974 CMR 2.00: SUBDIVISION

Section

2.01: Process and Goals

(1) Subdivision is the component of the Unified Development Permit system that manages the construction and layout of ways. The Applicant shall follow the procedures for Level Two review set forth in 974 CMR 1.00: *Administration*.

(2) The goals of Subdivision are to ensure:

(a) the safety, convenience, and welfare of the inhabitants of Devens and residents of the surrounding communities by regulating the laying out, construction and alteration of ways;

(b) development that facilitates safe and convenient vehicular, pedestrian and bicycle travel for people of all ages and abilities (universal design);

(c) adequate vehicular and pedestrian Access to all Lots;

(d) ways with adequate landscaping, lighting and sidewalks;

(e) adequate wastewater, drainage, and emergency services, as well as adequate street lighting;

(f) connections between and among proposed and existing ways, and residential, commercial and industrial uses and open space, trails and other community amenities;

(g) convenient on- and off-site pedestrian and vehicular circulation;

(h) opportunities for multi-modal means of transportation; and

(i) consistency with the Reuse Plan and By-laws.

2.02: General Provisions

(1) Authority to Undertake a Subdivision. No person shall make a subdivision nor proceed with the Improvement or sale of Lots from a subdivision, the construction or reconstruction of streets and/or roads, or the installation and/or extension of Utilities, facilities, and services therein, unless and until a Subdivision Plan has been submitted to and endorsed by the DEC and only then in accordance with 974 CMR 2.00.

(2) Endorsement of Plan. Endorsement of a Level One Plan shall be by the signature of the Director. In the absence of the Director, the signature of the Chairperson shall suffice. Endorsement of a Level Two Definitive Subdivision Plan shall be by the signatures of a quorum of the DEC (seven members) on the first page of the plan, and by the signature of the DEC Chairperson or designee on subsequent pages of the plan.

(2.03: Reserved: (this section left intentionally blank)

2.04: Level Two Plan -- Definitive Subdivision

(1) Submission Requirements for Definitive Plans. When the Subdivision Plan is submitted with other Unified Permit components, submission of duplicate information shall be minimized. An Applicant for Definitive Plan endorsement shall file the following:

(a) A completed Permit application form.

(b) The required administrative fee.

(c) A certified list of abutters, including the names and addresses of all property owners within 300' of the boundaries of the proposed subdivision as shown on the most recent tax list.

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(d) Seven sets of plans and one digital copy of the complete application and plans in a format acceptable to the Director.
(e) A locus plan of the Subdivision at a scale of 500' to the inch or other appropriate scale as determined by the Director, depicting the exterior lines of all proposed new or substantially upgraded streets and/or roads in the Subdivision, and clearly showing their location in relation to one or more existing streets and/or roads or contiguous portions thereof. Where buildings or other significant structures exist on abutting Lots, they shall be located on the locus plan as well.
(f) A sketch plan showing a possible or prospective street and/or road layout for any adjacent un-subdivided land owned or controlled by the Applicant.
(g) A completed and endorsed stormwater management form and drainage calculations in accordance with 974 CMR 4.08(2): *General Provisions*.
(h) If applicable, a Request for Determination of Applicability (RDA) or a Notice of Intent (NOI).
(i) Copies of all existing Easements, covenants and restrictions applying to the area that is proposed to be subdivided, and applying to areas outside the proposed Subdivision where such Easements will be used to provide services to the land proposed to be subdivided.
(j) Soil suitability tests and analysis shall be submitted, describing the locations, elevations, and classification of the soil strata by depth, indicating clearly the depth at which groundwater is encountered, and the date of the tests.
(k) Location of soil suitability test pits along the centerline of the proposed layout. Depth and intervals shall be determined by the Director.
(l) The grading plan shall accurately show the topography and drainage patterns needed to permit future development for each Lot in the proposed Subdivision. It shall also show existing grades and grades proposed to permit the construction of the street and/or road, driveways and future buildings, and the installation and/or extension of Utilities. Any need to add or remove material to or from the Lot, or to alter drainage patterns in order to fully develop the Lot, in accordance with the By-laws, shall be quantified and documented for the Definitive Plan.
(m) If new roadways are to remain private, a proposed plan for long term maintenance that the DEC determines is adequate.
(n) A street lighting plan.
(o) Notation of any variance issued as to the land or structures within the parcel giving Devens case number, date granted, and description of the variance.
(p) A list of Waivers requested by the Applicant, identified as Waivers of Submission and Plan Form and Contents requirements or Design Standards, with the applicable section of 974 CMR clearly identified or a statement that no waivers are being requested.
(q) If applicable, a plan for the phasing of the construction of the required Improvements, including a description, schedule, and plan showing the location of each phase.
(r) A *Stormwater Pollution Prevention Plan*, 1995, including erosion, siltation, and dust control measures before and during construction, and appropriate ground cover, seeding, and street sweeping of adjacent public ways.

(2) Plan Form and Contents. The Definitive Plan shall be prepared, signed and sealed by an Engineer. The Definitive Plan shall be clearly and legibly drawn in accordance with the recording rules adopted by the Worcester County or Northern Middlesex Registry of Deeds in Massachusetts. The Definitive Plan shall be at a scale of 1"= 40' or such other scale as the Director agrees to accept prior to the Definitive Plan being submitted. Sheet sizes shall be 24" by 36", with margins of 1½" on the left-hand margins, and all others ¾" or other margins acceptable to the Registry of Deeds. If multiple sheets are used they shall be accompanied by an index sheet showing the entire Subdivision. The Definitive Plan shall be drawn in black ink on mylar. The Definitive Plan drawings shall contain the following information:
(a) Subdivision name, boundaries, north arrow (indicate whether true, magnetic or grid), locus plan (at a scale not be smaller than 1"= 500'), date, scale, legend, and the title, Level Two Plan – Definitive Subdivision.
(b) A title block containing the name and parcel designation of the Subdivision, the name of the owner of record and the Applicant and the name, seal and signature of the Engineer or Surveyor, designation of drawing with reference to the matter shown thereon and number of the drawing.

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(c) Names and addresses of the Engineer and Surveyor.
(d) Abutting properties labeled with the assessor parcel number and names of all abutting property owners as they appear in the most recent tax list.
(e) Suitable space for endorsement of the plan by the DEC on the top sheet of the Definitive Plan, and suitable space for signature of the DEC Chairperson or designee on each successive sheet. The top sheet shall also include space for conditions, covenants, notes, *etc*.
(f) Entire parcel of land being subdivided and all contiguous property in the ownership of the Applicant or in the same ownership as any of the land being subdivided. If the Applicant wishes to have some portion of such land designated in the Definitive Plan as not part of the subdivision, the Applicant must submit to the DEC a determination from the Director that the land so excluded is a legally separate and buildable Lot.
(g) Names, existing improved widths, and exterior lines of existing ways that are bounding, providing Access to, or approaching in close proximity to the Subdivision; the boundaries of existing areas dedicated to other public uses and the location and character of existing Easements within or adjacent to and serving the Subdivision.
(h) All boundaries of Devens Zoning and Overlay Districts that intersect the proposed Subdivision.
(i) All deed lines within the Subdivision, if the Subdivision includes more than one deed, and the deed references, where available.
(j) Boundary lines, areas in square feet, and dimensions of all proposed Lots with all Lots designated numerically and in sequence, with the new proposed parcel number referenced accordingly.
(k) Proposed street addresses for each new Lot being created.
(l) Sufficient data including lengths, bearings, radii, and central angles to determine the exact location, direction, and length of every street and/or road and Right-of-way line, Lot line, boundary line, and sufficient data to establish these lines on the ground.
(m) Location and outlines of the following:

1. All existing Improvements within the Subdivision including buildings, fences, paving, utility lines, walls, and so forth. Where there are existing buildings, they shall be identified as to their proposed use, and the number of existing parking spaces available for the buildings shall be shown.
2. 100 year flood plain and flood plain elevations as shown on the National Flood Insurance Rate Maps issued by FEMA. Within 100' of the edge of the proposed Right-of-way, site features such as stone walls, rock outcroppings, fences, trees greater than 12" in diameter at a height of 3.5' above the ground, shall be shown. In addition, other areas deemed by the Director to be important for reasons of visual buffering or attenuation of environmental impacts shall also be shown.
3. Wetlands, watercourses, water bodies offsite but abutting the Subdivision within 300', and all private wells located on or within 200' of the property, and all public and community water supply wells on or within 1,000' of the property.

(n) Boundaries of any Resource Areas. For any Lot that contains such wetland areas, the area in square feet of wetlands contained within the boundaries of the Lot shall be shown.
(o) Location of all permanent monuments properly identified as to whether existing or proposed, stone bounds to be set at tangent points and at turning points on way lines and property lines.
(p) Boundaries of any existing area or areas proposed to be dedicated to public use. The DEC may, at its discretion, allow the Applicant to dedicate land as conservation areas or trail Easements, when conservation agreements and deed restrictions are created in favor of a qualified and responsible entity or organization.
(q) Existing and proposed topography for the entire subdivision at a contour interval of not greater than 2' or such other interval as may be approved by the DEC prior to the submission of the Definitive Plan. Existing contours must be shown extending 100' beyond the property to be subdivided.

2.04: continued

(r) Layout of the proposed storm and surface drainage system showing the size and location of existing and proposed surface and subsurface water Drains and their appurtenances. The plan shall be designed to intercept stormwater run-off along streets and/or roads at intervals reasonably related to the surface type, grade, and acreage area drained. The Applicant shall also provide the supporting data and design analysis, including plans and profiles showing the location and size of Low Impact Development (LID) features, Drain lines, culverts and trenches, design of catch basins and manholes, proposed connections to the existing drainage system and such other information as may be required to describe the drainage. All such information shall be stamped and signed by an Engineer.

(s) Special drainage construction features, deviating from or not covered by standard specifications, on detail drawings. Such detail drawings may be incorporated as part of a utility plan or profile or may be executed on a separate sheet or sheets, and shall provide information as to dimensions, locations, inverts, rim elevations, elevations, materials, and so forth, of the construction details involved. The requirement for detail drawings shall be applicable, but not limited to, bridges, culverts, permanent and interim drainage Improvements, structurally stabilized slopes, utility piping encased in concrete, swales and brooks shaped or constructed to a definite cross-section, dams and spillways, steps within the exterior lines of the street and/or road and similar construction features.

(t) Layout of the proposed water supply and wastewater systems showing the size and location of existing and proposed lines and their appurtenances. The Applicant shall also provide supporting data and design analysis, including plans and profiles, as may be required to describe the water and sewer systems.

(u) Water and sewer service laterals reflecting tie-ins and appropriate connections to existing and proposed Lots reflected on the subdivision. The Definitive Plan shall also show elevation of sewer laterals for each connection to a newly proposed Lot, generally at the property line.

(v) Lowest floor elevation of structures on each Lot in the proposed Subdivision.

(w) Location and base elevation of existing and proposed fire hydrants.

(x) Names, widths, and exterior lines of proposed streets and/or roads, the boundaries of other proposed public areas within the Definitive Plan, and the location and type of proposed Easements within or adjacent to the Subdivision. Street and/or road names shall be in keeping with the character and history of Devens and be supplied by and approved by the DEC. The developer shall also provide historic ovals. The DEC will provide the content and format of the historic ovals to the developer.

(y) Methods to minimize the number of curb openings into streets, including common driveways and roads (alleys). Easements and maintenance agreements between the parties sharing the facility shall also be provided and a traffic analysis may be required to demonstrate sufficient capacity in the common driveway or road (alley).

(z) Location of existing or proposed underground Utilities such as gas and electric lines, and other underground conduits or cables, and any proposed underground connection points to existing or future planned public services. Applicants shall consult with MassDevelopment Utilities Department for minimum utility requirements for existing, proposed and future utility connections.

(aa) The proposed location of street and/or road lighting within the Subdivision. The design and specifications of such lighting shall be submitted and included on detail sheet.

(bb) Where no site plan is being concurrently submitted with the Definitive Plan, the information required should be depicted on separate sheets. The following general groupings are suggested where the information cannot readily be shown on a single plan:

1. Boundaries of the subdivision, names of abutters, proposed Right-of-way including travelway, shoulders, sidewalks, planting strips and any improved areas beyond, Lot lines, areas and dimensions, Easements, adjacent streets, zoning districts, driveways, monuments, and so forth
2. Proposed Lot lines, topography, grading, watercourses and water bodies, wetlands, existing Improvements, natural site features, and similar information.
3. Proposed Lot lines, utility installations including structures, Easements, and so forth
4. Some information, such as the location of Lot lines and the Right-of-way shall be located on each sheet in order to permit the various sheets to be related to each other.

2.04: continued

(3) Form and Content of Way and Profile Plans. For the purposes of 974 CMR 2.00, Right-of-way refers to total area of streets and roads including travelway, shoulders, sidewalks, planting strips and any improved areas beyond. A "way" may be either public or private. The following must be shown on way and profile plans:

(a) Separate layout plan for each proposed street and/or road in the Subdivision, at a horizontal scale of 1"= 40', showing for each street and/or road the proposed exterior lines, centerline, points of tangency, length of tangents, length of curves, intersection angles, radii of curves, and the location of permanent monuments and benchmarks, together with all Lot lines, buildings, and other major features within 40' of the exterior lines of such street and/or road. The layout plan shall also show the size and location of existing and proposed Utilities, together with their appurtenances. All water gate boxes, mains, and service shall be shown with the tie-ins so they may be located by measurements. Sidewalks and planting strips shall also be shown on the layout plan if proposed or required for the Subdivision.

