Street Development Standards

Prepared for

Des Moines WA
The Waterland City

February 2023

Prepared by
Parametrix

Street Development Standards

Prepared for

City of Des Moines
21650 11th Avenue S
Des Moines, WA 98198

Prepared by

Parametrix
1019 39th Avenue SE, Suite 100
Puyallup, WA 98374
T. 253.604.6600 F. 1.855.542.6353
www.parametrix.com

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APPENDICES

ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
ASTM	American Society for Testing and Materials
BM	benchmark
BMPs	Best Management Practices
CDF	Controlled Density Fill
CFS	cubic feet per second
CSTC	crushed surfacing top course
CSWPP	Construction Stormwater Pollution Prevention
DHV	Design Hourly Volume
ESC	Erosion and Sediment Control
ESD	entering sight distance
FC	foot-candles
FHWA	Federal Highway Administration
FWD	Falling Weight Deflectometer tests
HMA	hot mix asphalt
HOV	High-Occupancy Vehicle
ISD	intersection sight distance
KCRDCS	King County Road Design and Construction Standards
KCSWDM	King County Surface Water Design Manual
LAG	Local Agency Guidelines Manual
LBS	pounds
MPH	Miles Per Hour
MUTCD	Manual of Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NPDES	National Pollutant Discharge Elimination System
NDCBU	Neighborhood Delivery and Collection Box Unit
OHWE	ordinary high water elevation
PASA	Public Agency Service Agreement
PC	point of curvature
PSE	Puget Sound Energy

ACRONYMS AND ABBREVIATIONS (CONTINUED)

PT	point of tangency
ROW	right-of-way
SEPA	State Environmental Policy Act
SSD	stopping sight distance
SU	Single Unit
SWPPS	Stormwater Pollution Prevention and Spill Control
USCS	Unified Soil Classification System
VMS	variable message sign
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1. ADMINISTRATION

1.1 General

The City of Des Moines has adopted these Street Development Standards to set forth specific, consistent, and acceptable street design and construction elements for developers and other private parties constructing or modifying street or right-of-way facilities which require City licenses or permits, and to establish uniform criteria to guide the City's own design and construction of new City streets or reconstruction of existing streets.

In addition, these Street Development Standards, hereafter known as the Standards, are intended to support City goals for achieving affordable housing, providing adequate facilities for development in an efficient manner, complying with storm water management and environmental policies, and to balance these goals with the general safety and mobility needs of the traveling public.

These Standards establish uniform technical requirements for street design, construction, and reconstruction within the City of Des Moines. In establishing these uniform technical requirements, the Public Works Director has sought to encourage standardization of street design elements where necessary for consistency and to ensure so far as practical that motoring, bicycling, and pedestrian public safety needs are met. Considerations include safety, convenience, aesthetics, proper drainage, economical maintenance, and protection of environmental resources.

The City's permitting and licensing activities require the adoption of specific, identifiable standards to guide individuals and entities in the administration process of procuring the necessary City approval(s). Yet, the City must have the flexibility to carry out its general duty to provide streets for the diverse and changing needs of the traveling public and others who use the public right-of-way. Accordingly, these standards are not intended to represent the legal standard by which the City's duty to the public is to be measured.

The decision to use a particular road design element at a particular location should be made on the basis of an engineering analysis of the location. Thus, while these Standards provide the minimum requirements for design, it is not a substitute for professional engineering judgment. It is the intent that the provisions of these Standards be uniform requirements for street design, but may not be appropriate for all locations and existing conditions.

These Standards cannot provide for all situations. They are intended to assist, but not to substitute for, competent work by design professionals. It is expected that that architects, engineers, land surveyors, and contractors will bring to each project the best of their skills and abilities from their respective area of expertise. These uniform requirements are also not intended to unreasonably limit any innovative or creative effort which could result in the more effective and appropriate combination of improved design, cost savings, or both. Environmental constraints may require more intense or rigorous design parameters than would be otherwise required. However, any proposed departure from these Standards will be judged on the likelihood that such variance will produce a compensating or comparable result, in every way safe and adequate for the public.

The design engineer should take into account all available information and use the professional judgment that comes from training and experience to make final design determination. There should be some record, not necessarily formal or cumbersome, of the matters that were considered during the design process that would justify the decisions that were made regarding the final project design.

The Public Works Director will judge any proposed designs that depart from the requirements outlined in these Standards on the likelihood that such deviation will produce compensating or comparable results, adequate for street use and the general public. The Public Works Director will be the final authority in resolving disputes concerning questions of fact in connection with standards for street design and construction not directly covered by these Standards.

1.2 Document Application

The requirements contained in these Standards, together with any and all amendments thereto, shall apply prospectively to all road, bridge, right-of-way facilities, and other new construction of public and private roads in the City of Des Moines. In case of any ambiguity or dispute over interpretation of the provisions of these Standards, the decision of the Public Works Director shall be final.

The Standards apply to modifications of roadway features or existing facilities which are within the scope of reconstruction, widening, required off-site road improvements for land developments, or capital improvement projects when so required by the City of Des Moines or to the extent they are expressly referred to in project plans and specifications.

These Standards are not intended to apply to "resurfacing, restoration, and rehabilitation" projects, also known as 3R projects, as those terms are defined in the Washington State Department of Transportation (WSDOT) Local Agency Guidelines Manual (LAG), as amended. However, the Public Works Director may at his/her discretion consider the Standards as optional goals for the design and construction of 3R projects.

1.3 Authority for Document

The Public Works Director is authorized by the Street Development Standards Code DMMC 12.15, to prepare, adopt, and update design standards to establish minimum requirements for the design and construction of transportation facilities during construction. The standards contained in this design manual constitute the design standards authorized by DMMC 12.15. These standards are intended to be consistent with the most currently adopted provisions and editions of the Des Moines city code, the Comprehensive Plan, and the publications cited in the appendices of this manual.

1.4 Severability

If any part of these Standards as adopted by ordinance shall be found invalid, all other parts shall remain in effect.

1.5 Modifications to These Standards

From time to time, it may be necessary to modify the standards in the design manual. The Public Works Director may incorporate minor changes to this manual as they become necessary.

1.6 Relationship to other Documents and Standards

The most current edition of the following publications and manuals are approved for use by the Public Works Director and may be used to supplement these Standards when a specific subject is not covered or discussed:

- *Standard Specifications for Road, Bridge, and Municipal Construction*, as published by the Washington State Department of Transportation and the American Public Works Association.
- *Standard Plans for Road, Bridge, and Municipal Construction*, as published by the Washington State Department of Transportation and the American Public Works Association.
- *Manual on Uniform Traffic Control Devices*, as published by the U.S. Department of Transportation, Federal Highway Administration, as amended and approved by the Washington State Department of Transportation. Commonly known as the "MUTCD".
- *Standard Specifications for Highway Bridges*, and any interim specifications, as adopted by the American Association of State Highway and Transportation Officials (AASHTO).
- *Construction Manual*, as published by the Washington State Department of Transportation.
- *Surface Water Design Manual*, as published by the King County Department of Natural Resources.
- *Local Agency Guidelines*, as published by the Washington State Department of Transportation. Commonly known as the "LAG Manual".
- *Trip Generation*, as published by the Institute of Transportation Engineers.

The most current edition of the following publications are recognized by the Public Works Director as industry authorities and may be consulted on specific subjects not covered or discussed in this Manual or the above supplemental documents:

- *A Policy on Geometric Design of Highways and Streets*, as published by the American Association of State Highway and Transportation Officials. Commonly known as the "AASHTO Green Book".
- *Americans with Disabilities Act (ADA) Standards for Accessible Design*, as published by the United States Department of Justice.
- *Plans Preparation Manual*, as published by the Washington State Department of Transportation.
- *Design Manual*, as published by the Washington State Department of Transportation.
- *Bridge Design Manual*, as published by the Washington State Department of Transportation.
- *Roadside Design Guide*, as published by the American Association of State Highway and Transportation Officials.
- *Hydraulic Manual*, as published by the Washington State Department of Transportation.
- *American Society for Testing and Materials (ASTM)*.

The design engineer may need to consult not only these Standards, but a number of other City of Des Moines documents. All road plans submitted to the City for review and approval shall be consistent with

these other adopted City standards or ordinances. These documents or standards include but are not limited to:

- City of Des Moines Comprehensive Plan
- City of Des Moines Comprehensive Transportation Plan
- City of Des Moines Transportation Improvement Plan
- Critical Areas Ordinance
- City of Des Moines Capital Improvement Plan

1.7 Responsibility to Provide Roadway Improvements

Any land development, which will impact the service level, safety, or operational efficiency of streets serving such land development, or is required by other City code or ordinance to improve such streets, shall improve those streets in accordance with these Standards. Off-site roadway improvements shall be based on an assessment of the impacts of the proposed land development by Public Works Director.

Any land development abutting and impacting existing streets shall improve the frontage of those streets in accordance with Chapter 12 of the DMMC and these Standards.

Any land development that contains internal roads shall construct or improve those roadways in accordance with these Standards.

For commercial developments, these Standards shall apply unless otherwise determined by the Public Works Director. These Standards shall apply to commercial developments with public/dedicated rights-of-way or easements, unless otherwise determined by the Public Works Director.

All new and reconstructed road and development projects shall provide applicable pedestrian and bicycle improvements that meet the Standards, unless otherwise approved by the Public Works Director.

Subdivisions, short subdivisions, binding site plans or any other developments that are subject to recording shall not be recorded until there exists a recorded continuous public maintained access, or an access that is covered by a maintenance financial guarantee to the development site. Additionally, the City will not accept a road or the drainage improvements within the road rights-of-way for maintenance until the road is directly connected to a City maintained or an acceptable publicly maintained road. This requirement also applies to public roadways located within a commercial development and those public roadways created through the binding site plan process and any other permit process.

1.8 Errors and Omissions

At the discretion of the Public Works Director, any significant errors or omissions in the plans approved by the City, or information used as a basis for such approvals may constitute grounds for withdrawal of the approvals and/or stoppage of any or all permitted work. It shall be the responsibility of the applicant, developer, or contractor to show cause why such work should continue, and make such changes in the plans that may be required by the Public Works Director before the plans are re-approved.

1.9 Deviation from Standards

No deviation from the technical requirements contained in these Standards may be made without first obtaining the written approval of the Public Works Director.

The minimum technical requirements contained in these Standards represent reasonable approaches to design and construction of streets, which indicate the appropriate engineering practice under most conditions. However, engineering design is an endeavor that examines alternative solutions in real world situations and accordingly, these Standards are not provided to hamper those creative engineered solutions. Situations will present themselves where alternatives may be preferred to allow conformance with existing conditions, to overcome adverse topography or to allow for more affordable solutions without adversely affecting safety, maintainability, or aesthetics.

1.9.1 Process

The following process is to be used to review a request to gain approval for alternative designs which vary from City of Des Moines Street Development Standards, but which serve to accomplish the intent of standards, criteria, and established minimum technical requirements contained in these Standards.

Requests for deviation should be submitted by the design engineer directly to the Public Works Director, together with the applicable fee (see Section 1.11), where they will be accepted, logged in, and assigned to the investigating staff. The Deviation Request Form can be found in Appendix C. At a minimum, the design engineer shall provide the following information:

Requestor's name, address, phone number, date of request, title of project, City of Des Moines Development File Number, project application numbers, relevant standard at issue, nature of requested deviation, and any other comments of relevance, together with the information required below in Section 1.9.2 of these Standards. The request package shall be stamped by a licensed professional engineer.

The Public Works Director will investigate the deviation request and coordinate with the design engineer and affected city staff as necessary. For deviation issues relating to the South King County Fire District, city staff shall notify the Fire District and request comments and concerns prior to issuing a staff recommendation. For deviation issues relating to School District(s), city staff shall notify the affected School District(s) and request comments and concerns prior to issuing a staff recommendation. City staff will in turn prepare a draft finding of facts and draft recommendations with regard to approval or denial in the form of a draft response letter to the design engineer to be signed by the Public Works Director.

The Public Works Director will review the design engineer's deviation request, together with all supportive material to justify the deviation request, and the draft finding of facts prepared by city staff and any staff recommendations included in the draft response letter.

When reviewing a deviation request, the Public Works Director will evaluate the request to determine if the proposal produces a compensating or comparable result which is in the public interest and that the proposal meets the requirements for safety, function, fire protection, appearance and maintainability utilizing the evaluation criteria outlines in Section 1.9.2. The Public Works Director shall then make a final determination and file a written finding of facts concerning the deviation request. The Public Works Director will grant or deny a deviation request in full or in part based on these findings. When granting a deviation, the Public Works Director may attach specific conditions to the deviation which will serve to accomplish the intent of standards, criteria, and established policies. Deviation requests must receive the approval of the Public Works Director before road construction plans can be approved.

Every effort will be made to complete the deviation review process within four weeks from acceptance of the deviation request by the Engineering Services division.

1.9.2 Evaluation Criteria

The Public Works Director has, for certain design items, established policy criteria which are used to assist in determining the appropriateness of granting a deviation from related City standards. Many of these policy criteria are contained in the documents outlined in Section 1.6 of these Standards.

Before any deviation may be granted, it shall be shown that:

1. The granting of such deviation will produce compensating or comparable results, adequate for the road users and the general public.
2. The granting of such deviation will not violate any development related conditions imposed upon the project.
3. The granting of such deviation will not be materially detrimental to the public welfare or injurious to the property or improvements is such vicinity in which the subject property is located.
4. Such deviation is based on sound engineering judgement, and that requirements for safety, function, appearance, environmental protection, and maintainability are fully met.

The Public Works Director may grant a deviation from the minimum technical requirements contained in these Standards only upon submittal of additional information, plans and/or design data by a design engineer showing that the requested deviation is safe, in the best interest of the public, and will not impose undue maintenance costs on the City of Des Moines, if applicable.

1.9.3 Re-Examination

The requesting party may seek a re-examination of the original request by transmitting a letter to the Public Works Director outlining exceptions taken to the original findings. The requesting party shall provide additional details specifically addressing the exceptions being taken in order to enable the Public Works Director to conduct additional evaluation of the request.

An additional deviation request fee is required with a re-examination request.

The Public Works Director will be final authority in resolving disputes concerning questions of fact in conjunction with standards for street design and construction not directly covered by these Standards, as set forth in DMMC 12.01.040.

1.10 Penalties and Financial Guarantees

Failure to comply with these Standards will be cause for denial of plan or development permit approval, revocation of prior approvals, withholding and reductions of financial guarantees, withholding final inspection approval, withholding occupancy certificates (temporary and permanent), legal action for forfeiture of financial guarantee, code enforcement, and/or other penalties as provided by law.

1.10.1 Performance/Restoration Financial Guarantees

Any construction work on City of Des Moines right-of-way (both maintained and unmaintained) other than Capital Improvement Projects by the City or City maintenance work, shall be guaranteed by a restoration financial guarantee or Public Agency Service Agreement (PASA).

1.10.2 Maintenance and Defect Guarantees

The successful performance of the right-of-way improvements or related drainage facilities shall be guaranteed for a period of at least 1 year from the date of the Construction Approval. The Public Works Director shall determine the amount and form of the maintenance financial guarantee. The minimum maintenance guarantee shall be $2,000.00.

1.10.3 Private Facilities Guarantees

All work on private road and drainage facilities, required as a condition of a City approval process, shall be guaranteed by a maintenance and/or performance financial guarantee at the time of plat recording. Public Works Director shall determine the amount and form of the financial guarantee. The minimum restoration and/or performance guarantee shall be $2,000.00. The preferred form is an assignment of funds.

1.11 Fees

Fees, charges or bonding requirements will be as established by the City Council adopting a fee, charge, and bonding requirement schedule except where specifically set forth in the DMMC.

The applicant/developer/contractor will pay for work beyond the normal working hours of an inspector at time and one half according to the overtime rates determined by the City.

The review of engineering plans, or portions thereof, and specifications may be reviewed by a third party, hired by the City of Des Moines.

Engineering Services fees for Engineering Plan Review, Right-of-Way Use Permits, Street/Alley Vacation Petitions, Vehicular Access Gate Permits, and Deviation Requests, will be assessed at the established rates as published in the current Development and Engineering Services Fee Schedule, available on the City website.

1.12 Definitions

When referring to these Standards the following definitions shall apply:

AASHTO: American Association of State Highway and Transportation Officials.

Access: An ability to enter or leave the general public street system from an adjacent driveway, shared access facility, alleyway, or private street.

Access Improvement: Any street improvement which is required at the intersection(s) created by the road approach(es) of the development to a City arterial classified street, or along a City local classified street between the street approach(es) of the development and the first local street/arterial street intersection(s), including said street intersection(s), including but not limited to entering sight distance and turn lane requirements.

ADA: Americans with Disabilities Act.

ADT: The Average Daily Traffic (ADT) is the general unit of measure for traffic defined as the total number of vehicles traveling past a particular point in an average 24-hour period. Typically the ADT is used to quantify the combined number of vehicles traveling either direction on a particular street.

Alley: A relatively narrow passageway intended for traffic to serve as rear access to lots or buildings. An alley is not intended for general traffic circulation.

Applicant: The person, party, firm, corporation, or other legal entity or designee proposing to do work regulated by these Standards.

Appurtenance: Equipment and/or accessories that are part of an operating system or subsystem.

APWA: American Public Works Association.

As-Built Drawings: See Record Drawings.

ASTM: American Society for Testing and Materials.

ATB: Asphalt Treated Base.

Auxiliary Lane: The portion of the roadway adjoining the traveled way for parking, turning or other purposes supplementary to through-traffic movement.

Backfill: Replacement of excavated material with suitable material compacted as specified.

Bikeway: A generic term for any road, street, path, or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Boring: Grade and alignment controlled mechanical method of installing a pipe or casing under a street or stream without disturbing the surrounding medium.

Breakaway Structure or Breakaway Design: A structure or installation that has been crash tested in accordance with National Cooperative Highway Research Program

Buffer: The space between the edge of the pavement or the back of the curb and the sidewalk.

Bus Zone: A designated space for loading and unloading transit passengers.

Capacity: The maximum number of vehicles that have a reasonable expectation of passing over a given roadway or section of roadway during a given time period under prevailing roadway and traffic conditions.

Channelization: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands or other suitable means to facilitate the safe and orderly movement of both vehicles and pedestrians.

City: The City of Des Moines, acting through its legally constituted elected officials, employees, or agents.

Clear Zone: The total roadside border area starting at the edge of the traveled way available for use by errant vehicles. The available clear zone is the distance, measured normal to the street, beginning at the edge of traveled lane to the closest part of any fixed object of nontraversable obstacle.

CMP: Corrugated Metal Pipe.

Compaction: The densification of a material, typically fill or asphalt, by mechanical means.

Conveyance System: The drainage facilities, both natural and man-made, which collect, contain, and provide for the flow of surface, stormwater, and sanitary sewage from the highest points on the land down to the receiving waters or receiving treatment facility. The natural elements of storm water conveyance systems include swales and small drainage courses, streams, creeks, rivers, lakes, and wetlands. The man-made elements of conveyance systems include gutters, ditches, pipes, channels, and retention/detention facilities.

Critical Areas: Those areas which are subject to natural hazards or those land features which support unique, fragile, or valuable natural resources including fish, wildlife and other organisms and their habitat and such resources which carry, hold or purify water in their natural state. Critical areas include but are not limited to erosion hazard areas, flood hazard areas, landslide hazard areas, seismic hazard areas, steep slope hazard areas, streams, wetlands and sensitive area buffers.

CSBC: Crushed Surfacing Base Course.

CSTC: Crushed Surfacing Top Course.

Cul-de-sac: A short street having one end open to traffic and the other temporarily or permanently terminated by a vehicle turnaround at or near the terminus.

Cultural Resources: Material evidence of human activities, occupations, and systems illustrated by districts, sites, landscapes, structures, objects, artifacts, ruins, buildings, and natural features that have been or are important in human history and prehistory, and in the maintenance of living cultures.

Dead End: A street without an exit.

Dedication: Shall mean the deliberate appropriation of land by its owner for public use or purpose, reserving no other rights than those that are compatible with the full exercise and enjoyment of the public uses or purpose to which the property has been devoted. The intent to dedicate will be evidenced by the owner by the presentment for filing of a final plat, short plat, binding site plan or statutory warranty deed that shows the dedication thereon. Acceptance by the public will be evidenced by written approval issued by the City of such document for filing with the County Auditor.

Design Hourly Volume (DHV): The DHV is generally the 30th highest hourly volume (30 DHV) of the future year chosen for design. On the average, in urban areas the DHV is usually 8 to 12 percent of the ADT.

Design Speed: A speed determined for design and correlation of the physical features of a street that influence vehicle operation; the maximum safe speed maintainable over a specified section of road when conditions permit design features to govern.

Developer: Any person, firm, partnership, association, joint venture or corporation, or any other entity who undertakes to improve residential, commercial, or industrial property or to subdivide for the purpose of resale and profit.

Development: Any man-made change to improved or unimproved real property including but not limited to, construction of buildings or other structures, placement of manufactured homes, mining, dredging, logging, clearing, filling, grading, paving, excavation, drilling operations, or the subdivision, short plat, and large lot division of property.

DHV: Design Hourly Volume.

DMMC: Des Moines Municipal Code.

Downstream Analysis: Report that assesses potential offsite drainage impacts associated with development of the project site and appropriate mitigation of these impacts in accordance with the requirements of the KCSWDM.

Driveway: A privately maintained access facility between the driveway approach point on a street, shared access facility, or emergency vehicle access and the abutting private property which provides access for vehicle traffic.

Driveway Approach: Any area, construction, or facility between the roadway and the driveway, shared access facility, or emergency vehicle access serving the abutting private property which provides access for vehicular traffic.

Dwelling Unit: One or more rooms designed for occupancy by a person or family for living and sleeping purposes, containing kitchen facilities and rooms with internal accessibility, for use solely by the dwelling's occupants; dwelling units include but are not limited to single detached units, townhouses, condominiums, apartments, factory built housing, and accessory units.

Easement: A right to use or control the property of another for designated purposes.

Edge of Traveled Way: The face of the curb for streets that are or will be constructed to the City of Des Moines Street Development Standards; or if no curb exists or is planned, the location on the pavement of the painted or marked edgeline; or if no edgeline is present, the edge of the pavement.

Encroachment: Occupancy of City right-of-way by nonroadway structures or other objects of any kind.

Engineer: A professional civil engineer licenses by the State of Washington.

Engineering Plan: A plan prepared, stamped, and signed by a professional civil engineer. An engineering plan may be supplemented with detailed drainage calculations, structural calculations, or other supporting documents needed to assess the total plan.

Entering Sight Distance: The sight distance required for a vehicle at a stopped position on the minor street to view an oncoming vehicle traveling at the speed limit on the major road and appearing after the moment has begun, and safely enter or cross the major street.

Established Grade: The profile and cross sections approved by the Public Works Director.

Eyebrow: A partial bulb located adjacent to the serving road that provides access to lots and serves as a vehicle turnaround.

FHWA: Federal Highway Administration.

Final Corrected Plans: See Record Drawings.

Frontage Improvement: Any roadway improvement which is required by City Code along the portion of the public right-of-way immediately adjacent to the development site. Frontage improvements may include, but are not limited to street pavement, curb, gutter, sidewalk, bus shelters, bus pullouts, storm drainage, undergrounding of existing overhead power and communications cable, street trees, and street lighting.

Functional Classification: The classification of a road as established by ordinance of the Des Moines City Council based upon the character or service the street is intended to provide with regard to mobility and access.

Generator Peak Hour: The specific 60 minute period of highest traffic volume for the specific use or activity under review.

Geometrics: The physical arrangement of the visible elements of a street such as alignment, grade, curvature, width and side slopes.

Grade: Rate or percent of change in slope measured along the centerline of the roadway or access point, either ascending or descending from or along the roadway/access point.

GSP: General Special Provisions.

Half-Street: A road section built adjacent to the property, which eventually will be completed to a full width road section when the adjacent property is developed or redeveloped.

Hammerhead: A type of roadway design used to provide a place for vehicles to turn around at the terminus of a street. The turnaround is typically in the shape of the letter "T".

Heritage Corridor: A transportation corridor that is known for its intrinsic historic resource values irrespective of jurisdictional boundaries and ownership.

HMA: Hot Mix Asphalt.

Island: A defined area between traffic lanes for control of vehicle movements and/or for pedestrian refuge.

ITE: Institute of Transportation Engineers.

Joint-Use Driveway: A jointly owned and maintained driveway serving multiple properties.

KCSWDM: King County Surface Water Design Manual

L & I: Washington State Department of Labor and Industries.

LAG: Local Agency Guidelines.

Landing: A road or driveway approach area to any public or private road. Also, the level area at the back of the sidewalk ramp.

Loop Road: A street of limited length forming a loop, having no other intersecting road, and functioning mainly as direct access to abutting properties.

Low Volume Road: A neighborhood collector or lower classified road with an ADT of less than 400 vehicles.

Low Impact Development: An innovative ecosystem based approach to land development and storm water management that results in fewer environmental impacts.

Median: The portion of a divided roadway separating the traveled ways for traffic in opposite directions.

MPH: Miles Per Hour.

MUTCD: The Manual on Uniform Traffic Control Devices, published by the U.S. Department of Transportation.

NEC: National Electric Code.

New Construction: Construction of a new roadway or structure on a substantially new alignment, or the upgrading of an existing roadway or structure by the addition of one or more through traffic lanes, excluding auxiliary lanes.

Off-Street Parking Space: An area accessible to vehicles, exclusive of roadways, sidewalks, and other pedestrian facilities that is improved, maintained, and used for the purpose of parking a motor vehicle.

Pan Handle: A strip of land having a width narrower than that of the lot or parcel to be served and designed for providing access to that lot or parcel.

Passing Sight Distance: The minimum sight distance required for the driver of one vehicle to pass another vehicle safely and comfortably.

Pavement Widening: Pavement widening projects are expansion of the roadway surface for vehicular use and may involve earthwork, drainage and paving elements. These projects are considered alterations of the roadway and must address ADA accessibility for pedestrians.

Pavement Width: Paved area on shoulder-type roads, or paved surface between curb or gutter as depicted on Standard Drawings DM.A1.1 through DM.A6.1.

PC: Point of Curvature.

PCC: Portland Cement Concrete.

Peak-Hour: The specific 60 minute period in the day within which the highest traffic volumes occur.

Peak-Hour Trip: A vehicle trip end generated by the development during a peak-hour period.

PI: Point of Intersection.

Public Works Department: The City of Des Moines department responsible for administering development and capital improvements within the City of Des Moines.

Public Works Director: The Public Works Department employee responsible for the conditioning, review, inspection, and approval of right-of-way use permits, and road and drainage improvements constructed as part of development permits administered by the Public Works Department. The Public Works Director or his/her authorized representative shall be a professional civil engineer registered and licensed under the laws of the State of Washington.

Plan of Record: See Record Drawings.

Posted Speed: The speed limit actually signed along the roadway.

Private Access Tract: A privately owned and maintained tract that provides vehicular access to residential properties.

Private Street/Road: A roadway facility provided for by a tract, easement, or other legal means, that is privately owned and maintained, and provides private access by the owner(s) or those having express or implied permission from the owner(s), but not by other persons.

Professional Engineer: A professional civil engineer registered and licensed to practice engineering in the State of Washington.

PS&E: Plans, Specifications, and Estimate.

PT: Point of Tangent.

RCW: Revised Code of Washington.

Reconstruction: A reconstruction project involves major construction activity in excess of 3-R activity. Reconstruction includes significant changes in cross section, the addition of an auxiliary lane, and/or shifts in vertical or horizontal alignment. If 50 percent or more of the project length involves significant vertical or horizontal alignment changes, the project will be considered reconstruction. Reconstruction may require acquisition of additional right-of-way, and may include all items or work usually associated with new construction.

Record Drawings: The plan set which is certified to contain a true and accurate representation of the actual field conditions for the project during construction, or upon completion of construction. Also known as “As-built Drawings” or “Final Corrected Plans”.

Recoverable Slope: A slope on which the driver of an errant vehicle can regain control of the vehicle. Slopes of 4H:1V or flatter are considered recoverable.

Rehabilitation: Work similar to restoration except the work may include reworking or strengthening the base or subbase, recycling or reworking existing materials to improve their structural integrity, adding underdrains, replacing or restoring malfunctioning joints, substantial pavement under-sealing when essential for stabilization, pavement grinding to restore smoothness (providing adequate structural thickness remains), removing and replacing deteriorated materials, crack and joint sealing (but only when the required shape factor is established by routing or sawing), and improving or widening shoulders.

Restoration: Work performed on pavement or bridge decks to prepare them for an additional stage of construction. This may include supplementing the existing roadway by increasing surfacing and paving courses to provide structural capability, widening up to a total of ten feet, and installing localized safety improvements. Restoration will generally be performed within the existing right-of-way.

Resurfacing: The addition of a layer or layers of paving material to provide additional structural integrity, and improve profile, cross section, and overall serviceability.

Right-of-Way: All property that the City has any form of ownership or title and which is held for public road purposes, regardless of whether or not any road exists thereon or whether or not it is used, improved, or maintained for public travel.

Road: A roadway facility providing public or private access including the roadway and all other improvements laying inside the right-of-way.

NOTE: “Road” and “Street” will be considered interchangeable terms for the purpose of these Standards.

Road Plans: A set of construction drawings and related documents which completely describe the work to be accomplished along with all needed supporting documents, maps, calculations, graphs, etc., prepared by a professional civil engineer licensed in the State of Washington.

Roadway: An open, generally public way for the passage of vehicles, bicycles, and pedestrians. Limits include the outside edge of sidewalks, or curbs and gutters, or side ditches, including the appertaining shoulder and all slopes, ditches, channels, waterways, and other features necessary for proper drainage and protection within the right-of-way.

ROW: Right-of-Way.

R/W: Right-of-Way.

SEPA: State Environmental Policy Act.

Separate Turn Lane: An auxiliary lane for traffic in one direction which has been physically separated from the intersection area by a traffic island or stripe. Separate turn lanes may be included within intersections or separated from intersection areas by traffic islands.

Shared Roadway: A roadway that is open to both bicycle and motor vehicle travel. This may be an existing roadway, a street with wide curb lanes, or a road with paved shoulders.

Shoulder: The paved or unpaved portion of the roadway outside the traveled way that is available for emergency parking, non-motorized use, and lateral support of base and surface courses.

Sidewalk: That portion of the roadway between the curb lines or the lateral lines of a roadway, and the adjacent property, set aside and intended for the use of pedestrians or such portions of private property parallel and in proximity to a highway and dedicated to use by pedestrians.

Special Provisions: Specifications, specific to a particular project, that supplement the Standard Specifications.

Standard Specifications: The most current edition of the "Standard Specifications for Road, Bridge, and Municipal Construction" published by the Washington State Department Transportation and the Washington State Chapter of the American Public Works Association.

Stopping Sight Distance: The length of roadway ahead visible to the driver which would enable the vehicle traveling at the design speed to stop before reaching a stationary object in its path.

Street Frontage: Any portion of a lot or combination of lots that directly abuts a public right-of-way.

Surety: A bonding company, for example.

Surveyor: A professional land surveyor registered and licensed by the State of Washington.

Temporary: Lasting for a "limited" time.

Three R: See 3-R**.**

TIA: Traffic Impact Analysis.

TIR: Technical Information Report.

Traffic Impact Analysis: A comprehensive, supplemental report that compares conditions with and without the proposed development for the purpose of identifying transportation improvements necessary to mitigate capacity and safety deficiencies created and/or exacerbated by the proposed development.

Technical Information Report: A comprehensive supplemental report containing all calculations, conceptual design analysis, reports, and studies required to construct a complete site improvement plan based on sound engineering practice and careful geotechnical and hydrological design.

Traveled Way: The portion of a street intended for the movement of vehicles. The traveled way does not include curbs and gutters, bike lanes, parking lanes or shoulders.

TRB: Transportation Research Board.

Trip: A one-directional movement which begins at the origin and ends at the destination.

Trip Distribution: The process by which the movement of trips between zones is estimated. The data for each distribution may be measured or estimated by a growth factor process or by a synthetic model.

Trip End: A trip origin or a trip destination. A trip has two trip ends; the origin and the destination.

Trip Generation: A general term describing the analysis and application of the relationships that exist between the trip makers, the traffic study area, and the trips making. It relates to the number of trip ends in any part of the traffic study area.

Turn Out: The paved or concrete area outside the traveled way for a use by transit vehicles.

TWLTL: Two-way Left-turn Lane.

Unmaintained Road: A road within the City right-of-way that is accessible to public travel but is not maintained by the City.

Unopened Right-of-Way: A City right-of-way that exists by dedication or deed, but for which no vehicular roadway has been constructed.

Utility: A privately, publicly, or cooperatively owned line, facility, or system for producing, transmitting, or distributing communications, cable television, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, or any other similar commodity which directly or indirectly serves the public. Additionally, the privately, publicly, or cooperatively owned company that owns the line, facility, or system.

Walkway: A facility designated for pedestrian and nonvehicular traffic. Walkways are typically constructed of asphalt. Separation from vehicle traffic may be provided by pavement striping, curbing, a ditch or open space.

VPD: Vehicles Per Day.

VPH: Vehicles Per Hour.

WSDOT: Washington State Department of Transportation.

3-R: Resurfacing, restoration, and rehabilitation of existing roadways with minimal changes to alignment or grade.

2. GENERAL PLAN REQUIREMENTS

2.1 Design and Drafting Standards for Engineering Plans

Plans submitted for review and approval by the Engineering Services division shall include the following minimum requirements. Any plans submitted not meeting these minimum requirements will not be reviewed further and will be returned to the design engineer for corrections.

1. All engineering plans, specifications, and calculations submitted for review and approval shall be prepared, stamped, signed, and dated by a professional engineer licensed in the State of Washington. All plans must be signed and stamped by the responsible professional engineer prior to submittal to the City.
2. Property surveys shall be performed and stamped by a professional land surveyor or professional civil engineer licensed in the State of Washington.
3. All plans and calculations shall be neat, uncluttered, legible, and in conformance with the requirements herein.
4. Where applicable (as determined by the Public Works Director), shop drawings shall be submitted for review and approval prior to plan approval. Other shop drawings may be required prior to notice to proceed.
5. Electronic plan submittal is preferred. Plans shall be submitted in PDF format. If electronic plan submittal is not possible, plans shall be 24 inches x 36 inches or 22 inches x 34 inches sheet size, with dark line on light background. The sheets shall be good quality reproducible ink on mylar or equivalent. At a minimum, the title block on the plans shall include the name of the project, name of the owner, application number, the applicant's/developer's name, address, and phone number, the name of the street to be improved, and the name, address, phone number, seal, date, and signature of the responsible professional engineer.
6. The cover sheet and all plan sheets shall include the same general title block including consecutive sheet numbers and an approval block that shall generally be located in the lower right-hand corner of each drawing.
7. City of Des Moines standard notes (provided in Appendix B), and applicable Standard Drawings, details, vicinity map, and legend of symbols shall also be included in the plan set.
8. If general notes do not adequately cover the project requirements, detailed Specifications will be required, and shall be submitted with the plans. A brief legal description of the site, in enough detail to locate the property, including lot #, 1/4 section, township, and range shall be located below the vicinity map.
9. For some projects covering a large area or containing a large number of sheets, the City may require a "Key Map" page to be included. The "Key Map" page shall show the overall general location of proposed improvements, where each page or sheet number can be found, and be at a horizontal scale of 1 inch = 100 feet.
10. North shall be shown up or to the right on the plans, and in no case will north be shown in opposing directions on the same or connecting sheets. The north arrow shall be located in the upper right corner of the plan sheet.
11. Engineer scale shall be required.

12. The scale shall be indicated directly below the north arrow and shall be only 1 inch = 20 feet, 40 feet, or 50 feet, as further described below. Any variation to the scale must be approved by the City in advance of plan submittal.
    a. Profile drawings shall have a horizontal scale of not more than 50:1 (50 feet to one inch), and a vertical scale of not more than 10:1 (10 feet to one inch). Plan views shall be of a corresponding horizontal scale.
    b. Channelization plans for connecting roadways may be at a 1 inch = 40 feet scale.
    c. Channelization and Signalization plans for intersections shall be provided at a 1 inch = 20 feet scale.
    d. Special Details shall be provided at a 1 inch=10 feet scale.
13. Minimum text height on plans will be at least 0.08 times the scale factor (i.e., 1 inch = 20-feet scale minimum text will be 20 (0.08) = 1.6 units). Minimum nominal text size will be 1/8 inch.
14. Indicate benchmark (BM) used with number and elevation.
15. The vertical and horizontal survey controls shall meet the requirements of RCW 58.09.070**.**
16. Bearings on roadway centerline or utility centerline, referenced to the NAD 83(11) Washington State Plane North Zone datum as well as location, description, and elevation of the nearest benchmark. Vertical datum shall be NAVD 88.
17. Lot size(s) with perimeter distances and bearings of the site shall be shown on the plans.
18. Proposed and existing rights-of-way and easements shall be clearly identified and dimensioned. New utility easements shall have a minimum width as required by each individual utility purveyor. Typically, pipes shall be centered in the easement. Show King County recording numbers for all existing easements. All easements required from adjacent properties shall be obtained prior to plan approval by the City (see Section 5.3).
19. All existing features (pipes, curbs, power poles, etc.) are to be produced with a small pen or half tones. Proposed features will be distinguished by a larger or bolder line weight.
20. The plans shall clearly identify all existing and proposed improvements, such as the roadway, sidewalks, shoulders, utilities, drainage facilities, rockeries, retaining walls and driveways. Existing and proposed driveway cross sections are required.
21. Show all pertinent existing and finish elevations.
22. The plans must include existing and proposed monuments. The roadway centerline, easements, and other pertinent data will be referenced to existing monuments.
23. Show existing natural drainage ways such as swales, ditches, etc. Show path of flow with arrows and elevations.
24. Show lakes, rivers, streams, flood plains, wetlands, sensitive slopes, and other sensitive areas.
25. Show limits and elevations of 100-Year Flood Plain, including delineation of the floodway and flood fringe where applicable.

26. All plan sets shall include the City of Des Moines Standard Drawings that are applicable for the project. Copies of the appropriate Standard Drawings shall be located on a separate plan sheets, at a maximum of 4 per sheet. Where a particular item is called out on the plans, a note shall be included on the drawing identifying the applicable City Standard Drawing referencing the plan sheet the detail is located on and the City Standard Drawing number.
27. All other required details not standardized by the City of Des Moines shall be shown on separate detail sheet(s).
28. The Public Works Director may require additional plan elements in addition to those cited above.
29. The plans must be reviewed and approved by the City prior to beginning construction.

2.2 Roadway Plan Notes

The notes provided in Appendix B shall be provided on the plans.

See Appendix B for:

- GENERAL NOTES
- TRANSPORTATION NOTES
- STORMWATER NOTES
- EROSION AND SEDIMENTATION CONTROL NOTES

2.3 Horizontal Plans

Horizontal plans shall include the following minimum requirements:

1. Roadway and/or proposed utility alignments, reading from left to right, showing stationing of points of curvature, tangency, intersection angle points, and with ties to existing monuments, including all necessary curvature data.
2. The plans must include existing and proposed monuments. The roadway centerline, easements, and other pertinent data will be referenced to existing monuments.
3. Right-of-Way and easement lines for existing and proposed improvements, including identification of all roadways, easements (including auditors file numbers), adjacent lot and tax lot numbers, and subdivision identifications.
4. All topographic features within and adjacent to proposed improvements and within sufficient area to assess impacts of slopes, drainage, access, future extensions, availability of service connections, etc.
5. All existing and proposed public and private utilities, including water and/or sewer district(s), electric power, natural gas, telephone, cable television, and any other utilities that may affect the proposed construction.
6. Existing and proposed drainage facilities, including culverts, catch basins, ditches, etc., indicating direction of flow, size, type of pipe, invert and rim elevations.
7. Identification of adjacent roads, subdivisions, building addresses, or any other information to facilitate locations and future reference.

8. Curb return elevations shall be shown at quarter points at all intersections at a minimum (larger radii should have more points), to verify drainage and a smooth transition.

2.4 Profile Plans

Profile plans shall include the following minimum requirements:

1. Profile drawings shall be prepared with all storm drain and street design plans, and with any other plans where vertical control is deemed to be important, and necessary, as determined by the Public Works Director.
2. In general, the existing centerline profile shall be plotted, denoting grade breaks, topographic features, and any other information important to the design.
3. The finish grade of the roadway and/or the utility profile shall be shown with the same stationing as the horizontal plan.
4. Roadway profiles shall include existing and proposed centerline elevations at 50-foot stations, or less; centerline grades and vertical curves, including station and elevations at PVCs, PVIs, PVTs, top of crest vertical curve, bottom of sag curve, flow grade of 0.50 percent within 50 feet of the level point for a sag vertical curve. When existing or proposed roadway includes superelevation, a superelevation diagram shall be included.

2.5 Detail Plans

Detail Plans shall include the following minimum requirements:

1. Appropriate Detail Plans, necessary for a detailed and accurate representation of the proposed improvements, shall be included in the plan set. Ideally and whenever appropriate and feasible, the City of Des Moines Standard Drawings shall be included in the Plans as Detail Plans.
2. Where special construction procedures or structures are required, Special Detail Drawings are required. These details would include designs and construction methods that are not included in the City's Standards Drawings.
3. Special Detail Drawings shall contain adequate dimensions, sections, views, notes, and call outs to construct the structure, or permit preparation of detailed shop drawings by the fabricator when necessary.

2.6 Stormwater Plans

Stormwater Plans shall include the following minimum requirements:

1. Plan and profile in accordance with Section 2.4 and 2.5.
2. Storm pipe including locations, lengths, materials, slopes, depths, and sizes.
3. Manholes and catch basins including location, types, and rim and invert elevations.
4. All new and existing manholes and catch basins shall be numbered consecutively.
5. Typical ditch cross sections shall be shown on the plans.
6. Easement widths and locations.

7. Identify any possible utility conflicts.
8. Roof drains.
9. The distance from the center line of pipes to any building structure.
10. An all-weather maintenance access to all structures, ditches, ponds, etc., including typical cross section of said access road.
11. Natural Drainageways.
12. Contours at 2-foot intervals.
13. Critical areas.
14. Significant trees.

2.7 Grading, Erosion and Sedimentation Control Plans

Grading, Erosion and Sedimentation Control Plans shall follow the minimum requirements of the Construction Stormwater Pollution Prevention Plan as required by the latest version of the King County Surface Water Design Manual.

2.8 Street Light Plans

Street Light Plans shall include the following minimum requirements:

1. Street light layout plans shall be on separate drawings from the street plan/profile sheets. The final locations shall be determined by the Public Works Director after the City receives a copy of the Puget Sound Energy (PSE) layout design drawings.
2. Street light disconnects shall be located near the power transformers.
3. Street light conduit for wiring shall be located within the utility easement for power, gas, telephone, and cable TV wherever possible.
4. Refer to Section 7.11 for Illumination standards.

2.9 Channelization and Signing Plans

Channelization and Signing Plans shall include the following minimum requirements:

1. Incorporated with “Street Light Plans”
2. Lane markers: locations and types
3. Pavement markings: locations and types
4. Signs: locations, types, and mountings
5. Painted street curbs

2.10 Signalization Plans

Signalization Plans shall include the following minimum requirements:

1. Separate detailed plans required
2. Pole base locations
3. Traffic loop location
4. Conduit location
5. Details of traffic signal system to be reviewed and approved by the Public Works Director
6. Location of power source

2.11 Record Drawings

Certified Records Drawings shall be signed and sealed by a Washington State licensed professional civil engineer and shall accurately reflect all field design revisions made during the construction process. These plans shall include field-verified elevations, slopes, and dimensions for curblines, sidewalks, ramps, and other features in the right-of-way or public sidewalk easements. All required Record Drawing information shall be clearly shown on the original design drawings approved for construction by the City of Des Moines. Each sheet of the Record Drawings shall include the following statement along with the design engineer's professional stamp, signed and dated, located at the bottom right-hand corner of the sheet when possible:

> "These plans are as-built, and the information shown accurately reflects existing field conditions as of this date: _____."

The as-built plans should also include all existing or abandoned utilities that were encountered during construction that were not shown on the design plans. The following required information is intended to provide a minimum guide to the engineer of record and should be used along with good engineering practices as the type of project and situation warrants.

Record Drawings shall be submitted to the City as PDF electronic files.

2.12 Waiver of Minimum Plan Requirements

The Public Works Director, in limited circumstances may waive minimum plan requirements. The Public Works Director will review the request for deviation of plan requirements based on a letter from the applicant.

3. ENGINEERING PLAN REVIEW PROCESS

3.1 Plan Review Fees

Engineering plan review fees are required separate from other departments review fees. The plan review fee shall be paid at the time of submittal. The review process begins when payment of the plan review fee has been made. Refer to Section 1.11 for additional information.

3.2 Plan Checklists

The Engineering Services division "Plan Review Checklists" and "Single Family Residence Review Plan Checklist" are included in these Standards (see Appendix A) as a guide to help the design engineer in the plan preparation process. The City recommends that these checklists be used by the design engineer to help facilitate an efficient plan review process.

3.3 Alternative Methods or Construction Materials Request

When circumstances warrant, the design engineer may request to vary from the design standards set forth in Section 1.9. The applicant should be aware that the City of Des Moines Street Development Standards are considered minimum requirements. It will be up to the design Engineer to provide the justification for the request. The applicant shall submit a completed "Deviation Request Form" (provided in Appendix C) form to the Engineering Services division with the applicable fee. The request will be reviewed by all applicable City departments. The final decision will be by the Public Works Director.

3.4 Plan Review Sequence

The following sequence shall be followed when engineered plans are required for review by the Engineering Services division:

1. All plans and reports are to be submitted to the Planning, Building, and Public Works Department. Any necessary easements, dedications, contracts, agreements, bonds, deviation request approvals, calculations, specifications, or other necessary documentation shall be submitted for review along with the plans.
2. An electronic set of plans shall be submitted to the Engineering Services division for review and approval. Plan shall be submitted in PDF format.
3. City staff will make a completeness check of the submittal against the Plan Review Checklists provided in the Appendix A. If the plans meet the minimum checklist requirements as to context, they will be routed to the appropriate City staff, and the plan review process begins.
4. The Engineering Services division will review the plans for conformance with City development requirements, policies, these Standards, and all other publications referenced herein. One set of red-line drawings and plan review comments will be returned to the design engineer for corrections as necessary.
5. The design engineer shall revise the plans addressing all red-line comments and "Plan Review Checklist" requirements. An electronic set of plans shall be resubmitted to the City for additional review.

6. When the engineering plans are acceptable for approval by the City, the plans will be stamped and signed by the Public Works Department. The plans will then be made available electronically for issuance, provided that all applicable fees required have been paid.
7. Prior to any work commencing, the general contractor shall arrange for a preconstruction meeting to be attended by all major contractors, representatives of involved utilities, and the City of Des Moines. Contact the Engineering Services division to schedule the meeting.
8. Any changes to the scope of the work as outlined on the approved plans shall be documented in a memo and submitted to the City by the Engineer of Record. The Public Works Director shall review and give approval of all changes prior to the commencing of any work related to the change.

3.5 Plan Termination

Applications for which no permit is issued within 180 days following the date of application will expire by limitation, and plans and other data submitted for review may thereafter be returned to the applicant or destroyed by the Public Works Department. The Public Works Director may extend the time for action by the applicant for a period not exceeding 180 days upon request of the applicant showing circumstances beyond the control of the applicant have prevented action from being taken. No application will be extended more than once. In order to renew action on an application after expiration, the applicant will resubmit plans and pay a new Plan Review Fee.

4. ACCESS, INTERSECTIONS, AND DRIVEWAYS

4.1 Access Control

This chapter provides guidelines and standards for access, which are those facilities necessary for movement from private property to the public road system.

Vehicular access is provided by one of the following means:

- Public road.
- Private road – including trail access permit road.
- Driveway – including fire apparatus access road.
- Alley – residential or commercial, a secondary access.

Design specifications for each type of road classification are contained in Chapter 5, "Roadway Design Control."

Access requirements for specific types of development are contained in the various development regulations of the DMMC.

Intersection and driveway location, spacing, and design are fundamental to the management of access and preservation of capacity provided for in the roadway design. The fundamental classification of each roadway addresses the appropriate level of access control for that roadway. The Public Works Director may require the applicant to furnish an access plan that will be used by the City to review what impact the proposed access will have on the city street system.

For proposed access approaches onto any road, the intersections created are classed into two types – roadways and driveways. Driveway design criteria are to be used for residential, minor, or major driveway approaches as outlined herein. Roadway intersection design criteria are to be used whenever an approach roadway intersects another road, or if traffic signalization is warranted as defined in the current edition of the MUTCD. All roadway intersections, public or private, will use roadway intersection design criteria.

When a three or more lane approach is requested, a traffic engineering study along with a signing, striping, and traffic channelization plan shall be completed by the design engineer.

The adequacy of all criteria given in this section to the particular situation in question should be checked by a proper engineering analysis. These criteria are minimum guidelines only and may be modified according to traffic volumes and mix, topography, design speed, design vehicle requirements, and other conditions.

4.1.1 General Access Requirements

The Public Works Director shall provide specific geometric design requirements for residential driveway approaches, minor driveway approaches, and major driveway approaches which are contained in Section 4.4. Roadway and driveway approaches, public or private, should be designed to provide adequate entering sight distance in both directions on the roadway being accessed, and so as to not interfere with drainage.

For both roadway and driveway intersections, the following general design criteria shall also apply:

A) Intersections should not be located on or near sharp curves, (i.e., curves with radii close to the AASHTO Green Book minimums). Intersections should be located sufficient distance from all curves to provide proper sight distance for vehicles on the intersecting road or driveway and on the through road.

B) In local road networks "T" and "L" intersections only are encouraged. For arterial access, four-leg intersections are encouraged.

C) Whenever a potential feasible access exists to any property from two or more roads, the Public Works Director may refuse access to the higher classified road.

D) New access locations internal to the platting of property shall be unified whenever possible to create the fewest number of access points onto a road if the access road is of a classification higher than a local road. Lots of record in existing formal plat subdivisions, short plats, and large lots not served by a minor or major driveway shall be permitted a minimum of one residential driveway.

E) The intersection of two local roads should be designed to operate without any traffic control device (i.e., STOP or YIELD Signs) whenever possible and as determined by the licensed engineer.

F) Access to corner lots should be from the lesser classified road, at a distance from the intersection as described in Section 4.3.1.

G) The number of intersections should be minimized as much as possible, particularly as classification of affected roads increases. Intersection spacing should be maximized wherever possible.

H) All gates shall meet the requirements contained in Section 8.10.

I) The subdivision of land shall be such as to provide access to each lot from a public or private street.

J) Single family residential driveways shall not access directly onto Principal, Minor, or Collector arterials unless approved by the Public Works Director.

K) Driveways allowed for commercial, industrial, public facilities, and residential uses shall be combined whenever possible.

L) Driveways shall be aligned across the roadway when possible.

M) No part of any access point, including any flare or radius, may be located within 3 feet of a fire hydrant, no-parking zone, utility pole, traffic signal installation or light standard, mailbox cluster or similar appurtenance.

N) Adjoining properties may be required to share an access through use of a joint access and circulation agreement.

O) The second access requirement may cause the construction of an off-site road connecting the development to a suitable public street.

Notwithstanding the requirements of this section, the number and location of intersections may be more restrictive then described herein if deemed necessary by the Public Works Director. The Public Works Director shall base the determination on existing and projected traffic volumes, channelization

and signalization on the existing city road, traffic, and turning movements generated by the existing and/or proposed project(s), other applicable traffic design criteria, as well as other driveways in the vicinity of the proposed access approach, the amount of lot frontage along the road, and channelization/traffic control.

4.1.2 Access Design Requirements

Access points shall be designed and constructed:

- To minimize conflicts between vehicles, bicycles and pedestrians.
- To avoid impacts to wetlands, streams, fish and wildlife habitat areas, buffers and other critical areas, to the maximum extent possible.
- To conform to ADA design requirements.
- So that backing maneuvers from, or onto, a public right-of-way do not occur. This requirement does not apply to single family or duplex residential uses taking access from neighborhood collectors or local roads. Under no circumstances shall an access point be designed so that backing maneuvers occur into an intersection of one or more arterial roads.

Design features, such as medians, channelization or curbing, may be required by the Public Works Director for control of traffic movements. The Public Works Director may determine, or require analysis to determine, if an access point must be designed to regulate traffic movements.

If a proposed development will discontinue use of one or more existing access points, these access points shall be removed by the developer and replaced with appropriate frontage improvements as approved by the Public Works Director.

4.1.3 State Highway Access

Access to the State Highway system is regulated by WSDOT and by local jurisdictions for highways within City limits. Permits and approvals for access must be obtained from the City and WSDOT.

4.2 Roadway Intersections

Roadway intersection guidelines encourage the preservation of capacity and safe operation of roadways. The following subsections provide the guidelines for roadway intersection location and design.

4.2.1 Angle of Intersections

New road intersections shall be designed to intersect one another at 90 degree angles or as close to 90 degrees as topography permits. If 90 degrees is not possible, the skew angle of intersections shall not vary more than 15 degrees from right angles.

4.2.2 Return Radii

The minimum return radii to be provided at road intersections are specified in the table below:

Table 4-1. Minimum Intersection Return Radii

Road Type	Intersecting Road	Radius Return
Any Road	Principal Arterial	35 feet
Any Road (except Principal)	Minor and Collector Arterials	30 feet
Neighborhood Collectors and Local Roads	Neighborhood Collectors and Local Roads	25 feet

Larger corner radii should be considered if the anticipated composition of traffic warrants such a need. For instance, roads with truck or bus traffic may require larger radii at intersections. The WSDOT Design Manual shall be used as a guide in evaluating such designs.

4.2.3 Geometrics

When either of the centerline profile grades within 35 feet of an intersection have a gradient of 8 percent or more, an intersection detail drawn to scale of 1 inch = 20 feet must be included as a detail in the road construction plans. The detail will show spot elevations every 10 feet on the road centerline, around the curb return, and grate elevations for drainage structures in the intersection. The intersection plan must be clearly detailed to show flow line grades and how surface drainage will be controlled at the intersection. Curb return data for lesser gradients shall be shown on the road construction plans.

At the intersection of different classifications of roads (e.g., a principal arterial with a collector arterial), the centerline slope and typical cross section of the higher classified road should be carried through the intersection with the lower classified road matching in a manner which will not interfere with the smooth movement of traffic in the travel lanes of the higher classified road.

Where two roads of the same classification intersect, the centerline grade shall be matched at the center of the intersection with cross slopes varying through the intersection to allow drainage. All classes of local roads shall be treated as the same classification for purposes of this paragraph.

Profile grades for all roads (public and private) intersecting onto a City road (existing or proposed) shall be designed and constructed so that adequate sight distance is available at the intersection. Sight distance requirements are provided in Section 6.7.

4.2.4 Grades at Intersections

Road grade transitions at intersections shall be designed using vertical curves wherever the grade change exceeds 1 percent. This includes the transition from the slope of the intersecting road to the cross-slope of the road being intersected. Vertical curve standards are provided in Section 6.5.

For safety reasons, a landing or safe stopping area must be provided before the intersection. The landing may be part of the vertical curve transition between the slope of the intersecting road and the cross-slope of the road being intersected. The standard to be met for an acceptable landing is no more than one foot of elevation change for a distance of 30 feet from an arterial road or 20 feet from a neighborhood collector or local road, measured from the ultimate right-of-way line and intersected by an imaginary 2 percent grade extended from crowned road to right-of-way line of intersecting street. See Standard Drawings DM.C1.1 through DM.C3.1.

For low-volume roads (<400 ADT) approaching a stop sign controlled intersection, a 20 mph design speed with a minimum vertical curve length of 60 feet may be used for the final curve at the intersection.

4.2.5 Intersection Spacing

In order to minimize the number of conflicts between vehicles entering and exiting the roadway and vehicles traveling along a roadway, the design engineer should maximize the distances between intersections along the roadway.

The minimum centerline offset/spacing between parallel roads, on either the same or opposite sides of the primary street are indicated in the following table:

Table 4-2. Minimum Intersection Spacing (Feet)

	INTERSECTING ROAD TYPE		
PARALLEL ROAD TYPE	**Principal Arterial**	**Minor Arterial and Collector Arterial**	**Neighborhood Collector and Local Road**
Principal Arterial	330	200	165
Minor Arterial	200	150	150
Collector Arterial	250	150	150
Neighborhood Collector	165	125	125
Local Road	250	125	125

Where two parallel roads have different classifications, the higher classification shall be used to determine the centerline offset/spacing.

4.3 Driveway Approaches

This section provides driveway standards for connections to public and private roads. It is not the intent of these Standards to govern design or location of driveways on private property except where they connect to a roadway, or where the location of driveways on private property may impact traffic operations on the public street system. However, fire access requirements governed by the Uniform Fire Code and Chapter 14 of the DMMC, establish criteria for driveway widths. No new driveway connection shall be constructed which does not conform to this chapter and minimum sight distance criteria established in Section 6.7.

Driveways shall be paved with asphalt between the edge of the paved surface and the right-of-way line, except when on curb and gutter section roadways. Refer to Section 7.4.5 for further information.

No person, party, firm, corporation, or entity shall construct, repair, alter, maintain or use any approach from any abutting property to any public road located in the City of Des Moines, permanently or on a temporary basis, without first obtaining or having a Right-of-Way Permit from the City. A copy of each Right-of-Way Permit shall be available for inspection at the site during the life of the Permit. Any change of use or any improvement that increases the traffic volumes using an existing driveway approach, will require the obtaining of a new Right-of-Way Permit and must otherwise comply with all standards.

Driveway approaches are deceptively simple in appearance and often do not receive the design consideration that they merit. Commonly overlooked design issues include inadequate radii at the

intersection with the roadway, excessive grades and grade changes within the driveway approach area, inadequate width, and inadequate sight distance.

Driveway approach design needs to address the type of vehicle composition anticipated, traffic volume, and land use activities being accessed. Driveway approach placement needs to be carefully determined to minimize interference with normal roadway operation. Driveway approaches need to be constructed where entering sight distance in conjunction with driveway access would be adequate for safe traffic operations. Closely spaced driveway approaches are discouraged.

The design of the driveway approach is broken into two general classifications which are:

- Residential Driveway Approach
- Commercial Driveway Approach

A residential driveway approach is used to serve up to two single family residences or one duplex unit. A residential driveway approach may also be used for a single driveway approach which serves a shared access facility. A commercial driveway approach is used for all other uses.

All driveway approaches shall be constructed in accordance with the specific geometric requirements provided in these Standards. Grading and restoration of the driveway beyond the end of the driveway approach shall be done to provide a smooth, passible, and safe transition to the facility.

For driveways near stop or signalized intersections, the Public Works Director may require studies to determine if stopping queues will block the access point and if left turns should be prohibited into or out of the access point.

4.3.1 Residential Driveway Approach

Residential driveway approaches shall be constructed to maximize practical distance but in no event, less then thirty-five feet from an arterial or neighborhood collector intersection; or less than twenty-five feet from a local road intersection. The distance is measured along the property line from the edge of the intersecting road lane edge line to the nearest edge of the driveway width.

Where two or more access points serve adjacent residential property uses there shall be a minimum separation of 10 feet between the nearest edges of access points (not including ADA compliant approach flares or return radii), except where the lots are part of a zero lot line development in accordance with Chapter 18 of the DMMC or where approved by the Public Works Director.

Where curb exists, access to residential corner lots shall be located a minimum of 10 feet from the point of curvature (PC) or point of tangency (PT) of the curb line at the intersection. No portion of an access will be permitted within curb returns or curb ramps.

4.3.2 Commercial Driveway Approach

Commercial driveway approaches must be located a minimum of 125 feet from an intersection or other adjacent driveways. In cases where physical site conditions and spacing of existing driveway approaches may not allow for 125 feet, the Public Works Director may determine that a traffic study is required to incorporate the driveway design. The 125 feet is measured along the property line from the intersecting road right-of-way line to the edge of the driveway width. New driveway approaches that would create a four-legged intersection are undesirable except on roadways that have an arterial classification. Access to a corner lot with frontage less than 155 feet in width will be established on a case-by-case basis by

the Public Works Director and the driveway approach shall be placed at such a location to maximize safety.

Access points for commercial or industrial property uses shall be placed directly opposite each other wherever possible for driver awareness and safety. If opposite placement is not possible, then the separation requirements shall be met. If such spacing cannot be provided, the Public Works Director may require analysis to determine if left turns should be prohibited at the access points.

The number, location, and size of commercial approaches shall be determined by the volume and type of traffic generated by the development, other driveway approaches in the vicinity of the proposed approach, the amount of lot frontage along the road, and channelization/traffic control on the road along the lot frontage. When multiple major driveway approaches to one parcel or development are permitted, they shall not be less than 125 feet apart, measured from centerline to centerline. A minimum of two driveway approaches (combination of minor and/or major) will be required for developments that will generate 3,000 ADT or more unless other mitigating measured are approved by the Public Works Director.

4.3.3 Number of Driveway Approaches

The number of access points allowed for a parcel or development depends on the intended land use.

A) Residential parcels shall be allowed one access point per parcel, unless otherwise approved by the Public Works Director. A duplex parcel may be allowed two access points, provided the location, separation, spacing and corner clearance requirements are met.

B) Commercial/Industrial parcels shall be allowed one two-way access point, or two one-way access points, exclusive of alleys, per 500 feet of total property frontage.

C) Additional access points may be approved by the Public Works Director upon submittal of a circulation plan that shows additional access points are required for traffic flow and that adjacent roads will not be adversely affected.

Additional access points may be required by the Public Works Director to provide adequate road and pedestrian circulation or emergency vehicle access. The Fire Marshal shall determine emergency vehicle access requirements pursuant to Chapter 14 of the DMMC and the Uniform Fire Code.

A development that will generate or attract a large traffic volume may be required to consolidate traffic at specific access points. Signalization at intersections may be required where warranted by the MUTCD.

4.3.4 Driveway Approach Angles

New driveway approaches shall be designed to align at 90 degrees to the adjacent centerline, or along a radial line in a cul-de-sac, as close to 90 degrees as topography permits. If 90 degrees is not possible, the skew angle of driveways shall not vary more than 15 degrees from right angles.

4.3.5 Driveway Approach Widths

Driveway widths are provided in the table below.

Table 4-3. Driveway Width(s)

Type	Minimum Width	Maximum Width
Residential	12 feet	24 feet
Commercial	24 feet	35 feet

Wider major driveways approaches, where necessary to accommodate buses, trucks or other oversized vehicles, may be approved through a deviation request. Such access points shall be designed to meet the additional loading and turning radius requirements.

4.3.6 Storm Drainage for Driveways

For driveways crossing an open ditch section, culverts shall be adequately sized to carry anticipated storm water flows and in no case be less than 12 inches) in diameter, and at a minimum the culvert shall be equal to or larger than existing pipes within 500 feet upstream. Pipe should be long enough to allow for the minimum 3:1 beveled ends. The property owner making the installation shall be responsible for determining proper pipe size. The Public Works Director may require the owner to verify the adequacy of pipe size.

Storm drainage from driveway surfaces must be accounted for in the roadway drainage design. Direct discharge to roadway surfaces and sidewalks is not allowed.

For additional storm drainage requirements, refer to Chapter 11 of these Standards.

4.3.7 Construction Criteria

When cutting through or crossing vertical curbs, gutters and sidewalks, access approaches must extend from the curb to back of sidewalk and be of Portland cement concrete.

When an opening for a driveway or for any other purpose is to be constructed through an existing portland cement concrete vertical curb, the existing curb, or curb and gutter shall be removed to the nearest construction joint. The opening shall be reconstructed in accordance with the approved plans and these Standards.

The outer edge of a driveway shall not be constructed closer than 70 feet to a bridge, culvert, or other structure that may warrant end protection using guard-railing in accordance with the most current criteria adopted by the WSDOT.

All driveway approaches shall be paved to the right-of-way line, or 3 feet beyond the end of the radius, whichever is greater, with a minimum of 3 inches of compacted depth of asphalt concrete over 2 inches of compacted depth crushed surfacing top course.

The minimum distance between the paved edge of a driveway approach and the face of an obstruction, including existing utility appurtenances which may cause a traffic safety concern may be no less than 4 feet without curbing and 3 feet with curbing on the approach. Obstructions located closer then these distances which may cause a traffic safety concern must be relocated.

4.4 Sight Distance

For determination of sight distance at access points, see Section 6.7 of these Standards.

4.5 Panhandle Lots

A lot within a subdivision may be permitted with a panhandle access, provided the panhandle shall have a minimum width of 20 feet and a maximum length of 200 feet and shall serve no more than 1 lot. Panhandle accesses will not be allowed unless they are separated by at least one lot width (i.e., no back-to-back panhandles).

4.6 Access Easements

New access across an easement is not allowed.

Existing legal access easements may be allowed to remain. However, additional lots shall not be served by such existing easement.

5. ROADWAY DESIGN CONTROL

5.1 Function Classification

The first step in the design process is to identify the functional classification of the roadway. The functional classification of existing City of Des Moines streets are established by ordinance by the City Council. A graphic representation of the street classification system can also be found in the City's Comprehensive Transportation Plan.

Existing and future traffic volumes must be documented. The estimated future traffic volumes serve as the design year for the roadway. Interim designs are based on a 5 or 10 year traffic study. All interim designs must contribute to, or be consistent with the ultimate roadway design identified in the Comprehensive Transportation Plan (typically 20 year design). The minimum number of lanes to be constructed for a particular road section shall be determined from the Comprehensive Transportation Plan. Additional lanes may be required above and beyond the Comprehensive Transportation Plan as identified in the Traffic Study.

5.1.1 Functional Classification System

Roads and highways are most effectively classified by their function, according to the character of service they are intended to provide. The primary functions of roads and highways are to provide mobility and to provide access, and the degree to which these functions are provided is considered an integral part of classifying roads. The functional classification system creates a hierarchy of classified roads.

Roads are grouped into a number of different classifications for administrative, planning, and design purposes. For example, the classification system can be used for planning for new routes, improvements to existing roads, and planning for area development in concert with the transportation network and providing minimum design standards or criteria to encourage the use of the road as intended.

The main considerations for classifying roads into functional groups are the travel desires of the public, land service needs based on existing and expected land use, and the overall continuity of the system. A classification plan which fits the various classes of roads together into a logical pattern and assigns realistic improvement standards to each class will promote the highest overall level of service for the funds that are available.

The City of Des Moines definitions for each functional classification are presented below. The City of Des Moines Comprehensive Transportation Plan includes transportation plans for modes other than passenger vehicles. These modal plans are intended to overlay onto the functional classification system. For example, the bicycle plan would overlay the functional classification system to identify those roadways that should include bicycle facilities as a design element of the roadway.

Streets within the City of Des Moines are classified functionally in one of five categories as defined in Section 5.1.2. All streets within the City of Des Moines are generally characterized as being urban, as there are no rural roadways within the City Limits. Function is the controlling element for classification and shall govern right-of-way widths, road widths, and road geometrics. Other given elements such as access, arterial spacing, and ADT have typical values for a given classification. However, these values alone do not determine a street's classification.

It is necessary to classify streets for purposes of traffic operations, control, and enforcement. Typically, arterials will have higher speed limits and more stringent traffic control measures at intersections, (e.g., traffic signals or stop signs), than non-arterials. In planning, functional classification establishes the hierarchy of streets and highways necessary for a complete transportation system that serves all types of travel needs. Each road has a specified function that produces a comprehensive network for travel and access throughout an area, when combined with the rest of the system.

5.1.2 Street Classifications

The definitions provided below serve as the general guide used in determining street classifications. Detailed cross sections for each street classification can be found in the Standard Drawings.

Principal Arterial: Urban principal arterials, also called Major Arterials, provide for movement across and between large sub-areas of an urban region. Principal arterials serve predominantly "through traffic", carry the highest traffic volumes, serve major centers of activity, and are fed by other arterials and local access streets. Principal arterials are expected to provide a high degree of mobility. Therefore, access to abutting properties should be very restricted. Spacing between parallel principals is generally two miles or greater. ADT is typically over 10,000 vehicles per day.

Minor Arterial: Urban minor arterials interconnect with and augment the principal arterial system. Minor arterials provide intra-community continuity connecting community centers and facilities. A minor arterial may also serve "through traffic". Access is partially restricted. Spacing between parallel minor arterials is generally less than two miles. ADT is typically between 4,000 and 12,000 vehicles per day.

Collector Arterial: Collector arterials typically are intra-community roadways connecting residential neighborhoods with community centers and facilities. They accumulate traffic from local roadways and distribute that traffic to roadways that are higher in the hierarchy of functional classification. Access is partially restricted. Spacing between collector arterials is generally a mile or less. ADT is typically between 1,000 and 5,000 vehicles per day.

Neighborhood Collectors: Neighborhood collectors connect two or more neighborhoods and typically connect to arterials or other neighborhood collectors. Although direct driveway access are typically allowed on neighborhood collectors, there are some project related exceptions. Whenever possible, direct driveway connections to neighborhood collectors should be avoided. Spacing is generally a half-mile or less. ADT is typically between 1,000 and 3,000 vehicles per day.

Local Streets: Local streets are a permanent cul-de-sac or short loop street with low traffic volumes that provides circulation and access to off-street parking within a residential development boundary. Local streets are not supportive of through traffic. Access is generally not limited. Spacing is as needed to access properties. ADT is typically less than 1,000 vehicles per day.

5.2 Right-of-Way

5.2.1 Widths

Standard right-of-way widths for road classifications are as shown in Table 5-1. These right-of-way widths shall apply for road design, except where these Standards specify other right-of-way requirements.

Any new road to be constructed as part of a land development proposal shall be classified in the development proposal and designed with a right-of-way width conforming to the standards below, unless otherwise approved.

Where right-of-way is to be deeded or dedicated from a parcel under development, the right-of-way shall be a uniform width across the parcel and not tapered. Exceptions to this requirement may be allowed where off-site right-of-way is to be acquired for a clear sight triangle or sight distance easement (refer to Section 6.7).

Table 5-1. Standard Right-of-Way Widths

Principal Arterial	80 feet
Minor Arterial	70 feet
Collector Arterial	60 feet
Neighborhood Collector	50 feet
Local Street	50 feet

There shall be a minimum amount of public right-of-way between the back of the public sidewalk and the private property line. Refer to Standard Drawings DM.A1.1 through DM.A5.3.

5.2.2 Right-of-Way Width Evaluation

Wider or narrower right-of-way widths than the standard may be required as determined by the Public Works Director. Right-of-way width must accommodate the road section applicable for the particular road classification, as described further in this chapter. Any change to the applicable road section must be approved by deviation.

The right-of-way width may be reduced to minimum roadway width, plus storm drainage, sidewalk, maintenance areas behind sidewalk, provided that potential serving utilities are accommodated within permanent public easements. The reduced right-of-way, plus easement, at a minimum shall allow for construction and maintenance of the sidewalks, 3 feet behind sidewalk, planting strips, drainage facilities, and sign placement. Additionally, they shall allow for sidewalk widening around mailbox locations.

5.2.3 Right-of-Way Dedications

All required right-of-way dedications shall be completed on a “Statutory Warranty Deed” and shall be recorded by King County prior to final plan approval. All easements shall be completed in a format to the City’s requirements. Easements for utilities shall be drafted and signed by the property owner and given to the City prior to final plan approval. Upon completion of the project, the original easement shall be modified, if necessary, then recorded at the property owner’s expense. All such easements and dedications shall be clearly shown on the engineering plans.

5.3 Easements

5.3.1 Utility Easements

Where utilities and/or their conveyance systems cross private lands, an easement must be granted. If the property is platted, the easement may be conveyed when the short plat or final plat is filed. An

attorney, licensed land surveyor, or engineering firm capable of performing such work must prepare all easements not shown on a plat.

Easement requirements are subject to each utility provider and reviewed by the Public Works Director, widths will be centered on the utility and be a minimum of 10 feet wide. Construction/slope easements will be required when appropriate, with widths as necessary to encompass work area. For stormwater conveyance systems, easement widths and building setbacks shall be as established by the KCSWDM or Chapter 17.35 of the DMMC.

5.3.2 Slope, Sight Distance, Wall, and Drainage Easements

Either the functional classification or particular design features of a road may necessitate slope, sight distance, and wall or drainage easements beyond the right-of-way line. The Public Works Director may require such easements in conjunction with dedication or acquisition of right-of-way. The design engineer must document there is sufficient right-of-way to include cuts and fills and necessary clear zone.

5.3.3 Construction Easements

Often times, construction easement are needed in order to facilitate public roadway and right-of-way improvements. Construction easements are also needed to make improvements to driveway accesses. The design engineer is responsible to secure all necessary construction easements from the affected property owners.

5.3.4 Submittal Process

Easements are required to be submitted in draft, unsigned form for review and approval prior to plan approval. Any change in design that places an amenity (i.e., water, sewer, sidewalk, etc.) outside of the easement may necessitate stopping construction until plans and easements can be resubmitted and approved.

5.4 Tracts

5.4.1 Private Access Tracts

Private access tracts shall meet the requirements contained in Section 5.5.1 Private Streets.

5.4.2 Tracts for Public Facilities

Under certain circumstances, it may be desirable to reduce right-of-way width and locate facilities, such as sidewalks, walkways or trails, in separate tracts of land outside the right-of-way. Such tracts shall be owned and maintained by a homeowners association and guaranteed by covenants recorded with the plat. The recorded covenants shall be referenced on the approved final plat document.

Locating public roadways (e.g., travel lanes) in Tracts for public facilities is expressly forbidden.

Tracts for Public Facilities must be approved by the Public Works Director through a request for deviation.

5.5 Other Roadway Types

5.5.1 Private Streets

While public streets, owned and maintained by the City, usually best serve community street requirements, private streets may be appropriate for some local access streets. Usually these are local roads, either residential or commercial, serving a low volume of daily traffic.

A private Street is a street, privately owned and maintained, located in a tract. Private streets may be utilized for access in accordance with Chapter 4. Private streets shall be designed and constructed in accordance with public street standards, except as permitted otherwise herein.

Private streets shall be permanently established by tract providing legal access to each affected lot, dwelling unit, or business and sufficient to accommodate required improvements, including provision for future use by adjacent property owners where applicable.

Each private street shall be clearly described on the face of the plat, short plat, or other development authorization and clearly signed as a private road. Private streets shall be maintained by capable and legally responsible owners, a homeowners association or other legal entity made up of all benefited property owners, in accordance with the provisions of Chapter 17.35 of the DMMC. Maintenance shall be guaranteed by covenants filed with the recorded binding site plan, record of survey, plat or short plat.

Private Streets may be approved only when they are:

1. Accessible at all times for emergency and public service vehicle use.
2. Not obstructing, or part of, the present or future public neighborhood circulation plan developed in processes such as the Comprehensive Plan, Comprehensive Transportation Plan, or Capital Improvement Program.
3. Not going to result in land locking of present or future parcels.
4. Not needed as public roads to meet the minimum road spacing requirements of these Standards.
5. Designed to serve a maximum potential of 16 single-family dwelling units when the entire length of the private road system to the nearest public maintained road is considered. The maximum potential is the number of dwelling units that can possibly be served by the road when physical barriers, zoning or other legal constraints are considered.
6. Clearly described on the face of the plat, short plat, binding site plan, site development permit or other development authorization and clearly signed at street location as a private street, for the maintenance of which the City of Des Moines is not responsible.

The City of Des Moines will not accept private streets for maintenance as public streets until such streets are brought into conformance with the current DMMC and these Standards for public streets.

Best Management Practices (BMPs) should be used when maintaining private roadways.

The following table provides Private Street requirements.

Table 5-2. Private Street Requirements

Number of Lots	Minimum Tract Width	Minimum Paved Width	Pedestrian Facilities	Minimum Turnaround if over 150 feet	Street Lighting Required
1-2	25*	15	No	Hammerhead	No
3-4	26*	16	No	Hammerhead	No
5-6	30*	20	No	Hammerhead	No
7-10	34*	24	No	Hammerhead	No
11-16	40*	24	Yes, 5-foot walking path	Cul-de-sac	Yes

The maximum to be served by a single private tract is 16 lots.

*Tract width may be reduced by up to 5 feet along properties that access tract. 20 feet is absolute minimum tract width.

5.5.2 Alleys

Alleys are streets that provide secondary access. Although there are pre-existing alleys within the City that are public, all new alleys shall be private streets meeting the requirements of Section 5.5.1.

