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~~188~~

COUNTY OF SANTA CRUZ

DESIGN CRITERIA

CONTAINING STANDARDS FOR THE CONSTRUCTION OF

STREETS
STORM DRAINS
SANITARY SEWERS
WATER SYSTEMS
DRIVEWAYS

WITHIN THE UNINCORPORATED PORTION OF SANTA CRUZ COUNTY

1999 EDITION

PRICE: $

72

A NOTE ON METRIC CONVERSION

Users of this edition of the *Design Criteria* manual will note that. in addition to the usual sorts of revisions to the text and standard details. the units of measure have changed. The text and figures call out dimensions and auantities in metric units followed bv English units in narentheses. e.g.,

300 mm (12 inches).

The use of dual units herein is for transitional purposes only and should not be taken as a format to be used bv designers. Imnrovement plans should avoid use of dual units. The inclusion of metric units in this revision of the *Design Criteria* is a step in the conversion to exclusive use of metric units in all publicly approved construction nroiects in Santa Cruz County. Some of the unit conversions herein are merelv direct rounded-off translations from customarv to metric units. so-called "soft" conversions. "Hard" conversions have been made. however. where the nominal designation of an item has actually changed. For examnle. nine manufactured with an inside diameter of annroximatelv two feet. with a nominal nine size (NPS) of 24 inches in customary units. will henceforth be known as 600 mm nine, the diameter nominal (DN) metric eauivalent.

(REV. 9/98)

APPLICABILITY

The Design *Criteria* standards contained herein, in addition to the latest edition of CALTRANS ~~Standard Specifications~~ *Standard Specifications* and ~~Standard Plans~~ *Standard Plans*, are minimum requirements' for development within the unincorporated areas of Santa Cruz County. In the event of conflict, ~~the Design Criteria~~ this *Design Criteria* shall control over CALTRANS ~~Standard Specifications~~ *Standard Specifications* and/or ~~Standard Plans~~ *Standard Plans*. In addition to being required standards for subdivision development, these standards shall apply to all other forms of development under the jurisdiction of the County Department of Public Works, including but not limited to encroachment permits, storm drainage improvement within drainage districts, and water and sewer line construction in County service areas and sanitation districts.

By reference, this criteria is incorporated as part of the subdivision ordinance as set forth in Section 14.01.501 of the Santa Cruz County Code. Exceptions and/or conditional exceptions for subdivisions may be authorized by the approving body and must be reflected in the development use permit and/or the map approval conditions.

The standards included in this *Design Criteria* are intended to comply with all applicable portions of the Americans With Disabilities Act and of Title 24. the State of California Administrative Code. Questions regarding compliance with these laws or the relationship of these laws to the standards contained herein should be directed to the Department of Public Works. bv mail at 701 Ocean Street. Room 410. Santa Cruz. California 95060. or bv telephone at (408) 454-*2160.*

ROADWAY AND ROADSIDE DESIGN CRITERIA REVISIONS

Section F - Curbs, Gutters, and Sidewalks

1. ~~P~~portland ~~C~~cement ~~C~~concrete (PCC) Type A curbs, gutters, and sidewalks shall be constructed for all development projects, unless, for reasons such as accessibility, preservation of rural character, nature of existing improvements, etc., a variation from this standard is approved through the Street Plan Line or roadside exception process, As determined by the Planning Department, in consultation with the Department of Public Works, roadway and roadside improvement fees may be paid in-lieu of constructing off-site roadway and road-side improvements. Asphalt dike curbs may be allowed on certain roads shown on the Roadside Improvement Plan map, adopted herein by reference and maintained on file in the Planning and Public Works Departments.

2. Curb returns shall include ramps ~~to accommodate wheel-chairs~~ provide access to the roadway grade and provide continuity of safe access for pedestrians (See Figs. ST-8a through ST-8d.

3. Sidewalks shall be constructed to meet accessibility standards set forth in ~~these design criteria~~ this *Design Criteria*,

4. Sidewalk ~~M~~material and ~~W~~width ~~R~~requirements are as follows:

   a. Portland cement concrete, Class B, on all arterials, collectors, and locals within the Urban Services Limit;

   b. Certain residential streets have been designated to include colored concret sidewalk or curb, gutter, and sidewalk. On streets which have been so designated *and on new local* streets either the color pigment ~~"Yosemite Brown"~~ "Mesa Buff' produced by Davis Colors, or the color ~~chromix admixture "Mocha Brown"~~ "Natural Honev" produced by ~~the L. M. Scofield Company~~ Q C Construction Products shall be used to color this concrete. A list of existing streets which have been designated to include colored concrete improvements is maintained on file in the Planning and Public Works Departments.

   c. Sidewalks shall be 1.2m (four feet) wide (unobstructed) in residential areas and 1.8m (six feet) wide (four feet unobstructed) in commercial areas; except that sidewalk widths shall match existing widths in various areas as appropriate and shall vary per accessibility standards set forth in these design criteria, with the separated sidewalk design (Figure ST-6B) being the standard design.

5. Portland ~~C~~cement ~~C~~concrete (PCC) Type B curbs shall be permitted for use in residential infill areas where other accessibility standards set forth in these design criteria are not practical, as determined through the roadside exception or Street Plan Line process.

~~193~~ 456

9. Dead-end streets shall not exceed 45m (150 feet) in length unless an emergency access road acceptable to the Fire Marshal and the Director of Public Works is provided.

10. Streets and highways shall intersect one another at angles as near to a right angle as is practical, and no intersections shall be at angles of less than ~~sixty~~ 60 degrees.

11. Streets intersecting at an angle other than 90 degrees may require the use of setback lines, special rounding of comers, traffic circle, or other design details to assure desirable results as to traffic movement, visibility, and safety.

12. If the center lines of two streets intercepting. the same street from opposite directions are offset from each other, said offset shall be a minimum distance of 61m (200 feet) measured along the center line of the street intercepted.

13. The maximum cross slope for any pavement widening shall be 4%. The widening or other conform section shall be extended into the existing road as far as is necessary to achieve a finished cross slope within tolerable limits(generally 2% to 4%), with the Director of Public Works approval. Improvement plans shall reflect the fact that the actual width of the new section depends upon this requirement.

14. Typical street sections appearing on improvement plans shall show the entire section, fully dimensioned, even though the plans may call for improving only a portion of the street section. Typical sections should show existing, as well as proposed, conditions.

Section C . Structural Section

1. The total structural section shall be designed by R-value (Test Method Calif. 301). The total structural section should be the reasonable result of a rational design method. such as CALTRANS' flexible navement design procedure. (See Section 608.4 et sea.. of CALTRANS' *Highway Design Manual.)*

2. Traffic Index values for new roads shall be based on the type of road and number of lots served in ultimate developments, and approved by the Director of Public Works. ~~Minimum values are given in Figure ST-3. Traffic Index values other than the minimum may be applied, at the discretion of the Director of Public Works.~~

3. Traffic Index values for existing County roads to be improved shall be determined by the Director of Public Works.

~~4. Figure ST-3 gives the minimum structural section requirements for asphalt concrete and aggregate base. Structural sections other than the minimum shall be used at the discretion of the Director of Public Works.~~

~~194~~ 457

4. ~~5.~~ Except for minor private roads and driveways, ~~M~~ minimum required surface course shall be 75mm (three inches) ~~two inches~~ Type B asphalt concrete, 12.5mm (1/2") maximum, medium aggregate gradation. A prime coat shall be applied before paving.

5. ~~6.~~ Except for private minor roads and driveways, ~~M~~ minimum required base course shall be 225mm (nine inches) ~~six inches~~ of Class 2 aggregate, for all non-engineered road sections.

6. ~~7.~~ The balance of the pavement structural section may be comprised of aggregate subbase with a minimum R-value of 50. ~~However, the total structural section should be the reasonable result of a rational design method, such as CALTRANS' flexible pavement design procedure. (See Section 608.4 et seq., of CALTRANS' *Highway Design Manual).*~~

7. With the approval of the Director of Public Works. the minimum structural section for minor roads and drivewavs shall be 50 mm (two inches) Type B asphalt concrete on 150 mm (six inches) of Class 2 aggregate base.

8. The number and location of soils tests shall be subject to the approval of the Director of Public Works, the minimum being one test for each 150 linear meters (500 linear feet) of proposed street. The R-value used-for design purposes shall be the lowest test result, unless sufficient tests and soils investigations are made to determine the limit of the various soil types tested.

9. Relative compaction shall conform to the latest CALTRANS specification. As a minimum standard the top 150 mm (six inches) of subgrade and the aggregate base material under all paved surfaces subject to vehicular use (including curbs, gutters, and driveway approaches) shall be compacted to a minimum 95% relative compaction. The top 150 mm (six inches] of subgrade under concrete sidewalks shall be compacted to a minimum 90% relative compaction, except where sidewalk is constructed next to Type B curb and gutter, in which case the top 150 mm [six inches) of subgrade under the sidewalk shall be compacted to a minimum 95% relative compaction.

10. In addition to R-value tests to determine the structural section, further soils tests may be required by the Director of Public Works to determine erosion control,stability, or subdrainage requirements.

11. 50 mm x 150 mm (2" x 6") Redwood headers shall be installed along all exposed edges of asphalt concrete paving, when deemed necessary by the Director of Public Works.

12. When overlaying existing asphalt concrete pavement next to existing concrete curb and gutter, the pavement next to the edge of the gutter shall be removed by grinding (See Fig. ST-IO), before applying the new surface course.

6. Portland ~~C~~cement ~~C~~concrete (PCC) Type C curb shall be permitted on privately maintained driveways and parking areas at the discretion of the Director of Public Works (Fig. ST-4).

7. Portland ~~C~~cement ~~C~~concrete (PCC) curb, curb and gutter, or valley gutter shall be required on paved surfaces having a longitudinal slope of less than 1.5%.

Section G - Land Division Road Requirements

1. Road requirements for Minor Land Divisions will be determined on a case by case basis and will be noted on the Tentative Map Approval document. ~~Generally, urban developments will be required to meet the standards of as noted herein. Rural development roads may be constructed to less rigorous standards, with the consent of the approving body in consultation with the Director of Public Works.~~

Section H - Landscaping

1. Where landscaping is required, a landscaping plan shall be prepared by a Licensed Architect or Licensed Landscape Architect. The plan shall show the species, location, number, and size of plants to be installed. Specifications for installation and establishment of plant materials shall be included.