(b) Cross-section or sections of each roadway, shall be properly located and identified by station number. The sections shall show sidewalks, Utilities, depth of Utilities, depth of gravel, crown of road, thickness of surface and materials. Slope of the side of the Right-of-way to the property line shall also be shown.

(c) A profile directly above or below the layout plan of each proposed street and/or road, at a horizontal scale of 1" = 40' and a vertical scale of 1" = 4'. The profile for such street and/or road shall show existing centerline grades in fine solid lines, existing exterior right side line in fine long broken lines, existing exterior left side line in fine short broken lines, and proposed finished centerline grades in heavy solid lines. Proposed grade elevations shall be shown by figures at beginning and end, and at 50' stations, except on vertical curves where they shall be shown at 25' stations. Rate of gradient in percentage shall also be shown. All elevations shall refer to *National Geodetic Vertical Datum (NGVD)* of 1929, unless in the opinion of the DEC, suitable benchmarks are not readily available, and alternative benchmarks are authorized by the Director prior to the submission of the plans. Profiles shall also indicate the location of any intersecting public or private ways, and the location of existing and proposed storm drains, water mains, and sewers and their appurtenances, and other Utilities. The profile shall show the rates of grade for sewers, storm Dains, and water mains.

(d) Material type for existing and proposed storm Drains, water mains, and sewers, conforming to the material specifications of 974 CMR 2.00.

(e) Proposed centerline profile of each way, showing the elevations of intersections of tangents, 50' stations, rates of slope, vertical curves, and data pertaining thereto in figures for each 25' station.

(f) High points and low points of vertical curves, calculated and shown on said profiles.

(g) Profiles on Easements and on the exterior lines of ways at a horizontal scale of 1" = 40' and vertical scale of 1"= 4', or such other scale as the Director deems appropriate. All Subdivision profiles and road grade levels will be established using certified benchmarks within Devens and tied to the Massachusetts Coordinate System or as directed by MassDevelopment Engineering.

(4) Review and Decision.

(a) Decision. If the DEC determines that the Definitive Plan:

1. meets the *Review Criteria* and the *Street and Road Design Standards*, it will approve or conditionally approve the Definitive Plan.

2. If the plan does not meet one or more of the *Review Standards* and Criteria or the *Street and Road Design Standards* it will disapprove the Plan and state in writing why the Definitive Plan does not comply.

(b) Review Criteria.

1. The Definitive Plan shall comply with the following:

a. Compliance with the applicable provisions of 974 CMR 2.00 through 5.00 and Bylaws as they pertain to ways.

b. The Submission is complete.

c. All new streets and/or roads and intersections align and connect with existing ways to ensure free movement of pedestrian, bicycle and vehicular traffic.

d. Provision has been made for the future extension of water, sewer, gas, electric, and stormwater systems and streets and/or roads to adjoining property unless the DEC determines this is not in the public interest.

2.04: continued

e. Water and wastewater systems and other required Utilities are properly sized and located and have adequate capacity for servicing the Subdivision.
f. Names of streets and/or roads are selected from the list of Devens-approved street names.
g. Trails are provided as shown on the Trail Master Plan.
h. Street lighting is adequate
i. All streets and/or roads have minimized the number of curb openings and have sufficient capacity and the necessary Easements, bonding and/or maintenance agreements.
j. Soil testing indicates that the soils are capable of supporting the roads, infrastructure and associated structures shown on the plans.

(5) Conditions. The DEC may require conditions necessary to cause the Definitive Plan to comply with the Review Criteria. Conditions the DEC might impose include:

(a) Completion of proposed ways and extension and/or installation of the proposed Improvements within the period specified by the DEC or agreed to by the Applicant.

(b) Slope Easements and/or retaining walls to provide for more gradual slopes and to support the street and/or road or adjacent land. Construction of retaining walls in accordance with MassDOT standards.

(c) Common portions of the water, sewer, drainage, and roadway systems be offered for public acceptance. The DEC may alternatively require that common portions of the systems be privately maintained; and, if such systems are required or proposed to be private, in perpetuity, the Applicant must provide for their long-term maintenance in a manner that is satisfactory to the DEC.

(d) Construction of off-site Improvements involving the extension and/or modification of streets and/or roads, utility or drainage systems beyond the project if the DEC finds that the proposed subdivision will create significant capacity, safety or environmental problems within the Public Infrastructure in Devens. Any required off-site Improvements shall be located within Devens. Specifically, the following types of off-site Improvements might be required:

1. Construction or modification of ways to ensure adequate capacity, efficiency, or safety of vehicular, bicycle, and/or pedestrian flow.
2. Installation of Improvements or segments within utility collection or distribution systems designed to increase their capacity or enhance performance.
3. Extension or modification of drainage collection or discharge Improvements in order to provide sufficient capacity for Lot-related runoff.
4. Installation of protective measures to safeguard off-site Resource Areas.

2.05: Amending or Reconsidering a Definitive Plan

(1) No amendment of a Definitive Plan shall affect the Lots in a subdivision that have been sold or mortgaged in good faith and for a valuable consideration subsequent to the endorsement of the plan, or any rights appurtenant to the Lots, without the consent of the owner of such Lots, and of the holder of the mortgage or mortgages, if any, for such land. However, the DEC may approve a request to amend an endorsed subdivision without the consent of the Lot owners and mortgagors, if the DEC makes a finding that the proposed amendments do not affect any Lots or rights appurtenant to the Lots or when there has been a sale to a single grantee of either the entire parcel of land shown on the subdivision plan or of all the Lots not previously released by the DEC.

(2) Recordation of an Amendment. No amendment shall take effect until the amended plan and the Certificate of the DEC's vote have been recorded in the Registry of Deeds or for registered land, verified by the Land Court.

2.06: Implementation of an Approved Definitive Subdivision Plan

(1) Provision of Performance Guarantee. Prior to endorsement by the DEC of a Definitive Plan, the DEC shall require that the Applicant file with the DEC a performance guarantee to secure the construction of ways and the installation and/or extension of services.

2.06: continued

(2) Conveyance of Utilities and Services.

(a) Before the DEC will release a surety bond or deposit, or in the case of a covenant, issue a Certificate of Performance for subdivisions in which the ways and Utilities are proposed to be offered for acceptance, the developer shall execute an instrument transferring to MassDevelopment unencumbered title to all sanitary sewers, stormwater Drains, water mains, and all appurtenances thereto constructed and installed in the subdivision. The Developer shall also convey to MassDevelopment, without cost and free of all liens and encumbrances, perpetual rights and Easements to construct, inspect, repair, renew, replace, operate, and forever maintain such sanitary sewers, stormwater Drains, water mains, and all appurtenances thereto and to do all acts incidental thereto, in, through, and under the whole of all streets and/or roads in the subdivision, and if such sewers, stormwater Drains, water Drains, and water mains have been constructed and installed in land not within such streets and/or roads, then in, through, and under the Easements, as shown on the Definitive Plan, and where no Easements are shown, in, through, and under a strip of land extending 10' in width on each side of the centerline of all such sewer Drains and water mains.

(b) The above shall not be construed to relieve the Applicant of responsibility to complete all construction, as required by Applicant's covenants and agreements with MassDevelopment, and to thereafter maintain all ways and Utilities in a satisfactory condition until they are accepted by MassDevelopment.

(c) Approval by the DEC of the Improvements required for a Definitive Plan does not constitute the laying out or acceptance by MassDevelopment of any ways or paths within a Subdivision.

(d) The Applicant shall retain title to each way, path, or Easement in or appurtenant to the subdivision until conveyed to and accepted by MassDevelopment;

(3) If the Applicant chooses not to offer the Right-of-way and other Access Easements to MassDevelopment, this shall be noted on the Definitive Plan and the Applicant shall propose and implement mechanisms for perpetual maintenance. Such plan shall include, but not be limited to snow plowing and/or removal, ice control, and management and maintenance of stormwater system(s), landscaping, sidewalks, paving and curbing signage, Utilities and parking/traffic control.

(4) Endorsed and As-built Plans.

(a) Upon endorsement of a Definitive Plan, the Applicant shall provide copies of the endorsed plan to the DEC for its record and use. The plan shall also be submitted in a digital format acceptable to the DEC.

(b) As-built Plan. Upon completion of construction, and before release of a performance guarantee, the DEC may require the Applicant to prepare and submit As-built Plans at the same scale as the street and/or road plans, which shall indicate all of the following:

1. Boundaries of the Right-of-way;
2. Location and elevations of roadway Improvements;
3. Driveway locations;
4. Permanent monuments;
5. Location and inverts, with elevation, of the required Utilities, hydrants and drainage including the location, with ties, and depth of sewer and water laterals serving each Lot;
6. Location of any other underground Utilities, such as natural gas, electricity, telephone lines, and street lighting;
7. Lot boundaries; and,
8. Centerline stationing.

The Applicant's Surveyor or Engineer shall certify that the ways and services as shown in the As-built Plans are complete and the As-built Plans are accurate. The DEC shall accept the As-built Plans upon determining that their content and form comply with 974 CMR 2.00.

(5) Street Acceptance Plan. For Ways proposed for acceptance, the Applicant shall have prepared and submitted a Street Acceptance Plan prior to the final release of the performance guarantee. Such plans shall be suitable for recording at the Registry of Deeds and acceptable to MassDevelopment. At a minimum, a Street Acceptance Plan shall contain the following information:

2.06: continued

(a) Title block indicating the name of the Subdivision, the name of the Public Way, the name and address of the Applicant, the name and address of the Engineer and/or Surveyor, and the date of preparation;
(b) Locus map;
(c) The boundaries and area of the Right-of-way; and
(d) The location and identification of the owners of Lots and all properties abutting the Public Way;
(e) Legal descriptions and a list of owners and mortgagees of Lots having rights to the Way.

Additional pertinent information as may be required by the Director, the DEC, or MassDevelopment shall be provided on the Street Acceptable Plan. Such plan shall be accompanied by deeds, Easements, and other appropriate documentation required for the conveyance of the Public Way.

2.07: Street and Road Design Standards

(1) Street and Road Layout and Construction.

(a) All projects that include construction of new or substantial alteration to existing streets and/or roads shall comply with 974 CMR 2.07 and the construction standards summarized in Table 1: *Street and/or Road Design Standards by Classification*.
(b) Streets and roads shall be continuous, designed to ensure free movement of multi-modal traffic and pedestrian flows, and terminate at the exterior boundary of the project unless the Director determines allowing a lesser distance is in the public interest. In certain circumstances, the DEC may allow this requirement to be met by the dedication of a Right-of-way and/or utility Easement(s) as may be required by MassDevelopment.
(c) Circulation, including vehicular, pedestrian and bicycle, shall be designed with respect to topography, integration with surrounding streets and/or roads, connection to existing or future pedestrian ways, interior circulation and the separation of pedestrians from vehicles. Bicycle accommodations shall be in accordance with current state and federal requirements. Neighborhood roads and roads (alleys) will be designed as shared use facilities where pedestrians and bicyclists have priority over motor vehicles. Refer to 974 CMR 2.07(3)(b) regarding the design of neighborhood roads and roads (alleys).
(d) Developments and streets and/or roads shall facilitate trail Access in accordance with the Devens Main Post Trails Master Plan and shall follow the Trail Design Guidelines. Applicants shall provide the DEC with Access Easements over ways and trails that are intended to be accessible to the public.
(e) Street and/or road widening, narrowing, or inclusion of traffic calming measures to assure safety for all users or improve roadway channelization and controls may be required by the DEC.
(f) Water mains shall connect to the Devens water supply system and the system shall be designed to form a continuous loop with existing or proposed water mains. Dead end mains are not permitted.
(g) Reserve strips prohibiting Access to streets and/or roads or adjoining property are not permitted, except where, in the opinion of the DEC, such strips restrict Access in accordance with the public interest.
(h) Prior to the construction or substantial modification of street and/or roads, test pits and/or soil borings shall be performed at locations along the centerline to depths specified by the Director to determine whether the existing soil can adequately support the street and/or road. If the soil testing reveals that the soil conditions are not appropriate to support the proposed street or road, or other structures, the applicant will be responsible for submitting alternative methods of construction based on recommendations from a registered structural and/or geotechnical engineer as appropriate.
(i) Street names shall be subject to approval by the DEC. Street and/or road signs of the type and character used within Devens and approved by MassDevelopment Engineering bearing the name of the street and/or road shall be provided at all intersections and shall be installed by the Applicant at its cost when the binder course of the roadway is installed. Safety and traffic control signs shall be installed by the Applicant in conformance with the *Manual on Uniform Traffic Control Devices (MUTCD)*, the Massachusetts Department of Transportation (MassDOT) revisions to *MUTCD*, and DEC requirements, as applicable to the specific project location. Historical ovals of the type and character used within Devens and approved by the DEC shall be provided and installed by the Applicant at its cost when the binder of the roadway is installed.