5.5.3 Half Streets

A half street may be permitted when:

1. Such street shall not serve as primary access to more than 20 dwelling units or equivalent ADT; and
2. Such alignment is consistent with or will establish a reasonable circulation pattern; and
3. There is reasonable assurance of obtaining the prescribed additional right-of-way from the adjoining property with topography suitable for completion of a full-section road.

A half street shall meet the following requirements:

1. Right-of-way width of the half street shall be a minimum width of 30 feet and sufficient to construct the roadway and related grading. Refer to Standard Drawing DM.A1.1 through DM.A5.3.
2. Traveled way shall be surfaced the same as the designated road type to a width not less than 20 feet, sidewalk shall be constructed as required for the designated road type.
3. Property line edge of street shall be finished with temporary curbing, shoulders, ditches, and/or side slopes in order to assure proper drainage, bank stability, and traffic safety.
4. Half streets shall not intersect other half streets.
5. Half-streets shall meet the requirements of Section 7.4.6 of these Standards.

When a half street is eventually completed to a whole street, the completing builder shall reconstruct the original half street as necessary to produce a proper full-width crowned street of a designated section.

Obtaining any right-of-way or easements shall be the responsibility of the applicant or developer.

5.5.4 Fire Apparatus Access Road (Fire Lane)

A fire apparatus access road or fire lane is any road or driving surface, whether public or private, which is used to meet the access requirement of the Uniform Fire Code, codified in Chapter 14 of the DMMC.

5.6 Cul-de-sacs and Hammerheads

5.6.1 Cul-de-Sacs

Whenever a public dead-end street serves or will serve more than 6 lots or extends more than 150 feet from centerline of accessing street to farthest extent of surfaced traveled way, a widened "bulb," (refer to Standard Drawing DM.A9.1) shall be constructed as follows:

1. Minimum right-of-way diameter across bulb section: 100 feet in a permanent cul-de-sac; 84 feet in a temporary cul-de-sac, with bulb area lying outside straight-street right-of-way provided as temporary easement pending forward extension of the street. Right-of-way may be reduced, provided utilities and necessary drainage are accommodated on permanent easements within the development. See Section 5.3.1.
2. Minimum diameter of surfacing across bulb: 80 feet of paving in curb-type road.
3. Where required on cul-de-sacs, sidewalks shall be constructed on both sides.
4. A permanent cul-de-sac shall not be longer than 600 feet measured from centerline of intersecting loop or through street to the center of the bulb section. If a bulb out/eyebrow is utilized the roadway may extend up to an additional 600 feet. Refer to Standard Drawing DM.A9.3. On the basis of pertinent traffic planning factors such as topography, sensitive areas and existing development, the Public Works Director will consider deviations to this requirement.
5. The Public Works Director may require an emergency vehicle access and/or an off-street walkway to connect a cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators.
6. If a street temporarily terminates at a property boundary, serves or will serve more than 6 lots, or is longer than 150 feet, a temporary bulb shall be constructed near the development boundary. The paved bulb shall be 80 feet in diameter with sidewalks terminated at the point where the bulb radius begins. Removal of the temporary constructed cul-de-sac and construction of the extension of the sidewalk shall be the responsibility of the applicant/developer who extends the road. Refer to Standard Drawing DM.A9.1.
7. The maximum cross slope in a bulb shall not exceed 4 percent in any direction.
8. Partial bulbs or eyebrows shall have a minimum paved radius and configuration as shown on Standard Drawing DM.A9.3.
9. Temporary cul-de-sac easements are extinguished, when applicable, through the right-of-way vacation process in accordance with Chapter 12 of the DMMC.

10. When a commercial access street changes from a public to private designation, a public turnaround shall be required, regardless whether another fire access turnaround is provided elsewhere.
11. Planter strips may be installed, but are not required, around permanent or temporary road ends. Additional right-of-way will be required.

5.6.2 Cul-de-Sac Islands

A cul-de-sac island is not allowed for any cul-de-sac when bulb paved diameter is 80 feet or less. A cul-de-sac island is an optional feature when bulb paved diameter exceeds 80 feet. If provided, the island shall have full-depth cement concrete vertical curb and gutter. Minimum island diameter shall be 20 feet and there shall be at least 30-foot wide paved traveled way around the circumference. An island shall be grassed or landscaped. The adjoining property owners are responsible for the landscaped and or grassed area within the island.

5.6.3 Drop-Curb Cul-de-Sac

A drop-curb cul-de-sac is a design option that may be used where multiple driveways around a cul-de-sac bulb will reduce the functionality of vertical curbs, planter strips and sidewalks. Where five or more access points are taken around the bulb, vertical curb may be eliminated and a drop-curb 1-inch lip (see Standard Drawing WSDOT DEPRESSED CURB F-10.12-04).

5.6.4 Hammerheads

A hammerhead may be used to satisfy the turnaround requirements where a private street serves or will serve 10 or fewer lots. Refer to Standard Drawing DM.A9.7.

5.7 Auxiliary Lanes

The design of road width transition tapers, speed change lanes, left-turn or right-turn lanes will be evaluated on a case-by-case basis using the AASHTO Green Book and the WSDOT Design Manual as a guide, and shall be consistent with Section 7.1.

5.8 Turn Lanes

Turning lanes and acceleration/deceleration lanes will be provided as required by the Public Works Director. Guidelines include the following: the *WSDOT Design Manual, Highway Research Record 211,* and *Guidelines for Right-Turn Treatment at Signalized Intersections*.

5.9 Medians

Unless otherwise required by the Public Works Director, Medians are an optional design feature.

Median width shall be additional to, not part of the specified width of traveled way. Edges shall be similar to outer road edges: the island shall have full-depth cement concrete vertical curb and gutter. Fourteen to 15 feet of drivable surface shall be provided on both sides of the median. The median may be grassed, landscaped, or surfaced with aggregate or pavement. Medians shall be designed so as not to limit turning radii or sight distance at intersections. No portion of a side street median may extend into the right-of-way for an arterial street. The Public Works Director may require revisions to medians as

necessary to provide for new access points and to maintain required sight distance. Nonyielding or non-breakaway structures shall not be installed in medians. Street trees may be planted in the median subject to approval by the Public Works Director. Medians and landscape islands shall be illuminated, as determined by the Public Works Director. Refer to Section 7.11 of these Standards.

5.10 One-Way Streets

Local access streets, including loops and bulbs, may be designated one-way upon a finding by the Public Works Director that topography or other site features make two-way traffic impractical.

5.11 Frontage Improvements

Frontage improvements shall be as required in Chapter 12 of the DMMC.

6. ROADWAY GEOMETRICS

6.1 General

Horizontal or vertical street curves, sight distance, grades, and tangents will be based on the current edition of AASHTO standards, and the Standards contained herein. A design proposal that differs from the AASHTO standards may be approved by the Public Works Director upon the review of a deviation request, if the deviation is justified to minimize grading, avoid excessive run-off or topographic conditions affecting the development site, or to implement traffic calming techniques when warranted.

6.2 Design Speeds

Design speed is a speed selected to determine the various geometric design features of a roadway. Design speed shall be used to determine stopping sight distance (SSD), entering sight distance (ESD), and intersection sight distance (ISD) requirements for new road facilities. Refer to Section 6.7 for a full discussion of sight distance analysis.

Table 6-1 contains the required design speed for street design and new construction in the City of Des Moines. Speed limit designations on specific streets within the City are published in the *Comprehensive Transportation Plan* and codified by DMMC Chapter 10.20.

Table 6-1. Design Speeds

	Design Speed (Miles Per Hour [MPH])	Posted Speed (MPH)
Principle Arterial	Posted Speed + 5 MPH	35-45
Minor Collector	Posted Speed + 5 MPH	35-40
Collector	Posted Speed	30-35
Neighborhood Collector	Posted Speed	25-30
Local Road	Posted Speed (25)	25[1]
Alley	Posted Speed (20)	20[2]

[1] Not all Local Roads will be posted.

[2] Speed Limit Signs shall not be posted on Alleys.

6.3 Design Vehicles

The minimum design vehicle for a Collector and above is a Single Unit (SU) Vehicle . The minimum design vehicle for all other classifications is a passenger vehicle. Additional factors, such as designated school bus routes and land use may necessitate the need to use multiple design vehicles.

6.4 Horizontal Alignment

The values for design of horizontal alignment shall be based on the current edition of the AASHTO standards. Superelevation is not required unless determined by a licensed professional engineer and/or the Public Works Director in the design of horizontal curves. However, additional pavement width may

be required on horizontal curves to provide for vehicle maneuvers where no superelevation is used and the minimum horizontal curve criteria are not met. Calculations for widening shall comply with Chapter 3 of the AASHTO Green Book or Chapter 6 of the WSDOT Design Manual.

Upon approval of a deviation request from the Public Works Director, superelevation may be used on local roads as necessary to meet terrain and right-of-way conditions. However, horizontal curves must be designed based on design speed and selected cross section as provided in current AASHTO standards.

Each horizontal curve design shall provide stopping sight distance for the design speed at all points on the road. Refer to Section 6.7 for sight distance requirements.

6.5 Vertical Alignment

Vertical curves shall be designed to ensure that minimum stopping sight distance is provided per current AASHTO standards. Sight distance is discussed in detail in Section 6.7.

Sag vertical curves on residential streets that do not meet the minimum SSD indicated in Section 6.7 may be approved by the Public Works Director through a deviation request if no practical design exists and if acceptable illumination is provided throughout the curve and is maintained by a franchise utility. The illumination design shall be consistent with Section 7.11.

6.6 Grades

6.6.1 Maximum Grades

The maximum grade on any new or reconstructed road shall not exceed the limits shown in Table 6-2. Grade transitions shall be constructed as vertical curves except at new intersections where the difference in grade is one percent or less. Refer to Section 4.2.4 for additional grade at intersection requirements.

Maximum roadway grade as shown in Table 6-2 may be exceeded for short distances of 300 feet or less, upon showing that no practical alternative exists through a deviation request. Exceptions, which exceed 14 percent, will require verification by the Fire Marshal that additional fire protection requirements will be met and show what method will be used to ensure drainage will be controlled. The grade shall not exceed 15 percent.

Table 6-2. Maximum Road Grades

Principal Arterials	8%
Minor Arterial	8%
Collector Arterial	10%
Neighborhood Collector	12%
Local Road	14%

Note: % = percent.

6.6.2 Grade Transitions

Grade transitions shall be constructed as smooth vertical curves, without angle points, except in intersections where the difference in grade is one percent or less and upon approval of the Public Works Director. Refer to Section 4.2.4 for additional grade at intersection requirements.

6.7 Sight Distance

6.7.1 General

Sight distance criteria established in this section are based upon A Policy on Geometric Design of Highways and Streets, AASHTO, current edition, except as superseded herein.

Each new intersection or access point connection must meet the SSD, ESD, and ISD requirements established herein.

Sight distance requirements in this section are based on passenger car operation and do not account for heavy vehicle operating characteristics. Access points or intersections that will handle significant numbers of heavy vehicles or trucks, as determined by the Public Works Director, shall be designed in accordance with Chapter 9 of the AASHTO Green Book.

6.7.2 Documentation of Sight Distance

To verify acceptable sight distance, the Public Works Director may require a developer to evaluate and document an existing sight distance condition. The evaluation and documentation of sight distance shall include the following, or such additional information as may be necessary to make a determination:

Plan, profile and cross-section drawings along the sight line

Posted speed, and/or speed study data

Right-of-way and easement limits (existing and proposed)

When the Public Works Director determines from the documentation presented that a location has insufficient sight distance, a plan to improve the sight distance, including public street improvements, to meet these standards will be required.

6.7.3 Stopping Sight Distance

SSD is the distance needed for a vehicle traveling at or near design speed to stop before reaching a stationary object in its path. SSD shall be calculated as provided in the current AASHTO Green Book. Design speed shall be used to determine SSD requirements for new facilities. Refer to Section 6.2. The posted speed limit shall be used to determine the SSD for existing facilities. SSD is measured along the centerline of the vehicle's travel lane.

6.7.3.1 Effect of Grade on Stopping Sight Distance

The grade of the roadway has an effect on the vehicle's stopping sight distance. Stopping sight distances are based on flat road grades. The stopping distance is increased on downgrades and decreased on upgrades. When evaluating sight distance with a changing grade, use the grade for which the longest sight distance is needed.

For downgrades or upgrades of 3 percent or greater, SSD requirements are shown in the current AASHTO standards.

6.7.4 Entering Sight Distance

ESD is the distance necessary for the driver of a vehicle stopped at an intersection to decide when to enter or cross the intersecting roadway, and for the driver of a vehicle traveling at or near the posted speed on the intersecting roadway to reduce speed to avoid overtaking a vehicle that has entered the roadway.

Entering sight distance applies on driveways and streets approaching intersections as set forth in Sections 4.2 and 4.4. Specific ESD values for required design speeds are shown in the current AASHTO standards.

When provision of sight distance is a condition of an application approval, it shall be the applicant's responsibility to accomplish any activities necessary to provide sight distance, such as trimming or removal of vegetation or regrading of earth.

When determining or measuring ESD, the height of the driver's eyes in the entering vehicle assumed to be 3.5 feet, and the height of the object to be seen, assumed to be another vehicle, is 3.5 feet above the pavement. For new construction and reconstruction, ESD shall be measured 14.5 feet back from the edge of traveled way. The edge of the traveled way shall be the outside edge of the travel lane. Bicycle lanes, walkways or paved shoulders are not included.

6.7.5 Intersection Sight Distance

Drivers approaching intersections should have a sufficient, unobstructed view of the intersection and approaches to safely permit control of all vehicles through the intersection. ISD refers to that length of highway along the intersecting road that the driver on the approach should have. ISD can be affected by the horizontal and vertical geometry of the approaches to the intersection. The AASHTO manual shall be used as a guide for providing adequate ISD, except as superseded herein.

6.7.6 Clear Sight Triangles

At any intersection or access point connection, there must exist clear sight triangles to allow drivers approaching the intersection from both approaches to see other approaching vehicles.

This area, along the intersection approach legs and across their included corners, must be clear of obstructions that might block a driver's view of potentially conflicting vehicles. Visibility applies not only to drivers on the minor road, but also drivers on the major road, allowing them to see vehicles stopped at an intersection and to prepare to slow or stop, if necessary.

The "triangle" is defined by the line-of-sight from a vehicle stopped on a minor road to a vehicle approaching on the major road and back to the intersection.

The line-of-sight defining one side of the clear sight triangle may cross private property and be obstructed by objects or vegetation outside the existing public right-of-way. To ensure that sight distance is maintained, the area within a clear sight triangle shall either be acquired and conveyed to the City as new public right-of-way or a sight distance easement recorded to allow maintenance of the clear sight triangle.

6.7.7 Passing Sight Distance

Passing sight distance requirements for the design or reconstruction of roads shall be as provided in the current AASHTO standards.

7. ROADWAY ELEMENTS

7.1 Survey Monuments

7.1.1 Existing Monumentation

In accordance with Chapter 332-120 Washington Administrative Code (WAC), no survey monument as defined therein shall be removed or destroyed without first obtaining a permit from the Department of Natural Resources. Any party causing the removal or destruction of a survey monument shall be responsible for ensuring that the original survey point is perpetuated.

All existing survey control monuments, which are disturbed, lost, or destroyed during construction or surveying, shall be replaced by a land surveyor registered in the State of Washington at the expense of the responsible applicant, contractor, builder, developer, or utility per RCW 58.09.130 and 58.04.015.

7.1.2 Requirements for New Monumentation

Monuments shall be placed at all street intersections, boundary angle points, points of curves in streets and at such intermediate points as may be required by the Public Works Director.

Plat monumentation shall comply with these standards and in conformance with Standard Drawing DM.F1.1 on developments such as subdivisions, residential, commercial, binding site plans, or any other construction that establish new roadways or reconstruct existing roadways. Monuments shall be set along the center of the right of way at the PC's and PT'S of curves. When the PI of the curve falls within the paved area of the road, a PI monument may be set in lieu of setting the PC and PT.

Boundaries of final plats, short plats and binding site plans shall be established with standard steel reinforcing bars or steel pipes. The same corners shall be used to mark the subdivision lot, tract and NGPA easement boundaries. Boundary lines or corners that are section or quarter-section corners shall be marked with standard monuments.

If a property corner is occupied by a fence post, an offset standard steel reinforcing bar shall be installed along one of the boundary lines. Offset concrete monuments shall only be set to witness section and quarter-section corners.

All lot and block corners shall be set within 90 days after recording of the plat, and shall mark set with an iron pipe or steel reinforcing bar at least 24 inches in length, and at least 1/2 inch in diameter. Steel pipes shall be at least 3/4 inch inside diameter. Pipe or rebar shall be permanently tagged with the land surveyor's registration number.

The monument case will be installed after the final course of surfacing has been placed on the road.

If monuments have not been set prior to recording of a plat or short plat, then a signed and sealed Certificate of Monumentation shall be submitted by the developer's land surveyor prior to construction acceptance of all land subdivision activities and/or road improvements requiring monumentation.

7.2 Drainage

Refer to Chapter 11 of these Standards for Storm Drainage standards and requirements.

7.3 Utilities

Refer to Chapter 9 of these Standards for Utility standards and requirements.

7.4 Pavement, Surfacing, and Subgrade

7.4.1 Streets, Sidewalks, and Shared Use Paths and Trails

The minimum paved section for new and reconstructed streets, lanes, shoulders, sidewalks and bikeways shall be as indicated in Table 7-1. These sections are acceptable only on stable compacted subgrade constructed with suitable materials. Any proposed exception to these materials will be subject to soils strength testing and traffic loading analysis, and subject to review and approval by the Public Works Director.

At any time during construction, should a question on the suitability or placement of native soil or import materials exist, the Public Works Director may require a geotechnical evaluation to address soil conditions. When required, the report shall be prepared, stamped, and signed by a licensed civil engineer registered in the State of Washington and include an assessment of the site conditions and recommendations for corrective actions as necessary. A copy of maximum density curves and all associated compaction test reports shall be included with the report. All materials shall meet the requirements of the WSDOT Standard Specifications unless otherwise approved.

Table 7-1. Minimum Surfacing Requirements

Facility	Surfacing Requirements
Principal Arterials	See Standard Drawing DM.A1.1, and Section 7.4.2.
Minor Arterial	See Standard Drawing DM.A1.1, and Section 7.4.1.
Collector Arterial	See Standard Drawing DM.A2.1, and Section 7.4.1.
Neighborhood Collector	See Standard Drawing DM.A3.1 and DM.A5.1 (PACIFIC RIDGE), and Section 7.4.1.
Local Road	See Standard Drawing DM.A4.1 through DM.A5.3 (PACIFIC RIDGE), and Section 7.4.1.
Curb, Gutter, and Sidewalk	See Standard Drawings DM.A4.1 through DM.A5.3 (PACIFIC RIDGE), and Section 7.9.1.
Asphalt Walkway (Road Shoulder)	Same as Arterials or Non-Arterials above, depending on road classification.
Asphalt Walkway (Separated)	3 inches Class 1/2-inch PG 58-22 over 4 inches crushed surfacing top course (CSTC).
Shared Use Path or Trail	12-foot-minimum paved width. Refer to requirements of Chapter 1515 of the WSDOT design manual, https://wsdot.wa.gov/publications/manuals/fulltext/M22-01/1515.pdf. 3 inches Class 1/2-inch PG 58-22 over 4 inches CSTC.
Bikeway (Road Shoulder)	Same as Arterials or Non-Arterials above, depending on road classification, to meet surfacing requirements for a consistent roadway section.
Asphalt Residential Driveway Approach	3 inches Class 1/2-inch PG 58-22 over 4 inches CSTC.

7.4.2 Pavement Design for Principle Arterials

The paved section requirements provided in Table 7-1, are considered minimum values for principle arterials. The design engineer must verify that the minimum requirements are adequate for the design year analysis.

Rigid pavement designs for principle arterials shall be prepared by a licensed professional civil engineer registered in the State of Washington and in accordance with the current "AASHTO Guide for Design of Pavement Structures." Flexible pavements shall be designed using a layered design analysis in accordance with the "AASHTO Guide for Design of Pavement Structures," current edition.

The pavement design shall be based on soil parameters reflecting actual field or laboratory tests, and a traffic loading analysis. A subsurface investigation shall be performed in order to provide information on any materials that would cause settlement, stability, or drainage problems. Soil used for the design analysis shall be representative of the native subgrade conditions. The traffic loading analysis shall include traffic volume, percentage growth rate, and axle loadings. Materials shall meet WSDOT specifications. The following design inputs shall be used for calculation of the pavement:

1. Pavement Design Life = 20 years
2. Reliability (R) = 85%
3. Overall Standard Deviation (So) = 0.50
4. Design Serviceability Loss (ΔPSI) = 1.5
5. Drainage Coefficient (m) < 1.0
6. Layer Coefficients:
    a) Hot Mix Asphalt: $\leq$ 0.44
7. Crushed Surfacing: $\leq$ 0.14
8. Resilient Modulus (M_r):
    a) HMA: M_r = 450,000 psi
    b) Crushed Surfacing Materials: M_r = 28,000 psi
    c) Subgrade Soil: The M_r is based on actual field or laboratory tests. The M_r value used in the pavement design is not to exceed 15,000 psi.

Resilient modulus values for the subgrade soil shall be determined by Laboratory M_r tests or Falling Weight Deflectometer tests (FWD) performed in situ or default M_r values based on soil classification per the Unified Soil Classification System (USCS). The soil classification shall be based on laboratory testing of representative samples of subgrade soil.

USCS soil types shall be determined per ASTM D 2487. Default M_r values based on the USCS are as follows:

Class	M_r (PSI)	USCS Soil Type
A	15,000	GW, GP, GW-GM, GP-GM
B	12,500	GW, SW, SP
C	10,000	SW-SM, SP-SM, SM, ML[1]
D	7,500	GW-GC, GP-GC, SW-SC, SP-SC, SM, ML[2]
E	2,500	GC, GC-GM, SC, SC-SM, CL, CL-,ML
F	Special Design[3]	MH, CH, OL, OH, Peat

[1] Nonplastic.

[2] Plastic.

[3] Class F soils require a special design required to stabilize the subgrade and will be subject to review and approval by the Public Works Director.

7.4.3 Subgrade

All minimum surfacing requirements shall be constructed on a well-drained, stable, and compacted subgrade. The Public Works Director may require additional measures if evidence exists of an unstable subgrade. Evidence may include standing water, wetland characteristics, fine-grained or organic soils, slides or uneven settlement. If any of these characteristics are present, the soil shall be sampled and tested sufficiently to establish a pavement design that will support the proposed construction. Any deficiencies shall be fully considered including an R-value of less than 55 or a CBR of less than 20.

Remedial measures may include, but are not limited to, a stronger paved section, a strengthening of subgrade by adding or substituting fractured aggregate, asphalt-treated base, geotextile, controlled density fill or CDF (see Section 9.4 for CDF requirements), improved drainage or a combination of such measures. The Public Works Director shall review and approve the soils test report and the resulting pavement design.

Alternative cross-sections for arterial roads may be considered when necessary to serve an engineering purpose. Supporting documentation must be submitted and a deviation request and approved by the Public Works Director.

7.4.4 Driveways

Driveways may be surfaced as desired by the owner, except:

1. On curbed streets with sidewalks, driveways shall be paved with Portland cement concrete Class 4000 for commercial and Class 3000 for residential from curb to back edge of sidewalk. See Standard Drawings DM.C2.1 through DM.C3.4.
2. On shoulder and ditch sections, driveway between edge of pavement and right-of-way line shall be HMA as required by Standard Drawing DM.C1.1.

7.4.5 Street Widening

1. When an existing asphalt paved street is to be widened, the edge of the driving lane shall be saw cut to provide a clean, vertical edge for joining to the new asphalt. After placement of the new asphalt section, the joint shall be sealed and the street overlaid with a minimum of 2 inches HMA, Class 1/2-inch PG 58-22, plus a pre-level course, full width throughout the widened area or as required per the approved Standard Drawings. All failures and cracking on road surfaces must be repaired prior to the overlay, see Section 7.4.7. The limits of the overlay will be based on the condition of existing pavement and the extent of required changes to the surfacing and channelization. When the Public Works Director determines that potential impacts from a development warrant subgrade repairs prior to the overlay, the applicant must provide a geotechnical report that includes recommendations for repairing the subgrade. The exception to this requirement must be through the road variance process.
2. If an existing shoulder is proposed to be incorporated into a future traveled way, a pavement evaluation shall be performed. This evaluation shall analyze the structural capacity and determine any need for improvement. Designs based on these evaluations are subject to review and approval by the Public Works Director. The responsibility for any shoulder material thickness improvement shall be considered part of the requirement for roadway widening.

3. Any widening of an existing roadway, either to add traveled way, or paved shoulder, shall have the same surfacing material as the existing roadway.
4. Any widening or channelization will require a minimum of a half street width overlay. Under certain circumstances, as determined by the Public Works Director, a full width overlay may be required. Refer to paragraph 1 of this section.

7.4.6 Materials and Lay-Down Procedures

Materials and lay-down procedures shall be in accordance with WSDOT/APWA Standard Specifications and the following requirements:

Prior to placement of the curb, gutter, and pavement section, a proof roll shall be performed to confirm the subgrade is firm and unyielding. A dual-axle dump truck, loaded to a minimum 90 percent maximum gross weight capacity, shall be used to perform the proof roll. The subgrade must comply with the requirements of Section 7.4.3 of these Standards.

During surfacing activities, utility covers in roadway shall be adjusted in accordance with Section 9.7.

Asphalt pavers shall be self-contained, power-propelled units. Truck mounted pavers are not considered self-propelled. Truck mounted pavers shall only be used for paving of irregularly shaped or minor areas as approved by the Public Works Director, or as follows:

a) Pavement widths less than 8 feet; and

b) Pavement lengths less than 150 feet

Hot mix asphalt (HMA) for wearing course shall not be placed on any traveled way between October 1 of any year and April 1 of the following year without written approval from the Public Works Director. Asphalt for prime coat shall not be applied when the ground temperature is lower than fifty (50) degrees Fahrenheit without written approval from the Public Works Director. When discharged, the temperature of the HMA shall not exceed the maximum temperature recommended by the asphalt binder manufacturer. For surface temperature limitations, see the WSDOT/APWA Standard Specifications. Each truckload shall be covered with a suitable tarpaulin while in transit to prevent unnecessary heat loss.

Asphalt shall not be applied to wet material. Asphalt shall not be applied during rainfall or before any imminent storms that might damage the construction. The Inspector will have the discretion as to whether the surface and materials are dry enough to proceed with construction.

7.4.7 Asphalt Surfacing Repairs

When repairing shallow holes and gouges in asphalt, the surface must be thoroughly cleaned. The bottom and edges of the hole/gouge shall be swabbed with asphalt tack. HMA shall then be placed and thoroughly tamped or rolled. The edges shall then be sealed in accordance with the WSDOT/APWA Standard Specifications.

For failures or holes/gouges exceeding 1 inch in depth, the minimum repair area shall be three feet beyond the perimeter. The existing pavement shall be sawcut or removed by a pavement grinder. Asphalt for tack coat shall be applied to all surfaces of existing pavement in the repair area. Placement of HMA shall be placed in lifts of not greater than 0.2 foot compacted depth and shall be thoroughly compacted by mechanical tamper or roller. Edges shall be sealed in accordance with the WSDOT/APWA Standard Specifications.

7.5 Lane Widths and Cross-Sections

See Standard Drawings DM.A1.1 through DM.A6.1.

7.6 Bicycle Facilities

The planning and design of bicycle facilities in any of the categories indicated herein shall be in accordance with the WSDOT Design Manual and the AASHTO Guide for the Development of Bicycle Facilities, current edition. The design and construction of bicycle facilities shall be consistent with the Comprehensive Transportation Plan, and the applicable Standard Drawings.

7.6.1 Classifications

Bikeways are generally shared with other transportation modes. When substantial bike usage is expected, which would benefit from construction of a bikeway, the facility may be required to be designed exclusively for bicycle use. However, where there is limited right-of-way availability or environmental constraints the bikeway may be a shared roadway facility. Bikeways are categorized below based on degree of separation from motor vehicles and other transportation modes. This classification does not denote preference of one type over another.

These Standards classify bikeways into five groups:

1. Shared Roadway: A roadway that accommodates bicyclists without special markings or designations. Shared roadways accommodate bicycles by either providing a wide paved shoulder or a wide curb lane.

A paved shoulder should be at least 4 feet wide to accommodate bicycle travel. A wide curb lane should have a total width of 14 feet exclusive of parking. A shared roadway using either a wide curb lane or shoulder is sufficient bicycle accommodation on most roads.

2. Signed Shared Roadway: Shared roadways that are identified by signing as preferred bicycle routes.
3. Bike Lanes: A portion of the road that is designated by pavement striping for exclusive bicycle use. Bicycle lanes may be signed as part of a directional route system. Bicycle lanes are 5 feet wide on a curbed road and minimum of 4 feet wide as a shoulder bike lane. See Standard Drawings DM.A1.1 through DM.A3.1, DM.A5.1.
4. Bike Path: Bicycle facilities on exclusive rights of way and with minimal cross flow by motor vehicles. However, they may be useful extensions of the road network in some situations, such as providing bicycle connections between roads in places where motor-vehicle travel is prohibited.
5. Shared Use Path: Shared use paved tread trails, double track, are typically designated for bicycle and pedestrian use and in general follow a right-of-way independent from any road. They shall be designed to meet the requirements of 12-foot-minimum paved width, WSDOT Design Manual Chapter 1515.

7.6.2 Signing , Striping, and Pavement Markings for Bicycle Facilities

Striping and signing shall be implemented as follows:

1. Pavement markings shall be used on bike lanes and paths according to MUTCD, the AASHTO Guide for the Development of Bicycle Facilities, current edition, and Standard Drawings DM.F2.3, DM.F5.1 through DM.F5.3.
2. The design of all signalized intersections will address bicycle usage.

7.7 High-Occupancy Vehicle (HOV) Lanes

The design of High-Occupancy Vehicle (HOV) lanes on city roads will be evaluated using the WSDOT Design Manual.

7.8 Shoulders

Asphalt paved shoulders may be used where approved by the Public Works Director on existing roads to provide for bicycle and pedestrian use. When allowed, paved shoulders shall be placed consistent with roadway cross-section requirements.

Shoulder areas shall be delineated by a 4-inch white painted edge line, as required by the Public Works Director.

7.9 Curb, Gutter, and Sidewalk

7.9.1 Construction Requirements

Sidewalks shall be designed and constructed on curb and gutter type streets, unless otherwise allowed by these Standards or the Public Works Director. They shall be located and constructed as follows:

A. Where a sidewalk is located adjacent to a curb, the width of sidewalk is measured from the back of the curb to the back of the sidewalk.

B. If it is necessary to locate facilities, such as mailboxes, hydrants, signposts, poles, pedestals, etc. within a sidewalk, then the sidewalk shall be widened to provide a minimum horizontal clearance of 48 inches around any part of the obstruction on neighborhood collectors and local roads, and 60 inches on collector, minor, and principal arterials.

C. Sidewalk cross slopes shall not exceed ADA Standards.

D. Subgrade compaction for curbs, gutters, and sidewalks shall meet a minimum 95 percent of maximum density.

E. Sidewalks located along a road shall follow the road grade in most cases. Where a sidewalk is separated from a road, its grade may or may not be controlled by the road grade. If not, the sidewalk grade shall not exceed ADA Standards.

F. Concrete for curbs, gutters, and sidewalks shall be Class 3000, furnished and placed in accordance with WSDOT/APWA Standard Specifications, Sections 6-02, 8-04, and 8-14. Cold weather precautions as set forth in WSDOT/APWA Standard Specifications, Sections 5-05.3(14) and 6-02.3(6) A shall apply. Once concrete is placed it shall be troweled smooth with a steel trowel. Before jointing or edging, the surface of the walk shall be lightly brushed

in a transverse direction with a soft brush. Concrete sidewalks shall be cured for at least 72 hours. Curing shall be by means of moist burlap or quilted blankets or other approved methods. During this curing period, all traffic, both pedestrian and vehicular, shall be excluded.

G. Extruded cement concrete curb shall be anchored to existing pavement by either steel tie bars or adhesive in conformance with WSDOT/APWA Standard Specification Section 8-04.

H. Extruded asphalt curbs, when allowed by the Public Works Director, shall be anchored by means of a tack coat of asphalt in accordance with WSDOT/APWA Standard Specification Section 8-04.

I. Sidewalk installed within the City's Marina District utilizes a distinct decorative finish. All sidewalk installed within the Marina District shall match existing finishes.

7.9.2 Expansion and Dummy Joints

An expansion joint consisting of 3/8 inch or 1/4 inch x full depth of pre-molded joint material shall be placed around fire hydrants, poles, posts, and utility castings and along walls or structures in paved areas. Joint material shall conform to the requirements of ASTM D994 (AASHTO M33).

A full depth expansion joint consisting of 3/8 inch or 1/4 inch of pre-molded joint material shall be placed in curbs and sidewalks at 10- or 12-foot intervals and at sides of drainage inlets. When curbs and/or sidewalks are placed by slip-forming, a pre-molded strip up to 1/2-inch thick and up to full depth shall be used.

Expansion joints in sidewalk shall be located so as to match the joints in the curb whether sidewalk is adjacent to curb or separated by planting strip.

Tool marks consisting of 1-inch V-grooves must be made in sidewalk at 5-foot intervals, intermediate to the expansion joints.

Interface between curb and adjacent sidewalk on integral pour construction shall be formed with 1-inch radius edging tool. On separate pour construction an expansion joint consisting of 3/8 inch or 1/4 inch x full depth of pre-molded joint material shall be placed between the curb or thickened edge and the adjacent sidewalk.

7.9.3 Curb Ramps

On all curbed streets, ramped sections to facilitate passage of disabled persons shall be constructed through curb and sidewalk at street intersections and other crosswalk locations. The design and construction of curb ramps shall be consistent with the ADA, WSDOT Standard Plans and Standard Drawing DM.C4.1.

Curb ramps are required at legal pedestrian crossings unless a crossing is prohibited and signed as a prohibited crossing. According to RCW 47.04.010, a crosswalk exists between an intersection area and a connection or extension of the farthest sidewalk line, or where no sidewalk exists, between the intersection and a line 10 feet away except as modified by a marked crosswalk.

Curb ramps shall be positioned so that a ramp opening is situated within the marked crosswalk or crossing area if unmarked per the ADA.

The ramps shall have detectable warnings consisting of raised truncated domes in accordance with the ADA Accessibility Guidelines for Buildings and Facilities. They shall be reviewed by the Public Works Director prior to use.

7.10 Signing, Striping, and Pavement Markings

7.10.1 General

Except as may be superseded by these Standards, all signing, striping, and pavement markings in the City of Des Moines shall follow the current edition of the Manual of Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration.

The City of Des Moines standard pavement markings for channelization of roadways are shown in Standard Drawings DM.F2.1 through DM.F6.1.

Tapers lengths shall be designed and constructed based on the following equations:

L = WxS for speeds of 45 mph or more

$L = WS^2/60$ for speeds of 40 mph or less

Where:

L = Minimum length of taper

W = Width of offset

S = Posted speed limit in mph

Pavement markings and raised pavement markers shall be used to delineate channelization, transit lanes, bus zones, lane endings, crosswalks and longitudinal lines to control or guide all users of the roadway system and shall conform to Standard Drawings DM.F2.1 through DM.F6.1.

When removal of existing pavement markings is required, a full-width overlay may be required by the Public Works Director to remove any reflections of the old markings.

All pavement markings shall be “Pre-Mark” preformed (Type B) pavement markings, consistent with Standard Drawing DM.F2.8, unless otherwise approved by the Public Works Director.

7.10.2 Replacement and Temporary Requirements

All traffic striping, striping, and pavement markings removed during a construction project shall be replaced. Temporary striping shall be used on a limited basis and only as approved by the Public Works Director. The Engineering Services division shall be contacted a minimum of 3 days in advance of installation to verify channelization layout.

7.10.3 Installation Requirements

All signing, striping, and pavement markings shall be laid out with spray paint and approved by the Public Works Director before final installation. Approval shall require advance notice of three working days to have field layout approved by the Inspector or to make arrangements to meet the Public Works Director or his designee on site during the installation.

All signing, striping, and pavement markings, including street name signs, within subdivision or short subdivision shall be provided and installed by the developer.

7.11 Illumination

Street illumination shall be provided on all roadways. Street illumination designs will make special provision for street illumination at the following locations:

- Channelized intersections
- Signalized intersections
- Transit stops
- Railroad crossings with automatic gates
- Any pedestrian undercrossings or overcrossings
- Multi-use trails adjacent to roadways
- Curbs and hard channelization
- Medians and landscape planters
- At traffic calming devices

The illumination system shall be designed to provide the lighting levels shown in Table 7-2, except at intersection where the system shall be designed to provide a minimum of 1.5 foot-candles with an average-to-minimum uniformity ratio of 3:1.

Table 7-2. Minimum Illumination Levels

	Minimum average foot-candles (FC)	Maximum average-minimum uniformity ratio
Principle, Minor, and Collector Arterials	1.2	3:1
Collector Arterial and Neighborhood Collector	0.9	4:1
Local Road	0.9	6:1

Galvanized Steel Type 1 poles shall be used for the street illumination system on arterials and collectors. Concrete octagonal poles shall be used for the street illumination system on local roads unless otherwise approved. Decorative poles may be required in various locations by the Public Works Director.

All new street lighting shall be by LED. Typical luminaire height is 25 feet.

When illumination is required for sag vertical curves the system shall be designed to provide a minimum of 0.4 foot-candles within the limits of the sag curve with a maximum average foot-candle value of 1.0. If an intersection is adjacent to the sag vertical curve, the illumination must include the intersection.

Street lighting designs are provided by PSE/IntoLight. PSE/IntoLight shall provide a street lighting authorization letter to City for design approval.

7.12 Traffic Signals

7.12.1 General

A pre-design conference is required with the Public Works Director for any proposal to install a new traffic signal, or modify an existing traffic signal. A signal warrant analysis is required for each new traffic

signal installation. Preparation of the warrant analysis shall conform to the applicable sections of the MUTCD. The warrant analysis shall be submitted to the Public Works Director for consideration before any design work is submitted.

An electronic copy of the plans, in the City's current CAD format, must be provided with the final plans.

7.13 Traffic Calming

City Staff will review traffic calming requests on a case-by-case basis.

8. ROADSIDE FEATURES

8.1 Clear Zones

The designer engineer must be aware of the extensive tables of recommended clear zone distances both in the AASHTO Green Book and WSDOT Design Manual. It must also be recognized however, that serious accidents on low volume roads, especially on those below 200 ADT, are rare occurrences. At this low end of the scale, the cost of providing the recommended clear zone may be prohibitive. Research undertaken to re-evaluate the safety needs on low volume rural roads indicates that the suggested values for side slopes and clear zones should be recognized as idealistic objectives and that a more realistic approach to roadside safety on low volume roads should depend on achieving a balance between the cost and the safety effectiveness of the design treatment.

Research further indicates that, while the application of such an analysis to low volume roads indicates that individual roadside safety treatments yield very small safety contributions, some low-cost improvements do appear to be cost effective especially on the outside of curves. The removal of certain trees and relocation of utility poles are recommended. Also cited as being cost effective is the placement of guardrail on steep slopes, the removal of unnecessary guardrail on flat slopes, and the flattening of steep but low embankments. In this regard it is most important that the design engineer is aware not only of pertinent published recommendations, but also of research done subsequent to their adoption. In the final analysis, the design engineer must apply his or her own professional judgment in making the final design decisions and be prepared to defend and justify them if necessary.

8.2 Roadside Obstacles

Non-yielding or non-breakaway structures exceeding 6 inches in height, including rockeries, retaining walls, and any other objects which may be a potential concern to the traveling public, shall be placed with due regard to safety. On shoulder or mountable curb roads, such as rolled curb, extruded curb, or thicken edge, roadside obstacles that are essential to the roadway network shall be placed as close to the right-of-way line as practicable and a minimum of 10 feet measured from the edge of the traveled way or edge line.

Non-essential items, (e.g., decorative items) shall not be placed within the right-of-way on shoulder or mountable curb roads unless otherwise approved by the Public Works Director through the deviation request process. Additionally, no open water facilities, with the exception of ditches and bio-swales shall be located within the road right-of-way, unless the Public Works Director grants a deviation. Landscaping placed within the right-of-way shall meet the minimum requirements specified in Section 8.3 of these Standards.

On vertical curb roadways with speed limits less than 40 miles per hour, roadside obstacles shall be placed as far from the edge of the traveled way or edge line as practical. Such objects shall not be placed in a sidewalk or with the object edge nearest the roadway less than 8.5 feet from the face of curb on principal and minor arterials and 5.5 feet from face of curb on neighborhood collectors and local roads. On vertical curb roads with speed limits of 40 miles per hour or greater, roadside obstacles shall be placed as close to the right-of-way line as practicable and a minimum of 10 feet from the edge of the traveled way or edge line.

The Public Works Director may approve the placement of roadside obstacles within a planter strip, provided the minimum roadside obstacle requirements are met. Placement of utility structures shall be

in accordance with requirements of Chapter 9 of these Standards to include constraints on placement of poles on the outside of curves. The applicant or the design engineer may apply for the deviation for the obstacle or utility structure when justified by a traffic safety evaluation. The applicable utility company shall be contacted for the opportunity to submit a written recommendation. No structure will be approved where there is less than 2 feet from the face of the curb to the face of the object.

As specified in the WSDOT Design Manual, there shall be an unobstructed vertical clearance of at least 7 feet above the surface of any sidewalk or walkway, and 8 feet above any bikeway.

8.3 Landscaping

8.3.1 General

Landscaping in the City road right-of-way provides numerous aesthetic, environmental and safety benefits. The City's landscaping requirements are codified in Chapter 18 of the DMMC with additional requirements contained herein. The following subsections provide amplifying information for the landscaping of city roads and stormwater facilities.

8.3.2 Planter Strips

A planter strip is that portion of the right-of-way between the curb line and the sidewalk or between the sidewalk and the right-of-way line used for the planting of trees, shrubs, groundcover, or grass. Planter strips are required on arterials, as shown in Standard Drawing DM.A1.1. Planter strips may be installed, but are not required, on neighborhood collectors and local roadways, as shown in Standard Drawings DM.A2.1 through DM.A4.1. Planter strips installed in plats and sub-divisions on neighborhood collectors and local roads shall require a maintenance agreement from the homeowners associations. See Section 8.3.4 for further information. The design of planter strips must be approved by the Public Works Director through a landscaping plan in which plant maintenance, utilities and traffic safety requirements are addressed.

The preferred planter strip location is between the vertical curb and sidewalk to enhance the urban road appearance. However, planter strips may be located behind sidewalks or on both sides of sidewalks, as discussed further below, if approved by the Public Works Director, if sufficient right-of-way is available, and if the landscape design will fit with the surroundings.

The minimum width of a planting strip from back of curb to the sidewalk shall be 4 feet on local roads and neighborhood collectors (when installed) and 5 feet on collector, minor, and principal arterials.

8.3.3 Planting Types

Landscape plantings, approved for use in public right-of-way, are grouped into four categories described in Section D of the details. Height, spacing, and plant root development have been evaluated to prevent interference with overhead or underground utilities. Approved species for each category are listed in Section D of the details.

Due to the sensitive nature of critical areas, as defined by Chapter 16 of the DMMC, non-native species may not be planted for landscaping in a public right-of-way that borders a critical area.

8.3.4 Tree Planting and Maintenance

1. Tree and shrub size specifications at time of planting shall comply with Standard Drawings DM.D1.1 through DM.D4.5.
2. Trees planted within the clear zone shall have a breakaway mature trunk diameter of four inches or less. Trees with mature trunk diameters of greater than 4 inches shall be located outside the clear zone. Clear zone setbacks for larger diameter trees shall meet the requirements of Section 8.1 and 8.2.
3. Location of trees shall take into consideration fixed objects so as not to obstruct sight distance, bus shelters, street signs, luminaries, mailboxes, utility boxes and other fixtures. The Public Works Director may restrict the use of plant materials in the right-of-way where sight distance, traffic safety, pedestrian conflicts, and maintenance issues are of concern

   Minimum setback of trees in right-of way from fixed objects shall meet the following criteria:

   a) 50 feet from intersection vertical curb line
   b) 20 feet from luminaries and utility poles
   c) 20 feet from signs
   d) 15 feet from bus shelters,
   e) 10 feet from driveways
   f) 10 feet from utility vaults/boxes
   g) 10 feet back of sidewalk for all evergreen trees
   h) 5 feet from hydrants
   i) 2 feet from back of sidewalk for all deciduous trees
   j) Outside identified sight distance restricted areas
4. Trees shall be planted so that the center of each trunk is 2.5 feet from the back of curb or, if planted behind a sidewalk, 3 feet from the back of sidewalk. Refer to Standard Drawings Section D.
5. Only shrubs, ground covers, and grasses that mature less than 24 inches in height shall be planted in the planting strips.
6. Where trees are to be planted adjacent to a sidewalk, a commercial root barrier shall be installed on the sidewalk side of each tree, parallel to and 6 inches from the sidewalk. The barrier shall be 15 feet long, centered horizontally on the tree trunk and extend from the ground surface to a depth of 36 inches or as recommended by a Registered Landscape Architect and approved by the Public Works Director.
7. The use of tree blockouts (see Standard Drawing DM.D2.1 & DM.D2.2), shall at a minimum, meet ADA standards for minimum sidewalk clearance. Tree grates that meet ADA standards may be considered for meeting the minimum sidewalk width.
8. The top 12 inches of soil within the entire planting strip shall be removed prior to planting and replaced with appropriate topsoil conducive to good plant growth. Provision for drainage and watering shall be considered required relative to the plant species approved.

9. Permanent irrigation systems may be required in the right-of-way and shall be designed by the landscape architect and/or engineer of record.
10. The applicant/developer shall ensure that any temporary irrigation systems are either removed or properly disconnected to prevent water leakage prior to final roadway acceptance by the City.
11. Trees shall be trimmed so that no branches extend below 14 feet above a traffic lane, 7 feet above pedestrian facility, and 8 feet above a bicycle lane.
12. Where a landscaping area within the right-of-way is proposed by a developer but not required by these street standards, a maintenance agreement shall be required.

8.3.5 Stormwater Facility Landscaping

Stormwater detention facilities shall be landscaped with vegetative buffers/screens pursuant to Chapter 18 of the DMMC. Submit landscaping plan for review by City.

Fencing around the facilities may be required for safety and security. Black vinyl-coated chain link fence is specified.

8.3.6 Landscaping in Traffic Islands, Circles, and Medians

Traffic islands, circles, and medians may be paved or planted with low shrubs (24-inches mature height or less) and ground covers, if long-term maintenance is provided and they have no traffic or pedestrian safety issues as determined by a Registered Professional Engineer. These planter islands shall be at least 9 feet wide from curb face to face. The first 20 feet of these islands may be planted with low shrubs and ground covers. Deciduous trees may be used if set back a minimum of 20 feet from the front of the island and evergreens at a minimum of 30 feet.

8.4 Cut and Fill Slopes

Side slopes shall generally be constructed no steeper than 3H:1V on both fill slopes and cut slopes. Slopes steeper than 2H:1V may be approved by the Public Works Director through a deviation request upon showing that the steeper slopes, based on soil analyses, will be stable. Side slopes on projects funded by federal grants shall be constructed in conformance with Local Agency Guidelines.

Side slopes shall be stabilized by grass sod or seeding or by other planting or surfacing materials acceptable to the Public Works Director.

Slope easements adjacent to the right-of-way may be required for maintenance and protection of cut or fill slopes.

8.5 Guardrail

Evaluation, design and installation of guardrails shall be in accordance with the WSDOT Design Manual, the AASHTO Roadside Design Guide, the WSDOT/APWA Standard Plans, and these Standards.

New roadways shall be designed with due regard to safety for the traveling public. To ensure a safe roadway configuration, the following features shall be included in the roadway design in order of preference:

1. Provide 4H:1V or flatter cut/fill slopes adjacent to the roadway where vertical change to existing grade is greater than 6 feet.
2. Provide 3H:1V or flatter cut/fill slopes where 4H:1V slopes cannot be provided and vertical change to existing grade exceed 6 feet.
3. Design location of stormwater runoff ponds where they are not accessible from errant vehicles.
4. Where slopes steeper than 3H:1V are necessary for cut/fill embankments, barrier systems are required. Evaluate need for barrier systems and provide design in conformance with WSDOT/APWA Standard Plans, Standard Specifications, and the WSDOT Design Manual and approved by a Registered Professional Engineer.
5. Guardrail, if required, shall be Type 31 with steel posts in conformance with WSDOT/APWA Standard Plans unless otherwise approved by the Public Works Director.

8.6 Safety Railings

Safety railings may be required for pedestrians and/or bicyclists along roadways, bridges or pedestrian facilities. Reference standards for design, depending on the type of facility to be constructed, include the following:

- AASHTO Standard Specifications for Highway Bridges
- WSDOT Design Manual
- International Building Code
- Americans with Disabilities Act (ADA)

8.7 Mail Boxes

A. The responsibilities for location support structures, and installation of mailboxes in connection with the construction or reconstruction of City roads are as follows:
    1. The Public Works Director will:
        a. Require road improvement plans to show clearly the designated location or relocation of mailboxes, whether single or in clusters.
        b. Require with this information any necessary widening or reconfiguration of sidewalks with suitable knockouts or open strips for mailbox posts or pedestal.
        c. Require these plans to include a statement on the first sheet that mailbox locations as shown on these plans have been coordinated with the serving post office. This will be a prerequisite to plan approval.
        d. Require construction of mailbox locations in accordance with these plans, through usual inspection and enforcement procedures.

2. The Postmaster or designated serving post office will:

    a. Designate location and manner of grouping of mailboxes when so requested by the design engineer. Note on the plans the type of mailbox delivery: NDCBU (Neighborhood Delivery and Collection Box Unit), or Residential type box. Authenticate by stamp or signature when these data have been correctly incorporated into the plans.

    b. Do all necessary coordination with owners or residents involved to secure agreement as to mailbox location and to instruct them regarding mailbox installation. Actually install or relocate NDCBUs if these are the types of box to be used in the neighborhood.

3. Owners or residents served by mailboxes, at time of original installation, will:

    a. If using individual mailboxes, clustered or separate, install and thereafter maintain their own mailboxes as instructed by the post office.

    b. If NDCBU delivery, rely on Post Office to provide and maintain NDCBUs.

4. Builders or their contractors shall:

    a. Where there are existing mailboxes and no plans to replace them with NDCBUs:

        When it becomes necessary to remove or otherwise disturb existing mailboxes within the limits of any project, install the boxes temporarily in such a position that their function will not be impaired. After construction work has been completed, reinstall boxes at original locations or at new approved locations as indicated on the plans or as directed by the Public Works Director. Use only existing posts or materials except that any damage caused by the builder or his/her contractor is to be repaired at the expense of the builder.

    b. Where there are existing NDCBUs or plans to install NDCBUs:

        Call on the Postmaster or designated serving post office to locate or relocate NDCBUs and make the necessary installation.

B. Installation methods are as follows:

1. Mailboxes, in the general case, shall be set in accordance with Standard Drawing DM.G1.1. Boxes shall be clustered together when practical and when reasonably convenient to the houses served.

2. NDCBUs will be installed by the Postal Service generally in accordance with Standard Drawing DM.G1.1.

3. Non-yielding and non-breakaway mailbox structures will not be allowed within the clear zone. See Section 8.1 and 8.2 of these Standards. The use of concrete filled metal pipe for any mailboxes, or the use of horizontally mounted wooded members to support multiple mailboxes is expressly prohibited.

8.8 Fire Hydrants

The placement of bollards (or similar objects) within the right-of-way as a means to “protect” fire hydrants from being struck by errant vehicles is expressly prohibited. Relocation of the fire hydrant outside the clear zone should be considered if ongoing maintenance is needed.

8.9 Bollards

When necessary to deny motor vehicle access to an easement, tract, or shared use path/trail, except for maintenance or emergency vehicles, the point of access may be closed by a line of bollards. These shall include one or more fixed bollards on each side of the traveled way and removable, locking bollards across the traveled way. Spacing shall provide one bollard on centerline of trail and other bollards spaced at a maximum of 50 inches on center on trails 10 feet wide or less. Spacing shall be 60 inches on center on trails wider than 10 feet. Bollard design shall be in accordance with Standard Drawing DM.E3.1. No fire apparatus access roads shall be blocked in this manner without the concurrence of the Fire Marshal. When used, bollards shall be located outside the designated clear zone.

8.10 Gates

See Des Moines Ordinance 1334 Exhibit "A" for gate requirements contained herein.

1. Private gates or other traffic barriers should be permitted only in cases where adequate provisions are made for access by fire, police, medical emergency, visitors and other public services (such as mail service, garbage collection, public utility emergency repairs, UPS/FedEx deliveries, home repair and maintenance vehicles, parking, etc.).
2. Private gates are allowed only on private streets and private driveways.
3. If, at any time, a private street in converted to, and accepted by the City, as a public street; any private gate(s) shall be removed.
4. In cases where the proposed gate or other barrier will affect 10 or more dwelling units, an engineering study will be required which addresses queuing patterns and associated questions related to items listed in No. 1 above. Recommended mitigation measures shall be submitted to the City along with the application. The traffic study shall be performed by a licensed and registered professional engineer within Washington State.
5. The entrance to the proposed gate shall be designed and stamped by a licensed and registered professional engineer within Washington State, and shall allow for a safe turnaround without backing on public right-of-way for vehicles in front of the gate in cases where the vehicle is denied entry. The design for the gated entrance shall consider the abutting public right of way and roadside alignments and grades, sight distance, posted speeds and other traffic engineering criteria relevant to designing the particular gated entrance. The gate design shall also consider current and future projects contained in the City's adopted Transportation Comprehensive Plan.
6. A sign shall be located on the private street at a point visible from the public roadway indicating "locked gate ahead".
7. All gates shall be equipped with a lockbox with momentary push-button switch and Opticom.
8. All gates shall include an activation system for use by private property owners. This system shall operate independently of the emergency access system, and may utilize keypads magnetic cards, radio transmitters, or other mechanisms approved by the City of Des Moines and South King County Fire District.
9. All gates shall include a default to unlocked, open position in the event of a power outage.

10. There shall be pedestrian access around all gates.
11. Gate construction, height and aesthetics shall be determined through the design review process, which is conducted by the Economic Development Department. The gate and related equipment shall be coated in a manner to prevent corrosion. The gate shall be constructed in a manner so as to allow viewing of obstructions located within the swing path of the gate. In no event shall the moving portion of the gate exceed 10 feet in height.
12. If the gate obstructs access to public utilities or appurtenances, the utility purveyors shall be provided with sufficient activation devices, keys, or the access code to the gate as required.
13. All gates shall be erected a minimum of thirty feet from the edge of any public right of way. A property survey may be required to determine where the property line is located.
14. All gates shall include adequate provisions for illumination and/or reflectorization in order to be properly seen during periods of darkness and inclement weather conditions.
15. Any person desiring to install a gate shall apply for a gate permit from the Public Works Department. The application shall contain the following information:
    a) A vicinity and site map of the proposed location for the gate;
    b) A plan view and elevation of the gate installation illustrating gate dimensions and direction of the swing path for the gate;
    c) A plan view of the gate turnaround maneuvering plan;
    d) The location of the access-control panel;
    e) Control system information;
    f) The names and addresses of all property owners affected by the residential access. A gate cannot be installed without 100 percent approval.
    g) Both the City of Des Moines and South King County Fire District shall review all gate applications. Prior to any permit issuance, approvals from both entities shall be obtained.
    h) Building Permits and inspections shall be required for all gate installations;
    i) Such other information as may be required by the Public Works Department; or other associated City departments such as Economic Development, or South King County Fire District;
    j) The application shall be signed and dated by all co-owners of the private street.
16. Any person submitting an application for a gate shall pay a non-refundable fee to be set by administrative order of the City Manager at the time the application is submitted to cover staff review costs. This fee shall be in addition to any other development or construction fees for the subject property.
17. Upon receipt of a properly completed application for a gate installation request conforming to City standards together with the private gate application fee, the Public Works Department shall begin the review process. Upon completion of a thorough review of the application, the Public Works Director, or his designee may issue a permit authorizing the installation and construction of the gate. The City retains the right to have such gates removed and/or relocated at the applicant's sole expense should the City deem such action

necessary for public safety. The applicant may appeal any removal/relocation decision to the Hearing Examiner.

18. The City shall have no liability for any damage to the gate resulting from City vehicles or City personnel accessing the property, whether responding to actual or false emergencies. Any damage sustained to City vehicles due to the gate installation shall be the responsibility of the party responsible for maintenance and repair of the gate.
19. The City shall have the right to access the property to inspect the gate on a periodic basis without being liable for trespass.
20. Maintenance and repair of the gate and related equipment shall be the responsibility of the applicant. A maintenance agreement between ALL affected property owners shall be submitted to, reviewed, and approved of, by the City prior to being recorded with King County against ALL properties involved. The applicant may, with the consent of the City, assign the obligation for maintenance and repair of the gate and related equipment to another person or entity, including a homeowner's association.
21. Upon notification by the City of any defects in the gate installation, the party responsible for maintenance and repair shall effect necessary repairs within fourteen days. Failure to make repairs within the specified period shall constitute a violation of the terms of the gate permit, and in such event, the City may require removal of the gate and related equipment. An extension of the time to make necessary repairs may be granted for just cause if requested in writing by the party responsible for maintenance and repair of the gate.
22. A turnaround analysis utilizing an SU30 as the design vehicle shall be provided for review of gate permits. The turnaround analysis must document a reasonable (three-point maximum) turnaround for an SU30 vehicle.
23. Gate permits for residential properties may include a deviation request for potential flexibility in the gate requirements. Deviations are reviewed by the Public Works Director on a case-by-case basis and may allow for a reduction of the gate setback to 20 feet from the traveled way or right-of-way and flexibility in turnaround requirements.
24. Gate permits for commercial properties may include a deviation request for potential flexibility in the gate requirements. Deviations are reviewed by the Public Works Director on a case-by-case basis. The deviation request for a commercial gate typically would include a traffic study by a licensed engineer to demonstrate potential queuing and its traffic safety impacts on the adjacent roadway.

8.11 Roadway Barricades

Temporary and permanent barricades shall conform to the standards described in Section 6C-8 of the MUTCD.

1. Type I or Type II barricades may be used when traffic is maintained through the area being constructed/reconstructed.
2. Type III barricades shall be used when roadways and/or proposed future roadways are closed to traffic. Type III barricades shall extend completely across a roadway or from curb to curb. Where provision must be made for access of equipment and authorized vehicles, the Type III barricades may be provided with movable sections that can be closed when work is not in progress, or with indirect openings that will discourage public entry. Where

job site access is provided through the Type III barricades, the applicant/contractor shall assure proper closure at the end of each working day.

3. In the general case, Type III permanent barricades shall be installed to close streets to traffic. They shall also be used to close off lanes where additional emphasis is desirable.
4. Type III barricades shall be used at the end of a local access street terminating abruptly without a cul-de-sac bulb or on temporarily stubbed off streets. Each such barricade shall be used together with an end-of-road marker.

8.12 Bus Stops and Shelters

Land development applications and city road projects are reviewed by local transit agencies for provision of appropriate transit facilities. During the design of arterials and neighborhood collectors, the design engineer shall contact the transit agencies, and the local school district to determine bus stop locations and other bus operation needs.

The project shall provide ADA accessible landing pads at designated bus stops, and where required shall include turn-outs and shelter pads. Pedestrian and disabled access improvements within the right-of-way to and from the bus loading zone or turn-out from nearby businesses or residences shall also be provided as part of the road improvement. Surfacing for bus zones and turn-outs shall at a minimum meet the requirements of Section 7.4 of these Standards. Metro's publication, "Metro Transportation Facility Design Guidelines," or other applicable agencies guidelines may require additional surfacing requirements.

8.12.1 Bus Pullouts

Bus pullouts are typically not recommended. Each case where a pullout may be considered will be reviewed by the Public Works Director and transit agency.

8.12.2 Bus Landing Pad

A landing pad, at least 9 feet wide and 15 feet long, shall be constructed at bus stops, or where requested by a transit agency or school district, for passenger waiting and wheelchair access.

8.13 Shared Use Paths and Trails

A shared use path is a multi-use facility, physically separated from the roadway, for bicyclists, pedestrians or other non-motorized users.

Shared use paths and trails shall be provided where designated in the City Comprehensive Plan or where required by the Public Works Director because of anticipated significant public usage.

Shared use paths and trails are typically located on an easement, in a tract, or within the right-of-way when separated from the roadway by a drainage ditch or barrier. Where multi-purpose trails intersect with motorized traffic, sight distance, markings, and signalization (if warranted) shall be as provided in MUTCD.

Shared use paths shall be designed to meet the requirements of 12-foot-minimum paved width, see Chapter 7.6.1 of these Standards and WSDOT Design Manual Chapter 1515.

9. UTILITIES

9.1 Franchising Policy and Permit Procedure

The Standards shall apply to every new placement and every planned, non-emergency replacement of existing utility poles and other utility structures within the City of Des Moines right-of-way. Every effort shall be made to meet the Standards during emergency replacement of existing utility poles and other structures.

Utilities to be located within existing and proposed city road right-of-way shall be constructed in accordance with current franchise and/or permit procedure, the City's Regulations for Accommodation of Utilities, and in compliance with these Standards. In their use of the right-of-way, utilities will be given consideration in concert with the traffic-carrying requirements of the road which are, namely, to provide safe, efficient and convenient passage for motor vehicles, pedestrians, and other transportation uses. Aesthetics shall be a consideration. Under grounding of aerial utilities is required per DMMC 12.25. Utilities are subject to City Codes and policies relating to drainage, erosion/sedimentation control, and sensitive areas as set forth in the King County Surface Water Design Manual.

Requests for exceptions to these Standards will be processed in accordance with the deviation request procedure as referenced in Section 1.9.

9.2 Standard Utility Locations within the Right-of-Way

Utilities within the right-of-way on new roads or on roads where existing topography, utilities or storm drains are not in conflict shall be located as indicated below. Where existing utilities or storm drains are in place, new utilities shall conform to these Standards as nearly as practicable and yet be compatible with the existing installations. Above ground utilities located within intersections shall be placed so as to avoid conflict with placement of accessible pedestrian routes, curb ramps, crosswalks, and bike facilities.

Notwithstanding other provisions, underground systems shall be located at least 5-feet away from the road centerline and where they will not otherwise disturb existing survey monumentation.

On crossings required to be opened to traffic, and prior to final trench restoration, steel plates shall be installed by the contractor as directed by the Public Works Director.

9.2.1 Gas and Water Lines

A. Located in a shoulder-and-ditch section shall be a minimum of 3 feet from the edge of traveled way.

B. Located in a curb and gutter section are preferable at 1.5 feet back from the back of curb, or at a distance which will clear root masses of street trees if present or anticipated. Otherwise, they shall be located in the street as close to the curb as practical without encroachment of the storm drainage system. Mains and service connections to all lots shall be completed prior to placing of surface materials.

C. Shall be placed with minimum 36-inch cover from finished grade, ditch bottom, or natural ground.

D. Gas lines shall generally be located on the South and West side of the roadway centerline.

E. Water lines shall generally be located on the North and East side of the roadway centerline.

9.2.2 Individual Water Service Lines and Side Sewers

A. Shall be placed with minimum 36-inch cover from finished grade, ditch bottom, or natural ground.

B. Shall use road right-of-way only as necessary to make side connections.

C. For any one connection, shall not extend more than 60 feet along or through the right-of-way, or the minimum width of the existing right-of-way.

D. Water meter boxes, when placed or replaced, shall be located on the right-of-way line immediately adjacent to the property being served, unless otherwise approved by the Public Works Director.

9.2.3 Sanitary Sewers

A. Shall be placed with minimum 36-inch cover from finished grade, ditch bottom, or natural ground.

B. Shall generally be placed 5 feet south and west of centerline.

C. Side Sewers shall be provided to all adjacent lots or parcels.

D. Side Sewers shall be placed within ten (10) degrees of perpendicular to road centerline.

E. In the case of individual sanitary sewer service lines which are force mains the pipe shall:

1. Be minimum 2-inches I.D., or as required by the utility to maintain internal scouring velocity.
2. If nonmetallic, contain wire or other acceptable proximity detection features; or be placed in a cast iron or other acceptable metal casing.
3. Shall be placed with minimum 36-inch cover from finished grade, ditch bottom, or natural ground.
4. Be placed within ten (10) degrees of perpendicular to road centerline.
5. Be jacked or bored under road unless otherwise approved by the Public Works Director.

F. Sanitary and water lines shall be separated in accordance with good engineering practice such as the Criteria for Sewage Work Design, Washington Department of Ecology, latest edition.

G. Gravity systems, whether sanitary or storm drainage, shall have precedence over other systems in planning and installation except where a non-gravity system has already been installed under previous approved permit and subject to applicable provisions of such permits or franchises.

9.2.4 Electric Utilities, Power, Telephone, Cable TV, Fiber Optic Conduit

A. Preferably located underground on either side of the roadway, with 36-inch minimum cover, at plan location and depth compatible with other utilities and storm drains. Otherwise, every new placement and every replacement of existing utility poles and other utility structures above grade shall conform to the following:

1. Utility poles or other approved essential roadside obstacles may be placed within the right-of-way and shall be as far back from the traveled way or auxiliary lane as possible. When allowed they shall be located as follows:

    a. On shoulder type or mountable curb roads, installation of new or relocated poles or obstacles shall be located behind existing ditches and in accordance with the criteria in Sections 8.1 and 8.2. Placement of barrier between the traveled way and the pole

or obstacle shall not satisfy this requirement unless the barrier already exists for other purposes and the pole location shall meet roadside barrier standards unless allowed by an approved deviation. Deviations will be considered only when other reasonable alternatives do not exist.

b. Notwithstanding other provisions regarding pole locations described in these standards, no pole shall be located so that it poses a roadside safety concern to the general public. Utilities shall place and replace poles with primary consideration given to public safety.

c. Every effort shall be made to meet the requirements of these Standards during emergency replacement of existing utility poles and other structures. After a pole has been replaced, all utilities sharing that pole shall have a maximum of 30 days to relocate their facilities to the new pole and remove the old pole.

2. The above constraints on pole and obstacle location will not apply to locations not accessible by moving vehicles, “breakaway” structures whose break-off resistance does not exceed that of a single 4-inch x 4 inch wood post, a standard Telspar style post, or to “breakaway” fire hydrants installed to manufacturer’s specifications.

3. Deviations from these pole and obstacle clearance criteria will only be allowed through an approved deviation when justified by suitable engineering study considering traffic safety. For franchised utility permits, the Utility may request a deviation from pole and obstacle clearance criteria. Up to three contiguous damaged or weakened poles may be replaced at existing locations under permit in accordance with emergency procedures; however, sequential permits resulting in continuous replacement of a pole line shall not be allowed. A pole or other obstacle, which incurs repeated damage from errant vehicles, shall be relocated outside the clear zone in accordance with Section 8.1 and 8.2.

4. Locations of poles shall also be compatible with driveways, intersections, and other road features, and shall not interfere with sight distances, road signing, traffic signals, culverts, etc. To the extent possible, utilities shall share facilities so that a minimum number of poles are needed.

5. Where road uses leave insufficient overhang, anchor, and tree-trimming space for overhead utilities, additional easements and/or right-of-way may be required. The costs associated with additional easements and/or right-of-way for this purpose shall be borne by the applicant, builder, or other party initiating the improvement. The associated cost of relocating the utility shall not be borne by the City.

9.3 Underground Installations

All hard surface roadways shall be jacked or bored. Exceptions shall be reviewed on a case-by-case basis through the Right-of-Way Permit approval process. The current WSDOT/APWA Standard Specifications will generally apply unless otherwise stated. Refer to Standard Drawings DM.A7.1 through DM.A7.5.

9.3.1 Existing Roadways

A. Cuts on Traveled Way:

All hard surface roadways shall be jacked or bored. Exceptions will be on a case-by-case basis with the express written permission of the Public Works Director if it can be shown that jacking or boring are not possible due to conflicts or soil conditions, or unless the utility, including drainage structures, can be installed just prior to reconstruction or overlay of the roadway.

B. Cuts Parallel to Road Alignment:

In cuts parallel to the road alignment, the entire trench shall meet the requirements of Standard Drawings DM.A7.1 through DM.A7.5. Trench restoration shall also satisfy these requirements when cuts occur within the traveled way. All cuts outside the traveled way that are located in paved areas shall be restored. The restoration shall include but is not limited to repairing all failures and cracking of the paved surface, repairing failures caused by the construction activity, rebuilding the cross slope to uniformity, and overlaying 2 inches for the full-lane or half street widths.

C. Cuts Transverse to Road Alignment:

Without exception, the entire trench shall be backfilled with 5/8-inch minus crushed surfacing top course meeting the requirements of Section 9-03.9(3) of the WSDOT/APWA Standard Specifications, or a Controlled Density Fill (CDF). Backfill shall be placed and compacted mechanically in 6-inch lifts to 95 percent of the maximum density as determined by the compaction control tests described in Section 2-03.3(14)D of the WSDOT/APWA Standard Specifications. If the capability can be demonstrated, based on compaction equipment or quality of backfill to achieve 95 percent density in thicker lifts, the depth of backfill lifts may be increased up to 1 foot. If the Inspector approves use of CDF, it shall meet the requirements of Section 9.4 of these Standards.

After backfill and compaction, an immediate cold mix patch shall be placed and maintained in a manner acceptable to the Public Works Director.

Restoration of a trench within an asphalt pavement shall include full trench depth of crushed surfacing material and HMA the same thickness as the existing asphalt pavement or a minimum of 4 inches, whichever is the greater. Pavement shall then be overlaid full width as indicated on the approved plans, with a minimum of 2-inches compacted depth HMA. Restoration of roadways paved within 5 years shall be overlaid a minimum of 25 feet in each direction from trench. Roads older than 5 years shall have pavement restoration limits set by the Public Works Director or his/her designee. Prior to the overlay, transverse joints and vertical curb lines shall be planed in accordance with Standard Drawing DM.A7.2. Concrete pavement shall be restored to be consistent with Sections 5-05 and 6-02 of the WSDOT/APWA Standard Specifications. Any concrete pavement traffic lane affected by the trenching shall have all affected panels replaced.

9.4 Controlled Density Fill (CDF)

9.4.1 General

As an alternative to mechanical compaction, trench backfill above the bedding and below the base course or ATB may be accomplished by use of controlled density backfill (CDF) in a design mixture according to Section 2-09.3(1) E of WSDOT/APWA Standard Specifications if requested and approved by the Public Works Director.

CDF may be required by the Public Works Director in situations where even a small amount of trench settlement cannot be tolerated, such as installation of transverse trenches on arterial roads.

CDF shall be used as fill above pipe zones at all street crossings and other areas, as specified by the Public Works Director, where consolidated, non-settling backfill is required to prevent settlement. The Public Works Director Engineer may limit the use of CDF in cases where trenching has penetrated the till layer and disruption of natural groundwater flow would occur.

9.4.2 CDF Composition

CDF shall be a mixture of Portland cement, fly ash, aggregates, water and admixtures which have been batched and mixed in accordance with WSDOT/APWA Standard Specifications

The contractor and/or the design engineer may request the use of an alternative mix design. The contractor shall provide a mix design in writing and the CDF shall not be placed until the Engineer has reviewed the mix design. CDF shall meet the requirements of Section 6-02.3(5)C of the WSDOT/APWA Standard Specifications

9.4.3 Certificate of Compliance

The producer shall provide a Certificate of Compliance for each truckload of control density fill. The Certificate of Compliance shall verify that the delivered material is in compliance with the Standard or approved mix design. Testing of CDF shall be in accordance with ASTM D4832.

9.4.4 CDF Placement

CDF shall be discharged from the mixer by any reasonable means into the area to be filled. The CDF shall be brought up uniformly to the elevation shown on the plans.

CDF shall not be placed on frozen ground. CDF patching, mixing, and placing may be started if weather conditions are favorable and the temperature is at least 34 degrees F. and rising. At the time of placement, CDF must have a temperature of at least 40 degrees F. Mixing and placing shall stop if the temperature drops to 38 degrees F. or less. Each filling stage shall be as continuous a process as possible.

Trench sections to be filled with CDF shall be contained at either end of the trench section by bulkheads or earth fill. The contractor shall provide steel plates to span the utility trenches and prevent traffic contact with the CDF for a minimum of 24 hours after placement or until the CDF is hard enough to prevent rutting by construction equipment or traffic.

9.4.5 CDF Compaction

For pourable CDF, compaction is not necessary for placement. The contractor may, as an option, adjust the water content only to obtain a 1-inch maximum slump mixture that shall be compacted in lifts not to exceed 12 inches. Compaction shall be accomplished by a manually operated vibratory plate/compactor.

9.5 Traffic Control Plan

A traffic control plan is required for any construction on or along traveled roadways. The traffic control plan shall be as required in Chapter 15 of these Standards.

9.6 Notification and Inspection

Consistent with Chapter 14 of these Standards, any applicant, utility, or others intending to trench existing or proposed City roads shall notify the City as set forth in Section 14 of these Standards for all work associated with a right-of-way permit, and not less than a working day prior to beginning utility construction. This notification shall include:

1. Location of the work
2. Method of compaction to be used

3. Day and hour when compaction is to be done
4. Day and hour when testing is to be done.

As set forth in Section 14 of these Standards, failure to notify may necessitate testing or retesting by the city at the expense of the Applicant or Utility. Furthermore, the work may be suspended pending satisfaction of test results.

9.7 Final Adjustment to Finish Grade

All utility covers, including storm drainage, which are located on proposed asphalt roadways, shall be temporarily placed at subgrade elevation prior to placing crushed surfacing material.

Final adjustment of all covers and access entries shall be made following final paving by:

1. Saw-cutting or neat-line jack hammering of the pavement around lids and covers. Opening should not be larger than 12 inches beyond the radius of the cover.
2. Removing base material, surfacing course, and frame; adding raising bricks; replacing frame and cover no higher than finished grade of pavement and no lower than 1/2 inch below the pavement.
3. Filling and mechanically compacting around the structure and frame with crushed surfacing material or ATB, or pouring in 5-inch minimum thickness of cement concrete Class 3000 to within 2 inches of the top.
4. Filling the remaining 2 inches with HMA compacted and sealed to provide a dense, uniform surface.
5. Final adjustment of all covers and access entries shall be completed within 30 days of final paving.

9.8 Utility Certification

All permits for new placement and replacement of existing utilities and utility structures shall be accompanied by written certification from the utility's professional engineer or from an agent authorized by the utility to certify that the installations conform to these Standards, and that the proposed work is in conformity with sound engineering principles relating to highway safety.

10. STRUCTURES

10.1 Review of Engineering Plans and Specifications for Structures

The review of engineering plans and specifications for structures will often be reviewed by a third party, hired by the City of Des Moines. All costs associated for the third-party review of engineering plans and specifications will be the responsibility of the applicant/developer and shall be supplemental to other city engineering review fees.

10.2 Bridges

10.2.1 Bridge Principal References

Except as specified below, all bridges within the City of Des Moines, whether on public roads or on private roads, shall be designed and constructed to meet the minimum requirements set forth in the latest edition, including all interim addenda of "AASHTO Standard Specifications for Highway Bridges," or "AASHTO LRFD Bridge Design Specifications" and in accordance with the most current requirements of WSDOT/APWA Standard Specifications. Bridge traffic barrier and approach railings shall be provided in accordance with those references and the WSDOT Bridge Design Manual and WSDOT/APWA Standard Plans. All new bridges shall be designed to carry an AASHTO HS 25 or HL93 (LRFD) unless otherwise approved by the Public Works Director.

Bridges that will carry pedestrian and bicycle traffic bridges shall be designed in accordance with the most current AASHTO "Guide Specifications for Design of Pedestrian Bridges".

10.2.2 Special Requirements

Construction or reconstruction of bridges may require permits from other agencies such as the Coast Guard, Army Corps of Engineers, Department of Ecology, or the Department of Fish and Wildlife, among others. It is the project applicant's responsibility to obtain all necessary permits.

10.2.3 Bridge Geometrics and Design Criteria

In general, the bridge shall comprise the full width and configuration of the road being served, (e.g., traveled way plus curb, gutter, sidewalks, bike lane, and/or shoulder on one or both sides). Requirements of utilities shall be duly considered. Bridge roadway width shall be measured between curbs or between faces of bridge traffic barrier; whichever is less.