2. Where regular periodic irrigation of the established landscaping is necessary, an irrigation plan shall be prepared. The plan shall show the location, size, and type of materials to be installed.

3. Street trees shall be required as part of all projects on public streets inside the Urban Services Line. These trees shall be chosen, planted, and maintained in accordance with the Santa Cruz County Urban Forestry Master Plan, when applicable, or chosen from the County Street Tree List (contained in the Planning Department landscape criteria), and planted at a minimum rate of one tree per 7.6 lineal meters (25 lineal feet) of frontage, with tree clusters an option for placement. Planting shall be done according to Figures ST-9a and ST-9b.

4. Street trees shall be maintained by the property owners and as directed by the approving body, unless the property is located on a "Primary Street Tree Street", as defined by the *Urban Forestry Master Plan*, and that street has been accepted into the regular street tree maintenance program administered by the Santa Cruz County Redevelopment Agency.

5. ~~4.~~ Street ~~T~~trees in residential projects shah be planted in County right-of-way in a

minimum 1.2m 4 (four-foot) -wide planting strip between the curb and the sidewalk. Where separated sidewalks are not possible, trees shall be planted per the *Urban Forestry Master Plan* or per the approving body. Trees shall be maintained per paragraph 4. above.

6. ~~5.~~ Street ~~T~~trees in commercial areas shall be planted in County right-of-way in a minimum 1.2m 4 (four-foot) -wide planting strip between the curb and sidewalk, or where 1.2m /four feet) of unobstructed sidewalk can be obtained, in a minimum 1.2m 4 (four-foot) -wide by 1.8m ~~6~~ (six-foot) long rectan~~gle&r tree well~~ cut out of the sidewalk behind the curb. Where separated sidewalks or tree wells are not possible, trees shall be planted outside the right-of-way or as recommended in the *Urban Forestry Master Plan*. Street trees shall be planted according to provisions of the *Urban Forestry Master Plan* and Figures ST-9a and ST-9b. Trees shall be maintained ~~by the County Department of Parks, Open Space, and Cultural Services where applicable, or as directed by the approving body~~ per paragraph 4, above.

7. ~~6.~~ Adequate sight distance shall be assured where trees are planted in or near the public right-of-way. (An encroachment permit shall be obtained in such case.)

Section I - ~~Wheelchair~~ Disabled Ramps

1. ~~Wheelchair~~ Disabled ramps shall be constructed at mid-block crosswalks and at all curb returns where there is existing sidewalk or ~~at the time~~ that sidewalk is constructed, when ~~wheelchair~~ to provide access to the roadway grade ~~is required to use crosswalks or to otherwise~~ and provide continuity of safe travel for pedestrians.

Section J - Inlet Location

1. Drainage inlets shall be placed outside the wheel path of passing vehicles. If this is not possible, the grate must be set to match the slope of the roadway.

Section K - Survey Monument Boxes

1. An aluminum monument box (Berntsen BMAC-6 type or approved equal) or cast iron monument box (Forni tvne 80-60-03. Phoenix type P-2001. or approved equal) shall be set, together with a standard bronze County monument, at all beginnings of curve, ends of curve, and intersection points along the center line of the right-of-way of all new roads intended to be County maintained. Street centerline monuments shall establish both vertical and horizontal control. Property sidelines points shall be monumented with standard markers in addition to the street centerline monumentation.

Section L - ~~Utility Poles and Other Surface Utilities~~ Placement of Utility Poles, Fire Hydrants, and Other Roadside Items

~~1. Where road widening, sidewalk construction, or other applicable work of improvement is required of a development, it is the sole responsibility of the developer to relocate all affected surface utilities on his property frontage in conformance with the requirements of the County and the requirements of the applicable utility agency.~~

~~2. Utility poles shall be relocated behind the back of sidewalk wherever possible. Where they cannot practically be moved behind the sidewalk, they may be located in the planting strip provided with the standard separated sidewalk. When the sidewalk is constructed adjacent to the curb, poles be located one foot from face of curb to face of pole if placement behind sidewalk is not possible, provided that a minimum four feet of clear sidewalk width is constructed in conformance with Figure ST-12.~~

1. Utility poles shall be located behind sidewalk or pedestrian path built adjacent to curb, or in the planting strip between curb and senarated sidewalk. Where it is not practical to place a utility pole behind the back of sidewalk. it may be located 300 mm (one foot) from face of curb to face of pole. provided that a minimum of 1.2 m (four feet) of clear sidewalk width is constructed in conformance with Figure ST-l 2.

2. Fire hydrants shall be located behind sidewalk built adjacent to curb. or in the nlanting strip between curb and senarated sidewalk. At midblock fire hydrant locations the curb shall be painted red to ensure visibilitv.

3. Where road widening. sidewalk construction. or other work of imnrovement is required of a develonment. it is the sole responsibility of the develoner to relocate all affected surface utilities on the develoaer's property frontage and along off-site improvements, in conformance with the reauirements of the Countv and the applicable utilitv agencies.

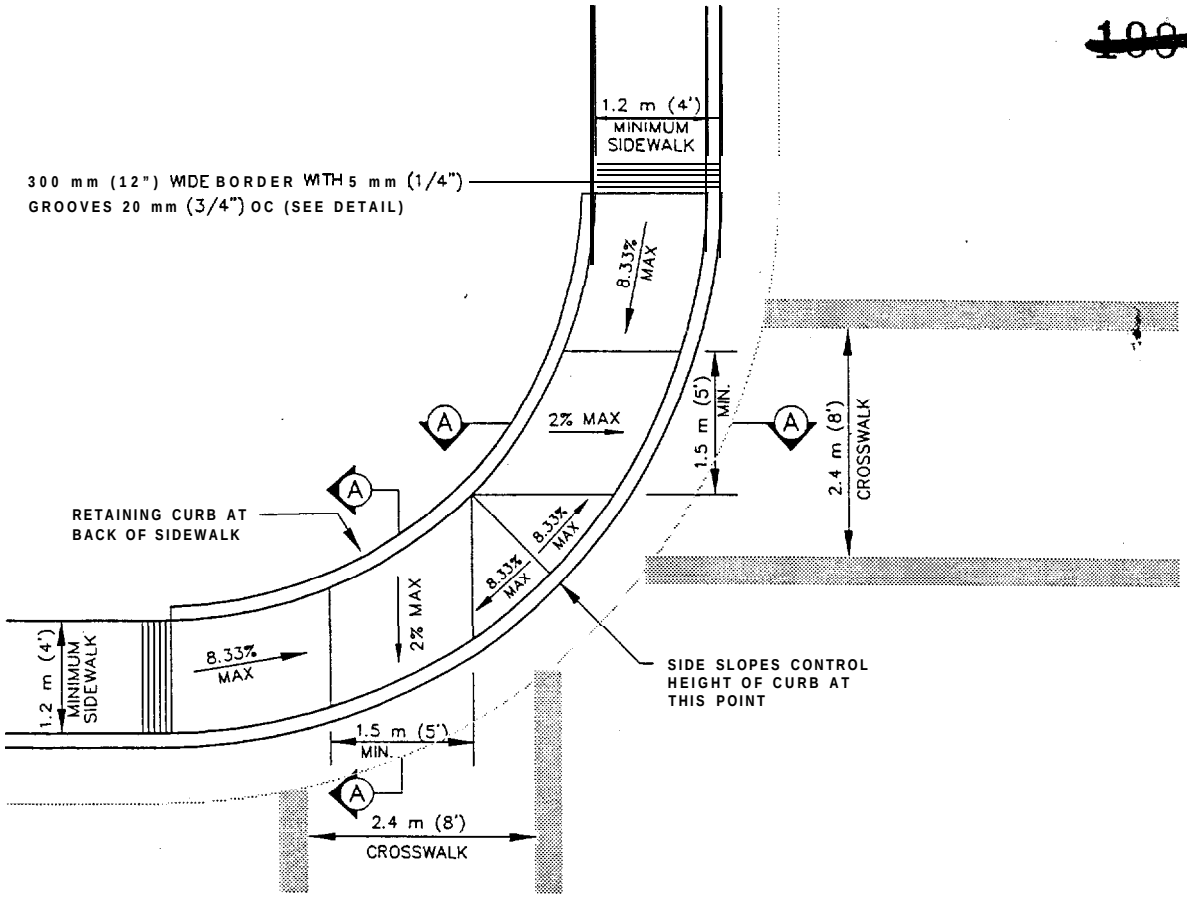
4. Individual and cluster mailboxes shall be located behind sidewalk built adjacent to curb, or in the nlanting strip between curb and senarated sidewalk.

5. Signage shall be located behind sidewalk built adjacent to curb. or in the planting strin between curb and separated sidewalk. except where such placement would conflict with good traffic engineering practice.

Section M - Residential Street Lighting

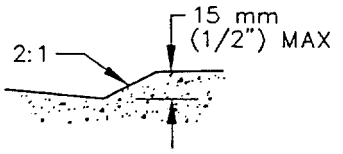
1. Except as provided below, residential street lighting improvement standards apply to all residential development located within the County Urban Services Line on a County road, or on a road to be offered for dedication to the County. Residential development may be required to construct off-site street lighting improvements.