2.07: continued

(j) Plans for Public Ways proposed for public acceptance shall provide for adequate private long-term Public Way and associated infrastructure maintenance unless and until the MassDevelopment accepts the Public Ways or agrees to maintain.

(k) Dead-end streets and/or roads or cul-de-sacs shall only be permitted if the Applicant demonstrates to the satisfaction of the DEC that connecting to other Devens ways is impractical or unreasonable. Gated communities are prohibited.

(l) If the DEC allows cul-de-sacs, they shall have a minimum required outside turning radius of 35'. The centers of the cul-de-sacs shall be comprised of pervious materials and shall be utilized for stormwater management (biofiltration landscape island). The Applicant shall provide pedestrian and bicycle connections to and from the end of the cul-de-sac.

(2) Design Standards by Street and Road Classification. All Design Standards apply to both streets and roads. In accordance with the Bylaws, all "streets" are Public Ways and "roads" are private ways. Table 1 lists the Design Standards for streets and roads and indicates which classification is allowed to be pubic and/or private. In addition to Table 1, the following additional design standards also apply to the specified roads:

(a) Road (Alley). Minimal pavement is to be used in roads (alleys). The travelway shall be no greater than 18' and shall consist of pervious pavement such as pervious asphalt, permeable pavers, or a mix of other similar Low Impact Development (LID) approaches where feasible or any combination of pavement and pervious materials that increases the infiltration rate in accordance with 974 CMR 4.08: *Stormwater Management*.

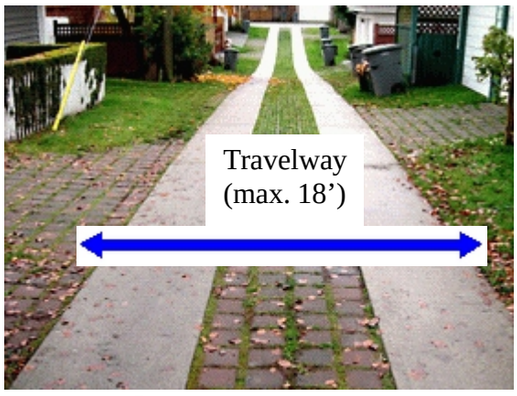


Figure 1: Road (alley) constructed using a combination of pervious and impervious paving materials to meet infiltration rate requirements in 974 CMR 4.08: *Stormwater Management*.

(b) Neighborhood Roads. Neighborhood roads are intended to be less formal than traditional, more highly trafficked streets or roads. Creativity in developing the design of these facilities is greatly encouraged. Therefore, 974 CMR 2.00 does not include strict design standards. Applicants proposing these types of facilities should be familiar with other Shared Streets facilities that have been designed and constructed and are strongly encouraged to engage professional Landscape Architects and Professional Engineers experienced with the design and construction of Shared Streets (*see* Figure 2 for an example of a neighborhood road layout). Minimal pavement is to be used. Pervious pavement and landscaping shall be the primary means of infiltrating stormwater runoff generated by the neighborhood. The Applicant shall be responsible for proposing other means of handling stormwater runoff in accordance with 974 CMR 4.08: *Stormwater Management*.

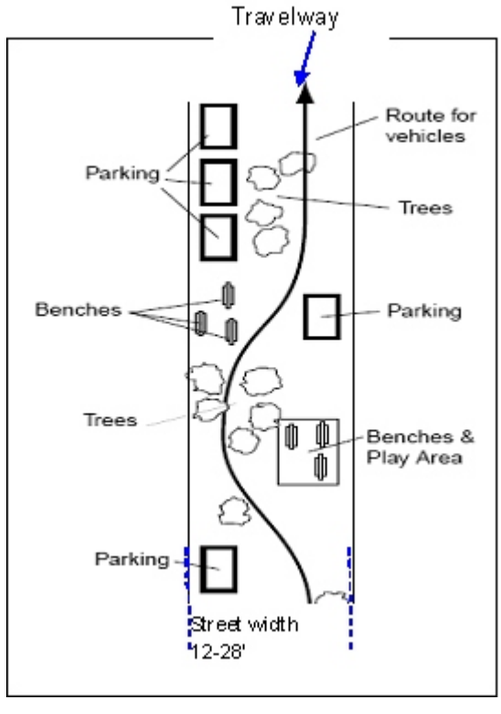


Figure 2: Example of a Neighborhood Road Layout

2.07: continued

Attributes of neighborhood roads include:

1. a ten MPH posted speed;
2. a single travelway;
3. Surfacing with scored concrete, paving blocks, bricks or other ornamental pavers indicating that the entire surface is intended for pedestrians as well as vehicles;
4. Recreational or playground facilities if desired by the developer or required by the DEC.
5. A length limited to serving a maximum of 150 Average Daily Traffic (ADT) from 15 dwelling units.
6. Traffic-calming measures to achieve ten MPH design speed. The design should limit forward visibility for vehicles to a maximum of 40'.
7. Traffic calming techniques should be installed at the entry to the neighborhood road, indicating to drivers as well as pedestrians and bicyclists that the conditions along neighborhood road are unusual as compared to traditional street networks and that caution should be taken when driving in these areas. Traffic calming techniques may include the following:
   a. Constructing gateways including narrowing the entrance to the shared zone of the neighborhood road from a standard street or road. Gateways may include the installation of planters or removable bollards. The gateway design and installation should not restrict entry to the area by emergency vehicles or block crosswalks.
   b. Consider raising the entrance to the neighborhood road so that vehicles, bicyclists, and pedestrians must ascend into the shared area.
   c. Post signage indicating speed limits and instructions to yield to pedestrians.
   d. Install different paving materials at the entrance to and throughout the neighborhood road to indicate to drivers, bicyclists, and pedestrians that the neighborhood road is not a traditional street.
   e. Introduce chicanes (serpentine pathways) for vehicular and bicycle travel.
8. Illumination for traffic-calming measures and any obstacles that may obstruct vehicles or pedestrians;
9. "On-street" parking areas;
10. Landscaping and other Improvements to facilitate pedestrian movement/activity.
11. Garages serving homes on neighborhood roads shall use roads (alleys) where feasible. If garage doors open onto a neighborhood road, the travelway shall provide 28' separation between opposing garage doors or 24' between a garage door and the far side of the travelway not abutting a garage door.

(c) For local streets, minor collectors, major collectors and boulevards, refer to Table 1.

(d) Where a street and/or road standard is not specified, Applicants may use the following references:

1. Sustainable Neighborhood Road Design: A *Guidebook for Massachusetts Cities and Towns by American Planning Association Massachusetts Chapter and Homebuilders Association of Massachusetts*, May 2011.
2. *MassDOT, Highway Division, Project Development & Design Guide*, 2006 (MHD),
3. *American Association of State Highway and Transportation Officials (AASHTO)*, 6th edition, (2011).

2.07: continued

TABLE 1: DESIGN STANDARDS BY STREET/ROAD CLASSIFICATION

Street/Road DESCRIPTION	Road (ALLEY)	NEIGHBOR-HOOD Road	LOCAL Street/Road	MINOR COLLECTOR (Street)	BOULEVARD (Street)	MAJOR COLLECTOR (Street)	REGULATION REFERENCE
Design Speed Posted Speed	10 MPH 5 MPH	10 MPH 5 MPH	30 MPH 25 MPH	30 MPH 30 MPH	30 MPH 25 MPH	30 MPH 35 MPH	AASHTO
*Right-of-way Width	18-20'	12-28'	40 ' typical	55' typical	75-80' typical	66' typical	AASHTO
Travel Lane Width	18'	varies	9'	10'-12'	10'-12'	10'-12'	MHD
Paved Shoulder Width	none	none	1'	2'-3'**	3'-6'**	2'-4'**	MHD
Cross-sectional Slope	2%	2%	2%	2%	2%	2%	AASHTO
Cul-de-sac Outer Pavement Radius with Island	N/A	N/A	45'	45'	N/A	45'	AASHTO
Profile Grades - Maximum	5%	5%	10%	5%	8%	5%	MHD
Profile Grades - Minimum	0.75%	.75%	1%	1%	0.75%	1%	AASHTO
Centerline-to-Centerline Intersection Spacing	Min. 310'	Min. 310'	Min. 310' Max.800'	Min. 400' Max 800'	Min. 310'	Min. 600'	
Curb Radius at Intersection	$\geq$ 25'	$\geq$ 25'	> 25'	> 30'	$\geq$ 25'	$\geq$ 30'	AASHTO
Intersection Grades	3%	3%	<2%	<2%	< 3%	<2%	AASHTO
Intersection Sight Distances	$\geq$ 310'	$\geq$ 310'	$\geq$ 310'	$\geq$ 310'	$\geq$ 310'	$\geq$ 310'	AASHTO
Reverse Curve Separation	N/A	N/A	> 100'	> 150'	$\geq$ 100'	> 150'	
Centerline Radius	N/A	N/A	> 150'	> 275'	$\geq$ 215'	> 320'	
Watermain - Class 52 Cement Lined Ductile Iron Pipe	$\geq$ 8"	$\geq$ 8"	> 8" min.	> 8" min.	$\geq$ 8" min	> 8" min	
Hydrant Spacing	N/A	500' max	500' max.	500'max.	500' max.	< 500' max.	
Sewer Main - SDR 35 PVC (gravity system)	$\geq$ 8"	$\geq$ 8"	> 8"	> 8"	$\geq$ 8"	> 8"	
Curbing - Sloped Granite (SG), or Cement Concrete	N/A	N/A	Cape Cod berm	SG: 6" reveal or Cape Cod berm	SG: 6" reveal or Cape Cod berm Reverse curb option	SG: 6" reveal	974 CMR 2.07(5) and MHD

2.07: continued

TABLE 1: DESIGN STANDARDS BY STREET/ROAD CLASSIFICATION (continued)

Street/Road DESCRIPTION	Road (ALLEY	NEIGHBOR-HOOD Road	LOCAL Street/Road	MINOR COLLECTOR (Street	BOULEVARD (Street	MAJOR COLLECTOR (Street	REGULATION REFERENCE
Curbing - Vertical Granite (VG), or cement concrete	N/A	N/A	Cape Cod berm	VG: 6" reveal	VG: 6" reveal	VG: 6" reveal	974 CMR 2.07(5) and MHD
Street lighting Maximum Height: Maximum Spacing:	18' 50'	18' 50'	18' 50'	30' 75'	35' 75'	35' 75'	974 CMR 2.07(6)
Gravel Sub-base - MHD M.1.03.1Typ A	varies	varies	8"	8"	8"	8"	974 CMR 4.08(5) for pervious
Gravel Base - MHD M.1.03.0. Typ B	varies	varies	4"	4"	4"	4"	974 CMR 4.08(5) for pervious
Bituminous Concrete Base Course	varies	varies	N/A	N/A	2"	3"	974 CMR 4.08(5) for pervious
Bituminous Concrete Binder Course	varies	varies	2"	2½"	1½"	1½"	974 CMR 4.08(5) for pervious
Bituminous Concrete Top Course	varies	1.5"	1.5"	1.5"	1.5"	1.5"	974 CMR 4.08(5) for pervious
Bituminous Concrete Sidewalks (Concrete required where matching existing concrete sidewalks)	N/A	N/A	Two sides 5' wide	BCS/VGII/Rail Related: One Side 5' wide. All Others: Two Sides 5' wide	Two sides 5 ' wide	BCS/VGII/Rail Related: One Side 5' wide. All Others: Two Sides 5' wide	
Planting Strips	N/A	N/A	3.5' wide min.	3.5' wide min	6' wide min.	6' wide min.	
Vertical Clearances (Bridges)	N/A	N/A	14.5 '	14.5 '	14.5 '	14.5 '	MHD

* Right-of-way refers to total area of streets and roads including travelway, shoulders, sidewalks, planting strips and any improved areas beyond.

(3) Traffic Calming Measures. Traffic calming measures shall be integrated into all existing and proposed street and/or road designs where feasible to improve public safety and facilitate Universal Design that results in a safe multi-modal street and/or road network throughout Devens. Traffic calming measures include, but are not limited to, the following:

- Street trees every 30'
- Bump-outs/curb extensions
- Pinch points

2.07: continued

- Lane offsets/shifts in pavement
- Pavement narrowing (chokers)
- Change in paving materials
- Traffic diverters/barriers
- Speed humps
- Forced turns/intersection islands
- Traffic Circle
- Street and/or road closures
- Raised intersections
- Signalized/raised vrosswalks
- Site furniture/bike racks for intersections adjacent to open space

The DEC will consider other traffic calming measures on a case-by-case basis. Refer to *MassDOT, Highway Division, Project Development & Design Guide*, 2006 (MHD) for details.

(4) Street and Road Edge Standards.

(a) Where curbs are necessary to protect the roadway edge or to direct drainage, perforated curbs (that allow runoff to flow into swales) or curbs set flush with pavement may be considered. Bituminous concrete curbing is not permitted within public or private Rights-of-ways.

(b) Where curbs are not necessary, the edge of road shall be protected with a grass strip flush with the pavement or by other means acceptable to the DEC and MassDevelopment.