On designated bike routes, combination bridge traffic barrier and bicycle railings shall be used. Where typical speed is 35 mph or higher and significant pedestrian and bike traffic can be expected, the Public Works Director may require that the lanes for these other modes of traffic be separated from motor vehicle traffic by use of a bridge traffic barrier and further protected by a rail at the outer edge.

Approach railings and transitions shall be made structurally continuous with bridge railings and shall meet AASHTO specifications, and as Specified in Section 8.5 of these Standards.

Overhead vertical clearances for motor traffic on the traveled way or under overpasses shall be 16.5 feet minimum. Vertical clearance for bridges over railroad tracks shall comply with the minimum vertical

clearance required by the WSDOT Design Manual and also may require negotiations with the railroad company concerning necessary clearances. Vertical clearance of structures above a walkway or sidewalk shall be 10 feet minimum.

Bridges located at the low point of a sag vertical curve shall have adequate provisions to accommodate stormwater runoff on the bridge. Stormwater shall not be allowed to free drain off of the bridge deck. Drainage must be tight lined from the bridge deck to an enclosed drainage system or open channel located adjacent to or below the bridge, and consistent with Chapter 11 of these Standards.

Best available flood data, as defined in the Department of Development and Environmental Services Public Rule, Sensitive Areas: Flood Hazard Areas, shall be used to establish the 100-year water surface elevation in consultation with the Department of Natural Resources and Parks, Flood Hazard Reduction Services Section.

For stream crossing locations where the 100-year peak flow exceeds 100 cubic feet per second (cfs), the height of bridge clearance above rivers and streams shall be a minimum 3 feet above the 100-year water surface elevation unless otherwise required by the Public Works Director based on an evaluation of conveyance factors as specified below. For stream crossing locations where the 100-year peak flow is 100 cfs or less, there is no specific clearance requirement, but bridges must meet the standards in the King County Surface Water Design Manual.

Evaluation of conveyance factors shall consider hydraulic capacity, bed aggradations, debris passage, safety margins, and bridges and levees, as specified in Section 4.3.3.1 of the King County Surface Water Design Manual.

For future bridge inspection and maintenance, access beneath the actual structure of the bridge shall be provided. A minimum 3 feet of clearance between the low chord of the bridge and final grade shall be maintained along the entire bridge.

Bridge span lengths shall be designed of sufficient length so that no in-stream piers are required. Bridge abutments shall be located well behind the ordinary high water elevation (OHWE) to minimize construction impacts.

All new bridges shall be designed for actual dead load and superimposed dead loads, such as utilities, pavement, and bridge railings. The loading for design shall be based upon the AASHTO “Standard Specifications for Highway Bridges” and the most current WSDOT Bridge Design Manual.

Unless otherwise approved by the Public Works Director, concrete approach slabs will be required for all new bridges and shall be constructed in accordance with WSDOT/APWA Standard Plans.

New bridge plans shall be designed in accordance with WSDOT/APWA Standard Specifications to prevent corrosion of reinforcing steel.

Criteria under other recognized road and bridge project classifications, such as those of 3-R projects, set forth in WSDOT Local Agency Guidelines, may be applied under conditions deemed appropriate by the Public Works Director.

10.2.4 Guardrails and Railings

Bridge approach guardrails are generally required at all four corners of each bridge. Refer to WSDOT Standard Plans for typical approach guardrails.

Approach guardrails and bridge railings shall be designed in accordance with AASHTO's Standard Specifications for Highway Bridges, Guide for Selecting, Locating, and Designing Traffic Barriers, and/or the WSDOT Design Manual.

Approach guardrails shall be made structurally continuous with bridge railings.

10.2.5 Utility Installation on Bridges

Attachment of utility lines to a roadway structure, including bridges, may be allowed where such attachment conforms to sound engineering practice for preserving the roadway structure and ensuring its safe operation, maintenance and appearance. Attachment of any utility to any bridge within the city road right-of-way requires the approval of the Public Works Director.

Attachment of a utility shall not be considered unless the structure is designed to support the additional load and can accommodate the utility facility without limiting features such as ease of maintenance.

Utility features, such as manholes or access panels, shall not be placed within the roadway portion of the structure.

A pipeline carrying a hazardous substance shall not be attached to a roadway structure unless specifically approved by the Public Works Director.

The utility attachment shall not reduce any clearance requirement of the structure. Attachment to the outside of a structure shall be avoided unless there are no reasonable alternatives.

Utility mountings shall be of a type that do not create noise from vibration.

Any hole created in a structure abutment shall be sleeved, be of a minimum size necessary to accommodate the utility line and be sealed to prevent any leakage of water or backfill material.

A utility line behind an abutment shall curve or angle out to align outside the roadbed area in as short a distance as is operationally practicable.

Communication and electrical power line attachments shall be suitably insulated, grounded, and carried in protective conduit or pipe from point of exit from the ground to re-entry. Carrier pipe and casing pipe shall be properly isolated from electric power line attachments.

If at any time the installation or attachment of a utility to a bridge limits the structural capacity of the bridge for carrying traffic, the utility will be required to remove the installed facilities and make any repairs to the bridge structure as a result of the initial installation.

10.2.6 Submittals for Bridge Designs

The construction or reconstruction of bridges will necessitate submittal of the following items, at a minimum, to the Public Works Director.

1. Design calculations
2. Load rating analysis
3. Hydraulic report
4. Scour analysis
5. Material certification of the major load bearing members

6. Pile driving records, for all pile supported foundations
7. Record Drawings

The construction or reconstruction of bridges will necessitate the Public Works Director's approval of the following:

1. Bridge type
2. Foundation type
3. Size and shape of the hydraulic opening
4. Vertical clearance between the superstructure and the design water surface, including sensitive areas
5. Location of piers and abutments
6. Roadway cross section
7. Bridge traffic barrier and approach guardrail type
8. Aesthetic treatments
9. Expansion joints (the design of bridge expansion joints shall consider the presence of bicycle traffic).

10.3 Special Culverts

All corrugated metal structures and reinforced concrete 3-sided and 4-sided box culverts shall be designed in accordance with the most current AASHTO Standard Specifications for Highway Bridges.

10.4 Structural Walls

Structural retaining walls shall be designed in accordance with the most current AASHTO "Standard Specifications for Highway Bridges" and the most current WSDOT Bridge Design Manual.

10.5 Rock Facings

A. Rock facings may be used for the erosion protection of cut or fill embankments up to a maximum height of 8 feet above the keyway in stable soil conditions, which will result in no significant foundation settlement or outward thrust upon the walls. For heights over 8 feet above the keyway or when soil is unstable, a structural wall of acceptable design stamped by a licensed structural engineer is required. See Section 10.4 for further details. As an exception, rock-facing heights may exceed 8 feet to a limited extent based on favorable soils analyses and a design by a geotechnical engineer or other professional engineer qualified in rock wall design, subject to approval by the Public Works Director. Terracing of rock facings is subject to approval by the Public Works Director. Terracing shall not surcharge lower rock facings.

B. Materials:

   The rock material shall be as nearly rectangular as possible. No stone shall be used which does not extend through the wall. The quarried trap rock shall be hard, sound, durable and free from weathered portions, seams, cracks and other defects. Rock quality shall meet all the test requirements of Section 9-13, "Riprap, Quarry Spalls, Slope Protection, and Rock Walls" of the

current WSDOT Standard Specifications." Size requirements for wall rock shall conform to the requirements shown in Table 10-1.

Table 10-1. Material Size Requirements

SIZE	WEIGHT/POUNDS (LBS)	DIAMETER (INCHES)
2-MAN	200-700	18-28
3-MAN	700-2,000	28-38
4-MAN	2,000-4,000	36-48
5-MAN	4,000-6,000	48-54
6-MAN	6,000-8,000	54-60

C. Keyway:

A keyway consisting of a shallow trench of minimum 12-inch depth shall be constructed the full rockery length, and slightly inclined towards the face being protected. It shall be excavated the full rockery width including the rock filter layer. The keyway subgrade shall be firm and acceptable to the Public Works Director.

D. Underdrains:

1. A minimum 6-inch diameter perforated or slotted drainpipe shall be placed in a shallow excavated trench located along the inside edge of the keyway. The pipe shall be bedded on "Gravel Backfill for Drains", consistent with Section 9-03.12(4) of the WSDOT/APWA Standard Specifications. The pipe shall be completely surrounded and covered with the gravel backfill to a minimum height of 18 inches from the bottom of the trench. Geotextile for underground use shall surround the gravel backfill and shall have a minimum one-foot overlap along the top surface of the gravel. This requirement for geotextile may be waived by the Public Works Director, if shown that soils and water conditions make it unnecessary.
2. The perforated pipe shall be connected to the storm drain system or to an acceptable outfall. Cleanouts must be provided at main angle points.

E. Rock Selection and Placement:

Rock selection and placement shall be such that there will be minimum voids and, in the exposed face, no open voids over 6 inches across in any direction. The final course shall have a continuous appearance and be placed to minimize erosion of the backfill material. The larger rocks shall be placed at the base of the facing so that it will be stable and have a stable appearance. The rocks shall be placed in a manner such that the longitudinal axis of the rock shall be at right angles to the face. The rocks shall have all inclined faces sloping to the back of the rockery. Each course of rocks shall be seated as tightly and evenly as possible on the course beneath. The rocks shall be placed so that there are no continuous joint planes either horizontally or vertically. After setting each course of rock, all voids between the rocks shall be chinked on the back with quarry rock to eliminate any void sufficient to pass a 2-inch square probe.

F. Rock Filter Layers:

The rock filter layer shall consist of quarry spalls with a maximum size of 4 inches and a minimum size of 2 inches. This material shall be placed to a 12-inch minimum thickness between

the entire facing and the cut or fill material. The backfill material shall be placed in lifts to an elevation approximately 6 inches below the top of each course of rocks as they are placed, until the uppermost course is placed. Any backfill material on the bearing surface of one rock course shall be removed before setting the next course.

G. Fill Rockery Facing Supporting Roadway Embankment:

Embankment behind rockeries exceeding 4 feet in height above the keyway shall be reinforced with a geosynthetic fabric or geogrid specifically manufactured for soil reinforcement, designed on a project-specific basis by a qualified engineer.

H. Sidewalks Above Rockery Facings:

When a sidewalk is to be built over a rock facing, the top of the facing shall be sealed and leveled with a cap constructed of cement concrete Class 4000 in accordance with the applicable provisions of Section 6-02 of the WSDOT/APWA Standard Specifications, but with reduced water content resulting in slump of not over 2 inches.

I. Fences and Handrails:

A chain link fence or metal handrail shall be installed when rockery is 18 inches or greater in height or as required by the Public Works Director.

11. STORM DRAINAGE

11.1 General

The general design and construction requirements for storm drainage in the City of Des Moines shall be those contained in the Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation and American Public Works Association, Washington State Chapter, latest edition; the Uniform Plumbing Code as adopted by the Washington State Building Code Council, latest edition; and the Standards and Specifications as set forth in the King County, Washington, Surface Water Design Manual, published by King County Department of Natural Resources and Parks Stormwater Services Division, latest edition—unless superseded or amended by the City of Des Moines Street Design and Construction Standards.

No drainage from downspouts, splash blocks, etc. shall discharge across a sidewalk, walkway, or roadway. Structures shall be placed and constructed as shown in the Standard Drawings. Materials, construction, and testing are specified in the WSDOT/APWA Standard Specifications.

The Public Works Director may amend, delete, or add specifications or Standard Drawings as described in Chapter 1 of these Standards. Where technical conflicts may occur between this document and the other documents referenced herein, the Public Works Director shall decide which document governs.

The following sections outline the requirements specific to the City of Des Moines that shall be used in conjunction with the other design principles identified herein.

11.2 Stormwater Detention/Retention Requirements

The latest edition of the King County Surface Water Design Manual outlines approved methods, criteria, and details for hydraulic analysis and design of flow control facilities. Flow control facilities, as described in this manual, are detention or infiltration facilities engineered to meet a specified discharge performance.

Three terms are commonly used to describe flow control facilities in King County: detention facilities, retention facilities, and infiltration facilities. A detention facility, by definition, temporarily stores surface water runoff and discharges it at a reduced rate. A retention facility stores water longer and effectively has no surface outflow (outflow occurs by evaporation or soaking into the ground). Infiltration facilities are retention facilities that rely entirely on the soaking of collected surface water into the ground.

Flow control BMPs, also known as low impact development BMPs, are methods and designs for dispersing, infiltrating, or otherwise reducing or preventing development-related increases in runoff at or near the sources of those increases. Flow control BMPs include, but are not limited to, preservation and use of native vegetated surfaces to fully disperse runoff; use of other pervious surfaces to disperse runoff; roof downspout infiltration; permeable pavements; bioretention; and reduction of development footprint.

11.3 Stormwater Quality

The latest edition of the King County Surface Water Design Manual outlines approved methods, criteria, and details for water quality facilities. Water quality menus, as described in this manual, are basic, enhanced basic, and high use, engineered to meet a specified water quality standard.

Commercial and industrial operations that discharge into the city stormwater system shall be responsible for compliance with the requirements of the federal National Pollutant Discharge Elimination System (NPDES) General Permit program. The Washington State Department of Ecology manages the General Permit program. City of Des Moines building permits may be issued only upon proof of submittals to the Washington State Department of Ecology.

11.4 Conveyance Systems

The latest edition of the King County Surface Water Design Manual outlines approved methods for the hydraulic analysis and design of conveyance systems. A conveyance system includes all portions of the surface water system, either natural or human-made, that transports surface and stormwater runoff. Components of the surface water system include pipes, outfalls, pumps, culverts, bridges, open channels, floodplains, and floodways.

This manual contains the detailed design criteria, methods of analysis, and standard details for all components of the conveyance system. In some cases, reference is made to other adopted or accepted design standards and criteria, such as the King County Road Design and Construction Standards (KCRDCS) the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction (most recent edition); and a King County supplement to the WSDOT/APWA standards called the General Special Provisions.

12. GRADING, EROSION, AND SEDIMENT CONTROL

12.1 Erosion and Sedimentation Control Plan

All proposed projects that will clear, grade, or otherwise disturb the site must provide erosion and sediment controls to prevent, to the maximum extent practicable, the transport of sediment from the project site to downstream drainage facilities, water resources, and adjacent properties. All proposed projects that will conduct construction activities on-site or off-site must provide stormwater pollution prevention and spill controls to prevent, reduce, or eliminate the discharge of pollutants to on-site or adjacent stormwater systems or watercourses.

To prevent sediment transport and pollutant discharges as well as other impacts related to land-disturbing and construction activities, Erosion and Sediment Control (ESC) measures and Stormwater Pollution Prevention and Spill Control measures that are appropriate to the project site must be applied and implemented through a comprehensive Construction Stormwater Pollution Prevention (CSWPP) plan as described in the latest edition of the King County Surface Water Design Manual.

An NPDES General Permit for Construction (pursuant to the Washington State Department of Ecology's Construction Stormwater General Permit) is required for projects that will disturb 1 or more acres for purposes of constructing or allowing for construction of a development or for projects disturbing less than 1 acre that are part of a larger common plan of sale that will ultimately disturb 1 or more acres. City of Des Moines building or grading permits may be issued only upon proof of submittals to the Washington State Department of Ecology.

12.2 Grading Design Requirements

Clearing and grading design required for project site development should be done in conjunction with proposed site development construction plans. Landfilling, clearing, and grading requirements are codified in Chapter 14.20 of the DMMC.

12.3 Grading, Erosion, and Sedimentation Control Plan Requirements

Clearing, erosion, and sedimentation control plan requirements are codified in Chapter 14.20 of the DMMC.

12.4 Erosion and Sedimentation Control Plan Notes

Erosion and Sedimentation Control Notes, provided in Appendix B, shall be included on the ESC Plans.

13. LOW-IMPACT DEVELOPMENT BMPS

13.1 Flow Control BMPs

Flow control BMPs are required to meet the requirements of the King County Surface Water Design Manual (KCSWDM). Flow control BMPs are methods and design for dispersing, infiltrating or otherwise reducing or preventing development-related increases in runoff at or near the sources of those increases.

Application guidelines and BMP design criteria and infeasibility criteria can be found in the KCSWDM. The following requirements supplement the requirements of the KCSWDM.

13.2 Pervious Pavements

The following requirements shall be met for the use of pervious pavements within a traveled way:

- All pervious pavements shall be designed by a Professional Engineer and provide a geotechnical report for verification.
- All pervious pavements shall be approved by the Public Works Director.
- Pervious pavements shall not be used on streets with a projected average daily traffic volume exceeding 400 vehicles per day.
- Pervious pavements shall NOT be constructed in the same location as existing impervious roadways.
- Pervious pavements shall not be used where finished grades exceed 5 percent in any direction unless otherwise approved by the Public Works Director.
- A secondary (redundant) flow path consisting of enclosed pipe systems or ditches, as allowed under these standards, shall be provided in the event that the pervious pavement is saturated or has failed.
- Pervious pavements shall not receive runoff from upstream pollution generating impervious surfaces.

13.3 Pervious Pavements for Driveways

The following requirements shall be met for the use of pervious pavements for driveways:

- All pervious driveways shall be designed by a Professional Engineer and provide a geotechnical report for verification.
- All pervious driveways shall be approved by the Public Works Director.
- Pervious surfaces may be allowed on private tracts and driveways within right-of-way by means of a pervious surface maintenance agreement and/or annual geotechnical report.
- Pervious pavements shall NOT be constructed in the same location as existing impervious surfaces or on compacted soil unless the existing pavement section (or compacted soil) is entirely removed and the pervious pavement is designed by a Professional Engineer.

- Pervious driveways shall be constructed with a minimum of 6 inches of pervious ballast and 6 inches of pervious concrete and shall be designed by a Professional Engineer.
- Pervious pavements shall not be used for driveways where finished grades exceed 8 percent in any direction.
- Pervious pavers shall not be used for driveways where finished grades exceed 5 percent.
- Pervious pavements shall not receive runoff from upstream impervious surfaces unless designed by a Professional Engineer. At no time shall upstream pollution generating impervious surfaces be allowed to drain to pervious pavements.
- Pervious driveways shall be graded to drain away from structures during saturated/failed conditions. If the finished grades of a driveway slope towards a structure then a secondary (redundant) flow path shall be provided to an existing downstream conveyance system or dry well to prevent flooding of the structure.

13.4 Bioretention/Rain Gardens

The following requirements shall be met when constructing bioretention/rain gardens adjacent to a road or access that serves more than 4 lots:

- Bioretention facilities shall not be constructed adjacent to a road or access that exceeds 3 percent grade.
- A minimum shy distance of 3-feet shall be maintained from the edge of the travel lane to the edge of the bioretention soils unless vertical curb and gutter is installed. The 3-foot-wide shoulder shall include a paved 2-foot shoulder with a 1-foot-wide compacted gravel transition to the bioretention soils. Minimum shy distance requirements may be reduced for access roads and driveways serving less than 15 lots.
- Side slopes shall not exceed 4H:1V unless curbing is used.
- The maximum depth of a swale shall be 2 feet unless curbing is used.
- Where curbing is used adjacent to continuous inflow bioretention facilities, the maximum spacing between curb openings shall be 20-feet. Spacing of the curb openings shall be designed to prevent ponding of water adjacent to the curb for tributary roadway widths that exceed 15-feet. Curb openings shall be made with approved cast iron curb openings with a minimum open width through the casting of 16-inches.
- Plantings within bioretention facilities shall be low in height (< 24-inches full maturity) within sight triangle areas for all road approaches and intersections.
- All bioretention facilities constructed within the public right of way shall include provisions for an emergency overflow system that is connected to the nearest downstream conveyance system to prevent overtopping.

14. CONSTRUCTION CONTROL AND INSPECTION

14.1 Control of Work

Work performed in the construction or improvement of public or private roads and utilities shall be done to the satisfaction of the City and in accordance with these Standards, the approved plans, and any other Specifications or guidelines for the project.

It is emphasized that no work may be started until such plans are approved. Any revision to such plans shall be approved by the Public Works Director before being implemented. Failure to receive the City's approval can result in removal or modification of construction improvements at the contractor or developer's expense to bring it into conformance with the approved plans.

The Public Works Director is authorized to enforce these Standards as well as other referenced or pertinent specifications or guidelines. They may appoint project engineers, assistants, and inspectors as necessary to inspect the work.

Provisions of Section 1-05 of the WSDOT/APWA Standard Specifications shall apply, with the term "Engineer" therein construed to be the Public Works Director as defined in Section 1.12.

14.2 Control of Materials

The contractor shall notify the City for all materials to be furnished. The Public Works Director shall approve the source of supply of each of the materials before the delivery is started. Representative preliminary samples or test data of the character and quality prescribed may be required to be submitted by the contractor or producer for examination.

Only materials conforming to the requirements of the WSDOT/APWA Standard Specifications or these Standards shall be used in the work, unless otherwise approved. Any of the materials proposed to be used may be inspected or tested at any time during their preparation and use. If after testing it is found that sources of supply that were previously approved do not furnish a uniform product, or if the product from any approved source proved unacceptable at any time, the contractor shall furnish approved materials from other approved sources.

The contractor shall, at any time requested, submit to the City properly authenticated documents or other satisfactory proofs as to their compliance with the contract requirements.

If the examination of the above documents reveals any defects in the work, such defects should be repaired or replaced as the Public Works Director may direct before final acceptance. The cost of all such repairs and replacements shall be borne by the developer.

14.3 Samples and Tests

At the direction of the Public Works Director, the applicant/developer shall direct a certified testing laboratory to conduct necessary field and/or lab tests of materials or methods.

All testing shall be in accordance with ASTM and/or AASHTO standards, WSDOT Standards, or other common industry standards approved by the Public Works Director.

The field tests of materials shall be made as deemed necessary by the Public Works Director at no cost to the City. In general, tests shall be made at the frequency as outlined by the applicable sections of the Standard Specifications.

The developer shall furnish, without charge, samples of all materials as requested. Materials shall not be used until approved.

The testing laboratory should be present during all field tests. Regardless, certified copies of the complete test reports direct from the testing lab shall be provided to the City.

Materials shall be delivered on the work in advance in such quantities as to afford the Public Works Director an opportunity to make tests before the materials are to be used.

14.4 Maintenance of Work After Acceptance

The developer shall be responsible for the entire improvement and maintain said improvements until the City has accepted it. The City reserves the right to utilize any portion of the improvements prior to final acceptance and in such event the City will assume responsibility for its use in case of damage caused by normal use.

Following acceptance of all public improvements, the developer shall be held responsible to guarantee materials and workmanship for a period of 1 year of satisfactory performance and operation. Any defects that appear during this period shall be corrected by the developer at no cost to the City under the terms of the maintenance bond.

14.5 Bonding

Bonds or other allowable securities will be required by the City to guarantee the performance or maintenance of required civil-related work. The type and amount of security will be determined by the Public Works Director. Types of securities include, but are not limited to, binding a surety or an assigned savings account. Typically, the City will select an assignment of funds.

14.6 Protection of Public and Private Utilities

The contractor shall be responsible for locating all existing underground utilities and protecting the same against damage whether shown on the plans or not. Refer to Section 14.15 for further information. The contractor shall support and protect all pipes, curbs, conduits, poles, wires or other apparatus which may be in any way affected by the work, and do everything to support, sustain, and protect the same, under, over, along, or across said work. In case any of said public or private utilities should be damaged, they shall be repaired by the contractor whenever feasible on the private/public utility having control of same, and the expense of such repairs, shall be the responsibility of the developer or contractor.

The contractor shall further be responsible for any damage done to any street or other public property, or to any private property by reason of the breaking of any water pipe, sewer, or gas pipe, electric conduit or other utility by or through his/her negligence.

14.7 Damage to Private Property and Improvements

The developer's/contractors work shall be confined to the job site premises and necessary off-site easements and they shall not enter upon or place materials on other private premises except by written

consent of the individual owners, and shall hold harmless the City from all suits and actions of every kind that might result from the use of private property.

The contractor shall take adequate precautions to protect existing lawns, trees and shrubs outside public right of way, sidewalks, curbs, pavements, utilities, adjoining property, structures, and to avoid damage thereto, and shall at their own expense completely repair any damage thereto caused by their operations to the satisfaction of the Public Works Director. All impacted property owners must be notified in advance of said work.

14.8 Construction Inspection

The Public Works Director may appoint project engineers, assistants, and inspectors as necessary to inspect the work and materials. Such inspection may extend to any or all parts of the work and to the preparation and/or manufacture of the materials to be used. The inspector will not be authorized to revise or alter the provisions of these Standards.

All work performed within the public right-of-way or easements, or as described in these standards, whether by or for a private developer, will be done to the satisfaction of the City and in accordance with the WSDOT/APWA Standard Specifications, any approved plans and these Standards. Public Works Director must approve any revision to construction plans before being implemented.

Generally, on all privately developed infrastructure road and drainage facility construction proposed or in progress by a private developer, control and inspection will be done by the City's Engineering Inspector.

The applicant is ultimately responsible for quality control of construction and the assurance of meeting the standards. The Inspectors will monitor these activities with enforcement authority when requirements are not met.

All materials provided by the contractor shall be subject to inspection and approval by the Inspectors at any time during the progress of work until final acceptance. The contractor's construction schedule shall include sufficient time for materials testing and any required verification by the Inspector.

All roadway and drainage infrastructures must be inspected. Subgrade inspection will not commence until density tests confirm that the compaction is in accordance with the Specifications.

14.9 Authority and Duties of Inspectors

The Inspectors will have the authority to reject defective material and suspend work that is being done improperly. The Inspector may advise the applicant or contractor of any faulty work or materials; however, failure of the inspector to advise the applicant or contractor does not constitute acceptance or approval.

The City's right to conduct inspections is to determine if acceptable construction practices are followed. The inspection process does not make the City an insurer or guarantor of contractor compliance or competence. Responsibility for any failures to follow these Standards rests solely with the developer and its agents.

At the Inspector's order, the applicant/contractor shall immediately remedy, remove, replace, or dispose of unauthorized or defective work or materials and bear all the costs of doing so.

The Inspectors will have the authority to require revisions to approved engineering plans when necessary due to conflicting field conditions.

Failure to comply with the provisions of these Standards may result in stop work orders, removal of work accomplished, or other penalties as established by ordinance.

All work conducted on electrical and communications systems shall be inspected by the City of Des Moines Electrical Inspector.

14.10 Inspection Scheduling

Prior to any critical task being started the applicant/developer must schedule an inspection in advance by request on the City's permitting portal (website).

At a minimum, the following critical tasks require advance notification:

14.10.1 Preconstruction Conference

Three working days prior notice. Preconstruction conference must precede the beginning of construction and include the applicant, contractor, design engineer, utilities, and other applicable participants. Plan approvals and permits must be in hand prior to the conference.

14.10.2 Clearing and Temporary Erosion/Sedimentation Control

One working day notice prior to initial site work involving drainage and installation of temporary erosion/sediment control.

14.10.3 Utility and Storm-Drainage Installation

One working day notice prior to trenching and placing of storm sewers and underground utilities such as sanitary, water, gas, power, telephone, and TV lines.

14.10.4 Utility and Storm-Drainage Backfill and Compaction

One working day notice before backfill and compaction of storm sewers and underground utilities.

14.10.5 Subgrade Completion

One working day notice at stage that underground utilities and roadway grading are complete; to include placement of gravel base if required.

14.10.6 Curb and Sidewalk Forming

One working day notice to verify proper forming and preparation prior to pouring concrete.

14.10.7 Curb and Sidewalk Placement

Two working days' notice to check placement of concrete.

14.10.8 Crushed Surfacing Placement

One working day notice to check placement and compaction of crushed surfacing base course and top course.

14.10.9 Paving

Three working days' notice in advance of paving with asphalt or Portland cement concrete.

14.10.10 Signing, Striping, and Pavement Markings

Three working days' notice in advance of final application, and after layout work has been completed.

14.10.11 Structural

Three working days' notice prior to each critical stage such as placement of foundation piling or footings, placement and assembly of major components, and completion of structure and approaches. Structural tests and certification requirements will be as directed by the Public Works Director.

14.10.12 Punchlist Inspection

Fifteen working days prior to overall check of road or drainage project site, to include completion of paving and associated appurtenances and improvements, cleaning of drainage system, and all necessary clean-up.

14.10.13 Final Inspection

Prior to final approval of construction work, acceptance and release of construction performance financial guarantees, the applicant/contractor shall pay any required fees, submit any required maintenance and defect financial guarantees, provide a certificate of monumentation and submit required record drawings reflecting all minor and design plan changes of the road and drainage systems.

14.10.14 Final Maintenance Inspection

The final maintenance inspection is performed by the City 45 days prior to the end of the maintenance period. Prior to release of the maintenance financial guarantee, there shall be successful completion of the maintenance period as described in Section 1.10 and 14.5, replacement/repair of any failed facilities, and the payment of any outstanding fees.

14.11 Penalties for Failure to Notify and Obtain Approval

Notification by the applicant or the applicant's contractor, at the necessary time frames noted in Section 14.11, is essential for the City to verify, through inspection, that the work meets the Standards. Failure to notify and obtain approval will result in the City requiring sampling and testing with certification by a private laboratory. Costs of such testing and certification shall be borne by the applicant. If the test results conclude that the unauthorized work does not meet the Standards, the applicant will be required to remove the unauthorized material and replace it with materials that meet the Standards at his/her own expense. At the time that such action is directed by the Public Works Director, further work on the development may be limited or prohibited until all directed tests have been completed, approved, and all corrections identified by the City have been made to the satisfaction of the Public Works Director. If necessary, the City may take further action as set forth in Chapter 12 of the DMMC.

14.12 Final Cleanup, Restoration of Surface Drainage, and Erosion/Sedimentation Control

In addition to restoration of the road as described above, the responsible applicant, utility, contractor, etc., shall care for adjacent areas in compliance with Sections 1-04.11 "Final Cleanup" and 8-02 "Roadside Restoration" in the WSDOT/APWA Standard Specifications. In particular:

A. Streets and roads shall be cleaned and swept both during and after the installation work.

B. Disturbed soils shall be final graded, seeded and mulched after installation of utility. In limited areas seeding and mulching by hand, using approved methods, will be acceptable.

C. Ditch lines with erodible soil and subject to rapid flows may require seeding, matting, netting, or rock lining to control erosion.

D. Any silting of downstream drainage facilities, whether ditches or pipe and catch basins, which results from the construction activity shall be cleaned out and the work site restored to a stable condition as part of site cleanup.

E. Remove all temporary erosion and sediment control materials and fencing and dispose of properly.

14.13 City Forces and City Contract Road Inspection

Road construction performed by City forces or by contract for the City will be inspected under the supervision of the Public Works Director.

14.14 Call Before You Dig

All developers/contractors are responsible for timely notification of all utilities in advance of any construction in right-of-way or utility easements. The utility One-Call Underground Location Center phone number 1-800-424-5555. This number should be prominently displayed on the work site. A minimum of two working days advanced notice is required.

14.15 Emergency Work

Should the work of a developer/contractor result in an emergency street or utility shutdown during non-working hours, the direct overtime costs of responding City personnel and any responding utility personnel will be billed to the responsible party.

15. TRAFFIC CONTROL AND HAUL ROUTES

15.1 Traffic Control

A traffic control plan is required for any construction on or along traveled roadways. The contractor will be responsible for interim traffic control during construction on or along traveled roadways. Traffic control will follow the guidelines of the WSDOT/APWA Standard Specifications and the MUTCD.

A Traffic Control Plan will be submitted to and approved by Public Works Director prior to the start of construction. Traffic control shall follow the guidelines of Section 1-07.23 of the WSDOT/APWA Standard Specifications.

All barricades, signs, coning, and flagging will conform to the requirements of the MUTCD. Signs must be legible and visible and shall be removed at the end of each workday if not applicable after construction hours.

All work zone traffic control devices used shall meet or exceed the requirements of crashworthiness as defined by the Federal Highway Administration (FHWA) National Cooperative Highway Research Program (NCHRP) Report 350. “Crashworthy” means they have met the test and evaluation criteria of Report 350 and/or have received a “Letter of Acceptance” from the FHWA.

All necessary and/or required traffic control devices will be in place prior to the beginning of the project construction or on a daily basis during project construction.

If the work zone is within 300 feet of a signalized intersection, or as required by the Public Works Director or their designee, the presence of a Police Officer(s) is required.

All traffic signing, striping, and pavement markers removed during a construction project shall be replaced. Temporary striping shall be used on a limited basis and only as approved by the Public Works Director. The Engineering Services division shall be contacted a minimum of 3 days in advance of installation to verify channelization layout.

When removal of existing pavement markings is required, a full-width overlay may be required by the Public Works Director to remove any reflections of the old markings.

When road closures and detours cannot be avoided, the contractor will notify the Engineering Inspector within a minimum of 48 hours. The City will require a detour plan to be prepared, submitted, and approved prior to closing any portion of a City roadway.

15.2 Temporary Road Closures and Detours

When temporary road closures cannot be avoided, the applicant/contractor shall post a notice of temporary road closure sign in accordance with the requirements of the Public Works Director a minimum of 14 days prior to the closing. The types and locations of the signs shall be shown on a detour plan. A proposal for a road closure and a detour plan must be prepared and submitted to the Public Works Director at least 28 calendar days in advance (40 calendar days if arterial) and approved prior to closing any City road. In addition, the applicant/contractor must notify, in writing, local fire, school, or law enforcement authorities; Metro transit; garbage/recycling services; and any other affected persons as directed by the Public Works Director at least 14 days prior to closing.

Typically the City wishes to limit any road closures throughout the City but understands that as a last resort they may be needed. All road closure requests must be reviewed and approved by the Public

Works Director, all stakeholders, and in some cases, the City Council as a legislative action. In order to provide all the necessary information to the Director and stakeholders, a technical memorandum must be submitted to the City for review of the closure request.

All roadway closure requests shall include a technical memorandum specifically describing what is being proposed and what is being sought for consideration. Elements to include in the memorandum shall include (but not all-inclusive) the following:

- Description of work.
- Requested closure dates and hours of work.
- Alternatives, if any, given the City preference to keep one lane open at all times for alternating traffic (can alternative work zones be utilized?).
- Proposed roadway and right-of-way (ROW) protection from large equipment operations – staging and operations plans.
- Traffic control narrative and plans:
  - Detours would need to be maintained typically on arterials and higher classifications, not residential roads.
  - Potential police presence at major intersections used for detour.
  - Two-week VMS (variable message sign) notification.
- Notification of impacted properties.
- Estimated value of construction for ROW permit processing.
- Request for City noise variance – estimated impact data, etc.

15.3 After-Hours/Night Work

Regular work hours within City right-of-way is 7 a.m. to 7 p.m., Monday through Friday, and 8 a.m. to 5 p.m., Saturday and Sunday. All work outside these regular work hours is deemed after-hours or night work.

Typically the City wishes to limit any after-hours work. All after-hours work requests must be reviewed and approved by the Public Works Director and all stakeholders. In order to provide all the necessary information to the Director and stakeholders, a technical memorandum must be submitted to the City for review of the after-hours work request.

All after-hours work requests shall include a technical memorandum and noise variance request specifically describing what is being proposed and what is being sought for consideration. Elements to include in the memorandum shall include (but not all-inclusive) the following:

- Description of work.
- Requested closure dates and hours of work.
- Alternatives, if any, given the City preference to keep work activities to normal business hours.
- Traffic control narrative and plans.
- Notification of impacted properties.

- Estimated value of construction for ROW permit processing.
- Request for City noise variance – estimated impact data, etc.
  - Flyer for public notification.

All after-hours work will require a noise variance request to be reviewed by the City's Building Department. The noise variance request shall include a flyer for public notification that includes a contact to call for any complaints or questions, location and hours of construction, schedule, equipment being used, lane closures, etc. This flyer, once approved, shall be sent to all residents within 300 feet of the source of noise, including noise caused by any related ongoing construction, per DMMC 18.20.130. The Public Works Director may require extended public notification limits based on project limits and haul routes, where applicable. All notification shall be complete at least 2 weeks prior to work commencing.

15.4 Haul Routes

When required by the Public Works Director, a haul route agreement and/or plan must be prepared by the permittee and submitted for review and approval prior to beginning hauling.

A haul route agreement will generally be required for new and expanded hauling operations within the right-of-way. Haul route agreements are necessary to ensure that trucking activities do not impact roadway capacity or cause damage or accelerated deterioration to City roads and to minimize impacts to surrounding residences and businesses.

These activities involve, but are not limited to, development construction, major utility construction, and similar operations. These agreements may be required through the State Environmental Policy Act (SEPA) process or by the Public Works Director. The absence of an agreement does not absolve the user from restoring the right-of-way.

Generally, a right-of-way use, special use, or conditional use permit will be required in conjunction with a haul road agreement. The agreement must be signed by the permittee prior to issuance of the permit to protect the integrity of the roadway surface and other roadway features within the right-of-way.

Additionally, existing operations may require a haul route agreement through a conditional use, special use, or right-of-way use permit.

At a minimum, the agreement shall include the haul route, type and number of haul vehicles, hauling period, hours of operation, signage and flagging, daily maintenance, and periodic and final right-of-way and roadway restoration. The Public Works Director must approve the route. Failure to use the approved designated haul route may result in prohibition or limitation of further work on the development/property until such time as the requirements of the haul route are fulfilled.

The Public Works Director and permittee shall make joint pre-activity and post-activity inspections of the proposed haul route. Conditions of the road prior to the anticipated activity will be analyzed, documented, and agreed upon by the parties prior to signing the agreement and issuance of the permit. The Public Works Director may require a restoration financial guarantee prior to signing the agreement. When hauling activities have been completed, conditions are again documented. The post-activity inspection will not be conducted until at least 30 days after completion of hauling activities. If damage occurred as a result of the hauling, the applicant is required, prior to release of the financial guarantee, to make necessary repairs or compensate the City for the actual costs required to repair the damage.

Appendix A

Plan Review Checklists

City of Des Moines
Engineering Services
PLAN REVIEW CHECKLIST

Project:

For **BASE MAP**: Sheet # of

Reviewed by: Date:

	Comments		Comments
❑ North Arrow in Upper Right		❑ North Arrow Up or Right	
❑ Scale 1" = 20', 30', or 50'		❑ Scale Under North Arrow	
❑ _____		❑ _____	

For **GRADING AND FILLING**: Sheet # of

❑ Grading Plan and Site Map		❑ Adjacent to Sensitive Area	
❑ Is a Buffer Required?		❑ Amount of Yardage	
❑ Deepest Fill		❑ Highest Cut	
❑ Walls Required		❑ Work schedule	
❑ Time Limits		❑ T.E.S.C	
❑ Final E.S.C.P.		❑ Existing and Proposed 2-ft. Contours	
❑ Final Runoff Control		❑ Existing Vegetation Type/Location	
❑ Ground Cover After 30 Days		❑	

PLAN REVIEW CHECKLIST

Project:

For **STREETS**: Sheet # of

Reviewed by: Date:

Existing

Comments

- ❑ Existing ROW Width Shown _____
- ❑ Pavement Type Shown _____

Proposed

- ❑ Does it Match the Comp Plan _____
- ❑ Catch Basins in Wheel Chr Rmp Area _____
- ❑ Sidewalk Width to Fit Zone _____
- ❑ Curb Ramp Detail _____
- ❑ Curb & Gutter Detail _____
- ❑ Curb & Sidewalk Transition _____
- ❑ Street Cross Section Details _____
- ❑ ROW Widths _____
- ❑ Taper to Existing _____
- ❑ Asphalt Restoration Details _____
- ❑ Access Easements/Tracts _____
- ❑ Signal Loops/Intersection Plans _____
- ❑ Street Light Plans _____

Comments

- ❑ Existing Pavement Shown _____
- ❑ Existing Curb, Gutter & Sidewalk _____
- ❑ Sidewalk & Ramps Meet ADA _____
- ❑ Smooth Transition at Ends _____
- ❑ Sidewalk Detail _____
- ❑ Driveway Detail _____
- ❑ Cul-de-sac Flow Line Detail _____
- ❑ How Does it Match Exist. on Sides _____
- ❑ Crown to be <2% _____
- ❑ Exist poles, Fire Hydrant, etc in ROW _____
- ❑ Centerline Elevations _____
- ❑ Match or Overlay Note _____
- ❑ Landscaping/Irrigation Plans _____
- ❑ Pedestrian Push Button _____
- ❑ _____ _____

For **SIGNAGE/CHANNELIZATION**: Sheet # of

- ❑ Raised Pavement Markers _____
- ❑ Street Name Signs _____
- ❑ Sign Details/Cut Sheets _____
- ❑ Pavement Markings Details _____
- ❑ Spec. Sheet of Materials _____

- ❑ Paint Edge Line _____
- ❑ Stop/Dead End/Warning Signs _____
- ❑ Private Signs _____
- ❑ Crosswalks/Stop Bars _____
- ❑ _____ _____

PLAN REVIEW CHECKLIST

Project:

For **STORM SEWER**: Sheet # of

Reviewed by: Date:

Existing	Comments		Comments
❑ Major Drainage Basin		❑ Flow Control Level	
❑ Existing Flow Control BMPs shown		❑ Water Quality Level	
❑ Total site area (acres)		❑ Onsite/Adjacent Sensitive Areas	
❑ Existing Impervious (sqft)		❑ _____	
❑ Existing Public Drainage Shown		❑ _____	
❑ Existing SWM Acc't on File?		❑ _____	
Proposed			
❑ Type of Drainage Review		❑ Total New Impervious	
❑ TIR Attached		❑ Total Replaced Impervious	
❑ Discharge at Natural Location		❑ Total New Pervious	
❑ Offsite Analysis		❑ Total New/Replaced PGIS	
❑ Meet Basic Exemption for Flow Control?		❑ Imp. Mitigated w/ Flow Control	
❑ CSWPP Plan		❑ Imp. Mitigated w/ Water Quality	
❑ Maintenance Covenant		❑ Imp. Mitigated w/ Flow Control BMPs	
❑ Meet Basic Exemption for Water Quality?		❑ Drainage Easements/Tracts	
❑ Flow Control BMP Analysis		❑ Native Growth Protection Covenant	
❑ Special Requirements		❑ KCSWDM Details	
❑ _____		❑ _____	
Stormwater Facility Descriptions			
❑ Detention (FC)		❑ Veg. Flowpath (WQ)	
❑ Infiltration (FC)		❑ Wetpool (WQ)	
❑ Regional/Shared Facility (FC)		❑ Filtration (WQ)	
❑ Other		❑ Oil Control (WQ)	
❑ Flow Control BMPs		❑ Spill Control (WQ)	
❑ _____		❑ _____	

PLAN REVIEW CHECKLIST

Project:

For **UTILITIES**: Sheet # of

Reviewed by: Date:

Sanitary Sewer	Comments		Comments
❑ Is Sewer Available?		❑ Exist. Sewer Shown on Plan?	
❑ Sewer Pipe Size/Type?		❑ Sewer Connection invert shown?	
❑ Sewer MH Rim Elev. Shown		❑ Offset from C/L	
❑		❑	

Water			
❑ Is Water Available?		❑ Exist. Water Shown on Plan?	
❑ Fire Flow Available		❑ Main Size & Dist from C/L	
❑ Offset from C/L		❑	

Dry Utilities			
❑ All New Power Underground		❑ All New Com. Underground	
❑		❑	

City of Des Moines
Engineering Services

Single Family Residence Plan Review Checklist

1. Site Plan

- ☐ North Arrow
- ☐ Scale
- ☐ Right-of-Way Shown
- ☐ Property Lines Shown
- ☐ Address or Lot Information
- ☐ Clear and Legible

Comments:_____

2. Proposed Work

- ☐ Interior Remodel or Addition
- ☐ Addition of Accessory Dwelling Unit (ADU)
- ☐ New Single Family Residence
- ☐ Right-of-Way Improvements
- ☐ Access Improvements
- ☐ Pedestrian Improvements

Comments:_____

3. Access by Right-of-Way

- ☐ Asphalt, Concrete or Gravel
- ☐ Existing Access Shown
- ☐ Driveway Cut Previously Installed
- ☐ Standards (12'-24', <14%, concrete/asphalt)
- ☐ Driveway Separation (5' to PL, 30' other DW's)
- ☐ Other……

Comments:_____

4. Private Access

- ☐ Private Access by Tract, Easement, Ect.
- ☐ Impact on Other Lots
- ☐ Access Meets Private Standards
- ☐ Other…..

Comments:_____

5. Traffic Impact Fees

- ☐ Credit Available
- ☐ In-lieu Fees or Exempt
- ☐ Single Family Rate
- ☐ Multi-Family Rate (ADU)

Comments:_____

6. Inspections

- ☐ Driveways/Access
- ☐ Special Inspections
- ☐ Transportation Final
- ☐ Right-of-Way Permit Required

Comments:_____

7. Other

- ☐ Proposed Utilities Underground
- ☐ Street Lighting
- ☐ ….
- ☐ ….

Comments:_____

Appendix B

Standard Notes

GENERAL NOTES:

The standard plan notes must be included on all engineering plans. Notes which in no way apply to the project may be omitted.

1. All work in City right-of-way requires a Right-of-Way Permit from the City of Des Moines. Right-of-Way Permits can be applied for at the following link: https://www.desmoineswa.gov/departments/public_works/permit_center

2. Prior to any work commencing, the general contractor shall arrange for a preconstruction meeting to be attended by all major contractors, representatives of involved utilities, and the City of Des Moines. Contact the Engineering Services Division at ROWPermits@desmoineswa.gov to schedule the meeting.

3. After completion of all items shown on these plans and before acceptance of the project, the contractor shall obtain a “punch list” prepared by the City's inspector detailing remaining items of work to be completed. All items of work shown on these plans shall be completed to the satisfaction of the City prior to acceptance.

4. All materials and workmanship shall conform to the Standard Specifications for Road, Bridge, and Municipal Construction (hereinafter referred to as the “Standard Specifications”), Washington State Department of Transportation and American Public Works Association, Washington State Chapter, latest edition, unless superseded or amended by the City of Des Moines Street Development Standards (hereinafter referred to as the “City Standards”).

5. A copy of these approved plans and applicable City developer specifications and details shall be on site during construction.

6. Any revisions made to these plans must be reviewed and approved by the developer's engineer and the City Engineer prior to any implementation in the field. The City shall not be responsible for any errors and/or omissions on these plans.

7. The contractor shall have all utilities verified on the ground prior to any construction. Call 1-800-424-5555 or (811) at least 48 hours in advance. The owner and his/her engineer shall be contacted immediately if a conflict exists.

8. Any structure and/or obstruction which requires removal or relocation relating to this project shall be done so at the developer's expense.

9. Locations of existing utilities are approximate. It shall be the contractor's responsibility to determine the true elevations and locations of hidden utilities.

10. All new utilities must be located underground.

11. All construction surveying for extensions of public facilities shall be done under the direction of a Washington State licensed land surveyor or a Washington State licensed professional civil engineer.

12. During construction, all public streets adjacent to this project shall be kept clean of all material deposits resulting from on-site construction, and existing structures shall be protected as directed by the City.

13. Certified Records Drawings shall be signed and sealed by a Washington State licensed professional civil engineer and shall accurately reflect all field design revisions made during the construction process. Certified Record Drawings are required prior to project acceptance. See City Standards 2.11, Record Drawings.

TRANSPORTATION NOTES:

The standard plan notes must be included on all engineering plans. Notes which in no way apply to the project may be omitted.

1. Roadway cross sections shall conform with the Des Moines Comprehensive Transportation Plan and the details found in Section A of the Standard Drawings.

2. Curb, gutter, and sidewalk installation shall conform to the details in Section A of the the Standard Drawings.

3. Asphalt restoration and limits shall be determined in the field by the City of Des Moines representative. Asphalt restoration shall conform to the following Standard Drawings: DM.A7.1, DM.A7.2, DM.A7.3, DM.A7.4, and DM.A7.5.

4. Driveways, curb ramps and sidewalk transitions shall be installed per approved plans. Installation of these items shall conform to the details in Section C of the Standard Drawings.

5. All landscaping within City right-of-way shall conform to the details in Section D of the Standard Drawings.

6. All street signs shall conform to the details in Section E of the Standard Drawings.

7. Monuments shall be installed at all street intersections, at angle points, and points of curvature in each street. All boundary monuments must be installed according to the Washington State subdivision laws. See Street Design and Construction Standards 7.1, Survey Monuments, and Standard Drawing DM.F1.1.

8. All channelization and pavement markings shall conform to the details in Section F of the Standard Drawings.

9. The Contractor shall mark in the field, the location of all proposed channelization, pavement markings, and signs a minimum of 3 days prior to installation. The layout must be reviewed and approved in the field by the City of Des Moines representative.

10. Approved street lighting desing is required. Street lighting designs are provided by INTOlight and must meet City Standards.

STORMWATER NOTES:

The standard plan notes must be included on all engineering plans. Notes which in no way apply to the project may be omitted.

1. All pipe and appurtenances shall be laid on a properly prepared foundation in accordance with WSDOT specifications. This shall include leveling and compacting the trench bottom, the top of the foundation material, and any required pipe bedding, to a uniform grade so that the entire pipe is supported by a uniformly dense unyielding base.

2. Steel pipe shall be aluminized, or galvanized with asphalt treatment #1 or better inside and outside.

3. All drainage structures, such as catch basins and manholes, not located within a traveled roadway or sidewalk, shall have solid locking lids. All drainage structures associated with a permanent retention/detention facility shall have solid locking lids.

4. All catch basin grates shall conform to KCRDCS, which includes the stamping "OUTFALL TO STREAM, DUMP NO POLLUTANTS"

5. Rock for erosion protection of roadway ditches, where required, must be of sound quarry rock, placed to a depth of 1 foot, and must meet the following specifications: 4"-8” rock/40%-70% passing; 2"- 4" rock/30%-40% passing; and -2" rock/10%-20% passing.

6. All disturbed pervious areas (compacted, graded, landscaped, etc.) of the development site must demonstrate one of the following, in accordance with KCC and the Low Impact Development (LID) components of the approved site plan: The existing duff layer shall be staged and redistributed to maintain the moisture capacity of the soil, OR; Amended soil shall be added to maintain the moisture capacity.

7. Seasonal clearing is limited between October 1 and April 30 inclusive, unless otherwise approved with a written decision by the Reviewing Agency.

EROSION AND SEDIMENTATION CONTROL NOTES:

The standard plan notes must be included on all engineering plans. Notes which in no way apply to the project may be omitted.

1. The implementation of these ESC plans and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the applicant/ESC supervisor until all construction is approved.

2. The boundaries of the clearing limits shown on this plan shall be clearly flagged by survey tape or fencing, if required, prior to construction (King County SWDM Appendix D). During the construction period, no disturbance beyond the clearing limits shall be permitted. The clearing limits shall be maintained by the applicant/ESC supervisor for the duration of construction.

3. The ESC facilities shown on this plan must be constructed prior to or in conjunction with all clearing and grading so as to ensure that the transport of sediment to surface waters, drainage systems, flow control BMP locations (existing and proposed), and adjacent properties is minimized.

4. The ESC facilities shown on this plan are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events and modified to account for changing site conditions (e.g. additional cover measures, additional sump pumps, relocation of ditches and silt fences, perimeter protection etc.).

5. Any areas of exposed soils, including roadway embankments, that will not be disturbed for two days during the wet season or seven days during the dry season shall be immediately stabilized with the approved ESC cover methods (e.g., seeding, mulching, plastic covering, etc.).

6. At no time shall more than one (1) foot of sediment be allowed to accumulate within a 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.

7. Cover measures will be applied in conformance with Appendix D of the King County Surface Water Design Manual.

Appendix C

Sample Forms

City of Des Moines
Public Works

Deviation Request Form

Requestor's Name	**Phone Number**	**Email**
Project Name		**Date of Request**
Permit Number (LUA, BLD, ENG, ect.)		
Project Location (Address or Street and to/from)		

Instructions:
For a full explanation of the Deviation from Standards, see Section 1.9 of the Des Moines Street Design and Construction Standards.

Request for deviation should be submitted by the design engineer directly to the Public Works Director, together with the applicable fee, where they will be accepted, logged in, and assigned to the investigating staff. At a minimum, the design engineer shall provide the following information in addition to the above: relevant standards at issue, nature of requested deviation, and any other comment of relevance, together with the information required below per Section 1.9.2 of the Des Moines Street Design and Construction Standards. The request package shall be stamped by a licensed professional engineer.

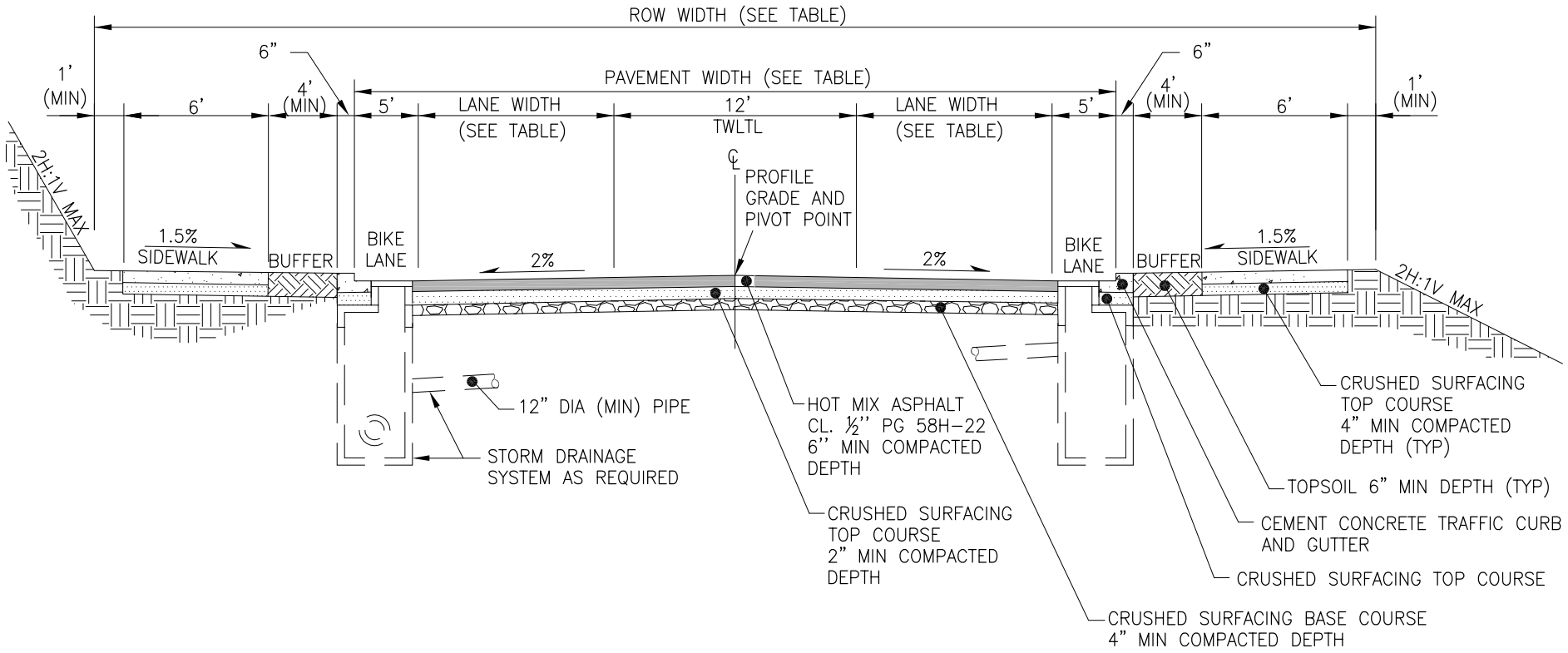
Before any deviation may be granted, it shall be shown that:

1. The granting of such deviation will produce compensating or comparable results, adequate for road users and the general public.
2. The granting of such deviation will not violate any development related conditions imposed upon the project.
3. The granting of such deviation will not be materially detrimental to the public welfare or injurious to the property or improvements is such vicinity in which the subject property is located.
4. Such deviation is based on sound engineering judgement, and that requirements for safety, function, appearance, environmental protection, and maintainability are fully met.

The Public Works Director may grant a deviation from the minimum technical requirements contained in the Street Design and Construction Standards only upon submittal of additional information, plans and/or design data by a design engineer showing that the requested deviation is safe, in the best interest of the public, and will not impose undue maintenance cost on the City of Des Moines, if applicable.

Please attach additional sheets as needed for review of the Deviation Request.

Deviation Request Number ***(For City use only)***



PRINCIPAL AND MINOR ARTERIAL TABLE				
ROAD CLASSIFICATION	ROW WIDTH	PAVEMENT WIDTH	LANE WIDTH	BIKE LANE WIDTH
PRINCIPAL ARTERIAL	80' MIN	36' MIN	12'	5'
MINOR ARTERIAL	70' MIN	34' MIN	12'	5'

NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04.
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.
3. NO ON STREET PARKING.

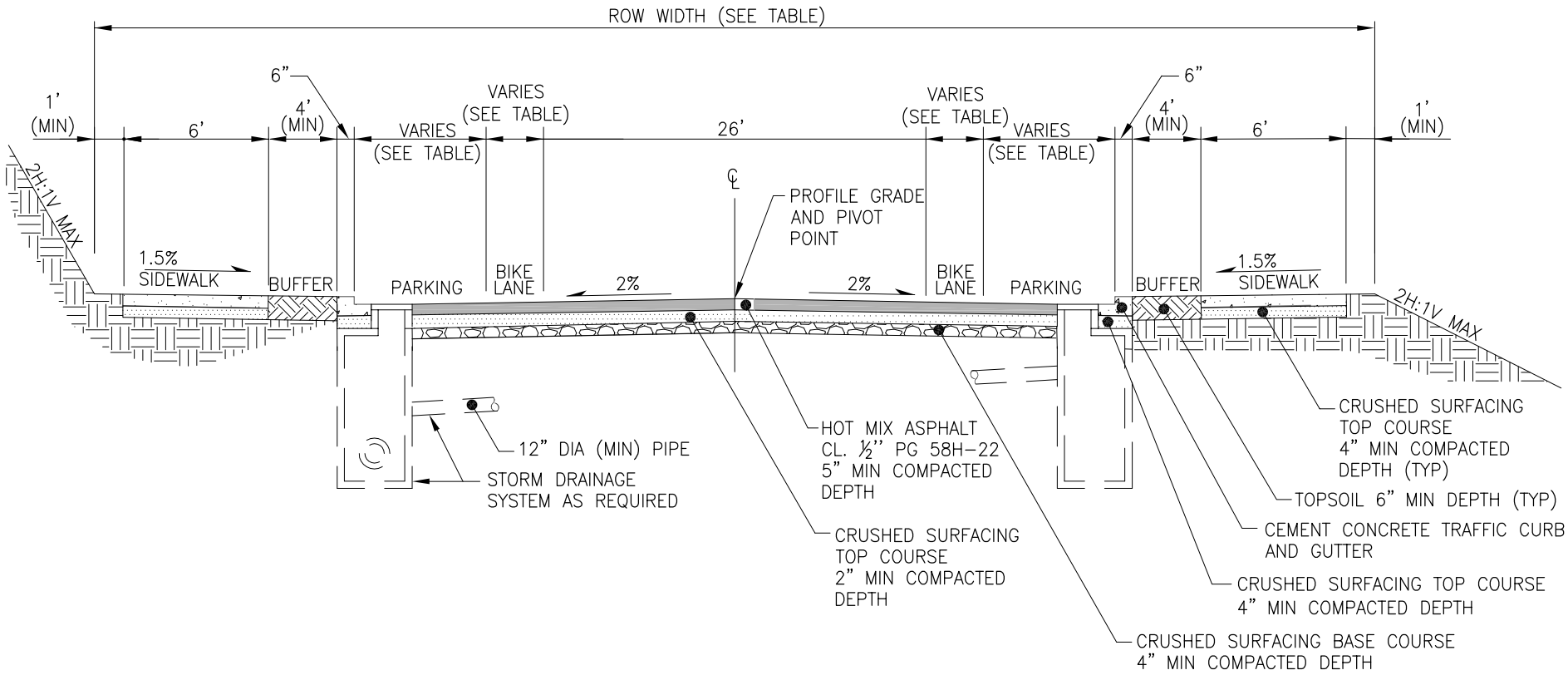
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

PRINCIPAL & MINOR ARTERIAL CROSS SECTION

DM.A1.1

REVISED: 02/23



COLLECTOR ARTERIAL TABLE

ROADWAY SECTION	ROW WIDTH	BIKE LANE (RT)	BIKE LANE (LT)	PARKING (RT)	PARKING (LT)
COLLECTOR ARTERIAL	60' MIN	0'	0'	0'	0'
COLLECTOR ARTERIAL W/ PARKING	60' MIN	0'	0'	8'	0'
COLLECTOR ARTERIAL W/ BIKE LANE AND PARKING	65' MIN	5'	0'	8'	0'
COLLECTOR ARTERIAL W/ PARKING BOTH SIDES	70' MIN	0'	0'	8'	8'
COLLECTOR ARTERIAL W/ BIKE LANE AND PARKING BOTH SIDES	80' MIN	5'	5'	8'	8'

NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04

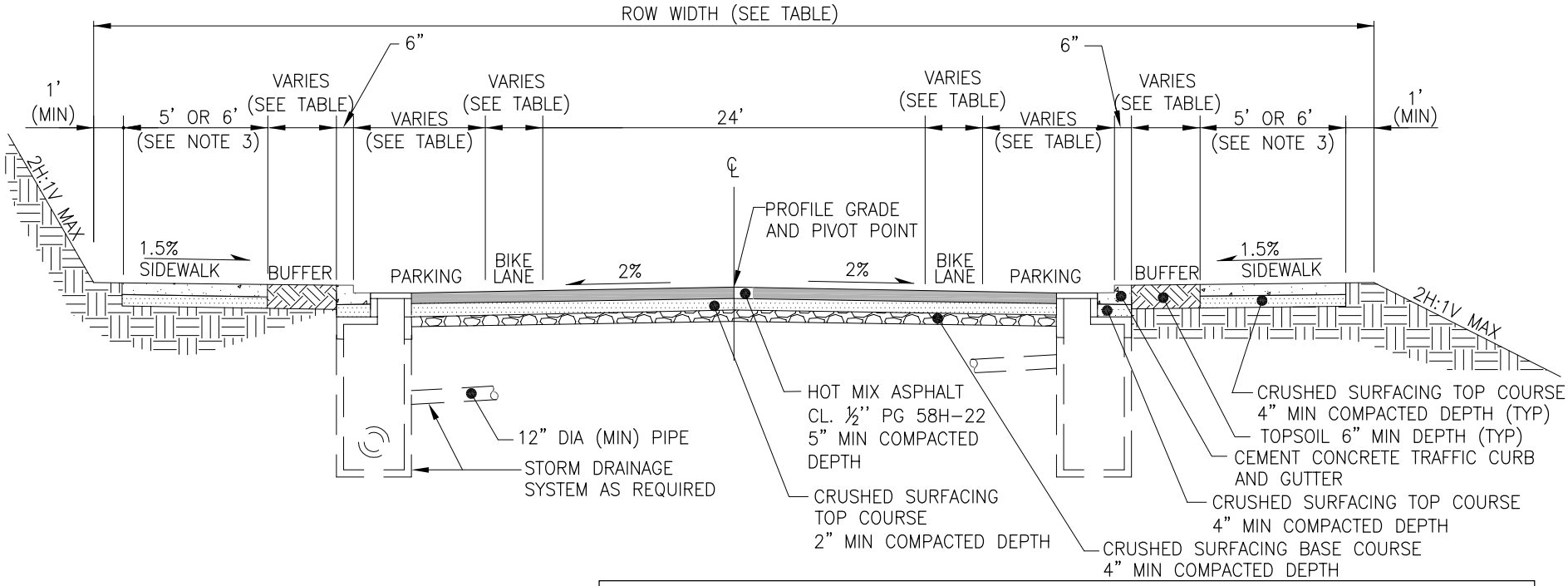
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

COLLECTOR CROSS SECTION

DM.A2.1

REVISED: 02/23



NEIGHBORHOOD COLLECTOR TABLE

ROADWAY SECTION	ROW WIDTH	BL (RT)	BL (LT)	PARK (RT)	PARK (LT)	BUFFER (LT)	BUFFER (RT)
NEIGHBORHOOD COLLECTOR	40' MIN	0'	0'	0'	0'	0'	0'
W/ BIKE LANE BOTH SIDES	50' MIN	5'	5'	0'	0'	0'	0'
W/ PARKING	50' MIN	0'	0'	8'	0'	0'	0'
W/ BIKE LANE BOTH SIDES AND PARKING	60' MIN	5'	5'	8'	0'	0'	0'
W/ PARKING BOTH SIDES	55' MIN	0'	0'	8'	8'	0'	0'
W/ BIKE LANE AND PARKING BOTH SIDES	65' MIN	5'	5'	8'	8'	0'	0'
W/ PARKING AND BUFFER	55' MIN	0'	0'	8'	0'	4' MIN	0'
W/ BIKE LANE BOTH SIDES, PARKING AND BUFFER	65' MIN	5'	5'	8'	0'	4' MIN	0'
W/ PARKING AND BUFFER BOTH SIDES	65' MIN	0'	0'	8'	8'	4' MIN	4' MIN
W/ BIKE LANE, PARKING AND BUFFER BOTH SIDES	75' MIN	5'	5'	8'	8'	4' MIN	4' MIN

NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04.
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.
3. SIDEWALK WIDTH IN COMMERCIAL ZONES IS 6' MINIMUM. SEE ENGINEERING PLAN.

NOT TO SCALE

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PUBLIC WORKS DEPARTMENT

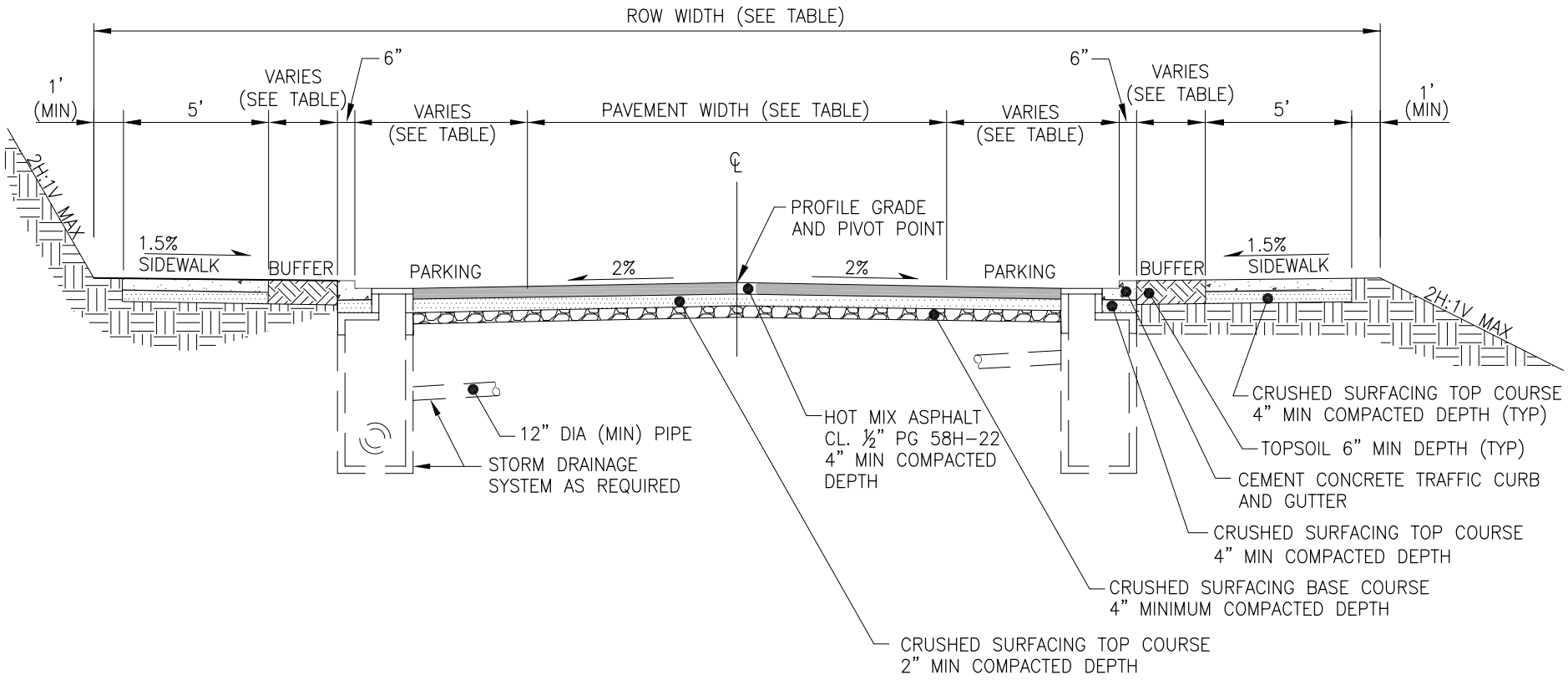
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

NEIGHBORHOOD COLLECTOR CROSS SECTION

DM.A3.1

REVISED: 02/23



LOCAL STREET TABLE

ROADWAY SECTION	ROW WIDTH	PAVEMENT WIDTH	PARK (RT)	PARK (LT)	BUFFER (RT)	BUFFER (LT)
LOCAL STREET	50' MIN	28' MIN	0'	0'	0'	0'
W/ PARKING	50' MIN	30'	8'	0'	0'	0'
W/ PARKING AND BUFFER	50' MIN	30'	8'	0'	4' MIN	0'
W/ PARKING BOTH SIDES	50' MIN	38'	8'	8'	0'	0'
W/ PARKING AND BUFFER BOTH SIDES	60' MIN	38'	8'	8'	4' MIN	4' MIN

NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04.
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.