The developer of property within an area which does not currently have residential street



NOTES:

1. **THE CURB AND GUTTER ADJACENT TO THE RAMP LANDING SHALL BE MODIFIED SO THAT THE CROSS SLOPE OF THE GUTTER DOES NOT EXCEED FIVE PERCENT.**
2. **THE RAMP SURFACE SHALL HAVE A ROUGH TRANSVERSE BROOMED TEXTURE.**
3. **THE RAMP LANDINGS SHALL BE COLOR-HARDENED WITH LITHOCHROME COLOR HARDENER A-33, CLASSIC GRAY, MANUFACTURED BY L. M. SCOFIELD COMPANY.**



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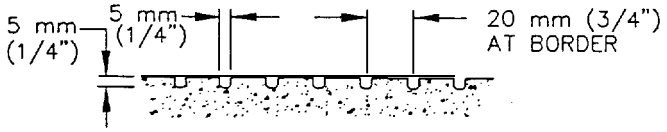

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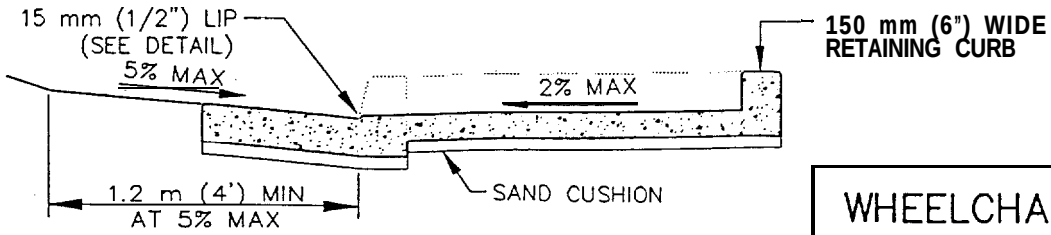
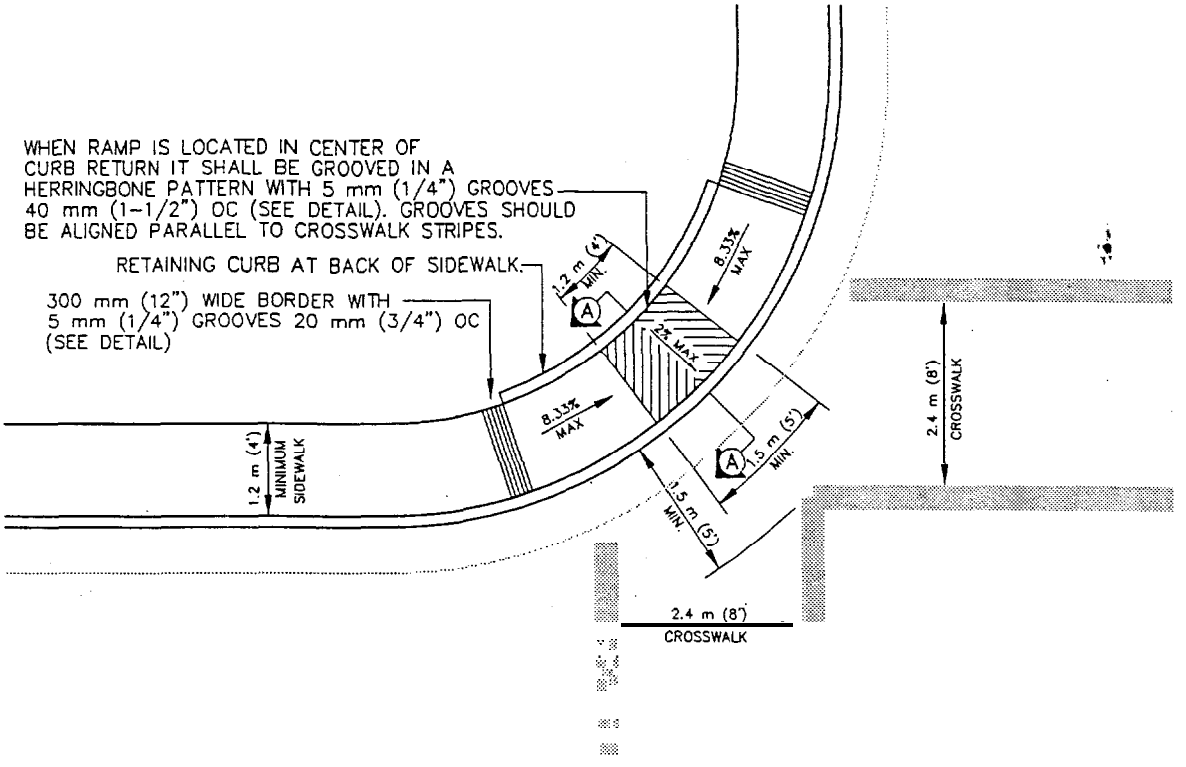


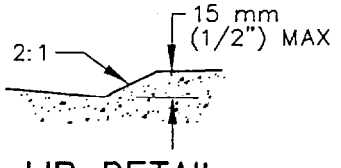
SECTION A–A

WHEELCHAIR RAMP
TYPE A



NOTES:

1. **THE CURB AND GUTTER ADJACENT TO THE RAMP** LANDING **SHALL BE MODIFIED SO THAT THE CROSS SLOPE OF THE GUTTER DOES NOT EXCEED FIVE PERCENT.**
2. **THE RAMP SURFACE SHALL HAVE A ROUGH TRANSVERSE BROOMED TEXTURE.**
3. **THE RAMP LANDING SHALL BE COLOR-HARDENED WITH LITHOCHROME COLOR HARDENER A-33, CLASSIC GRAY, MANUFACTURED BY L. M.** SCOFIELD **COMPANY.**



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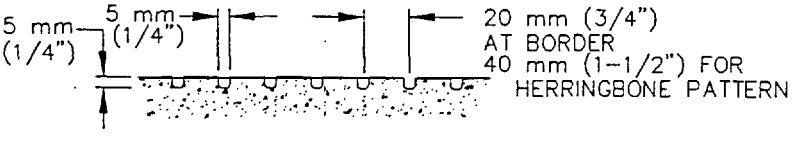

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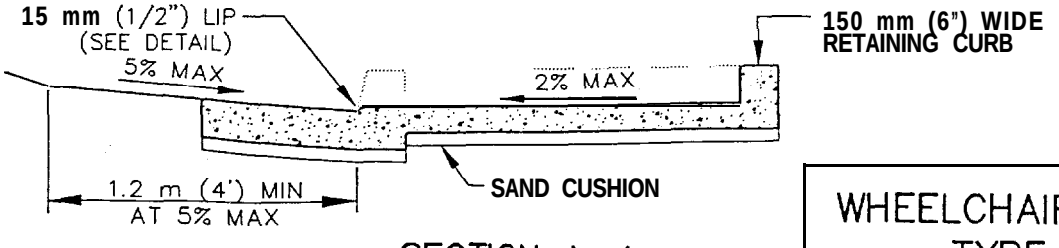

SECTION A–A

WHEELCHAIR RAMP TYPE B

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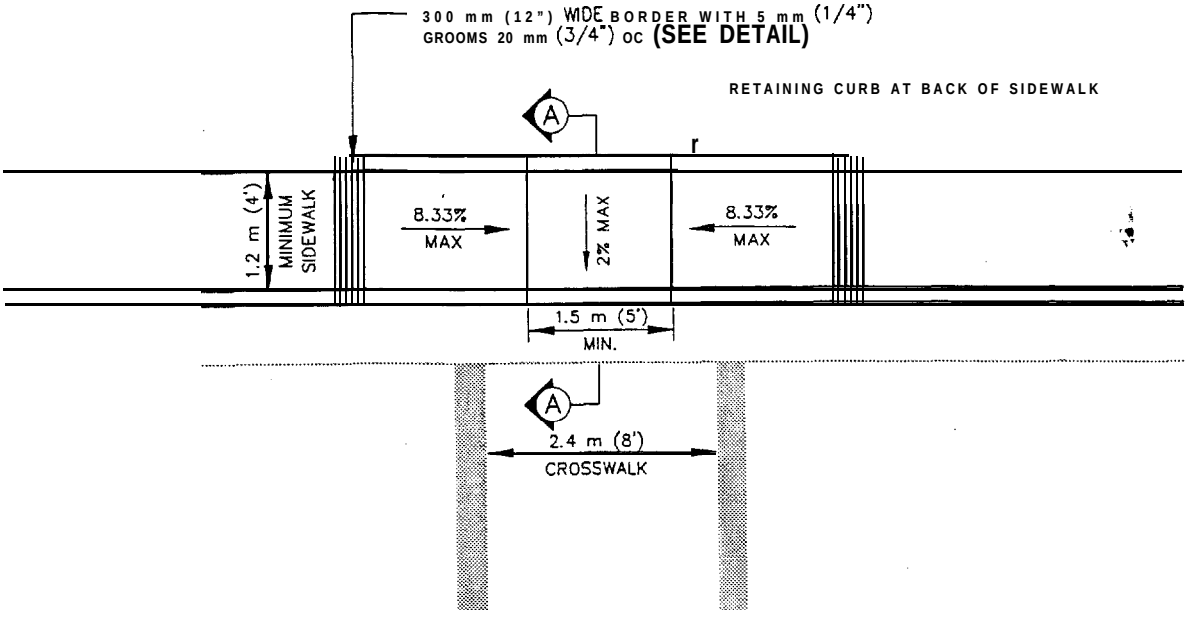
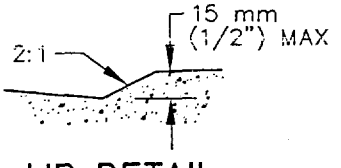
FIG. ST–8b



NOTES:

1. **THE CURB AND GUTTER ADJACENT TO THE RAMP LANDING SHALL BE MODIFIED SO THAT THE CROSS SLOPE OF THE GUTTER DOES NOT EXCEED FIVE PERCENT.**
2. **THE RAMP SURFACE SHALL HAVE A ROUGH TRANSVERSE BROOMED TEXTURE.**
3. **THE RAMP LANDING SHALL BE COLOR-HARDENED WITH LITHOCHROME COLOR HARDENER A-33, CLASSIC GRAY, MANUFACTURED BY L. M. SCOFIELD COMPANY.**



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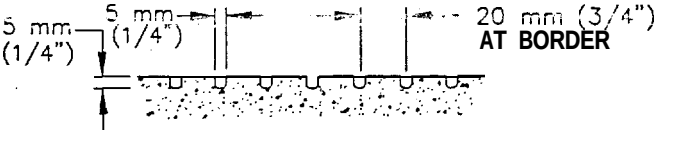