(c) Cement concrete or vertical granite curbing with a specified reveal shall be installed in all other areas where LID design techniques have not been incorporated.

(d) Whenever the profile or type of curbing material changes, matching transition curb sections shall be installed.

(e) Guard rails are required off of the edge of streets/roads with improved/unimproved shoulders that abut steep slope areas.

(5) Intersection Design Standards. While vehicular traffic flow should be carefully considered, creating safe crossings and accommodating pedestrians, vehicles and bicycles as much as possible in the Right-of-way takes precedence. Reasonable reduction of vehicular traffic capacities and level of service at intersections are justified when high volumes of pedestrians and bicyclists are present.

(a) Streets and/or Road intersections shall be designed to ensure free movement of Pedestrian, bicycle and vehicular traffic.

(b) Streets and/or Road intersections shall align and connect with existing ways at 90° angles to the maximum extent feasible. Streets and/or roads shall not have intersecting angles less than 60°.

(c) All intersection designs shall comply with *MassDOT, Highway Division, Project Development & Design Guide*, 2006 (MHD).

(6) Stormwater Management.

(a) Overview. Stormwater Management within subdivisions generally consists of the control of stormwater runoff within ways. It is characterized by common, multiple user drainage collected in the ways and directed towards appropriate receptors. MassDevelopment will usually maintain or oversee maintenance of these public stormwater management systems.

(b) All Stormwater management systems shall comply with 974 CMR 4.08: *Stormwater Management*.

(c) The stormwater management system for the subdivision may be designed and constructed to include drainage and run-off from developed sites as well as the roadway. The Director may require the Applicant to provide a stormwater management plan for the entire subdivision at full build-out to minimize the total number of detention/retention basins.

(d) Maintenance of Stormwater Improvements in Private Ways. Where the DEC requires that road maintenance be done by the Applicant, the following schedule applies:

1. Biannual inspection of detention/retention and infiltration facilities for Erosion, debris, sand deposits, and vegetative growth. Vegetation shall be cut back annually, as appropriate, and debris or sediment removed from the basins.

2.07: continued

2. Submission of an annual report to the DEC by the Applicant of the detention/ retention basin to the DEC indicating that maintenance issues have been adequately addressed and that corrective measures were made where necessary.

(e) Refer to 974 CMR 4.08: *Stormwater Management* for Design Standards and Criteria for Certain Structural Low Impact Development (LID) Techniques. For combined public/private systems, Applicants shall obtain authorization from MassDevelopment Engineering and Public Works for private connections into public systems.

(7) Landscape Treatment within Street/Road Rights-of-way

(a) Purpose. When a new street and/or road is built or substantially upgraded, the Applicant shall provide street trees and planting strips.

(b) Design Standards.

1. Minimum sizes for plant material, other than for specific uses indicated elsewhere in 974 CMR 2.00, shall be in accordance with 974 CMR 3.04(8)(c): *General Provisions*.

2. Street trees are shade trees located along a road and/or street. Applicants shall plant street trees in accordance with 974 CMR 3.04(8)(k). Multiple species may be used on the same side of any street between intersections.

3. Groundplane Treatment.

a. All unpaved areas within the Right-of-way (public or private) shall pitch at 1:50 minimum.

b. All unpaved areas within the Right-of-way with a gradient between 1:50 and 1:3 shall be lawn. Grass shall be sod, seed, or hydroseed using species mix composition typically used in New England for grass receiving routine mowing.

c. Any unpaved areas within the Right-of-way between 1:3 and 1:1.5 shall be planted with low shrubs (under 3' height at maturity) or groundcover, having fibrous root systems to control Erosion.

d. Slopes created to meet existing grades within or immediately adjacent to the Right-of-way shall not be greater than 1:1.5. Where space is limited or nearby existing trees/woodland are being retained, the Applicant shall provide retaining walls to avoid slopes steeper than 1:1.5.

e. Retaining walls under 4' retaining height shall be mortared fieldstone wall construction with dry-laid look, brick, or flat face "lock blocks" in a natural stone color acceptable to the DEC. Retaining walls 4' height or greater shall be concrete with a fieldstone or brick veneer, or flat face "lock blocks" in a natural stone color acceptable to the DEC.

f. Within the Rail, Industrial, and Trade Related District and the Environmental Business District only, the use of trap rock for bank stabilization may be substituted in the place of the recommended shrubs. Proposed retaining walls may be concrete.

4. Shrubs. The following list of native shrub species is recommended for their high performance in slope stabilization, urban, and roadside conditions. Substitutions must be able to demonstrate suitability to the satisfaction of the DEC.

Botanical Name	**Common Name**	**Minimum Installed Size**	**Maximum Spacing (on-center)**
Cornus sericea 'Kelseyi'	Kelsey Dwarf Red Osier Dogwood	12" - 15"	18" o.c.
Ilex verticillata 'Nana'	Dwarf Winterberry	18" - 24"	2' o.c.
Rhus aromatica 'Gro-low'	Dwarf Fragrant Sumac	15" - 18"	18" o.c.
Vaccinium angustifolium	Lowbush Blueberry	1 gal.	2' o.c.

In addition, the following list of non-native species may be used for bank stabilization, urban, and roadside conditions. Substitutions must be able to demonstrate suitability to the satisfaction of the DEC.

2.07: continued

Botanical Name	Common Name	Minimum Installed Size	Maximum Spacing (on-center)
Cotoneaster horizontalis	Rockspray	18" - 24"	2' o.c.
Hedera helix 'Baltica'	Baltic Ivy	2 yr.	8" o.c.
Juniperus chinensis sargentii	Sargent Juniper	18" - 24"	2' o.c.
Juniperus horizontalis varieties	Creeping Juniper	18" - 24"	2' o.c.
Spiraea bumalda 'Anthony Waterer'	Anthony Waterer Spirea	18" - 24"	2' o.c.
Vinca minor	Periwinkle	2 yr.	8" o.c.

5. Existing Vegetation.

a. Vertical alignment of streets and/or roads and sidewalks running through areas of undisturbed woodland or mature trees shall follow the existing topography to the maximum extent feasible to reduce the impact to undisturbed woodland within and adjacent to the Right-of-way.

b. Topographic alteration and the removal of vegetation beyond the limits of the proposed Right-of-way shall be kept to the minimum possible extent to meet existing grades.

c. Vegetation shall be cleared from the Right-of-way only as needed to accommodate roadway, Utilities, and sidewalks.

d. Significant trees (minimum 12" caliper) or woodland vegetation outside the roadbed within the Right-of-Way shall be preserved by adjusting the alignment of Utilities and sidewalks to avoid the trees. The Applicant shall provide tree wells for any grade change of 6" above or below existing finish grade within 6' of the trunk of a tree to be preserved. Use of dry laid fieldstone construction for tree wells is encouraged.

e. All work within the root zone of existing trees to be preserved shall be carried out under the direction and supervision of a certified arborist.

(8) Sidewalks.

(a) Objectives.

1. Sidewalks are designed primarily for pedestrians.
2. Sidewalks shall become part of a continuous system.
3. All sidewalks shall be Americans with Disabilities Act (ADA) compliant, and conform to 521 CMR: *Architectural Access Board* requirements and shall include transition intersections with tactile strips at crosswalks.

(b) Design Standards.

1. There shall be three types of sidewalks in Devens: minimum standard, higher standard, and highest standard. Minimum standard sidewalks are constructed in areas with lower levels of pedestrian traffic and where appearance is typically of less importance. These areas include the Rail-related District, the Environmental Business District, and the Special Use II District. In the Innovation Technology Business District and the Gateway I and II Districts, minimum standard sidewalks shall be constructed along minor collector streets/roads, while higher standard sidewalks shall be constructed in residential districts, along major collector streets and/or roads. Highest standard sidewalks are used in areas with relatively high levels of pedestrian traffic.
2. Sidewalk standards are as follows:

a. Minimum Standard Sidewalks shall be constructed of bituminous concrete, 5'-0" minimum width, and shall comply with the dimensions and specifications of the sidewalk details of 974 CMR 2.00.

b. Higher Standard Sidewalks shall be constructed using cement concrete with an SRI of at least 29 and shall be 5'-0" minimum width, and shall comply with the specifications in 974 CMR 2.00: *Appendix B.* Applicants are encouraged to use pervious concrete. Refer to 974 CMR 4.08(5): *Design Standards and Criteria for Certain Structural LID Techniques* for pervious concrete construction specifications.

2.07: continued

c. Highest Standard Sidewalks. Uses that generate particularly high levels of pedestrian activity, such as schools, transit stops and places of public assembly shall have cement concrete sidewalks that are the highest standard and have a 7'-0" minimum width across the entire Lot frontage. The DEC may allow a lesser width (but in no instance less than 5'-0") or sidewalks along a portion of the frontage, if the DEC finds adequate pedestrian access and safety will be provided.

3. Sidewalks shall run continuously on both sides of all streets and roads to the maximum extent feasible.

4. Sidewalks shall be separated from streets and roads by a landscape strip at least 3' wide. Where Street trees are provided between the sidewalk and street/road, the landscape strip shall be increased to an appropriate width to ensure survival of the street trees.

5. Refer to 974 CMR 3.04(6)(a)1.: *Sidewalks/Trails* for additional sidewalk requirements.

(9) Lighting.

(a) Design Standards.

1. All lighting shall comply with 974 CMR 3.04(6): *Site Improvements*.

2. Light poles shall be located and spaced to ensure safe and adequate light levels for all streets and/or roads, intersections and sidewalks. Refer to Table 1 for maximum spacing and height restrictions for all roads/streets. Fixture height is measured from the ground to the top of the light fixture/post assembly.

(b) Fixture Style.

1. Within all districts (except the Historic District overlay) fixtures shall comply with 974 CMR 4.04: *Illumination and Astrophysical Compatability* and the applicable *MassDevelopment Devens Design Guidelines for Devens Industrial Park.*

2. Within the Historic District overlay, street light fixtures and poles shall comply with the Report: Street Lighting Recommendation for Devens Historic Overlay District prepared by Carol R. Johnson and Associates of Boston, MA dated November 30, 2001.

(10) Trails. When a portion of the public trail system or private connections to the public trail system as shown on the *Devens Main Post Trails Report* dated July 2001 falls within the land to be subdivided, the Applicant shall provide an Easement and construct that portion of the trail on the parcel/project site. The trail detail is shown as 974 CMR 3.08(12): *Figure L*. Depending on the size and use of a proposed subdivision, DEC may require connectors to the main trail system in addition to or in *lieu* of sidewalks.

(11) Transit Improvements Within Rights-of-ways. Where feasible, Applicants shall incorporate the following:

(a) Parking bump-outs shall be designed to easily convert to transit stops when transit service becomes available.

(b) Transit stops shall be sited in accordance with the *MassDOT, Highway Division, Project Development & Design Guide*, 2006 (MHD), Section 6.3.4.

(c) When projects are proposed within a public or private transit-served area, the Applicant shall coordinate with the applicable transit authority. Should the transit authority or the DEC require any stops, such stops should be sited as close to the maximum number of existing and proposed Dwelling Units as possible. Any required stop(s) shall include shelter with seating and protection from rain, snow, wind, and sun (using vegetation where feasible), street furniture, bike racks, planting bed and signage. Required stops shall also include the following:

1. Enough waiting area for passengers without interfering with the flow of pedestrians walking by and also provide safe and convenient Street and/or Road crossings to access the stop.

2. Shelters positioned so riders in wheelchairs have enough room to enter and exit the shelter. The sidewalk behind the shelter shall be wide enough for two wheelchair users to pass each other and to handle the expected levels of pedestrian activity.

3. Adequate lighting for safety and visibility. All lighting shall be shielded with full cut-offs and not spill over onto adjacent properties or into the Street and/or Road or create a visual hazard/glare for road traffic.

2.07: continued

4. An area to accommodate posting of schedules and route maps and any local ride share programs in addition to the ability to accommodate electronic schedule displays.
5. ADA compliant treatments such as tactile strips along loading areas and adequate room to operate wheelchair lifts (minimum ADA Accessibility Guidelines for Buildings and Facilities [ADAAG] requirement is 8').