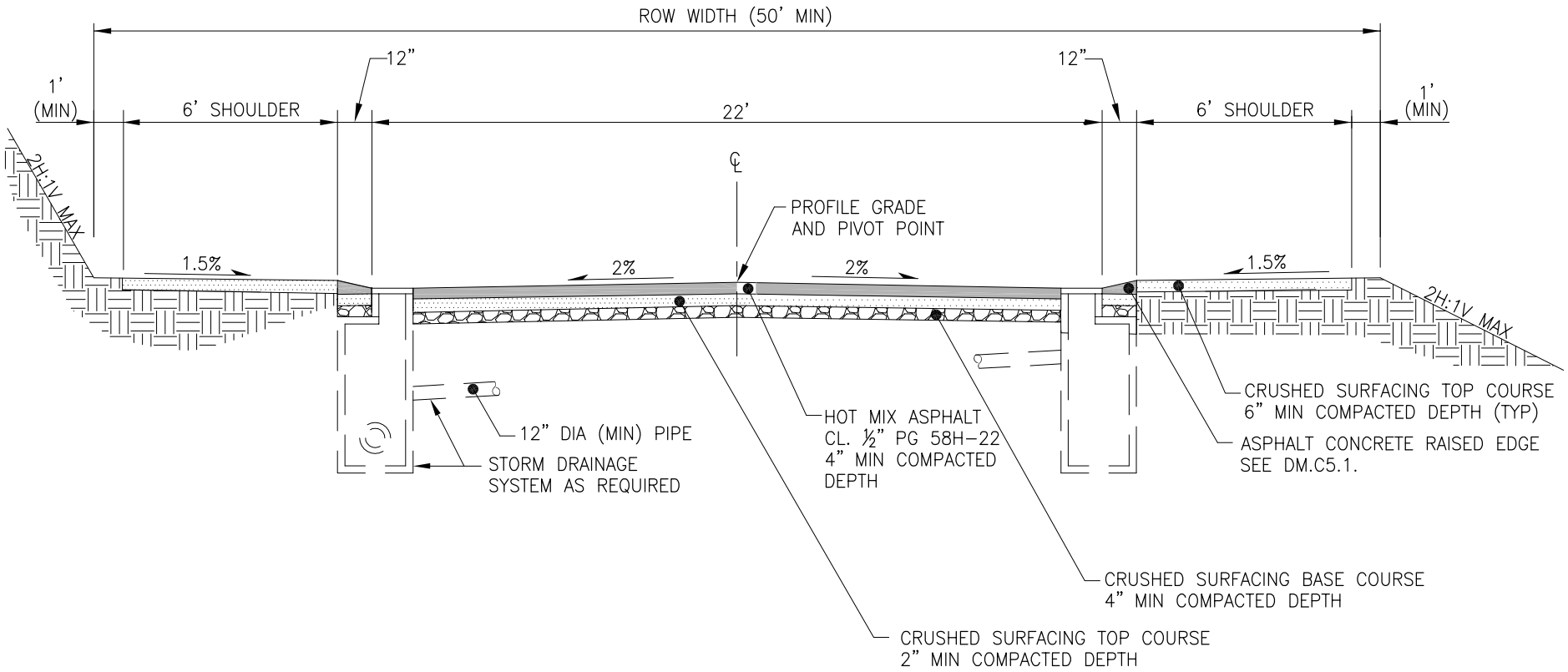
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

LOCAL STREET CROSS SECTION

DM.A4.1

REVISED: 02/23



NOTES:

1. CURB AND GUTTER MAY BE REQUIRED IN PLACE OF ASPHALT CONCRETE RAISED EDGE.
2. SEE DETAIL DM.C5.1 FOR ASPHALT CONCRETE RAISED EDGE DETAIL.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

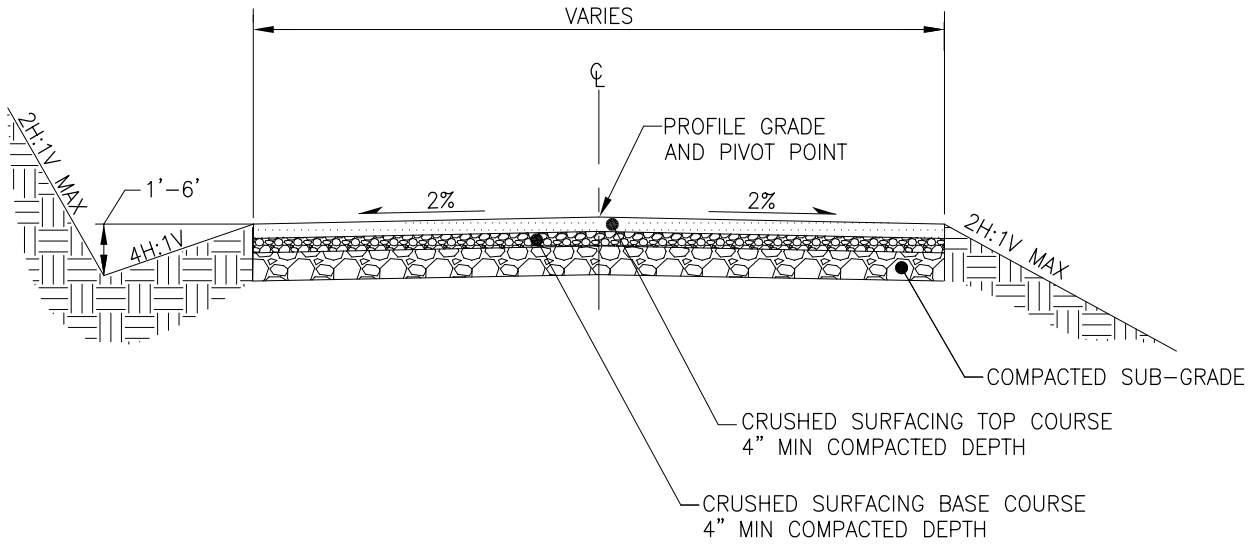
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

LOCAL STREET WITHOUT FRONTAGE IMPROVEMENTS

DM.A4.2

REVISED: 02/23



NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

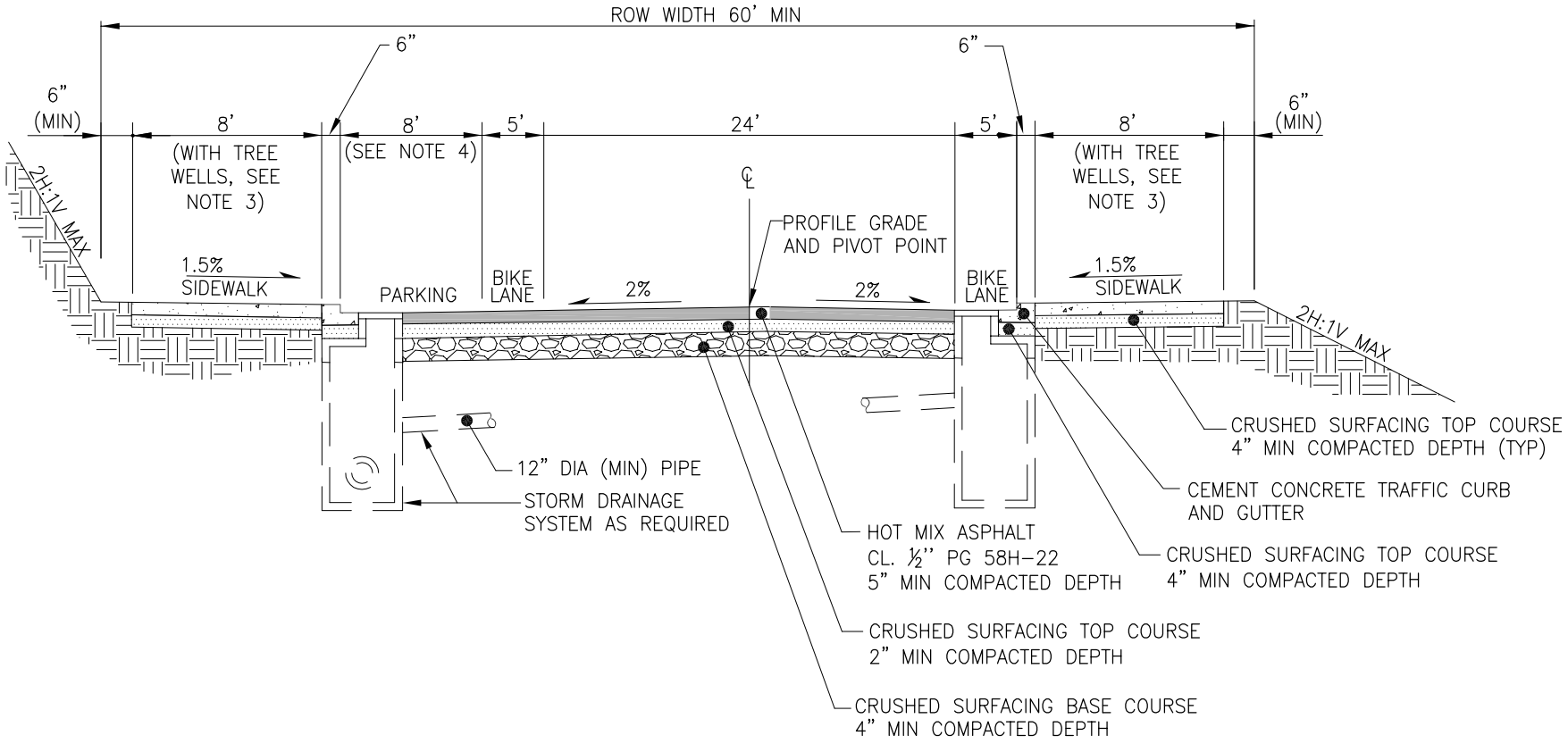
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

GRAVEL STREET CROSS SECTION

DM.A4.3

REVISED: 02/23



NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04.
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.
3. TREE WELLS WITH METAL GRATES SHALL BE PLACED WITHIN SIDEWALK EVERY 25'.
4. ON-STREET PARKING MAY BE LOCATED ON EITHER SIDE OF ROADWAY.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

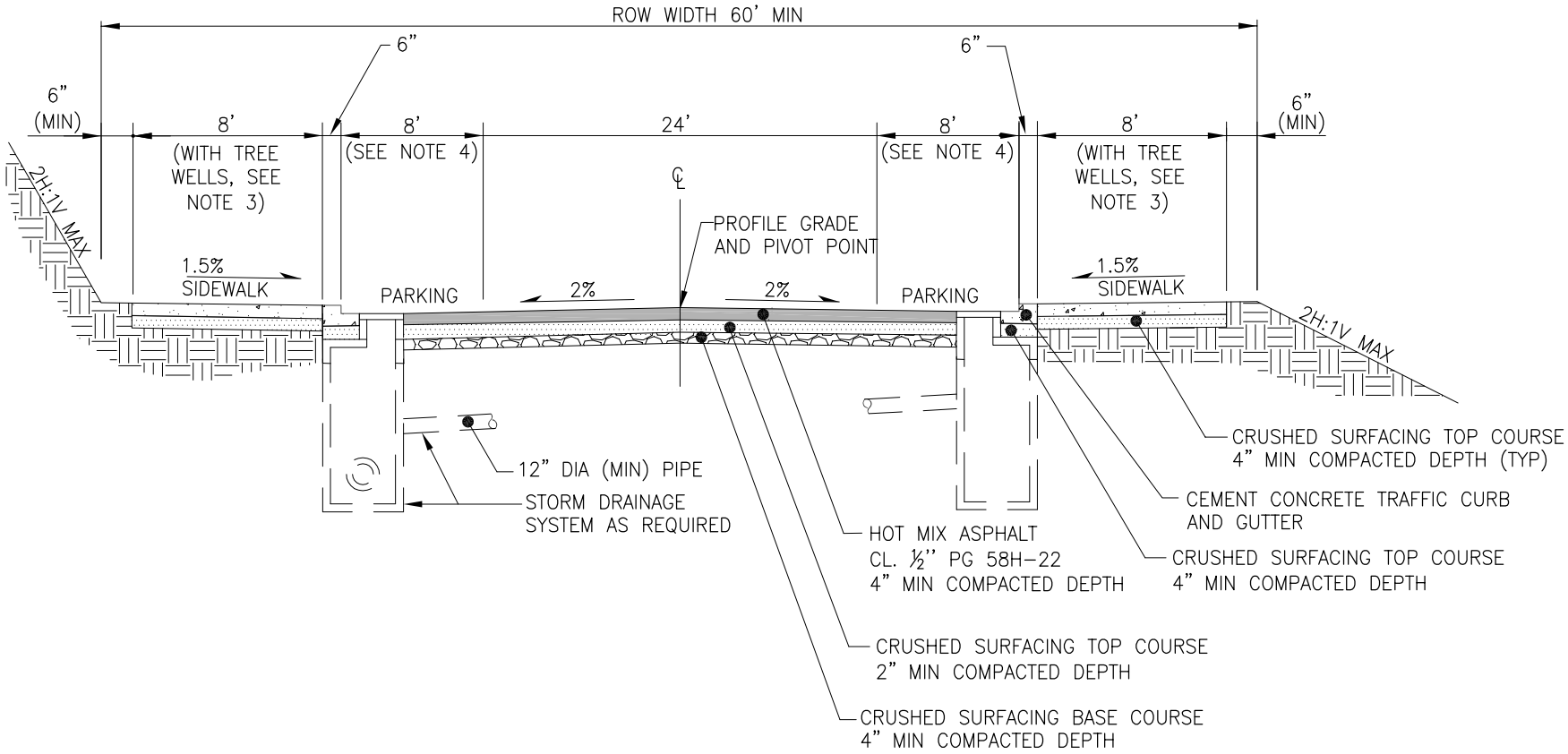
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

PACIFIC RIDGE TYPE A STREET CROSS SECTION

DM.A5.1

REVISED: 02/23



NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04.
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.
3. TREE WELLS WITH METAL GRATES SHALL BE PLACED WITHIN SIDEWALK EVERY 25'.
4. ON-STREET PARKING MAY BE LOCATED ON EITHER SIDE OF ROADWAY.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

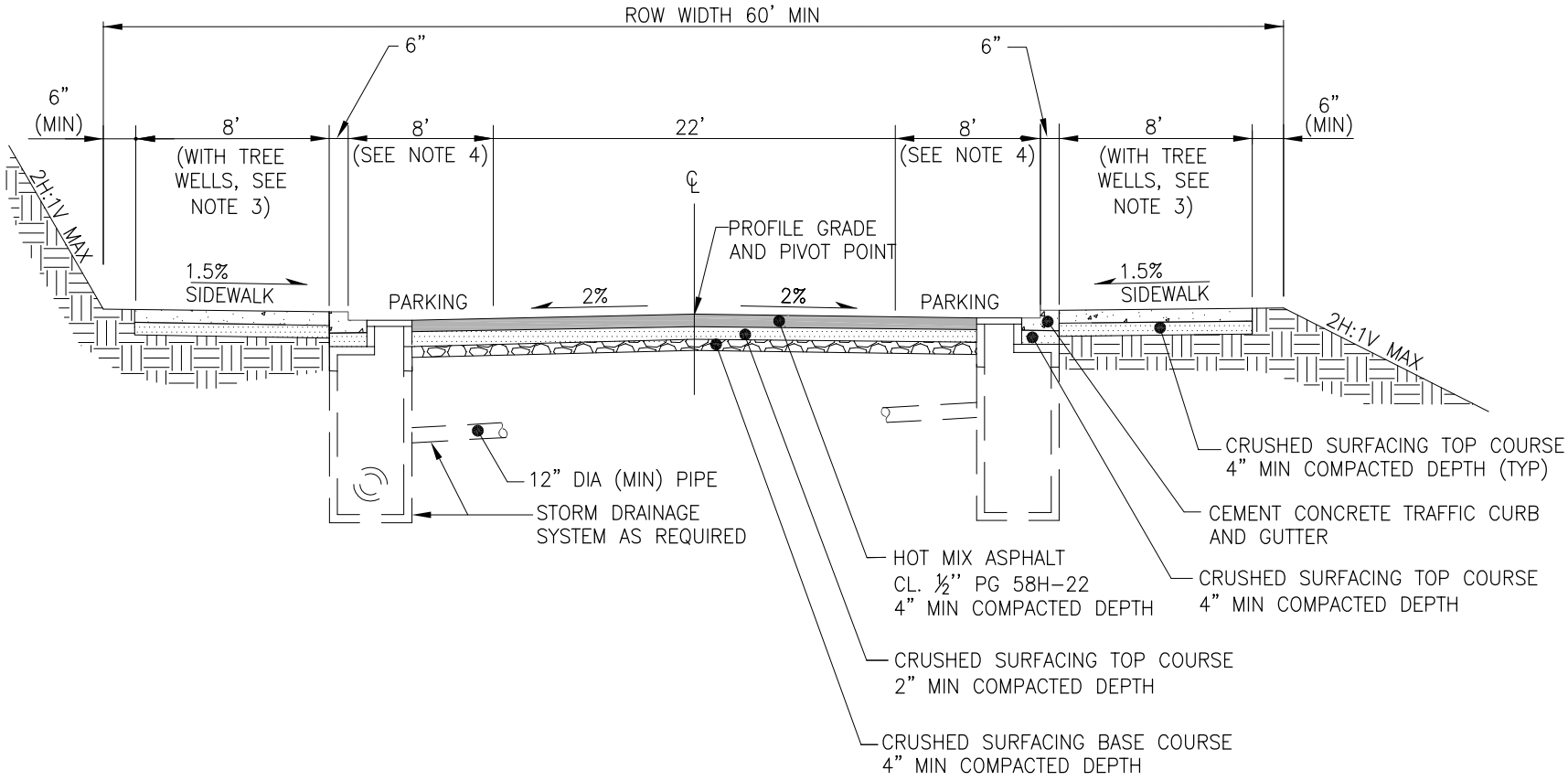
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

PACIFIC RIDGE TYPE B STREET CROSS SECTION

DM.A5.2

REVISED: 02/23



NOTES:

1. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04
2. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04
3. TREE WELLS WITH METAL GRATES SHALL BE PLACED WITHIN SIDEWALK EVERY 25'.
4. ON-STREET PARKING MAY BE LOCATED ON EITHER SIDE OF ROADWAY.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

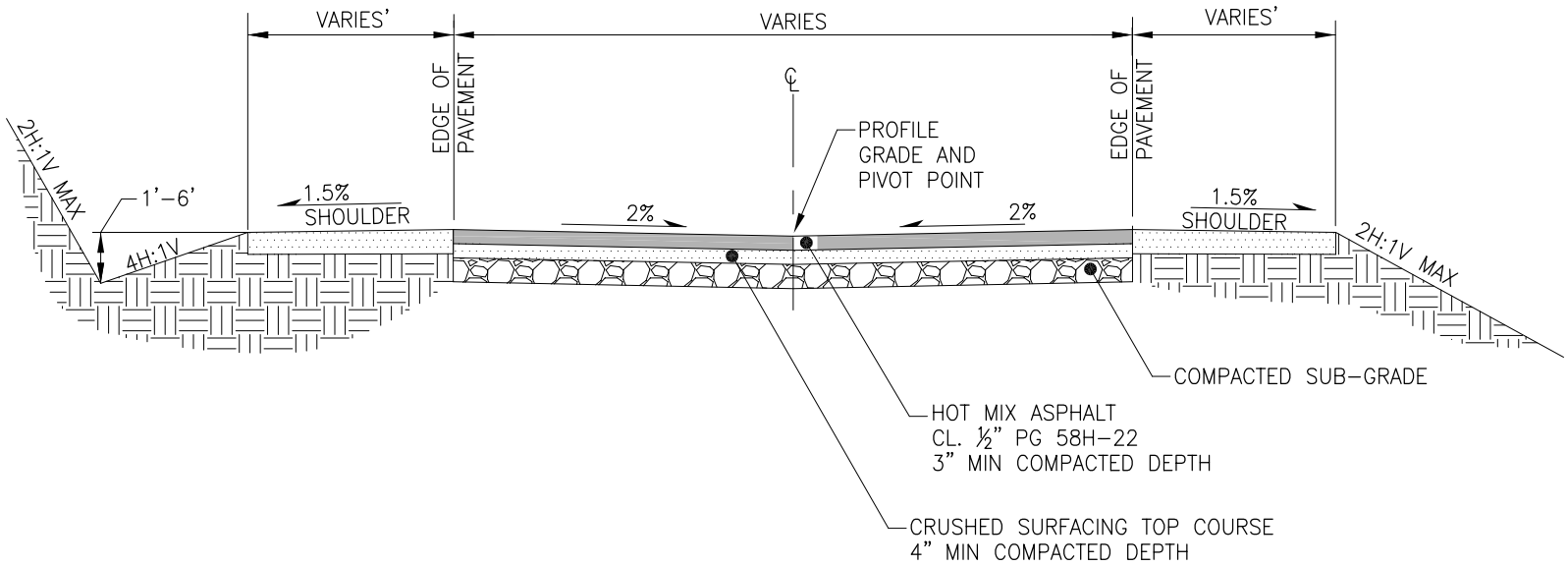
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

PACIFIC RIDGE TYPE C STREET CROSS SECTION

DM.A5.3

REVISED: 02/23



NOTES:

1. NO ON STREET PARKING.
2. SHOULDER MATERIAL: 4" MINIMUM COMPACTED DEPTH CSTC OR CSBC.
3. PROFILE OF ROADWAY MAY BE REVERSED PER APPROVAL OF SURFACE WATER MANAGEMENT.
4. SEE DETAIL DM.A9.7 FOR TURN-A-ROUND REQUIREMENTS.
5. SEE 5.4.1 OF STREET DEVELOPMENT STANDARDS FOR PRIVATE STREET REQUIREMENTS.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

PRIVATE STREET CROSS SECTION

DM.A6.1

REVISED: 02/23

NOTES:

1. HOT MIX ASPHALT (HMA) CL. 1/2 IN. PG 58H–22, WITH MINIMUM COMPACTED DEPTH OF 4" OR EXISTING PAVEMENT DEPTH PLUS 1", WHICHEVER IS GREATER. PLACE IN LIFTS WITH A MAXIMUM COMPACTED DEPTH OF 2" PER WSDOT STANDARD SPECIFICATION 5–04, AND MACHINE ROLL FLUSH WITH EXISTING PAVEMENT.

2. 5/8" MINUS CRUSHED SURFACING TOP COURSE WITH 2" MINIMUM DEPTH, COMPACTED TO 95% MAXIMUM DENSITY. IF THE EXISTING PAVEMENT DEPTH IS GREATER THAN 8", THE MINIMUM COMPACTED DEPTH OF CRUSHED SURFACING TOP COURSE SHALL BE EQUAL TO THE DEPTH OF THE EXISTING PAVEMENT MINUS 6".

3. EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 2–09 OF THE WSDOT STANDARD SPECIFICATIONS. IMPORTED MATERIAL USED FOR BACKFILL SHALL BE CONSISTENT CRUSHED SURFACE TOP COURSE AS DEFINED IN SECTION 9–03.9 OF THE WSDOT STANDARD SPECIFICATIONS. BACKFILL MATERIAL SHALL BE PLACED IN 1' MAXIMUM LOOSE LIFTS AND COMPACTED TO 95% MAXIMUM DENSITY.

4. PIPE INSTALLATIONS SHALL BE IN ACCORDANCE WITH SECTION 7–04 AND SECTION 7–08 OF THE WSDOT STANDARD SPECIFICATIONS.

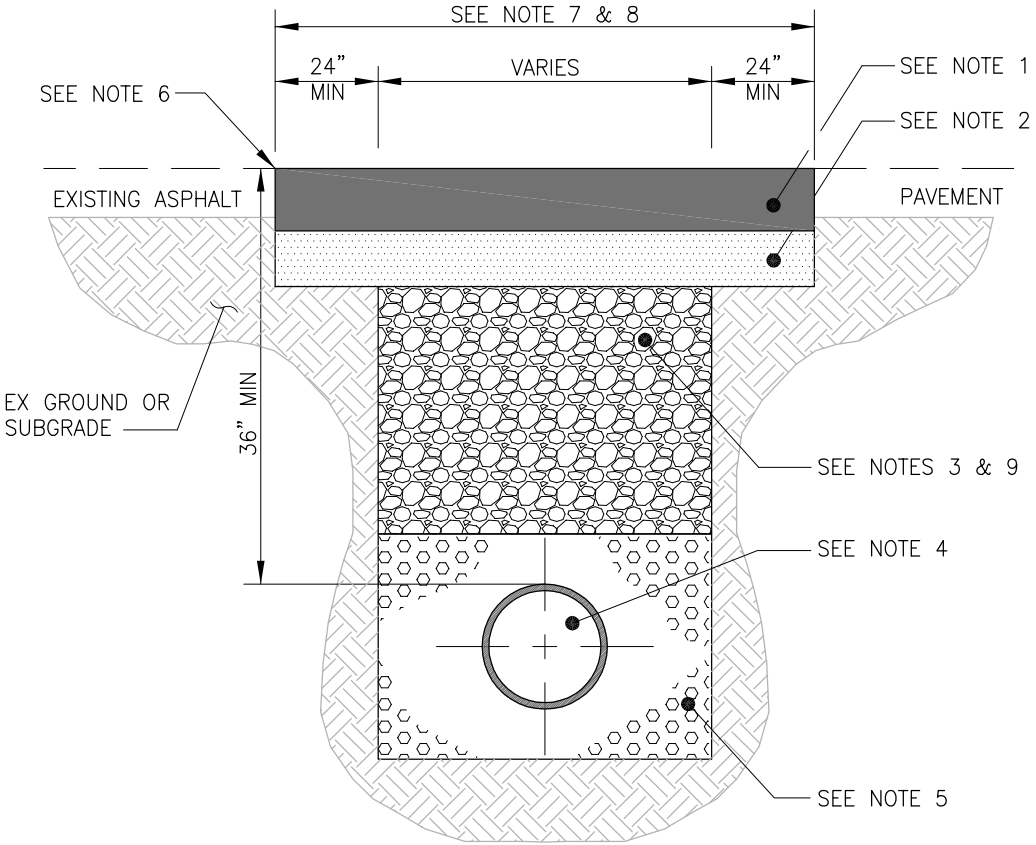
5. MATERIAL USED FOR PIPE BEDDING MATERIAL SHALL BE CONSISTENT GRAVEL BACKFILL FOR PIPE ZONE BEDDING AS DEFINED IN SECTION 9–03.12(3) OF THE WSDOT STANDARD SPECIFICATIONS. BEDDING MATERIAL SHALL BE PLACED IN 1' MAXIMUM LOOSE LIFTS AND COMPACTED TO 95% MAXIMUM DENSITY. DEPTH OF MATERIAL SURROUNDING PIPE SHALL BE ADEQUATE TO SUPPORT THE PIPE AND TRENCH.

6. NEAT, UNIFORM AND VERTICAL CUT (TYPICAL BOTH SIDES). CLEAN AND HEAT EDGES AND TACK WITH EMULSIFIED ASPHALT. SEAL JOINT WITH HOT ASPHALT CEMENT (AR 4000 TYPICAL).

7. MINIMUM RESTORATION LIMITS UNLESS OTHERWISE DETERMINED BY THE ENGINEER. IF ANY PORTION OF A LONGITUDINAL PAVEMENT CUT AFFECTS A WHEEL TRACK, 2" HMA OVERLAY FOR MINIMUM HALF ROADWAY REQUIRED OR FULL LANE AS DETERMINED BY THE ENGINEER. WHEREVER AN EXISTING PATCH OR CRACK IS IN CLOSE PROXIMITY TO THE NEW CUT, THE ENGINEER MAY REQUIRE REMOVAL OF THE EXISTING PATCH OR CRACK AND ANY INTERVENING PAVEMENT. DEPTH OF REPLACEMENT ASPHALT SHALL BE IN ACCORDANCE WITH NOTE 1.

8. ALL PERMANENT FINAL PATCHES SHALL BE RECTANGULAR OR CIRCULAR IN SHAPE AND CONSTRUCTED TO BE PARALLEL AND PERPENDICULAR TO THE ROAD CENTERLINE. ALL FINAL RESTORATION LIMITS WILL BE DETERMINED BY PUBLIC WORKS DIRECTOR OR DESIGNEE IN FIELD.

9. CONTROLLED DENSITY FILL (CDF) MAY BE REQUIRED ON PRINCIPAL ARTERIAL ROADWAYS AND SHALL BE PLACED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS 2–09.3(1)E.



RESTORATION DETAIL FOR UTILITY ROAD CUTS

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

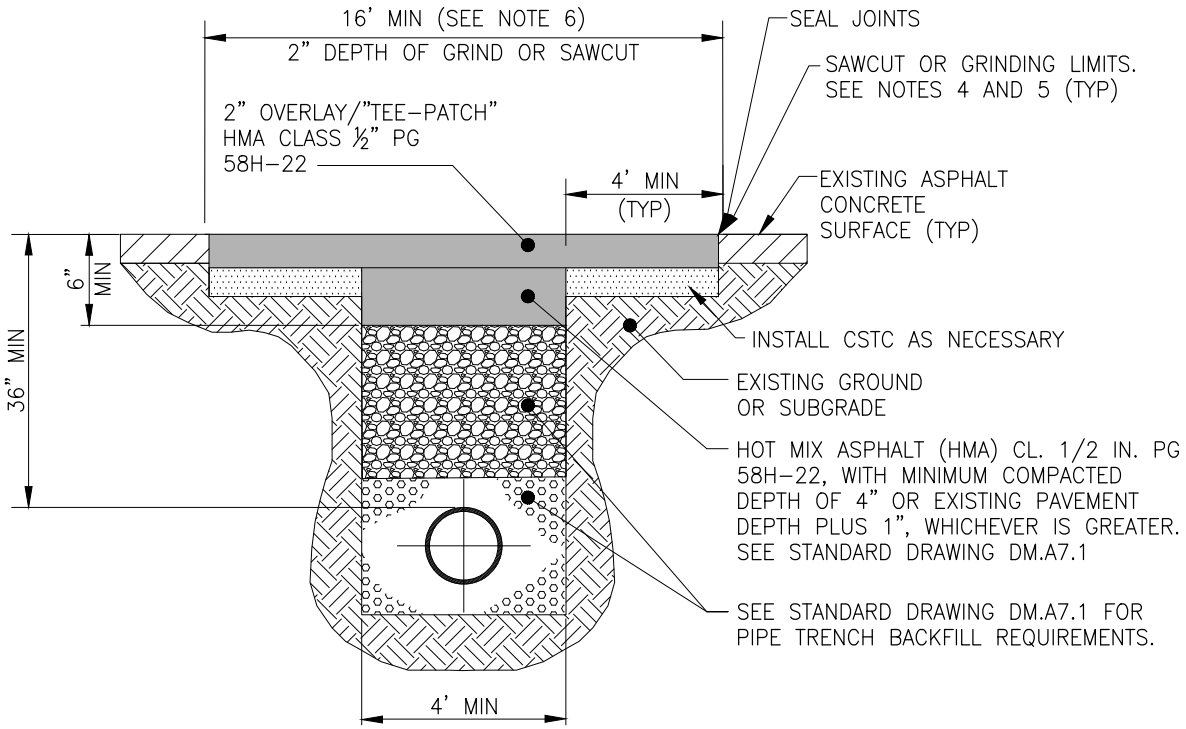
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

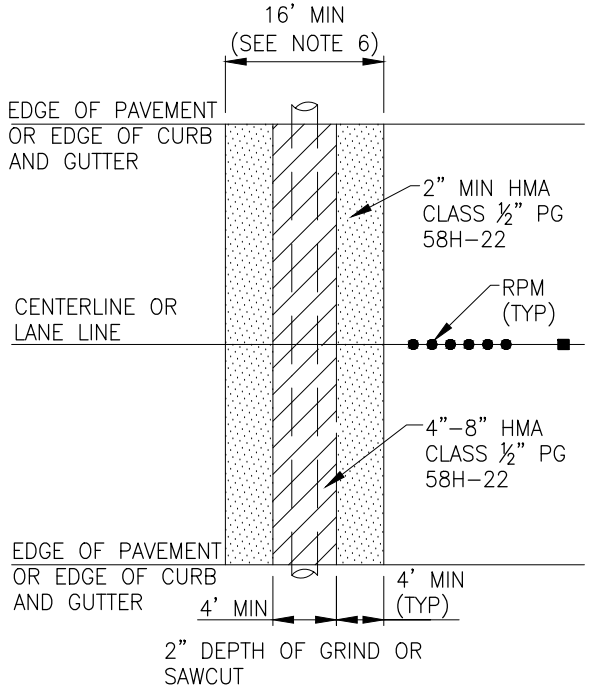
PAVEMENT PATCHING AND RESTORATION DETAILS GENERAL REQUIREMENTS

DM.A7.1

REVISED: 02/23



SECTION



PLAN VIEW

NOTES:

1. ASPHALT CONCRETE MIX SHALL BE HMA CLASS ½ IN. PG 58H-22.
2. REPLACE ALL DISTURBED STRIPING AND MARKINGS.
3. ALL SAW CUTS SHALL BE VERTICAL AND IN STRAIGHT LINES AS DIRECTED BY ENGINEER.
4. TACK ASPHALT FACES OF SAW CUTS AND SEAL SAW CUTS WITH PG 58H-22 OIL.
5. PAVING FABRIC (IF FOUND) WILL NOT REQUIRE REPLACEMENT.
6. PER 9.3.1 OF STREET DEVELOPMENT STANDARDS, ROADWAYS PAVED WITHIN 5 YEARS SHALL BE OVERLAID A MINIMUM OF 25' IN EACH DIRECTION FROM TRENCH.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

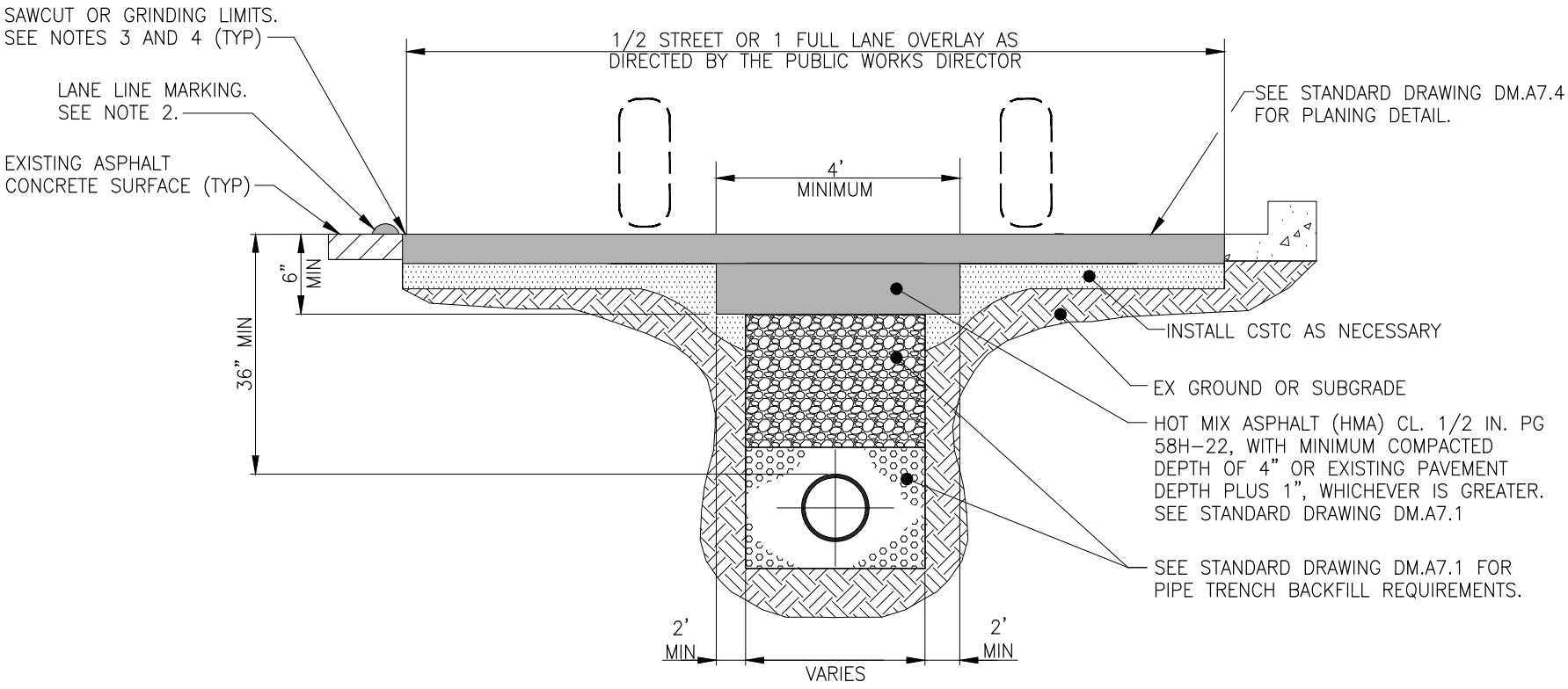
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

PAVEMENT PATCHING AND RESTORATION DETAILS TRANSVERSE CUTS

DM.A7.2

REVISED: 02/23



SECTION

NOTES:

1. ASPHALT CONCRETE MIX SHALL BE HMA CLASS ½ IN. PG 58H-22.
2. REPLACE ALL DISTURBED STRIPING AND MARKINGS.
3. ALL SAW CUTS SHALL BE VERTICAL AND IN STRAIGHT LINES AS DIRECTED BY ENGINEER.
4. ALL SAW CUTS MUST BE A MINIMUM 2' FROM EXISTING CURB FOR ADEQUATE COMPACTION/RESTORATION.
5. TACK ASPHALT FACES OF SAW CUTS AND SEAL SAW CUTS WITH PG 58H-22 OIL.
6. PAVING FABRIC (IF FOUND) WILL NOT REQUIRE REPLACEMENT.
7. SEE DM.A7.1 FOR RESTORATION LIMITS WHEN LONGITUDINAL PAVEMENT CUT AFFECTS A WHEEL TRACK.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

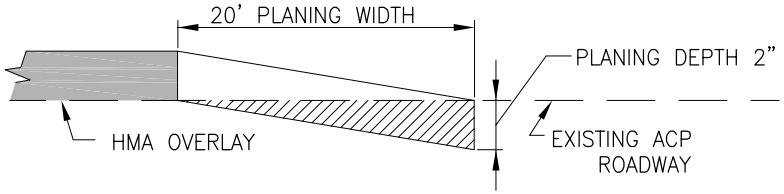
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

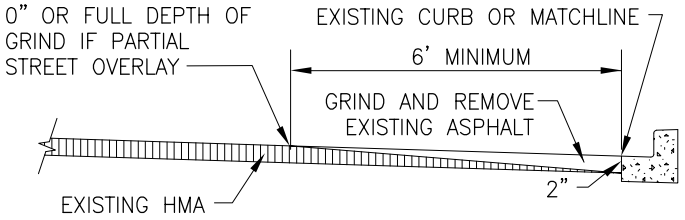
PAVEMENT PATCHING AND RESTORATION DETAILS
LONGITUDINAL CUT

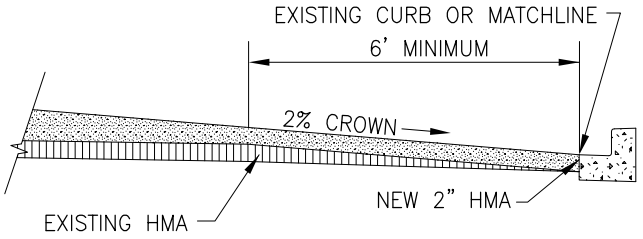
DM.A7.3

REVISED: 02/23



TRANSVERSE JOIT PLANING





PLANING AT VERTICAL CURB

NOTES:

1. ASPHALT CONCRETE MIX SHALL BE HMA CLASS 1/2" PG 58H-22.
2. ALL PAVEMENT MARKINGS SHALL BE REMOVED PRIOR TO PAVING.
3. AFTER OVERLAY, REPLACE ALL DISTURBED STRIPING AND MARKINGS.
4. ALL SAW CUTS SHALL BE VERTICAL AND IN STRAIGHT LINES AS DIRECTED BY ENGINEER.
5. TACK ASPHALT FACES OF SAW CUTS AND SEAL SAW CUTS WITH PG 58H-22 OIL.
6. PAVING FABRIC (IF FOUND) WILL NOT REQUIRE REPLACEMENT.
7. IDENTIFY AND PROTECT ALL LOOP AND LOOP LEAD-INS DURING GRINDING.
8. ALL INDUCTION LOOPS SHALL BE INSTALLED PRIOR TO FINAL LIFT OF ASPHALT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

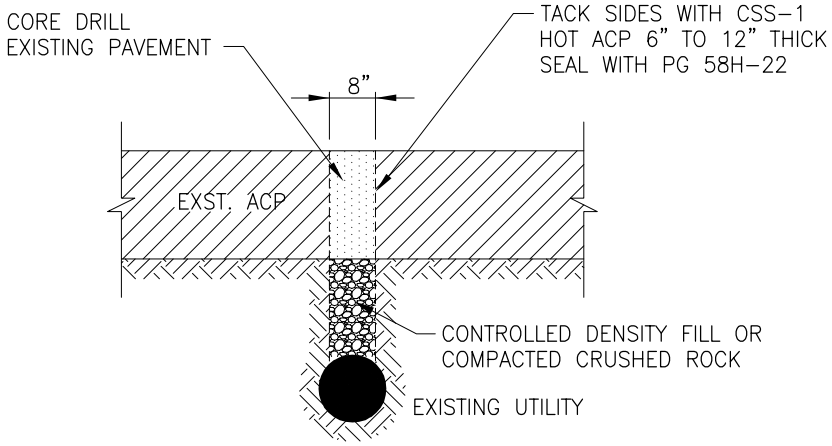
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

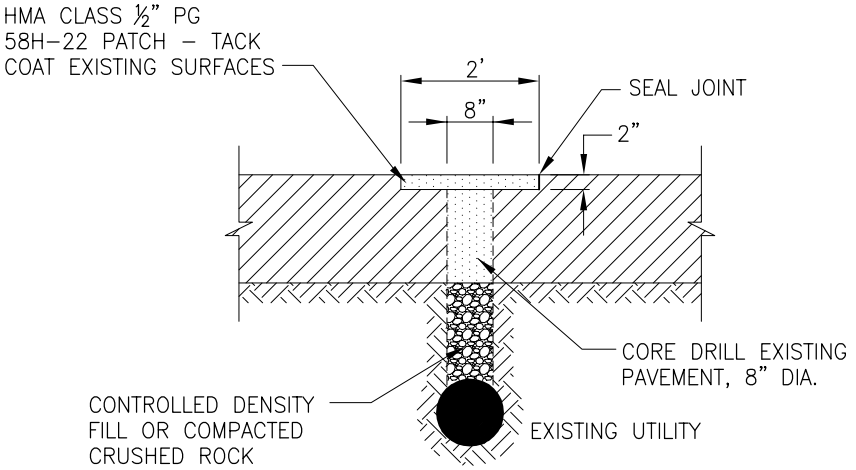
SAILS WITH PRIDE

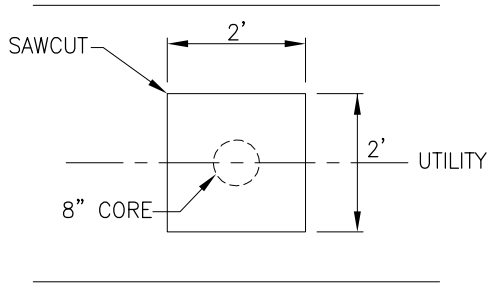
PAVEMENT PLANING DETAILS

DM.A7.4

REVISED: 02/23







ALTERNATE REPAIR

NOTES:

1. TO BE USED FOR NO-CUT AND GRIND & OVERLAY STREET RESTORATION CLASSIFICATIONS
2. THE EXISTING PAVEMENT SHALL BE CUT FULL DEPTH WITH AN EIGHT INCH DIAMETER CORE DRILL. THE SUBBASE MATERIAL SHALL BE REMOVED USING A VACUUM EXCAVATOR, KEEPING THE EXCAVATION AS MINIMAL AS POSSIBLE.
3. BACKFILL THE EXCAVATION WITH A SIX INCH CUSHION OF CRUSHED ROCK OVER THE UTILITY THEN PLACE THE REMAINING VOID WITH CDF OR COMPACTED CSTC.
4. REPAIR THE CORED PAVEMENT SECTION WITH HMA CLASS ½" PG 58H-22 AND SEAL THE JOINT WITH PG 58H-22 OIL.
5. IF THE OPENING IS LARGER THAN THE 8 INCH CORE, THE PAVEMENT RESTORATION WILL INCLUDE A 2' BY 2' TEE PATCH 2" IN DEPTH CENTERED ON THE EXCAVATION.
6. IF THE EXCAVATION IS LARGER THAN 2' BY 2', REFER TO STANDARD DRAWING DM.A7.1 FOR RESTORATION DETAILS.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

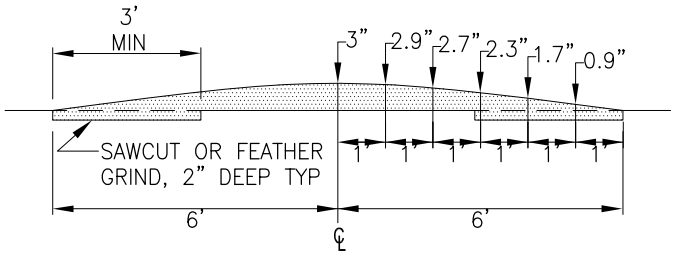
POTHOLE PATCHING AND RESTORATION DETAILS

DM.A7.5

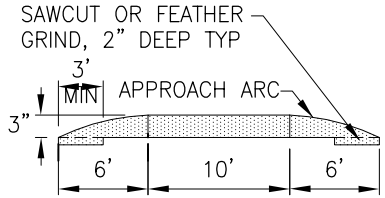
REVISED: 02/23

SIGN DESIGNATION / SIZE TABLE		
W8-1	SPEED	30" x 30"
W13-1(15)	15 MPH ADVISORY PLAQUE	18" x 18"
	BUMP AHEAD	30" x 30"

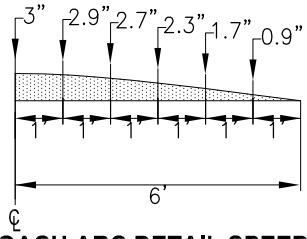
NOTES:
1. ADVANCE SIGNS USED ONLY FOR FIRST IN SERIES.
2. ALL SIGNS SHALL HAVE HIGH INTENSITY PRIZMATIC SHEETING.



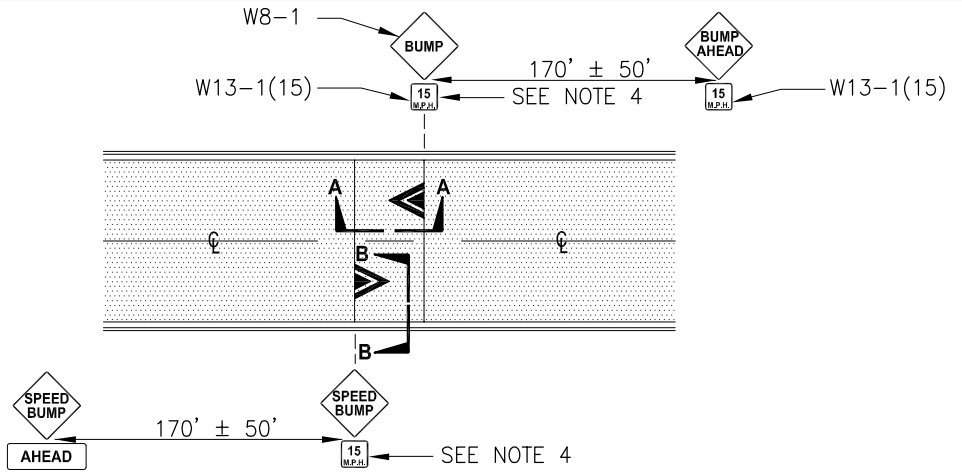
SECTION A-A SPEED HUMP



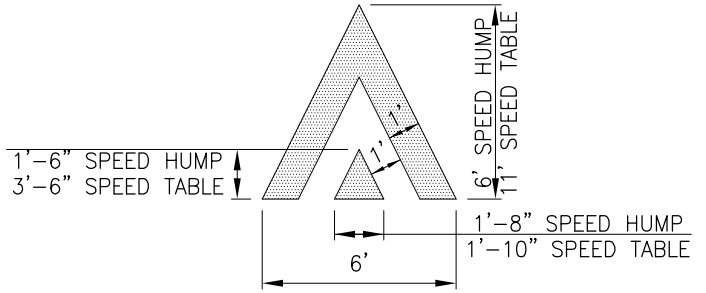
SECTION A-A SPEED TABLE



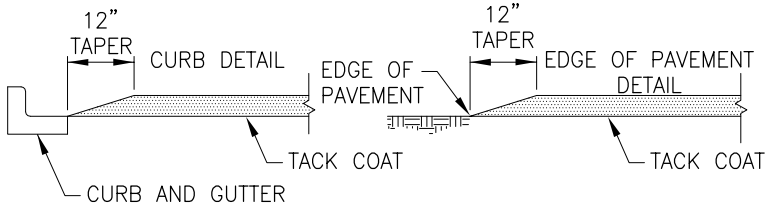
APPROACH ARC DETAIL SPEED TABLE



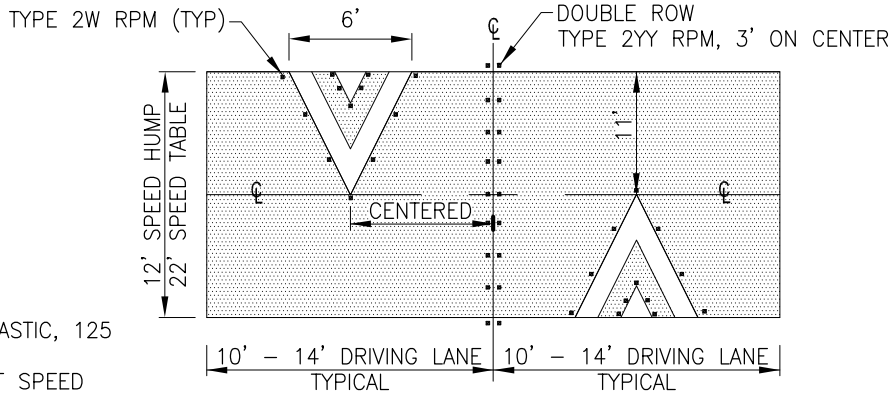
SIGNING LAYOUT FOR SPEED HUMP



PAVEMENT MARKING DETAIL



SECTION B-B



MARKING DETAIL

NOTES:
1. SAWCUT OR FEATHER GRIND TO KEY IN SPEED HUMP. SEE SECTION A-A.
2. SIGN LOCATIONS SHALL BE VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
3. SPEED HUMP PAVEMENT MARKING SHALL BE PREFORMED TYPE B HEAT FUSED THERMOPLASTIC, 125 MIL., OR EQUAL APPROVED BY THE PUBLIC WORKS DIRECTOR.
4. FOR A SERIES OF SPEED HUMPS, USE THE ADVISORY SPEED PLAQUE AT ONLY THE FIRST SPEED HUMP IN EACH DIRECTION OF TRAVEL.
5. SPEED HUMP TO BE INSTALLED USING CITY PROVIDED TEMPLATE, 48 HOURS NOTICE REQUIRED.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

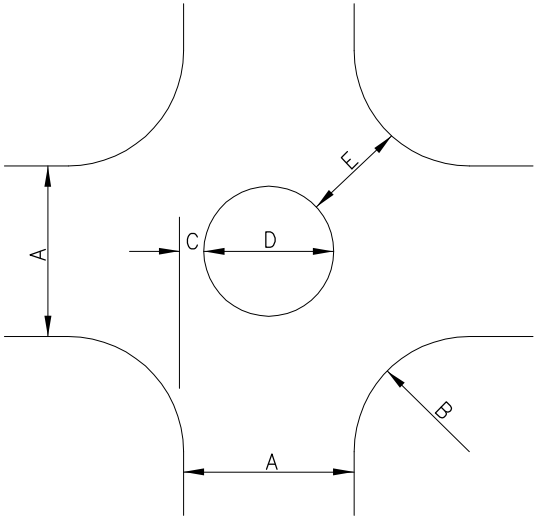
SPEED HUMP

DM.A8.1

REVISED: 02/23

OPTIMUM DIMENSIONS TABLE	
OFFSET DISTANCE (C)	OPENING WIDTH (E)
5.5' MAX	16' MIN
5.0'	17' ±
4.5'	18' ±
4.0'	19' ±
3.5' OR LESS	20' ±

INTERSECTION GEOMETRY



DIMENSIONS TABLE				
A STREET WIDTH	B CURB RETURN RADIUS	C OFFSET DISTANCE	D CIRCLE DIAMETER	E OPENING WIDTH
20'	<15'	RECONSTRUCT CURBS		
	15'	5.5'	9'	16',+
	18'	5.0'	10'	17',+
	20'	4.5'	11'	18',–
	25'	4.0'	12'	19',+
24'	<12'	RECONSTRUCT CURBS		
	12'	5.5'	13'	16',
	15'	5.0'	14'	17',–
	20'	4.5'	15'	18',+
	25'	3.5'	17'	20',–
25'	<12'	RECONSTRUCT CURBS		
	12'	5.5'	14'	16',+
	15'	5.0'	15'	17',–
	18'	4.5'	16'	18',–
	20'	4.5'	16'	18',+
	25'	3.5'	18'	20',–
30'	10'	5.5'	19'	16',+
	12'	5.0'	20'	17',–
	15'	5.0'	20'	17',+
	18'	4.5'	21'	18',+
	20'	4.0'	22'	19',+
	25'	3.0'	24'	20'
32'	10'	5.5'	21'	16',+
	12'	5.0'	22'	17',–
	15'	4.5'	23'	18',–
	18'	4.0'	24'	19',–
	20'	4.0'	24'	19',+
	25'	2.5'	27'	20'
36'	10'	5.0'	26'	17',–
	12'	5.0'	26'	17',+
	15'	4.5'	27'	18',+
	18'	4.0'	28'	19',+
	20'	3.5'	29'	20',–
	25'	1.5'	33'	20'
40'	10'	5.0'	30'	17',+
	12'	4.5'	31'	18',+
	15'	4.0'	32'	19',–
	18'	3.5'	33'	20',–
	20'	3.0'	34'	20'
	25'	1.0'	38'	20'

NOTES:

1. USE DIMENSION SCHEDULE AS A DESIGN GUIDE. FINAL DIMENSIONS TO BE DETERMINED BY THE ENGINEER.
2. FOR PLANTER ISLAND SPECIFICATIONS SEE STANDARD DRAWING DM.A8.3.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

TRAFFIC CIRCLE DIMENSIONS

DM.A8.2

REVISED: 02/23

TRAFFIC CIRCLE LANDSCAPING

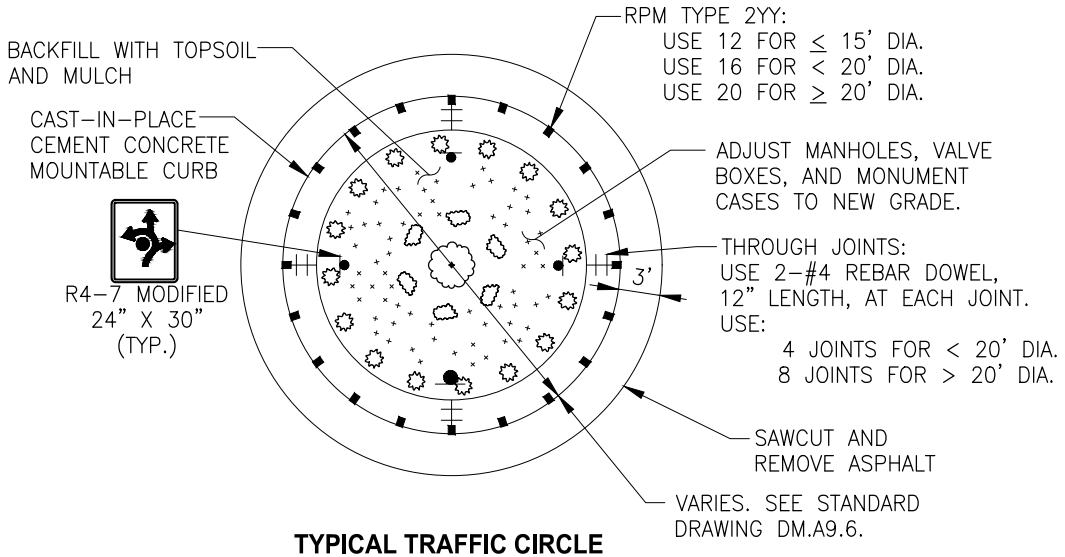
LEGEND	
TREE	
SHRUB	
GROUND COVER	
BULBS	

TREES
SEE STANDARD DRAWING DM.D4.3 FOR TYPE.

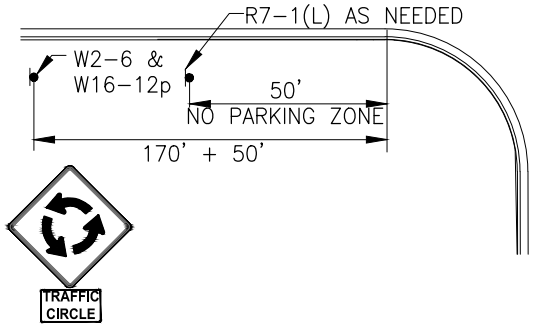
SHRUBS
FOUNTAIN GRASS, FROSTY CRUEL, MOLINA, CAREX FLAGELIFERA, BLUE GRASS, LAVANDULA,

GROUND COVER
KINNIKINNICK, COTONEASTER EVERGREEN LOW GROWTH

BULBS
DAFFODIL, TULIPS, AND CROCUS
OTHER PLANT MATERIAL BY APPROVAL

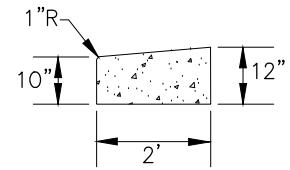


TYPICAL TRAFFIC CIRCLE

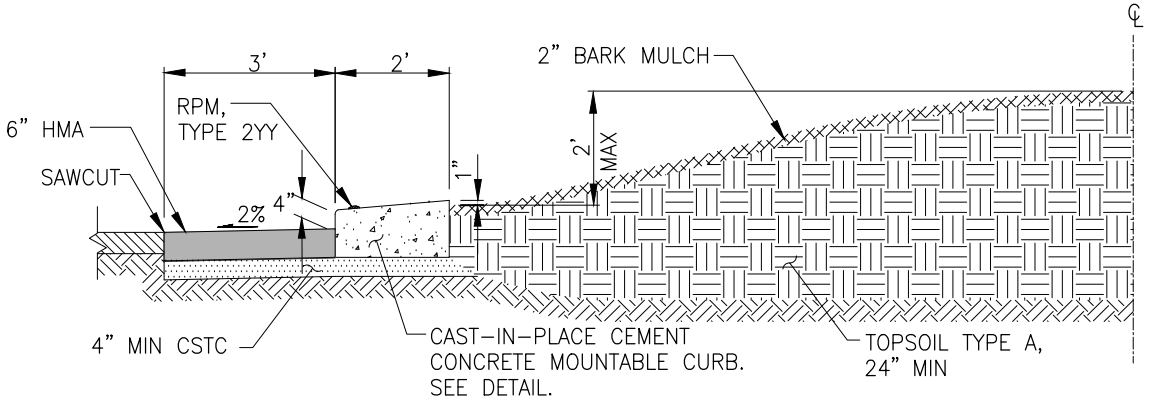


SIGNING LOCATIONS

TYPICAL ON ALL APPROACHS



MOUNTABLE CURB DETAIL



TYPICAL SECTION

NOTES:

1. LANDSCAPING TO BE APPROVED BY THE PUBLIC WORKS DIRECTOR.
2. MONUMENT PROTECTION/PRESERVATION: RAISE ALL MONUMENTS TO GRADE IN APPROPRIATE CASING. SEE STANDARD DRAWING DM.H1.1. ADJUSTED SURVEY SHALL BE FILLED WITH KING COUNTY.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

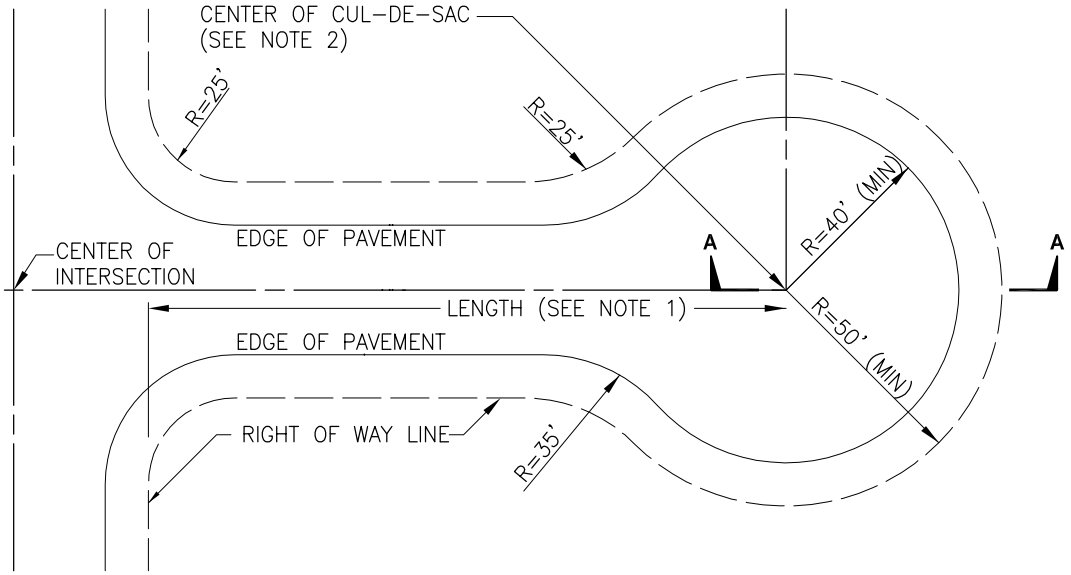
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

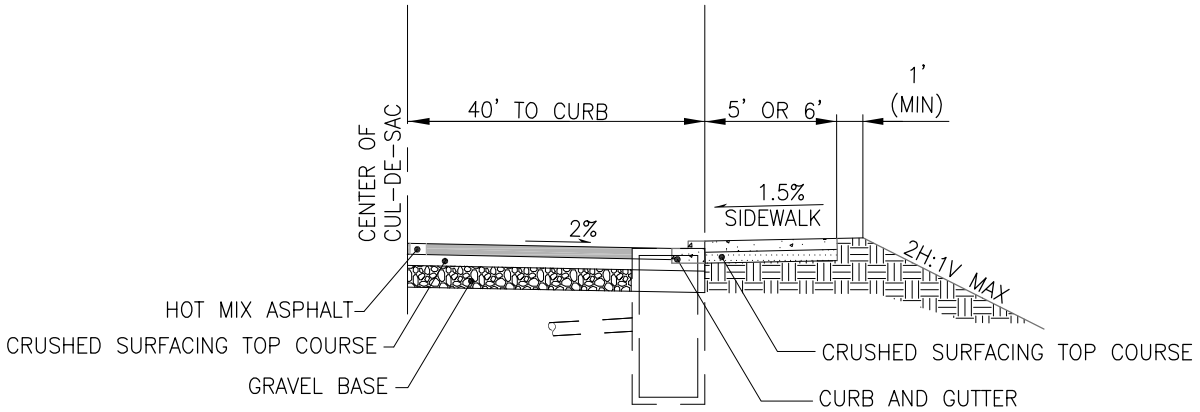
SAILS WITH PRIDE

TRAFFIC CIRCLE DETAILS

DM.A8.3

REVISED: 02/23





TYPICAL SECTION A-A

REFER TO STANDARD DRAWING DM.A5.1
FOR PAVEMENT SECTION DETAILS.

NOTES:

1. LENGTH MEASURED ALONG CENTER LINE:
   MINIMUM = 100 FEET
   MAXIMUM = 400 FEET
2. STANDARD MONUMENT TO BE INSTALLED AT THE CENTER OF THE CUL-DE-SAC. SEE STANDARD DRAWING DM.F1.1.
3. NO DRIVE THROUGH CUL-DE-SACS ALLOWED.
4. LANDSCAPED CENTER ISLAND MAY BE PROVIDED.
5. MAXIMUM RADIUS OF ISLAND IS 10'. ISLAND SHALL HAVE CEMENT CONCRETE TRAFFIC CURB.

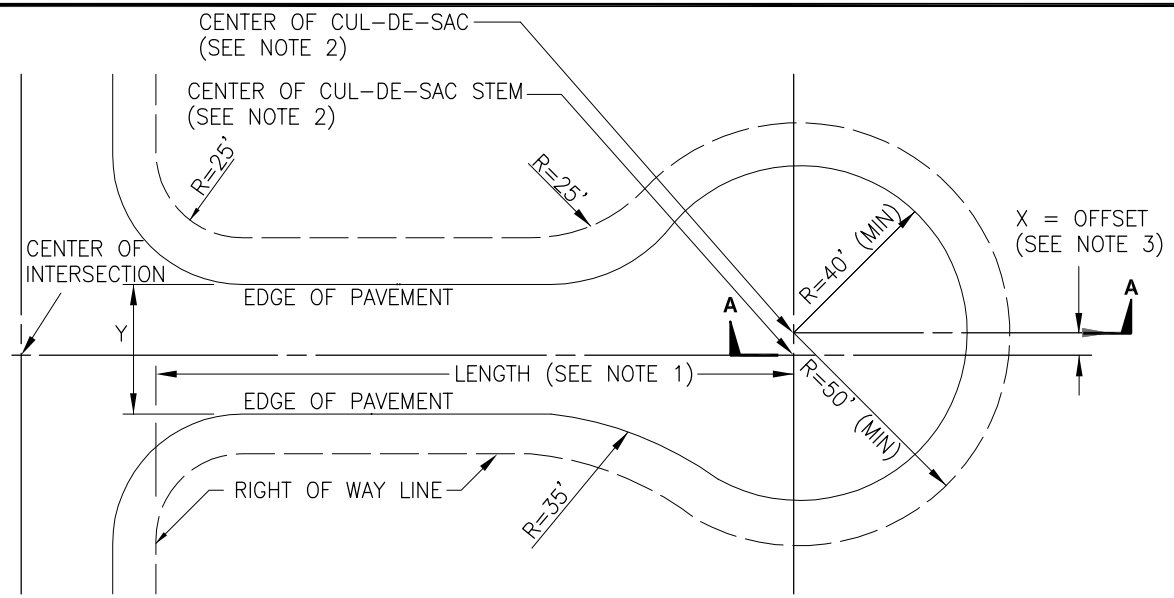
NOT TO SCALE

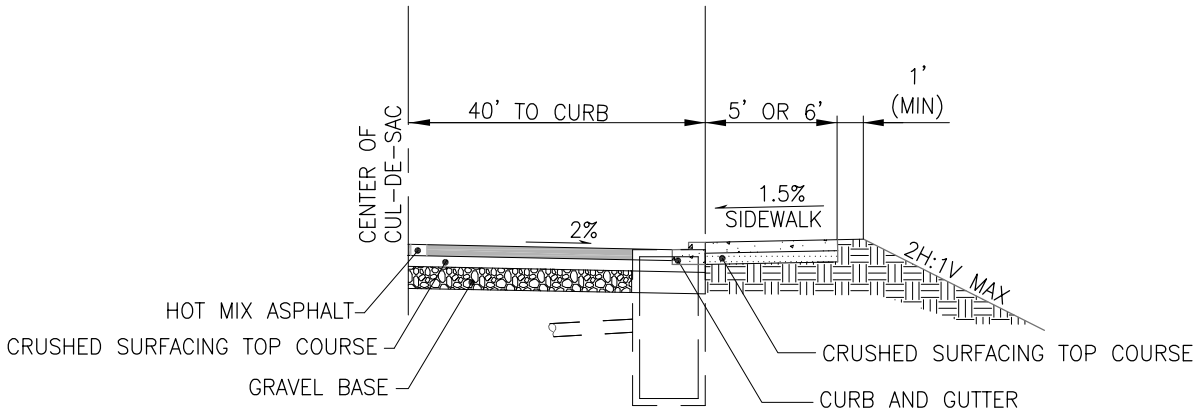
CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

CUL-DE-SAC TURN AROUND

DM.A9.1

REVISED: 02/23





TYPICAL SECTION A-A

REFER TO STANDARD DRAWING DM.A5.1
FOR PAVEMENT SECTION DETAILS.

NOTES:

1. LENGTH MEASURED ALONG CENTER LINE:
   MINIMUM = 100 FEET
   MAXIMUM = 400 FEET
2. STANDARD MONUMENT TO BE INSTALLED AT BOTH THE CENTER OF THE CUL-DE-SAC AND AT THE OFFSET POINT ON THE CENTERLINE OF THE STEM. SEE STANDARD DRAWING DM.F1.1.
3. MAXIMUM OFFSET:X = 40-Y/2 LANDSCAPED CENTER ISLAND MAY BE PROVIDED.
4. MAXIMUM RADIUS OF ISLAND IS 10'. ISLAND SHALL HAVE CENMENT CONCRETE TRAFFIC CURB.

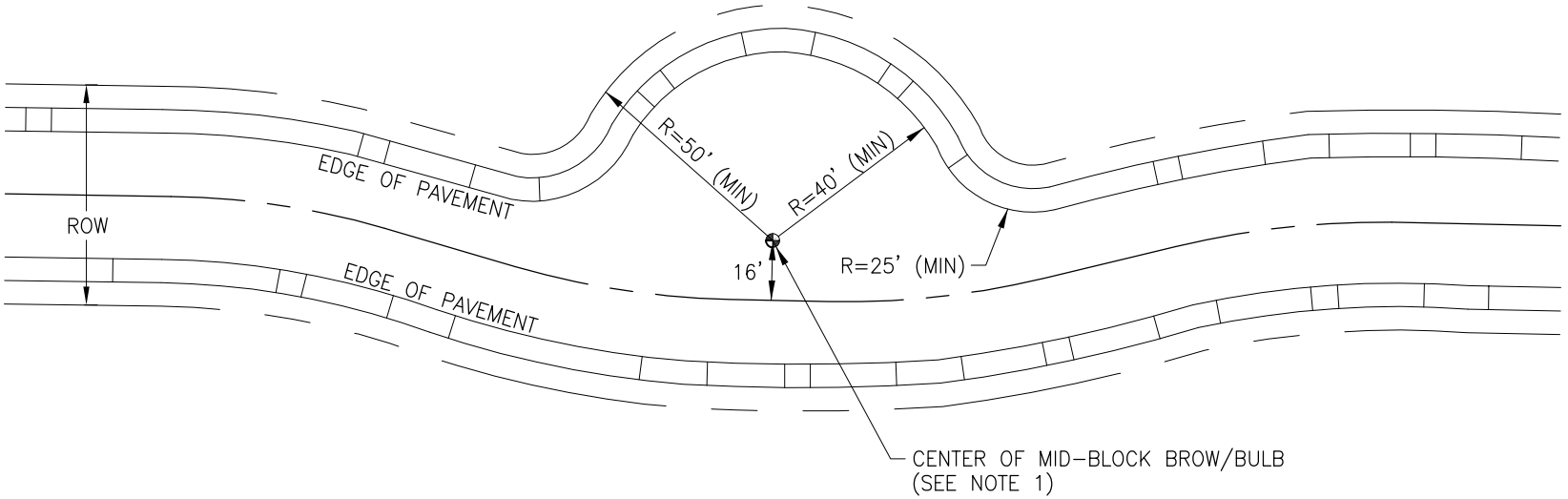
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

CUL-DE-SAC TURN AROUND WITH OFFSET

DM.A9.2

REVISED: 02/23



NOTES:

1. STANDARD MONUMENT TO BE INSTALLED AT THE CENTER OF THE BROW/BULB. SEE STANDARD DRAWING DM.F1.1.
2. FOR CEMENT CONCRETE SIDEWALK, SEE WSDOT STD PLAN F-30.10-04.
3. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

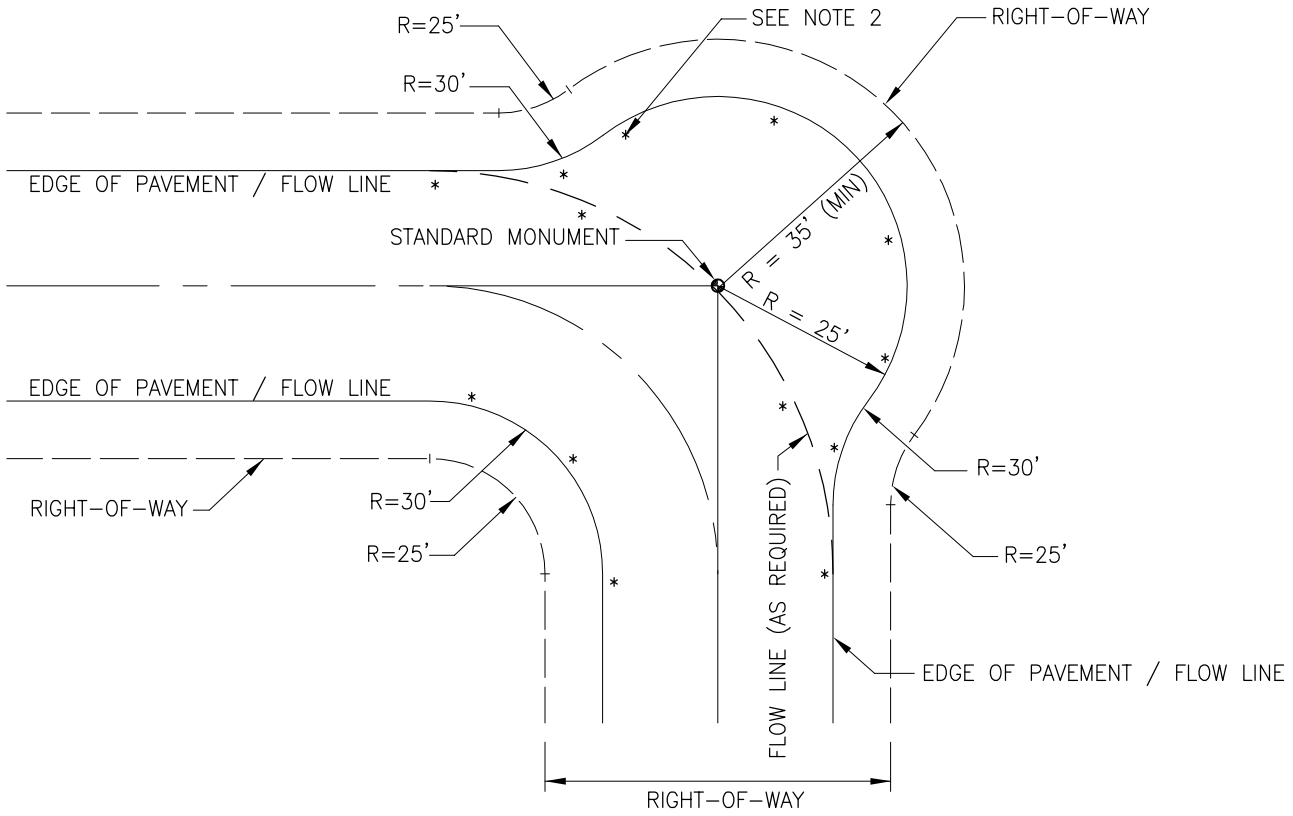
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

MID-BLOCK BROW/BULB

DM.A9.3

REVISED: 02/23



NOTES:

1. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F-10.12-04.
2. FLOW LINE ELEVATIONS REQUIRED ON PLANS AT * LOCATIONS.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

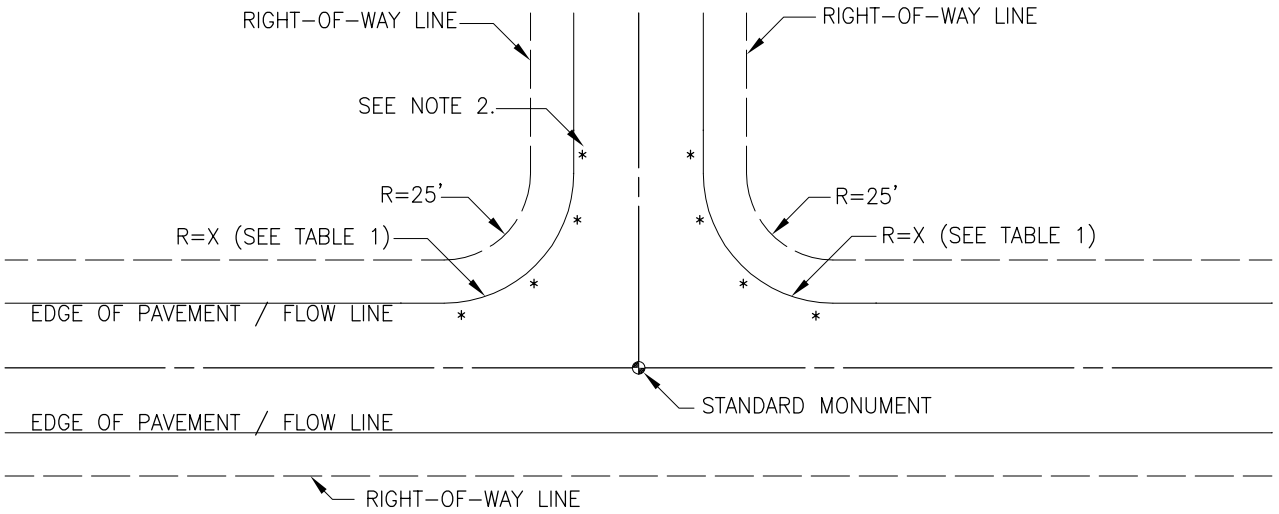
SAILS WITH PRIDE

ELBOW INTERSECTION

DM.A9.4

REVISED: 02/23

TABLE 1	
FUNCTIONAL CLASSIFICATION	**RADIUS (X)**
PRINCIPAL ARTERIAL	35' – 50'
MINOR ARTERIAL	35'
COLLECTOR ARTERIAL	30'
NEIGHBORHOOD COLLECTOR	25'
LOCAL ROAD	25'
BASED ON HIGHEST CLASSIFICATION OF INTERSECTING ROADWAYS	



NOTES:

1. FOR CEMENT CONCRETE CURBS, SEE WSDOT STD PLAN F–10.12–04.
2. FLOW LINE ELEVATIONS REQUIRED ON PLANS AT * LOCATIONS.
3. SEE STANDARD DRAWING DM.F1.1 FOR STANDARD MONUMENT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

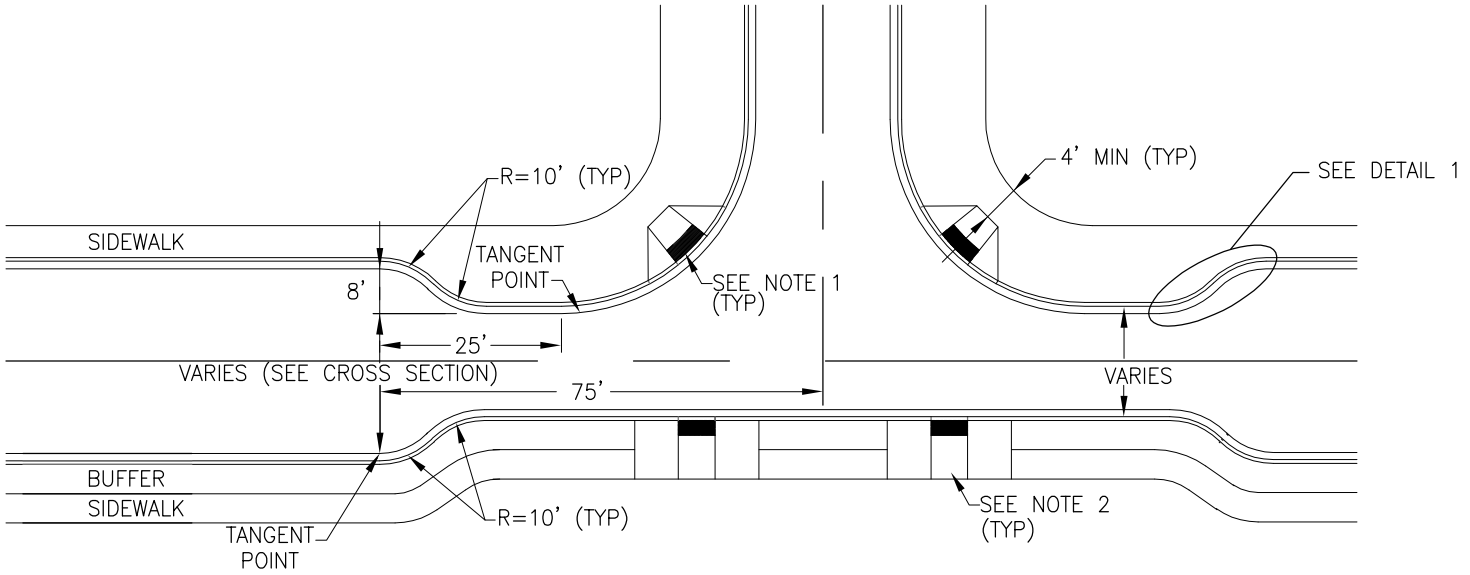
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

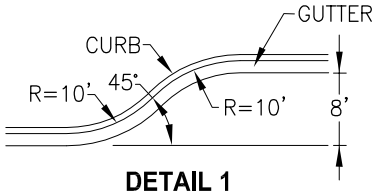
SAILS WITH PRIDE

TYPICAL INTERSECTION RADIUS

DM.A9.5

REVISED: 02/23





DETAIL 1

NOTES:

1. WSDOT PERPENDICULAR CURB RAMP. RAMP IS TYPICALLY LOCATED AT MIDPOINT OF RADIUS.
2. WSDOT PARALLEL CURB RAMP. RAMP IS TYPICALLY LOCATED AT MIDPOINT OF RADIUS.
3. ON STREET PARKING CAN BE ON ONE SIDE, OR BOTH SIDES. REFER TO SPECIFIED CROSS SECTION.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

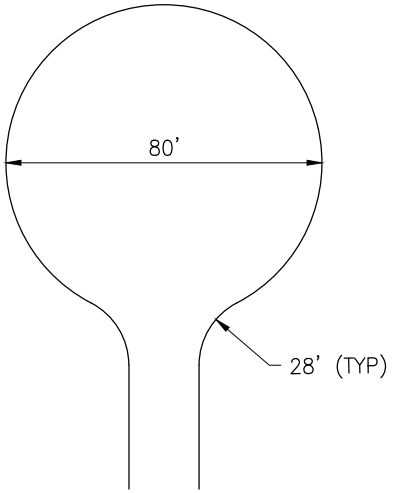
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

