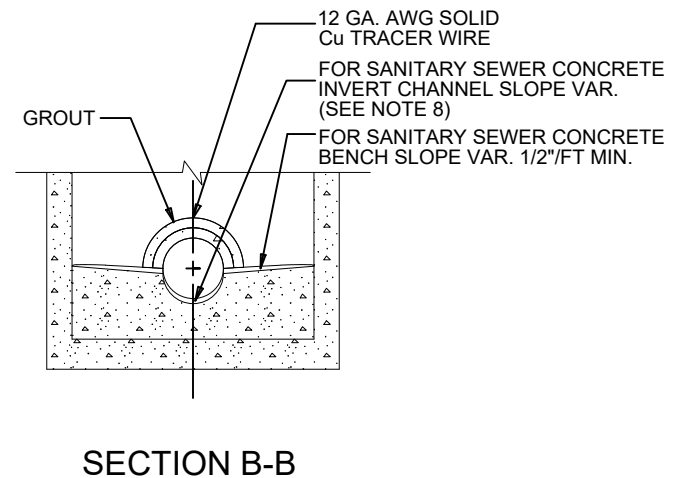
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CONNECTION OF RIGID PIPE TO MANHOLE



NOTES FOR ALL DETAILS:

1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
2. MANHOLE BASE SECTIONS MAY BE PRECAST OR CAST-IN-PLACE.
3. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
4. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
5. MAX. PIPE DIAMETER VARIES.
6. MINIMUM DISTANCE BETWEEN HOLE PENETRATIONS INTO MANHOLES SHALL BE PER THE MANUFACTURERS MINIMUM RECOMMENDATIONS.
7. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
8. INVERT CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE. FOR ALL SANITARY MANHOLES.
9. WHEN RIGID PIPE IS USED, THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKETED AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL. JOINT TYPE VARIES WITH MANUFACTURER.



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PIPE TO MANHOLE CONNECTION
1 OF 2

PROJ: 200-166682-20001

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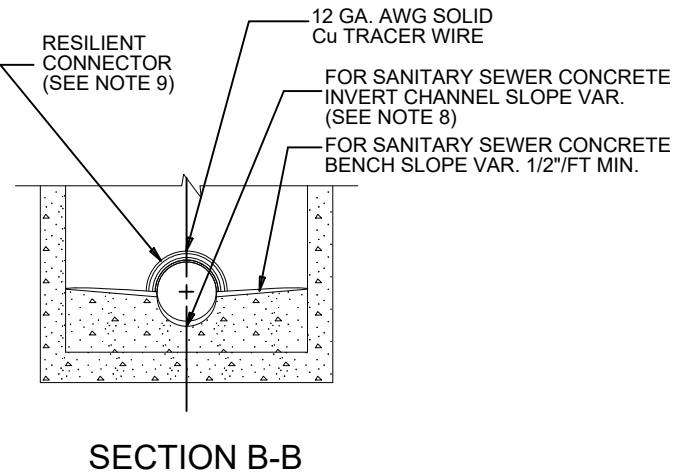
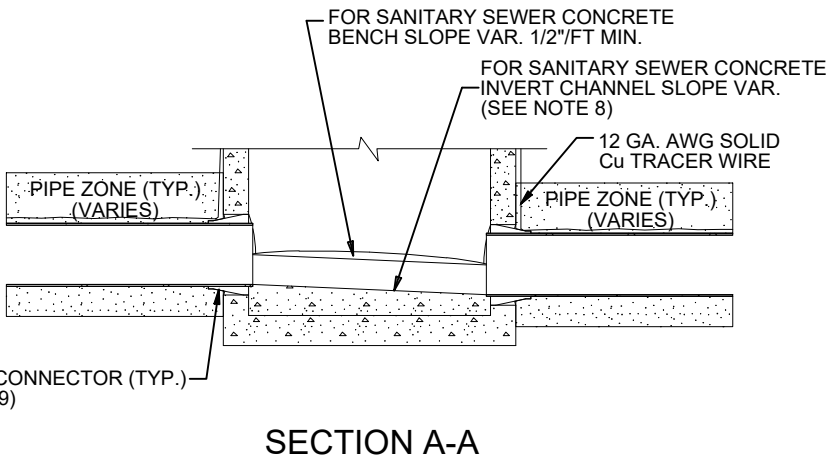
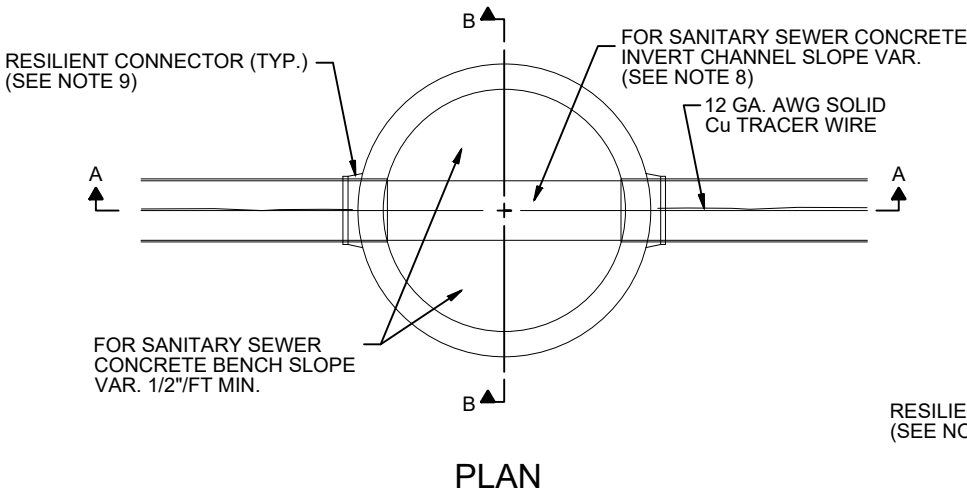
DESN: MCH