2.08: Severability

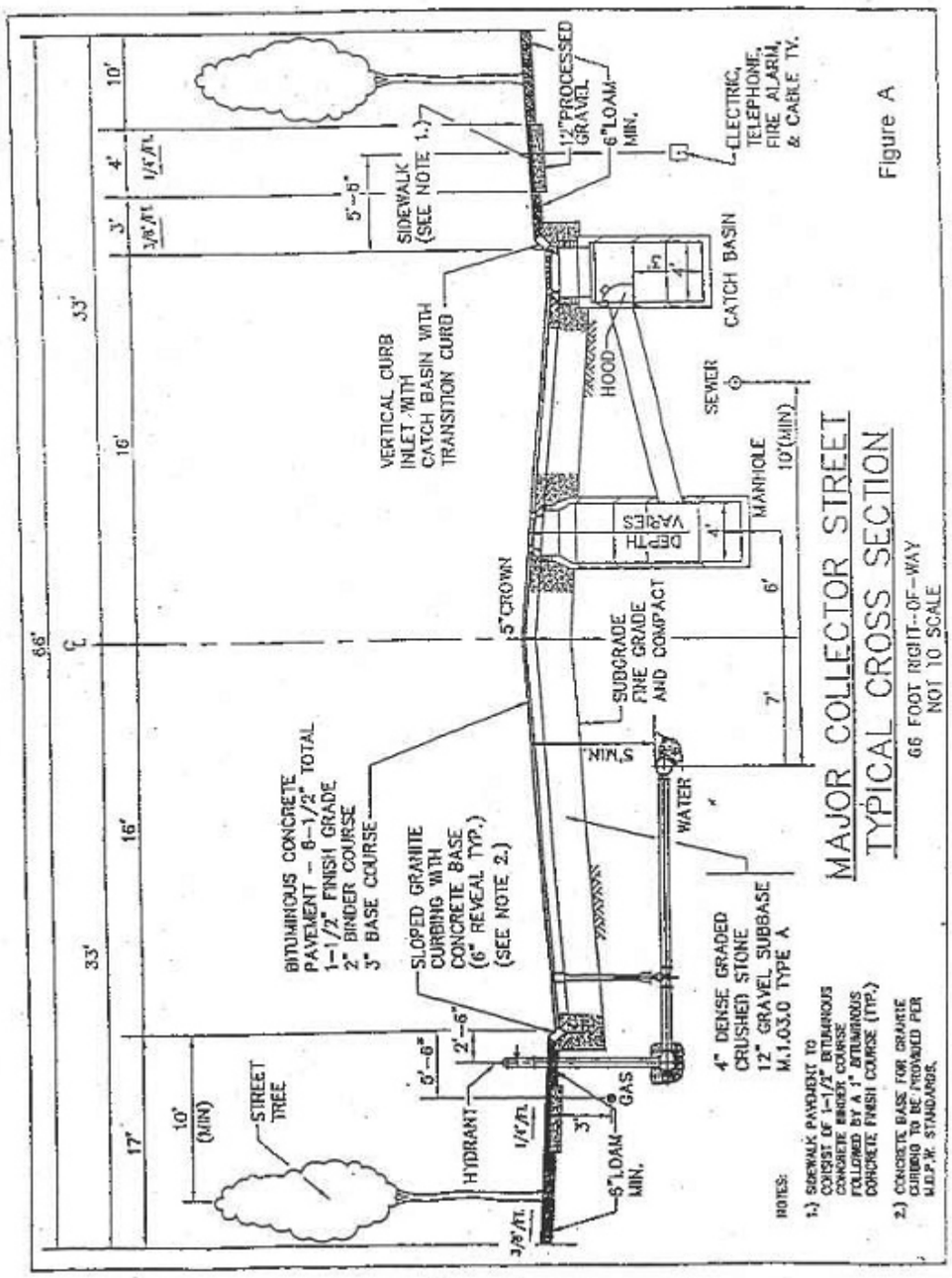
If any provision of 974 CMR 2.00 or the administration thereof shall be held unconstitutional, invalid or void, it shall not affect any other provision of 974 CMR 2.00 or the administration thereof.

REGULATORY AUTHORITY

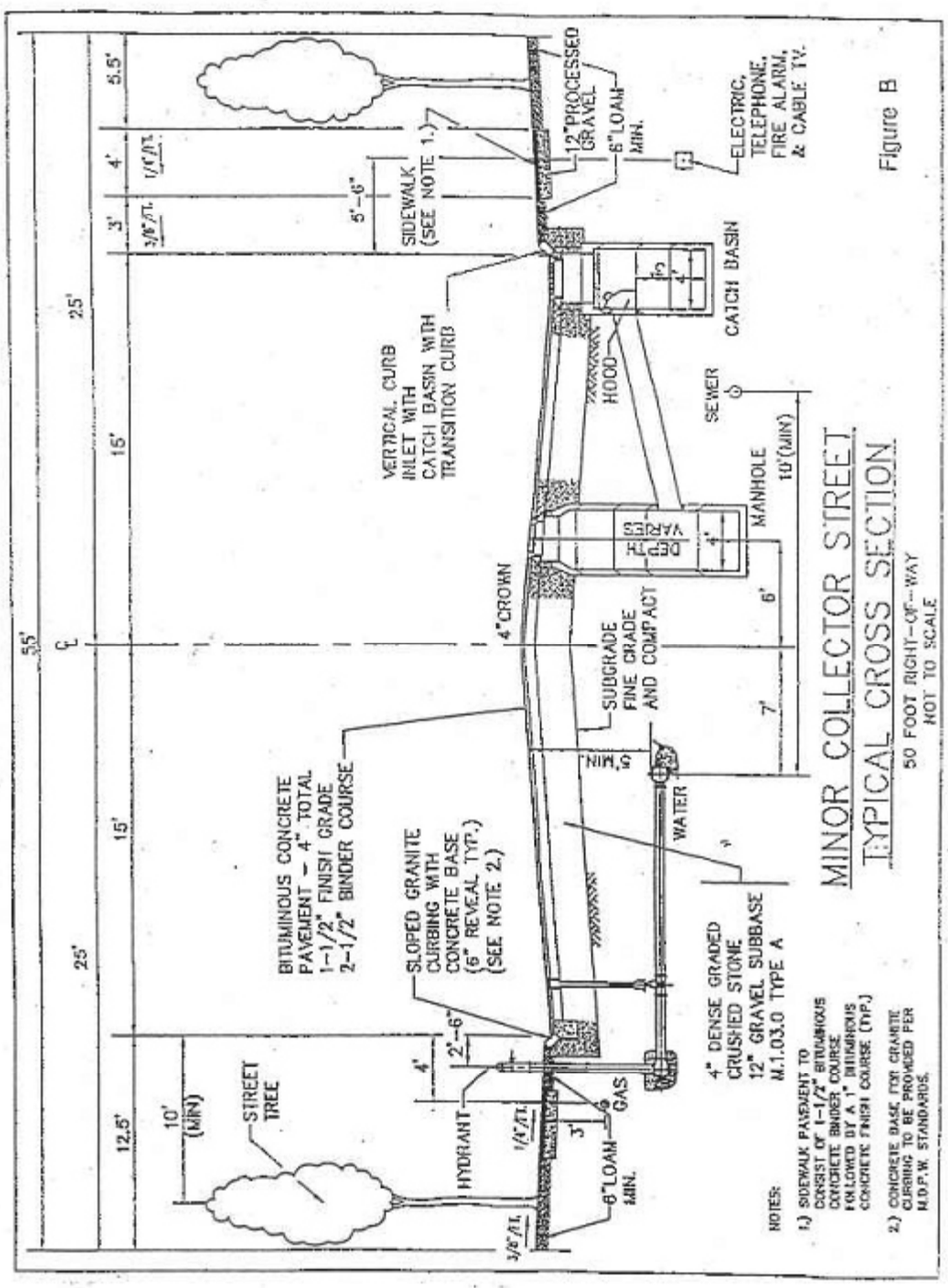
974 CMR 2.00: St. 1993, c. 498.

NON-TEXT PAGE

2.09: Appendix A



2.09: Appendix A: continued



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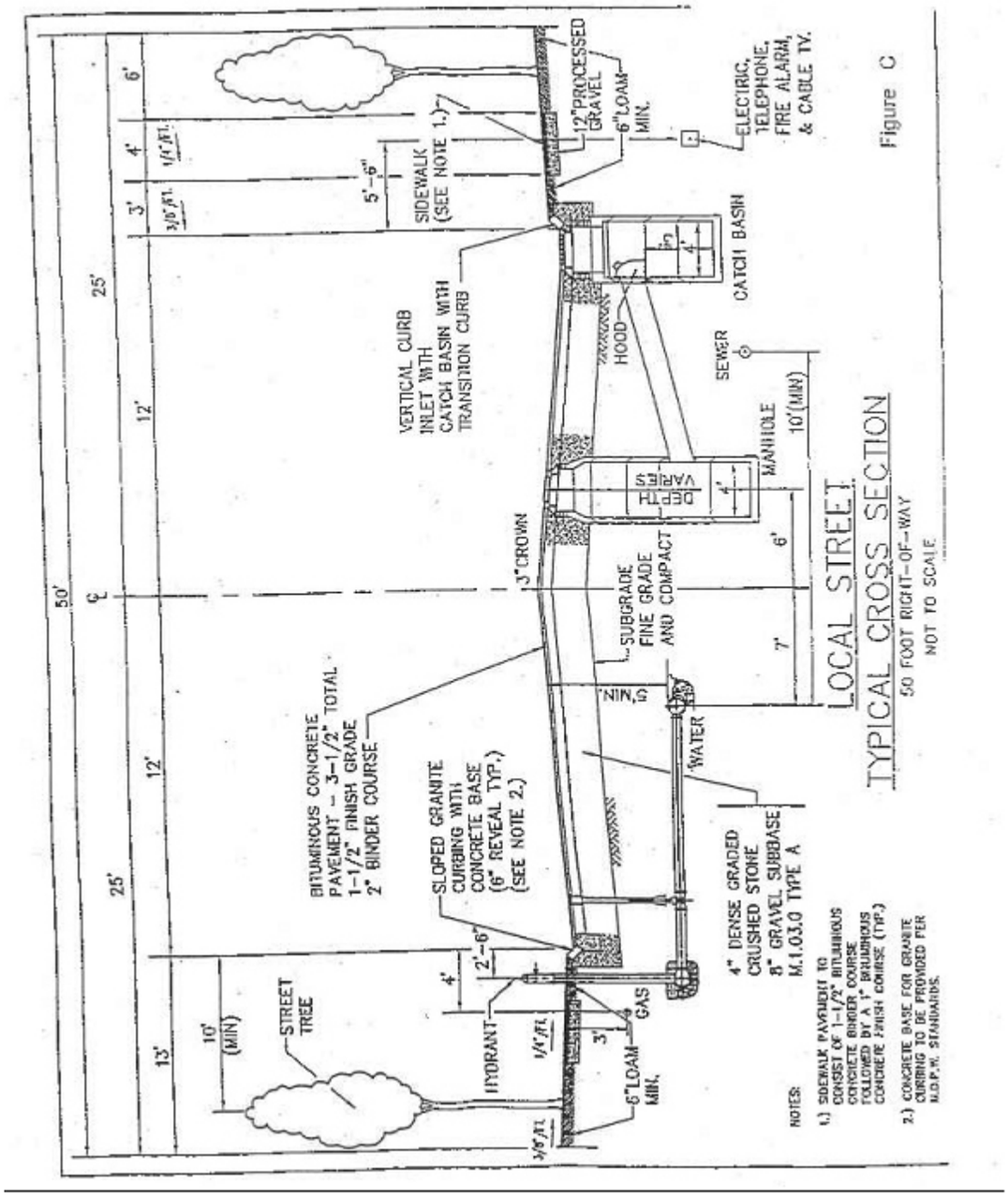