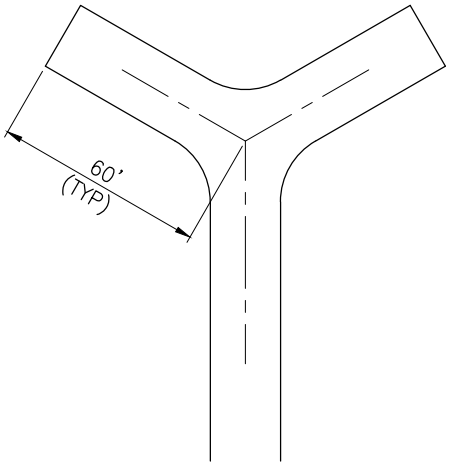
T INTERSECTION WITH PARALLEL PARKING

DM.A9.6

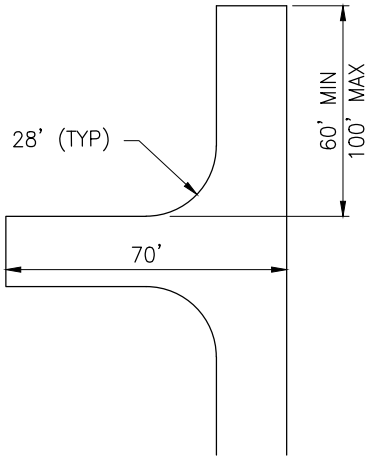
REVISED: 02/23



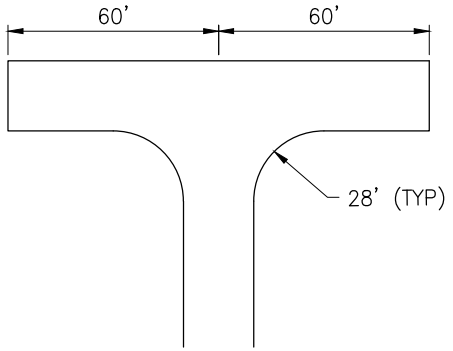
80' DIAMETER CUL-DE-SAC



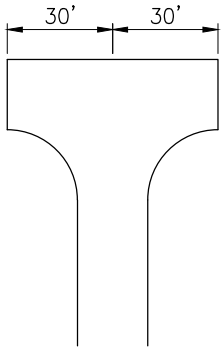
ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



120' HAMMERHEAD



60' HAMMERHEAD

NOTES:

1. ALTERNATIVE TURN-A-ROUNDS MAY BE CONSIDERED THAT ALLOW FOR SAFE TURN-A-ROUND OF A SU30 DESIGN VEHICLE.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

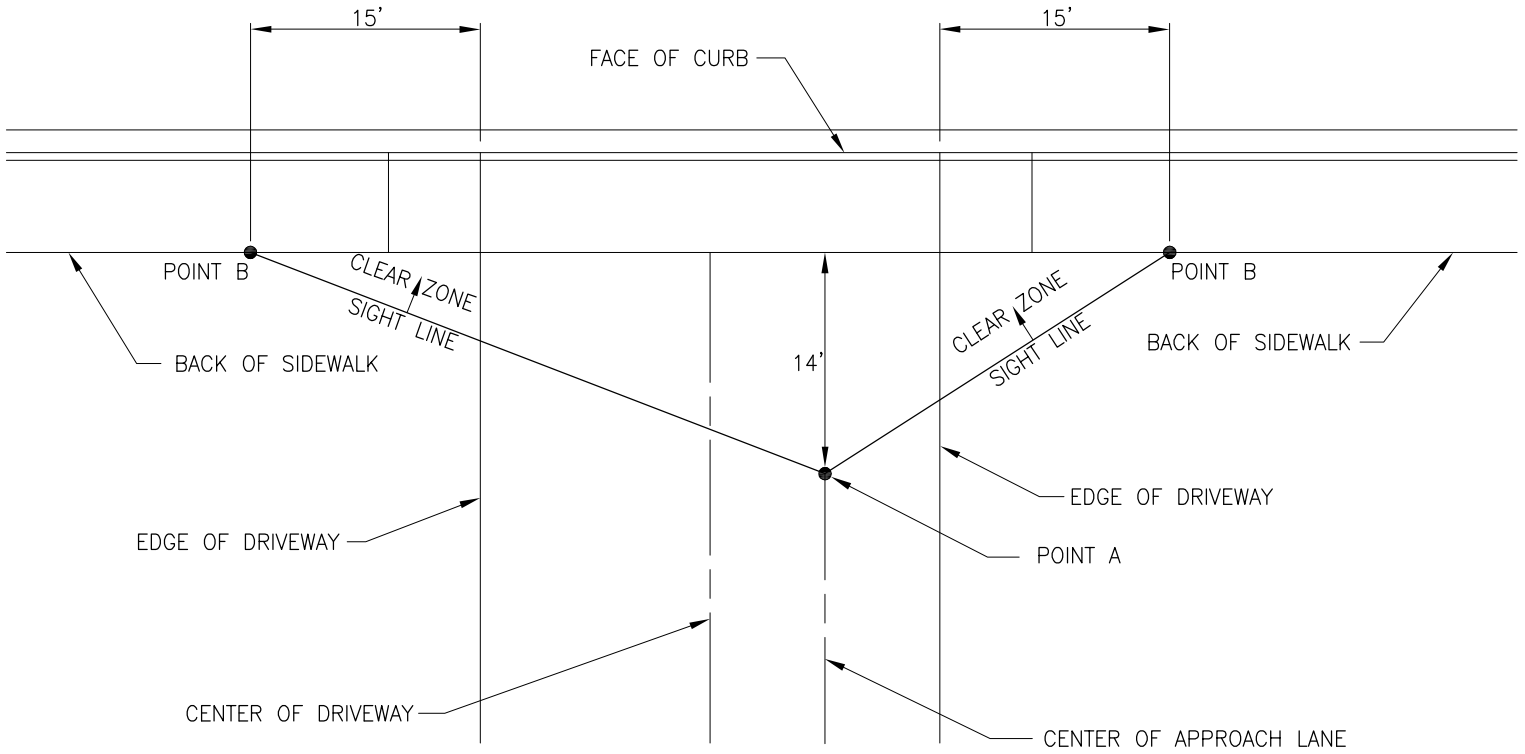
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

DEAD END PRIVATE ROAD REQUIREMENTS

DM.A9.7

REVISED: 02/23



NOTES:

1. SEE STREET DESIGN AND CONSTRUCTION STANDARDS SECTION 6.7.5 AND 6.7.6.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

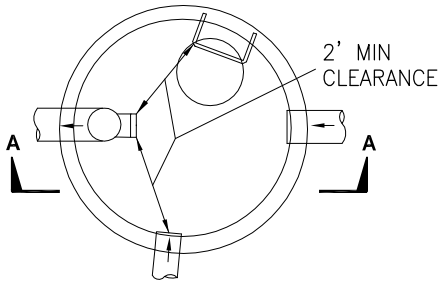
PEDESTRIAN SIGHT LINES

DM.A10.1

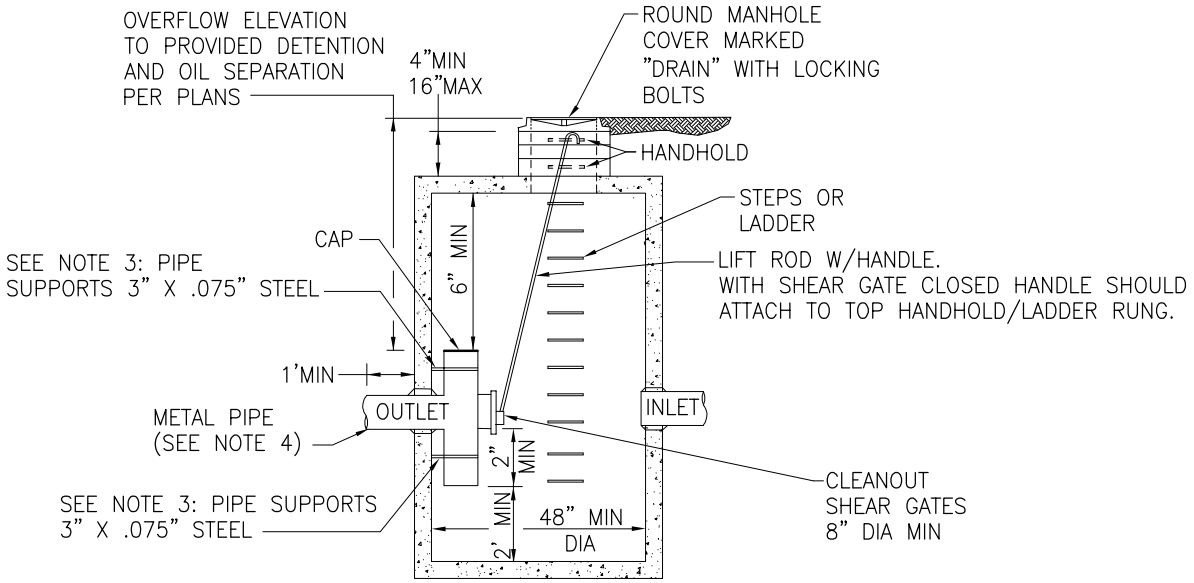
REVISED: 02/23

NOTES:

1. SEE STANDARD DRAWING DM.B1.3 FOR NOTES.
2. NO GALVANIZED MATERIAL ALLOWED.



PLAN VIEW



TYPE 2 CATCH BASIN
SECTION A-A

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

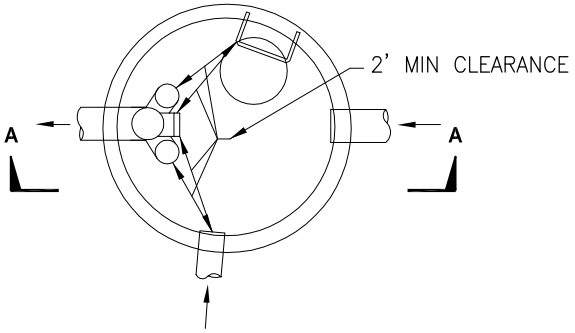
OIL POLLUTION CONTROL CATCH BASIN

DM.B1.1

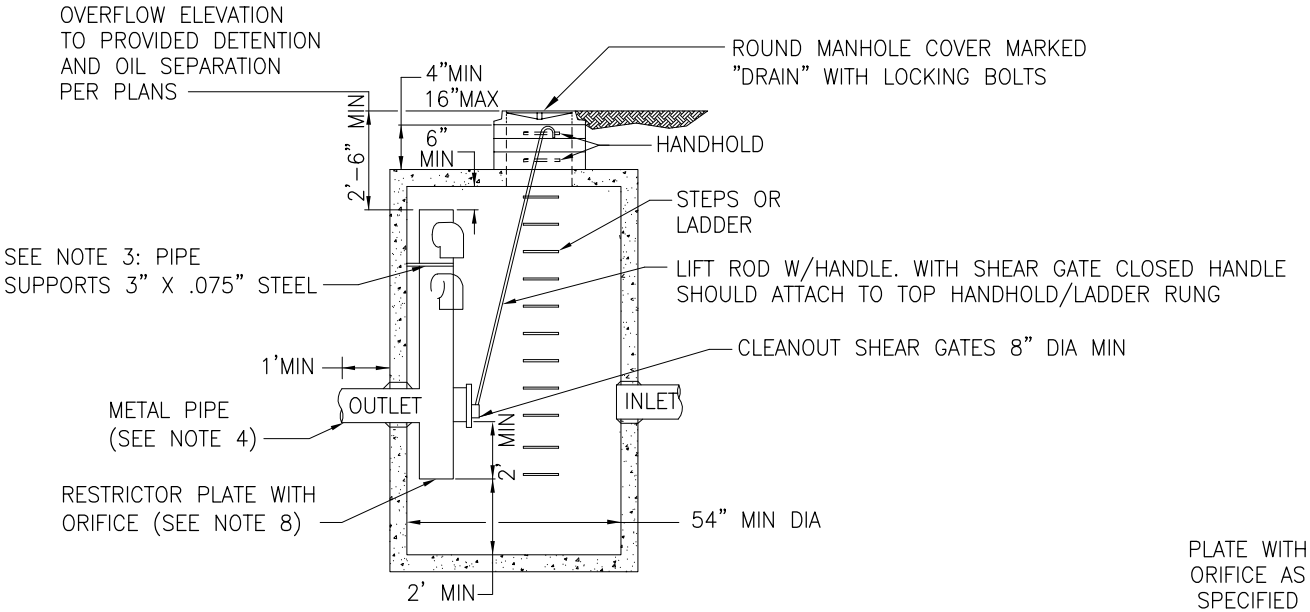
REVISED: 02/23

NOTES:

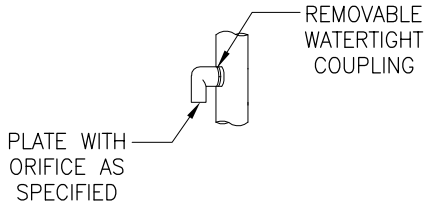
1. SEE STANDARD DRAWING DM.B1.3 FOR NOTES.
2. NO GALVANIZED MATERIAL ALLOWED.



PLAN VIEW



SECTION A-A



ELBOW DETAIL

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

FLOW RESTRICTOR/OIL POLLUTION CONTROL T-RESTRICTOR

DM.B1.2

REVISED: 02/23

NOTES:

1. EXCEPT AS SHOWN OR NOTED, UNITS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS FOR CATCH BASIN TYPE 2 54" MINIMUM DIAMETER.
2. FOR DETAILS SHOWING GRADE RING, LADDER, STEPS, HANDHOLDS AND TOP SLABS, SEE MISCELLANEOUS DETAILS FOR DRAINAGE STRUCTURES, WSDOT STANDARD PLAN B-30.90-02.
3. THE RESTRICTOR/SEPARATOR AND PIPE SUPPORTS SHALL BE OF THE SAME MATERIAL AND SHALL BE FABRICATED FROM 0.060" ALUMINUM OR 0.064" ALUMINIZED STEEL PIPE IN ACCORDANCE WITH AASHTO M 36, M 196, M197 AND M274. NO GALVANIZED MATERIAL ALLOWED.
4. OUTLET SHALL BE CONNECTED TO CULVERT OR SEWER PIPE WITH A STANDARD COUPLING BAND FOR CORRUGATED METAL PIPE OR GROUTED INTO THE BELL OF CONCRETE PIPE.
5. THE VERTICAL RISER STEM OF THE RESTRICTOR/SEPARATOR SHALL BE THE SAME DIAMETER AS THE HORIZONTAL OUTLET PIPE WITH A 8" MINIMUM SIZE.
6. FRAME AND LADDER OR STEPS TO BE OFFSET SO THAT
   (1) CLEANOUT GATE IS VISIBLE FROM TOP.
   (2) CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
   (3) FRAME IS CLEAR OF CURB (IF ANY EXIST).
7. MULTI-ORIFICE ELBOWS MAY BE LOCATED AS SHOWN ON ONE SIDE OF RISER TO ASSURE LADDER CLEARANCE. SIZE OF ELBOWS TO BE DETERMINED BY THE ENGINEER.
8. RESTRICTOR PLATE WITH ORIFICE AS SPECIFIED IN THE PLANS. OMIT PLATE IF ONLY FOR POLLUTION CONTROL. SPECIFIED OPENING TO BE CUT ROUND AND SMOOTH.
9. CLEANOUT GATE/SHEAR GATE: ALUMINUM ALLOY PER ASTM B26-ZG32A OR CAST IRON ASTM A48 CLASS 30B AS REQUIRED. LIFT HANDLE EITHER SOLID OR TUBING WITH ADJUSTABLE HOOK AS REQUIRED. NEOPRENE RUBBER GASKETS REQUIRED BETWEEN FLANGES.
10. ALTERNATE CLEANOUT GATES/SHEAR GATES TO THE DESIGN SHOWN ON STANDARD DRAWING DM.B2.5 ARE ACCEPTABLE PROVIDED THEY MEET THE MATERIAL SPECIFICATIONS ABOVE AND HAVE A SIX BOLT, 10 3/8" BOLT CIRCLE FOR BOLTING TO THE FLANGE CONNECTION. 5/8" DIAMETER STAINLESS STEEL EXPANSION BOLTS SHALL BE USED.
11. RESTRICTOR TEES MAY BE FABRICATED (EXTRUSION WELDED) FROM DOUBLE WALLED (SMOOTH INTERIOR) CORRUGATED POLYETHYLENE PIPE MEETING THE REQUIREMENTS OF SECTION 5-04.H OF THESE STANDARDS. PIPE SUPPORTS FOR RESTRICTOR SHALL BE FABRICATED FROM THOSE MATERIALS LISTED IN NOTE 3 ABOVE. THE OUTLET SHALL BE CONNECTED TO CULVERT OR SEWER PIPE WITH A PREMIUM COUPLING, BY USING A HEAT SHRINK ADAPTER TO OTHER TYPES OF PIPE, OR BY FABRICATING A SMOOTH OR TAPERED OUTLET TO SLIP INSIDE OF THE CULVERT OR SEWER PIPE.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

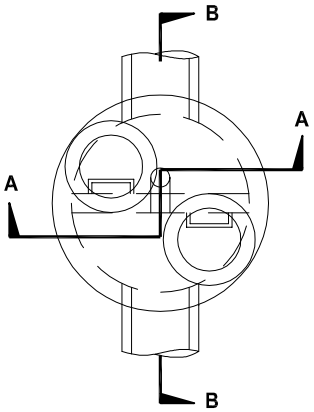
FLOW RESTRICTOR/OIL POLLUTION CONTROL NOTES

DM.B1.3

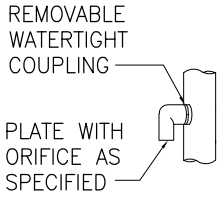
REVISED: 02/23

NOTES:

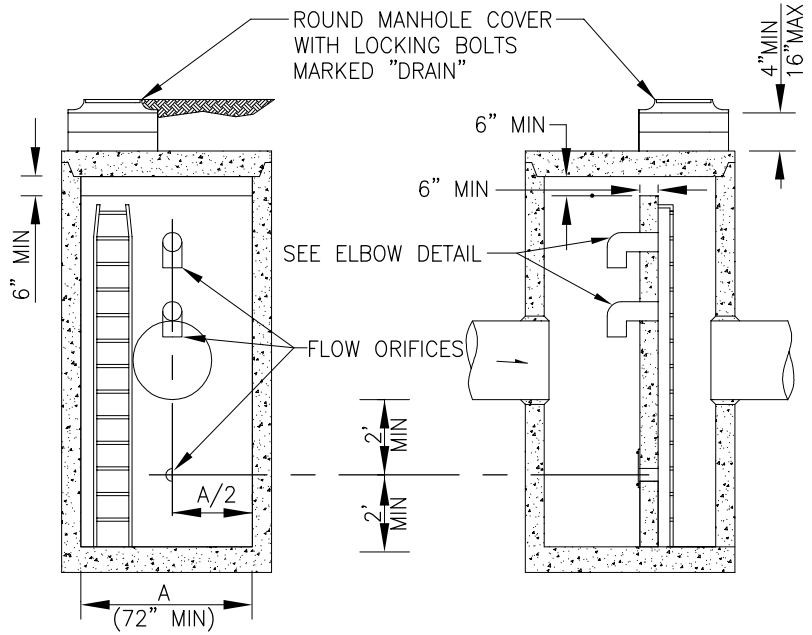
1. PIPE SIZE, SLOPES AND ALL ELEVATIONS: PER PLANS.
2. OUTLET CAPACITY: NOT LESS THAN COMBINED INLETS.
3. CATCH BASIN: TYPE 2, TO BE CONSTRUCTED IN ACCORDANCE WITH WSDOT STANDARD PLANS AND AASHTO M199 UNLESS OTHERWISE SPECIFIED.
4. COVERS: ROUND, SOLID MARKED "DRAIN," WITH LOCKING BOLTS SEE WSDOT STANDARD PLANS.
5. ORIFICES: SIZED AND LOCATED AS REQUIRED, WITH LOWEST ORIFICE MIN. 2 FT. FROM BASE.
6. BAFFLE WALL SHALL HAVE #4 BAR AT 12 IN. SPACING EACH WAY.
7. PRECAST BAFFLE WALL SHALL BE KEYED AND GROUTED IN PLACE.
8. BOTTOM ORIFICE PLATE TO BE 1/4 IN. MIN. NON–GALVANIZED CORROSIVE RESISTANT MATERIAL AND ATTACHED WITH 1/2 IN. STAINLESS STEEL BOLTS. OMIT ORIFICE PLATE IF ONLY FOR OIL SEPARATION.
9. UPPER FLOW ORIFICE SHALL BE ALUMINUM, OR ALUMINIZED STEEL. NO GALVANIZED MATERIAL ALLOWED.



PLAN



ELBOW DETAIL



SECTION A-A **SECTION B-B**

ELEVATION

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

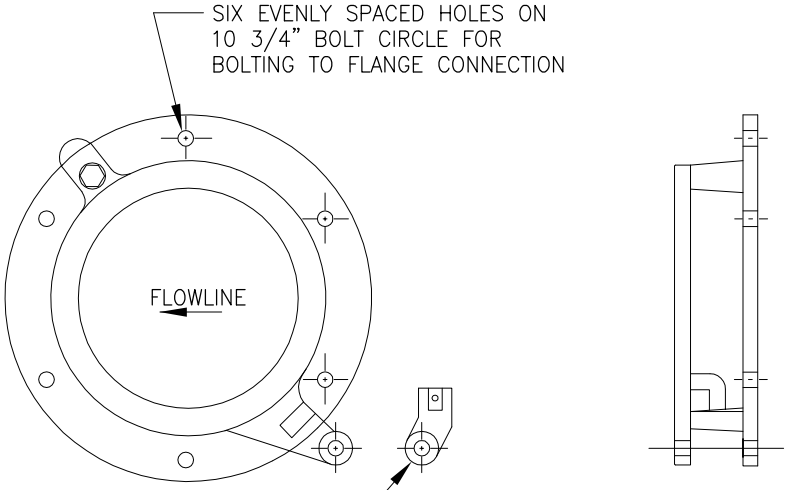
FLOW RESTRICTOR CONTROL DEVICE BAFFLE TYPE

DM.B1.4

REVISED: 02/23

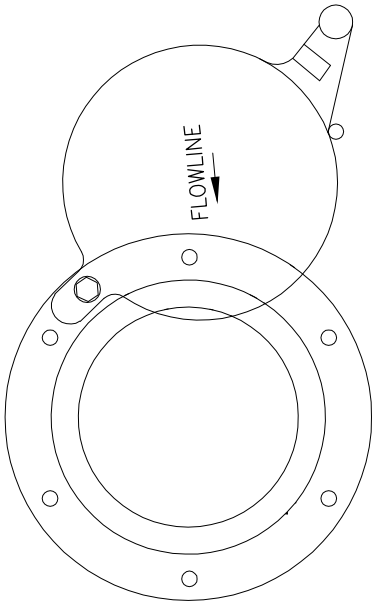
CLEANOUT / SHEAR GATE

ALTERNATES ARE ACCEPTABLE PROVIDED MATERIAL SPECIFICATIONS ARE MET AND FLANGE BOLT PATTERN MATCHES.



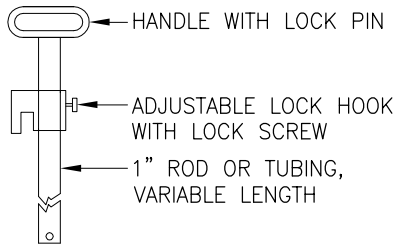
FRONT

SIDE



MAXIMUM OPENING OF GATE

WSDOT STD PLAN B-10.40-01



LIFT HANDLE

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

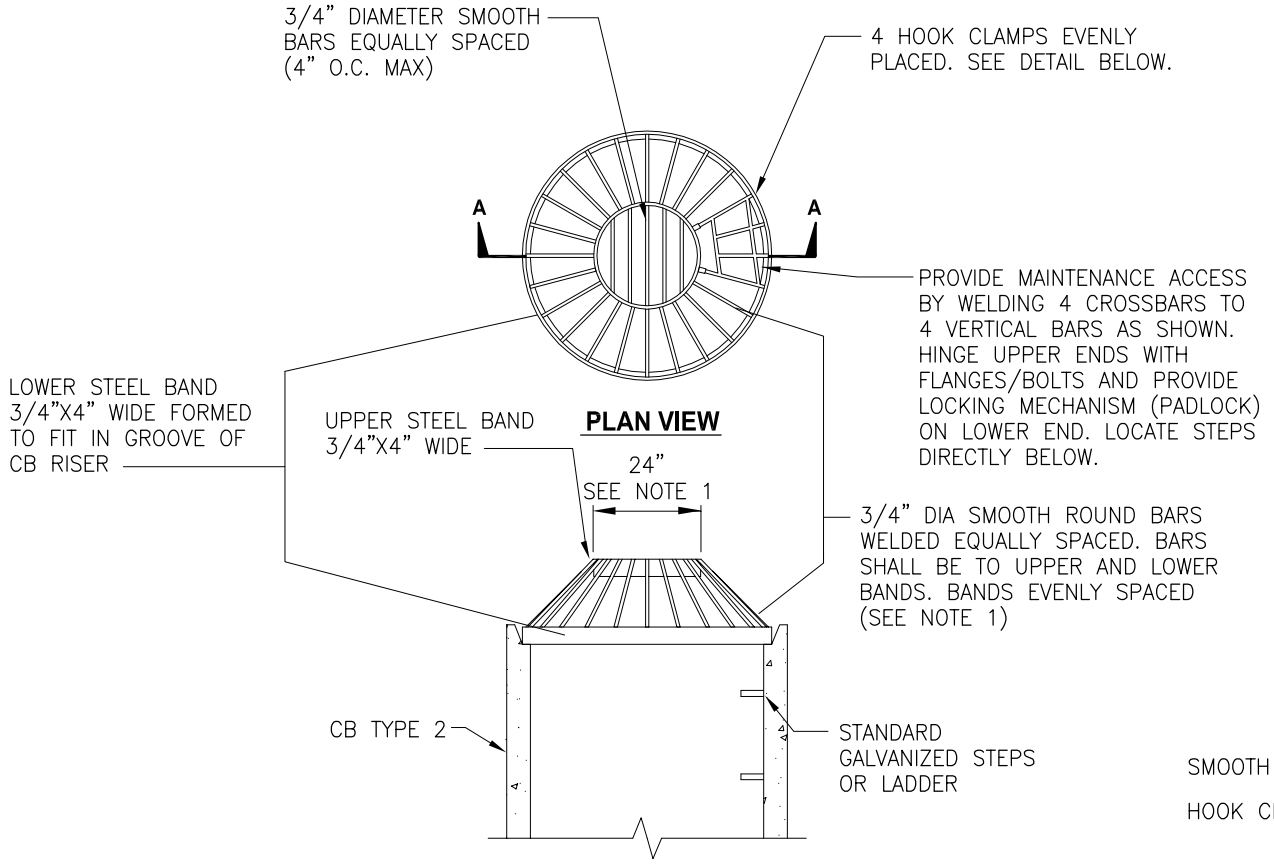
FLOW RESTRICTOR/OIL POLLUTION CONTROL DETAIL

DM.B1.5

REVISED: 02/23

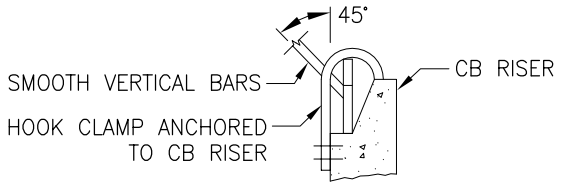
NOTES:

1. DIMENSIONS ARE FOR ILLUSTRATION ON 54 IN. DIAMETER CB. FOR DIFFERENT DIAMETER CB'S, ADJUST TO MAINTAIN 45° ANGLE ON "VERTICAL" BARS AND 4 IN. O.C. MAXIMUM SPACING OF BARS AROUND LOWER STEEL BAND.
2. METAL PARTS MUST BE CORROSION RESISTANT, STEEL BARS MUST BE GALVANIZED.
3. THIS DEBRIS BARRIER IS ALSO RECOMMENDED FOR USE ON THE INLET TO ROADWAY CROSS–CULVERTS WITH HEIGHT POTENTIAL FOR DEBRIS COLLECTION (EXCEPT ON TYPE 2 STREAMS)
4. USE OF THIS STRUCTURE WITHIN THE ROAD RIGHT–OF–WAY SHALL MEET THE MINIMUM CLEAR ZONE REQUIREMENTS.



PLAN VIEW

SECTION A-A



DETAIL HOOK CLAMP

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

DEBRIS CAGE

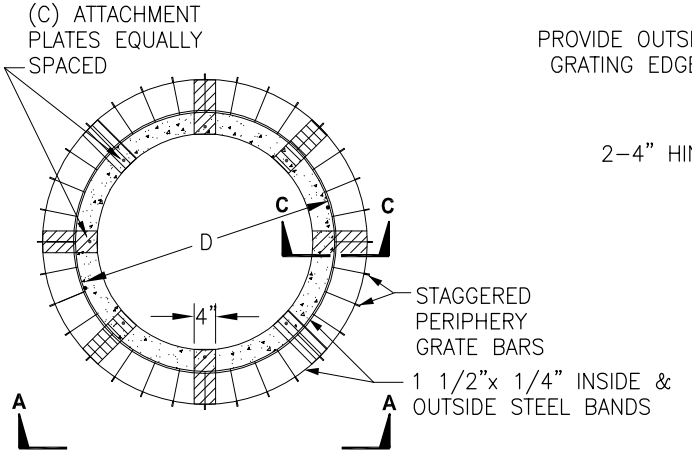
DM.B1.6

REVISED: 02/23

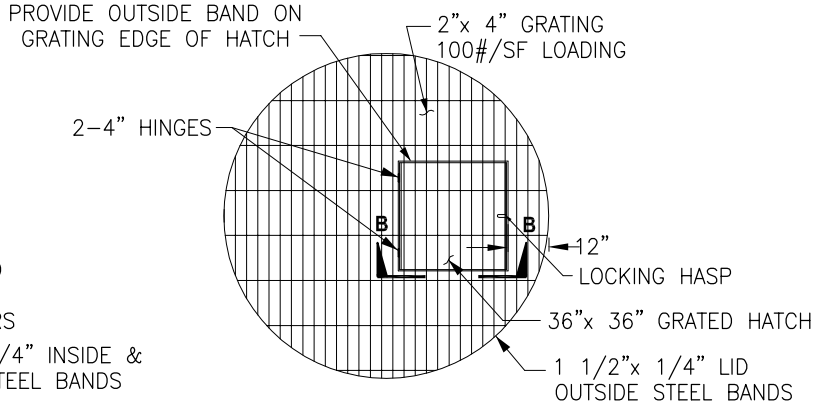
NOTES:

1. ALL PARTS OF THE CAGE SHALL BE ALUMINUM, ALUMINIZED STEEL OR STAINLESS STEEL AND JOINTS WELDED. NO GALVANIZED MATERIAL ALLOWED. IN ADDITION WHERE SPECIFIED, DEBRIS CAGE SHALL BE SHOP PAINTED FLAT BLACK.
2. UNLESS INDICATED OTHERWISE, ALL BANDS AND BARS SHALL BE 1 1/2" X 1/4".
3. GRATED LID SHALL BE CONSTRUCTED TO WITHSTAND A 100 PSF LOADING.

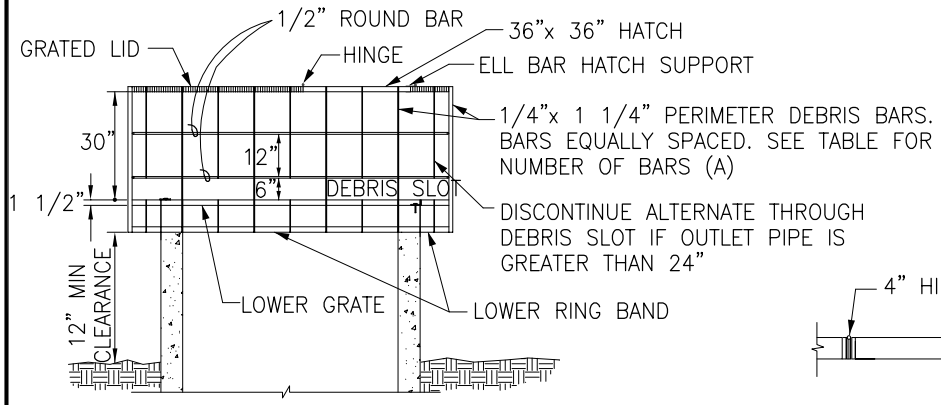
TABLE OF VARIABLES				
CB DIA. INSIDE	No. OF BARS (A)	(B)	No. OF ATTACHMENT PLATES (C)	(D)
48"	26	8"	4	60"
54"	29	8"	6	67"
60"	32	10"	6	74"
72"	39	12"	8	88"
96"	50	12"	8	116"



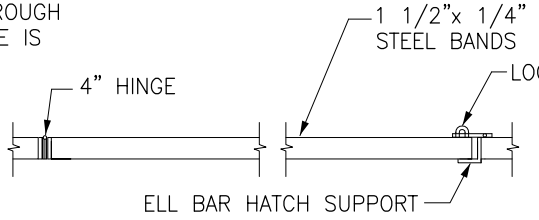
LOWER GRATING PLAN



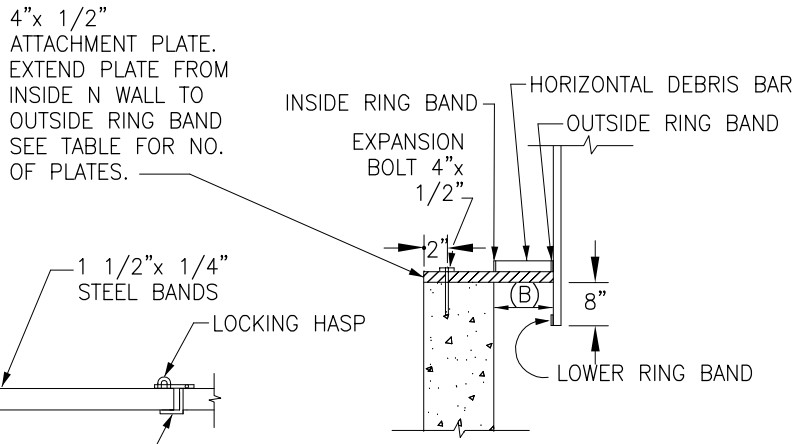
GRATED LID



SECTION A-A



SECTION B-B



SECTION C-C

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

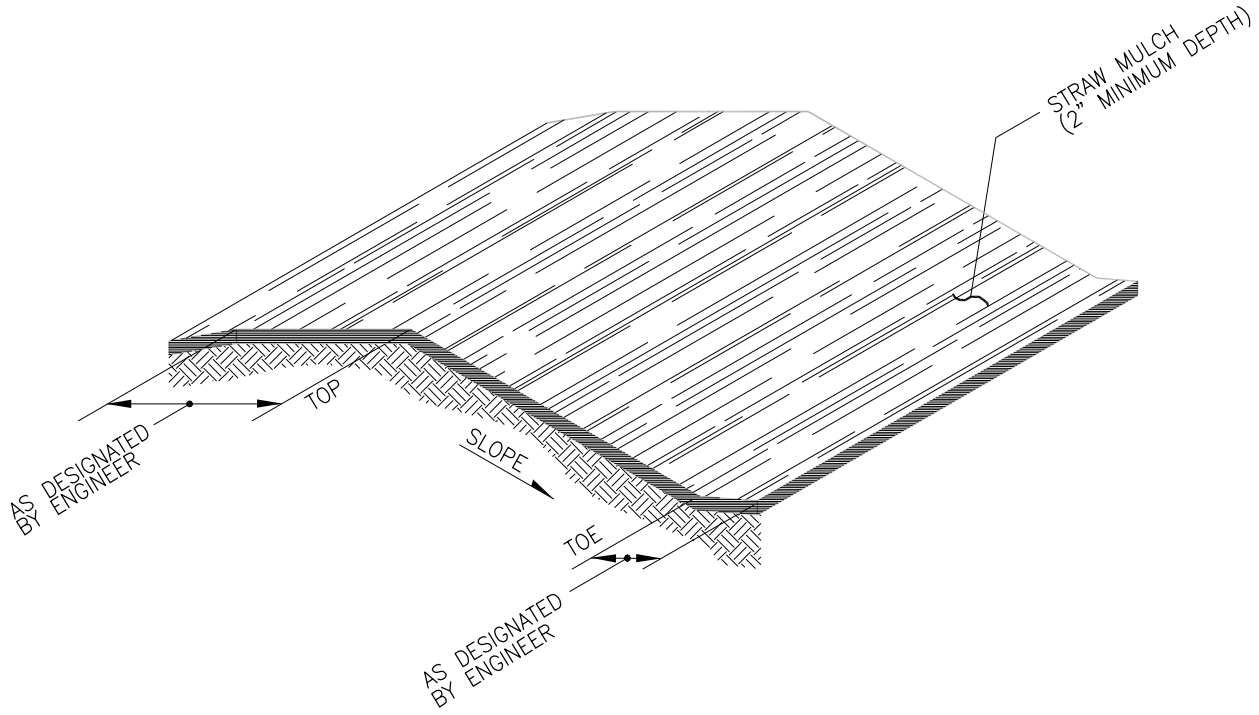
EXTENDED DEBRIS CAGE

DM.B1.7

REVISED: 02/23

NOTES:

1. STRAW MUST BE ANCHORED DOWN BY ONE OF THE FOLLOWING METHODS:
A. CRIMPING, DISKING, ROLLING, OR PUNCHING INTO THE SOIL.
B. COVERING WITH NETTING.
C. SPRAYING WITH A CHEMICAL OR FIBER BINDER (TACKIFIER).
D. MOISTENING



NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

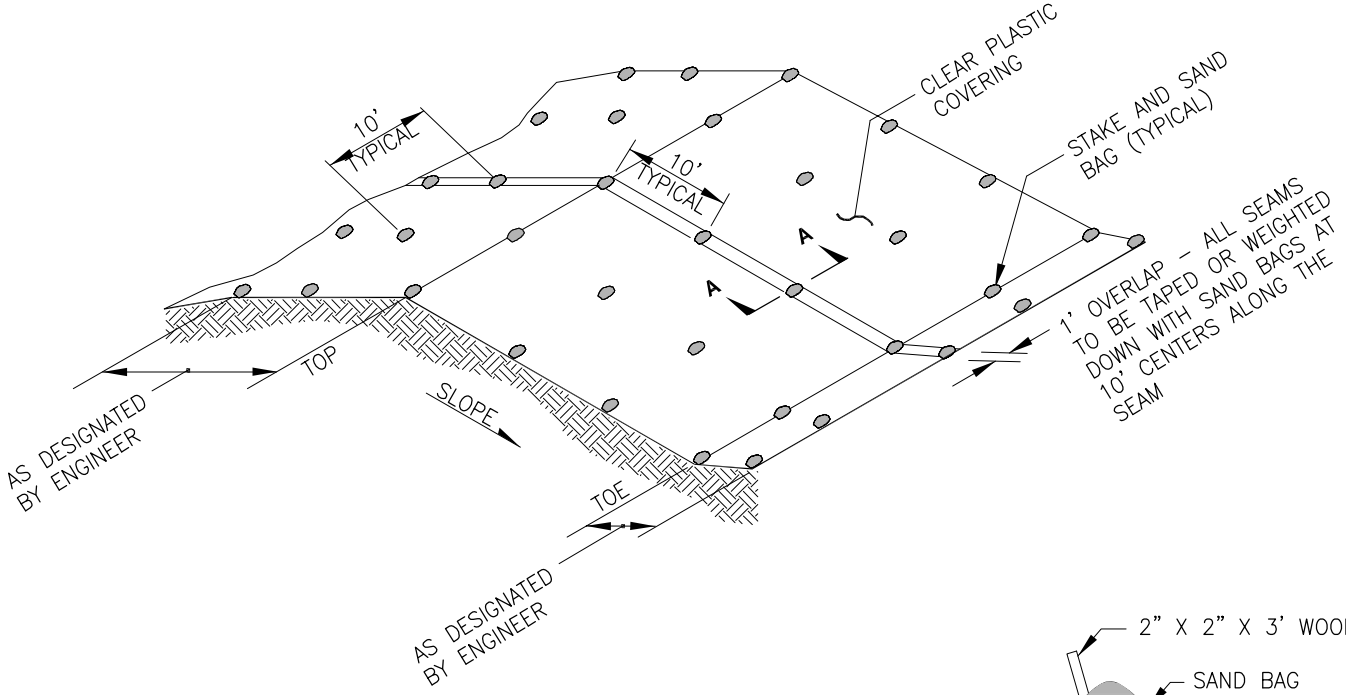
STRAW MULCH

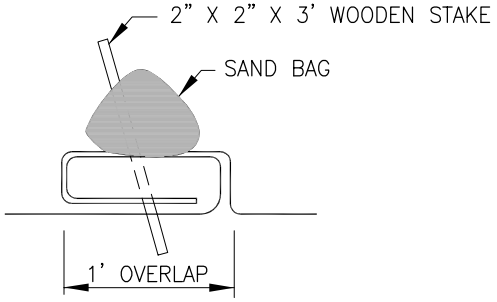
DM.B2.1

REVISED: 02/23

NOTES:

1. SEE WSDOT STANDARD SPECIFICATIONS SECTION 8-01.3(5).





SECTION A-A
OVERLAP DETAIL

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

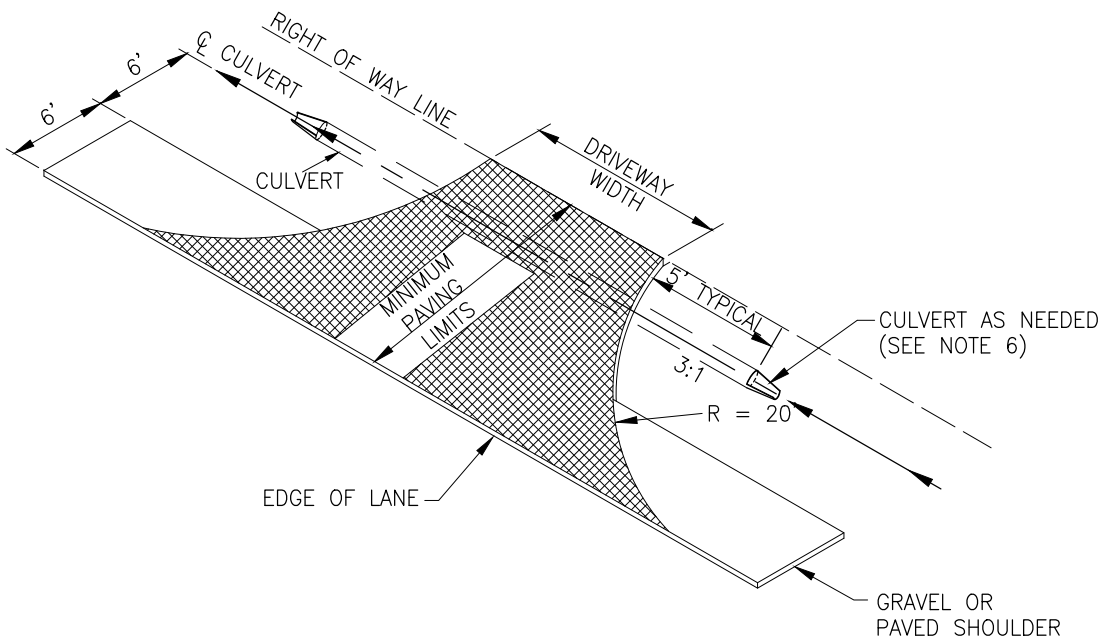
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

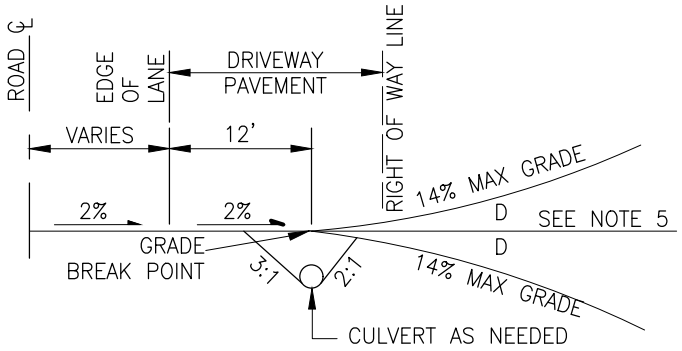
SAILS WITH PRIDE

PLASTIC COVERING

DM.B2.2

REVISED: 02/23

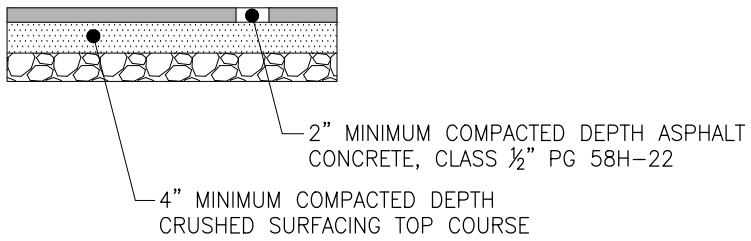




CROSS SECTION

NOTES:

1. DRIVEWAY WIDTH = 12' MINIMUM TO 24' MAXIMUM. DRIVEWAY WIDTH OF FLAG LOTS IS 20' MINIMUM.
2. RAISED EDGE MAY BE REQUIRED ALONG FLOW LINE AT EDGE OF LANE. SEE DM.C5.1.
3. STORM DRAINAGE FROM DRIVEWAY SHALL NOT BE PERMITTED TO DRAIN ONTO ROADWAY SURFACE, UNLESS ACCOUNTED FOR IN DESIGN, AND APPROVED UNDER A DEVIATION REQUEST.
4. DRIVEWAY SHALL NORMALLY BE AT 90 DEGREES TO ROAD CENTERLINE, BUT CAN VARY FROM 75 DEGREES TO 105 DEGREES.
5. A VERTICAL CURVE SHALL BE CONSTRUCTED TO TRANSITION THE LANDING TO THE ACCESS APPROACH. THE VERTICAL SEPARATION BETWEEN THE CURVE AND A 10–FOOT CHORD OF THE CURVE SHALL NOT EXCEED 3.25 INCHES (WHERE D IS POSITIVE) OR 2.00 INCHES (WHERE D IS NEGATIVE).
6. 12" MINIMUM DIA. CONCRETE CULVERT, LENGTH AS DETERMINED BY WIDTH OF DRIVEWAY, PLUS 5' AT EACH END, WITH BEVELED END SECTIONS. PIPE SHALL BE:
   A. SIZED TO CONVEY COMPUTED STORM WATER RUNOFF
   B. MINIMUM 12 INCH DIA.
   C. EQUAL TO OR LARGER THAN EXISTING PIPES WITHIN 500' UPSTREAM. ALL TYPES OF PIPE SHALL HAVE MIN. 12 INCH COVER TO FINISH GRADE.
7. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE PAVING.
8. ALL TYPE OF PIPE SHALL HAVE A MINIMUM OF 12" COVER TO FINISH GRADE. COVER DEPTHS LESS THAN 12 INCHES REQUIRE APPROVAL BY THE ENGINEER.
9. CEMENT CONCRETE DRIVEWAY MAY BE CONSIDERED UNDER A DEVIATION REQUEST.



DRIVEWAY CROSS SECTION WITHIN RIGHT-OF-WAY

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

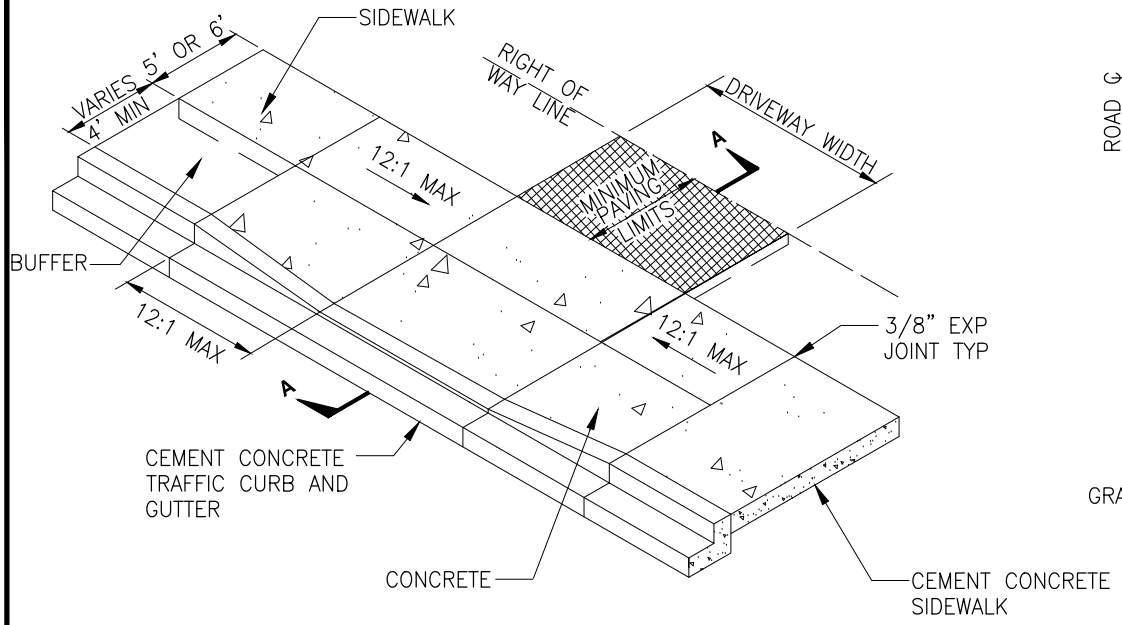
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

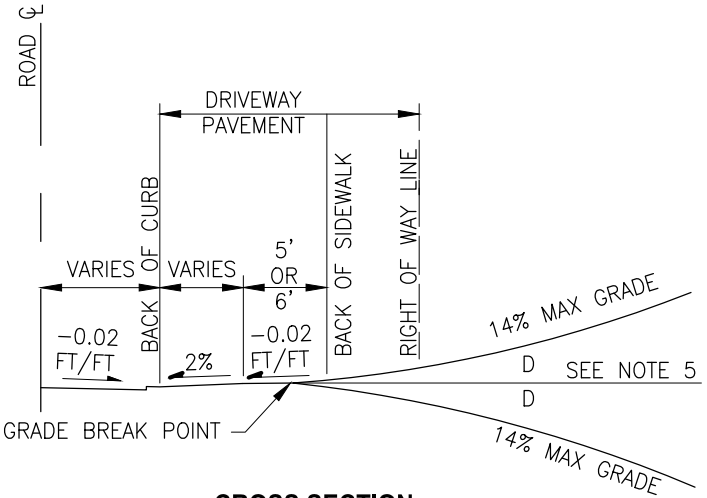
SAILS WITH PRIDE

MINOR DRIVEWAY APPROACH

DM.C1.1

REVISED: 02/23

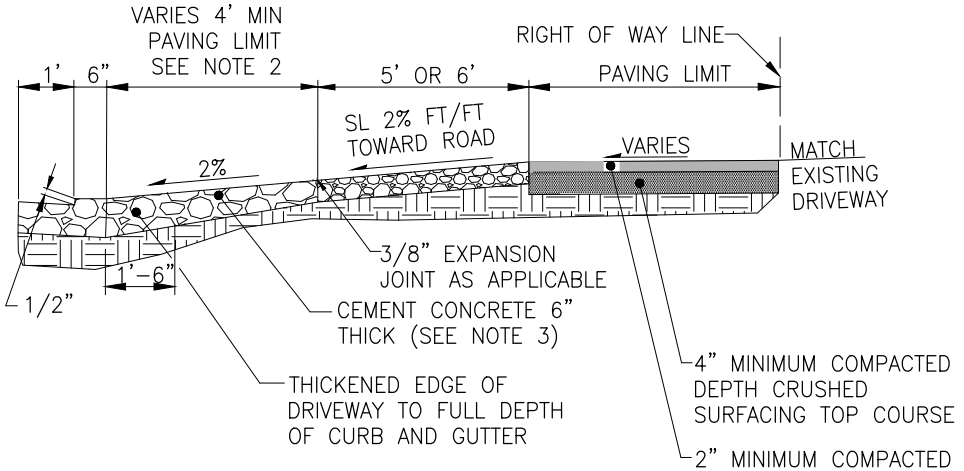




CROSS SECTION

NOTES:

1. DRIVEWAY WIDTH = 12' MINIMUM TO 24' MAXIMUM.
2. DRIVEWAY WIDTH ON FLAG LOTS IS 20' MINIMUM.
3. CEMENT CONCRETE CLASS 3000 FOR RESIDENTIAL USE.
4. DRIVEWAY PAVING = 6" MINIMUM CEMENT CONCRETE IF CEMENT SIDEWALK OR: 2" MINIMUM COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT CL. 1/2" PG 58H–22, OVER 2" MINIMUM COMPACTED DEPTH CRUSHED SURFACING TOP COURSE, IF PAVED WALKWAY. BETWEEN SIDEWALK AND RIGHT OF WAY LINE CAN BE CEMENT CONCRETE IF THE EXISTING DRIVEWAY IS CEMENT CONCRETE.
5. A VERTICAL CURVE SHALL BE CONSTRUCTED TO TRANSITION THE LANDING TO THE ACCESS APPROACH. THE VERTICAL SEPARATION BETWEEN THE CURVE AND A 10–FOOT CHORD OF THE CURVE SHALL NOT EXCEED 3.25 INCHES (WHERE D IS POSITIVE) OR 2.00 INCHES (WHERE D IS NEGATIVE).
6. STORM DRAINAGE FROM DRIVEWAY SHALL NOT BE PERMITTED TO DRAIN ONTO ROADWAY SURFACE, UNLESS ACCOUNTED FOR IN DESIGN, AND APPROVED UNDER A DEVIATION REQUEST.
7. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE PAVING.
8. DRIVEWAY SHALL NORMALLY BE AT 90 DEGREES TO ROAD CENTERLINE, BUT CAN VARY FROM 75 DEGREES TO 105 DEGREES.
9. WHEN ROADWAY PROFILE GRADE EXCEEDS 4%, ADJUST RAMP LENGTHS TO MEET AMERICANS WITH DISABILITIES ACT REQUIREMENTS.



SECTION A-A

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

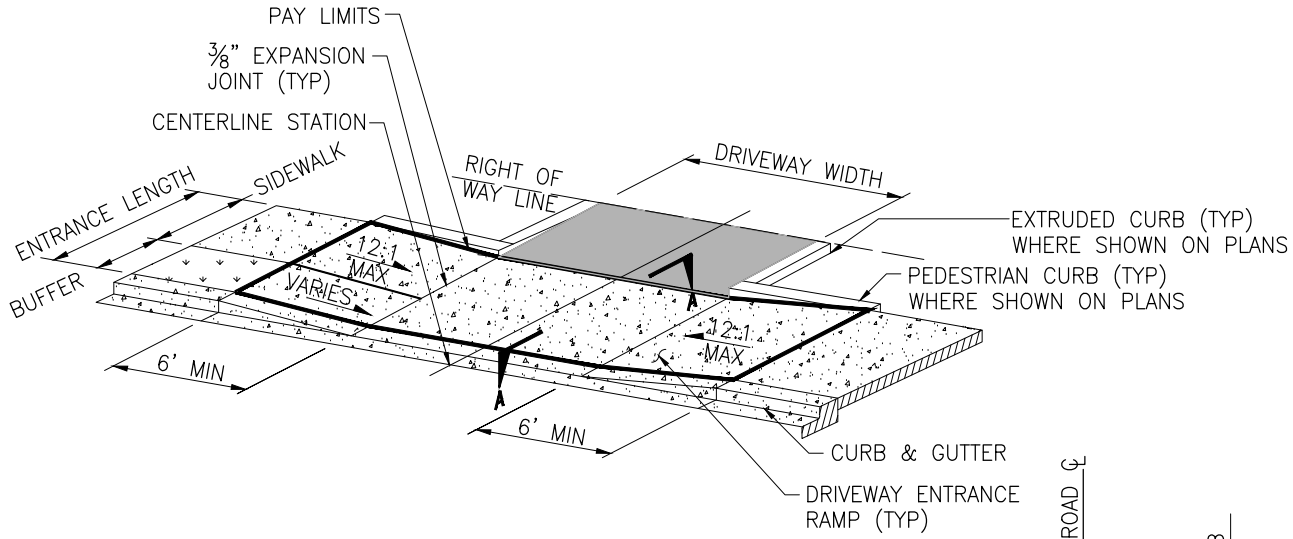
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

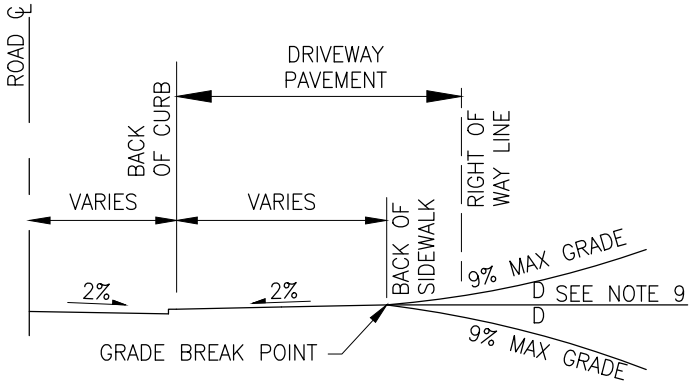
SAILS WITH PRIDE

RESIDENTIAL DRIVEWAY APPROACH WITH SIDEWALK AND BUFFER

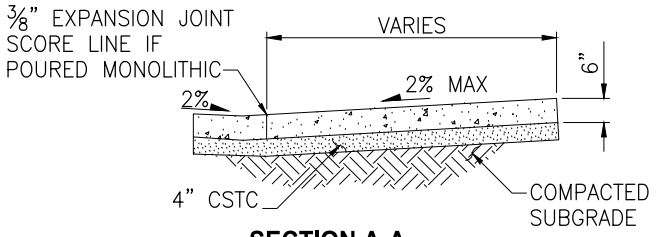
DM.C2.1

REVISED: 02/23





CROSS SECTION



SECTION A-A

NOTES:

1. DRIVEWAY WIDTH = 24' MINIMUM TO 35'.
2. DRIVEWAY PAVING = 6" MINIMUM CEMENT CONCRETE CLASS 4000
3. WHEN THE ENTRANCE WIDTH EXCEEDS 15 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT WITH 3/8" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE.
4. CONSTRUCT EXPANSION JOINTS WITH 3/8" JOINT FILLER PARALLEL WITH THE CENTERLINE AS REQUIRED AT 15' MAXIMUM SPACING WHEN ENTRANCE WIDTHS EXCEED 30'.
5. PLACE FULL DEPTH EXPANSION JOINT WITH 3/8" JOINT FILLER AT BACK, FRONT, AND SIDES OF DRIVEWAY ENTRANCE.
6. ALL JOINTS AND EDGES SHALL BE CLEANED AND EDGED THE FULL LENGTH.
7. STORM DRAINAGE FROM DRIVEWAY SHALL NOT BE PERMITTED TO DRAIN ONTO ROADWAY SURFACE, UNLESS ACCOUNTED FOR IN DESIGN, AND APPROVED UNDER A DEVIATION REQUEST.
8. DRIVEWAY SHALL NORMALLY BE AT 90 DEGREES TO ROAD CENTERLINE, BUT CAN VARY FROM 75 DEGREES TO 105 DEGREES.
9. A VERTICAL CURVE SHALL BE CONSTRUCTED TO TRANSITION THE LANDING TO THE ACCESS APPROACH. THE VERTICAL SEPARATION BETWEEN THE CURVE AND A 10-FOOT CHORD OF THE CURVE SHALL NOT EXCEED 3.25 INCHES (WHERE D IS POSITIVE) OR 2.00 INCHES (WHERE D IS NEGATIVE).
10. WHEN ROADWAY PROFILE GRADE EXCEEDS 4%, ADJUST RAMP LENGTHS TO MEET AMERICANS WITH DISABILITIES ACT REQUIREMENTS.
11. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE PAVING.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

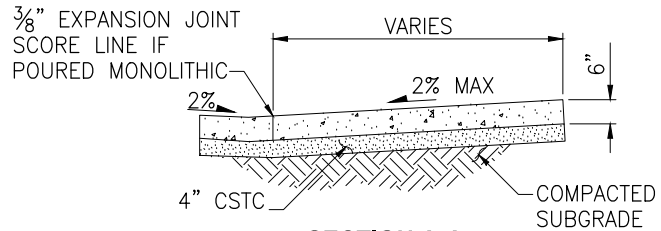
TYPE 1 MAJOR DRIVEWAY APPROACH FOR COMMERCIAL USE

DM.C3.1

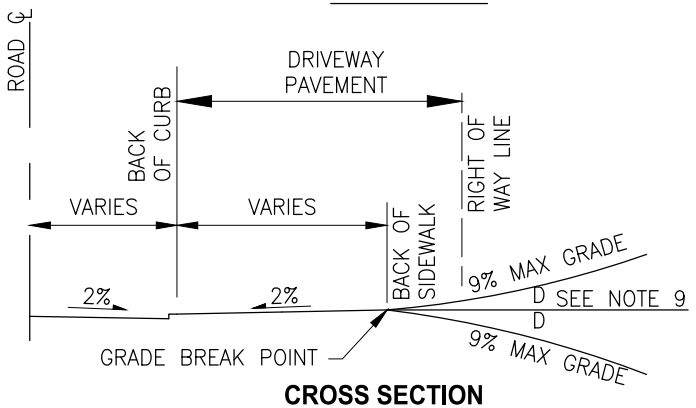
REVISED: 02/23

NOTES:

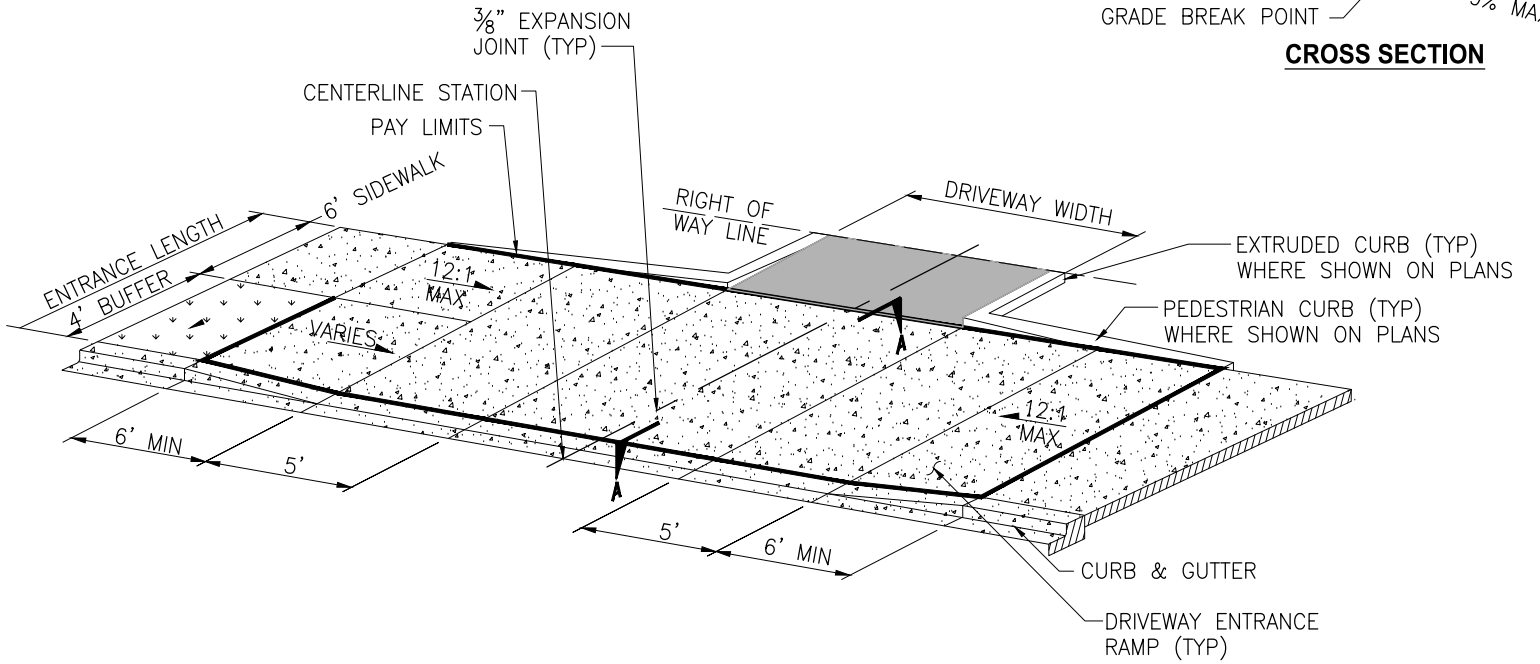
1. DRIVEWAY WIDTH = 24' MINIMUM TO 35' MAXIMUM APPROACH WIDTH = DRIVEWAY WIDTH PLUS 5' ON EACH SIDE.
2. DRIVEWAY PAVING = 6" MINIMUM CEMENT CONCRETE CLASS 4000
3. WHEN THE ENTRANCE WIDTH EXCEEDS 15 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT WITH ⅜" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE.
4. CONSTRUCT EXPANSION JOINTS WITH ⅜" JOINT FILLER PARALLEL WITH THE CENTERLINE AS REQUIRED AT 15' MAXIMUM SPACING WHEN ENTRANCE WIDTHS EXCEED 30'.
5. PLACE FULL DEPTH EXPANSION JOINT WITH ⅜" JOINT FILLER AT BACK, FRONT, AND SIDES OF DRIVEWAY ENTRANCE.
6. ALL JOINTS AND EDGES SHALL BE CLEANED AND EDGED THE FULL LENGTH.
7. STORM DRAINAGE FROM DRIVEWAY SHALL NOT BE PERMITTED TO DRAIN ONTO ROADWAY SURFACE, UNLESS ACCOUNTED FOR IN DESIGN, AND APPROVED UNDER A DEVIATION REQUEST.
8. DRIVEWAY SHALL NORMALLY BE AT 90 DEGREES TO ROAD CENTERLINE, BUT CAN VARY FROM 75 DEGREES TO 105 DEGREES.
9. A VERTICAL CURVE SHALL BE CONSTRUCTED TO TRANSITION THE LANDING TO THE ACCESS APPROACH. THE VERTICAL SEPARATION BETWEEN THE CURVE AND A 10-FOOT CHORD OF THE CURVE SHALL NOT EXCEED 3.25 INCHES (WHERE D IS POSITIVE) OR 2.00 INCHES (WHERE D IS NEGATIVE).
10. WHEN ROADWAY PROFILE GRADE EXCEEDS 4%, ADJUST RAMP LENGTHS TO MEET AMERICANS WITH DISABILITIES ACT REQUIREMENTS.
11. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE PAVING.



SECTION A-A



CROSS SECTION



NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

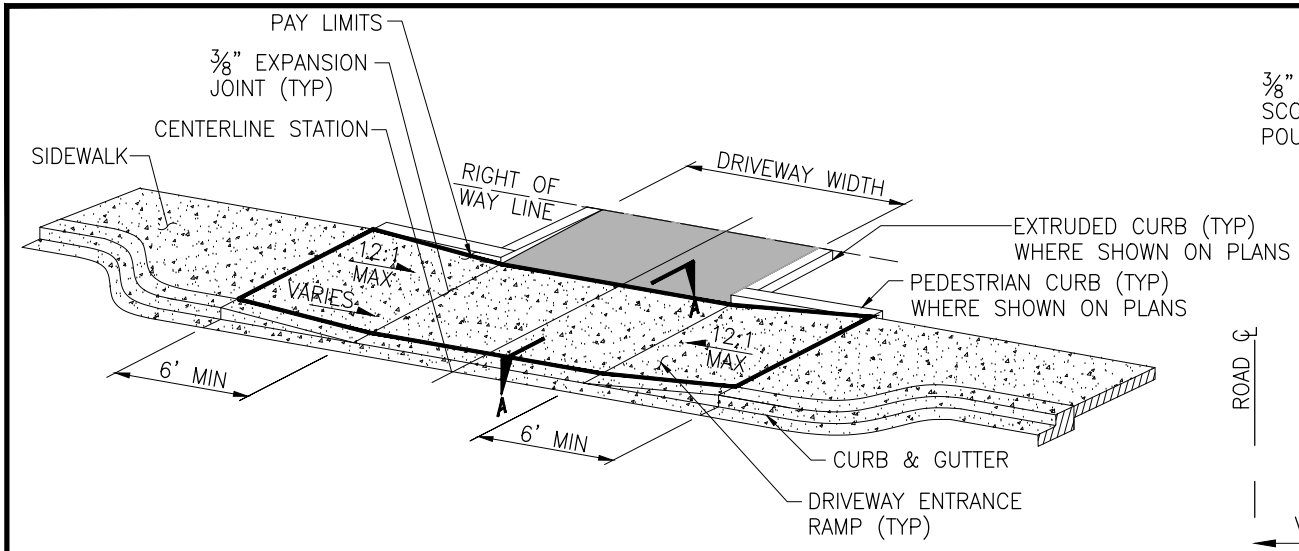
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

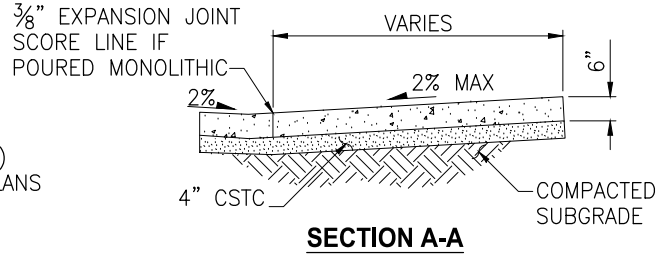
SAILS WITH PRIDE

MODIFIED TYPE 1 MAJOR DRIVEWAY APPROACH FOR COMMERCIAL USE

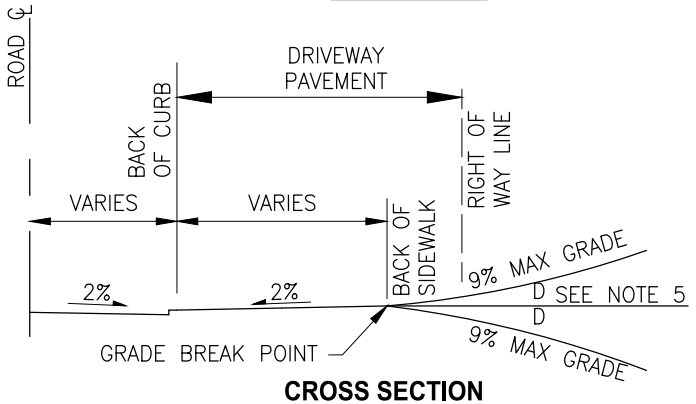
DM.C3.2

REVISED: 02/23





SECTION A-A



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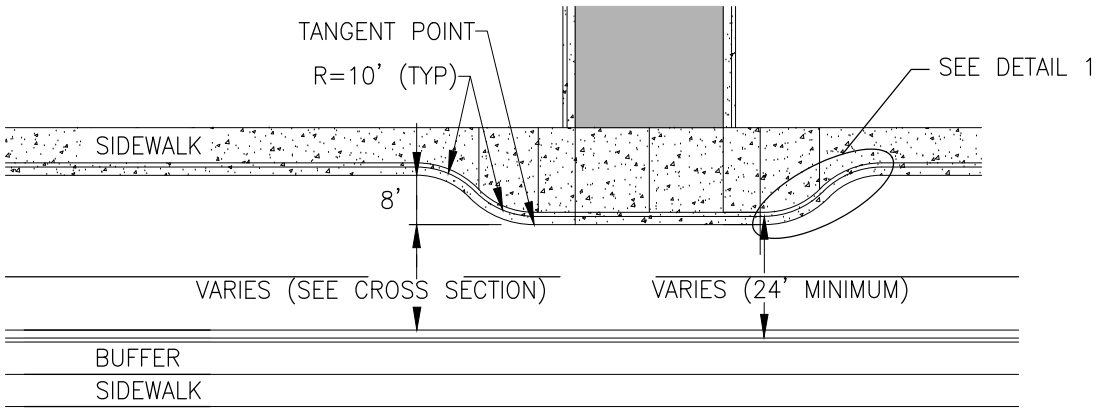
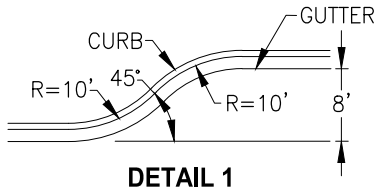




DETAIL 1

NOTES:

1. DRIVEWAY WIDTH = 12' MINIMUM TO 24' MAXIMUM.
2. DRIVEWAY WIDTH ON FLAG LOTS IS 20' MINIMUM.
3. CEMENT CONCRETE CLASS 3000 FOR RESIDENTIAL USE.
   CEMENT CONCRETE CLASS 4000 FOR COMMERCIAL USE.
4. DRIVEWAY PAVING = 6" MINIMUM CEMENT CONCRETE OR: 4" MINIMUM COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT CL. 1/2" PG 58H–22, OVER 4" MINIMUM COMPACTED DEPTH CRUSHED SURFACING TOP COURSE. BETWEEN SIDEWALK AND RIGHT OF WAY LINE CAN BE CEMENT CONCRETE IF THE EXISTING DRIVEWAY IS CEMENT CONCRETE.
5. A VERTICAL CURVE SHALL BE CONSTRUCTED TO TRANSITION THE LANDING TO THE ACCESS APPROACH. THE VERTICAL SEPARATION BETWEEN THE CURVE AND A 10–FOOT CHORD OF THE CURVE SHALL NOT EXCEED 3.25 INCHES (WHERE D IS POSITIVE) OR 2.00 INCHES (WHERE D IS NEGATIVE).
6. STORM DRAINAGE FROM DRIVEWAY SHALL NOT BE PERMITTED TO DRAIN ONTO ROADWAY SURFACE, UNLESS ACCOUNTED FOR IN DESIGN, AND APPROVED UNDER A DEVIATION REQUEST.
7. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE PAVING.
8. DRIVEWAY SHALL NORMALLY BE AT 90 DEGREES TO ROAD CENTERLINE, BUT CAN VARY FROM 75 DEGREES TO 105 DEGREES.
9. WHEN ROADWAY PROFILE GRADE EXCEEDS 4%, ADJUST RAMP LENGTHS TO MEET AMERICANS WITH DISABILITIES ACT REQUIREMENTS.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

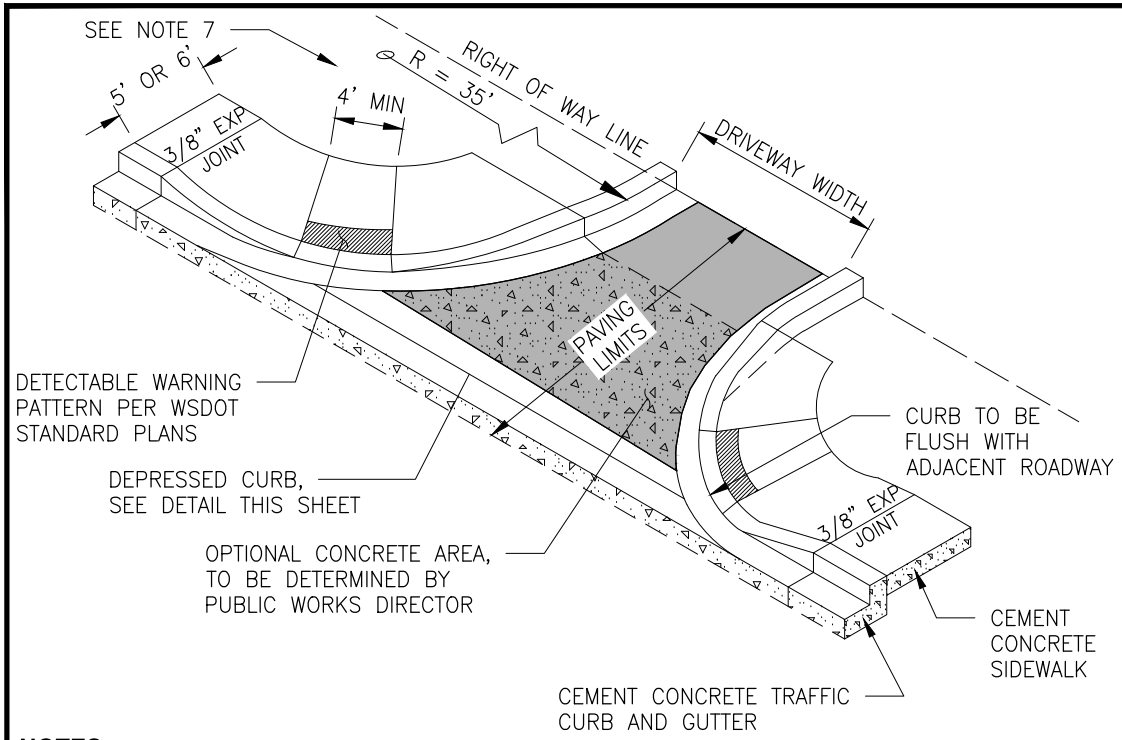
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

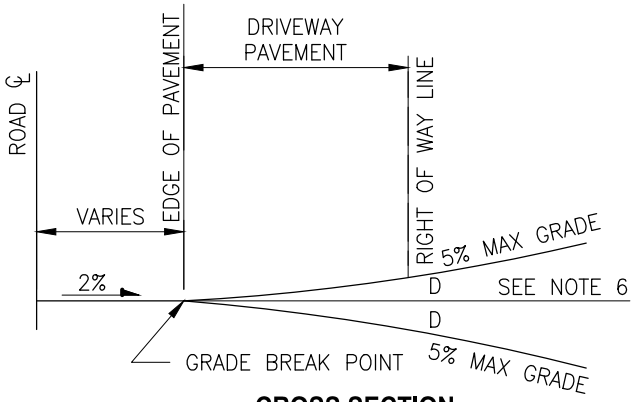
SAILS WITH PRIDE

TYPE 1 DRIVEWAY APPROACH WITH BULB-OUTS

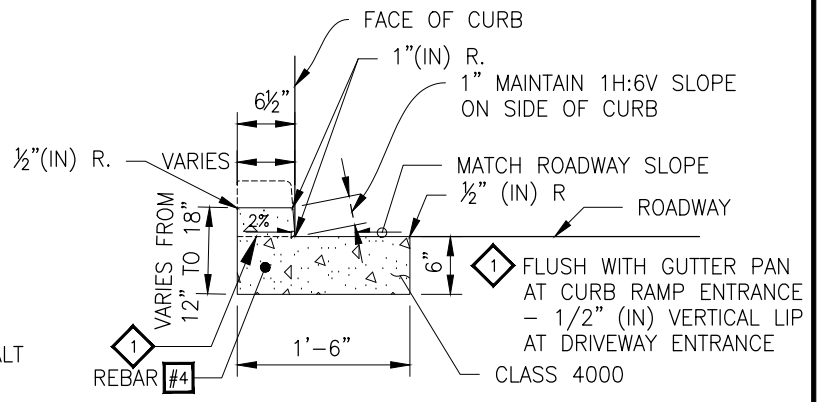
DM.C3.3

REVISED: 02/23

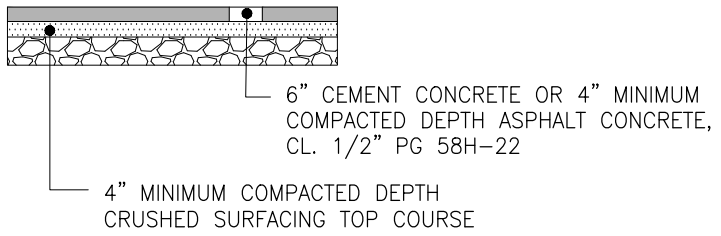




CROSS SECTION



DEPRESSED CURB SECTION
AT CURB RAMPS AND DRIVEWAY ENTRANCES



DRIVEWAY CROSS SECTION WITHIN RIGHT-OF-WAY

NOT TO SCALE

NOTES:

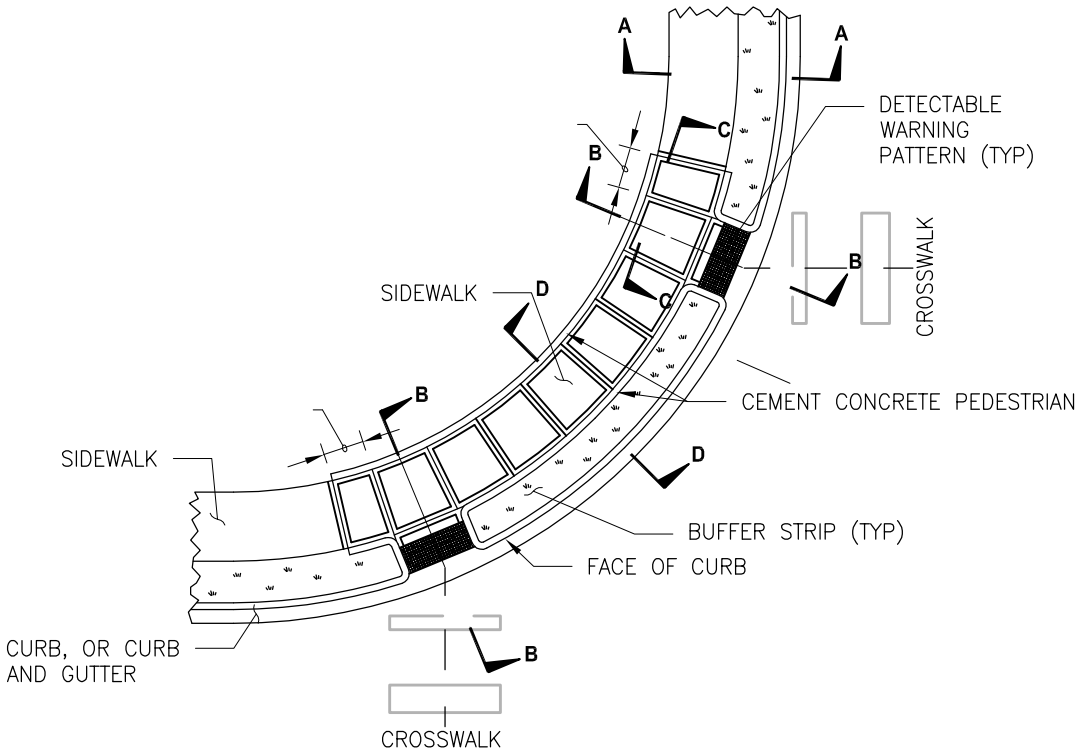
1. DRIVEWAY FOR COMMERCIAL USE ONLY. REQUIRES PUBLIC WORKS DIRECTOR APPROVAL.
2. DRIVEWAY WIDTH = 24' MINIMUM TO 35' MAXIMUM.
3. DRIVEWAY PAVING = 6" MINIMUM CEMENT CONCRETE OR: 4" MINIMUM COMPACTED DEPTH ASPHALT CONCRETE PAVEMENT CL. 1/2" PG 58H-22, OVER 4" MINIMUM COMPACTED DEPTH CRUSHED SURFACING TOP COURSE. BETWEEN SIDEWALK AND RIGHT OF WAY LINE CAN BE CEMENT CONCRETE IF THE EXISTING DRIVEWAY IS CEMENT CONCRETE.
4. STORM DRAINAGE FROM DRIVEWAY SHALL NOT BE PERMITTED TO DRAIN ONTO ROADWAY SURFACE, UNLESS ACCOUNTED FOR IN DESIGN, AND APPROVED UNDER A DEVIATION REQUEST.
5. DRIVEWAY SHALL NORMALLY BE AT 90 DEGREES TO ROAD CENTERLINE, BUT CAN VARY FROM 75 DEGREES TO 105 DEGREES.
6. A VERTICAL CURVE SHALL BE CONSTRUCTED TO TRANSITION THE LANDING TO THE ACCESS APPROACH. THE VERTICAL SEPARATION BETWEEN THE CURVE AND A 10-FOOT CHORD OF THE CURVE SHALL NOT EXCEED 3.25 INCHES (WHERE D IS POSITIVE) OR 2.00 INCHES (WHERE D IS NEGATIVE).
7. FORM AND SUBGRADE INSPECTION REQUIRED BEFORE PAVING.
8. ON SITE STORM DRAINAGE REQUIRED.
9. WHEN ROADWAY PROFILE GRADE EXCEEDS 4%, ADJUST RAMP LENGTHS TO MEET AMERICANS WITH DISABILITIES ACT REQUIREMENTS.
10. MUST PROVIDE ADA CROSSING AT DRIVEWAY.