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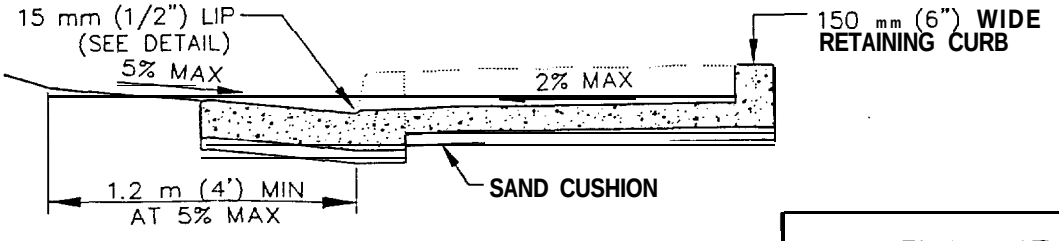
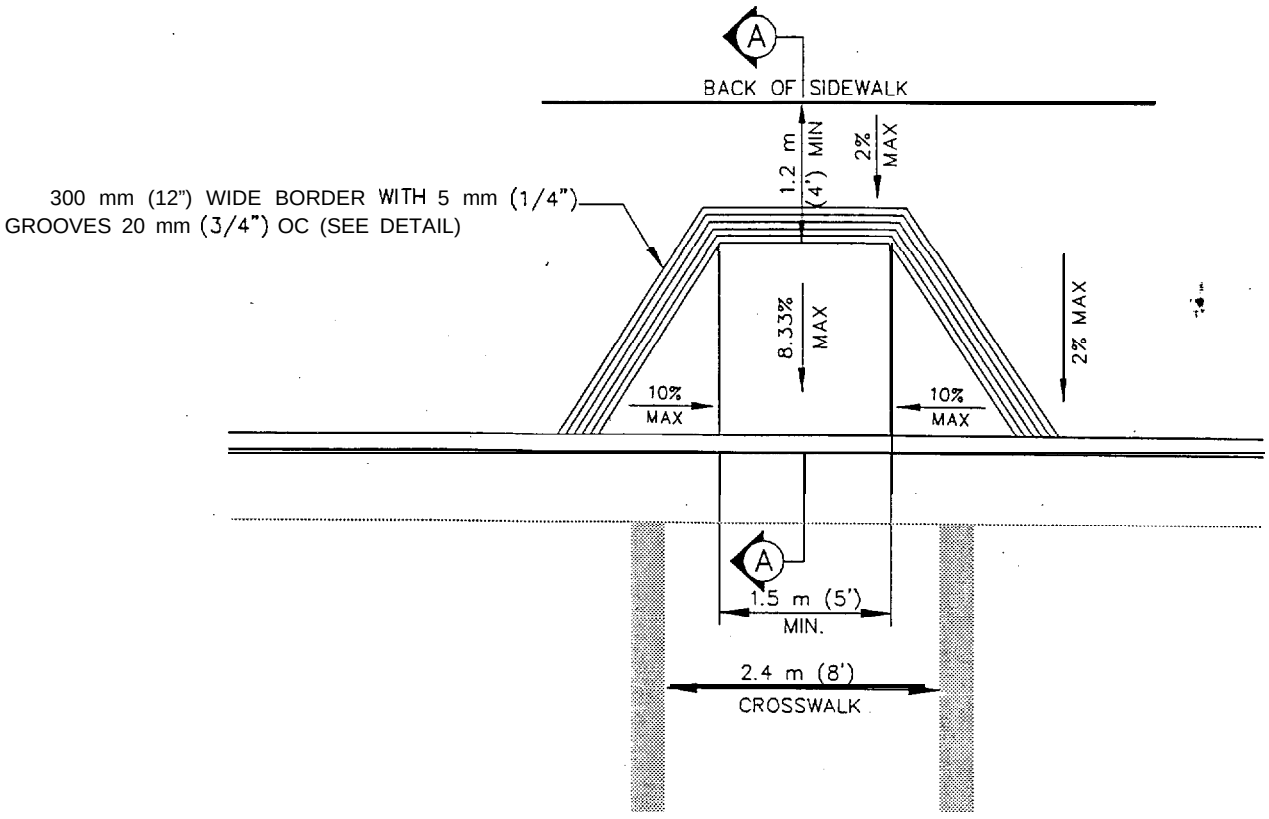


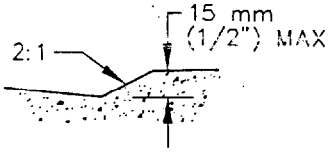
SECTION A–A

WHEELCHAIR RAMP
TYPE C



NOTES:

1. **THE CURB AND GUTTER ADJACENT TO THE RAMP LANDING SHALL BE MODIFIED SO THAT THE CROSS SLOPE OF THE GUTTER DOES NOT EXCEED FIVE PERCENT.**
2. **THE RAMP SURFACE SHALL HAVE A ROUGH TRANSVERSE BROOMED TEXTURE.**
3. **THE RAMP SURFACE SHALL BE COLOR-HARDENED WITH LITHOCHROME COLOR HARDENER A-33, CLASSIC GRAY, MANUFACTURED BY L. M. SCOFIELD COMPANY.**



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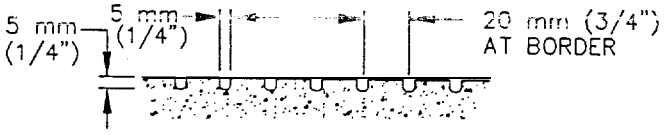

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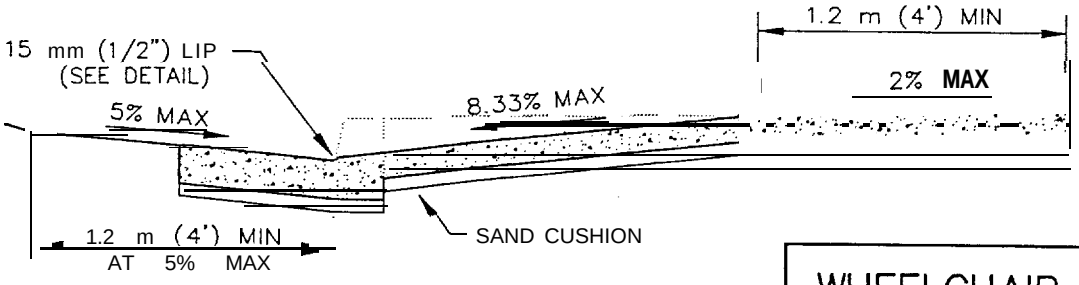
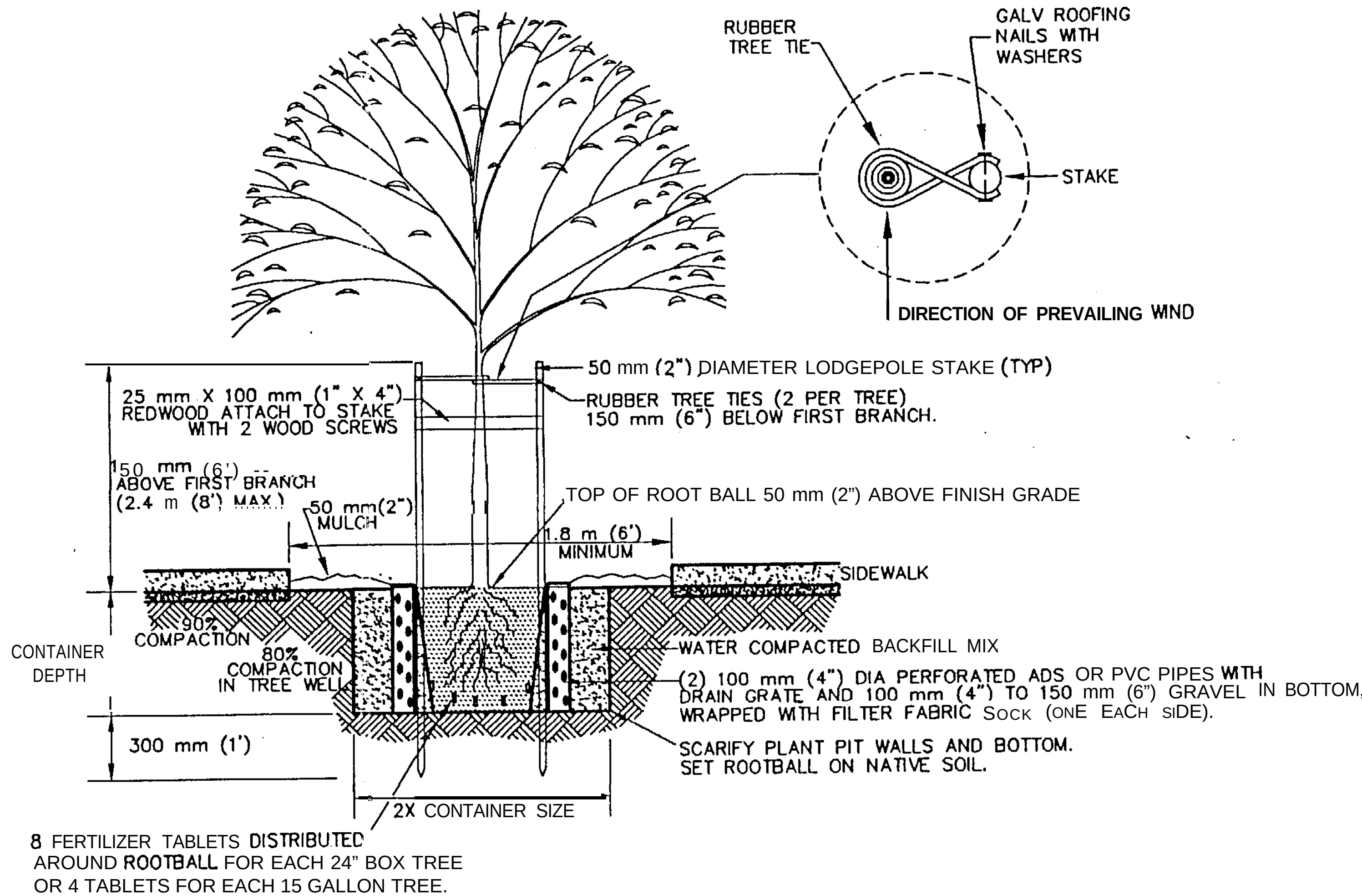


SECTION A–A

WHEELCHAIR RAMP TYPE D

REV. 5/96

FIG. ST–8d



NOTE: MINIMUM TREE WELL SIZE SHALL BE 1.2 m X 1.6 m (4' X 6').