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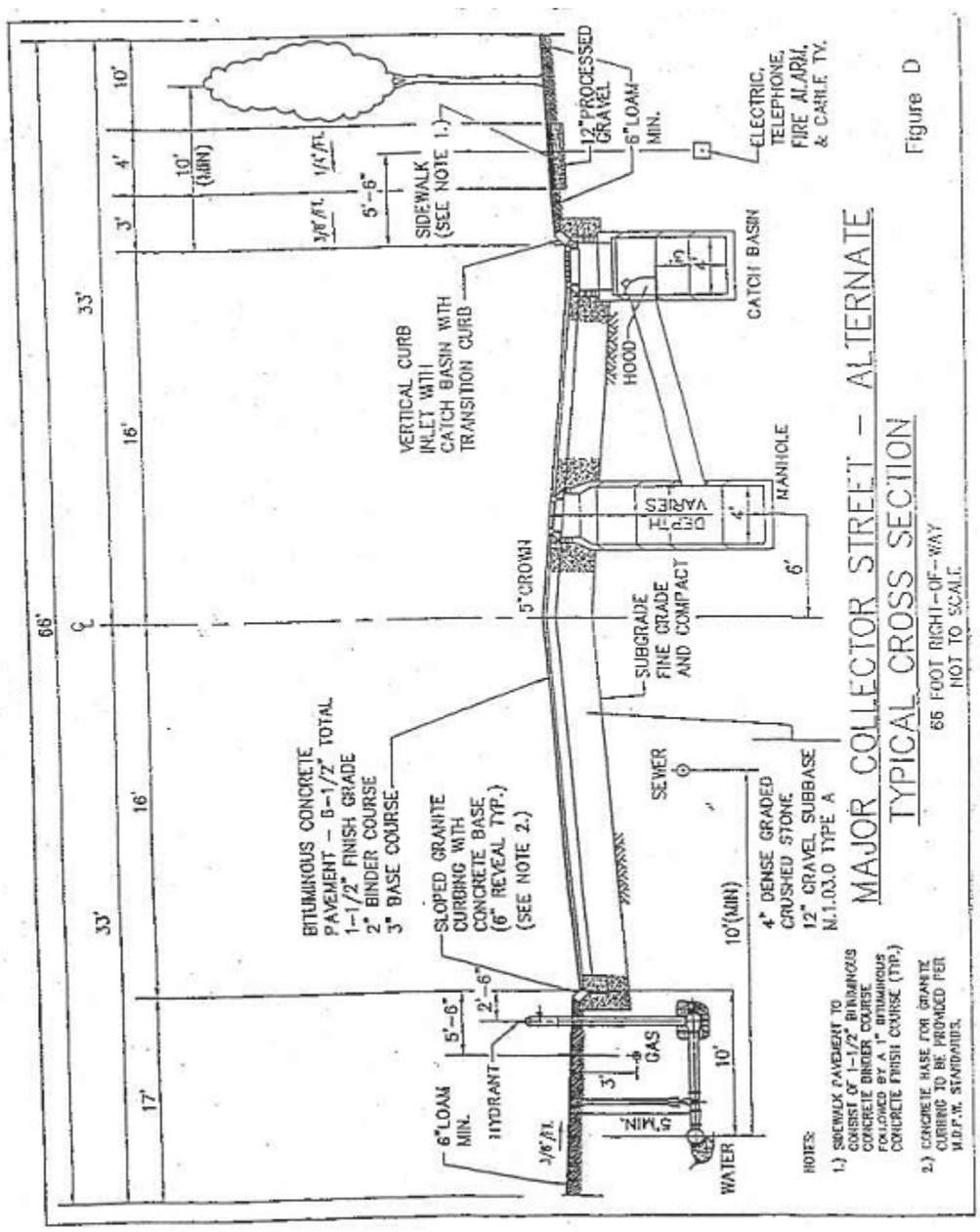
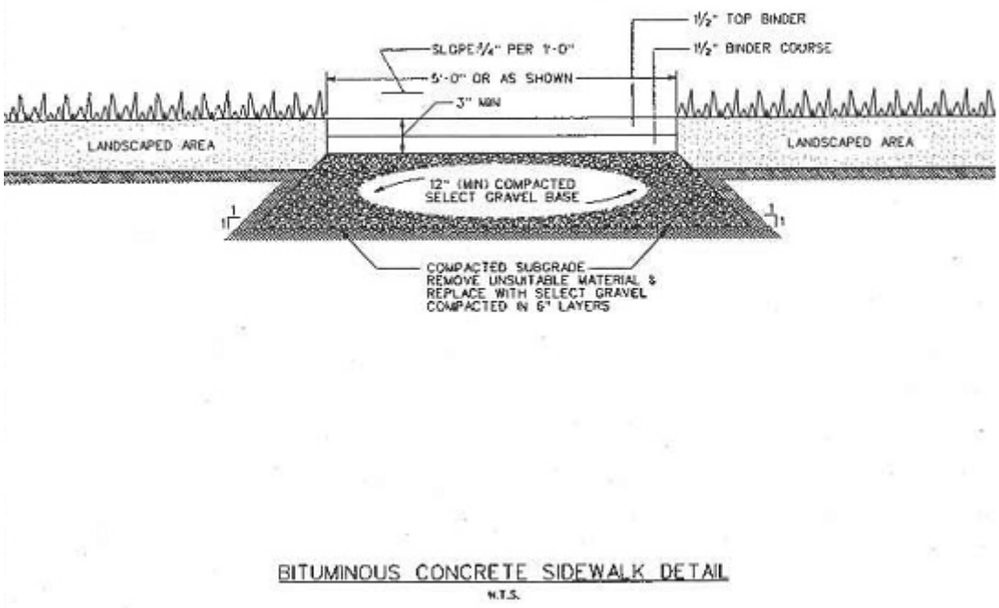


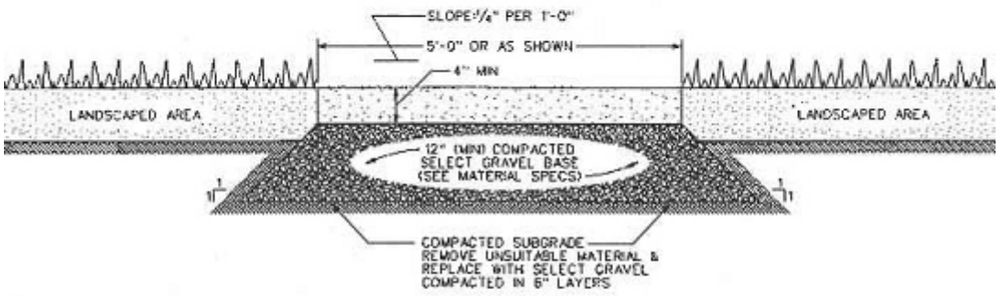
2.09: Appendix B - Figure A



BITUMINOUS CONCRETE SIDEWALK DETAIL
N.T.S.

Note: All sidewalks shall be Americans with Disabilities Act (ADA) compliant, and conform to 521 CMR: *Architectural Access Board* requirements and shall include transition intersections with tactile strips at crosswalks.

2.09: Appendix B - Figure B



NOTES:

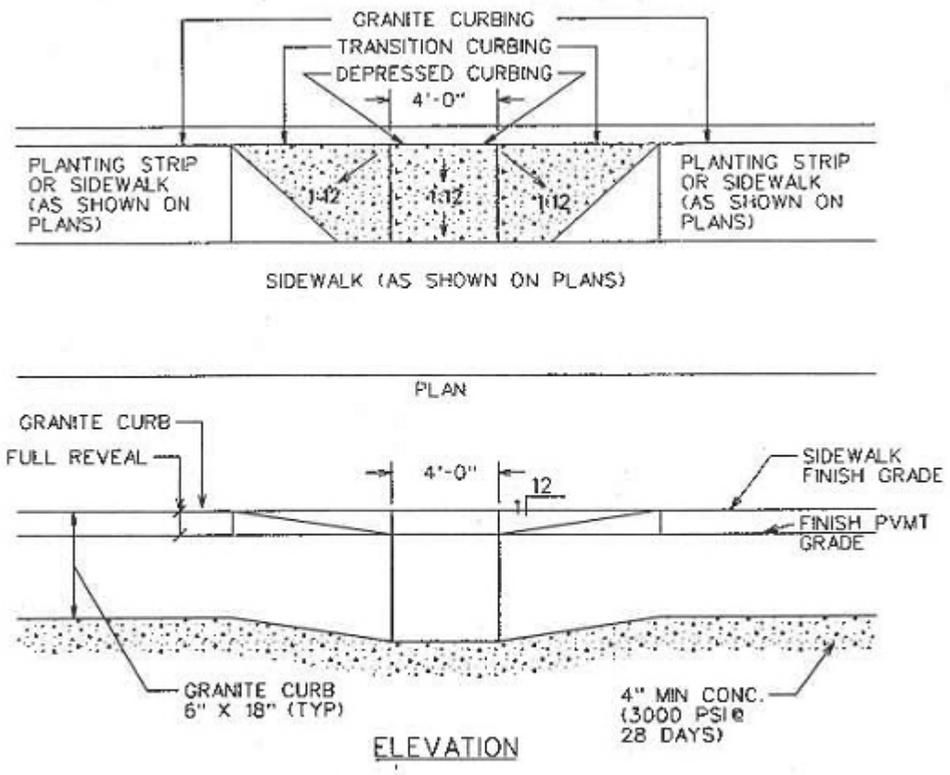
CONTRACTOR SHALL INSTALL AN EXPANSION JOINT AT ALL BUILDINGS AND ALL SIDEWALK INTERSECTIONS OR AT A START OF CURVED SECTIONS AND SHALL INSTALL LATERAL CONTROL JOINTS AS REQUIRED (5'-0" TYP. SPACING).
SLOPE SIDEWALK AS SHOWN ON PLANS OR ROADWAY SECTIONS (MINIMUM SLOPE - 1%)

CONCRETE SIDEWALK DETAIL

N.T.S.

Note: All sidewalks shall be Americans with Disabilities Act (ADA) compliant, and conform to 521 CMR: *Architectural Access Board* and shall include transition intersections with tactile strips at crosswalks.

2.09: Appendix B - Figure C

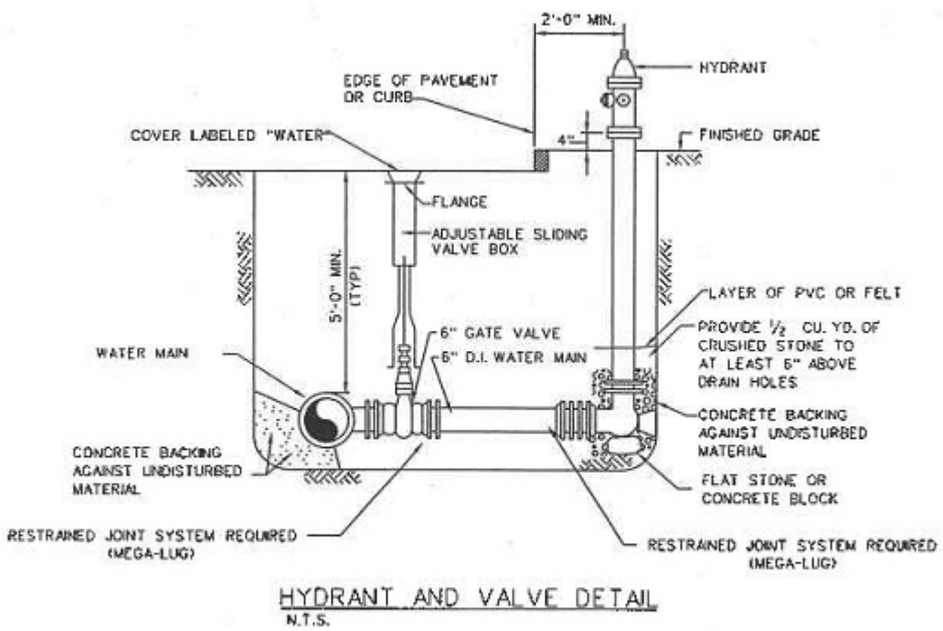


WHEELCHAIR RAMP DETAIL

N.T.S.

Note: All sidewalks shall be Americans with Disabilities Act (ADA) compliant, and conform to 521 CMR: *Architectural Access Board* and shall include transition intersections with tactile strips at crosswalks.

2.09: Appendix B - Figure D



HYDRANT AND VALVE DETAIL
N.T.S.

Note: Contact Devens Utilities Department for additional details/requirements.

2.09: Appendix B - Figure E

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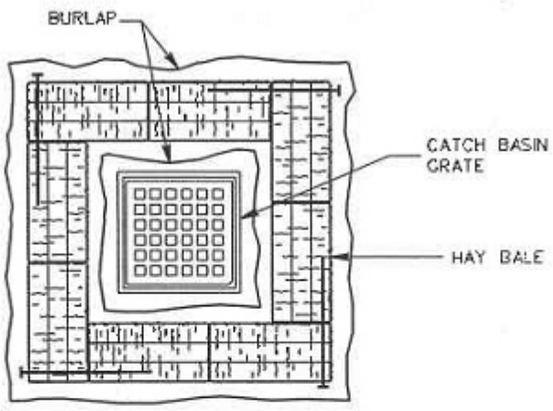


SURROUND STREET DRAINAGE STRUCTURE INLET WITH HAY BALES PRIOR TO CONSTRUCTION AND MAINTAIN UNTIL CONSTRUCTION IS COMPLETED. ACCUMULATED SEDIMENTS SHALL BE REMOVED ON A REGULAR SCHEDULE.

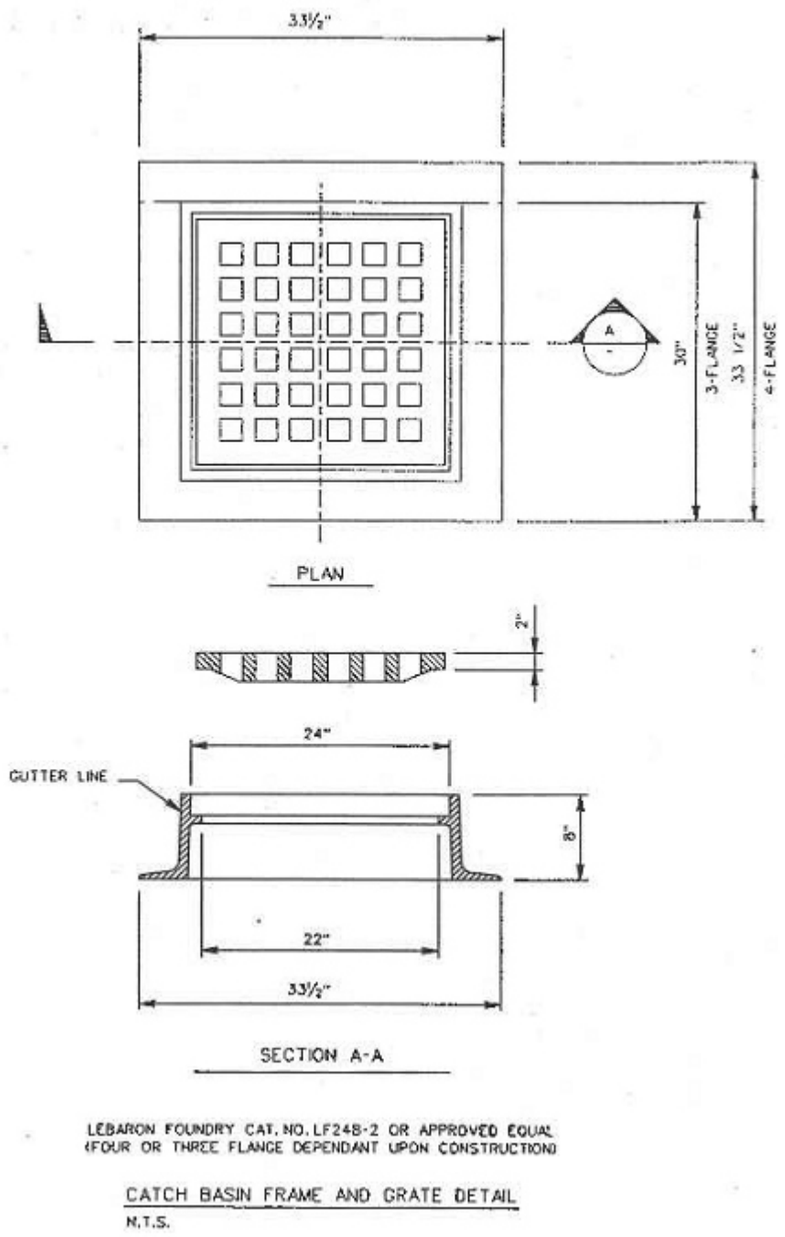
HAY BALES PLACED ON PAVEMENT SHOULD HAVE BURLAP PLACED BETWEEN PAVEMENT AND HAY BALE.