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

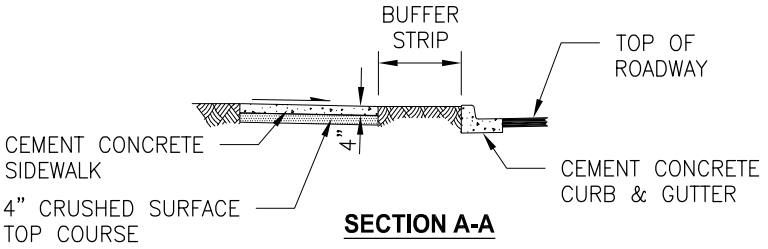
MAJOR DRIVEWAY W/ RADIUS RETURN

DM.C3.4

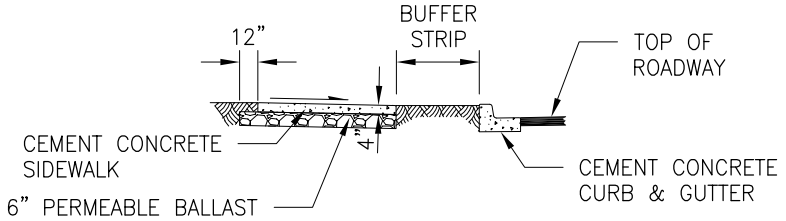
REVISED: 02/23



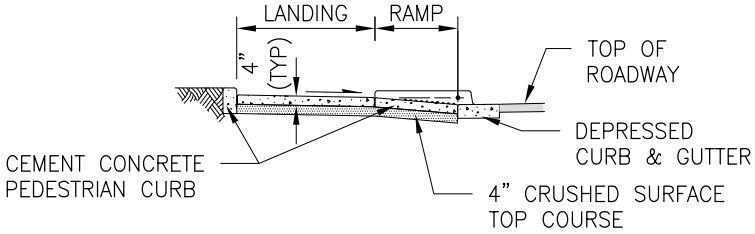
EXAMPLE SIDEWALK RAMP



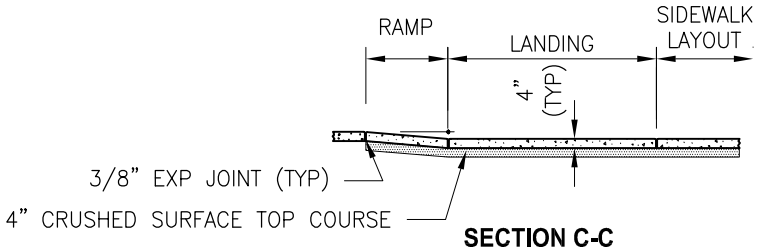
SECTION A-A



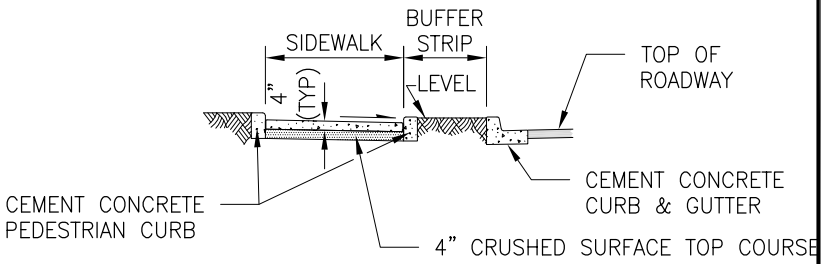
SECTION A-A W/ BALLASTED SIDEWALK



SECTION B-B



SECTION C-C



SECTION D-D

NOT TO SCALE

NOTES:

1. SIDEWALK RAMP IS TYPICALLY LOCATED AT THE MIDPOINT.
2. CURB TO BE FLUSH WITH ADJACENT ROADWAY SURFACE.
3. RAMP SLOPES SHALL NOT BE STEEPER THAN 12H:1V.
4. AVOID PLACING DRAINAGE STRUCTURES, JUNCTION BOXES, OR OTHER OBSTRUCTIONS IN FRONT OF RAMP ACCESS AREAS. CURB & GUTTER IS SHOWN, SEE THE CONTRACT PLANS FOR THE CURB DESIGN SPECIFIED.
5. FOR CURB AND GUTTER SEE WSDOT STD PLAN F-10.16-00.
6. FOR SIDEWALK SEE WSDOT STD PLAN F-30.10-04.
7. FOR PARALLEL CURB RAMP SEE WSDOT STD PLAN F-40.12-03.
8. FOR COMBINATION CURB RAMP SEE WSDOT STD PLAN F-40.14-03.
9. FOR PERPENDICULAR CURB RAMP SEE WSDOT STD PLAN F-40.15-04.
10. FOR DETECTABLE WARNING SURFACE SEE WSDOT STD PLAN F-45.10-02.
11. CROSSWALKS ARE NOT ALWAYS MARKED.

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

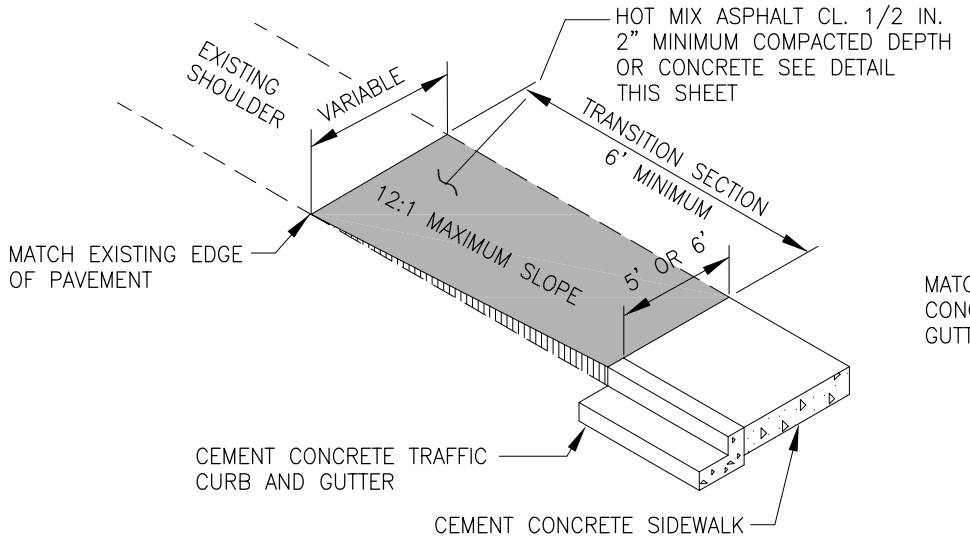
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

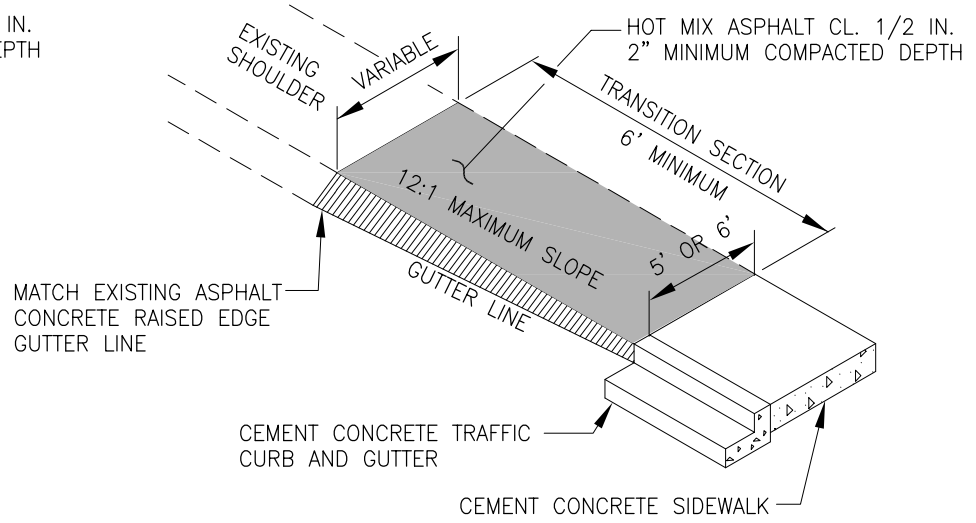
CEMENT CONCRETE SIDEWALK RAMP FOUNDATION

DM.C4.1

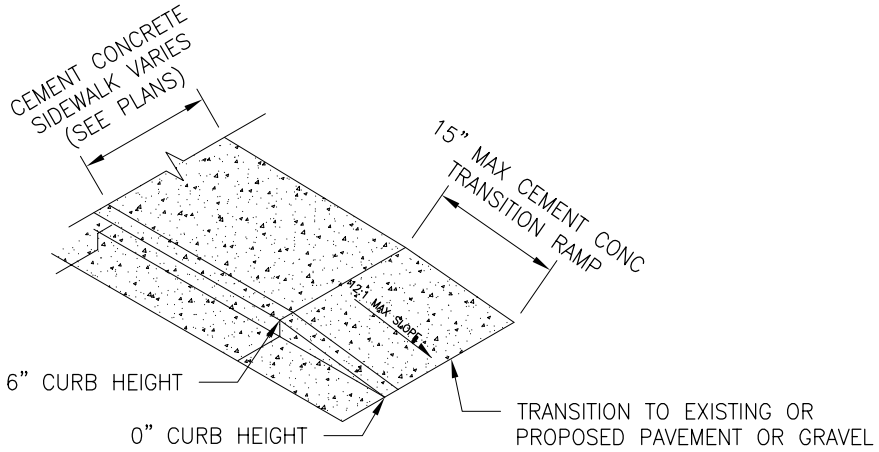
REVISED: 02/23



CEMENT CONCRETE TRAFFIC CURB, GUTTER, AND SIDEWALK TO ASPHALT CONCRETE EDGE WITH GRAVEL SHOULDER

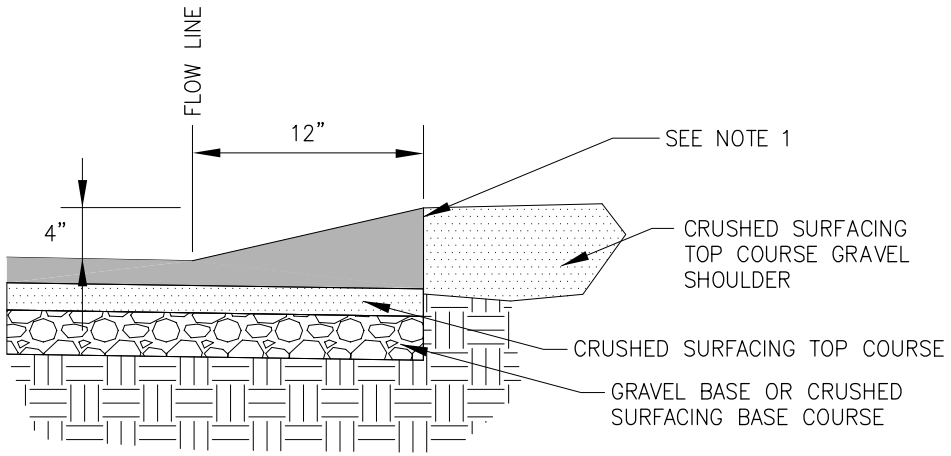


CEMENT CONCRETE TRAFFIC CURB, GUTTER, AND SIDEWALK TO ASPHALT CONCRETE RAISED EDGE



RAMP CONCRETE SECTION TO MATCH ADJACENT SIDEWALK SECTION

CONCRETE TRANSITION RAMP



ASPHALT CONCRETE RAISED EDGE

NOTES:

1. RAISED PORTION SHALL BE HOT MIX ASPHALT PLACED AS PART OF THE ROAD PAVEMENT.
2. CURB SHALL BE FLUSH WITH GUTTER PAN AT SIDEWALK RAMP ENTRANCE.

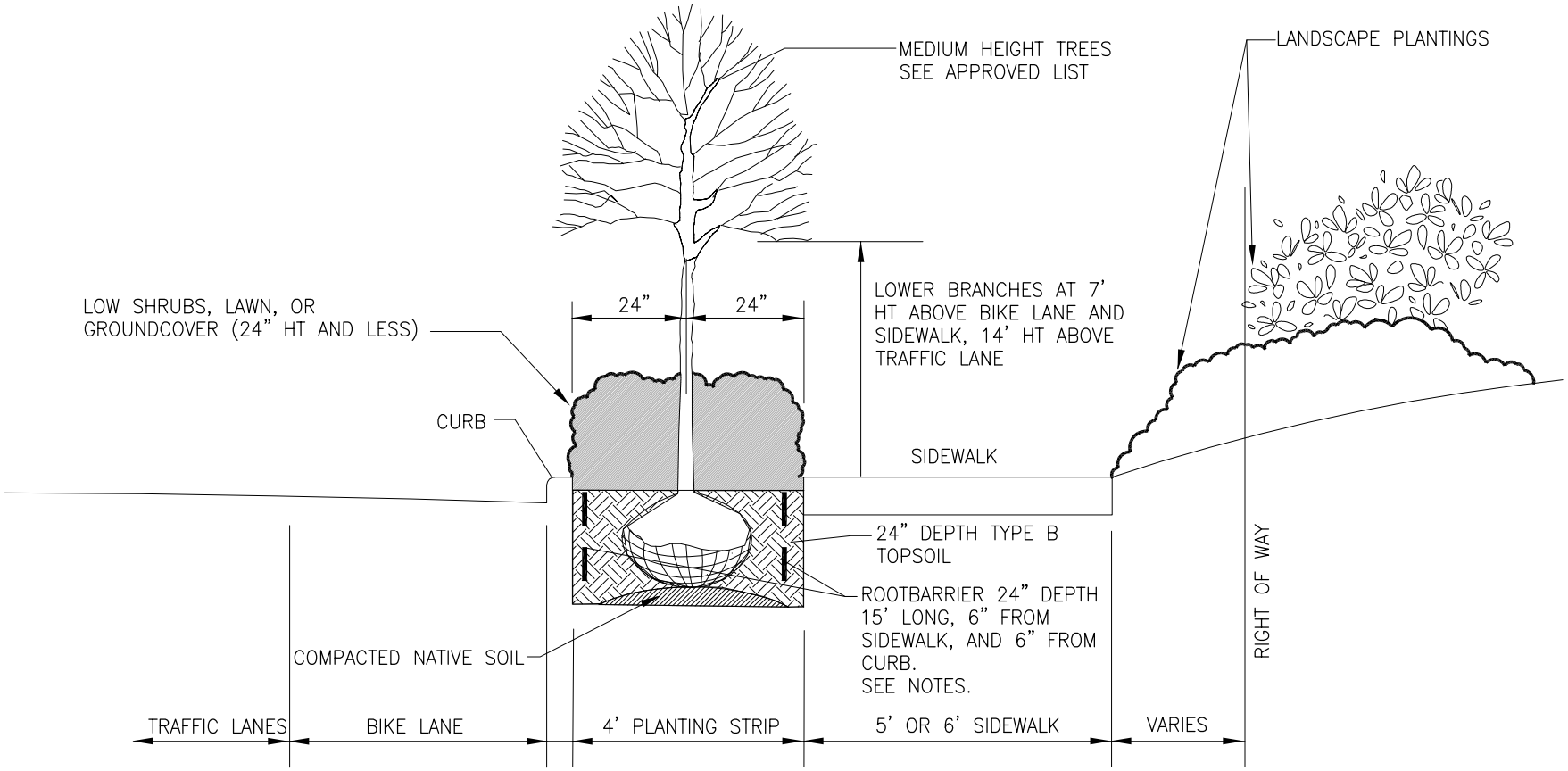
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

ASPHALT CONCRETE TRAFFIC CURBS AND CURB TRANSITIONS

DM.C5.1

REVISED: 02/23



NOTES:

1. SEE STANDARD DRAWING DM.D3.5 FOR PLANTING NOTES.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

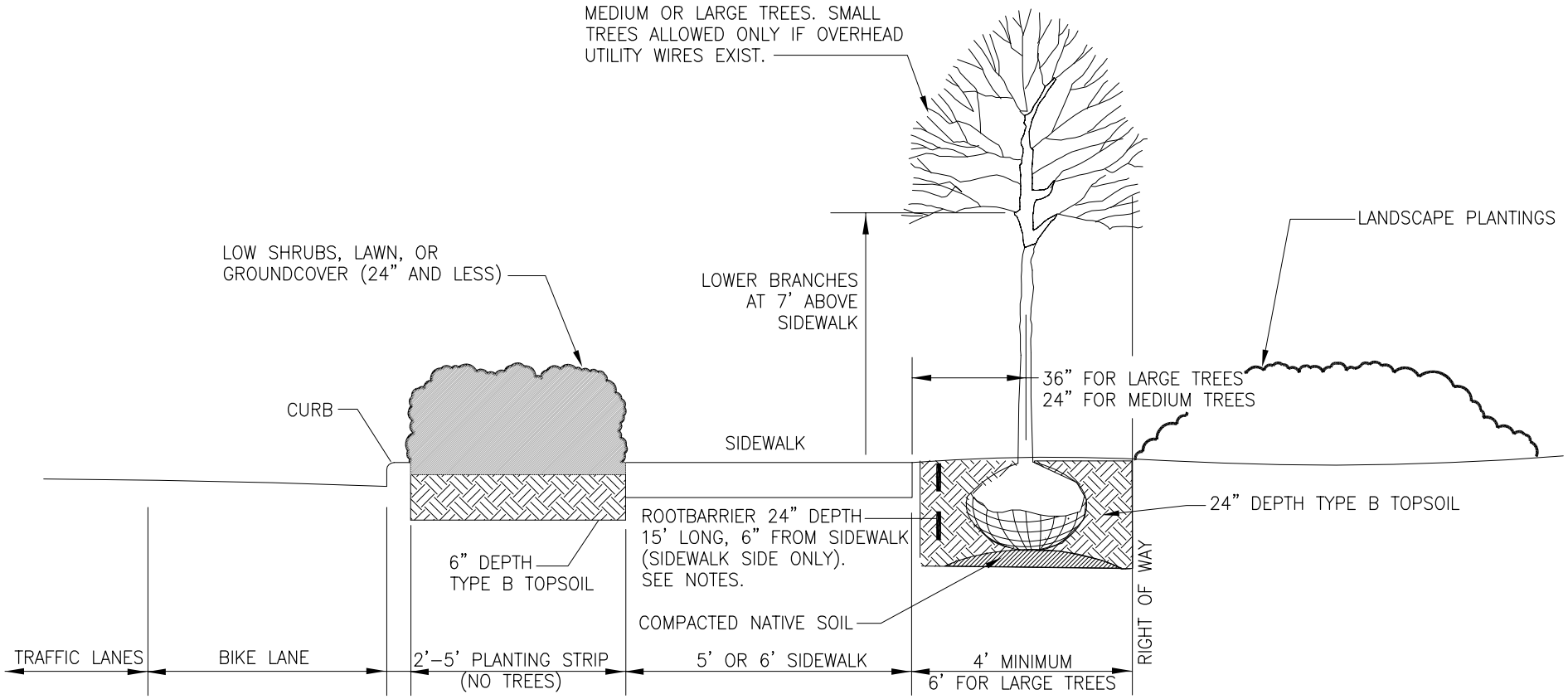
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

STANDARD PLANTING STRIP

DM.D1.1

REVISED: 02/23



NOTES:

1. SEE STANDARD DRAWING DM.D3.5 FOR PLANTING NOTES.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

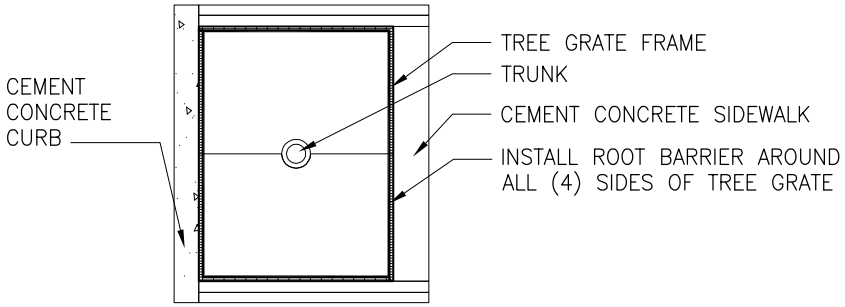
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

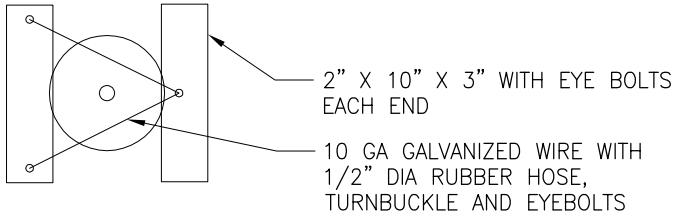
COMBINATION PLANTING STRIPS

DM.D1.2

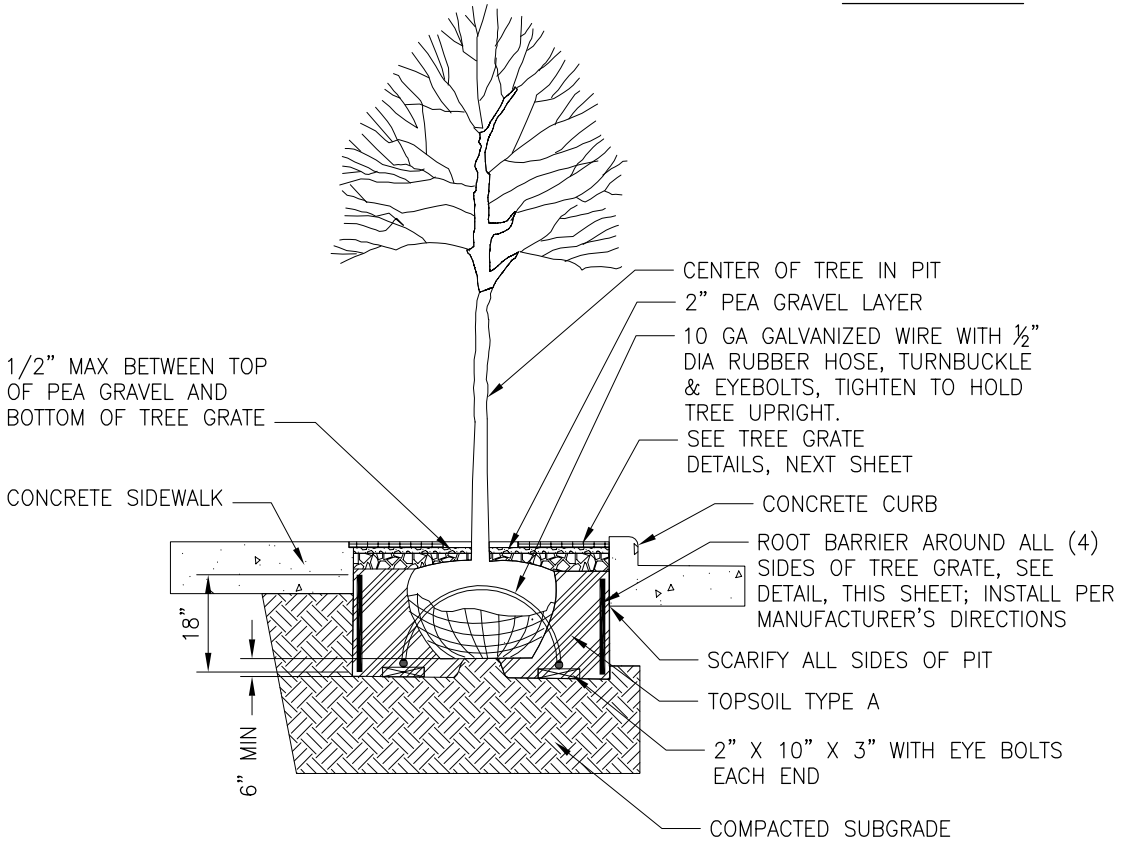
REVISED: 02/23



ROOT BARRIER PLAN



STAKING PLAN



NOTES:

1. TREE PIT SHALL NOT BE LESS THAN 2 TIMES ROOT BALL DIAMETER.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

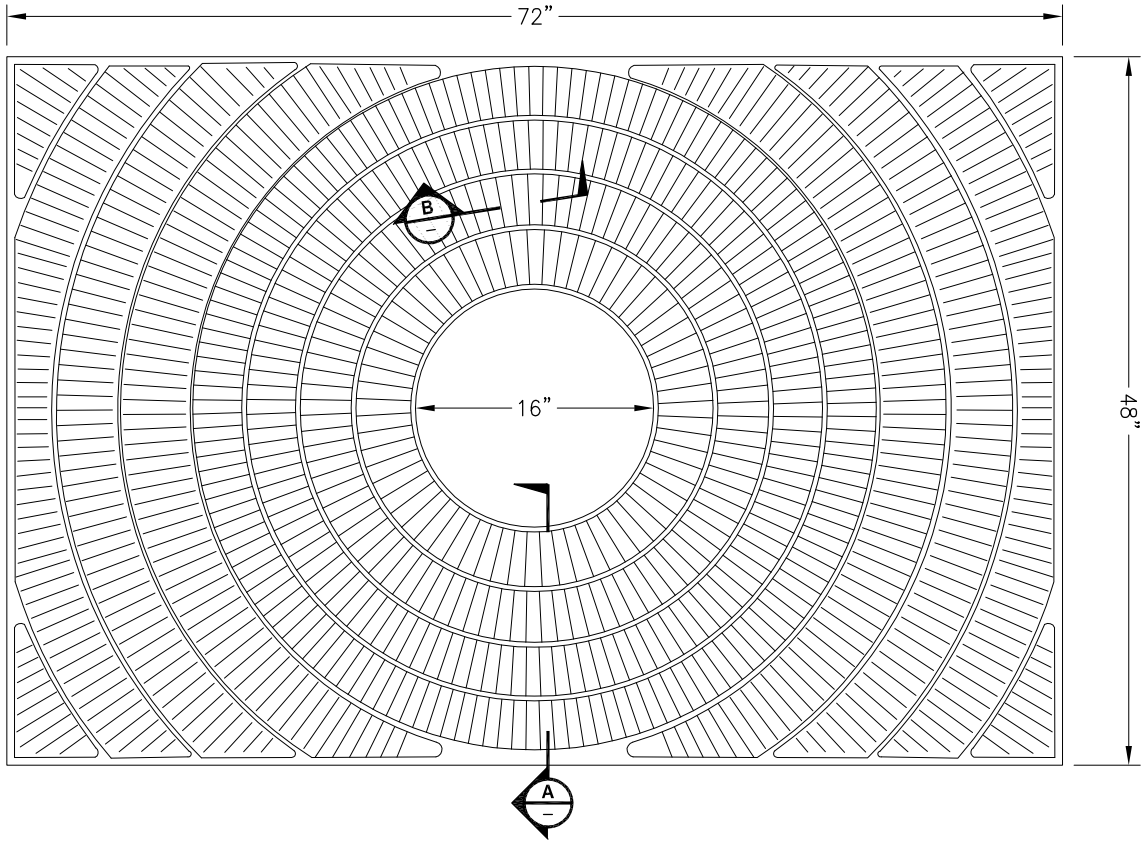
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

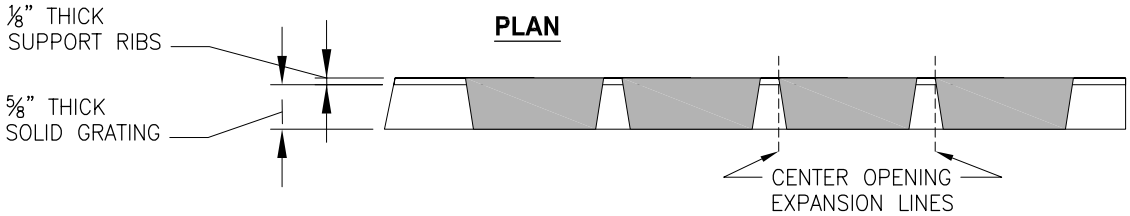
TYPICAL TREE PLANTING DETAIL AT TREE GRATE LOCATIONS

DM.D2.1

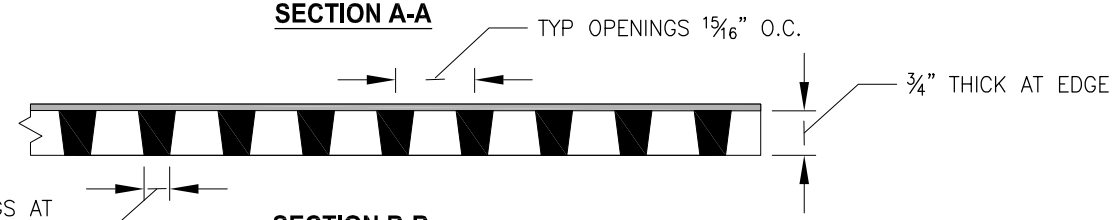
REVISED: 02/23



PLAN



SECTION A-A



SECTION B-B

SPECIFICATIONS:

MATERIAL WILL BE 48" X 72" HIGH QUALITY 100% RECYCLED GREY IRON; ASTM A48 CLASS 35B OR BETTER; RAW CAST IRON GREY FINISH; 16" CENTER HOLE OPENING; AND MEET ADA ACCESSIBILITY GUIDELINES.

NOTES:

1. CAST IN FOUR PIECES.
2. GRATE IS ¾" THICK AT EDGE
3. CENTER OPENING EXPANSIONS AT 2'-0" AND 2'7" DIAMETER.
4. NO OPENINGS GREATER THAN ½", IN CONFORMANCE WITH ADA ACCESSIBILITY GUIDELINES.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

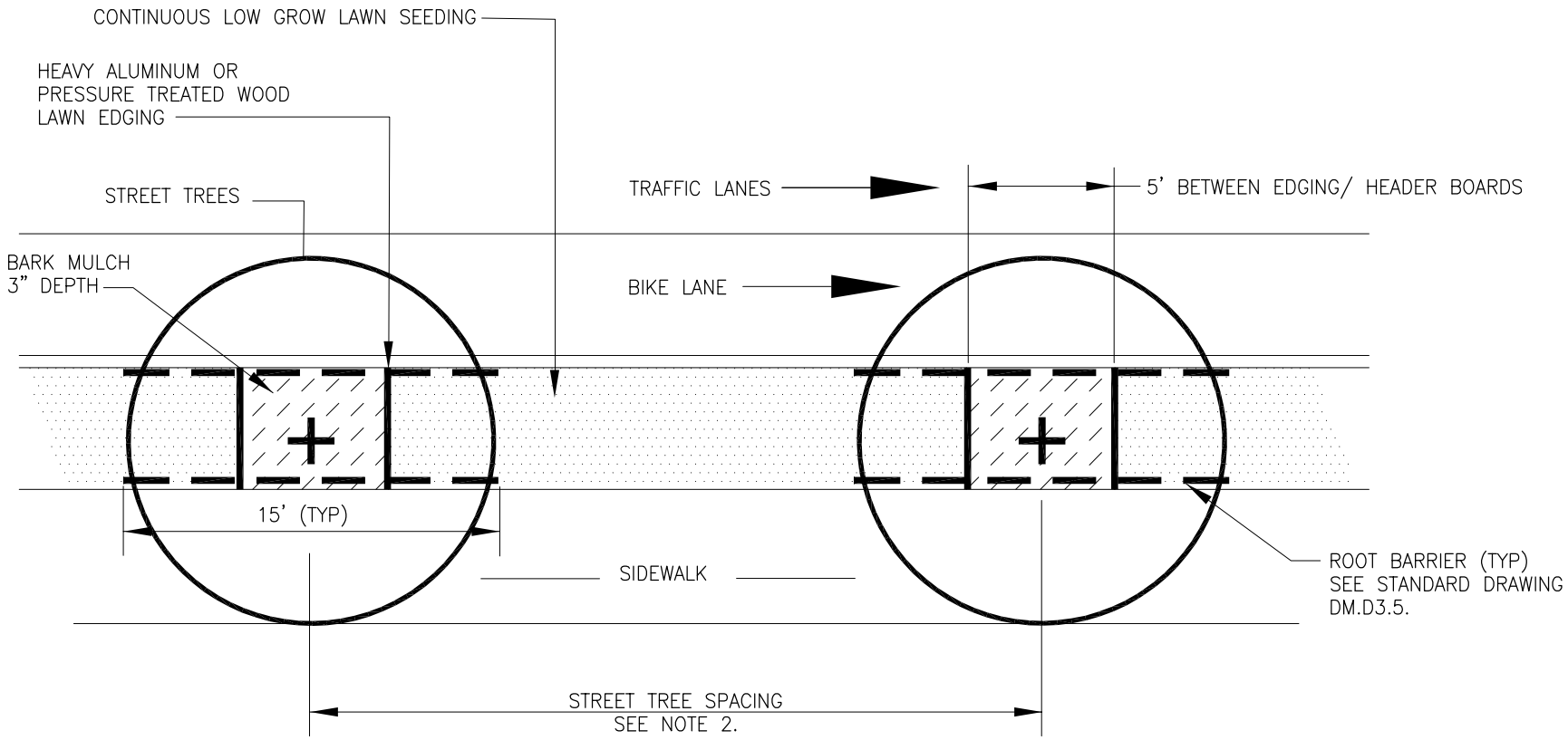
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

TREE GRATE DETAIL

DM.D2.2

REVISED: 02/23



NOTES:

1. SEE STANDARD DRAWING DM.D3.5 FOR PLANTING NOTES.
2. SEE STANDARD DRAWING DM.D4.3 THROUGH DM.D4.5 FOR STREET TREE LIST.
3. SEE STANDARD DRAWING DM.D3.5 FOR STREET TREE PLANTING RESTRICTIONS.

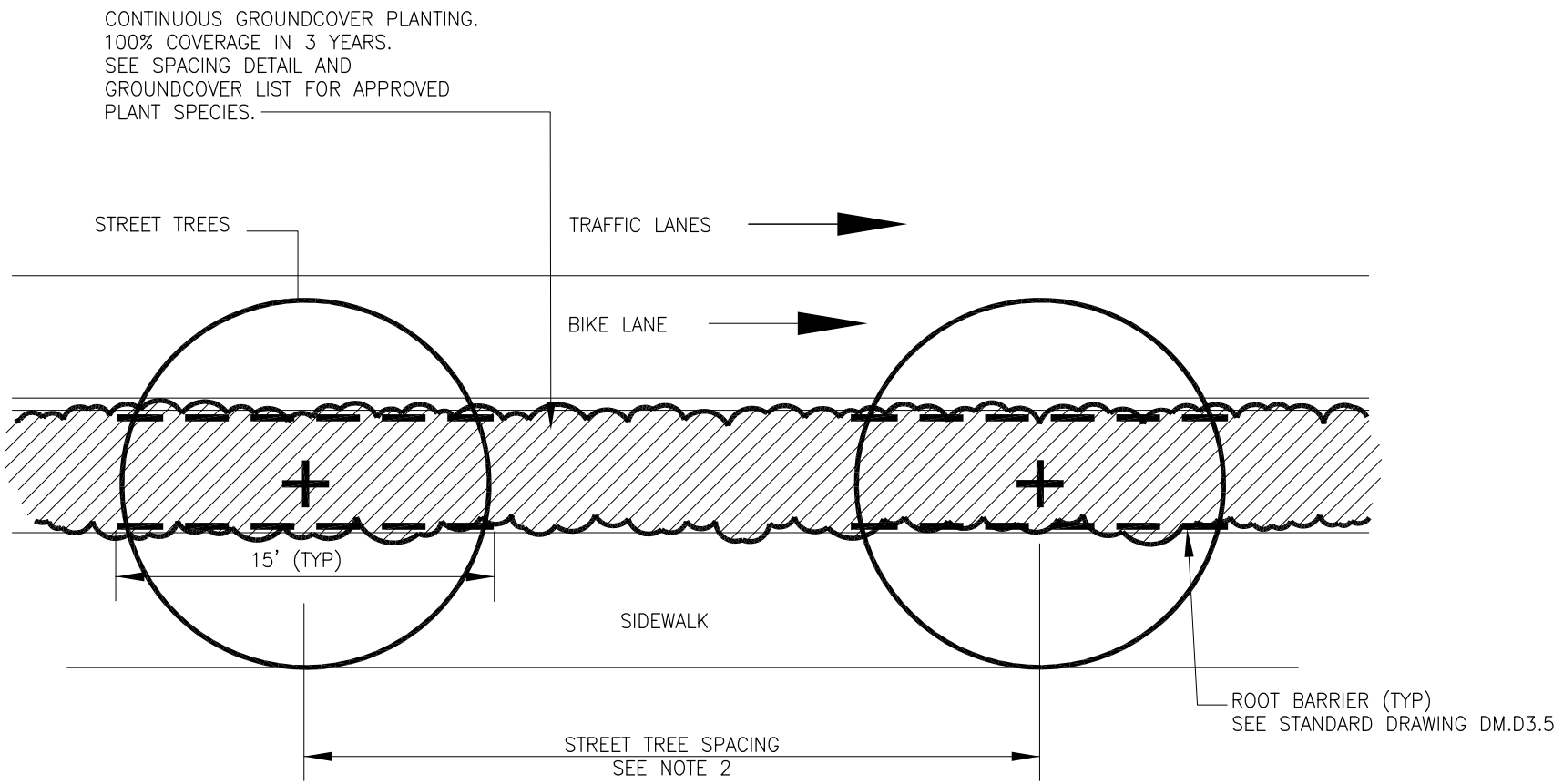
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

TREE AND LAWN PLANTING STRIPS

DM.D3.1

REVISED: 02/23



NOTES:

1. SEE STANDARD DRAWING DM.D3.5 FOR PLANTING NOTES.
2. SEE STANDARD DRAWING DM.D4.3 THROUGH DM.D4.5 FOR STREET TREE LIST.
3. SEE STANDARD DRAWING DM.F6.7 FOR STREET TREE PLANTING RESTRICTIONS.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

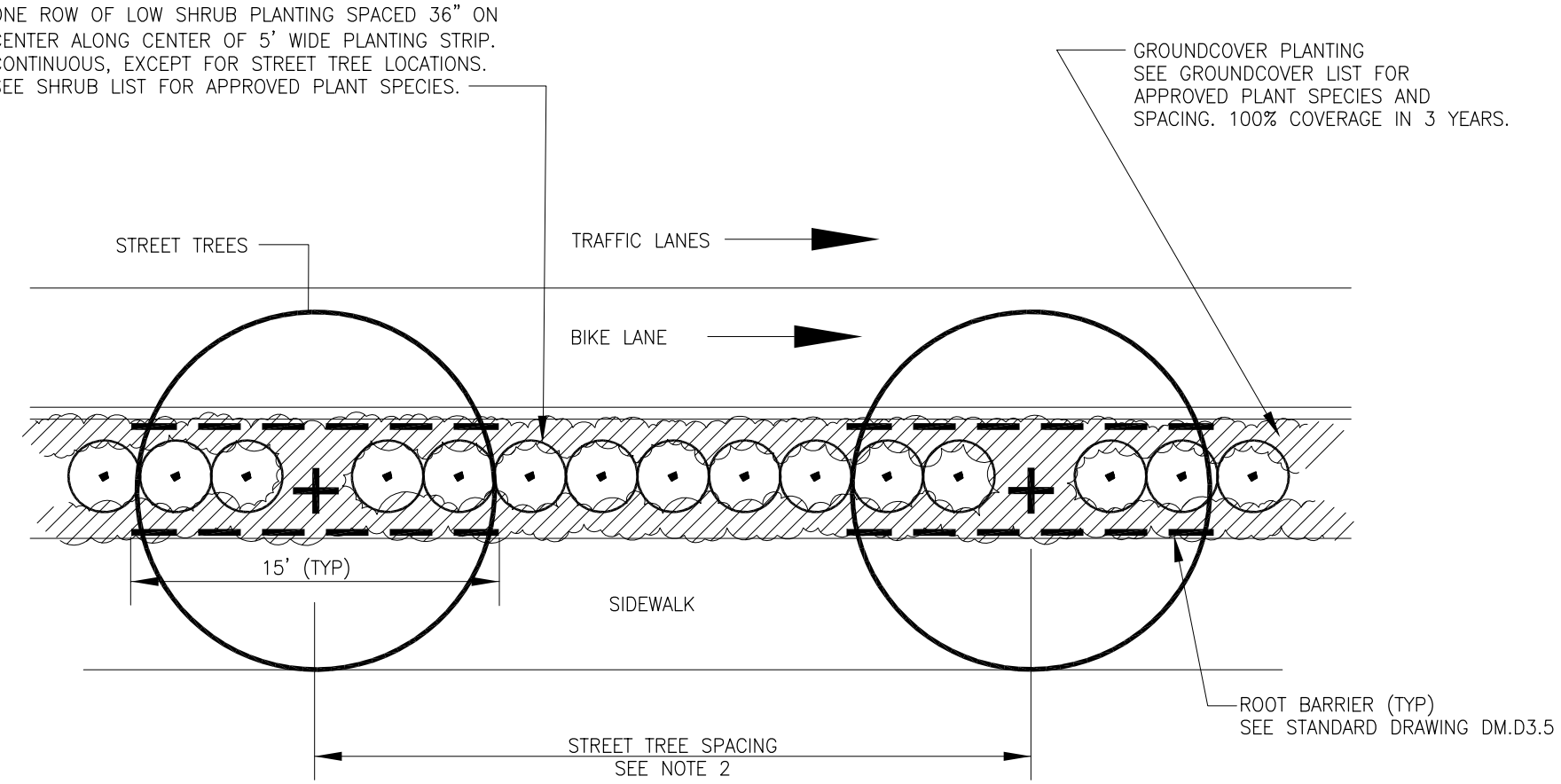
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

TREE AND GROUNDCOVER PLANTING STRIPS

DM.D3.2

REVISED: 02/23



NOTES:

1. SEE STANDARD DRAWING DM.D3.5 FOR PLANTING NOTES.
2. SEE STANDARD DRAWING DM.D4.3 THROUGH DM.D4.5 FOR STREET TREE LIST.
3. SEE STANDARD DRAWING DM.F6.7 FOR STREET TREE PLANTING RESTRICTIONS.

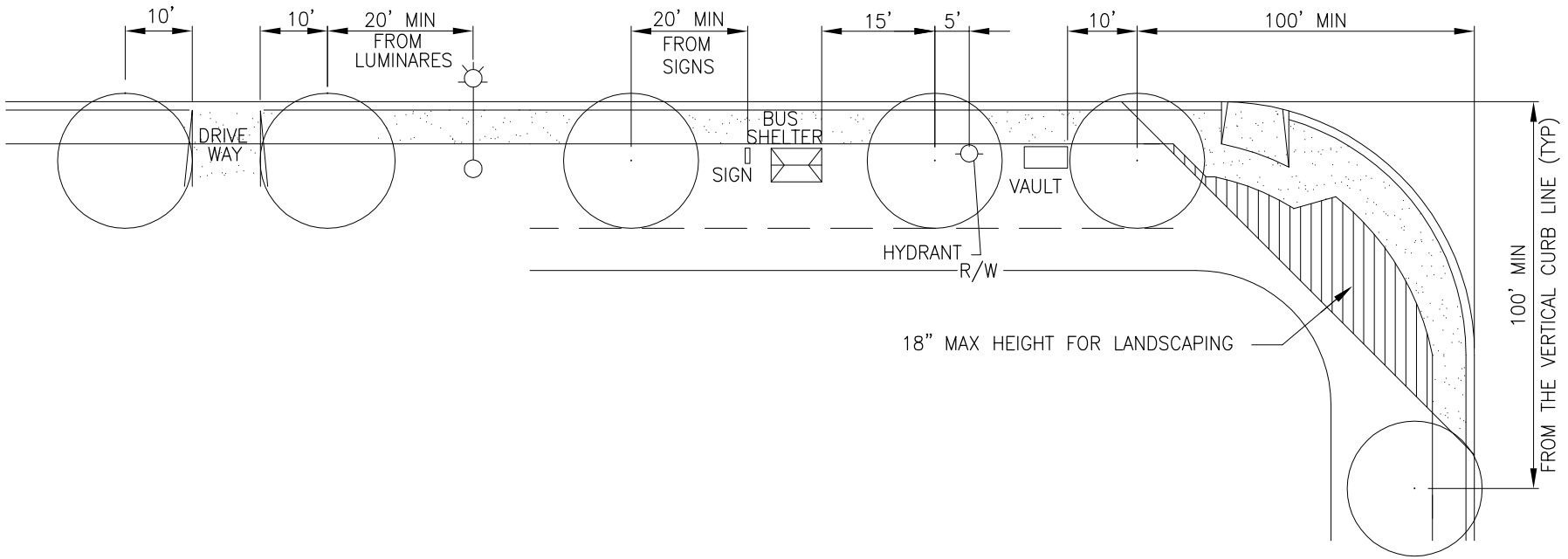
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

SHRUB, TREE, AND GROUNDCOVER PLANTING STRIP

DM.D3.3

REVISED: 02/23



NOTES:

1. ON BUS ROUTES, PLANS SHALL BE COORDINATED WITH KING COUNTY METRO.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

STREET TREE SPACING REQUIREMENTS

DM.D3.4

REVISED: 02/23

PLANTING NOTES:

PLANTING:

1. DIG HOLE 2 – 3 TIMES THE WIDTH OF THE ROOT BALL AND AS DEEP AS THE ROOT BALL. DO NOT MAKE HOLE DEEPER THAN THE ROOT BALL.
2. REMOVE CONTAINERS, BIODEGRADABLE POTS, SYNTHETIC OR TREATED BURLAP, WIRE, TWINE, OR ROPES. LEAVE NATURAL BURLAP IN PLACE AND FOLD BACK. LOOSEN THE ROOTS AND SPREAD OR CUT CIRCLING ROOTS.
3. PLACE TOP OF ROOT BALL EVEN WITH OR SLIGHTLY HIGHER THAN SOIL GRADE ON FIRM SOIL. DO NOT ADD SOIL AMENDMENTS OR GRAVEL UNLESS APPROVED BY THE CITY TRANSPORTATION ENGINEER.
4. INSTALL 4" x 24" PERFORATED DRAIN PIPE; FILL WITH DRAIN ROCKS. PIPE SHALL NOT EXTEND MORE THAN 1/2" ABOVE FINISH GRADE..
5. BACK FILL WITH CLEAN NATIVE SOIL. FIRM SOIL AROUND THE ROOT BALL; WATER SLOWLY AND THOROUGHLY.
6. MULCH AROUND TREE WITH 2–4" WOOD–CHIP MULCH. DO NOT PLACE MULCH NEXT TO TRUNK.

ROOT BARRIER:

1. ROOT BARRIER SHALL BE RIGID HIGH IMPACT POLYPROPYLENE TREATED WITH UV INHIBITORS, MINIMUM 24" HEIGHT, WITH 1/2" RAISED VERTICAL RIBS 6" ON CENTER, OR APPROVED EQUAL.
2. INSTALL ROOT BARRIER IN CONTINUOUS 15' STRIP, CENTERED ON TREE, NEXT TO SIDEWALK AND CURB ACCORDING TO MANUFACTURER'S DIRECTIONS. EXPOSED EDGE SHALL NOT EXTEND MORE THAN 1/2" ABOVE FINISHED GRADE.

STAKING:

1. USE 2, 1–1/2" BY 8'–0" REBAR TREE STAKES. DO NOT DRIVE STAKE THROUGH ROOT BALL.
2. ATTACH TREE TO STAKE WITH CANVAS WEB BELTING OR RUBBER, USING A FIGURE–8 FORMATION.
3. TREES SHALL BE STAKED IN A MANNER NOT TO OBSTRUCT SIDEWALK TRAFFIC.

TAGS:

1. REMOVE TAG ONLY AFTER INSPECTION.

BUS ROUTES:

1. ON BUS ROUTES, PLANS SHALL BE COORDINATED WITH KING COUNTY METRO.

NOT TO SCALE

BOTANICAL NAME	COMMON NAME	HEIGHT + OR – 24"	DROUGHT TOLERANT	BERRIES OR FLOWERS	REQUIRES MOIST SOIL	REMARKS
GROUNDCOVERS						
ARCTOSTAPHYLOS UVA–URSI	KINNIKINNICK	–	●	●		NATIVE EVERGREEN, LOW 3 IN. TO 9 IN. HT. VERY DROUGHT TOLERANT
ERICA CARNEA	WINTER HEATH	–		●		EVERGREEN, GROWS 2 FT. HT. BY 6 FT. WIDE, FLOWERS IN SPRING
RUBUS CALYCINOIDES	BRAMBLE	–	●	●		EVERGREEN, SPREADING GROUNDCOVER, SALMON COLORED BERRIES
SHRUBS						
BERBERIS THUNBERGII (CRIMSON PYGMY)	CRIMSON PYGMY BARBERRY	–		●		SMALL DECIDUOUS SHRUB, 18 IN. TO 24 IN., PURPLE FOLIAGE
CISTUS X HYBRIDUS	WHITE ROCKROSE	+	●	●		ROUNDED EVERGREEN SHRUB, GROWS 3 FT. TO 5 FT. HT., WHITE FLOWERS, VERY DROUGHT TOLERANT
CORNUS STOLONIFERA (KELSYEI)	KELSYEI RED TWIG DOGWOOD	–			●	DECIDUOUS MOUNDING SHRUB TO 2 FT. BRIGHT RED STEMS, NEEDS IRRIGATION
FESTUCA GLAUCA	BLUE FESCUE	–				SMALL CLUMPS OF EVERGREEN GRASS
GAULTHERIA SHALLON	SALAL	+	●	●		NATIVE EVERGREEN SHRUB, GROWS 2 FT.–4 FT. NEEDS TRIMMING, DROUGHT TOLERANT, WHITE FLOWERS, BLACK BERRIES
PINUS MUGO VAR. PUMILIO	COMPACT DWARF MUGO PINE	–				EVERGREEN SHRUB, GROWS SLOWLY TO 2 FT.
PRUNUS LAUROCERASUS (MT. VERNON)	MT. VERNON LAUREL	+		●		SMALL EVERGREEN SHRUB, GROWS SLOWLY TO 3 FT. HT.
PRUNUS LAUROCERASUS (OTTO LUYKEN)	OTTO LUYKEN LAUREL	+	●	●		SPREADING EVERGREEN SHRUB TO 3 FT., WHITE FLOWERS
VIBURNUM DAVIDII	DAVID VIBURNUM	+		●		2 FT.–3 FT. BY 3 FT. TO 4 FT. WIDE, WHITE FLOWERS, BLACK BERRIES

NOTES:

1. SUITABLE FOR USE IN PLANTER STRIPS AS SHOWN IN STANDARD DRAWINGS DM.D1.1, DM.D1.2, DM.D3.1 THROUGH DM.D3.4.
2. ANY OTHER PLANTS PROPOSED WITHIN ROW REQUIRE A RECOMMENDATION BY LANDSCAPE ARCHITECT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

SHRUBS AND GROUNDCOVERS

DM.D4.1

REVISED: 02/23

BOTANICAL NAME	COMMON NAME	HEIGHT + OR – 30'	10'–20' SPREAD	20'–30' SPREAD	DROUGHT TOLERANT	SEASONAL COLOR	REQUIRES MOIST SOIL	REMARKS
ACER CAMPESTRE (EVELYN)	QUEEN ELIZABETH HEDGE MAPLE	+		●	●	●		YELLOW FALL COLOR, UPRIGHT AND ROUND
ACER GRISEUM	PAPERBARK MAPLE	–	●			●	●	RED FALL COLOR, EXFOLIATING BARK
ACER PLATANOIDES (GLOBOSUM)	GLOBE NORWAY MAPLE	–	●			●		SHORT, 15' TALL, COMPACT ROUND CANOPY
ACER TRUNCATUM X A. PLATANOIDES	KEITHSFORM NORWEGIAN SUNSET MAPLE	+		●		●		FALL YELLOW/ORANGE/RED
ACER TRUNCATUM X A. PLATANOIDES	WARRENRED PACIFIC SUNSET MAPLE	–		●		●		SHORTER, MORE SPREADING THAN KEITHSFORM
CRATAEGUS X LAVALII	LAVALLE HAWTHORN	–	●			●		RED FALL LEAVES AND FRUIT
CRATAEGUS PHAENOPYRUM	WASHINGTON HAWTHORN	–	●			●		THORNY, RED FALL COLOR
KOELREUTERIA PANICULATA	GOLDENRAIN TREE	–		●	●	●		YELLOW SUMMER FLOWERS AND FALL COLOR
MAGNOLIA GRANDIFLORA	EDITH BOGUE MAGNOLIA	–	●			●	●	WHITE BLOOMS, EVERGREEN, PYRAMIDAL, SNOW RESISTANT
MALUS (TSCHONOSKII)	TSCHONOSKII CRAB APPLE	–	●			●	●	DISEASE RESISTANT, PYRAMIDAL FORM
PRUNUS X HILLIERI (SPIRE)	SPIRE CHERRY	–	●			●		NARROW, PINK BLOOMS
PYRUS CALLERYANA (CAPITAL)	CAPITAL PEAR	+	●			●		SMALL NARROW UPRIGHT FORM
PYRUS CALLERYANA (AUTUMN BLAZE)	AUTUMN BLAZE PEAR	+		●		●		ROUND FORM, RED FALL COLOR
SORBUS X HYBRIDA	OAK–LEAF MOUNTAIN ASH	–	●		●	●		RED FRUIT, RUST FALL COLOR
TILIA CORDATA (CHANCOLE)	CHANCELLOR LINDEN	–		●		●		UPRIGHT, TIGHTLY PYRAMIDAL

NOTES:

1. THESE TREES ARE SUITABLE FOR USE IN PLANTER STRIPS ALONG 2–LANE ROADS AND UNDER UTILITY LINES.
2. AVERAGE TREE SPACING: 25'–30' O.C.
3. ANY OTHER PLANTS PROPOSED WITHIN ROW REQUIRE A RECOMMENDATION BY LANDSCAPE ARCHITECT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

SMALL TREES

DM.D4.2

REVISED: 02/23

BOTANICAL NAME	COMMON NAME	HEIGHT + OR – 40'	10'–20' SPREAD	20'–30' SPREAD	30'–40' SPREAD	DROUGHT TOLERANT	SEASONAL COLOR	REQUIRES MOIST SOIL	REMARKS
ACER X FREEMANII (JEFFERSRED)	AUTUMN BLAZE MAPLE	+			●	●	●		BRILLIANT ORANGE FALL COLOR, UPRIGHT AND ROUND
ACER NIGRUM (GREENCOLUMN)	GREENCOLUMN MAPLE	+	●				●		UPRIGHT OVAL FORM, YELLOW/ORANGE FALL COLOR
ACER PLATANOIDES (COLUMNAR)	COLUMNAR NORWAY MAPLE	–	●				●		VERY NARROW, YELLOW FALL COLOR
ACER PLATANOIDES (EMERALD QUEEN)	EMERALD QUEEN MAPLE	+			●		●		DURABLE STANDARD, OVAL UPRIGHT
ACER PLATANOIDES (COLUMNARBROAD)	PARKWAY MAPLE	–		●			●		GOOD FORM, DURABLE, YELLOW FALL COLOR
ACER RUBRUM (BOWHALL)	BOWHALL MAPLE	–	●				●	●	VERY NARROW, ORANGE FALL COLOR
ACER RUBRUM (KARPICK)	KARPICK MAPLE	–	●				●	●	MEDIUM NARROW, YELLOW/ORANGE FALL COLOR
ACER RUBRUM (SCARSEN)	SCARLET SENTINEL MAPLE	–	●				●	●	UPRIGHT BRANCHING HABIT
AESCULUS X CARNEA (BRIOTTII)	BRIOTTI RED HORSECHESTNUT	–			●			●	LOW, WIDE, AND ROUND
BETULA JACQUEMONTII	JACQUEMONTII BIRCH	–		●				●	BRILLIANT WHITE BARK
CARPINUS BETULUS (FASTIGIATA)	PYRAMIDAL EUROPEAN HORNBEAM	–		●		●	●		STARTS NARROW, BROADENS TO OVAL WITH AGE
CERCIDIPHYLLUM JAPONICUM	KATSURA TREE	–			●		●	●	VARIABLE UPRIGHT FORM, APRICOT FALL COLOR
FRAXINUS OXYCARPA (RAYWOOD)	RAYWOOD ASH	+		●			●	●	BRIGHT REDDISH PURPLE FALL COLOR
FRAXINUS PENNSYLVANICA (PATMORE)	PATMORE ASH	+			●		●		EXTREMELY HARDY, UPRIGHT BRANCHES
FRAXINUS AMERICANA (AUTUMN APPLAUSE)	AUTUMN APPLAUSE ASH	+		●			●		GOOD PURPLE FALL COLOR, SMALL AND DENSE
FRAXINUS PENNSYLVANICA (URBANITE)	URBANITE ASH	+			●		●		TALL, BROAD, AND UPRIGHT WITH BRONZE FALL COLOR

NOTES:

1. STREET TREES IN PLANTER STRIPS ALONG CITY ROADWAYS ARE TO BE FROM THIS LIST OF MEDIUM SIZE TREES, UNLESS SPECIAL CONDITIONS SUCH AS OVERHEAD WIRES OR WIDE PLANTING AREAS FAVOR SMALL OR LARGE TREES AS DETERMINED BY THE CITY TRANSPORTATION ENGINEER.
2. AVERAGE TREE SPACING: 35'–40' O.C.
3. ANY OTHER PLANTS PROPOSED WITHIN ROW REQUIRE A RECOMMENDATION BY LANDSCAPE ARCHITECT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

MEDIUM TREES

DM.D4.3

REVISED: 02/23

BOTANICAL NAME	COMMON NAME	HEIGHT + OR – 40'	10'–20' SPREAD	20'–30' SPREAD	30'–40' SPREAD	DROUGHT TOLERANT	SEASONAL COLOR	REQUIRES MOIST SOIL	REMARKS
GINKGO BILOBA (AUTUMN GOLD)	AUTUMN GOLD GINKGO	+			●		●		BROADLY PYRAMIDAL, GOLDEN YELLOW FALL COLOR
GINKGO BILOBA (PRINCETON SENTRY)	PRINCETON SENTRY GINKGO	+	●				●		NARROWLY PYRAMIDAL, BRIGHT YELLOW FALL COLOR
GLEDITSIA TRIACANTHOS (SHADEMASTER)	SHADEMASTER HONEYLOCUST	+			●		●		LACY, OPEN FORM, YELLOW FALL COLOR
LIQUIDAMBAR STYRACIFLUA (MORAINE)	MORAINE SWEETGUM	–		●			●		COLD HARDY, BURGUNDY FALL COLOR
LIQUIDAMBAR STYRACIFLUA (ROTUNDILOBA)	ROTUNDILOBA SWEETGUM	+		●			●		FRUITLESS, ROUNDED LOBES, ORANGE TO PURPLE FALL COLOR
LIQUIDAMBAR STYRACIFLUA (WORPLESDON)	WORPLESDON SWEETGUM	–		●			●		BROADLY PYRAMIDAL, ORANGE AND PURPLE FALL COLOR
PRUNUS SARGENTII (COLUMNARIS)	COLUMNAR SARGENT CHERRY	–	●				●		PINK BLOOMS, ORANGE/RED FALL COLOR, VASE SHAPED
PYRUS CALLERYANA (ARISTOCRAT)	ARISTOCRAT PEAR	–		●			●		WHITE BLOOMS, RED FALL COLOR, SPREADING BRANCHES
PYRUS CALLERYANA (GLEN'S FORM)	CHANTICLEER FLOWERING PEAR	–	●				●		SIMILAR TO ARISTOCRAT, NARROWER
PYRUS CALLERYANA (REDSPIRE)	REDSPIRE PEAR	–		●			●		WHITE SPRING BLOOMS, DENSE AND SYMMETRICAL
QUERCUS ROBUR (FASTIGIATA)	SKYROCKET OAK	+	●						UNIFORMLY NARROW
ROBINIA X AMBIGUA (IDAHOENSIS)	PINK IDAHO LOCUST	–		●		●			FOR DRY LOCATIONS, ROSE–PINK FRAGRANT FLOWERS
SORBUS AUCUPARIA (MICHRED)	CARDINAL ROYAL MTN. ASH	–		●			●		RED BERRIES, UPRIGHT BRANCHES, NARROW OVAL
TILIA CORDATA (GREENSPIRE)	GREENSPIRE LINDEN	+			●			●	WIDER PYRAMIDAL FORM, SYMMETRICAL
ZELKOVA SERRATA (VILLAGE GREEN)	VILLAGE GREEN ZELKOVA	+			●		●		VIGOROUS, WIDE VASE FORM, RUSTY RED FALL COLOR

NOTES:

1. STREET TREES IN PLANTER STRIPS ALONG CITY ROADWAYS ARE TO BE FROM THIS LIST OF MEDIUM SIZE TREES, UNLESS SPECIAL CONDITIONS SUCH AS OVERHEAD WIRES OR WIDE PLANTING AREAS FAVOR SMALL OR LARGE TREES AS DETERMINED BY THE CITY TRANSPORTATION ENGINEER.
2. AVERAGE TREE SPACING: 35'–40' O.C.
3. ANY OTHER PLANTS PROPOSED WITHIN ROW REQUIRE A RECOMMENDATION BY LANDSCAPE ARCHITECT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

MEDIUM TREES

DM.D4.4

REVISED: 02/23

BOTANICAL NAME	COMMON NAME	HEIGHT + OR – 50'	8' MIN. PLANTER WIDTH	10' MIN. PLANTER WIDTH	20'–30' SPREAD	20' TO 40' SPREAD	OVER 40' SPREAD	DROUGHT TOLERANT	SEASONAL COLOR	REQUIRES MOIST SOIL	REMARKS
ABIES GRANDIS	GRAND FIR	+		●			●			●	TALL EVERGREEN CONIFER
ACER SACCHARUM (BONFIRE)	BONFIRE MAPLE	+	●				●		●		FAST GROWING, ORANGE/RED FALL COLOR
ACER SACCHARUM (COMMEMORATION)	COMMEMORATION MAPLE	+	●			●			●		ORANGE FALL COLOR, RAPID GROWING
ACER SACCHARUM (GREEN MOUNTAIN)	GREEN MOUNTAIN MAPLE	–	●			●			●		HARDY, RED FALL COLOR
CALOCEDRUS DECURRENS	INCENSE CEDAR	+	●		●			●			EVERGREEN, NARROW FORM
LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	+				●			●	●	PYRAMIDAL FORM, YELLOW/RED/PURPLE FALL COLOR
LIRIODENDRON TULIPIFERA	TULIP TREE	+				●					STRONG CENTRAL TRUNK, NARROW FORM
NYSSA SYLVATICA	BLACK TUPELO	–	●		●				●		ORANGE FALL COLOR, SHAPE SPREADS WITH AGE
PLATANUS X ACERIFOLIA (BLOODGOOD)	BLOODGOOD LONDON PLANETREE	+		●		●			●		LARGE SPREADING TREE, PATCHY BARK
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	+		●		●		●			VERY TALL EVERGREEN CONIFER
QUERCUS COCCINEA	SCARLET OAK	+		●			●		●		UPRIGHT GROWTH, OVAL, BRILLIANT RED FALL COLOR
QUERCUS RUBRA	RED OAK	+					●		●		FAST GROWING, ROUNDED SHAPE, RED FALL COLOR
THUJA PLICATA	WESTERN RED CEDAR	+		●		●				●	FOR MOIST OR SHADY LOCATIONS
ULMUS (HOMESTEAD)	HOMESTEAD ELM	+	●			●					FAST GROWTH, RESISTS DUTCH ELM DISEASE
ULMUS (PIONEER)	PIONEER ELM	+		●			●		●		RESISTS DUTCH ELM DISEASE, YELLOW FALL COLOR

NOTES:

1. NOT FOR USE IN STANDARD PLANTER STRIPS OR UNDER UTILITY WIRES. USE FOR BACK OF SIDEWALK OR LARGE PLANTING STRIPS 8' TO 10' WIDE.
2. CONIFERS ONLY ON BACK OF SIDEWALK, AND OUTSIDE OF SIGHT TRIANGLES.
3. AVERAGE TREE SPACING: 35'–40' O.C.
3. ANY OTHER PLANTS PROPOSED WITHIN ROW REQUIRE A RECOMMENDATION BY LANDSCAPE ARCHITECT.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

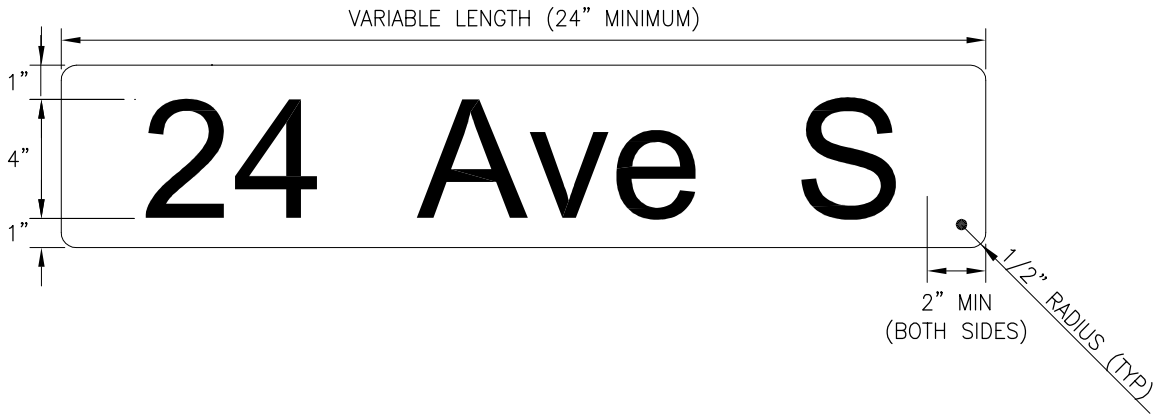
SAILS WITH PRIDE

LARGE TREES

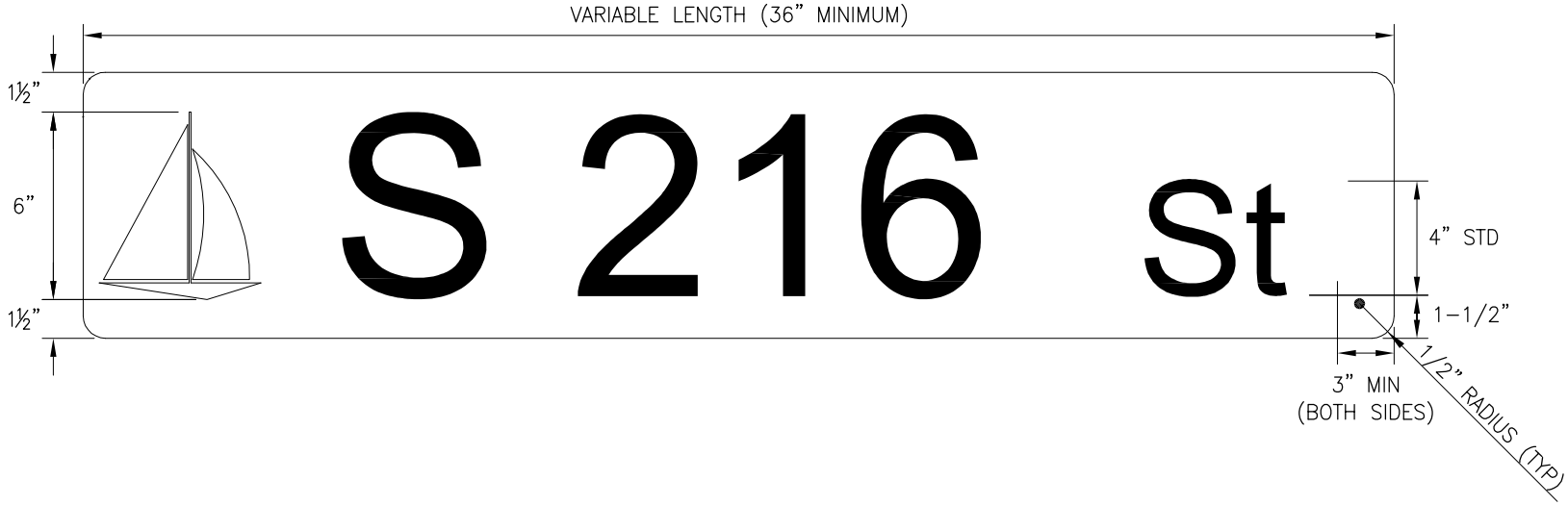
DM.D4.5

REVISED: 02/23

AT LOCAL ROAD INTERSECTIONS ONLY:



AT OR ALONG ARTERIALS:



SEE STANDARD DRAWING DM.E1.3 FOR STREET NAME SIGN NOTES AND DETAILS

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

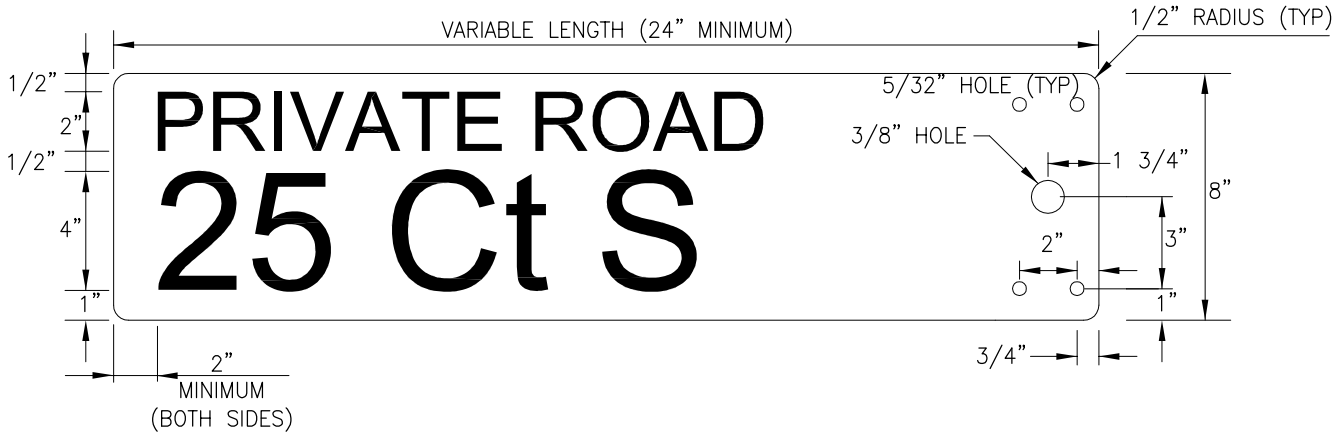
SAILS WITH PRIDE

STREET NAME SIGN PUBLIC STREET

DM.E1.1

REVISED: 02/23

AT NON-ARTERIAL INTERSECTIONS ONLY:



SEE STANDARD DRAWING DM.E1.3 FOR STREET NAME SIGN NOTES AND DETAILS

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

STREET NAME SIGN PRIVATE STREET

DM.E1.2

REVISED: 02/23

NOTES:

GENERAL REQUIREMENTS

1. PROVIDE SIGN CUT SHEET FOR REVIEW OF ALL SIGNS BY PUBLIC WORKS DIRECTOR PRIOR TO INSTALLATION.

LETTERING REQUIREMENTS

1. STANDARD LETTER SERIES "B" OR "C" (OR "D" FOR A PRIVATE STREET NAME SIGN).
2. DO NOT USE ORDINATE SUFFIXES (1ST, 2ND, 3RD, etc.) WITH NUMBERED STREET NAMES (e.g., 110 AVE, NOT 110TH AVE).
3. USE STANDARD ROADWAY DESIGNATION ABBREVIATIONS AS LISTED ON THIS SHEET.