TREE PLANTING IN TREE WELL OR PLANTING STRIP

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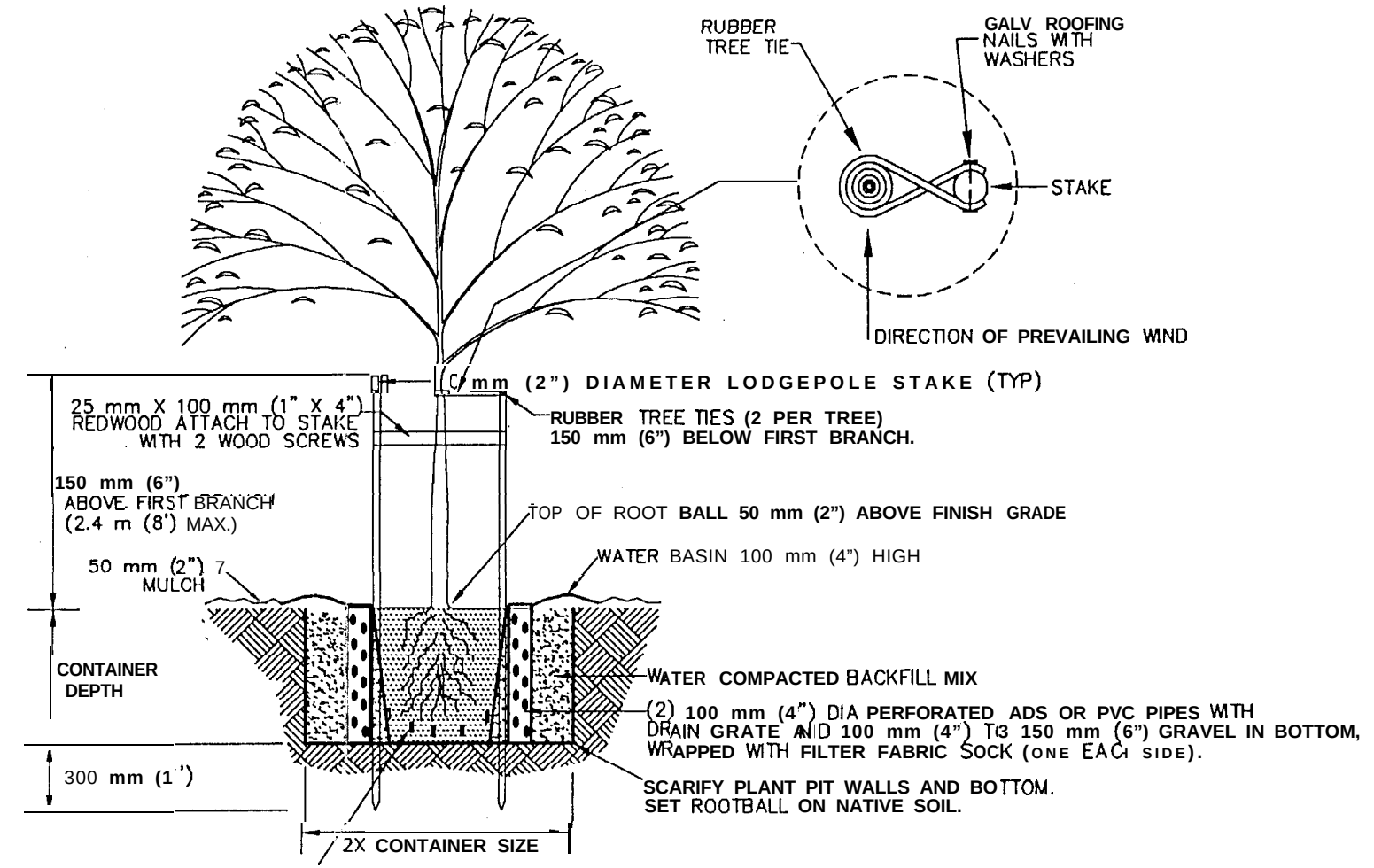
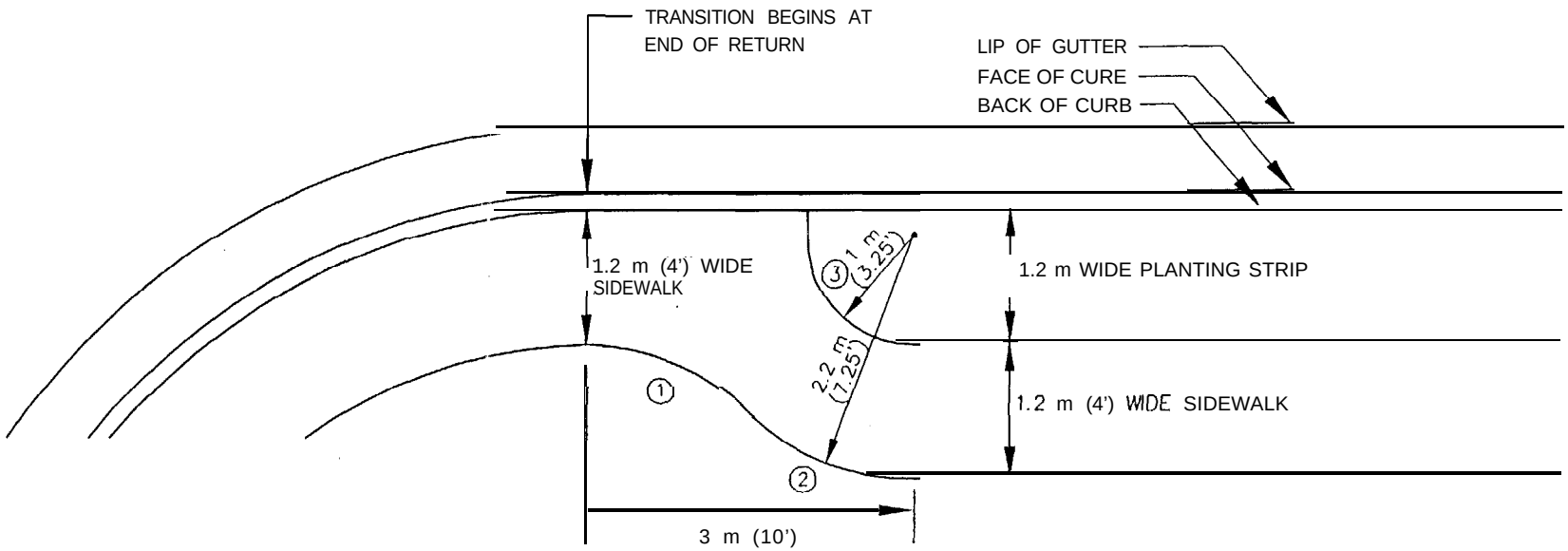


8 FERTILIZER TABLETS DISTRIBUTED
AROUND ROOTBALL FOR EACH 24" BOX TREE
OR 4 TABLETS FOR EACH 15 GAL-ON TREE.

TREE PLANTING IN LANDSCAPE AREA

FIG. ST-9b



. CURVE DATA FOR 1.2 m (4') WIDE SIDEWALK

① & ② R = 2.2 m (7.25')
Δ = 43° 36' 10"
CH = 1.6 m (5.4')
T = 880 mm (2.9')
L = 1.7 m (5.52')

③ R = 1 m (3.25')
Δ = 90° 00' 00"
CH = 1.4 m (4.6')
T = 1 m (3.25')
L = 1.6 m (5.1')

CURVE DATA FOR 1.8 m (6') WIDE SIDEWALK

① R = 1.6 m (5.25')
Δ = 43° 36' 10"
CH = 1.2 m (3.9')
T = 640 mm (2.1')
L = 1.2 m (4')

② R = 2.8 m (9.25')
Δ = 43° 36' 10"
CH = 1.6 m (5.4')
T = 1.1 m (3.7')
L = 2.15 m (7.0')

③ R = 1 m (3.25')
Δ = 90° 00' 00"
CH = 1.4 m (4.6')
T = 1 m (3.25')
L = 1.6 m (5.1')

TRANSITION FROM CONTIGUOUS TO SEPARATED SIDEWALK

FIG. ST-14

DRAINAGE DESIGN CRITERIA REVISIONS

2. Pipe Systems

   a. Minimum pipe diameter shall be 450 mm (18 inches) ~~12"~~ within County rights-of-way, easements, and offers of dedication, except when there are drainage inlets at both ends of the pipe. in which case 300 mm (12 inches) mav be allowed.

   b. Maximum spacing of access openings shall be 150 m (500 feet).

   c. Access openings shall be provided at all horizontal angle points and changes in grade.

3. Curves will be allowed in pipe systems only when the pipe diameter is 900mm (36 inches) or larger, at the discretion of the Director of Public Works.

4. Culverts

   a. Reinforced concrete pipe, polyvinvl chloride (PVC). or high densitv polvethvlene (HPDE) shall be used for all drainage facilities constructed in County rights-of-way except where approval is obtained from the Director of Public Works for use of an alternate type of pipe. These pipes shall have smooth interior walls and shall withstand fill loads and H-20 highway loading;, Aall joints shall be rubber gasketed.

   b. Corrugated metal pipe and pipe-arch may be used at the discretion of the Director of Public Works. All CMP must be fully coated (both interior and exterior surfaces) with a bituminous material. Hydraulic demands may also dictate that CMP be fully paved with a durable bituminous lining applied to the inside surface, filling and covering the corrugations so as to form a smooth surface.

   ~~c. Polyvinyl Chloride (PVC) or High Density Polyethylene (HPDE) pipes may be used at the discretion of the Director of Public Works. These pipes shall have smooth interior walls and withstand fill loads and H-20 highway loading. All joints shall be rubber or neopreme gasketed. Trench dimensions and backfill for these pipes shall satisfy CALTRANS specifications.~~

   c. ~~d.~~ Corrugated aluminum (CAP) drain pipe may be used ~~at the discretion of~~ only with nrior approval of the Director of Public Works. To use bare aluminum pipes, a certified report must be submitted to the Public Works Department, showing that the pH of the soil is between 5.5 and 8.5 and the resistivity is 1500 ohm-cm or greater. Additionally, the average velocity through the pipe shall be less than 3 m/s (10 feet per second) with no significant abrasive channel bedload.

   d. ~~e.~~ All culvert materials and trench backfill shall conform to the manufacturer's specifications and the provisions set forth in the latest edition of CALTRANS' ~~Standard Specifications~~ *Standard Specifications* and ~~Standard Plans~~ *Standard Plans.*

2. Drainage improvements not already in County right-of-way which are to be County maintained shall be accompanied by corresponding reservations or dedications to the County of drainage easements of a minimum 3 m (10 foot) width or as otherwise specified in ~~these cirteria~~ this *Design Criteria*, or as specified by the Director of Public Works. These drainage easements shall generally be such as to contain the improvements and any necessary appurtenances and allow full access and easy maintenance of the improvements. In cases where drainage improvements which are to be County maintained are too far removed from easy points of access, the County may require a separate easement in order to gain and maintain access to the drainage improvements.