CATCH BASIN INLET EROSION CONTROL

N.T.S.

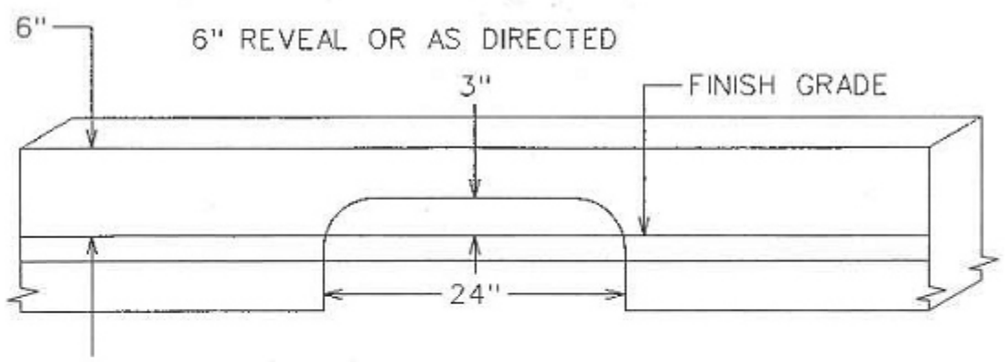
In certain instances, haybales may be removed on the up-stream side of the catch basin in order to capture runoff.

2.09: Appendix B - Figure F

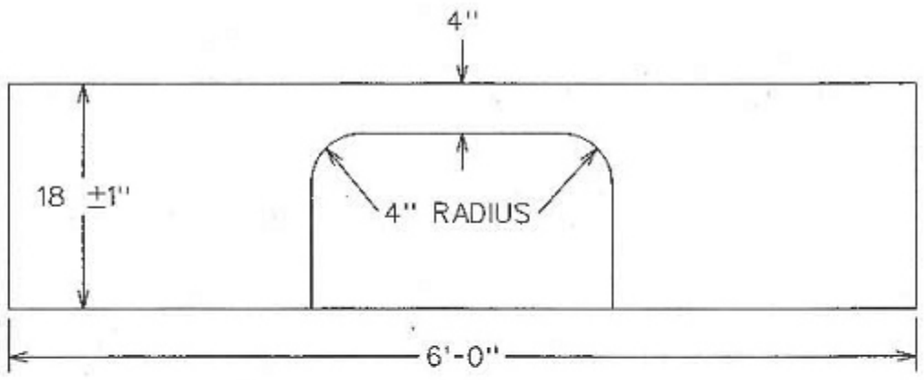


Note: Contact Devens Engineering Department for additional details/requirements.

2.09: Appendix B - Figure G



PLAN



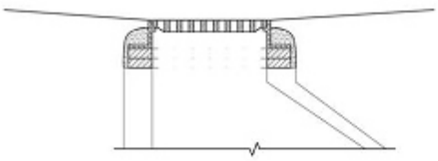
ELEVATION

TYPICAL GRANITE CURB INLET

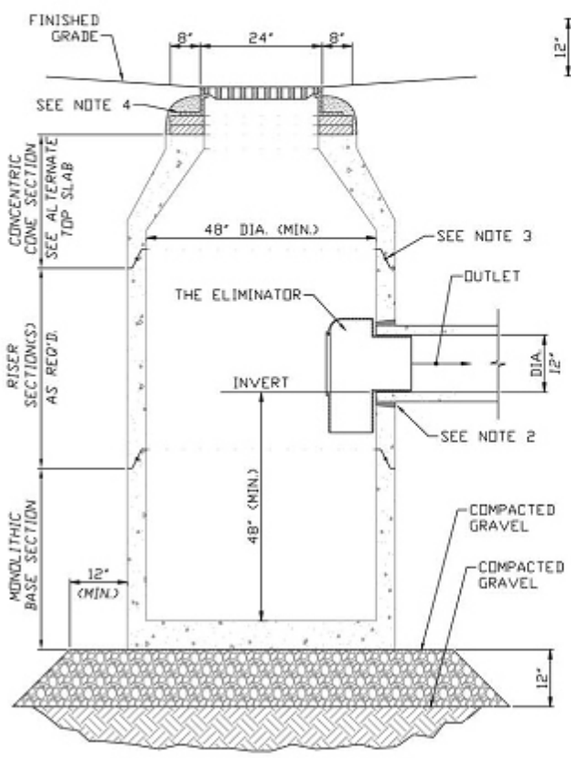
N.T.S.

Note: Contact Devens Engineering Department for additional details/requirements.

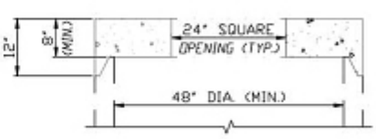
2.09: Appendix B - Figure H



ALTERNATE ECCENTRIC CONE SECTION



CATCH BASIN (CB) WITH TRAP

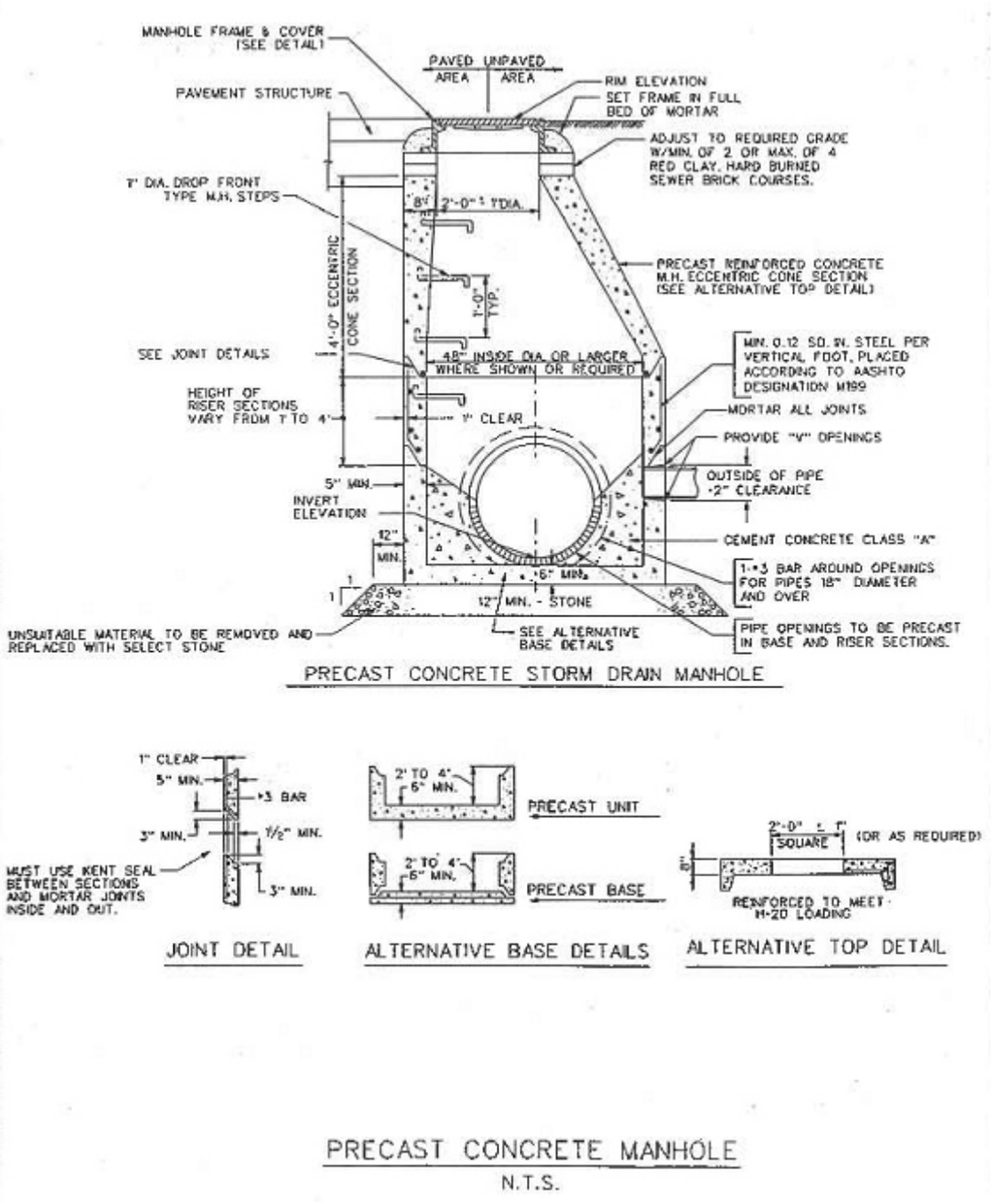


ALTERNATE TOP SLAB

Notes:

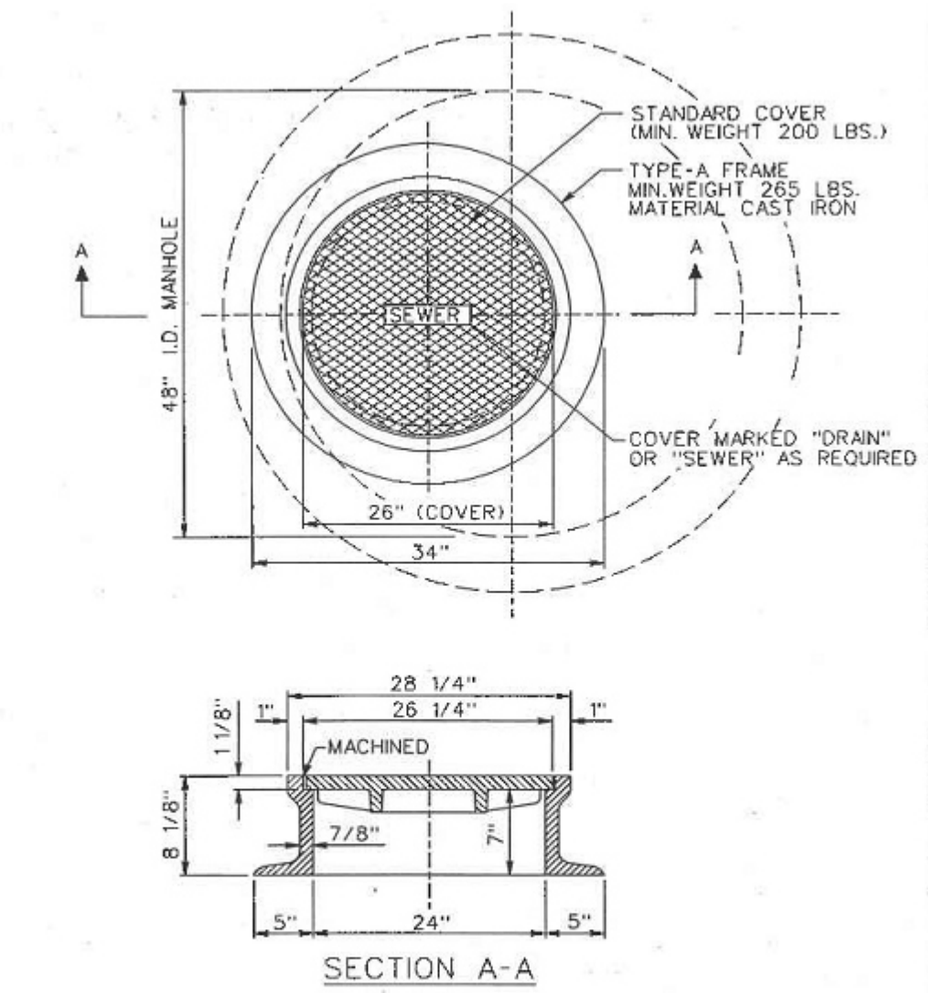
1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 5 BRICK COURSES MAXIMUM.
5. HOOD SHALL BE "THE ELIMINATOR" OIL & FLOATING DEBRIS TRAP AS MANUFACTURED BY GROUND WATER RESCUE, INC., QUINCY, MA., TEL. 617-773-1128 ON THE WEB @ WWW.KLEANSTREAM.COM or APPROVED EQUAL

2.09: Appendix B - Figure I



Note: Contact Devens Engineering Department for additional details/requirements.