SIGN MATERIAL REQUIREMENTS

1. SHEET ALUMINUM SIGN SHALL BE CONSTRUCTED OF ALLOY 6061–T6, 5052–H36 OR 5052–H38. THICKNESS SHALL BE 0.080" OR 14 GAUGE.
2. SIGN FACE MATERIAL SHALL BE MADE OF BLUE REFLECTIVE SHEETING WITH WHITE REFLECTIVE LETTERING, ALL HIGH INTENSITY GRADE.
3. STREET NAMES SHALL BE ON BOTH SIDES OF SIGN.

SIGN POST REQUIREMENTS

1. SIGN POSTS SHALL BE PERFORATED SQUARE STEEL, 2"X2", CONFORMING TO ASTM A653. THICKNESS SHALL BE 0.19" OR 12 GAUGE. BASES SHALL BE A HEAVY DUTY 30" ANCHORING SYSTEM OR 8" STUB X 7" BASE X ¼" STEEL BASE PLATE SURFACE MOUNT ANCHOR.
2. ONLY WHEN SPECIFIED, SIGN POSTS SHALL BE WESTERN RED CEDAR, TREATED DOUGLAS FIR OR TREATED HEM–FIR WHICH ARE 4" X 4" NOMINAL DIMENSION.

HARDWARE PUBLIC ROAD SIGNS

1. SIGN BRACKET SHALL BE DIE CAST HIGH STRENGTH ALUMINUM ALLOY DESIGNED FOR MOUNTING ON TOP OF THE 4" X 4" WOODEN POST. SLOTS FOR SIGNS SHALL HAVE A NOMINAL LENGTH OF 3" WITH TWO 5/16" ZINC PLATED STANDARD ALLEN WRENCH SET SCREWS.
2. ALL OTHER HARDWARE AND FASTENERS SHALL BE GALVANIZED STEEL.

HARDWARE PRIVATE ROAD SIGNS

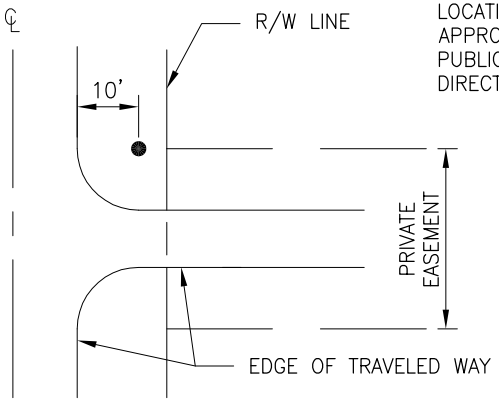
1. USE 3/8" X 2" GALVANIZED LAG BOLT WITH NYLON WASHER FOR CENTER MOUNTING HOLE. SUPPLEMENT LAG BOLT WITH FOUR 2–1/2" 8 D GALVANIZED NAILS IN THE OUTER HOLES.

SIGN LOGO

1. SAIL BOAT LOGO SHALL BE MADE OF HIP SHEETING FOR GROUND MOUNTED SIGNS AND DIAMOND GRADE VIP SHEETING FOR MAST ARM MOUNTED SIGNS.
2. SEE STANDARD DRAWING DM.E1.5 FOR SAIL BOAT DETAILS.

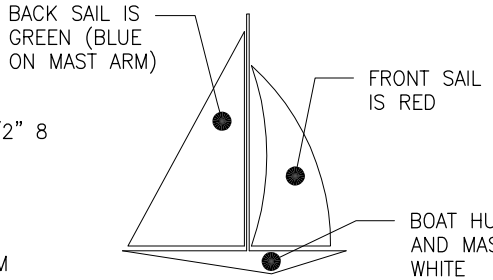
ROADWAY DESIGNATION ABBREVIATIONS:

Ave – AVENUE
Bv – BOULEVARD
Cir – CIRCLE
Ct – COURT
Dr – DRIVE
Hwy – HIGHWAY
Pkwy – PARKWAY
Pl – PLACE
Ln – LANE
Rd – ROAD
Way – WAY
S – SOUTH



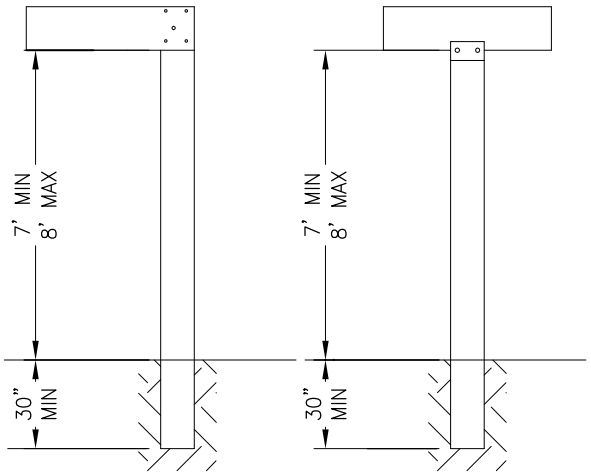
VARIATION FROM THIS LOCATION BY WRITTEN APPROVAL OF THE PUBLIC WORKS DIRECTOR ONLY.

SIGN PLACEMENT PRIVATE ROAD



SIGN LOGO

CENTER SIGN ON POST



SIGN INSTALLATION PRIVATE ROAD

SIGN INSTALLATION PUBLIC ROAD

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

STREET NAME SIGN NOTES AND DETAILS

DM.E1.3

REVISED: 02/23

NOTES:

GENERAL REQUIREMENTS

1. PROVIDE SIGN CUT SHEET FOR REVIEW OF ALL SIGNS BY CITY TRANSPORTATION ENGINEER PRIOR TO INSTALLATION.

LETTERING REQUIREMENTS

1. STANDARD LETTER SERIES "C".
2. DO NOT USE ORDINATE SUFFIXES (1ST, 2ND, 3RD, etc.) WITH NUMBERED STREET NAMES (e.g., 16 Ave S, NOT 16TH Ave S).
3. USE STANDARD ROADWAY DESIGNATION ABBREVIATIONS AS LISTED ON THIS SHEET.

SIGN MATERIAL REQUIREMENTS

1. SHEET ALUMINUM SIGN SHALL BE CONSTRUCTED OF ALLOY 6061–T6, 5052–H36 OR 5052–H38. THICKNESS SHALL BE 0.080" OR 14 GAGE.
2. SIGN BACKGROUND SHALL BE GREEN, WITH 3M DIAMOND GRADE VISUAL IMPACT PERFORMANCE (VIP) SHEETING, OR APPROVED EQUAL.
3. SIGN LEGEND SHALL BE WHITE, WITH 3M DIAMOND GRADE VISUAL IMPACT PERFORMANCE (VIP) CUT OUT LETTERS, OR 3M SCOTCHLITE EC FILM SERIES 1170, OR APPROVED EQUAL. COPY MAY ALSO BE SCREENED ONTO BACKGROUND. SEE SECTION 9–28 OF THE WSDOT STANDARD SPECIFICATIONS.

SIGN ATTACHMENT REQUIREMENTS

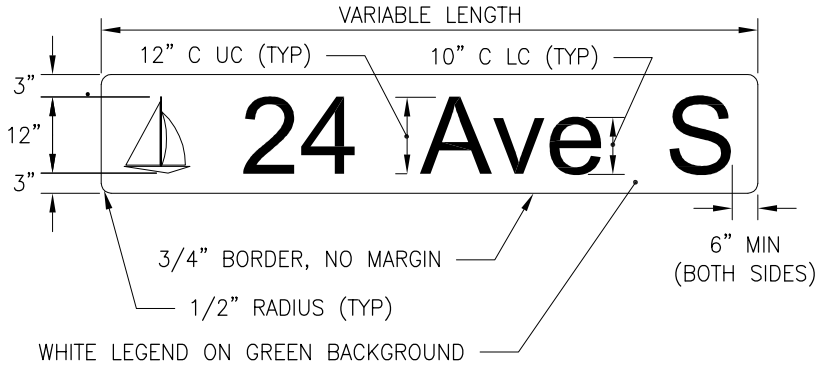
1. FOR SIGN ATTACHMENT DETAILS, SEE LATEST WSDOT STANDARD PLANS.

SIGN LOGO

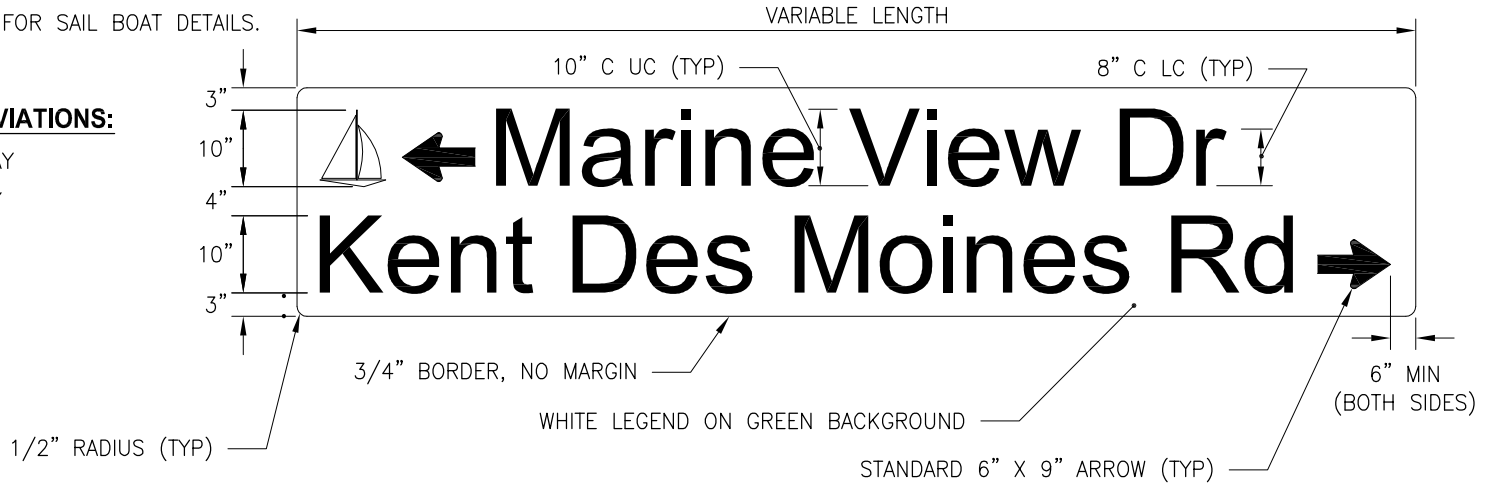
1. SAIL BOAT LOGO SHALL BE MADE OF HIP SHEETING FOR GROUND MOUNTED SIGNS AND DIAMOND GRADE VIP SHEETING FOR MAST ARM MOUNTED SIGNS.
2. SEE STANDARD DRAWING DM.E1.5 FOR SAIL BOAT DETAILS.

ROADWAY DESIGNATION ABBREVIATIONS:

Ave – AVENUE	Hwy – HIGHWAY
Bv – BOULEVARD	Pkwy– PARKWAY
Cir – CIRCLE	Pl – PLACE
Ct – COURT	Ln – LANE
Dr – DRIVE	Rd – ROAD
	Way – WAY
	S – SOUTH



SINGLE LINE



DOUBLE LINE

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

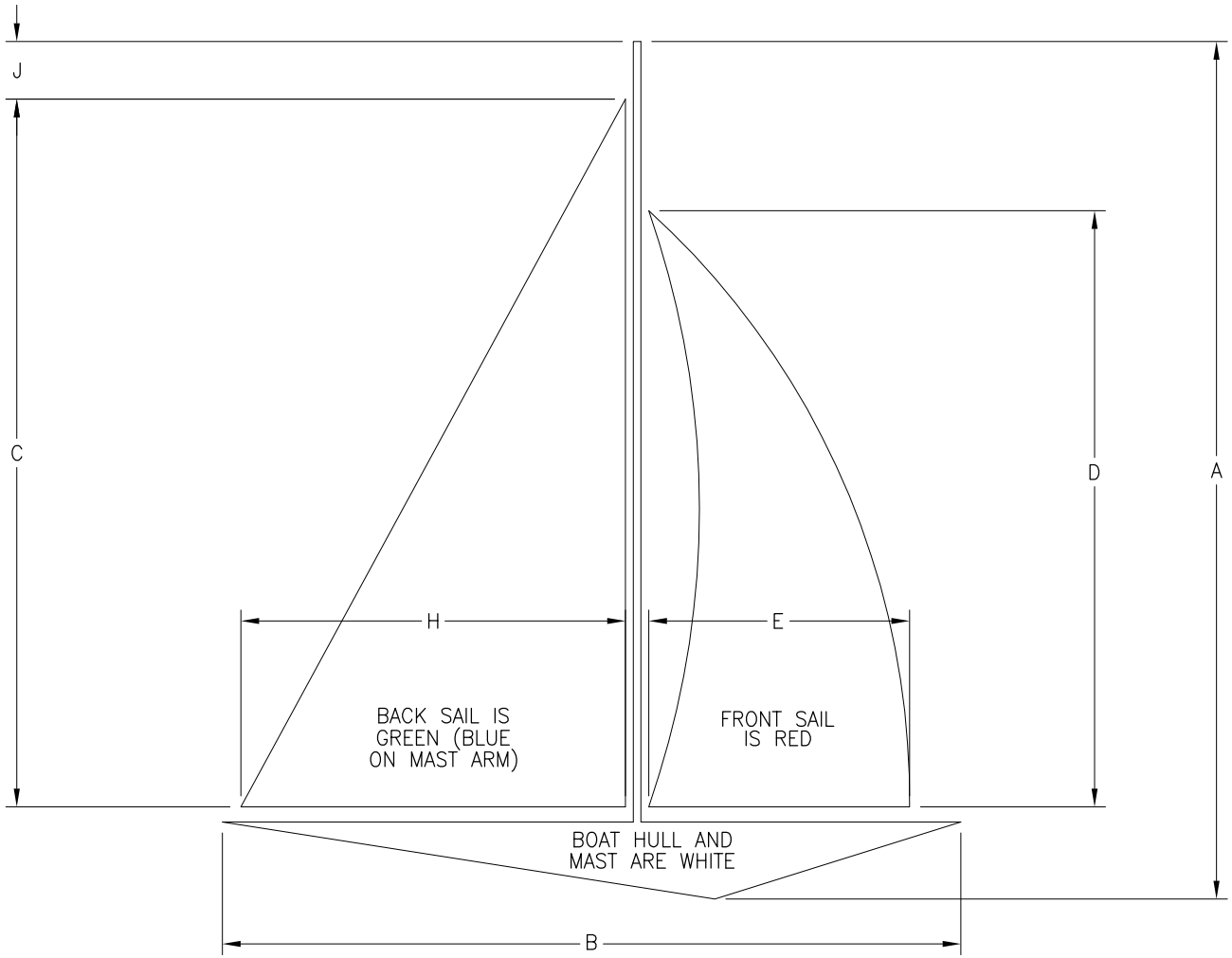
STREET NAME SIGN MAST ARM

DM.E1.4

REVISED: 02/23

SIGN LOGO NOTES:

1. SAIL BOAT LOGO SHALL BE MADE OF HIP SHEETING FOR GROUND MOUNTED SIGNS AND DIAMOND GRADE VIP SHEETING FOR MAST ARM MOUNTED SIGNS.



SIGN LOGO

DIMENSIONS (IN)									
TEXT SIZE	A	B	C	D	E	F (R)	G (R)	H	J
4"	4	3.333	3.333	2.747	1.217	4.197	3.708	1.794	.2360
6"	6	5.000	5.000	4.120	1.825	6.291	5.562	2.691	.3540
10"	10	8.333	8.333	6.866	3.042	10.485	9.270	4.484	.5910
12"	12	10.000	10.000	8.240	3.650	12.582	11.124	5.381	.709

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

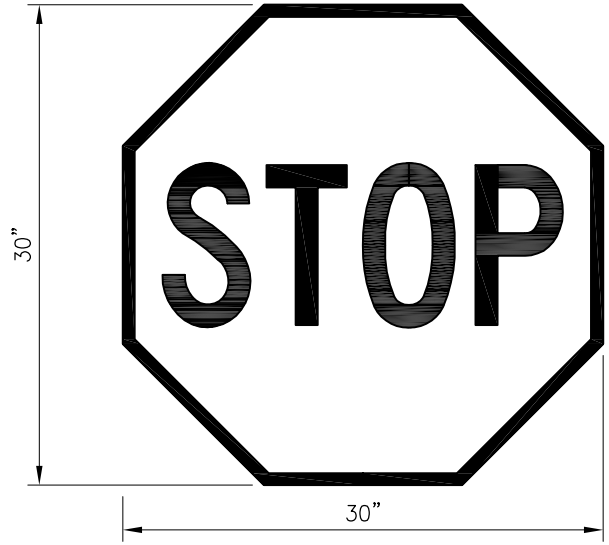
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

SAIL BOAT DETAILS FOR STREET NAME SIGNS

DM.E1.5

REVISED: 02/23



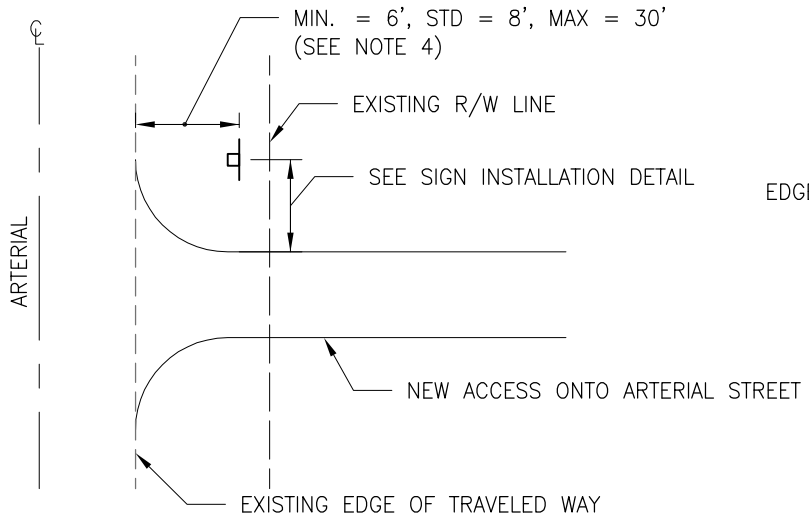
STOP SIGN (R1-1)

NOTES:

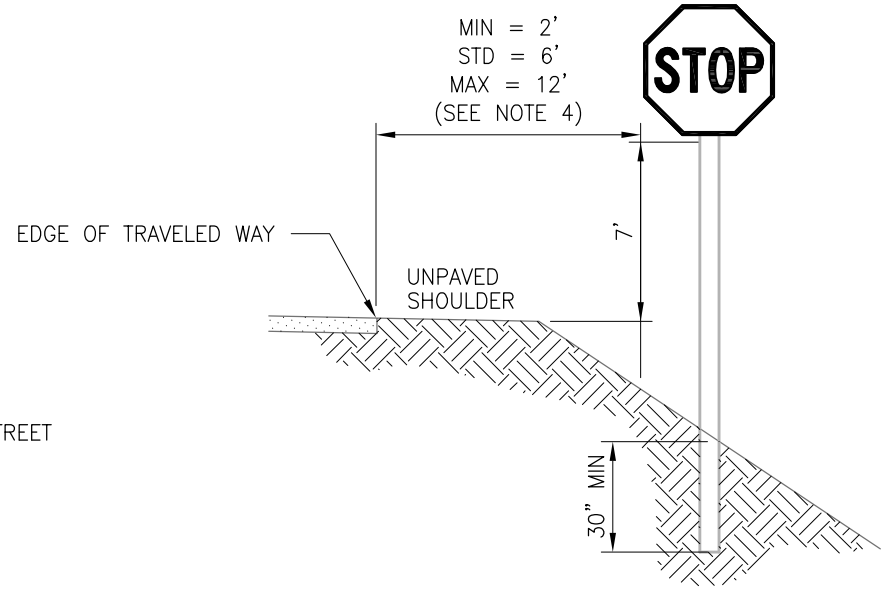
1. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE LATEST WSDOT STANDARD PLAN AND STANDARD SPECIFICATIONS, SECTION 9-28. SIGN FACE MATERIAL SHALL BE HIGH INTENSITY SHEETING.
2. SIGNS SHALL BE VISIBLE ON THE APPROACHING ROADWAY FROM THE MINIMUM DISTANCES SHOWN IN THE FOLLOWING TABLE:

SPEED LIMIT (MPH)	VISIBILITY DISTANCE (FEET)
25	240
30	295
35	350
40	415
45	485

3. ALL CLEARING WITHIN CITY RIGHT-OF-WAY TO MAKE THE SIGN VISIBLE IS THE RESPONSIBILITY OF THE APPLICANT. APPROVED ROAD CONSTRUCTION PLANS OR A PERMIT FROM THE CITY IS NECESSARY BEFORE WORK COMMENCES.
4. VARIATION FROM THIS LOCATION BY WRITTEN APPROVAL OF THE CITY TRANSPORTATION ENGINEER.



SIGN PLACEMENT



SIGN INSTALLATION DETAIL

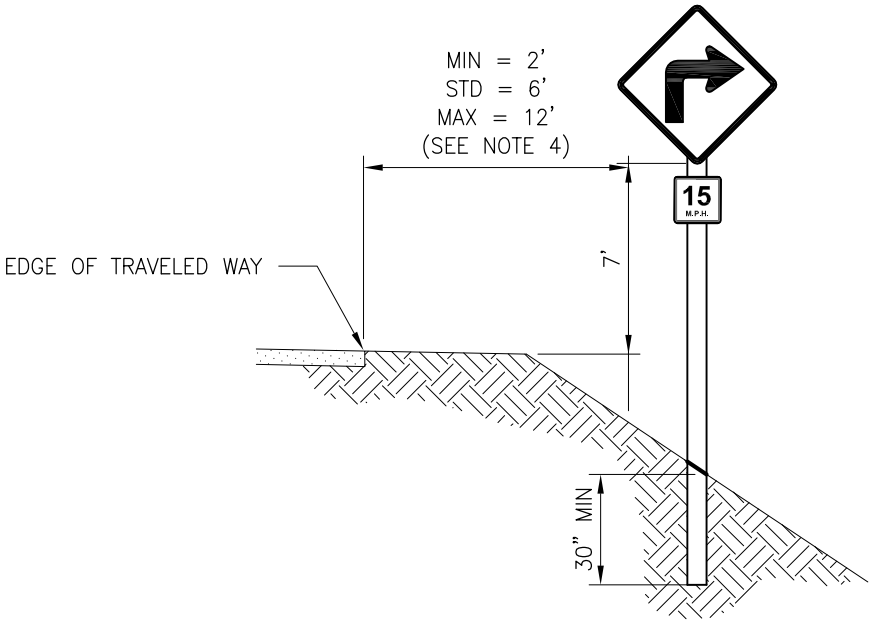
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

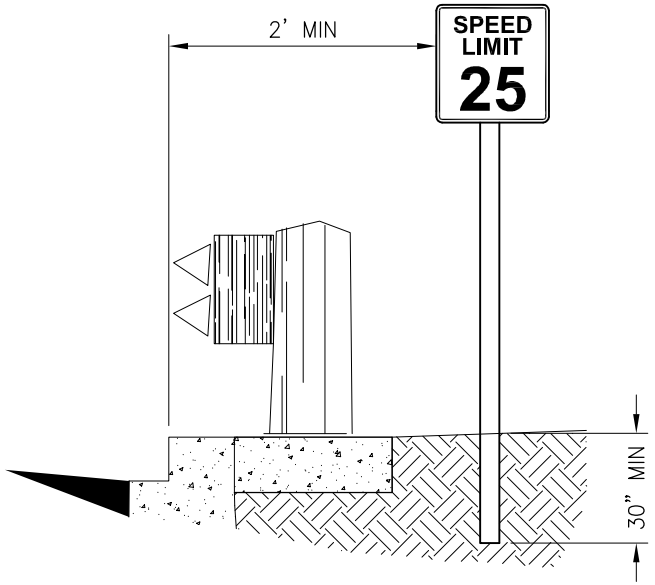
STOP SIGN INSTALLATION

DM.E2.1

REVISED: 02/23



SIGN INSTALLATION DETAIL



SIGN INSTALLATION DETAIL

NOTES:

1. ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE LATEST WSDOT STANDARD PLAN AND STANDARD SPECIFICATIONS, SECTION 9-28. SIGN FACE MATERIAL SHALL BE HIGH INTENSITY SHEETING.
2. SIGNS SHALL BE VISIBLE ON THE APPROACHING ROADWAY FROM THE MINIMUM DISTANCES SHOWN IN THE FOLLOWING TABLE:

SPEED LIMIT (MPH)	VISIBILITY DISTANCE (FEET)
25	240
30	295
35	350
40	415
45	485

3. ALL CLEARING WITHIN CITY RIGHT-OF-WAY TO MAKE THE SIGN VISIBLE IS THE RESPONSIBILITY OF THE APPLICANT. APPROVED ROAD CONSTRUCTION PLANS OR A PERMIT FROM THE CITY IS NECESSARY BEFORE WORK COMMENCES.
4. VARIATION FROM THIS LOCATION BY WRITTEN APPROVAL OF THE CITY TRANSPORTATION ENGINEER.
5. TO OBTAIN MAXIMUM REFLECTION FROM TRAFFIC SIGNS, AND TO MINIMIZE GLARE, SIGNS SHALL BE INSTALLED SO THAT THE VERTICAL AXIS IS PLUMB AND THE HORIZONTAL AXIS IS AT AN ANGLE OF 93° WITH THE TRAFFIC LANE THAT THE SIGN SERVES.

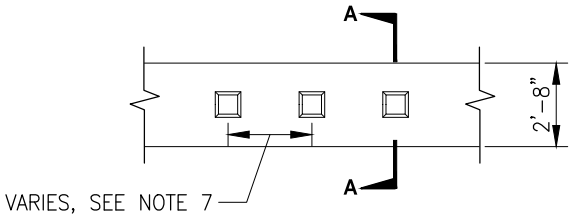
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

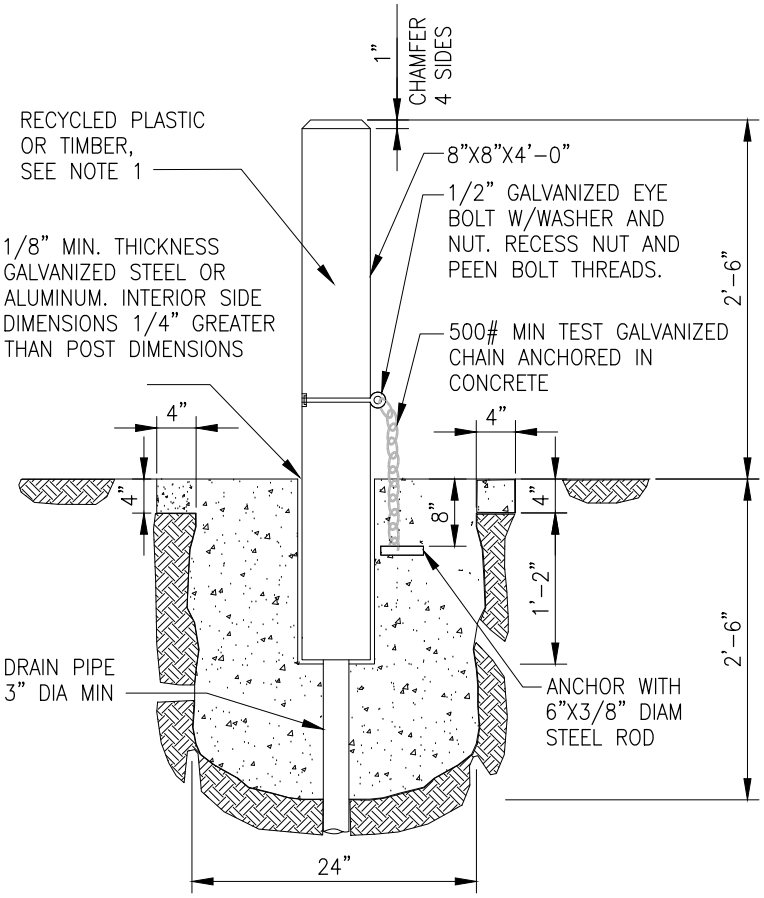
REGULATORY AND WARNING SIGN INSTALLATIONS

DM.E2.2

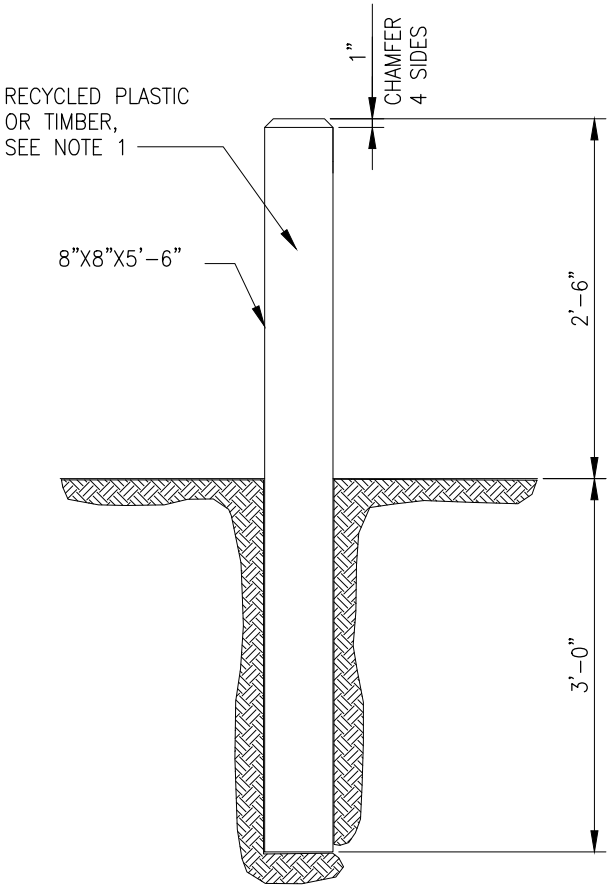
REVISED: 02/23



REMOVABLE BOLLARD PLAN



REMOVABLE BOLLARD SECTION A



FIXED BOLLARD

NOTES:

1. RECYCLED PLASTIC BOLLARD SHALL BE WHITE. TIMBER SHALL BE DOUGLAS FIR, DENSE CONSTRUCTION GRADE, AND SHALL BE PRESSURE TREATED WITH A WATERBORNE PRESERVATIVE (ACA, CCA, ACZA) IN ACCORDANCE WITH THE REQUIREMENTS OF SEC 9-09.3 (1) OF THE WSDOT/APWA STANDARD SPECIFICATIONS. TOP 5 IN. OF TIMBER SHALL BE PAINTED WHITE.
2. STEEL TUBE SHALL CONFORM TO ASTM A53 GRADE A.
3. NUTS, BOLTS, & WASHERS SHALL CONFORM TO ASTM A307.
4. ALL STEEL PARTS SHALL BE GALVANIZED.
5. CONCRETE SHALL BE CLASS 4000.
6. SEE SEC 5.08.
7. MIN 50 IN. SPACING ON TRAILS LESS THAN 10 FT WIDE. 60 IN. SPACING ON TRAILS 10 FT OR WIDER.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

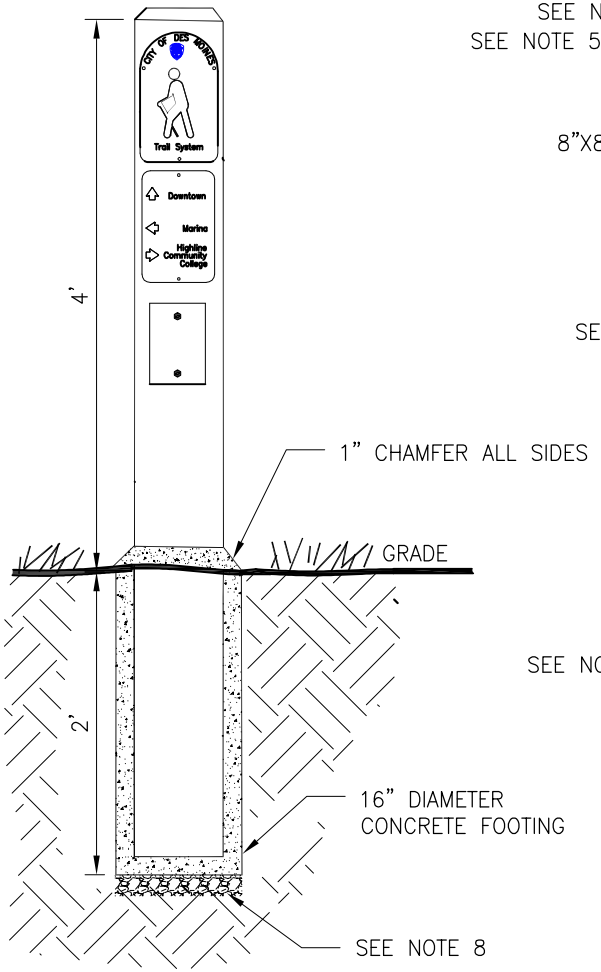
BOLLARDS

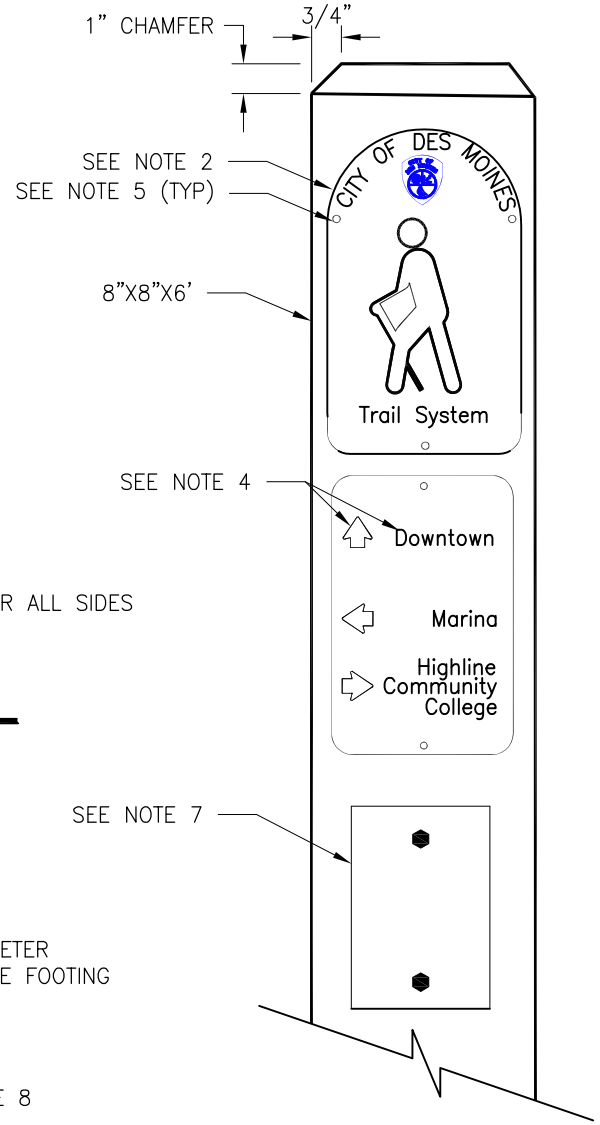
DM.E3.1

REVISED: 02/23

NOTES:

1. SEE DESIGN PLANS AND SPECIFICATIONS FOR TEXT AND SYMBOLS ON BOLLARD. SHOP DRAWINGS ARE REQUIRED FOR ALL SIGNS, AND MUST BE APPROVED BY THE CITY TRANSPORTATION ENGINEER.
2. ALL SYMBOLS, CITY OF DES MOINES LOGO, AND TEXT SHALL BE PAINTED OPAQUE WHITE UNLESS SPECIFIED OTHERWISE. USE HELVETICA FONT WITH ½"CAPS. TRANSITION STRAIGHT EDGE OF SIGN WITH 1–½" RADIUS TO A 10" RADIUS LOCATED AT THE TOP OF THE BOLLARD SIGN.
3. SIGN PLATES SHALL BE ⅛" THICK ALUMINUM LETTERED AND PAINTED AS SPECIFIED BY THE CITY. TIGER DRYLAC SERIES 49 SMOOTH, GLOSSY POLYESTER SYSTEM, POWDER COAT WITH RAC 5018 (BLUE) OR PERFORMANCE EQUIVALENT AND COLOR MATCH.
4. TRAIL NAMES AND ARROWS SHALL BE WHITE, WEATHER RESISTANT, PRESSURE SENSITIVE VINYL. USE 3M SCHOTCHAL #3470 OR EQUAL. USE HELVETICA FONT WITH ¾" HIGH CAPITAL LETTERS.
5. MOUNT SIGNS TO TWO SIDES OF BOLLARD FACING TRAVEL DIRECTION. USE 5¾" x ⅛" STAINLESS STEEL ALLEN HEAD WOOD SCREWS AND WASHERS.
6. BOLLARD SHALL BE 6' (LONG) x 8" (WIDE) x 8" (THICK) AND SHALL BE PRESSURE TREATED IN ACCORDANCE WITH SECTION 9–09.3(4) OF THE WSDOT STANDARD SPECIFICATIONS. SET POST 2' DEEP BELOW GRADE. CONCRETE SHALL BE CLASS 3000. 1" CONCRETE CHAMFER ALL SIDES ABOVE GRADE.
7. A HIGH INTENSITY DELINEATOR SHALL BE ATTACHED TO ALL BOLLARDS THAT ARE LOCATED WITHIN THE CITY OF DES MOINES. USE 4" x 8" WHITE COLOR ONLY. INSTALL ON ALL SIDES WHICH ARE VISIBLE FROM TRAIL. FASTEN WITH STAINLESS STEEL LAG SCREWS.
8. INSTALL BASE COURSE OF ¾" MINUS CRUSHED ROCK, 4" THICK BENEATH BOLLARD CONCRETE FOOTING AS SHOWN.
9. BOLLARDS SHALL NOT BE PLACED WITHIN 10 FEET OF THE EDGE–OF–TRAVELED WAY OF AN ADJACENT STREET.





NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

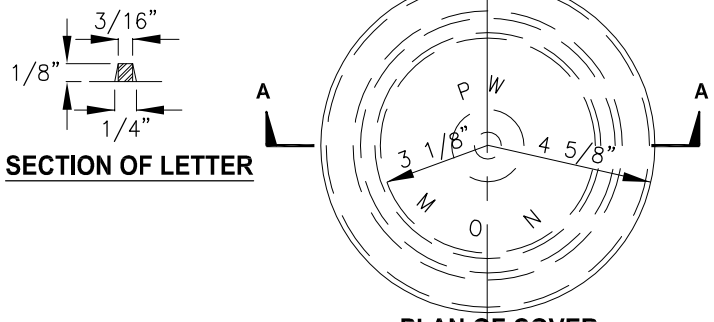
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

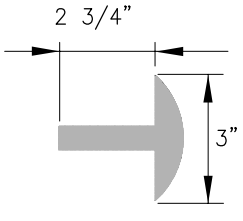
DIRECTIONAL BOLLARDS

DM.E3.2

REVISED: 02/23

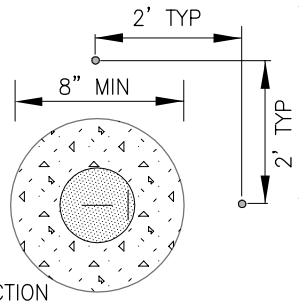


PLAN OF COVER

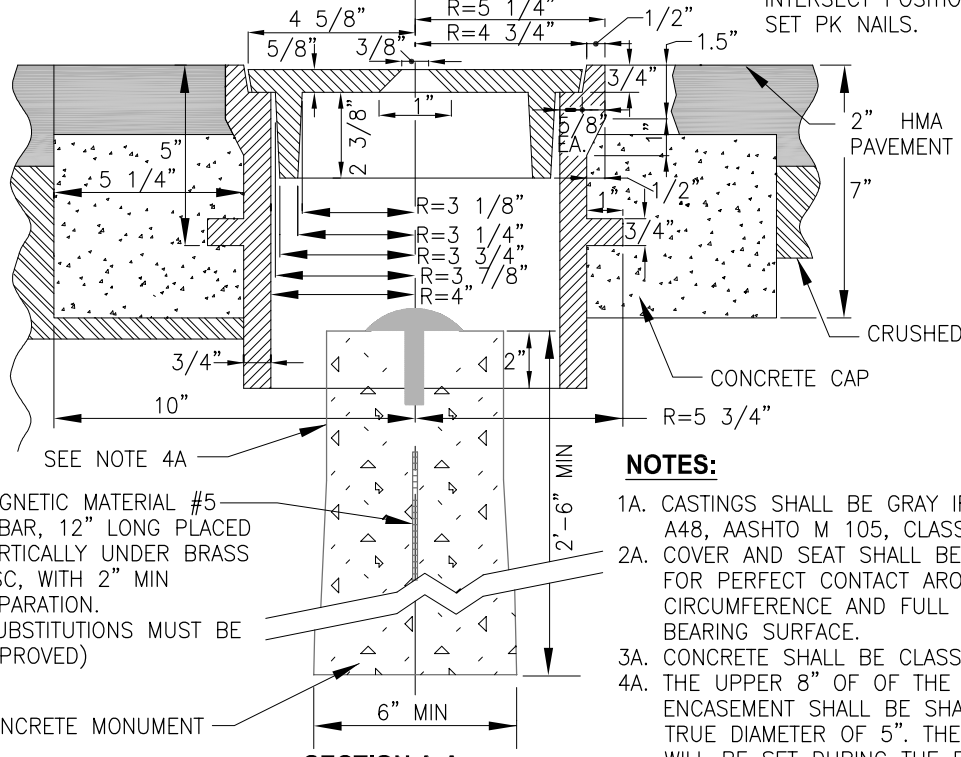


BRASS DISC

STRADDLES, A STRING–LINE INTERSECTION OF THE MONUMENT INTERSECT POSITION AND SET PK NAILS.



TOP VIEW



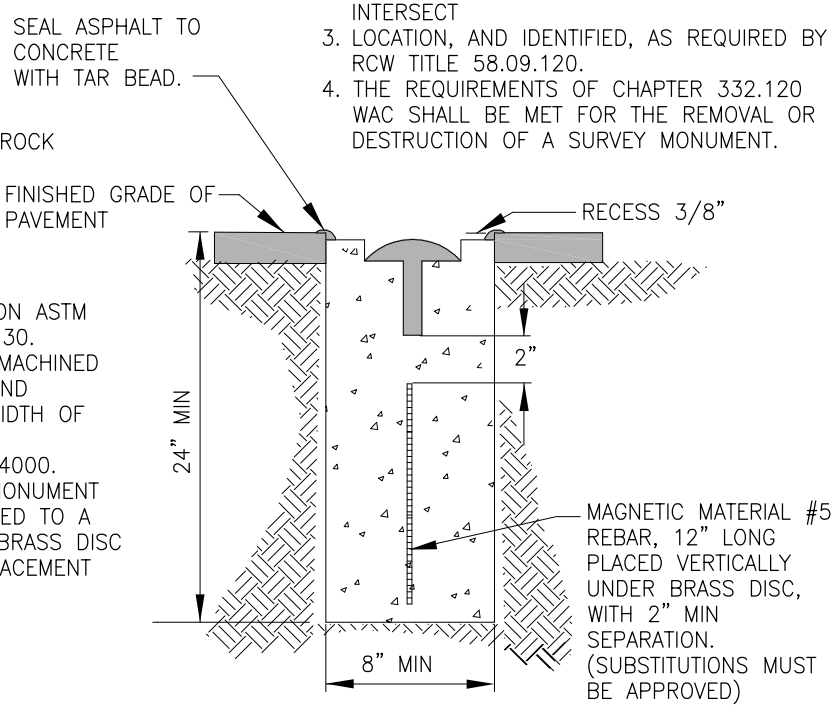
SECTION A-A

NOTES:

1A. CASTINGS SHALL BE GRAY IRON ASTM A48, AASHTO M 105, CLASS 30.
2A. COVER AND SEAT SHALL BE MACHINED FOR PERFECT CONTACT AROUND CIRCUMFERENCE AND FULL WIDTH OF BEARING SURFACE.
3A. CONCRETE SHALL BE CLASS 4000.
4A. THE UPPER 8" OF OF THE MONUMENT ENCASEMENT SHALL BE SHAPED TO A TRUE DIAMETER OF 5". THE BRASS DISC WILL BE SET DURING THE PLACEMENT OF THE CONCRETE.

NOTES:

1. THE HOLE FOR THE MONUMENT SHALL BE CUT AFTER THE NEW PAVEMENT HAS BEEN CONSTRUCTED. THE UPPER 8" OF THE MONUMENT ENCASEMENT SHALL BE SHAPED TO A TRUE DIAMETER OF 8". THE BRASS DISC WILL BE SET DURING THE PLACEMENT OF THE CONCRETE.
2. MONUMENT CORE MATERIAL SHALL MEET OR EXCEED "RAPID SET NON–SHRINK, NON–METALLIC GROUT" OR CORED AND APPROVED EQUAL. THE HOLE SHALL BE 24" MIN. IN DEPTH. ALL LOOSE MATERIAL SHALL BE REMOVED FROM THE BOTTOM OF THE HOLE. THE CONCRETE SHALL BE PLACED ON FIRM UNDISTURBED EARTH. THE TOP OF THE CONCRETE SHALL BE TROWELED SMOOTH AND THE BRASS DISC SHALL BE CENTERED AND SLIGHTLY BELOW GRADE TO PREVENT DAMAGE. THE REBAR SHALL CENTERED BENEATH THE BRASS DISC USING THE STRADDLES. BRASS DISC SHALL BE MARKED BY AN "X" AT THE INTERSECT
3. LOCATION, AND IDENTIFIED, AS REQUIRED BY RCW TITLE 58.09.120.
4. THE REQUIREMENTS OF CHAPTER 332.120 WAC SHALL BE MET FOR THE REMOVAL OR DESTRUCTION OF A SURVEY MONUMENT.



CAST IN PLACE MONUMENT

SURVEY MONUMENT WITH CASE AND COVER FOR ALL STREETS

FOR LOCAL ROADWAYS ONLY

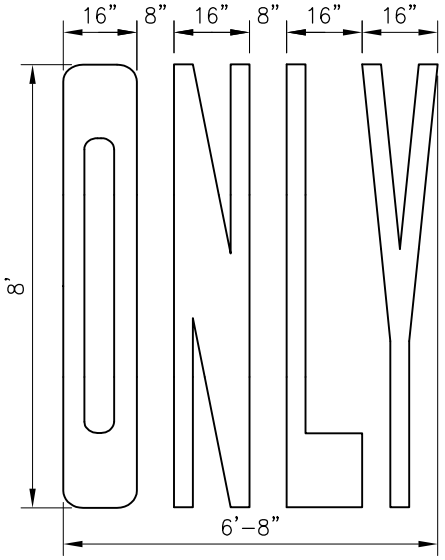
NOT TO SCALE

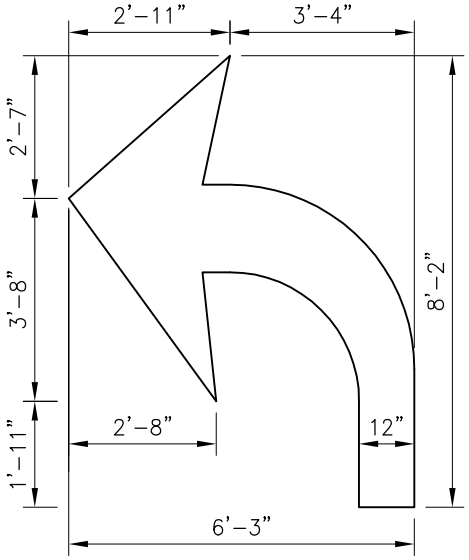
CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

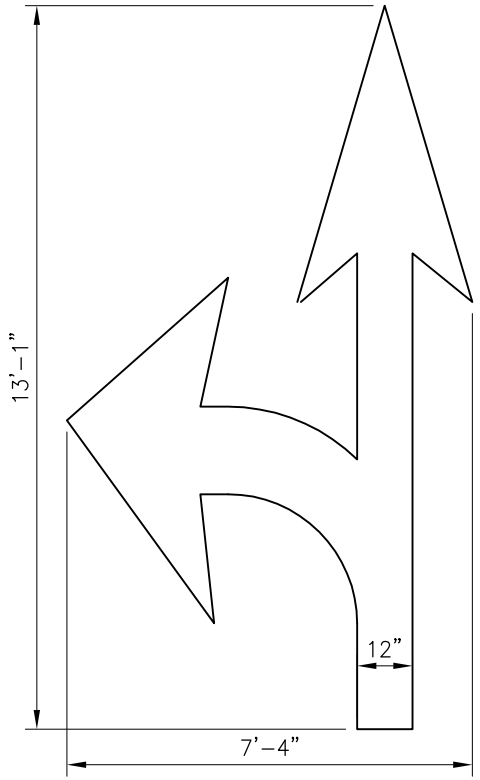
STANDARD MONUMENT CASE AND COVER

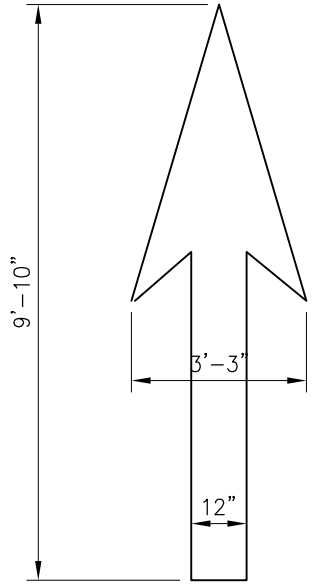
DM.F1.1

REVISED: 02/23

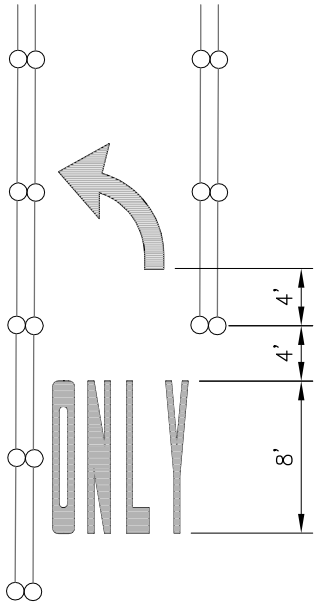




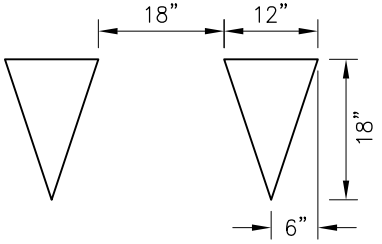




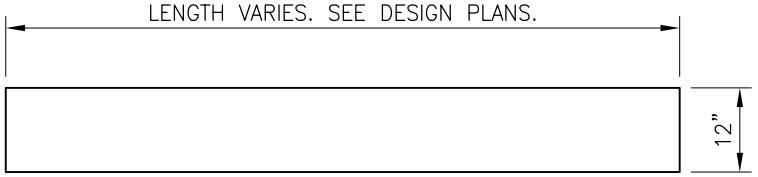
DURABLE TRAFFIC ARROW AND ONLY DETAILS



ARROW/ONLY PLACEMENT AT BEGINNING OF TURN POCKET STORAGE



YIELD LINE SYMBOL



STOP BAR

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PRE-FORMED TYPE B HEAT FUSED THERMOPLASTIC (125 MILS.)
2. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

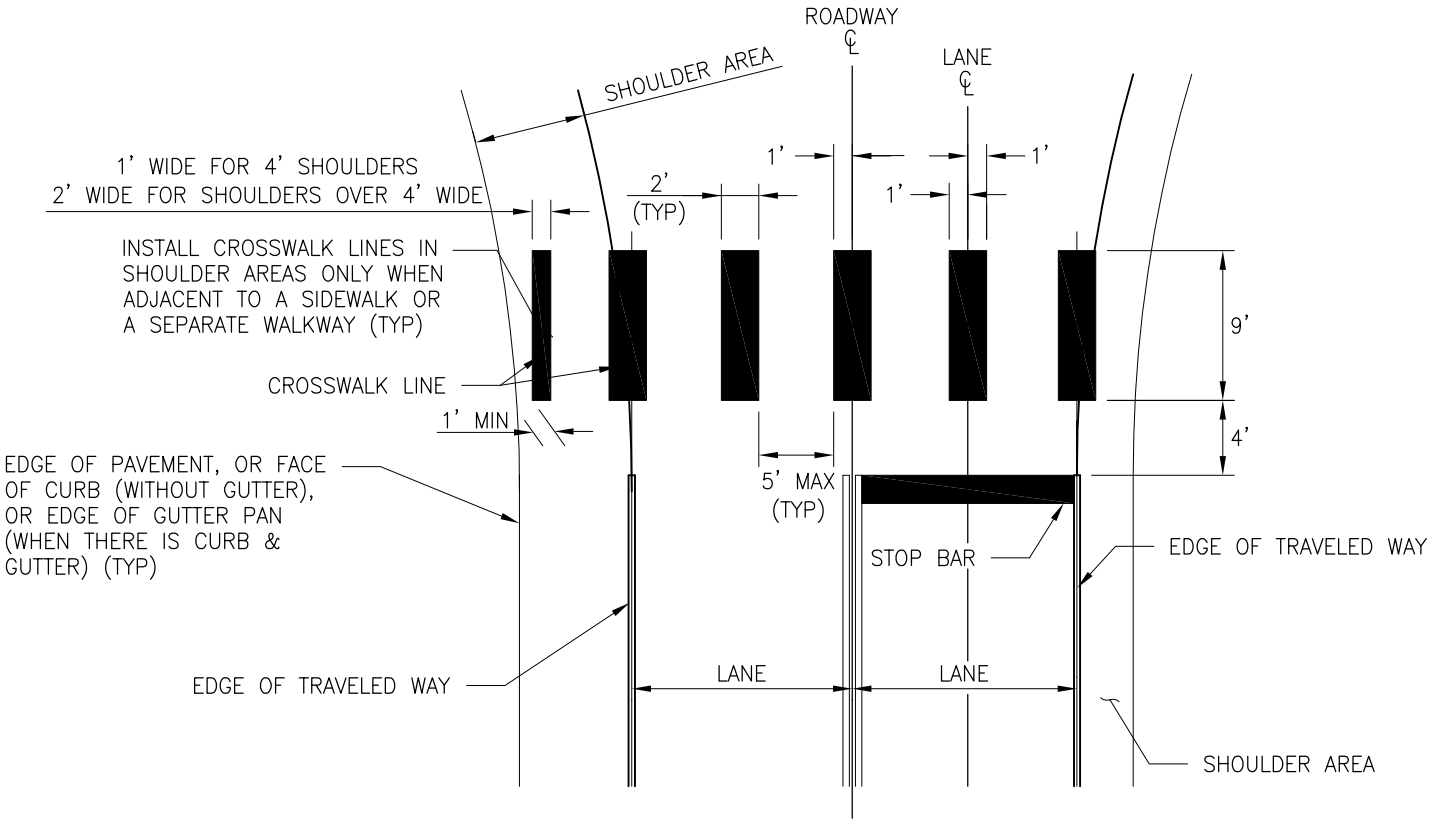
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

PAVEMENT MARKINGS

DM.F2.1

REVISED: 02/23



DETAIL

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PRE-FORMED TYPE B HEAT FUSED THERMOPLASTIC (125 MILS.),
2. TO THE MAXIMUM EXTENT POSSIBLE, CURB RAMP CENTERLINE SHOULD BE PERPENDICULAR TO THE CROSSWALK CENTERLINE.
3. TO THE MAXIMUM EXTENT POSSIBLE, MARKED CROSSWALKS SHOULD BE PERPENDICULAR TO THE CENTERLINE OF THE ROADWAY.
4. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

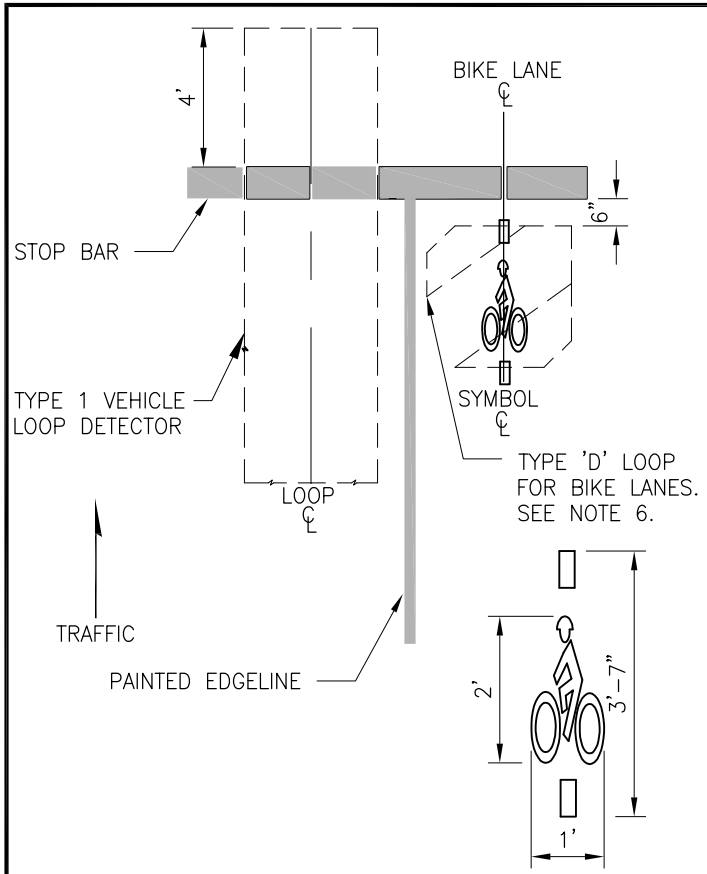
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

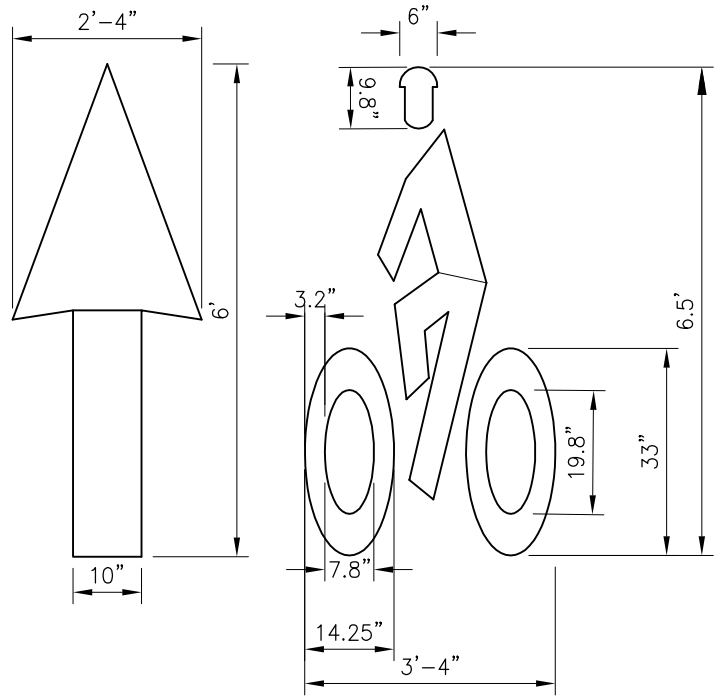
CROSSWALK LAYOUT

DM.F2.2

REVISED: 02/23

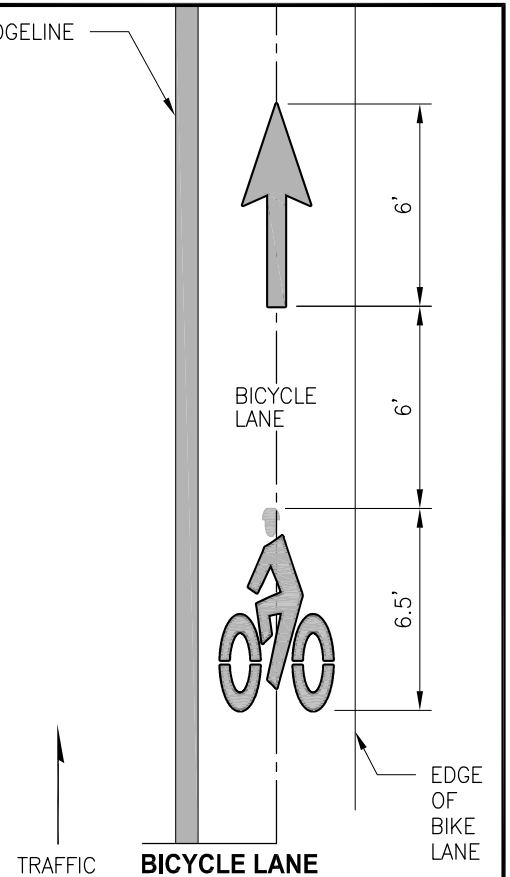


BICYCLE DETECTOR SYMBOL



ARROW **BIKE RIDER**

PAVEMENT MARKING DETAIL



BICYCLE LANE SYMBOL LAYOUT

BICYCLE DETECTOR PAVEMENT MARKING DETAIL

NOTES:

1. ALL BICYCLE PAVEMENT MARKINGS FOR BICYCLES SHALL BE LOW PROFILE PRE-FORMED TYPE B HEAT FUSED THERMOPLASTIC (90 MILS.),
2.. BICYCLE LANE MARKINGS SHALL BE USED IN CONJUNCTION WITH BICYCLE LANE SIGNAGE.
3. BICYCLE LANE SIGNS (R3-17) SHALL BE USED IN ADVANCE OF THE BEGINNING OF A MARKED BICYCLE LANE. SEE STANDARD DRAWING DM.F5.1 – DM.F5.3.
4. BID ITEM "BICYCLE LANE SYMBOL" INCLUDES BIKE LANE ARROW AND BIKE RIDER SYMBOL.
5. SEE WSDOT STANDARD PLANS FOR LOOP DETECTOR DETAILS.
6. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

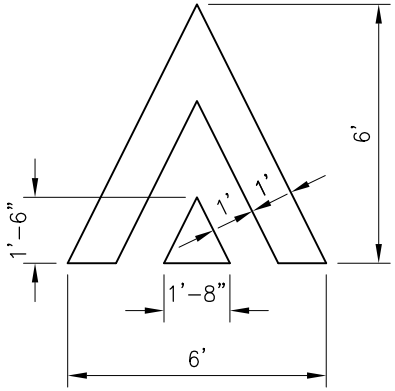
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

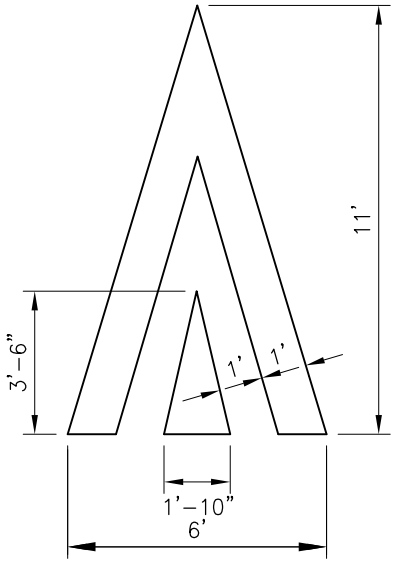
BICYCLE LANE MARKINGS

DM.F2.3

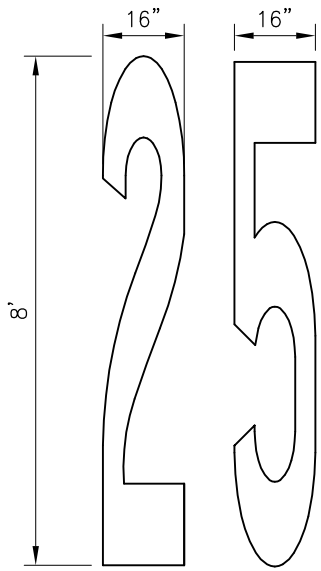
REVISED: 02/23

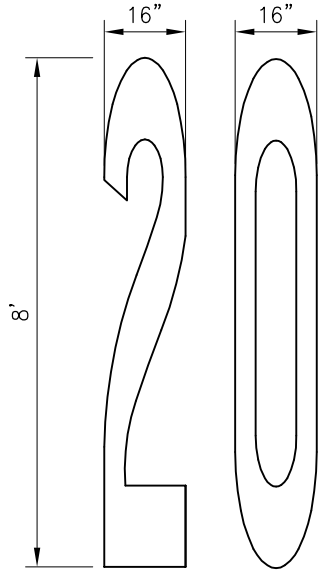


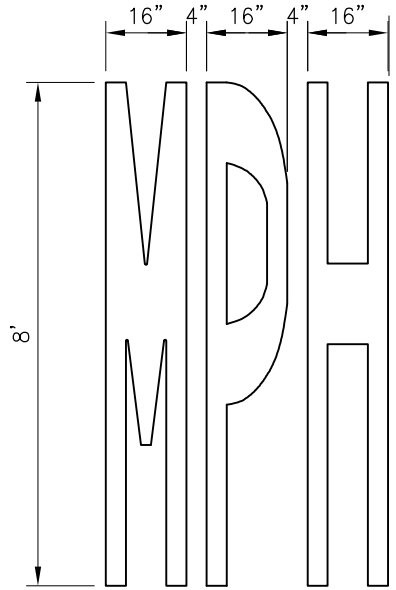
CHEVRON DETAIL FOR SPEED HUMP



CHEVRON DETAIL FOR SPEED TABLE







SPEED LIMIT MARKINGS

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PRE-FORMED TYPE B HEAT FUSED THERMOPLASTIC (125 MILS.).
2. SPEED LIMIT PAVEMENT MARKINGS SHALL BE INSTALLED ONLY AT THE WRITTEN DIRECTION OF THE PUBLIC WORKS DIRECTOR.
3. 20 MPH SPEED LIMIT PAVEMENT MARKING IS FOR PARK USE ONLY.
4. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

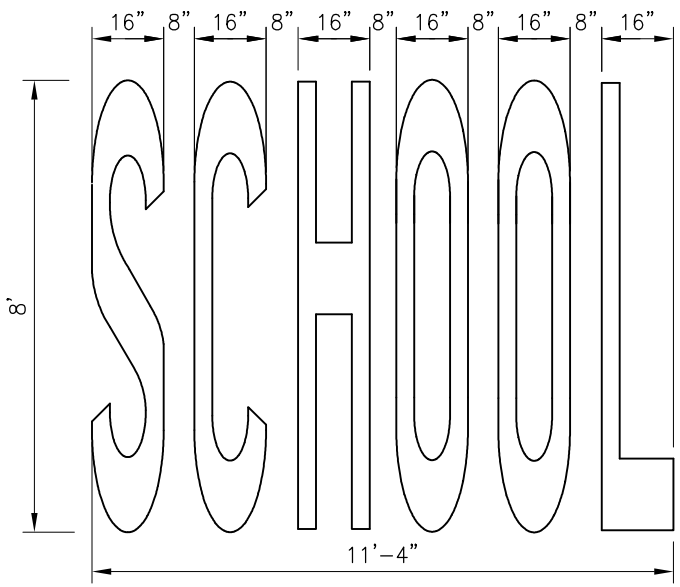
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

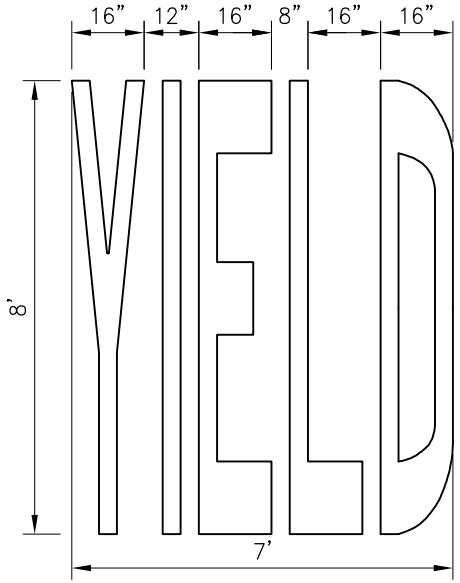
SAILS WITH PRIDE

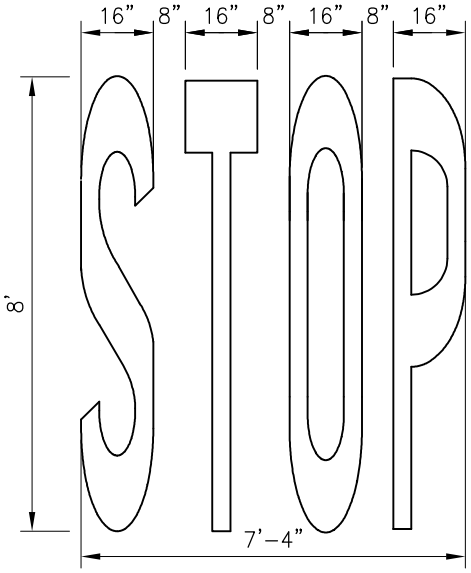
PAVEMENT MARKINGS

DM.F2.4

REVISED: 02/23







NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PRE–FORMED TYPE B HEAT FUSED THERMOPLASTIC (125 MILS.).
2. SCHOOL, STOP, AND YIELD PAVEMENT MARKINGS SHALL BE INSTALLED AT THE WRITTEN DIRECTION OF THE PUBLIC WORK DIRECTOR.
3. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

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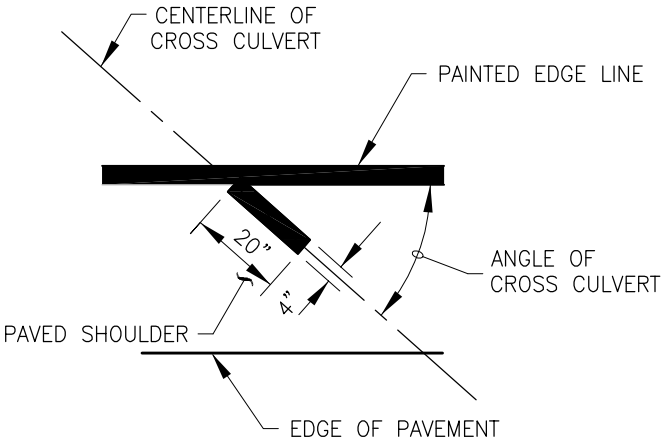
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

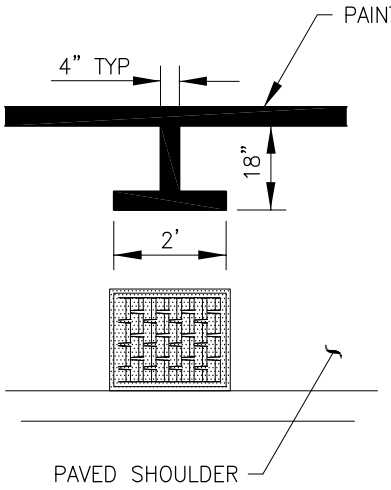
PAVEMENT MARKINGS

DM.F2.5

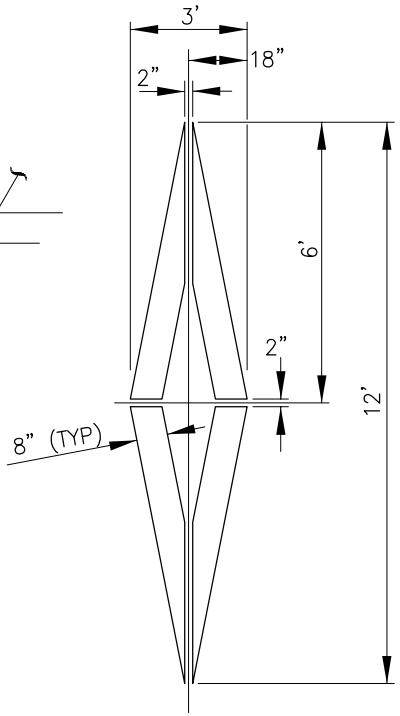
REVISED: 02/23



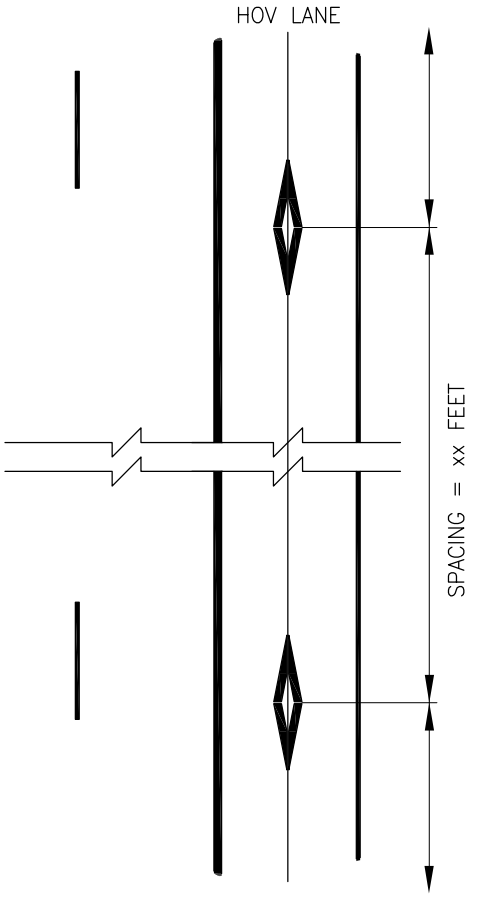
CROSS CULVERT MARKING



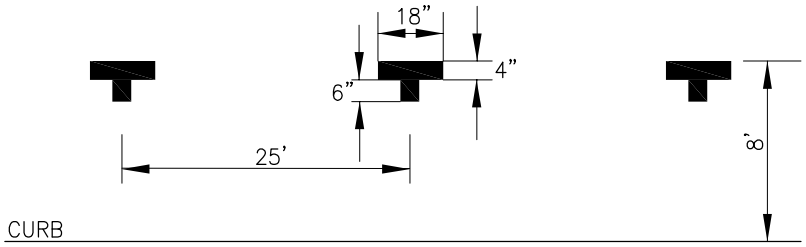
DRAINAGE MARKING



HOV LANE SYMBOL



HOV LANE LAYOUT



ON STREET PARKING MARKINGS

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PRE–FORMED TYPE B HEAT FUSED THERMOPLASTIC (125 MILS.).
2. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