SS-004

Bar Measures 1 inch


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CONNECTION OF FLEXIBLE PIPE TO MANHOLE



NOTES FOR ALL DETAILS:

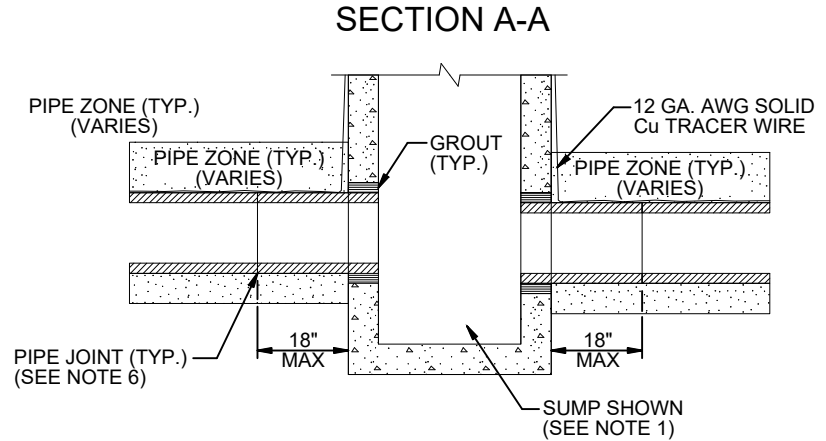
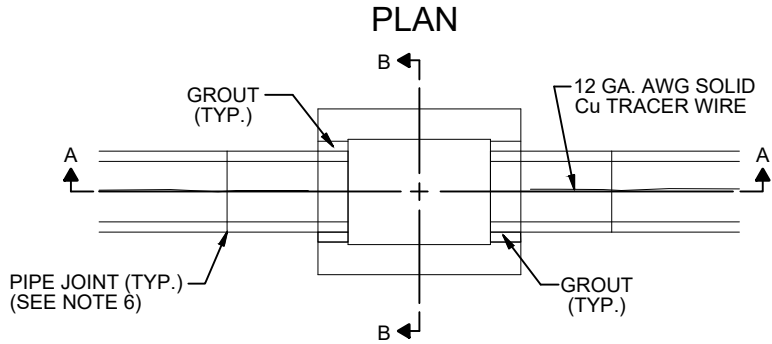
- 1. ALL PRECAST PRODUCTS SHALL CONFORM TO REQUIREMENTS OF ASTM C478.
- 2. MANHOLE BASE SECTIONS MAY BE PRECAST OR CAST-IN-PLACE.
- 3. ALL CONCRETE SHALL BE COMMERCIAL GRADE CONCRETE.
- 4. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
- 5. MAX. PIPE DIAMETER VARIES.
- 6. MINIMUM DISTANCE BETWEEN HOLE PENETRATIONS INTO MANHOLES SHALL BE PER THE MANUFACTURERS MINIMUM RECOMMENDATIONS.
- 7. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
- 8. INVERT CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE FOR ALL SANITARY MANHOLES.
- 9. WHEN FLEXIBLE PIPE IS USED, INSTALL RESILIENT CONNECTORS CONFORMING TO REQUIREMENTS OF ASTM C923 (I.E. KOR=N-SEAL BOOT).

	CITY OF DONALD P.O BOX 388 DONALD, OR 97020	PIPE TO MANHOLE CONNECTION 2 OF 2		PROJ: 200-166682-20001
				DATE: 6/3/2021
				DESN: MCH
				SS-004

Bar Measures 1 inch

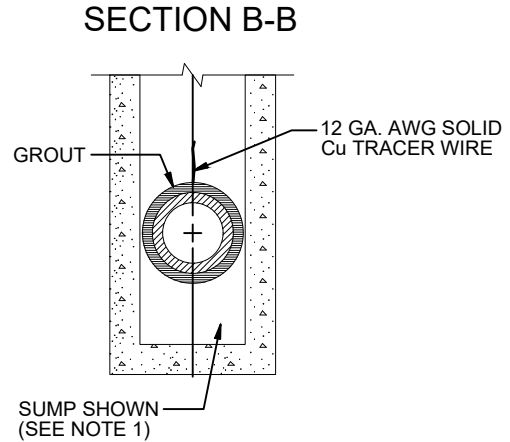
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CONNECTION OF RIGID PIPE TO STRUCTURE



NOTES FOR ALL DETAILS:

1. SEE STD. DWG. FOR INLET DETAILS NOT SHOWN.
2. SEE APPROPRIATE STD. DWGS. OR SPECIAL PROJECT DETAILS FOR OTHER SIMILAR STRUCTURES.
3. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
4. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL.
5. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
6. WHEN RIGID PIPE IS USED, THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKET, AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL. JOINT TYPE VARIES WITH MANUFACTURER.
7. WHEN FLEXIBLE PIPE IS USED, INSTALL RESILIENT CONNECTORS CONFORMING TO REQUIREMENTS OF ASTM C923 (I.E. KOR-N-SEAL BOOT).