2.09: Appendix B - Figure J



STANDARD MANHOLE FRAME & COVER
N.T.S.

Note: Contact Devens Engineering Department for additional details/requirements.

2.09: Appendix B - Figure J Table

TABLE OF BEARING AREAS IN SQUARE FEET
AGAINST UNDISTURBED MATERIAL FOR FITTING

SIZE OF MAIN (INCHES)	90° BEND (S.F.)	DEAD END (S.F.)	45° BEND (S.F.)
4	2.3	1.3	1.6
6	4.7	2.5	3.3
8	8.0	4.5	6.0
12	17.0	9.5	12.0

NOTES:

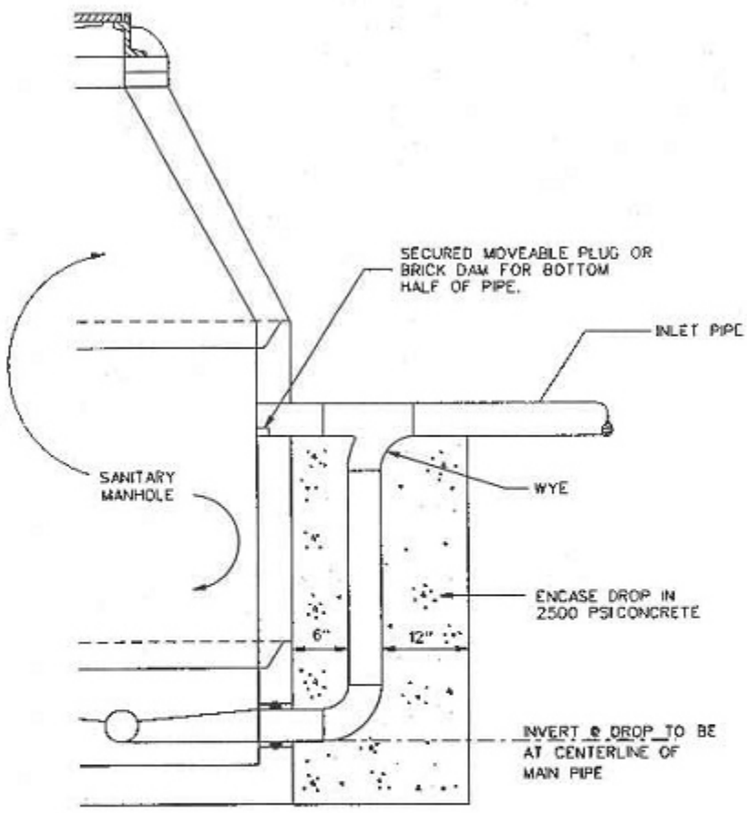
1. FOR FITTINGS WITH LESS THAN 45° DEFLECTION USE BEARING AREAS FOR 45° BEND.

2. BEARING AREAS BASED ON HORIZONTAL PASSIVE SOIL PRESSURE OF 2000 PSF AND A MINIMUM INTERNAL WATER PRESSURE OF 175 PSIG. JOINTS SHALL NOT BE ENCASED IN CONCRETE, BEARING AREAS MAY BE DISREGARDED FOR TRENCHES IN ROCK WHERE THE TOP OF THE ROCK FACE IS AT OR ABOVE THE CROWN OF THE PIPE. HOWEVER, CONCRETE BACKING SHALL BE PLACED BETWEEN THE PIPE AND ROCK FACE

3. TABLE PROVIDED FOR REFERENCE ONLY, ALL RESTRAINT SHALL CONFORM TO THRUST RESTRAINT FOR DUCTILE IRON PIPE PUBLISHED BY DUCTILE IRON PIPE REASEARCH ASSOCIATION.

Note: Contact Devens Utilities Department for additional details/requirements.

2.09: Appendix B - Figure K-1

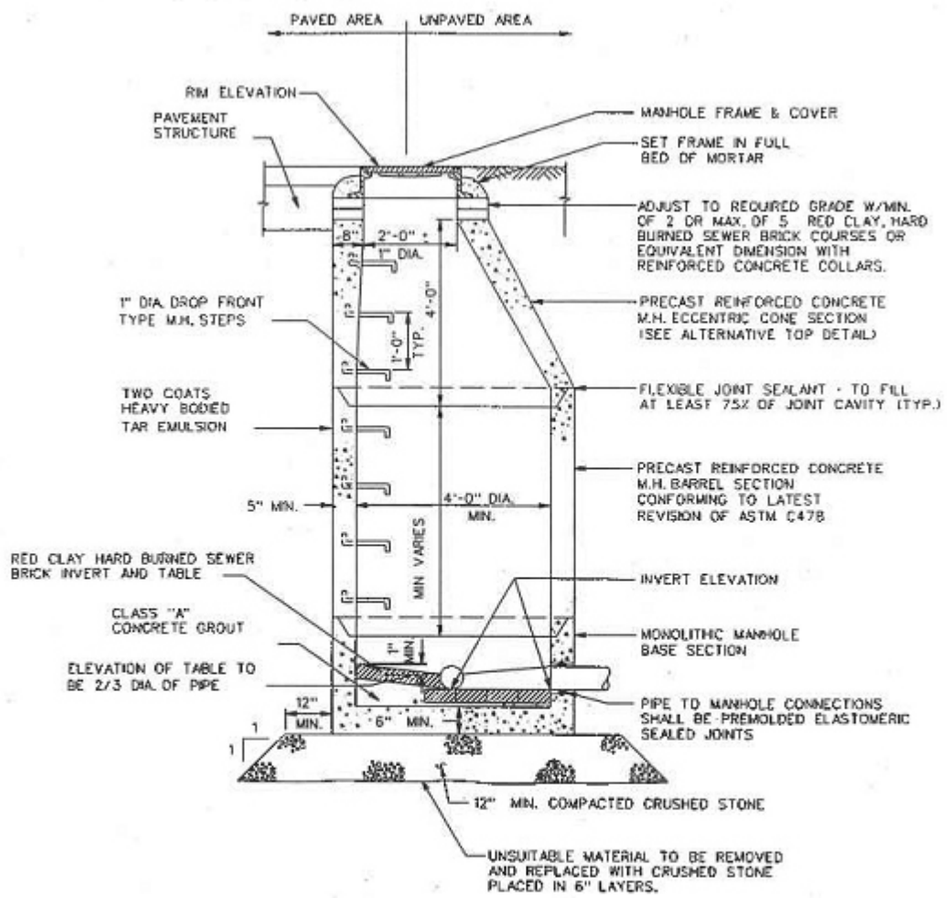


DROP INLET DETAIL
FOR SANITARY SEWER M.H.

N.T.S.

Note: Contact Devens Utilities Department for additional details/requirements.

2.09: Appendix B - Figure K-2

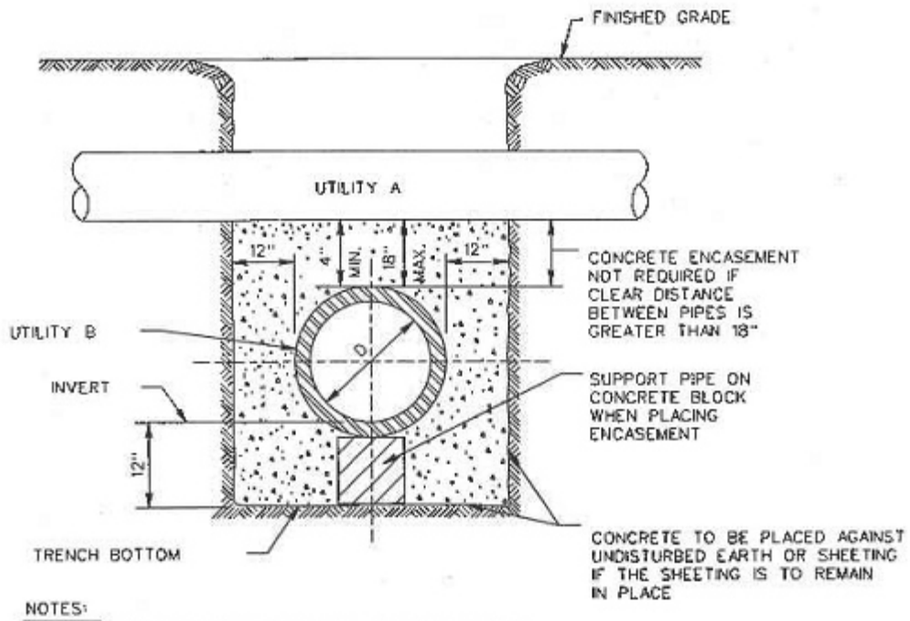


PRECAST CONCRETE SEWER MANHOLE

N.T.S.

Note: Contact Devens Utilities Department for additional details/requirements.

2.09: Appendix B - Figure L



NOTES:

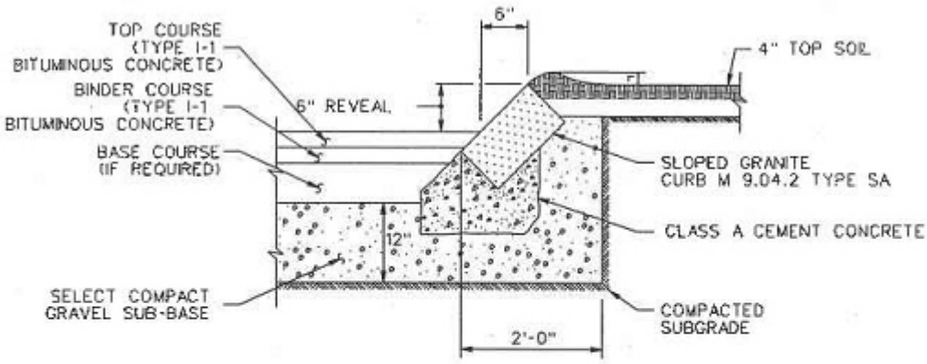
1. UTILITIES A AND B CAN BE EITHER NEW OR EXISTING.
2. WHEN ONE UTILITY IS A SANITARY SEWER, IT IS PREFERABLE TO BE POSITIONED AS SHOWN FOR UTILITY B.
3. UTILITY B JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE CENTERLINE OF UTILITY A.
4. ENCASEMENT EXTENDS 10'-0" ON EACH SIDE OF THE CENTERLINE OF UTILITY A.
5. PIPE MUST BE BRACED VERTICALLY AND HORIZONTALLY TO PREVENT FLOATATION DURING PLACEMENT OF CONCRETE.

CONCRETE ENCASEMENT DETAIL
AT UTILITY CROSSINGS

N.T.S.

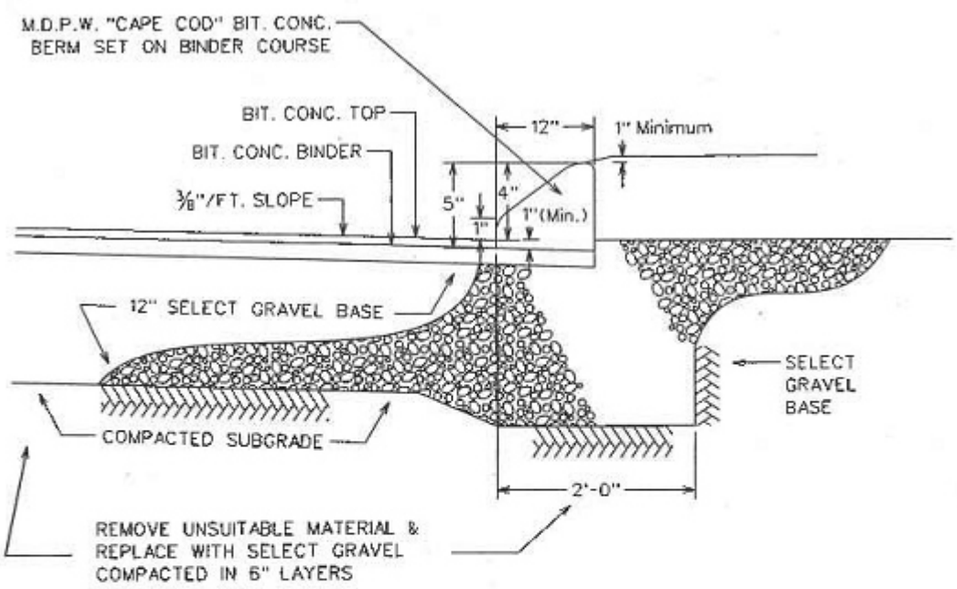
Note: Contact Devens Utilities Department for additional details/requirements.

2.09: Appendix B - Figure M



TYPICAL PAVEMENT AND SLOPED GRANITE CURB
N.T.S.

2.09: Appendix B - Figure N



TYPICAL PAVEMENT AND
BITUMINOUS CONC. BERM SECTION
N.T.S.