No permanent structures of any kind may be placed in County drainage easements without the permission of the Director of Public Works. Any gates which must be constructed over such easements shall be a minimum of 3 m (10 feet) in width and be noted on applicable improvement plans. Such gates shall have locking mechanisms compatible with existing County padlocks. Any obstructions in County easements can be removed by the County without compensation of any kind to the owner.

If the County is unable to remove an obstruction in its easement placed there by the owner of the land and the owner is unresponsive to requests by the County to remove the obstructions, the County shall move against the owner to recover from the owner the costs associated with any extra work or any damages attributable to the obstruction.

Section G - On-Site Detention of Storm Water Runoff

1. ~~The basic criteria for providing on-site detention is that the maximum runoff rate (Q) leaving the development site shall not exceed the runoff rate from the undeveloped site based on a 10 year storm.~~

~~Higher levels of protection may be required by the Director of Public Works if a substantial flooding hazard exists downstream.~~

Use of a detention system for controlling: storm water runoff is subject to the discretion **of** the Director of Public Works. Designers shall contact the Denartment of Public Works for approval prior to the design of a detention system.

2. A standardized detention calculation form, Figure SD-4, and design curve for required storage volumes, Figure SD-5, are provided for use by ~~D~~design ~~E~~engineers. Other methods may be used with prior approval by the Director of Public Works; however, a 25% safety factor shall be added to the storage volume determined by any such approved alternate method.

3. Storage areas should be completely drained by properly sized discharge pipes or structures which control the discharge flow rate (Q) to predevelopment rates, and shall be designed to minimize clogging and future maintenance. The use of pumps as the primary low flow bypass is not permitted. However, pumps may be used to drain storage volumes, areas or facilities if there is no adverse impact on the total system bypass flow rate.

4. Ground percolation as a means of disposal shall be substantiated with adequate soils data and will normally be approved only as an interim measure if soils conditions are not particularly well suited to percolation.

5. Common methods of providing detention are shallow surface swales in landscaped areas, underground structures or pipes, and void volume within rock or sand filled trenches and excavations. When on-site detention is required, it is advisable to make such provisions in the preliminary planning of the site development and landscaping plans. The required method of providing subsurface detention in general shall be with pipes or structures. Rock- or sand-filled trenches and excavations may be used at the discretion of the Director of Public Works. An appropriate filter cloth shall be used with all rock-filled subsurface detention systems. The top, bottom and sides of the excavation shall be lined with filter fabric to prevent native soils from migrating into the detention facility and filling the voids in the rock. The detention system shall be inspected and maintained as needed, at least once annually, by the owner. The developer or property owner shall be required to record a Maintenance Agreement for the future maintenance of the detention system on site unless the detention system is accepted by the County for maintenance (Figure SD-17).

6. Storage facilities shall not produce hazardous conditions. Potential future legal liability shall be carefully considered by both the designer and reviewing agency. Detention facilities shall be located on private property and shall be maintained by the property owner(s).

7. Drainage easements shall be provided if required to insure perpetuity of storage areas when constructed as permanent drainage facilities.

8. Parking lot detention can be considered in the County and City of Capitola only if the applicant and all reviewing agencies consent.

9. Detention volume determination must include consideration of all proposed impervious areas, both on- and off-site, to be constructed as part of the development.

~~10. At the discretion of the Director of Public Works, the requirement for detention may be waived.~~

AGREEMENT regarding silt and grease
trap(s) and (or) detention system maintenance

_____- -_____, being the owner of the real property located at _____ California, consents and agrees to inspect and maintain annually "prior to the rainy season" the silt and grease trap(s) and (or) the detention system on the subject property as shown on the improvement plans dated _____ on file with the County of Santa Cruz Department of Public Works. I agree to forward a letter to County Public Works prior to October 15 of every year stating the date and type of service performed on the grease trap(s) and (or) detention system.

I have read the above agreement and understand it.

_____
Owner

Dated this _____Day of _____, 19___

SILT&GREASETRAPAND DETENTION SYSTEM MAINTENANCEAGREEMENT

~~210~~

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SANITATION DESIGN CRITERIA REVISIONS

Section A - Submittal Requirements

1. Sewer design, containing the elements described below will be reviewed by the Sanitation District Engineer's office for adequacy and completeness.

2. Design calculations and manufacturer's **pump curves** ~~graphs~~ shall be required for all lift stations. When requested, design calculations shall also be submitted for other facets of projects.

Section B - Reference Manuals

1. The design and construction of sanitary sewers and pump stations shall conform to the practices and methods set forth in the following manuals:

   a) ~~ASCE*~~ **American Society of Civil Engineers** Manual of Engineering No. 37
   b) Wastewater Engineering, Medcalf & Eddy
   c) Uniform Plumbing Code, current approved edition

2. Requirements set forth in this Design Criteria shall prevail over practices set forth in above manuals.

3. Refer to County of Santa Cruz Sanitation Districts. **Master** Specifications ~~for Construction of, Sanitary Sewer Improvement Project (current edition)~~ for additional requirements relating to sewer construction procedures, class of pipe, pipe deformation, laterals, manholes, cleanouts, trench backfill, paving, lift stations, line cleaning, testing and videotaping and other design criteria.

Section C - Design Flow Rates

1. Design flow rate shall be the peak flow rate, including infiltration and storm water inflow of the total ultimate tributary area.

formula, using a roughness coefficient, "n," of 0.0 13, or the pipe manufacturer's recommendation, whichever is greater.

3. Sanitary sewers shall be designed and sized for the following depths of flow: pipes ~~30.48cm~~ 300 **mm** (12") in diameter and less, at ~~½~~ **1/2** full; and pipes greater than 300 **mm** (12") in diameter, at 3/4 full.

4. **The minimum pipe diameter shall be** ~~15.24cm (6")~~ **200 mm (8")** ~~shall be the minimum pipe diameter~~ for public collector lines.

5. ~~Sanitary sewer systems shall be designed to provide a velocity of 0.762 m/s (2.5 fps) at 50 percent of design flow~~. Velocity shall be restricted to 4.6 m/s (15 fps) maximum, unless special pipe or controls have been approved. Design depth of flow shall not exceed those standards established in paragraph 3 above. The use of pipe slopes less than ~~1.0%~~ 2.0% for all new construction must have variance approval by **the Sanitation Engineer** ~~District staff~~, and will only be allowed where a greater slope is not physically possible.

6. Minimum pipe cover:

~~Trunk sewer . . . . . 2.44cm (8')~~

Public ~~Main~~ sewer . . . . . 1.5m (5')

Laterals . . . . . .0.9m (3')

Prior to initiating any grading in the vicinity of any existing public sewers where the above required minimum depths of cover cannot be assured, the contractor shall be required to assume any costs in determining the existing condition of the sanitary sewers in the affected area. In the case of **locating** laterals, this would require video taping the **sewer main** ~~line(s)~~, pursuant to District specifications, if an existing tape is not already on record with the District.

7. Manholes shall be provided at intervals not greater than ~~121.92m~~ 120 **m (400')** for ~~15.24cm (6") and 20.32cm~~ 200 **mm** (8") lines, ~~152.4m~~ 150 **m (500')** for **250**

mm (10") and larger lines, and at all changes in horizontal or vertical alignment. **Manhole covers shall have closed pickholes.** Horizontal interior angles between incoming and outgoing lines shall not be less than 90 degrees. Manhole depth shall not exceed **6.1 m** ~~(25~~ **20')** ~~feet~~ **without written approval of the Sanitation Engineer.** Water-tight covers shall be installed at all manhole and cleanout locations where storm water inflow could otherwise enter the sewer. **Slurry dams shall be installed around the upstream and downstream lines connected to the manhole. The dimensions of the slurry dam shall be 6 m (2 feet) thick and the height and width shall be as wide and as deep as the manhole.** Manholes and cleanouts shall not be located within any drainage ~~swales~~, valleys, channels or gutter lines.

8. ~~Sewers shall provide 60.96cm (2') vertical and 3.05m (10') horizontal clearance from water lines, and shall cross such lines as nearly as possible to 90°. Refer to water company standards in such cases.~~ **Sewer mains shall conform to current State of California, Department of Health Services, criteria regarding separation between sewer and water mains.**

9. Drop manhole connections shall require prior approval and be allowed only if a standard manhole connection is shown to be infeasible. **Refer to Figure SS-6 for details.** Drop manhole connections may be used **only** where the difference in invert elevations at manholes exceeds ~~60.96cm (24")~~ **1.8 m (6') .**

10. Cul-de-sac manholes (see **Figure SS-7)** shall be **installed at** ~~used on~~ the end of all lines where more than one building connection could be made, and where it would not be feasible to extend the line any further.

11. ~~A metering manhole shall be constructed and flow meter provided by all developments containing 30 or more building sites at a location to be designated by the District. Larger developments sewering to more than one basin may be required to provide additional manholes and meters. The metering manhole shall consist of a standard manhole with a cast-in-place "Palmer Bowlus"-type~~

~~flow measuring flume centered in the channel. The meter shall be an approved ultrasonic or "dipper-type" device with compatible data collection capabilities; including spare computer data chip, spare battery, and manhole bracket.~~ **The developer shall deliver, to the Sanitation Engineer, flow metering or odor control equipment that is required for any development containing 30 or more equivalent dwelling units. Equipment shall be specified at time of development review. Upon approval by the Sanitation Engineer, a payment of $7,500 may be made to the District'in lieu of delivering the required equipment.**

12. For new commercial developments, an **industrial waste sampling** ~~monitoring~~ manhole shall be constructed **either on or off site,** as part of the ~~on-site~~ sewer system if any building or its dischargers will be used for industrial purposes. Details and specifications for each **industrial waste sampling** ~~metering~~ manhole, ~~flow meter and monitoring manhole~~ shall be approved by the **Sanitation Engineer during development review** ~~District~~.