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PIPE TO STRUCTURE
CONNECTIONS
1 OF 2

PROJ: 200-166682-20001

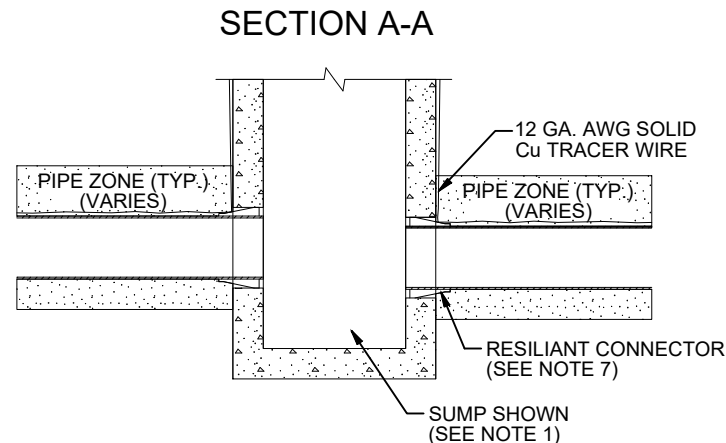
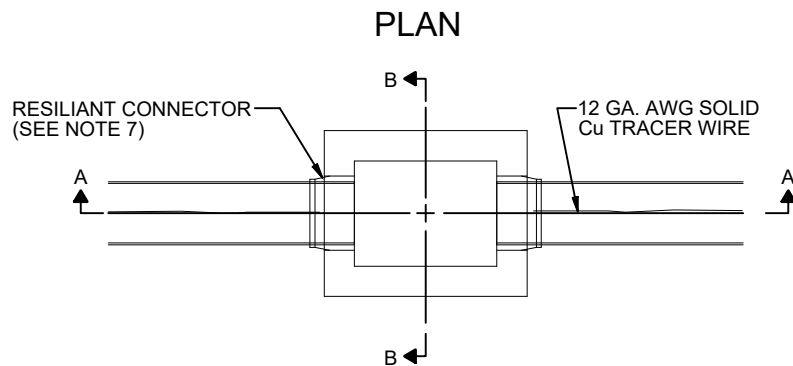
DATE: 6/3/2021

DESN: MCH

SS-005

Bar Measures 1 inch

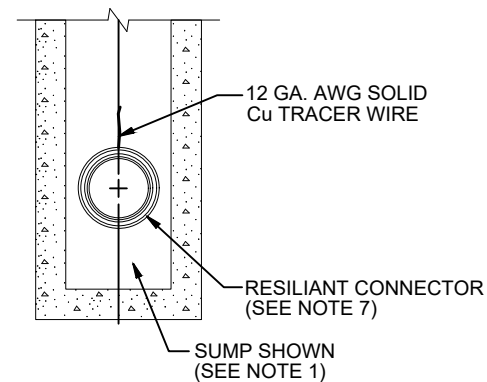
CONNECTION OF FLEXIBLE PIPE TO STRUCTURE



NOTES FOR ALL DETAILS:

1. SEE STD. DWG. FOR INLET DETAILS NOT SHOWN.
2. SEE APPROPRIATE STD. DWGS. OR SPECIAL PROJECT DETAILS FOR OTHER SIMILAR STRUCTURES.
3. LOCATION, ELEVATION, DIAMETER, SLOPE, AND NUMBER OF PIPE(S) VARIES, SEE PROJECT PLANS.
4. MAX. PIPE DIAMETER VARIES WITH PIPE MATERIAL.
5. ALL CONNECTING PIPES SHALL HAVE A TRACER WIRE, OR APPROVED ALTERNATE.
6. WHEN RIGID PIPE IS USED, THE CONNECTING PIPE SHALL HAVE A FLEXIBLE, GASKET, AND UNRESTRAINED JOINT WITHIN 18" OF MANHOLE WALL. JOINT TYPE VARIES WITH MANUFACTURER.
7. WHEN FLEXIBLE PIPE IS USED, INSTALL RESILIENT CONNECTORS CONFORMING TO REQUIREMENTS OF ASTM C923 (I.E. KOR-N-SEAL BOOT).

SECTION B-B



CITY OF
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P.O BOX 388
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PIPE TO STRUCTURE
CONNECTIONS
2 OF 2

PROJ: 200-166682-20001

DATE: 6/3/2021

DESN: MCH

SS-005

Bar Measures 1 inch