NOT TO SCALE

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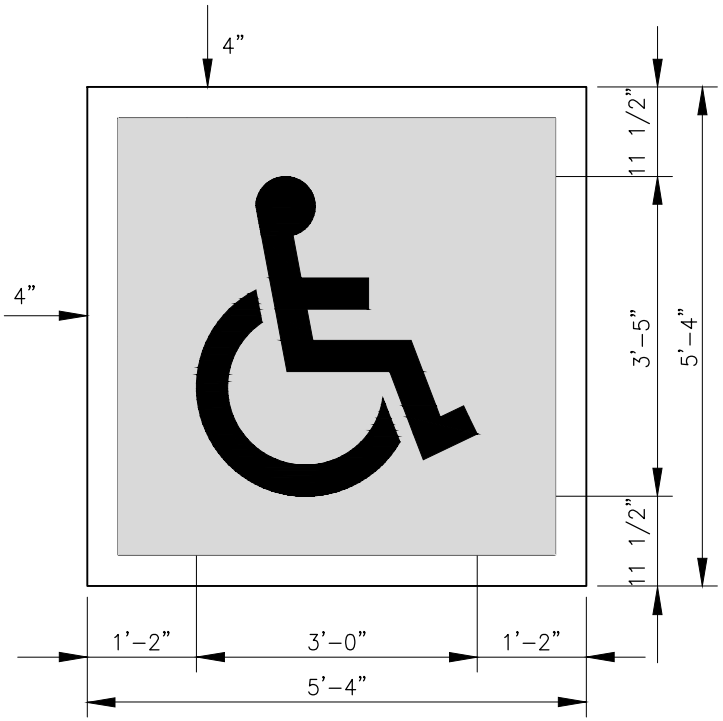
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

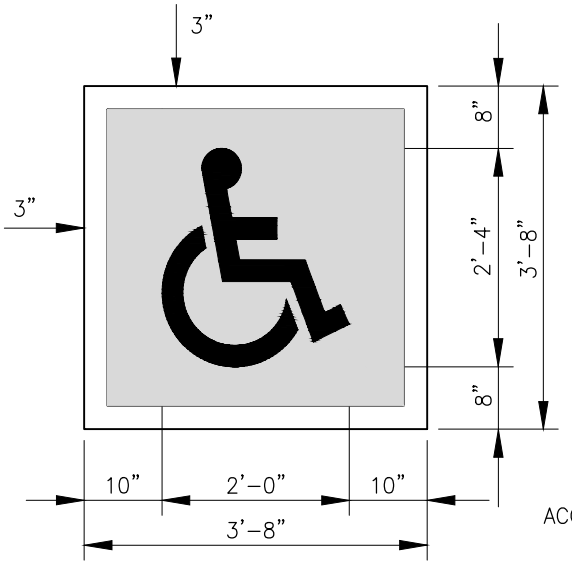
PAVEMENT MARKINGS

DM.F2.6

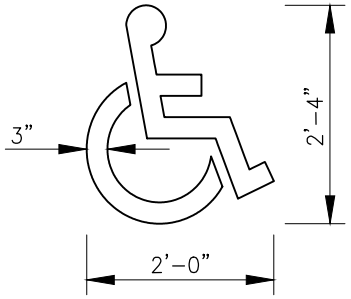
REVISED: 02/23



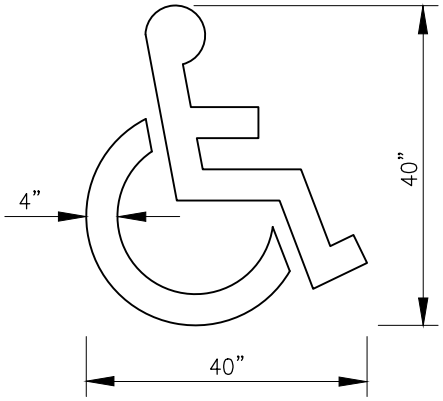
ACCESSIBLE PARKING SPACE PAVEMENT MARKING (STANDARD) WITH BLUE BACKGROUND AND WHITE BORDER (REQUIRED FOR CEMENT CONCRETE SURFACES)



ACCESSIBLE PARKING SPACE PAVEMENT MARKING (MINIMUM) WITH BLUE BACKGROUND AND WHITE BORDER (REQUIRED FOR CEMENT CONCRETE SURFACES)



ACCESSIBLE PARKING SPACE PAVEMENT MARKING (MINIMUM)



ACCESSIBLE PARKING SPACE PAVEMENT MARKING (STANDARD)

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE PRE-FORMED TYPE B HEAT FUSED THERMOPLASTIC (125 MILS.), UNLESS PAINT IS SPECIFICALLY CALLED OUT ON THE PLANS.
2. IF PAINTED MARKINGS ARE SPECIFIED FOR USE, CONTACT THE PUBLIC WORKS SERVICE CENTER AT (206) 870-6525 FOR TEMPLATES.
3. SCHOOL, STOP, AND YIELD PAVEMENT MARKINGS SHALL BE INSTALLED AT THE WRITTEN DIRECTION OF THE PUBLIC WORKS DIRECTOR. CALLED OUT ON THE PLANS.
4. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

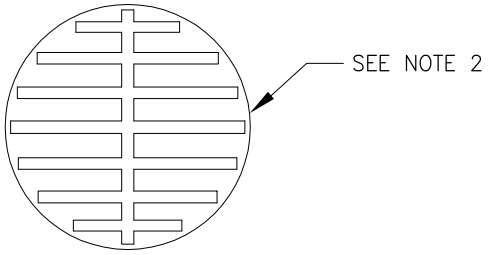
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

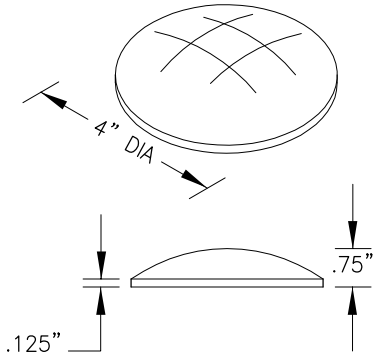
ACCESSIBLE PARKING SPACE PAVEMENT MARKING

DM.F2.7

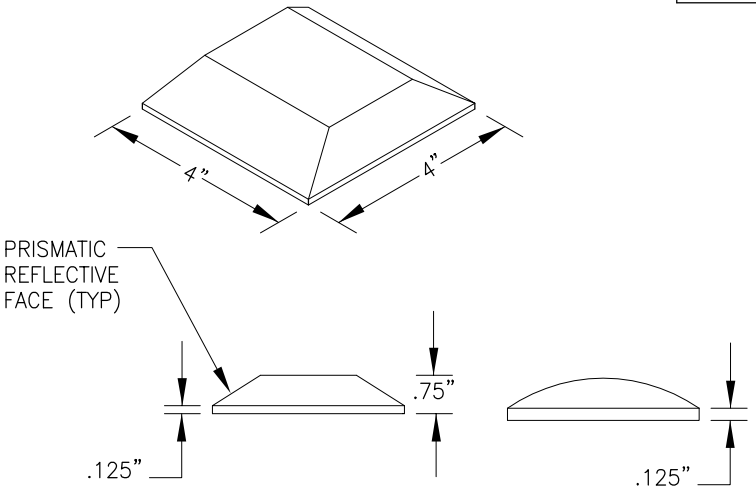
REVISED: 02/23



BOTTOM VIEW



TYPE 1 RPM



TYPE 2 RPM

RAISED PAVEMENT MARKER COLORS	
TYPE 1W	NONREFLECTORIZED WHITE
TYPE 1Y	NONREFLECTORIZED YELLOW
TYPE 2W	REFLECTORIZED WHITE – ONE SIDE ONLY
TYPE 2Y	REFLECTORIZED YELLOW – ONE SIDE ONLY
TYPE 2YY	REFLECTORIZED YELLOW – BOTH SIDES
TYPE 2YR	REFLECTORIZED YELLOW/RED
TYPE 2WR	REFLECTORIZED WHITE/RED

NOTES:

1. TYPE 1 MATERIAL– MARKER SHALL BE MOLDED OF A HIGH IMPACT, RECYCLED ACRYLONITRILE BUTADIENE STYRENE (ABS), CONFORMING TO ASTM SPEC DI 78888.
2. MARKER BOTTOM SHALL ALLOW UPWARD FLOW OF ADHESIVE AND VENTING TO PREVENT AIR ENTRAPMENT.
3. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

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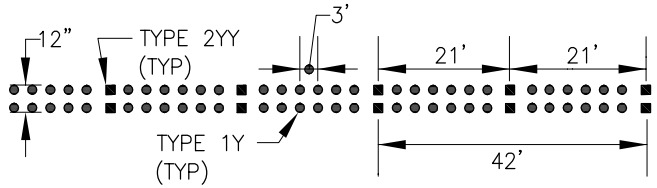
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

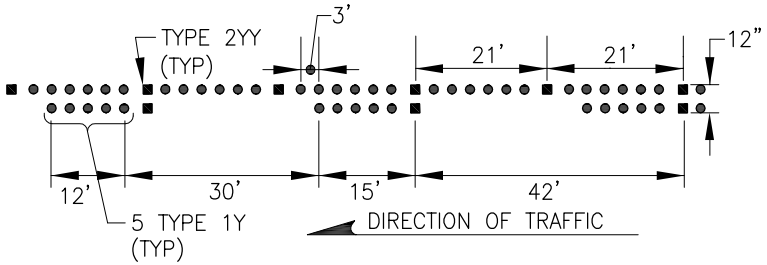
RAISED PAVEMENT MARKER DETAILS

DM.F2.8

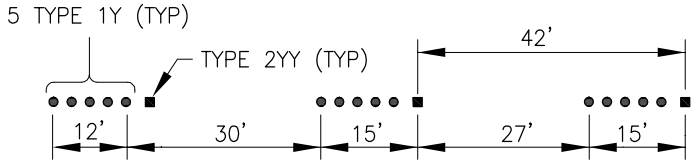
REVISED: 02/23



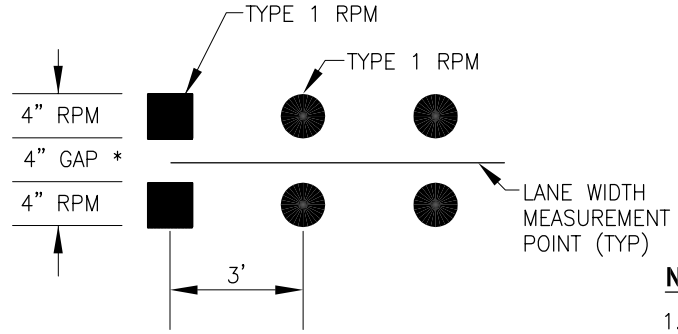
RPM LAYOUT FOR DOUBLE YELLOW CENTERLINE STRIPE



RPM LAYOUT FOR TWO-WAY LEFT TURN LANE CENTERLINE STRIPE

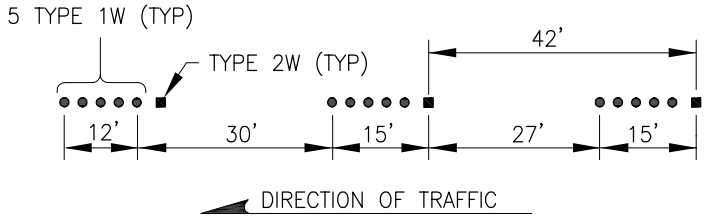


RPM LAYOUT FOR CENTERLINE SKIP STRIPE

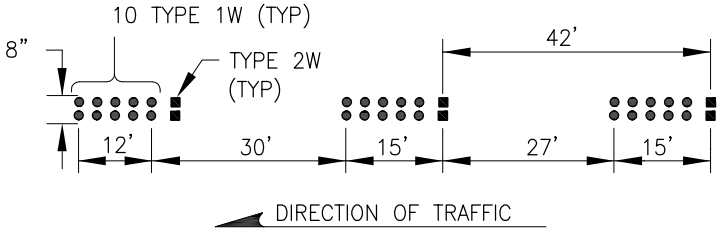


* NO GAP FOR WIDE SKIP AND WIDE LINE

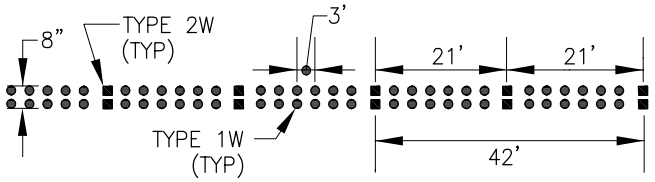
RPM LAYOUT DETAIL



RPM LAYOUT FOR LANE LINE SKIP STRIPE



RPM LAYOUT FOR WHITE WIDE LINE SKIP STRIPE



RPM LAYOUT FOR WHITE WIDE LINE STRIPE

TYPE 1	NON–REFLECTIVE	YELLOW OR WHITE
TYPE 2YY	REFLECTIVE FACE	YELLOW AND YELLOW
TYPE 2W	REFLECTIVE FACE	WHITE–ONE SIDE ONLY
TYPE 2Y	REFLECTIVE FACE	YELLOW–ONE SIDE ONLY

SEE STANDARD DRAWING DM.F2.8 FOR MORE RPM DETAILS

RAISED PAVEMENT MARKERS (RPM'S)

NOTES:

1. SEE STANDARD DRAWING DM.F2.8 FOR RAISED PAVEMENT MARKER DETAIL.
2. ALL CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

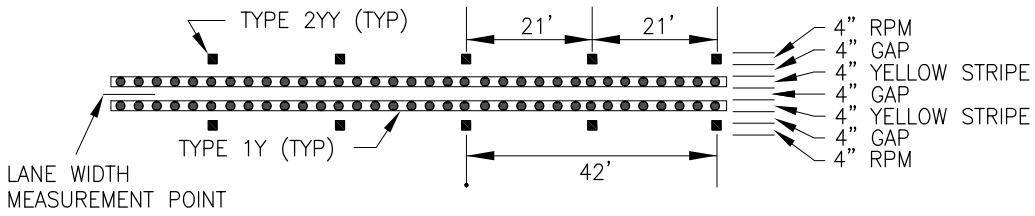
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

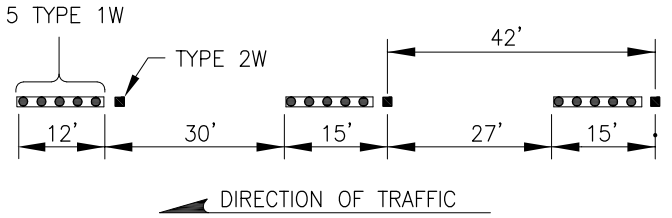
CHANNELIZATION LAYOUT WITH RAISED PAVEMENT MARKERS

DM.F3.1

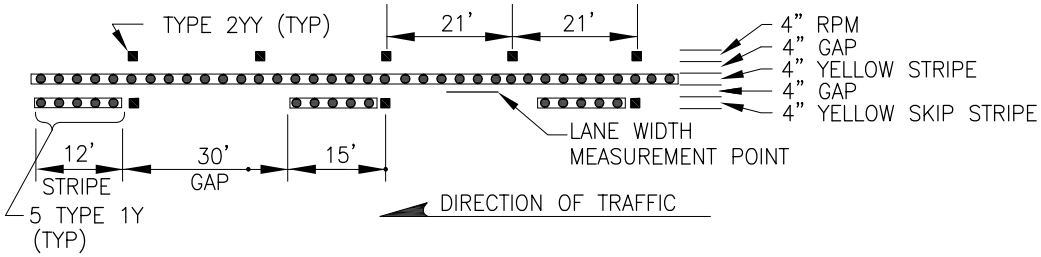
REVISED: 02/23



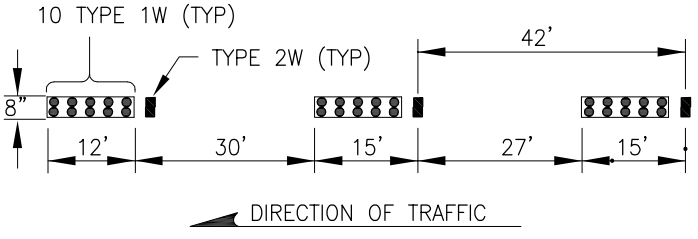
DOUBLE YELLOW CENTERLINE STRIPE



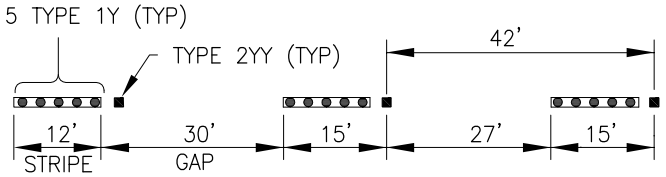
RPM LAYOUT FOR LANE LINE SKIP STRIPE



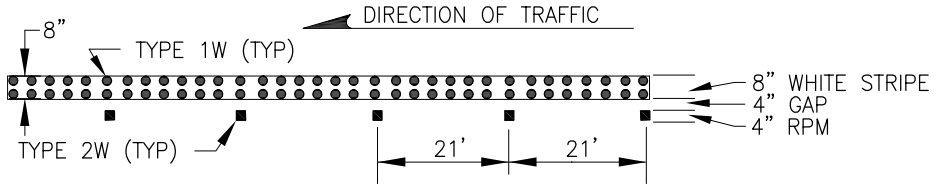
TWO-WAY LEFT TURN LANE CENTERLINE STRIPE



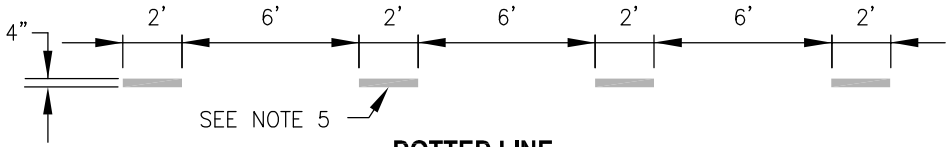
WHITE WIDE LINE SKIP STRIPE



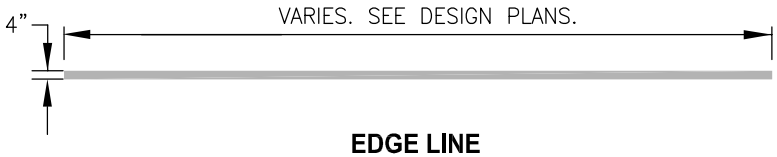
CENTERLINE SKIP STRIPE



WHITE WIDE LINE STRIPE



DOTTED LINE



EDGE LINE

NOTES:

1. SEE STANDARD DRAWING DM.F2.8 FOR RAISED PAVEMENT MARKER DETAIL.
2. SEE STANDARD DRAWING DM.F3.1 FOR RPM LAYOUT.
3. DOTTED LINE SHALL BE TYPE "B" HEAT FUSED PAVEMENT MARKING MATERIAL.
4. DOTTED LINE SHALL BE THE SAME COLOR AS THE LINE IT IS EXTENDING.
6. EDGE LINE SHALL BE WHITE ON THE RIGHT SIDE OF THE TRAVELED WAY AND YELLOW ON THE LEFT SIDE OF THE TRAVELED WAY ON ONE WAY STREETS OR STREETS SEPARATED BY A MEDIAN BARRIER.
7. PAINTED CENTERLINES ARE ONLY USED IN SPECIFIC LOCATIONS AND MUST BE APPROVED BY THE PUBLIC WORKS DIRECTOR. SEE DETAIL DM.F3.1 FOR TYPICAL RPM CENTERLINES.
8. ALL PAVEMENT CHANNELIZATION (OR PAVEMENT MARKINGS) SHALL BE LAID OUT WITH SPRAY PAINT AND APPROVED BEFORE FINAL INSTALLATION. APPROVALS SHALL REQUIRE ADVANCE NOTICE OF THREE WORKING DAYS TO HAVE FIELD LAYOUT APPROVED.

NOT TO SCALE

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21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

CHANNELIZATION LAYOUT FOR PAINTED LINES

DM.F3.2

REVISED: 02/23

TURN LANE STORAGE LENGTH P

TO BE DETERMINED BY THE ENGINEER (100' MINIMUM).
SEE DESIGN PLANS FOR SPECIFIC LENGTH.

CHANNELIZATION TAPER FORMULA T

T = WS (45 MPH OR MORE)

T = $\frac{WS^2}{60}$ (0 TO 40 MPH)

S = SPEED LIMIT (MPH)

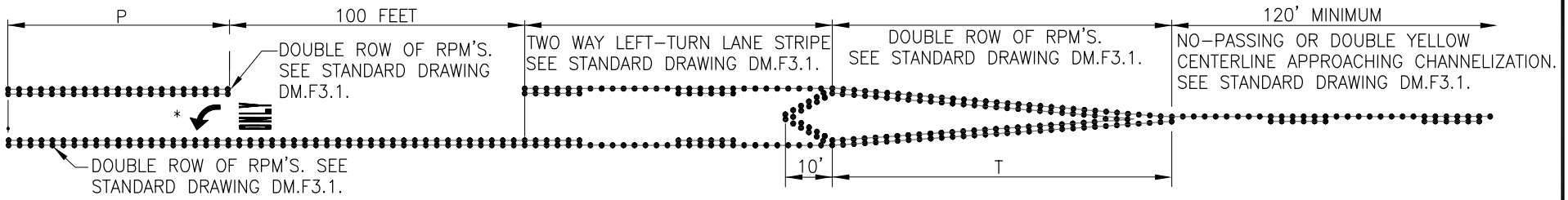
W = OFFSET FROM NORMAL CENTERLINE (FT.)

T = LENGTH OF TAPER (FT); INCREASE TAPER BY 50% WHEN LOCATED ON A CURVE

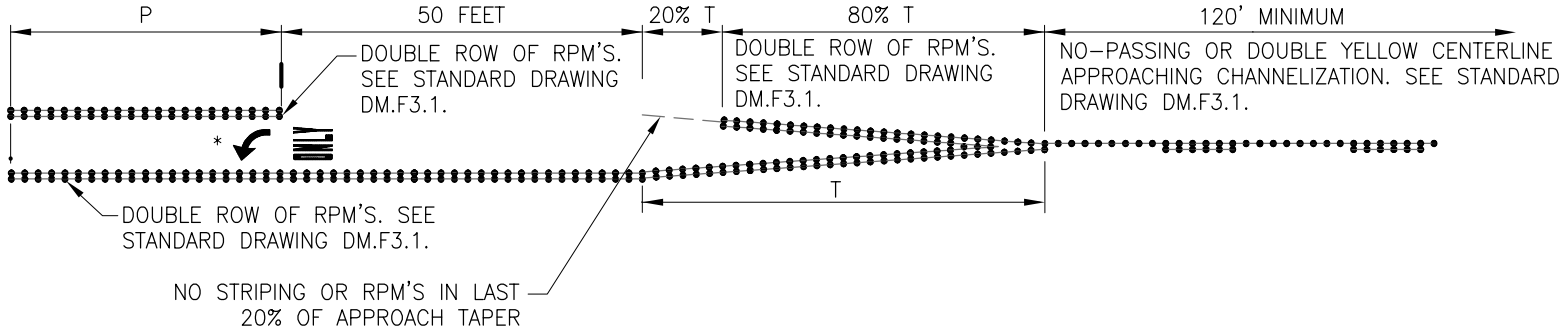
* NUMBER AND SPACING OF ARROW AND "ONLY" MARKINGS FOR LEFT/RIGHT TURN POCKETS:

POCKET LENGTH (P)		USE	SPACING (% OF POCKET LENGTH) ← DIRECTION OF TRAFFIC
MORE THAN	BUT LESS THAN		
60 FEET	120 FEET	1 ARROW/ONLY	100%
120 FEET	250 FEET	2 ARROWS/ONLYS	40% 100%
250 FEET	350 FEET	3 ARROWS/ONLYS	20% 60% 100%
350 FEET	450 FEET	4 ARROWS/ONLYS	15% 45% 75% 100%

LEFT TURN POCKET FROM TWO-WAY LEFT TURN LANE



LEFT TURN POCKET FROM TAPER SECTION



NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

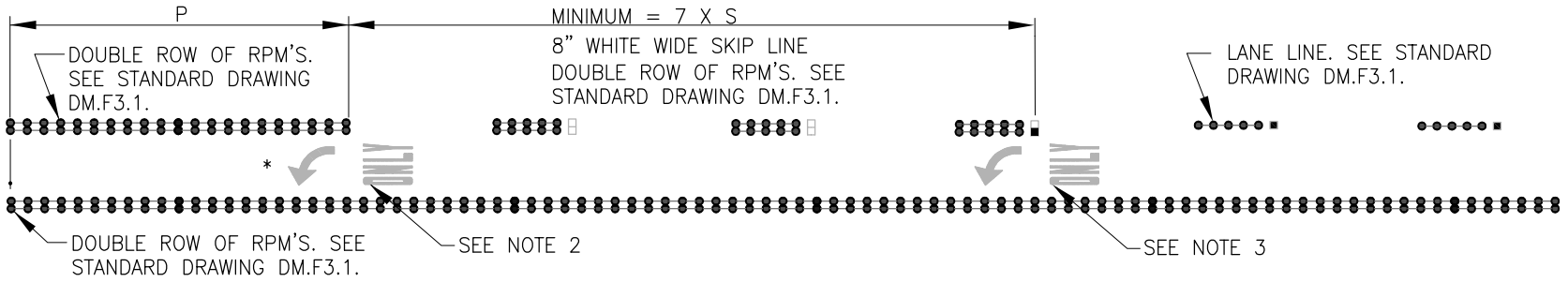
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

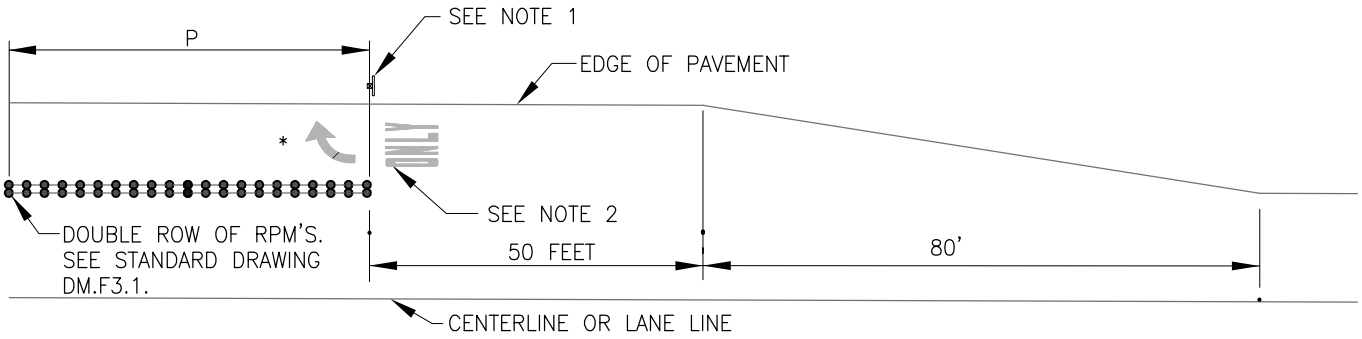
PAVEMENT MARKINGS

DM.F4.1

REVISED: 02/23



LEFT TURN OR RIGHT TURN POCKET FROM TWO THRU LANES



RIGHT TURN ADD LANE

CHANNELIZATION TAPER FORMULA T

T = WS (45 MPH OR MORE)

T = $\frac{WS^2}{60}$ (0 TO 40 MPH)

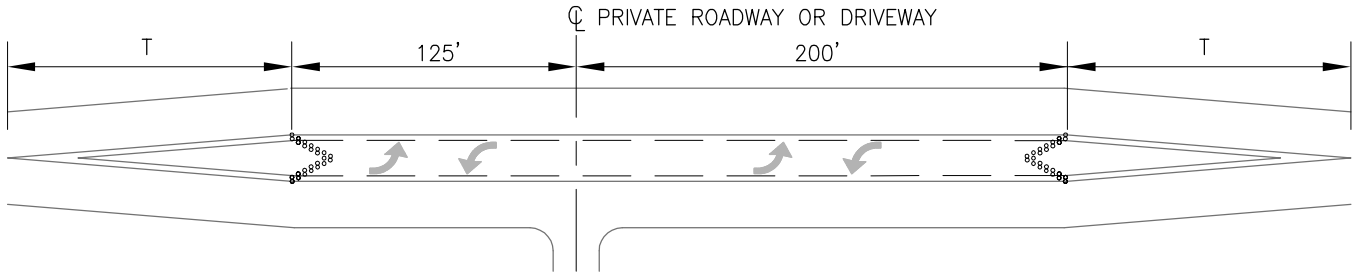
S = SPEED LIMIT (MPH)

W = OFFSET FROM NORMAL CENTERLINE (FT)

T = LENGTH OF TAPER (FT); INCREASE TAPER BY 50% WHEN LOCATED ON A CURVE

TURN LANE STORAGE LENGTH P

TO BE DETERMINED BY THE ENGINEER (100' MINIMUM). SEE DESIGN PLANS FOR SPECIFIC LENGTH.



TWO-WAY LEFT TURN LANE AT DRIVEWAY OR PRIVATE ROADWAY

DESIRABLE MINIMUM SEGMENT LENGTHS SHOWN

NOTES:

1. RIGHT AND LEFT TURN DROP LANES SHOULD ALSO BE SUPPLEMENTED WITH R3-7 (GROUND MOUNT) AND/OR R3-5 (OVERHEAD MOUNT) LANE CONTROL SIGNS.
2. SEE STANDARD DRAWING DM.F4.1 FOR NUMBER AND SPACING OF ARROW AND "ONLY" MARKINGS FOR LEFT AND RIGHT TURN POCKETS.
3. INSTALL ONE ARROW AND "ONLY" AT BEGINNING OF 8" GORE SKIP LINE; INSTALL SECOND ARROW AND "ONLY" AT 45% OF GORE SKIP WHEN LENGTH OF GORE SKIP IS $\geq$ 250'.

NOT TO SCALE

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DES MOINES, WA 98198
SAILS WITH PRIDE

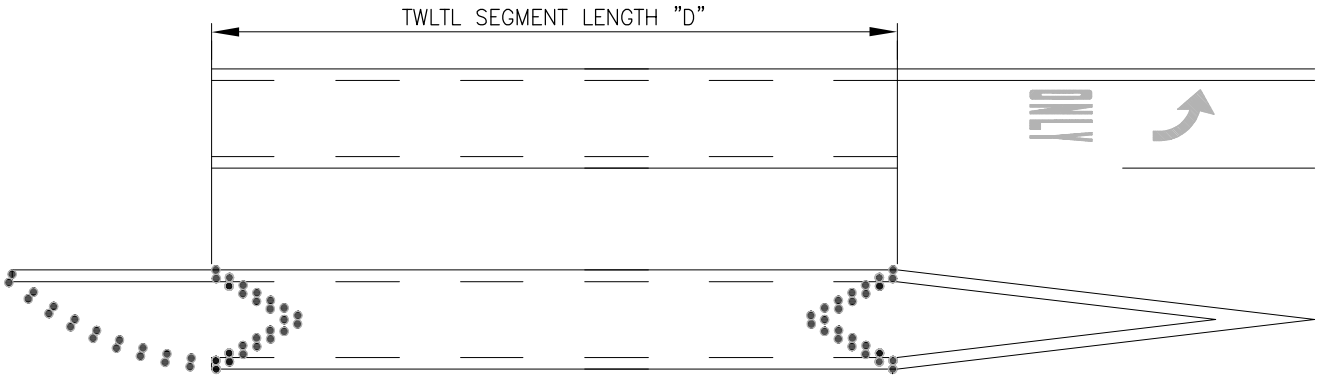
PAVEMENT MARKINGS

DM.F4.2

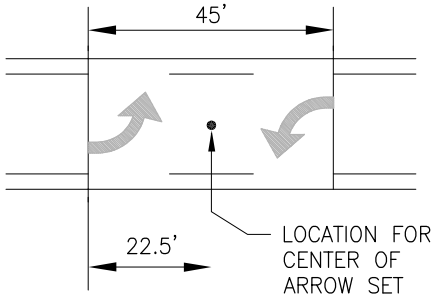
REVISED: 02/23

SEGMENT LENGTH "D" FROM:	TO:	# OF ARROW SETS	LOCATION OF CENTER OF SET
0'	100'	0	NONE
101'	300'	1	0.5L 0.5L
301'	500'	2	75' 75'
501'	850'	3	75' 0.5L 75'
851'	1200'	4	75' * 75'

TWO-WAY LEFT TURN LANE ARROW PLACEMENT



MEASUREMENT OF SEGMENT LENGTH AND END TREATMENT EXAMPLES:



LAYOUT FOR TWLTL PAVEMENT MARKING

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
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DES MOINES, WA 98198
SAILS WITH PRIDE

PAVEMENT MARKINGS

DM.F4.3

REVISED: 02/23

CHANNELIZATION TAPER FORMULA T

$T = WS$ (45 MPH OR MORE)

$T = \frac{WS^2}{60}$ (0 TO 40 MPH)

S = SPEED LIMIT (MPH)

W = OFFSET FROM NORMAL CENTERLINE (FT)

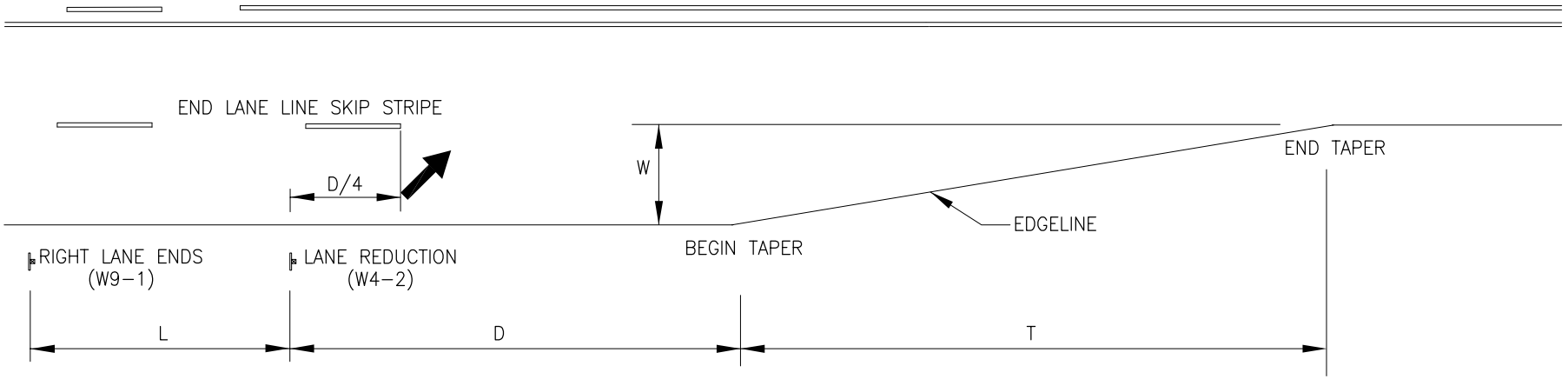
T = LENGTH OF TAPER (FT); INCREASE TAPER BY 50% WHEN LOCATED ON A CURVE

FORMULA FOR D

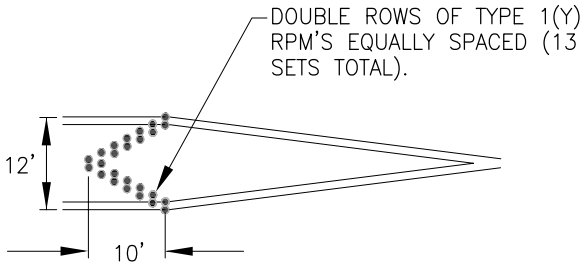
D = POSTED SPEED LIMIT X 7

SIGN SPACING TABLE

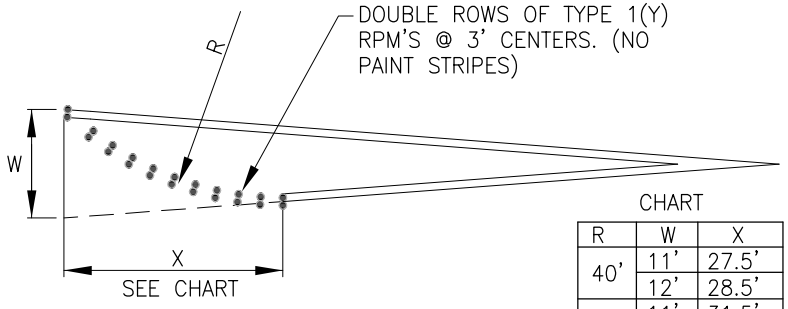
POSTED SPEED LIMIT	L
30 MPH	170 FEET
35 MPH	280 FEET
40 MPH	320 FEET
45 MPH	360 FEET



DROP LANE LAYOUT AND TAPER



RPM LAYOUT FOR END OF TAPER/BEGINNING OF TWO-WAY LEFT TURN LANE



CHART

R	W	X
40'	11'	27.5'
	12'	28.5'
50'	11'	31.5'
	12'	32.5'

BULLET TREATMENT FOR END OF TAPER

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

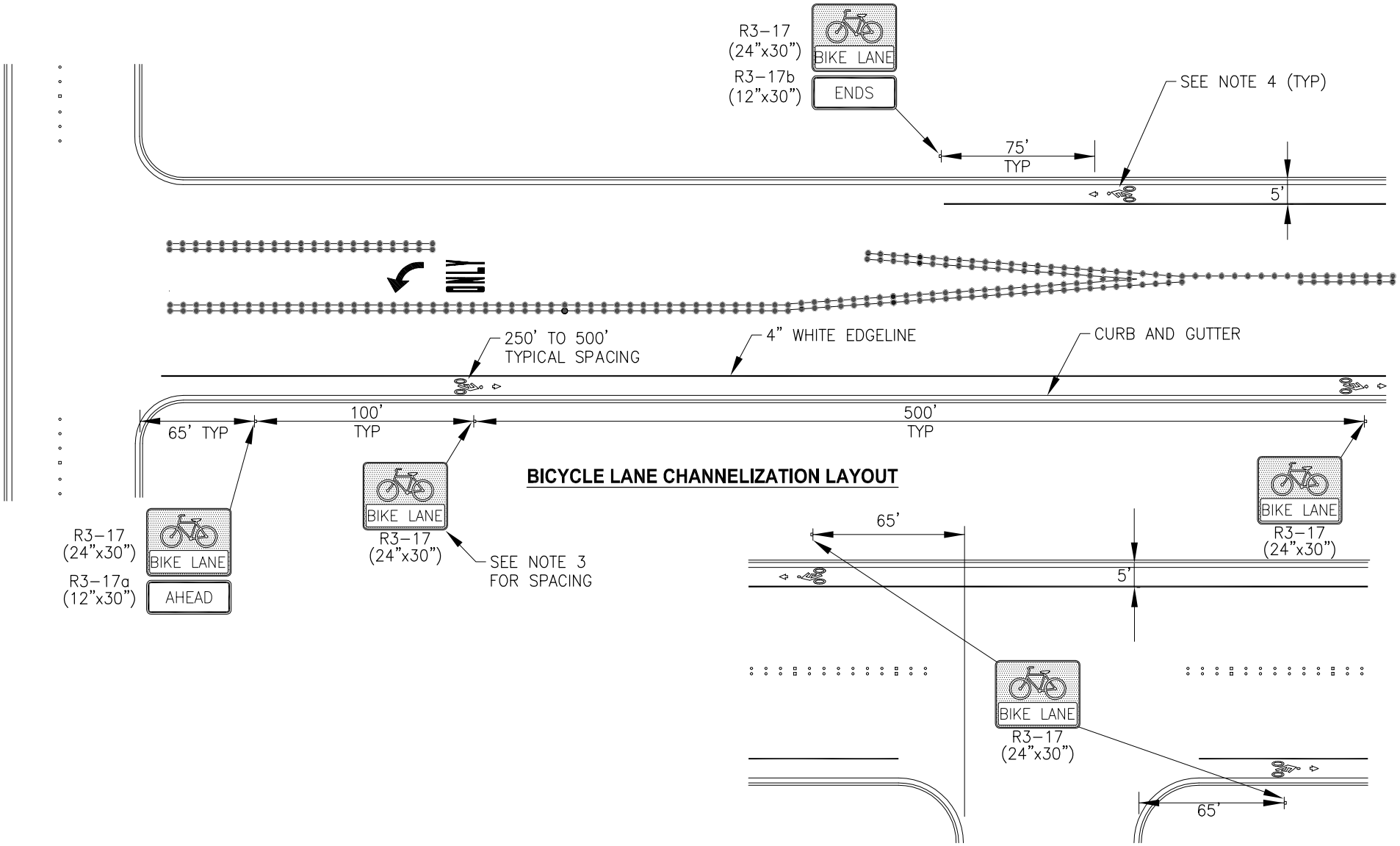
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

CHANNELIZATION AND TAPER MARKERS

DM.F4.4

REVISED: 02/23



NOTES:

1. BIKE LANE WIDTH IS 5 FEET. UNLESS NOTED OTHERWISE ON THE DESIGN PLANS.
2. WHEN SIGN R3–17 IS USED, PAVEMENT MARKING SHALL BE INSTALLED ADJACENT TO R3–17.
3. R3–17 SIGN SHOULD BE SPACED EVERY 1000' (TYP.) AND DOWNSTREAM OF PUBLIC SIDE STREETS.
4. FOR BIKE LANE PAVEMENT MARKING DETAILS, SEE STANDARD DRAWING DM.F2.3.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

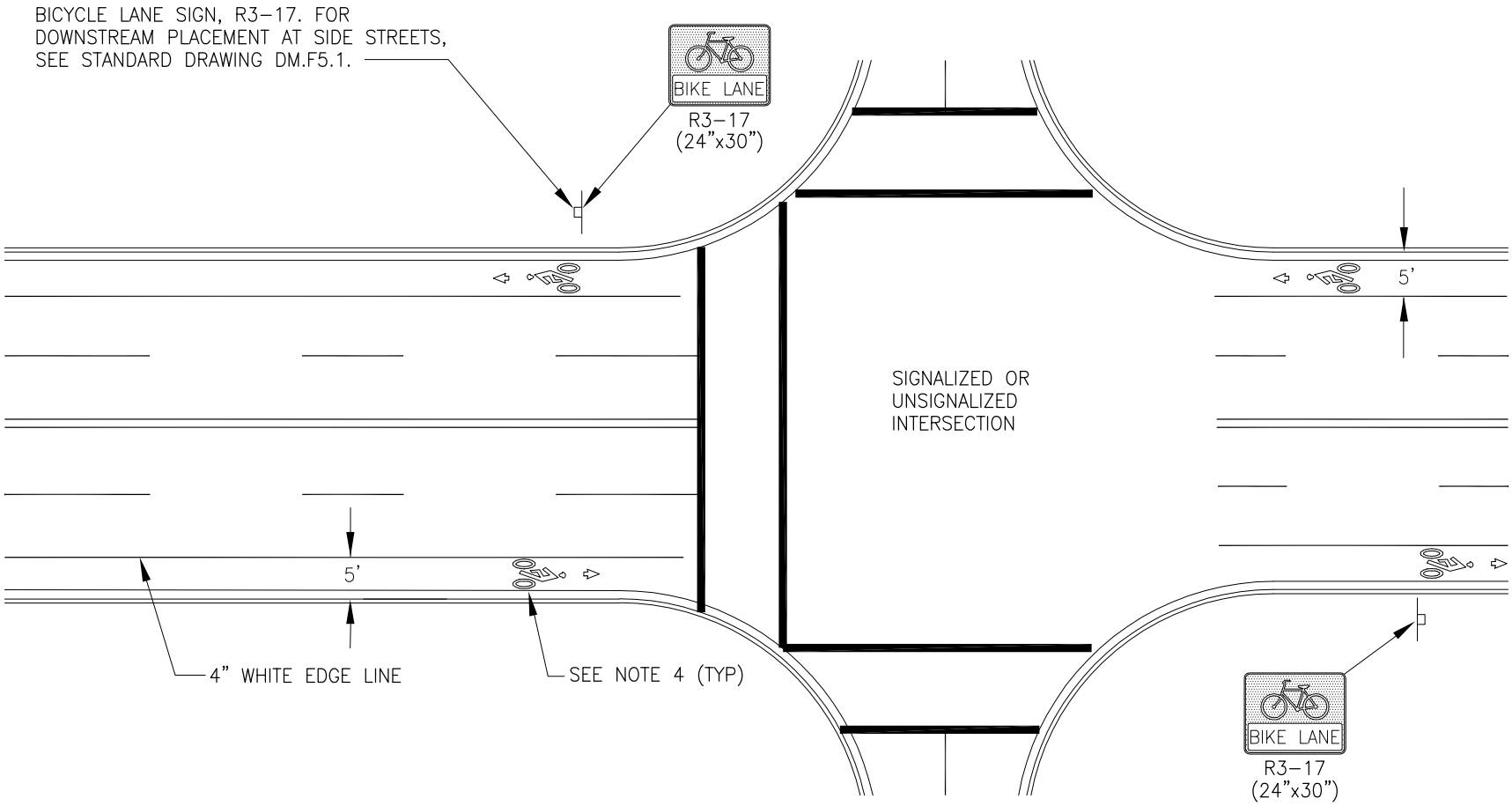
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

BICYCLE LANE CHANNELIZATION

DM.F5.1

REVISED: 02/23



NOTES:

1. BIKE LANE WIDTH IS 5 FEET. UNLESS NOTED OTHERWISE ON THE DESIGN PLANS.
2. WHEN SIGN R3-17 IS USED, PAVEMENT MARKING SHALL BE INSTALLED ADJACENT TO R3-17.
3. R3-17 SIGN SHOULD BE SPACED EVERY 500' (TYP.) AND DOWNSTREAM OF PUBLIC SIDE STREETS.
4. FOR BIKE LANE PAVEMENT MARKING DETAILS, SEE STANDARD DRAWING DM.F2.3.

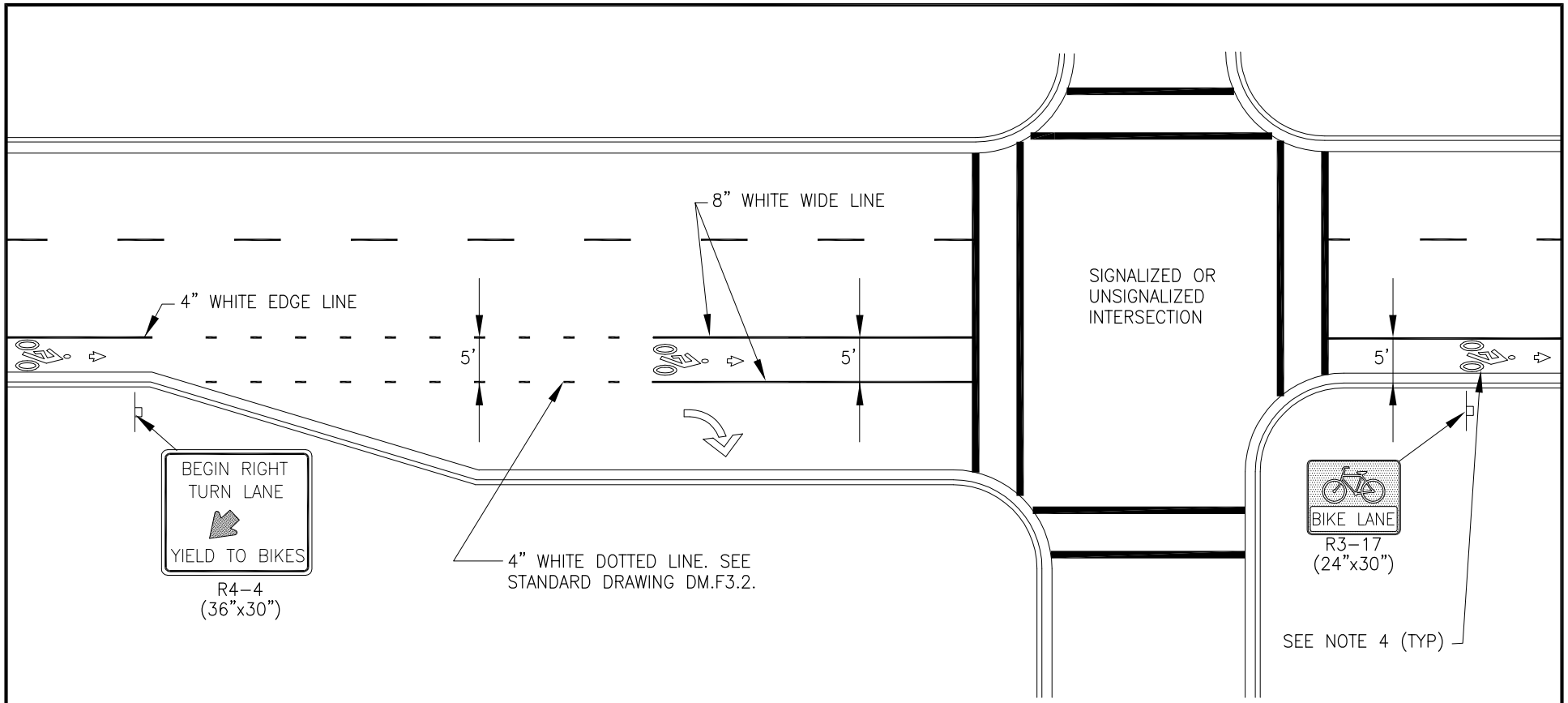
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

BICYCLE LANES AT INTERSECTIONS

DM.F5.2

REVISED: 02/23



NOTES:

1. BIKE LANE WIDTH IS 5 FEET. UNLESS NOTED OTHERWISE ON THE DESIGN PLANS.
2. WHEN SIGN R3-17 IS USED, PAVEMENT MARKING SHALL BE INSTALLED ADJACENT TO R3-17.
3. R3-17 SIGN SHOULD BE SPACED EVERY 500' (TYP) AND DOWNSTREAM OF PUBLIC SIDE STREETS.
4. FOR BIKE LANE PAVEMENT MARKING DETAILS, SEE STANDARD DRAWING DM.F2.3.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

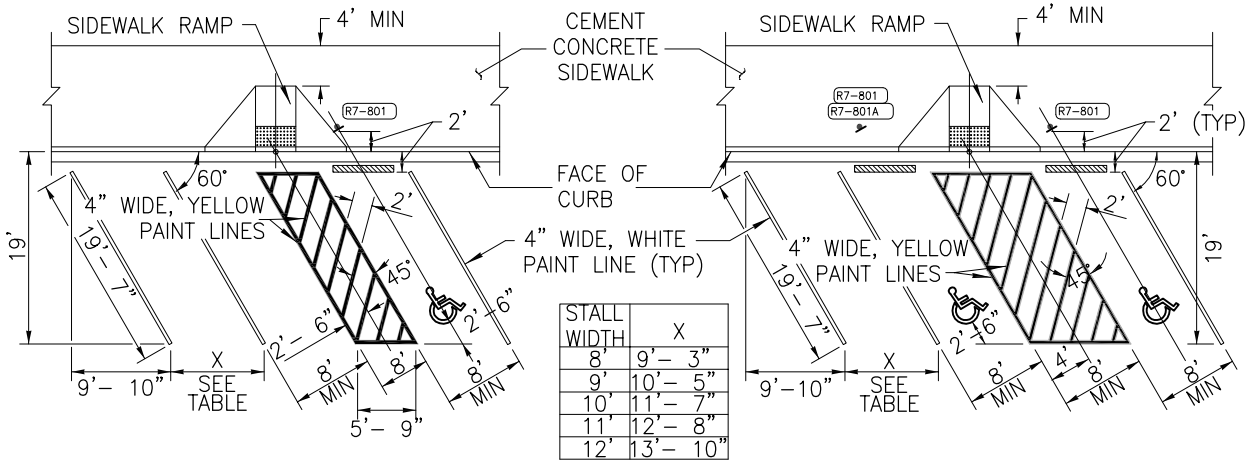
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

BICYCLE LANES AT RIGHT TURN POCKETS

DM.F5.3

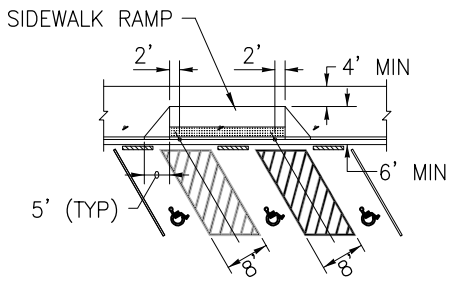
REVISED: 02/23



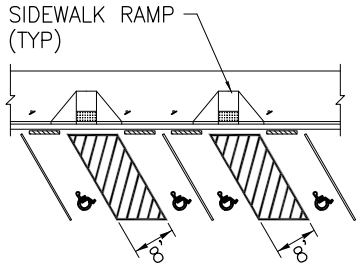
STALL WIDTH	X
8'	9'-3"
9'	10'-5"
10'	11'-7"
11'	12'-8"
12'	13'-10"

ONE ACCESSIBLE STALL
60° PARKING STALL ARRANGEMENT

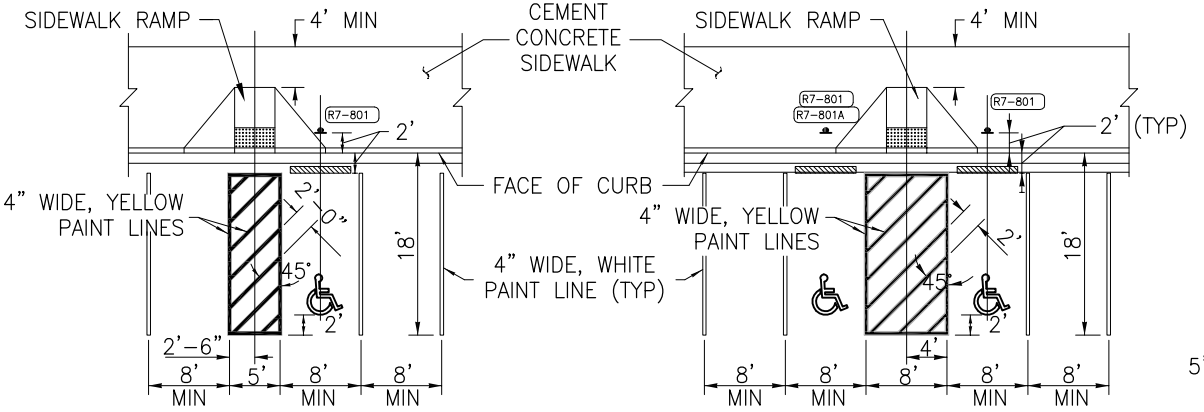
TWO ACCESSIBLE STALLS
60° PARKING STALL ARRANGEMENT



THREE ACCESSIBLE STALLS
60° PARKING STALL ARRANGEMENT

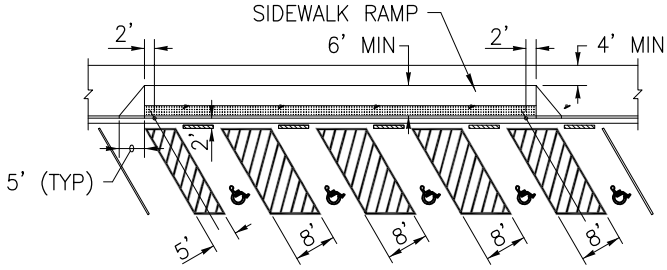


FOUR ACCESSIBLE STALLS
60° PARKING STALL ARRANGEMENT



ONE ACCESSIBLE STALL
90° PARKING STALL ARRANGEMENT

TWO ACCESSIBLE STALLS
90° PARKING STALL ARRANGEMENT



FIVE ACCESSIBLE STALLS
60° PARKING STALL ARRANGEMENT

NOTES:

1. THREE, FOUR, AND FIVE ACCESSIBLE STALL ARRANGEMENTS MAY BE EITHER 60° (ANGLED) OR 90° (PERPENDICULAR). SEE CONTRACT.
2. AN ACCESSIBLE PARKING SPACE PAVEMENT MARKING IS REQUIRED FOR EACH ACCESSIBLE PARKING STALL. A BLUE BACKGROUND AND WHITE BORDER ARE REQUIRED WHEN THE PAVEMENT SURFACE IS CONCRETE.
3. ALL ACCESSIBLE STALLS SHALL HAVE WHEEL STOPS. PLACE WHEEL STOPS IN OTHER STALL WHEN SPECIFIED IN THE CONTRACT. WHEEL STOPS SHALL BE 6" HIGH AND APPROXIMATELY 6' LONG. REFER TO THE LATEST WSDOT STANDARD PLANS FOR CURB RAMP DETAILS.
4. REFER TO THE STANDARD DRAWING DM.F2.7 FOR PAVEMENT MARKING DETAILS.

LEGEND

- R7-801 — RESERVED PARKING SIGN AND POST WITH PLAQUE IF INDICATED.
- ACCESSIBLE PARKING SPACE PAVEMENT MARKING
- WHEEL STOP
- DETECTABLE WARNING PATTERN

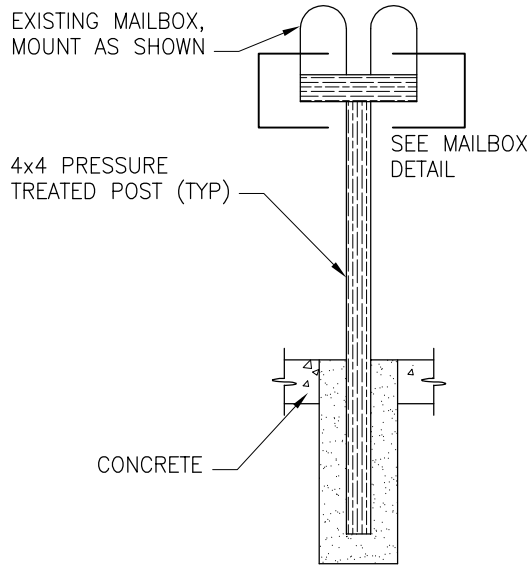
NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

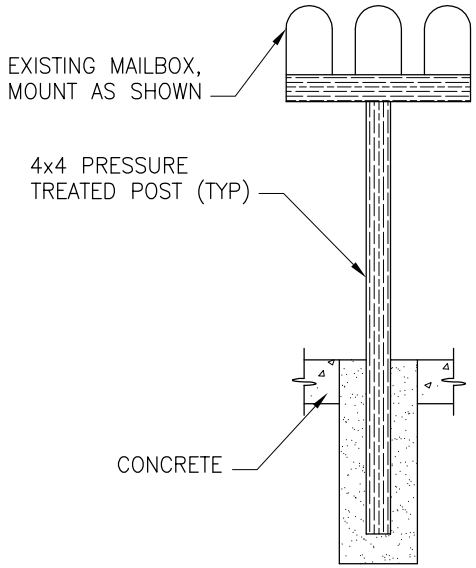
ACCESSIBLE PARKING SPACE PAVEMENT MARKING

DM.F6.1

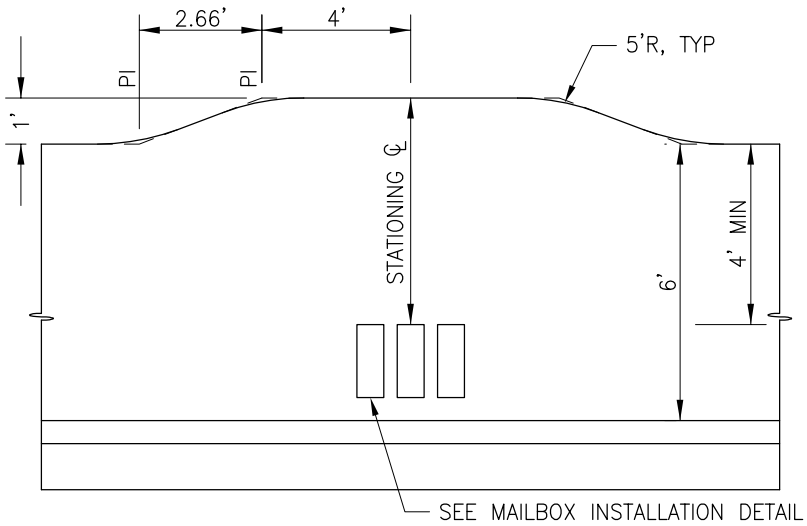
REVISED: 02/23



TYPE 2

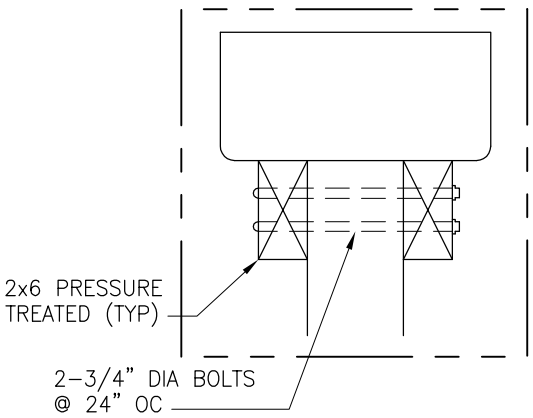


TYPE 3

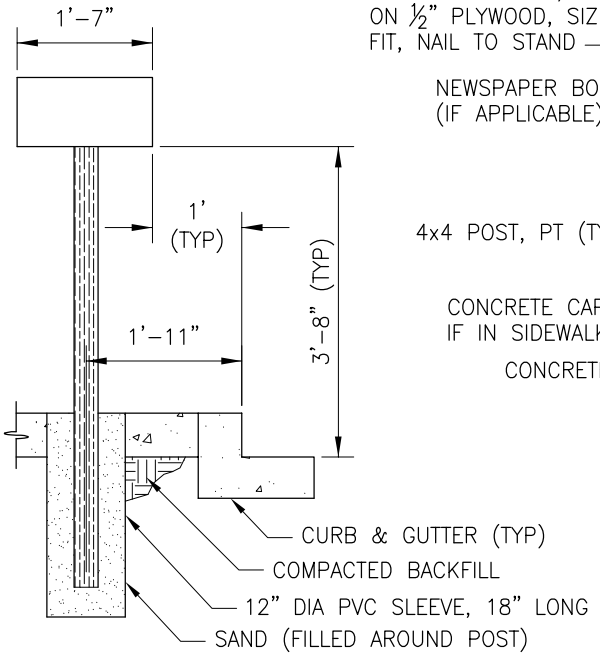


SIDEWALK WIDENING

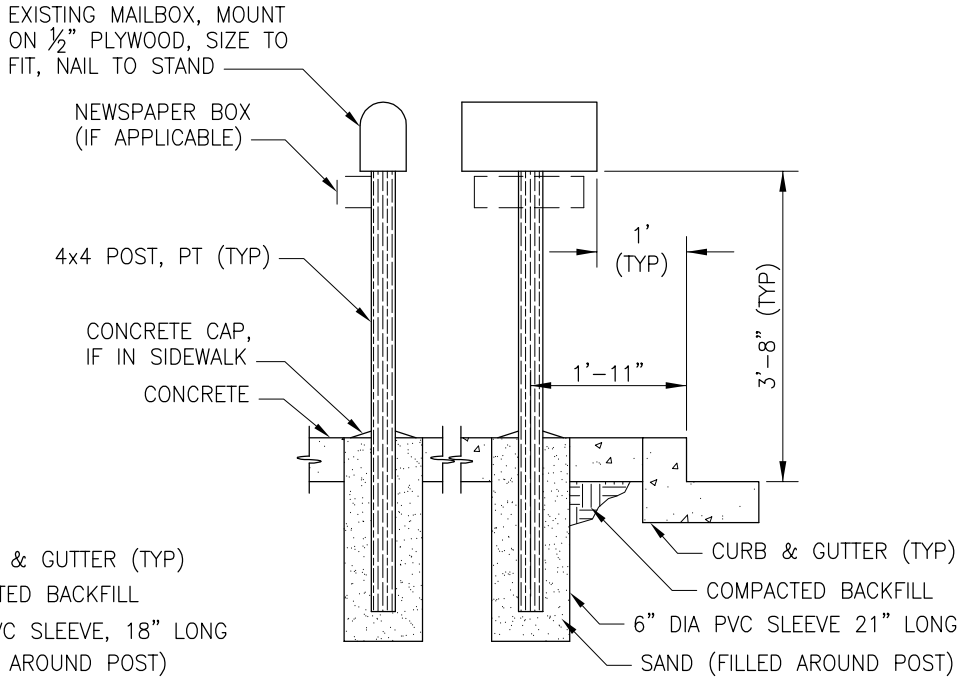
MULTIPLE MAILBOX SUPPORT INSTALLATION



MAILBOX DETAIL



PLAN VIEW



SINGLE MAILBOX SUPPORT INSTALLATION

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

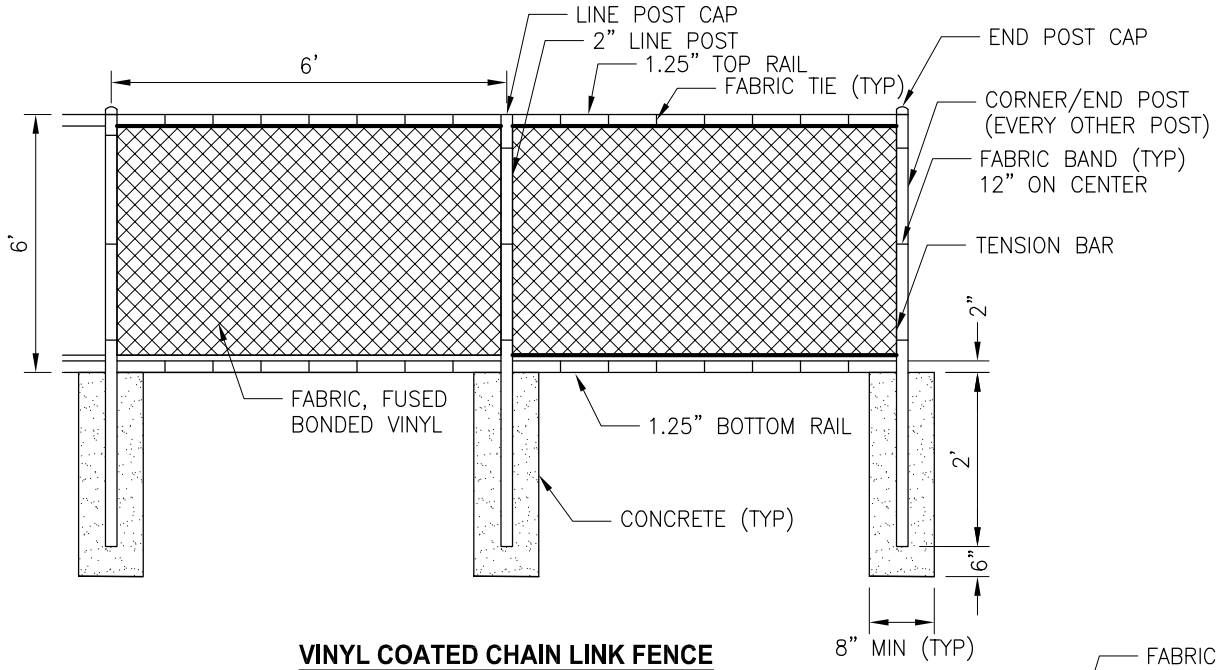
ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

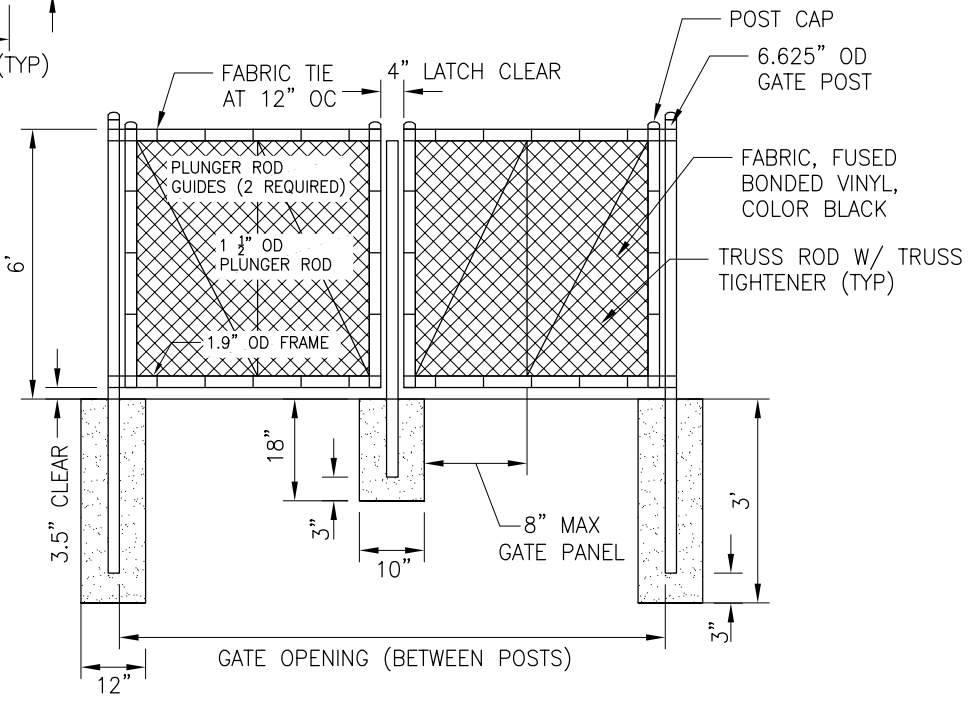
MAIL BOX SUPPORTS

DM.G1.1

REVISED: 02/23



VINYL COATED CHAIN LINK FENCE



ACCESS GRATE FOR CHAIN LINK FENCE

NOTES:

1. CHAIN LINK FENCE SHALL BE PER DETAIL OR MATCH EXISTING, UNLESS OTHERWISE APPROVED BY ENGINEER.
2. ALL COATED COMPONENTS TO BE BLACK.
3. ALL POST AND RAIL DIAMETERS ARE INSIDE DIAMETERS.
4. END POSTS TO BE INSTALLED EVERY 48 FEET, AT ANGLE POINTS AND AT BOTH ENDS OF THE RUN.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT
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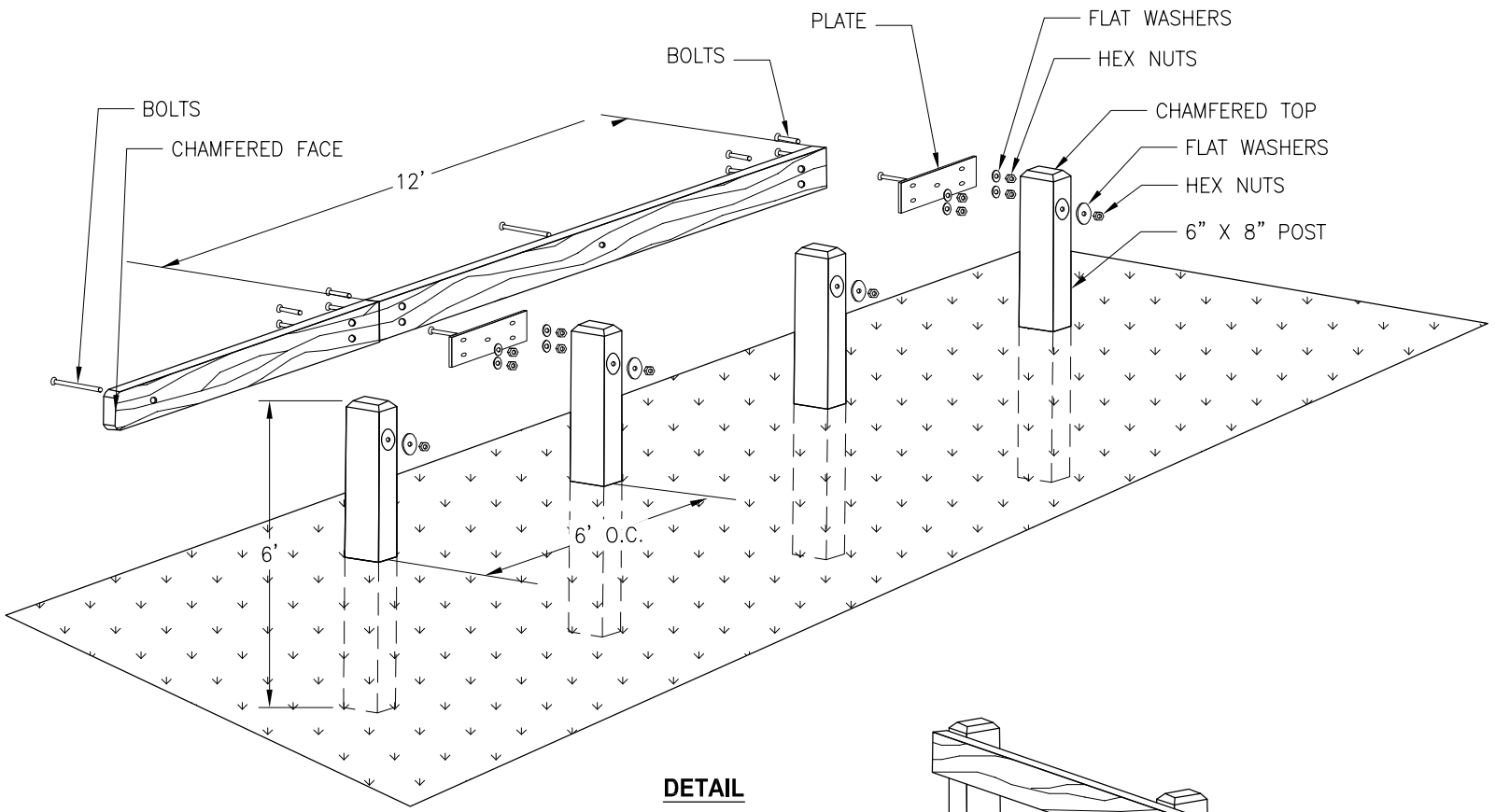
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198
SAILS WITH PRIDE

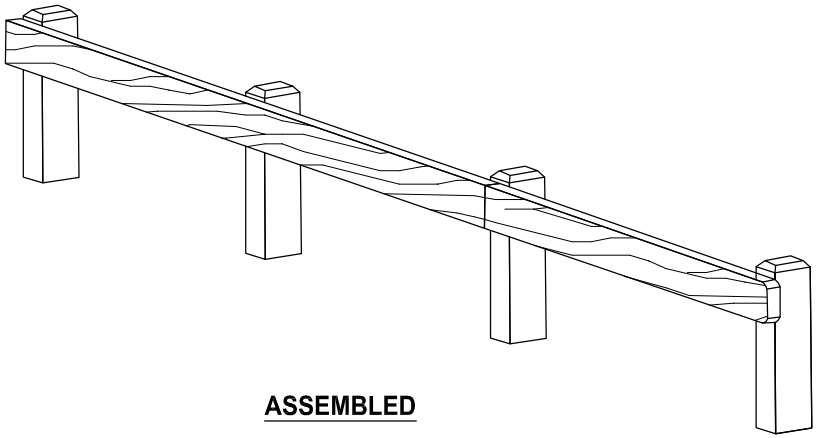
VINYL COATED CHAIN LINK FENCE

DM.G2.1

REVISED: 02/23



DETAIL



ASSEMBLED

NOTES:

1. 6"x8"x6' POSTS WITH CHAMFERED TOPS. SHALL BE INSTALLED 6 FT ON CENTER. 4"x8"x12' PRESSURE TREATED RAILS WITH A CHAMFERED FACE, SHALL HAVE A 12 FT SPLICING.
2. SQUARE EDGE TIMBER SHALL BE OF YELLOW PINE TREATED WITH MINIMUM OF 0.60 LBS PER FOOT COPPER CHROMATED ARESENATE.
3. ALL PLATES AND HARDWARE SHALL BE OF WEATHERING STEEL.
4. ALL HARDWARE, BOLTS WASHERS AND NUTS, SHALL BE OF THE SAME SIZE.

NOT TO SCALE

CITY OF DES MOINES
PUBLIC WORKS DEPARTMENT

ENGINEERING SERVICES
21650 11TH AVENUE SOUTH
DES MOINES, WA 98198

SAILS WITH PRIDE

TIMBER GUIDE POST

DM.G3.1

REVISED: 02/23