13. Anti-backflow check **and/or** sewer relief valves shall be provided in all service connections in which the finished floor elevation is less than 300 **mm** ~~30.48cm~~ (1') above the next ~~adjacent~~ upstream manhole or **cleanout cover** ~~or bypass invert elevation~~. The valves shall be located in such a way as to prevent damage to adjacent property as a result of sewage released through the device (see Fig. SS-14). Sewer relief-type overflow valves shall not be placed in ~~Christy or yard type boxes~~ **any structure that would hamper the free discharge of sewage.**

Section E - Sewer Easement Requirements

1. Easements shall be provided for all District- maintained sewers, ~~with the~~ except& **where located** ~~of sewers to be placed~~ in rights-of-way currently maintained by the County. Easements shall also be required wherever necessary to facilitate connections to any future lines or line extensions, to serve adjacent parcels, or to provide access to existing sewers within or adjacent to the

~~215~~

k) Grading & paving details for driveway construction (for access to easement sewers) 478

l) Portions of lines to be publicly or privately maintained

m) Datum from which elevations are established

n) Sanitation District's "Standard Notes for Development."

2. Standard details and material specifications will be provided by the District Engineer.

3. Condominium, townhouse and cluster development sewer systems shall be designed according to these District criteria, and as noted on Figure SS-3, although such systems shall be operated and maintained by their homeowners' association. Specific reference to sanitary sewer maintenance and operation shall be included in the C.C. & R.'s for all such developments.

Section G - Lift Stations

1. Refer to Section C regarding design flow rates for District-maintained lift stations and private stations serving multiple units.

2. Refer to Figures SS-8 and SS-9 for minimum design standards for all such lift stations. The **design and** location of all lift stations shall be subject to the approval of the District. Where necessary, additional right-of-way shall be set aside within the development for such stations.

3. Lift stations shall be designed to provide for the following minimum forcemain diameters and flow velocities unless otherwise specified by the District:

District-Maintained Stn.
~~10.16 (4") F.M. @ 1.22m/s (4) FPS~~
100 mm (4") F.M. @ 1.2 m/s (4 fps)

Private Multi-Residential Stn.
~~7.62cm (3") F.M. @ 0.914m/s (3) FPS~~

75 **mm (3") F.M. @ 0.9 m/s (3 fps)**

4. Private residential pump stations shall conform to the provisions of Fig. SS- 13 **and to the Uniform Plumbing Code.** Their location shall be included on the plot plan of the building permit application, together with a complete list of all equipment (including pump curves) and accessories that are to be installed.

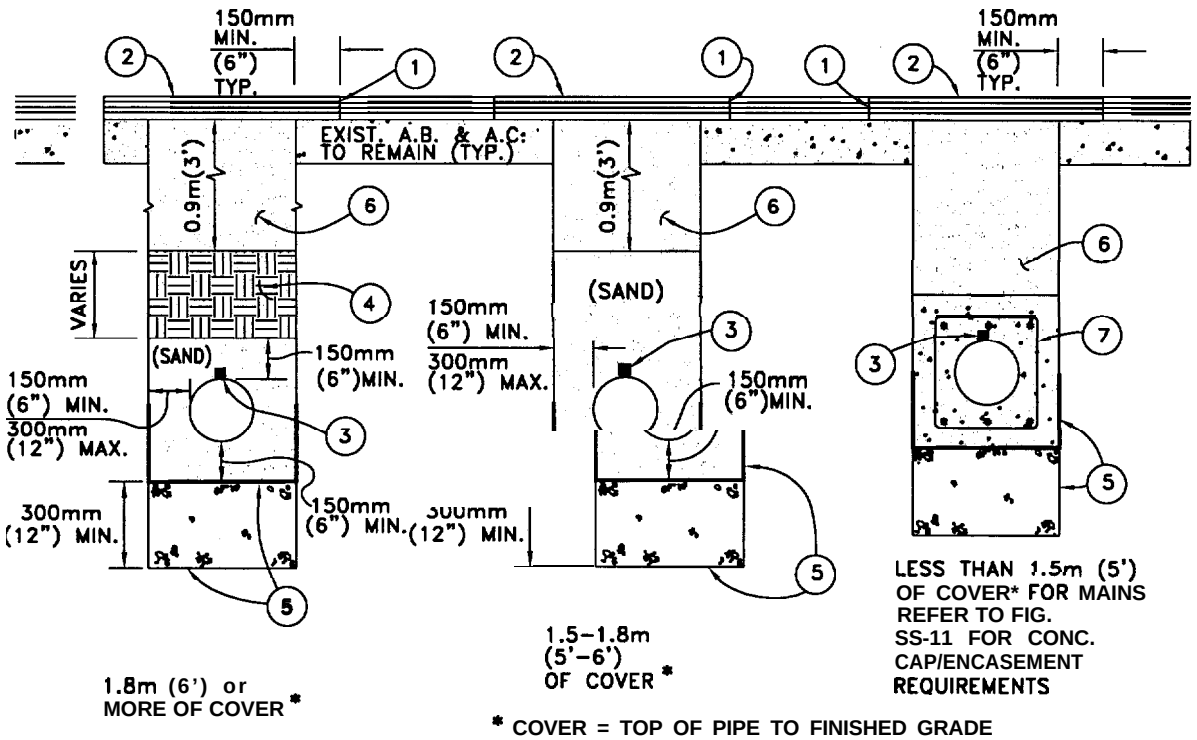
5. A **permanently installed** standby engine-generator set, capable of automatically running both pump motors simultaneously at maximum load during power outages, shall be provided to the District for each new public lift station. The District shall ~~specify whether a given facility shall require either trailer-mounted or fixed installation set~~ **specify criteria.**

6. Shop drawings (3 sets) of all lift station equipment shall be submitted to the Sanitation Engineering ~~Division~~ for review and approval prior to accepting the delivery of any such equipment.

Section H - Construction Standards

1. Reference is made to the County of Santa Cruz Sanitation Districts **master** specifications ~~for Construction of Sanitary Sewer Improvement Project,~~ which are hereby incorporated into this criteria, and which sets forth the required special provisions for sanitary sewer work on all projects covered by this criteria.

2. In order to allow for more reliable future location of existing sewer lines and laterals, ~~magnetic location marker tape~~ **insulated 10 gauge copper wire** shall be ~~buried~~ **attached to the top of** ~~above~~ new sewers ~~where so specified (including all easement sewers),~~ and over those new sewer laterals which are constructed in the public right-of-way or sewer easement, ~~as per~~ (**see** Fig. SS-2A, SS-2B and SS-12). **Wire shall be brought up from outside of manhole, under manhole cover frame and make an easily accessible loop within manhole.**



* COVER = TOP OF PIPE TO FINISHED GRADE

ITEM	DESCRIPTION
1	Cut A.C. as shown to produce a straight face against which to butt trench pavement.
2	PAVED ROADS – Minimum 50mm (2") Type B A.C. or replace In klnd if more than minimum. TRENCHES SKEWED over 15° from perpendicular to public roads shall have 200mm (8") of four-sack concrete under 50mm (2") of Type B A.C.
3	Locating Wire: #10 insulated copper wire shall be tied to all sewer lines and run up into all connecting structures for locating access. For manholes, place wire under manhole cover frame and moke on easily accessible loop within manhole.
4	Structural backfill, minimum 95% R.C. [maximum 600mm (24") lifts] or sand/cement slurry as directed by the Engineer.
5	Select drainrock and approved filter fabric is required as "extra work" where soil or ground water conditions are encountered during construction or where it has been specified on the project plans.
6	0.9m (3') of two-sock cement/sand slurry backfill required on any cross trenching for new sewer lateral connections or repairs, or excavations for manholes, cleanouts. or other structures on sanitary sewer mains within the County-maintained road right-of-way.
7	Refer to Fig. SS-11 for concrete encasement.

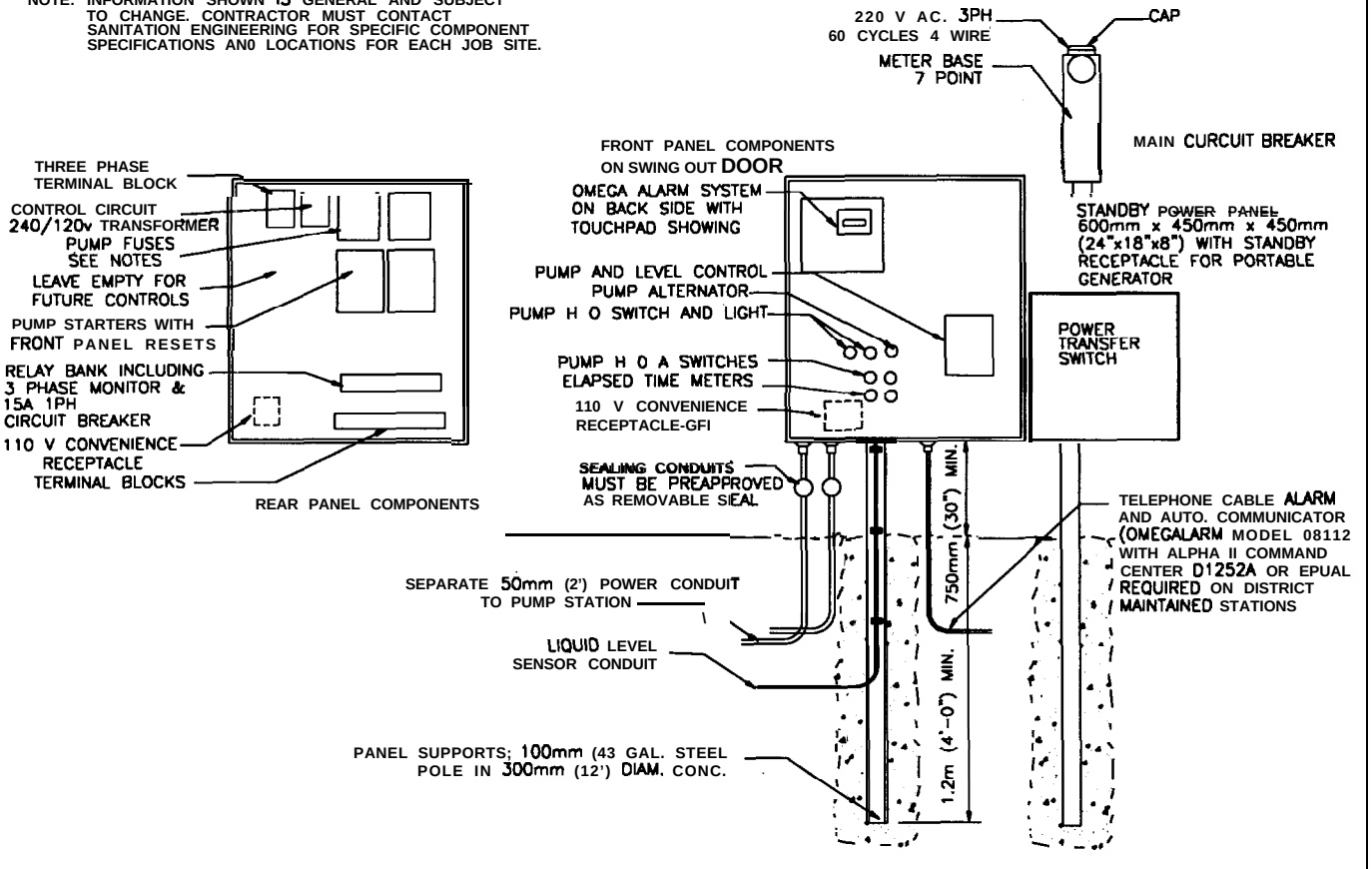
NOTES:

1. All publicly-maintained sewers or private lines shall be laid with approved controls. Following cleaning and testing, public sewers (or private sewers at the discretion of the Public Works Inspector) shall be T.V.'d with V.H.S. color tape after slurry encasement in the pipe zone prior to final slurry backfill paving and acceptance by District.
2. In non-paved, non-County maintained sewer right-of-way area, minimum 90% R.C. for backfill.
3. In paved, non-county maintained right-of-way. minimum 95% R.C. for top 1.5m (5') of backfill, or slurry backfill.
4. In non-paved, County maintained right-of-woy, minimum 95% R.C. for top 1.5m (5) of backfill.

SANITARY SEWER STANDARD
CROSS TRENCH BACKFILL FOR
LATERALS OR SEWER STRUCTURES
FIG. SS–2B

REV. 9-98

NOTE: INFORMATION SHOWN IS GENERAL AND SUBJECT TO CHANGE. CONTRACTOR MUST CONTACT SANITATION ENGINEERING FOR SPECIFIC COMPONENT SPECIFICATIONS AN0 LOCATIONS FOR EACH JOB SITE.



CONTROL PANEL

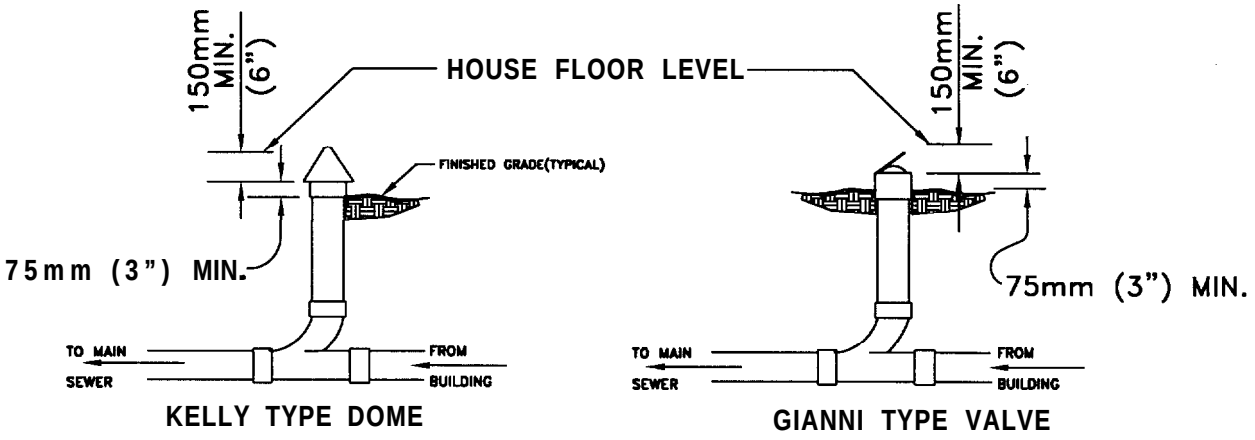
MAIN PANEL: 900mm x 750mm x 300mm (36" x 30' x 12") w/ BACK PANEL AND 14 GA. LOCKING MID PANEL DOOR AND LOCKING FRONT DOOR. NEMA 4 STYLE

NOTES:

1. Pumps for District maintained stotions shall depend on flows. Typical large pumps shall be either WEMCO 4x11 ESR pumps, or PACO lift-type QD 4x4x9-1/2 pumps. Typical small pumps shall be WEMCO 4x11 ESR pumps, or PACO lift-type QD 4x4x9-1/2 pumps. Typical small pumps shall be minimum 3 hp Barnes, Hydromotic or other Grinder pumps. All pumps to be 3 phase, 230 volt. Plon submittols shall include hydraulic design calculations and all pertinent pump dato, curves and shop drowings for District Review.
2. The lift stotion shall be located within the sidewalk area, out of ony roadways or driveways. and accessible by District maintenance vehicles ond personnel. The control ponel shall be located within the immediate vicinity of the station.
3. Explosion-proof unions with water-tight cable connectors.
4. Minimum 50mm (2") conduit for motor wiring.
5. All liquid level sensor conduit within the wet well shall be Schedule 80, 25mm (1" PVC) pipe.
6. The contractor shall coordinate connection ond testing of auto communicator with the District.
7. The contractor shall coordinate the location and installation of the stondby generator with the District. In those cases where generator is installed with stotion. auxiliary power shall be tied directly into the control panel.
8. Fuses: Provide 125% of Full Load Amps. Fuses shall be Bussmann or approved equol. Type LP-CC fuses in Optima type fuse holder(includes on/off switch)
9. Provide opproved ground rod connection.

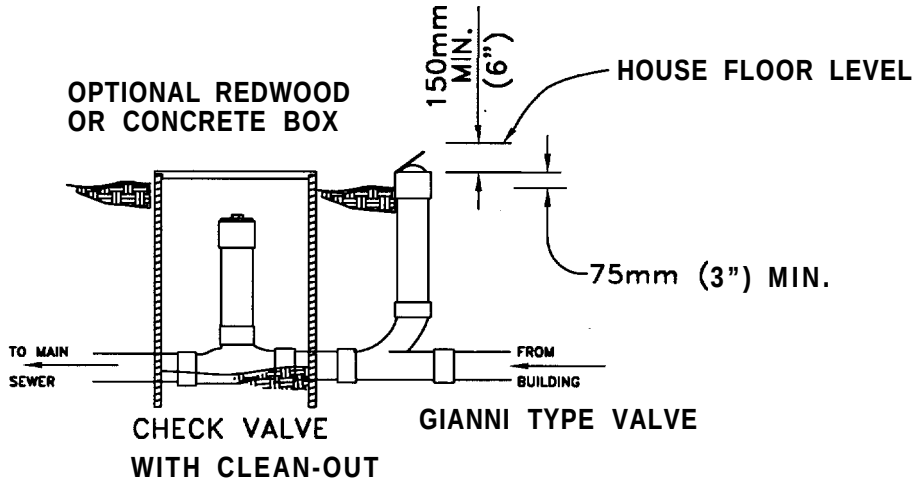
Rev. 10/98

LIFT STATION
FIGURE SS-9



BACKWATER OVERFLOW DEVICES

OPTIONAL FOR EXISTING SYSTEMS ONLY



BACKWATER CHECK VALVE AND GIANNI SYSTEM

REQUIRED FOR NEW INSTALLATIONS
PREFERRED BUT OPTIONAL FOR EXISTING INSTALLATIONS

NOTES:

1. AN OVERFLOW SYSTEM IS REQUIRED AND SHALL BE INSTALLED PER SANITATION DISTRICT ORDINANCE WHERE THE FINISHED FLOOR ELEVATION OF THE BUILDING TO BE CONNECTED IS LESS THAN 0.3m (1') ABOVE THE RIM OF THE NEAREST UPSTREAM MANHOLE. OR RIM FLUSHING INLET, OR WHERE SEWER LATERAL HAS NOT BEEN CONSTRUCTED PER DESIGN CRITERIA REQUIREMENTS.
2. INSPECTION OF THE BACKWATER DEVICE SHALL BE MADE AFTER THE FINAL GRADING AROUND THE BUILDING IS COMPLETED. THE BACKWATER DEVICE SHALL BE AS DETAILED, OR AN APPROVED EQUAL.
3. CONSIDERATION MUST BE GIVEN TO THE DAMAGE POTENTIAL TO ADJACENT PROPERTY BY SEWAGE RELEASED THROUGH THE BACKWATER DEVICE.
4. KELLY OR GIANNI TYPE VALVES SHALL NOT BE INSTALLED INSIDE A BOX IN ANY WAY.

REV. 9-98

BACKFLOW PREVENTIVE DEVICES

FIG. SS-14

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December 14, 1998

County of Santa Cruz Board of Supervisors
701 Ocean Street
Santa Cruz, CA. 95060

Members of the Board:

Re: County road design criteria.

Changing minimum culvert size from 12" to 18" may have substantial impacts which should be considered.

The depth of the ditches would have to increase at least nine inches, which would increase hazards to'the public. It may add to slope instability. It moy increase water infiltration into underlying materiel which could lead to down slope Failure. It may increase ponding along roodsides. It would increaserreaoonce use by at leaat 30%.

Improving inlet structures end establishing beck-up systems for culvert blockage should be the foucus; not enlarging culverts.

It is imperative that we develop guideline= which will work toward reducing our resource consumption, rather than increasing it where it is not neceeeery.

Sincerely,

Howard Liebenberg

Howard Liebenberg
P.O.Box 190
Felton, CA. 95018

c.c. Planning Department
c.c. Couty Councel

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